HITACHI

PM | NO. 0423E

RAF-25QH8
RAF-35QH8
RAF-50QH8

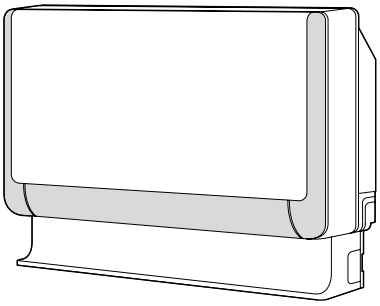
SERVICE MANUAL

TECHNICAL INFORMATION

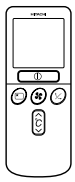
REFER TO THE FOUNDATION MANUAL

FOR SERVICE PERSONNEL ONLY

INDOOR UNIT



RAF-25QH8
RAF-35QH8
RAF-50QH8



CONTENTS

SPECIFICATIONS

TYPE			DC INVERTER
			INDOOR UNIT
MODEL			RAF-25QH8/RAF-35QH8/RAF-50QH8
POWER SOURCE			1ø, 220 – 230V, 50 Hz
COOLING	TOTAL INPUT	(W)	REFER TO THE SPECIFICATION (OUTDOOR)
	TOTAL AMPERES	(A)	
	CAPACITY	(kW)	
		(B.T.U./h)	
HEATING	TOTAL INPUT	(W)	
	TOTAL AMPERES	(A)	
	CAPACITY	(kW)	
		(B.T.U./h)	
DIMENSIONS (mm)		W	750
		H	590
		D	215
NET WEIGHT		(kg)	15

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

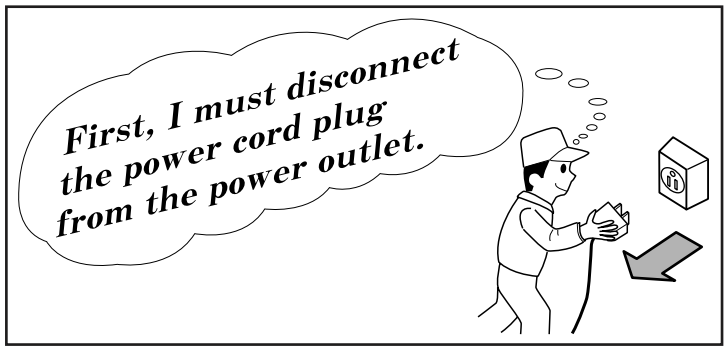
ROOM AIR CONDITIONER

INDOOR UNIT

JUN 2008 **Refrigeration & Air-Conditioning Division**

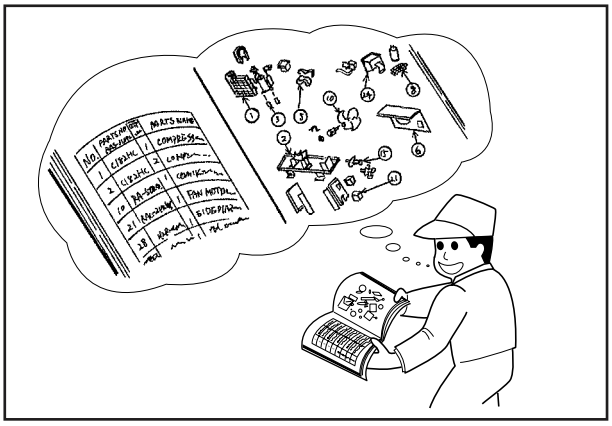
SAFETY DURING REPAIR WORK

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 occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.

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

9. The initial location of installation such as window, floor or the other should be checked for being safe enough to support the repaired unit again.
   If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.

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

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

WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope

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

2. Object parts

(1) Microcomputer

(2) Integrated circuits (I.C.)

(3) Field effective transistor (F.E.T.)

(4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

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

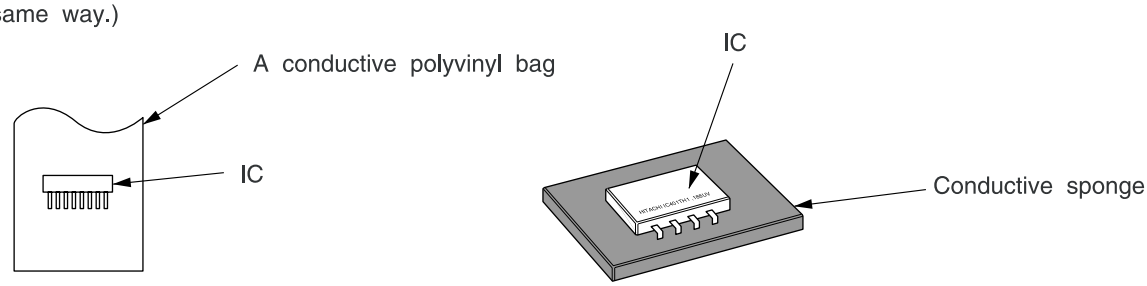


Fig. 1 Conductive container

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

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

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

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

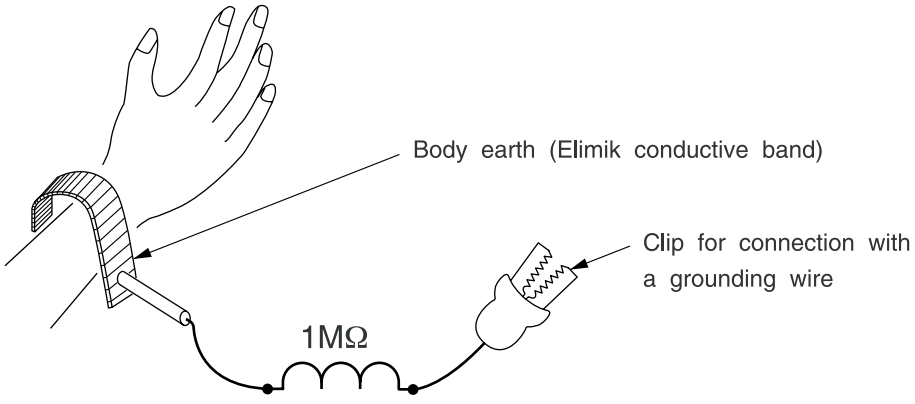


Fig. 2 Body earth

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

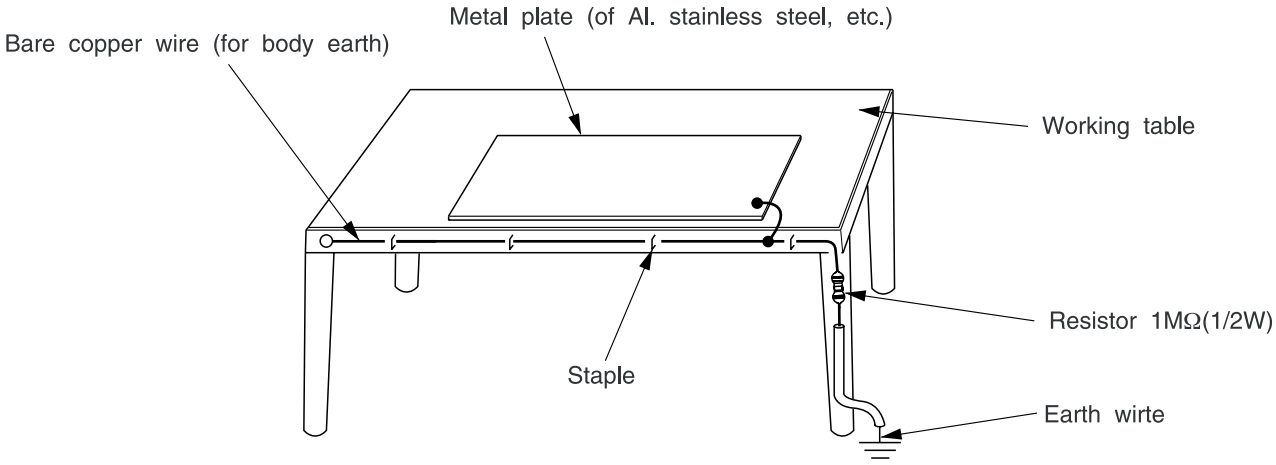


Fig.3 Grounding of the working table

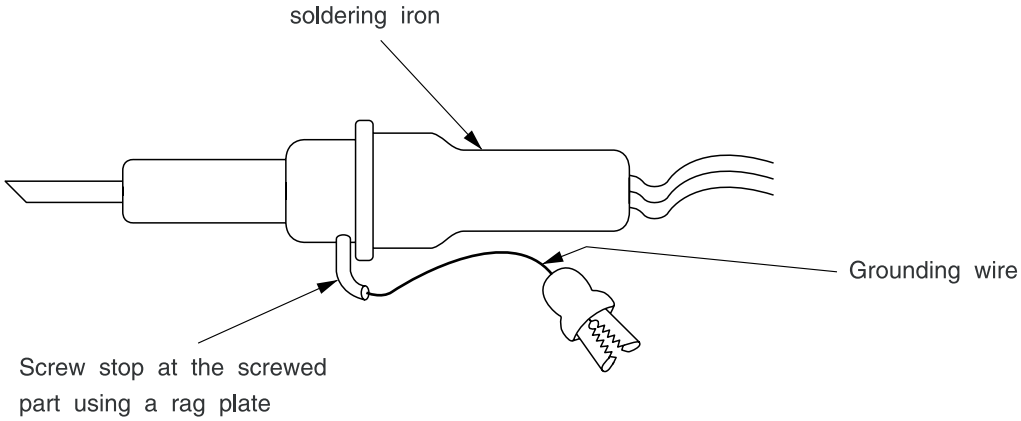


Fig.4 Grounding a solder iron

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

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

⚠CAUTION

1. In quiet operation or stopping the running, its heard slight flowing noise of refrigerant in the refrigerating cycle occasionally, but this noise is not abnormal for the operation.

2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.

3. The room air conditioner dose not start automaticaly after recovery of the electric power failure for preventing fuse blowing. Re-press START / STOP button after 3 minutes from when unit stopped.

4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.

5. This room air conditioner should not be used at the cooling operation when the outside temperature is below –10˚C (14˚F).

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

7. When the outside heat exchanger is frosted, the front is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.

SPECIFICATIONS

MODEL		RAF-25QH8/RAF-35QH8/RAF-50QH8
FAN MOTOR		25W (DC35V)
FAN MOTOR CAPACITOR		NO
FAN MOTOR PROTECTOR		NO
COMPRESSOR		———
OVER HEAT PROTECTOR		NO
OVERLOAD RELAY		NO
FUSE (for MICRO COMPUTER)		NO
POWER RELAY, STICK RELAY		NO
POWER SWITCH		NO
TEMPORARY SWITCH		YES
SERVICE SWITCH		NO
TRANSFORMER		NO
VARISTOR		NO
NOISE SUPPRESSOR		NO
THERMOSTAT		YES (IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES (RAR-3U2)
FUSE CAPACITY		A INRUSH - WITH STAND TYPE
REFRIGERANT CHARGING VOLUME (R410A)	UNIT	———
	PIPES	———

HOW TO USE

MODEL RAF-50FX8, RAC-50FX8

SAFETY PRECAUTION

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

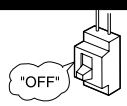
⃠ This sign in the figure indicates prohibition.	❗ Indicates the instructions that must be followed.

- Please keep this manual after reading.

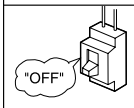
PRECAUTIONS DURING INSTALLATION

⚠ WARNING	• Do not reconstruct the unit. Water leakage, fault, short circuit or fire may occur if you reconstruct the unit by yourself.	 PROHIBITION
	• 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 or fire.	 CONNECT EARTH LINE
	• Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.	
⚠ CAUTION	• A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.	 PROHIBITION
	• Do not install the unit near a location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it. Piping shall be suitable supported with a maximum spacing of 1m between the supports.	
	• Please ensure smooth flow of water when installing the drain hose.	
	• Make sure that a single phase 220-230V power source is used. The use of other power sources may cause electrical components to overheat and lead to fire.	 PROHIBITION

PRECAUTIONS DURING SHIFTING OR MAINTENANCE

⚠ WARNING	• Should abnormal situation arise (like burning smell), please stop operating the unit and remove plug from the socket. 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.	

PRECAUTIONS DURING OPERATION

⚠ WARNING	• Avoid an extended period of direct air flow for your health.	 PROHIBITION
	 PROHIBITION	• Do not put objects like thin rods into the panel of blower and suction side because the high-speed fan inside may cause danger.
	• Do not use any conductor as fuse wire, this could cause fatal accident.	 PROHIBITION
	 	• During thunder storm, disconnect the plug top 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.	 PROHIBITION

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.

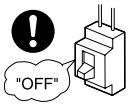
- When operating the unit with burning equipments, regularly ventilate the room to avoid oxygen insufficiency.

- 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.

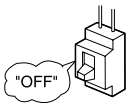
- Do not wash the unit with water or place a water container such as a vase on the indoor unit.
  Electrical leakage could be present and cause electric shock.

- Do not place plants directly under the air flow as it is bad for the plants.



- Be sure to stop the operation by using the remote controller 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 be operated for a long period.



- Do not climb on the outdoor unit or put objects on it.

- 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.

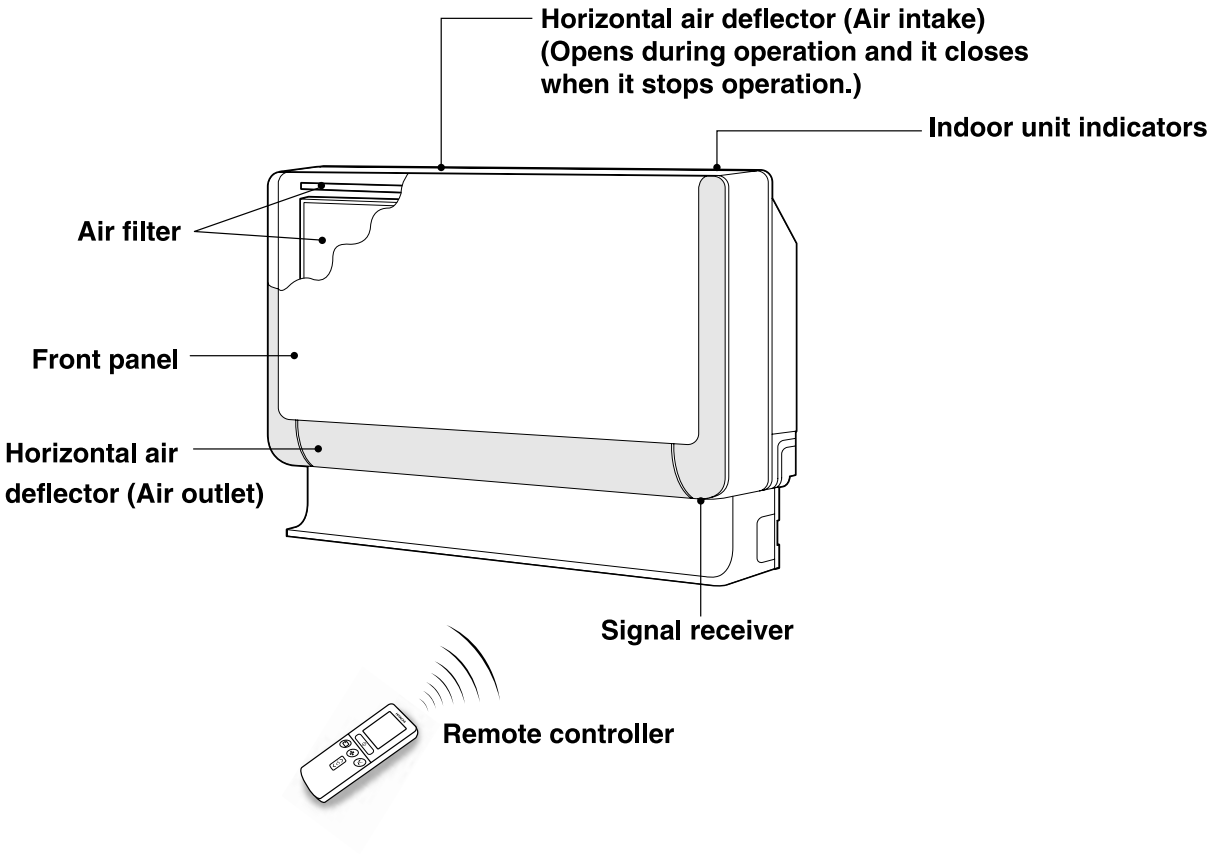
- Indoor unit cleaning must be performed by authorized personnel only. Consult your sales agent.
  Using a commercially available detergent or similar can damage the plastic parts or clog the drain pipe, causing water to drip with potential electric shock hazard.

- Do not touch the air outlet, bottom surface and aluminum fin of the outdoor unit.
  You may get hurt.

- Do not touch the refrigerant pipe and connecting valve.
  Burns may result.

NAMES AND FUNCTIONS OF EACH PART

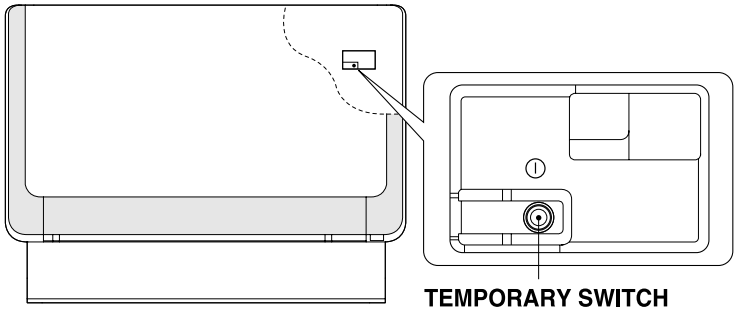
INDOOR UNIT



MODEL NAME AND DIMENSIONS

MODEL	WIDTH	HEIGHT	DEPTH
RAF-25QH8 RAF-35QH8 RAF-50QH8 (INDOOR UNIT)	750mm (29-17/32")	590mm (23-6/25")	215mm (8-15/32")

TEMPORARY SWITCH

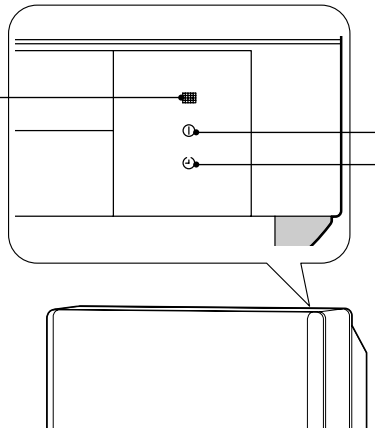


TEMPORARY SWITCH
If the remote controller does not work due to battery failure, press this switch to start and stop operation.

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

INDOOR UNIT INDICATORS

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



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

(1) **During preheating (heating operation)**
For about 2~3 minutes after start up.

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

TIMER lamp
This lamp lights when the timer is working.

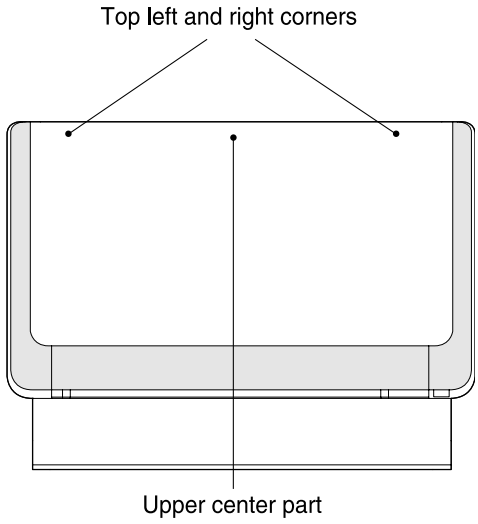
HOW TO OPEN OR CLOSE THE FRONT PANEL

Open the front panel

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

Close the front panel

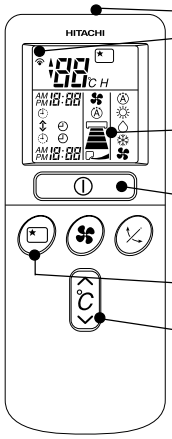
- To close the front panel, press at the top left and right corners of the front panel.
- Press the upper center part of the front panel to close properly.



NAMES AND FUNCTIONS OF EACH PART

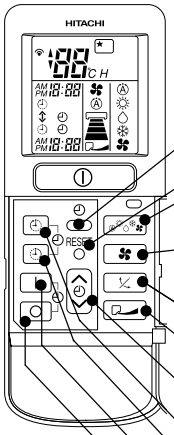
REMOTE CONTROLLER

- This controls the operation of the indoor unit. The range of control is about 7 meters. If indoor lighting is controlled electronically, the range of control may be shorter.
  This unit can be fixed on a wall using the fixture provided. Before fixing it, make sure the indoor unit can be controlled from the remote controller.
- Handle the remote controller with care. Dropping it or getting it wet may compromise its signal transmission capability.
- After new batteries are inserted into the remote controller, the unit will initially require approximately 10 seconds to respond to commands and operate.



- **Signal emitting window/transmission sign**

  The transmission sign blinks when a signal is sent.
- **Display**
  This indicates the room temperature selected, current time, timer status, function and intensity of circulation selected.
- **START/STOP button**
  Press this button to start operation. Press it again to stop operation.
- **SLEEP button**
  Use this button to set the sleep timer.
- **TEMPERATURE buttons**
  Use these buttons to raise or lower the temperature setting. (Keep pressed, and the value will change more quickly.)



- **TIME button**
  Use this button to set and check the time.
- **RESET buttons**
- **FUNCTION selector**
  Use this button to select the operating mode. Every time you press it, the mode will change from Ⓐ (AUTO) to ☼ (HEAT) to ○ (DEHUMIDIFY) to ❄ (COOL) and to ✣ (FAN) cyclically.
- **FAN SPEED selector**
  This determines the fan speed. Every time you press this button, the intensity of circulation will change from Ⓐ (AUTO) to (HI) to (MED) to (LOW) to (SILENT). (This button allows selecting the optimal or preferred fan speed for each operation mode.)
- **AUTO SWING button**
  Controls the angle of the horizontal air deflector
- **EXTENDED AIRFLOW button**
  Pushes air out further for an extended airflow
- **TIMER control**
  Use these buttons to set the timer.
- **OFF-TIMER button** Select the turn OFF time.
- **ON-TIMER button** Select the turn ON time.
- **RESERVE button** Time setting reservation.
- **CANCEL button** Cancel time reservation.

Ⓐ	AUTO
☼	HEAT
○	DEHUMIDIFY
❄	COOL
✣	FAN
	FAN SPEED SILENT LOW MED HI
*	SLEEPING
○	STOP (CANCEL)
I	START (RESERVE)
⏻	START/STOP
🕘	TIME
🕘	TIMER SET
🕘	TIMER SELECTOR ON TIMER OFF TIMER
	AUTO SWING
	EXTENDED AIRFLOW

Precautions for Use

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

VARIOUS FUNCTIONS

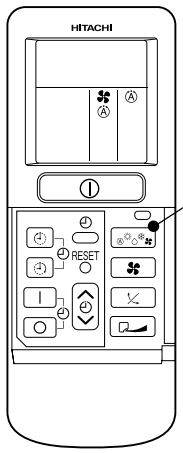
Auto Restart Control

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

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

AUTOMATIC OPERATION

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

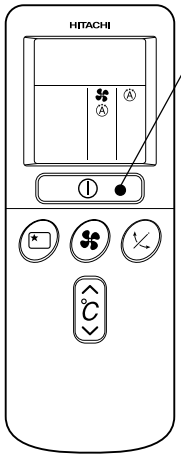


1 Press the FUNCTION selector so that the display indicates Ⓐ the (AUTO) mode of operation.

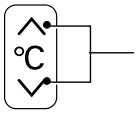
- When AUTO has been selected, the device will automatically determine the mode of operation, HEAT, COOL, or DEHUMIDIFY, depending on the current room temperature.

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

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



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



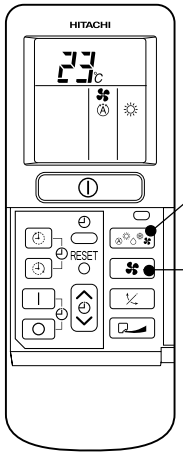
Press the temperature button and the temperature setting will change by 1°C each time.

