HITACHI

PM | NO. 0680E

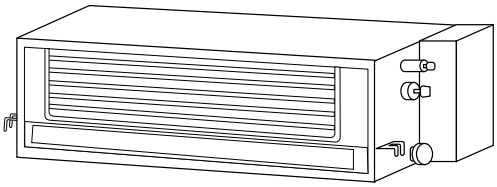
RAD-50RPE/RAC-50NPE
RAD-60RPE/RAC-60NPE

SERVICE MANUAL

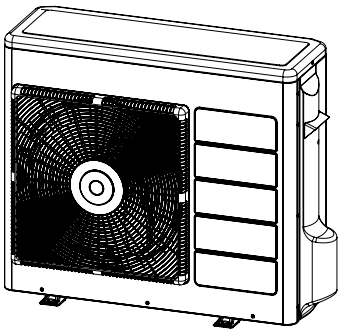
TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY

REFER TO THE FOUNDATION MANUAL

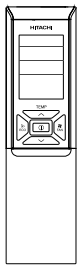


RAD-50RPE
RAD-60RPE

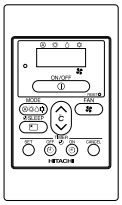


RAC-50NPE
RAC-60NPE

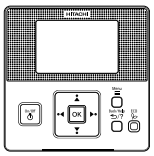
OPTIONAL



WIRELESS REMOTE CONTROLLER (SPX-RCKA1)



WIRED REMOTE CONTROLLER (SPX-RCDA)



WIRED REMOTE CONTROLLER (SPX-WKT3)

※ For SPX-WKT3, Please refer to it's own manual.

CONTENTS

SPECIFICATIONS

TYPE			(DUCT TYPE)			
			INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL			RAD-50RPE	RAC-50RPE	RAS-60NPE	RAC-60NPE
POWER SOURCE			1 Ø, 50/60 Hz, 220-240V		1 Ø, 50/60 Hz, 220-240V	
COOLING	TOTAL INPUT	(W)	1,420 (300 ~ 2,500)		1,710 (300 ~ 2,600)	
	TOTAL AMPERES	(A)	6.52 – 5.98		7.85 – 7.20	
	CAPACITY	(kW)	5.00 (1.20 ~ 5.80)		6.00 (1.20 ~ 6.50)	
		(B.T.U./h)	17,060 (4,090 ~ 19,780)		20,470 (4,090 ~ 22,170)	
HEATING	TOTAL INPUT	(W)	1,570 (300 ~ 2,650)		1,840 (300 ~ 2,650)	
	TOTAL AMPERES	(A)	7.21 – 6.61		8.45 – 7.74	
	CAPACITY	(kW)	6.00 (1.20 ~ 6.80)		7.00 (1.20 ~ 8.00)	
		(B.T.U./h)	20,470 (4,090 ~ 23,200)		23,880 (4,090 ~ 27,290)	
DIMENSIONS (mm)		W	900	850	900	850
		H	270	750	270	750
		D	720	298	720	298
NET WEIGHT		(kg)	35	50	35	50

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

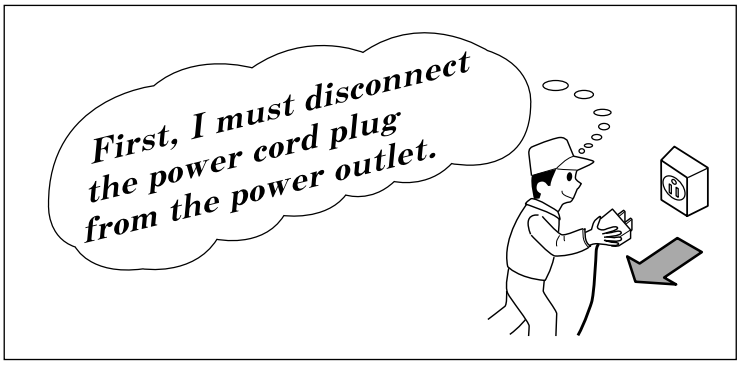
ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

FEBRUARY 2019 Refrigeration & Air-Conditioning Division

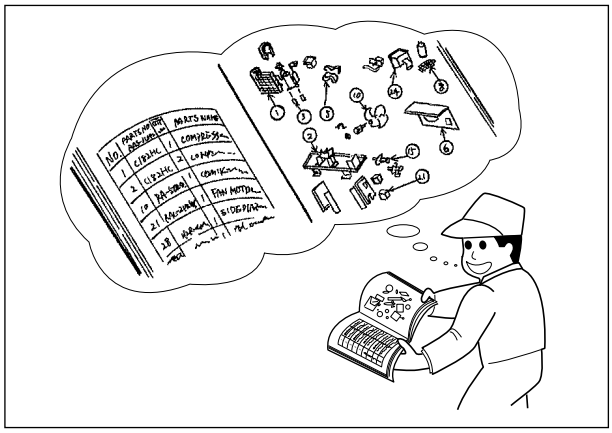
SAFETY DURING REPAIR WORK

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 the user himself should absolutely be prohibited.

6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.

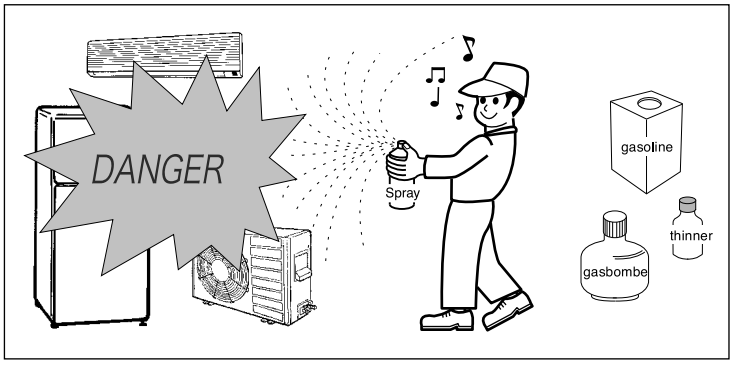
7. In installing the unit having been repaired, be careful to prevent the occurence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.

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 after reinforced or at a new location.

10. Any inflammable object must not be placed about the location of installation.

11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope
   The standards provide for items to be generally observed in carrying and handling semiconductors in relative 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 (I.C.)
   (3) Field-effective transistor (F.E.T.)
   (4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

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

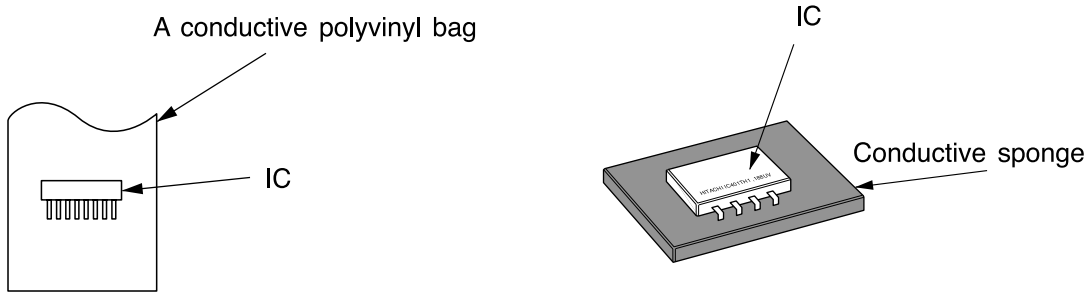


Fig. 1. Conductive container

   (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing 1MΩ earth resistance through a ring or bracelet).

   (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.

   (4) Be sure to place a part on a metal plate with grounding.

   (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

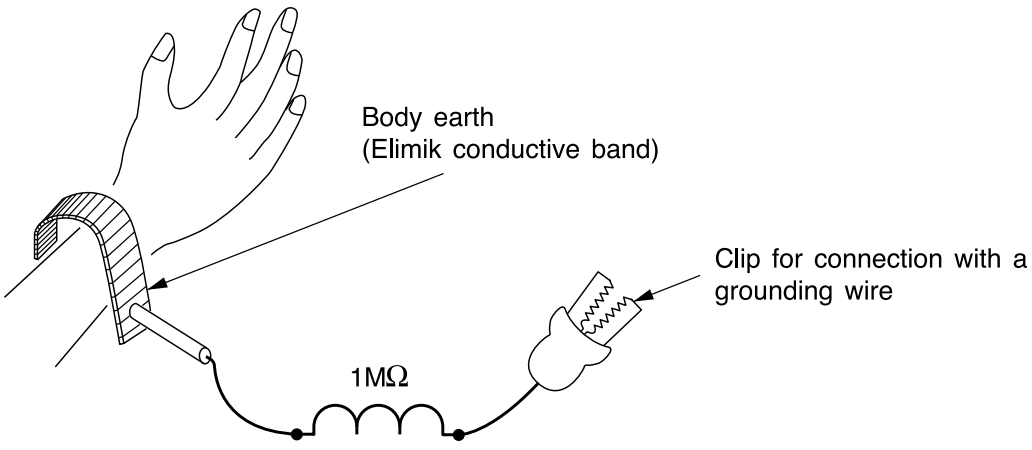


Fig. 2. Body Earth

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

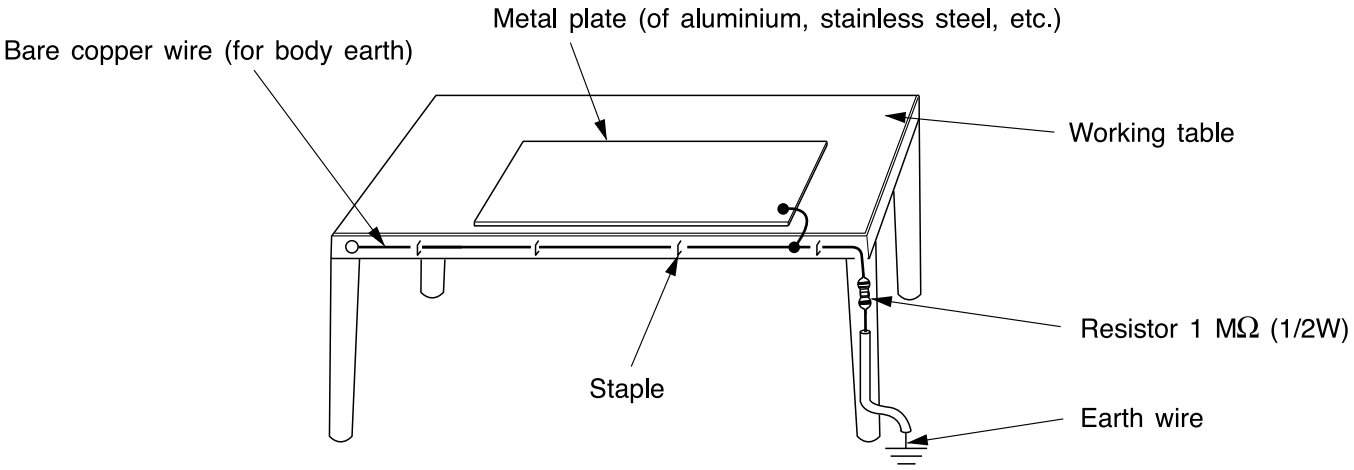


Fig. 3. Grounding of the working table

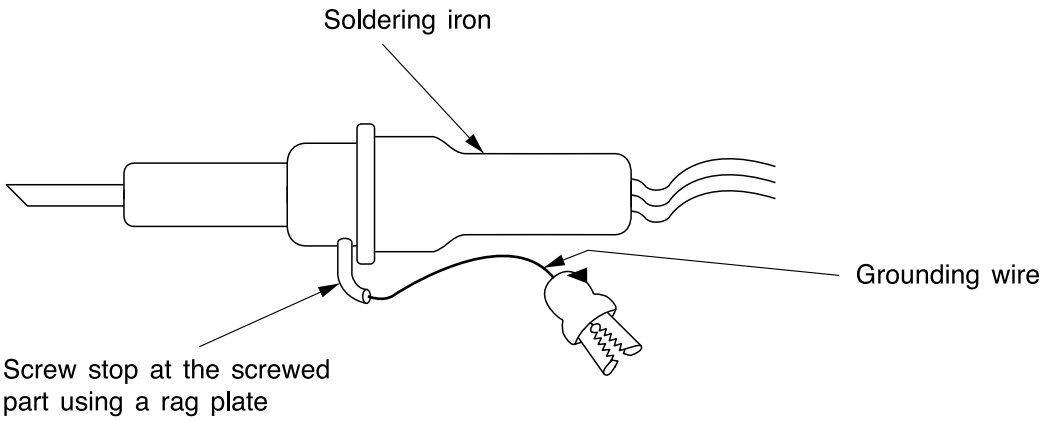


Fig. 4. Grounding a solder iron

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

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

⚠ CAUTION

1. In quiet 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 nearby, 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 airconditioner will not start automatically. Re-press START/STOP button after 3 minutes from when unit stopped or power recovery.

4. If the room air conditioner is stopped by adjusting thermostat, or miss operation, 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 –15°C (5°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.

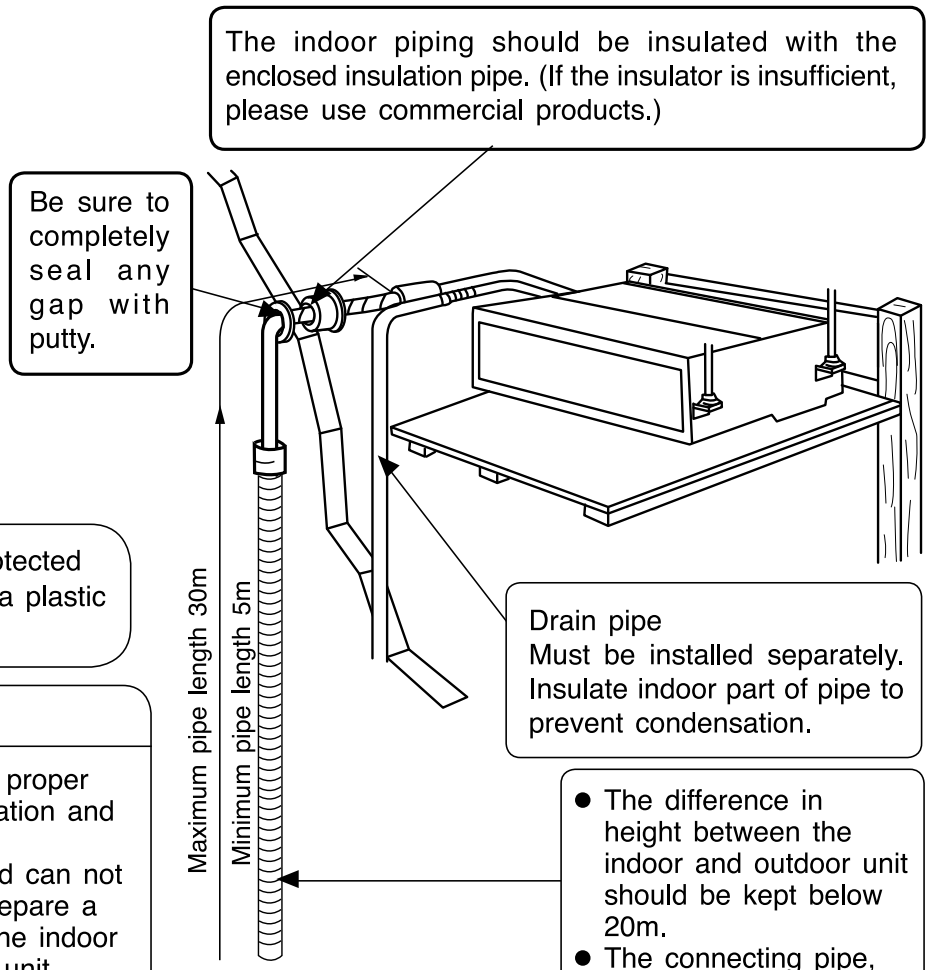
SPECIFICATIONS

MODEL		RAD-50RPE RAD-60RPE	RAC-50NPE RAC-60NPE
FAN MOTOR		180W	DC47W
FAN MOTOR CAPACITOR		NO	NO
FAN MOTOR PROTECTOR		NO	NO
COMPRESSOR		–	JX151XG1
COMPRESSOR MOTOR CAPACITOR		NO	NO
OVERLOAD PROTECTOR		NO	NO
OVERHEAT PROTECTOR		NO	YES
FUSE (MICRO COMPUTER CIRCUIT)		3.15A	3A
POWER RELAY		NO	G4A
POWER SWITCH		NO	NO
TEMPORARY SWITCH		YES	NO
TEST/SERVICE SWITCH		YES	NO
TRANSFORMER		NO	NO
VARISTOR		NO	450NR
NOISE SUPPRESSOR		NO	YES
THERMOSTAT		YES(IC)	YES(IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
REFRIGERANT CHARGING VOLUME (Refrigerant R410A)	UNIT	---------	1500g
	PIPES (MAX. 30M) (MIN. 3M)	CHARGELESS	

Figure showing the installation of Indoor unit

⚠ CAUTION

- Install the indoor unit with a proper clearance around it for operation and maintenance working space.
- In case that the ceiling board can not be detected for servicing, prepare a service access door below the indoor unit for removing the indoor unit.



⚠ CAUTION

- Install the indoor unit with a proper clearance around it for operation and maintenance working space.
- In case that the ceiling board can not be detected for servicing, prepare a service access door below the indoor unit for removing the indoor unit.

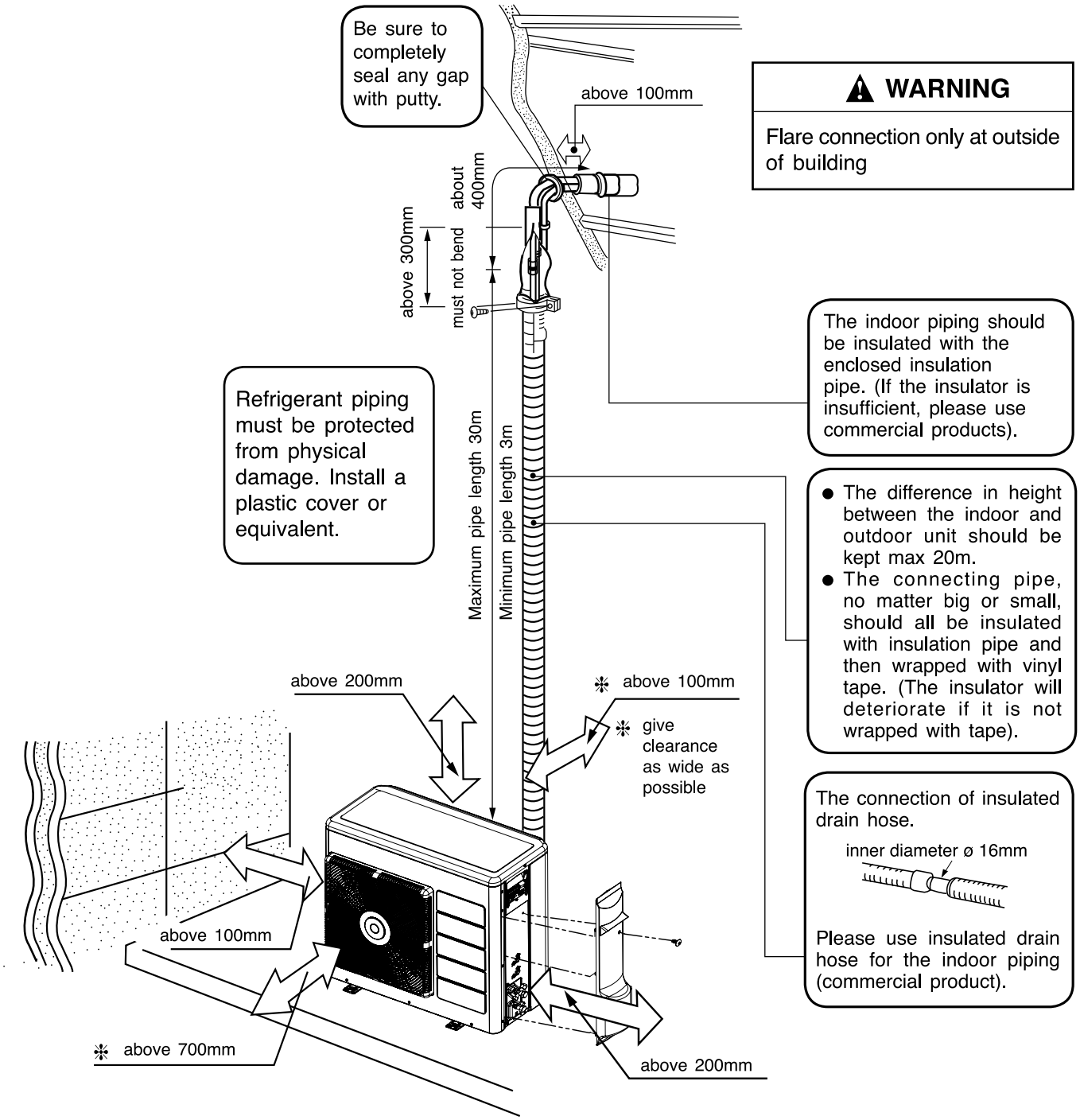
⚠ CAUTION

- Discharge grille and suction grille shall be covered by insulation material to prevent water drop.

⚠ CAUTION

Always install the indoor unit level. Units not installed level may leak.

Figure showing the installation of Outdoor unit



⚠ WARNING

Flare connection only at outside of building

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

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.	

WARNING	This symbol shows that this equipment uses a flammable refrigerant. If the refrigerant is leaked, together with an external ignition source, there is a possibility of ignition.
CAUTION	This symbol shows that the Operation Instructions should be read carefully.
CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the Installation Manual.
CAUTION	This symbol shows that there is information included in the Operation Manual and/or Installation Manual

- 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 R32. Otherwise, this may result in broken copper pipes or faults.
- Do not use refrigerant other than the one indicated on the outdoor unit (R32) when installing, moving or repairing. Using other refrigerants may cause trouble or damage to the unit, and personal injury.

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.
- Do not install the indoor unit in a machine shop or kitchen where vapor from oil or its mist flows to the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance and may deform and in the worst case, break the plastic parts of the indoor unit.

PRECAUTIONS DURING SHIFTING OR MAINTENANCE

WARNING

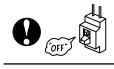
- Should abnormal situation arises (like burning smell), please stop operating the unit and turn off the circuit breaker. Contact your agent. Fault, short circuit or fire may occur if you continue to operate the unit under abnormal situation.
- Please contact your agent for maintenance. Improper self 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.
- If the air conditioner is not cool, one possible cause could be due to refrigerant leakage, so consult your dealer.
  The refrigerant gas used in the air conditioner is harmless. But if refrigerant gas leaks into the room, harmful products are generated when in contact with fire from appliances such as a stove heater.
  When there is refrigerant gas accumulation in the room, immediately stop the air conditioner. Open the windows for ventilation and contact your agent.

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.

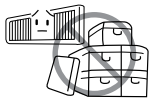


- During thunder storm, disconnect and turn off the circuit breaker.
- Spray cans and other combustibles should not be located within a meter of the air outlets of both indoor and outdoor units. As a spray can's internal pressure can be increased by hot air, a rupture may result.

PRECAUTIONS DURING OPERATION

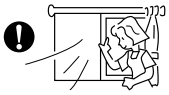
CAUTION

- 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.

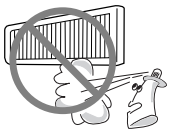


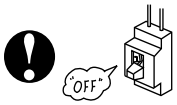
- Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.

- 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.

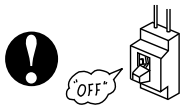
- Do not use any aerosol or hair sprays near the indoor unit. This chemical can adhere on heat exchanger fin and blocked the evaporation water flow to drain pan. The water will drop on tangential fan and cause water splashing out from indoor unit.





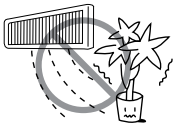
- Please switch off the unit and turn off the circuit breaker during cleaning, the high-speed fan inside the unit may cause danger.

- 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.

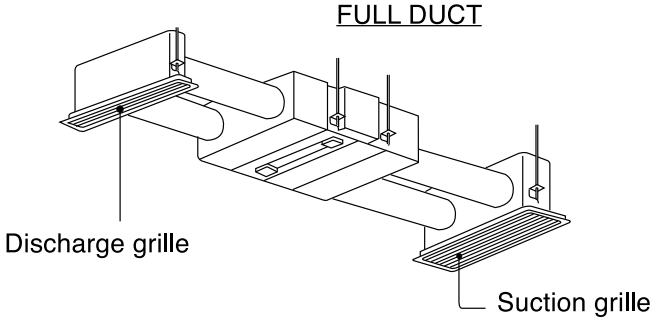
- When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, 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 can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
  Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

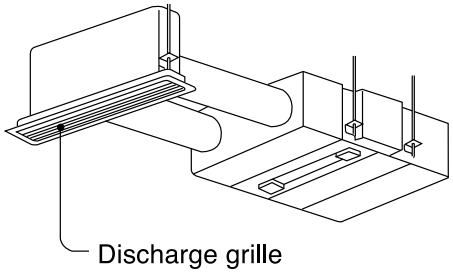
NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT

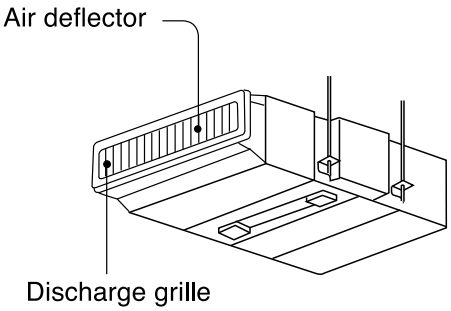
FULL DUCT



SEMI DUCT

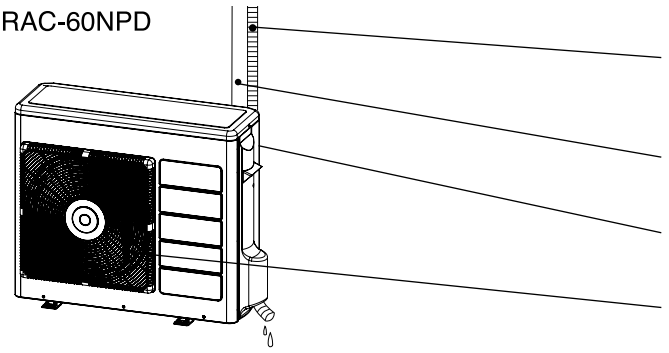


NON DUCT



OUTDOOR UNIT

RAC-50NPD/
RAC-60NPD



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)
RAD-50RPE / RAD-60RPE	900	270	720
RAC-50NPE / RAC-60NPE	850	750	298

MULTI-AIR CONDITIONER

Several indoor units can be connected to one outdoor unit. You can operate only one unit or several units according to your needs.

Combination of Operations:

When operation mode is selected:

- You cannot operate the indoor units in the following combinations.

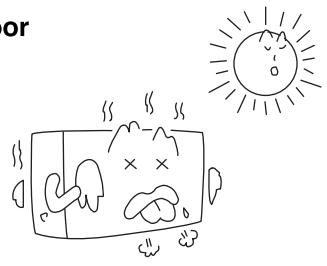
One unit	Other unit
Heating	Cooling
	Dehumidifying
	Fan

- The indoor unit which is turned on first continues to operate. Other indoor units which are turned on later go into stanby mode and the operation lamp lights.
- To operate the indoor units turned on later, set the operation mode as same as the indoor unit turned on first.

During automatic operation:

- When heating operation is automatically selected for the first indoor unit, the next indoor unit will then start to heat. Also, if cooling or dehumidifying is automatically selected for the first indoor unit, the next indoor unit will also start to cool or dehumidify.

Adjusting the Number of Indoor Units:
Decrease the number of indoor units to be operated especially when it is very hot or cold or when you want to reach the present temperature quickly.



Stopped Indoor Units:
When an indoor unit is operated in the cooling, heating or dehumidifying mode in the room, the sound of refrigerant flow may be heard from a stopped indoor unit or a stopped indoor unit may become warm. This is because the indoor unit returns refrigerant to the outdoor unit to be ready for operation.

OPERATING RANGE

Operation mode	Cooling / Dehumidifying	Heating
Outdoor temperature	–10 to 46°C	–15 to 24°C

Note

- The recommended temperature range for safety testing 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

CIRCUIT BREAKER

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

HOW TO USE THE AIR CONDITIONER EFFECTIVELY

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

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

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

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

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

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

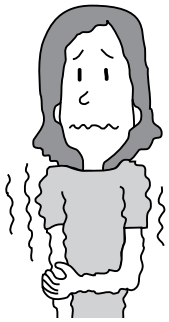
- Benzine, thinner and scrub can damage plastic surfaces or coating.
- Hot water above 40°C can shrink the filter and deform plastic parts.

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

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

THE IDEAL WAYS OF OPERATION

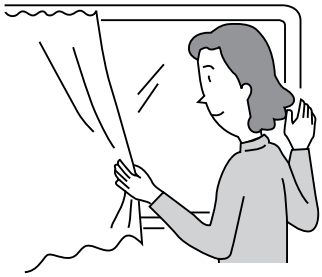
Suitable Room Temperature



⚠ 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.

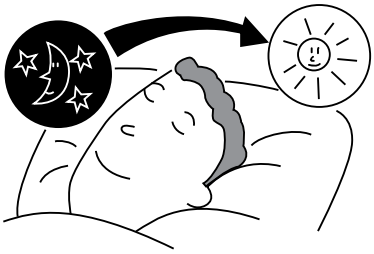
Ventilation

⚠ 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.

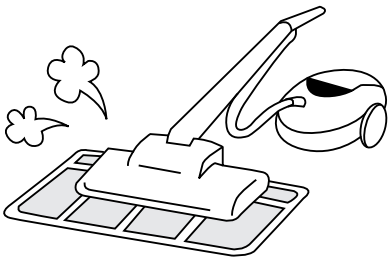
Effective Usage Of Timer

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 Pre-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.

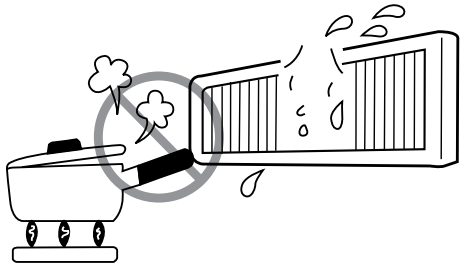


Please Adjust Suitable Temperature For Baby And Children

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.

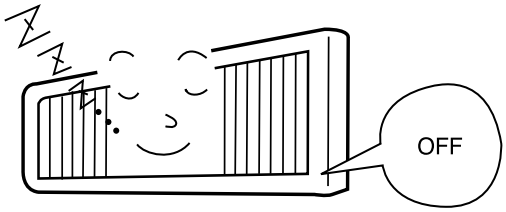
The Air Conditioner And The Heat Source In The Room

⚠ 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.



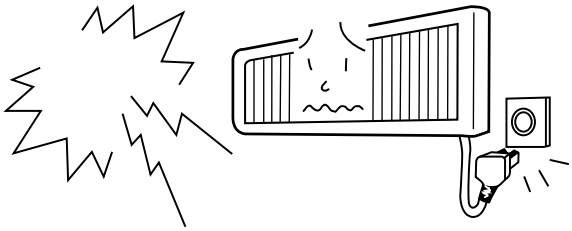
Not Operating For A Long Time

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 3W in the operation control circuit even if it is in "OFF" mode.



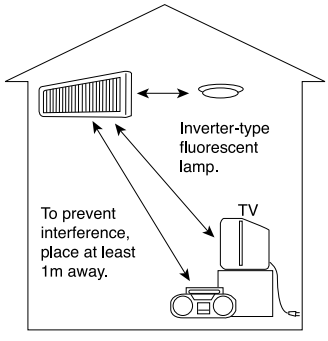
When Lightning Occurs

⚠ 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.



MAINTENANCE

⚠ WARNING

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

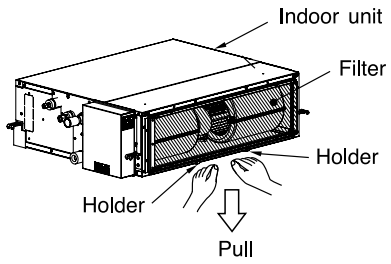
⚠ CAUTION

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

1. PRE-FILTER

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

PROCEDURE



1. Pull the filter toward the center until it detached from the holders. Then take it out from holders (refer to diagram).

2. Remove dust from the filter using a vacuum cleaner. If there is too much dust, wipe the filter with wet cloth or sponge. Allow filter to dry in shade.

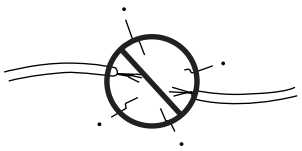
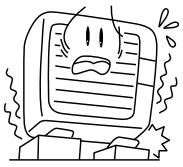
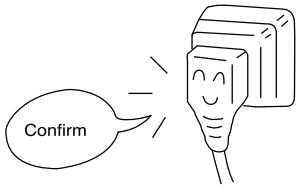
3. Install the filters. Gently insert back the filter into the holders.

⚠ CAUTION

- Do not wash with hot water at more than 40°C. The filter may shrink.
- Do not operate the air conditioner with the filter removed. Dust may enter the air conditioner and cause trouble.

REGULAR INSPECTION

PLEASE CHECK THE FOLLOWING POINTS BY QUALIFIED SERVICE PERSONNEL 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
When it does not operate	● Is the fuse all right? ● Is the voltage extremely high or low? ● Is the circuit breaker “ON”?
When it does not cool well When it does not hot well	● Was the air filter cleaned? ● 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?

Notes

- In quiet or stop 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.

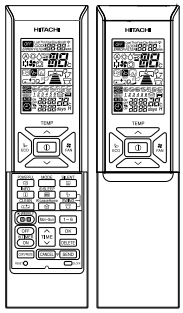
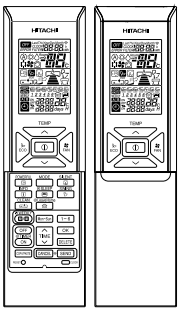
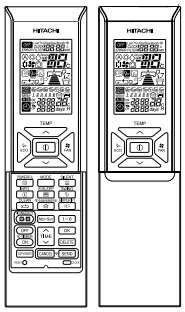
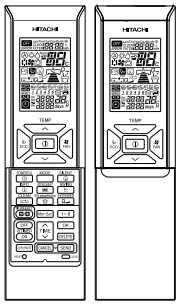
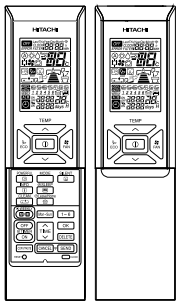
- Power supply shall be connected at the rated voltage, otherwise the unit will be broken or could not reach the specified capacity.

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

MEMO

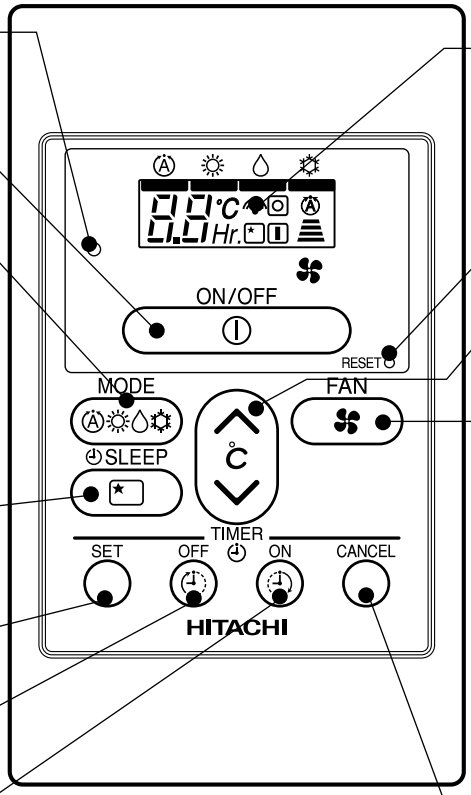
PRECAUTIONS FOR USE

- In case of power failure happen, Wired Remote Controller may not show current operating mode when power comes back. However unit will continue to operate at previous setting mode.
- Some features of Wireless Remote Controller are not available when use Wired Remote Controller as mentioned below:

Standard Wireless Remote Controller	Features not available on Wired Remote Controller	
RAR-6N1 	• Powerful POWERFUL • Information INFO • One touch clean CLEAN • Leave home LeaveHome	• Silent SILENT • Weekly timer WEEKLY A/B • Auto swing (vertical) • Auto swing (horizontal) • ECO
RAR-6N2 	• Powerful POWERFUL • Information INFO • One touch clean CLEAN • Leave home LeaveHome	• Silent SILENT • Weekly timer WEEKLY A/B • Auto swing (vertical) • ECO
RAR-6N3 	• Powerful POWERFUL • Information INFO • One touch clean CLEAN • Leave home LeaveHome	• Silent SILENT • Weekly timer WEEKLY A/B • Auto swing (vertical) • Air purify AIR PURIFY • ECO
RAR-6N4 	• Powerful POWERFUL • Information INFO • One touch clean CLEAN • Leave home LeaveHome	• Silent SILENT • Weekly timer WEEKLY A/B • Auto swing (vertical) • Extended EXTENDED • ECO
RAR-6N5 	• Powerful POWERFUL • Information INFO • One touch clean CLEAN • Leave home LeaveHome	• Silent SILENT • Weekly timer WEEKLY A/B • ECO

NAMES AND FUNCTIONS OF REMOTE CONTROLLER

■ This controls the operation function and timer setting of the room air conditioner.



OPERATION LAMP

START/STOP Button

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

MODE SELECTOR Button

Use this button to select the operating mode. Every time you press it, the mode will change from Ⓐ (AUTO) to ☼ (HEAT) to ○ (DEHUMIDIFY) and to ❄ (COOL) cyclically.

SLEEP Button

Use this button to set the sleep timer. (☞Page 26)

SET Button

Timer setting reservation.

OFF TIMER Button

Select the turn OFF timer.

ON TIMER Button

Select the turn ON timer.

Transmission Sign

The transmission sign blinks when a signal has been send.

RESET SWITCH

ROOM TEMPERATURE Setting Button

Room temperature setting. Value will change quicker when keep pressing.

FAN SPEED Button

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

CANCEL Button

Cancel timer reservation.

Precautions for Use

- Do not put the remote controller in the following places.
  - Under direct sunlight.
  - In the vicinity of a heater.
- Handle the remote controller carefully. Do not drop it on the floor, and protect it from water.
- Once the outdoor unit stops, it will not restart for about 3 minutes (unless you turn the power switch off and on or unplug the power cord and plug it in again).

  This is to protect the device and does not indicate a failure.
- If you press the MODE SELECTOR button during operation, the device may stop for about 3 minutes for protection.

VARIOUS FUNCTIONS

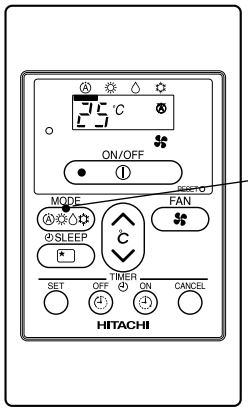
■ Auto Restart Control

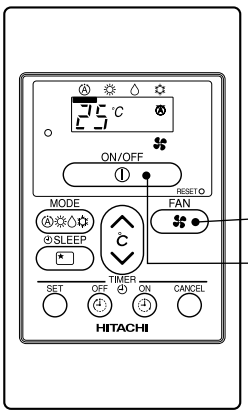
- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode.
  (As the operation is not stopped by remote controller.)
- If you intend not to continue the operation when the power is resumed, switch off the power supply. When you switch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

Note: 1. If you do not require Auto Restart Control, please consult your sales agent.
2. Auto Restart Control is not available when Timer or Sleep Timer mode is set.

AUTOMATIC OPERATION

The device will automatically determine the mode of operation, HEAT or COOL depending on the current room temperature. The selected mode of operation will change when the room temperature varies. However the mode of operation will not change for RAD-50PPA, RAD-60PPA, RAD-70PPA and when indoor unit is connected to multi type outdoor unit.





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

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

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

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

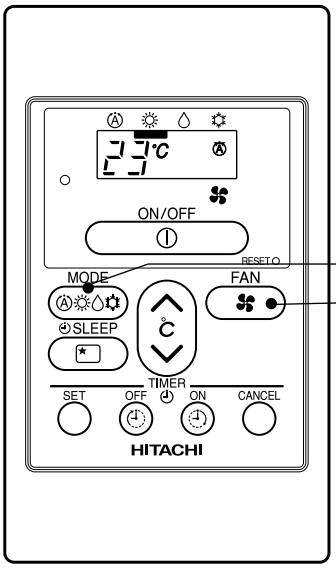
→ Ⓐ (AUTO) → (HIGH) → (MED) → (SILENT) ← (LOW) ←

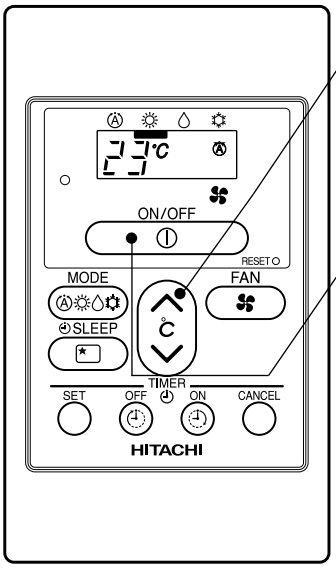
START / STOP Press the ⏻ (START/STOP) button.
Operation starts.
Press the button again to stop operation.

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

HEATING OPERATION

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





1 Press the MODE SELECTOR button so that the display indicates ☼ (HEAT).

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

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

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

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

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

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

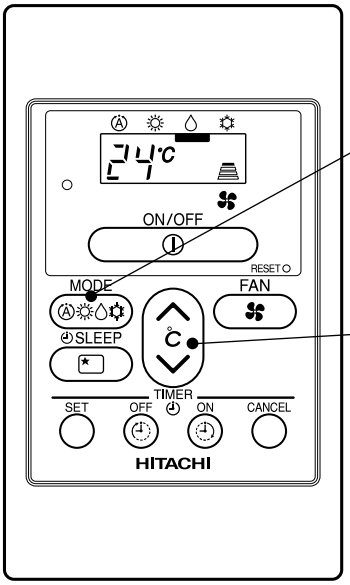
■ During AUTO fan, the fan speed automatically changes as below:
- When the difference between room temperature and setting temperature is large, fan starts to run at HI speed.
- After room temperature reaches the preset temperature, fan speed will be changed to lower speed to obtain optimum room temperature condition for natural healthy heating.

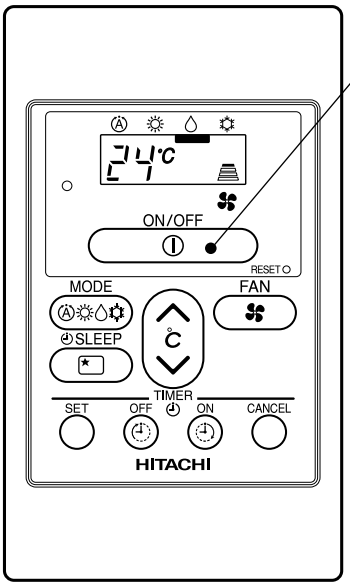
Defrosting

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

DEHUMIDIFYING OPERATION

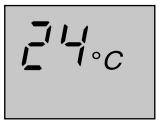
Use the device for dehumidifying when the room temperature is over 16°C.
When it is under 15°C, the dehumidifying function will not work.





1 Press the MODE SELECTOR button so that the display indicates ♢ (DEHUMIDIFY).
Press ✿ (FAN SPEED) button to select SILENT or LOW fan speed.

2 Set the desired room temperature with the ROOM TEMPERATURE setting 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. Press the button again to stop operation.

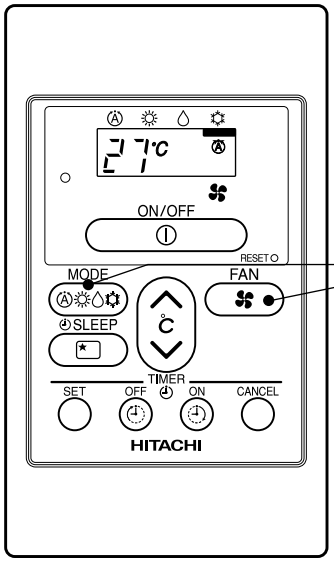
■ As the settings are stored in the memory in the remote controller, you only have to press the ⏻ (START/STOP) button next time.

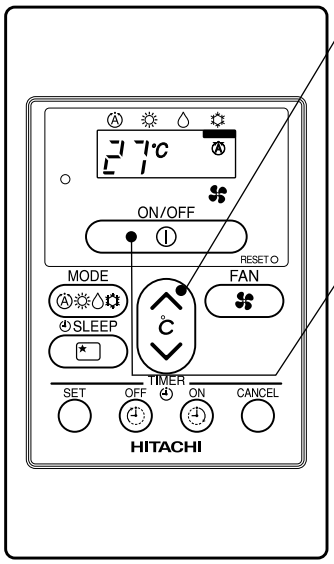
■ Dehumidifying Function

- 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 preset room temperature may not be reached depending on the number of people present in the room or other room conditions.

COOLING OPERATION

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





1 Press the MODE SELECTOR button so that the display indicates ☼ (COOL).

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

Ⓐ (AUTO) → ≡ (HIGH) → ≡ (MED) → ≡ (LOW) → ≡ (SILENT) → Ⓐ (AUTO)

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

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

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

LEAVE HOME(LH) AND CLEAN (ONE TOUCH CLEAN) OPERATIONS

- Leave Home (LH) and CLEAN(One Touch Clean) operations activation buttons are not available on this device. The operations shall be activated by wireless remote controller.
- Please refer to wireless 'Remote Controller Manual' to activate the operations.

NOTE

- If  or  is displayed on the wired remote controller display, the unit will operate Leave Home (LH) operation mode or CLEAN (One Touch Clean) which shall be activated by wireless remote controller.
- Push start/stop ⏻ button to stop Leave Home (LH) or CLEAN (One Touch Clean) operation.

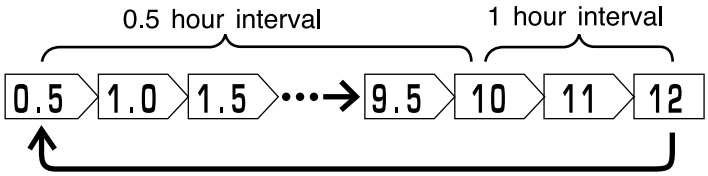
TIMER RESERVATION

■ ON Timer and OFF Timer are available.

OFF Timer Reservation

1 OFF TIMER setting

- Select the OFF TIMER by pressing the (OFF) Button.
- Setting timer will change according to the below sequence when you press the button.



- The value change quicker if you keep pressing the button.

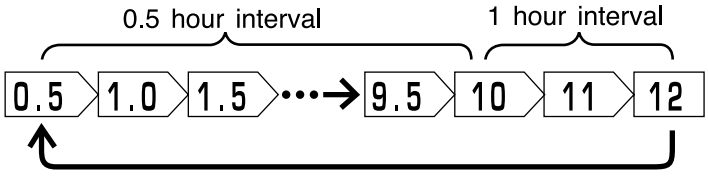
2 Press the ◯ (SET) button

- OFF TIMER is reserved.
- The ⊡ (OFF) Mark starts lighting instead of blinking.

ON Timer Reservation

1 ON TIMER setting

- Select the ON TIMER by pressing the (ON) Button.
- At the beginning of setting, timer is set to 6 hours.
- Setting timer will change according to the below sequence.



- The value change quicker if you keep pressing the button.

2 Press the ◯ (SET) button

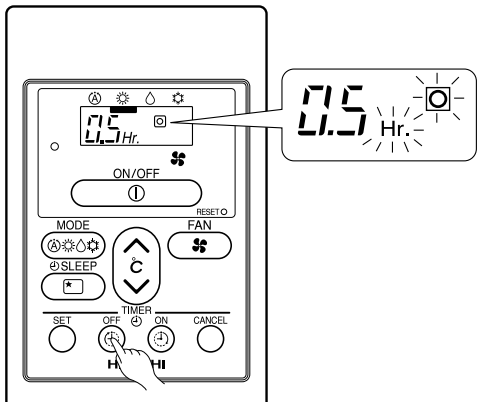
- ON TIMER is reserved.
- The [I] (ON) Mark starts lighting instead of blinking.

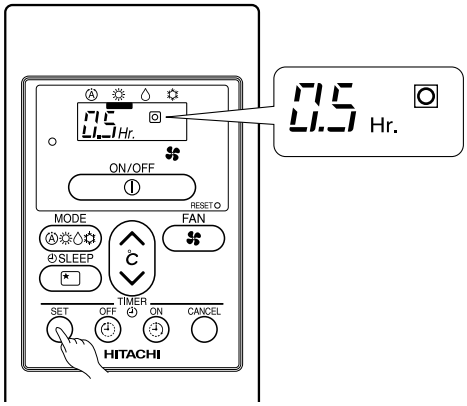
CANCELLATION of Timer Reservation

1 Press the ◯ (CANCEL) button

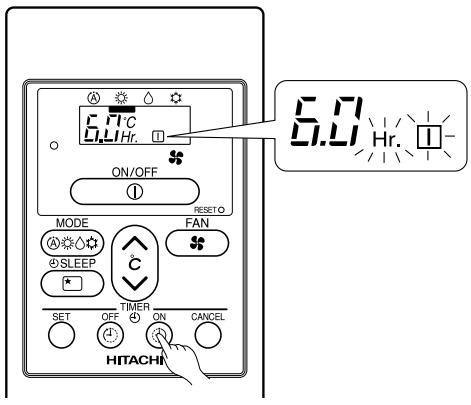
- As the timer settings are stored in remote controller memory, you only have to press the ◯ (SET) button in order to use the same setting next time.

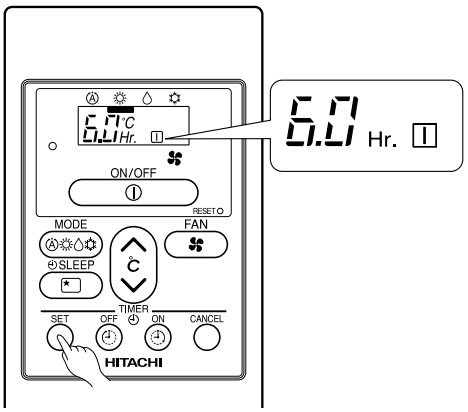
■ Operation stop at setting timer



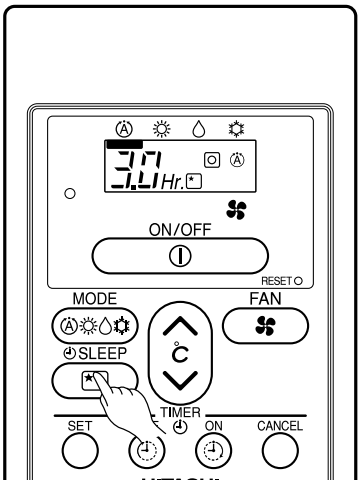


■ Operation will start for setting temperature at setting timer (The starting time may different depend on the room temperature and set temperature).





HOW TO SET THE SLEEP TIMER



Example: Setting 3 hours sleep timer.

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.
Press the SLEEP button.
The timer information will be displayed on the remote controller.

How to Cancel Reservation

Press the ○ (CANCEL) button. The ○ and ★ (RESERVED) sign goes out.

Explanation of the sleep timer

The device will control the FAN SPEED and room temperature automatically so as to be quiet and good for people's health.

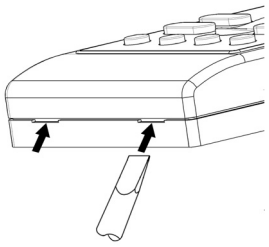
NOTE

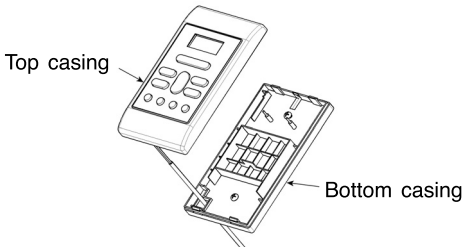
- If you set the sleep timer after the off or on-timer has been set, the sleep timer becomes effective instead of the off or on-timer set earlier.
- You can not set other timer during sleep timer operation.
- After sleep timer time is up and when press sleep button again, the sleep timer will be set as last setting.
- Sleep timer effective only once.

INSTALLATION OF WIRED REMOTE CONTROLLER

(a) Connection to the electrical box;
- Remove the cover of electric box
- Connect the connector of wired remote controller to CN1102 of electrical board
- Assemble back the cover of electrical box

(b) Wiring installation for wired remote controller (2 methods);
- Wired remote controller casing can be opened by pressing the slots with minus screw driver (see below diagram)





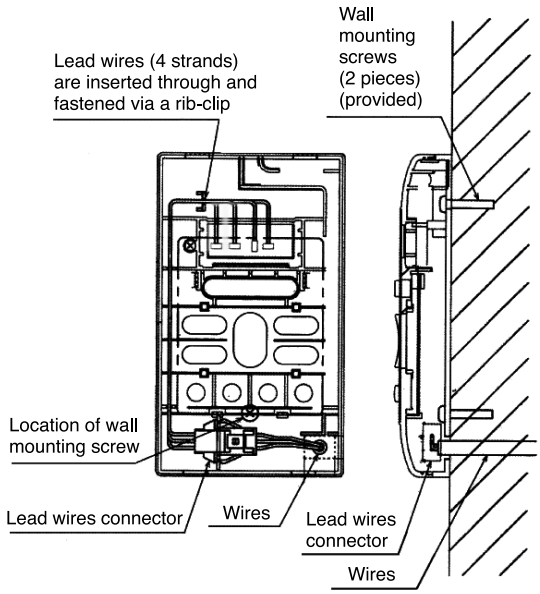
- Decide the fixing location of remote controller so that the length of wire shall be within 5 meters.

⚠ CAUTION	• Do not cut the provided wire. Excess wire should be properly wound and fitted at safe place. • Do not join the wire with additional wire.

Wiring installation illustrations

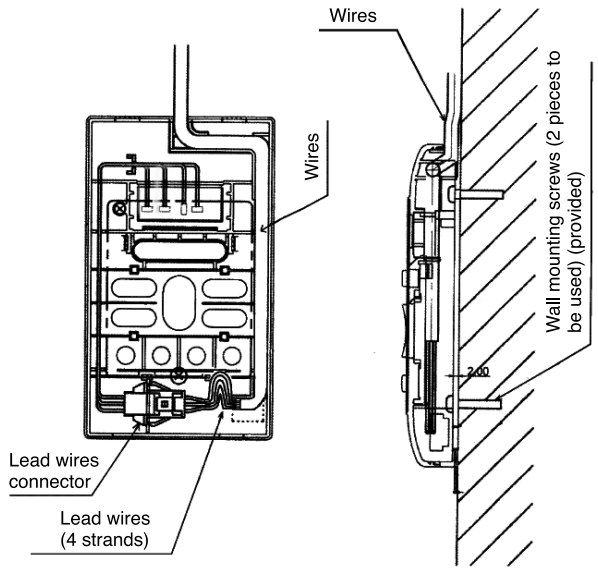
Wall recessed wiring installation (Supplied)

1. When connecting the wires via the wall's recessed slot;
   - Fix the bottom casing to the wall by provided screw.
   - Assemble the top casing to the fixed bottom casing.
     (Refer to the illustration below for detail installation)



Inside top wiring installation (Alternative)

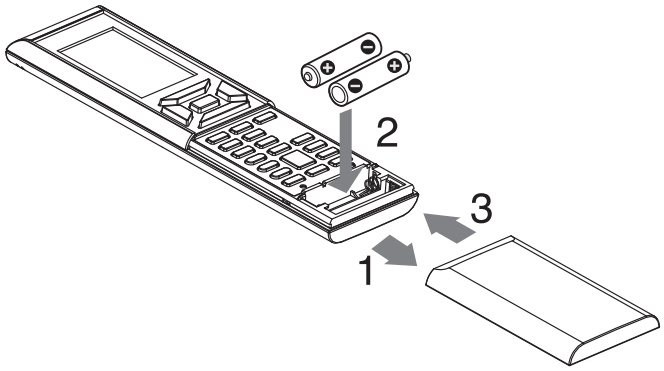
2. When the wires to be connected from the inside top portion of top casing;
   - Break off a perforated aperture located at the top portion of the bottom casing by nipper. Smoothen the aperture by cutter.
     Fix the bottom casing to the wall by provided screw.
   - Connect the wires to the lead wires connector.
   - Mount the wires through the provided slot on top casing.
   - Assemble the top casing to the fixed bottom casing
     (Refer to the illustration below for detail installation)



PREPARATION BEFORE OPERATION

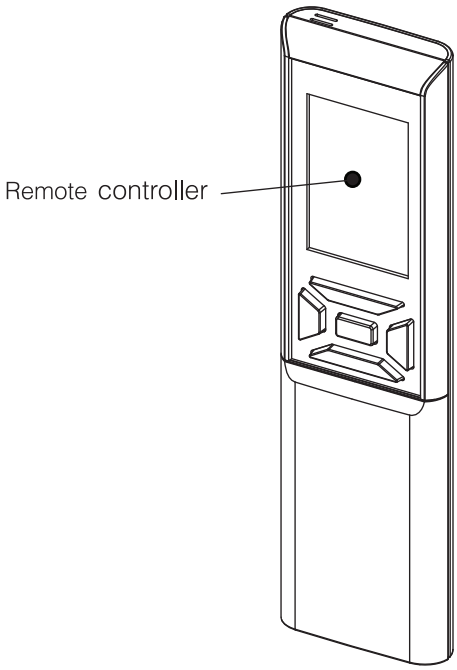
■ To install the batteries

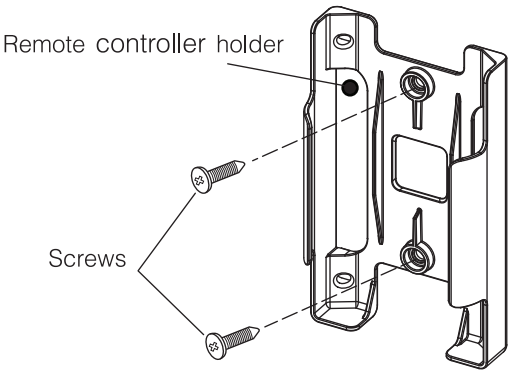
1. Slide the cover to take it off.
2. Install two dry batteries AAA.LR03 (alkaline).
   The direction of the batteries should match the marks in the case.
3. Replace the cover at its original position.



■ To fix the remote controller holder to the wall

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





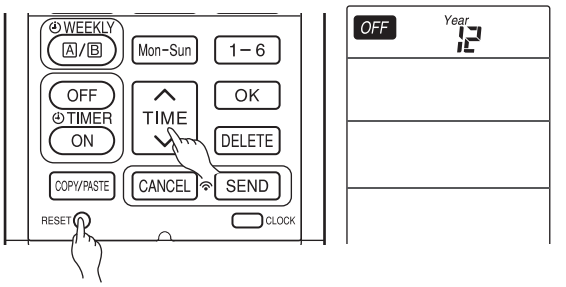
NOTE

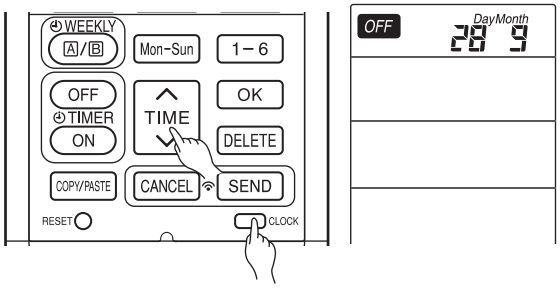
Notes on batteries

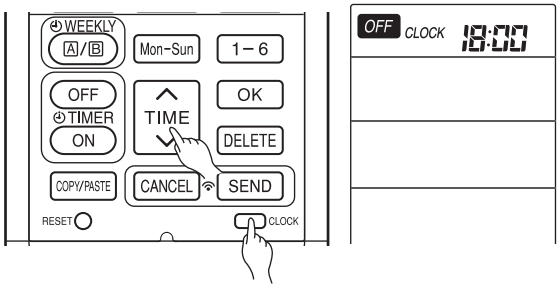
- When replacing the batteries, use batteries of the same type, and replace both old batteries together.
- When the system is not used for a long time, take the batteries out.
- The batteries will last for approximately 1 year. However, if the remote controller display begins to fade and degradation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

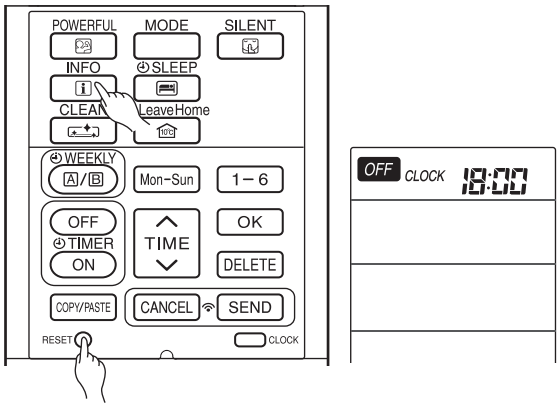
Notes on the remote controller

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









■ To set calendar and clock

1. Press RESET (RESET) button when first time setting. "Year" blinks.
2. Press TIME (TIME) button to set the current year.
3. Press CLOCK (CLOCK) button. "Day" and "Month" blink.
4. Press TIME (TIME) button to set the current day and month.
5. Press CLOCK (CLOCK) button. "CLOCK" blinks.
6. Press TIME (TIME) button to set the clock to the current time.
7. Press CLOCK (CLOCK) button.

