



Service Manual

MODEL: ACZEM4H4R09/ACZCI4H4R09
ACZEM4C4R12/ACZCI4C4R12
ACZEM4H4R12/ACZCI4H4R12
(Refrigerant R410A)

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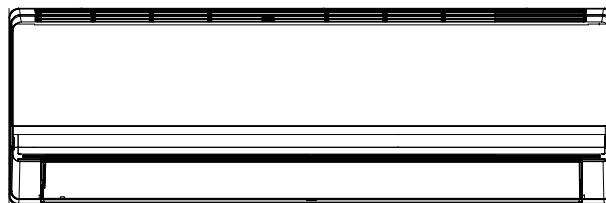
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Part I : Technical Information

1. Summary

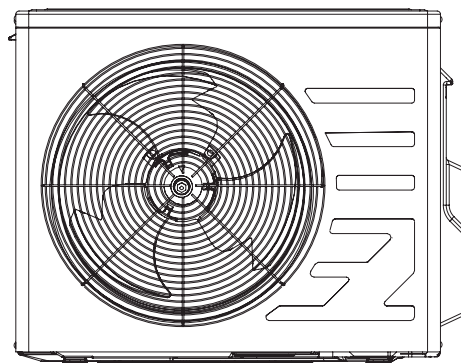
Indoor Unit:

ACZEM4H4R09
ACZEM4C4R12
ACZEM4H4R12



Outdoor Unit:

ACZCI4H4R09
ACZCI4C4R12
ACZCI4H4R12



Remote Controller:

YX1FF



2. Specifications

2.1 Specification Sheet

Model			ACZEM4H4R09/ACZCI4H4R09
Product Code			CB162008200_L14385
Power Supply	Rated Voltage	V~	208/230
	Rated Frequency	Hz	60
	Phases		1
Power Supply Mode			Outdoor
Cooling Capacity (Min~Max)		Btu/h	9000(5000~11300)
Heating Capacity (Min~Max)		Btu/h	9550(5300~12000)
Cooling Power Input (Min~Max)		W	950(375~1300)
Heating Power Input (Min~Max)		W	800(300~1350)
Cooling Current Input		A	4.0
Heating Current Input		A	3.5
Rated Input		W	1800
Rated Current		A	9.0
Air Flow Volume (SH/H/M/L/SL)		CMF	306/277/253/218/-
Dehumidifying Volume		Pint/h	1.69
EER		(Btu/h)/W	9.47
COP		(Btu/h)/W	11.94
SEER			15
HSPF			8.5
Application Area		m ²	12-18
Indoor Unit	Indoor Unit Model		ACZEM4H4R09
	Indoor Unit Product Code		CB162N08200_L14385
	Fan Type		Cross-flow
	Fan Diameter Length (DXL)	inch	3 5/8X25 2/5
	Cooling Speed (SH/H/M/L/SL)	r/min	1260/1100/950/750/-
	Heating Speed (SH/H/M/L/SL)	r/min	1320/1200/1100/950/-
	Fan Motor Power Output	W	20
	Fan Motor RLA	A	0.20
	Fan Motor Capacitor	μF	1
	Evaporator Form		Aluminum Fin-copper Tube
	Evaporator Pipe Diameter	inch	Φ2/7
	Evaporator Row-fin Gap	inch	2-1/18
	Evaporator Coil Length (LXDXW)	inch	25 2/5 X 1X 10 1/2
	Swing Motor Model		MP24AA
	Swing Motor Power Output	W	2
	Fuse Current	A	3.15
	Sound Pressure Level (SH/H/M/L/SL)	dB (A)	43/40/37/34/-
	Sound Power Level (SH/H/M/L/SL)	dB (A)	53/50/47/44/-
	Dimension (WXHxD)	inch	33 1/4X10 5/6X7
	Dimension of Carton Box (LXWXH)	inch	36X10X14
	Dimension of Package (LXWXH)	inch	36 1/7X10 1/6X14 4/7
	Net Weight	lb	19.8
	Gross Weight	lb	26.5

Note: The connection pipe applies metric diameter.

Model			ACZEM4C4R12/ACZCI4C4R12	ACZEM4H4R12/ACZCI4H4R12
Product Code			CB162008700_L17107	CB162008100_L14385
Power Supply	Rated Voltage	V~	208/230	208/230
	Rated Frequency	Hz	60	60
	Phases		1	1
Power Supply Mode			Outdoor	Outdoor
Cooling Capacity (Min~Max)		Btu/h	12000(5300~12500)	12000(5300~12500)
Heating Capacity (Min~Max)		Btu/h	/	13000(5500~13500)
Cooling Power Input (Min~Max)		W	1300(550~1350)	1300(550~1350)
Heating Power Input (Min~Max)		W	/	1250(500~1500)
Cooling Current Input		A	6.0	6.0
Heating Current Input		A	/	5.5
Rated Input		W	1800	1800
Rated Current		A	9.0	9.0
Air Flow Volume (SH/H/M/L/SL)		CMF	335/277/253/218/-	335/277/253/218/-
Dehumidifying Volume		Pint/h	2.96	2.96
EER		(Btu/h)/W	9.23	9.23
COP		(Btu/h)/W	/	10.04
SEER			15	15
HSPF			/	8.5
Application Area		m ²	16-24	16-24
Indoor Unit	Indoor Unit Model		ACZEM4C4R12	ACZEM4H4R12
	Indoor Unit Product Code		CB162N08700_L17107	CB162N08100_L14385
	Fan Type		Cross-flow	Cross-flow
	Fan Diameter Length (DXL)		inch Φ3 5/8X25 2/5	Φ3 5/8X25 2/5
	Cooling Speed (SH/H/M/L/SL)		r/min 1330/1100/950/750/-	1330/1100/950/750/-
	Heating Speed (SH/H/M/L/SL)		r/min /	1350/1170/1050/950/-
	Fan Motor Power Output		W 20	20
	Fan Motor RLA		A 0.20	0.20
	Fan Motor Capacitor		μF 1	1
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Evaporator Pipe Diameter		inch Φ2/7	Φ2/7
	Evaporator Row-fin Gap		inch 2-1/18	2-1/18
	Evaporator Coil Length (LXDXW)		inch 25 2/5 X1X10 1/2	25 2/5 X 1X10 1/2
	Swing Motor Model		MP24AA	MP24AA
	Swing Motor Power Output		W 2	2
	Fuse Current		A 3.15	3.15
	Sound Pressure Level (SH/H/M/L/SL)		dB (A) 44/42/39/36/-	44/42/39/36/-
	Sound Power Level (SH/H/M/L/SL)		dB (A) 54/52/49/46/-	54/52/49/46/-
	Dimension (WXHDX)		inch 33 1/4X10 5/6X7	33 1/4X10 5/6X7
	Dimension of Carton Box (LXWXH)		inch 36X10X14	36X10X14
	Dimension of Package (LXWXH)		inch 36 1/7X10 1/6X14 4/7	36 1/7X10 1/6X14 4/7
	Net Weight		lb 20.9	20.9
	Gross Weight		lb 25.4	27.6

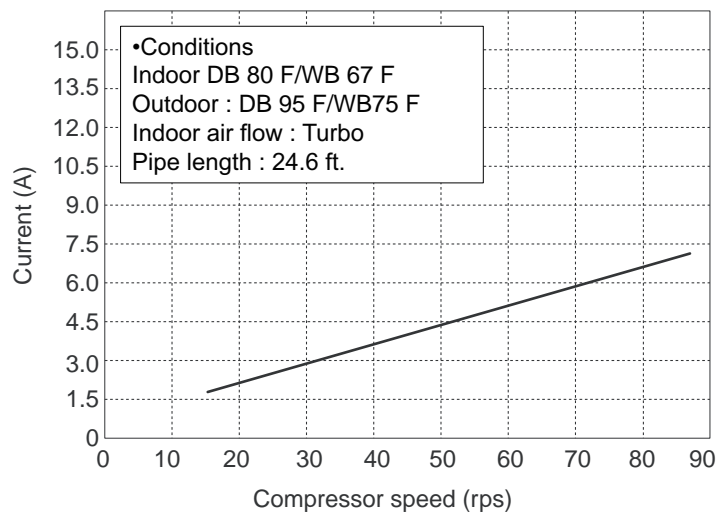
Outdoor Unit	Outdoor Unit Model		ACZCI4C4R12	ACZCI4H4R12
	Outdoor Unit Product Code		CB145W04500_L17107	CB145W04600_L14385
	Compressor Manufacturer		ZHUHAI LANDA COMPRESSOR CO.,LTD	ZHUHAI LANDA COMPRESSOR CO.,LTD
	Compressor Model		QXA-A091zE190A(GREE)	QXA-A091zE190A(GREE)
	Compressor Oil		FVC 68D or RB 68EP	FVC 68D or RB 68EP
	Compressor Type		Rotary	Rotary
	Compressor LRA.	A	/	/
	Compressor RLA	A	7.30	7.30
	Compressor Power Input	W	942	942
	Compressor Overload Protector		1NT11L-6233HPC115/95U1 KSD115°C	1NT11L-6233HPC115/95U1 KSD115°C
	Throttling Method		Capillary	Capillary
	Set Temperature Range	°F	61~86	61~86
	Cooling Operation Ambient Temperature Range	°F	64~109	64~109
	Heating Operation Ambient Temperature Range	°F	/	19~75
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Condenser Pipe Diameter	inch	Φ2/7	Φ2/7
	Condenser Rows-fin Gap	inch	2-1/18	2-1/18
	Condenser Coil Length (LXDXW)	inch	25 1/2X1 1/2X20 4/5	25 1/2X1 1/2X20 4/5
	Fan Motor Speed	rpm	880	880
	Fan Motor Power Output	W	21	21
	Fan Motor RLA	A	0.25	0.25
	Fan Motor Capacitor	μF	2	2
	Outdoor Unit Air Flow Volume	CFM	942	942
	Fan Type		Axial-flow	Axial-flow
	Fan Diameter	inch	Φ14 3/5	Φ14 3/5
	Defrosting Method		/	Automatic Defrosting
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IP24	IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
	Sound Pressure Level (H/M/L)	dB(A)	53/-/-	53/-/-
	Sound Power Level (H/M/L)	dB(A)	63/-/-	63/-/-
	Dimension (WXHXD)	inch	28X21 2/3X12 1/2	28X21 2/3X12 1/2
	Dimension of Carton Box (LXWXH)	inch	30 1/3X13 5/7X23 1/3	30 1/3X13 5/7X23 1/3
	Dimension of Package (LXWXH)	inch	30 1/2X13 5/6X23 8/9	30 1/2X13 5/6X23 8/9
	Net Weight	lb	65	66.2
	Gross Weight	lb	69.5	70.6
	Refrigerant		R410A	R410A
	Refrigerant Charge	oz	35.3	35.3
Connection Pipe	Connection Pipe Length	ft	24.6	24.6
	Connection Pipe Gas Additional Charge	oz/ft.	0.2	0.2
	Outer Diameter Liquid Pipe	inch	1/4	1/4
	Outer Diameter Gas Pipe	inch	3/8	3/8
	Max Distance Height	ft	32.8	32.8
	Max Distance Length	ft	65.6	65.6

Note: The connection pipe applies metric diameter.

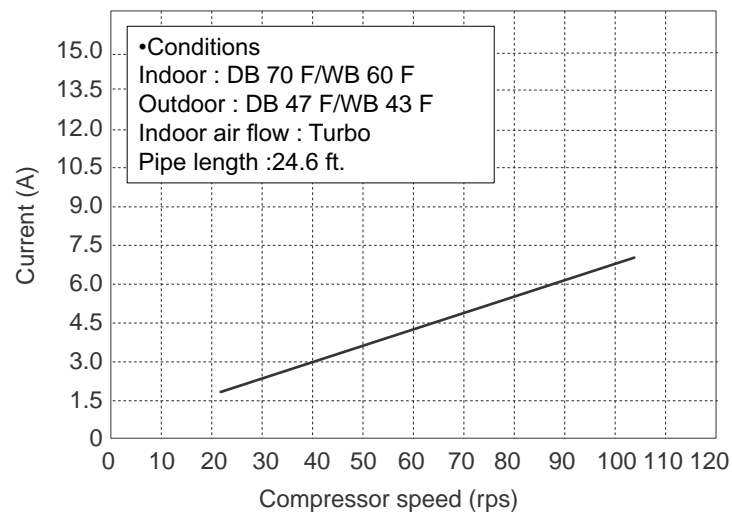
The above data is subject to change without notice. Please refer to the nameplate of the unit.

2.2 Operation Characteristic Curve

Cooling

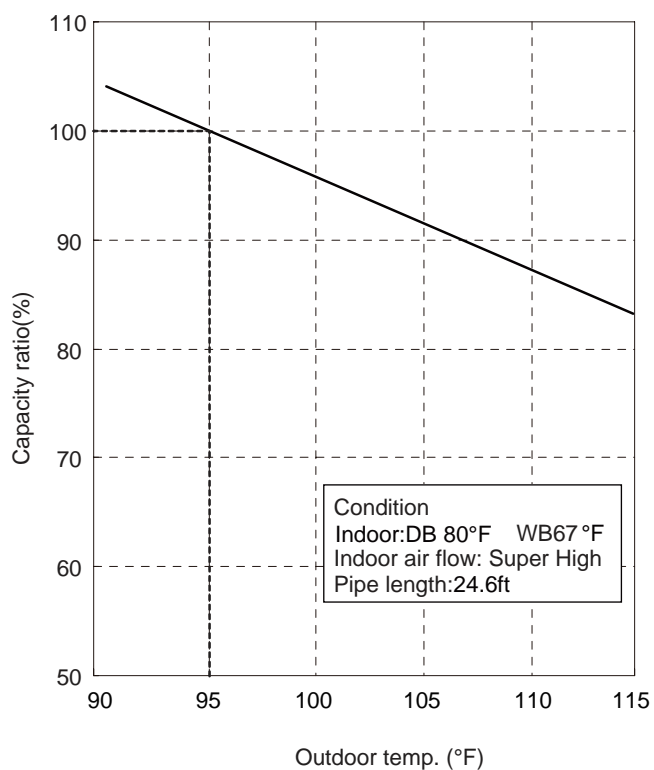


Heating

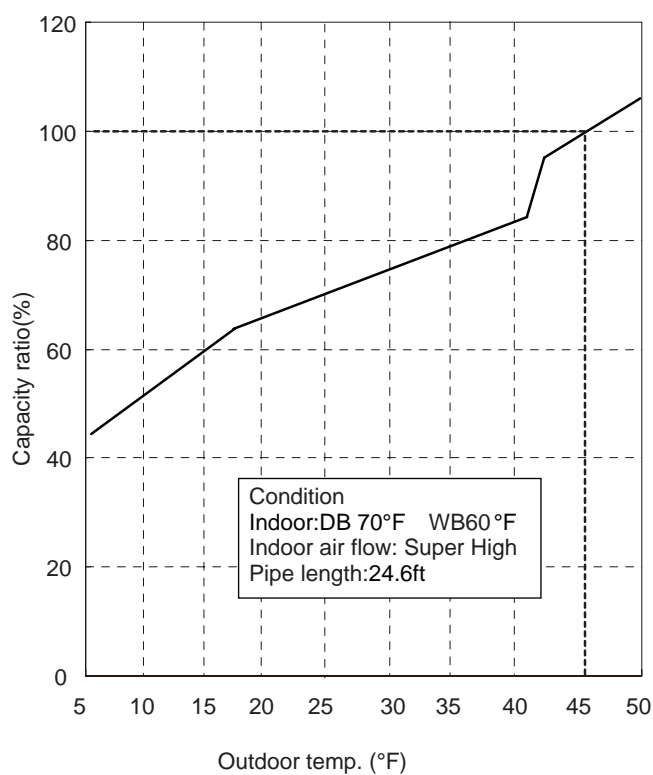


2.3 Capacity Variation Ratio According to Temperature

Cooling



Heating



2.4 Cooling and Heating Data Sheet in Rated Frequency

Cooling

Rated cooling condition(°F) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor frequency (Hz)
Indoor	Outdoor		P (MPa)	T1 (°F)	T2 (°F)			
80/67	95/75	ACZEM4H4R09/ACZCI4H4R09	0.9 to 1.1	54 to 57	158 to 104	Super High	High	56
27/19	35/24	ACZEM4C4R12/ACZCI4C4R12 ACZEM4H4R12/ACZCI4H4R12	0.9 to 1.1	54 to 57	158 to 104	Super High	High	79

Heating

Rated heating condition(°F) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor frequency (Hz)
Indoor	Outdoor		P (MPa)	T1 (°F)	T2 (°F)			
70/60	47/43	ACZEM4H4R09/ACZCI4H4R09	2.5 to 2.7	158 to 95	36 to 39	Super High	High	58
70/60	47/43	ACZEM4H4R12/ACZCI4H4R12	2.5 to 2.7	158 to 95	36 to 39	Super High	High	75

Instruction:

T1: Inlet and outlet pipe temperature of evaporator

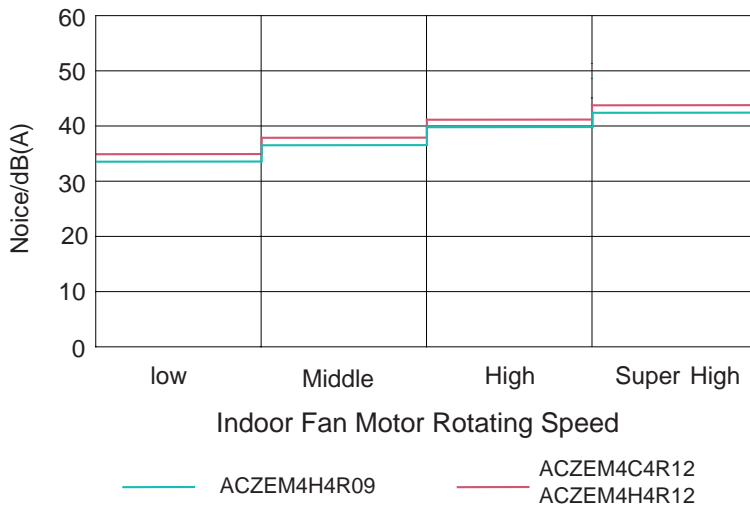
T2: Inlet and outlet pipe temperature of condenser

P: Pressure at the side of big valve

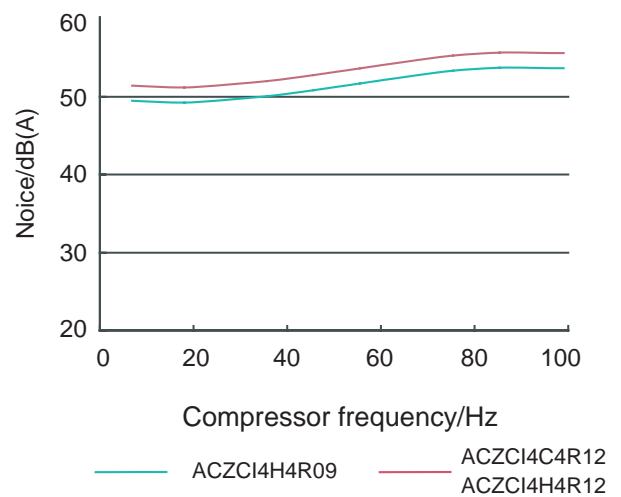
Connection pipe length: 24.6ft.

2.5 Noise Curve

Indoor side noise

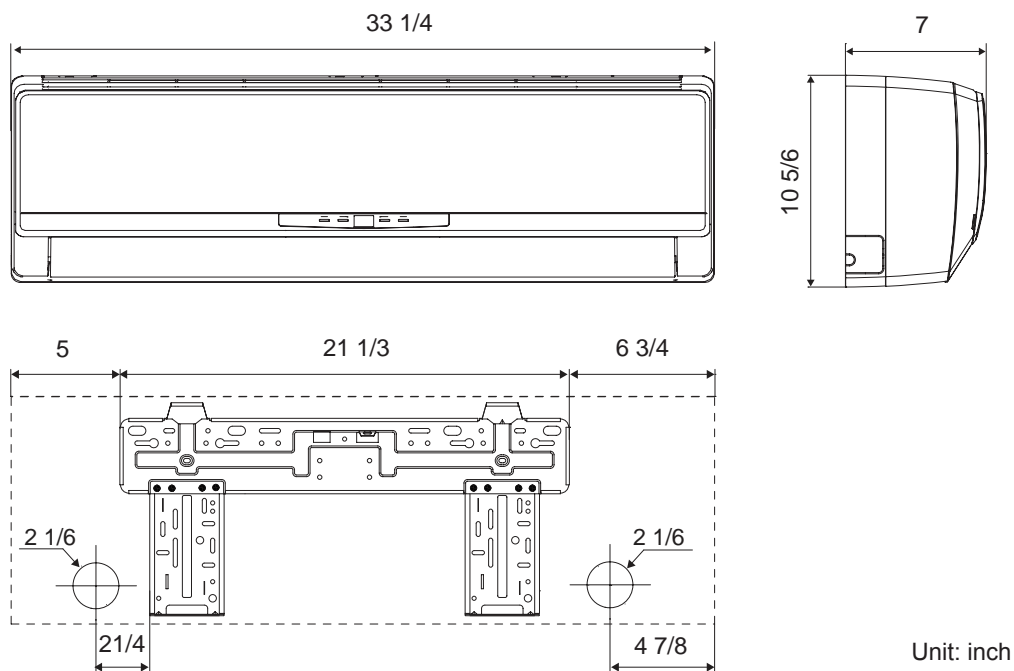


Outdoor side noise

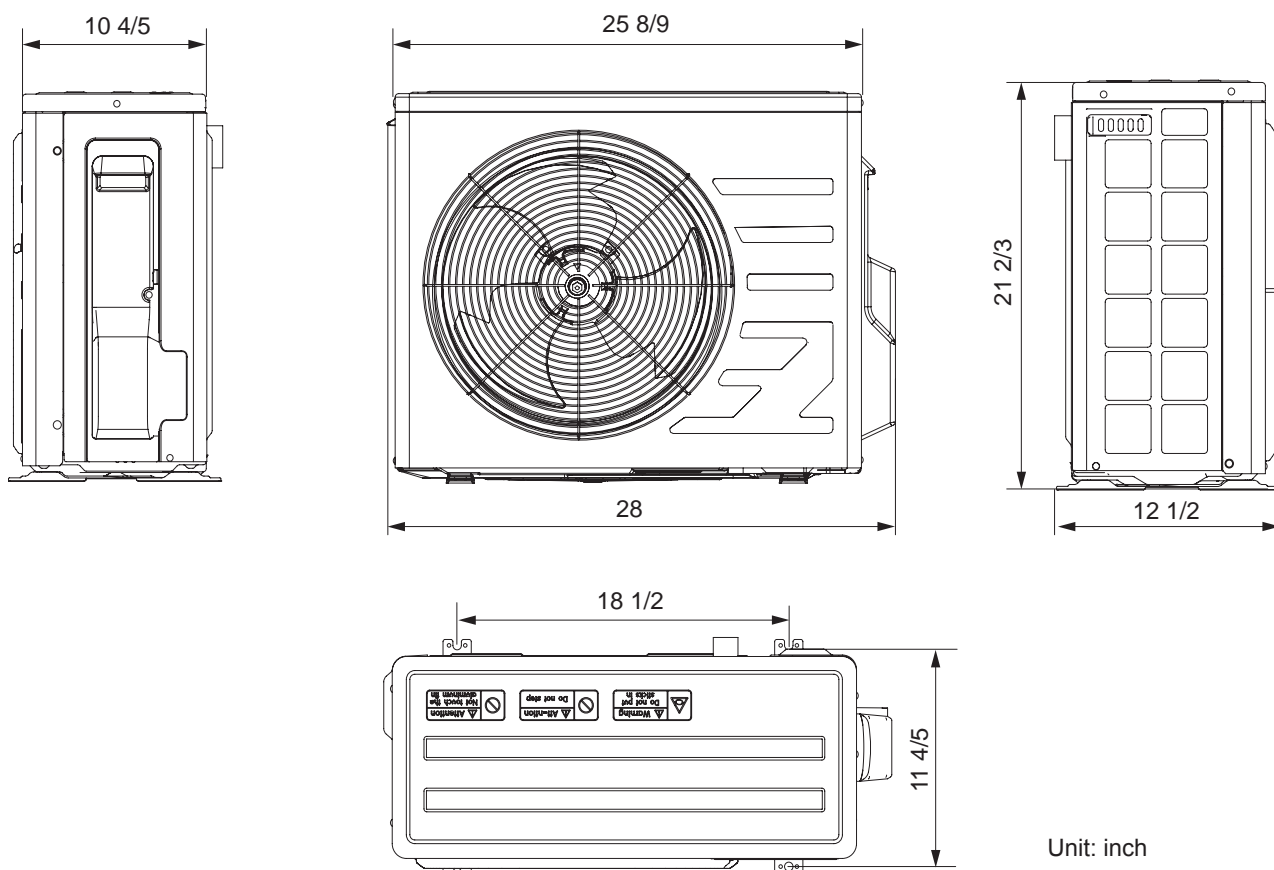


3. Outline Dimension Diagram

3.1 Indoor Unit

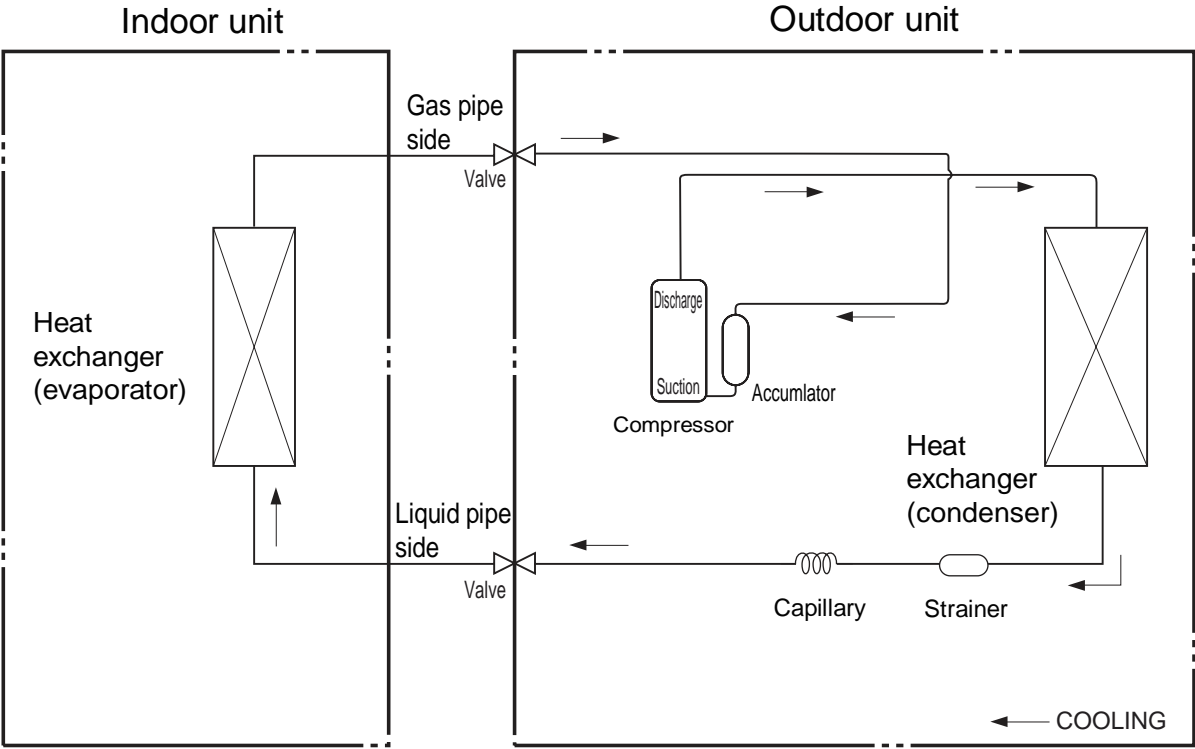


3.2 Outdoor Unit

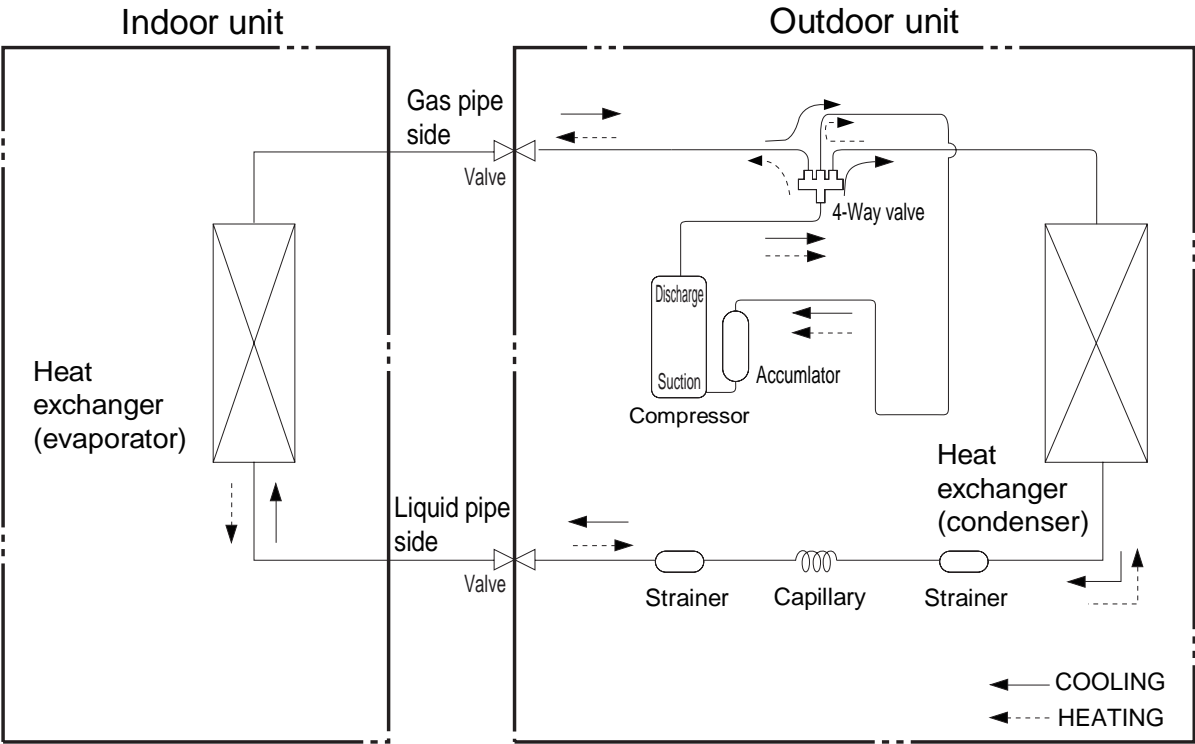


4. Refrigerant System Diagram

Cooling only type



Cooling and heating type



Refrigerant pipe diameter
Liquid : 1/4"
Gas : 3/8"

