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PM | NO. 0411E

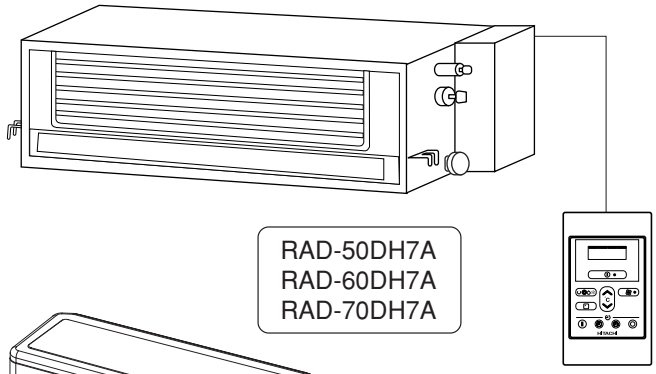
SERVICE MANUAL

TECHNICAL INFORMATION

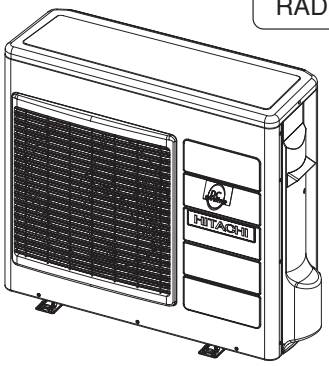
RAD-50DH7A/RAC-50DH7
RAD-60DH7A/RAC-60DH7
RAD-70DH7A/RAC-70DH7

REFER TO THE FOUNDATION MANUAL

FOR SERVICE PERSONNEL ONLY



RAD-50DH7A
RAD-60DH7A
RAD-70DH7A



RAC-50DH7
RAC-60DH7
RAC-70DH7

CONTENTS

SPECIFICATIONS

TYPE			(DUCTING TYPE)					
			INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL			RAD-50DH7A	RAC-50DH7	RAD-60DH7A	RAC-60DH7	RAD-70DH7A	RAC-70DH7
POWER SOURCE			1 Ø, 50 Hz, 220-240V		1 Ø, 50 Hz, 220-240V		1 Ø, 50 Hz, 220-240V	
COOLING	TOTAL INPUT	(W)	1,400 (200 ~ 2,100)		1,870 (200 ~ 2,500)		2,530 (200 ~ 2,920)	
	TOTAL AMPERES	(A)	6.40 ~ 5.90		8.55 ~ 7.90		11.60 ~ 10.70	
	CAPACITY	(kW)	5.00 (0.90 ~ 6.00)		6.00 (0.90 ~ 7.00)		7.10 (0.90 ~ 8.00)	
		(B.T.U./h)	17,070 (3,073 ~ 20,490)		20,490 (3,073 ~ 23,901)		24,240 (3,073 ~ 27,310)	
HEATING	TOTAL INPUT	(W)	1,590 (200 ~ 2,200)		2,130 (200 ~ 2,600)		2,340 (200 ~ 3,100)	
	TOTAL AMPERES	(A)	7.30 ~ 6.70		9.75 ~ 9.00		10.70 ~ 9.80	
	CAPACITY	(kW)	6.00 (0.90 ~ 7.00)		7.30 (0.90 ~ 8.00)		8.00 (0.90 ~ 9.00)	
		(B.T.U./h)	20,490 (3,073 ~ 23,901)		24,920 (3,073 ~ 27,315)		27,310 (3,073 ~ 30,730)	
DIMENSIONS (mm)		W	900	850	900	850	900	850
		H	270	800	270	800	270	800
		D	720	298	720	298	720	298
NET WEIGHT		(kg)	35	55	35	55	35	55

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

APRIL 2008 Refrigeration & Air-Conditioning Division

WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

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

2. Object parts

   (1) Micro computer
   (2) Integrated circuits (IC)
   (3) Field-effect transistors (FET)
   (4) P.C. boards or the like on which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