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

Press the ✻ (FAN SPEED) button, AUTO, LOW and SILENT are available.

HEATING OPERATION

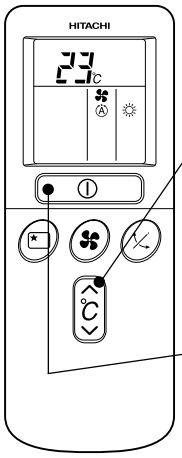
- Use the device for heating when the outdoor temperature is under 21°C.
  When it is too warm (over 21°C), the heating function may not work in order to protect the device.
- In order to keep reliability of the device, please use this device above -15°C of the outdoor temperature.



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

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

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



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

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

START / STOP

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

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

■ Defrosting

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

During defrosting operation, the operation lamp blinks in cycle of 3 seconds on and 0.5 second off.

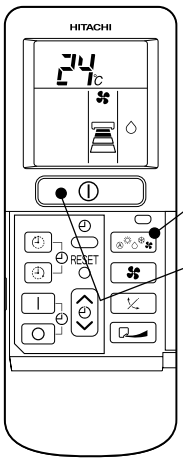
The maximum time for defrosting is 20 minutes.

However, if it is connected to multi type outdoor unit, the maximum time for defrosting is 15 minutes.

(If the piping length used is longer than usual, frost will likely to form.)

DEHUMIDIFYING OPERATION

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



1 Press the FUNCTION selector so that the display indicates ♢ (DEHUMIDIFY).
The FAN SPEED button, LOW and SILENT.

START / STOP Press the ⏻ (START/STOP) button.

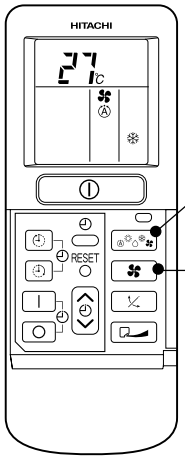
- When you want to change the operation mode, please use the FUNCTION selector.
- Set the desired temperature is available.
- You also can use the FUNCTION selector to select this operation.

■ Dehumidifying Function

- Dehumidifying takes place with a target temperature which is slightly lower than the room temperature setting. (However, target temperature is 16°C for a temperature setting of 16°C.)
  If the room temperature becomes lower than the target value, operation stops. If the room temperature becomes higher than the target value, operation restarts.
- The preset room temperature may not be reached depending on the number of people present in the room or other room conditions.

COOLING OPERATION

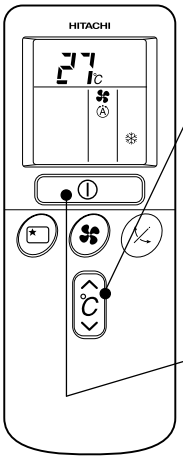
Use the device for cooling when the outdoor temperature is –10~42°C.
If humidity is very high (over 80%) indoors, some dew may form on the air outlet grille of the indoor unit.



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

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

- Ⓐ (AUTO) : The FAN SPEED is HI at first and varies to MED automatically when the preset temperature has been reached.
- (HI) : Economical as the room will become cool quickly.
- (MED) : Quiet.
- (LOW) : More quiet.
- (SILENT) : Ultra quiet.



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

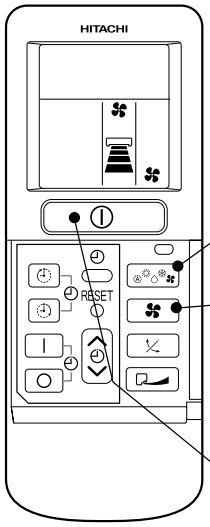
The temperature setting and the actual room temperature may vary somewhat depending on conditions.

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

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

FAN OPERATION

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



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

2 Press the (FAN SPEED) button.

- (HI) : The strongest air blow.
- (MED) : Quiet.
- (LOW) : More quiet.
- (SILENT) : Ultra quiet.

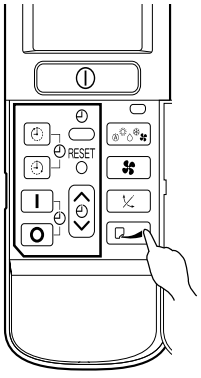
START / STOP Press the ⏻ (START/STOP) button. Fan operation starts with a beep. Press the button again to stop operation.

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

For the heating operation	• The fan speed will automatically change according to the temperature of discharged air. • As room temperature reaches the preset temperature, a very light breeze will blow.
For the cooling operation	• Operation starts in the ìHIî mode to reach the preset temperature. • As room temperature approaches the preset temperature, fan speed automatically switches to ìMEDî.

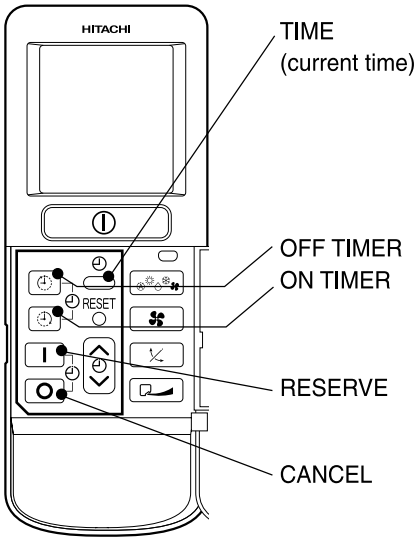
EXTENDED AIRFLOW

When the (EXTENDED AIRFLOW) button is pressed during operation, the airflow direction will automatically set according to the type of operation and the fan speed will change to allow air to blow further. (During cooling operation, fan speed will return to the original position after 3 hours.)



- If the (EXTENDED AIRFLOW) button is pressed while the AUTO SWING mode is set, the AUTO SWING mode is cancelled and the EXTENDED AIRFLOW mode is set.
- If the (AUTO SWING) button is pressed while the EXTENDED AIRFLOW mode is set, the EXTENDED AIRFLOW mode is cancelled and the AUTO SWING mode is set.
- If the (EXTENDED AIRFLOW) button is pressed when the horizontal air deflector stops at your preferred angle, the deflector will change to EXTENDED AIRFLOW.
- Press (EXTENDED AIRFLOW) button to lower the room temperature quickly when the temperature is high during the cooling operation.

HOW TO SET THE TIMER

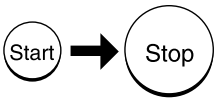


Time

After you change the batteries;

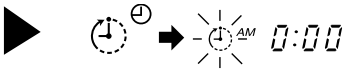
1 Set the ◴ (TIME) button.

OFF-Timer



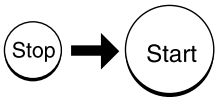
You can set the device to turn off at the present time.

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

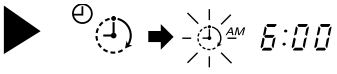


ON-Timer

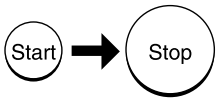
The device will turn on at the designated times.



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

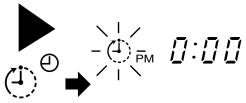


ON/OFF-Timer

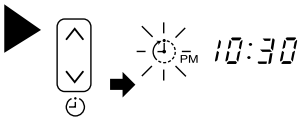


- The device will turn on (off) and off (on) at the designated times.
- The switching occurs first at the preset time that comes earlier.
- The arrow mark appearing on the display indicates the sequence of switching operations.

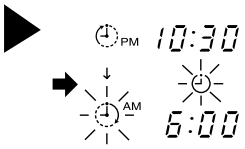
1 Press the ◴ (ON-OFF) button so that the ◴ (OFF) mark blinks.



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



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



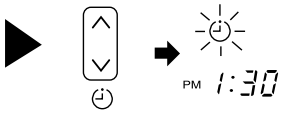
How to Cancel Reservation

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

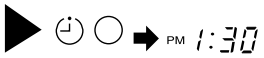
NOTE

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

2 Set the current time with the TIMER control button.



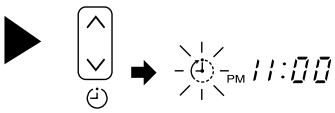
3 Press the ⏲ (TIME) button again. The time indication starts lighting instead of flashing.



- The time indication will disappear automatically in 10 seconds.
- To check the current time setting, press the ⏲ (TIME) button twice.
  The setting of the current time is now complete.

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

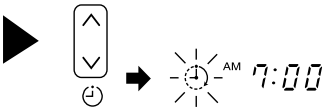
2 Set the turn-off time with the TIMER control button.



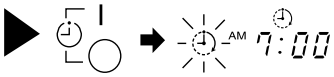
3 Point the signal window of the remote controller toward the indoor unit, and press the I (RESERVE) button.
The ⏲ (OFF) mark starts lighting instead of flashing and the ⏲ (RESERVED) sign lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.

Example:
The device will turn off at 11:00p.m.
The setting of turn-off time is now complete.

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

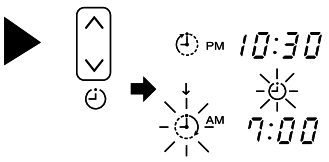


3 Point the signal window of the remote controller toward the indoor unit, and press the I (RESERVE) button.
The ⏲ (ON) mark starts lighting instead of flashing and the ⏲ (RESERVED) sign lights. A beep occurs and the ⏲ (TIMER) lamp lights on the indoor unit.

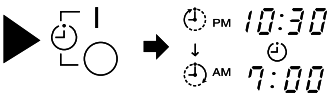


Example:
The device will automatically turn on earlier so that the preset temperature can be reached at 7:00a.m.
The setting of the turn-on time is now complete.

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



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

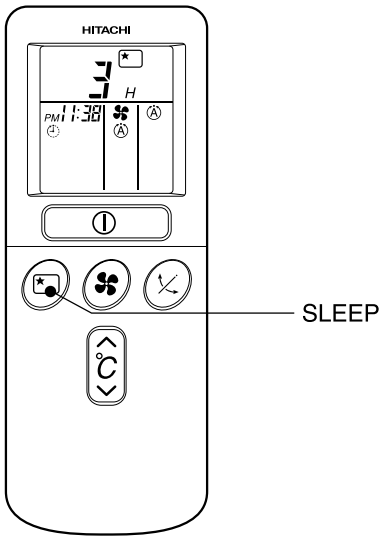


Example:
The device will turn off at 10:30p.m. and then automatically turn on earlier so that the preset temperature can be reached at 7:00a.m.
The settings of the turn-on/off times are now complete.

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

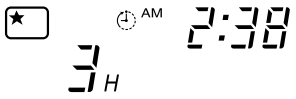
HOW TO SET THE SLEEP TIMER

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



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

Sleep Timer: The device will continue working for the desired number of hours and then turn off.
Point the signal window of the remote controller toward the indoor unit, and press the SLEEP button.
The timer information will be displayed on the remote controller. The TIMER lamp lights with a beep from the indoor unit. When the sleep timer has been set, the display indicates the turn-off time.



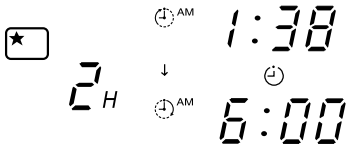
Example: If you set 3 hours sleep time at 11:38 p.m., the turn-off time is 2:38 a.m..

Sleep timer → Start

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

1 Set the ON-timer.

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



For heating:

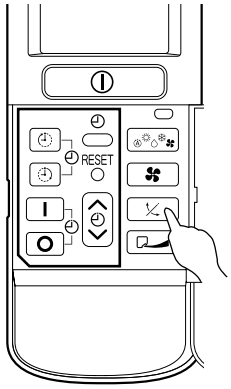
In this case, the device will turn off in 2 hours (at 1:38 a.m.) and will turn on early so that the present temperature will be almost reached at 6:00 a.m. next morning.

How to Cancel Reservation

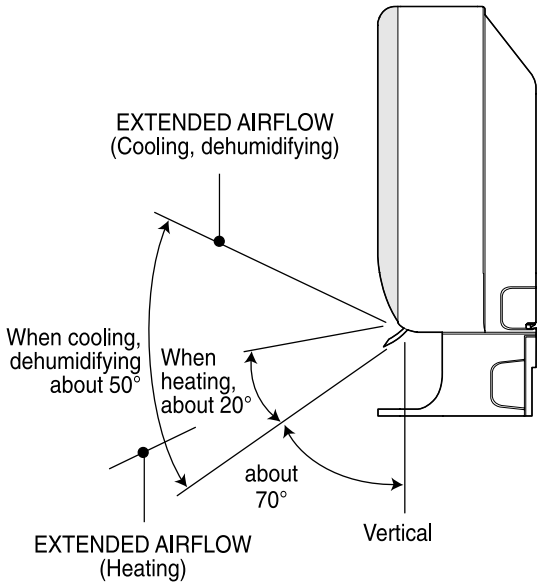
Point the signal window of the remote controller toward the indoor unit, and press the O (CANCEL) button.
The ◷ (RESERVED) sign goes out with a beep and the ◷ (TIMER) lamp turns off on the indoor unit.

ADJUSTING THE AIR DEFLECTORS

1 Adjustment of the conditioned air in the upward and downward directions.
The horizontal air deflector is automatically set to the proper angle suitable for each operation. The deflector can be swung up and down continuously and also set to the desired angle using the " ⩙ (AUTO SWING)" button.

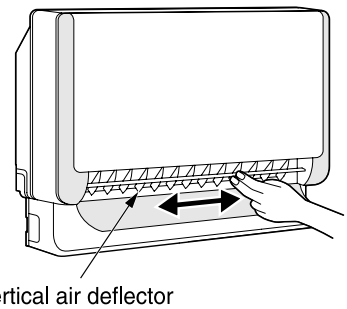


- If the " ⩙ (AUTO SWING)" button is pressed once, the horizontal air deflector swings up and down. If the button is pressed again, the deflector stops in its current position.
- Use the horizontal air deflector within the adjusting range shown in the right figure.
- When the " ⩙ (AUTO SWING)" button is pressed while the operation is stopped, the horizontal air deflector moves and stops at the position where the air outlet closes.
- When the auto swing operation is performed, if the horizontal air deflector is moved manually, the swinging range may drift. However, it will return to the original operation range after a short time.
- When the humid in the room is high during cooling or dehumidifying operation, the vertical air deflector may automatically change to the straight direction to prevent dew (except during auto swing operation).



2 Adjustment of the conditioned air to the left and right.

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



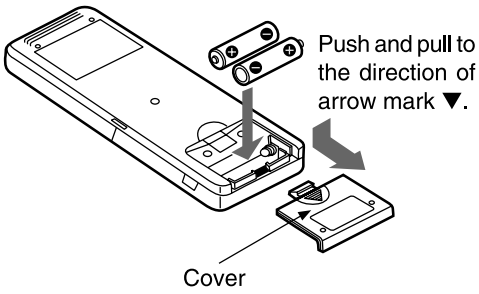
⚠ CAUTION

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

HOW TO CHANGE THE BATTERIES IN THE REMOTE CONTROLLER

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

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



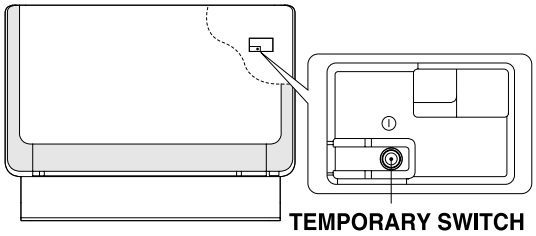
⚠ CAUTION

1. Do not mix new and old batteries, or different type of batteries together.
2. Remove the batteries when you do not use the remote controller for 2 or 3 months.

TEMPORARY SWITCH

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

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



CIRCUIT BREAKER

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

HOW TO USE THE AIR CONDITIONER EFFECTIVELY

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

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

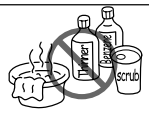
2. At intervals, the doors and windows should be opened to let fresh air in.

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

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

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

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



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

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

MAINTENANCE

⚠ WARNING

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

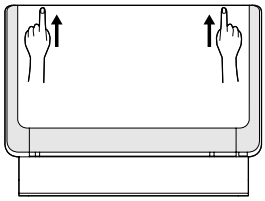
⚠ CAUTION

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

1. AIR FILTER

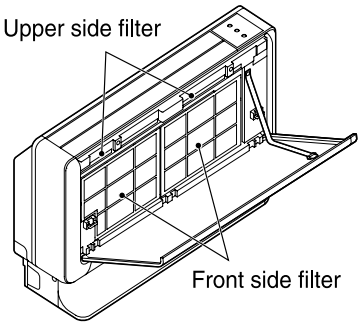
Clean the air filter, as it removes dust inside the room.
Be sure to clean the filter once every two weeks so as not to consume electricity unnecessarily.

PROCEDURE



1 Open the front panel.

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



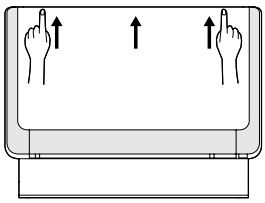
2 Remove the filters.
(Front side 2 pieces, upper side 2 pieces, total 4 pieces.)

3 Remove dust of the filters using a vacuum cleaner.

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

4 Attach the filters.

- Attaching the filters.
  (Front side 2 pieces, upper side 2 pieces, total 4 pieces.)



5 Close the front panel.

- To close the front panel, press at the top left and right corners of the front panel.
- Press the upper center part of the front panel to close properly.

⚠ CAUTION

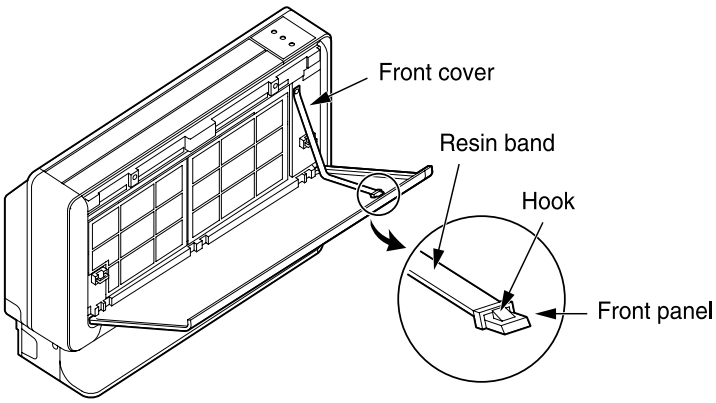
- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink. And also use a soft sponge to wash. Using a scrubber or brush cause the metal film on the surface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

2. HOW TO INSTALL AND REMOVE THE FRONT PANEL

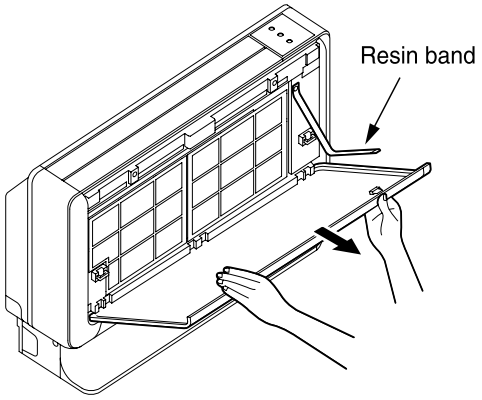
- Be sure to use both hands to grasp the front panel when removing it or attaching it.
- The front panel may be installed up or down to suit user preference.

Removing

1 Press the hook found at the tip of the resin band installed inside the front panelís right section to remove the resin band.



2 Pull the front panel down toward you and once fully open, pull it to remove.



Attaching

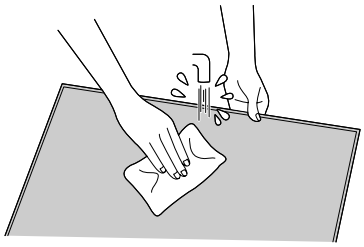
1 Attach three front panel bearings to the axis of the front cover. (Set the hook to face up.)

2 Insert the tip of the resin band into the hole of the protrusion inside the right section of the front panel.

3. CLEANING OF FRONT PANEL

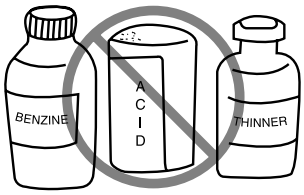
The front panel can be washed in water. It can be kept clean at all times.

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



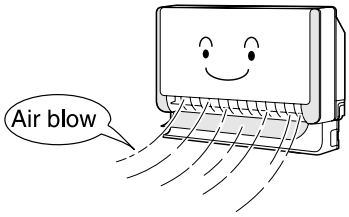
⚠ CAUTION

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



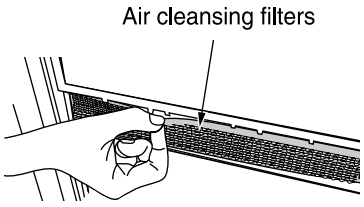
4. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

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



5. AIR CLEANSING FILTERS (SPX-CFH15)

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



INFORMATION

CAPABILITIES

Heating Capability

- This room air conditioner utilizes a heat pump system that absorbs exterior heat and brings it into a room to be heated. As the ambient temperature gets lower, heating capability will also lower. In such a situation, the PAM and inverter work to increase compressor rpm to keep the unitís heating capability from decreasing. If the unitís heating performance is still unsatisfactory, other heating appliances should be used to augment this unitís performance.

CAUTION

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

PROHIBITION

- The air conditioner is designed to heat an entire room so that it may take some time before you feel warm. Timer operation is recommended for effective preheating ahead of the desired time.

Cooling and Dehumidifying Capabilities

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

VARIOUS FUNCTIONS

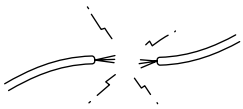
- When fan speed, room temperature are set with the remote controller before starting manual operation and the buttons are released, the indication of settings will go off in 10 seconds and only the operation mode will be displayed.
- Pressing the button while the unit is in operation will let the protective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

TIMER PROGRAMMING/SLEEP TIMER OPERATION

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

REGULAR INSPECTION

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

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

AFTER SALES SERVICE AND WARRANTY

WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING

CONDITION	CHECK THE FOLLOWING POINTS
If the remote controller is not transmitting a signal. (Remote controller display is dim or blank.)	• Do the batteries need replacement? • Is the polarity of the inserted batteries correct?
When it does not operate.	• Is the fuse all right? • Is the voltage extremely high or low? • Is the circuit breaker "ON"? • Is the setting of operation mode different from other indoor units?
When it does not cool well. When it does not heat well.	• Is the air filter blocked with dust? • Is the set temperature suitable? • Have the top and bottom air deflectors been adjusted to their correct positions according to the operation mode selected? • Are the air inlets or air outlets of indoor and outdoor units blocked? • Is the fan speed "LOW" or "SILENT"?

■ The following phenomena do not indicate unit failure.