5. Electrical Part

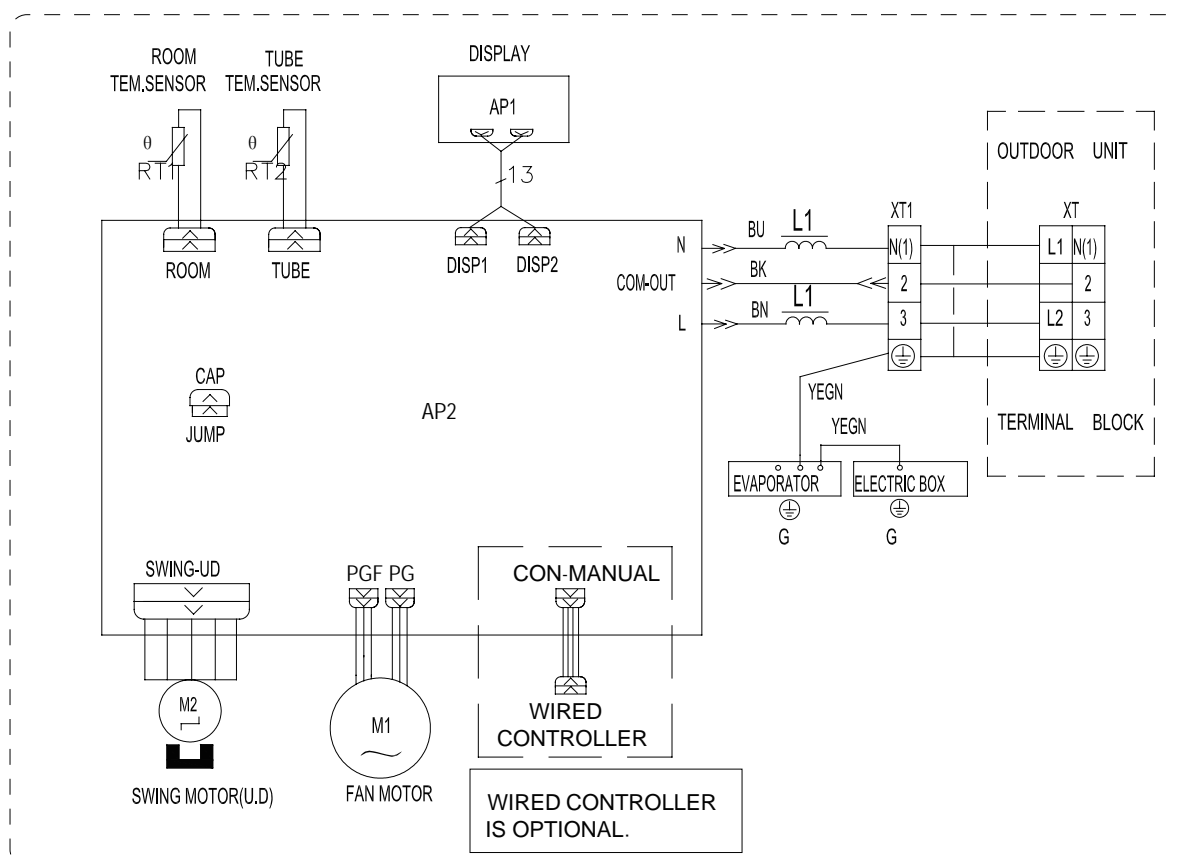
5.1 Wiring Diagram

• Instruction

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

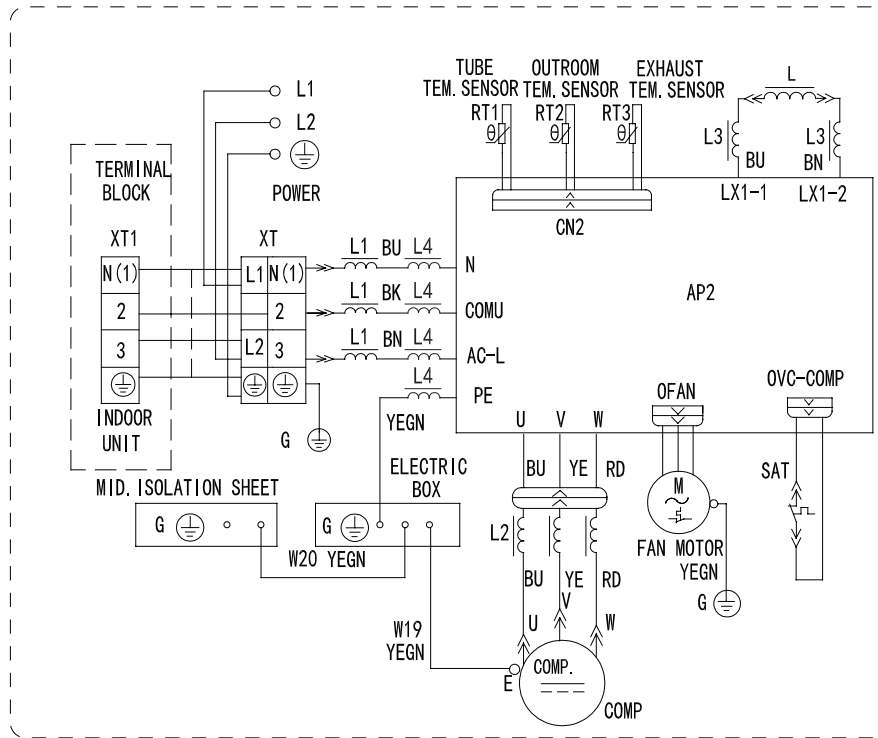
Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

• Indoor Unit

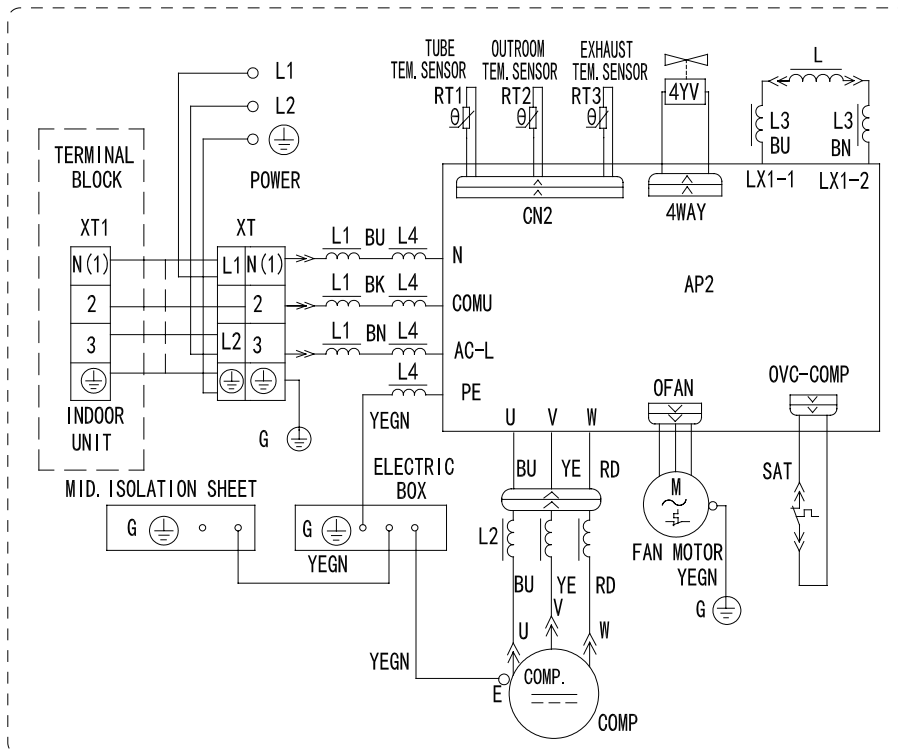


• Outdoor Unit

ACZCI4C4R12



ACZCI4H4R09 ACZCI4H4R12

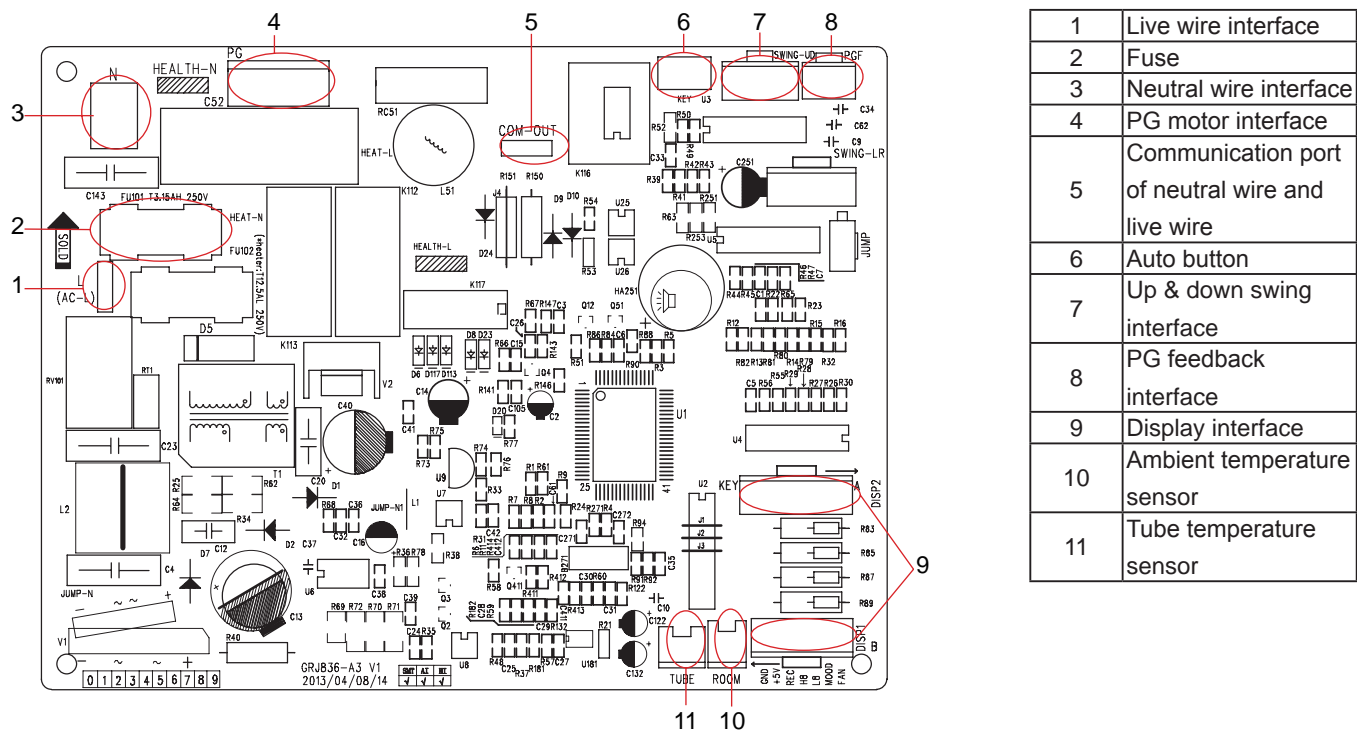


These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

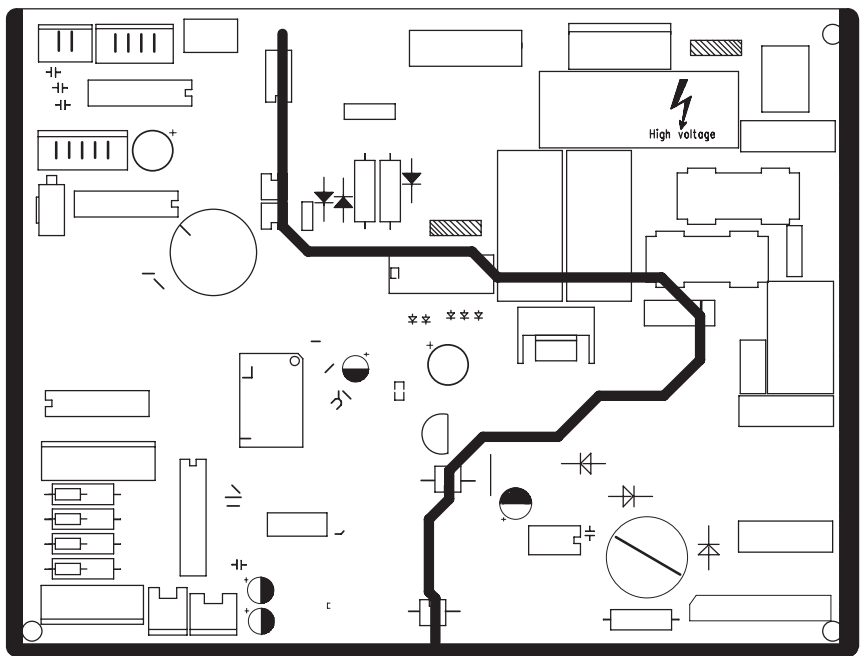
5.2 PCB Printed Diagram

Indoor Unit

• Top view

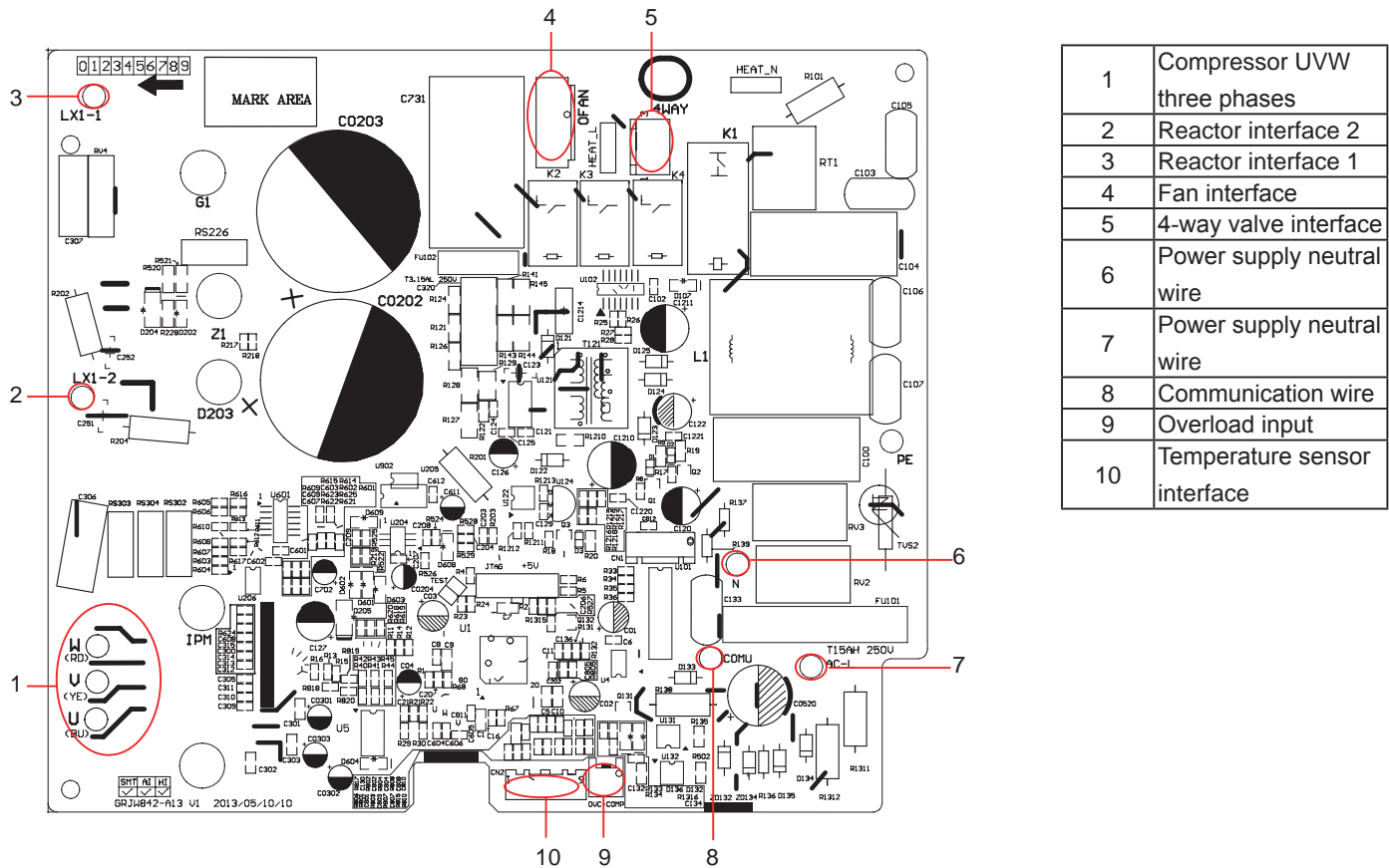


• Bottom view

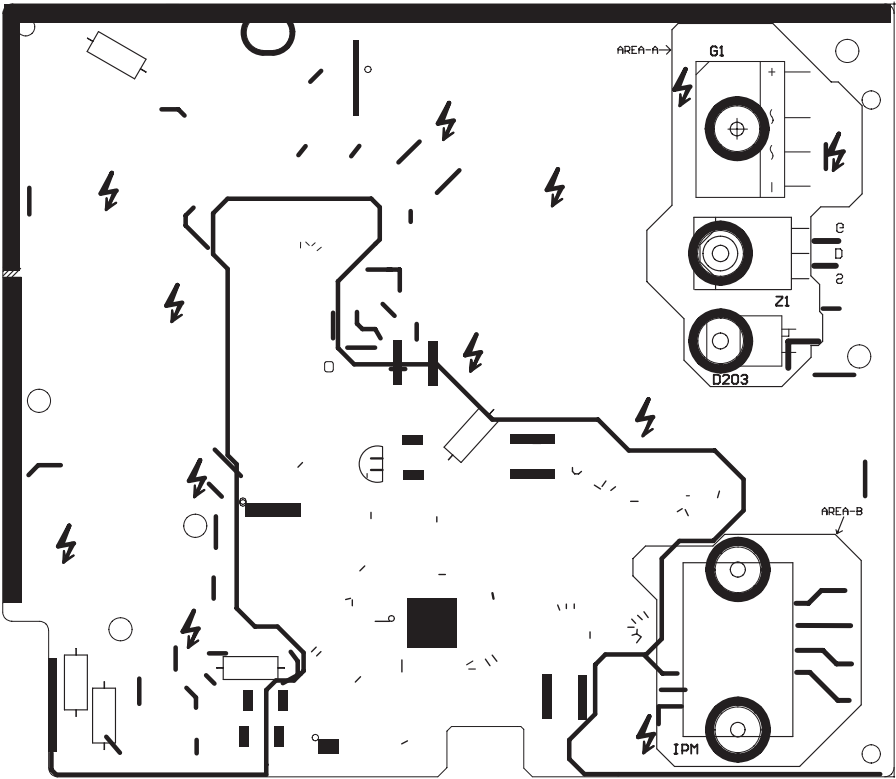


Outdoor Unit

• Top view



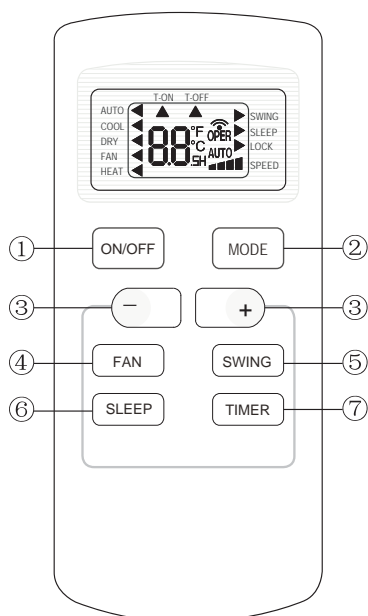
• Bottom view



6. Function and Control

6.1 Remote Controller Introduction

Buttons on Remote Controller



①: **ON/OFF** button

②: **MODE** button

③: **+/-** button

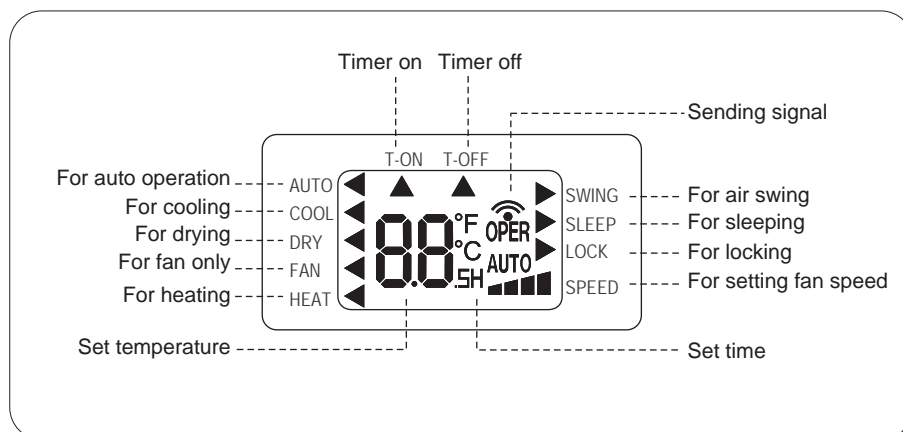
④: **FAN** button

⑤: **SWING** button

⑥: **SLEEP** button


⑦: **TIMER** button

Icon Display on Remote Controller



Operation introduction of remote controller

Note:

- ◆ When power is connected(stand by condition), you can operate the air conditioner through the remote controller.
- ◆ When unit is on, each time you press the button on remote controller, the sending signal icon  on the display of remote controller will blink once. If the air conditioner gives out a beep sound, it means the signal has been sent.
- ◆ When unit is off, set temperature will be displayed on the remote controller(If the light of indoor unit display is turned on, the corresponding icon will be displayed); When unit is on, it will display the icon of the on-going function.

1. ON/OFF Button

Press this button to turn unit on/off.

2. MODE Button

Pressing this button once can select your required mode circularly as below(the corresponding icon ► will be lit up after the mode is selected):



When selecting auto mode,air conditoner will operate automatically according to ambient temperature.Set temperature can't be adjusted and won't be displayed either.Press FAN button to adjust fan speed.

When selecting cool mode,air conditioner will operate under cool mode.Then press + or - button to adjust set temperature.Press FAN button to adjust fan speed.

When selecting dry mode,air conditioner will operate at low fan speed under dry mode..In dry mode,fan speed can't be adjusted.

When selection fan mode,air conditioner will operate in fan mode only.Then press FAN button to adjust fan speed.

When selecting heat mode,air conditoner will operate under heat mode.Then press + or - button to adujst set temperature.Press FAN button to adjust fan speed.(Cooling only unit can't receive heating mode signal.If set HEAT mode by remote controller,press ON/OFF button can't turn on the air conditioner.)

3. +/- button

- ◆ Pressing + or - button once will increase or decrease set temperature by 1 °F(°C). Hold + or -- button for 2s, set temperature on remote controller will change quickly. Release the button after your required set temperature is reached.
- ◆ When setting Timer On, Timer Off or Clock, press + or -- button to adjust the time (See TIMER Button for setting details).

4. FAN Button

Pressing this button can select fan speed circularly as: AUTO, SPEED 1(), SPEED 2(), SPEED 3(), SPEED 4()



Note:

- ◆ Under Auto speed,air conditoner will select proper fan speed automatically according to ambient temperatue.
- ◆ Fan speed can't be adjusted under DRY mode.

5. SWING Button

Press this button to turn on up&down air swing.

6. SLEEP Button

Under Cool,Heat mode press this button to turn on sleep function.Press this button to cancel Sleep function.Under Fan,Dry and Auto mode,this function is unavailable

7. TIMER Button

- ◆ When unit is on, press this button to set Timer Off. T-OFF and H icon will be blinking. Within 5s, press + or - button to adjust the time for Timer Off. Pressing + or - button once will increase or decrease the time by 0.5h . Hold + or -- button for 2s,time will change quickly. Release the button after your required set time is reached. Then press TIMER button to con rm it. T-OFF and H icon will stop blinking.
- ◆ When unit is off, press this button to set Timer On. T-ON and H icon will be blinking. Within 5s, press + or - button to adjust the time for Timer On. Pressing + or - button once will increase or decrease the time by 0.5h. Hold + or - button for 2s, time will change quickly. Release the button after your required set time is reached. Then press TIMER button to con rm it. T-ON and H icon will stop blinking.
- ◆ Cancel Timer On/Off: If Timer function is set up, press TIMER button once to review the remaining time. Within 5s, press TIMER button again to cancel this function.


Note:

- ◆ Range of time setting is: 0.5~24h
- ◆ The interval between two motions can't exceed 5s, otherwise the remote controller will exit setting status.

Simple operation rst

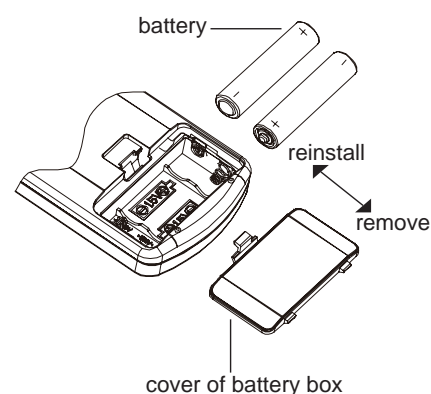
1. After putting through the power, press "ON/OFF" button on remote controller to turn on the air conditioner.
2. Press "MODE" button to select your required mode: AUTO, COOL, DRY, FAN, HEAT.
3. Press "+" or "-" button to set your required temperature. (Temperature can't be adjusted under auto mode).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

Replacement of Batteries in Remote Controller

1. Press the back side of remote controller on the spot marked with , and then push out the cover of battery box along the arrow direction.
2. Replace two No.7 (AAA 1.5V) dry batteries and make sure the positions of + and -- polar are correct.
3. Reinstall the cover of battery box.

Note:

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



6.2 Brief Description of Modes and Functions

(1) Cooling Mode

① Working conditions and process of cooling

When $T_{amb} \geq T_{preset}$, the unit will enter cooling operation, in which case the indoor fan, the outdoor fan and the compressor will work and the indoor fan will run at preset speed.

When $T_{amb} \leq T_{preset} - 3.6^{\circ}\text{F}$, the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will run at preset speed.

When $T_{preset} - 3.6^{\circ}\text{F} < T_{amb} < T_{preset}$, the unit will remain at its previous state.

Under this mode, the four-way valve will be de-energized and temperature can be set within a range from 61~to 86°F.

If the compressor is shut down for some reason, the indoor fan and the swing device will operate at original state.

② Protection

◆ Antifreeze protection

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

If $T_{evap} \leq 35.6^{\circ}\text{F}$, the compressor will operate at reduced frequency.

If $T_{evap} \leq 30.2^{\circ}\text{F}$ is detected for durative 3 minutes, the compressor will stop, and after 30 seconds, the outdoor fan will stop; and under cooling mode, the indoor fan and the swing motor will remain at the original state.

If $T_{evap} \geq 42.8^{\circ}\text{F}$ and the compressor has remained at OFF for at least 3 minutes, the compressor will resume its original operation state.

◆ Total current up and frequency down protection

When total current $I_{total} \leq 5.5\text{A}$, increase frequency is allowed; when total current $I_{total} \geq 6\text{A}$, increasing frequency is prohibited; when total current $I_{total} \geq 7\text{A}$, the unit operates by decreasing frequency. When total current $I_{total} \geq 9\text{A}$, the compressor stops operation, and indoor fan will stop operation after 30s.