   Calendar and clock are set.

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

Calendar and clock need to be set again after changing batteries.

After changing the batteries,
1. Press RESET (RESET) button.
2. Direct remote controller towards indoor unit and press INFO (INFO) button.
3. The calendar and clock from indoor unit will be transmitted.

■ Calendar and clock will not be transmitted from indoor unit when the following occurs:
- When there is a power failure.
- When breaker is OFF by user (unit is not in STANDBY MODE).

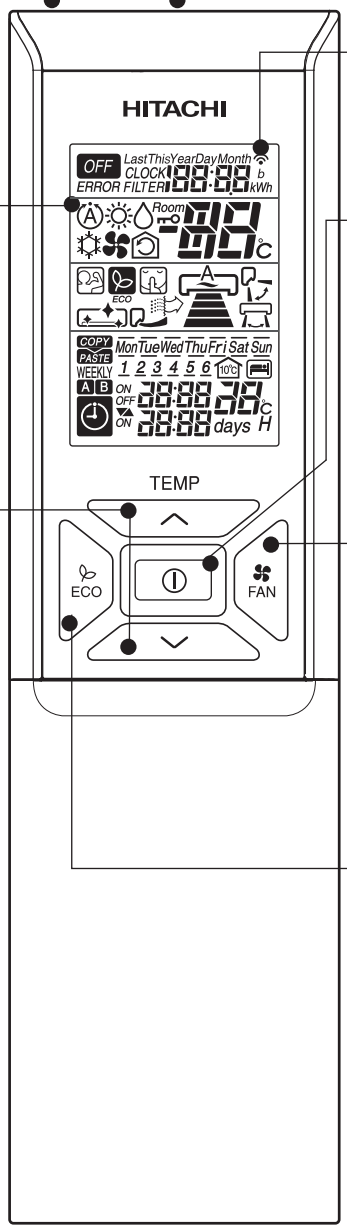
NOTE

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

NAMES AND FUNCTIONS OF REMOTE CONTROLLER

REMOTE CONTROLLER

- This controls the operation of the indoor unit. The range of control is about 7 meters. If indoor lighting is controlled electronically, the range of 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.
- When remote controller is not in use for about 3 minutes during OFF condition, indicated by OFF on the display, the LCD will turn off.
- During clock setting, the LCD will turn off about 10 minutes later if the remote controller is not in use.
- When pressing any button, the LCD will turn on.
- The LCD will not turn off during TIMER setting.



Signal Transmitting/Receiving Window

Point this window towards the indoor unit when controlling it.

Sensor

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

Display

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

ROOM TEMPERATURE setting Buttons

Press these buttons to set the room temperature.

Press the [∧] button to raise the room temperature.

Press the [∨] button to lower the room temperature.

Keep pressing and the value will change more quickly.

Transmission sign

The transmission sign lights up when a signal is sent.

START/STOP button

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

FAN SPEED selector Button

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

ECO Button

Use this button to set the ECO mode. (▶ p. 39)

NAMES AND FUNCTIONS OF REMOTE CONTROLLER

POWERFUL Button
Use this button to set the POWERFUL mode. (▶ p. 37)

INFORMATION Button
(▶ p. 51)

ONE TOUCH CLEAN Button
(▶ p. 41)

LEAVE HOME Button
(▶ p. 40)

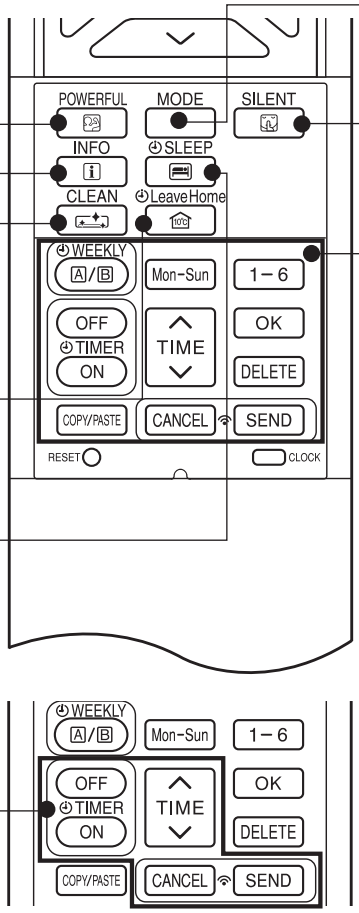
ECO SLEEP TIMER Button
Use this button to set the ECO sleep timer. (▶ p. 43)

ON / OFF TIMER setting Buttons
(▶ p. 42)

MODE selector Button
Use this button to select the operating mode. Every time you press this button, the mode will change from Ⓐ (AUTO) → ☼ (HEAT) → ◯ (DEHUMIDIFY) → ☼ (COOL) and → ✿ (FAN) cyclically.

SILENT Button
Use this button to set the SILENT mode. (▶ p. 38)

WEEKLY TIMER setting Buttons
(▶ p. 45)



MODE	MODE SELECTOR
Ⓐ	AUTO
☼	HEAT
◯	DEHUMIDIFY
☼	COOL
✿	FAN
A	FAN SPEED AUTO SILENT LOW MED HIGH
⏻	START / STOP

ECO	ECO
FAN	FAN
	POWERFUL
	SILENT
	INFO
	SLEEP TIMER
10°C	LEAVE HOME
	CLEAN
Mon-Sun	DAY
1–6	PROGRAM NO.

OFF TIMER ON	ON / OFF TIMER
TIME	TIME
OK	OK
DELETE	DELETE
COPY/PASTE	COPY / PASTE
CANCEL	CANCEL
SEND	SEND
CLOCK	CLOCK

Precautions for Use

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

VARIOUS FUNCTIONS

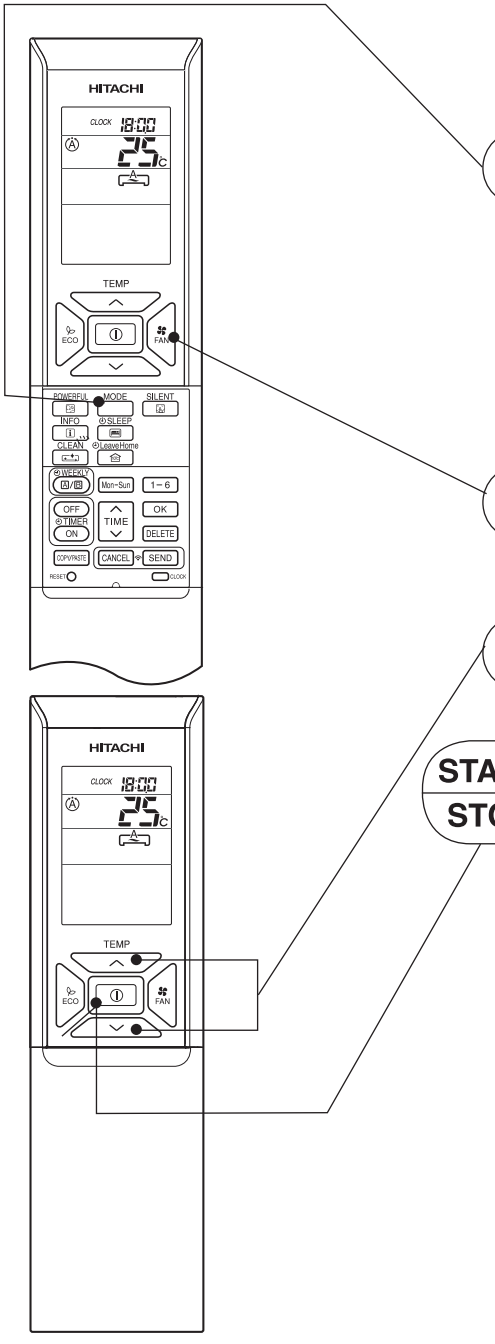
■ Auto Restart Control

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

  Note: 1. If you do not require Auto Restart Control, please consult your sales agent.
  2. Auto Restart Control is not available when Timer or Sleep Timer mode is set.

AUTOMATIC OPERATION

The device will automatically determine the mode of operation, HEAT or COOL depending on the current room temperature. The selected mode of operation will change when the room temperature varies. However, the mode of operation will not change for RAD-50PPA, RAD-60PPA, RAD-70PPA and when indoor unit is connected to multi type outdoor unit.



1

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

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

2

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

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

3

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

START / STOP

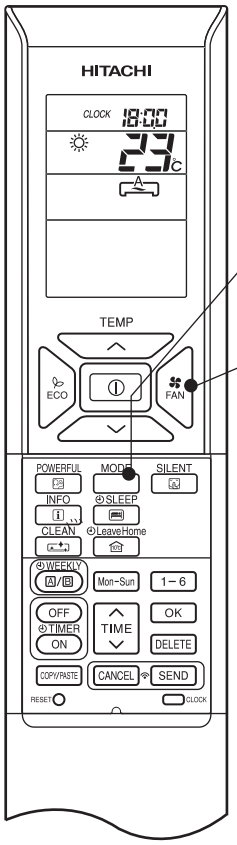
Press the ⏻ (START/STOP) button.
Operation starts with a beep.
Press the button again to stop operation.

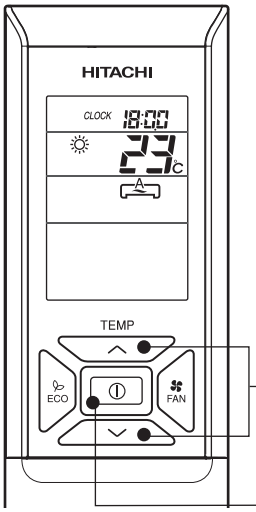
■ As the settings are stored in the memory of the remote controller, you only have to press the ⏻ (START/STOP) button next time.

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

HEATING OPERATION

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





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

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

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

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

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

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

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

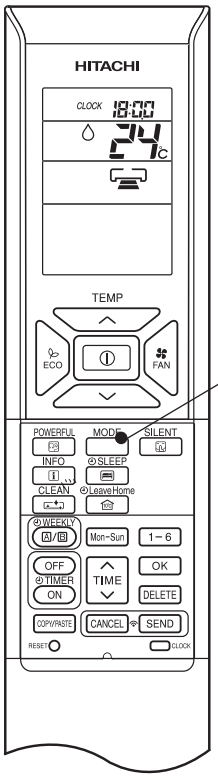
■ During AUTO fan, the fan speed automatically changes as below:
- When the difference between room temperature and setting temperature is large, fan starts to run at HI speed.
- After room temperature reaches the preset temperature, fan speed will be changed to lower speed to obtain optimum room temperature condition for natural healthy heating.

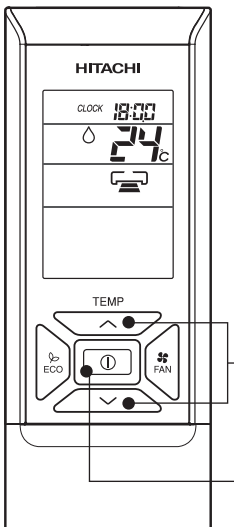
Defrosting

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

DEHUMIDIFYING OPERATION

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





1 Press the MODE selector button so that the display indicates ◇ (DEHUMIDIFY).
The fan speed is set at LOW.
Press FAN (FAN SPEED) button to select SILENT or LOW fan speed.

2 Set the desired room temperature with the ROOM TEMPERATURE setting buttons (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.

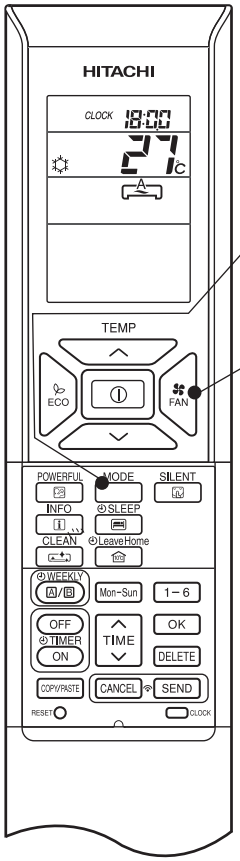
■ As the settings are stored in the memory of the remote controller, you only have to press the ⏻ (START/STOP) button next time.

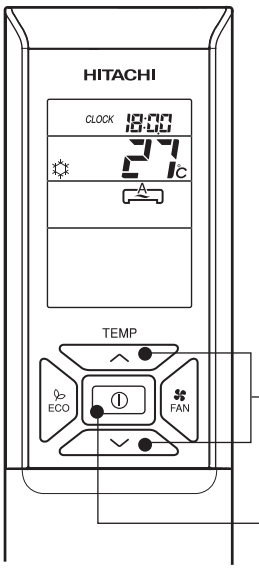
■ Dehumidifying Function

- 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 preset room temperature may not be reached depending on the number of people present in the room or other room conditions.

COOLING OPERATION

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





1 Press the MODE selector button so that the display indicates ☼ (COOL).

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

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

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

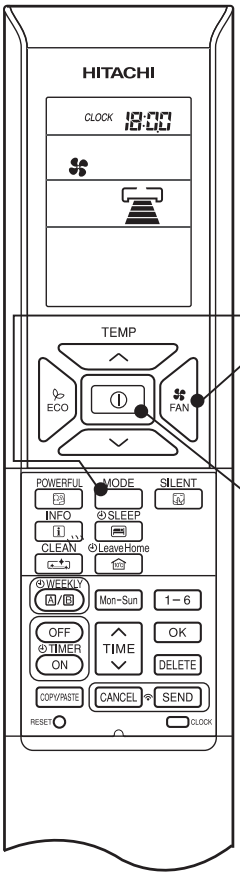
The temperature setting and the actual room temperature may vary depending on conditions.

START / STOP 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 user set the temperature below the current room temperature.

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

FAN OPERATION

User can use the device simply as an air circulator.



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

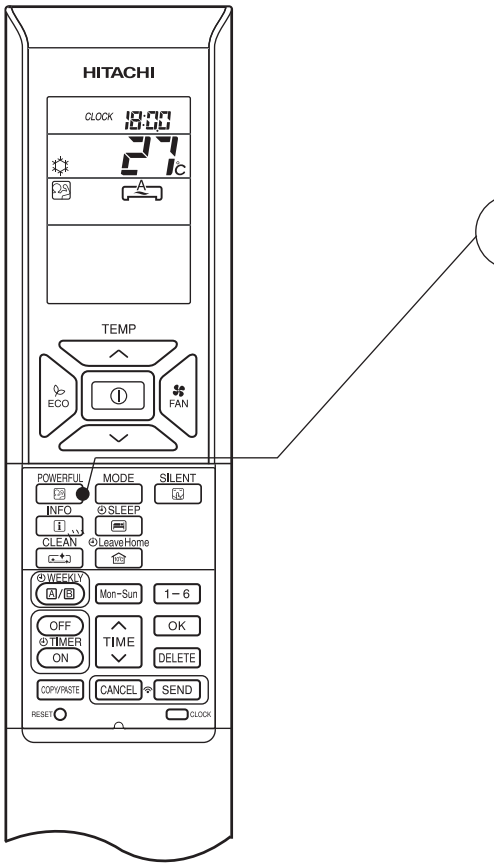
2 Set the desired FAN SPEED with the FAN (FAN SPEED) button (the display indicates the setting).

→ (HIGH) → (MED) → (LOW) → (SILENT) →

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

POWERFUL OPERATION

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



■ To start POWERFUL operation

1

- Press POWERFUL (POWERFUL) button during operation.

  " " is displayed on the LCD.

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

■ To cancel POWERFUL operation

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

  POWERFUL operation stops.

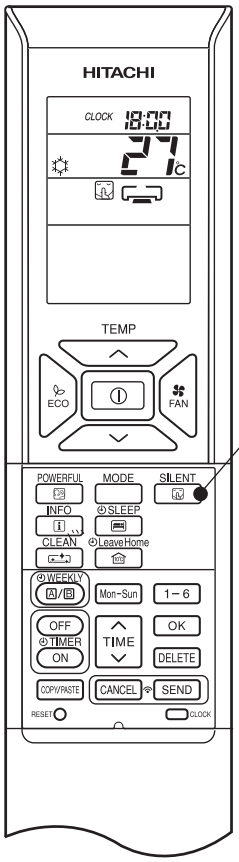
  " " disappears from the LCD.

NOTE

- When SLEEP mode, ECO mode, SILENT mode or LEAVE HOME mode is selected, POWERFUL operation is cancelled.
- During POWERFUL operation, capacity of the air conditioner will not increase
  – if the air conditioner is already running at maximum capacity.
  – just before defrost operation (when the air conditioner is running in HEATING operation).
- After auto restart, POWERFUL operation is cancelled and previous operation shall start.
- For multi model connections, RAD-50PPA, RAD-60PPA and RAD-70PPA, POWERFUL operation may not function depending on operation conditions.

SILENT OPERATION

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



■ To start SILENT operation

1

- Press SILENT (SILENT) button during operation.

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

■ To cancel SILENT operation

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

  Fan speed will return to previous fan speed before SILENT operation starts.

  SILENT operation stops.

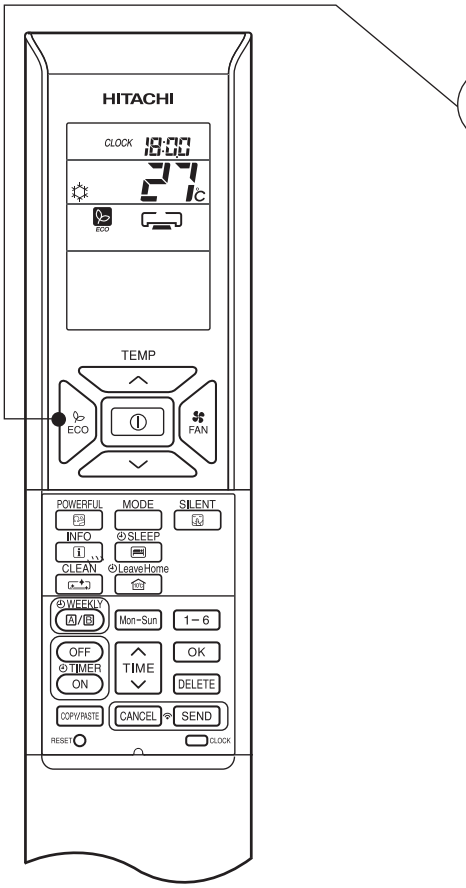
  " " disappears from the LCD.

NOTE

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

ECO OPERATION

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



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

■ To start ECO operation

● Press ECO (ECO) button during operation.

" ECO " is displayed on the LCD.

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

■ To cancel ECO operation

● Press ⏻ (START/STOP) button. Or

● Press ECO (ECO) button again.

" ECO " disappears from the LCD.

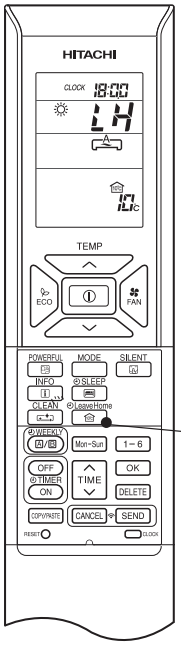
NOTE

- ECO function will not be effective when power consumption is low.
- By pressing (POWERFUL) button, ECO operation is cancelled.
- After auto restart, ECO operation is cancelled and previous operation mode shall start.
- For multi model connections, RAD-50PPA, RAD-60PPA and RAD-70PPA, energy saving operation shall start only by changing set temperature higher or lower automatically. However, effectiveness of ECO depends on operation conditions.

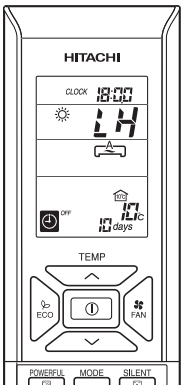
LEAVE HOME(LH) OPERATION

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

Continuous operation



Day timer operation



■ To start LEAVE HOME operation

Option 1. Continuous operation.

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

Option 2. Day timer operation.

- Press LeaveHome (LEAVE HOME) button during stop or operation.
  Room temperature is set at 10°C and heating operation starts.
  " ☼ ", " LH ", " ≋ ", " 10°C " is displayed on the LCD.
- Set number of operation days (1 to 99 days), if needed.
  Press TIME (TIME) button to select number of days.
  Number of days blink.
  * Press " ∧ (UP)" to set number of days from 1 day, 2 days, 3 days ..... 98 days, 99 days, 1 day and so on.
  * Press " ∨ (DOWN)" to set number of days from 99 days, 98 days, 97 days .... 3 days, 2 days, 1 day, 99 days and so on.
  * Number of day is counted when clock indicates 0:00.
- Press SEND (SEND) button to confirm number of operation days. Display for number of operation days will stop blinking.
- Press CANCEL (CANCEL) button to reset number of operation days or to have continuous operation.

■ To cancel LEAVE HOME operation

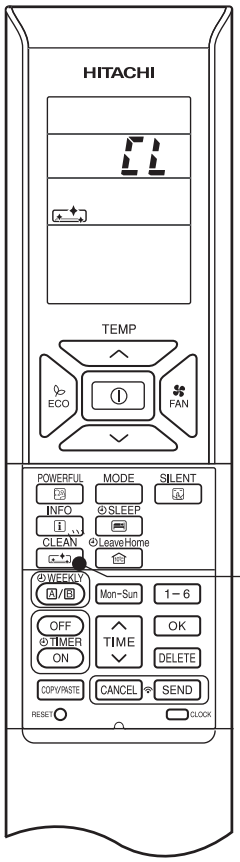
- Press ⏻ (START/STOP) button. Or
- Press LeaveHome (LEAVE HOME) button again.
  Return to previous operation mode. Or
- Change to other operation mode by pressing MODE (MODE) button.

NOTE

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

CLEAN (ONE TOUCH CLEAN) OPERATION

Drying indoor heat exchanger after cooling operation to prevent mildew.



1

■ To start CLEAN operation

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

  "CL", " " is displayed on the LCD.

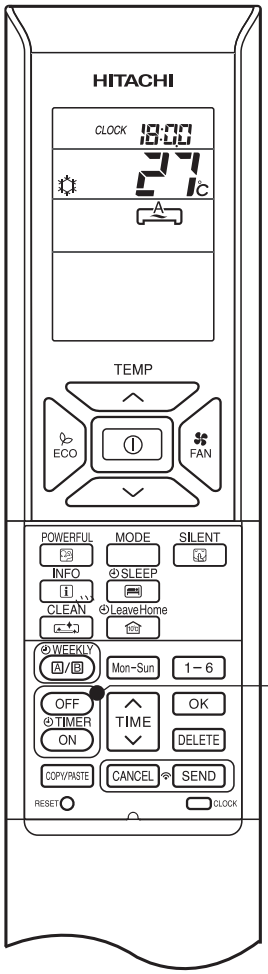
■ To cancel CLEAN operation

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

NOTE

- When CLEAN operation finish, unit will switch OFF automatically.
- If Weekly Timer or Once Timer is set, there is a need to cancel those timer before operating CLEAN function.
- For multi connections, RAD-50PPA, RAD-60PPA and RAD-70PPA, when pressing CLEAN (CLEAN) button, operation is limited to FAN operation.
- For multi connections, when one room operates CLEAN operation first, other rooms can operate COOLING, DEHUMIDIFYING or FAN operation. However, when other rooms need to operate HEATING operation, air conditioner will be in STANDBY mode. After CLEAN operation finish, HEATING operation will start.

ONCE TIMER (ON/OFF TIMER) OPERATION



1

OFF TIMER

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

1. Press OFF TIMER (OFF-TIMER) button. OFF and 0:00 blink on the display.
2. Set the "turn-off time" with TIME (TIME) button.
3. After setting, direct the remote controller towards the indoor and press SEND (SEND) button.

   OFF and "set time" lights up instead of blinking.

   A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

ON TIMER

The device will turn on at a designated time.

1. Press TIMER ON (ON-TIMER) button. ON and 0:00 blink on the display.
2. Set the "turn-on time" with TIME (TIME) button.
3. After setting, direct the remote controller towards the indoor and press SEND (SEND) button.

   ON and "set time" light up instead of blinking.

   A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

ON/OFF TIMER

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

1. Press OFF TIMER (OFF-TIMER) button so that OFF and 0:00 blink on the display.
2. Set the "turn-off" time with TIME (TIME) button. After setting, direct the remote controller towards the indoor and press SEND (SEND) button.
3. Press TIMER ON (ON-TIMER) button so that OFF and set "turn-off" time light up.

   The ON and 0:00 blink.
4. Set the "turn-on" time with TIME (TIME) button.
5. After setting, direct the remote controller towards the indoor and press SEND (SEND) button

   ON and set "turn-on" time light up instead of blinking.

   A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

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

■ To cancel Reservation

- Point the signal window of the remote controller towards the indoor unit and press CANCEL (CANCEL) button.

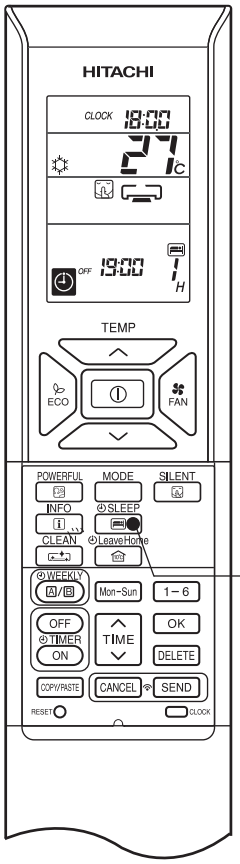
  and "ON or OFF set time" goes out with a beep and the (TIMER) lamp on the indoor unit turns off.

NOTE

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

SLEEP ECO SLEEP TIMER OPERATION

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



■ To start ECO SLEEP TIMER operation

Press SLEEP (SLEEP) button during operation.

- " ", " ", " ", "OFF", off time, " " and number of hour are displayed on the remote controller display.
- During ECO SLEEP TIMER operation, fan speed will be ultra slow.
- A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

Pressing SLEEP (SLEEP) button repeatedly, the number of hours will change as below:

1 H → 2 H → 3 H → 7 H → SLEEP TIMER off

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

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

■ To cancel ECO SLEEP TIMER operation

Press (START/STOP) button.

- Room air conditioner will switch off.

Press SLEEP (SLEEP) button again until " ", " ", " ", off time, " " and number of hour disappear from the remote controller display.

Press CANCEL (CANCEL) button.

- A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit turns off.
- SLEEP TIMER operation is cancelled.

SLEEP ECO SLEEP TIMER OPERATION

■ To set ECO SLEEP TIMER and ON TIMER

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

1. Set the ON TIMER.
2. Press SLEEP (SLEEP) button and set ECO SLEEP TIMER.

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

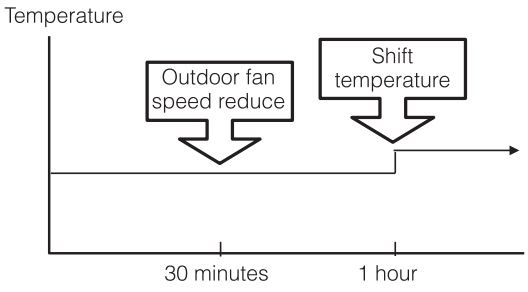
■ To cancel ECO SLEEP TIMER and ON TIMER operation

Direct the remote controller towards the indoor unit and press CANCEL (CANCEL) button.

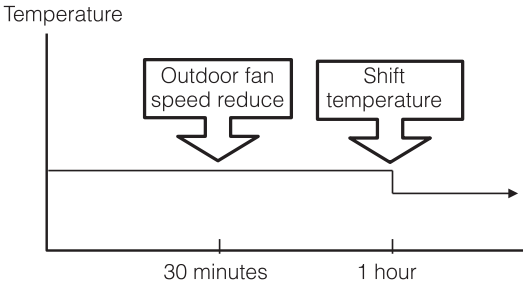
- " ", " ", " ", "OFF", off time, " ", number of hour, "ON" and ON TIMER set time disappear from the remote controller display.
- A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit turns off.
- ECO SLEEP TIMER and ON TIMER reservations are cancelled.

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

Cooling operation [diagram representation for illustrative purpose only]



Heating operation [diagram representation for illustrative purpose only]



NOTE

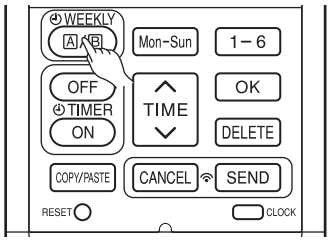
- If ECO SLEEP TIMER is set when OFF TIMER or ON/OFF TIMER has been set earlier, the ECO SLEEP TIMER becomes effective instead of the OFF TIMER or ON/OFF TIMER.

WEEKLY TIMER OPERATION

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

Step 1 : Set the reservation schedule to the remote controller. Send the registered reservation to indoor unit and then operate.
Step 2 : Select Mode A or Mode B and activate or deactivate WEEKLY TIMER .
Step 3 : Copy and cancel the reservation schedule.

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



①
②

■ How to set a WEEKLY TIMER.

1. Select Mode A or Mode B

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

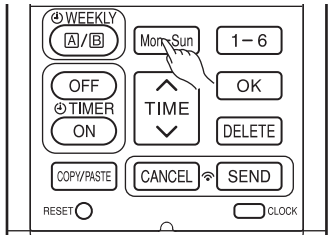
Press (WEEKLY) button again, B and ◴ blink on the display. (Mode B is selected).

- If no reservation has been made, ON/OFF, --:-- , --.-°C appear.
- If reservation has been made, ON/OFF, --:-- , --.-°C will not appear.

2. Set a program

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

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



③

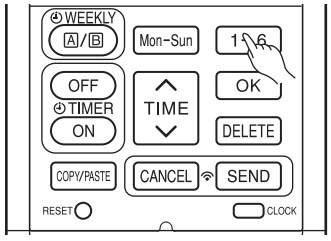
3. Select the desired day of the week

Press [Mon-Sun] (DAY) button.

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

Select [Full days] for daily reservation.
Select [weekday] for Monday to Friday reservation.
Select [weekend] for Saturday and Sunday reservation.

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



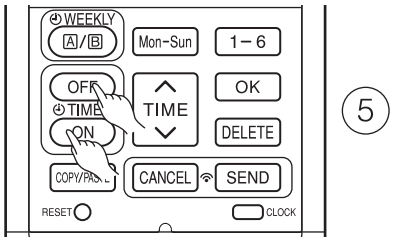
④

4. Press [1–6] button to select a program number.

The number changes from 1 ⟶ 2 ⟶ 3 ⟶ 4 ⟶ 5 ⟶ 6 ⟶ 1 ⟶ 2 .....

- If program number has been set, follow above in order to make changes.

WEEKLY TIMER OPERATION



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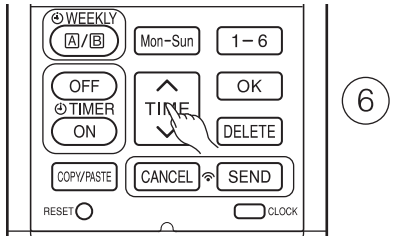

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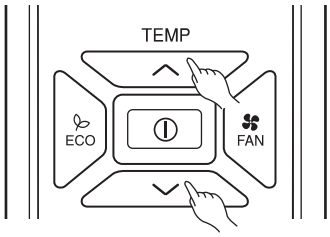

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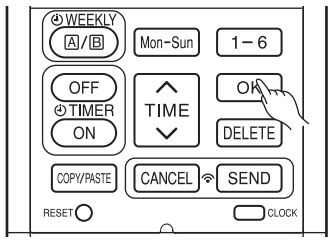

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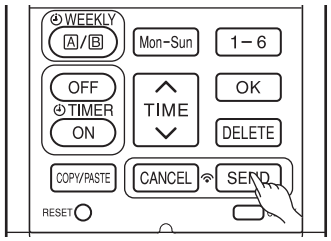


9

5. Press [OFF TIMER ON] (ON-OFF TIMER) button to select ON TIMER or OFF TIMER reservation.
6. Press [TIME] (TIME) button to set time reservation.
7. Press (TEMP ∧ or ∨) button to set temperature reservation.
8. Press [OK] (OK) button. The reservations are set. Day, program number, ON reservation, setting temperature will light up. 🕘 will be continuously blinks. If reservation is not complete, settings will not be stored in memory.

To continue with the reservation, press [Mon-Sun] [1–6] [TIME] [OFF TIMER ON] buttons. Follow step 3 to 8 for reservation.

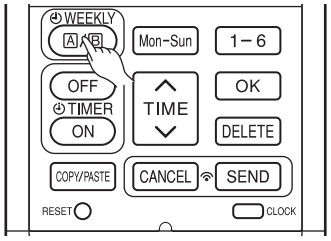
9. After all the reservations have been set, press [SEND] (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.
   After beep sound emitted from indoor unit, TIMER lamp will light up.
   Please ensure that the TIMER lamp lights up.
   This indicates that the reservation has been stored in the indoor unit and Timer function has been completed.
   The reservation contents will appear on the remote controller display.

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

NOTE

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

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



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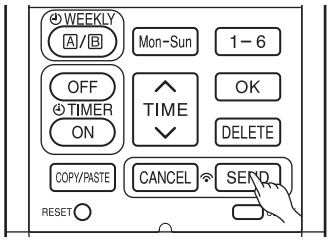
2

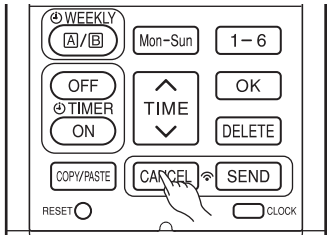
■ How to select Mode A or Mode B of WEEKLY TIMER setting.

1. Press WEEKLY A/B (WEEKLY) button. **A** and ◴ blink on the display. (Normally Mode A will blink first).
2. Press WEEKLY A/B (WEEKLY) button again. **B** and ◴ blink on the display.
3. Select Mode A or Mode B. Press SEND (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.



3

After beep sound emitted from indoor unit, TIMER lamp will light up.
Please ensure that the TIMER lamp lights up.
This indicates that Mode A or Mode B selection and active WEEKLY TIMER have been confirmed.



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■ Setting non-active WEEKLY TIMER .

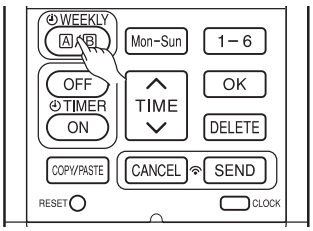
1. Direct the remote controller towards the indoor unit and press CANCEL (CANCEL) button.
   Beep sound will be emitted from indoor unit and TIMER lamp will be OFF. Reservation indication on remote display will also disappear.
   This indicates that non-active WEEKLY TIMER has been confirmed.

   - To activate back the setting of WEEKLY TIMER , repeat the steps for "How to select Mode A or Mode B of WEEKLY TIMER setting".

NOTE

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

Step 3: Copy and cancel the reservation schedule.



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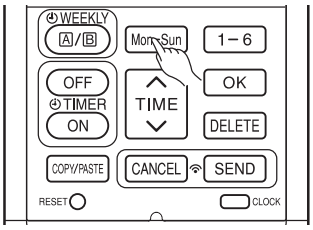

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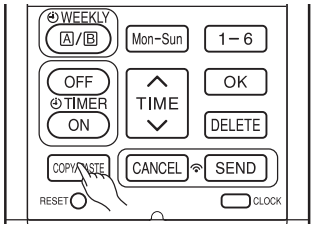

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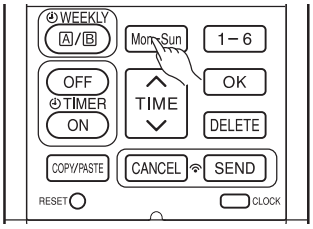
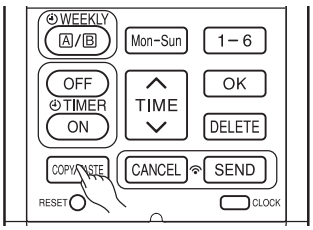
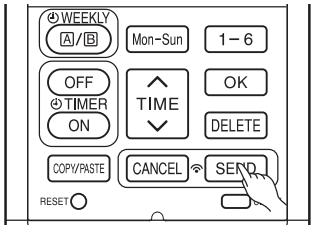


5



6



8

■ How to copy and paste.

Editing the reservation schedule is easy by copying data from one day to another day.

1. Press WEEKLY A/B (WEEKLY) button to select Mode A or Mode B.
2. Press WEEKLY A/B (WEEKLY) button for about 3 seconds to start editing the reservation schedule.
3. Press Mon-Sun (DAY) button to select a day of the week to copy.
4. Press COPY/PASTE (COPY/PASTE) button. Then "PASTE" blinks on the display.
   * Press CANCEL (CANCEL) button to cancel the COPY mode. Normal setting mode is activated.
5. Press Mon-Sun (DAY) button to select a day of the week to paste.
6. Press COPY/PASTE (COPY/PASTE) button one more time to paste. ◴ only blinks on the display.
7. To continue copying to other days, press Mon-Sun or 1–6 or TIME or OFF TIMER ON .

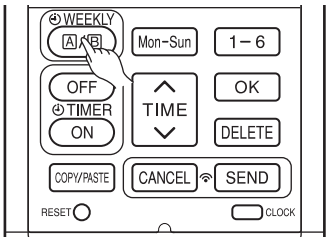
   Then start from step 3.
8. After copy and paste completed, press SEND (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.
   After beep sound emitted from indoor unit, TIMER lamp will light up.
   Please ensure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

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

NOTE

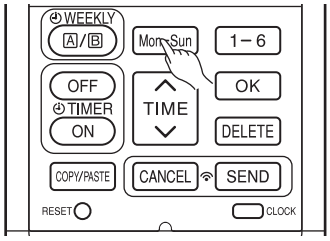
- If there is no reservation data, copying data from one day to another day cannot be done.

Step 3: Copy and cancel the reservation schedule.

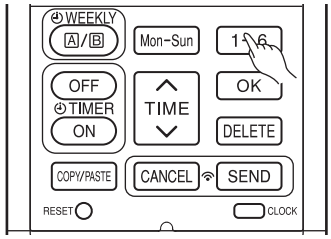


1

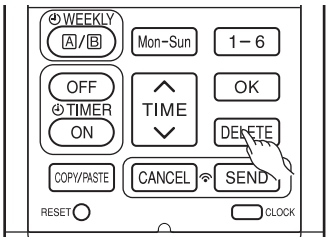
2



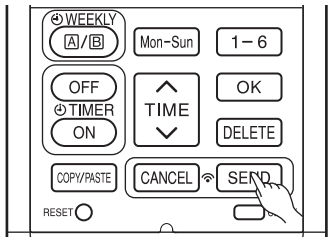
3



4



5



6

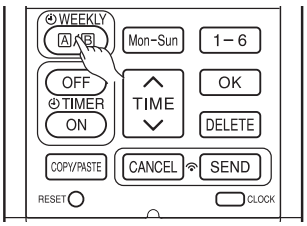
■ How to delete WEEKLY TIMER data.

[Delete one program number reservation]

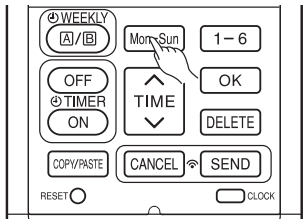
1. Press WEEKLY A/B (WEEKLY) button to select Mode A or Mode B.
2. Press WEEKLY A/B (WEEKLY) button for 3 seconds to start editing the reservation schedule.
3. Press Mon-Sun (DAY) button to select a day of the week to edit.
4. Press 1–6 to select program number. Selected program number will blink.
5. Press DELETE (DELETE) button. Reservation of selected program number is deleted.
6. After deleting, press SEND (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.
   After beep sound emitted from indoor unit, TIMER lamp will light up.
   Please ensure that the TIMER lamp lights up.

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

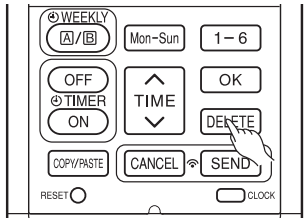
Step 3: Copy and cancel the reservation schedule.



1

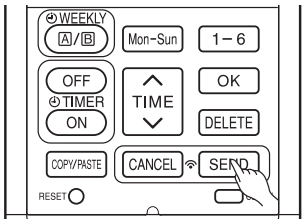


2



3

4

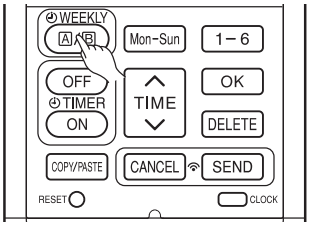


5

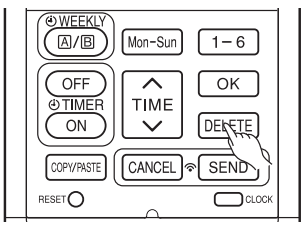
[Delete one day reservation]

1. Press WEEKLY A/B (WEEKLY) button to select Mode A or Mode B.
2. Press WEEKLY A/B (WEEKLY) button for 3 seconds to start editing the reservation schedule.
3. Press Mon-Sun (DAY) button to select a day of the week to edit.
4. Press DELETE (DELETE) button for about 10 seconds. Reservations for all program numbers will be deleted.
   - If press for a short time, reservation for one program number will be deleted.
5. After deleting, press SEND (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.
   After beep sound emitted from indoor unit, TIMER lamp will light up.
   Please ensure that the TIMER lamp lights up.

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



1



2

[Delete Mode A or Mode B]

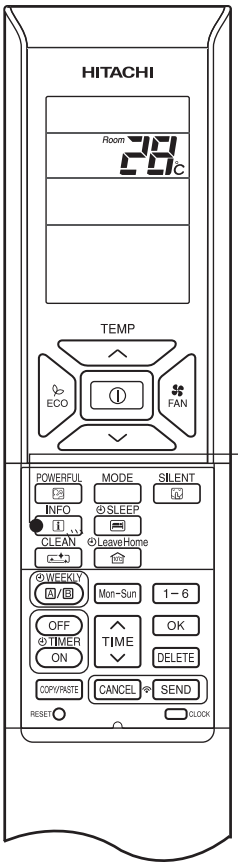
1. Press WEEKLY A/B (WEEKLY) button to select Mode A or Mode B.
2. Direct the remote controller towards the indoor unit and press DELETE (DELETE) button for about 10 seconds while Mode A or Mode B display blinks.
   After beep sound emitted from indoor unit, reservations for Mode A or Mode B will disappear.

NOTE

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

INFO FUNCTION

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



■ To check temperature around remote controller

1 Press INFO (INFO) button.

Temperature will be displayed for 10 seconds.

■ To check monthly power consumption

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

While temperature around remote controller is displayed, press INFO (INFO) button repeatedly. The display will show as below:

this month power consumption amount for heating → last month power consumption amount for heating → this month power consumption amount for cooling → last month power consumption amount for cooling → temperature around remote controller → this month power consumption amount for heating ..... cyclically.

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

■ Current calendar and clock can be retrieved from indoor unit

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

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

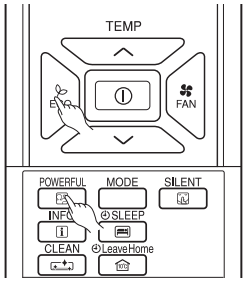
- If there is no power supply to indoor unit or calendar and clock have not been set, INFO function cannot be used for sending or receiving information.

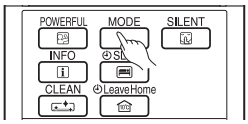
NOTE

- In case failure occurs to the air conditioner, by pressing INFO (INFO) button, an error code will be displayed.
  Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press INFO (INFO) button. Wait for 2 seconds for signal transmission.
  An error code will be displayed.
  Call service center and inform the error code.
- Information of “Monthly power consumption” are not available for model RAM-130NP6A.
- Info Function to check monthly power consumption.
  During installation, in case of power failure or breaker ON / OFF, ensure to set the clock and calendar for each indoor unit (unit in standby mode or auto restart), for single or multi connection, by pressing ⏻ (START / STOP) button.
  Failure to do the above, monthly power consumption amount will not be displayed on the remote controller.

OPERATION MODE LOCK

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





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

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

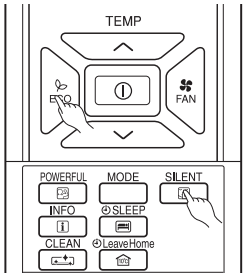
" ☼ ", " ✿ " and " 🔑 " will be displayed for about 10 seconds. Later, " ☼ " and " 🔑 " will remain.

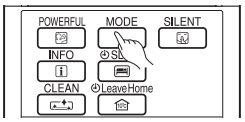
This indicates that HEATING mode operation is locked.

When pressing MODE (MODE) button, " ☼ " or " ✿ " will be displayed.

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

Press ECO (ECO) and POWERFUL (POWERFUL) buttons simultaneously for about 5 seconds when the remote controller is OFF.
All operation mode symbols will appear on the display for about 10 seconds. After that, operation mode symbol before cancellation will be displayed.
This indicates that HEATING mode operation is unlocked.





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

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

" ☼ ", " ◇ ", " ✿ " and " 🔑 " will be displayed for about 10 seconds. Later, " ☼ " and " 🔑 " will remain.

This indicates that COOLING and DEHUMIDIFYING mode operation is locked.

When pressing MODE (MODE) button, " ☼ ", " ✿ " or " ◇ " will be displayed.

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

Press ECO (ECO) and SILENT (SILENT) buttons simultaneously for about 5 seconds when the remote controller is OFF.
All operation mode symbols will appear on the display for about 10 seconds. After that, operation mode symbol before cancellation will be displayed.
This indicates that COOLING and DEHUMIDIFYING modes operation is unlocked.

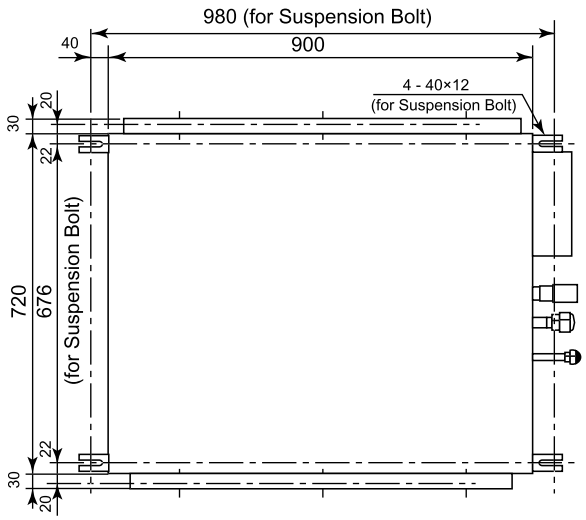
NOTE

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

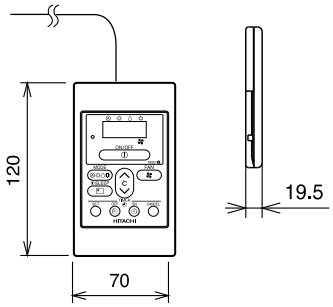
CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAD-50RPE
RAD-60RPE

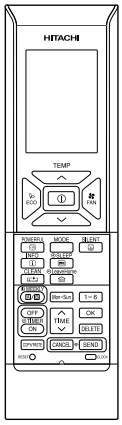
Unit: mm

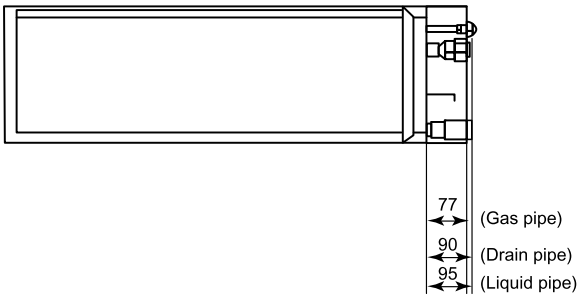


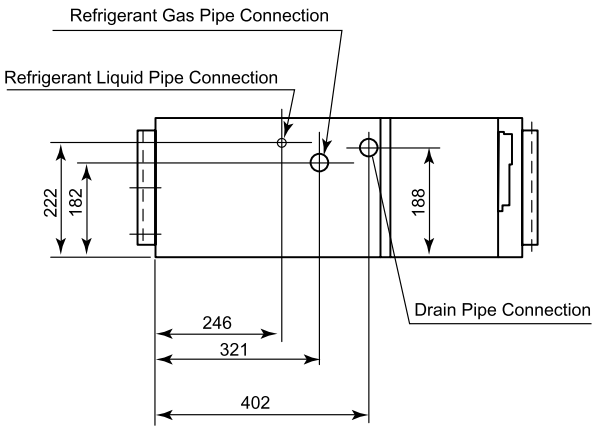
OPTIONAL
Wired Remote Controller
(SPX-RCDA)



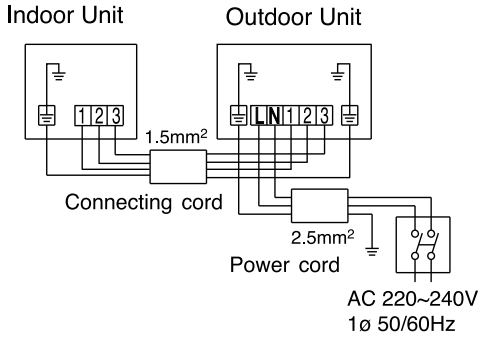
OPTIONAL
Wireless Remote Controller
(SPX-RCKA1)







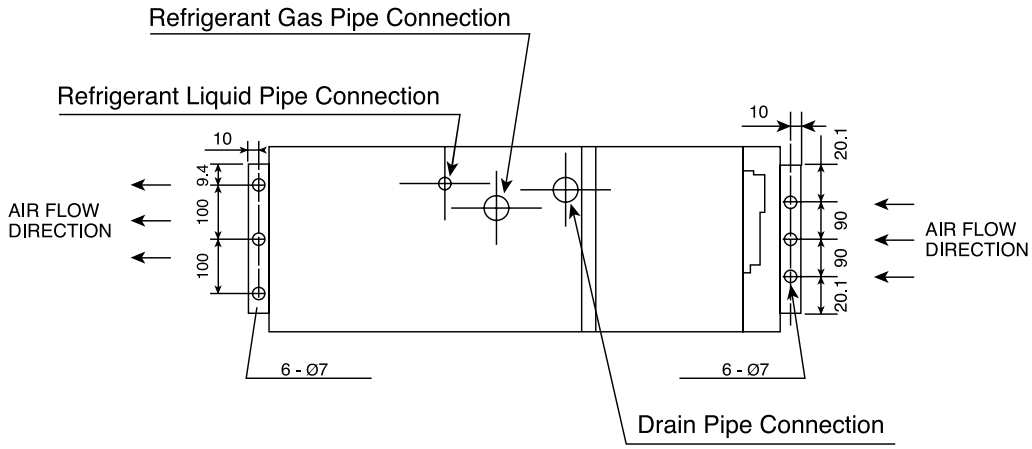
Note:
1. Servicing space of 100mm or more is required on the left and right sides of the indoor unit and also 50mm or more space is required above the unit
2. Insulated pipes should be used for both the narrow and wide dia. pipes.
3. Piping length is within 30m
4. Height different of the piping between the indoor unit and the outdoor unit should be within 10m.
5. Connecting cable 2.5mm dia. x 3 (LN Line), 1.5mm dia. x 4 is used for the connection.