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

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

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

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

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

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

Notes

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

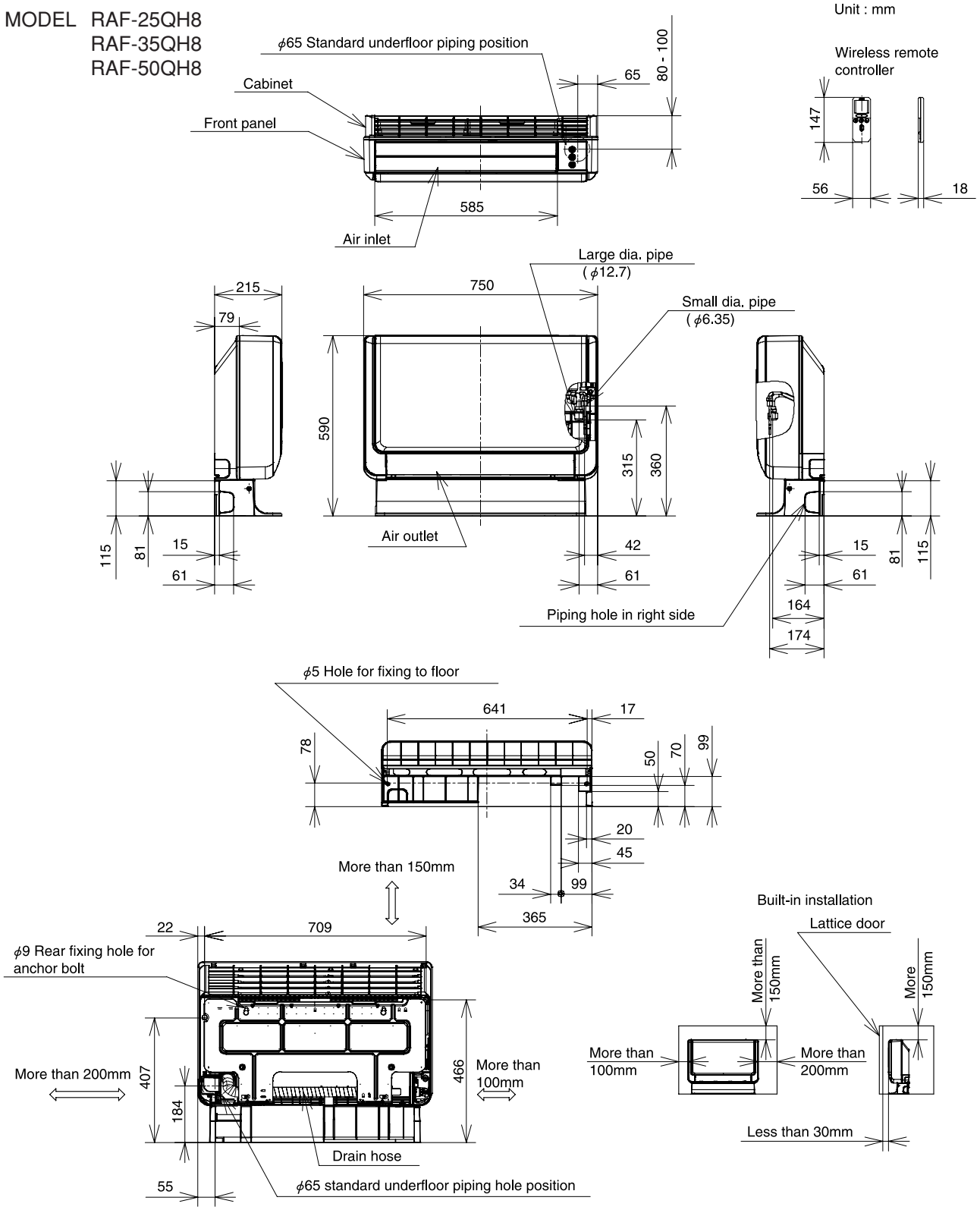
- Please contact your sales agent immediately if the air conditioner still fails to operate normally after the above inspections. Inform your agent of the model of your unit, production number, date of installation. Please also inform him regarding the fault.

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

CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAF-25QH8
RAF-35QH8
RAF-50QH8

Unit : mm



Cautions:
1. Use insulated pipes for both large and small diameters.
2. Use pipes of no more than 30m length.
3. Make sure the difference in heights between the indoor and outdoor units is 10m.
4. For built-in installation, make sure that the infrared receiver and indicator are not blocked.
5. Pipes can be laid out from the right, bottom or rear, when the unit is viewed from front.
6. Keep the clearance shown by ⟺ for installation.
7. For built-in installation, keep the vertical deflector at top air outlet as flat as possible.
   If it is inclined too much, heat will be trapped in the unit, which could cause faulty room temperature control.
8. An F-cable 1.6mm or 2.0mm dia. x 2 (control side) is used for the connection cable.

MAIN PARTS COMPONENT

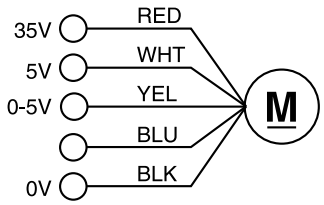
THERMOSTAT

Thermostat Specifications

MODEL			RAF-25QH8/RAF-35QH8/RAF-50QH8	
THERMOSTAT MODEL			IC	
OPERATION MODE			COOL	HEAT
TEMPERATURE ˚C (˚F)	INDICATION 16	ON	15.3 (59.5)	17.0 (62.6)
		OFF	15.0 (59.0)	16.3 (61.3)
	INDICATION 24	ON	23.3 (73.9)	25.0 (77.0)
		OFF	23.0 (73.4)	24.3 (75.7)
	INDICATION 32	ON	31.3 (88.3)	32.0 (89.6)
		OFF	31.0 (87.8)	32.3 (90.1)

FAN MOTOR

Fan Motor Specifications

MODEL		RAF-25QH8/RAF-35QH8/RAF-50QH8
POWER SOURCE		DC : 5V, DC : 0 - 35V
OUT PUT		25W
CONNECTION		 (Control circuit built in)
RESISTANCE VALUE (Ω)	20˚C (68˚F)	—
	75˚C (167˚F)	—

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

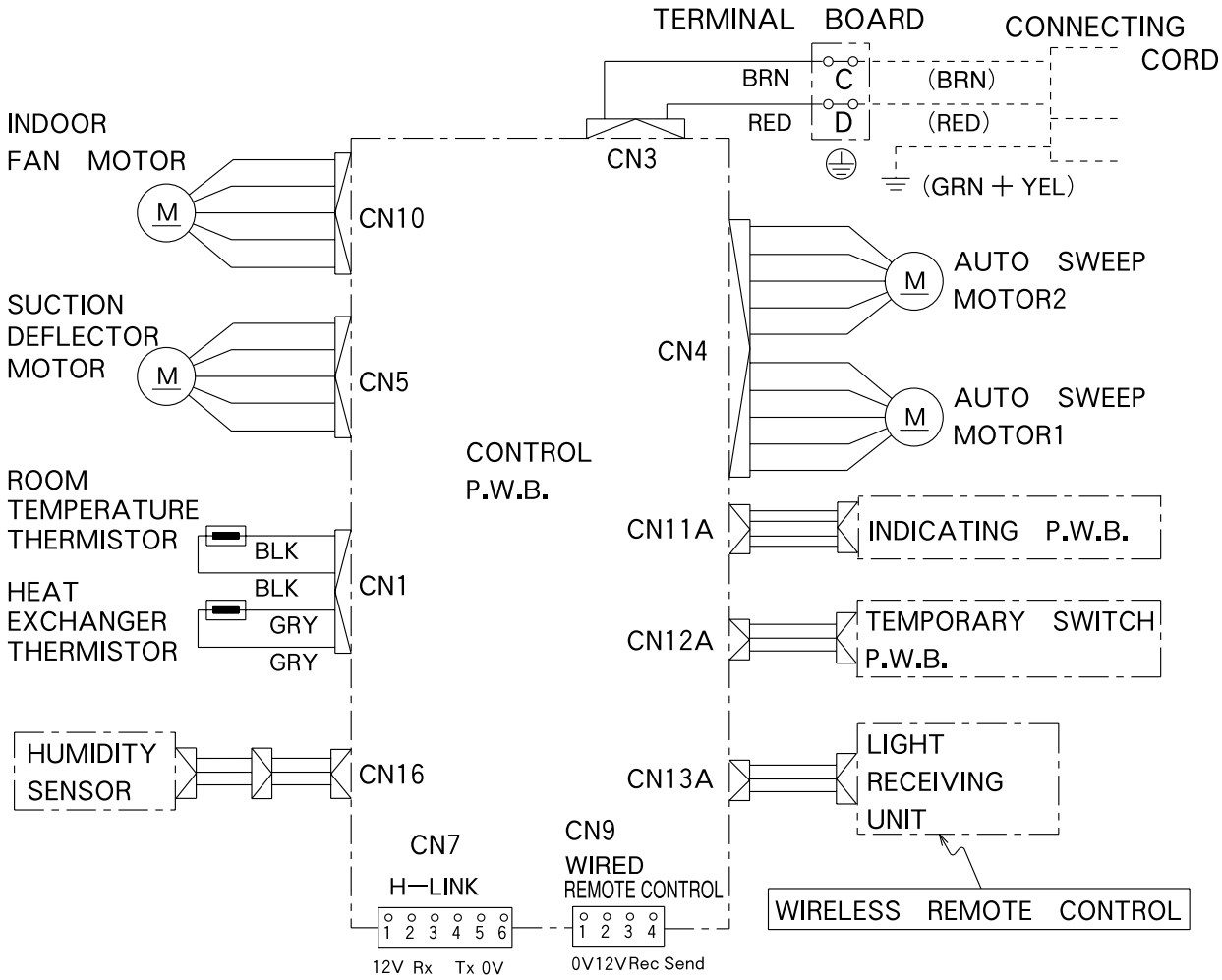
GRY : GRAY ORN : ORANGE GRN : GREEN RED : RED

BLK : BLACK PNK : PINK VIO : VIOLET

WIRING DIAGRAM

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

INDOOR UNIT



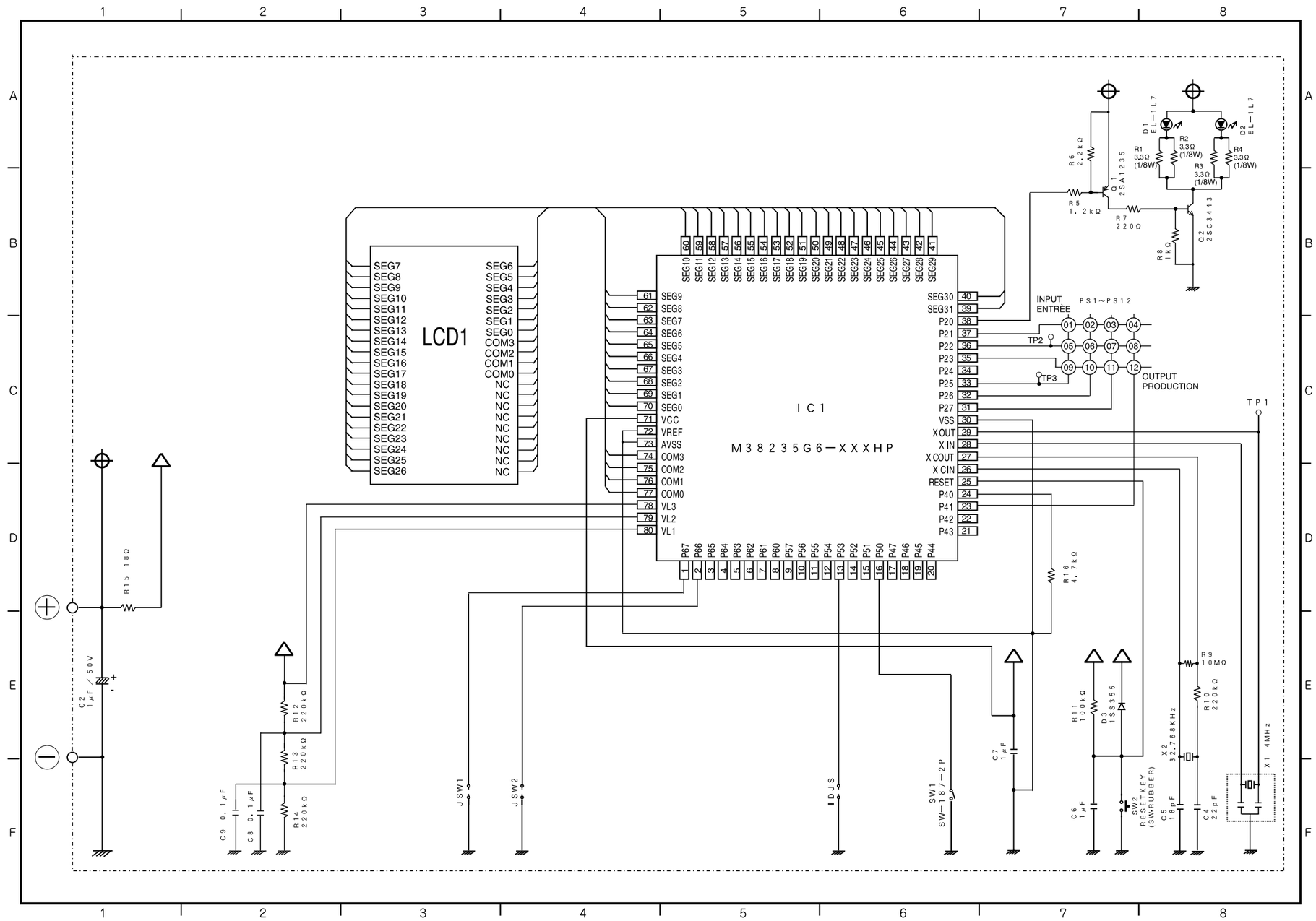
BLU : BLUE	WHT : WHITE	GRN : GREEN	PNK : PINK
YEL : YELLOW	GRY : GRAY	RED : RED	VIO : VIOLET
BRN : BROWN	ORN : ORANGE	BLK : BLACK	

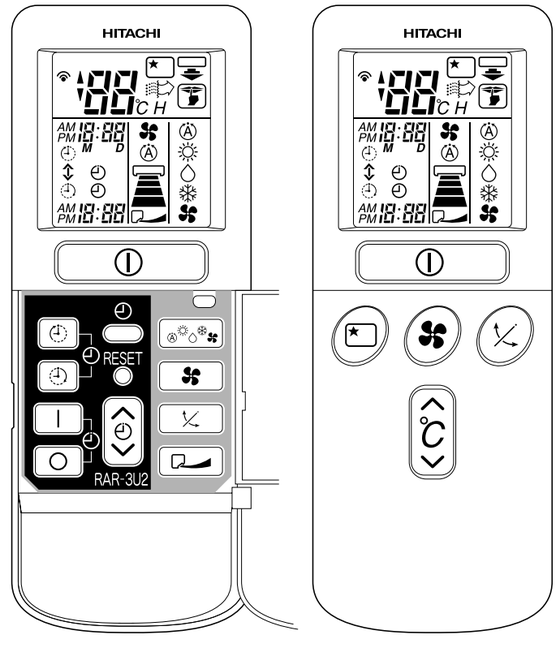
⚠ CAUTION

The marked parts ⚠ are very important ones for safety.

WIRING DIAGRAM OF THE PRINTED WIRING BOARD

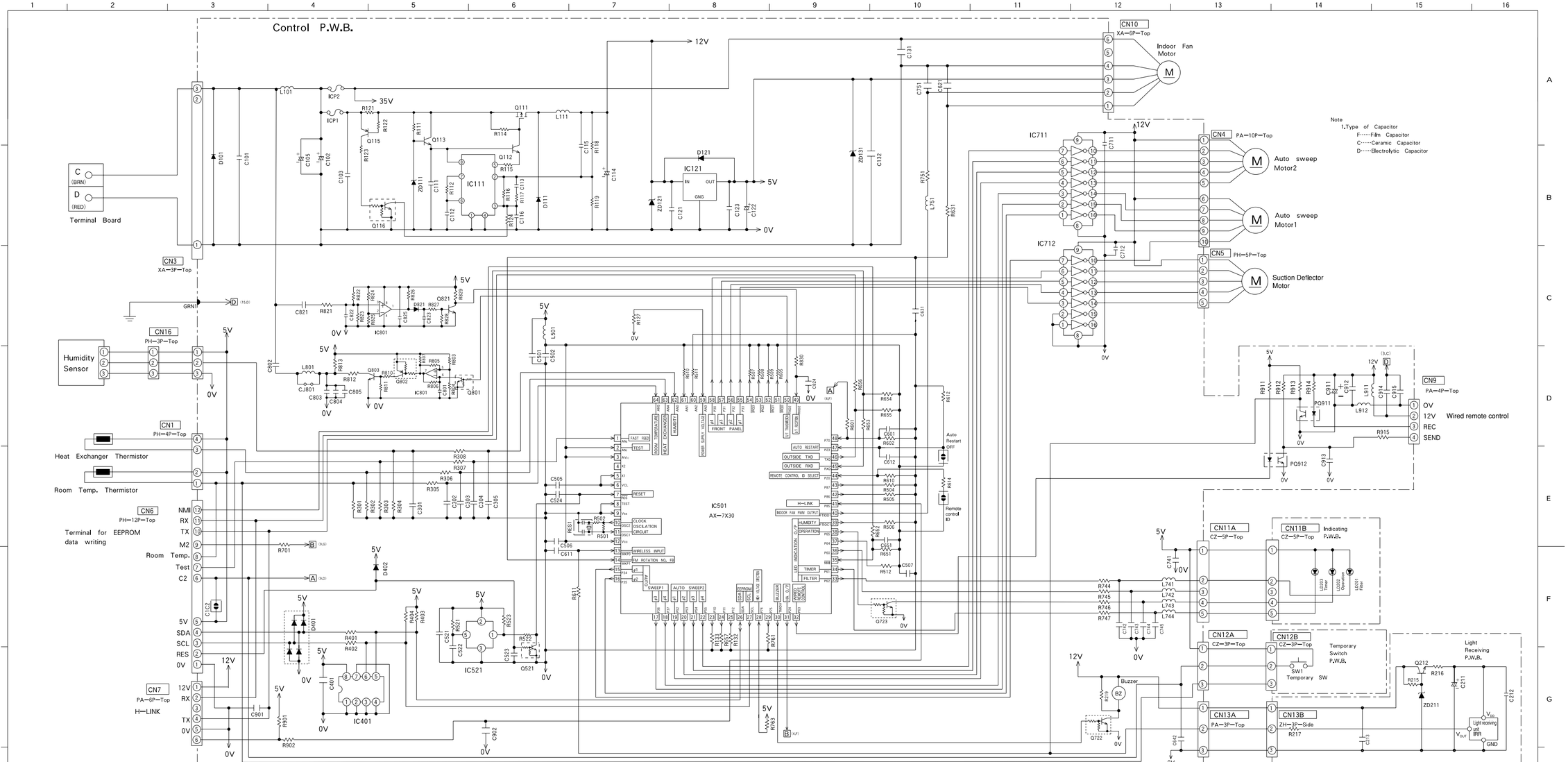
[Remote controller] RAR-3U2





WIRING DIAGRAM OF THE PRINTED WIRING BOARD

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8



RESISTOR

Circuit's Symbol	Numerical Value (Ω)		Common gulf	Power (W)	Shape
R111	27K	±5%	1/10W	C
R112	30K	±5%	1/16W	C
R114	750	±5%	1/8W	C
R115	560	±5%	1/8W	C
R116				
R117	68K	±5%	1/16W	C
R118	75K	±5%	1/16W	C
R119	6.8K	±5%	1/16W	C
R121	0,56	±5%	1/4W	C
R122	100	±5%	1/16W	C
R123	33K	±5%	1/8W	A
R124	100	±5%	1/16W	C
R127	5.1K	±5%	1/16W	C
R132	10K	±5%	1/16W	C
R133	10K	±5%	1/16W	C
R215	2.7K	±5%	1/10W	C
R216	47	±5%	1/10W	C
R217	1K	±5%	1/8W	C
R219	3.3K	±5%	1/16W	C
R301	12.7K	±1%	1/16W	C
R302	12.7K	±1%	1/16W	C
R303	10K	±1%	1/16W	C
R304	300K	±1%	1/16W	C

Circuit's Symbol	Numerical Value (Ω)		Common gulf	Power (W)	Shape
R305	1K	±5%	1/8W	C
R306	1K	±5%	1/8W	C
R307	1K	±5%	1/8W	C
R308	1K	±5%	1/16W	C
R401	390	±5%	1/8W	C
R402	390	±5%	1/16W	C
R403	5.1K	±5%	1/16W	C
R404	5.1K	±5%	1/16W	C
R501	1M	±5%	1/16W	C
R502	0	±5%	1/8W	C
R504	10K	±5%	1/16W	C
R505	10K	±5%	1/16W	C
R506	10K	±5%	1/16W	C
R507	10K	±5%	1/16W	C
R508	10K	±5%	1/16W	C
R509	10K	±5%	1/16W	C
R510	10K	±5%	1/8W	A
R511	10K	±5%	1/16W	C
R512	10K	±5%	1/16W	C
R521	1M	±5%	1/16W	C
R522	1K	±5%	1/16W	C
R523	300K	±5%	1/16W	C
R601	1K	±5%	1/8W	A
R602	10K	±5%	1/16W	C

Circuit's Symbol	Numerical Value (Ω)		Common gulf	Power (W)	Shape
R605	10K	±5%	1/16W	C
R610	10K	±5%	1/16W	C
R611	1K	±5%	1/8W	A
R612	10K	±5%	1/16W	C
R614	1K	±5%	1/8W	C
R631	1K	±5%	1/8W	A
R651	1K	±5%	1/16W	C
R652	100	±5%	1/8W	C
R653	1K	±5%	1/8W	C
R654	10K	±5%	1/16W	C
R655	10K	±5%	1/16W	C
R656	1K	±5%	1/8W	C
R657	10K	±5%	1/16W	C
R701	1K	±5%	1/8W	C
R744	390	±5%	1/8W	C
R745	300	±5%	1/16W	C
R746	300	±5%	1/8W	C
R747	390	±5%	1/8W	C

Circuit's Symbol	Numerical Value (Ω)		Common gulf	Power (W)	Shape
R751	2.7K	±5%	1/16W	C
R761	10K	±5%	1/16W	C
R763	10K	±5%	1/16W	C
R803	120K	±5%	1/16W	C
R804	120K	±5%	1/16W	C
R805	120K	±5%	1/16W	C
R806	120K	±5%	1/16W	C
R807	4.3K	±5%	1/16W	C
R810	680	±5%	1/10W	C
R811	2K	±5%	1/16W	C
R812	39	±5%	1/8W	C
R813	39	±5%	1/8W	C
R821	1K	±5%	1/8W	C
R822	10K	±1%	1/16W	C
R823	10K	±1%	1/16W	C
R824	8.25K	±1%	1/16W	C
R825	10K	±1%	1/16W	C
R826	1K	±5%	1/16W	C
R827	3K	±5%	1/16W	C
R828	10K	±5%	1/16W	C
R829	5.1K	±5%	1/16W	C
R830	1K	±5%	1/16W	C
R901	10K	±5%	1/8W	C

Circuit's Symbol	Numerical Value (Ω)		Common gulf	Power (W)	Shape
R902	1K	±5%	1/8W	C
R911	560	±5%	1/10W	C
R912	2K	±5%	1/10W	C
R913	2K	±5%	1/8W	C
R914	1.2K	±5%	1/8W	C
R915	620	±5%	1/10W	C

IC

Circuit's Symbol	Model	Shape
IC111	NJM2340M	C
IC121	BA50BC0T	H
IC401	S24CS04AFJ	C
IC501	HD64F36077	C
IC521	S80942CNMC	C
IC711	ULN2003ANS	C
IC712	ULN2003ANS	C
IC801	NJM2903M	C

Jumper

Circuit's Symbol	Use／Dont's Use	Shape
J101~J140	Use	C
CJ801	Use	C

Capacitor

Circuit's Symbol	Numerical Value (F)	Voltage (V)	Type	Shape
C101	0,22μ	55V	F	H
C102	180μ	50V	D	R
C103	470p	630V	C	C
C105	180μ	50V	D	R
C111	2,2μ	10V	C	C
C112	1000P	50V	C	C
C113	0,047μ	25V	C	C
C114	220μ	25V	D	R
C115				
C116				
C121	0,1μ	25V	C	C
C122	100μ	10V	D	R
C123	0,1μ	25V	C	C
C131	0,22μ	50V	C	C
C132	0,1μ	25V	C	C
C211	47μ	16V	D	R
C212	0,1μ	25V	C	C
C213	0,1μ	25V	C	C
C301	0,1μ	25V	C	C
C302	0,1μ	25V	C	C
C303	0,1μ	25V	C	C
C304	0,1μ	25V	C	C

Circuit's Symbol	Numerical Value (F)	Voltage (V)	Type	Shape
C305	0,1μ	25V	C	C
C401	0,1μ	25V	C	C
C501	0,1μ	25V	C	C
C502	0,1μ	25V	C	C
C505	0,1μ	25V	C	C
C506	0,1μ	25V	C	C
C507	0,1μ	25V	C	C
C521	0,1μ	25V	C	C
C522	0,01μ	50V	C	C
C523	0,1μ	25V	C	C
C524	0,1μ	25V	C	C
C601	0,1μ	25V	C	C
C611	1000P	50V	C	C
C612	0,1μ	25V	C	C
C621				
C631	1000P	50V		C