(2) Dehumidifying Mode

① Working conditions and process of dehumidifying

If $T_{amb} > T_{preset}$, the unit will enter cooling and dehumidifying mode, in which case the compressor and the outdoor fan will operate and the indoor fan will run at low speed.

If $T_{preset} - 3.6^{\circ}\text{F} \leq T_{amb} \leq T_{preset}$, the compressor remains at its original operation state.

If $T_{amb} < T_{preset} - 3.6^{\circ}\text{F}$, the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will operate at low speed.

② Protection

Protection is the same as that under the cooling mode.

(3) Heating Mode

① Working conditions and process of heating

If $T_{amb} \leq T_{preset} + 3.6^{\circ}\text{F}$, the unit enters heating mode, in which case the four-way valve, the compressor and the outdoor fan will operate simultaneously, and the indoor fan will run at preset speed in the condition of preset cold air prevention.

If $T_{amb} \geq T_{preset} + 9^{\circ}\text{F}$, the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will stop after 60-second blow at low speed.

If $T_{preset} + 3.6^{\circ}\text{F} < T_{amb} < T_{preset} + 9^{\circ}\text{F}$, the unit will maintain its original operating status.

Under this mode, the four-way valve is energized and temperature can be set within a range of 61 ~ 86°F. The operating symbol, the heating symbol and preset temperature are revealed on the display.

② Condition and process of defrost

When duration of successive heating operation is more than 45 minutes, or accumulated heating time more than 90 minutes, and one of the following conditions is reached, the unit will enter the defrost mode after 3 minutes.

- When $T_{outdoor\ amb} \geq 41^{\circ}\text{F}$, $T_{outdoor\ tube} \leq 28.4^{\circ}\text{F}$;
- When $28.4^{\circ}\text{F} \leq T_{outdoor\ amb} < 41^{\circ}\text{F}$, $T_{outdoor\ tube} \leq 21.2^{\circ}\text{F}$;
- When $23^{\circ}\text{F} \leq T_{outdoor\ amb} < 28.4^{\circ}\text{F}$, $T_{outdoor\ tube} \leq 14^{\circ}\text{F}$;
- When $14^{\circ}\text{F} \leq T_{outdoor\ amb} < 23^{\circ}\text{F}$, $T_{outdoor\ tube} \leq (T_{outdoor\ amb} - 10.8)^{\circ}\text{F}$;
- When $T_{outdoor\ amb} < 14^{\circ}\text{F}$, $T_{outdoor\ tube} \leq (T_{outdoor\ amb} - 7.2)^{\circ}\text{F}$;

In this case, the compressor and indoor fan stop, while the outdoor fan and 4-way valve stop after 30s; after another 30s, the compressor starts with the operation frequency of 70Hz. When the compressor has operated for 8min or $T_{outdoor\ tube} \geq 50^{\circ}\text{F}$, the compressor stops and the 4-way valve starts after 30s; after another 60s, the compressor and outdoor fan resumes operation, and the indoor fan operates according to the condition of cold air prevention.

③ Protection

◆ Cold air prevention

The unit is started under heating mode (the compressor is ON):

① In the case of $T_{indoor\ amb} < 75.2^{\circ}\text{F}$: if $T_{tube} \leq 104^{\circ}\text{F}$ and the indoor fan is at stop state, the indoor fan will begin to run at low speed with a time lag of 2 minutes. Within 2 minutes, if $T_{tube} > 104^{\circ}\text{F}$, the indoor fan also will run at low speed; and after 1-minute operation at low speed, the indoor fan will be converted to operation at preset speed. Within 1-minute low speed operation or 2-minute non-operation, if $T_{tube} > 107.6^{\circ}\text{F}$, the fan will run at present speed.

② In the case of $T_{indoor\ amb} \geq 75.2^{\circ}\text{F}$: if $T_{tube} \leq 107.6^{\circ}\text{F}$, the indoor fan will run at low speed, and after one minute, the indoor fan will be converted to preset speed. Within one-minute low speed operation, if $T_{tube} > 107.6^{\circ}\text{F}$, the indoor fan will be converted to preset speed.

Note: $T_{indoor\ amb}$ indicated in ① and ② refers to, under initially heating mode, the indoor ambient temperature before the command to start the compressor is performed according to the program, or after the unit is withdrawn from defrost, the indoor ambient temperature before the defrost symbol is cleared.

◆ Total current up and frequency down protection

When total current $I_{total} \leq 6\text{A}$, increase frequency is allowed; when total current $I_{total} \geq 7\text{A}$, increasing frequency is prohibited; when total current $I_{total} \geq 8\text{A}$, the unit operates by decreasing frequency. When total current $I_{total} \geq 9\text{A}$, the compressor stops operation, and indoor fan will stop operation after 30s.

(5)Auto Changeover Mode

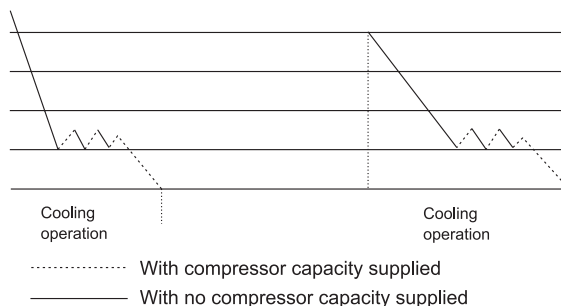
In this mode,the system selects the operation mode (cooling and fan) automatically according to the ambient temperature.The display shows the actual operation mode and setting temperature.

There will be 30s delay for mode conversion.The protection function is the same as that of other modes.

1.When $T_{amb.} \geq 77^{\circ}\text{F}$,the cooling mode is selected.

2.For cooling only unit:when $T_{amb.} < 71.6^{\circ}\text{F}$,the unit runs in fan mode.

3.When $71.6^{\circ}\text{F} < T_{indoor\ amb.} < 77^{\circ}\text{F}$,upon initial startup,the unit will enter auto mode and run in automatic fan mode.if the other mode changes to auto mode,the previous operation mode will remain.



(6)Auto fan speed Mode

In auto fan mode,the rotational speed of the fan for indoor unit is decided by the differential temperature between ambient temperature and set temperature.In dry mode,the automatic fan speed is forced to be low.

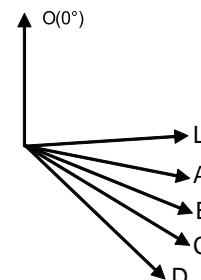
Models	Mode	Turbo	High fan speed	Medium fan speed	Low fan speed
ACZEM4H4R09	Cooling	1260	1100	950	750
	Heating	1320	1200	1100	950
ACZEM4C4R12	Cooling	1330	1100	950	750
ACZEM4H4R12	Heating	1350	1170	1050	950

(7)Liver Mode

After energization,the swing motor will open the horizontal louver to be open and then be close completely.And the air outlet is close.

In heating mode,if the swing function is not set,the horizontal louver will rotate to maximum in clockwise direction.Then it will rotate to place D. Under other state, the horizontal louver will rotate to level L. If the swing function is set when starting the unit, the horizontal louver will swing between place L and D. there are 7 states for the louver: in Place L, Place A, Place B, Place C, Place D, and swing between Place L and place D, stop in any place between Place L and place D. When the unit is turned off, the louver will stay in place 0. The swing is available only. when the swing function is set and the indoor fan is running.

Note: When place L to B, place A to C, and place B and D is set, the horizontal louver will swing between place L to D. $L \longleftrightarrow A \longleftrightarrow B \longleftrightarrow C \longleftrightarrow D$



(8)Sleep Function

Sleeping mode is available only in cooling and heating modes;

Cooling mode: at the base of initial set temperature by remote controller, the set temperature will increase automatically according to people's coziness within several hours after setting sleep function.

Heating mode: at the base of initial set temperature by remote controller, the set temperature will decrease automatically according to people's coziness within several hours after setting sleep function.

(9)Timer Function

The main board has general timer function and clock function. The timer function can be selected by remote controller with different function

1.General timer (start and stop time can be set. The accuracy is minute. E.g.: timer on for 1 hour; timer off for 1.5 hours.)

Timer on: after setting timer on, the unit will run at setting time according to the original setting mode. The timing interval is 0.5hour, and the setting range is 0.5~24hours.

Timer off: the timer off function can be set when the unit is on. When the setting time for timer off is reached, the unit will stop. The timing interval is 0.5hour, and the setting range is 0.5~24hours.

2.Clock (start and stop time can be set. The accuracy is minute. E.g.: timer on at 8:00a.m.; timer off at 17:30p.m.)

Timer on: if the timer on function is set when the system is on, the system will go on running. If the timer on function is set when the system is off, the system will start running in the previously set mode when the setting time is reached.

Timer off: if the timer off function is set when the system is off, the system will keep off even though the setting time is reached. If the timer off function is set when the system is on, the system will stop running when the setting time is reached.

Timer modification: when the system is under timer state, start or stop of the unit can be set via remote ON/OFF button and the timer can be reset. The system runs according to the latest setting state.

When both the timer on and timer off are set: the system runs according to the current setting state. When the setting time is reached, the unit will start and stop running. In that case, the unit will run according to the previously setting mode when the setting time for timer on is reached. The unit will stop running while the setting time for timer off is reached.

If the setting time for timer on and timer off is the same, the unit will stop running no matter what the current state is.

(10)Auto-Restart Function

Memory: mode, up and down swing, light, setting temperature, setting fan speed, general timer (not clock), Fahrenheit / Celsius. After de-energized, the unit can run according to the memory if it is energized again. If the timer function is not set in the last remote control, the system will run according to the last remote control. If the timer function is set in the last control before it is de-energized, the system will memorize the last timer setting. The setting time is recalculated since the energization of the unit. If the timer function is set in the last control and the setting time is reached before the unit is de-energized, the unit will run according to the previous running mode after it is energized again. But the timer function will terminate. The clock will not be memorized.

In cooling and heating mode (not available in auto, dehumidify, fan mode), press the Turbo button, the fan speed displayed super high speed in the remote controller and the indoor fan rotates at super high speed.

(11)Turbo Function

In cooling and heating mode (not available in auto, dehumidify, fan mode), press the Turbo button, the fan speed displayed super high speed in the remote controller and the indoor fan rotates at super high speed.

(12)Health Function

When the indoor fan motor is running, the Health function is set by pressing remote controller (If there is no Health button on the remote controller, the health function opening is defaulted).

(13)I Feel Function

If the remote controller receives the I Feel order, the controller will work at the ambient temperature value which is sent by remote controller (Except the defrosting and anti-cool wind, which still adopts the sampling value of AC itself ambient temperature sensor), the remote controller will send ambient temperature value to controller every 10mins. After 11mins, if the controller hasn't received the ambient temperature value from the remote controller for long time, then it will run according to the current ambient temperature of AC. If the function has not been set, the ambient temperature will adopt the sensor sampling value of AC itself. If power off happens, this function will not be memorized.

Troubleshooting of Temperature Sensor

(1) Indoor Temperature Sensor

Detect malfunctions of temperature sensor any time.

(2) Indoor Pipe Temperature Sensor

In defrosting period, the temperature sensor malfunction will not be detected. 5 min after finishing defrosting, the system begins to detect the temperature sensor malfunction. In other times, the temperature sensor malfunction will be detected.

(3) Protection of Temperature Sensor

1. When short-circuit occurs to the temperature sensor for 5s:

The temperature sensor overheats. In this case, the complete unit will stop for protection. At the same time, the temperature protection and temperature sensor malfunction will be shown.

2. When break-circuit occurs to the temperature sensor for 5s:

The unit will stop and the temperature sensor malfunction will be displayed.

Frequency Control

Frequency Initial Setting<Outline>When starting the compressor, or when conditions are varied due to the change of the room, the frequency must be initialized according to the ΔD value of the indoor unit and the Q value of the indoor unit. Q value: Indoor unit output determined from indoor unit volume, air flow rate and other factors. PI Control (Determine Frequency Up / Down by ΔD Signal)

1.P control Calculate ΔD value in each sampling time (20 seconds), and adjust the frequency according to its difference from the frequency previously calculated.

2.I control If the operating frequency is not change more than a certain fixed time, adjust the frequency up and down according to the ΔD value, obtaining the fixed ΔD value.

When the ΔD value is small lower the frequency.

When the ΔD value is large increase the frequency.

3.Frequency management when other controls are functioning When frequency is drooping; Frequency management is carried out only when the frequency droops. For limiting lower limit Frequency management is carried out only when the frequency rises.

4.Upper and lower limit of frequency by PI control The frequency upper and lower limits are set depending on indoor unit. When low noise commands come from the indoor unit or when outdoor unit low noise or quiet commands come from indoor unit, the upper limit frequency must be lowered than the usual setting.

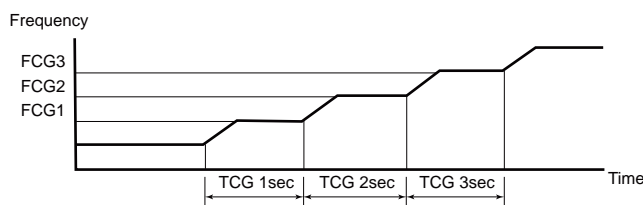
3-minutes Standby

Prohibit to turn ON the compressor for 3 minutes after turning it off.(except when defrosting)

Compressor Protection Function

When turning the compressor from OFF to ON, the upper limit of frequency must be set as follows. (The function must not be used when defrosting.)

FCG 3	88
FCG 2	64
FCG 1	48
TCG1	240
TCG2	360
TCG3	180



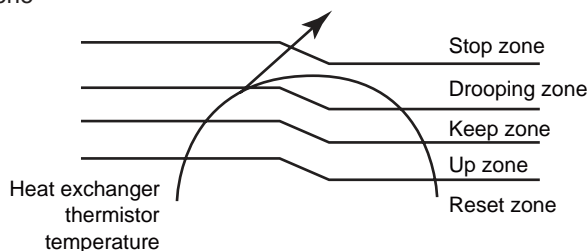
Discharge Pipe Control

Outline

The discharge pipe temperature is used as the compressor's internal temperature. If the discharge pipe temperature rises above a certain level, the operating frequency upper limit is set to keep this temperature from going up further.

Detail

Divide the Zone



Management within the Zones

Zone	Control contents
Stop zone	When the temperature reaches the stop zone, stop the compressor and correct abnormality.
Drooping zone	Start the timer, and the frequency will be drooping.
Keep zone	Keep the upper limit of frequency.
Return / Reset zone	Cancel the upper limit of frequency.

Input Current Control

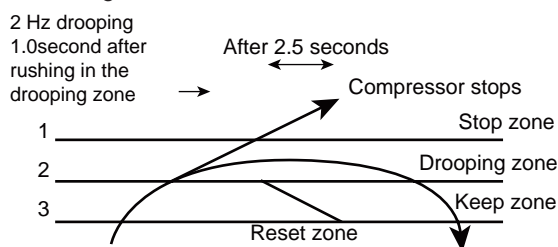
Outline

Detect an input current by the CT during the compressor is running, and set the frequency upper limit from such input current.

In case of heat pump model, this control is the upper limit control function of the frequency which takes priority of the lower limit of four way valve activating compensation.

Detail

The frequency control will be made within the following zones.



When a "stop current" continues for 2.5 seconds after rushing on the stop zone, the compressor operation stops.

If a "drooping current" is continues for 1.0 second after rushing on the drooping zone, the frequency will be 2 Hz drooping.

Repeating the above drooping continues until the current rushes on the drooping zone without change.

In the keep zone, the frequency limit will remain.

In the return / reset zone, the frequency limit will be cancelled.

Limitation of current drooping and stop value according to the outdoor air temperature

1. In case the operation mode is cooling

* The current droops when outdoor air temperature becomes higher than a certain level (model by model).

2. In case the operation mode is heating

* The current droops when outdoor air temperature becomes higher than a certain level (model by model).

Freeze-up Protection Control

Outline

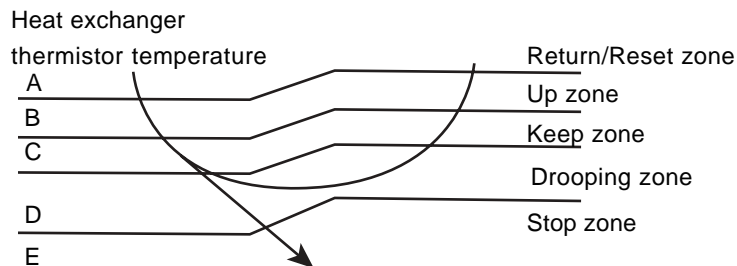
During cooling operation, the signals being sent from the indoor unit allow the operating frequency limitation and then prevent freezing of the indoor heat exchanger. (The signal from the indoor unit must be divided into the zones as the followings.)

Detail

1. Conditions for Start Controlling

Judge the controlling start with the indoor heat exchanger temperature after 2 sec from operation start.

2. Control in Each Zone



Heating Peak-cut Control

Outline

Heat Pump Only

During heating operation, the signals being sent from the indoor unit allow the operating frequency limitation and prevent abnormal high pressure. (The signal from the indoor unit must be divided as follows.)

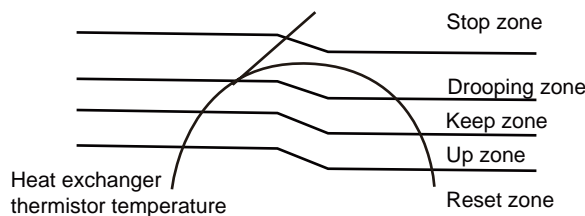
Detail

1. Conditions for Start Controlling

Judge the controlling start with the indoor heat exchanger temperature after 2 sec. from operation start.

2. Control in Each Zone

The heat exchange intermediate temperature of indoor unit controls the following.



Defrost Control

Outline

Heat Pump Only

Defrosting is carried out by the cooling cycle (reverse cycle). The defrosting time or outdoor heat exchanger temperature must be more than its fixed value when finishing.

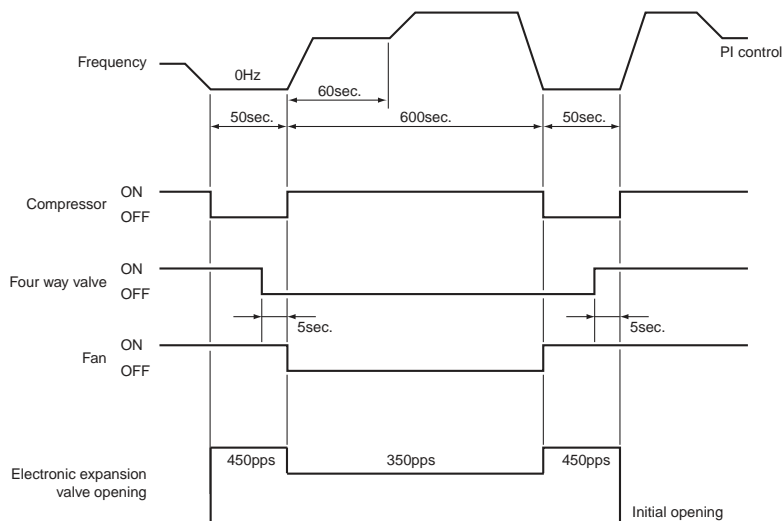
Detail

1. Conditions for Starting Defrost

The starting conditions must be made with the outdoor air temperature and heat exchanger temperature. Under the conditions that the system is in heating operation, 6 minutes after the compressor is started and more than 44 minutes of accumulated time pass since the start of the operation or ending the defrosting.

2. Conditions for Canceling Defrost

The judgment must be made with heat exchanger temperature. (39°F~72°F)



Fan Control

Outline

Fan control is carried out according to the following priority.

1. Fan ON control for electric component cooling fan
2. Fan control when defrosting
3. Fan OFF delay when stopped
4. ON/OFF control in cooling operation
5. Tap control when drooping function is working
6. Fan control in forced operation
7. Fan control in indoor/outdoor unit silent operation
8. Fan control in powerful mode
9. Fan control in normal operation

Detail

Fan OFF Control when Stopped

* Fan OFF delay for 60 seconds must be made when the compressor is stopped.

Tap Control in indoor/outdoor unit silent operation

1. When Cooling Operation

When the outdoor air temperature is lower than 99°F, the fan tap must be set to L.

2. When Heating Operation

When the outdoor air temperature is higher than 39°F, the fan tap must be turned to L (only for heat pump model).

Refrigerant Recycling Function (applicable when changing installation location or in maintenance)

- (1) Enter refrigerant recycling function

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

- (2) Exit refrigerant recycling function

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

Compulsive Defrosting Function

- (1) Start up compulsory defrosting function

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

- (2) Exit compulsory defrosting mode

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

Part II : Installation and Maintenance

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

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



Warnings

Electrical Safety Precautions:

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

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

11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 0.12inch.

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

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

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

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

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 40.09lbs.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Wear safety belt if the height of working is above 6.56ft.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

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

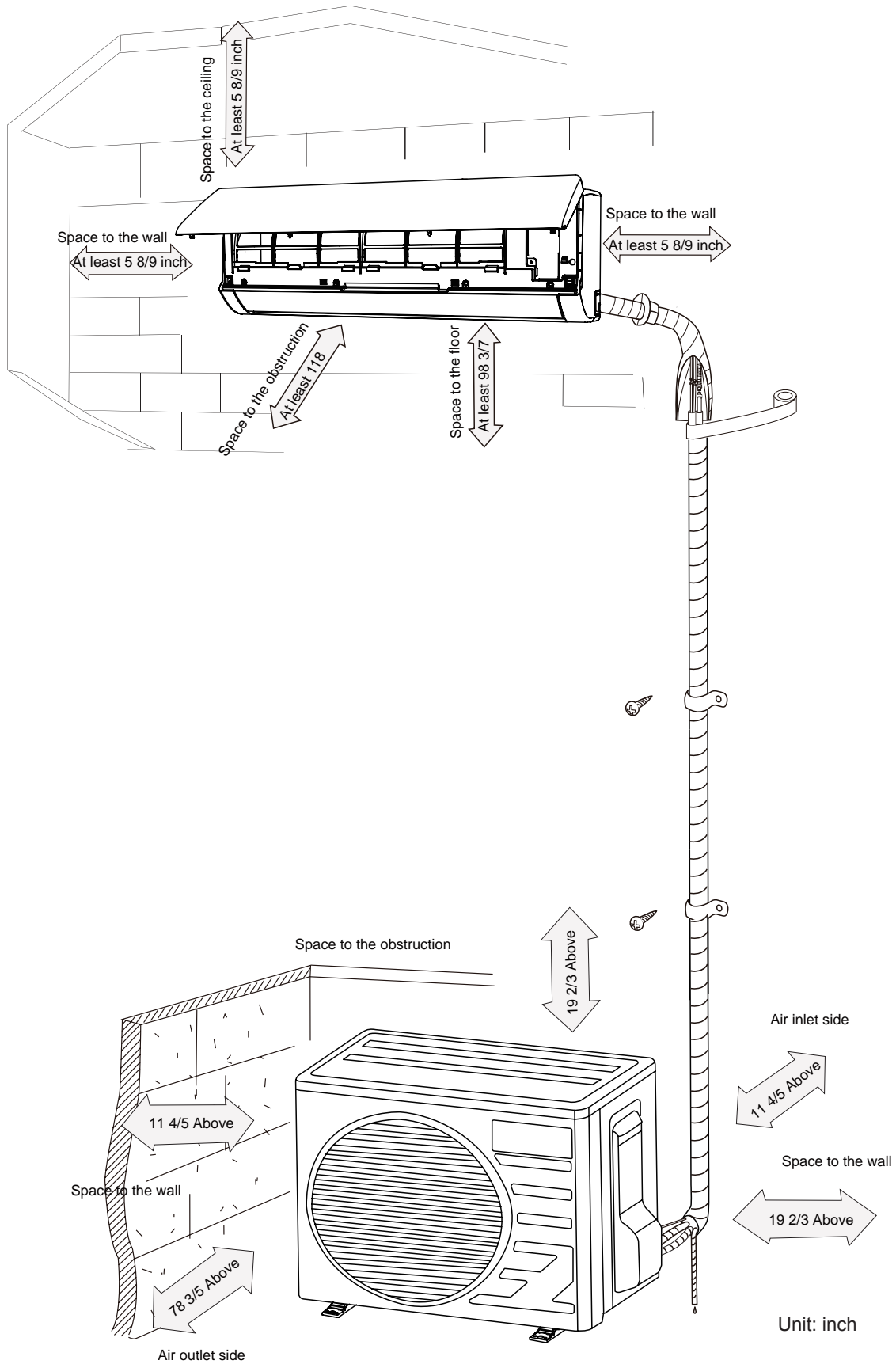
Improper installation may lead to fire hazard, explosion, electric shock or injury.

Main Tools for Installation and Maintenance

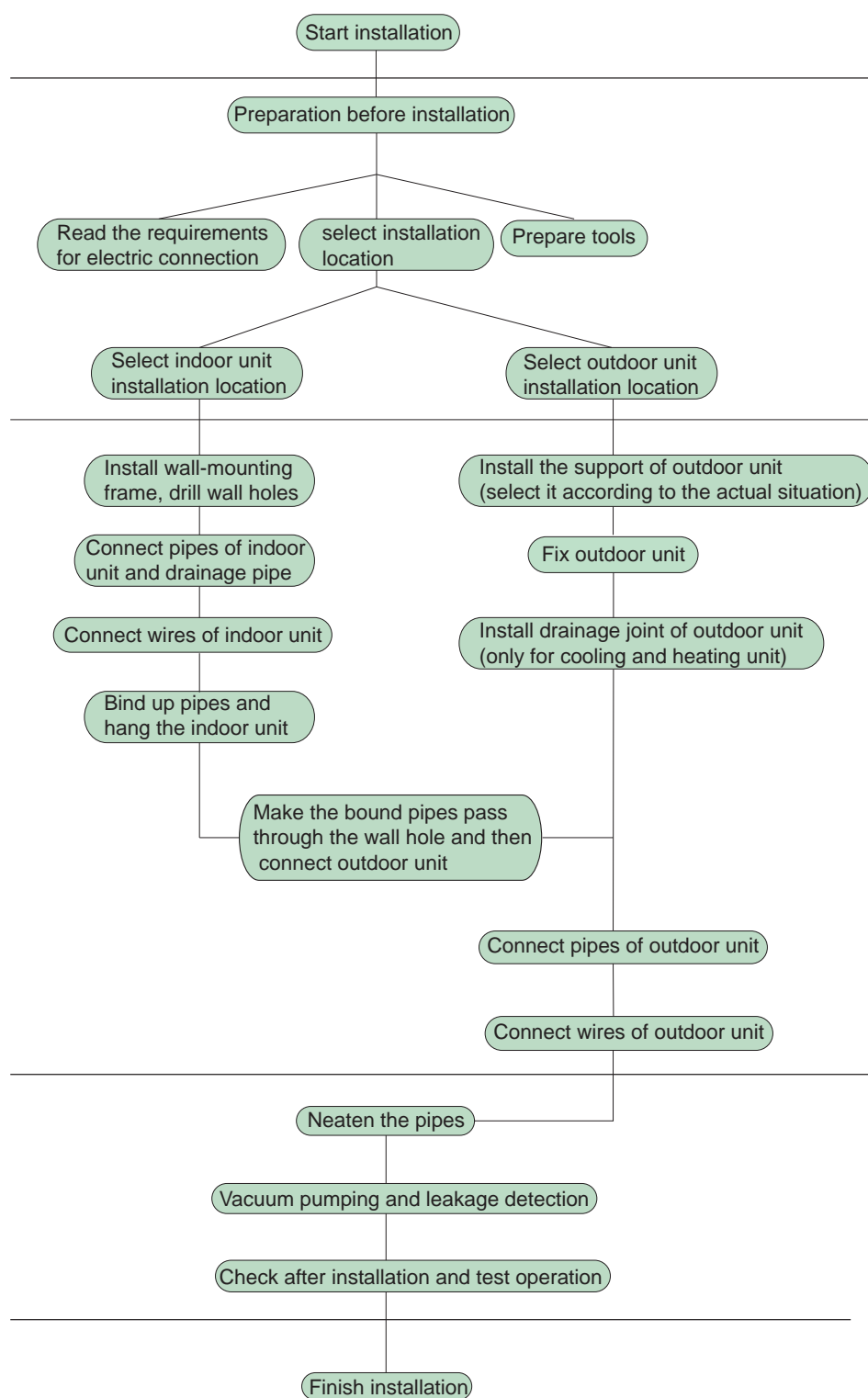
<p>1. Level meter, measuring tape</p> 	<p>2. Screw driver</p> 	<p>3. Impact drill, drill head, electric drill</p> 
<p>4. Electroprobe</p> 	<p>5. Universal meter</p> 	<p>6. Torque wrench, open-end wrench, inner hexagon spanner</p> 
<p>7. Electronic leakage detector</p> 	<p>8. Vacuum pump</p> 	<p>9. Pressure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

8. Installation

8.1 Installation Dimension Diagram



Installation procedures



Note: this flow is only for reference; please find the more detailed installation steps in this section.

