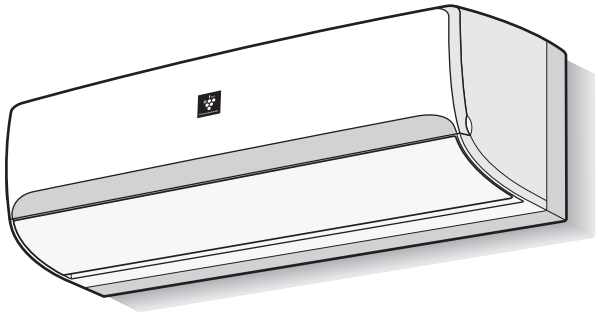
IVT SERVICE MANUAL

S1603AYXP2THNC



SPLIT TYPE
AIR TO AIR HEAT PUMP

MODEL **12THR-N**

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

CONTENTS

Parts marked with " ⚠ " are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

CHAPTER 1. SPECIFICATION

[1] SPECIFICATION

1. 12THR-N

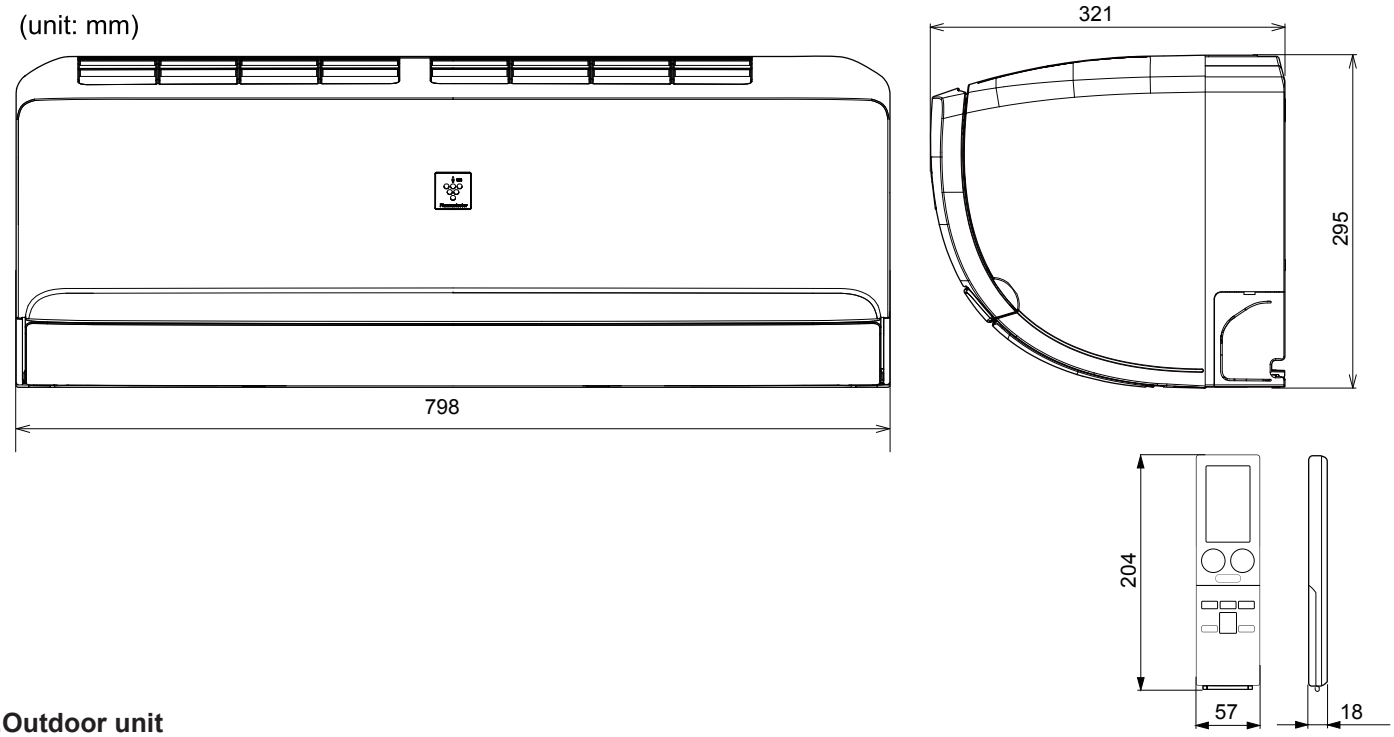
ITEMS		MODEL	INDOOR UNIT	OUTDOOR UNIT
			12THR-N	
Rated cooling capacity (Min– Max.)		kW	3.5(0.8 - 4.0)	
Rated heating capacity (Min–Max.)		kW	4.6 (0.8 - 8.5)	
Moisture removal (at cooling)		Liters/h	1.2	
Electrical data				
Phase			1	
Rated frequency		Hz	50	
Rated voltage		V	220-240	
Rated current ☆ (Min - Max.)	Cool	A	3.8 (1.0 - 4.7)	
	Heat	A	4.7 (0.8 - 11.0)	
Rated input ☆ (Min - Max.)	Cool	W	760 (170- 950)	
	Heat	W	920 (140 - 2400)	
Power factor ☆	Cool	%	86	
	Heat	%	85	
Maximum operating current		A	12.5	
Compressor	Type		Hermetically sealed twin rotary type	
	Model		SNB140FHTMC	
	Oil charge		FV50S(PVE)350cc	
Refrigerant system	Evaporator		Slit Fin and Grooved tube type	
	Condenser		Corrugate Fin and Grooved tube type	
	Control		Expansion valve	
	Refrigerant (R410A)		1350g	
	De-Ice system		Micro computer controled reversed systems	
Noise level (Sound Pressure) (at cooling)	High	dB(A)	46	47
	Soft	dB(A)	33	–
	Slient	dB(A)	26	–
Fan system				
Drive			Direct drive	
Air flow quantity (at cooling)	High	m3/min	13.1	35.3
	Soft	m3/min	7.0	–
	Slient	m3/min	5.8	–
Fan			Cross flow fan	Propeller fan
Connections				
Refrigerant coupling			Flare type	
Refrigerant tube size Gas, Liquid		inch	3/8", 1/4"	
Drain piping mm		mm	O.D.Φ16	
Others				
Safety device			Compressor: Thermistor	
			Fan motors: Inherent thermistor	
			Fuse, Micro computer control	
Air filters			Polypropylene net (Washable)	
Net dimensions	Width	mm	798	800
	Height	mm	295	630
	Depth	mm	325	300
Net weight		kg	15	39

NOTE: The conditions of star"☆" marked item are "EN14511"and "supply power voltage:230V".

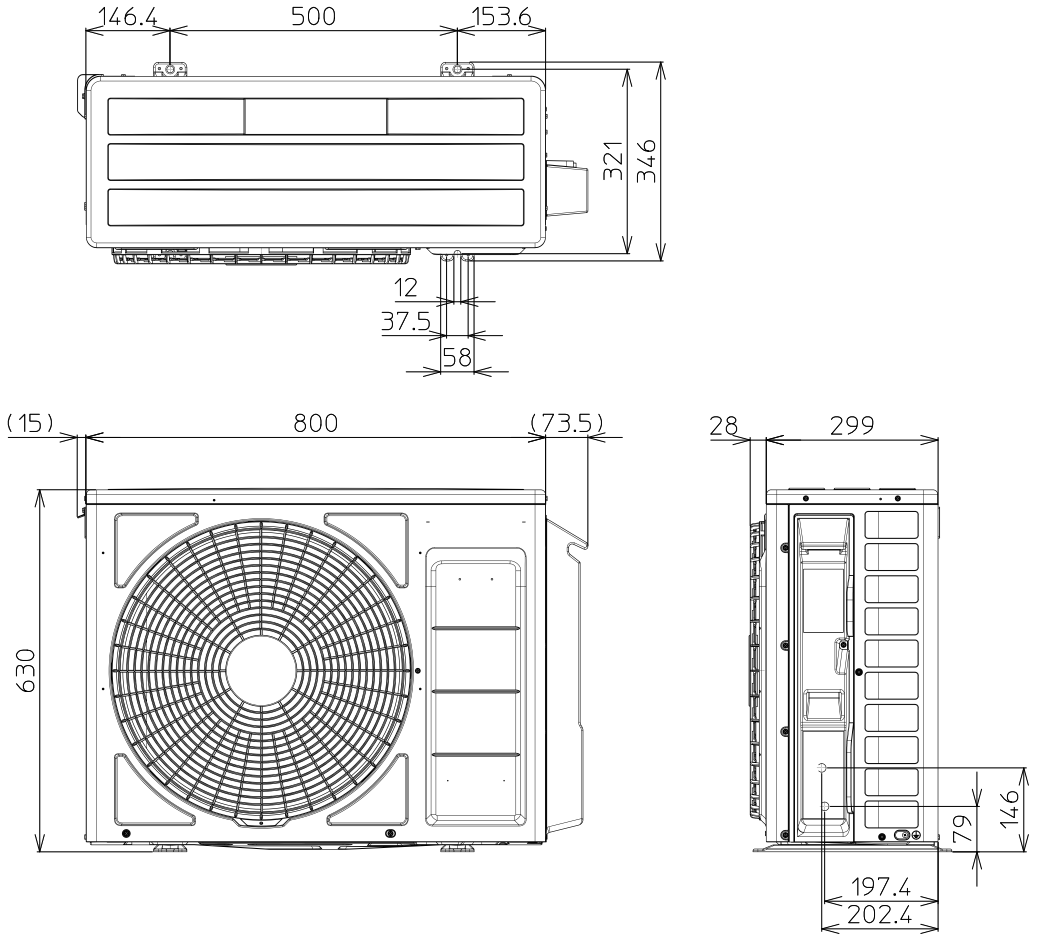
[2] EXTERNAL DIMENSION

1. Indoor unit

(unit: mm)

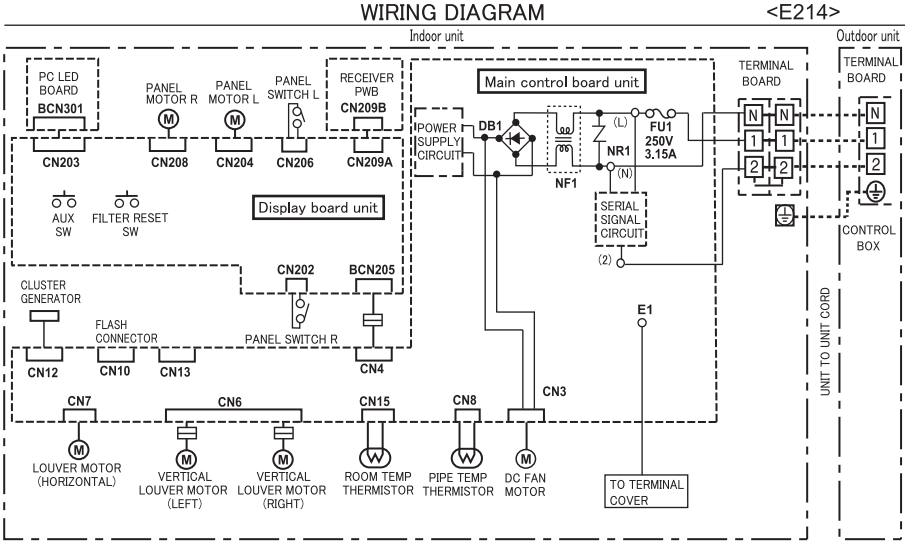


2.Outdoor unit

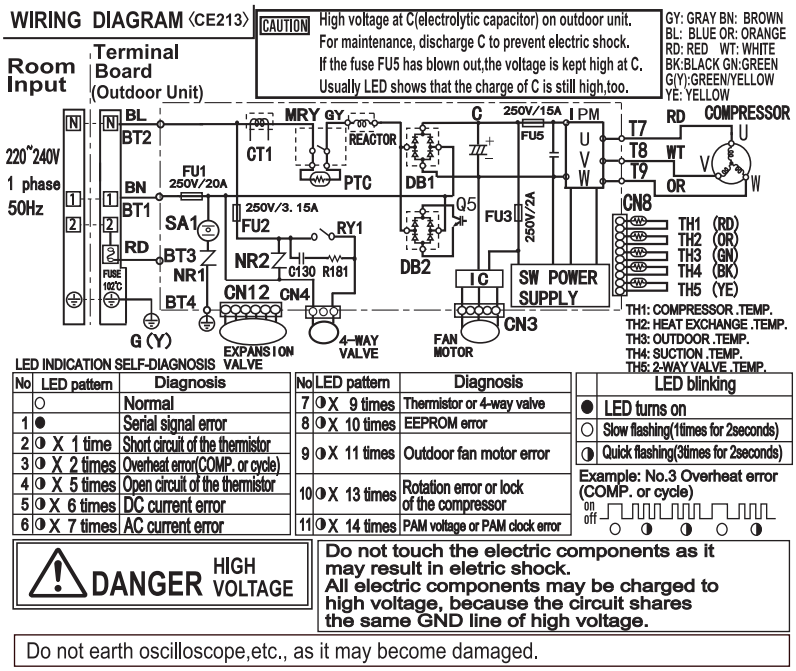


[3] WIRING DIAGRAM

1. Indoor unit



2. Outdoor unit



[4] ELECTRICAL PARTS

1. Indoor unit

DESCRIPTION	MODEL	REMARKS
Indoor fan motor	SHA-37CVL-F424-3	DC motor
Transformer	–	RTRNWA075JBZZ
FUSE1	–	QFS-GA078JBZZ (250V, 3.15A)

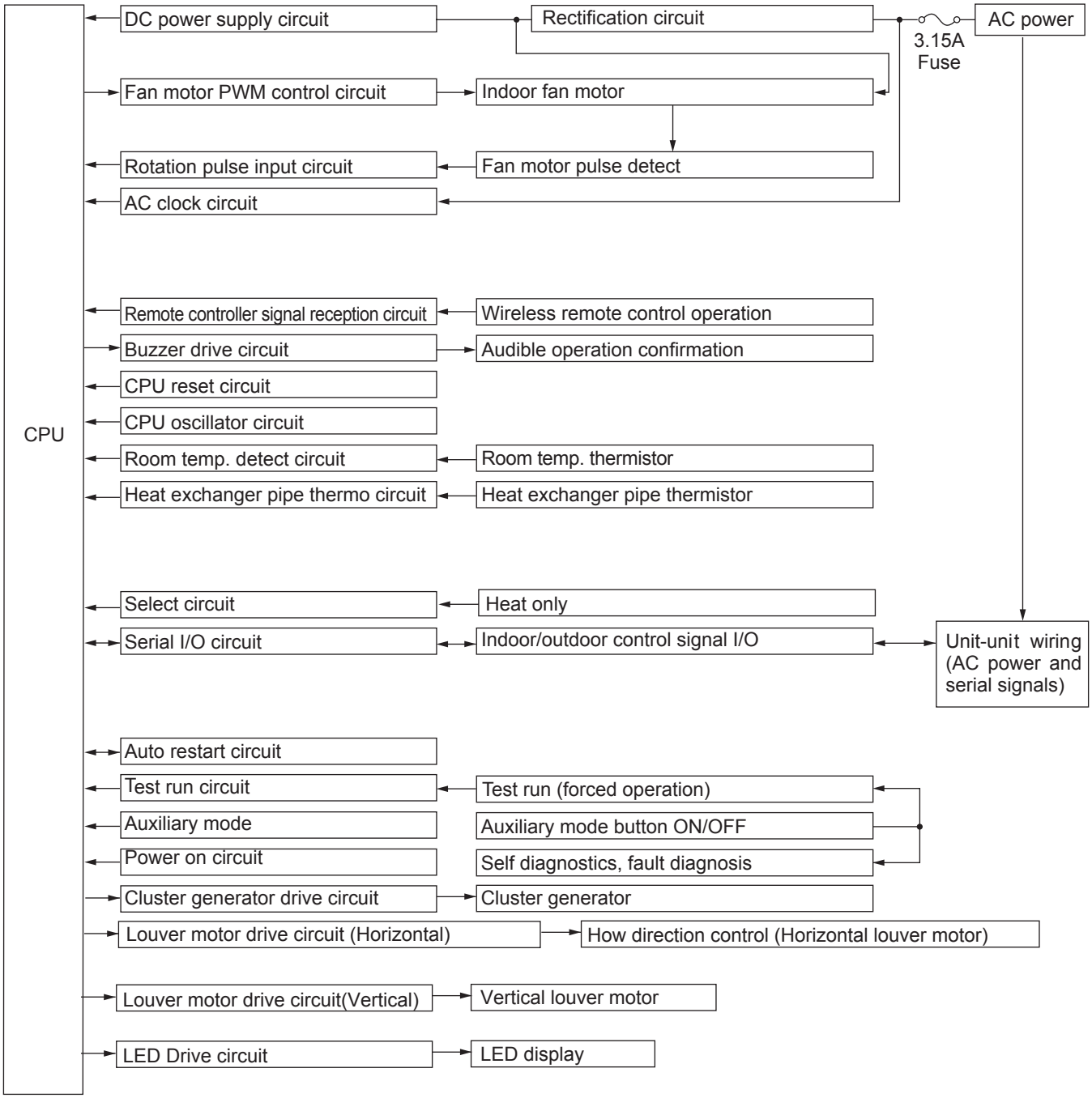
2. Outdoor Unit

DESCRIPTION	MODEL	REMARKS
Compressor	SNB140FHTMC	DC motor
Outdoor fan motor	MLB585	DC motor
Fu3	–	QFS-GA077JBZZ(250V, 2A)
Fu2	–	QFS-GA078JBZZ(250V, 3.15A)
Fu1	–	QFS-CA001JBZZ(250V, 20A)
Fu5	–	QFS-CA002JBZZ(250V, 15A)

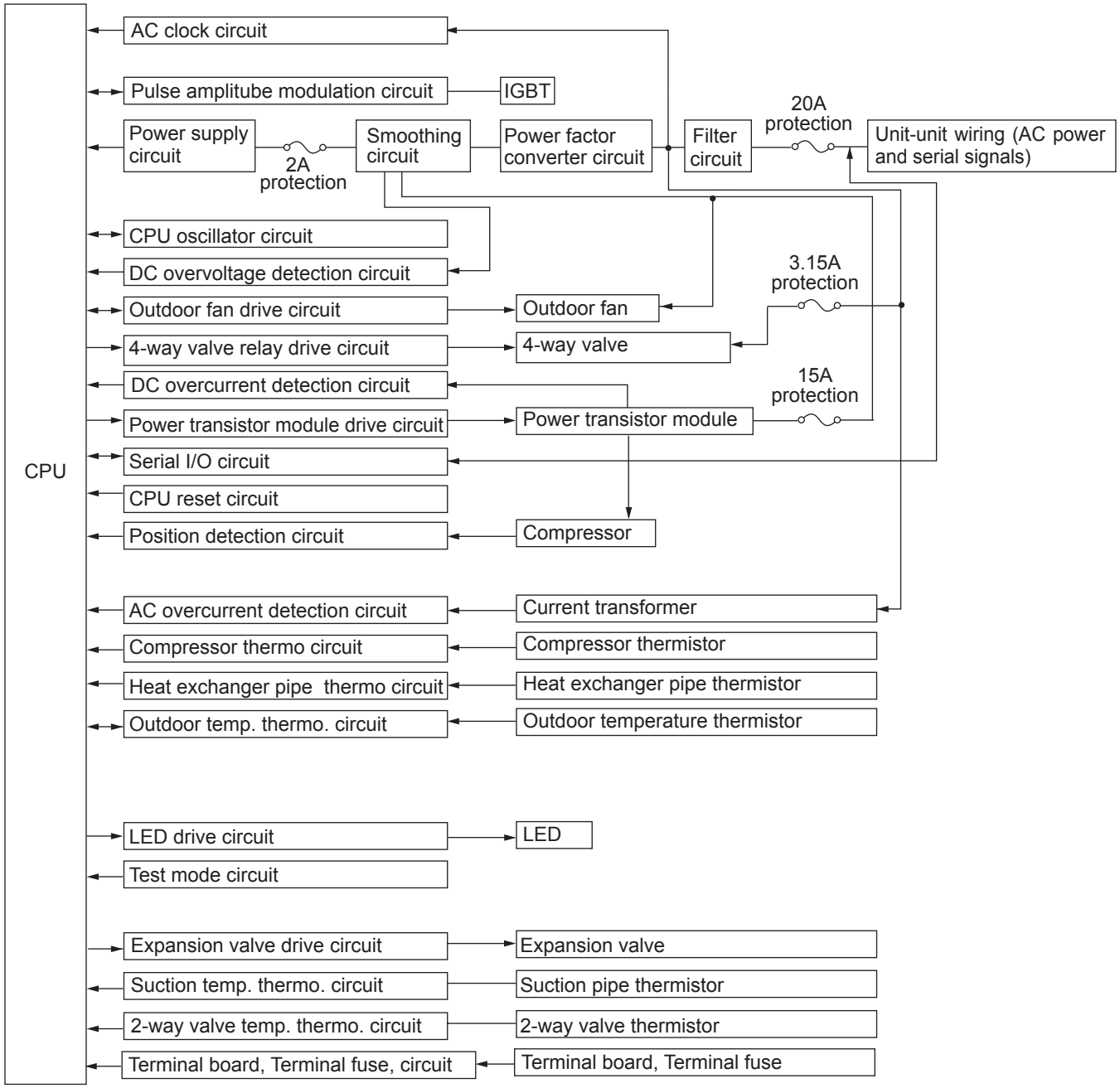
CHAPTER 2. EXPLANATION OF CIRCUIT AND OPERATION

