

# HITACHI

HHAW

NO. 0070E-2

## SERVICE MANUAL

TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY

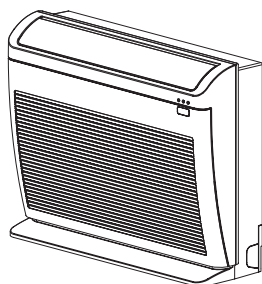
# RAF-50RPA RAC-50FPA

REFER TO THE FOUNDATION MANUAL

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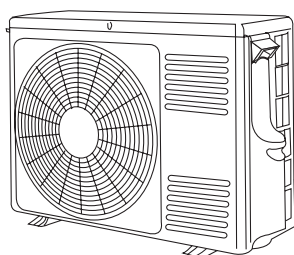
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INDOOR UNIT



RAF-50RPA

OUTDOOR UNIT



RAC-50FPA



### SPECIFICATIONS

TYPE		DC INVERTER	
		INDOOR UNIT	OUTDOOR UNIT
MODEL		RAF-50RPA	RAC-50FPA
POWER SOURCE		1 PHASE, 50Hz, 220V - 230V	
COOLING	TOTAL INPUT	1,510 (500 ~ 2,100)	
	TOTAL AMPERES (A)	6.64 - 6.94	
	CAPACITY (kW)	5.0 (1.9 ~ 5.2)	
	(B.T.U./h)	17,060 (6,480 ~ 17,740)	
HEATING	TOTAL INPUT (W)	1,660 (500 ~ 2,700)	
	TOTAL AMPERES (A)	7.30 - 7.63	
	CAPACITY (kW)	6.0 (2.2 ~ 7.3)	
	(B.T.U./h)	20,472 (7,510 ~ 24,910)	
DIMENSIONS (mm)	W	760	792 (+95)※
	H	600	600
	D	235	299 (+46)※
NET WEIGHT (kg)		14	40

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.

## ROOM AIR CONDITIONER

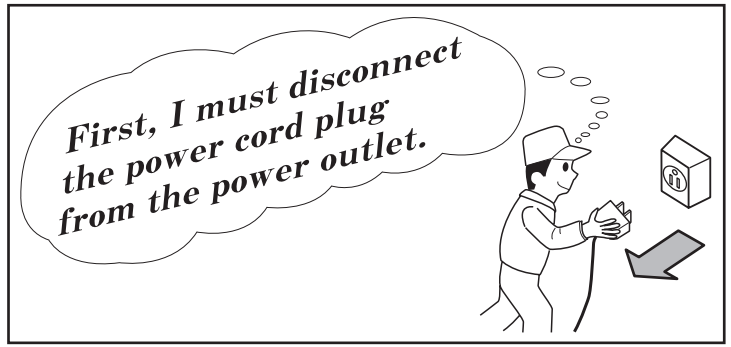
INDOOR UNIT + OUTDOOR UNIT

JULY 2013

Hitachi Household Appliances(Wuhu) Co., Ltd.

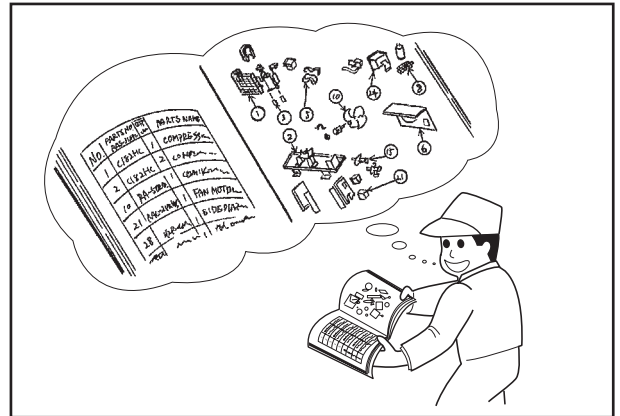
## SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them



3. After completion of repairs, the initial state should be restored.
4. Lead wires should be connected and laid as in the initial state.
5. Modification of the unit by the user himself should absolutely be prohibited.
6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.
7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit.  
The insulation resistance should be 1MΩ or more as measured by a 500V DC megger.
9. The initial location of installation such as window, floor or the other should be checked for being safe enough to support the repaired unit again.  
If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.
10. Any inflammable object must not be placed about the location of installation.
11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



# WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

## 1. Scope

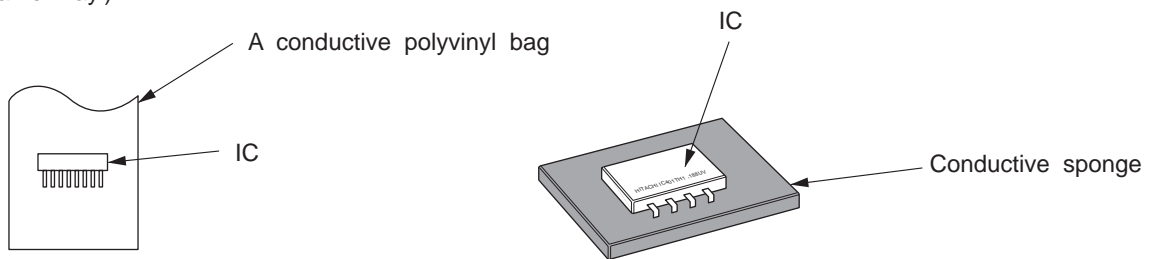
The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufactures during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned.)

## 2. Object parts

- (1) Microcomputer
- (2) Integrated circuits (I.C.)
- (3) Field effective transistor (F.E.T.)
- (4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

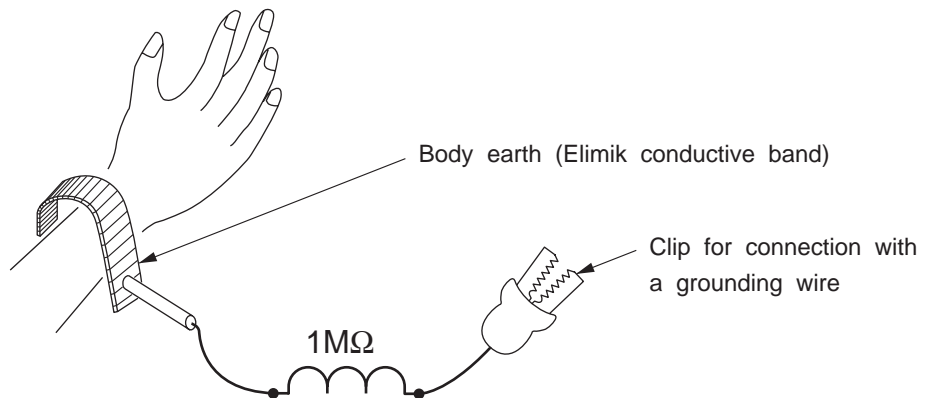
## 3. Items to be observed in handling

- (1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way.)



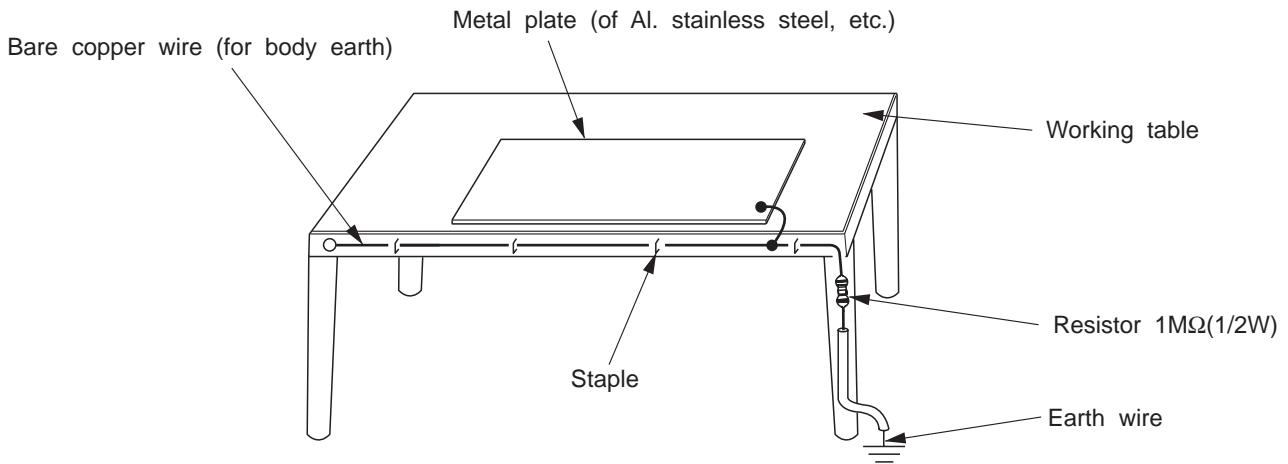
**Fig. 1 Conductive container**

- (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet.)
- (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.
- (4) Be sure to place a part on a metal plate with grounding.
- (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

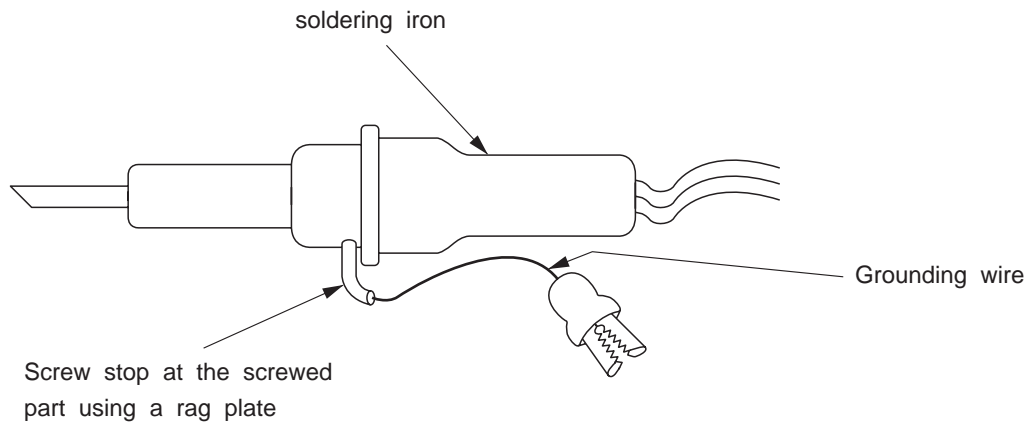


**Fig. 2 Body earth**

(6) Use a three wire type soldering iron including a grounding wire.



**Fig.3 Grounding of the working table**



**Fig.4 Grounding a solder iron**

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

(7) In checking circuits for maintenance, inspection, or some others, be careful not to have the test probes of the measuring instrument short circuit a load circuit or the like.



## **▲ CAUTION**

1. In quiet operation or stopping the running, its heard slight flowing noise of refrigerant in the refrigerating cycle occasionally, but this noise is not abnormal for the operation.
2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.
3. The room air conditioner dose not start automaticaly after recovery of the electric power failure for preventing fuse blowing. Re-press START / STOP button after 3 minutes from when unit stopped.
4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.
5. This room air conditioner should not be used at the cooling operation when the outside temperature is below  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ).
6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below  $-15^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ).  
If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.
7. When the outside heat exchanger is frosted, the front is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.

## SPECIFICATIONS

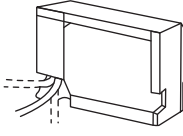
MODEL		RAF-50RPA	RAC-50FPA
FAN MOTOR		25W (DC35V)	47W (DC380V)
FAN MOTOR CAPACITOR		NO	
FAN MOTOR PROTECTOR		NO	
COMPRESSOR		——	ASG133CDMB7AT
OVER HEAT PROTECTOR		NO	YES
OVERLOAD RELAY		NO	YES
FUSE (for MICRO COMPUTER)		NO	3A
POWER RELAY, STICK RELAY		NO	G4A-1A
POWER SWITCH		NO	
TEMPORARY SWITCH		YES	NO
SERVICE SWITCH		NO	YES
TRANSFORMER		NO	NO
VARISTOR		NO	450NR
NOISE SUPPRESSOR		NO	NO
THERMOSTAT		YES (IC)	NO
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
REFRIGERANT CHARGING VOLUME (R410A)	UNIT	——	1,250g
	PIPES (MAX. 20m) MIN. 5m)	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE.	

Figure showing the installation of Indoor and Outdoor unit

MODEL RAF-50RPA/RAC-50FPA

**[Indoor unit installation]**

**Direction of Piping**

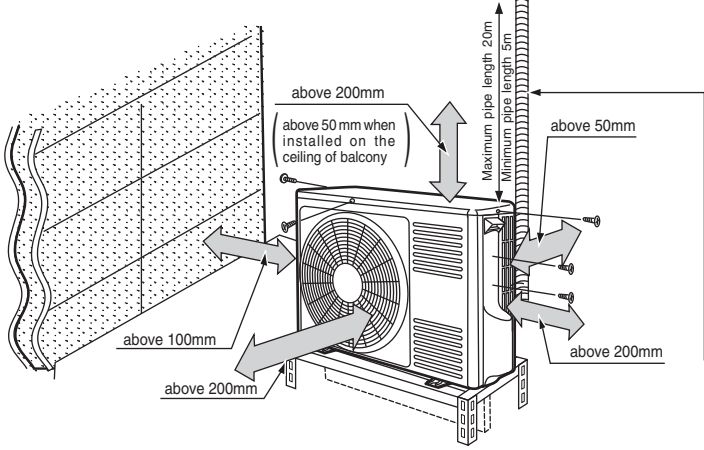
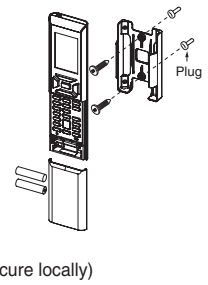
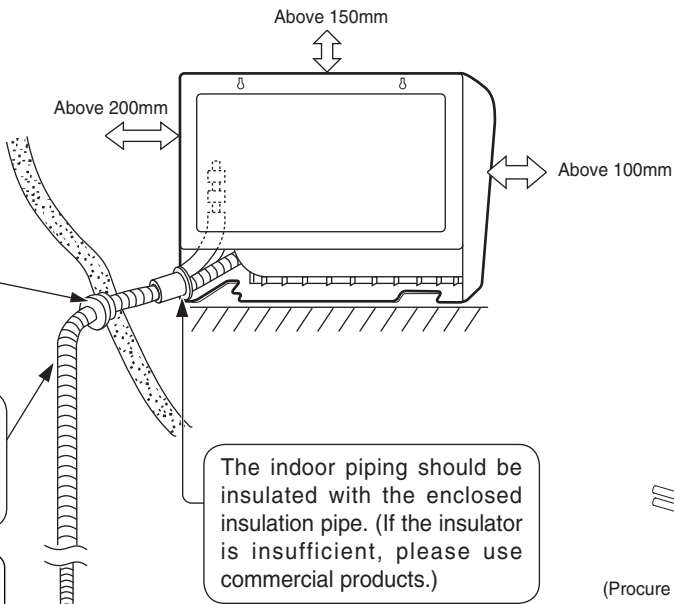


Piping con guration may be in three different directions: direct rear piping, right downward piping and right sideways piping.

Be sure to completely seal any gap with putty.


Drain pipe  
Must be installed separately.  
Insulate indoor part of pipe to prevent condensation.

The clearances of the unit from top, left, right and front are specified in figure below. At least three of the above sides must be open air.



- The refrigerating machine oil is easily affected by moisture. Use caution to prevent water from entering the cycle.
- The difference in height between the indoor and outdoor unit should be kept below 10m.
- The connecting pipe, no matter big or small, should all be insulated with insulation pipe and then wrapped with vinyl tape. (The insulator will deteriorate if it is not wrapped with tape.)

The connection of insulated drain hose. Inner diameter  $\phi$ 16mm



Please use insulated drain hose for the indoor piping (commercial product).

For outdoor unit installation, allow at least 2 sides of space around the unit to ensure ventilation ue.



# SAFETY PRECAUTION

- Please read the "Safety Precaution" carefully before operating the unit to ensure correct usage of the unit.
- Pay special attention to signs of "▲ Warning" and "▲ Caution". The "Warning" section contains matters which, if not observed strictly, may cause death or serious injury. The "Caution" section contains matters which may result in serious consequences if not observed properly. Please observe all instructions strictly to ensure safety.
- The signs indicate the following meanings. (The following are examples of signs.)

	Make sure to connect earth line.
	The sign in the gure indicates prohibition.

• Please keep this manual after reading.

## PRECAUTIONS DURING INSTALLATION

<b>▲ WARNING</b>	<ul style="list-style-type: none"> <li>• Do not reconstruct the unit. Water leakage, fault, short circuit or fire may occur if you reconstruct the unit by yourself.</li> <li>• Please ask your sales agent or qualified technician for the installation of your unit. Water leakage, short circuit or fire may occur if you install the unit by yourself.</li> <li>• Please use earth line. Do not place the earth line near water or gas pipes, lightning-conductor, or the earth line of telephone. Improper installation of earth line may cause electric shock.</li> </ul>	 
	<ul style="list-style-type: none"> <li>• Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.</li> <li>• A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.</li> <li>• Do not install the unit near a location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it. Piping shall be suitable supported with a maximum spacing of 1m between the supports.</li> <li>• Please ensure smooth flow of water when installing the drain hose. If any failure is found in the drain path, water drops from the indoor and outdoor units, causing wet household effects.</li> </ul>	 
<b>▲ CAUTION</b>	<ul style="list-style-type: none"> <li>• Make sure that a single phase 230V power source is used. The use of other power sources may cause electrical components to overheat and lead to fire.</li> </ul>	

## PRECAUTIONS DURING OPERATION

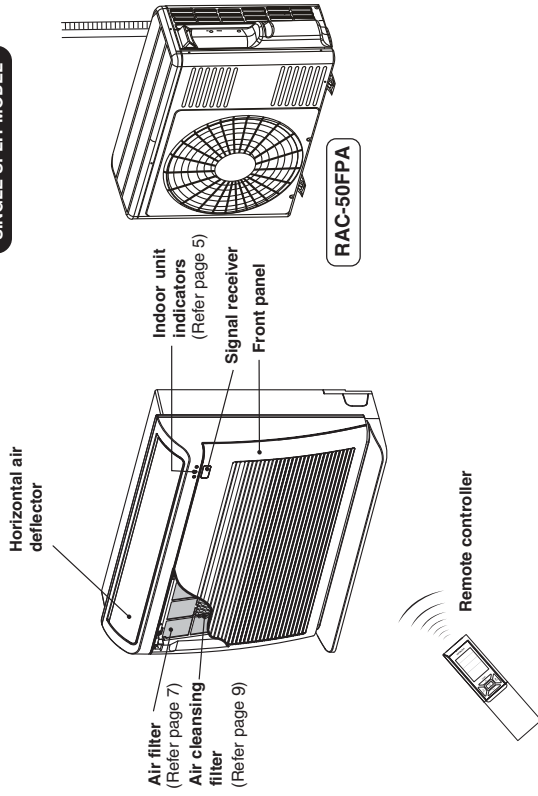
<b>▲ WARNING</b>	<ul style="list-style-type: none"> <li>• Do not use any conductor as fuse wire, this could cause fatal accident.</li> </ul>	
	<ul style="list-style-type: none"> <li>• During thunder storm, disconnect the plug top or turn off the circuit breaker.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Spray cans and other combustibles should not be located within a meter of the air outlets of both indoor and outdoor units. As a spray can's internal pressure can be increased by hot air, a rupture may result.</li> </ul>	
	<ul style="list-style-type: none"> <li>• The product shall be operated under the manufacturer specification and not for any other intended use.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not attempt to operate the unit with wet hands, this could cause fatal accident.</li> </ul>	
	<ul style="list-style-type: none"> <li>• When operating the unit with burning equipments, regularly ventilate the room to avoid oxygen insufficiency.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Please ensure that outdoor mounting frame is always stable, firm and without defect. If not, the outdoor unit may collapse and cause danger.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not wash the unit with water or place a water container such as a vase on the indoor unit. Electrical leakage could be present and cause electric shock.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not place plants or animals directly under the air flow as it is bad for the plants or animals.</li> </ul>	
<b>▲ CAUTION</b>	<ul style="list-style-type: none"> <li>• Do not climb on the outdoor unit or put objects on it.</li> </ul>	
	<ul style="list-style-type: none"> <li>• When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, do not operate under such condition for a long time.</li> </ul>	
	<ul style="list-style-type: none"> <li>• If the amount of heat in the room is above the cooling or heating capability of the unit (for example: more people entering the room, using heating equipments and etc.), the preset room temperature cannot be achieved.</li> </ul>	
	<ul style="list-style-type: none"> <li>• This appliance especially indoor unit cleaning must be performed by authorized personnel only. Consult your sales agent. Using a commercially available detergent or similar can damage the plastic parts or clog the drain pipe, causing water to drip with potential electric shock hazard.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not touch the air outlet, bottom surface and aluminum fin of the outdoor unit. You may get hurt.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not touch the refrigerant pipe and connecting valve. Burns may result.</li> </ul>	
	<ul style="list-style-type: none"> <li>• This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use this appliance safely.</li> <li>• Young children should be supervised to ensure that they do not play with the appliance.</li> </ul>	

## PRECAUTIONS DURING SHIFTING OR MAINTENANCE

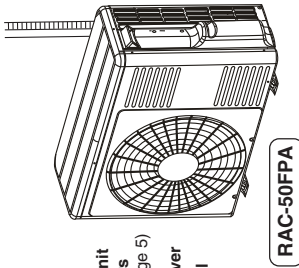
<b>▲ WARNING</b>	<ul style="list-style-type: none"> <li>• Should abnormal situation arise (like burning smell), please stop operating the unit and remove plug from the socket or turn off the circuit breaker. Contact your agent. Fault, short circuit or fire may occur if you continue to operate the unit under abnormal situation.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Please contact your agent for maintenance. Improper self maintenance may cause electric shock and fire.</li> <li>• Please contact your agent if you need to remove and reinstall the unit. Electric shock or fire may occur if you remove and reinstall the unit yourself improperly.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Avoid an extended period of direct air flow for your health.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not connect the power cable with an extension cable or do not plug too many leads of the other electric appliance into the socket where this cable is plugged. In addition, wire the cable with some allowances to prevent the cable from stretching. Not doing so will cause an electrical shock, heat generation or fire.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not bundle the power cable, pull it, put something on it, heat it, process it, or put it between things. Breackage of the power cable may result. Use of a damaged cable may cause an electrical shock or a fire.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Do not put objects like thin rods into the panel of blower and suction side because the high-speed fan inside may cause danger.</li> </ul>	

**NAMES AND FUNCTIONS OF EACH PART**

**INDOOR UNIT**



**OUTDOOR UNIT FOR SINGLE SPLIT MODEL**

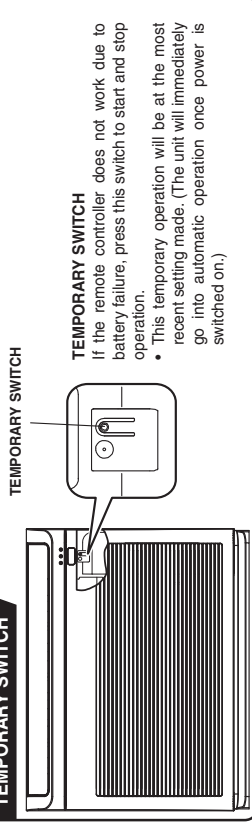


**MODEL NAME AND DIMENSIONS**

MODEL	WIDTH	HEIGHT	DEPTH
RAF-50RPA (INDOOR UNIT)	760mm	600mm	235mm
RAC-50FPA	792mm	600mm	299mm

\* OUTDOOR UNIT for single split model.

**TEMPORARY SWITCH**

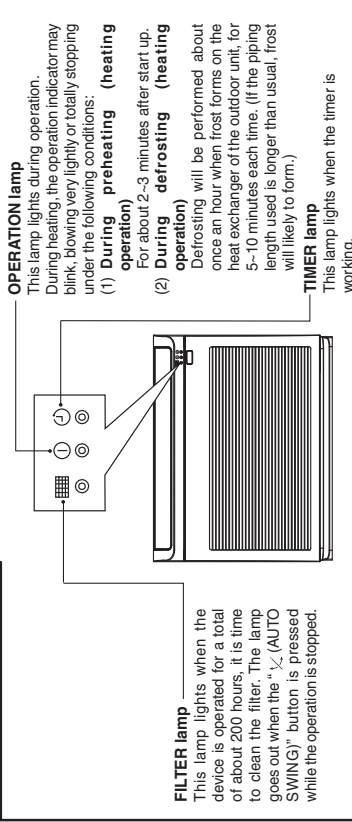


**TEMPORARY SWITCH**

If the remote controller does not work due to battery failure, press this switch to start and stop operation.

- This temporary operation will be at the most recent setting made. (The unit will immediately go into automatic operation once power is switched on.)

**INDOOR UNIT INDICATORS**



**FILTER lamp**  
This lamp lights when the device is operated for a total of about 200 hours, it is time to clean the filter. The lamp goes out when the "X (AUTO SWING)" button is pressed while the operation is stopped.

**OPERATION lamp**

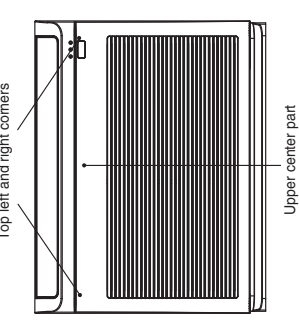
This lamp lights during operation. During heating, the operation indicator may blink, blowing very lightly or totally stopping under the following conditions:

- (1) **During preheating (heating operation)**  
For about 2-3 minutes after start up.
- (2) **During defrosting (heating operation)**  
Defrosting will be performed about once an hour when frost forms on the heat exchanger of the outdoor unit, for 5-10 minutes each time. (If the piping length used is longer than usual, frost will likely to form.)

**TIMER lamp**

This lamp lights when the timer is working.

**HOW TO OPEN OR CLOSE THE FRONT PANEL**



**Open the front panel**

1. To open the front panel, use the remote controller to stop unit operation. Then press at the top left and right corners of the front panel.
2. Grasp the left and right sides of the front panel and open it toward you.

**Close the front panel**

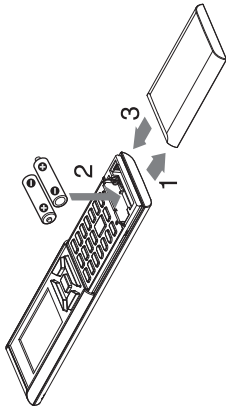
1. To close the front panel, press the upper center part of the front panel.
2. Press at the top left and right corners of the front panel.



## PREPARATION BEFORE OPERATION

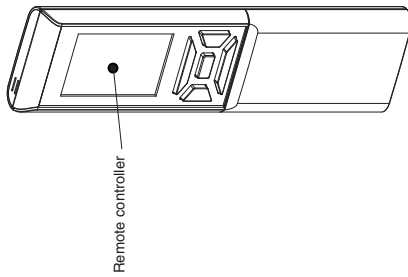
### To install the batteries

- Slide the cover to take it off.
- Install two dry batteries AAA.LR03 (alkaline). The direction of the batteries should match the marks in the case.
- Replace the cover at its original position.

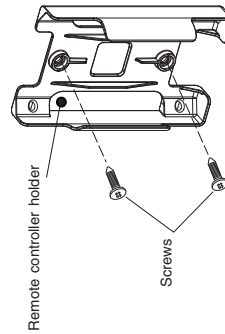


### To fix the remote controller holder to the wall

- Choose a place from where the signals can reach the unit.
- Fix the remote controller holder to a wall, a pillar or similar location with the provided screws.
- Place the remote controller in the remote controller holder.



Remote controller



Remote controller holder

Screws

### NOTE

#### Notes on batteries

- When replacing the batteries, use batteries of the same type, and replace both old batteries together.
- When the system is not used for a long time, take the batteries out.
- The batteries will last for approximately 1 year. However, if the remote controller display begins to fade and degradation of reception performance occurs within a year, replace both batteries with new size AAA.LR03 (alkaline).
- The attached batteries are provided for the initial use of the system.
- The usable period of the batteries may be short depending on the manufactured date of the air conditioner.

#### Notes on the remote controller

- Never expose the remote controller to direct sunlight.
- Dust on the signal transmitter or receiver will reduce the sensitivity. Wipe off dust with soft cloth.
- Signal communication may be disabled if an electronic-starter-type fluorescent lamp (such as inverter-type lamps) is in the room. Consult the shop if that is the case.
- If the remote controller signals happen to operate another appliance, move that appliance to somewhere else, or consult the service shop.
- When the remote controller is not in use, please close the slide cover to prevent failure.

## PREPARATION BEFORE OPERATION

### To set calendar and clock

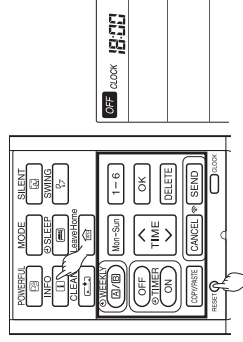
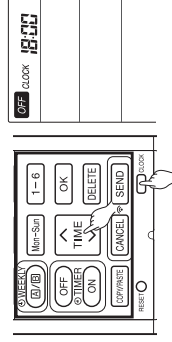
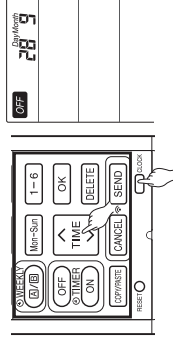
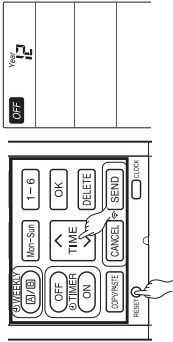
- Press **RESET** (RESET) button when first time setting. "Year" blinks.
- Press **TIME** (TIME) button to set the current year.
- Press **TIME** (GLOCK) (GLOCK) button. Next, "Day" and "Month" blink.
- Press **TIME** (TIME) button to set the current day and month.
- Press **TIME** (GLOCK) (GLOCK) button. Next, "CLOCK" blinks.
- Press **TIME** (TIME) button to set the clock to the current time.
- Press **TIME** (GLOCK) (GLOCK) button. Calendar and clock are set.

To modify the calendar and clock, press **TIME** (GLOCK) (GLOCK) button. Then follow steps 1 to 7.

Calendar and clock shall be set again after changing batteries.

After changing the batteries,

- Press **RESET** (RESET) button.
  - Direct remote control towards indoor unit and press **INFO** (INFO) button.
  - The calendar and clock from indoor unit will be transmitted.
- Calendar and clock will not be transmitted from indoor unit when the following occurs:
    - When there is a power failure.
    - When breaker is OFF by user (unit is not in STANDBY MODE).



### NOTE

Note on setting the calendar and clock

- If the calendar and clock are not set, the ON-timer, OFF-timer and Weekly Timer cannot be set.
- If the calendar and clock are not set correctly, the ON-timer, OFF-timer and Weekly Timer will not operate correctly.
- When the ON-timer, OFF-timer and Weekly Timer are set, the calendar and clock cannot be changed. If need to change the calendar and clock, ON-timer, OFF-timer and Weekly Timer need to be cancelled.



## NAMES AND FUNCTIONS OF REMOTE CONTROLLER

### REMOTE CONTROLLER

- This controls the operation of the indoor unit. The range of control is about 7 meters. If indoor lighting is controlled electronically, the range of controller may be shorter.
- This unit can be fixed on a wall using the fixture provided. Before fixing it, make sure the indoor unit can be controlled from the remote controller.
- Handle the remote controller with care. Dropping it or getting it wet may compromise its signal transmission capability.
- After new batteries are inserted into the remote controller, the unit will initially require approximately 10 seconds to respond to commands and operate.
- When remote controller is not in use for about 3 minutes during OFF condition, indicated by **OFF** on the display, the LCD will turn off.
- During clock setting, the LCD will turn off about 10 minutes later if the remote controller is not in use.
- When pressing any button, the LCD will turn on.
- The LCD will not turn off during TIMER setting.

### Signal Transmitting/Receiving Window

Point this window towards the indoor unit when controlling it.

### Sensor

A temperature sensor inside the remote controller senses ambient temperature around the remote-controller.

### Display

This indicates the room temperature selected, current time, timer status, function and airflow rate selected.

### ROOM TEMPERATURE setting Buttons

Press these buttons to set the room temperature.

Press the [ **▲** ] button to raise the room temperature.

Press the [ **▼** ] button to lower the room temperature.

Keep pressing and the value will change more quickly.

### Transmission sign

The transmission sign lights up when a signal is sent.

### START/STOP button

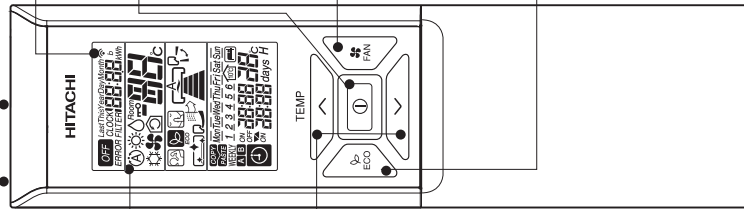
Press this button to start operation. Press it again to stop operation.

### FAN SPEED selector Button

This determines the fan speed. Every time you press this button the airflow rate will change from (AUTO) → (HIGH) → (MED) → (LOW) → (SILENT) (This button allows selection of optimal or preferred fan speed for each operation mode).

### ECO Button

Use this button to set the ECO mode.(▶ p.18)



## NAMES AND FUNCTIONS OF REMOTE CONTROLLER

### POWERFUL Button

Use this button to set the POWERFUL mode.(▶ p.16)

### INFORMATION Button

(▶ p.30)

### ONE TOUCH CLEAN Button

(▶ p.20)

### LEAVE HOME Button

(▶ p.19)

### SLEEP TIMER Button

Use this button to set the sleep timer. (▶ p.22)

### MODE selector Button

Use this button to select the operating mode. Every time you press this button, the mode will change from (AUTO) → (HEAT) → (DEHUMIDIFY) → (COOL) and → (FAN) cyclically.

### SILENT Button

Use this button to set the SILENT mode.(▶ p.17)

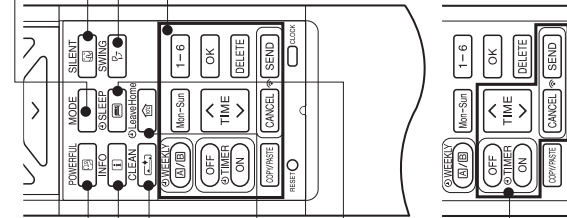
### AUTO SWING (Vertical) Button

Controls the angle of the horizontal air deflector.(▶ p.15)

FILTER lamp goes when the " (AUTO SWING)" button is pressed while the device is on "STANDBY MODE".

### WEEKLY TIMER setting Buttons

(▶ p.24)



### ON / OFF TIMER setting Buttons

(▶ p.21)

MODE SELECTOR	FAN	ON / OFF TIMER
AUTO	POWERFUL	TIME
HEAT	SILENT	OK
DEHUMIDIFY	INFO	DELETE
COOL	SLEEP TIMER	COPY/PASTE
FAN	AUTO SWING (VERTICAL)	CANCEL
FAN SPEED	LEAVE HOME	SEND
AUTO	CLEAN	LOCK
SILENT	DAY	CLOCK
LOW	PROGRAM NO.	
MED		
HI		
START / STOP		
ECO		

FAN	ON / OFF TIMER
POWERFUL	TIME
SILENT	OK
INFO	DELETE
SLEEP TIMER	COPY/PASTE
AUTO SWING (VERTICAL)	CANCEL
LEAVE HOME	SEND
CLEAN	LOCK
DAY	CLOCK
PROGRAM NO.	

### Precautions for Use

- Do not put the remote controller in the following places.
  - Under direct sunlight.
  - In the vicinity of a heater.
- Handle the remote controller carefully. Do not drop it on the floor, and protect it from water.
- Once the outdoor unit stops, it will not restart for about 3 minutes (unless you turn the power switch off and on or unplug the power cord and plug it in again).
- This is to protect the device and does not indicate a failure.
- If you press the MODE selector button during operation, the device may stop for about 3 minutes for protection.





## VARIOUS FUNCTIONS

### Auto Restart Control

- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode and airflow direction. (As the operation is not stopped by remote controller.)
  - If you intend not to continue the operation when the power is resumed, switch off the power supply. When you switch on the circuit breaker, the operation will be automatically restarted with previous operation mode and air flow direction.
- Note: 1. If you do not require Auto Restart Control, please consult your sales agent.  
2. Auto Restart Control is not available when Timer or Sleep Timer mode is set.

## AUTOMATIC OPERATION

The device will automatically determine the mode of operation, HEAT or COOL, depending on the current room temperature. The selected mode of operation will change when the room temperature varies. However, the mode of operation will not change when indoor unit is connected to multi type outdoor unit.

**1** Press the MODE selector button so that the display indicates the (AUTO) mode of operation.

- When AUTO has been selected, the device will automatically determine the mode of operation, HEAT or COOL depending on the current room temperature. However, the mode of operation will not change when indoor unit is connected to multi type outdoor unit.
- If the mode automatically selected by the unit is not satisfactory, manually change the mode setting (HEAT, DEHUMIDIFY, COOL or FAN).

Set the desired FAN SPEED with the **FAN** (FAN SPEED) button (the display indicates the setting).

→ (AUTO) → (HIGH) → (MED) ←  
← (SILENT) ← (LOW) ←

**3** Set the desired room temperature with the TEMPERATURE buttons (the display indicates the setting).  
The temperature setting and the actual room temperature may vary depending on conditions.

**START STOP**

- As the settings are stored in the memory of the remote controller, you only have to press the (START/STOP) button next time.

Press the **FAN** (FAN SPEED) button to select AUTO, HI, MED, LOW or SILENT.

## HEATING OPERATION

- Use the device for heating when the outdoor temperature is under 21°C. When it is too warm (over 21°C), the heating function may not work in order to protect the device.
- In order to maintain reliability of the device, please use this device when outdoor temperature is above -15°C.

**1** Press the MODE selector button so that the display indicates (HEAT).

Set the desired FAN SPEED with the **FAN** (FAN SPEED) button (the display indicates the setting).

→ (AUTO) → (HIGH) → (MED) ←  
← (SILENT) ← (LOW) ←

**3** Set the desired room temperature with the TEMPERATURE buttons (the display indicates the setting).  
The temperature setting and the actual room temperature may vary depending on conditions.

**START STOP**

- As the settings are stored in the memory of the remote controller, you only have to press the (START/STOP) button next time.
- During AUTO fan, the fan speed automatically changes as below.
  - When the difference between room temperature and setting temperature is large, fan starts to run at HI speed.
  - After room temperature reaches the preset temperature, fan speed will be changed to lower speed to obtain optimum room temperature condition for natural healthy heating.

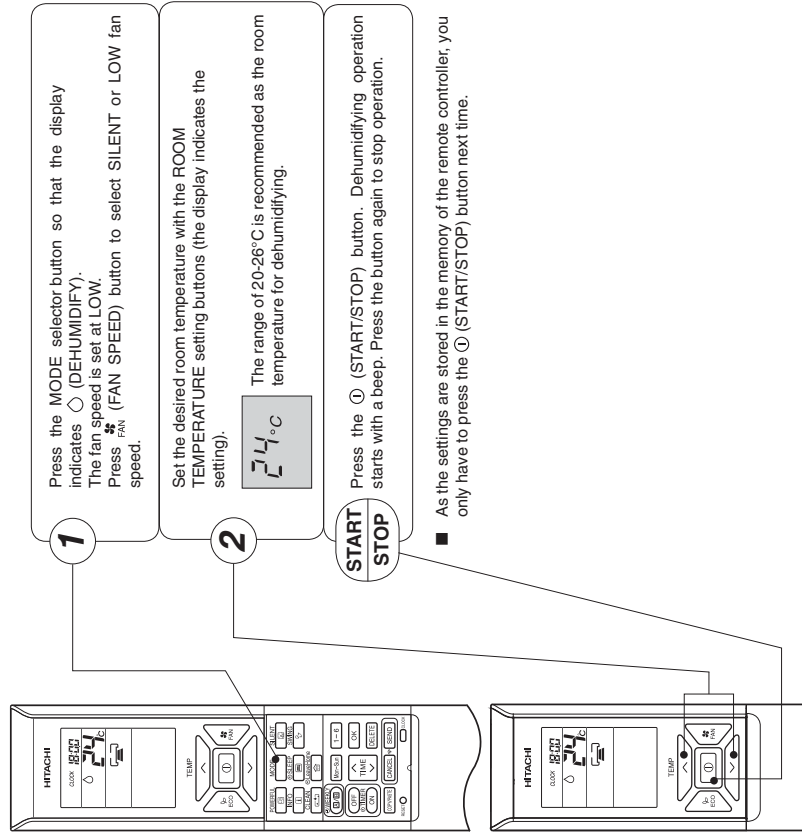
### Defrosting

Defrosting will be performed about once an hour when frost forms on the heat exchange of the outdoor unit, for 5-10 minutes each time.  
During defrosting operation, the operation lamp blinks in a cycle of 3 seconds on and 0.5 second off. The maximum time for defrosting is 20 minutes.  
However, if the indoor unit is connected to multi type outdoor unit, the maximum time for defrosting is 15 minutes. (If the piping length used is longer than usual, frost is likely to form.)



## DEHUMIDIFYING OPERATION

Use the device for dehumidifying when the room temperature is over 16°C. When it is under 15°C, the dehumidifying function will not work.

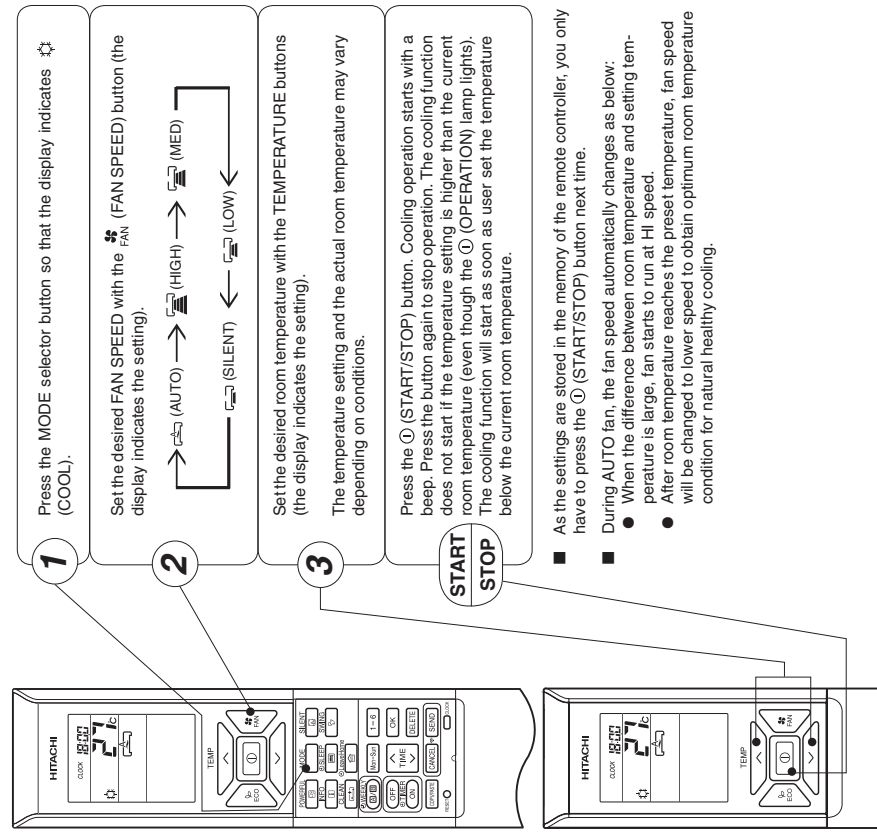


### Dehumidifying Function

- When the room temperature is higher than the temperature setting: The device will dehumidify the room, reducing the room temperature to the preset level.
- When the room temperature is lower than the temperature setting: Dehumidifying will be performed at the temperature setting slightly lower than the current room temperature, regardless of the temperature setting.
- The preset room temperature may not be reached depending on the number of people present in the room or other room conditions.

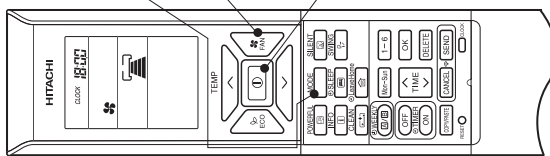
## COOLING OPERATION

Use the device for cooling when the outdoor temperature is -10~43°C. If indoors humidity is very high (80%), some dew may form on the air outlet grille of the indoor unit.



## FAN OPERATION

User can use the device simply as an air circulator.



**1** Press the **MODE** selector so that the display indicates **FAN**.

**2** Set the desired **FAN SPEED** with the **FAN** (FAN SPEED) button (the display indicates the setting).

**START/STOP** Press the **(START/STOP)** button. Fan operation starts with a beep. Press the button again to stop operation.

## AUTO SWING OPERATION

### To start Vertical Auto Swing

- Press **(AUTO SWING (VERTICAL))** button. The deflector(s) will start to swing up and down.

**(AUTO SWING)** is displayed on the LCD.

### To cancel Vertical Auto Swing

- Press **(AUTO SWING (VERTICAL))** button again. The deflector(s) will stop in the current position.

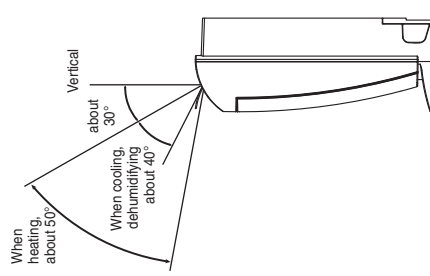
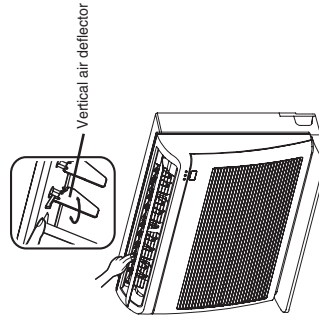
**(AUTO SWING)** disappeared from the LCD.

### NOTE

- During cooling and dehumidifying operation, do not keep the deflectors swinging or in the lower position (in the case of vertical auto swing) for a long time. It may cause dew condensation on the deflectors.

Adjustment of the conditioned air to the left and right.

Hold the vertical air deflector as shown in the figure and adjust the conditioned air to the left and right.



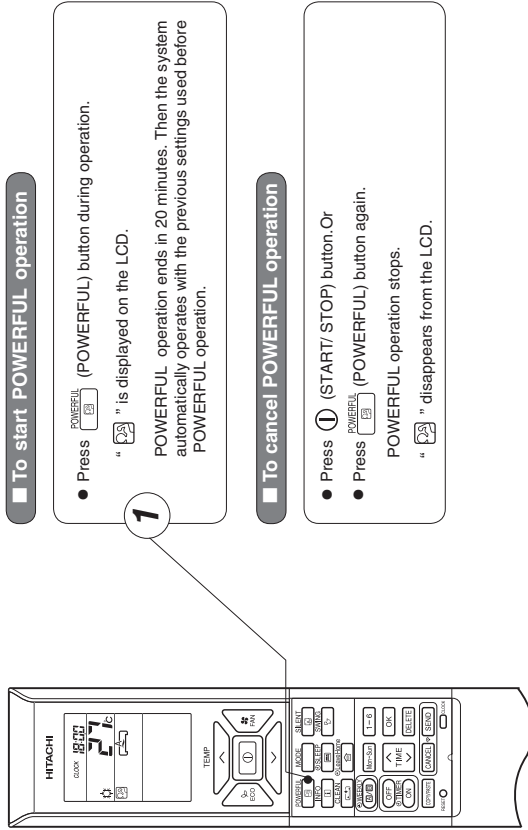
### CAUTION

- When operating the unit in cooling operation with the air deflector facing down and moving automatically for a long period of time, water will be condensed on the air deflector and drips down occasionally. This will wet your furniture.



## POWERFUL OPERATION

- By pressing **POWERFUL** (POWERFUL) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the air conditioner performs at the maximum power.
- During POWERFUL operation, cooler or warmer air will be blown out from indoor unit for COOLING or HEATING operation respectively.



### To start POWERFUL operation

- Press **POWERFUL** (POWERFUL) button during operation.

\* "POWERFUL" is displayed on the LCD.

POWERFUL operation ends in 20 minutes. Then the system automatically operates with the previous settings used before POWERFUL operation.

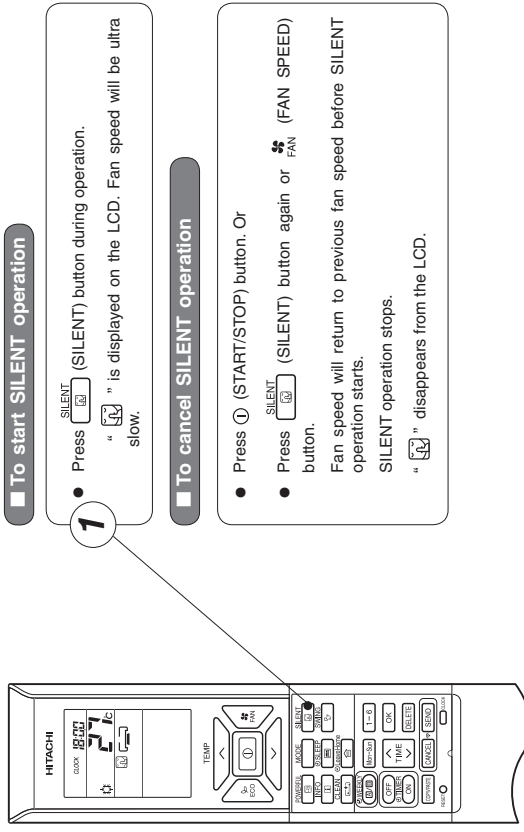
### To cancel POWERFUL operation

- Press **START/STOP** button.Or
- Press **POWERFUL** (POWERFUL) button again.

POWERFUL operation stops.  
\* "POWERFUL" disappears from the LCD.

## SILENT OPERATION

- By pressing **SILENT** (SILENT) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the fan speed will change to ultra slow.



### To start SILENT operation

- Press **SILENT** (SILENT) button during operation.

\* "SILENT" is displayed on the LCD. Fan speed will be ultra slow.

### To cancel SILENT operation

- Press **START/STOP** button.Or
- Press **SILENT** (SILENT) button again or **FAN SPEED** button.

Fan speed will return to previous fan speed before SILENT operation starts.  
SILENT operation stops.  
\* "SILENT" disappears from the LCD.

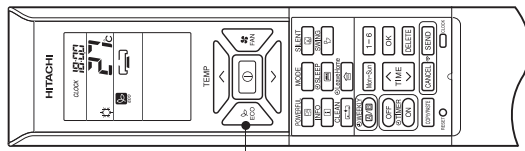
### NOTE

- When POWERFUL operation is selected, SILENT operation is cancelled. Fan speed will return to previous fan speed before SILENT operation.
- After auto restart, SILENT operation is cancelled. Fan speed will return to previous fan speed before SILENT operation.
- During any operation with fan speed **SILENT** (SILENT), if press **SILENT** (SILENT) button, fan speed will not change.



## ECO OPERATION

ECO operation is an energy saving function by changing set temperature automatically and by limiting the maximum power consumption value.



1

- By pressing the (ECO) button during AUTO, HEATING, DEHUMIDIFYING or COOLING operation, the air conditioner performs the "ECO" operation.

### To start ECO operation

- Press (ECO) button during operation.

"" is displayed on the LCD.

Energy saving operation will start by changing the set temperature higher or lower automatically and reducing operation power consumption. This function may vary based on the connected outdoor unit.

### To cancel ECO operation

- Press (START/STOP) button.Or
- Press (ECO) button again.

"" disappears from the LCD.

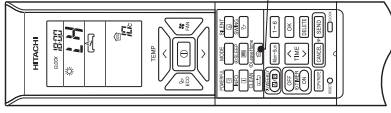
### NOTE

- ECO function will not be effective when power consumption is low.
- By pressing (POWERFUL) button, ECO operation is cancelled.
- After auto restart, ECO operation is cancelled and previous operation mode shall start.
- For multi model connections, energy saving operation shall only start by changing set temperature higher or lower automatically. However, effectiveness of ECO depends on operation conditions.

## LEAVE HOME(LH) OPERATION

Prevent the room temperature from falling too much by setting temperature 10°C automatically when no one is at home. This operation is able to operate by "Continuous operation" or "Day timer operation". Please use "Day timer operation" to set the number of days up to 99 days.

### Continuous operation



### To start LEAVE HOME operation

#### Option 1. Continuous operation.

- Press (LEAVE HOME) button during stop or operation. Room temperature is set at 10°C and heating operation starts. "" is displayed on the LCD.