8.2 Installation Parts-checking

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

⚠ Note:

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

8.3 Selection of Installation Location

1. Basic Requirement:

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

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

2. Indoor Unit:

- (1) There should be no obstruction near air inlet and air outlet.
- (2) Select a location where the condensation water can be dispersed easily and won't affect other people.
- (3) Select a location which is convenient to connect the outdoor unit and near the power socket.
- (4) Select a location which is out of reach for children.
- (5) The location should be able to withstand the weight of indoor unit and won't increase noise and vibration.
- (6) The appliance must be installed 98 3/7 inch above floor.
- (7) Don't install the indoor unit right above the electric appliance.
- (8) The appliance shall not be installed in the laundry.

3. Outdoor Unit:

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

8.4 Electric Connection Requirement

1. Safety Precaution

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

Air-conditioner	Air switch capacity
ACZEM4H4R09/ACZCI4H4R09	10A
ACZEM4C4R12/ACZCI4C4R12	16A
ACZEM4H4R12/ACZCI4H4R12	

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

2. Grounding Requirement:

- (1) The air conditioner is first class electric appliance. It must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
- (2) The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
- (3) The grounding resistance should comply with national electric safety regulations.
- (4) The appliance must be positioned so that the plug is accessible.
- (5) An all-pole disconnection switch having a contact separation of at least 1/8 inch in all poles should be connected in fixed wiring.
- (6) Including an air switch with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

8.5 Installation of Indoor Unit

1. Choosing Installation location

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

2. Install Wall-mounting Frame

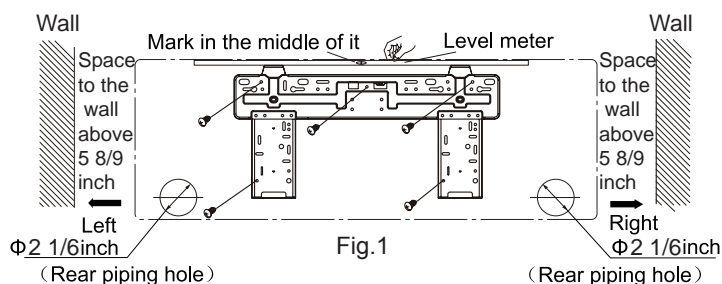
- (1) Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.
- (2) Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle)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

in the holes.

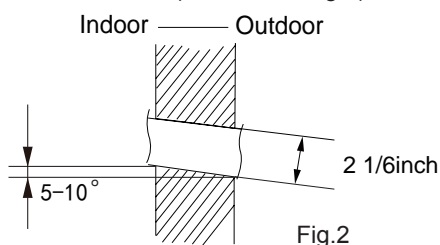
(3) Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

3. Install Wall-mounting Frame

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



(2) Open a piping hole with the diameter of 2 1/6 inch on the selected outlet pipe position. In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of 5-10°. (As show in Fig.2)

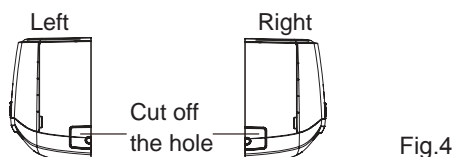
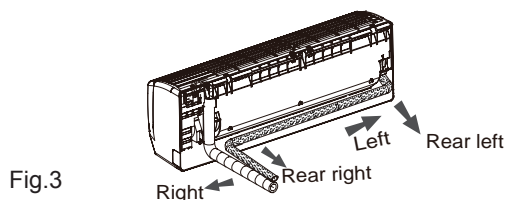


⚠ Note:

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

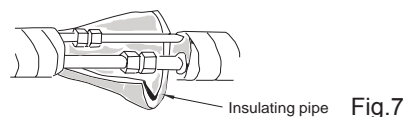
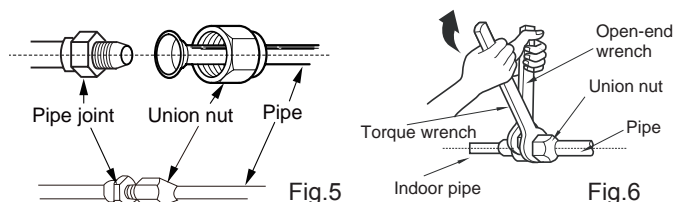
4. Outlet Pipe

- (1) The pipe can be led out in the direction of right, rear right, left or rear left. (As show in Fig.3)
- (2) When selecting leading out the pipe from left or right, please cut off the corresponding hole on the bottom case. (As show in Fig.4)



5. Connect the Pipe of Indoor Unit

- (1) Aim the pipe joint at the corresponding bellmouth. (As show in Fig.5)
- (2) Pretightening the union nut with hand.
- (3) Adjust the torque force by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench. (As show in Fig.6)
- (4) Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape. (As show in Fig.7)

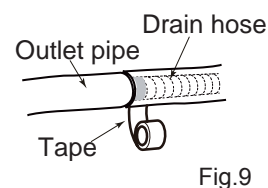
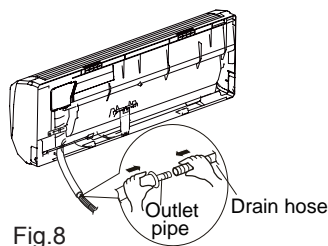


Refer to the following table for wrench moment of force:

Hex nut diameter(inch)	Tightening torque(ft.lbf)
Φ1/4	11.10~14.75
Φ3/8	22.82~29.50
Φ1/2	33.19~40.56
Φ5/8	44.24~47.94
Φ3/4	51.32~55.31

6. Install Drain Hose

- (1) Connect the drain hose to the outlet pipe of indoor unit. (As show in Fig.8)
- (2) Bind the joint with tape. (As show in Fig.9)



⚠ Note:

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

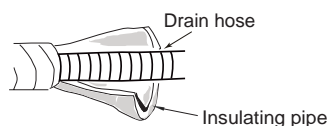
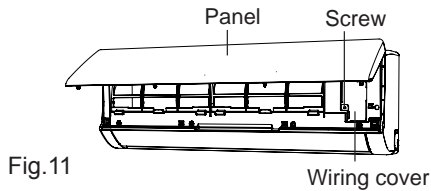


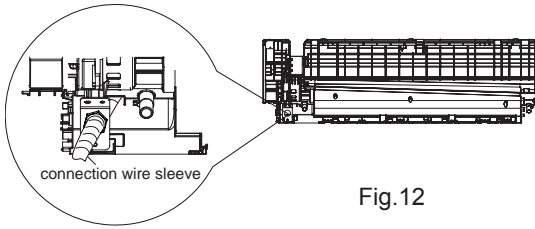
Fig.10

7. Connect Wire of Indoor Unit

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



(2) Fix the wire crossing board on connection wire sleeve at the bottom case; let the connection wire sleeve go through the wire crossing hole at the back of indoor unit, and then pull it out from the front.(As show in Fig.12)



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

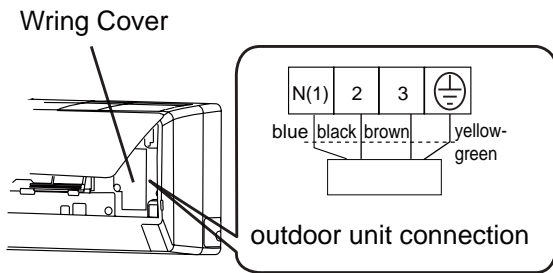


Fig.13

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

⚠ Note:

- (1) All wires of indoor unit and outdoor unit should be connected by a professional.
- (2) If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.
- (3) For the air conditioner with plug, the plug should be reachable after finishing installation.
- (4) For the air conditioner without plug, an air switch must be installed in the line. The air switch should be all-pole parting and the contact parting distance should be more than 1/8inch.

8. Bind up Pipe

- (1) Bind up the connection pipe, power cord and drain hose with the band.(As show in Fig.14)
- (2) Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.(As show in Fig.15)
- (3) Bind them evenly.
- (4) The liquid pipe and gas pipe should be bound separately at the end.

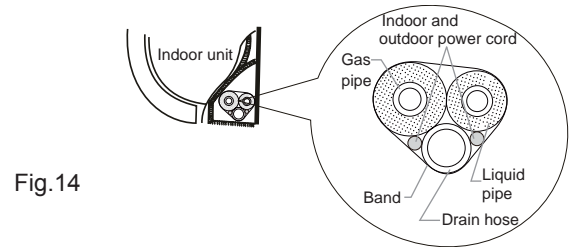


Fig.14

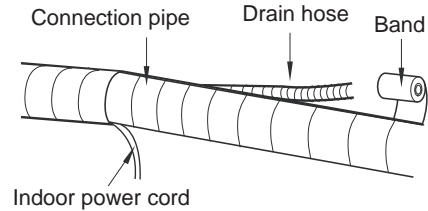


Fig.15

⚠ Note:

- (1) The power cord and control wire can't be crossed or winding.
- (2) The drain hose should be bound at the bottom.

9. Hang the Indoor Unit

- (1) Put the bound pipes in the wall pipe and then make them pass through the wall hole.
- (2) Hang the indoor unit on the wall-mounting frame.
- (3) Stuff the gap between pipes and wall hole with sealing gum.
- (4) Fix the wall pipe.(As show in Fig.16)
- (5) Check if the indoor unit is installed firmly and closed to the wall.(As show in Fig.17)

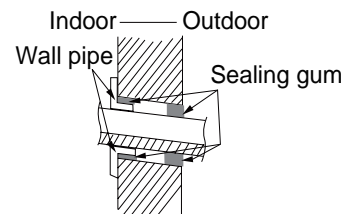


Fig.16

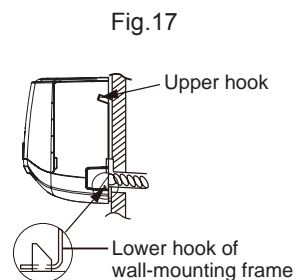


Fig.17

⚠ Note:

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

8.6 Installation of Outdoor Unit

1. Fix the Support of Outdoor Unit(select it according to the actual installation situation)

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

⚠ Note:

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

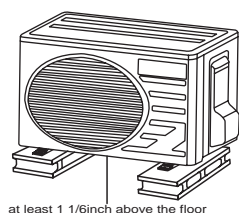


Fig.18

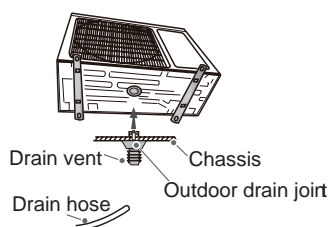


Fig.19

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

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

3. Fix Outdoor Unit

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

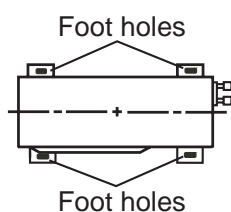


Fig.20

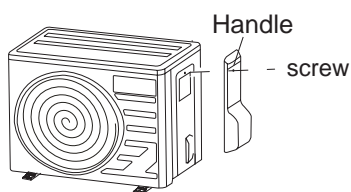


Fig.21

4. Connect Indoor and Outdoor Pipes

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

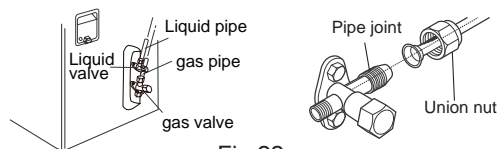


Fig.22

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

Refer to the following table for wrench moment of force:

Hex nut diameter(inch)	Tightening torque(ft-lbf)
Φ1/4	11.10~14.75
Φ3/8	22.82~29.50
Φ1/2	33.19~40.56
Φ5/8	44.24~47.94
Φ3/4	51.32~55.31

5. Connect Outdoor Electric Wire

1. Remove the handle of outdoor right side plate.
2. Put the power connection wire and power cord through the wire hole.
3. Take off the wire clamp. Connect the power connection wire and power cord to the terminal and then fix them. Wiring should be coherent with the indoor unit.
4. Fix the power connection wire and power cord with wire clamp.
5. Ensure if the wires have been fixed well.
6. Reinstall the handle

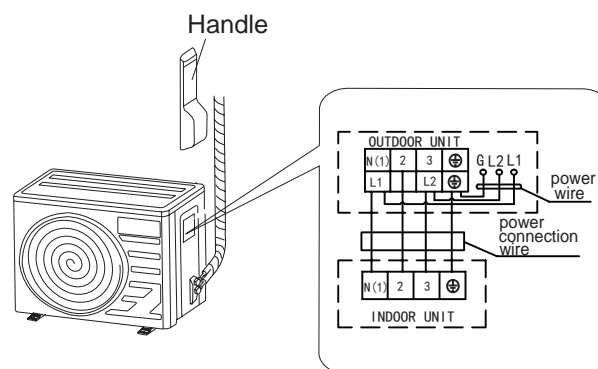


Fig.23

⚠ Note:

- Incorrect wiring may cause malfunction of spare part.
 - After the wire has been fixed, ensure there is free space between the connection and fixing places on the lead wire.
- Schematic diagram being reference only, please refer to real product for authentic information.

6. Neaten the Pipes

- (1) The pipes should be placed along the wall, bent reasonably and hidden possibly. Min. semidiameter of bending the pipe is 4 inch.
- (2) If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room.(As show in Fig.24)

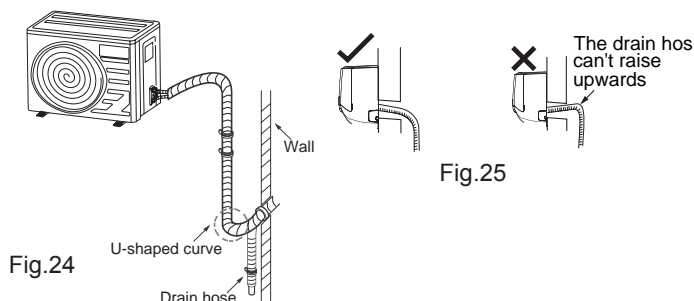


Fig.24

Fig.25

⚠ Note:

- (1) The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit.(As show in Fig.25)
- (2) Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.(As show in Fig.26)
- (3) The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.27)

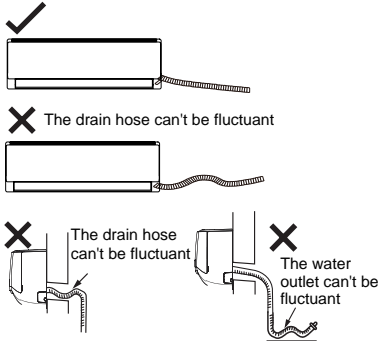


Fig.26

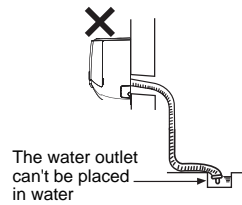


Fig.27

8.7 Vacuum Pumping and Leak Detection

1. Use Vacuum Pump

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

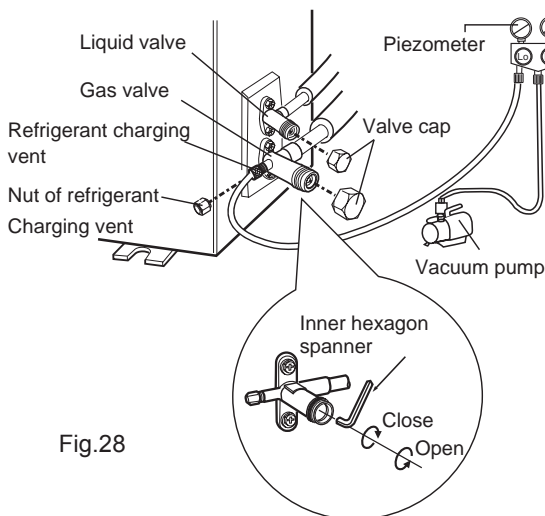


Fig.28

2. Leakage Detection

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

8.8 Check after Installation and Test Operation

1. Check after Installation

Check according to the following requirement after finishing installation.

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

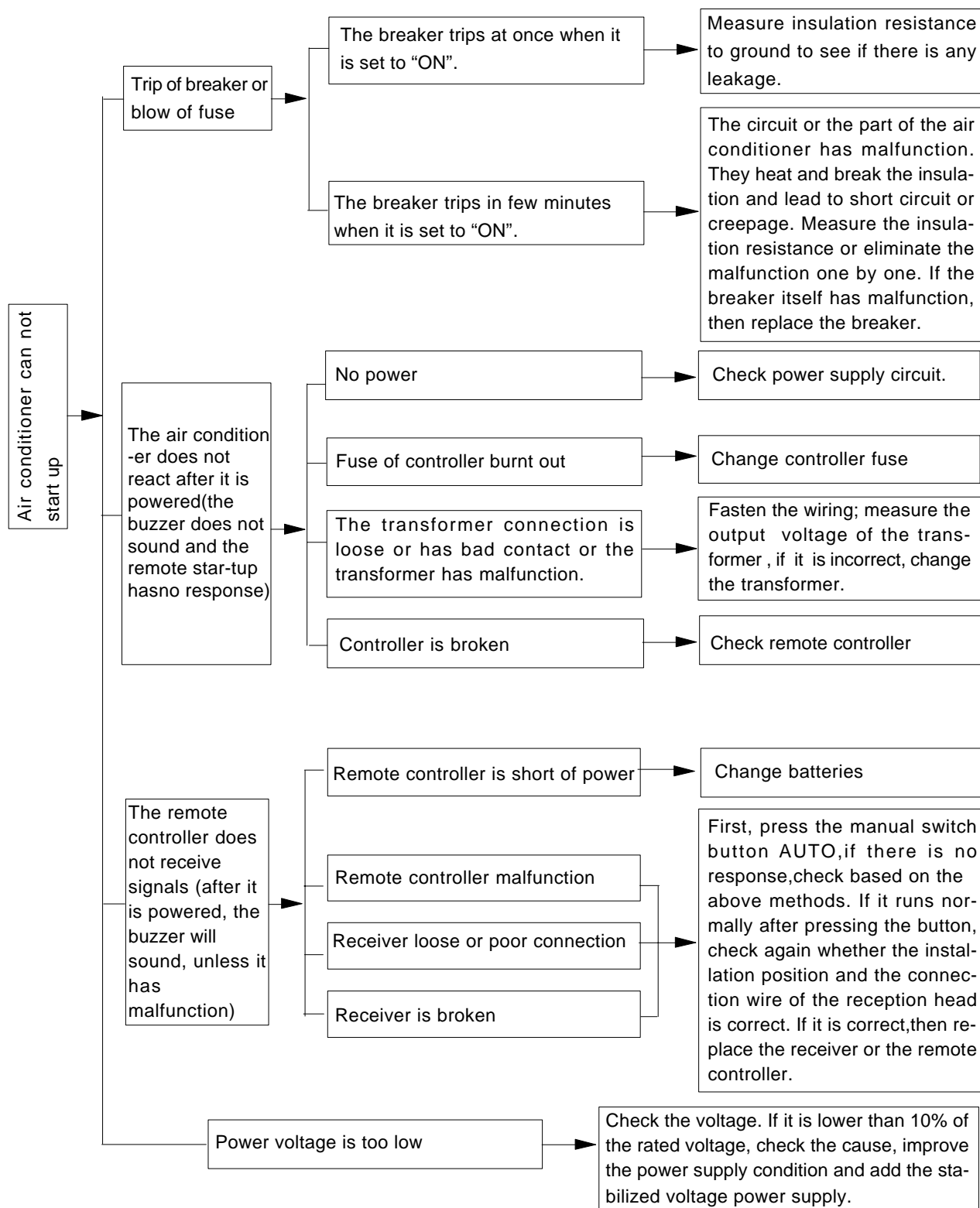
2. Test Operation

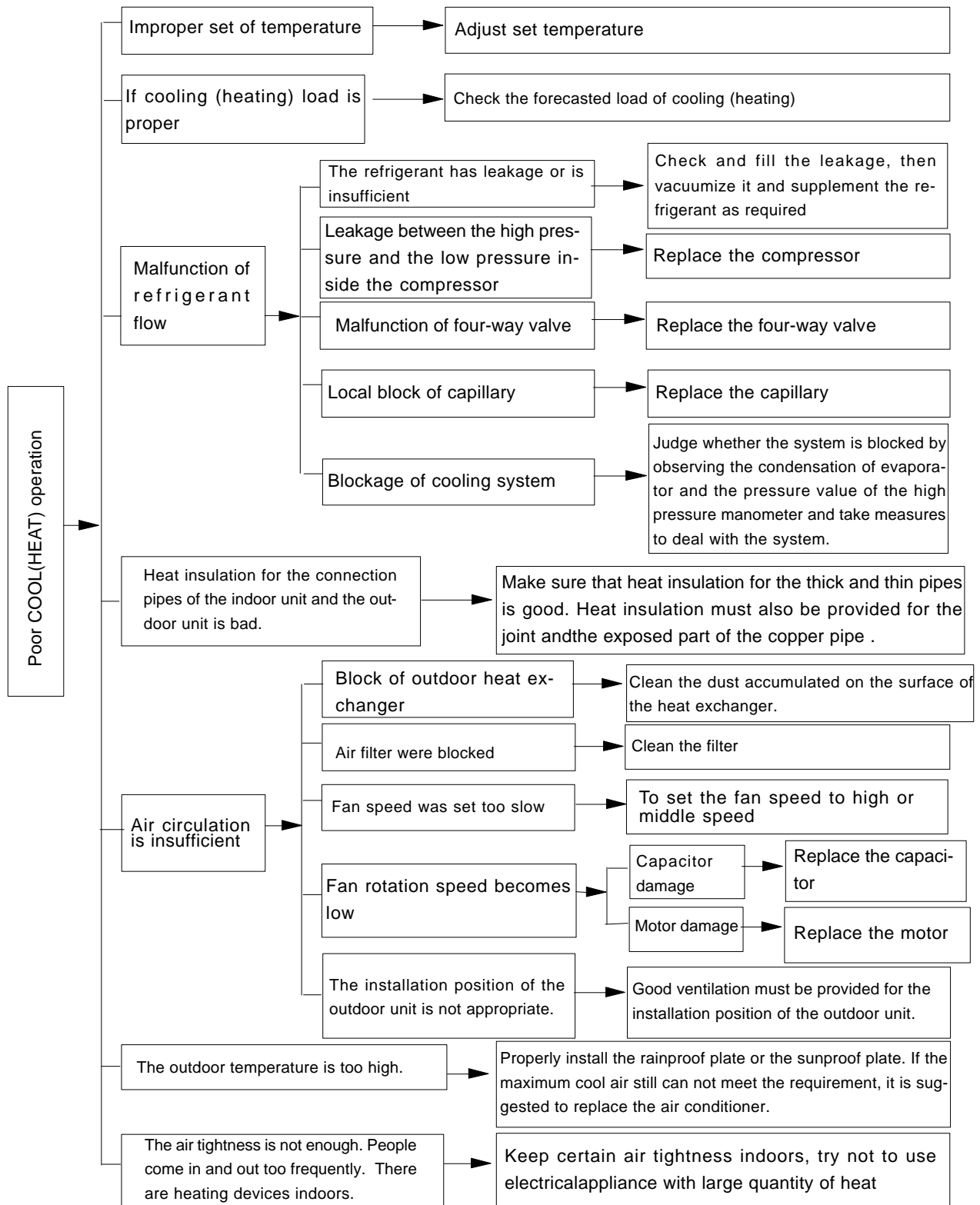
- (1) Preparation of test operation
 - The client approves the air conditioner installation.
 - Specify the important notes for air conditioner to the client.
- (2) Method of test operation
 - Put through the power, press ON/OFF button on the remote controller to start operation.
 - Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.
 - If the ambient temperature is lower than 60.8°F, the air conditioner can't start cooling.

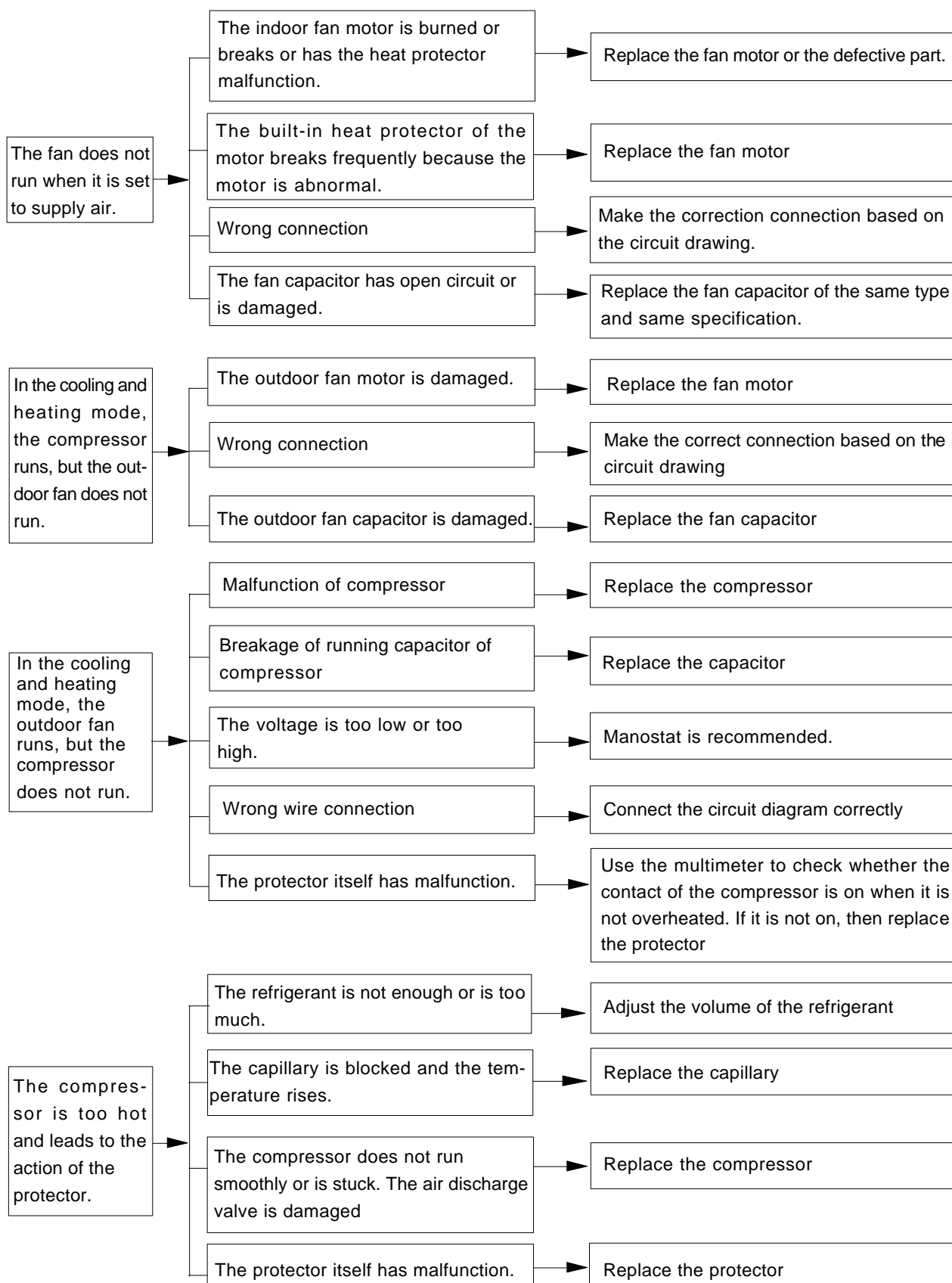
9. Maintenance

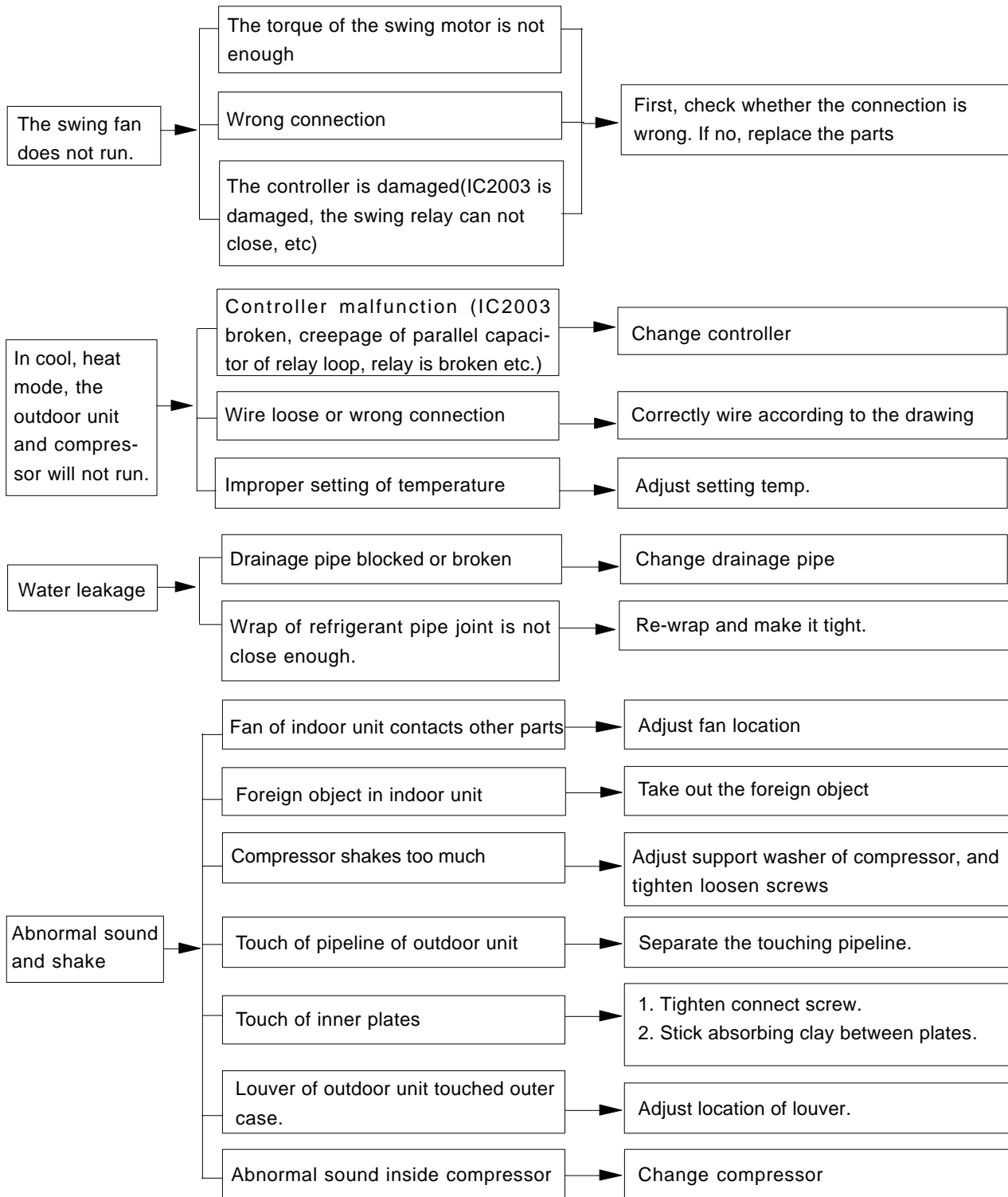
9.1 Malfunction Analysis

Note: When replacing the controller, be sure to insert the wire jumper into the new controller, otherwise the unit will display C5









9.2 Flashing LED of Indoor/Outdoor Unit and Primary Judgement

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
1	High pressure protection of system	E1	OFF 3s and blink once						During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment); Ambient temperature is too high.
2	Antifreezing protection	E2	OFF 3S and blink twice			OFF 1S and blink 3 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	1. Poor air-return in indoor unit; 2. Fan speed is abnormal; 3. Evaporator is dirty.
3	In defect of refrigerant	F0					OFF 1S and blink 9 times		The Dual-8 Code Display will show F0 and the complete unit stops.	1.In defect of refrigerant; 2.Indoor evaporator temperature sensor works abnormally; 3.The unit has been plugged up somewhere.
4	High discharge temperature protection of compressor	E4	OFF 3S and blink 4 times			OFF 1S and blink 7 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
5	Overcurrent protection	E5	OFF 3S and blink 5 times			OFF 1S and blink 5 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Supply voltage is unstable; 2. Supply voltage is too low and load is too high; 3. Evaporator is dirty.
6	Communi- cation Malfunction	E6	OFF 3S and blink 6 times			Always ON			During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
7	High temperature resistant protection	E8	OFF 3S and blink 8 times			OFF 1S and blink 6 times			During cooling operation: compressor will stop while indoor fan will operate. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
8	EEPROM malfunction	EE			OFF 3S and blink 15 times	OFF 1S and blink 11 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
9	Limit/ decrease frequency due to high temperature of module	EU		OFF 3S and blink 6 times	OFF 3S and blink 6 times				All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
10	Malfunction protection of jumper cap	C5	OFF 3S and blink 15 times						Wireless remote receiver and button are effective, but can not dispose the related command	1. No jumper cap insert on mainboard. 2. Incorrect insert of jumper cap. 3. Jumper cap damaged. 4. Abnormal detecting circuit of mainboard.

