# HITACHI Inspire the Next

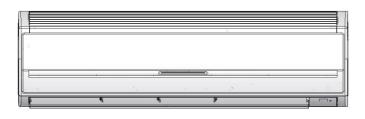
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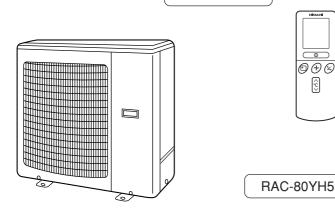
RAS-80YH5A/RAC-80YH5

# **SERVICE MANUAL**

FOR SERVICE PERSONNEL ONLY



RAS-80YH5A



#### REFER TO THE FOUNDATION MANUAL

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#### **SPECIFICATIONS**

TYPE			(WALL TYPE)			
			INDOOR UNIT	OUTDOOR UNIT		
MODEL			RAS-80YH5A	RAC-80YH5		
POWER S	OURCE		1 Ø, 50 Hz, 220 ~ 240V			
	TOTAL INPUT	(W)	3,070 (200	0 ~ 3,850)		
COOLING	TOTAL AMPERES	(A)	14.10 ^	12.90		
OOOLING	O A D A O ITV	(kW)	8.00 (1.50 ~ 8.50)			
	CAPACITY	(B.T.U./h)	27,300 (5,12	27,300 (5,120 ~ 29,000)		
	TOTAL INPUT	(W)	3,100 (200 ~ 3,850)			
HEATING	TOTAL AMPERES	(A)	14.30 ~ 13.00			
I III.	CAPACITY	(kW)	9.30 (1.50	0 ~ 9.70)		
	CAPACITY	(B.T.U./h)	31,730 (5,12	20 ~ 33,310)		
DIMENSIONS (mm)		W	1150	925		
		Н	333	875		
		D	245	315		
NET WEIGHT (kg)		15	57			

After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

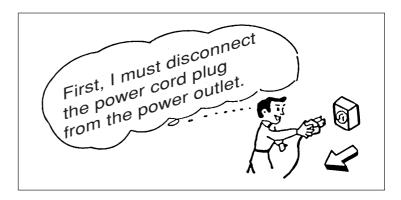
## ROOM AIR CONDITIONER

**INDOOR UNIT + OUTDOOR UNIT** 

Refrigeration & Air-Conditioning Division

### SAFETY DURING REPAIR WORK

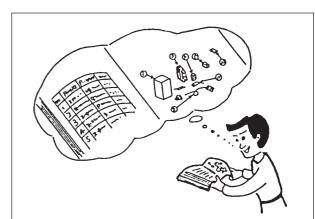
 In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



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 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  $1M\Omega$  or more as measured by a 500V DC megger.
- The initial location of installation such as window, floor or the other should be checked for being and 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 reinforced or at a new location.
- Any inflammable thing should never 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 manufacturers during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned).

#### 2. Object parts

- (1) Micro computer
- (2) Integrated circuits (IC)
- (3) Field-effect transistors (FET)
- (4) P.C. boards or the like on 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).

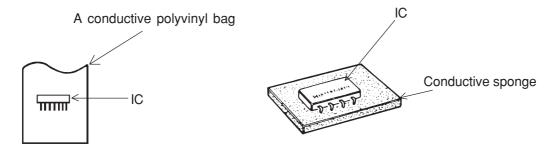


Fig. 1. Conductive Container

- (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.

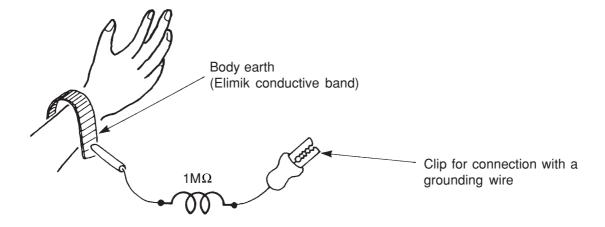


Fig. 2. Body Earth

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

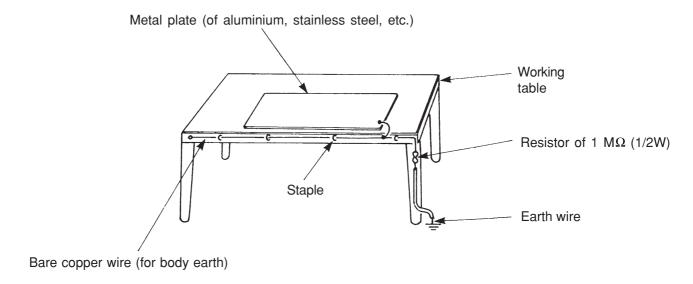


Fig. 3. Grounding of the working table

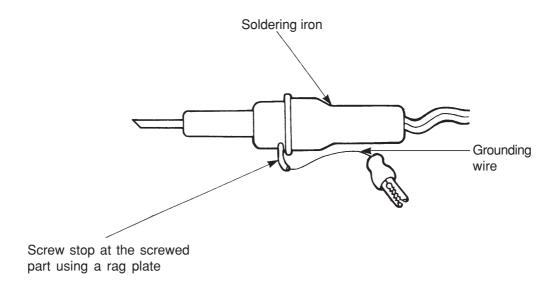


Fig. 4. Grounding a soldering iron

Use a high insulation mode (100V,  $10M\Omega$  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 shortcircuit a load circuit or the like.

## **A** CAUTION

- 1. In quiet or stopping operation, slight flowing noise of refrigerant in the refrigerating cycle is heard occasionally, but this noise is not abnormal for the operation.
- 2. When it thunders near by, it is recommended to stop the operation and to disconnect the power cord plug from the power outlet for safety.
- 3. In the event of power failure, the airconditioner will restart automatically in the previously selected mode once the power is restored. In the event of power failure during TIMER operation, the timer will be reset and the unit will begin or stop operating under a new timer setting.
- 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°C (50°F).
- 6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below -15°C (5°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 frost 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**

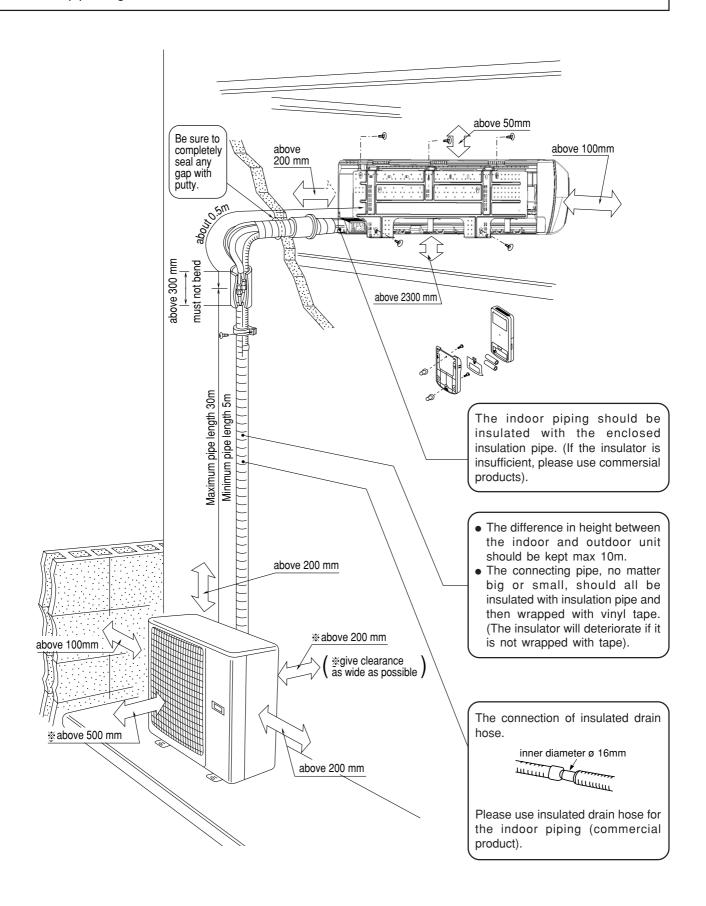
MODEL		RAS-80YH5A	RAC-80YH5
FAN MOTOR	30 W	100 W	
FAN MOTOR CAPACITOR		NO	NO
FAN MOTOR PROTECTOR		NO	NO
COMPRESSOR		-	JU1015D3
COMPRESSOR MOTOR CAPACIT	OR	NO	NO
OVERLOAD PROTECTOR		NO	NO
OVERHEAT PROTECTOR		NO	YES
FUSE (MICRO COMPUTER CIRCU	JIT)	3.15A	NO
POWER RELAY		G4A	NO
POWER SWITCH		NO	NO
TEMPORARY SWITCH		YES	NO
SERVICE SWITCH		NO	NO
TRANSFORMER		NO	NO
VARISTOR	416NR	NO	
NOISE SUPPRESSOR		NO	NO
THERMOSTAT		YES(IC)	YES(IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
FUSE CAPACITY		30 A TIME [	DELAY FUSE
	UNIT		<b>¾</b> 1800g
REFRIGERANT CHARGING VOLUME (Refrigerant R410A)	PIPES (MAX. 30m) (MIN. 5m)	ADDITIONAL REF AT 20g PER EVE PIPE LENGTH MO	

#### Figure showing the installation of Indoor and Outdoor unit

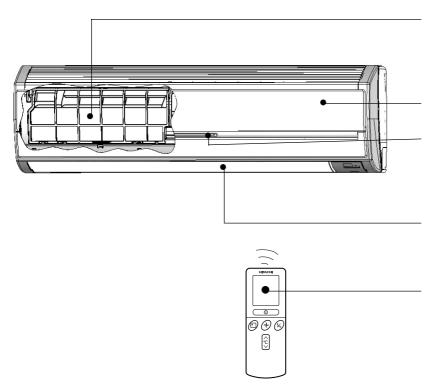


#### **CAUTION**

In case the pipe length is more than 20m, add refrigerant R410A at 20 gram per every meter exceeds. However, pipe length shall not exceed 30m.



### **INDOOR UNIT**



#### **AIR FILTER**

To prevent dust from coming into the indoor unit.

(Refer page 26)

### FRONT PANEL (AIR INLET).

#### **INDOOR UNIT INDICATORS**

Light indicator showing the operating condition.

(Refer page 8)

# HORIZONTAL DEFLECTOR ● VERTICAL DEFLECTOR (AIR OUTLET)

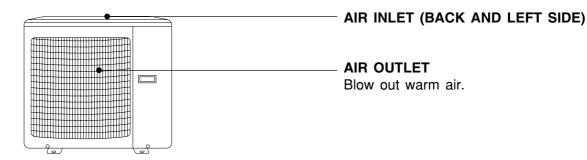
#### REMOTE CONTROLLER

Send out operation signal to the indoor unit. So as to operate the whole unit. (Refer page 12)

### NOTE

- Air cleansing filters are washable and can be use in 1 year time. Type number for this air cleansing filter is <SPX-CFH12>. Please use this number for ordering when you want to renew it.
- Air cleansing filter should be cleaned every month or sooner if noticeable loading occurs. When used overtime, it may loose its deodorizing function. For maximum performance, it is recommended to replace it every 1 year depending on application requirements.

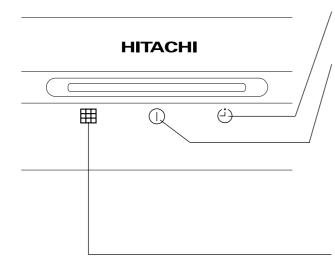
### **OUTDOOR UNIT**



### **MODEL NAME AND DIMENSIONS**

MODEL	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)
RAS-80YH5A	1150	333	245
RAC-80YH5	925	875	315

### **INDOOR UNIT INDICATORS**



#### **TIMER LAMP**

This lamp lights when the timer is working.

#### **OPERATION LAMP**

This lamp lights during operation.

The OPERATION LAMP flashes in the following cases during heating.

#### (1) During preheating

For about 2-3 minutes after starting up.

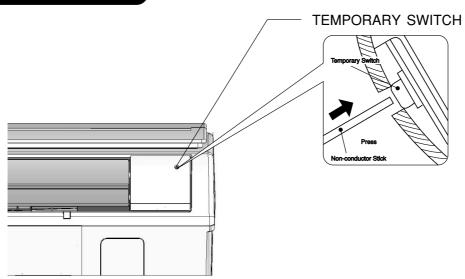
### (2) During defrosting

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.

#### **FILTER LAMP**

When the device is operated for a total of about 200 hours, the FILTER lamp lights to indicate that it is time to clean the filter. The lamp goes out when the " (AUTO SWING)" button is pressed while the device is on "STANDBY MODE".

### **OPERATION INDICATOR**



#### **TEMPORARY SWITCH**

Use this switch to start and stop when the remote controller does not work. [Use non-conductor stick (example: toothpick)]

- By pressing the temporary switch, the operation is done in previously set operation mode.
- When the operation is done using the temporary switch after the power source is turned off and turn on again, the operation is done in automatic mode.

### Note

 Avoid to use the room air conditioner for cooling operation when the outside temperature is below 21°C (70°F).

The recommended maximum and minimum operating temperatures of the hot and cold sides should be as below:

		Coo	ling	Heating	
		Minimum	Maximum	Minimum	Maximum
Indoor	Dry bulb °C	21	32	20	27
muoor	Wet bulb °C	15	23	12	19
Outdoor	Dry bulb °C	21	43	2	21
Outdoor	Wet bulb °C	15	26	1	15

EMO	



# 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 "A Warning" and "A 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 sign indicate the following meanings.

Make sure to connect earth line.

Note that the figure indicates prohibition.

Indicates the instructions that must be followed.

• Please keep this manual after reading.

### PRECAUTIONS DURING INSTALLATION



Do not reconstruct the unit.
 Water leakage, fault, short circuit or fire may occur if you reconstruct the unit by yourself.



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.

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.



 Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.



• A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.



• Do not install near location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it.

• Please ensure smooth flow of water when installing the drain hose.

### PRECAUTIONS DURING SHIFTING OR MAINTENANCE

WARNING

• Should abnormal situation arises (like burning smell), please stop operating the unit and 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.



• Please contact your agent for maintenance. Improper self maintenance may cause electric shock and fire.

- 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.
- If the supply cord is damaged, it must be replaced by the special cord obtainable at authorized service/parts centers.

### PRECAUTIONS DURING OPERATION



N G • Avoid an extended period of direct air flow for your health.



• Do not insert a finger, a rod or other objects into the air outlet or inlet. As the fan is rotating at a high speed, it will cause injury. Before cleaning, be sure to stop the operation and turn the breaker OFF.

• Do not use any conductor as fuse wire, this could cause fatal accident.





• During thunder storm, disconnect and turn off the circuit breaker.

### PRECAUTIONS DURING OPERATION

• The product shall be operated under the manufacturer specification and not for any other intended use.





- Do not attempt to operate the unit with wet hands, this could cause fatal accident.
- When operating the unit with burning equipments, regularly ventilate the room to avoid oxygen insufficiency.





- 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.
- Please ensure that outdoor mounting frame is always stable, firm and without defect. If not, the outdoor unit may collapse and cause danger.





- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.
- Do not use any aerosol or hair sprays near the indoor unit. This chemical can adhere on heat exchanger fin and blocked the evaporation water flow to drain pan. The water will drop on tangential fan and cause water splashing out from indoor unit.





- Please switch off the unit and turn off the circuit breaker during cleaning, the high-speed fan inside the unit may cause danger.
- Turn off the circuit breaker if the unit is not to be operated for a long period.





- Do not climb on the outdoor unit or put objects on it.
- Do not put water container (like vase) on the indoor unit to avoid water dripping into the unit. Dripping water will damage the insulator inside the unit and causes short-circuit.





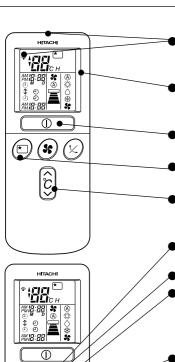
- Do not place plants directly under the air flow as it is bad for the plants.
- When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, do not operate under such condition for a long time.
- 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.
- 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 the appliance safely.
- Young children should be supervised to ensure that they do not play with the appliance.



### NAMES AND FUNCTIONS OF REMOTE CONTROL UNIT

#### 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 control 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.



Signal emitting window/transmission sign

Point this window toward the indoor unit when controlling it.

The transmission sign blinks when a signal is sent.

Display

This indicates the room temperature selected, current time, timer status, function and intensity of circulation selected.

START/STOP button

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

SLEEP button

Use this button to set the sleep timer.

TEMPERATURE buttons

Use these buttons to raise or lower the temperature setting. (Keep pressed, and the value will change more quickly.)

TIME button

Use this button to set and check the time and date.

RESET buttons

FUNCTION selector

Use this button to select the operating mode. Every time you press it, the mode will change from 6 (AUTO) to 4 (HEAT) to 0 (DEHUMIDIFY) to 4 (COOL) and to 4 (FAN) cyclically.

FAN SPEED selector

This determines the fan speed. Every time you press this button, the intensity of circulation will change from A (AUTO) to  $\textcircled{\Xi}$  (HI) to  $\textcircled{\Xi}$  (MED) to  $\textcircled{\Xi}$  (LOW) to  $\textcircled{\Xi}$  (SILENT) (This button allows selecting the optimal or preferred fan speed for each operation mode).

PARALLEL SWING button

Controls the angle of the vertical air deflectors to parallel.

SYMMETRY SWING button

Controls the angle of the vertical air deflectors to symmetry.

TIMER control

Use this button to set the timer.

- OFF-TIMER button Select the turn OFF time.
- ON-TIMER button Select the turn ON time.
- RESERVE button Time setting reservation.
- CANCEL button Cancel time reservation.

#### 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 FUNCTION selector button during operation, the device may stop for about 3 minutes for protection.

#### (À) **AUTO** Ö HEAT $\Diamond$ **DEHUMIDIFY** \* COOL ¥ FAN FAN SPEED **SLEEPING** 0 STOP (CANCEL) START (RESERVE) 1 1 START/STOP ① TIME (j) TIMER SET **(**-) TIMER SELECTOR ĕ ON TIMER (I) OFF TIMER // PARALLEL SWING SYMMETRY SWING

**4** 

### **VARIOUS FUNCTIONS**

### **■** Auto Restart Control

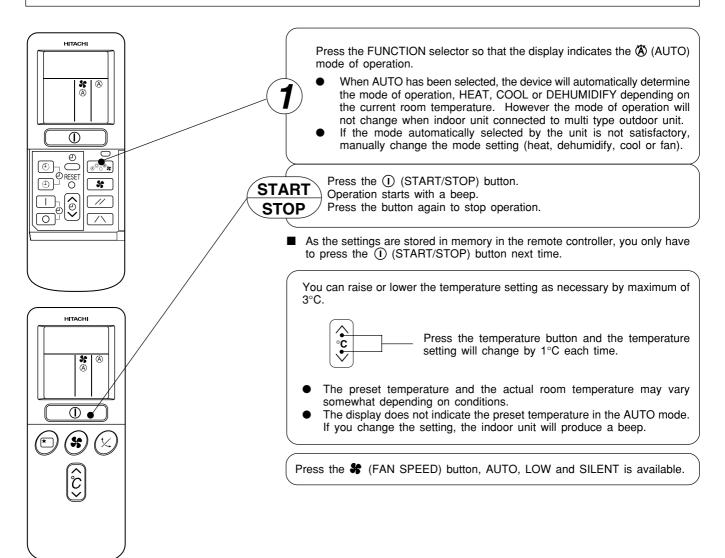
- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode and airflow direction.
  - (As the operation is not stopped by remote controller.)
- If you intend not to continue the operation when the power is resumed, switch off the power supply.
   When you switch on the circuit breaker, the operation will be automatically restarted with previous operation mode and airflow direction.

Note: 1. If you do not require Auto Restart Control, please consult your sales agent or OFF by remote control.

2. Auto Restart Control is not available when Timer or Sleep Timer mode is set.

### **AUTOMATIC OPERATION**

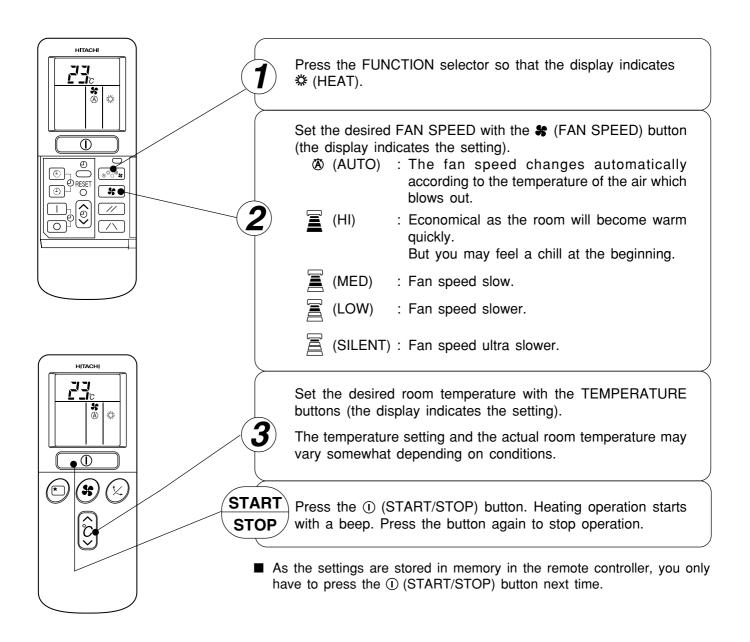
The device will automatically determine the mode of operation, HEAT, COOL or DEHUMIDIFY depending on the current room temperature. The selected mode of operation will change when the room temperature varies. However the mode of operation will not change when indoor unit connected to multi type outdoor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



### **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 keep reliability of the device, please use this device above -15°C of the outdoor temperature.



### ■ Defrosting

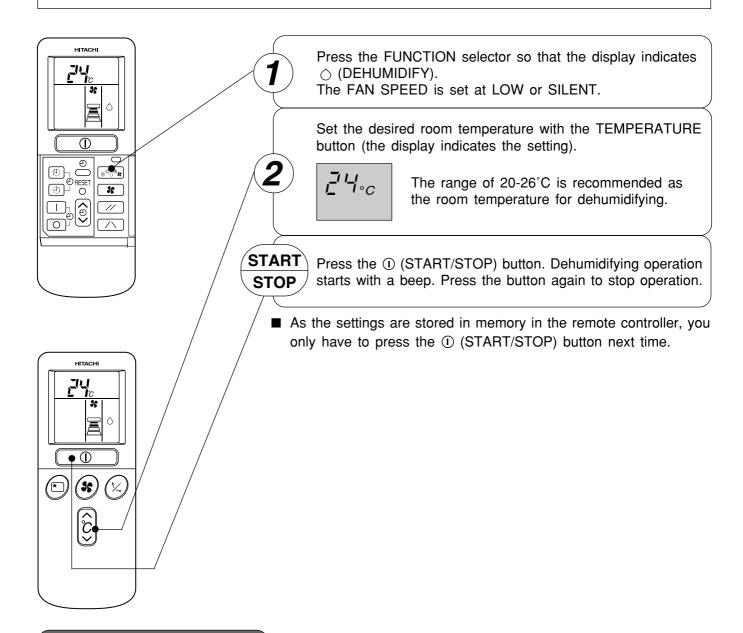
Defrosting will be performed about once an hour when frost forms on the heat exchange of the outdoor unit, for 5~10 minutes each time.

During defrosting operation, the operation lamp blinks in cycle of 3 seconds on and 0.5 second off. The maximum time for defrosting is 20 minutes.