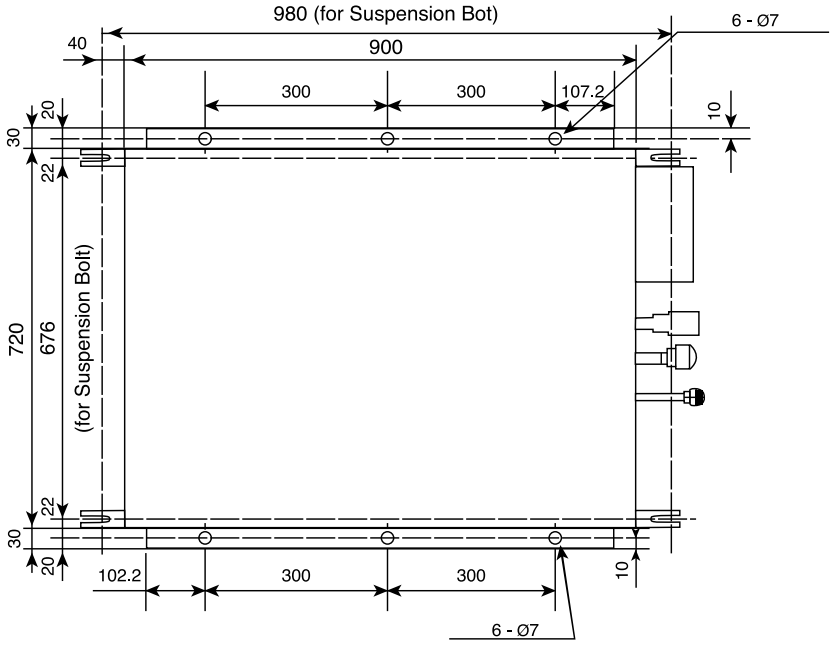
MOUNTING HOLE DIMENSION

MODEL RAD-50RPE
RAD-60RPE

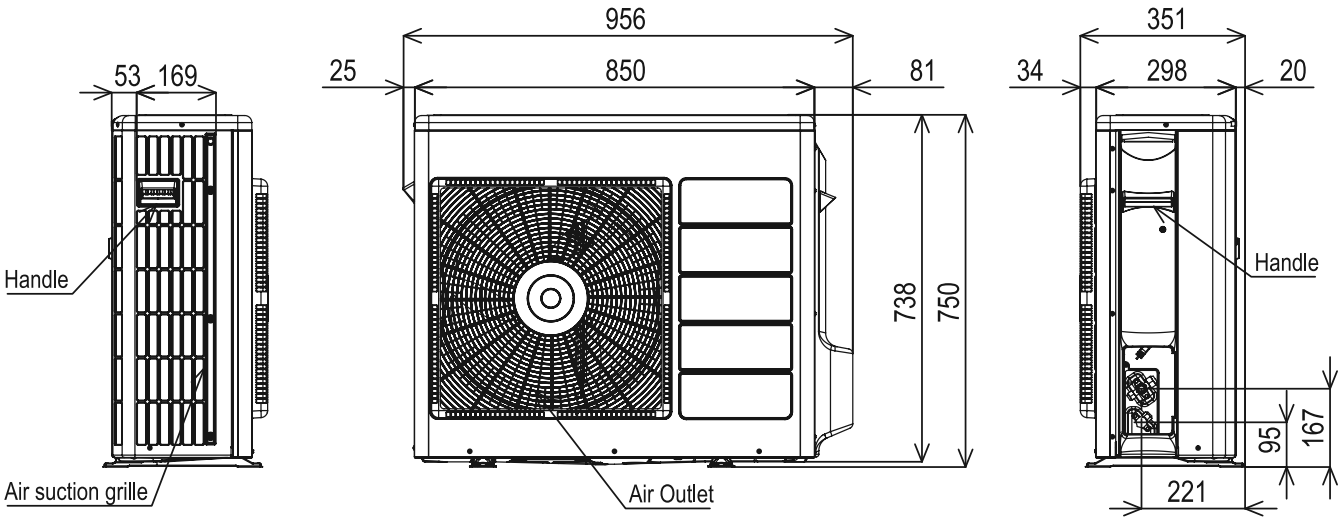
SIDE VIEW

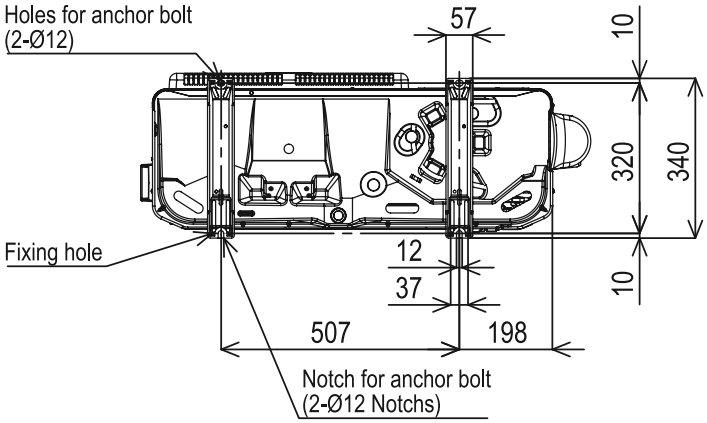


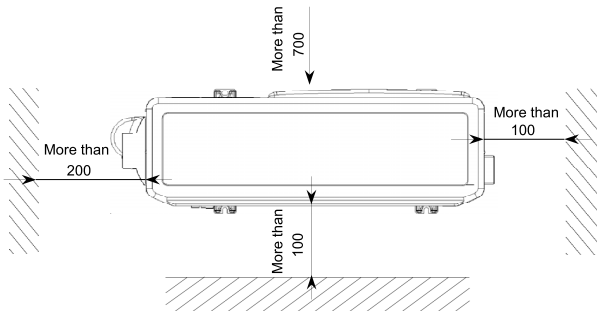
TOP VIEW



MODEL RAC-50NPE
RAC-60NPE







Service space

MAIN PARTS COMPONENT

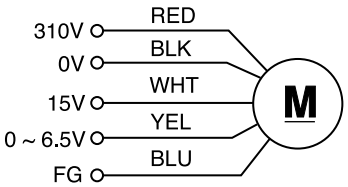
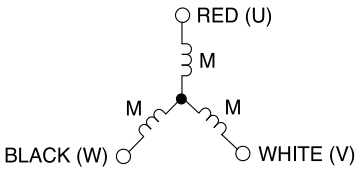
THERMOSTAT (Room Temperature Thermistor)

Thermostat Specifications

MODEL			RAD-50RPE/RAD-60RPE	
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)

FAN MOTOR

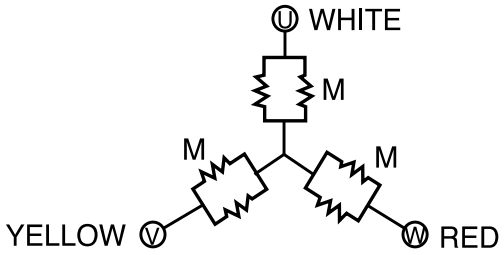
Fan Motor Specifications

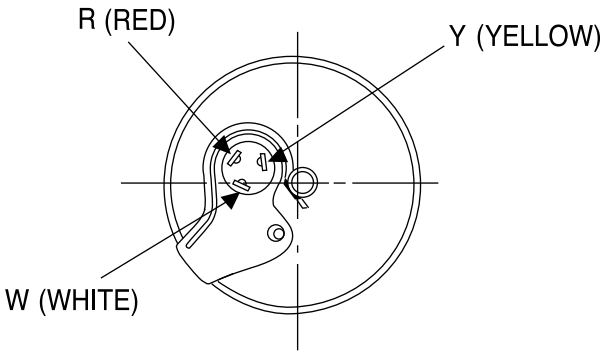
MODEL	RAD-50RPE/RAD-60RPE	RAC-50NPE/RAC-60NPE
POWER SOURCE	DC: 310V	DC120~380V
OUTPUT	180W	47W
CONNECTION	 (Control circuit built in)	

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-50NPE	RAC-6NPE
COMPRESSOR MODEL		JX151XG1	
PHASE		SINGLE	
RATED VOLTAGE		AC 220 ~ 240 V	
RATED FREQUENCY		50 Hz	
POLE NUMBER		4	
CONNECTION			
RESISTANCE VALUE (Ω)	20°C (68°F)	2M = 1.2984	
	75°C (167°F)	2M = 1.7671	



⚠ CAUTION

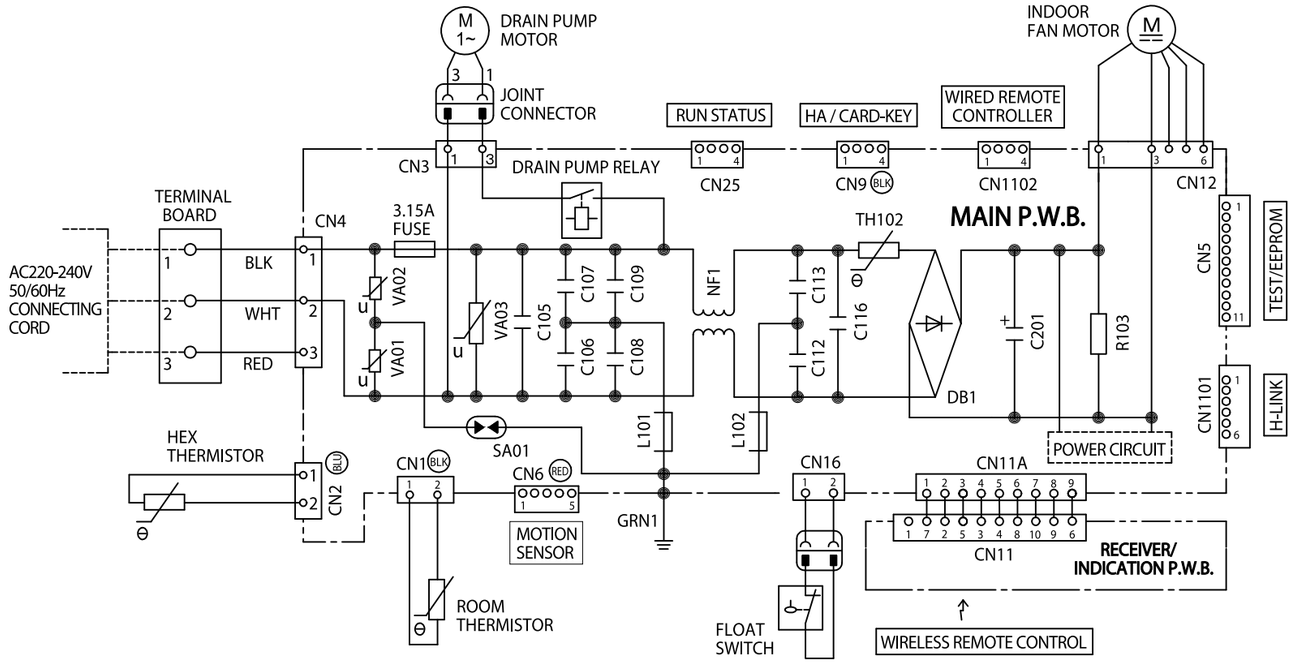
When the Air Conditioner has been operated for a long time with the strainer clogged or crushed or with too little refrigerant, check the color of the refrigerant oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

WIRING DIAGRAM

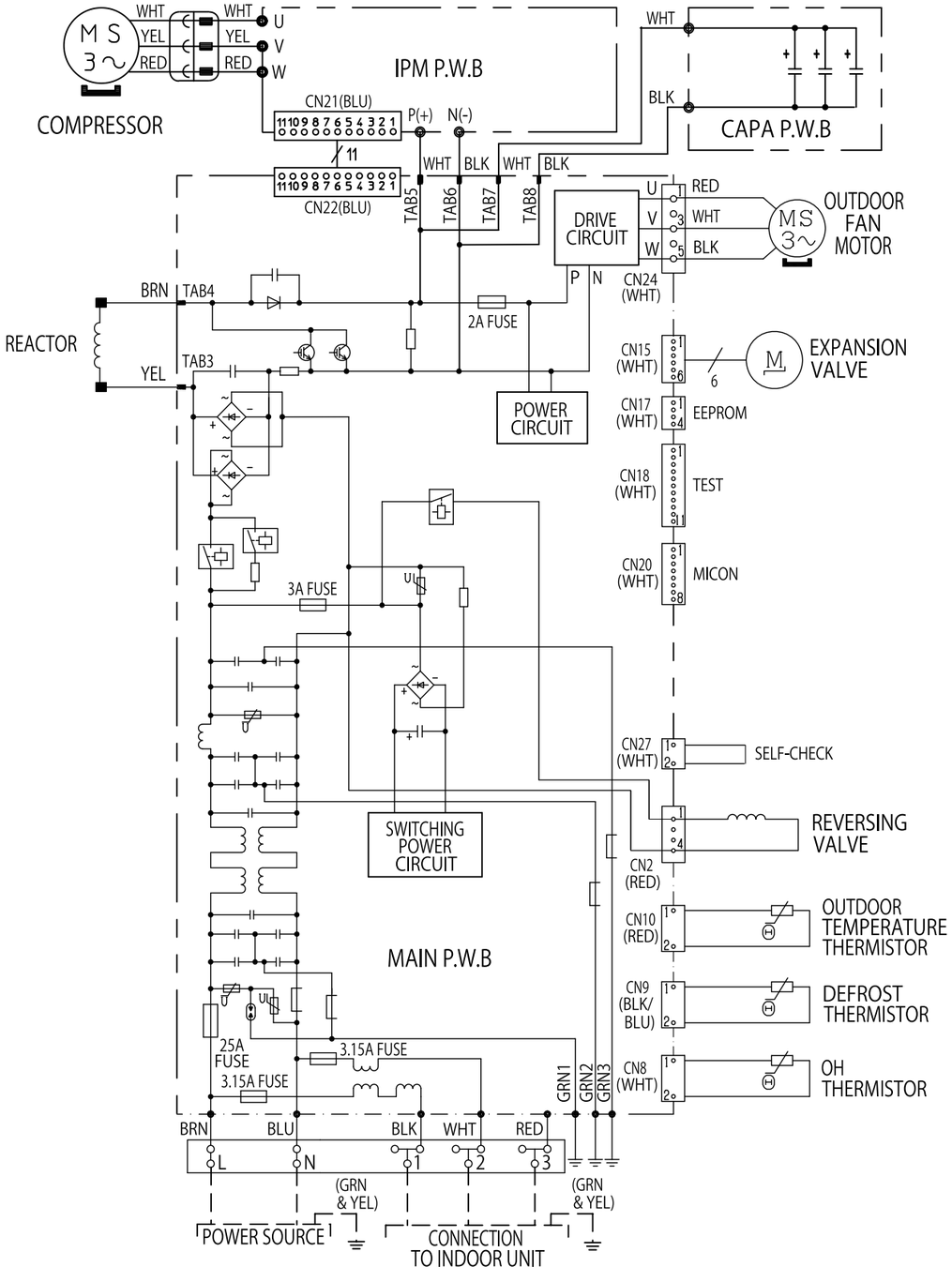
MODEL RAD-50RPE/RAC-50NPE & RAD-60RPE/RAC-60NPE

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

INDOOR UNIT

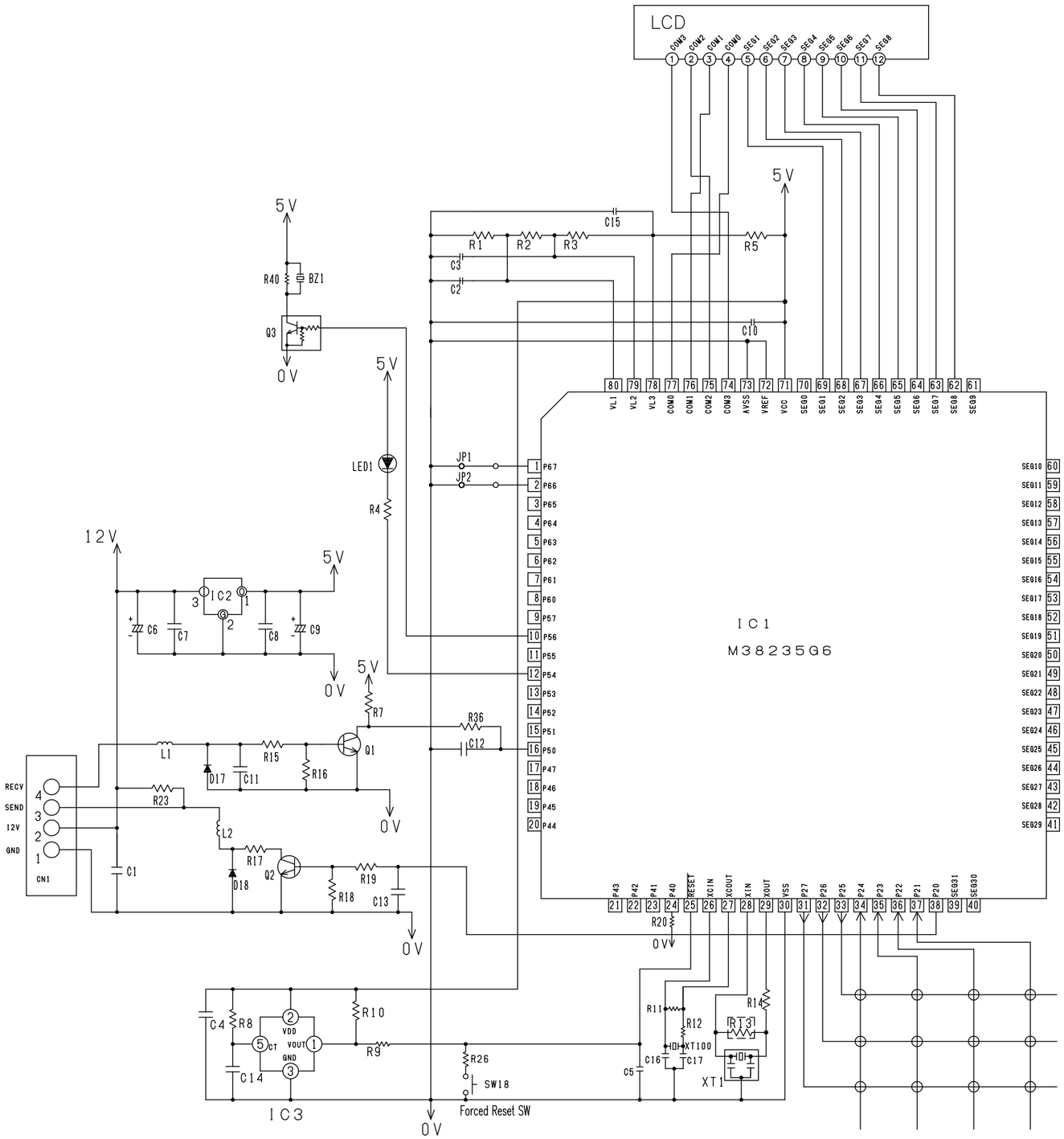


OUTDOOR UNIT



CIRCUIT DIAGRAM

Wired Remote Control



Resistor

symbol	resistance (Ω)	tolerance	power rating (W)	mounting form	surface	remark
R1	220k	5%	1/10	C	A	1608
R2	220k	5%	1/10	C	A	1608
R3	220k	5%	1/10	C	A	1608
R4	1k	5%	1/10	C	A	1608
R5	430k	5%	1/10	C	A	1608
R7	10k	5%	1/10	C	A	1608
R8	No Mount		1/10	C	A	1608
R9	1k	5%	1/10	C	A	1608
R10	300k	5%	1/10	C	A	1608
R11	10M	5%	1/10	C	A	1608
R12	220k	5%	1/10	C	A	1608
R13	No Mount		1/10	C	A	1608
R14	0	5%	1/10	C	A	1608
R15	10k	5%	1/10	C	A	1608
R16	10k	5%	1/10	C	A	1608
R17	0	5%	1/10	C	A	1608
R18	10k	5%	1/10	C	A	1608
R19	10k	5%	1/10	C	A	1608
R20	4.7k	5%	1/10	C	A	1608
R23	10k	5%	1/10	C	A	1608
R26	1k	5%	1/10	C	A	1608
R36	1k	5%	1/10	C	A	1608
R40	No Mount		1/10	C	A	1608
JP1	No Mount		1/10	C	A	1608
JP2	No Mount		1/10	C	A	1608

Capacitor

symbol	capacitance (μF)	rated voltage (V)	type	mounting form	surface	remark	temperature compensating
C1	0.1	25	C	C	A	1608	B
C2	0.1	25	C	C	A	1608	B
C3	0.1	25	C	C	A	1608	B
C4	0.1	25	C	C	A	1608	B
C5	0.1	25	C	C	A	1608	B
C6	10	25	D	C	A		
C7	0.1	25	C	C	A	1608	B
C8	0.1	25	C	C	A	1608	B
C9	10	25	D	C	A		
C10	1	16	C	C	A	1608	B
C11	470p	50	C	C	A	1608	B
C12	470p	50	C	C	A	1608	B
C13	470p	50	C	C	A	1608	B
C14	0.01	50	C	C	A	1608	B
C15	0.1	25	C	C	A	1608	B
C16	18p	50	C	C	A	1608	CH
C17	22p	50	C	C	A	1608	CH

Diode

symbol	product name	mounting form	surface
D17	1SS355	C	A
D18	1SS355	C	A

LED

symbol	product name	mounting form	surface
LED1	SML-811WT(A)	C	A

IC

symbol	product name	mounting form	surface
IC1	M38235G6-105HP	C	A
IC2	NJM78L05UA	C	A
IC3	S-80942CNMC-G9CT2G	C	A

Coil

symbol	product name	mounting form	surface
L1	BLM18AG102SN1D	C	A
L2	BLM18AG102SN1D	C	A

Transistor

symbol	product name	mounting form	surface
Q1	2SC2412K	C	A
Q2	2SC2412K	C	A
Q3	No Mount	C	A

Resonators

symbol	product name	mounting form	surface
XT100	CFS2063276	H	A
XT1	CSTCR4M00G55-R0	C	A

Connector

symbol	product name	mounting form	surface
CN1	S4B-ZR-SM4A-TF	C	A

Buzzer

symbol	product name	mounting form	surface
BZ1	NO MOUNT	C	B

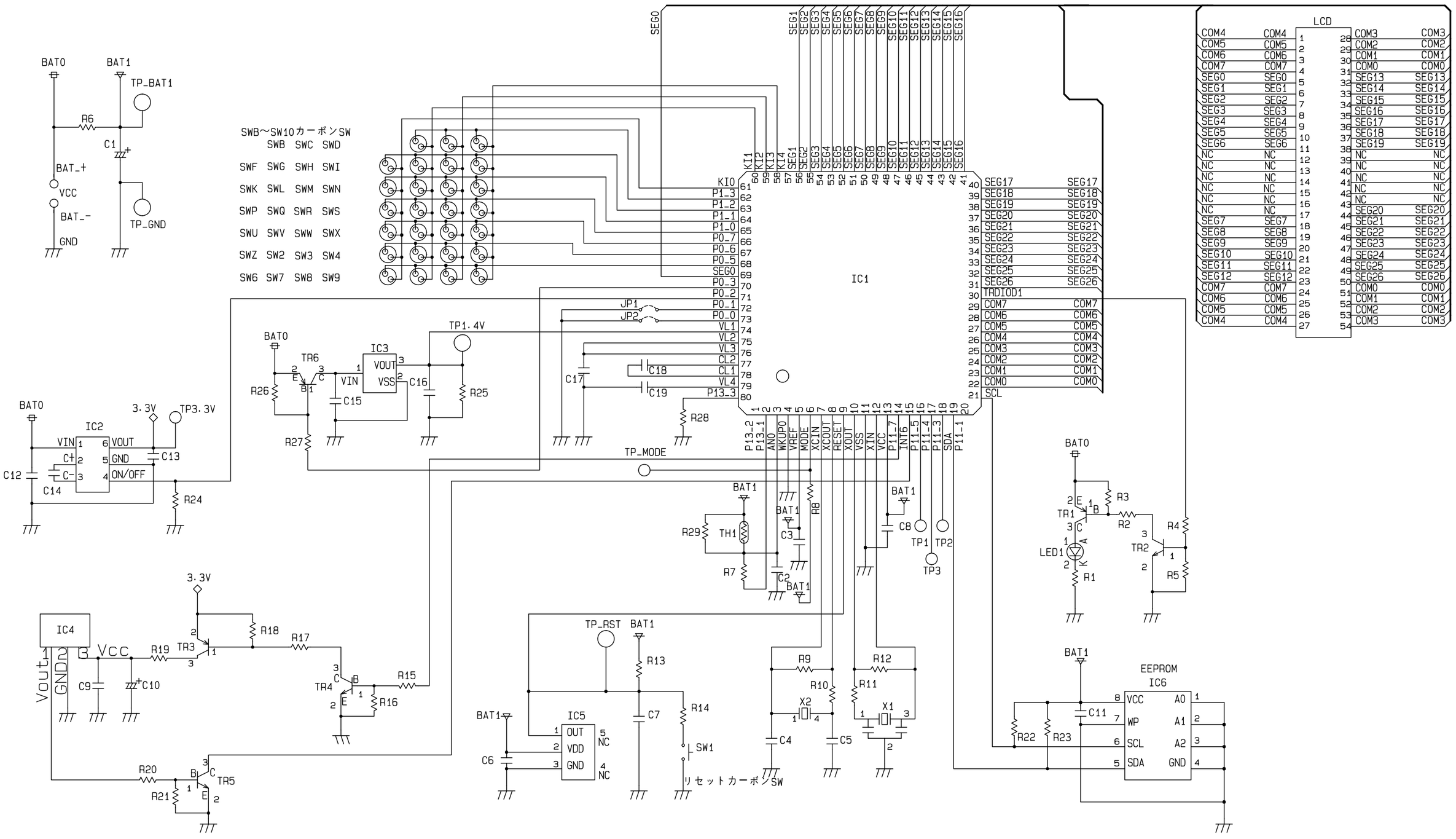
表1 キーマトリックス表

Table1. Key-matrix table

Output \ Input	P21	P22	P23	P24
P25	(自動風向) (Auto louver)	取消 Cancel	風速切換 Wind speed select	予約 Book
P26	切タイマー Off	入タイマー On	温度 ∧ Temperature up	温度 ∨ Temperature down
P27	運転/停止 Start/Stop	—	おやすみ Sleep	運転切換 Drive mode select

CIRCUIT DIAGRAM

Wireless Remote Controller



CIRCUIT DIAGRAM

MODEL RAD-50RPE, RAD-60RPE

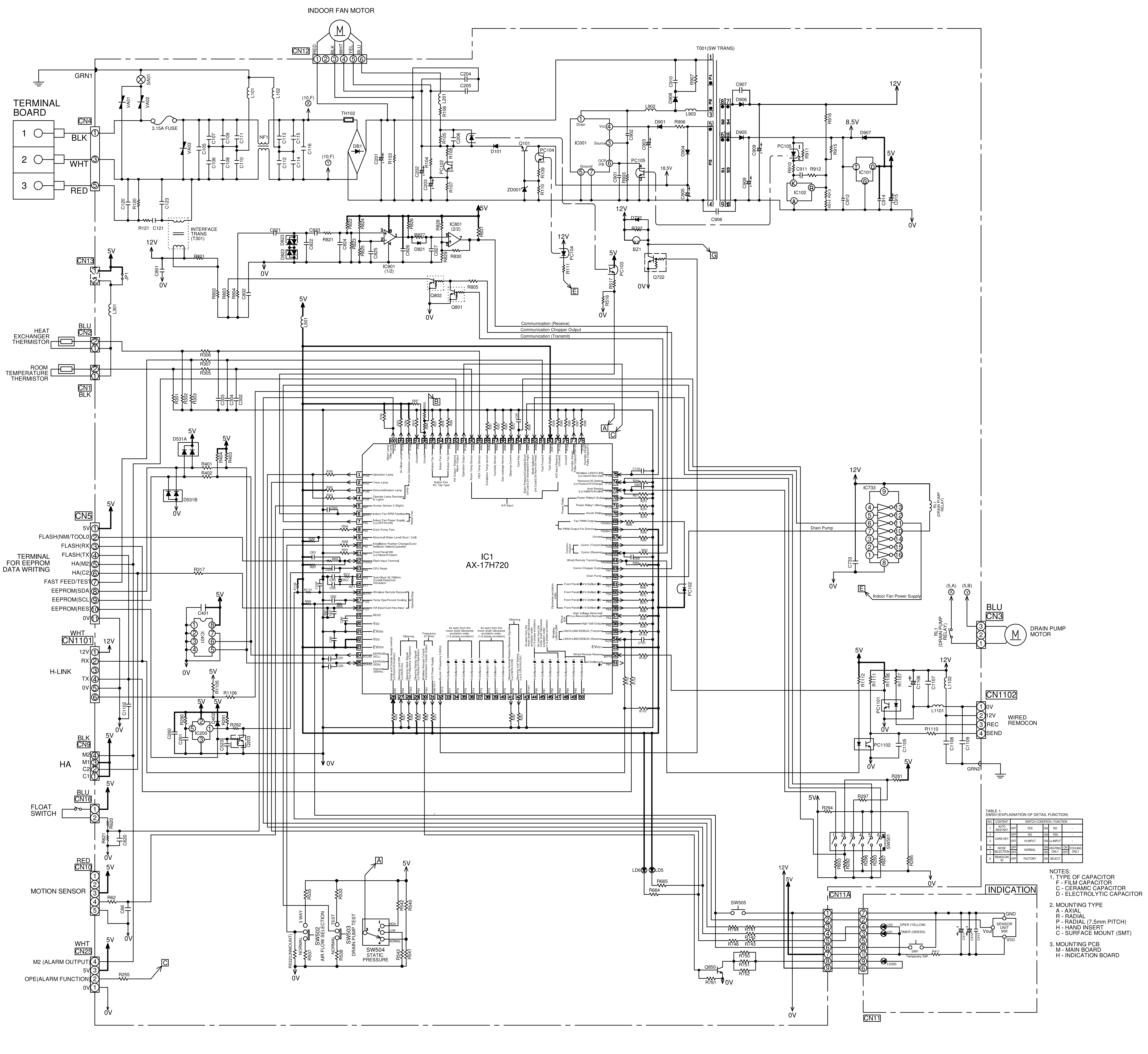


TABLE 1:
SW501(EXPLAINATION OF DETAIL FUNCTION)

NO.	CONTENT	SWITCH CONDITION / FUNCTION					
1	AUTO RESTART	OFF	YES	ON	NO		-
2	CARD KEY	OFF	NO	ON	YES		-
3		OFF	Hi INPUT	ON	Lo INPUT		-
4	MODE SELECTION	OFF	NORMAL	ON	HEATING ONLY	ON	COOLING ONLY
5		OFF		ON		OFF	
6	REMOCON ID	OFF	FACTORY	ON	SELECT		-

NOTES:
1. TYPE OF CAPACITOR
   F - FILM CAPACITOR
   C - CERAMIC CAPACITOR
   D - ELECTROLYTIC CAPACITOR
2. MOUNTING TYPE
   A - AXIAL
   R - RADIAL
   P - RADIAL (7.5mm PITCH)
   H - HAND INSERT
   C - SURFACE MOUNT (SMT)
3. MOUNTING PCB
   M - MAIN BOARD
   H - INDICATION BOARD

RESISTOR

SYM	VALUE (Ω)	TOL	POWER (W)	FORM	PCBA	ASSY. NO	GROUP	REMARK
R62	10k	5%	1/10	C	M	25	A,B	1608
R103	1M	5%	1/4	A	M	8	A,B	
R104	100	5%	1/10	C	M	9	A,B	1608
R105	4.3k	5%	1/10	C	M	10	A,B	1608
R106	4.3k	5%	1/4	C	M	11	A,B	3216
R107	3.3k	5%	1/10	C	M	12	A,B	1608
R108	4.7k	5%	1/4	C	M	13	A,B	3216
R109	402	1%	1/8	C	M	14	A,B	2125
R110	33k	5%	1/10	C	M	15	A,B	1608
R111	1.5k	5%	1/4	C	M	16	A,B	3216
R120	470k	5%	1/4	A	M	19	A,B	
R121	47	5%	1/2	A	M	20	A,B	
R211	1M	5%	1/16	C	M	59	A,B	1608
R212	1M	5%	1/16	C	M	59	A,B	1608
R238	10k	5%	1/16	C	M	18	A,B	1608
R239	10k	5%	1/16	C	M	18	A,B	1608
R240	1k	5%	1/16	C	M	17	A,B	1608
R241	10k	5%	1/16	C	M	18	A,B	1608
R242	10k	5%	1/16	C	M	18	A,B	1608
R243	680	5%	1/16	C	M	130	A,B	1608
R244	10k	5%	1/16	C	M	18	A,B	1608
R245	10k	5%	1/16	C	M	18	A,B	1608
R246	10k	5%	1/16	C	M	18	A,B	1608
R247	10k	5%	1/16	C	M	18	A,B	1608
R248	10k	5%	1/16	C	M	18	A,B	1608
R249	10k	5%	1/16	C	M	18	A,B	1608
R250	10k	5%	1/16	C	M	18	A,B	1608
R251	10k	5%	1/16	C	M	18	A,B	1608
R253	10k	5%	1/16	C	M	18	A,B	1608
R254	10k	5%	1/16	C	M	18	A,B	1608
R255	10k	5%	1/16	C	M	18	A,B	1608
R256	10k	5%	1/16	C	M	18	A,B	1608
R257	10k	5%	1/16	C	M	18	A,B	1608
R258	1k	5%	1/16	C	M	17	A,B	1608
R260	10k	5%	1/16	C	M	18	A,B	1608
R261	10k	5%	1/16	C	M	18	A,B	1608
R262	10k	5%	1/16	C	M	18	A,B	1608
R263	10k	5%	1/16	C	M	18	A,B	1608
R264	10k	5%	1/16	C	M	18	A,B	1608
R266	10k	5%	1/16	C	M	18	A,B	1608
R267	10k	5%	1/16	C	M	18	A,B	1608
R268	10k	5%	1/16	C	M	18	A,B	1608
R269	10k	5%	1/16	C	M	18	A,B	1608
R270	10k	5%	1/16	C	M	18	A,B	1608
R273	10k	5%	1/16	C	M	18	A,B	1608
R274	10k	5%	1/16	C	M	18	A,B	1608
R276	10k	5%	1/16	C	M	18	A,B	1608
R278	10k	5%	1/16	C	M	18	A,B	1608
R281	10k	5%	1/10	C	M	25	A,B	1608
R282	10k	5%	1/10	C	M	25	A,B	1608
R283	-	-	-	-	-	-	-	-
R284	10k	5%	1/16	C	M	18	A,B	1608
R290	-	5%	1/10	C	M			1608
R291	300k	5%	1/10	C	M	21	A,B	1608
R292	1k	5%	1/10	C	M	22	A,B	1608
R293	1k	5%	1/10	C	M	22	A,B	1608
R294	10k	5%	1/10	C	M	25	A,B	1608
R295	10k	5%	1/10	C	M	25	A,B	1608
R296	1k	5%	1/10	C	M	22	A,B	1608
R297	1k	5%	1/10	C	M	22	A,B	1608
R301	12.7k	1%	1/10	C	M	24	A,B	1608
R302	12.7k	1%	1/10	C	M	24	A,B	1608
R303	10k	5%	1/10	C	M	25	A,B	1608
R305	1k	5%	1/10	C	M	22	A,B	1608
R306	1k	5%	1/10	C	M	22	A,B	1608
R307	1k	5%	1/10	C	M	22	A,B	1608
R317	1k	5%	1/16	C	M	17	A,B	1608
R401	390	5%	1/10	C	M	26	A,B	1608
R402	390	5%	1/10	C	M	26	A,B	1608
R403	5.1k	5%	1/10	C	M	27	A,B	1608
R404	5.1k	5%	1/10	C	M	27	A,B	1608
R411	47	5%	1/6	A	H	12	B	1608
R500	10k	5%	1/16	C	M	18	B	1608
R510	10k	5%	1/16	C	M	18	A,B	1608
R511	10k	5%	1/16	C	M	18	A,B	1608
R512	10k	5%	1/16	C	M	18	A,B	1608
R513	10k	5%	1/16	C	M	18	A,B	1608
R515	10k	5%	1/16	C	M	18	A,B	1608
R516	10k	5%	1/4	C	M	28	A,B	3216
R517	1k	5%	1/16	C	M	39	A,B	1005
R532	10k	5%	1/10	C	M	25		1608
R533	10k	5%	1/10	C	M	25	A,B	1608
R534	1k	5%	1/10	C	M	22	A,B	1608
R535	10k	5%	1/10	C	M	25	A,B	1608
R537	10k	5%	1/10	C	M	25	A,B	1608
R538	10k	5%	1/10	C	M	25	A,B	1608
R539	1k	5%	1/16	C	M	22	B	1608
R540	10k	5%	1/10	C	M	25	A,B	1608
R541	10k	5%	1/10	C	M	25	A,B	1608
R542	10k	5%	1/10	C	M	25	A,B	1608
R543	10k	5%	1/10	C	M	25	A,B	1608
R545	10k	5%	1/16	C	M	18	A,B	1608
R546	1k	5%	1/16	C	M	22	B	1608
R547	0	5%	1/16	C	M	60	A	1608
R601	10k	5%	1/10	C	M	25	A,B	1608
R602	1k	5%	1/16	C	M	39	A,B	1005
R603	1k	5%	1/16	C	M	17	A,B	1608
R607	1k	5%	1/16	C	M	17	A,B	1608
R608	10k	5%	1/16	C	M	18	A,B	1608
R609	10k	5%	1/16	C	M	37	A,B	1005
R620	1k	5%	1/10	C	M	22	A,B	1608
R621	10k	5%	1/10	C	M	25	A,B	1608
R651	1k	5%	1/10	C	M	22	A,B	1608
R652	100	5%	1/10	C	M	9	A,B	1608
R656	390	5%	1/8	C	M	31	A,B	2125
R664	1k	5%	1/10	C	M	22	A,B	1608
R665	1k	5%	1/10	C	M	22	A,B	1608
R722	3.3k	5%	1/10	C	M	12	A,B	1608
R740	10k	5%	1/16	C	M	18	A,B	1608
R741	240	5%	1/10	C	M	33	A,B	1608
R742	240	5%	1/10	C	M	33	A,B	1608
R743	240	5%	1/10	C	M	33	A,B	1608
R744	130	5%	1/10	C	M	34	A,B	1608
R745	680	5%	1/10	C	M	130	A,B	1608
R746	130	5%	1/10	C	M	34	A,B	1608
R750	75	5%	1/2	C	M	57	A,B	4532
R751	75	5%	1/2	C	M	57	A,B	4532
R752	75	5%	1/2	C	M	57	A,B	4532
R760	390	5%	1/10	C	M	26	A,B	1608
R761	10k	5%	1/10	C	M	25	A,B	1608
R801	680	5%	1/4	C	M	45	A,B	3216
R802	180	5%	1/8	C	M	30	A,B	2125
R803	510	5%	1/4	C	M	29	A,B	3216
R804	820	5%	1/10	C	M	32	A,B	1608
R805	5.6k	1%	1/16	C	M	36	A,B	1005
R821	1k	5%	1/16	C	M	39	A,B	1005
R822	10k	1%	1/16	C	M	40	A,B	1005
R823	10k	1%	1/16	C	M	40	A,B	1005

CAPACITOR

SYM	VALUE (F)	VOLT (V)	TYPE	FORM	PCBA	ASSY. NO	CHAR	GROUP	REMARK
C66	0.1u	25	C	C	M	72		A,B	1608
C105	1.5u	AC310	F	H	M	64		A,B	RRCP2923
C106	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C107	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C108	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C109	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C110	-	AC300	C	R	M	-			RRCP3411
C111	-	AC300	C	R	M	-			RRCP3411
C112	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C113	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C114	-	AC300	C	R	M	-			RRCP3411
C115	-	AC300	C	R	M	-			RRCP3411
C116	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C120	4700p	AC250	C	R	M	61		A,B	
C121	0.33u	AC310	F	H	M	63		A,B	RRCP2926
C123	0.022u	50	F	R	M	65		A,B	
C201	82u	450	D	H	M	66		A,B	
C202	4.7u	25	D	R	M	74		A,B	
C203	10u	16	D	R	M	68		A,B	
C204	0.1u	25	C	C	M	72		A,B	1608
C205	0.1u	25	C	C	M	72		A,B	1608
C206	1000p	50	C	C	M	70		A,B	1608
C220	100p	50	C	C	M	60	CH	A,B	1608
C221	100p	50	C	C	M	60	CH	A,B	1608
C252	12p	50	C	C	M	88	CH	A,B	1608
C253	15p	50	C	C	M	89	CH	A,B	1608
C260	0.1u	25	C	C	M	72	F	A,B	1608
C261	0.01u	50	C	C	M	73	B	A,B	1608
C265	0.1u	25	C	C	M	72	F	A,B	1608
C266	0.47u	25	C	C	M	90	F	A,B	1608
C281	0.1u	25	C	C	M	72	F	A,B	1608
C302	0.1u	25	C	C	M	72	F	A,B	1608
C303	0.1u	25	C	C	M	72	F	A,B	1608
C304	0.1u	25	C	C	M	72	F	A,B	1608
C401	0.1u	25	C	C	M	72	F	A,B	1608
C411	47u	10	D	R	H	13		B	UMF
C412	47u	10	D	R	H	13		B	UMF
C413	0.01u	25	C	R	H	14		B	
C503	1000p	50	C	C	M	70	F	A,B	1608
C523	0.1u	25	C	C	M	72	F	A,B	1608
C524	0.1u	25	C	C	M	72	F	A,B	1608
C601	0.1u	25	C	C	M	72	F	A,B	1608
C602	0.1u	25	C	C	M	72	F	A,B	1608
C603	0.1u	25	C	C	M	72	F	A,B	1608
C620	0.1u	25	C	C	M	72	F	A,B	1608
C651	0.1u	25	C	C	M	72	F	A,B	1608
C711	0.1u	25	C	C	M	72	F	B	1608
C722	0.1u	25	C	C	M	72	F	B	1608
C733	0.1u	25	C	C	M	72	F	A,B	1608
C801	0.1u	25	C	C	M	72	F	A,B	1608
C802	-	50	C	C	M	-		A,B	1608
C821	0.022u	50	C	C	M	75	B	A,B	1608
C822	47p	50	C	C	M	76	CH	A,B	1608
C823	0.022u	50	C	C	M	75	B	A,B	1608
C824	2200p	50	C	C	M	77	B	A,B	1608
C825	0.1u	16	C	C	M	67		A,B	1005
C826	0.1u	16	C	C	M	67		A,B	1005
C827	0.01u	16	C	C	M	84	B	A,B	1608
C828	0.022u	50	C	C	M	75	B	A,B	1608
C901	2200p	50	C	C	M	77	B	A,B	1608
C902	100p	2000	C	R	M	69	SL	A,B	-
C903	22u	35	D	R	M	78		A,B	-
C905	100u	50	D	H	M	79		A,B	YXG
C906	1000p	AC250	C	R	M	80	B	A,B	KY
C907	2200p	1000	C	R	M	81	R	A,B	-
C908	680u	16	D	R	M	82		A,B	ZLH
C909	1500u	16	D	R	M	83		A,B	YXH
C910	2200p	1000	C	R	M	81	R	A,B	-
C911	0.1u	16	C	C	M	71	B	A,B	1608
C912	0.1u	25	C	C	M	72	F	A,B	1608
C914	0.1u	25	C	C	M	72	F	A,B	1608
C915	220u	10	D	R	M	85		A,B	PX
C1101	1000p	50	C	C	M	70	F	A,B	1608
C1102	1000p	50	C	C	M	86	CH	A,B	1608
C1103	0.1u	25	C	C	M	72	F	A,B	1608
C1104	1000p	50	C	C	M	70	F	A,B	1608
C1105	1000p	50	C	C	M	70	F	A,B	1608
C1106	47u	25	D	R	M	87		A,B	VR
C1107	0.1u	25	C	C	M	72	F	A,B	1608
C1108	0.01u	AC300	C	R	M	62		A,B	RRCP3411
C1109	0.01u	AC300	C	R	M	62		A,B	RRCP3411

RESISTOR

SYM	VALUE (Ω)	TOL	POWER (W)	FORM	PCBA	ASSY. NO	GROUP	REMARK
R824	7.15k	1%	1/16	C	M	41	A,B	1005
R825	10k	1%	1/16	C	M	40	A,B	1005
R826	5.1k	5%	1/16	C	M	43	A,B	1005
R827	51k	5%	1/16	C	M	44	A,B	1005
R828	10k	5%	1/16	C	M	37	A,B	1005
R829	10k	5%	1/16	C	M	37	A,B	1005
R830	51k	1%	1/16	C	M	42	A,B	1005
R831	1k	5%	1/16	C	M	39	A,B	1005
R832	10k	5%	1/10	C	M	25	A,B	1608
R903	0.82	5%	1	R	M	46	A,B	-
R906	22	5%	1/2	A	M	47	A,B	MOS
R907	220k	5%	2	R	M	58	A,B	-
R910	1k	5%	1/4	C	M	48	A,B	3226
R911	1.5k	5%	1/10	C	M	49	A,B	1608
R912	10k	5%	1/10	C	M	25	A,B	1608
R913	6.2k	1%	1/10	C	M	50	A,B	1608
R914	16k	1%	1/10	C	M	51	A,B	1608
R915	330k	1%	1/10	C	M	52	A,B	1608
R916	100k	1%	1/10	C	M	53	A,B	1608
R1100	1k	5%	1/10	C	M	22	A,B	1608
R1101	10k	5%	1/10	C	M	25	A,B	1608
R1102	1k	5%	1/10	C	M	22	A,B	1608
R1103	10k	5%	1/10	C	M	25	A,B	1608
R1104	1k	5%	1/10	C	M	22	A,B	1608
R1105	10k	5%	1/10	C	M	25	A,B	1608
R1106	1k	5%	1/4	C	M	54	A,B	3216
R1107	1.2k	5%	1/8	C	M	55	A,B	2125
R1108	2k	5%	1/10	C	M	38	A,B	1608
R1109	-	5%	1/10	C	M			1680
R1110	620	5%	1/8	C	M	56	A,B	2125
R1111	2k	5%	1/10	C	M	38	A,B	1680
R1112	560	5%	1/10	C	M	23	A,B	1680
R1113	1k	5%	1/10	C	M	22	A,B	1680

CONNECTOR

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
CN1	B2B-PH-K-K	H	A	M	157	ROOM THERM
CN1A	B2B-XARK-1N	H	B	M	152	ROOM THERM
CN2	B2B-PH-K-E	H	A	M	158	HEX-THERM
CN2A	B2B-XAKK-1	H	B	M	154	HEX-THERM
CN3	B2P3-VH-BL	H	A	M	159	DRAIN PUMP
CN3A	B02B-XASK-1	H	B	M	155	DRAIN PUMP
CN4	B3P5-VH	H	A,B	M	160	POWER
CN5	B11B-CZHK-B-1	H	A,B	M	161	EEPROM
CN10	B05B-XARK-1	H	A,B	M	170	MOTION
CN7	B20B-PNDZS-1	H	B	M	168	S/MOTOR
CN25	B4B-XH-A	H	A,B	M	169	
CN9	B4B-XH-A-BK	H	A,B	M	162	HA
CN13	B2B-PH-K-S	H	A,B	M		TERM FUSE
CN11	S14B-CZHK-B-1	H	B	H	25	INDICATION
CN11A	B14B-PH-K-S	H	B	M	163	INDICATION
CN11A	B9B-PH-K-S	H	A	M	164	INDICATION
CN1101	B6B-PASK-1	H	A,B	M	166	H-LINK
CN1102	B4B-PASK-1	H	A,B	M	167	WIRED
CN12A	B8B-XASK-1	H	B	M	153	FAN MOTOR
CN12	B5P6-VH-L	H	A	M	156	FAN MOTOR
CN16	B2B-XAEK-1N	H	A,B	M	165	FLOAT SW.
CN17	S05B-CZYK-B-1	H	B	H	26	EEPROM

IC

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
IC001	STR-W6051S	H	A,B	M	110	RREA5576
IC1	R5F104PKAFB	S	A,B	M	111	RREAP007
IC101	NJM7805DL1(TE1)	S	A,B	M	112	RREG5932
IC102	KIA431A-AT/P	R	A,B	M	113	RREA5209
IC200	RN5VD42C	S	A,B	M	114	RREA4144
IC401	S-24C32CI-J8T1U3	S	A,B	M	116	RREA5765
IC711	KID65003AF	S	B	M	117	RREA5528
IC722	KID65003AF	S	B	M	117	RREA5528
IC733	KID65003AF	S	A,B	M	117	RREA5528
IC801	NJM2903E	S	A,B	M	115	RREA5408

TRANSISTOR

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
Q101	2SC5810	C	A,B	M	120	RREG5145
Q203	DTC114EETL	C	A,B	M	119	RREG4882
Q651	NO USE	C		M		
Q722	DTC114EETL	C	A,B	M	119	RREG4882
Q801	RN1106	C	A,B	M	121	RREG4317
Q802	RN1105	C	A,B	M	122	RREG5128
Q850	2SD596	C	A,B	M	123	RREG8U68

DIODE

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
D101	KDS4148U	C	A,B	M	93	RREB5211
D531A	KDS184-RTK/P	C	A,B	M	92	RREB5212
D531B	KDS181-RTK/P	C	A,B	M	100	RREB5213
D402	KDS4148U	C	A,B	M	93	RREB5211
D722	1SS355	C	A,B	M	94	RREB4147
D821	KDS4148U	C	A,B	M	93	RREB5211
D822	1SS226	C	A,B	M	95	RREB5134
D823	1SS226	C	A,B	M	95	RREB5134
D901	D1NL40U	A	A,B	M	96	RREB5585
D904	D1NL20U	A	A,B	M	97	RREB4808
D905	D1NS6	A	A,B	M	98	RREB4822
D906	S3L20U-F	H	A,B	M	99	RREB5227
D907	KDS4148U	C	A,B	M	93	RREB5211
D908	EG01CV1	A	A,B	M	91	RREB4886
D909	D1NL20U	A	B	M	97	RREB4808
DB1	D2SB60A	H	A,B	M	128	RREB4602
ZD001	HZS16-2	A	A,B	M	127	RREB5144

COIL

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
L101	FBA04HA600	A	A,B	M	104	RRMH4184
L102	FBA04HA600	A	A,B	M	104	RRMH4184
L201	LEAD JUMPER	A	A,B	M	105	
L301	FBA04HA600	A	A,B	M	104	RRMH4184
L501	FBA04HA600	A	A,B	M	104	RRMH4184
L902	FBA04HA600	A	A,B	M	104	RRMH4184
L903	FBA04HA600	A	A,B	M	104	RRMH4184
L1101	FBA04HA600	A	A,B	M	104	RRMH4184
L1102	FBA04HA600	A	A,B	M	104	RRMH4184
NF1	SC-03-67J	H	A,B	M	106	RRMH3901
T001	RRMF4158(200V)	H	A,B	M	172	RRMH4158
T301	RRMF3959(UU9LF)	H	A,B	M	173	RRMF3959

SWITCH

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
SW501	KSD62	H	A,B	M	139	RRSH1700
SW502	SSSS912000	H	B	M	138	RRSG1605
SW503	SSSS912000	H	A,B	M	138	RRSG1605
SW504	SSSS919800	H	A,B	M	137	RRSG1633
SW505	EVQ11A09K	R	A,B	M	140	RRSA1673
SW1	SKHHLU	H	B	H	17	

LED

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
LD1	SLR-332DC	H	B	H	7	TIMER
LD2	LED-Y(YEL)	H	B	H	8	OPERATION
LD3		H	B	H		
LD5	SEL2710K(YEL)	R	A,B	M	145	
LD6	SEL2410E(GRN)	R	A,B	M	146	
LD200	SIR-34ST3F	H	B	H	10	

PHOTO COUPLER

SYM	MODEL	FORM	GROUP	PCBA	ASS. NO	REMARK
PC102	LTV-817S-TA1	S	A,B	M	107	RREG5797
PC103	LTV-817S-TA1	S	A,B	M	107	RREG5797
PC104	LTV-817S-TA1	S	A,B	M	107	RREG5797
PC105	LTV-817S-TA1	S	A,B	M	107	RREG5797
PC1101	LTV-817S-TA1	S	A,B	M	107	RREG5797
PC1102	LTV-817S-TA1	S	A,B	M	107	RREG5797

WIRES

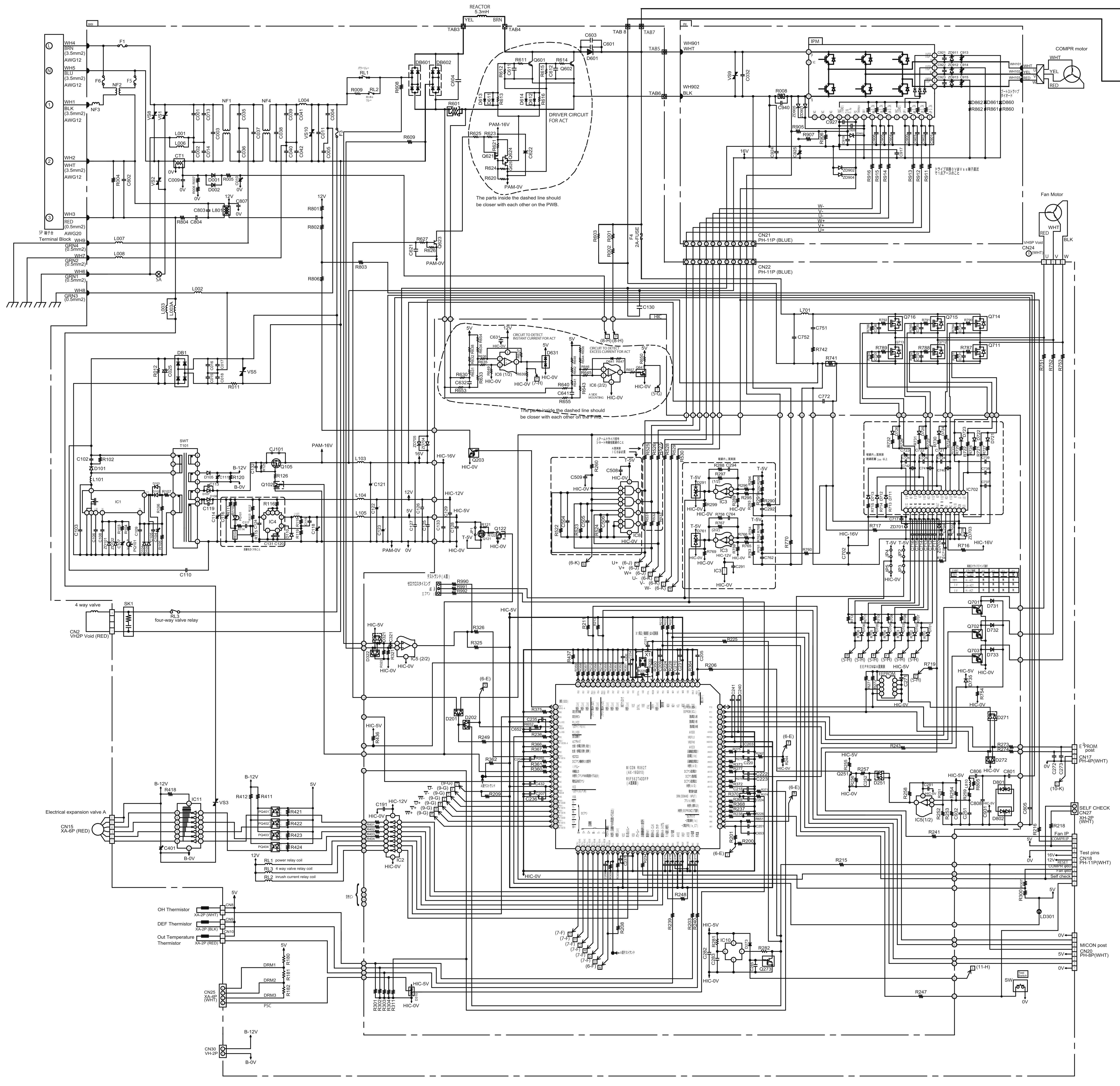
SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REM.
GRN1	G20TS-CAS5	BOARD IN	B	M	149	AWG20
GRN1	G30TS-CAS5	BOARD IN	A	M	150	AWG20

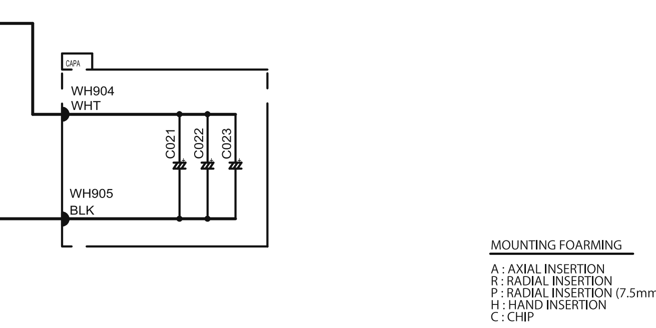
OTHER

SYM	MODEL	FORM	GROUP	PCBA	ASSY. NO	REMARK
BZ1	PS1720P02	H	A	M	143	BUZZER
BZ2	PS1720P02	H	B	H	19	BUZZER
FUSE	3.15A-F-WE	H	A,B	M	135	FUSE
SA01	RA-102M-C6-Y	R	A,B	M	142	SURGE PROTECTOR
VA01	450NR12D-KO-TB5	H	A,B	M	125	SURGE PROTECTOR
VA02	450NR12D-KO-TB5	H	A,B	M	125	SURGE PROTECTOR
VA03	450NR12D-KO-TB5	H	A,B	M	125	SURGE PROTECTOR
TH102	SD2-08LCS	H	A,B	M	175	POWER THERMISTOR
IRR	GP1UM281K	H	B	H	6	IR RECEIVER
OSC2	NXS3215SA	C	A,B	M	133	RREV5580
JP1	CHIP JUMPER	C	A,B	M	103	1608
RL1	FTR-F3-RY	H	A	M	108	
RL2	FTR-F3-RY	H	B	M	108	

CIRCUIT DIAGRAM

MODEL RAC-50NPE/RAC-60NPE
P.W.B. : HIC





MOUNTING FOARMING

A : AXIAL INSERTION
R : RADIAL INSERTION
P : RADIAL INSERTION (7.5mm pitch)
H : HAND INSERTION
C : CHIP

MOUNTING BOARD

H : HIC PCB (#HIC-BOARD)

Resistance

Symbol	Resistance (Ω)	Tolerance	Rated wattage (W)	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
R121	10K	5%	1/16	C	HIC	B	12	1005
R122	5.1K	5%	1/16	C	HIC	B	16	1005
R200	10K	1%	1/16	C	HIC	A	13	1005
R201	510	5%	1/16	C	HIC	A	7	1005
R203	100	5%	1/16	C	HIC	B	8	1005
R206	5.1K	5%	1/16	C	HIC	B	16	1005
R208	10K	5%	1/16	C	HIC	B	12	1005
R209	10K	5%	1/16	C	HIC	B	12	1005
R211	10K	5%	1/16	C	HIC	A	12	1005
R212	390	5%	1/16	C	HIC	A	17	1005
R213	10K	5%	1/16	C	HIC	A	12	1005
R214	390	5%	1/16	C	HIC	A	17	1005
R215	100	5%	1/16	C	HIC	B	8	1005
R217	10K	5%	1/16	C	HIC	A	12	1005
R223	10K	5%	1/16	C	HIC	A	12	1005
R224	390	5%	1/16	C	HIC	A	17	1005
R225	5.1K	5%	1/16	C	HIC	B	16	1005
R226	10K	5%	1/16	C	HIC	B	12	1005
R227	10K	5%	1/16	C	HIC	A	12	1005
R228	390	5%	1/16	C	HIC	A	17	1005
R229	/	/	/	C	HIC	A	/	1005
R230	330	5%	1/16	C	HIC	A	48	1005
R234	100	5%	1/16	C	HIC	B	8	1005
R236	2.2K	5%	1/16	C	HIC	B	18	1005
R237	2.2K	5%	1/16	C	HIC	B	18	1005
R238	1K	5%	1/16	C	HIC	B	21	1005
R239	100	5%	1/16	C	HIC	B	8	1005
R240	100	5%	1/16	C	HIC	B	8	1005
R241	100	5%	1/16	C	HIC	B	8	1005
R242	160	5%	1/16	C	HIC	B	24	1005
R243	100	5%	1/16	C	HIC	B	8	1005
R244	3.32K	1%	1/16	C	HIC	B	25	1005
R247	100	5%	1/16	C	HIC	A	8	1005
R248	10K	5%	1/16	C	HIC	A	12	1005
R249	2.2K	5%	1/16	C	HIC	A	18	1005
R251	7.15K	1%	1/16	C	HIC	A	27	1005
R252	10K	1%	1/16	C	HIC	A	13	1005
R253	10K	1%	1/16	C	HIC	A	13	1005
R254	10K	1%	1/16	C	HIC	A	13	1005
R255	2K	5%	1/16	C	HIC	B	20	1005
R256	10K	5%	1/16	C	HIC	B	12	1005
R257	3K	5%	1/16	C	HIC	B	28	1005
R258	2.2K	1%	1/16	C	HIC	B	29	1005
R259	510	5%	1/16	C	HIC	A	7	1005
R260	510	5%	1/16	C	HIC	B	7	1005
R265	100	5%	1/16	C	HIC	B	8	1005
R271	5.1K	5%	1/16	C	HIC	A	16	1005
R272	5.1K	5%	1/16	C	HIC	A	16	1005
R273	390	5%	1/16	C	HIC	A	17	1005
R274	390	5%	1/16	C	HIC	A	17	1005
R275	100	5%	1/16	C	HIC	A	8	1005
R276	100	5%	1/16	C	HIC	A	8	1005
R277	100	5%	1/16	C	HIC	A	8	1005
R278	100	5%	1/16	C	HIC	A	8	1005
R281	510K	5%	1/16	C	HIC	B	40	1005
R282	1K	5%	1/16	C	HIC	B	21	1005
R288	/	/	/	C	HIC	A	/	1005
R289	/	/	/	C	HIC	A	/	1005
R290	24	5%	1/16	C	HIC	A	35	1005
R291	5.11K	1%	1/16	C	HIC	A	36	1005
R292	5.11K	1%	1/16	C	HIC	A	36	1005
R293	5.11K	1%	1/16	C	HIC	A	36	1005
R294	5.11K	1%	1/16	C	HIC	A	36	1005
R295	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R296	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R297	12.1K	1%	1/16	C	HIC	A	51	1005
R298	24	5%	1/16	C	HIC	A	35	1005
R299	10K	1%	1/16	C	HIC	A	13	1005
R301	3.74K	0.5%	1/16	C	HIC	B	42	1005
R302	3.01K	0.5%	1/16	C	HIC	B	43	1005
R303	3.01K	0.5%	1/16	C	HIC	B	43	1005
R304	1K	1%	1/16	C	HIC	B	39	1005
R305	10K	5%	1/16	C	HIC	A	12	1005
R311	12.7K	1%	1/16	C	HIC	B	52	1005
R321	1.8K	1%	1/16	C	HIC	B	44	1005
R322	1.8K	1%	1/16	C	HIC	B	44	1005
R325	10K	5%	1/16	C	HIC	A	12	1005
R326	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R350	10K	5%	1/16	C	HIC	A	12	1005
R351	10K	5%	1/16	C	HIC	A	12	1005
R352	10K	5%	1/16	C	HIC	A	12	1005
R353	10K	5%	1/16	C	HIC	A	12	1005
R354	10K	5%	1/16	C	HIC	A	12	1005
R355	10K	5%	1/16	C	HIC	A	12	1005
R356	10K	5%	1/16	C	HIC	A	12	1005
R357	10K	5%	1/16	C	HIC	A	12	1005
R358	10K	5%	1/16	C	HIC	A	12	1005
R359	10K	5%	1/16	C	HIC	A	12	1005
R360	10K	5%	1/16	C	HIC	B	12	1005
R361	10K	5%	1/16	C	HIC	A	12	1005
R362	10K	5%	1/16	C	HIC	A	12	1005
R364	10K	5%	1/16	C	HIC	B	12	1005
R365	10K	5%	1/16	C	HIC	B	12	1005
R366	10K	5%	1/16	C	HIC	B	12	1005
R367	10K	5%	1/16	C	HIC	B	12	1005
R368	10K	5%	1/16	C	HIC	B	12	1005
R369	10K	5%	1/16	C	HIC	B	12	1005
R370	~~10K~~	5%	1/16	C	HIC	B	/	1005

Resistance

Symbol	Resistance (Ω)	Tolerance	Rated wattage (W)	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
R371	10K	5%	1/16	C	HIC	B	12	1005
R372	10K	5%	1/16	C	HIC	B	12	1005
R373	10K	5%	1/16	C	HIC	A	12	1005
R374	1K	5%	1/16	C	HIC	B	21	1005
R375	10K	5%	1/16	C	HIC	B	12	1005
R401	1K	5%	1/16	C	HIC	B	21	1005
R402	1K	5%	1/16	C	HIC	B	21	1005
R403	1K	5%	1/16	C	HIC	B	21	1005
R404	1K	5%	1/16	C	HIC	B	21	1005
R436	5.1K	5%	1/16	C	HIC	A	16	1005
R437	10K	5%	1/16	C	HIC	A	12	1005
R522	10K	5%	1/16	C	HIC	B	12	1005
R523	10K	5%	1/16	C	HIC	B	12	1005
R524	10K	5%	1/16	C	HIC	B	12	1005
R525	430	5%	1/16	C	HIC	B	45	1005
R526	430	5%	1/16	C	HIC	B	45	1005
R527	430	5%	1/16	C	HIC	B	45	1005
R528	430	5%	1/16	C	HIC	A	45	1005
R529	430	5%	1/16	C	HIC	A	45	1005
R530	430	5%	1/16	C	HIC	A	45	1005
R531	~~Chip JUMPER~~	5%	1/16	C	HIC	B	~~38~~	1005
R532	~~Chip JUMPER~~	5%	1/16	C	HIC	B	~~38~~	1005
R533	~~Chip JUMPER~~	5%	1/16	C	HIC	B	~~38~~	1005
R630	24	5%	1/16	C	HIC	A	35	1005
R631	5.11K	1%	1/16	C	HIC	A	36	1005
R632	5.11K	1%	1/16	C	HIC	A	36	1005
R633	5.11K	1%	1/16	C	HIC	A	36	1005
R634	5.76K	1%	1/16	C	HIC	A	31	1005
R635	24	5%	1/16	C	HIC	A	35	1005
R636	24	5%	1/16	C	HIC	A	35	1005
R637	21.5K	1%	1/16	C	HIC	A	32	1005
R638	24	5%	1/16	C	HIC	A	35	1005
R639	10K	1%	1/16	C	HIC	A	13	1005
R640	24	5%	1/16	C	HIC	A	35	1005
R641	3.3K	1%	1/16	C	HIC	A	33	1005
R642	5.11K	1%	1/16	C	HIC	A	36	1005
R643	5.11K	1%	1/16	C	HIC	A	36	1005
R644	5.11K	1%	1/16	C	HIC	A	36	1005
R645	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R646	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R647	51K	1%	1/16	C	HIC	A	34	1005
R648	24	5%	1/16	C	HIC	A	35	1005
R649	43.2K	1%	1/16	C	HIC	A	47	1005
R650	5.1K	1%	1/16	C	HIC	A	22	1005
R651	1K	5%	1/16	C	HIC	B	21	1005
R652	510	5%	1/16	C	HIC	A	7	1005
R653	24	5%	1/16	C	HIC	A	35	1005
R654	24	5%	1/16	C	HIC	A	35	1005
R655	24	5%	1/16	C	HIC	A	35	1005
R656	24	5%	1/16	C	HIC	A	35	1005
R657	20K	5%	1/16	C	HIC	A	19	1005
R701	1.5K	5%	1/16	C	HIC	B	41	1005
R702	1.5K	5%	1/16	C	HIC	B	41	1005
R703	1.5K	5%	1/16	C	HIC	B	41	1005
R704	1.5K	5%	1/16	C	HIC	B	41	1005
R705	1.5K	5%	1/16	C	HIC	B	41	1005
R706	1.5K	5%	1/16	C	HIC	B	41	1005
R707	20K	5%	1/16	C	HIC	B	19	1005
R708	20K	5%	1/16	C	HIC	B	19	1005
R709	20K	5%	1/16	C	HIC	B	19	1005
R710	20K	5%	1/16	C	HIC	B	19	1005
R711	20K	5%	1/16	C	HIC	B	19	1005
R712	20K	5%	1/16	C	HIC	B	19	1005
R713	10	5%	1/4	C	HIC	B	49	3216
R714	10	5%	1/4	C	HIC	B	49	3216
R715	10	5%	1/4	C	HIC	B	49	3216
R716	1M	5%	1/10	C	HIC	B	50	1608
R717	1K	5%	1/16	C	HIC	A	21	1005
R718	Chip JUMPER	5%	1/16	C	HIC	B	38	1005
R719	Chip JUMPER	5%	1/16	C	HIC	B	38	1005
R721	2K	5%	1/16	C	HIC	A	20	1005
R722	2K	5%	1/16	C	HIC	A	20	1005
R723	2K	5%	1/16	C	HIC	A	20	1005
R724	2K	5%	1/16	C	HIC	A	20	1005
R725	2K	5%	1/16	C	HIC	A	20	1005
R726	2K	5%	1/16	C	HIC	A	20	1005
R727	100	5%	1/16	C	HIC	A	8	1005
R728	100	5%	1/16	C	HIC	A	8	1005
R729	100	5%	1/16	C	HIC	A	8	1005
R730	100	5%	1/16	C	HIC	A	8	1005
R731	100	5%	1/16	C	HIC	A	8	1005
R732	100	5%	1/16	C	HIC	A	8	1005
R754	11K	1%	1/16	C	HIC	B	30	1005
R758	/	/	/	C	HIC	A	/	1005
R759	/	/	/	C	HIC	A	/	1005
R760	24	5%	1/16	C	HIC	A	35	1005
R761	5.11K	1%	1/16	C	HIC	A	36	1005
R762	5.11K	1%	1/16	C	HIC	A	36	1005
R763	5.11K	1%	1/16	C	HIC	A	36	1005
R764	5.11K	1%	1/16	C	HIC	A	36	1005
R765	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R766	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R767	18.7K	1%	1/16	C	HIC	A	46	1005
R768	24	5%	1/16	C	HIC	A	35	1005
R769	10K	1%	1/16	C	HIC	A	13	1005
R770	/	/	/	C	HIC	A	/	1005
R805	Chip JUMPER	5%	1/16	C	HIC	A	38	1005
R990	100	5%	1/16	C	HIC	A	8	1005
R991	100	5%	1/16	C	HIC	A	8	1005
R992	100	5%	1/16	C	HIC	A	8	1005