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
11	Gathering refrigerant	Fo	OFF 3S and blink 1 times	OFF 3S and blink 1 times		OFF 1S and blink 17 times			When the outdoor unit receive signal of Gathering refrigerant ,the system will be forced to run under cooling mode for gathering refrigerant	Nominal cooling mode
12	Indoor ambient temperature sensor is open/short circuited	F1		OFF 3S and blink once					During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	1. Loosening or bad contact of indoor ambient temp. sensor and mainboard terminal. 2. Components in mainboard fell down leads short circuit. 3. Indoor ambient temp. sensor damaged.(check with sensor resistance value chart) 4. Mainboard damaged.
13	Indoor evaporator temperature sensor is open/short circuited	F2		OFF 3S and blink twice					AC stops operation once reaches the setting temperature. Cooling, drying: internal fan motor stops operation while other loads stop operation; heating: AC stop operation	1. Loosening or bad contact of Indoor evaporator temp. sensor and mainboard terminal. 2. Components on the mainboard fall down leads short circuit. 3. Indoor evaporator temp. sensor damaged.(check temp. sensor value chart for testing) 4. Mainboard damaged.
14	Outdoor ambient temperature sensor is open/short circuited	F3		OFF 3S and blink 3 times			OFF 1S and blink 6 times		During cooling and drying operating, compressor stops while indoor fan operates; During heating operation, the complete unit will stop operation	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
15	Outdoor condenser temperature sensor is open/short circuited	F4		OFF 3S and blink 4 times			OFF 1S and blink 5 times		During cooling and drying operation, compressor stops while indoor fan will operate; During heating operation, the complete unit will stop operation.	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
16	Outdoor discharge temperature sensor is open/short circuited	F5		OFF 3S and blink 5 times			OFF 1S and blink 7 times		During cooling and drying operation, compressor will sop after operating for about 3 mins, while indoor fan will operate; During heating operation, the complete unit will stop after operating for about 3 mins.	1.Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor) 2.The head of temperature sensor hasnt been inserted into the copper tube
17	Limit/ decrease frequency due to overload	F6		OFF 3S and blink for 6 times			OFF 1S and blink 3 times		All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
18	Decrease frequency due to overcurrent	F8		OFF 3S and blink 8 times			OFF 1S and blink once		All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
19	Decrease frequency due to high air discharge	F9		OFF 3S and blink 9 times			OFF 1S and blink twice		All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV)
20	Limit/ decrease frequency due to antifreezing	FH		OFF 3S and blink 2 times	OFF 3S and blink 2 times		OFF 1S and blink 4 times		All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low
21	Voltage for DC bus-bar is too high	PH		OFF 3S and blink 11 times		OFF 1S and blink 13 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
22	Voltage of DC bus-bar is too low	PL			OFF 3S and blink 21 times	OFF 1S and blink 12 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
23	Compressor Min frequency in test state	P0		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during min. cooling or min. heating test
24	Compressor rated frequency in test state	P1		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during nominal cooling or nominal heating test
25	Compressor maximum frequency in test state	P2		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during max. cooling or max. heating test

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
26	Compressor intermediate frequency in test state	P3		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during middle cooling or middle heating test
27	Overcurrent protection of phase current for compressor	P5		OFF 3S and blink 15 times					During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
28	Charging malfunction of capacitor	PU			OFF 3S and blink 17 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Refer to the part three—charging malfunction analysis of capacitor
29	Malfunction of module temperature sensor circuit	P7			OFF 3S and blink 18 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
30	Module high temperature protection	P8			OFF 3S and blink 19 times				During cooling operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	After the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
31	Decrease frequency due to high temperature resistant during heating operation	H0			OFF 3S and blink 10 times				All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
32	Static dedusting protection	H2			OFF 3S and blink twice					
33	Overload protection for compressor	H3			OFF 3S and blink 3 times	OFF 1S and blink 8 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1ohm. 2.Refer to the malfunction analysis (discharge protection, overload)

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
34	System is abnormal	H4			OFF 3S and blink 4 times	OFF 1S and blink 6 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (overload, high temperature resistant)
35	IPM protection	H5			OFF 3S and blink 5 times	OFF 1S and blink 4 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
36	Module temperature is too high	H5			OFF 3S and blink 5 times	OFF 1S and blink 10 times				
37	Internal motor (fan motor) do not operate	H6	OFF 3S and blink 11 times						Internal fan motor, external fan motor, compressor and electric heater stop operation,guide louver stops at present location.	1. Bad contact of DC motor feedback terminal. 2. Bad contact of DC motor control end. 3. Fan motor is stalling. 4. Motor malfunction. 5. Malfunction of mainboard rev detecting circuit.
38	Desynchronizing of compressor	H7			OFF 3S and blink 7 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
39	PFC protection	HC			OFF 3S and blink 6 times	OFF 1S and blink 14 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
40	Outdoor DC fan motor malfunction	L3	OFF 3S and blink 23 times				OFF 1S and blink 14 times		Outdoor DC fan motor malfunction lead to compressor stop operation,	DC fan motor malfunction or system blocked or the connector loosed
41	power protection	L9	OFF 3S and blink 20 times			OFF 1S and blink 9 times			compressor stop operation and Outdoor fan motor will stop 30s latter , 3 minutes latter fan motor and compressor will restart	To protect the electronical components when detect high power
42	Indoor unit and outdoor unit doesn't match	LP	OFF 3S and blink 19 times			OFF 1S and blink 16 times			compressor and Outdoor fan motor can't work	Indoor unit and outdoor unit doesn't match
43	Failure start-up	LC			OFF 3S and blink 11 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
44	Malfunction of phase current detection circuit for compressor	U1			OFF 3S and blink 13 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
45	Malfunction of voltage dropping for DC bus-bar	U3			OFF 3S and blink 20 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Supply voltage is unstable
46	Malfunction of complete units current detection	U5		OFF 3S and blink 13 times					During cooling and drying operation, the compressor will stop while indoor fan will operate; During heating operating, the complete unit will stop operation.	Theres circuit malfunction on outdoor units control panel AP1, please replace the outdoor units control panel AP1.
47	The four-way valve is abnormal	U7		OFF 3S and blink 20 times					If this malfunction occurs during heating operation, the complete unit will stop operation.	1.Supply voltage is lower than AC175V; 2.Wiring terminal 4V is loosened or broken; 3.4V is damaged, please replace 4V.
48	Zero-crossing malfunction of outdoor unit	U9	OFF 3S and blink 18 times						During cooling operation, compressor will stop while indoor fan will operate; during heating,the complete unit will stop operation.	Replace outdoor control panel AP1
49	Frequency limiting (power)						OFF 1S and blink 13 times			
50	Compressor running					OFF 1S and blink once				
51	The temperature for turning on the unit is reached						OFF 1S and blink 8 times			
52	Frequency limiting (module temperature)						OFF 1S and blink 11 times			

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
53	Normal communication							OFF 0.5S and blink once		
54	Defrosting				OFF 3S and blink once (during blinking, ON 10s and OFF 0.5s)	OFF 1S and blink twice			Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	Its the normal state

9.3 How to Check Simply the Main Part

Confirm the malfunction type according to the malfunction indicator of indoor/outdoor unit and malfunction sheet (usually the sheet will be stuck on the electric box cover or top cover of the unit).

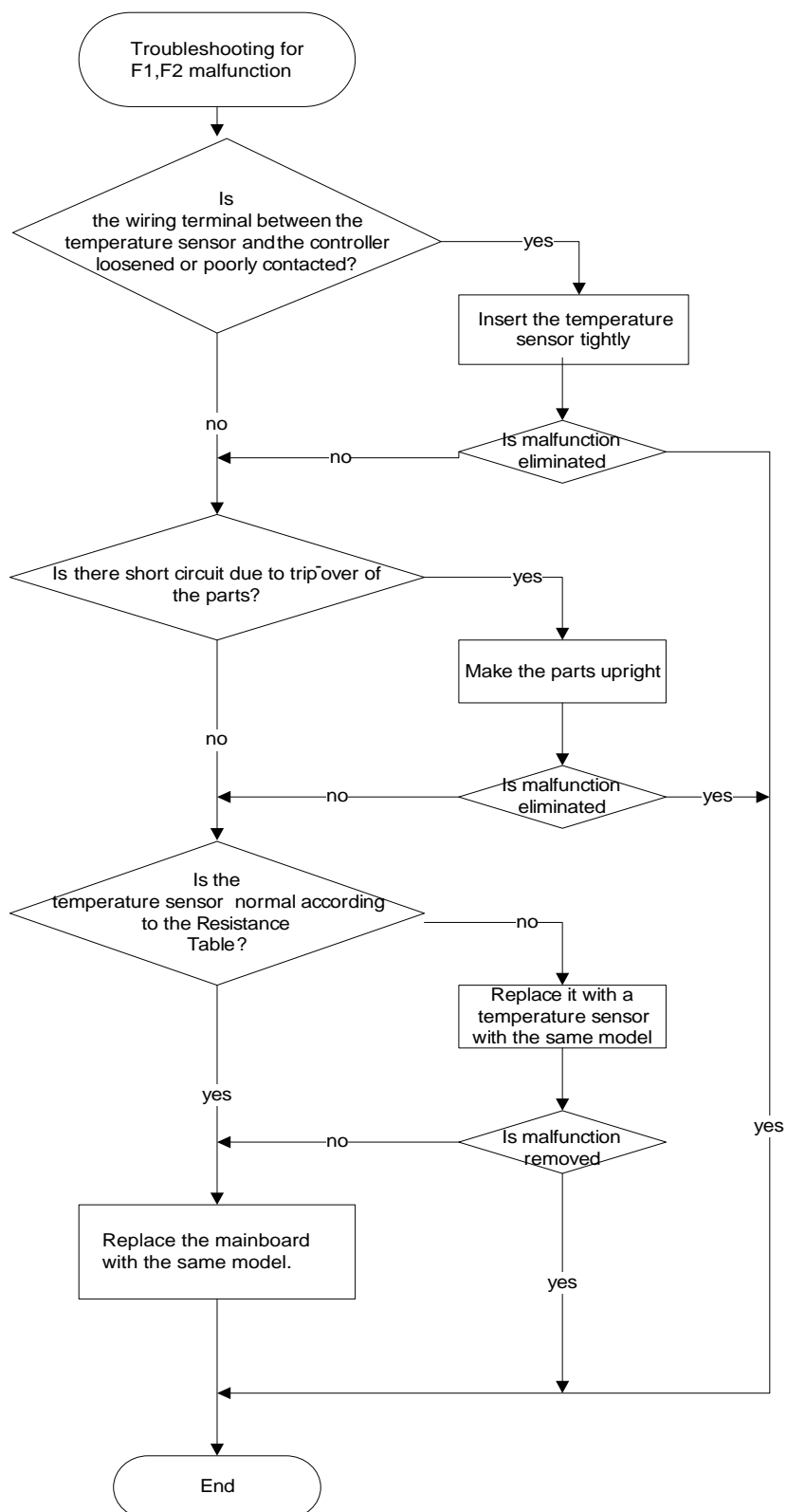
As long as there is a malfunction, the indicator of the outdoor controller board will display the corresponding malfunction directly; Some malfunctions will be displayed on the indoor unit directly and some malfunctions will be seen on the remote controller by pressing light button for 4 times in 3 seconds.

In the below malfunction diagnosis process, “Y” means “Yes”, “N” means “No”;

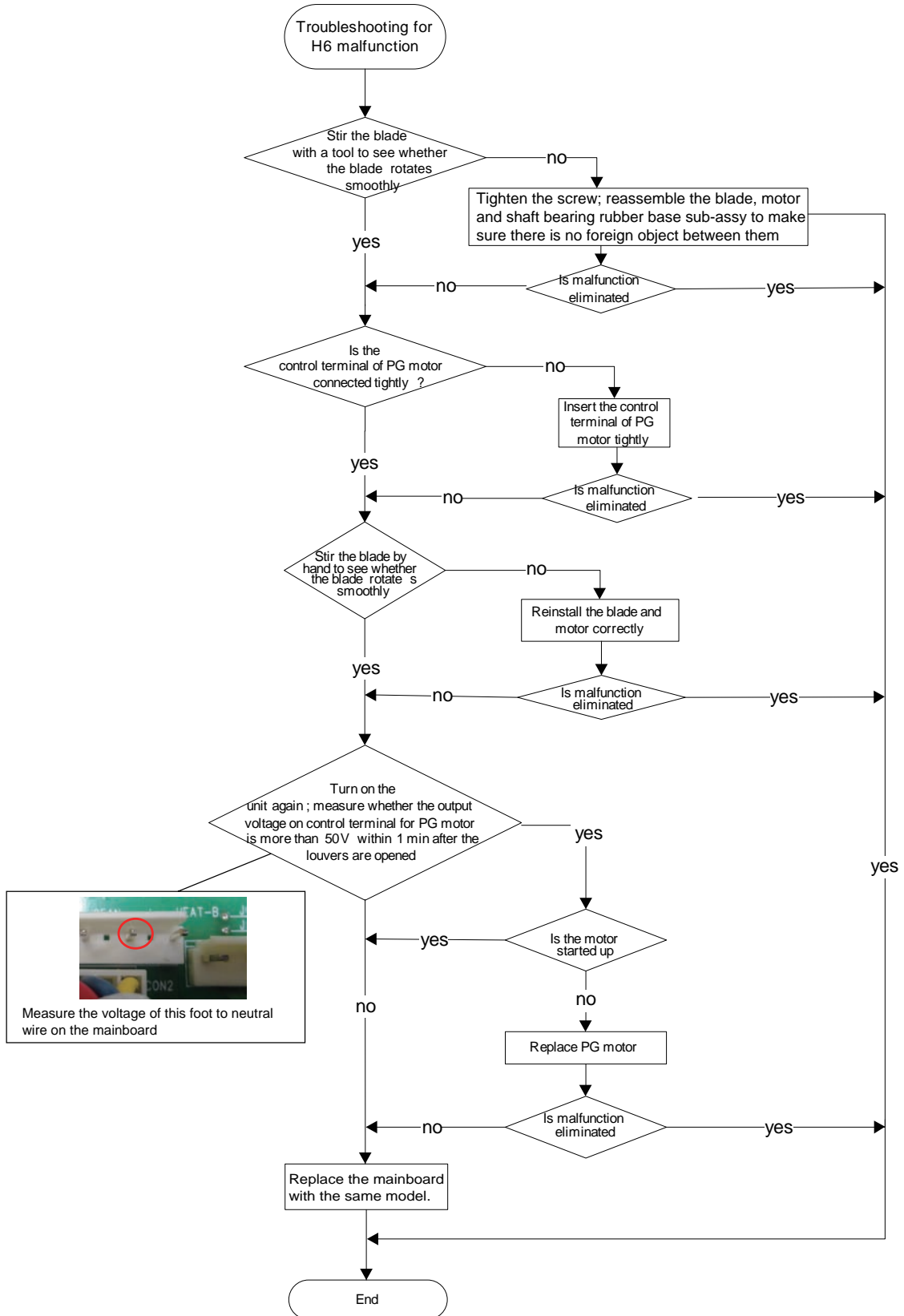
In the below malfunction diagnosis process, controller board AP1 is for outdoor controller board;

Before proceeding malfunction check, make sure the electrolytic capacitor safety, it may cause electric shock or break the controller board!

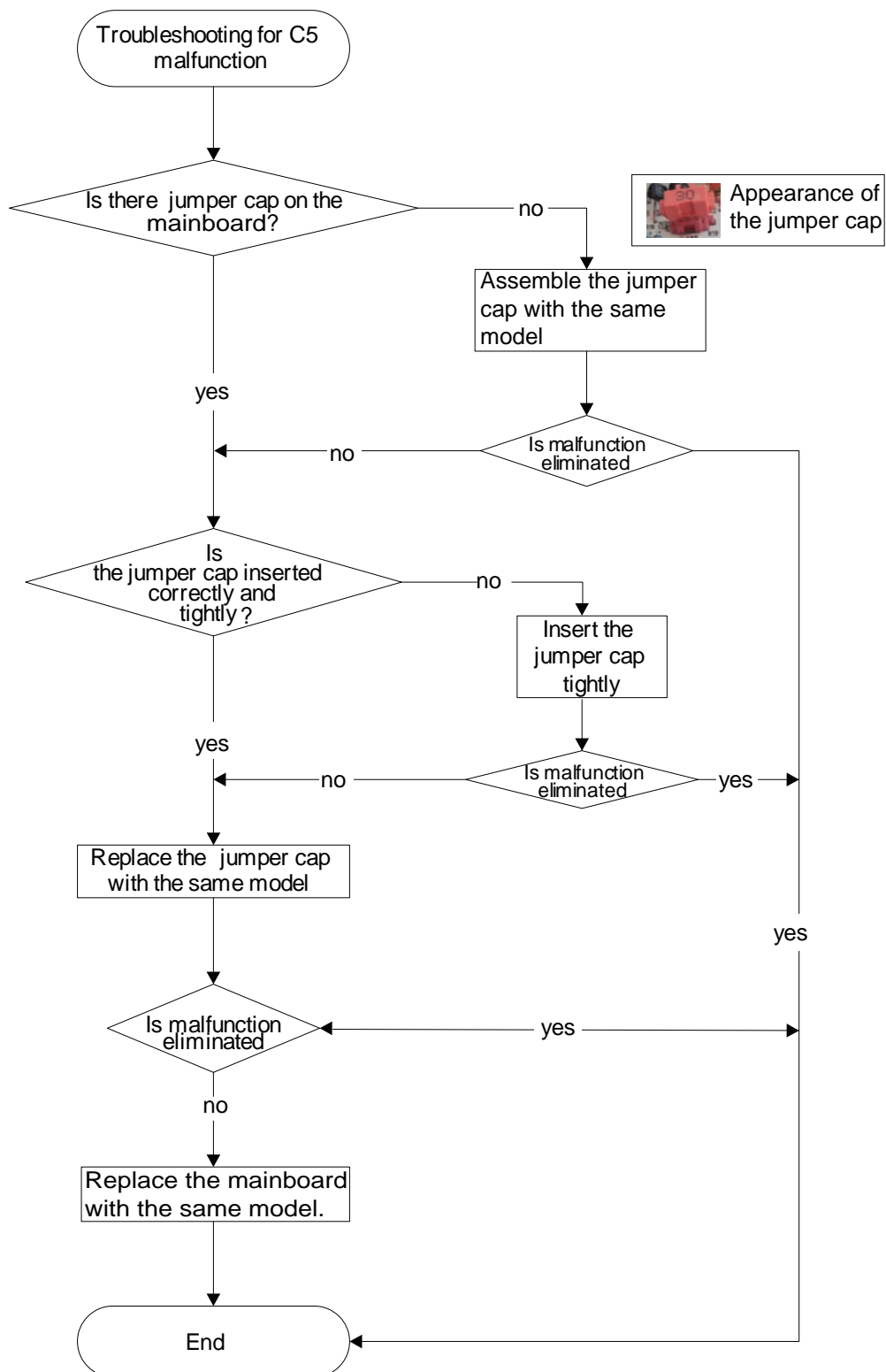
1. Malfunction of Temperature Sensor F1, F2



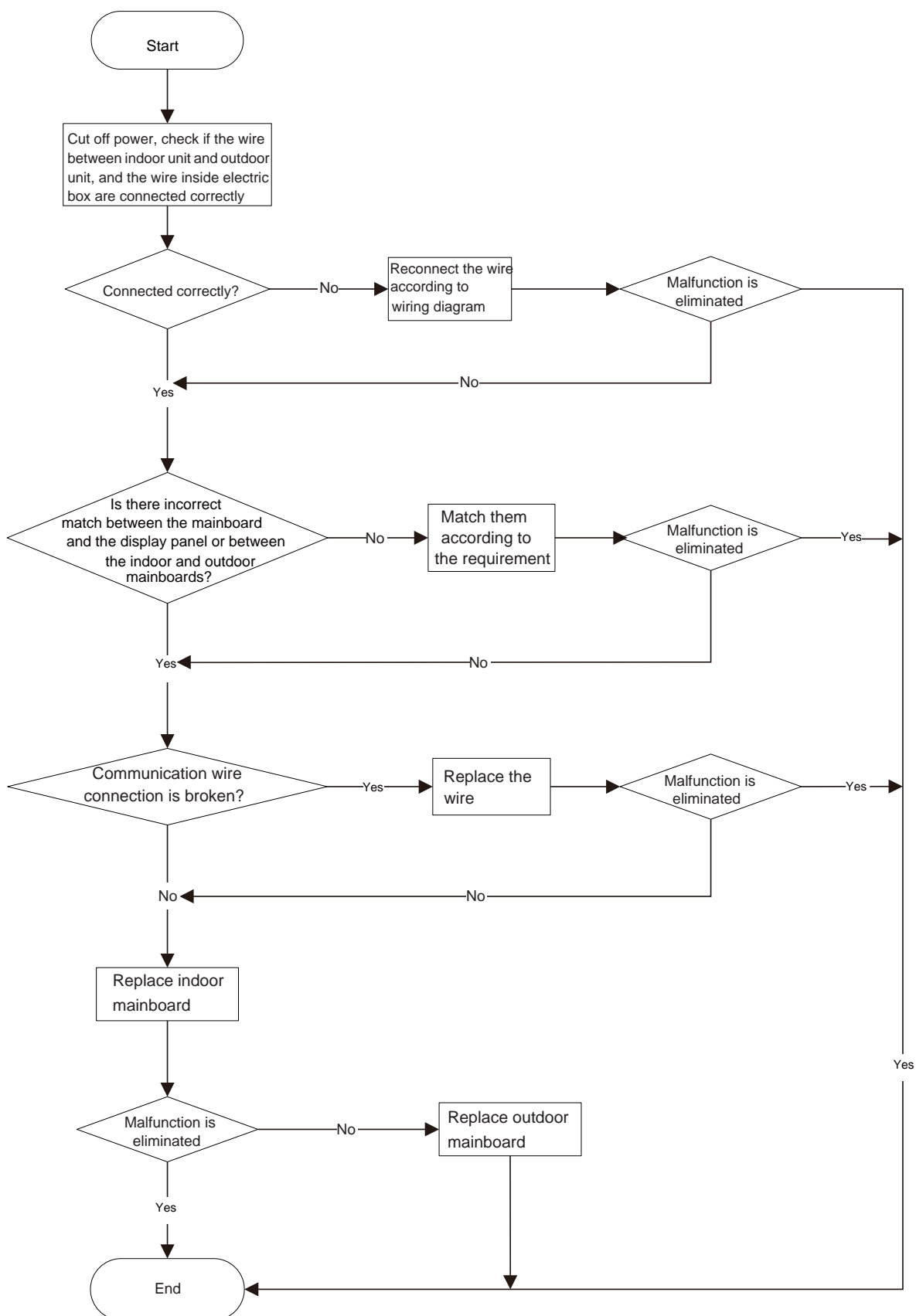
2. Malfunction of Blocked Protection of IDU Fan Motor H6



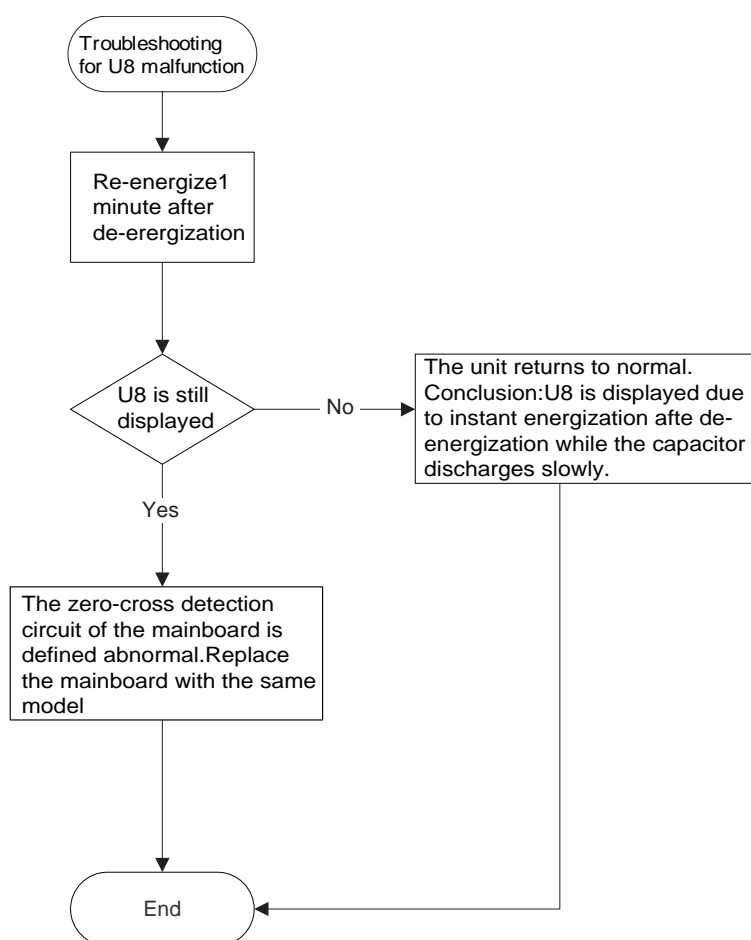
3. Malfunction of Protection of Jumper Cap C5



4. Communication malfunction E6



5. Malfunction of Zero-crossing Inspection Circuit Malfunction of the IDU Fan Motor U8

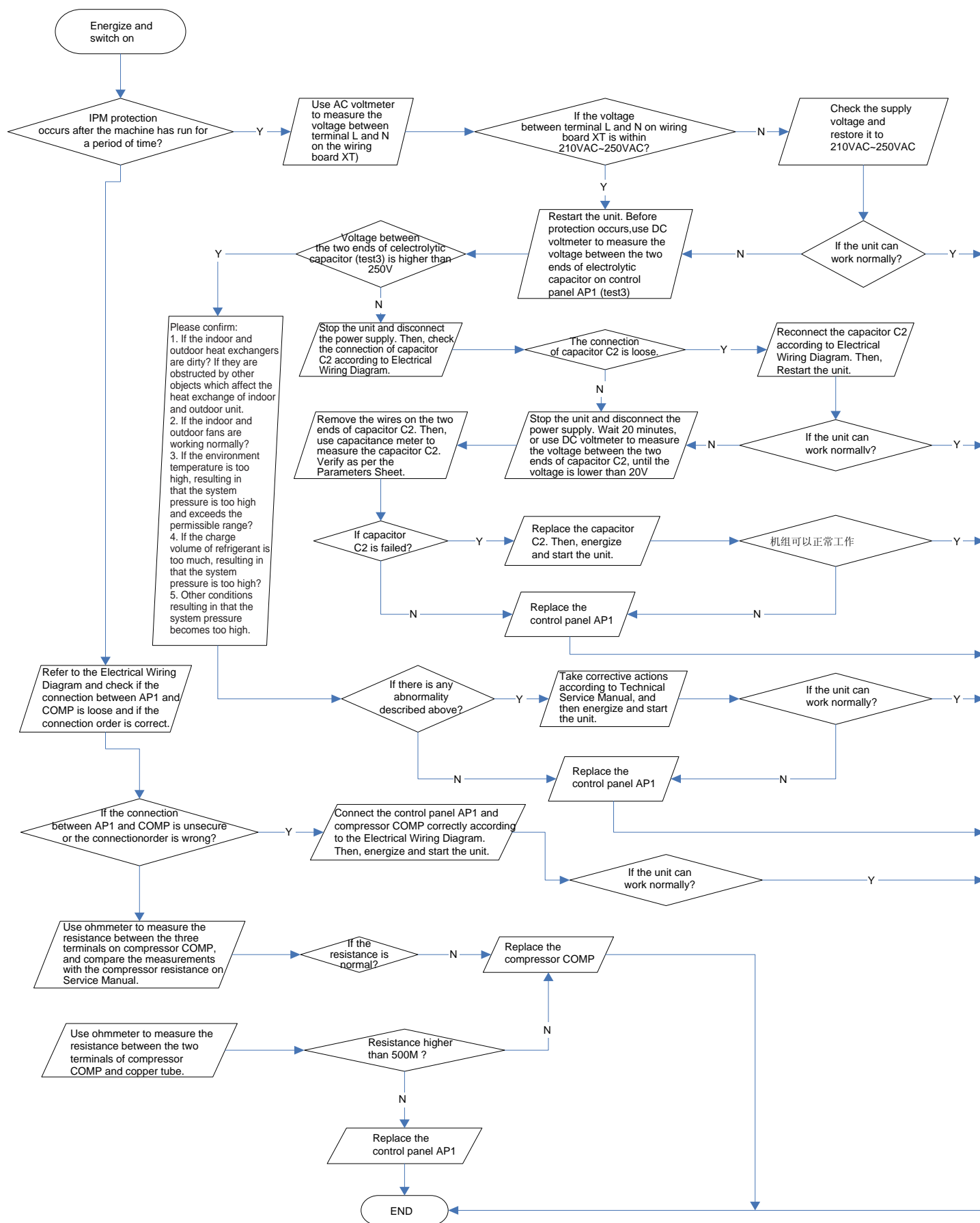


6. IPM protection, desynchronizing malfunction, phase current of compressor is overcurrent (outdoor unit malfunction)

Main detection point:

- If control board AP1 and compressor COMP is well connected? If they are loosened? If the connection sequence is correct?
- Is voltage input in the normal range (Test the voltage between L, N of wiring board XT by DC voltage meter)?
- If coil resistance of compressor is normal? Is compressor coil insulating to copper pipe well?
- If the work load of unit is heavy? If radiating of unit is well? If the refrigerant charging is appropriate?