[1] BLOCK DIAGRAMS

1. Indoor unit



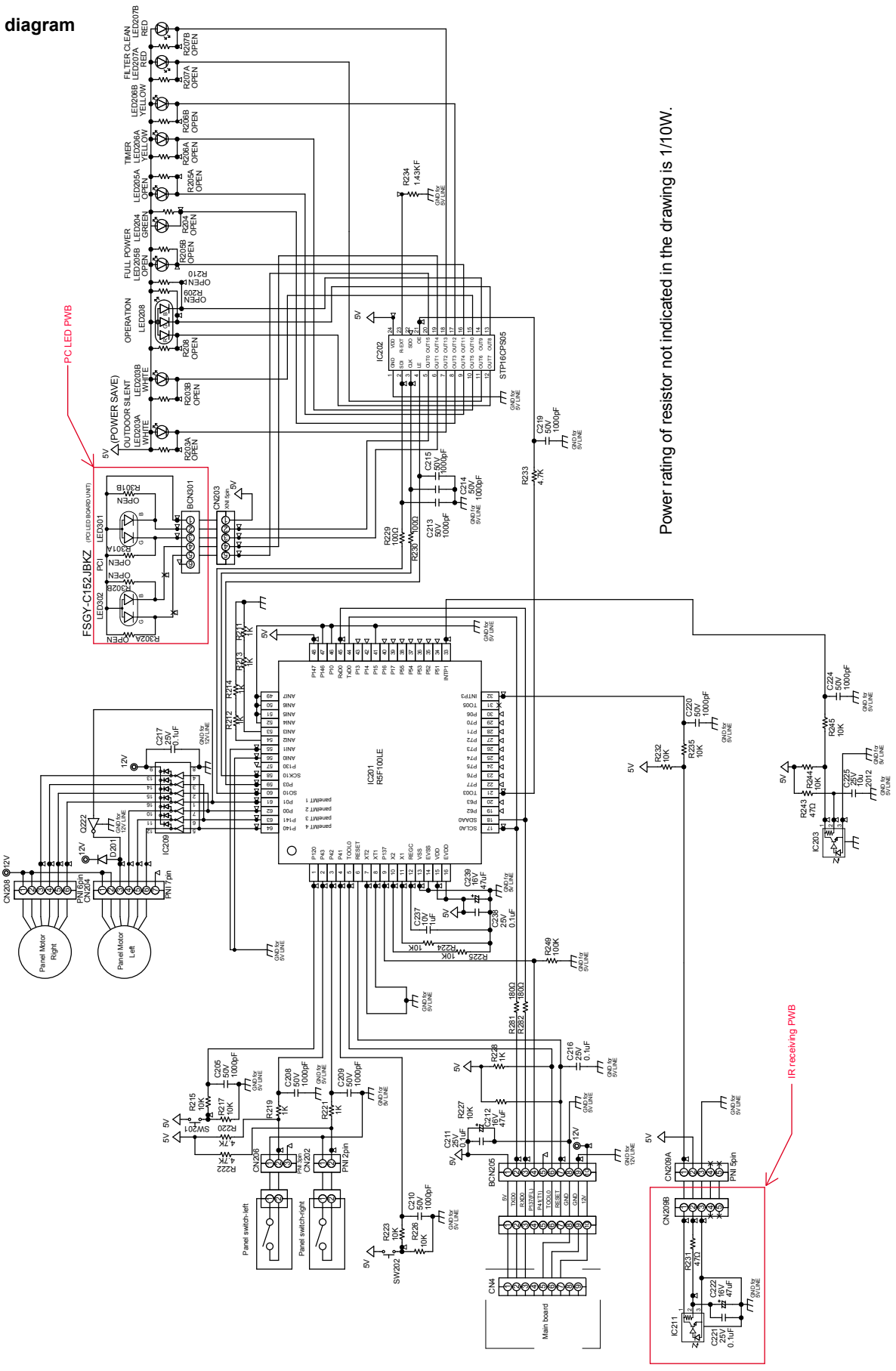
2. Outdoor unit



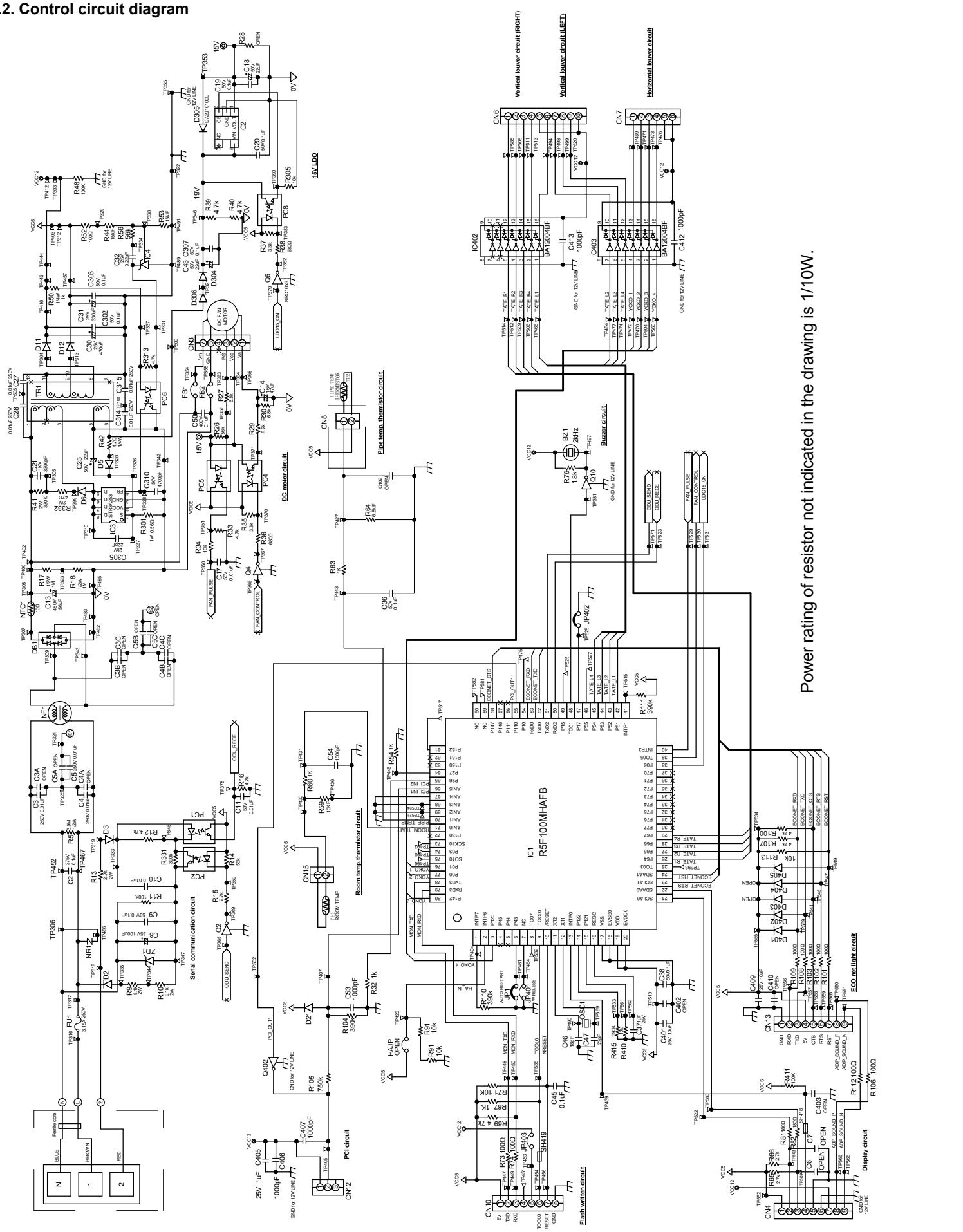
[2] MICROCOMPUTER CONTROL SYSTEM

1. Indoor unit

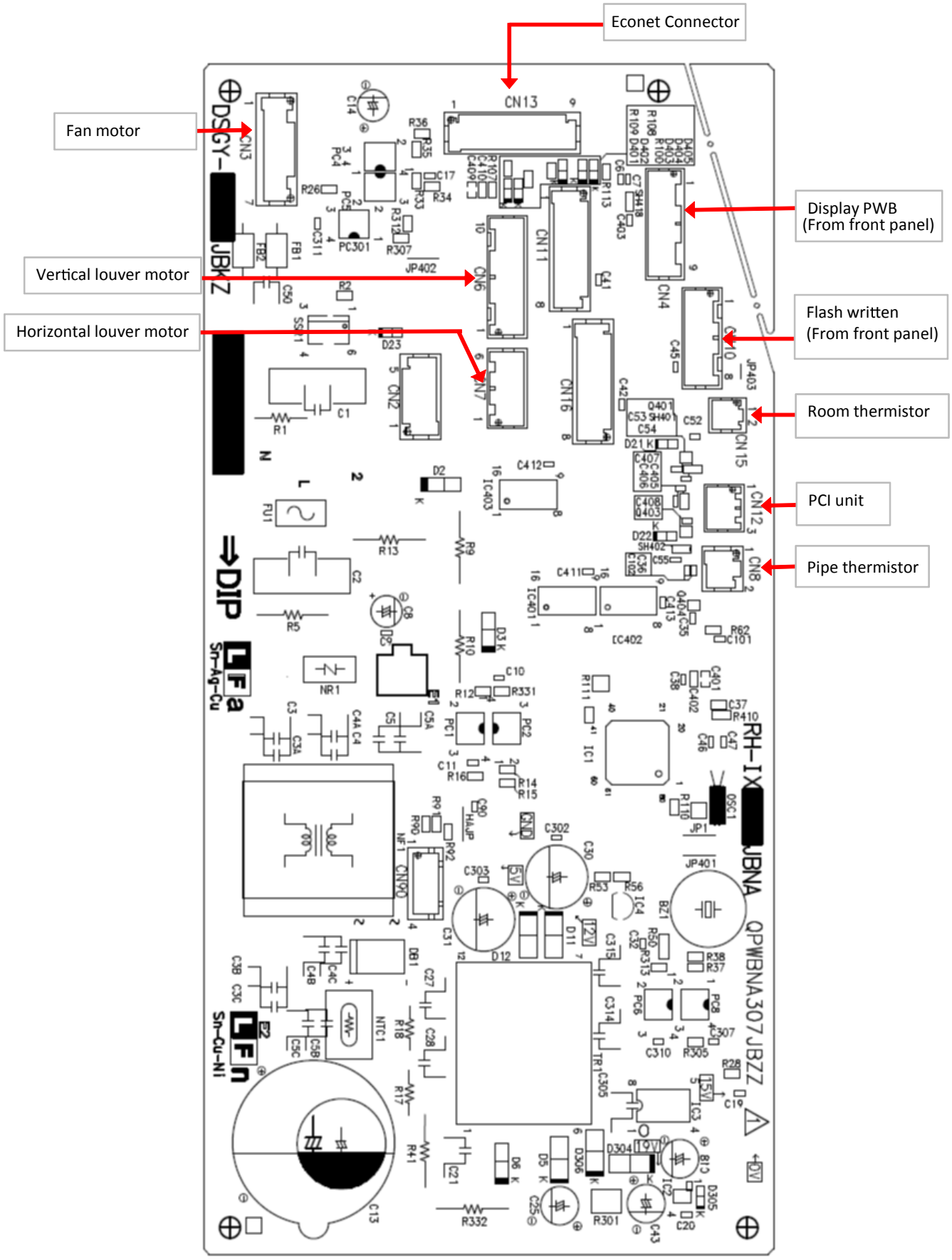
1.1. Display circuit diagram

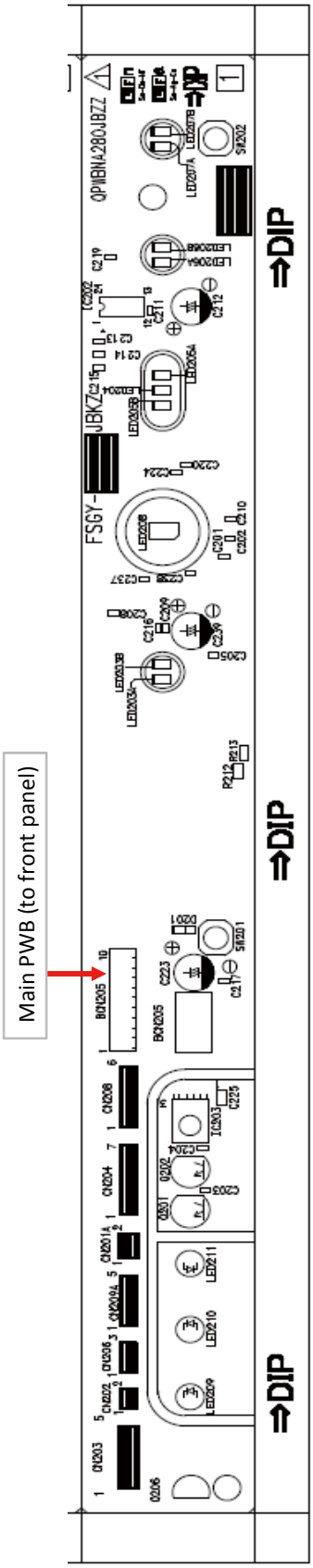


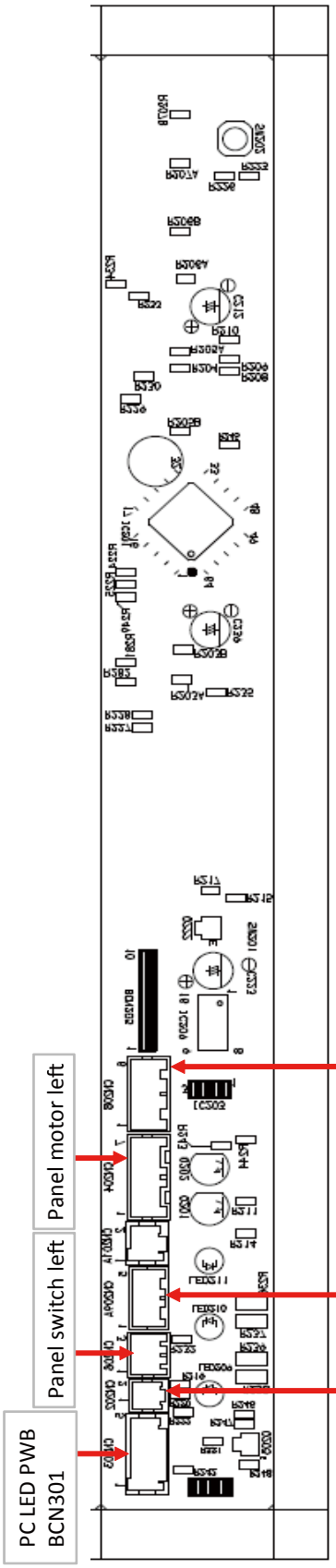
1.2. Control circuit diagram



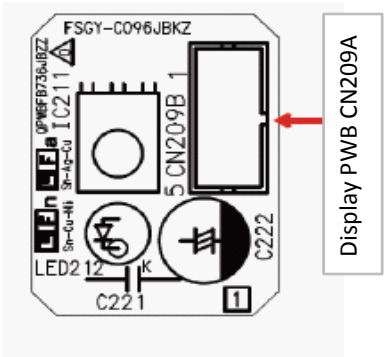
1.2. Printed wiring board





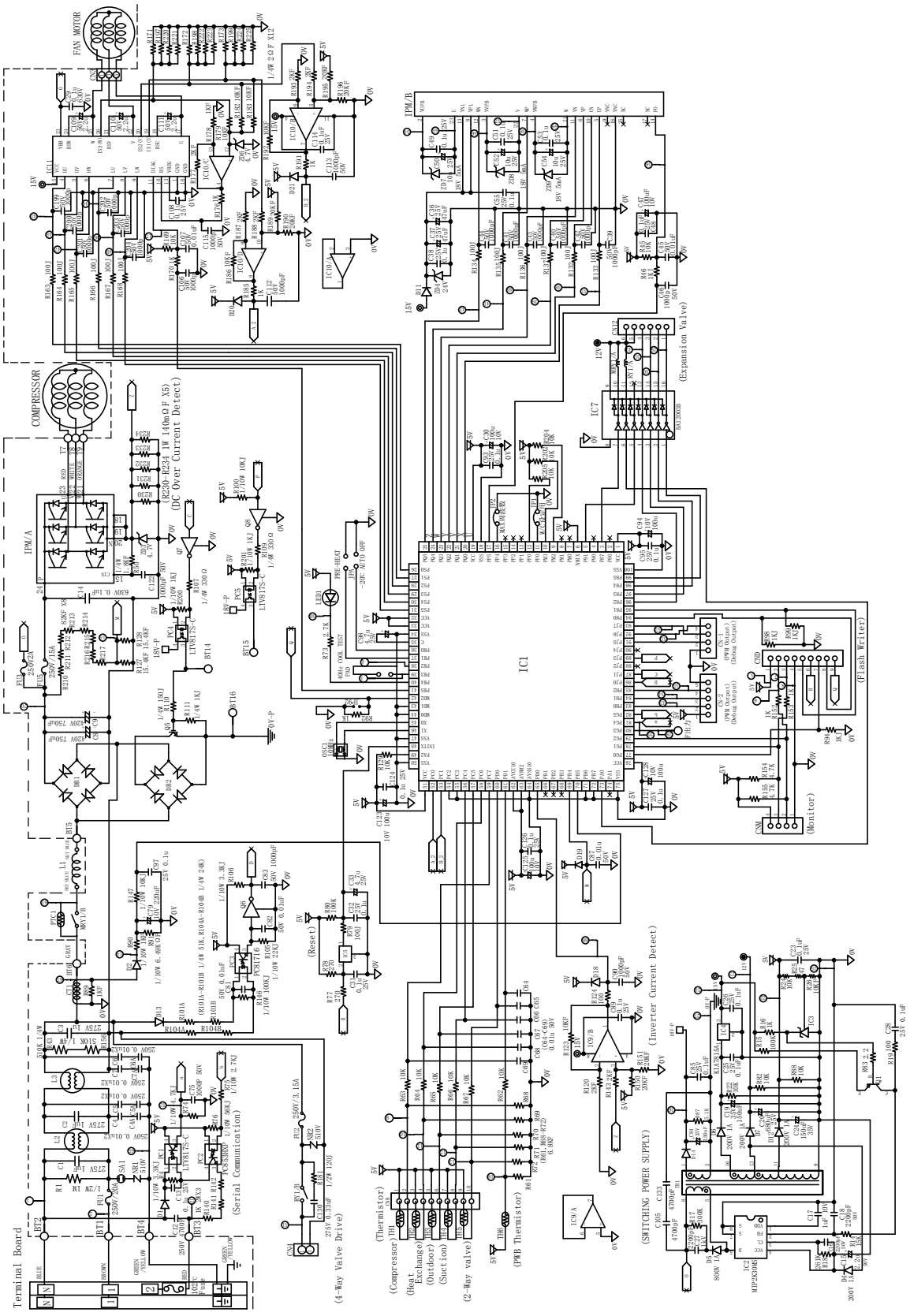


IR receiving PWB

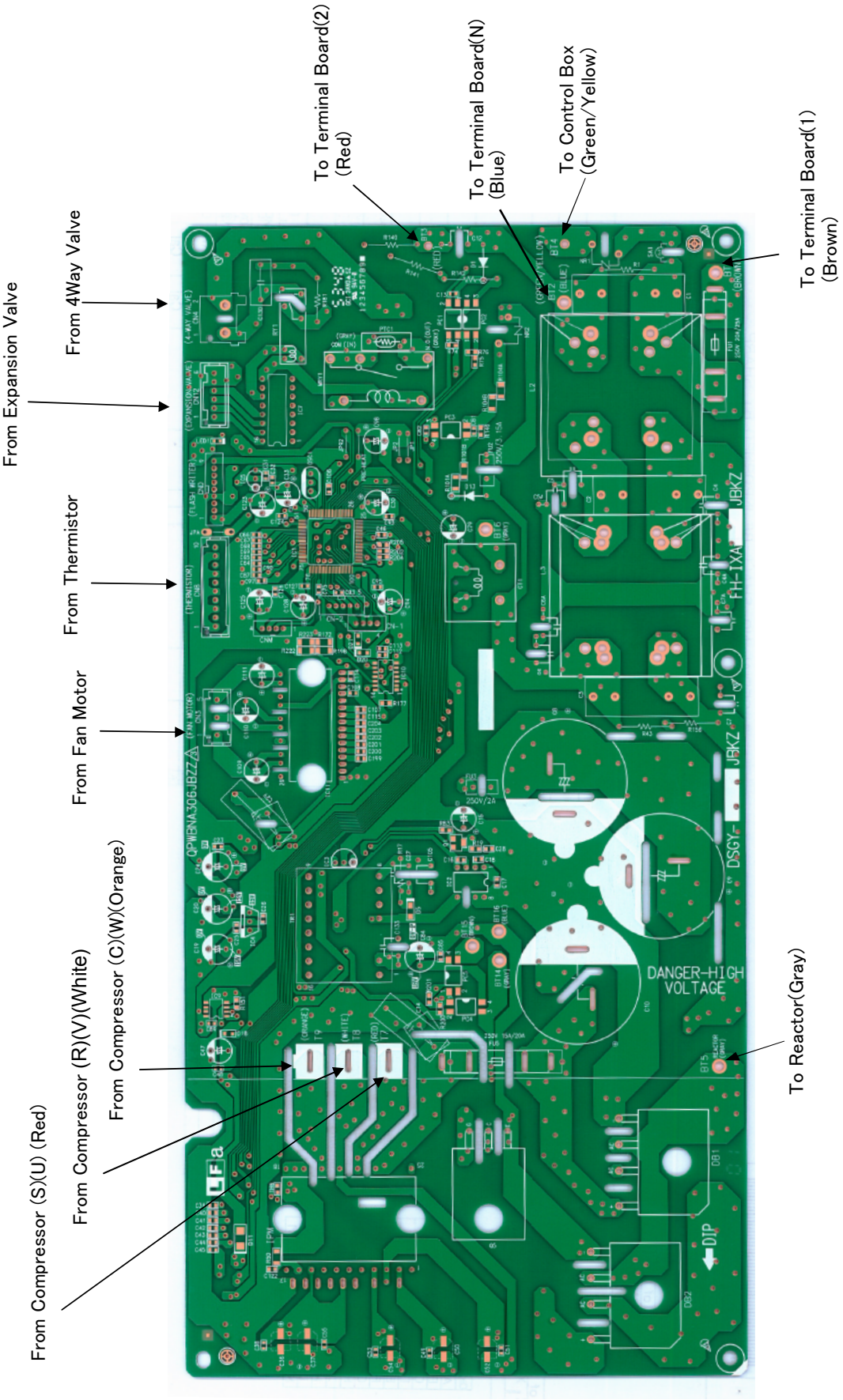


2. Outdoor unit

2.1. Electronic control circuit diagram



2.2. Printed wiring board



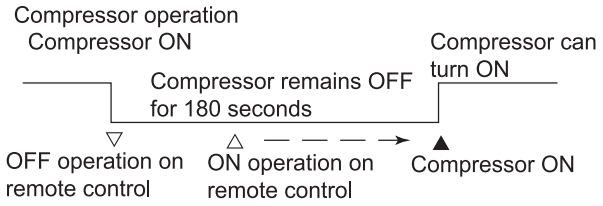
[3] FUNCTION

1. Restart control

Once the compressor stops operating, it will not restart for 180 seconds to protect the compressor.

Therefore, if the operating compressor is shut down from the remote control and then turned back on immediately after, the compressor will restart after a preset delay time.

(The indoor unit will restart operation immediately after the ON switch is operated on the remote control.)



2. Startup control

When the air conditioner starts in the cooling mode, if the room temperature is 2℃ higher than the set temperature the air conditioner operates with the operating frequency at maximum.Then, when the set temperature is reached, the air conditioner operates at the operating frequency determined by fuzzy logic calculation, then enters the normal control mode after a while.

3. ON timer

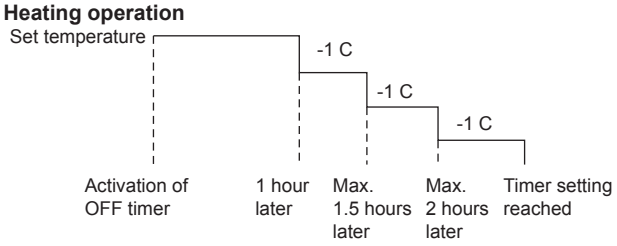
The ON timer can be activated by pressing the ON timer button. When the ON timer is activated, the operation start time is adjusted based on fuzzy logic calculations 1 hour before the set time so that the room temperature reaches the set temperature at the set time.

