Haier SERVICE MANUAL

Order No.AC1007S002V0

Wall mounted Type

DC Inverter S -Series

Model No. HSU-09RS03/R2(SDB)
HSU-12RS03/R2(SDB)

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death

Haier Group

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1 Introduction

1.1 Safety Cautions

Be sure to read the following safety cautions before conducting repair work.

The caution items are classified into “Warning” and “Caution”. The “Warning” items are especially important since they can lead to death or serious injury if they are not followed closely. The “Caution” items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.

About the pictograms

△ This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.

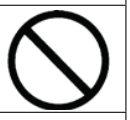
○ This symbol indicates a prohibited action.
The prohibited item or action is shown inside or near the symbol.

● This symbol indicates an action that must be taken, or an instruction.
The instruction is shown inside or near the symbol.

After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

1.1.1 Caution in Repair

Warning	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical shook. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas.The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work.A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

Warning	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	
Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	

1.1.2 Cautions Regarding Products after Repair

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only

Warning	
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A / R22) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

1.1.3 Inspection after Repair

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	

Warning	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

Caution	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 M ohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

2 List of fuctions

Category	Functions	Y/N
Healthy negative ion	Make your room full of an abundance natural negative ions	Y
Left&right flow	With specialized motor and flaps, the airflow can be adjusted .	Y
Child lock	Avoid the child's wrong operation on the remote	Y
3D air flow	The 3D airflow is able to deliver the airflow horizontally and vertically.	Y
24Hour timer	Use the timer function to set on,or off,or from on to off,or from off to on	Y
Auto restart	Automatic return to previous operation conditions after asundden power blackout	Y
Easy clean design	The panel is easy to wash and the airflow vents can be detached easily	Y
Intelligent air	With twin-blade technology ,the airflow can be adjusted not to blow directly	Y
Anti-mold filter	Catches most small particles and remove unpleasant odors effectively.	Y
Sleep mode	The setting temprature and the indoor noise can be adjusted to a more comfortable level when you set the "sleep mode"during night sleep	Y
4 Fan setting	Slect the fan speed LO,MED,HI,AUTO	Y
Entire auto mode	When air-con is in auto mode, it decides the running mode according to temperature difference between setting temperature and indoor temperature.	Y
ESF filter	Trap harmful dust and remove unpleasant odors effectively	Y
Power mode	Quick cooling or heating	Y
Soft mode	Lower noise operation condition	Y
Negative ion filter	Generate negative ions by the filter.	Y
human perceptible	By detecting number and location of people indoor, airflow, air speed and temperature can be adjusted automatically	Y
Hidden Display	When the air-con is off, you can't see the display screen, which looks like part of the panel.	Y
electric deicer	Automatically clean ice on outdoor unit and make the unit work normally.	Y
10℃ control	Indoor temperature can be controlled at 10℃ by pressing the 10℃ button when leaving room.	Y

Note: Y: Holding Functions
N : No Functions

3 Specifications

Model			HSU-09RS03/R2(SDB)		HSU-12RS03/R2(SDB)	
			Cooling	Heating	Cooling	Heating
Capacity Rated (Min.~Max.)		kW	2.7(0.7~4.0)	3.3(0.9 ~6.0)	3.5(0.7~4.4)	4.2(0.9~6.5)
		Btu/h	9200(2350~13650)	11250(3050~20450)	12000(2350~15000)	14300(2050~22150)
		kcal/h	2322(602~3440)	2838(774~5160)	3010(602~3784)	3612(774~5590)
Moisture Removal		L/h	1.2	—	1.6	—
Running Current (Rated)		A	2.6	3.2	3.7	4.2
Power Consumption Rated (Min.~Max.)		W	520(160~1100)	630(180-1710)	830(160~1460)	920(180~2030)
Power Factor		%	87	86	98	95
COP Rated (Min.~Max.)		W/W	5.19	5.24	4.22	4.57
Piping Connections	Liquid	mm	φ 6.35		φ 6.35	
	Gas	mm	φ9.52		φ 9.52	
	Drain	mm	φ16.0		φ16.0	
Heat Insulation			Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Max. Interunit Piping Length		m	15		15	
Max. Interunit Height Difference		m	10		10	
Chargeless		m	10		10	
Amount of Additional Charge of Refrigerant		g/m	20		20	
Indoor Unit						
Front Panel Color			White		White	
Air Flow Rate	m³/min(cfm)	H	11.7	12.7	11.7	12.7
		M	10.4	11.4	10.4	11.4
		L	9.2	10.2	9.2	10.2
		SL	-	-	-	-
Fan	Type		Cross Flow Fan		Cross Flow Fan	
	Motor Output	W	16		16	
	Speed	Steps	4 Steps, Silent, Auto		4 Steps, Silent, Auto	
Air Direction Control			Right, Left, Horizontal, Downward		Right, Left, Horizontal, Downward	
Air Filter			Removable / Washable / Mildew Proof		Removable / Washable / Mildew Proof	
Running Current (Rated)		A	0.15	0.15	0.15	0.15
Power Consumption (Rated)		W	40	40	40	40
Power Factor		%	96	96	96	96
Temperature Control			Microcomputer Control		Microcomputer Control	
Dimensions (H×W×D)		mm	298x800X243		298x800X243	
Packaged Dimensions (H×W×D)		mm	390X888X335		390X888X335	
Weight		kg	12.5		12.5	
Gross Weight		kg	14.5		14.5	
OperationSound	H/L/SL	dBA	36/24/22		37/25/23	
Sound Power	H	dBA	46		47	

Outdoor Unit			HSU-09RS03/R2(SDB)		HSU-12RS03/R2(SDB)	
Casing Color			White		White	
Compressor	Type		rotary Compressor		rotary Compressor	
	Model		SNB130FGYM2		SNB130FGYM2	
	Motor Output	W	900		900	
RefrigerantOil	Model		FV50S		FV50S	
	Charge	L	0.5		0.5	
Refrigerant	Model		R410a		R410a	
	Charge	kg	1.15		1.15	
Air Flow Rate (H/L)	m^3/min		33.3	33.3	33.3	33.3
	cfm		1175.5	1175.5	1175.5	1175.5
Fan	Type		Propeller		Propeller	
	Motor Output	W	52		52	
Running Current (Rated)		A	2.6	3.2	3.7	4.2
Power Consumption (Rated)		W	520	630	830	920
Power Factor		%	98	98	98	98
Starting Current		A	8.0		8.0	
Dimensions (H×W×D)		mm	643X783X255		643X783X255	
Packaged Dimensions (H×W×D)		mm	714X930X340		714X930X340	
Weight		kg	33.5		33.5	
Gross Weight		kg	36.5		36.5	
OperationSound	H/L	dBA	47	47	48	48
Sound Power	H	dBA	57	57	58	58

Note: The data are based on the conditions shown in the table below.

Cooling	Heating	Piping Length
Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	Indoor ; 20°CDB Outdoor ; 7°CDB/6°CWB	5 m

Conversion Formulae
kcal/h=kW×860
Btu/h=kW×3414
cfm=m^3/min×35.3

4.Printed Circuit Board Connector Wiring Diagram

4.1：Indoor unit Connectors

Connectors

PCB(1) (Control PCB)

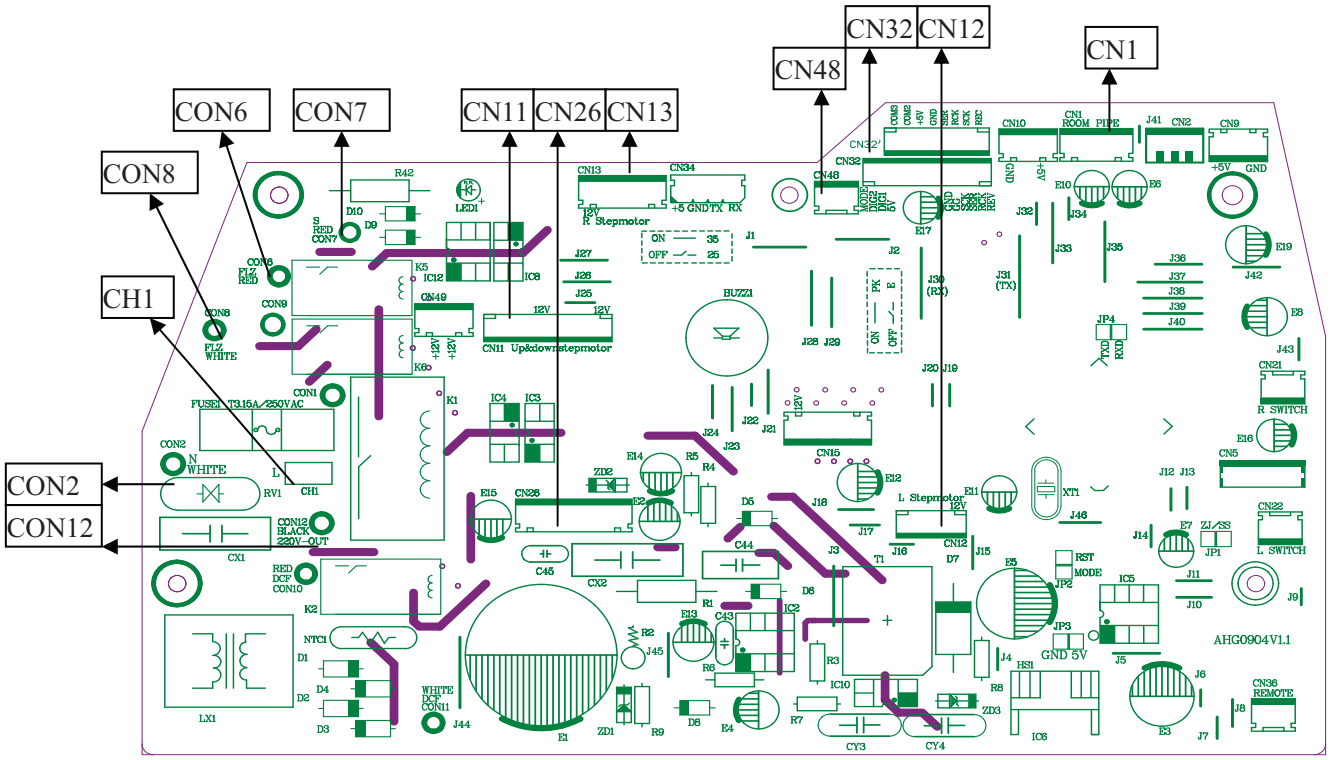
PCB（1）（control PCB）

1) CN12,CN13 connector for L&R step motor
2) CN11 connector for Up&down step motor
3) CN26 connector for DC fan motor
4) CON7 connector for communication line between the indoor and outdoor
5) CN1 connector for ambient temp. sensor and piping temp. sensor
6) CH1 connector for power L wire
7) CON12 connector for L in terminal block
8) CON2 connector for N in terminal block
8) CN32 connector for display board
9) CON6 CON8 connector for ions generator

Note: Other designations

PCB(1) (INdoor Control PCB)

1) CN48 Connector for Forced operation ON / OFF switch
2) J1 Select 25 or 35
3) RV1 Varistor
4) FUSE1 Fuse 3.15A/250VAC



PCB1

4.2: outdoor unit

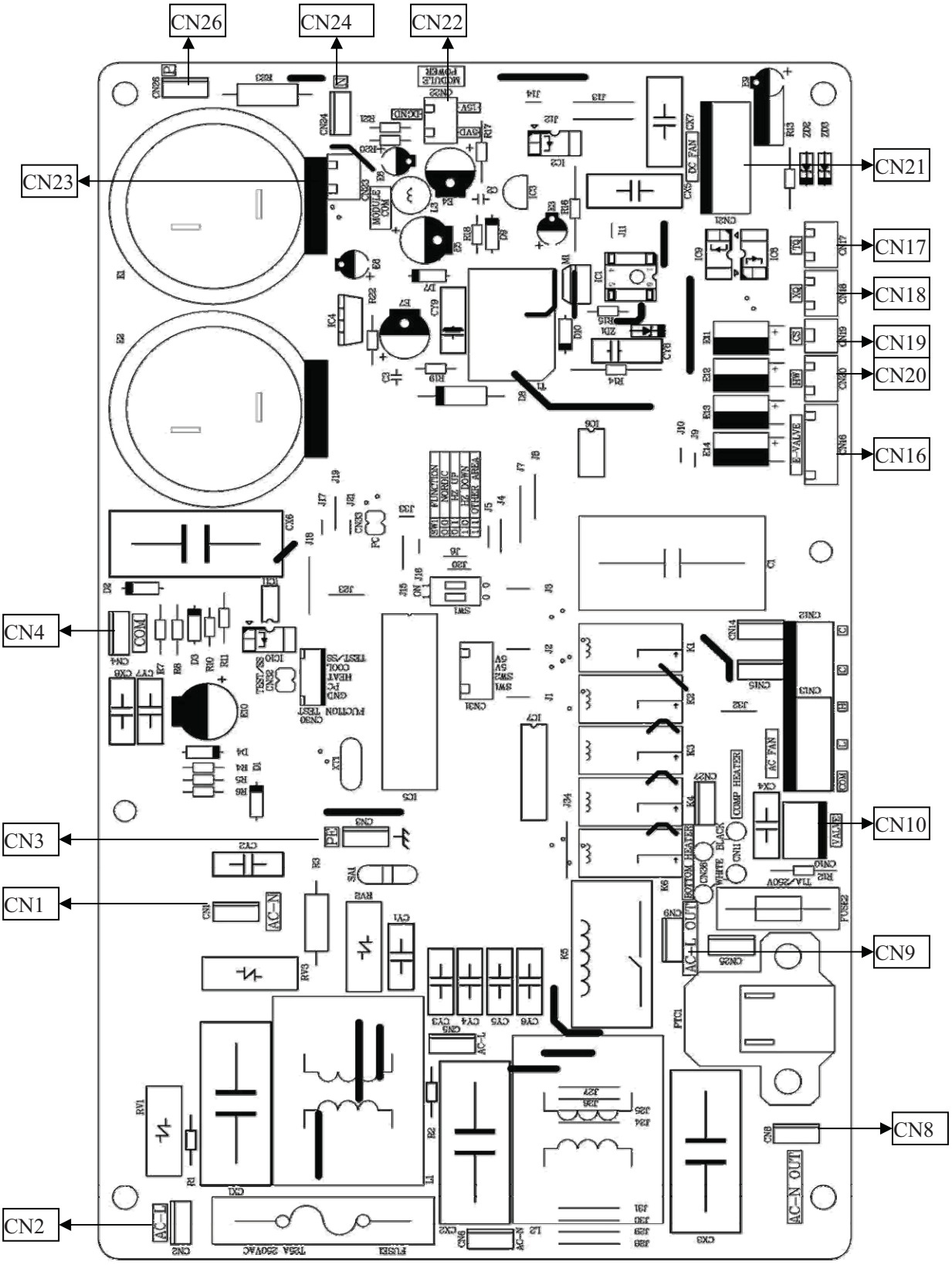
Connectors

PCB(1) (Control PCB)

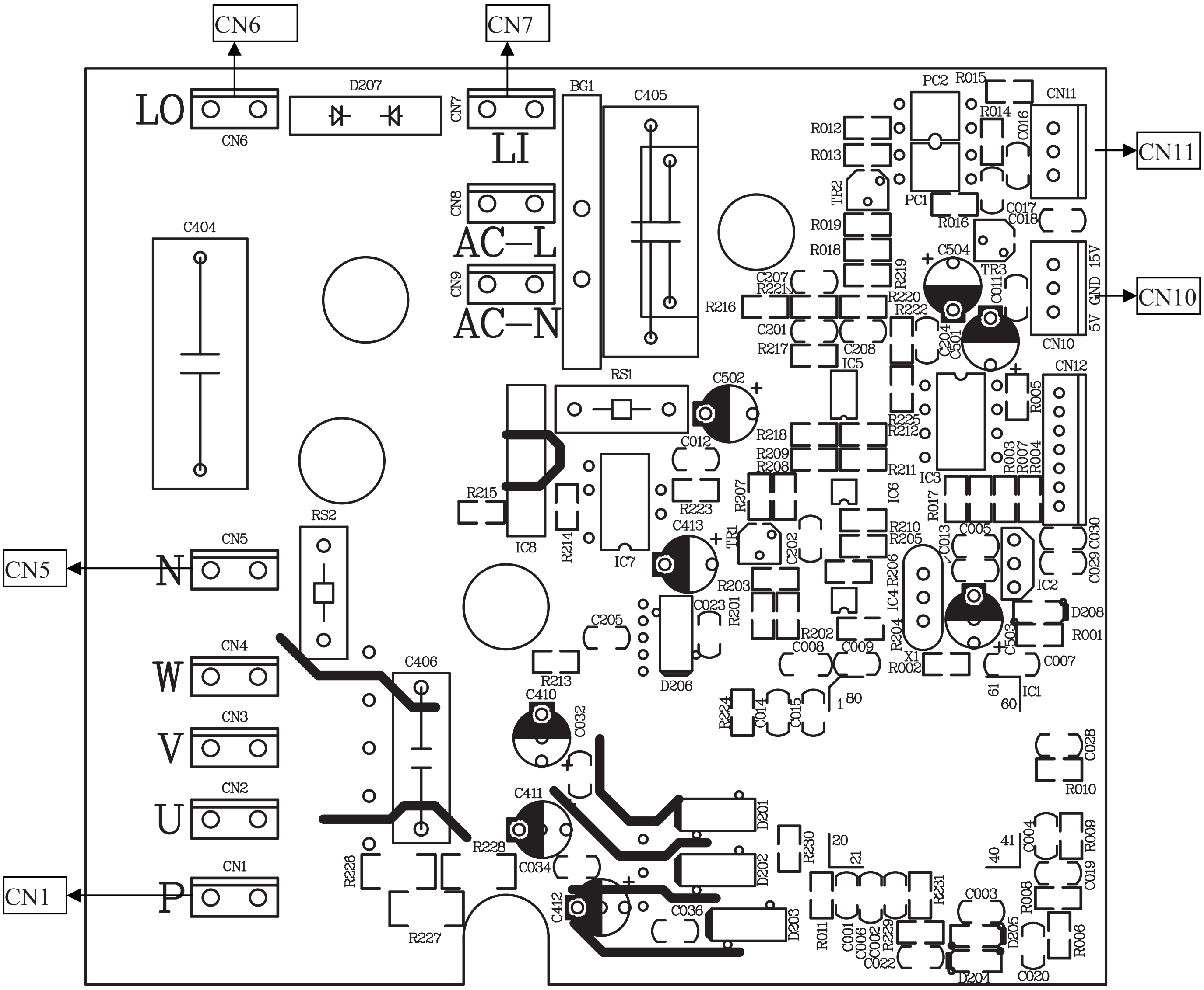
1) CN1、CN2 Connector for power N and L
2) CN3 Connector for ground
3) CN22 Connector for DC POWER 15V and 5V to the module board
4) CN22、CN23 Connector for CN10,CN11 on the module board
5) CN21 Connector for fan motor
6) CN10 Connector for four way valve coil
7) CN17、CN18、CN19、CN20 Connector for thermistors
8) CN23 Connector for communicate between the control board and the module board
9) CN26、CN24 Connector to P and N of the module board
10) CN4 Connector for communicate between indoor and outdoor unit
11) CN16 Connector for electric expansion valves
12) CN9、CN8 Connector to L and N of the module board

PCB(2) (module PCB)

CN10 Connector for the DC power 5V and 15V form the control PCB
CN11 Connector for communicate between the control board and the module board
P(CN1), N(CN5) Connector for capacitance board
LI (CN7),LO(CN6) Connector for reactor
Note: Other Designations
PCB(1) (Control PCB)
1) FUSE 1, (25A,250VAC) FUSE 2(1A,250VAC)
2)LED 1 keep light representative normal ,if keep flash interval representative trouble Alarm
3)RV1,RV2,RV3 Varistor


CN26
CN24
CN22
CN23
CN21
CN17
CN18
CN19
CN20
CN16
CN4
CN3
CN1
CN10
CN9
CN8
CN2

PCB(1)



CN6
CN7
LO
CN6
D207
CN7
LI
CN8
AC–L
CN9
AC–N
BG1
C405
C404
RS1
RS2
C502
IC8
IC7
CN5
N
CN4
W
CN3
V
CN2
U
CN1
P
C406
C410
C411
C412
R226
R227
R228
D201
D202
D203
D206
CN11
CN10
CN12
5V GND 15V
PC1
PC2
TR1
TR2
TR3
C504
C501
C503
IC1
IC2
IC3
IC4
IC5
IC6
X1
D204
D205
D208

PCB(2)

5.Funcitions and Control

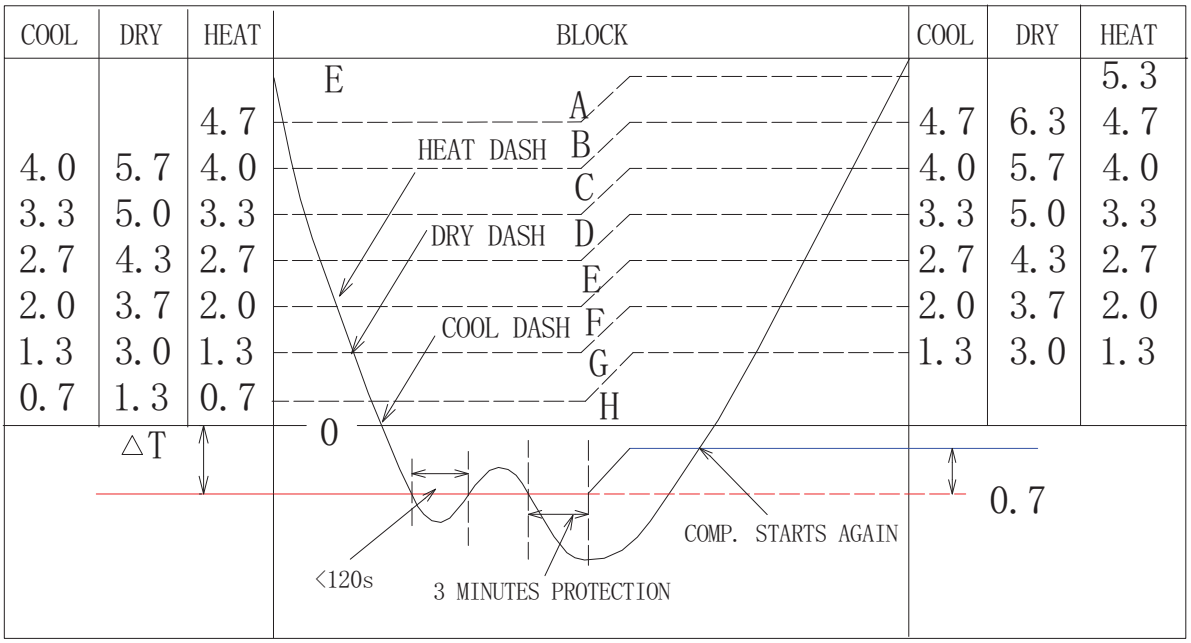
5.1 Main functions and control specification of indoor unit

This specification use for HSU-09/12RS03/R2(SDB) frequency conversion air condition are manufactured by Haier air condition parent company. "Setting value" (express in parameter) in this specification means is a parameter that is stored in EEPROM. Refer to [EEPROM parameter table].