Malfunction diagnosis process:

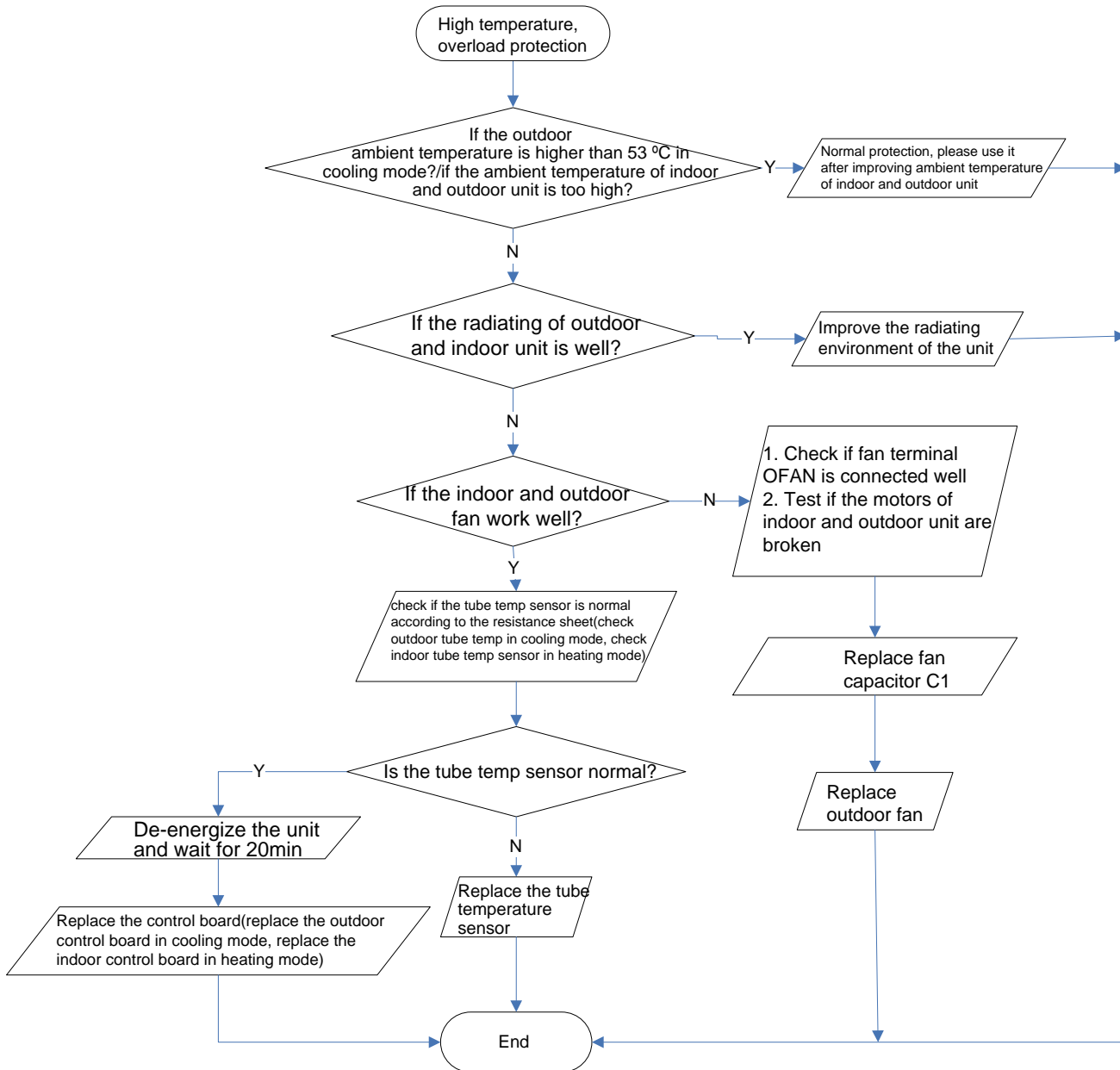


7. Diagnosis for high temperature, overload protection (check outdoor unit in cooling mode and check indoor unit in heating mode)

Main detection point:

- If the outdoor ambient temperature is in normal range;
- If the indoor and outdoor fan is running normally;
- If the radiating environment inside and outside the unit is well (including if the fan speed is too low)?
- If the tube temperature sensor of indoor and outdoor unit is normal?

Malfunction diagnosis process:

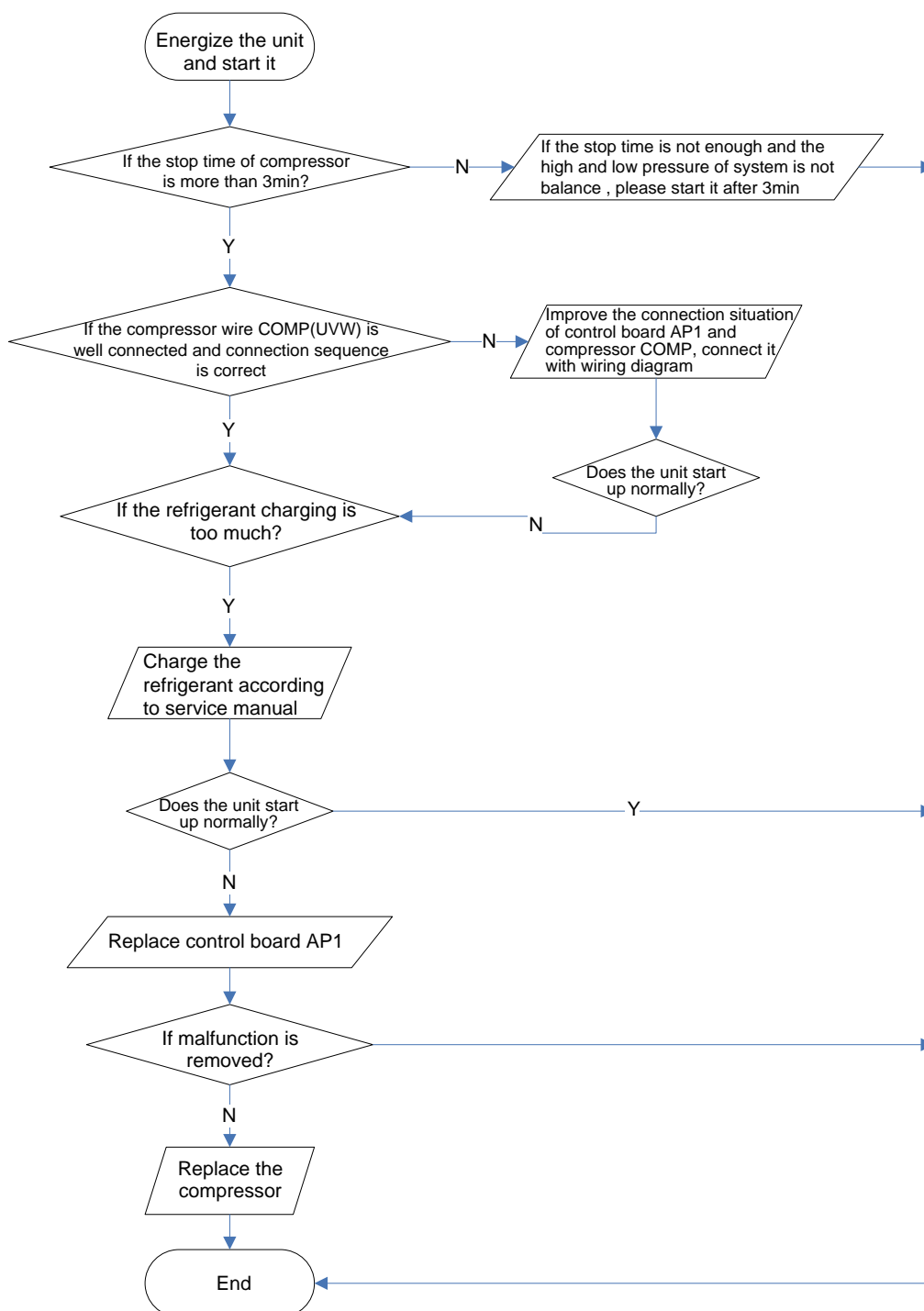


8. Diagnosis for failure start up malfunction (outdoor unit malfunction)

Main detection point:

- If the compressor wiring is correct?
- If the stop time of compressor is enough?
- If the compressor is damaged?
- If the refrigerant charging is too much?

Malfunction diagnosis process:

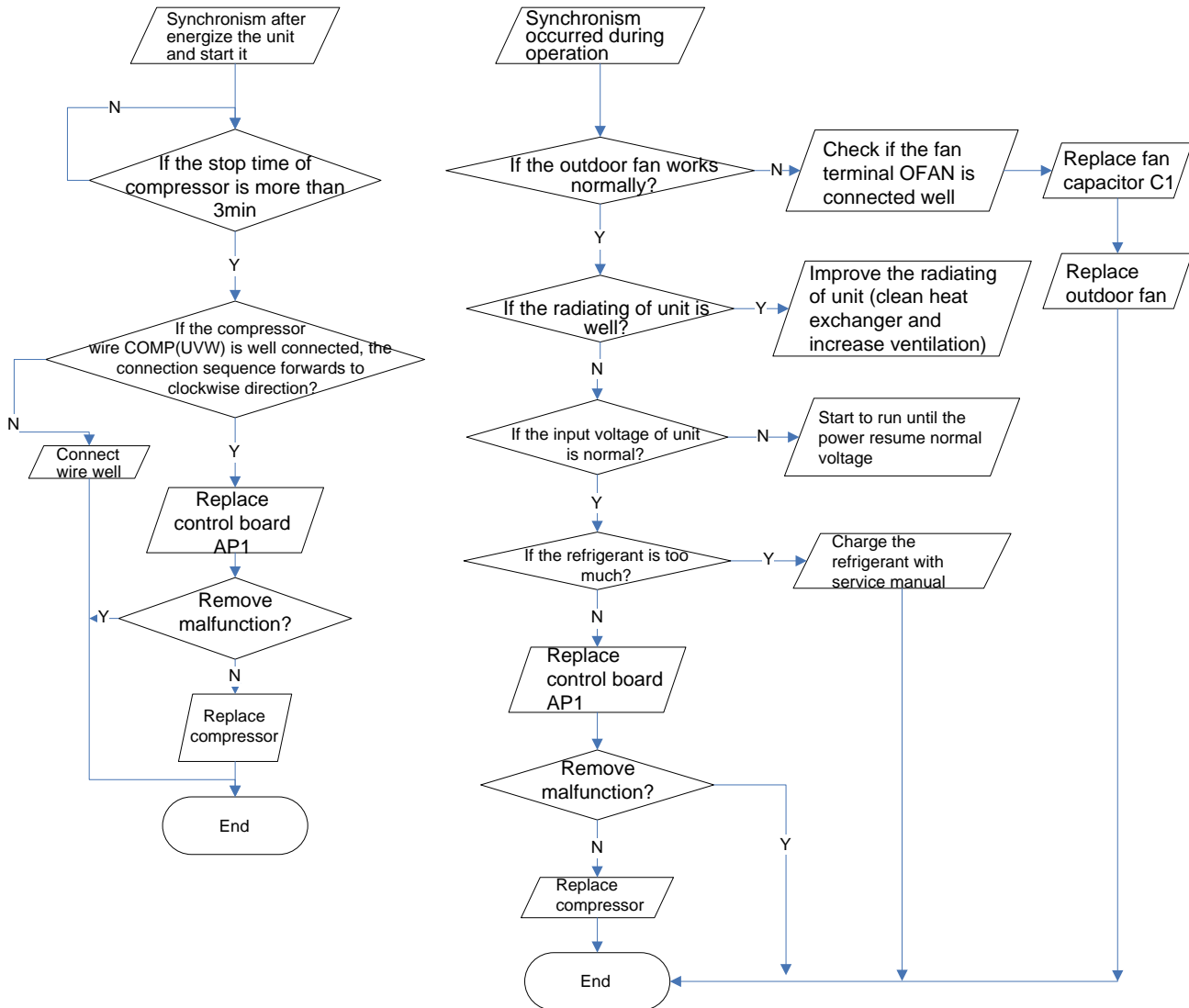


9. Diagnosis for compressor synchronism (outdoor unit malfunction)

Main detection point:

- If the system pressure is over-high?
- If the working voltage is over-low?

Malfunction diagnosis process:

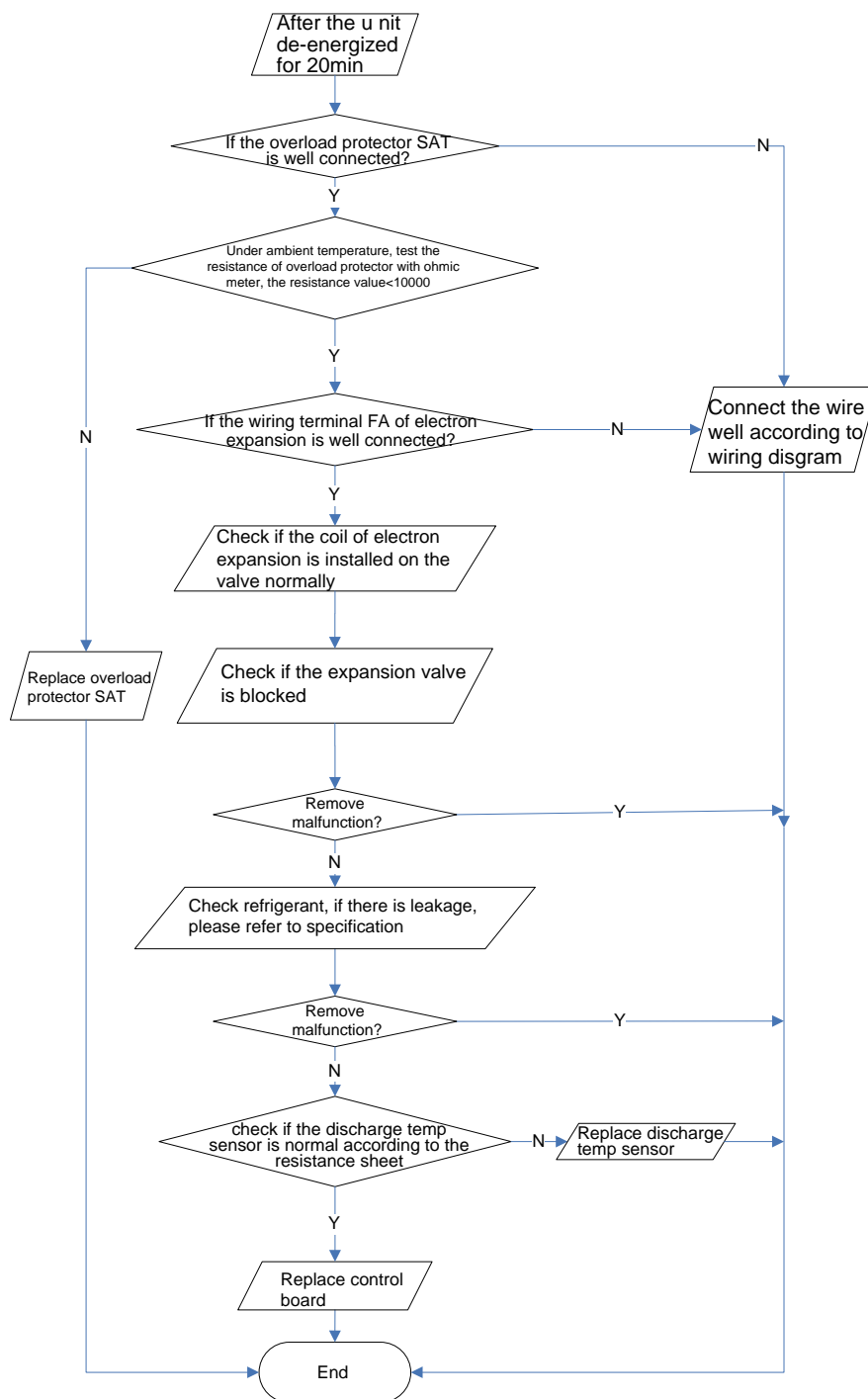


10. Diagnosis for overload and discharge malfunction (outdoor unit malfunction)

Main detection point:

- If the electron expansion valve is connected well? Is the expansion valve damaged?
- If the refrigerant is leakage?
- If the overload protector is damaged?
- If the discharge temp sensor is damaged?

Malfunction diagnosis process:

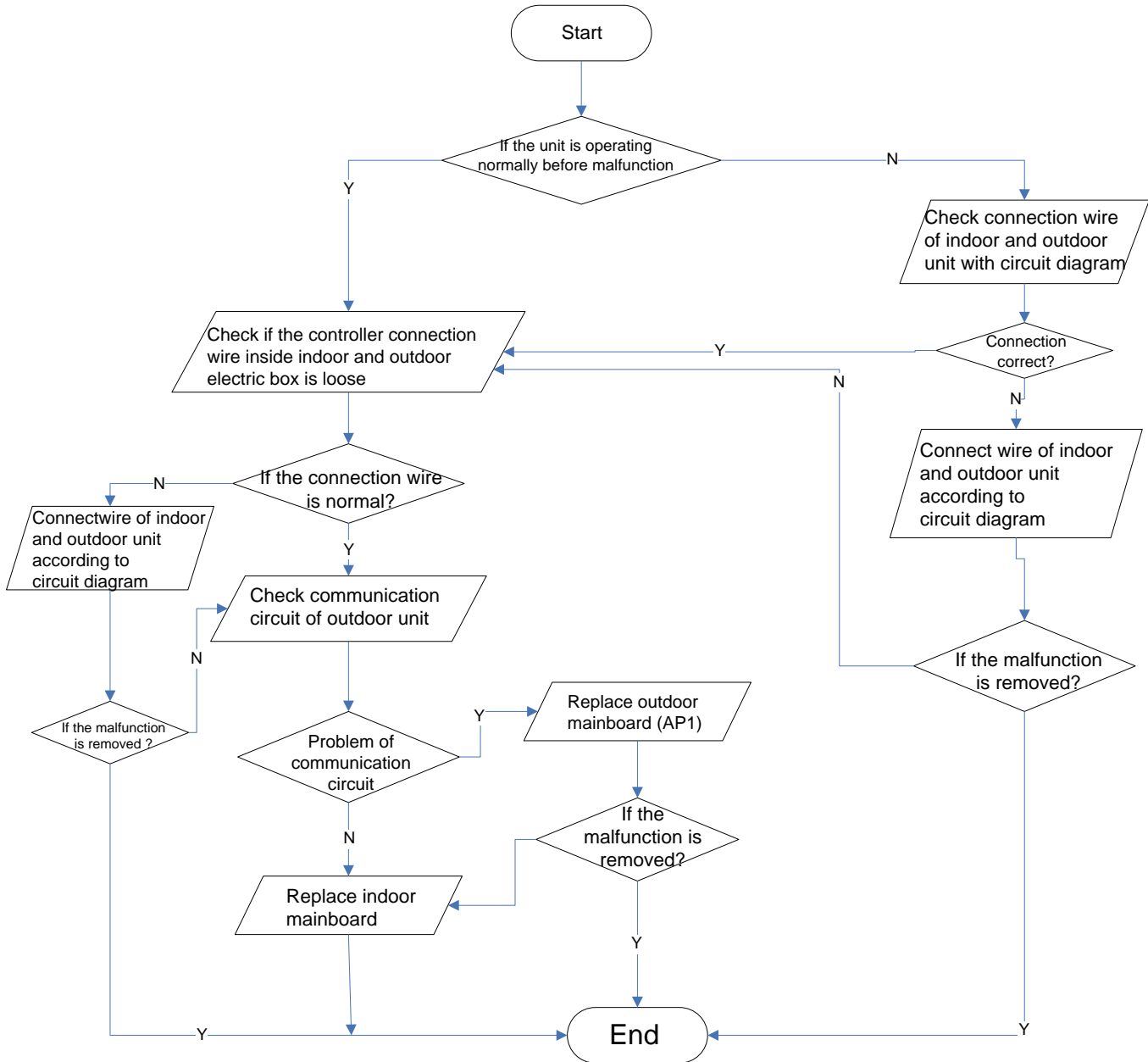


11. Communication malfunction

Main detection point:

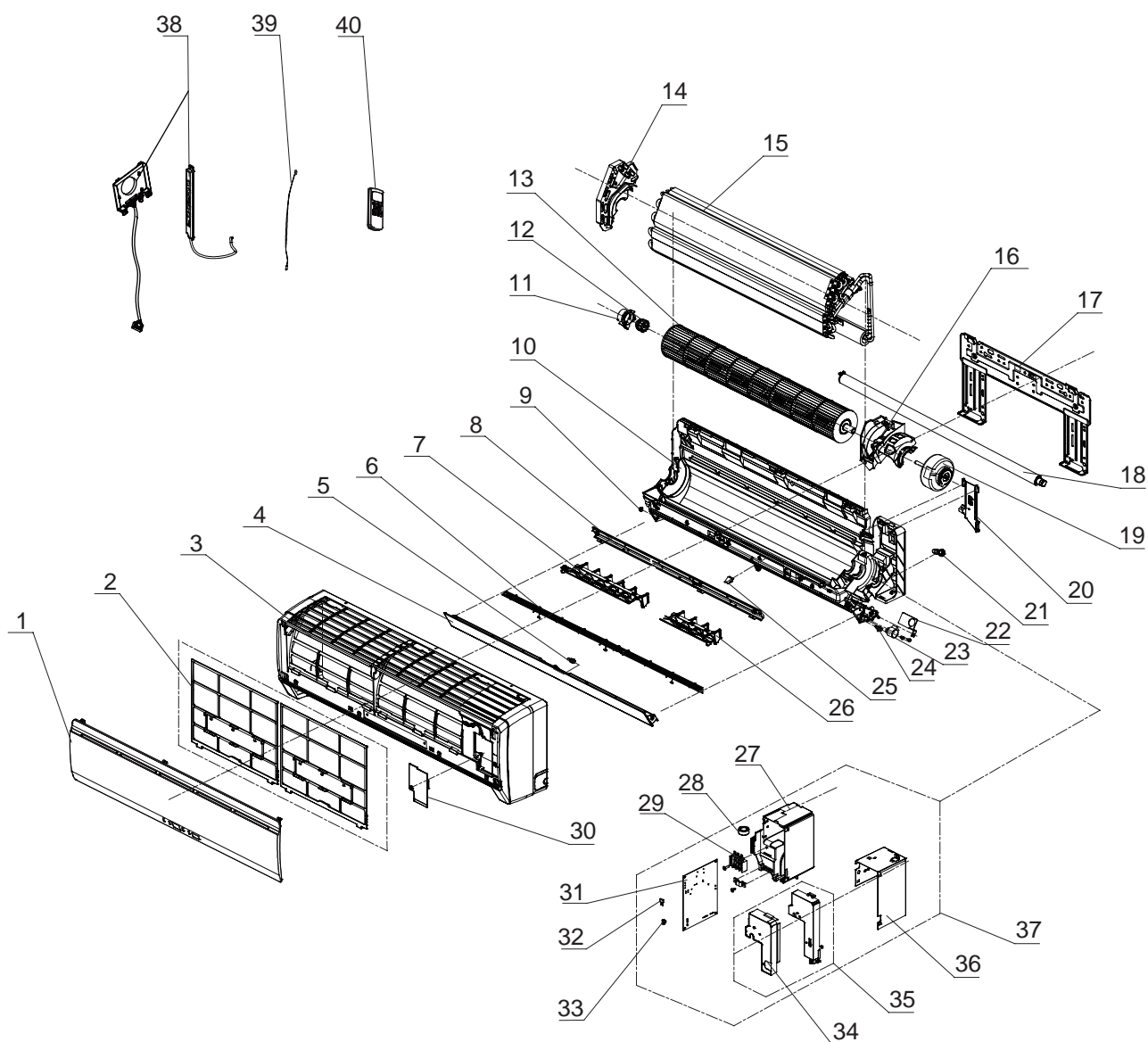
- Check if the connection wire and the built-in wiring of indoor and outdoor unit is connected well and no damaged;
- If the communication circuit of indoor mainboard is damaged? If the communication circuit of outdoor mainboard (AP1) is damaged?

