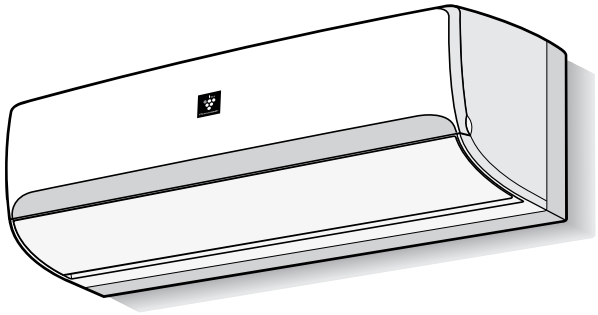
SHARP SERVICE MANUAL

S1610AYXP12THC



SPLIT TYPE ROOM AIR CONDITIONER

MODEL	INDOOR UNIT	OUTDOOR UNIT
	AY-XP12THU	AE-X12THU
	AY-XP18THU	AE-X18THU

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. AY-XP12THU/AY-XP18THU

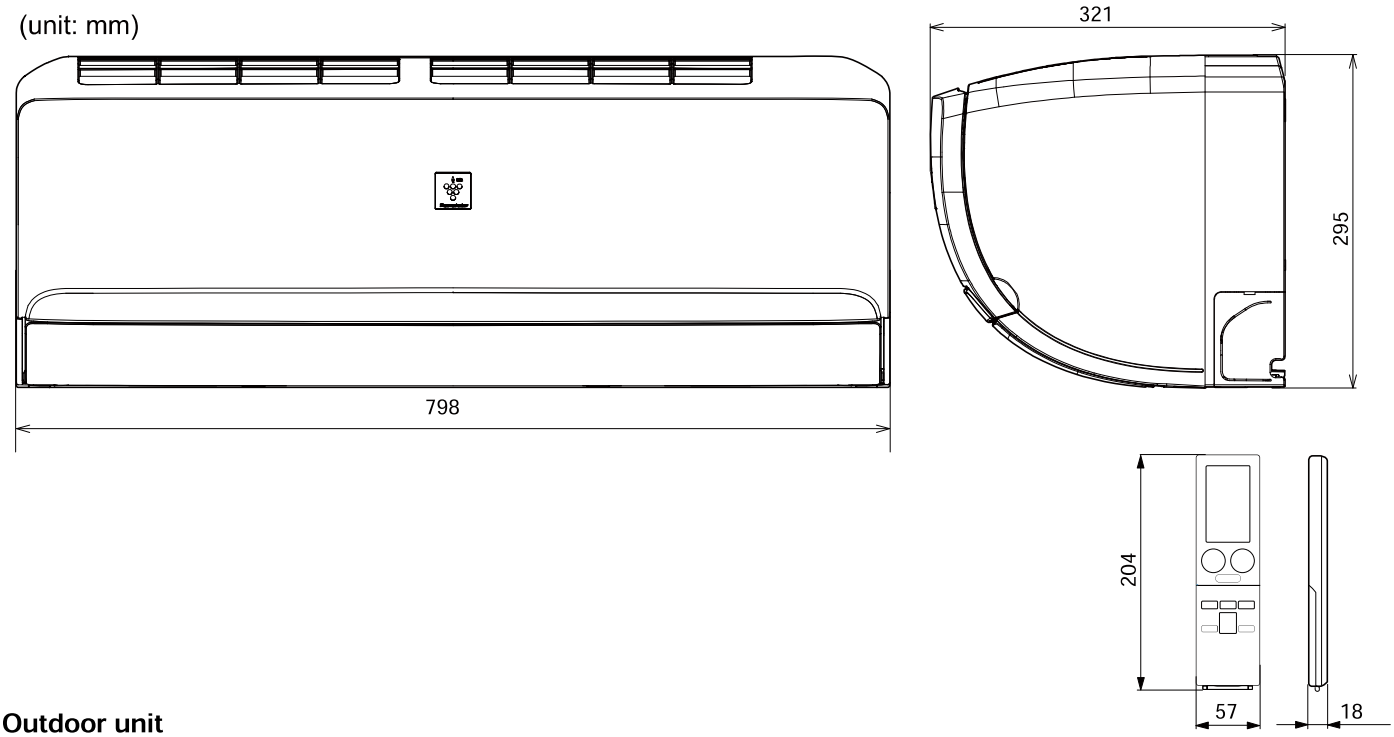
ITEMS \ MODEL				INDOOR UNIT AY-XP12THU	OUTDOOR UNIT AE-X12THU	INDOOR UNIT AY-XP18THU	OUTDOOR UNIT AE-X18THU
Rated cooling capacity (Min. - Max.)			Btu/h	11500 (4000 - 13500)		17000 (6000 - 19000)	
Rated heating capacity (Min. - Max.)			Btu/h	14000 (3500 - 22000)		21600 (5500 - 28000)	
Moisture removal (at cooling)			Pt/h	1.6		3.7	
Electrical data							
Phase				1		1	
Rated frequency			Hz	60		60	
Rated voltage			V	208 / 230		208 / 230	
Rated input		Cool	W	765		1475	
		Heat	W	875		1600	
Circuit Breaker			A	15		20	
Compressor		Type		Hermetically sealed twin rotary type		Hermetically sealed twin rotary type	
		Model		SNB140FHTMC		SNB140FHTMC	
		Oil charge		FV50S(PVE) 350cc		FV50S(PVE) 350cc	
Refrigerant system		Evaporator		Slit Fin and Grooved tube type		Slit Fin and Grooved tube type	
		Condenser		Corrugate Finand Grooved tube type		Corrugate Finand Grooved tube type	
		Control		Expantion Valve		Expantion Valve	
		Refrigerant (R410A)		47.6 oz(1350 g)		47.6 oz(1350 g)	
		De-Ice system		Micro computer controled reversed systems		Micro computer controled reversed systems	
Noise level (Sound Pressure)	Cooling	High	dB(A)	45	49	47	52
		Soft	dB(A)	30	-	31	-
		Silent	dB(A)	25	-	25	-
	Heating	High	dB(A)	45	50	47	52
		Soft	dB(A)	34	-	35	-
		Silent	dB(A)	25	-	25	-
Fan system							
Drive				Direct drive		Direct drive	
Air flow quantity	Cooling	High	CFM (m^3/min)	491 (13.9)	1410 (39.9)	512 (14.5)	1410 (39.9)
		Soft	CFM (m^3/min)	251 (7.1)	-	251 (7.1)	-
		Silent	CFM (m^3/min)	208 (5.9)	-	208 (5.9)	-
	Heating	High	CFM (m^3/min)	491 (13.9)	1410 (39.9)	537 (15.2)	1410 (39.9)
		Soft	CFM (m^3/min)	311 (8.8)	-	311 (8.8)	-
		Silent	CFM (m^3/min)	208 (5.9)	-	208 (5.9)	-
Fan revolution	Cooling	High	rpm	1250	880	1300	880
		Soft	rpm	750	-	750	-
		Silent	rpm	660	-	660	-
	Heating	High	rpm	1250	880	1350	880
		Soft	rpm	880	-	880	-
		Silent	rpm	660	-	660	-
Fan				Cross flow fan	Propeller fan	Cross flow fan	Propeller fan
Connections							
Refrigerant coupling				Flare type		Flare type	
Refrigerant tube size Gas, Liquid			inch	3/8", 1/4"		3/8", 1/4"	
Drain piping mm			mm	O.D.ϕ16		O.D.ϕ16	
Others							
Safety device				Compressor: Thermistor		Compressor: Thermistor	
				Fan motors: Inherent thermistor		Fan motors: Inherent thermistor	
				Fuse, Micro computer control		Fuse, Micro computer control	
Air fillters				Polypropylene net (Washable)		Polypropylene net (Washable)	
Net dimensions		Width	inch (mm)	31 7/16 (798)	31 1/2 (800)	31 7/16 (798)	31 1/2 (800)
		Height	inch (mm)	11 5/8 (295)	24 13/16 (630)	11 5/8 (295)	24 13/16 (630)
		Depth	inch (mm)	12 13/16 (325)	11 13/16 (300)	12 13/16 (325)	11 13/16 (300)
Net weight			lbs (kg)	33 (15)	84 (38)	33 (15)	86 (39)

NOTE: Test conditions are based on AHRI 210/240. (Piping length : 25ft [7.6m])

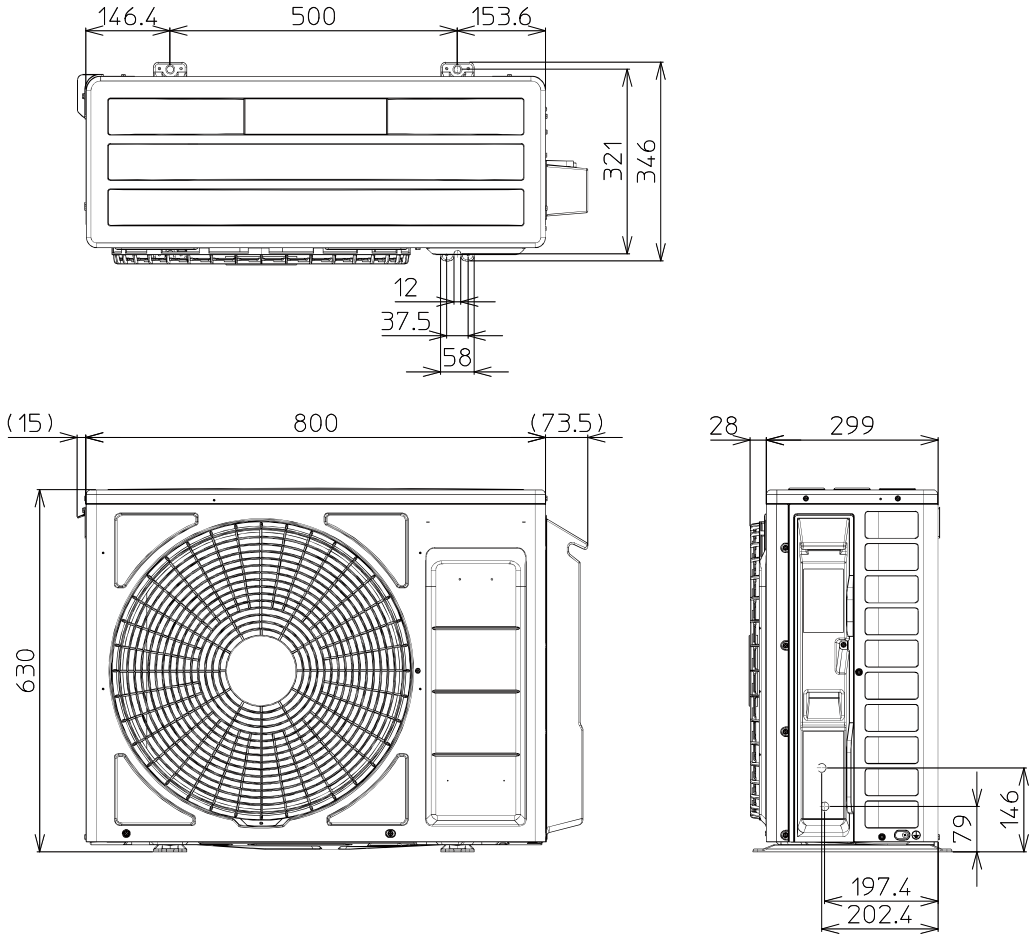
[2] EXTERNAL DIMENSION

1. Indoor unit

(unit: mm)

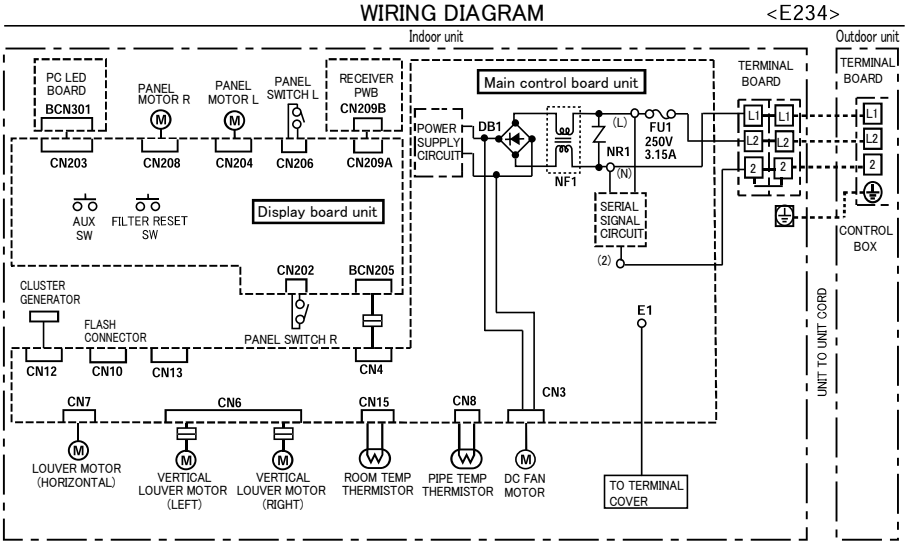


2.Outdoor unit

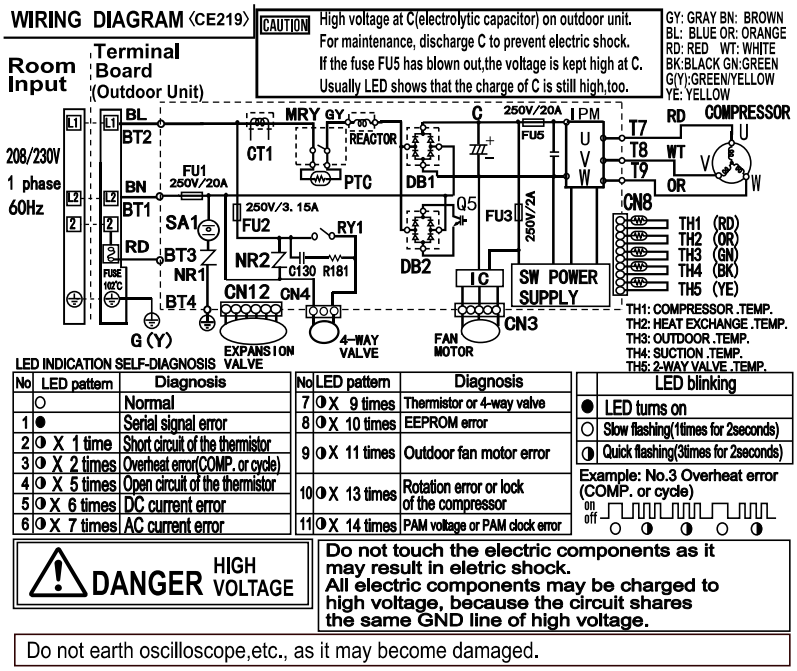


[3] WIRING DIAGRAM

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)

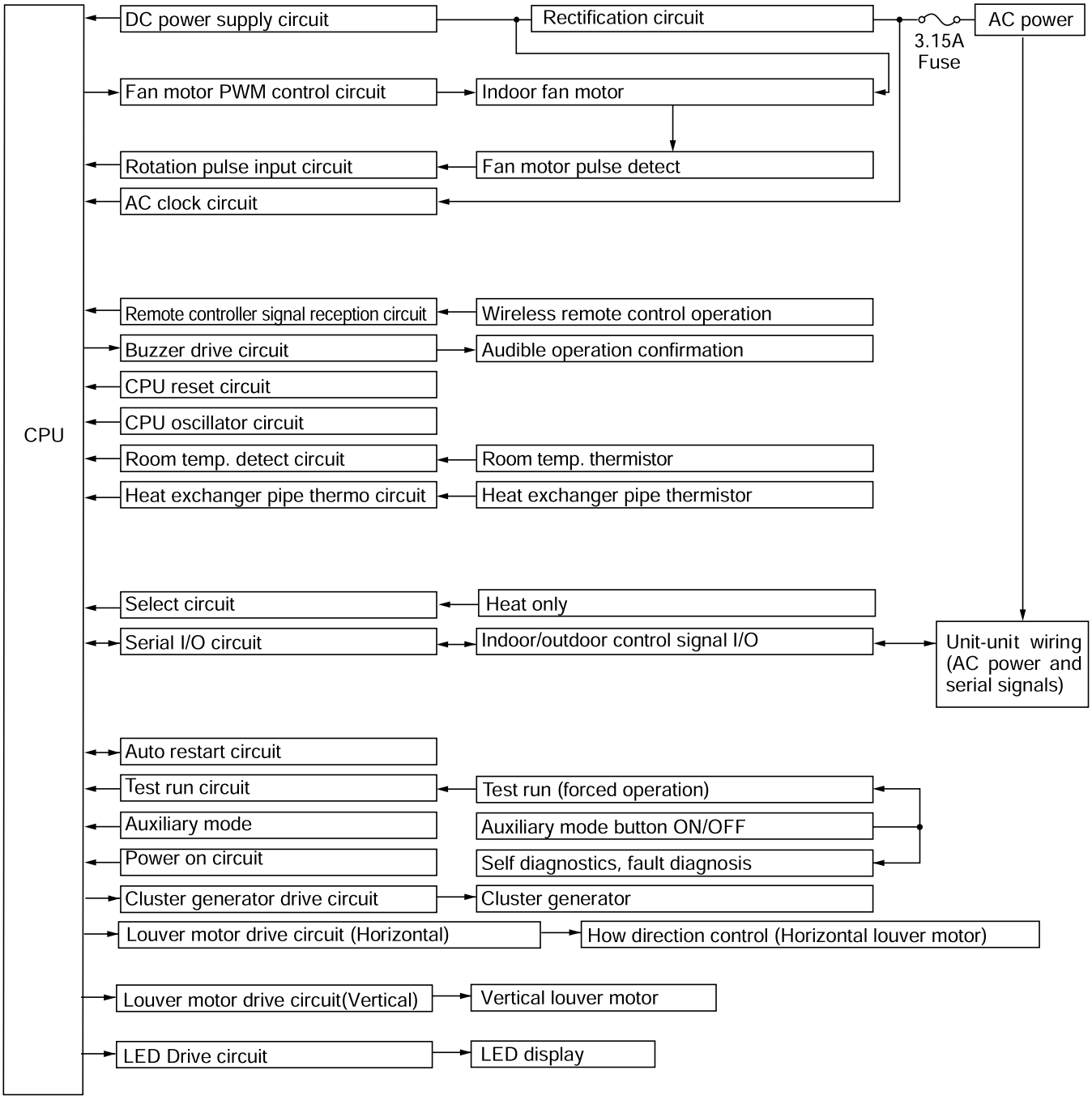
2. Outdoor Unit

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-GA090JBZZ(250V, 20A)
Fu5	–	QFS-GA090JBZZ(250V, 20A)

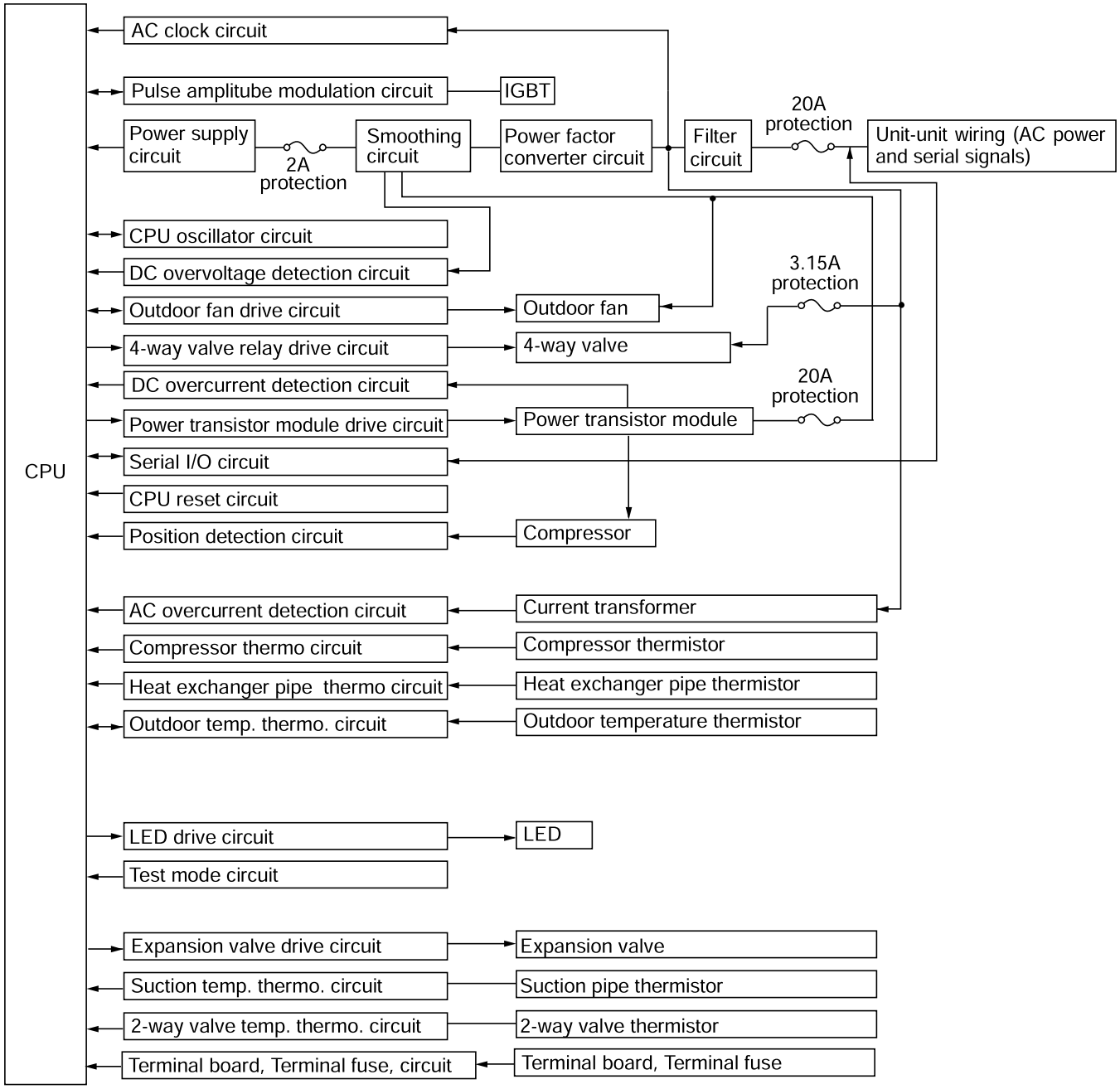
CHAPTER 2. EXPLANATION OF CIRCUIT AND OPERATION

