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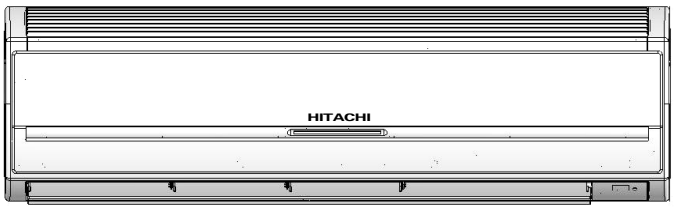
PM | NO. 0465E

RAS-70YH7/RAC-70YH7

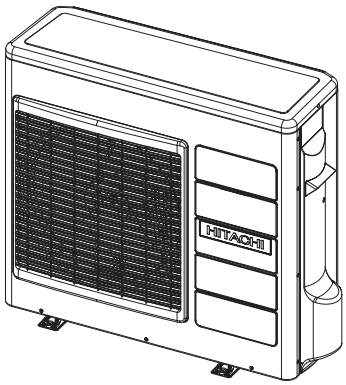
SERVICE MANUAL
TECHNICAL INFORMATION

REFER TO THE FOUNDATION MANUAL

FOR SERVICE PERSONNEL ONLY



RAS-70YH7



RAC-70YH7

CONTENTS

SPECIFICATIONS

TYPE			(WALL TYPE)	
			INDOOR UNIT	OUTDOOR UNIT
MODEL			RAS-70YH7	RAC-70YH7
POWER SOURCE			1 Ø, 50/60 Hz, 220-240V	
COOLING	TOTAL INPUT	(W)	2,170 (200 – 2,820)	
	TOTAL AMPERES	(A)	9.95	
	CAPACITY	(kW)	7.00 (1.50 – 8.00)	
		(B.T.U./h)	23,900 (5,120 – 27,315)	
HEATING	TOTAL INPUT	(W)	2,200 (200 – 2,970)	
	TOTAL AMPERES	(A)	10.10	
	CAPACITY	(kW)	8.00 (1.50 – 9.20)	
		(B.T.U./h)	27,300 (5.119 – 31,396)	
DIMENSIONS (mm)		W	1150	850
		H	333	800
		D	245	298
NET WEIGHT		(kg)	15	55

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

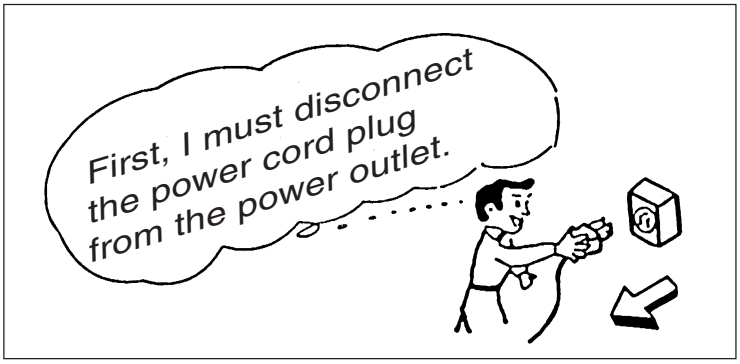
ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

JANUARY 2010 Refrigeration & Air-Conditioning Division

SAFETY DURING REPAIR WORK

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



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

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

3. After completion of repairs, the initial state should be restored.

4. Lead wires should be connected and laid as in the initial state.

5. Modification of the unit by 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 occurence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.

8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit. The insulation resistance should be 1MΩ or more as measured by a 500V DC megger.

9. The initial location of installation such as window, floor or the other should be checked for being 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.

10. 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).

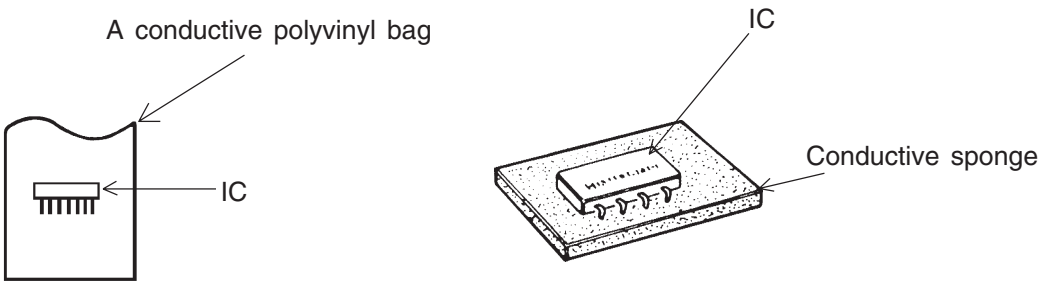


Fig. 1. Conductive Container

   (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.

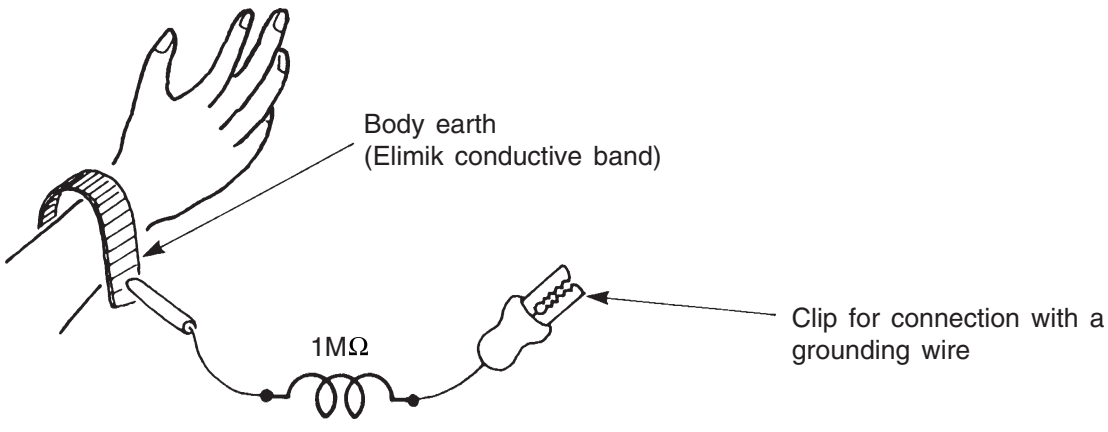


Fig. 2. Body Earth

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

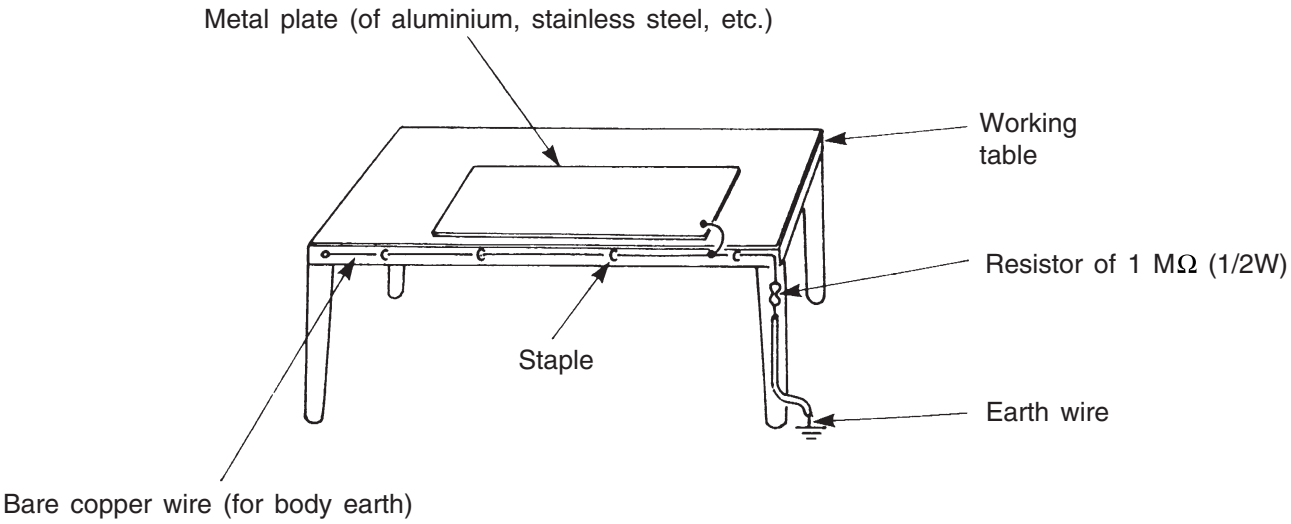


Fig. 3. Grounding of the working table

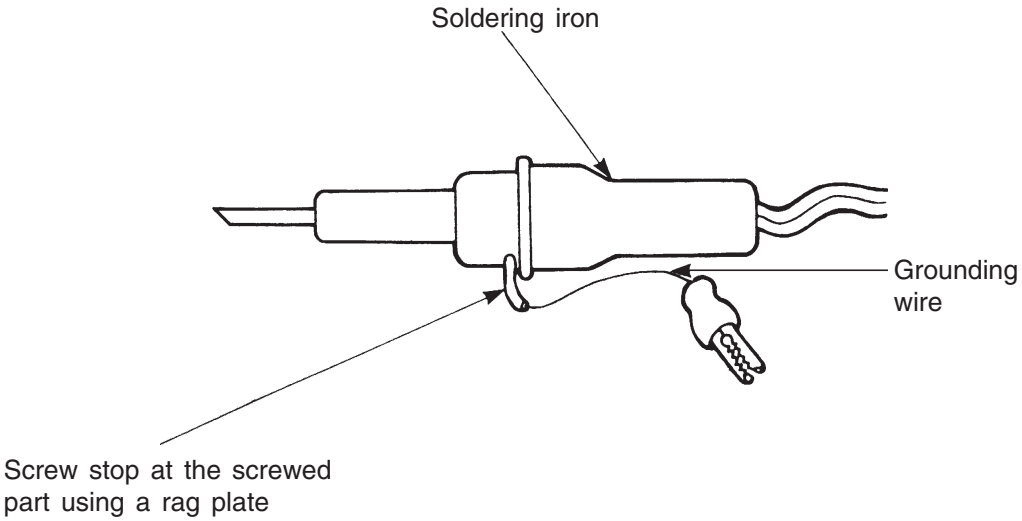


Fig. 4. Grounding a soldering iron

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

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

⚠ CAUTION

1. In quiet or stop 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 (14°F).

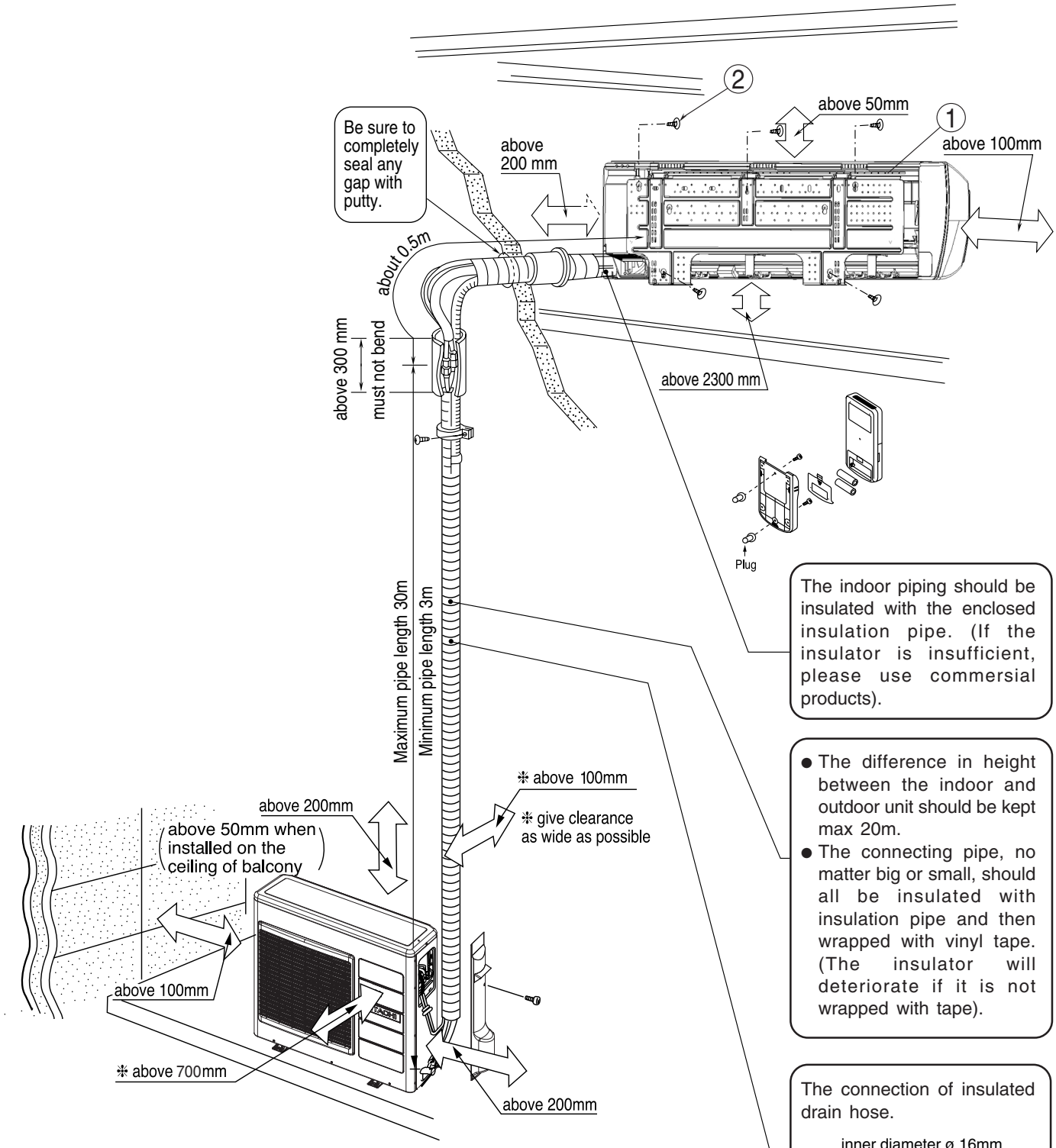
6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below –15°C (5°F).
   If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.

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-70YH7	RAC-70YH7
FAN MOTOR		30 W	47 W
FAN MOTOR CAPACITOR		NO	NO
FAN MOTOR PROTECTOR		NO	NO
COMPRESSOR		–	JU1015D9
COMPRESSOR MOTOR CAPACITOR		NO	NO
OVERLOAD PROTECTOR		NO	NO
OVERHEAT PROTECTOR		NO	YES
FUSE (MICRO COMPUTER CIRCUIT)		3.15A	NO
POWER RELAY		G4A	G4A
POWER SWITCH		NO	NO
TEMPORARY SWITCH		YES	NO
TEST/SERVICE SWITCH		NO	YES
TRANSFORMER		NO	NO
VARISTOR		416NR	450NR
NOISE SUPPRESSOR		NO	NO
THERMOSTAT		YES(IC)	YES(IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
FUSE CAPACITY		30 A TIME DELAY FUSE	
REFRIGERANT CHARGING VOLUME (Refrigerant R410A)	UNIT	----------	❊ 1850g
	PIPES (MAX. 30m) (MIN. 3m)	CHARGELESS	

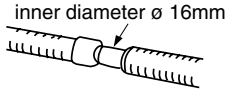
Figure showing the installation of Indoor and Outdoor unit



The indoor piping should be insulated with the enclosed insulation pipe. (If the insulator is insufficient, please use commersial products).

- The difference in height between the indoor and outdoor unit should be kept max 20m.
- The connecting pipe, no matter big or small, should all be insulated with insulation pipe and then wrapped with vinyl tape. (The insulator will deteriorate if it is not wrapped with tape).

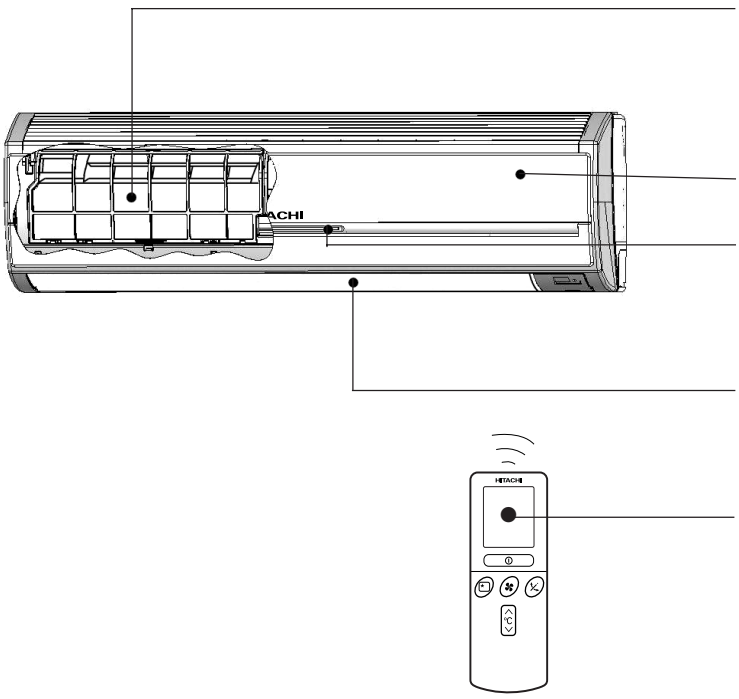
The connection of insulated drain hose.



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

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT



AIR FILTER
To prevent dust from coming into the indoor unit.
(Refer Instruction manual)

FRONT PANEL (AIR INLET).

INDOOR UNIT INDICATORS
Light indicator showing the operating condition.
(Refer page 8)

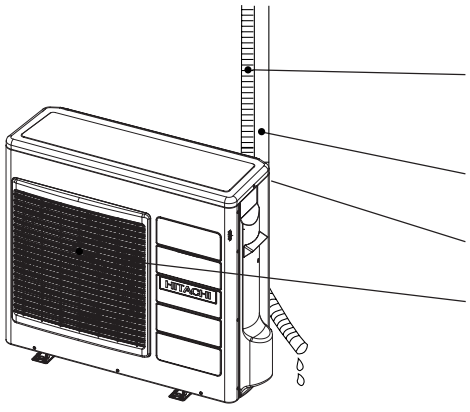
HORIZONTAL DEFLECTOR ● VERTICAL DEFLECTOR (AIR OUTLET)
(Refer Instruction manual)

REMOTE CONTROLLER
Send out operation signal to the indoor unit. So as to operate the whole unit.
(Refer Instruction manual)

NOTE

- Air cleansing filters are not 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



DRAIN PIPE
Condensed water drain to outside.

CONNECTING CORD

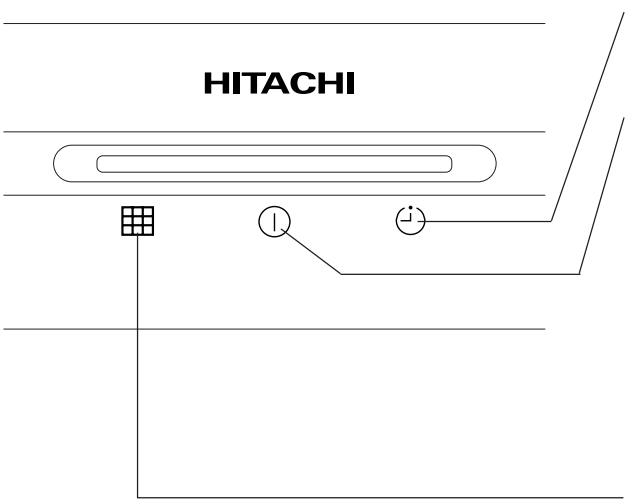
AIR INLET (BACK, LEFT SIDE)

AIR OUTLET

MODEL NAME AND DIMENSIONS

MODEL	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)
RAS-70YH7	1150	333	245
RAC-70YH7	850	800	298

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.

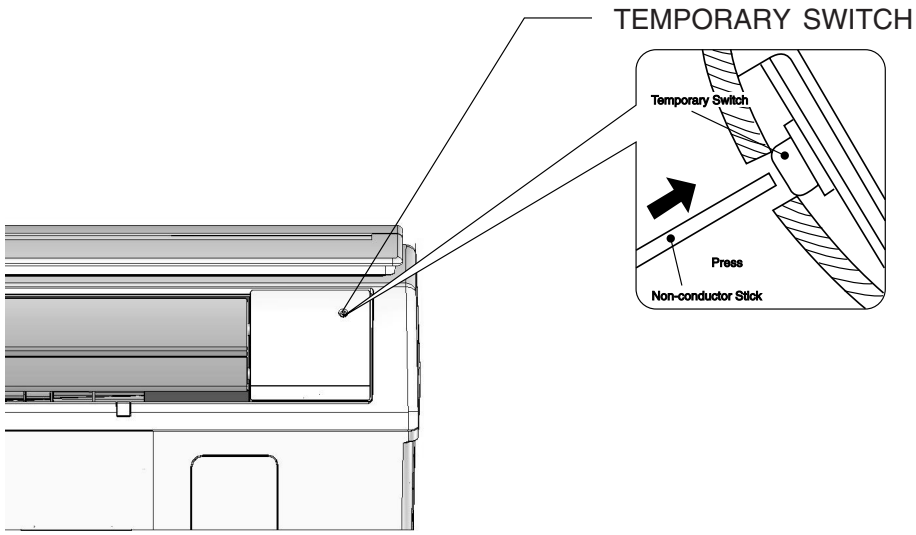
(1) During preheating
For about 2–3 minutes after starting up.

(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 –10°C (14°F).
  The recommended maximum and minimum operating temperatures of the hot and cold sides should be as below:

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

MEMO

SAFETY PRECAUTION

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

Make sure to connect earth line.	The sign in the figure indicates prohibition.
Indicates the instructions that must be followed.	

- Please keep this manual after reading.

PRECAUTIONS DURING INSTALLATION

⚠ WARNING

- 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.

⚠ CAUTION

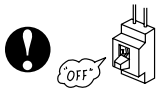
- A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.
- Do not install near location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it.

- 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.



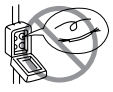
- Please contact your agent for maintenance. Improper self maintenance may cause electric shock and fire.
- Please contact your agent if you need to remove and reinstall the unit. Electric shock or fire may occur if you remove and reinstall the unit yourself improperly.
- If the supply cord is damaged, it must be replaced by the special cord obtainable at authorized service/parts centers.

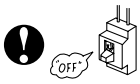
PRECAUTIONS DURING OPERATION

⚠ WARNING

- 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.



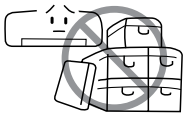


- During thunder storm, disconnect and turn off the circuit breaker.

PRECAUTIONS DURING OPERATION

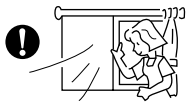
CAUTION

- 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.

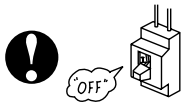


- Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.

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

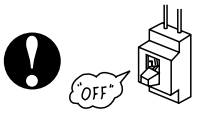
- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.

- 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.



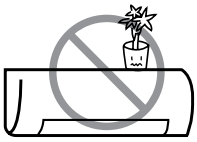
- Please switch off the unit and turn off the circuit breaker during cleaning, the high-speed fan inside the unit may cause danger.

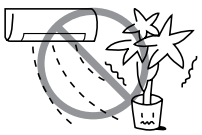
- Turn off the circuit breaker if the unit is not to be operated for a long period.



- 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.

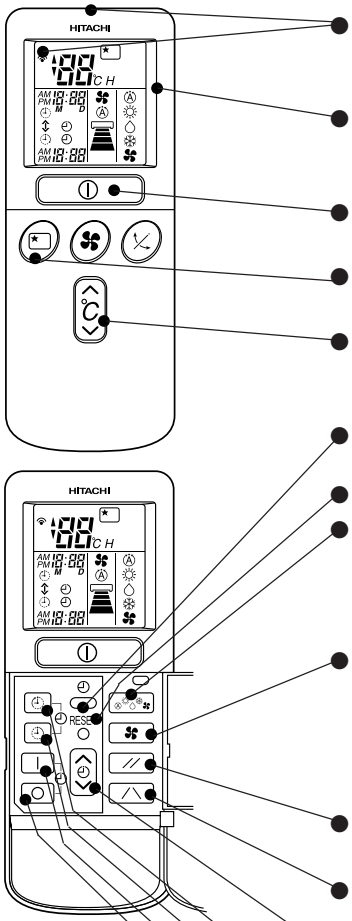
- When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, 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 Ⓐ (AUTO) to ☼ (HEAT) to ○ (DEHUMIDIFY) to ❄ (COOL) and to ✣ (FAN) cyclically.
- **FAN SPEED selector**
  This determines the fan speed. Every time you press this button, the intensity of circulation will change from Ⓐ (AUTO) to (HI) to (MED) to (LOW) to (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.

Ⓐ	AUTO
☼	HEAT
○	DEHUMIDIFY
❄	COOL
✣	FAN
	FAN SPEED SILENT LOW MED HI
	SLEEPING
	STOP (CANCEL)
I	START (RESERVE)
	START/STOP
	TIME
	TIMER SET
	TIMER SELECTOR ON TIMER OFF TIMER
//	PARALLEL SWING
/\	SYMMETRY SWING

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.

VARIOUS FUNCTIONS

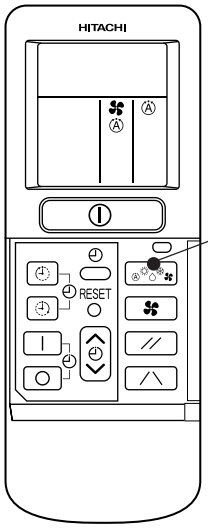
■ Auto Restart Control

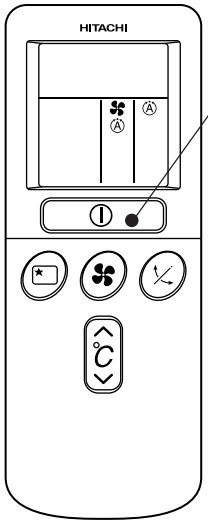
- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode and airflow direction.
  (As the operation is not stopped by remote controller.)
- If you intend not to continue the operation when the power is resumed, switch off the power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





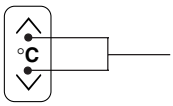
1 Press the FUNCTION selector so that the display indicates the Ⓐ (AUTO) mode of operation.

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

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

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

You can raise or lower the temperature setting as necessary by maximum of 3°C.



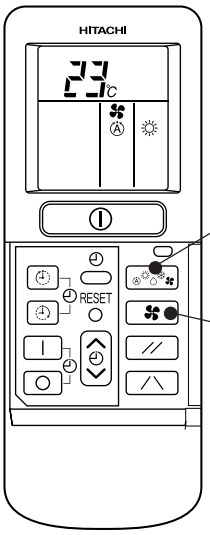
Press the temperature button and the temperature setting will change by 1°C each time.

- The preset temperature and the actual room temperature may vary somewhat depending on conditions.
- The display does not indicate the preset temperature in the AUTO mode. If you change the setting, the indoor unit will produce a beep.

Press the ✾ (FAN SPEED) button, AUTO, LOW and SILENT is available.

HEATING OPERATION

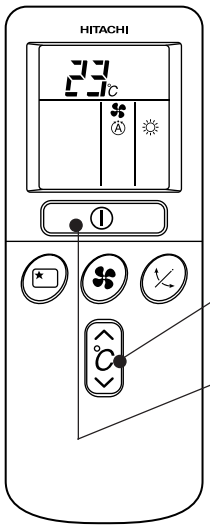
- Use the device for heating when the outdoor temperature is under 21°C.
  When it is too warm (over 21°C), the heating function may not work in order to protect the device.
- In order to keep reliability of the device, please use this device above -15°C of the outdoor temperature.



1 Press the FUNCTION selector so that the display indicates ☼ (HEAT).

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

- Ⓐ (AUTO) : The fan speed changes automatically according to the temperature of the air which blows out.
- (HI) : Economical as the room will become warm quickly.
  But you may feel a chill at the beginning.
- (MED) : Fan speed slow.
- (LOW) : Fan speed slower.
- (SILENT) : Fan speed ultra slower.



3 Set the desired room temperature with the TEMPERATURE buttons (the display indicates the setting).

The temperature setting and the actual room temperature may vary somewhat depending on conditions.

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

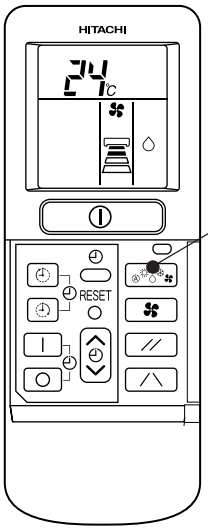
■ As the settings are stored in memory in the remote controller, you only have to press the ⏻ (START/STOP) button next time.

■ 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.)

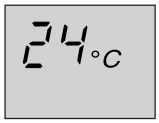
DEHUMIDIFYING OPERATION

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



1 Press the FUNCTION selector so that the display indicates ◇ (DEHUMIDIFY).
The FAN SPEED is set at LOW or SILENT.

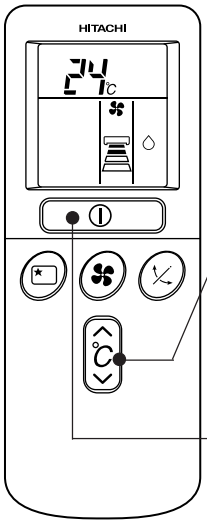
2 Set the desired room temperature with the TEMPERATURE button (the display indicates the setting).



The range of 20-26˚C is recommended as the room temperature for dehumidifying.

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

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

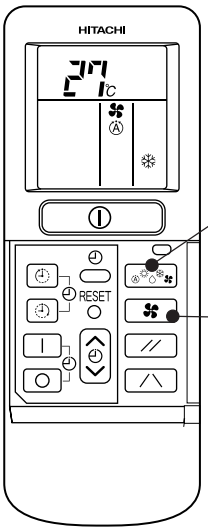


■ Dehumidifying Function

- 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

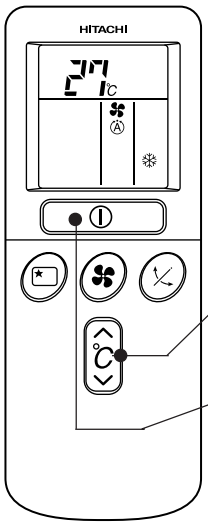
Use the device for cooling when the outdoor temperature is –10°C~ 43°C.
If in doors humidity is very high (80%), some dew may form on the air outlet grille of the indoor unit.



1 Press the FUNCTION selector so that the display indicates ❄ (COOL).

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

- Ⓐ (AUTO) : The FAN SPEED is HI at first and varies to MED or LOW automatically when the preset temperature has been reached.
- (HI) : Economical as the room will become cool quickly.
- (MED) : Fan speed slow.
- (LOW) : Fan speed slower.
- (SILENT) : Fan speed ultra slower.



3 Set the desired room temperature with the TEMPERATURE button (the display indicates the setting).

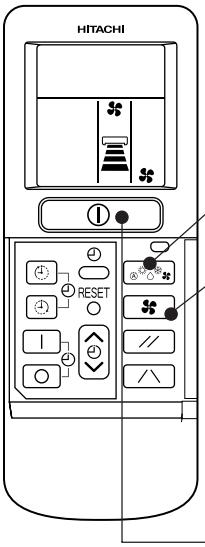
The temperature setting and the actual room temperature may vary some how depending on conditions.

START / STOP Press the ⏻ (START/STOP) button. Cooling operation starts with a beep. Press the button again to stop operation. The cooling function does not start if the temperature setting is higher than the current room temperature (even though the ⏻ (OPERATION) lamp lights). The cooling function will start as soon as you set the temperature below the current room temperature.

■ As the settings are stored in memory in the remote controller, you only have to press the ⏻ (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.



1 Press the FUNCTION selector so that the display indicates ✾ (FAN).

2 Press the ✾ (FAN SPEED) button.

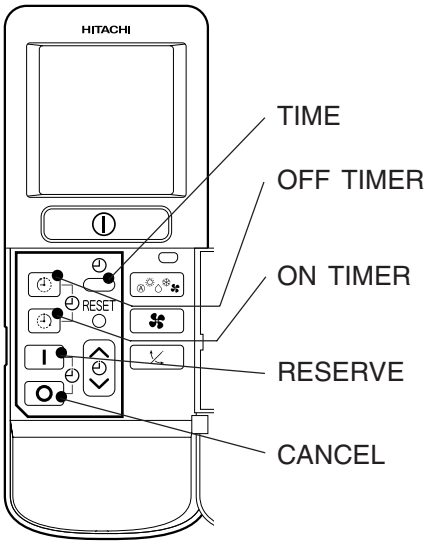
- (HI) : The strongest air blow.
- (MED) : Fan speed slow.
- (LOW) : Fan speed slower.
- (SILENT) : Fan speed ultra slower.

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

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

For the heating operation	● When the difference of room temperature and setting temperature is large, fan starts to run at HI speed. ● After room temperature reaches the preset temperature, the heating operation, which changes the fan speed and room temperature to obtain optimum conditions for natural healthful heating will be performed.
For the cooling operation	● When the difference of room temperature and setting temperature is large, fan starts to run at HI speed. ● 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.

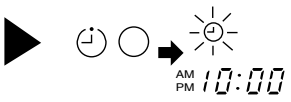
HOW TO SET THE TIMER



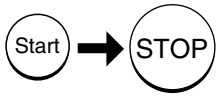
Time

After you change the batteries;

1 Set the (TIME) button.

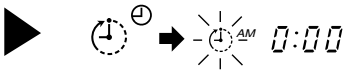


OFF-Timer

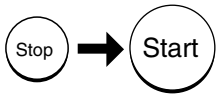


You can set the device to turn off at the preset time.

1 Press the (OFF-TIMER) button. The (OFF) mark blinks on the display.

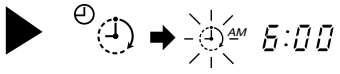


ON-Timer

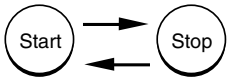


- The device will turn on at the designated times.

1 Press the (ON-TIMER) button the (ON) mark blinks on the display.

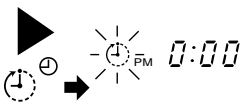


ON/OFF-Timer

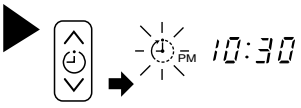


- The device will turn on (off) and off (on) at the designated times.
- The switching occurs first at the preset time that comes earlier.
- The arrow mark appearing on the display indicates the sequence of switching operations.

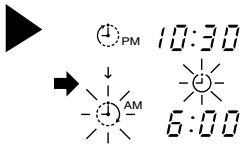
1 Press the (ON-OFF) button so that the (OFF) mark blinks.



2 Set the turn-off time with the TIMER control button.
Press the | (RESERVE) button.



3 Press the (ON-TIMER) button so that the (OFF) mark lights and the (ON) mark blinks.



How to Cancel Reservation

Point the signal window of the remote controller toward the indoor unit, and press the ○ (CANCEL) button.
The (RESERVED) sign goes out with a beep and the (TIMER) lamp turns off on the indoor unit.

NOTE

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

2 Press the ⏲ (TIME) button.

3 Set the current time with the TIMER control button.

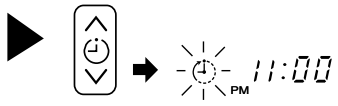
4 Press the ⏲ (TIME) button again.
The time indication starts lighting instead of flashing.

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

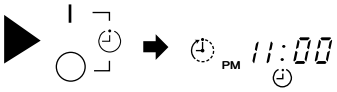
- The time indication will disappear automatically in 10 second.
- To check the current time setting, press the ⏲ (TIME) button twice.

The setting of the current time is now complete.

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



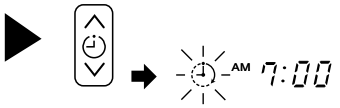
3 Point the signal window of the remote controller toward the indoor unit, and press the ❙ (RESERVE) button.
The ⏲ (OFF) mark starts lighting instead of flashing and the sign ⏲ (RESERVED) lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.



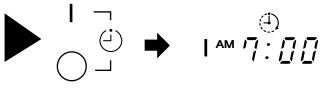
Example: The device will turn off at 11:00p.m.

The setting of turn-off time is now complete.

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

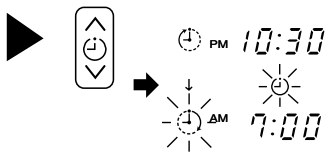


3 Point the signal window of the remote controller toward the indoor unit, and press the ❙ (RESERVE) button.
The ⏲ (ON) mark starts lighting instead of flashing and the ⏲ (RESERVED) sign lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.

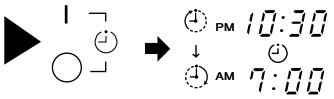


Example:
The device will turn on at 7:00 a.m.
The setting of the turn-on time is now complete.

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

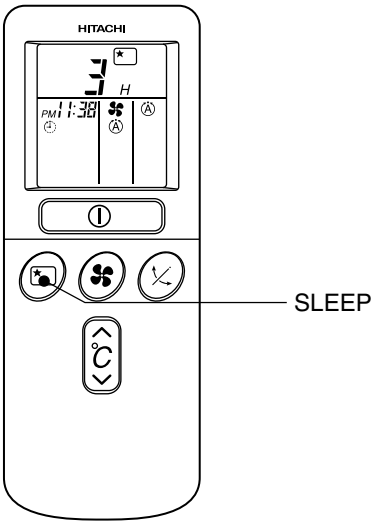


Example:
The device will turn off at 10:30 p.m. and it will be turned on at 7:00 a.m.
The settings of the turn-on/off times are now complete.

- 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 ❙ (RESERVE) button in order to use the same settings next time.

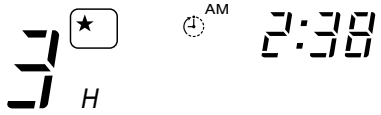
HOW TO SET THE SLEEP TIMER

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.

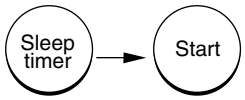


Mode	Indication
Sleep timer	→ 1 hour → 2 hours → 3 hours → 7 hours → Sleep timer off →

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.



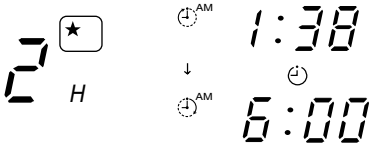
Example: If you set 3 hours sleep time at 11:38 p.m., the turn-off time is 2:38 a.m.