Circuit's Symbol	Numerical Value (F)	Voltage (V)	Type	Shape
C642				
C651	0,1μ	25V	C	C
C711	0,1μ	25V	C	C
C712	0,1μ	25V	C	C
C741	0,1μ	25V	C	C
C742				
C743				
C744				
C745				
C751	1μ	16V	C	C
C801	150P	50V	C	C
C802	0,22μ	50V	F	H
C803	0,1μ	25V	C	C
C804				
C805				
C821	0,01μ	50V	F	R
C822	1000P	50V	C	C
C823	0,047μ	25V	C	C

Circuit's Symbol	Numerical Value (F)	Voltage (V)	Type	Shape
C824	0,01μ	50V	C	C
C825	0,1μ	25V	C	C
C901				
C902	0,1μ	25V	C	C
C911	100μ	25V	D	R
C912	0,1μ	25V	C	C
C913	1000p	50V	C	C
C914				
C915				

Transistor

Circuit's Symbol	Model	Shape
Q111	2SJ518	C
Q112	2SC5209H	C
Q113	2SC5209H	C
Q115	2SA1162Y	C
Q116	DTC114EE	C
Q212	2SC2462LC	C
Q521	DTC114EE	C
Q722	DTC114EE	C
Q723	DTC114EE	C
Q801	DTC114EE	C
Q802	DTA114EE	C
Q803	2SC3441E	C
Q821	2SC5383	C

Diode

Circuit's Symbol	Model	Shape
D101	DSM3MA2	C
D111	D1FS6	C
D121	1SS355	C
D401	HN1D03FU	C
D402	1SS355	C
D821	1SS355	C

Zener Diode

Circuit's Symbol	Model	Shape
ZD111	RD6.2UJN2	C
ZD121	PTZ20A	C
ZD131	RLZ6.8A	C
ZD211	RD5.6UJN2	C

Buzzer

Circuit's Symbol	Model	Shape
BZ	PKM13EPY	H

Sensor Unit

Circuit's Symbol	Model	Shape
IRR	GP1UX511RK	H

Oscillator

Circuit's Symbol	Model	Frequency	Shape
RES1	CSTLS10M0G53	10MHz	R

Coil

Circuit's Symbol	Numerical Value (H)	Rating Current	Shape
L101	82μ	1.3A	C
L111	560μ	0.4A	C
L501	1608CJ	—	C
L741	1608CJ	—	C
L742	1608CJ	—	C
L743	1608CJ	—	C
L744	1608CJ	—	C
L751	1608CJ	—	C
L801			
L911	BL01RN1	7A	A
L912	BL01RN1	7A	A

Photo Coupler

Circuit's Symbol	Model	Shape
PQ911	TLP421 (BL)	H
PQ912	TLP421 (BL)	H

LED

Circuit's Symbol	Model	Color	Shape
LD201	SEL6414E	Green	H
LD202	SEL6914A	Yellow	H
LD203	SEL6814A	Orange	H

Over Current Protecter

Circuit's Symbol	Model	Rating Current	Shape
ICP1	CCP2E—20	0.8A	C
ICP2	CCP2E—50	2.0A	C

CONNECTER

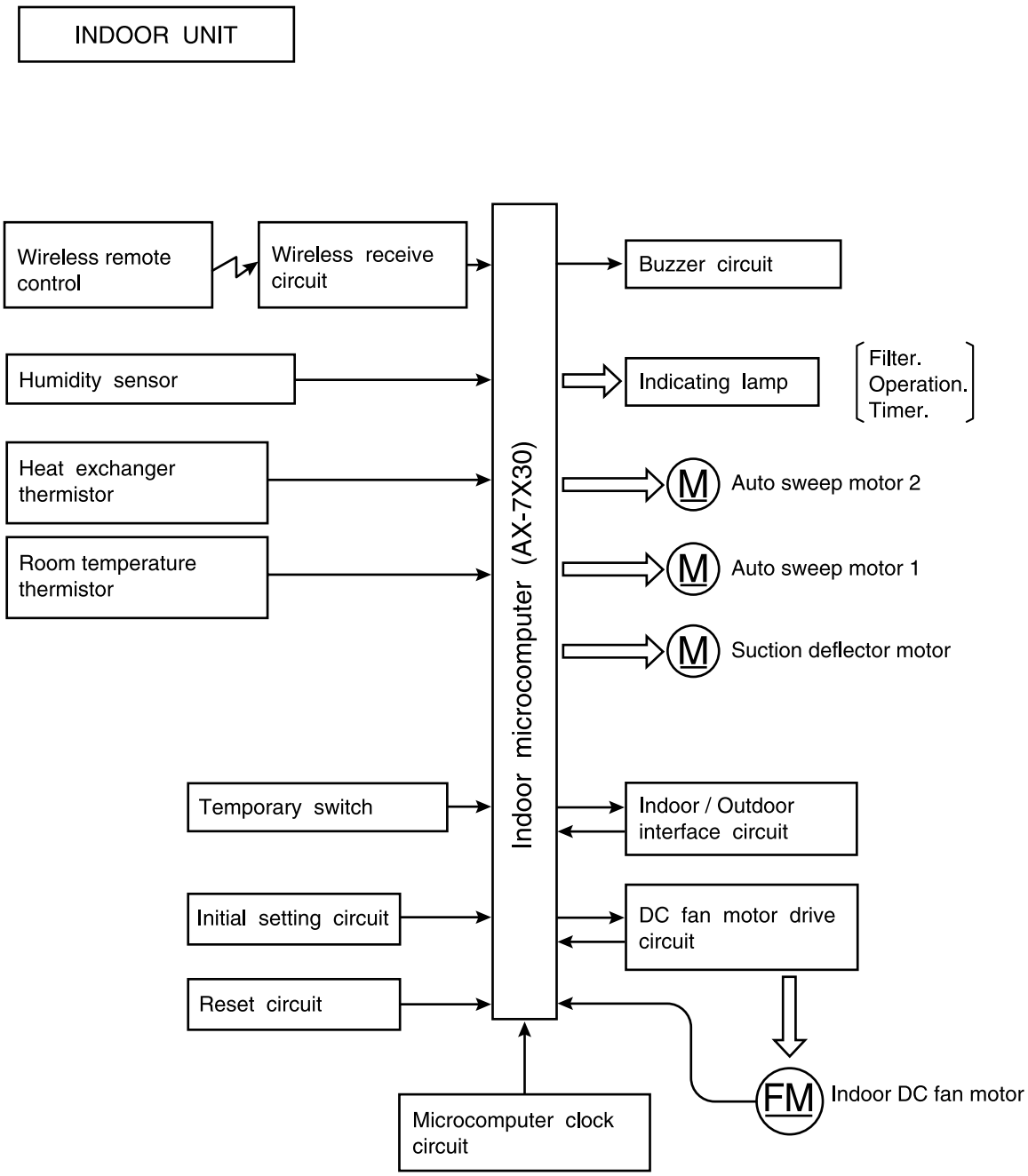
Circuit's Symbol	Model	Shape
CN1	PH—4P—Top	H
CN3	XA—3P—Top	H
CN4	PA—10P—Top	H
CN5	PH—5P—Top	H
CN6	PH—12P—Top	H
CN7	PA—6P—Top	H
CN9	PA—4P—Top	H
CN10	XA—6P—Top	H
CN11A	CZ—5P—Top	H
CN11B	CZ—5P—Top	H
CN12A	CZ—3P—Top	H
CN12B	CZ—3P—Top	H
CN13A	PA—3P—Top	H
CN13B	ZH—3P—Side	H
CN16	PH—3P—Top	H

Switch

Circuit's Symbol	Model	Shape
SW1	KSM0633B	H

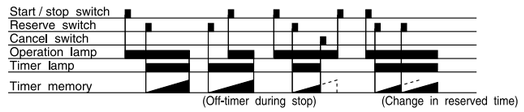
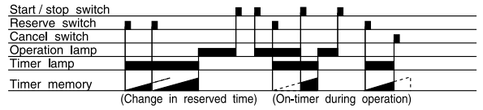
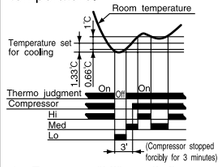
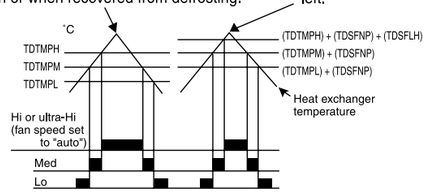
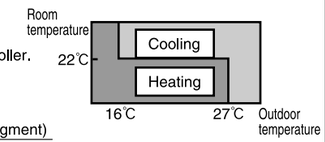
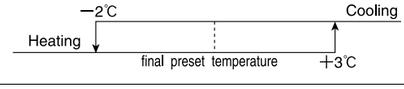
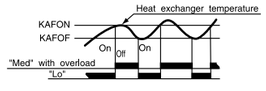
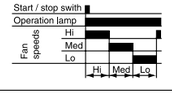
BLOCK DIAGRAM

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8



BASIC MODE

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

Operation mode		Fan	Cooling	Dehumidifying	Heating	Auto
Basic operation of start / stop switch						
Timer functions	Off-timer					
	On-timer					
Fan speed mode (indoor fan)	Auto		Changes from "Hi" to "Med" or "Lo" depending on room temperature.  1. Runs at "Hi" until first thermo off after operation is started. 2. Runs at "Lo" when thermo is off.		Set to "ultra-Lo", "Lo", "Med", "Hi", "ultra-Hi" or "stop" depending on the room temperature, time and heat exchange temperature. Set to "stop" if the room temperature is 18˚C in the "ultra-Lo" mode other than during preheating (cooling is recovered at 18,33˚C). When the compressor is running at maximum speed during hot dash or when recovered from defrosting. In modes other than left. 	Operating mode is judged by room temperature and outdoor temperature. (1) Judging by outdoor temperature ・Operating mode is judged by outdoor temperature. Only when the mode is not restricted by this judgment, the judgment by room temperature in the next paragraph will be performed. (a) Outdoor temperature ≧ 27˚C : Restricted to cooling (b) Outdoor temperature ≦ 16˚C : Restricted to heating (2) Judging by room temperature Operating mode at start up is judged (Initial judgment) (a) Conditions for judgment (any of the followings) ・When auto operation is started after 1 hour has elapsed since the operation was stopped. ・When auto operation is started after the previous manual mode operation. ・When the operating mode is switched to auto while operating at manual mode. (b) Judging method ・Room temperature ≧ 22˚C ±3˚C : Cooling ・Room temperature < 22˚C ±3˚C : Heating ※ ±3˚C is the fine adjustment value from the remote controller.  Judging operating mode change during operation (Continuous judgment) (a) Conditions for judgment (any of the followings) ・The mode is reviewed at every interval time. ・When auto operation is started again before 1 hour has elapsed since the operation was stopped. (b) Judging method ・Judge by setting the hysteresis on the final preset temperature. The final preset temperature is the actually targeted preset temperature which is the sum of the basic preset temperature and each type of shift value (e.g. ±3˚C by remote controller, preset temperature correction value, powerful shift value, etc.). [Currently cooling] ・Room temperature ≦ Final preset temperature −2˚C Change to heating ・Room temperature > Final preset temperature −2˚C Continue cooling [Currently heating] ・Room temperature ≧ Final preset temperature +3˚C Change to cooling ・Room temperature < Final preset temperature +3˚C Continue heating 
	Hi	Operates at "Hi" regardless of the room temperature.	Set to "Ultra-Hi" when the compressor runs at maximum speed, and to "Hi" in other modes.		Set to "Ultra-Lo", "Lo", "Med", "Hi", "Ultra-Hi" or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18˚C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33˚C). Set to "Ultra-Hi" when the compressor is running at maximum speed during hot dash or when recovered from defrosting.	
	Med	Operates at "Med" regardless of the room temperature.	Same as at left.		Set to "Ultra-Lo", "Lo", "Med" or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18˚C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33˚C).	
	Lo	Operates at "Lo" regardless of the room temperature.	Same as at left.	Set to "Lo" in modes other than when the compressor stops.	Set to "Ultra-Lo", "Lo", or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18˚C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33˚C). The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram: 	
	Silent	Operates at "Silent" regardless of the room temperature.	Same as at left.	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 41.	See page 45.	See page 47.	
Sleep operation (with sleep button ON)		Enters sleep operation after set as on the left. Action during sleep operation silent (sleep) operation.	・Same as at left. ・See page 43.	・Same as at left. ・See page 45.	・Same as at left. ・See page 49.	・Same as at left. ・Performs the sleep operation of each operation mode.

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

Combination of operations:

When operation mode is selected:

- You cannot operate the indoor units in the following combinations.
- The indoor unit which is switched on first continues to operate, but other indoor units which is switched on later, does not operate while the lamp lights.

One unit	Other unit
Heating	Cooling
	Dehumidifying
	Circulating (fan)

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.

	MODEL	RAF-25QH8	RAF-35QH8	RAF-50QH8
PROM NO	LABEL NAME	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE
0F5	WMAX_M	5300 min^{-1}	5000 min^{-1}	4500 min^{-1}
0F6	WMAX2_M	5300 min^{-1}	5000 min^{-1}	4500 min^{-1}
0F7	WSTD_M	4000 min^{-1}	4000 min^{-1}	4000 min^{-1}
0F8	CMAX_M	3500 min^{-1}	3300 min^{-1}	4000 min^{-1}
0F9	CSTD_M	3250 min^{-1}	3150 min^{-1}	3100 min^{-1}
0FA	SDMAX_M	2600 min^{-1}	2400 min^{-1}	1800 min^{-1}
0FB	SDRPM_M	2200 min^{-1}	2000 min^{-1}	1100 min^{-1}
0FC	WMINHI_M	800 min^{-1}	800 min^{-1}	800 min^{-1}
0FD	WMIN_M	800 min^{-1}	800 min^{-1}	800 min^{-1}
0FE	CMINHI_M	900 min^{-1}	900 min^{-1}	900 min^{-1}
0FF	CMIN_M	1200 min^{-1}	1200 min^{-1}	1200 min^{-1}
100	DMIN_M	1100 min^{-1}	1100 min^{-1}	1100 min^{-1}
101	PKOU_M	500 min^{-1}	500 min^{-1}	500 min^{-1}
102	FZZY_GN_M	1	1	1
103	FZZYTM_M	3 min^{-1}	3 min^{-1}	3 min^{-1}
10F	SHIFTW_M	-0.33 °C	-0.33 °C	-0.33 °C
110	SFTSZW_M	0 °C	0 °C	0 °C
111	SFTOYW_M	0 °C	0 °C	0 °C
112	SHIFTC_M	-0.66 °C	-0.66 °C	-0.66 °C
113	SHIFTD_M	1.33 °C	1.33 °C	1.33 °C
115	YNEOF_M	26 °C	26 °C	26 °C
12D	TEION_M	1 °C	1 °C	1 °C
12E	TEIOF_M	9 °C	9 °C	9 °C
133	FWSS_M	350 min^{-1}	350 min^{-1}	350 min^{-1}
134	FWSOY_M	550 min^{-1}	550 min^{-1}	650 min^{-1}
135	FWS_M	650 min^{-1}	650 min^{-1}	750 min^{-1}
136	FWKAF_M	800 min^{-1}	800 min^{-1}	900 min^{-1}
137	FWL_M	800 min^{-1}	800 min^{-1}	900 min^{-1}
138	FWAH_M	900 min^{-1}	950 min^{-1}	1100 min^{-1}
139	FWH_M	900 min^{-1}	1000 min^{-1}	1200 min^{-1}
13A	FWAHH_M	950 min^{-1}	1100 min^{-1}	1220 min^{-1}
13B	FWHH_M	950 min^{-1}	1100 min^{-1}	1220 min^{-1}
13C	FCSOY_M	500 min^{-1}	500 min^{-1}	550 min^{-1}
13D	FCS_M	600 min^{-1}	630 min^{-1}	700 min^{-1}
13E	FCL_M	750 min^{-1}	800 min^{-1}	850 min^{-1}
13F	FCAH_M	800 min^{-1}	950 min^{-1}	1100 min^{-1}
140	FCH_M	850 min^{-1}	1000 min^{-1}	1100 min^{-1}
141	FCHH_M	980 min^{-1}	1050 min^{-1}	1200 min^{-1}
142	FDSOY_M	500 min^{-1}	500 min^{-1}	550 min^{-1}
143	FDS1_M	600 min^{-1}	650 min^{-1}	700 min^{-1}
144	FDS2_M	600 min^{-1}	650 min^{-1}	790 min^{-1}

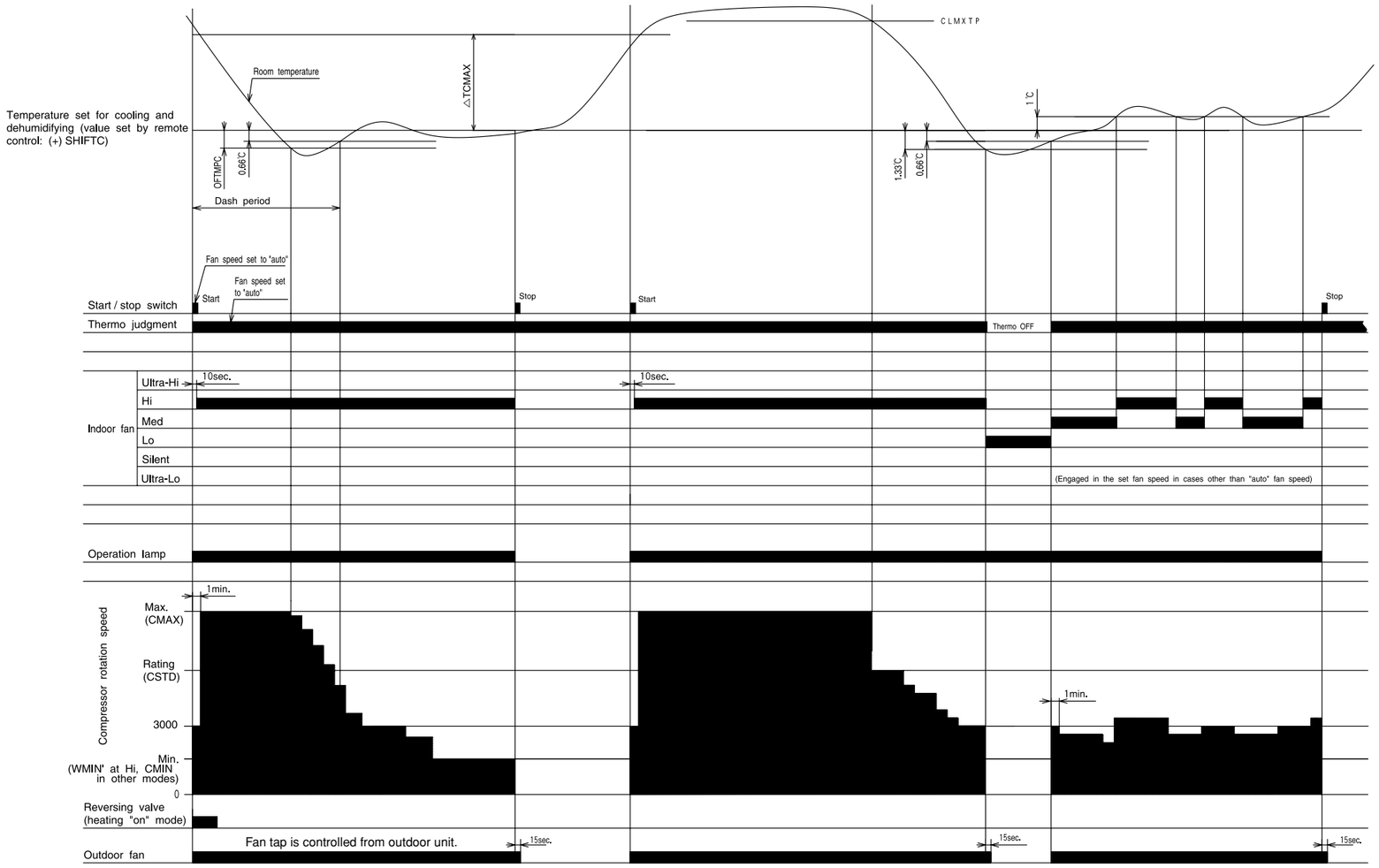
Table 1 Fan speed by mode

Operation mode	Fan speed mode		Label name
Heating Operation	Ultra Lo		FWSS_M
	Silent, Sleep		FWSOY_M
	Lo		FWS_M
	Over load		FWKAF_M
	Med		FWL_M
	Hi	Set fan speed “AUTO”	FWAH_M
	Ultra Hi	Set fan speed “AUTO”	FWAHH_M
	Hi	Set fan speed “Hi”	FWH_M
	Ultra Hi	Set fan speed “Hi”	FWHH_M
Cooling Operation	Silent, Sleep		FCSOY_M
	Lo		FCS_M
	Med		FCL_M
	Hi	Set fan speed “AUTO”	FCAH_M
	Hi	Set fan speed “Hi”	FCH_M
	Ultra Hi	Set fan speed “Hi”	FCHH_M
Dehumidifying Operation	Silent, Sleep		FDSOY_M
	Lo 1		FDS1_M
	Lo 2		FDS2_M

Table 2 Room temperature shift value

Operation mode		Shift value
Heating Operation	Fan speed “AUTO, Hi, Med”	SHIFTW_M
	Fan speed “Lo, Sleep”	SFTSZW_M
Cooling Operation		SHIFTC_M
Dehumidifying Operation		SHIFTD_M

Basic Cooling Operation



Notes:

(1) Cool dash is started when the operation is started at fan speed "AUTO" or "Hi" or when the fan speed is changed to "AUTO" or "Hi" during cooling operation, and when the compressor speed reaches CMAX or higher.

(2) The maximum compressor speed period during cool dash is finished ① when 25 minutes have elapsed after cool dash was started ② when the room temperature reaches the cooling set temperature -1˚C (including cooling shift) and then becomes lower than the preset temperature by 0.66˚C after the steady speed period, ③ when thermo is OFF.
(if cool dash finished in the above ①, the compressor does not go through the steady speed period but it starts fuzzy control.)

(3) The thermo OFF temperature during cool dash is cooling set temperature (including cooling shift) -3˚C. After thermo OFF, cool dash is finished and fuzzy control starts.

(4) The compressor minimum ON time and minimum OFF time is 3 minutes.

(5) The time limit for which the maximum compressor speed (CMAX) during normal cooling can be maintained is less than 60 minutes when the room temperature is less than CLMXTP: it is not provided when the room temperature is CLMXTP or more.

(6) Compressor speed is determined by instruction sent from indoor unit and corrected by outdoor unit according to such factors as capacity, fan speed, number of units being operated, outdoor temperature, etc.

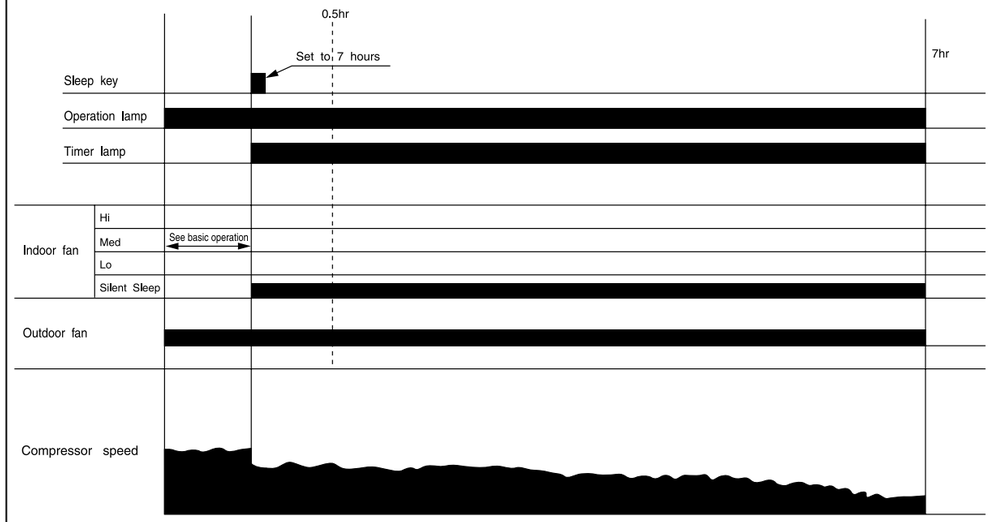
(7) If another indoor unit is doing heating operation, cooling operation cannot be done.