#### Option 2. Day timer operation.

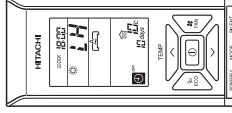
- Press (LEAVE HOME) button during stop or operation. Room temperature is set at 10°C and heating operation starts. "" is displayed on the LCD.
- Set number of operation days (1 to 99 days), if needed.

1

Press (TIME) button to select number of days. Number of days blink.

- Press "" to set number of days from 1 day, 2 days, 3 days ..... 98 days, 99 days, 1 day and so on.
- Press "" to set number of days from 99 days, 98 days, 97 days ..... 3 days, 2 days, 1 day, 99 days and so on.
- Number of day is counted when clock indicates 0:00.

### Day timer operation



### To cancel LEAVE HOME operation

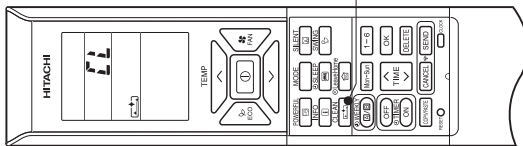
- Press (START/STOP) button.Or
- Press (LEAVE HOME) button again. Return to previous operation mode.<sup>(1)</sup>
- Change to other operation mode by pressing (MODE) button.

### NOTE

- After reaching the set number of operation days for Leave Home or by pressing the (Leave Home) button again, the unit will operate in previous mode.
- During Leave Home operation, fan speed and horizontal air deflector position cannot be changed.
- By pressing (Leave Home) button, implementation of Weekly Timer or One Timer only Timer is cancelled.
- In case of power supply shut down, after autorestart, all setting for number of days operation will be reset and unit shall be in continuous operation.
- For multi connections, when each room is running in different operation mode such as FAN only, COOLING, DEHUMIDIFYING or AUTO mode, Leave Home operation cannot operate even though it is possible to set Leave Home operation. In order to start Leave Home operation, all rooms must stop its operation. Then, press (LEAVE HOME) button to operate Leave Home operation.
- For multi connections, when all rooms are running HEATING operation, it is possible to operate Leave Home operation by pressing the (LEAVE HOME) button.
- For multi connections, if two or more rooms are set to operate Leave Home operation, the capability to reach the set temperature at 10°C may not be possible. In addition, this also depends on outdoor temperature.
- POWERFUL, SILENT and ECO operations are not applicable during Leave Home.

## CLEAN (ONE TOUCH CLEAN) OPERATION

Drying indoor heat exchanger after cooling operation to prevent mildew.



### To start CLEAN operation

- Press **CLEAN** (CLEAN) button when unit is OFF.  
Total time taken for One Touch Clean operation is 60 minutes.  
During this operation, HEATING or FAN operation shall operate.  
During one touch clean, operation lamp is blinking.

1

"CLEAN", "60" is displayed on the LCD.

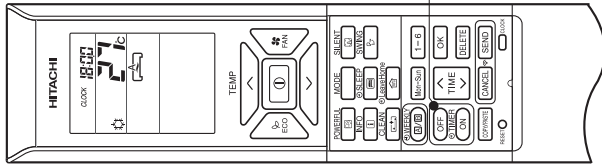
### To cancel CLEAN operation

- Press **STOP** (START/STOP) button.Or
- Press **CLEAN** (CLEAN) button again.

### NOTE

- When CLEAN operation finish, unit will switch OFF automatically.
- If Weekly Timer or Once Timer is set, there is a need to cancel those timer before operating CLEAN function.
- For multi connections, when pressing **CLEAN** (CLEAN) button, operation is limited to FAN operation.
- For multi connections, when one room operates CLEAN operation first, other rooms can operate COOLING, DEHUMIDIFYING or FAN operation. However, when other rooms need to operate HEATING operation, air conditioner will be in STANDBY mode. After CLEAN operation finish, HEATING operation will start.

## ONCE TIMER (ON/OFF TIMER) OPERATION



### OFF TIMER

The device can be set to turn off at a preset time.

- Press **OFF** (OFF-TIMER) button. **OFF** and **60** blink on the display.
- Set the "turn-off time" with **TIME** (TIME) button.
- After setting, direct the remote controller towards the indoor and press **SEND** (SEND) button.  
**OFF** and "set time" lights up instead of blinking.  
A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

1

### ON TIMER

When (ON-TIMER) is set, the operation starts so that the preset temperature is reached at the preset time.  
The air conditioner starts operation a maximum 60 minutes before the preset time, depending on conditions including room temperature and preset temperature.

- Press **ON** (ON-TIMER) button. **ON** and **60** blink on the display.
- Set the "turn-on time" with **TIME** (TIME) button.
- After setting, direct the remote controller towards the indoor and press **SEND** (SEND) button.  
**ON** and "set time" light up instead of blinking.  
A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

### ON/OFF TIMER

- The device will turn off and on at the designated time.
  - The switching occurs first at the preset time that comes earlier.
  - The arrow mark appears on the display to indicate the sequence of switching operations.
- Press **OFF** (OFF-TIMER) button so that **OFF** and **60** blink on the display.
  - Set the "turn-off" time with **TIME** (TIME) button. After setting, direct the remote controller towards the indoor and press **SEND** (SEND) button.
  - Press **ON** (ON-TIMER) button so that **ON** and "set time" time light up. The **OFF** and **60** blink.
  - Set the "turn-on" time with **TIME** (TIME) button.
  - After setting, direct the remote controller towards the indoor and press **SEND** (SEND) button.  
**ON** and "set time" time light up instead of blinking.  
A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

The timer may be used in three ways: OFF-timer, ON-timer and ON/OFF (OFF/ON)-timer. Set the current time first because it serves as a reference.

### To cancel Reservation

- Point the signal window of the remote controller towards the indoor unit and press **CANCEL** (CANCEL) button.  
**OFF** and "ON or OFF set time" goes out with a beep and the (TIMER) lamp on the indoor unit turns off.

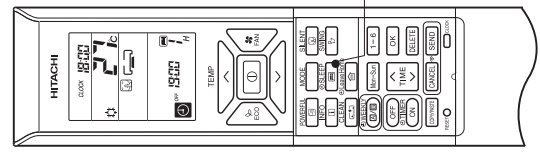
### NOTE

- User can set only one of the OFF-timer, ON-timer or ON/OFF-timer.
- If WEEKLY TIMER already set, by setting the ONCE TIMER, ONCE TIMER operation is prioritized. When ONCE TIMER operation is complete, WEEKLY TIMER operation will be activated.



### ECO SLEEP TIMER OPERATION

The timer can be set up to a duration of 7 hours. By pressing **ECO SLEEP** (SLEEP) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the unit shifts the room temperature and reduces the fan speed. It results in energy saving. Set the current time first before operating the ECO SLEEP TIMER operation.



#### To start ECO SLEEP TIMER operation

- Press **ECO SLEEP** (SLEEP) button during operation.
- "OFF", "ECO SLEEP", "OFF", off time, "H" and number of hour are displayed on the remote controller display.
  - During ECO SLEEP TIMER operation, fan speed will be ultra slow.
  - A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.
- Pressing **ECO SLEEP** (SLEEP) button repeatedly, the number of hours will change as below:



- During ECO SLEEP TIMER operation, air conditioner will continue to operate for the designated number of hours and then turn off.
- When the ECO SLEEP TIMER has been set, the display on the remote controller indicates the turn off time.

Example: If ECO SLEEP TIMER is set for 1 hour at 18:00, the switch off time will be at 19:00.



#### To cancel ECO SLEEP TIMER operation

- Press **START/STOP** button.
- Room air conditioner will switch off.
- Press **ECO SLEEP** (SLEEP) button again until "OFF", "ECO SLEEP", "OFF", off time, "H" and number of hour disappear from the remote controller display.
- Press **CANCEL** (CANCEL) button.
- A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit turns off.
  - SLEEP TIMER operation is cancelled.

### ECO SLEEP TIMER OPERATION

#### To set SLEEP TIMER and ON TIMER

The air conditioner will be turned off by ECO SLEEP TIMER and turned on by ON TIMER.

- Set the ON TIMER.
- Press **ECO SLEEP** (SLEEP) button and set ECO SLEEP TIMER.



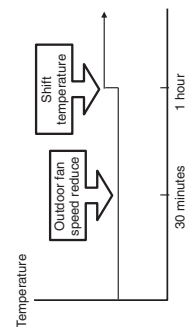
Example:  
In this case, air conditioner will turn off in 2 hours (at 1:38) and it will be turned on at 6:00 the next morning.

#### To cancel ECO SLEEP TIMER and ON TIMER operation

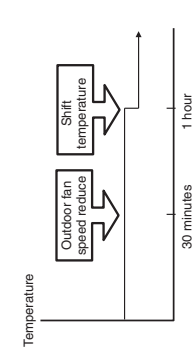
- Direct the remote controller towards the indoor unit and press **CANCEL** (CANCEL) button.
- "OFF", "ECO SLEEP", "OFF", off time, "H", number of hour, "ON" and ON TIMER set time disappear from the remote controller display.
  - A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit turns off.
  - ECO SLEEP TIMER and ON TIMER reservations are cancelled.

30 minutes after setting ECO SLEEP TIMER, outdoor fan speed will be reduced to lower the noise level and to have comfort operation. 1 hour after setting ECO SLEEP TIMER, set temperature will be slightly shifted. Amount of temperature shifted depends on type of air conditioner. These automatic operation changes contribute to energy saving without losing comfort. The level of energy consumption depends on outside temperature, room temperature, set temperature or air conditioner type.

Cooling operation [diagram representation for illustrative purpose only]



Heating operation [diagram representation for illustrative purpose only]



#### NOTE

- If ECO SLEEP TIMER is set when OFF TIMER or ON/OFF TIMER has been set earlier, the ECO SLEEP TIMER becomes effective instead of the OFF TIMER or ON/OFF TIMER.



## WEEKLY TIMER OPERATION

- It is possible to select Mode A or Mode B. For each mode, up to 6 programs can be set per day. In total, a maximum of 42 programs can be set for a week for each mode.
- If calendar and clock are not set, the reservation setting for WEEKLY TIMER cannot be set.
- If calendar and clock are not set correctly, WEEKLY TIMER will not operate correctly.
- Reservation for calendar and clock shall be set first before operating WEEKLY TIMER.

**Step 1: Set the reservation schedule to the remote controller. Send the registered reservation to indoor unit and then operate.**

**Step 2: Select Mode A or Mode B and activate or deactivate WEEKLY TIMER.**

**Step 3: Copy and cancel the reservation schedule.**

**Step 1: Set reservation schedule to the remote controller. Send the registered reservation to indoor unit and then operate.**

- How to set a WEEKLY TIMER.
  - Select Mode A or Mode B.

1 Press **WEEKLY** (WEEKLY) button. WEEKLY lights up. **A** and **3** blink on the display. (Mode A is selected).

2 Press **WEEKLY** (WEEKLY) button again, **B** and **3** blink on the display. (Mode B is selected).

- If no reservation has been made, ON/OFF, **1**, **2**, **3** will not appear.
- If reservation has been made, ON/OFF, **1**, **2**, **3** will not appear.

2. Set a program.

Press **WEEKLY** (WEEKLY) button for about 3 seconds. The selection mode can be changed.

**3** day: Mon, program no. : 1, ON/OFF, setting time and setting temperature blink on the display.

3. Select the desired day of the week.

Press **Mon-Sun** (DAY) button.

The day changes from Mon → Tue → Wed → Thu → Fri → Sat → Sun → Mon, Tue, Wed, Thu, Fri, Sat, Sun [Full days] → Mon, Tue, Wed, Thu, Fri [weekday] → Sat, Sun [weekend] → Mon → Tue ....

Select [Full days] for daily reservation.

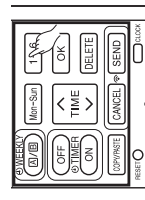
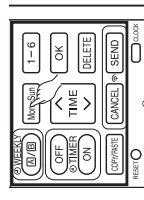
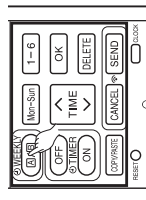
Select [weekday] for Monday to Friday reservation.

Select [weekend] for Saturday and Sunday reservation.

- After reservation has been set, it is easy to check and edit at the same time.

4. Press **1-6** button to select a program number.

- The number changes from 1 → 2 → 3 → 4 → 5 → 6 → 1 → 2 ....
- If program number has been set, follow above in order to make changes.



## WEEKLY TIMER OPERATION

- Press **ON-OFF** (ON-OFF TIMER) button to select ON TIMER or OFF TIMER reservation.
- Press **TIME** (TIME) button to set time reservation.
- Press **TEMP** (TEMP ^ or v) button to set temperature reservation.
- Press **OK** (OK) button. The reservations are set. Day, program number, ON reservation, setting temperature will light up. **3** will be continuously blinks. If reservation is not complete, settings will not be stored in memory.

To continue with the reservation, press **Mon-Sun** **1-6** **OFF** **ON** buttons. Follow step 3 to 8 for reservation.

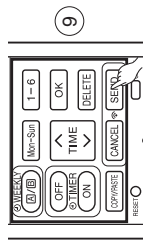
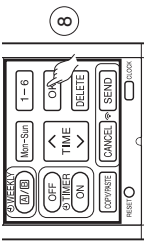
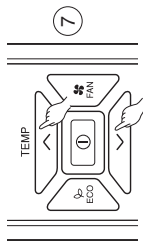
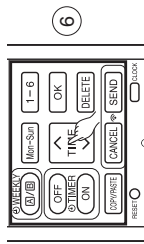
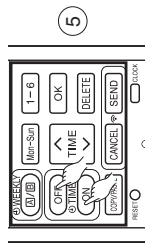
- After all the reservations have been set, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly. After beep sound emitted from indoor unit, TIMER lamp will light up.

**Please ensure that the TIMER lamp lights up.**

This indicates that the reservation has been stored in the indoor unit and Timer function has been completed.

The reservation contents will appear on the remote controller display.

- If TIMER lamp on the indoor unit does not light up, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds.
- CAUTION 1** Do not press **CANCEL** (CANCEL) button during reservation setting because this will result in all reservation contents to be lost.
- The reservation contents will not stored in the indoor unit until **SEND** (SEND) button has been pressed.



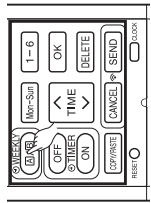
### NOTE

- Up to 6 programs can be set per day. Setting ON TIMER or OFF TIMER for each program number can be at random. When pressing **SEND** (SEND) button, the set ON TIMER or OFF TIMER for each program number will automatically arranged so that program number 1 shall have the earliest time and program number 6 shall have the latest time.
- CAUTION 1** If the remote controller is left idle and **SEND** (SEND) button is not pressed within 3 minutes after reservations have been made, all current reservations will be lost.



## WEEKLY TIMER OPERATION

### Step 2: Select Mode A or Mode B and activate or deactivate WEEKLY TIMER.

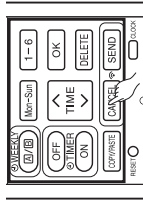


- How to select Mode A or Mode B of WEEKLY TIMER setting.
- Press **WEEKLY** (WEEKLY) button. **A** and **2** blink on the display. (Normally Mode A will blink first).
  - Press **WEEKLY** (WEEKLY) button again. **B** and **4** blink on the display.
  - Select Mode A or Mode B. Press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.



After beep sound emitted from indoor unit, TIMER lamp will light up. **Please ensure that the TIMER lamp lights up.**

This indicates that Mode A or Mode B selection and active WEEKLY TIMER have been confirmed.



- Setting non-active WEEKLY TIMER.

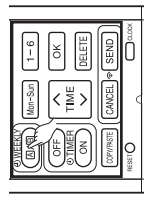
- Direct the remote controller towards the indoor unit and press **CANCEL** (CANCEL) button. Beep sound will be emitted from indoor unit and TIMER lamp will be OFF. Reservation indication on remote display will also disappear. This indicates that non-active WEEKLY TIMER has been confirmed.
- To activate back the setting of WEEKLY TIMER, repeat the steps for "How to select Mode A or Mode B of WEEKLY TIMER setting".

### NOTE

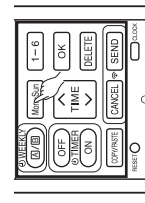
- When setting ONCE TIMER, operation of WEEKLY TIMER is interrupted. After ONCE TIMER operation is complete, WEEKLY TIMER operation will be activated.
- When ONCE TIMER is cancelled, operation of WEEKLY TIMER is also cancelled. Need to set WEEKLY TIMER operation for activation.
- After auto restart, WEEKLY TIMER operation is cancelled. Need to set WEEKLY TIMER operation for activation.

## WEEKLY TIMER OPERATION

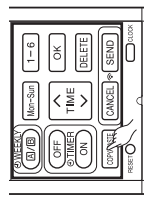
### Step 3: Copy and cancel the reservation schedule.



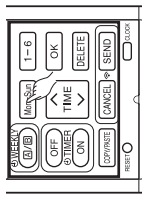
- How to copy and paste.
- Editing the reservation schedule is easy by copying data from one day to another day.



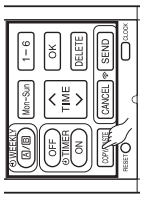
- Press **WEEKLY** (WEEKLY) button to select Mode A or Mode B.
- Press **WEEKLY** (WEEKLY) button for about 3 seconds to start editing the reservation schedule.
- Press **Mon-Sun** (DAY) button to select a day of the week to copy.



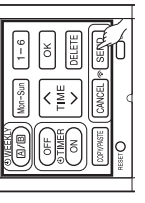
- Press **Mon-Sun** (DAY) button to select a day of the week to paste.
- Press **COPY/PASTE** (COPY/PASTE) button one more time to paste. **2** only blinks on the display.



- To continue copying to other days, press **Mon-Sun** or **1-6** or **Mon-Sun** or **1-6** or **Mon-Sun** or **1-6**.
- Then start from step 3.



- Alter copy and paste completed, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly. After beep sound emitted from indoor unit, TIMER lamp will light up. **Please ensure that the TIMER lamp lights up.**
- If TIMER lamp does not light up, Press **SEND** (SEND) button again.

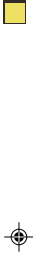


- Reservation data will not change if **SEND** (SEND) button is not pressed.

### NOTE

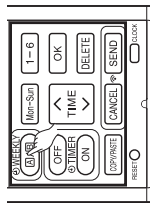
- If there is no reservation data, copying data from one day to another day cannot be done.





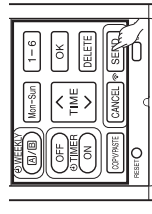
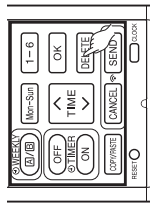
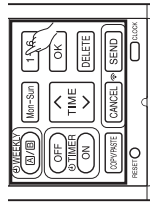
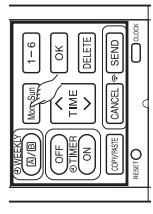
## WEEKLY TIMER OPERATION

### Step 3: Copy and cancel the reservation schedule.



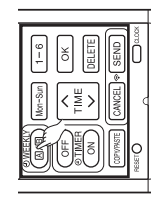
■ How to delete WEEKLY TIMER data.  
[Delete one program number reservation]

1. Press **WEEKLY (D/B)** (WEEKLY) button to select Mode A or Mode B.
  2. Press **WEEKLY (D/B)** (WEEKLY) button for 3 seconds to start editing the reservation schedule.
  3. Press **Mon-Sun** (DAY) button to select a day of the week to edit.
  4. Press **1-6** to select program number. Selected program number will blink.
  5. Press **DELETE** (DELETE) button. Reservation of selected program number is deleted.
  6. After deleting, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.  
After beep sound emitted from indoor unit, **TIMER lamp** will light up. **Please ensure that the TIMER lamp lights up.**
- Reservation will not change if **SEND** (SEND) button is not pressed.



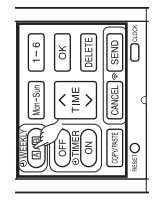
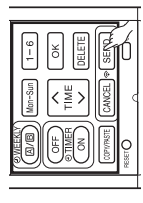
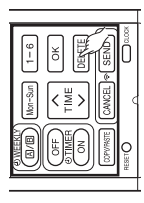
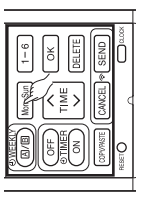
## WEEKLY TIMER OPERATION

### Step 3: Copy and cancel the reservation schedule.



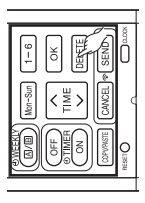
[Delete one day reservation]

1. Press **WEEKLY (D/B)** (WEEKLY) button to select Mode A or Mode B.
  2. Press **WEEKLY (D/B)** (WEEKLY) button for 3 seconds to start editing the reservation schedule.
  3. Press **Mon-Sun** (DAY) button to select a day of the week to edit.
  4. Press **DELETE** (DELETE) button for about 10 seconds. Reservations for all program numbers will be deleted.
    - If press for a short time, reservation for one program number will be deleted.
  5. After deleting, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.  
After beep sound emitted from indoor unit, **TIMER lamp** will light up. **Please ensure that the TIMER lamp lights up.**
- Reservation will not change if **SEND** (SEND) button is not pressed.



[Delete Mode A or Mode B]

1. Press **WEEKLY (D/B)** (WEEKLY) button to select Mode A or Mode B.
2. Direct the remote controller towards the indoor unit and press **DELETE** (DELETE) button for about 10 seconds while Mode A or Mode B display blinks.  
After beep sound emitted from indoor unit, reservations for Mode A or Mode B will disappear.



### NOTE

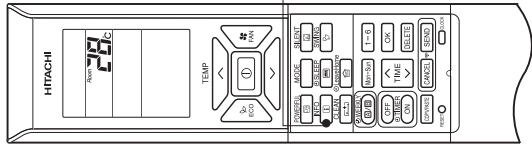
- If all reservations in the remote controller were deleted and pressed **SEND** (SEND) button, no signal will be transmitted to indoor unit. **TIMER lamp** will remain off and no changes will be done to the reservations stored in the indoor unit.





## INFO FUNCTION

- By pressing **INFO** (INFO) button, temperature around remote controller and monthly power consumption will be displayed on the remote controller.
- After changing the batteries, direct the remote controller towards the indoor unit and press **INFO** (INFO) button. Current calendar and clock will be transmitted from indoor unit.
- In order to receive information from indoor unit, the distance between remote controller and receiver of indoor units is within 2 meters.



### To check temperature around remote controller

Press **INFO** (INFO) button.  
Temperature will be displayed for 10 seconds.

### To check monthly power consumption

Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press **INFO** (INFO) button. Wait for 2 seconds for signal transmission.

While temperature around remote controller is displayed, press **INFO** (INFO) button repeatedly. The display will show as below:  
this month power consumption amount for heating → last month power consumption amount for heating → this month power consumption amount for cooling → last month power consumption amount for cooling → temperature around remote control → this month power consumption amount for heating ..... cyclically.

- If indication is not given, bring remote controller closer to the receiver of the indoor unit.
- Indicated value shall be regarded as a guide only.

### Current calendar and clock can be retrieved from indoor unit

Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press **INFO** (INFO) button. Wait for 2 seconds for signal transmission.

Once received the current calendar and clock, check whether they are correct or not by pressing **CLOCK** (CLOCK) button.

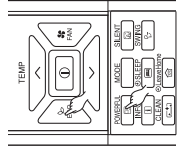
- If there is no power supply to indoor unit or calendar and clock have not been set, INFO function cannot be used for sending or receiving information.

#### NOTE

- In case failure occurs to the air conditioner, by pressing **INFO** (INFO) button, an error code will be displayed. Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press **INFO** (INFO) button. Wait for 2 seconds for signal transmission. An error code will be displayed. Call service center and inform the error code.

## OPERATION MODE LOCK

The remote controller can be set to fix the HEATING mode (including FAN), COOLING mode (including FAN) and DEHUMIDIFYING mode (including FAN) operations.



- Method to lock HEATING mode (including FAN) operation.

Press **ECO** (ECO) and **POWERFUL** (POWERFUL) buttons simultaneously for about 5 seconds when remote controller is OFF.

"**HEATING**", "**FAN**" and "**HEATING**" will be displayed for about 10 seconds. Later, "**HEATING**" and "**HEATING**" will remain.

This indicates that HEATING mode operation is locked.

When pressing **MODE** (MODE) button, "**HEATING**" or "**FAN**" will be displayed.

- Method to unlock HEATING mode (including FAN) operation.

Press **ECO** (ECO) and **POWERFUL** (POWERFUL) buttons simultaneously for about 5 seconds when the remote controller is OFF.

All operation mode symbols will appear on the display for about 10 seconds. After that, operation mode symbol before cancellation will be displayed. This indicates that HEATING mode operation is unlocked.

- Method to lock COOLING and DEHUMIDIFYING modes (including FAN) operations.

Press **ECO** (ECO) and **SILENT** (SILENT) buttons simultaneously for about 5 seconds when the remote controller is OFF.

"**COOLING**", "**FAN**" and "**COOLING**" will be displayed for about 10 seconds. Later, "**COOLING**" and "**COOLING**" will remain.

This indicates that COOLING and DEHUMIDIFYING mode operation is locked.

When pressing **MODE** (MODE) button, "**COOLING**", "**FAN**" or "**COOLING**" will be displayed.

- Method to unlock COOLING and DEHUMIDIFYING modes (including FAN) operations.

Press **ECO** (ECO) and **SILENT** (SILENT) buttons simultaneously for about 5 seconds when the remote controller is OFF.

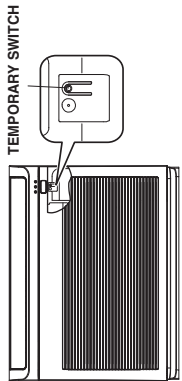
All operation mode symbols will appear on the display for about 10 seconds. After that, operation mode symbol before cancellation will be displayed. This indicates that COOLING and DEHUMIDIFYING modes operation is unlocked.

#### NOTE

- Operation Mode Lock function will not activate if TIMER reservations activate.
- TIMER reservations shall be deactivated first. Then, Operation Mode Lock function can be activated.
- HEATING, COOLING and DEHUMIDIFYING mode (including FAN) operations can be unlocked by pressing the **RESET** (RESET) button. However, by pressing the **RESET** (RESET) button, all the information stored in the remote controller will disappear. You may need to set the necessary information again.
- For multi connections, unit and mode which is set to lock HEATING and switched on first shall have higher priority. Other units which are chosen to operate at different modes shall be in STANDBY until either the first unit operation is switched off or the mode is selected to be same as the first unit.

## TEMPORARY SWITCH

If the remote controller does not work due to battery failure, press this switch to start and stop operation. This temporary operation will be at the setting made most recently. (The unit will immediately go into automatic operation once power is switched on.)



## CIRCUIT BREAKER

When you do not use the room air conditioner, set the circuit breaker to "OFF".

## HOW TO USE THE AIR CONDITIONER EFFECTIVELY

1. **An average room temperature setting is probably the best for you as well as being economical.**

- Excessive cooling or heating is not recommended for health reasons. High electricity bills may also result.
- Close the curtains or blinds to prevent heat from flowing into or escaping the room as well as to make more effective use of electricity.



2. **At intervals, the doors and windows should be opened to let fresh air in.**

- **CAUTION** Make sure the room is ventilated when operating the air conditioner at the same time as other heating appliances.



3. **Using the timer is recommended before going to sleep or going out.**



4. **The following must never be used for cleaning the indoor and outdoor units:**

- Benzine, thinner and scrub can damage plastic surfaces or coating.
- Hot water above 40°C can shrink the filter and deform plastic parts.



5. **Do not block the air intake and air outlet.**

- Do not block the air outlets and intakes of the indoor and outdoor units with curtains or other obstacles which could degrade air conditioner performance and cause unit failure.

## MAINTENANCE

### ▲ WARNING

- Before cleaning, stop unit operation with the remote controller and turn off the circuit breaker.

### ▲ CAUTION

- Do not expose the unit to water as it may cause an electric shock.
- For cleaning inside the air conditioner, consult your sales agent.
- Avoid using detergent when cleaning the heat exchanger of the indoor unit. Unit failure may result.
- When cleaning the heat exchanger with a vacuum cleaner, make sure to wear gloves so as not to injure your hands on the heat exchanger fins.

## 1. AIR FILTER

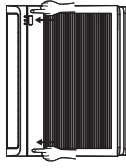
Clean the air filter, as it removes dust inside the room. Be sure to clean the filter once every two weeks so as not to consume electricity unnecessarily.

### PROCEDURE

#### 1

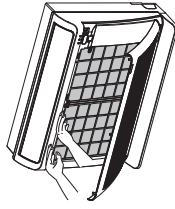
##### Open the front panel.

- To open the front panel, use the remote controller to stop unit operation. Then press at the top left and right corners of the front panel.
- Grasp the left and right sides of the front panel and open it toward you.



#### 2

##### Remove the filters.



#### 3

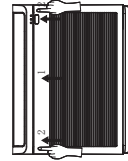
##### Remove dust of the filters using a vacuum cleaner.

- After using neutral detergent, wash with clean water and dry in shade.



#### 4

##### Attach the filters.



#### 5

##### Close the front panel.

1. To close the front panel, press the upper center part of the front panel.
2. Press at the top left and right corners of the front panel.

#### 6

##### Filter lamp goes when the " (AUTO SWING)" button is pressed while the device is on "STANDBY MODE".

### ▲ CAUTION

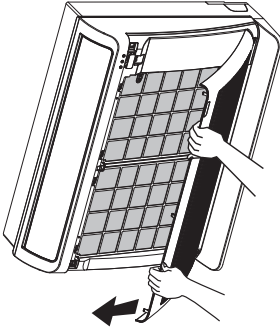
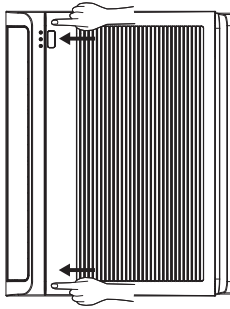
- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink. And also use a soft sponge to wash. Using a scrubber or brush cause the metal film on the surface to come off.
- Don't operate the unit without filter. Fault may occur if you continue.

## 2. HOW TO INSTALL AND REMOVE THE FRONT PANEL

- Be sure to use both hands to grasp the front panel when removing it or attaching it.

### Removing

1. Press at the top left and right corners of the front panel.
2. Grasp the left and right sides of the front panel and pull it up to remove.



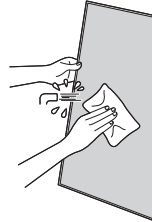
### Attaching

1. Attach three front panel bearings to the axis of the front cover. (Set the hook to face up.)
2. Close the front panel.

## 3. CLEANING OF FRONT PANEL

The front panel can be washed in water. It can be kept clean at all times.

- Front panel can be removed and washed in water. Gently clean the front panel using a soft sponge.
- When the air conditioner is to be cleaned without removing the front panel, clean both the body and remote controller with a dry soft cloth.
- Wipe off water completely. If water remains on the display section or light receiver section, this could cause a malfunction.



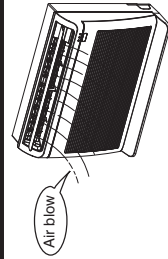
### CAUTION

- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.
- Never clean with hot water (above 40°C), benzene, gasoline, acid, thinner or a brush, because it will damage the plastic surface and the coating.



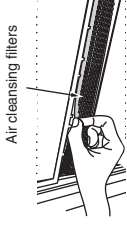
## 4. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

- Activating air conditioner drying will keep the interior of the indoor unit dry and prevent mold formation.
- Turn off the circuit breaker.



## 5. AIR CLEANSING FILTERS (SPX-CFH15)

- When installing the air cleansing filters, remove the air filters and attach them onto the hooks of the front cover frame.
- The cooling capacity is slightly weakened and the cooling speed becomes slower when the air cleansing filters are used. So, set the fan speed to "HIGH" when using it in this condition.
- The air cleansing filters can be used for 2 years.



## INFORMATION

### CAPABILITIES

#### Heating Capability

- This room air conditioner utilizes a heat pump system that absorbs exterior heat and brings it into a room to be heated. As the ambient temperature gets lower, heating capability will also lower. In such a situation, the PAM and inverter work to increase compressor rpm to keep the unit's heating capability from decreasing. If the unit's heating performance is still unsatisfactory, other heating appliances should be used to augment this unit's performance.
- The air conditioner is designed to heat an entire room so that it may take some time before you feel warm. Timer operation is recommended for effective preheating ahead of the desired time.



**CAUTION**  
Do not use a stove or any other high-temperature devices in proximity to the indoor unit.

#### Cooling and Dehumidifying Capabilities

- If the heat present in a room exceeds the unit's cooling capacity (for example, if there are many people in the room or other heating appliances are used), the preset room temperature may not be reached.

### VARIOUS FUNCTIONS

- When fan speed, room temperature are set with the remote controller before starting manual operation and the buttons are released, the indication of settings will go off in 10 seconds and only the operation mode will be displayed.
- Pressing the button while the unit is in operation will let the protective circuit work so that the unit will not operate for approximately 3 minutes.
- During heating operation, the indoor unit's color indicator lamp may flash with no air emitted for a while.
- If you feel cold wind during warming operation with the (HI) fan speed or want to make the unit operation quieter after the room is heated, use of (AUTO) setting is recommended.
- With the (SILENT) setting, the unit's cooling capability will lower slightly.

### TIMER PROGRAMMING/SLEEP/TIMER OPERATION

- When the timer has been programmed, the unit will not operate even if the set time is reached unless the unit receives a signal from the remote controller. Confirm that timer programming is complete (beep) and the TIMER lamp of the indoor unit lights.
- If the button is pressed while the ON/OFF timer is programmed, the sleep timer takes priority.
- During sleep timer operation, the fan speed sets to (SILENT) regardless of the preset speed. The remote controller display indication will remain unchanged even with the (SILENT) setting.

## REGULAR INSPECTION

PLEASE CHECK THE FOLLOWING POINTS EVERY EITHER HALF YEARLY OR YEARLY. CONTACT YOUR SALES AGENT SHOULD YOU NEED ANY HELP.

1		<b>WARNING</b>	<p><b>Check to see if the unit's earth line has been connected correctly.</b> If the earth line is disconnected or faulty, unit failure or electric shock hazard may result.</p>
2		<b>WARNING</b>	<p><b>Check to see if the mounting frame has rusted excessively or if the outdoor unit has tilted or become unstable.</b> It could collapse or fall, causing injury.</p>

## AFTER SALES SERVICE AND WARRANTY

### WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING

CONDITION	CHECK THE FOLLOWING POINTS
<p>If the remote controller is not transmitting a signal. (Remote controller display is dim or blank.)</p>	<ul style="list-style-type: none"> <li>Do the batteries need replacement?</li> <li>Is the polarity of the inserted batteries correct?</li> </ul>
<p>When it does not operate.</p>	<ul style="list-style-type: none"> <li>Is the fuse all right?</li> <li>Is the voltage extremely high or low?</li> <li>Is the circuit breaker "ON"?</li> <li>Is the setting of operation mode different from other indoor units?</li> </ul>
<p>When it does not cool well. When it does not heat well.</p>	<ul style="list-style-type: none"> <li>Is the air filter blocked with dust?</li> <li>Is the set temperature suitable?</li> <li>Have the top and bottom air deflectors been adjusted to their correct positions according to the operation mode selected?</li> <li>Are the air inlets or air outlets of indoor and outdoor units blocked?</li> <li>Is the fan speed "LOW" or "SILENT"?</li> </ul>

■ The following phenomena do not indicate unit failure.

<p>&lt;Operation start&gt; During heating, the operation indicator blinks and air blow stops</p>	<p>&lt;Operation start&gt; The unit is preparing to blow warm air. Please wait. &lt;In operation&gt; The outdoor unit is defrosting. Please wait.</p>
<p>Hissing or fizzy sounds</p>	<p>Refrigerant flow noise in the pipe or valve sound generated when flow rate is adjusted.</p>
<p>Squeaking noise</p>	<p>Noise generated when the unit expands or contracts due to temperature changes.</p>
<p>Rustling noise</p>	<p>Noise generated with the indoor unit fan's rpm changing such as operation start times.</p>
<p>Clicking noise</p>	<p>Noise of the motorized valve when the unit is switched on.</p>
<p>Perking noise</p>	<p>Noise of the ventilation fan sucking in air present in the drain hose and blowing out dehumidifying water that had accumulated in the condensed water collector. For details, consult your sales agent.</p>
<p>Changing operation noise</p>	<p>Operation noise changes due to power variations according to room temperature changes.</p>
<p>Mist emission</p>	<p>Mist is generated as the air within the room is suddenly cooled by conditioned air.</p>

Steam emitted from the outdoor unit	Water generated during defrosting operation evaporates and steam is emitted. Caused as the smells and particles of smoke, food, cosmetics, etc. present in room air become attached to the unit and blown off into the room again.
Odors	
The outdoor unit continues to operate even if operation is stopped	Defrosting is underway (as the heating operation is stopped, the microcomputer checks frost accumulated in the indoor unit and instructs the unit to perform automatic defrosting if necessary).
The OPERATION lamp is blinking	Shows preheating or defrosting operation is underway. As the protective circuit or preheat sensor operates when unit operation is stopped during preheating and then restarted, or when operation mode is switched from cooling to heating, the lamp continues to blink.
Does not reach the temperature setting	Actual room temperature may deviate slightly from the remote controller's temperature setting depending on the number of people in the room, indoor or outdoor conditions when the air conditioner is used for more than one room at the same time.

- If the unit still fails to operate normally after performing the above inspections, turn the circuit breaker off and contact your sales agent immediately.



**Contact your sales agent immediately if the following phenomena should occur:**

- The circuit breaker switches off or the fuse blows frequently.
- The switch operation is not stable.
- Foreign matter or water accidentally enters the unit interior.
- The power cord gets excessively hot or its insulation is torn or stripped.
- TIMER lamp on the indoor unit display blinks.

(As the nature of the failure can be identified by the blinking cycle, check the blinking cycle before turning off the circuit breaker.)

**Notes**

- In quiet operation or stopping the running, the following phenomena may occasionally occur, but they are not abnormal for the operation.
  - (1) Slight flowing noise of refrigerant in the refrigerating cycle.
  - (2) Slight rubbing noise from the fan casing which is cooled and then gradually warmed as operation stops.
- The odor will possibly be emitted from the room air conditioner because the various odor, emitted by smoke, foodstuffs, cosmetics and so on, sticks to it. So please clean the air filter and the evaporator regularly to reduce the odor.



- Please contact your sales agent immediately if the air conditioner still fails to operate normally after the above inspections. Inform your agent of the model of your unit, production number, date of installation. Please also inform him regarding the fault.

Please note:  
On switching on the equipment, particularly when the room light is dimmed, a slight brightness fluctuation may occur. This is of no consequence.  
The conditions of the local Power Supply Companies are to be observed.

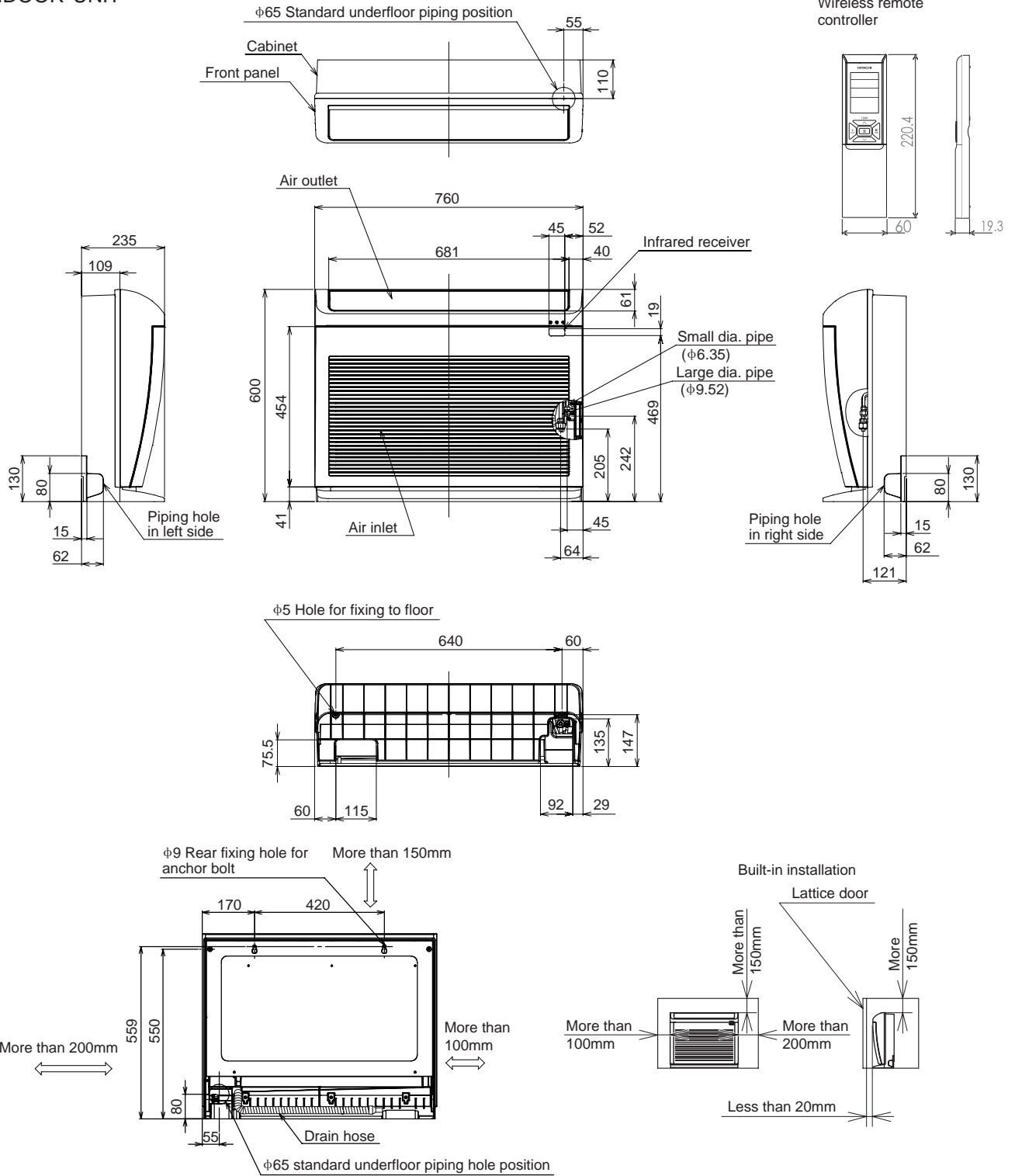


# CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAF-50RPA

Unit : mm

## INDOOR UNIT

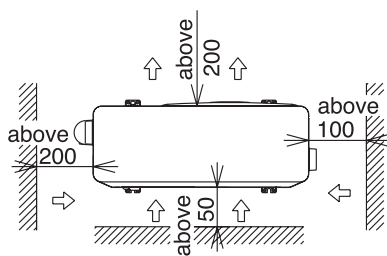
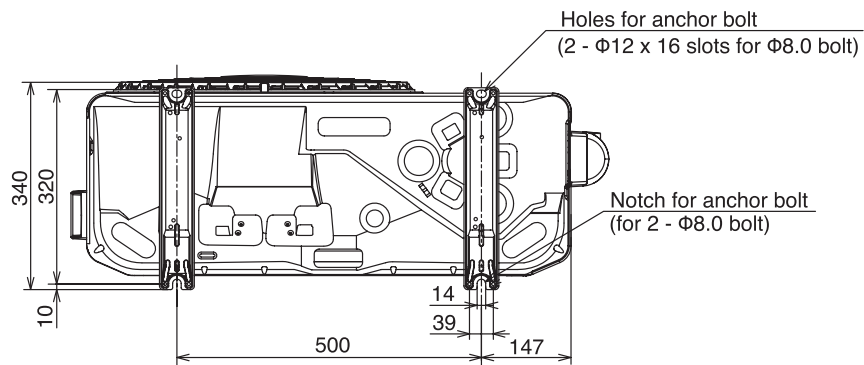
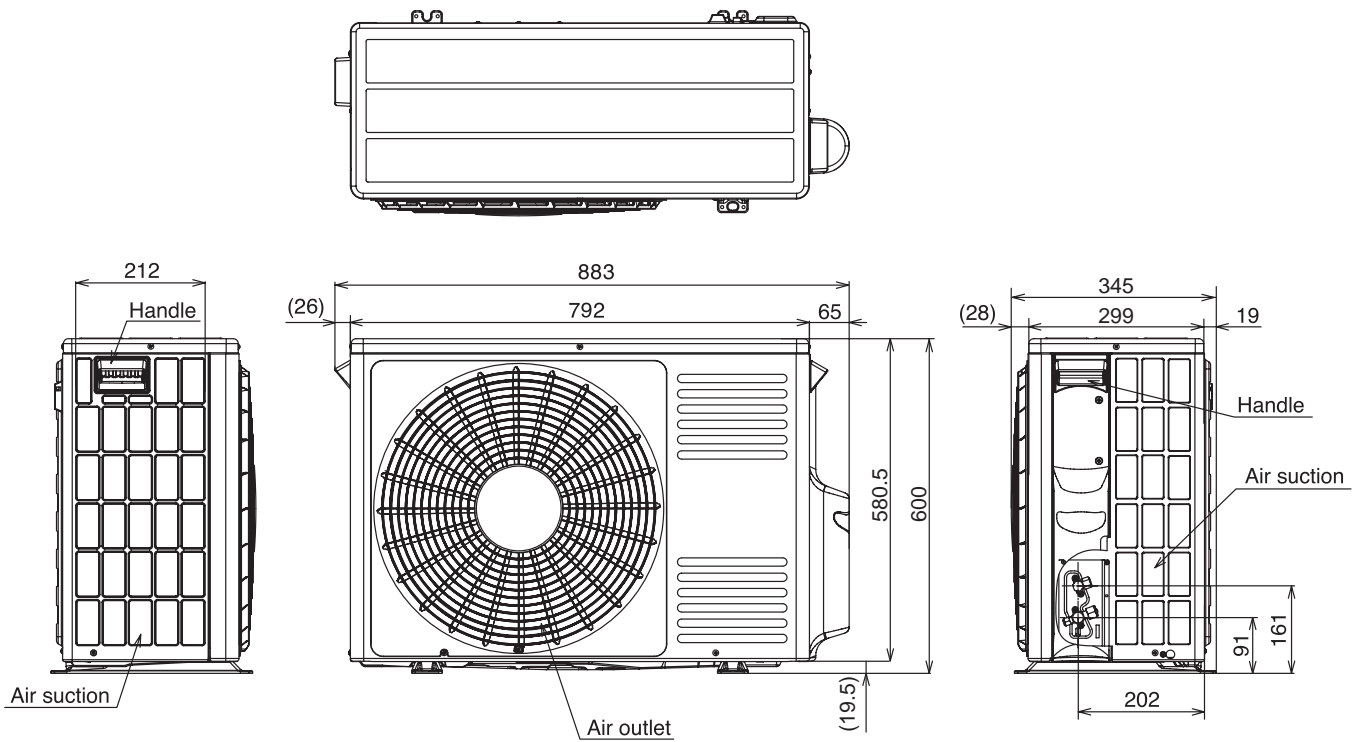


- Cautions:
1. Use insulated pipes for both large and small diameters.
  2. Use pipes of no more than 20m length.
  3. Make sure the difference in heights between the indoor and outdoor units is 10m.
  4. For built-in installation, make sure that the infrared receiver and indicator are not blocked.
  5. Pipes can be laid out from the right, bottom or rear, when the unit is viewed from front.
  6. Keep the clearance shown by  $\longleftrightarrow$  for installation.
  7. For built-in installation, keep the vertical deflector at top air outlet as flat as possible.  
If it is inclined too much, heat will be trapped in the unit, which could cause faulty room temperature control.
  8. An F-cable 1.6mm or 2.0mm dia. x 2 (control side) is used for the connection cable.

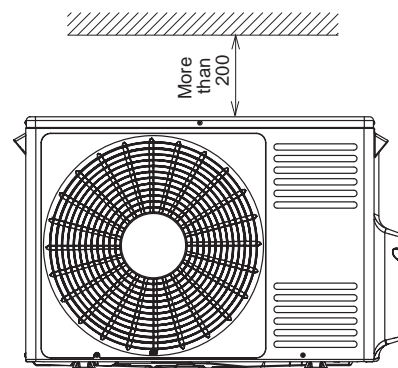
# CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAC-50FPA  
OUTDOOR UNIT

Unit : mm



Service space



## NOTE:

1. For outdoor unit installation, allow at least 2 sides of space around the unit ensure ventilation flue.
2. The connecting pipe, should all the insulated with insulation pipe.
3. Piping length is within 20m.
4. Height different of the piping between the indoor unit and outdoor unit should be within 10m.