Capacitor

Symbol	Capacity (μF)	Voltage (V)	Assortment	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
C128	0.1	16	C	C	HIC	B	55	1005
C129	0.1	25	C	C	HIC	B	59	1608
C133	0.1	25	C	C	HIC	B	59	1608
C191	0.1	25	C	C	HIC	B	63	R spec 1608
C201	0.1	16	C	C	HIC	A	55	1005
C202	0.1	16	C	C	HIC	B	55	1005
C203	/	/	/	/	HIC	/	/	1005
C204	470p	50	C	C	HIC	A	60	R spec 1005
C205	0.047	25	C	C	HIC	B	54	R spec 1005
C206	470p	50	C	C	HIC	B	60	R spec 1005
C207	470p	50	C	C	HIC	A	60	R spec 1005
C209	0.1	16	C	C	HIC	A	55	1005
C210	0.1	16	C	C	HIC	B	55	1005
C211	0.047	25	C	C	HIC	B	54	R spec 1005
C215	/	/	C	C	HIC	A	/	1005
C216	0.1	16	C	C	HIC	B	55	1005
C217	0.1	16	C	C	HIC	B	55	1005
C218	0.1	16	C	C	HIC	B	55	1005
C220	0.01	25	C	C	HIC	B	70	R spec 1005
C222	/	/	/	/	HIC	B	/	1005
C223	1000p	50	C	C	HIC	B	68	B spec 1005
C224	0.1	16	C	C	HIC	B	55	1005
C231	0.1	16	C	C	HIC	B	55	1005
C234	0.1	16	C	C	HIC	B	55	1005
C235	0.1	16	C	C	HIC	B	55	1005
C236	0.1	16	C	C	HIC	B	55	1005
C237	0.1	16	C	C	HIC	B	55	1005
C238	0.1	16	C	C	HIC	B	55	1005
C239	0.1	16	C	C	HIC	B	55	1005
C240	0.1	16	C	C	HIC	B	55	1005
C241	0.1	16	C	C	HIC	B	55	1005
C251	2200p	50	C	C	HIC	A	61	CH spec 1608
C252	0.068	25	C	C	HIC	B	62	R spec 1608
C271	0.1	16	C	C	HIC	A	55	1005
C281	0.1	16	C	C	HIC	B	55	1005
C282	0.1	16	C	C	HIC	A	55	1005
C283	0.22	16	C	C	HIC	B	57	B spec 1608
C285	0.1	16	C	C	HIC	A	55	1005
C291	0.1	25	C	C	HIC	A	59	1608
C292	0.047	25	C	C	HIC	A	54	R spec 1005
C294	/	/	/	/	HIC	/	/	1005
C321	0.033	50	C	C	HIC	B	65	R spec 1608
C430	0.1	16	C	C	HIC	A	55	1005
C432	0.1	16	C	C	HIC	B	55	1005
C504	100p	50	C	C	HIC	B	76	CH spec 1005
C505	100p	50	C	C	HIC	B	76	CH spec 1005
C506	100p	50	C	C	HIC	B	76	CH spec 1005
C508	0.1	16	C	C	HIC	B	55	1005
C509	220p	50	C	C	HIC	B	67	B spec 1005
C631	0.047	25	C	C	HIC	A	54	R spec 1005
C632	0.047	25	C	C	HIC	A	54	R spec 1005
C641	0.047	25	C	C	HIC	A	54	R spec 1005
C652	/	50	/	/	HIC	A	/	1005
C653	0.1	16	C	C	HIC	B	55	1005
C702	0.33	25	C	C	HIC	B	74	B spec 2125
C703	2200p	50	C	C	HIC	B	75	B spec 1005
C704	1000p	50	C	C	HIC	A	68	B spec 1005
C706	0.1	16	C	C	HIC	B	55	1005
C711	100p	50	C	C	HIC	A	73	CH spec 1608
C712	100p	50	C	C	HIC	A	73	CH spec 1608
C713	100p	50	C	C	HIC	A	73	CH spec 1608
C714	100p	50	C	C	HIC	A	73	CH spec 1608
C715	100p	50	C	C	HIC	A	73	CH spec 1608
C716	100p	50	C	C	HIC	A	73	CH spec 1608
C717	/	/	/	/	HIC	B	/	2125
C718	/	/	/	/	HIC	B	/	1608
C721	10	25	D	C	HIC	A	72	WR
C722	10	25	D	C	HIC	A	72	WR
C723	10	25	D	C	HIC	A	72	WR
C724	0.1	25	C	C	HIC	A	63	R spec 1608
C725	0.1	25	C	C	HIC	A	63	R spec 1608
C726	0.1	25	C	C	HIC	B	63	R spec 1608
C737	100p	50	C	C	HIC	B	73	1608
C738	100p	50	C	C	HIC	B	73	1608
C739	100p	50	C	C	HIC	B	73	1608
C740	100p	50	C	C	HIC	B	73	1608
C741	100p	50	C	C	HIC	B	73	1608
C742	100p	50	C	C	HIC	A	73	1608
C762	0.01	25	C	C	HIC	A	70	R spec 1005
C764	/	/	/	/	HIC	A	/	1005
C801	0.022	50	C	C	HIC	A	69	B spec 1608
C806	0.022	50	C	C	HIC	A	69	B spec 1608
C808	47p	50	C	C	HIC	A	66	CH spec 1005
C931	0.1	16	C	C	HIC	A	55	1005
C932	0.1	16	C	C	HIC	A	55	1005

Diode

Symbol	Type	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
D201	KDS181-RTK/P	C	HIC	B	79	
D202	KDS181-RTK/P	C	HIC	B	79	
D251	KDS184-RTK/P	C	HIC	B	82	
D271	KDS184-RTK/P	C	HIC	B	82	
D272	KDS181-RTK/P	C	HIC	B	79	
D273	1SS352TPH3F	C	HIC	A	85	
D291	KDS226-RTK/P	C	HIC	A	83	
D310	KDS226-RTK/P	C	HIC	B	83	
D321	KDS184-RTK/P	C	HIC	B	82	
D322	KDS181-RTK/P	C	HIC	B	79	
D631	KDS226-RTK/P	C	HIC	A	83	DAN217
D641	1SS352TPH3F	C	HIC	A	85	DAN217
D701	/	/	HIC	/	/	
D702	/	/	HIC	/	/	
D703	/	/	HIC	/	/	
D704	/	/	HIC	/	/	
D705	/	/	HIC	/	/	
D706	/	/	HIC	/	/	
D711	D1FK60	C	HIC	A	84	
D712	D1FK60	C	HIC	A	84	
D713	D1FK60	C	HIC	A	84	
D721	1SS355VM	C	HIC	B	80	
D722	1SS355VM	C	HIC	B	80	
D723	1SS355VM	C	HIC	B	80	
D724	1SS355VM	C	HIC	A	80	
D725	1SS355VM	C	HIC	A	80	
D726	1SS355VM	C	HIC	A	80	
D731	1SS355VM	C	HIC	B	80	
D732	1SS355VM	C	HIC	B	80	
D733	1SS355VM	C	HIC	B	80	
D735	1SS355VM	C	HIC	B	80	
D761	KDS226-RTK/P	C	HIC	A	83	
D801	KDS226-RTK/P	C	HIC	A	83	
D802	KDS226-RTK/P	C	HIC	A	83	

IC

Symbol	Type	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
IC2	TD62003AFG	S	HIC	B	101	
IC3	NJM2742M	S	HIC	A	102	
IC5	NJM2903E	S	HIC	A	105	
IC6	μPC4742G2	S	HIC	A	104	
IC8	74AHC08PW	S	HIC	A	106	
IC10	R3112N421C-TR	S	HIC	B	100	
IC702	6ED003L06	S	HIC	A	103	
E²PROM	S-24C32C1-T8T1U3	S	HIC	A	99	
MICON	RX62T	S	HIC	A	97	

ZENER DIODE

Symbol	Type	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
ZD701	/	/	HIC	/	/	
ZD702	/	/	HIC	/	/	
ZD703	/	/	HIC	/	/	

TRANSISTOR

Symbol	Type	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
Q121	SSM3J314T	C	HIC	B	92	
Q122	RN1115TE85L	C	HIC	B	93	
Q203	DTC143EEBTL	C	HIC	B	90	
Q251	KTC3875SGR	C	HIC	B	88	
Q273	RN1102TE	C	HIC	A	91	
Q641	RN1102TE	C	HIC	A	91	DTC114ES
Q701	DTC114EEBTL	C	HIC	A	89	
Q702	DTC114EEBTL	C	HIC	A	89	
Q703	DTC114EEBTL	C	HIC	A	89	

INDUCTOR

Symbol	Type	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
L810	/	/	HIC	/	/	

OSCILLATOR

Symbol	Type	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
X1	CSTCE12M5G	C	HIC	A	96	12.5MHZ

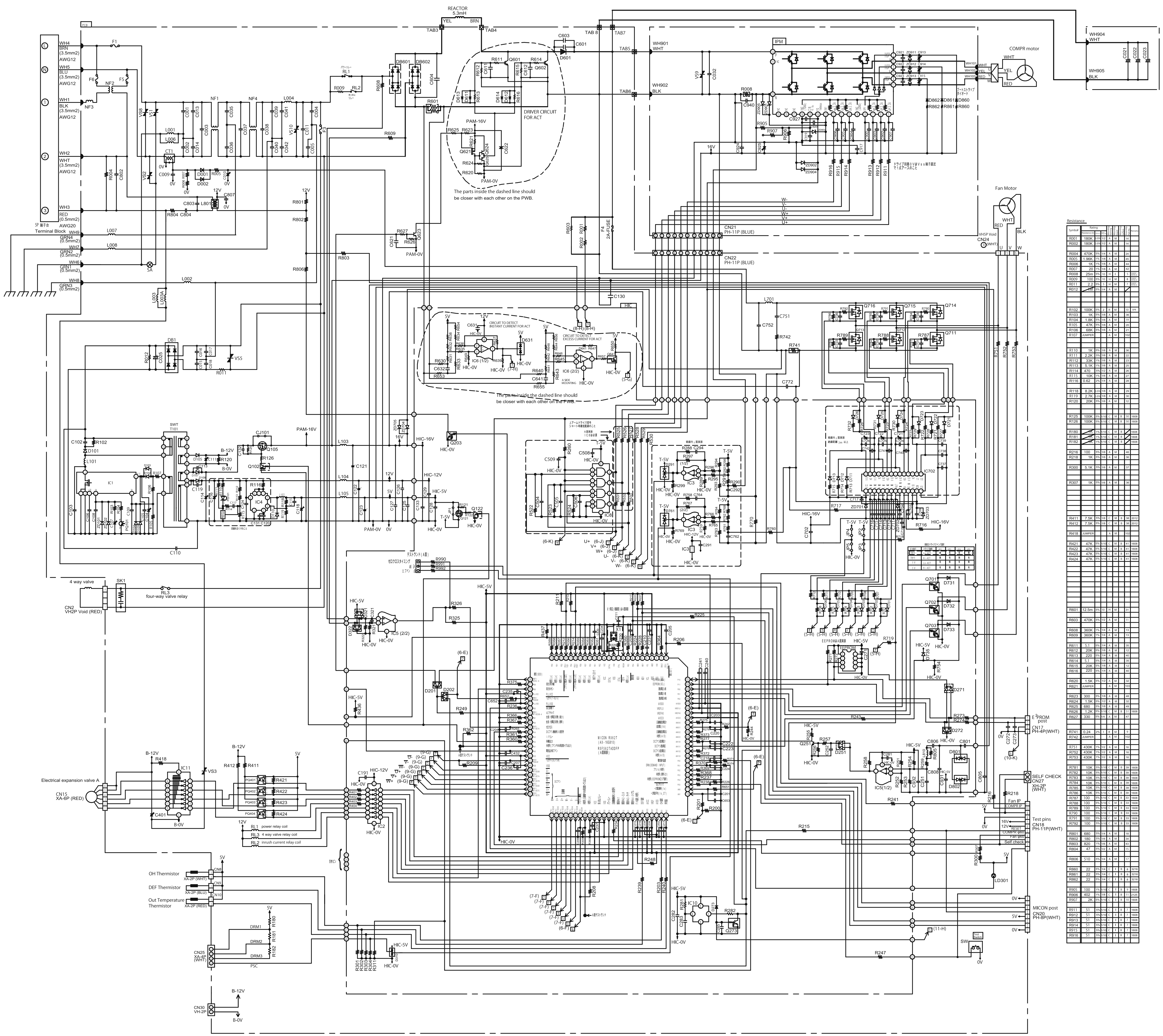
JUMPER

Symbol	EXIST / NO	Mounting forming	Mounting board	Mounting surface	Assembly Part No.	Remarks
JP1	NO	/	HIC	/	/	1005
JP2	NO	/	HIC	/	/	1005
JP3	EXIST	C	HIC	A	38	1005
JP4	EXIST	C	HIC	A	38	1005
JP5	NO	C	HIC	A	/	1005

CIRCUIT DIAGRAM

MODEL RAC-50NPE/RAC-60NPE

P.W.B. : MAIN, IPM, CAPA



MOUNTING FOARMING

A : AXIAL INSERTION
R : RADIAL INSERTION
P : RADIAL INSERTION (7.5mm pitch)
H : HAND INSERTION
C : CHIP

MOUNTING BOARD

M : MAIN PCB (#MBOARD-AS)
I : IPM PCB (#IPM-BOARD)
C : CAPA PCB (#CAPA-BORD)

Resistance

Symbol	Resistance (Ω)	Tolerance	Rated wattage	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
R001	180K	0.5%	1/2	A	M		14	
R002	180K	0.5%	1/2	A	M		14	
R004	470K	5%	1/4	A	M		24	
R005	1.96K	1%	1/6	A	M		45	
R006	1K	1%	1/6	A	M		44	
R007	20	1%	1/6	A	M		42	
R008	25m	5%	10	H	I		5	CEMENT VERTICAL
R009	100	5%	10	H	M		8	CEMENT VERTICAL
R011	2.2	5%	5	H	M		7	CEMENT VERTICAL
R012	1M	5%	1/4	A	M		/	
R102	100K	5%	2	R	M		10	SPR
R103	1K	5%	1/6	A	M		36	
R104	1.8K	5%	1/6	A	M		19	
R105	47K	5%	1/6	A	M		20	
R106	68K	5%	1/6	A	M		21	
R107	JUMPER			A	M		102	
R110	1K	5%	1/6	A	M		36	
R111	2.2K	5%	1/6	A	M		22	
R112	33K	1%	1/6	A	M		23	
R113	5.1K	1%	1/6	A	M		25	
R114	470	5%	1/2	A	M		26	
R115	10K	1%	1/6	A	M		27	
R116	0.62	2%	1/4	A	M		28	
R118	8.2K	0.5%	1/6	A	M		29	
R119	2.7K	0.5%	1/6	A	M		30	
R120	20K	5%	1/6	A	M		12	
R125	100K	5%	1/10	C	M	B	50	1608
R126	100K	5%	1/10	C	M	B	50	1608
R180	1K	1%	1/10	C	M	B	/	1608
R181	1K	1%	1/10	C	M	B	/	1608
R182	1K	1%	1/10	C	M	B	/	1608
R216	100	5%	1/6	A	M		46	
R218	1K	5%	1/6	A	M		36	
R300	5.1K	5%	1/6	A	M		37	
R307	1K	5%	1/6	A	M		36	
R411	7.5K	5%	1/8	C	M	B	38	2012
R412	7.5K	5%	1/8	C	M	B	38	2012
R418	JUMPER			A	M		102	
R421	47K	5%	1/10	C	M	B	41	1608
R422	47K	5%	1/10	C	M	B	41	1608
R423	47K	5%	1/10	C	M	B	41	1608
R424	47K	5%	1/10	C	M	B	41	1608
R601	12.5m	5%	10	H	M		31	
R603	470K	5%	1/2	A	M		11	
R608	360K	1%	1/4	A	M		13	
R609	360K	1%	1/4	A	M		13	
R611	5.1	5%	1/4	A	M		35	
R612	20K	5%	1/6	A	M		12	
R613	220	5%	1/4	A	M		40	
R614	5.1	5%	1/4	A	M		35	
R615	20K	5%	1/6	A	M		12	
R616	220	5%	1/4	A	M		40	
R620	1.5K	5%	1/2	A	M		32	
R621	JUMPER			A	M		103	
R623	300	5%	1/6	A	M		48	
R624	1.5K	5%	1/2	A	M		32	
R625	680	5%	1/6	A	M		49	
R626	1.2K	5%	1/10	C	M	B	51	1608
R627	330	5%	1/4	A	M		47	
R741	0.24	2%	1	R	M		9	
R742	JUMPER			A	M		102	
R751	430K	1%	1/2	A	M		16	
R752	430K	1%	1/2	A	M		16	
R753	430K	1%	1/2	A	M		16	
R781	10K	5%	1/10	C	M	B	39	1608
R782	10K	5%	1/10	C	M	B	39	1608
R783	10K	5%	1/10	C	M	B	39	1608
R784	10K	5%	1/10	C	M	B	39	1608
R785	10K	5%	1/10	C	M	B	39	1608
R786	10K	5%	1/10	C	M	B	39	1608
R787	100	5%	1/10	C	M	B	33	1608
R788	100	5%	1/10	C	M	B	33	1608
R789	100	5%	1/10	C	M	B	33	1608
R790	100	5%	1/10	C	M	B	33	1608
R791	100	5%	1/10	C	M	B	33	1608
R792	100	5%	1/10	C	M	B	33	1608
R801	680	5%	1/4	A	M		18	
R802	180	5%	1/6	A	M		34	
R803	820	1%	1/6	A	M		43	
R804	47	5%	1/2	A	M		15	
R806	510	5%	1/4	A	M		17	
R860	22	5%	1/4	C	I	B	8	3216
R861	22	5%	1/4	C	I	B	8	3216
R862	22	5%	1/4	C	I	B	8	3216
R905	100	1%	1/10	C	I	B	9	1608
R906	402	1%	1/8	C	I	B	11	2125
R907	2K	5%	1/10	C	I	B	10	1608
R911	51	5%	1/10	C	I	B	7	1608
R912	51	5%	1/10	C	I	B	7	1608
R913	51	5%	1/10	C	I	B	7	1608
R914	51	5%	1/10	C	I	B	7	1608
R915	51	5%	1/10	C	I	B	7	1608
R916	51	5%	1/10	C	I	B	7	1608

Capacitor

Symbol	Capacity (μF)	Voltage (V)	Assortment	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
C102	1000p	1K	C	P	M		57	R Spec RRCP2941
C103	220p	2K	C	P	M		56	R Spec
C104	100	50	D	R	M		59	KMG
C105	0.1	50	C	A	M		79	F Spec
C106	1	50	C	A	M		64	F Spec
C107	22	25	D	R	M		66	KMG
C108	0.047	50	C	A	M		67	B Spec
C109	15p	50	C	A	M		68	CH Spec
C110	/	AC 250	C	R	M		/	
C111	470	25	D	R	M		73	KY
C113	/		D	R	M		/	
C114	470	25	D	R	M		73	KY
C115	470p	50	C	A	M		76	F Spec
C116	470	25	D	R	M		74	LXZ
C117	0.1	50	C	A	M		79	F Spec
C118	330	16	D	R	M		77	LXZ
C119	/	/	C	R	M		/	
C120	330p	50	C	A	M		78	CH Spec
C121	100	25	D	R	M		83	KY
C122	/	25	D	R	M		/	KY
C123	100	10	D	R	M		84	KY
C124	0.1	50	C	A	M		79	F Spec
C125	0.1	50	C	C	M	B	80	F Spec 1608
C126	0.1	50	C	C	M	B	80	F Spec 1608
C127	0.1	50	C	C	M	B	80	F Spec 1608
C130	/	50	C	A	M		/	
C131	/	50	C	A	M		/	
C132	0.1	50	C	C	M	B	/	B Spec 1608
C001	0.01	AC 300	C	R	M		61	Murata KH
C002	0.01	AC 300	C	R	M		61	Murata KH
C003	0.68	AC 310	F	H	M		70	OKAYA LE-MX
C004	0.01	AC 300	C	R	M		61	Murata KH
C005	0.01	AC 300	C	R	M		61	Murata KH
C009	0.1	50	C	A	M		79	F Spec
C010	100	50	D	R	M		63	NICHICON VR
C011	3.3	AC 275	F	H	M		71	OKAYA LE-MX
C013	0.01	AC 300	C	R	M		61	Murata KH
C014	0.01	AC 300	C	R	M		61	Murata KH
C015	4700p	AC 250	C	R	M		74	Murata KH
C016	4700p	AC 250	C	R	M		74	Murata KH
C017	4700p	AC 250	C	R	M		74	Murata KH
C018	4700p	AC 250	C	R	M		74	Murata KH
C021	500	450	D	H	C		6	
C022	500	450	D	H	C		6	
C023	500	450	D	H	C		6	
C025	68	450	D	H	M		72	KXG φ18x31.5
C032	0.1	450	F	H	I		15	OKAYA AFP
C035	/	AC 250	C	R	M		/	Murata KH
C036	/	AC 250	C	R	M		/	Murata KH
C037	/	AC 250	C	R	M		/	Murata KH
C038	0.68	AC 310	F	H	M		70	OKAYA LE-MX
C039	0.01	AC 300	C	R	M		61	Murata KH
C040	0.01	AC 300	C	R	M		61	Murata KH
C041	0.01	AC 300	C	R	M		61	Murata KH
C042	0.01	AC 300	C	R	M		61	Murata KH
C272	100p	50	C	A	M		81	CH Spec
C273	100p	50	C	A	M		81	CH Spec
C401	100	25	D	R	M		65	NICHICON VR
C601	4700p	DC 1KV	C	R	M		62	R Spec
C603	2200p	DC 1KV	C	R	M		/	
C604	0.01	DC 1KV	C	R	M		58	E Spec
C611	/	50	C	A	M		/	
C612	/	50	C	A	M		/	
C621	100p	50	C	C	M	B	54	CH Spec 1608
C622	47	25	D	H	M		55	NICHICON ST
C731	220p	50	C	C	M	B	82	CH Spec 1608
C732	220p	50	C	C	M	B	82	CH Spec 1608
C733	220p	50	C	C	M	B	82	CH Spec 1608
C734	220p	50	C	C	M	B	82	CH Spec 1608
C735	220p	50	C	C	M	B	82	CH Spec 1608
C736	220p	50	C	C	M	B	82	CH Spec 1608
C751	0.01	DC 1KV	C	R	M		58	E Spec
C752	/	/	C	R	M	/	/	
C772	0.1	50	C	C	M	B	80	F Spec 1608
C802	4700p	AC 250	C	R	M		60	F Spec
C803	0.022	50	F	R	M		75	
C804	0.1	AC 310	F	H	M		69	OKAYA LE-MX
C805	0.1	50	C	C	M	B	80	F Spec 1608
C807	0.1	50	C	C	M	B	80	F Spec 1608
C900	0.1	50	C	C	I	B	17	F Spec 1608
C901	680p	50	C	C	I	B	18	CH Spec 1608
C902	680p	50	C	C	I	B	18	CH Spec 1608
C903	680p	50	C	C	I	B	18	CH Spec 1608
C904	680p	50	C	C	I	B	18	CH Spec 1608
C905	680p	50	C	C	I	B	18	CH Spec 1608
C906	680p	50	C	C	I	B	18	CH Spec 1608
C913	33	25	D	R	I		13	NICHICON SV(105°C)
C914	33	25	D	R	I		13	NICHICON SV(105°C)
C915	33	25	D	R	I		13	NICHICON SV(105°C)
C917	/	/	C	A	I	B	/	F Spec 1608
C919	0.022	50	C	C	I	B	19	B Spec
C920	0.1	50	C	C	I	B	17	F Spec 1608
C921	0.1	50	C	C	I	B	17	F Spec 1608
C922	0.1	50	C	C	I	B	17	F Spec 1608
C923	0.1	50	C	C	I	B	17	F Spec 1608
C924	0.1	50	C	C	I	B	17	F Spec 1608
C925	220	25	D	R	I		14	NICHICON RZ
C927	220p	50	C	C	I	B	20	CH Spec 1608
C940	0.1	50	C	C	I	B	/	F Spec 1608

LED

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
LD301	SLR-342VC	R	M	98	RED

Diode

Symbol	Type	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
D101	SARS01	A	M		89	
D102	DA2JF23	C	M	B	/	
D103	D1NL20U	A	M		88	
D104	RB721Q	A	M		94	D109
D105	RL2Z	H	M		92	
D107	D1NL20U	A	M		88	
D108	EL1Z	A	M		93	
D109	DB2J314	C	M	B	/	
D110	AK04	A	M		95	
D001	1SS120	A	M		87	
D002	DA3X101K	C	M	B	/	1SS120
D601	D30L60	H	M		91	RREB 5186
D611	1SS120	A	M	B	87	
D612	1SS120	A	M	B	87	
D613	DA3X101K	C	M	B	/	1SS120
D614	DA3X101K	C	M	B	/	1SS120
D860	D1NK60	A	I		22	
D861	D1NK60	A	I		22	
D862	D1NK60	A	I		22	
DB1	D2SB60A	H	M		90	
DB601	LL25XB60	H	M		99	
DB602	LL25XB60	H	M		99	

Zener Diode

Symbol	Type	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
ZD101	HZS5A1	A	M		96	
ZD102	/	C	M		/	ZD101
ZD704	TFZ 22B	C	M	B	/	
ZD705	HZ22-1TA-E	A	M		97	ZD704
ZD901	TFZ 22B	C	I	B	/	
ZD902	TFZ 22B	C	I	B	/	
ZD903	/	C	I			
ZD904	HZ22-1TA-E	A	I		23	ZD902
ZD905	HZ22-1TA-E	A	I		23	ZD901
ZD911	/	C	I			
ZD912	/	C	I			
ZD913	/	C	I			

Transistor

Symbol	Type	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
Q102	DTC123YK	C	M	B	106	
Q105	RRR040P03TL	C	M	B	105	
Q601	RGCL60TK60	H	M		107	
Q602	RGCL60TK60	H	M		107	
Q621	2SJ496	R	M		108	
Q623	KTC200-Y	R	M		109	
Q624	2SC1214CTZ	R	M		110	
Q625	2SA673CTZ	R	M		111	
Q711	P5F50HP2F	H	M		112	
Q712	P5F50HP2F	H	M		112	
Q713	P5F50HP2F	H	M		112	
Q714	P5F50HP2F	H	M		112	
Q715	P5F50HP2F	H	M		112	
Q716	P5F50HP2F	H	M		112	

IC

Symbol	Type	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
IC1	MIP4140S	H	M		118	
IC4	NJM2392D	H	M		117	
IC11	TD62003AP	H	M		119	
REG2	KIA431-A-AT/PC	R	M		120	
IPM	PS21965-4W	H	I		25	

Inductor

Symbol	Type	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
L001	JUMPER	A	M		102	
L002	JUMPER	A	M		102	
L003	JUMPER	A	M		/	
L003A	NLCV32T4R7	C	M	B	129	3225
L004	NORMAL COIL	H	M		131	
L006	FBA04HA600BB-00	A	M		/	
L007	JUMPER	A	M		/	
L008	JUMPER	A	M		102	
L101	JUMPER	A	M		102	
L102	RCH108NP-331K	H	M		130	SUMIDA RRMH9411
L103	JUMPER	A	M		102	
L104	JUMPER	A	M		102	
L105	JUMPER	A	M		102	
L701	JUMPER	A	M		102	
L801	IF-TRANS	H	M		125	
T101	RRMF4331	H	M		123	
CT1	S19-J299CT	H	M		124	
NF1	RRMH3925	H	M		126	
NF2	RRMH3900	H	M		127	
NF3	RRMH3728	H	M		128	
NF4	RRMH3925	H	M		126	

Surge Absorbers

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
VS1	ERZVA9V431	R	M	139	
VS2	ERZVA9V431	R	M	139	
VS3	ERZVA5V471	R	M	140	
VS5	ERZVA9V431	R	M	139	
VS8	450NR-12D	H	M	138	
VS9	450NR-12D	H	I	/	
VS10	ERZVA9V431	R	M	139	
SA	DE37-102MF	R	M	143	
SK1	RE1201-C	H	M	146	

Photo Coupler

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
PQ101	LTV-817CHA	H	M	114	
PQ401	LTV-817CHA	H	M	114	
PQ402	LTV-817CHA	H	M	114	
PQ403	LTV-817CHA	H	M	114	
PQ404	LTV-817CHA	H	M	114	

Relay

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
RL1	G4A-1A-PE	H	M	134	
RL2	ALD112B01	H	M	135	
RL3	ALD112B01	H	M	135	

Fuse

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
F1	25A FUSE	H	M	152	HOLDER TYPE
F3	3A - FUSE-WE	H	M	154	READ TYPE
F4	2A - FUSE-WE	H	M	155	READ TYPE
F5	3.15A - FUSE	H	M	153	HOLDER TYPE
F6	3.15A - FUSE	H	M	153	HOLDER TYPE

Fuse Clip

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
F1	RRPM1075	H	M	156	φ5.2x20mm
F5	RRPM3094	R	M	157	φ5.2x20mm
F6	RRPM3094	R	M	157	φ5.2x20mm

Connector

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
CN2	VH 2P (/4)	H	M	160	RED
CN8	XA 2P	H	M	161	WHITE
CN9	XA 2P	H	M	162	BLUE
CN10	XA 2P	H	M	163	RED
CN15	XA 6P	H	M	169	WHITE
CN17	PH 4P	H	M	164	WHITE
CN18	PH 11P	H	M	171	WHITE
CN20	PH 8P	H	M	170	WHITE
CN21	PH 11P	H	I	27	BLUE
CN22	PH 11P	H	M	172	BLUE
CN24	VH 3P (/5)	H	M	165	WHITE
CN25	XA 4P	H	M	/	WHITE
CN27	XA 2P	H	M	166	WHITE
CN30	VH 2P	H	M	/	WHITE

Switch

Symbol	Type	Mounting-forming	Mounting-board	Assembly-Part No.	Remarks
SW	EVQPAE07K	H	M	149	

Jumper

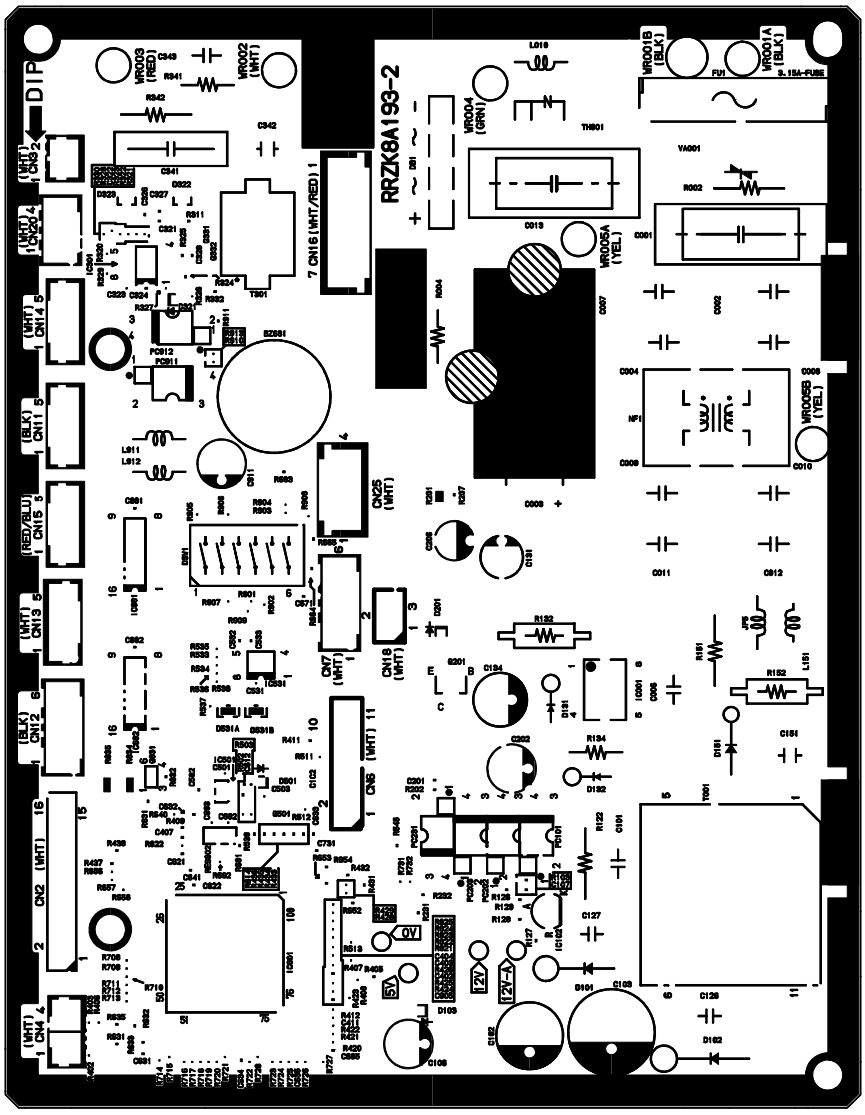
Symbol	Exist / No	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
JP01	NO	/	M	/	/	
JP02	NO	/	M	/	/	
CJ101	NO	A	M	B		

250TAB

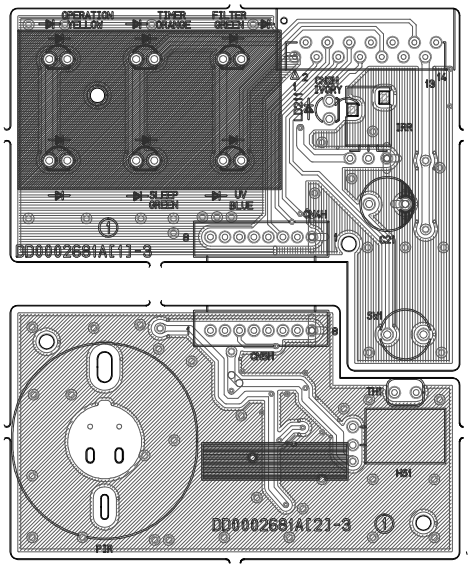
Symbol	Dwg. / No	Mounting-forming	Mounting-board	Mounting-surface	Assembly-Part No.	Remarks
TAB3	RRPJ2142	R	M	A	174	
TAB4	RRPJ2142	R	M	A	174	
TAB5	RRPJ2142	R	M	A	174	
TAB6	RRPJ2142	R	M	A	174	
TAB7	RRPJ2142	R	M	A	174	
TAB8	RRPJ2142	R	M	A	174	

PRINTED BOARD LOCATION DIAGRAM

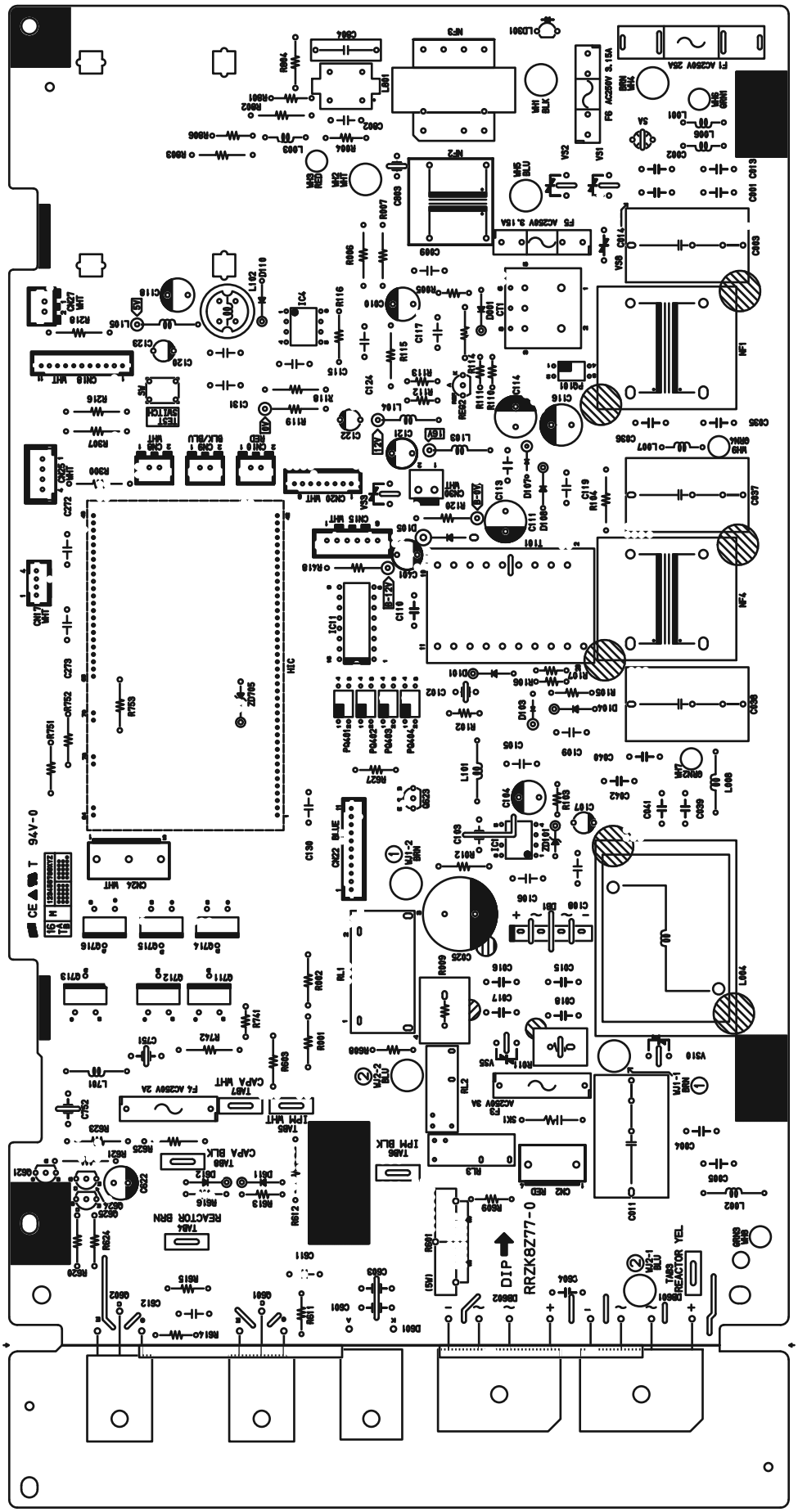
MAIN P.W.B
Marking on P.W.B



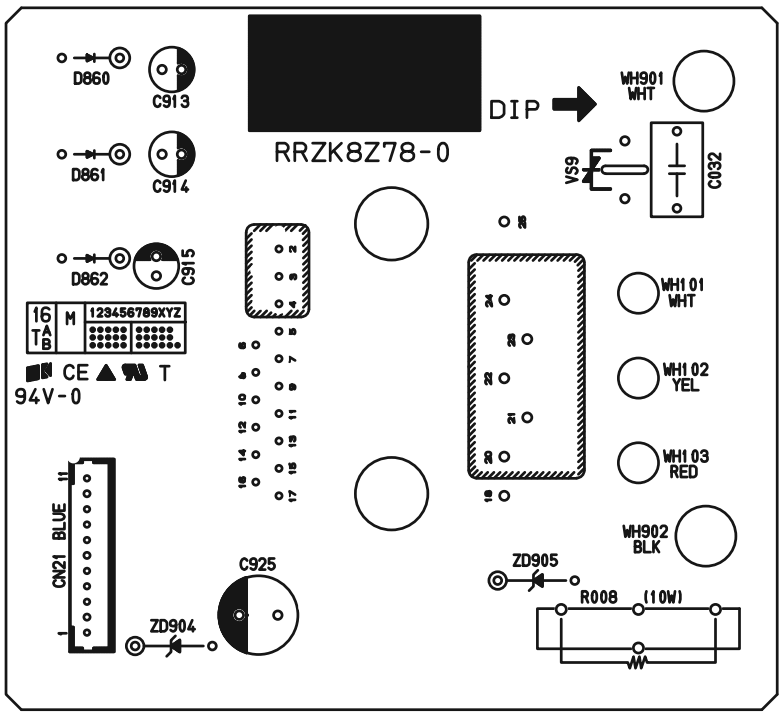
RECEIVING P.W.B
Marking on P.W.B



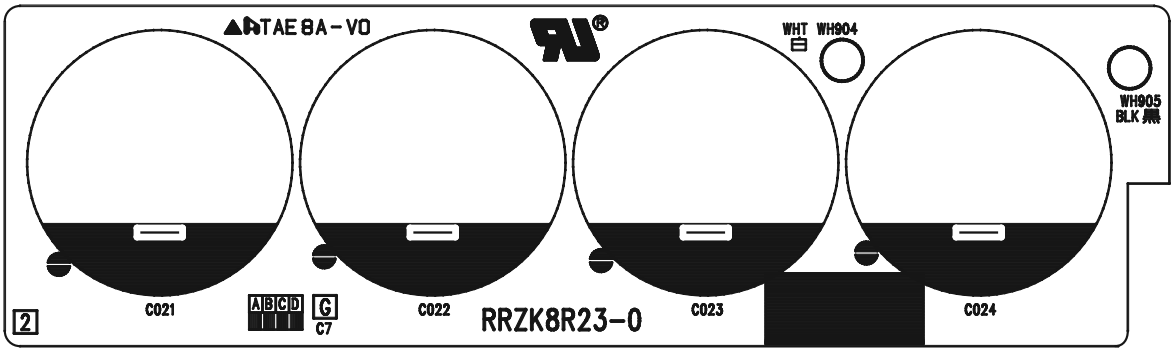
P.W.B. MAIN



P.W.B. IPM



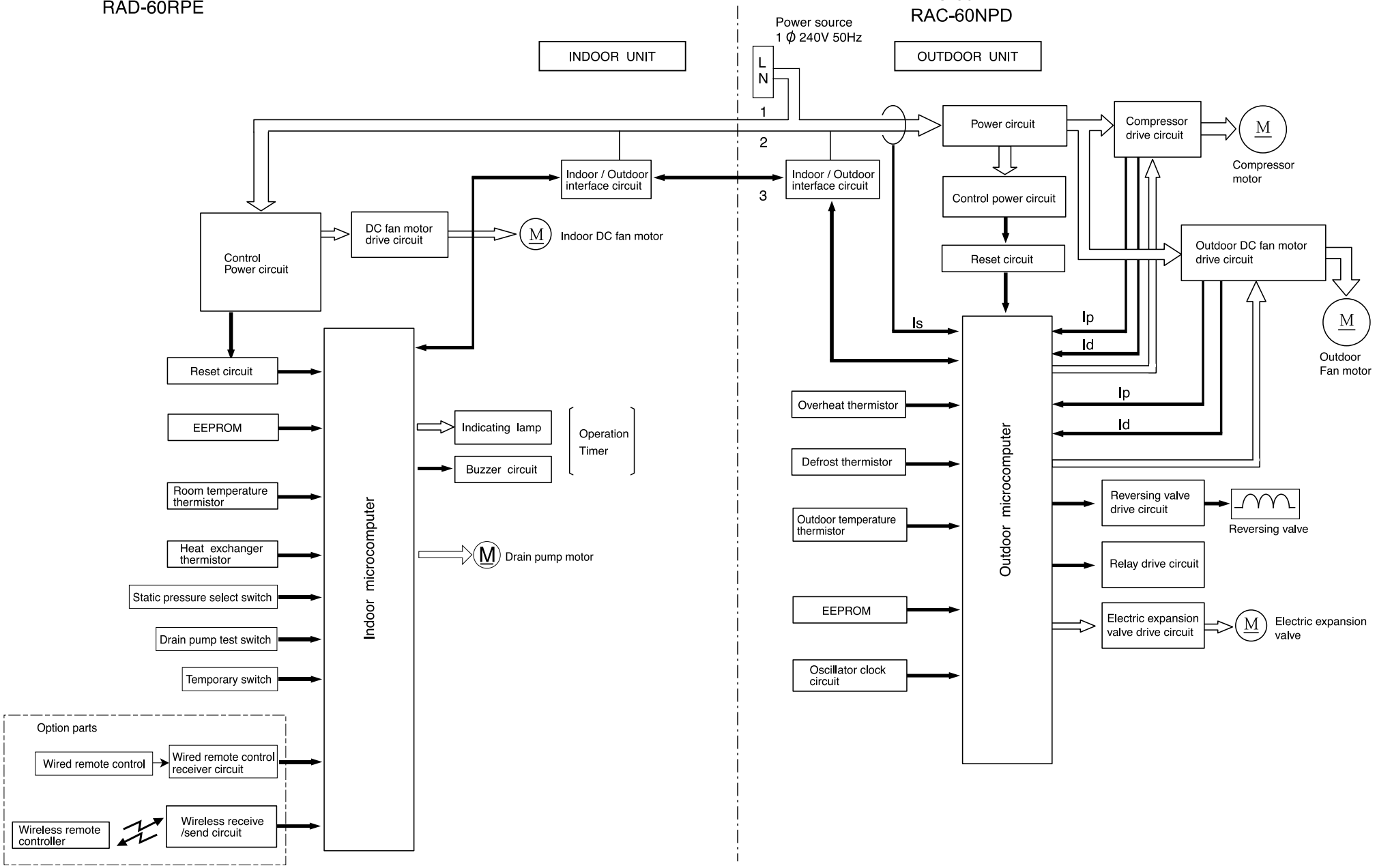
P.W.B. CAPA-BOARD



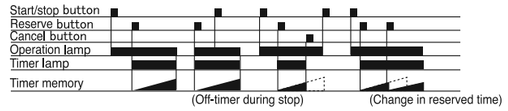
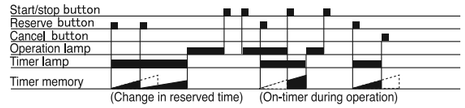
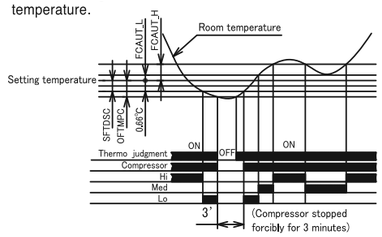
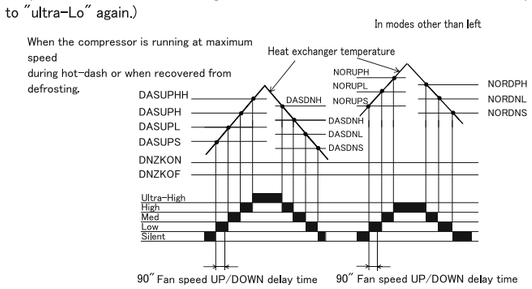
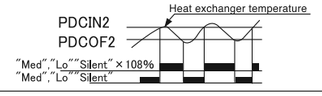
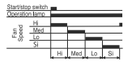
BLOCK DIAGRAM

MODEL RAD-50RPE
RAD-60RPE

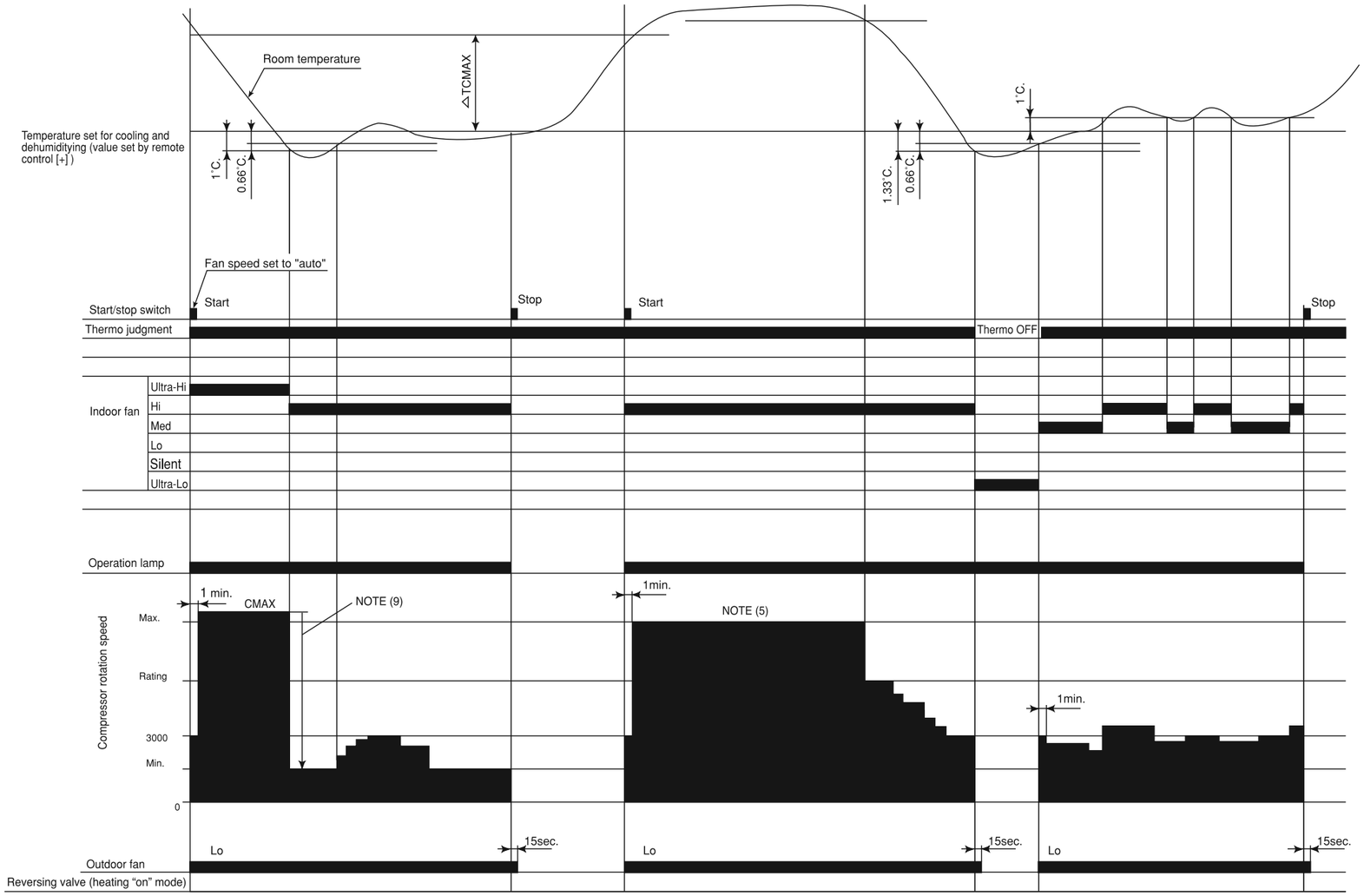
RAC-50NPD
RAC-60NPD



BASIC MODE

Operation mode		Fan	Cooling	Dehumidifying	Heating	Auto
Basic operation of start/stop button						
Timer functions	Off-timer					
	On-timer					
Fan speed mode (indoor fan)	Auto		Changes from "Hi" to "Med" or "Lo" depending on room temperature.  1. Runs at "Hi" until room temperature reaches to "setting temperature−SFTDSC" after operation is started. 2. Runs at "ultra−Lo" when thermo is off.		Set to "ultra−Lo","Silent","Lo","Med","Hi","ultra−Hi" or "stop" depending on the room temperature, time and heat exchanger temperature. Set to "stop" if the heat exchanger temperature is "DNZKOF" during Thermo OFF.(When reach at "DNZKON", fan speed set to "ultra−Lo" again.) 	Operating mode is judged by room temperature. (1) Judging by room temperature (Initial judgement) (a) Conditions for judgment (any of the followings). ・ When auto operation is started after the previous auto mode operation. ・ When auto operation is started after the previous manual mode operation. ・ When the operating mode is switched to auto while operating at manual mode. (b) Judging method ・ [Cooling] : Room temperature ≧ Remote controller setting ・ [Heating] : Room temperature < Remote controller setting [Room temperature setting of remote controller] — Cooling / Heating (2) Judging by room temperature (continuous judgement) (a) Judging condition • Operating mode will be judge again after auto mode interval time (1) 1st interval [auttmn1_8u] (2) 2nd interval [auttmn2_8u] (3) 3rd and next interval [auttmn3_8u] (b) Judging method • Judging method will follow as below • Final set temperature is remote controller setting including shift value [Current operation is COOLING] • Room temperature ≤ Final set temperature - [nwautw_8u], change to HEATING • Room temperature > Final set temperature - [nwautw_8u], continue in COOLING [Current operation is HEATING] • Room temperature ≥ Final set temperature + [nwautc_8u], change to COOLING • Room temperature > Final set temperature + [nwautc_8u], continue in HEATING
	Hi	Operates at "Hi" regardless of the room temperature.	Set to "ultra−Hi" when the compressor runs at cold dash mode speed, and to "Hi" in other modes. Runs at "ultra−Lo" when thermo is off.		Set to "ultra−Lo","Silent","Lo","Med","Hi","ultra−Hi" or "stop" depending on the room temperature, time and heat exchanger temperature. Set to "stop" if the heat exchanger temperature is "DNZKOF" during Thermo OFF.(When reach at "DNZKON", fan speed set to "ultra−Lo" again.) 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.	Operates at "Med" regardless of the room temperature. Runs at "ultra−Lo" when thermo is off.		Set to "ultra−Lo","Silent","Lo","Med","Hi","ultra−Hi" or "stop" depending on the room temperature, time and heat exchanger temperature. Set to "stop" if the heat exchanger temperature is "DNZKOF" during Thermo OFF.(When reach at "DNZKON", fan speed set to "ultra−Lo" again.)	
	Lo	Operates at "Lo" regardless of the room temperature.	Operates at "Lo" regardless of the room temperature. Runs at "ultra−Lo" when thermo is off.	Set to "Lo" in modes other than when the compressor stops.	Set to "ultra−Lo","Silent","Lo","Med","Hi","ultra−Hi" or "stop" depending on the room temperature, time and heat exchanger temperature. Set to "stop" if the heat exchanger temperature is "DNZKOF" during Thermo OFF.(When reach at "DNZKON", fan speed set to "ultra−Lo" again.) The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram: 	
	Silent	Operates at "Silent" regardless of the room temperature.	Operates at "Silent" regardless of the room temperature. Runs at "ultra−Lo" when thermo is off.	Set to "Silent" in modes other than when the compressor stops.		
Basic operation of temperature controller		Performs only fan operation at the set speed regardless of the room temperature. 	See page 51.	See page 55.	See page 59.	Follow basic cooling or heating operation

Basic Cooling Operation



Notes:

(1) Condition for entering into Cool Dashed mode. When fan set to “Hi” or “Auto and when the compressor speed (P section) due to temperature difference between setting temperature (including the correction shift only) and room temperature is CMAX or higher.

(2) Cool Dashed will release when i) a maximum 25 minutes is lapsed and ii) room temperature is lower than set temperature –3°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.

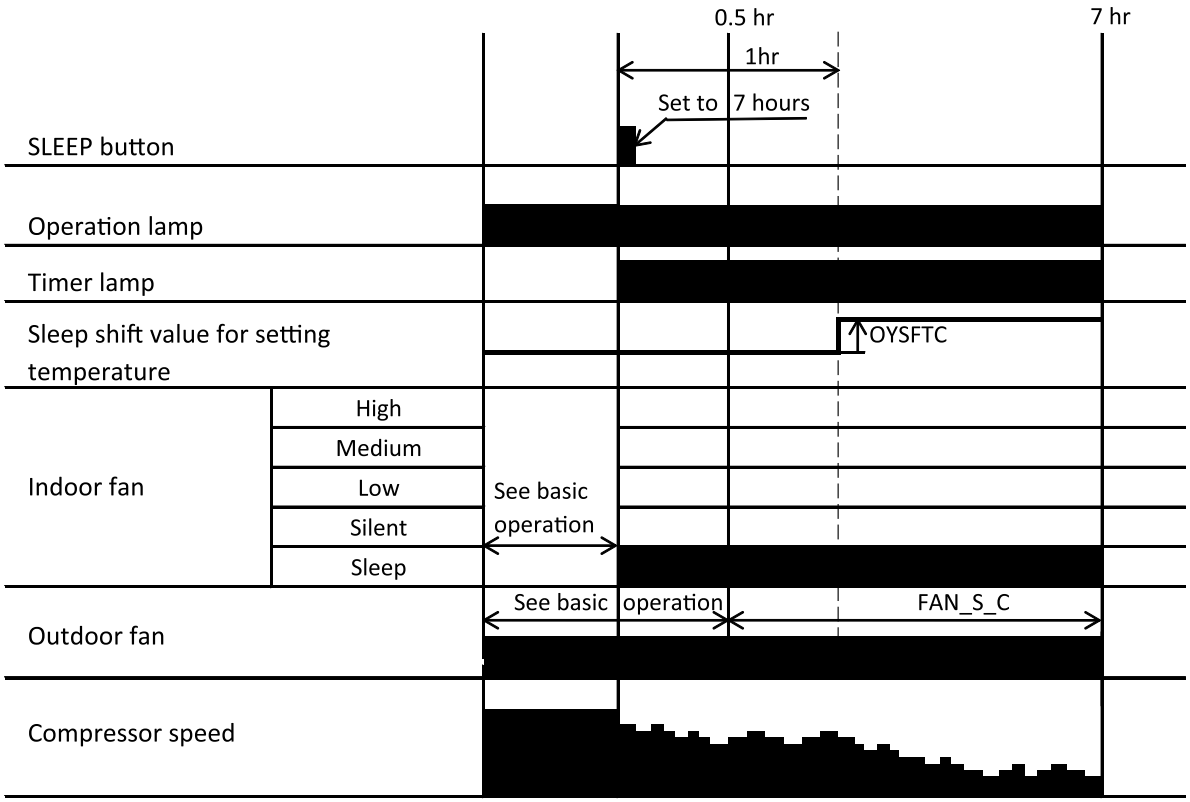
(6) When fan is set to “Hi”, compressor rpm will be limited to CSTD.