(8) While the cooling thermo is OFF, the indoor fan speed is maintained at the preset fan speed.

Table 3 Condensation Condition Criterion Value

Item		Temperature
Room temperature	Condensation condition (engaged)	30˚C
	Condensation condition (released)	32˚C
Outdoor temperature	Condensation condition (engaged)	32˚C
	Condensation condition (released)	34˚C

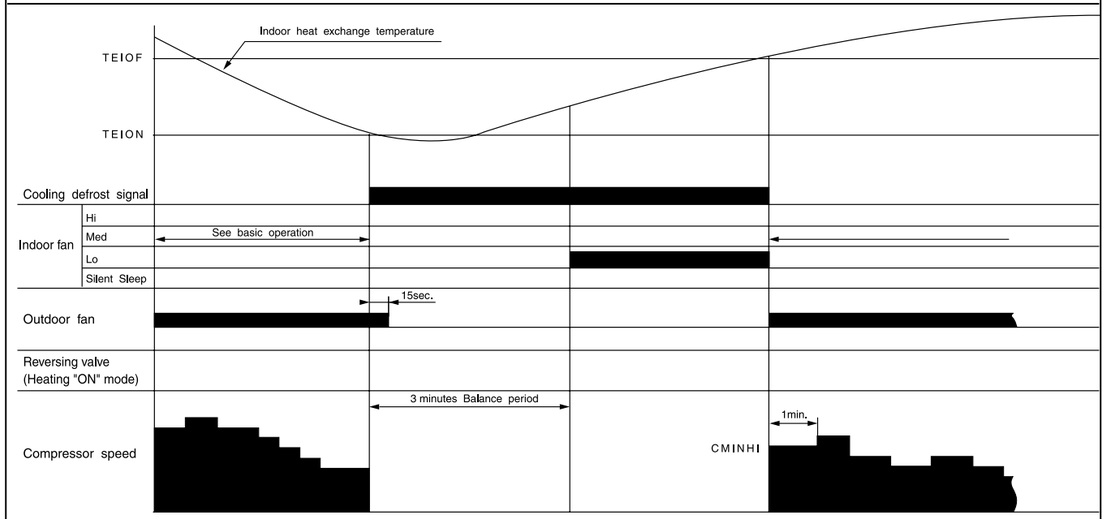
Cooling Sleep Operation



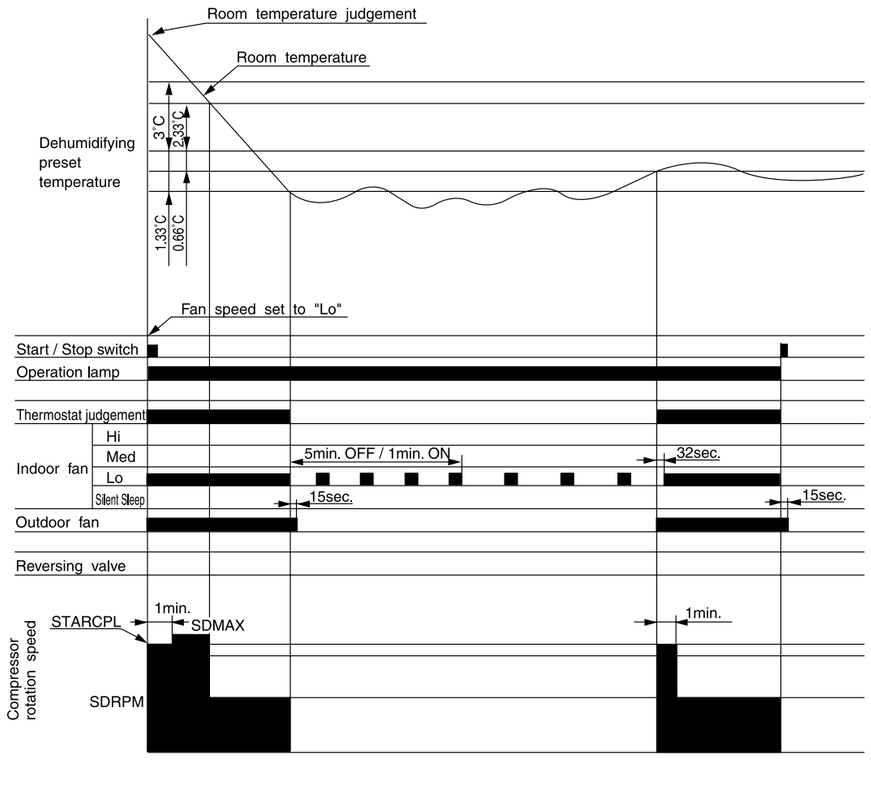
Notes:

(1) The sleep operation starts when the sleep key is pressed.
(2) When the sleep key is set, the indoor fan is set to “Sleep Silent” (FCSOY).
(3) If the operation mode is changed during sleep operation, the set temperature is cleared, and shift starts from the point when switching is made.
(4) The indoor fan speed does not change even when the fan speed mode is changed.
(5) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
(6) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
(7) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.
(8) The indoor fan is stopped while the thermo is OFF during sleep operation.
(9) There is no preset temperature shift due to time elapse.

Cooling Defrost



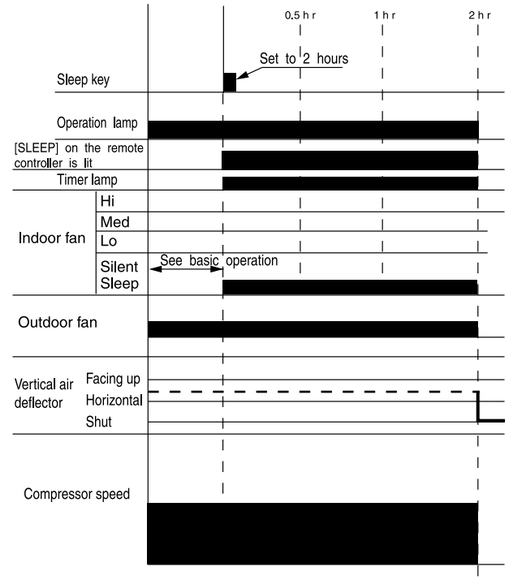
Dehumidifying



Notes:

(1) The indoor fan is operated in the "Lo" or "Silent" mode, OFF for 5 minutes and ON for 1 minute, repeatedly according to the humidity judgement when the thermostat is turned OFF.
(2) When the operation is started by the thermostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.
(3) The compressor is operated forcedly for 3 minutes after operation is started.
(4) The minimum ON time and OFF time of the compressor are 3 minutes.

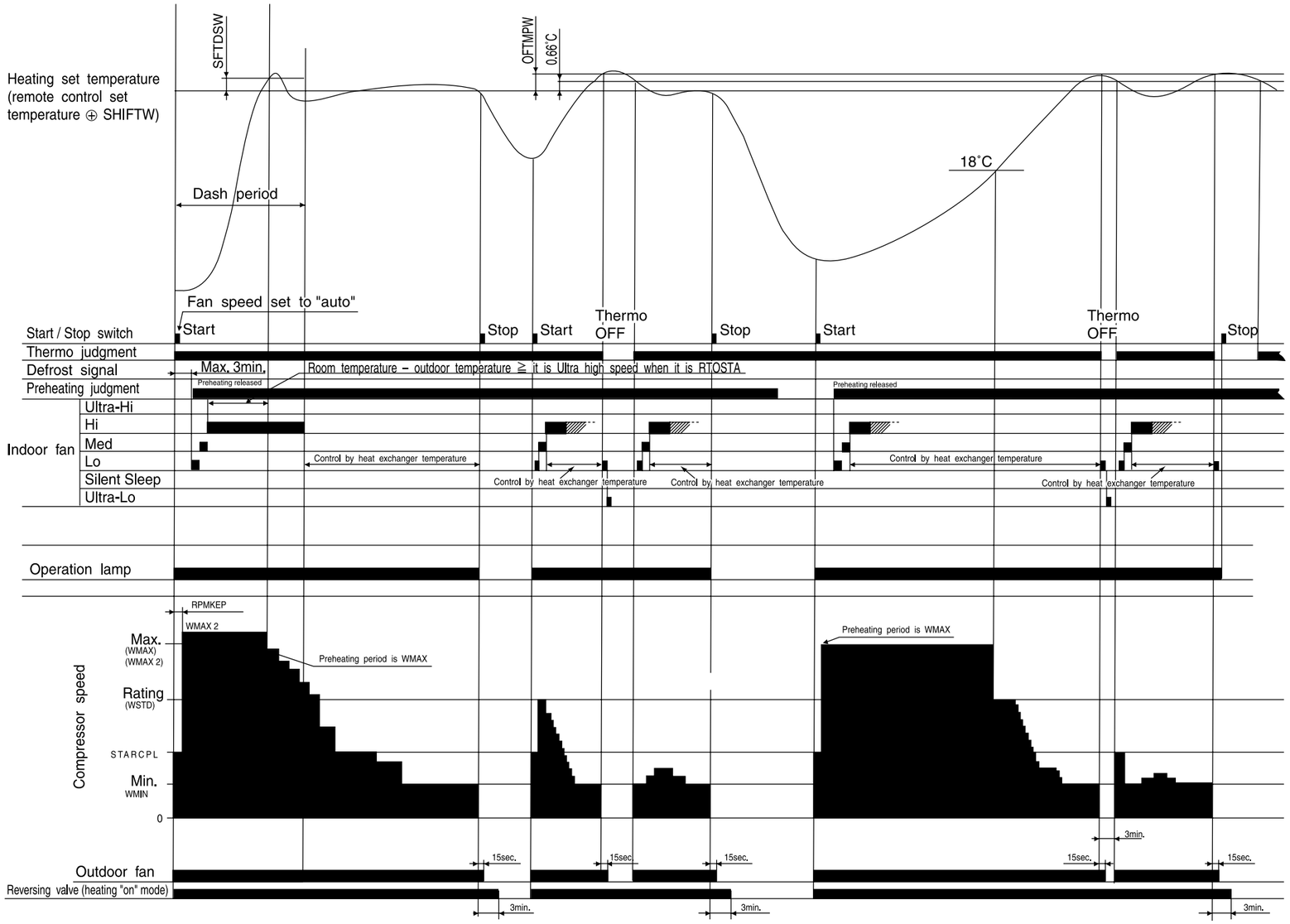
Dehumidifying Sleep Operation



Notes:

(1) The sleep operation starts when the sleep key is pressed.
(2) When the sleep key is set, the indoor fan is set to "Sleep Silent" (FDOY_M).
(3) If the operation mode is changed during sleep operation, the set temperature is cleared, and shift starts from the point when switching is made.
(4) The indoor fan speed does not change even when the fan speed mode is changed.
(5) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
(6) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
(7) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.
(8) The indoor fan is stopped while the thermo is OFF during sleep operation.
(9) There is no preset temperature shift due to time elapse.

Heating Basic Operation



Notes:

(1) Hot Dash is started when the operation is started at fan speed “AUTO” of “HI” or when the fan speed is changed to “AUTO” or “HI” during heating operation, and when the compressor speed (P item) reaches (WMAX1 or WMAX2) or higher with the room temperature at 18°C or less and outdoor temperature at 10°C or less.

(2) The maximum compressor speed period during hot dash is finished ① when the room temperature reaches the heating set temperature (including heating shift) plus SFTDSW or ② when the thermo is off.

(3) The thermo OFF temperature during hot dash is heating set temperature (including heating shift) plus 3℃. After thermo OFF, hot dash finishes, and fuzzy control starts.

(4) The time limit for which the maximum compressor speed (WMAX) or (WMAX2) during normal heating (except for hot dash) can be maintained is less than 120 minutes when the room temperature is 18℃ or more; it is not provided when the room temperature is less than 18℃ and outdoor temperature is less than 2℃.

(5) The operation indicator blinks every second during initial cycle operation, preheating, defrosting (including balance time after defrosting is finished), or auto fresh defrosting.

(6) For preheating judgment, preheating starts if the heat exchange temperature is lower than YNEOFC and is cancelled if the heat exchange temperature is YNEOF plus 0.33℃ or higher at the start of operation using the START / STOP button.

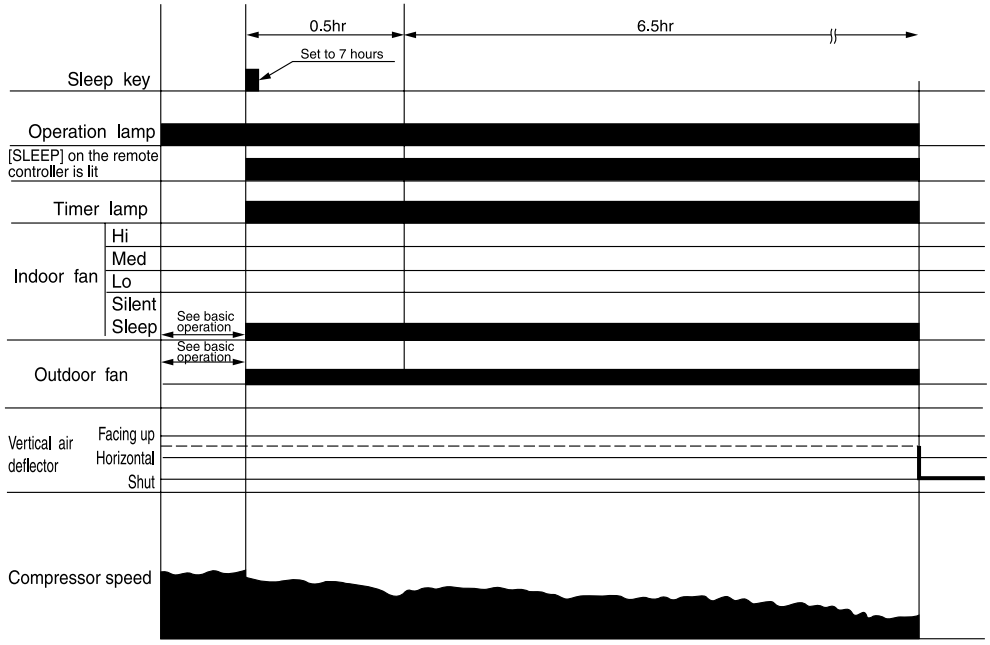
(7) If the room temperature falls to less than 18℃ in the "Ultra-Lo" mode, the indoor fan stops. When the room temperature is 18℃+0.33℃ or more, the ultra-Lo operation restarts. However, the ultra-Lo operation during preheating or preheating after defrosting does not stop if the room temperature is less than 18℃.

(8) With thermo OFF or in approximately 1 minute after operation is stopped using the remote controller, the fan operates in the "Ultra-Lo" mode.
This operation is for discharging heat from the indoor unit.

(9) Compressor speed is determined by instruction sent from indoor unit and corrected by outdoor unit according to such factors as capacity, fan speed, number of units being operated, outdoor temperature, etc.

(10) If another indoor unit is doing cooling operation, dehumidifying operation or fan operation, heating operation cannot be done.

Heating Sleep Operation

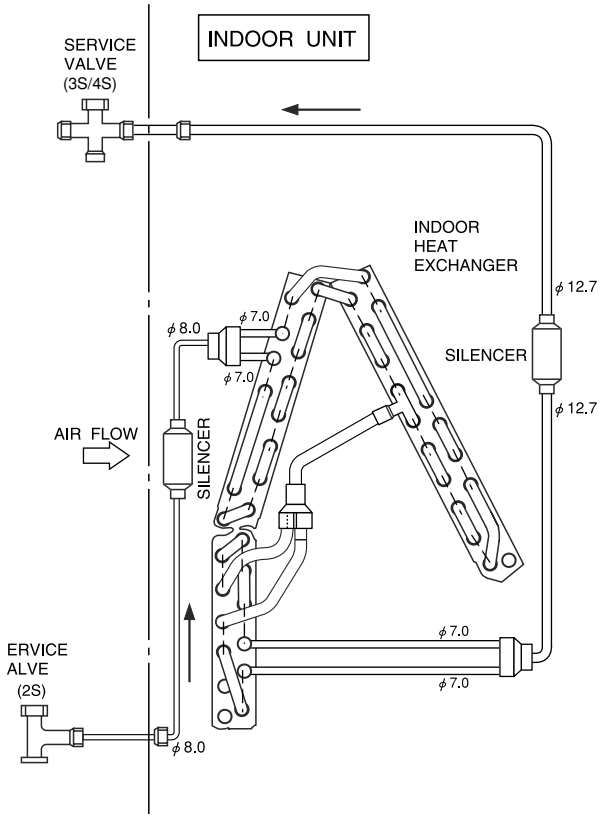


Notes:
(1) The sleep operation starts when the sleep key is pressed.
(2) When the sleep key is set, the indoor fan is set to “Sleep Silent” (FWSOY).
(3) If the operation mode is changed during sleep operation, the changed operation mode is set and sleep control starts.
(4) The indoor fan speed does not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

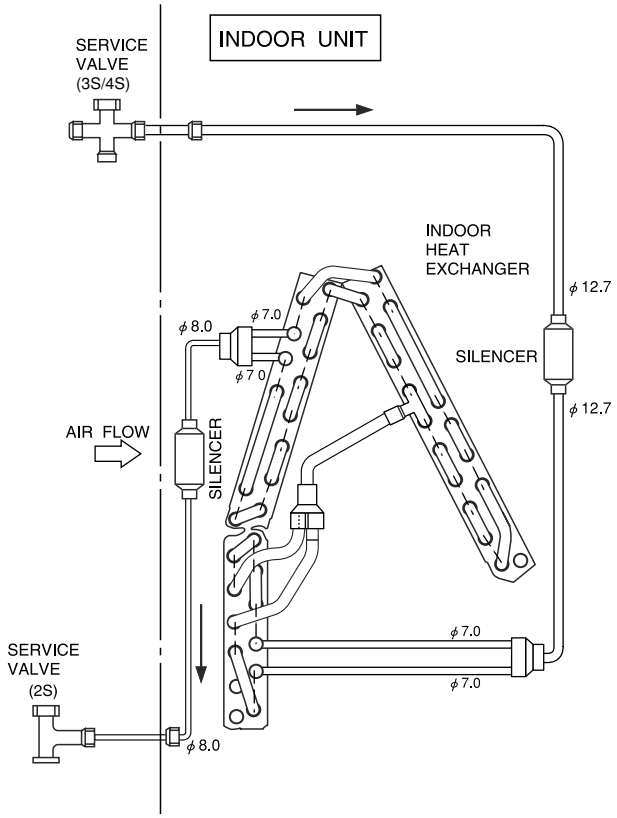
REFRIGERATING CYCLE DIAGRAM

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

COOLING CYCLE



HEATING CYCLE

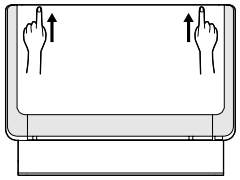


DISASSEMBLY & ASSEMBLY PROCEDURE

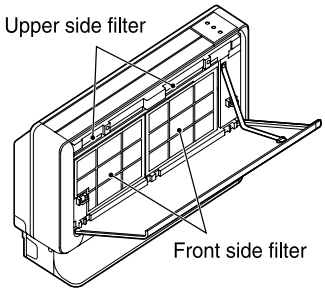
1. AIR FILTER

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

PROCEDURE



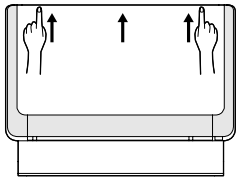
1 **Open the front panel.**
- To open the front panel, use the remote controller to stop unit operation. Then press at the top left and right corners of the front panel.
- Grasp the left and right sides of the front panel and open it toward you.



2 **Remove the filters.**
(Front side 2 pieces, upper side 2 pieces, total 4 pieces.)

3 **Remove dust of the filters using a vacuum cleaner.**
- After using neutral detergent, wash with clean water and dry in shade.

4 **Attach the filters.**
- Attaching the filters.
(Front side 2 pieces, upper side 2 pieces, total 4 pieces.)



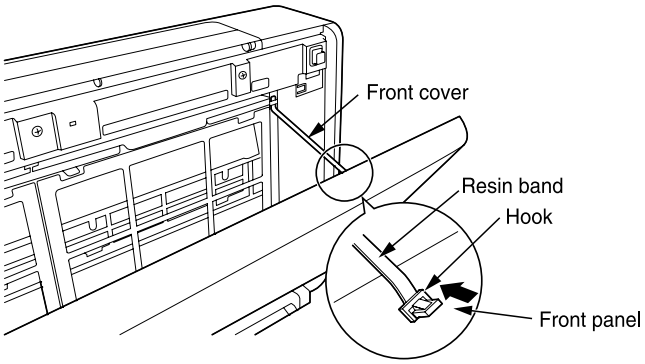
5 **Close the front panel.**
- To close the front panel, press at the top left and right corners of the front panel.
- Press the upper center part of the front panel to close properly.

2. HOW TO INSTALL AND REMOVE THE FRONT PANEL

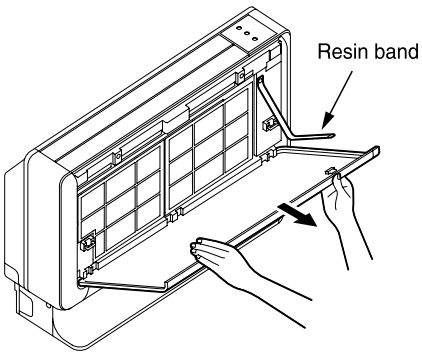
- Be sure to use both hands to grasp the front panel when removing it or attaching it.
- The front panel may be installed up or down to suit user preference.

Removing

① Press the hook found at the tip of the resin band installed inside the front panel's right section to remove the resin band.



② Pull the front panel down toward you and once fully open, pull it to remove.

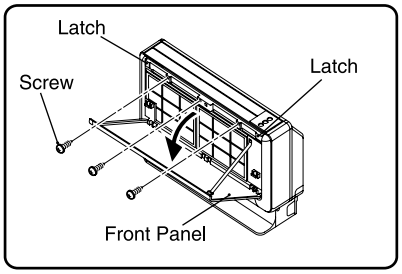


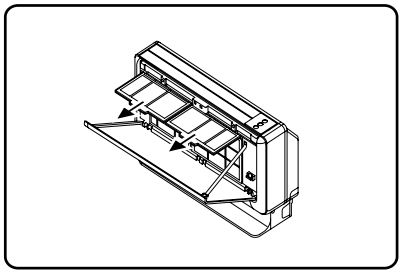
Attaching

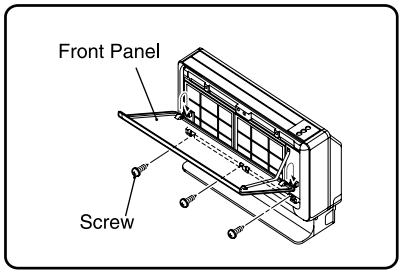
① Attach three front panel bearings to the axis of the front cover. (Set the hook to face up.)

② Insert the tip of the resin band into the hole of the protrusion inside the right section of the front panel.

3. Remove the front cover

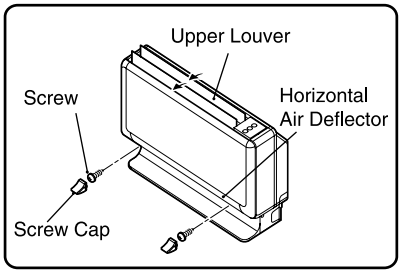


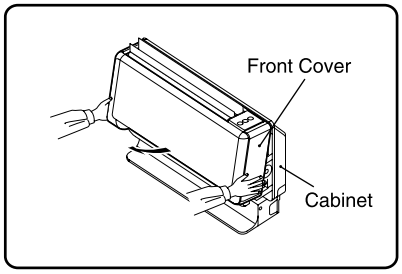




① Push the latch at both sides to open the front panel. Pull out the filter and remove 3 screws.