# MAIN PARTS COMPONENT

THERMOSTAT (Room temperature Thermistor)

Thermostat Specifications

MODEL			RAF-50RPA	
THERMOSTAT MODEL			IC	
OPERATION MODE			COOL	HEAT
TEMPERATURE °C (°F)	INDICATION 16	ON	15.3 (62.1)	16.7 (62.1)
		OFF	15.0 (60.8)	17.3 (63.1)
	INDICATION 24	ON	23.3 (76.5)	24.7 (76.5)
		OFF	23.0 (75.2)	25.3 (77.5)
	INDICATION 32	ON	31.3 (90.9)	32.7 (90.9)
		OFF	31.0 (89.6)	33.3 (91.9)

## FAN MOTOR

Fan Motor Specifications

MODEL	RAF-50RPA	RAC-50FPA
POWER SOURCE	DC : 5V, DC : 35V	DC : 120 - 380V
OUT PUT	25W	47W
CONNECTION	<p>(Control circuit built in)</p>	

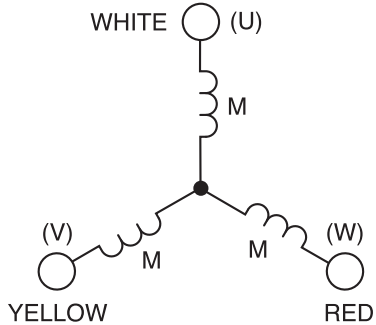
BLU : BLUE      YEL : YELLOW      BRN : BROWN      WHT : WHITE  
 GRY : GRAY      ORN : ORANGE      GRN : GREEN      RED : RED  
 BLK : BLACK      PNK : PINK      VIO : VIOLET

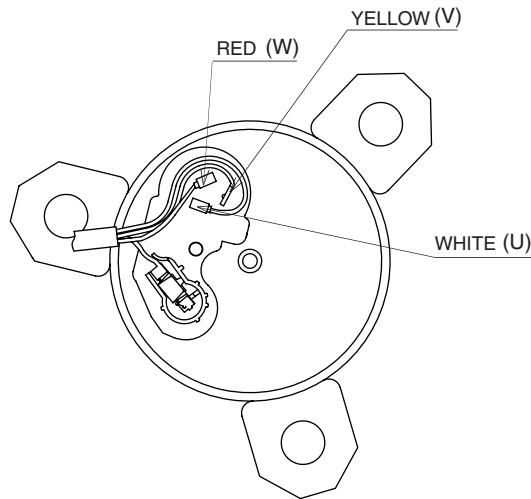
## MAIN ELECTRIC COMPONENTS FOR OUTDOOR UNIT

NAME	RATING	APPLICABLE MODELS
REVERSING VALVE COIL	81.8 Ω (20 °C)	RAC- 50FPA
REACTOR L1	5.3 (mH), 67mΩ	RAC-50FPA
FILM CAPACITOR	400 (μF)	RAC-50FPA

COMPRESSOR

Compressor Motor Specifications

MODEL	RAC-50FPA	
COMPRESSOR MODEL	5RS132ZBA21	
RATED VOLTAGE	DC220V	
CONNECTION		
RESISTANCE VALUE (Ω)	25°C	2M= 1.65
	75°C	2M= 1.97



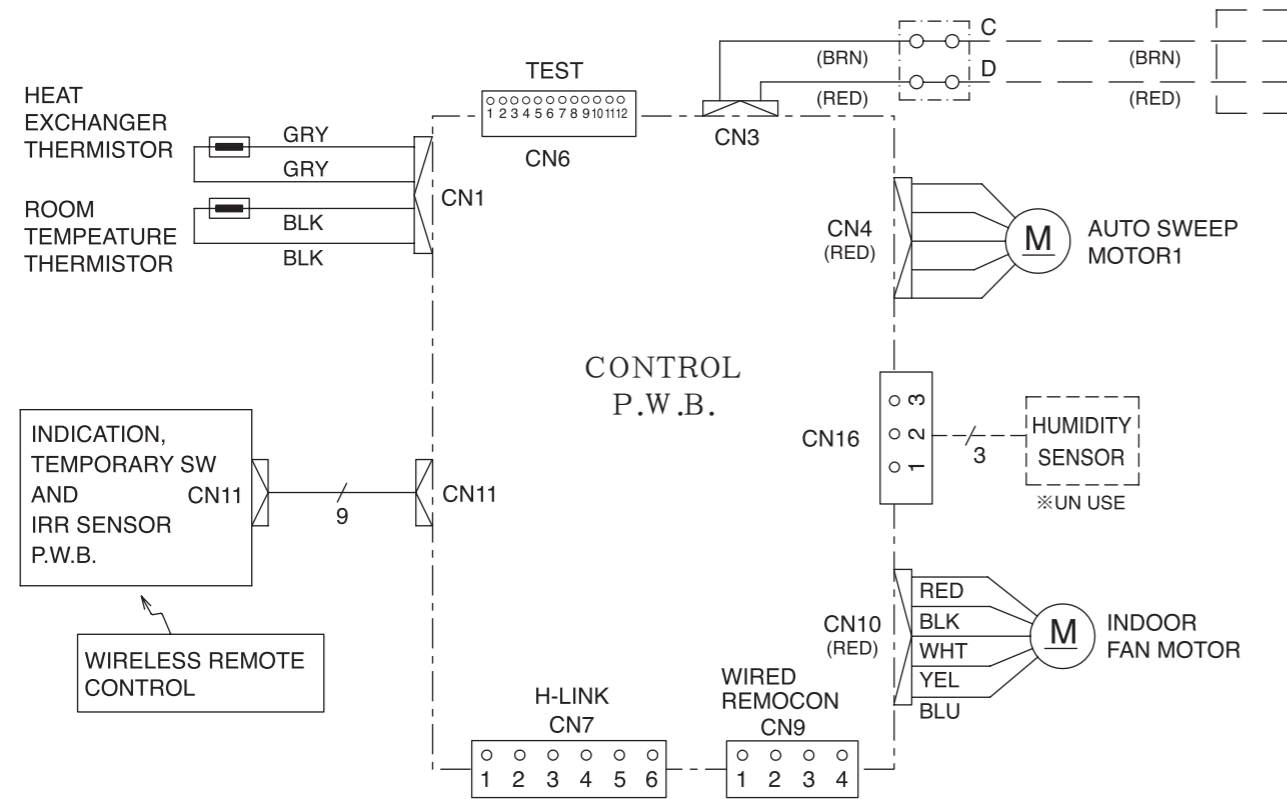
**CAUTION**

When the refrigerating cycle has been operated for a long time with the capillary tubes clogged or crushed or with too little refrigerant, check the color of the refrigerating machine oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

# WIRING DIAGRAM

MODEL RAF-50RPA / RAC-50FPA

## INDOOR UNIT

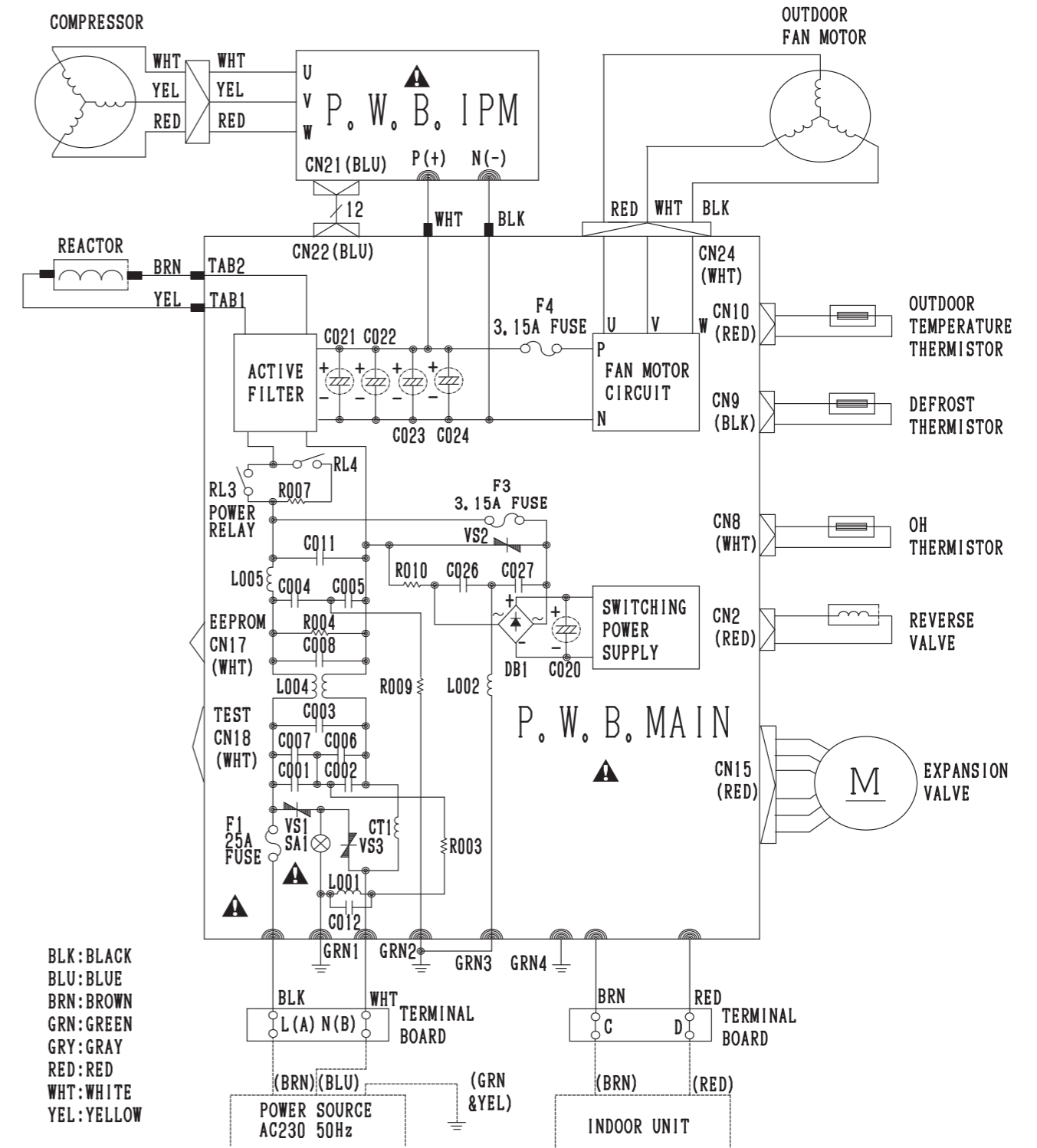


**CAUTION**  
The marked parts ⚠ are very important ones for safety.

NOTE  
1. Connecting cable 1.5mm dia.x2 (C D line) is used for the connection.

## OUTDOOR UNIT

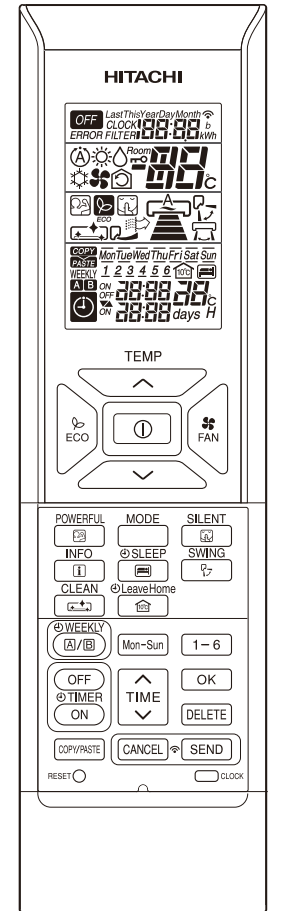
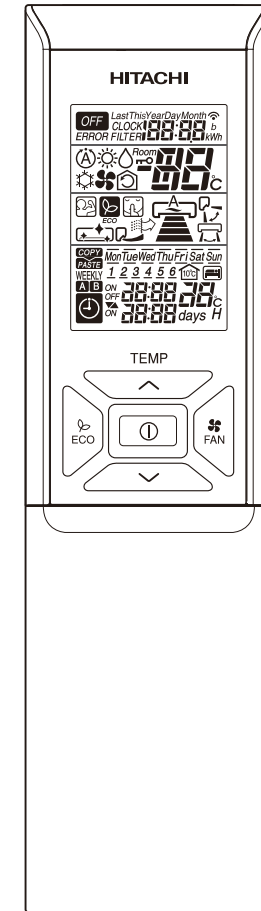
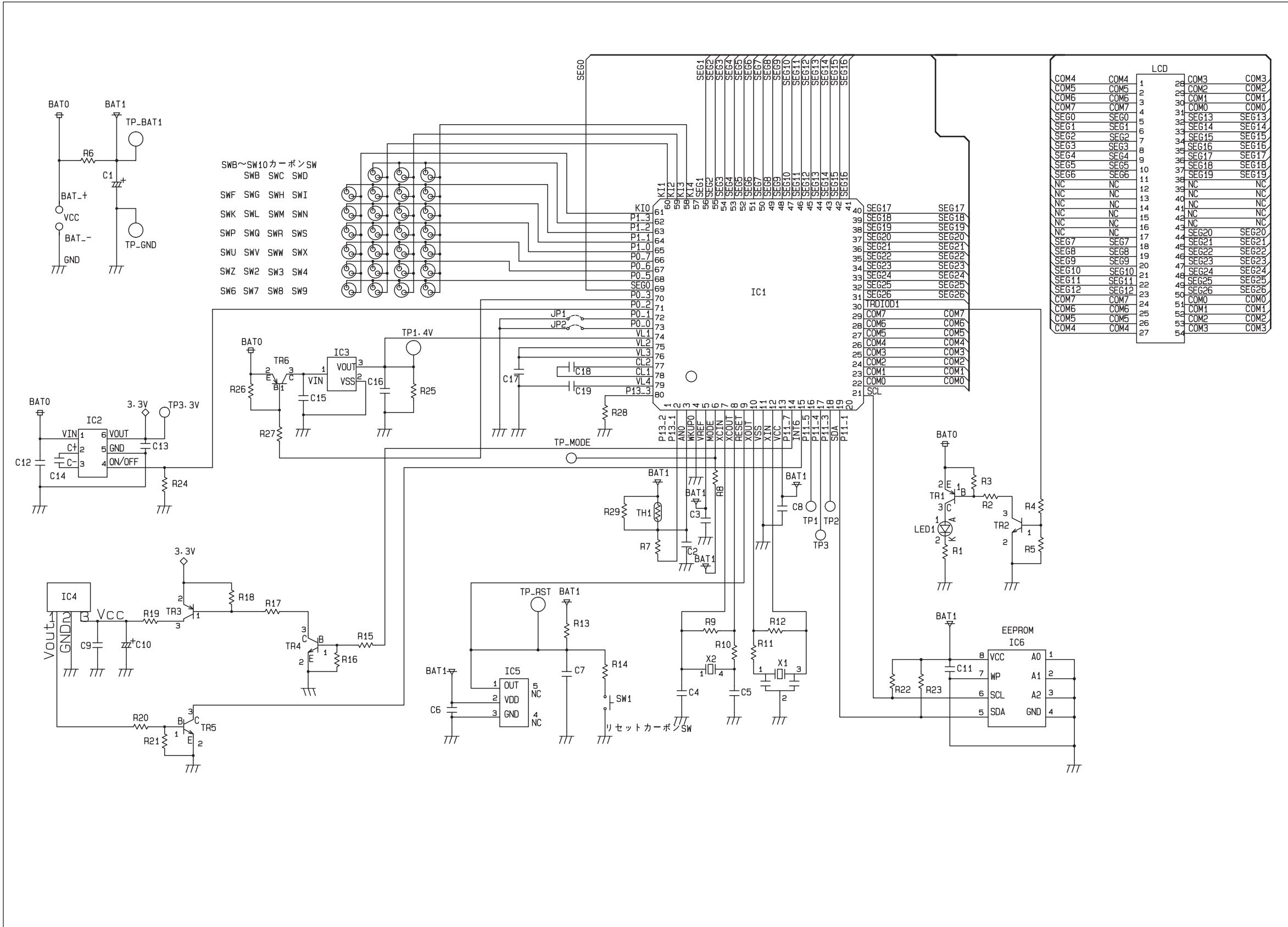
# WIRING DIAGRAM

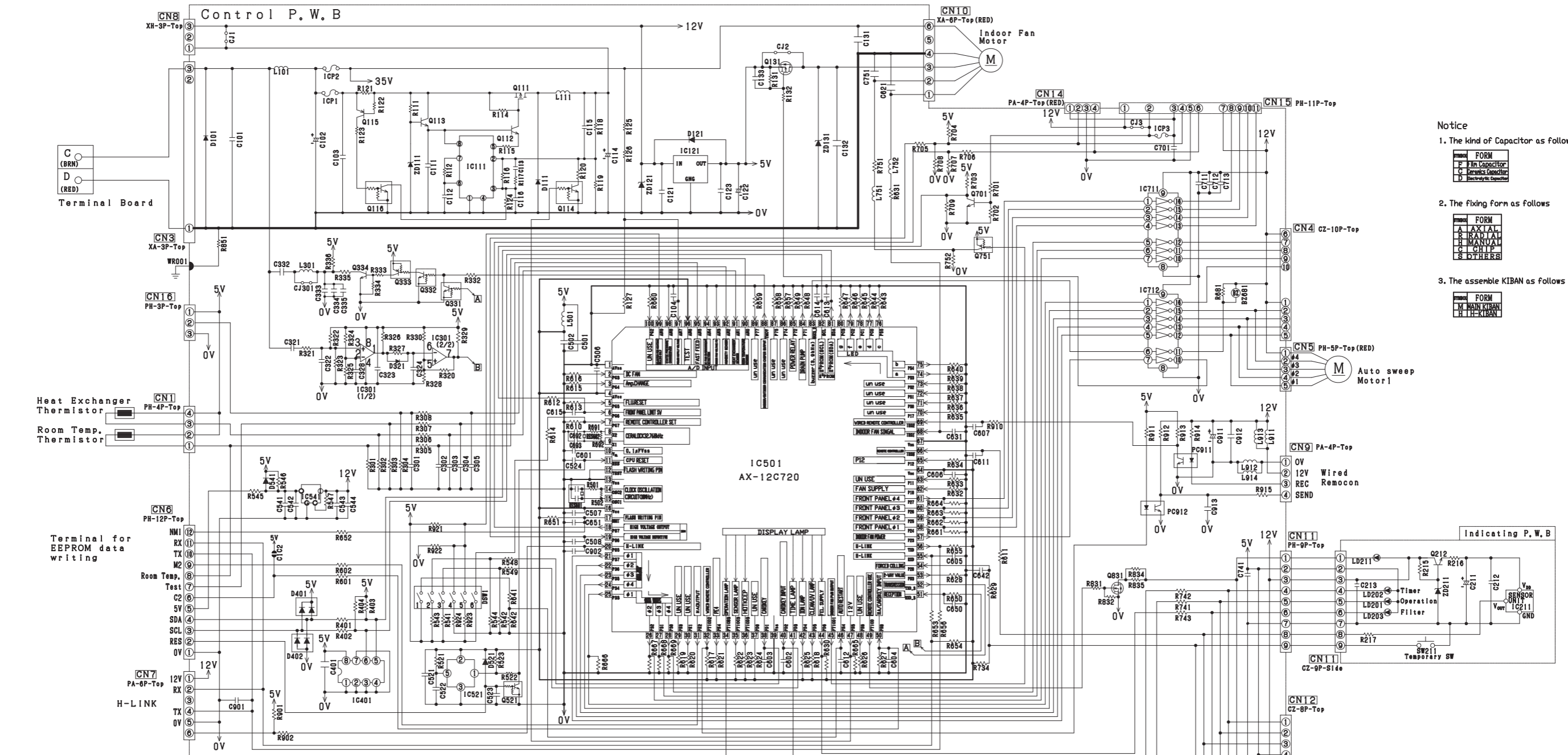


BLK: BLACK  
BLU: BLUE  
BRN: BROWN  
GRN: GREEN  
GRY: GRAY  
RED: RED  
WHT: WHITE  
YEL: YELLOW

# WIRING DIAGRAM OF THE PRINTED WIRING BOARD

[Remote controller] RAR-5E2





- Notice**
1. The kind of Capacitor as follows
 

F	FORM
C	Pin Capacitor
G	Gamma Capacitor
D	Disc-style Capacitor
  2. The fixing form as follows
 

F	FORM
A	AXIAL
R	RADIAL
H	HORIZONTAL
C	CHIP
S	OTHERS
  3. The assemble KIBAN as follows
 

F	FORM
M	MAIN KIBAN
H	THE KIBAN

**RESISTOR**

Part#	Model	PCB
R101	10K	PCB
R102	100K	PCB
R103	1K	PCB
R104	100Ω	PCB
R105	1M	PCB
R106	10K	PCB
R107	100K	PCB
R108	1K	PCB
R109	100Ω	PCB
R110	1M	PCB
R111	10K	PCB
R112	100K	PCB
R113	1K	PCB
R114	100Ω	PCB
R115	1M	PCB
R116	10K	PCB
R117	100K	PCB
R118	1K	PCB
R119	100Ω	PCB
R120	1M	PCB
R121	10K	PCB
R122	100K	PCB
R123	1K	PCB
R124	100Ω	PCB
R125	1M	PCB
R126	10K	PCB
R127	100K	PCB
R128	1K	PCB
R129	100Ω	PCB
R130	1M	PCB

**Capacitor**

Part#	Model	PCB
C101	100P	PCB
C102	100P	PCB
C103	100P	PCB
C104	100P	PCB
C105	100P	PCB
C106	100P	PCB
C107	100P	PCB
C108	100P	PCB
C109	100P	PCB
C110	100P	PCB
C111	100P	PCB
C112	100P	PCB
C113	100P	PCB
C114	100P	PCB
C115	100P	PCB
C116	100P	PCB
C117	100P	PCB
C118	100P	PCB
C119	100P	PCB
C120	100P	PCB

**Diode**

Part#	Model	PCB
D101	1N4148	PCB
D102	1N4148	PCB
D103	1N4148	PCB
D104	1N4148	PCB
D105	1N4148	PCB
D106	1N4148	PCB
D107	1N4148	PCB
D108	1N4148	PCB
D109	1N4148	PCB
D110	1N4148	PCB
D111	1N4148	PCB
D112	1N4148	PCB
D113	1N4148	PCB
D114	1N4148	PCB
D115	1N4148	PCB
D116	1N4148	PCB
D117	1N4148	PCB
D118	1N4148	PCB
D119	1N4148	PCB
D120	1N4148	PCB

**Transistor**

Part#	Model	PCB
Q101	2N3858	PCB
Q102	2N3858	PCB
Q103	2N3858	PCB
Q104	2N3858	PCB
Q105	2N3858	PCB
Q106	2N3858	PCB
Q107	2N3858	PCB
Q108	2N3858	PCB
Q109	2N3858	PCB
Q110	2N3858	PCB
Q111	2N3858	PCB
Q112	2N3858	PCB
Q113	2N3858	PCB
Q114	2N3858	PCB
Q115	2N3858	PCB
Q116	2N3858	PCB
Q117	2N3858	PCB
Q118	2N3858	PCB
Q119	2N3858	PCB
Q120	2N3858	PCB

**LED**

Part#	Model	PCB
L101	LED5050	PCB
L102	LED5050	PCB
L103	LED5050	PCB
L104	LED5050	PCB
L105	LED5050	PCB
L106	LED5050	PCB
L107	LED5050	PCB
L108	LED5050	PCB
L109	LED5050	PCB
L110	LED5050	PCB
L111	LED5050	PCB
L112	LED5050	PCB
L113	LED5050	PCB
L114	LED5050	PCB
L115	LED5050	PCB
L116	LED5050	PCB
L117	LED5050	PCB
L118	LED5050	PCB
L119	LED5050	PCB
L120	LED5050	PCB

**Coil**

Part#	Model	PCB
L101	500P	PCB
L102	500P	PCB
L103	500P	PCB
L104	500P	PCB
L105	500P	PCB
L106	500P	PCB
L107	500P	PCB
L108	500P	PCB
L109	500P	PCB
L110	500P	PCB
L111	500P	PCB
L112	500P	PCB
L113	500P	PCB
L114	500P	PCB
L115	500P	PCB
L116	500P	PCB
L117	500P	PCB
L118	500P	PCB
L119	500P	PCB
L120	500P	PCB

**IC**

Part#	Model	PCB
IC101	AX-12C720	PCB
IC102	74C01	PCB
IC103	74C02	PCB
IC104	74C03	PCB
IC105	74C04	PCB
IC106	74C05	PCB
IC107	74C06	PCB
IC108	74C07	PCB
IC109	74C08	PCB
IC110	74C09	PCB
IC111	74C10	PCB
IC112	74C11	PCB
IC113	74C12	PCB
IC114	74C13	PCB
IC115	74C14	PCB
IC116	74C15	PCB
IC117	74C16	PCB
IC118	74C17	PCB
IC119	74C18	PCB
IC120	74C19	PCB

**Oscillator**

Part#	Model	PCB
OSC1	455K	PCB
OSC2	455K	PCB
OSC3	455K	PCB
OSC4	455K	PCB
OSC5	455K	PCB
OSC6	455K	PCB
OSC7	455K	PCB
OSC8	455K	PCB
OSC9	455K	PCB
OSC10	455K	PCB
OSC11	455K	PCB
OSC12	455K	PCB
OSC13	455K	PCB
OSC14	455K	PCB
OSC15	455K	PCB
OSC16	455K	PCB
OSC17	455K	PCB
OSC18	455K	PCB
OSC19	455K	PCB
OSC20	455K	PCB

**Photoc Unit**

Part#	Model	PCB
PH1	PHOTOC	PCB
PH2	PHOTOC	PCB
PH3	PHOTOC	PCB
PH4	PHOTOC	PCB
PH5	PHOTOC	PCB
PH6	PHOTOC	PCB
PH7	PHOTOC	PCB
PH8	PHOTOC	PCB
PH9	PHOTOC	PCB
PH10	PHOTOC	PCB
PH11	PHOTOC	PCB
PH12	PHOTOC	PCB
PH13	PHOTOC	PCB
PH14	PHOTOC	PCB
PH15	PHOTOC	PCB
PH16	PHOTOC	PCB
PH17	PHOTOC	PCB
PH18	PHOTOC	PCB
PH19	PHOTOC	PCB
PH20	PHOTOC	PCB

**Diode**

Part#	Model	PCB
D101	1N4148	PCB
D102	1N4148	PCB
D103	1N4148	PCB
D104	1N4148	PCB
D105	1N4148	PCB
D106	1N4148	PCB
D107	1N4148	PCB
D108	1N4148	PCB
D109	1N4148	PCB
D110	1N4148	PCB
D111	1N4148	PCB
D112	1N4148	PCB
D113	1N4148	PCB
D114	1N4148	PCB
D115	1N4148	PCB
D116	1N4148	PCB
D117	1N4148	PCB
D118	1N4148	PCB
D119	1N4148	PCB
D120	1N4148	PCB

**Transistor**

Part#	Model	PCB
Q101	2N3858	PCB
Q102	2N3858	PCB
Q103	2N3858	PCB
Q104	2N3858	PCB
Q105	2N3858	PCB
Q106	2N3858	PCB
Q107	2N3858	PCB
Q108	2N3858	PCB
Q109	2N3858	PCB
Q110	2N3858	PCB
Q111	2N3858	PCB
Q112	2N3858	PCB
Q113	2N3858	PCB
Q114	2N3858	PCB
Q115	2N3858	PCB
Q116	2N3858	PCB
Q117	2N3858	PCB
Q118	2N3858	PCB
Q119	2N3858	PCB
Q120	2N3858	PCB

**LED**

Part#	Model	PCB
L101	LED5050	PCB
L102	LED5050	PCB
L103	LED5050	PCB
L104	LED5050	PCB
L105	LED5050	PCB
L106	LED5050	PCB
L107	LED5050	PCB
L108	LED5050	PCB
L109	LED5050	PCB
L110	LED5050	PCB
L111	LED5050	PCB
L112	LED5050	PCB
L113	LED5050	PCB
L114	LED5050	PCB
L115	LED5050	PCB
L116	LED5050	PCB
L117	LED5050	PCB
L118	LED5050	PCB
L119	LED5050	PCB
L120	LED5050	PCB

**Coil**

Part#	Model	PCB
L101	500P	PCB
L102	500P	PCB
L103	500P	PCB
L104	500P	PCB
L105	500P	PCB
L106	500P	PCB
L107	500P	PCB
L108	500P	PCB
L109	500P	PCB
L110	500P	PCB
L111	500P	PCB
L112	500P	PCB
L113	500P	PCB
L114	500P	PCB
L115	500P	PCB
L116	500P	PCB
L117	500P	PCB
L118	500P	PCB
L119	500P	PCB
L120	500P	PCB

**IC**

Part#	Model	PCB
IC101	AX-12C720	PCB
IC102	74C01	PCB
IC103	74C02	PCB
IC104	74C03	PCB
IC105	74C04	PCB
IC106	74C05	PCB
IC107	74C06	PCB
IC108	74C07	PCB
IC109	74C08	PCB
IC110	74C09	PCB
IC111	74C10	PCB
IC112	74C11	PCB
IC113	74C12	PCB
IC114	74C13	PCB
IC115	74C14	PCB
IC116	74C15	PCB
IC117	74C16	PCB
IC118	74C17	PCB
IC119	74C18	PCB
IC120	74C19	PCB

**Oscillator**

Part#	Model	PCB
OSC1	455K	PCB
OSC2	455K	PCB
OSC3	455K	PCB
OSC4	455K	PCB
OSC5	455K	PCB
OSC6	455K	PCB
OSC7	455K	PCB
OSC8	455K	PCB
OSC9	455K	PCB
OSC10	455K	PCB
OSC11	455K	PCB
OSC12	455K	PCB
OSC13	455K	PCB
OSC14	455K	PCB
OSC15	455K	PCB
OSC16	455K	PCB
OSC17	455K	PCB
OSC18	455K	PCB
OSC19	455K	PCB
OSC20	455K	PCB

**Photoc Unit**

Part#	Model	PCB
PH1	PHOTOC	PCB
PH2	PHOTOC	PCB
PH3	PHOTOC	PCB
PH4	PHOTOC	PCB
PH5	PHOTOC	PCB
PH6	PHOTOC	PCB
PH7	PHOTOC	PCB
PH8	PHOTOC	PCB
PH9	PHOTOC	PCB
PH10	PHOTOC	PCB
PH11	PHOTOC	PCB
PH12	PHOTOC	PCB
PH13	PHOTOC	PCB
PH14	PHOTOC	PCB
PH15	PHOTOC	PCB
PH16	PHOTOC	PCB
PH17	PHOTOC	PCB
PH18	PHOTOC	PCB
PH19	PHOTOC	PCB
PH20	PHOTOC	PCB

**Diode**

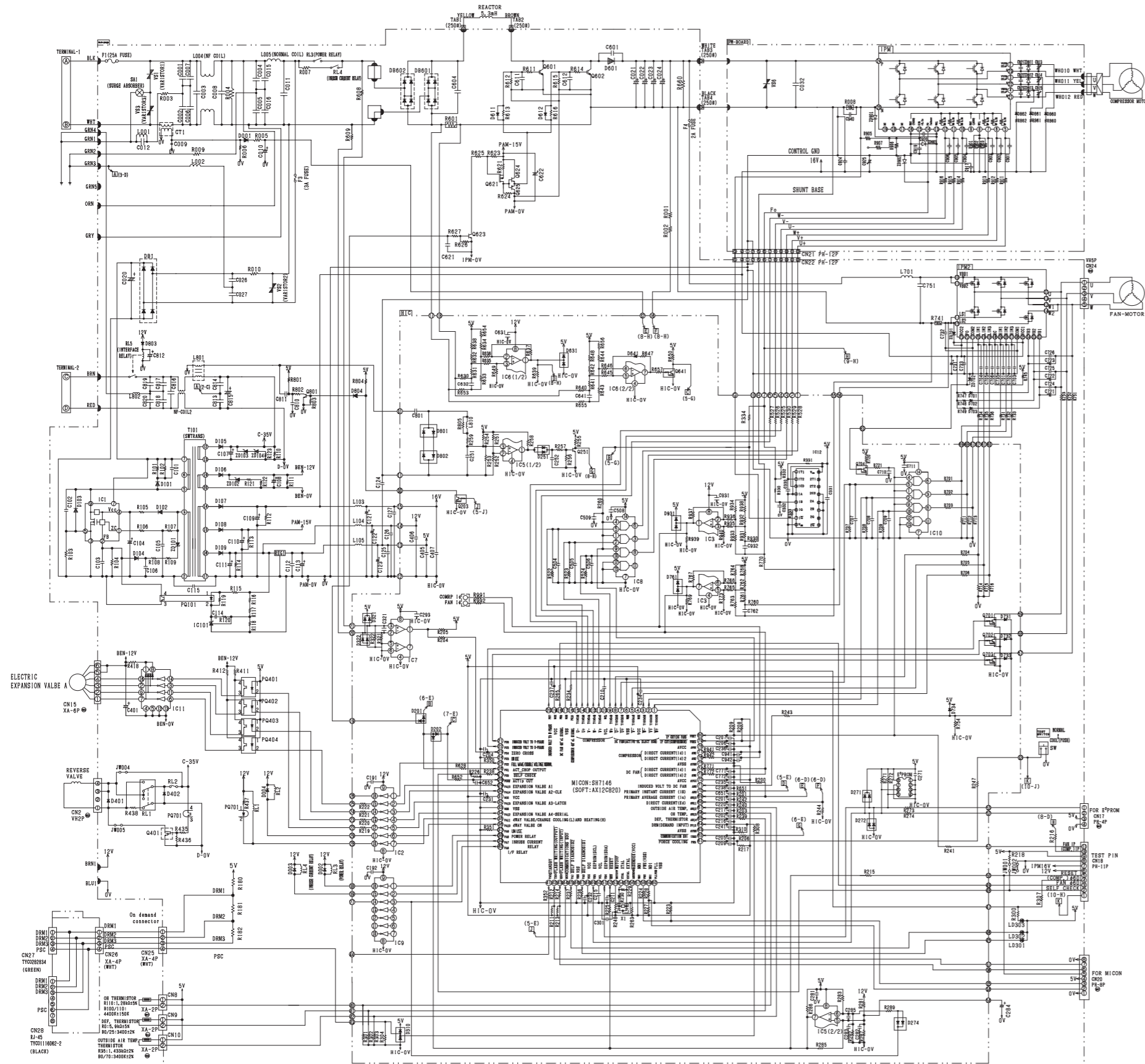
Part#	Model	PCB
D101	1N4148	PCB
D102	1N4148	PCB
D103	1N4148	PCB
D104	1N4148	PCB
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D106	1N4148	PCB
D107	1N4148	PCB
D108	1N4148	PCB
D109	1N4148	PCB
D110	1N4148	PCB
D111	1N4148	PCB
D112	1N4148	PCB
D113	1N4148	PCB
D114	1N4148	PCB
D115	1N4148	PCB
D116	1N4148	PCB
D117	1N4148	PCB
D118	1N4148	PCB
D119	1N4148	PCB
D120	1N4148	PCB

**Transistor**

Part#	
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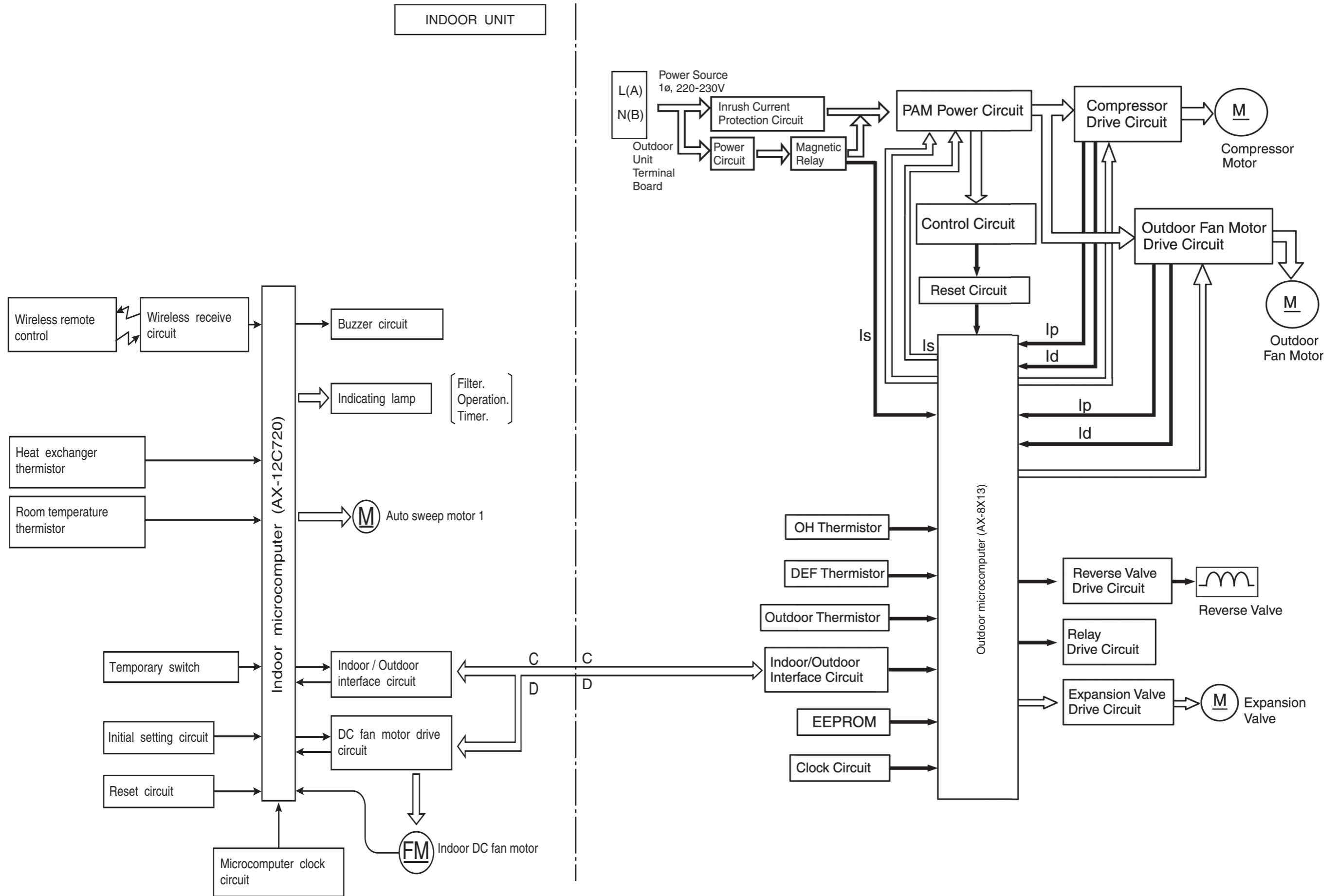
MODEL RAC-50FPA



RESISTORS		RESISTORS		RESISTORS		CAPACITORS		CAPACITORS		DIODES		TRANSISTORS	
SYMBOL	HEATING VALUE/RESISTANCE	SYMBOL	HEATING VALUE/RESISTANCE	SYMBOL	HEATING VALUE/RESISTANCE	SYMBOL	RATING	SYMBOL	RATING	SYMBOL	MODEL	SYMBOL	MODEL
R101	100 Ω	R101	100 Ω	R101	100 Ω	C101	0.1 μF	C101	0.1 μF	D101	1N4001	Q101	2N2222
R102	100 Ω	R102	100 Ω	R102	100 Ω	C102	0.1 μF	C102	0.1 μF	D102	1N4001	Q102	2N2222
R103	100 Ω	R103	100 Ω	R103	100 Ω	C103	0.1 μF	C103	0.1 μF	D103	1N4001	Q103	2N2222
R104	100 Ω	R104	100 Ω	R104	100 Ω	C104	0.1 μF	C104	0.1 μF	D104	1N4001	Q104	2N2222
R105	100 Ω	R105	100 Ω	R105	100 Ω	C105	0.1 μF	C105	0.1 μF	D105	1N4001	Q105	2N2222
R106	100 Ω	R106	100 Ω	R106	100 Ω	C106	0.1 μF	C106	0.1 μF	D106	1N4001	Q106	2N2222
R107	100 Ω	R107	100 Ω	R107	100 Ω	C107	0.1 μF	C107	0.1 μF	D107	1N4001	Q107	2N2222
R108	100 Ω	R108	100 Ω	R108	100 Ω	C108	0.1 μF	C108	0.1 μF	D108	1N4001	Q108	2N2222
R109	100 Ω	R109	100 Ω	R109	100 Ω	C109	0.1 μF	C109	0.1 μF	D109	1N4001	Q109	2N2222
R110	100 Ω	R110	100 Ω	R110	100 Ω	C110	0.1 μF	C110	0.1 μF	D110	1N4001	Q110	2N2222
R111	100 Ω	R111	100 Ω	R111	100 Ω	C111	0.1 μF	C111	0.1 μF	D111	1N4001	Q111	2N2222
R112	100 Ω	R112	100 Ω	R112	100 Ω	C112	0.1 μF	C112	0.1 μF	D112	1N4001	Q112	2N2222
R113	100 Ω	R113	100 Ω	R113	100 Ω	C113	0.1 μF	C113	0.1 μF	D113	1N4001	Q113	2N2222
R114	100 Ω	R114	100 Ω	R114	100 Ω	C114	0.1 μF	C114	0.1 μF	D114	1N4001	Q114	2N2222
R115	100 Ω	R115	100 Ω	R115	100 Ω	C115	0.1 μF	C115	0.1 μF	D115	1N4001	Q115	2N2222
R116	100 Ω	R116	100 Ω	R116	100 Ω	C116	0.1 μF	C116	0.1 μF	D116	1N4001	Q116	2N2222
R117	100 Ω	R117	100 Ω	R117	100 Ω	C117	0.1 μF	C117	0.1 μF	D117	1N4001	Q117	2N2222
R118	100 Ω	R118	100 Ω	R118	100 Ω	C118	0.1 μF	C118	0.1 μF	D118	1N4001	Q118	2N2222
R119	100 Ω	R119	100 Ω	R119	100 Ω	C119	0.1 μF	C119	0.1 μF	D119	1N4001	Q119	2N2222
R120	100 Ω	R120	100 Ω	R120	100 Ω	C120	0.1 μF	C120	0.1 μF	D120	1N4001	Q120	2N2222
R121	100 Ω	R121	100 Ω	R121	100 Ω	C121	0.1 μF	C121	0.1 μF	D121	1N4001	Q121	2N2222
R122	100 Ω	R122	100 Ω	R122	100 Ω	C122	0.1 μF	C122	0.1 μF	D122	1N4001	Q122	2N2222
R123	100 Ω	R123	100 Ω	R123	100 Ω	C123	0.1 μF	C123	0.1 μF	D123	1N4001	Q123	2N2222
R124	100 Ω	R124	100 Ω	R124	100 Ω	C124	0.1 μF	C124	0.1 μF	D124	1N4001	Q124	2N2222
R125	100 Ω	R125	100 Ω	R125	100 Ω	C125	0.1 μF	C125	0.1 μF	D125	1N4001	Q125	2N2222
R126	100 Ω	R126	100 Ω	R126	100 Ω	C126	0.1 μF	C126	0.1 μF	D126	1N4001	Q126	2N2222
R127	100 Ω	R127	100 Ω	R127	100 Ω	C127	0.1 μF	C127	0.1 μF	D127	1N4001	Q127	2N2222
R128	100 Ω	R128	100 Ω	R128	100 Ω	C128	0.1 μF	C128	0.1 μF	D128	1N4001	Q128	2N2222
R129	100 Ω	R129	100 Ω	R129	100 Ω	C129	0.1 μF	C129	0.1 μF	D129	1N4001	Q129	2N2222
R130	100 Ω	R130	100 Ω	R130	100 Ω	C130	0.1 μF	C130	0.1 μF	D130	1N4001	Q130	2N2222
R131	100 Ω	R131	100 Ω	R131	100 Ω	C131	0.1 μF	C131	0.1 μF	D131	1N4001	Q131	2N2222
R132	100 Ω	R132	100 Ω	R132	100 Ω	C132	0.1 μF	C132	0.1 μF	D132	1N4001	Q132	2N2222
R133	100 Ω	R133	100 Ω	R133	100 Ω	C133	0.1 μF	C133	0.1 μF	D133	1N4001	Q133	2N2222
R134	100 Ω	R134	100 Ω	R134	100 Ω	C134	0.1 μF	C134	0.1 μF	D134	1N4001	Q134	2N2222
R135	100 Ω	R135	100 Ω	R135	100 Ω	C135	0.1 μF	C135	0.1 μF	D135	1N4001	Q135	2N2222
R136	100 Ω	R136	100 Ω	R136	100 Ω	C136	0.1 μF	C136	0.1 μF	D136	1N4001	Q136	2N2222
R137	100 Ω	R137	100 Ω	R137	100 Ω	C137	0.1 μF	C137	0.1 μF	D137	1N4001	Q137	2N2222
R138	100 Ω	R138	100 Ω	R138	100 Ω	C138	0.1 μF	C138	0.1 μF	D138	1N4001	Q138	2N2222
R139	100 Ω	R139	100 Ω	R139	100 Ω	C139	0.1 μF	C139	0.1 μF	D139	1N4001	Q139	2N2222
R140	100 Ω	R140	100 Ω	R140	100 Ω	C140	0.1 μF	C140	0.1 μF	D140	1N4001	Q140	2N2222
R141	100 Ω	R141	100 Ω	R141	100 Ω	C141	0.1 μF	C141	0.1 μF	D141	1N4001	Q141	2N2222
R142	100 Ω	R142	100 Ω	R142	100 Ω	C142	0.1 μF	C142	0.1 μF	D142	1N4001	Q142	2N2222
R143	100 Ω	R143	100 Ω	R143	100 Ω	C143	0.1 μF	C143	0.1 μF	D143	1N4001	Q143	2N2222
R144	100 Ω	R144	100 Ω	R144	100 Ω	C144	0.1 μF	C144	0.1 μF	D144	1N4001	Q144	2N2222
R145	100 Ω	R145	100 Ω	R145	100 Ω	C145	0.1 μF	C145	0.1 μF	D145	1N4001	Q145	2N2222
R146	100 Ω	R146	100 Ω	R146	100 Ω	C146	0.1 μF	C146	0.1 μF	D146	1N4001	Q146	2N2222
R147	100 Ω	R147	100 Ω	R147	100 Ω	C147	0.1 μF	C147	0.1 μF	D147	1N4001	Q147	2N2222
R148	100 Ω	R148	100 Ω	R148	100 Ω	C148	0.1 μF	C148	0.1 μF	D148	1N4001	Q148	2N2222
R149	100 Ω	R149	100 Ω	R149	100 Ω	C149	0.1 μF	C149	0.1 μF	D149	1N4001	Q149	2N2222
R150	100 Ω	R150	100 Ω	R150	100 Ω	C150	0.1 μF	C150	0.1 μF	D150	1N4001	Q150	2N2222
R151	100 Ω	R151	100 Ω	R151	100 Ω	C151	0.1 μF	C151	0.1 μF	D151	1N4001	Q151	2N2222
R152	100 Ω	R152	100 Ω	R152	100 Ω	C152	0.1 μF	C152	0.1 μF	D152	1N4001	Q152	2N2222
R153	100 Ω	R153	100 Ω	R153	100 Ω	C153	0.1 μF	C153	0.1 μF	D153	1N4001	Q153	2N2222
R154	100 Ω	R154	100 Ω	R154	100 Ω	C154	0.1 μF	C154	0.1 μF	D154	1N4001	Q154	2N2222
R155	100 Ω	R155	100 Ω	R155	100 Ω	C155	0.1 μF	C155	0.1 μF	D155	1N4001	Q155	2N2222
R156	100 Ω	R156	100 Ω	R156	100 Ω	C156	0.1 μF	C156	0.1 μF	D156	1N4001	Q156	2N2222
R157	100 Ω	R157	100 Ω	R157	100 Ω	C157	0.1 μF	C157	0.1 μF	D157	1N4001	Q157	2N2222
R158	100 Ω	R158	100 Ω	R158	100 Ω	C158	0.1 μF	C158	0.1 μF	D158	1N4001	Q158	2N2222
R159	100 Ω	R159	100 Ω	R159	100 Ω	C159	0.1 μF	C159	0.1 μF	D159	1N4001	Q159	2N2222
R160	100 Ω	R160	100 Ω	R160	100 Ω	C160	0.1 μF	C160	0.1 μF	D160	1N4001	Q160	2N2222
R161	100 Ω	R161	100 Ω	R161	100 Ω	C161	0.1 μF	C161	0.1 μF	D161	1N4001	Q161	2N2222
R162	100 Ω	R162	100 Ω	R162	100 Ω	C162	0.1 μF	C162	0.1 μF	D162	1N4001	Q162	2N2222
R163	100 Ω	R163	100 Ω	R163	100 Ω	C163	0.1 μF	C163	0.1 μF	D163	1N4001	Q163	2N2222
R164	100 Ω	R164	100 Ω	R164	100 Ω	C164	0.1 μF	C164	0.1 μF	D164	1N4001	Q164	2N2222
R165	100 Ω	R165	100 Ω	R165	100 Ω	C165	0.1 μF	C165	0.1 μF	D165	1N4001	Q165	2N2222
R166	100 Ω	R166	100 Ω	R166	100 Ω	C166	0.1 μF	C166	0.1 μF	D166	1N4001	Q166	2N2222
R167	100 Ω	R167	100 Ω	R167	100 Ω	C167	0.1 μF	C167	0.1 μF	D167	1N4001	Q167	2N2222
R168	100 Ω	R168	100 Ω	R168	100 Ω	C168	0.1 μF	C168	0.1 μF	D168	1N4001	Q168	2N2222
R169	100 Ω	R169	100 Ω	R169	100 Ω	C169	0.1 μF	C169	0.1 μF	D169	1N4001	Q169	2N2222
R170	100 Ω	R170	100 Ω	R170	100 Ω	C170	0.1 μF	C170	0.1 μF	D170	1N4001	Q170	2N2222
R171	100 Ω	R171	100 Ω	R171	100 Ω	C171	0.1 μF	C171	0.1 μF	D171	1N4001	Q171	2N2222
R172	100 Ω	R172	100 Ω	R172	100 Ω	C172	0.1 μF	C172	0.1 μF	D172	1N4001	Q172	2N2222
R173	100 Ω	R173	100 Ω	R173	100 Ω	C173	0.1 μF	C173	0.1 μF	D173	1N4001	Q173	2N2222
R174	100 Ω	R174	100 Ω	R174	100 Ω	C174	0.1 μF	C174	0.1 μF	D174	1N4001	Q174	2N2222
R175	100 Ω	R175	100 Ω	R175	100 Ω	C175	0.1 μF	C175	0.1 μF	D175	1N4001	Q175	2N2222
R176	100 Ω	R176	100 Ω	R176	100 Ω	C176	0.1 μF	C176	0.1 μF	D176	1N4001	Q176	2N2222
R177	100 Ω	R177	100 Ω	R177	100 Ω	C177	0.1 μF	C177	0.1 μF	D177	1N4001	Q177	2N2222
R178	100 Ω	R178	100 Ω	R178	100 Ω	C178	0.1 μF	C178	0.1 μF	D178	1N4001	Q178	2N2222
R179	100 Ω												

# BLOCK DIAGRAM

MODEL RAF-50RPA / RAC-50FPA



# BASIC MODE

MODEL RAF-50RPA

Operation mode		Fan	Cooling	Dehumidifying	Heating	Auto		
Basic operation of start / stop switch								
Timer functions	Off-timer							
	On-timer							
Fan speed mode (indoor fan)	Auto		<p>Changes from "Hi" to "Med" or "Lo" depending on room temperature.</p> <ol style="list-style-type: none"> <li>Runs at "Hi" until first thermo off after operation is started.</li> <li>Runs at "Lo" when thermo is off.</li> </ol>		<p>Set to "Silent", "Lo", "Med", "Hi", "ultra-Hi" or "stop" depending on the room temperature, time and heat exchange temperature. Set to "stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C).</p> <p>When the compressor is running at maximum speed during hot dash or when recovered from defrosting.</p>	<p>Operating mode is judged by room temperature.</p> <p>(1) Judging by room temperature Operating mode at start up is judged (initial judgment).</p> <p>(a) Conditions for judgment (any of the followings). · When auto operation is started after the previous auto mode operation. · When auto operation is started after the previous manual mode operation. · When the operating mode is switched to auto while operating at manual mode.</p> <p>(b) Judging method · [ Cooling ] : Room temperature <math>\geq</math> Remote controller setting · [ Heating ] : Room temperature <math>&lt;</math> Remote controller setting</p> <p>[ Room temperature setting of remote controller ]</p> <table border="1"> <tr> <td>Cooling</td> </tr> <tr> <td>Heating</td> </tr> </table>	Cooling	Heating
	Cooling							
	Heating							
	Hi	Operates at "Hi" regardless of the room temperature.	Set to "Ultra-Hi" when the compressor runs at maximum speed, and to "Hi" in other modes.		Set to "Silent", "Lo", "Med", "Hi", "Ultra-Hi" or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C). Set to "Ultra-Hi" when the compressor is running at maximum speed during hot dash or when recovered from defrosting.		(2) Judging operating mode change during operation (Continuous judgment). (a) Conditions for judgment · The mode is reviewed at interval time. · *Interval time as below · The first interval time : 30 minutes · The second interval time : 50 minutes · On and after the third interval time : 55 minutes	
	Med	Operates at "Med" regardless of the room temperature.	Same as at left.		Set to "Silent", "Lo", "Med" or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C).		(b) Judging method · Judge by setting the hysteresis on the final preset temperature. The final preset temperature is the actually targeted preset temperature which is sum of basic preset temperature and each type of shift value. (e.g. preset temperature correction value, powerful shift value, eco shift value, eco sleep shift value, etc.)	
Lo	Operates at "Lo" regardless of the room temperature.	Same as at left.	Set to "Lo" in modes other than when the compressor stops.	Set to "Silent", "Lo", or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C). The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram:		[ Currently cooling ] · Room temperature $\leq$ Final preset temperature -2 Change to heating · Room temperature $>$ Final preset temperature -2 Continue cooling		
Silent	Operates at "Silent" regardless of the room temperature.	Same as at left.	Set to "Silent" in modes other than when the compressor stops.	Set to "Silent", "Lo", or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C). The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram:		[ Currently heating ] · Room temperature $\geq$ Final preset temperature +3 Change to cooling · Room temperature $<$ Final preset temperature +3 Continue heating		
Basic operation of temperature controller	Performs only fan operation at the set speed regardless of the room temperature.	See page 38.	See page 40.	See page 42.				
Sleep operation (with sleep button ON)	Enters sleep operation after set as on the left. Action during sleep operation silent (sleep) operation.	· Same as at left. · See page 40.	· Same as at left. · See page 40.	· Same as at left. · See page 42.		· Same as at left. · Performs the sleep operation of each operation mode.		
Leave home				· See page 44.				

**Notes:**

- The speed set of rotation for the fan motor in each operation mode are as shown in Table 1.
- The set room temperatures in the diagram include the shift values in Table 2.