(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.

Cooling Sleep Operation



Notes :

(1) The sleep operation starts when the "SLEEP" button is pressed.

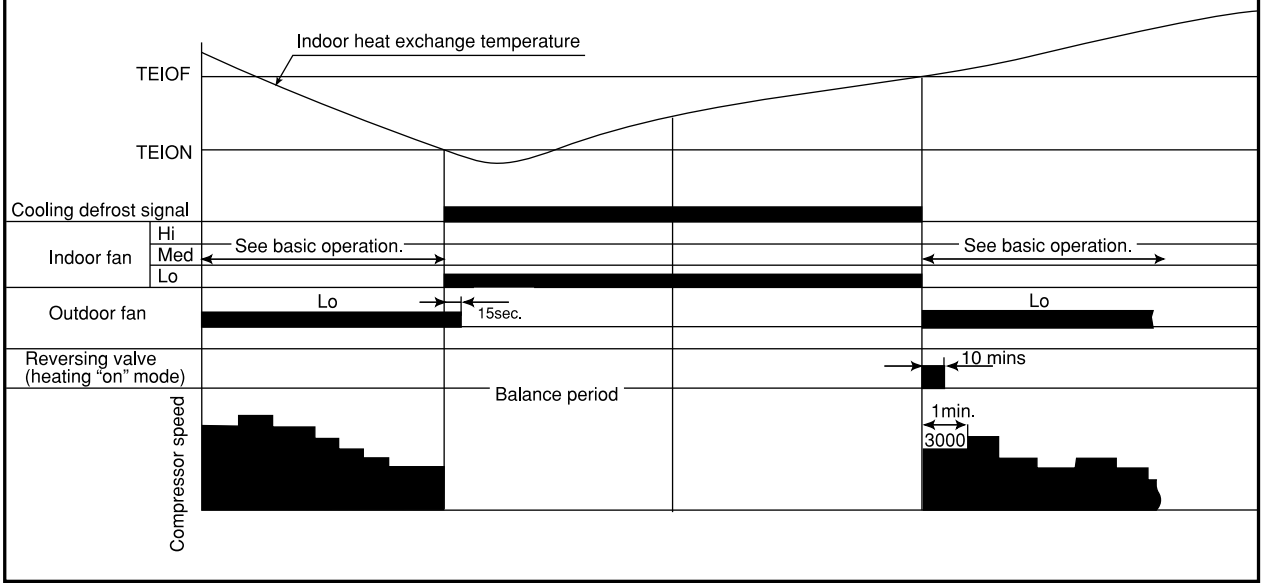
(2) When the sleep operation is set, the maximm compressor speed is limited to CSZMAX, and the indoor fan set is "sleep"(FCSOY_P).

(3) The indoor fan speed does not change even when the fan speed mode is changed.

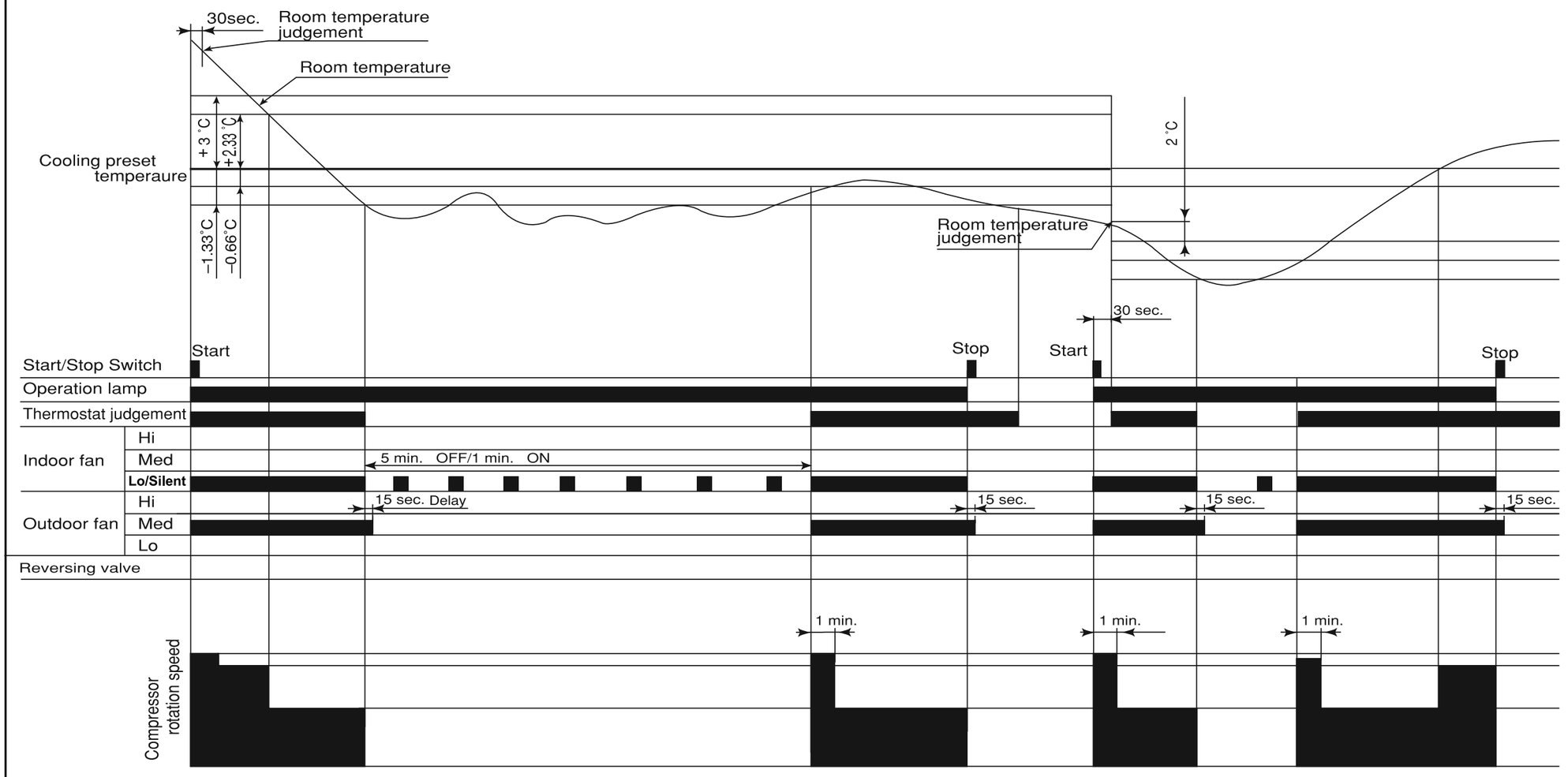
(4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.

(5) 1 hour after the sleep operation is set, the sleep shift value(OYSFTC) is added.

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).

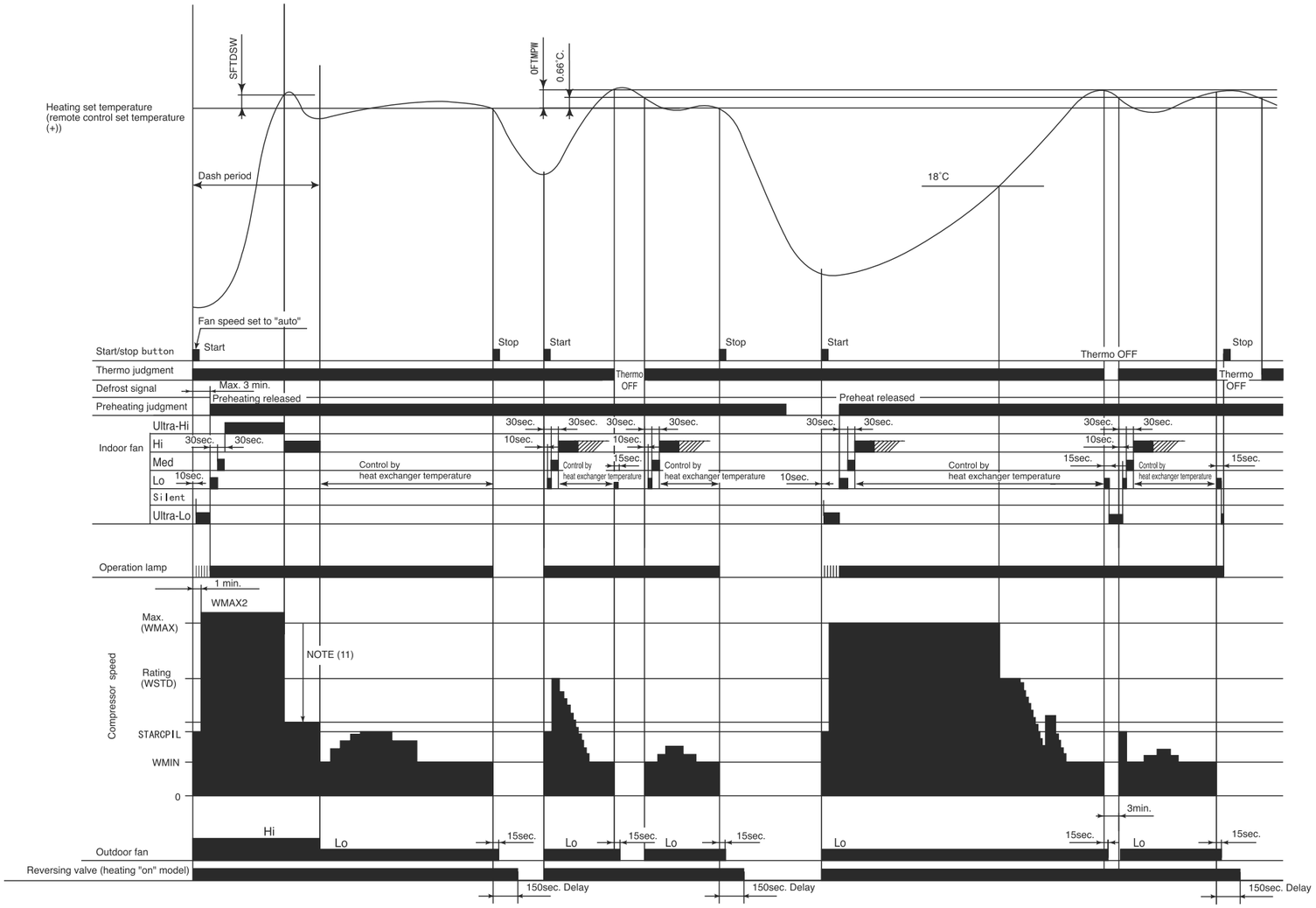
(2) The indoor fan is operated in the "Lo" or "Silent" mode. During thermo OFF, indoor fan will be OFF 5 minutes and ON for 1 minute

(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" and i) room temperature is 18 or less, and ii) outdoor temperature is 10 or less, and iii) compressor speed (P section) due to temperature difference between setting temperature(including shift value only) and room temperature is WMAX or more.

(2) The maximum compressor speed period during hot dash is finished when i) room temperature has reached the setting temperature + SFTDSW. ii) thermo off.

(3) During hot dashed operation, thermo off temperature is setting temperature (with shift value) +3 . After thermo off, operation continue inn Fuzzy control mode.

(4) Minimum "ON" time and minimum "OFF" time of compressor operation is 3 minutes.

(5) During normal heating mode, compressor maximum rpm WMAX will maintain for 120 minutes. No time limit constrain if room temperature is 18 or less and outdoor temperature is 2 or less.

(6) During preheating or defrosting or auto fresh defrosting mode, indoor unit operation lamp will blink at interval of 2 seconds "ON" and 1 second "OFF".

(7) When heating mode starts, it will enter into preheating mode if indoor heat exchanger temperature is less than YNEOF + 0.33 .

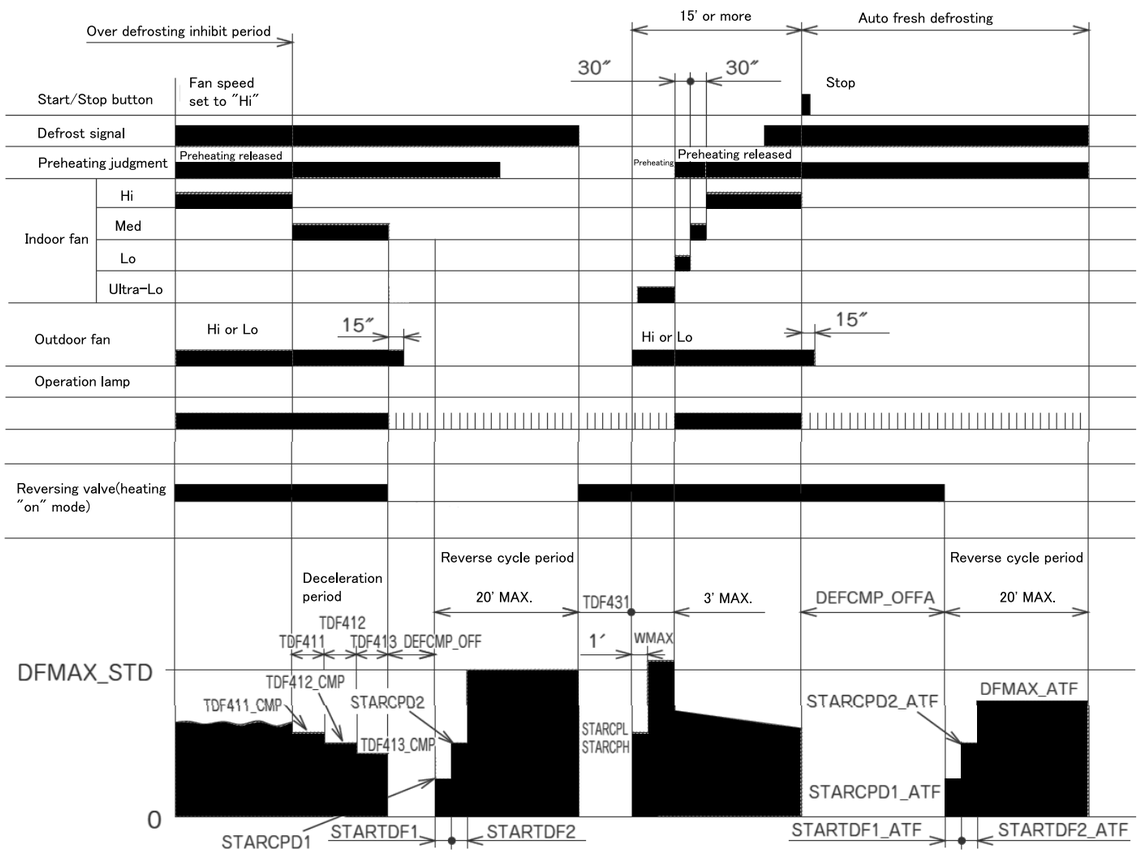
(8) When fan is set to "Med" or "Lo" or "Silent", compressor rpm will be limited to "WJKMAX" or "WBEMAX" or "WSZMAX".

(9) During "Ultra-Lo" mode, heat exchanger temp 18 or less, indoor fan will stop. If hex temperature is 18 + 0.33 or more, fan will continue in "Ultra-Lo" mode. However, "Ultra-Lo" mode during preheating or preheating after defrosting does not stop if room temperature is 18 or less.

(10) During hot dashed or outdoor temperature is -5 or less, compressor rpm is WMAX2.

(11) During hot dashed, when room temperature reaches setting temperature + SFTDSW compressor rpm is actual rpm x DWNRATEW.

Reversing valve defrosting



Notes:

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

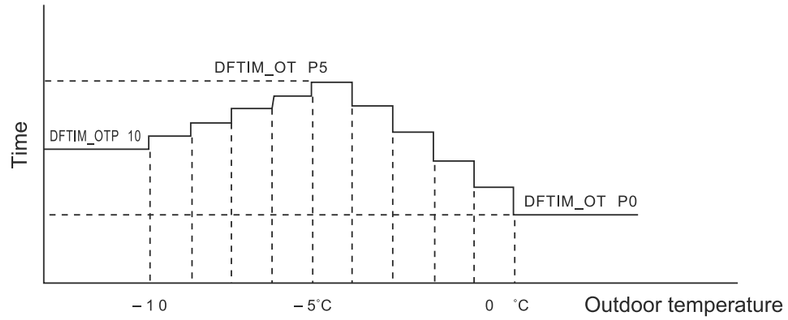
(2) If the difference between the room and outdoor temperature is large when defrosting is finished, the maximum compressor speed (WMAX) or (WMAX2) can be continued for 120 minutes maximum.

(3) The defrosting period is 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

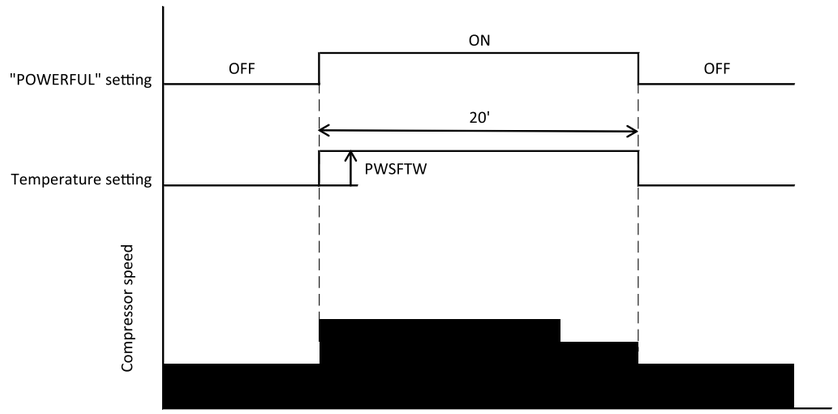


Notes:

(1) The first inhibit time after operation start is set to DFTIM_FST.

(2) From the second time onwards, the inhibit time is set according to the time required for defrosting.
Reverse cycle operation time ≧ [DEFCOL] : DEFTIM_COL is set.
Reverse cycle operation time < [DEFCOL] : The time corresponding to outdoor temperature is set.

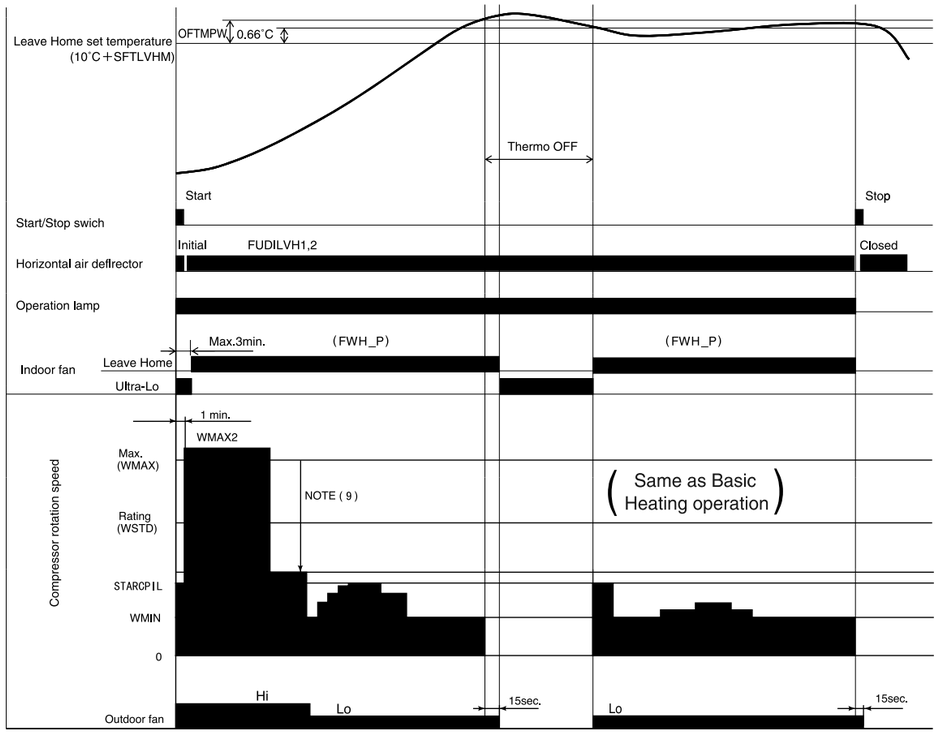
Heating Powerful Operation



Notes :

(1) Pressing the "POWERFUL" button will increase the temperature setting by PWSFTW.
(2) The powerful operation is for 20 minutes after setting.
(3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
(4) Defrost is inhibited for 20 minutes after the start of the powerful operation.
(5) Pressing the "START/STOP" button and "POWERFUL"button during powerful operation wil cancel the powerful operation.
(6) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
(7) When the powerful operation is set, the fan speed will be set to "HIGH" and the compressor's maximum speed will be set to WMAX2 during powerful operation. The compressor's lower limit speed is WKYMIN_PW.
(8) After the powerful operation is ended, the system automatically operates with the previous settings used before the powerful operation.

Leave Home

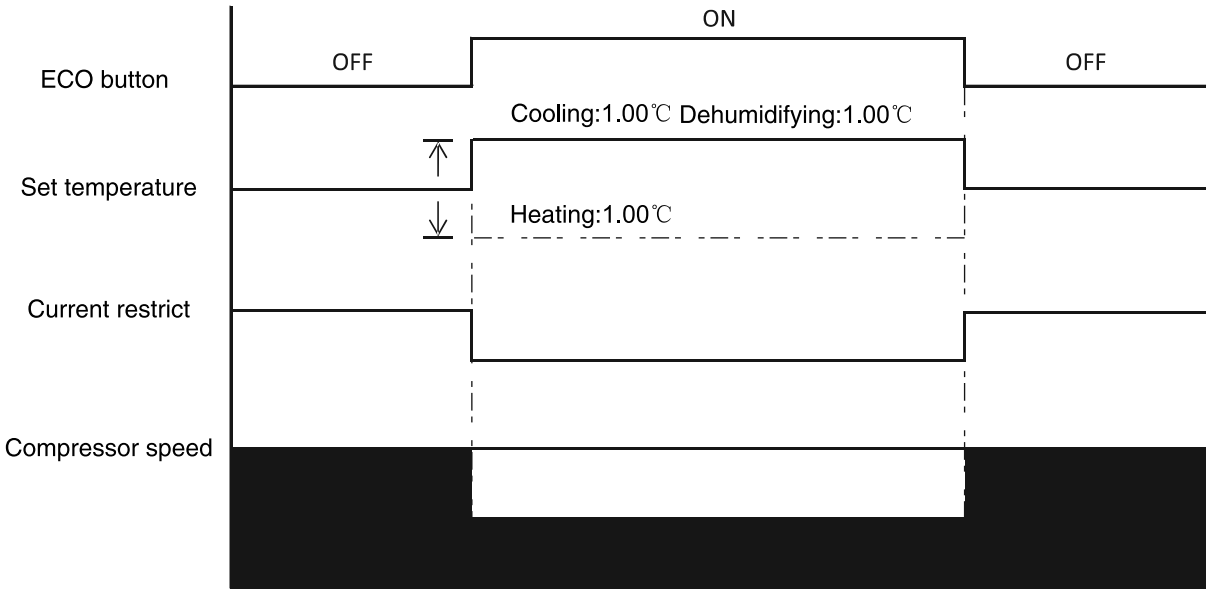


Notes:

Perform Leave Home operation according to the following control contents.

(1) Operation mode : Heating
(2) Setting temperature : 10˚C
(3) Shift value : + SFTLVHM
(4) Indoor fan speed : FWH_P
(5) Outdoor fan speed :
(6) Compressor start control : } Same as Basic Heating operation
(7) Compressor speed :
(8) Operation lamp : ON

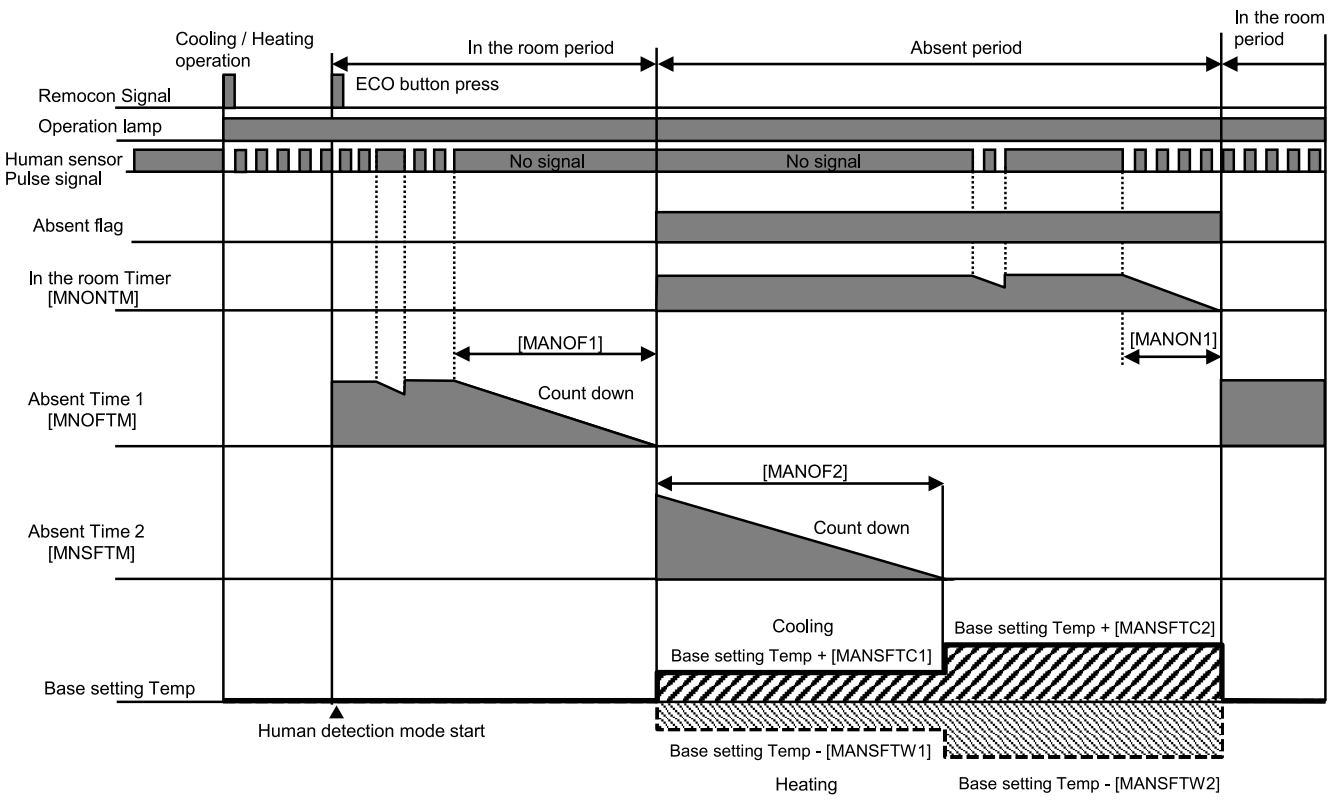
ECO



Notes:

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

ECO Operation (With Motion Sensor)



Notes :

1. ECO and POWERFUL cannot operate at the same time
2. ECO is not available during FAN operation.

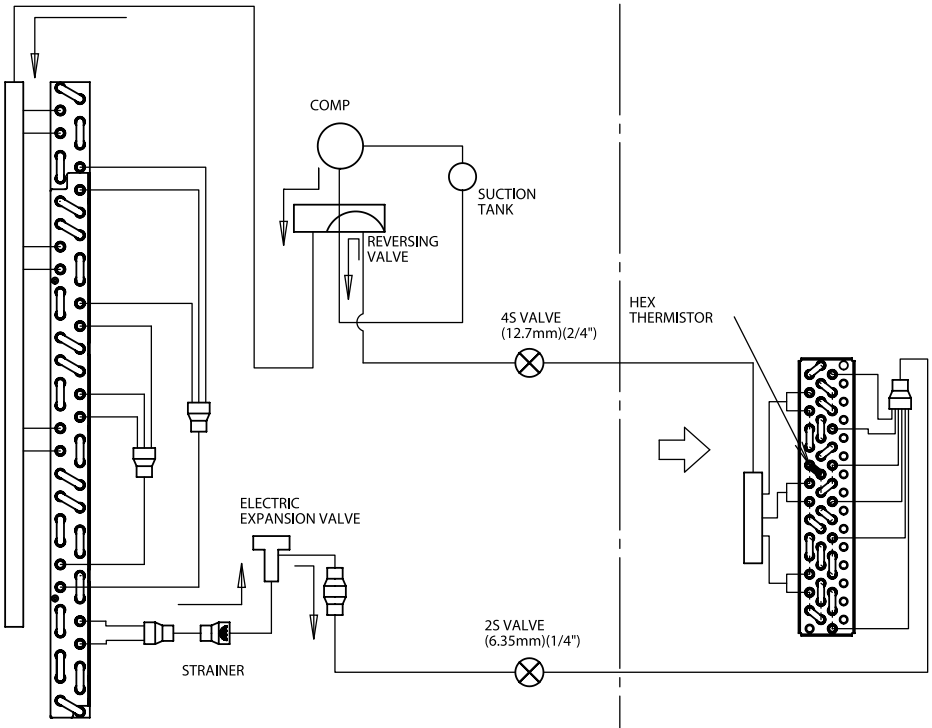
REFRIGERATING CYCLE DIAGRAM

MODEL RAD-50RPE/RAC-50NPE
RAD-60RPE/RAC-60NPE

COOLING, DEHUMIDIFYING, DEFROSTING

OUTDOOR UNIT

INDOOR UNIT

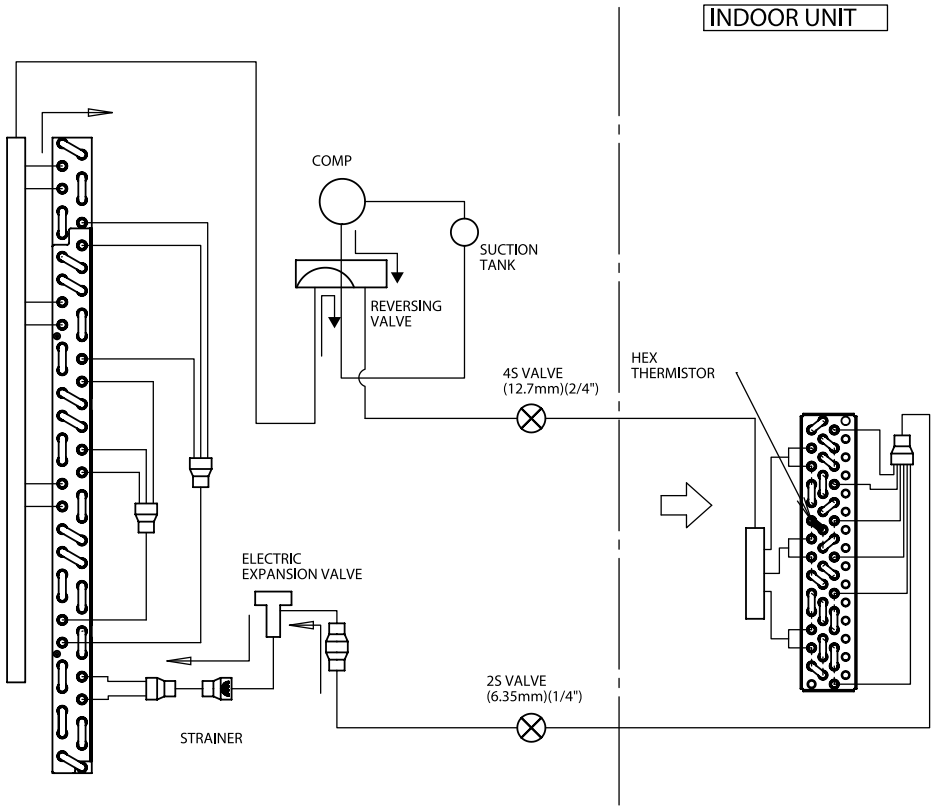


RAD-50PPD / RAC-50NPD
RAD-60PPD / RAC-60NPD

COOLING, DEHUMIDIFYING, DEFROSTING

OUTDOOR UNIT

INDOOR UNIT



DESCRIPTION OF MAIN CIRCUIT OPERATION

■ RAD-50RPE/RAD-60RPE

1. Power control circuit

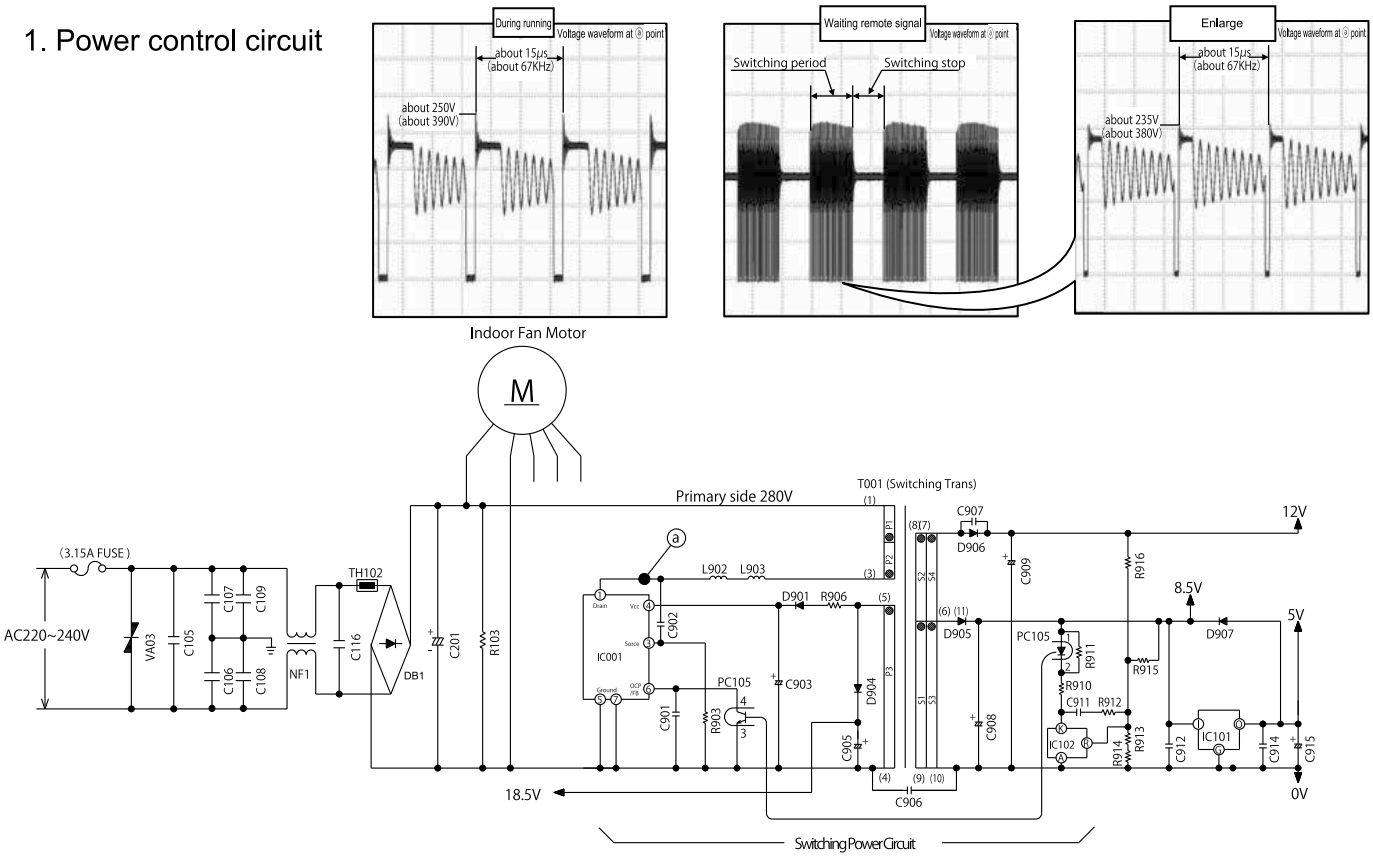


Fig. 1-1

・An AC power supply from outdoor unit flow through the 3.15A fuse, varistor (VA03), then filtered by noise filter circuit, rectified and smoothed by DB1 and C201 to a DC current 311V to 325V. Then it is supplied to the indoor fan motor drive circuit and switching power circuit.

・The switching power circuit, as controlled by IC001, drives the primary winding of the transformer (T001) to produce a specified voltage at the output winding. [The output terminal (pin ①) of IC001 has a switching voltage as shown in Fig. 1-1 but it changes in voltage peak and oscillation period depending on the power load. While on standby for a remote control signal, in particular, the oscillation frequency is lowered to a level as low as 20 kHz or so to reduce the standby power.]

・The outputs of the output windings of the transformer is rectified and smoothed to become DC voltages at primary 18.5V,12V, and 8.5V respectively. The primary 18.5V is supplied to the drive circuit of the indoor fan motor, the 12V is supplied to each vane motor and to the drive circuits of the cleaning unit driving motor and other equipment, and the 8.5V is adjusted to a stable 5V by the 3-terminal regulator IC (IC101) and supplied to the microcomputer peripheral circuit.

Check

If a failure in a part or circuit has produced an abnormal current in the power supply, the 3.15A fuse will blown to prevent further damage. If the 3.15A fuse blown, check the indoor fan motor, switching electrical circuit, and other components and replace any defective part.

Check

If an abnormally high voltage is applied to the power supply, the 3.15A fuse and varistor (VA03) will prevent further damage. If a high voltage results in the 3.15A fuse blown, the varistor (VA03) should have deteriorated and destroyed. Therefore replace it at the same time.

Caution

The primary circuit of the transformer (T001) has a voltage to ground. Guard against electric shocks.

Caution

Even the breaker is OFF, the high voltage is still exist on the board. Make sure to wait for 15 minutes or more before start the part replacing work.

2. Drive circuit of the indoor fan motor

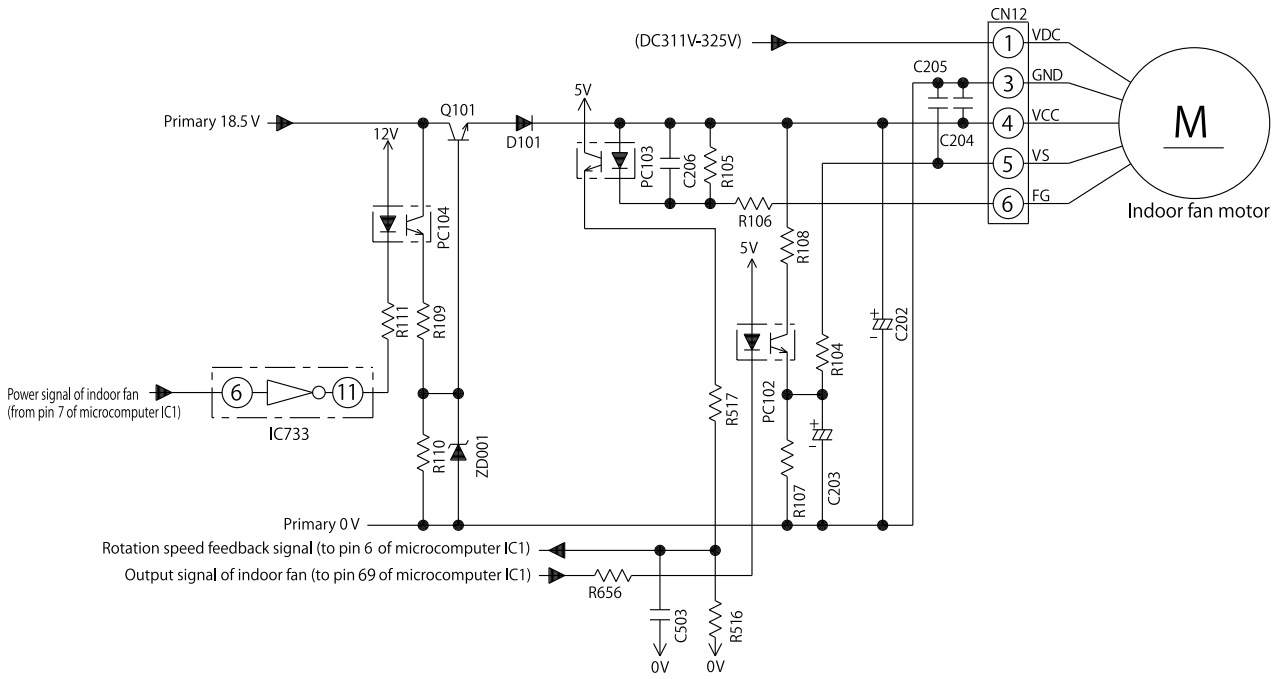


Fig. 2-1

< Typical circuit waveform >

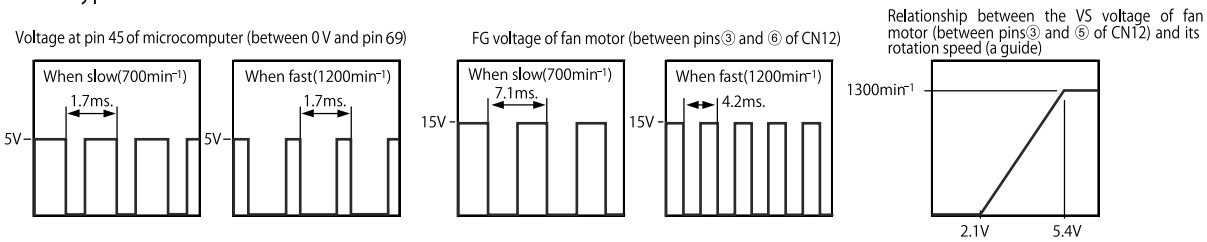


Fig. 2-2

- The indoor fan motor DC Voltage(VDC), Control Circuit Voltage(VCC), and Speed Control Voltage (VS) are supplied from connector CN12. FG is a feedback signal for a indoor fan motor frequency of rotation speed.
- Primary 18.5V flow through a converter circuit and step down to 5V.
- While remote control signal is on Standby, the Q101 act as a switch and cut off OFF the supply for VCC. Hence it will reduces power consumption during standby.
- The VS is controlled by microcomputer (IC1). The VS terminal undergoes an analog voltage that matches the LO pulse signal at pin69 microcomputer (IC1) . (See Fig. 2-2.)
- The FG feedback signal send 12 pulses per revolution of the motor shaft. By counting the pulse frequency rate, the microcomputer (IC1) recognizes the motor speed, thereby performing feedback control.

Caution

The indoor fan motor and drive circuit are connected to the primary power supply. Do perform safe work practise to avoid electric shock.

Caution

Do not plug/unplug connector when unit is power ON. Doing so may cause indoor fan motor and board circuit damaged. Perform the repair work after sufficiently dischare. Insufficient capacitor discharge may cause an electric shock.

3. Remote control reception circuit

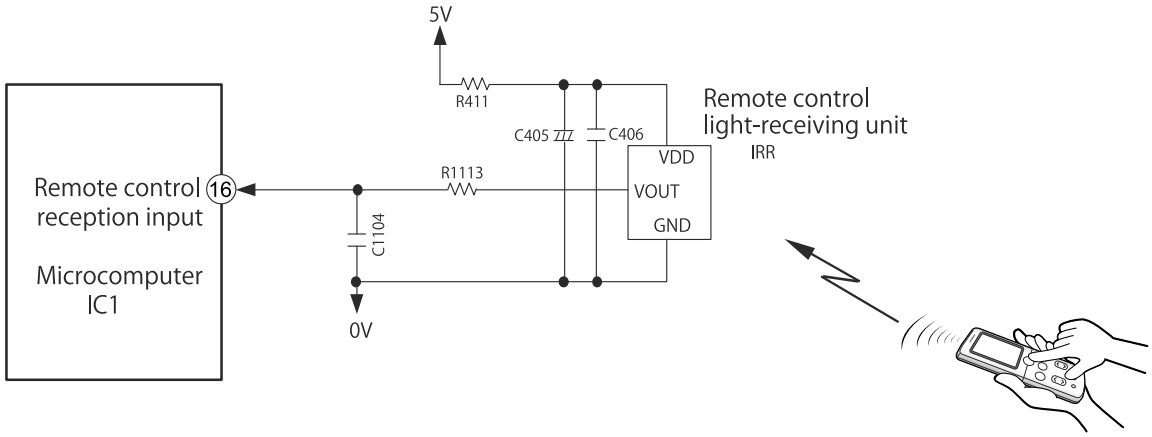


Fig. 3-1

[Typical communication waveform]

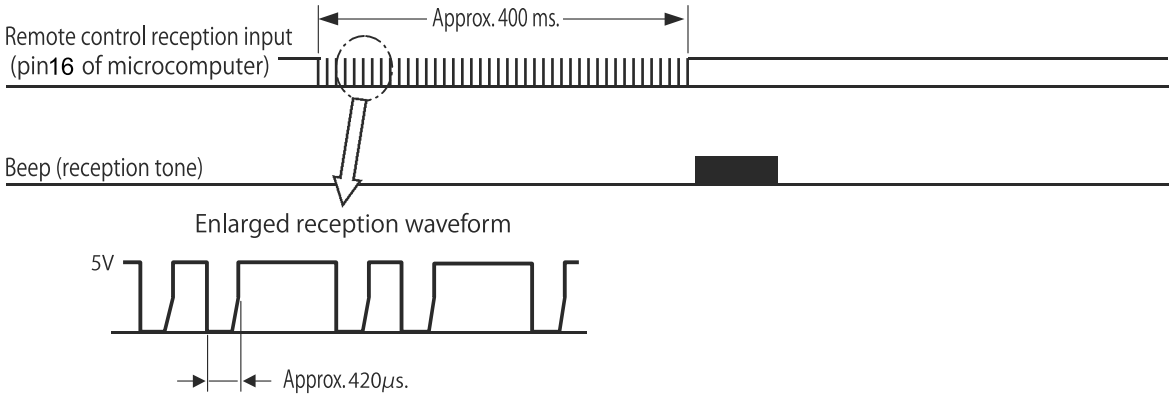


Fig. 3-2

- An infrared signal from the remote control unit is converted to an electrical signal by Remote Control Light-Receiving Unit (IRR) and send to microcomputer (IC1). Data is transmitted in digital data "0" and "1" by changing the interval of the basis pulses at about 420μs.

4. Indoor/outdoor communication circuit

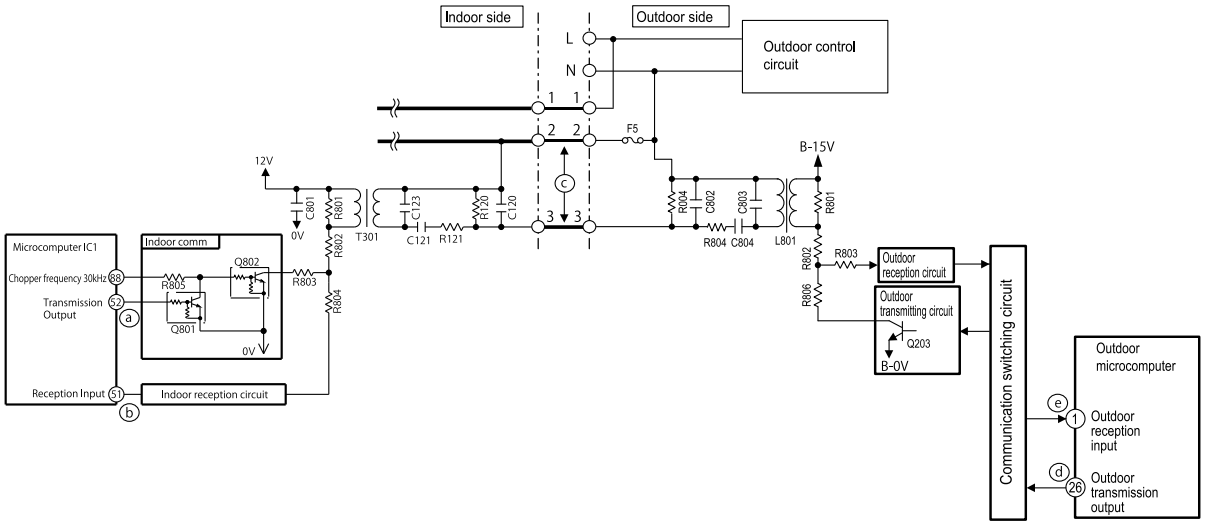
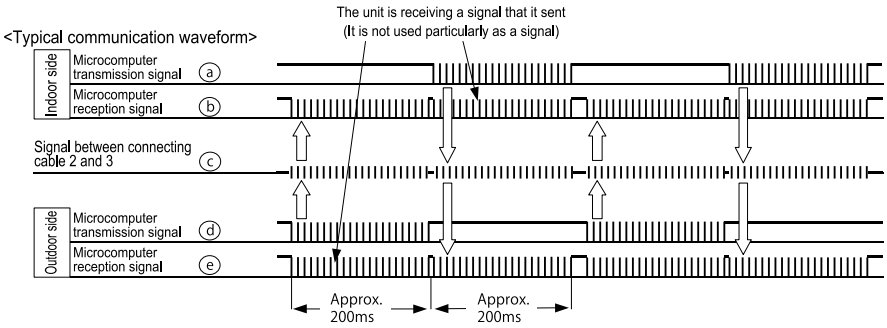


Fig. 4-1



<Enlarged waveform>

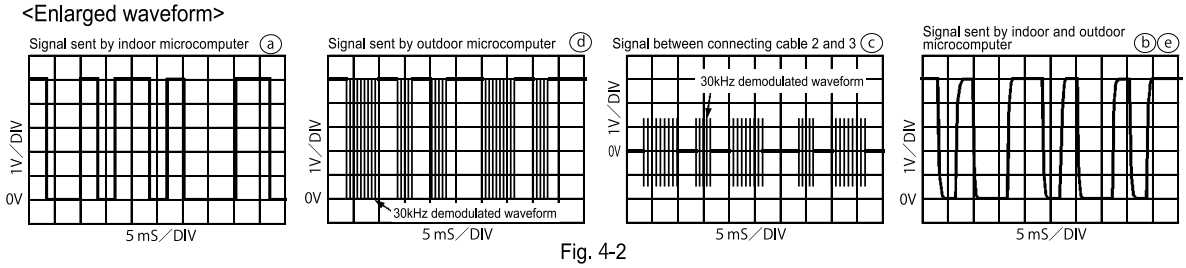


Fig. 4-2

* Indoor and outdoor communications are conducted by using lines 2 and 3 of connecting cable. Line 2 of connecting cable is share with a transmission channel that powers the indoor unit.
* Data communicated between the indoor and outdoor units are outputted from the microcomputer as serial signals and are transmitted as demodulated by a 30kHz carier wave.

Check

If the communication fails between the indoor and outdoor units for some reason, the product will give a self-diagnosis display either by “the timer lamp blinking 3 times” or “the the timer lamp blinking 12 times” depending on the cause.

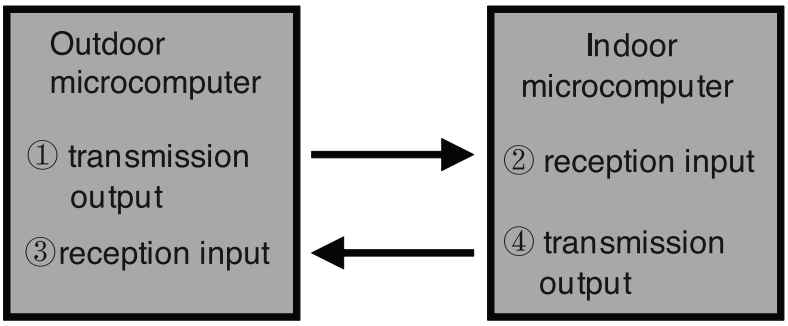
Check

If a cable poorly inserted in the indoor terminal board or some other failure overheats the terminal board and the temperature fuse of the terminal board blows out, the power to the indoor communication circuit will be shut down to stop the communications function. (In that case, the failure will be displayed by the timer lamp blinking 3 times.)

Check

If communication fails between the indoor and outdoor units for some reason, the product will give a self-diagnosis display either by "the timer lamp blinking 3 times" or "the timer lamp blinking 12 times" depending on the cause.

Indoor/Outdoor communication fault circuit judgement



1. Failure happen during unit running
【If ①failure】Outdoor: LD301 blinking 9 times / Indoor: no failure display
【If ②failure】Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times
【If ③failure】Outdoor: LD301 blinking 9 times / Indoor: no failure display
【If ④ failure】Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times

2. Failure happen during standby mode but outdoor unit not yet enter hibernation mode
【If ①failure】Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 12 times
【If ②failure】Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times
【If ③failure】Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 12 times
【If ④ failure】Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times

3. Failure happen during standby mode but outdoor unit already enter hibernation mode
【If ①failure】Outdoor: no failure display / Indoor: the timer lamp blinking 12 times
【If ②failure】Outdoor: no failure display / Indoor: the timer lamp blinking 3 times
【If ③failure】Outdoor: no failure display / Indoor: the timer lamp blinking 12 times
【If ④failure】Outdoor: no failure display / Indoor: the timer lamp blinking 3 times
When outdoor unit is in hibernation mode, outdoor microcomputer is off,
so the outdoor unit can't display the failure.

5. Room temperature heat exchanger thermistor circuit

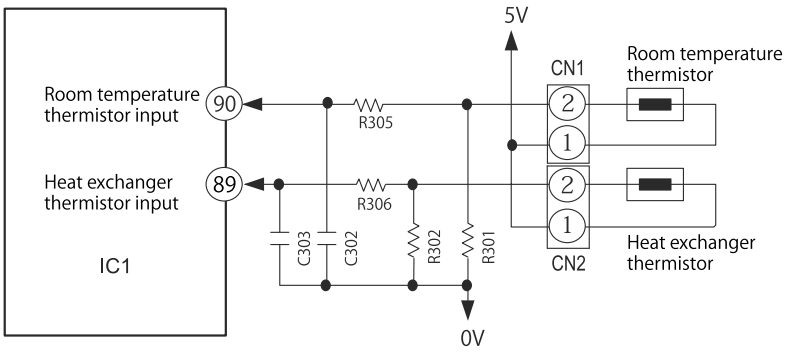


Fig. 5-1

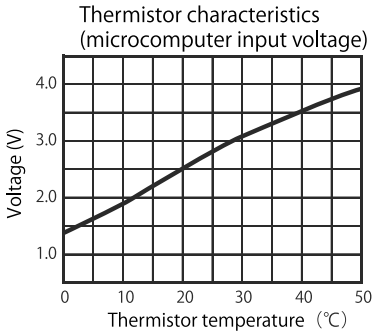


Fig. 5-2

- The room and indoor heat exchanger pipe temperature are detected by Room Temperature Thermistor and Heat Exchanger Thermistor.
- A thermistor is an electrical resistor whose resistance is reduced by the heat. Analog voltages obtained by the resistance voltage is devided with the fixed resistor recognized by the microcomputer (IC1) as temperature signals.
- The relationship between the thermistor temperature and circuit voltage is roughly as shown in Fig. 5-2. If it is easier to take actual measurements between the terminals of CN1 and CN2, refer chart in Fig. 5-3 "Voltages between Thermistor ends."

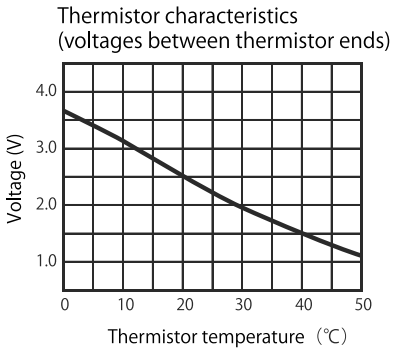


Fig. 5-3

6. Float switch

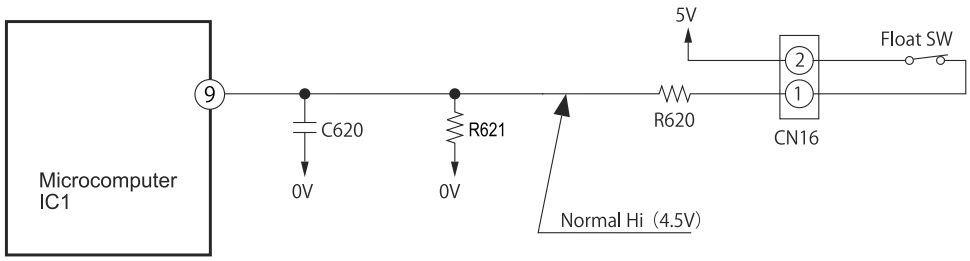


Fig. 6-1

- It is a float type switch used to observe the drain water level in the drain pan. This switch will be activated and forced the unit to stop when abnormal water level is detected caused by drain pump broken or blocked drain hose failed to suck the water out.
- During float switch operated, timer lamp will blink 6 times. Please take note that the switch will also activated when float switch connector is not inserted properly of the lead wire is shorted.

7. Drain pump driven circuit

● During cooling and dry mode, microcomputer pin 62 will become Hi and turned ON the drain pump relay to driven the drain pump motor.

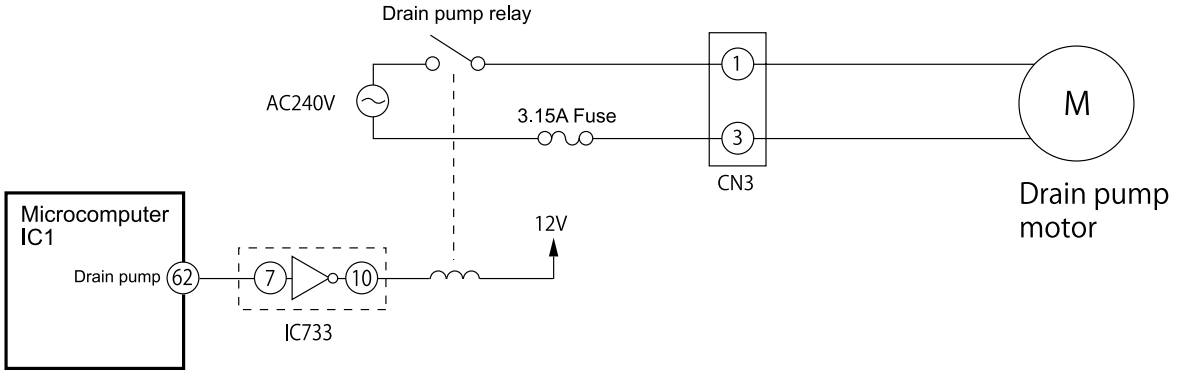


Fig. 7-1

8. Drain pump test switch

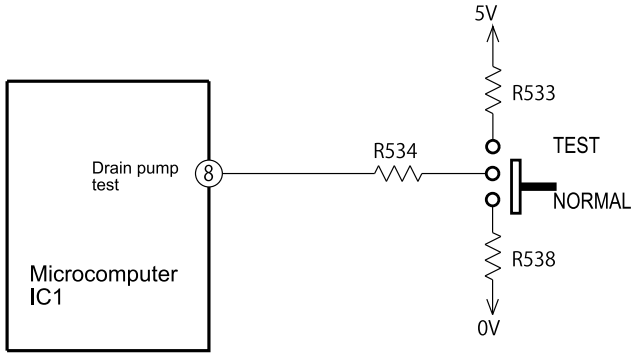


Fig. 8-1

● It is a switch to turn ON the drain pump for testing purpose. When select the switch to test position, drain pump motor will operate and timer lamp will blink 7 times. During this time, remote control signal will not receive.