However, if it 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 will likely to form.)

### **DEHUMIDIFYING OPERATION**

Use the device for dehumidifying when the room temperature is over  $16^{\circ}$ C. When it is under  $15^{\circ}$ C, the dehumidifying function will not work.



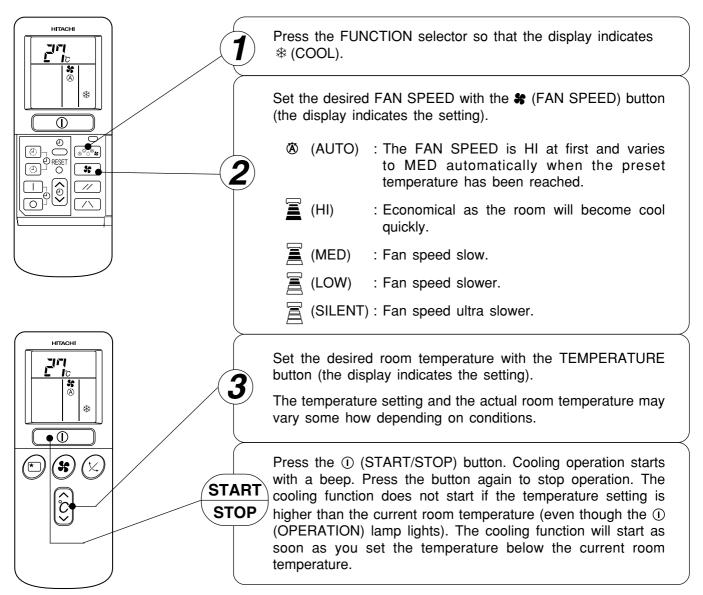
### **■** Dehumidifying Function

- 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 function will stop (the indoor unit will stop emitting air) as soon as the room temperature becomes lower than the setting temperature.
- 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 21~43°C.

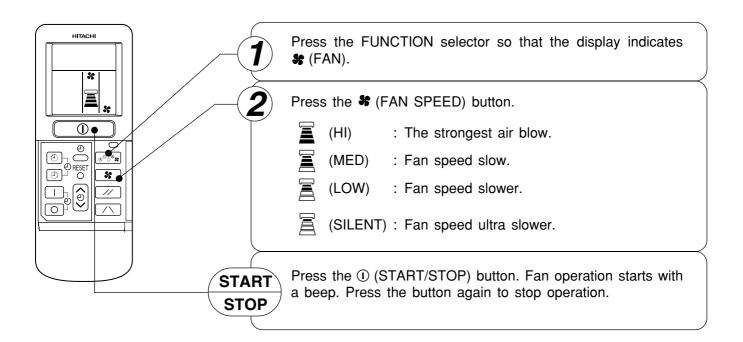
If in doors humidity is very high (80%), some dew may form on the air outlet grille of the indoor unit.



■ As the settings are stored in memory in the remote controller, you only have to press the ① (START/STOP) button next time.

### **FAN OPERATION**

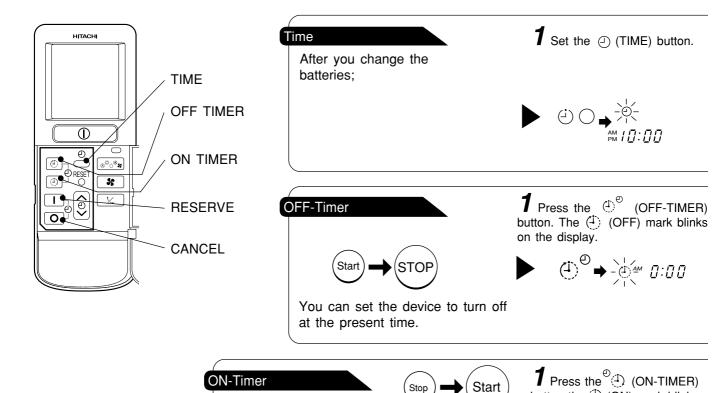
You can use the device simply as an air circulator. Use this function to dry the interior of the indoor unit at the end of summer.

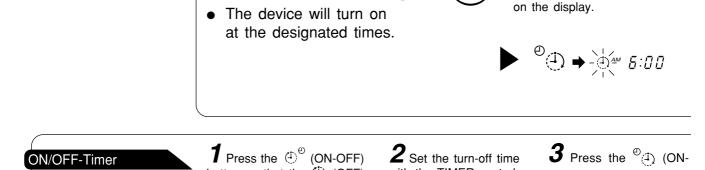


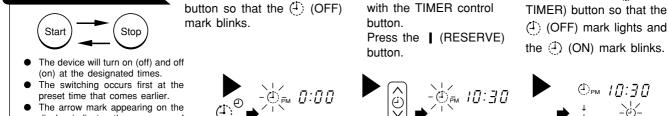
FAN SPEED (AUTO) ..... When the AUTO fan speed mode is set in the cooling/heating operation:

For the heating operation	<ul> <li>The fan speed will automatically change according to the temperature of discharged air.</li> <li>When the difference of room temperature and setting temperature is large, fan starts to run at HI speed.</li> <li>When the room temperature reaches setting temperature, fan speed changes to LOW automatically.</li> </ul>
For the cooling operation	<ul> <li>When the difference of room temperature and setting temperature is large, fan starts to run at HI speed.</li> <li>After room temperature reaches the preset temperature, the cooling operation, which changes the fan speed and room temperature to obtain optimum conditions for natural healthful cooling will be performed.</li> </ul>

### **HOW TO SET THE TIMER**







button the (ON) mark blinks

#### **How to Cancel Reservation**

The arrow mark appearing on the display indicates the sequence of

switching operations

Point the signal window of the remote controller toward the indoor unit, and press the O (CANCEL)

The ⊕ (RESERVED) sign goes out with a beep and the ⊕ (TIMER) lamp turns off on the indoor unit.

### NOTE

ON/OFF-Timer

You can set only one of the OFF-timer, ON-timer and ON/OFF-timer.

**2** Press the ① (TIME) button.

 $oldsymbol{3}$  Set the current time with the TIMER control button.

4 Press the (TIME) button again. The time indication starts lighting instead of flashing.





- The time indication will disappear automatically in 10 second.
- To check the current time setting, press the (1) (TIME) button twice.

The setting of the current time is now complete.

Example: The current time is 1:30 p.m.

**2** Set the turn-off time with the TIMER control button.

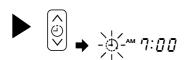
 $oldsymbol{3}$  Point the signal window of the remote controller toward the indoor unit, and press the I (RESERVE) button.

The (1) (OFF) mark starts lighting instead of flashing and the sign (2) (RESERVED) lights. A beep occurs and the ( (TIMER) lamp lights on the indoor unit.

Example: The device will turn off at 11:00p.m.

The setting of turn-off time is now complete.

2 Set the turn-on time with the TIMER control button.

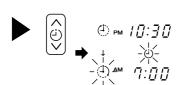


 $oldsymbol{3}$  Point the signal window of the remote controller toward the indoor unit, and press the [(RESERVE) button.

The (ON) mark starts lighting instead of flashing and the (RESERVED) sign lights. A beep occurs and the (1) (TIMER) lamp lights on the indoor unit.

The device will turn on at 7:00 a.m.
The setting of the turn-on time is now complete.

4 Set the turn-on time with the TIMER control button.



**5** Point the signal window of the remote controller toward the indoor unit, and press the (RESERVE) button.

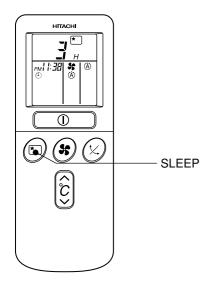
The (1) (ON) mark starts lighting instead of flashing and the (1) (RESERVED) sign lights. A beep occurs and the ( (TIMER) lamp lights on the indoor unit.

The device will turn off at 10:30 p.m. and it will be turned on at 7:00 a.m.

The settings of the turn-on/off times are now complete.

- The timer may be used in three ways: off-timer, on-timer, and ON/OFF (OFF/ON)-timer. Set the current time at first because it serves as a reference.
- As the time settings are stored in memory in the remote controller, you only have to press the I (RESERVE) button in order to use the same settings next time.

Set the current time at first if it is not set before (see the pages for setting the current time). Press the (SLEEP) button, and the display changes as shown below.



Mode	Indication
Sleep timer	1 hour → 2 hours → 3 hours → 7 hours → Sleep timer off

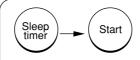
**Sleep Timer:** The device will continue working for the designated number of hours and then turn off.

Point the signal window of the remote controller toward the indoor unit, and press the SLEEP button.

The timer information will be displayed on the remote controller. The TIMER lamp lights with a beep from the indoor unit. When the sleep timer has been set, the display indicates the turn-off time.



Example: If you set 3 hours sleep time at 11:38 p.m., the turn-off time is 2:38 a.m.



The device will be turned off by the sleep timer and turned on by on-timer.

1 Set the ON-timer.

**2** Press the \* (SLEEP) button and set the sleep timer.



For heating:

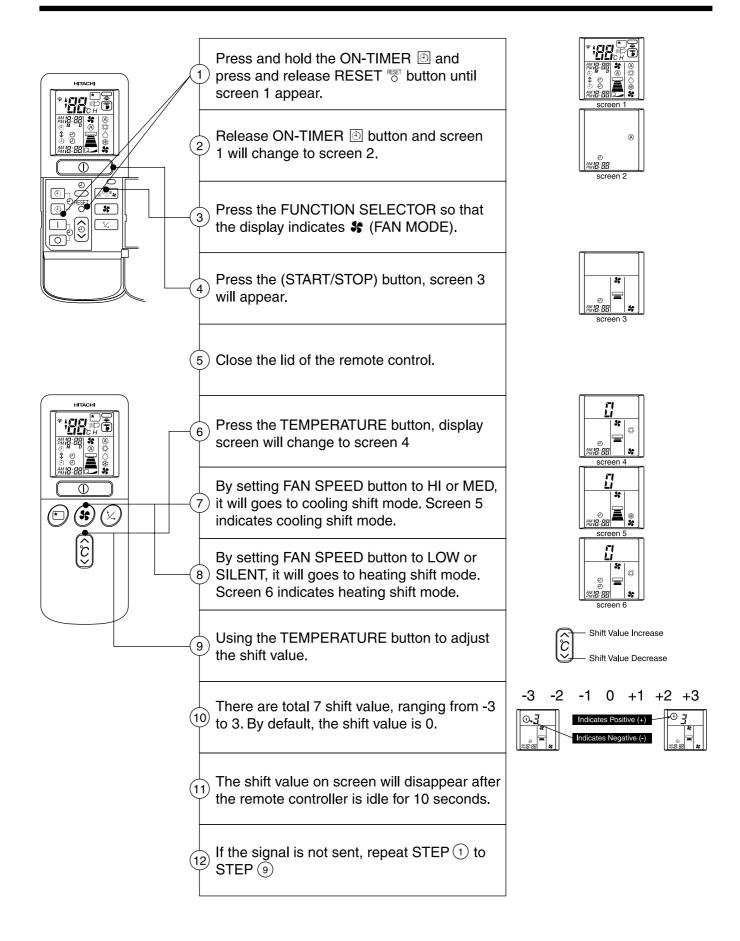
In this case, the device will turn off in 2 hours (at 1:38 a.m.) and it will be turned on 6:00 next morning.

#### **How to Cancel Reservation**

Point the signal window of the remote controller toward the indoor unit, and press the  $\bigcirc$  (CANCEL) button.

The ① (RESERVED) sign goes out with a beep and the ② (TIMER) lamp turns off on the indoor unit.

### SHIFT VALUE ADJUSTMENT



## HOW TO EXCHANGE THE BATTERIES IN THE REMOTE CONTROLLER



Remove the cover as shown in the figure and take out the old batteries.

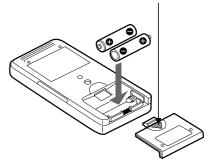




Install the new batteries.

The direction of the batteries should match the marks in the case.

Push and pull to the direction of arrow



### **A** CAUTION

- 1. Do not use new and old batteries, or different kinds of batteries together.
- 2. Take out the batteries when you do not use the remote controller for 2 or 3 months.

### **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".

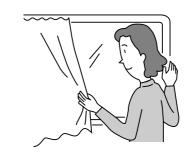
### **Suitable Room Temperature**



### Warning

Freezing temperature is bad for health and a waste of electric power.

### Install curtain or blinds



It is possible to reduce heat entering the room through windows.

### **Ventilation**

#### **A** Caution

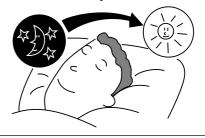
Do not close the room for a long period of time. Occasionally open the door and windows

to allow the entrance of fresh air.



### **Effective Usage Of Timer**

At night, please use the "OFF or ON timer operation mode", together with your wake up time in the morning. This will enable you to enjoy a comfortable room temperature. Please use the timer effectively.



## Do Not Forget To Clean The Air Filter

Dusty air filter will reduce the air volume and the cooling efficiency. To prevent from wasting electric energy, please clean the filter every 2 weeks.



### Please Adjust Suitable Temperature For Baby And Children

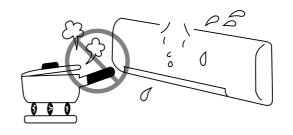
Please pay attention to the room temperature and air flow direction when operating the unit for baby, children and old folks who have

difficulty in movement.

### The Air Conditioner And The Heat Source In The Room

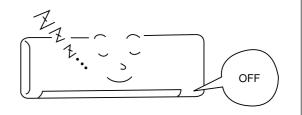
### **A** Caution

If the amount of heat in the room is above the cooling capability of the air conditioner (for example: more people entering the room, using heating equipments and etc.), the preset room temperature cannot be achieved.



### Not Operating For A Long Time

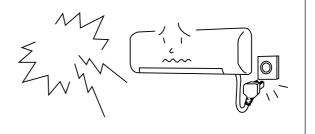
When the indoor unit is not to be used for a long period of time, please switch off the power from the mains. If the power from mains remains "ON", the indoor unit still consumes about 8W in the operation control circuit even if it is in "OFF" mode.



### When Lightning Occurs

### Warning

To protect the whole unit during lightning, please stop operating the unit and remove the plug from the socket.

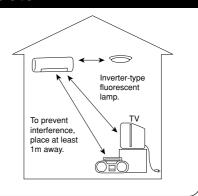


## Interference From Electrical Products



#### **A** Caution

To avoid noise interference, please place the indoor unit and its remote controller at least 1m away from electrical products.



### ATTACHING THE AIR CLEANSING FILTERS

### **A** CAUTION

Cleaning and maintenance must be carried out only by qualified service personal. Before cleaning, stop operation and switch off the power supply.



#### Open the front panel.

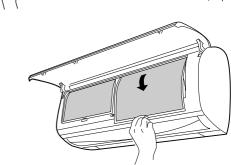
 Pull up the front panel by holding it at both sides with both hands.





#### Remove the filter.

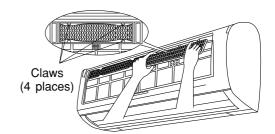
 Push upward to release the claws and pull out the filter.





#### Attaching the air cleansing filters to the filter.

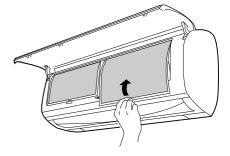
 Attach the air cleansing filters to the frame by gently compress its both sides and release after insertion into filter frame.



### **A** CAUTION

Do not bend the air cleansing filter as it may cause damage to the structure.

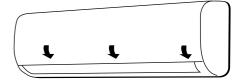






#### Attach the filters.

- Attach the filters by ensuring that the surface written "FRONT" is facing front.
- After attaching the filters, push the front panel at three arrow portion as shown in figure and close it.



### NOTE

- In case of removing the air cleansing filters, please follow the above procedures.
- 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.
- Do not operate the air conditioner without filter. Dust may enter the air conditioner and fault may occur.



### **MAINTENANCE**

### **A** CAUTION

Cleaning and maintenance must be carried out only by qualified service personal. Before cleaning, stop operation and switch off the power supply.

### 1. AIR FILTER IIII

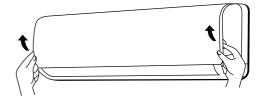
Clean the air filter, as it removes dust inside the room. In case the air filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the filter following the procedure below.

#### PROCEDURE



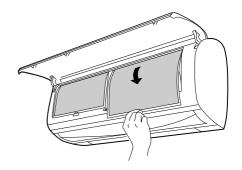
Open the front panel and remove the filter

 Gently lift and remove the air cleansing filter from the air filter frame.



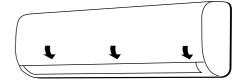
Vacuum dust from the air filter and air cleansing filter using vacuum cleaner. If there is too much dust, air filter only rinse under running tap water and gently brush it with soft bristle brush. Allow filters to dry in shade.







- Re-insert the air cleansing filter to the filter frame. Set the filter with "FRONT" mark facing front, and slot them into the original state.
- After attaching the filters, push the front panel at three arrow portions as shown in figure and close it.



### A 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.
- Do not use detergent on the air cleansing filter as some detergent may deteriorate the filter electrostatic performance.

#### 2. Washable Front Panel

 Remove the front panel and wash with clean water.

Wash it with a soft sponge.

After using neutral detergent, wash thoroughly with clean water.

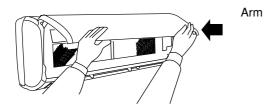
- When front panel is not removed, wipe it with a soft dry cloth. Wipe the remote controller thoroughly with a soft dry cloth.
- Wipe the water thoroughly.
   If water remains at indicators or signal receiver of indoor unit, it causes trouble.

Method of removing the front panel. Be sure to hold the front panel with both hands to detach and attach it.



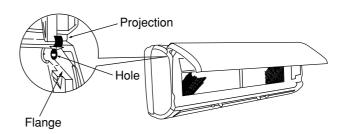


### Removing the Front Panel



 When the front panel is fully opened with both hands, push the right arm to the inside to release it, and while closing the front panel slightly, put it out forward.

### Attaching the Front Panel



 Move the projections of the left and right arms into the Flanges in the unit and securely insert them into the holes.

### **A** CAUTION

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

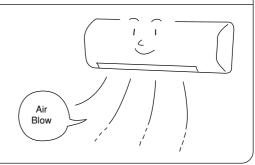


### **A** CAUTION

Cleaning and maintenance must be carried out only by qualified service personal. Before cleaning, stop operation and switch off the power supply.

#### 3. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

- Running the unit setting the operation mode to
   (FAN) and the fan speed to HI for about half a day on a fine day, and dry the whole of the unit.
- Switch off the power plug.



### REGULAR INSPECTION

PLEASE CHECK THE FOLLOWING POINTS BY QUALIFIED SERVICE PERSONAL EITHER EVERY HALF YEARLY OR YEARLY. CONTACT YOUR SALES AGENT OR SERVICE SHOP.

1		Is the earth line disconnected or broken?
2		Is the mounting frame seriously affected by rust and is the outdoor unit tilted or unstable?
3	Confirm	Is the plug of power line firmly plugged into the socket? (Please ensure no loose contact between them).

## WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING POINTS.

CONDITION	CHECK THE FOLLOWING POINTS
If the remote controller is not transmitting a signal.  Remote controller display is dim or blank.)	<ul> <li>Do the batteries need replacement?</li> <li>Is the polarity of the inserted batteries correct?</li> </ul>
When it does not operate	<ul> <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>
When it does not cool well When it does not hot well	<ul> <li>Is the air filter blocked with dust?</li> <li>Does sunlight fall directly on the outdoor unit?</li> <li>Is the air flow of the outdoor unit obstructed?</li> <li>Are the doors or windows opened, or is there any source of heat in the room?</li> <li>Is the set temperature suitable?</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>



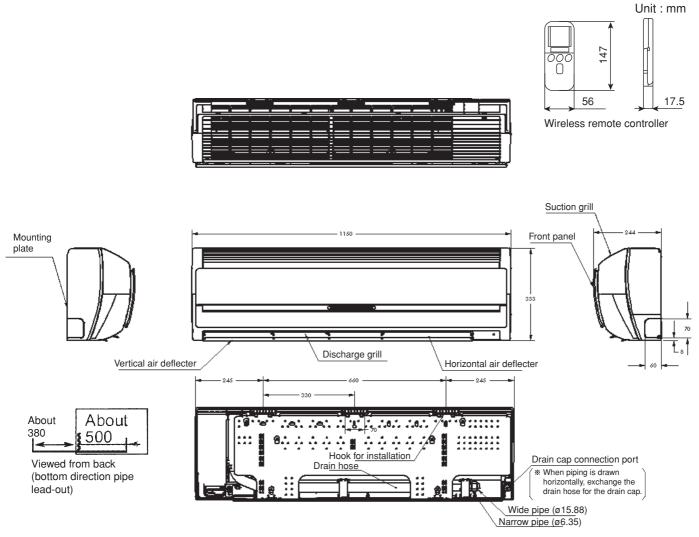
#### **Notes**

- In quiet operation or stopping the operation, the following phenomena may occassionally 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 the air filter and the evaporator regularly must be cleaned 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.
- Power supply shall be connected at the rated voltage, otherwise the unit will be broken or could not reach the specified capacity.

#### NOTE:

- If the supply cord is damaged, it must be replaced by the special cord obtainable at authorized service parts centers.
- 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

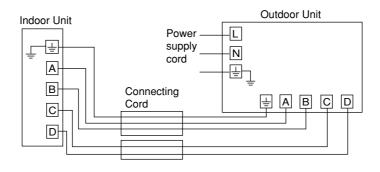


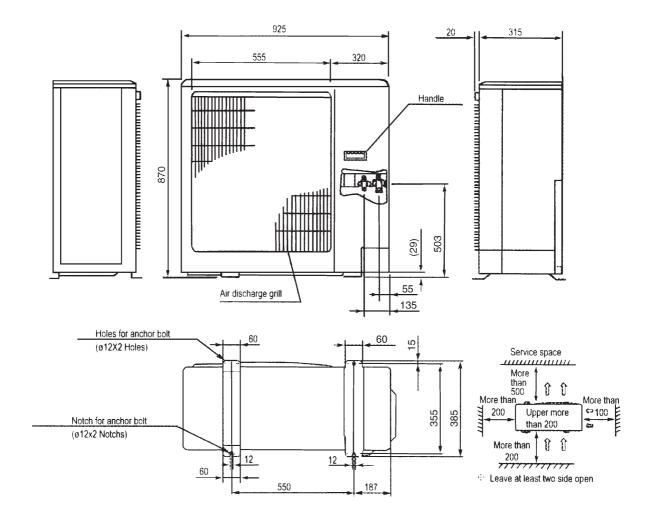
#### Notes:

- Service space (free space needed for servicing) is 200mm on the right, 100mm on the left and 50mm on top.
- 2. The wide and narrow pipes must be thermally insulated.

#### Note:

- 1. Servicing space of 100mm or more is required on the left and right sides of the indoor unit and also 50mm or more space is required above the unit
- 2. Insulated pipes should be used for both the narrow and wide dia. pipes.
- 3. Piping length is within 30m
- 4. Height different of the piping between the indoor unit and the outdoor unit should be within 10m.
- 5. Power supply cord length is about 2m
- 6. Connecting cable 3.5mm dia. x 3 (AB Line), 1.6mm dia. x 2 (CD Line) is used for the connection.