Mode data file

LABEL NAME	REQUIRED VALUE OF UNIT SIDE	
	RAF-50RPA	
WMAX	6000	min <sup>1</sup>
WMAX2	6400	min <sup>1</sup>
WSTD	4700	min <sup>1</sup>
WJKMAX	4100	min <sup>1</sup>
WBEMAX	3600	min <sup>1</sup>
WSZMAX	3000	min <sup>1</sup>
CMAX	5200	min <sup>1</sup>
CSTD	4900	min <sup>1</sup>
CJKMAX	3200	min <sup>1</sup>
CBEMAX	3200	min <sup>1</sup>
CSZMAX	2250	min <sup>1</sup>
SDMAX	3000	min <sup>1</sup>
SDRPM	2200	min <sup>1</sup>
WMINHI	2200	min <sup>1</sup>
WMIN	2200	min <sup>1</sup>
CMINHI	2200	min <sup>1</sup>
CMIN	2200	min <sup>1</sup>
DMIN	2200	min <sup>1</sup>
STAROTP	10	
STARCP1	2200	min <sup>1</sup>
STARCPH	2200	min <sup>1</sup>
STARCP2	800	min <sup>1</sup>
STARCP3	500	min <sup>1</sup>
STARTMW	40	sec.
STARTMC	90	sec.
STARTMD	80	sec.
STARTM2	60	sec.
STARTM3	30	sec.
PKOU	500	min <sup>1</sup>
FZZY_GN	1	
FZZYTM	3	min.
SHIFTW	0.33	
SFTSZW	0.33	
SFTOYW1	0.66	
SHIFTC	0	
SHIFTD	0	
CMNLMT	2000	min <sup>1</sup>
TEION	2.00	
TEIOF	9.00	
DFTIM_COL	43	min.
DFTIM_FST	45	min.
DFTIM_OTP0	43	min.
DFTIM_OTP5	50	min.
DFTIM_OTP10	50	min.
TDF411	60	sec.
TDF412	50	sec.
TDF413	0	sec.
DFRPM3	2400	min <sup>1</sup>
STARCPDL	2200	min <sup>1</sup>
STARCPDH	2200	min <sup>1</sup>
STARCPD2	300	min <sup>1</sup>
STARTDF1	40	sec.
STARTDF2	40	sec.
DFMXTM	20	min.
DFMAX	5500	min <sup>1</sup>
TDF431	50	sec.
TDF431_CHG	30	sec.
DEFCOL	5	min.
CLNTMW	38	min.
CLNTMS	22	min.
CLNCPW	2200	min <sup>1</sup>
CLNEVP	40	
FWSS_P	300	min <sup>1</sup>
FWSOY_P	560	min <sup>1</sup>
FWS_P	650	min <sup>1</sup>
FWKAF_P	750	min <sup>1</sup>
FWL_P	750	min <sup>1</sup>

LABEL NAME	REQUIRED VALUE OF UNIT SIDE	
	RAF-50RPA	
FVAH_P	1000	min <sup>1</sup>
FWH_P	1100	min <sup>1</sup>
FVAHH_P	1000	min <sup>1</sup>
FWHH_P	1100	min <sup>1</sup>
FCSOY_P	480	min <sup>1</sup>
FCS_P	550	min <sup>1</sup>
FCL_P	700	min <sup>1</sup>
FCAH_P	1050	min <sup>1</sup>
FCH_P	1050	min <sup>1</sup>
FCHH_P	1100	min <sup>1</sup>
FDSOY_P	450	min <sup>1</sup>
FDS1_P	600	min <sup>1</sup>
FDS2_P	650	min <sup>1</sup>
WLHMAX	5000	min <sup>1</sup>
WMIN_LH	2000	min <sup>1</sup>
STARCP1_LH	2200	min <sup>1</sup>
STARCP2_LH	2200	min <sup>1</sup>
STARCP3_LH	800	min <sup>1</sup>
STARTMW_LH	20	sec.
STARTM2_LH	30	sec.
STARTM3_LH	40	sec.
SFTLVHM	2	
FWLVHM_P	1100	min <sup>1</sup>
FAN_LH_H	750	min <sup>1</sup>

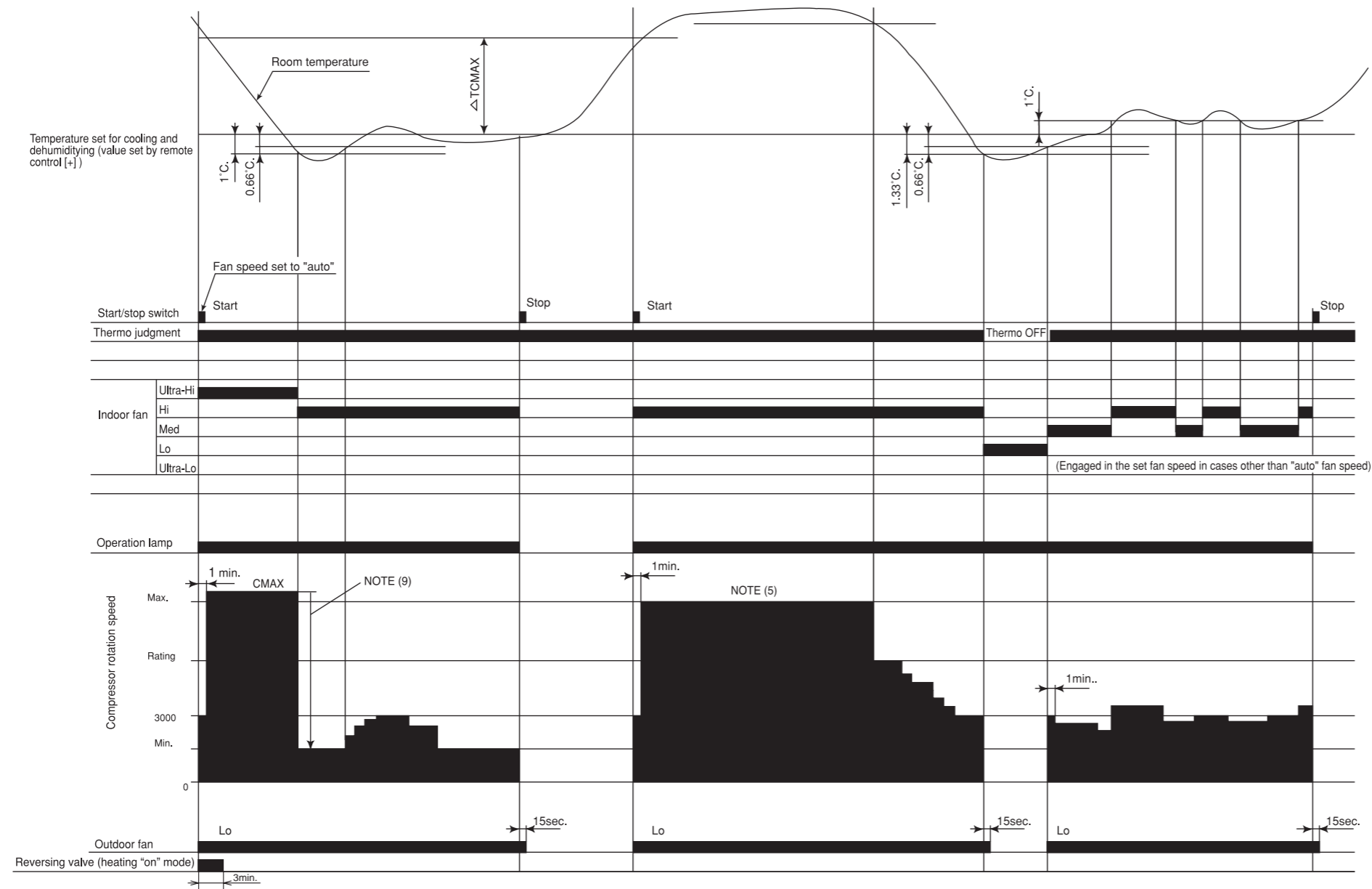
Table 1 Fan speed by mode

Operation mode	Fan speed mode	Label name	
Heating operation	Ultra Lo	FWSS	
	Silent, Sleep	FWSOY	
	Lo	FWS	
	Overload	FWKAF	
	Med	FWL	
	Hi	Set fan speed "AUTO"	FVAH
	Ultra Hi	Set fan speed "H"	FVAHH
Cooling operation	Hi	FWH	
	Ultra Hi	FWHH	
	Silent, Sleep	FCSOY	
	Lo	FCS	
	Med	FCL	
Dehumidifying operation	Hi	Set fan speed "AUTO"	FCAH
	Hi	Set fan speed "H"	FCH
	Ultra Hi	Set fan speed "H"	FCHH
	Silent, Sleep	FDSOY	
	Lo 1	FDS1	
	Lo 2	FDS2	

Table 2 Room temperature shift value

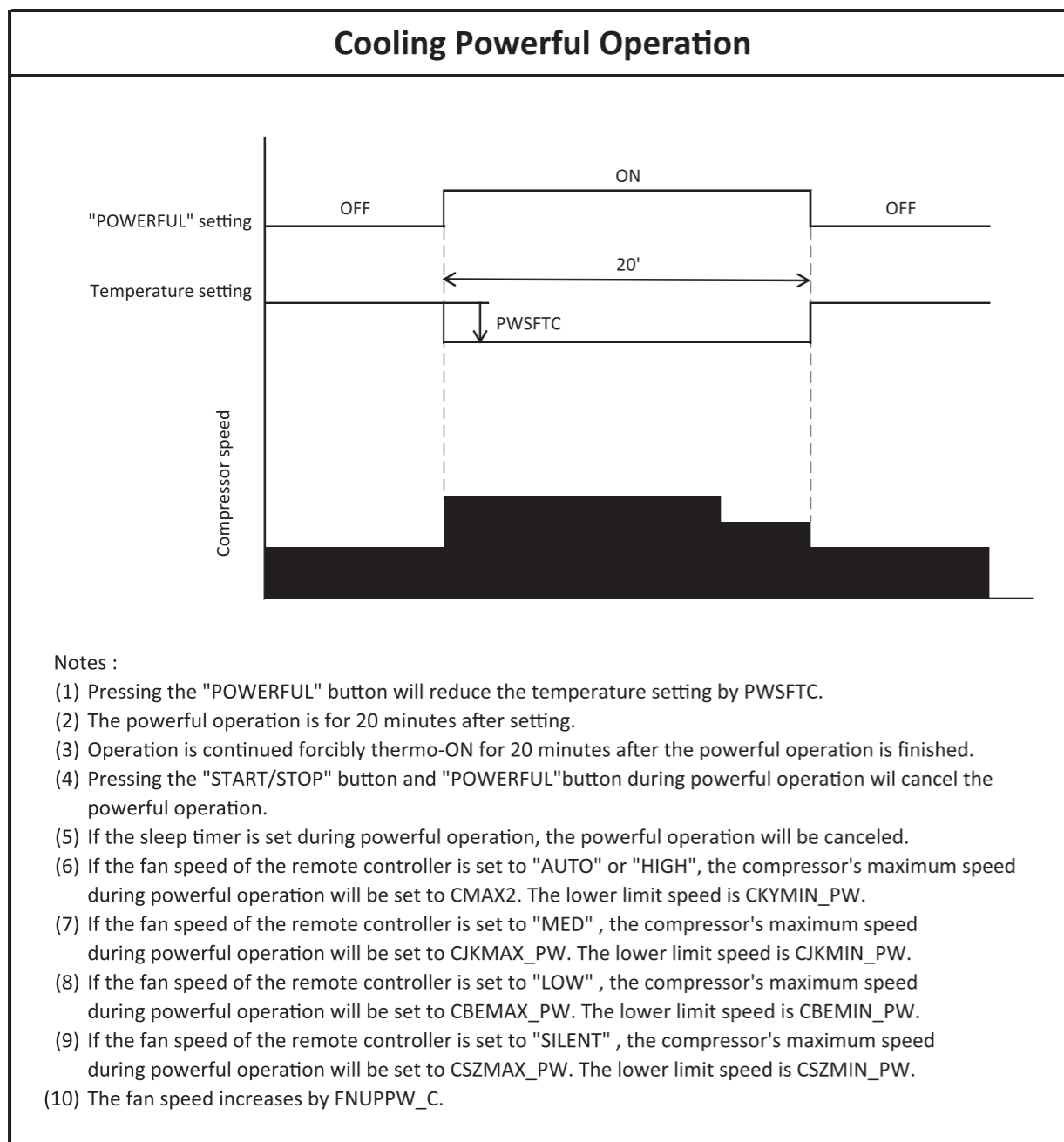
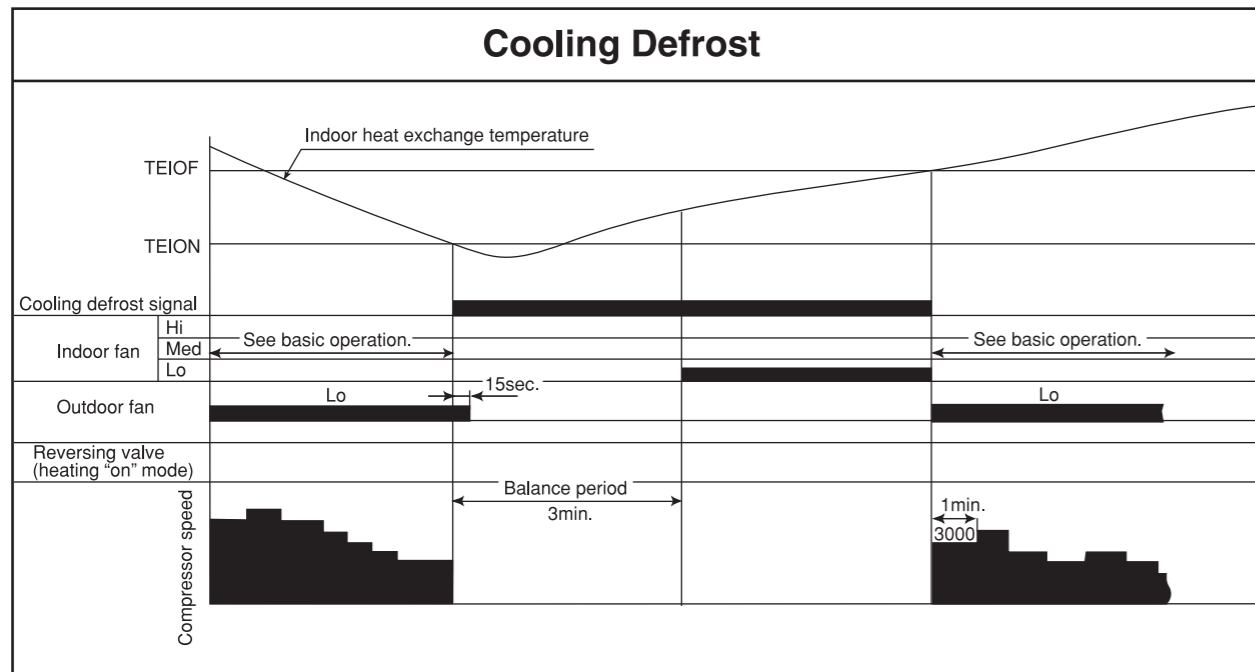
Operation mode	Shift value	
Heating operation	Fan speed "AUTO, Hi, Med"	SHIFTW
	Fan speed "Lo, Silent, Sleep"	SFTSZW
Cooling operation		SHIFTC
Dehumidifying operation		SHIFTD

## Basic Cooling Operation

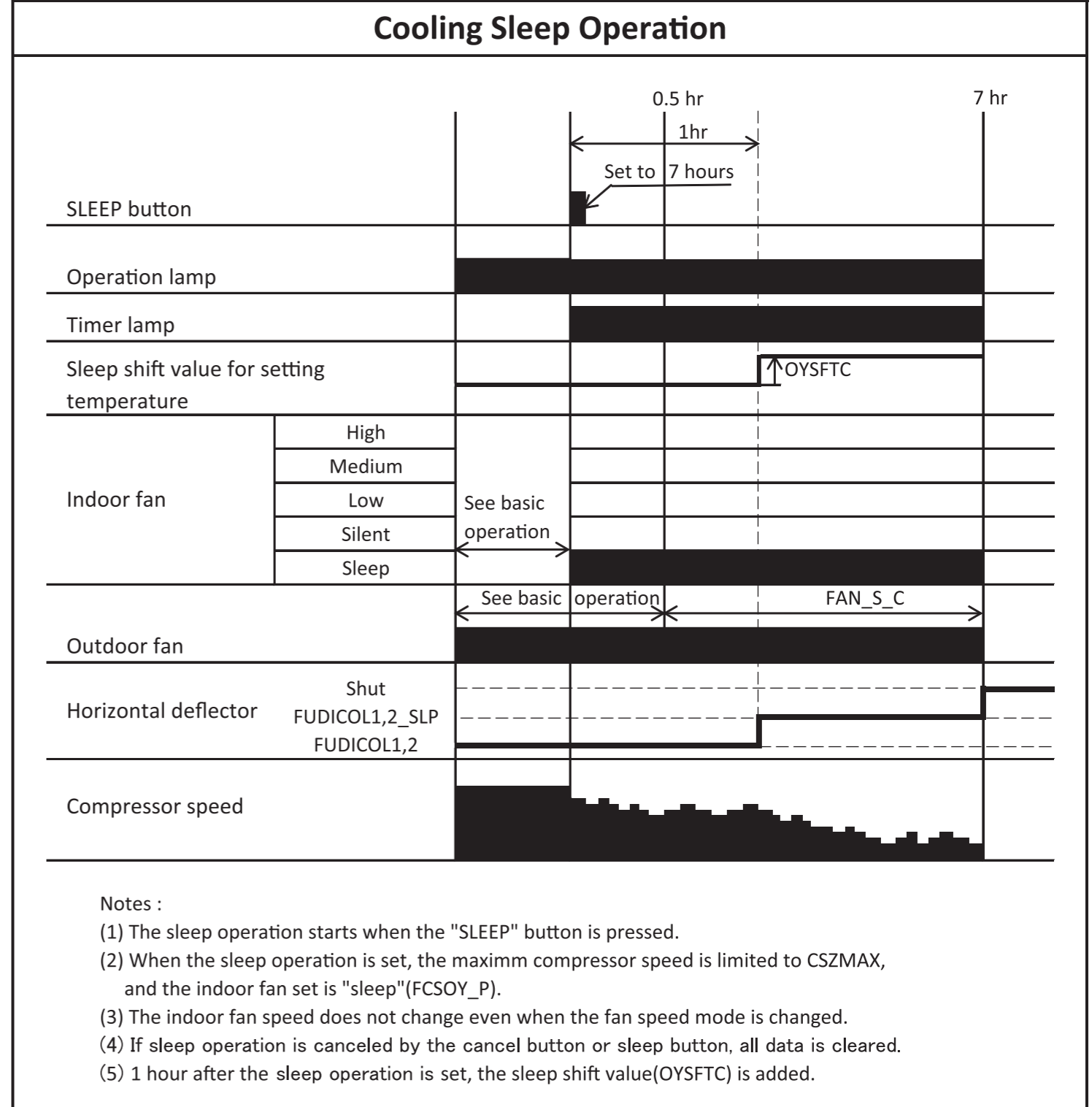


**Notes:**

- (1) Condition for entering into Cool Dashed mode. When fan set to "Hi" or "Auto" and when the compressor speed (P section) due to temperature difference between setting temperature (including the correction shift only) and room temperature is C<sub>MAX</sub> or higher.
- (2) Cool Dashed will release when i) a maximum 25 minutes is lapsed and ii) room temperature is lower than set temperature  $-3^{\circ}\text{C}$  (thermo off) and iii) when room temperature has achieved setting temperature  $-1^{\circ}\text{C}$  then maximum Cool Dashed time will be revised to 20 minutes. And iv) indoor fan is set to Lo and Med fan mode and v) change operation mode.
- (3) During Cool Dashed operation, thermo off temperature is set temperature (with shift value)  $-3^{\circ}\text{C}$ . After thermo off, operation continues in Fuzzy control mode.
- (4) Compressor minimum "ON" time and "OFF" time is 3 minutes.
- (5) During normal cooling mode, compressor maximum rpm C<sub>MAX</sub> will maintain for 60 minutes if indoor temperature is lower than CLM<sub>XTP</sub>. No time constraint if indoor temperature is higher than CLM<sub>XTP</sub>.
- (6) When fan is set to "Hi", compressor rpm will be limited to C<sub>STD</sub>.
- (7) When fan is set to "Med", compressor rpm will be limited to C<sub>JKMAX</sub>.
- (8) When fan is set to "Lo", compressor rpm will be limited to C<sub>BEMAX</sub>.
- (9) During Cool Dashed, when room temperature reaches set temperature  $-1^{\circ}\text{C}$  compressor rpm is actual rpm x D<sub>WNRATEC</sub>.

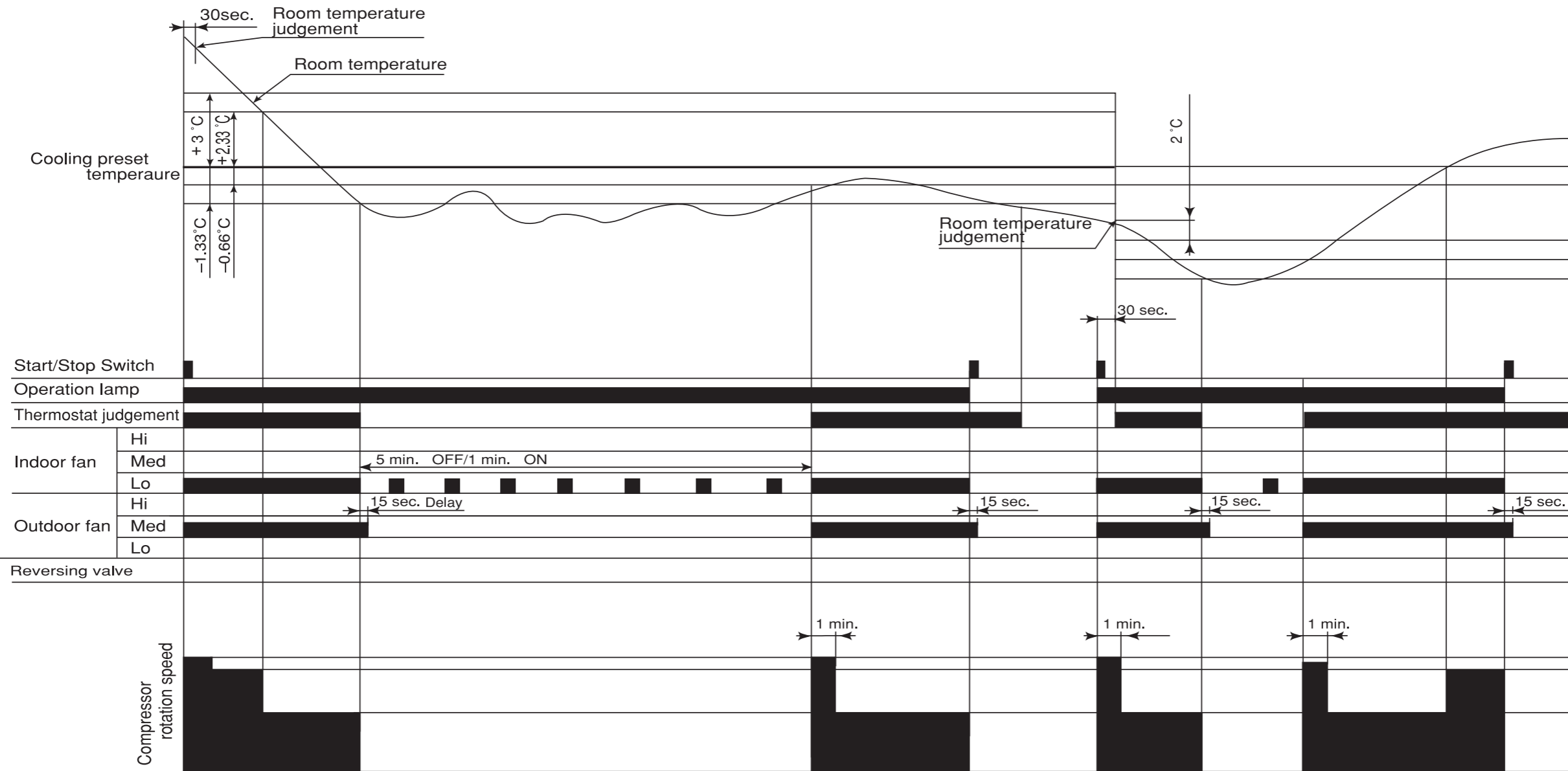


- Notes :
- (1) Pressing the "POWERFUL" button will reduce the temperature setting by PWSFTC.
  - (2) The powerful operation is for 20 minutes after setting.
  - (3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
  - (4) Pressing the "START/STOP" button and "POWERFUL" button during powerful operation will cancel the powerful operation.
  - (5) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
  - (6) If the fan speed of the remote controller is set to "AUTO" or "HIGH", the compressor's maximum speed during powerful operation will be set to CMAX2. The lower limit speed is CKYMIN\_PW.
  - (7) If the fan speed of the remote controller is set to "MED", the compressor's maximum speed during powerful operation will be set to CJKMAX\_PW. The lower limit speed is CJKMIN\_PW.
  - (8) If the fan speed of the remote controller is set to "LOW", the compressor's maximum speed during powerful operation will be set to CBEMAX\_PW. The lower limit speed is CBEMIN\_PW.
  - (9) If the fan speed of the remote controller is set to "SILENT", the compressor's maximum speed during powerful operation will be set to CSZMAX\_PW. The lower limit speed is CSZMIN\_PW.
  - (10) The fan speed increases by FNUPPW\_C.



- Notes :
- (1) The sleep operation starts when the "SLEEP" button is pressed.
  - (2) When the sleep operation is set, the maximum compressor speed is limited to CSZMAX, and the indoor fan set is "sleep"(FCSOY\_P).
  - (3) The indoor fan speed does not change even when the fan speed mode is changed.
  - (4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.
  - (5) 1 hour after the sleep operation is set, the sleep shift value(OYSFTC) is added.

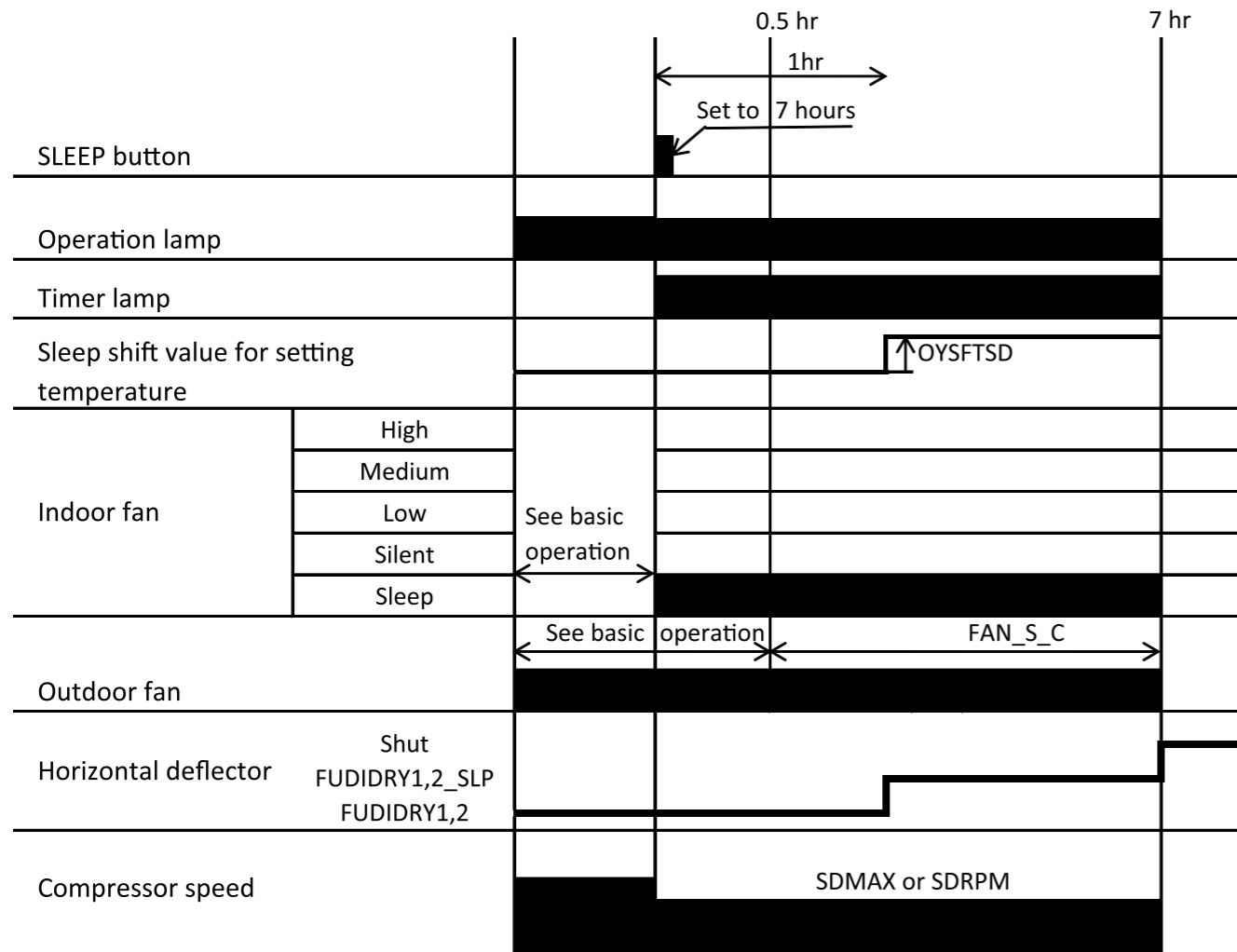
# Dehumidifying



**Notes:**

- (1) If the room temperature is (cooling preset temperature) - (1.33°C) or less after 30 seconds from starting the operation, the operation is done assuming as the preset temperature = (room temperature at the time) - (2°C).
- (2) The indoor fan is operated in the "Lo" mode. During thermo OFF indoor fan will be OFF for 5 minutes and ON for 1 minute.
- (3) When the operation is started by the thermostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.
- (4) The compressor is operated forcedly for 3 minutes after operation is started.
- (5) The minimum ON time and OFF time of the compressor are 3 minutes.

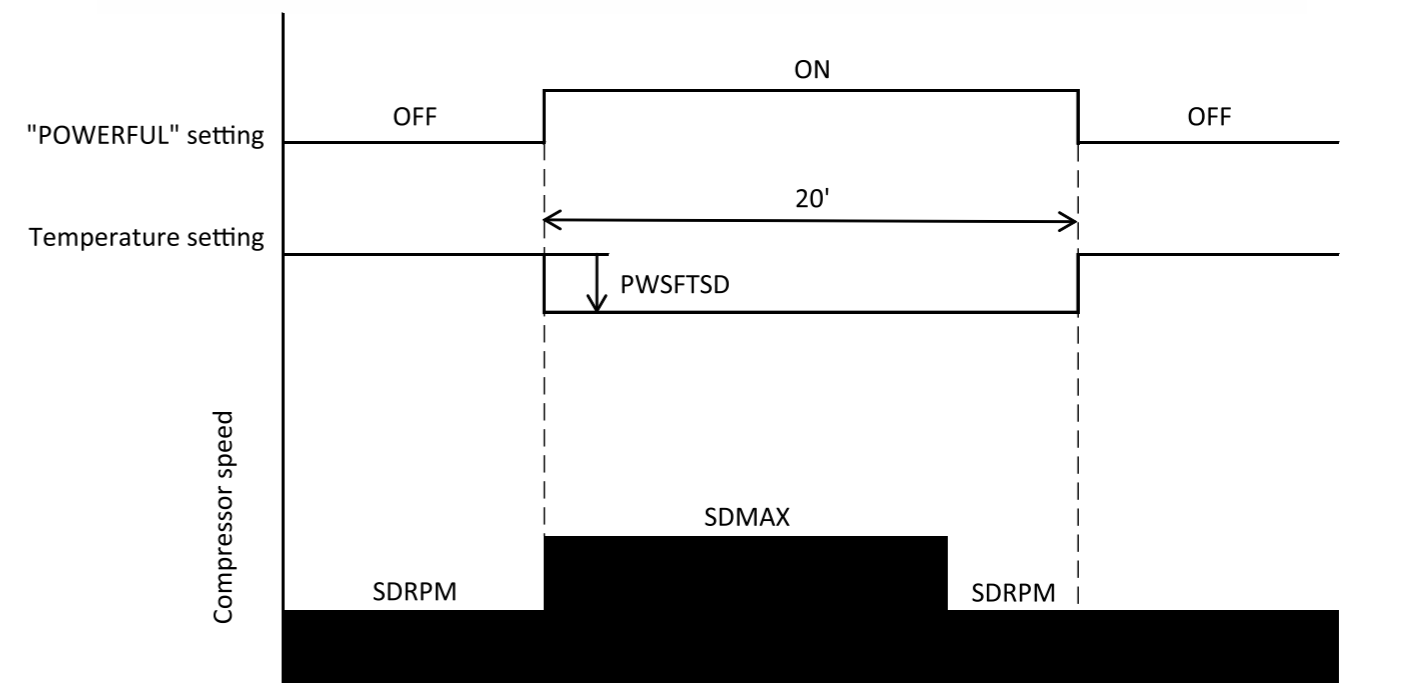
## Dehumidifying Sleep Operation



**Notes :**

- (1) The sleep operation starts when the "SLEEP" button is pressed.
- (2) When the sleep operation is set, the indoor fan set is "sleep"(FDOY\_P).
- (3) The indoor fan speed does not change even when the fan speed mode is changed.
- (4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.
- (5) 1 hour after the sleep operation is set, the sleep shift value(OYSFTSD) is added.

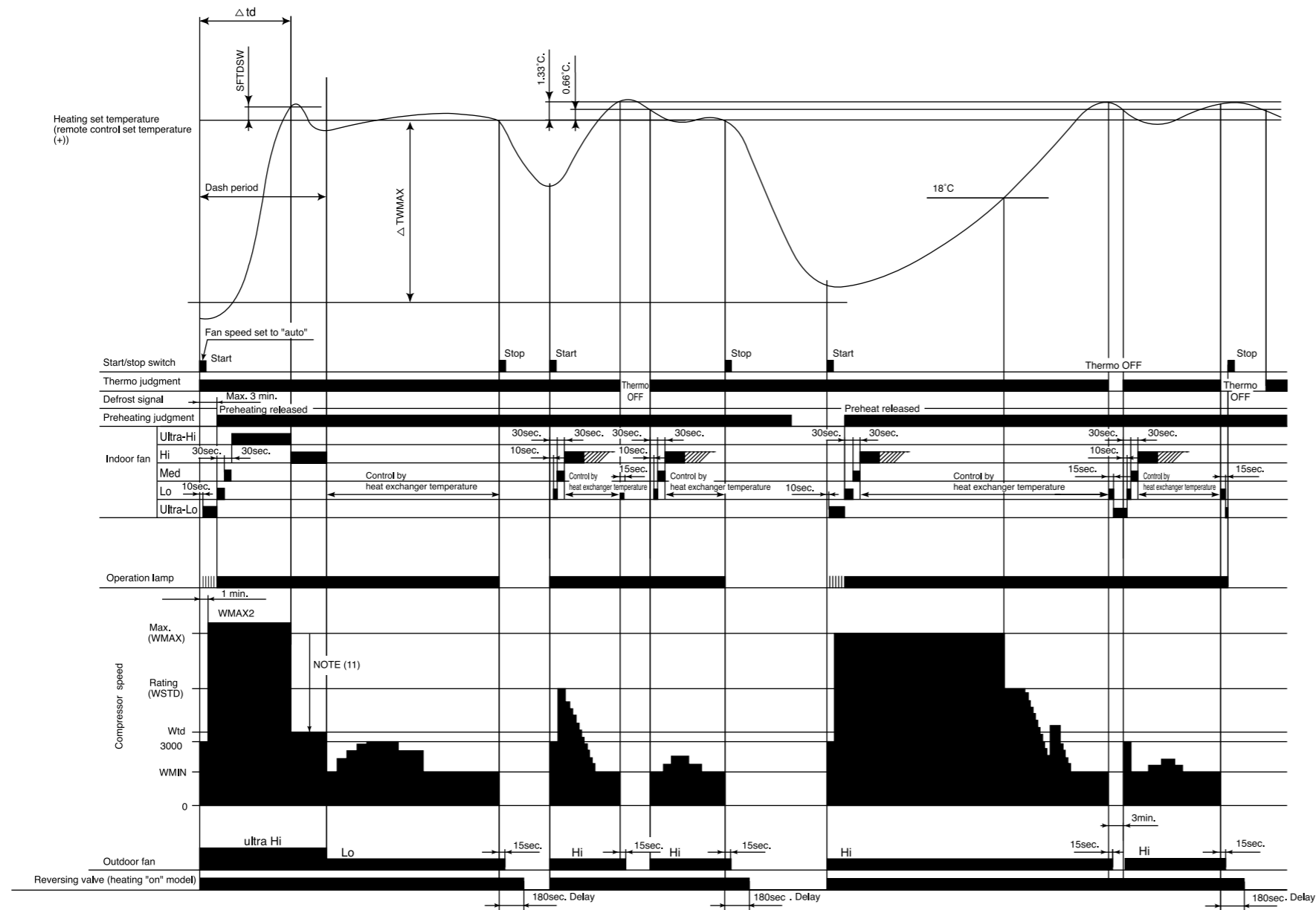
## Dehumidifying Powerful Operation



**Notes :**

- (1) Pressing the "POWERFUL" button will reduce the temperature setting by PWSFTSD.
- (2) The powerful operation is for 20 minutes after setting.
- (3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
- (4) Pressing the "START/STOP" button and "POWERFUL" button during powerful operation will cancel the powerful operation.
- (5) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
- (6) If the differential (the room temperature - the temperature setting) is "the differential  $\geq 3^{\circ}\text{C}$ " after powerful setting, the compressor's maximum speed during powerful operation will be set to SDMAX. Then the differential reduce "the differential  $\leq 2.33^{\circ}\text{C}$ " during powerful operation, the compressor's speed will be set to SDRPM. If the differential (the room temperature - the temperature setting) is "the differential  $< 3^{\circ}\text{C}$ " after powerful setting, the compressor's minimum speed during powerful operation will be set to SDRPM.
- (7) The fan speed increases by FNUPPW\_D.

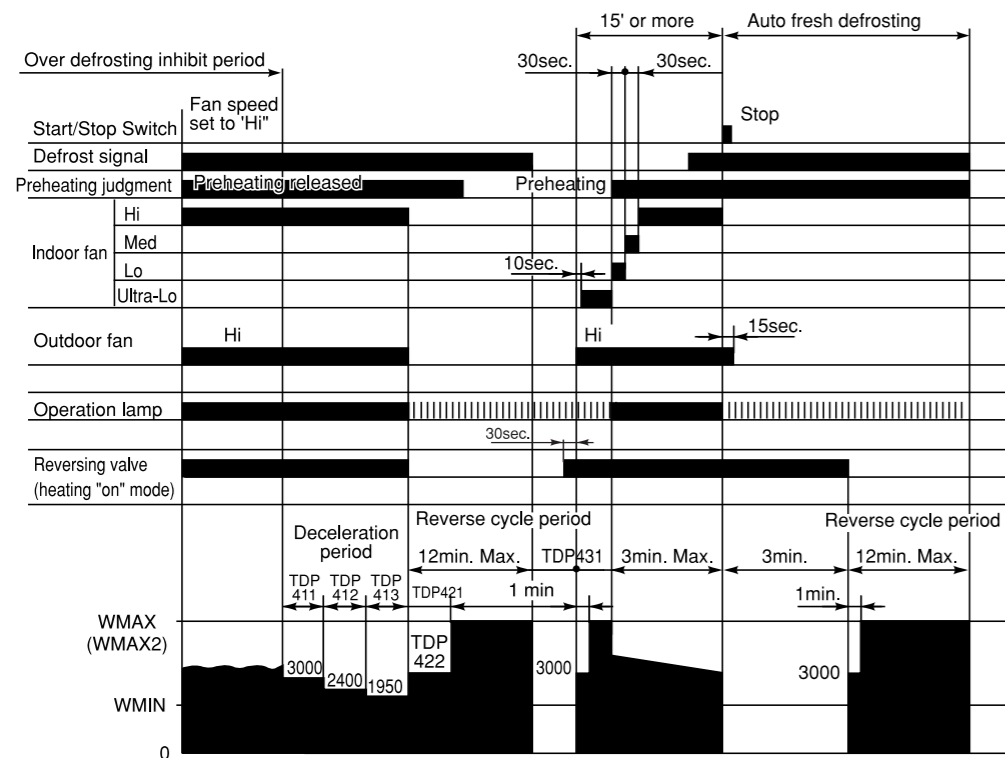
## Basic Heating Operation



### Notes:

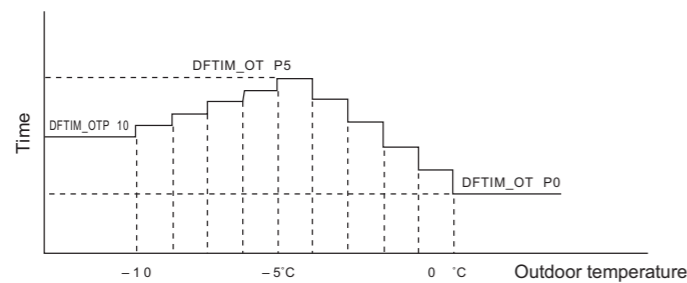
- (1) Condition for entering into Hot Dashed mode. When fan set to "Hi" or "Auto mode" and i) Indoor temperature is lower than  $18^\circ\text{C}$ , and ii) outdoor temperature is lower than  $10^\circ\text{C}$ , and iii) compressor speed (P section) due to temperature difference between setting temperature (including the correction shift only) and room temperature is WMAX or higher.
- (2) Hot Dashed will release when i) Room temperature has achieved the set temperature + SFTDSW. ii) Thermo off.
- (3) During Hot Dashed operation, thermo off temperature is set temperature (with shift value)  $+3^\circ\text{C}$ . After thermo off, operation continue in Fuzzy control mode.
- (4) Compressor minimum "ON" time and "OFF" time is 3 minutes.
- (5) During normal heating mode, compressor maximum rpm WMAX will maintain for 120 minutes if indoor temperature is higher than  $18^\circ\text{C}$ . No time limit constrain if indoor temperature is lower than  $18^\circ\text{C}$  and outdoor temperature is lower than  $2^\circ\text{C}$ .
- (6) During Hotkeep or Defrost mode, indoor operation lamp will blink at interval of 3 seconds "ON" and 0.5 second "OFF".
- (7) When heating mode starts, it will enter into Hotkeep mode if indoor heat exchanger temperature is lower than  $\text{YNEOF} + 0.33^\circ\text{C}$ .
- (8) When fan is set to "Med" or "Lo", compressor rpm will be limited to WBEMAX.
- (9) In "Silent" fan mode, if indoor temperature is lower than  $18^\circ\text{C}$ , indoor fan will stop. If indoor temperature is higher than  $18^\circ\text{C} + 0.33^\circ\text{C}$ , fan will continue in "Ultra-Lo" mode. During Hotkeep or Defrost mode, fan will continue in "silent" mode.
- (10) During Hot Dashed or outdoor temperature is lower than  $-5^\circ\text{C}$ , compressor rpm is WMAX2.
- (11) During Hot Dashed, when room temperature reaches set temperature + SFTDSW compressor rpm is actual rpm x DWNRATEW.

## Reversing Valve Defrosting



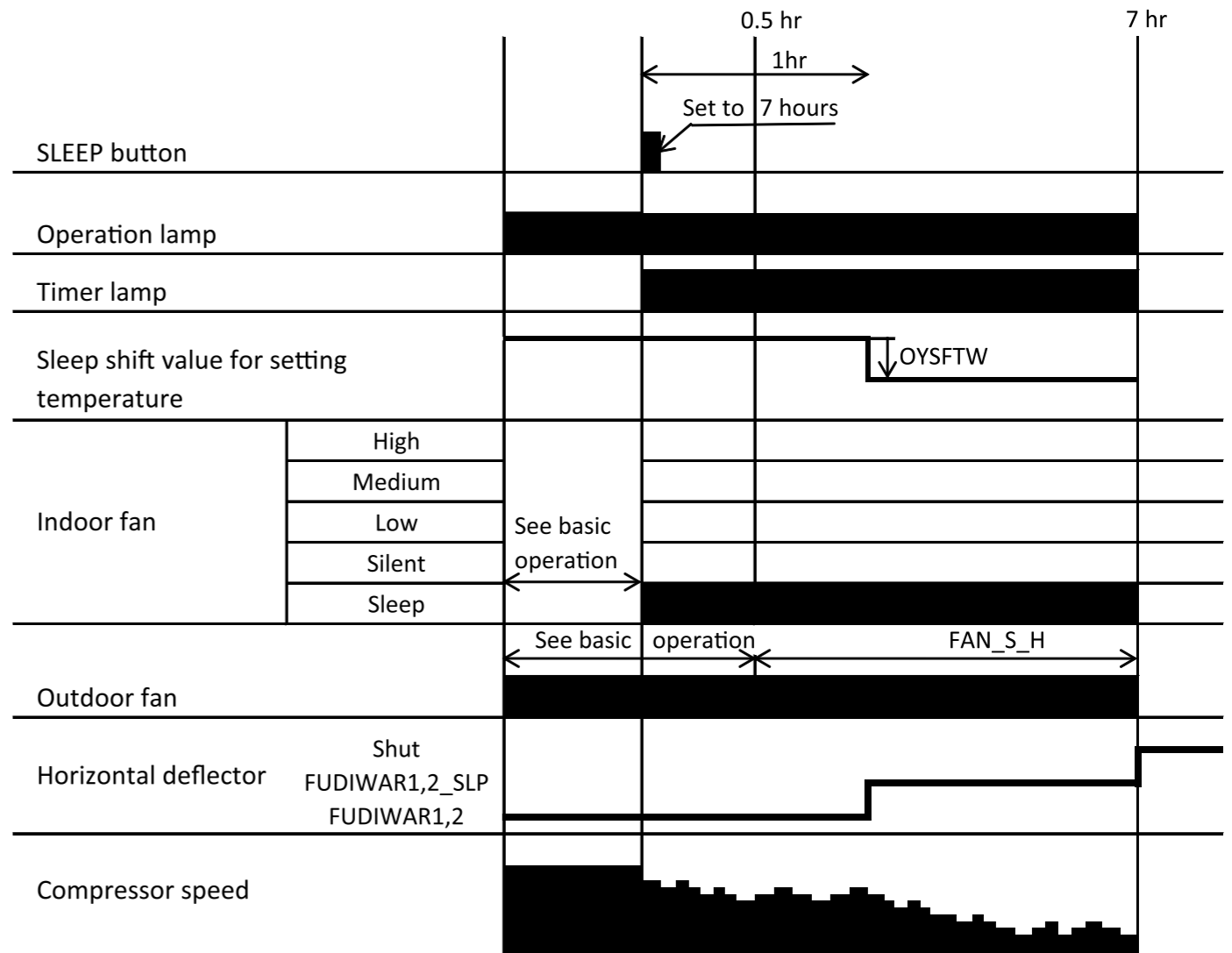
- Notes:
- (1) The defrosting inhibit period is set as shown in the diagram below. When defrosting has finished once, the inhibit period is newly set, based on the outdoor temperature when the compressor was started. During this period, the defrost signal is not accepted.
  - (2) If the difference between the room and outdoor temperature is large when defrosting is finished, the maximum compressor speed (WMAX) or (WMAX2) can be continued for 120 minutes maximum.
  - (3) The defrosting period is 12 minutes maximum.
  - (4) When operation is stopped during defrosting, it is switched to auto refresh defrosting.
  - (5) Auto refresh defrosting cannot be engaged within 15 minutes after operation is started or defrosting is finished.

## Setting Defrosting Inhibit Period



- Notes:
- (1) The first inhibit time after operation start is set to DFTIM\_FST.
  - (2) From the second time onwards, the inhibit time is set according to the time required for defrosting.  
Reverse cycle operation time [DEFCOL] : DEFTIM\_COL is set.  
Reverse cycle operation time < [DEFCOL] : The time corresponding to outdoor temperature is set.

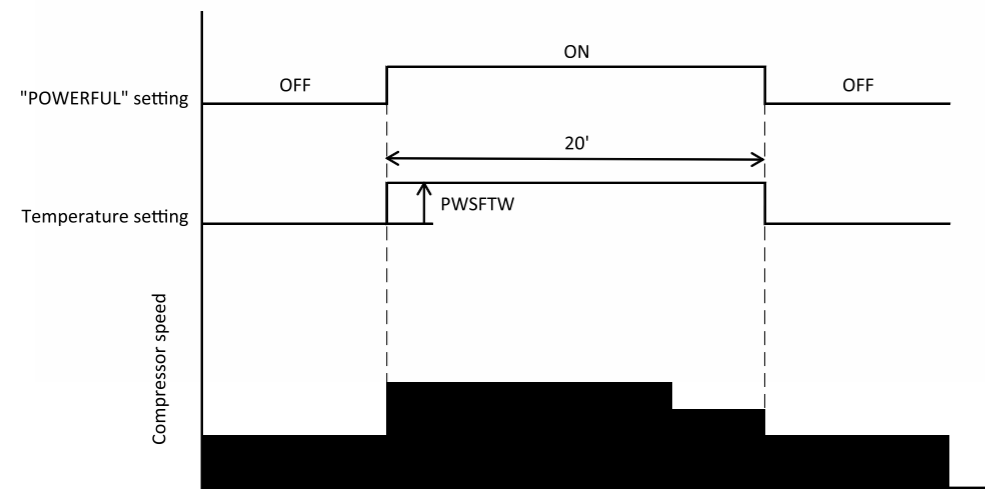
## Heating Sleep Operation



- Notes :
- (1) The sleep operation starts when the "SLEEP" button is pressed.
  - (2) When the sleep operation is set, the maximum compressor speed is limited to WSZMAX, and the indoor fan set is "sleep"(FWSOY\_P).
  - (3) The indoor fan speed does not change even when the fan speed mode is changed.
  - (4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.
  - (5) 1 hour after the sleep operation is set, the sleep shift value(OYSFTW) is reduced.



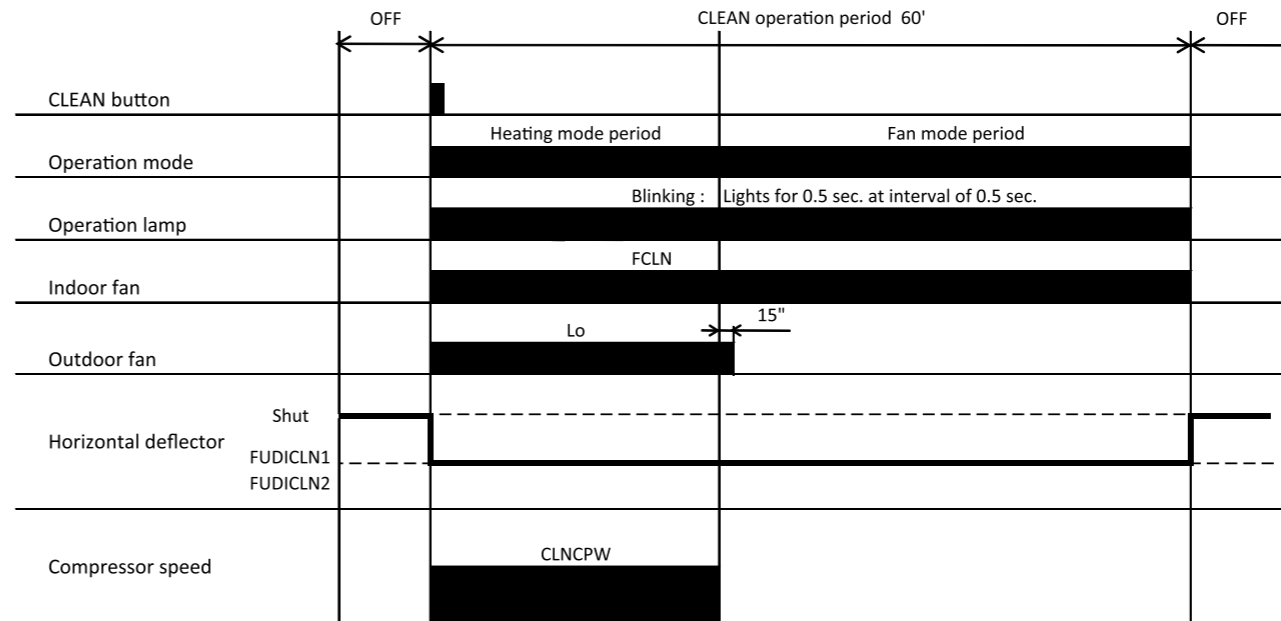
## Heating Powerful Operation



### Notes :

- (1) Pressing the "POWERFUL" button will reduce the temperature setting by PWSFTW.
- (2) The powerful operation is for 20 minutes after setting.
- (3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
- (4) Defrost is inhibited for 20 minutes after the start of the powerful operation.
- (5) Pressing the "START/STOP" button and "POWERFUL" button during powerful operation will cancel the powerful operation.
- (6) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
- (7) If the fan speed of the remote controller is set to "AUTO" or "HIGH", the compressor's maximum speed during powerful operation will be set to WMAX2. The lower limit speed is WKYMIN\_PW.
- (8) If the fan speed of the remote controller is set to "MED", the compressor's maximum speed during powerful operation will be set to WJMAX\_PW. The lower limit speed is WJMIN\_PW.
- (9) If the fan speed of the remote controller is set to "LOW", the compressor's maximum speed during powerful operation will be set to WBEMAX\_PW. The lower limit speed is WBEMIN\_PW.
- (10) If the fan speed of the remote controller is set to "SILENT", the compressor's maximum speed during powerful operation will be set to WSZMAX\_PW. The lower limit speed is WSZMIN\_PW.
- (11) The fan speed increases by FNUPPW\_W.