4. OFF Timer (Sleep Operation)

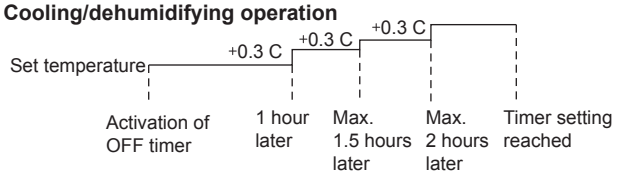
The OFF timer can be activated by pressing the OFF timer button. When the OFF timer is set, the operation stops after the set time.

When this timer is set, the compressor operating frequency lowers for quieter operation, and the room temperature is gradually varied after one hour (reduced 1 ˚C three times (max. 3 ˚C) in heating, or increased 0.3 ˚C three times (max. 1 ˚C) in cooling or dehumidifying operation) so that the room temperature remains suitable for comfortable sleeping.

Heating operation



Cooling/dehumidifying operation



5. Power ON start

If the connecting wire “POWER ON” (POJP) is put on the PWB assembly, when the power is supplied by turning on a circuit breaker, the air conditioner automatically starts of operation in “AUTO”.

(Refer to Printed Wiring Board.).

6. Self-diagnostic malfunction code display

1) When a malfunction is confirmed, all relays turn off and a flashing operation LED,timer LED,Plasamacluter LED is displayed to indicate the type of malfunction.

   When the air conditioner is in non-operating condition, holding down AUX button for more than 5 seconds activates the malfunction code display function.

   The operation continues only in the case of a serial open-circuit, and the main relay turns off after 30 seconds if the open-circuit condition remains.

   In the case of a serial short-circuit, the air conditioner continues operating without a malfunction code display, and the main relay turns off after 30 seconds if the short-circuit condition remains.

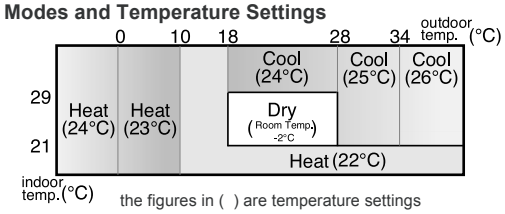
   The malfunction information is stored in memory, and can be recalled later and shown on display.

2) The self-diagnostic memory can be recalled and shown on the display by stopping the operation and holding down AUX button for more than 5 seconds.

   (For details, refer to the troubleshooting section.)

7. Auxiliary mode

In the AUXILIARY mode, the unit will automatically select COOL and HEAT mode by comparing the room temperature and your desired temperature.



During operation, if the outdoor temperature changes, the temperature settings will automatically slide as shown in the chart.

8. Difference of operation in Auto and Manual modes

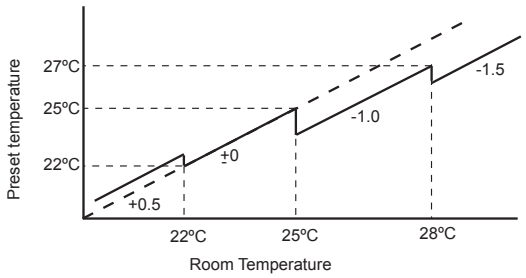
In the Auto mode, the temperature setting is automatically determined based on the outside air temperature. In addition, the air conditioner operation differs from the operation in the Manual mode as explained below.

8.1. Difference relating to set temperature

		Temperature setting method
Auto mode (by pressing AUX button)	Heat	Automatic temperature setting based on outside air temperature.
	Cooling	
Auto mode (set by remote control)	Heat	Can be changed between 16 ~ 30 ℃ (61 ~ 86℉) using remote control.
	Cooling	
Manual mode	Heat	Can be changed between 16 ~ 30 ℃ (61 ~ 86℉) using remote control.
	Cooling	
	Dehumidifying	Automatic setting. Can be changed within ±2℃ (±3℉) using remote control.

9. Dehumidifying operation control

In the Dehumidifying mode, the temperature setting is automatically determined based on the outside air temperature. In addition, the air conditioner operation differs from the operation in the Manual mode as explained below.



10. Full Power Operation

In this operation, the air/air heat pump works at the maximum power and optimum louver direction to make the room cool or warm rapidly.

During operation, press the FULL POWER button.

- The remote control will display"⏠"
- The temperature display will go off.
- The green FULL POWER lamp on the unit will light up.

TO CANCEL

Press the FULL POWER button again.

- The FULL POWER operation will also be cancelled when the operation mode is changed, or when the unit is turned off.
- The geen FULL POWER lamp on the unit will turn off

NOTE:

- The air/air heat pump will operate at “Extra HIGH” fan speed for 15 minutes, and then shift to “HIGH” fan speed. The vertical adjustment louvre will be set obliquely downward.
- You can not set the temperature or fan speed during the FULL POWER operation.
- To turn off the FULL POWER lamp, press the DISPLAY button.

11. Self Clean operation

Heating or Fan operation and Cluster operation are performed simultaneously.

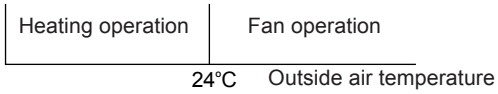
The judgment of whether Heating or Fan operation is used is based on the outside air temperature at 3 minutes after the start of internal cleaning.

The operation stops after 90 minutes.

• During this operation the horizontal louver moves and stays two positions.

It turns to the lower direction and stays for 80 minutes.

Next moves upward and stays for 10 minutes.



12. Plasmacluster Ion function

Operating the Plasmacluster Ion button while the air conditioner is in operation or in non-operation allows the switching of the operation mode in the following sequence: “Air Clean operation” → “Stop”.

- “Plasmacluster operation” generates about equal amounts of (+)ions and (-)ions from the cluster unit to provide clean air.

If the Plasmacluster Ion generation function is operated together with the air conditioner operation, the indoor unit fan speed and louver direction are in accordance with the air conditioner settings.

If the Plasmacluster Ion generation function is used without operating the air conditioning function, the indoor unit fan operates at a very low speed and the upper louver is angled upward and the lower louver remains horizontal. (The airflow volume and direction can be changed by using the remote control.)

13. Auto restart

When power failure occures, after power is recovered, the unit will automatically restart in the same setting which were active before the power failure.

13.1. Operating mode (Heat, Cool, Dry)

- Temperature adjustment (within 2℃[3℉] range) automatic operation
- Temperature setting
- Fan setting
- Air flow direction
- Power ON/OFF
- Automatic operation mode setting
- Swing louver
- Plasmacluster mode
- OD SILENT Setting

13.2. Setting not memorized

- Timer setting
- Full power setting
- Self cleaning

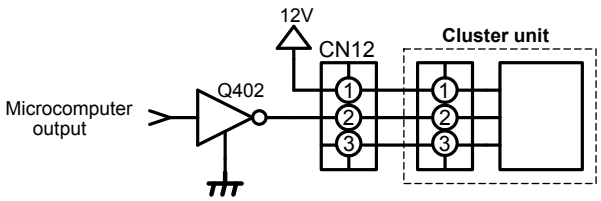
13.3. Disabling auto restart function

By removing (cutting) jumper ○ (JP○) on the printed circuit board (PCB), the auto restart function can be disabled.

14. Explanation of cluster circuit

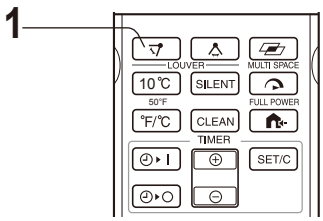
The cluster unit generates cluster ions, which are circulated throughout the room by the air flow created by the blower fan (indoor unit fan motor) in the air conditioner unit.

1) When microcomputer output turns "H," the Q402 output changes to "Lo," turning ON the SSR2 and applying 100 V to the cluster unit for the generation of cluster ions (positive and negative ions).



15. 10A mode

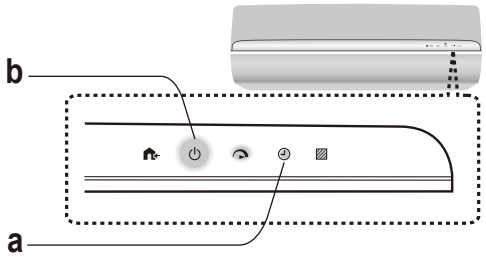
1) Press the vertical louver button on the remote control for 10 seconds, and the remote control display will show “PS”.



2) Point the remote control to the indoor unit and press vertical louver button, then the current state (amps mode) will be displayed.

Timer LED (a) turns on: not 10A mode

Operation LED (b) turns on: 10A mode



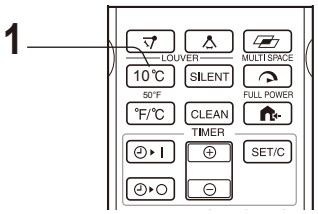
3) Press vertical louver button one more time to change the mode, and the LED will display accordingly. The indoor unit will also make beeping sound.

4) Press “stop” on the remote control to complete the change, or leave the unit untouched for 30 seconds to complete the change automatically.

16. Swiching the Hot Keep function

Hot Keep function to prevent cold air from coming out of the indoor unit when the compressor has stopped by stopping the indoor fan, and Hot Keep-less is to continue the fan operation even when the compressor has stopped to circulate the air.

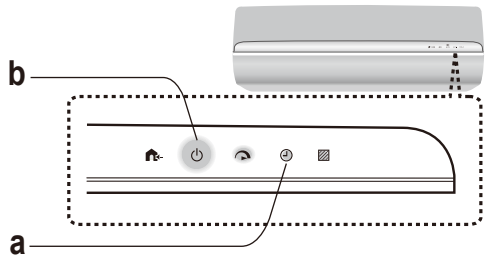
1) Press the “10°C” button 10℃ on the remote control for 10 seconds and the remote control will show “Ho”.



2) Point the remote control to the indoor unit and press the “10°C” once, then the current state (Hot Keep function) will be displayed.

Timer LED (a) turns on: Hot Keep-less

Operation LED (b) turns on: Hot keep mode

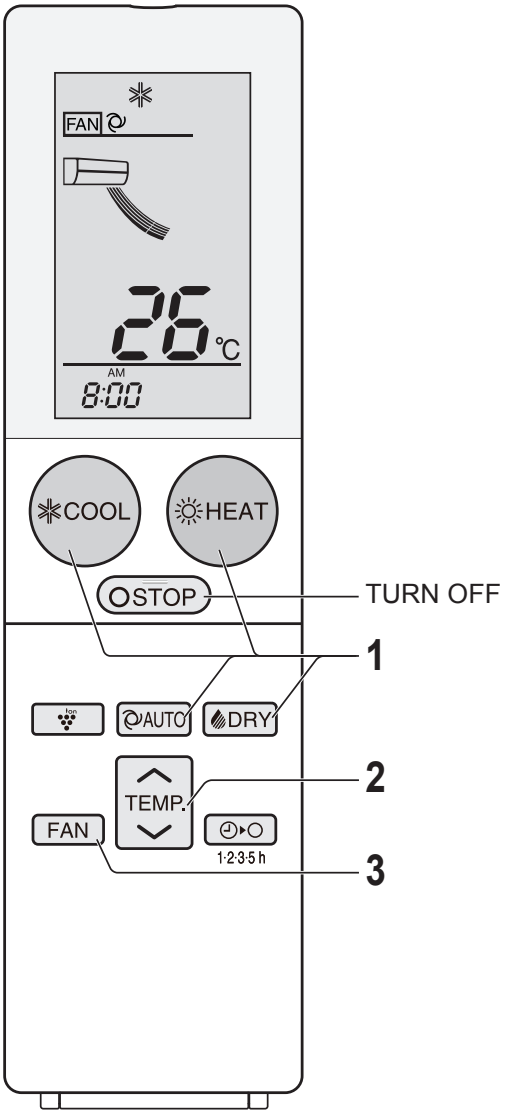


3) Press the “10°C” button one more time to change the mode, and the LED will display accordingly. The indoor unit will also make beeping sound three times.

4) Press “Stop” on the remote control to complete the change, or leave the unit untouched for 30 seconds to the change automatically.

[4] OPERATION MANUAL

BASIC OPERATION



1 Press the COOL, HEAT, AUTO or DRY button.

: COOL : HEAT

: AUTO : DRY

• The green OPERATION lamp (⏻) will light up.

TO TURN OFF

Press the STOP button.

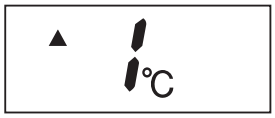
• The green OPERATION lamp (⏻) will turn off.

2 Press the TEMPERATURE button to set the desired temperature.

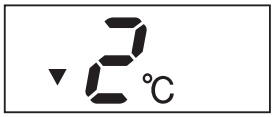
(COOL/HEAT/AUTO mode)
The temperature setting range: 16-30°C.

(DRY mode)
The temperature can be changed up to 2°C above or below the temperature automatically determined by the air conditioner.

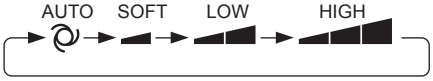
(Example: 1°C higher)



(Example: 2°C lower)



3 Press the FAN button to set the desired fan speed.



• In the DRY mode, the fan speed is preset to AUTO and cannot be changed.

NOTE:

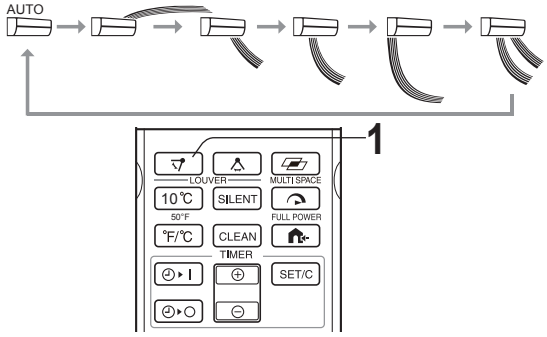
TIPS ABOUT AUTO MODE

- In the AUTO mode, the unit will automatically select COOL or HEAT mode by comparing the room temperature and your desired temperature.
- The unit will automatically switch between HEAT and COOL mode to keep the desired temperature.
- 10°C button , MULTI SPACE button will be inactivated during AUTO mode.

ADJUSTING THE AIR FLOW DIRECTION

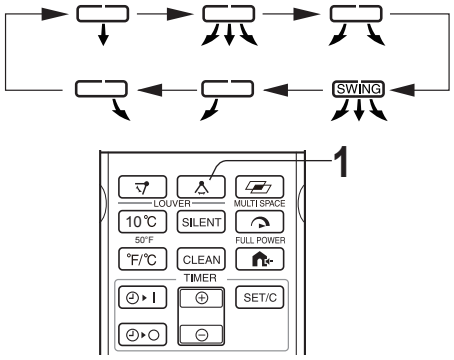
VERTICAL AIR FLOW DIRECTION

1 Press the LOUVER button ( ) to set desired air flow direction.



HORIZONTAL AIR FLOW DIRECTION

1 Press the LOUVER button ( ) to set desired air flow direction.



CAUTION:

Never attempt to adjust the louvers manually.

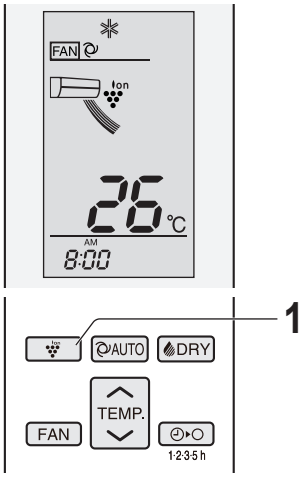
- Manual adjustment of the louvers can cause the unit to malfunction.
- When the vertical adjustment louver is positioned at the lowest position in the COOL or DRY mode for an extended period of time, condensation may result.

PLASMACLUSTER OPERATION

Plasmacluster ions released into the room are effective against airborne contaminants, such as mold, viruses, and allergens.

1 During operation, press the PLASMACLUSTER button.

- The remote control will display " ".
- The blue PLASMACLUSTER lamp on the unit will light up.



TO CANCEL

Press the PLASMACLUSTER button again.

- The PLASMACLUSTER lamp on the unit will turn off.

NOTE:

- Use of the PLASMACLUSTER operation will be memorized, and it will be activated the next time you turn on the air conditioner.
- To perform the PLASMACLUSTER operation in fan only mode, press the PLASMACLUSTER button while the unit is not operating. The mode symbol of the remote control will go off and the fan speed can not be set AUTO.
- Plasmacluster is Sharp's original technology. For more information, please visit: http://www.sharp-world.com/pci/en

TIPS ABOUT AIR FLOW DIRECTION "AUTO"

COOL mode

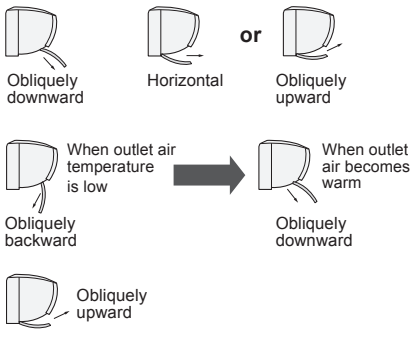
The open panel will be set obliquely downward for less than 20 minutes, and then shift to horizontal or obliquely upward to deliver cool air to the ceiling.

HEAT mode

The open panel will be set obliquely backward when outlet air temperature is low, and then shift to obliquely downward when outlet air becomes warm.

DRY mode

The open panel will be set obliquely upward.

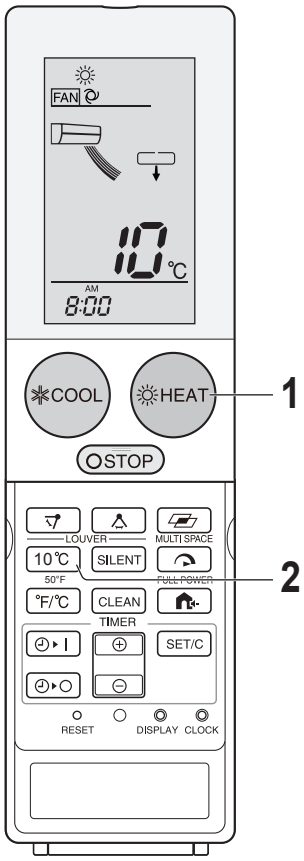


10˚C OPERATION

Heating operation with 10˚C set temperature will be performed.

1 Press the HEAT button to start HEAT operation.

2 Press the 10˚C button.
• The remote control will display " **10˚C** ".



TO CANCEL
Press the 10˚C button again.

NOTE:
• 10˚C operation will not be available with heating operation automatically selected by AUTO mode.

MULTI SPACE

The unit will operate to cool or warm multiple rooms in well insulated house by pressing this button.

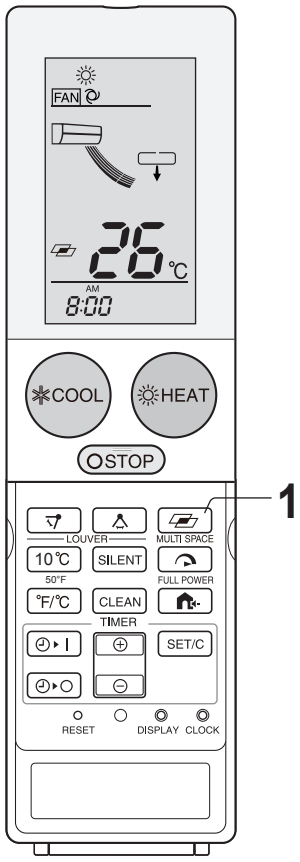
1 During cooling or heating operation, press MULTI SPACE button.
The remote controller will display " " and fan speed icon will be changed to " ".

Louver angle will be changed to the position for long distance delivery of cool or warm air.

(HEAT mode)
• The remote control will display " ".

(COOL mode)
• The remote control will display " ".

TO CANCEL
Press MULTI SPACE button again.



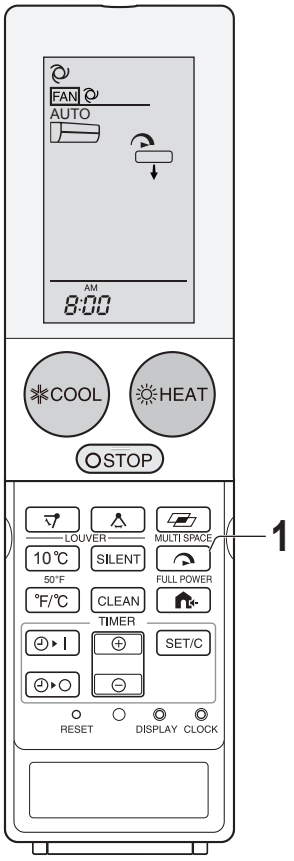
NOTE:
• The unit will operate at "Extra HIGH" fan speed for 15 minutes for long distance delivery of conditioned air, and then shift to "HIGH" fan speed after 15 minutes.
• SILENT and FAN SPEED button will be disabled during this operation.
• Effectiveness of this function may differ depending on the room layout, installation position of the unit, and insulation level of the space concerned.

FULL POWER OPERATION

In this operation, the air conditioner works at the maximum power to makes the room cool or warm rapidly.

1 Press the FULL POWER button during operation.

- The remote control will display " ".
- The temperature display will go off.
- The green FULL POWER lamp ( ) on the unit will light up.



TO CANCEL

Press the FULL POWER button again.

- The green FULL POWER lamp ( ) on the unit will turn off.

NOTE:

- You can not set the temperature or fan speed during the FULL POWER operation.
- FULL POWER operation will be automatically cancelled in one hour, and the unit return to the original settings. The green FULL POWER lamp ( ) on the unit will turn off.

SILENT OPERATION

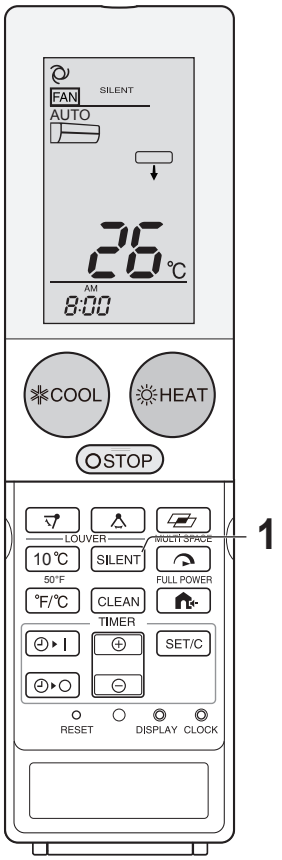
The unit will operate at "Extra LOW" fan speed for comfort and in need of quieter operation.

1 During COOL, HEAT, and AUTO operation, press the SILENT button.

- The speed icon on the remote control will display "SILENT".

TO CANCEL

Press the SILENT button again.



TIMER OPERATION

When the 1·2·3·5h OFF TIMER is set, the unit will automatically turn off after the setting hours.