### Note:

1. 200mm or more servicing space is required above the outdoor unit.

### MAIN PARTS COMPONENT

### **THERMOSTAT (Room Temperature Thermistor)**

Thermostat Specifications

MODEL		RAS-80YH5A		
THERMOSTAT MODEL		IC		
OPERATION MODE			COOL	HEAT
	INDICATION	ON	15.6 (60.1)	20.0 (68.0)
16	16	OFF	15.3 (59.5)	20.7 (69.3)
TEMPERATURE		ON	23.6 (74.5)	28.0 (82.4)
°C (°F)	24	OFF	23.3 (73.9)	28.7 83.7)
	INDICATION	ON	31.6 (88.9)	36.0 (96.8)
	32	OFF	31.3 (88.3)	36.7 (98.1)

#### **FAN MOTOR**

### Fan Motor Specifications

MODEL	RAS-80YH5A	RAC-80YH5
POWER SOURCE	DC: 100 ~ 322V	DC350V
OUTPUT	30W	100W
CONNECTION	100 ~ 322V o RED 0V O BLK WHT 15V O YEL 0 ~ 6.5V O BLU FG O BLU  (Control circuit built in)	360V

BLU : BLUE YEL : YELLOW BRN : BROWN WHT : WHITE

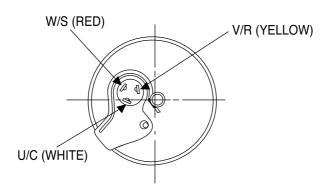
GRY: GRAY ORN: ORANGE GRN: GREEN RED: RED

BLK : BLACK PNK : PINK VIO : VIOLET

### **COMPRESSOR MOTOR**

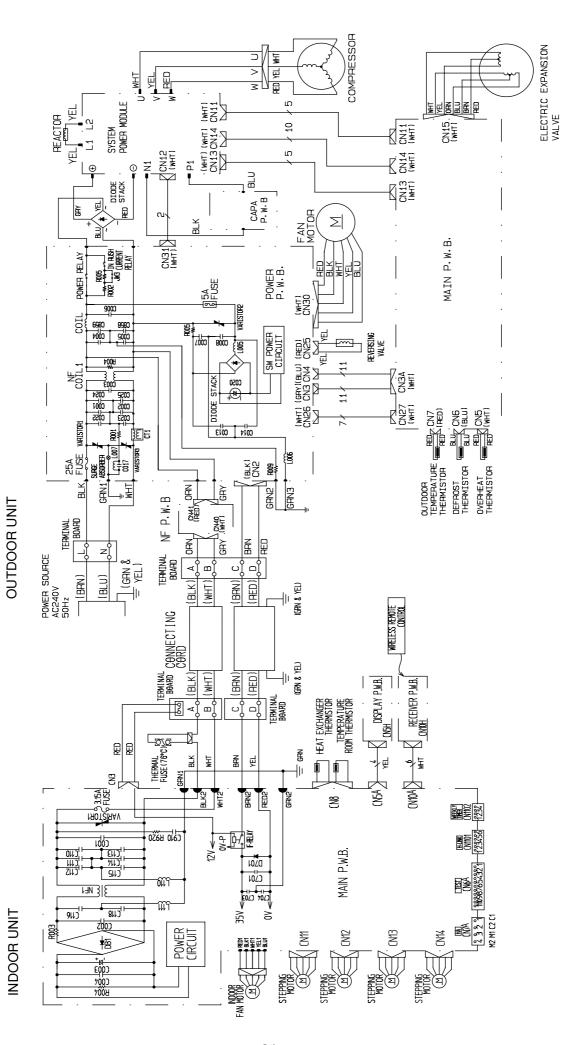
#### Compressor Motor Specifications

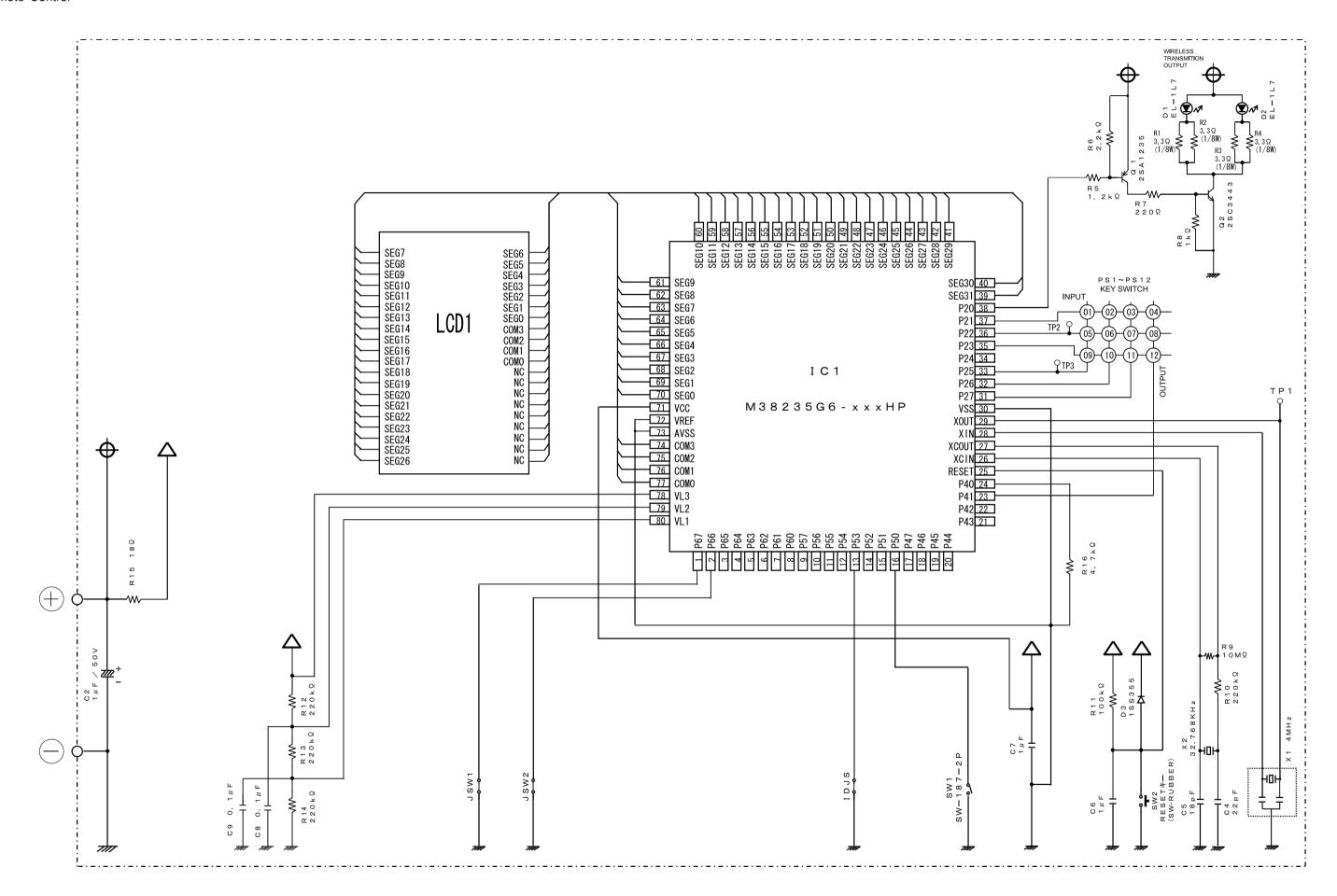
MODEL		RAC-80YH5
COMPRESSOR MODEL		JU1015D3
PHASE		SINGLE
RATED VOLTAGE		AC 220 ~ 240 V
RATED FREQUENCY		50 Hz
POLE NUMBER		4
CONNECTION		WHITE  M  M  YELLOW   RED
RESISTANCE VALUE $(\Omega)$	20°C (68°F)	2M = 1.05
	75°C (167°F)	2M = 1.268

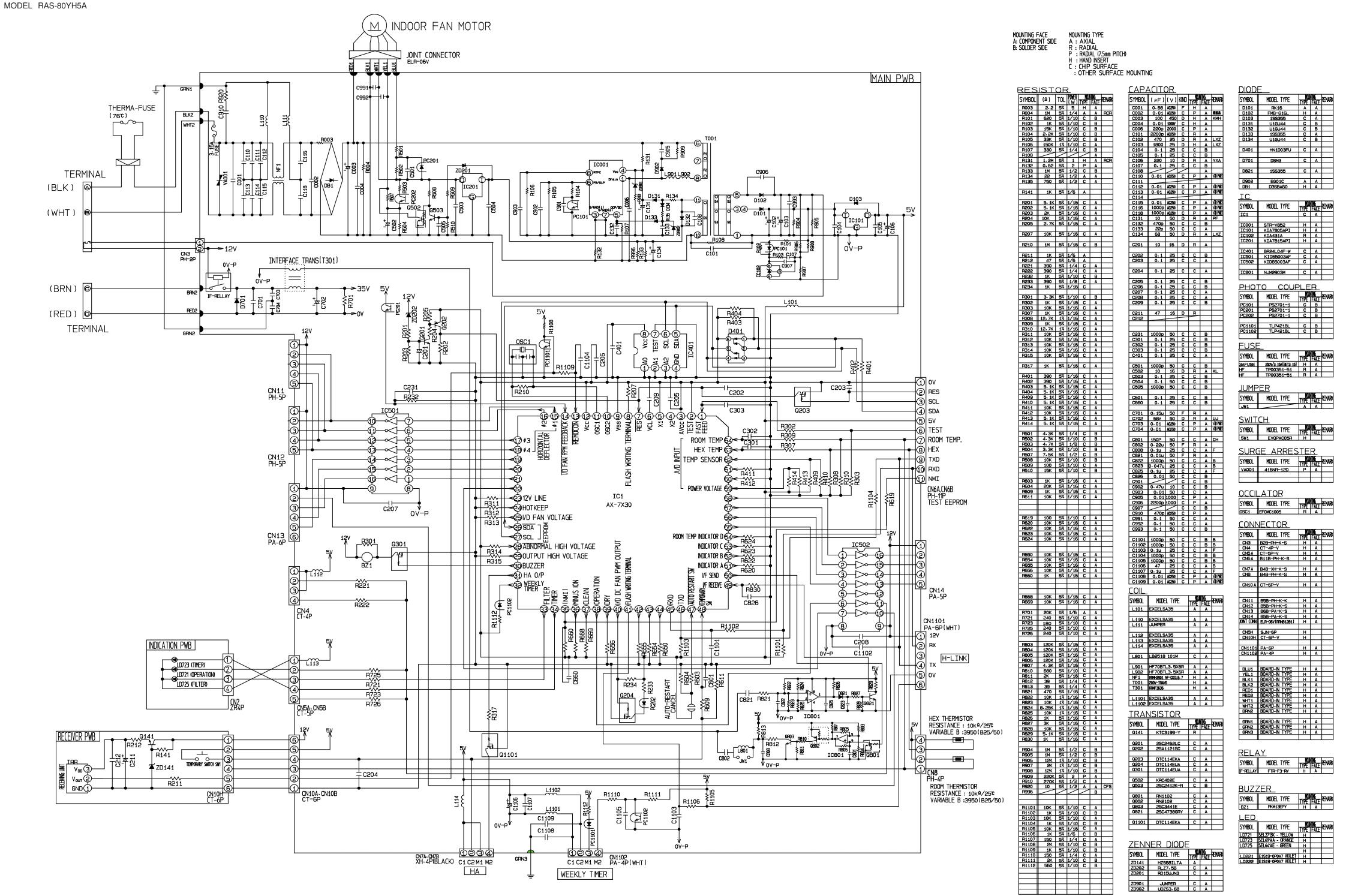


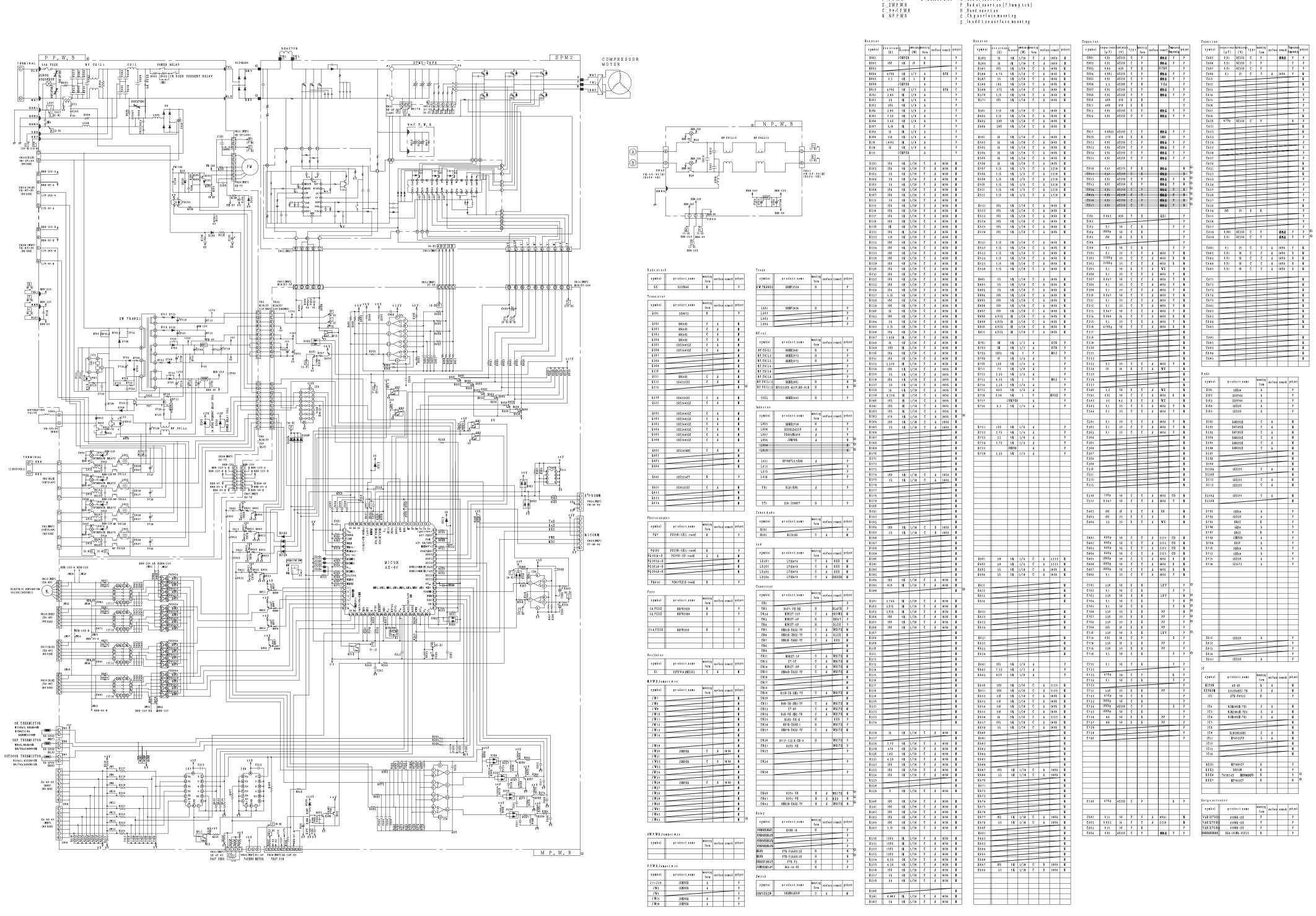
### **A** CAUTION

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









Mounting form A \_Axial\_msert.on R \_Rad\_al\_msert.on

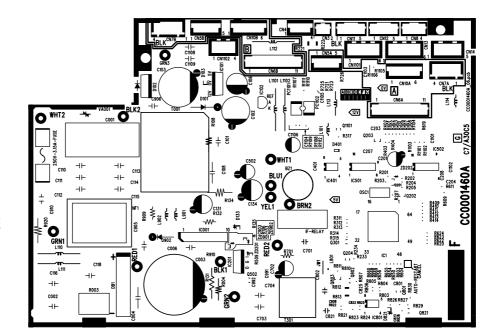
P ... P . P . W . B

# PRINTED WIRING BOARD LOCATION DIAGRAM

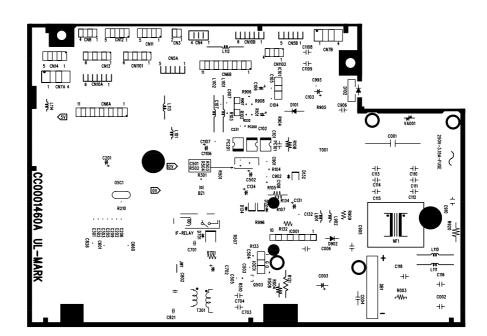
MODEL RAS-80YH5A

# MAIN P.W.B.

Marking on P.W.B



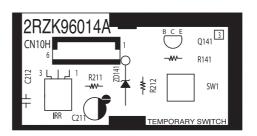
COMPONENT SIDE



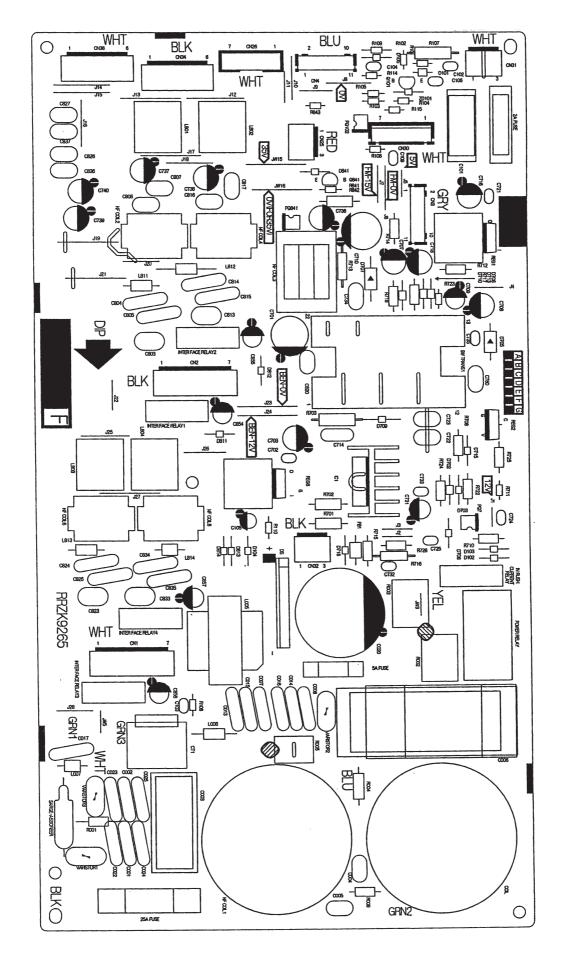
SOLDERING SIDE

# RECEIVING P.W.B.

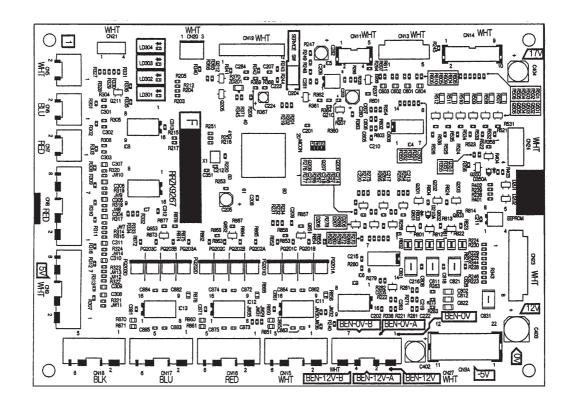
Marking on P.W.B



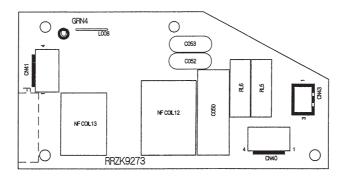
# MAIN P.W.B.



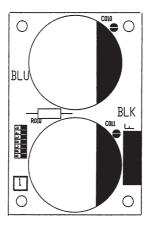
### MAIN P.W.B.



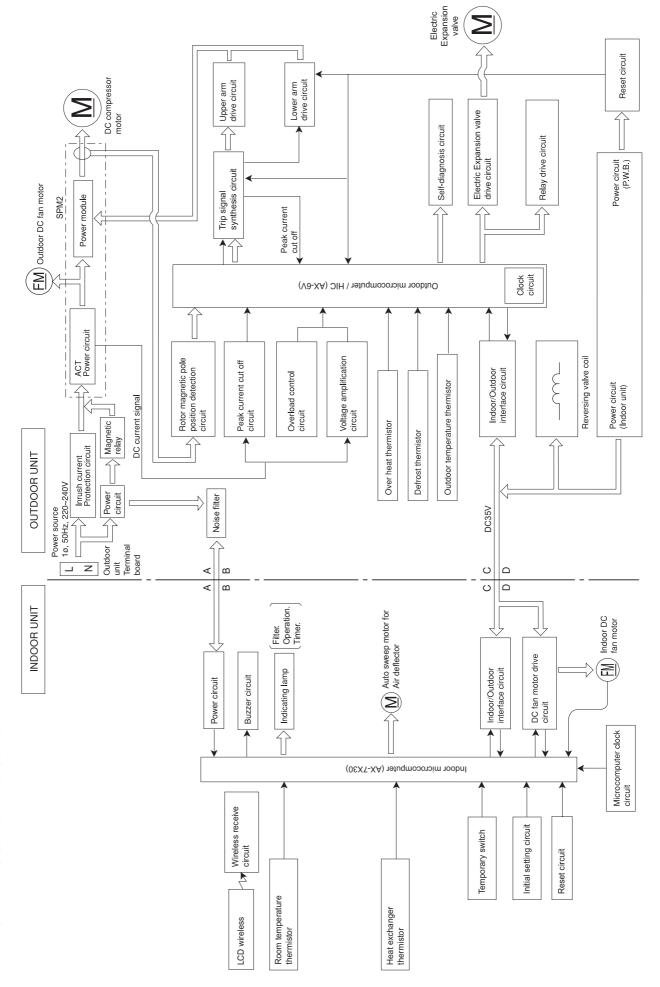
# NF P.W.B.