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.

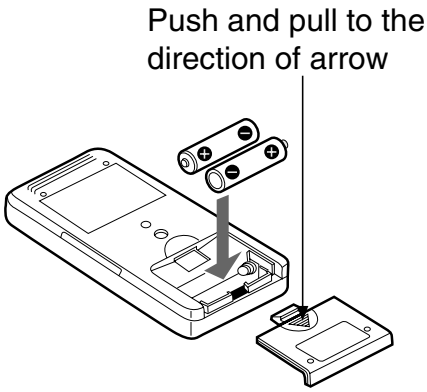
How to Cancel Reservation

Point the signal window of the remote controller toward the indoor unit, and press the ○ (CANCEL) button.
The ◴ (RESERVED) sign goes out with a beep and the ◴ (TIMER) lamp turns off on the indoor unit.

HOW TO EXCHANGE THE BATTERIES IN THE REMOTE CONTROLLER

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

2 Install the new batteries.
The direction of the batteries should match the marks in the case.



⚠ 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.

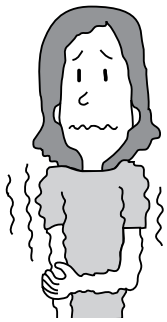
- This temporary operation will be at the setting made most recently. (The unit will immediately go into automatic operation once power is switched on.)

CIRCUIT BREAKER

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

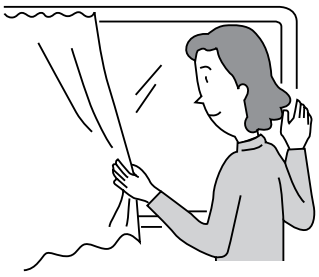
THE IDEAL WAYS OF OPERATION

Suitable Room Temperature



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

Install curtain or blinds



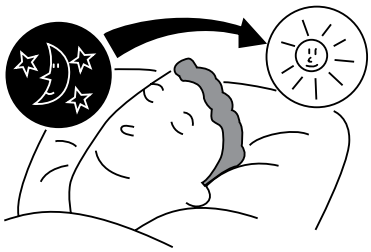
It is possible to reduce heat entering the room through windows.

Ventilation

⚠ 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.

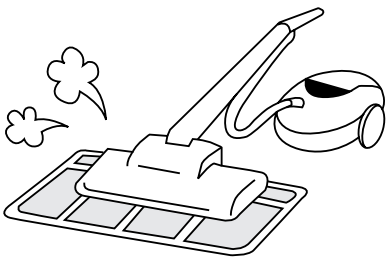
Effective Usage Of Timer

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.



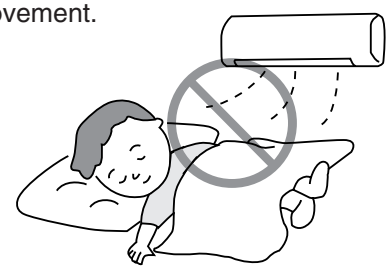
Do Not Forget To Clean The Air Filter

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.



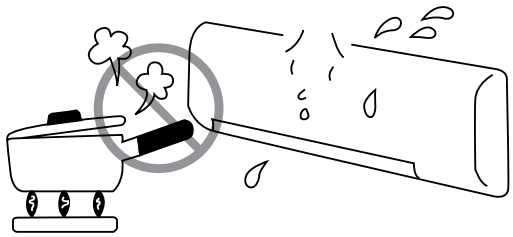
Please Adjust Suitable Temperature For Baby And Children

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.



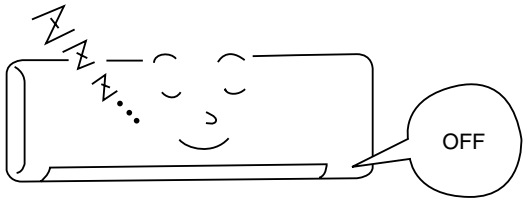
The Air Conditioner And The Heat Source In The Room

⚠ 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.



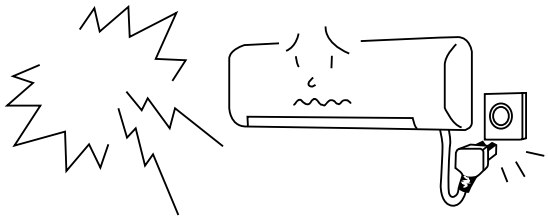
Not Operating For A Long Time

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.



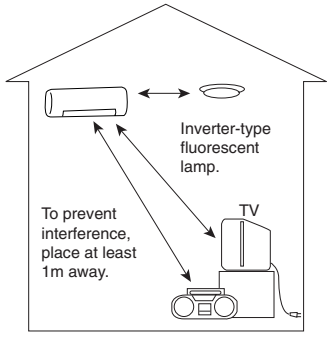
When Lightning Occurs

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



Interference From Electrical Products

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



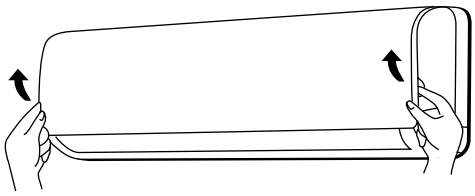
ATTACHING THE AIR CLEANSING FILTERS

⚠ CAUTION

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

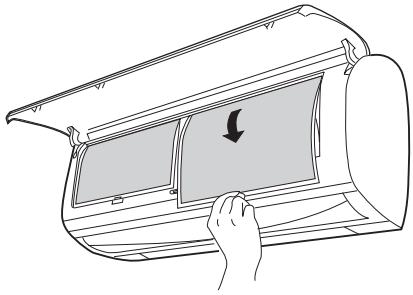
1 **Open the front panel.**

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



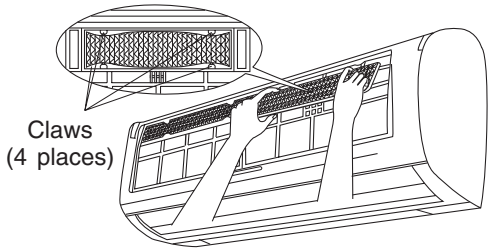
2 **Remove the filter.**

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



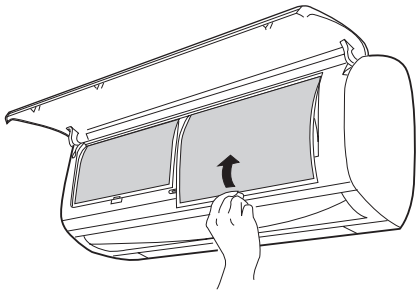
3 **Attaching the air cleansing filters to the filter.**

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



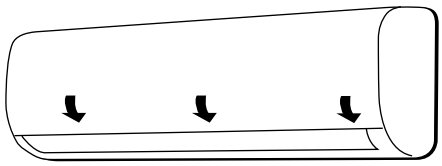
⚠ CAUTION

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



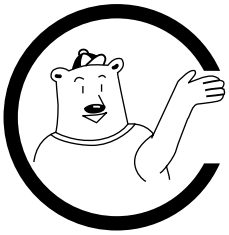
4 **Attach the filters.**

- 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

⚠ CAUTION

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

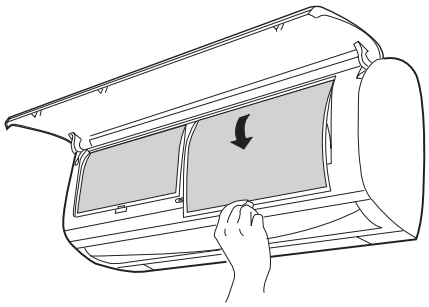
1. AIR FILTER

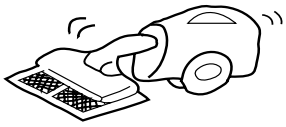
Clean the air filter, as it removes dust inside the room. In case the air filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the filter following the procedure below.

PROCEDURE

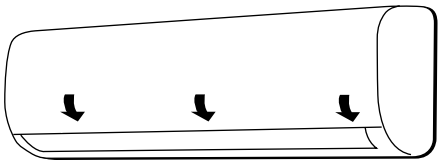
1 Open the front panel and remove the filter
- Gently lift and remove the air cleansing filter from the air filter frame.

2 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.





3
- 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.

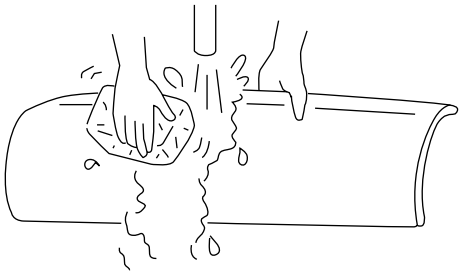


⚠ CAUTION

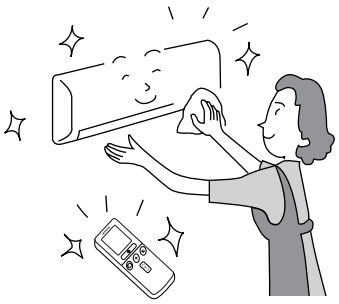
- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink.
- Do not use detergent on the air cleansing filter as some detergent may deteriorate the filter 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.



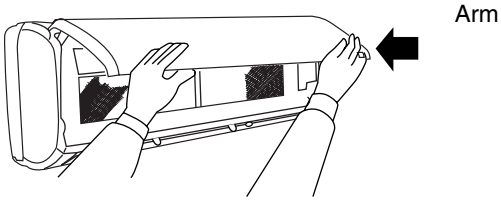
- When front panel is not removed, wipe it with a soft dry cloth. Wipe the remote controller thoroughly with a soft dry cloth.



- Wipe the water thoroughly.
  If water remains at indicators or signal receiver of indoor unit, it causes trouble.

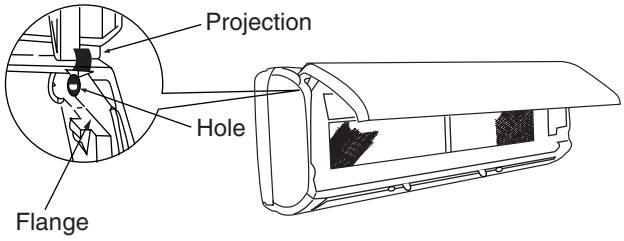
Method of removing the front panel.
Be sure to hold the front panel with both hands to detach and attach it.

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.

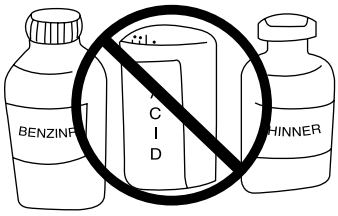
Attaching the Front Panel



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

⚠ 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.

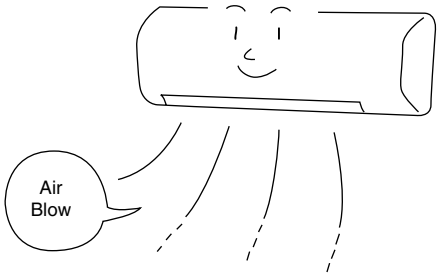


⚠ CAUTION

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

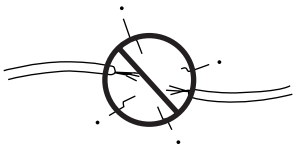
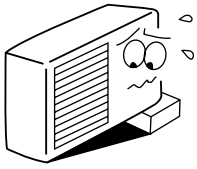
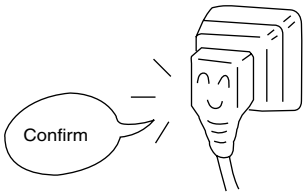
3. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

- 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		Is the plug of power line firmly plugged into the socket? (Please ensure no loose contact between them).

AFTER SALE SERVICE AND WARRANTY

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.)	● Do the batteries need replacement? ● Is the polarity of the inserted batteries correct?
When it does not operate	● Is the fuse all right? ● Is the voltage extremely high or low? ● Is the circuit breaker “ON”? ● Is the setting of operation mode different from other indoor units?
When it does not cool well When it does not hot well	● Is the air filter blocked with dust? ● Does sunlight fall directly on the outdoor unit? ● Is the air flow of the outdoor unit obstructed? ● Are the doors or windows opened, or is there any source of heat in the room? ● Is the set temperature suitable? ● Are the air inlets or air outlets of indoor and outdoor units blocked? ● Is the fan speed “LOW” or “SILENT”?

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.

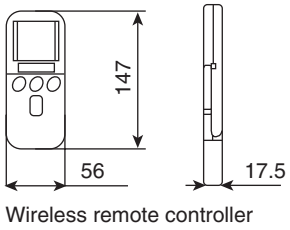
NOTE:

- 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.

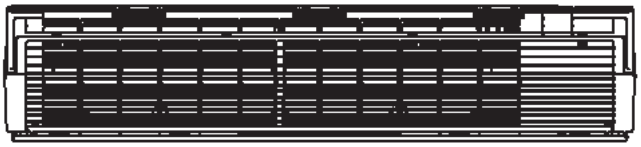
CONSTRUCTION AND DIMENSIONAL DIAGRAM

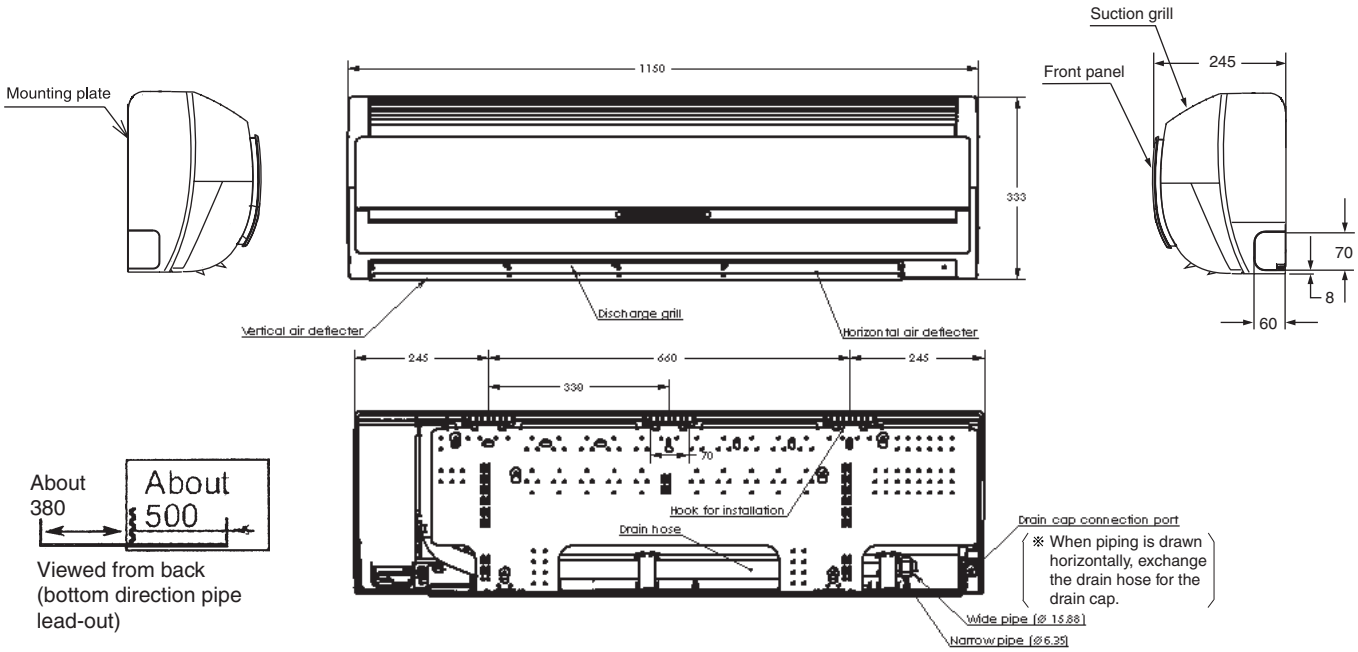
MODEL RAS-70YH7

Unit : mm



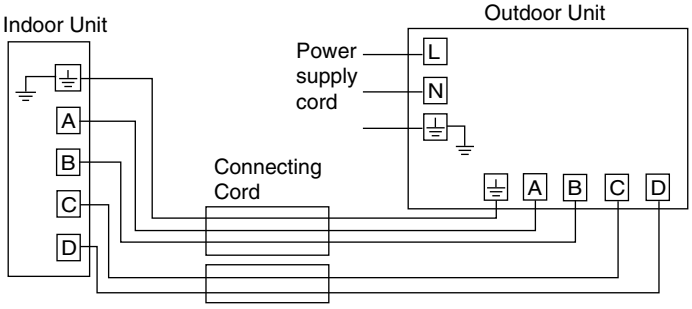
Wireless remote controller



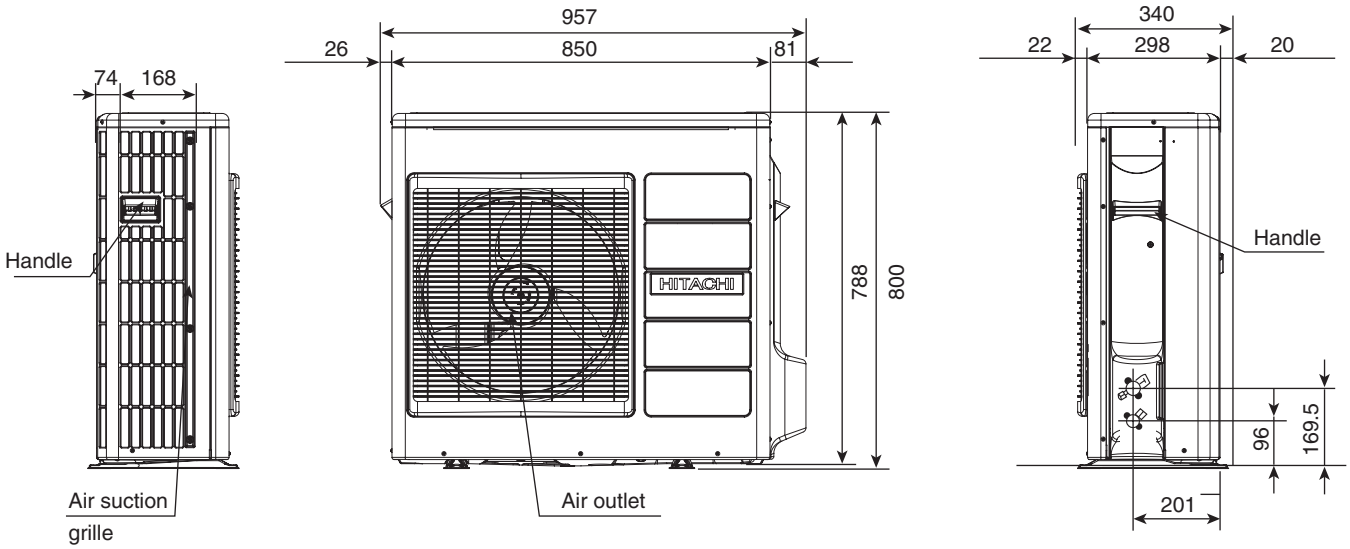


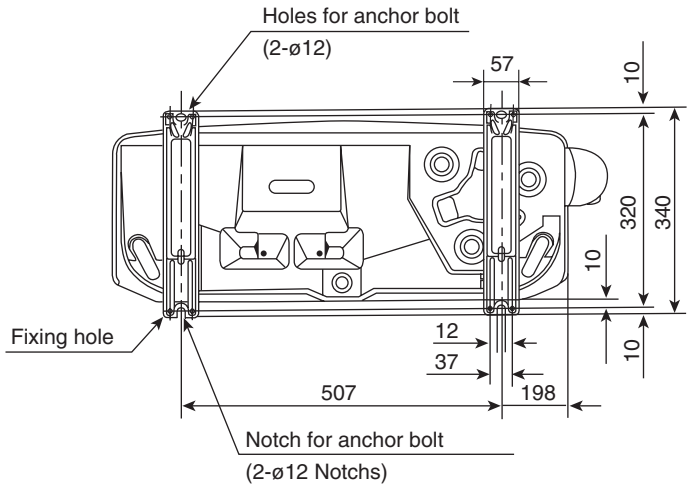
Note:

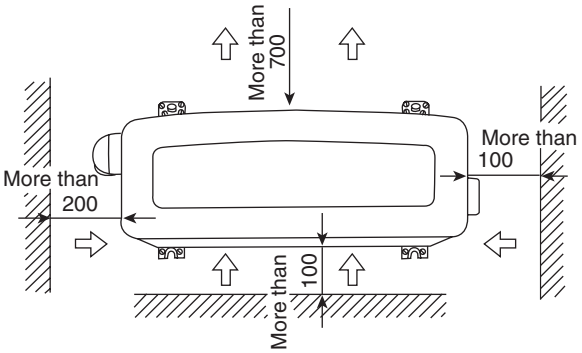
1. Service space (free space needed for servicing) is 200mm on the right, 100mm on the left and 50mm on top.
2. The wide and narrow pipes must be thermally insulated.
3. Piping length is within 30m
4. Height different of the piping between the indoor unit and the outdoor unit should be within 20m.
5. Power supply cord length is about 2m
6. Connecting cable 2.5mm dia. x 3 (AB Line), 1.6mm dia. x 2 (CD Line) is used for the connection.



MODEL RAC-70YH7







Service space

MAIN PARTS COMPONENT

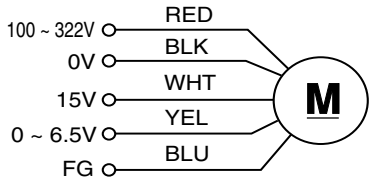
THERMOSTAT (Room Temperature Thermistor)

Thermostat Specifications

MODEL			RAS-70YH7	
THERMOSTAT MODEL			IC	
OPERATION MODE			COOL	HEAT
TEMPERATURE °C (°F)	INDICATION 16	ON	15.6 (60.1)	20.0 (68.0)
		OFF	15.3 (59.5)	20.7 (69.3)
	INDICATION 24	ON	23.6 (74.5)	28.0 (82.4)
		OFF	23.3 (73.9)	28.7 83.7)
	INDICATION 32	ON	31.6 (88.9)	36.0 (96.8)
		OFF	31.3 (88.3)	36.7 (98.1)

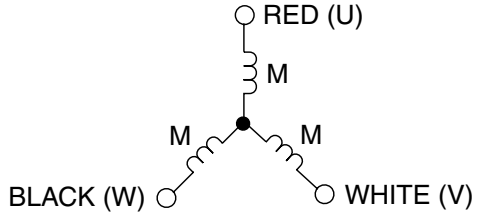
INDOOR FAN MOTOR

Fan Motor Specifications

MODEL	RAS-70YH7
POWER SOURCE	DC: 100 ~ 322V
OUTPUT	30W
CONNECTION	 (Control circuit built in)

OUTDOOR FAN MOTOR

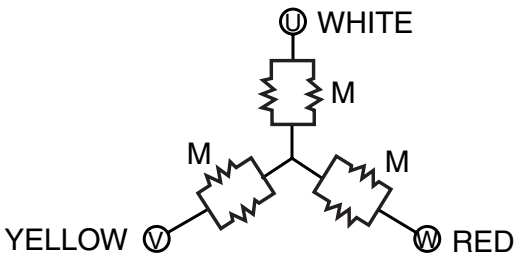
Fan Motor Specifications

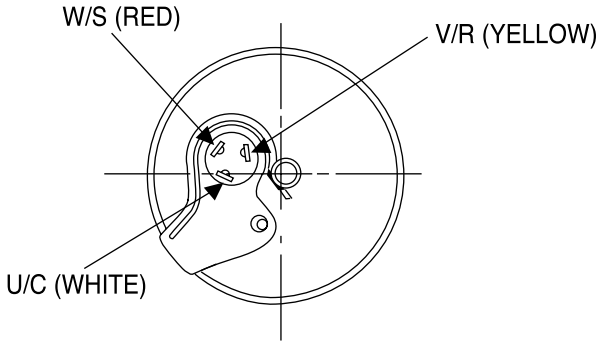
ITEM \ MODEL			RAC-70YH7
POWER SOURCE			DC: 120 ~ 380V
OUTPUT	(W) MAX		47
COIL			
RESISTANCE VALUE (Ω)	20°C	2M	U-V 35 ± 2.5 V-W 35 ± 2.5 W-U 35 ± 2.5

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-70YH7
COMPRESSOR MODEL		JU1015D9
PHASE		SINGLE
RATED VOLTAGE		AC 220 ~ 240 V
RATED FREQUENCY		50/60 Hz
POLE NUMBER		4
CONNECTION		
RESISTANCE VALUE (Ω)	20°C (68°F)	2M = 1.2984
	75°C (167°F)	2M = 1.7671



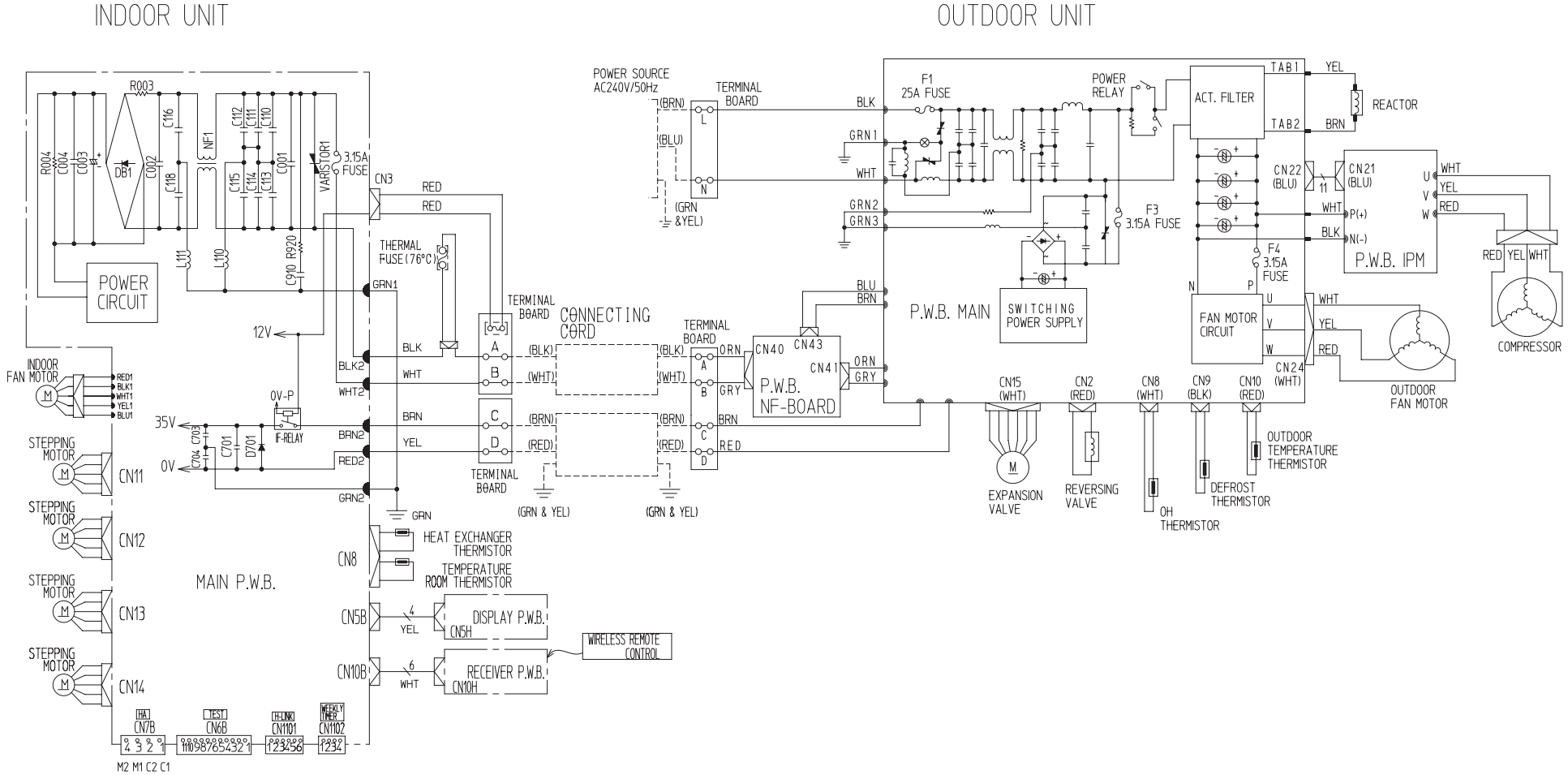
⚠ CAUTION

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

WIRING DIAGRAM

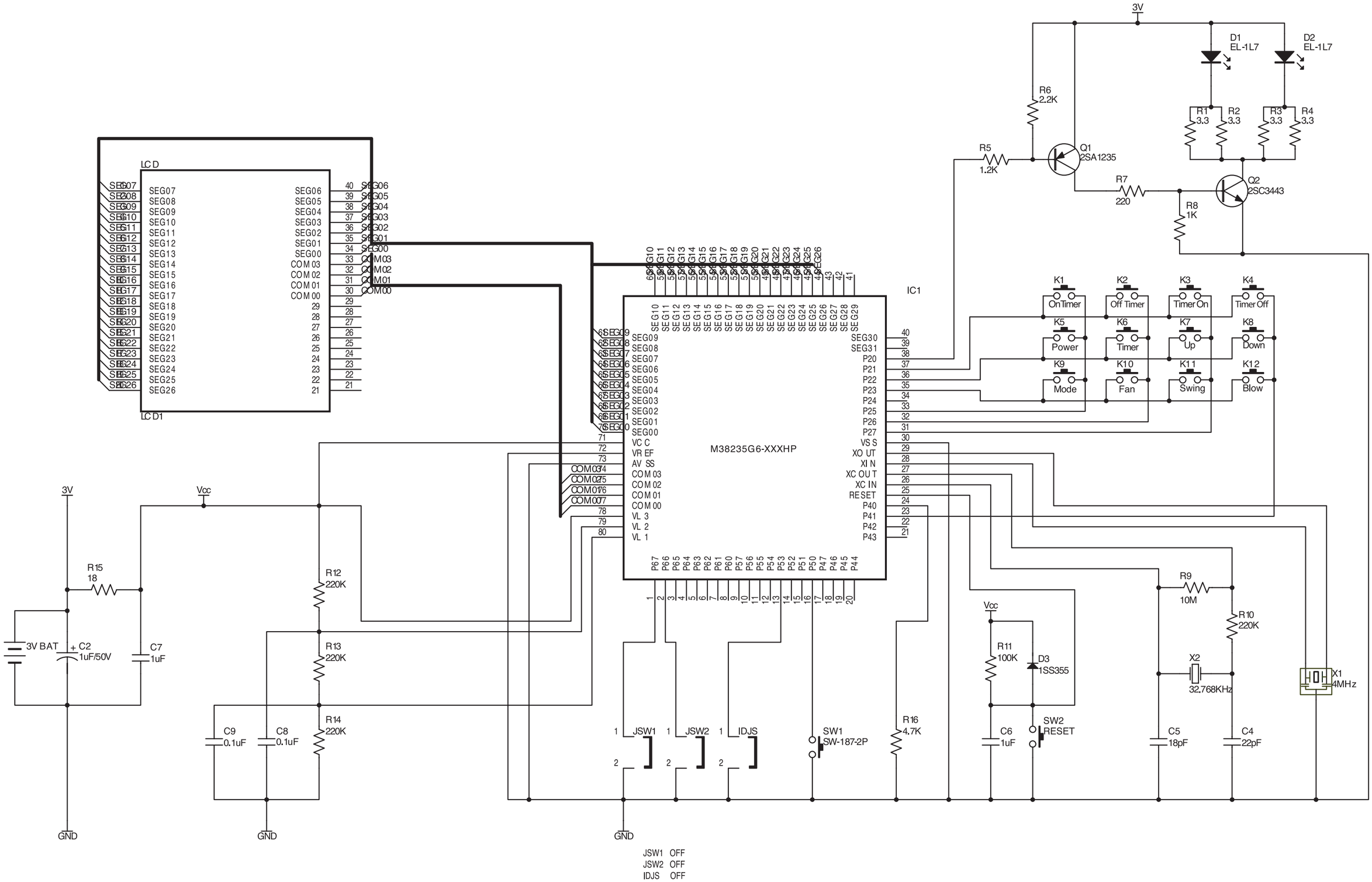
MODEL RAS-70YH7 / RAC-70YH7

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



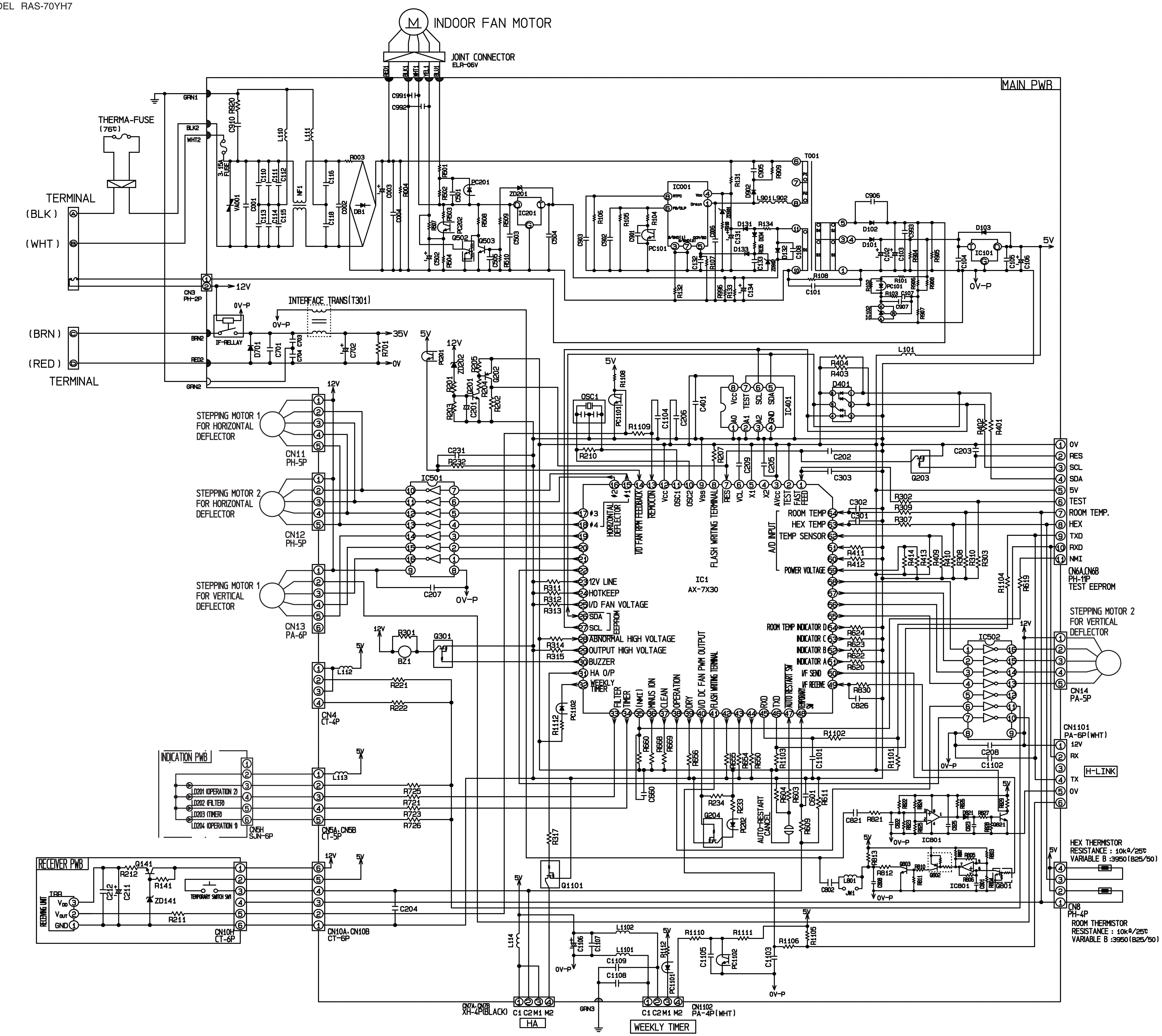
CIRCUIT DIAGRAM

Remote Control



CIRCUIT DIAGRAM

MODEL RAS-70YH7



MOUNTING FACE
A: COMPONENT SIDE
B: SOLDER SIDE

MOUNTING TYPE
A : AXIAL
R : RADIAL
P : RADIAL (7.5mm PITCH)
H : HAND INSERT
C : CHIP SURFACE
: OTHER SURFACE MOUNTING

RESISTOR

SYMBOL	(Ω)	TOL	POWER (W)	MOUNTING TYPE	MOUNTING FACE	REMARK
R003	2.2	5%	5	H	A	
R004	1M	5%	1/4	A	A	RCR
R101	620	5%	1/10	C	B	
R102	1K	5%	1/10	C	B	
R103	15K	5%	1/10	C	B	
R104	2.2K	5%	1/10	C	B	
R105	33K	5%	1/10	C	B	
R106	150K	1%	1/10	C	A	
R107	330	5%	1/4	C	B	
R108					A	
R131	1.2M	5%	1	H	A	RCR
R132	0.62	5%	2	P	A	
R133	1M	5%	1/2	C	B	
R134	22	5%	1/2	A	A	
R135	750	5%	1/2	C	A	
R141	1K	5%	1/6	A		
R201	5.1K	5%	1/16	C	A	
R202	5.1K	5%	1/16	C	A	
R203	2K	5%	1/16	C	A	
R204	10K	5%	1/16	C	A	
R205	2.7K	5%	1/16	C	A	
R207	10K	5%	1/16	C	A	
R210	1M	5%	1/16	C	B	
R211	1K	5%	1/6	A		
R212	47	5%	1/6	A		
R221	390	5%	1/4	C	A	
R222	390	5%	1/4	C	A	
R232	1K	5%	1/10	C	B	
R233	390	5%	1/8	C	A	
R234	1K	5%	1/16	C		
R301	3.3K	5%	1/10	C	B	
R302	1K	5%	1/16	C	A	
R303	10K	5%	1/16	C	A	
R307	1K	5%	1/16	C	A	
R308	12.7K	1%	1/16	C	A	
R309	1K	5%	1/16	C	A	
R310	12.7K	1%	1/16	C	A	
R311	10K	5%	1/16	C	A	
R312	10K	5%	1/16	C	A	
R313	10K	5%	1/16	C	A	
R314	10K	5%	1/16	C	A	
R315	10K	5%	1/16	C	A	
R317	1K	5%	1/16	C	A	
R401	390	5%	1/16	C	A	
R402	390	5%	1/16	C	A	
R403	5.1K	5%	1/16	C	A	
R404	5.1K	5%	1/16	C	A	
R409	5.1K	5%	1/16	C	A	
R410	5.1K	5%	1/16	C	A	
R411	10K	5%	1/16	C	A	
R412	10K	5%	1/16	C	A	
R413	5.1K	5%	1/16	C	A	
R414	5.1K	5%	1/16	C	A	
R501	4.3K	5%	1/4	C	B	
R502	4.3K	5%	1/10	C	B	
R503	4.7K	5%	1/8	C	B	
R504	3.3K	5%	1/10	C	B	
R507	7.5K	5%	1/2	C	B	
R508	10K	5%	1/10	C	B	
R509	100	5%	1/10	C	A	
R510	15K	5%	1/10	C	B	
R603	1K	5%	1/16	C	A	
R604	20K	5%	1/16	C	A	
R609	1K	5%	1/16	C	A	
R611	10K	5%	1/16	C	A	
R619	100	5%	1/10	C	A	
R620	10K	5%	1/16	C	A	
R622	10K	5%	1/16	C	A	
R623	10K	5%	1/16	C	A	
R624	10K	5%	1/16	C	A	
R650	10K	5%	1/16	C	A	
R654	10K	5%	1/16	C	A	
R655	10K	5%	1/16	C	A	
R656	10K	5%	1/16	C	A	
R660	1K	5%	1/16	C	A	
R668	10K	5%	1/16	C	A	
R669	10K	5%	1/16	C	A	
R701	20K	5%	1/6	A	A	
R721	240	5%	1/10	C	A	
R723	180	5%	1/10	C	A	
R725	240	5%	1/10	C	A	
R726	240	5%	1/10	C	A	
R803	120K	5%	1/16	C	A	
R804	120K	5%	1/16	C	A	
R805	120K	5%	1/16	C	A	
R806	120K	5%	1/16	C	A	
R807	4.3K	5%	1/16	C	A	
R810	680	5%	1/10	C	A	
R811	2K	5%	1/16	C	A	
R812	39	5%	1/4	C	A	
R813	39	5%	1/4	C	A	
R821	470	5%	1/16	C	A	
R822	10K	1%	1/16	C	A	
R823	10K	1%	1/16	C	A	
R824	8.25K	1%	1/16	C	A	
R825	10K	1%	1/16	C	A	
R826	1K	5%	1/16	C	A	
R827	3K	5%	1/16	C	A	
R828	10K	5%	1/16	C	A	
R829	5.1K	5%	1/16	C	A	
R830	1K	5%	1/16	C	A	
R904	1M	5%	1/2	C	B	
R905	1M	5%	1/2	C	B	
R906	12K	1%	1/10	C	B	
R907	2K	1%	1/10	C	B	
R908	12K	1%	1/10	C	B	
R909	220K	5%	2	P	A	
R910	270K	5%	1/2	C	A	
R920	10	5%	1/2	A	A	CFS
R996					B	
R1101	10K	5%	1/10	C	A	
R1102	1K	5%	1/10	C	B	
R1103	10K	5%	1/10	C	A	
R1104	1K	5%	1/10	C	B	
R1105	10K	5%	1/16	C	A	
R1106	1K	5%	1/6	C	B	
R1107	150	5%	1/4	C	A	
R1108	2K	5%	1/10	C	B	
R1109	1K	5%	1/10	C	B	
R1110	150	5%	1/4	C	A	
R1111	2K	5%	1/10	C	B	
R1112	560	5%	1/10	C	B	