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

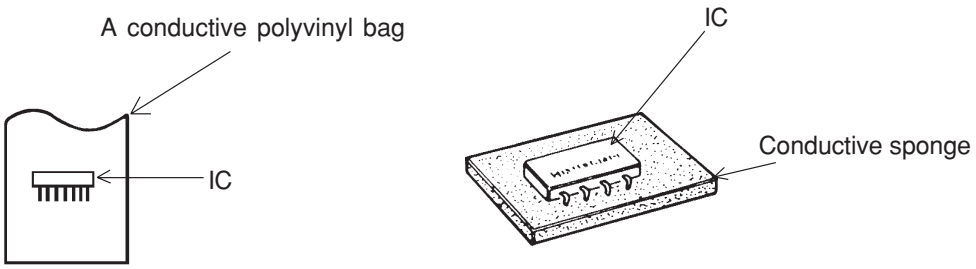


Fig. 1. Conductive Container

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

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

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

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

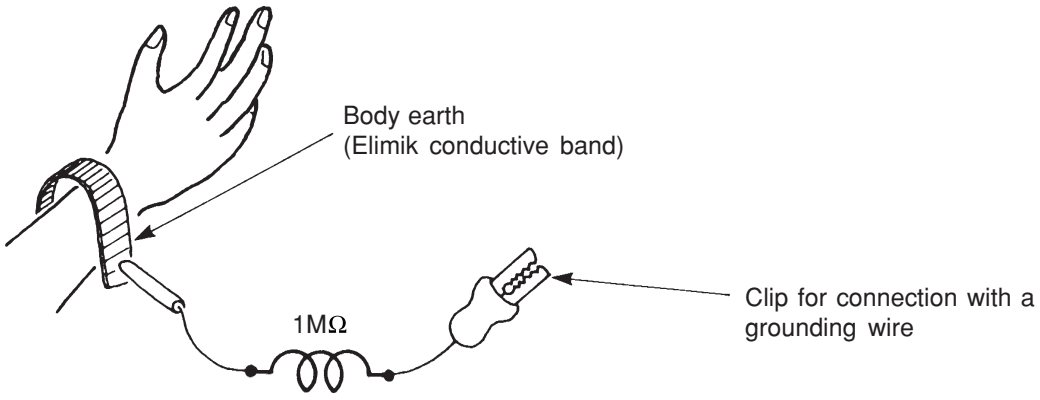


Fig. 2. Body Earth

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

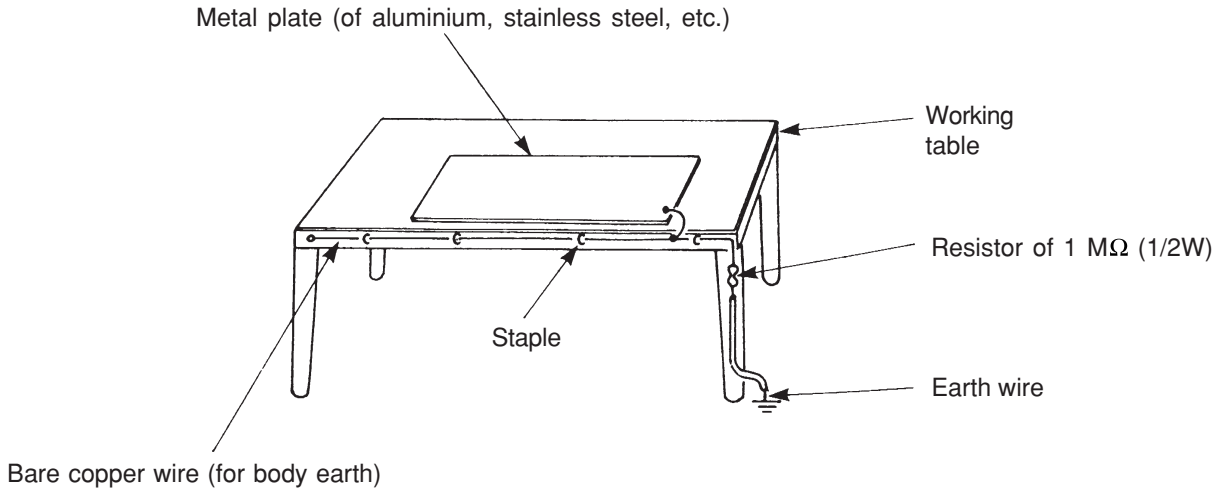


Fig. 3. Grounding of the working table

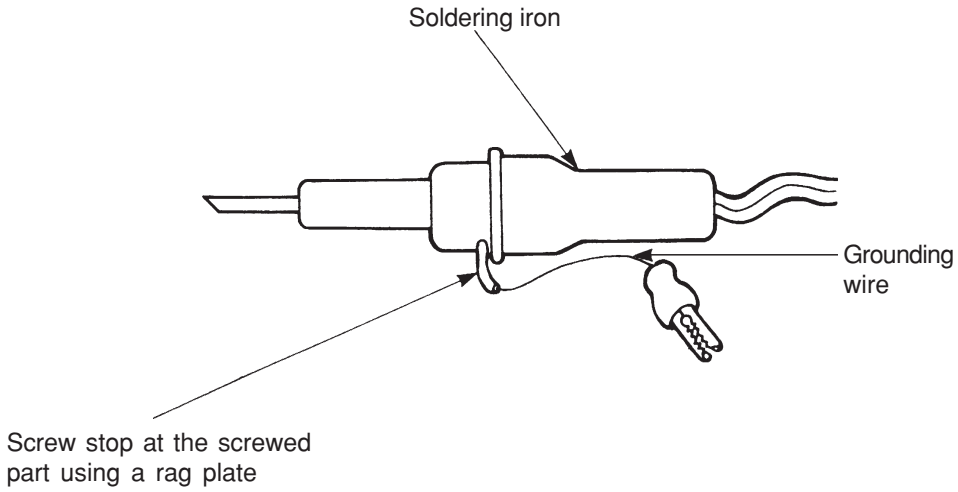


Fig. 4. Grounding a soldering iron

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

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

⚠ CAUTION

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

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

3. In the event of power failure, the airconditioner will restart automatically in the previously selected mode once the power is restored. In the event of power failure during TIMER operation, the timer will be reset and the unit will begin or stop operating under a new timer setting.

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

5. This room air conditioner should not be used at the cooling operation when the outside temperature is below -10°C (50°F).