② Lift up the front panel and latch the claws firmly at the lower part of rear of the front panel.
Then remove 3 screws.

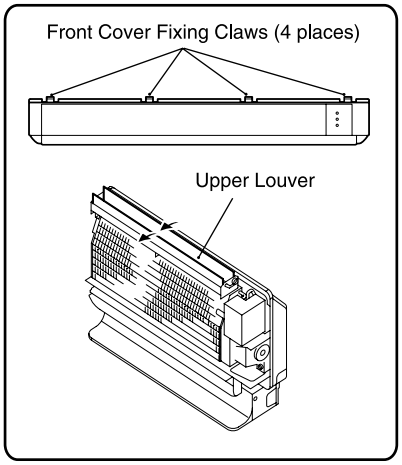


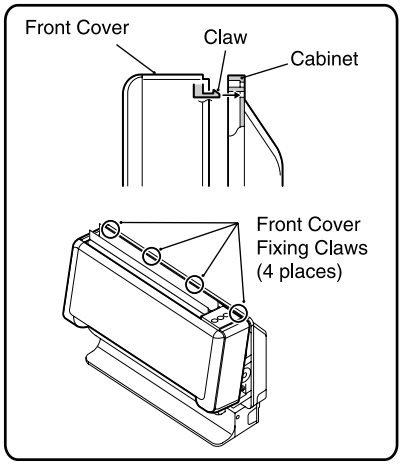


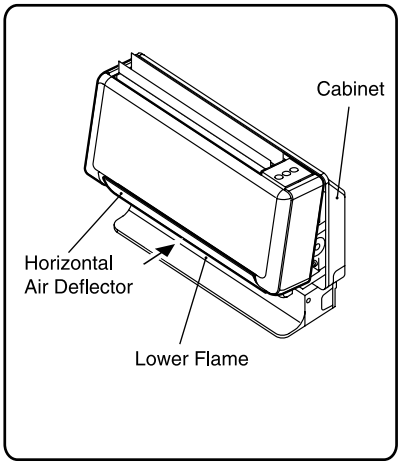
③ Take off 2 screw caps at the lower part of the horizontal air deflector and remove 2 screws. Then leave the upper louver in open position.

④ Hold both sides of the lower part of front cover and pull down towards an oblique direction.

4. Install the front cover







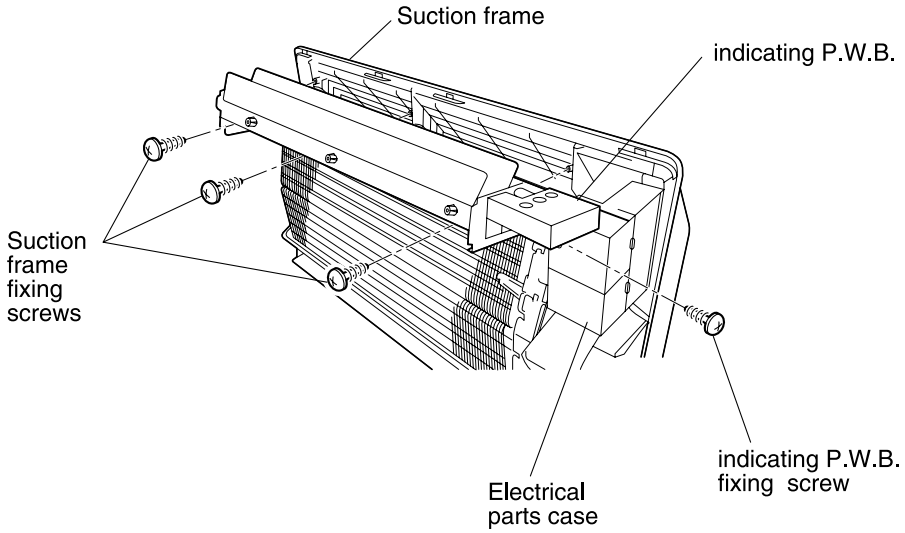
① Set the upper louver in open position.

② Insert the front cover fixing claws (4 places) to the insertion groove of the cabinet and put the upper louver through to the front cover frame.

③ Put the horizontal air deflector to the lower part of front cover frame and insert to the cabinet.
After fixed the front cover, fix back all the screws in order.

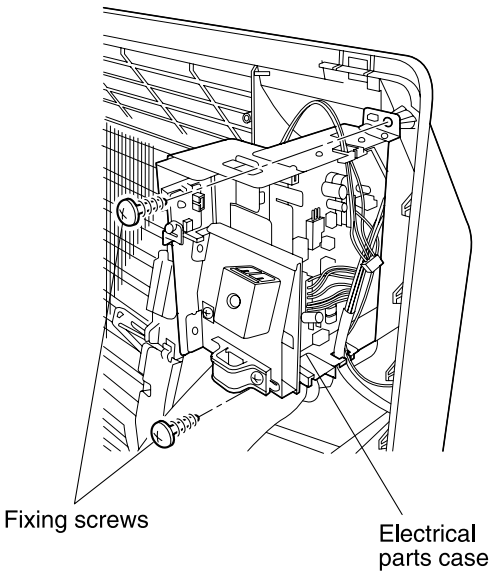
5. INDICATING P.W.B.

(1) Remove the front panel and the front cover.
(2) Remove the three fixing screws of the suction frame.
(3) Remove the one fixing screw of the indicating P.W.B. case.
(4) Slide the indicating P.W.B. case to the right while removing it from the suction frame.



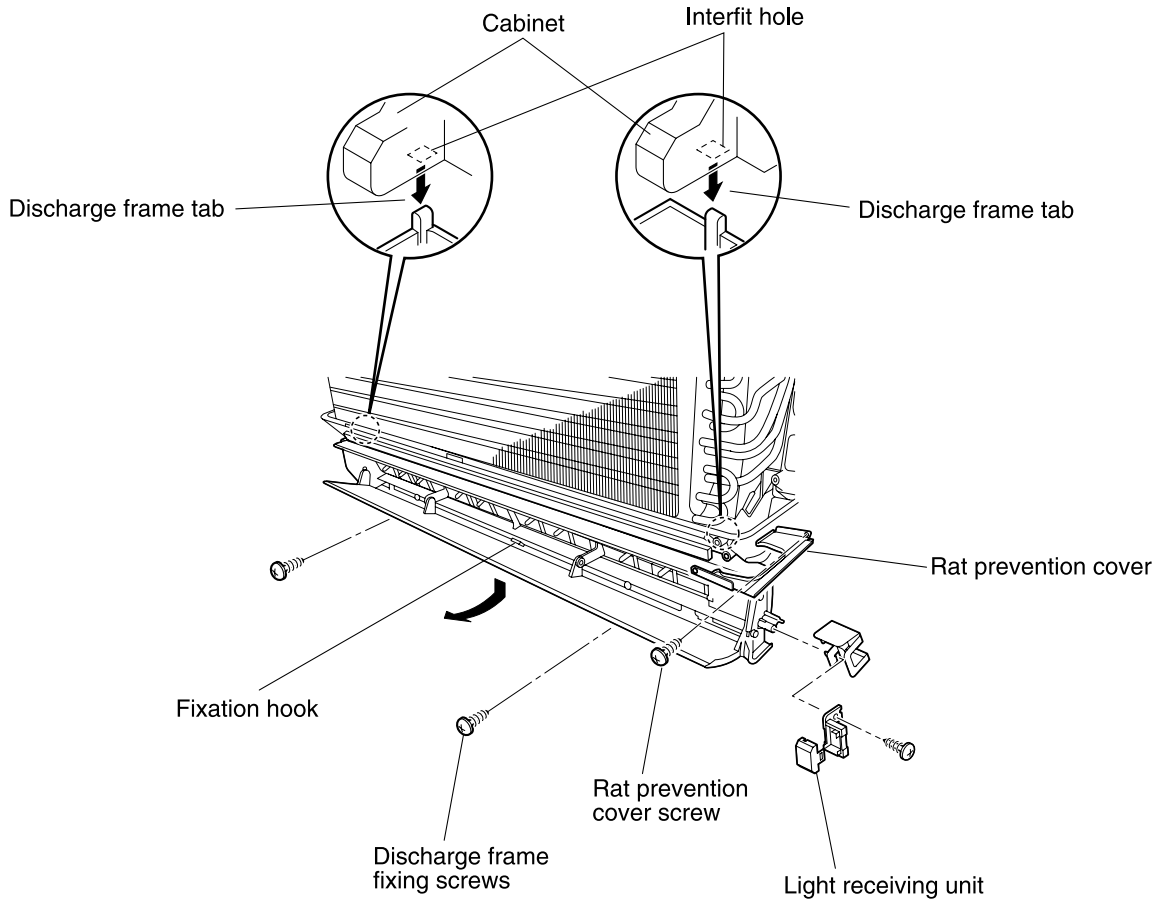
6. ELECTRICAL PARTS CASE

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

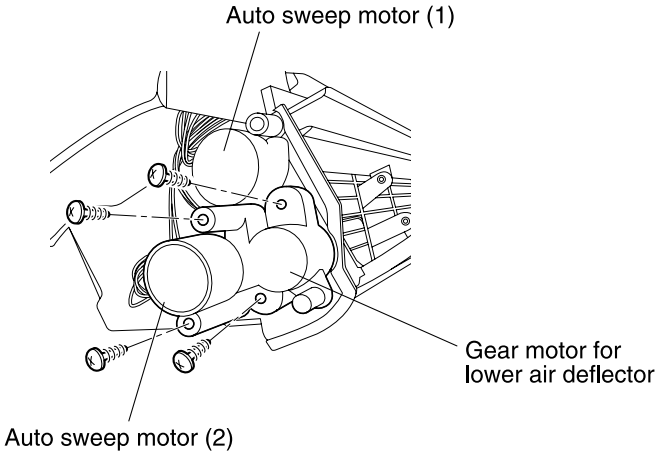


7. DISCHARGE FRAME

(1) Remove the front panel and the front cover.
(2) Remove the two fixing screws of the discharge frame.
(3) Remove the screw on the rat prevention cover.
(4) Remove the hook that is the fixation of a lower center part of Discharge frame.
(5) Lower the rear side of the discharge frame, remove the tab on the interfit section, and then pull out the discharge frame towards you.

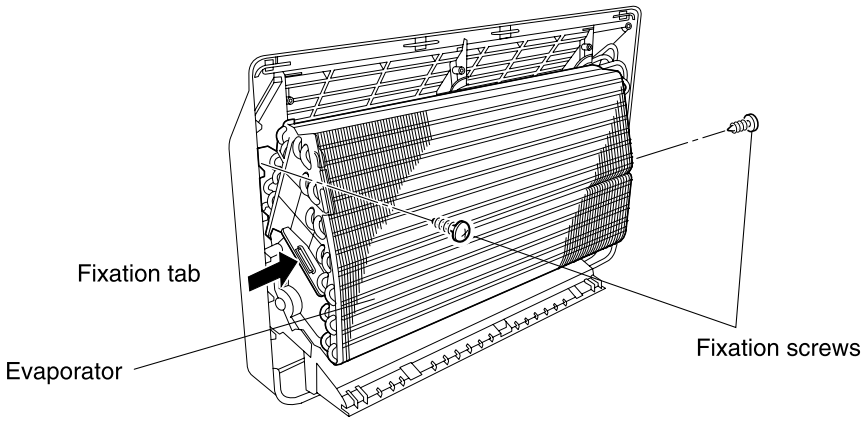


8. DISCHARGE FRAME AUTO SWEEP MOTOR

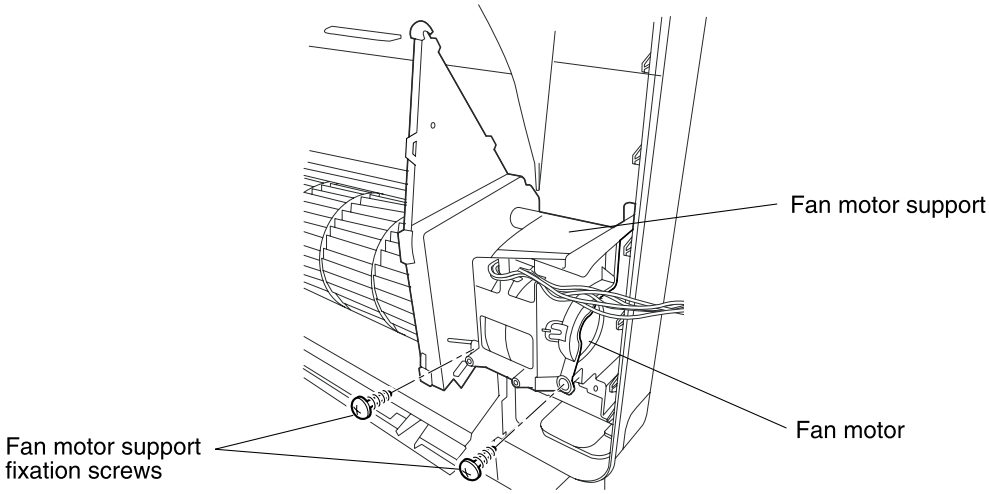


9. FAN MOTOR AND TANGENTIAL AIR FLOW FAN

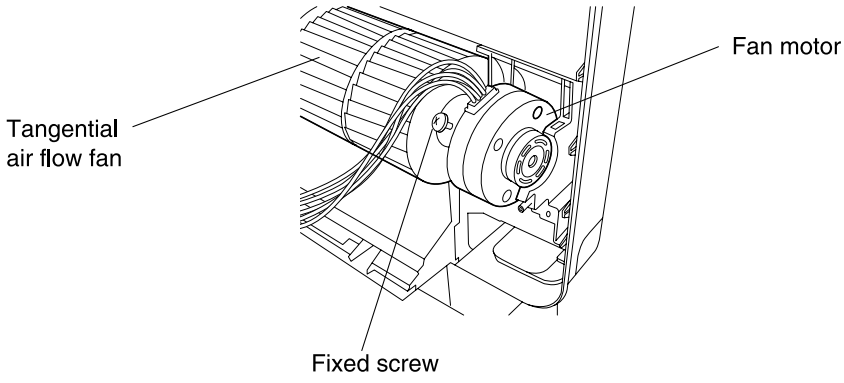
(1) Two screws that are the fixation of evaporator are removed.
(2) The tab where the left side of evaporator is fixed is removed.
(3) Evaporator is lifted up and remove.



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



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



DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

1. Power circuit

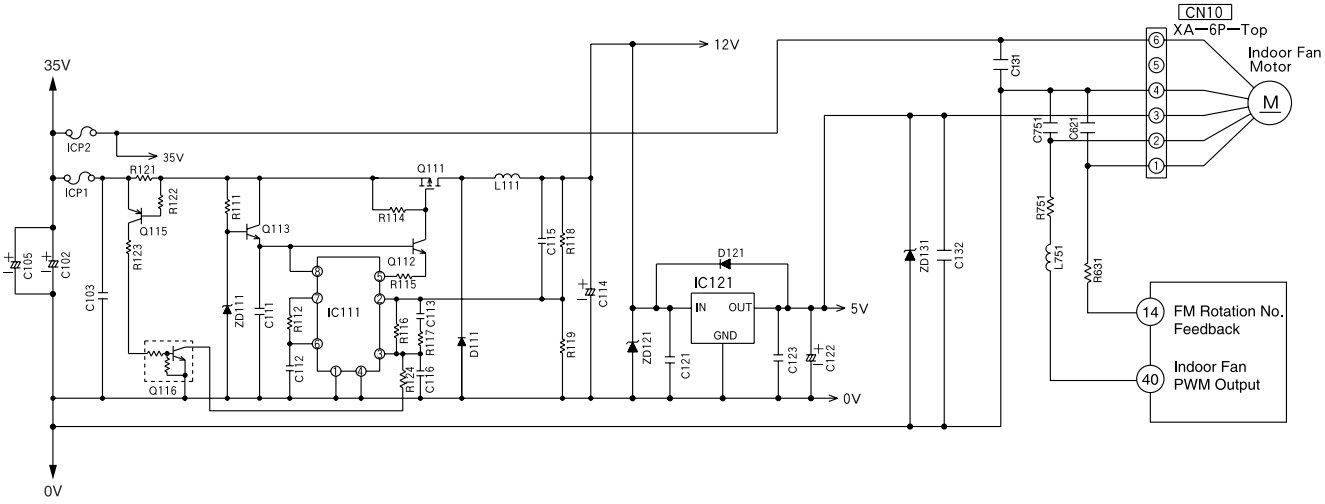


Fig. 1-1

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

2. Reset Circuit

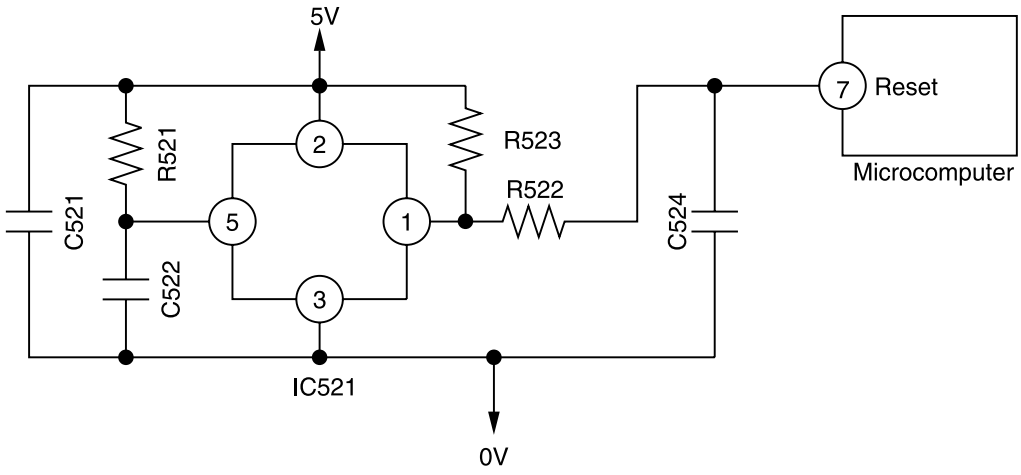


Fig.2-1

Timing chart

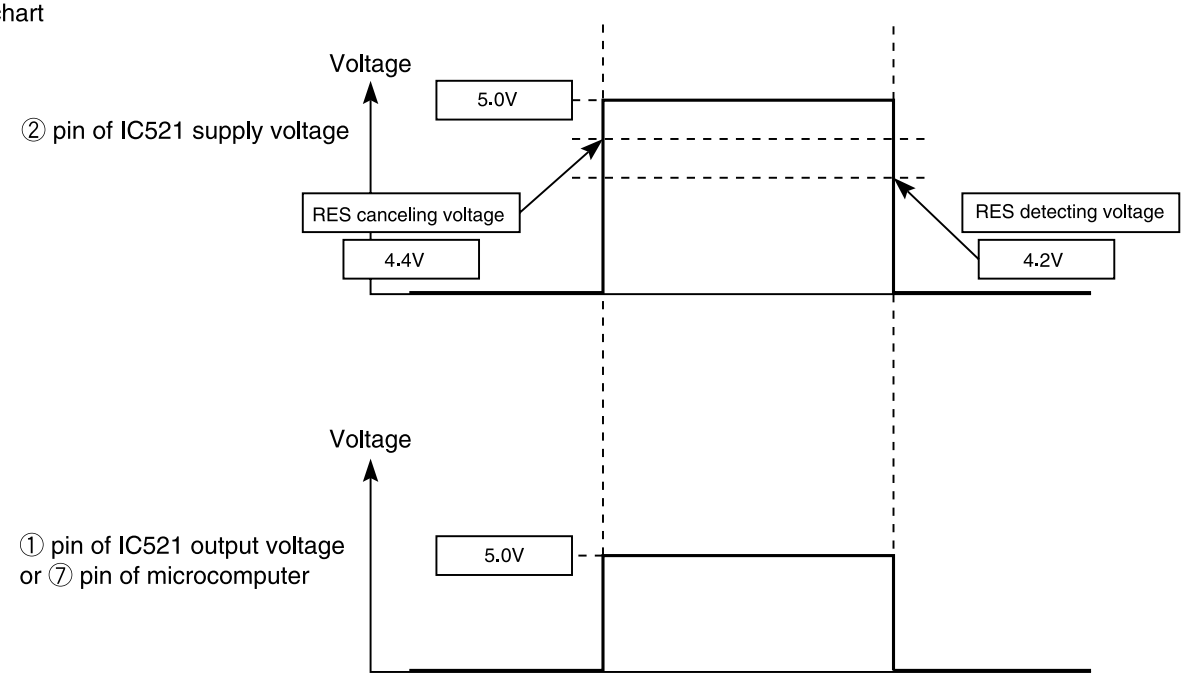


Fig.2-2

- Reset circuit is to initialize the indoor unit microcomputer when switching ON the power or after recovering from power failure.
- Microcomputer operates when ⑦ pin of the indoor unit microcomputer (reset input) is "Lo" for resetting and "Hi" for hitting.
- Waveform of each part when switching ON the power and when shutting down is shown in the Fig. 2-2.
- After switching ON the power, ① pin of IC521 supply voltage and ⑦ pin of microcomputer becomes Hi when DC5V line rises and reaches approximately 4.4V or higher.
  Then, resetting will be cancelled and microcomputer starts operating.
- After shutting down the power, ① pin of IC521 supply voltage and ⑦ pin of microcomputer becomes Lo when DC5V line falls and reaches approximately 4.2V or lower.
  Then, the microcomputer will be in reset condition.

3. Room Temperature Thermistor Circuit

A room temperature thermistor circuit is shown in Fig. 3-1.
According to room temperature, the voltage of point Ⓐ becomes as it is shown in Fig.3-2.

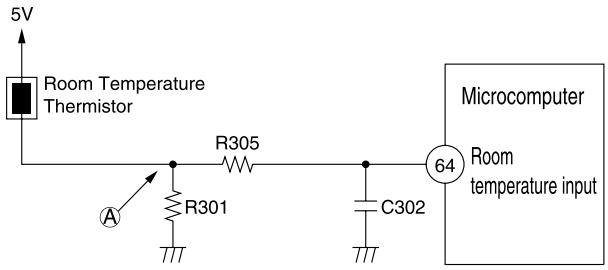


Fig. 3-1

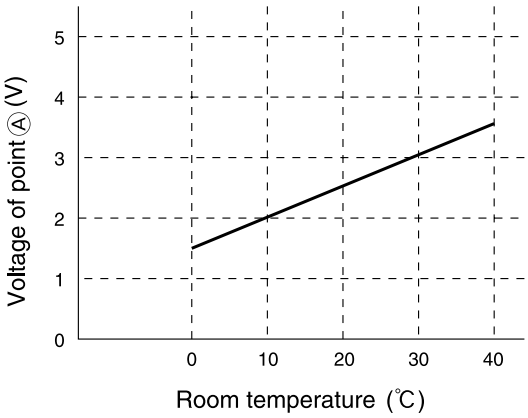


Fig. 3-2

4. Heat Exchanger Thermistor Circuit

Heat exchanger temperature is noticed inside the room
(1) Preheating
(2) Low-temperature defrosts at cooling･dehumidification operation time.
(3) Not working of reversing valve or detection of opening of heat exchange thermistor is controlled.

According to heat exchange temperature, the voltage of point Ⓐ becomes as it is shown in Fig. 4-2.