# CAPA P.W.B.



# BLOCK DIAGRAM MODEL RAS-80YH5A/RAC-80YH5



# **BASIC MODE**

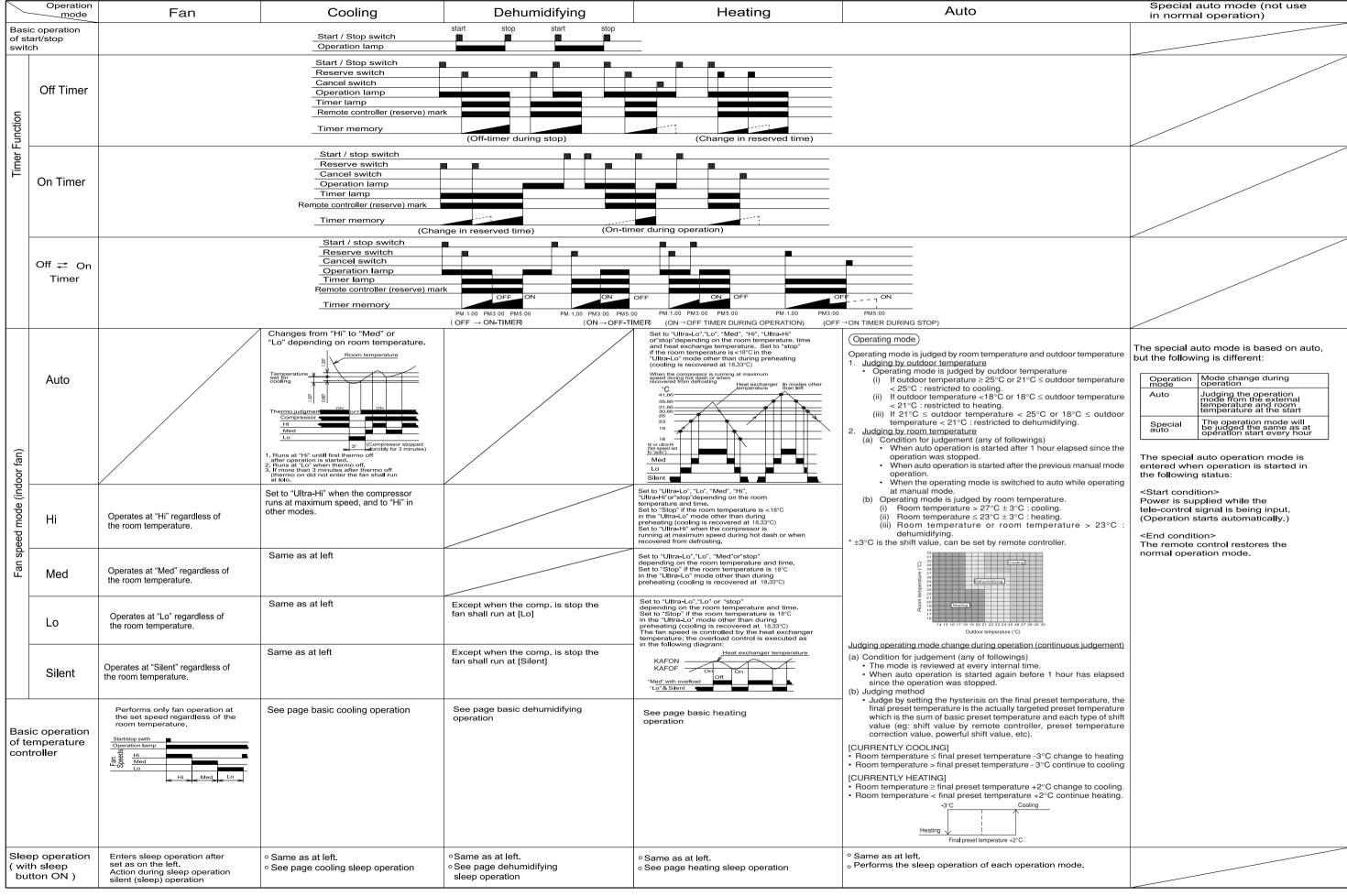
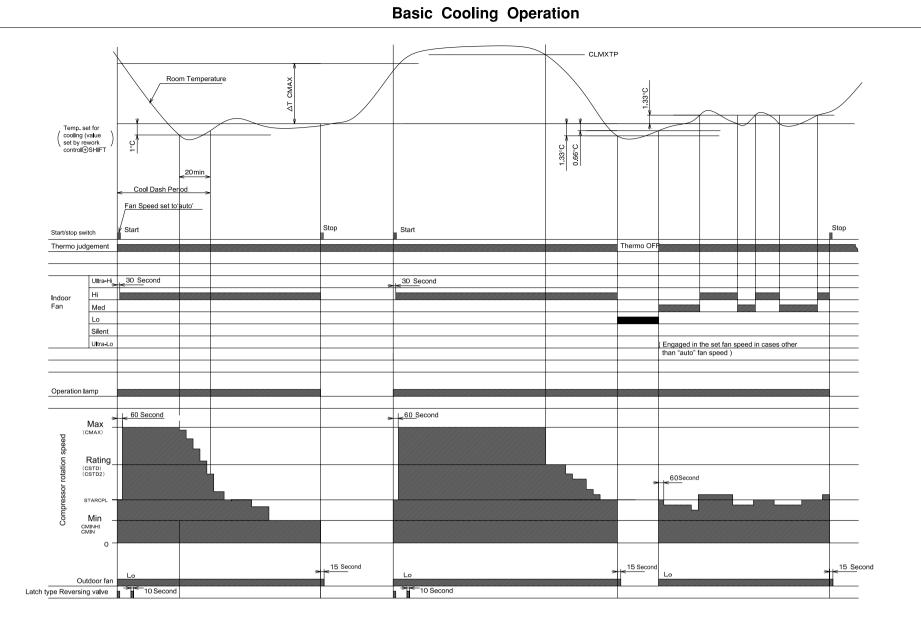


Table 1 Mode data file

	RAS-80YH5A			
LABEL NAME	VALUE			
WMAX	5800 min <sup>-1</sup>			
WMAX2	5800 min <sup>-1</sup>			
WSTD	5000 min <sup>-1</sup>			
WJKMAX	5000 min <sup>-1</sup>			
WBEMAX	4000 min <sup>-1</sup>			
WSZMAX	4000 min <sup>-1</sup>			
CMAX	5800 min <sup>-1</sup>			
CSTD	5300 min <sup>-1</sup>			
CJKMAX	4000 min <sup>-1</sup>			
CBEMAX	4000 min <sup>-1</sup>			
CSZMAX	3000 min <sup>-1</sup>			
WMIN	1200 min <sup>-1</sup>			
CMIN	1200 min <sup>-1</sup>			
STARTMC	60 Seconds			
DWNRATEW	100%			
DWNRATEC	100%			
SHIFTW	0°C			
SHIFTC	1.00°C			
CLMXTP	30.00°C			
YNEOF	25.00°C			
TEION	2.00°C			
TEIOF	9.00°C			
SFTDSW	0.66°C			
DFTIM1	50 Minutes			
DFTIM2	50 Minutes			
KAFON	55°C			
KAFOF	44°C			



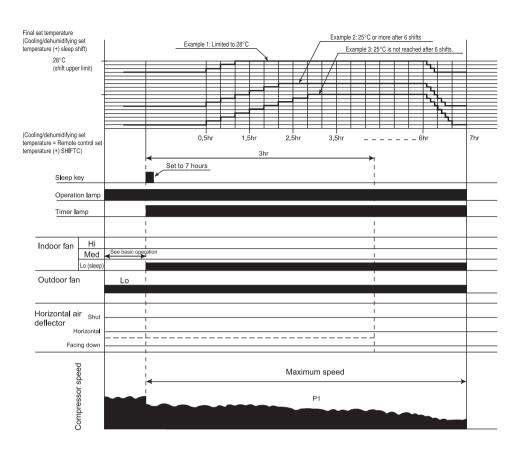
### Notes:

- 1. Condition for entering Cool Dashed Mode: When fan is set at 'Hi' or 'Auto' Mode or when the fan speed is changed to 'Hi' or 'Auto' during cooling operation and temperature difference between indoor temperature and setting temperature + SHIFTC has a corresponding compressor rpm (calculated value in Table 2) larger than CMAX.
- 2. Cool Dashed will release when: (i) a maximum 25 minutes is elapsed after Cool Dashed Mode was started; (ii) room temperature less than cooling setting temperature + SHIFTC 1°C, then maximum Cool Dashed time will be revised to 20 minutes; (iii) Thermo OFF (the compressor does not go through the steady speed period but it starts by fuzzy control).
- 3. During Cool Dashed operation, Thermo OFF temperature = setting temperature + SHIFTC 3°C. After Thermo OFF, operation continues in fuzzy control.
- 4. The compressor minimum 'ON' time and 'OFF' time is 3 minutes.
- 5. During normal cooling mode, CMAX will be maintained until 60 minutes when room temperature less than CLMXTP and no time constrain when room temperature is CLMXTP and above.
- 6. If the fan speed set to 'Med' mode by remote control, maximum compressor rpm = CJKMAX.
- 7. If the fan speed set to 'Lo' mode by remote control, maximum compressor rpm = CBEMAX.
- 8. If the fan speed set to 'Silent' mode by remote control, maximum compressor rpm = CSZMAX.
- 9. During Cool Dashed, when room temperature reaches setting temperature  $1^{\circ}$ C, compressor rpm = actual rpm x DWNRATEC.

Table 2 △TCMAX

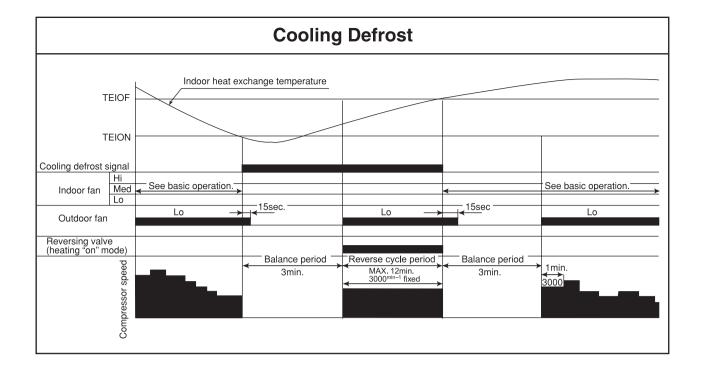
Temperature difference	Calculated compressor rpm
1.66	2300
2.00	2300
2.33	2300
2.66	2800
3.00	2800
3.33	2800
3.66	3300
4.00	3300
4.33	3300
4.66	3800
5.00	3800
6.00	4300
6.33	4300
6.66	4800
7.00	4800
7.33	4800
7.66	5300
8.00	5300
8.33	5300
8.66	5800
9.00	5800
9.33	5800
9.66	6300
10.00	6300
10.33	6300
10.66	6800
11.00	6800

# **Cooling Sleep Operation**

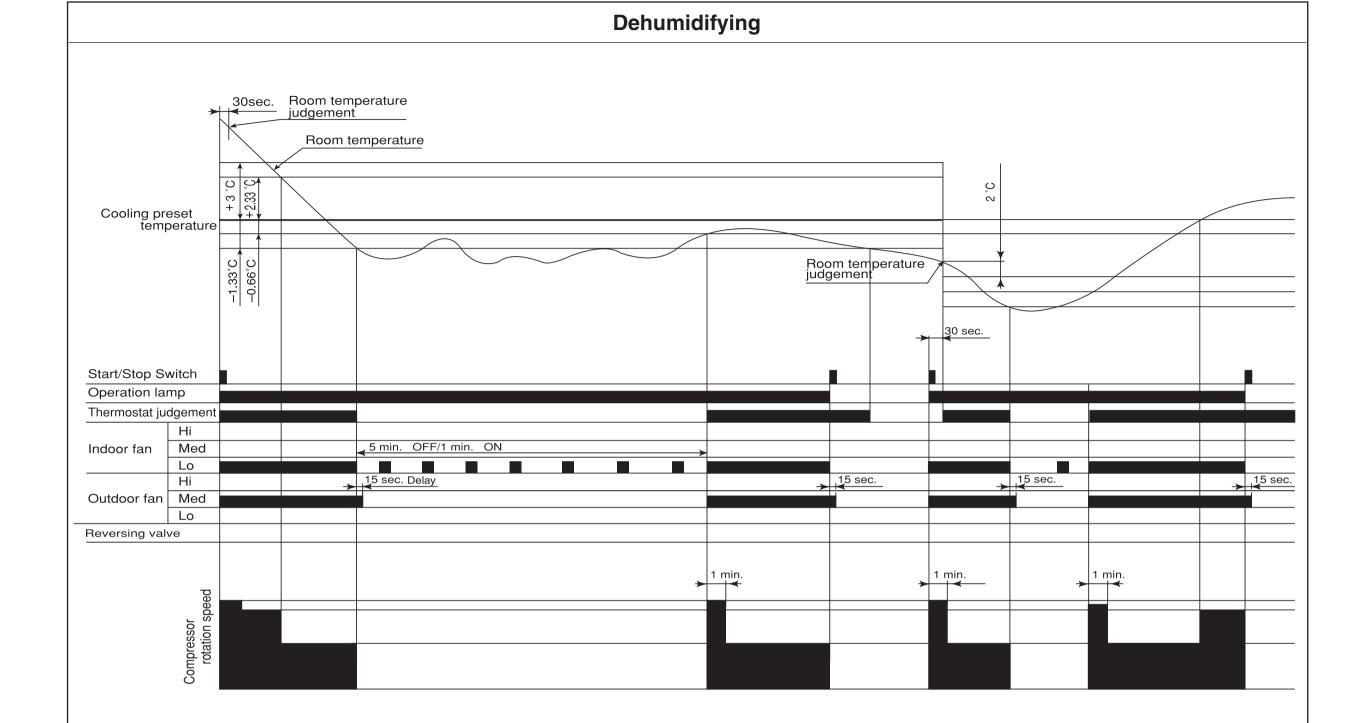


### Notes:

- (1) The sleep operation starts when the sleep key is pressed.
- (2) When the sleep key is set, the maximum compressor speed is limited, and the indoor fan is set to "sleep Lo".
- (3) 30 minutes after the sleep key is set, the sleep shift of temperature starts, and upper shift is made at least 6 times. If 25°C is not reached after 6 shifts, shifts repeat unit 25°C is reached.
- (4) The sleep shift upper value of set temperature is 28°C.
- 5) After 6 hours, a shift down to the initial set temperature is made at a rate of 0.33°C/5 min.
- (6) If the operation mode is changed during sleep operation, the set temperature is cleared, and shift starts from the point when switching is made.
- (7) The indoor fan speed does not change even when the fan speed mode is changed.
- (8) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
- (9) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (10) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.



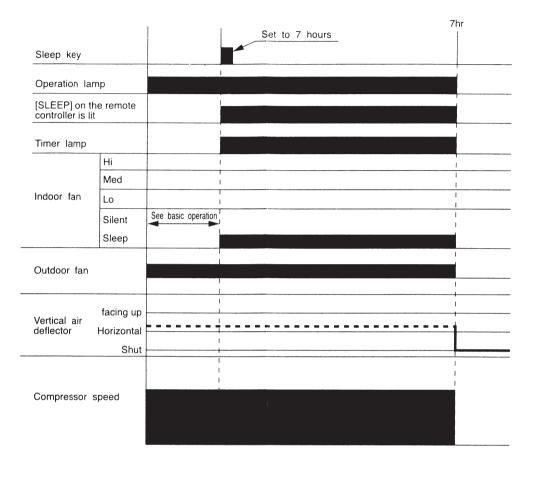
**–** 51 **–** 



### Votes:

- (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 themostat 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.

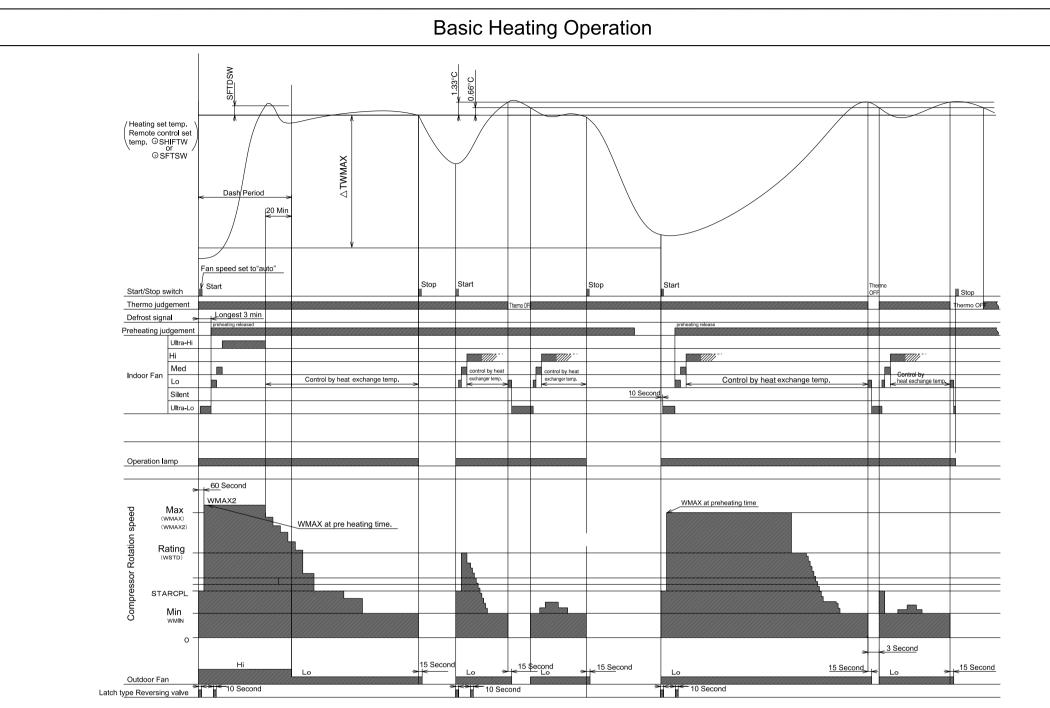
# **Dehumidifying Sleep Operation**



### Notes:

- (1) The sleep operation starts when the sleep key is pressed.
- (2) When the sleep key is set, the indoor fan is set to "sleep silent" (FDOY\_M or AFDOY).
- (3) The indoor fan speed does not change even when the fan speed mode is changed.
- (4) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (5) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.
- (6) If the position of air deflector is being operated using remote control, the operation will be performed at any desired position of air deflector.

**- 53 -**

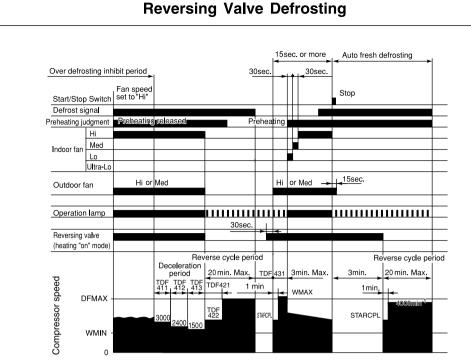


### Notes

- 1. Condition for entering into hot dashed mode: when fan set to "Hi" or "Auto mode" and i) indoor temperature is lower than 18°C, and ii) outdoor temperature is lower than 10°C, and iii) temperature difference between indoor temperature and set temperature + SHIFTW has a corresponding compressor rpm (calculated in Table 3) larger than WMAX.
- 2. Hot dashed will release (the maximum compressor speed during hot dash is finish) when i) room temperature has achieved the set temperature + SHIFTW + SFTDSW or ii) Thermo OFF.
- 3. During hot dash operation, thermo off temperature is set temperature + SHIFTW +3°C. After thermo off, operation continue in fuzzy control mode.
- 4. Compressor minimum "ON" time and "OFF" time is 3 minutes.
- 5. The time limit for which the maximum compressor (WMAX) or (WMAX2) during normal heating (except for hot dash) can be maintained in less than 120 minutes when the room temperature is higher than 18°C. No time limit if room temperature is less than 18°C and outdoor temperature is lower than 2°C.
- 6. The operation indication lamps blinks at interval of 3 seconds "ON" and 0.5 seconds "OFF" during initial cycle operation, preheating, defrosting (including balance time after defrosting is finished) or auto fresh defrosting.
- 7. When heating mode start, it will enter into hotkeep (preheating) if indoor heat exchanger temperature is lower than YNEOF +0.33°C and it will not enter if indoor heat exchanger temperature is equal or higher than YNEOF +0.33°C at the start of operation by using START/STOP button.
- 8. The limitation of compressor speed during the operation at indoor fan speed of "Med" is set to WJKMAX or below "LO" is set to WBEMAX or below and "SILENT" is set to WSZMAX or below.
- 9. If the room temperature falls less than 18°C in the "Ultra Lo" fan mode, the indoor fan stops. When the room temperature is 18°C +0.33 or higher, the "Ultro Lo" operation restarts. However the "Ultra-Lo" operation during preheating or preheating after defrosting will stop if the heat exchanger temperature is less than 16°C.
- 10. During Hot Dash and outdoor temperature lower than -5°C, maximum compressor rpm is WMAX2.
- 11. During Hot Dash and room temperature reaches set temperature + SFTDSW, compressor rpm is actual rpm x DWNRATEW.

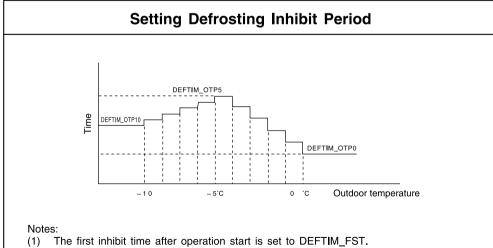
Table 3 △TWMAX

Temperature difference	Calculated compressor rpm
1.66	2300
2.00	2300
2.33	2300
2.66	2800
3.00	2800
3.33	2800
3.66	3300
4.00	3300
4.33	3300
4.66	3800
5.00	3800
6.00	4300
6.33	4300
6.66	4800
7.00	4800
7.33	4800
7.66	5300
8.00	5300
8.33	5300
8.66	5800
9.00	5800
9.33	5800
9.66	6300
10.00	6300
10.33	6300
10.66	6800
11.00	6800



### 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 temperatures 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 20 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.

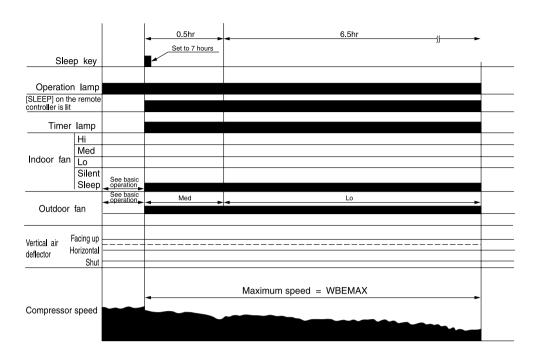


(2) From the second time onwards, the inhibit time is set according to the time required for defrosting.

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**



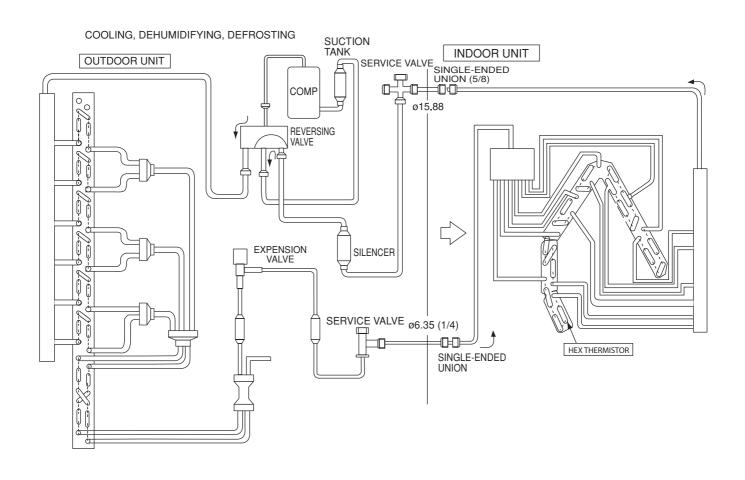
### Notes:

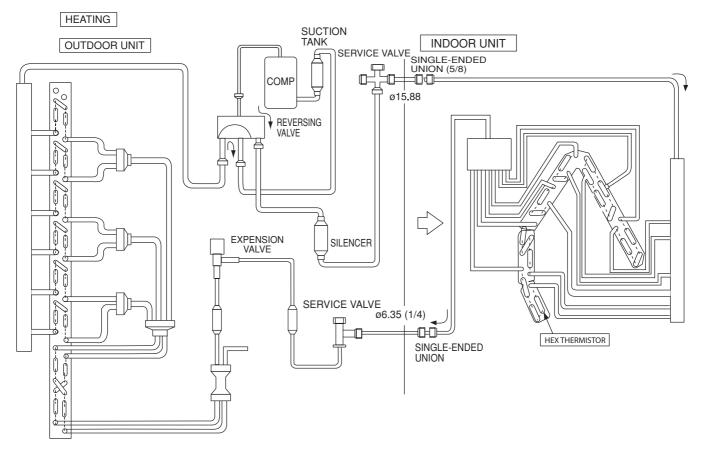
- (1) The sleep operation starts when the sleep key is pressed.
- (2) When the sleep key is set, the maximum compressor speed is limited to WBEMAX, and the indoor fan is set to "Sleep Silent" (FWSOY).
- (3) If the operation mode is changed during sleep operation, the changed operation mode is set and sleep control starts.
- (4) The indoor fan speed does not change even when the fan speed mode is changed. (Lo)
- (5) When defrosting is to be set during sleep operation, defrosting is engaged and sleep operation is restored after defrosting.
- (6) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
- 7) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (8) If sleep operation is cancelled by the cancel key or sleep key, all data is cleared.
- 9) There is no preset temperature shift due to time elapse.