[1] BLOCK DIAGRAMS

1. Indoor unit



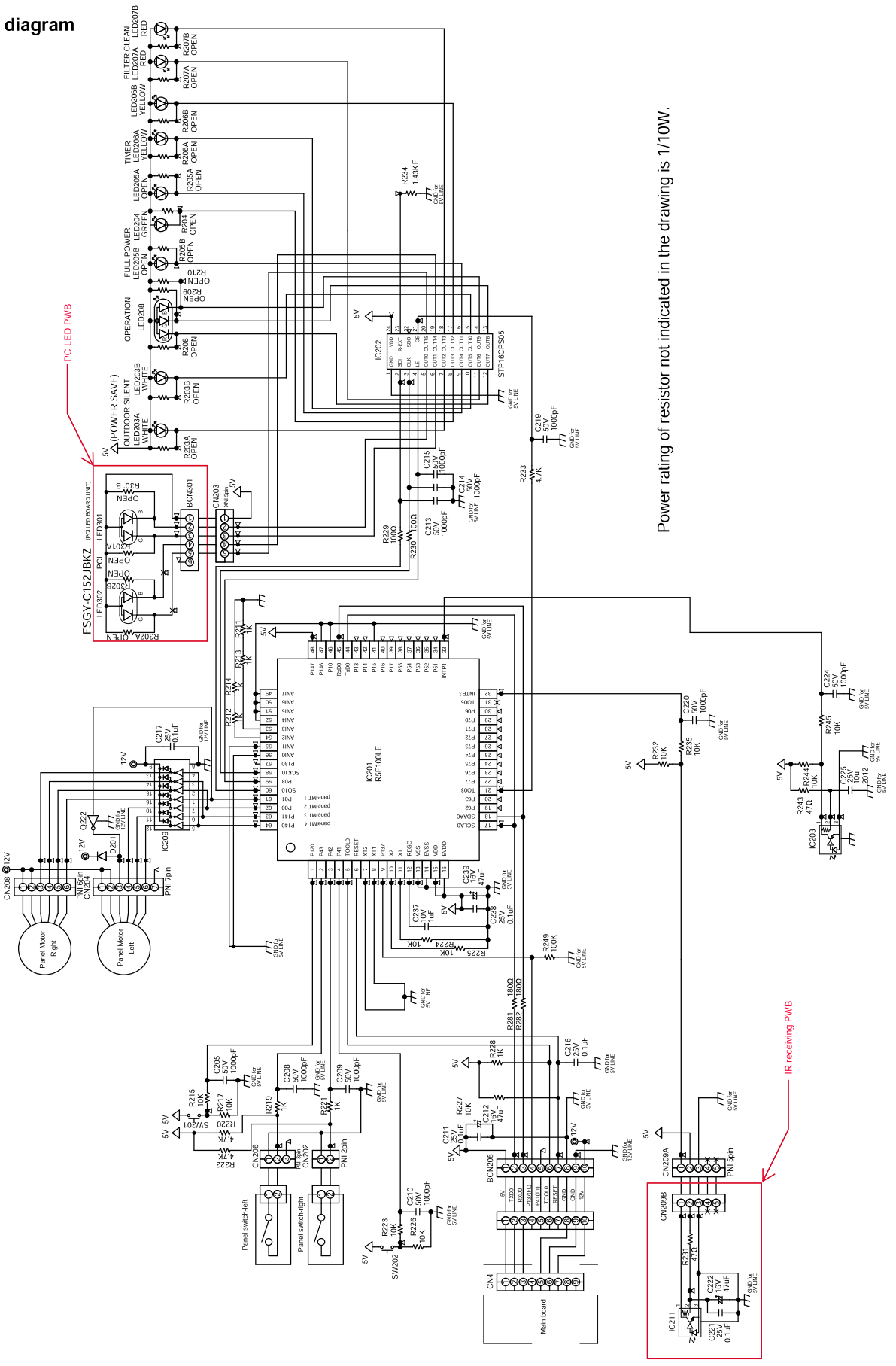
2. Outdoor unit



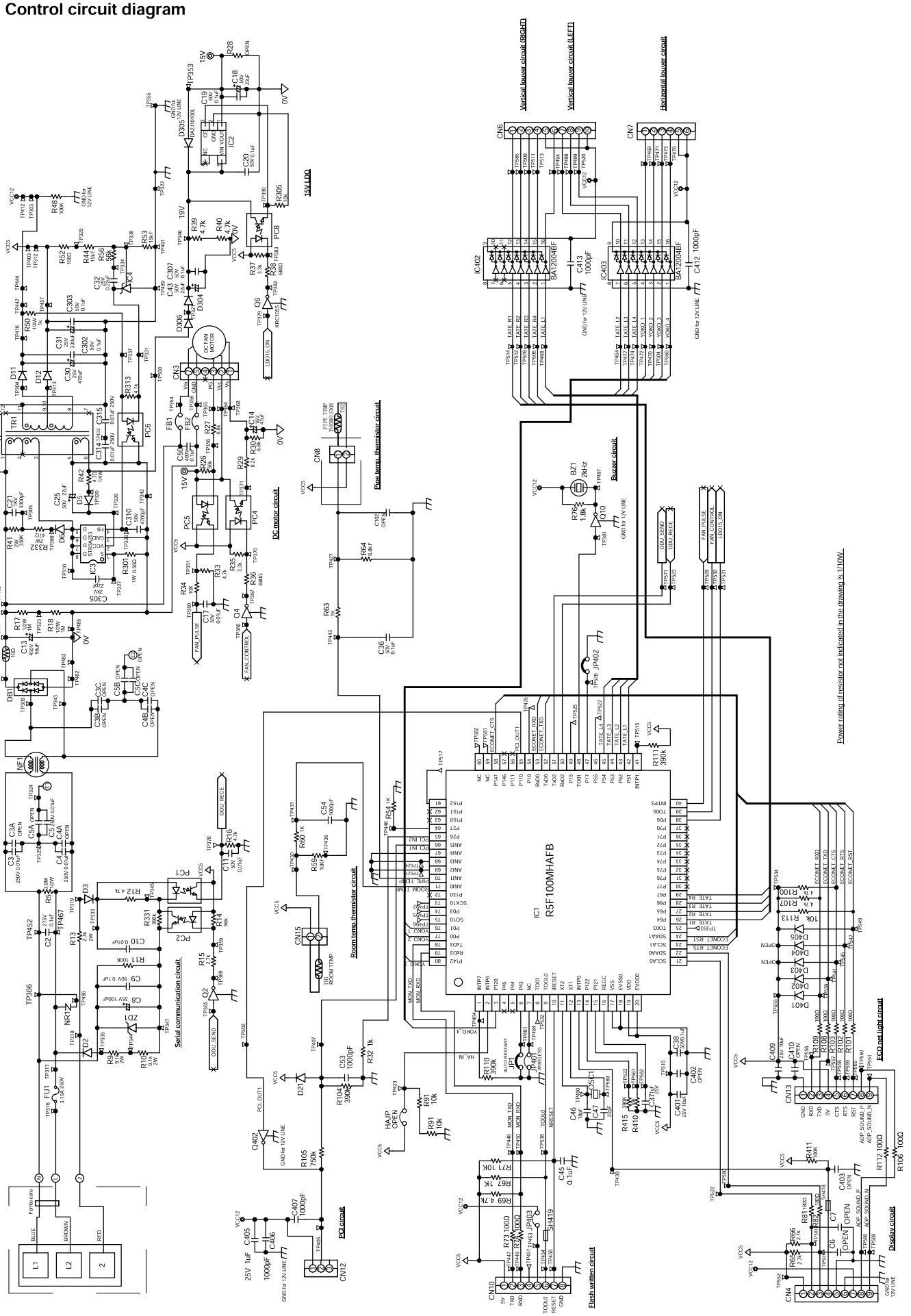
[2] MICROCOMPUTER CONTROL SYSTEM

1. Indoor unit

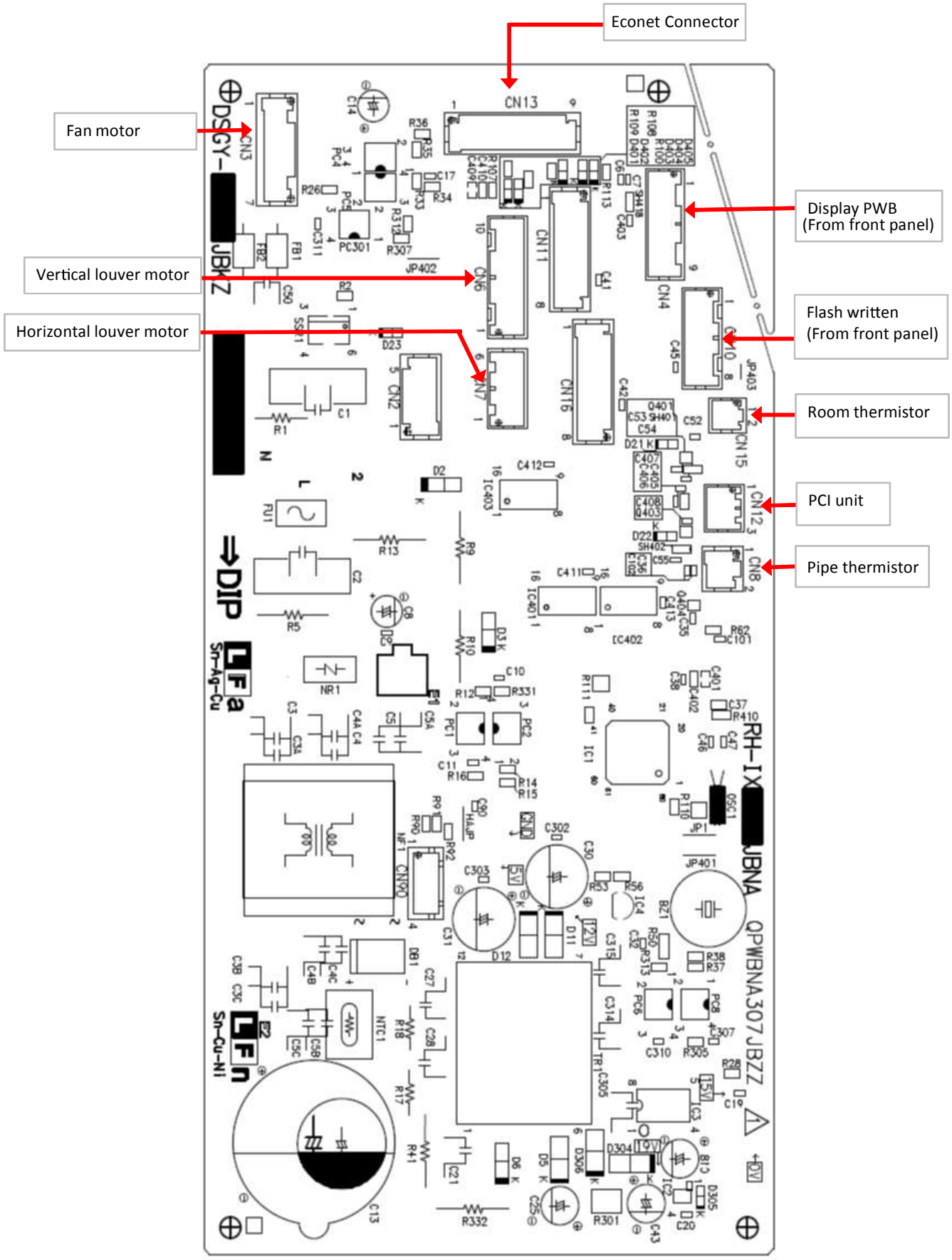
1.1. Display circuit diagram

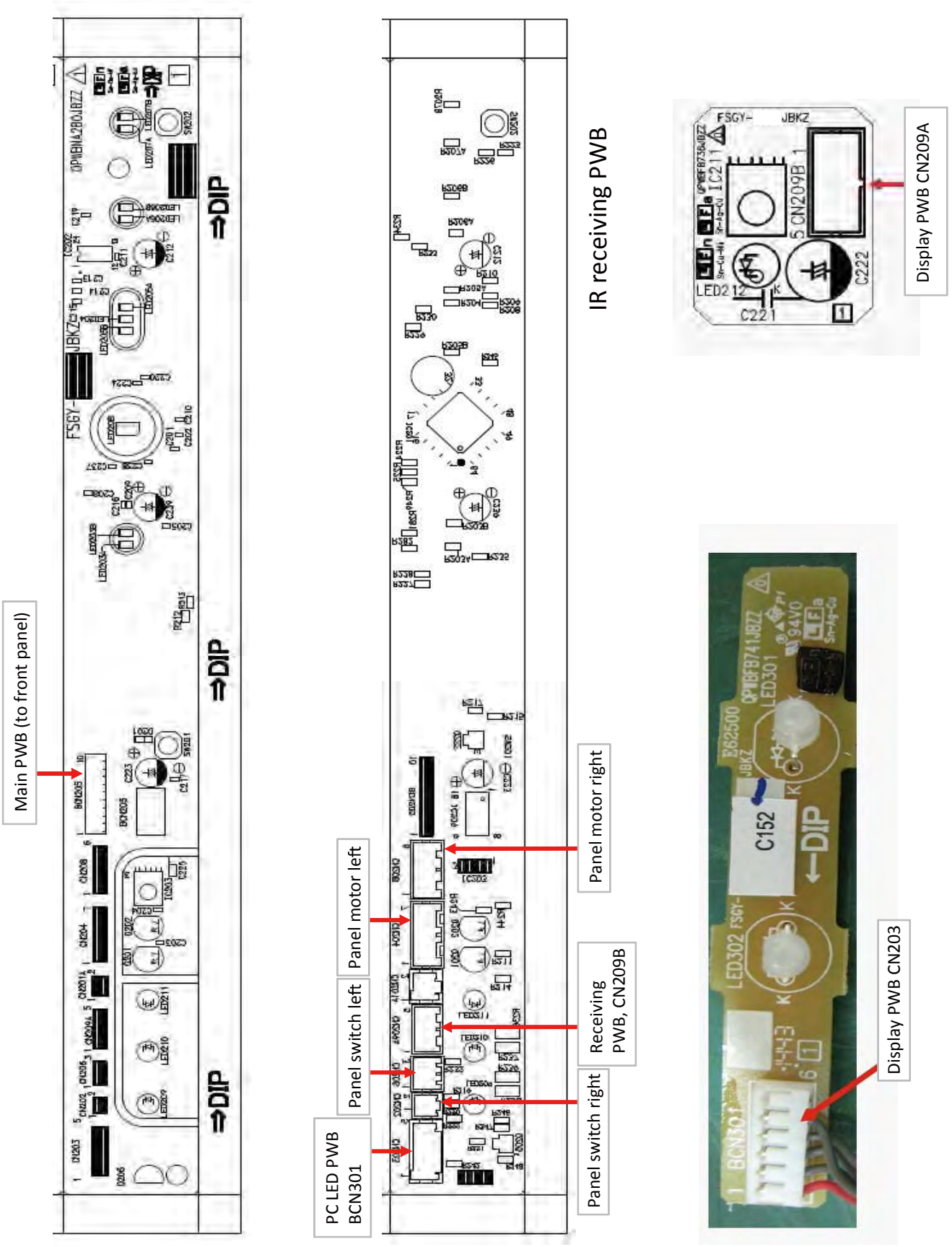


1.2. Control circuit diagram



1.2. Printed wiring board

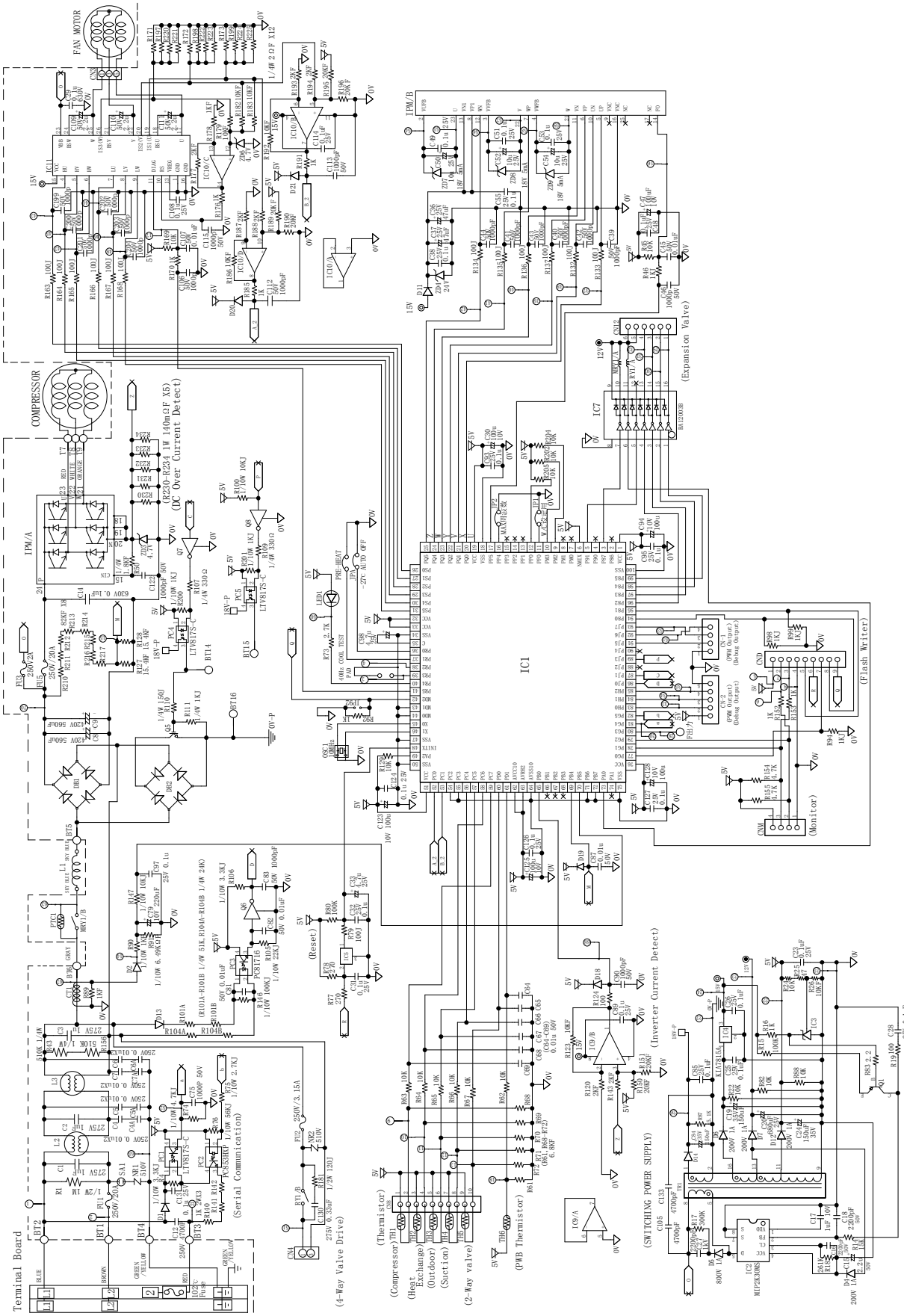



Main PWB (to front panel)
PC LED PWB
BCN301
Panel switch left
Panel motor left
Panel switch right
Panel motor right
Receiving
PWB, CN209B
IR receiving PWB
Display PWB CN209A
Display PWB CN203
FSGY-
JBKZ
C152
LED301
LED302
C221
C222
CN209B
⇒DIP

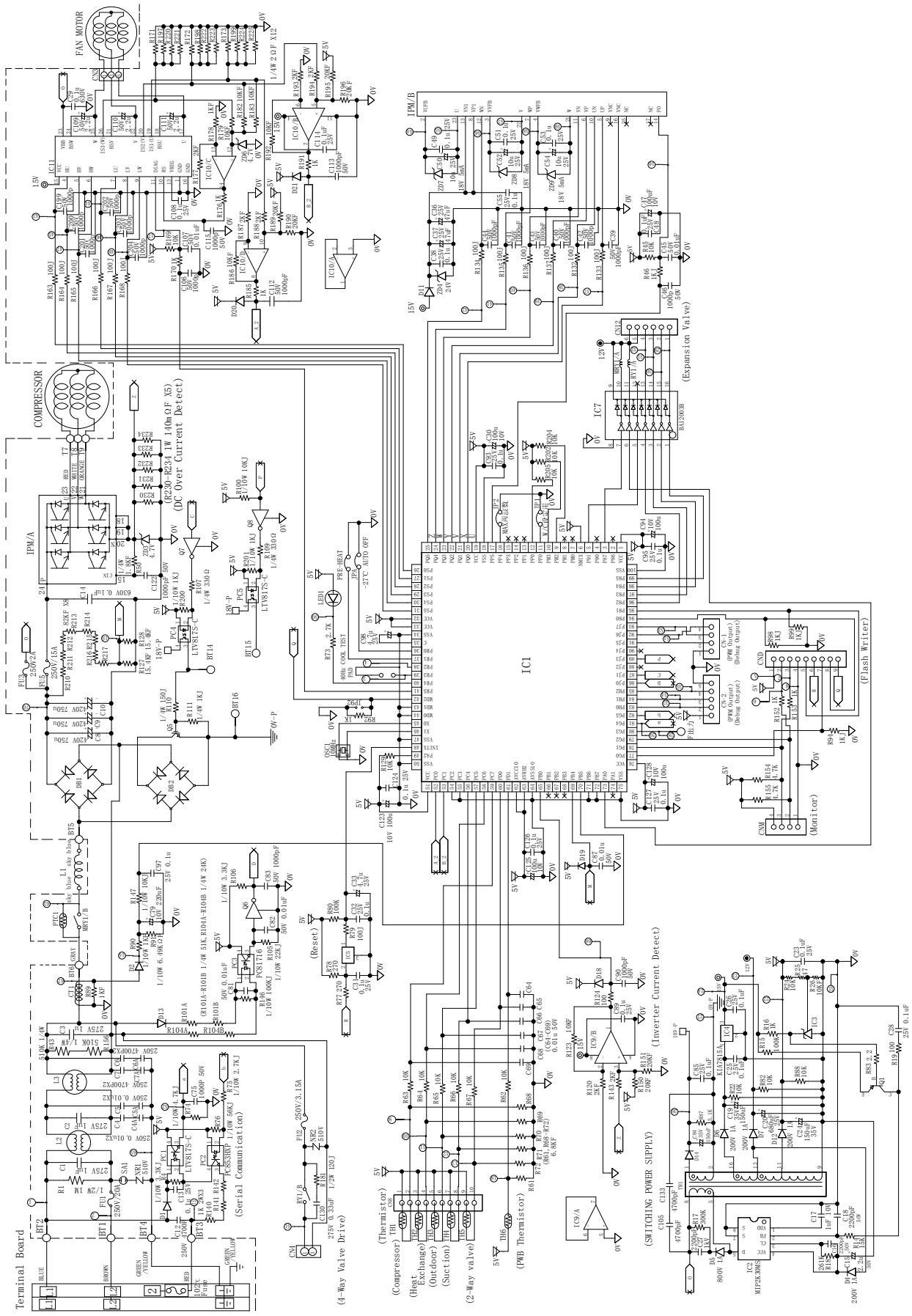
2. Outdoor unit

2.1. Electronic control circuit diagram

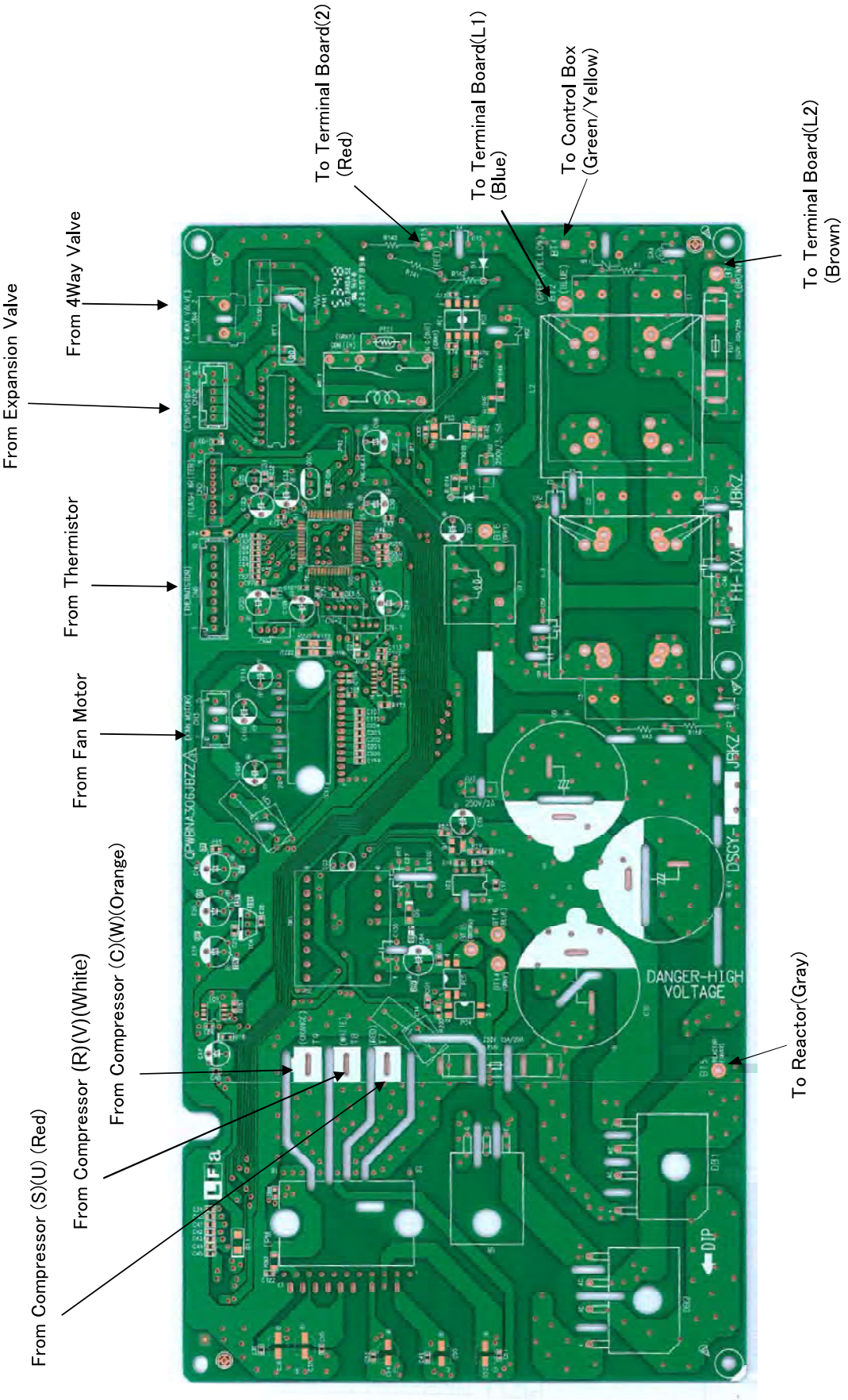
AY-XP12THU



AY-XP18THU


FAN MOTOR
COMPRESSOR
IPM/A
IPM/B
IC1
IC7
IC9/A
IC9/B
IC10/A
IC10/B
IC10/C
IC11
IC12
(Expansion Valve)
(Flash Writer)
(Monitor)
(Inverter Current Detect)
(SWITCHING POWER SUPPLY)
(Serial Communication)
(4-Way Valve Drive)
(Thermistor)
(Compressor) THI
(Heat Exchanger) THH
(Outdoor) THO
(Suction) THS
(2-Way valve) THJ
(PWB Thermistor) THW
Terminal Board
(R230-R234 1W 140mΩ P X5)
(DC Over Current Detect)
PRE-HEAT
27°C AUTO OFF
400Hz COOL TEST
PAD
(Reset)

2.2. Printed wiring board



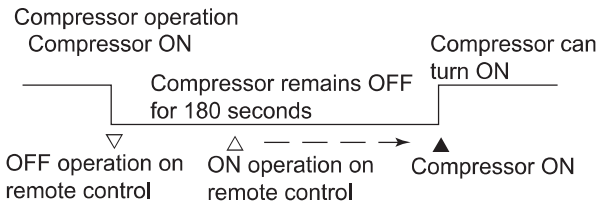
[3] FUNCTION

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

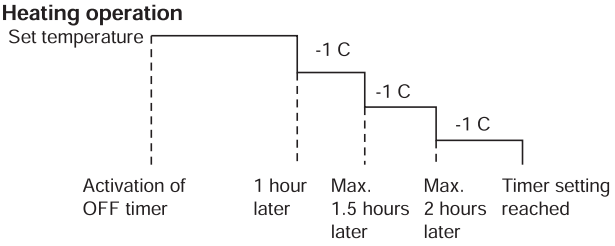
The ON timer can be activated by pressing the ON timer button. When the ON timer is activated, the operation start time is adjusted based on fuzzy logic calculations 1 hour before the set time so that the room temperature reaches the set temperature at the set time.