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

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

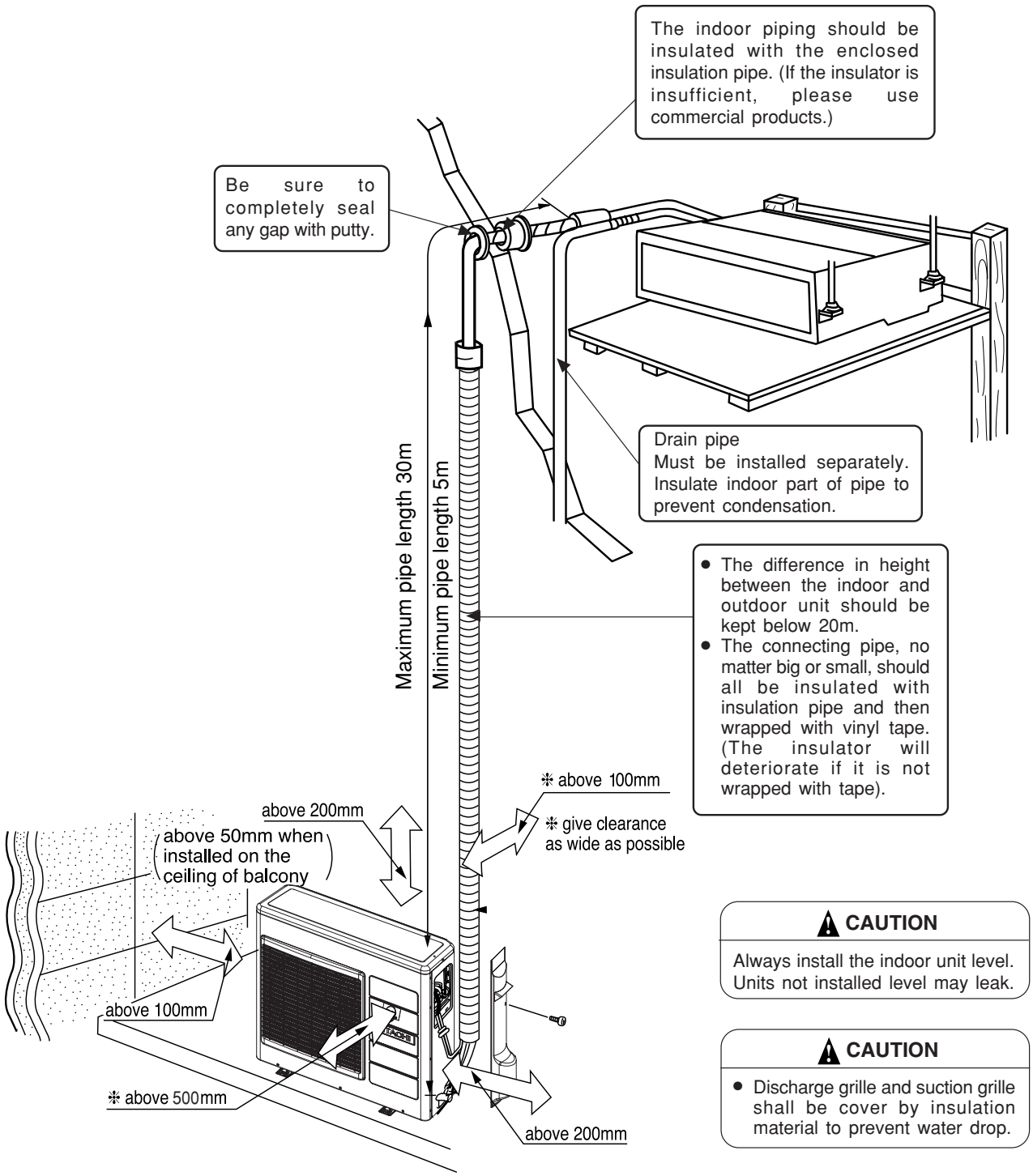
SPECIFICATIONS

MODEL		RAD-50DH7A RAD-60DH7A RAD-70DH7A	RAC-50DH7/RAC-60DH7/RAC-70DH7
FAN MOTOR		56 W	80 W
FAN MOTOR CAPACITOR		NO	NO
FAN MOTOR PROTECTOR		NO	NO
COMPRESSOR		–	JU1015D4
COMPRESSOR MOTOR CAPACITOR		NO	NO
OVERLOAD PROTECTOR		NO	NO
OVERHEAT PROTECTOR		NO	YES
FUSE (MICRO COMPUTER CIRCUIT)		3.15A	NO
POWER RELAY		G4A	NO
POWER SWITCH		NO	NO
TEMPORARY SWITCH		NO	NO
SERVICE SWITCH		NO	NO
TRANSFORMER		NO	NO
VARISTOR		416NR	NO
NOISE SUPPRESSOR		NO	NO