1·2·3·5h OFF TIMER

1 Press the 1·2·3·5h OFF TIMER button to set the desired time.

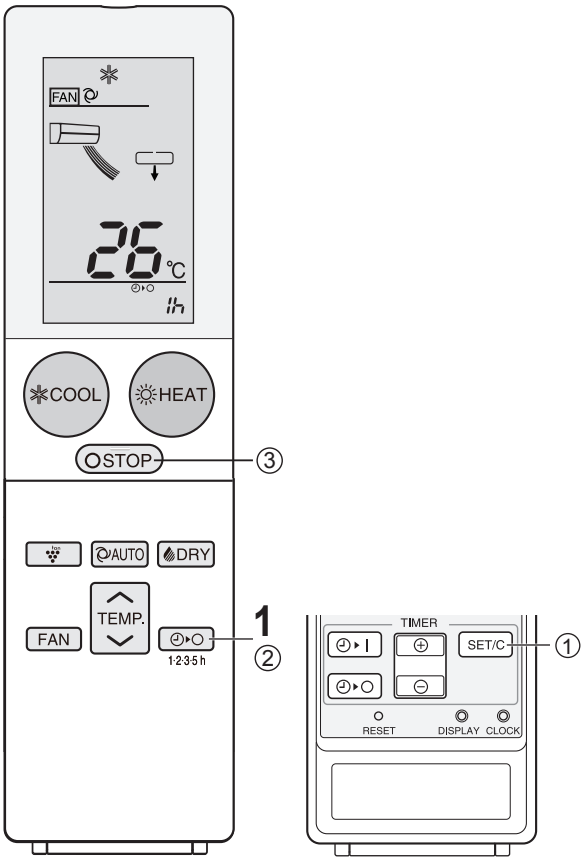
1h → 2h → 3h → 5h → CANCEL

- The orange TIMER lamp ( ) will light up.
- The remaining time will be indicated on the remote control in 1-hour increments.

TO CANCEL

① **Press the SET/C button.**
② **Press the 1·2·3·5h OFF TIMER button.**
③ **Press the STOP button.**

- The orange TIMER lamp ( ) on the unit will turn off.
- The current clock time will be displayed on the remote control.



NOTE:

- The 1·2·3·5h OFF TIMER has priority over TIMER ON and TIMER OFF.
- If the 1·2·3·5h OFF TIMER is set while the unit is not operating, the unit will operate at the formerly set condition and stop after a period of set time.

Before setting the timer,make sure the clock is properly set with the current time.

TIMER OFF

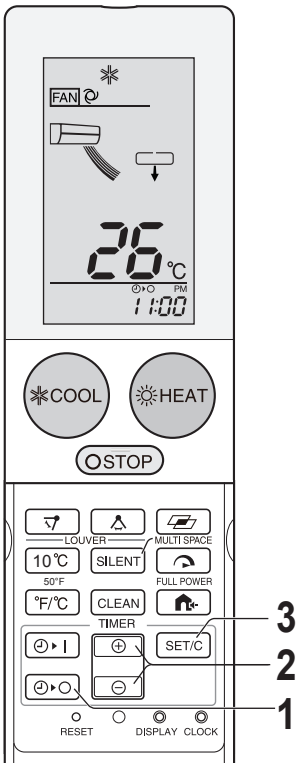
1 Press the TIMER OFF ( ) button.

2 The TIMER OFF indicator will blink; press the TIME ADVANCE (⊕)or REVERSE (⊖) button to set the desired time.

(The time can be set in 10-minute increments or decrements.)

3 Press the TIMER SET (SET/C) button.

- The orange TIMER lamp ( ) on the unit will light.



TIPS ABOUT TIMER OFF OPERATION

When the TIMER OFF mode is set, the temperature setting is automatically adjusted to prevent the room from becoming excessively warm or cool, for example while you sleep. (Auto Sleep function)

COOL/DRY MODE:

- One hour after the time operation begins, the temperature setting rises 1°C higher than the original temperature setting.

HEAT MODE:

- One hour after the timer operation begins, the temperature setting drops 3°C lower than the original temperature setting.

TIMER ON

1 Press the TIMER ON (◷▸ \|) button.

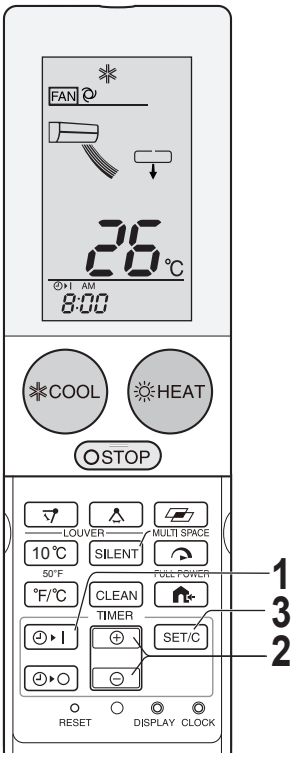
2 The TIMER ON indicator will blink; press the TIME ADVANCE (⊕) or REVERSE (⊖) button to set the desired time.

(The time can be set in 10-minute increments or decrements.)

- Select the operation condition.

3 Press the TIMER SET (SET/C) button.

- The orange TIMER lamp (◷) on the unit will light.



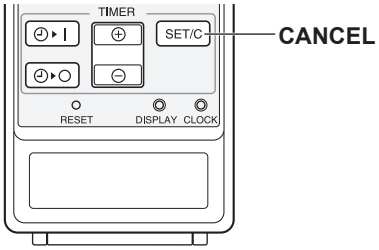
NOTE:

- The unit will turn on prior to the set time to allow the room to reach the desired temperature by the programmed time. (Awaking function)

TO CANCEL (for TIMER OFF and TIMER ON)

Press the TIMER CANCEL (SET/C) button.

- The orange TIMER lamp (◷) on the unit will turn off.
- The current clock time will be displayed on the remote control.



TO CHANGE TIME SETTING

Cancel the TIMER setting first, then set it again.

TO COMBINE TIMER ON AND TIMER OFF

TIMER ON and TIMER OFF can be set up at the same time.

Set the TIMER OFF and TIMER ON.

- The settings will be automatically combined.

Example
(Current time: 9:00 p.m.)
OFF TIMER at 11:00 p.m.
ON TIMER at 7:00 a.m.

- The arrow (◀ or ▶) between the TIMER ON indicator and the TIMER OFF indicator shows which timer will activate first.

NOTE:

- You cannot program the ON-TIMER and OFF-TIMER to operate the unit at different temperatures or other settings.
- Either timer can be programmed to activate prior to the other.
- When SET/C button is pressed, all the timer setting will be cancelled (including TIMER ON, TIMER OFF and 1·2·3·5h OFF TIMER)

SELF CLEAN OPERATION

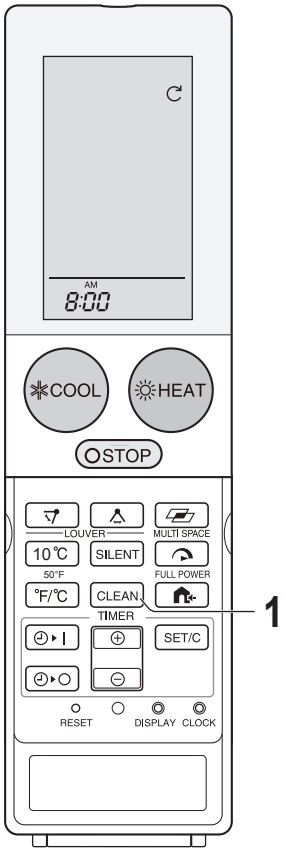
SELF CLEAN operation will reduce the growth of mold fungus with Plasmacluster ions and dry inside of the unit. Utilize the operation at seasonal change over terms.

1 Press the SELF CLEAN button when the unit is not operating.

- The remote control will display " ↻ ". (The " ↻ " will disappear automatically in 1 minute.)
- The light blue SELF CLEAN lamp (↻)on the unit will light up.
- The unit will stop operation after 90 minutes.

TO CANCEL

Press the STOP button.
- The light blue SELF CLEAN lamp (↻) will turn off.



NOTE:
- You cannot set the temperature, fan speed, air flow direction or timer setting during the SELF CLEAN operation.
- Mold fungus already grown can not be eliminated by this operation.
- SELF CLEAN and PLASMACLUSTER use common lamp, only lamp color different.

DISPLAY BUTTON

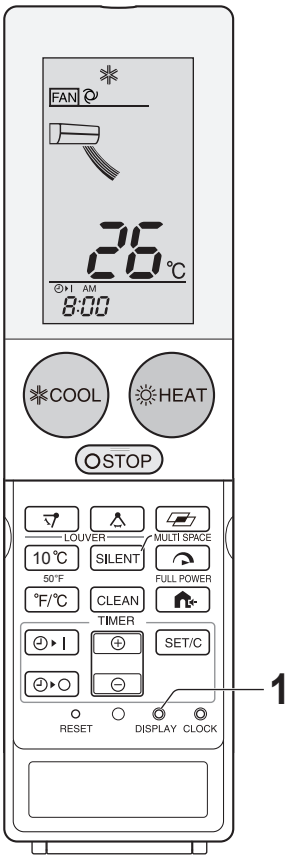
Press the DISPLAY button when the lamps on the unit are too bright. (All the lamps on indoor unit cannot be turned off.)

1 During operation, press the DISPLAY button.

- All the lamps on indoor unit will get dark in same time

TO LIGHT UP

Press the DISPLAY button again.

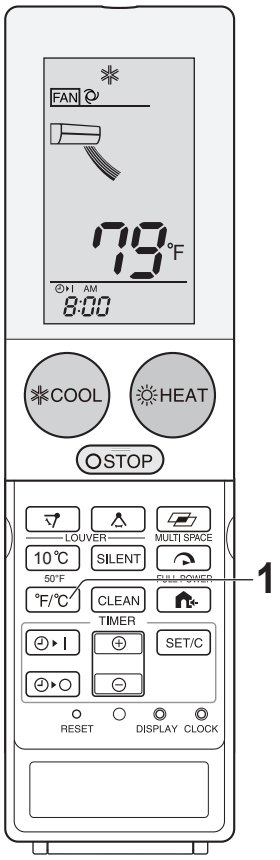


°F/°C CHANGE OVER OPERATION

Change °F/°C display of temperature setting on remote control.

1 During operation, press °F/°C CHANGE OVER button.

- Thermostat display of remote control will change between "°F" (Fahrenheit) and "°C" (Centigrade).



OUTDOOR SILENT OPERATION

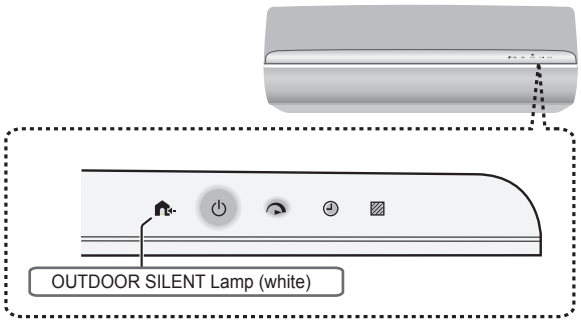
Turn ON this operation to limit the sound of the outdoor unit during operation. This operation will be beneficial especially during the night, if you need to be considerate to the neighbors.

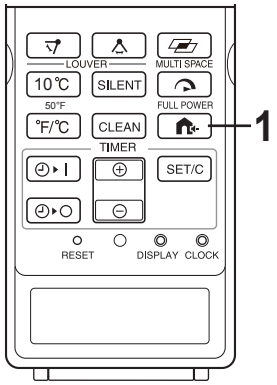
1 During operation, press OUTDOOR SILENT button.

- LED on the indoor unit display will illuminate when this operation is turned ON.

TO CANCEL

Press OUTDOOR SILENT button again, and the LED on the indoor unit display will turn OFF.





NOTE:

- If OUTDOOR SILENT function is used together with FULL POWER or MULTI-SPACE operations, the performance may not reach the full potential as it could without OUTDOOR SILENT function.
- If the unit is turned OFF while in OUTDOOR SILENT operation, the unit will not remember the OUTDOOR SILENT operation when restarted.
- The sound of the outdoor unit will not be lowered if the sound level has dropped low enough at stable condition.

CHAPTER 3. FUNCTION AND OPERATION OF PROTECTIVE PROCEDURES

[1] PROTECTION DEVICE FUNCTIONS AND OPERATIONS

Function		Operation				Self-diagnosis result display	
		Description	Detection period	Reset condition	Indoor unit error display	Indoor unit	Outdoor unit
1	Indoor unit fan lock	Operation stops if there is no input of rotation pulse signal from indoor unit fan motor for 1 minute.	When indoor unit fan is in operation	Operation OFF or ON	☆2	Yes	None
	Indoor unit fan rotation speed error	Operation stops if rotation pulse signal from indoor unit fan indicates abnormally low speed (about 300 rpm or slower).	When indoor unit fan is in operation	Operation OFF or ON	☆2	Yes	None
2	Indoor unit freeze prevention	Compressor stops if temperature remains below 0°C for 4 minutes.	When in cooling or dehumidifying operation	Automatic reset when heat exchanger temperature rises above freeze prevention temperature (2°C or higher)	—	None	None
3	2-way valve freeze prevention	Compressor stops if temperature of outdoor unit 2-way valve remains below 0°C for 10 continuous minutes during cooling or dehumidifying operation.	When in cooling or dehumidifying operation	Automatic reset when temperature of 2-way valve rises above 10°C.	None	Yes	Yes
4	Indoor unit heat exchanger overheat shutdown	Operating frequency lowers if indoor unit heat exchanger temperature exceeds overheat temperature during heating operation. Compressor stops if indoor unit heat exchanger temperature exceeds overheat temperature for 60 seconds at minimum frequency. Overheat temperature setting value indoor unit heat exchanger thermistor temperature: about 45 to 54°C	When in heating operation	Automatic reset after safety period (180 sec).	None	Yes	Yes
5	Outdoor unit heat exchanger overheat shutdown	Operation frequency lowers if outdoor unit heat exchanger temperature exceeds about 55°C during cooling operation. Compressor stops if outdoor unit heat exchanger temperature exceeds about 55°C for 120 seconds at minimum frequency.	When in cooling or dehumidifying operation	Automatic reset after safety period (180 sec).	None	Yes	Yes
6	Compressor discharge overheat shutdown	Operating frequency lowers if temperature of compressor chamber thermistor (TH1) falls below about 110°C. Compressor stops if temperature of compressor chamber thermistor (TH1) remains at about 110°C (for 120 seconds in cooling operation, or 60 seconds in heating operation) at minimum frequency.	When compressor is in operation	Automatic reset after safety period (180 sec).	None	Yes	Yes
7	Dehumidifying operation temporary stop	Compressor stops if outside air temperature thermistor is lower than about 16°C during dehumidifying operation.	When in dehumidifying operation	Automatic reset when outside air temperature rises above 16°C.	None	Yes	Yes
8	DC overcurrent error	Compressor stops if DC current of about 25 A or higher flows in IPM.	When compressor is in operation	Operation OFF or ON	Yes ☆1	Yes	Yes
9	AC overcurrent error	Operating frequency lowers if outdoor AC current exceeds peak control current value. outdoor stops if compressor AC current exceeds peak control current value at minimum frequency.	When compressor is in operation	Operation OFF or ON	Yes ☆1	Yes	Yes

Function		Operation				Self-diagnosis result display	
		Description	Detection period	Reset condition	Indoor unit error display	Indoor unit	Outdoor unit
10	AC overcurrent error in compressor OFF status	Indoor and outdoor units stop if outdoor AC current exceeds about 3 A while compressor is in non-operation status.	When compressor is in non-operation	Replacement of defective parts such as IPM	Yes ☆2	Yes	Yes
11	AC maximum current error	Compressor stops if coutdoor AC current exceeds 17 A.	When compressor is in operation	Operation OFF or ON	Yes ☆1	Yes	Yes
12	AC current deficiency error	Compressor stops if operating frequency is 50 Hz or higher and outdoor AC current is about 2.0 A or lower.	When compressor is in operation	Operation OFF or ON	Yes ☆1	Yes	Yes
13	Thermistor installation error or 4-way valve error	Compressor stops if high and low values of temperatures detected by outdoor unit heat exchanger thermistor (TH2) and 2-way valve thermistor (TH5) do not match operating cycle.	3 minutes after compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
14	Compressor high temperature error	Compressor stops if compressor chamber thermistor (TH1) exceeds about 114☒C, or if there is short-circuit in TH1.	When in operation	Operation OFF or ON	Yes ☆1	Yes	Yes
15	Outdoor unit heat exchanger thermistor short-circuit error	Compressor stops if there is short-circuit in outdoor unit heat exchanger thermistor (TH2).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
16	Outdoor unit outside air temperature thermistor short-circuit error	Compressor stops if there is short-circuit in outdoor unit outside air temperature thermistor (TH3).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
17	Outdoor unit suction thermistor short-circuit error	Compressor stops if there is short-circuit in outdoor unit suction thermistor (TH4).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
18	Outdoor unit 2-way valve thermistor short-circuit error	Compressor stops if there is short-circuit in outdoor unit 2-way valve thermistor (TH5).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
19	Outdoor unit heat exchanger thermistor open-circuit error	Compressor stops if there is open-circuit in outdoor unit heat exchanger thermistor (TH2).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
20	Outdoor unit outside air temperature thermistor open-circuit error	Compressor stops if there is open-circuit in outdoor unit outside air temperature thermistor (TH3).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
21	Outdoor unit suction thermistor open-circuit error	Compressor stops if there is open-circuit in outdoor unit suction thermistor (TH4).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
22	Outdoor unit 2-way valve thermistor open-circuit error	Compressor stops if there is open-circuit in outdoor unit 2-way valve thermistor (TH5).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
23	Outdoor unit discharge thermistor open-circuit error	Compressor stops if there is open-circuit in outdoor unit discharge thermistor (TH1).	At compressor startup	Operation OFF or ON	Yes ☆1	Yes	Yes
24	Serial signal error	Compressor stops if outdoor unit cannot receive serial signal from indoor unit for 30 seconds.	When in operation	Reset after reception of serial signal	None	None	None
25	Compressor startup error	Compressor stops if compressor fails to start up.	At compressor startup	Operation OFF or ON	Yes ☆3	Yes	Yes
26	Compressor rotation error (at 120☒ energizing)	Compressor stops if there is no input of position detection signal from compressor or input is abnormal.	Compressor operating at 120☒ energizing	Operation OFF or ON	Yes ☆3	Yes	Yes
27	Outdoor unit DC fan error	Operation stops if there is no input of rotation pulse signal from outdoor unit fan motor for 30 seconds.	When outdoor unit fan is in operation	Operation OFF or ON	Yes ☆1	Yes	Yes
28	PAM overvoltage error	Compressor stops if DC voltage is 400 V or higher.	When in operation	Operation OFF or ON	Yes ☆1	Yes	Yes

Function		Operation				Self-diagnosis result display	
		Description	Detection period	Reset condition	Indoor unit error display	Indoor unit	Outdoor unit
29	PAM clock error	When power source frequency cannot be determined (at startup), or when power source clock cannot be detected for 1 continuous second (at startup).	At compressor startup, when in operation	Compressor continues operation without stopping.	None	Yes	Yes

☆1—The outdoor unit restarts four times before the indoor unit error is displayed (complete shutdown).

☆2—A single error judgment results in the display of the indoor unit error (complete shutdown).

☆3—The outdoor unit restarts eight times before the indoor unit error is displayed (complete shutdown).

[2] AIR TO AIR HEAT PUMP OPERATION IN THERMISTOR ERROR

1. Indoor unit

Item	Mode	Control operation	When resistance is low (temperature judged higher than actual)	Short-circuit	When resistance is high (temperature judged lower than actual)	Open-circuit
Room temperature thermistor (TH1)	Auto	Operation mode judgment	Cooling mode is activated even if room temperature is low.	Cooling mode is activated in most cases.	Heating mode is activated even if room temperature is high.	Heating mode is always activated.
	Cooling	Frequency control	Room becomes too cold.	Air conditioner operates in full power even when set temperature is reached.	Room does not become cool.	Compressor does not operate.
	Dehumidifying	Room temperature memory Frequency control	Normal operation.	Room temperature is stored in memory as 31.0°C, and compressor does not stop.	Normal operation.	Room temperature is stored in memory as 18.5°C, and compressor does not operate.
	Heating	Frequency control	Room does not become warm.	Hot keep status results immediately after operation starts. Frequency does not increase above 30 Hz (40 Hz).	Room becomes too warm.	Air conditioner operates in full power even when set temperature is reached.
Heat exchanger thermistor (TH2)	Cooling Dehumidifying	Freeze prevention	Indoor unit evaporator may freeze.	Indoor unit evaporator may freeze.	Compressor stops occasionally.	Compressor does not operate.
	Heating	Cold air prevention	Cold air prevention deactivates too soon and cold air discharges.	Compressor operates at low speed or stops, and frequency does not increase.	Cold air prevention deactivates too slow.	Cold air prevention does not deactivate, and indoor unit fan does not rotate.

2. Outdoor unit

Item	Mode	Control operation	When resistance is low (temperature judged higher than actual)	Short-circuit	When resistance is high (temperature judged lower than actual)	Open-circuit
Compressor chamber thermistor (TH1)	Cooling Dehumidifying Heating	Expansion valve control and compressor protection	Compressor operates, but room does not become cool or warm (expansion valve is open).	Compressor high temperature error indication.	Layer short-circuit or open-circuit may result in compressor in normal operation.	Outdoor unit thermistor open-circuit error indication.
Heat exchanger thermistor (TH2)	Cooling Dehumidifying	Outdoor unit heat exchanger overheat prevention	Compressor operates at low speed or stops.	Outdoor unit thermistor short-circuit error indication.	Normal operation.	Outdoor unit thermistor open-circuit error indication.
	Heating	Expansion valve control Defrosting	Defrosting operation is not activated as needed, and frost accumulates on outdoor unit (expansion valve is closed).	Outdoor unit thermistor short-circuit error indication.	Defrosting operation is activated unnecessarily, and room does not become warm (expansion valve is open).	Outdoor unit thermistor open-circuit error indication.
Outside air temperature thermistor (TH3)	Auto	Operation mode judgment	Cooling mode is activated even if room temperature is low.	Outdoor unit thermistor short-circuit error indication.	Heating mode is activated even if room temperature is high.	Outdoor unit thermistor open-circuit error indication.
	Cooling Dehumidifying	Operation not affected	Normal operation.	Outdoor unit thermistor short-circuit error indication.	Normal operation.	Outdoor unit thermistor open-circuit error indication.
	Heating	Rating control Defrosting	Defrosting operation is activated unnecessarily.	Outdoor unit thermistor short-circuit error indication.	Defrosting operation is not activated, and frost accumulates on outdoor unit.	Outdoor unit thermistor open-circuit error indication.
Suction pipe thermistor (TH4)	Cooling Dehumidifying	Expansion valve control	Compressor operates, but room does not become cool (expansion valve is open).	Outdoor unit thermistor short-circuit error indication.	Frost accumulates on evaporator inlet section, and room does not become cool (expansion valve is closed).	Outdoor unit thermistor open-circuit error indication.
	Heating	Expansion valve control	Compressor operates, but room does not become warm (expansion valve is open).	Outdoor unit thermistor short-circuit error indication.	Frost accumulates on expansion valve outlet section, and room does not become warm (expansion valve is closed).	Outdoor unit thermistor open-circuit error indication.
2-way valve thermistor (TH5)	Cooling Dehumidifying	Expansion valve control	Frost accumulates on indoor unit evaporator and room does not become cool (expansion valve is closed).	Outdoor unit thermistor short-circuit error indication.	Compressor operates, but room does not become cool (expansion valve is open).	Outdoor unit thermistor open-circuit error indication.
	Heating	Operation not affected	Normal operation.	Outdoor unit thermistor short-circuit error indication.	Normal operation.	Outdoor unit thermistor open-circuit error indication.