5.1.1 Temperature Adjusting function

5.1.1.1 Temperature adjusting of different levels.

(DASH operation conditions under different modes)



5.1.1.2 Select the wind volume when it is set automatic

When the wind volume is automatic, it can be switched between strong, medium and weak according to the temperature adjusting levels.

Wind volume under the automatic wind volume mode

	Temperature adjusting levels								
	A	B	C	D	E	F	G	H	I
Heating	Strong	Strong	Strong	Strong	Strong	Medium	Weak	Weak	SLO
cooling		Strong	Strong	Strong	Medium	Medium	Weak	Weak	Weak
Moisture removing		Strong	Medium	Medium	Medium	Weak	Weak	SLO	SLO

5.1.1.3 Wind volume limit

When the compressor is working and the max setting for indoor fan motor is medium or weak, the upper limit of indicated frequency is as follows:

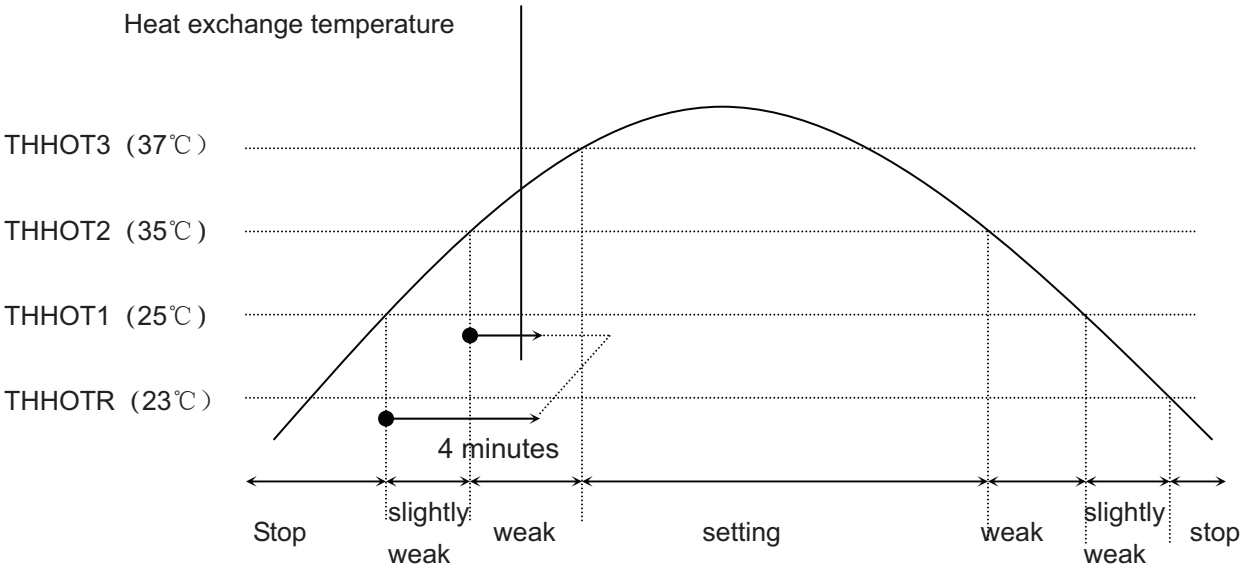
Frequency control form for wind volume in cooling mode

	Limited frequency variables	Limited frequency
Medium wind volume	FQLIMMD	40Hz
Weak wind volume	FQLIMLO	36Hz
Limited frequency for up/down health wind	FUPHEAL	80Hz

5.1.2 Main functions

5.1.2.1 Warm boot

When the heat running starts or the frost removing ends and the compressor starts again, in order to avoid cold wind, warm boot wind volume control should be done.



To control the indoor fan motor as shown in the table above according to the heat exchange temperature

The fan motor stops when the heat exchange temperature is below 25℃

The fan motor is working slightly weak when the heat exchange temperature is above25 ℃ and below 35℃

The fan motor is working weak when the heat exchange temperature is above35 ℃ and below 37℃

The fan motor works as set if the he heat exchange temperature remains above 38℃

5.1.2.2 When the compressor stops and remains idle for 3 minutes

1. Turn off the air conditioner by remote control; the indoor fan stops operation.
2. The temperature sensing device stops running and the indoor fan operates under wind mode.
3. When the air conditioner turns to the heating mode from other modes and the compressor fails to start, the indoor fan will operate under wind mode.

5.1.2.3 Dehumidification running

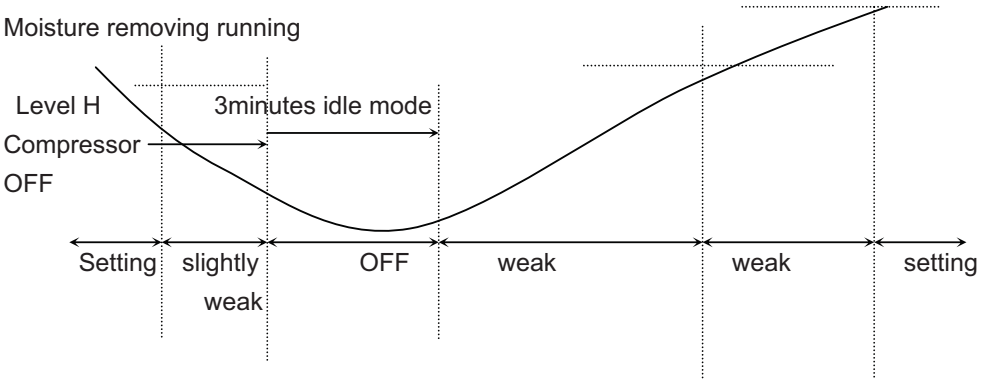
Under the dehumidification mode the fan motor stops as the compressor stops

The operation is weak after 3 minutes' idle mode

After stand by for 3 minutes, the compressor is on.

The compressor operates as the set wind volume when the wind volume is set to be strong, medium or weak

The wind volume is decided according to the temperature adjusting when the wind volume is set to be automatic.



5.1.2.4 Automatic running

When the running mode is turned to automation after starting the system, the system will first determine the running mode according to the current room temperature and then will run according to the determined mode. Tr in the following selection conditions means room temperature, Ts means setting temperature, Tp means temperature of indoor coil pipe

Tr≥23℃ Choose Cooling Mode

Tr＜23℃ Choose Heating Mode

After turning to the automation mode, the running mode can be switched between cooling mode, fan mode and heating mode according to the change of the indoor ambient temperature. But the automatic conversion between cooling mode and heating mode must be conducted after 15 minutes.

5.1.3 Special functions

5.1.3.1 Powerful running

The mode switch ends the powerful running

Enter into the silent mode, normal running mode or timed switching on mode to end the powerful running

When in automatic mode, there are powerful and silent functions for your choice. When the main unit is in cooling mode, it operates with powerful cooling or silent cooling. When the main unit is in heating mode, it operates with powerful heating or silent heating. When the main unit is in wind-sending mode,

there are no powerful or silent modes.
There is no powerful mode for wind-sending and moisture removing
Powerful heating：
Change the set temperature. With temperature adjusting function
The wind volume is the automatic medium
When in frost removing mode, the outdoor unit does not accept the communication signal for powerful running
Powerful cooling：
Change the set temperature. With temperature adjusting function
The wind volume is the automatic strong
After the compressor starts, there will be no low-intense running protection within 3 minutes

5.1.3.2 Silent running

Send the silent running signal to the outdoor unit
Under the Silent hearing mode,The wind volume is SSLO after the compressor is on,The wind volume will be kept SSLO within 20 seconds after the compressor stops and then changes to weak
Under the Silent cooling mode the wind volume is SSLO
There is no silent mode for moisture removing and wind-sending.

5.1.3.3 Air cleaning

If the fan motor starts working after receiving the remote-control order, the aion generator starts working and sends out ions.
The ion generator stops as the fan motor stops.
When the ion generator is OFF and the air cleaning function is on, the fan motor starts running and the ion generator starts working again.

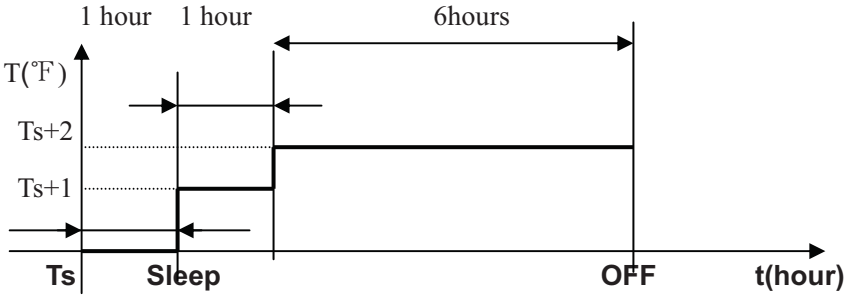
5.1.3.4 Timed running

Set the time duration according to the time difference between the clock for timing and the current clock
In timing mode, the display panel will flash the light at fixed times

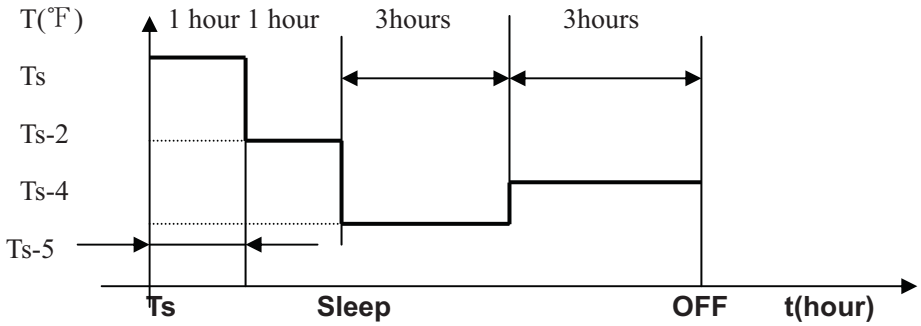
Timed OFF	When this function is set, operation modes on the panel display will not change. The timing icon will show and the operation stops when the set time comes.
Timed ON	When this function is on, the panel display will only display a question mark. The unit will operate as the set mode when the time comes.
Timed ON/OFF	The unit will start operating or stop according to the order of your setting.

5.1.3.5 Sleeping function

a.After setting the sleeping function, the refrigerating mode and dehumidification mode will run as per the following rules:



b.After setting the sleeping function, the heating mode will run as per the following rules:



As shown in the above diagram, after running for 1 hour under refrigerating mode and dehumidification mode, the setting temperature will increase about1℉; after another 1 hour, it will increase about1℉ again, and after 6 hours, it will cease; after running for 1 hour under heating mode, the setting temperature will decrease about2℉, after another 1 hour, it will decrease the about 2℉ again, and after 3 hours, it will increase about 1℃, and after other 3 hours, it will cease.

5.1.3.6 Trial running

The indicated frequency for trial running is 58Hz, wind volume is strong.

The trial running will last for 30 minutes and then the unit will be powered off. The unit will exit the trial running if it receives any remote-control signal during the trial running period.

There is no low-intense running protection.

5.1.3.7 Power failure compensation

To enter into the function please press the sleep key 10 times with 4 beeps in 7 seconds

Under the power failure compensation mode, unplug and plug again ,the indoor unit will resume original operation

Under the power failure compensation mode, unplug and plug again, the unit will be on OFF state.

Mode, Fan speed, Healthy, Set temperature can be memoried. Swing, Timer, Sleep cannot be memoried

Press the sleep key for 10 times with 2 beeps in 7 seconds to exit.

5.1.3.8 Rated Operation

Rated Cooling:

When receiving the instruction of indoor unit rated operation, the unit will start rated cooling operation.

Rated Heating:

When receiving the instruction of indoor unit rated operation, the unit will start rated heating operation.

5.1.3.9 IFP （Optional Function）

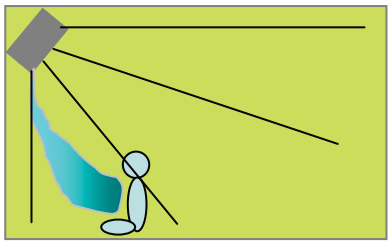
Press the remote control to select and enter the human perception mode; the panel will display the human perception symbol. Two wind velocity modes are available: fixed velocity and adjustable velocity. The specific options and control functions are as follows:

Judge the position of the human being to have air flow control.

Follow or Avoid may be set by the remote controller. When signals are detected for 10 seconds continuously in any area, humans are determined to be in the area and the air conditioner will enter auto control.

(1) When signals are detected in a certain zone:

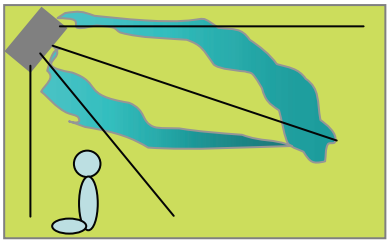
① Wind direction following → Detect the area where human beings are and adjust the deflector to blow conditioned air towards the human body;



When humans are detected in Zone A: See Position 4 

When humans are detected in Zone C: See Position 7. 

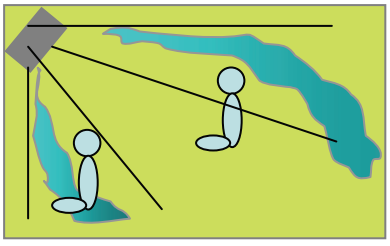
② Wind direction avoiding → Detect the area where human beings are and adjust the deflector to blow air away from the human body.



When humans are detected in Zone A: See Position 6 

When humans are detected in Zone C: See Position 5. 

(2) When humans are detected in both areas:



Whether following or avoiding mode is set, the air deflector will oscillate automatically. 

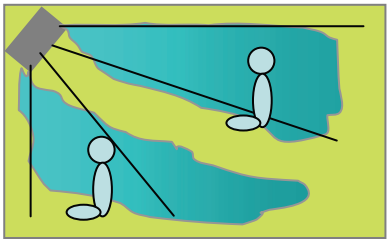
(3) If humans in several areas move to one area and no change is detected for 30 seconds continuously, it will be handled as one person. Power save control function under human perception mode:

Judge the number of human beings and approximate their activities to ensure energy saving control.

(1) When humans are detected in more than two areas:

Refrigeration: Temperature set remains unchanged.

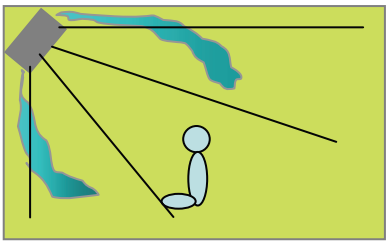
Heating: Temperature set will decrease by one degree.



(2) When humans are detected in a single area:

Refrigeration: Temperature set will increase by one degree.

Heating: Temperature set remains unchanged.



(3) When two sensors fail to detect any signal within 20 minutes continuously, it will be deemed that no humans are present and the air conditioner will enter power save mode.

5.1.3.10 10 degree heating maintaining

special heating set function:10 degree heating maintaining。

5.1.3.11 temp display

Default displaying temp is ambient temp, but it can be also changed to set temp via some special operation.

When receiving the remote control signal, display the set temperature and in the rest time display the room temperature，temperature is only for reference。

5.2 Main functions and control specification of outdoor unit

Sensor Code Definition: Tai= Indoor Ambient Temperature, Tao=Outdoor Ambient Temperature, Tc1=Indoor Coil, Td= Air Discharge, Te= Outdoor Coil, Ts=Air Intake

5.2.1 Outdoor Unit Operation Frequency and Control

Compressor Operation Frequency Range

Compressor Operation Frequency Range:

Outdoor Temperature	≤4	4∽18	≥18
Heating（Hz）	20∽90	20∽90	20∽50
Defrosting（Hz）	88		
Outdoor Temperature	≤23	23∽32	≥32
Cooling（Hz）	20∽50	20∽70	20∽90

Compressor Startup

Regardless of target frequency of indoor unit, each time when compressor is from off to on, it must maintain 60Hz,90Hz for one minute (Frequency will be immediately decreased under the condition that outdoor unit air discharge temperature overheating protection is activated or over current of compressor) then the compressor will operate towards target frequency. This process does not exist in normal operation of unit.

Heating

When completing compressor startup operation, it will operate as per frequency of indoor unit.

After 2 minutes, compressor operation frequency will be compensated as per relevant conditions.

Cooling & Dehumidification:

When completing compressor startup operation, it will operate as per frequency of indoor unit.

After 2 minutes, compressor operation frequency will be compensated as per relevant conditions.

Compressor Frequency Increase/Decrease Speed

Rapid Frequency Increase/Decrease Speed 1 ----------1Hz/s

Slow Frequency Increase/Decrease Speed 2 ----------1Hz/10s

5.2.2 Outdoor fan control

Compressor startup within 3min ,outdoor fan speed control as follows:

Outdoor Temperature	＜10	10∽25	≥25
Cooling/ Dehumidification	3	5	7
Heating	7	5	3

fter compressor runs 3min ,outdoor fan speed control as follows:

Cooling/ Dehumidification:

Compressor Operation Frequency（Hz）		＜25	25∽45	≥45
Tao（℃）	≤28	1	3	5
	28∽38	3	6	7
	≥38	7		

Heating:

Compressor Operation Frequency（Hz）		＜25	25∽45	≥45
Tao（℃）	≤4	3	5	7
	4∽18	2	4	5
	≥18	1		

Compressor shutdown and outdoor fan residual heat blow process

When compressor shuts down in cooling mode, outdoor fan automatically jumps to low speed and blows residual heat for 30s and stop.

5.2.3 Four-way Valve Control

Defrosting Four-way Valve Control，(please see defrosting process for details)

Time sequence of the defrosting operation is as follows:

Four-way Valve Work Status in Other Modes:

In heating mode, four-way valve is on. If compressor is off or is switched to non-heating mode, four-way valve ensures that it is off at least 3 minutes after compressor shuts down.

5.2.4 Outdoor Defrosting Control

Defrosting Mode Entry Conditions

The unit will enter defrosting mode when compressor starts up and operates for 1 minutes continuously in heating mode or after compressor runs for an accumulated time of 30 minutes (Upon completion of defrosting or when switched to cooling mode, compressor accumulated operation time will be cleared) and when 2 minutes' continuous checking by defrosting sensor TE (check frosting condition of outdoor unit heat exchanger) and outdoor ambient temperature sensor TA meets the following conditions:

TE≤C×TA－α

Among which: C:TA＜0℃，C=0.8

TA≥0℃，C=0.6

For area prone to frost, the value is set at 6 when unit leaves the factory.

Defrosting entry temperature control -15℃≤C×TA－α≤-5℃

Defrosting Time Interval

time interval between two defrosting cycles is 45 minutes.

Defrosting Operation

When defrosting begins, compressor will stop for one minute, external fan is running and 50s later, four-way valve will be off.

When compressor starts, external fan will be off, compressor will run at 28Hz for 60s then run at 60Hz for 60s and then move on to target frequency of 88Hz.

During defrosting, compressor current and air discharge overheat protection features are effective. During defrosting, if compressor shuts down due to activation of protection feature or due to malfunction, it will resume after 3 minutes. In the unit is still within defrosting cycle, it will resume defrosting and startup of compressor will be based on the rule for defrosting startup. (The unit will exit defrosting mode and handle fault in the event of 3 consecutive restart failures.)

On entering defrosting, it must guarantee that compressor will operate for a minimum of 2 minutes in defrosting mode before exit.

Defrosting Exit Condition

When one of the following conditions is met, defrosting operation will be switched to heating operation.

（1）:Temperature of outdoor heat exchanger exceeds10℃ for 80s continuously

（2）: Temperature of outdoor heat exchanger exceeds 15℃ for 5s continuously

（3）:Defrosting operation continues for 18 minutes.

When defrosting exit conditions are met, the unit will operate as follows

Compressor stops and external fan starts, 50s later, four-way valve will be on, 60s later, compressor will operate as per startup process.

5.2.5 PTC Output Control

When outdoor unit is energized, PTC output value is 0, 10s later, output value is 1.