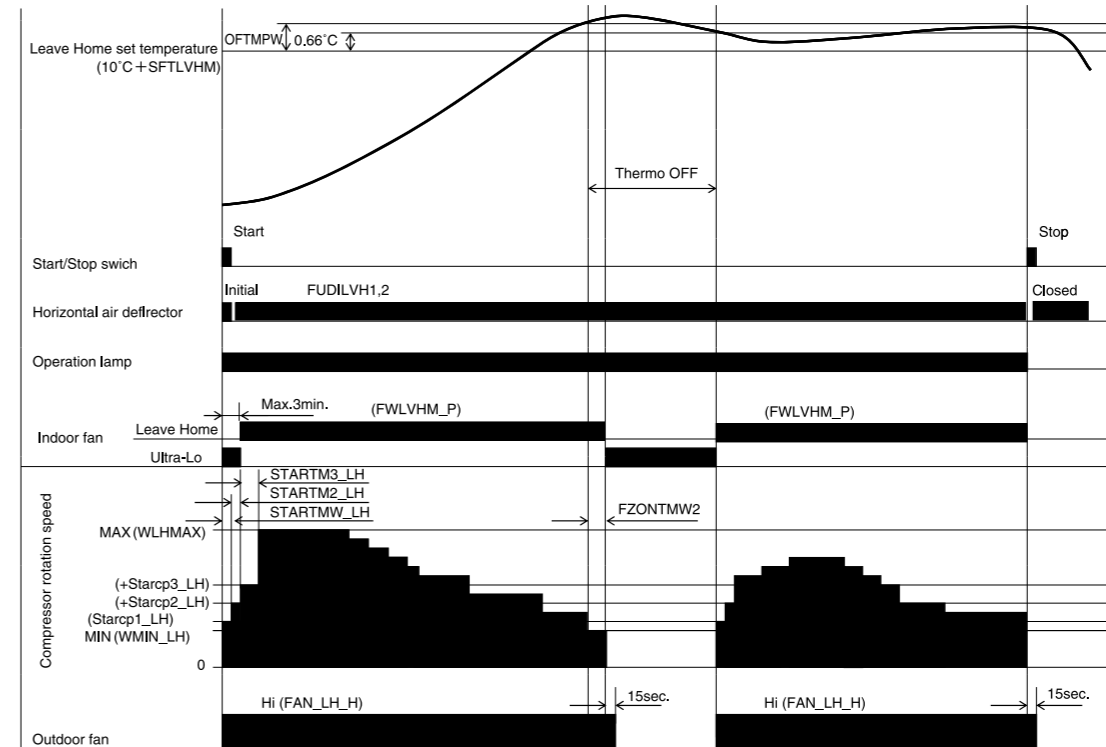
## Clean Operation



### Notes :

- (1) During CLEAN operation period, heating mode will change to fan mode when HEX temperature is "CLNEVP" or more except for 3 minutes operation.
- (2) For multi connections, CLEAN operation is limited to fan mode.

## Leave Home

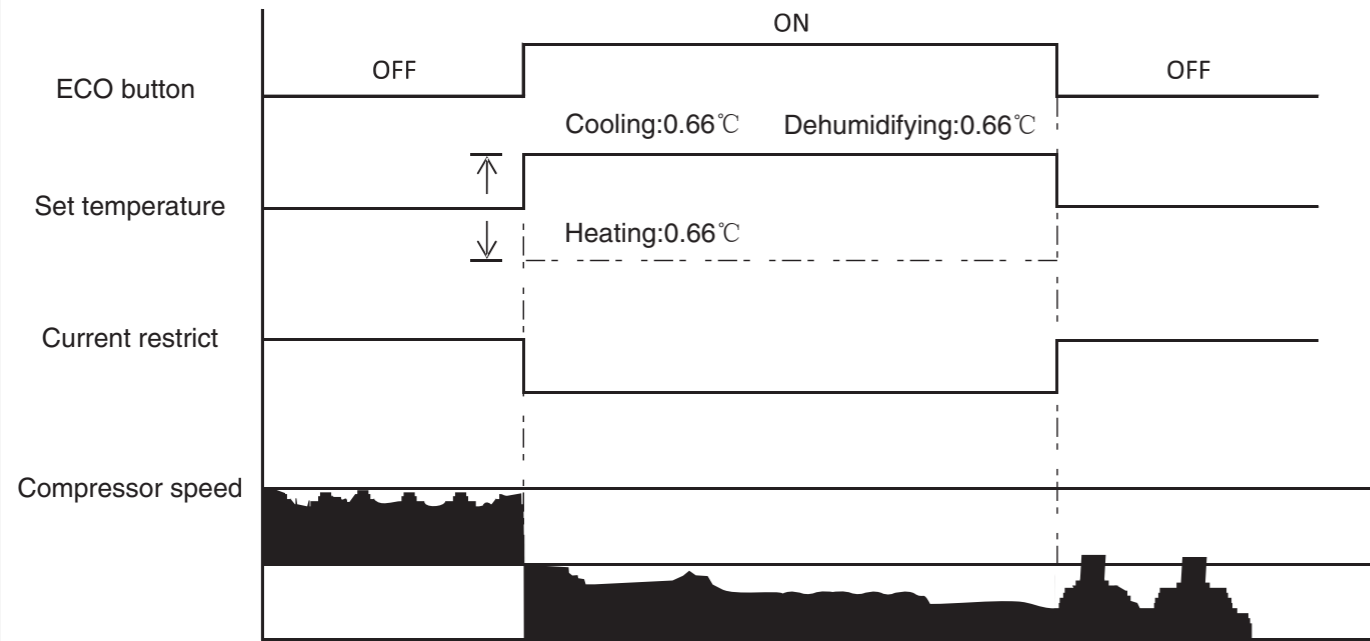


### Notes:

Perform Leave Home operation according to the following control contents.

- ① Operation mode : Heating
  - ② Temperature set : 10°C
  - ③ Temperature setting correction shift : + 『SFTLVHM』
  - ④ Indoor fan : 『FWLVHM\_P』
  - ⑤ Outdoor fan : 『FAN\_LH\_H』
  - ⑥ Compressor start control : Set the start control using the special value for the Leave Home mode.
  - ⑦ Compressor rotation speed : Upper limit speed by fuzzy control 『WLHMAX』  
Lower limit speed by fuzzy control 『WMIN\_LH』
  - ⑧ Operation lamp : The timer lamp lights up when the timer for the desired number of days is set.
- ※ The vertical air deflection plate is initially operated when the Leave Home mode is activated; this serves as a notification that the Leave Home mode has been set.

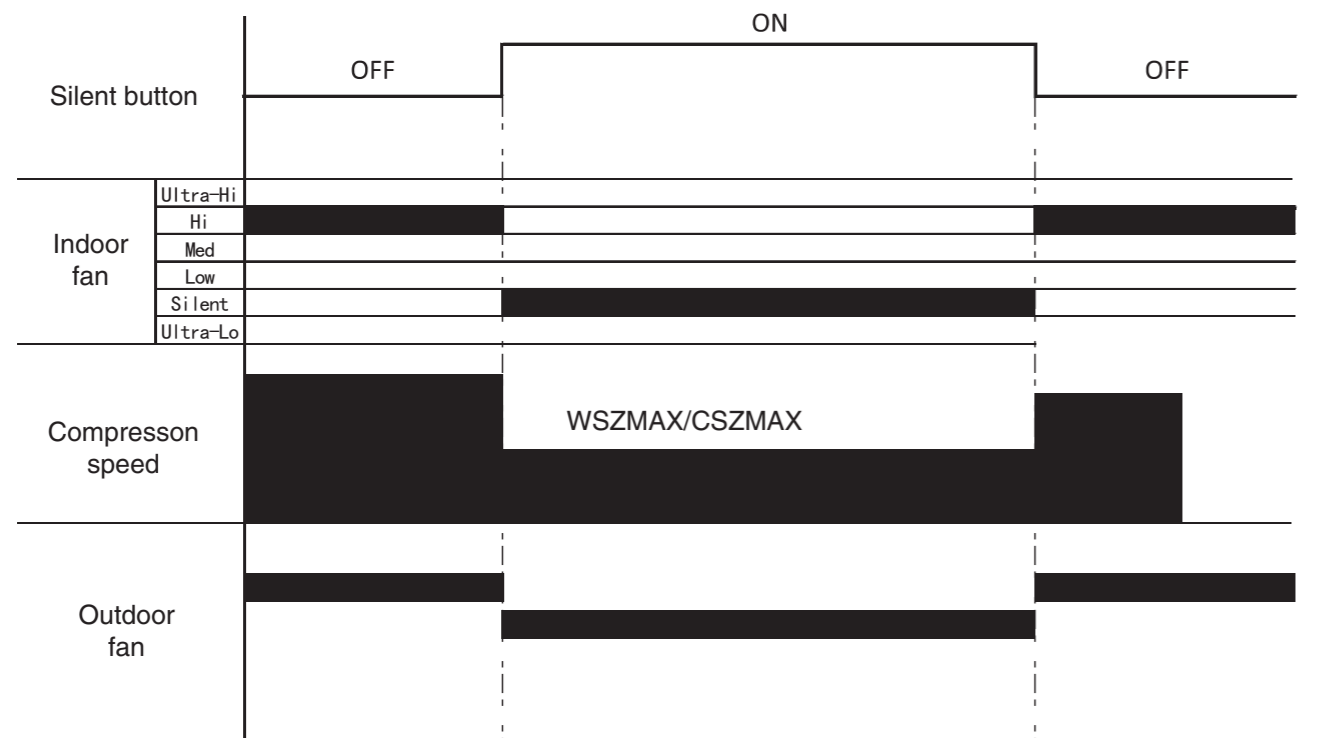
## ECO



Notes:

- Can't set POWERFUL and ECO at the same time.
- During FAN operation, can't set ECO.

## SILENT

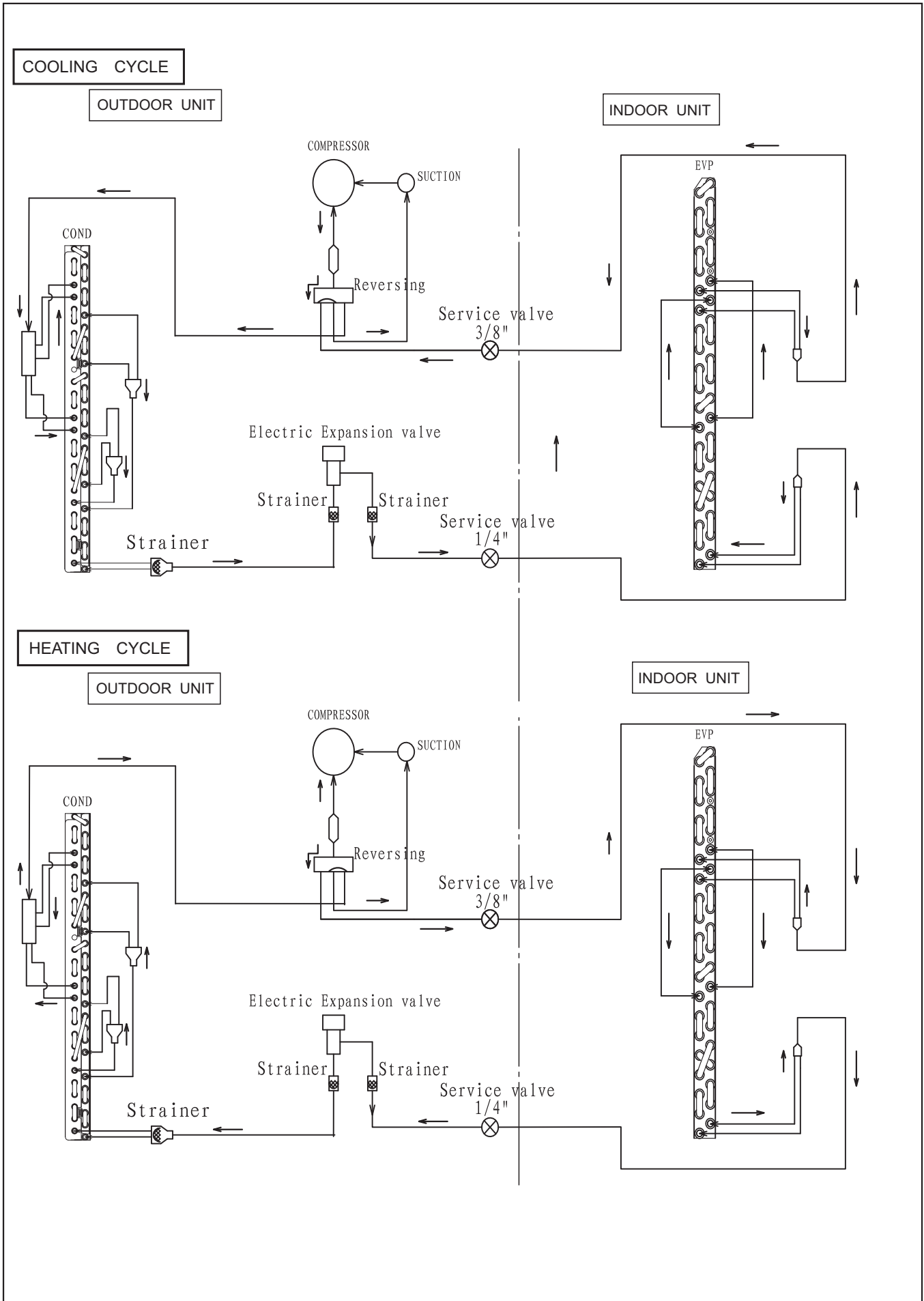


Notes:

- Can't set POWERFUL and SILENT at the same time.

# REFRIGERATING CYCLE DIAGRAM

MODEL RAF-50RPA/RAC-50FPA



## DISASSEMBLY & ASSEMBLY PROCEDURE

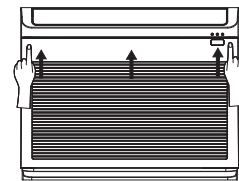
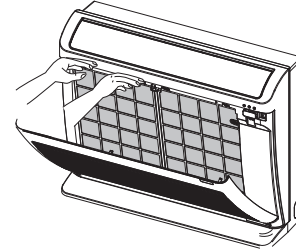
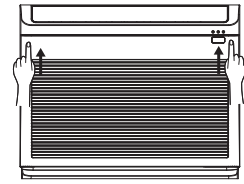
### 1. AIR FILTER

Clean the air filter, as it removes dust inside the room.

Be sure to clean the filter once every two weeks so as not to consume electricity unnecessarily.

#### PROCEDURE

- 1** **Open the front panel.**
  - To open the front panel, use the remote controller to stop unit operation. Then press at the top left and right corners of the front panel.
  - Grasp the left and right sides of the front panel and open it toward you.
- 2** **Remove the filters.**
- 3** **Remove dust of the filters using a vacuum cleaner.**
  - After using neutral detergent, wash with clean water and dry in shade.
- 4** **Attach the filters.**
- 5** **Close the front panel.**
  1. To close the front panel, press the upper center part of the front panel.
  2. Press at the top left and right corners of the front panel.

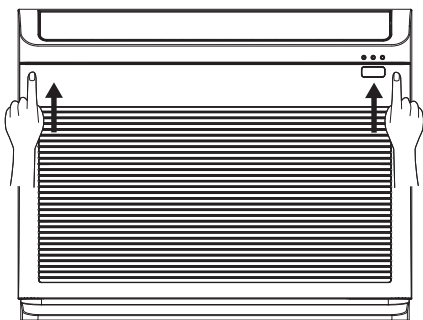


### 2. HOW TO INSTALL AND REMOVE THE FRONT PANEL

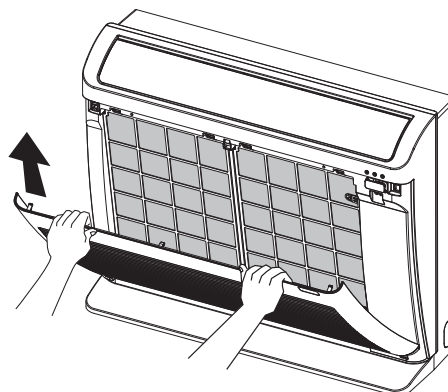
•Be sure to use both hands to grasp the front panel when removing it or attaching it.

#### Removing

Press at the top left and right corners of the front panel.



Grasp the left and right sides of the front panel and pull it up to remove.



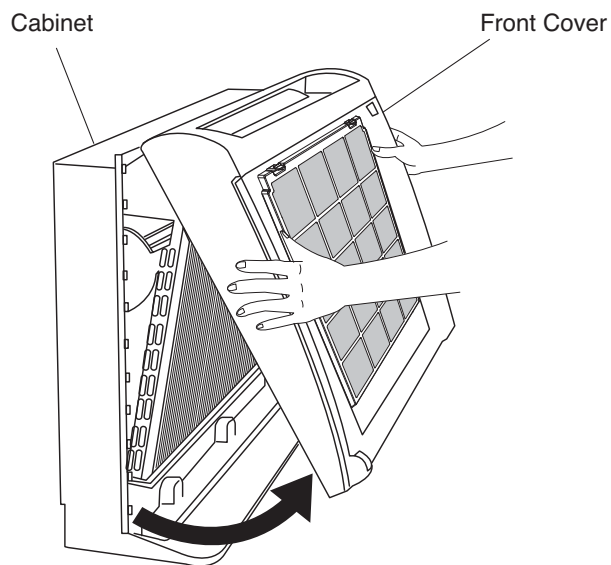
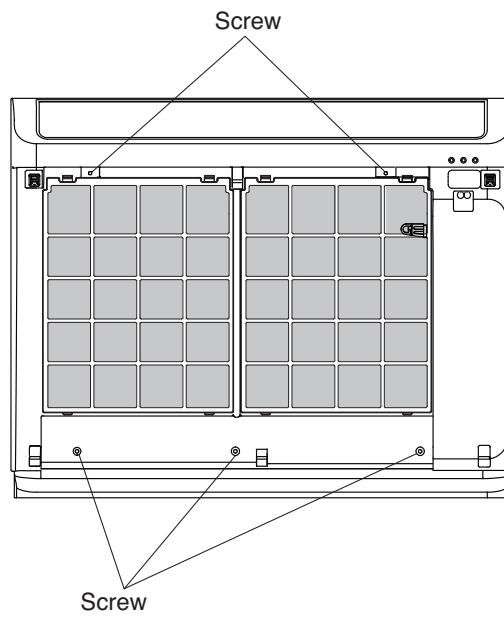
#### Attaching

Attach three front panel bearings to the axis of the front cover. (Set the hook to face up.)

Close the front panel.

### 3. FRONT COVER

- (1) Remove the front panel.
- (2) Remove the front cover.  
Remove the 3 bottom screws and 2 top screws.  
Pull the front cover approximately 30mm toward you.

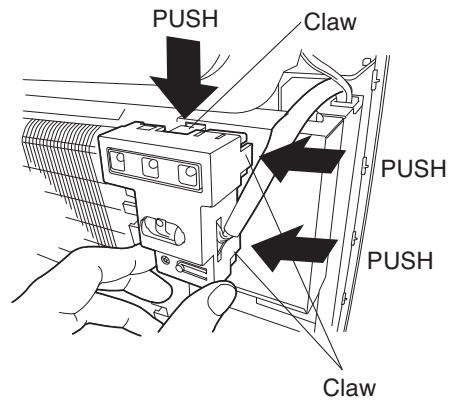


### ATTACHING

When attaching the front cover, follow the above procedure in reverse order. Make sure the hooks at the front cover top surface are securely inserted into the cabinet.

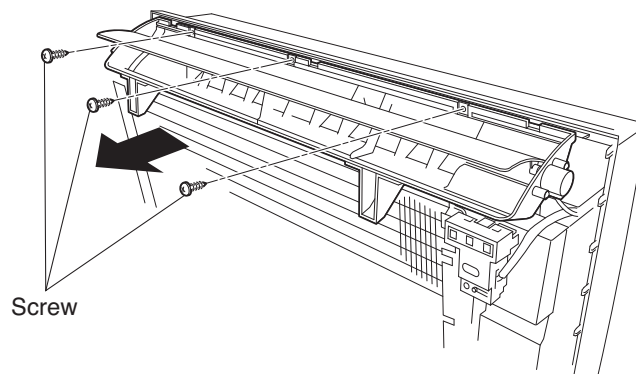
#### 4. INDICATING P.W.B.

- (1) Remove the front panel and the front cover.
- (2) Remove the indicating P.W.B. case.



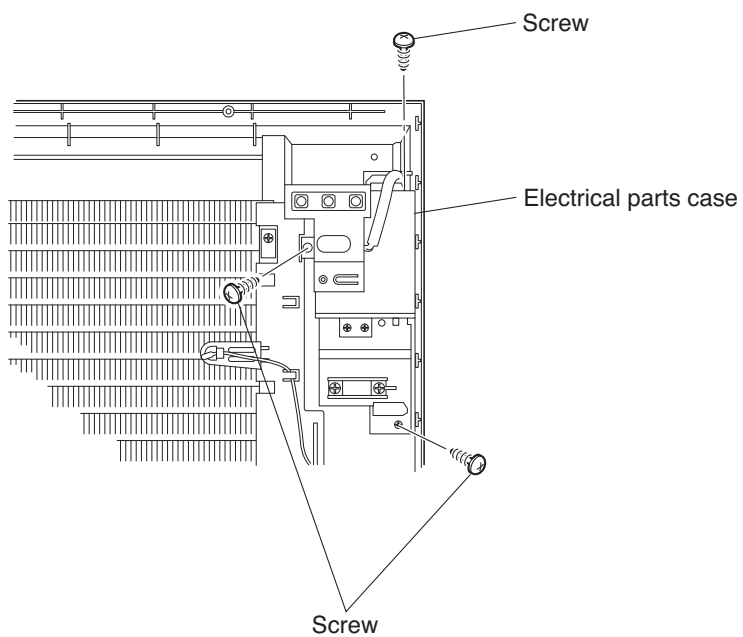
#### 5. DISCHARGE FRAME

- (1) Remove the front panel and the front cover.
- (2) Remove the 3 fixing screws of the discharge frame, and then pull out the discharge frame toward you.



## 6. ELECTRICAL PARTS CASE

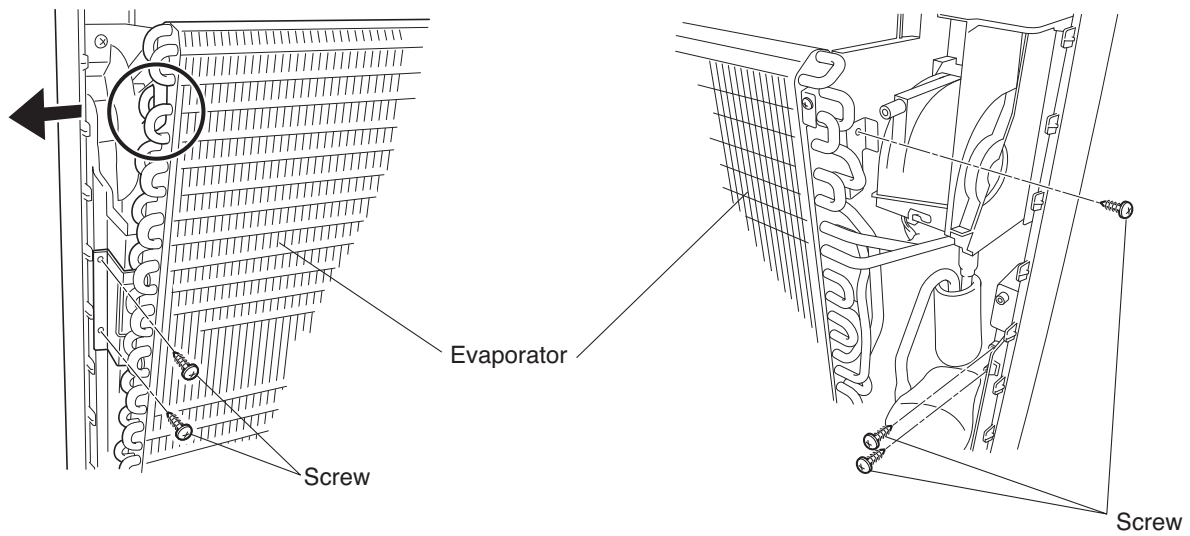
- (1) Remove the front panel and the front cover.
- (2) Remove the 3 fixing screws of the electrical parts case.



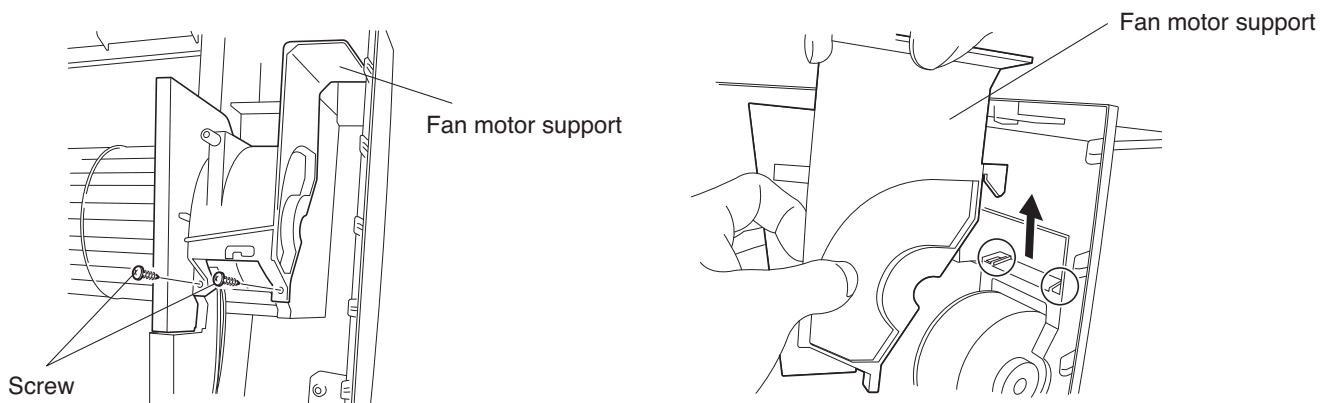


## 7. FAN MOTOR AND TANGENTIAL AIR FLOW FAN

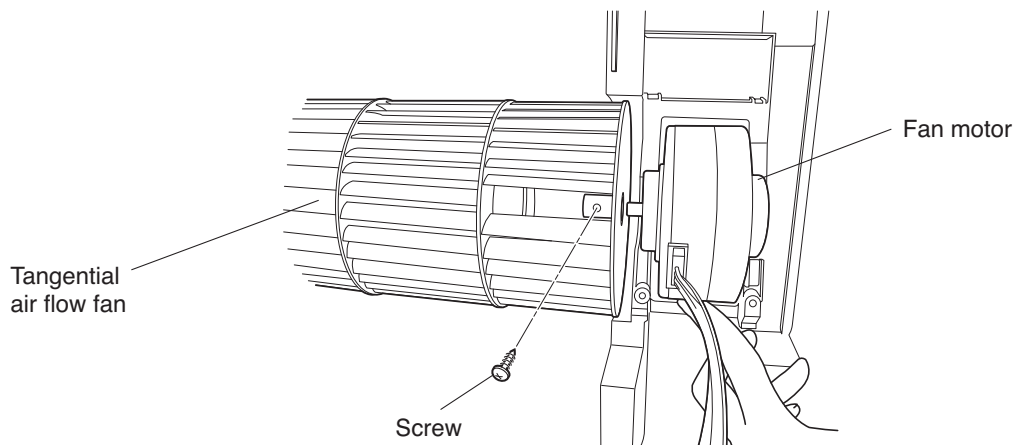
- (1) 5 screws that are the fixation of evaporator are removed.
- (2) The tab where the left side of evaporator is fixed is removed.
- (3) Evaporator is lifted up and removed.



- (4) Two screws that is the fixation of fan-motor support is removed, and fan motor support is removed.



- (5) The tangential air flow fan and fan motor are fixed with screw. Please loosen screw when you remove.



# DESCRIPTION OF MAIN CIRCUIT OPERATION

## MODEL RAF-50RPA

### 1. Power circuit

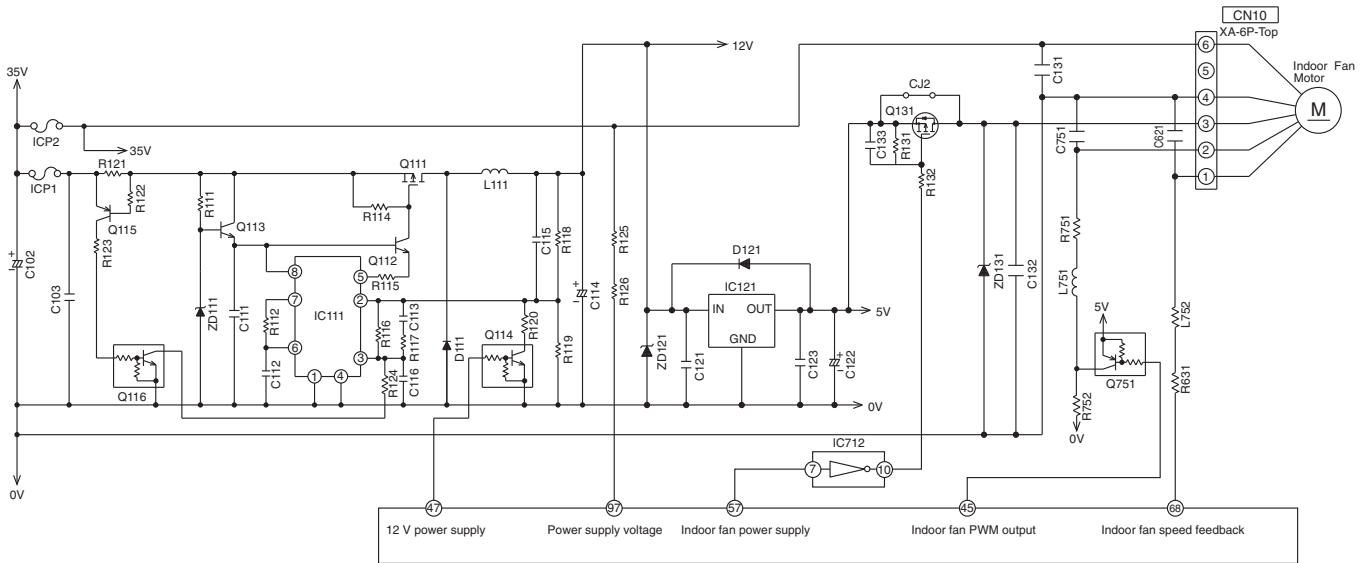


Fig. 1-1

Power to operate indoor unit (DC35V) is generated at the power supply in outdoor unit and it is sent to indoor unit through the connecting cord C and D. Then, DC 12V (12V line) is generated using DC/DC converter from the voltage sent from outdoor unit, as the control voltage of 12V is required to drive the auto sweep motor and others. Furthermore, 5V (5V line), which is necessary to drive the microcomputer and to control the fan motor, is generated using three-terminal regulator IC121.

## 2. Reset Circuit

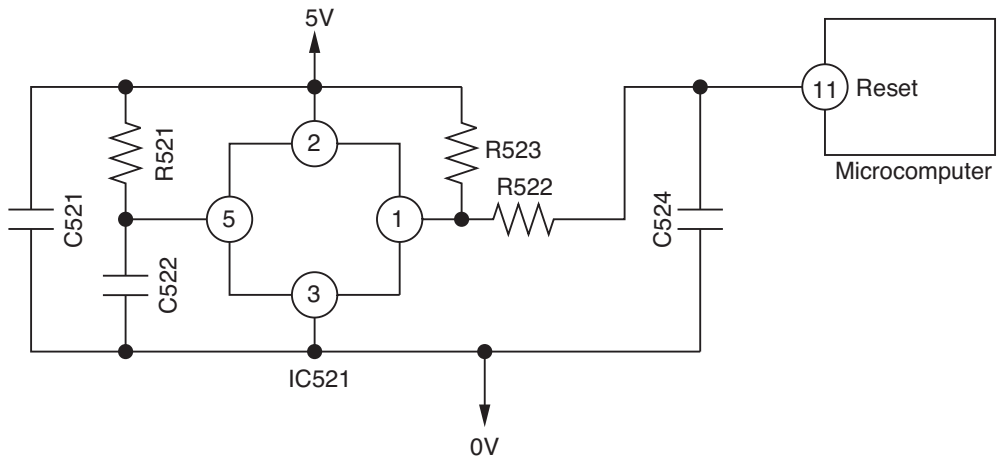


Fig.2-1

### Timing chart

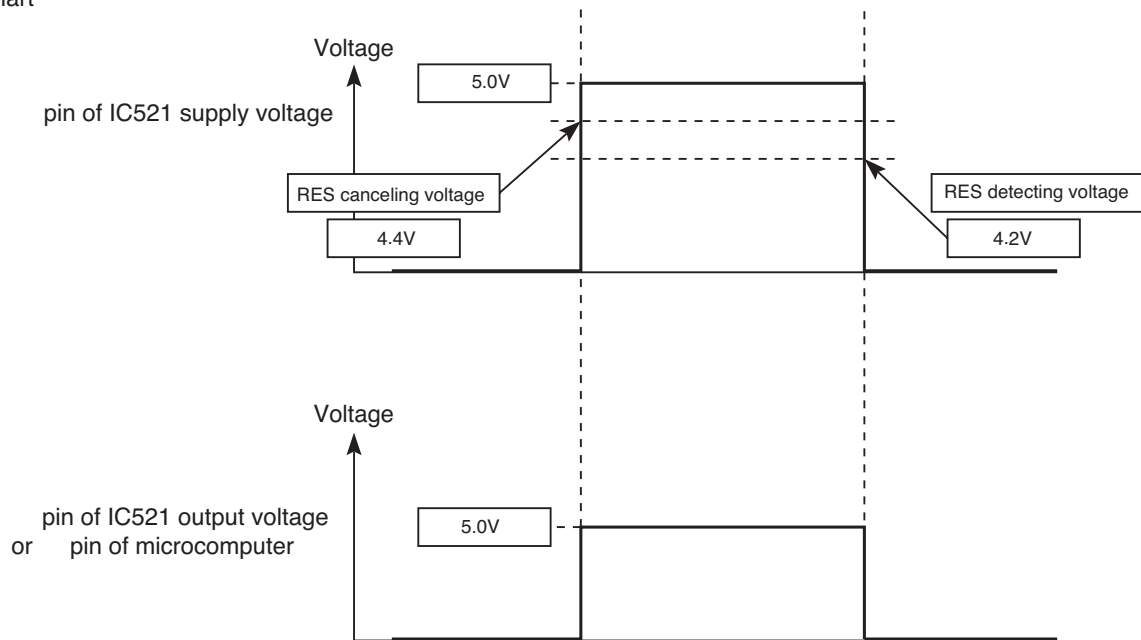


Fig.2-2

- Reset circuit is to initialize the indoor unit microcomputer when switching ON the power or after recovering from power failure.
- Microcomputer operates when pin of the indoor unit microcomputer (reset input) is "Lo" for resetting and "Hi" for heating.
- Waveform of each part when switching ON the power and when shutting down is shown in the Fig. 2-2.
- After switching ON the power, pin of IC521 supply voltage and pin of microcomputer becomes Hi when DC5V line rises and reaches approximately 4.4V or higher. Then, resetting will be cancelled and microcomputer starts operating.
- After shutting down the power, pin of IC521 supply voltage and pin of microcomputer becomes Lo when DC5V line falls and reaches approximately 4.2V or lower. Then, the microcomputer will be in reset condition.

### 3. Fan Motor Drive Circuit

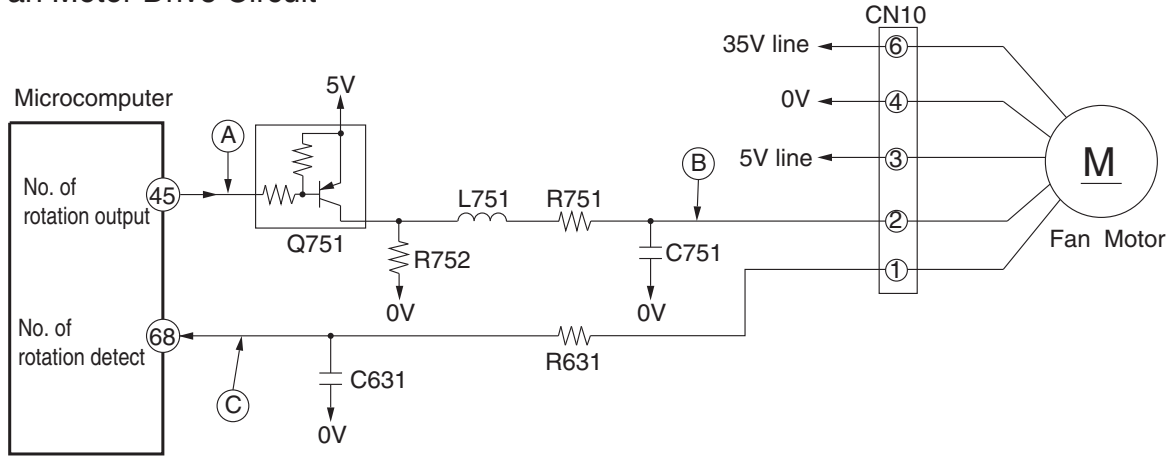


Fig. 3-1

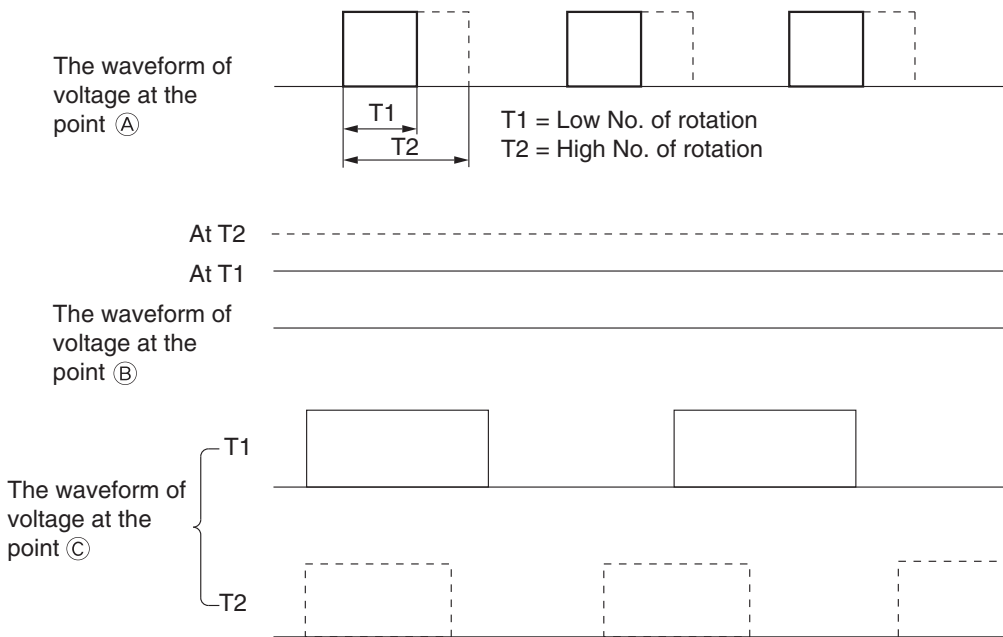


Fig. 3-2

- The 610Hz PWM pulse shown in Fig. 3-2 from the microcomputer pin 45 is output to point A. The width of this pulse changes with instruction number of rotations.
- This pulse changes to analog voltage by R751 and C751 and it is applied to the fan motor as instruction voltage number of rotations. The relationship between the voltage of point B and number of rotations becomes as shown in Fig. 3-3. (The gap may arise depending on the condition of unit.)
- The feedback pulse of number of rotation is outputted from the fan motor and input to micro computer pin 68. The frequency of this pulse is 12/60 of the number of rotations. (Ex:  $1000\text{min}^{-1} \times 12/60 = 200\text{Hz}$ ) The microcomputer observes this frequency and to make it as the instruction number of rotation all the time, adjusts the output pulse width of pin 45.
- If the feedback pulse becomes lower than  $100\text{min}^{-1}$  caused by lock or failure of a fan motor, the fan output stops temporary as the fan lock is faulty. The pulse will output again after 10 seconds. If the abnormal in fan lock is detected twice in 10 minutes, the unit is completely stopped and change to the fault mode which the timer lamp blinks 10 times.

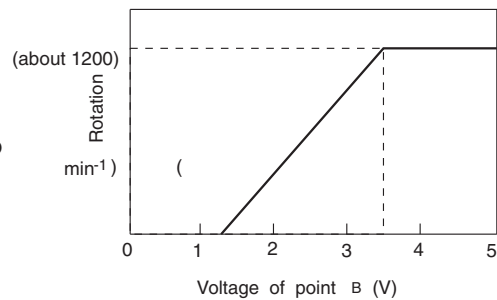


Fig. 3-3

## 4. Buzzer Circuit

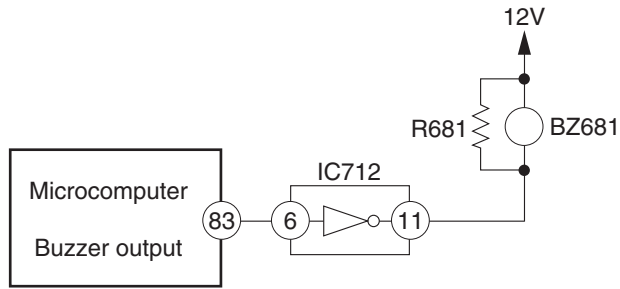


Fig.4-1 Buzzer Circuit

- When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin (83) of the micro computer. After the amplitude of this signal has been set to 12Vp-p by a transistor, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

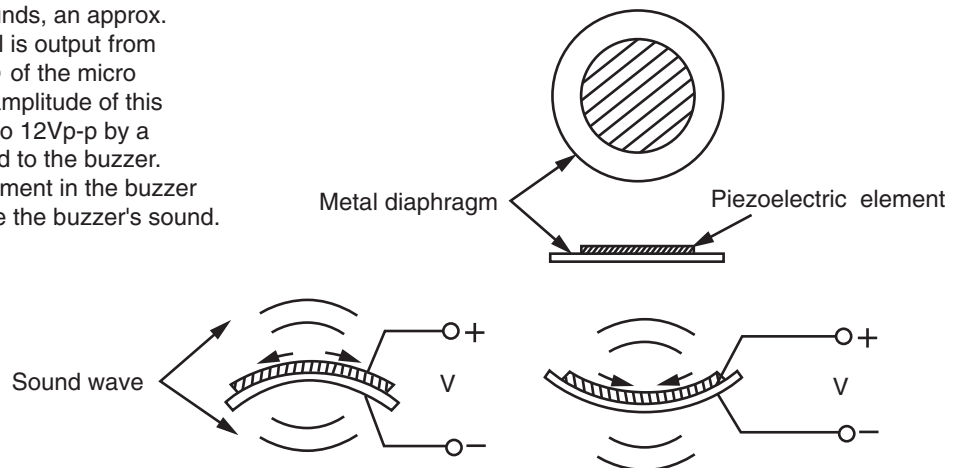


Fig.4-2 Buzzer Operation

## 5. Receive Circuit

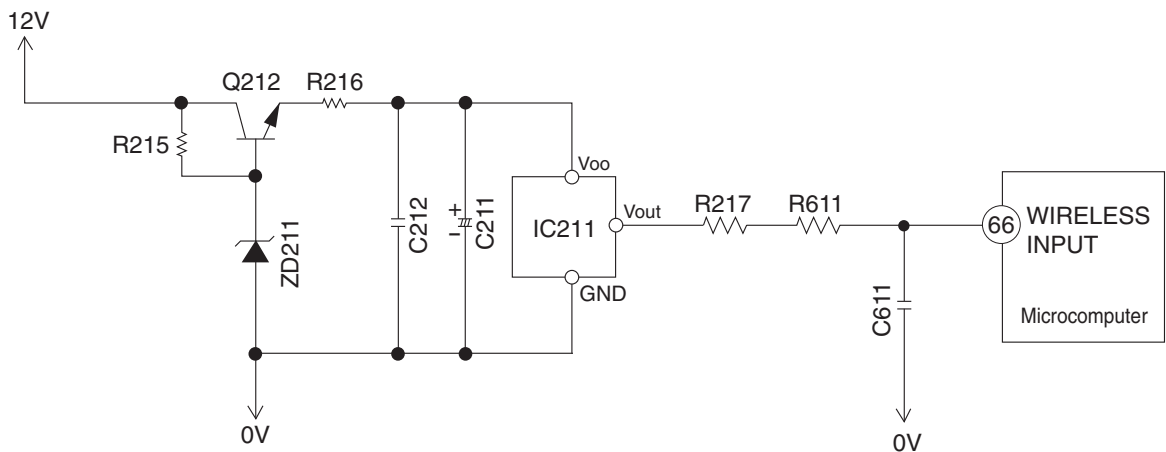


Fig.5-1

- The light receiving unit receives an infrared signal from the wireless remote control. The receiver amplifies and shapes the signal and outputs it.

## 6. Initial Setting Circuit (IC401)

- When power is supplied, the microcomputer reads the data in IC401 (E<sup>2</sup>PROM) and sets the preheating activation value and the rating and maximum speed of the compressor, etc. to their initial values.
- Data of self-diagnosis mode is stored in IC401; data will not be erased even when power is turned off.

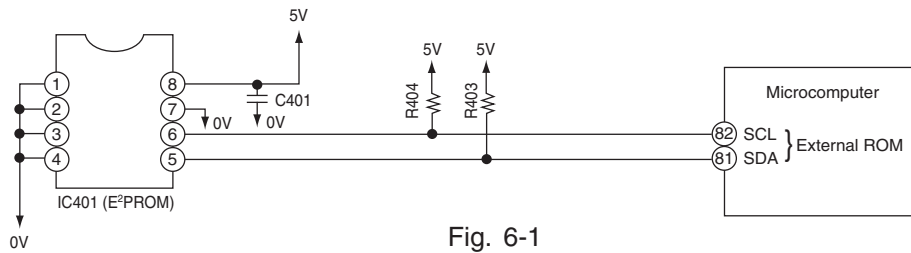


Fig. 6-1

## 7. Temporary Switch Circuit

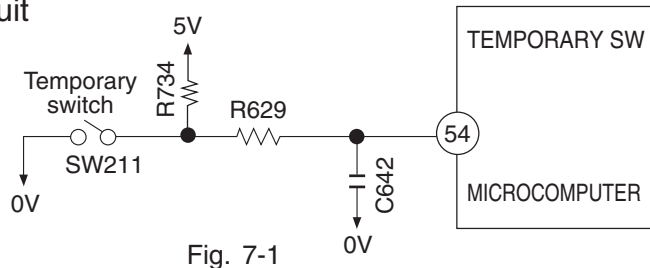


Fig. 7-1

- The temporary switch is used to operate the air conditioner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the previous mode at the previously set temperature. However, when the power switch is set to OFF, it starts automatic operation.

## 8. Room Temperature Thermistor Circuit

A room temperature thermistor circuit is shown in Fig. 8-1.

According to room temperature, the voltage of point A becomes as it is shown in Fig.8-2.

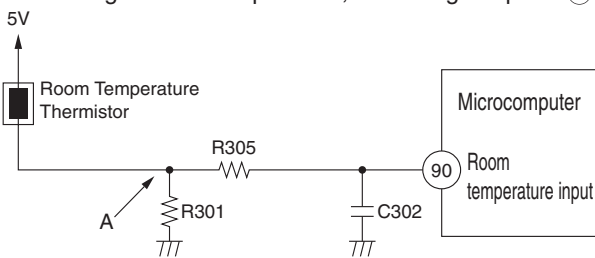


Fig. 8-1

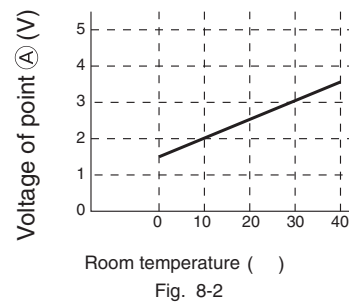


Fig. 8-2

## 9. Heat Exchanger Thermistor Circuit

Heat exchanger temperature is noticed inside the room

- (1) Preheating
- (2) Low-temperature defrosts at cooling and dehumidification operation time.
- (3) Not working of reversing valve or detection of opening of heat exchange thermistor is controlled.

According to heat exchange temperature, the voltage of point A becomes as it is shown in Fig. 9-2.

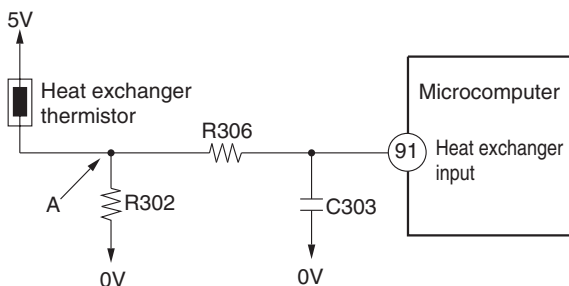


Fig. 9-1

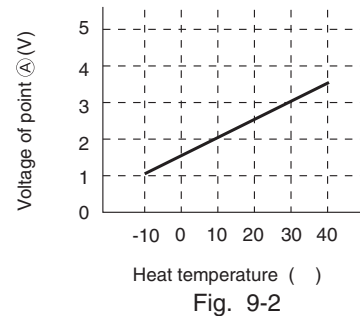


Fig. 9-2

## 10. Dip-switch

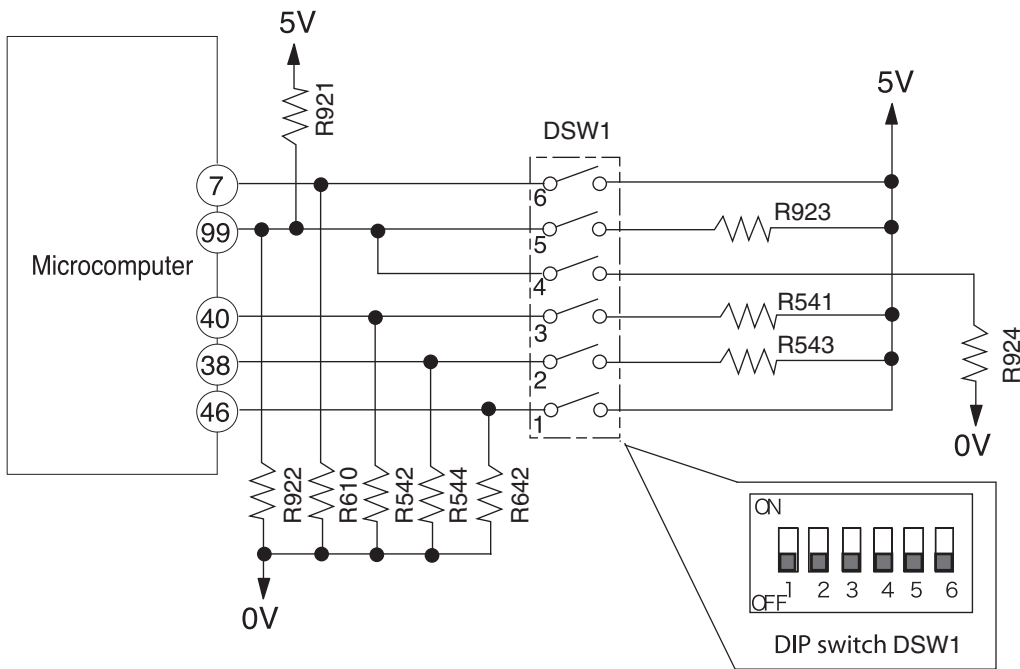


Fig.10-1 Dip switch Circuit

- Fig.8-1 shows the dip switch circuit; the table shown in Fig.10-2 are function and setting position from ① – ⑥ of the switch no.

Switch No.	FUNCTION	Switch Position/Setting.				
		OFF*	ENABLE	ON	DISABLE	-----
1	AUTO RESTART	OFF*	ENABLE	ON	DISABLE	-----
2	CARD KEY MODE	OFF*	DISABLE	ON	ENABLE	-----
3	CARD KEY LOGIC SELECT	OFF*	INPUT HIGH ACTIVE	ON	INPUT LOW ACTIVE	-----
4	HEATING/COOLING ONLY MODE SELECT	OFF*	NORMAL (HEAT AND COOL)	OFF		ON
5	HEATING/COOLING ONLY MODE SELECT	OFF*		ON		OFF
6	REMOCON ID SELECT ※ 1	OFF*	SELECT ID A	ON	SELECT ID B	-----

Fig.10-2 Functions of Dip switch

NOTE:

\* Marking is position of shipping [FACTORY default setting]

※ 1 Weekly Timer wireless remocon for new model have function of setting remocon ID A or B. This remocon using model can not operate "DIP SWITCH 6" (disabled by EEPROM data flag.)