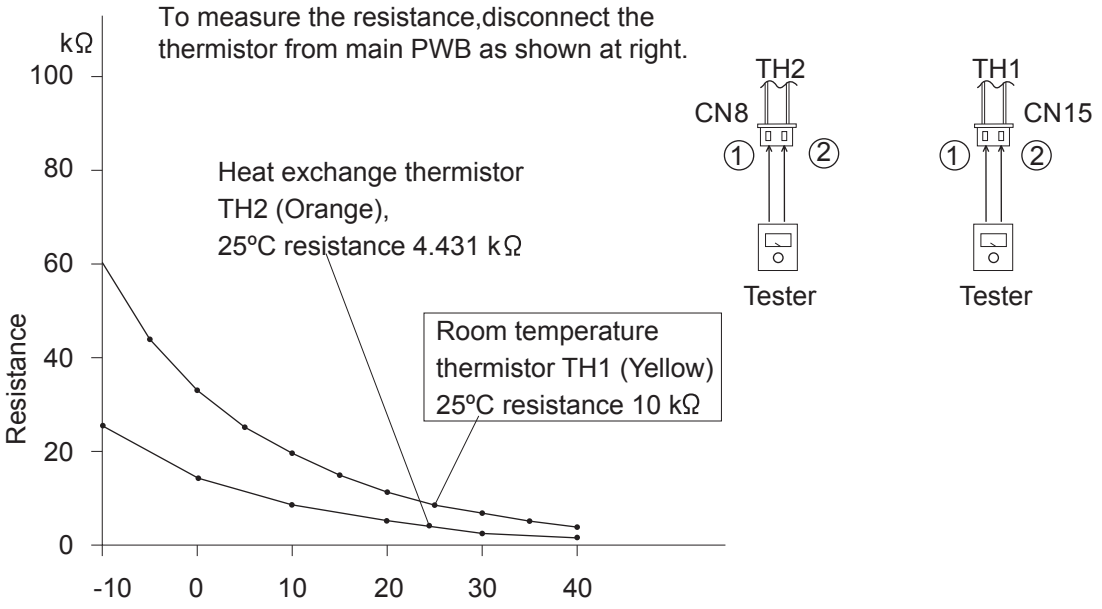
[3] THERMISTOR TEMPERATURE CHARACTERISTICS

1. Indoor unit thermistor temperature characteristics

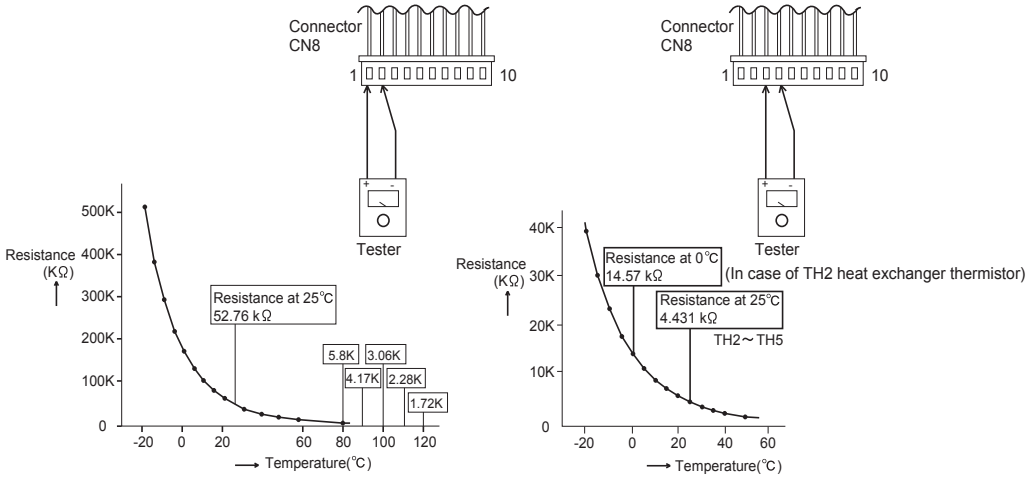
Figure 1 Temperature properties of indoor thermistors

Thermistor	Signal	Color
Room temperature	TH1	Yellow
Heat exchange	TH2	Orange

Room temperature thermistor TH1 CN15 ① - ②)
Heat exchange thermistor TH2 (CN8 ① - ②)



2. Outdoor unit thermistor temperature characteristics



TH1 Compressor thermistor

TH2 Heat exchanger thermistor
TH3 Outdoor air temperature thermistor
TH4 Suction thermistor
TH5 2-way valve thermistor

Thermistor	No.	Connector	Color
Compressor thermistor	TH1	No. (1) - No. (2)	Red
Heat exchanger thermistor	TH2	No. (3) - No. (4)	Orange
Outdoor air temperature thermistor	TH3	No. (5) - No. (6)	Green
Suction thermistor	TH4	No. (7) - No. (8)	Black
2-way valve thermistor	TH5	No. (9) - No. (10)	Yellow

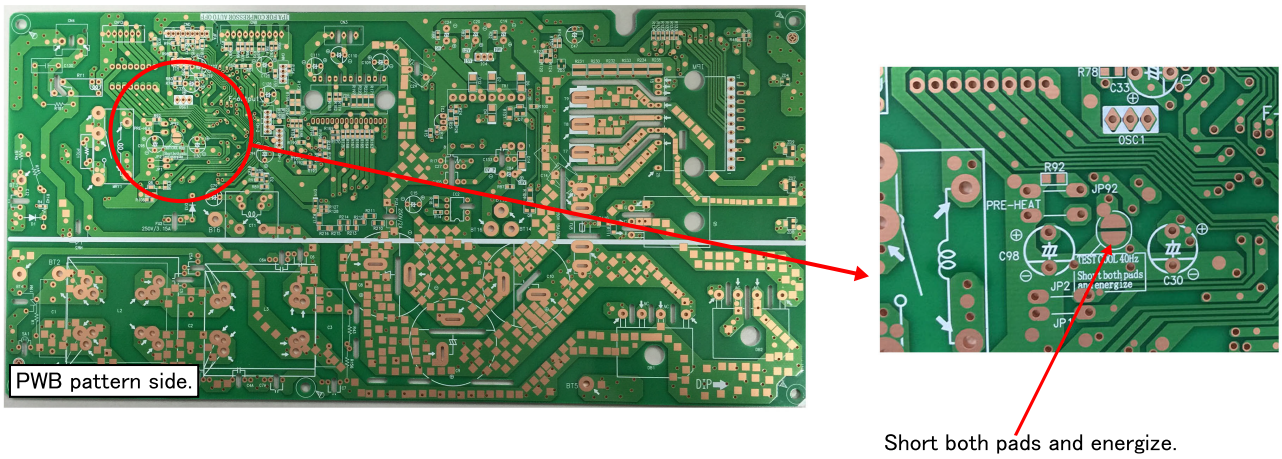
Before measuring resistance, disconnect connectors from PWB.

[4] HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

1. Cooling in 40 Hz fixed mode

To operate the outdoor unit independently, short-circuit the sections indicated by arrows in the diagram below with an adapter, and apply 220-240 VAC between (1) and (N) on the terminal board of the outdoor unit. This allows the outdoor unit to be operated in cooling mode independently.

(Do not operate the outdoor unit in this condition for an extended period of time.)



[5] GENERAL TROUBLESHOOTING CHART

1. Indoor unit does not turn on

Main cause	Inspection method	Normal value/condition	Remedy
Cracked PWB. (Cracked pattern)	Check visually.	There should be no cracking in PWB or pattern.	Replace PWB.
Open-circuit in FU1 (250 V, 3.15 A)	Check melting of FU1.	There should be no open-circuit.	Replace PWB.

2. Indoor unit fan does not operate

Main cause	Inspection method	Normal value/condition	Remedy
Open-circuit in heat exchanger thermistor (TH2) (in heating operation)	Measure thermistor resistance (dismount for check).	CN8(1)–(2)	Replace thermistor.
		There should be no open-circuit or faulty contact.	Replace thermistor.
Disconnected heat exchanger thermistor (TH2) (in heating operation)	Inspect connector on PWB. Check thermistor installation condition.	Thermistor should not be disconnected.	Install correctly.

3. Indoor unit fan speed does not change

Main cause	Inspection method	Normal value/condition	Remedy
Remote control is not designed to allow fan speed change in several operation mode.	Check operation mode.	Fan speed should change except during dehumidifying operation, ventilation, light dehumidifying operation, internally normal operation	Explain to user.

4. Remote control signal is not received

Main cause	Inspection method	Normal value/condition	Remedy
Batteries at end of service life.	Measure battery voltage.	2.5 V or higher (two batteries in series connection)	Install new batteries.
Batteries installed incorrectly.	Check battery direction.	As indicated on battery compartment.	Install batteries in indicated direction.
Lighting fixture is too close, or Fluorescent lamp is flickering in the room.	Turn off light and check.	Signal should be received when light is turned off.	Change light position or install new fluorescent lamp.
Sevick light (Hitachi) is used in the room.	Check room lights.	Signal may not be received sometimes due to effect of Sevick light.	Replace light or change position.
Operating position/angle are inappropriate.	Operate within range specified in manual.	Signal should be received within range specified in manual.	Explain appropriate handling to user.

Main cause	Inspection method	Normal value/condition	Remedy
Open-circuit or short-circuit in wiring of light receiving section.	Check if wires of light receiving section are caught.	Wires of light receiving section should not have any damage caused by pinching.	Replace wires of light receiving section.
Light receiving unit is defective	Check signal receiving circuit (measure voltage between terminals 8 and 10, 9 and 10 of connector CN17).	Tester indicator should move when signal is received.	Replace PWB.
Dew condensation on light receiving unit.	Check for water and rust.	Signal should be received within range specified in manual.	Take moisture-proof measure for lead wire outlet of light receiving section.

5. Louvers do not move

Main cause	Inspection method	Normal value/condition	Remedy
Caught in sliding section.	Operate to see if louvers are caught in place.	Louvers should operate smoothly.	Remove or correct catching section.
Disconnected connector (CN7) on PWB,	Inspect connectors.	Connectors or pins should not be disconnected.	Install correctly.
Contact of solder on PWB (connector section on PWB)	Check visually.	There should not be solder contact.	Correct contacting section.

6. There is noise in TV/radio

Main cause	Inspection method	Normal value/condition	Remedy
Grounding wires not connected properly.	Check grounding wire connections.	Grounding wires should be connected properly.	Connect grounding wires properly.
TV/radio is placed too close to outdoor unit.	Check distance between TV/radio and outdoor unit.	If TV/radio is placed too close, it may become affected by noise.	Move TV/radio away from outdoor unit.
Other than above.	Check for radio wave interference.		

7. Malfunction occurs

Main cause	Inspection method	Normal value/condition	Remedy
Malfunction caused by noise.	Check for radio wave interference.		

8. Compressor does not start

Main cause	Inspection method	Normal value/condition	Remedy
Erroneous inter-unit connection.	Check wiring between indoor and outdoor units.	Terminal board 1-N: 220-240 VAC, 50 Hz Terminal board 2: serial signal	Correct wiring.
Damaged IPM.	Check IPM continuity.	See [IPM check method] on page 3-10	Replace IPM.
Dried-up electrolytic capacitor.	Check electrolytic capacitor.	See [Inverter electrolytic capacitor (C8,C9) check method] on page 3-9	Replace electrolytic capacitor.
Blown outdoor unit fuse.	Check 20A fuse. Check 15A fuse.	Fuse should not be blown.	Replace fuse/diode bridge. Replace fuse. Replace outdoor unit PWB assembly.
Power supply voltage is too low.	Measure power supply voltage during startup.	230±10 VAC, 50 Hz	Make sure that power supply voltage is 200 V or higher.
Compressor lock.	Supply current and touch compressor cover (sound absorbing material) to check if operation starts.	Compressor should start normally.	Apply external impact to compressor. Replace compressor.
•Temp. fuse of terminal is error •EEEPROM error •AC Over current error	See (Diagnosis Function and display mode) on page 3-13	Malfunction display section (0-0) Compressor should start normally.	•Replace terminal •Replace outdoor unit PWB •Replace outdoor unit PWB

9. Operation stops after a few minutes and restarts, and this process repeats

Main cause	Inspection method	Normal value/condition	Remedy
Dried-up electrolytic capacitor.	Measure 320VDC line voltage.	300 V or higher.	Replace electrolytic capacitor.
Layer short-circuit in expansion valve coil.	Measure resistance.	46±3Ω in each phase (at 20°C)	Replace coil.

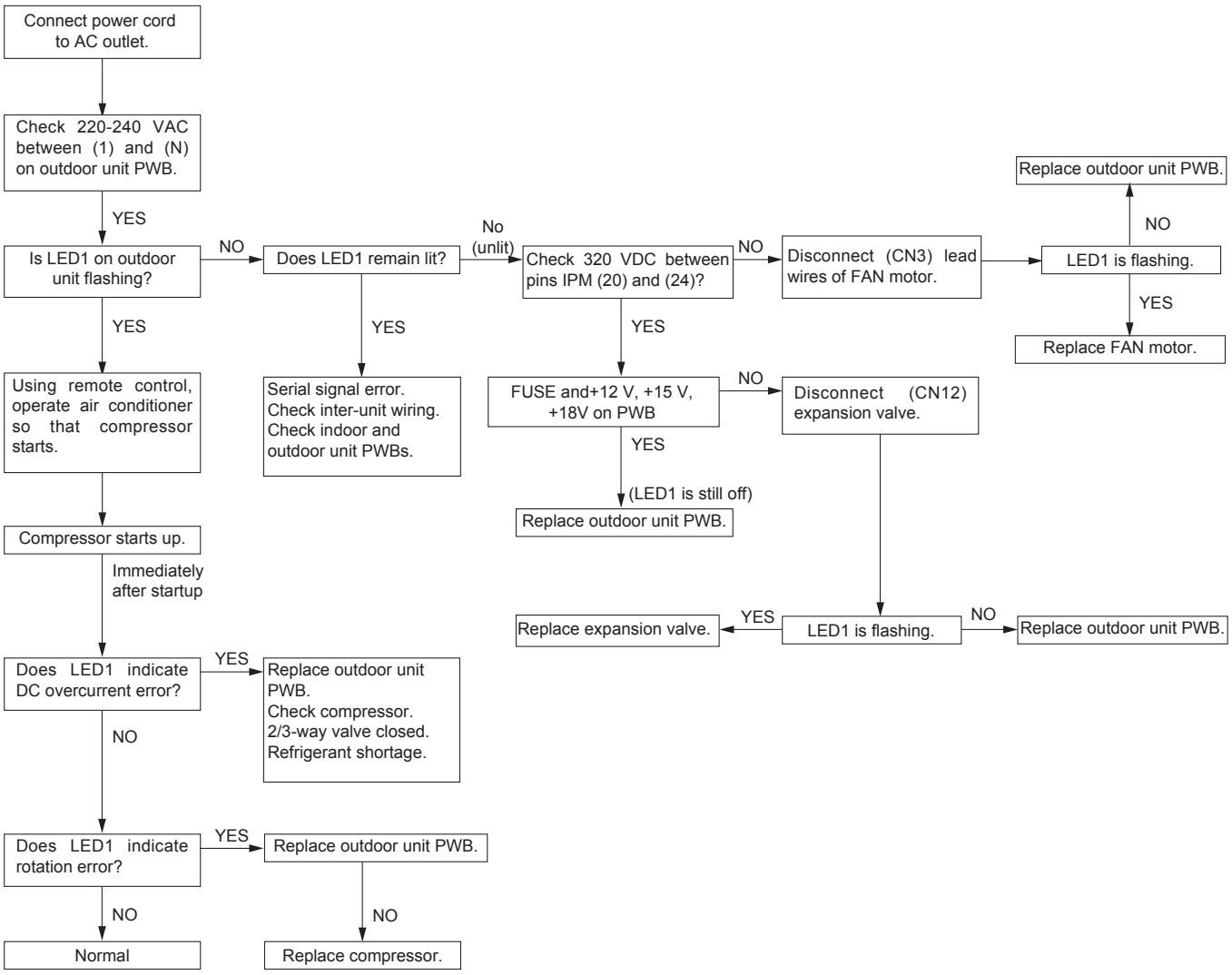
CAUTION: If fuse FU1/FU5 (outdoor unit control circuit board) is blown, be careful of charging voltage in inverter electrolytic capacitor C8, C9.

To discharge stored electricity, unplug the power cord and connect the plug of a soldering iron (230VAC, 50W) between the positive and negative terminals of inverter electrolytic capacitor C8, C9.

[6] MALFUNCTION (PARTS) CHECK METHOD

1. Procedure for determining defective outdoor unit IPM/compressor

The following flow chart shows a procedure for locating the cause of a malfunction when the compressor does not start up and a DC overcurrent indication error occurs.

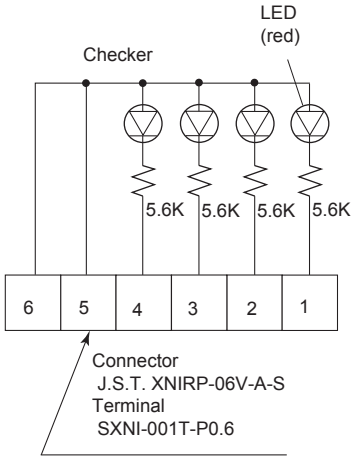


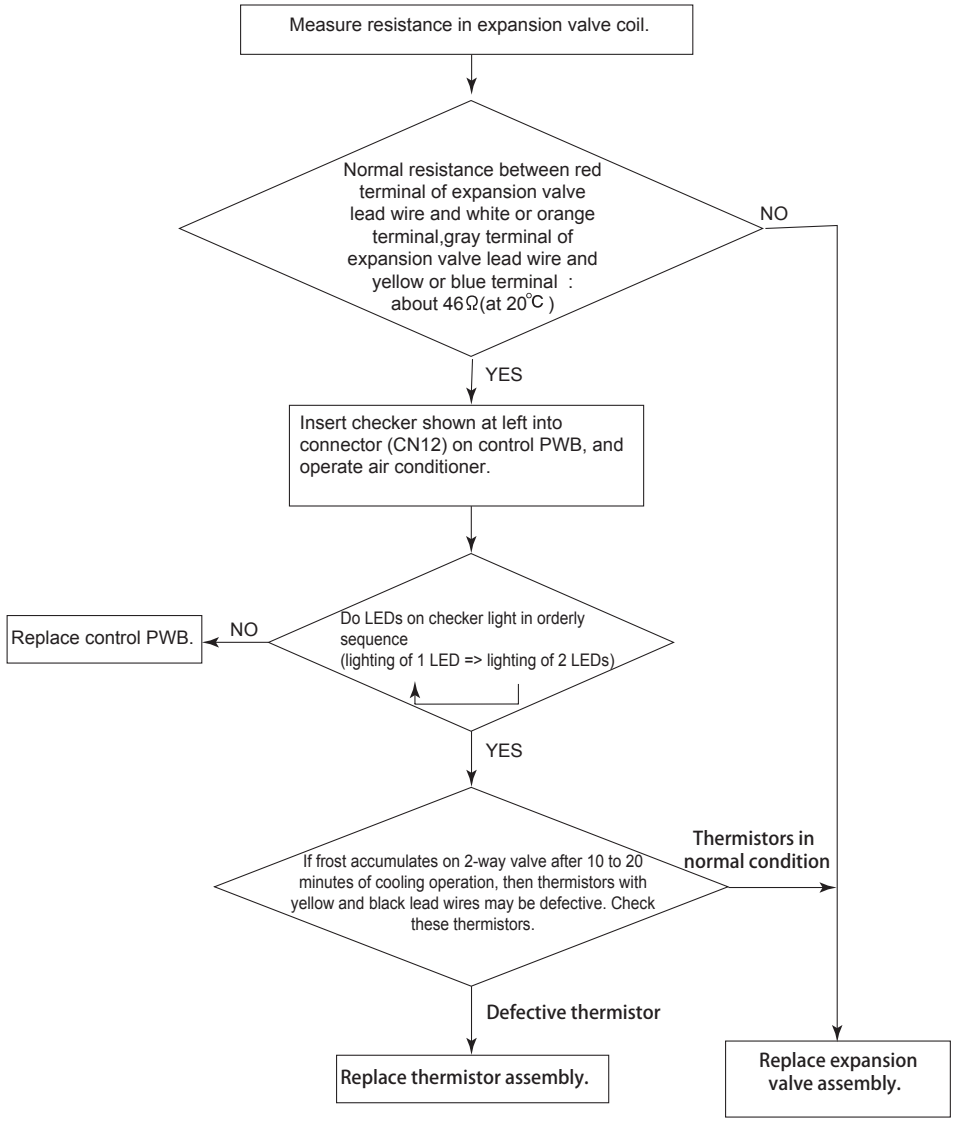
CAUTION: Please take care for electrical shock when you work to change defective parts or disconnect wires of defective application.

The outdoor unit has energy changed for a while even after unplugging the power supply cord.

After changing the part or unit, please retry check procedure from the beginning.

2. Procedure for determining defective expansion valve

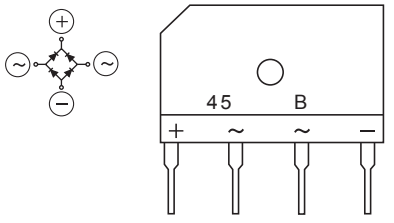




3. Diode bridge check method

Turn off the power and let the inverter electrolytic capacitor (C8, C9) discharge completely. Then use a tester and check cont inuity.

When using a digital tester, the (+) and (-) tester lead wires in the table must be reversed.



Needle-type tester		Normal resistance value
+	−	
~	+	∞ (several MΩ)
−	~	

Value in ( ) is for digital tester.

4. Inverter electrolytic capacitor (C8, C9) check method

Turn off the power, let the inverter electrolytic capacitor (C8, C9) discharge completely, and remove the capacitor from the c ontrol printed circuit board (PWB). First, check the case for cracks, deformation and other damages. Then, using a needle-type tester, check continuity.

Determination of normal condition
The tester needle should move on the scale and slowly returns to the original position. The tester needle should move in the same way when polarities are reversed. (When measurement is taken with the polarities reversed, the tester needle exceeds the scale range. Therefore, let the capacitor discharge before measurement.)

5. IPM check method

Turn off the power, let the large capacity electrolytic capacitor (C10) discharge completely, and dismount the IPM. Then, using a tester, check leak current between C and E.