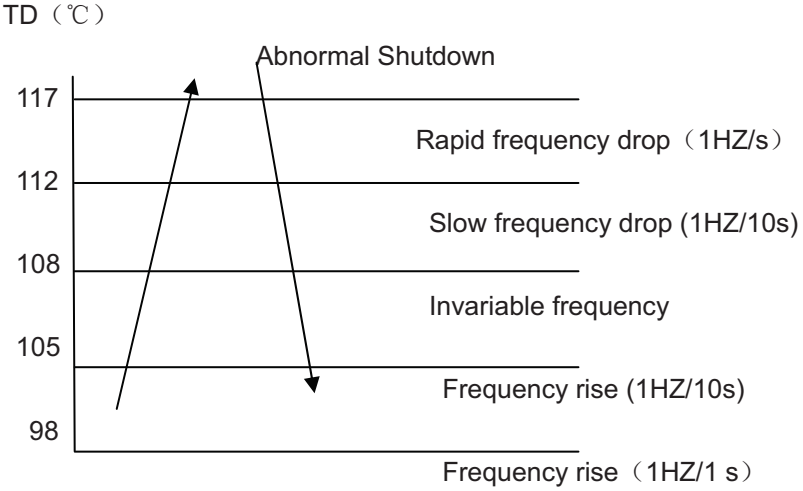
5.2.6 System Protection Function

5.2.6.1 3 minutes stand-by time

Time interval between compressor shutdown and restart is set at 3 minutes to ensure that compressor will only restart after 3-minute shutdown and initial energization valves are turned on to adequate opening position after being fully turned off.

5.2.6.2 TD High Temperature Protections

As long as unit is on, the TD air discharge overheat protection feature will be activated, yet air discharge sensor fault must be alarmed 4 minutes after compressor starts.

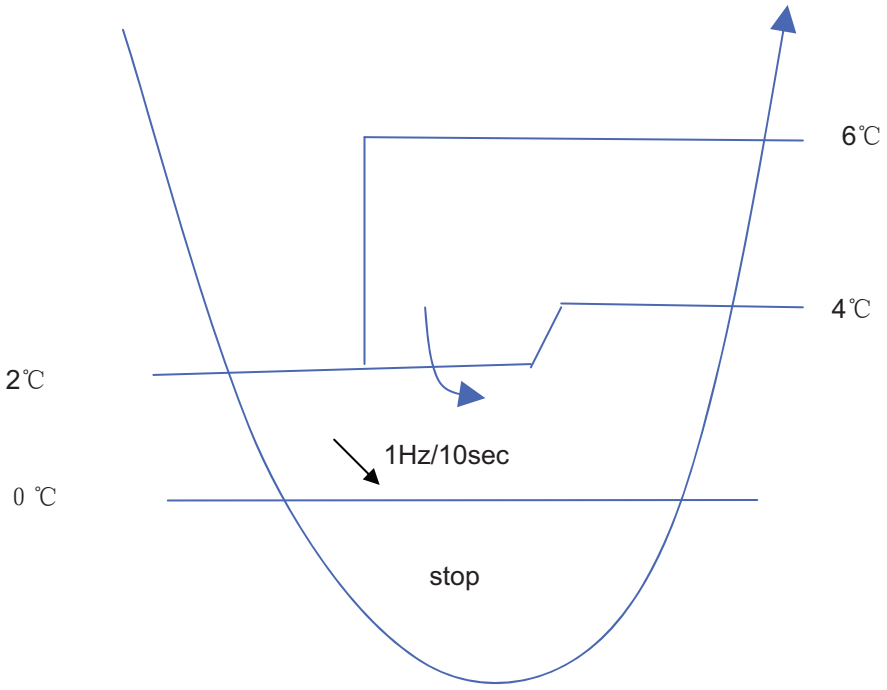


When TD>117℃ for 20s continuously，air discharge overheat protection will be activated and fault will be reported to indoor unit.

It will not continue in other conditions.

5.2.6.3 Indoor Heat Exchanger Anti-freeze Protection

Anti-freeze during cooling



When TC < 2℃，compressor frequency will drop at a speed of 1HZ/10s

When TC starts to rise，and 4 ≤ TC ≤ 6℃，compressor frequency will remain unchanged.

When 96< TC , frequency will rise nomal.

If TC ≤ 0℃，for 2 consecutive minutes, compressor will shutdown and outdoor fault lamp blinks. Fault will not be reported to indoor unit.

When compressor shuts down for more than3 minutes，and when TC>9℃，compressor will restart.

5.2.6.4 Outdoor Temperature Limit

Cooling: When outdoor temperature is lower than 23℃, cooling operation will start, compressor frequency is limited to less than 50 HZ, outdoor wind speed is forced at level 1.

Heating: When outdoor temperature is higher than 18℃, heating operation will start, compressor frequency is limited to less than 50 HZ, outdoor wind speed is forced at level 1.

5.2.6.5 Special Features

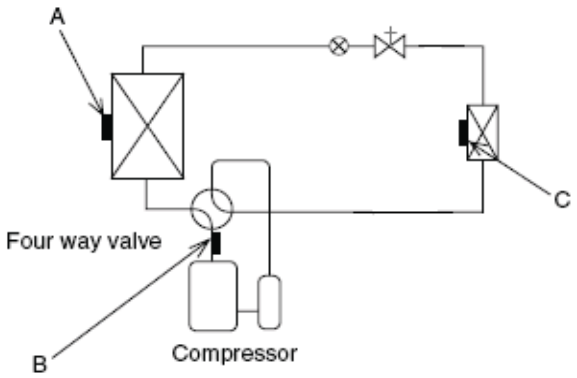
1. Forced Cooling: When receiving indoor forced cooling signal, cooling operation will start in a frequency signaled by indoor unit. Only air discharge temperature and over current protection features are effective and other protection features are invalid.
2. Rated, Middle and Minimum Capacity Operation: When receiving indoor, rated, middle and minimum capacity operation signal, outdoor unit will operate as per wind speed and frequency set by EEPROM and all the protection features are effective.

5.2.6.6 Fault Display and Treatment

In case outdoor unit faults, the alarm indicator lamp will blink and blink frequency is 1HZ，Time interval between blink cycles is 3s.

Alarm indicator lamp is off when there is no fault.

5.3 Function of Main Thermistor



Note: A:Outdoor suction temperature sensor
B: Exhaust temperature sensor
C: Indoor heat-exchange sensor

Outdoor Suction Temperature Sensor

The outdoor heat exchanger thermistor is used for controlling target discharge temperature. The system sets a target discharge temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge temperature can be obtained.

Exhaust Temperature Sensor

The discharge pipe thermistor is used for controlling temperature of the discharge pipe.

If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation halts.

Indoor heat-exchange sensor

1.The indoor heat exchanger thermistor is used for controlling target discharge temperature. The system sets a target discharge temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge temperature can be obtained.

2.The indoor heat exchanger thermistor is used for preventing freezing.During the cooling operation, if the temperature drops abnormally, the operating frequency becomes lower, then the operation halts.

3.The indoor heat exchanger thermistor is used for anti-icing control.During the cooling operation, if the heat exchanger temperature in the room where operation is halted becomes -1°C, it is assumed as icing.

5.4 Value of Thermistor

5.4.1 intdoor Unit

Room sensor

R25℃=23KΩ±3.5%

B25℃/50℃=4200K±3%

Temp.(℃)	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	568.8372	501.0746	440.8435	-1.97	1.75
-29	530.9600	468.6491	413.1441	-1.95	1.74
-28	495.8488	438.5314	387.3645	-1.93	1.72
-27	463.2850	410.5433	363.3602	-1.91	1.71
-26	433.0683	384.5212	340.9980	-1.90	1.70
-25	405.0156	360.3153	320.1558	-1.88	1.69
-24	378.9588	337.7879	300.7211	-1.86	1.67
-23	354.7440	316.8126	282.5905	-1.84	1.66
-22	332.2300	297.2732	265.6686	-1.82	1.64
-21	311.2873	279.0627	249.8676	-1.80	1.63
-20	291.7969	262.0831	235.1067	-1.78	1.62
-19	273.6494	246.2437	221.3111	-1.76	1.60
-18	256.7445	231.4612	208.4122	-1.74	1.59
-17	240.9897	217.6590	196.3462	-1.72	1.57
-16	226.3000	204.7662	185.0545	-1.70	1.56
-15	212.5973	192.7176	174.4829	-1.68	1.54
-14	199.8093	181.4531	164.5813	-1.66	1.53
-13	187.8698	170.9169	155.3033	-1.64	1.51
-12	176.7176	161.0578	146.6059	-1.62	1.49
-11	166.2961	151.8284	138.4495	-1.60	1.48
-10	156.5532	143.1847	130.7973	-1.58	1.46
-9	147.4409	135.0863	123.6153	-1.56	1.44
-8	138.9148	127.4956	116.8717	-1.53	1.43
-7	130.9337	120.3778	110.5374	-1.51	1.41
-6	123.4597	113.7009	104.5852	-1.49	1.39
-5	116.4577	107.4349	98.9897	-1.47	1.38
-4	109.8953	101.5523	93.7278	-1.45	1.36
-3	103.7422	96.0274	88.7774	-1.43	1.34
-2	97.9708	90.8365	84.1185	-1.40	1.32
-1	92.5551	85.9574	79.7322	-1.38	1.30
0	87.4712	81.3697	75.6011	-1.36	1.29
1	82.6970	77.0544	71.7088	-1.34	1.27
2	78.2118	72.9937	68.0402	-1.31	1.25
3	73.9966	69.1712	64.5813	-1.29	1.23
4	70.0335	65.5716	61.3188	-1.27	1.21
5	66.3062	62.1807	58.2405	-1.24	1.19
6	62.7992	58.9853	55.3351	-1.22	1.17
7	59.4984	55.9729	52.5917	-1.20	1.15
8	56.3905	53.1320	50.0006	-1.17	1.13

9	53.4631	50.4521	47.5523	-1.15	1.11
10	50.7048	47.9230	45.2384	-1.13	1.09
11	48.1049	45.5355	43.0505	-1.10	1.07
12	45.6534	43.2808	40.9813	-1.08	1.04
13	43.3410	41.1509	39.0236	-1.05	1.02
14	41.1592	39.1381	37.1708	-1.03	1.00
15	39.0998	37.2355	35.4167	-1.00	0.98
16	37.1553	35.4363	33.7555	-0.98	0.96
17	35.3186	33.7344	32.1818	-0.95	0.94
18	33.5833	32.1240	30.6905	-0.93	0.91
19	31.9432	30.5997	29.2769	-0.90	0.89
20	30.3925	29.1565	27.9365	-0.88	0.87
21	28.9259	27.7895	26.6651	-0.85	0.84
22	27.5383	26.4944	25.4589	-0.83	0.82
23	26.2252	25.2670	24.3140	-0.80	0.80
24	24.9822	24.1034	23.2271	-0.78	0.77
25	23.8050	23.0000	22.1950	-0.78	0.77
26	22.7500	21.9499	21.1520	-0.78	0.78
27	21.7477	20.9536	20.1638	-0.82	0.81
28	20.7951	20.0081	19.2272	-0.86	0.85
29	19.8895	19.1104	18.3394	-0.89	0.88
30	19.0285	18.2581	17.4974	-0.93	0.92
31	18.2094	17.4484	16.6988	-0.97	0.95
32	17.4302	16.6792	15.9410	-1.00	0.99
33	16.6885	15.9480	15.2217	-1.04	1.02
34	15.9825	15.2530	14.5389	-1.08	1.06
35	15.3103	14.5920	13.8903	-1.12	1.09
36	14.6700	13.9632	13.2743	-1.16	1.13
37	14.0599	13.3650	12.6889	-1.20	1.16
38	13.4786	12.7957	12.1325	-1.23	1.20
39	12.9244	12.2537	11.6035	-1.27	1.24
40	12.3960	11.7375	11.1004	-1.31	1.27
41	11.8921	11.2459	10.6218	-1.35	1.31
42	11.4113	10.7775	10.1665	-1.39	1.34
43	10.9526	10.3311	9.7330	-1.43	1.38
44	10.5147	9.9056	9.3204	-1.48	1.42
45	10.0967	9.4999	8.9275	-1.52	1.45
46	9.6976	9.1130	8.5532	-1.56	1.49
47	9.3163	8.7439	8.1965	-1.60	1.53
48	8.9521	8.3916	7.8566	-1.64	1.57
49	8.6040	8.0554	7.5327	-1.68	1.60
50	8.2713	7.7345	7.2237	-1.73	1.64
51	7.9531	7.4280	6.9291	-1.77	1.68
52	7.6489	7.1353	6.6480	-1.81	1.72
53	7.3580	6.8556	6.3797	-1.85	1.76
54	7.0796	6.5884	6.1237	-1.90	1.79
55	6.8131	6.3329	5.8793	-1.94	1.83

56	6.5581	6.0887	5.6459	-1.99	1.87
57	6.3140	5.8552	5.4230	-2.03	1.91
58	6.0802	5.6318	5.2100	-2.07	1.95
59	5.8563	5.4181	5.0065	-2.12	1.99
60	5.6417	5.2136	4.8120	-2.16	2.03
61	5.4361	5.0178	4.6260	-2.21	2.07
62	5.2391	4.8304	4.4481	-2.25	2.11
63	5.0502	4.6510	4.2780	-2.30	2.15
64	4.8691	4.4791	4.1153	-2.35	2.19
65	4.6954	4.3145	3.9596	-2.39	2.23
66	4.5287	4.1567	3.8105	-2.44	2.27
67	4.3689	4.0055	3.6678	-2.49	2.31
68	4.2154	3.8605	3.5312	-2.53	2.35
69	4.0682	3.7216	3.4004	-2.58	2.39
70	3.9268	3.5883	3.2750	-2.63	2.43
71	3.7910	3.4605	3.1549	-2.68	2.48
72	3.6606	3.3378	3.0398	-2.73	2.52
73	3.5353	3.2201	2.9294	-2.77	2.56
74	3.4150	3.1072	2.8237	-2.82	2.60
75	3.2993	2.9987	2.7222	-2.87	2.64
76	3.1881	2.8946	2.6249	-2.92	2.68
77	3.0812	2.7946	2.5316	-2.97	2.73
78	2.9785	2.6986	2.4420	-3.02	2.77
79	2.8796	2.6063	2.3560	-3.07	2.81
80	2.7845	2.5176	2.2735	-3.12	2.86
81	2.6931	2.4324	2.1943	-3.17	2.90
82	2.6050	2.3505	2.1182	-3.22	2.94
83	2.5203	2.2717	2.0451	-3.28	2.99
84	2.4388	2.1960	1.9749	-3.33	3.03
85	2.3602	2.1231	1.9075	-3.38	3.07
86	2.2846	2.0530	1.8426	-3.43	3.12
87	2.2118	1.9856	1.7803	-3.48	3.16
88	2.1416	1.9207	1.7204	-3.54	3.20
89	2.0740	1.8582	1.6628	-3.59	3.25
90	2.0089	1.7981	1.6074	-3.64	3.29
91	1.9461	1.7402	1.5541	-3.70	3.34
92	1.8856	1.6844	1.5028	-3.75	3.38
93	1.8272	1.6307	1.4535	-3.80	3.43
94	1.7709	1.5789	1.4060	-3.86	3.47
95	1.7166	1.5291	1.3603	-3.91	3.52
96	1.6643	1.4810	1.3163	-3.97	3.56
97	1.6138	1.4347	1.2739	-4.02	3.61
98	1.5650	1.3900	1.2331	-4.08	3.66
99	1.5180	1.3470	1.1937	-4.13	3.70
100	1.4726	1.3054	1.1559	-4.19	3.75

101	1.4287	1.2654	1.1194	-4.24	3.80
102	1.3864	1.2268	1.0842	-4.30	3.84
103	1.3455	1.1895	1.0503	-4.36	3.89
104	1.3060	1.1535	1.0176	-4.42	3.94
105	1.2679	1.1188	0.9860	-4.47	3.98
106	1.2310	1.0853	0.9556	-4.53	4.03
107	1.1954	1.0529	0.9263	-4.59	4.08
108	1.1610	1.0217	0.8980	-4.65	4.13
109	1.1277	0.9915	0.8707	-4.70	4.17
110	1.0955	0.9624	0.8443	-4.76	4.22
111	1.0644	0.9342	0.8189	-4.82	4.27
112	1.0344	0.9070	0.7943	-4.88	4.32
113	1.0053	0.8807	0.7706	-4.94	4.37
114	0.9771	0.8553	0.7478	-5.00	4.41
115	0.9499	0.8307	0.7256	-5.06	4.46
116	0.9235	0.8070	0.7043	-5.12	4.51
117	0.8980	0.7840	0.6837	-5.18	4.56
118	0.8734	0.7618	0.6637	-5.24	4.61
119	0.8495	0.7404	0.6445	-5.30	4.66
120	0.8263	0.7196	0.6258	-5.36	4.71

Pipe Sensor

R25℃=10KΩ ±3%

B25℃/50℃=3700K±3%

Temp.((℃))	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	165.2170	147.9497	132.3678	-1.94	1.75
-29	155.5754	139.5600	125.0806	-1.93	1.74
-28	146.5609	131.7022	118.2434	-1.91	1.73
-27	138.1285	124.3392	111.8256	-1.89	1.71
-26	130.2371	117.4366	105.7989	-1.87	1.70
-25	122.8484	110.9627	100.1367	-1.85	1.69
-24	115.9272	104.8882	94.8149	-1.83	1.67
-23	109.4410	99.1858	89.8106	-1.81	1.66
-22	103.3598	93.8305	85.1031	-1.80	1.64
-21	97.6556	88.7989	80.6728	-1.78	1.63
-20	92.3028	84.0695	76.5017	-1.76	1.62
-19	87.2775	79.6222	72.5729	-1.74	1.60
-18	82.5577	75.4384	68.8710	-1.72	1.59
-17	78.1230	71.5010	65.3815	-1.70	1.57
-16	73.9543	67.7939	62.0907	-1.68	1.55
-15	70.0342	64.3023	58.9863	-1.66	1.54
-14	66.3463	61.0123	56.0565	-1.64	1.52
-13	62.8755	57.9110	53.2905	-1.62	1.51
-12	59.6076	54.9866	50.6781	-1.60	1.49
-11	56.5296	52.2278	48.2099	-1.58	1.47
-10	53.6294	49.6244	45.8771	-1.56	1.46

-9	50.8956	47.1666	43.6714	-1.54	1.44
-8	48.3178	44.8454	41.5851	-1.51	1.42
-7	45.8860	42.6525	39.6112	-1.49	1.40
-6	43.5912	40.5800	37.7429	-1.47	1.39
-5	41.4249	38.6207	35.9739	-1.45	1.37
-4	39.3792	36.7676	34.2983	-1.43	1.35
-3	37.4465	35.0144	32.7108	-1.41	1.33
-2	35.6202	33.3552	31.2062	-1.38	1.31
-1	33.8936	31.7844	29.7796	-1.36	1.29
0	32.2608	30.2968	28.4267	-1.34	1.28
1	30.7162	28.8875	27.1431	-1.32	1.26
2	29.2545	27.5519	25.9250	-1.29	1.24
3	27.8708	26.2858	24.7686	-1.27	1.22
4	26.5605	25.0851	23.6704	-1.25	1.20
5	25.3193	23.9462	22.6273	-1.23	1.18
6	24.1432	22.8656	21.6361	-1.20	1.16
7	23.0284	21.8398	20.6939	-1.18	1.14
8	21.9714	20.8659	19.7982	-1.15	1.12
9	20.9688	19.9409	18.9463	-1.13	1.09
10	20.0176	19.0621	18.1358	-1.11	1.07
11	19.1149	18.2270	17.3646	-1.08	1.05
12	18.2580	17.4331	16.6305	-1.06	1.03
13	17.4442	16.6782	15.9315	-1.03	1.01
14	16.6711	15.9601	15.2657	-1.01	0.99
15	15.9366	15.2770	14.6315	-0.98	0.96
16	15.2385	14.6268	14.0271	-0.96	0.94
17	14.5748	14.0079	13.4510	-0.93	0.92
18	13.9436	13.4185	12.9017	-0.91	0.90
19	13.3431	12.8572	12.3778	-0.88	0.87
20	12.7718	12.3223	11.8780	-0.86	0.85
21	12.2280	11.8126	11.4011	-0.83	0.83
22	11.7102	11.3267	10.9459	-0.81	0.80
23	11.2172	10.8634	10.5114	-0.78	0.78
24	10.7475	10.4216	10.0964	-0.75	0.75
25	10.3000	10.0000	9.7000	-0.75	0.75
26	9.8975	9.5974	9.2980	-0.76	0.76
27	9.5129	9.2132	8.9148	-0.80	0.80
28	9.1454	8.8465	8.5496	-0.84	0.83
29	8.7942	8.4964	8.2013	-0.87	0.86
30	8.4583	8.1621	7.8691	-0.91	0.90
31	8.1371	7.8428	7.5522	-0.95	0.93
32	7.8299	7.5377	7.2498	-0.98	0.97
33	7.5359	7.2461	6.9611	-1.02	1.00
34	7.2546	6.9673	6.6854	-1.06	1.04
35	6.9852	6.7008	6.4222	-1.10	1.07
36	6.7273	6.4459	6.1707	-1.13	1.11
37	6.4803	6.2021	5.9304	-1.17	1.14