CAPACITOR

SYMBOL	(μF)	(V)	KIND	MOUNTING TYPE	MOUNTING FACE	REMARK
C001	0.68	AC250	F	H	A	
C002	0.01	AC250	C	P	A	[illegible]
C003	100	450	D	H	A	KMH
C004	0.01	1000V	C	H	A	
C006	220p	2000	C	P	A	
C101	2200p	AC250	C	R	A	
C102	470	25	D	R	A	LXZ
C103	1800	25	D	H	A	LXZ
C104	0.1	25	C	C	B	
C105	0.1	25	C	C	B	
C106	220	10	D	R	A	YXA
C107	0.1	25	C	C	B	
C108					A	
C110	0.01	AC250	C	P	A	SMD PART
C111						
C112	0.01	AC250	C	P	A	SMD PART
C113	0.01	AC250	C	P	A	SMD PART
C114						
C115	0.01	AC250	C	P	A	SMD PART
C116	1000p	AC250	C	P	A	SMD PART
C118	1000p	AC250	C	P	A	SMD PART
C131	10	50	D	R	A	PF
C132	470p	50	C	C	B	
C133	22p	50	C	C	A	
C134	68	50	D	R	A	LXZ
C201	10	16	D	R	A	
C202	0.1	25	C	C	B	
C203	0.1	25	C	C	A	
C204	0.1	25	C	C	A	
C205	0.1	25	C	C	B	
C206	0.1	25	C	C	B	
C207	0.1	25	C	C	A	
C208	0.1	25	C	C	A	
C209	0.1	25	C	C	B	
C211	47	16	D	R		
C212						
C231	1000p	50	C	C	B	
C301	0.1	25	C	C	B	
C302	0.1	25	C	C	B	
C303	0.1	25	C	C	B	
C401	0.1	25	C	C	A	
C501	1000p	50	C	C	B	
C502	10	16	D	R	A	KL
C503	0.1	25	C	C	B	
C504	0.1	50	C	C	B	
C505	1000p	50	C	C	B	
C601	0.1	25	C	C	B	
C660	0.1	25	C	C	B	
C701	0.15u	50	F	R	A	
C702	68μ	50	D	R	A	UJ
C703	0.01	AC250	C	P	A	SMD PART
C704	0.01	AC250	C	P	A	SMD PART
C801	150P	50	C	C	A	CH
C802	0.22u	50	F	R	A	
C808	0.1u	25	C	C	A	F
C821	0.01u	50	F	R	A	
C822	1000p	50	C	C	A	B
C823	0.047u	25	C	C	A	B
C825	0.1u	25	C	C	A	F
C826	0.01	50	C	C	B	
C901			C	C	B	
C902	0.47u	10	C	C	B	
C903	0.01	50	C	C	A	
C905	0.01	1000	C	P	A	
C906	2200p	1000	C	P	A	
C907			C	C	B	
C910	470p	AC250	C	P	A	
C991	0.1	50	C	C	A	
C992	0.1	50	C	C	A	
C993	0.1	50	C	C	B	
C1101	1000p	50	C	C	B	B
C1102	1000p	50	C	C	B	B
C1103	0.1u	25	C	C	A	F
C1104	1000p	50	C	C	B	B
C1105	1000p	50	C	C	B	B
C1106	47	25	C	C	A	B
C1107	0.1u	25	C	C	A	F
C1108	0.01	AC250	C	P	A	SMD PART
C1109	0.01	AC250	C	P	A	SMD PART

COIL

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
L101	EXCELSA35	A	A	
L110	EXCELSA35	A	A	
L111	JUMPER	A	A	
L112	EXCELSA35	A	A	
L113	EXCELSA35	A	A	
L114	EXCELSA35	A	A	
L801	LB2518 101M	C	A	
L901	HF70BTL3.5X6R	A	A	
L902	HF70BTL3.5X6R	A	A	
NF1	[illegible] NF-COIL6.7	H	A	
T001	200V-TRANS	H	A	
T301	RRMF3636	H	A	
L1101	EXCELSA35	A	A	
L1102	EXCELSA35	A	A	

TRANSISTOR

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
Q141	KTC3199-Y	R		
Q201	2SC2462LC	C	A	
Q202	2SA1121SC	C	A	
Q203	DTC114EKA	C	A	
Q204	DTC114EUA	C	A	
Q301	DTC114EUA	C	A	
Q502	KRC402E	C	A	
Q503	2SC2412K-R	C	B	
Q801	RN1102	C	A	
Q802	RN2102	C	A	
Q803	2SC3441E	C	A	
Q821	2SC4738GRY	C	A	
Q1101	DTC114EKA	C	A	

ZENNER DIODE

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
ZD141	HZS68ILTA	A		
ZD202	RLZ7.5B	C	A	
ZD201	RD15UJN3	C	A	
ZD901	JUMPER	C	A	
ZD902	UDZS3.6B	C	A	

DIODE

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
D101	RK16	A	A	
D102	FMB-G16L	H	A	
D103	1SS355	C	A	
D131	U1GU44	C	B	
D132	U1GU44	C	B	
D133	1SS355	C	A	
D134	U1GU44	C	B	
D401	HN1D03FU	C	A	
D701	DSM3	C	A	
D821	1SS355	C	A	
D902	EG01C	A	A	
DB1	D3SBA60	H	A	

IC

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
IC1		C	A	
IC001	STR-V652	H	A	
IC101	KIA7805API	H	A	
IC102	KIA431A	R	A	
IC201	KIA7815API	H	A	
IC401	BR24L04F-W	C	A	
IC501	KID65003AF	C	A	
IC502	KID65003AF	C	A	
IC801	NJM2903M	C	A	

PHOTO COUPLER

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
PC101	PS2701-1	C	B	
PC201	PS2701-1	C	B	
PC202	PS2701-1	C	B	
PC1101	TLP421BL	C	B	
PC1102	TLP421BL	C	B	

FUSE

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
3AFUSE	250V/3.15A(BET3.15)	H	A	
HF	TP00351-51	R	A	
HF	TP00351-51	R	A	

JUMPER

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
JW1		A	A	

SWITCH

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
SW1	EVQPAC05R	H		

SURGE ARRESTER

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
VA001	416NR-12D	P	A	

OCCILATOR

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
OSC1	EFOMC1005	R	A	

CONNECTOR

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
CN3	B2B-PH-K-S	H	A	
CN4	CT-4P-V	H	A	
CN5A	CT-5P-V	H	A	
CN6A	B11B-PH-K-S	H	A	
CN7A	B4B-XH-K-S	H	A	
CN8	B4B-PH-K-S	H	A	
CN10A	CT-6P-V	H	A	
CN11	B5B-PH-K-K	H	A	
CN12	B5B-PH-K-S	H	A	
CN13	B6B-PA-K-S	H	A	
CN14	B5B-PA-K-S	H	A	
JOINT CONN	ELR-06V(RRNB1281)	H	A	
CN5H	SJN-6P	H		
CN10H	CT-6P-V	H		
CN1101	PA-6P	H	A	
CN1102	PA-4P	H	A	
BLU1	BOARD-IN TYPE	H	A	
YEL1	BOARD-IN TYPE	H	A	
BLK1	BOARD-IN TYPE	H	A	
BLK2	BOARD-IN TYPE	H	A	
RED1	BOARD-IN TYPE	H	A	
RED2	BOARD-IN TYPE	H	A	
WHT1	BOARD-IN TYPE	H	A	
WHT2	BOARD-IN TYPE	H	A	
BRN2	BOARD-IN TYPE	H	A	
GRN1	BOARD-IN TYPE	H	A	
GRN2	BOARD-IN TYPE	H	A	
GRN3	BOARD-IN TYPE	H	A	

RELAY

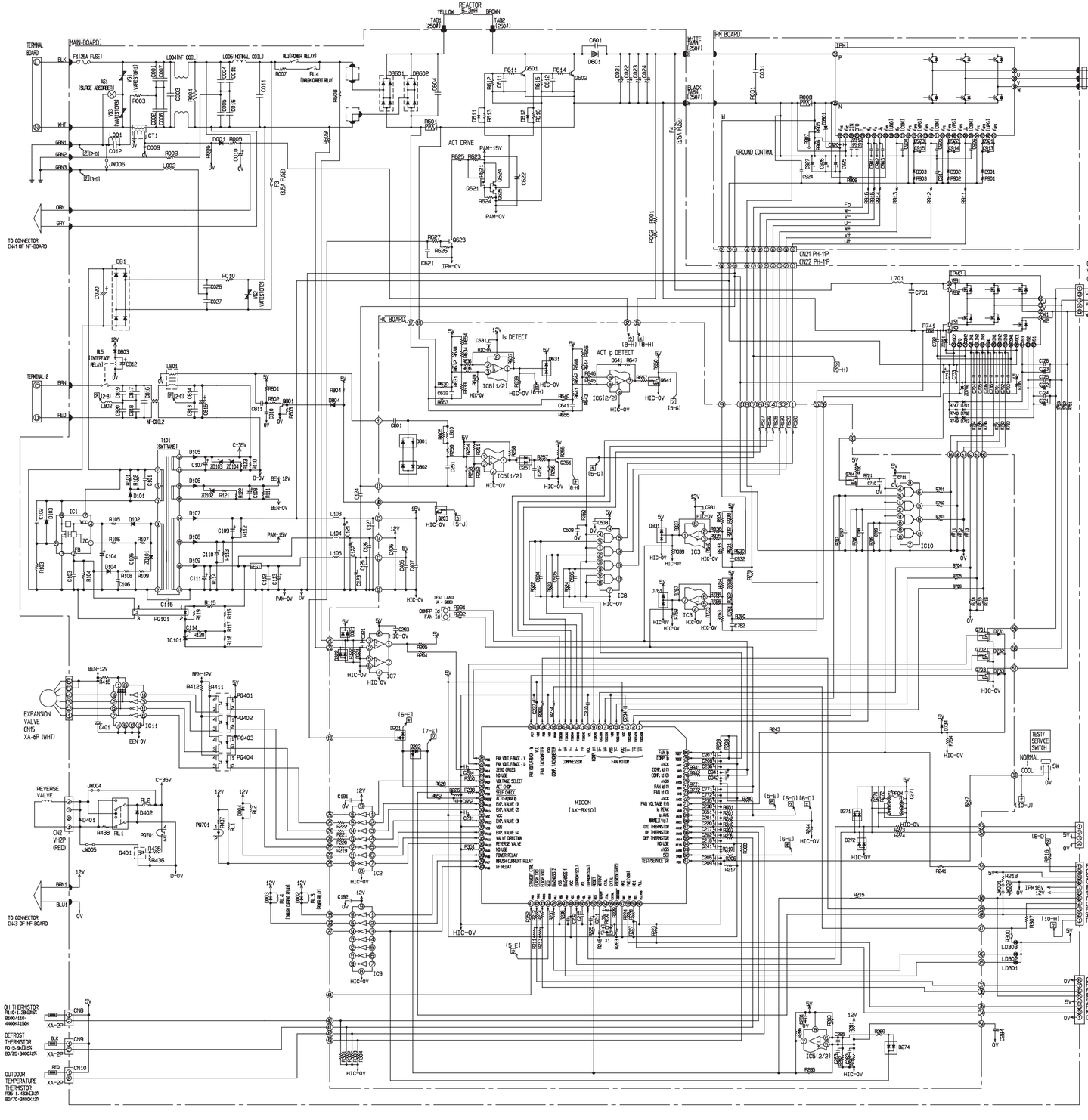
SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
IF-RELLAY	FTR-F3-RY	H	A	

BUZZER

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
BZ1	PKM13EPY	H	A	

LED

SYMBOL	MODEL TYPE	MOUNTING TYPE	MOUNTING FACE	REMARK
LD721	SEL2713K - YELLOW	H		
LD723	SEL6914A - ORANGE	H		
LD725	SEL6414E - GREEN	H		
		H		
LD221	E1S19-0P0A7 VIOLET	H		
LD222	E1S19-0P0A7 VIOLET	H		



CIRCUIT DIAGRAM

MODEL RAC-70YH7

FLASH MICON TERMINAL		
MODE	MD1	FWE
NORMAL	Hi	Lo
WRITE	Lo	Hi

MOUNTING STYLE

A:AXIAL INSERT
R:RADIAL INSERT
P:RADIAL INSERT (7.5mm PITCH)
H:MANUAL (HAND INSERT)
C:CHIP SMD
S:OTHER SMD

PCB

HIC:HIC BOARD
M:MAIN BOARD

RESISTANCE

SYM	SPECIFICATION RESISTANCE ( )	TOLERANCE	PWR (W)	MOUNTING STYLE	PCB	PART NO.	REMARK
R001	180K	0.5%	1/2	A	M	10	SN
R002	180K	0.5%	1/2	A	M	10	SN
R003	JUMPER			A	M		(5room)
R004	470K	5%	1/2	A	M	11	(5room)
R005	1.69K	1%	1/6	A	M	12	(5room)
R006	1K	1%	1/6	A	M	13	(5room)
R007	100	5%	10	H	M	14	(5room)
R009	JUMPER			A	M		(5room)
R010	2.2	5%	5	H	M	15	(5room)
R008	25m	5%	10	H	IPM	7	CEMENT
R031	10	5%	2	H	IPM	8	
R101	100K	5%	3	H	M	16	(5room)
R102	100K	5%	3	H	M	16	(5room)
R103	0.27	5%	2	H	M	17	(5room)
R104	18K	1%	1/4	A	M	18	(5room)
R105	4.7	5%	1/4	A	M	19	(5room)
R106	10K	5%	1/4	A	M	20	(5room)
R107	10K	5%	1/4	A	M	20	(5room)
R108	11K	1%	1/4	A	M	21	(5room)
R109	JUMPER	5%	1/4	A	M		(5room)
R110	8.2K	5%	1	H	M	22	(5room)
R111	100K	5%	1/4	A	M	23	(5room)
R112	3.3K	5%	1/4	A	M	24	(5room)
R113	3.3K	5%	1/4	A	M	24	(5room)
R114	3.3K	5%	1/4	A	M	24	(5room)
R115	1.8K	5%	1/4	A	M	25	(5room)
R116	120	1%	1/4	A	M	26	(5room)
R117	9.1K	1%	1/4	A	M	27	(5room)
R118	2.4K	1%	1/4	A	M	28	(5room)
R119	1 K	5%	1/4	A	M	29	(5room)
R120	10K	5%	1/4	A	M	20	(5room)
R121	59	1%	1/4	A	M	30	(5room)
R122	59	1%	1/4	A	M	30	(5room)
R123	1 K	5%	1	H	M	31	(5room)
R200	10K	1%	1/16	C	HIC	6	1005
R201	510	5%	1/16	C	HIC	35	1005
R203	100	5%	1/16	C	HIC	24	1005
R204	100	5%	1/16	C	HIC	24	1005
R205	10K	5%	1/16	C	HIC	25	1005
R206	5.1K	5%	1/16	C	HIC	26	1005
R208	10K	5%	1/16	C	HIC	25	1005
R209	10K	5%	1/16	C	HIC	25	1005
R211	10K	5%	1/16	C	HIC	25	1005
R212	390	5%	1/16	C	HIC	27	1005
R213	10K	5%	1/16	C	HIC	25	1005
R214	390	5%	1/16	C	HIC	27	1005
R215	100	5%	1/16	C	HIC	24	1005
R216	100	5%	1/6	A	M	32	
R217	10K	5%	1/16	C	HIC	25	1005
R218	1K	5%	1/6	A	M	33	
R219	390	5%	1/16	C	HIC	27	1005
R220	390	5%	1/16	C	HIC	27	1005
R221	390	5%	1/16	C	HIC	27	1005
R222	390	5%	1/16	C	HIC	27	1005
R223	10K	5%	1/16	C	HIC	25	1005
R224	390	5%	1/16	C	HIC	27	1005
R225	5.1K	5%	1/16	C	HIC	26	1005
R226	20K	5%	1/16	C	HIC	28	1005
R227	20K	5%	1/16	C	HIC	28	1005
R228	390	5%	1/16	C	HIC	27	1005
R229		5%	1/16	C	HIC		1005
R230	330	5%	1/16	C	HIC	29	1005
R234	100	5%	1/16	C	HIC	24	1005
R236	2.2K	5%	1/16	C	HIC	37	1005
R237	2.2K	5%	1/16	C	HIC	37	1005
R238	1K	5%	1/16	C	HIC	31	1005
R239	100	5%	1/16	C	HIC	24	1005
R240	100	5%	1/16	C	HIC	24	1005
R241	100	5%	1/16	C	HIC	24	1005
R242	160	5%	1/16	C	HIC	32	1005
R243	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R244	3.32K	1%	1/16	C	HIC	7	1005
R247	100	5%	1/16	C	HIC	24	1005
R248	10K	5%	1/16	C	HIC	25	1005
R251	8.25K	1%	1/16	C	HIC	8	1005
R252	10K	1%	1/16	C	HIC	6	1005
R253	10K	1%	1/16	C	HIC	6	1005
R254	10K	1%	1/16	C	HIC	6	1005
R255	2K	5%	1/16	C	HIC	30	1005
R256	10K	5%	1/16	C	HIC	25	1005
R257	3K	5%	1/16	C	HIC	34	1005
R258	2.2k	1%	1/16	C	HIC	9	1005
R259	470	5%	1/16	C	HIC	23	1005
R260	510	5%	1/16	C	HIC	35	1005
R263	10K	5%	1/16	C	HIC	25	1005
R265	100	5%	1/16	C	HIC	24	1005
R271	5.1K	5%	1/16	C	HIC	26	1005
R272	5.1K	5%	1/16	C	HIC	26	1005
R273	390	5%	1/16	C	HIC	27	1005
R274	390	5%	1/16	C	HIC	27	1005
R281	10K	1%	1/16	C	HIC	6	1005
R282	4.7K	1%	1/16	C	HIC	10	1005
R283	5.1K	1%	1/16	C	HIC	21	1005
R285	51K	5%	1/16	C	HIC	36	1005
R286	5.1K	5%	1/16	C	HIC	26	1005
R287	3K	1%	1/16	C	HIC	11	1005
R289	1.8K	1%	1/16	C	HIC		1608
R300	2K	5%	1/6	A	M	34	
R301	3.74K	0.5%	1/16	C	HIC	42	1005
R302	3.01K	0.5%	1/16	C	HIC	43	1005
R303	3.01K	0.5%	1/16	C	HIC	43	1005
R304		0.5%	1/16	C	HIC		1005
R307	1K	5%	1/6	A	M	33	
R308		5%	1/16	C	HIC		1005
R310	10K	5%	1/16	C	HIC	25	1005
R321	1.8K	1%	1/16	C	HIC	12	1005
R322	1.8K	1%	1/16	C	HIC	12	1005
R350	10K	5%	1/16	C	HIC	25	1005
R351	10K	5%	1/16	C	HIC	25	1005
R352	1K	5%	1/16	C	HIC	31	1005
R411	1K	5%	1/4	A	M	29	
R412	1K	5%	1/4	A	M	29	
R418	100	5%	1/4	A	M	35	
R435	7.5K	5%	1/2	A	M	36	
R436	10K	5%	1/6	A	M	37	
R437	1.2K	5%	1/4	A	M	38	
R438	82	5%	3	H	M		RRTA 1786
R522	10K	5%	1/16	C	HIC	25	1005
R523	10K	5%	1/16	C	HIC	25	1005
R524	10K	5%	1/16	C	HIC	25	1005
R525	390	5%	1/16	C	HIC	27	1005
R526	390	5%	1/16	C	HIC	27	1005
R527	390	5%	1/16	C	HIC	27	1005
R528	390	5%	1/16	C	HIC	27	1005
R529	390	5%	1/16	C	HIC	27	1005
R530	390	5%	1/16	C	HIC	27	1005
R601	12.5m	5%	5	H	M	39	CEMENT
R608	180K	1%	1/2	A	M	40	SN
R609	180K	1%	1/2	A	M	40	SN
R611	5.1	5%	1/4	A	M	41	
R612	20K	5%	1/6	A	M	42	
R613	75	5%	1/4	A	M	43	
R614	5.1	5%	1/4	A	M	41	
R615	20K	5%	1/6	A	M	42	
R616	75	5%	1/4	A	M	43	
R621	JUMPER	5%	1/6	A	M		
R623	820	5%	1/6	A	M	44	
R624	750	5%	1	H	M	45	
R625	1.2K	5%	1/6	A	M	46	
R626	1.2K	5%	1/6	A	M	46	
R627	330	5%	1/6	A	M	47	
R628	2.2K	5%	1/16	C	HIC	37	1005
R630	24	5%	1/16	C	HIC	38	1005
R631	5.11K	1%	1/16	C	HIC	13	1005
R632	5.11K	1%	1/16	C	HIC	13	1005
R633	5.11K	1%	1/16	C	HIC	13	1005
R634	5.76K	1%	1/16	C	HIC	19	1005
R635	24	5%	1/16	C	HIC	38	1005
R636	24	5%	1/16	C	HIC	38	1005
R637	21.5K	1%	1/16	C	HIC	20	1005
R638	24	5%	1/16	C	HIC	38	1005
R639	2 K	1%	1/16	C	HIC	15	1005
R640	24	5%	1/16	C	HIC	38	1005
R641	3.3K	1%	1/16	C	HIC	18	1005
R642	5.11K	1%	1/16	C	HIC	13	1005
R643	5.11K	1%	1/16	C	HIC	13	1005
R644	5.11K	1%	1/16	C	HIC	13	1005
R645	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R646	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R647	47K	5%	1/16	C	HIC	40	1005
R648	24	5%	1/16	C	HIC	38	1005
R649	43.2k	1%	1/16	C	HIC	22	1005
R650	5.1K	5%	1/16	C	HIC	26	1005
R651	1K	5%	1/16	C	HIC	31	1005
R652	510	5%	1/16	C	HIC	35	1005
R653	24	5%	1/16	C	HIC	38	1005
R654	24	5%	1/16	C	HIC	38	1005
R655	24	5%	1/16	C	HIC	38	1005
R656	24	5%	1/16	C	HIC	38	1005
R657	20K	5%	1/16	C	HIC	28	1005
R701	240	5%	1/16	C	HIC	39	1005
R702	240	5%	1/16	C	HIC	39	1005
R703	240	5%	1/16	C	HIC	39	1005
R704	240	5%	1/16	C	HIC	39	1005
R705	240	5%	1/16	C	HIC	39	1005
R706	240	5%	1/16	C	HIC	39	1005
R707	10K	5%	1/16	C	HIC	25	1005
R708	10K	5%	1/16	C	HIC	25	1005
R709	10K	5%	1/16	C	HIC	25	1005
R711	10K	5%	1/16	C	HIC	25	1005
R712	10K	5%	1/16	C	HIC	25	1005
R713	10K	5%	1/16	C	HIC	25	1005
R714	10K	5%	1/16	C	HIC	25	1005
R715	10K	5%	1/16	C	HIC	25	1005
R716	10K	5%	1/16	C	HIC	25	1005
R720	10K	5%	1/16	C	HIC	25	1005
R721	100	5%	1/16	C	HIC	24	1005
R731	270	5%	1/6	A	M	48	
R732	270	5%	1/6	A	M	48	
R733	270	5%	1/6	A	M	48	
R734	270	5%	1/6	A	M	48	
R735	270	5%	1/6	A	M	48	
R736	270	5%	1/6	A	M	48	
R741	0.24	2%	1	H	M	49	
R745	1M	5%	1/6	A	M	50	
R747	10	5%	1/4	A	M	51	
R748	10	5%	1/4	A	M	51	
R749	10	5%	1/4	A	M	51	
R751	430K	1%	1/2	A	M	52	SN
R752	430K	1%	1/2	A	M	52	SN
R753	430K	1%	1/2	A	M	52	SN
R754	11K	1%	1/16	C	HIC	16	1005
R760	100	5%	1/16	C	HIC	24	1005
R761	5.11K	1%	1/16	C	HIC	13	1005
R762	5.11K	1%	1/16	C	HIC	13	1005
R763	5.11K	1%	1/16	C	HIC	13	1005
R764	5.11K	1%	1/16	C	HIC	13	1005
R765	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R766	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R767	18.7K	1%	1/16	C	HIC	14	1005
R768	100	5%	1/16	C	HIC	24	1005
R769	2K	1%	1/16	C	HIC	15	1005
R770		5%	1/16	C	HIC	33	1005
R771	100	5%	1/16	C	HIC	24	1005
R772	100	5%	1/16	C	HIC	24	1005
R773		1%	1/16	C	HIC		1005
R801	39	5%	1/4	A	M	53	
R802	39	5%	1/4	A	M	53	
R803	3K	5%	1/6	A	M	54	
R804	3K	5%	1/6	A	M	54	
R805			1/16	C	HIC		1005
R901	10	5%	1/4	A	IPM	9	
R902	10	5%	1/4	A	IPM	9	
R903	10	5%	1/4	A	IPM	9	
R905	100	1%	1/6	A	IPM	10	
R906	330	1%	1/6	A	IPM	11	
R907	2K	5%	1/4	A	IPM	12	
R908			1/6	A	IPM		
R911	51	5%	1/6	A	IPM	13	
R912	51	5%	1/6	A	IPM	13	
R913	51	5%	1/6	A	IPM	13	
R914	51	5%	1/6	A	IPM	13	
R915	51	5%	1/6	A	IPM	13	
R916	51	5%	1/6	A	IPM	13	
R930	24	5%	1/16	C	HIC	38	1005
R931	5.11K	1%	1/16	C	HIC	13	1005
R932	5.11K	1%	1/16	C	HIC	13	1005
R933	5.11K	1%	1/16	C	HIC	13	1005
R934	5.11K	1%	1/16	C	HIC	13	1005
R935	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R936	CHIP JUMPER	5%	1/16	C	HIC	33	1005
R937	12.1K	1%	1/16	C	HIC	17	1005
R938	24	5%	1/16	C	HIC	38	1005
R939	2 K	1%	1/16	C	HIC	15	1005
R940		1%	1/16	C	HIC		1005
R941	100	5%	1/16	C	HIC	24	1005
R942	100	5%	1/16	C	HIC	24	1005
R991	100	5%	1/16	C	HIC	24	1005
R992	100	5%	1/16	C	HIC	24	1005

CAPACITOR

SYM	SPECIFICATION CAPACITANCE ( )	VOLT (V)	TYPE	MOUNTING STYLE	PCB	PART NO.	REMARK
C001	0.01	AC 250	C	P	M	59	IEC
C002	0.01	AC 250	C	P	M	59	IEC
C003	3.3	AC275	F	H	M	63	OKAYA MAX3.3μF
C004	0.01	AC 250	C	P	M	59	IEC
C005	0.01	AC 250	C	P	M	59	IEC
C006	0.01	AC 250	C	P	M	59	IEC
C007	0.01	AC 250	C	P	M	59	IEC
C009	0.1	50	C	R	M	61	RRCP 1667
C010	100	10	D	H	M	62	
C011	3.3	AC275	F	H	M	63	OKAYA MAX3.3μF
C012	0.0022	AC 250	C	P	M	58	[illegible]
C015	0.01	AC 250	C	P	M	59	IEC
C016	0.01	AC 250	C	P	M	59	IEC
C020	68	450	D	H	M	64	KMX
C021	400	450	D	H	M	65	
C022	400	450	D	H	M	65	
C023	400	450	D	H	M	65	
C024	400	450	D	H	M	65	
C026	0.01	AC 250	C	P	M	59	IEC
C027	0.01	AC 250	C	P	M	59	IEC
C031	0.01	1k	C	H	IPM	15	
C101	2200p	1k	C	R	M	66	RRCP 2884
C102	220p	2k	C	P	M	67	RRCP 2587
C103	1000p	50	F	P	M	68	
C104	68	25	D	R	M	69	
C105	100p	50	C	A	M	70	
C106	2200p	50	F	R	M	71	
C107	270	50	D	H	M	72	
C108	330	25	D	H	M	73	
C109	100	25	D	R	M	74	
C110	100	25	D	R	M	74	
C111	220	25	D	R	M	75	
C112	0.1	50	C	R	M	61	RRCP 1667
C113	330	10	D	R	M	76	
C114	0.01	50	F	R	M	77	
C115	470p	AC 250	C	R	M	78	RRCP 2314
C121	100	25	D	R	M		
C122	100	25	D	R	M		
C123	100		D	R	M		
C124	0.1	50	C	A	M	85	B SPEC
C125	0.1	50	C	A	M	85	B SPEC
C126	0.1	50	C	A	M	85	B SPEC
C127	0.1	50	C	A	M	85	B SPEC
C191	0.1	16	C	C	HIC	49	1005
C192	0.1	16	C	C	HIC	49	1005
C201	0.1	16	C	C	HIC	49	1005
C202	0.1	16	C	C	HIC	49	1005
C204		50	C	C	HIC	50	R SPEC 1005
C205	0.047	25	C	C	HIC	48	R SPEC 1005
C206	470P	50	C	C	HIC	50	R SPEC 1005
C207	470P	50	C	C	HIC	50	R SPEC 1005
C209	0.1	16	C	C	HIC	49	1005
C210	0.47	16	C	C	HIC	51	1005
C211	0.047	25	C	C	HIC	48	R SPEC 1005
C215	0.47	16	C	C	HIC	51	1005
C216	0.1	16	C	C	HIC	49	1005
C217	0.1	16	C	C	HIC	49	1005
C220	0.01	25	C	C	HIC	52	R SPEC 1005
C231	0.1	16	C	C	HIC	49	1005
C232	0.1	16	C	C	HIC	49	1005
C234	0.1	16	C	C	HIC	49	1005
C235	0.1	16	C	C	HIC	49	1005
C236	0.1	16	C	C	HIC	49	1005
C237	0.1	16	C	C	HIC	49	1005
C238	1000p	50	C	C	HIC	53	B SPEC 1005
C241		16	C	C	HIC		1005
C251	4700p	50	C	C	HIC	54	CH SPEC 1608
C252	0.068	25	C	C	HIC	55	R SPEC 1608
C271	0.1	16	C	C	HIC	49	1005
C281	0.1	16	C	C	HIC	49	1005
C282	0.1	16	C	C	HIC	49	1005
C283	0.1	25	C	C	HIC	56	R SPEC 1608
C284	2.2	50	D	R	M	86	NICHICON VR
C285	470p	50	C	C	HIC	57	B SPEC 1005
C293	0.1	16	C	C	HIC	49	1005
C321	0.01	50	C	C	HIC	58	F SPEC 1608
C401	100	25	D	R	M	79	NICHICON VR
C405	0.1	16	C	C	HIC	49	1007
C406	0.1	25	C	C	HIC	59	F SPEC 1608
C407	0.1	25	C	C	HIC	59	F SPEC 1608
C504	100P	50	C	C	HIC	60	CH SPEC 1005
C505	100P	50	C	C	HIC	60	CH SPEC 1005
C506	100P	50	C	C	HIC	60	CH SPEC 1005
C508	0.1	16	C	C	HIC	49	1005
C509	220P	50	C	C	HIC	61	B SPEC 1005
C601	4700p	1k	C	R	M	87	
C604	0.01	1k	C	R	M	80	
C611	0.01	50	C	A	M		B SPEC
C612	0.01	50	C	A	M		B SPEC
C621	100p	50	C	A	M	70	
C622	47	25	D	R	M	81	
C631	0.047	25	C	C	HIC	48	R SPEC 1005
C632	0.047	25	C	C	HIC	48	R SPEC 1005
C641	0.047	25	C	C	HIC	48	R SPEC 1005
C651	0.01	25	C	C	HIC	52	R SPEC 1005
C652	1000p	50	C	C	HIC	53	B SPEC 1005
C701	220p	50	C	A	M	82	CH SPEC
C702	220p	50	C	A	M	82	CH SPEC
C703	220p	50	C	A	M	82	CH SPEC
C704	220p	50	C	A	M	82	CH SPEC
C705	220p	50	C	A	M	82	CH SPEC
C706	220p	50	C	A	M	82	CH SPEC
C707	100p	50	C	C	HIC	60	CH SPEC 1005
C708	100p	50	C	C	HIC	60	CH SPEC 1005
C709	100p	50	C	C	HIC	60	CH SPEC 1005
C710	220p	50	C	C	HIC	61	B SPEC 1005
C711	0.1	16	C	C	HIC	49	1005
C721	10	25	D	R	M	89	
C722	10	25	D	R	M	89	
C723	10	25	D	R	M	89	
C724		25	C	R	M		
C725		25	C	R	M		
C726		25	C	R	M		
C731	100	25	D	R	M	79	NICHICON VR
C732		25	C	A	M		
C733		25	C	A	M		
C735	2200p	50	C	A	M	57	B SPEC
C751	0.01	DC 1KV	C	P	M	80	RRCP 2793
C762	0.01	25	C	C	HIC	52	R SPEC 1005
C771		50	C	C	HIC		R SPEC 1005
C772		50	C	C	HIC		R SPEC 1005
C801	0.022	50	C	C	HIC	62	B SPEC 1608
C810	0.15	50	F	R	M	83	
C811	0.15	50	F	R	M	83	
C812	100	25	D	R	M	79	NICHICON VR
C813	0.01	AC 250	C	P	M	59	IEC
C814	0.01	AC 250	C	P	M	59	IEC
C815	68	50	D	R	M	84	
C816	0.15	50	F	R	M	83	
C817	0.01	AC 250	C	P	M	59	IEC
C818	0.01	AC 250	C	P	M	59	IEC
C819	0.01	AC 250	C	P	M	59	IEC
C820	0.01	AC 250	C	P	M	59	IEC
C901	680p	50	C	A	IPM	16	B SPEC
C902	680p	50	C	A	IPM	16	B SPEC
C903	680p	50	C	A	IPM	16	B SPEC
C904	680p	50	C	A	IPM	16	B SPEC
C905	680p	50	C	A	IPM	16	B SPEC
C906	680p	50	C	A	IPM	16	B SPEC
C913	10	25	D	R	IPM	17	(105℃)
C914	10	25	D	R	IPM	17	(105℃)
C915	10	25	D	R	IPM	17	(105℃)
C917	0.1	50	C	R	IPM	18	
C918	0.01	50	C	A	IPM	19	B SPEC
C919	0.022	50	C	A	IPM	20	B SPEC
C921	0.1	50	C	R	IPM	18	
C922	0.1	50	C	R	IPM	18	
C923	0.1	50	C	R	IPM	18	
C924	0.1	50	C	R	IPM	18	
C925	0.1	50	C	R	IPM	18	
C926	33	25	D	R	IPM	21	
C927	33	25	D	R	IPM	21	
C928	33	25	D	R	IPM	21	
C931	0.047	25	C	C	HIC	48	R SPEC 1005
C932	0.047	25	C	C	HIC	48	R SPEC 1005
C941		50	C	C	HIC		R SPEC 1005
C942		50	C	C	HIC		R SPEC 1005