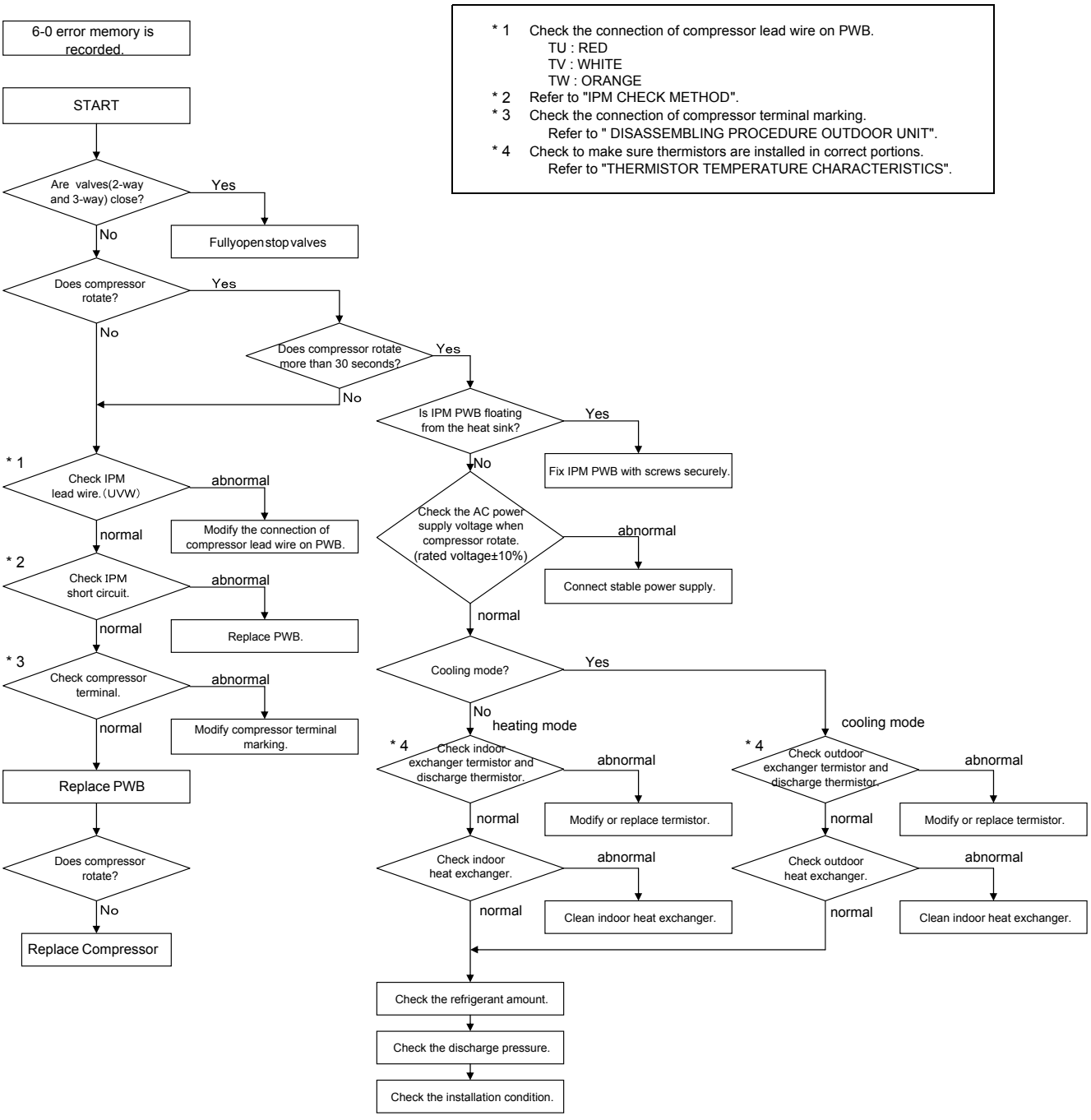
When using a digital tester, the (+) and (-) tester lead wires in the table must be reversed.

Needle-type tester		Normal resistance value
(-)	(+)	
P	N	∞ (several MΩ)
	U	
	V	
	W	

Needle-type tester		Normal resistance value
(-)	(+)	
U	N	∞ (several MΩ)
V		
W		

Values in ( ) are for digital tester.

6. DC Over Current Error (6-0 error)



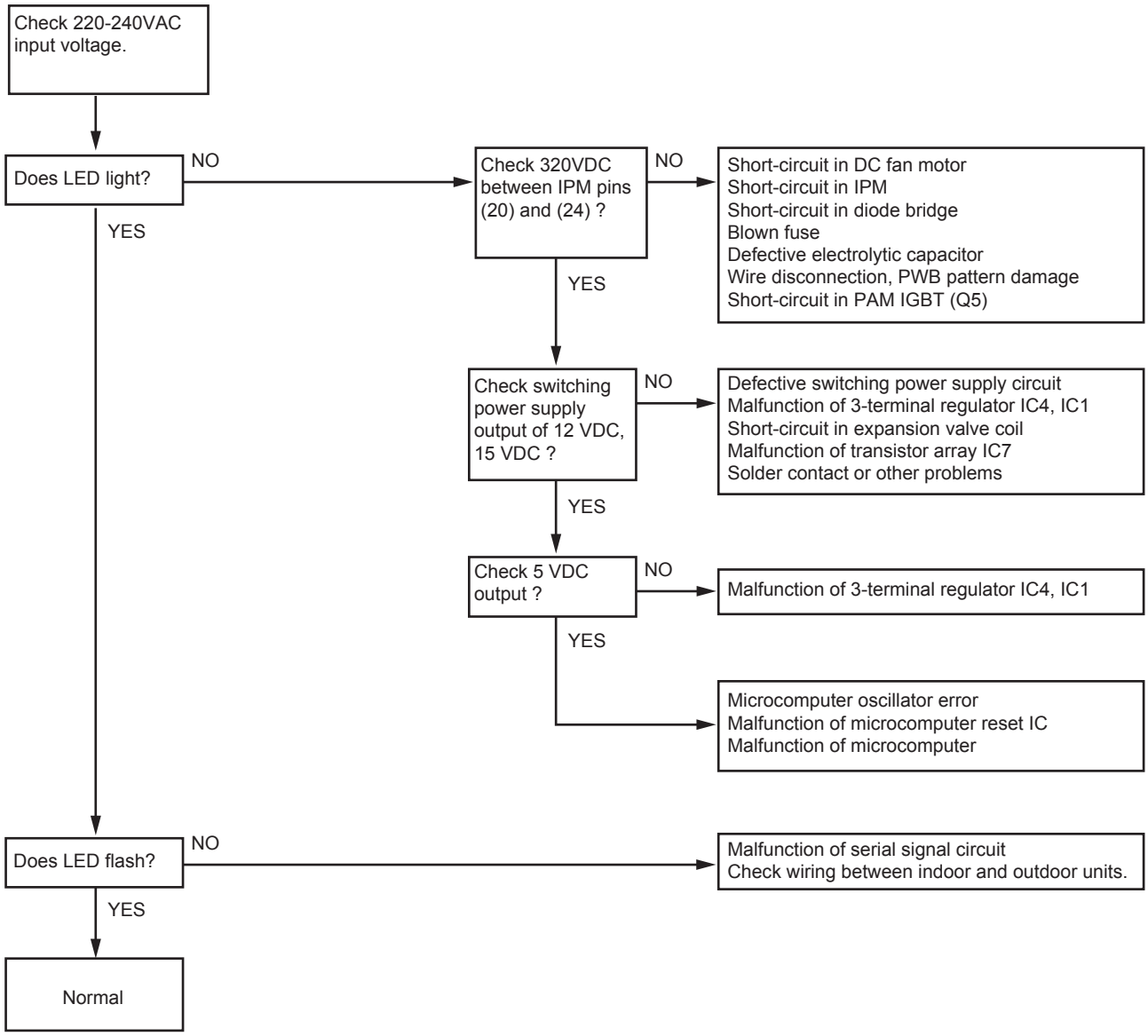
[7] OUTDOOR UNIT CHECK METHOD

After repairing the outdoor unit, conduct the following inspection procedures to make sure that it has been repaired completely. Then, operate the compressor for a final operation check.

1. Checking procedures

No.	Item	Check method	Normal value/condition	Remedy
1	Preparation	Disconnect compressor cords (white, orange, red: 3 wires) from compressor terminals, and connect simulated load (lamp used as load). Operate air conditioner in cooling or heating test operation mode.		
2	Inverter DC power supply voltage check	Measure DC voltage between IPM pins (20) and (24).	320 VDC	Replace control PWB. Replace diode bridge. Correct soldered section of Fasten tabs (BT1,2,3,4,5,6) on control PWB. Repair solder cracks.)
3	IPM circuit check	Check that 3 lamps (load) light. Check position detection voltage (+15 V, 5 V) on control PWB.	Each voltage should be normal. All 3 lamps (load) should light with same intensity.	Replace control PWB.
4	Compressor check	Measure compressor coil resistance (for each phase of U, V and W). Use multi-meter or digital tester capable of displaying two digits right of the decimal point (0.01Ω).	Resistance value at 20°C --- 0.65Ω	Correct connections at compressor terminals. Replace compressor.
5	Expansion valve check	Measure expansion valve coil resistance.	Each phase 46±3Ω (at 20°C)	Replace expansion valve.
6	Final check	Turn off power, and connect compressor cords to compressor. Operate air conditioner. Measure DC voltage between IPM pins (20) and (24).	Compressor should operate normally. 320 VDC or higher.	Replace control PWB. Replace outdoor unit thermistor. Replace compressor (in case of compressor lock).

2. Troubleshooting of outdoor unit electric components



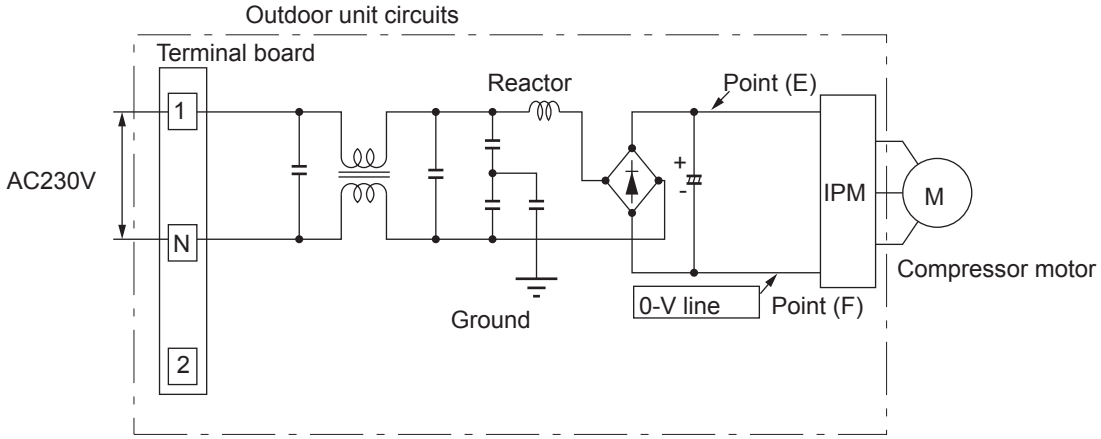
3. Caution in checking printed circuit boards (PWB)

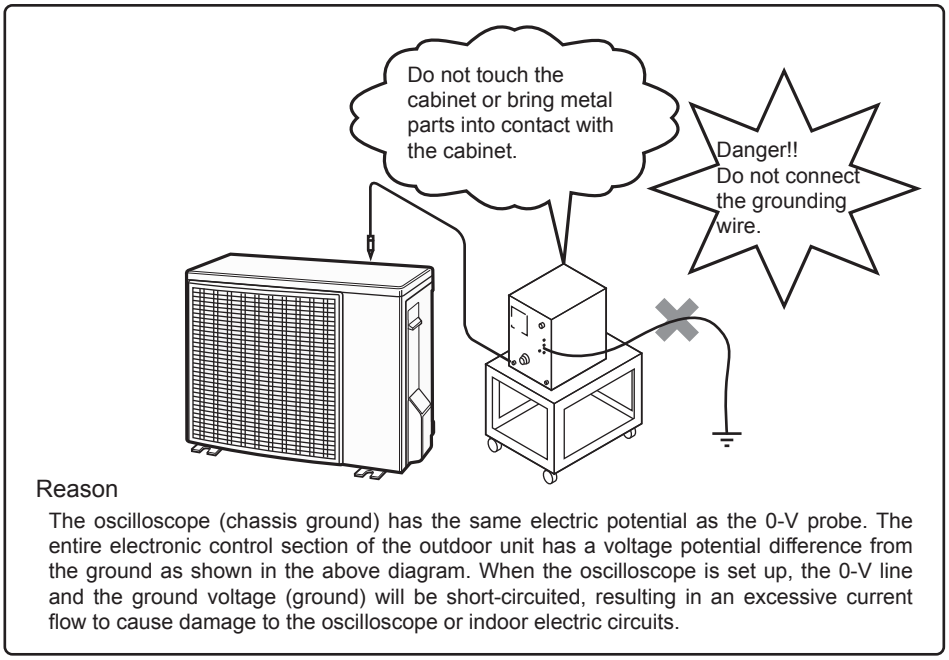
3.1. Non-insulated control circuit

The GND terminals of the low-voltage circuits (control circuits for microcomputer and thermistors and drive circuits for expansion valve and relays) on the control printed circuit board (PWB) are connected to the compressor drive power supply (320-VDC negative terminal). Therefore, exercise utmost caution to prevent electric shock.

If a measuring instrument used for the test is grounded, its chassis (ground) has the same electric potential as the 0-V probe. Since non-insulated circuits have the following voltage potential difference from the ground, connection of the grounding wire results in a short-circuit between the 0-V line and the ground, thus allowing an excessive current to flow to the tester to cause damage.

If the sheaths of the thermistor lead wires or expansion valve lead wires inside the outdoor unit become damaged due to pinching by the front panel or other metal parts or contacting a pipe, a high voltage can flow and destroy the circuits. To prevent these problems, carefully conduct assembly work.





Reason

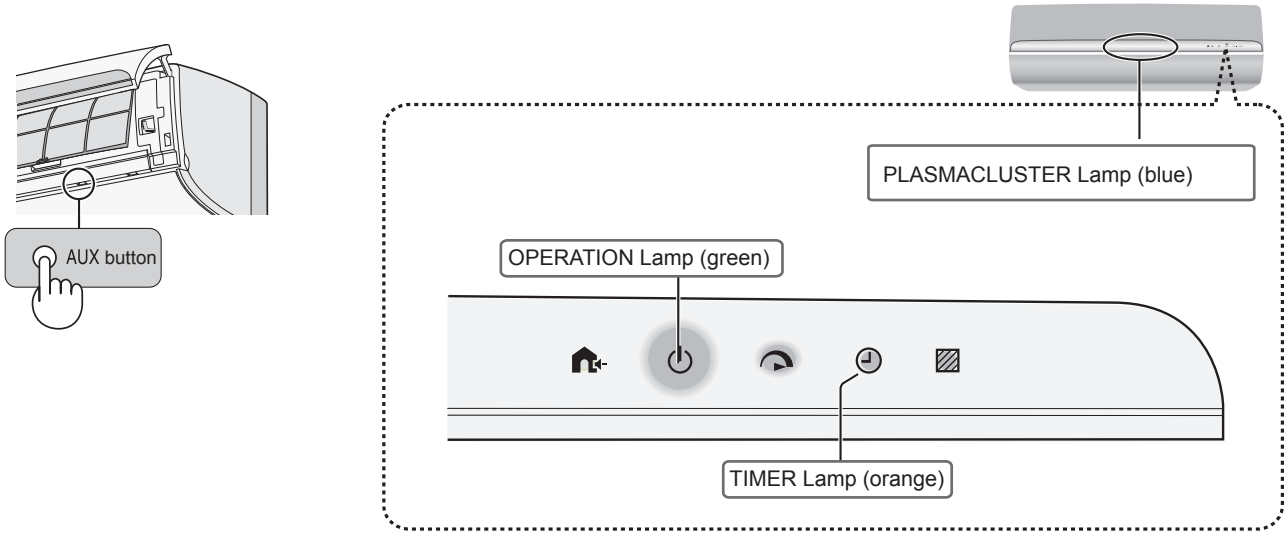
The oscilloscope (chassis ground) has the same electric potential as the 0-V probe. The entire electronic control section of the outdoor unit has a voltage potential difference from the ground as shown in the above diagram. When the oscilloscope is set up, the 0-V line and the ground voltage (ground) will be short-circuited, resulting in an excessive current flow to cause damage to the oscilloscope or indoor electric circuits.

[8] TROUBLESHOOTING GUIDE

1. Self-Diagnosis Function

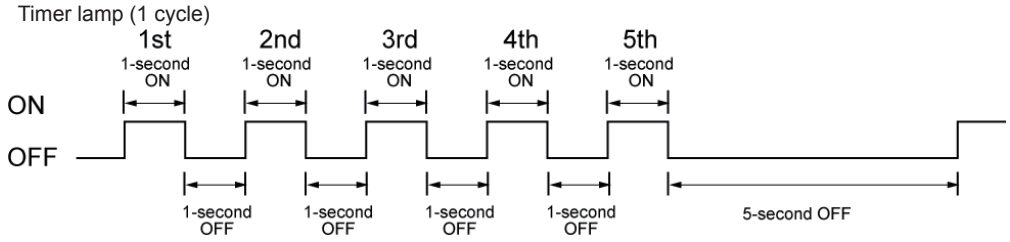
1. Indoor unit

- To display the self-diagnosis, hold down the AUX button for over 5 seconds on the indoor unit when the indoor unit is not operating.
- The operation lamp (green), timer lamp (orange) and Plasmcluster lamp (blue) flash to indicate the information of mulfunction.
- If the power cord is unplugged or the circuit breaker is turned off, the self-diagnosis memory is lost.



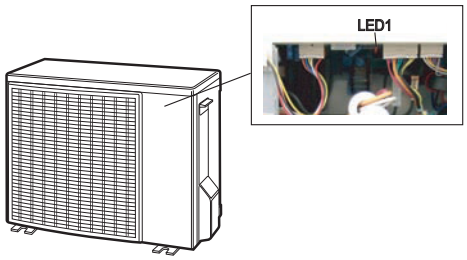
Display of self-diagnosis result

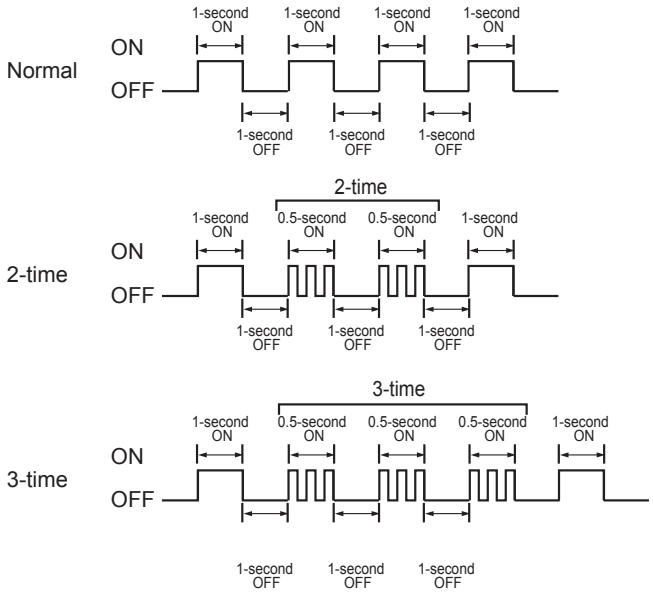
The operation lamp (green) and the Plasmacluster lamp (blue) flash in synchronization with the timer lamp (orange).



2. Outdoor unit

- The self-diagnosis is indicated the error information by flashing LED1 on the outdoor unit.
- The self-diagnosis of outdoor unit is displayed for about 3-10 minutes. Then, the LED1 returns to normal display.





<INDOOR UNIT> O:1-second ON / 1-second OFF

Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Normal condition	Normal blinking	○	○	○	○	○	Timer (Orange)	0	0	Normal			
							Operation(green)						
							Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	1-time	○	○	○	○	○	Timer (Orange)	1	0	Outdoor unit thermistor short-circuit	Heat exchanger thermistor short circuit error	(1) Measure the resistance of the outdoor unit thermistors.	(1) Replace the outdoor unit thermistor assembly.
						○	Operation(green)						
							Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		1		Outdoor temperature thermistor short circuit error	(2) Check the lead wire of the outdoor unit thermistor for torn sheath and shortcircuit.	(2) Replace the outdoor unit thermistor assembly.
						○	Operation(green)						
						○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		2		Suction thermistor short circuit error	(3) No abnormality found in above inspections (1) and (2).	(3) Replace the outdoor unit control PWB assembly.
						○	Operation(green)						
					○		Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		3		2-way valve thermistor short circuit error		
						○	Operation(green)						
					○	○	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	2-time	○	○	○	○	○	Timer (Orange)	2	0	Cycle temperature	Compressor high temperature error	(1) Check the outdoor unit air outlet for blockage.	(1) Ensure unobstructed air flow from the outdoor unit air outlet.
					○		Operation(green)						
							Plasmacluster (Blue)					(2) Check if the power supply voltage is AC 230V at full power.	(2) Connect power supply of proper voltage.
												(3) Check the pipe connections for refrigerant leaks.	(3) Charge the specified amount of refrigerant.
												(4) Measure resistance of the outdoor unit compressor thermistor.	(4) Replace the outdoor unit compressor thermistor assembly.
												(5) Check the expansion valve for proper operation.	(5) Replace the expansion valve coil, expansion valve or outdoor unit control PWB assembly.
Indoor unit operates. Outdoor unit does not operate temporarily.		○	○	○	○	○	Timer (Orange)		1		Compressor discharge overheat.	(Temporary stop for cycle protection)	-
					○		Operation(green)						
						○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		2		Outdoor unit heat exchanger overheat.	(Temporary stop for cycle protection)	-
					○		Operation(green)						
					○		Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		3		Indoor unit heat exchanger overheat.	(Temporary stop for cycle protection)	-
					○		Operation(green)						
					○	○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		4		IPM high temperature error	(Temporary stop for cycle protection)	-
					○		Operation(green)						
				○			Plasmacluster (Blue)						
Indoor and outdoor units do not operate.		○	○	○	○	○	Timer (Orange)		5		IPM high temperature error	(1) Measure resistance of the heat-sink thermistor.	(1) Replace the outdoor unit PFCM PWB or control PWB assembly or change the heat-sink thermistor.
					○		Operation(green)						
				○		○	Plasmacluster (Blue)						

Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor unit operates. Outdoor unit does not operate temporarily.	3-time	○	○	○	○	○	Timer (Orange)	3	0	Dry operation	Temporary stop due to dehumidifying operation	(Temporary stop for cycle protection)	-
					○	○	Operation(green)						
							Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	5-time	○	○	○	○	○	Timer (Orange)	5	0	Outdoor unit thermistor open-circuit	Heat exchanger thermistor open circuit error	(1) Check connector of the outdoor unit thermistor for secure installation.	(1) Correct the installation.
				○		○	Operation(green)						
							Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		1		Outdoor temperature thermistor open circuit error	(2) Measure resistance of outdoor thermistors.	(2) Replace the outdoor unit thermistor assembly.
				○		○	Operation(green)						
						○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		2		Suction thermistor open circuit error	(3) Check the lead wires of thermistors on the outdoor unit control PWB for open-circuit.	(3) Replace the outdoor unit thermistor assembly.
				○		○	Operation(green)						
					○		Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		3		2-way valve thermistor open circuit error.	(4) No abnormality found in above inspections (1) through (3).	(4) Replace the outdoor unit control PWB assembly.
				○		○	Operation(green)						
					○	○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		4		Discharge thermistor open circuit error		
				○		○	Operation(green)						
				○			Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		5		Heat sink thermistor open circuit error		
				○		○	Operation(green)						
				○		○	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	6-time	○	○	○	○	○	Timer (Orange)	6	0	Outdoor unit DC Current	DC over current error	Go to “DC Over Current Error (6-0 error)”.	
				○	○		Operation(green)						
							Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		1		IPM pin level error	(1) Check the IPM is attached correctly to the outdoor unit IPM PWB.	(1) Replace the outdoor unit IPM PWB assembly.
				○	○		Operation(green)						
						○	Plasmacluster (Blue)						

Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor and outdoor units do not operate.	7-time	○	○	○	○	○	Timer (Orange)	7	0	Outdoor unit AC Current	AC over current error	(1) Check the outdoor unit air outlet for blockage.	(1) Ensure unobstructed air flow from the outdoor unit air outlet.
				○	○	○	Operation(green)						
							Plasmacluster (Blue)					(2) Check the outdoor unit fan for proper rotation.	(2) Check the outdoor unit fan motor.
		○	○	○	○	○	Timer (Orange)		1		AC current error when OFF	(1) IPM continuity check	(1) Replace the outdoor IPM PWB
				○	○	○	Operation(green)						
						○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		2		AC maximum current error	(1) Check the outdoor unit air outlet for blockage.	(1) Ensure unobstructed air flow from the outdoor unit air outlet.
				○	○	○	Operation(green)						
					○		Plasmacluster (Blue)					(2) Check the outdoor unit fan for proper rotation.	(2) Check the outdoor unit fan motor.
		○	○	○	○	○	Timer (Orange)		3		AC current deficiency error	(1) Check if there is an open-circuit in the secondary winding of the current transformer of the outdoor unit control PWB.	(1) Replace the outdoor unit control PWB assembly.
				○	○	○	Operation(green)						
					○	○	Plasmacluster (Blue)					(2) Check if the refrigerant volume is abnormally low.	(2) Charge the specified amount of refrigerant.
												(3) Check if the refrigerant flows properly.	(3) Correct refrigerant clogs. (Stop valve, pipe, expansion valve)
Indoor and outdoor units do not operate.	8-time	○	○	○	○	○	Timer (Orange)	8	0	Abnormal wire check	Abnormal wire check error	(1) Check the expansion valve. (unit A - C)	(1) Replace the outdoor control board assembly.
			○				Operation(green)						
							Plasmacluster (Blue)					(2) Are four expansion valves connected by mistake	(2) Reattach
												(3) Check the wiring between units.	(3) Check the wiring between units.