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# REFRIGERATING CYCLE DIAGRAM

MODEL RAS-80YH5A/RAC-80YH5



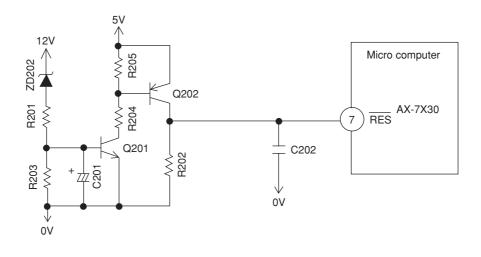


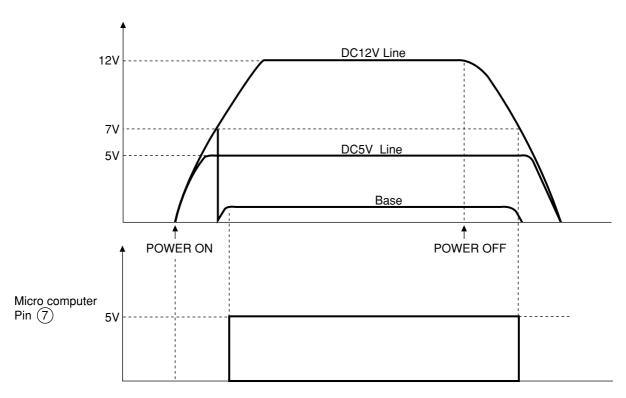
# AUTO SWING FUNCTION

		PRESENT CONDITION	NOI.		
INPUT SIGNAL	OPERATION	OPERATION MODE	AIR DEFLECTOR	OPERATING SPECIFICATION	KETEKENCE
KEY INPUT	STOP	EACH MODE	STOP	ONE SWING (CLOSING AIR DEFLECTOR)  ① DOWNWARD ② UPWARD	INITIALIZE AT NEXT OPERATION.
			DURING ONE SWING	STOP AT THE MOMENT.	
		AUTO COOL COOL FAN AUTO DRY DRY	STOP	START SWINGING  ① DOWNWARD ② UPWARD ③ DOWNWARD	
	DURING		DURING SWINGING	STOP AT THE MOMENT.	
	OPERATION	AUTO HEAT HEAT CIRCULATOR	STOP	START SWINGING  ① DOWNWARD ② UPWARD ③ DOWNWARD	
			DURING SWINGING	STOP AT THE MOMENT.	
THERMO. ON (INTERNAL FAN	!	AUTO DRY DRY	TEMPORARY STOP	START SWING AGAIN.	
THERMO. ON (INTERNAL FAN OFF)	DURING	AUTO HAET HEAT CIRCULATOR	DURING SWINGING	STOP SWINGING TEMPORARILY. (SWING MODE IS CLEARED IF SWING COMMAND IS TRANSMITTED DURING TEMPORARY STOP.)	
MAIN SWITCH	STOP	COOL FAN DRY	STOP DURING ONE SWING	INITIALIZE ① DOWNWARD ② UPWARD	
5		HEAT CIRCULATOR	STOP DURING ONE SWING	INITIALIZE ① DOWNWARD	
MAIN SWITCH OFF	DURING OPERATION	EACH MODE	STOP DURING SWINGING DURING	ONE SWING (CLOSING AIR DEFLECTOR)  ① DOWNWARD ② UPWARD	INITIALIZE AT NEXT OPERATION.
			STOP	NITIALIZING CONDITION OF FACH MODE	
CHANGE OF OPERATION	DURING OPERATION	EACH MODE	DURING SWINGING	STOP SWINGING AND MODE BECOMES INITIALIZING CONDITION.	

# DESCRIPTION OF MAIN CIRCUIT OPERATION

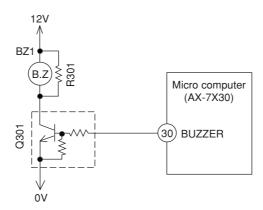
# 1. Reset Circuit





- The reset circuit is used to reset the program to its initial settings when the power is turned on or when the power is recovered after a power failure.
- The micro computer is reset when the reset input is "Hi", and operation is possible when the reset input is "I o"
- The waveforms at each point when the power is turned on and off are shown in the diagrams.
- When the power is turned on, the voltages of the DC 12V line and DC 5V lines are increased. When the voltage of DC 12V lines reaches about 7V, ZD202 is turned ON, the potential of Q201's base rises and Q202 is turned ON. Since Q202's collector is set to "LO" at this time, Q202 is turned OFF and the reset input of the micro computer is set to "Lo". The DC 5V line voltage has already become 5V at this time and the micro computer starts operation.
- When the power is turned OFF, the voltage of the DC 12V line decreases. When it becomes about 7V, ZD202 is turned OFF, then Q201 is turned OFF, Q202 is turned ON the reset input of the micro computer is set to "Hi' and the micro computer is set to the reset mode.

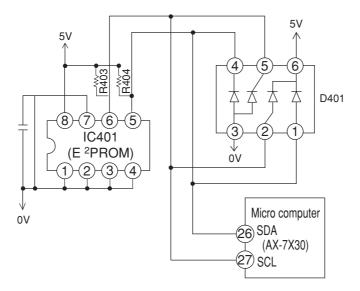
# 2. Buzzer Circuit



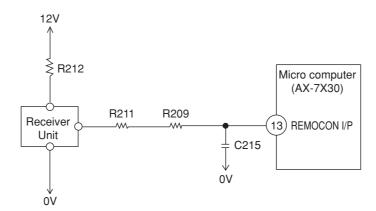
When the buzzer is to be activated, buzzer output pin ⓐ of the micro computer alternates between ON and OFF repeatedly at 4kHz and Q302 is turned ON/OFF accordingly. A 4kHz voltage is applied to the buzzer and the diaphragm of the buzzer vibrates to output 4kHz sound.

# 3. Initial setting (IC301)

The pre-heating operation start value, ratings of the compressor, maximum rotation speed, etc. are preset in the micro computer.



# 4. Receive circuit



Infrared signals from the wireless remote controller are received by the light receiving unit and output after being amplified and shaped.

# 5. Auto Sweep Motor Circuit

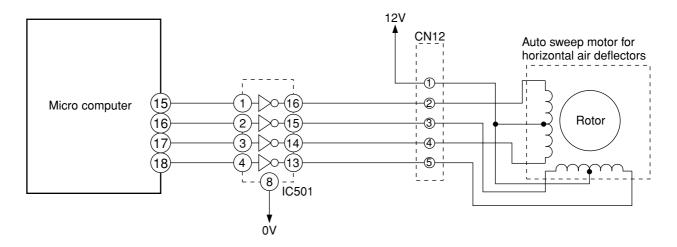


Fig. 5-1 Auto Sweep Motor Circuit (Horizontal air deflectors)

• Fig. 5-1 shows the Auto sweep motor drive circuit; the signals shown in Fig. 5-2 are output from pins  $^{(5)}$  –  $^{(8)}$  of the micro computer.

Micro computer pins			Step	width		(	Horizoi deflector	
Horizontal air deflectors	1	2	3	! 4 !	5	6	7	8
(15)		 	 		 	 	 	 
16			 	 	 	 		 
(17)		 	 	 		I I	I I	
(18)		1 		1	 		1 	  -  -  -

Fig. 5-2 Micro computer Output Signals

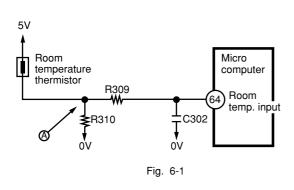
• As the micro computer's outputs change as shown in Fig. 5-2, the core of the auto sweep motor is excited to turn the rotor. Table 5-1 shows the rotation angle of horizontal air deflectors.

Table 5-1 Auto sweep Motor Rotation

	Rotation angle per step (°)	Time per step (ms)
Horizontal air deflectors	0.0879	10

# 6. Room Temperature Thermistor Circuit

- Fig. 6-1 shows the room temperature thermistor circuit.
  - The voltage at (A) depends on the room temperature as shown in Fig. 6-2.



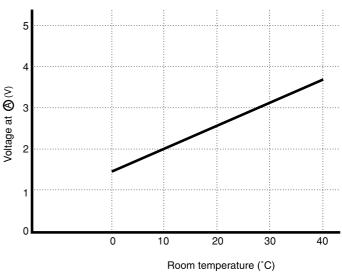


Fig. 6-2

# 7. Heat exchanger temperature thermistor circuit

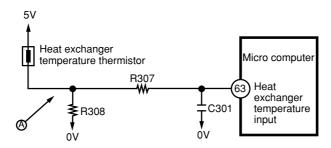


Fig. 7-1

- The circuit detects the indoor heat exchanger temperature and controls the following.
  - (1) Low-temperature defrosting during cooling and dehumidifying operation.

The voltage at (A) depends on the heat exchanger temperature as shown in Fig. 7-2.

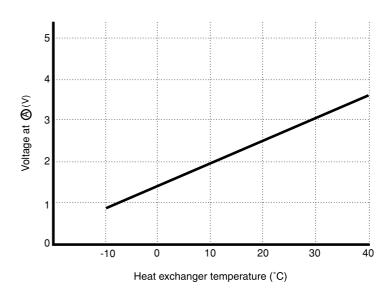
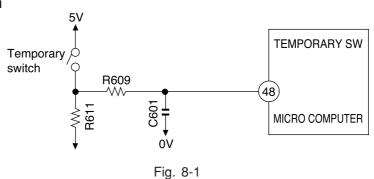


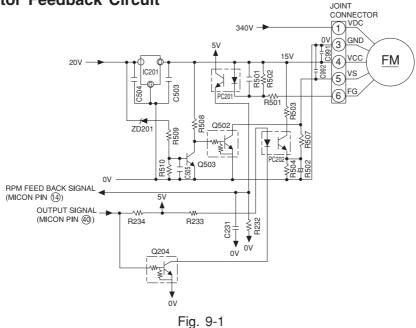
Fig. 7-2

# 8. Temporary Switch

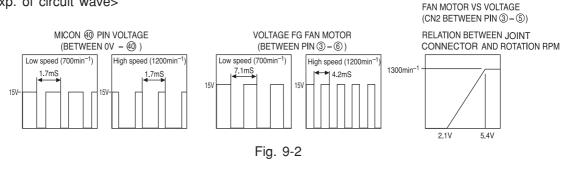


- The temporary switch is used to operate the air conditioner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the previous mode at the previously set temperature. However, when the power switch is set to OFF, it starts automatic operation.

# 9. Indoor Fan Motor Feedback Circuit



<Exp. of circuit wave>



- Fan motor will receive signal thru Joint Connector with VDC (Motor Drive Voltage), VCC (Motor Controller Power Supply), VSC (RPM Instruction) motor WCC return the FG sinal under frequency RPM.
- The circuit produces fan motor drive from 340V DC supplied from the indoor unit and controls the fan motor speed.

# A CAUTION 1

Indoor fan motor circuit will be connected with primary power source line and please take care of the electrical shock.

# **A** CAUTION 2

Please do not disconnect the fan motor connector during running due to the high voltage supply, it will cause the damage at fan motor and PWB.

# 1. Power Circuit

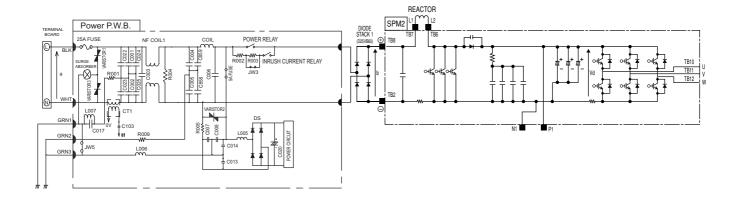


Fig. 1-1

• This circuit full-wave rectifies 220-240V AC applied between terminals L and N, and boosts it to a required voltage with the active module, to create a DC voltage.

# The voltage becomes 260-360V when the compressor is operated

### (1) Active module

The active filter, consisting of a reactor and switching element, eliminates higher harmonic components contained in the current generated when the compressor is operated, and improves the power-factor.

### (2) Diode stacks

These rectify the 220-240V AC from terminals L and N to a DC power supply.

### < Reference >

- In case of malfunction or defective connection: Immediately after the compressor starts, it may stop due to "abnormally low speed" active error, etc.
  - The compressor may continue to operate normally, but the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.
- In case of active module faulty or defective connection:

Although the compressor continues to operate normally, the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.

### < Reference >

- If diode stack 1 is faulty, the compressor may stop due to "lp", "anbormally low speed", etc. immediately after it starts, or it may not operate at all because no DC voltage is generated between the positive ⊕ and negative ⊕ terminals.
  - If diode stack 1 is faulty, be aware that the 25A fuse might also have blown.
- If diode stack 2 is faulty, DC voltage may not be generated and the compressor may not operate at all. Also, be aware that the 5A fuse might have blown.

# (3) Smoothing capacitor (C501, C502, C503)

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

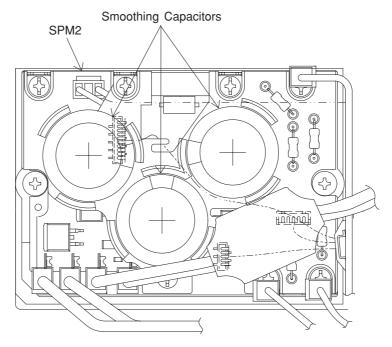


Fig. 1-2

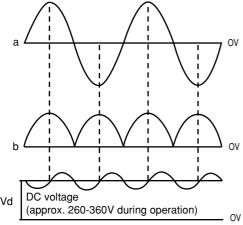


Fig. 1-3

- Fig. 1-
- (4) Smoothing capacitor (C020)
  - This smoothes (averages) the voltage rectified by the diode stack2. A DC voltage is generated in the same way as in Fig. 1-3.
  - Voltage between + side of C020 is about 330V.
- (5) C001 to C003, C012 to C015, C007, C008, NF COIL1, COIL, C22 ~ C25 absorb electrical noise generated during operation of compressor, and also absorb external noise entering from power line to protect electronic parts.
- (6) Surge absorber, Varistor 1, 2, 3, absorbs external power surge.
- (7) Inrush protective resistor (R002, R003)

  This works to protect from overcurrent when power is turned on.

 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 could be damaged.

- < Reference >
- When inrush protective resistor is defective, diode stack may malfunction. As a result, DC voltage is not generated and no operation can be done.

# 2. Indoor/Outdoor Interface Circuit

- The interface circuit superimposes an interface signal on the DC 35V line supplied from the outdoor unit
  to perform communications between indoor and outdoor units. This circuit consists of a transmiting circuit
  which superimposes an interface signal transmit from the microcomputer on the DC 35V line and a
  transmiting circuit which detects the interface signal on the DC 35V line and outputs it to the microcomputer.
- Communications are performed by mutually transmiting and receiving the 4-frame outdoor request signal one frame of which consists of a leader of approx. 100 ms., start bit, 8-bit data and stop bit and the command signal with the same format transmit from the indoor unit.
- From outdoor microcomputer to indoor microcomputer.
  - The request signal output from microcomputer pin (3), (4),(9) is input to the transmitting circuit. The transmitting circuit modulates this signal by approx. 38kHz high-frequency. This high-frequency signal is amplified by a transistor, superimposed on the DC 35V line via C801 (or C811, C821) and L801 (or L802, L803), and supplied to the indoor unit.
  - To prevent erroneous reception, the outdoor microcomputer is designed so that it cannot receive a signal while is is outputting a request signal.
  - The receiving circuit in the indoor unit consists of a comparator and transistor. The interface signal from the outdoor unit on the DC 35V line is supplied to C821, where DC components are eliminated, and is then shaped by the comparator. The shaped signal is detected by diode, amplified by amp, and supplied to receiving input of the indoor microcomputer.
  - Fig. 2-2 shows the voltages at each component when data is transferred from the outdoor microcomputer to the indoor microcomputer.
- Indoor microcomputer to outdoor microcomputer.
  - The communications from the indoor microcomputer to the outdoor micro computer are the same. Fig. 2-3 shows the voltages and waveforms at each circuit.

• Fig. 2-1 shows the interface circuit used for the indoor and outdoor microcomputers to communicate with each other.

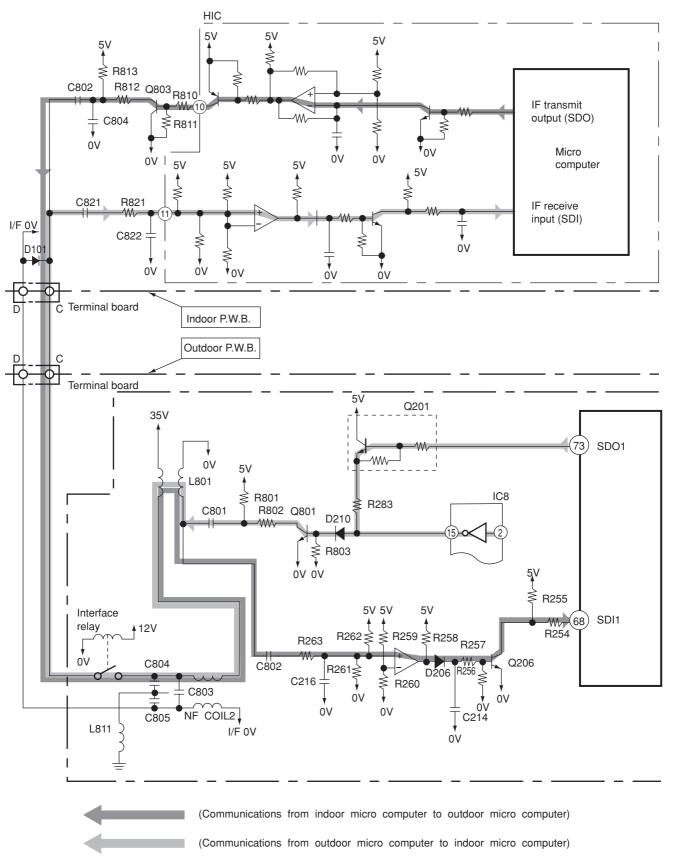


Fig. 2-1 Indoor / Outdoor interface Circuit

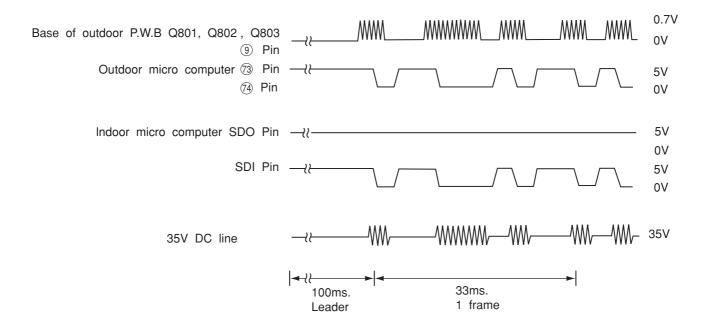


Fig. 2-2 Voltages Waveforms of indoor / Outdoor Micro computers (Outdoor to Indoor Communications)

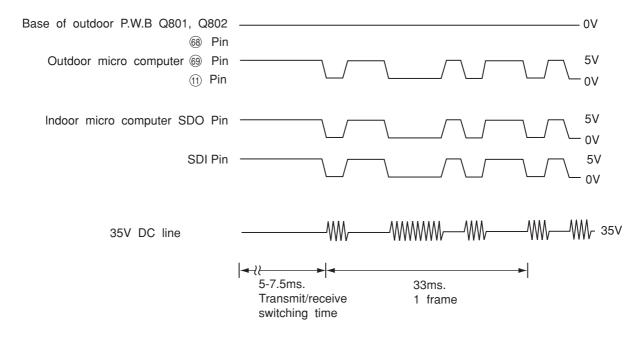


Fig. 2-3 Voltages Waveforms of indoor / Outdoor Micro computers (Indoor to Outdoor Communications)

# 3. Power Module Circuit

Fig. 3-1 shows the system power module and its peripheral circuit. (Current ACT module and power module are combined into one unit.) The three transistors on the positive ⊕ side are called the upper arm, and the three transistors on the negative ⊖ side, the lower arm.

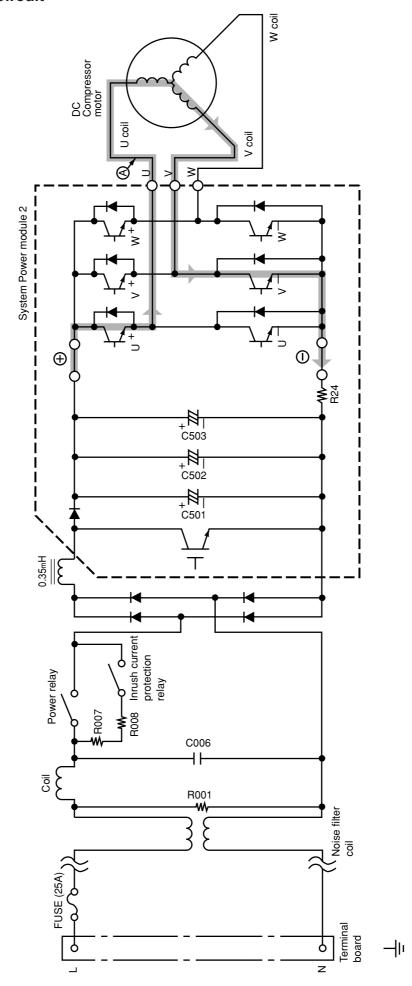


Fig. 3-1 Power module circuit (U<sup>+</sup> is ON, V<sup>-</sup> is ON)

• DC 320-360V is input to power module and power module switches power supply current according to rotation position of magnet rotor. The switching order is as shown in Fig. 3-2.