- If the dip switch is set to "Heating mode only" or "Cooling mode only", the wireless remote controller must be set to operation mode lock setting as indicated on page 93.



# MODEL RAC-50FPA

## 1. Power Circuit

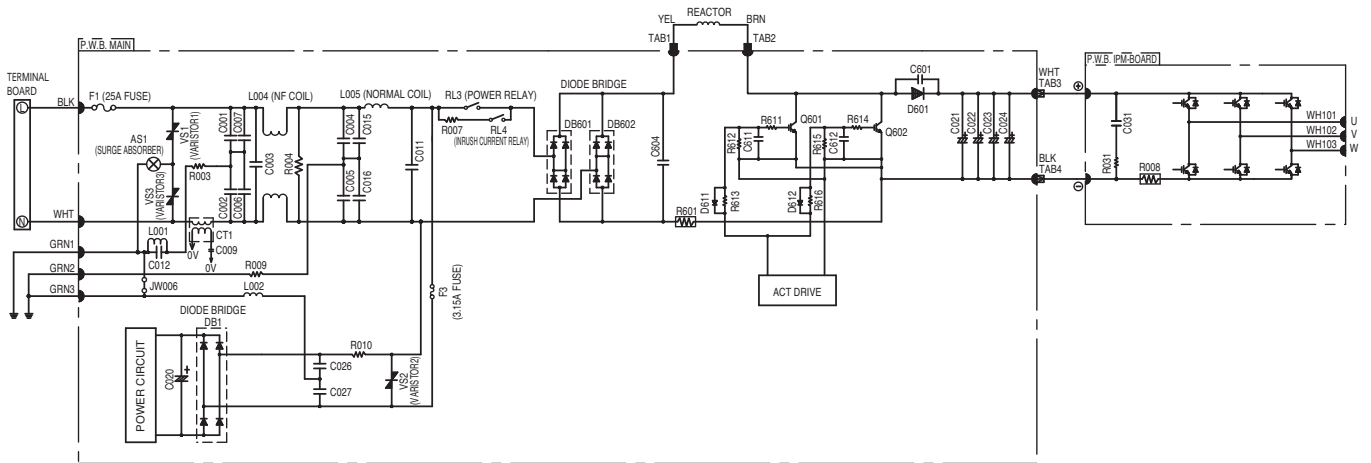


Fig 1-1

※ This circuit full-wave rectifies 220-230VAC applied between terminals L and N and boosts it to a required voltage with the IPM to create a DC voltage.

The voltage become 320-360V when the compressor is operated.

※ Importance component

- ( 1 ) Intelligence Power Module (IPM)  
A module that constitute by an inverter part.
- ( 2 ) Diode Stack (DB1, DB601, DB602)  
These rectify the 220-230VAC from terminal L and N to a DC power supply.

<Reference>

※ In case of Intelligence Power Module malfunction or connection failure immediately after compressor starts, its may stop due to error of [abnormal low speed], [switching failure],[Ip stop] and others.

<Reference>

※ If diode stack (DB601, DB602) are faulty, DC voltage may not be generated and the compressor may not operate at all. Also be aware that the 25A fuse might have blown.

※ If DB1 is faulty compressor may not operate at all. Also be aware that the 3.15A fuse might have blown.

(3) Smoothing capacitors (C021-C024, 400  $\mu$ F, 450V)

This smoothes (averages) the voltage rectified by the diode stack.

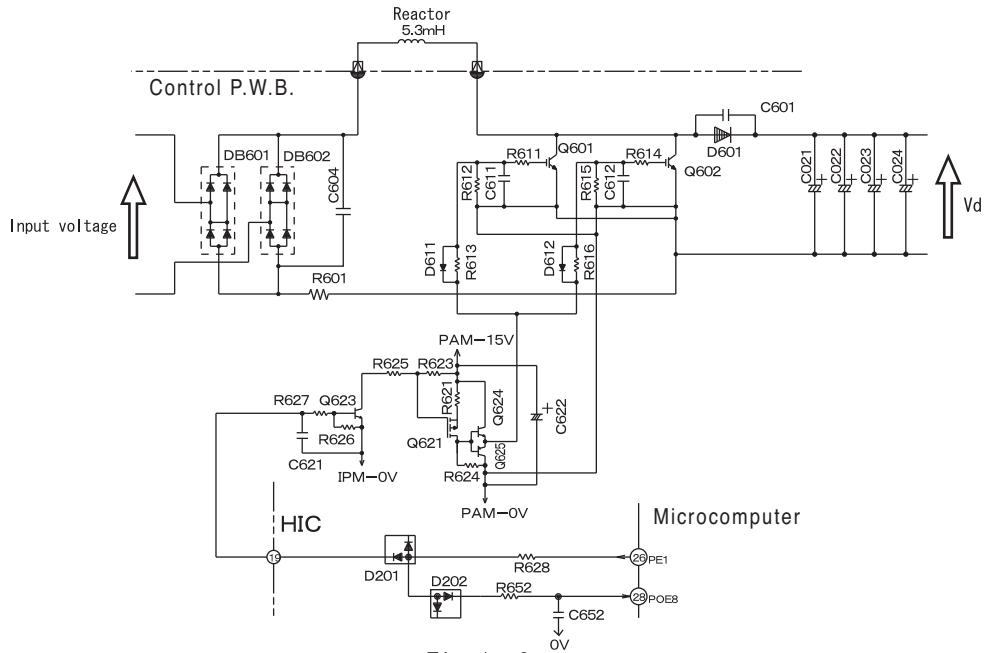


Fig. 1-2

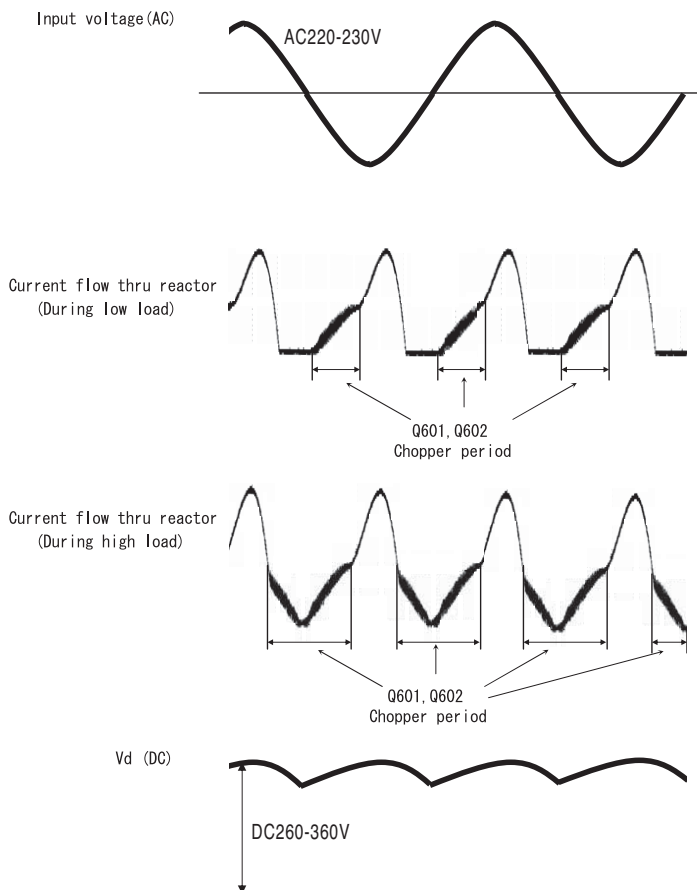


Fig. 1-3

(4) IGBT to improve efficiency (Q601, Q602)

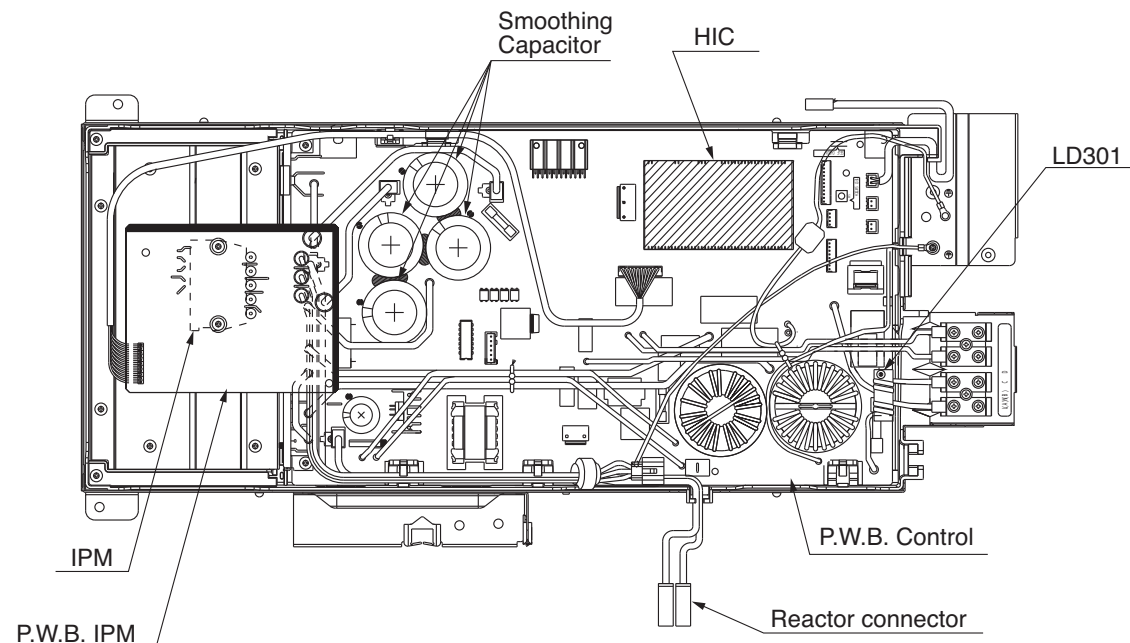
It will improve the efficiency during compressor load become heavy when current flow thru the chopper period of Q601, Q602.

(5) C001-C007, C015, C016, C026, C027, L004, L005

These absorb electrical noise generated during operation of compressor and also absorb external noise entering from power line to protect electronic parts.

(6) Surge Absorber, Varistor1,2,3

These absorb external power surge.



※Be careful to avoid an electric shock as a high voltage is generated. Also take care not to cause a short-circuit through incorrect connection of test equipment terminals. The circuit board can be damage.

## 2. P.W.B. for power circuit

Voltage specification of power circuit as shown in below table.

<Checking point>

Output	Spec	Main load	Measuring point	Example of possible failure mode.
5V O/P	$5 \pm 0.4V$	Micon, Thermistor	Tester $\oplus$ : L105 (5V) Tester $\ominus$ : J25 (0V)	Outdoor not operate, no blinking indication
12V O/P	$12 \pm 1V$	Micon, IC2, 3, 4 Relay circuit	Tester $\oplus$ : L104 (12V) Tester $\ominus$ : J25 (0V)	Outdoor not operate, no blinking indication
16V O/P	$15.5 \pm 1.5V$	IPM for Comp IPM for DC fan	Tester $\oplus$ : J58 (16V) Tester $\ominus$ : J25 (0V)	Stop : LD301 3,4 or 12 times blinking
PAM-15V O/P	$15 \pm 1.5V$	ACT circuit	Tester $\oplus$ : J23 (PAM-15V) Tester $\ominus$ : J25 (0V)	Stop : LD301 14 times blinking

※ Power circuit for pwb can consider normal if the result is satisfied with above specification.

### 3. Latch-type reversing valve control circuit

- This model comes equipped with a latch-type reversing valve.
- The latch-type reversing valve is so designed that its valve is "slid" in a specified direction according to a specific operation mode, thereby switching freezing channels and retaining the built-in permanent magnet.
- The latch-type reversing valve control circuit is so designed that, in response to an operation command from the indoor microcomputer, the reversing valve coil receives a current in a specified direction according to a specific operation mode, thereby sliding the valve.
- The product is energized twice at increments of 1 second as illustrated in Fig. 3-1, starting immediately before compressor startup.
- During forcible cooling, the product is energized twice at increments of 1 second as illustrated in Fig. 3-1, starting immediately after the forcible freezing switch is turned on.
- When stopped, the product holds the valve in the position where it was before stoppage.

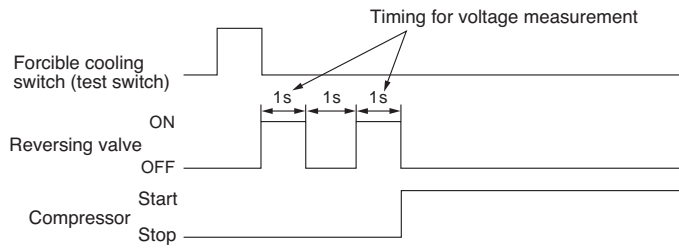


Fig. 3-1

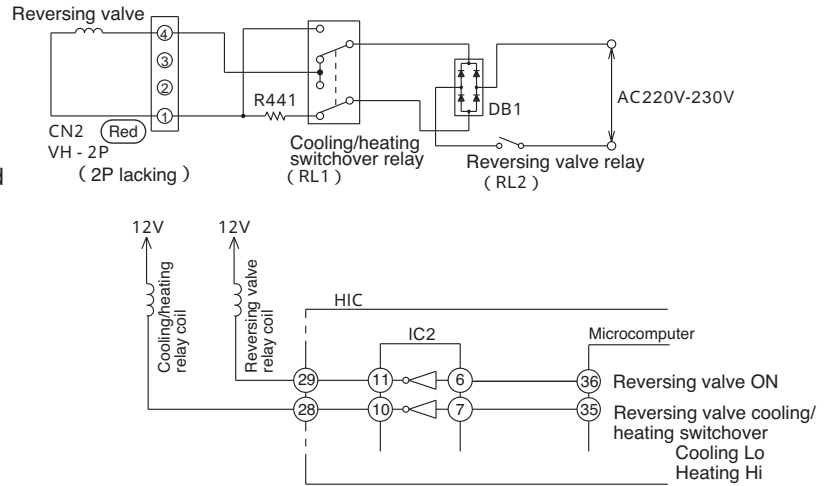


Fig. 3-2

- Before conducting an energization check of the reversing valve, detach the connector CN2, measure the resistance at both ends of the connector, and ensure that it is within the range  $[400 \pm 100]$ . Check for energization only when the above test proves the product to be normal. If it is abnormal, it should be a lead wire break or a reversing valve failure.
- Voltage when measured with a tester while the reversing valve is energized (at the timing for voltage measurement) Hold down the "test switch" of the outdoor electrical parts for at least 1 second. Energization begins 1 second after the "test switch" is pressed.

Tester type	Connect pin 1 of the CN2 to the positive terminal of the tester. Connect pin 2 of the CN2 to the negative terminal of the tester.	Connect pin 1 of the CN2 to the positive terminal of the tester. Connect pin 2 of the CN2 to the negative terminal of the tester.
Analog tester	The pointer will keep swinging up to about 150 V DC, goes back to 0 V, and then swing back to about 150 V DC.	The pointer will swing in reverse direction.
Digital tester	The pointer will momentarily display a high value, go back to 0 V, and then display a large value again.	The tester will display a large negative value, go back to 0 V, and then display a negative large value.

- When the voltage is measured with a tester with the timing for voltage measurement, and if the pointer swings as illustrated in the above table, then the product should be normal. (There are dispersions with testers. Moreover, a digital tester often results in its reading being illegible. An analog tester is therefore recommended.) The product is energized only twice a second. Missing the timings will therefore result in failure to measure normal operations. If the reversing valve proper is normal, it will synchronize with the timing for voltage measurement and the reversing valve itself will click twice. If this click is heard, the reversing valve should be functioning normally. If the energization check shows an abnormality, the electrical parts should be out of order.

## 4. Temperature Detection Circuit

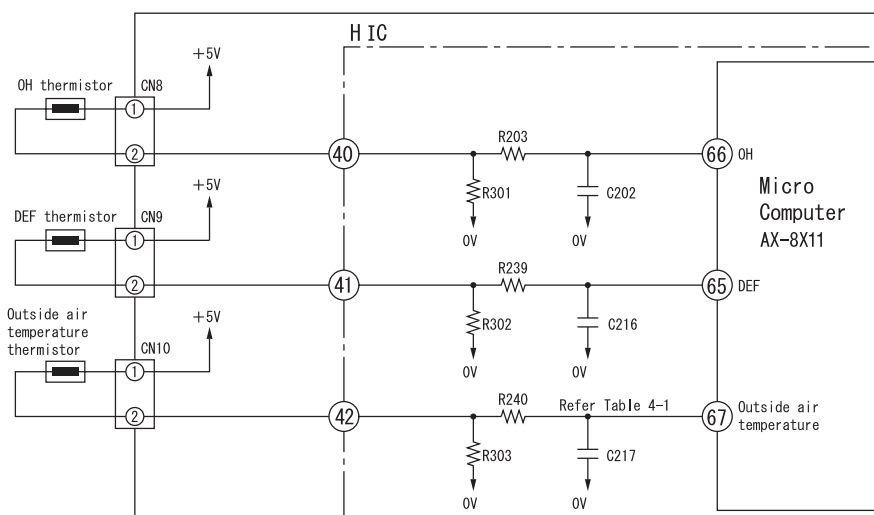


Fig. 4-1

- OH thermistor circuit detect the temperature at the surface of compressor head, DEF thermistor circuit detect the defrosting operation temperature.
  - A thermistor is a negative resistor element which has characteristics that the higher(lower) the temperature, the lower(higher) the resistance.
  - When the compressor is heated, the resistance of the OH thermistor becomes low and  $\oplus 5V$  is divided by OH thermistor and R301 and the voltage at pin ⑥⑥ of microcomputer.
  - Compare the voltage at microcomputer pin ⑥⑥ and setting value stored inside. If the value exceed the set value, microcomputer will judge that the compressor is overheated and stop the operation.
  - When frost is formed on the outdoor heat exchanger, the temperature at the exchanger drops abruptly. Therefore the resistance of the DEF thermistor becomes high and the voltage at pin ⑥⑤ of micro computer drops. If this voltage becomes lower than the set value stored inside, microcomputer will enter the defrost control.
  - During defrost operation, the microcomputer will transfer the defrosting condition command to indoor unit via SDO pin of interface of IF transmission output.
  - The microcomputer read the outdoor temperature by Outside Air thermistor and transfer it to the indoor unit, thus controlling the compressor rotation speed according to the set value in the EEPROM of indoor unit and switching the operation mode (outdoor fan on/off etc.) to DRY mode.
- Below table show the typical values of outdoor temperature in relation to the voltage.

Table 4-1

Outside Air Temperature (°C)	-10	0	10	20	30	40
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

<Reference>

When the thermistor is open, open condition or disconnect, microcomputer pin ⑥⑤~⑥⑦ are approx. 0V;

When thermistor is shorted, they are approx. 5V and LD301 will blink 7 times.

However, an error is detected when only the OH thermistor is shorted and will enter blinking mode after 12 minutes start the compressor operation.

## 5. Electric expansion valve circuit

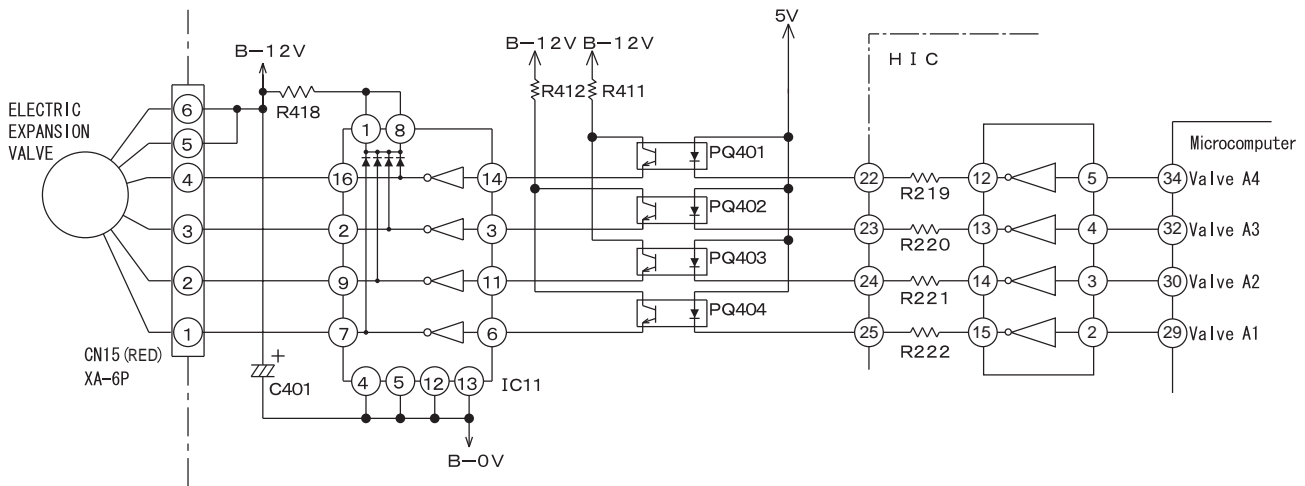


Fig.5-1

- The electric expansion valve is driven by DC12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control the opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below. When power is supplied, voltages at pins ④ to ① of CN15 are about 0.9V and 12V when no power is supplied. When power is reset, initial operation is performed for 10 or 20 seconds. During initial operation, measure all voltages at pin ④ to ① of CN15 by using a multimeter. If there is any pin with voltage that has not changed from 0.9V or 12V, expansion valve or microcomputer is broken.
- Fig.5-2 shows logic waveform when expansion valve is operating.

Table 5-1

CN15 pin no.	Wire	Drive status							
		1	2	3	4	5	6	7	8
①	WHT	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
②	YEL	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
③	ORG	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
④	BLU	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

Operation mode  
 1→2→3→4→5→6→7→8 VALVE CLOSE  
 8→7→6→5→4→3→2→1 VALVE OPEN

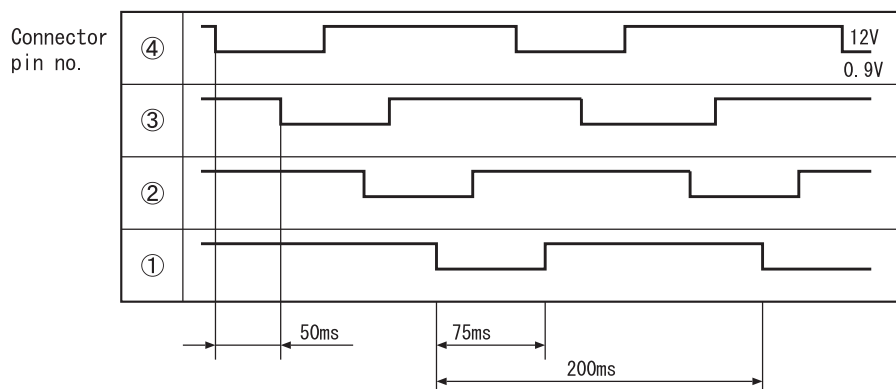


Fig. 5-2

With expansion valve control, opening degree is adjusted to stabilize target temperature by detecting compressor head temperature. The period of control is about once per 20 seconds and output a few pulse.

## 6. Outdoor DC fan motor control circuit

- This model is built with DC fan motor control circuit inside outdoor electrical unit.

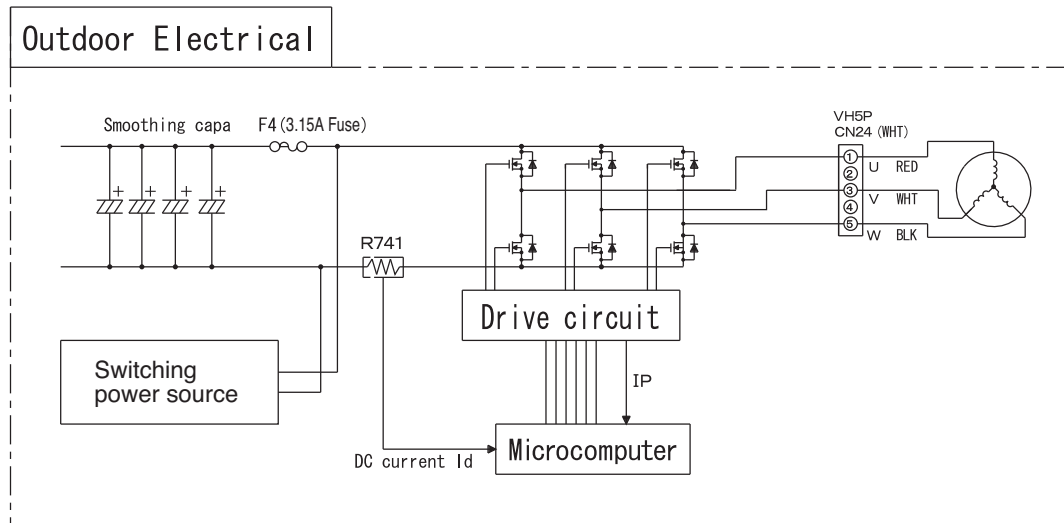


Fig 6—1

This DC fan motor is control by outdoor microcomputer that follow the operating instruction received from indoor microcomputer. The DC current that flow from R741 will presume actual operation speed and control the rotation to follow the operating instruction. Based on this DC current it will detect a over current and other fan motor failure.

### (1) Fan motor speed controller during starting

Due to the interference of strong wind etc., operation movement is changed based on fan direction and rotation speed as shown below during starting of operation.

In addition, the fair wind is define as wind that blow to outside direction using Mouth Ring part. At strong and contrary wind ... The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

At contrary wind ... The rotational speed is controlled in fair wind direction after it slowly reduce the speed and finally stop.

At fair wind ... The rotational speed is controlled as it is.

At strong fair wind ... The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

### (2) Fan motor speed controller during unit operating

There is a case where fan rpm is reducing during rotating caused by interference of strong wind. If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking)  
The unit will restart according to control as per during start (1).

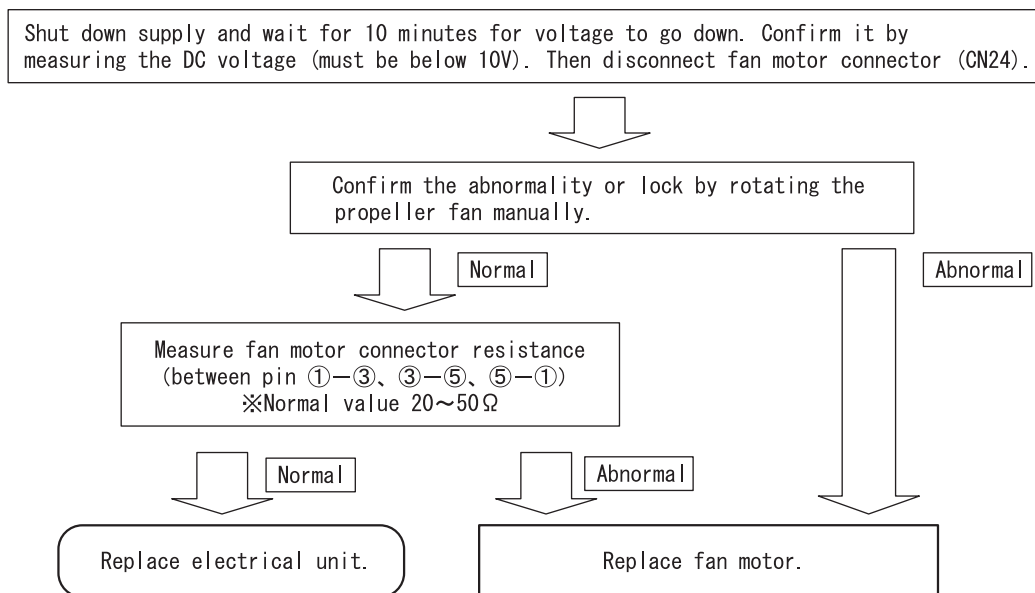


(3) Method of confirming self diagnosis LD301 lamp : 12 times blinking

If the unit stop and LD301 on the pwb blinking 12 times [fan lock stop is detected], follow below steps to confirm it.

1. Fan lock stop is detected when something has disturb the fan rotation by inserting material into propeller fan or ice has growing inside outdoor unit caused by snow.  
Remove it if found something is bloking the fan.
2. Confirmed that CN24 connector is securely inserted. Fan lock stop is detected also when connector is not properly inserted. Please securely insert if found any disconnection.
3. Fan lock stop also can be detected where strong wind blown surrounding the unit.  
Please confirm after restart the unit. (It may take few minutes to operate the compressor)  
It is not a malfunction of electrical unit or fan motor if the unit run continuesly after restart the unit.
4. Check fan motor condition as below procedure.

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found F4(3.15A fuse) blown.

If fan motor is broken, replace both electrical unit and fan motor.

Reference

※No power is supplied to the outdoor unit if F4(3.15A Fuse) is blown.

Both DC fan motor and switching power supply is using same fuse.

Caution

※Beware of electric shock due to high voltage when conducting an operation check.

Power supply for DC fan motor and compressor is common (DC260-360V).

## 7. Intelligent power module circuit (IPM circuit)

Fig. 7-1 shows peripheral circuits of intelligent power module (IPM).

In the diagram, U<sup>+</sup>, V<sup>+</sup> and W<sup>+</sup> are called the "upper arm", U<sup>-</sup>, V<sup>-</sup> and W<sup>-</sup>, the "lower arm".

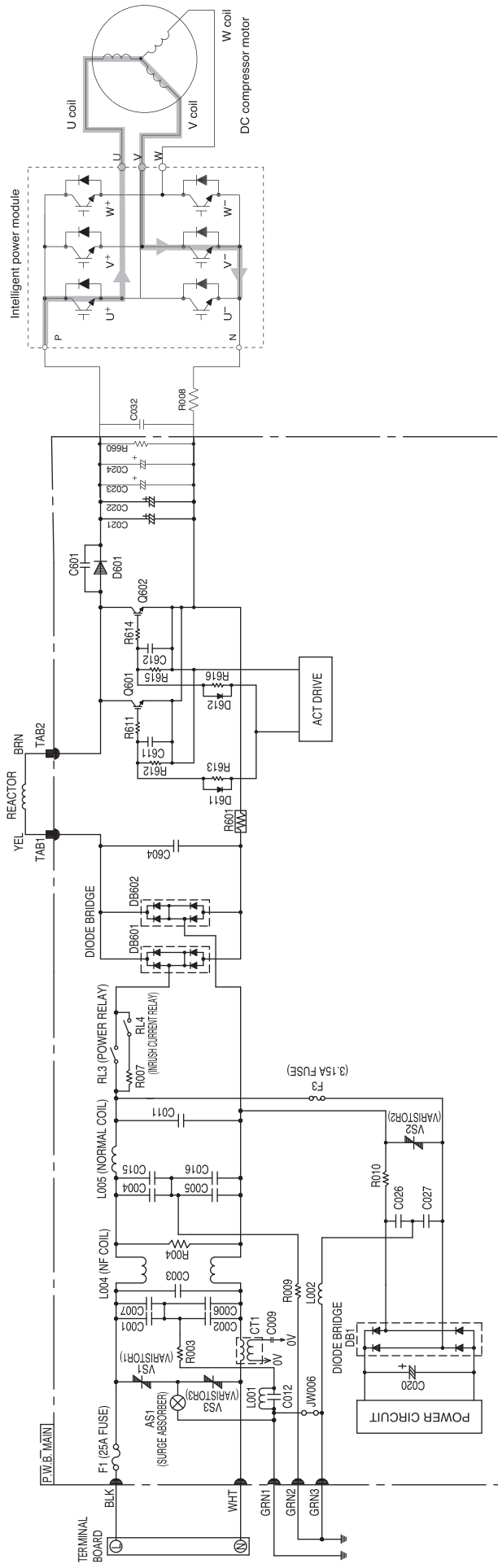


Fig. 7-1 System power module circuit (U<sup>+</sup> is ON, V<sup>-</sup> is ON)

Intelligent power module switches power supply current according to position of the compressor motor rotor.

The switching order is as shown in Fig. 7-2.

At point E : U<sup>+</sup> is ON, V<sup>-</sup> is ON (circuit in Fig. 7-1)

At point F : U<sup>+</sup> is chopped (OFF), V<sup>-</sup> is ON (circuit in Fig. 7-4)

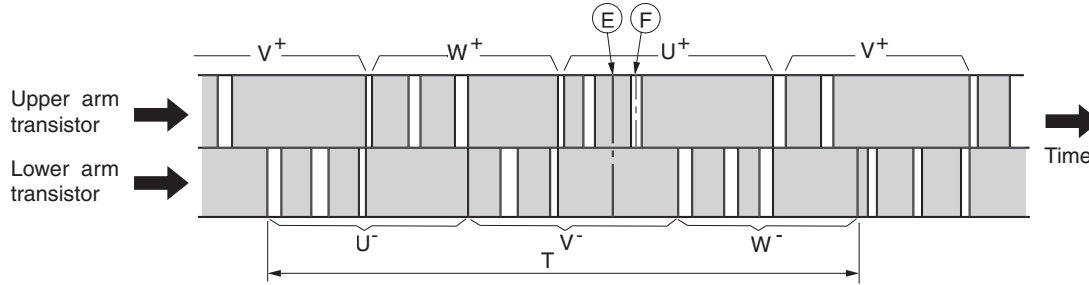


Fig. 7-2 Switching order of power module

Upper arm transistor is controlled to ON/OFF by 2.5kHz-5kHz chopper signal. Rotation speed of the compressor is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal. Time T in Fig. 7-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 \times 1/T$$

Fig. 7-3 shows voltage waveform at each point shown in Figs. 7-1 and 7-4. First half of upper arm is chopper, second half is ON, and first half of lower arm is chopper, second half is ON.

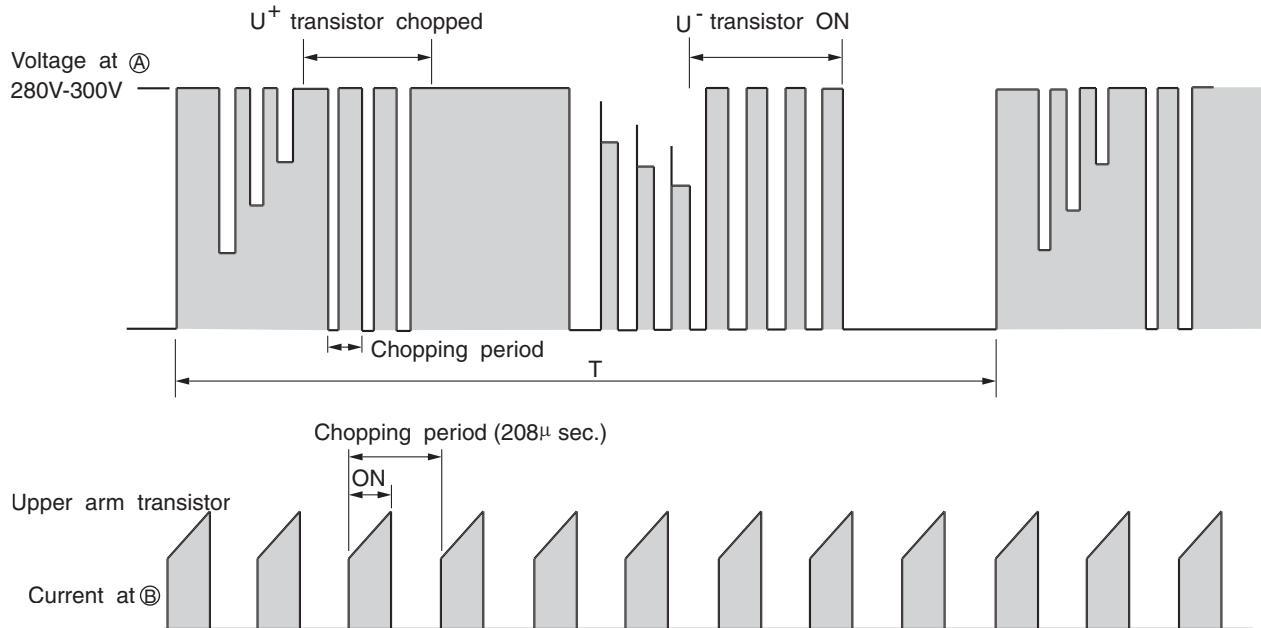


Fig. 7-3 Voltage waveform at each point

When power is supplied U<sup>+</sup> → V<sup>-</sup>, because of that U<sup>+</sup> is chopped, current flows as shown below;

- (1) When U<sup>+</sup> transistor is ON: U<sup>+</sup> transistor → U coil → V coil → V<sup>-</sup> transistor → DC current detection resistor → Point B (Fig. 7-3)
- (2) When U<sup>+</sup> transistor is OFF: (by inductance of motor coil) U coil → V coil → V<sup>-</sup> transistor → U<sup>-</sup> diode → Point A (Fig. 7-4)

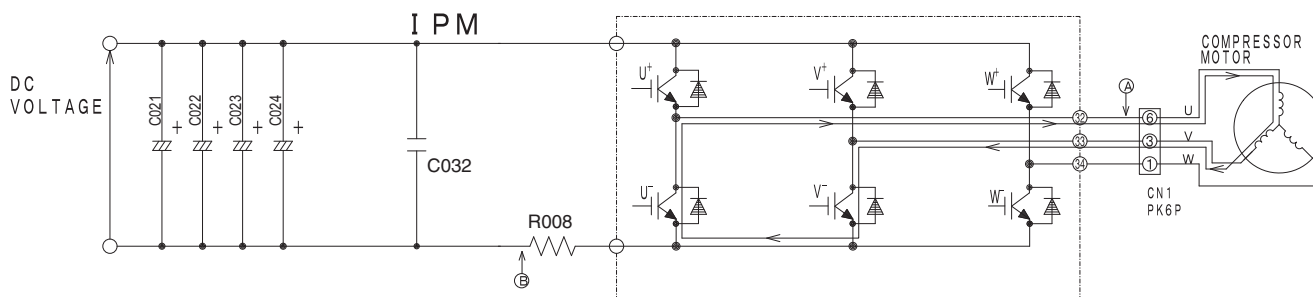


Fig. 7-4 Power module circuit (U<sup>+</sup> is OFF, V<sup>-</sup> is ON)

Since current flows at point ② only when U<sup>+</sup> transistor and V<sup>-</sup> transistor are ON, the current waveform at point ② becomes intermittent waveform as shown in Fig. 7-3. Since current at point ② is approximately proportional to the input current of the air conditioner, input current is controlled by using DC current (I<sub>d</sub>) detection resistor.

<Reference>

If power module is defected, self diagnosis lamps on the MAIN P.W.B. may indicate as shown below:

Table 7 -1

Self-diagnosis	Self-diagnosis lamp and mode	
I <sub>p</sub> (peak current cut)	LD301	Blinks 2 times
Abnormal low speed rotation	LD301	Blinks 3 times
Switching incomplete	LD301	Blinks 4 times

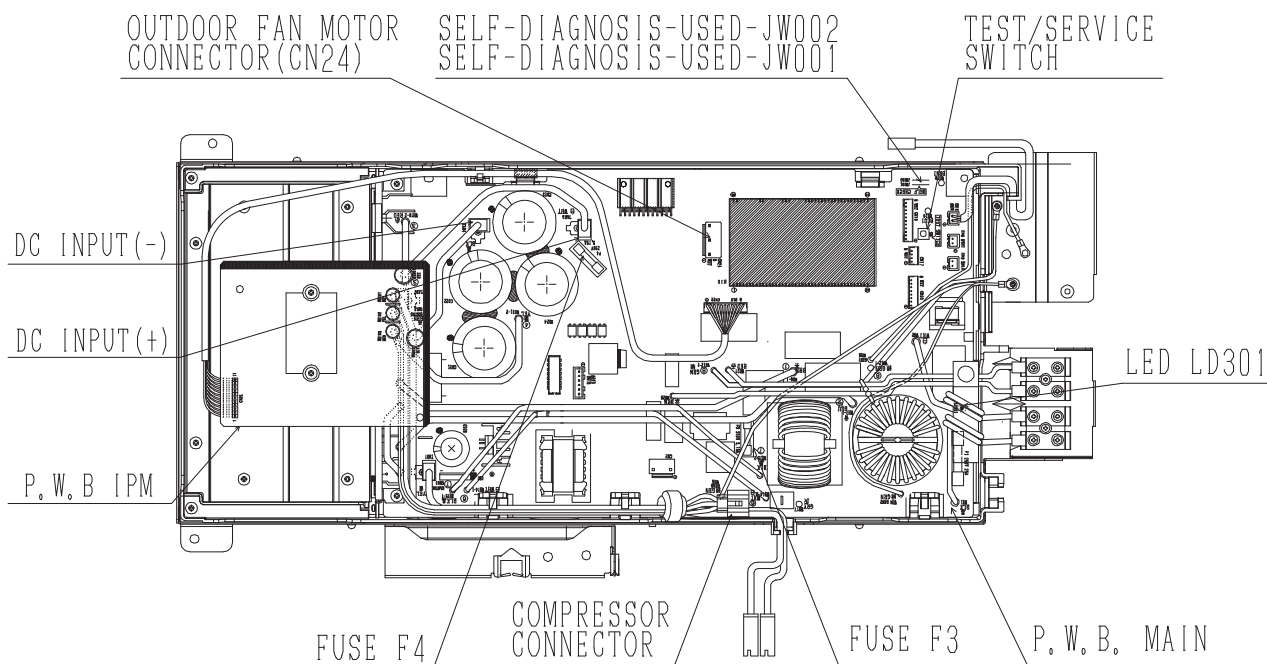


Fig. 7-5

## SERVICE CALL Q&A

MODEL RAF-50RPA / RAC-50FPA

### COOLING MODE

**Q1** The compressor has stopped suddenly during cooling operation.

**A1** Check if indoor heat exchanger is frosted. Wait for 3-4 minutes until it is defrosted.

If the air conditioner operates in cooling mode when it is cold, the evaporator may get frosted.

### DEHUMIDIFYING MODE

**Q1** Sound of running water is heard from indoor unit during dehumidifying.

**A1** Normal sound when refrigerant flows in pipe.

**Q2** Cold air comes out during a dehumidifying operation.

**A2** To improve the dehumidification efficiency performs quiet fan operation. Therefore the air is cold and it is not a malfunction.

**Q3** The operation does not stop even by setting the temperature higher than room temperature on the remote controller.

**A3** It sets to perform dehumidifying operation by setting the temperature slightly lower than remote controller setting.

### HEATING MODE

**Q1** The circulation stops occasionally during Heating mode.

**A1** It occurs during defrosting. Wait for 5 -10 minutes until the condenser is defrosted.

**Q2** When the fan speed is set at HIGH or MED, the flow is actually Weak.

**A2** At the beginning of heating, the fan speed remains LOW for 30 seconds. If HIGH is elected, it switches to LOW and again to MED after additional 30 seconds.

**Q3** Heating operation stops while the temperature is preset at "30".

**A3** If temperature is high in the outdoor, heating operation may stop to protect internal devices.

**Q4** When the heating operation is started, the indoor fan not start.

**A4** This is because the preheating device is working. It will not start to drive the fan until the refrigerating cycle warms up and warm air blows.

## AUTO FRESH DEFROSTING

**Q1** After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp lighting.



**A1** Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

## AUTO OPERATION

**Q1** Fan speed does not change when fan speed selector is changed during auto operation.



**A1** At this point fan speed is automatic.

**Q2** How is the automatic operation mode determined?



**A2** According to the room temperature and outside temperature, heating or cooling operation is automatically selected. Refer to the basic operation section.

**Q3** The room temperature cannot be controlled at an automatic operation.



**A3** It is automatically set as follows.  
At cooling: and heating: Set at 22°C  
The room temperature setting can be raised 3°C by “^” or lowered 3°C by “v”.

## NICE TEMPERATURE RESERVATION

**Q1** When on-timer has been programmed, operation starts before the preset time has been reached.



**A1** This is because "Nice temperature reservation" function is operating. This function starts operation earlier so the preset temperature is reached at the preset time. Operation may start maximum 60 minutes before the preset time.

**Q2** Does "Nice temperature reservation" function operate during dehumidifying?



**A2** It does not work. It works only during cooling and heating.

**Q3** Even if the same time is preset, the operation start time varies.



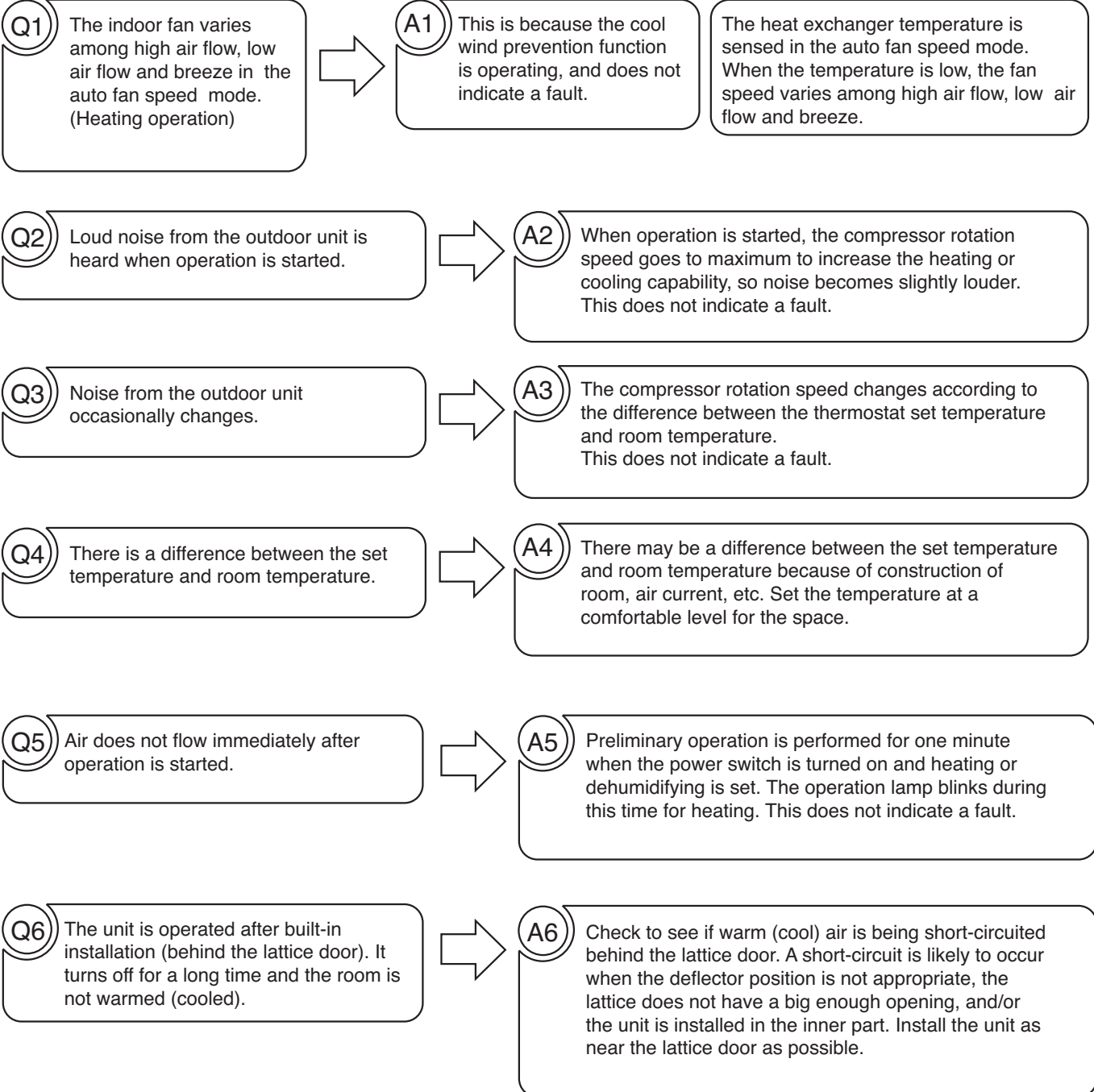
**A3** This is because "Nice temperature reservation" function is operating. The start time varies according to the load of room. Since load varies greatly during heating, the operation start time is corrected, so it will vary each day.

**Q4** When does "Nice temperature reservation" not work.



**A4** In case of weekly timer operation has been preset, "Nice temperature reservation" not work.

## OTHERS





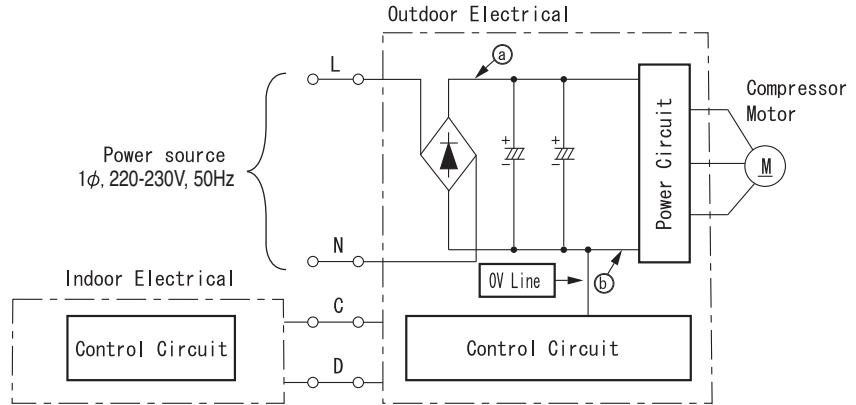
**TROUBLE SHOOTING**  
**MODEL RAC-50FPA**

**PRECAUTIONS FOR CHECKING**



**CAUTION**

1. Remember that the OV line is biased to 320 - 360V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltage fall after the power switch is turned off.

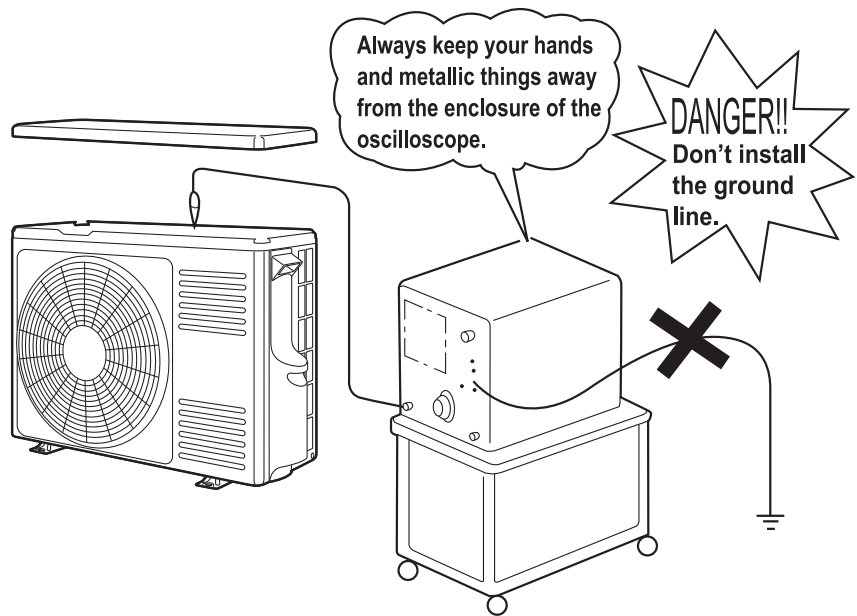


Across a - b (OV line) ----- approx 320 - 360V  
 Across a - ground ----- approx 155 - 160V  
 Across b (OV line) - ground ----- approx 155 - 160V



**CAUTION**

When using an oscilloscope, never ground it. Don't forget that high voltages as noted above may apply to the oscilloscope.