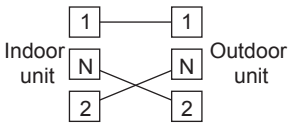
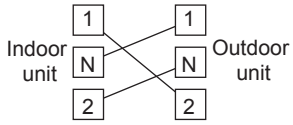
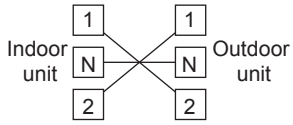
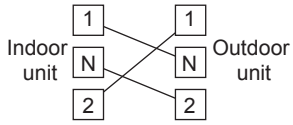
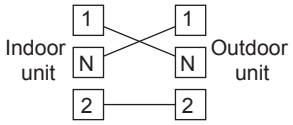
Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor and outdoor units do not operate.	9-time	○	○	○	○	○	Timer (Orange)	9	0	Cycle temperature	Thermistor installation error or 4-way valve error.	(1) Check the thermistor (heat exchanger) and (2-way valve) are installed in correct positions.	(1) Correct the installation.
			○			○	Operation(green)						
							Plasmacluster (Blue)					(2) Check resistance of thermistors (heat exchanger and 2-way valve).	(2) Change the specified amount of refrigerant.
												(3) Check the 4-way valve for proper operation.	(3) Replace the 4-way valve.
												(4) No abnormality found in above inspections (1) through (3).	(4) Replace the outdoor unit control PWB assembly.
Indoor and outdoor units do not operate.		○	○	○	○	○	Timer (Orange)		4		4 way valve error or Gas leak error	(1) Check the indoor/outdoor heat exchanger thermistors are installed in correct positions.	(1) Correct the installation.
			○			○	Operation(green)						
				○			Plasmacluster (Blue)					(2) Check if the refrigerant volume is abnormally low.	(2) Change the specified amount of refrigerant.
												(3) Check the 4-way valve for proper operation.	(3) Replace the 4-way valve.
Indoor and outdoor units do not operate.	10-time	○	○	○	○	○	Timer (Orange)	10	0	EEPROM error	EEPROM (outdoor) data error	-	(1) Replace the outdoor unit control PWB assembly.
			○		○		Operation(green)						
							Plasmacluster (Blue)						
Indoor and outdoor units do not operate.		○	○	○	○	○	Timer (Orange)		1		EEPROM (outdoor) data error		
			○		○		Operation(green)						
						○	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.		○	○	○	○	○	Timer (Orange)		2		CPU (outdoor) RAM data error		
			○		○		Operation(green)						
					○		Plasmacluster (Blue)						

Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor and outdoor units do not operate.	11-time	○	○	○	○	○	Timer (Orange)	11	0	Outdoor unit DC fan	Outdoor unit DC fan rotation error	(1) Check connector CN3 of the outdoor unit DC fan motor for secure installation.	(1) Correct the installation.
			○		○	○	Operation(green)						
							Plasmacluster (Blue)						
												(2) Check the outdoor unit fan motor for proper rotation.	(2) Replace the outdoor unit fan motor.
												(3) Check fuse FUSE5.	(3) Replace the outdoor unit control PWB assembly.
												(4) No abnormality found in above inspections (1) through (3).	(4) Replace the outdoor unit control PWB assembly.
		○	○	○	○	○	Timer (Orange)		1		Outdoor unit DC fan drive IC error	(1) Check if the fan IPM terminal resistance values are uniform.	(1) Replace the outdoor unit control PWB assembly.
			○		○	○	Operation(green)						
						○	Plasmacluster (Blue)						
												(2) Outdoor unit fan motor continuity check.	(2) Replace the outdoor unit fan.
		○	○	○	○	○	Timer (Orange)		2		Outdoor unit DC fan lock error	(1) Check the outdoor unit fan motor for proper rotation.	(1) Replace the outdoor unit control PWB assembly.
			○		○	○	Operation(green)						
					○		Plasmacluster (Blue)					(2) (1):Normal	(2) Replace the outdoor unit fan.
		○	○	○	○	○	Timer (Orange)		3		Detection error of DC fan negative rotation before compressor is driven	(1) (Temporary stop for DC fan circuit protection)	-
			○		○	○	Operation(green)						
					○	○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		4		Detection error of inverter current for DC fan	-	(1) Replace the outdoor unit control PWB assembly.
			○		○	○	Operation(green)						
				○			Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		5		Outdoor unit DC fan open connector error	(1) Check connector CN3 of the outdoor unit DC fan motor for secure installation.	(1) Correct the installation.
			○		○	○	Operation(green)						
				○		○	Plasmacluster (Blue)						
												(2) No abnormality found in above inspections (1).	(2) Replace the outdoor unit control PWB assembly.
Indoor and outdoor units do not operate.	12-time	○	○	○	○	○	Timer (Orange)	12	0	Thermal fuse in terminal board	Thermal fuse error in terminal board (for power supply)	(1) Check the thermal fuse in terminal board (for Power supply)	(1) Replace terminal board for Power supply
			○	○			Operation(green)						
							Plasmacluster (Blue)						
												(2) Check connector CN5 of the outdoor unit.	(2) Correct the installation.
												(3) No abnormality found in above inspections (1) and (2).	(3) Replace the outdoor unit control PWB assembly.

Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor and outdoor units do not operate.	13-time	○	○	○	○	○	Timer (Orange)	13	0	DC compressor	Compressor startup error	(1) Check the colors (red, white, orange) of the compressor cords for proper connection. (PWB side, compressor side)	(1) Correct the installation. (U: Red, V: White, W: Orange)
			○	○		○	Operation(green)						
							Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		1		Compressor rotation error. (at 120o energizing)	(2) Check if the IPM terminal resistance values are uniform.	(2) Replace the outdoor unit control PWB assembly.
			○	○		○	Operation(green)						
						○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		2		Compressor rotation error (at 180o energizing)	(3) Check if outdoor main relay (MRY1) turns on and voltage of both end of the condenser (C10) has become DC290-330V.	(3) Replace the outdoor unit control PWB assembly.
			○	○		○	Operation(green)						
					○		Plasmacluster (Blue)						
												(4) No abnormality found in above inspections (1) through (3).	(4) Replace the compressor.
Indoor and outdoor units operate.		○	○	○	○	○	Timer (Orange)		3		Detection error of inverter current.	(1) Check the circuit of detection of inverter current.	(1) Replace the outdoor unit control PWB assembly.
			○	○		○	Operation(green)						
					○	○	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	14-time	○	○	○	○	○	Timer (Orange)	14	0	Outdoor unit PAM	PAM over voltage error	(1) Check the AC power supply voltage for fluctuation.	(1) Correct the installation.
			○	○	○		Operation(green)						
							Plasmacluster (Blue)						
												(2) No abnormality found in above inspection.	(2) Replace the PWB assembly.
		○	○	○	○	○	Timer (Orange)		1		PAM clock error	(1) Check the PAM clock for proper input.	(1) Replace the outdoor unit control PWB assembly.
			○	○	○		Operation(green)						
						○	Plasmacluster (Blue)						
		○	○	○	○	○	Timer (Orange)		2		PAM under voltage error	(1) Check the AC power supply voltage for fluctuation.	(1) Correct the installation.
			○	○	○		Operation(green)						
					○		Plasmacluster (Blue)						
												(2) No abnormality found in above inspection.	(2) Replace the PWB assembly.

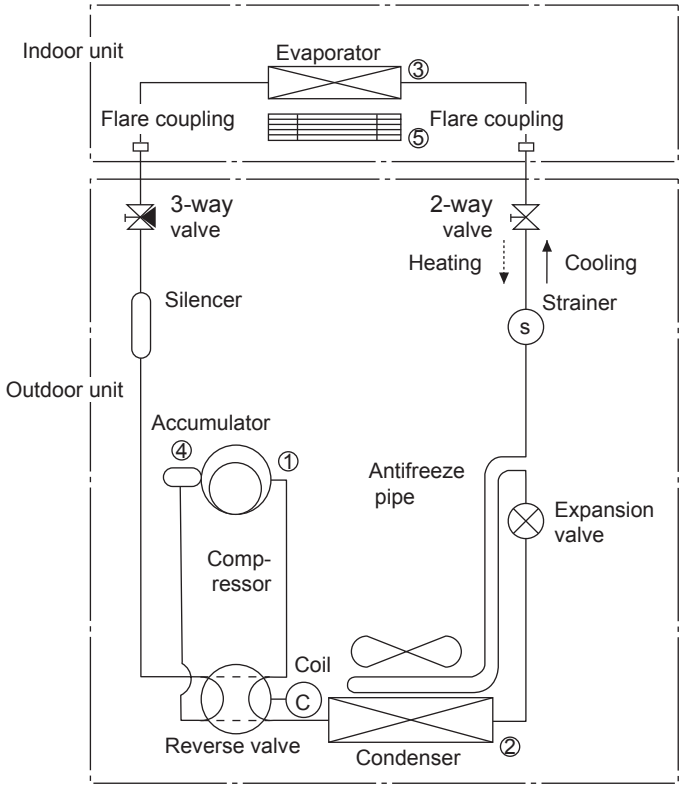
Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor unit operates. Outdoor unit does not operate.	Lighting or OFF	○	○	○	○	○	Timer (Orange)	17	0	Wiring between units	Serial open-circuit	(1) Check the wires between units.	(1) Connect stable power supply. Correct the wiring.
		○				○	Operation(green)						
							Plasmacluster (Blue)					(2) Check voltage between N and 1 the indoor/outdoor unit terminal boards.	(2) Replace the outdoor unit control PWB assembly.
												(3) Check the outdoor unit fuse.	(3) Replace the fuse/ outdoor unit control PWB assembly.
												(4) Check 15-V,13-V and 5-V voltages on the PWB. Check resistance between IPM terminals.	(4) Replace the outdoor unit control PWB assembly.
												(5) Check pins No.5 and 8 of connector CN3 of the outdoor unit fan motor for short-circuit.	(5) Replace the outdoor unit fan motor.
												(6) No abnormality found in above inspections (1) through (5).	(6) Replace the outdoor unit control PWB board.
Indoor unit operates. Outdoor unit does not operate.	Lighting or OFF	○	○	○	○	○	Timer (Orange)	18	0	Wiring between units	Serial short-circuit	(1) Check the wiring between units.	(1) Correct the wiring.
		○			○		Operation(green)						
							Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	Lighting or OFF	○	○	○	○	○	Timer (Orange)		1		Serial erroneous wiring	(1) Check the wiring between units.	(1) Correct the wiring.
		○			○		Operation(green)						
						○	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	Normal blinking or OFF	○	○	○	○	○	Timer (Orange)	19	0	Indoor unit fan	Indoor unit fan error	(1) Check the indoor fan motor for proper rotating operation. (Check fan lock.)	(1) Replace the indoor fan motor.
		○			○	○	Operation(green)						
							Plasmacluster (Blue)					(2) Check the lead wire of the indoor fan motor for open-circuit.	(2) Replace the indoor fan motor.
												(3) Check connector of the indoor unit fan motor for secure installation.	(3) Correct the installation of the indoor fan motor connector.
												(4) No abnormality found in above inspections (1) through (3).	(4) Replace the indoor unit control PWB.
Indoor and outdoor units do not operate.	Normal blinking or OFF	○	○	○	○	○	Timer (Orange)	20	0	Indoor unit control PWB	EEPROM data error	(1) (EEPROM read data error)	(1) Replace the indoor unit control PWB.
		○		○			Operation(green)						
							Plasmacluster (Blue)						

Malfunction indications due to erroneous wiring during air conditioner installation

	Inter-unit wiring error mode	Symptom	
1		Malfunction diagnosis display	“18-1”
2		Malfunction diagnosis display	None (Displays “18-0” when malfunction code is called out.)
3		Malfunction diagnosis display	None (Displays “18-0” when malfunction code is called out.)
4		Malfunction diagnosis display	“18-1”
5		Malfunction diagnosis display	“18-1”

CHAPTER 4. REFRIGERATION CYCLE

[1] HOW REFRIGERANT FLOW



[2] STANDARD CONDITION

	Indoor side		Outdoor side	
	Dry-bulb Temp. (℃)	Relative Humidity (%)	Dry-bulb Temp. (℃)	Relative Humidity (%)
Cooling	27	47	35	40
Heating	20	–	7	87

* PIPE LENGTH 5m

[3] TEMPERATURE AT EACH PART AND PRESSURE IN 3-WAY VALVE

Model	12THR-N			
Mode	Cooling		Heating	
	Max	Test Run	Max	Test Run
Compressor frequency(Hz)	50 or More	42 Fixed	97 or More	42 Fixed
Temp. on ① (℃)	61	60	85	50
Temp. on ② (℃)	41	41	3	3
Temp. on ③ (℃)	14	16	50	23
Temp. on ④ (℃)	12	17	0	5
Outlet Air Temp. on ⑤ (℃)	14	15	51	33
3-way valve pressure (MPaG)	0.99	1.04	2.96	1.98
AC Current (A)*	4.5	3.8	10.6	3.3

Caution: Indoor fan speed is set to [HIGH]
*AC power supply is set to 230V,50Hz

[4] PEAK OPERATION CURRENT

If the current flowing in the air conditioner exceeds the peak control current,
the operation frequency is decreased until the current value drops below the peak control current.

	Cooling		Heating	
Outdoor Air Temp.	＜40℃	≧40℃	＜12℃	≧12℃
Peak Current (A)	6.84	6.84	12.49	6.42

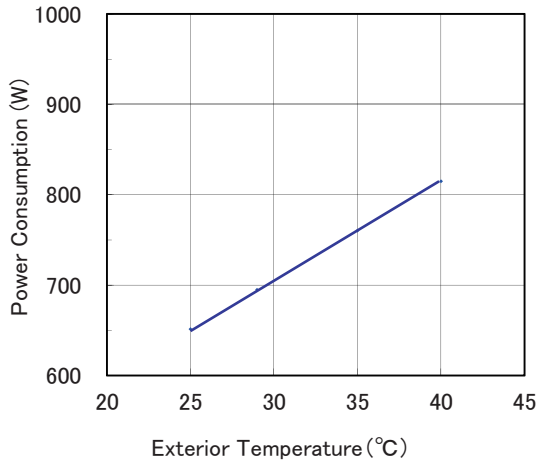
[5] PERFORMANCE CURVES

OTE

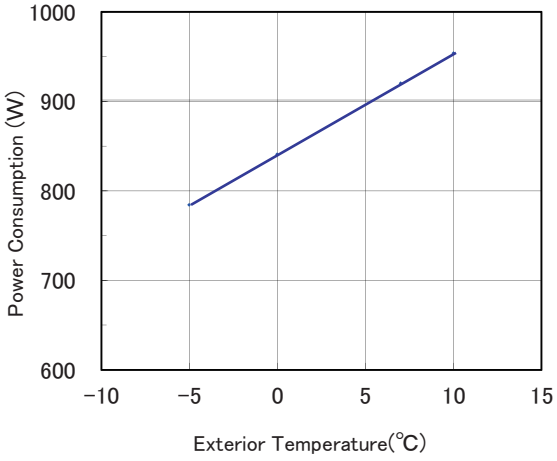
1) Indoor fan speed: Hi
2) Vertical adjustment louver “45°”, Horizontal adjustment louver “front”
3) Indoor air temp.: Cooling 27°C, Heating 20°C
4) Power source: 230V, 50Hz
5) Performance corresponding to change in outside temperature when compressor is fixed to rated operation.

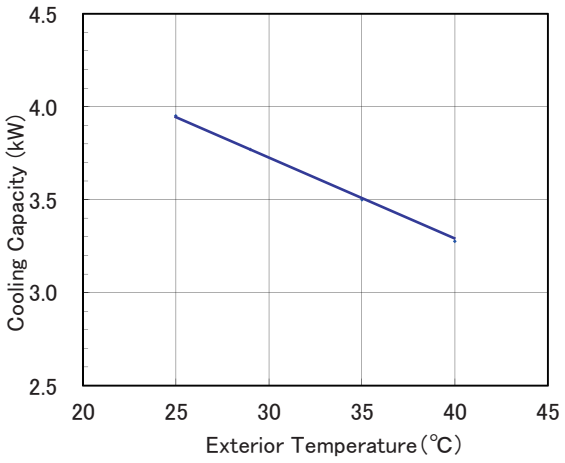
1. 12THR-N

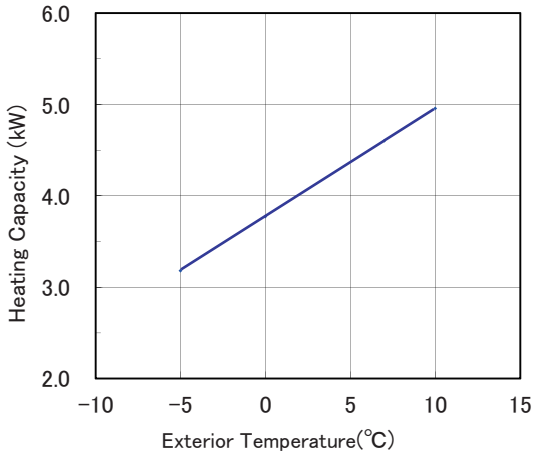
1.1. At Cooling



1.2. At Heating







CHAPTER 5. DISASSEMBLY PROCEDURE

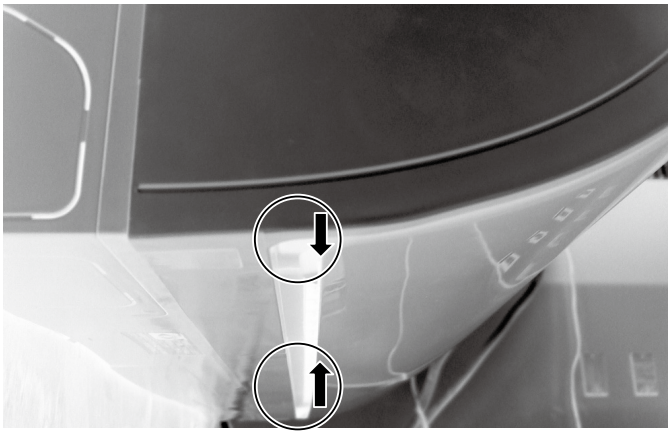
Be sure to disconnect the power cord from the AC power outlet before starting the disassembly procedure.
Be sure to install screws to their original positions after repairing
After the air conditioner is repaired or parts are replaced, measure insulation resistance of the equipment using an insulation resistance meter. If the measured resistance is lower than 1 MΩ,inspect parts and repair or replace defective parts.

[1] INDOOR UNIT

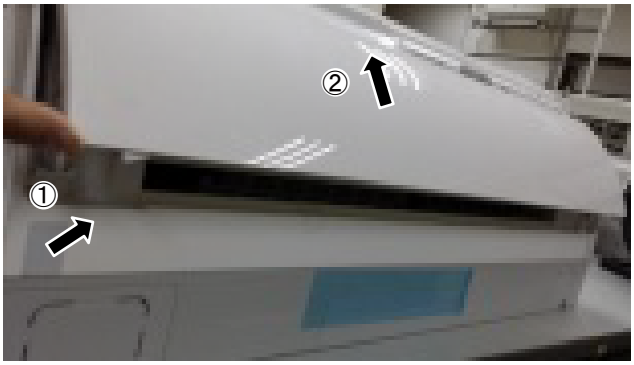
1.Main Part

1) Open the panel to a horizontal position,then pull out the open panel along the axial direction.

2) Press the left and right sides of panel levers underside of panel inward.