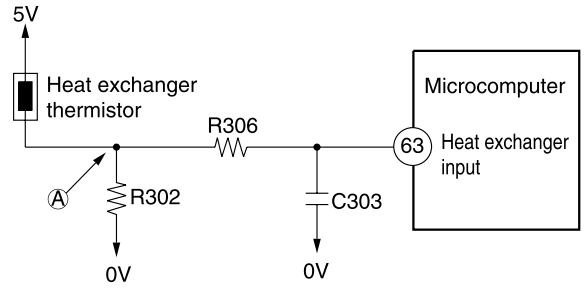


Fig. 4-1

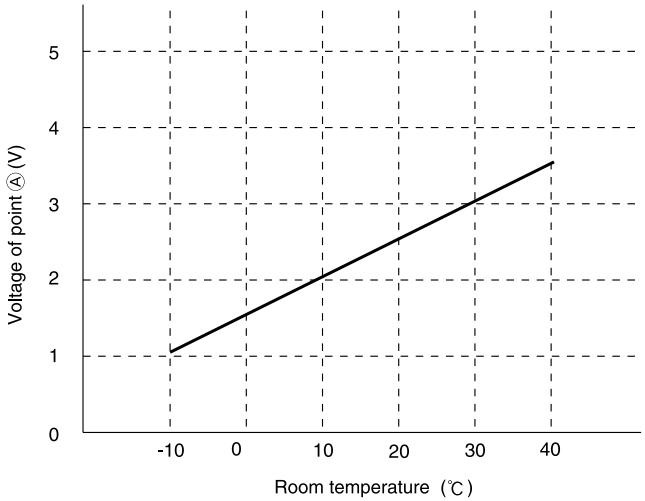


Fig. 4-2

5. Humidity Sensor Circuit

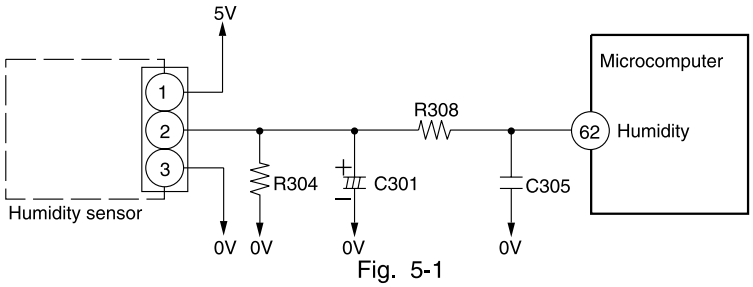


Fig. 5-1

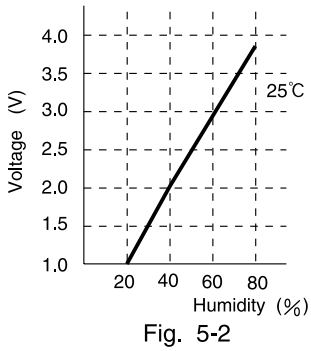


Fig. 5-2

- From the output (② pin) of humidity sensor, the 5V pulse of different width is output according to detected humidity. Smooth output pulse is carried out by C301 and it changes into the characteristic of voltage-humidity as shown in Fig.5-2. The micro computer detects and controls humidity by reading this voltage directly.

6. Fan Motor Drive Circuit

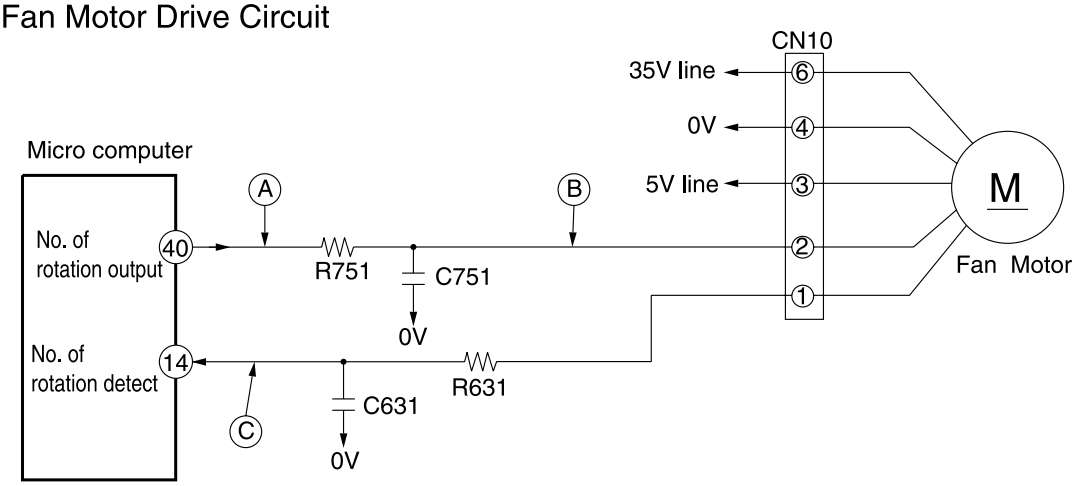


Fig. 6-1

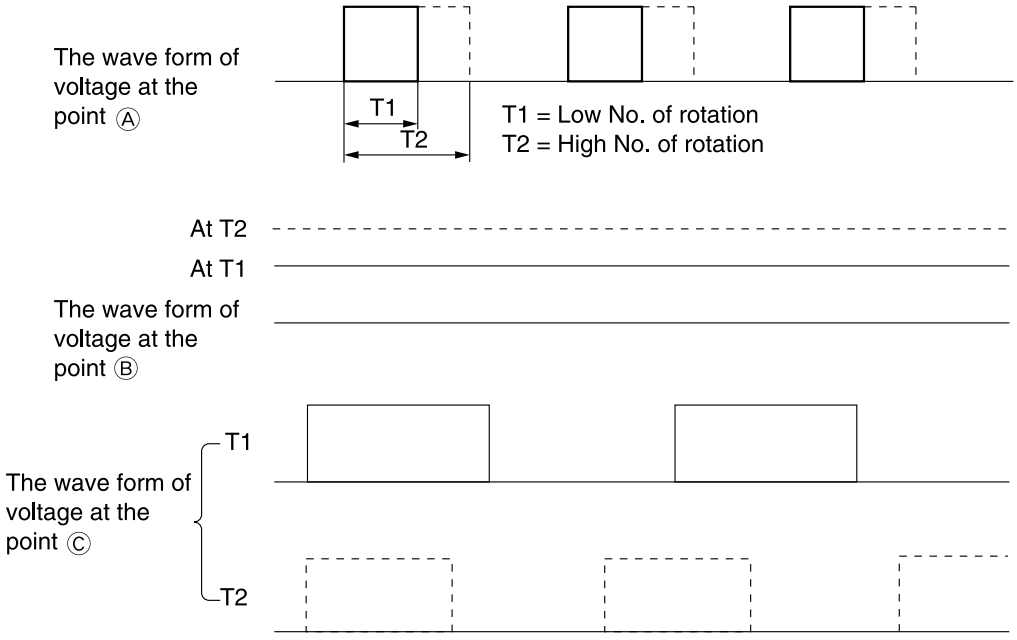


Fig. 6-2

- The 15.7 kHz PWM pulse shown in Fig.6-2 from the micro computer pin ㊵ is output to point Ⓐ. The width of this pulse changes with instruction number of rotations.
- This pulse changes to analog voltage by R751 and C751 and it is applied to the fan motor as instruction voltage number of rotations. The relationship between the voltage of point Ⓑ and number of rotations becomes as shown in Fig.6-3. (The gap may arise depending on the condition of unit.)
- The feedback pulse of number of rotation is outputted from the fan motor and input to micro computer pin ⑭. The frequency of this pulse is 12/60 of the number of rotations. (Ex: 1000min^{-1}X 12/60=200Hz) The micro computer observes this frequency and to make it as the instruction number of rotation all the time, adjusts the output pulse width of pin ㊵.
- If the feedback pulse becomes lower than 100min^{-1} caused by lock or failure of a fan motor, the fan output stops temporary as the fan lock is faulty. The pulse will output again after 10 seconds. If the abnormal in fan lock is detected twice in 10 minutes, the unit is completely stopped and change to the fault mode which the timer lamp blinks 10 times.

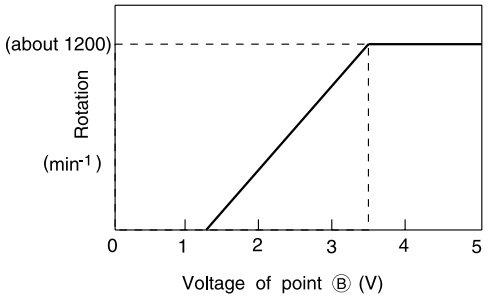


Fig. 6-3

7. Buzzer Circuit

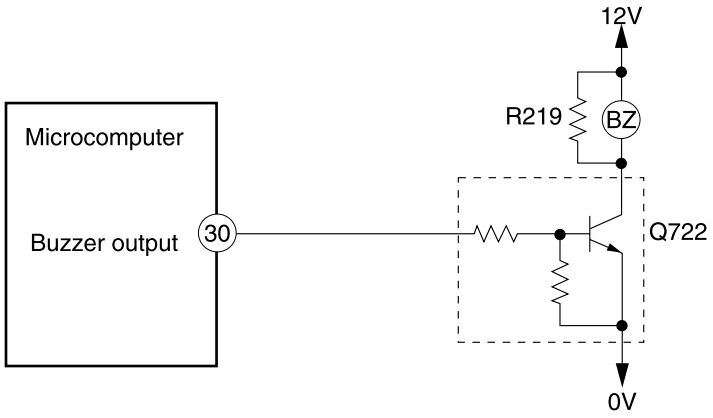


Fig.7-1 Buzzer Circuit

• When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin ㉚ of the micro computer. After the amplitude of this signal has been set to 12Vp-p by a transistor, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

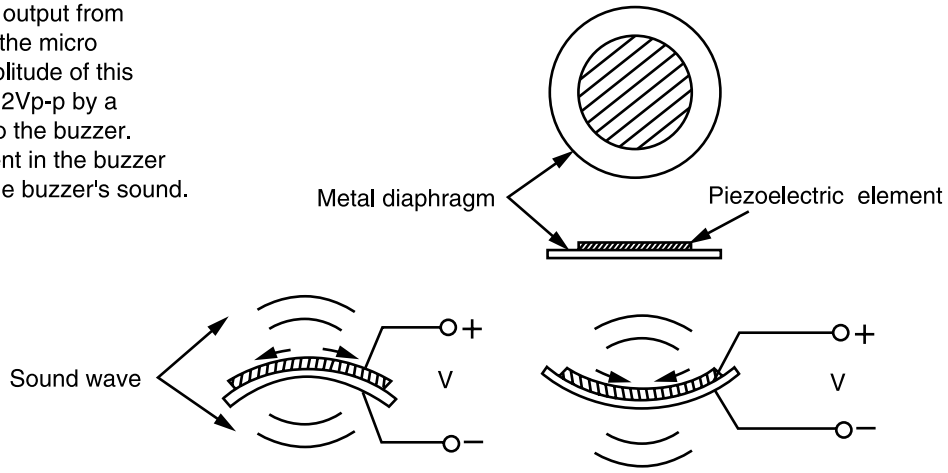


Fig.7-2 Buzzer Operation

8. Receive Circuit

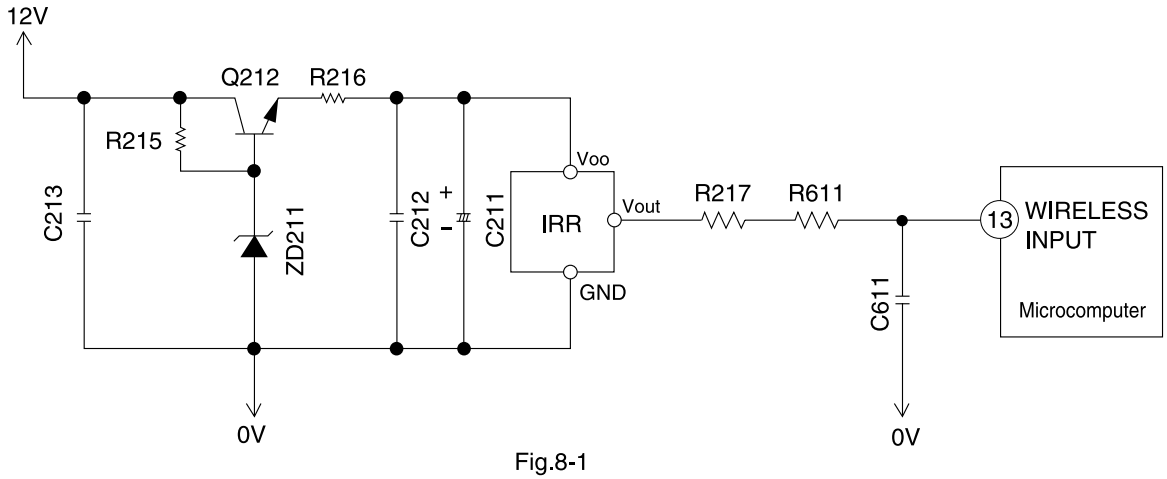


Fig.8-1

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

9. Initial Setting Circuit (IC401)

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

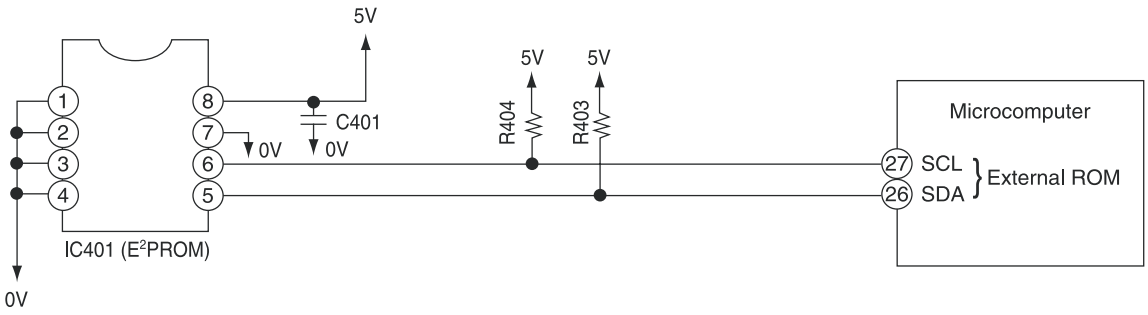


Fig. 9-1

10. Temporary Switch Circuit

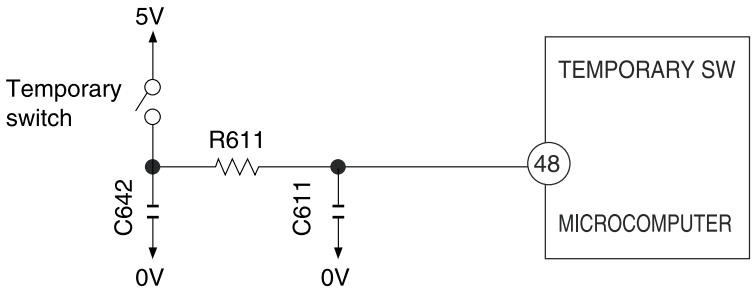


Fig. 10-1

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

SERVICE CALL Q&A

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

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

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

DEHUMIDIFYING MODE

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

A1 Normal sound when refrigerant flows in pipe.

Q2 Compressor occasionally does not operate during dehumidifying.

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

Q3 Cold air comes out during a dehumidifying operation.

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

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

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

HEATING MODE

Q1 The circulation stops occasionally during Heating mode.

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

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

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

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

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

AUTO FRESH DEFROSTING

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

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

AUTO OPERATION

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

A1 At this point fan speed is automatic.

Q2 How is the automatic operation mode determined?

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

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

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

NICE TEMPERATURE RESERVATION

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

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

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

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

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

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

AT STARTING OPERATION

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

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

Q2 When the heating operation is started, the indoor fan does not start immediately.

A2 This is because the preheating device is working. It will not start to drive the fan until the refrigerating cycle warms up and warm air blows. Wait for a while.

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

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

OTHERS

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

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

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

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

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

Q3 Noise from the outdoor unit occasionally changes.

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

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

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

Q5 Air does not flow immediately after operation is started.

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

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

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

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

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

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

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

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

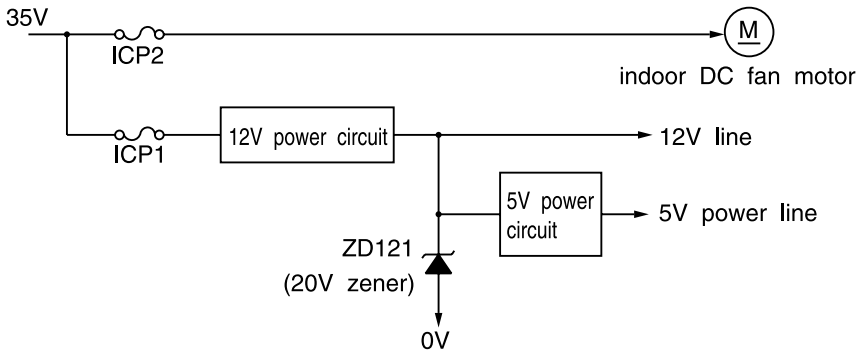
A9 Check to see if warm (cool) air is being short-circuited behind the lattice door. A short-circuit is likely to occur when the deflector position is not appropriate, the lattice does not have a big enough opening, and/or the unit is installed in the inner part. Install the unit as near the lattice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

[Other Caution]

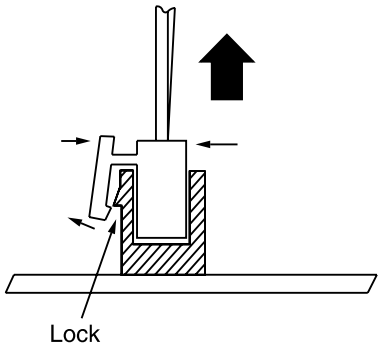
1.Cautions for ICP (IC protector)

(1) Be careful not to short-circuit during servicing.
→If short-circuited, ICP will instantaneously open.

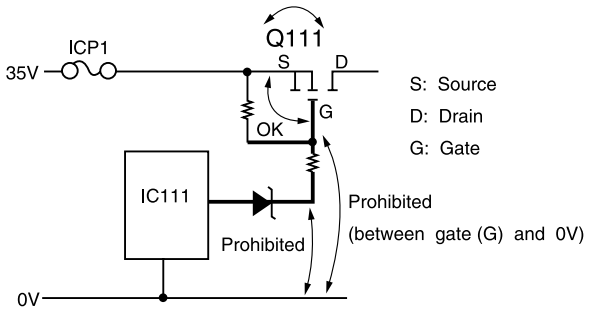
(2) If ICP Opens, remove cause, and then replace ICP.
→If repair is incomplete, ICP may open again.



2. CN3 (Power), CN10 (Fan Motor), CN13 (Temporary switch-P.W.B.) and CN4 (Indicating P.W.B.) are connectors with lock mechanism: Release lock with finger before disconnecting.



3. Do not touch the following parts during voltage and waveform check; ICP1 may be blown or Q111 may be damaged:



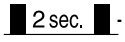
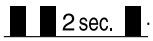
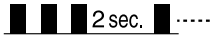
● Q111 is MOS-FET and its gate terminal is a high input resistor, If tester probe, etc, touches gate (G), gate drive circuit and 0V line, Q111 will be turned on continuously, over-current will flow, and ICP1 may be blown, causing trouble in Q111.
When switching waveform of Q111 is to be observed, measure gate (G) and drain (D) with source (S) as base point.

4. Do not connect/disconnect CN10 (fan motor connector) when power is being supplied to P.W.B.: Over-current will flow to fan motor and P.W.B. (microcomputer, IC, etc.) and cause malfunction. Always connect/ disconnect CN10 with power turned off.

TROUBLE SHOOTING WHEN THE TIMER LAMP BLINKS

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

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

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

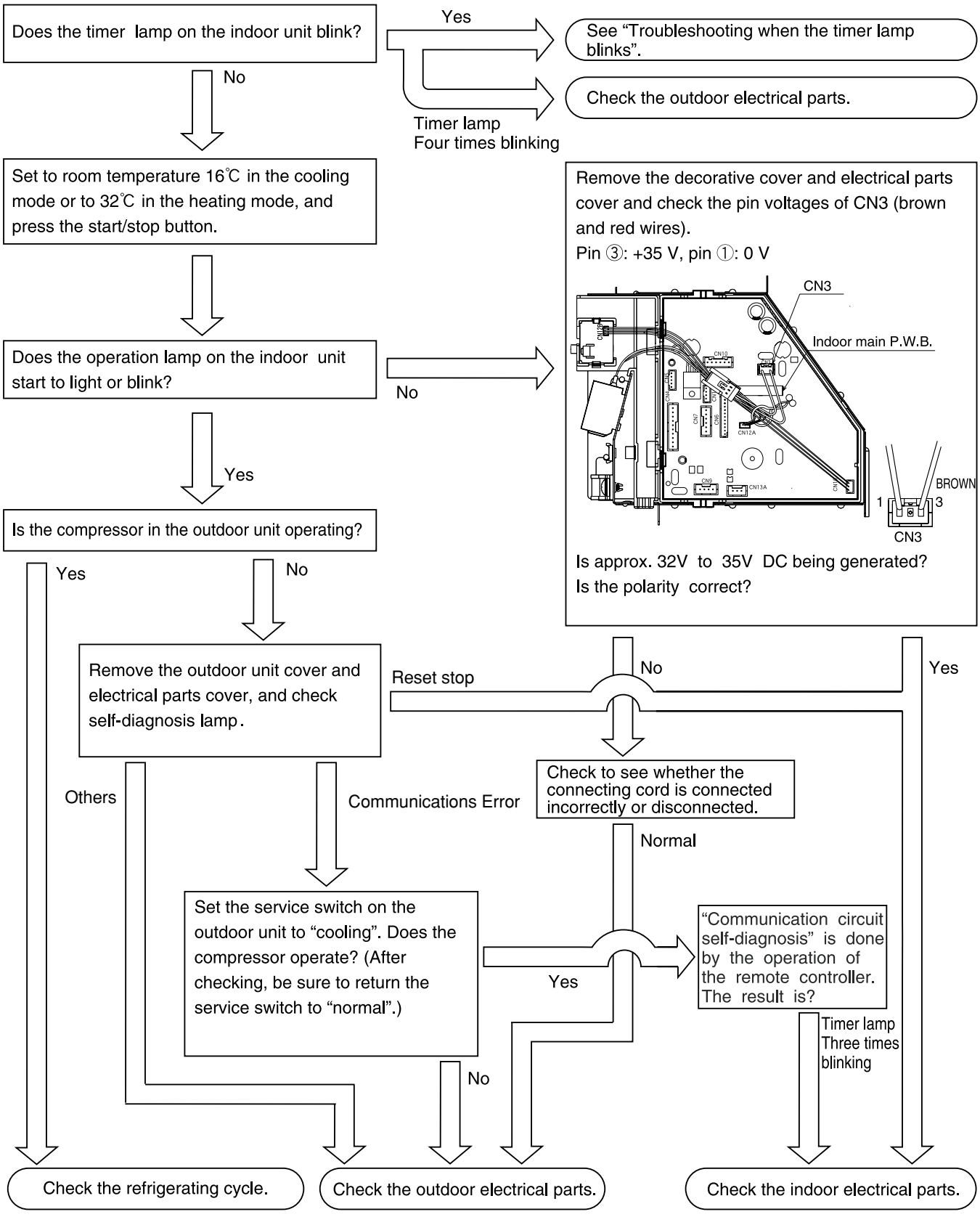
(Lights for 0.35 sec. at interval of 0.35 sec.)