4. OFF Timer (Sleep Operation)

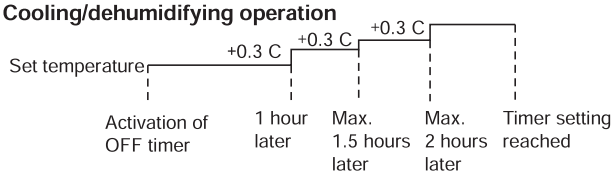
The OFF timer can be activated by pressing the OFF timer button. When the OFF timer is set, the operation stops after the set time.

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.

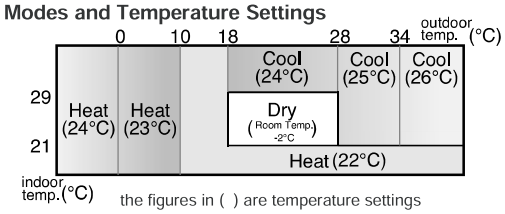
   The malfunction information is stored in memory, and can be recalled later and shown on display.

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

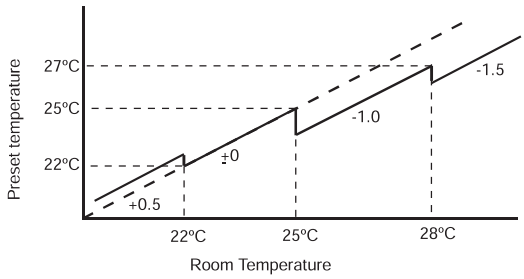
In the Auto mode, the temperature setting is automatically determined based on the outside air temperature. In addition, the air conditioner operation differs from the operation in the Manual mode as explained below.

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 61 ~ 86°F (16 ~ 30°C) using remote control.
	Cooling	
Manual mode	Heat	Can be changed between 61 ~ 86°F (16 ~ 30°C) using remote control.
	Cooling	
	Dehumidifying	Automatic setting. Can be changed within ± 3°F (±2°C) 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 conditioner 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 conditioner 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.

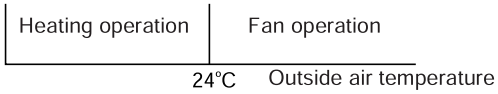
The judgment of whether Heating or Fan operation is used is based on the outside air temperature at 3 minutes after the start of internal cleaning.

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 3°F[2°C] 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

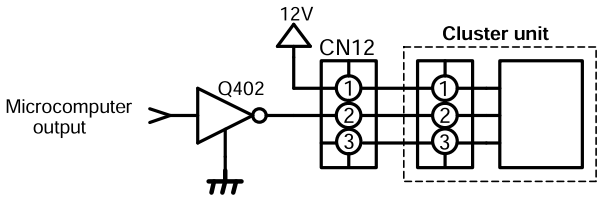
13.3. Disabling auto restart function

By removing (cutting) jumper O (JPO) 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.

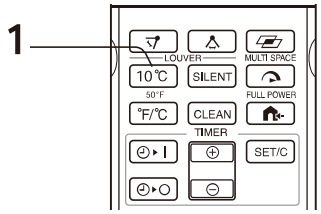
1) When microcomputer output turns "H," the Q402 output changes to "Lo," turning ON the SSR2 and applying 100 V to the cluster unit for the generation of cluster ions (positive and negative ions).



15. Switching the Hot Keep function

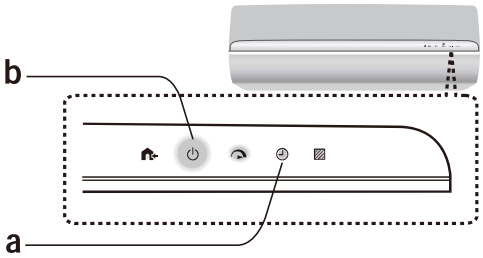
Hot Keep function to prevent cold air from coming out of the indoor unit when the compressor has stopped by stopping the indoor fan, and Hot Keep-less is to continue the fan operation even when the compressor has stopped to circulate the air.

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



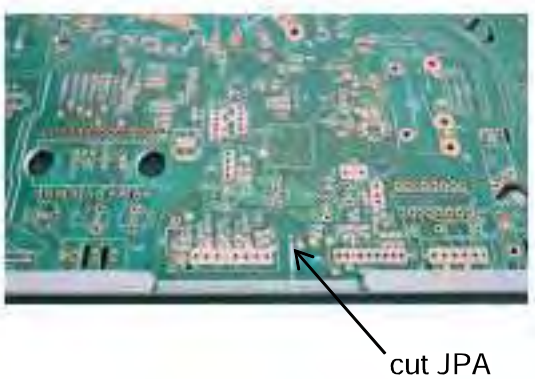
3) Press the "10°C" button one more time to change the mode, and the LED will display accordingly. The indoor unit will also make beeping sound three times.
4) Press "Stop" on the remote control to complete the change, or leave the unit untouched for 30 seconds to the change automatically.

16. INACTIVATE -17°F(-27°C) AUTO STOP FUNCTION

During the heating operation, the unit will automatically stop when the outdoor temperature drops below -17°F(-27°C) to prevent the outdoor unit from the damage caused by the freezing of the drained water. The unit will stop its operation for 4 hour and then resume the operation when the outdoor temperature rises above -13°F(-25°C).

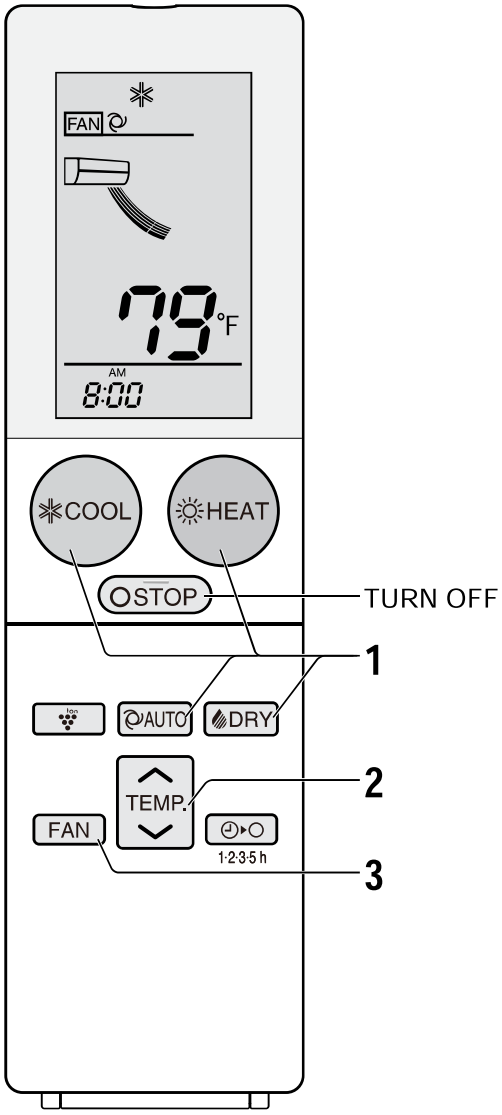
If the customer do not want to use this function, this function can be inactivated by cutting JPA on outdoor PWB.

1. Power off.
2. Cut the JPA



[4] OPERATION MANUAL

BASIC OPERATION



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 (50°F) button , MULTI SPACE button will be inactivated during AUTO mode.

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.

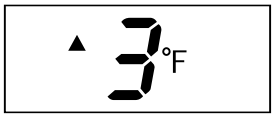
- The green OPERATION lamp (⏻) will turn off.

2 Press the TEMPERATURE button to set the desired temperature.

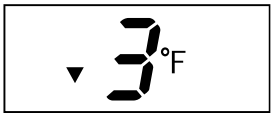
(COOL/HEAT/AUTO mode)
The temperature setting range: 61-86°F(16-30°C).

(DRY mode)
The temperature can be changed up to 3°F(2°C) above or below the temperature automatically determined by the air conditioner.

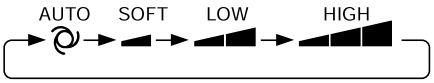
(Example: 3°F higher)



(Example: 3°F lower)



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

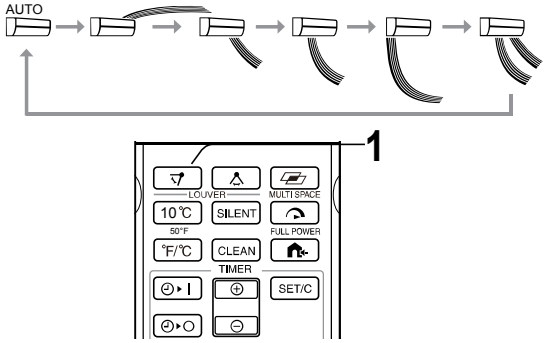


- In the DRY mode, the fan speed is preset to AUTO and cannot be changed.

ADJUSTING THE AIR FLOW DIRECTION

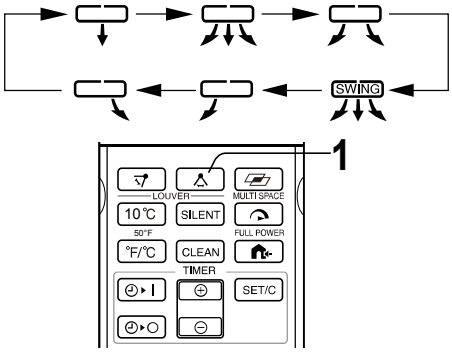
VERTICAL AIR FLOW DIRECTION

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.

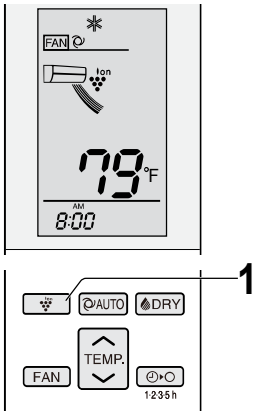
PLASMACLUSTER OPERATION

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.

he



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

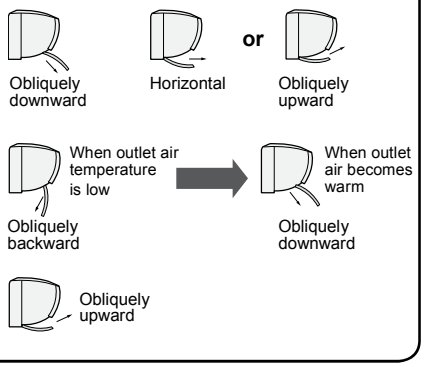
The open panel will be set obliquely downward for less than 20 minutes, and then shift to horizontal or obliquely upward to deliver cool air to the ceiling.

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.



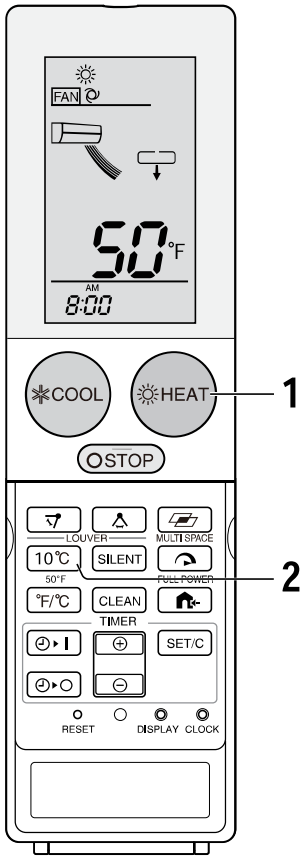
10˚C (50˚F) OPERATION

The unit will operate the heating mode at 10°C (50°F) to prevent freezing of the room when you are away from home for a long time.

1 Press the HEAT button to start HEAT operation.

2 Press the 10˚C (50°F) button.

• The remote control will display " **10˚C (50°F)** ".



TO CANCEL

Press the 10˚C (50°F) button again.

NOTE:

• 10˚C (50°F) 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 the MULTI SPACE button.

The remote control 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)

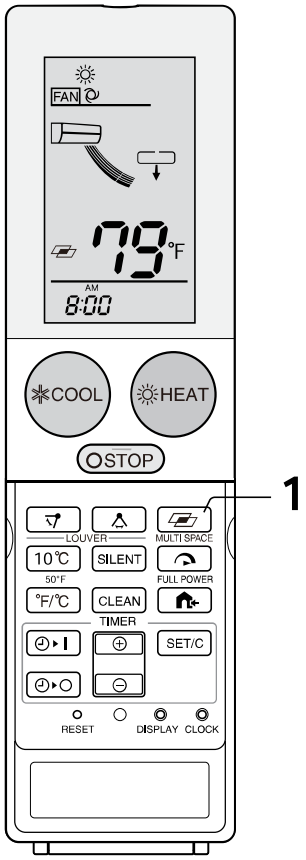
• The remote control will display "  ".

(COOL / DRY 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.

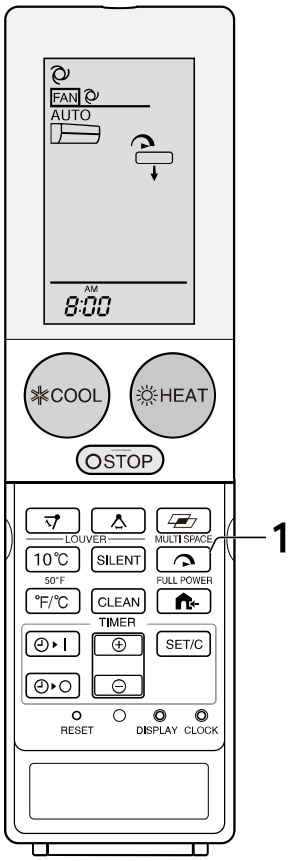
• Effectiveness of this function may differ depending on the room layout, installation position of the unit, and insulation level of the space concerned.

FULL POWER OPERATION

In this operation, the air conditioner works at the maximum power to make 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:

- 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.
- You can not set the temperature or fan speed during the FULL POWER operation.

SILENT OPERATION

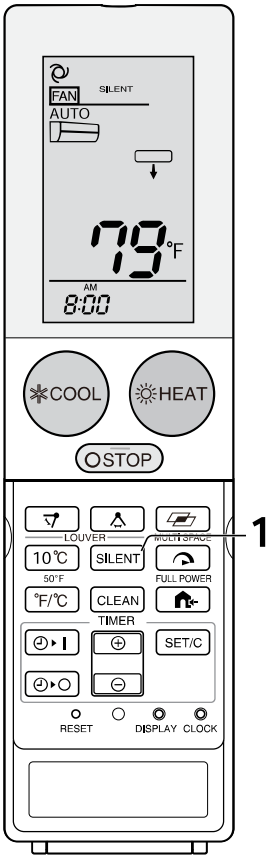
The unit will operate at "Extra LOW" fan speed for comfort and in need of quieter operation.

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.



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.

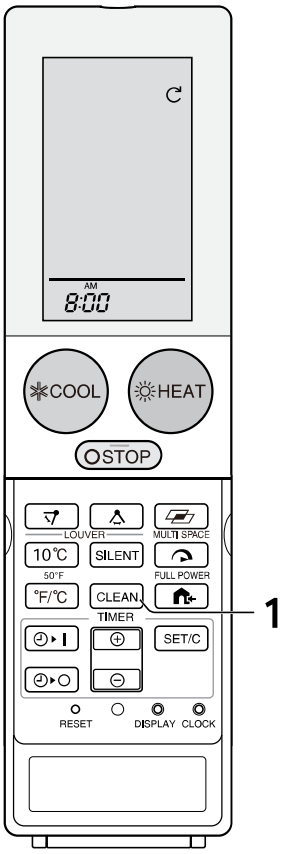
1 Press the SELF CLEAN button when the unit is not operating.

- 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 on the unit 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

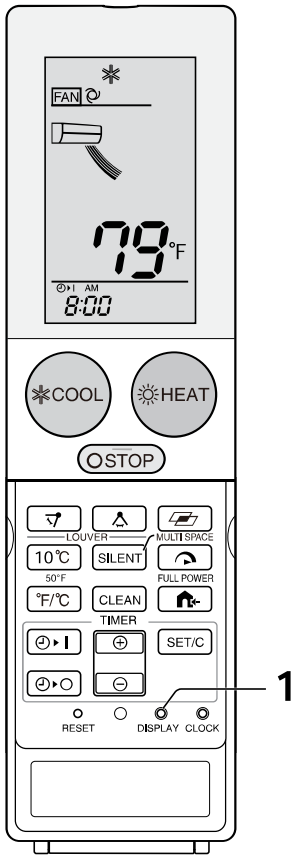
Press the DISPLAY button when the lamps on the unit are too bright.

1 During operation, press the DISPLAY button.

- Indoor unit lamps get dimmer.

TO LIGHT UP

Press the DISPLAY button again.



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.

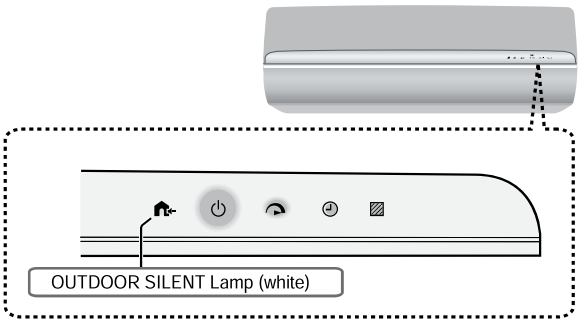
1 During operation, press the OUTDOOR SILENT button.

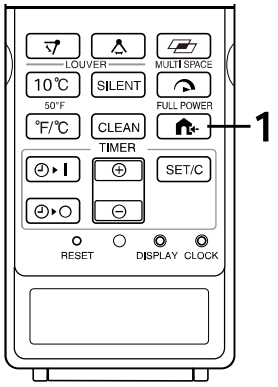
- The white OUTDOOR SILENT lamp on the unit will light up.

TO CANCEL

Press OUTDOOR SILENT button again.

- The white OUTDOOR SILENT lamp on the unit 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.

AUXILIARY MODE

Use this mode when the remote control is not available.

TO TURN ON

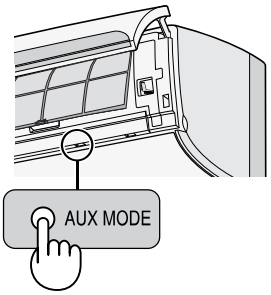
Press the AUX button.

- The green OPERATION lamp (⏻) on the unit will light and the unit will start operating in the AUTO mode.
- The fan speed and temperature setting are set to AUTO.

TO TURN OFF

Press the AUX button again.

- The green OPERATION lamp (⏻) on the unit will turn off.



TIPS ON SAVING ENERGY

Below are some simple ways to save energy when you use your air conditioner.

SET THE PROPER TEMPERATURE

- Setting to higher-(lower-)than-necessary temperature point will result in increased power consumption.

BLOCK DIRECT SUNLIGHT AND PREVENT DRAFTS

- Blocking direct sunlight during cooling operation will reduce power consumption.
- Close the windows and doors during cooling and heating operations.

SET PROPER AIR FLOW DIRECTION TO OBTAIN THE BEST AIR CIRCULATION

KEEP FILTER CLEAN TO ENSURE THE MOST EFFICIENT OPERATION

MAKE MOST OF THE TIMER OFF FUNCTION

TURN OFF THE CIRCUIT BREAKER WHEN THE UNIT IS NOT USED FOR AN EXTENDED PERIOD OF TIME

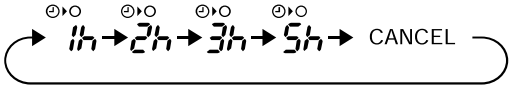
- The unit still consumes a small amount of power when it is not operating.

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.



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

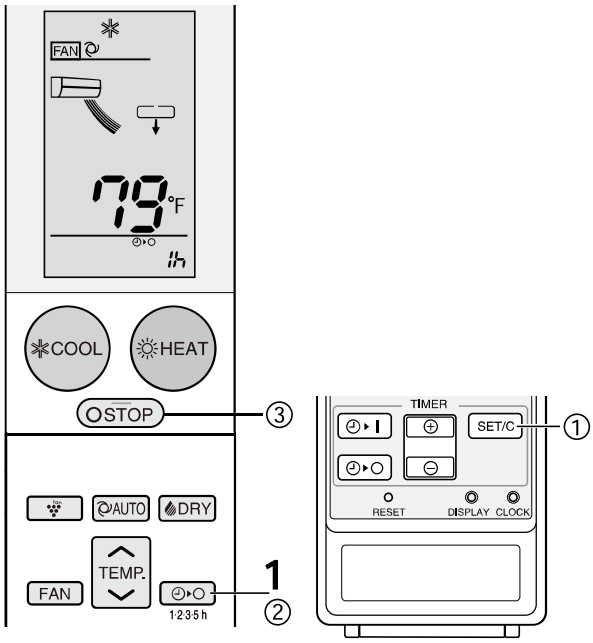
TO CANCEL

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

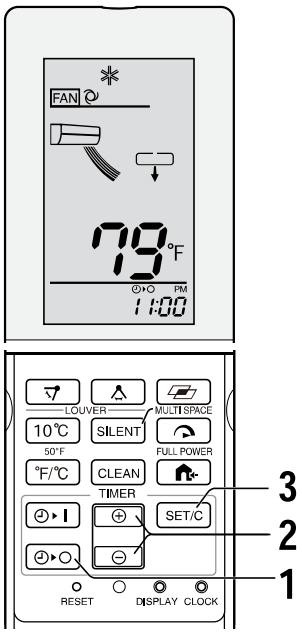
1 Press the TIMER OFF ( ) button.

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.

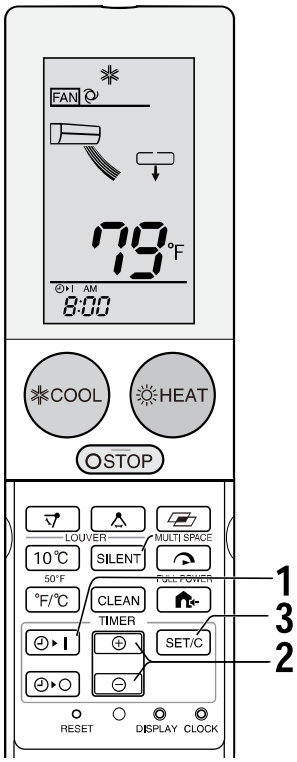
2 The TIMER ON indicator will blink; press the TIME ADVANCE (⊕) or REVERSE (⊖) button to set the desired time.

(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.