Malfunction diagnosis process:



10. Exploded View and Parts List

10.1 Indoor Unit

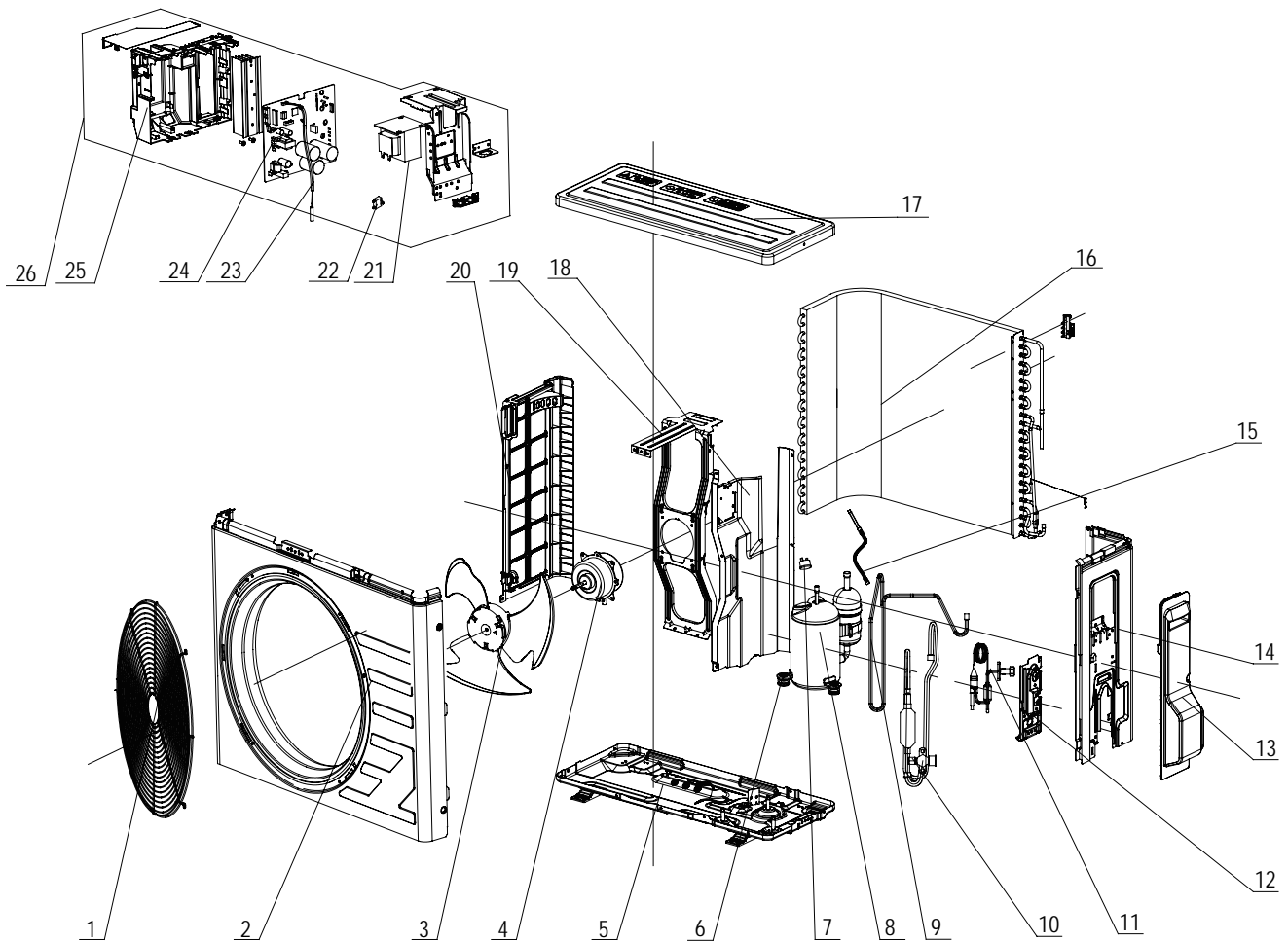


No.	Description	Part Code	Qty
		ACZEM4H4R09	
		CB162N08200_L14385	
1	Front Panel Sub-Assy	20012558_L14385	1
2	Filter Sub-Assy	1112220403	2
3	Front Case Sub-assy	2001213931	1
4	Guide Louver	10512157	1
5	Axile Bush	10542036	1
6	Rear Grill	01472013	1
7	Air Louver 2	10512165	1
8	Helicoid Tongue	26112163C	1
9	Left Axile Bush	10512037	1
10	Rear Case assy	2220210309	1
11	Ring of Bearing	26152022	1
12	O-Gasket sub-assy of Bearing	7651205102	1
13	Cross Flow Fan	10352017	1
14	Evaporator Support	24212091	1
15	Evaporator Assy	01002424	1
16	Motor Press Plate	26112161	1
17	Wall Mounting Frame	01252021	1
18	Drainage Hose	0523001401	1
19	Fan Motor	1501208905	1
20	Connecting pipe clamp	26112164	1
21	Rubber Plug (Water Tray)	76712012	1
22	Cable Cross Plate	02122039	1
23	Stepping Motor	1521212901	1
24	Crank	10582070	1
25	Screw Cover	24252016	1
26	Air Louver 1	10512164	1
27	Electric Box	2011216702	1
28	Magnetic Ring	49010104	1
29	Terminal Board	42011233	1
30	Electric Box Cover2	2012207504	1
31	Main Board	30148875	1
32	Capacitor CBB61	33010002	1
33	Jumper	4202300106	1
34	Shield Cover of Electric Box	01412036	1
35	Shield Cover of Electric Box Sub-assy	01592073	1
36	Lower Shield Sub-assy of Electric Box	01592072	1
37	Electric Box Assy	10000200510	1
38	Display Board	30565026	1
39	Temperature Sensor	390000453/390000599	1/1
40	Remote Controller	30510092_L14385	1

Above data is subject to change without notice.

No.	Description	Part Code		Qty
		ACZEM4C4R12	ACZEM4H4R12	
	Product Code	CB162N08700_L17107	CB162N08100_L14385	
1	Front Panel Sub-Assy	20012830_L17107	20012830_L14385	1
2	Filter Sub-Assy	1112220403	1112220403	2
3	Front Case Sub-assy	2001213931	2001213931	1
4	Guide Louver	10512157	10512157	1
5	Axile Bush	10542036	10542036	1
6	Rear Grill	01472013	01472013	1
7	Air Louver 2	10512165	10512165	1
8	Helicoid Tongue	26112163C	26112163C	1
9	Left Axile Bush	10512037	10512037	1
10	Rear Case assy	2220210309	2220210309	1
11	Ring of Bearing	26152022	26152022	1
12	O-Gasket sub-assy of Bearing	7651205102	7651205102	1
13	Cross Flow Fan	10352017	10352017	1
14	Evaporator Support	24212091	24212091	1
15	Evaporator Assy	0100242201	0100242201	1
16	Motor Press Plate	26112161	26112161	1
17	Wall Mounting Frame	01252021	01252021	1
18	Drainage Hose	0523001401	0523001401	1
19	Fan Motor	1501208905	1501208905	1
20	Connecting pipe clamp	26112164	26112164	1
21	Rubber Plug (Water Tray)	76712012	76712012	1
22	Cable Cross Plate	02122039	02122039	1
23	Stepping Motor	1521212901	1521212901	1
24	Crank	10582070	10582070	1
25	Screw Cover	24252016	24252016	1
26	Air Louver 1	10512164	10512164	1
27	Electric Box	2011216702	2011216702	1
28	Magnetic Ring	49010104	49010104	1
29	Terminal Board	42011233	42011233	1
30	Electric Box Cover2	2012207504	2012207504	1
31	Main Board	30138000243	30148875	1
32	Capacitor CBB61	33010002	33010002	1
33	Jumper	4202300107	4202300107	1
34	Shield Cover of Electric Box	01412036	01412036	1
35	Shield Cover of Electric Box Sub-assy	01592073	01592073	1
36	Lower Shield Sub-assy of Electric Box	01592072	01592072	1
37	Electric Box Assy	10000201033	10000200511	1
38	Display Board	30565073	30565026	1
39	Temperature Sensor	390000453/390000599	390000453/390000599	1/1
40	Remote Controller	30510092_L17107	30510092_L14385	1

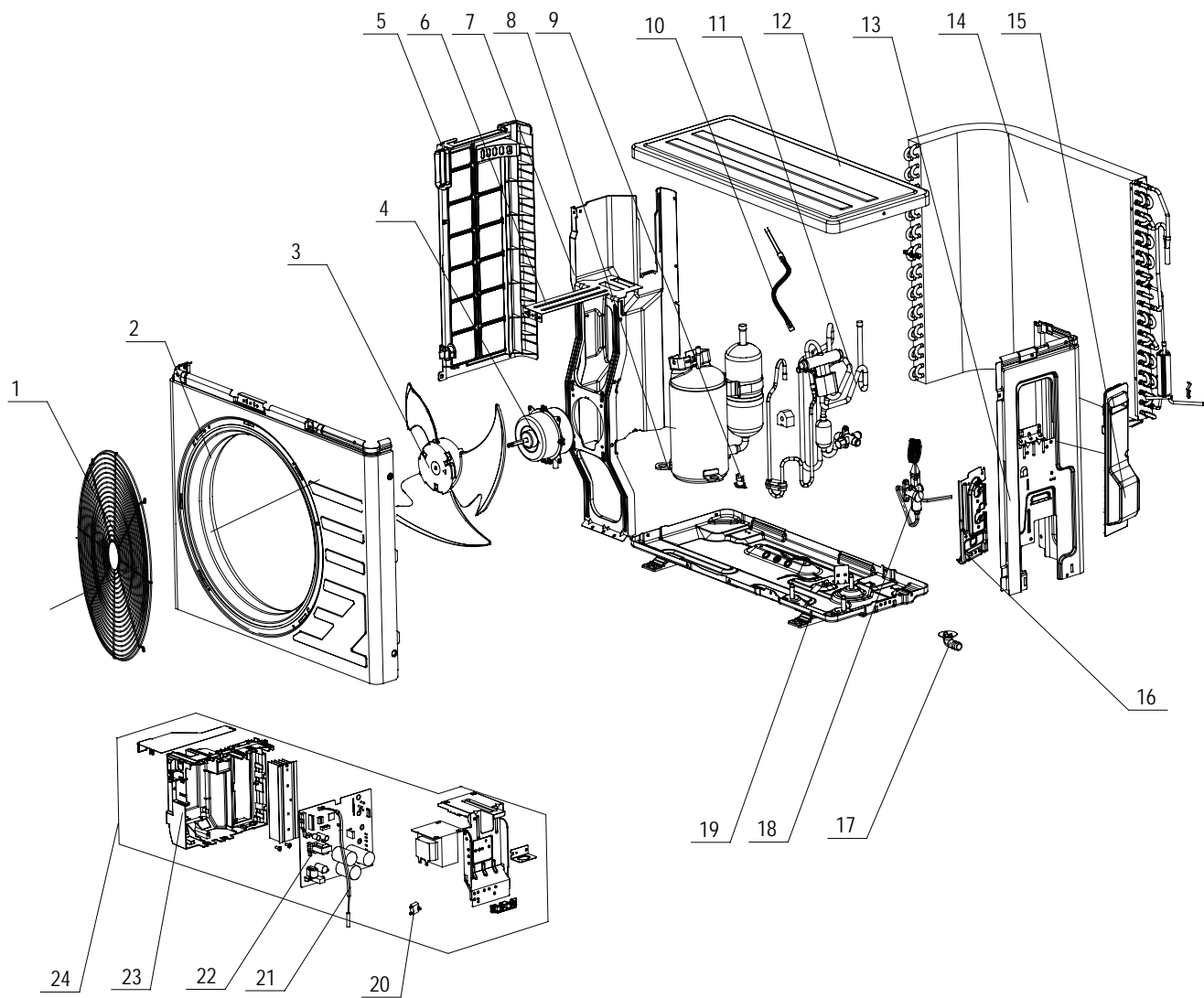
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No.	Description	Part Code	Qty
		ACZCI4C4R12	
	Product Code	CB145W04500_L17107	
1	Front Grill	01473051	1
2	Cabinet	0143304401P	1
3	Axial Flow Fan Sub-Assy	1033300901	1
4	Fan Motor	1501307301	1
5	Chassis Sub-assy	02803265P	1
6	Compressor Gasket	76710302	3
7	Compressor Overload Protector(External)	00183032	1
8	Compressor and Fittings	00103896G	1
9	Discharge Tube	03833586	1
10	Cut off Valve Assy	07133841	1
11	Cut off Valve Assy	07133960	1
12	Valve Support	01713089	1
13	Handle	26233044	1
14	Right Side Plate Sub-Assy	0130318001	1
15	Electric Heater(Compressor)	76612814	0
16	Condenser Assy	01163944	1
17	Top Cover Sub-Assy	01253071	1
18	Clapboard	01233088	1
19	Motor Support	01703122	1
20	Left Side Plate	20053001	1
21	Reactor	43130184	1
22	Capacitor CBB61	33010034	1
23	Temperature Sensor	3900030805	1
24	Main Board	30138000230	1
25	Electric Box Sub-Assy	01403000177	1
26	Electric Box Assy	014031000168	1

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ACZCI4H4R09 ACZCI4H4R12




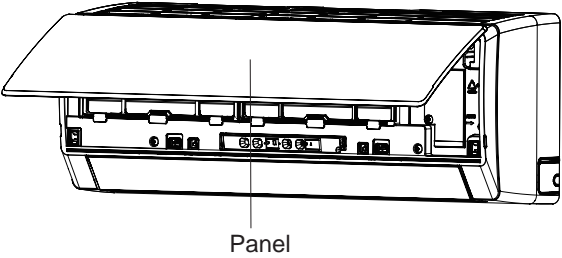
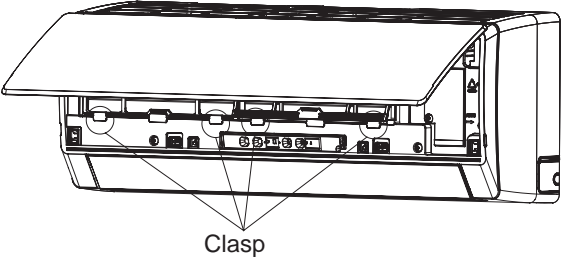
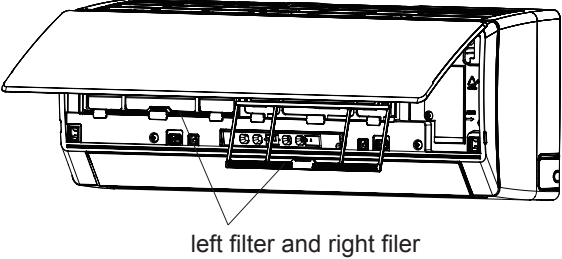
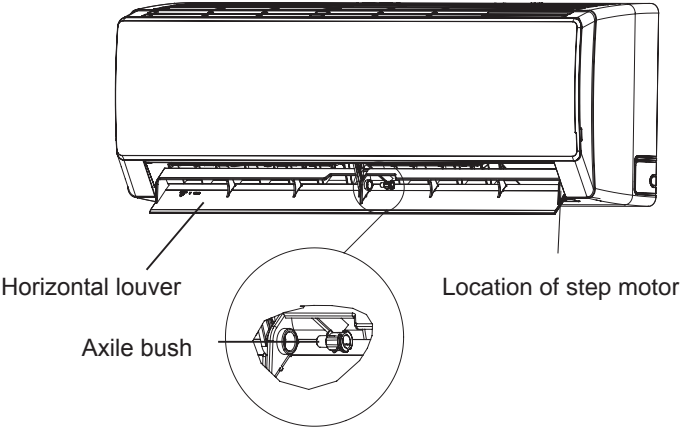
No.	Description	Part Code		Qty
		ACZCI4H4R09	ACZCI4H4R12	
		Product Code	Product Code	
		CB145W04400_L14385	CB145W04600_L14385	
1	Front Grill	01473051	01473051	1
2	Cabinet	0143304401P	0143304401P	1
3	Axial Flow Fan Sub-Assy	1033300901	1033300901	1
4	Fan Motor	1501307301	1501307301	1
5	Left Side Plate	20053001	20053001	1
6	Motor Support	0170312201	01703122	1
7	Clapboard	01233088	01233088	1
8	Compressor and Fittings	00103896G	00103896G	1
9	Compressor Overload Protector(External)	00183032	00183032	1
10	Electric Heater(Compressor)	76612814	76612814	0
11	4-Way Valve Assy	03073299	03073152	1
12	Top Cover Sub-Assy	01253071	01253071	1
13	Right Side Plate Sub-Assy	0130318001	0130318001	1
14	Condenser Assy	01103000205	01163946	1
15	Handle	26233044	26233044	1
16	Valve Support	01713089	01713089	1
17	Drainage Joint	06123024	06123024	1
18	Cut off Valve Assy	07133962	07133963	1
19	Chassis Sub-assy	02803264P	02803264P	1
20	Capacitor CBB61	33010034	33010034	1
21	Temperature Sensor	3900030805	3900030805	1
22	Main Board	30138000229	30138000228	1
23	Electric Box Sub-Assy	01403000194	01403000195	1
24	Electric Box Assy	01403000192	01403000193	1

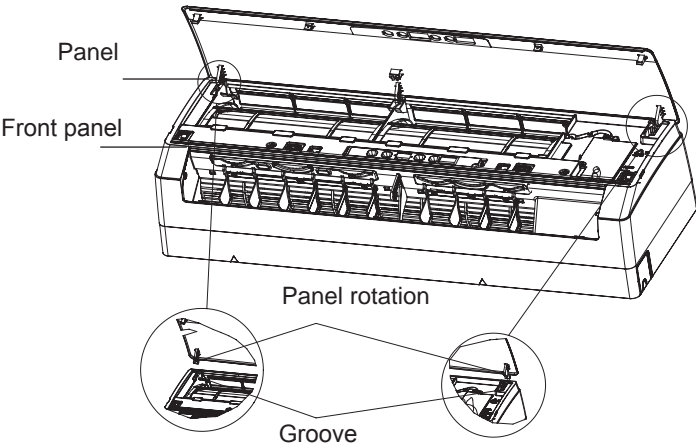
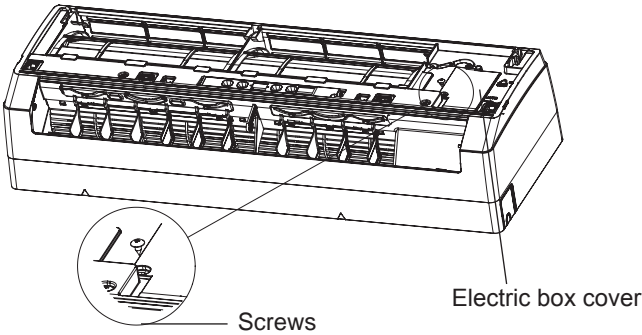
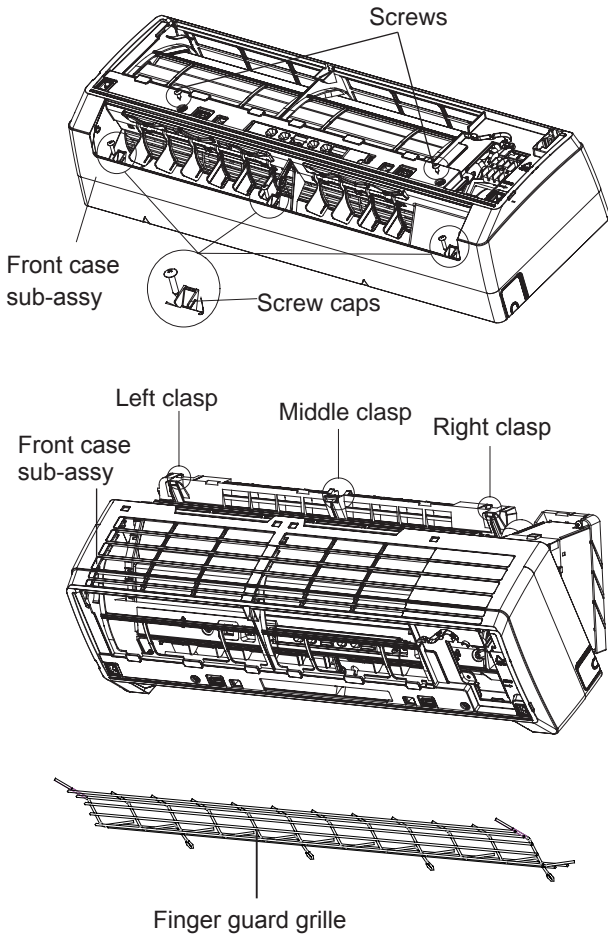
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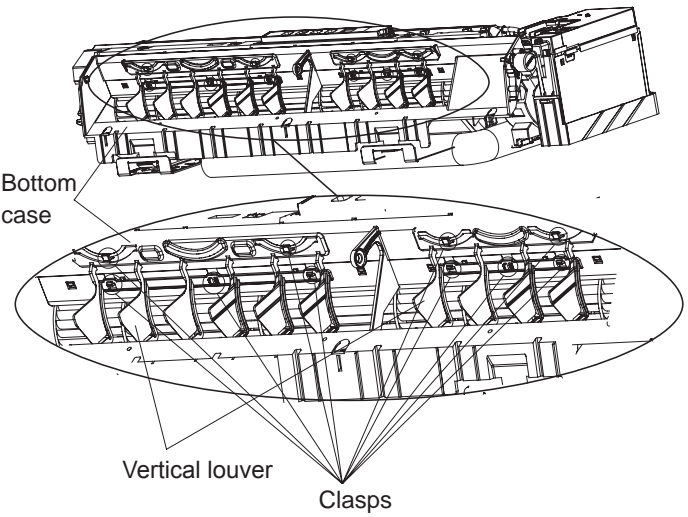
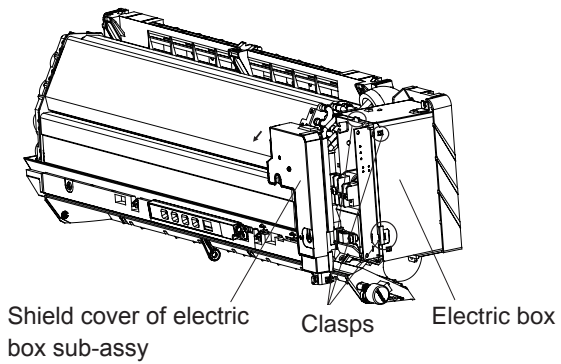
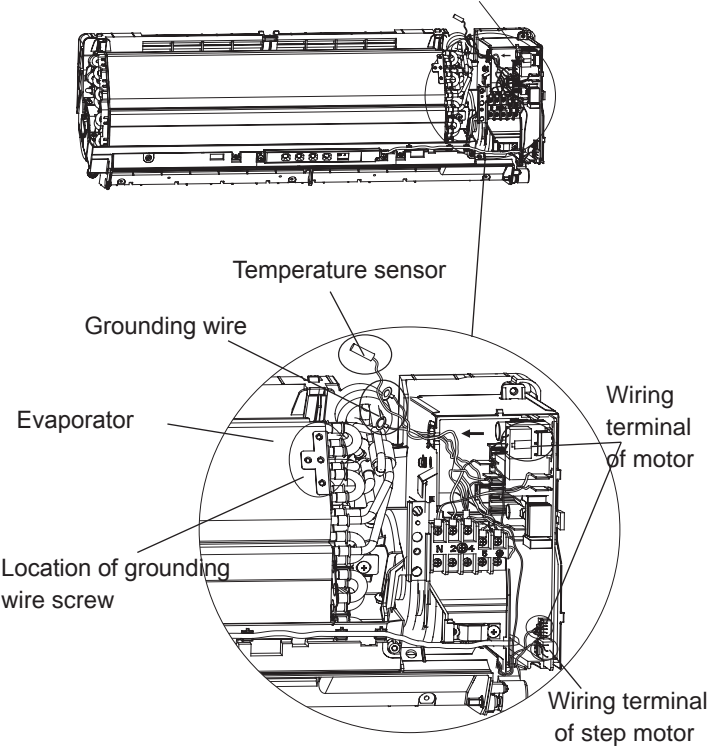
11. Removal Procedure

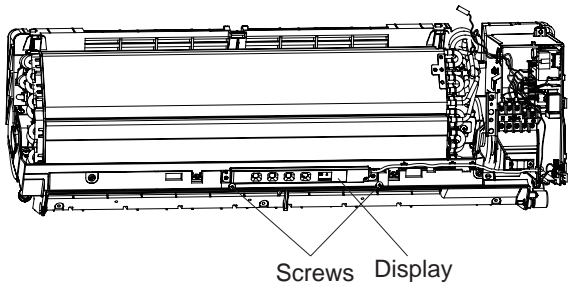
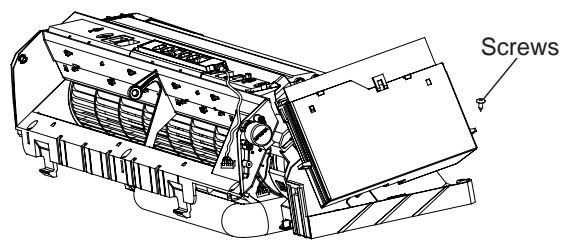
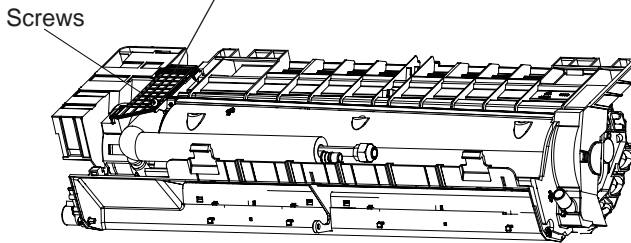
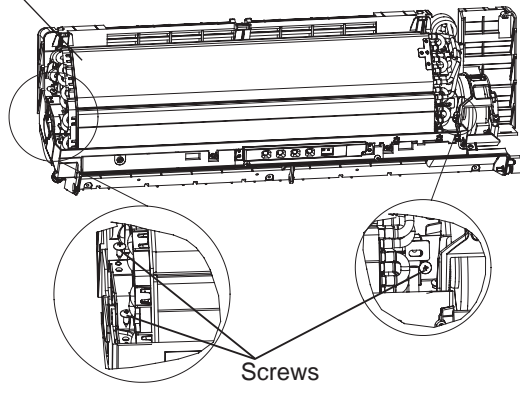
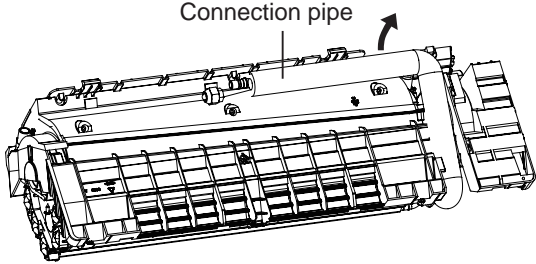
11.1 Removal Procedure of Indoor Unit

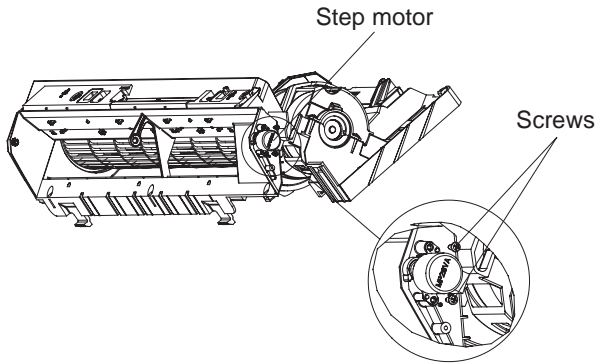
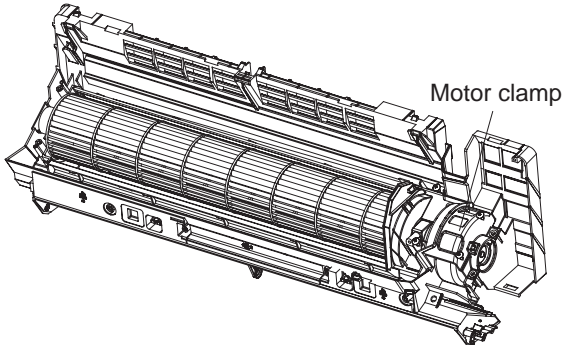
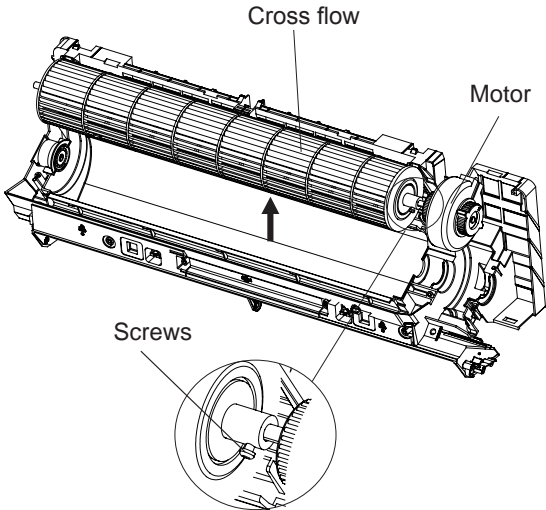
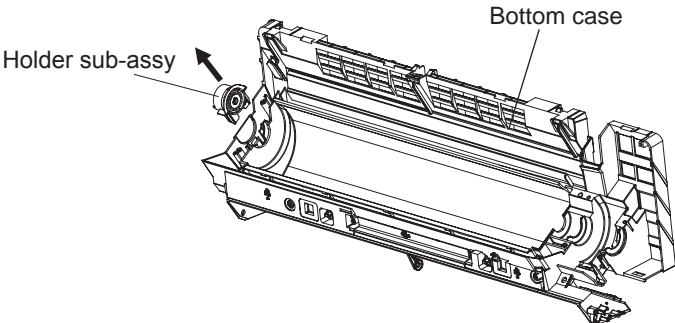
 **Caution: discharge the refrigerant completely before removal.**

Steps	Procedure	
1. Remove filter		
a	Open the panel.	
b	Loosen the clasp shown in the fig and then pull the left filter and right filter outwards to remove them.	 
2. Remove horizontal louver		
	Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crankshaft of step motor to remove it.	