〈Cautions〉

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

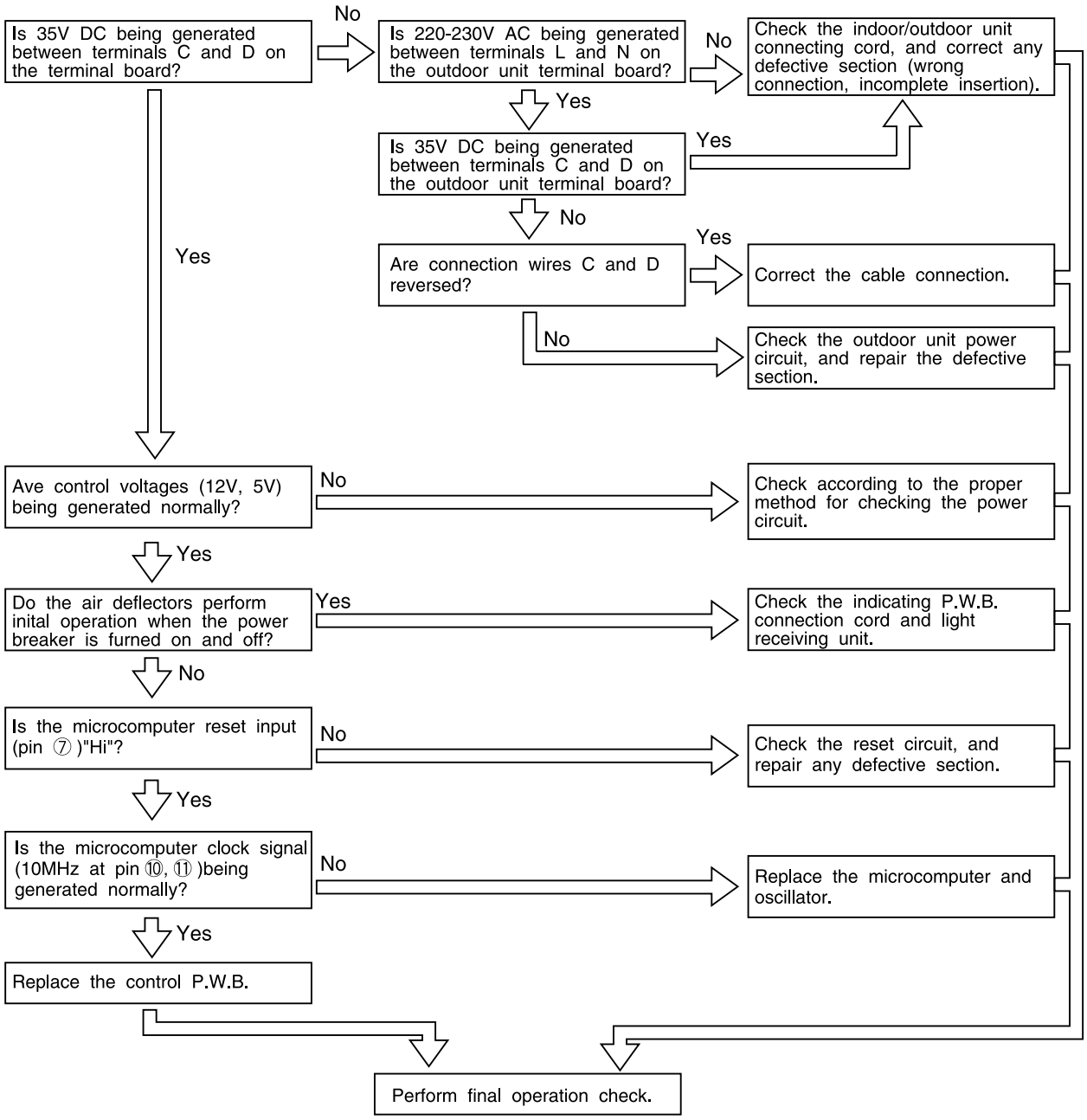
CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

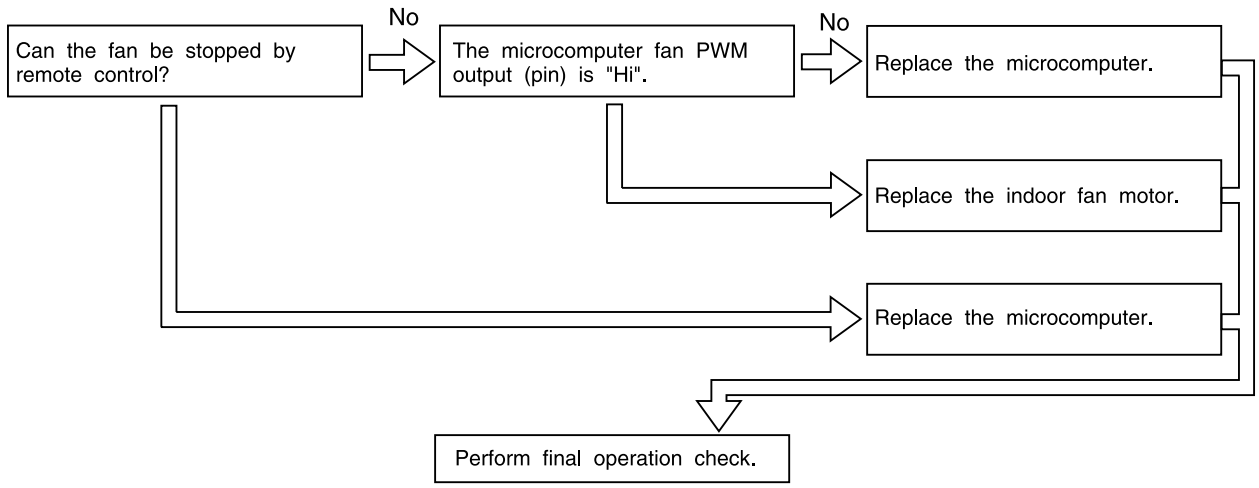


CHECKING THE INDOOR UNIT ELECTRICAL PARTS

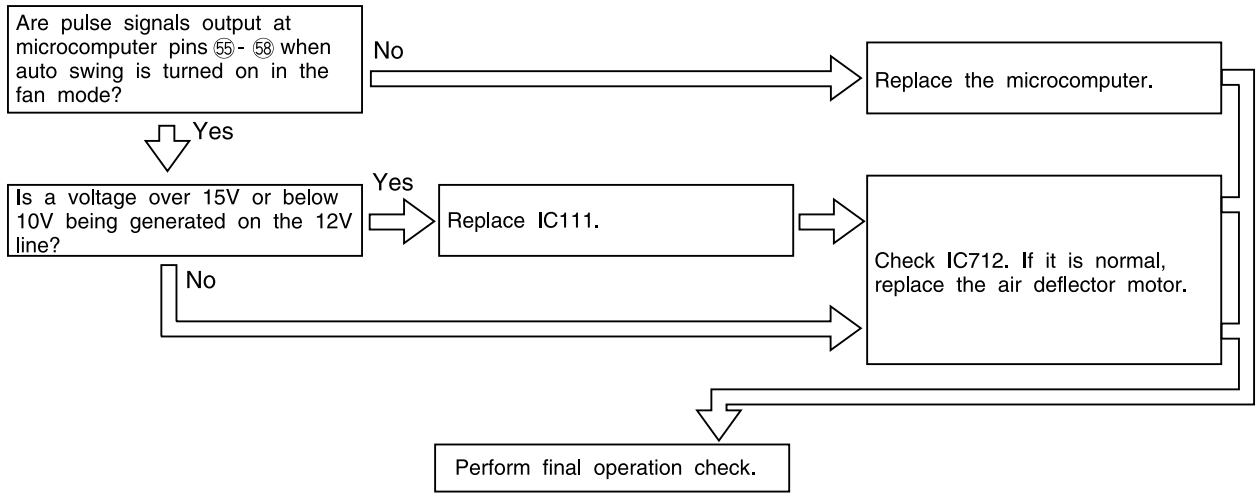
1. Power does not come on (no operation)



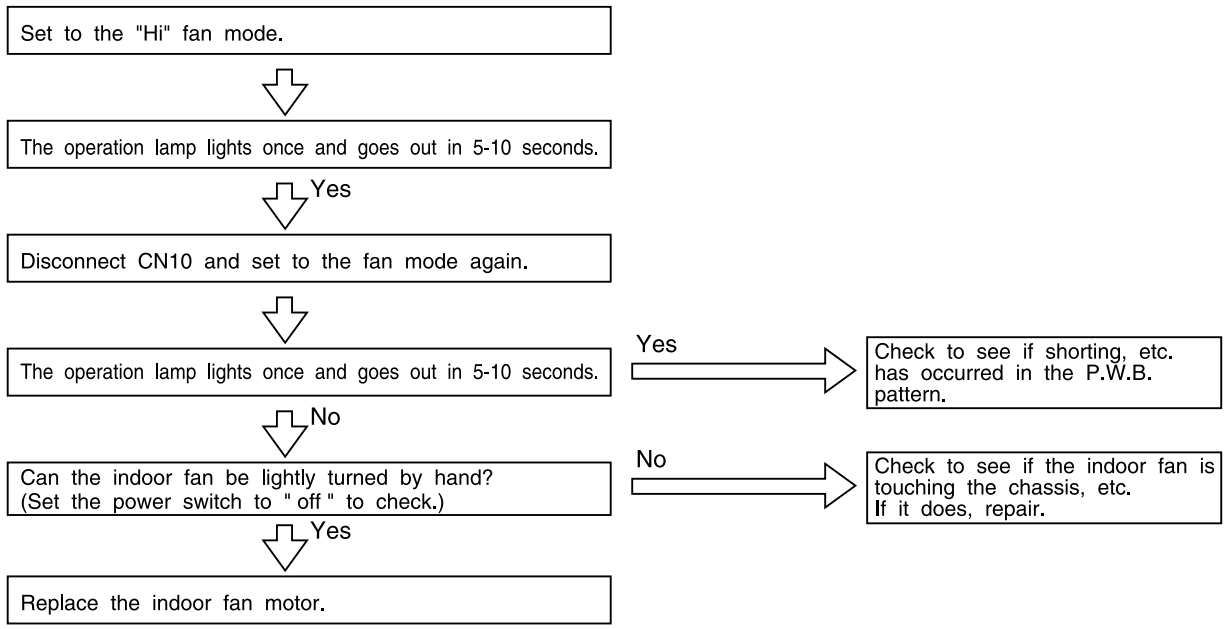
3. Indoor fan speed does not change (others are normal)



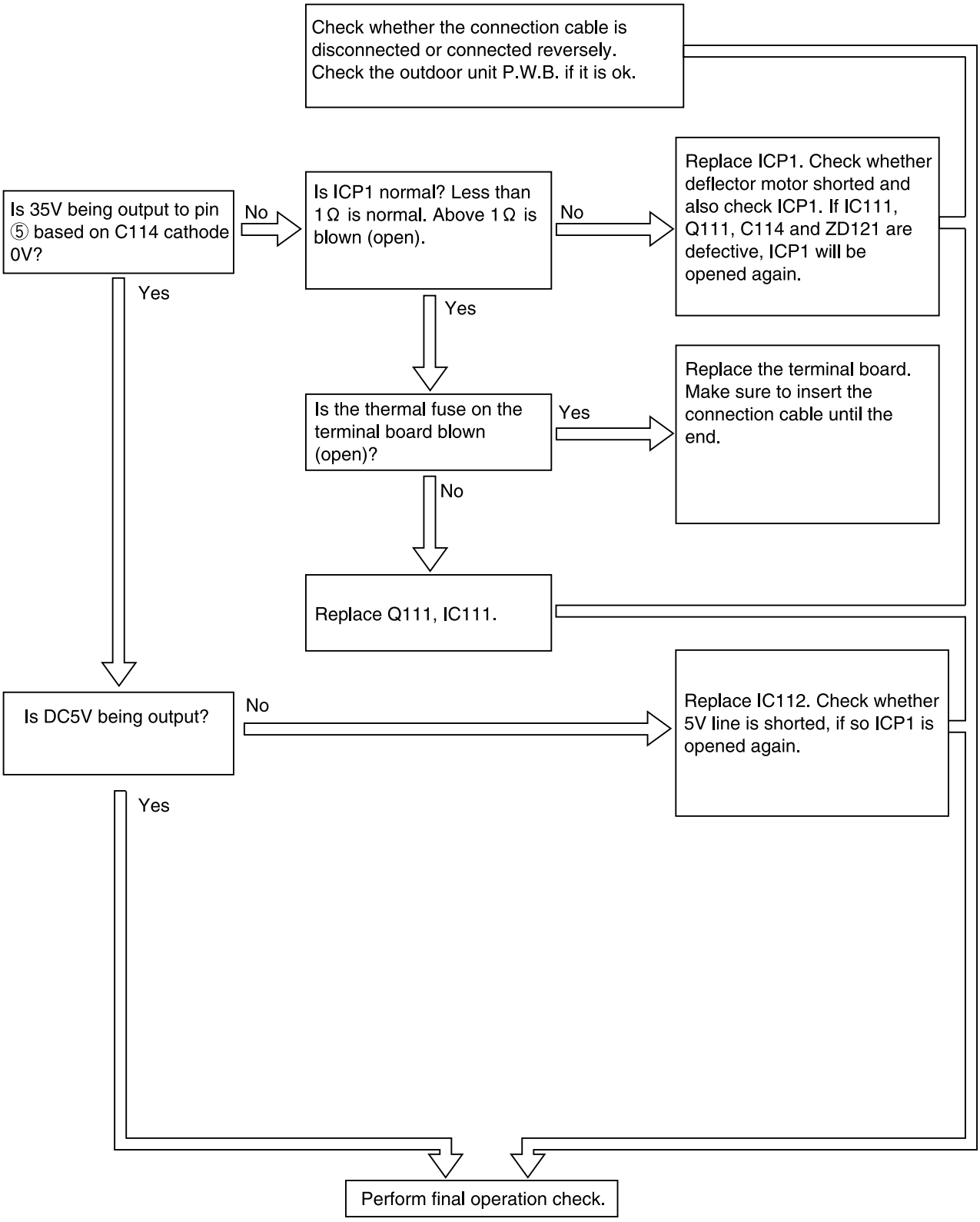
4. Air deflector does not move (others are normal)



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



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



※1 During the operation is being stopped, 12V line may change to 7V.

Self Diagnosis Indicating Function (Indoor Unit)

If the “Timer Lamp” of the indoor unit blinks, repair the malfunction referring to the table below.

1. How to count the number of blinking of the lamp

Blinking is repeated with intervals of 2 seconds.
Blinking speed is: Lit 0.35 second/OFF 0.35 second.

[Example of 5 times blinks]

2. When trying to restart the unit while the lamp is blinking, press the “START/STOP” button on the remote controller for 2 times. The first press turns the microcomputer to the resetting state. Then the second press starts the unit.

<Note>
(1) When the indoor unit does not work at all, check if there is an incorrect wire connection or breaking of the wire on F cable.
(2) When the interface circuit is at fault from the time the power is switched ON, no indication by lamp blinking is made on the indoor unit. To diagnose the interface circuit, use the self diagnosis function for the communication circuit or the self diagnosis memory function.
(3) “Outdoor unit forced operation” is not stored in the self diagnosis memory.

Blinking lamp	Number of blinking	Self diagnosis	Reason for the detection of malfunction	Remarks
Timer lamp	1	Malfunction of reversing valve	Heat exchange temperature of the indoor unit during heating operation is too low, or heat exchange temperature of the indoor unit during cooling operation is too high.	
	2	Outdoor unit forced operation	The unit is in operation using the service switch on the outdoor unit.	
	3	Indoor/outdoor unit interface defective	Communication from the outdoor unit was interrupted.	
	4	Outdoor defective indication	Outdoor unit electrical components defective.	
	9	Abnormality on indoor unit sensor	Wire breakage or short circuit occurred on the indoor thermistor.	
	10	Abnormality on DC fan motor rotation	An upper indoor fan motor is locked.	
	13	IC401 defective	Indoor unit EEPROM cannot be read.	

Self Diagnosis Memory Function

Defective modes stored in the non-volatile memory of the indoor unit are re-indicated by the remote controller operation. This is useful to check the defective mode when switching OFF the power or restarting the unit operation without checking the number of blinking of the defective indication lamp. (The defective mode which occurred the last is memorized.)
Defective modes of which occurrence frequency is too low to indicate on the indoor unit are also stored in the memory, thus defective phenomenon which was not checked at the visit can be found by clearing the memory and rechecking the memory contents later on.

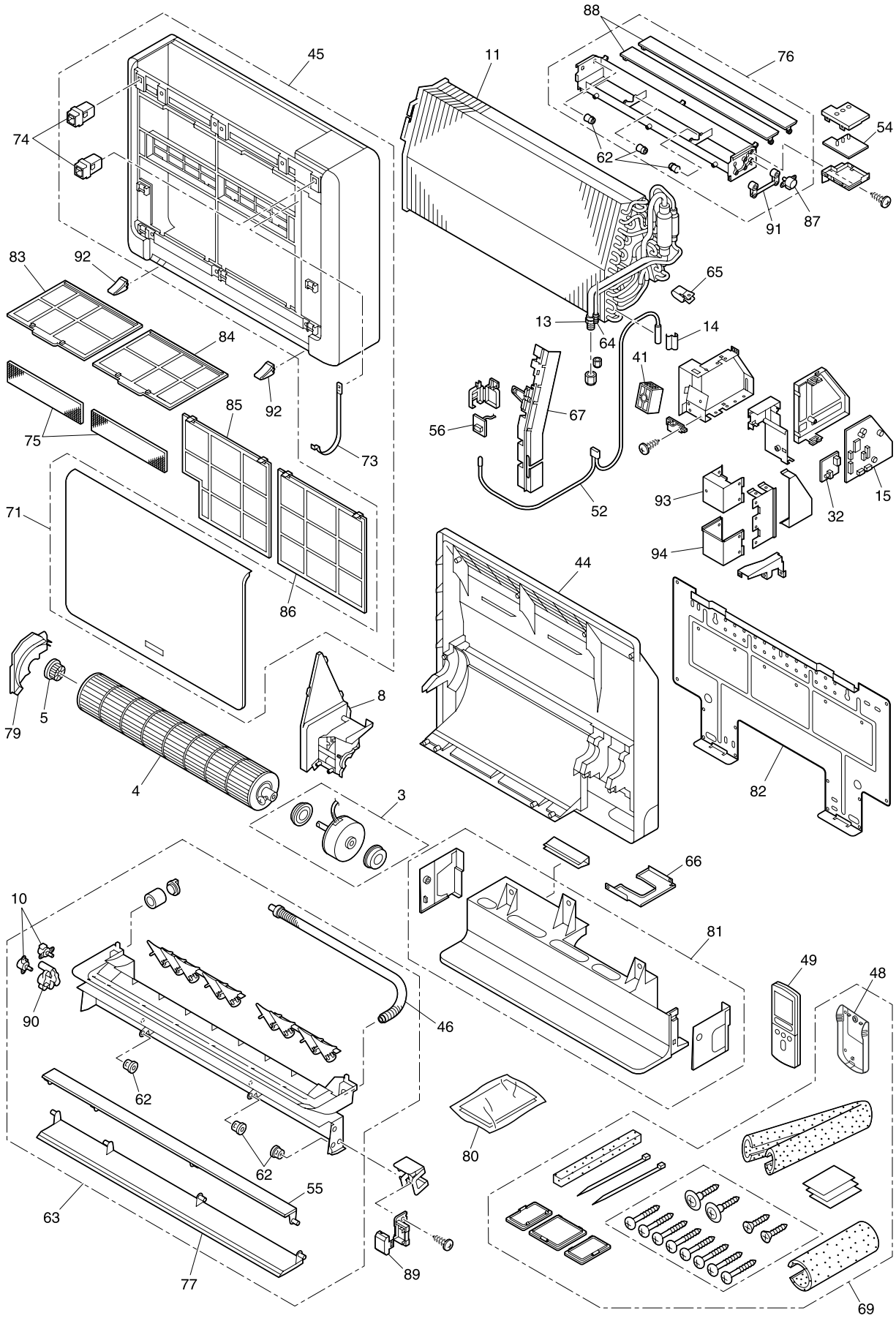
Re-indication method for defective mode .
1. Turn the circuit breaker OFF and set the remote controller STOP position. (No indication status.)
2. Turn the circuit breaker ON.
3. Set the remote controller COOL, and to be set 32℃ and press the [⏻] button while pressing the [∧] of temperature buttons. ⇨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

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

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

PARTS LIST AND DIAGRAM

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8



MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

NO.	PARTS NO.		Q'TY/ UNIT	PARTS NAME
3	RAF-50FX8	901	1	FAN MOTOR 25W, 1.1kg
4	RAS-N22V	005	1	TANGENTIAL AIR FLOW FAN
5	RAS-E40V2	041	1	FAN SUPPORT ASSMBLY
8	RAF-50FX8	902	1	FAN MOTOR SUPPORT
10	RAS-E40V2	068	2	AUTO SWEEP MOTOR
11	RAF-35QH8	901	1	HEAT EXCHANGER ASSEMBLY 2.5 kW, 3.5 kW
	RAF-50QH8	901	1	HEAT EXCHANGER ASSEMBLY 5.0 kW
13	RAF-50NH5	952	1	UNION (4)
	RAS-N22V	806	1	UNION (3)
14	ATE-0972B	904	1	BULB SUPPORT
15	RAF-25QH8	901	1	P.W.B. (CONTROL)
	RAF-35QH8	902	1	P.W.B. (CONTROL)
	RAF-50QH8	902	1	P.W.B. (CONTROL)
32	RAF-50FX8	905	1	P.W.B. (SWTICH)
41	RAF-50FX8	906	1	TERMINAL BOARD (2P)
44	RAF-50FX8	907	1	CABINET (W)
	RAF-50FX8	908	1	CABINET (B)
45	RAF-50FX8	909	1	FRONT COVER ASSEMBLY (W)
	RAF-50FX8	910	1	FRONT COVER ASSEMBLY (B)
46	RAF-50FX8	911	1	DRAIN HOSE
48	RAD-35NH5	967	1	REMOTE CONTROL SUPPORT
49	RAF-50FX8	912	1	REMOTE CONTROL ASSEMBLY
52	RAS-E40V2	030	1	THERMISTOR ASSEMBLY
54	RAF-50FX8	913	1	P.W.B. (INDICATION)
55	RAF-50FX8	914	1	WIDE DEFLECTOR 2
56	RAS-S40W2	028	1	SENSOR (HUMIDITIY)
62	RAF-50W2	038	6	DEFLECTOR SUPPORT
63	RAF-50FX8	915	1	DISCHARGE FRAME (W)
	RAF-50FX8	916	1	DISCHARGE FRAME (B)
64	RAS-5202CP	962	1	UNION (2)
65	RAF-50FX8	917	1	PIPE BAND
66	RAF-50FX8	918	1	RAT PREVENTION COVER
67	RAF-50FX8	919	1	PIPE COVER
69	RAF-50FX8	920	1	ACCESSARIES ASSEMBLY (W)
	RAF-50FX8	921	1	ACCESSARIES ASSEMBLY (B)

MODEL RAF-25QH8/RAF-35QH8/RAF-50QH8

NO.	PARTS NO.		Q'TY/ UNIT	PARTS NAME
71	RAF-50FX8	922	1	FRONT PANEL (W)
	RAF-50FX8	923	1	FRONT PANEL (B)
73	ATI-0972B	983	1	BAND (FOR FRONT PANEL)
74	RAF-50W2	052	2	LATCH 1 (FRONT COVER)
75	RAF-50FX8	924	2	AIR CLEAN FILTER
76	RAF-50FX8	925	1	SUCTION FRAME (W)
	RAF-50FX8	926	1	SUCTION FRAME (B)
77	RAF-50FX8	927	1	WIDE DEFLECTOR 1 (W)
	RAF-50FX8	928	1	WIDE DEFLECTOR 1 (B)
79	RAF-50FX8	947	1	FAN COVER
80	RAF-25QH8	902	1	LABEL ASSEMBLY
	RAF-35QH8	903	1	LABEL ASSEMBLY
	RAF-50QH8	903	1	LABEL ASSEMBLY
81	RAF-50FX8	930	1	STAND (W)
	RAF-50FX8	931	1	STAND (B)
82	RAF-50FX8	932	1	MOUNTING PLATE
83	RAF-50FX8	933	1	FILTER (UPPER) (LEFT)
84	RAF-50FX8	934	1	FILTER (UPPER) (RIGHT)
85	RAF-50FX8	935	1	FILTER (LEFT)
86	RAF-50FX8	936	1	FILTER (RIGHT)
87	RAF-50FX8	937	1	SUCTION DEFLECTOR MOTOR
88	RAF-50FX8	938	2	DEFLECTOR (UPPER) (W)
	RAF-50FX8	939	2	DEFLECTOR (UPPER) (B)
89	RAF-50FX8	940	1	LIGHT RECEIVING UNIT
90	RAF-50FX8	941	1	GEAR MOTOR
91	RAF-50FX8	942	1	CONNECTING ROD
92	RAF-50FX8	943	2	SCREW COVER (W)
	RAF-50FX8	944	2	SCREW COVER (B)
93	RAF-50FX8	945	1	P.W.B. COVER (UPPER)
94	RAF-50FX8	946	1	P.W.B. COVER (LOWER)

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