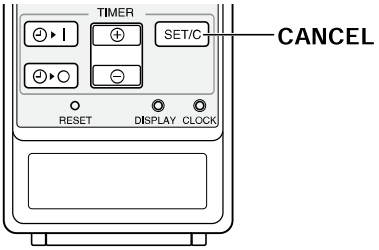
NOTE:

- 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)

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 outdoor 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 CONDITIONER 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

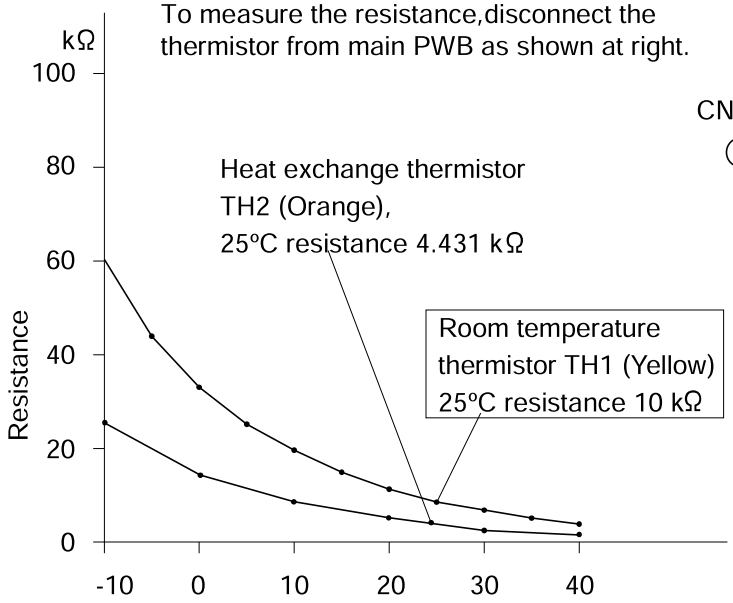
1. Indoor unit thermistor temperature characteristics

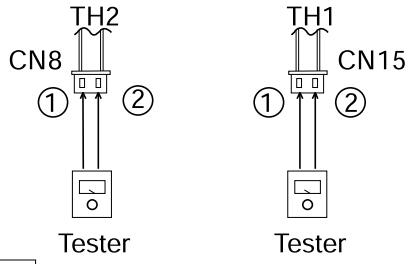
Figure 1 Temperature properties of indoor thermistors

Thermistor	Signal	Color
Room temperature	TH1	Yellow
Heat exchange	TH2	Orange

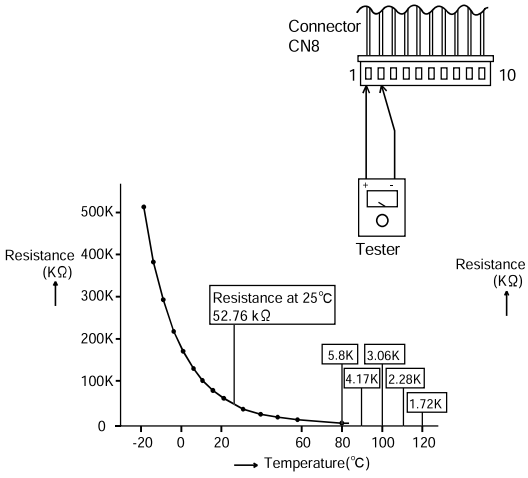
Room temperature thermistor TH1 CN15 ① - ②)
Heat exchange thermistor TH2 (CN8 ① - ②)

To measure the resistance,disconnect the thermistor from main PWB as shown at right.

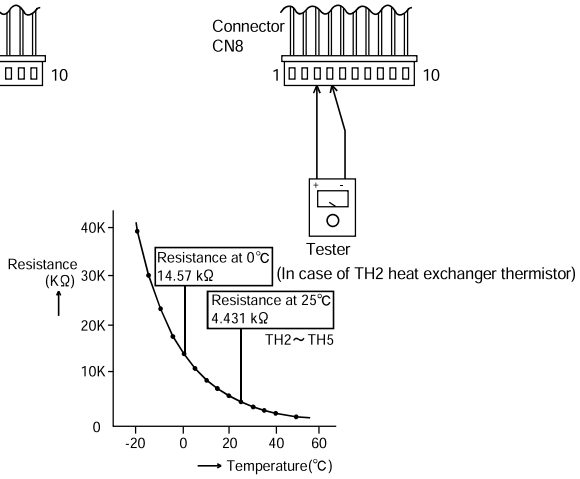




2. Outdoor unit thermistor temperature characteristics



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

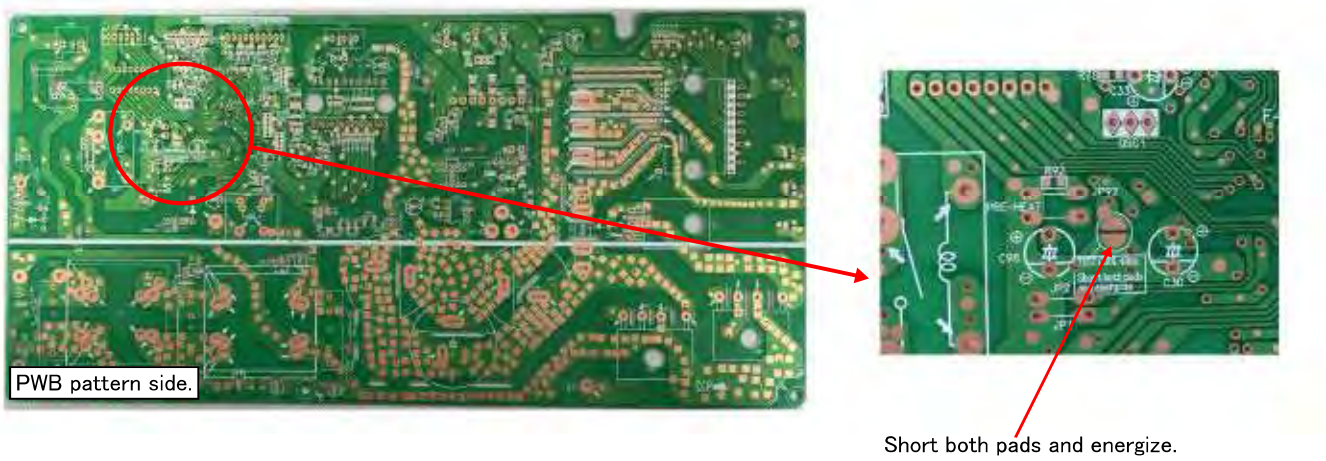
Before measuring resistance, disconnect connectors from PWB.

[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 rated VAC between (L1) and (L2) 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 L1-L2: 230 VAC, 60 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, 60 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.

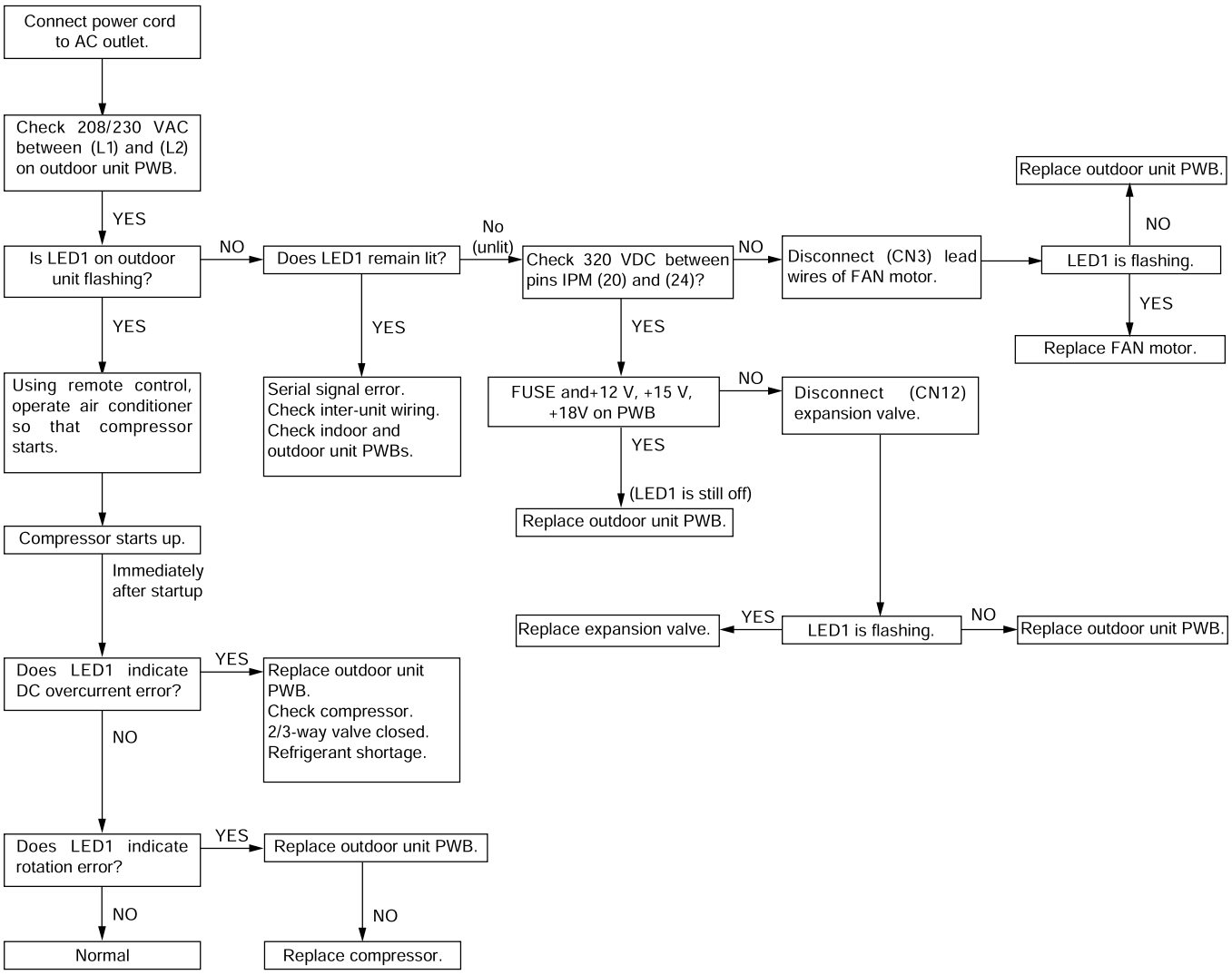
CAUTION: If fuse FU1/FU5 (outdoor unit control circuit board) is blown, be careful of charging voltage in inverter electrolytic capacitor C8, C9.

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.

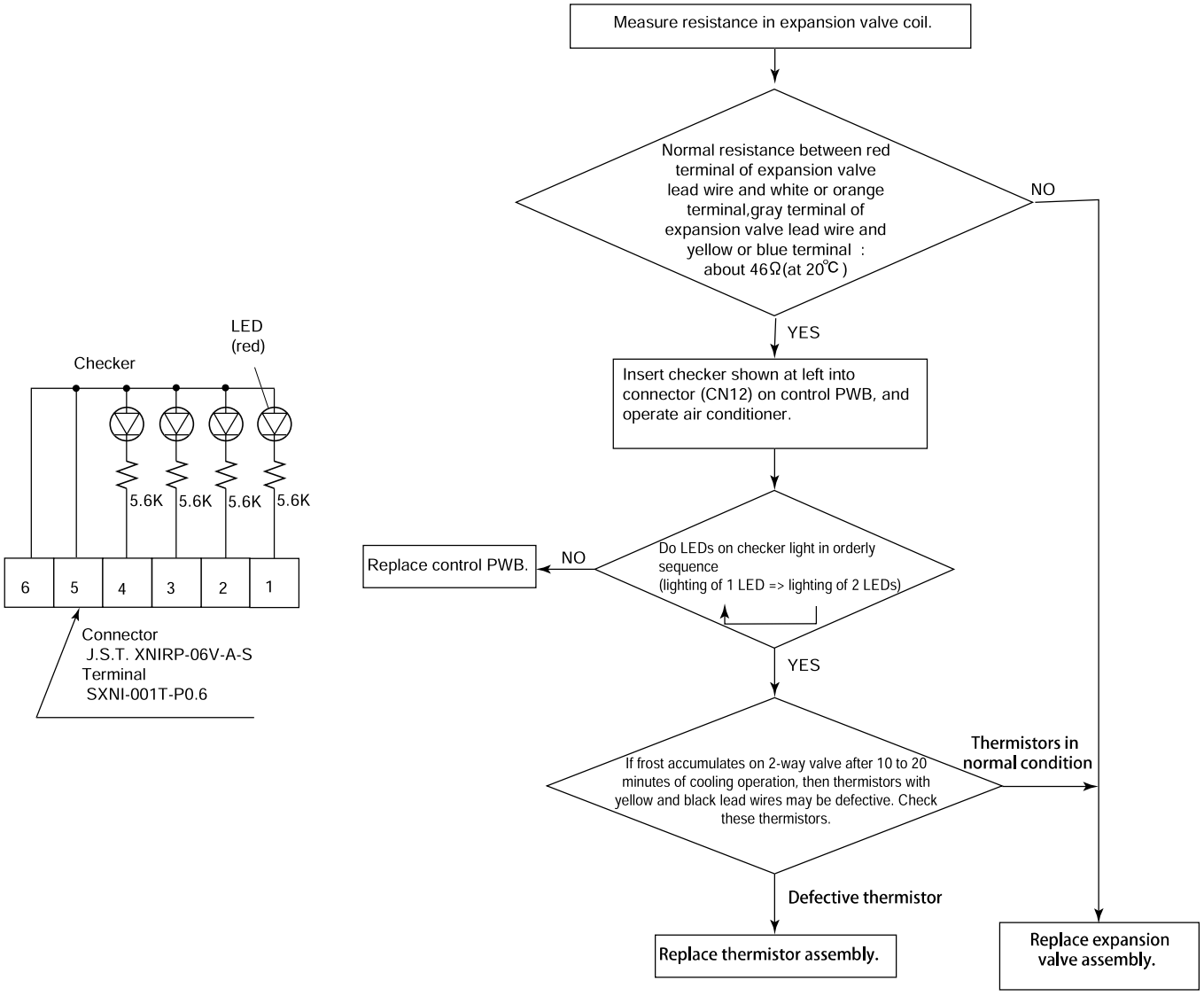


CAUTION: Please take care for electrical shock when you work to change defective parts or disconnect wires of defective application.

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.

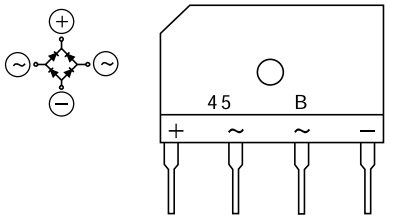
2. Procedure for determining defective expansion valve



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.

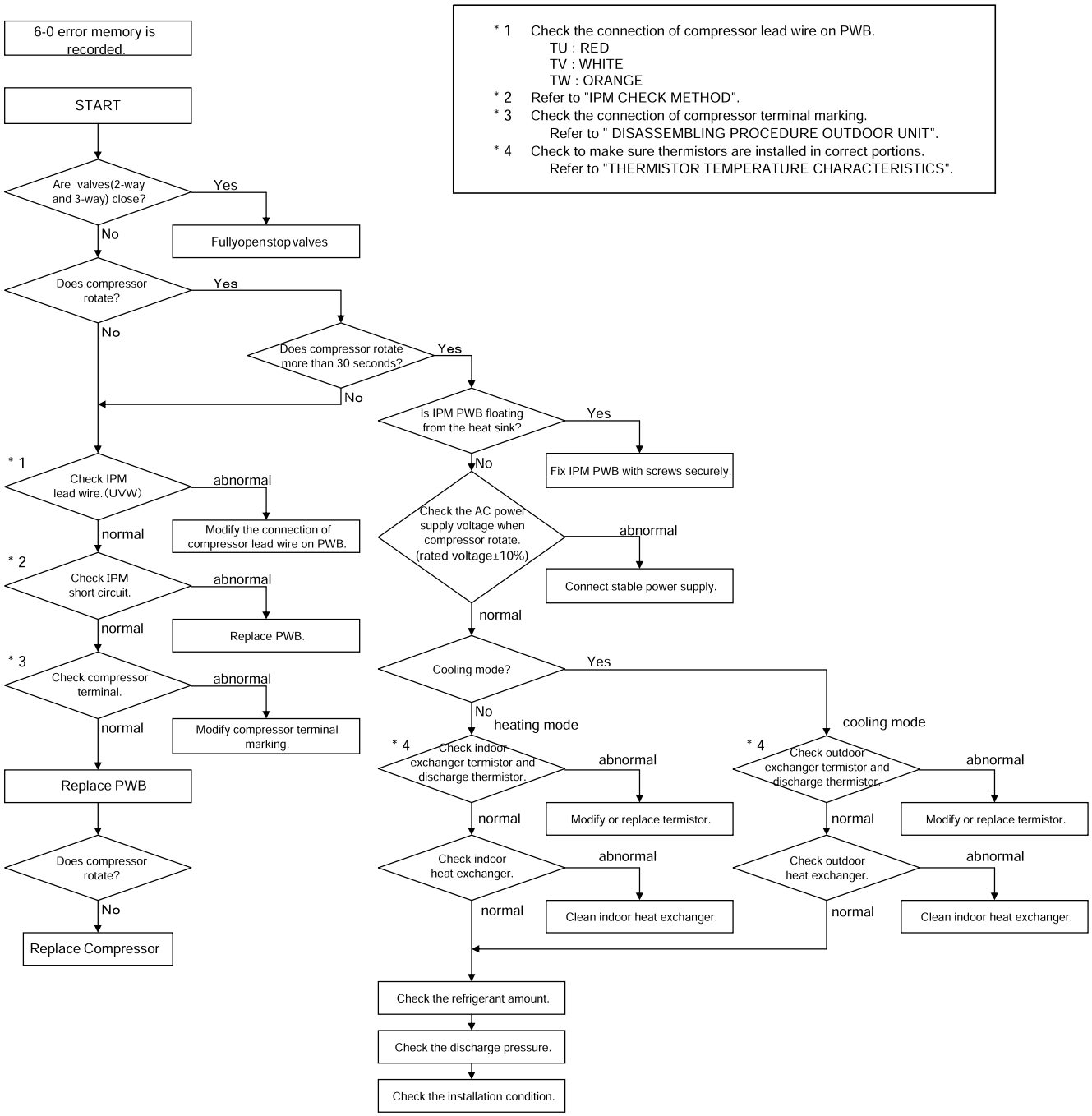
When using a digital tester, the (+) and (-) tester lead wires in the table must be reversed.

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)



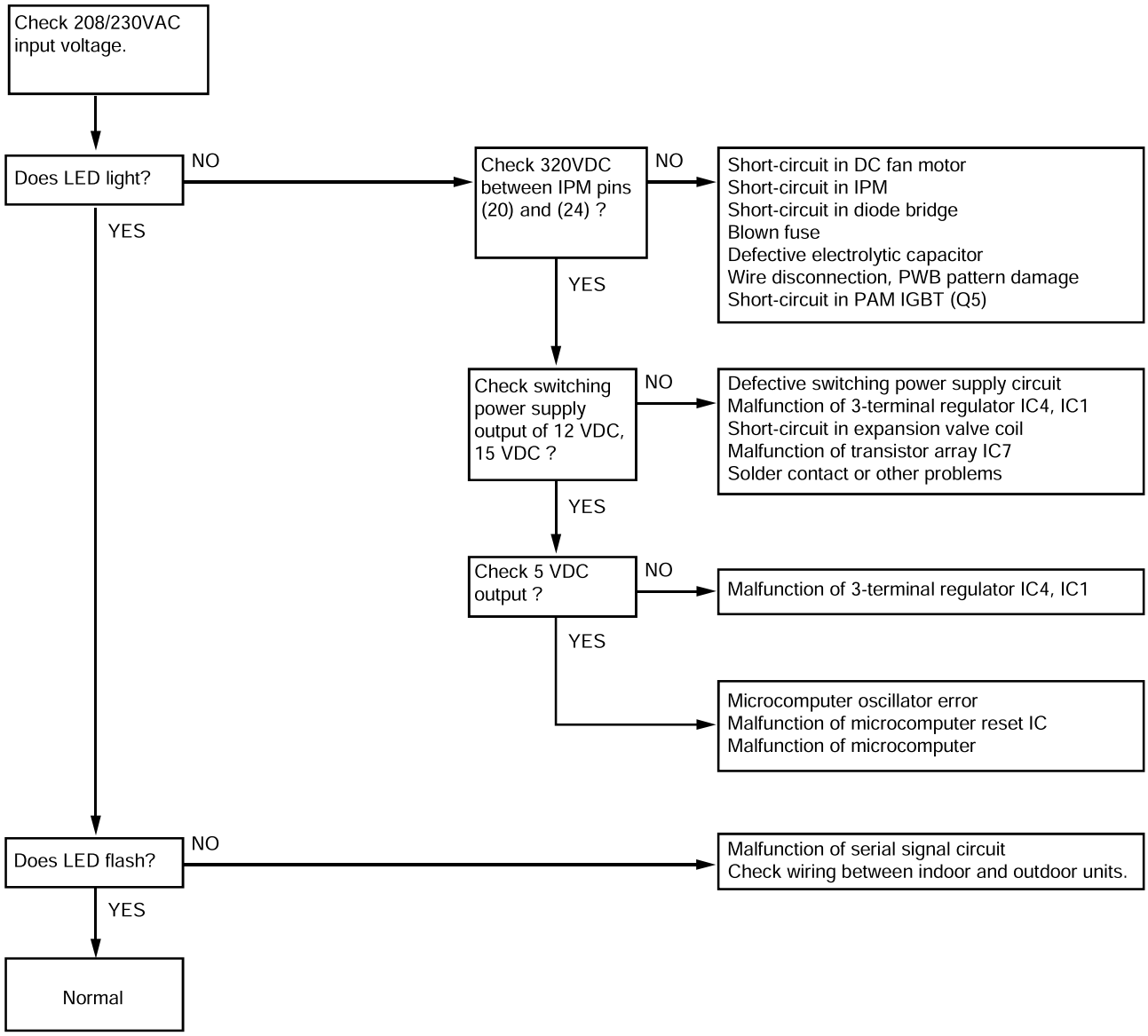
[7] OUTDOOR UNIT CHECK METHOD

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



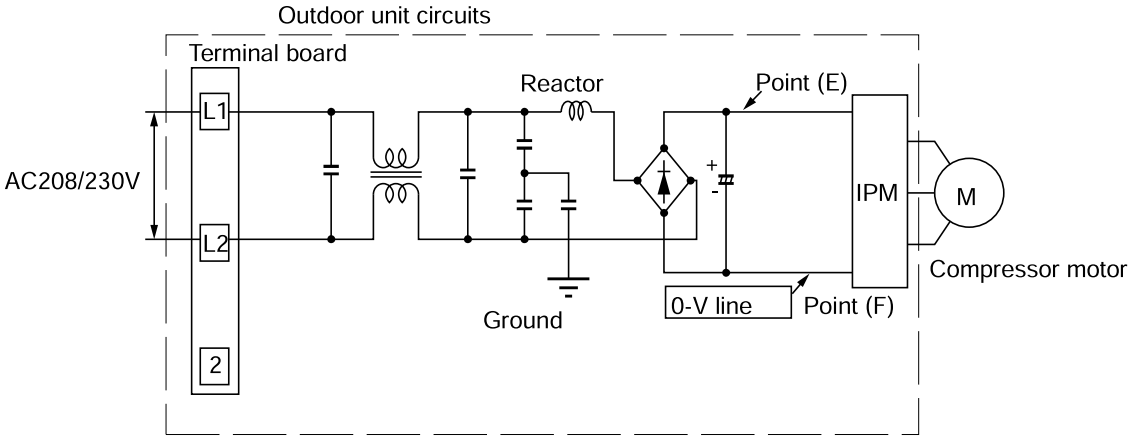
3. Caution in checking printed circuit boards (PWB)

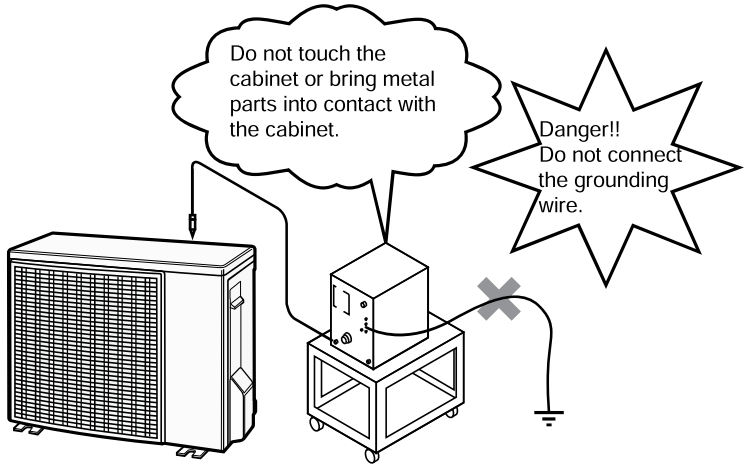
3.1. Non-insulated control circuit

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

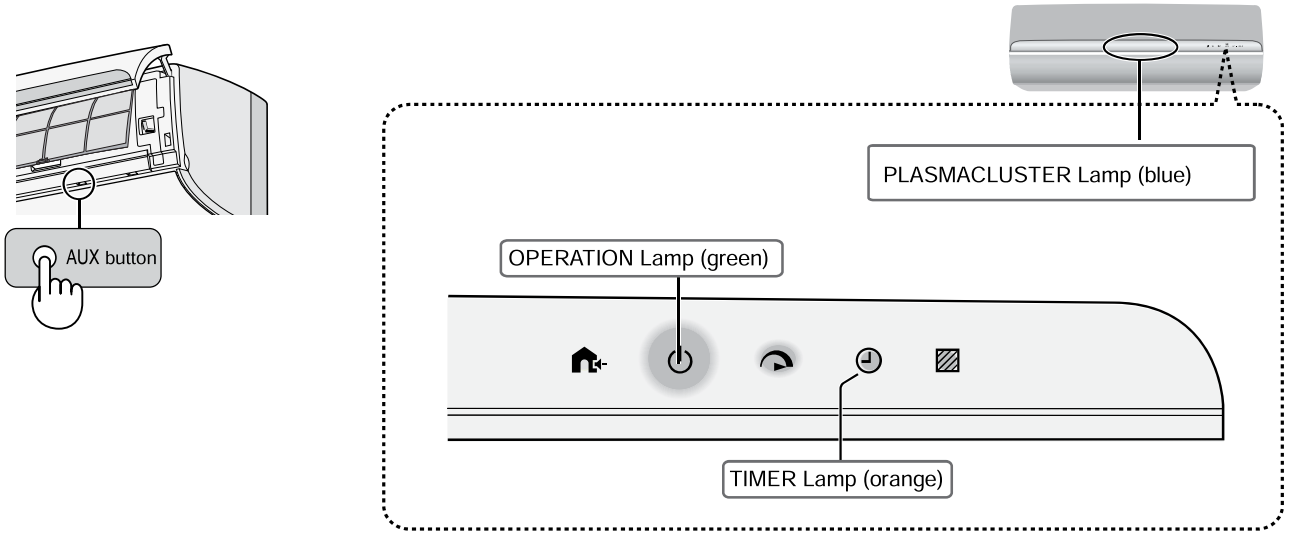
The oscilloscope (chassis ground) has the same electric potential as the 0-V probe. The entire electronic control section of the outdoor unit has a voltage potential difference from the ground as shown in the above diagram. When the oscilloscope is set up, the 0-V line and the ground voltage (ground) 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

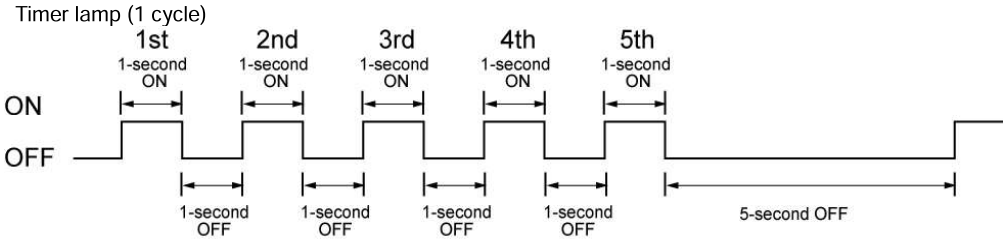
1. Indoor unit

- 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.