38	6.2437	5.9687	5.7007	-1.21	1.18
39	6.0170	5.7454	5.4812	-1.25	1.22
40	5.7997	5.5316	5.2712	-1.29	1.25
41	5.5914	5.3269	5.0704	-1.33	1.29
42	5.3916	5.1308	4.8783	-1.37	1.33
43	5.2001	4.9430	4.6944	-1.41	1.36
44	5.0163	4.7630	4.5185	-1.45	1.40
45	4.8400	4.5905	4.3500	-1.49	1.44
46	4.6708	4.4252	4.1887	-1.53	1.47
47	4.5083	4.2666	4.0342	-1.57	1.51
48	4.3524	4.1145	3.8862	-1.61	1.55
49	4.2026	3.9686	3.7443	-1.65	1.59
50	4.0588	3.8287	3.6084	-1.70	1.62
51	3.9206	3.6943	3.4780	-1.74	1.66
52	3.7878	3.5654	3.3531	-1.78	1.70
53	3.6601	3.4416	3.2332	-1.82	1.74
54	3.5374	3.3227	3.1183	-1.87	1.78
55	3.4195	3.2085	3.0079	-1.91	1.82
56	3.3060	3.0989	2.9021	-1.95	1.85
57	3.1969	2.9935	2.8005	-2.00	1.89
58	3.0919	2.8922	2.7029	-2.04	1.93
59	2.9909	2.7948	2.6092	-2.08	1.97
60	2.8936	2.7012	2.5193	-2.13	2.01
61	2.8000	2.6112	2.4328	-2.17	2.05
62	2.7099	2.5246	2.3498	-2.22	2.09
63	2.6232	2.4413	2.2700	-2.26	2.13
64	2.5396	2.3611	2.1932	-2.31	2.17
65	2.4591	2.2840	2.1195	-2.36	2.21
66	2.3815	2.2098	2.0486	-2.40	2.25
67	2.3068	2.1383	1.9803	-2.45	2.29
68	2.2347	2.0695	1.9147	-2.49	2.34
69	2.1652	2.0032	1.8516	-2.54	2.38
70	2.0983	1.9393	1.7908	-2.59	2.42
71	2.0337	1.8778	1.7324	-2.63	2.46
72	1.9714	1.8186	1.6761	-2.68	2.50
73	1.9113	1.7614	1.6219	-2.73	2.54
74	1.8533	1.7064	1.5697	-2.78	2.58
75	1.7974	1.6533	1.5194	-2.83	2.63
76	1.7434	1.6021	1.4710	-2.88	2.67
77	1.6913	1.5528	1.4243	-2.92	2.71
78	1.6409	1.5051	1.3794	-2.97	2.75
79	1.5923	1.4592	1.3360	-3.02	2.80
80	1.5454	1.4149	1.2942	-3.07	2.84
81	1.5000	1.3721	1.2540	-3.12	2.88
82	1.4562	1.3308	1.2151	-3.17	2.93
83	1.4139	1.2910	1.1776	-3.22	2.97
84	1.3730	1.2525	1.1415	-3.27	3.01

85	1.3335	1.2153	1.1066	-3.32	3.06
86	1.2953	1.1794	1.0730	-3.38	3.10
87	1.2583	1.1448	1.0405	-3.43	3.15
88	1.2226	1.1113	1.0092	-3.48	3.19
89	1.1880	1.0789	0.9789	-3.53	3.24
90	1.1546	1.0476	0.9497	-3.58	3.28
91	1.1223	1.0174	0.9215	-3.64	3.33
92	1.0910	0.9882	0.8942	-3.69	3.37
93	1.0607	0.9599	0.8679	-3.74	3.42
94	1.0314	0.9326	0.8424	-3.80	3.46
95	1.0030	0.9061	0.8179	-3.85	3.51
96	0.9756	0.8806	0.7941	-3.90	3.55
97	0.9490	0.8558	0.7711	-3.96	3.60
98	0.9232	0.8319	0.7489	-4.01	3.64
99	0.8983	0.8088	0.7275	-4.07	3.69
100	0.8741	0.7863	0.7067	-4.12	3.74
101	0.8507	0.7646	0.6867	-4.18	3.78
102	0.8281	0.7436	0.6672	-4.23	3.83
103	0.8061	0.7233	0.6484	-4.29	3.88
104	0.7848	0.7036	0.6303	-4.34	3.92
105	0.7641	0.6845	0.6127	-4.40	3.97
106	0.7441	0.6661	0.5957	-4.46	4.02
107	0.7247	0.6482	0.5792	-4.51	4.07
108	0.7059	0.6308	0.5632	-4.57	4.12
109	0.6877	0.6140	0.5478	-4.63	4.16
110	0.6700	0.5977	0.5328	-4.69	4.21
111	0.6528	0.5820	0.5183	-4.74	4.26
112	0.6361	0.5667	0.5043	-4.80	4.31
113	0.6200	0.5518	0.4907	-4.86	4.36
114	0.6043	0.5374	0.4775	-4.92	4.41
115	0.5891	0.5235	0.4648	-4.98	4.45
116	0.5743	0.5100	0.4524	-5.04	4.50
117	0.5600	0.4968	0.4404	-5.10	4.55
118	0.5460	0.4841	0.4288	-5.16	4.60
119	0.5325	0.4717	0.4175	-5.22	4.65
120	0.5194	0.4597	0.4066	-5.28	4.70

5.4.2 Outdoor Unit

Ambient Sensor, Suction Sensor, Defrosting Sensor

R25℃=10KΩ ±3%

B25℃/50℃=3700K±3%

Temp.(℃)	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	165.2170	147.9497	132.3678	-1.94	1.75
-29	155.5754	139.5600	125.0806	-1.93	1.74
-28	146.5609	131.7022	118.2434	-1.91	1.73
-27	138.1285	124.3392	111.8256	-1.89	1.71

-26	130.2371	117.4366	105.7989	-1.87	1.70
-25	122.8484	110.9627	100.1367	-1.85	1.69
-24	115.9272	104.8882	94.8149	-1.83	1.67
-23	109.4410	99.1858	89.8106	-1.81	1.66
-22	103.3598	93.8305	85.1031	-1.80	1.64
-21	97.6556	88.7989	80.6728	-1.78	1.63
-20	92.3028	84.0695	76.5017	-1.76	1.62
-19	87.2775	79.6222	72.5729	-1.74	1.60
-18	82.5577	75.4384	68.8710	-1.72	1.59
-17	78.1230	71.5010	65.3815	-1.70	1.57
-16	73.9543	67.7939	62.0907	-1.68	1.55
-15	70.0342	64.3023	58.9863	-1.66	1.54
-14	66.3463	61.0123	56.0565	-1.64	1.52
-13	62.8755	57.9110	53.2905	-1.62	1.51
-12	59.6076	54.9866	50.6781	-1.60	1.49
-11	56.5296	52.2278	48.2099	-1.58	1.47
-10	53.6294	49.6244	45.8771	-1.56	1.46
-9	50.8956	47.1666	43.6714	-1.54	1.44
-8	48.3178	44.8454	41.5851	-1.51	1.42
-7	45.8860	42.6525	39.6112	-1.49	1.40
-6	43.5912	40.5800	37.7429	-1.47	1.39
-5	41.4249	38.6207	35.9739	-1.45	1.37
-4	39.3792	36.7676	34.2983	-1.43	1.35
-3	37.4465	35.0144	32.7108	-1.41	1.33
-2	35.6202	33.3552	31.2062	-1.38	1.31
-1	33.8936	31.7844	29.7796	-1.36	1.29
0	32.2608	30.2968	28.4267	-1.34	1.28
1	30.7162	28.8875	27.1431	-1.32	1.26
2	29.2545	27.5519	25.9250	-1.29	1.24
3	27.8708	26.2858	24.7686	-1.27	1.22
4	26.5605	25.0851	23.6704	-1.25	1.20
5	25.3193	23.9462	22.6273	-1.23	1.18
6	24.1432	22.8656	21.6361	-1.20	1.16
7	23.0284	21.8398	20.6939	-1.18	1.14
8	21.9714	20.8659	19.7982	-1.15	1.12
9	20.9688	19.9409	18.9463	-1.13	1.09
10	20.0176	19.0621	18.1358	-1.11	1.07
11	19.1149	18.2270	17.3646	-1.08	1.05
12	18.2580	17.4331	16.6305	-1.06	1.03
13	17.4442	16.6782	15.9315	-1.03	1.01
14	16.6711	15.9601	15.2657	-1.01	0.99
15	15.9366	15.2770	14.6315	-0.98	0.96
16	15.2385	14.6268	14.0271	-0.96	0.94
17	14.5748	14.0079	13.4510	-0.93	0.92
18	13.9436	13.4185	12.9017	-0.91	0.90
19	13.3431	12.8572	12.3778	-0.88	0.87
20	12.7718	12.3223	11.8780	-0.86	0.85

21	12.2280	11.8126	11.4011	-0.83	0.83
22	11.7102	11.3267	10.9459	-0.81	0.80
23	11.2172	10.8634	10.5114	-0.78	0.78
24	10.7475	10.4216	10.0964	-0.75	0.75
25	10.3000	10.0000	9.7000	-0.75	0.75
26	9.8975	9.5974	9.2980	-0.76	0.76
27	9.5129	9.2132	8.9148	-0.80	0.80
28	9.1454	8.8465	8.5496	-0.84	0.83
29	8.7942	8.4964	8.2013	-0.87	0.86
30	8.4583	8.1621	7.8691	-0.91	0.90
31	8.1371	7.8428	7.5522	-0.95	0.93
32	7.8299	7.5377	7.2498	-0.98	0.97
33	7.5359	7.2461	6.9611	-1.02	1.00
34	7.2546	6.9673	6.6854	-1.06	1.04
35	6.9852	6.7008	6.4222	-1.10	1.07
36	6.7273	6.4459	6.1707	-1.13	1.11
37	6.4803	6.2021	5.9304	-1.17	1.14
38	6.2437	5.9687	5.7007	-1.21	1.18
39	6.0170	5.7454	5.4812	-1.25	1.22
40	5.7997	5.5316	5.2712	-1.29	1.25
41	5.5914	5.3269	5.0704	-1.33	1.29
42	5.3916	5.1308	4.8783	-1.37	1.33
43	5.2001	4.9430	4.6944	-1.41	1.36
44	5.0163	4.7630	4.5185	-1.45	1.40
45	4.8400	4.5905	4.3500	-1.49	1.44
46	4.6708	4.4252	4.1887	-1.53	1.47
47	4.5083	4.2666	4.0342	-1.57	1.51
48	4.3524	4.1145	3.8862	-1.61	1.55
49	4.2026	3.9686	3.7443	-1.65	1.59
50	4.0588	3.8287	3.6084	-1.70	1.62
51	3.9206	3.6943	3.4780	-1.74	1.66
52	3.7878	3.5654	3.3531	-1.78	1.70
53	3.6601	3.4416	3.2332	-1.82	1.74
54	3.5374	3.3227	3.1183	-1.87	1.78
55	3.4195	3.2085	3.0079	-1.91	1.82
56	3.3060	3.0989	2.9021	-1.95	1.85
57	3.1969	2.9935	2.8005	-2.00	1.89
58	3.0919	2.8922	2.7029	-2.04	1.93
59	2.9909	2.7948	2.6092	-2.08	1.97
60	2.8936	2.7012	2.5193	-2.13	2.01
61	2.8000	2.6112	2.4328	-2.17	2.05
62	2.7099	2.5246	2.3498	-2.22	2.09
63	2.6232	2.4413	2.2700	-2.26	2.13
64	2.5396	2.3611	2.1932	-2.31	2.17
65	2.4591	2.2840	2.1195	-2.36	2.21
66	2.3815	2.2098	2.0486	-2.40	2.25
67	2.3068	2.1383	1.9803	-2.45	2.29

68	2.2347	2.0695	1.9147	-2.49	2.34
69	2.1652	2.0032	1.8516	-2.54	2.38
70	2.0983	1.9393	1.7908	-2.59	2.42
71	2.0337	1.8778	1.7324	-2.63	2.46
72	1.9714	1.8186	1.6761	-2.68	2.50
73	1.9113	1.7614	1.6219	-2.73	2.54
74	1.8533	1.7064	1.5697	-2.78	2.58
75	1.7974	1.6533	1.5194	-2.83	2.63
76	1.7434	1.6021	1.4710	-2.88	2.67
77	1.6913	1.5528	1.4243	-2.92	2.71
78	1.6409	1.5051	1.3794	-2.97	2.75
79	1.5923	1.4592	1.3360	-3.02	2.80
80	1.5454	1.4149	1.2942	-3.07	2.84
81	1.5000	1.3721	1.2540	-3.12	2.88
82	1.4562	1.3308	1.2151	-3.17	2.93
83	1.4139	1.2910	1.1776	-3.22	2.97
84	1.3730	1.2525	1.1415	-3.27	3.01
85	1.3335	1.2153	1.1066	-3.32	3.06
86	1.2953	1.1794	1.0730	-3.38	3.10
87	1.2583	1.1448	1.0405	-3.43	3.15
88	1.2226	1.1113	1.0092	-3.48	3.19
89	1.1880	1.0789	0.9789	-3.53	3.24
90	1.1546	1.0476	0.9497	-3.58	3.28
91	1.1223	1.0174	0.9215	-3.64	3.33
92	1.0910	0.9882	0.8942	-3.69	3.37
93	1.0607	0.9599	0.8679	-3.74	3.42
94	1.0314	0.9326	0.8424	-3.80	3.46
95	1.0030	0.9061	0.8179	-3.85	3.51
96	0.9756	0.8806	0.7941	-3.90	3.55
97	0.9490	0.8558	0.7711	-3.96	3.60
98	0.9232	0.8319	0.7489	-4.01	3.64
99	0.8983	0.8088	0.7275	-4.07	3.69
100	0.8741	0.7863	0.7067	-4.12	3.74
101	0.8507	0.7646	0.6867	-4.18	3.78
102	0.8281	0.7436	0.6672	-4.23	3.83
103	0.8061	0.7233	0.6484	-4.29	3.88
104	0.7848	0.7036	0.6303	-4.34	3.92
105	0.7641	0.6845	0.6127	-4.40	3.97
106	0.7441	0.6661	0.5957	-4.46	4.02
107	0.7247	0.6482	0.5792	-4.51	4.07
108	0.7059	0.6308	0.5632	-4.57	4.12
109	0.6877	0.6140	0.5478	-4.63	4.16
110	0.6700	0.5977	0.5328	-4.69	4.21
111	0.6528	0.5820	0.5183	-4.74	4.26
112	0.6361	0.5667	0.5043	-4.80	4.31
113	0.6200	0.5518	0.4907	-4.86	4.36
114	0.6043	0.5374	0.4775	-4.92	4.41

115	0.5891	0.5235	0.4648	-4.98	4.45
116	0.5743	0.5100	0.4524	-5.04	4.50
117	0.5600	0.4968	0.4404	-5.10	4.55
118	0.5460	0.4841	0.4288	-5.16	4.60
119	0.5325	0.4717	0.4175	-5.22	4.65
120	0.5194	0.4597	0.4066	-5.28	4.70

Discharging Sensor

:80℃=50KΩ±3%

25/80℃=4450K±3%

Temp.((℃))	Max.(KΩ)	Normal(KΩ)	Min.(KΩ)	Tolerance(℃)	
-30	14646.0505	12061.7438	9924.4999	-2.96	2.45
-29	13654.1707	11267.8730	9290.2526	-2.95	2.44
-28	12735.8378	10531.3695	8700.6388	-2.93	2.44
-27	11885.1336	9847.7240	8152.2338	-2.92	2.43
-26	11096.6531	9212.8101	7641.8972	-2.91	2.42
-25	10365.4565	8622.8491	7166.7474	-2.90	2.42
-24	9687.0270	8074.3787	6724.1389	-2.88	2.41
-23	9057.2314	7564.2244	6311.6413	-2.87	2.41
-22	8472.2852	7089.4741	5927.0206	-2.86	2.40
-21	7928.7217	6647.4547	5568.2222	-2.84	2.39
-20	7423.3626	6235.7109	5233.3554	-2.83	2.39
-19	6953.2930	5851.9864	4920.6791	-2.82	2.38
-18	6515.8375	5494.2064	4628.5894	-2.80	2.37
-17	6108.5393	5160.4621	4355.6078	-2.79	2.37
-16	5729.1413	4848.9963	4100.3708	-2.77	2.36
-15	5375.5683	4558.1906	3861.6201	-2.76	2.35
-14	5045.9114	4286.5535	3638.1938	-2.75	2.34
-13	4738.4141	4032.7098	3429.0191	-2.73	2.34
-12	4451.4586	3795.3910	3233.1039	-2.72	2.33
-11	4183.5548	3573.4260	3049.5312	-2.70	2.32
-10	3933.3289	3365.7336	2877.4527	-2.69	2.31
-9	3699.5139	3171.3148	2716.0828	-2.67	2.30
-8	3480.9407	2989.2460	2564.6945	-2.66	2.29
-7	3276.5302	2818.6731	2422.6139	-2.64	2.28
-6	3085.2854	2658.8058	2289.2164	-2.63	2.28
-5	2906.2851	2508.9126	2163.9230	-2.61	2.27
-4	2738.6777	2368.3158	2046.1961	-2.60	2.26
-3	2581.6752	2236.3876	1935.5371	-2.58	2.25
-2	2434.5487	2112.5459	1831.4826	-2.56	2.24
-1	2296.6230	1996.2509	1733.6024	-2.55	2.23
0	2167.2730	1887.0018	1641.4966	-2.53	2.22
1	2045.9191	1784.3336	1554.7931	-2.52	2.21
2	1932.0242	1687.8144	1473.1460	-2.50	2.20
3	1825.0899	1597.0431	1396.2333	-2.48	2.19
4	1724.6540	1511.6468	1323.7551	-2.47	2.17

5	1630.2870	1431.2787	1255.4324	-2.45	2.16
6	1541.5904	1355.6163	1191.0048	-2.43	2.15
7	1458.1938	1284.3593	1130.2298	-2.41	2.14
8	1379.7528	1217.2282	1072.8813	-2.40	2.13
9	1305.9472	1153.9626	1018.7481	-2.38	2.12
10	1236.4792	1094.3200	967.6334	-2.36	2.11
11	1171.0715	1038.0743	919.3533	-2.35	2.09
12	1109.4661	985.0146	873.7359	-2.33	2.08
13	1051.4226	934.9440	830.6210	-2.31	2.07
14	996.7169	887.6792	789.8583	-2.29	2.06
15	945.1404	843.0486	751.3077	-2.27	2.04
16	896.4981	800.8922	714.8380	-2.26	2.03
17	850.6086	761.0603	680.3265	-2.24	2.02
18	807.3024	723.4134	647.6580	-2.22	2.00
19	766.4212	687.8205	616.7252	-2.20	1.99
20	727.8172	654.1596	587.4271	-2.18	1.98
21	691.3524	622.3161	559.6694	-2.16	1.96
22	656.8979	592.1831	533.3634	-2.14	1.95
23	624.3328	563.6604	508.4261	-2.12	1.93
24	593.5446	536.6540	484.7796	-2.10	1.92
25	564.4275	511.0760	462.3510	-2.09	1.90
26	536.9865	486.9352	441.1516	-2.07	1.89
27	511.0105	464.0500	421.0258	-2.05	1.87
28	486.4151	442.3499	401.9146	-2.03	1.86
29	463.1208	421.7683	383.7626	-2.01	1.84
30	441.0535	402.2430	366.5175	-1.99	1.83
31	420.1431	383.7151	350.1301	-1.97	1.81
32	400.3242	366.1295	334.5542	-1.95	1.80
33	381.5350	349.4341	319.7460	-1.93	1.78
34	363.7176	333.5801	305.6645	-1.90	1.76
35	346.8176	318.5216	292.2709	-1.88	1.75
36	330.7839	304.2151	279.5286	-1.86	1.73
37	315.5682	290.6199	267.4031	-1.84	1.71
38	301.1254	277.6976	255.8620	-1.82	1.70
39	287.4128	265.4119	244.8745	-1.80	1.68
40	274.3905	253.7288	234.4118	-1.78	1.66
41	262.0206	242.6161	224.4465	-1.76	1.64
42	250.2676	232.0436	214.9529	-1.74	1.63
43	239.0983	221.9825	205.9065	-1.71	1.61
44	228.4809	212.4060	197.2844	-1.69	1.59
45	218.3860	203.2887	189.0648	-1.67	1.57
46	208.7855	194.6066	181.2273	-1.65	1.55
47	199.6531	186.3369	173.7524	-1.63	1.54
48	190.9639	178.4584	166.6217	-1.60	1.52
49	182.6945	170.9508	159.8181	-1.58	1.50
50	174.8228	163.7951	153.3249	-1.56	1.48
51	167.3280	156.9733	147.1268	-1.53	1.46