9. High static pressure switch (Full duct type and semi duct type)

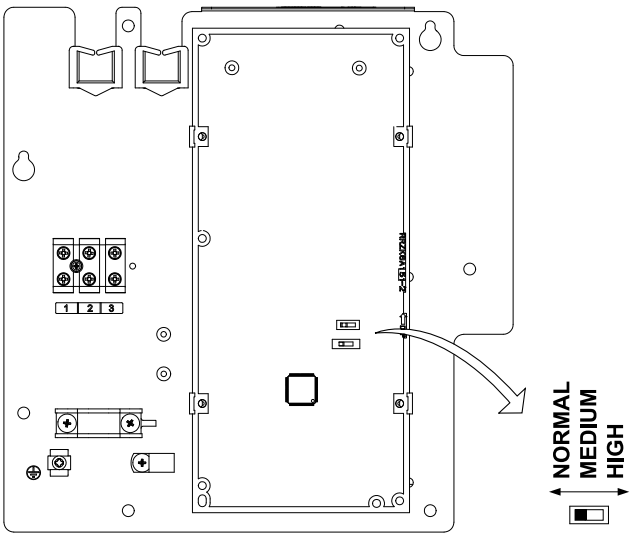


Fig. 9-1

- For full duct type, set the switch to High position. For semi duct type, set the switch to Medium position.
- If not set to High or Medium, there will reduction of cooling and heating capacity.

10. Wired remote control reception and transmission circuit.

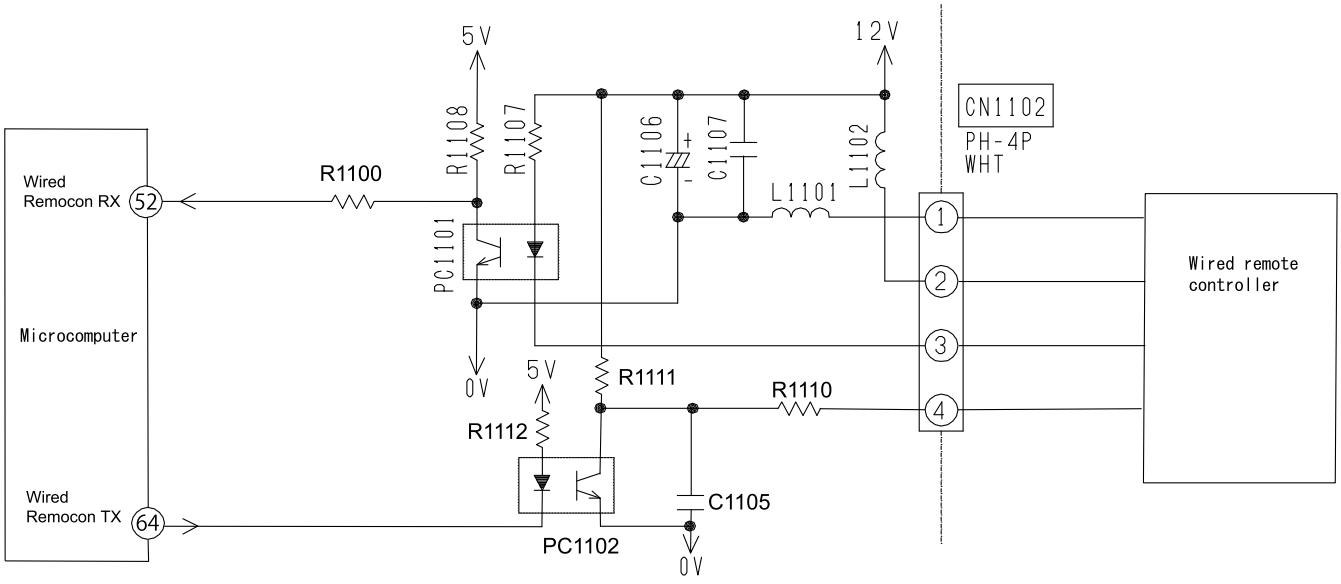


Fig. 10-1

- In wired remote control circuit, the signal will transmit to microcomputer pin 52 by using photocoupler PC1101 and receive from microcomputer pin 64 by using photocoupler PC1102.

11. Dip switch

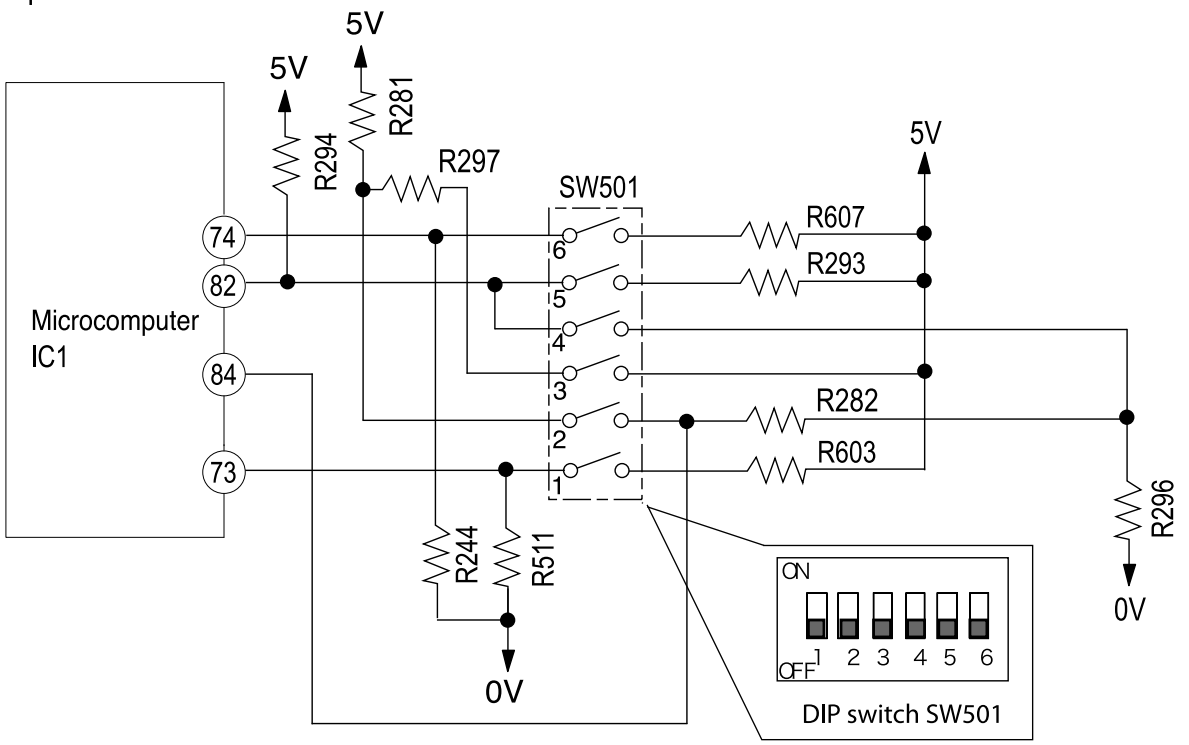


Fig. 11-1

- Fig.11-1 shows the dip switch circuit. The table shown in Fig.11-2 are function and setting position from ① - ⑥ of the switch number.

SW No.	ITEM	FUNCTION									
1	AUTO RESTART	OFF	ENABLE	ON	DISABLE						
2	CARD KEY MODE	OFF	DISABLE	ON	ENABLE						
3	CARD KEY LOGIC SELECT	OFF	INPUT HIGH ACTIVE	ON	INPUT LOW ACTIVE						
4	HEATING/COOLING ONLY MODE SELECT	OFF	HEATING & COOLING	OFF	HEATING ONLY	ON	COOLING ONLY	ON	HEATING & COOLING		
5	HEATING/COOLING ONLY MODE SELECT	OFF		ON		OFF		ON			
6	NOT USED										

Fig. 11-2

NOTE :

1. All switch set to OFF position (Factory setting).
2. If the dip switch set to “Heating mode only” or “Cooling mode only”, the wireless remote controller must be set to operation mode lock setting as indicated on page 119.

12. Run status and alarm signal output circuit

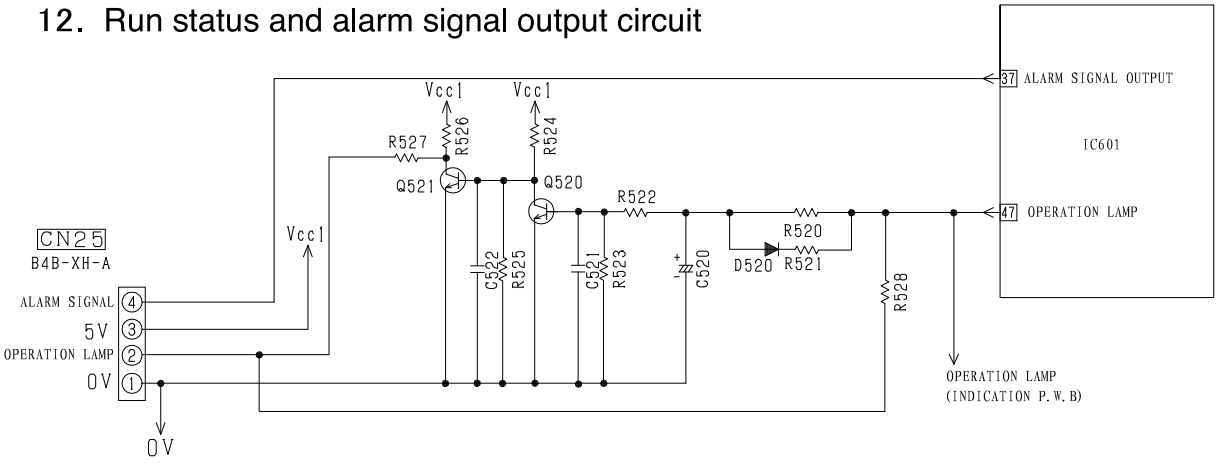


Fig.12−1

Fig.12−1 is the control circuit of run status and signal output in main PWB.The pin ② of CN25 is used to show run status and the pin ④ of CN25 is used to warn people when failure occurrence. If customer want to use this function, need to use the adapter(sold separately) to achieve it. the adapter is optional and the detail circuit refer to following circuit.

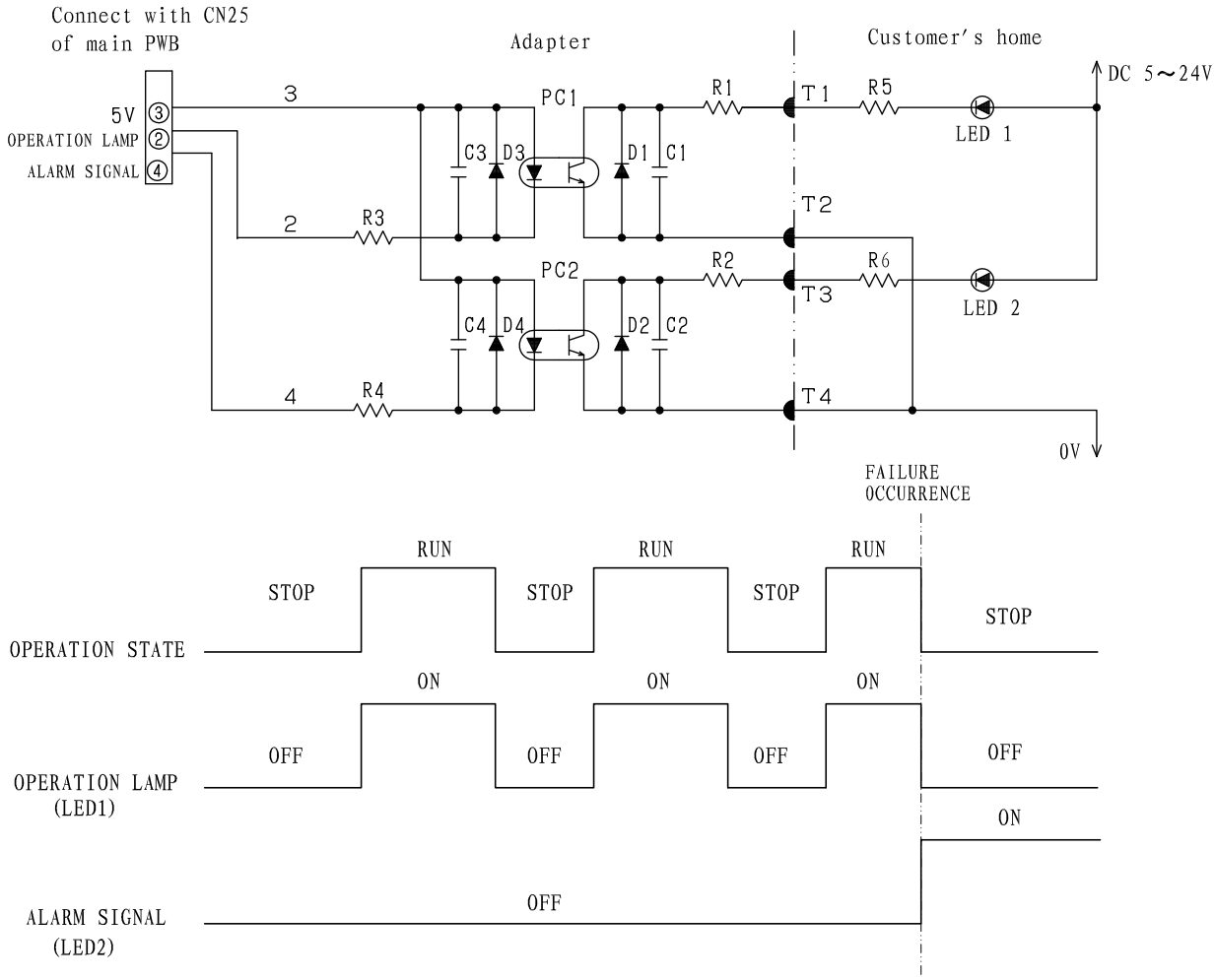


Fig.12−2

LED1 is on When air-condition is running and is off When air-condition is stopping.We can know the status of air-condition by LED1. LED2 is off When air-condition in normal condition and is on when air-condition in failure occurrence,we can repair it in time.The brightness of the lamp(LED1, LED2) can be determined by adjusting the resistance(R5,R6) value.

※ The adapter must to be used because of noise interference. The noise will cause air-condition failure. the voltage from customer's home supply to adapter must be in the 5～24V, the current is less than 10mA. If the voltage is lower than 5V, optocouplers will not be action; once the voltage is higher than 24 V, optocouplers adapter will be damaged.

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAC-50NPE / RAC-60NPE

1. Power Circuit

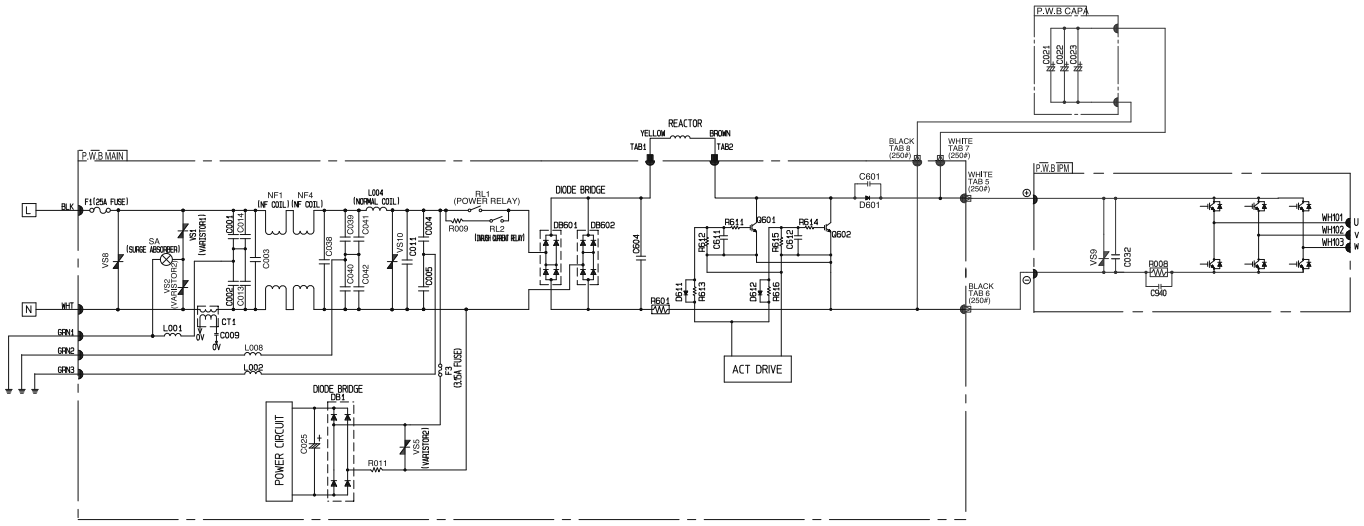


Fig 1-1

※ This circuit full-wave rectifies 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.

<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.

（2） Diode Stack（DB1, DB601, DB602）

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

<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-C023, 500μF 450V

<Reference>

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

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

<Reference>

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

2. Power circuit (Low voltage)

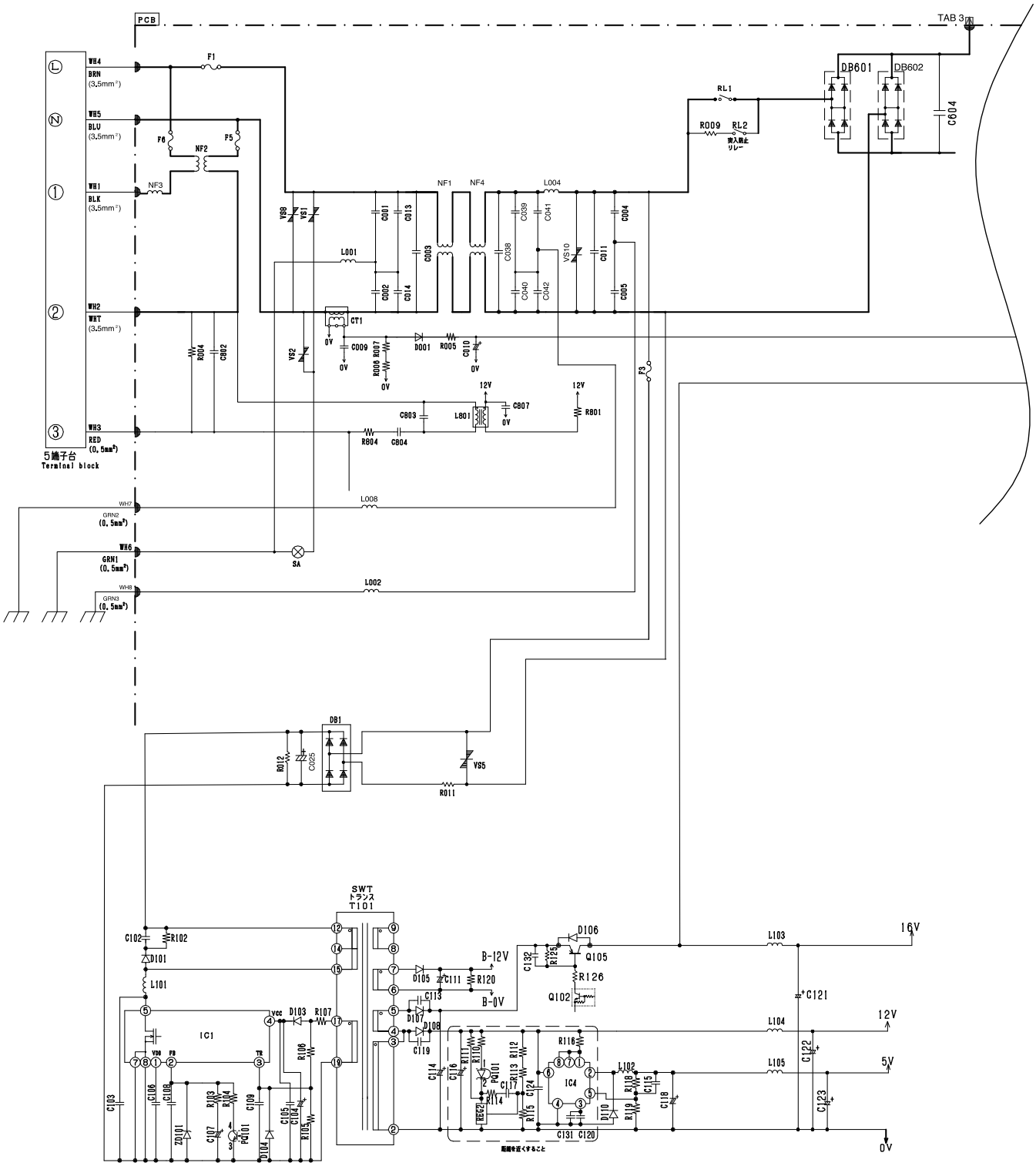


Fig. 2-1

- The 240V AC voltage is rectified to DC voltage (B-12V,16V,12V,5V) pass through switching control IC (IC1), switching transformer.
  (1) B-12V Power supply for electrical expansion valve.
  (2) 16V Power supply for IPM driver circuit of compressor and fan motor, IGBT action.
  (3) 12V Power supply for 4 way valve relay, power relay, in rush current relay,motor current amplification,
  (4) 5V Power supply for microcomputer, peripheral circuits.

Main parts

(1) C001,C002,C003,C004,C005,C011,C013,C014, C038, C039, C040, C041, NF1, NF2, NF3, NF4

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

(2) Surge Absorber, Varistor1,2,5,8,10

These absorbs external power surge.

(3) IC4

DC/DC convertor IC (DC12V ➞ DC5V).

3. P.W.B. for power circuit

Voltage specification of power circuit as shown in below table.

〈Checking point〉

Output	Spec	Main load	Measuring point	Example of possible failure mode.
5V O/P	5 ± 0.4V	Micon, Thermistor	Tester⊕ : L105 (5V) Tester⊖ : R119 (0V)	Outdoor not operate, no blinking indication
12V O/P	12 ± 0.5V	Micon, IC2, 3, 4 Relay circuit	Tester⊕ : L104 (12V) Tester⊖ : R119 (0V)	Outdoor not operate, no blinking indication
16V O/P	$15.5^{+1.5V}_{-1.0V}$	IPM for Comp IPM for DC fan	Tester⊕ : L103 (16V) Tester⊖ : R119 (0V)	Stop : LD301 2, 3, 4 or 12 times blinking
B-12V O/P	$13^{+2.5V}_{-1.0V}$	Expansion valve	Tester⊕ : R418 (B-12V) Tester⊖ : R120 (B-0V)	Stop : LD301 5 times blinking (related to refrigerant cycle error)

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

4. Reversing valve control circuit

This model reversing valve control used to control the relay ON/OFF of the reversing valve, and also control the coil of the reversing valve ON/OFF.

The relay ON/OFF has different type when in the different operation mode.

You can see each operation mode as follows. If the reversing valve not connected or all the condition not the same as follow, it may be something wrong with the reversing valve circuit.

Point / operation mode		micon ㉘ pin - 0V	HIC ㉘ pin - 0V	CN2①- CN2④
Cooling	Usual cooling	Hi	0V	0V
Heating	Usual heating	Lo	12V	AC240V
	Defrost	Hi	0V	0V

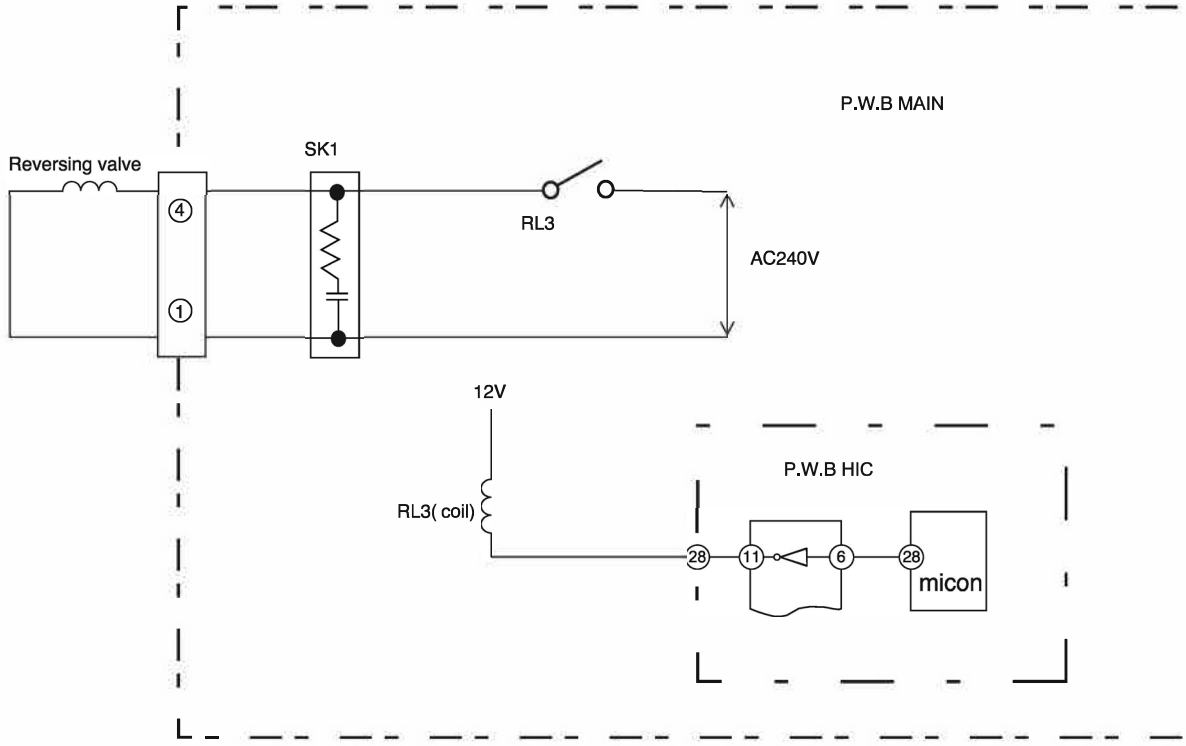


Fig.4-1

5. Temperature Detection Circuit

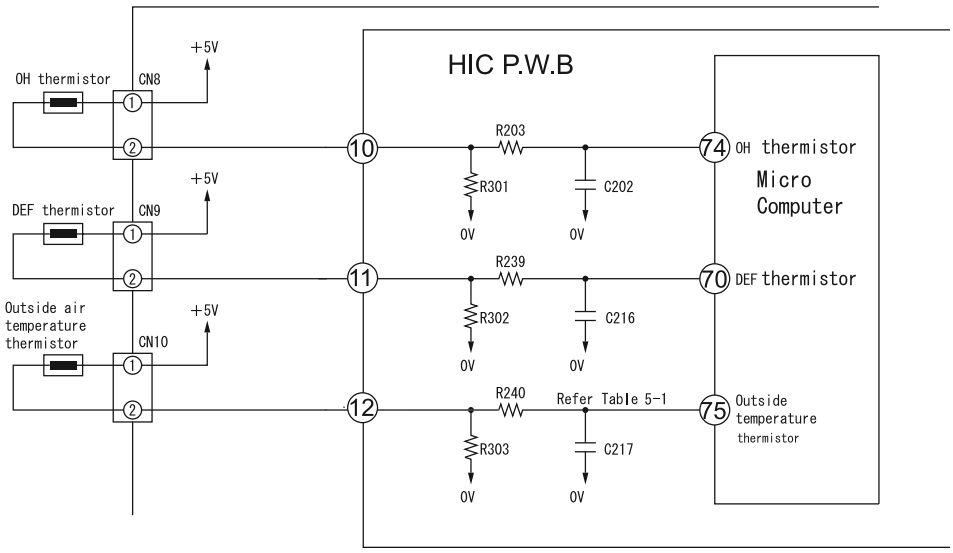


Fig. 5-1

- 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 ⑭ of microcomputer.
- Compare the voltage at microcomputer pin ⑭ 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 ⑦⓪ 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 5-1

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 70, 74, 75 are approx. 0V; When thermistor is shorted, they are approx. 5V and LD301 will blink as below table:-

Table 4-2

Thermistor / Thermistor Condition	LD 301 Blinking		
	OH Thermistor	Outdoor Thermistor	Defrost Thermistor
Short	6 Times Blinking	7 Times Blinking	7 Times Blinking
Open	7 Times Blinking	7 Times Blinking	7 Times Blinking

6. Electric expansion valve circuit

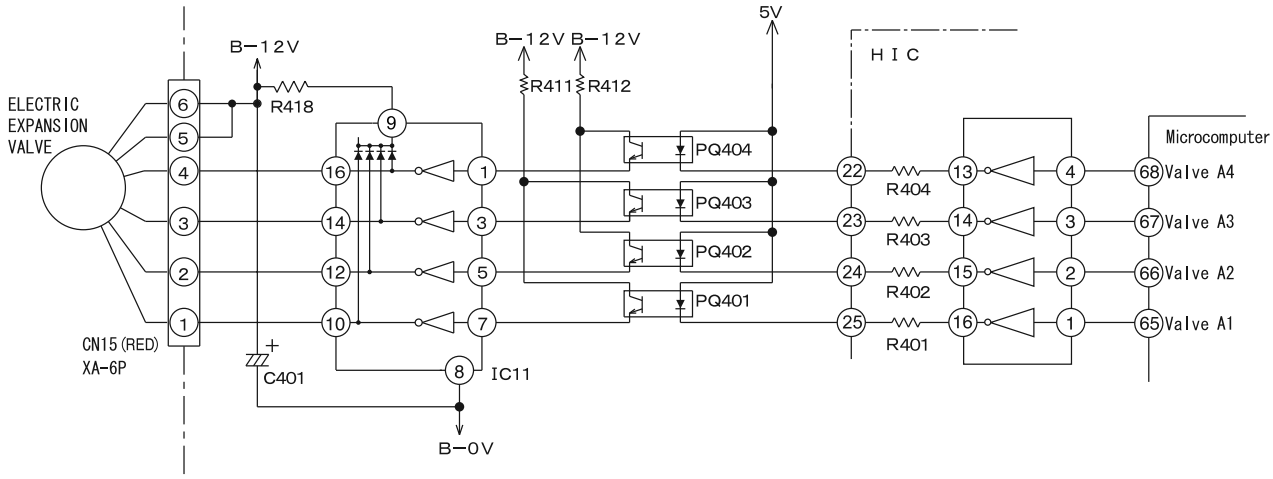


Fig. 6-1

- The electric expansion valve is driven by DC12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control the opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below. When power is supplied, voltages at pins ④ to ① of CN15 are about 0.9V and 12V when no power is supplied. When power is reset, initial operation is performed for 10 or 20 seconds. During initial operation, measure all voltages at pin ④ to ① of CN15 by using a multimeter. If there is any pin with voltage that has not changed from 0.9V or 12V, expansion valve or microcomputer is broken.
- Fig. 6-2 shows logic waveform when expansion valve is operating.

Table 6-1

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

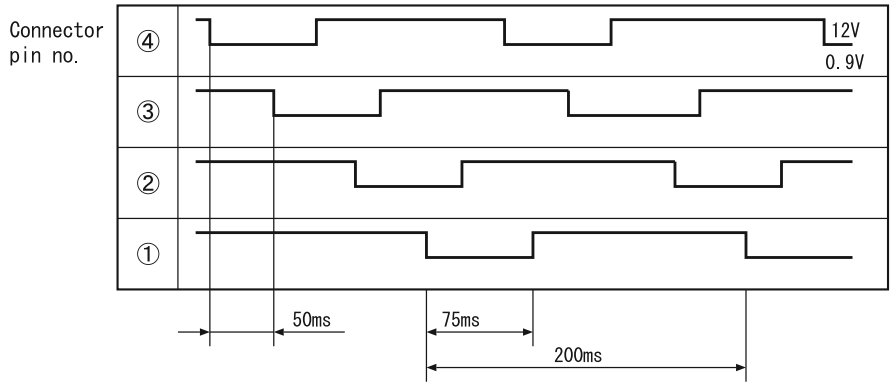


Fig. 6-2

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.

7. Outdoor DC fan motor control circuit

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

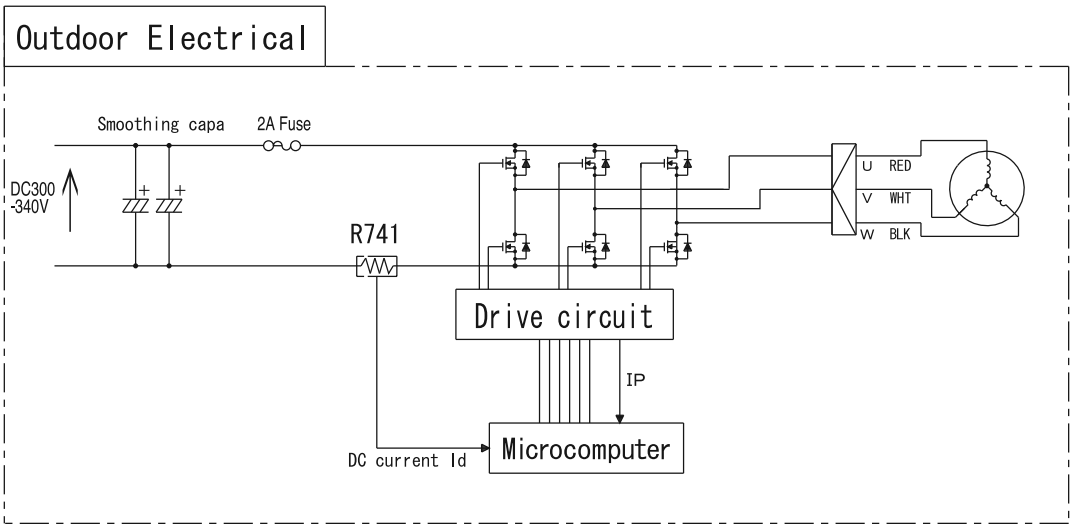


Fig 7-1

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

（1）Fan motor speed controller during starting

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

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

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

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

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

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

（2）Fan motor speed controller during unit operating

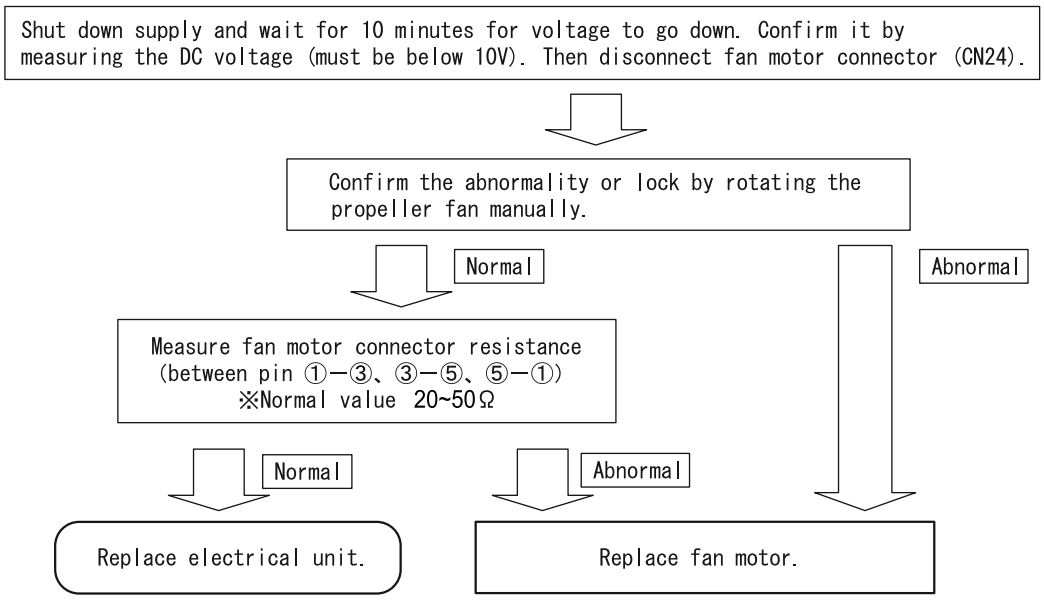
There is a case where fan rpm is reducing during rotating caused by interference of strong wind If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking) The unit will restart according to control as per during start (1).

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

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

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

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found 2Afuse blown.
If fan motor is broken, replace both electrical unit and fan motor.

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).

9. Hibernation Mode

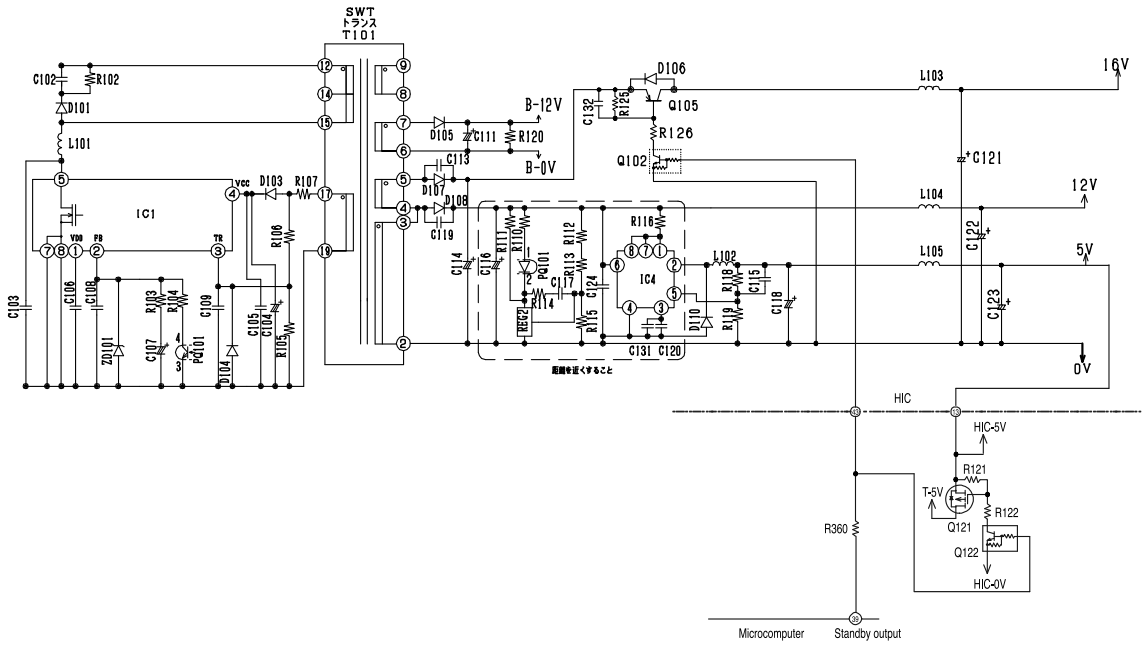


Fig. 9-1

- This model have designed to enter hibernation mode for energy saving and power consumption reduction during stanby.
- Unit will enter hibernation mode during below stanby condition if not received any signal from remote controller and expansion valve already completed initialization .
  1) Stanby continuesly
  2) Unit in running condition, then off the unit by remote controller and leave the unit in stanby condition.
- During hibernation activation, main microcomputer pin (39) will change to LOW condition.
  Due to this pin become LOW, Q121 and Q122 will be OFF. As Q121 OFF, T-5V will drop to 0V.
  Beside, Q102 and Q105 will be OFF and causing 16V also drop to 0V.
- During hibernation mode, DC voltage will be as below condition.
  (1) B-12V : Maintain at 12V
  (2) 16V : Drop to 0V
  (3) 12V : Maintain at 12V
  (4) 5V : Maintain at 5V

  LD301 on the Main P.W.B will be OFF during this mode.
- If outdoor unit have failure/error, all indication including error diagnosis LED will be OFF once the smoothing capacitor (C019 ~ C021) voltage reduce to 38.7V.
- For inspection during hibernation mode, service person can measure DC voltage B-12V, 12V and 5V on Main P.W.B.
  But to measure DC voltage 16V on Main P.W.B., service person shall on the indoor unit by remote controller first. This will change the unit from hibernation mode to normal.

SERVICE CALL Q & A

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

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

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

DEHUMIDIFYING MODE

Q2 Sound of running water is heard from indoor unit during dehumidifying.

A2 Normal sound when refrigerant flows in pipe.

Q3 Compressor occasionally does not operate during dehumidifying.

A3 Compressor may not operate when room temperature is 10°C or less. It also stops when the humidity is preset humidity or less.

HEATING MODE

Q4 The circulation stops occasionally during Heating mode.

A4 It occurs during defrosting. Wait for 5-10 minutes until the condenser is defrosted.

Q5 When the fan speed is set at HIGH or MED, the flow is actually Weak.

A5 At the beginning of heating, the fan speed remains LOW for 30 seconds. If HIGH is selected, it switches to LOW and again to MED after additional 30 seconds.

Q6 Heating operation stops while the temperature is preset at “30”.

A6 If temperature is high in the outdoor, heating operation may stop to protect internal devices.

AUTO FRESH DEFROSTING

Q7 After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp blinking.

A7 Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

AUTO OPERATION

Q8 Fan speed does not change when fan speed selector is changed during auto operation.

A8 At this point fan speed is automatic.

INFRARED REMOTE CONTROL

Q9 Timer cannot be set.

A9 Has the clock been set? Timer cannot be set unless the clock has been set.

Q10 The current time display disappears soon.

A10 The current time disappears in approx. 10 seconds. The time set display has priority.

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

Q11 The timer has been programmed, but the preset time disappears.

A11 Is the current time past the preset time? When the preset time reaches the current time, it disappears.

OTHERS

Q12 The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)

A12 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 speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

Q13 Loud noise from the outdoor unit is heard when operation is started.

A13 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.

Q14 Noise from the outdoor unit occasionally changes.

A14 The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature. This does not indicate a fault.

Q15 There is a difference between the set temperature and room temperature.

A15 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 for the space.

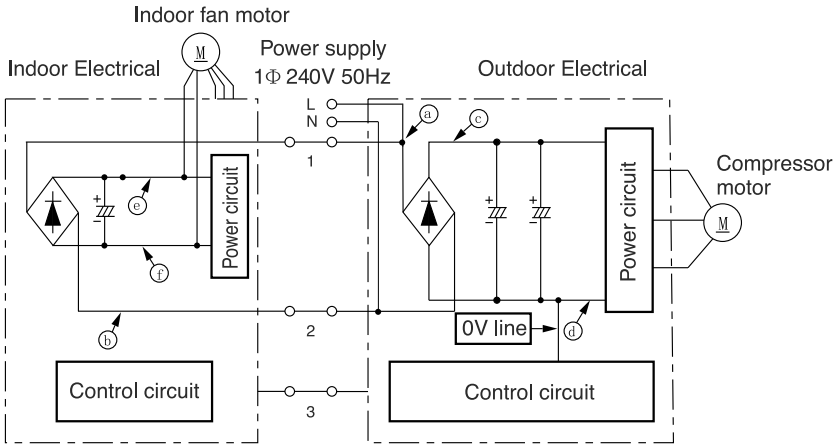
Q16 Air does not flow immediately after operation is started.

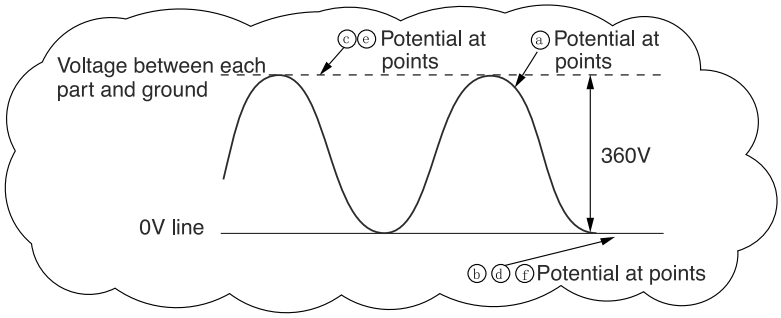
A16 Preliminary operation is performed for one minute when the power switch on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

Inspection instructions

Warning

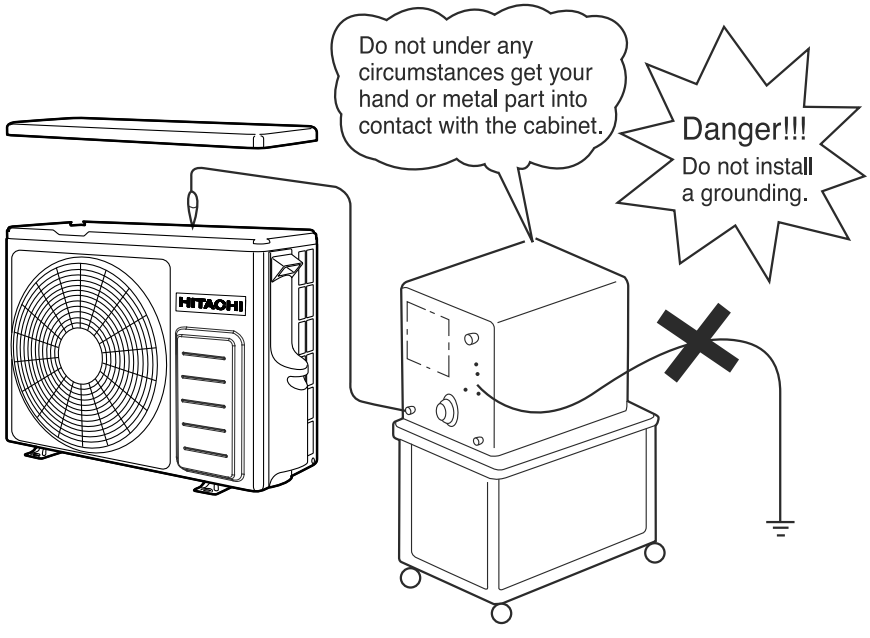
Note that the 0 V line of the outdoor electrical parts and the primary power circuit of the indoor electrical parts have voltages to ground as illustrated in the right-hand figure.





Warning

When conducting a check with an oscilloscope or something similar, do not ground the oscilloscope. Note that the oscilloscope will be subjected to voltages as illustrated in the figure above.



DISCHARGE, PROCEDURE AND POWER SHUT OFF METHOD FOR POWER CIRCUIT

WARNING

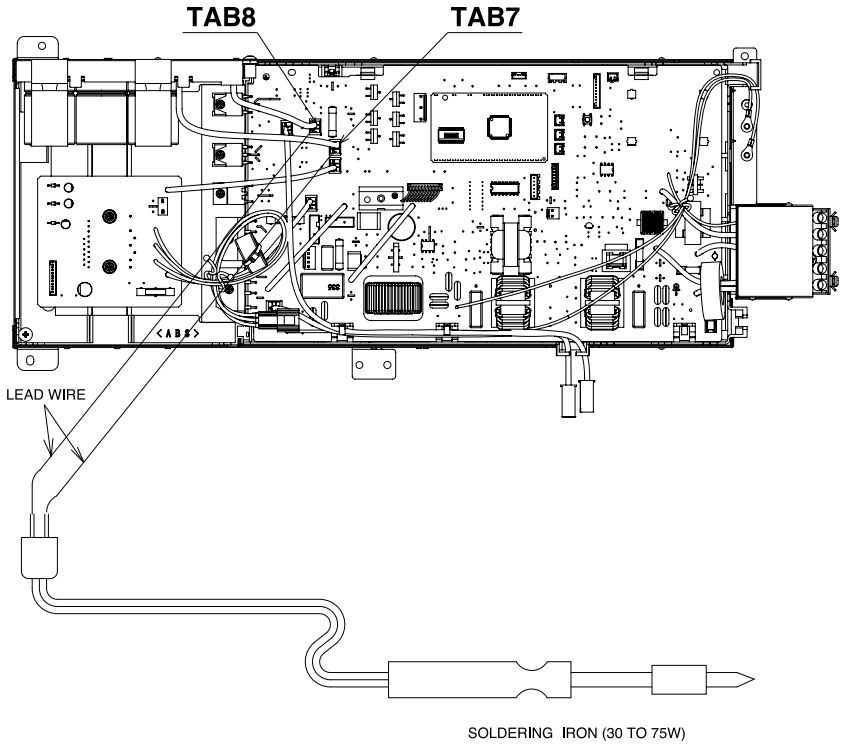
Caution

- Voltage of about 360 V is charged between the terminal of smoothing capacitors (500μF x 3).
- During continuity check for each circuit part of the outdoor unit, be sure to discharge the smoothing capacitors.

Discharge Procedure

1. Turn off the power.
2. After power is turned off, wait for 10 minutes or more .Then, remove electrical parts cover and apply soldering iron of 30 to 75 W for 15 seconds or more to TAB7 and TAB8 terminals on the main P.W.B. as shown in the figure below, in order to discharge voltage in smoothing capacitor.

Do not use a soldering iron with transformer: Otherwise, thermal fuse inside transformer will be blown.



No.	Function	Description	See page
1	Self-diagnosis display [Display on the indoor unit side]	・The failure mode detected on the indoor unit side is displayed by blinking of the "timer lamp". ・If the outdoor unit side detects a failure, the product will first conduct several operation retry and then blink the "timer lamp" 4 times. There are some failure modes with no lamp display while retry are continued. Then if want to continue further checking based on self-diagnosis method "operation lamp" will blinking. [Failure mode where retry are continued and the indoor unit lamp does not end up giving a error display] ・Compressor body temperature rise ・Supply voltage error ・Fan stop due to heavy wind ・Things with low incident to happen	95
	[Display on the outdoor unit side]	・The failure mode detected on the outdoor unit side is displayed by blinking the "LD351" or "LD352". Detecting a failure will stop the outdoor unit and keep blinking the "LD351" or "LD352" until it is restarted. (The communication error will persist until the communication is reestablished.)	Refer outdoor unit service manual.
2	Self-diagnosis memory	・The failure modes detected on the indoor and outdoor unit sides are stored in the nonvolatile memory of the indoor unit and can be read later on. (The memory will remain even after power-off.) ・The failure modes detected on the outdoor unit side are written in memory every time any such mode occurs. The failure mode can therefore be detected on the indoor unit side without waiting for the retry frequency to reach the display of the indoor unit lamp. Moreover, the normal self-diagnosis display function which rarely occurs will store and display failure modes that do not end up displaying the indoor unit lamp. (Any such mode may be unable to be stored if indoor or outdoor communications is in a failure.) ・The product stores 5 last-stored failure modes. ・There is a function for deleting memory. Once you clear the memory and run the product for several days, you can read the failure modes and check them, thereby detecting the less frequent failure phenomena. ・Failure modes can be checked by both the blinking of the lamp of the indoor unit and the display of the remote control liquid crystal display.	96

※The "self-diagnosis function of the communication circuit" available in our conventional models is now incorporated as part of the normal self-diagnosis function. In the case of a failure in the communication circuit, you do not have to conduct a special operation and the operations can be automatically divided into 3 blinking operations and 12 blinking operations of the timer lamp. However, a strong external noise may have resulted in 12 times of blinking.

Self-diagnosis display function (indoor side display)

In case the "timer lamp" (green) or the “operation lamp (yellow) of the indoor unit is blinking, troubleshoot the product while referring to the table below.

1. Method to count the lamp blinking times.
   - Blinking will repeat with 2s of interval time.
   - Blinking speed will be lit for 0.35s and off for 0.35s.

<Example of 5 times blinking>

2. If you wish to try another operation while the lamp is blinking, press the START/STOP button on the remote control unit twice. The first press will reset the microcomputer while the second will activate the unit. (Except for mode※1)

<Caution>

- There is a failure mode displayed only while the self-diagnosis memory is read.（※2）
  Read and check it as necessary.
- An error connection (wrong insertion) of terminal 1 or 2 of connecting cable may go undetected.
- Please confirm operation lamp blinking before proceed to self-diagnosis re-displayed. （※3）

- In case all indication lamp blink
- There is a possiblity 100V had beed supplied to outdoor unit. Check supply voltage with tester and do repair as below table.

Check Point	Repair or replace part
・Less than 100V supplied.	・Not a failure. Please repair the power supply.
・ 220~240V supplied.	・Outdoor electrical part abnormal. Please replace outdoor electrical part.

Blink lamp	Blinks	Check Point	Action	Remark
Timer Lamp (green)	1	・Reversing valve or related circuit.	・Refer outdoor self-diagnosis.	
		・Refrigerant cycle abnormal or leak.	Check refrigerant cycle.	
	2	・Forced cooling in operation.	・Not a failure.	
	3	・Indoor communication circuit error.	・Replace indoor main PWB.	
	4	・Check failure indication of outdoor unit or failure mode redisplayed.	・Refer table on the right.	※3
	6	・Abnormal water level detected.	・Check drain pump or drain pan.	
		・Float switch connector bad insertion or wire shorted.	・Securely connect CN22 connector.	
	7	・Drain pump test in operation.	・Not a failure.	
	9	・Connector for room thermistor or heat exchanger thermistor not connect properly or thermistor wire broken or shorted.	・Securely connect CN1 and CN2 connector.	
		・Check terminal board fuse. (Mis-connection of connecting cable might blown the fuse)	・Replace terminal board. ・Securely connect the connecting cable.	
	10	・Fan motor connector disconnected.	・Connect securely CN12.	
		・Fan motor lock mechanically.	・Adjust the locking position.	
		・Fan motor broken.	・Replace new fan motor.	
	12	・Connecting cable wrong insert.	・Reconnect cable.	
		・Outdoor communication circuit failure.	・Refer outdoor self-diagnosis for detail.	
		・Outdoor CN30 forgot to connect.	・Securely connect CN30 connector.	
	13	・EEPROM or Microcomputer defect.	・Replace indoor main PWB.	※1

Blink lamp	Blinks	Check Point	Action	Remark
Operation Lamp (yellow)	Outdoor failure indicate as below when operation lamp blink. Detail shall refer to lamp label attached.			
	2	Peak current cut.	Refer to Outdoor unit self-diagnosis lighting mode.	
	3	Abnormal low speed rotation.		
	4	Switching failure.		
	5	Overload lower limit cut.		
	6	Compressor body temperature rise.		※2
	7	Outdoor thermistor abnormal.		
	8	Communication error between micon.		
	9	Indoor unit type mismatch.		
	10	Power voltage error.		※2
	11	Fan stop due to heavy wind.		※2
	12	Fan lock stop.		
	13	EEPROM read error.		
	14	DC voltage abnormal.		
	15	ACT circuit abnormal.		
Totally no operation.		・FU1 3.15A fuse blown	・Replace fuse or other part that causing the fuse blown.	
		・Receiver PWB connector disconnected.	・Securely connect connector CN11A.	
		・Card-key selection [yes] condition.	If not using card-key function, make sure to turned OFF the switch SW501 setting of main PWB.	
		・Indoor PWB defect.	・Replace indoor PWB.	

SELF-DIAGNOSIS MEMORY FUNCTION

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

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

< How to redisplay failure diagnosis >

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

Fan speed settings for failure data

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

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

< How to clear the troubleshooting data >

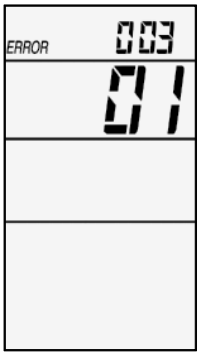
1. Redisplay the troubleshooting status. (See the above procedure.)
2. Turn the circuit breaker OFF.
3. By pressing MODE (MODE) button on the remote controller, set to Heating operation indicated by (HEAT).
4. Turn the circuit breaker ON.
5. Set the room temperature setting on the remote controller to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

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

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

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

For example :



For details information regarding error code, please refer to page 97.

SELF-DIAGNOSIS LIGHTING MODE

MODEL RAC-50NPE AND RAC-60NPE

DANGER (DC 360V)

- SWITCH OFF MAIN POWER SUPPLY TO THE OUTDOOR UNIT AT LEAST 10 MINUTES BEFORE START THE SERVICING WORK
- MAKE SURE THE LEVEL DC VOLTAGE BETWEEN TAB7/WHT(+) AND TAB8/BLK(-) IS LESS THAN 10V.
- DO NOT TOUCH ANY OTHER PARTS EXCEPT TEST (SERVICE) SWITCH WHEN SERVICE OPERATION IS CONDUCTED.

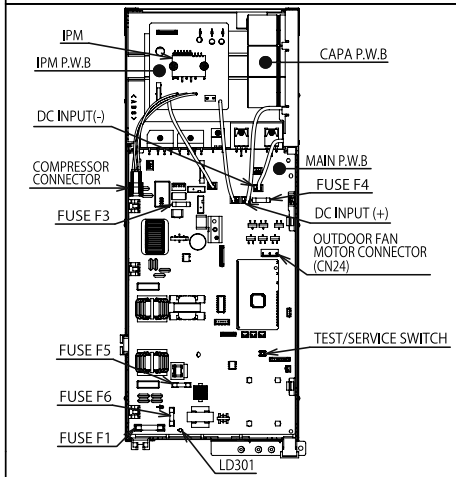
SELF DIAGNOSIS LIGHTING MODE

■ LIT ▨ BLINKING □ OFF

LD301 (RED)	SELF-DIAGNOSIS NAME	MAIN CHECK POINT	HOW TO REPAIR
[1] DURING OPERATION			
■	NORMAL OPERATION	COMPRESSOR OPERATION	NOT MALFUNCTION
▨	OVERLOAD OPERATION	COMPRESSOR OPERATION	THIS SHOW AN OVERLOAD, NOT MALFUCTION
✸ BLINKING DURING OVERLOAD	0.3SEC ■ ■ (■ •• LIGHTS FOR 2 SEC. AT INTERVAL OF 0.3 SEC.)		
[2] DURING STOP			
□	NORMAL STOP (STOPPED BY INDOOR THERMOSTAT OR MAIN OPERATION OFF	1. NO NEED TO CHECK ⇒	1. NOT ANY MALFUNCTION
▨ 1 TIME	FAN MODE OPERATION, RESET STOP	1. WAITING FOR COMPRESSOR START ⇒ 2. OTHER THAN ABOVE ⇒	1. NORMAL 2. CHANGE THE P.W.B.s
▨ 2 TIMES	PEAK CURRENT CUT	1. P.W.B.s DEFECTIVE ⇒ 2. COMPRESSOR ABNORMAL LOAD ⇒	1. CHANGE THE P.W.B.s 2. CHECK THE COMPRESSOR
▨ 3 TIMES	ABNORMAL LOW SPEED ROTATION	1. P.W.B.s DEFECTIVE ⇒ 2. COMPRESSOR ABNORMAL LOAD ⇒	1. CHANGE THE P.W.B.s 2. CHECK THE COMPRESSOR
▨ 4 TIMES	SWITCHING FAILURE	1. COMPRESSOR CONNECTOR OPEN ⇒ 2. COMPRESSOR ABNORMAL LOAD ⇒ 3. P.W.B.s DEFECTIVE ⇒	1. INSERT THE CONNECTOR 2. CHECK THE COMPRESSOR 3. CHANGE THE P.W.B.s
▨ 5 TIMES	OVERLOAD LOWER LIMIT CUT	1. OBSTACLE SURROND THE OUTDOOR UNIT ⇒ 2. OTHER CAUSE ⇒	1. REMOVE THE OBTRUCTION 2. CHECK CYCLE PIPE
▨ 6 TIMES	OH THERMISTOR TEMPERATURE RISE	1. DUE TO CONNECTOR OPEN ⇒ 2. LEAKAGE OF REFRIGERANT ⇒ 3. OTHER CAUSE ⇒	1. INSERT THE CONNECTOR 2. CHECK THE CYCLE PIPE AND RECHARGE THE REFRIGERANT 3. CHANGE THE P.W.B.s
▨ 7 TIMES	THERMISTOR ABNORMAL	1. CONNECTOR MISS INSERT ⇒ 2. THERMISTOR WIRE OPEN/SHORT CIRCUIT ⇒ 3. P.W.B.s DEFECTIVE ⇒	1. INSERT PROPERLY 2. CHANGE THE THERMISTOR 3. CHANGE THE P.W.B.s
▨ 9 TIMES	COMMUNICATIONS ERROR	1. CONNECTING CABLE MISS CONNECTION ⇒ 2. CONNECTING CABLE DISCONNECTION ⇒ 3. P.W.B.s DEFECTIVE ⇒	1. CONNECT CONNECTING CABLE PROPERLY 2. CHANGE THE CONNECTING CABLE 3. CHANGE THE P.W.B.s
▨ 10 TIMES	ABNORMAL POWER SOURCE	1. REACTOR IS UNCONNECTED ⇒ 2. ABNORMAL AC INPUT: OUT OF RANGE (230±10%) ⇒ 3. AC INPUT IS NORMAL ⇒	1. CONNECT REACTOR PROPERLY 2. CONNECT TO NORMAL AC POWER SOURCE 3. CHANGE THE P.W.B.s
▨ 11 TIMES	OUTDOOR FAN STOP BY STRONG REVERSE WIND	1. OUTDOOR FAN STOP BY STRONG REVERSE WIND ⇒	1. IT WILL RE-START AFTER WIND BECOME WEAK
▨ 12 TIMES	OUTDOOR FAN LOCK ERROR	1. OUTDOOR FAN STOP BY STRONG REVERSE WIND ⇒ 2. PROPELLY FAN LOCK ⇒ 3. OUTDOOR FAN MOTOR LOCK ⇒ 4. OUTDOOR FAN MOTOR OK ⇒	1. IT WILL RE-START AFTER WIND BECOME WEAK 2. REMOVE THE OBSTRUCTION 3. CHANGE THE FAN MOTOR 4. CHANGE THE P.W.B.s
▨ 13 TIMES	EEPROM READING ERROR	CHANGE THE P.W.B.s	
▨ 14 TIMES	ACTIVE VOLTAGE ABNORMAL	1. P.W.B.s DEFECTIVE ⇒ 2. ABNORMAL COMPRESSOR LOAD ⇒	1. CHANGE THE P.W.B.s 2. CHECK THE COMPRESSOR
▨ 15 TIMES	CIRCUIT ABNORMAL	CHANGE THE P.W.B.s	
▨ 16 TIMES	HIGH LOAD STOP	1. SERVICE VALVE CLOSE ⇒ 2. OBSTACLE SURROND THE OUTDOOR UNIT ⇒ 3. CLOGGED FILTER IN INDOOR UNIT ⇒	1. CHECK SERVICE VALVE 2. REMOVE THE OBTRUCTION 3. CHECK FILTER

✸ EXAMPLE OF BLINKING(5 TIMES) ■ ■ ■ ■ ■ 2SEC ■ (■ •• LIGHTS FOR 0.25 SEC. AT INTERVAL OF 0.25 SEC.)