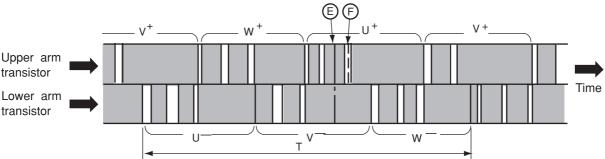


Fig. 3-2 Switching order of power module

- Upper arm transistor is controlled to ON/OFF by 3.2kHz chopper signal. Rotation speed of the compress is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal.
- Time T in Fig. 3-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 X 1/T$$

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

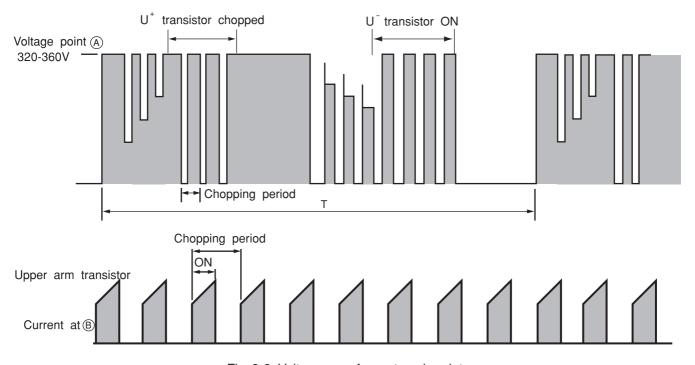


Fig. 3-3 Voltage waveform at each point

- When power is supplied  $U^+ \rightarrow U^-$ , because of that  $U^+$  is chopped, current flows as shown below;  $\mathbb{B}$ 
  - (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. 3-1)
  - (2) When U<sup>+</sup> transistor is OFF: (by inductance of motor coil) U coil → V coil → V<sup>-</sup> transistor → Return diode → Point (A) (Fig. 3-4)

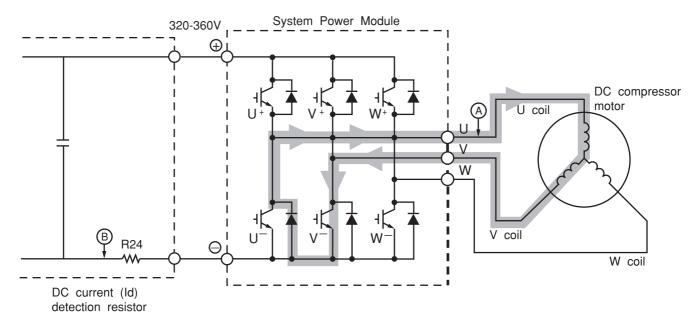
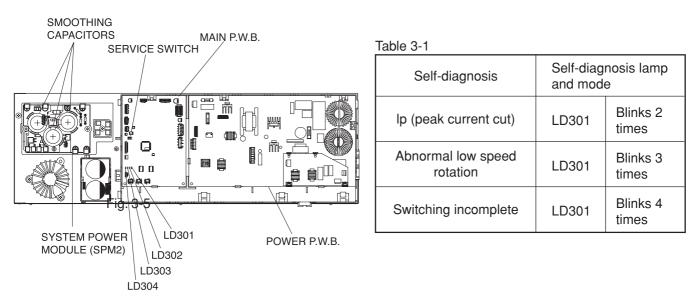


Fig. 3-4 System Power module circuit (U<sup>+</sup> is OFF, V<sup>-</sup> is ON)

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

### <Reference>

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



\*\* From results of power module simple inspection (inspection mode when operated with compressor lead disconnected), LD310 blinks four times about 2 seconds later: Unit has not entered the normal operation.

# 4. Power Supply Circuit

• Fig. 4-1 shows the power circuit.

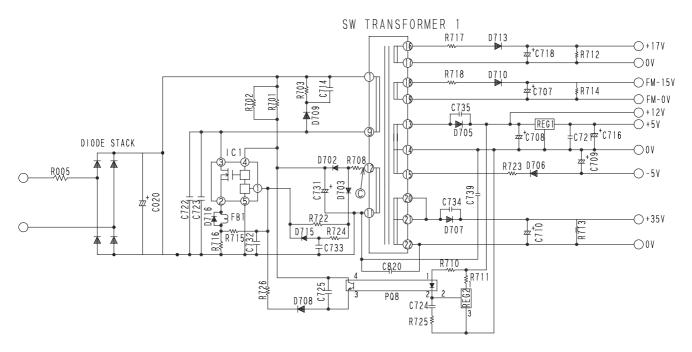


Fig. 4-1 Power circuit for P.W.B.

- There are two switching power supply in Power PWB.
- Switching power supply 1 is generating the secondary power for control circuits and DC35V indoor unit.
- Switching power supply performs voltage conversion effectively by switching transistor IC1 to convert DC330V to high frequency of approximately 20kHz to 200kHz.
- Transistor IC1 operates as follows:

# (1) Shifting from OFF to ON

DC about 330V is applied from smoothing capacitors C020 ⊕ and ⊝ in the control power circuit. With this power, current flows to pin ④ of IC1 via R701 and IC1 starts to turn ON. Since voltage in the direction of arrow generates at point ⓒ at the same time, current passing through R708 and D702 is positive-fed back to IC1.

### (2) During ON

• The drain current at IC1 increases linearly. During this period, the gate voltage and current become constant because of the saturation characteristics of the transformer.

# (3) Shifting from ON to OFF

• This circuit applies a negative feedback signal from the 12V output. When the voltage across C708 reaches the specified value, REG2 turns on and current flows to PQ8 ①-②. This turns the secondary circuits on, sets IC1 pin ① to "Hi", and turns IC1 off.

# (4) During OFF

• While IC1 is on, the following energy charges the primary windings of the transformer:

Energy=LI<sup>2</sup>/2. Here, L: Primary inductance

I: Current when IC1 is off

This energy discharges to the secondary windings during power off. That is, C707-C710, C718 is charged according to the turn ratio of each winding.

- At the start, an overcurrent flows to IC1 because of the charged current at C707-C710, C718.
- The drain current at IC1 generates a voltage across R716. If it exceeds the IC1 base voltage, it sets the IC gate voltage to "HI".
- R716 limits the gate voltage to prevent excessive collector current from flowing to IC1.
- This SW power circuit uses a frequency as low as 20kHz, especially at a low load (when both the indoor and outdoor units stop): This reduces power loss in standby status.

### <Reference>

If the power circuit for P.W.B. seems to be faulty:

- (1) Make sure that 5V, 12V, 15V, 17V and -5V on the control P.W.B. power voltage are the specified values.
- (2) When only the 5V output is low:

  REG 1 (regulator) faulty, 5V-0V shorted, output is too high, or REG 1 is abnormal.
- (3) When 12V and 5V are abnormal:

The following defects can be considered:

- 1) Fan, operation, power, rush prevention relay (shorting in relay, etc.)
- 2) REG 1 (regulator is abnormal), etc.

Shorting on primary circuits.

When shorting occurs in the secondary circuits, there is no abnormality in the primary circuits because of overcurrent protection.

The voltage rises when an opening occurs in the primary circuits, or the feedback system is abnormal.

(4) When 15V and 17V power supply are abnormal:

D710, D713 or Drive circuit is abnormal.

(5) When all voltage are abnormal:

IC1, R716, may possibly be defective. Also D cable may possibly be reverse connected.

If IC1 is abnormal, be aware that other components, such as the power module, REG (regulator), etc. are possibly defective.

[When the switching power supply seems to be abnormal, the voltage between IC1 pin ④ (to be measured at the leads of R701 and R702) and IC1 pin ⑤ (to be measured at R216 lead) may be between 11 and 16V. This is because the protection circuit of IC is operating.]

# 6. Rotor magnetic pole position detection circuit

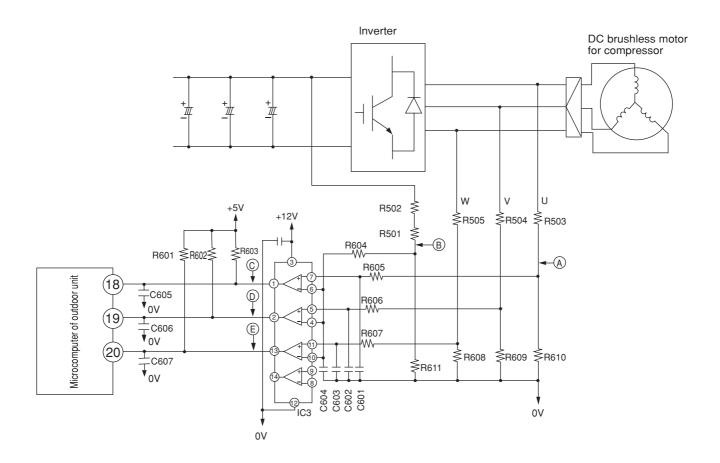


Fig. 6-1 Rotor magnetic pole position detection circuit

When the DC brushless motor is rotated, it also operates as power generator, generating reverse electromotive force according to number of rotations. This reverse electromotive force is voltage-divided by R503 - R505 and R608 - R610, and appears as point A voltage. IC3 compares and digitalizes point A voltage with point B voltage (in which DC voltage (Vd) is voltage-divided by R501, R502 and R611), and inputs this to microcomputer as position detection signals for points C, D and E. Microcomputer switches inverter using optimum timing based on position detection signals, in order to control the rotation of the brushless motor.

# 7. Peripheral circuit of microcomputer

• Fig. 7-1 shows the microcomputer and its peripheral circuits.

Table 7-1, the basic operations of each circuit block, and Fig. 7-2, the system configuration.

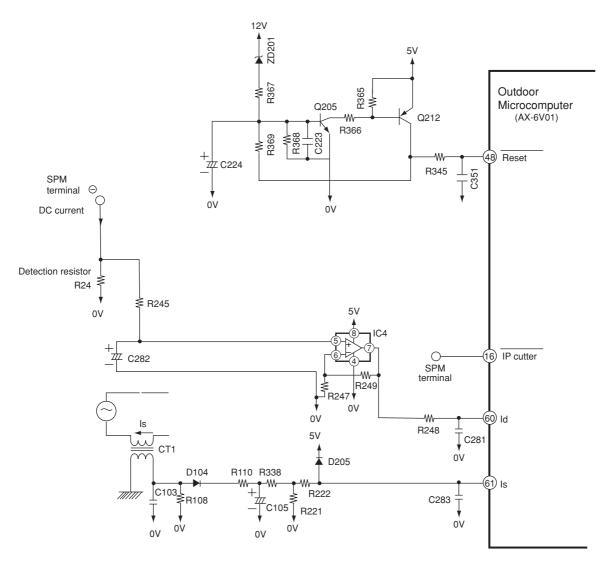


Fig. 7-1 Peripheral circuit of microcomputer (AX-6S)

Table 7-1

Circuit block	Basic operation
Peak current cutoff circuit	This circuit detects DC current flowing power module: When over-current (instantaneous value) flows, it stops upper and lower arm drive circuit and also produces lp signal to stop microcomputer.
Overload external judgment circuit	This circuit detects DC current flowing to power module and produces signal to notify microcomputer of overload status.
Voltage amplifier circuit	This circuit voltage-amplifies DC current level detected by detection resistor and sends it to microcomputer. In addition, setting of internal/external overload judgment is performed.
Reset circuit	This circuit produces reset voltage.

# 8. Overload control circuit (OVL control circuit)

- Overload control is to decrease the speed of the compressor and reduce the load when the load on the air conditioner increases to an overload state, in order to protect the compressor, electronic components and power breaker.
- Overloads are judged by comparing the DC current level and set value.
- Fig. 8-1 shows the overload control system configuration and Fig. 8-2 is a characteristic diagram of
  overload judgement values. There are two judgement methods-external judgement which compares the
  externally set value with the DC current value regardless of the rotation speed and internal judgement
  which compares the set value that varies according to the rotation speed programmed in the microcomputer
  software with the DC current value.

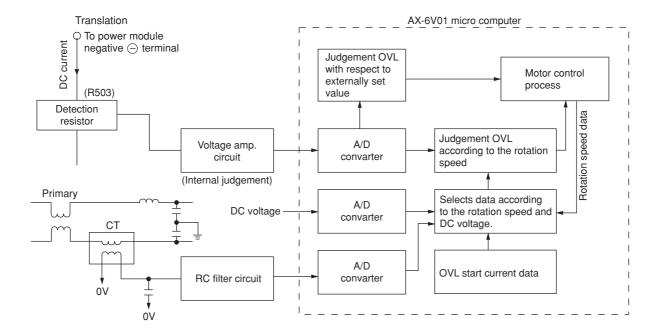


Fig. 8-1 Overload Control System Configuration

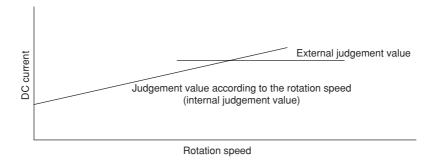


Fig. 8-2

# 9. Reset Circuit

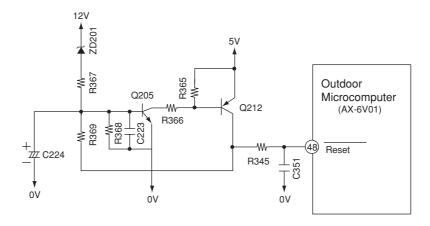


Fig. 9-1

- Reset circuit performs initial setting of the microcomputer program when power is turned on.
- Microcomputer resets program with reset voltage set to Lo, to enable operation at Hi level.
- Fig. 9-1 shows the reset circuit, and Fig. 9-2 shows waveform at each point when power is turned on/ off.
- After power is turned on, 12V line and 5V line voltages rise: When 12V line voltage reaches 7.2V (Zener voltage of ZD201), ZD201 turns ON and Q211 and Q205 turn on, and reset voltage becomes Hi. Reset voltage is not set to Hi until VDD of microcomputer rises to 5V, enabling operation, due to ZD201.
- After power turns off, when 12V line voltage drops, ZD201 also turns OFF.

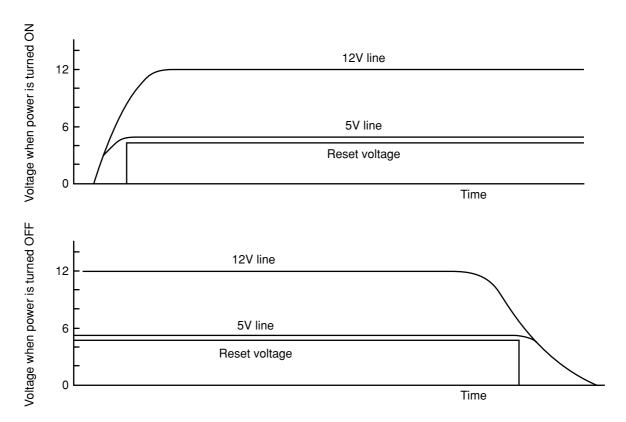


Fig. 9-2

# 10. Temperature Detection Circuit

- The outdoor units (this model) provides with the outdoor temperature thermistor, DEF (defrost) thermistor, OH (overheat) thermistor and electric expansion valve thermistor so that they detect the temperatures of the unit and control the system.
- The circuit of the thermistors is shown as Fig. 10-1 for model RAS-80YHA, and their roles and temperature measuring points are shown as Table 10-1.

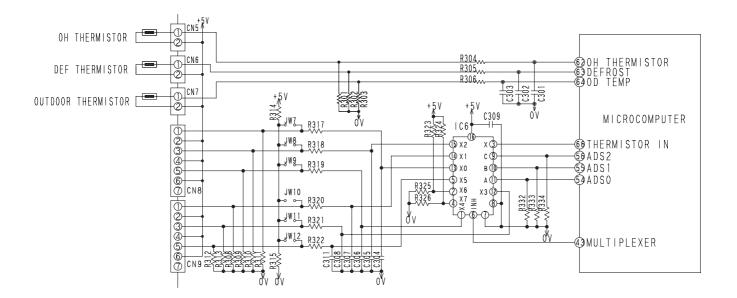


Fig. 10-1 Temperature Detection Circuit

Table 10-1 Name and Role of each thermistor

Name	Connector No	Measuring Point	Role
OH thermistor	CN5	Compressor head	If the temperature of the compressor rises abnormally (118°C), the compressor will be stopped. The temperature is used to decide the operation of the valve.
DEF thermistor	CN6	Heat exchanger	The thermistors decide the defrost operation during heating combined the data of the outside temperature and its data.
Outdoor temperature thermistor	CN7	Outside temperature	Outdoor temperature is used to decide the various operations of the air conditioner.
Electric expansion valve thermistor (NARROW PIPE)	CN8	Indoor unit (NARROW PIPE)	The thermistors detect the temperatures of the piping to the
Electric expansion valve thermistor (WIDE PIPE)	CN9	Indoor unit (WIDE PIPE)	indoor units. The temperatures are used to decide how much the expansion valve is opened.

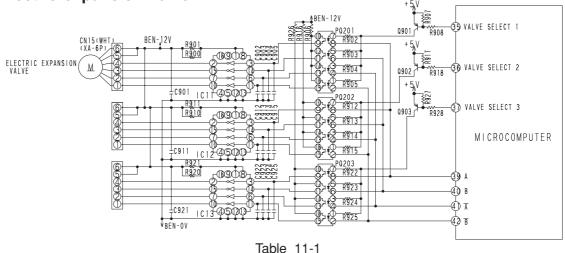
- Table 10-2 shows the correspondence between
  the thermistor's resistance and the temperature.
  They should be used as reference values. The
  value, which you measure, may be slightly
  difference from that in the table. It depends on
  the instrument.
- When you measure the resistance, pull out the connector after turning off the power supply.
   Pulling out the connector while the power supply is turned on will cause troubles.

Table 10-2 Correspondence between each thermistor's resistance and temperature (reference value)

Electric expansion valve thermistor	Temperature	Resistance	Microcomputer pin potential
DEF thermistor	-15°C	12.6kΩ	1.0V
	0°C	6.1kΩ	1.7V
	25°C	2.2kΩ	3.0V
	50°C	860Ω	3.9V
	75°C	400Ω	4.4V
Outdoor temperature	Temperature	Resistance	Potential
thermistor	-15°C	12.6kΩ	1.0V
	0°C	6.1kΩ	1.7V
	15°C	3.2kΩ	2.4V
	30°C	2kΩ	3.1V
OH thermistor	Temperature	Resistance	Potential
	25°C	33.9kΩ	0.5V
	50°C	10.8kΩ	1.3V
	75°C	4.1kΩ	2.4V
	100°C	1.7kΩ	3.4V
	105°C	1.5kΩ	3.6V
	118°C	1kΩ	3.9V

- When the connectors of the thermistors are disconnected or the thermistors is open or short, LD301 (red) lights and LD302 (red) blinks so that they indicate troubled parts. Combinations of LD301 and LD302 are set up for indicating troubled thermistors. The correspondences between the number of blink time and troubled parts are shown as Table 10-3. Look in the table (LD301 and LD302 blink) for troubled parts, and if the disconnections of them are checked out, they are replaced.
- If you can see two or more troubled thermistors, a small number of blink takes precedence of others.
- The electric expansions valve thermistor is put togrther with 3 pieces, when replacing the thermistor, replace one set of 3 pieces as taking care of positioning. If you don't do so, the unit may not operate normally and its cooling performance may drop.
- Be ware that only an open-circuit for OH thermistor has to be checked in 5 minutes after the compressor starts.
- If the unit operates abnormally after replacing the thermistor, replace the control P.W.B. because it malfunctions.

### 11. Electric expansion valve



- The electric expansion valve is driven by DC 12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control 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; they are about 12V when no power is supplied. When power is reset, initialization is performed for 10 or 20 seconds.
   During initialization, measure all voltages at pins 4 to 1 of CN15 using mutimeter. If there is any pin with voltage that has not changed from around 0.9V or 12V, expansion valve or microcomputer is defective.
- Fig. 11-2 shows logic waveform when expansion valve is operating.

Drive status Pin Lear hase No. wire 1 2 3 4 5 6 7 8 (4) White ON ON OFF OFF OFF OFF OFF ON (3) OFF OFF OFF Yellow ON ON ON OFF OFF (2) OFF OFF OFF OFF OFF ON ON ON Orange (1) OFF OFF OFF OFF OFF ON ON ON Blue Operation mode 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 VALVE CLOSE  $8 \rightarrow 7 \rightarrow 6 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1$ VALVE OPEN

Table 11-2

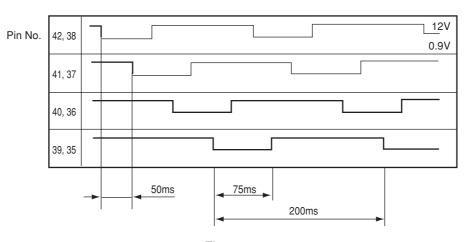


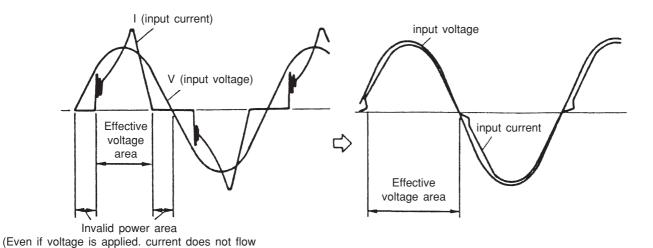
Fig. 11-2

With expansion valve control, opening degree is adjusted to stabilize target temperature, by detecting temperature of compressor head.

The period of control is about once per 20 seconds, and output a few pulses.

### 12. Power Factor Control Circuit

Power factor is controlled by almost 100%. (Effective use of power) With IC in ACT module, control is performed so that input current waveform will be similar to waveform of input voltage.



\*Assuming the same current capacity (20A), power can be used about 10% effective, comparing with curent use (power factor of 90%), and maximum capacity is thereby improved.

### **SERVICE CALL Q & A**

### **COOLING MODE**



The compressor has stopped suddenly during cooling operation.



Check if the 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**



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



Normal sound when refrigerant flows in pipe.



Compressor occasionally does not operate during dehumidifying.



Compressor may not operate when room temperature is 10°C or less. It also stops when the humidity is preset humidity or less.

### **HEATING MODE**



The circulation stops occasionally during Heating mode.



It oo ing.

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



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



(A5))

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



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



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

## **AUTO FRESH DEFROSTING**



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



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

### **AUTO OPERATION**



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



At this point fan speed is automatic.

### **NICE TEMPERATURE RESERVATION**



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



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.



Does "Nice temperature reservation" function operate during dehumidifying?



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

Q11)

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



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.

### INFRARED REMOTE CONTROL



Timer cannot be set.



(A12)

Has the clock been set? Timer cannot be set unless the clock has been set.

Q13)

The current time display disappears soon.



The current time disappears in approx. 10 seconds. The time set display has priority.

When the current time is set the display flashes for approx 3 minutes.

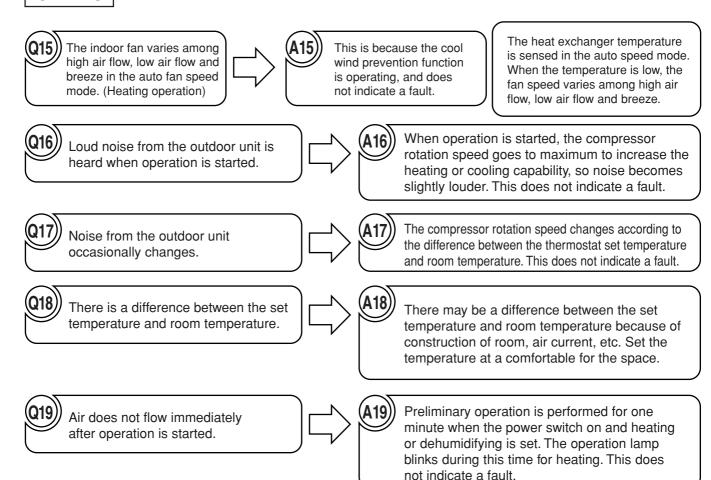
Q14)

The timer has been programmed, but the preset time disappears.



Is the current time past the preset time? When the preset time reaches the current time, it disappears.