52	160.1904	150.4683	141.2090	-1.51	1.44
53	153.3914	144.2641	135.5577	-1.49	1.42
54	146.9136	138.3454	130.1598	-1.47	1.40
55	140.7403	132.6980	125.0027	-1.44	1.38
56	134.8559	127.3081	120.0746	-1.42	1.36
57	129.2457	122.1630	115.3645	-1.40	1.34
58	123.8956	117.2504	110.8618	-1.37	1.32
59	118.7926	112.5589	106.5564	-1.35	1.30
60	113.9241	108.0776	102.4388	-1.32	1.28
61	109.2784	103.7961	98.5000	-1.30	1.26
62	104.8443	99.7046	94.7315	-1.28	1.23
63	100.6112	95.7939	91.1253	-1.25	1.21
64	96.5692	92.0553	87.6735	-1.23	1.19
65	92.7088	88.4805	84.3690	-1.20	1.17
66	89.0211	85.0614	81.2048	-1.18	1.15
67	85.4976	81.7908	78.1744	-1.15	1.12
68	82.1303	78.6615	75.2715	-1.13	1.10
69	78.9116	75.6668	72.4902	-1.10	1.08
70	75.8343	72.8004	69.8249	-1.08	1.06
71	72.8916	70.0561	67.2703	-1.05	1.03
72	70.0770	67.4283	64.8213	-1.03	1.01
73	67.3844	64.9115	62.4731	-1.00	0.99
74	64.8080	62.5006	60.2211	-0.98	0.96
75	62.3423	60.1906	58.0609	-0.95	0.94
76	59.9821	57.9770	55.9885	-0.92	0.92
77	57.7223	55.8552	53.9998	-0.90	0.89
78	55.5583	53.8210	52.0912	-0.87	0.87
79	53.4856	51.8706	50.2591	-0.85	0.84
80	51.5000	50.0000	48.5000	-0.85	0.84
81	49.7063	48.2057	46.7083	-0.85	0.85
82	47.9835	46.4842	44.9911	-0.89	0.89
83	46.3286	44.8323	43.3452	-0.93	0.92
84	44.7385	43.2468	41.7672	-0.96	0.95
85	43.2105	41.7248	40.2540	-1.00	0.99
86	41.7386	40.2604	38.7996	-1.03	1.02
87	40.3241	38.8545	37.4048	-1.07	1.06
88	38.9643	37.5045	36.0668	-1.11	1.09
89	37.6569	36.2078	34.7831	-1.14	1.13
90	36.3996	34.9622	33.5513	-1.18	1.16
91	35.1903	33.7653	32.3689	-1.22	1.19
92	34.0269	32.6151	31.2338	-1.26	1.23
93	32.9075	31.5096	30.1438	-1.30	1.27
94	31.8302	30.4467	29.0970	-1.33	1.30
95	30.7933	29.4246	28.0915	-1.37	1.34
96	29.7950	28.4417	27.1254	-1.41	1.37
97	28.8337	27.4961	26.1970	-1.45	1.41
98	27.9078	26.5864	25.3048	-1.49	1.44

99	27.0160	25.7110	24.4470	-1.53	1.48
100	26.1569	24.8685	23.6222	-1.57	1.52
101	25.3290	24.0574	22.8291	-1.61	1.55
102	24.5311	23.2765	22.0662	-1.65	1.59
103	23.7620	22.5245	21.3323	-1.69	1.63
104	23.0205	21.8002	20.6261	-1.73	1.66
105	22.3055	21.1025	19.9465	-1.77	1.70
106	21.6159	20.4303	19.2924	-1.81	1.74
107	20.9508	19.7825	18.6626	-1.85	1.77
108	20.3091	19.1582	18.0563	-1.89	1.81
109	19.6899	18.5564	17.4723	-1.93	1.85
110	19.0924	17.9761	16.9098	-1.98	1.89
111	18.5157	17.4166	16.3680	-2.02	1.93
112	17.9590	16.8769	15.8458	-2.06	1.96
113	17.4214	16.3564	15.3427	-2.10	2.00
114	16.9023	15.8542	14.8577	-2.15	2.04
115	16.4010	15.3696	14.3902	-2.19	2.08
116	15.9167	14.9020	13.9394	-2.23	2.12
117	15.4489	14.4506	13.5047	-2.27	2.16
118	14.9968	14.0149	13.0855	-2.32	2.19
119	14.5599	13.5942	12.6811	-2.36	2.23
120	14.1376	13.1879	12.2909	-2.41	2.27
121	13.7294	12.7955	11.9144	-2.45	2.31
122	13.3347	12.4165	11.5510	-2.50	2.35
123	12.9531	12.0503	11.2003	-2.54	2.39
124	12.5840	11.6965	10.8617	-2.58	2.43
125	12.2270	11.3545	10.5348	-2.63	2.47
126	11.8817	11.0240	10.2191	-2.68	2.51
127	11.5475	10.7046	9.9142	-2.72	2.55
128	11.2242	10.3957	9.6197	-2.77	2.59
129	10.9112	10.0970	9.3352	-2.81	2.63
130	10.6084	9.8082	9.0602	-2.86	2.67
131	10.3151	9.5288	8.7945	-2.91	2.71
132	10.0312	9.2586	8.5378	-2.95	2.75
133	9.7563	8.9971	8.2895	-3.00	2.80
134	9.4901	8.7441	8.0495	-3.05	2.84
135	9.2322	8.4993	7.8175	-3.09	2.88
136	8.9824	8.2623	7.5931	-3.14	2.92
137	8.7404	8.0329	7.3760	-3.19	2.96
138	8.5059	7.8108	7.1660	-3.24	3.00
139	8.2787	7.5958	6.9629	-3.29	3.04
140	8.0584	7.3875	6.7664	-3.33	3.09

6. System Configuration

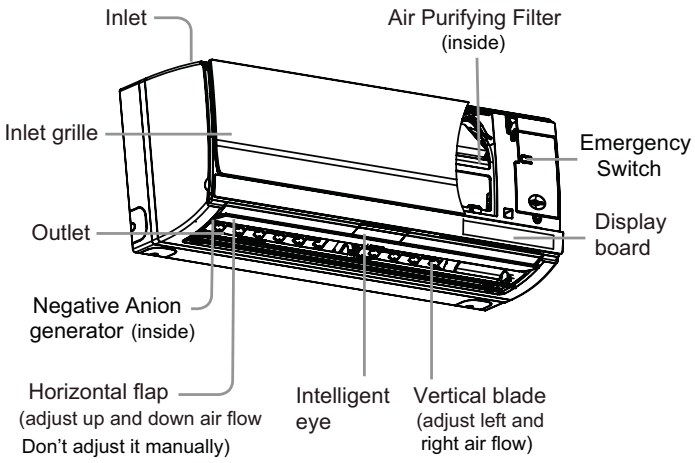
6.1 System Configuration

After the installation and test operation of the room air conditioner have been completed, it should be operated and handled as described below. Every user would like to know the correct method of operation of the room air conditioner, to check if it is capable of cooling (or heating) well, and to know a clever method of using it.In order to meet this expectation of the users, giving sufficient explanations taking enough time can be said to reduce about 80% of the requests for servicing. However good the installation work is and however good the functions are, the customer may blame either the room air conditioner or its installation work because of improper handling. The installation work and handing over of the unit can only be considered to have been completed when its handling has been explained to the user without using technical terms but giving full knowledge of the equipment.

6.2 Instruction

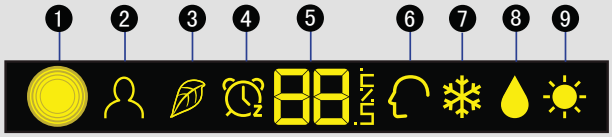
Parts and Functions

Indoor Unit



Please be subject to the actual produce purchased, the above picture is just from your reference.

Display board

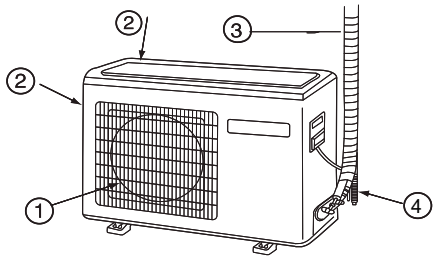


1. Signal receiver hole
2. iFP display
3. HEALTH display
   (If the unit which you purchased has healthy function,follow it. If not,please ignore.)
4. TIMER OFF display
   TIMER ON display
   SLEEP display
5. temp display
   Default displaying temp is ambient temp, but it can be also changed to set temp via some special operation.

When receiving the remote control signal, display the set temperature and in the rest time the room temperature is displayed and this room temperature is only for reference.
when displaying set temp, the displaying process is the same as above
Diaplaying set temp function only valuable for RS.

6. SMART display
7. COOL display
8. DRY display
9. HEAT display

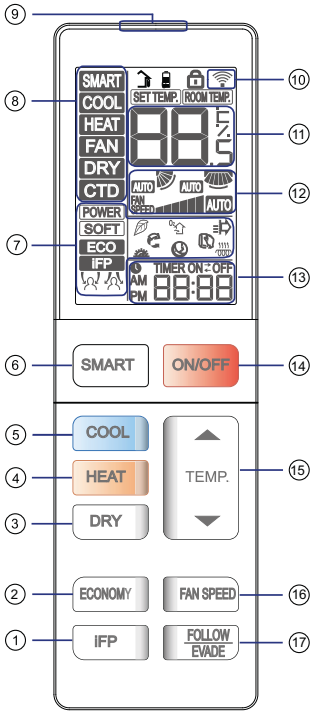
Outdoor Unit



① OUTLET ③ CONNECTING PIPING AND ELECTRICAL WIRING
② INLET ④ DRAIN HOSE

Remote controller

Outer side of the controller



1.iFP button
Induce the movement of the human body,so as to control the airflow / energy saving functioning.

2.ECONOMY button
Used to set ECONOMY operation.

3.DRY button
Used to set DRY operation.

4.HEAT button
Used to set HEAT operation. (Cooling only unit do not have displays and functions related with heating.)

5.COOL button
Used to set COOL operation.

6.SMART button
Used to set SMART operation. (This function is unavailable on some models.)

7.Display of each function status

8.Operation mode display

9.Signal sending end

10.Signal sending display

11.TEMP display

12.FAN SPEED display
Swing up/down display
Left/right air flow display

13.TIMER ON display
TIMER OFF display
CLOCK display

14.ON / OFF button

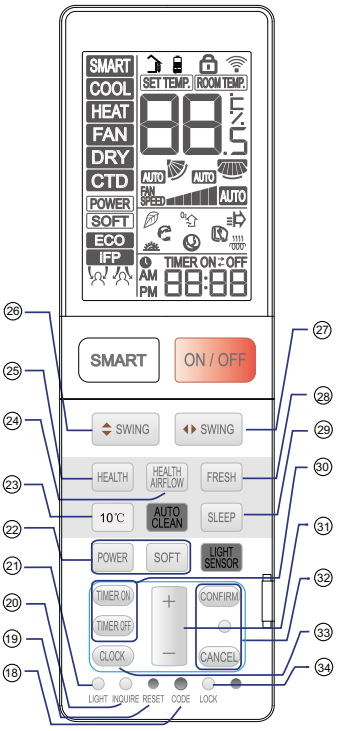
15.TEMP. button

16.FAN SPEED button
Used to select fan speed: LOW,MED,HI,AUTO

17.FOLLOW / EVADE button
Detect the location where the human body is, adjust the air deflector to blow/avoid the body.

Operation

Inner side of the controller



operating power is 100W; when the panel display “02”, the operating power is 200W, and so forth)

21.LIGHT button
Control the lightening and extinguishing of the indoor LED display board.
the manual of how to display set temp:
Press LIGHT button continuously for ten times, the display temp on display panel can be changed from ambient temp to set temp. Set temp function only valuable for RS.

22.POWER / SOFT button

23.10℃
special heating set function: 10 degree heating maintaining (valuable for RS)

24.HEALTH AIRFLOW button

25.HEALTH button

26.SWING UP/DOWN button

27.SWING LEFT/RIGHT button

28.FRESH button

29.SLEEP button

30.TIMER ON / OFF button

31.HOUR button

32.CANCEL/CONFIRM button
Used to confirm timer and clock settings.

33.CLOCK button

34.LOCK button
If pressed, the other buttons will be disabled. Press it once again,lock will be cancelled.

18.CODE button
Used to select CODE A or B with a press, A or B will be displayed on LCD.Please select A without special explanation.

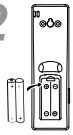
19.RESET button
When the remote controller appears abnormal,use a sharp pointed article to press this button to reset the controller normal.

20.INQUIRE button
Inquire the external environmental temperature and the operating power of the machine. (e.g. when the panel display “01”, the

AUTO CLEAN LIGHT SENSOR This function unavailable on this models.

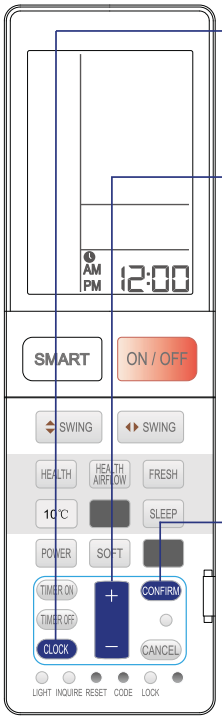
Loading of the battery

1  Remove the battery cover;

2  Load the batteries as illustrated. 2 R-03 batteries,resetting key(cylinder); Be sure that the loading is in line with the" + "/"-";

3  Load the battery,then put on the cover again.

Clock set



1 Press CLOCK button,

"AM" or "PM" flashes.

2 Press “+” or “-” to set correct time.

Each press will increase or decrease 1min.If the button is kept pressed,time will change quickly.

3 Confirm time.

After time setting is confirmed, press CONFIRM,"AM "and "PM" stop flashing,while clock starts working.

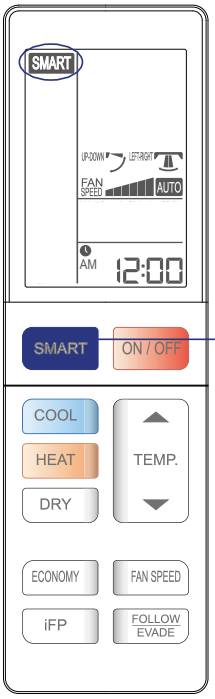
Note:

The distance between the signal transmission head and the receiver hole should be within 7m without any obstacle as well.
When electronic-started type fluorescent lamp or change-over wireless telephone is installed in the type fluorescent lamp or room, the receiver is apt to be disturbed in receivingthe signals, so the distance to the indoor unit should be shorter.
Full display or unclear display during operation indicates the batteries have been used up.Please change batteries.
If the remote controller can’t run normally during operation, please remove the batteries and reload several minutes later.

Hint:
Remove the batteries in case unit won’t be in usage for a long period.If there are any display after taking-out,just need to press reset key.

Operation

SMART Operation



(This function is unavailable on some models)

One key can give you a comfortable room!

The air conditioning unit can judge the indoor temperature and humidity, and make the adjustment accordingly.

SMART SMART start

Press ON/OFF button, unit starts.

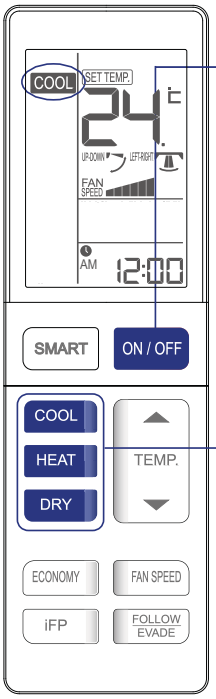
Press SMART button“ SMART ” is displayed on the remote controller and “ ” is displayed on the display board,unit will run in SMART mode.

- SMART FRESH
- SMART Defrost
- SMART FAN SPEED
- SMART FAN HEALTH
- SMART DRY
- SMART SOFT
- SMART Control temperature

SMART or ON / OFF SMART stops

- Under the cooling, heating and dehumidifying mode, press the smart key to enter the smart function.
- Under the smart running mode, when the air conditioning is running, it will automatically select cooling, heating, dehumidifying or blowing mode as per the setting temperature.
- When the smart function is running, press the “cooling” “heating” or “dehumidifying” key to switch to the other mode, you will exit from the smart function.

COOL,HEAT and DRY Operation



1 ON / OFF Unit start.

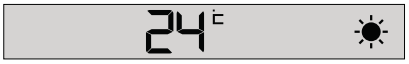
2 Select operation mode.

COOL

Press COOL button“ COOL ” is displayed on the remote controller and “ ” is displayed on the display board,unit will run in COOL mode.

HEAT

Press HEAT button“ HEAT ” is displayed on the remote controller and “ ” is displayed on the display board, unit will run in HEAT mode.



DRY

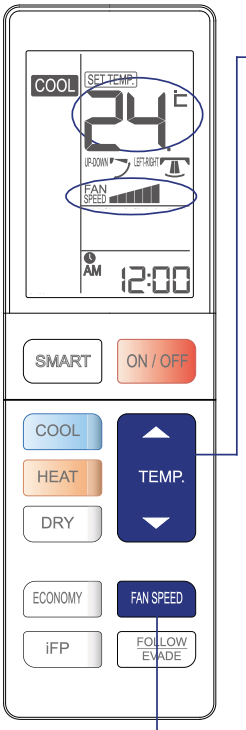
Press DRY button“ DRY ” is displayed on the remote controller and “ ” is displayed on the display board, unit will run in DRY mode.

1.In DRY mode, when room temperature becomes lower than temp.setting+2℃, unit will run intermittently ai LOW speed regardless of FAN setting.

2.Remote controller can memorize each operation status. When starting it next time, just press ON/OFF button and unit will run in previous status.

Operation

Select TEMP.setting, FAN Operation

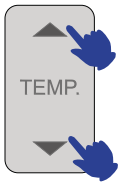


1 Press TEMP.setting

Press TEMP button.

△ Every time the button is pressed, temp. setting increases 0.5°C.

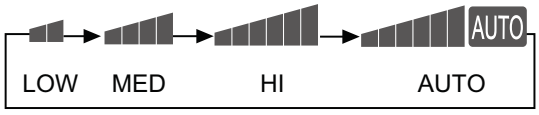
▽ Every time the button is pressed, temp. setting decreases 0.5°C.



Unit will start running to reach the temp.setting on LCD.

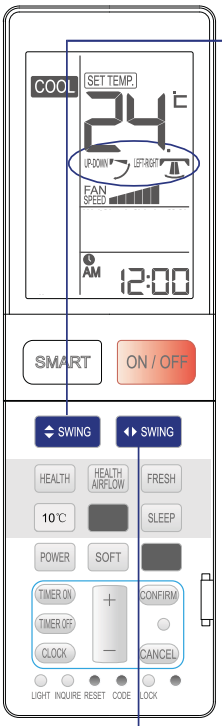
2 FAN Operation

Press FAN SPEED button. For each press, fan speed changes as follows:



Unit will run at selected fan speed.

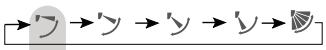
SWING Operation



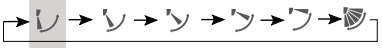
1 Up and down air flow direction

For each press of " SWING " button, air flow direction on remote controller displays as follows according to different operation modes:

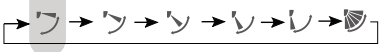
COOL/DRY:



HEAT:



SMART:



Initial state

2 Left and right air flow direction

For each press of " SWING " buttor,remote controller displays as follows:

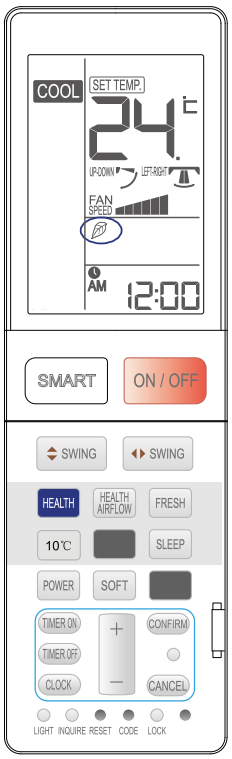
remote controller:

Initial state

- When humidity is high,condensate water might occur at air outlet if all vertical louvers are adjusted to left or right.
- It is advisable not to keep horizontal flap at downward position for a long time in COOLor DRY mode , otherwise, condensate water might occur.
- As cold air flows downward in COOL mode, adjusting air flow horizontally will be much more helpful for a better air circulation.

Operation

HEALTH Operation



The anion generator in the airconditioner can generate a lot of anion effectively balance the quantity of position and anion in the air and also to kill bacteria and speed up the dust sediment in the room and finally clean the air in the room.

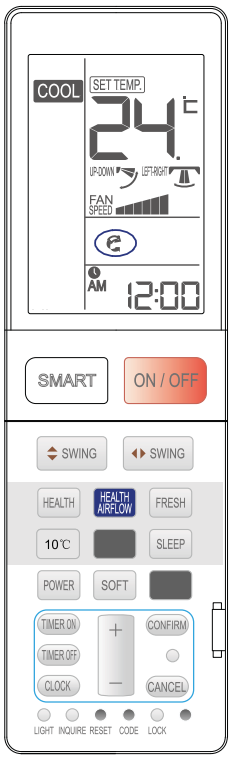
Press HEALTH button

For each press, is displayed Air conditioner starts health anion function operation.

Press HEALTH button for twice press, disappears,the operation stops.

When indoor fan motor is running, it has healthy process function. (It's available under any mode) When the fan in the indoor unit does not work, the health lamp lights up, but the anion generator does not release anion.

HEALTH AIRFLOW Operation



The setting of health airflow function

1).Press the button of health airflow, appears on the display. Avoid the strong airflow blows direct to the body.

2).Press the button of health airflow again, appears on the display. Avoid the strong airflow blows direct to the body.

The cancel of the health airflow function

Press the button of health airflow again, both the inlet and outlet grills of the air conditioner are opened, and the unit goes on working under the condition before the setting of health airflow function.
After stopping, the outlet grille will close automatically.

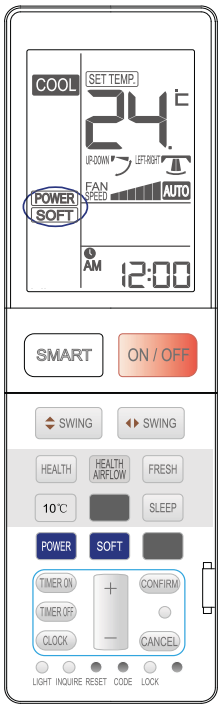
Notice:
Cannot pull direct the outlet grille by hand. Otherwise,the grille will run incorrectly. If the grille is not run correctly, stop for a minute and then start, adjusting by remote controller.