THERMOSTAT		YES(IC)	YES(IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO
		30 A TIME DELAY FUSE	
REFRIGERANT CHARGING VOLUME (Refrigerant R410A)	UNIT	----------	❄ 1800g
	PIPES (MAX. 30m) (MIN. 5m)		

Figure showing the installation of Indoor and Outdoor unit

⚠ CAUTION

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



⚠ CAUTION

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

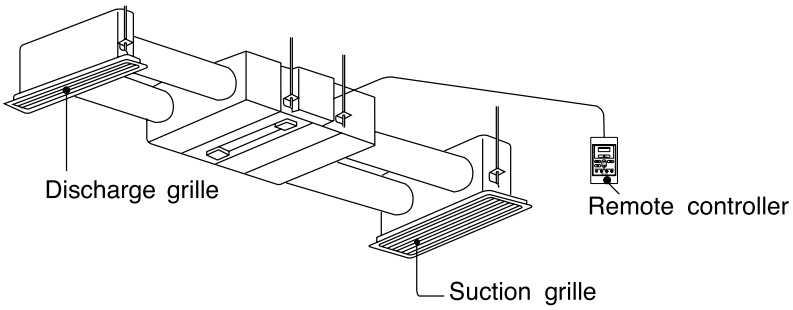
⚠ CAUTION

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

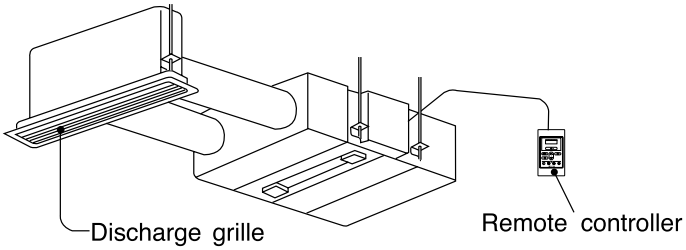
NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT

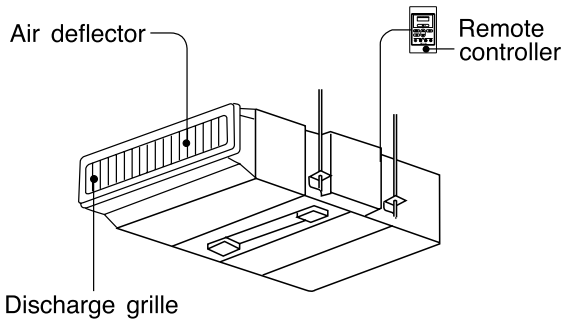
FULL DUCT



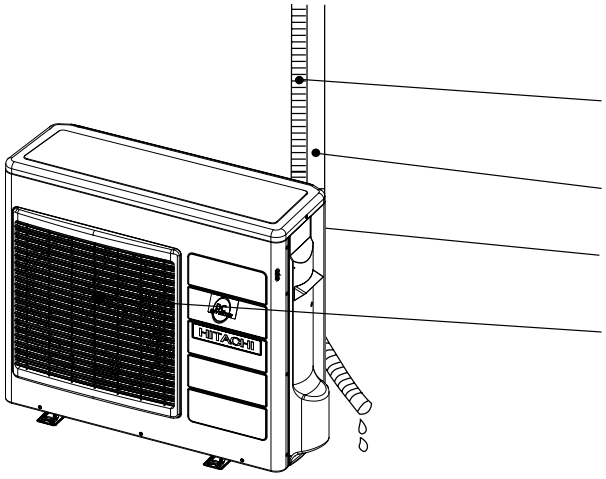
SEMI DUCT



NON DUCT



OUTDOOR UNIT



DRAIN PIPE
Condensed water drain to outside.

CONNECTING CORD

AIR INLET (BACK, LEFT SIDE)

AIR OUTLET

MODEL NAME AND DIMENSIONS

MODEL	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)
RAD-50DH7A / RAD-60DH7A / RAD-70DH7A	900	270	720
RAC-50DH7 / RAC-60DH7 / RAC-70DH7	850	800	298

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.

Note

- Avoid to use the room air conditioner for cooling operation when the outside temperature is below 21°C (70°F).
  The recommended maximum and minimum operating temperatures of the hot and cold sides should be as below:

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

MEMO

SAFETY PRECAUTION

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

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

- Please keep this manual after reading.

PRECAUTIONS DURING INSTALLATION

⚠ WARNING

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

- Please ask your sales agent or qualified technician for the installation of your unit. Water leakage, short circuit or fire may occur if you install the unit by yourself.
- Please use earth line.
  Do not place the earth line near water or gas pipes, lightning-conductor, or the earth line of telephone. Improper installation of earth line may cause electric shock.

⚠ CAUTION

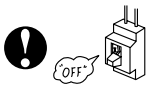
- A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.
- Do not install near location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it.

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

PRECAUTIONS DURING SHIFTING OR MAINTENANCE

⚠ WARNING

- Should abnormal situation arises (like burning smell), please stop operating the unit and turn off the circuit breaker. Contact your agent. Fault, short circuit or fire may occur if you continue to operate the unit under abnormal situation.



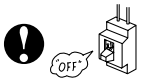
- Please contact your agent for maintenance. Improper self maintenance may cause electric shock and fire.
- Please contact your agent if you need to remove and reinstall the unit. Electric shock or fire may occur if you remove and reinstall the unit yourself improperly.
- If the supply cord is damaged,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

PRECAUTIONS DURING OPERATION

⚠ WARNING

- Avoid an extended period of direct air flow for your health.

- Do not insert a finger, a rod or other objects into the air outlet or inlet. As the fan is rotating at a high speed, it will cause injury. Before cleaning, be sure to stop the operation and turn the breaker OFF.
- Do not use any conductor as fuse wire, this could cause fatal accident.

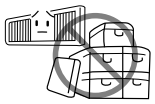


- During thunder storm, disconnect and turn off the circuit breaker.

PRECAUTIONS DURING OPERATION

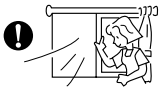
⚠ CAUTION

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



- Do not attempt to operate the unit with wet hands, this could cause fatal accident.

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

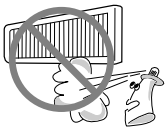


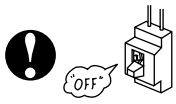
- Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.

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

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

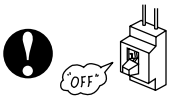
- Do not use any aerosol or hair sprays near the indoor unit. This chemical can adhere on heat exchanger fin and blocked the evaporation water flow to drain pan. The water will drop on tangential fan and cause water splashing out from indoor unit.





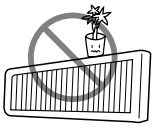
- Please switch off the unit and turn off the circuit breaker during cleaning, the high-speed fan inside the unit may cause danger.

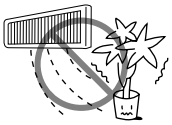
- Turn off the circuit breaker if the unit is not to be operated for a long period.