### **OTHERS**



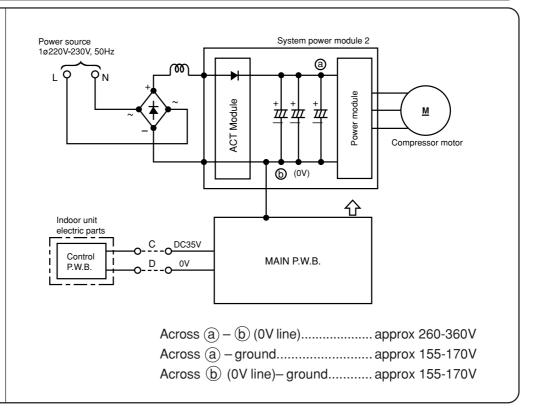
### TROUBLE SHOOTING

### PRECAUTIONS FOR CHECKING



- Remember that the 0V line is biased to 155-170V 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.

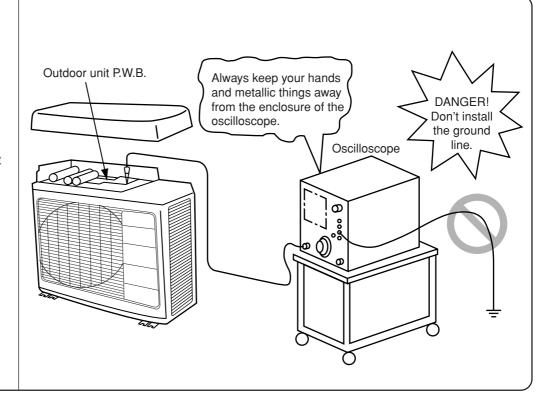






When using an oscilloscope, never ground it. Don't forget that high voltages as noted above may apply to the oscilloscope.





### DISCHARGE PROCEDURE AND POWER SHUT OFF METHOD FOR POWER CIRCUIT



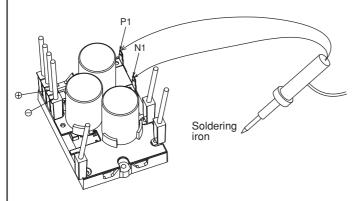
#### Caution

Voltage of about 300-330V is charged between both ends of smoothing capacitors



 During continuity check for each part of circuit in indoor unit electrical parts, disconnect red/gray lead wire connected from diode stack to system power module (SPM2) to prevent secondary trouble. (Be sure to discharge smoothing capacitor)

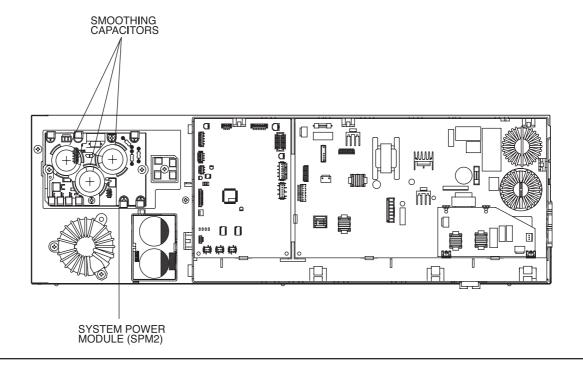
- 1. Turn OFF the Power supply to the outdoor unit.
- 2. After power is turned off, wait for 10 minutes or more. Then, remove electrical parts cover and apply soldering iron of 30 to 75W for 15 seconds or more to P2 and N1 terminals on system power module, in order to discharge voltage in smoothing capacitor.
- 3. Remove receptable of red/gray lead wire connected to system power module from diode stack before performing operation chech of each circuit.



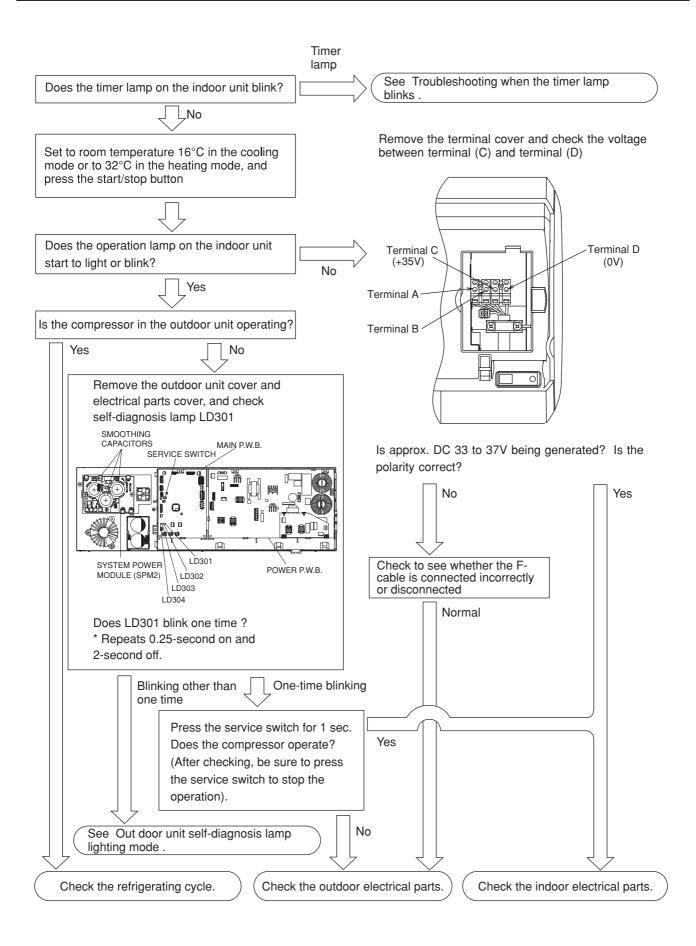
System power module

Do not use a soldering iron with transformer: If one is used, thermal fuse inside transformer will be blown

As shown above, apply soldering iron to metal parts (receptable) inside the sleeve corresponding to P1 and N1 terminals of system power module: Do this with smoothing capacitors kept connected. By removing red/gray lead wire from diode stack, power supply can be shut off. (corresponding to +) and -> terminals of system power module)



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



### TROUBLESHOOTING WHEN TIMER LAMP BLINKS.

Perform troubleshooting according to the number of times the indoor timer lamp and outdoor LD301 blink.

### SELF-DIAGNOSIS LIGHTING MODE

No.	Blinking of Timer lamp	Reason for indication	Possible cause
1		Reversing valve defective When the indoor heat exchanger temperature is too low in the heating mode or it is too high in the cooling mode.	<ul> <li>(1) Reversing valve defective</li> <li>(2) Heat exchanger thermistor disconnected         (only in the heating mode)</li> <li>(Note)</li> <li>The malfunction mode is entered the 3rd time this abnormal indication appears (read every 3 minutes).</li> </ul>
2		Outdoor unit forced operation When the outdoor unit is in forced operation or balancing operation after forced operation	Electrical parts in the outdoor unit
3		Indoor/outdoor interface defective When the interface signal from the outdoor unit is interrupted.	(1) Indoor interface circuit (2) Outdoor interface circuit
4		Outdoor electrical assembly defective.	Please check at the outdoor electrical led lamp blinking (LD301) and refer to self diagnosis lighting mode for outdoor unit.
5		Room thermistor or heat exchanger thermistor is faulty When room thermistor or heat exchanger thermistor is opened circuit or short circuit.	(1) Room thermistor (2) Heat exchanger thermistor
6		Over-current detection at the DC fan motor when over-current is detected at the DC fan motor of the indoor unit.	<ul><li>(1) Indoor fan locked</li><li>(2) Indoor fan motor</li><li>(3) Indoor control P.W.B.</li></ul>
7		IC401 or IC402 data reading error When data read from IC401 or IC402 is incorrect.	IC401 or IC402 abnormal

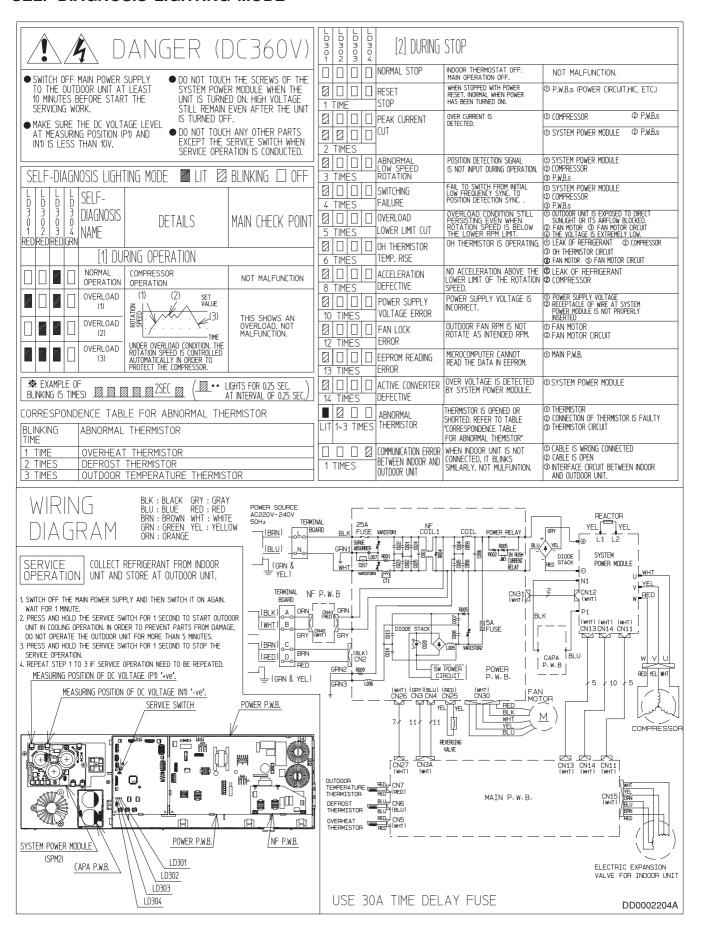
( $\underline{\blacksquare}$  -- Lights for 0.5 sec. at interval of 0.5 sec..)

### <Cautions>

**%1** 

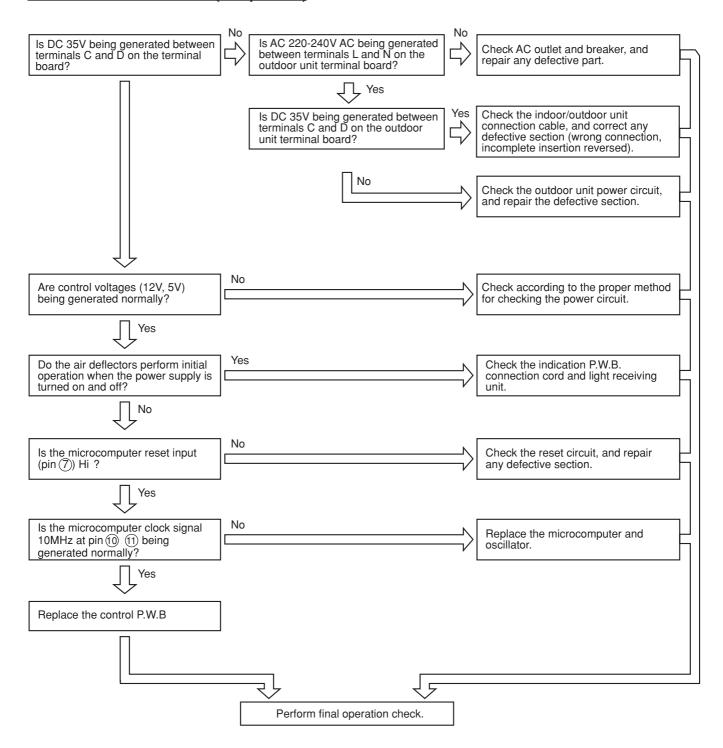
- (1) If the interface circuit is faulty when power is supplied, the self-diagnosis display will not be displayed.
- (2) If the indoor unit does not operate at all, check to see if the F-cable is connected or disconnected.
- (3) To check operation again when the timer lamp is blinking, you can use the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

### SELF-DIAGNOSIS LIGHTING MODE

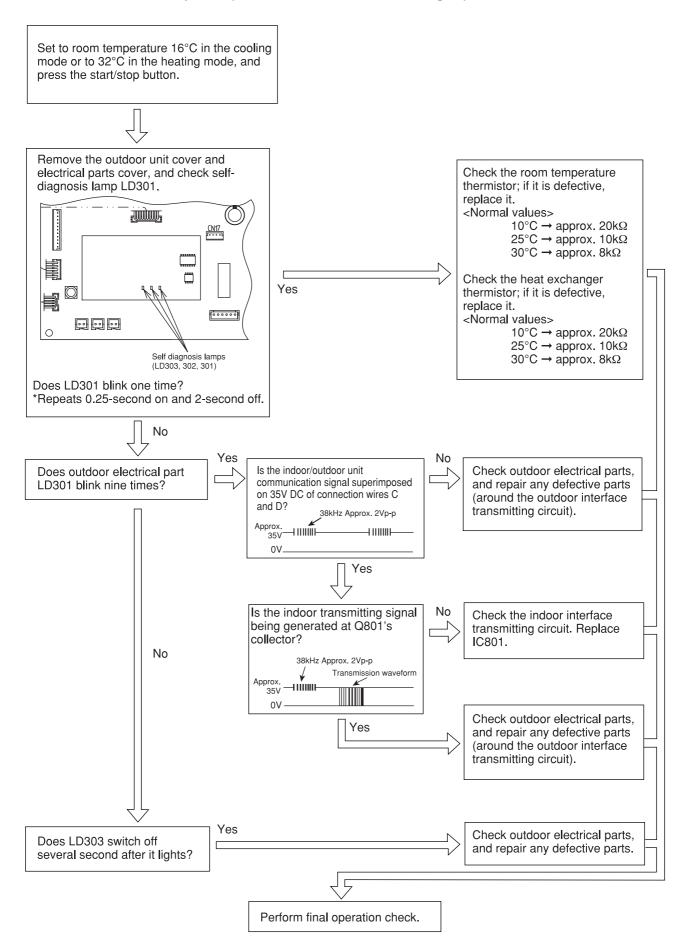


### CHECKING INDOOR UNIT ELECTRICAL PARTS

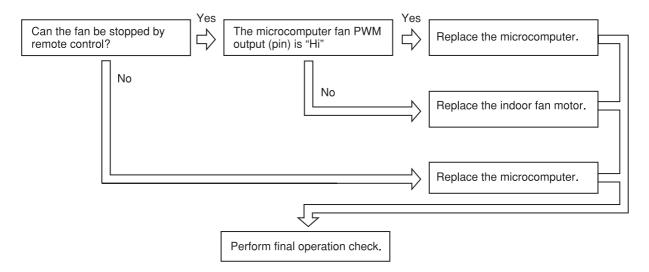
### 1. Power does not come on (no operation)



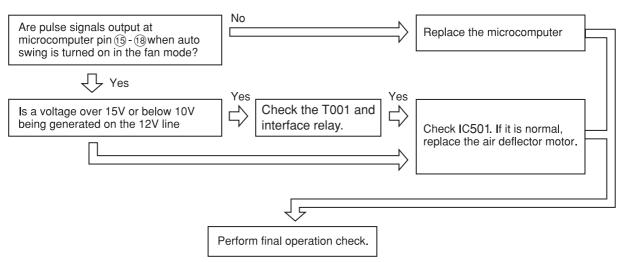
### 2. Outdoor unit does not operate (but receives remote infrared signal)



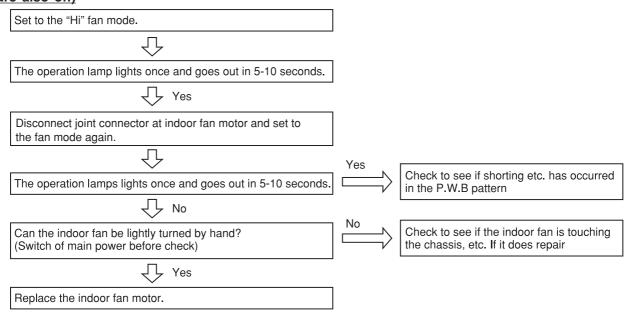
### 3. Only indoor fan does not operate (other is normal)



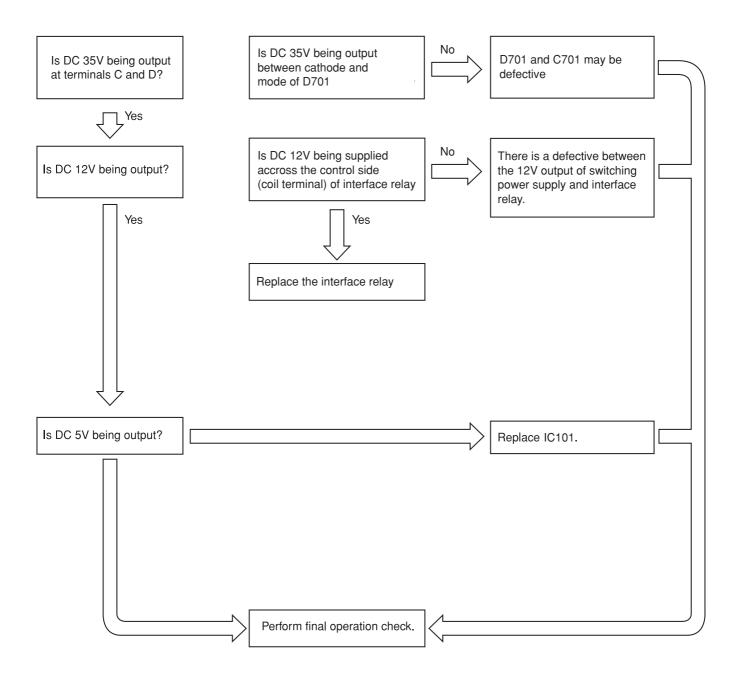
### 4. Air deflector does not move (others are normal)



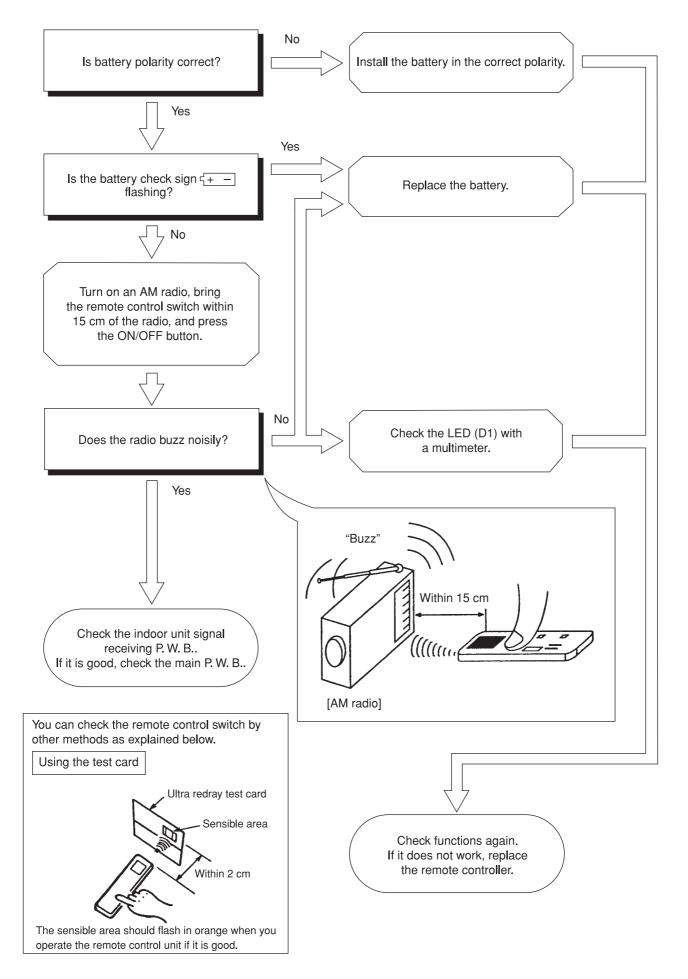
# 5. All systems stop from several seconds to several minutes after operation is started (all indicators are also off)

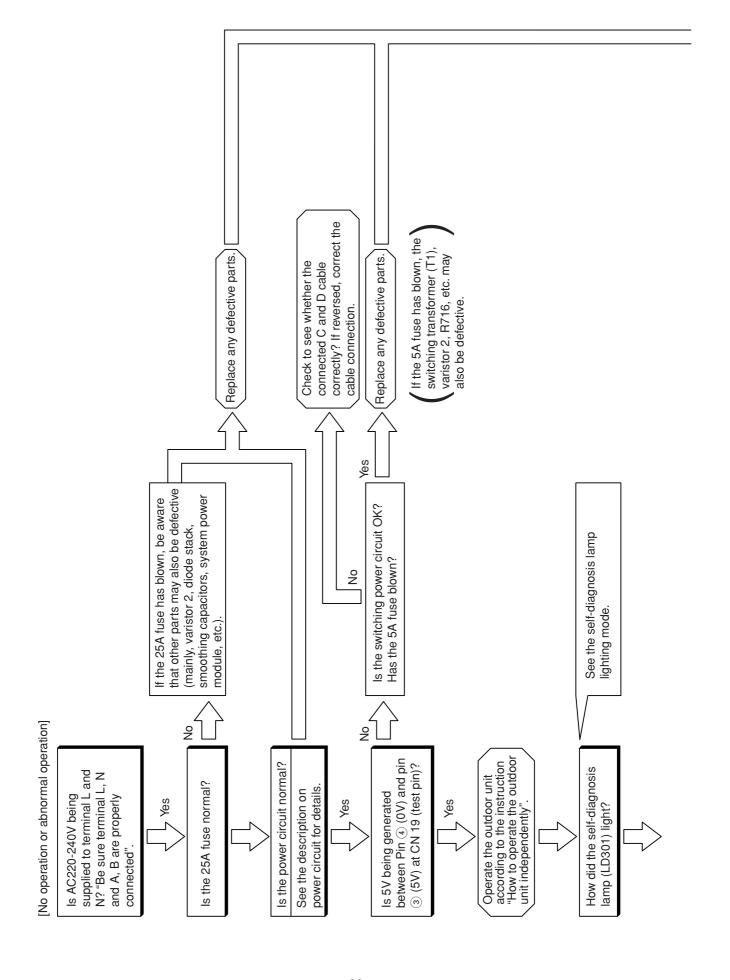


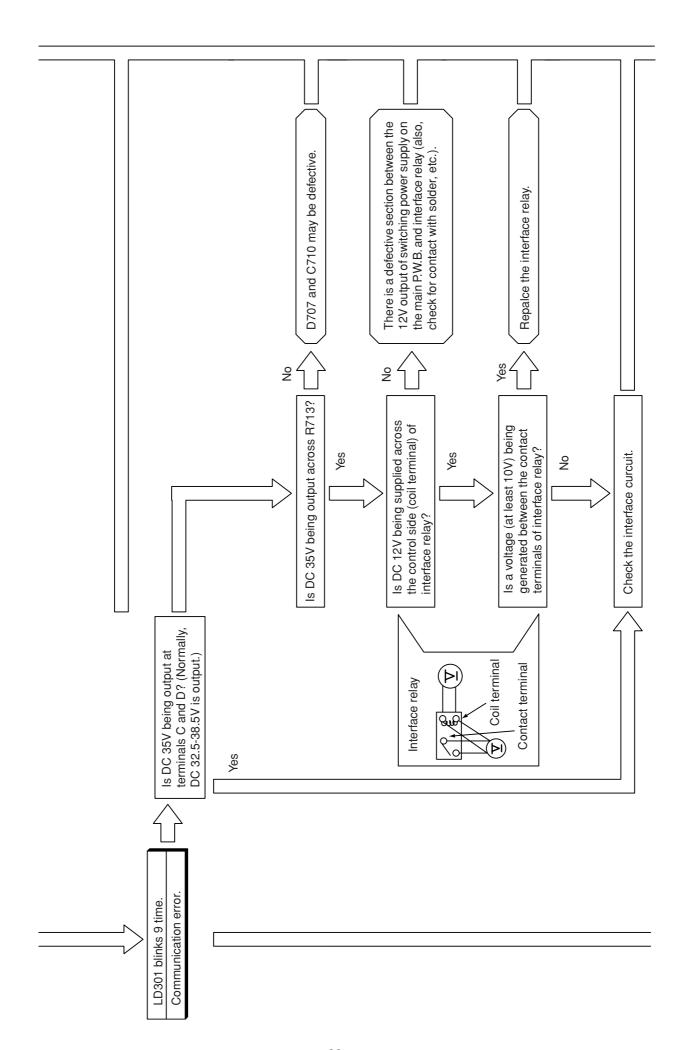
### 6. Check the main P.W.B (power circuit)