- Remote controller can memorize each operation status. when starting it next time, just press ON/OFF button and unit will run in previous status.

Note:
1.After setting the health airflow function, the position of inlet and outlet grills is fixed.
2.In heating, it is better to select the mode.
3.In cooling, it is better to select the mode.
4.In cooling and dry, using the air conditioner for a long time under the high air humidity, a phenomenon falling drips of water occurs at the outlet grille .
5.Select the appropriate fan direction according to the actual conditions.

Operation

POWER/SOFT Operation



POWER Operation

When you need rapid cooling, you can use this function.

For each press, POWER is displayed Air conditioner starts POWER function operation.

In COOL mode, fan speed automatically takes high speed of AUTO fan mode.

Press POWER button again, POWER disappears,the operation stops.

SOFT Operation

You can use this function when silence is needed for rest or reading.

For each press, SOFT is displayed Air conditioner starts POWER function operation.

In SOFT operation mode, fan speed automati cally takes low speed of AUTO fan mode.

Press SOFT button again, SOFT disappears,the operation stops.

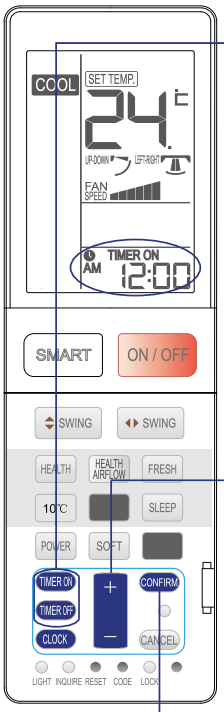
Hints:

During POWER operation, in rapid COOL mode, the room will show inhomogeneous temperature distribution.

Long period SOFT operation will cause effect of not too cool or not too warm.

TIMER Operation

Set Clock correctly before starting Timer operation.You can let unit start or stop automatically a following times:Before you wake up in the morning,or get back from outside or after you fall asleep at night.



1 Select your desired operation mode.

Select your desired TIMER ON.

Remote controller: " **TIMER ON** " will flash.

Select your desired TIMER OFF.

Remote controller: " **TIMER OFF** " will flash.

2 Time setting.

Every time the button is pressed, time setting increases or decreases 1 min, if kept depressed, it will increase rapidly. It can be adjusted within 24 hours.

3 Confirming your setting.

After setting correct time, press CONFIRM button press CONFIRM button to confirm " **ON** "or" **OFF** " on the remote controller stops flashing.

TIMER ON→OFF / TIMER ON←OFF

press TIMER ON button to confirm, follow the same procedure in "Time setting for TIMER OFF "

Remote controller: **TIMER ON→OFF**

press TIMER OFF button to confirm, follow the same procedure in "Time setting for TIMER ON "

Remote controller: **TIMER ON←OFF**

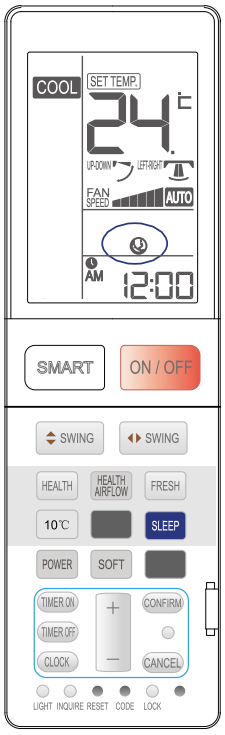
To cancel TIMER mode

Just press CANCEL button several times until TIMER mode disappears.

Operation

Comfortable SLEEP

Before going to bed,you can simply press the SLEEP button and unit will operate in SLEEP mode and bring you a sound sleep.

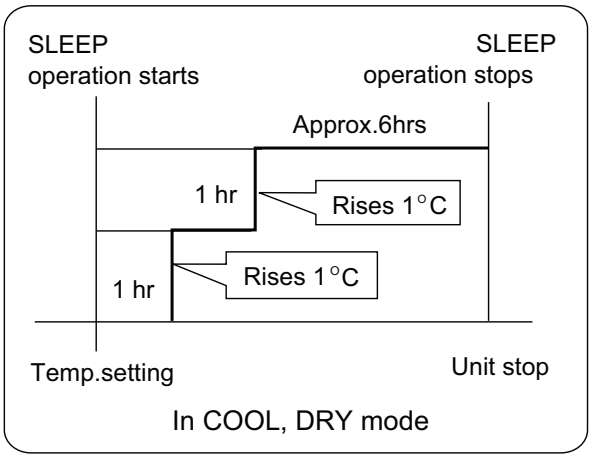


Press SLEEP button.

Operation Mode

1.In COOL,DRY mode

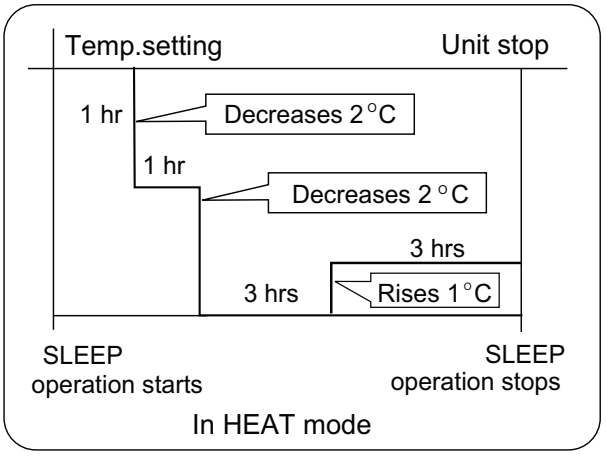
1 hours after SLEEP mode starts, temp.will become 1°C higher than temp.setting. After another 1 hours, temp. rises by 1°C further. The unit will run for further 6 hours then stops Temp.is higher than temp. setting so that room temperature won't be too low for your sleep.



In COOL, DRY mode

2.In HEAT mode

1 hours after SLEEP mode starts,temp will become 2°C lower than temp.setting. After another 1 hours, temp decrease by 2°C further. After more another 3 hours, temp. rises by 1°C further. The unit will run for further 3 hours then stops. Temp. is lower than temp. setting so that room temperature won't be too high for your sleep.



In HEAT mode

3.In SMART mode

The unit operates in corresponding sleep mode, which adapted to the automatically selected operation mode.

4.When quiet sleeping function is set to 8 hours the quiet sleeping time can not be adjusted.When TIMER function is set,the quiet sleeping function can't be set up.After the sleeping function is set up,if user resets TIMER function, the sleeping function will be cancelled; the machine will be in the state of timing-on,if the two modes are set up at the same time, either of their operation time is ended first ,the unit will stop automatically, and the other mode will be cancelled.

Power Failure Resume Function

If the unit is started for the first time, the compressor will not start running unless 3 minutes have elapsed. When the power resumes after power failure, the unit will run automatically, and 3 minutes later the compressor starts running.

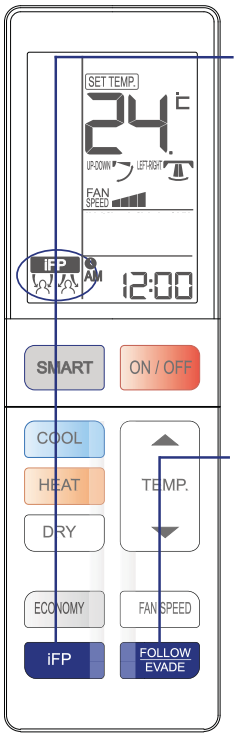
Note to the power failure resume:

press the sleep button ten times in five seconds and enter function after hearing four sounds.And press the sleep button ten times within five seconds and leave this function after hearing two sounds.

Operation

iFP Operation

The movement of people in the room can be sensed, which can improve the air adjustment efficiency.



1 iFP

Press iFP button "iFP" is displayed on the remote controller and "" is displayed on the display board, unit will unrin iFP mode.

2 FOLLOW EVADE

Every time the button is pressed, display changes as follows:
Remote controller:

FOLLOW Detect the location of the human body, adjust the wind swing,blow the location where the body is.

EVADE Detect the location of the human body,adjust the wind swing,avoid the location where the body is.

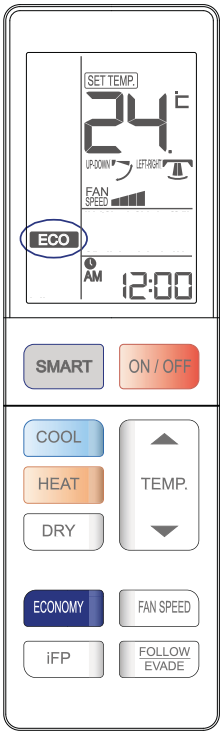
- When several people are located at different positions,or one person is moving in different areas, no matter whether the wind is blowing or not, the wind will automatically swing and blow to multi areas, the wind direction adjustment will be delayed, it cannot be deflected suddenly while detecting.
- In iFP,FOLLOW and EVADE operation mode, Press"SWING" button, the unit will not operate " " mode, Press "HEALTH AIRFLOW" button, the operation stops.

The human body sensor is used to detect if the infrared ray is changing. It may be inaccurate in the following conditions:

- The human body keeps still (when reading or watching TV etc.) or is blocked by barriers like screen, cabinet or glass.
- The person is wearing very thick clothes or the person is lying or sleeping.
- A pet is moving frequently, or the wind is blowing the curtains, or something in the room is swinging frequently.

ECO Operation

Automatic adjusting with the environmental temperature, running with power saving.



ECONOMY

Press ECONOMY button " ECO " is displayed on the remote controller,unit will run in ECONOMY operation.

ECONOMY

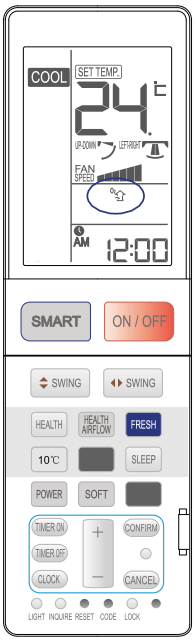
Press ECONOMY button For twice press, ECONOMY disappears, the operation stops.

- The power saving function only works under the cooling, heating or dehumidifying mode, after the power saving function is set, press the sharp, mute, sleep, or smart key to exit the power saving function.
- After the power saving is set, the host machine will automatically adjust the setting temperature, and automatically control the switch of the compressor, which may be inconsistent with the user's setting.
- The power saving function is more effective after the air conditioning has been running for a long time (more than 2 hours)

Operation

FRESH Operation

Exhaust the vitiated air from the room, and inhale fresh air.
(This function is unavailable on some models.)



Press FRESH button " " is displayed on the remote controller and " " is displayed on the display board, and the change-for-fresh-air function operation begins.

For twice press , the display " " disappears and the change-for-fresh-air function operation is canceled.

Note:

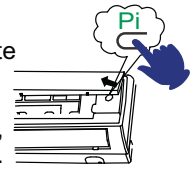
If the unit didn't install change-for-fresh-air electrical engine, change-for-fresh-air function is not available.

About change-for-fresh-air function

- After the change-for-fresh-air function is initiated, the outside air can enter the indoors through the change-fresh-air tube thereby keeping the indoor air fresh.
- Setting the change-for-fresh-air function under the shutdown status, press the fresh air key and the remote controller displays the on status of air flow, low wind,and change-for-fresh-air functions, and now can set the timing open, timing close and time control switch.
- The dual fresh air has a memory function, which can be cancelled by pressing the key one time.
- Under the smart mode, after the machine has been running for a while,the dual fresh air function will be started automatically,it will be automatically stopped after continuously running for a while.

Emergency operation and test operation

Emergency Operation:



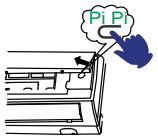
- Use this operation only when the remote controller is defective or lost.
- When the emergency operation switch is pressed,the"Pi" sound is heard once, which means the start of this operation.
- In this operation,the system automatically selects the operation modes,cooling tor fan or heat, according to the room temperature.

Room temperature	Operation mode	Designated temperature	Timer mode	Air flow
ABOVE 23°C	COOLING	26°C	NO	AUTOMATIC
BELOW 23°C	HEAT	23°C	NO	AUTOMATIC

(cooling only uint) Room temperature	Operation mode	Designated temperature	Timer mode	Air flow
BELOW 23 °C	FAN	26 °C	NO	AUTOMATIC

- It is not possible to operate in dry mode.

Test operation:

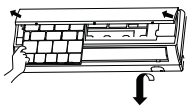


Test operation switch is the same as emergency switch.

- Use this switch in the test operation when the room temperature is below 16°C, do not use it in the normal operation.
- Continue to press the test operation switch for more than 5 seconds. After you hear the"Pi" sound twice,release your finger from the switch:the cooling operation starts with the air flow speed "Hi".

For smart Use of The Air Conditioner

Air Filter cleaning



1 Open the inlet grille by pulling it upward

2 Remove the filter

Push up the filter's center tab slightly until it is released from the stopper, and remove the filter downward.

3 Clean the filter

Use a vacuum cleaner to remove dust, or wash the filter with water. After washing, dry the filter completely in the shade.

4 Attach the filter

Attach the filter correctly so that the "FRONT" indication is facing to the front. Make sure that the filter is completely fixed behind the stopper. If the right and left filters are not attached correctly, that may cause defects.

5 Close the inlet grille

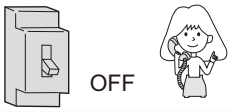
Cautions

⚠ WARNING

Please call Sales/Service Shop for the Installation.
Do not attempt to install the air conditioner by yourself because improper works may cause electric shock, fire, water leakage.

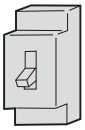
⚠ WARNING

When abnormality such as burnt-small found, immediately stop the operation button and contact sales shop.



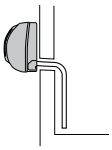
STRICT ENFORCEMENT

Use an exclusive power source with a circuit breaker



Check proper installation of the drainage securely

STRICT ENFORCEMENT



Connect power supply cord to the outlet completely

STRICT ENFORCEMENT

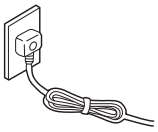
Use the proper voltage

STRICT ENFORCEMENT

1.Do not use power supply cord extended or connected in halfway
2.Do not install in the place where there is any possibility of inflammable gas leakage around the unit.
3.Do not get the unit exposed to vapor or oil steam.

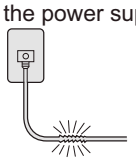
PROHIBITION

Do not use power supply cord in a bundle.



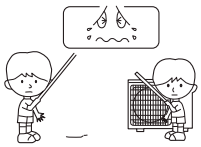
PROHIBITION

Take care not to damage the power supply cord.



PROHIBITION

Do not insert objects into the air inlet or outlet.



PROHIBITION

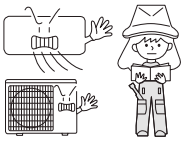
Do not start or stop the operation by disconnecting the power supply cord and so on.

PROHIBITION

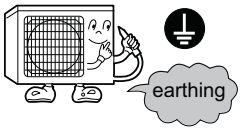
Do not channel the air flow directly at people, especially at infants or the aged.

PROHIBITION

Do not try to repair or reconstruct by yourself.

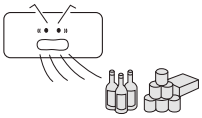


Connect the earth cable.



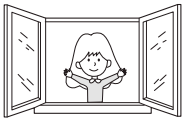
⚠ CAUTION

Do not use for the purpose of storage of food, art work, precise equipment, breeding, or cultivation.



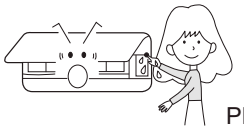
PROHIBITION

Take fresh air occasionally especially when gas appliance is running at the same time.



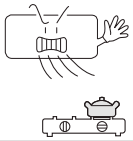
STRICT ENFORCEMENT

Do not operate the switch with wet hand.



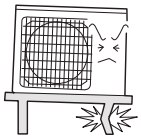
PROHIBITION

Do not install the unit near a fireplace or other heating apparatus.



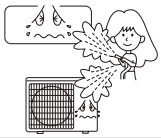
PROHIBITION

Check good condition of the installation stand



PROHIBITION

Do not pour water onto the unit for cleaning

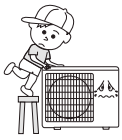


PROHIBITION

Do not place animals or plants in the direct path of the air flow

PROHIBITION

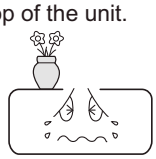
Do not place any objects on or climb on the unit.



PROHIBITION

Do not place flower vase or water containers on the top of the unit.

PROHIBITION



Trouble shooting

Before asking for service, check the following first.

	Phenomenon	Cause or check points
Normal Performance inspection	The system does not restart immediately. 	• When unit is stopped, it won't restart immediately until 3 minutes have elapsed to protect the system. • When the electric plug is pulled out and reinserted, the protection circuit will work for 3 minutes to protect the air conditioner.
	Noise is heard 	• During unit operation or at stop, a swishing or gurgling noise may be heard.At first 2-3 minutes after unit start, this noise is more noticeable. (This noise is generated by refrigerant flowing in the system.) • During unit operation, a cracking noise may be heard.This noise is generated by the casing expanding or shrinking because of temperature changes. • Should there be a big noise from air flow in unit operation, air filter may be too dirty.
	Smells are generated.	• This is because the system circulates smells from the interior air such as the smell of furniture, paint, cigarettes.
	Mist or steam are blown out. 	• During COOL or DRY operation, indoor unit may blow out mist. This is due to the sudden cooling of indoor air.
	In dry mode,fan speed can't be changed.	• In DRY mode, when room temperature becomes lower than temp. setting+2 °C,unit will run intermittently at LOW speed regardless of FAN setting.
Multiple check		• Is power plug inserted? • Is there a power failure? • Is fuse blownout?
	Poor cooling 	• Is the air filter dirty? Normally it should be cleaned every 15 days. • Are there any obstacles before inlet and outlet? • Is temperature set correctly? • Are there some doors or windows left open? • Is there any direct sunlight through the window during the cooling operation?(Use curtain) • Are there too much heat sources or too many people in the room during cooling operation?

Cautions

- Do not obstruct or cover the ventilation grille of the air conditoner.Do not put fingers or any other things into the inlet/outlet and swing louver.
- Do not allow children to play with the air conditioner.In no case should children be allowed to sit on the outdoor unit.

Specifications

- The refrigerating circuit is leak-proof.

The machine is adaptive in following situation

1.Applicable ambient temperature range:

Cooling	Indoor	Maximum:D.B/W.B	32°C/23°C
		Minimum:D.B/W.B	21°C/15°C
	Outdoor	Maximum:D.B/W.B	43°C/26°C
		Minimum: D.B	18°C
Heating	Indoor	Maximum:D.B	27°C
		Minimum: D.B	0°C
	Outdoor	Maximum:D.B/W.B	24°C/18°C
		Minimum:D.B/W.B	-7°C/-8°C
	Outdoor (INVERTER)	Maximum:D.B/W.B	24°C/18°C
		Minimum:D.B	-15°C

2. If the power supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person.

3.If the fuse of indoor unit on PC board is broken,please change it with the type of T. 3.15A/ 250V. If the fuse of outdoor unit is broken,change it with the type of T.25A/250V

4. The wiring method should be in line with the local wiring standard.

5. After installation, the power plug should be easily reached.

6. The waste battery should be disposed properly.

7. The appliance is not intended for use by young children or infirm persons without supervision.

8. Young children should be supervised to ensure that they do not play with the appliance.

9. Please employ the proper power plug,which fit into the power supply cord.

10. A breaker should be incorporated into fixed wiring. The breaker should be all-pole switch and the distance between its two contacts should be not less than 3mm.

11 .The power plug and connecting cable must have acquired the local attestation.

12.In order to protect the units,please turn off the A/C first,and at least 30 seconds later, cutting off the power.

13.Please don't insert any sensor on 3-waystop valve pipe fitting.

7 Service Diagnosis

7.1 Caution for Diagnosis

The operation lamp flashes when any of the following errors is detected.

1.When a protection device of the indoor or outdoor unit is activated or when the thermistor malfunctions, disabling equipment operation.

2.When a signal transmission error occurs between the indoor and outdoor units.In either case, conduct the diagnostic procedure described in the following pages.

7.2.Problem Symptoms and Measures

Symptom	**Check Item**	**Details of Measure**
None of the units operates	Check the power supply.	Check to make sure that the rated voltage is supplied.
	Check the indoor PCB	Check to make sure that the indoor PCB is broken
Operation sometimes stops.	Check the power supply.	A power failure of 2 to 10 cycles can stop air conditioner operation.
Equipment operates but does not cool, or does not heat (only for heat pump)	Check for faulty operation of the electronic expansion valve.	Set the units to cooling operation, and compare the temperatures of the liquid side connection pipes of the connection section among rooms to check the opening and closing operation of the electronic expansion valves of the individual units.
	Diagnosis by service port pressure and operating current.	Check for insufficient gas.
Large operating noise and vibrations	Check the installation condition.	Check to make sure that the required spaces for installation (specified in the Technical Guide, etc.) are provided.