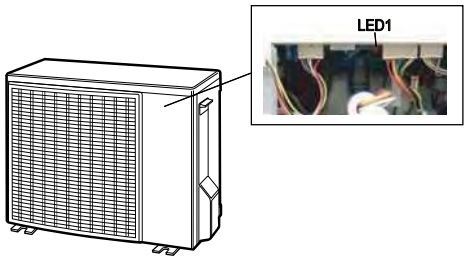
Display of self-diagnosis result

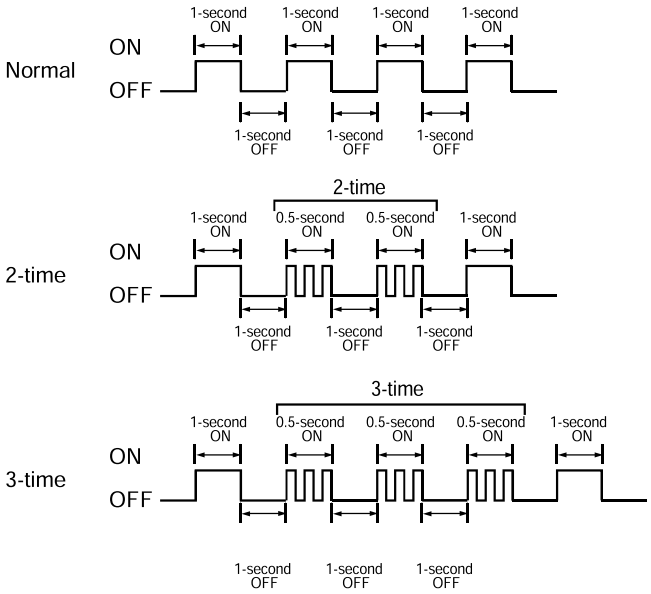
The operation lamp (green) and the Plasmacluster lamp (blue) flash in synchronization with the timer lamp (orange).



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	O	O	O	O	O	Timer (Orange)	0	0	Normal			
							Operation(green)						
							Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	1-time	O	O	O	O	O	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.
						O	Operation(green)						
							Plasmacluster (Blue)						
		O	O	O	O	O	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.
						O	Operation(green)						
						O	Plasmacluster (Blue)						
		O	O	O	O	O	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.
						O	Operation(green)						
					O		Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		3		2-way valve thermistor short circuit error		
						O	Operation(green)						
					O	O	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	2-time	O	O	O	O	O	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.
					O		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.		O	O	O	O	O	Timer (Orange)		1		Compressor discharge overheat.	(Temporary stop for cycle protection)	-
					O		Operation(green)						
						O	Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		2		Outdoor unit heat exchanger overheat.	(Temporary stop for cycle protection)	-
					O		Operation(green)						
					O		Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		3		Indoor unit heat exchanger overheat.	(Temporary stop for cycle protection)	-
					O		Operation(green)						
					O	O	Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		4		IPM high temperature error	(Temporary stop for cycle protection)	-
					O		Operation(green)						
				O			Plasmacluster (Blue)						
Indoor and outdoor units do not operate.		O	O	O	O	O	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.
					O		Operation(green)						
				O		O	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)						
										Heat Operation	-17°F/-27°C AUTO OFF	Measure the resistance of outdoor temperature thermister.	Replace the indoor unit thermister assembly.
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	O	O	O	O	O	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.
				O	O	O	Operation(green)						
							Plasmacluster (Blue)					(2) Check the outdoor unit fan for proper rotation.	(2) Check the outdoor unit fan motor.
		O	O	O	O	O	Timer (Orange)		1		AC current error when OFF	(1) IPM continuity check	(1) Replace the outdoor IPM PWB
				O	O	O	Operation(green)						
						O	Plasmacluster (Blue)						
		O	O	O	O	O	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.
				O	O	O	Operation(green)						
					O		Plasmacluster (Blue)					(2) Check the outdoor unit fan for proper rotation.	(2) Check the outdoor unit fan motor.
		O	O	O	O	O	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.
				O	O	O	Operation(green)						
					O	O	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	O	O	O	O	O	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.
			O				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.

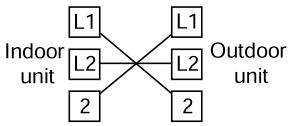
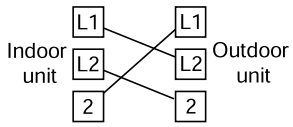
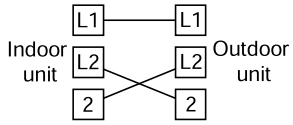
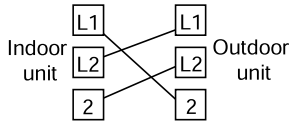
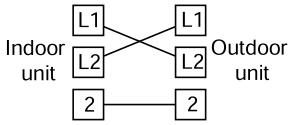
Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor and outdoor units do not operate.	9-time	O	O	O	O	O	Timer (Orange)	9	0	Cycle temperature	Thermistor installation error or 4-way valve error.	(1) Check the thermistor (heat exchanger) and (2-way valve) are installed in correct positions.	(1) Correct the installation.
			O			O	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.		O	O	O	O	O	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.
			O			O	Operation(green)						
				O			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	O	O	O	O	O	Timer (Orange)	10	0	EEPROM error	EEPROM (outdoor) data error	-	(1) Replace the outdoor unit control PWB assembly.
			O		O		Operation(green)						
							Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		1		EEPROM (outdoor) data error		
			O		O		Operation(green)						
						O	Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		2		CPU (outdoor) RAM data error		
			O		O		Operation(green)						
					O		Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		3		CPU(Microcomputer outdoor) error	-	(1) Replace the outdoor unit control PWB assembly. (main-PWB)
			O		O		Operation(green)						
					O	O	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	O	O	O	O	O	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.
			O		O	O	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.
		O	O	O	O	O	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.
			O		O	O	Operation(green)						
						O	Plasmacluster (Blue)						
												(2) Outdoor unit fan motor continuity check.	(2) Replace the outdoor unit fan.
		O	O	O	O	O	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.
			O		O	O	Operation(green)						
					O		Plasmacluster (Blue)					(2) (1):Normal	(2) Replace the outdoor unit fan.
		O	O	O	O	O	Timer (Orange)		3		Detection error of DC fan negative rotation before compressor is driven	(1) (Temporary stop for DC fan circuit protection)	-
			O		O	O	Operation(green)						
					O	O	Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		4		Detection error of inverter current for DC fan	-	(1) Replace the outdoor unit control PWB assembly.
			O		O	O	Operation(green)						
				O			Plasmacluster (Blue)						
		O	O	O	O	O	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.
			O		O	O	Operation(green)						
				O		O	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	O	O	O	O	O	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
			O	O			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	O	O	O	O	O	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)
			O	O		O	Operation(green)						
							Plasmacluster (Blue)						
		O	O	O	O	O	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.
			O	O		O	Operation(green)						
						O	Plasmacluster (Blue)						
		O	O	O	O	O	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.
			O	O		O	Operation(green)						
					O		Plasmacluster (Blue)						
												(4) No abnormality found in above inspections (1) through (3).	(4) Replace the compressor.
Indoor and outdoor units operate.		O	O	O	O	O	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.
			O	O		O	Operation(green)						
					O	O	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	14-time	O	O	O	O	O	Timer (Orange)	14	0	Outdoor unit PAM	PAM over voltage error	(1) Check the AC power supply voltage for fluctuation.	(1) Correct the installation.
			O	O	O		Operation(green)						
							Plasmacluster (Blue)						
												(2) No abnormality found in above inspection.	(2) Replace the PWB assembly.
		O	O	O	O	O	Timer (Orange)		1		PAM clock error	(1) Check the PAM clock for proper input.	(1) Replace the outdoor unit control PWB assembly.
			O	O	O		Operation(green)						
						O	Plasmacluster (Blue)						
		O	O	O	O	O	Timer (Orange)		2		PAM under voltage error	(1) Check the AC power supply voltage for fluctuation.	(1) Correct the installation.
			O	O	O		Operation(green)						
					O		Plasmacluster (Blue)						
												(2) No abnormality found in above inspection.	(2) Replace the PWB assembly.

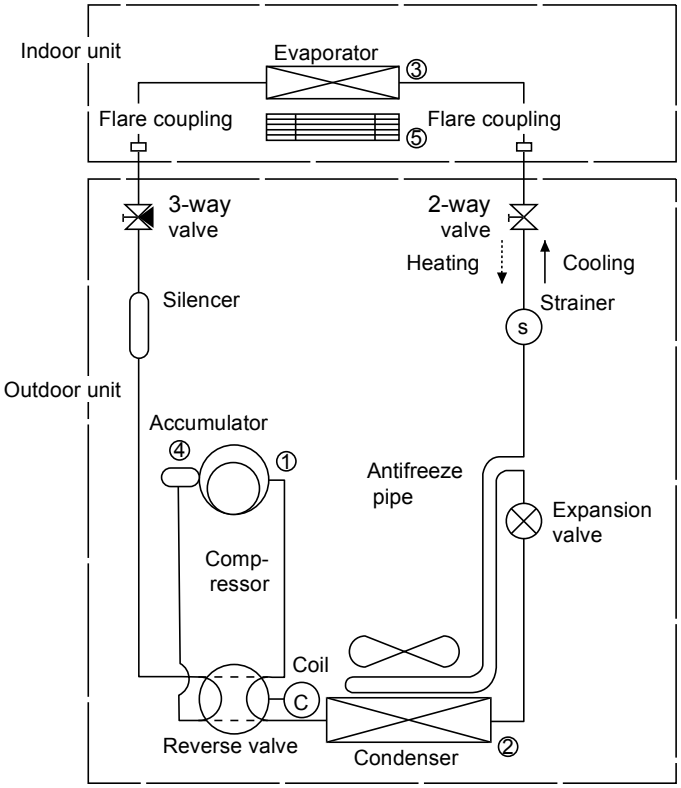
Problem symptom	Outdoor unit indication (LED1)	Indoor unit						Malfunction No.		Content of diagnosis		Check point	Action
							Lamp	Main	Sub	Main	Sub		
Indoor unit operates. Outdoor unit does not operate.	Lighting or OFF	O	O	O	O	O	Timer (Orange)	17	0	Wiring between units	Serial open-circuit	(1) Check the wires between units.	(1) Connect stable power supply. Correct the wiring.
		O				O	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	O	O	O	O	O	Timer (Orange)	18	0	Wiring between units	Serial short-circuit	(1) Check the wiring between units.	(1) Correct the wiring.
		O			O		Operation(green)						
							Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	Lighting or OFF	O	O	O	O	O	Timer (Orange)		1		Serial erroneous wiring	(1) Check the wiring between units.	(1) Correct the wiring.
		O			O		Operation(green)						
						O	Plasmacluster (Blue)						
Indoor and outdoor units do not operate.	Normal blinking or OFF	O	O	O	O	O	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.
		O			O	O	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	O	O	O	O	O	Timer (Orange)	20	0	Indoor unit control PWB	EEPROM data error	(1) (EEPROM read data error)	(1) Replace the indoor unit control PWB.
		O		O			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

Temperature of each part and presure of 3-way valve are acquired in standard condition, and would change with condition around. The standard condition is as follows:

	Indoor side		Outdoor side	
	Dry-bulb Temp. °F(℃)	**Relative Humidity (%)**	**Dry-bulb Temp. °F(℃)**	**Relative Humidity (%)**
Cooling	80(26.7)	50.7	95(35)	-
Heating	70(21.1)	–	47(8.33)	72.7

* PIPE LENGTH: 25ft [7.6m].

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

1. AY-XP12THU/AE-X12THU

Mode	Cooling		Heating	
	Max	**Test Run**	**Max**	**Test Run**
Compressor frequency (Hz)	53 or More	42 Fixed	81 or More	42 Fixed
Temp. on (1) ˚F(℃)	147 (64)	140 (60)	171 (77)	124 (51)
Temp. on (2) ˚F(℃)	108 (42)	106 (41)	36 (2)	37 (3)
Temp. on (3) ˚F(℃)	57 (14)	61 (16)	117 (47)	97 (36)
Temp. on (4) ˚F(℃)	55 (13)	63 (17)	36 (2)	41 (5)
Outlet Air Temp. on (5) ˚F(℃)	57 (14)	61 (16)	117 (47)	93 (34)
3-way valve pressure PSIG (MPaG)	142 (1.0)	149 (1.0)	390 (2.7)	296 (2.0)
AC Current (A) *	4.8	4.0	8.0	3.5

Caution: Indoor fan speed is set to [HIGH]
*AC power supply is set to 230V , 60Hz

2. AY-XP18THU/AE-X18THU

Mode	Cooling		Heating	
	Max	Test Run	Max	Test Run
Compressor frequency (Hz)	91 or More	42 Fixed	98 or More	42 Fixed
Temp. on (1) ˚F(℃)	176 (80)	144 (62)	180 (82)	124 (51)
Temp. on (2) ˚F(℃)	109 (43)	106 (41)	37 (3)	36 (2)
Temp. on (3) ˚F(℃)	55 (13)	61 (16)	120 (49)	95 (35)
Temp. on (4) ˚F(℃)	46 (8)	63 (17)	34 (1)	39 (4)
Outlet Air Temp. on (5) ˚F(℃)	54 (12)	61 (16)	120 (49)	91 (33)
3-way valve pressure PSIG (MPaG)	126 (0.87)	151 (1.04)	437 (3.01)	283 (1.95)
AC Current (A) *	9.6	3.8	10.5	3.2

Caution: Indoor fan speed is set to [HIGH]
*AC power supply is set to 230V , 60Hz

[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.

1. AY-XP12THU/AE-X12THU

	Cooling		Heating	
Outdoor Air Temp.	＜104˚F(40℃)	≧104˚F(40℃)	＜54˚F(12℃)	≧54˚F(12℃)
Peak Current (A)	7.47	7.47	12.91	12.91

2. AY-XP18THU/AE-X18THU

	Cooling		Heating	
Outdoor Air Temp.	＜104˚F(40℃)	≧104˚F(40℃)	＜54˚F(12℃)	≧54˚F(12℃)
Peak Current (A)	10.82	9.46	13.85	9.46

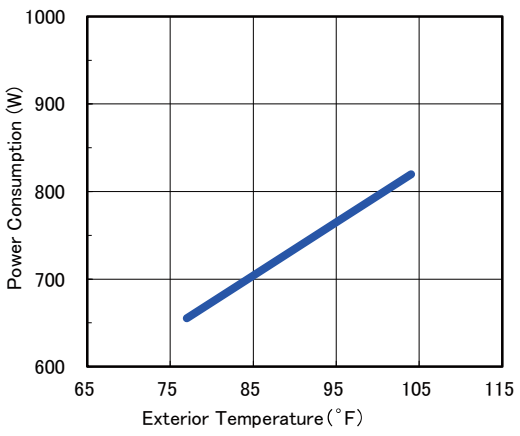
[5] PERFORMANCE CURVES

NOTE

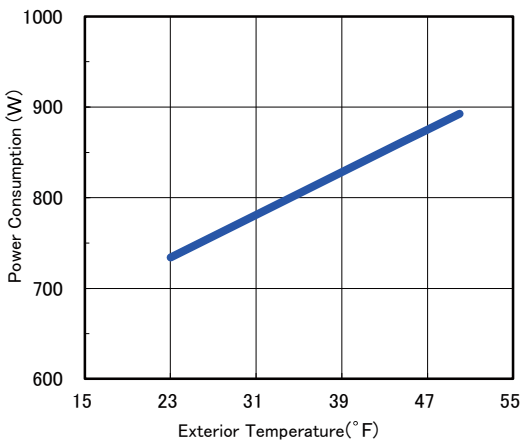
1) Indoor fan speed: Hi
2) Vertical adjustment louver " ", Horizontal adjustment louver " "
3) Indoor air temp.: Cooling 80˚F(26.7°C), Heating 70˚F(21.1°C)
4) Power source: 230V, 60Hz
5) Performance corresponding to change in outside temperature when compressor is fixed to rated operation.

1. AY-XP12THU/AE-X12THU

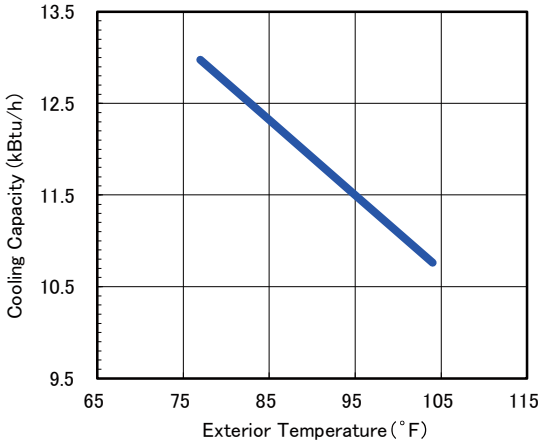
At Cooling



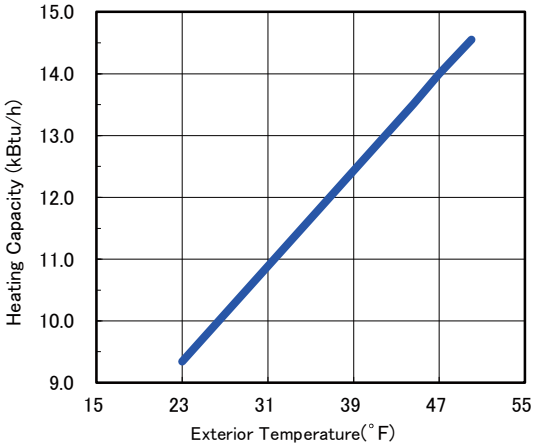
At Heating



At Cooling

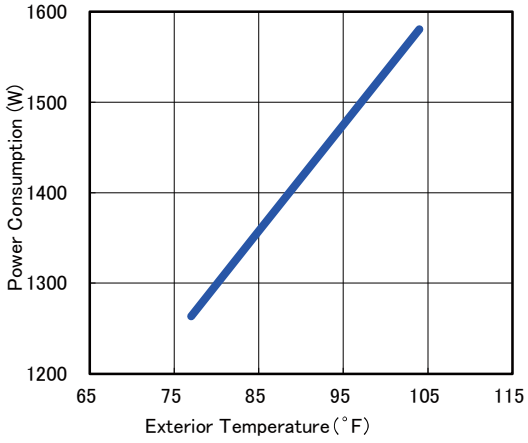


At Heating

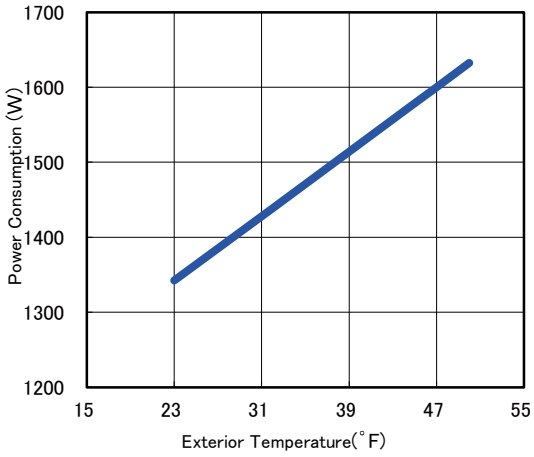


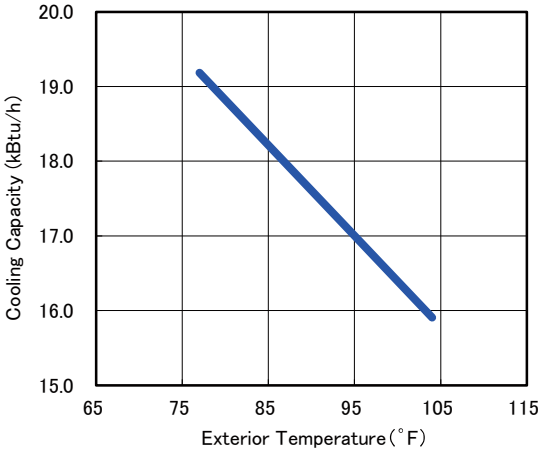
2. AY-XP18THU/AE-X18THU

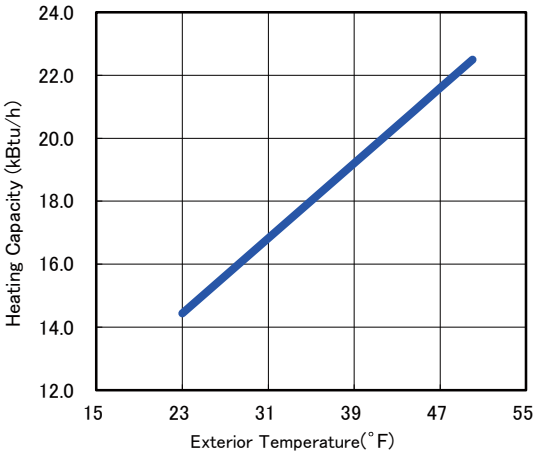
At Cooling



At Heating







[6] LOW TEMP. HEATING CAPACITY

1. AY-XP12THU/AE-X12THU

Indoor fan setting : High
Data below is without any frost.

			Indoor temperature							
		˚FDB	60		65		70		75	
	˚FDB	˚FWB	Heating Capacity (kBtu/h)	Power Consumption (kW)	Heating Capacity (kBtu/h)	Power Consumption (kW)	Heating Capacity (kBtu/h)	Power Consumption (kW)	Heating Capacity (kBtu/h)	Power Consumption (kW)
Outdoor temperature	-13	-14	11.45	1.32	11.04	1.34	10.60	1.36	10.20	1.38
	-4	-6	13.75	1.42	13.09	1.44	12.40	1.47	11.77	1.50
	5	3	14.80	1.53	14.42	1.57	14.00	1.61	13.65	1.65
	14	12	18.28	1.64	17.79	1.68	17.30	1.73	16.82	1.78

			Indoor temperature							
		˚CDB	15.6		18.3		21.1		23.9	
	˚CDB	˚CWB	Heating Capacity (kW)	Power Consumption (kW)	Heating Capacity (kW)	Power Consumption (kW)	Heating Capacity (kW)	Power Consumption (kW)	Heating Capacity (kW)	Power Consumption (kW)
Outdoor temperature	-25	-25.4	3.36	1.32	3.23	1.34	3.11	1.36	2.99	1.38
	-20	-21	4.03	1.42	3.84	1.44	3.64	1.47	3.45	1.50
	-15	-16	4.34	1.53	4.23	1.57	4.11	1.61	4.00	1.65
	-10	-11	5.36	1.64	5.21	1.68	5.07	1.73	4.93	1.78

2. AY-XP18THU/AE-X18THU

Indoor fan setting : High
Data below is without any frost.