DIODE

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
D001	1SS120	A	M	90	RREB 1822
D002	1S2076A	A	M	91	RREB 1431
D003	1S2076A	A	M	91	RREB 1431
D004	1S2076A	A	M		RREB 1431
D101	05NU42	A	M	92	
D102	D1NL20U	A	M	93	AL01Z
D103	05NU42	A	M	92	
D104	D1NL20U	A	M	93	AL01Z
D105	RL4Z	H	M	94	RREB 4763
D106	S2S6M	H	M	95	RREB 4839
D107	D1NL20U	A	M	93	AL01Z
D108	D1NL20U	A	M	93	AL01Z
D109	S2S6M	H	M	95	RREB 4839
D201	KDS181-RTK/P	C	HIC	69	DAP202K
D202	KDS181-RTK/P	C	HIC	69	DAP202K
D251	KDS184-RTK/P	C	HIC	70	DAN202K
D271	KDS184-RTK/P	C	HIC	70	DAN202K
D272	KDS181-RTK/P	C	HIC	69	DAP202K
D274	KDS184-RTK/P	C	HIC		DAN202K
D321	KDS184-RTK/P	C	HIC	70	DAN202K
D322	KDS181-RTK/P	C	HIC	69	DAP202K
D401	D1NK60	A	M	98	RREB 4932
D402	D1NK60	A	M		RREB 4932
D601	D30L60	H	M	96	RREB 5186
D602	EG01C	A	M		
D611	1SS133	A	M	97	RREB 1815
D612	1SS133	A	M	97	RREB 1815
D631	KDS226-RTK/P	C	HIC	71	DAN217
D641	1SS352TPH3F	C	HIC	72	DAN217
D701	D1NK60	A	M	98	RREB 4932
D702	D1NK60	A	M	98	RREB 4932
D703	D1NK60	A	M	98	RREB 4932
D731	1SS352TPH3F	C	HIC	72	1SS355
D732	1SS352TPH3F	C	HIC	72	1SS355
D733	1SS352TPH3F	C	HIC	72	1SS355
D734	1SS352TPH3F	C	HIC	72	1SS355
D761	KDS226-RTK/P	C	HIC	71	DAN217
D801	KDS226-RTK/P	C	HIC		DAN217
D802	KDS226-RTK/P	C	HIC		DAN217
D803	1SS120	A	M	90	RREB 1822
D804	1S2076A	A	M	91	RREB 1431
D901	D1NK60	A	IPM	22	RREB 4932
D902	D1NK60	A	IPM	22	RREB 4932
D903	D1NK60	A	IPM	22	RREB 4932
D931	KDS226-RTK/P	C	HIC	71	DAN217
DB1	D2SB60A	H	M	100	RREB 4602
DB601	RBV-2506	H	M	101	RREB 5264
DB602	RBV-2506	H	M	101	RREB 5264

JUMPER

SYM	EXIST/ NON EXIST	MOUNTING STYLE	PCB	PART NO.	REMARK
JW001	EXIST	A	M		
JW002	EXIST	A	M		
JW004	EXIST	A	M		
JW005	EXIST	A	M		
JW006	NON EXIST	A	M		

LED

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
LD301	SLR-342VCTB7	R	M	102	RED
LD302	SLR-342VCTB7	R	M	102	RED
LD303	SLR-342VCTB7	R	M	102	RED

ZENER DIODE

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
ZD101	HZ11C3	A	M	103	
ZD102	RD12FB1	A	M	104	
ZD103	HZ11A1	A	M	105	
ZD104	HZ11A1	A	M	105	
ZD701			M		
ZD702			M		
ZD901	HZ22-1	A	IPM	23	

RELAY

SYM	SPECIFICATION 330	MOUNTING STYLE	PCB	PART NO.	REMARK
RL1	G5V-2	H	M	133	RRRB 1338
RL2	G5T	H	M	134	RRRB 1378
RL3	G4A-1A-PE	H	M	135	RRRB 1313
RL4	G5NB-1A	H	M	136	RRRB 1369
RL5	G5NB-1A	H	M	136	RRRB 1369

OSCILLATOR

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
X1	CSTCE10M0G55	C	HIC	86	10MHZ

TRANSISTOR

SYM	SPECIFICATION	RATING I (A)	RATING V (V)	MOUNTING STYLE	PCB	REMARK	PART NO.
Q203	DTC143EE			C	HIC	DTC114EE	74
Q251	KTC3875S			C	HIC	2SC412KS	76
Q401	2SC1214CTZ			R	M	RREG 1722	
Q601	GT50J121	50	500	H	M		107
Q602	GT50J121	50	500	H	M		107
Q621	2SJ167			R	M		108
Q623	2SC5058S			R	M		109
Q624	2SC1214CTZ			R	M	RREG 1722	112
Q625	2SA573GZ			R	M	RANK C	111
Q641	RN1102TE			C	HIC	DTC114EE	75
Q701	RN1102TE			C	HIC	DTC114EE	75
Q702	RN1102TE			C	HIC	DTC114EE	75
Q703	RN1102TE			C	HIC	DTC114EE	75
Q704	RN1102TE			C	HIC	DTC114EE	75
Q801	2SC1214CTZ			R	M	RREG 1722	112

PHOTO COUPLER

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
PQ101	TLP421BL	H	M	113	PC817X
PQ401	TLP421BL	H	M	113	PC817X
PQ402	TLP421BL	H	M	113	PC817X
PQ403	TLP421BL	H	M	113	PC817X
PQ404	TLP421BL	H	M	113	PC817X
PQ701	TLP421BL				PC817X

INDUCTOR

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
L001	HF70BTL3	A	M	122	BEAD
L002	HF70BTL3	A	M	122	BEAD
L003	HF70BTL3	A	M		BEAD
L004	NF COIL1	H	M	123	RRMH 3681
L005	COIL	H	M	124	RRMH 3442
NF-COIL2	NF COIL3.5	H	M	126	RRMH 3573
L103	JUMPER	A	M		
L104	JUMPER	A	M		
L105	JUMPER	A	M		
L701	JUMPER	A	M		
L801	IF-TRANS	H	M	128	RRMF 3636
L802	HF70BTL3	A	M	122	BEAD
L810	LB2518B102M	C	HIC	88	
T101	RRMF3972	H	M	129	
CT1	S19-J299CT	H	M	130	RRMF 3484

SURGE ABSORBER

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
VS1	450NR-12D	H	M	131	RREL 1206
VS2	450NR-12D	H	M	131	RREL 1206
VS3	450NR-12D	H	M	131	RREL 1206
AS1	DE37-102MF	R	M	132	RRZE 2528

IC

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
REG1	MC7805CT	H	M	114	RREA 2855
IC1	MR4020	H	M	115	RREA 5096
IC2	ULN2003ANS	S	HIC	78	
IC3	NJM082M	S	HIC	79	
IC5	KIA393F-EL/P	S	HIC	80	LM2903DR
IC6	uPC4742G2	S	HIC	81	
IC7	KIA393F-EL/P	S	HIC	80	LM2903DR
IC8	SN74LV08APW	S	HIC	82	
IC9	ULN2003ANS	S	HIC	78	
IC10	SN74LV08APW	S	HIC	82	
IC11	TD6206AP	H	M	116	
IC101	K1A431A	R	M	117	
IPM	PS21565	H	IPM	5	20A
IPM2	SLA6818M	H	M	118	RREP 5039
E^{2}PROM	S-24CS08AFJ	S	HIC	83	
MICON	SH7146(AX-8X10)	Q	HIC	4	RREA 5236

SWITCH

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
SW	KSHC614AT	R	M	119	

FUSE

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
F1	250VTLNC25A	H	M	138	
F3	250V 3.15A	H	M	140	
F4	250V 3.15A	H	M	140	

CONNECTOR

SYM	SPECIFICATION	MOUNTING STYLE	PCB	PART NO.	REMARK
CN2	VH-2P(RED)	H	M	143	
CN8	XA-2P(WHT)	H	M	144	
CN9	XA-2P(BLU)	H	M	145	
CN10	XA-2P(RED)	H	M	146	
CN15	XA-6P	H	M	147	
CN17	PH-4P	H	M	148	
CN18	PH-11P	H	M	149	
CN20	PH-8P	H	M	150	
CN21	PH-11P(BLU)	H	IPM	25	
CN22	PH-11P(BLU)	H	M	151	
CN24	VH-5P (1,3,5 PIN)	H	M	152	

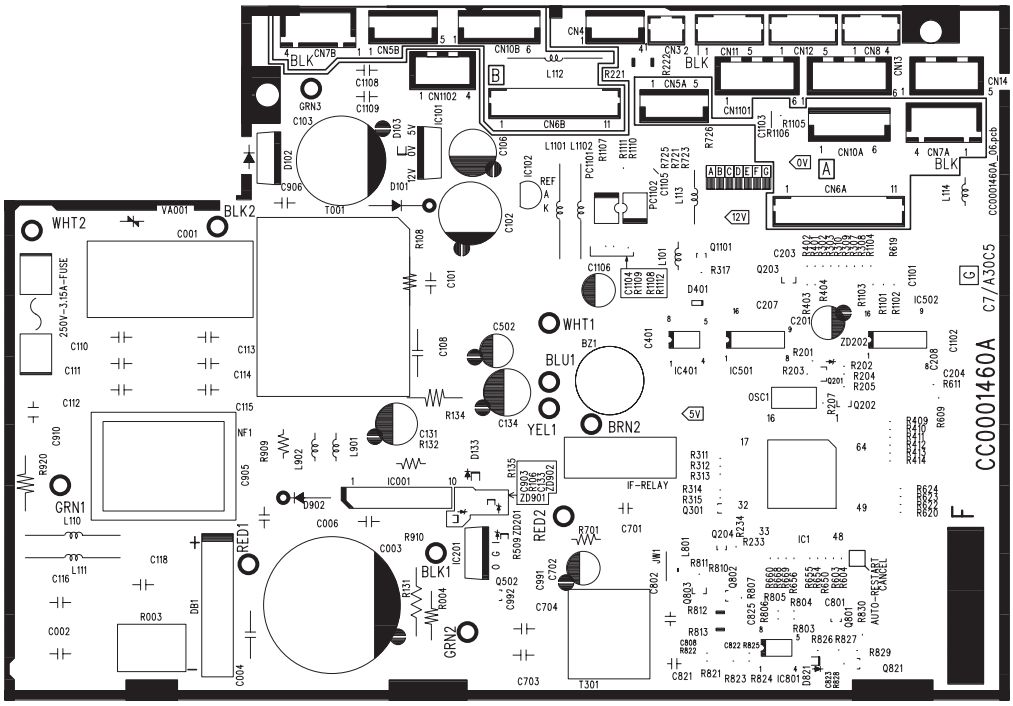
PRINTED WIRING BOARD LOCATION DIAGRAM

MODEL RAS-70YH7

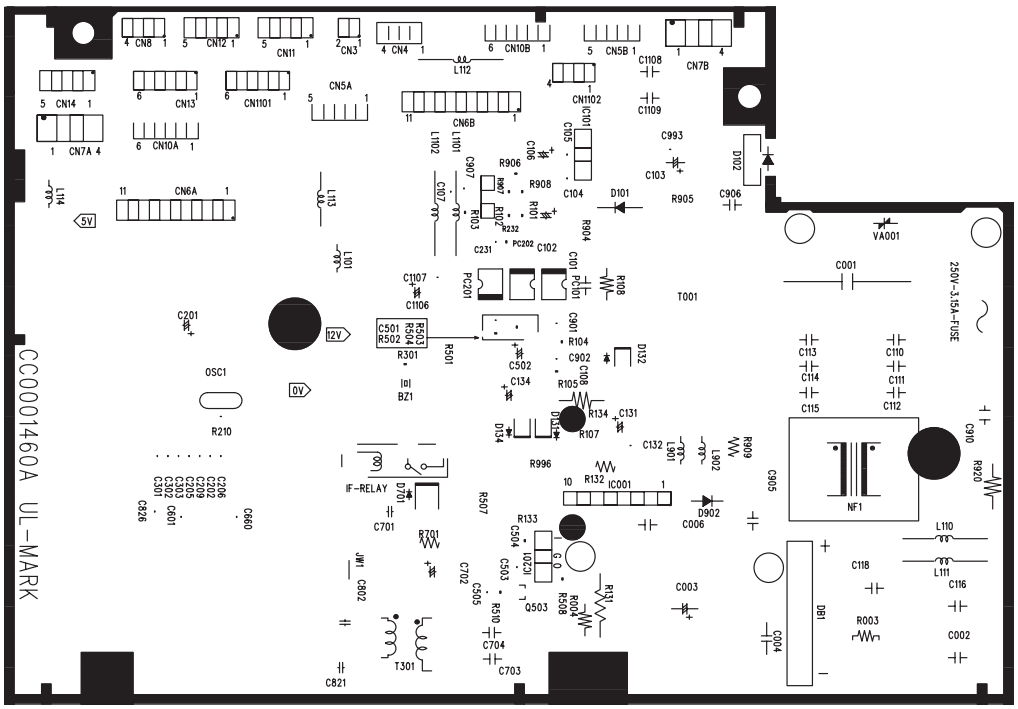
MAIN P.W.B.

Marking on P.W.B

COMPONENT SIDE

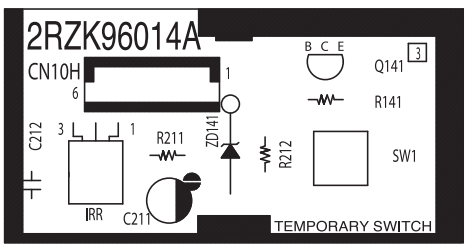


SOLDERING SIDE

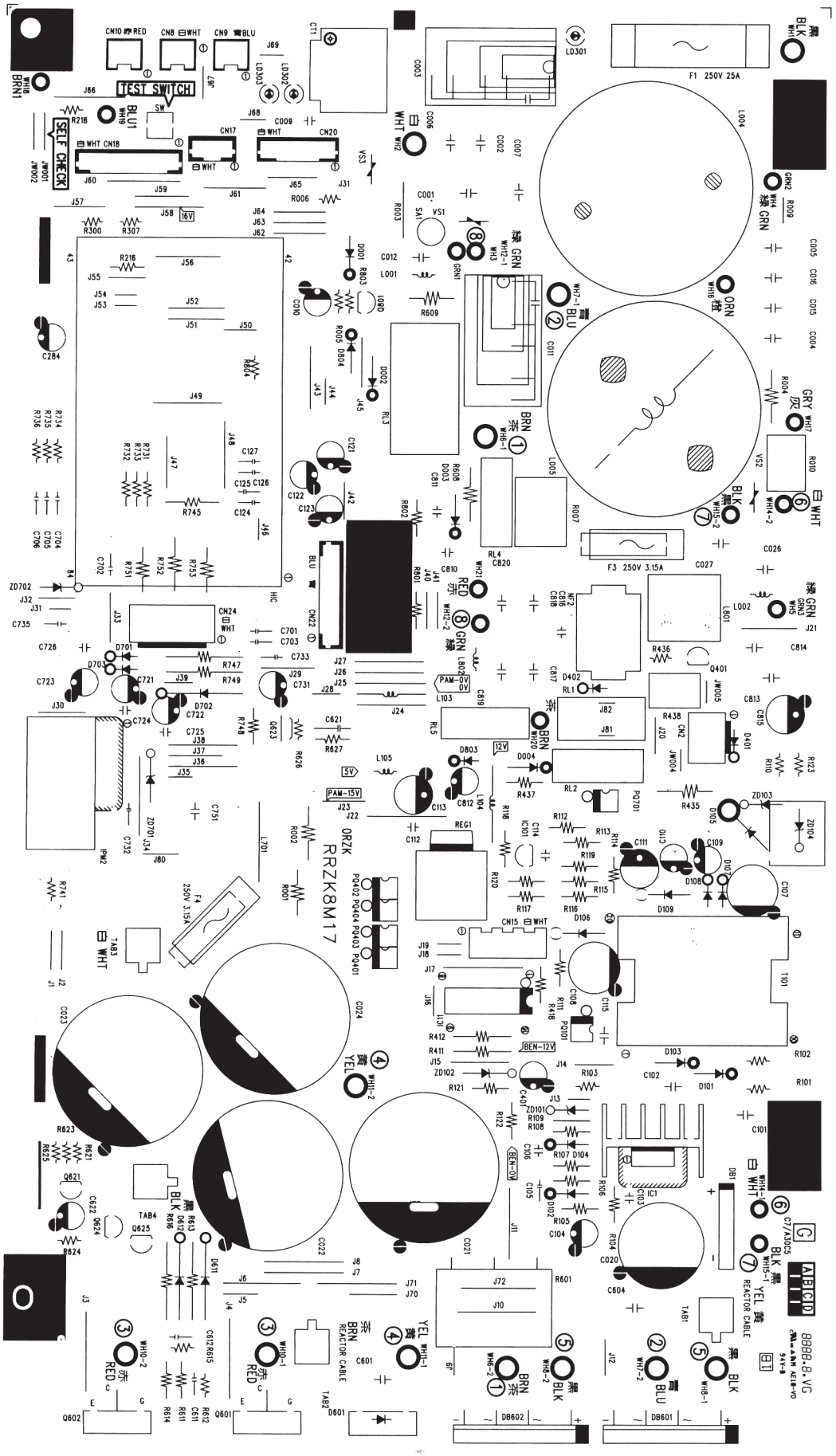


RECEIVING P.W.B.

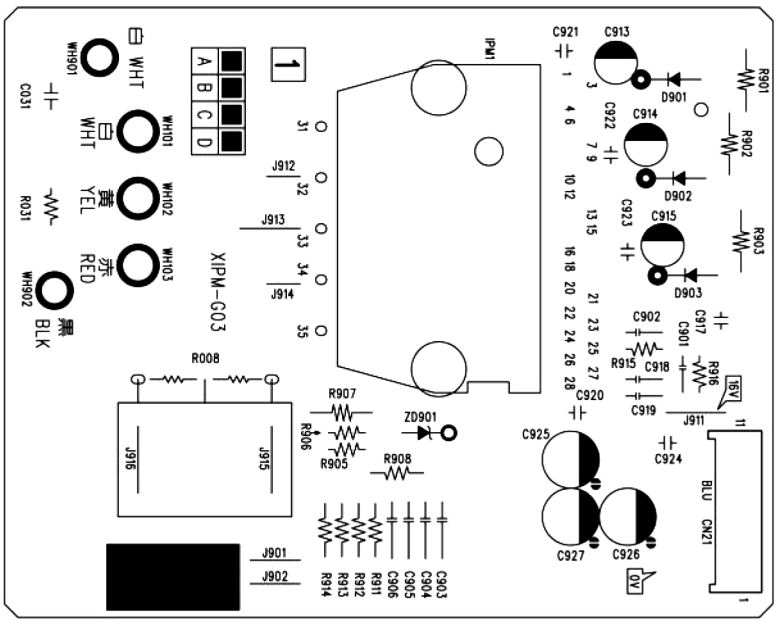
Marking on P.W.B



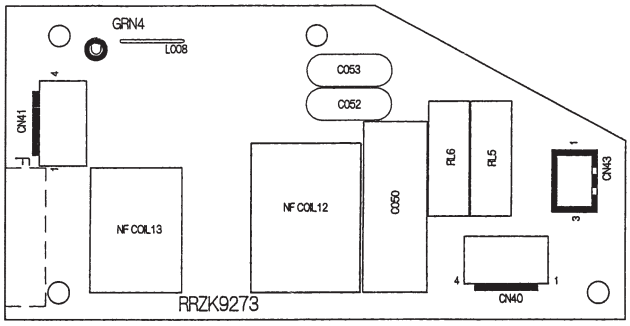
P.W.B. MAIN


TEST SWITCH
SELF CHECK
F1 250V 25A
F3 250V 3.15A
F4 250V 3.15A
RRZK8M17
ORZK
REACTOR CABLE
REACTOR CABLE

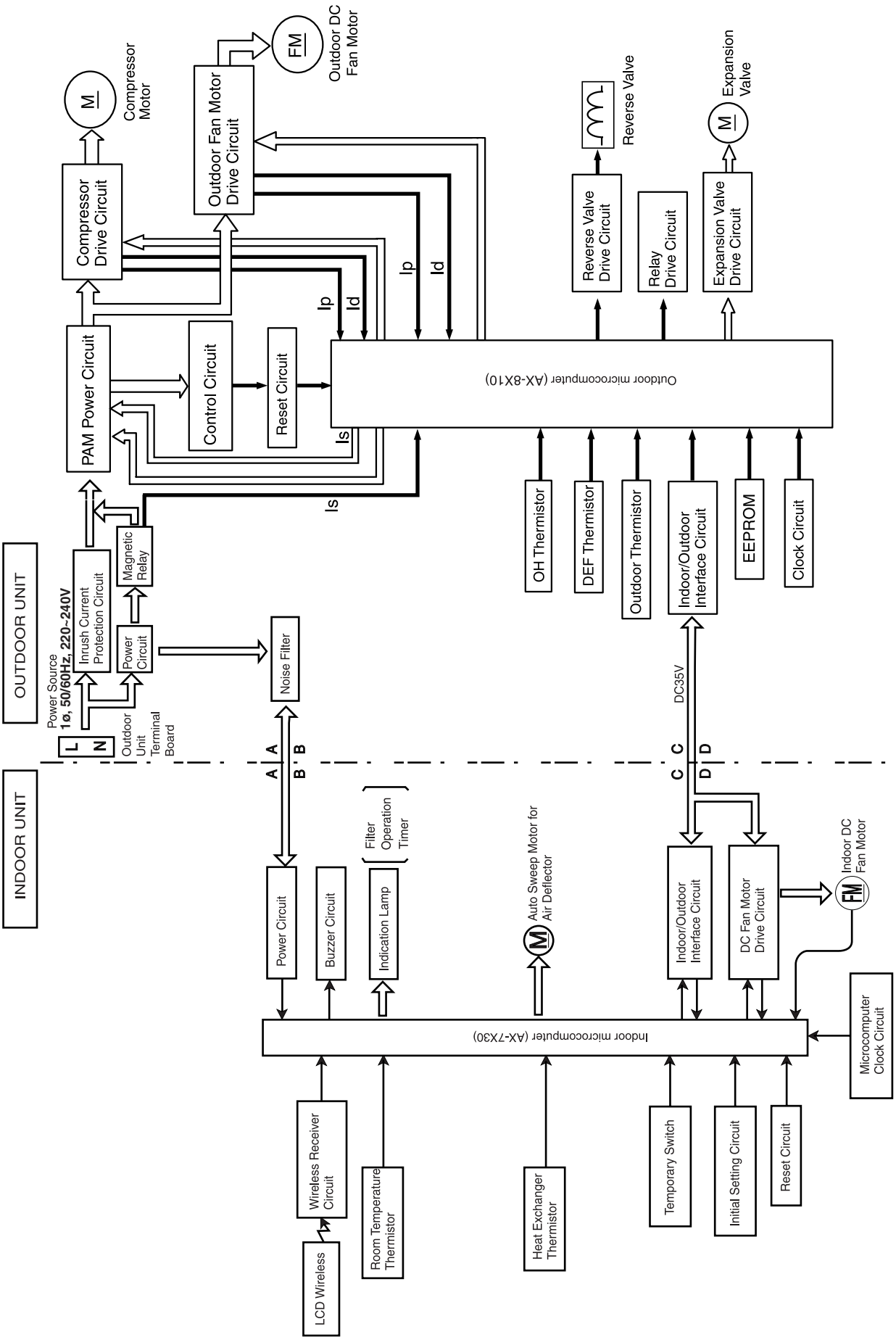
P.W.B. IPM-BOARD



P.W.B. NF-BOARD



BLOCK DIAGRAM
MODEL RAS-70YH7/RAC-70YH7



BASIC MODE

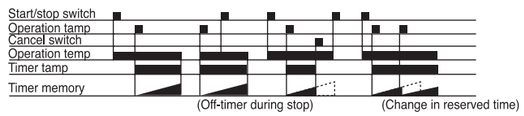
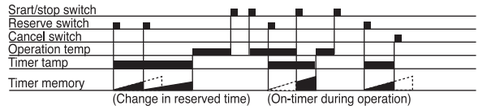
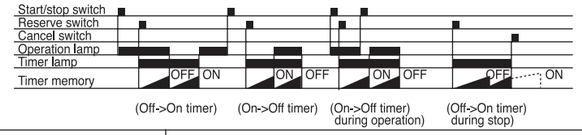
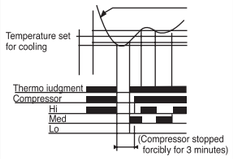
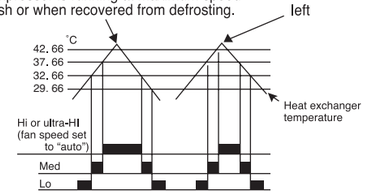
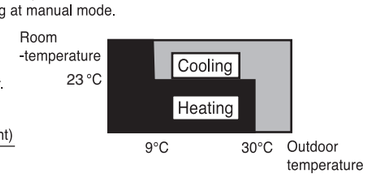
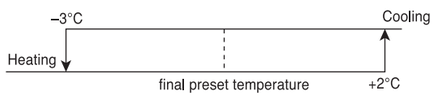
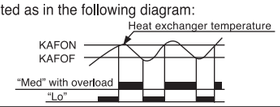
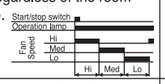
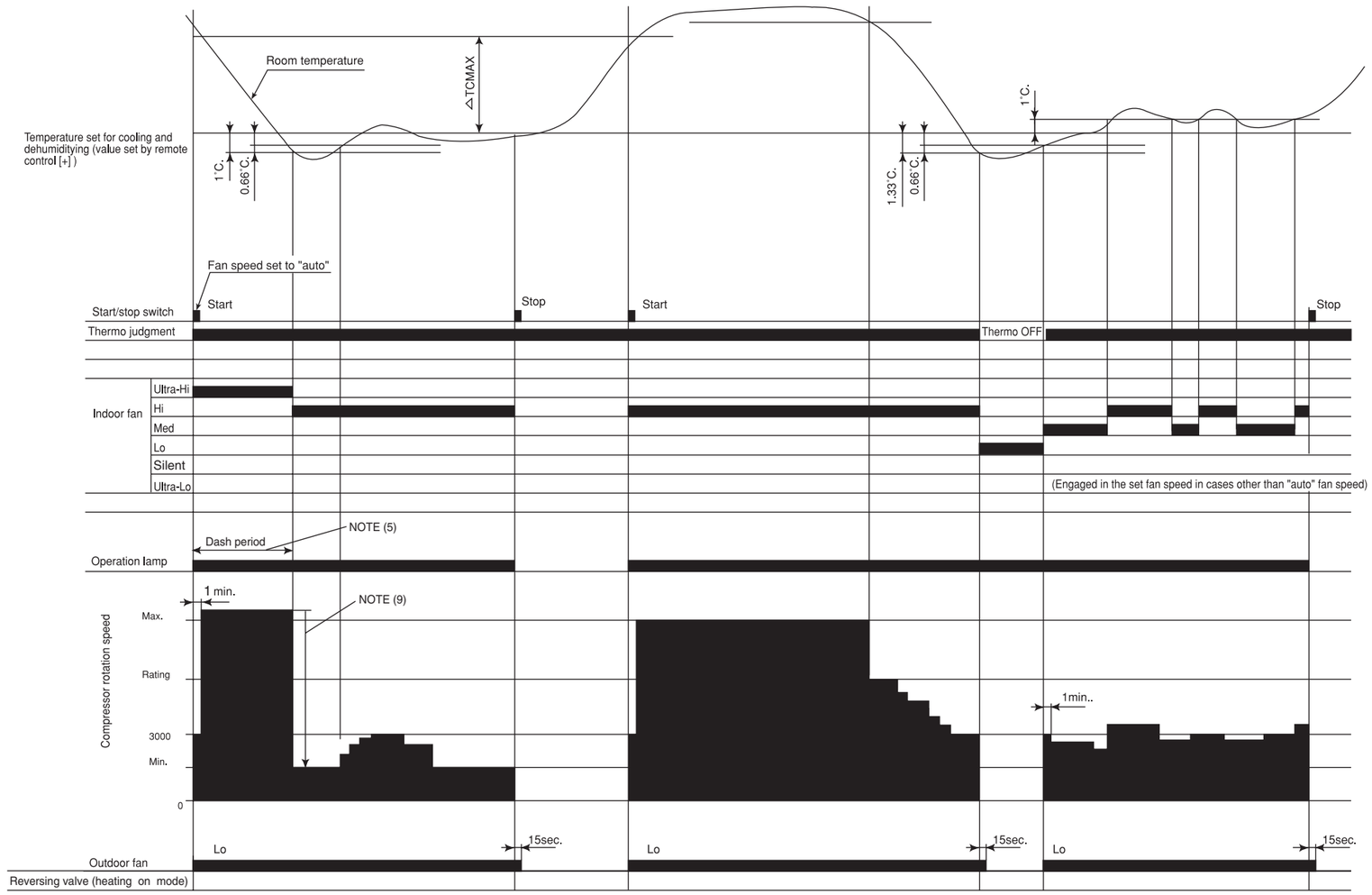
Operation mode		Fan	Cooling	Dehumidifying (dehumidifying operation by the function select button only, not including that engaged by the dehumidify button)	Heating	Auto
Basic operation of start/stop switch						
Timer functions	Off-timer					
	On-timer					
	Off -> On On -> Off timer					
Fan speed mode (indoor fan)	Auto		Changes from “Hi” to “Med” or “Lo” depending on room temperature.  1. Runs at “Hi” until first thermo off after operation is started. 2. Runs at “Lo” when thermo is off.	Changes between “Lo” and “Med” depending on the room temperature. Temperature division / Fan speed Division 1 – Lo Division 2 – Lo Division 3 – Med Division 4 – Med 1. The indoor fan also stops when the compressor is in stop status.	Set to “ultra-Lo”, “Lo”, “Med”, “Hi”, “ultra-Hi” or “stop” depending on the room temperature, time and heat exchange temperature. Set to “stop” if the room temperature is 25˚C in the “ultra-Lo” mode other than during preheating (cooling is recovered at 18.33˚C). When the compressor is running at maximum speed during hot dash or when recovered from defrosting. In modes other than left 	Operating mode is judged by room temperature and outdoor temperature. (1) Judging by outdoor temperature • Operating mode is judged by outdoor temperature. Only when the mode is not restricted by this judgment, the judgment by room temperature in the next paragraph will be performed. (a) Outdoor temperature ≧ 30°C : Restricted to cooling (b) Outdoor temperature ≦ 9°C : Restricted to heating (2) Judging by room temperature Operating mode at start up is judged (initial judgment) (a) Conditions for judgment (any of the followings) • When auto operation is started after 1 hour has elapsed since the operation was stopped. • When auto operation is started after the previous manual mode operation. • When the operating mode is switched to auto while operating at manual mode. (b) Judging method • Room temperature ≧ 23°C ±3°C : Cooling • Room temperature < 23°C ±3°C : Heating ※ ±3°C is the fine adjustment value from the remote controller.  Judging operating mode change during operation (Continuous judgment) (a) Conditions for judgment (any of the followings) • The mode is reviewed at every interval time. • When auto operation is started again before 1 hour has elapsed since the operation was stopped. (b) Judging method • Judge by setting the hysteresis on the final preset temperature. The final preset temperature is the actually targeted preset temperature which is the sum of the basic preset temperature and each type of shift value (e.g. ±3°C by remote controller, preset temperature correction value, powerful shift value, etc.). [Currently cooling] • Room temperature ≦ Final preset temperature –3°C Change to heating • Room temperature > Final preset temperature –3°C Continue cooling [Currently heating] • Room temperature ≧ Final preset temperature +2°C Change to cooling • Room temperature < Final preset temperature +2°C Continue heating 
	Hi	Operates at “Hi” regardless of the room temperature.	Set to “ultra-Hi” when the compressor runs at maximum speed, and to “Hi” in other modes.	Set to “Hi” in modes other than when the compressor stops.	Set to “ultra-Lo”, “Lo”, “Med”, “Hi”, “ultra-Hi” or “stop” depending on the room temperature, and time. Set to “stop” if the room temperature is 25˚C in the “ultra-Lo” mode other than during preheating (cooling is recovered at 18.33˚C). Set to “ultra-Hi” when the compressor is running at maximum speed during hot dash or when recovered from defrosting.	
	Med	Operates at “Med” regardless of the room temperature.	Same as at left.	Set to “Med” in modes other than when the compressor stops.	Set to “ultra-Lo”, “Lo”, “Med” or “stop” depending on the room temperature and time. Set to “stop” if the room temperature is 25˚C in the “ultra-Lo” mode other than during preheating (cooling is recovered at 18.33˚C).	
	Lo	Operates at “Lo” regardless of the room temperature.	Same as at left.	Set to “Lo” in modes other than when the compressor stops.	Set to “ultra-Lo”, “Lo”, or “stop” depending on the room temperature and time. Set to “stop” if the room temperature is 25˚C in the “ultra-Lo” mode other than during preheating (cooling is recovered at 18.33˚C). The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram: 	
Basic operation of temperature controller		Performs only fan operation at the set speed regardless of the room temperature. 	See page 49.	See page 53.	See page 55.	
Sleep operation (with sleep button ON)		• Enters sleep operation after set as on the left. • Action during sleep operation Lo (sleep) operation	• Same as at left • See page 51.	• Same as at left • See page 53.	• Same as at left • See page 57.	• Same as at left. • Performs the sleep operation of each operation mode.

Table 1 Mode data file

	RAS-70YH7
LABEL NAME	**VALUE**
WMAX	5700 min^{-1}
WMAX2	5700 min^{-1}
WSTD	5400 min^{-1}
WBEMAX	4000 min^{-1}
CMAX	5200 min^{-1}
CSTD	4900 min^{-1}
CKYMAX	4000 min^{-1}
CJKMAX	4000 min^{-1}
CBEMAX	2300 min^{-1}
WMIN	1200 min^{-1}
CMIN	1200 min^{-1}
STARTMC	60 Seconds
DWNRATEW	100%
DWNRATEC	100%
SHIFTW	0.00°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
DFTIM_OTP0	50 Minutes
DFTIM_OTP10	50 Minutes
DFTIM_OTP5	60 Minutes
STARCPL	1600 min^{-1}

Basic Cooling Operation



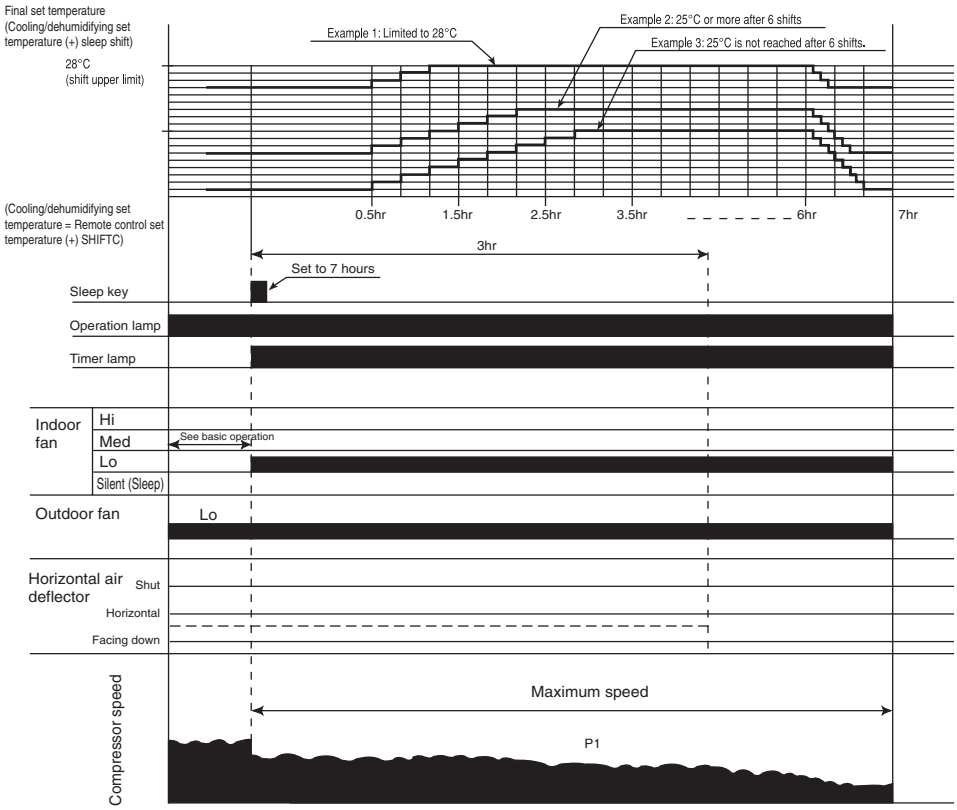
Notes:

(1) Condition for entering into Cool Dashed mode. When fan set to “Hi” or “Auto mode” and temperature difference between indoor temperature and set temperature 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 lapsed and ii) room temperature is lower than set temperature –3°C (thermo off) and iii) when room temperature has achieved setting temperature –1°C then maximum Cool Dashed time will be revised to 20 minutes. And iv) indoor fan is set to Lo and Med fan mode and v) change operation mode.
(3) During Cool Dashed operation, thermo off temperature is set temperature (with shift value) –3°C. After thermo off, operation continue in Fuzzy control mode.
(4) Compressor minimum “ON” time and “OFF” time is 3 minutes.
(5) During normal cooling mode, compressor maximum rpm CMAX will maintain for 60 minutes if indoor temperature is lower than CLMXTP. No time constrain if indoor temperature is higher than CLMXTP.
(6) When fan is set to “Hi”, compressor rpm will be limited to CKYMAX.
(7) When fan is set to “Med”, compressor rpm will be limited to CJKMAX.
(8) When fan is set to “Lo”, compressor rpm will be limited to CBEMAX.
(9) During Cool Dashed, when room temperature reaches set temperature –1°C compressor rpm is actual rpm x DWNRATEC.