7.4.Error Codes and Description indoor display

	Code indication		Description	Reference Page
	indoor	Outdoor (LED1 flash times)		
Indoorand Outdoor	E7	15	Communication fault between indoor and outdoor units	61
Indoor Malfunction	E1		Room temperature sensor failure	54
	E2		Heat-exchange sensor failure	54
	E4		Indoor EEPROM error	60
	E14		Indoor fan motor malfunction	55
Outdoor Malfunction	F12	1	Outdoor EEPROM error	60
	F1	2	The protection of IPM	56
	F3	4	Communication fault between the IPM and outdoor PCB	56
	F19	6	Power voltage is too high or low	63
	F4	8	Overheat protection for exhaust temperature	58
	F21	10	Frost-removing temperature sensor failure	57
	F6	12	Ambient temperature sensor failure	57
	F25	13	Exhaust temperature sensor failure	57
	F11	18	deviate from the normal for the compressor	64

7.4.1Thermistor or Related Abnormality (indoor unit)

Indoor Display

E1: Room temperature sensor failure

E2: Heat-exchange sensor failure

Method of Malfunction Detection

the temperatures detected by the thermistors are used to determine thermistor errors

Malfunction Decision Conditions

when the thermistor input is more than 4.92V or less than 0.08V during compressor operation.

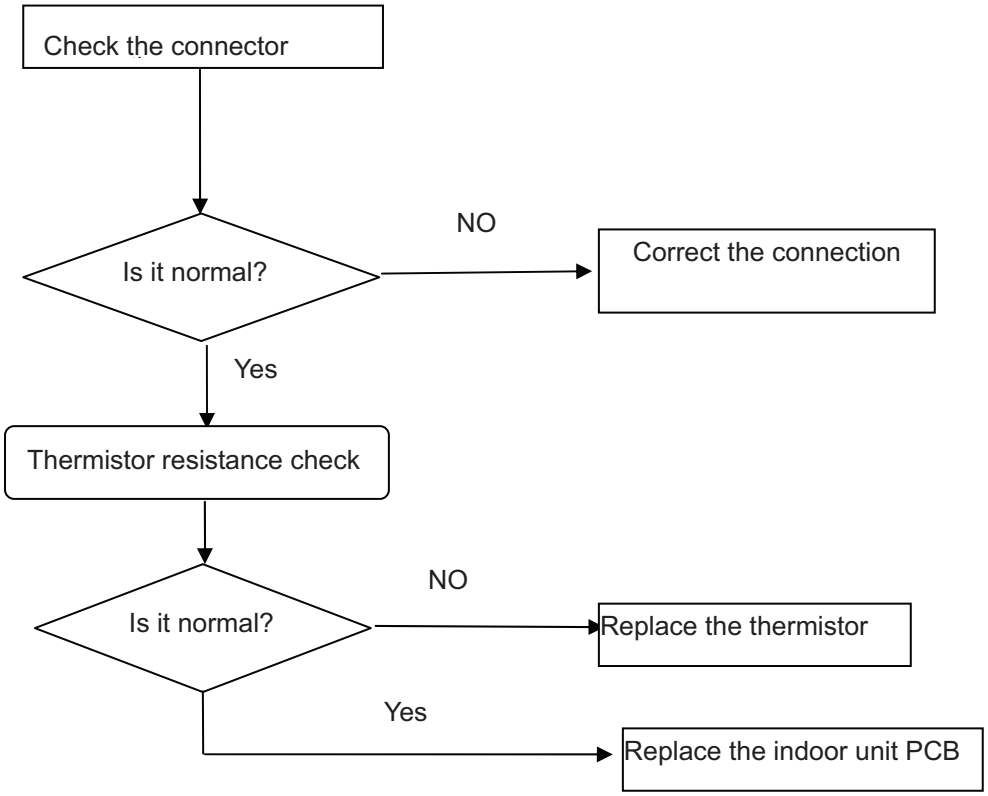
* **Note:** The values vary slightly in some models

Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

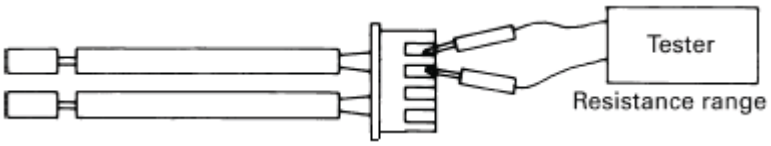
Troubleshooting

* **Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



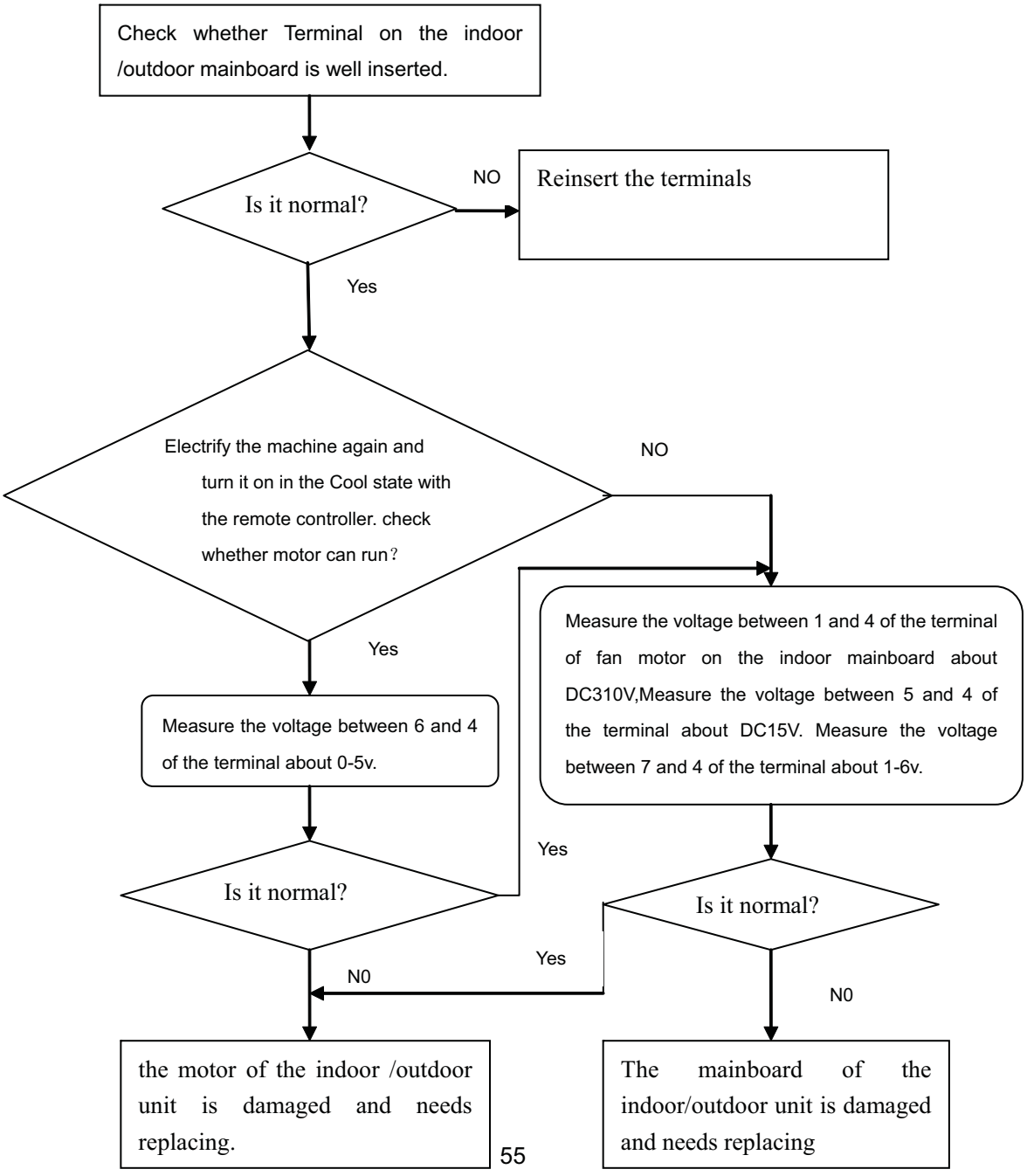
Thermistor resistance check method:

Remove the connector of the thermistor on the PCB, and measure the resistance of thermistor using tester.The relationship between normal temperature and resistance is shown in the value of indoor thermistor.



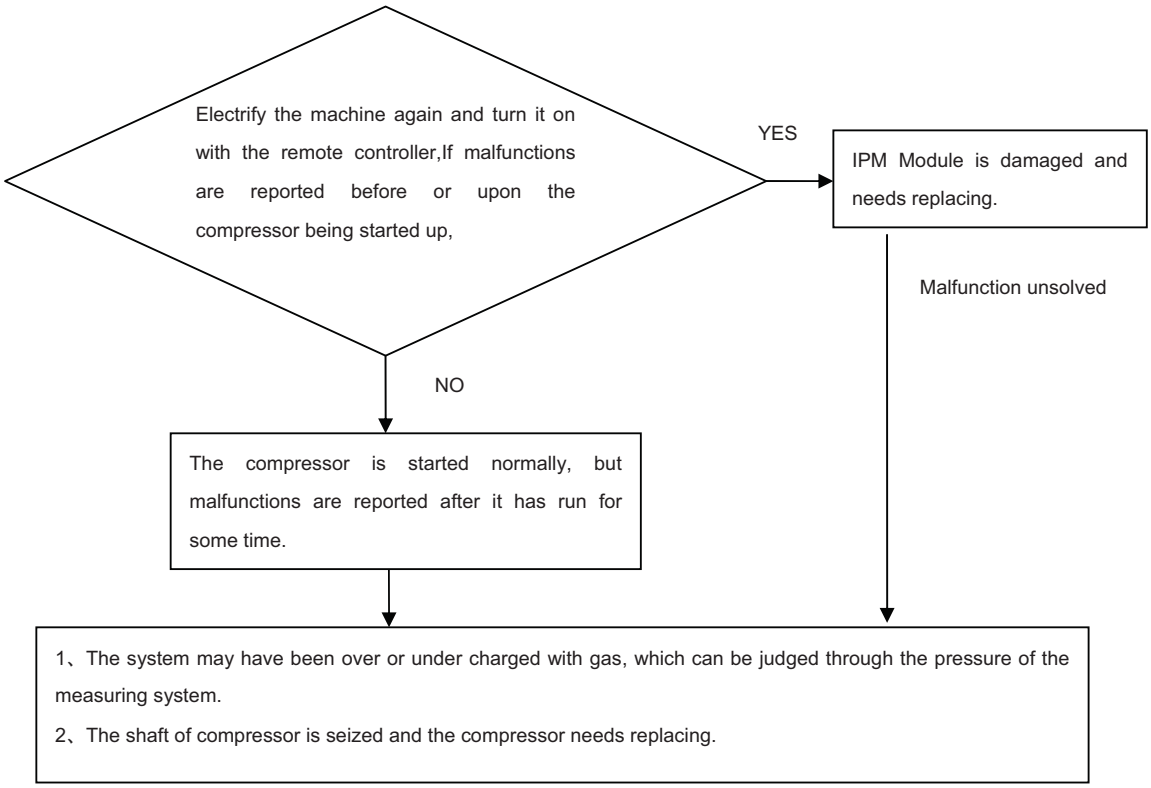
7.4.2 Indoor fan motor malfunction

Indoor Display	E14
Method of Malfunction Detection	The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor operation
Malfunction Decision Conditions	when the detected rotation feedback singal don't receiced in 2 minutes
Supposed Causes	■ Operation halt due to breaking of wire inside the fan motor . ■ Fan motor overheat protection ■ Operation halt due to breaking of the fan motor lead wires ■ Detection error due to faulty indoor unit PCB
Troubleshooting	* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



7.4.3 IPM protection

Outdoor display	LED1 flash 2 times
Method of Malfunction Detection	IPM protection is detected by checking the compressor running condition and so on
Malfunction Decision Conditions	■ The system leads to IPM protection due to over current ■ The compressor faulty leads to IPM protection ■ circuit component of IPM is broken and led to IPM protection
Supposed Causes	■ IPM protection dues to the compressor faulty ■ IPM protection dues to faulty PCB of IPM module ■ Compressor wiring disconnected
Troubleshooting	* Caution Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.

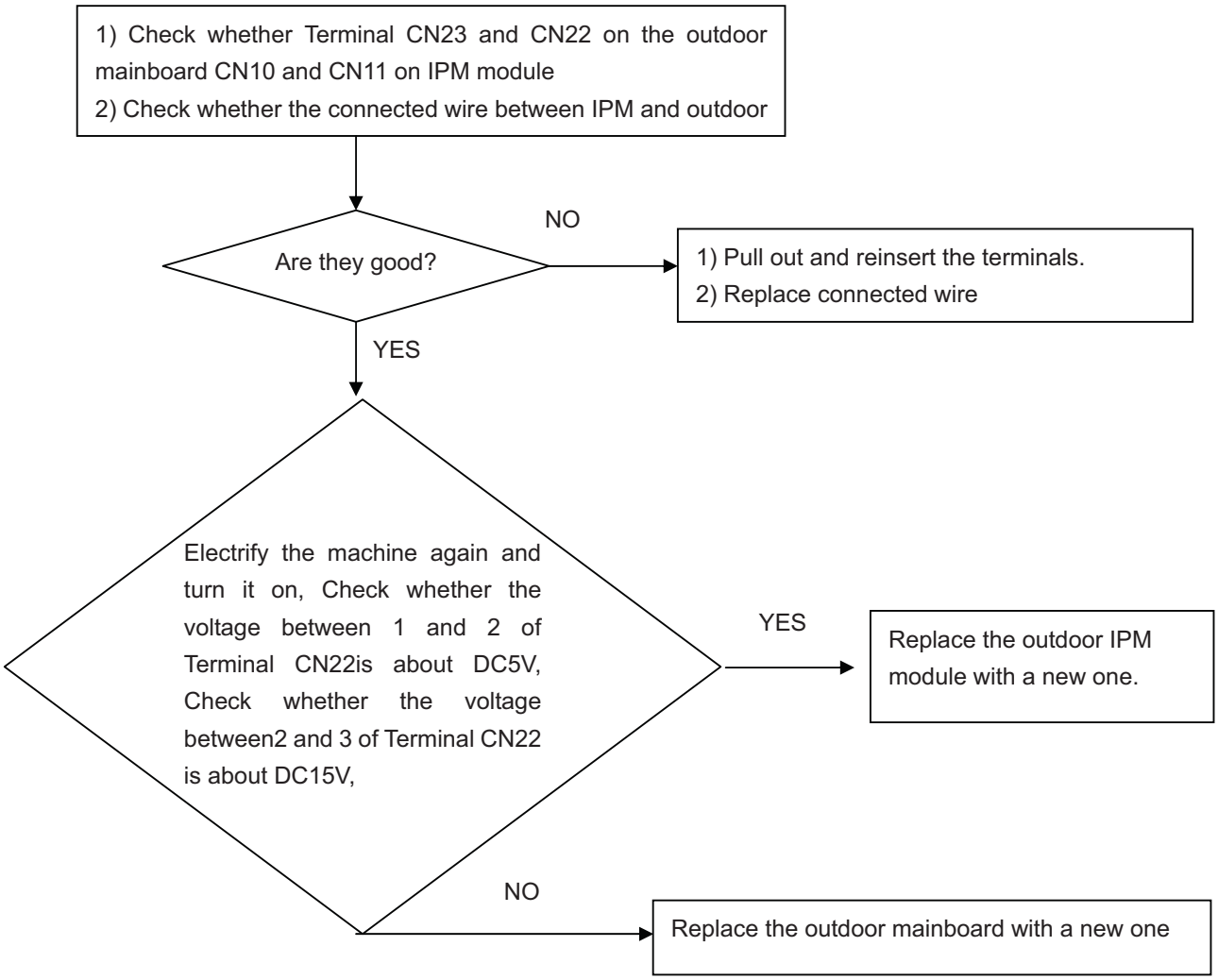


7.4.4 The IPM and outdoor PCB don't communicate or Related Abnormality

outdoor display	LED1 flash 4 times Indoor Display F3
Method of Malfunction Detection	Communication is detected by checking the IPM module and the outdoor PCB
Malfunction Decision Conditions	■ The outdoor PCB broken leads to communication fault ■ The IPM module broken leads to communication fault
Supposed Causes	■ The outdoor PCB is broken ■ The IPM module is broken

■ Communication wiring disconnected

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



7.4.5 Thermistor or Related Abnormality(outdoor unit)

Frost-removing temperature sensor failure

Indoor display: **F21**

outdoor display: LED1 flash 10 times:

Exhaust temperature sensor failure

Indoor display: **F25**

outdoor display: LED1 flash 13 times:

Ambient temperature sensor failure

Indoor display: **F6**

outdoor display: LED1 flash 12 times:

Method of Malfunction This type of error is detected by checking the thermistor input voltage to the microcomputer. (A thermistor error is detected by checking the temperature)

Detection

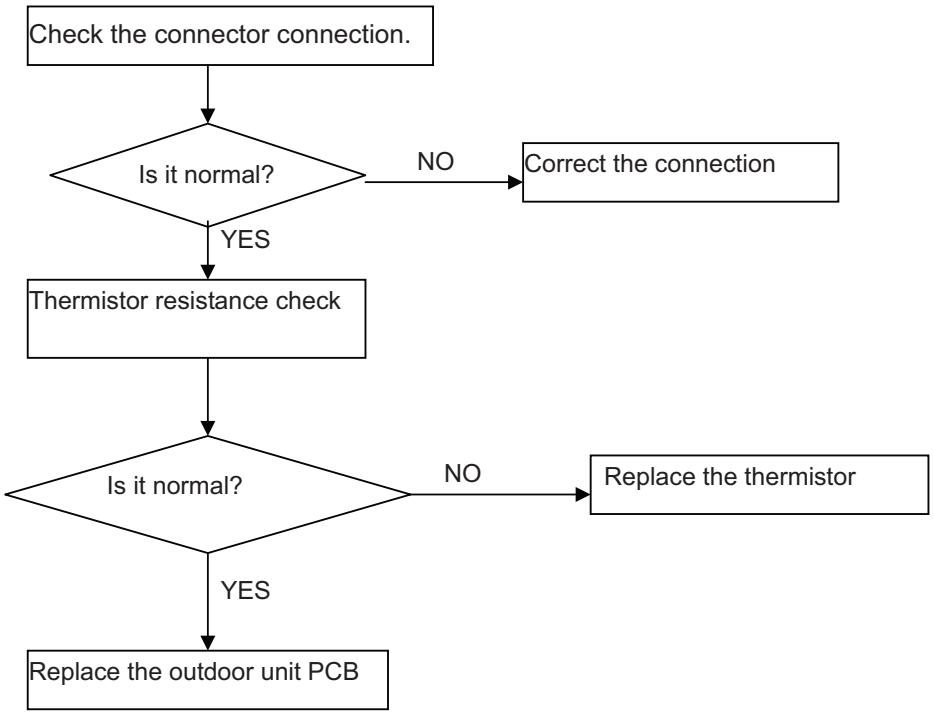
Malfunction Decision Conditions The thermistor input is above 4.9V or below 0.1V with the power on.