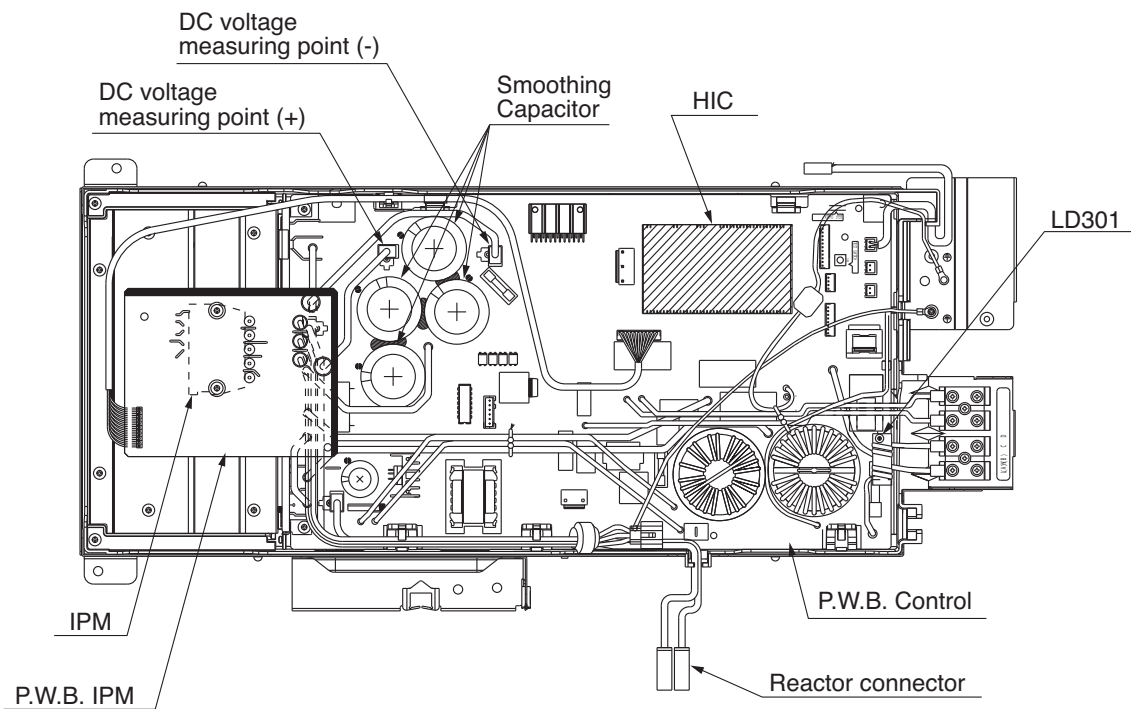
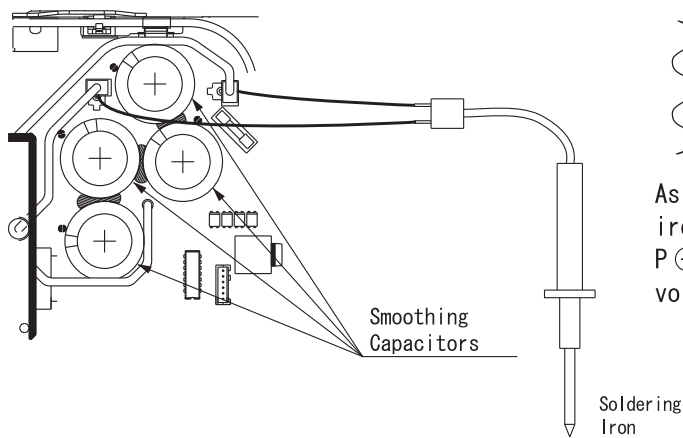
# Procedures for Electrical Discharge and How to Stop Energizing the Power Circuit

## ⚠ WARNING ⚡

### Caution

- Voltage of about 320-360V is charged between both ends of smoothing capacitors.
- During continuity check for each part of circuit in outdoor electrical parts, be sure to discharge smoothing capacitor to prevent secondary trouble.

1. Turn OFF power supply to the outdoor unit.
2. After power is turned OFF, wait for 15 minutes or more. Then remove electrical parts cover and apply soldering iron of 30 to 75W for 15 seconds or more to DC voltage ⊕ and DC voltage ⊖ terminals in order to discharge voltage in smoothing capacitors.

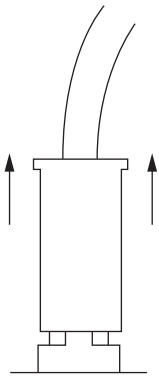


## [Other cautions]

### (1) Disconnection of tab terminal receptacle

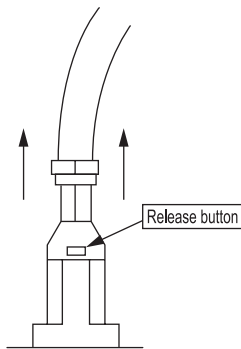
All receptacle used to connect with tab terminal are built with lock mechanism. Please take note that by using a force to pull out the receptacle without releasing the lock, can cause a damage. Furthermore, during connecting the receptacle back make sure to securely insert until end.

- Receptacle type and procedure to releasing the lock



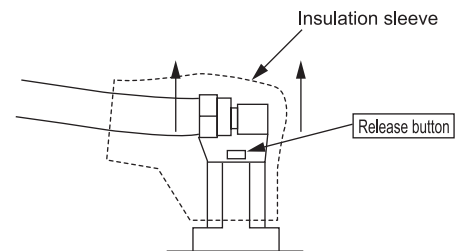
Vertical type (with plastic casing)

Pull out by holding the plastic casing.



Vertical type (without casing)

Pull out while pushing the release button.



Horizontal type (with insulation sleeve)

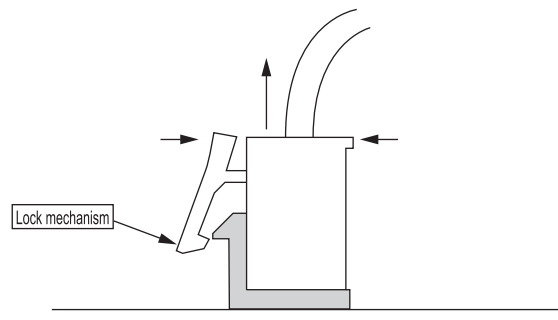
Pull out from top of insulation sleeve while pushing the release button.

### (2) Disconnecting on board connector

On board connector with lock mechanism are widely used. Please take note that by using a force to pull out without releasing the lock mechanism, can cause a damage.

Furthermore, during inserting back the connector make sure it surely done.

Release lock with finger before disconnecting.



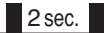

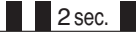


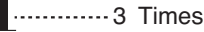

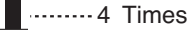



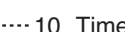

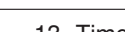
### (3) Connector disconnection during discharge is prohibited


Disconnecting connector during discharge is extremely prohibited. Component on board and fan motor will damage. Proceed trouble shooting process after confirming smoothing capacitor of indoor & outdoor pwb has been discharge.

# TROUBLE SHOOTING WHEN THE TIMER LAMP BLINKS

## MODEL RAF-50RPA

When the timer lamp on the display section of the indoor unit blinks, refer to the following table.

Lamp blinking mode	Main defective
 2 sec.  Once	Reversing valve defective
 2 sec.  2 Times	Forced operation of outdoor unit
 2 sec.  3 Times	Indoor/Outdoor interface defective
 2 sec.  4 Times	Outdoor defective indication
 2 sec.  9 Times	Indoor sensor defective
 2 sec.  10 Times	Abnormal rotating numbers of DC fan motor (Upper)
1  2 sec.  13 Times	IC401 defective

(  ..... Lights for 0.35 sec. at interval of 0.35 sec. )

### Cautions

- (1) If the interface circuit is faulty when power is supplied, the self-diagnosis display will not be displayed.
- (2) If the indoor unit does not operate at all, check if the connecting cable is connected to the outdoor unit.
- (3) To check operation again when the timer is blinking, you can use the remote control for operation.  
(except for mode marked 1)

# LIGHTING MODE OF THE SELF-DIAGNOSIS LAMP

MODEL RAC-50FPA

## ⚠️ DANGER (DC350V)

- SWITCH OFF MAIN POWER SUPPLY TO THE OUTDOOR UNIT AT LEAST 10 MINUTES BEFORE START THE SERVICING WORK.
- DO NOT TOUCH ANY OTHER PARTS EXCEPT TEST (SERVICE) SWITCH WHEN SERVICE OPERATION IS CONDUCTED.
- MAKE SURE THE LEVEL DC VOLTAGE BETWEEN TAB3/WHT (+) AND TAB4/BLK(-) IS LESS THAN 10V.

### SELF-DIAGNOSIS LIGHTING MODE

■ LIT    ☒ BLINKING    □ OFF

LD301	LD302	LD303	SELF-DIAGNOSIS NAME	DETAILS	MAIN CHECK POINT
-------	-------	-------	---------------------	---------	------------------

#### [1] DURING OPERATION

☐ ☐ ☐	NORMAL OPERATION	COMPRESSOR OPERATION	NOT MALFUNCTION
☒ ☐ ☐	OVERLOAD (1)	<p>THIS SHOWS AN OVERLOAD, NOT MALFUNCTION.</p>	
☐ ☒ ☐	OVERLOAD (2)		
☐ ☐ ☒	OVERLOAD (3)		

UNDER OVERLOAD CONDITION, THE ROTATION SPEED IS CONTROLLED AUTOMATICALLY IN ORDER TO PROTECT THE COMPRESSOR.

#### [2] DURING STOP

☐ ☐ ☐	NORMAL STOP	INDOOR THERMOSTAT OFF. MAIN OPERATION OFF.	NOT MALFUNCTION.
☒ ☐ ☐	RESET STOP	WHEN STOPPED WITH POWER RESET. (NORMAL WHEN POWER HAS BEEN TURNED ON).	① P.W.B.s (POWER CIRCUIT, HIC, ETC)
☒ ☐ ☐	PEAK CURRENT CUT	OVER CURRENT IS DETECTED.	① COMPRESSOR    ② P.W.B.s
☒ ☐ ☐	ABNORMAL LOW SPEED ROTATION	POSITION DETECTION SIGNAL IS NOT INPUT DURING OPERATION.	① P.W.B.s    ② COMPRESSOR
☒ ☐ ☐	SWITCHING FAILURE	FAIL TO SWITCH FROM INITIAL LOW FREQUENCY SYNC. TO POSITION DETECTION SYNC.	① P.W.B.s    ② COMPRESSOR
☒ ☐ ☐	OVERLOAD LOWER LIMIT CUT	OVERLOAD CONDITION STILL PERSISTING EVEN WHEN ROTATION SPEED IS BELOW THE LOWER RPM LIMIT.	① OUTDOOR UNIT IS EXPOSED TO DIRECT SUNLIGHT OR ITS AIRFLOW BLOCKED. ② FAN MOTOR    ③ FAN MOTOR CIRCUIT ④ THE VOLTAGE IS EXTREMELY LOW.

### SELF-DIAGNOSIS LIGHTING MODE

■ LIT    ☒ BLINKING    □ OFF

LD301	LD302	LD303	SELF-DIAGNOSIS NAME	DETAILS	MAIN CHECK POINT
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#### [2] DURING STOP

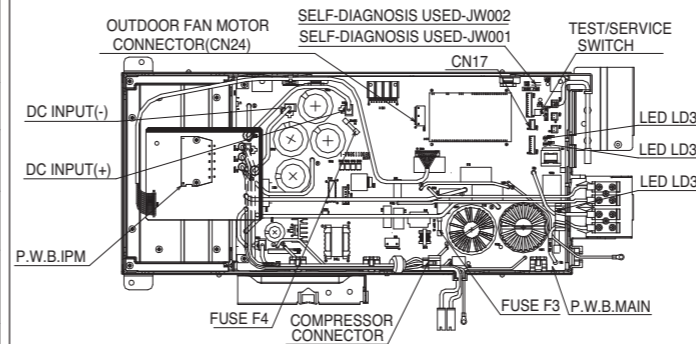
☒ ☐ ☐	6 TIMES	OH THERMISTOR TEMP. RISE	OH THERMISTOR IS OPERATING.	① LEAK OF REFRIGERANT    ② COMPRESSOR ③ OH THERMISTOR CIRCUIT ④ FAN MOTOR    ⑤ FAN MOTOR CIRCUIT
☒ ☐ ☐	7 TIMES	ABNORMAL THERMISTOR	THERMISTOR IS OPENED OR SHORTED.	① THERMISTOR ③ CONNECTION OF THERMISTOR IS FAULTY ④ THERMISTOR CIRCUIT
☒ ☐ ☐	9 TIMES	COMMUNICATION ERROR - INDOOR & OUTDOOR	WHEN INDOOR UNIT IS NOT CONNECTED, IT BLINKS SIMILARLY. NOT MALFUNCTION.	① CABLE IS WRONG CONNECTED ② CABLE IS OPEN ③ INTERFACE CIRCUIT BETWEEN INDOOR AND OUTDOOR UNIT
☒ ☐ ☐	10 TIMES	POWER SUPPLY VOLTAGE ERROR	POWER SUPPLY VOLTAGE IS INCORRECT.	① POWER SUPPLY VOLTAGE ② RECEPTACLE OF WIRE FOR P.W.B. IPM IS NOT PROPERLY INSERTED
☒ ☐ ☐	11 TIMES	FAN MOTOR OVERLOAD	FAN MOTOR LOAD TOO HEAVY OR ROTATION DISTURBED BY WIND BLOW	① FAN MOTOR ② OUTDOOR CONDITION (WIND)
☒ ☐ ☐	12 TIMES	FAN LOCK ERROR	OUTDOOR FAN RPM IS NOT ROTATE AS INTENDED RPM.	① FAN MOTOR ② FAN MOTOR CIRCUIT
☒ ☐ ☐	13 TIMES	EEPROM READING ERROR	MICROCOMPUTER CANNOT READ THE DATA IN EEPROM.	① P.W.B. MAIN
☒ ☐ ☐	14 TIMES	ACTIVE CONVERTER DEFECTIVE	OVER VOLTAGE IS DETECTED. COMPRESSOR ABNORMAL LOAD	① P.W.B.s ② COMPRESSOR
☒ ☐ ☐	15 TIMES	ACTIVE CONVERTER DEFECTIVE	ACTIVE CIRCUIT ABNORMAL	① P.W.B.s

※ EXAMPLE OF BLINKING (5 TIMES)    ☐ ☒ ☐ ☐ ☐ 2SEC ☐    (☐ .. LIGHTS FOR 0.25 SEC. AT INTERVAL OF 0.25 SEC.)

### SERVICE OPERATION

- TO COLLECT REFRIGERANT FROM INDOOR UNIT AND STORE IT AT OUTDOOR UNIT;
1. SWITCH OFF THE MAIN POWER SUPPLY AND THEN SWITCH IT ON AGAIN. WAIT FOR 1 MINUTE.
  2. PRESS AND HOLD TEST/SERVICE SWITCH FOR 1 SEC. OR MORE TO START OUTDOOR UNIT IN COOLING OPERATION. IN ORDER TO PREVENT PARTS FROM DAMAGE, DO NOT OPERATE THE OUTDOOR UNIT FOR MORE THAN 5 MINUTES.
  3. PRESS AND HOLD TEST/SERVICE SWITCH FOR 1 SEC. OR MORE TO STOP THE SERVICE OPERATION.
  4. REPEAT STEP 1 TO 3 IF SERVICE OPERATION NEED TO BE REPEATED.

### STRUCTURE OF ELECTRICAL



WHEN SELF-DIAGNOSIS BLINKS 2, 3, 4 AND 5 TIMES HAPPEN, TO DETERMINE WHETHER COMPRESSOR OR ELECTRICAL UNIT FAULTY, BELOW DIAGNOSIS CAN BE FOLLOWED.

### SELF-DIAGNOSIS METHOD

1. SWITCH OFF MAIN POWER SUPPLY.
2. SHORT CIRCUIT BETWEEN JW001 AND JW002
3. SWITCH ON MAIN POWER SUPPLY - LD302 WILL BLINK 1 TIME.
4. (WITHIN 3 MINUTES) PRESS TEST / SERVICE SWITCH FOR 1 SECOND OR MORE.
5. SELF - DIAGNOSIS RESULT WILL BE SHOWN - LD303 WILL ON (LIT) AND LD301 WILL BE BLINKING. THEN REFER SELF - DIAGNOSIS TABLE 2.
6. SWITCH OFF MAIN POWER SUPPLY. THEN RELEASE BACK JW001 AND JW002 TO ORIGINAL CONDITION (NO SHORT CIRCUIT CONDITION).

\*IF STEP NO. 6 NOT CARRIED OUT, THE SYSTEM WILL NOT OPERATE PROPERLY UNTIL 3 MINUTES HAS LAPSED AFTER RESTORE THE POWER SUPPLY.

TABLE 2 : DURING SELF-DIAGNOSIS COMPLETED

SELF-DIAGNOSIS LIGHTING MODE ■ LIT    ☒ BLINKING    □ OFF			SELF-DIAGNOSIS RESULT	REPAIR METHOD
☒ ☐ ☐	1 TIME	ELECTRICAL OK	① CHANGE COMPRESSOR	
☒ ☐ ☐	2 TIMES	PEAK CURRENT CUT OFF	① CHANGE P.W.B.s	
☒ ☐ ☐	7 TIMES	COMPRESSOR CURRENT ABNORMAL	① IF COMPRESSOR CONNECTOR LOOSE OR NG - CHECK CONNECTOR CONDITION ② IF COMPRESSOR CONNECTOR OK, - CHECK COMPRESSOR, CHANGE P.W.B.s	
☒ ☐ ☐	10 TIMES	DC VOLTAGE ABNORMAL	① IF AC VOLTAGE INPUT ABNORMAL (OVER STANDARD VOLTAGE ±10%), - FOLLOW STANDARD AC VOLTAGE INPUT ② IF AC VOLTAGE INPUT IS NORMAL (WITHIN ±10%), - CHANGE P.W.B.s	
☒ ☐ ☐	13 TIMES	EEPROM READING ERROR	① CHANGE P.W.B. MAIN	

TABLE 3 : OUTDOOR FAN MOTOR INSPECTION (SELF-DIAGNOSIS)

1. SWITCH OFF MAIN POWER SUPPLY.
2. DISCONNECT OUTDOOR FAN MOTOR CONNECTOR FROM CONNECTOR, CN24 OF P.W.B MAIN.
3. ROTATE THE OUTDOOR FAN SHAFT TO CONFIRM THE FAN MOTOR MOVEMENT EITHER NORMAL OR ABNORMAL.
4. CHECK RESISTANCE VALUE BETWEEN PIN TERMINAL AT CONNECTOR AREA. THE RESISTANCE BETWEEN PIN TERMINAL SHOULD BE WITHIN 20 TO 50 Ohm.

\*CONNECT BACK THE OUTDOOR FAN CONNECTOR ONCE FINISH DO INSPECTION.

#### OTHERS INSPECTION:




1. DIAGNOSIS FOR REVERSING VALVE OPERATION ERROR;  
- CHECK REVERSING VALVE WIRE CONNECTION EITHER WIRE BROKEN OR NOT. IF OK, CHECK FUSE F3. IF BROKEN, REPLACE FUSE OR P.W.B.s.
2. DIAGNOSIS FOR COMMUNICATION SIGNAL ERROR OR OUTDOOR NOT FUNCTIONAL;  
- CHECK WIRING CONNECTION BETWEEN INDOOR AND OUTDOOR.

## SELF-DIAGNOSIS MEMORY FUNCTION






Failure modes are stored in the nonvolatile memory of indoor unit and shall be redisplayed by remote controller.



This function is useful in checking the failure modes either during switching OFF the power or restarting the device without checking the number of indication lamp blinking. Remote controller can redisplay up to last 5 failure modes from the memory. However, failure modes which are rarely to occur are also stored in the memory which caused the numbers of failure more than 5. Thus, for some failure modes which are unable to retrieve because of remote controller limit to redisplay only 5 failure modes, it can be found by clearing up the memory first then recheck the memory content again during the visit at the customer place.

### < How to redisplay failure diagnosis >




1. Turn the circuit breaker OFF.
2. Set the remote controller to OFF condition, indicated by **OFF** on the display.
3. By pressing  (MODE) button on the remote controller, set to Cooling operation indicated by  (COOL).
4. Turn the circuit breaker ON.
5. Set the room temperature setting on the remote controller to 32°C by pressing the (TEMP  $\downarrow$  or  $\uparrow$ ) button.
6. Set the fan speed with the  (FAN SPEED) button according to the desired failure information. (Refer b the corresponding table below)

Fan speed settings for failure data

Fan Speed	Data
AUTO 	Newest
HI 	Second newest
MED 	Third newest
LOW 	Fourth newest
SILENT 	Oldest


7. While directing the remote controller towards the receiver of the indoor unit, press (TEMP  $\uparrow$ ) button and  (START/STOP) button simultaneously. (The remote controller perform signal transmission with the device.)
8. The device beeps [Pi-] to indicate that it has just received the signal to redisplay the failure mode.
9. Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press the  (INFO) button. Wait for 2 seconds for signal transmission. An error code will be displayed on the remote controller display.

### < How to clear the troubleshooting data >

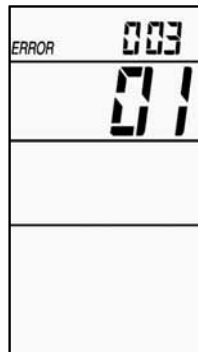
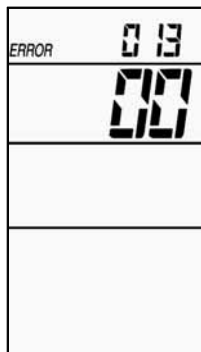
1. Redisplay the troubleshooting status. (See the above procedure.)
2. Turn the circuit breaker OFF.
3. By pressing  (MODE) button on the remote controller, set to Heating operation indicated by  (HEAT).
4. Turn the circuit breaker ON.
5. Set the room temperature setting on the remote controller to 16°C by pressing the (TEMP  $\downarrow$  or  $\uparrow$ ) button.
6. While directing the remote controller towards the receiver of the indoor unit, press (TEMP  $\downarrow$ ) button and  (START/STOP) button simultaneously. (The remote controller perform signal transmission with the device.)
7. The product beeps for a second [Pi-] to indicated that it has just received the signal. The data has now been cleared.

### < How to display error code in case of failure just occurs >

If timer lamp  of the indoor unit blinking and operation stops, please perform below procedures.

1. Direct the remote controller towards the receiver of indoor unit (within 2m in front of the indoor unit) and press  (INFO) button.
2. Wait for 2 seconds for signal transmission.
3. Indication of error code will be shown on the remote controller display for 10 seconds.

For example :



	TIMER LAMP BLINKING	LD301 BLINKING	CODE	MEANING	DETAILS	MAIN CHECK POINT
INDOOR	-	-	000 00	Normal		
	1 time	-	001 00	Refrigerant cycle fault	When the indoor heat exchanger temperature is too low in the heating mode or it is too high in the cooling mode.	1. Reversing valve defective 2. Heat exchanger thermistor disconnected. (only in heating mode)
	2 times	-	-	Outdoor unit is under forced operation.	It is not failure. Outdoor unit is in forced operation or balancing operation after forced operation.	1. Electrical parts in the outdoor unit.
	3 times	-	003 00	Communication error between indoor and outdoor units.	Interface signal from the outdoor unit is interrupted.	1. Indoor interface circuit 2. Outdoor interface circuit
	9 times	-	009 00	Indoor thermistor	Room thermistor or heat exchanger thermistor is opened circuit or short circuit.	1. Room thermistor 2. Heat exchanger thermistor
	10 times	-	010 00	Abnormal rotating numbers of DC fan motor	Overcurrent is detected at the DC fan motor of the indoor unit.	1. Indoor interface circuit 2. Outdoor interface circuit 3. Indoor control P.W.B
	13 times	-	013 00	IC401 data reading error	When data read from IC401 or IC402 is incorrect.	1. IC401 or IC402 abnormal
OUTDOOR	4 times	2 times	002 01	Peak current cut	Over current is detected.	1.Compressor 2. P.W.B.s
	4 times	3 times	003 01	Compressor abnormal low speed rotation	Position detection signal is not input during operation.	1. P.W.B.s 2.Compressor
	4 times	4 times	004 01	Compressor switching failure	Fail to switch from initial low frequency sync to position detection sync.	1. P.W.B.s 2.Compressor
	4 times	5 times	005 01	Overload lower limit cut	Overload condition still persisting even when rotation speed is below the lower rpm limit.	1. Outdoor unit is exposed to direct sunlight or its air flow blocked. 2. Fan motor 3. Fan motor circuit 4. The voltage is extremely low.
	-	6 times	006 01	OH thermistor temperature rise	OH thermistor is operating.	1. Leak of refrigerant 2. Compressor 3. OH thermistor circuit 4. Fan motor 5. Fan motor circuit
	4 times	7 times	007 01	Abnormal outdoor thermistor	Thermistor is opened or shorted.	1. Thermistor 2. Connection of thermistor is faulty 3. Thermistor circuit
	4 times	8 times	008 01	Acceleration defective		
	-	9 times	009 01	Communication error	When indoor unit is not connected, it blinks similarly, not malfunction.	1. Cable is wrong connected 2. Cable is open 3. Interface circuit between indoor and outdoor unit
	-	10 times	010 01	Abnormal power source	Power supply voltage is incorrect.	1. Power supply voltage 2. Receptacle of wire for P.W.B.IPM is not properly inserted
	-	11 times	011 01	Fan stop for strong wind	Fan motor load is too heavy or rotation disturbed by wind blow.	1. Fan motor 2. Outdoor condition (wind)
	4 times	12 times	012 01	Fan motor fault	Outdoor fan rpm is not rotate as intended rpm.	1. Fan motor 2. Fan motor circuit
	4 times	13 times	013 01	EEPROM reading error	Microcomputer cannot read the data in EEPROM.	1. P.W.B main
	4 times	14 times	014 01	Active converter defective	Over voltage is detected, compressor abnormal load.	1. P.W.B.s 2. Compressor
	4 times	15 times	015 01	Abnormal PWB circuit	Active circuit abnormal.	1. P.W.B.s
	-	16 times	016 01	Software peak current cut		

< Cautions >

This function is effective only once immediately after the power is turned on. It will not work if you have performed another remote control operation beforehand. Note also that it may not function in response to a procedure other than the above. (If it does not work, turn off the power, turn it back on and repeat the procedure.)

If the memory stores nothing, performing a redisplay operation will not blink the lamp.

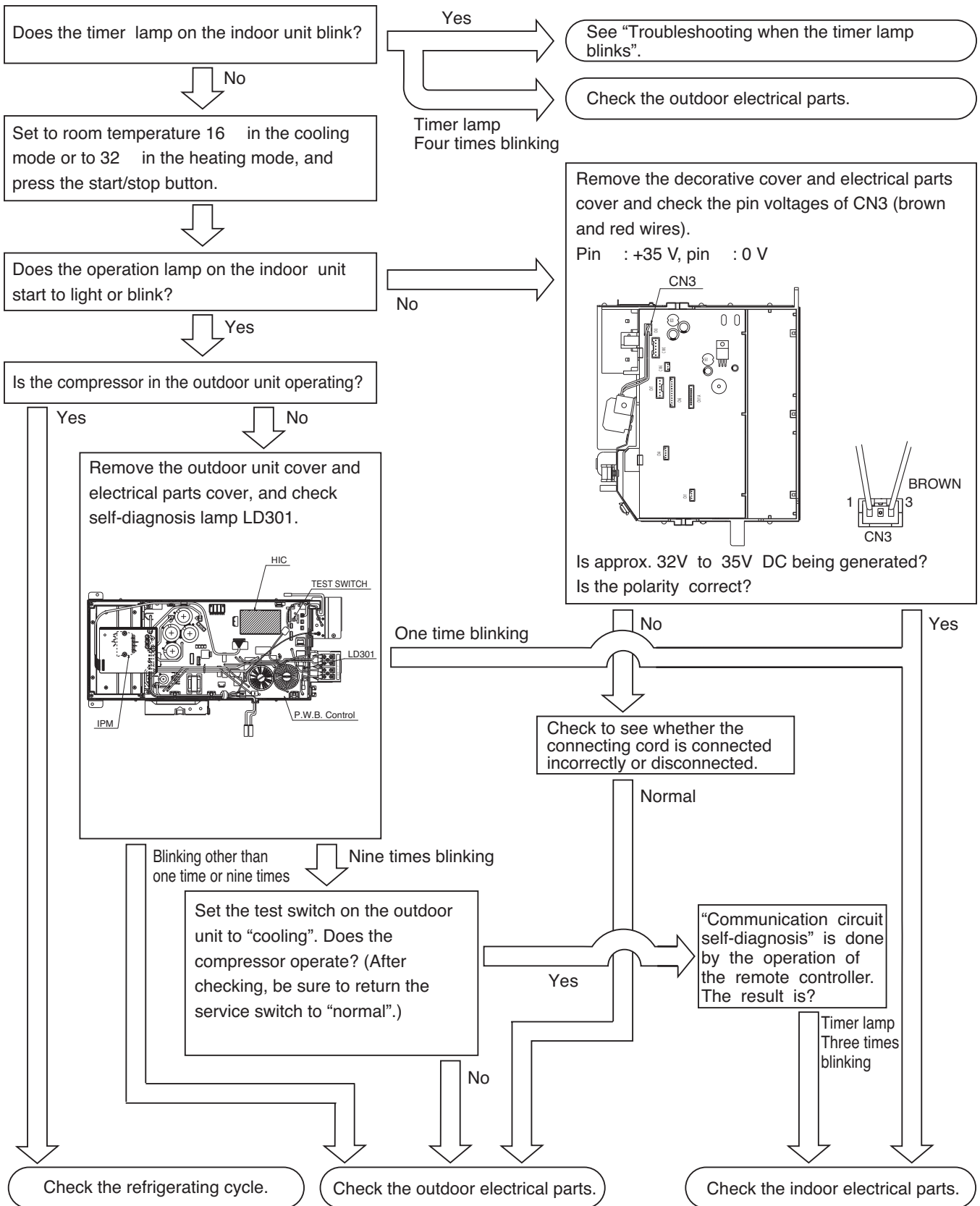
For a normal operation, turn off the power and turn it back on. After the above operation, the product will not receive a remote control signal normally.

After clearing the troubleshooting data, turn off the power. (If you do not turn off the power, the product will become unresponsive to remote control signals.)



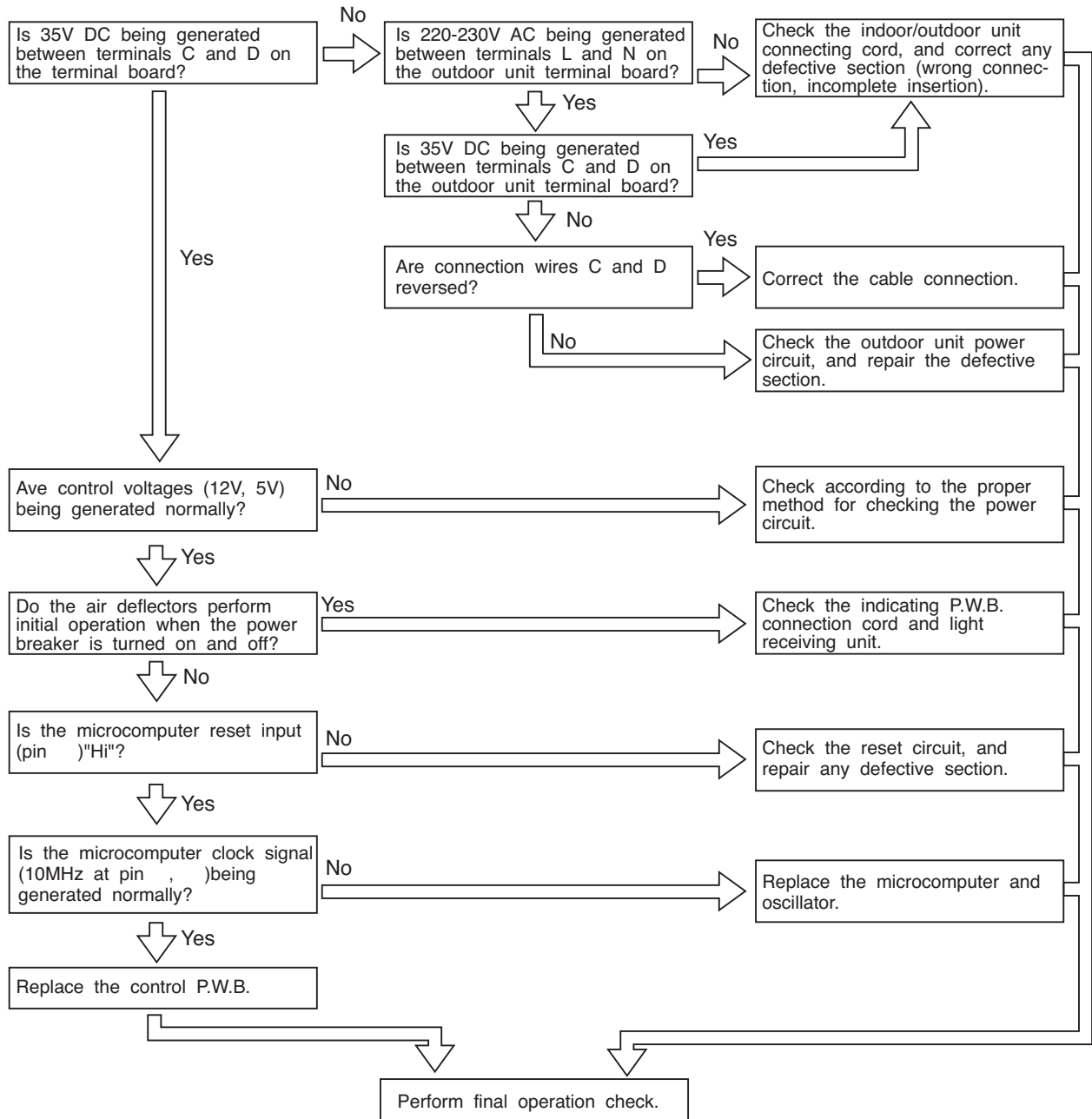
# CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

MODEL RAF-50RPA/RAC-50FPA



# CHECKING THE INDOOR UNIT ELECTRICAL PARTS

## 1. Power does not come on (no operation)



2. Outdoor unit does not operate (but receives remote infrared signal)

Set room temperature 16 in the cooling mode or to 32 in the heating mode, and press the start/stop button.



Remove the outdoor unit cover and electrical parts cover, and check self-diagnosis lamp LD301.

Does LD301 blink one time?  
Repeats 0.25-second on and 2-second off.



Check the room temperature thermistor, if it is defective, replace it.  
<normal values>  
10 approx. 20kΩ  
25 approx. 10kΩ  
30 approx. 8 kΩ

Check the heat exchanger thermistor, if it is defective, replace it.  
<normal values>  
10 approx. 20kΩ  
25 approx. 10kΩ  
30 approx. 8 kΩ



Does outdoor electrical part LD301 blink nine times?

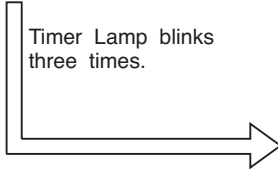


"Communication circuit self-diagnosis" is done by the operation of the remote controller.  
As for the diagnosis result?

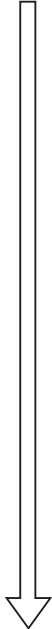
Timer lamp blinks nine times.



Check outdoor electrical parts, and repair any defective parts (around the outdoor interface transmitting circuit).



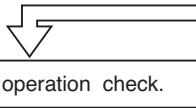
Check indoor electrical parts, and repair any defective parts (around the indoor interface transmitting circuit).



Does LD303 switch off several seconds after it lights?

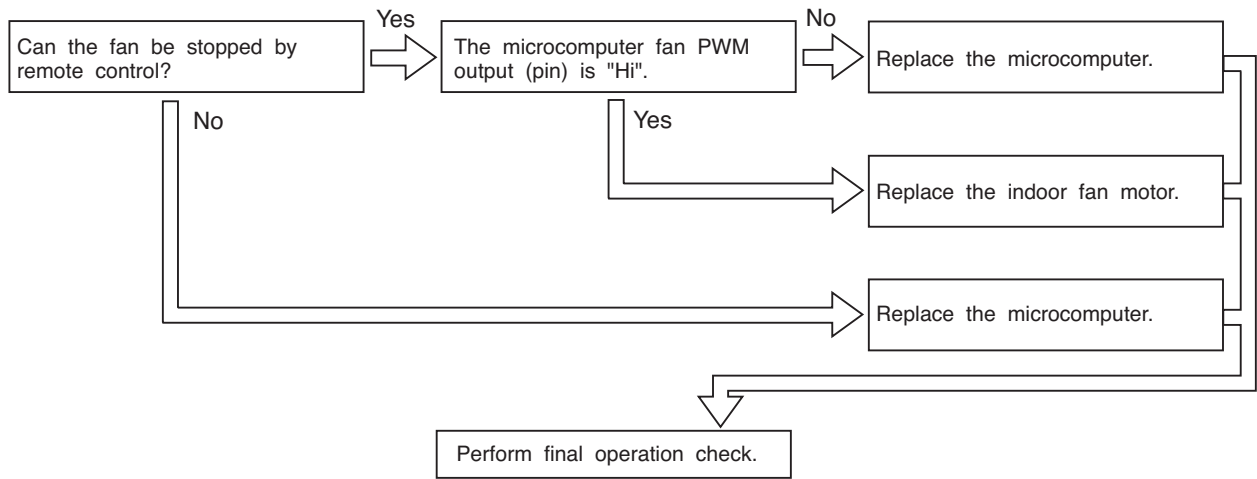


Check outdoor electrical parts, and repair any defective parts.

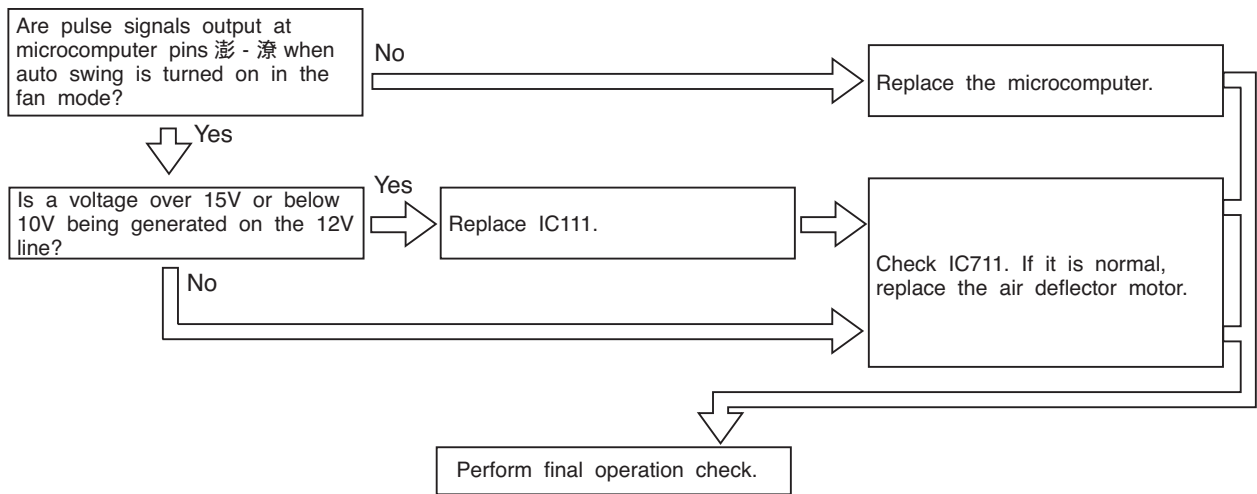


Perform final operation check.

3. Indoor fan speed does not change (others are normal)

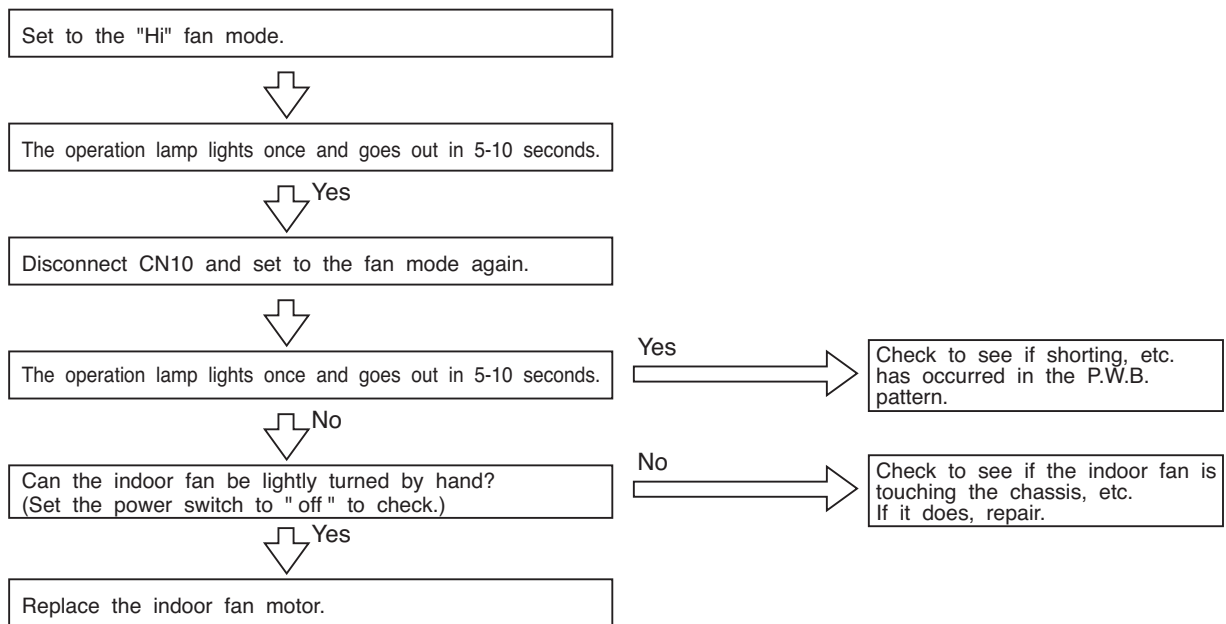


4. Air deflector does not move (others are normal)

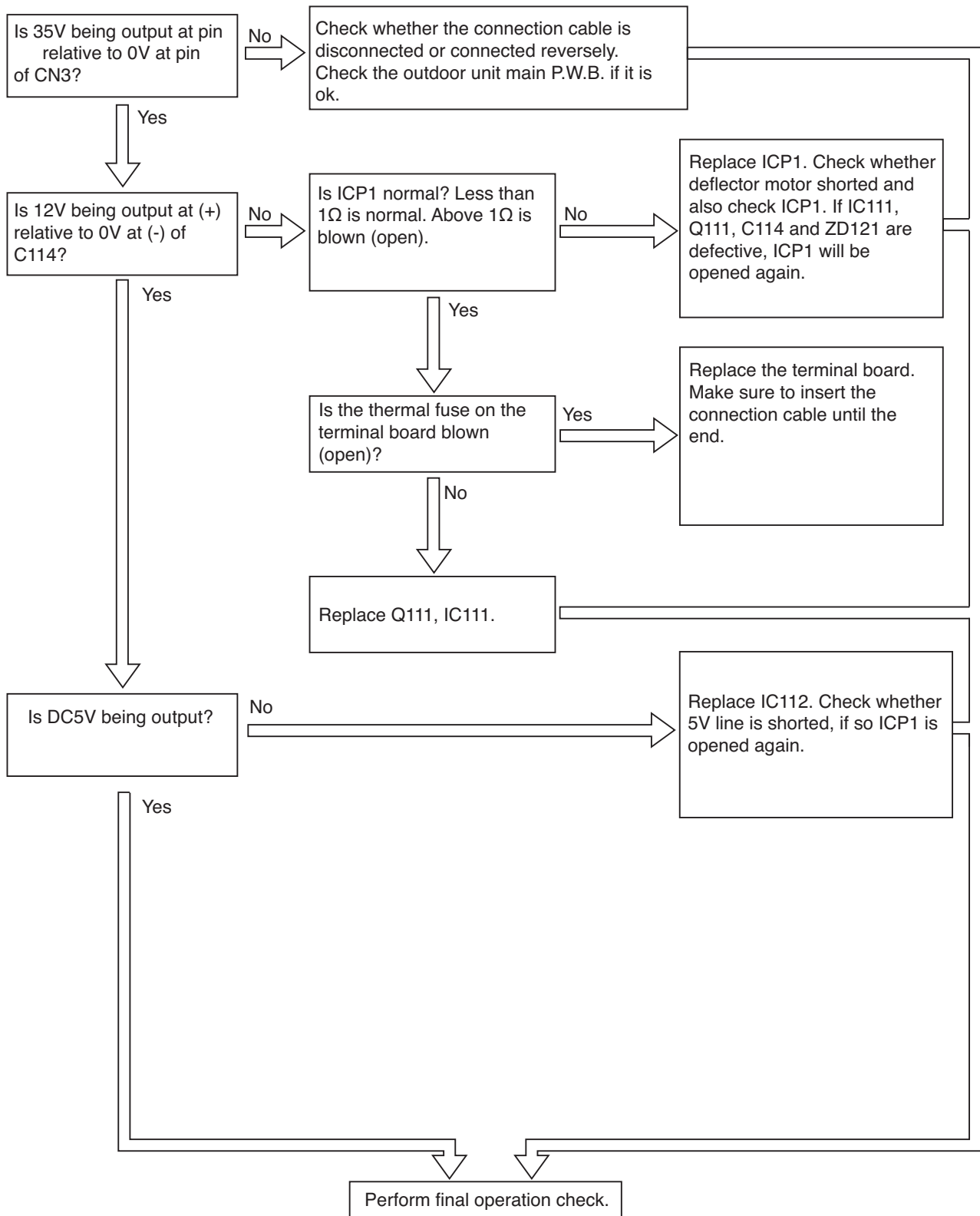


5. All systems stop from several seconds minutes to several after operation is started

(all indicators are also off)



6. Checking the main P.W.B (power circuit)



## Self Diagnosis Memory Function

Defective modes stored in the non-volatile memory of the indoor unit are re-indicated by the remote controller operation. This is useful to check the defective mode when switching OFF the power or restarting the unit operation without checking the number of blinking of the defective indication lamp. (The defective mode which occurred the last is memorized.)

Defective modes of which occurrence frequency is too low to indicate on the indoor unit are also stored in the memory, thus defective phenomenon which was not checked at the visit can be found by clearing the memory and rechecking the memory contents later on.

Re-indication method for defective mode .

1. Turn the circuit breaker OFF and set the remote controller STOP position.  
(No indication status.)
2. Turn the circuit breaker ON.
3. Set the remote controller COOL, and to be set 32 and press the [ ① ] button while pressing the [ ] of temperature buttons. ⇒ Transmission
4. The main unit makes the receiving sound [ Pi- ] and becomes the defective indication mode. (Timer lamp goes on and off, but if the unit has no memory, the indication is not shown.)
5. Finish after turning the circuit breaker OFF. (Please turn OFF once without fail.)

Clear method for data of defective mode.

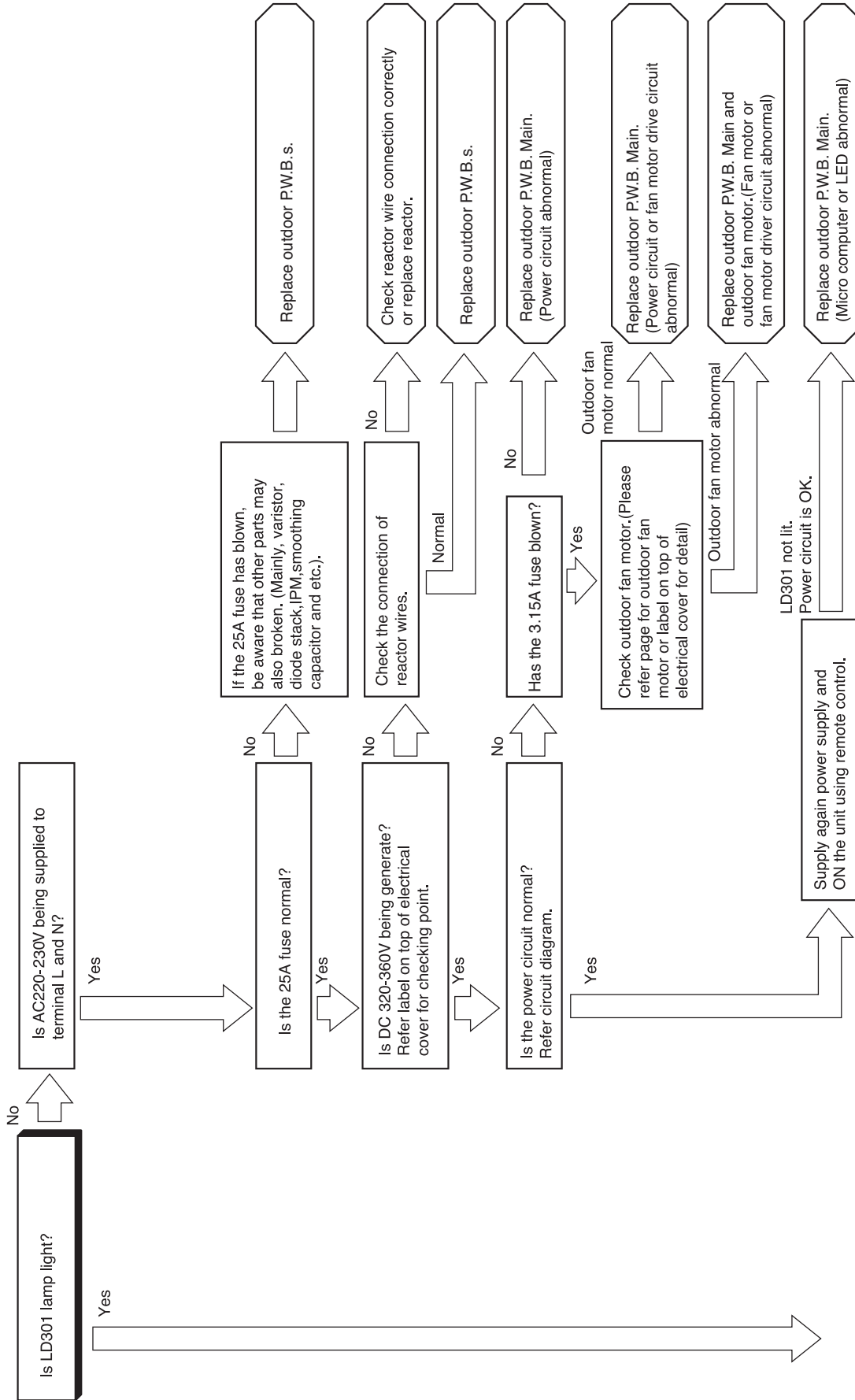
1. Proceed the re-indication of defective mode. (proceed without fail, after having the re-indication, do not operate the remote controller except for indicated ones.)
2. Turn the circuit breaker OFF. (Continue OFF more than 5 seconds.)
3. Turn the circuit breaker ON.
4. Set the remote controller HEAT and to be set 16 and press the [ ① ] button. while pressing the [ ] of temperature buttons. ⇒ Transmission.
5. Finish the clear after having the receiving sound [ Pii- ] of one second.
6. Turn the circuit breaker OFF and finish. ( Please turn OFF once without fail.)

### Notes

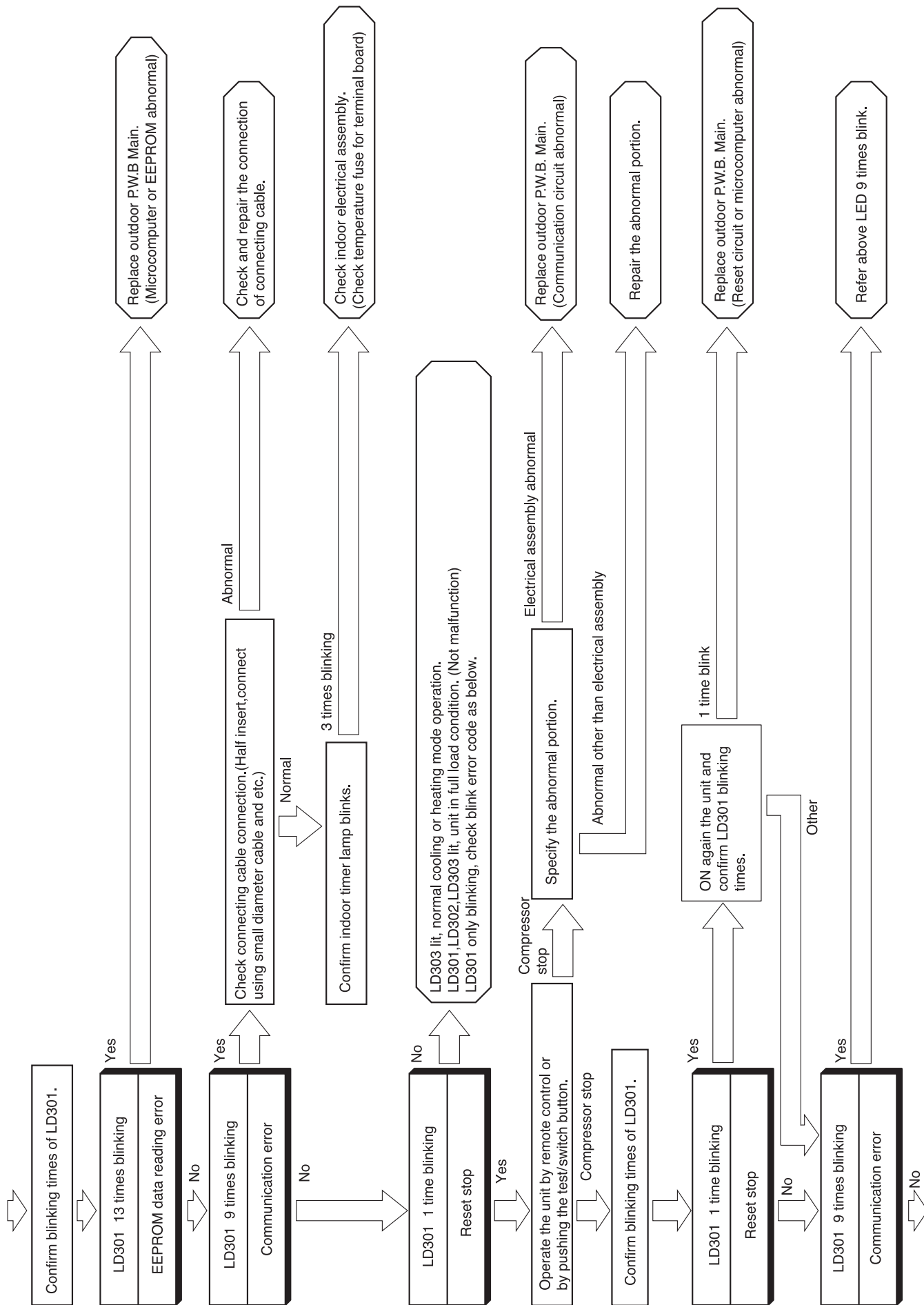
- This function is valid only once right after switching ON the power and does not work if other remote controller operation was made prior to it.  
Take note that this function may not work when not following the above procedures.  
(If it does not work, switch OFF the power and try again.)
- If nothing is stored in the memory, the lamp does not blink even if re-indication operation is carried out.
- After carrying out re-indication operation, the remote controller operation will not be accepted once the data has been cleared. To carry out normal operation, switch OFF the power beforehand.