STRUCTURE OF ELECTRICAL



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

SELF-DIAGNOSIS METHOD

1. SWITCH OFF MAIN POWER SUPPLY.
2. REMOVE THE CONNECTION OF INDOOR/OUTDOOR TERMINAL 3 CONNECTING CABLE.
3. SWITCH ON MAIN POWER SUPPLY.
4. WAIT FOR MORE THAN 30 SEC, UNTIL OUTDOOR LD301 BLINKING 9 TIMES.
5. KEEP PRESSING THE TEST SWITCH AT OUTDOOR FOR MORE THAN 5 SEC, UNTIL LD301 FAST BLINKS AND THEN RELEASE THE TEST SWITCH.
6. SELF-CHECK RESULT WILL DISPLAY AT LD301. REFER TO TABLE 2 FOR THE DETAIL OF THE DIAGNOSIS RESULT.
7. SWITCH OFF MAIN POWER SUPPLY ONCE DONE.

TABLE 2 : DURING SELF-DIAGNOSIS COMPLETED

SELF-DIAGNOSIS LIGHTING MODE ▨ BLINKING

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

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

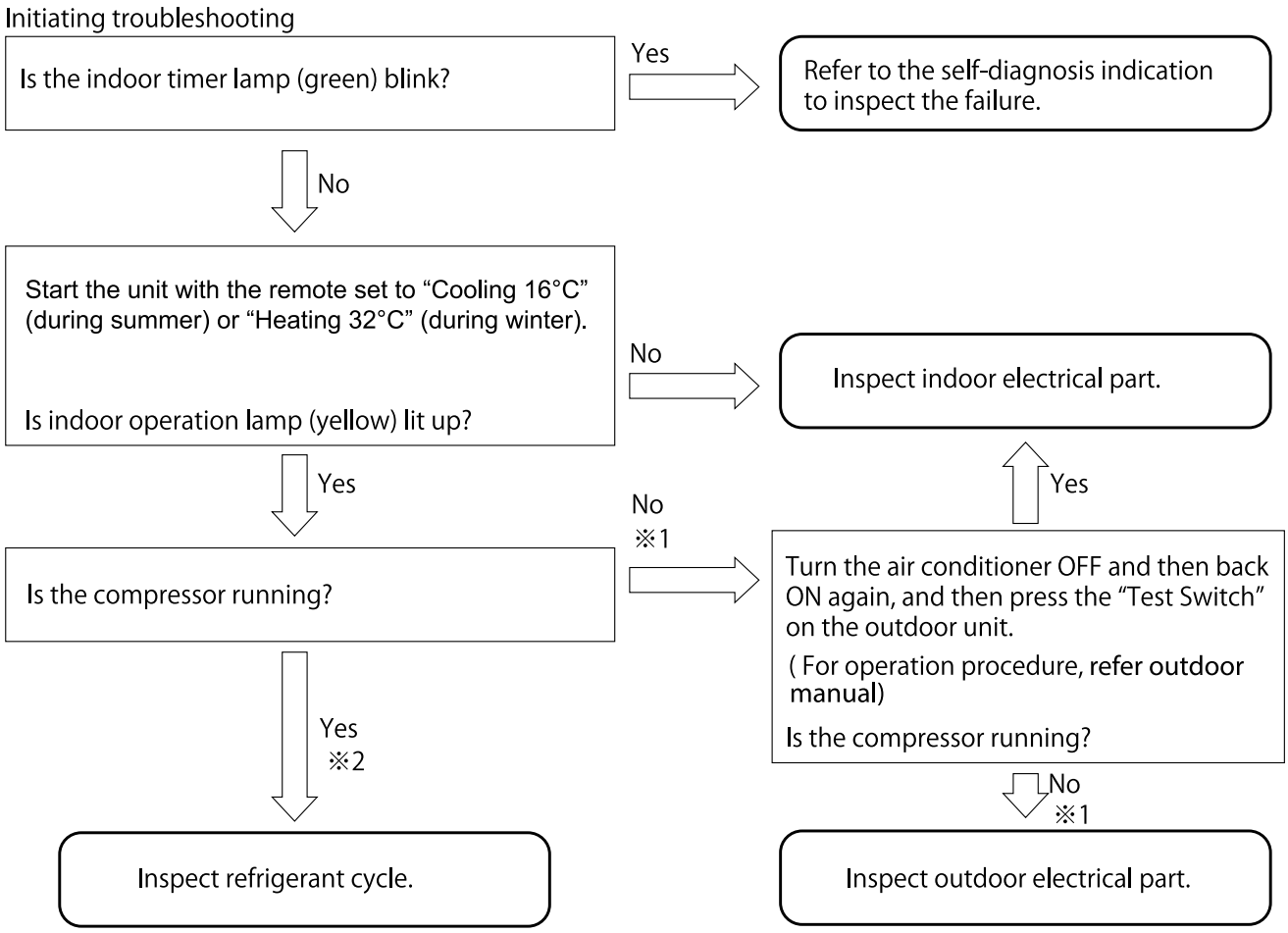
1. SWITCH OFF MAIN POWER SUPPLY.
2. DISCONNECT OUTDOOR FAN MOTOR CONNECTOR FROM CONNECTOR CN24 OF P.W.B MAIN.
3. ROTATE THE OUTDOOR FAN SHAFT TO CONFIRM THE FAN MOTOR MOVEMENT EITHER NORMAL OR ABNORMAL.
4. CHECK THE RESISTANCE VALUE BETWEEN PIN TERMINAL SHOULD BE WITHIN 20 TO 50 Ohm.

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

OTHER INSPECTION;

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

Diagnosing Indoor unit, Outdoor unit and Refrigerant cycle.



<Failure Diagnosis Using the Self-Diagnosis Memory Function> (Refer page for detail)

- You can use the self-diagnosis memory function to check the failure mode (※1) that occured on the outdoor unit from the indoor unit.

Step
1. Clear the troubleshooting data.
2. Run the unit for several minutes under condition where the compressor runs.
3. Redisplay and check the data writen in the self-diagnosis memory.

- The self-diagnosis memory function can also be used to catch sporadic failure phenomena.

Step
1. Clear the troubleshooting data.
2. Have the user use the product as usual until a failure phenomenon occurs. (The period depends on the incidence of the phenomenon)
3. At a later date, redisplay and check the data writen in the self-diagnosis memory.

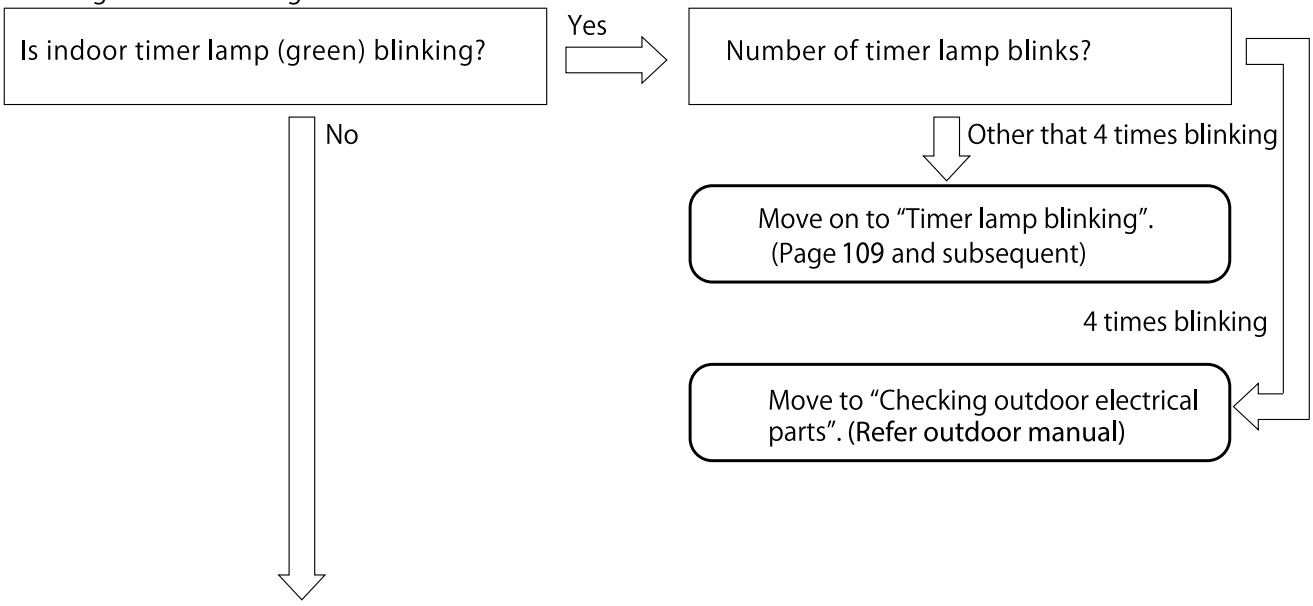
- Outdoor self-diagnosis indicator (rising compressor temperature, overload lower limit cut) that are caused by the cooling cycle or the usage environment take a long time to occur after the unit starts running. Further, they are influenced by atmospheric temperature, direct sunlight and operation time, all of which can make it difficult to confirm the failure when a repairman visit. In such case, use the self-diagnosis memory function. (※2)
- The "Fan stopped due to strong wind", "Compressor temperature rise"and "Power voltage error" self-diagnosis indicators ont he outdoor unit can be confirmed only by checking the self-diagnosis lamp on the outdoor unit or using the self-diagnosis memory function on the indoor unit.

Checking the indoor unit electrical parts

Introduction

First, check the failure and condiitions before moving to a detail diagnosis.

Initiating troubleshooting



Turn the air conditioner's breaker OFF, wait at least 5 seconds and then turn it ON again. Observe the movement of the horizontal deflector for about 30 seconds.

Check 1 : Does the horizontal deflector move? (Yes / No)

Set the remote control unit to cooling mode, temperature setting 16°C (summer), heating mode, temperature setting 32°C (winter) and operate the product.

Check 2: Can the product received the remote control signal and has the "operation lamp" lit up? (Yes/No)

If you responded "Yes" to Check 2:

Check 3: Is the compressor of the outdoor unit running? (Yes/No)

If you responded "No" to Check 2:

Check 4: Does the indoor "emergency switch" work? (Yes/No)

Check results and next check items

Check 1	Check 2	Check 3	Check 4	Next check item
No	No	—	No	Go on to "Power does not come on". (page 102)
Yes	No	—	Yes	Go on to "The product will not receive the remote control signal". (page 104)
Yes	Yes	No	—	Go on to "The compressor not run". (page 107)

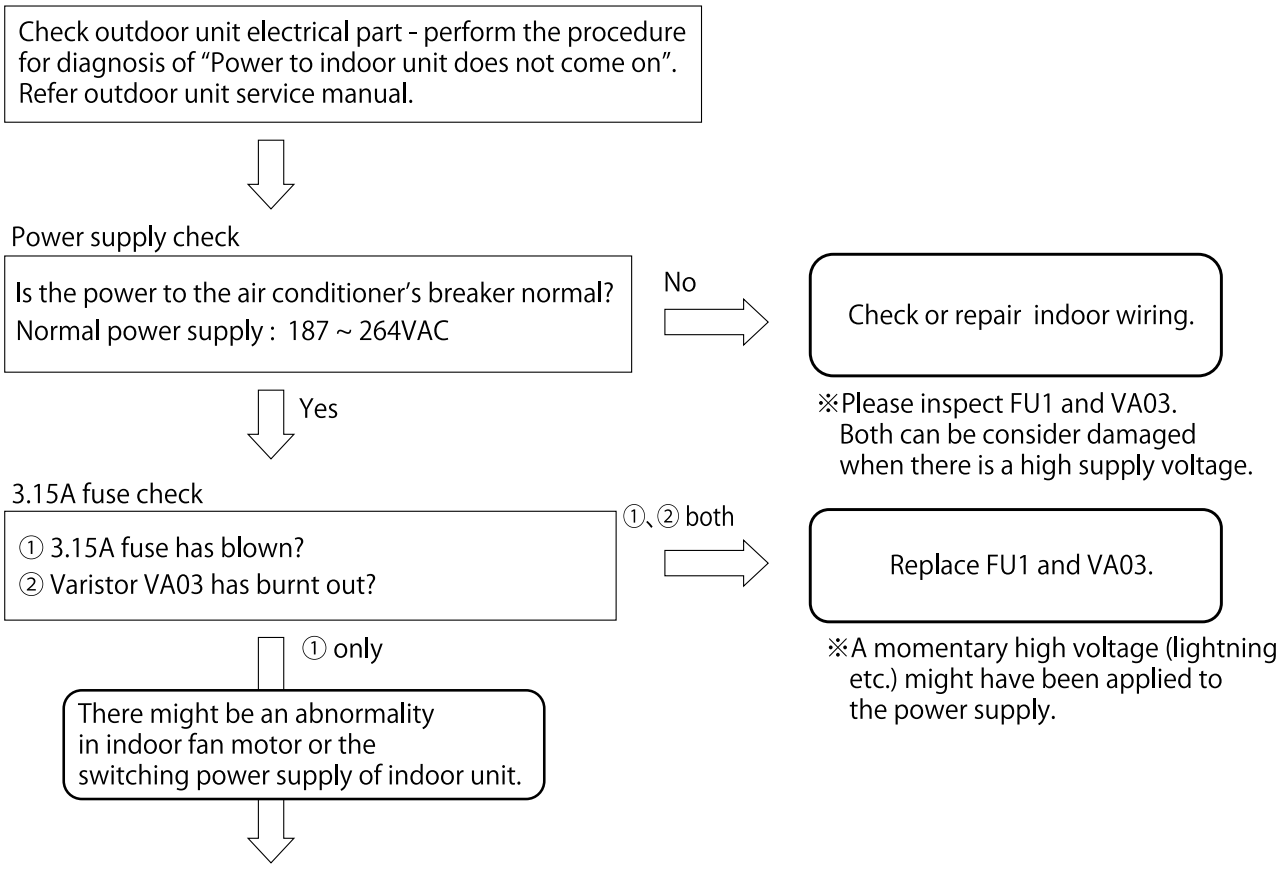
1. Failure : Power does not come on

[Situation] Initialization of the horizontal deflector position and remote control reception do not occur when the power turned ON.

[Suspected failure location]
- Power supply
- Indoor fan motor
- Switching power circuit

[Cautions]
- When going on a service run to address a "Power does not come on" failure, bring along a "3.15A fuse (FU1)" and a "varistor (VA03).
- Before start repair work, check the voltage coming to the air conditioner's breaker. On rare condition, an abnormal voltage might be supplied by faulty house wiring (240V applied to 100V outlet, neutral line disconnected in single phase 3-wire power supply).
- If an abnormal high voltage is applied to the unit, the 3.15A fuse and the varistor are degraded or damaged, and should be replace.
- If the 3.15A fuse is blown, the cause must be remove first or else the new fuse will blown as well.
- The indoor fan motor is connected to the primary power source. Therefore, a voltage to ground occurs. Take care to avoid electric shock.
- The indoor fan motor uses the same fuse as the control board. If the 3.15A fuse is blown, check the indoor fan motor before turning the power ON.

[Diagnosis flow]



Check indoor fan motor

Turn the fan blade a few times by hand.

Is the spindle tight?

※If the short-circuit occurs, the fan become tight and diffiicult to turn.

Is there a short-circuit between red and black wire?

※Use a tester to check the insulation between red and black wire of connector CN12 on the indoor PWB.

Yes → Replace indoor fan motor and 3.15A fuse.

No

There might be an abnormality in switching power supply of indoor unit.

Check indoor electrical

Replace the 3.15A fuse.

At this time be sure to disconnect the connector CN12 on the indoor PWB side.

Again turn ON power supply, has the 3.15A fuse blown?

※For safety, be sure to close the cover on the indoor unit before performingthis work. If you hear any noise, immediately turn the air conditioner's breaker OFF.

No → Check all output voltage to search again for problems with the switching power supply. (0V,5V,8.5V,12V)

Check for other abnormalities in the PWB and remove any abnormalities that are found.

Yes

Replace indoor PWB.

2. Failure : Remote control does not receive communication signal

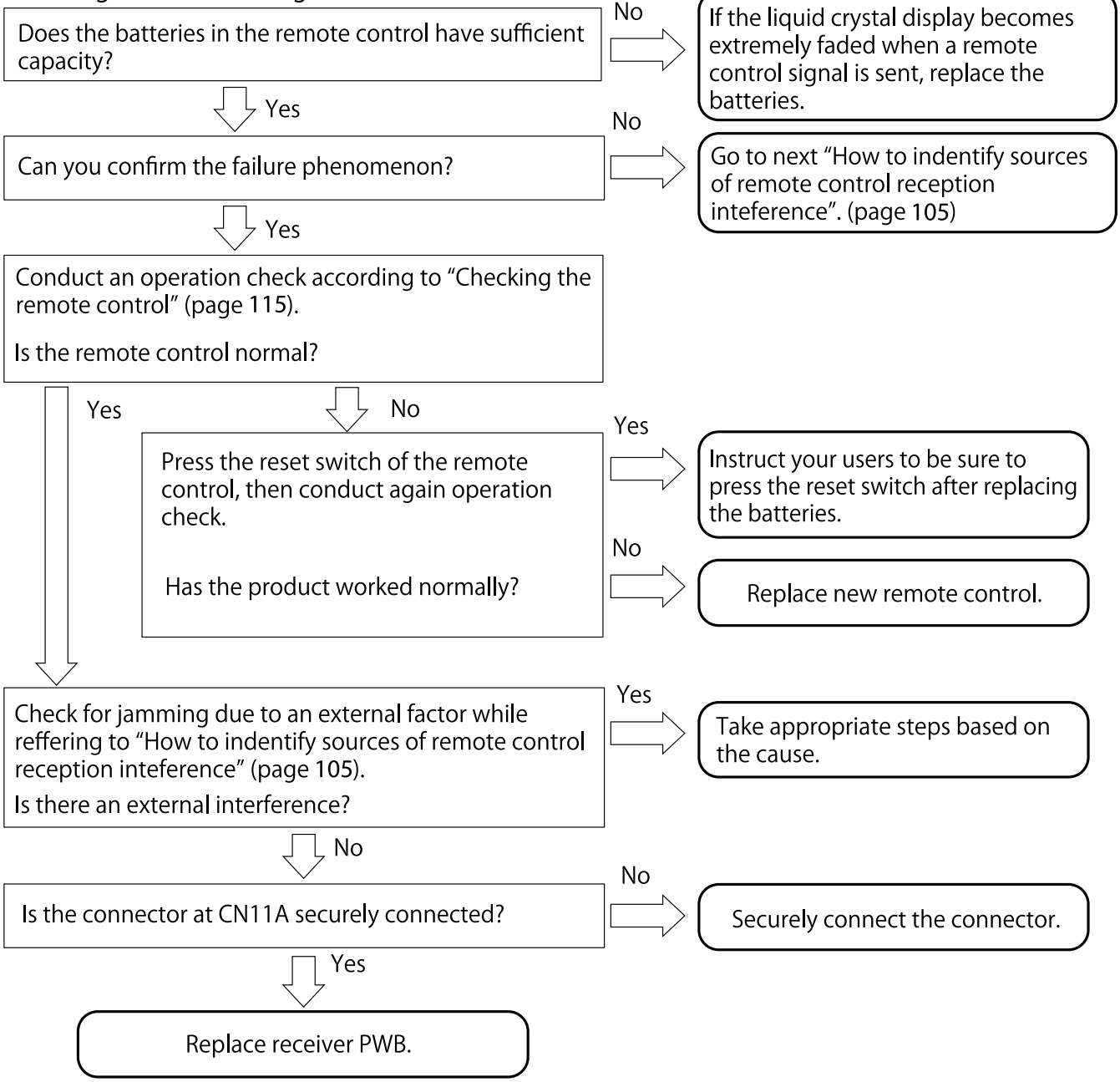
[Situation] No reception or poor reception by the remote control.
(Unit operate normally when using temporary switch)

[Suspected failure location]
- The remote control is damaged, has dead batteries or cannot be reset.
- Remote control receving unit.
- The connector is loose or disconnected.
- The product is normal (external cause : lighting, remote control of other device, electrical noise, etc.)

[Cautions]
- Even if there are no abnormalities in the product, external factor to the product can cause interference with remote control reception.
- The capacity of the batteries drops in low temperature environment. The voltage of old batteries will drops in particular in the morning and at night in the winter, possibly resulting in reduced remote control range. So, please use new alkaline batteries.

[Diagnosis flow]

Initiating troubleshooting



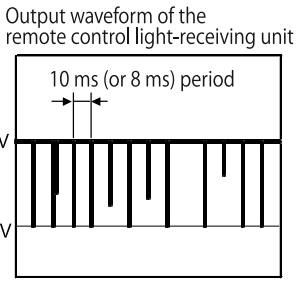
How to identify sources of remote control reception interference

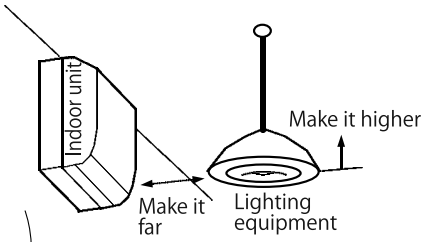
[Situation] The product may become poorly responsive to remote control signals due to external factors even though the product itself is trouble-free.

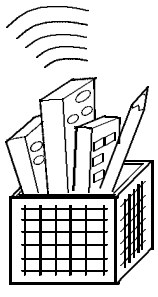
[Suspected sources of inteference] Identify the installation status of the air-conditioner and the indoor and outdoor environments to identify possible causes of the inteference.

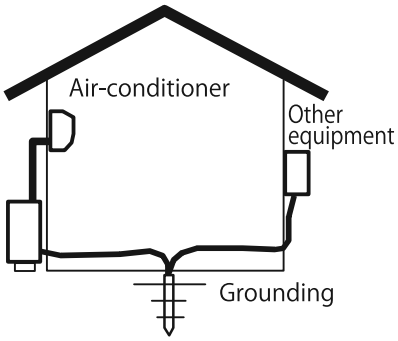
- Indoor lighting equipment (quantity, type, location)
- Remote control units of other electrical products and equipment
- Is the grounding for the air-conditioner shared with other equipment?
- Are the surroundings of the air-conditioner clear of wireless antenna?
- Is the remote control light-receiving unit protected from direct sunlight?

[Checking and actions]

<table>
<tr>
<td>Effects of lighting equipment (fluorescent lamps)</td>
<td>
Checking points
・Turn on and off the lighting equipment and check for its effects on the reception of remote control signals.
・When cold, the fluorescent lamp tends to emit infrared rays with wavelengths close to those used in remote control.
If you cannot detect the phenomenon about which your user is complaining at the time of your visit, such as "the product sometimes fails to receive remote control signals" and "the product fails to receive remote control signals in the morning alone", then turn off the lighting for about 20-30 minutes and wait for the fluorescent lamps to cool down before conducting another check.
There are even cases where the product fails to receive remote control signals for 1 to 2 minutes only after the lighting equipment is turned on.
・The noise status may vary with the dimming of the lighting equipment. In the case of lighting equipment with a dimmer, therefore, conduct a check with all the light intensities.
・If the lighting equipment is the source of the jamming, the remote control light-receiving unit output usually shows a noise waveform as shown in the right-hand figure. In the case of slight jamming, this kind of waveform will not cause practical problems. However, intense degrees of jamming will disable the reception of remote control signals.
・When the fluorescent lamp is old and is flickering, it may cause disorders in the reception of remote control signals.


Actions proposed
1. Make it hard for light of the lighting equipment to enter the remote control light-receiving unit.
・Separate the lighting equipment from the indoor unit.
・Raise the lighting equipment.
・Cover the upper half of the light-receiving panel from its rear side with aluminum tape or black vinyl tape.


(This will also affect the reception of remote control signals. Therefore, set the range to be covered with tape to a range that is problem-free in practice, while checking the reception status.)
2. Add an interference filter to the front panel of the remote control light-receiving unit.
※ Lighting equipment that produces strong interference exists although rarely. Some problems may therefore be unsolvable by managing the air-conditioner side alone.
</td>
</tr>
<tr>
<td>Effects of the remote control units of other equipment</td>
<td>
Checking points
・If, on the remote control unit of a TV or audio equipment, its sound volume key or something similar is left pressed, infrared signals become continuously sent, thereby jamming the reception of remote control signals.
・Check how the remote control unit and related components are stored, thereby checking if there is any possibility that a button may be inadvertently left pressed on the remote control unit of other equipment.

Actions proposed
If there is any such possibility, give explanations to your users to that effect and instruct them to exercise caution.
</td>
</tr>
</table>

Effects of other electrical products	Checking points • Check the effects of light and power noises coming from other electrical products. • Turn on and off the electrical products, turn off the power and turn on the power, and check their effects on the reception of remote control signals. • For products whose operating states change, check the effects of each state. Actions proposed • Change the location relationship between the air-conditioner and the target products. • Use a different wall outlet for the target products.
Sharing a grounding	Checking points • Check for effects of electrical noises coming into the air-conditioner through grounding wires. • Check if the grounding works is for the air-conditioner alone or shared with other equipment. If there is any equipment that shares it, turn on and off that equipment and detach and reattach the power plugs and examine their effects on the reception of remote control signals. Actions proposed • Establish an independent grounding for the air-conditioner. 
Effects of radio waves	Checking points • Using a wireless transmitter near the air-conditioner may affect the reception of remote control signals. • Have your users try sending signals with a wireless transmitter and examine their effects on the reception of remote control signals. Actions proposed • Add a ferrite core to the power cord and F cable. • Add a ferrite core to the internal wiring of the indoor unit. • Move the wireless antenna.
Effects of direct sunlight	Checking points • Direct sunlight and other intense light make the remote control light-receiving unit less sensitive. • Check for any time zone where the remote control light-receiving unit of the indoor unit is affected by direct sunlight depending on the location of the sun and mirror reflection. Actions proposed • Block the sunlight to protect against direct sunlight.

3. Failure : Compressor does not run

[Situation] Compressor does not run (same condition as thermo off), remote control reception is normal.
The self-diagnosis lamp on the outdoor unit (LD351) blinks once or is off.

[Suspected failure location]
- Indoor room thermistor, Heat exchanger thermistor
- Micro computer surrounding circuit

[Diagnosis flow]

Initiating troubleshooting

Is the "timer lamp" (green) of indoor unit blinking?
Yes → Check for failures acording to the self-diagnosis display.

No ↓

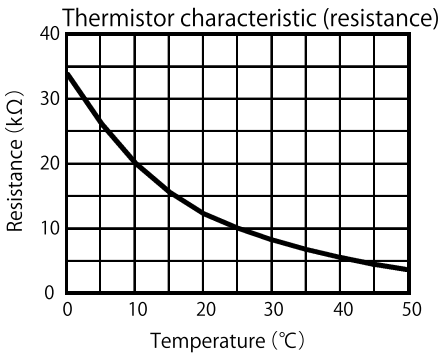
DId the self-diagnosis lamp (LD351) of the outdoor unit blink once or become turned off?
No → Check for failures acording to the self-diagnosis display.

Yes ↓

Remove the connector (CN1 and CN2) of the room temperature thermistor and heat exchanger thermistor and measure the thermistor resistance.
Did the reading roughly as per resistance value indicated in the right-hand figure?
No → Replace "room thermistor" and "heat exchanger thermistor".

Yes ↓

Replace indoor main PWB.



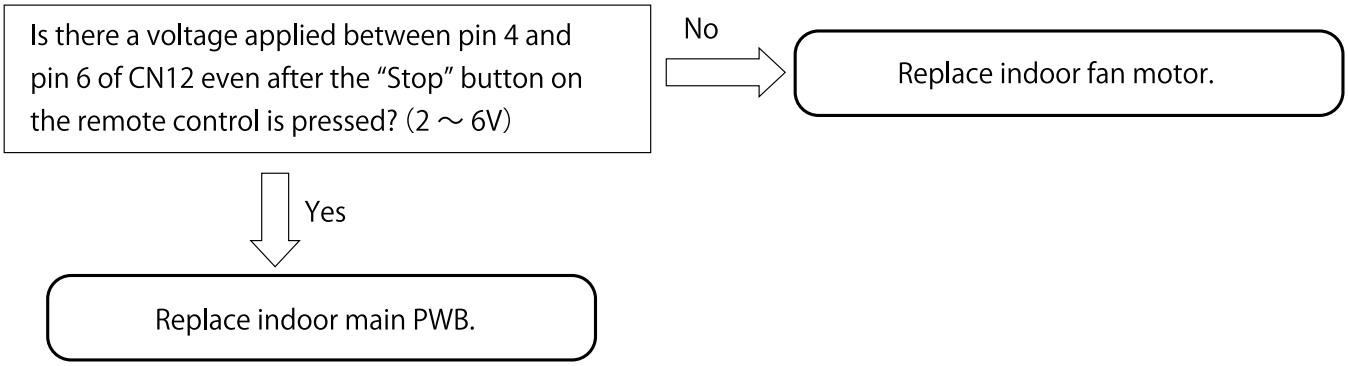
4. Failure : The fan motor does not stop

[Situation] Operation stops with the remote control, but the indoor fan motor does not stop.

[Suspected failure location]
- Indoor fan motor
- Fan motor driven circuit

[Diagnosis flow]

Initiating troubleshooting



※When voltage is applied to pin 6 (motor speed command) the indoor fan motor runs. Normally, signals (PWM) from the microcomputer pass through the photocoupler and apply voltage to pin 6. At this time, DUTY is variable according to speed and the speed is adjusted or stopped. However, if there is a short-circuit in the photocoupler, the voltage remains applied continuously and the fan motor cannot stop as long as Vcc is ON.

【Behaviour of the motor when a failure occurs】
- Power supply ON.
- Horizontal deflector start initialization movement.
- Same time the fan motor start rotating.
- Send an operation command with the remote control.
- Send the stop command with the remote control.
- Normally operation should stop, but the indoor fan motor continues to run.

5. Timer lamp blinking : 1 time

[Situation] Timer lamp blinks once and unit operation is not possible.

[Suspected failure location]

- Control circuit failure in outdoor reversing valve, connector disconnected
- Mechanical locking of reversing valve, broken coil wire
- Incorrectly installed indoor unit heat exchanger thermistor (during heating only)
- Clogged cycle (forgot to open service valve, etc.)
- Refrigerant leak

(If most refrigerant is removed in extremely hot (40°C or greater room temperature) or extremely cold (5°C or lower room temperature) conditions, it is possible for this failuremode to occur. (Absolutely no cooling or heating))

[Diagnosis flow]

Refer to page "Inspection when timer lamp on indoor unit blink once" of outdoor unit service manual.

6. Timer lamp blinking : 2 times

[Situation] The unit is under forced cooling operation (Not a malfunction).

7. Timer lamp blinking : 3 times

[Situation] Timer lamp blinks 3 times and unit operation is not possible.

[Suspected failure location]

- Indoor communication circuit failure

[Diagnosis flow]

Refer main circuit operation for "Indoor/ outdoor communication circuit (page 85)

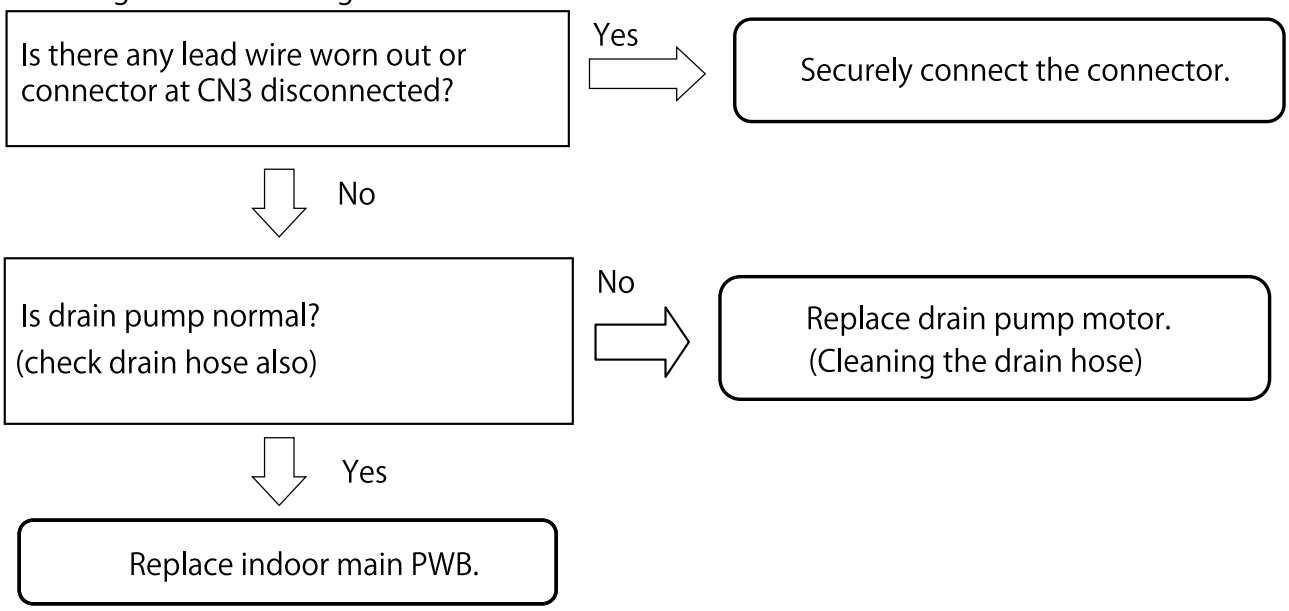
8. Timer lamp blinking : 6 times

[Situation] Timer lamp blinks 6 times and unit operation is not possible.

[Suspected failure location]
- Connector CN3 disconnected, wire worn out
- Drain pump abnormal water level

[Diagnosis flow]

Initiating troubleshooting



9. Timer lamp blinking : 7 times

[Situation] Timer lamp blinks 7 times and unit operation is not possible.

- Drain pump switch is in test position (not a malfunction)

10. Timer lamp blinking : 9 times

[Situation] Timer lamp blinks 9 times and unit operation is not possible.

[Suspected failure location]
- Loose connector, wire worn out or short-circuit in room and heat exchanger thermistor
- Terminal board fuse blown

[Cautions]
- Failure detection starts when starting operation with the remote control.
  (The failure detection function is not triggered simply by inserting the power plug.)
- If the terminal board has been replaced because the terminal board temperature fuse blew, check that the dimensions of the insulating coating of the connecting cable inserted in the terminal board are appropriate and that there is no bending in the inserted portion, and then insert it securely into the terminal board.

[Diagnosis flow]

Initiating troubleshooting

Are the room thermistor and heat exchanger thermistor connector (CN1 and CN2) securely connected?

No → Securely connect the connector.

Yes ↓

Remove the connector (CN10) of therminal board temperature fuse and check the resistance. Is the resistance value as shown in the right-hand figure?

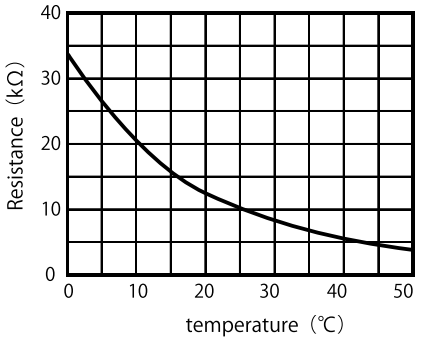
No → Replace terminal board.

Yes ↓

Remove the connector (CN1 and CN2) of room and heat exchanger thermistor and check the resistance.
Exactly the resistance as per shown in right-hand figure?
(A failure is detected if a wire is about to worn out or short-circuit is about to occur.)

No → Replace room thermistor and heat exchanger thermistor.

Thermistor characteristic (resistance)



Yes ↓

Turn the circuit breaker ON and then press "START" button on the remote control.

Then, is the timer lamp blinks 9 times again?

Yes ↓

Replace main PWB.

※ Although this is as extremely rare case for circuit configurations, if the above failure diagnosis does not resolve the situation you will need to replace the indoor electrical assembly.

11. Timer lamp blinking : 10 times

[Situation] Timer lamp blinks 10 times and unit operation is not possible.

[Suspected failure location]
- Fan motor connector disconnected or lead wire worn out
- Mechanical locking of indoor fan motor or the T-fan.
- Indoor fan motor failure
- Indoor fan motor driver circuit failure

[Diagnosis flow]

Make sure to turn OFF the circuit breaker.

T-fan check

Can the fan rotate lightly?

※Check or rotate by inertia
※Confirm there is no abnormal sound fan is rotating.

Yes

Check work step

Is the fan motor connector (CN12) connection securely?

Is there any short-circuit?

Yes

Fan motor check

Turn the breaker ON and make the indoor fan motor start to rotate (cooling mode operation or etc.)

※Power supply of indoor fan motor is connected to the primary power supply, therefore it is voltage to groud has occurred. Please becareful of electric shock.

No

Securely connect.

No

Are there any factors that interfere with the mechanical rotation?

Ex.) Foreign matter is mixed in the t-fan.

Ex.) Adhesion of dust is accumulated.

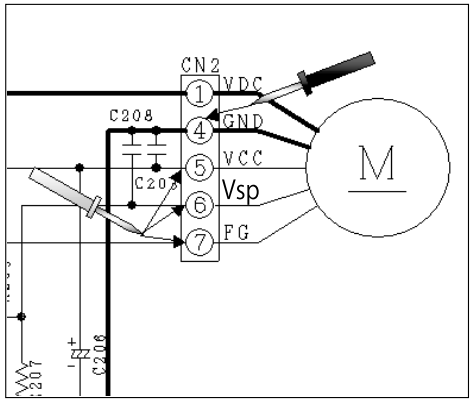
Yes

Remove blocking cause.

No

Replace fan motor.

※Bearing and axis abnormal



【Inspection location】

Check voltage between pin1 and pin4 of connector CN12.
V DC：Power supply to drive fan motor (about DC280V)
※ Motor will not rotate if abnormal.

Abnormal

Replace indoor main PWB.

※ Check again if the connector is inserted half way and check the voltage of the outlet.

Normal

Check voltage between pin5 and pin4 of connector CN12.
V CC：Power supply to control fan motor. (Rated : 15V)
※ Motor will not rotate if voltage is 0V. At this time, Vsp voltage rises gradually (appr. 10 sec), stop (appr. 8 sec) and then repeats this pattern 3 times before indicator begins to blink.

Abnormal

Replace indoor main PWB.

※ A failure in the indoor fan motor power circuit in the indoor unit is possible cause.

Normal

Check voltage between pin6 and pin4 of connector CN12.
Vsp：Motor speed command (Rated : 2~5V)
※ Although this varies according to wind speed, it is clearly abnormal for the voltage to remain stuck at 0V or 6V.
※ At approximately 0V, the fan motordoes not run. After 1 minute, the failure indicators will blink.
※ At approximately 6V, the fan motor is running at maximum speed. In this case, no failure indicators will blink.

Abnormal

Replace indoor main PWB.

※ A failure in the circuit that sends speed commands from the indoor unit is possible cause.

Normal

● Check voltage between pin7 and pin4 of connector CN12.
FG：Motor rotation feedback signal (Rated : 7.5V)
※ Signals are output based on a speed of 15V/DUTY50%. If measure with tester, a voltage of approx. 7.5V is displayed.
※ When this failure occurs, the motor runs at maximum speed and then stops. This pattern repeated 3 times. Regarding operation of the circuit, the Vsp voltage rises gradually (about 10 sec), stops (about 8 sec) and then repeatd this pattern 3 times before indicator begins to blink.

Abnormal

Replace indoor fan motor.

※ A failure in the circuit that sends speed feedback signal from the indoor fan motor is possible cause.

Normal

Replace indoor main PWB.

※ We can assume that circuit that read the feedback signal is having failure.
(Surround circuit of PC103)

11. Timer lamp blinking : blinking 12 times

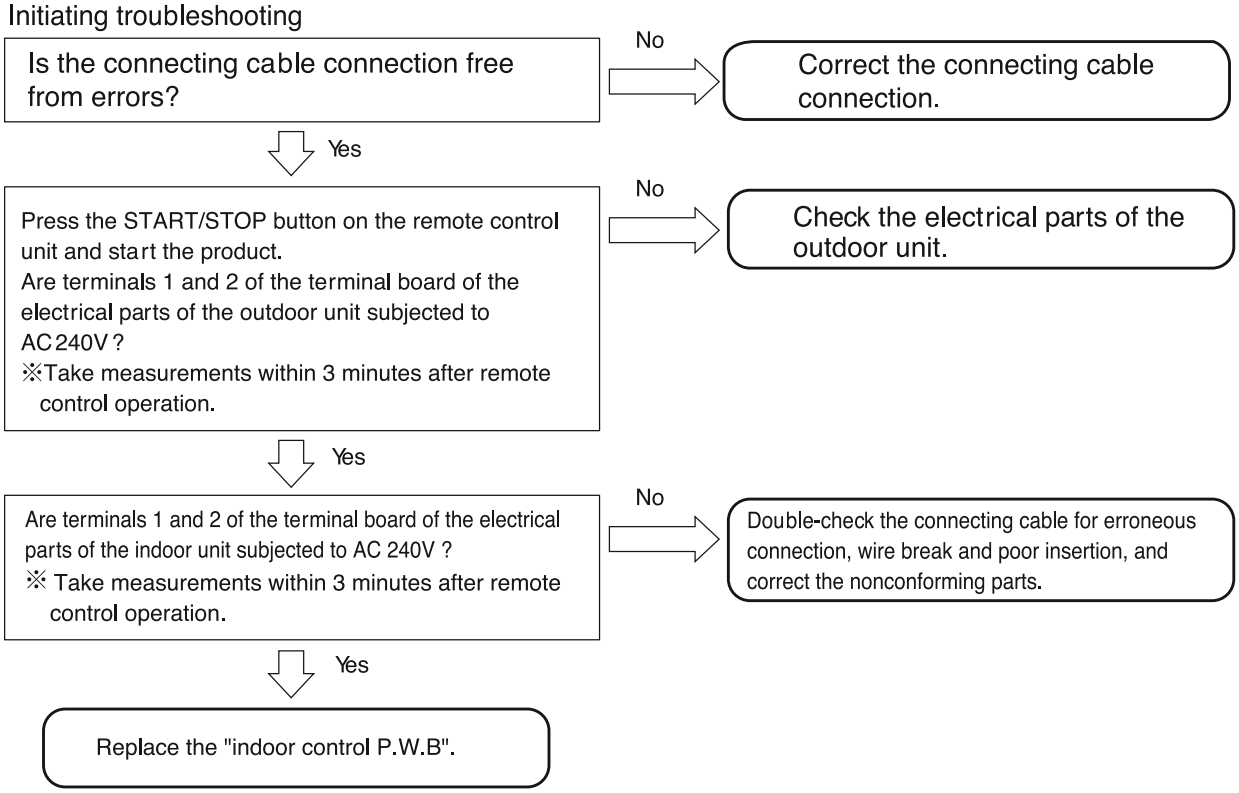
[Situation] The timer blinks 12 times and the product will not run.

[Estimated failure locations]
- Erroneous connection in the indoor-outdoor connection line (connecting cable)
- Forget to insert back self-check connector at CN27 of outdoor MAIN P.W.B
- Wire break or poor insertion of the indoor-outdoor connection line (connecting cable)
- Electrical parts in the outdoor unit (communication circuit, power circuit error)
- Communication error due to noise in other home electronics

※This does not constitute a failure in the air-conditioner

[Cautions] · When lines 1 and 2 of connecting cable are erroneously connected (crossed), the product may not enter self-diagnosis display mode. If the self-diagnosis memory stores data about "timer . lamp blinked 12 times", then, just in case, check if the connecting cable is not erroneously connected

[Diagnosis flow]



12. Timer lamp blinking : blinking 13 times

[Situation] The timer lamp blinks 13 times and the product will not run.

[Estimated failure location] · EEPROM, microcomputer

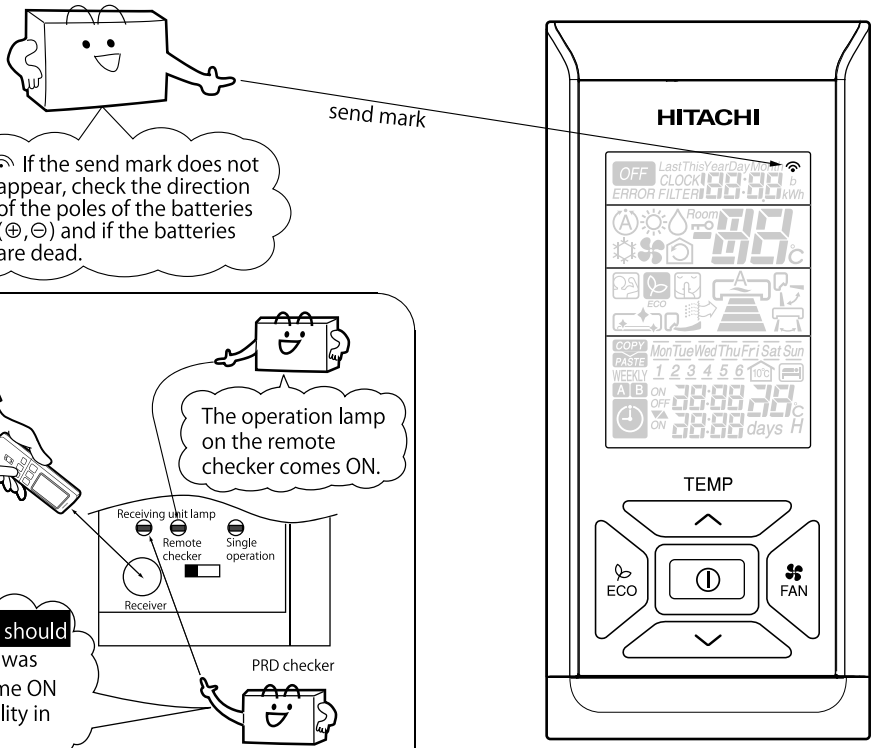
[Diagnosis flow]

Replace the "indoor control P.W.B".

Inspecting the wireless remote control

1. Remote transmission check

The remote control for conforming operation of the remote control is describe in RAR-6N5. The method is the same as for checking other remote control.

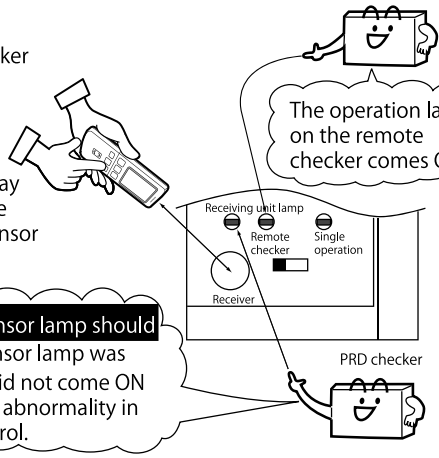


Method of checking remote control

〔Checking using PRD checker〕

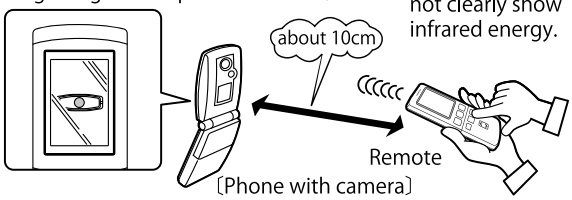
① Select the switch of PRD checker to "Remote checker" side.

② Standing about 3m to 7m away from the PRD checker, aim the remote control toward the sensor and press OFF/START button.



〔Checking using mobile phone's camera〕

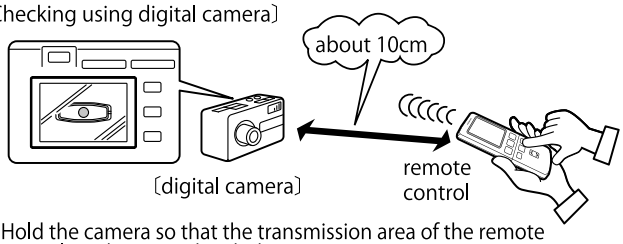
※ Some cameras do not clearly show infrared energy.



① Hold the mobile phone so that the transmission area of the remote control can be viewed with the camera.

② On the camera screen, a flash should appear in the transmission area of the remote control when buttons are pressed.

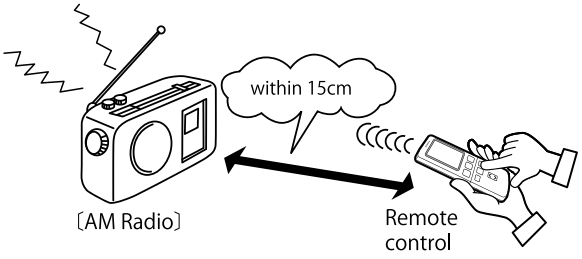
〔Checking using digital camera〕



① Hold the camera so that the transmission area of the remote control can be viewed with the camera.

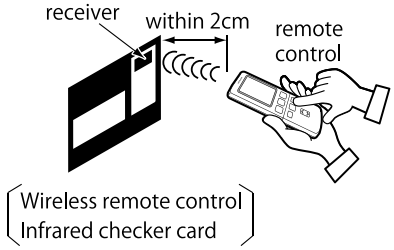
② On the camera screen, a flash should appear in the transmission area of the remote control when buttons are pressed.

〔Checking using AM Radio〕



It is normal when noise (bii-bii- sound) should be heard when buttons on the remote control are pressed.

〔Checking using remote checker card〕



Its consider normal if the receiver turned to orange color when any button was press on the remote control.

Normal

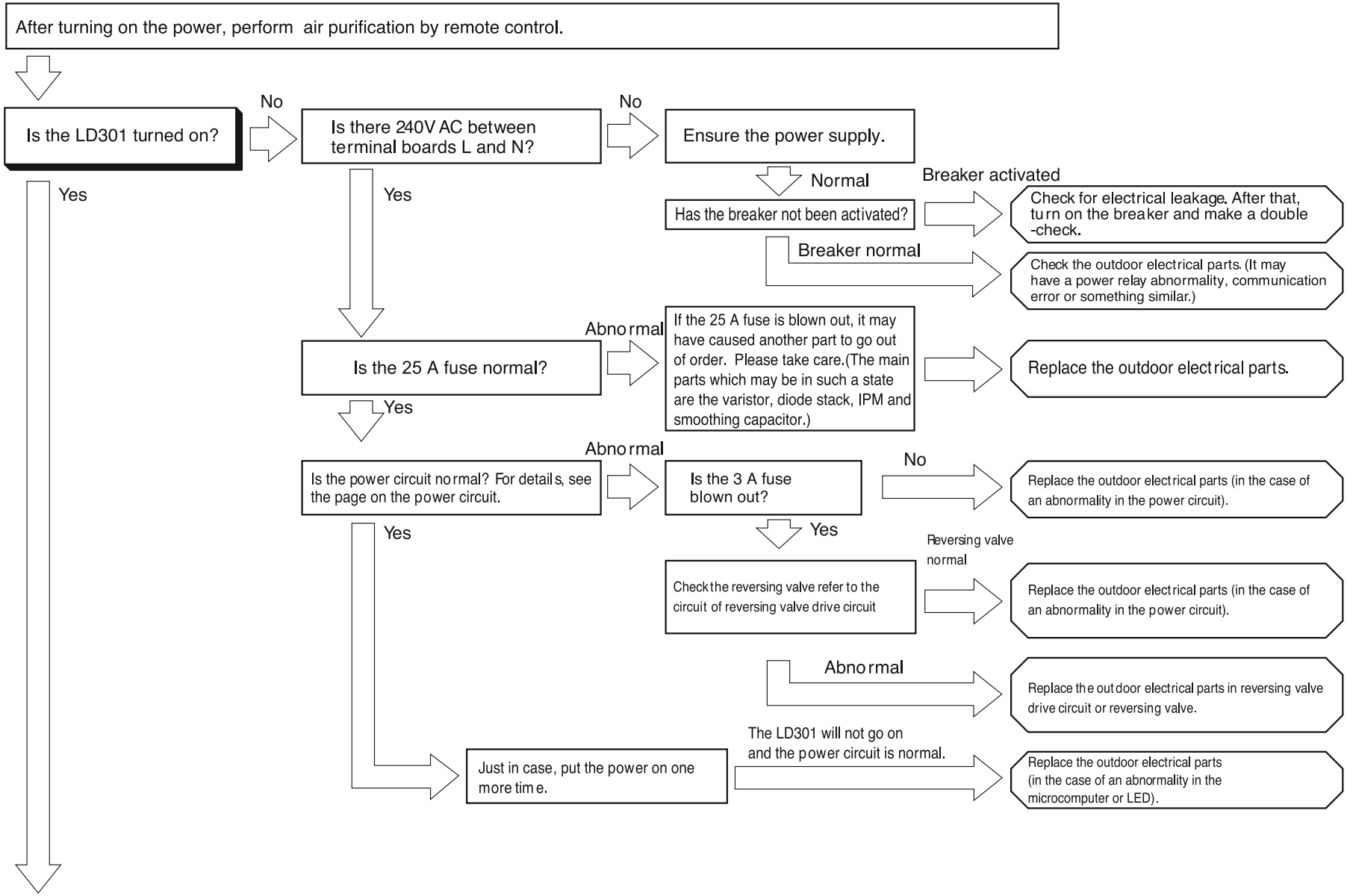
Check for the external causes of inteference to the indoor unit and remote control reception.

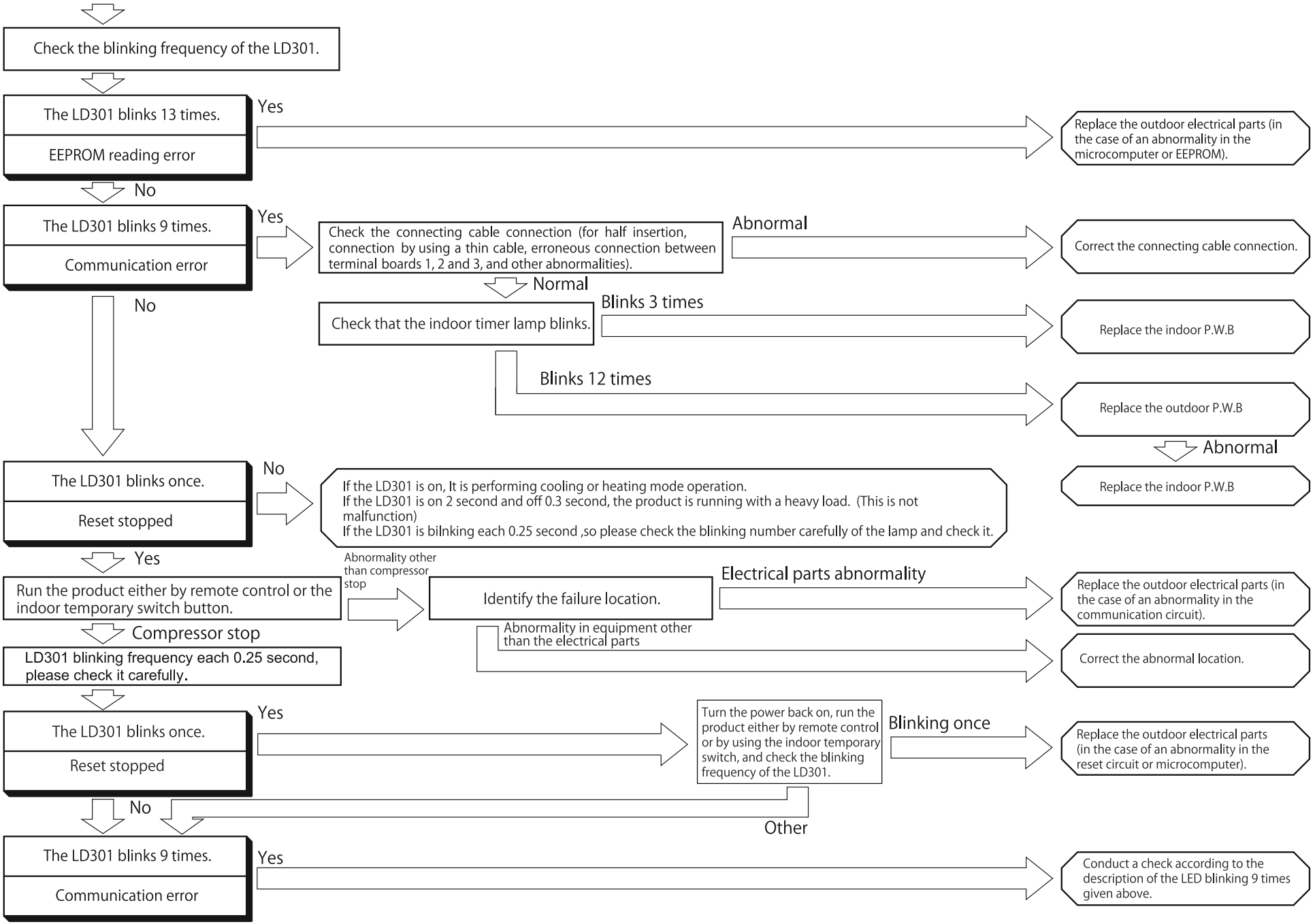
Abnormal

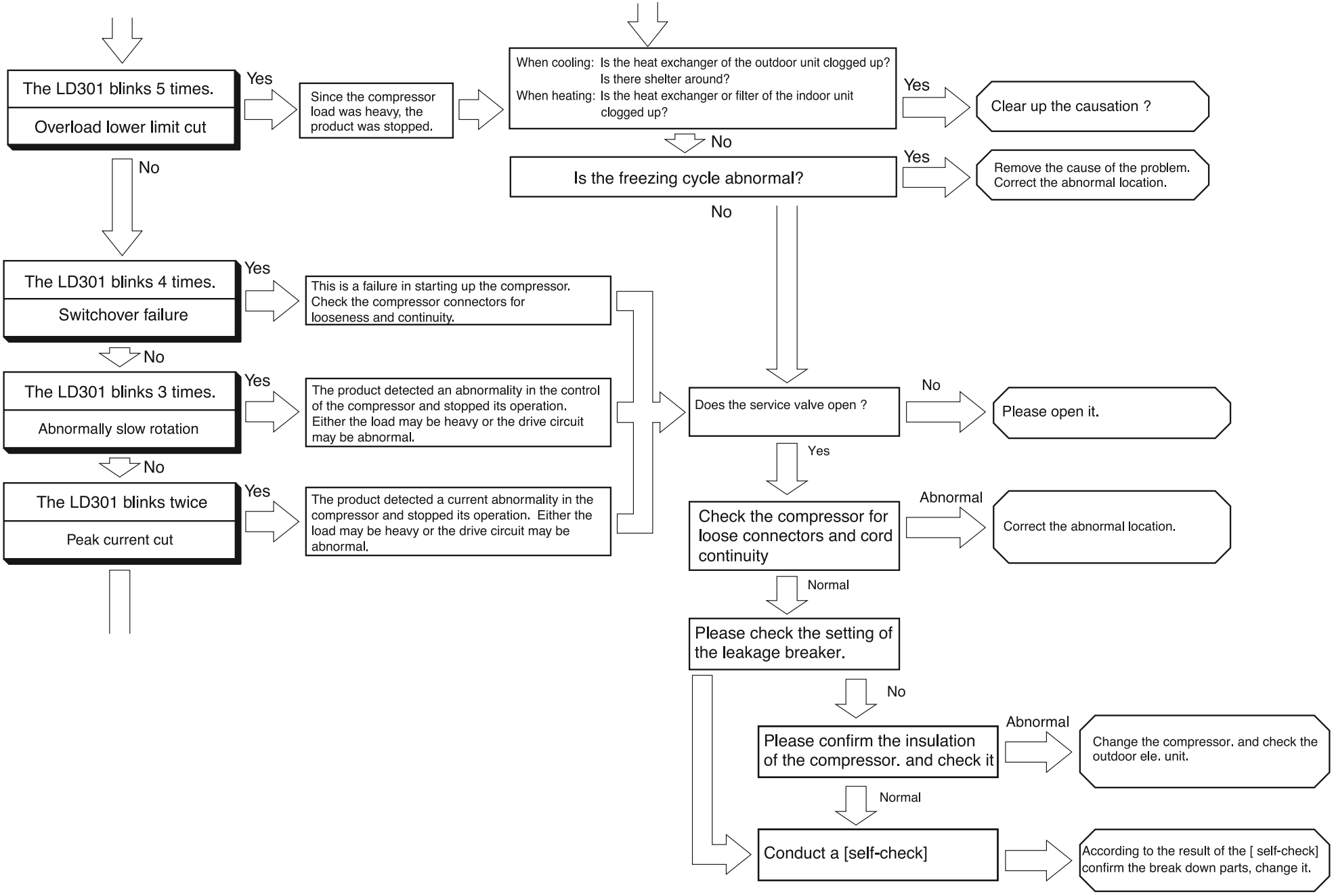
Check the operation once again. If the remote control does not operate normally, replace it.