Table 2 ΔTCMAX

Temperature difference	Calculated compressor rpm
1.66	2265 min^{-1}
2	2435 min^{-1}
2.33	2600 min^{-1}
2.66	2765 min^{-1}
3	2935 min^{-1}
3.33	3100 min^{-1}
3.66	3265 min^{-1}
4	3435 min^{-1}
4.33	3600 min^{-1}
4.66	3765 min^{-1}
5	3935 min^{-1}
5.33	4100 min^{-1}
5.66	4265 min^{-1}
6	4435 min^{-1}
6.33	4600 min^{-1}
6.66	4765 min^{-1}
7	4935 min^{-1}
7.33	5100 min^{-1}
7.66	5265 min^{-1}
8	5435 min^{-1}
8.33	5600 min^{-1}
8.66	5765 min^{-1}
9	5935 min^{-1}
9.33	6100 min^{-1}
9.66	6265 min^{-1}
10	6435 min^{-1}
10.33	6600 min^{-1}
10.66	6765 min^{-1}
11	6935 min^{-1}

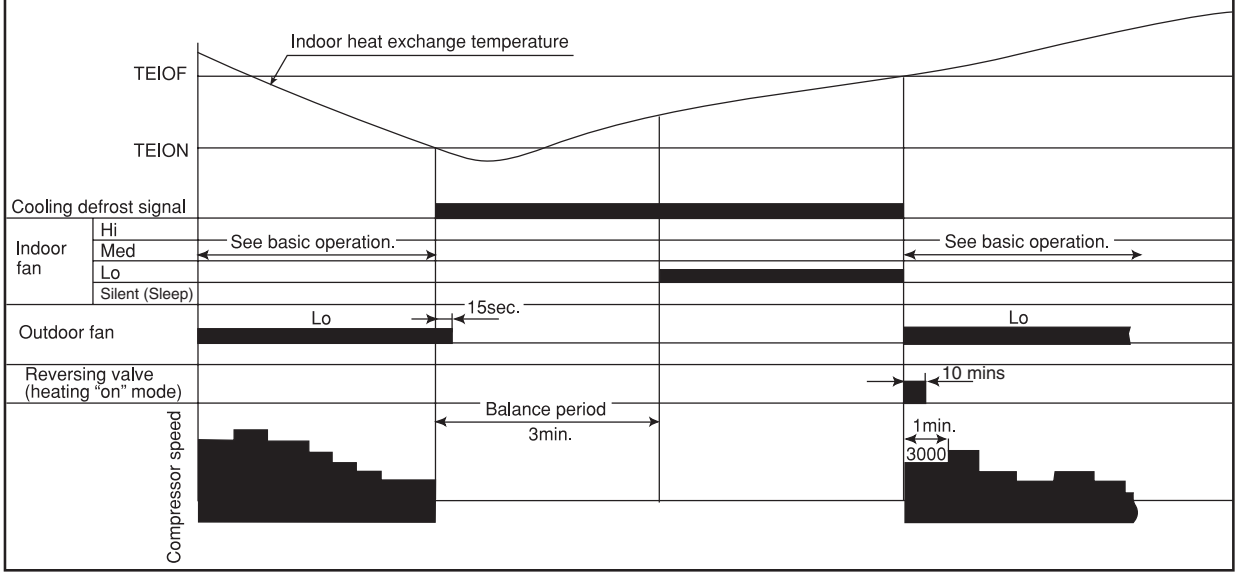
Cooling Sleep Operation



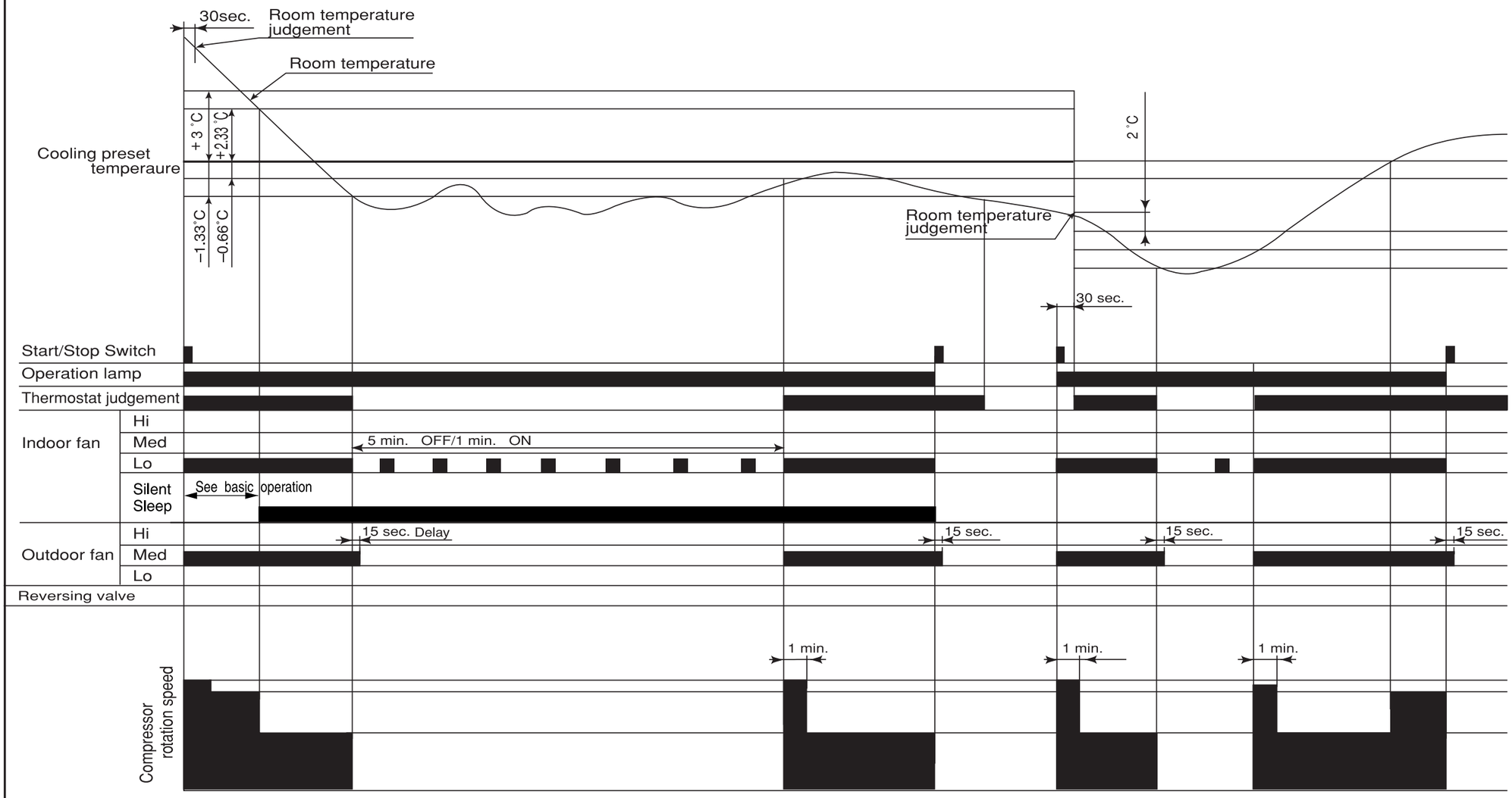
Notes:

(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.

Cooling Defrost



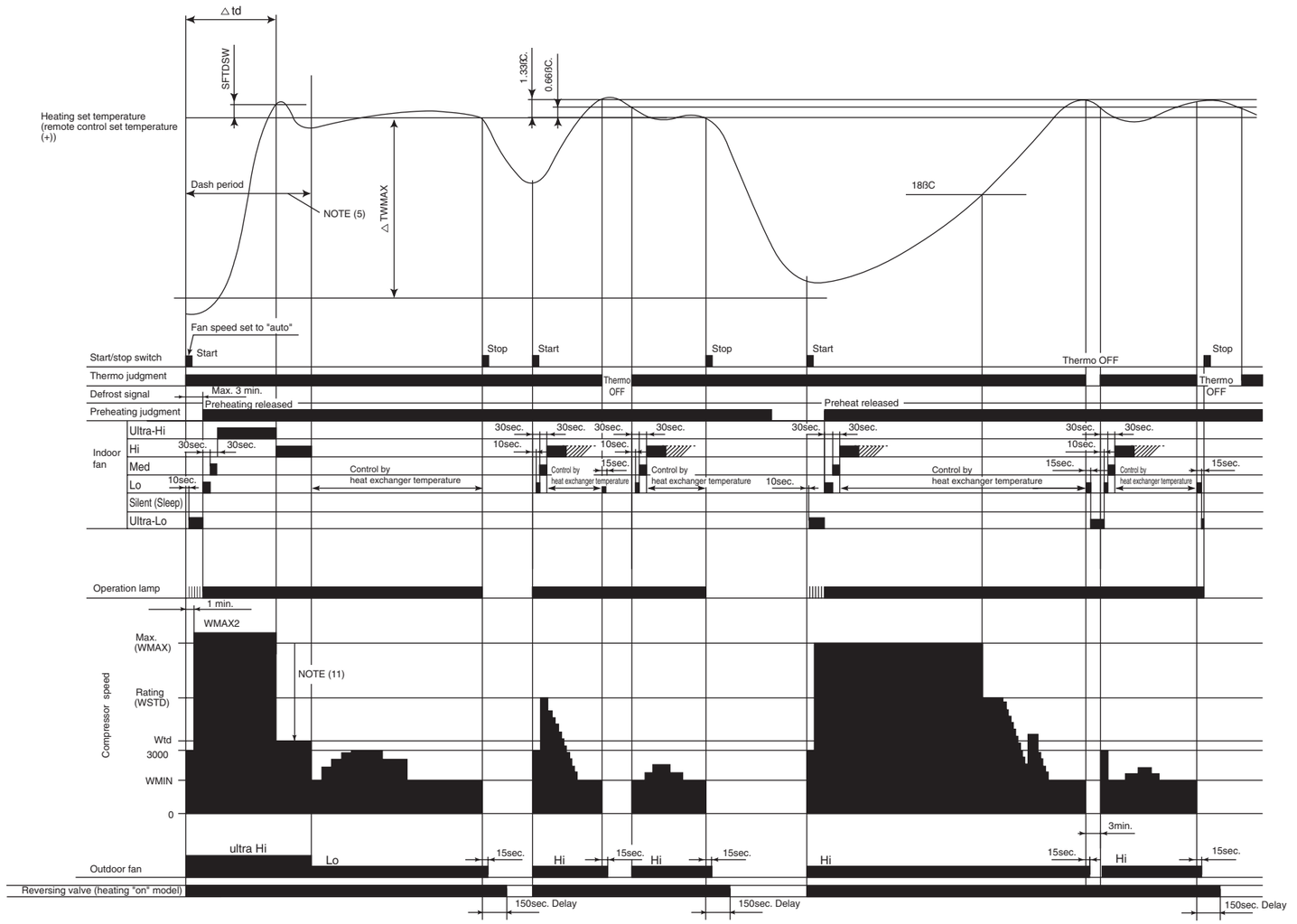
Dehumidifying



Notes:

(1) If the room temperature is (cooling preset temperature) - (1.33°C) or less after 30 seconds from starting the operation, the operation is done assuming as the preset temperature = (room temperature at the time) - (2°C).
(2) The indoor fan is operated in the “Lo” mode. During thermo OFF indoor fan will be OFF for 5 minutes and ON for 1 minute.
(3) When the operation is started by the 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.

Basic Heating Operation



Notes:

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

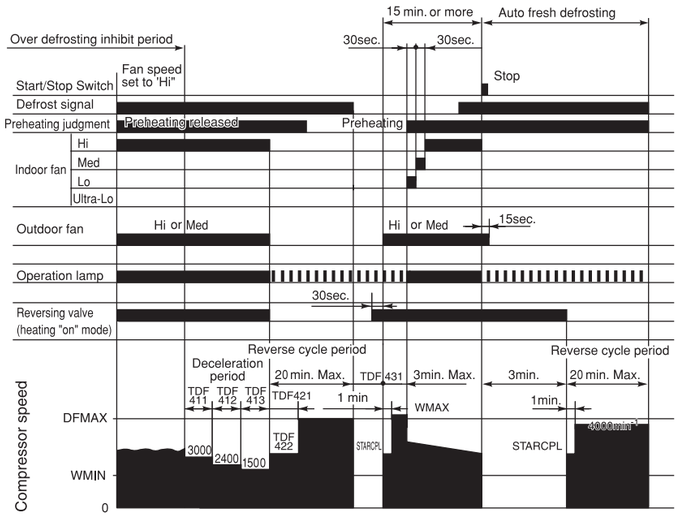
Table 3 ΔTWMAX

Temperature difference	Calculated compressor rpm
1.66	1965 min^{-1}
2	2135 min^{-1}
2.33	2300 min^{-1}
2.66	2465 min^{-1}
3	2635 min^{-1}
3.33	2800 min^{-1}
3.66	2965 min^{-1}
4	3135 min^{-1}
4.33	3300 min^{-1}
4.66	3465 min^{-1}
5	3635 min^{-1}
5.33	3800 min^{-1}
5.66	3965 min^{-1}
6	4135 min^{-1}
6.33	4300 min^{-1}
6.66	4465 min^{-1}
7	4635 min^{-1}
7.33	4800 min^{-1}
7.66	4965 min^{-1}
8	5135 min^{-1}
8.33	5300 min^{-1}
8.66	5465 min^{-1}
9	5635 min^{-1}
9.33	5800 min^{-1}
9.66	5965 min^{-1}
10	6135 min^{-1}
10.33	6300 min^{-1}
10.66	6465 min^{-1}
11	6635 min^{-1}

Notes:

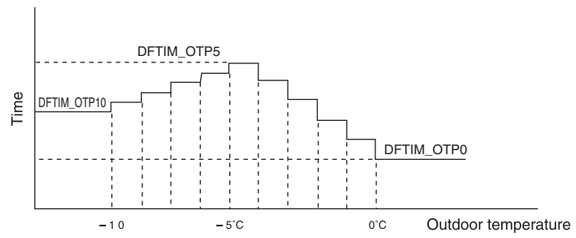
1. See the data in Table 1 on page 47 for each constant in capital letters in the diagrams.

Reversing Valve Defrosting



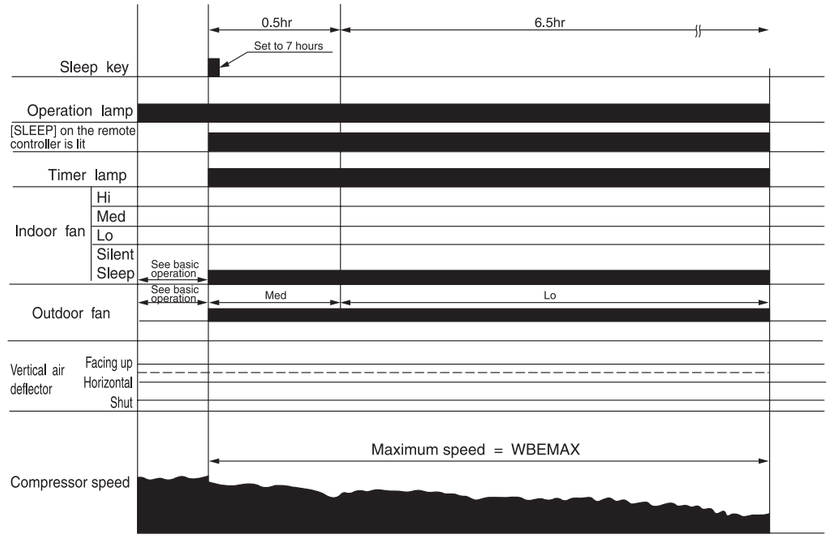
Notes:
(1) The defrosting inhibit period is set as shown in the diagram below. When defrosting has finished once, the inhibit period is newly set, based on the outdoor temperature when the compressor was started. During this period, the defrost signal is not accepted.
(2) If the difference between the room and outdoor 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.

Setting Defrosting Inhibit Period



Notes:
(1) The first inhibit time after operation start is set to DFTIM_OTP0.
(2) From the second time onwards, the inhibit time is set according to the time required for defrosting.
Reverse cycle operation time ≥ [DEFCOL] : DFTIM_OTP0 is set.
Reverse cycle operation time < [DEFCOL] : The time corresponding to outdoor temperature is set.

Heating Sleep Operation

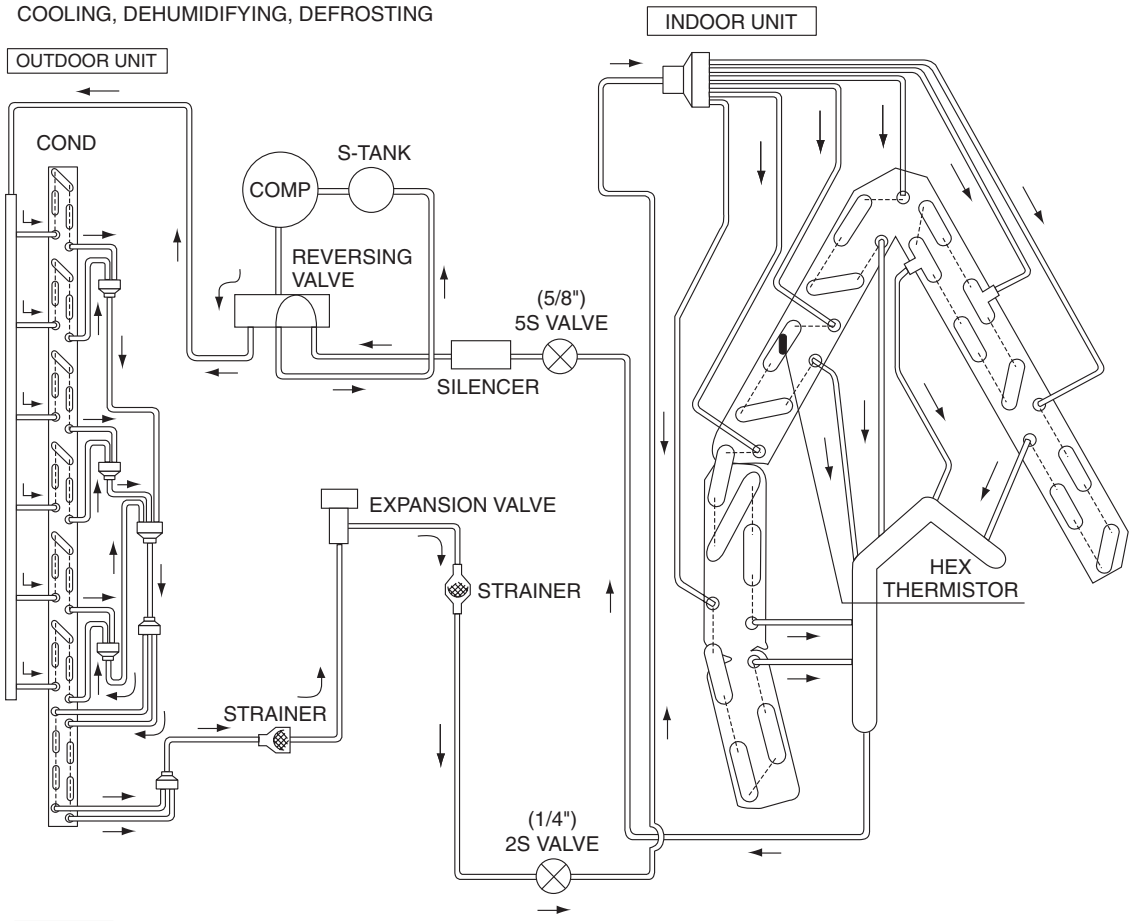


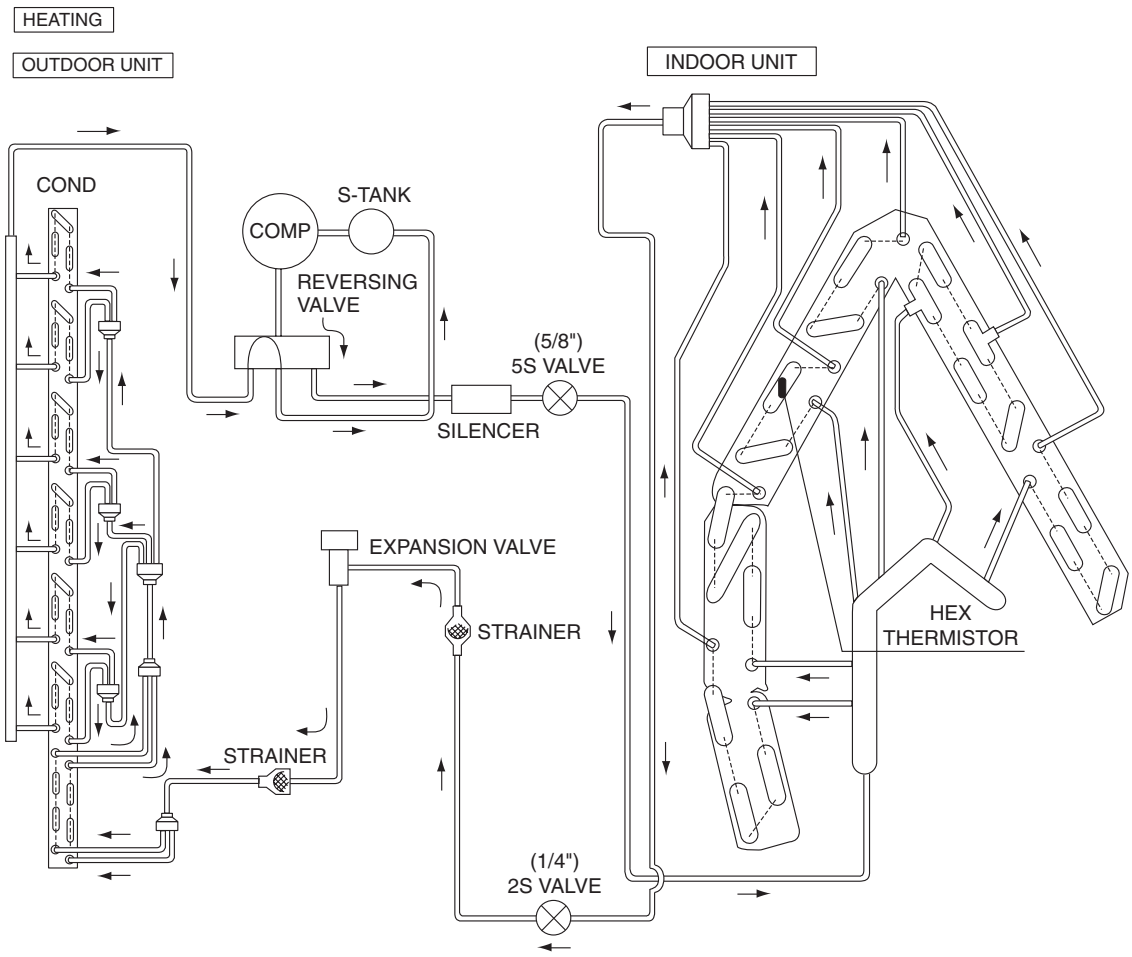
Notes:
(1) The sleep operation starts when the sleep key is pressed.
(2) When the sleep key is set, the maximum compressor speed is limited to WBEMAX, and the indoor fan is set to “Sleep Silent” (FWSOY).
(3) If the operation mode is changed during sleep operation, the changed operation mode is set and 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.

NOTE
1. Refer to the Table 1 Mode data file on page 47 for the constants expressed by capital alphabet letters in the drawing.

REFRIGERATING CYCLE DIAGRAM

MODEL RAS-70YH7/RAC-70YH7





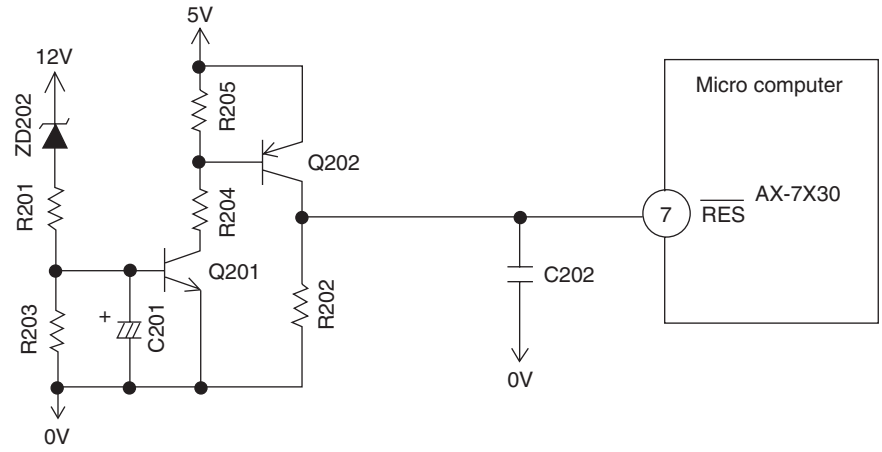
AUTO SWING FUNCTION

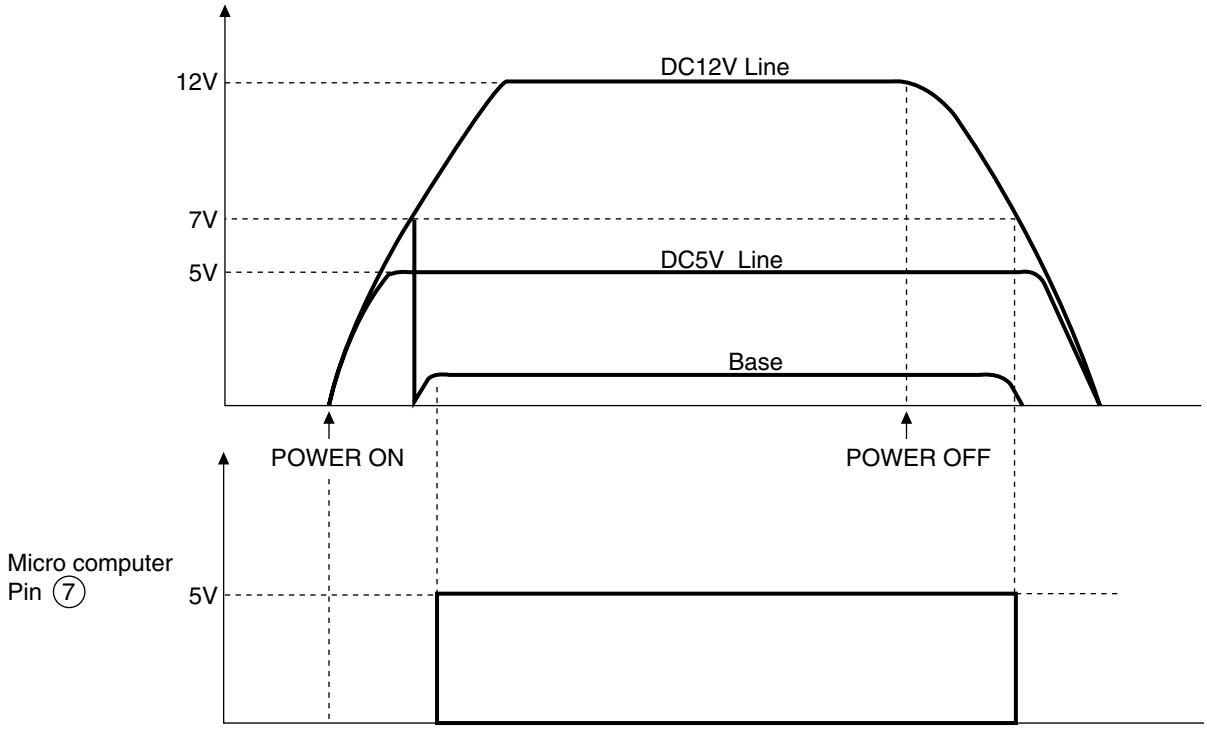
INPUT SIGNAL	PRESENT CONDITION			OPERATING SPECIFICATION	REFERENCE
	OPERATION	OPERATION MODE	AIR DEFLECTOR		
KEY INPUT	STOP	EACH MODE	STOP	ONE SWING (CLOSING AIR DEFLECTOR) ① DOWNWARD ② UPWARD	INITIALIZE AT NEXT OPERATION.
			DURING ONE SWING	STOP AT THE MOMENT.	
	DURING OPERATION	AUTO COOL COOL FAN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

DESCRIPTION OF MAIN CIRCUIT OPERATION

RAS-70YH7

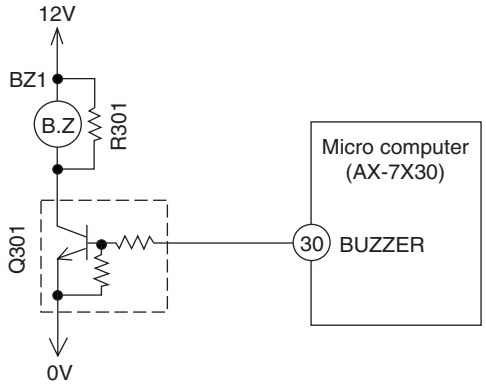
1. Reset Circuit





- 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 “Lo”.
- 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.

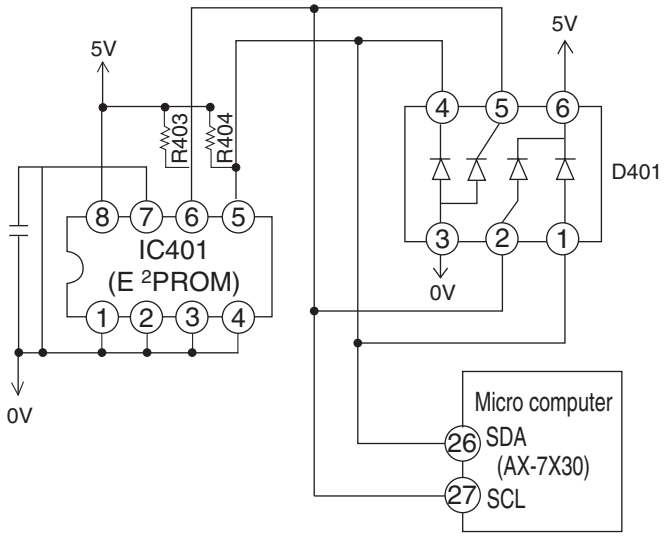
2. Buzzer Circuit



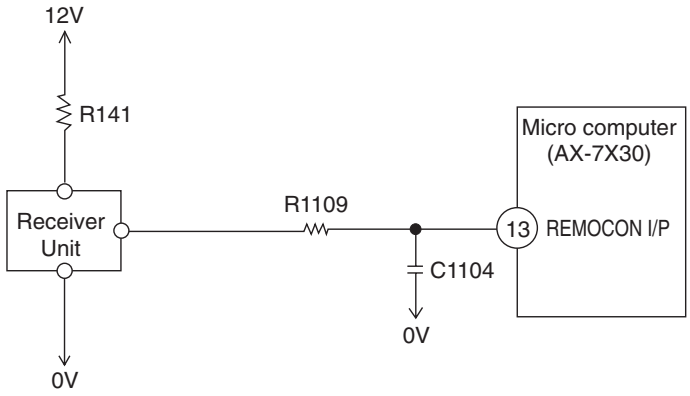
When the buzzer is to be activated, buzzer output pin ㉚ of the micro computer alternates between ON and OFF repeatedly at 4kHz and Q301 is turned ON/OFF accordingly. A 4kHz voltage/frequency is applied to the buzzer and the diaphragm of the buzzer vibrates to output 4kHz sound.

3. Initial setting (IC401)

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

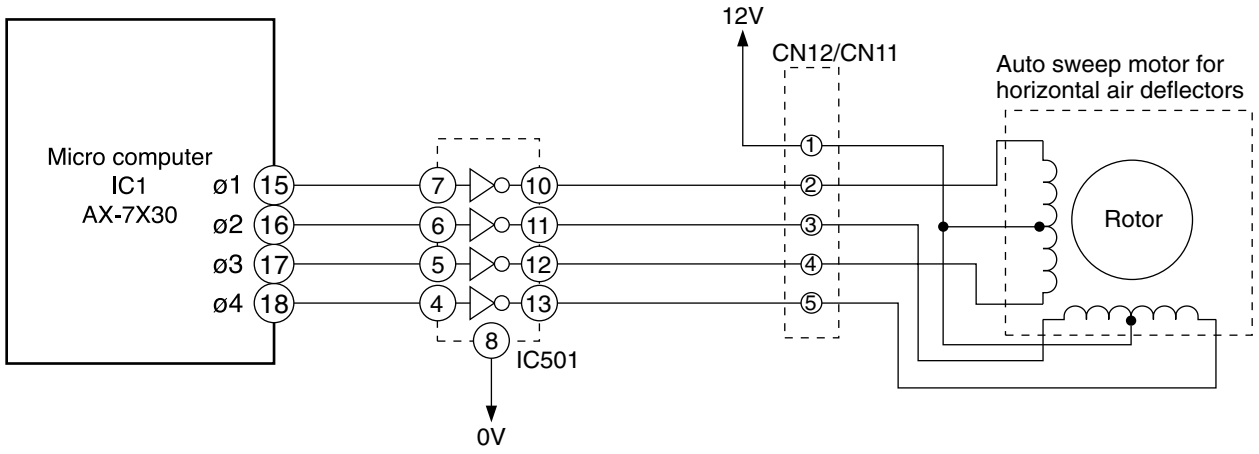


Fig. 5-1 Auto Sweep Motor Circuit (Horizontal air deflectors only)

- Fig. 5-1 shows the Auto sweep motor drive circuit; the signals shown in Fig. 5-2 are output from pins ⑮–⑱ of the micro computer.

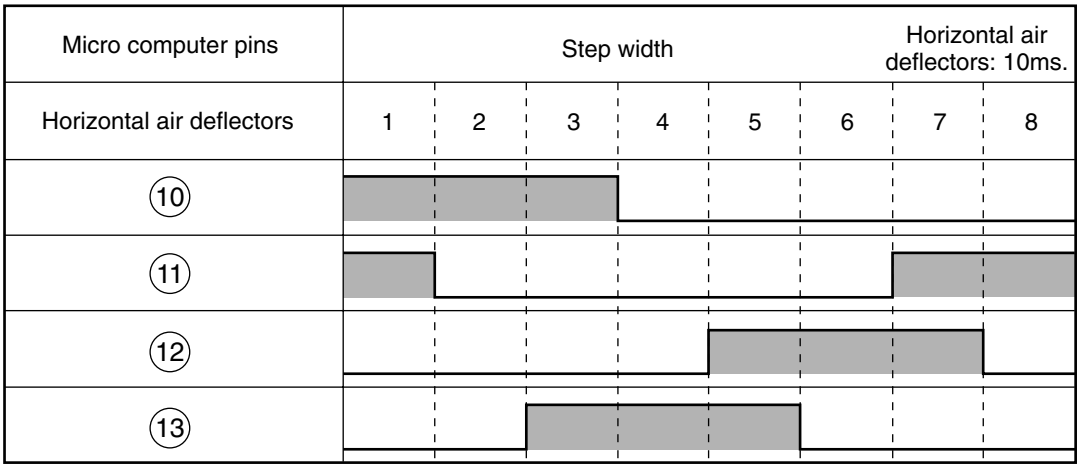


Fig. 5-2 Micro computer Output Signals

- 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.

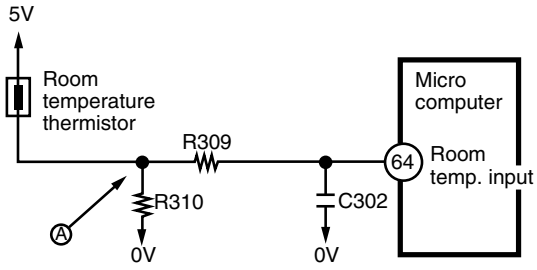


Fig. 6-1

- The voltage at Ⓐ depends on the room temperature as shown in Fig. 6-2.

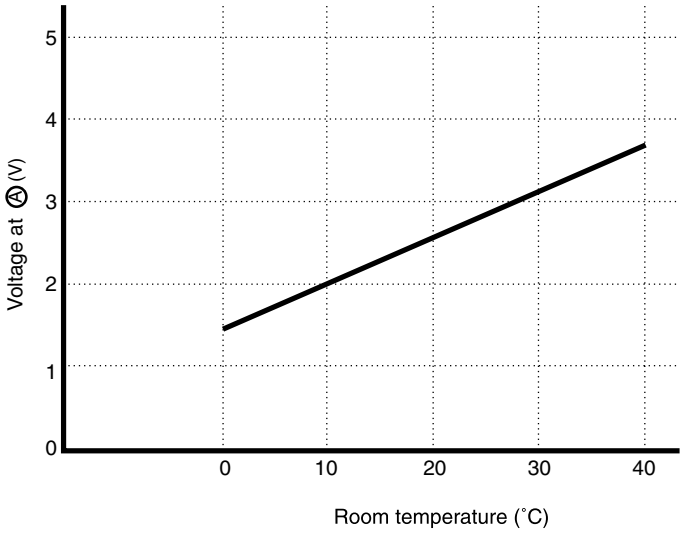


Fig. 6-2

7. Heat exchanger temperature thermistor circuit

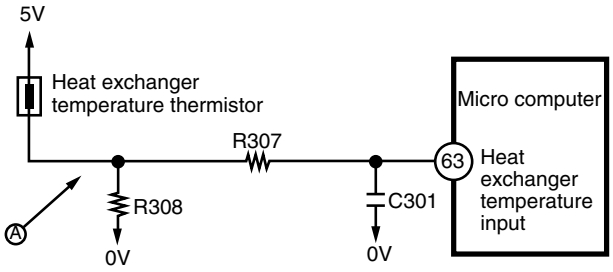


Fig. 7-1

- The circuit detects the indoor heat exchanger temperature and controls the following.

  (1) Low-temperature defrosting during cooling and dehumidifying operation.