*** Note:** The values may vary slightly in some models

Supposed Causes

- ■ Faulty connector connection
- ■ Faulty thermistor
- ■ Faulty PCB

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



7.4.6 Overheat Protection For Exhaust Temperature

Indoor display outdoor display **F4**
LED1 flash 8 times

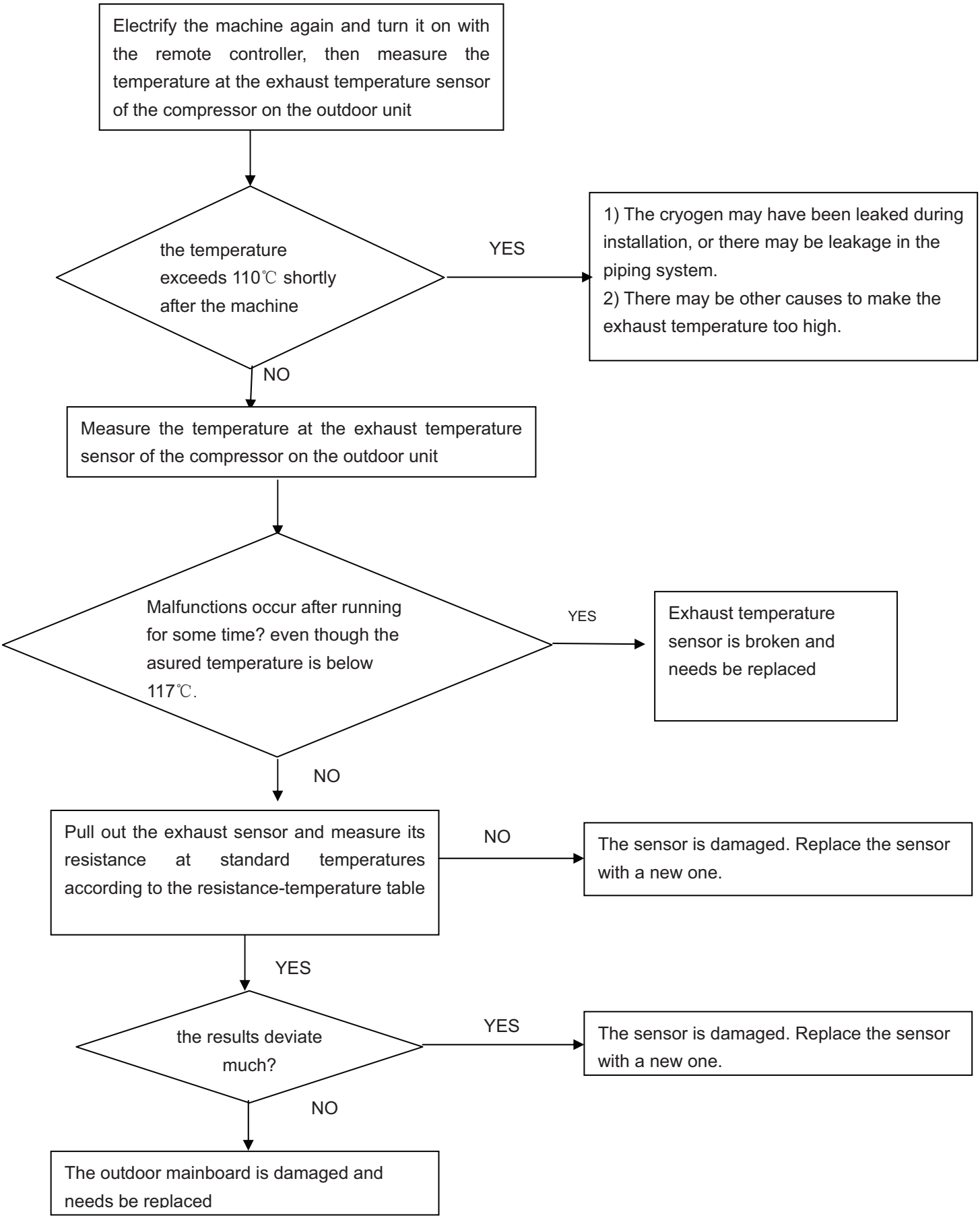
Method of Malfunction Detection the exhaust temperature control is checked with the temperature being detected by the exhaust pipe thermistor

Malfunction Decision Conditions when the compressor discharge temperature is above 117℃

Supposed Causes

- ■ Electronic expansion valve defective
- ■ Faulty thermistor
- ■ Faulty PCB

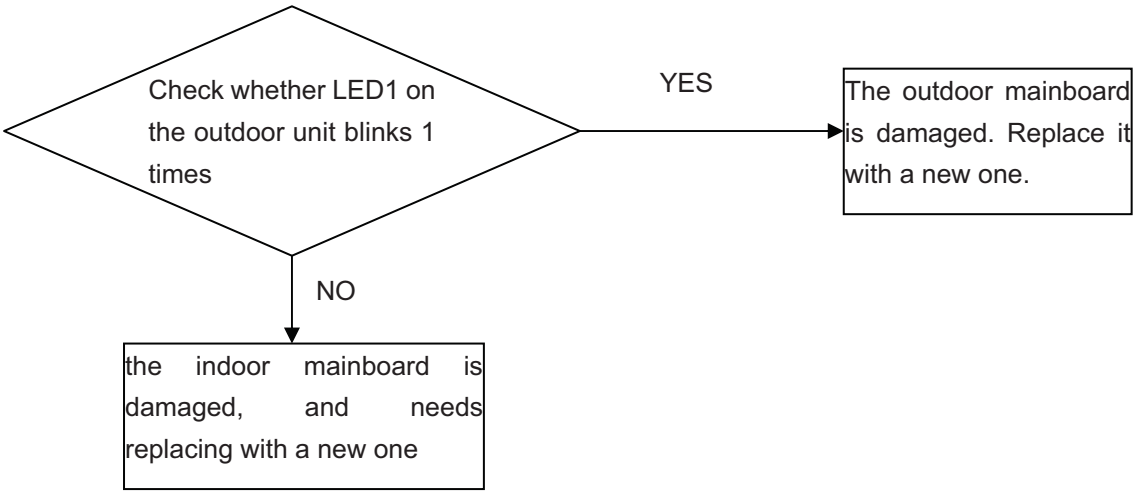
Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.


Electrify the machine again and turn it on with the remote controller, then measure the temperature at the exhaust temperature sensor of the compressor on the outdoor unit
the temperature exceeds 110℃ shortly after the machine
YES
1) The cryogen may have been leaked during installation, or there may be leakage in the piping system.
2) There may be other causes to make the exhaust temperature too high.
NO
Measure the temperature at the exhaust temperature sensor of the compressor on the outdoor unit
Malfunctions occur after running for some time? even though the asured temperature is below 117℃.
YES
Exhaust temperature sensor is broken and needs be replaced
NO
Pull out the exhaust sensor and measure its resistance at standard temperatures according to the resistance-temperature table
NO
The sensor is damaged. Replace the sensor with a new one.
YES
the results deviate much?
YES
The sensor is damaged. Replace the sensor with a new one.
NO
The outdoor mainboard is damaged and needs be replaced

7.4.7 The EEPROM Abnormality (Indoor or outdoor unit)

Indoor Display	**E4**：：Indoor EEPROM error **F12**：Outdoor EEPROM error
Method of Malfunction Detection	the Data detected by the EEPROM are used to determine MCU
Malfunction Decision Conditions	when the Data of EEPROM is error or the EEPROM is damaged
Supposed Causes	■ Faulty EEPROM data ■ Faulty EEPROM ■ Faulty PCB

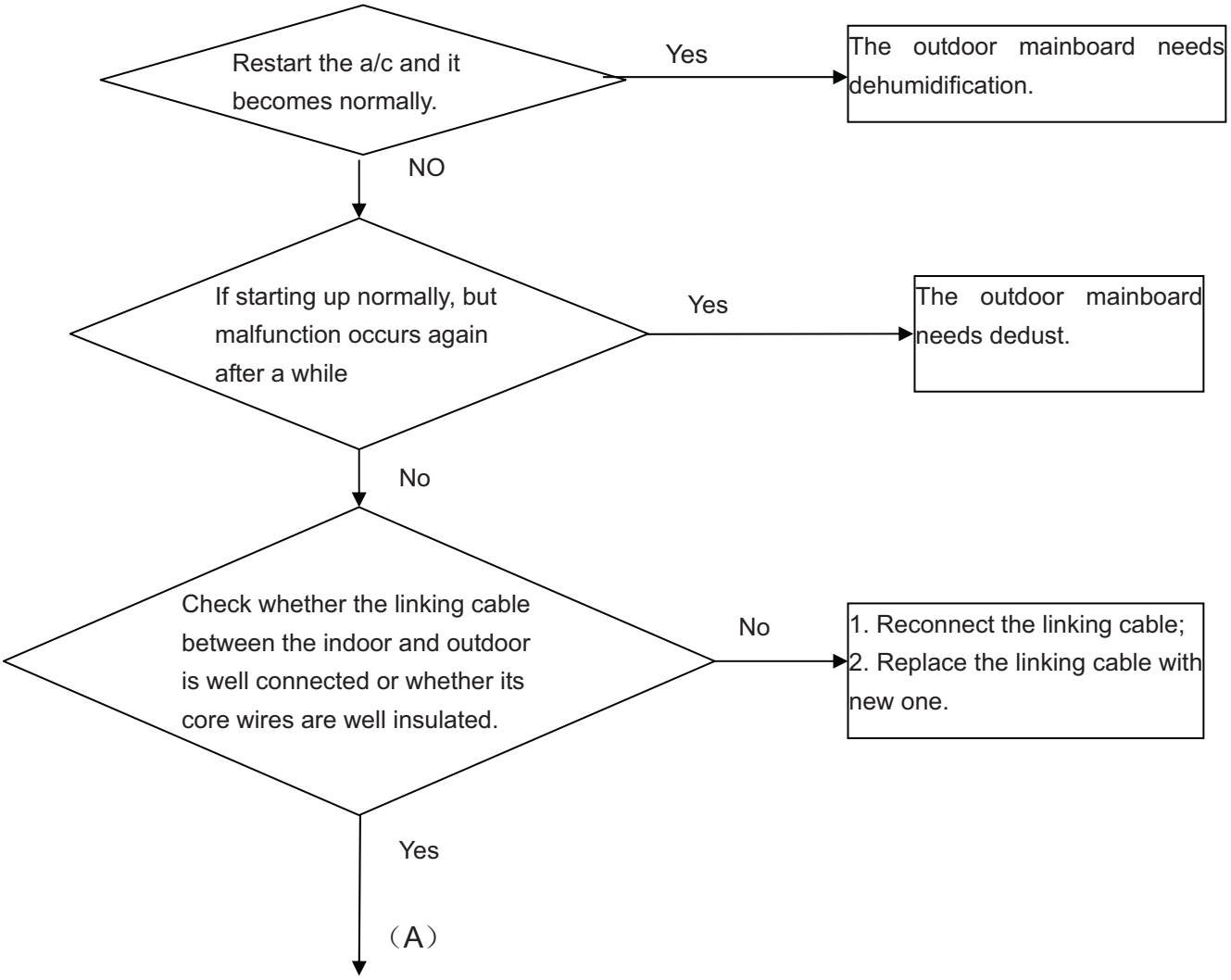
Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

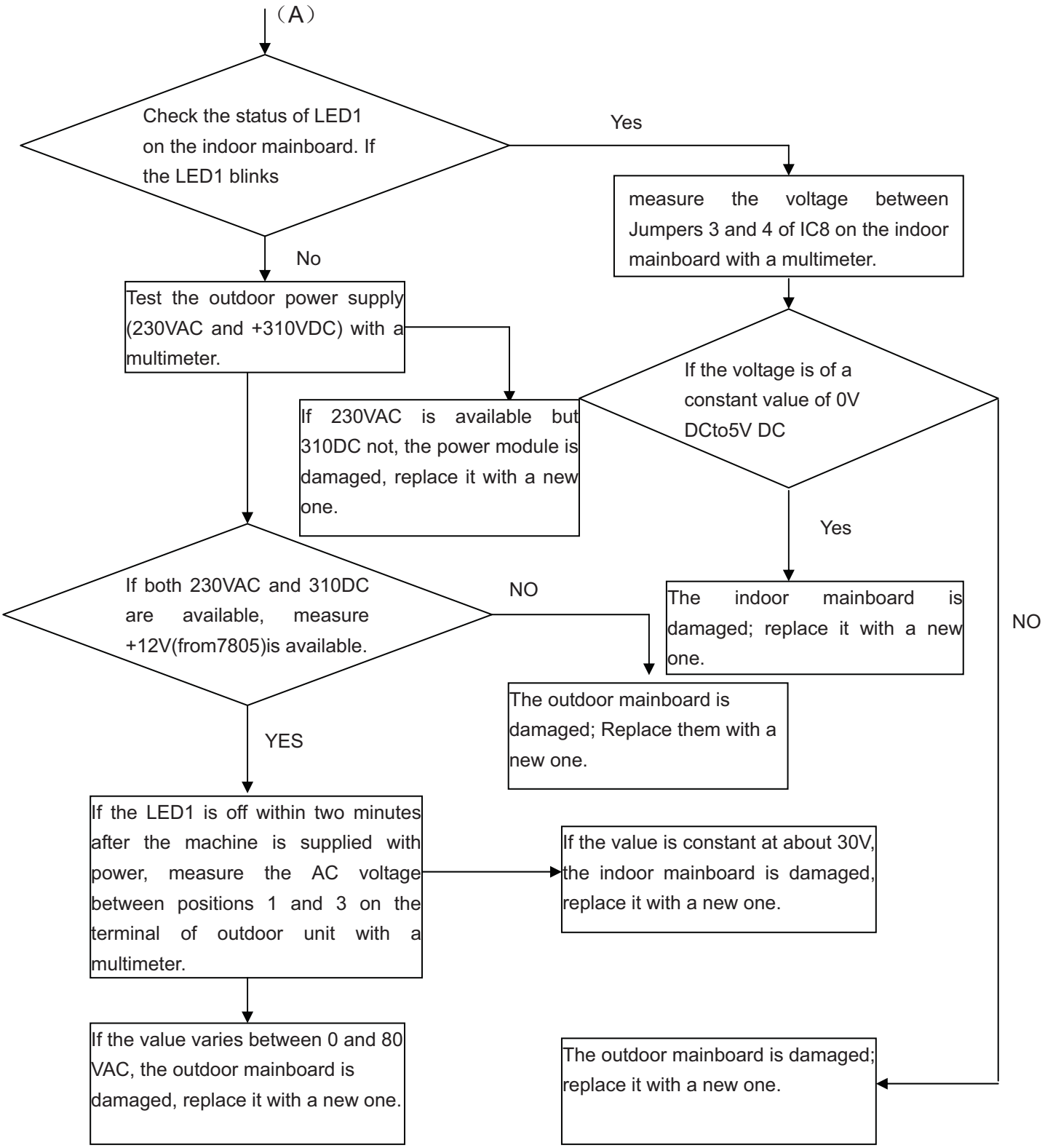


7.4.8 Communication error between the indoor and outdoor units

Indoor display	**E7**；
Outdoor: display：	LED1 flash 15 times
Method of Malfunction Detection	The date received from the another unit in indoor unit-outdoor unit signal transmission is checked whether is normal
Malfunction Decision Conditions	When the date sent from the another unit cannot be received normally,or when the content of the data is abnormal
Supposed Causes	■ indoor unit- outdoor unit signal transmission error due to wiring error ■ Faulty PCB

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.




（A）
Check the status of LED1 on the indoor mainboard. If the LED1 blinks
Yes
No
measure the voltage between Jumpers 3 and 4 of IC8 on the indoor mainboard with a multimeter.
Test the outdoor power supply (230VAC and +310VDC) with a multimeter.
If the voltage is of a constant value of 0V DCto5V DC
If 230VAC is available but 310DC not, the power module is damaged, replace it with a new one.
Yes
NO
If both 230VAC and 310DC are available, measure +12V(from7805)is available.
The indoor mainboard is damaged; replace it with a new one.
NO
The outdoor mainboard is damaged; Replace them with a new one.
YES
If the LED1 is off within two minutes after the machine is supplied with power, measure the AC voltage between positions 1 and 3 on the terminal of outdoor unit with a multimeter.
If the value is constant at about 30V, the indoor mainboard is damaged, replace it with a new one.
If the value varies between 0 and 80 VAC, the outdoor mainboard is damaged, replace it with a new one.
The outdoor mainboard is damaged; replace it with a new one.

7.4.10 Power Supply Over or under voltage fault

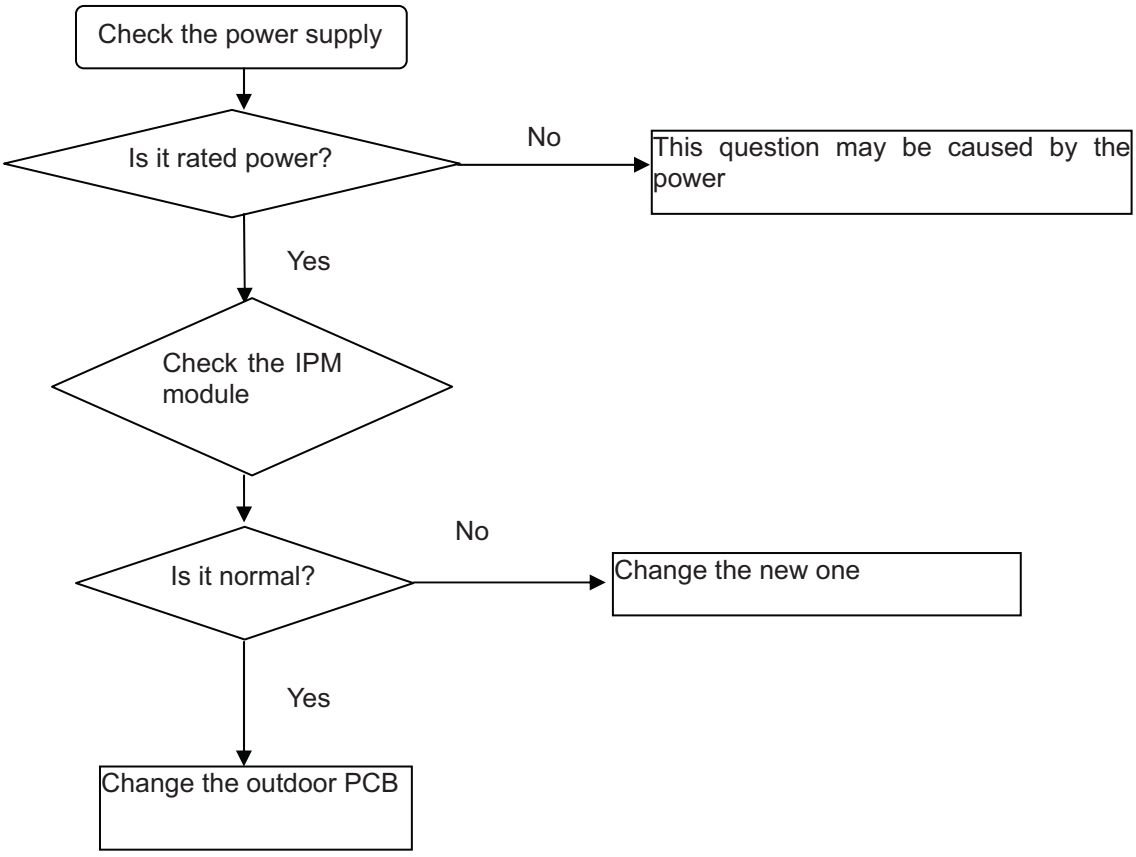
Indoor display **F19**
outdoor display: LED1 flash 6 times

Method of Malfunction Detection An abnormal voltage rise or fall is detected by checking the specified voltage detection **circuit.**

Malfunction Decision Conditions An voltage signal is fed from the voltage detection circuit to the microcomputer

Supposed Causes
- Supply voltage not as specified
- the IPM module is broken
- the outdoor PCB is broken

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



About how to check the IPM module,please refer to IPM protection fault

7.4.11 Loop of the station detect error

Outdoor Display **LED1 flash 18 times Indoor Display F11**

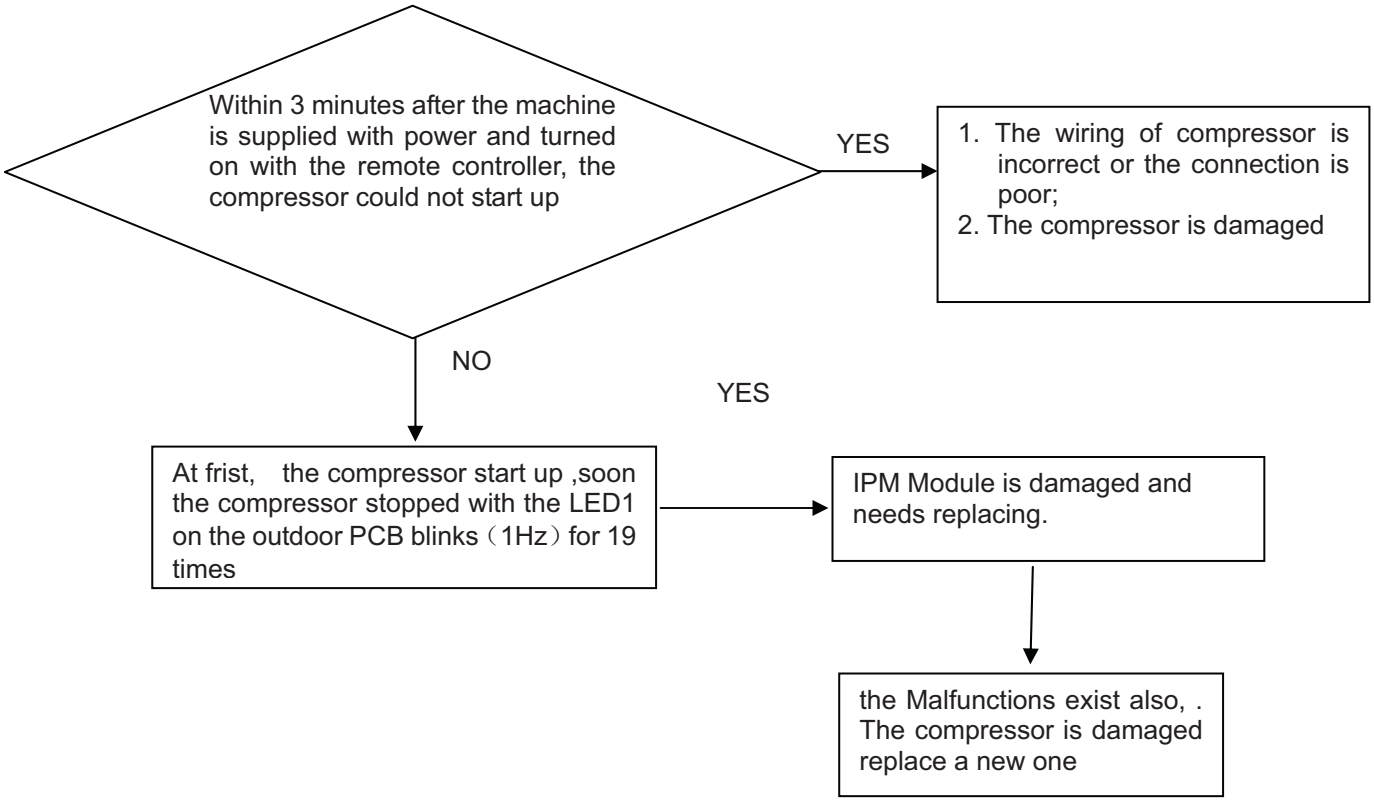
LED1 flash 19 times Indoor Display F28

Method of Malfunction Detection the position of the compressor rotor can not detected normally

Malfunction Decision Conditions when the The wiring of compressor is wrong or the connection is poor; **or** the compressor is damaged

Supposed Causes
- ■ Faulty The wiring of compressor
- ■ Faulty compressor
- ■ Faulty PCB

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



7.4.12 Over-current of the compressor

Outdoor Display LED1 flash 3 or 24 or 25 times

Method of Malfunction Detection The current of the compressor is too high

Malfunction Decision Conditions when the IPM Module is damaged **or** the compressor is damaged power supply. voltage is too low or too high

Supposed Causes
- ■ Faulty IPM Module
- ■ Faulty compressor
- ■ Faulty power supply

Troubleshooting *** Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.