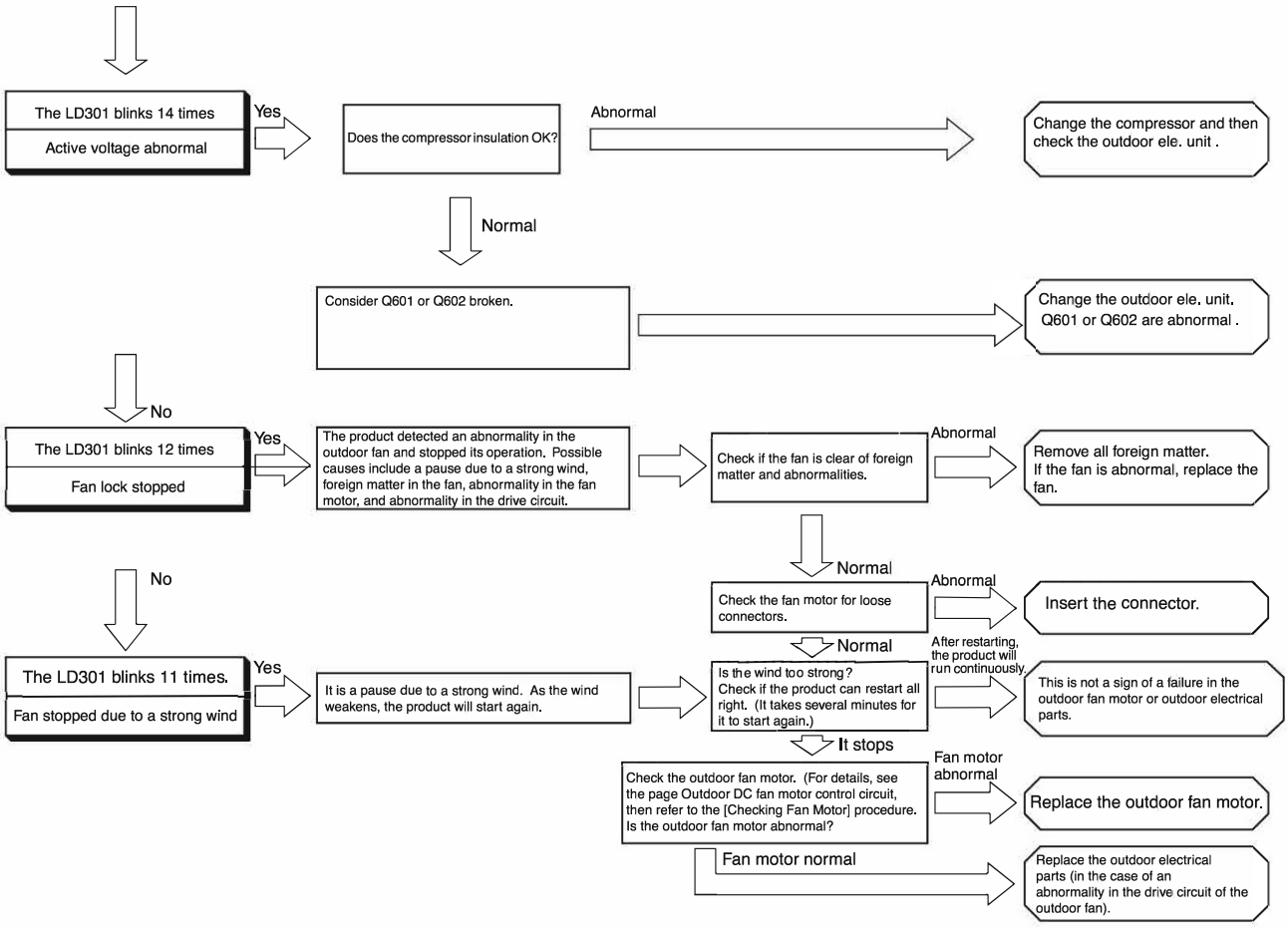
Part description	Part no.
PRD Checker	RSC-PRD1006

Checking the electrical parts of outdoor unit




Check the blinking frequency of the LD301.
The LD301 blinks 13 times.
EEPROM reading error
Yes
Replace the outdoor electrical parts (in the case of an abnormality in the microcomputer or EEPROM).
No
The LD301 blinks 9 times.
Communication error
Yes
Check the connecting cable connection (for half insertion, connection by using a thin cable, erroneous connection between terminal boards 1, 2 and 3, and other abnormalities).
Abnormal
Correct the connecting cable connection.
Normal
Check that the indoor timer lamp blinks.
Blinks 3 times
Replace the indoor P.W.B
Blinks 12 times
Replace the outdoor P.W.B
Abnormal
Replace the indoor P.W.B
No
The LD301 blinks once.
Reset stopped
No
If the LD301 is on, It is performing cooling or heating mode operation.
If the LD301 is on 2 second and off 0.3 second, the product is running with a heavy load. (This is not malfunction)
If the LD301 is bilnking each 0.25 second ,so please check the blinking number carefully of the lamp and check it.
Yes
Run the product either by remote control or the indoor temporary switch button.
Abnormality other than compressor stop
Identify the failure location.
Electrical parts abnormality
Replace the outdoor electrical parts (in the case of an abnormality in the communication circuit).
Abnormality in equipment other than the electrical parts
Correct the abnormal location.
Compressor stop
LD301 blinking frequency each 0.25 second, please check it carefully.
The LD301 blinks once.
Reset stopped
Yes
Turn the power back on, run the product either by remote control or by using the indoor temporary switch, and check the blinking frequency of the LD301.
Blinking once
Replace the outdoor electrical parts (in the case of an abnormality in the reset circuit or microcomputer).
No
Other
The LD301 blinks 9 times.
Communication error
Yes
Conduct a check according to the description of the LED blinking 9 times given above.


The LD301 blinks 5 times.
Overload lower limit cut
Yes
Since the compressor load was heavy, the product was stopped.
When cooling: Is the heat exchanger of the outdoor unit clogged up? Is there shelter around?
When heating: Is the heat exchanger or filter of the indoor unit clogged up?
Yes
Clear up the causation ?
No
Is the freezing cycle abnormal?
Yes
Remove the cause of the problem. Correct the abnormal location.
No
No
The LD301 blinks 4 times.
Switchover failure
Yes
This is a failure in starting up the compressor. Check the compressor connectors for looseness and continuity.
No
The LD301 blinks 3 times.
Abnormally slow rotation
Yes
The product detected an abnormality in the control of the compressor and stopped its operation. Either the load may be heavy or the drive circuit may be abnormal.
No
The LD301 blinks twice
Peak current cut
Yes
The product detected a current abnormality in the compressor and stopped its operation. Either the load may be heavy or the drive circuit may be abnormal.
Does the service valve open ?
No
Please open it.
Yes
Check the compressor for loose connectors and cord continuity
Abnormal
Correct the abnormal location.
Normal
Please check the setting of the leakage breaker.
No
Please confirm the insulation of the compressor. and check it
Abnormal
Change the compressor. and check the outdoor ele. unit.
Normal
Conduct a [self-check]
According to the result of the [self-check] confirm the break down parts, change it.


The LD301 blinks 14 times
Active voltage abnormal
Yes
Does the compressor insulation OK?
Abnormal
Change the compressor and then check the outdoor ele. unit .
Normal
Consider Q601 or Q602 broken.
Change the outdoor ele. unit. Q601 or Q602 are abnormal .
No
The LD301 blinks 12 times
Fan lock stopped
Yes
The product detected an abnormality in the outdoor fan and stopped its operation. Possible causes include a pause due to a strong wind, foreign matter in the fan, abnormality in the fan motor, and abnormality in the drive circuit.
Check if the fan is clear of foreign matter and abnormalities.
Abnormal
Remove all foreign matter. If the fan is abnormal, replace the fan.
Normal
Check the fan motor for loose connectors.
Abnormal
Insert the connector.
No
The LD301 blinks 11 times.
Fan stopped due to a strong wind
Yes
It is a pause due to a strong wind. As the wind weakens, the product will start again.
Normal
Is the wind too strong? Check if the product can restart all right. (It takes several minutes for it to start again.)
After restarting, the product will run continuously.
This is not a sign of a failure in the outdoor fan motor or outdoor electrical parts.
It stops
Check the outdoor fan motor. (For details, see the page Outdoor DC fan motor control circuit, then refer to the [Checking Fan Motor] procedure. Is the outdoor fan motor abnormal?
Fan motor abnormal
Replace the outdoor fan motor.
Fan motor normal
Replace the outdoor electrical parts (in the case of an abnormality in the drive circuit of the outdoor fan).

HOW TO CHANGE THE SHIFT VALUE SETTING TEMPERATURE USING WIRELESS REMOTE CONTROLLER

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

(For initial shift value temperature setting for Cooling mode (SHIFTC) and Heating operation mode (SHIFTW) : Please refer to page 67)

PROCEDURES

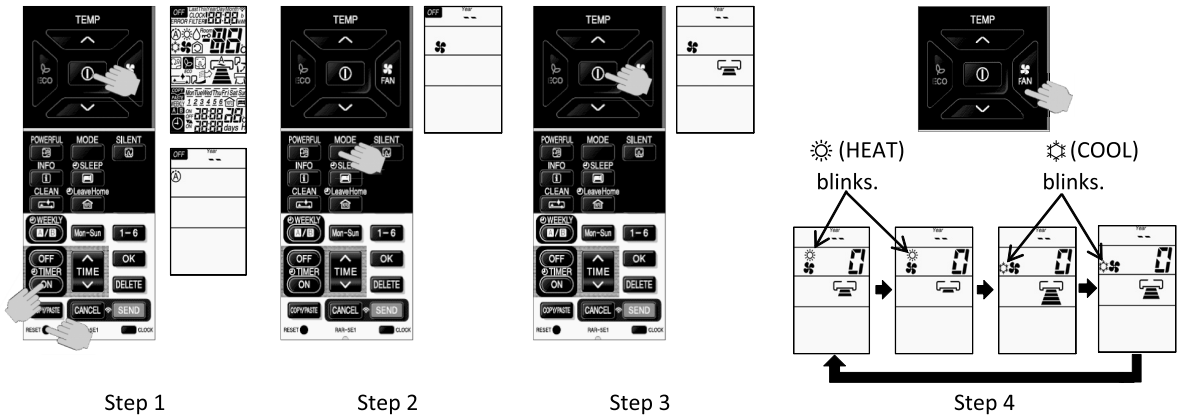
1. While pressing and holding ⏻ (START/STOP) button and TIMER ON (ON) button, press RESET [RESET] button on the same. Release RESET [RESET] button only and make sure that all marks on the remote controller display are indicated, then release the ⏻ (START/STOP) button and TIMER ON [ON] button.
   Remote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

2. Press the MODE (MODE) selector button so that the display indicates (FAN) mode.

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

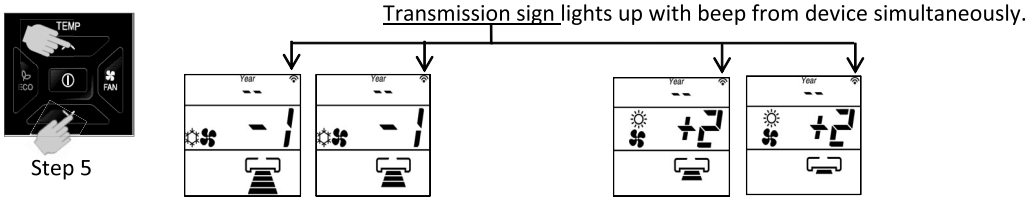
4. Set the FAN SPEED with the FAN (FAN SPEED) button according to the following FAN speed setting in order to choose the desired operation mode that is required for shift value setting temperature modification.

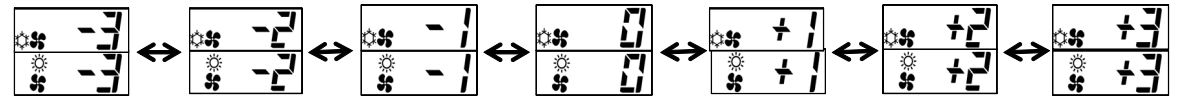
   - To change the shift value for COOLING mode operation, select either (HIGH) or (MED) FAN SPEED.
   - To change the shift value for HEATING mode operation, select either (LOW) or (SILENT) FAN SPEED.



Step 1 Step 2 Step 3 Step 4

5. Press the (TEMP ﹀ or ﹀) button to change the shift value.
   (The shift value changed with device beep sound.)





Decrease 3˚C from the initial shift value setting. | Decrease 2˚C from the initial shift value setting. | Decrease 1˚C from the initial shift value setting. | The initial shift value setting. | Increase 1˚C from the initial shift value setting. | Increase 2˚C from the initial shift value setting. | Increase 3˚C from the initial shift value setting.

NOTE :

(1) The displayed shift value, (HEAT) and (COOL) symbol on the remote controller display will be disappear after 10 seconds.

(2) The changed shift value will remain unchanged after turned off the power.

(3) If "0" is displayed on the remote controller display, it indicates the shift value is now at the initial setting.

HOW TO CHANGE THE SHIFT VALUE for SETTING TEMPERATURE USING WIRED REMOTE CONTROLLER

Shift value for COOLING and HEATING mode operation can be changed using wired remote controller.
(This procedure shall be strictly carried out by service personnel).
(For initial shift value temperature setting for Cooling mode (SHIFTC) and Heating operation mode (SHIFTW):
Please refer to page 67)

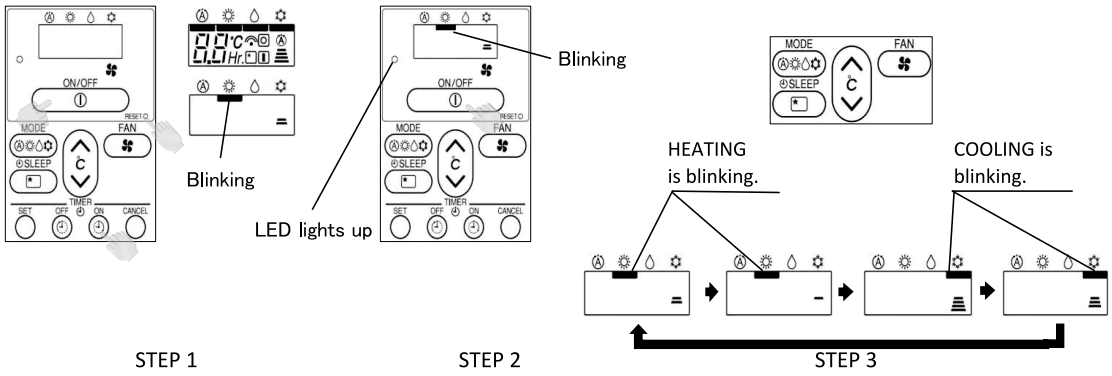
PROCEDURE

1. While pressing the ⏻ ON/OFF and ON TIMER button, press and release the RESET RESET button once.
All icon will be displayed on the LCD screen and shortly disappear.
Initial cursor will be at AUTO mode. After about 5 sec, cursor will shift and blink continously at HEATING mode. Release hold of ⏻ ON/OFF and ON TIMER button.
The remote is now in **SHIFT VALUE CHANGE MODE**.

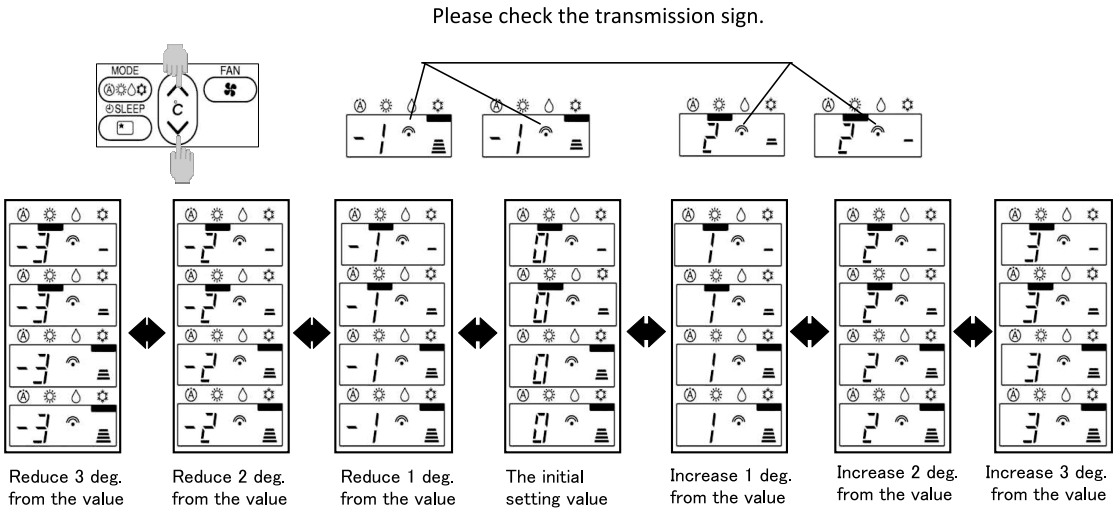
2. Press ⏻ ON/OFF button. Operation LED will ON. Cursor will stop blinking. Unit will operate in FAN mode.

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

- To change the shift value of COOLING mode operation, select either (HIGH) or (MED) FAN SPEED.
- To change the shift value of HEATING mode operation, select either (LOW) or (SILENT) FAN SPEED.



4. Press the (TEMP V or Λ) button to change the shift value.



5. Press the ⏻ [ON/OFF] button to end "Shift value change mode".

NOTE :
1. Shift value is everytime temperature button is pressed. Maximum 7 shift values only. (-3°C to + 3°C)
2. Changed shift value remain even after power supply is switched off.
3. By default the Shift value is set at "0°C" on the remote display. This indicates the unit is set to initial setting.

SETTING THE PREVENTION OF MUTUAL INTERFERENCE FOR REMOTE CONTROLLER

(Applicable for Remote controller model : RAR-5E1, RAR-5E2, RAR-5E3, RAR-5E4, RAR-5E5, RAR-6N1, RAR-6N2, RAR-6N3, RAR-6N4 and RAR-6N5)

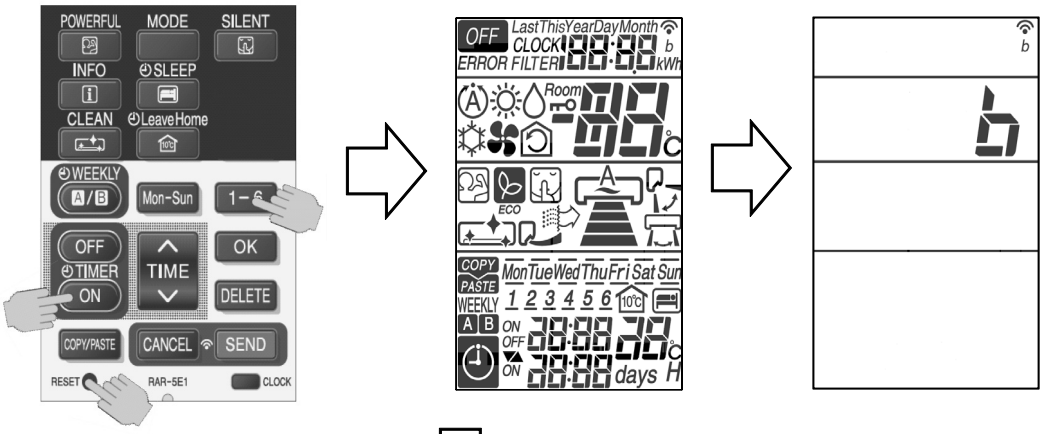
Case : 2 sets of indoor units installed near to each other.
If both indoor units can receive the same remote controller signal, please set the remote controller as below. (This setting will change the signal address of each remote controller.)

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

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

2. Slide the remote controller cover to take it off.
3. While directing the remote controller towards the receiver of the indoor unit, press 1 – 6 button, TIMER ON (ON TIMER) button and RESET (RESET) button simultaneously. (The remote controller perform signal transmission with the device.)

Signal transmission : From A to B

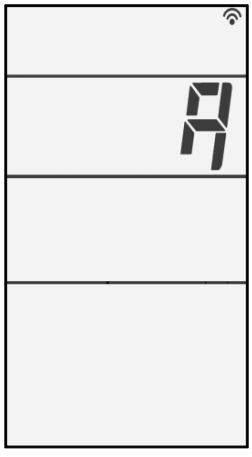


4. The indoor unit beeps [Pip] to indicate that it has just received the signal from remote controller.

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

Signal transmission : From B to A

Note : If indoor unit still not receive the correct signal from the correct remote controller, setting shall be made again.
By setting again for the 2nd time, the signal address will change from B to **A**. Then, if repeat again for the 3rd time, the remote controller signal address will change from A to **B**.



OPERATION MODE LOCK SETTING

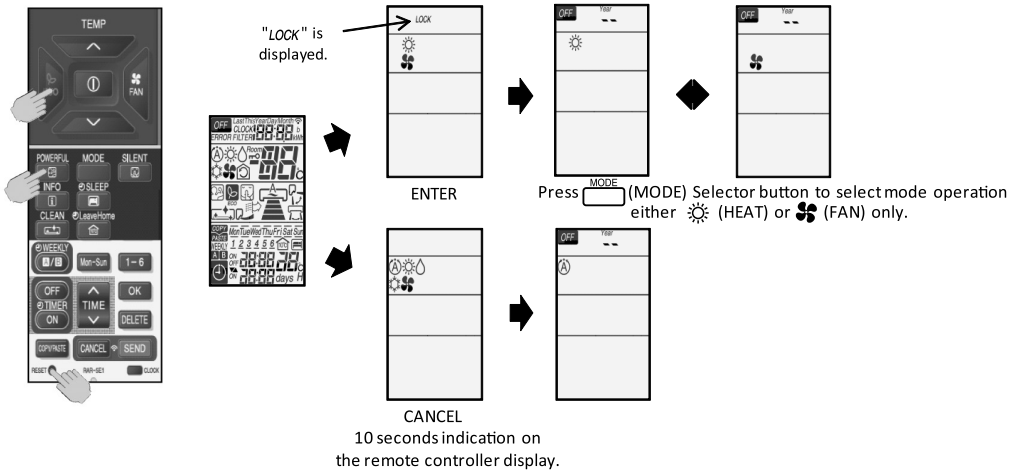
If Dip switch position is set at "Heating mode only" or "Cooling mode only" as mentioned on page 91, it is required to set the remote controller into operation mode lock setting. Without setting the remote controller, it will caused unmatch signal transmission between indoor unit and remote controller.

PROCEDURE

1. Heating operation mode lock setting

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

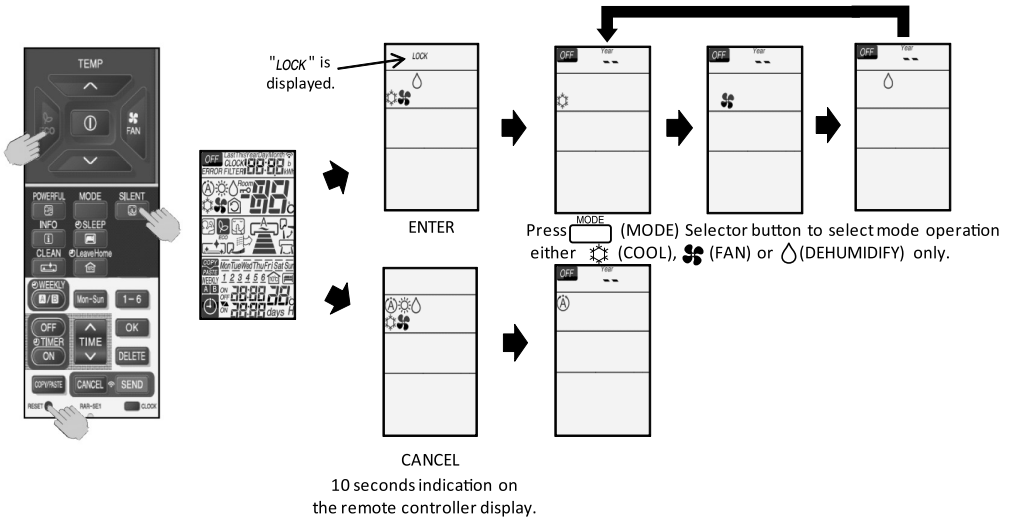
(b) To cancel the "Heating operation mode lock", repeat the above procedure (1(a)).



2. Cooling opearation mode lock setting

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

(b) To cancel the "Cooling operation mode lock", repeat the above procedure (2(a)).



NOTE :

(1) The indication of " LOCK " and (" "(HEAT), " " (COOL)," " (FAN) or " " "(DEHUMIDIFY)) mode operation symbol on the remote controler display will disappear after 10 seconds and it will enters to OFF condition indicated by OFF on the display.

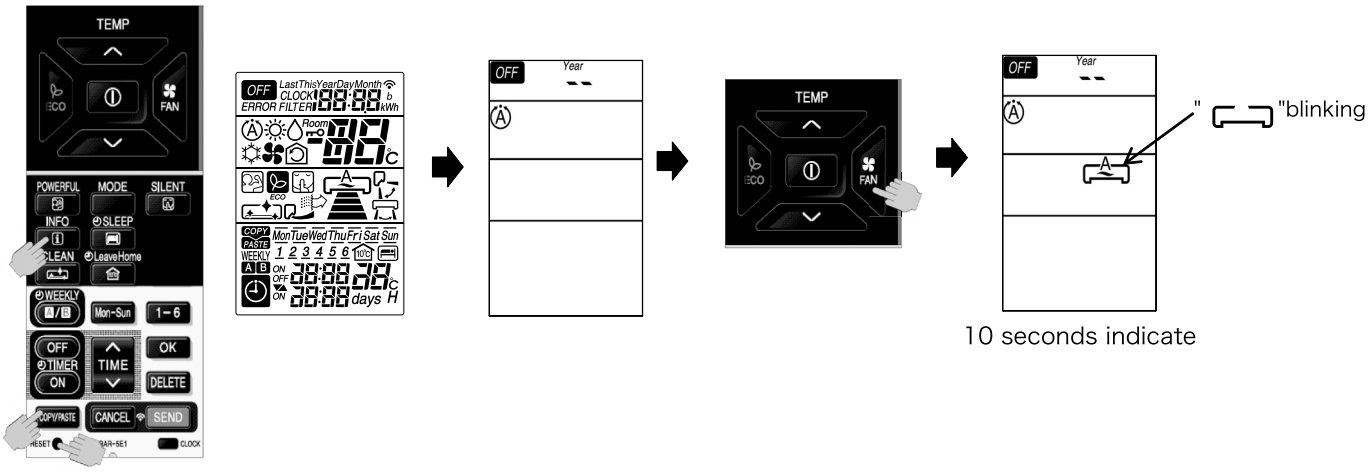
(2) The OPERATION MODE LOCK setting will remain in the remote controller memory eventhough the remote controller is ran out of battery.

DISPLAY OPERATION MODE SETTING

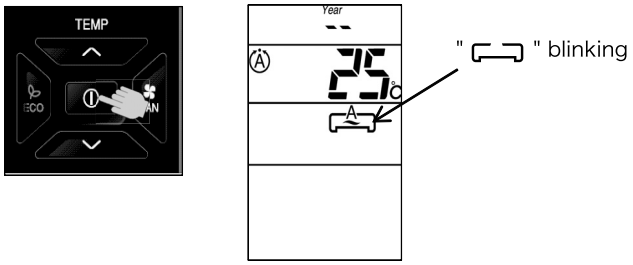
For operating indoor unit independently (without outdoor unit connection), remote controller has to be set according to below procedures before send the signal to the indoor unit. New communication format between indoor and outdoor is required to communicate with outdoor unit.

PROCEDURE

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



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



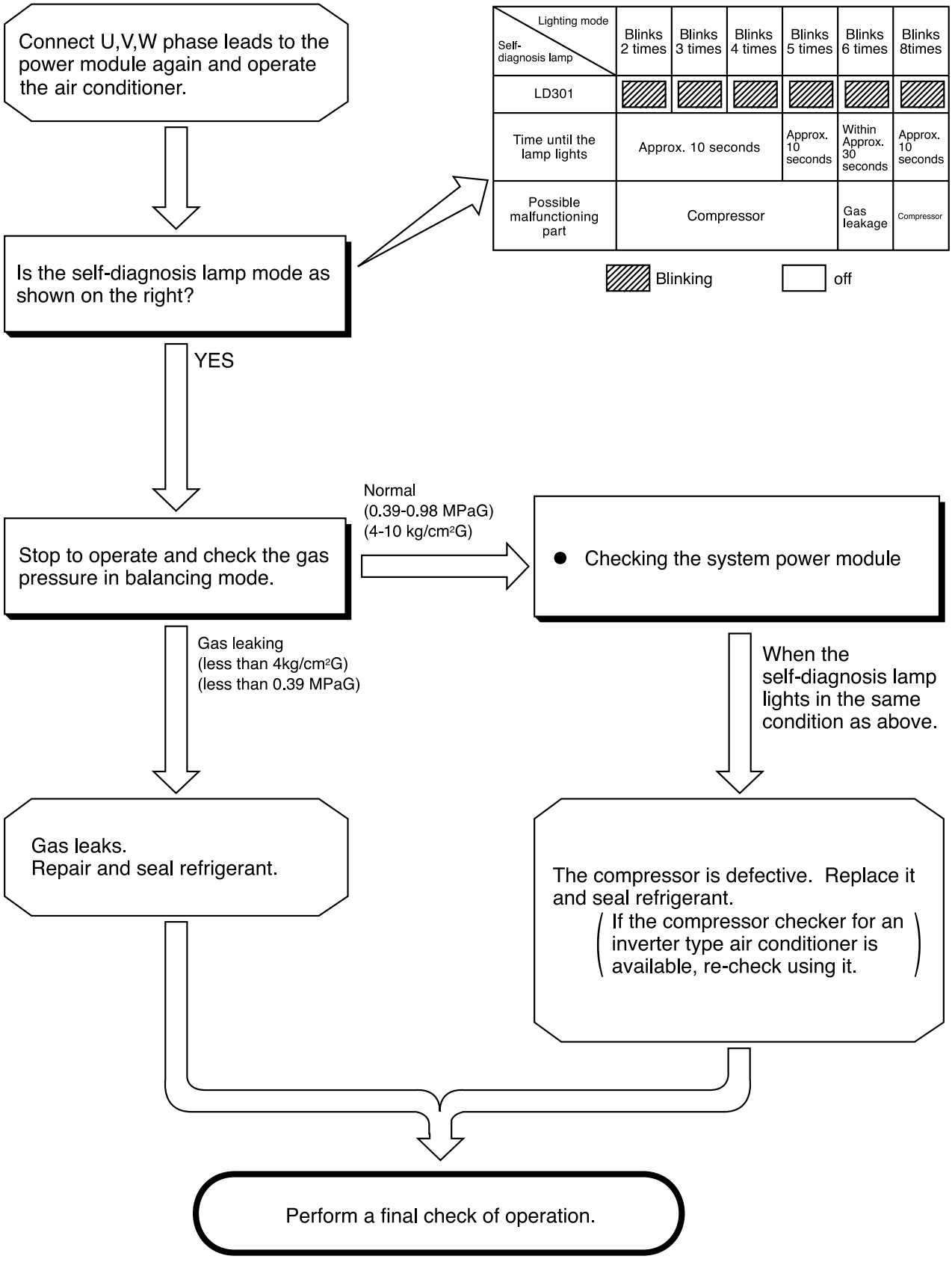
NOTE :

(1) During "DISPLAY OPERATION MODE", "⌐¬" blinks on LCD of remote controller.

(2) When operation stops, "DISPLAY OPERATION MODE" is canceled.

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

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



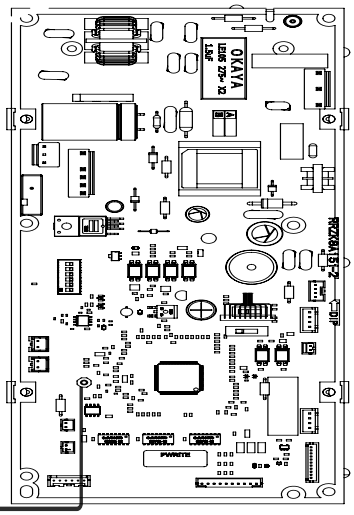
Forced cooling operation

The cooling operation can be forcibly performed for collecting refrigerant and inspecting failures.
Do not perform the forced cooling operation continuously for long hours,
because the compressor continues to be in operational status, regardless of room temperature.

＜How to start the operation＞
- The operation of the unit should be stopped.
- Press and hold the "Temporary operation SW" shown in the right figure for 5 sec.

＜How to stop the operation＞
- Press and hold the "Temporary operation SW" again. Or stop the operation using the remote controller.

※During the forced cooling operation, the "Timer indicator" blinks twice.



Temporary operation switch

When performing the forced cooling operation, turn the power on once. If you press and hold the switch for 5 sec or longer, the forced cooling operation starts. To stop the forced cooling operation, press the switch once again or stop the operation using the remote controller.

How to run the product with the outdoor unit test switch

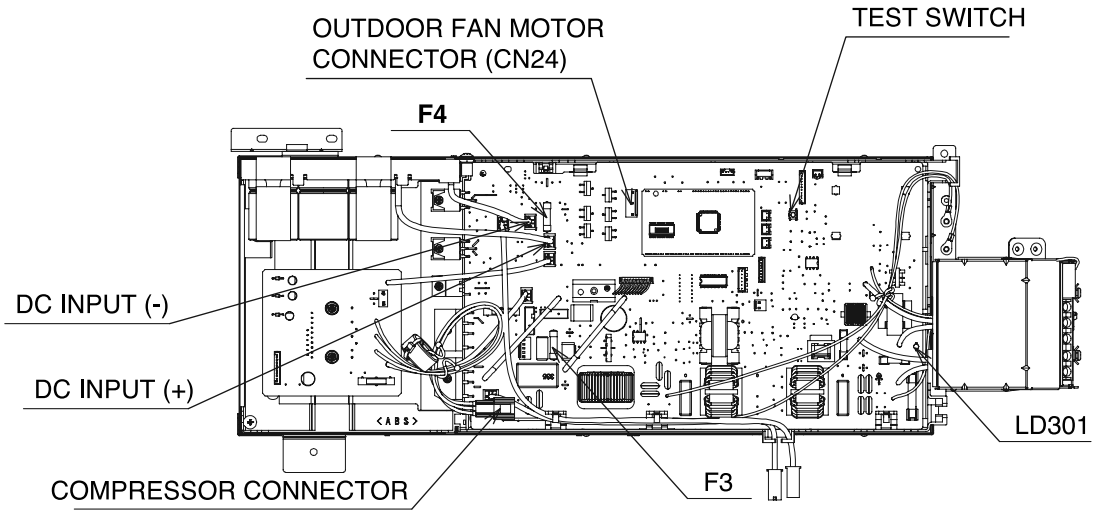
If the indoor electrical parts is out of order and if you wish to run the outdoor unit

1. Remove the connection of indoor/outdoor connecting cable Terminal 3.
2. Turn on the outdoor terminal boards L and N (230 V AC).
3. Confirm that the "LD301" blinks once from the terminal side of the outdoor unit. Afterwards (when about 30 sec elapses after the power turns on), confirm that the "LD301" changes to blinking 9 times (communication error).
4. When the "LD301" is blinks 9 times, if you press the test switch, the "LD301" lights up.

If you release your finger from the test switch within 1 sec to 5 sec after pressing the switch, the forced cooling operation starts.
※(If you press the test switch for 5 sec or longer, the self-check diagnosis starts. In this case, turn the power off and start the procedure from once again.)

※(For the initialization of the expansion valve, it may take 1 min until the operation starts.)

5. When you press the test switch again for 1 sec or longer, the unit stops the operation.



※Cautions

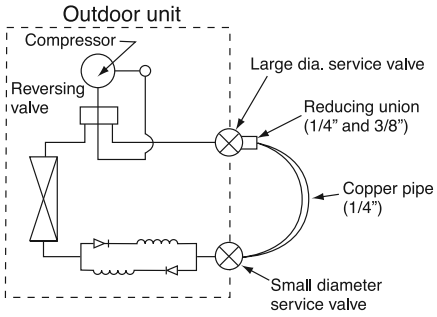
1. Applying power directly to the outdoor unit will cause a rush current to stress the outdoor unit. Therefore, if the indoor unit is not out of order, do not use the method descried in 2).
2. Before making the connections, be sure to turn off the breaker.
3. Do not under any circumstances run the product for more than 5 minutes.
4. Doing work with the compressor connector removed will cause the LD301 to blink 4 times. It will not start.
5. For another test run, turn off the breaker and turn it back on. (The test switch is accepted only once after power-on. After operation by remote control, it is not accepted.)
6. When the operation with the test switch is over, turn off the breaker and set the connectors back.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

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

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

Charge refrigerant of 300g after vacuuming (※1)



Parts to be prepared

(1) Reducing union
1/4" (6.35 mm)
3/8" (9.52 mm)
(2) Copper pipe (1/4" and 3/8")

Do not operate for more than 5 minutes

The operation method is the same as "How to operate using the connector to servicing the outdoor unit".
※1 The charging amount of 300g is equivalent to the load in normal operation.

SUMMARY OF TROUBLESHOOTING METHOD FOR OUTDOOR UNIT
MODEL RAC-50NPE AND RAC-60NPE

Checking the IPM IC of IPM P.W.B.
1) Power off the unit.
2) Disconnect compressor wire connector between compressor to IPM P.W.B.
3) Check the diode value between below point :-
   a) Terminal U, V, W (+ side of multimeter probe) to Terminal P (WHT wire) (- side of multimeter probe). It shall be around 0.40 to 0.43.
   b) Terminal N (BLK wire) (+ side of multimeter probe) to Terminal U, V, W (- side of multimeter probe) It shall be around 0.40 to 0.43.

**During normal running, DC voltage between below point are:-
a) Terminal P & Terminal N shall be around 320V
b) Terminal U, V, W (+ side of multimeter probe) to Terminal N (- side of multimeter probe) shall be around 160V.

Checking the fan motor winding.
1) Power off the unit.
2) Disconnect fan motor wire from CN24 of MAIN P.W.B.
3) Check the resistance value between RED, WHT, BLK wire of fan motor. It shall be around 20Ω to 50Ω.

**During normal running, DC voltage between RED, WHT, BLK wire of fan motor (+ side of multimeter probe) to Terminal N (R741 leg) (- side of multimeter probe) shall be around 160V.

Test Run
1) Remove Terminal 3 connection.
2) Power ON the unit and wait for 30 seconds.
3) Press and hold test switch for 5 seconds.

Checking the expansion valve winding.
1) Power off the unit.
2) Disconnect the expansion valve from CN15 of MAIN P.W.B.
3) Check the resistance value between wire of expansion valve as below:-
   a) WHT to BRN
   b) ORN to BRN
   c) YEL to RED
   d) BLU to RED
   It shall be around 46Ω ± 3.7Ω.

Checking the compressor motor winding.
1) Power off the unit.
2) Disconnect compressor wire connector between compressor to IPM P.W.B.
3) Check the resistance value between WHT, YEL, RED wire of compressor wire. It shall be same on all terminals between 1Ω to 3Ω.

Checking the reversing valve winding.
1) Power off the unit.
2) Disconnect the reversing valve wire from CN2 of MAIN P.W.B.
3) Check the resistance value between the wire of reversing valve. It shall be around 1.9kΩ.

Checking the reactor winding.
1) Power off the unit.
2) Disconnect YEL and BRN wire at TAB3 and TAB4 from MAIN P.W.B.
3) Check the resistance value between YEL & BRN wire of reactor. It shall be around 0.01Ω to 0.1Ω.

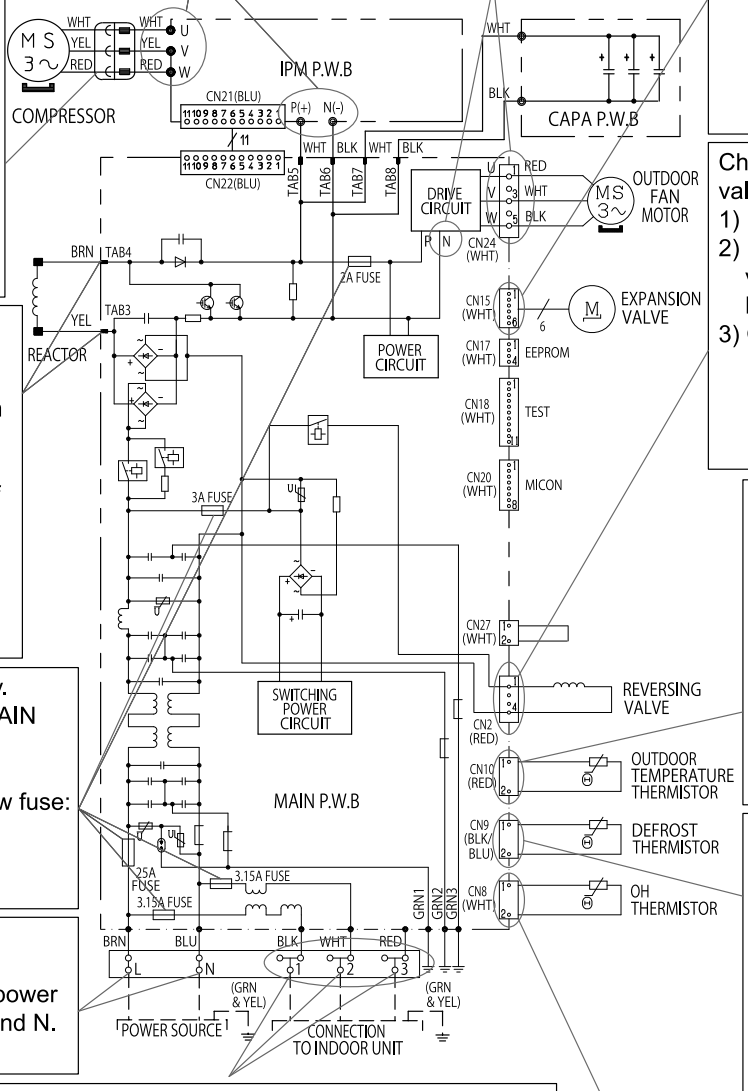
** During normal running, DC voltage between TAB 3 and TAB4 shall be 17V to 20V.

Checking the outdoor temperature thermistor.
1) Power off the unit.
2) Disconnect the thermistor wire from CN10 of MAIN P.W.B.
3) Check the resistance value between the wire of thermistor. It shall be around 1.7kΩ ± 0.3kΩ.

Checking all the fuse continuity.
There are 5 fuses inside the MAIN P.W.B.
1) Power off the unit.
2) Check the continuity of below fuse:
   a) F1 (25A) b) F5 (3.15A)
   c) F6 (3.15A) d) F3 (3A)
   e) F4 (2A)

Checking the defrost thermistor.
1) Power off the unit.
2) Disconnect the thermistor wire from CN9 of MAIN P.W.B.
3) Check the resistance value between the wire of thermistor. It shall be around 1.7kΩ ± 0.3kΩ.

Checking the power source.
1) Power ON the unit.
2) Check the AC voltage from power source between terminal L and N. It shall be around 240 ±10 V



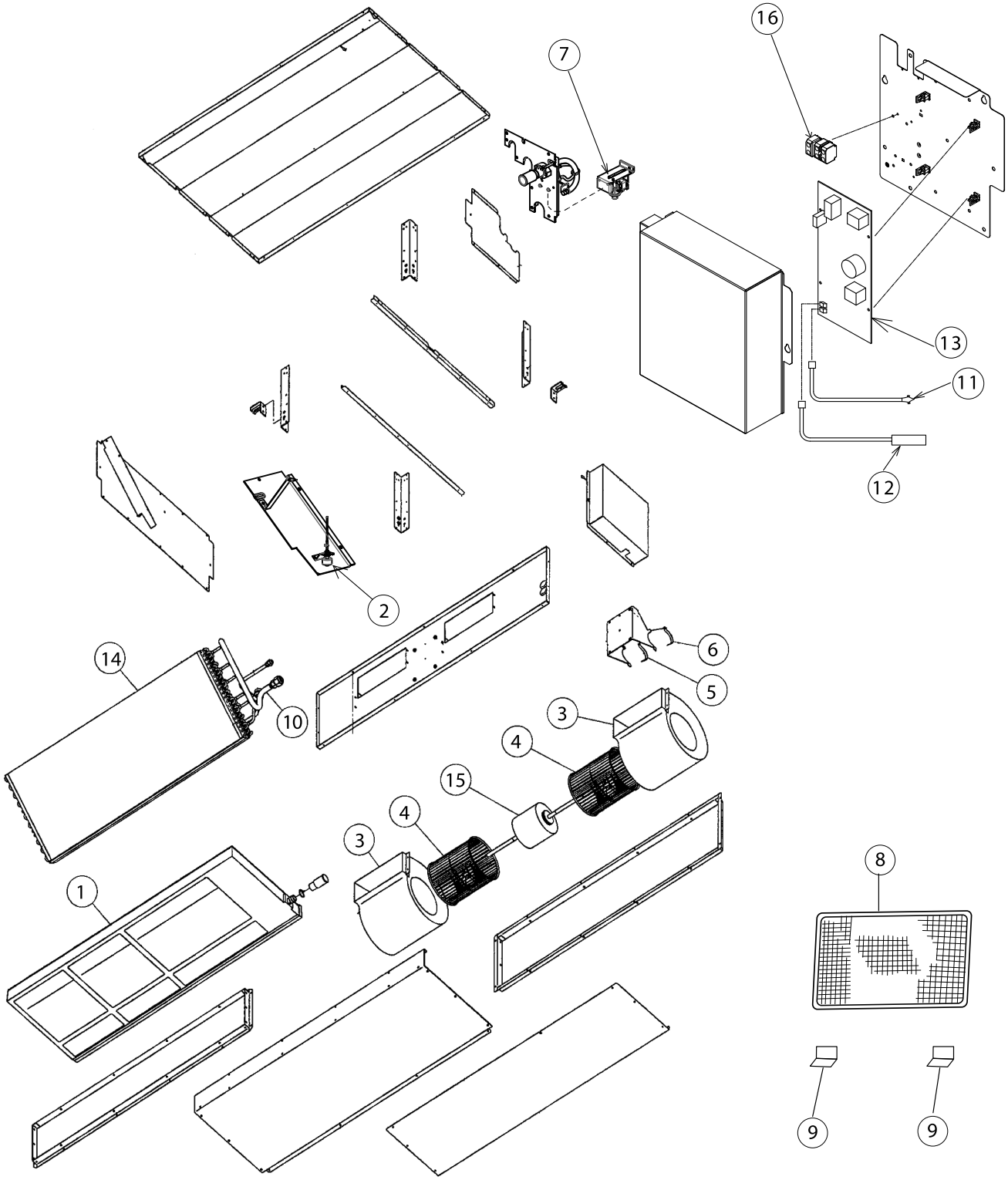
Checking the connection of 1, 2, 3 terminal to the indoor.
1) Power ON the unit.
2) After around 1 minute, check the AC voltage between terminal as below table.

Connection condition	Voltage value between terminal			Outdoor LD301 indication
	1 to 2	2 to 3	1 to 3	
All connection OK	240V	around 0.3V	240V	Off or 1 time blink
Terminal 1 no connection	240V	0.1-0.4V	240V	9 times blink
Terminal 2 no connection	240V	100 - 120V	120-140V	9 times blink
Terminal 3 no connection	240V	0.1-0.4V	240V	9 times blink

Checking the OH thermistor.
1) Power off the unit.
2) Disconnect the thermistor wire from CN8 of MAIN P.W.B.
3) Check the resistance value between the wire of thermistor. It shall be around 25kΩ ± 5kΩ.

PARTS LIST AND DIAGRAM

INDOOR UNIT
MODEL : RAD-50RPE & RAD-60RPE



MODEL RAD-50RPE

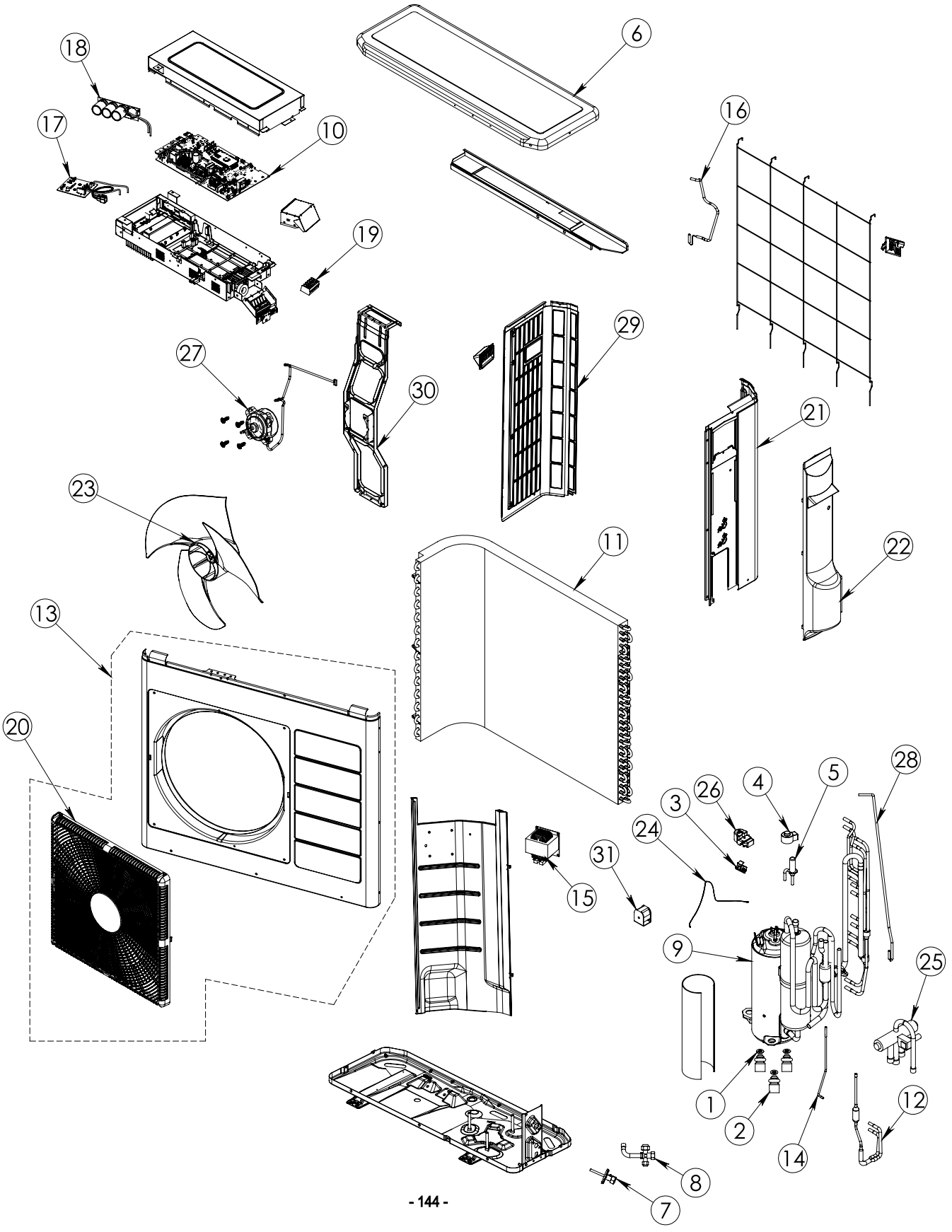
NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAD-50DH7 003	1	DRAIN PAN ASSY
2	PMRAD-50DH7 004	1	FLOAT SWITCH
3	PMRAD-50DH7 006	2	FAN CASING
4	PMRAD-50DH7 007	2	FAN COVER
5	PMRAD-50DH7 008	1	BAND (L)
6	PMRAD-50DH7 009	1	BAND (R)
7	PMRAD-50DH7 010	1	DRAIN PUMP
8	PMRAD-50DH7 011	1	FILTER
9	PMRAD-50DH7 012	2	FILTER PLATE
10	PMRAD-50DH7 013	1	THERMISTOR SUPPORT
11	PMRAD-50DH7 014	1	ROOM THERMISTOR
12	PMRAD-50DH7 015	1	THERMISTOR
13	PMRAD-50PPD R01	1	P.W.B MAIN
14	PMRAD-50PPD R02	1	CYCLE ASSY
15	PMRAD-50PPD R03	1	FAN MOTOR
16	PMRAD-50PPD R04	1	3P-TERMINAL

MODEL RAD-60RPE

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAD-50DH7 003	1	DRAIN PAN ASSY
2	PMRAD-50DH7 004	1	FLOAT SWITCH
3	PMRAD-50DH7 006	2	FAN CASING
4	PMRAD-50DH7 007	2	FAN COVER
5	PMRAD-50DH7 008	1	BAND (L)
6	PMRAD-50DH7 009	1	BAND (R)
7	PMRAD-50DH7 010	1	DRAIN PUMP
8	PMRAD-50DH7 011	1	FILTER
9	PMRAD-50DH7 012	2	FILTER PLATE
10	PMRAD-50DH7 013	1	THERMISTOR SUPPORT
11	PMRAD-50DH7 014	1	ROOM THERMISTOR
12	PMRAD-50DH7 015	1	THERMISTOR
13	PMRAD-50PPD R01	1	P.W.B MAIN
14	PMRAD-50PPD R02	1	CYCLE ASSY
15	PMRAD-50PPD R03	1	FAN MOTOR
16	PMRAD-50PPD R04	1	3P-TERMINAL

PARTS LIST AND DIAGRAM

OUTDOOR UNIT
MODEL : RAC-50NPE & RAC-60NPE



MODEL RAC-50NPE

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	KPNT1 001	4	PUSH NUT
2	RAC-2226HV 805	3	COMPRESSOR RUBBER
3	PMRAC-25NH4 S09	1	OVERHEAT THERMISTOR SUPPORT
4	PMRAC-25NPA S02	1	ELECTRICAL EXPANSION COIL
5	PMRAC-25NPA S03	1	EXPANSION VALVE
6	PMRAC-30MH1 S05	1	TOP COVER
7	PMRAC-50NH4 S03	1	VALVE (2S)
8	PMRAC-50NH4 S04	1	VALVE (4S)
9	PMRAC-50NPD S01	1	COMPRESSOR
10	PMRAC-50NPD S02	1	P.W.B (MAIN)
11	PMRAC-50NPD S03	1	CONDENSOR
12	PMRAC-50NPD S04	1	STRAINER (COND)
13	PMRAC-50NPD S05	1	CABINET
14	PMRAC-50NPD S06	1	STRAINER (PIPE)
15	PMRAC-50YHA2 S04	1	REACTOR
16	PMRAC-50YHA2 S08	1	THERMISTOR (OUTSIDE TEMPERATURE)
17	PMRAC-50YHA4 S02	1	IPM BOARD
18	PMRAC-50YHA4 S03	1	CAPACITOR BOARD
19	PMRAC-50YHA4 S04	1	TERMINAL BOARD (5P)
20	PMRAC-50NPD S07	1	D-GRILL
21	PMRAC-60YHA4 S03	1	SIDE PLATE R
22	PMRAC-60YHA4 S04	1	SV-COVER-ASSY
23	PMRAC-70YHA S07	1	PROPPELLER FAN
24	PMRAC-80YHA S14	1	THERMISTOR (OH)
25	PMRAC-S18CPA S02	1	REVERSING VALVE
26	PMRAC-X13CX 906	1	OVERLOAD RELAY COVER
27	PMRAM-53NP2B S10	1	FAN MOTOR
28	PMRAM-65QHA4 S12	1	THERMISTOR (DEFROST)
29	PMRAM-72Q9 S05	1	SIDE PLATE L
30	PMRAM-72Q9 S08	1	SUPPORT (FAN MOTOR)
31	PMRAM-90NP5B S09	1	MG-COIL (REVERSING VALVE)

MODEL RAC-60NPE

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	KPNT1 001	4	PUSH NUT
2	RAC-2226HV 805	3	COMPRESSOR RUBBER
3	PMRAC-25NH4 S09	1	OVERHEAT THERMISTOR SUPPORT
4	PMRAC-25NPA S02	1	ELECTRICAL EXPANSION COIL
5	PMRAC-25NPA S03	1	EXPANSION VALVE
6	PMRAC-30MH1 S05	1	TOP COVER
7	PMRAC-50NH4 S03	1	VALVE (2S)
8	PMRAC-50NH4 S04	1	VALVE (4S)
9	PMRAC-50NPD S01	1	COMPRESSOR
10	PMRAC-60NPD S01	1	P.W.B (MAIN)
11	PMRAC-50NPD S03	1	CONDENSOR
12	PMRAC-50NPD S04	1	STRAINER (COND)
13	PMRAC-50NPD S05	1	CABINET
14	PMRAC-50NPD S06	1	STRAINER (PIPE)
15	PMRAC-50YHA2 S04	1	REACTOR
16	PMRAC-50YHA2 S08	1	THERMISTOR (OUTSIDE TEMPERATURE)
17	PMRAC-50YHA4 S02	1	IPM BOARD
18	PMRAC-50YHA4 S03	1	CAPACITOR BOARD
19	PMRAC-50YHA4 S04	1	TERMINAL BOARD (5P)
20	PMRAC-50NPD S07	1	D-GRILL
21	PMRAC-60YHA4 S03	1	SIDE PLATE R
22	PMRAC-60YHA4 S04	1	SV-COVER-ASSY
23	PMRAC-70YHA S07	1	PROPPELLER FAN
24	PMRAC-80YHA S14	1	THERMISTOR (OH)
25	PMRAC-S18CPA S02	1	REVERSING VALVE
26	PMRAC-X13CX 906	1	OVERLOAD RELAY COVER
27	PMRAM-53NP2B S10	1	FAN MOTOR
28	PMRAM-65QHA4 S12	1	THERMISTOR (DEFROST)
29	PMRAM-72Q9 S05	1	SIDE PLATE L
30	PMRAM-72Q9 S08	1	SUPPORT (FAN MOTOR)
31	PMRAM-90NP5B S09	1	MG-COIL (REVERSING VALVE)

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