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

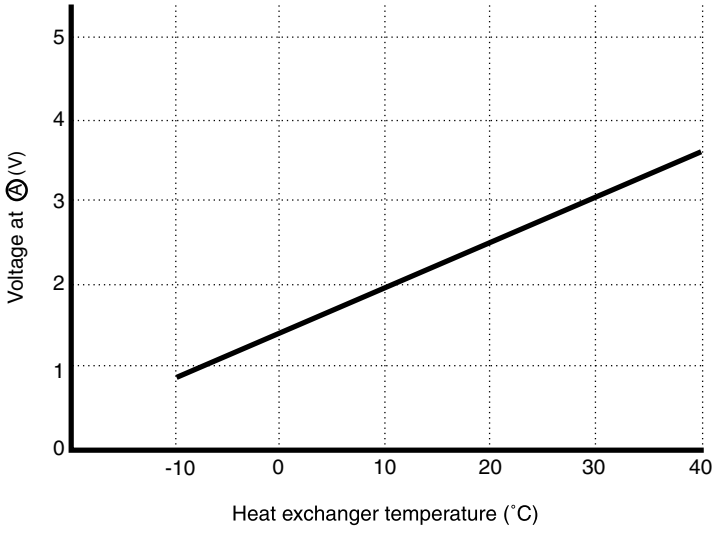


Fig. 7-2

8. Temporary Switch

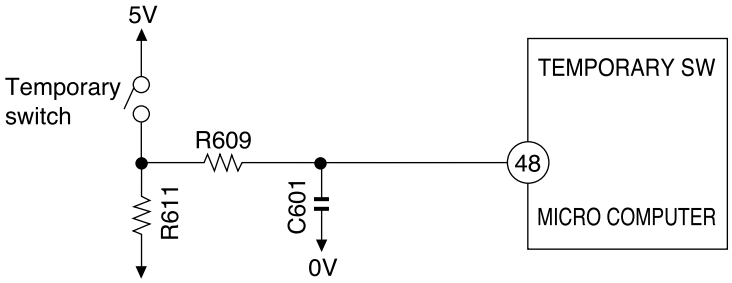


Fig. 8-1

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

9. Indoor Fan Motor Feedback Circuit

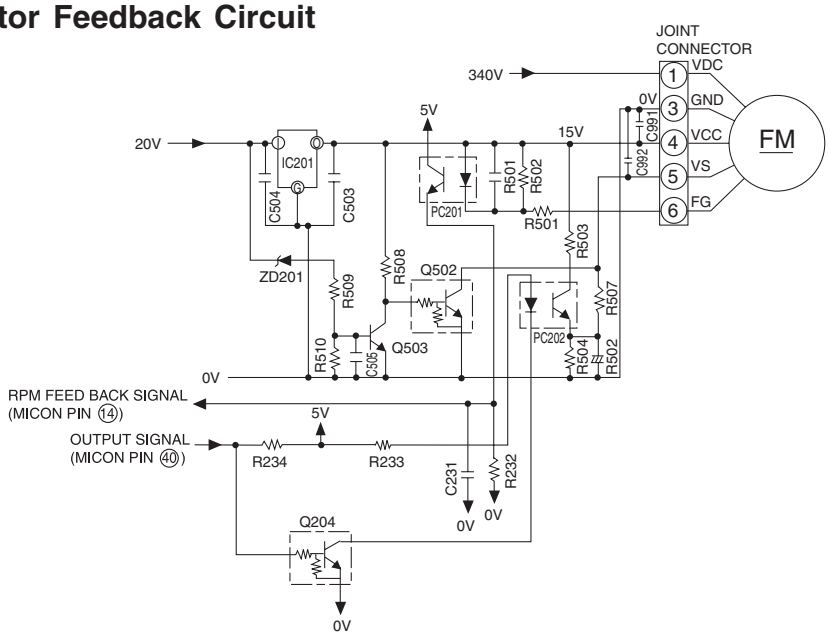


Fig. 9-1

- <Exp. of circuit wave>

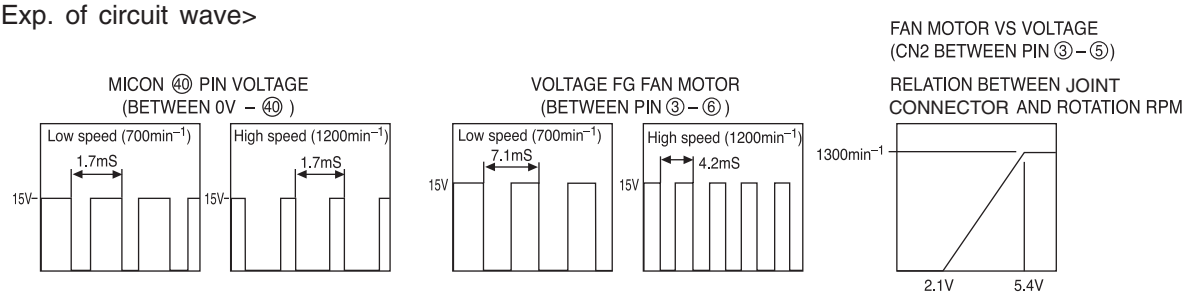


Fig. 9-2

- 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.

⚠ CAUTION 1

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

⚠ 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

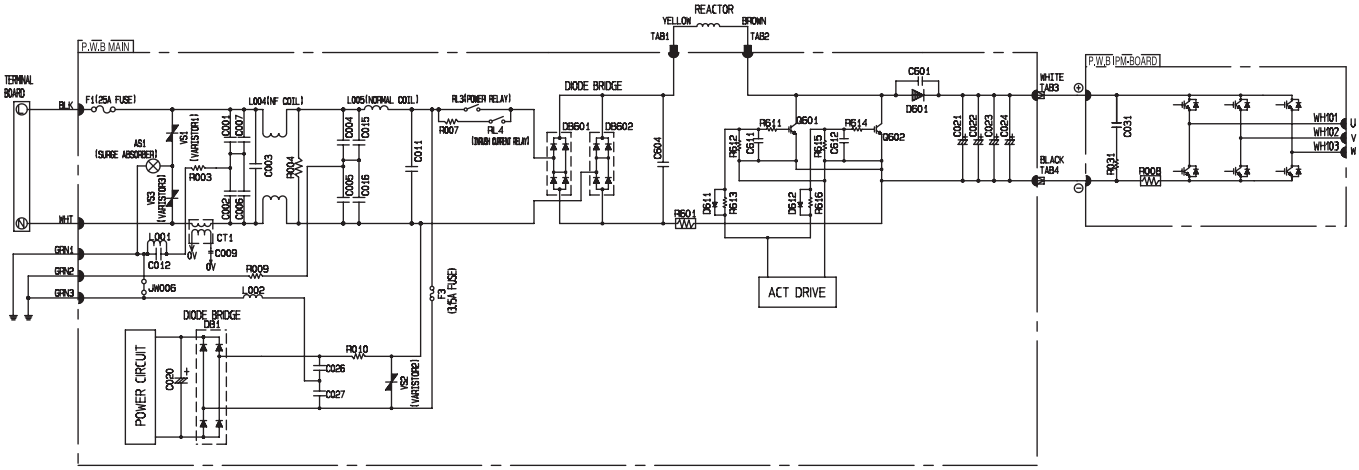


Fig 1-1

※ This circuit full-wave rectifies 220-240VAC applied between terminals L and N and boosts it to a required voltage with the IPM to create a DC voltage.

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

※ Importance component

（1）Intelligence Power Module (IPM)

A module that constitute by an inverter part.

（2） Diode Stack（DB1, DB601, DB602）

These rectify the 220-240VAC from terminal L and N to a DC power supply.

<Reference>

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

<Reference>

※ If diode stack (DB601,DB602) are faulty, DC voltage may not be generated and the compressor may not operate at all. Also be aware that the 3.15A fuse might have blown.

(3) Smoothing capacitors (C021～C024, 400μF, 450V)

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

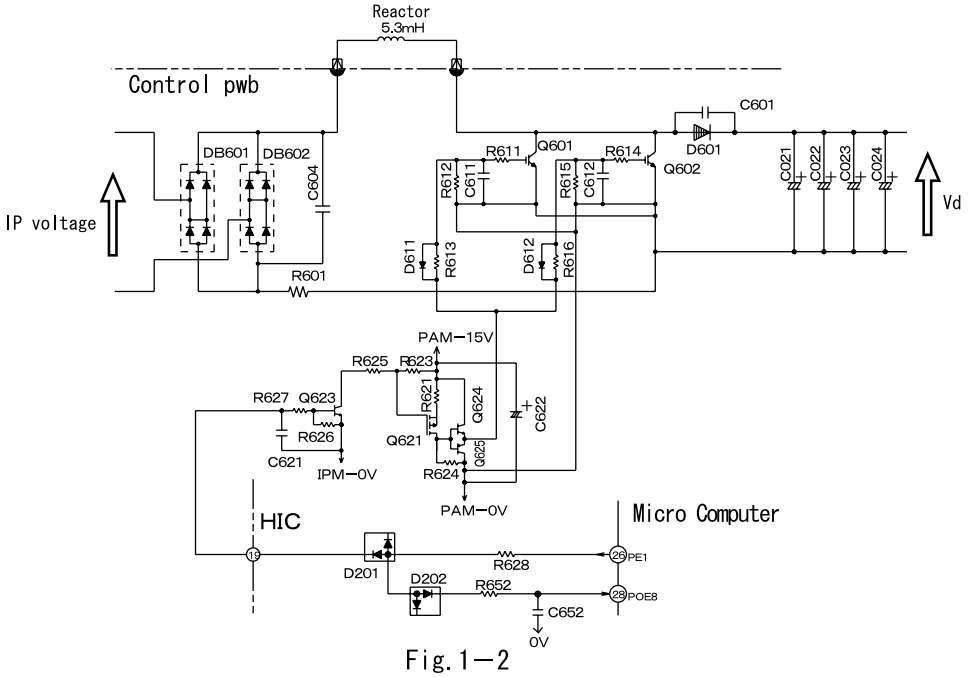


Fig.1−2

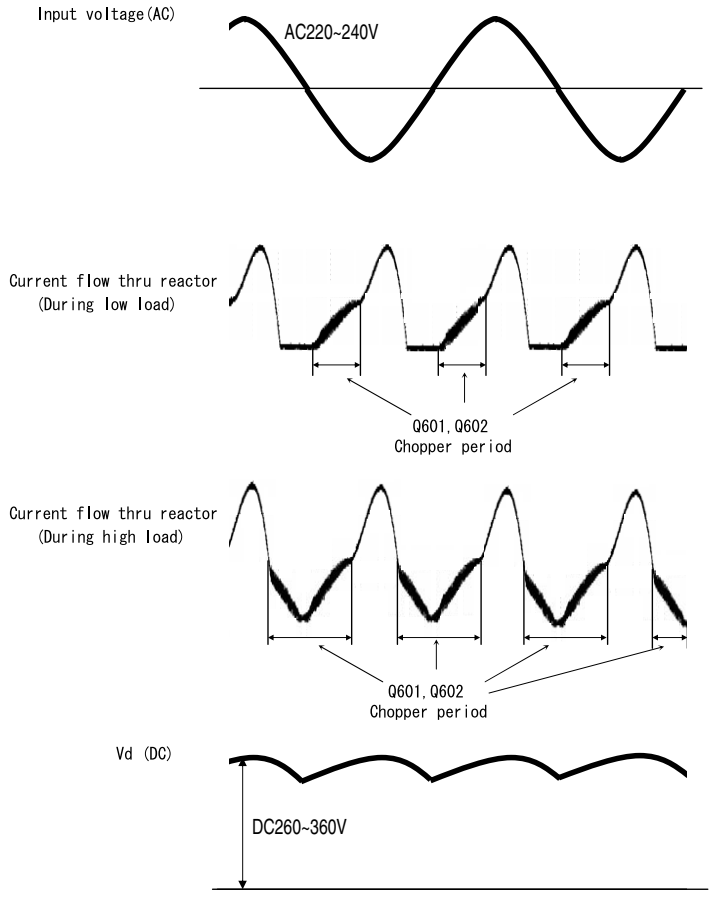


Fig.1−3

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

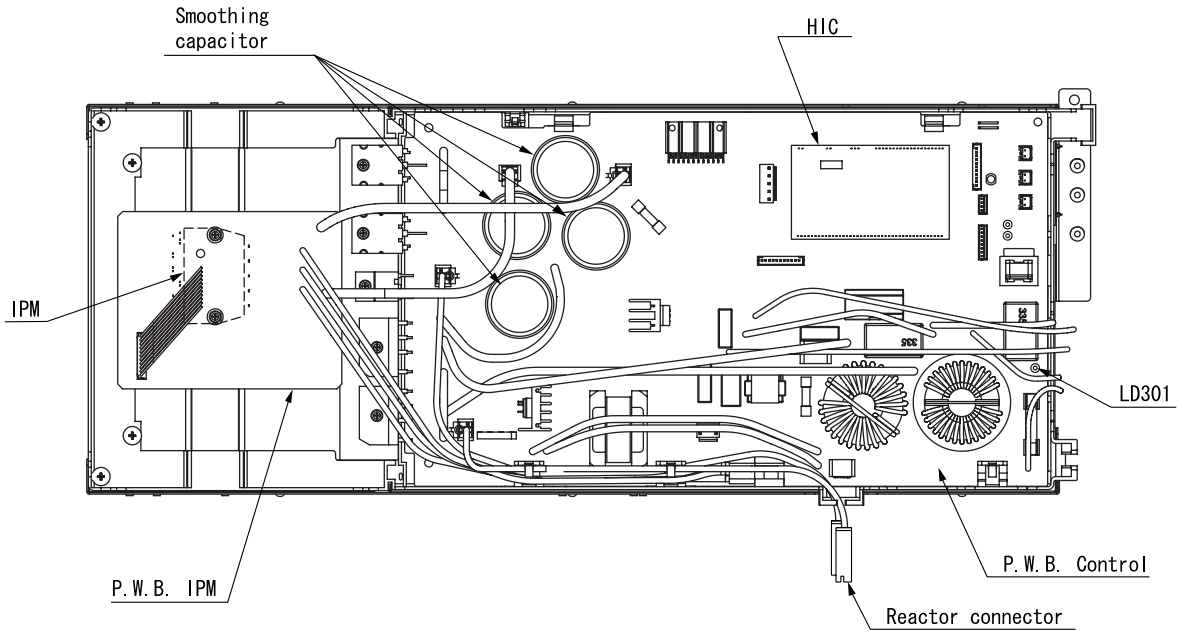
It will improve the efficiency during compressor load become heavy when current flow thru the chopper period of Q601,Q602.

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

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

(6) Surge Absorber, Varistor1, 2, 3

These absorbs external power surge.



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

2. PWB for power circuit

Voltage specification of power circuit as shown in below table.

〈Checking point〉

Output	Spec	Main load	Measuring point	Example of possible failure mode.
5V O/P	$5^{\pm 0.4}$V	Micon, Thermistor	Tester⊕ : L105(5V) Tester⊖ : J25(0V)	Outdoor not operate, no blinking indication
12V O/P	$12^{\pm 1}$V	Micon, IC2, 3, 4 Relay circuit	Tester⊕ : L104(12V) Tester⊖ : J25(0V)	Outdoor not operate, no blinking indication
16V O/P	$15.5^{\pm 1.5}$V	IPM for Comp IPM for DC fan	Tester⊕ : J58(16V) Tester⊖ : J25(0V)	Stop : LD301 3, 4 or 12 times blinking
PAM-15V O/P	$15^{\pm 1.55}$V	ACT circuit	Tester⊕ : J23(PAM-15V) Tester⊖ : J25(0V)	Stop : LD301 14 times blinking

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

3. Reversing valve control circuit

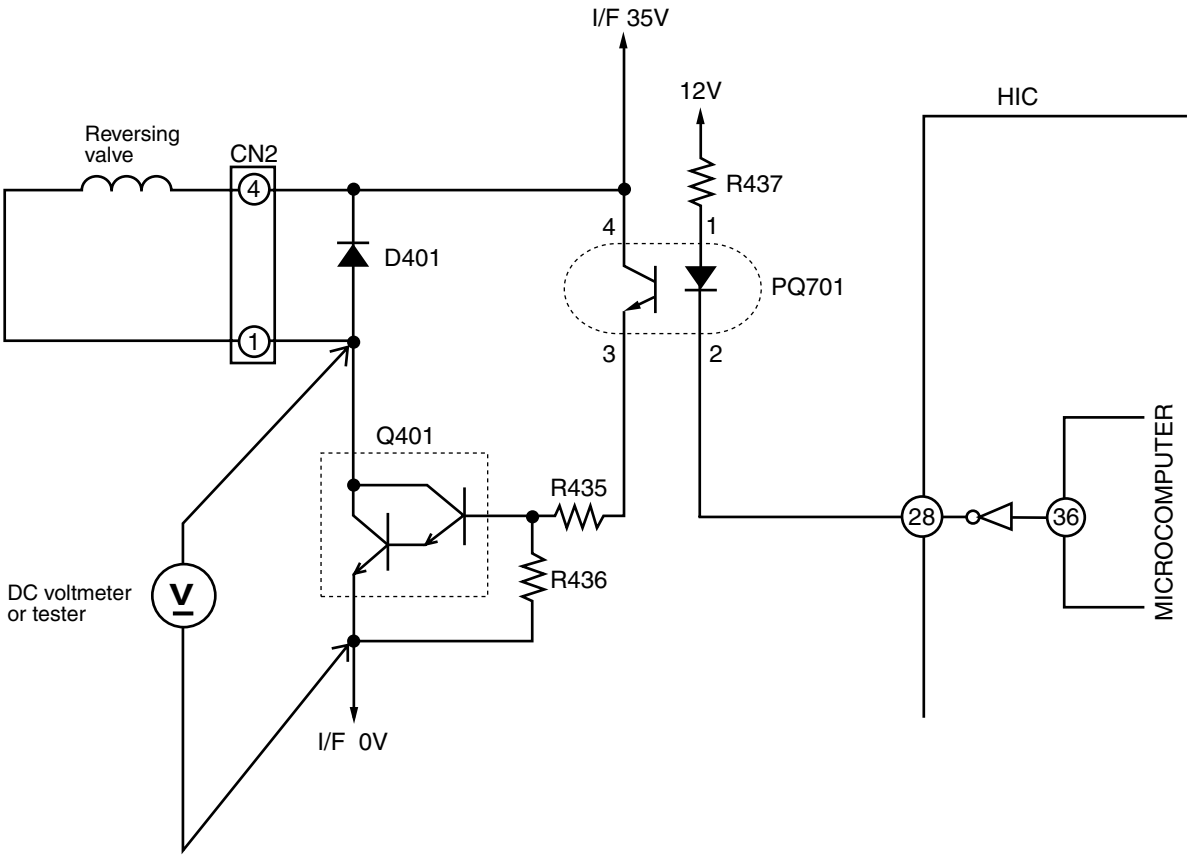


Fig. 3 – 1

- Reversing valve control circuit can switch reversing valve ON/OFF according to instruction from indoor microcomputer depending on the operation condition shows in Table 3-1.

  Voltage at each point in each operation condition is approximately as shown below when measured by tester. (When collector voltage of Q401 is measured)

Table 3-1

Operation condition		Collector voltage of Q401
Cooling	General operation of Cooling	About 0.8V
Heating	In normal heating operation	About 35V
	MAX. rotation speed instructed by indoor microcomputer after defrost is completed	About 35V
	Defrosting	About 0.8V
Dehumidifying	Sensor dry	About 0.8V

4. Temperature Detection Circuit

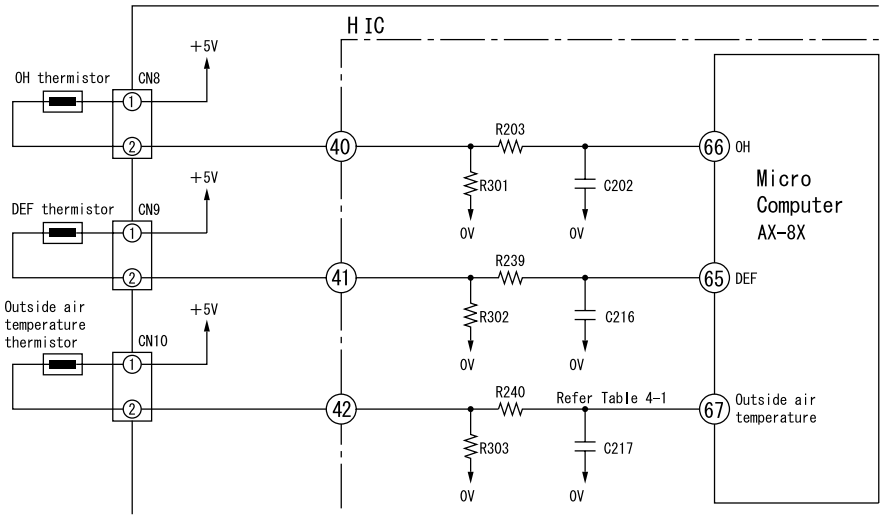


Fig.4—1

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

  Below table show the typical values of outdoor temperature in relation to the voltage.

Table 4—1

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

<Reference>

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

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

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

5. Electric expansion valve circuit

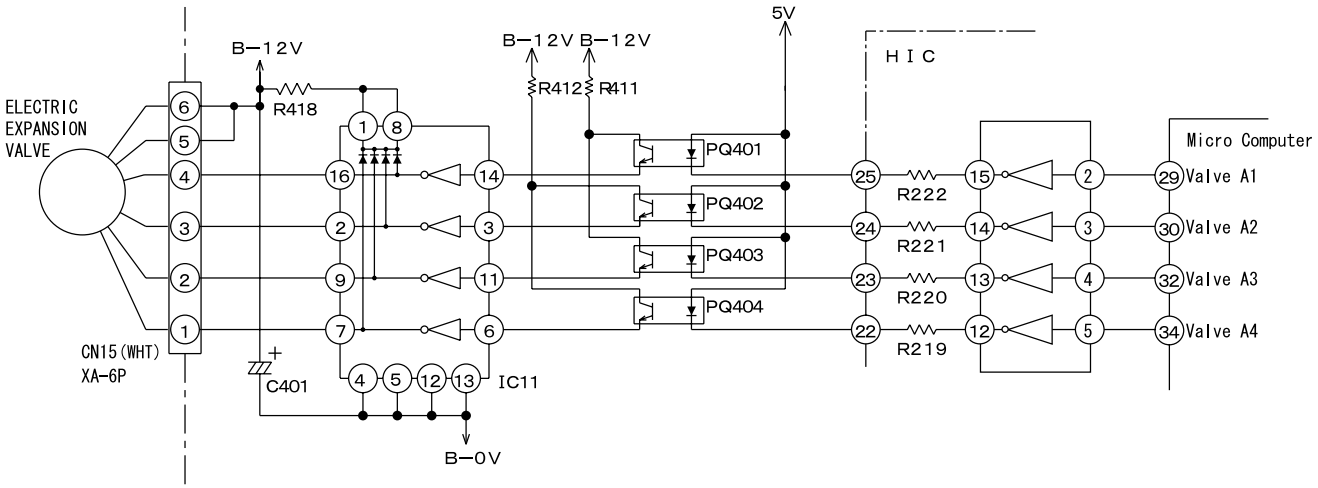


Fig.5−1

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

Table 5−1

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

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

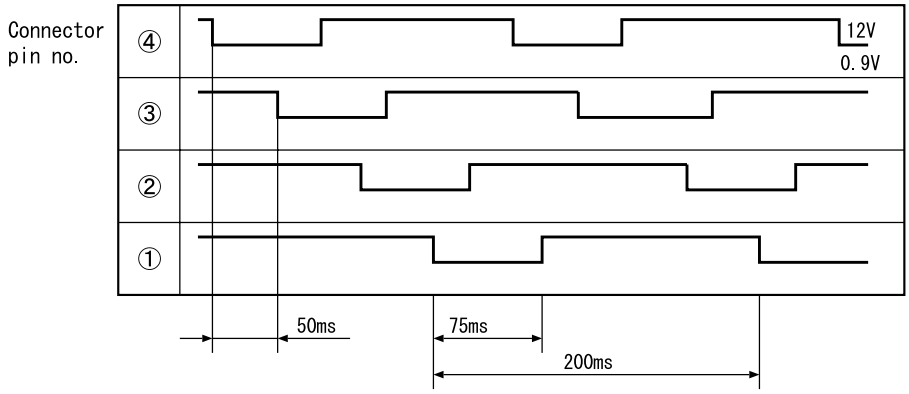


Fig.5−2

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

6. Outdoor DC fan motor control circuit

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

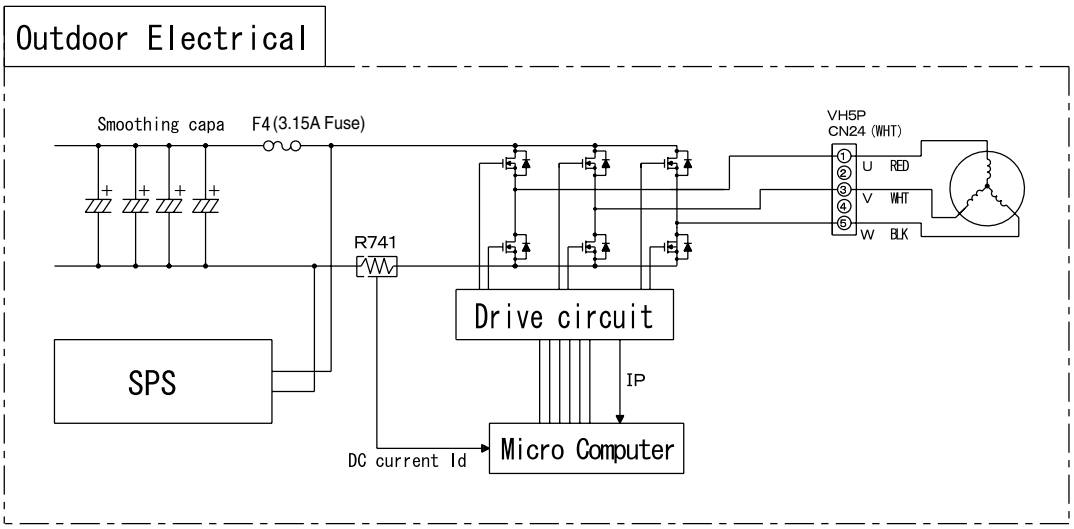


Fig 6－1

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

（1）Fan motor speed controller during starting

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

In addition, the fair wind is define as wind that blow to outside direction using Mouth Ring part.

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

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

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

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

（2）Fan motor speed controller during unit operating

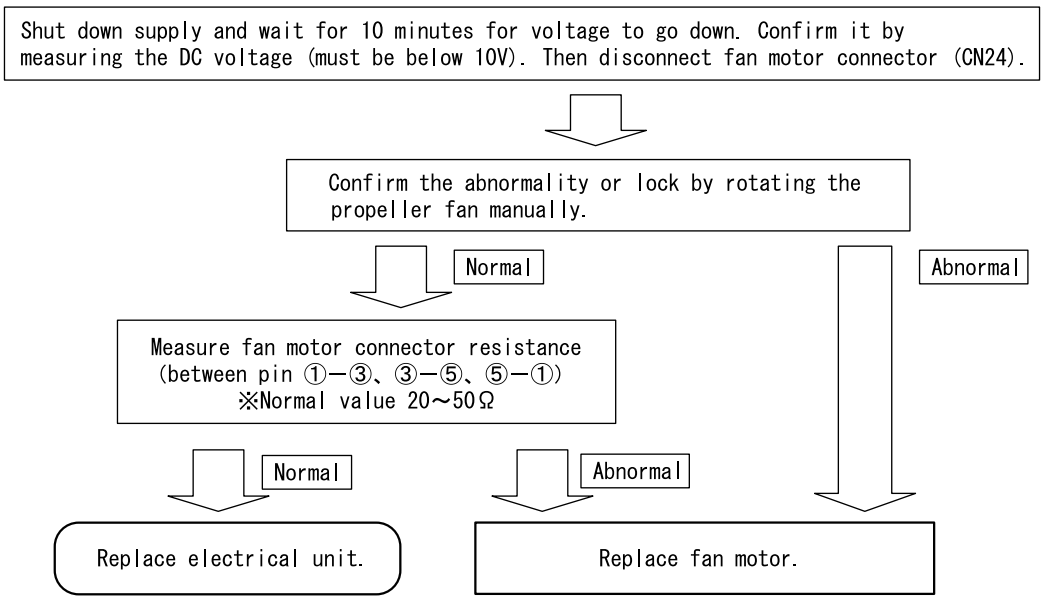
There is a case where fan rpm is reducing during rotating caused by interference of strong wind If this condition continue in long period, fan will stop rotating.(LD301 : 11 times blinking) The unit will restart according to control as per during start (1).

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

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

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

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found F4(3.15A fuse) blown.
If fan motor is broken, replace both electrical unit and fan motor.

Reference

※No power is supllied to the outdoor unit if F4(3.15A Fuse) is blown.
Both DC fan motor and switching power supply is using same fuse.

Caution

※Beware of electric shock due to high voltage when conducting an operation check.
Power supply for DC fan motor and compressor is common (DC260~360V).

SERVICE CALL Q & A

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

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

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

DEHUMIDIFYING MODE

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

A1 Normal sound when refrigerant flows in pipe.

Q2 Compressor occasionally does not operate during dehumidifying.

A2 Compressor may not operate when room temperature is 10°C or less. It also stops when the humidity is preset humidity or less.

Q3 Cold air comes out during a dehumidifying operation.

A3 To improve the dehumidification efficiency performs quiet fan operation. Therefore the air is cold and it is not a malfunction.

Q4 The operation does not stop even by setting the temperature higher than room temperature on the remote controller.

A4 It sets to perform dehumidifying operation by setting the temperature slightly lower than remote controller setting.

HEATING MODE

Q1 The circulation stops occasionally during Heating mode.

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

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

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

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

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

AUTO FRESH DEFROSTING

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

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

AUTO OPERATION

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

A1 At this point fan speed is automatic.

Q2 How is the automatic operation mode determined?

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

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

A3 It is automatically set as follows.
At cooling: and heating: Set at 22°C °C
The room temperature setting can be raised 3°C by "∧" or lowered 3°C by "∨".

NICE TEMPERATURE RESERVATION

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

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

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

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

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

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

AT STARTING OPERATION

Q1 When only the power switch is turned on, the damper at the bottom air outlet moves even if the START/STOP button is not pressed.

A1 To ensure correct opening and closing of the damper, the damper will move when power is turned on or the unit is to be operated in order to check its fully opened and closed positions.

Q2 When the heating operation is started, the indoor fan does not start immediately and the damper at the bottom air outlet occasionally does not open.

A2 This is because the preheating device is working. It will not start to drive the fan until the refrigerating cycle warms up and warm air blows. Wait for a while. The damper does not open either during preheating or for one minute after preheating is finished.

Q3 When the unit built behind the gallery (lattice door) is to be started immediately after it has stopped, the unit occasionally will not start.

A3 Such a phenomenon may occur with built-in installation where heat is likely to be stuffy. Install the unit as near to the lattice door as possible so that air is not short-circuited, or provide a partition between the unit and lattice door.

OTHERS

Q1 The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)

A1 This is because the cool wind prevention function is operating, and does not indicate a fault.

The heat exchanger temperature is sensed in the auto fan speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

Q2 Loud noise from the outdoor unit is heard when operation is started.

A2 When operation is started, the compressor rotation speed goes to maximum to increase the heating or cooling capability, so noise becomes slightly louder. This does not indicate a fault.

Q3 Noise from the outdoor unit occasionally changes.

A3 The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature.
This does not indicate a fault.

Q4 There is a difference between the set temperature and room temperature.

A4 There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable level for the space.

Q5 Air does not flow immediately after operation is started.

A5 Preliminary operation is performed for one minute when the power switch is turned on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

Q6 Mold in the room cannot be inhibited even after performing the air conditioner drying operation.

A6 Air conditioner drying operation is to dry the interior of the indoor unit to inhibit the growth of mold. It is not to inhibit the mold growth in the room.

Q7 The interior of the indoor unit seems to be still damp even after performing the air conditioner drying operation.

A7 Condition of the interior of the indoor unit varies depending on usage of the unit and condition of the indoor unit. If it is not dried after the first try, perform the drying more than one time for better effect.

Q8 Even if the air conditioner drying is performed using the remote controller during the unit operation or timer programming, the air conditioner drying operation does not start.

A8 To perform the air conditioner drying, stop the unit operation or programming beforehand.

Q9 The unit is operated after built-in installation (behind the lattice door). It turns off for a long time and the room is not warmed (cooled).

A9 Check to see if warm (cool) air is being short-circuited behind the lattice door. A short-circuit is likely to occur when the deflector position is not appropriate, the lattice does not have a big enough opening, and/or the unit is installed in the inner part. Install the unit as near the lattice door as possible.

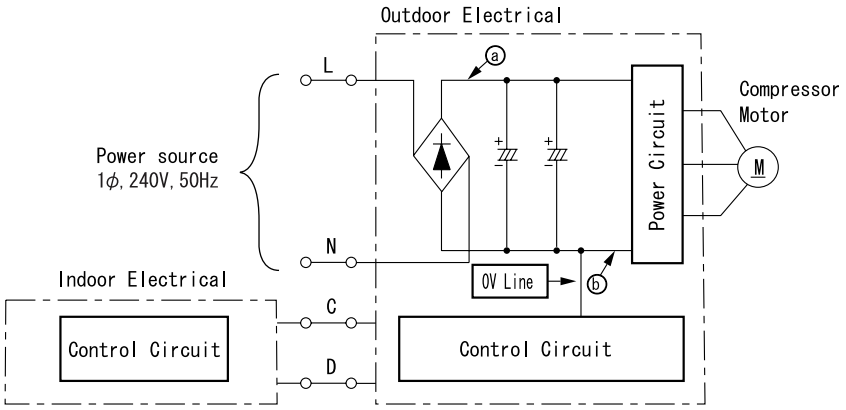
Q10 Strange sound is occasionally heard from the bottom air outlet.

A10 When the damper is switched, scrambling of air will occur between the top and bottom outlets due to the set fan speed during switching and filter clogged state, which, may generate some sound.

PRECAUTIONS FOR CHECKING

CAUTION

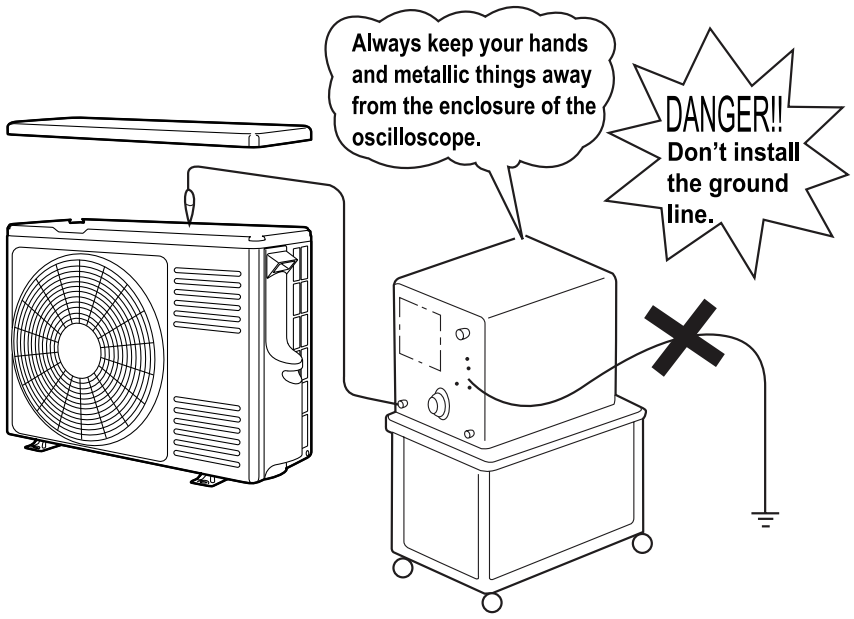
1. Remember that the 0V line is biased to 320 – 360V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltage fall after the power switch is turned off.



Across a – b (0V line) ----------approx 320 – 360V
Across a – ground ----------approx 155 – 170V
Across b (0V line) – ground -------approx 155 – 170V

CAUTION

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



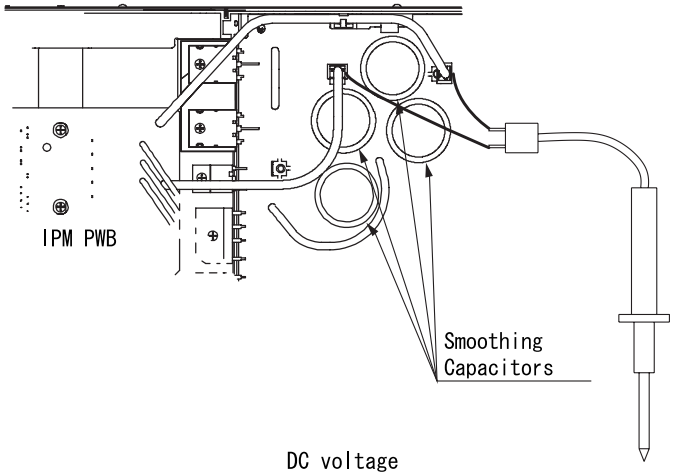
DISCHARGE PROCEDURE AND METHOD TO STOP ENERGIZE THE POWER CIRCUIT

⚠ WARNING ⚠

Caution

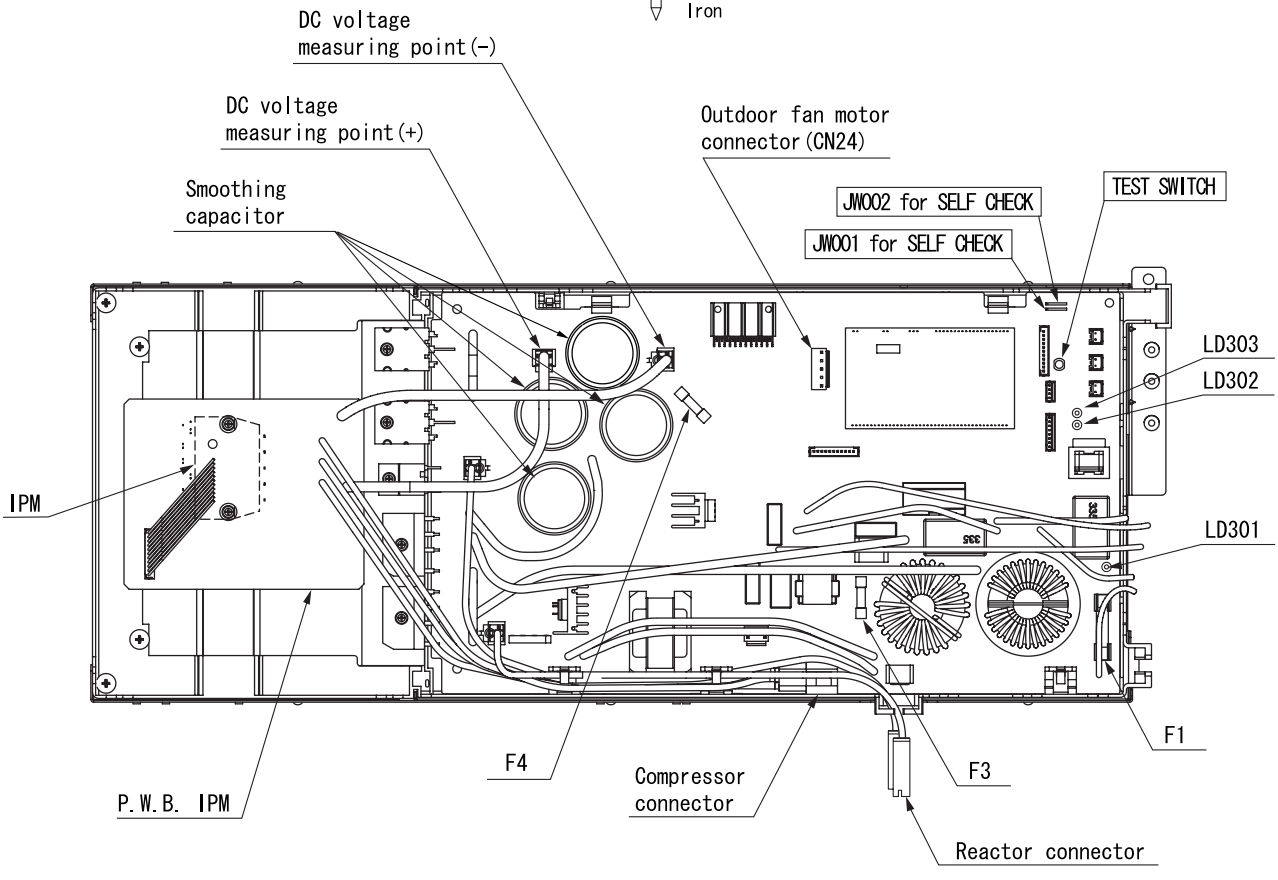
- Voltage of about 300-330V is charged between both ends of smoothing capacitors.
- During continuity check for each part of circuit in outdoor electrical parts, be sure to discharge smoothing capacitor to prevent secondary trouble.