			Indoor temperature							
		˚FDB	60		65		70		75	
	˚FDB	˚FWB	Heating Capacity (kBtu/h)	Power Consumption (kW)	Heating Capacity (kBtu/h)	Power Consumption (kW)	Heating Capacity (kBtu/h)	Power Consumption (kW)	Heating Capacity (kBtu/h)	Power Consumption (kW)
Outdoor temperature	-13	-14	12.88	1.48	12.60	1.52	12.30	1.57	11.98	1.62
	-4	-6	15.32	1.61	14.87	1.64	14.40	1.68	13.96	1.72
	5	3	17.45	1.73	16.94	1.77	16.40	1.81	15.85	1.85
	14	12	20.19	1.85	19.53	1.89	18.84	1.93	18.14	1.97

			Indoor temperature							
		˚CDB	15.6		18.3		21.1		23.9	
	˚CDB	˚CWB	Heating Capacity (kW)	Power Consumption (kW)	Heating Capacity (kW)	Power Consumption (kW)	Heating Capacity (kW)	Power Consumption (kW)	Heating Capacity (kW)	Power Consumption (kW)
Outdoor temperature	-25	-25.4	3.78	1.48	3.69	1.52	3.60	1.57	3.51	1.62
	-20	-21	4.49	1.61	4.36	1.64	4.22	1.68	4.09	1.72
	-15	-16	5.12	1.73	4.96	1.77	4.80	1.81	4.64	1.85
	-10	-11	5.92	1.85	5.72	1.89	5.52	1.93	5.32	1.97

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.

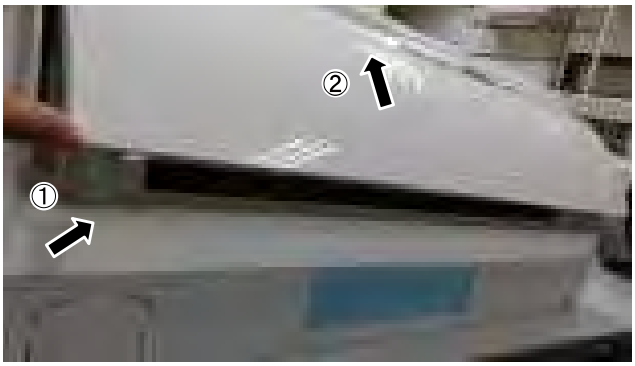
[1] INDOOR UNIT

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)

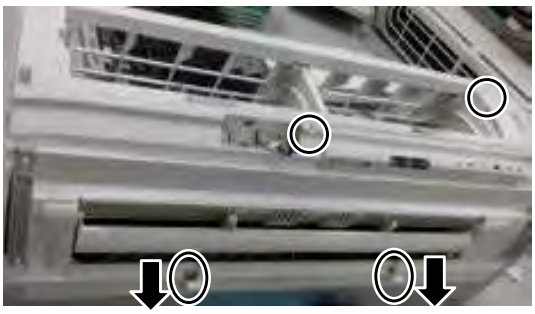


4. Pull out two left and right filters.

5) Take down the cover by a slotted screwdriver.

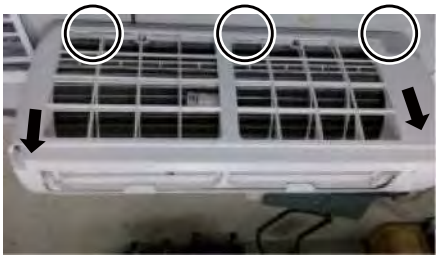
6) Take down the connection.(one place)

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



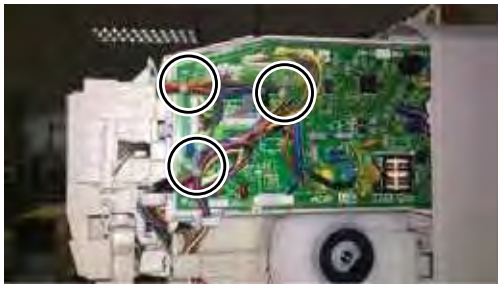
8) Rotate the longitudinal plate to the horizontal direction.

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

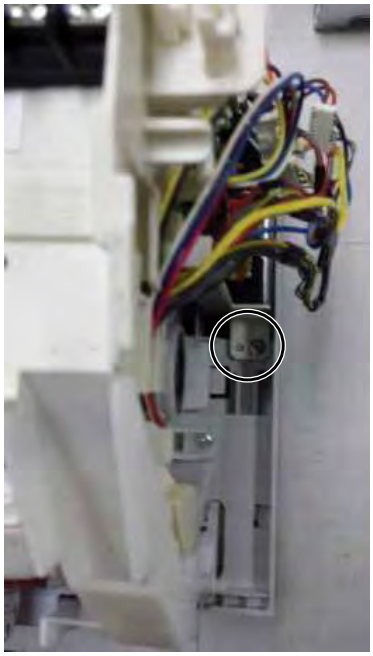


10) Take down the pressing line plate and wire terminals.

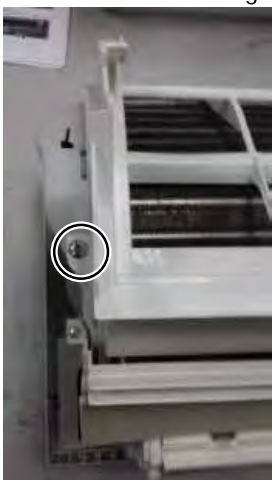
11) Dismantle the cover of control substrate and snip the wire fixing bands.Then pull down the fixed terminals of connector clips.



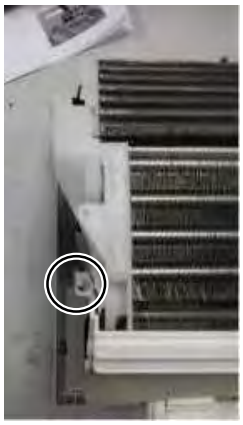
12) Remove a screw which fixes the electric box.



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.

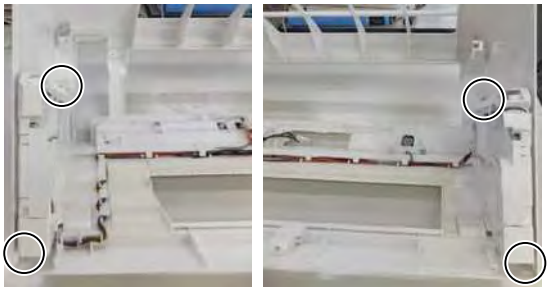
17) Slide and open the cover on the right and slide the fan motor out at one time.

2. Infront panel assembly

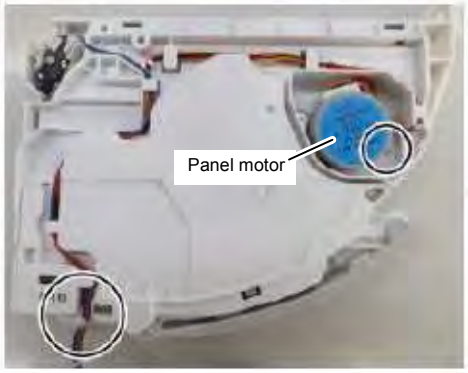
1) Cut the wire fixing bands inside and pull out the connecters, then remove the two screws.

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

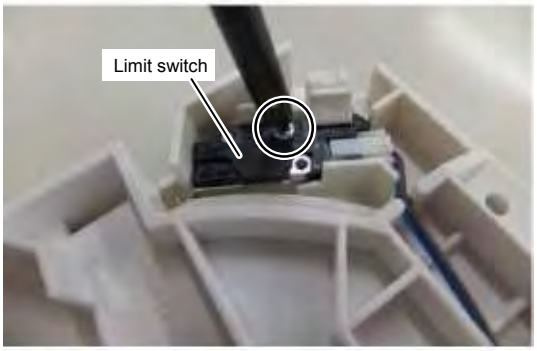
3) Take the panel mecha assemblies apart from the front panel. (2 screws each side)



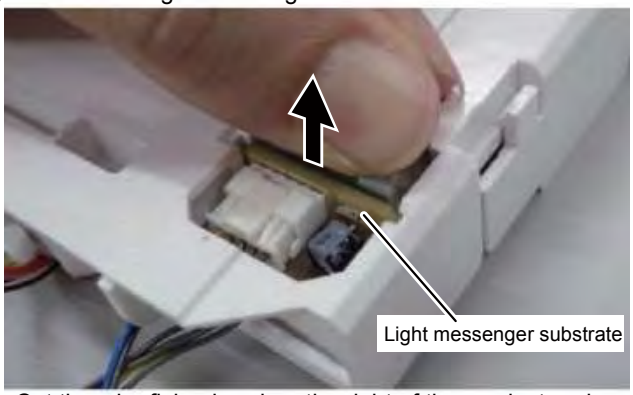
4) Cut the wire fixing band on the right side of the product,and remove the panel motor after unscrewing a screw of it.



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

[2] OUTDOOR UNIT

1.Body's decomposition steps

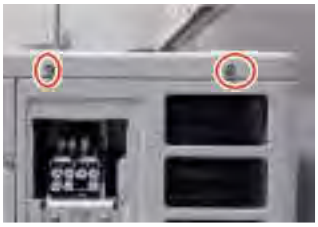
1) Remove a screw fixing the electric cap,then remove the cap.

2) Remove 2 screws fixing the terminal cover then remove it. Then remove the holder.

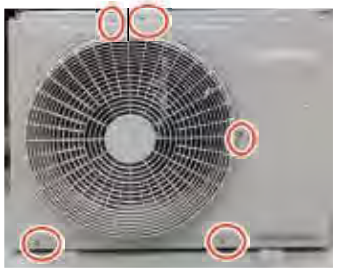
3) Remove the top cover after removing 4 screws of it.

(Left side of top cover)

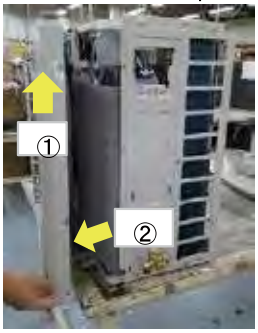
(Right side of top cover)



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 4 screws of wire guard,then remove it.

7) Remove the cover R.(8 screws)

8) Remove the cover L. (4 screws)

9) Remove the screw fixing the electric box.

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

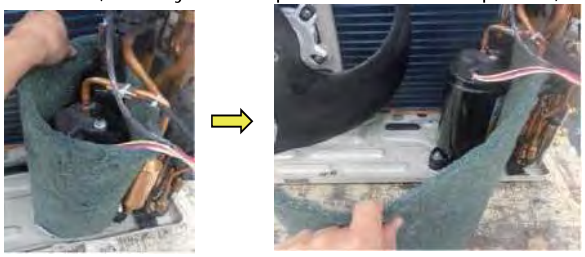
11) Cut the wire fixing band fixing the transfer connector of the compressor and electric box and take down the transfer connectors of compressor.

Remove the electric box

12) Remove the sound-absorbing cotton outside.Then remove the sheltering baffle.(2 screws)

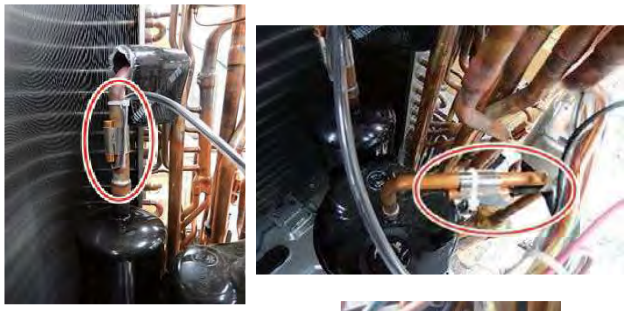
13) Take apart the cover, the cover of compressor,sound-absorbing cotton inside.(5 screws)

(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)

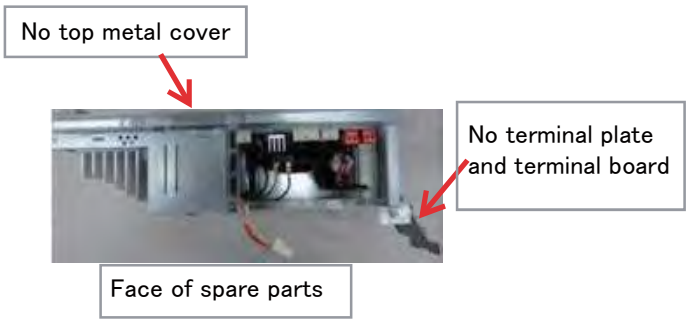
17) Remove 2 screws fixing the motor angle.

18) Take apart 2 screws fixing the motor angle.

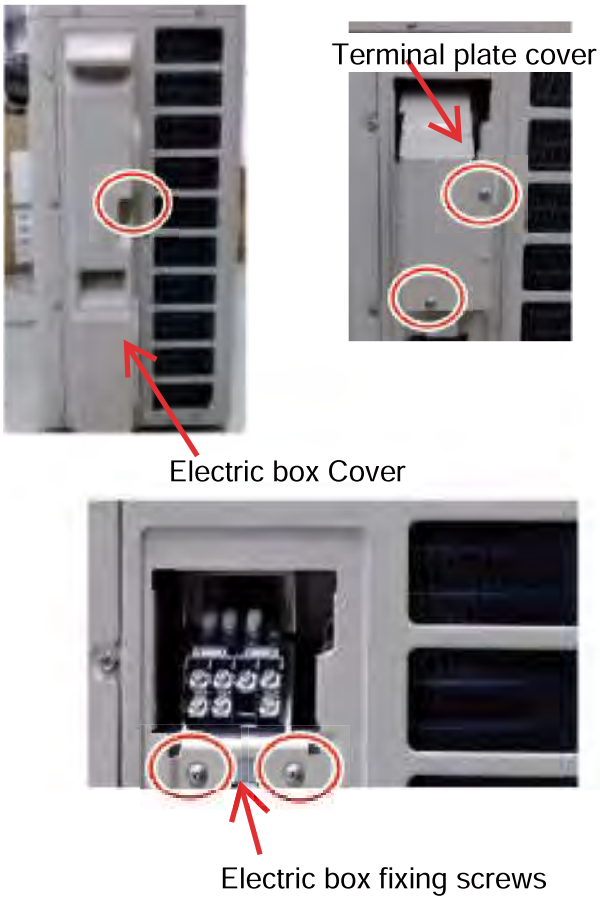
2.Electrical parts exchange methods of outdoor unit

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.

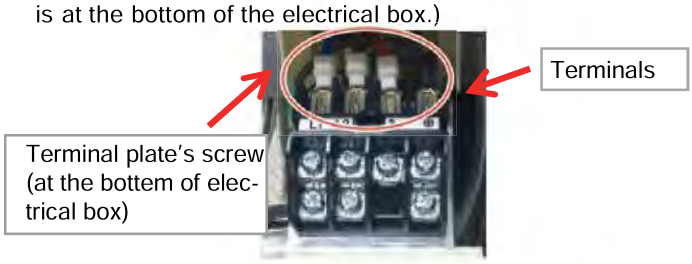
- Terminal plate（Used to connect the indoor and outdoor units）
- Terminal board
- Metal cover on the top of electrical box（Electrical box cover）



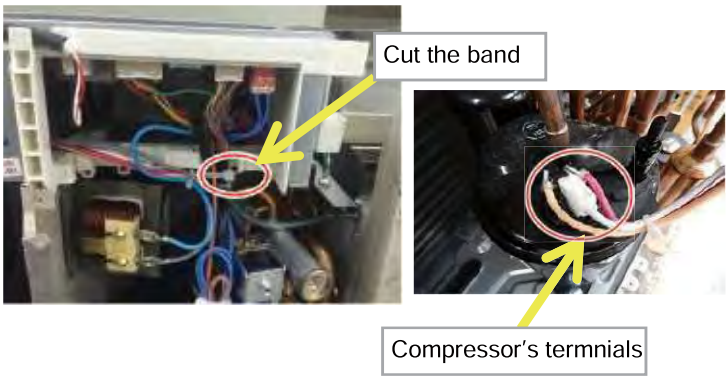
1) The cover on the side of terminal plate
(Don't need to remove plate R)
Remove the electrical box cover(resin). (1 screw)
Remove the terminal plate cover(metal).(2 screws)
Remove the 2 screws fixing the electrical box.



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.))



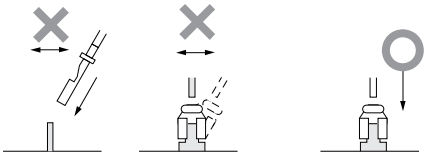
4) Remove the screw under the electrical box.

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.

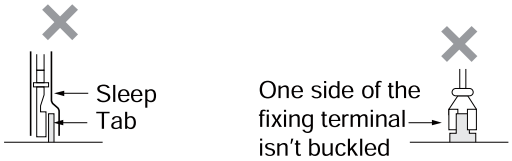
Notice:

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.

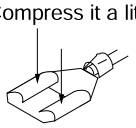


3) Pay attention to the lock pin when pluging the city block fasten terminal.Try not plug the terminal by hand,or clip the lock part with radio pench.

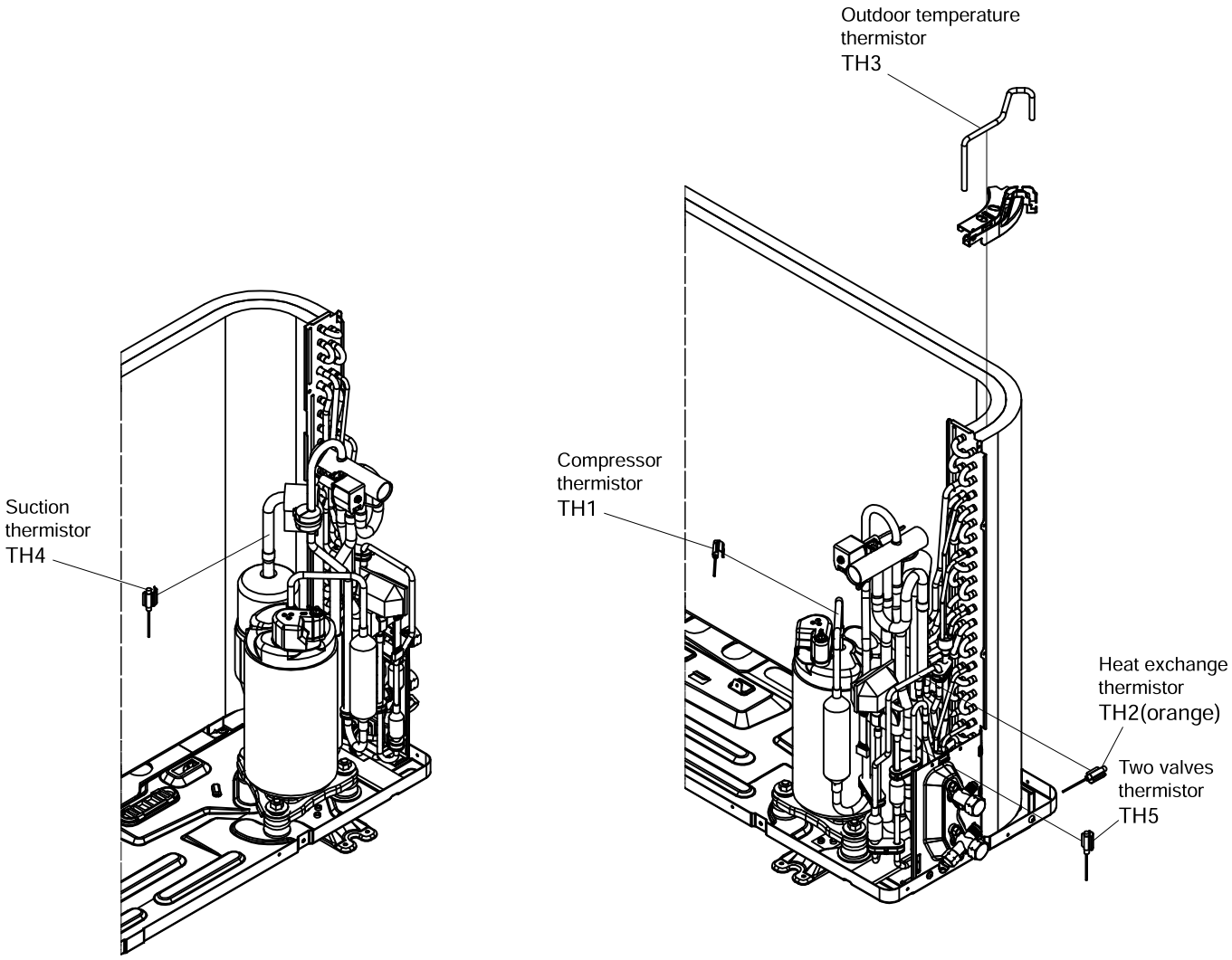
Don't clip it with radio pench

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.

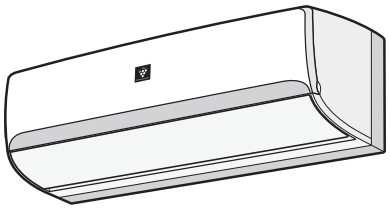
Compress it a little



[3] THERMISTOR ASSEMBLY INSTALLATION DRAWING



SHARP PARTS LIST



SPLIT TYPE
ROOM AIR CONDITIONER

MODEL	INDOOR UNIT	OUTDOOR UNIT
	AY-XP12THU	AE-X12THU
	AY-XP18THU	AE-X18THU

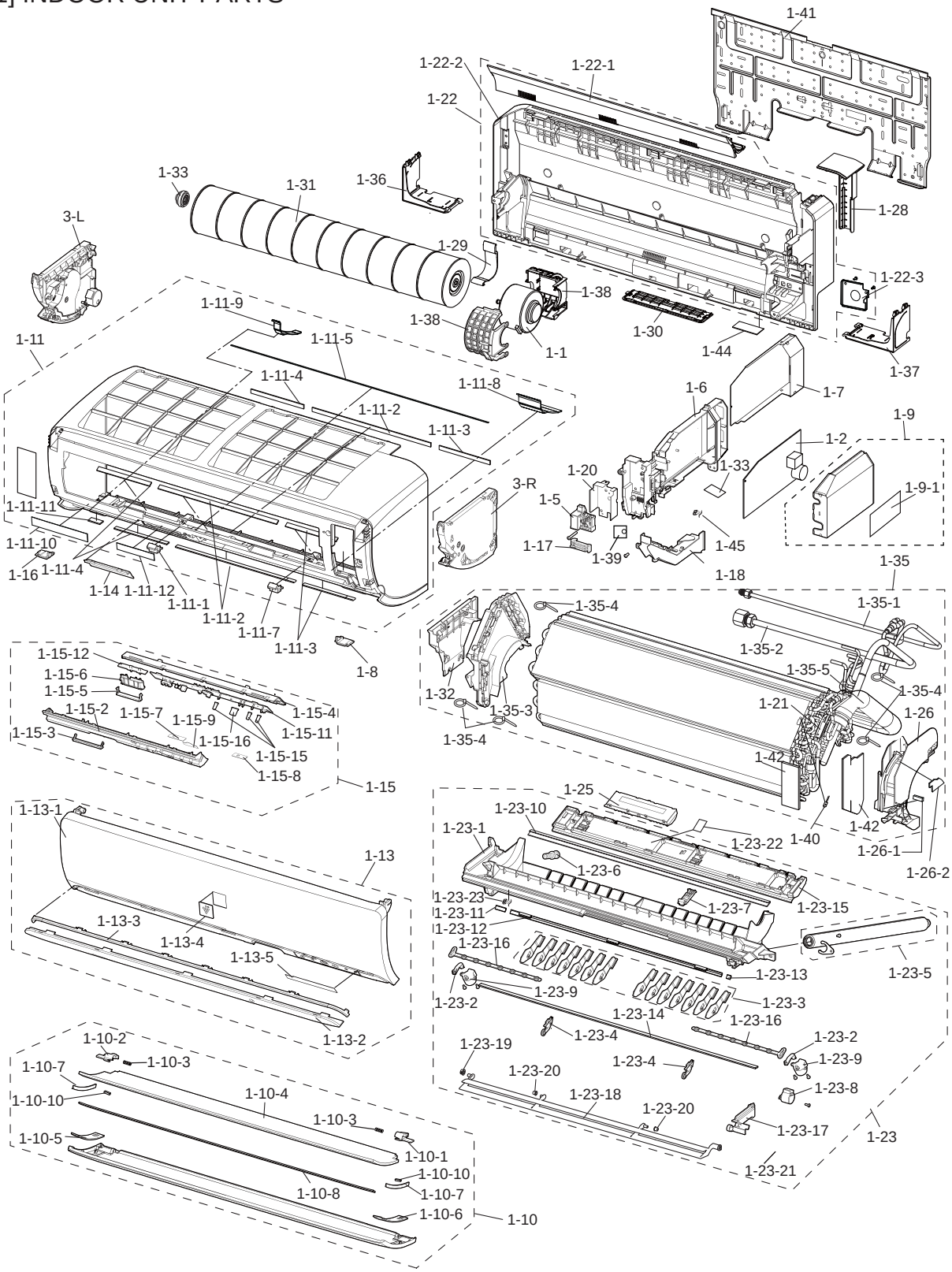
In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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.