Steps		Procedure
3. Remove panel	<p>Open the front panel; separate the panel rotation shaft from the groove fixing the front panel and then removes the front panel.</p> <p>Note: The display of some models is fixed on the panel; unscrew the screws fixing the display on the panel before removing the panel.</p>	
4. Remove electric box cover	<p>Remove the screws on the electric box cover to remove the electric box cover.</p>	
5. Remove front case sub-assy	<p>Remove the screws fixing front case.</p> <p>Note: 1. Open the screw caps before removing the screws around the air outlet. 2. The quantity of screws fixing the front case sub-assy is different for different models.</p> <p>a</p> <p>b</p> <p>c</p> <p>Loosen the clasps at left, middle and right sides of front case. Lift the front case sub-assy upwards to remove it.</p> <p>Remove screws fixing the finger guard grille and then remove the finger guard grille</p>	

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

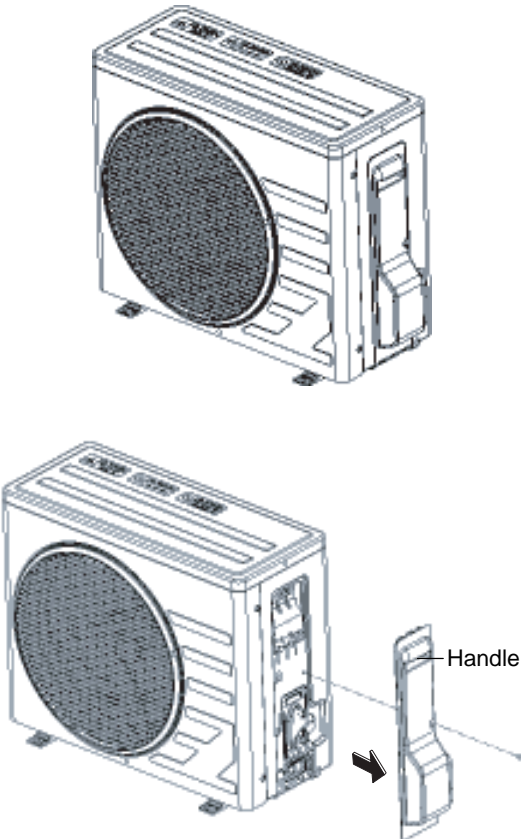
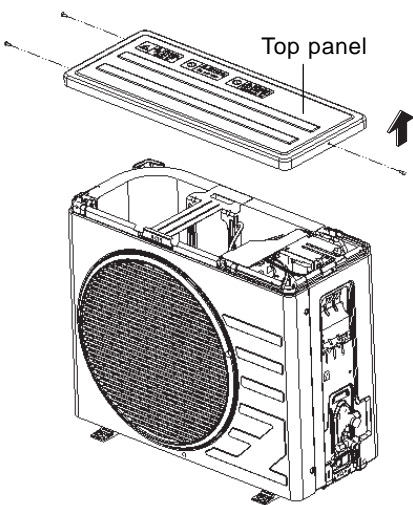
Steps	Procedure	
c	<p>Remove two screws fixing display.</p> <p>Note: The display of some models is fixed on the panel; unscrew the screws fixing the display on the panel before removing the panel.</p>	 <p>Screws Display</p>  <p>Screws</p>
8. Remove evaporator assy		
a	<p>At the back of the unit, remove the screw fixing connection pipe clamp and then remove the connection pipe clamp.</p>	 <p>Connection pipe clamp</p> <p>Screws</p>
b	<p>Remove 3 screws fixing evaporator assy.</p>	 <p>Evaporator assy</p> <p>Screws</p>
c	<p>Adjust the position of connection pipe on evaporator slightly and then lift the evaporator upwards to remove it.</p>	 <p>Connection pipe</p>

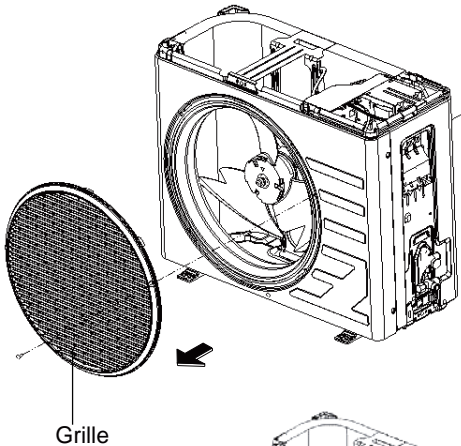
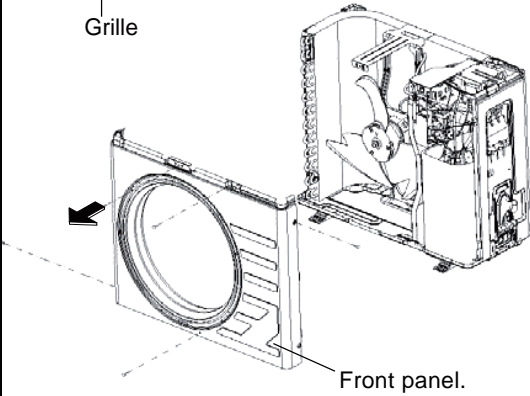
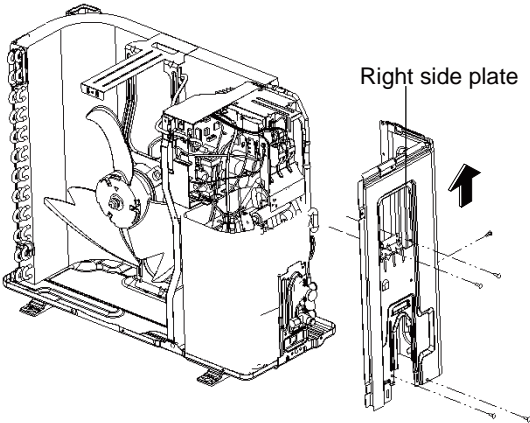
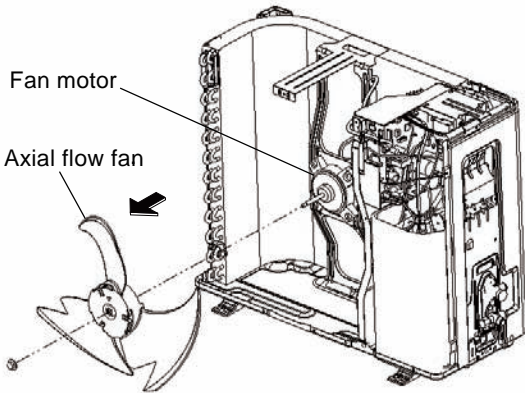
Steps	Procedure	
9. Remove stepping motor		
	Remove the screw fixing step motor and then remove the step motor.	
10. Remove motor and cross flow blade		
a	Remove the screws fixing motor clamp and then remove the motor clamp.	
b	Remove the screws at the connection place of cross flow blade and motor;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

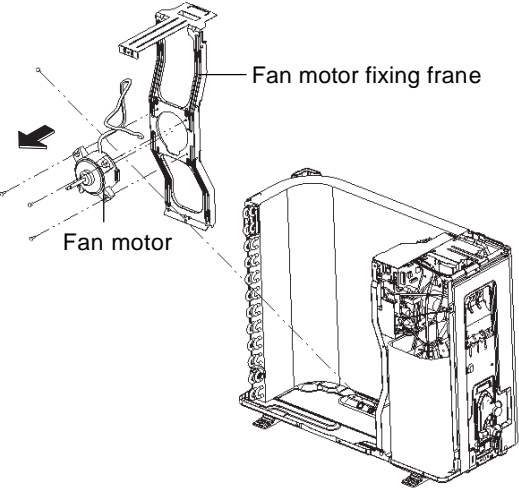
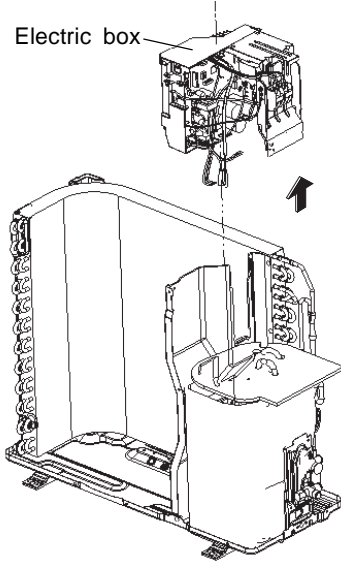
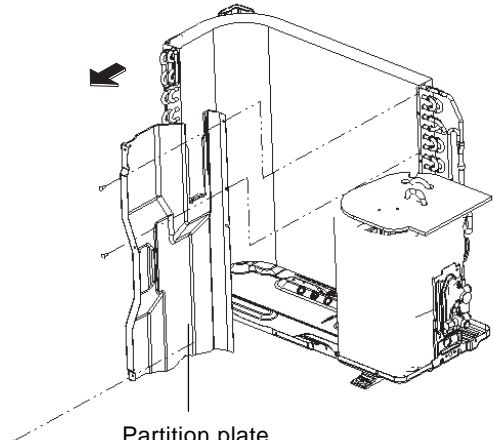
11.2 Removal Procedure of Outdoor Unit

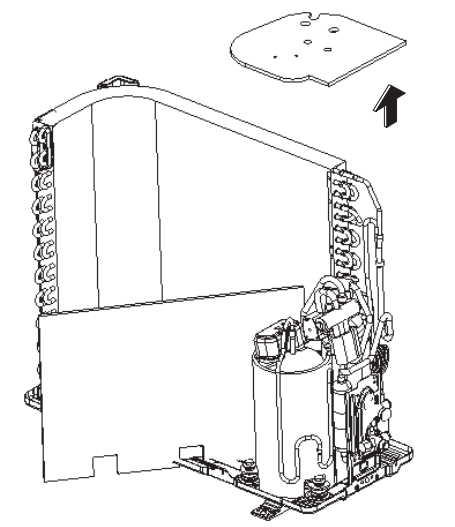
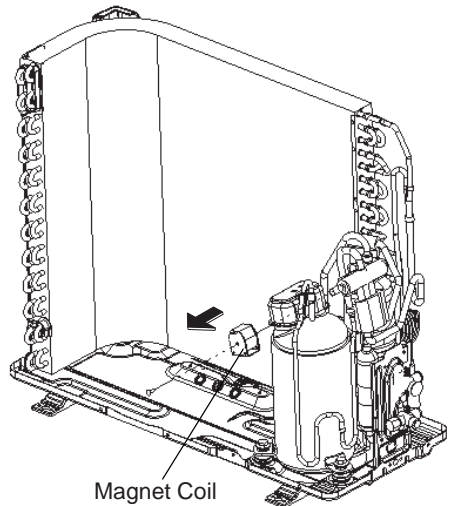



Warning: Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

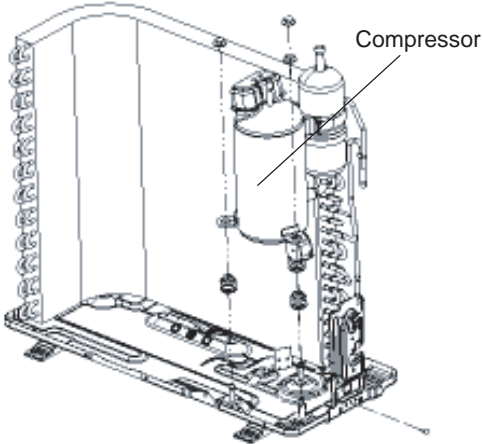
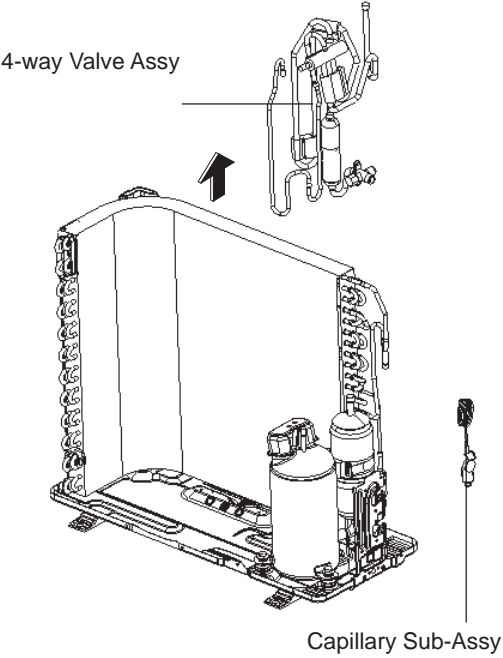
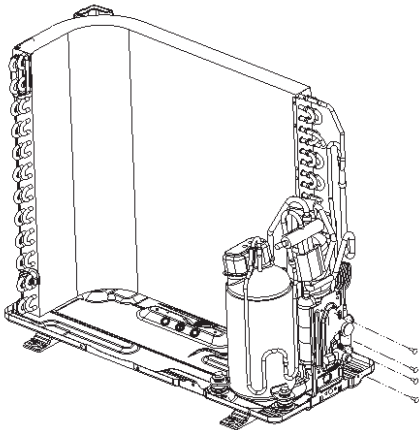
Steps	Procedure	Points
1. Remove the handle	 <p>1 Loosen the screw of the Handle. Pull down the handle and remove it.</p>	<p>■ The stop valve cover has 6 hooks.</p>
2. Remove the top panel	 <p>1 Loosen the 3 screws (front, right, left) and lift the top panel.</p>	

Steps		Procedure	Points
3.Remove grille and front panel			
1	Loosen one screw and remove the discharge grille.		<ul style="list-style-type: none">■ Lift the front panel and remove it while pushing the right side panel inwards.
2	Loosen the 5 screws of the front panel.		
4.Remove right side plate			
1	Remove the 5 screws from the edge between right-side board and condenser and from valve. Lift to remove the right side plate.		
5.Remove the fan motor and Axial fan			
1	Remove the screws of the fan by wrench and then remove the axial flow fan and fan motor.		<ul style="list-style-type: none">■ The screw has reverse winding.■ Remove the propeller fan.

Steps		Procedure	Points
2	Remove the 4 tapping screws fixing the motor. Pull out the lead-out wire and remove the motor. Remove the 2 tapping screws fixing the motor support. Lift to remove the motor support.	 <p>Fan motor fixing frame</p> <p>Fan motor</p>	<ul style="list-style-type: none"> ■ M4×16 ■ DC fan motor
6.Remove the electric box		 <p>Electric box</p>	
1	Remove the 2 screws fixing the cover of electric box. Lift to remove the cover. Remove the screws fixing the electric box subassembly. Loosen the wire and disconnect the terminals. Lift to remove the electric box subassembly.		
7.Remove the partition plate		 <p>Partition plate</p>	<ul style="list-style-type: none"> ■ The partition plate is fixed to the bottom frame with a hook.
1	Loosen the 2 screws.		
2	The partition plate has a hook on the lower side. Lift and pull the partition plate to remove.		

Steps	Procedure		Points
8.Remove the sound blanket			
1	Lift and remove the sound blanket (top).		<ul style="list-style-type: none">■ Since the piping ports on the sound blanket are torn easily, remove the blanket carefully.
2	Untie the strings and open the sound blanket.		
3	Lift and remove the sound blanket (body) as it is opened.		
4	Pull the sound blanket (inner) out.		<ul style="list-style-type: none">■ Since the piping ports on the sound blanket are torn easily, remove the blanket carefully.
9.Remove four way valve coil			
1	Loosen the screw of the four way valve coil.		<ul style="list-style-type: none">■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.■ Be careful so as not to break the pipes by pressing it excessively by pliers when withdrawing it. <p> Caution Be careful about the four way valve, pipes and so on, which were heated up by a gas brazing machine, so as not to get burnt your hands.</p>

Steps	Procedure	Points
10.Remove compressor		
1	Solder off the welding spot of capillary and valve and outlet pipe of condenser.	
2	Remove the 2 screws fixing the gas valve. Solder off the weld spot connecting gas valve and air return pipe and remove the gas valve. (Note: it is necessary to warp the gas valve when soldering off the welding spot.) Remove the 2 screws fixing liquid valve. Solder off the welding spot connecting liquid valve and remove the liquid valve.	
3	Solder off the pipe connected with the compressor.	
4	Remove the 3 footing screws of the compressor and remove the compressor.	



Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

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

Set temperature

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

Ambient temperature

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

Appendix 2: Configuration of Connection Pipe

- Standard length of connection pipe
 - 5m, 7.5m, 8m.
- Min. length of connection pipe is 3m.
- Max. length of connection pipe and max. high difference.
- The additional refrigerant oil and refrigerant charging required after prolonging connection pipe
 - After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.
 - The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	49.21ft	16.40ft
7000 Btu/h(2051 W)	49.21ft	16.40ft
9000 Btu/h(2637 W)	49.21ft	32.81ft
12000 Btu/h(3516 W)	65.61ft	32.81ft
18000 Btu/h(5274 W)	82.02ft	32.81ft
24000 Btu/h(7032 W)	82.02ft	32.81ft
28000 Btu/h(8204 W)	98.43ft	32.81ft
36000 Btu/h(10548 W)	98.43ft	65.61ft
42000 Btu/h(12306 W)	98.43ft	65.61ft
48000 Btu/h(14064 W)	98.43ft	65.61ft

- When the length of connection pipe is above 5m, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.
- Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(inch)	Gas pipe(inch)	Cooling only(g/m)	Cooling and heating(g/m)
Φ0.24	Φ0.37 or Φ0.47	15	20
Φ0.24 or Φ0.37	Φ0.63 or Φ0.75	15	20
Φ0.47	Φ0.75 or Φ0.87	30	120
Φ0.63	Φ1.00 or Φ1.25	60	120
Φ0.75	/	250	250
Φ0.87	/	350	350

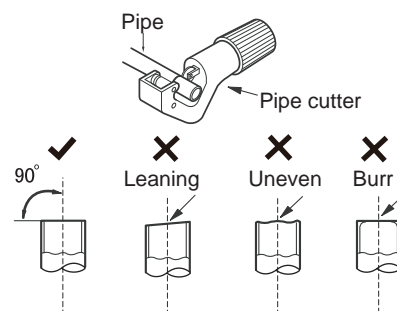
Appendix 3: Pipe Expanding Method

⚠ Note:

Improper pipe expanding is the main cause of refrigerant leakage. Please expand the pipe according to the following steps:

A: Cut the pipe

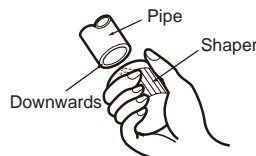
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.



B: Remove the burrs

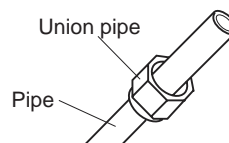
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.

C: Put on suitable insulating pipe



D: Put on the union nut

- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



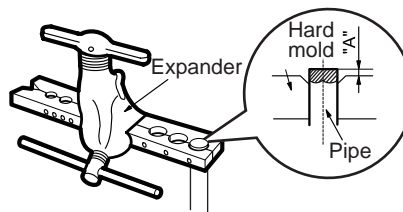
E: Expand the port

- Expand the port with expander.

⚠ Note:

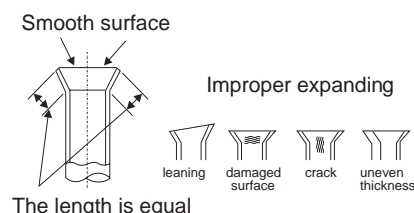
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(inch)	A(inch)	
	Max	Min
Φ0.24 (1/4")	0.054	0.028
Φ0.37 (3/8")	0.063	0.039
Φ0.47 (1/2")	0.071	0.039
Φ0.63 (5/8")	0.095	0.087



F: Inspection

- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



Appendix 4: List of Resistance for Temperature Sensor

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

Temp(°F)	Resistance(kΩ)	Temp(°F)	Resistance(kΩ)	Temp(°F)	Resistance(kΩ)	Temp(°F)	Resistance(kΩ)
-2.2	138.1	68	18.75	138.2	3.848	208.4	1.071
-0.4	128.6	69.8	17.93	140	3.711	210.2	1.039
1.4	121.6	71.6	17.14	141.8	3.579	212	1.009
3.2	115	73.4	16.39	143.6	3.454	213.8	0.98
5	108.7	75.2	15.68	145.4	3.333	215.6	0.952
6.8	102.9	77	15	147.2	3.217	217.4	0.925
8.6	97.4	78.8	14.36	149	3.105	219.2	0.898
10.4	92.22	80.6	13.74	150.8	2.998	221	0.873
12.2	87.35	82.4	13.16	152.6	2.896	222.8	0.848
14	82.75	84.2	12.6	154.4	2.797	224.6	0.825
15.8	78.43	86	12.07	156.2	2.702	226.4	0.802
17.6	74.35	87.8	11.57	158	2.611	228.2	0.779
19.4	70.5	89.6	11.09	159.8	2.523	230	0.758
21.2	66.88	91.4	10.63	161.6	2.439	231.8	0.737
23	63.46	93.2	10.2	163.4	2.358	233.6	0.717
24.8	60.23	95	9.779	165.2	2.28	235.4	0.697
26.6	57.18	96.8	9.382	167	2.206	237.2	0.678
28.4	54.31	98.6	9.003	168.8	2.133	239	0.66
30.2	51.59	100.4	8.642	170.6	2.064	240.8	0.642
32	49.02	102.2	8.297	172.4	1.997	242.6	0.625
33.8	46.6	104	7.967	174.2	1.933	244.4	0.608
35.6	44.31	105.8	7.653	176	1.871	246.2	0.592
37.4	42.14	107.6	7.352	177.8	1.811	248	0.577
39.2	40.09	109.4	7.065	179.6	1.754	249.8	0.561
41	38.15	111.2	6.791	181.4	1.699	251.6	0.547
42.8	36.32	113	6.529	183.2	1.645	253.4	0.532
44.6	34.58	114.8	6.278	185	1.594	255.2	0.519
46.4	32.94	116.6	6.038	186.8	1.544	257	0.505
48.2	31.38	118.4	5.809	188.6	1.497	258.8	0.492
50	29.9	120.2	5.589	190.4	1.451	260.6	0.48
51.8	28.51	122	5.379	192.2	1.408	262.4	0.467
53.6	27.18	123.8	5.197	194	1.363	264.2	0.456
55.4	25.92	125.6	4.986	195.8	1.322	266	0.444
57.2	24.73	127.4	4.802	197.6	1.282	267.8	0.433
59	23.6	129.2	4.625	199.4	1.244	269.6	0.422
60.8	22.53	131	4.456	201.2	1.207	271.4	0.412
62.6	21.51	132.8	4.294	203	1.171	273.2	0.401
64.4	20.54	134.6	4.139	204.8	1.136	275	0.391
66.2	19.63	136.4	3.99	206.6	1.103	276.8	0.382

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

Temp(°F)	Resistance(kΩ)		Temp(°F)	Resistance(kΩ)		Temp(°F)	Resistance(kΩ)		Temp(°F)	Resistance(kΩ)
-2.2	181.4		68	25.01		138.2	5.13		208.4	1.427
-0.4	171.4		69.8	23.9		140	4.948		210.2	1.386
1.4	162.1		71.6	22.85		141.8	4.773		212	1.346
3.2	153.3		73.4	21.85		143.6	4.605		213.8	1.307
5	145		75.2	20.9		145.4	4.443		215.6	1.269
6.8	137.2		77	20		147.2	4.289		217.4	1.233
8.6	129.9		78.8	19.14		149	4.14		219.2	1.198
10.4	123		80.6	18.13		150.8	3.998		221	1.164
12.2	116.5		82.4	17.55		152.6	3.861		222.8	1.131
14	110.3		84.2	16.8		154.4	3.729		224.6	1.099
15.8	104.6		86	16.1		156.2	3.603		226.4	1.069
17.6	99.13		87.8	15.43		158	3.481		228.2	1.039
19.4	94		89.6	14.79		159.8	3.364		230	1.01
21.2	89.17		91.4	14.18		161.6	3.252		231.8	0.983
23	84.61		93.2	13.59		163.4	3.144		233.6	0.956
24.8	80.31		95	13.04		165.2	3.04		235.4	0.93
26.6	76.24		96.8	12.51		167	2.94		237.2	0.904
28.4	72.41		98.6	12		168.8	2.844		239	0.88
30.2	68.79		100.4	11.52		170.6	2.752		240.8	0.856
32	65.37		102.2	11.06		172.4	2.663		242.6	0.833
33.8	62.13		104	10.62		174.2	2.577		244.4	0.811
35.6	59.08		105.8	10.2		176	2.495		246.2	0.77
37.4	56.19		107.6	9.803		177.8	2.415		248	0.769
39.2	53.46		109.4	9.42		179.6	2.339		249.8	0.746
41	50.87		111.2	9.054		181.4	2.265		251.6	0.729
42.8	48.42		113	8.705		183.2	2.194		253.4	0.71
44.6	46.11		114.8	8.37		185	2.125		255.2	0.692
46.4	43.92		116.6	8.051		186.8	2.059		257	0.674
48.2	41.84		118.4	7.745		188.6	1.996		258.8	0.658
50	39.87		120.2	7.453		190.4	1.934		260.6	0.64
51.8	38.01		122	7.173		192.2	1.875		262.4	0.623
53.6	36.24		123.8	6.905		194	1.818		264.2	0.607
55.4	34.57		125.6	6.648		195.8	1.736		266	0.592
57.2	32.98		127.4	6.403		197.6	1.71		267.8	0.577
59	31.47		129.2	6.167		199.4	1.658		269.6	0.563
60.8	30.04		131	5.942		201.2	1.609		271.4	0.549
62.6	28.68		132.8	5.726		203	1.561		273.2	0.535
64.4	27.39		134.6	5.519		204.8	1.515		275	0.521
66.2	26.17		136.4	5.32		206.6	1.47		276.8	0.509

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

Temp(°F)	Resistance(kΩ)		Temp(°F)	Resistance(kΩ)		Temp(°F)	Resistance(kΩ)		Temp(°F)	Resistance(kΩ)
-20.2	853.5		50	98		120.2	18.34		190.4	4.75
-18.4	799.8		51.8	93.42		122	17.65		192.2	4.61
-16.6	750		53.6	89.07		123.8	16.99		194	4.47
-14.8	703.8		55.4	84.95		125.6	16.36		195.8	4.33
-13	660.8		57.2	81.05		127.4	15.75		197.6	4.20
-11.2	620.8		59	77.35		129.2	15.17		199.4	4.08
-9.4	580.6		60.8	73.83		131	14.62		201.2	3.96
-7.6	548.9		62.6	70.5		132.8	14.09		203	3.84
-5.8	516.6		64.4	67.34		134.6	13.58		204.8	3.73
-4	486.5		66.2	64.33		136.4	13.09		206.6	3.62
-2.2	458.3		68	61.48		138.2	12.62		208.4	3.51
-0.4	432		69.8	58.77		140	12.17		210.2	3.41
1.4	407.4		71.6	56.19		141.8	11.74		212	3.32
3.2	384.5		73.4	53.74		143.6	11.32		213.8	3.22
5	362.9		75.2	51.41		145.4	10.93		215.6	3.13
6.8	342.8		77	49.19		147.2	10.54		217.4	3.04
8.6	323.9		78.8	47.08		149	10.18		219.2	2.96
10.4	306.2		80.6	45.07		150.8	9.83		221	2.87
12.2	289.6		82.4	43.16		152.6	9.49		222.8	2.79
14	274		84.2	41.34		154.4	9.17		224.6	2.72
15.8	259.3		86	39.61		156.2	8.85		226.4	2.64
17.6	245.6		87.8	37.96		158	8.56		228.2	2.57
19.4	232.6		89.6	36.38		159.8	8.27		230	2.50
21.2	220.5		91.4	34.88		161.6	7.99		231.8	2.43
23	209		93.2	33.45		163.4	7.73		233.6	2.37
24.8	198.3		95	32.09		165.2	7.47		235.4	2.30
26.6	199.1		96.8	30.79		167	7.22		237.2	2.24
28.4	178.5		98.6	29.54		168.8	7.00		239	2.18
30.2	169.5		100.4	28.36		170.6	6.76		240.8	2.12
32	161		102.2	27.23		172.4	6.54		242.6	2.07
33.8	153		104	26.15		174.2	6.33		244.4	2.02
35.6	145.4		105.8	25.11		176	6.13		246.2	1.96
37.4	138.3		107.6	24.13		177.8	5.93		248	1.91
39.2	131.5		109.4	23.19		179.6	5.75		249.8	1.86
41	125.1		111.2	22.29		181.4	5.57		251.6	1.82
42.8	119.1		113	21.43		183.2	5.39		253.4	1.77
44.6	113.4		114.8	20.6		185	5.22		255.2	1.73
46.4	108		116.6	19.81		186.8	5.06		257	1.68
48.2	102.8		118.4	19.06		188.6	4.90		258.8	1.64



JF00302266