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



Do not use soldering iron with transformer. If not, theral fuse inside the transformer will be blown.

As shown in this figure, apply soldering iron to metal parts (receptacle) DC voltage P ⊕ and N ⊖ to discharge the charged voltage inside smoothing capacitors.

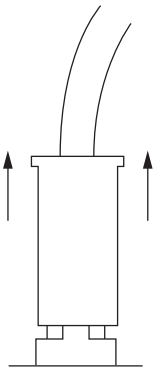


[Other cautions]

(1) Disconnection of tab terminal receptacle

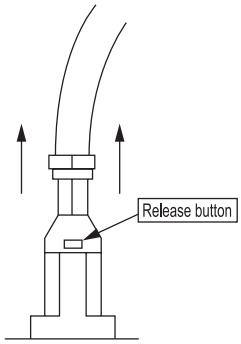
All receptacle used to connect with tab terminal are built with lock mechanism. Please take note that by using a force to pull out the receptacle without releasing the lock, can cause a damage.
Furthermore, during connecting the receptacle back make sure to securely insert until end.

＊ Receptacle type and procedure to releasing the lock



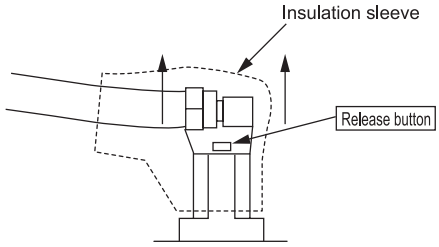
Vertical type (with plastic casing)

Pull out by holding the plastic casing.



Vertical type (without casing)

Pull out while pushing the release button.



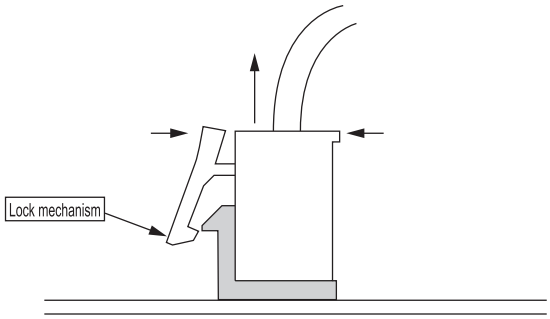
Horizontal type (with insulation sleeve)

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

(2) Disconnecting on board connector

On board connector with lock machanism are widely used. Please take note that by using a force to pull out with out releasing the lock mechanism, can cause a damage.
Furthermore, during inserting back the connector make sure it surely done.

Release lock with finger before disconnecting.

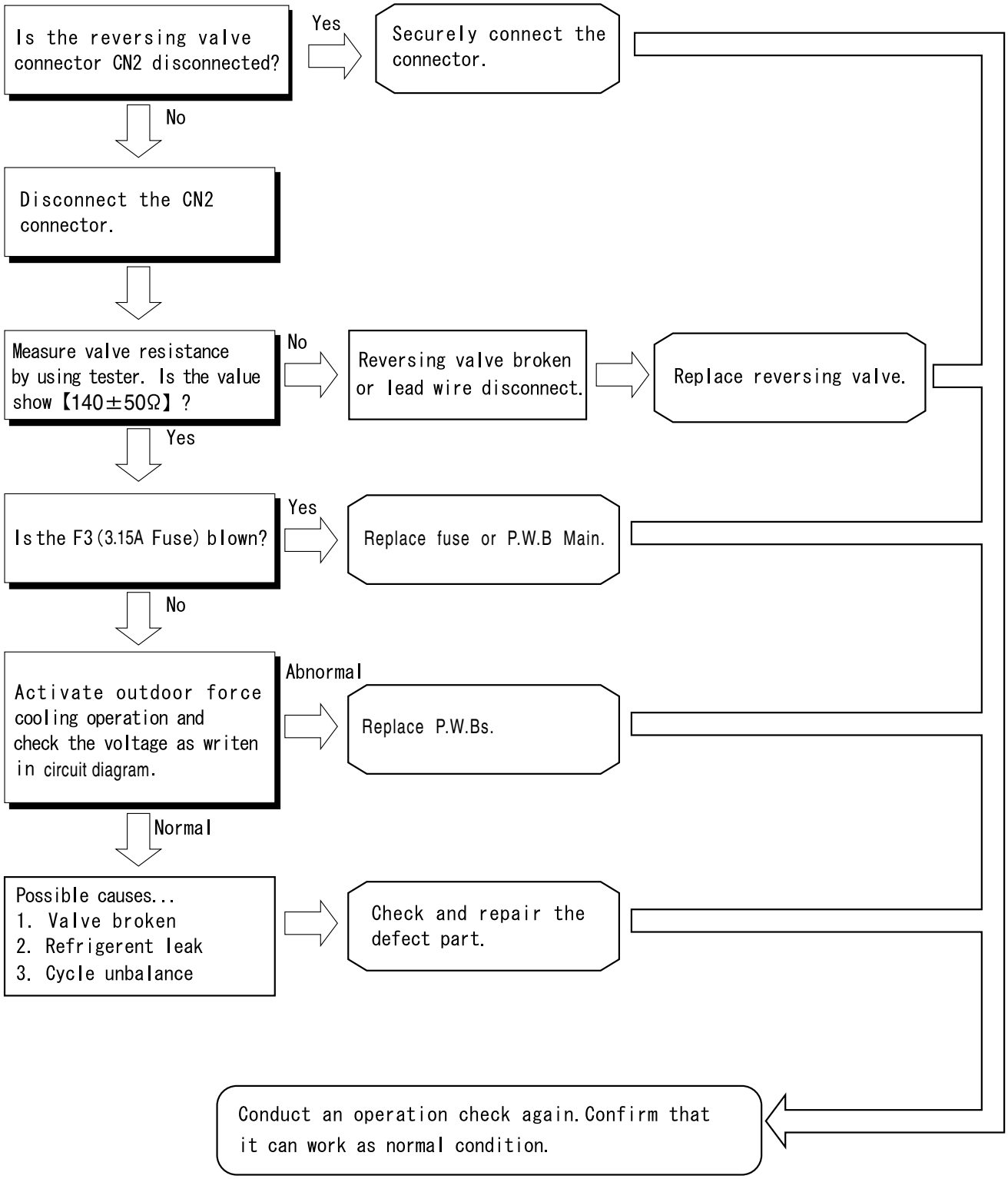


(3) Connector disconnection during discharge is prohibited

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

CHECKING THE INDOOR TIMER LAMP IF BLINKING 1 TIME

<Caution> Please turn OFF power supply before proceed with below checking flow.



CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

Timer lamp

Does the timer lamp on the indoor unit blink? → See Troubleshooting when the timer lamp blinks .

No

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

Does the operation lamp on the indoor unit start to light or blink? → No

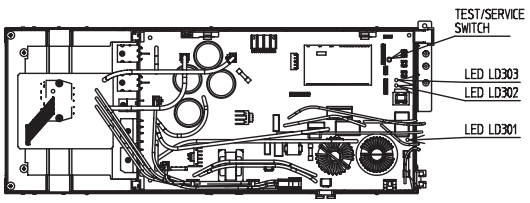
Yes

Is the compressor in the outdoor unit operating?

Yes

No

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



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

Blinking other than one time

One-time blinking

Press the service switch for 1 sec. Does the compressor operate? (After checking, be sure to press the service switch to stop the operation).

Yes

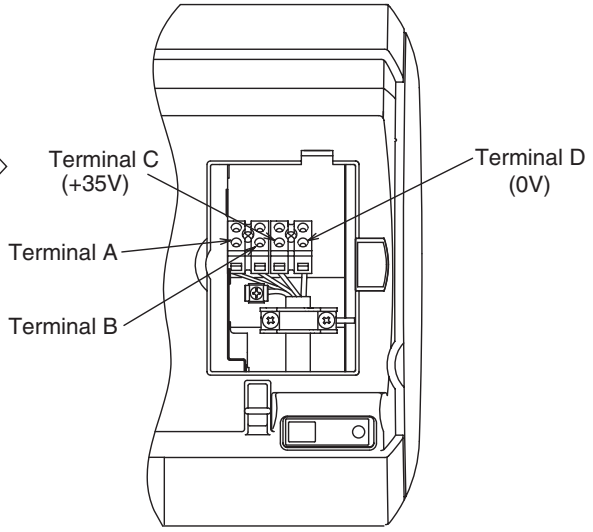
No

See Out door unit self-diagnosis lamp lighting mode .

Check the refrigerating cycle.

Check the outdoor electrical parts.

Remove the terminal cover and check the voltage between terminal (C) and terminal (D)



Is approx. DC 33 to 37V being generated? Is the polarity correct?

No

Yes

Check to see whether the F-cable is connected incorrectly or disconnected

Normal

Check the indoor electrical parts.

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	 1 time	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.	(1) Reversing valve defective (2) Heat exchanger thermistor disconnected (only in the heating mode) (Note) The malfunction mode is entered the 3rd time this abnormal indication appears (read every 3 minutes).
2	 2 times	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	 3 times	Indoor/outdoor interface defective When the interface signal from the outdoor unit is interrupted.	(1) Indoor interface circuit (2) Outdoor interface circuit
4	 4 times	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	 9 times	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	 10 times	Over-current detection at the DC fan motor when over-current is detected at the DC fan motor of the indoor unit.	(1) Indoor fan locked (2) Indoor fan motor (3) Indoor control P.W.B.
※1 7	 13 times	IC401 or IC402 data reading error When data read from IC401 or IC402 is incorrect.	IC401 or IC402 abnormal

(▮ – – Lights for 0.5 sec. at interval of 0.5 sec..)

<Cautions>

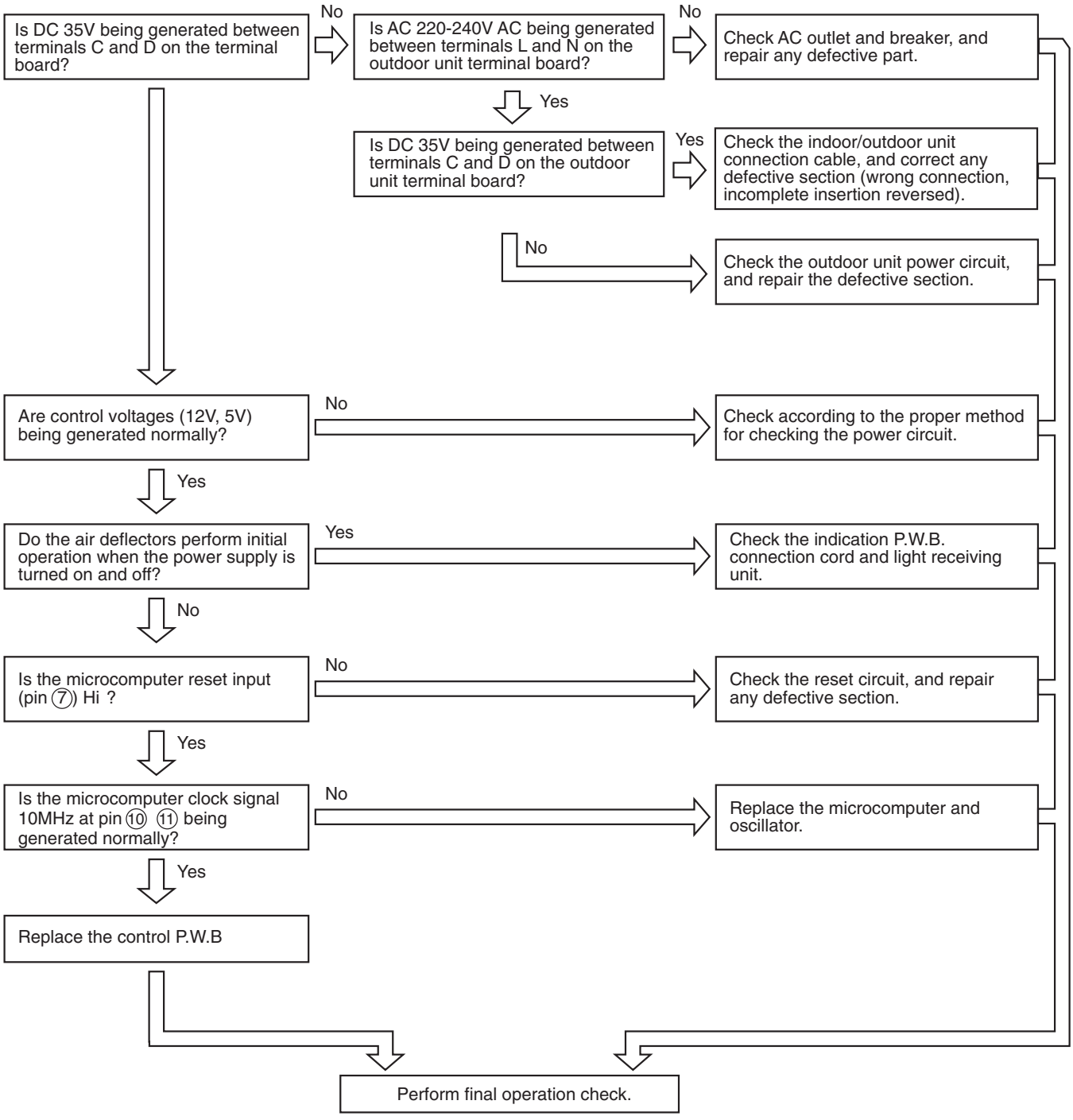
(1) If the interface circuit is faulty when power is supplied, the self-diagnosis display will not be displayed.

(2) If the indoor unit does not operate at all, check 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).

CHECKING INDOOR UNIT ELECTRICAL PARTS

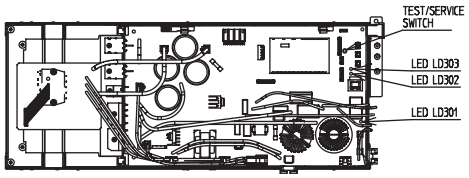
1. Power does not come on (no operation)



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

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

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



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

Yes

Check the room temperature thermistor; if it is defective, replace it.
<Normal values>
10°C → approx. 20kΩ
25°C → approx. 10kΩ
30°C → approx. 8kΩ

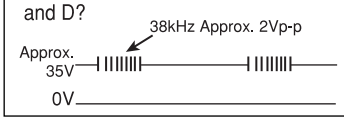
Check the heat exchanger thermistor; if it is defective, replace it.
<Normal values>
10°C → approx. 20kΩ
25°C → approx. 10kΩ
30°C → approx. 8kΩ

No

Does outdoor electrical part LD301 blink nine times?

Yes

Is the indoor/outdoor unit communication signal superimposed on 35V DC of connection wires C and D?

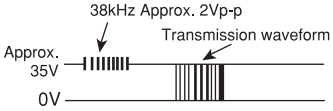


No

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

Yes

Is the indoor transmitting signal being generated at Q801's collector?



No

Check the indoor interface transmitting circuit. Replace IC801.

Yes

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

No

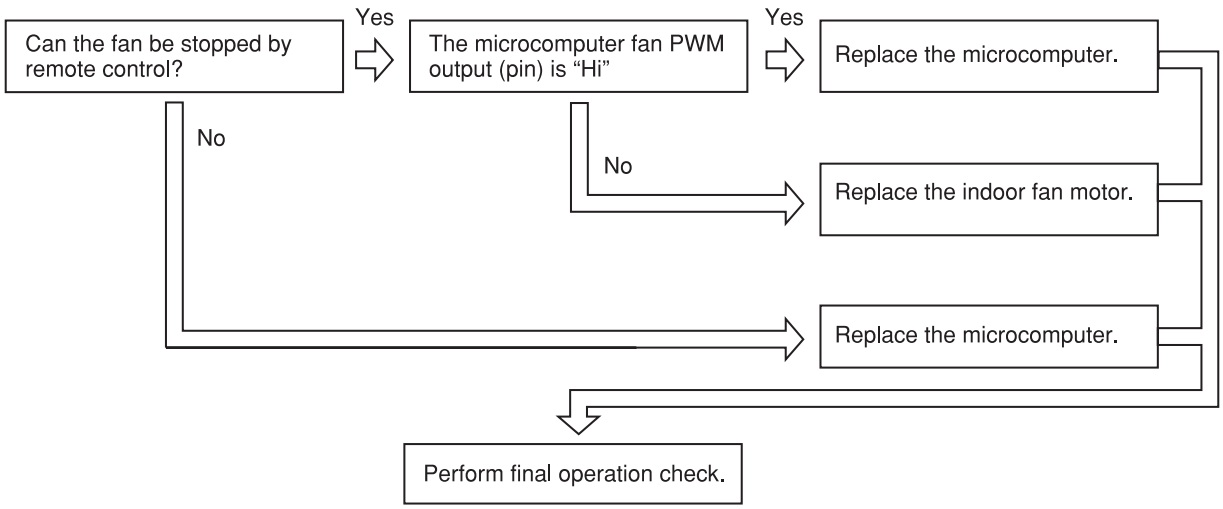
Does LD303 switch off several second after it lights?

Yes

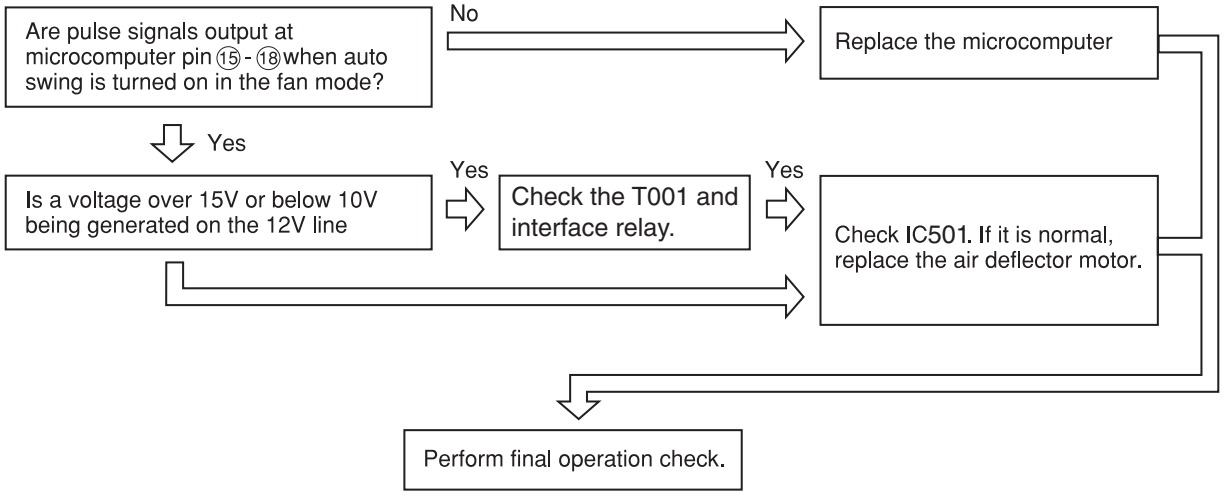
Check outdoor electrical parts, and repair any defective parts.

Perform final operation check.

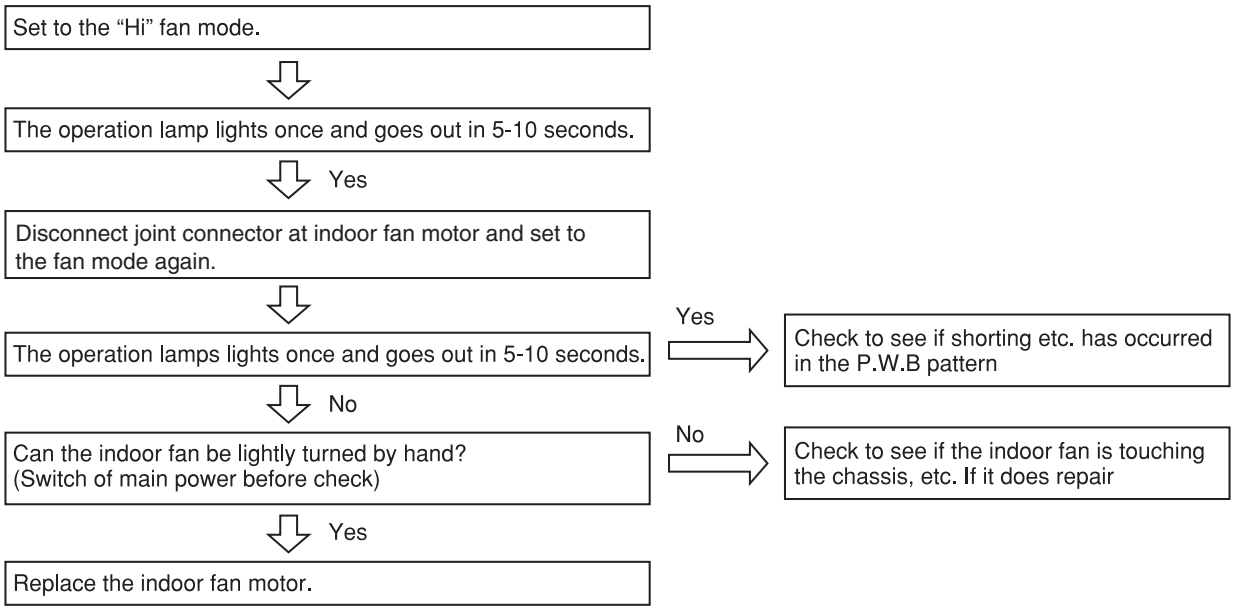
3. Only indoor fan does not operate (other is normal)



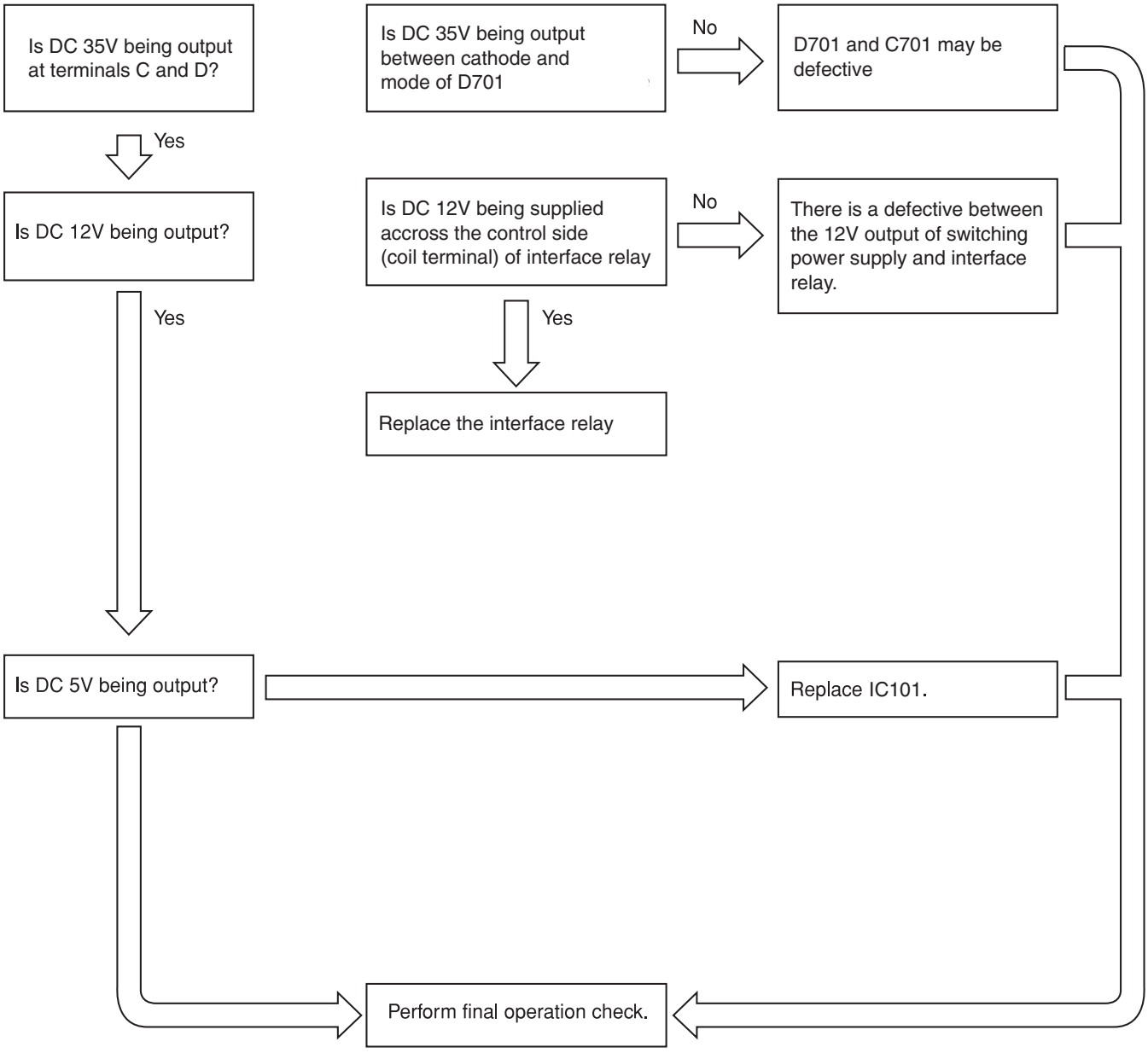
4. Air deflector does not move (others are normal)



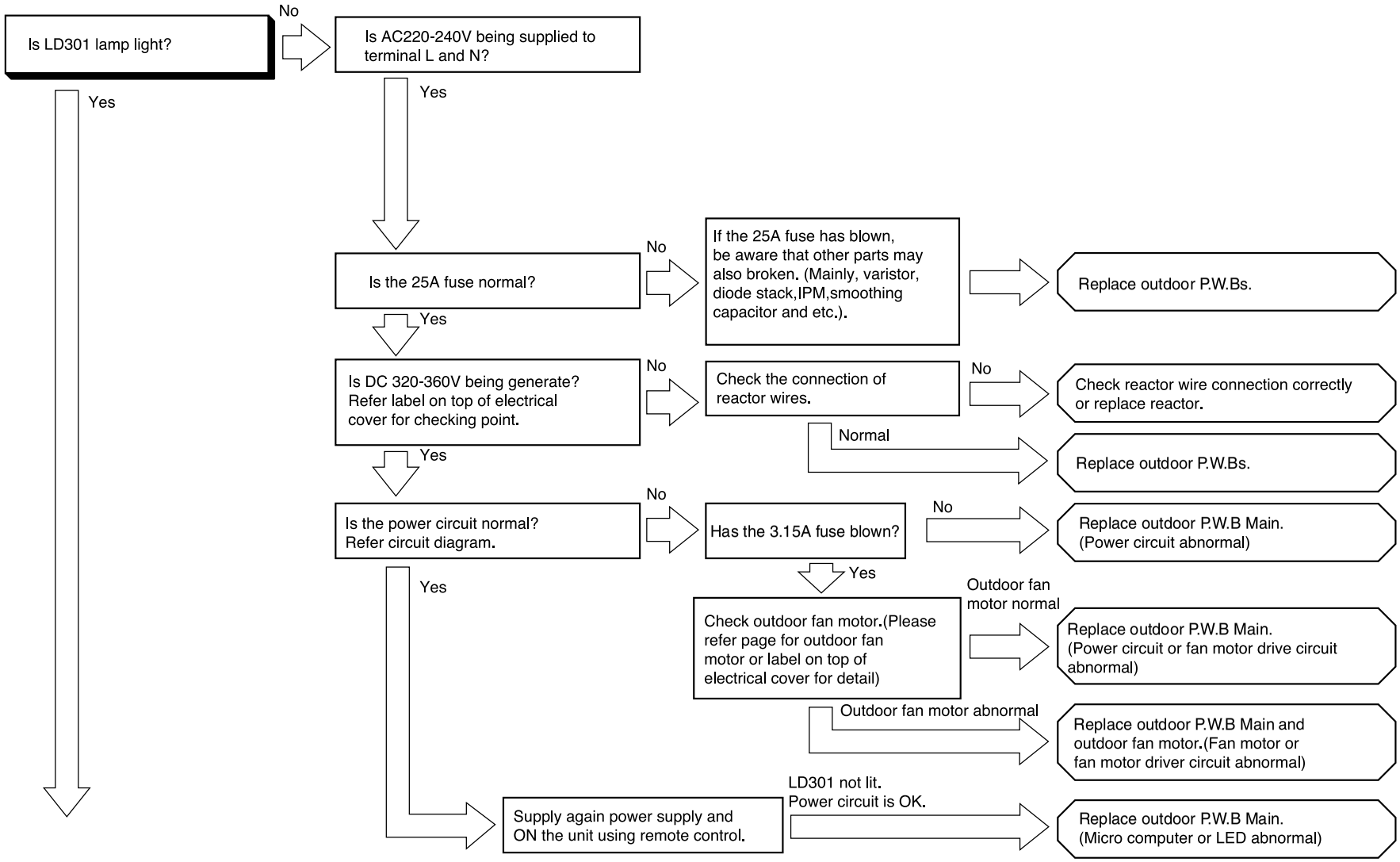
5. All systems stop from several seconds to several minutes after operation is started (all indicators are also off)

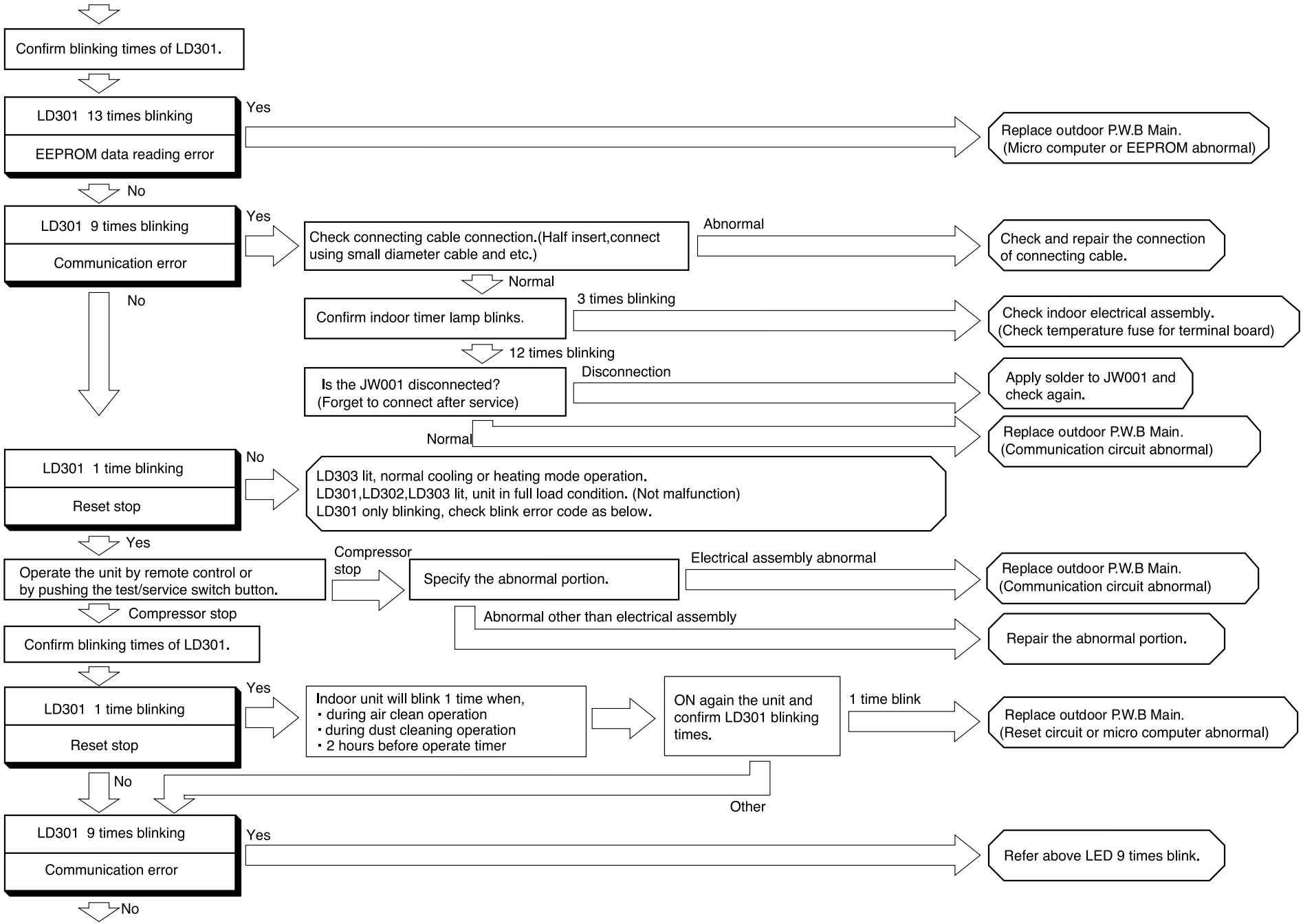


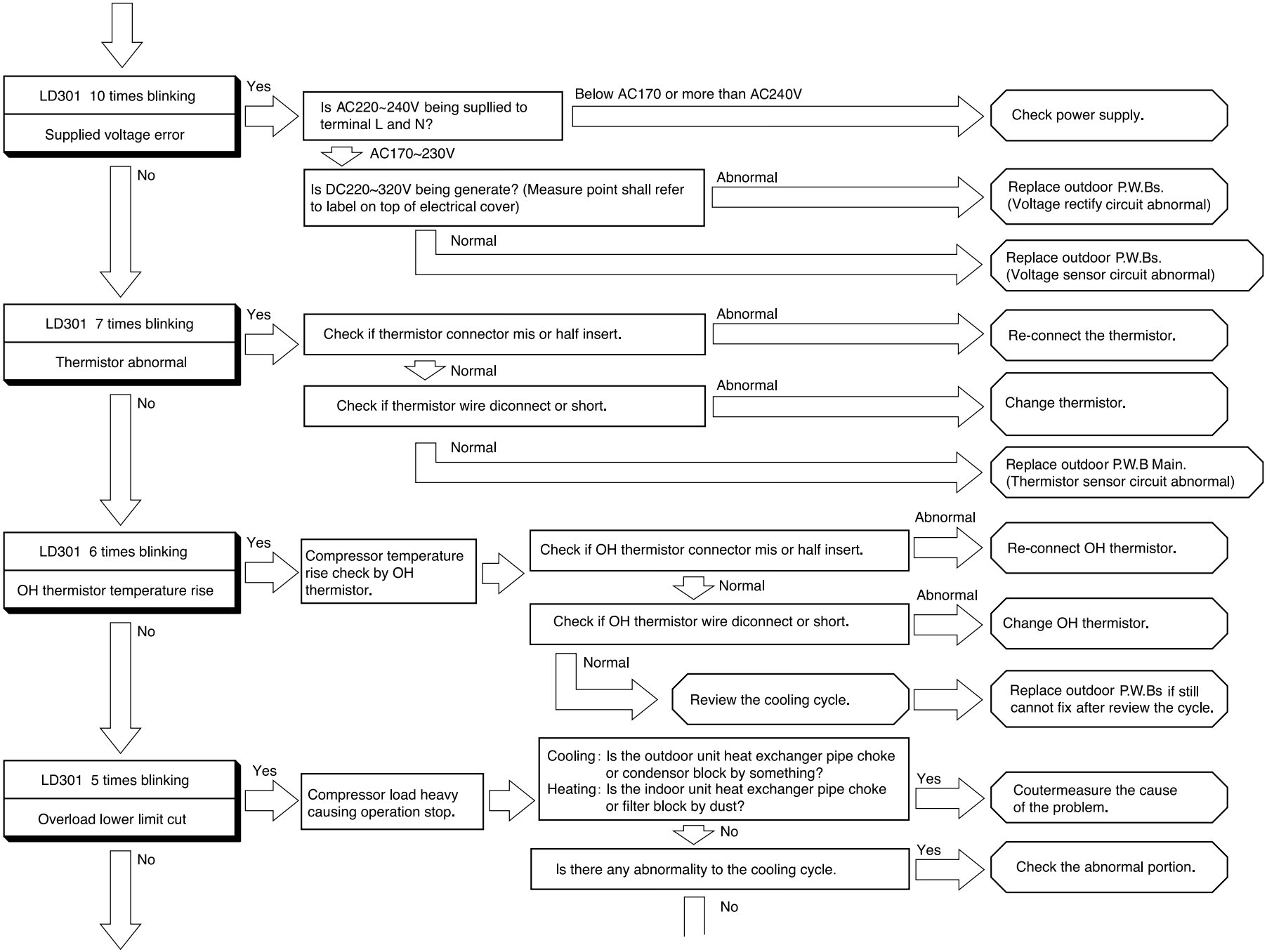
6. Check the main P.W.B (power circuit)