AY-XP12THU

[1] INDOOR UNIT PARTS

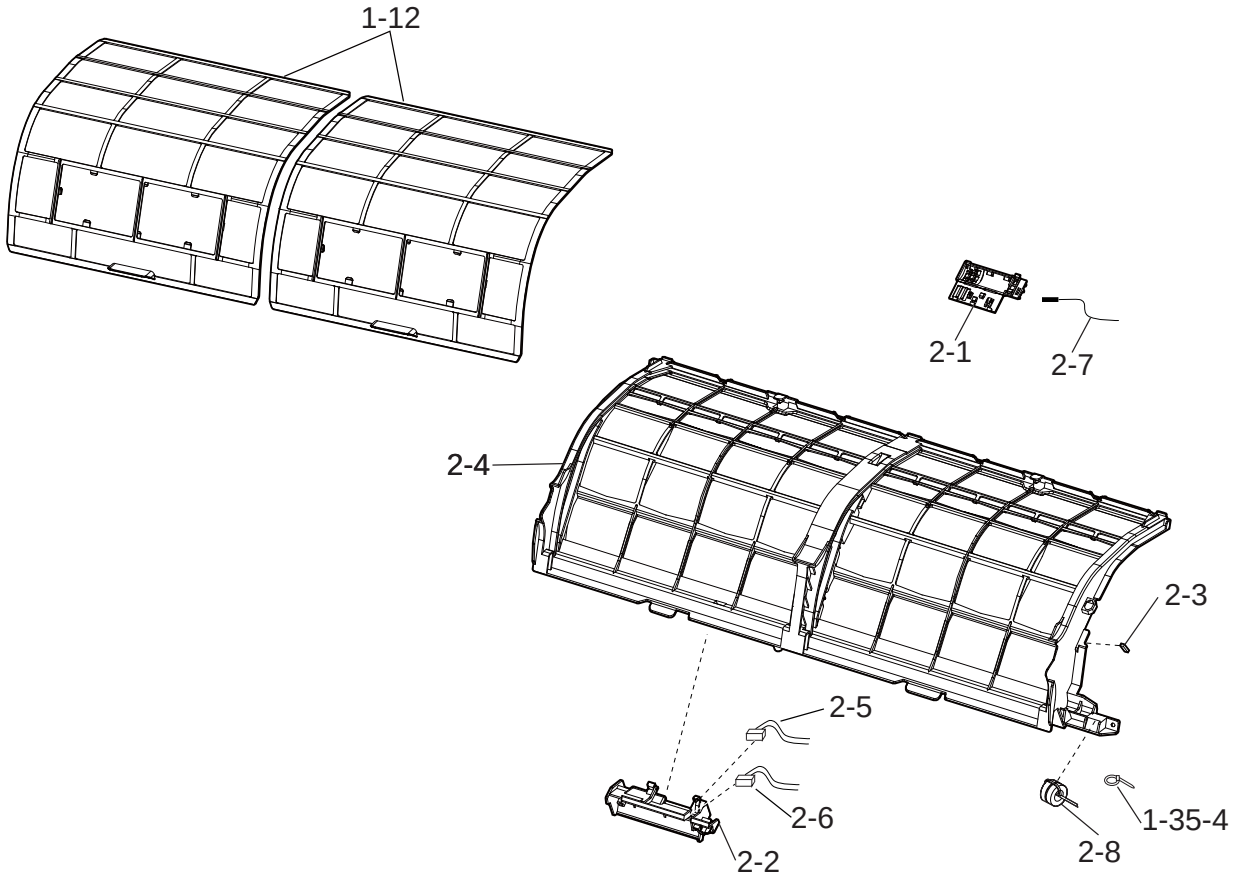


NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[1] INDOOR UNIT PARTS						
1-1	CMOT-A610JBKZ	BQ			FAN MOTOR SUB ASS'Y	1
1-2	DSGY-G147JBKZ	BQ	N		CONTROL BOARD UNIT[AY-XP12THU]	1
	DSGY-G148JBKZ	BQ	N		CONTROL BOARD UNIT[AY-XP18THU]	1
1-5	QTANZA131JBZZ	AN	N		TERMINAL BOARD 3P	1
1-6	PBOX-A620JBFZ	AM			CONTROL BOX	1
1-7	PCOV-C074JBWZ	AH			CONTROL BOX BOTTOM	1
1-8	LHLD-B270JBFA	AC			RECEIPT COVER	1
1-9	FCOV-A360JBKZ	AL	N		BOX COVER ASS'Y	1
1-9-1	TLABCE234JBRZ	AC	N		WIRING DIAGRAM	1
1-10	CPNL-A868JBKZ	AZ			PANEL ASS'Y	1
1-10-1	JBTN-A017JBFA	AC			PANEL LEVER L	1
1-10-2	JBTN-A018JBFA	AC			PANEL LEVER R	1
1-10-3	MSPR-A188JBEZ	AC			SPRING	2
1-10-4	PFPFPF097JBEZ	AQ			PANEL INSULATOR A	1
1-10-5	PFPFPE760JBEZ	AB			PANEL INSULATOR B	1
1-10-6	PFPFPE761JBEZ	AB			PANEL INSULATOR C	1
1-10-7	PFPFPE891JBEZ	AB			PANEL INSULATOR D	2
1-10-8	PFPFPE893JBEZ	AB			PANEL INSULATOR F	1
1-10-10	PFPFPE895JBEZ	AA			PANEL INSULATOR H	2
1-11	DWAK-B135JBKZ	BE	N		FRONT PANEL SUB ASS'Y	1
1-11-1	CCOV-A379JBKZ	AD			SCREW COVER ASSY	2
1-11-2	PFPFPE781JBEZ	AB			FP INSULATOR A	3
1-11-3	PFPFPE782JBEZ	AB	N		FP INSULATOR B	3
1-11-4	PFPFPE783JBEZ	AB			FP INSULATOR C	3
1-11-5	PFPFPE784JBEZ	AC	N		SEAL	1
1-11-7	PFPFPE901JBEZ	AB			FP INSULATOR F	1
1-11-8	PFPFPE902JBEZ	AB	N		FP INSULATOR G	1
1-11-9	PFPFPE903JBEZ	AB			FP INSULATOR H	1
1-11-10	TLAB-G593JBRZ	AC			LABEL	1
1-11-11	TLAB-G594JBRZ	AB			CAUTION LABEL	1
1-11-12	TLAB-G595JBRZ	AB			LABEL	1
1-11-13	TCAUSA005JBRZ	AB	N		UL WARNING LABEL	1
1-12	PFILMA312JBEA	AK			AIR FILTER	2
1-13	CPNL-A911JBKZ	BG	N		OPEN PANEL K	1
1-13-1	HPNL-B445JBFA	AX			OPEN PANEL	1
1-13-2	PCOV-C492JBRA	BE	N		DISPLAY PANEL	1
1-13-3	PCOV-C238JBFA	AH			DECORATION PANEL	1
1-13-4	HBDGBA004JBEB	AG			PC BADGE S32	1
1-13-5	PFPFPF293JBEZ	AN			LED SEAL	1
1-14	PCOV-C082JBFA	AD			CONNECTOR COVER	1
1-15	DDAI-A258JBKZ	BK			DISPLAY ASSY	1
1-15-2	LHLD-B268JBFA	AP			LED GUIDE	1
1-15-3	PCOV-C281JBFA	AT			SENSOR COVER	1
1-15-4	PCOV-C363JBFA	AR			LED COVER	1
1-15-5	PCOV-C077JBFA	AE			PCI COVER	1
1-15-6	PPLT-B072JBFA	AF			LED GUIDING PLATE	1
1-15-7	PSHE-A400JBEZ	AF			EMERGENCY LABEL	1
1-15-8	PSHE-A401JBEZ	AF			RESET LABEL	1
1-15-9	PSHE-A366JBEZ	AF			LED SHEET	1
1-15-11	FSGY-C152JBKZ	AZ			CONTROL BOARD UNIT	1

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[1] INDOOR UNIT PARTS						
1-15-12	FSGY-C372JBKZ	BR			CONTROL BOARD UNIT	1
1-15-15	PPLT-A993JBFA	AE			LED GUIDING PLATE1	3
1-15-16	PPLT-A994JBFA	AE			LED GUIDING PLATE2	1
1-16	LHLD-B269JBFA	AC			RECEIPT COVER	1
1-17	LHLD-B281JBFA	AC			CORD HOLDER	1
1-18	PDUC-A037JBFZ	AK			VA DUCT	1
1-20	PDAI-A301JBWZ	AE			EARTH PLATE	1
1-21	RH-HXA202JBZZ	AK			THERMISTOR	1
1-22	DCHS-A942JBKZ	BF	N		CABINET DK	1
1-22-1	PGID-A225JBFZ	AR			GUIDE	1
1-22-2	DCHS-A946JBKZ	BE			CABINET K	1
1-22-3	LHLD-B399JBWZ	AE	N		WIRE HOLDER	1
1-23	CSRA-A983JBKZ	BP			DRAIN PAN ASS'Y	1
1-23-1	DSRA-A443JBKZ	BB			DRAIN PAN SUB ASS'Y	1
1-23-2	MJNTPA197JBFA	AC			V-LOUVER-JOINT	2
1-23-3	MLOV-A583JBFA	AC			VERTICAL LOUVER	14
1-23-4	NBRG-A073JBFA	AC			LOUVER SUPPORT	1
1-23-5	CHOS-A050JBKZ	AH			DRAIN HOSE ASS'Y	1
1-23-6	PGUMMA381JBEZ	AF			DRAIN PLUG	1
1-23-7	MLEV-A025JBFA	AC			PCI LOCK	1
1-23-8	RMOT-A244JBZZ	AM			LOUVER MOTOR	1
1-23-9	RMOT-A243JBZZ	AM			STEPPING MOTOR V	2
1-23-10	PFPFPE775JBEZ	AD			SEAL C	1
1-23-11	PFPFPE777JBEZ	AA			PCI DAN A	1
1-23-12	PFPFPE778JBEZ	AC			PCI DAN C	1
1-23-13	PFPFPE779JBEZ	AB			PCI DAN B	1
1-23-14	PFPFPE907JBEZ	AB			PCI DAN D	1
1-23-15	LHLD-B282JBFA	AH			PCI-BASE 1	1
1-23-16	MJNTPA196JBFA	AD			V-LOUVER-LINK	2
1-23-17	PCOV-C094JBFZ	AC			COVER	1
1-23-18	MLOV-A607JBFA	AN			H-LOUVER	1
1-23-19	NBRG-A077JBFA	AB			BEARING	1
1-23-20	NBRG-A038JBFP	AB			BEARING C	2
1-23-21	FSGY-C161JBKZ	AQ			SUB JOINT BOARD UNIT	1
1-23-22	PSHE-A323JBEZ	AB			PROTECT SHEET	1
1-23-23	QW-VZG827JBZZ	AN			LEAD WIRE	1
1-25	CKITTA098JBKZ	BN			PCI UNIT ASS'Y	1
1-26	DCOV-A416JBKZ	AL			SIDE COVER R ASS'Y	1
1-26-1	PFPFPE788JBEZ	AA			SCR INSULATOR	1
1-26-2	PFPFPE908JBEZ	AB			SIDE COVER DAN-B	1
1-28	LHLD-B272JBFA	AE			PIPE HOLDER	1
1-29	LHLD-B271JBFZ	AC			PIPR HOLDER	1
1-30	PCOV-C083JBFA	AD			PIPE COVER	1
1-31	NFANCA152JBEZ	AW			CLOSS FLOW FAN	1
1-32	PCOV-C070JBFZ	AD			DEW COVER	1
1-33	CHLD-A188JBKZ	AG			BEARING ASS'Y	1
1-35	CCYC-E491JBKZ	CM			CYCLE ASS'Y	1
1-35-1	DPIPCA687JBKZ	BA			TUBE S ASS'Y	1
1-35-2	DPIPCA690JBKZ	BD			TUBE ASS'Y	1
1-35-3	PCOV-C069JBFZ	AF			SIDE COVER L	1

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[1] INDOOR UNIT PARTS						
1-35-4	LBND-A072JBE0	AC			WIRE FIXING BAND	6
1-35- 5	PFPFPF260JBEZ	AK			PIPE DAN-S	1
1-36	PCOV-C080JBFA	AE			CABI COVER L	1
1-37	PCOV-C081JBFA	AE			CABI COVER R	1
1-38	PCOV-C518JBFZ	AF			COVER	1
1-39	LHLD-B396JBFZ	AE			TERMINAL SPACER	1
1-40	FW-VZA119JBKZ	AH			LEAD WIRE	1
1-41	PPLTNA154JBWZ	AR			MOUNTING ANGLE	1
1-42	PFPFPE861JBEZ	AD			PIPE-DAN	1
1-44	TSPC-K313JBRZ	AE	N		NAME BADGE[AY-XP12THU]	1
	TSPC-K328JBRZ	AE	N		NAME BADGE[AY-XP18THU]	1
1-45	QW-VZH014JBZZ	AM			LEAD WIRE	1

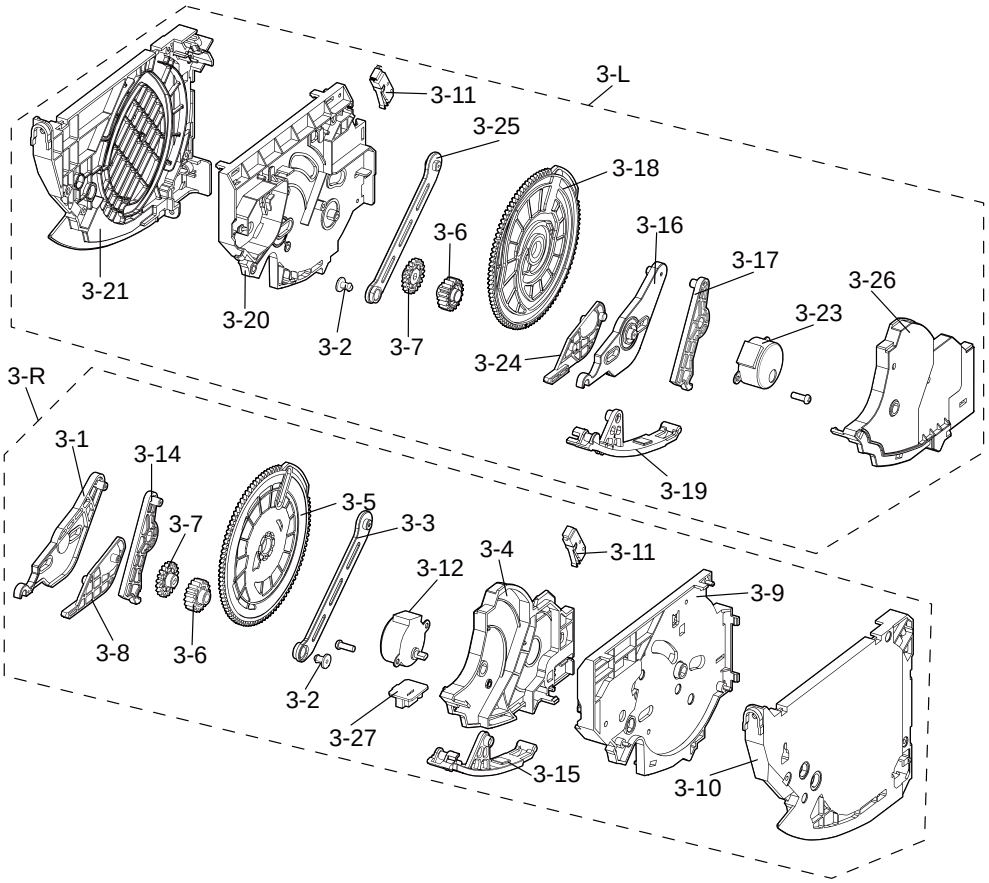
[2] INDOOR FILTER GUIDE PARTS



NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[2] INDOOR FILTER GUIDE PARTS						
2-1	LHLD-A449JBF0	AH			THERMISTOR HOLDER	1
2-2	LHLD-B395JBFA	AK			CONNECTOR HOLDER	1
2-3	PFPFPF104JBEZ	AC			GUIDE SEAL	1
2-4	PGID-A224JBFA	AZ			FILTER GUIDE	1

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[2] INDOOR FILTER GUIDE PARTS						
2-5	QW-VZH151JBZZ	AP			LEAD WIRE	1
2-6	QW-VZH152JBZZ	AM			LEAD WIRE	1
2-7	RH-HXA221JBZZ	AM			THERMISTOR	1
2-8	RNF--A001VBE0	AF			FERRITE CORE	1

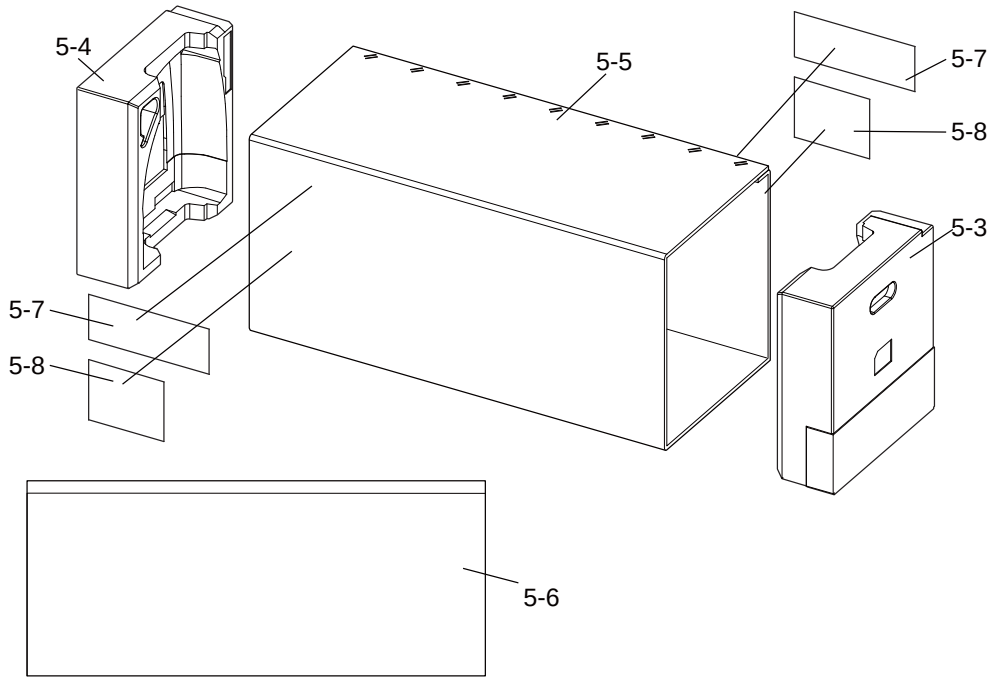
[3] INDOOR PANEL OPENING AND SHUTTING MECHANISM PARTS



NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[3] INDOOR PANEL OPENING AND SHUTTING MECHANISM PARTS						
3-L	CBOX-A103JBKZ	BD			PANEL MECHA LEFT	1
3-R	CBOX-A105JBKZ	BE			PANEL MECHA RIGHT	1
3-1	MCAMPA028JBFA	AD			CAM AR	1
3-2	LPIN-A015JBFA	AB			PIN	2
3-3	MARMPA082JBFA	AC			ARM R	1
3-4	PCAS-A108JBFA	AG			CAS AR	1
3-5	NGER-A065JBFZ	AH			GEAR AR	1
3-6	NGER-A060JBFZ	AC			GEAR 18	2
3-7	NGER-A061JBFZ	AC			GEAR 20	2

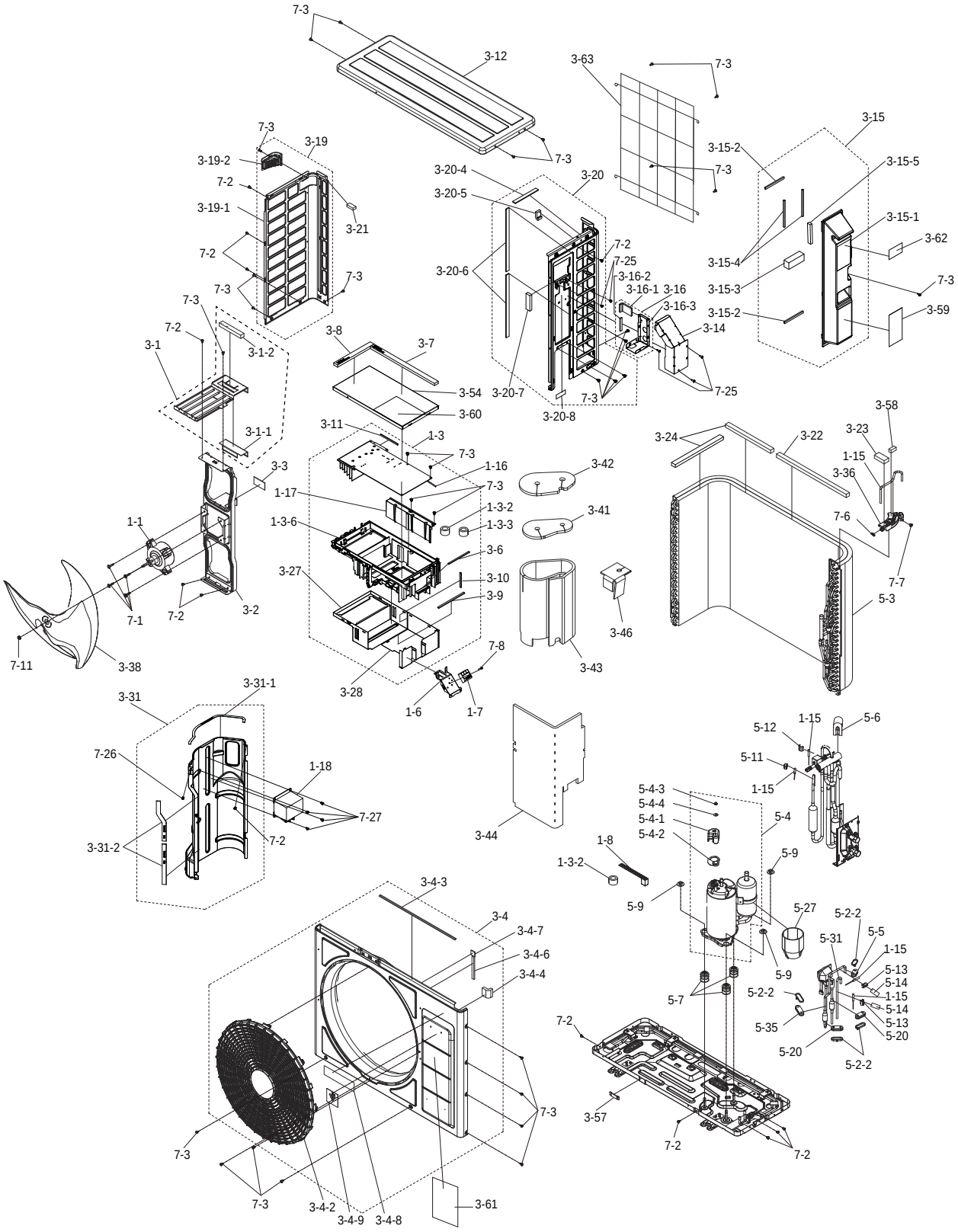
NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[3] INDOOR PANEL OPENING AND SHUTTING MECHANISM PARTS						
3-8	LHLD-B264JBFA	AC			HOOK R	1
3-9	PCAS-A107JBFA	AK			CASE AR	1
3-10	PCAS-A095JBFA	AK			CASE BR	1
3-11	QSW-MA013JBZZ	AH			SWTICH	2
3-12	RMOT-A241JBZZ	AP			STEPPING MOTOR R	1
3-14	MCAMPA024JBFA	AD			CAM BR	1
3-15	LHLD-B263JBFA	AD			PANEL BASE R	1
3-16	MCAMPA029JBFA	AD			CAM AL	1
3-17	MCAMPA027JBFA	AD			CAM BL	1
3-18	NGER-A066JBFZ	AH			GEAR AL	1
3-19	LHLD-B265JBFA	AD			PANEL BASE L	1
3-20	PCAS-A105JBFA	AK			CASE AL	1
3-21	PCAS-A096JBFA	AH			CASE BL	1
3-23	RMOT-A242JBZZ	AP			STEPPING MOTOR L	1
3-24	LHLD-B266JBFA	AC			HOOK L	1
3-25	MARMPA083JBFA	AC			ARM L	1
3-26	PCAS-A106JBFA	AG			CASE CL	1
3-27	FSGY-C371JBKZ	AS			DISPLAY BOARD UNIT	1
[4] INDOOR ACCESSORY PARTS						
4-1	UBATUA027JBE0	AE			BATTERY PACK	1
4-2	CHLD-A187JBKZ	AG			CORD HOLDER ASS'Y	1
4-3	CRMC-A960JBEZ	BB	N		REMOTE CONTROL	1
4-6	TINS-B595JBRZ	AH	N		INSTALLATION MANUAL	1
4-7	TINSJB400JBRZ	AL	N		OPERATION MANUAL	1
4-10	FFZK-A327JBKZ	AE			SCREWS KIT	1
4-11	LHLD-B401JBKZ	AL	N		CABLE COVER K	1
4-11-1	PBRS-A014JBFA	AF			PCI BRUSH	1