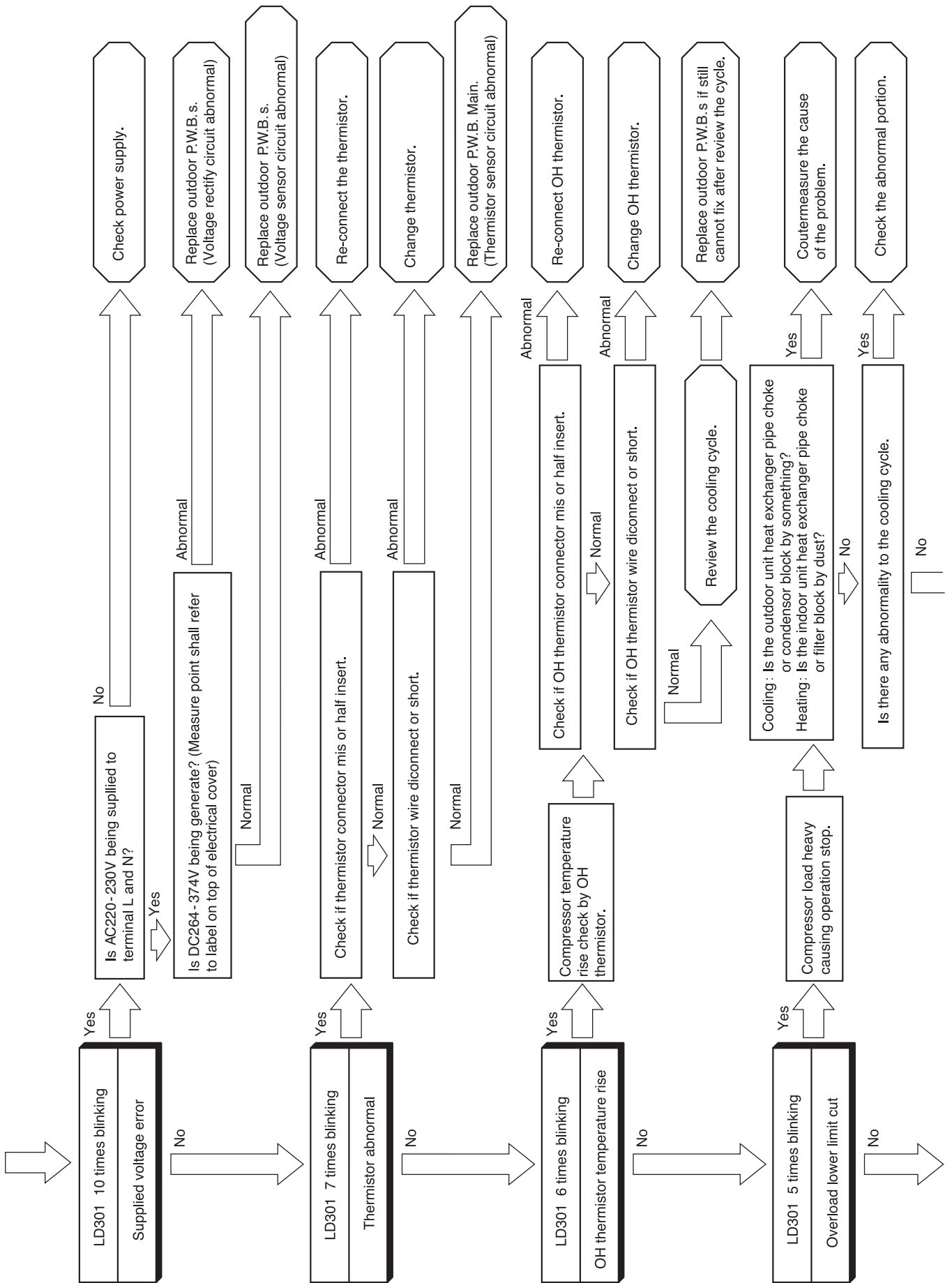
# CHECKING THE OUTDOOR UNIT ELECTRICAL PARTS

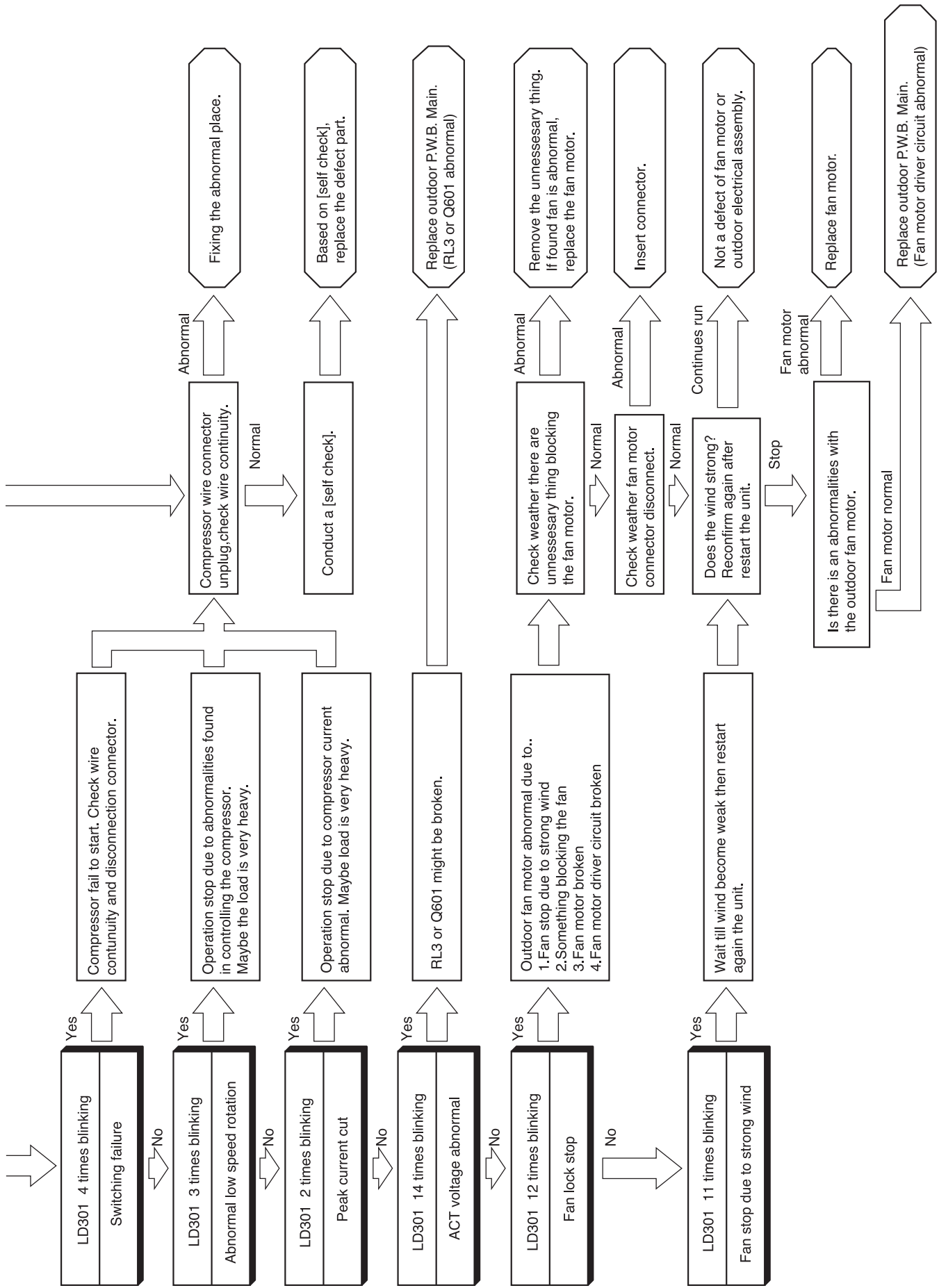
MODEL RAC-50FPA











# SELF CHECK

When self-diagnosis lamp blinks 2,3,4 and 5 times happen, to determine whether compressor faulty or electrical unit faulty, please conduct a SELF CHECK as below.

1. Switch OFF main power supply.
2. Short circuit between JW001 and JW002.
3. Switch ON main power supply – LD302 will blink 1 time.
4. (Within 3 minutes) Press Test/ Switch for 1 second or more.
5. Self-diagnosis result will be shown – LD303 will ON (LIT) and LD301 will be blinking. Then refer to diagnosis table 2.
6. Switch OFF main power supply. Then release back JW001 and JW002 to original condition (no short circuit condition).

If step No. 6 is not carried out, the system will not operate properly until 3 minutes has lapsed after restore the power supply.

## SELF CHECK diagnosis result

SELF-DIAGNOSIS LIGHTING MODE			<input checked="" type="checkbox"/> LIT	<input checked="" type="checkbox"/> BLINKING	<input type="checkbox"/> OFF
LD301	LD302	LD303	SELF-DIAGNOSIS RESULT		REPAIR METHOD
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ELECTRICAL OK		① CHANGE COMPRESSOR
1 TIME					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	PEAK CURRENT CUT OFF		① CHANGE P.W.B.s
2 TIMES					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	COMPRESSOR CURRENT ABNORMAL		① IF COMPRESSOR CONNECTOR LOOSE OR NG - CHECK CONNECTOR CONDITION ② IF COMPRESSOR CONNECTOR OK, - CHECK COMPRESSOR, CHANGE P.W.B.s
7 TIMES					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DC VOLTAGE ABNORMAL		① IF AC VOLTAGE INPUT ABNORMAL (OVER STANDARD VOLTAGE $\pm 10\%$ ), - FOLLOW STANDARD AC VOLTAGE INPUT ② IF AC VOLTAGE INPUT IS NORMAL (WITHIN $\pm 10\%$ ), - CHANGE P.W.B.s
10 TIMES					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EEPROM READING ERROR		① CHANGE P.W.B. MAIN
13 TIMES					

In case abnormalities found in measurement result, change the defect part.

In case electrical is normal and before it can be use, modify back

**JW001 and JW002 as normal condition (before conduct a self check).**

In case of service person forgot to release JW001 and JW002 to original condition;

### Case 1:

If main power supply continuously ON, outdoor microcomputer will keep showing diagnosis result (LD303 will ON and LD301 will blinks).

### Case 2:

If main power supply OFF at once, then switch ON again:

- a) Outdoor microcomputer will wait the self check command (by pressing test/service switch) within 3 minutes (LD302 blinks 1 time).

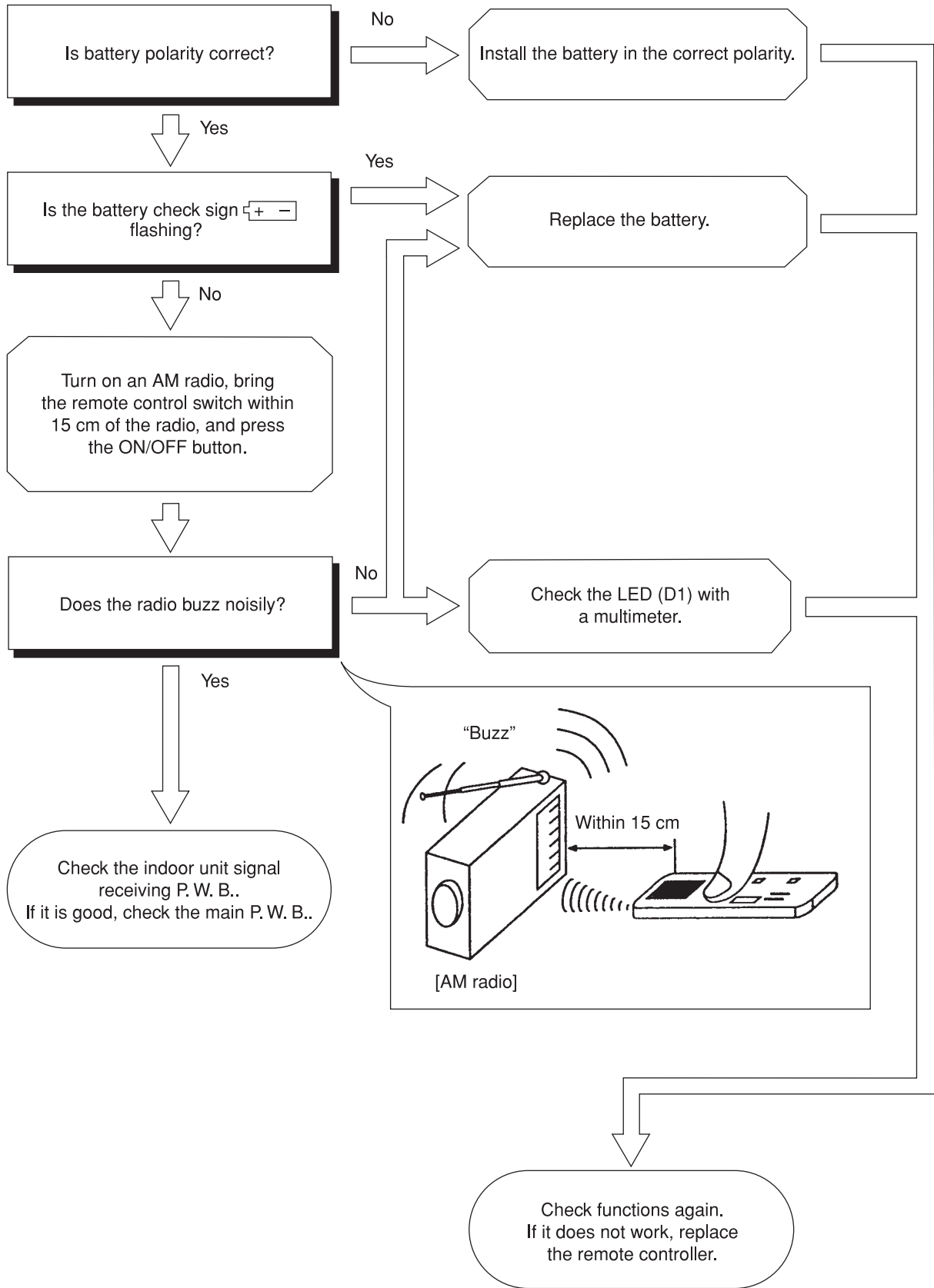
If test/service signal input is not received, unit will return to normal operation mode after this 3 minutes has lapsed. (LD302 OFF and LD301 blinks 1 time).

### Case 3:

If main power supply OFF at once, then switch ON again and on indoor unit by remote control;

- a) Indoor unit will receive remote control signal and send signal to outdoor unit. For the first 3 minutes, outdoor microcomputer will ignore this indoor signal (LD302 blinks 1 time).
- b) After 3 minutes has lapsed (LD302 OFF and LD301 blinks 1 time), unit will return to normal operation mode.

# CHECKING THE REMOTE CONTROLLER



## HOW TO CHANGE THE SHIFT VALUE SETTING TEMPERATURE

The shift value setting temperature for Cooling and Heating mode operation can be changed using the remote controller. (This procedure shall be implemented strictly by service personnel only.)

(For initial shift value temperature setting for Cooling mode (SHIFTC) and Heating operation mode (SHIFTW) : Please refer to page 36)

### PROCEDURES

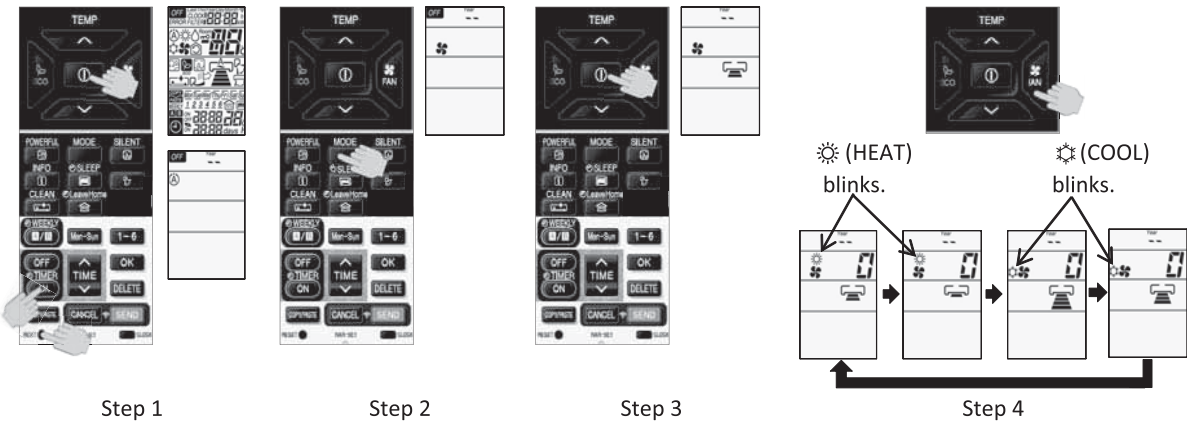
1. While pressing and holding  $\odot$  (START/STOP) button and  $\text{ON}$  button, press  $\text{RESET}$  [RESET] button on the same. Release  $\text{RESET}$  [RESET] button only and make sure that all marks on the remote controller display are indicated, then release the  $\odot$  (START/STOP) button and  $\text{ON}$  button. Remote controller now enters "Shift Value Change Mode".

2. Press the  $\square$  (MODE) selector button so that the display indicates  $\text{FAN}$  mode.

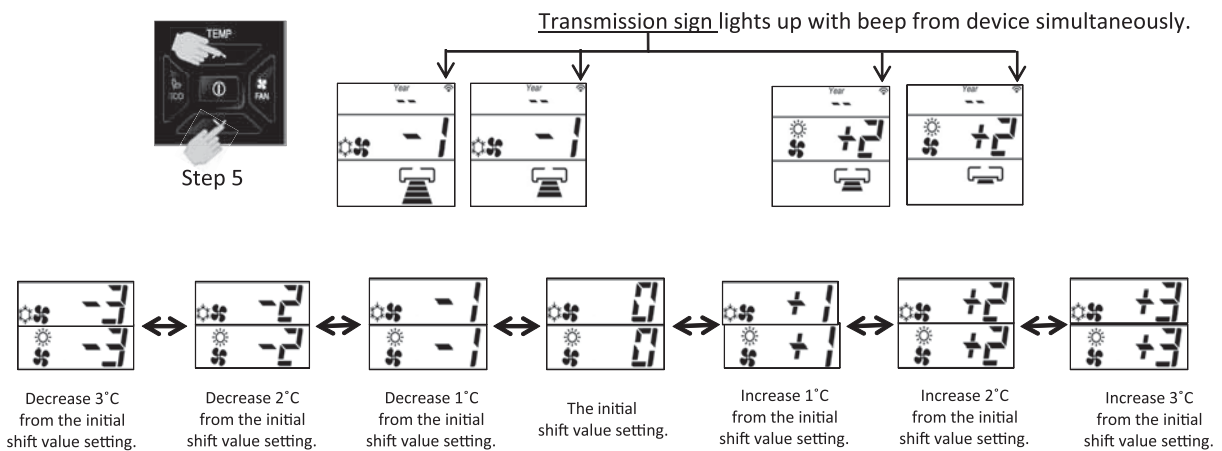
3. Press the  $\odot$  (START/STOP) button and FAN operation will be started.

4. Set the FAN SPEED with the  $\text{FAN}$  (FAN SPEED) button according to the following FAN speed setting in order to choose the desired operation mode that is required for shift value setting temperature modification.

- To change the shift value for COOLING mode operation, select either  $\text{HIGH}$  or  $\text{MED}$  FAN SPEED.
- To change the shift value for HEATING mode operation, select either  $\text{LOW}$  or  $\text{SILENT}$  FAN SPEED.



5. Press the (TEMP  $\vee$  or  $\wedge$ ) button to change the shift value. (The shift value changed with device beep sound.)



### NOTE :

- (1) The displayed shift value,  $\text{HEAT}$  and  $\text{COOL}$  symbol on the remote controller display will disappear after 10 seconds.
- (2) The changed shift value will remain unchanged after turned off the power.
- (3) If "0" is displayed on the remote controller display, it indicates the shift value is now at the initial setting.

## SETTING THE PREVENTION OF MUTUAL INTERFERENCE FOR REMOTE CONTROLLER

( Applicable for Remote controller model : RAR-5E1, RAR-5E2, RAR-5E3, RAR-5E4 and RAR-5E5 )

Case : 2 sets of indoor units installed near to each other.

If both indoor units can receive the same remote controller signal, please set the remote controller as below. ( This setting will change the signal address of each remote controller.)

Initial remote controller signal address setting is **A**.

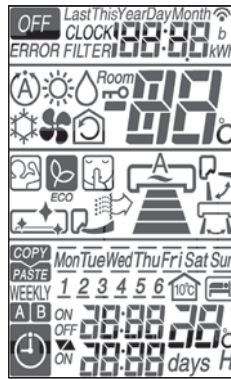
This procedure change the remote controller signal address from **A** to **B**.

1. The circuit breaker for the other unit shall be OFF.



2. Slide the remote controller cover to take it off.

3. While directing the remote controller towards the receiver of the indoor unit, press **1-6** button, **ON** (ON TIMER) button and **RESET** (RESET) button simultaneously. (The remote controller perform signal transmission with the device.)



Signal transmission : From A to B



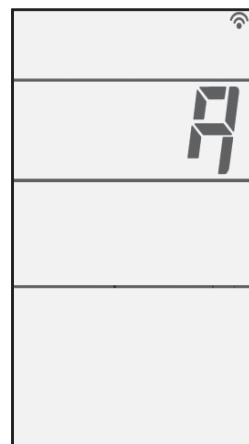
4. The indoor unit beeps [Pip] to indicate that it has just received the signal from remote controller.



5. Please check the usability of each set of indoor unit using its own remote controller.

**Note :** If indoor unit still not receive the correct signal from the correct remote controller, setting shall be made again.  
By setting again for the 2nd time, the signal address will change from **B** to **A**. I hen, it repeat again for the 3rd time, the remote controller signal address will change from **A** to **B**.  
Please set the DIP switch No.6 to ON accordingly (Refer to page 57).

Signal transmission : From B to A









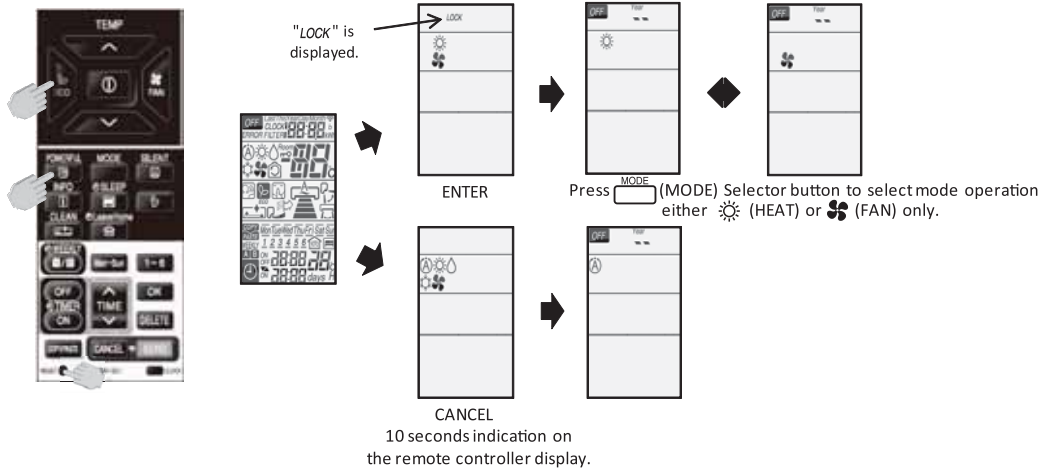
# OPERATION MODE LOCK SETTING

If Dip switch position is set at "Heating mode only" or "Cooling mode only" as mentioned on page 57, it is required to set the remote controller into operation mode lock setting. Without setting the remote controller, it will caused unmatch signal transmission between indoor unit and remote controller.







**PROCEDURE**

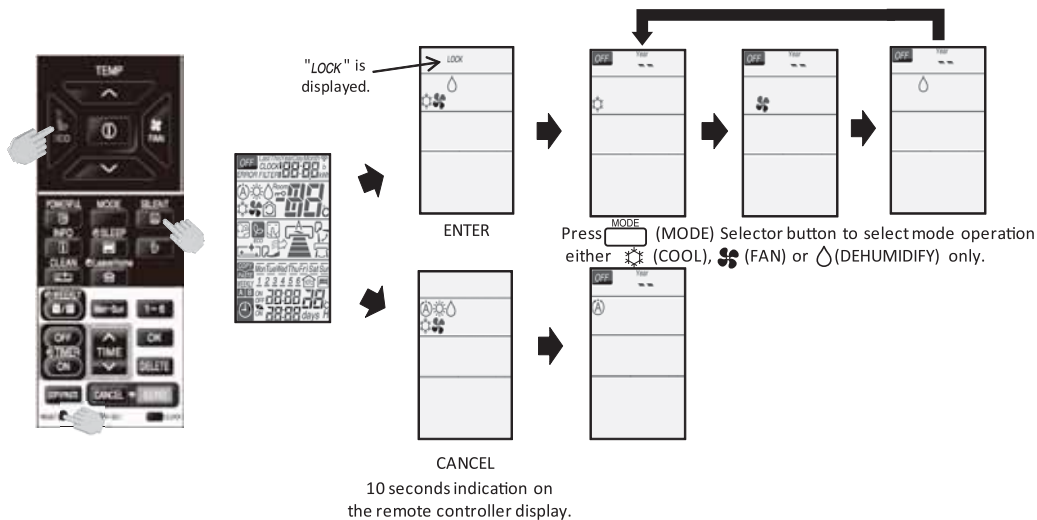
**1. Heating operation mode lock setting**

- (a) While pressing and holding  (ECO) button and  (POWERFUL) button, press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the remote controller display are indicated, then release the  (ECO) button and  (POWERFUL) button. Remote controller now enters "Heating operation mode lock".
- (b) To cancel the "Heating operation mode lock", repeat the above procedure (1(a)).








**2. Cooling operation mode lock setting**

- (a) While pressing and holding  (ECO) button and  (SILENT) button, press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the remote controller display are indicated, then release the  (ECO) button and  (SILENT) button. Remote controller now enters "Cooling operation mode lock".
- (b) To cancel the "Cooling operation mode lock", repeat the above procedure (2(a)).



**NOTE :**









- (1) The indication of " LOCK " and ("  " (HEAT), "  " (COOL), "  " (FAN) or "  " (DEHUMIDIFY)) mode operation symbol on the remote controller display will disappear after 10 seconds and it will enters to OFF condition indicated by  on the display.
- (2) The OPERATION MODE LOCK setting will remain in the remote controller memory eventhough the remote controller is ran out of battery.

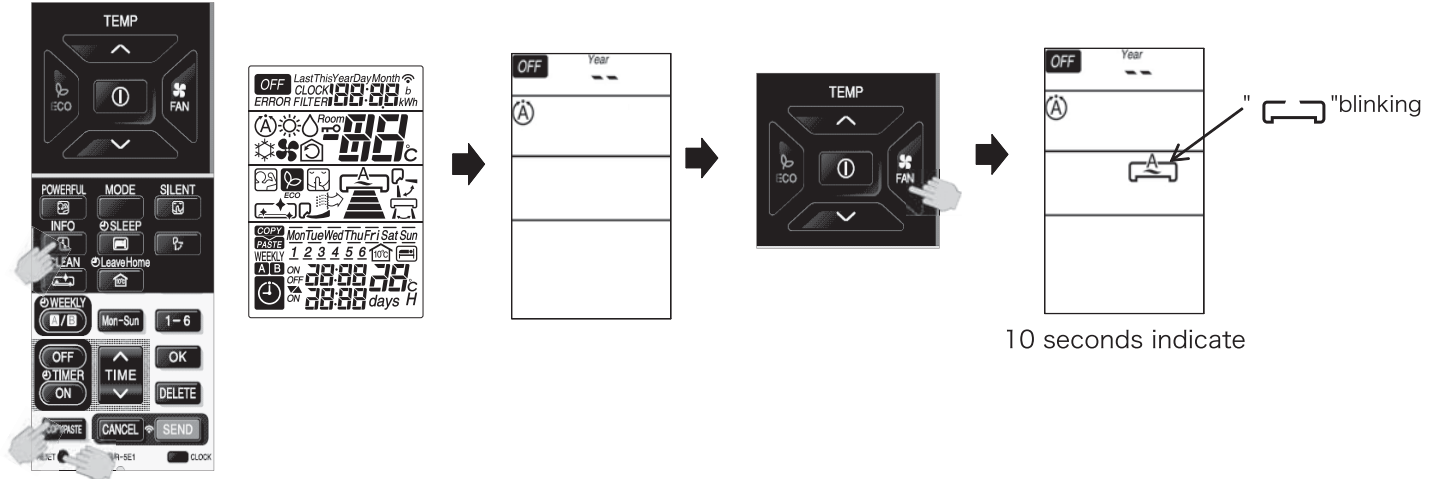




# DISPLAY OPERATION MODE SETTING

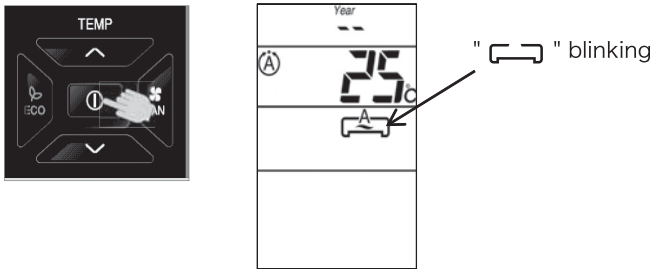
For operating indoor unit independently (without outdoor unit connection), remote controller has to be set according to below procedures before send the signal to the indoor unit. New communication format between indoor and outdoor is required to communicate with outdoor unit.

## PROCEDURE

1. While pressing and holding  (INFO) button and  (COPY/PASTE) button, press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the LCD display are indicated, then release the  (INFO) button and  (COPY/PASTE) button. Remote controller now enters "DISPLAY OPERATION MODE" for the indoor unit to run independently. Please ensure that when pressing  (FAN) button, "" will blinking.



2. Press the  (MODE) selector button to choose the desired operation mode.
3. Press  (START/STOP) button. Then, the indoor unit will starts to operate independently accoring the selected operation mode.



## NOTE :

- (1) During "DISPLAY OPERATION MODE", "" blinks on LCD of remote controller.
- (2) When operation stops, "DISPLAY OPERATION MODE" is canceled.

# CHECKING THE REFRIGERATING CYCLE

(JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

Connect U,V,W phase leads to the power module again and operate the air conditioner.



Is the self-diagnosis lamp mode as shown on the right?

Lighting mode Self-diagnosis Lamp	Blinks 2 times	Blinks 3 times	Blinks 4 times	Blinks 5 times	Blinks 6 times	Blinks 8 times
LD301						
Time until the lamp lights	Approx. 10 seconds			Approx. 10 seconds	Within approx. 30 minutes	Approx. 10 seconds
Possible malfunctioning part	Compressor				Gas leakage	Compressor

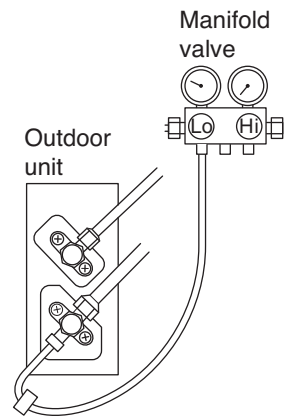
Blinking  Off

YES



Stop to operate and check the gas pressure in balancing mode.

Outdoor air temperature (°C)	Charge port pressure Mpa(G) { kgf/cm <sup>2</sup> (G) }
50	2.96 { 30.14 }
45	2.62 { 26.72 }
40	2.31 { 23.58 }
35	2.03 { 20.73 }
30	1.78 { 18.14 }
25	1.55 { 15.79 }
20	1.34 { 13.66 }
15	1.15 { 11.74 }
10	0.98 { 10.02 }
5	0.83 { 8.48 }
0	0.70 { 7.10 }
-5	0.58 { 5.89 }
-10	0.47 { 4.81 }

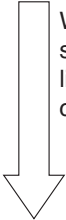


Normal



Checking the power module.

When the self-diagnosis lamp lights in the same condition as above.



The compressor is defective. Replace it and seal refrigerant.  
( If the compressor checker for an inverter type air conditioner is available, re-check using it. )

( R410A )

The values above are the theoretical ones.

Gas leaking



Gas leaks.  
Repair and seal refrigerant.



Perform a final check of operation.

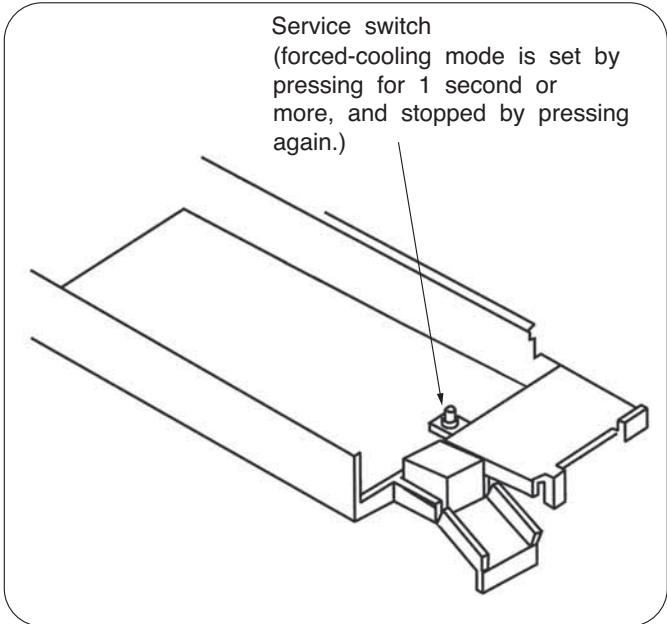
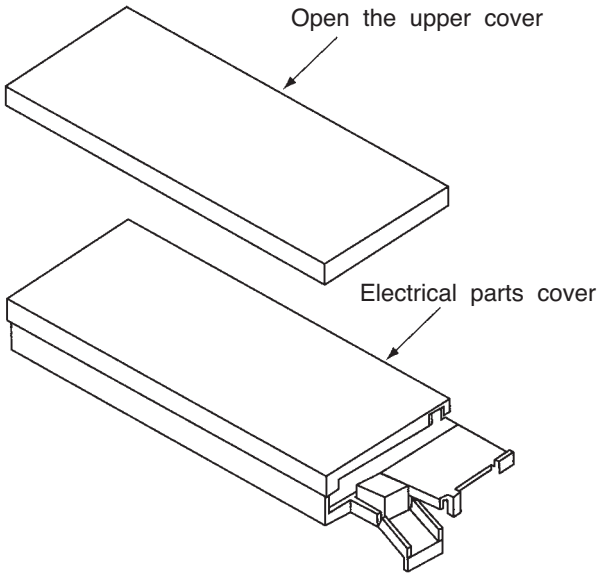
# HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

MODEL RAC-50FPA

1. Turn the power switch off and then turn on again.
2. Remove the electrical parts cover.

LD303 (red) will light and the unit will operate in the forced cooling mode at this time.

Never operate the unit in this state for more than 5 minutes.



**(Cautions)**

- (1) If interface signal (35V DC) terminals C and D are not connected when the outdoor unit service switch is used for checking, the outdoor unit defect indicator (LD301) will blink 9 times after operation to indicate communication error.
- (2) If checking is done with the compressor connector disconnected, the unit will continue normal operation when the electrical parts are normal, or it will repeat operating for approx. one minute and stop due to overload power limit cut, or it will operate in the overload status.

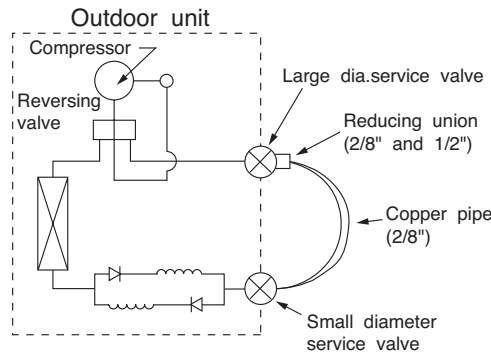
Be sure to return the service switch to "normal" after checking with service operation is completed.

## HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

1. Connect the large dia. pipe side and small dia. pipe side service valves using a pipe.

Connect the small diameter service valve and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming ( 1 )



**Parts to be prepared**

- (1) Reducing union  
2/8" (6.35mm)  
1/2" (12.7mm)
- (2) Copper pipe (2/8" and 1/2")
- (3) Shorting leads  
2 leads approx. 10 cm long with alligator clip or IC clip

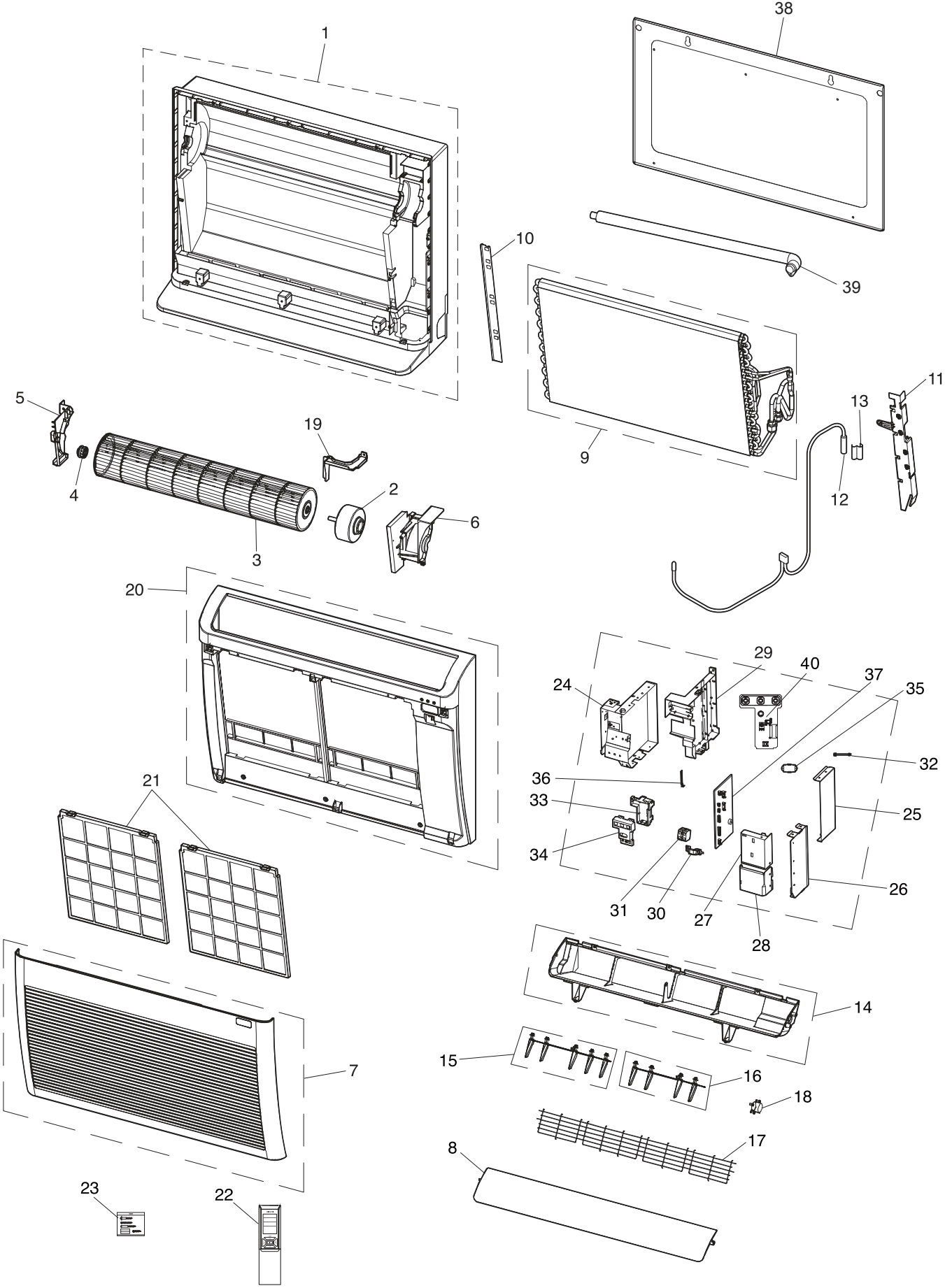
Do not operate for 5 minutes or more.

The operation method is the same as "How to operate using the connector to servicing the outdoor unit".

- 1 The charging amount of 300g is equivalent to the load in normal operation.

# PARTS LIST AND DIAGRAM

## INDOOR UNIT MODEL: RAF-50RPA

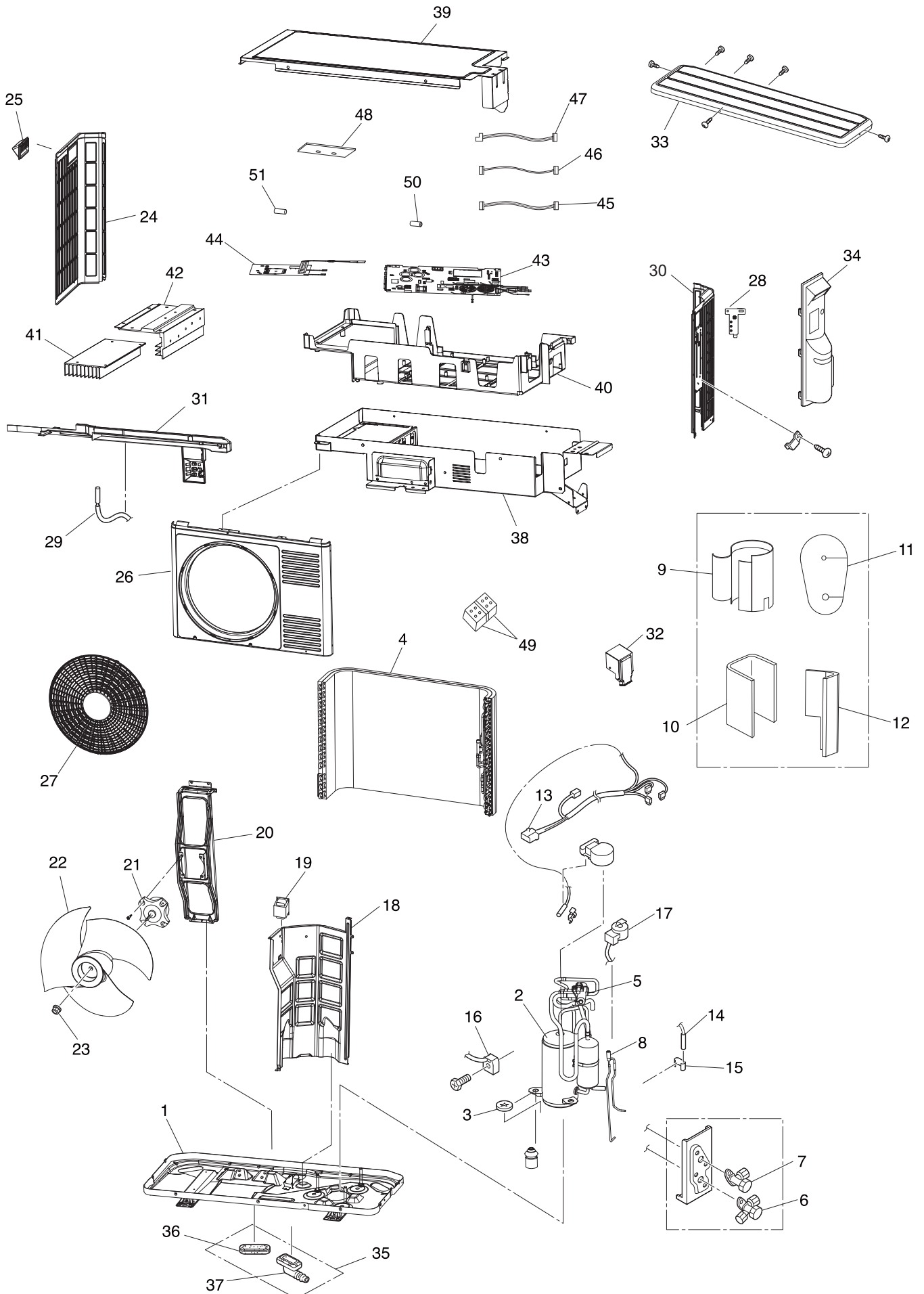


MODEL RAF-50RPA

NO	HHAW PARTS NO	Q' TY	PARTS NAME
	RAF-50RPA		
1	HWRAF-50NX2 A01	1	CABINET
2	HWRAF-50NX2 A02	1	PWM-MOTOR
3	HWRAF-50NX2 A03	1	TANGENTIAL AIR FLOW FAN
4	HWRAF-50NX2 A04	1	FAN SUPPORT ASSEMBLY
5	HWRAF-50NX2 A05	1	FAN COVER
6	HWRAF-50NX2 A06	1	FAN MORTOR SUPPORT
7	HWRAF-50NX2 A07	1	#F-PANELAS
8	HWRAF-50NX2 A08	1	DEFLECT
9	HWRAF-50NX2 A09	1	EVAPORATOR ASSEMBLY
10	HWRAF-50NX2 A10	1	P-COVER-L
11	HWRAF-50NX2 A11	1	P-COVER-R
12	HWRAF-25FPA A01	1	THERMISTOR ASSEMBLY
13	RAS-25DVX002	1	SPRING
14	HWRAF-50NX2 A14	1	DRAIN PAN
15	HWRAF-50NX2 A15	1	#L-DEF-AS
16	HWRAF-50NX2 A16	1	#R-DEF-AS
17	HWRAF-50NX2 A17	1	GUARD
18	HWRAF-50NX2 A18	1	AUTO SWEEP MOTOR
19	HWRAF-50NX2 A19	1	BOARD
20	HWRAF-50NXA1 A01	1	FRONT COVER ASSEMBLY
21	HWRAF-50NX2 A21	2	FILTER
22	HWRAF-25RPA A02	1	REMOTE CONTROL ASSEMBLY
23	HWRAF-50NX2 A22	1	SCREW ASSEMBLY
24	HWRAF-50NX2 A23	1	#ELE-PLATE
25	HWRAF-50NX2 A24	1	ELE-COV-1
26	HWRAF-50NX2 A25	1	ELE-COV-2
27	HWRAF-50NX2 A26	1	TERM-COV-1
28	HWRAF-50NX2 A27	1	TERM-COV-2
29	HWRAF-25RPA A03	1	M-PWB-SUP
30	HWRAF-50NX2 A29	1	BAND
31	HWRAF-50NX2 A30	1	2PTERMINAL
32	HWRAF-25RPA A04	1	#2PCORD-AS
33	HWRAF-50NX2 A32	1	IRR-SUP
34	HWRAF-50NX2 A33	1	IRR-COV1
35	HWRAF-50NX2 A34	1	LENS-COVER
36	HWRAF-25RPA A05	1	#9PCORD-AS
37	HWRAF-50RPA A01	1	P. W. B. (MAIN)
38	HWRAF-50NX2 A38	1	BOARD
39	HWRAF-50NX2 A39	1	DRAIN-HOSE
40	HWRAF-25RPA A07	1	#HBOARD-AS

# OUTDOOR UNIT

## MODEL: RAC-50FPA



MODEL RAC-50FPA

NO	HHAW PARTS NO	Q' TY/UNIT	PARTS NAME
1	HWRAC-50WEA A01	1	BASE
2	HWRAC-50WEA A02	1	COMPRESSOR
3	HWRAC-50NX2 A04	3	PUSH NUT
4	HWRAC-50NX2 A05	1	CONDENSER
5	HWRAC-50WEA A04	1	REVERSING VALVE
6	HWRAC-50WEA A05	1	SERVICE VALVE
7	HWRAC-50WEA A06	1	SERVICE VALVE
8	HWRAC-50NX2 A09	1	ELECTRIC EXPANSION VALVE
9	HWRAC-50WEA A07	1	SOUND PROOF
10	HWRAC-50WEA A08	1	SOUND PROOF
11	HWRAC-50WEA A09	1	SOUND PROOF
12	HWRAC-50WEA A10	1	SOUND PROOF
13	HWRAC-50WEA A12	1	CONNECTING CORD (COMP)
14	HWRAC-50NX2 A16	1	THERMISTOR (DEFROST)
15	HWRAC-50NX2 A17	1	THERMISTOR SUPPORT
16	HWRAC-50NX2 A18	1	COIL (REVERSING VALVE)
17	HWRAC-50NX2 A19	1	COIL (EXPANSION VALVE)
18	HWRAC-50WEA A13	1	PARTITION
19	HWRAC-50NX2 A21	1	REACTOR
20	HWRAC-50NX2 A22	1	FAN MOTOR SUPPORT
21	HWRAC-50NX2 A23	1	FAN MOTOR
22	HWRAC-50NX2 A24	1	PROPELLER FAN
23	HWRAC-50NX2 A25	1	NUT (PROPELLER FAN)
24	HWRAC-50NX2 A26	1	SIDE COVER (L)
25	HWRAC-50NX2 A27	1	HANDLE
26	HWRAC-50NX2 A28	1	FRONT COVER
27	HWRAC-50NX2 A29	1	DISCHARGE GRILL
28	HWRAC-50WEA A14	1	EARTH-PLATE
29	HWRAC-50NX2 A30	1	THERMISTOR (OUTDOOR TEMPERATURE)
30	HWRAC-50NX2 A31	1	SIDE COVER (R)
31	HWRAC-50WEA A15	1	COVER (OUTDOOR THERMISTOR)
32	HWRAC-50NX2 A33	1	TERMINAL COVER
33	HWRAC-50NX2 A34	1	TOP COVER
34	HWRAC-50NX2 A35	1	SERVICE VALVE COVER
35	HWRAC-50NX2 A36	1	BUSH ASSEMBLY
36	HWRAC-50NX2 A37	2	BUSH
37	HWRAC-50NX2 A38	1	DRAIN PIPE
38	HWRAC-50NXA1 A02	1	ELECTRIC PARTS PLATE
39	HWRAC-50WEA A16	1	ELECTRIC PARTS COVER
40	HWRAC-50NX2 A41	1	SUPPORT (P. W. B.)
41	HWRAC-50WEA A17	1	H-HEAT SINK
42	HWRAC-50NX2 A43	1	HEAT SINK2
43	HWRAC-50FPA A01	1	P. W. B. (MAIN)
44	HWRAC-50WEA A19	1	P. W. B. (IPM)
45	HWRAC-50WEA A20	1	12 CORD ASSEMBLY
46	HWRAC-50NX2 A47	1	CORD ASSEMBLY
47	HWRAC-50NX2 A48	1	CORD ASSEMBLY
48	HWRAC-50NX2 A49	1	ZETU-SHEET
49	HWRAC-50NX2 A50	2	TERMINAL BOARD (2P)
50	HWRAC-50NX2 A51	1	FUSE (25A)
51	HWRAC-50NX2 A52	2	FUSE (3. 15A)

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