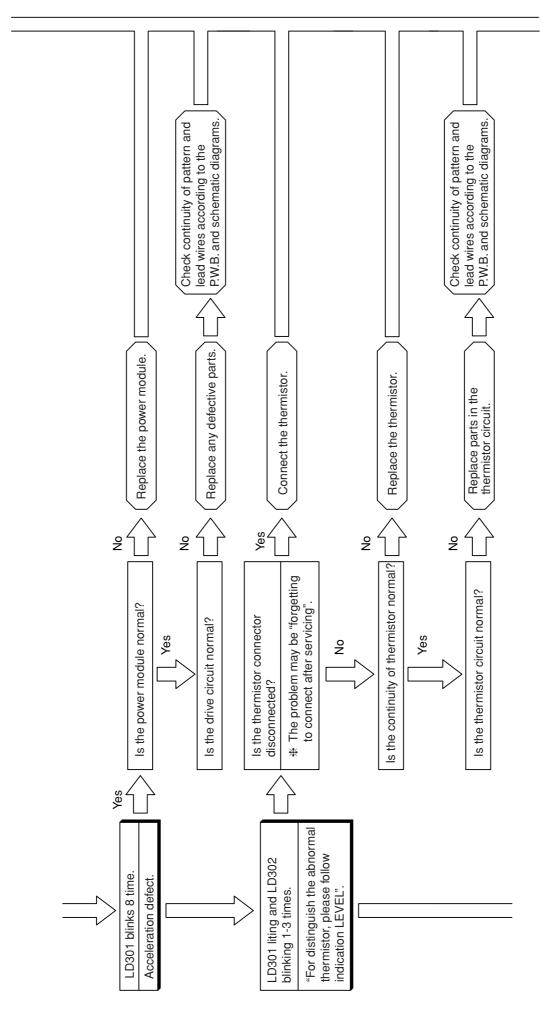


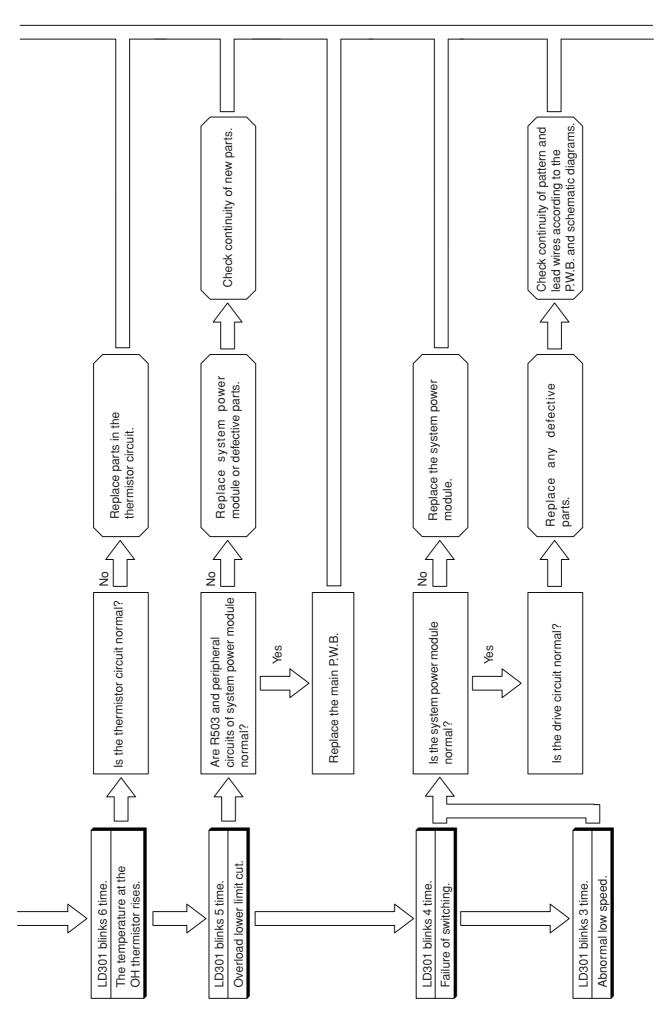
### CHECKING THE REMOTE CONTROLLER

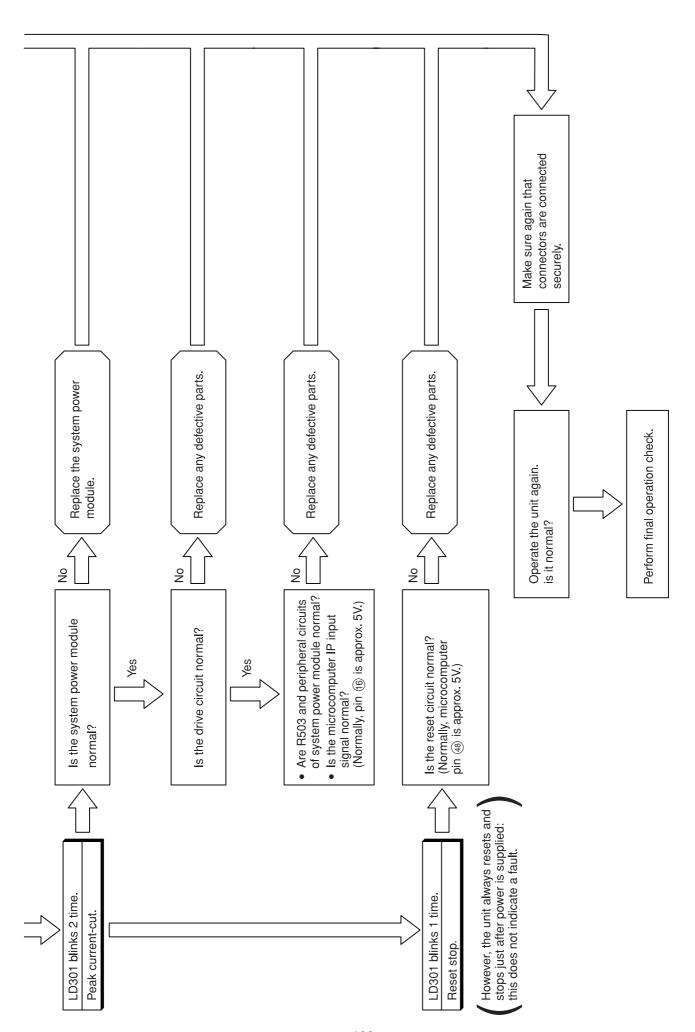






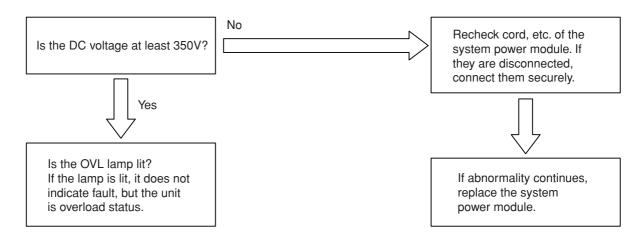






# **POWER CIRCUIT**

### Phenomenon 1 < Rotation speed does not increase>

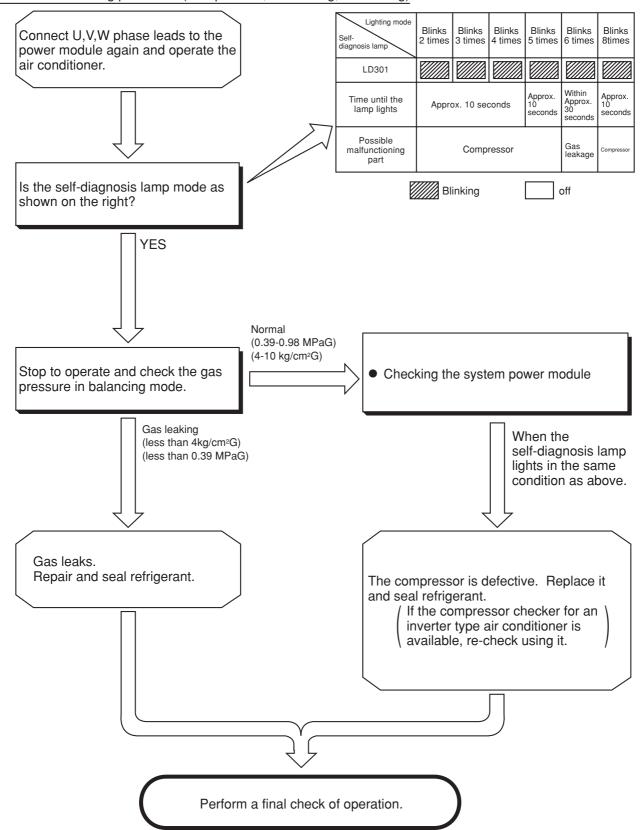


Overvoltage defect: system power module faulty (15-times blinking)

### CHECKING THE REFRIGERATING CYCLE

# (JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

### 1. Troubleshooting procedure (No operation, No heating, No cooling)



### **HOW TO CHECK SYSTEM POWER MODULE**

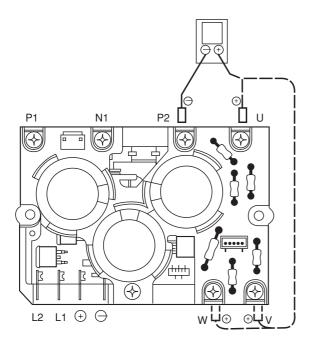
### Checking system power module using tester

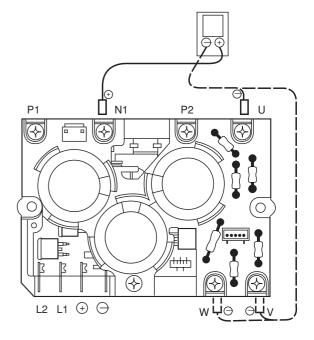
Set tester to resistance range (X 100)

If indicator does not swing in the following conductivity check, the system power module is normal. (In case of digital tester, since built-in battery is set in reverse direction, (+) and (-) terminals are reversed.)

### **△** CAUTION

If inner circuit of system power module is disconnected (open), the indicator of tester will not swing and this may assumed as normal. In this case, if indicator swings when  $\bigoplus$  and  $\bigoplus$  terminals are connected in reverse of diagram below, it is normal. Furthermore, compare how indicator swings at U, V and W phases. If indicator swings the same way at each point, it is normal.



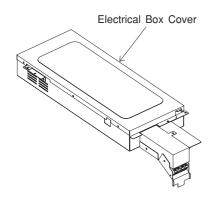


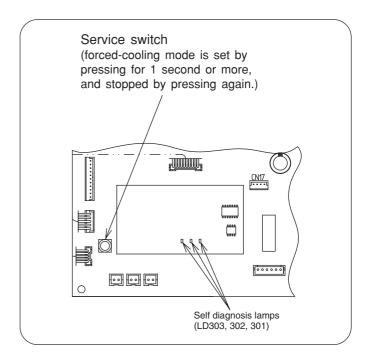
### HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

- 1. Turn off the power supply to outdoor unit and then turn on again.
- 2. Remove the electrical box cover.

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

Never operate the unit for more than 5 minutes.





#### (Cautions)

- (1) If interface signal (DC 35V) terminals C and D are not connected when the outdoor unit is in forced cool mode, the outdoor unit defect indicator (LD301) will blink 9 times during 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 push the service switch again to stop the forced cool operation.

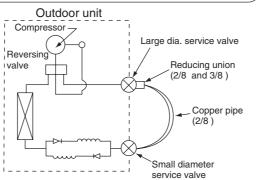
## HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

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

Outdoor unit

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

Charge refrigerant of 300g after vacuuming (  $\mbox{\% 1}$  )



Parts to be prepared

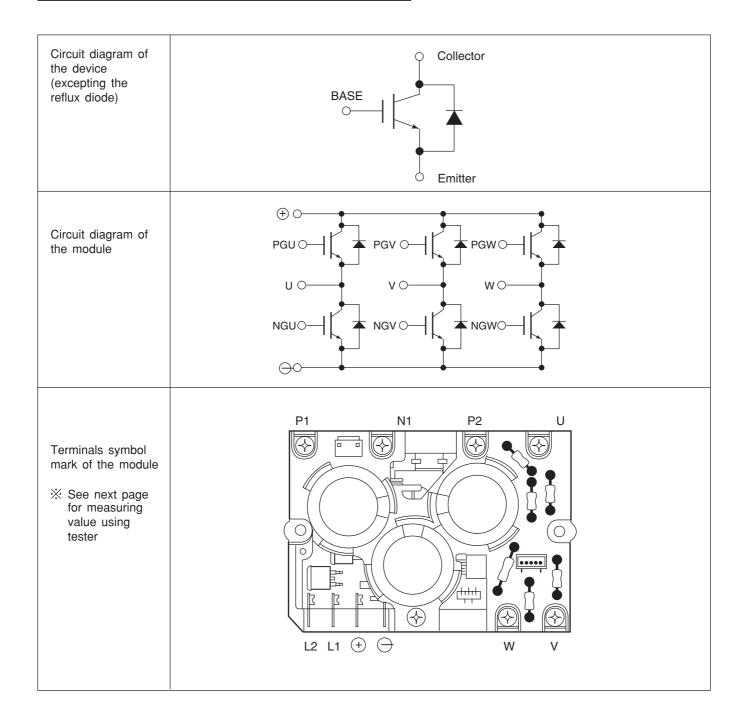
- (1) Reducing union 2/8" (6.35mm) 1/2" (12.7mm)
- (2) Copper pipe (2/8" and 1/2")

Do not operate for more than 5 minutes

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.

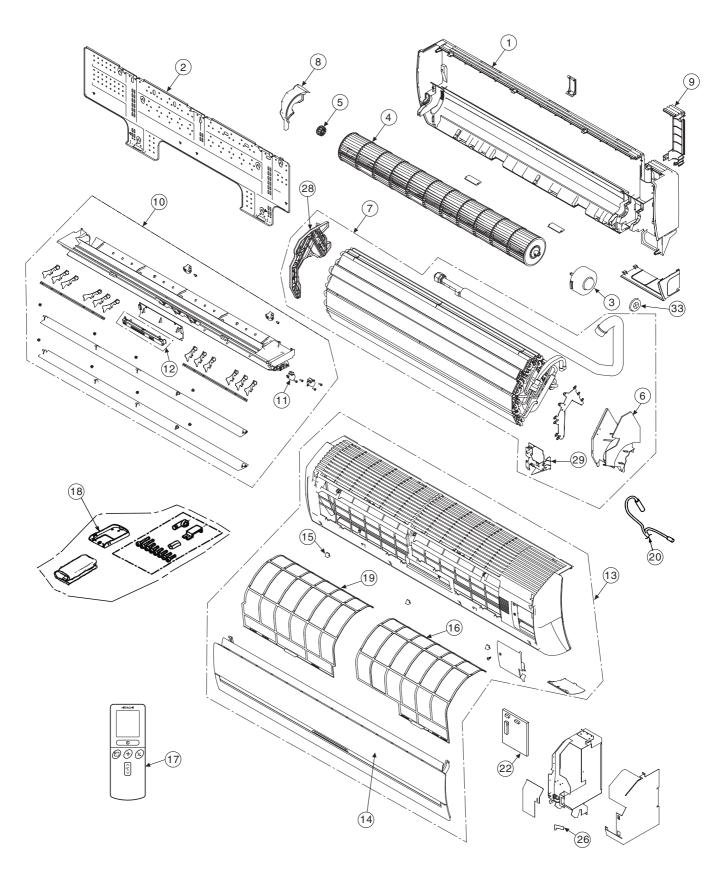
# SYSTEM POWER MODULE DIAGNOSIS



# PARTS LIST AND DIAGRAM

# **INDOOR UNIT**

**MODEL: RAS-80YH5A** 



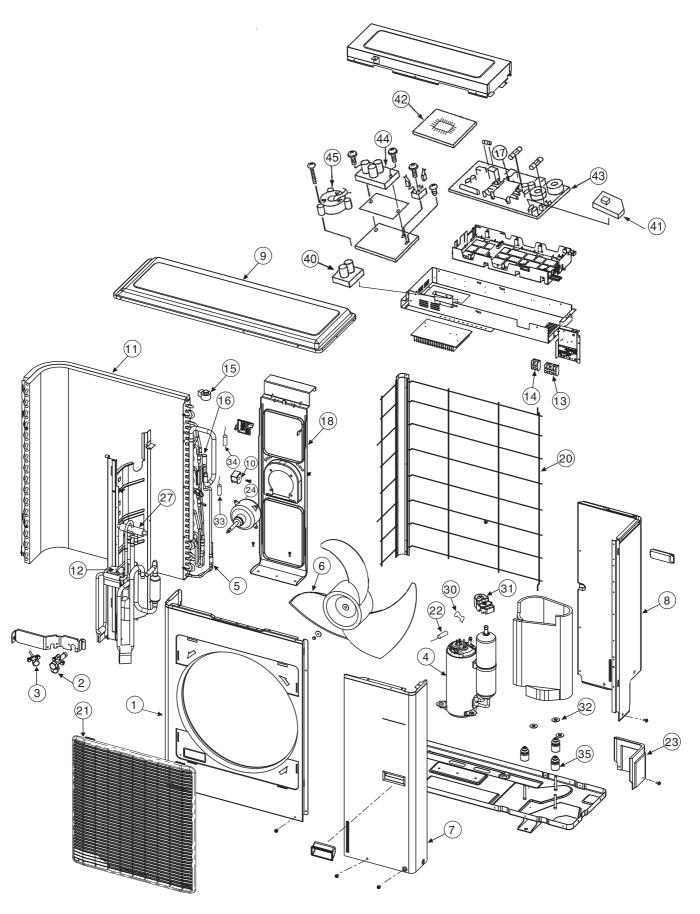
### MODEL RAS-80YH5A

NO.	PART NO. RAS-80YH5A		Q'TY / UNIT	PARTS NAME
1	PMRAS-72CHA3	002	1	CABINET ASSY
2	PMRAS-72CHA3	R13	1	MOUNTING PLATE
3	PMRAS-80YHA	R01	1	FAN MOTOR
4	PMRAS-80YHA	R04	1	TANGENTIAL FAN
5	PMRAS-72CHA3	017	1	P-BEARING ASSY
6	PMRAS-72CHA3	007	1	FAN MOTOR SUPPORT
7	PMRAS-80YHA	R06	1	CYCLE ASSY
8	PMRAS-72CHA3	005	1	BEARING COVER
9	PMRAS-72CHA3	029	1	PIPE SUPPORT (U-COVER)
10	PMRAS-80YHA	R05	1	DRAIN PAN ASSY
11	PMRAS-72CHA3	R01	4	AUTO SWEEP MOTOR
12	PMRAS-72CHA3	R14	1	P.W.B (LED)
13	PMRAS-80YH5	003	1	FRONT COVER ASSY
14	PMRAS-80YH5	002	1	FRONT PANEL
15	PMRAS-10C7M	800	3	CAP
16	PMRAS-72CHA3	009	1	FILTER (R)
17	PMRAS-80YH5A	R02	1	REMOTE CONTROL ASSY
18	PMRAS-10C3M	003	1	REMOTE CONTROL SUPPORT
19	PMRAS-72CHA3	800	1	FILTER (L)
20	PMRAS-72CHA3	022	1	THERMISTOR
22	PMRAS-80YH5A	R01	1	P.W.B (MAIN)
26	PMRAS-72CHA3	R15	1	P.W.B (RECEIVER)
28	PMRAS-72CHA3	024	1	FAN COVER
29	PMRAS-72CHA3	018	1	PIPE COVER
33	PMRAS-72CHA3	028	1	FAN MOTOR RUBBER

# PARTS LIST AND DIAGRAM

# **OUTDOOR UNIT**

MODEL: RAC-80YH5



### MODEL RAC-80YH5

NO.	PART NO. RAC-80YH5		Q'TY / UNIT	PARTS NAME
1	PMRAC-30CVP1	901	1	CABINET
2	PMRAC-80YHA	905	1	VALVE (5S)
3	PMRAC-50NH4	S03	1	VALVE (2S)
4	PMRAC-80YHA	902	1	COMPRESSOR
5	PMRAC-80YHA	908	1	STRAINER (COND)
6	PMRAC-30CVP1	903	1	PROPELLER FAN
7	PMRAC-81CHA3	909	1	SIDE PLATE
8	PMRAC-80YHA	917	1	BACK PLATE
9	PMRAC-30CVP1	906	1	TOP COVER
10	PMRAC-80YHA	S07	1	COIL (REVERSING VALVE)
11	PMRAC-80YHA	903	1	CONDENSER
12	PMRAC-80YHA	909	1	STRAINER (PIPE)
13	PMRAC-25NH4	S13	1	TERMINAL BOARD (4P)
14	PMRAC-63CA1	S02	1	TERMINAL BOARD (2P)
15	PMRAC-80YHA	903	1	ELECTRICAL EXPANSION COIL
16	PMRAC-80YHA	906	1	EXPANSION VALVE
18	PMRAC-80YHA	915	1	FAN MOTOR SUPPORT
20	PMRAC-80YHA	916	1	NET
21	PMRAC-81CHA3	904	1	GRILL
22	PMRAC-80YHA	S14	1	OH TERMISTOR
23	PMRAC-30CVP1	911	1	PIPE COVER (BACK)
24	PMRAC-80YHA	904	1	FAN MOTOR
27	PMRAM-22NHZ4	S01	1	REVERSING VALVE
30	PMRAC-25NH4	S09	1	OVERHEAD THERMISTOR SUPPORT
31	PMRAC-25NH4	910	1	OVERLOAD RELAY COVER
32	KPNTI	001	3	PUSH NUT
33	PMRAC-70YHA	913	1	THERMISTOR (DEFROST)
34	PMRAM-65QH4	S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
35	RAC-2226HV	805	3	COMPRESSOR RUBBER
40	PMRAC-80YHA	S12	1	CAPACITOR BOARD
41	PMRAC-80YHA	913	1	NOISE FILTER BOARD
42	PMRAC-80YHA	901	1	PWB MAIN
43	PMRAC-80YHA	911	1	POWER BOARD
44	PMRAC-80YHA	S10	1	SYSTEM POWER MODULE
45	PMRAC-18SH4	S01	1	REACTOR

# **HITACHI**