[5] INDOOR PACKING PARTS



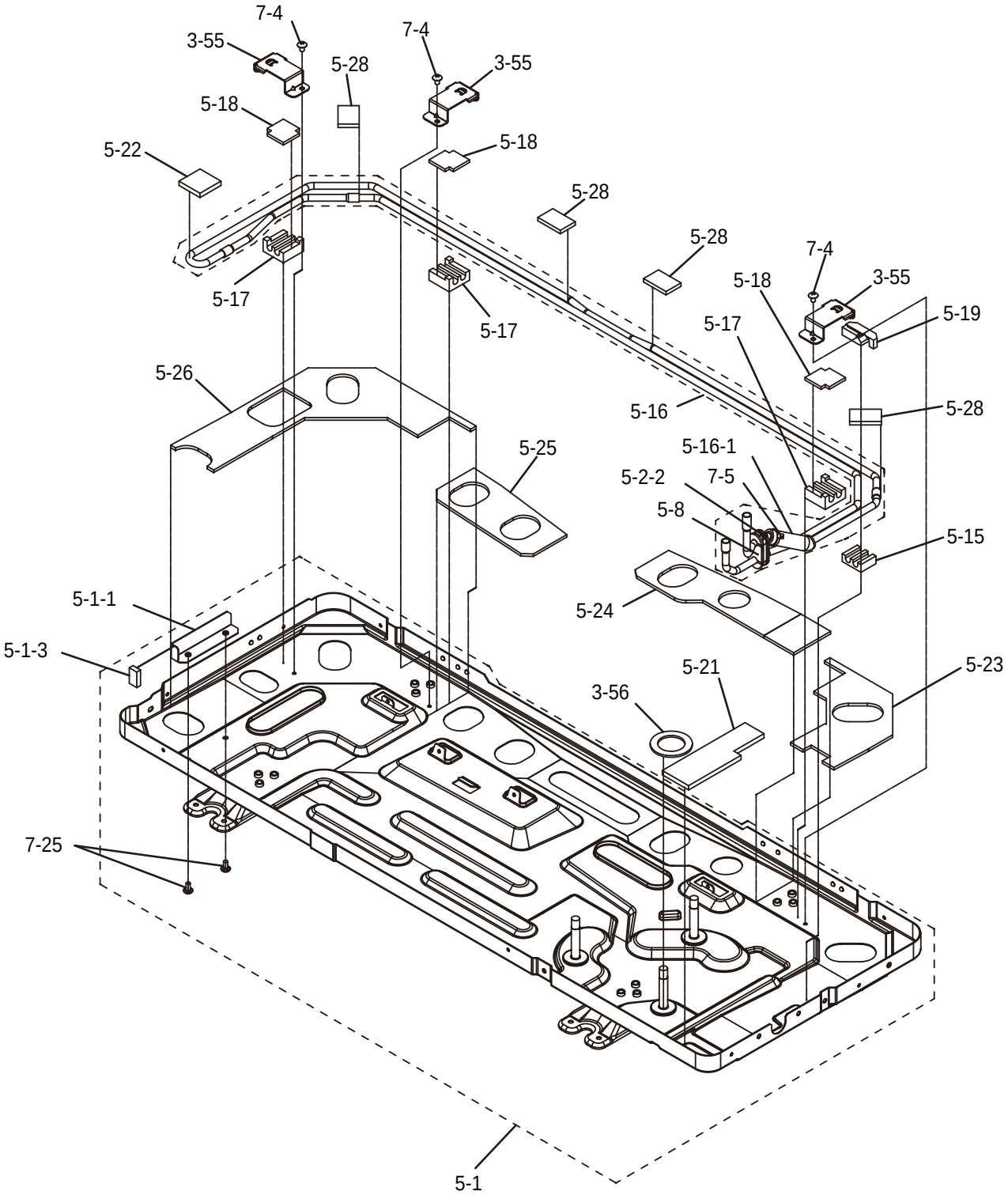
NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[5] INDOOR PACKING PARTS						
5-3	CPADBA256JBKZ	AN			PAD K-R	1
5-4	SPADBA691JBEZ	AK			PAD L	1
5-5	SPAKCE636JBEZ	AS	N		PACKING CASE	1
5-6	SSAKAA144JBEZ	AF			BAG	1
5-7	TLAB-F722JBRZ	AE			NO CLAMP LABEL	2
5-8	TLABME095JBRZ	AE	N		PRODUCT LABEL[AY-XP12THU]	2
	TLABME107JBRZ	AE	N		PRODUCT LABEL[AY-XP18THU]	2

[5] OUTDOOR UNIT PARTS

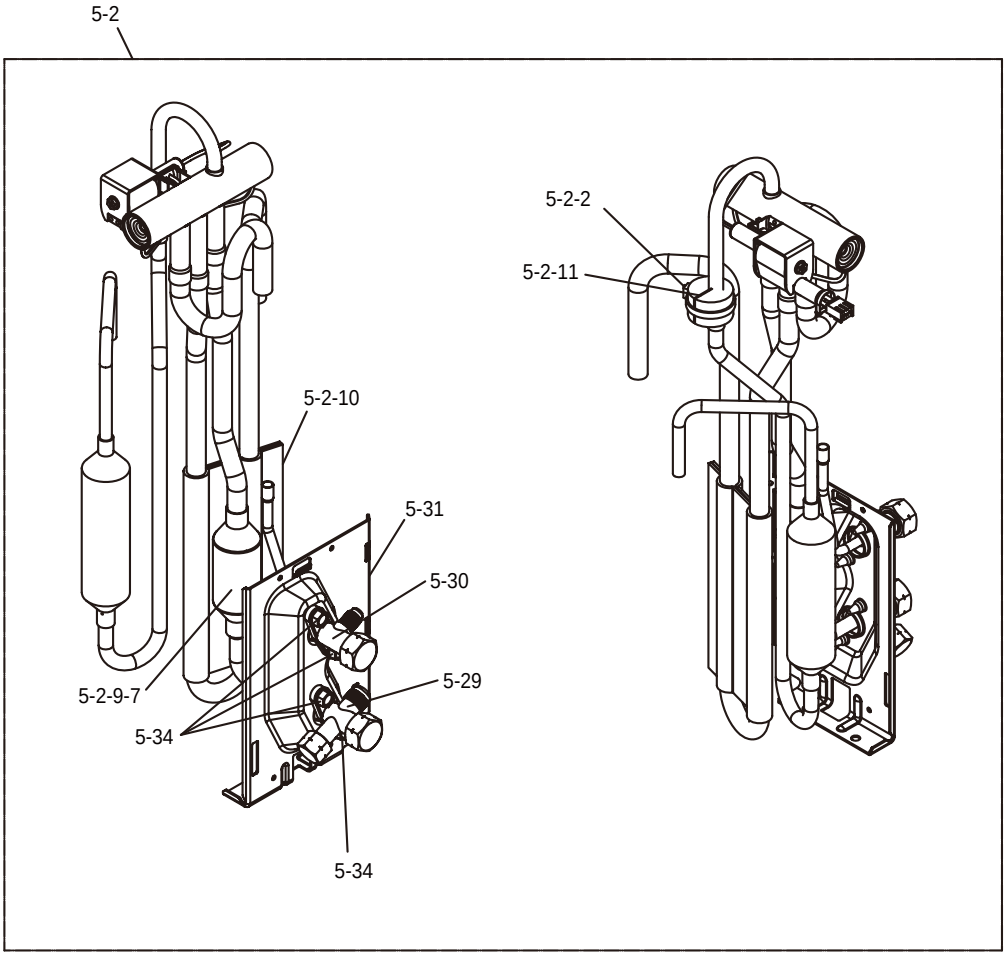


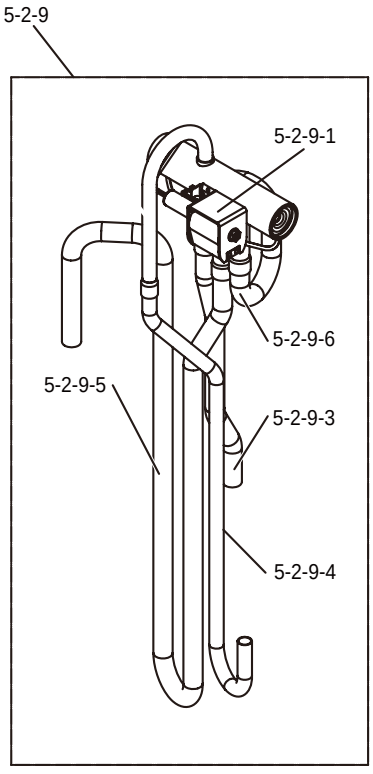
AY-XP12THU

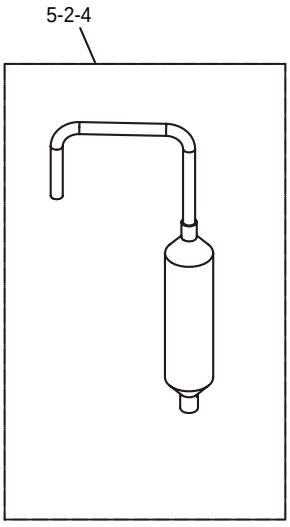
HEATER PIPE ASS'Y



REVERSE VALVE ASS'Y

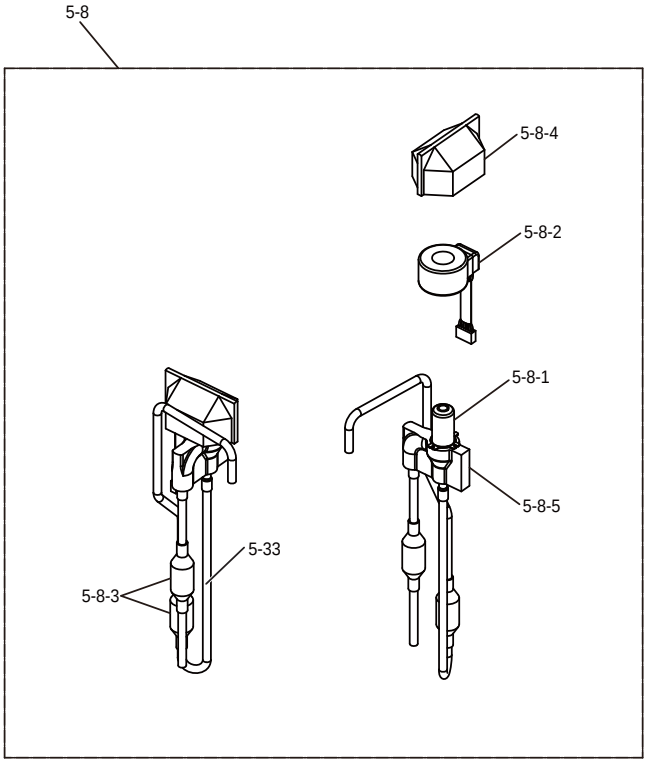






AY-XP12THU

EXPANSION VALVE ASS'Y



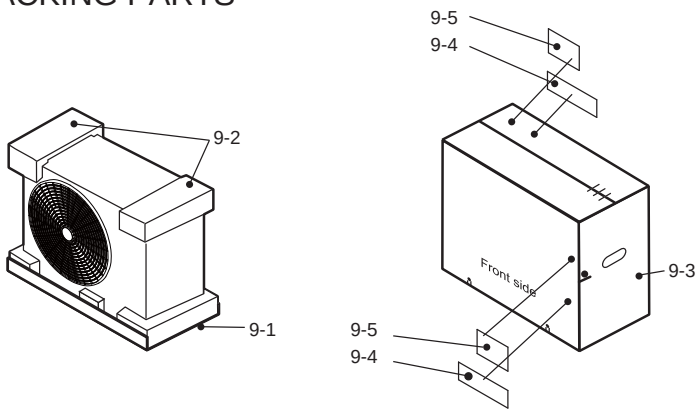
NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[6] OUTDOOR CONTROL UNIT PARTS						
1-1	CMOTLB585JBEZ	BM			FAN MOTOR	1
1-3	DSGY-G129JBKZ	CC	N		SERVICE CONTROL BOARD UNIT (AE-X12THU)	1
	DSGY-G138JBKZ	CF	N		SERVICE CONTROL BOARD UNIT (AE-X18THU)	1
1-3-2	RNF--A001VBE0	AF			-	2
1-3-3	RFIL-A143JBEZ	AK			FERRITE CORE	1
1-3-6	LHLD-B329JBFZ	AM			HOLDER	1
1-6	PDAI-A354JBWZ	AF			TERMINAL HOLDER	1
1-7	QTANZA091JBZZ	AU			TERMINAL BOARD	1
1-8	FW-VZA133JBKZ	AP			LEAD WIRE	1
1-15	RH-HXA219JBZZ	BA			THERMISTOR	1
1-16	QW-VZF343JBZZ	AE			EARTH LEAD WIRE	1
1-17	PSPA-A240JBFZ	AF			PWB SPACER	1
1-18	RCILZA054JBZZ	BC			REACTOR (AE-X12THU)	1
	RCILZA075JBZZ	BC			REACTOR (AE-X18THU)	1
[7] OUTDOOR MECHANICAL PARTS						
3-1	DANG-A063JBKZ	AR			FAN MOTOR ANGLE ASS'Y	1
3-1-1	PSEL-E609JBEZ	AC			SEAL	1
3-1-2	PSEL-E610JBEZ	AB			SEAL	1
3-2	LANGKA365JBTA	AW			FAN MOTOR ANGLE	1
3-3	PSEL-E620JBEZ	AB			SEAL	1
3-4	CCAB-A669JBKZ	BL	N		FRONT CABINET ASS'Y	1
3-4-2	GGADPA043JBFA	AV			FAN GUARD	1
3-4-3	PSEL-E612JBEZ	AB			SEAL	1
3-4-4	PSEL-E613JBEZ	AB			SEAL	1
3-4-6	PSEL-E614JBEZ	AB			SEAL	1
3-4-7	PSEL-E615JBEZ	AB			SEAL	1
3-4-8	TLABBA311JBRA	AF	N		SHARP LABEL	1
3-4-9	TLAB-F933JBRZ	AC			LABEL	1
3-6	PSEL-E756JBEZ	AB			SEAL	1
3-7	PSEL-E618JBEZ	AC			SEAL	1
3-8	PSEL-E619JBEZ	AB			SEAL	1
3-9	PSEL-E639JBEZ	AB			SEAL	1
3-10	PSEL-E640JBEZ	AB			SEAL	1
3-11	PSEL-E636JBEZ	AB			SEAL	1
3-12	GCAB-A557JBTA	BC			TOP PLATE	1
3-14	PCOV-C489JBTA	AN			TERMINAL COVER	1
3-15	CFTA-A393JBKZ	AS			SIDE COVER ASS'Y	1
3-15-1	PFTA-A156JBFA	AQ			SIDE COVER	1
3-15-2	PSEL-E611JBEZ	AB			SEAL	2
3-15-3	PSEL-E624JBEZ	AC			SEAL	1
3-15-4	PSEL-E637JBEZ	AB			SEAL	2
3-15-5	PSEL-E711JBEZ	AC			SEAL	1
3-16	CHLD-A210JBKZ	AR	N		CABLE HOLDER K	1
3-16-1	PSEL-E710JBEZ	AC			HOLDER SEAL A	1
3-16-2	PSEL-E712JBEZ	AB			HOLDER SEAL B	1
3-16-3	LHLD-B400JBTA	AP	N		CABLE HOLDER	1
3-19	CPLT-A296JBKZ	AZ	N		SIDE COVER L ASS'Y	1
3-19-1	PPLT-B138JBTA	AX	N		SIDE COVER L	1

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[7] OUTDOOR MECHANICAL PARTS						
3-19-2	JHNDPA044JBFA	AE	N		GRIP	1
3-20	CPLT-A298JBKZ	BA	N		SIDE COVER R ASS'Y	1
3-20-4	PSEL-E662JBEZ	AB			SEAL	1
3-20-5	PSEL-E616JBEZ	AB			SEAL	1
3-20-6	PSEL-E617JBEZ	AB			SEAL	2
3-20-7	PSEL-E641JBEZ	AB			SEAL	1
3-20-8	TLAB-F748JBRZ	AF			UL COPPER WIRE LABEL	1
3-21	PFPFPF287JBEZ	AB			CUSHION	1
3-22	PFPFPF098JBEZ	AD			SEAL	1
3-23	PSEL-E663JBEZ	AB			SEAL	1
3-24	PFPFPF282JBEZ	AC			SEAL	2
3-27	PBOX-A618JBWZ	AM			CONTROL BOX L	1
3-28	PBOX-A619JBWZ	AK			CONTROL BOX R	1
3-31	CSKR-A612JBKZ	BB			BULKHEAD ASS'Y	1
3-31-1	PSEL-E669JBEZ	AB			SEAL	1
3-31-2	PSEL-E623JBEZ	AB			SEAL	2
3-36	LHLD-B371JBFZ	AE			THERMISTOR HOLDER	1
3-38	NFANPA160JBEZ	AV			PROPELLER FAN	1
3-41	PSPF-B526JBEZ	AM			COMPRESSOR COVER	1
3-42	PSPF-B527JBEZ	AP			COMPRESSOR COVER	1
3-43	PSPF-B525JBEZ	AM			COMPRESSOR COVER	1
3-44	PSPF-B528JBEZ	AZ			COMPRESSOR COVER	1
3-46	PSPF-B499JBEZ	AD			COVER	1
3-54	PCOV-C317JBWZ	AL			COVER	1
3-55	LANGKA369JBTA	AG			BASE PAN ANGLE	3
3-56	PGUMSA457JBEZ	AC			RUBBER WASHER	1
3-57	PSEL-E650JBEZ	AB			SEAL	1
3-58	PSEL-E664JBEZ	AB			SEAL	1
3-59	TSPC-K314JBRZ	AF	N		NAME LABEL (AE-X12THU)	1
	TSPC-K329JBRZ	AF	N		NAME LABEL (AE-X18THU)	1
3-60	TLABCE219JBRZ	AC	N		WIRING DIAGRAM	1
3-61	TLAB-G598JBEZ	AF	N		ENERGY LABEL (AE-X12THU)	1
	TLAB-G606JBEZ	AF	N		ENERGY LABEL (AE-X18THU)	1
3-62	TCAUSA006JBRZ	AC	N		UL WARNING LABEL	1
3-63	GGAD-A080JBTA	AY	N		WIRED GUARD	1
[8] OUTDOOR CYCLE PARTS						
5-1	CCHS-B593JBKZ	BK			BASE PAN ASS'Y	1
5-1-1	LSUB-A046JBTA	AY			SHELTER	1
5-1-3	PSEL-E661JBEZ	AB			SEAL	1
5-3	DCON-A890JBPZ	CN			CONDENSER ASSY	1
5-4	FCMPRA437JBKZ	CS			COMPRESSOR ASS'Y	1
5-4-1	PCOV-C326JBEZ	AG			TERMINAL COVER	1
5-4-2	PSEL-E622JBEZ	AF			TERMINAL GASKET	1
5-4-3	LX-NZA490JBEZ	AB			SPECIAL NUT	1
5-4-4	PGUM-A256JBEZ	AB			RUBBER WASHER	1
5-5	PGUM-A264JBEZ	AE			DAMPER RUBBER	2
5-6	PGUMSA428JBEZ	AF			DAMPER RUBBER	1
5-7	GLEG-A175JBEZ	AE			COMPRESSOR CUSHION	3

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[8] OUTDOOR CYCLE PARTS						
5-9	LX-NZA313JBEZ	AE			SPECIAL NUT	3
5-11	MSPR-A208JBEZ	AD			SPRING	1
5-12	MSPR-A212JBEZ	AE			THERMISTOR SPRING	1
5-13	MSPR-A195JBEZ	AF			THERMISTOR SPRING	2
5-14	PSEL-E607JBEZ	AD			THERMISTOR SEAL	2
5-15	PGUM-A203JBEZ	AD			TUBE HOLDER RUBBER	1
5-16	CPIPCC048JBKZ	BA			HEAT TUBE ASS'Y	1
5-16-1	PFPFPF210JBEZ	AE			INSULATOR	1
5-17	PGUM-A268JBEZ	AE			TUBE HOLDER RUBBER	3
5-18	PGUM-A269JBEZ	AE			HOLDER RUBBER	3
5-19	PGUM-A270JBEZ	AG			HOLDER RUBBER	1
5-20	PGUM-A271JBEZ	AE			DAMPER RUBBER	2
5-21	PGUM-A272JBEZ	AK			DAMPER RUBBER	1
5-22	PGUMSA461JBEZ	AB			DAMPER RUBBER	1
5-23	PFPFPF211JBEZ	AE			BASE PAN INSU. A	1
5-24	PFPFPF212JBEZ	AD			BASE PAN INSU. B	1
5-25	PFPFPF213JBEZ	AC			BASE PAN INSU. C	1
5-26	PFPFPF214JBEZ	AF			BASE PAN INSU. D	1
5-27	PFPFPF216JBEZ	AE			INSULATOR	1
5-28	PFPFPF218JBEZ	AB			SEAL	4
5-2	CVLV-B364JBKZ	BP			REVERSE VALVE ASSY	1
5-2-2	LBND-A072JBE0	AC			WIRE FIXING BAND	4
5-2-4	CPIPCC047JBKZ	AW			DSCHARGE TUBE ASSY	1
5-2-9	DVLV-B584JBKZ	BP			REVERSE VALVE ASS'Y	1
5-2-9-1	CCIL-A204JBKZ	AY			COIL ASS'Y	1
5-2-9-3	PPIPCM441JBWZ	AQ			LEAD TUBE	1
5-2-9-4	PPIPCM626JBWZ	AQ			DISCHARGE TUBE B	1
5-2-9-5	PPIPCM443JBWZ	AY			SUCTION TUBE B	1
5-2-9-6	PPIPCM442JBWZ	AP			LEAD TUBE CON-IN	1
5-2-9-7	PMUF-A087JBEZ	AN			MUFFLER	1
5-2-10	PGUMSA470JBEZ	AH			DAMPER RUBBER	1
5-2-11	PGUM-0034JBE0	AF			DAMPER RUBBER	1
5-8	DVLV-B558JBKZ	BH			EXPAN.VALVE ASS'Y	1
5-8-1	PVLVRA056JBEZ	AX			VAVLE BASE	1
5-8-2	RMOTSA052JBZZ	AV			VALVE MOTOR-B	1
5-8-3	PSRN-A102JBEZ	AF			STRAINER	1
5-8-4	PSEL-D263JBEZ	AC			SEAL	1
5-8-5	PGUMSA421JBEZ	AE			DAMPER RUBBER	1
5-29	DVLV-B532JBKZ	AW			3WAY VALVE UNIT	1
5-30	DVLV-B556JBKZ	AW			2WAY VALVE UNIT	1
5-31	PDAI-A334JBTA	AN			FLARE COUPLING BASE	1
5-33	PPIPCM628JBWZ	AK			LEAD TUBE	1
5-34	LX-BZA488JBEZ	AC			SPECIAL SCREW	4
5-35	PGUM-A144JBEZ	AD			DAMPER RUBBER	1
[9] OUTDOOR SCREWS AND NUTS						
7-1	LX-BZA485JBEZ	AD			SPECIAL SCREW	4
7-2	LX-BZA182JBE0	AB			SPECIAL SCREW	21
7-3	LX-BZA475JBEZ	AD			SPECIAL SCREW	27
7-4	XCTWW40P06000	AA			TAPPING SCREW	3

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[9] OUTDOOR SCREWS AND NUTS						
7-5	LBND-0037QBE0	AB			UNITY BAND	6
7-6	LBND-A047JBE0	AB			WIRE FIXING BAND	7
7-7	LBND-A077JBE0	AC			WIRE FIXING BAND	2
7-8	XCPS740P25000	AD			TAPPING SCREW	1
7-11	LX-NZA412JBEZ	AC			NUT	1
7-25	LX-CZA013JBE0	AH			SPECIAL SCREW	4
7-26	LX-BZA284JBEZ	AB			SPECIAL SCREW	1
7-27	LX-BZA351JBEZ	AD			SPECIAL SCREW	4

[10] OUTDOOR PACKING PARTS



NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	QTY
[10] OUTDOOR PACKING PARTS						
9-1	CPADBA274JBKZ	AX			BOTTOM PAD ASS'Y	1
9-2	CPADBA270JBKZ	AP			TOP PAD K	1
9-3	SPAKCE637JBEZ	AY	N		PACKING CASE	1
9-4	TLAB-F722JBRZ	AE			NO CLAMP LABEL	2
9-5	TLABME096JBRZ	AF	N		PRODUCT LABEL (AE-X12THU)	2
	TLABME108JBRZ	AF	N		PRODUCT LABEL (AE-X18THU)	2