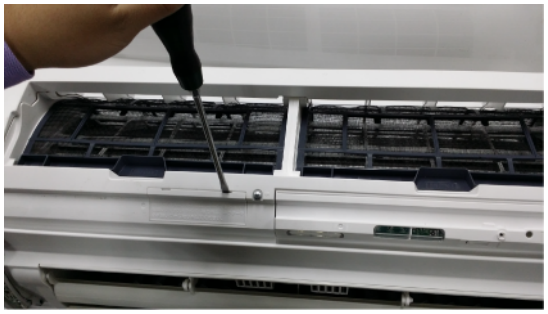


3) Open the panel a little and take it down by sliding it up.
(The panel can't be taken down when open panel is closed)

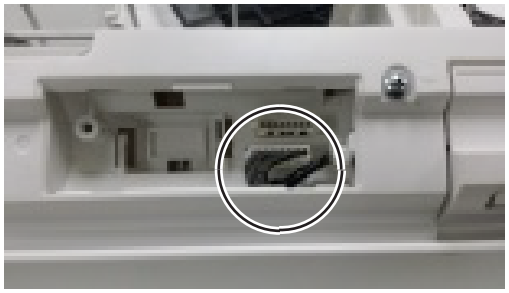


4. Pull out two left and right filters.

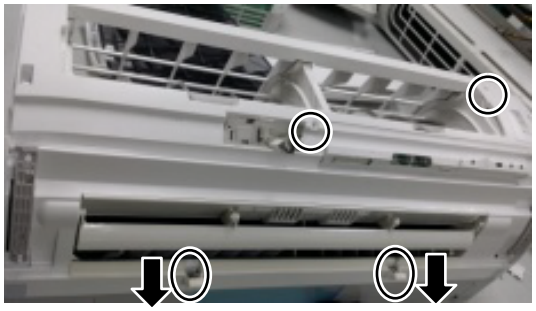
5) Take down the cover by a slotted screwdriver.



6) Take down the connection.(one place)

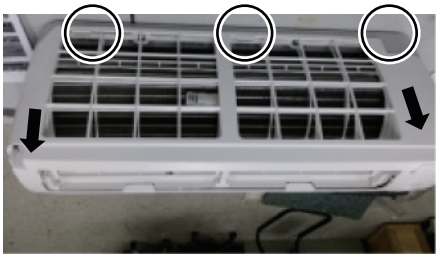


7) Remove the four screws that secure the front panel.
※Two screws should be taken down after opening screw covers under the air outlet.



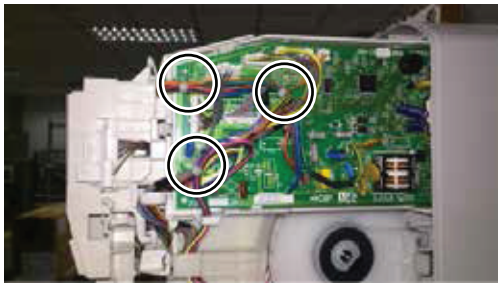
8) Rotate the longitudinal plate to the horizontal direction.

9) Open the three clasps fixing front panel,above of the cabinet,Then pull the front panel out as shown in the following picture.



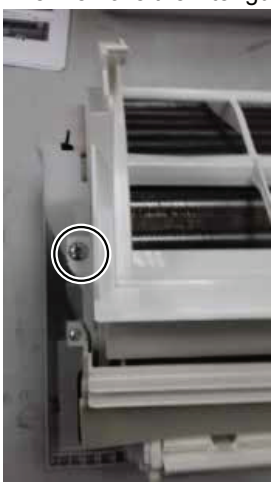
10) Take down the pressing line plate and wire terminals.

11) Dismantle the cover of control substrate and snip the wire fixing bands.Then pull down the fixed terminals of connector clips.

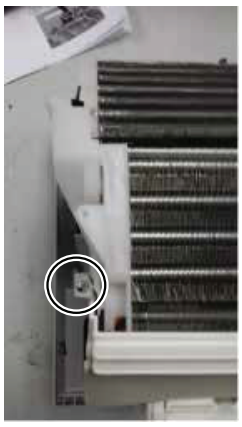


12) Remove a screw which fixes the electric box.

13) Remove the left and right sides screws fixing the filter guide. Then remove the filter guide.



14) Remove the left and right sides screws fixing the drain pan. Then remove the drain pan.



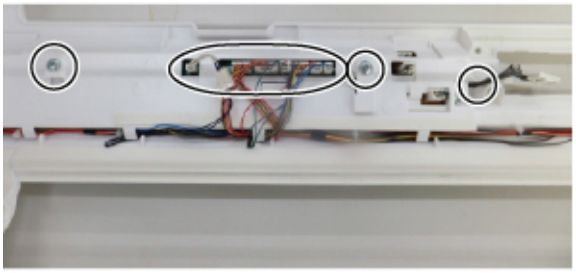
15) Remove a screw fixing the fan.

16) Remove a screw fixing the fan motor.

17) Slide and open the cover on the right and slide the fan motor out at one time.

2. Infront panel assembly

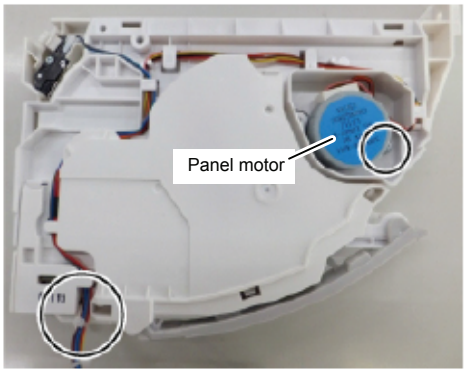
1) Cut the wire fixing bands inside and pull out the connecters, then remove the two screws.



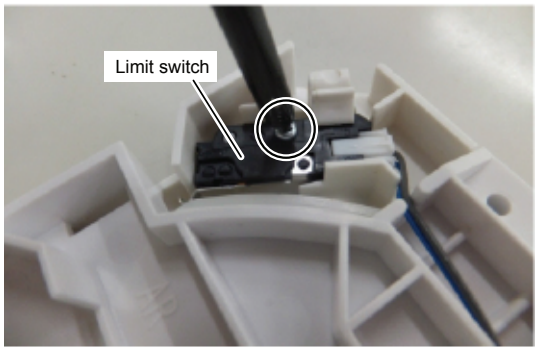
2) Remove the display decorative device after unlocking it.Then slide and remove the cover .(1 piece)

3) Take the panel mecha assemblies apart from the front panel. (2 screws each side)

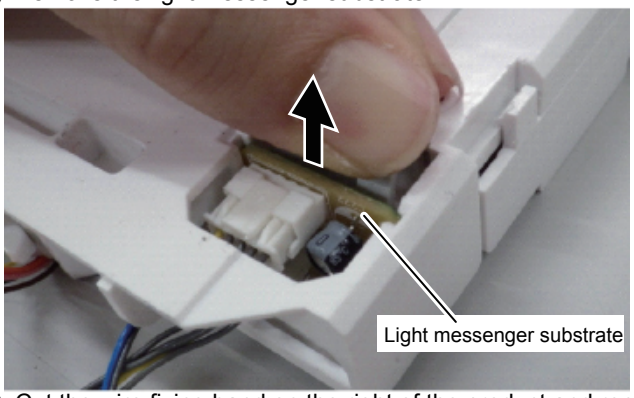
4) Cut the wire fixing band on the right side of the product,and remove the panel motor after unscrewing a screw of it.



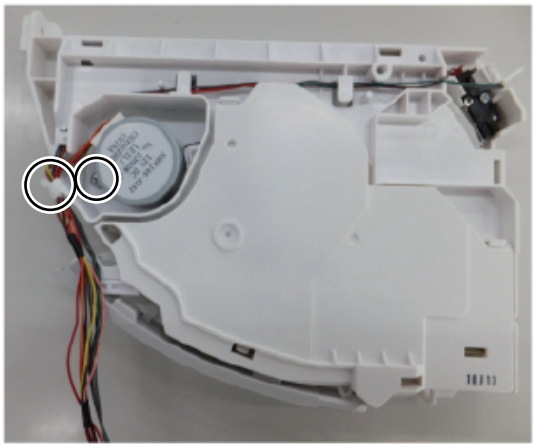
5) Remove the limit switch after removing a screw.
※ Screw type：XTPS723P12000.



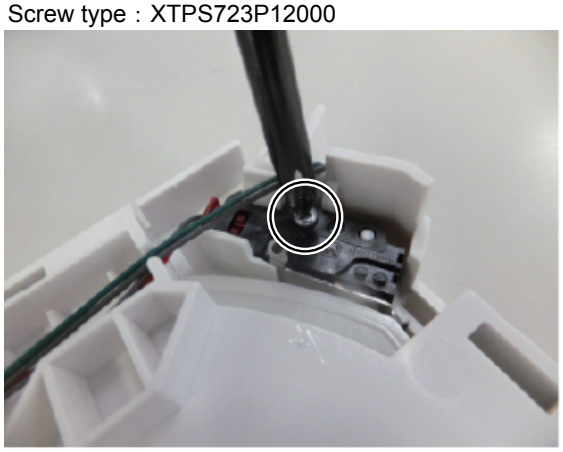
6) Remove the light messenger substrate.



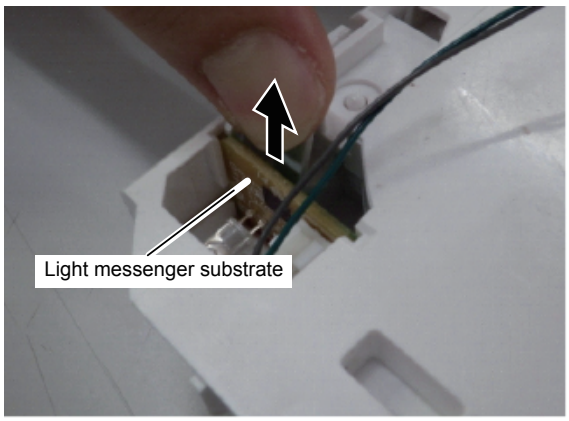
7) Cut the wire fixing band on the right of the product,and remove the panel motor after removing a screw of it.



8) Remove the limit switch after removing a screw of it.
※ Screw type：XTPS723P12000



9) Remove light messenger substrate.

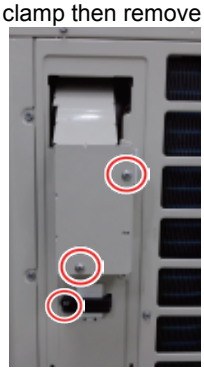


[2] OUTDOOR UNIT

1.Body's decomposition steps

1) Remove a screw fixing the electric cap,then remove the cap.

2) Remove 2 screws fixing the terminal cover and a screw of cord clamp then remove them.Then remove the holder.

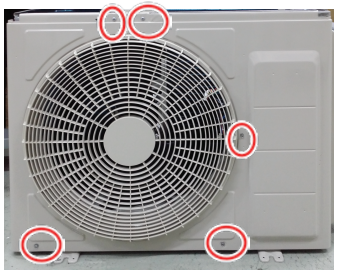


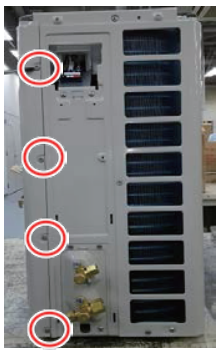
3) Remove the top cover after removing 4 screws of it.

(Left side of top cover)

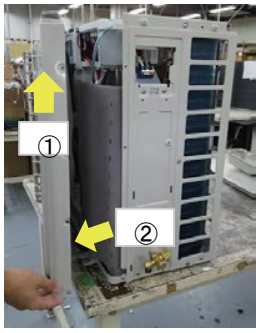
(Right side of top cover)

4) Remove the front panel.(5 screws in front,4 screws on the right)



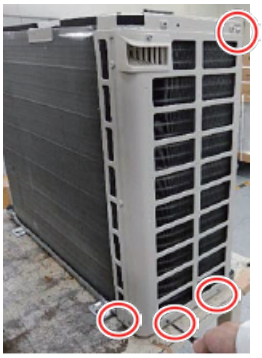


5) Open the front panel axis on the left
① Lift it up a little on the right ② Open it outward and lift up a little on the left,then open it.

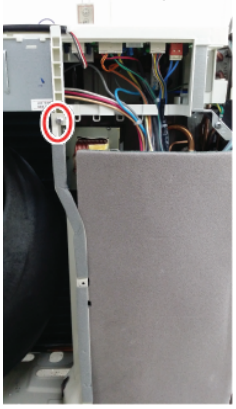


6) Remove the cover R.(8 screws)

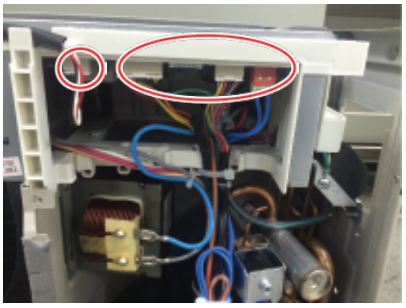
7) Remove the cover L. (4 screws)



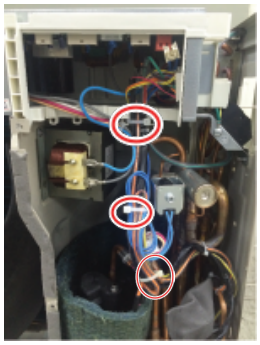
8) Remove the screw fixing the electric box.



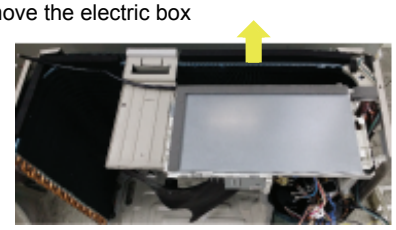
9) Pull down the terminals connecting the electric box substrate.



10) Cut the wire fixing band fixing the transfer connector of the compressor and electric box and take down the transfer connectors of compressor.



Remove the electric box



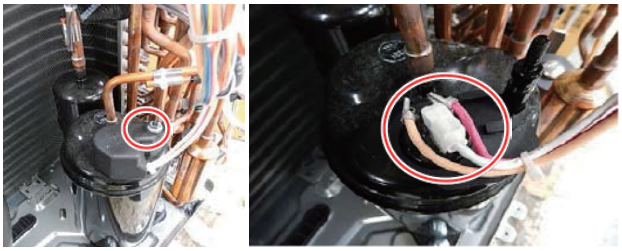
11) Remove the sound-absorbing cotton outside.

12) Remove the sheltering baffle.(2 screws)

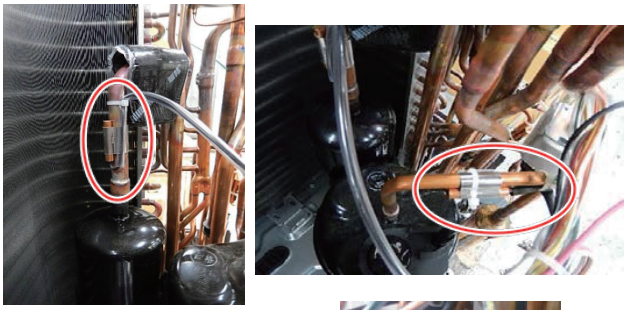
13) Take apart the cover, the cover of compressor,sound-absorbing cotton inside.(5 screws)

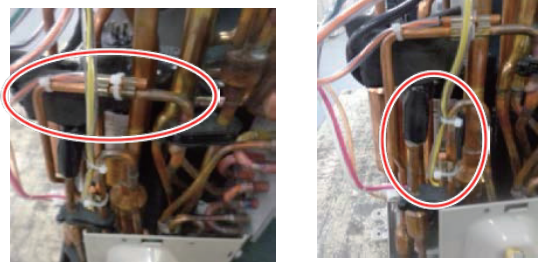
(The way to take apart the cover of compressor)

14) Take apart the terminal cover.(1 screw)
Then take apart the compressor connecting terminal.



15) Take apart the thermistors(4 pieces) and thermistor clamps.

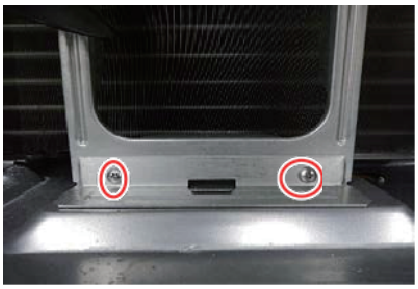




16) Take apart the fan and the motor.(1 nut,4 screws)

17) Remove 2 screws fixing the motor angle.

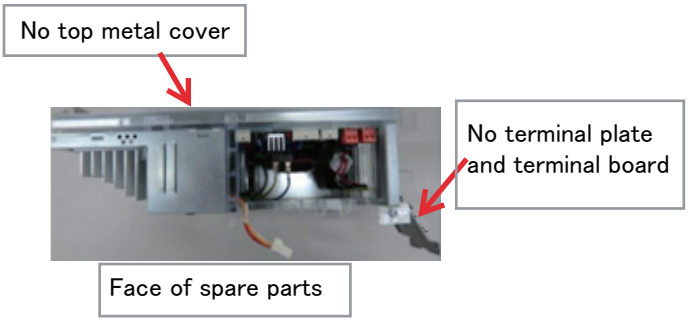
18) Take apart 2 screws fixing the motor angle.



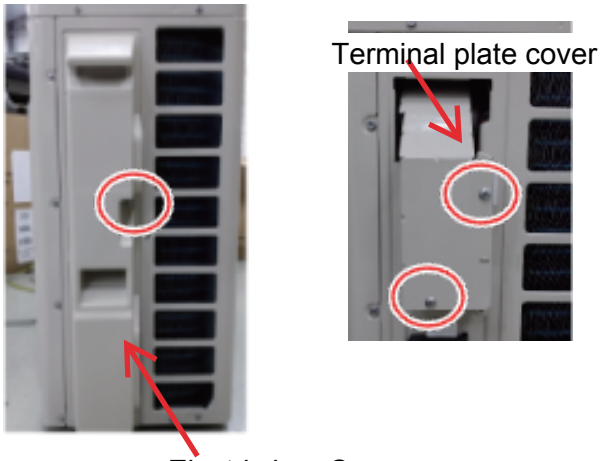
2.Electrical parts exchange methods of outdoor unit

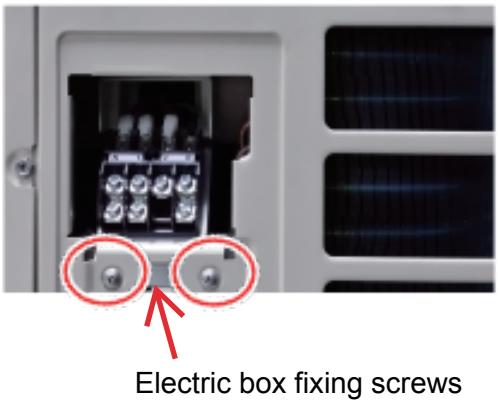
Electric box(metal frame) and metal parts fixing the terminal plate are contained in the spare parts .See below images. But the following parts are not contained in the spare parts, please use existing parts.

- Terminal plate（Used to connect the indoor and outdoor units）
- Terminal board
- Metal cover on the top of electrical box（Electrical box cover）

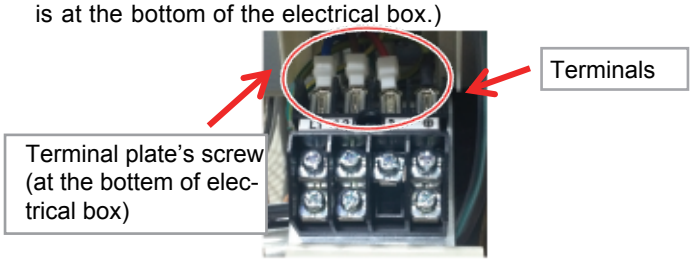


1) The cover on the side of terminal plate
(Don't need to remove plate R)
Remove the electrical box cover(resin). (1 screw)
Remove the terminal plate cover(metal).(2 screws)
Remove the 2 screws fixing the electrical box.

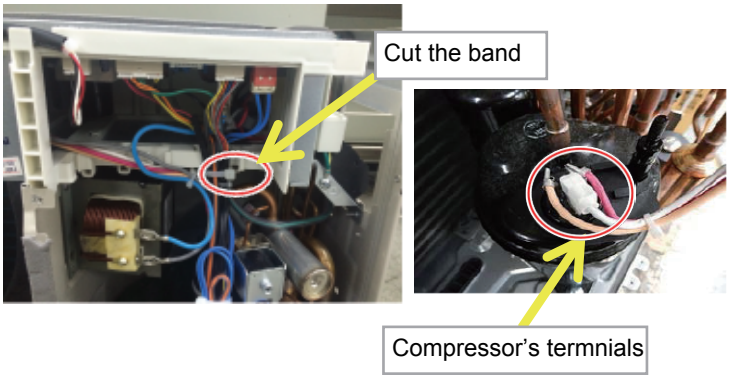




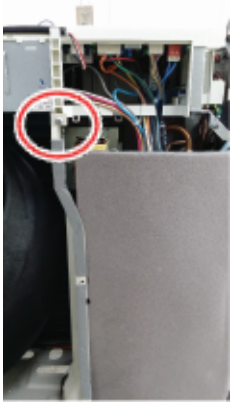
2) Terminal plate is not contained in the spare parts,which is a transfer wiring connecting the indoor and outdoor units. Please use the existing parts.
(Remove the screws fixing the terminal plate wiring first,when changing the electric assembly.Then separate the terminal plate and terminal assembly from the electrical box.The screw is at the bottom of the electrical box.)



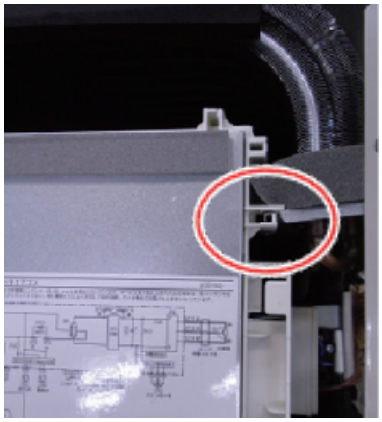
3) Pull down the terminals to compressor and cut a band as the picture showing.Then separate the wire.(Don't cut the band of red,white and orange wire.(Separate the white plug in the middle of the following picture.))



4) Remove the screw under the electrical box.



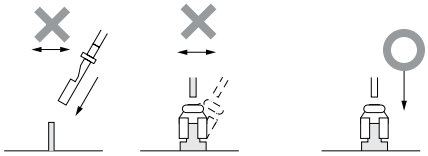
5) Slide the electric assembly upward as the following picture showing,and separate it from indoor unit. There are grooves in the side of electric box,where insert the metal parts.



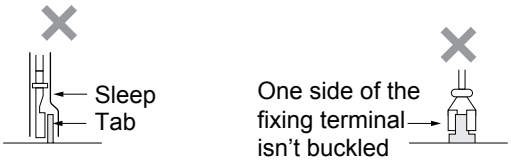
Notice:

1. Exchange outdoor circuit board
   1) Remove the fixing terminals(T5, 7~9).
      (Pull it out after pressing the delocking pin.)
   2) Reconnect terminals in order after exchanging the control basal lamina.
2. The notes of the fixing terminals connection
   1) Please pull and remove the terminal straight along the tab.

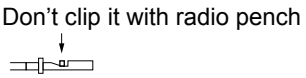
      Don't pull the wire to remove the terminal.



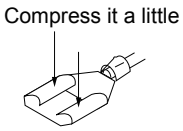
   2) Don't plug between fixing terminal and sleep.



   3) Pay attention to the lock pin when pluging the city block fasten terminal.Try not plug the terminal by hand,or clip the lock part with radio pench.



   4) It's inappropriate that the tension in the fasten terminal is too big when wiring.
   5) The terminal once removed can't be used again,because the interlocking decreases.It's necessary that use it after compressing it a little.



[3] THERMISTOR ASSEMBLY INSTALLATION DRAWING