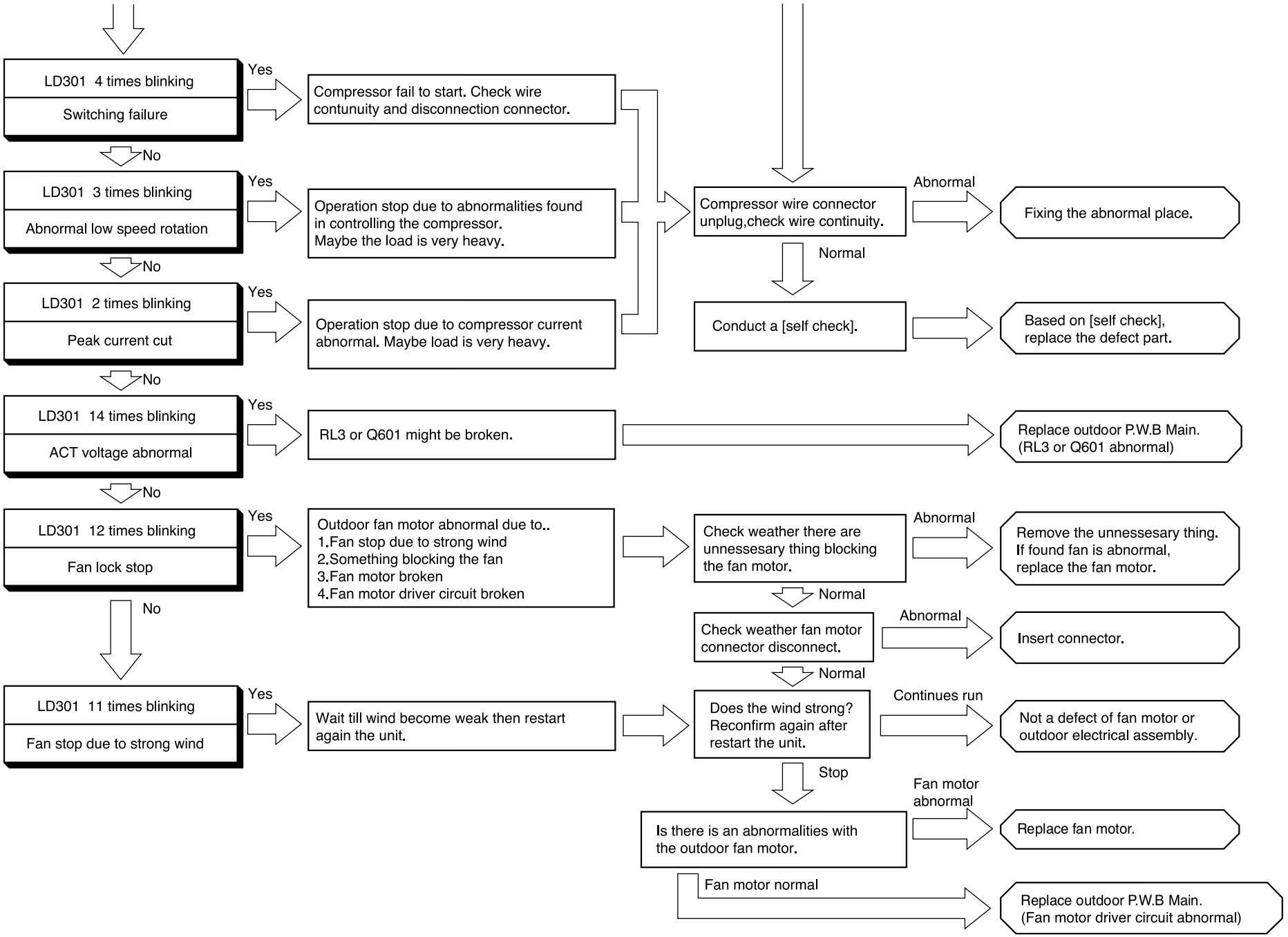


CHECKING THE OUTDOOR UNIT ELECTRICAL PART




Confirm blinking times of LD301.
LD301 13 times blinking
EEPROM data reading error
Yes
Replace outdoor P.W.B Main.
(Micro computer or EEPROM abnormal)
No
LD301 9 times blinking
Communication error
Yes
Check connecting cable connection.(Half insert,connect using small diameter cable and etc.)
Abnormal
Check and repair the connection of connecting cable.
Normal
Confirm indoor timer lamp blinks.
3 times blinking
Check indoor electrical assembly.
(Check temperature fuse for terminal board)
12 times blinking
Is the JW001 disconnected?
(Forget to connect after service)
Disconnection
Apply solder to JW001 and check again.
Normal
Replace outdoor P.W.B Main.
(Communication circuit abnormal)
No
LD301 1 time blinking
Reset stop
LD303 lit, normal cooling or heating mode operation.
LD301,LD302,LD303 lit, unit in full load condition. (Not malfunction)
LD301 only blinking, check blink error code as below.
Yes
Operate the unit by remote control or by pushing the test/service switch button.
Compressor stop
Specify the abnormal portion.
Electrical assembly abnormal
Replace outdoor P.W.B Main.
(Communication circuit abnormal)
Abnormal other than electrical assembly
Repair the abnormal portion.
Compressor stop
Confirm blinking times of LD301.
LD301 1 time blinking
Reset stop
Yes
Indoor unit will blink 1 time when,
・during air clean operation
・during dust cleaning operation
・2 hours before operate timer
ON again the unit and confirm LD301 blinking times.
1 time blink
Replace outdoor P.W.B Main.
(Reset circuit or micro computer abnormal)
No
Other
LD301 9 times blinking
Communication error
Yes
Refer above LED 9 times blink.
No


LD301 10 times blinking
Supplied voltage error
Yes
Is AC220~240V being supllied to terminal L and N?
Below AC170 or more than AC240V
Check power supply.
AC170~230V
No
Is DC220~320V being generate? (Measure point shall refer to label on top of electrical cover)
Abnormal
Replace outdoor P.W.Bs. (Voltage rectify circuit abnormal)
Normal
Replace outdoor P.W.Bs. (Voltage sensor circuit abnormal)
LD301 7 times blinking
Thermistor abnormal
Yes
Check if thermistor connector mis or half insert.
Abnormal
Re-connect the thermistor.
Normal
No
Check if thermistor wire diconnect or short.
Abnormal
Change thermistor.
Normal
Replace outdoor P.W.B Main. (Thermistor sensor circuit abnormal)
LD301 6 times blinking
OH thermistor temperature rise
Yes
Compressor temperature rise check by OH thermistor.
Check if OH thermistor connector mis or half insert.
Abnormal
Re-connect OH thermistor.
Normal
No
Check if OH thermistor wire diconnect or short.
Abnormal
Change OH thermistor.
Normal
Review the cooling cycle.
Replace outdoor P.W.Bs if still cannot fix after review the cycle.
LD301 5 times blinking
Overload lower limit cut
Yes
Compressor load heavy causing operation stop.
Cooling: Is the outdoor unit heat exchanger pipe choke or condensor block by something?
Heating: Is the indoor unit heat exchanger pipe choke or filter block by dust?
Yes
Coutermeasure the cause of the problem.
No
No
Is there any abnormality to the cooling cycle.
Yes
Check the abnormal portion.
No


LD301 4 times blinking
Switching failure
Yes
Compressor fail to start. Check wire contunuity and disconnection connector.
No
LD301 3 times blinking
Abnormal low speed rotation
Yes
Operation stop due to abnormalities found in controlling the compressor. Maybe the load is very heavy.
No
LD301 2 times blinking
Peak current cut
Yes
Operation stop due to compressor current abnormal. Maybe load is very heavy.
No
LD301 14 times blinking
ACT voltage abnormal
Yes
RL3 or Q601 might be broken.
Replace outdoor P.W.B Main. (RL3 or Q601 abnormal)
No
LD301 12 times blinking
Fan lock stop
Yes
Outdoor fan motor abnormal due to..
1.Fan stop due to strong wind
2.Something blocking the fan
3.Fan motor broken
4.Fan motor driver circuit broken
Check weather there are unnessesary thing blocking the fan motor.
Abnormal
Remove the unnessesary thing. If found fan is abnormal, replace the fan motor.
Normal
Check weather fan motor connector disconnect.
Abnormal
Insert connector.
Normal
No
LD301 11 times blinking
Fan stop due to strong wind
Yes
Wait till wind become weak then restart again the unit.
Does the wind strong? Reconfirm again after restart the unit.
Continues run
Not a defect of fan motor or outdoor electrical assembly.
Stop
Is there is an abnormalities with the outdoor fan motor.
Fan motor abnormal
Replace fan motor.
Fan motor normal
Replace outdoor P.W.B Main. (Fan motor driver circuit abnormal)
Compressor wire connector unplug,check wire continuity.
Abnormal
Fixing the abnormal place.
Normal
Conduct a [self check].
Based on [self check], replace the defect part.

SELF CHECK

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

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

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

* SELF CHECK diagnosis result

SELF-DIAGNOSIS LIGHTING MODE ▩ LIT ▨ BLINKING □ OFF				
LD301 RED	LD302 RED	LD303 RED	SELF-DIAGNOSIS RESULT	REPAIR METHOD
▨	□	■	ELECTRICAL OK	① CHANGE COMPRESSOR
1 TIME				
▨	□	■	PEAK CURRENT CUT OFF	① CHANGE P.W.B.s
2 TIMES				
▨	□	■	COMPRESSOR CURRENT ABNORMAL	① IF COMPRESSOR CONNECTOR LOOSE OR NG - CHECK CONNECTOR CONDITION ② IF COMPRESSOR CONNECTOR OK, - CHECK COMPRESSOR, CHANGE P.W.B.s
7 TIMES				
▨	□	■	DC VOLTAGE ABNORMAL	① IF AC VOLTAGE INPUT ABNORMAL (OVER STANDARD VOLTAGE ±10%), - FOLLOW STANDARD AC VOLTAGE INPUT ② IF AC VOLTAGE INPUT IS NORMAL (WITHIN ±10%), - CHANGE P.W.B.s
10 TIMES				
▨	□	■	EEPROM READING ERROR	① CHANGE P.W.B. MAIN
13 TIMES				

In case abnormalities found in measurement result, change the defect part.
In case electrical is normal and before it can be use, modify back
JW001 and JW002 as normal condition (before conduct a self check).

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

Case 1:

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

Case 2:

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

a) Outdoor microcomputer will wait the self check command (by pressing test/service switch) within 3 minutes (LD302 blinks 1 time).
   If test/service signal input is not received, unit will return to normal operation mode after this 3 minutes has lapsed. (LD302 OFF and LD301 blinks 1 time).

Case 3:

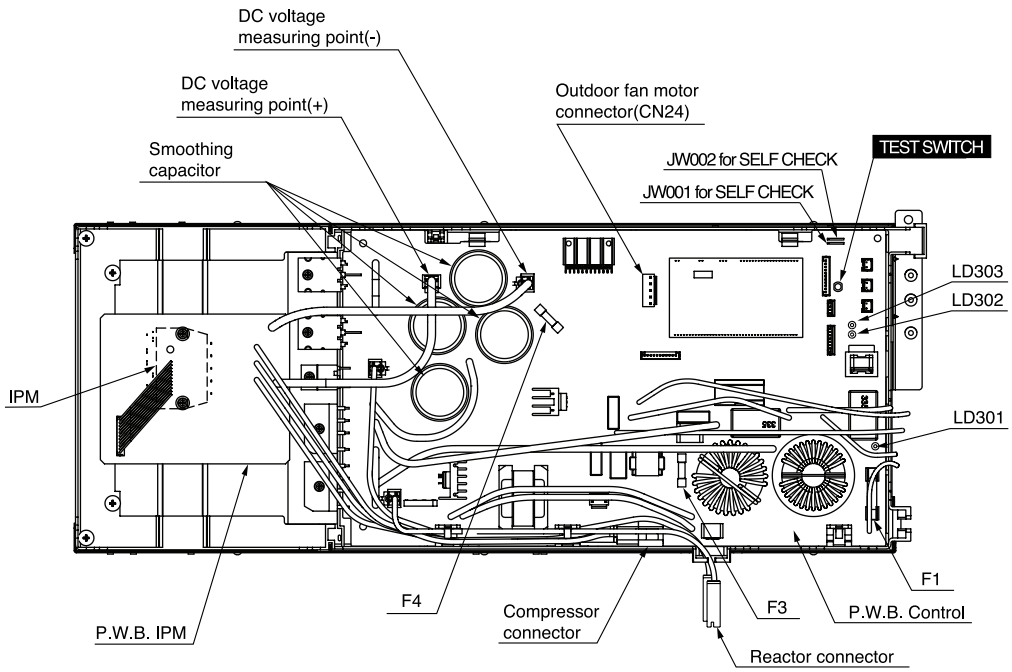
If main power supply OFF at once, then switch ON again and on indoor unit by remote control;

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

HOW TO OPERATE USING OUTDOOR UNIT TEST SWITCH

1. Pull out power cord plug and wait for 1 minute before plug in again.
2. Remove outdoor electrical cover and confirm that LD301 will blink 1 time.
3. Force cooling operation is start when TEST SWITCH is pressed for 1 second or more.

   ※ (There is a case where operation will only start after 1 minute after pressing the TEST SWITCH due to initilizing of the expansion valve)
5. Press again the TEST SWITCH for about 1 minute or more to stop the force cooling operation.

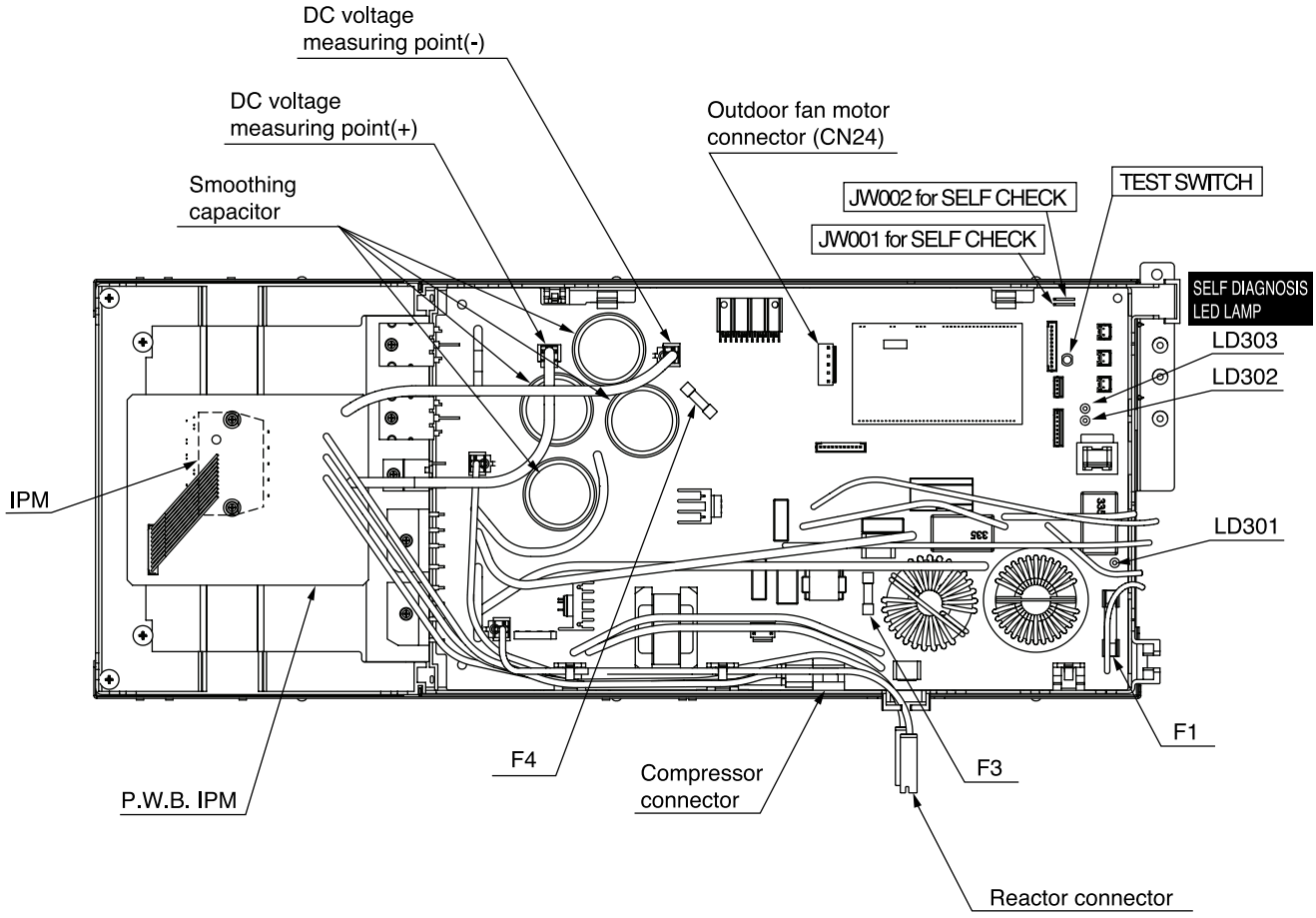


※ Caution

1. Turn OFF the breaker first before can start servicing.
2. Never operate the unit in this condition for more than 5 minutes.
3. If the checking is done with the compressor connector disconnected, the unit will continue normal operation when electrical part are normal, or it will repeat operating for approximate 1 minute and stop due to overload power limit cut
4 If interface signal (DC35V) terminal C and D are not connected when the outdoor unit TEST SWITCH is used for checking,LD301 will blink 9 times after operation to indicate a communication error.
5. To proceed with TEST SWITCH operation again, breaker must be turn OFF and ON it again. (TEST SWITCH will operate 1 time only once power is supplied)
6 When service operation is completed, restore the connection as original condition.

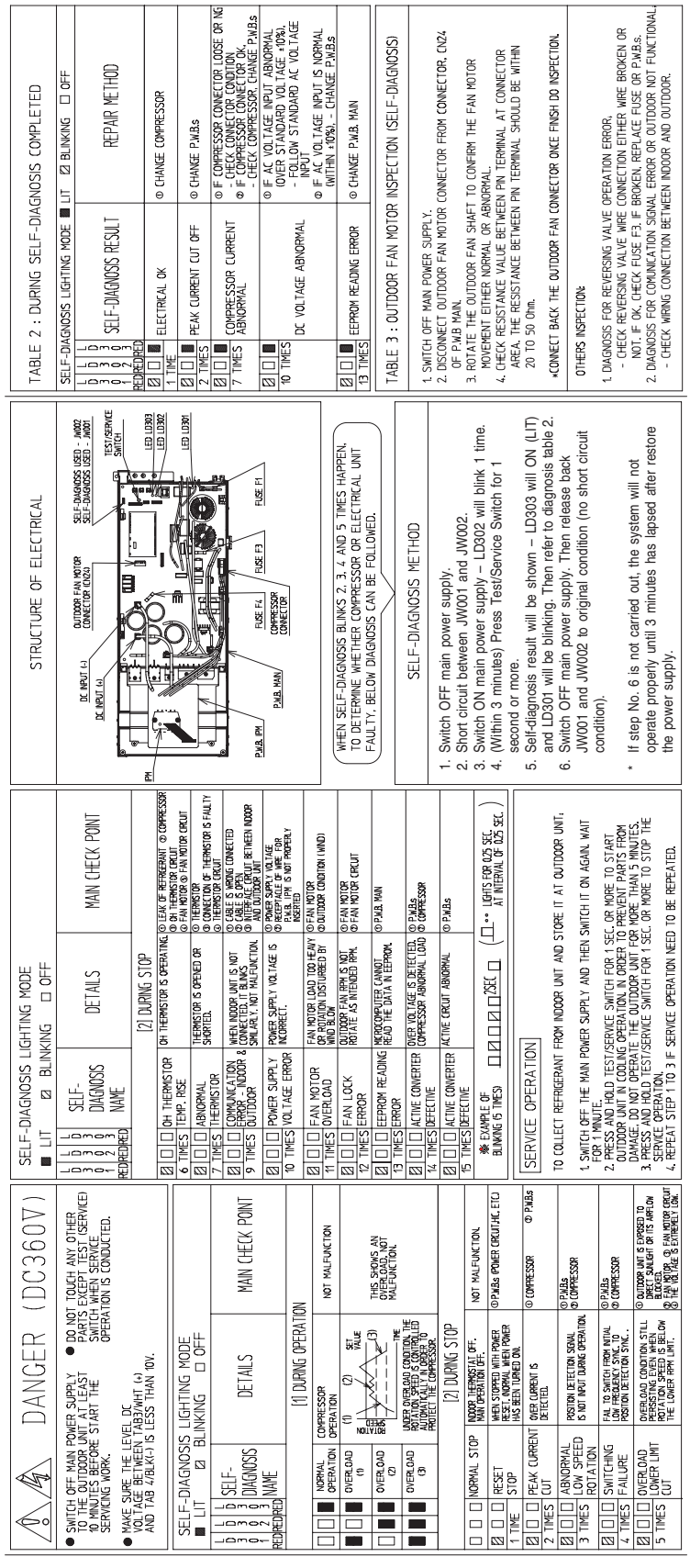
LIGHTING MODE OF SELF-DIAGNOSIS LAMP

1 POSITION OF SELF-DIAGNOSIS LAMP



LIGHTING MODE SELF-DIAGNOSIS LAMP

2 LIGHTING MODE SELF-DIAGNOSIS LAMP



CHECKING THE REMOTE CONTROLLER

Is battery polarity correct?

No

Install the battery in the correct polarity.

Yes

Is the battery check sign + − flashing?

Yes

Replace the battery.

No

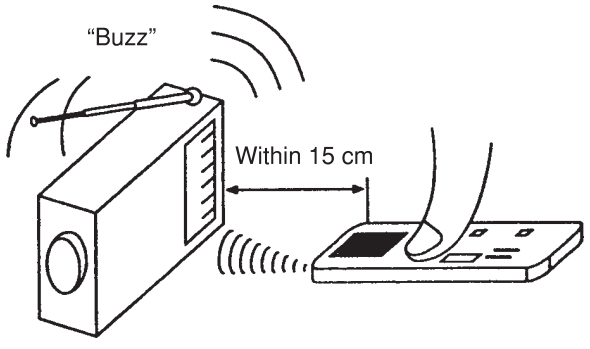
Turn on an AM radio, bring the remote control switch within 15 cm of the radio, and press the ON/OFF button.

Does the radio buzz noisily?

No

Check the LED (D1) with a multimeter.

Yes



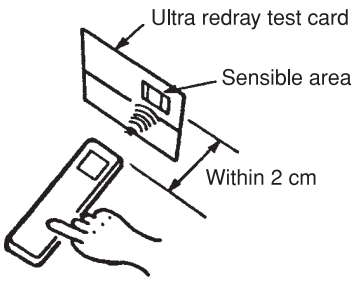
[AM radio]

Check the indoor unit signal receiving P. W. B..
If it is good, check the main P. W. B..

Check functions again.
If it does not work, replace the remote controller.

You can check the remote control switch by other methods as explained below.

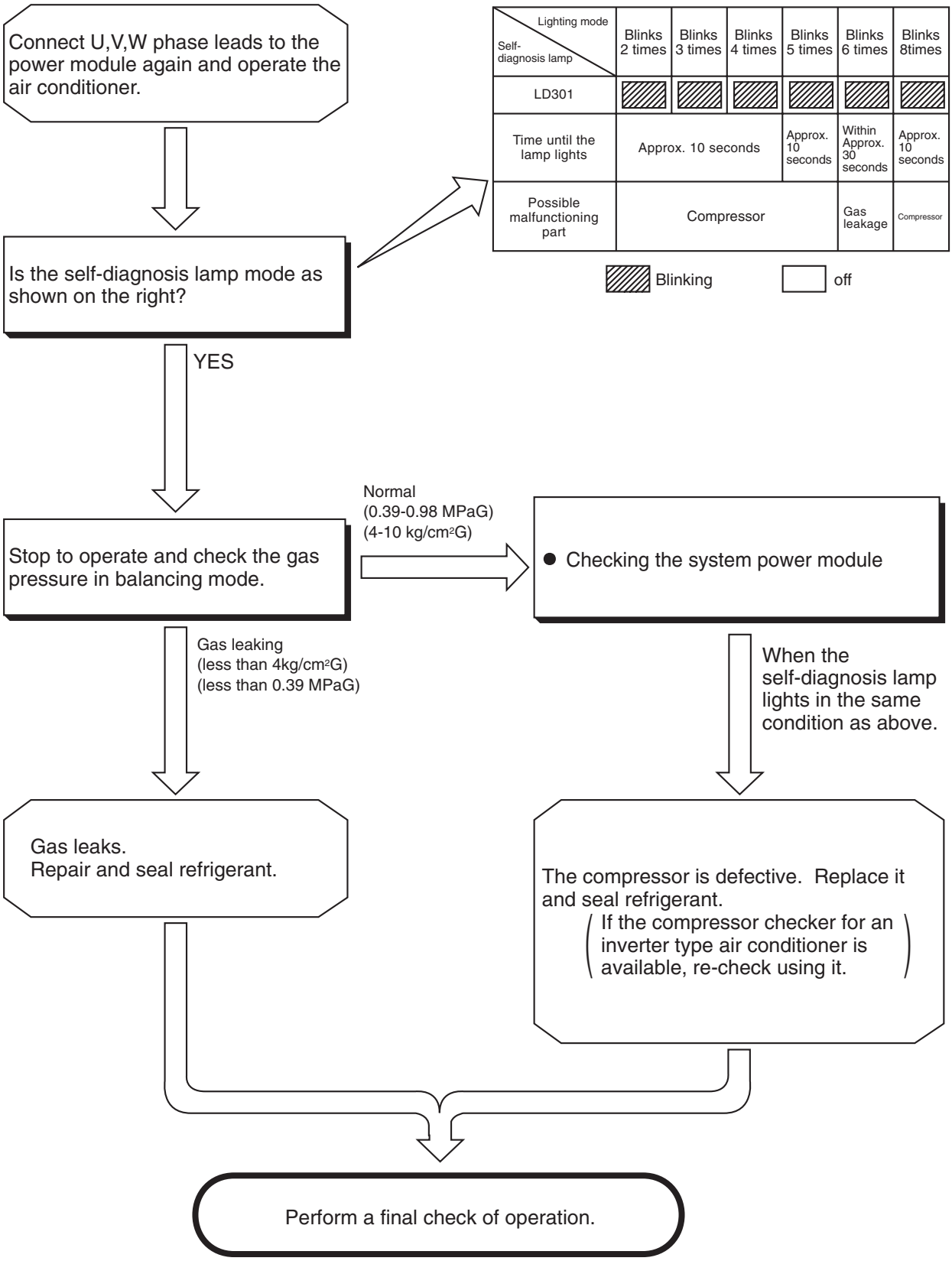
Using the test card



The sensible area should flash in orange when you operate the remote control unit if it is good.

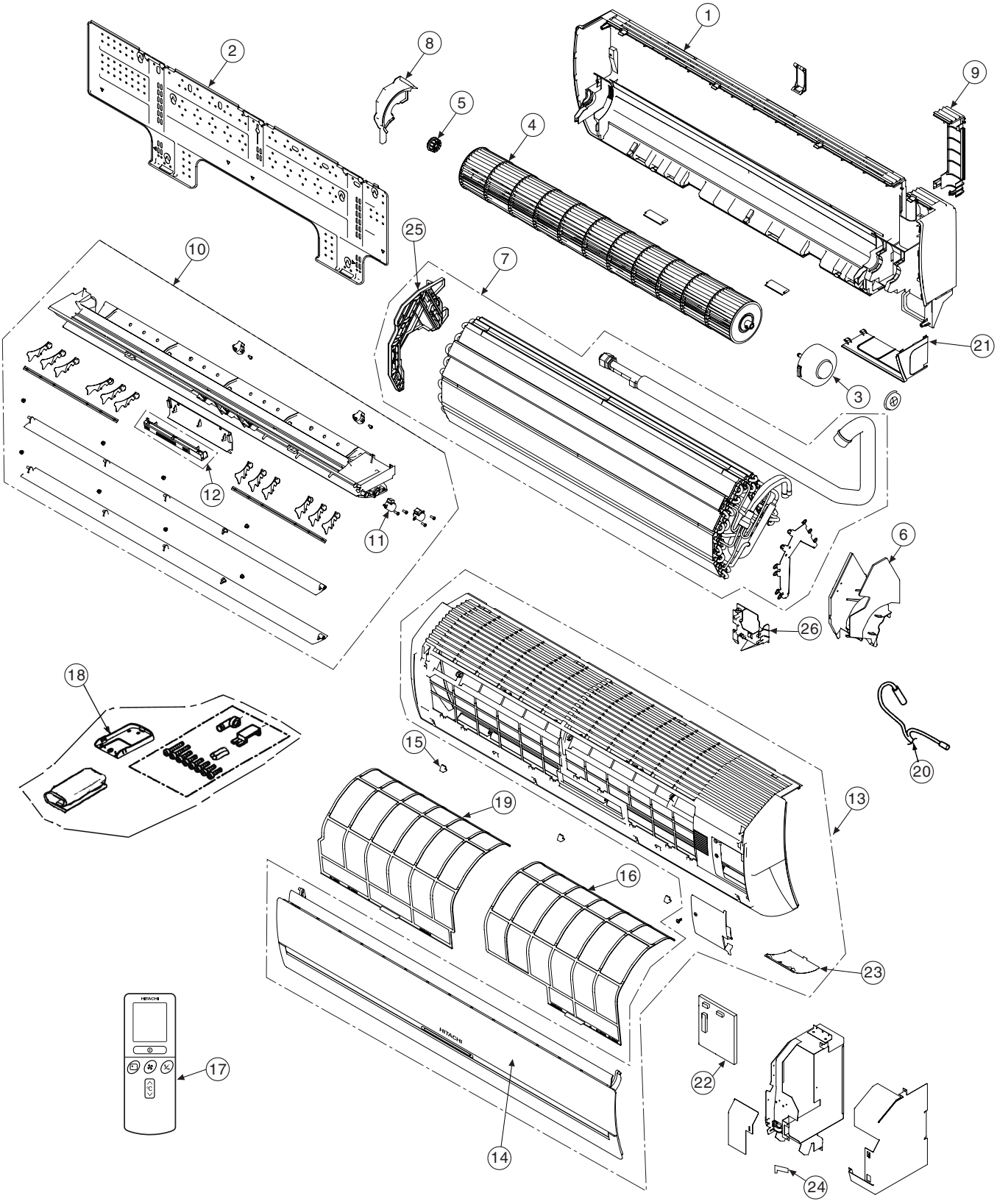
CHECKING THE REFRIGERATING CYCLE (JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

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



PARTS LIST AND DIAGRAM

INDOOR UNIT
MODEL : RAS-70YH7

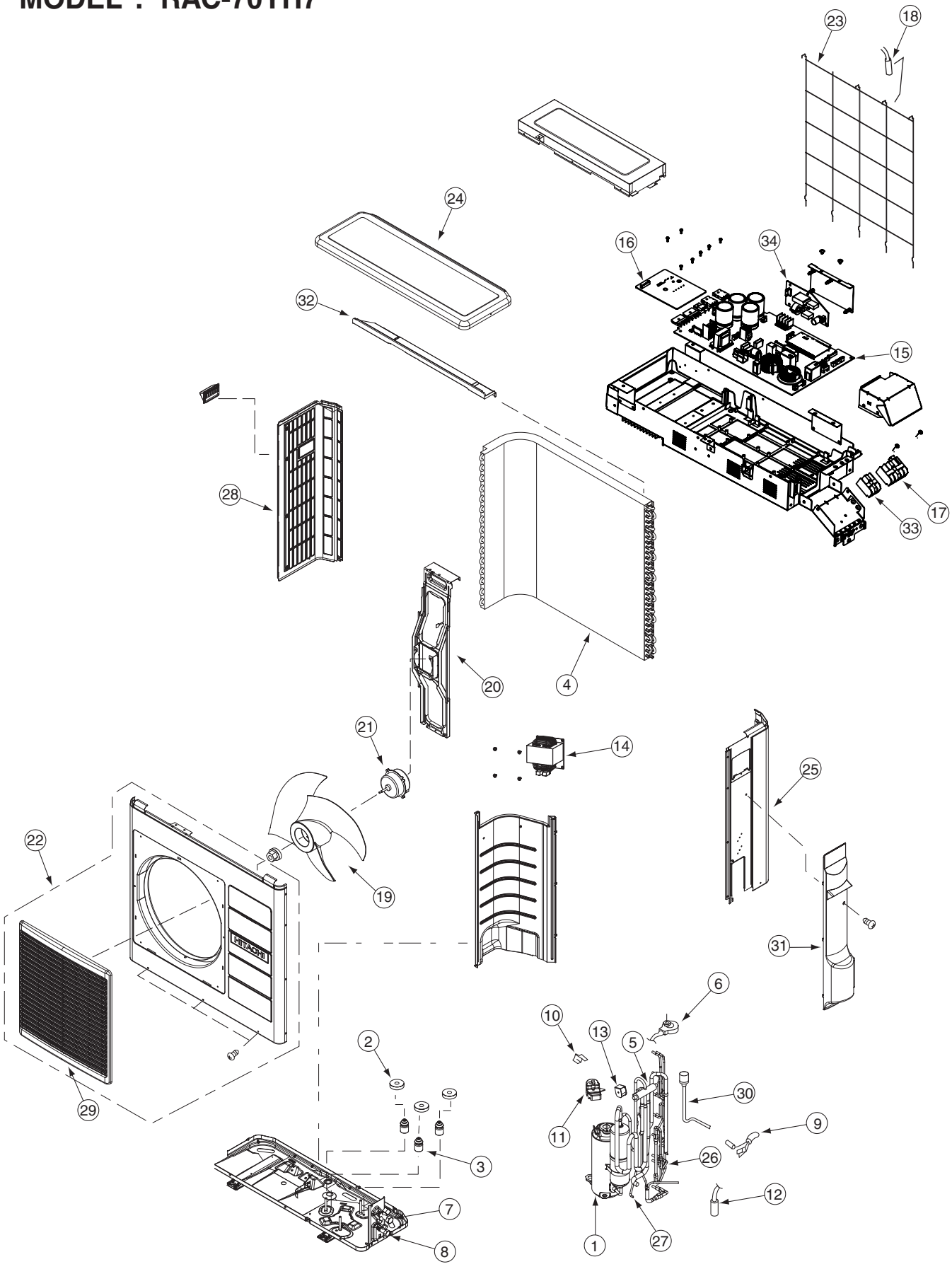


MODEL RAS-70YH7

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAS-30CHP6 002	1	CABINET ASSY
2	PMRAS-72CHA3 013	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-70YH7 R03	1	CYCLE ASSY
8	PMRAS-72CHA3 005	1	BEARING COVER
9	PMRAS-24CE9G 004	1	PIPE SUPPORT (U-COVER)
10	PMRAS-80YHA R05	1	DRAIN PAN ASSY
11	PMRAS-72CHA3 R01	4	AUTO SWEEP MOTOR
12	PMRAS-70YH7 R04	1	P.W.B (LED)
13	PMRAS-80YH5 003	1	FRONT COVER ASSY
14	PMRAS-80YH5 002	1	FRONT PANEL
15	PMRAS-10C7M 008	3	CAP
16	PMRAS-72CHA3 009	1	FILTER (R)
17	PMRAS-70YH7 R02	1	REMOTE CONTROL ASSY
18	PMRAS-10C3M 003	1	REMOTE CONTROL SUPPORT
19	PMRAS-72CHA3 008	1	FILTER (L)
20	PMRAS-72CHA3 R22	1	THERMISTOR
21	PMRAS-70YHA1 006	1	S-COVER R
22	PMRAS-70YH7 R01	1	P.W.B (MAIN)
23	SVP-2WDS62329A	1	SE-COVER
24	PMRAS-72CHA3 015	1	P.W.B (RECEIVER)
25	PMRAS-72CHA3 024	1	FAN COVER
26	PMRAS-72CHA3 018	1	PIPE SUPPORT

PARTS LIST AND DIAGRAM

OUTDOOR UNIT
MODEL : RAC-70YH7



MODEL RAC-70YH7

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAC-60YH7 S01	1	COMPRESSOR
2	KPNT1 001	6	PUSH NUT
3	RAC-2226HV 805	3	COMPRESSOR RUBBER
4	PMRAC-70YHA S03	1	CONDENSER
5	PMRAC-70YHA1 999	1	REVERSING VALVE
6	PMRAC-25NH4 S03	1	ELECTRICAL EXPANSION COIL
7	PMRAC-80YHA 905	1	VALVE (5S)
8	PMRAC-50NH4 S03	1	VALVE (2S)
9	PMRAM-72Q8 S03	1	THERMISTOR (OH)
10	PMRAC-25NH4 S09	1	OVERHEAT THERMISTOR SUPPORT
11	PMRAC-X13CX 906	1	OVERLOAD RELAY COVER
12	PMRAC-50YHA2 S07	1	THERMISTOR (DEFROST)
13	PMRAC-50YHA2 S09	1	COIL (REVERSING VALVE)
14	PMRAC-50YHA2 S04	1	REACTOR
15	PMRAC-70YHA2 S01	1	P.W.B (MAIN)
16	PMRAC-70YHA2 S02	1	P.W.B (IPM)
17	PMRAS-25NH4 S13	1	TERMINAL BOARD (4P)
18	PMRAM-72Q8 S03	1	THERMISTOR (OUTSIDE TEMPERATURE)
19	PMRAC-70YHA 907	1	PROPELLER FAN
20	PMRAC-70YHA S12	1	SUPPORT (FAN MOTOR)
21	PMRAC-70YHA2 S05	1	FAN MOTOR
22	PMRAC-70YHA S01	1	CABINET
23	PMRAC-70YHA S06	1	NET
24	PMRAC-24CP5 905	1	TOP COVER
25	PMRAC-70YHA S09	1	SIDE PLATE-R
26	PMRAC-70YHA2 S04	1	STRAINER (COND)
27	PMRAC-70YHA 910	1	STRAINER (PIPE)
28	PMRAC-70YHA 908	1	SIDE PLATE-L
29	PMRAC-70YHA S05	1	GRILL
30	PMRAC-80YHA 906	1	EXPANSION VALVE
31	PMRAC-70YHA 915	1	SV-COVER
32	PMRAC-70YHA 916	1	NET COVER
33	PMRAC-63CA1 S02	1	TERMINAL BOARD (2P)
34	PMRAC-70YHA2 S03	1	P.W.B (NF-BOARD)

HITACHI

RAS-70YH7 / RAC-70YH7

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