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

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





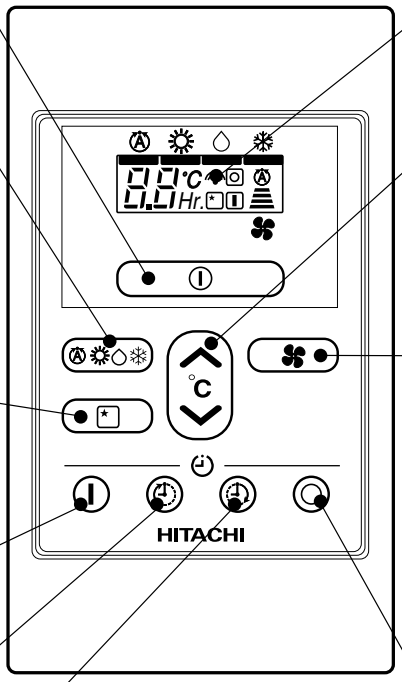
- Do not place plants directly under the air flow as it is bad for the plants.

- When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, do not operate under such condition for a long time.
- If the amount of heat in the room is above the cooling or heating capability of the unit (for example: more people entering the room, using heating equipments and etc.), the preset room temperature cannot be achieved.

- This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely.
- Young children should be supervised to ensure that they do not play with the appliance.

NAMES AND FUNCTIONS OF REMOTE CONTROL UNIT

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



START/STOP Button

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

FUNCTION Button

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

SLEEP Button

Use this button to set the sleep timer. (☞ Page 16)

Reserve Button

Timer setting reservation.

OFF TIMER Button

Select the turn OFF time.

ON TIMER Button

Select the turn ON time.

Transmission Sign

The transmission sign blinks when a signal has been send.

TEMPERATURE Button

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

FAN SPEED Button

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

CANCEL Button

Cancel timer reservation.

Precautions for Use

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

VARIOUS FUNCTIONS

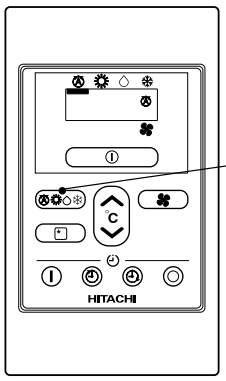
■ Auto Restart Control

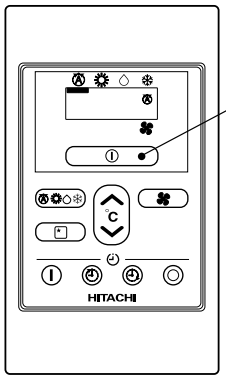
- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode.
  (As the operation is not stopped by remote controller.)
- If you intend not to continue the operation when the power is resumed, switch off the power supply.
  When you switch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

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

AUTOMATIC OPERATION

The device will automatically determine the mode of operation, HEAT, COOL or DEHUMIDIFY depending on the current room temperature. The selected mode of operation will change when the room temperature varies.





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

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

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

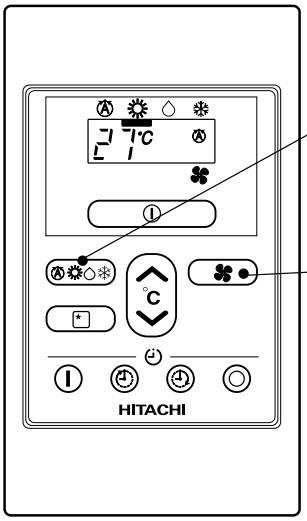
■ As the settings are stored in memory in the remote controller, you only have to press the ⏻ (START/STOP) button next time.

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

HEATING OPERATION

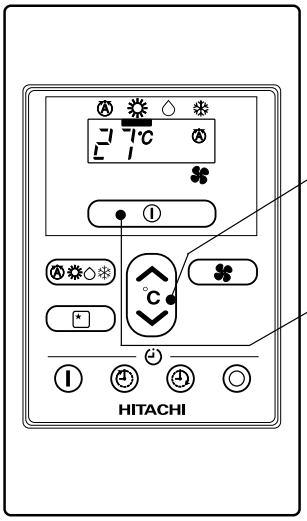
- Use the device for heating when the outdoor temperature is under 21°C.
  When it is too warm (over 21°C), the heating function may not work in order to protect the device.
- In order to keep reliability of the device, please use this device above -15°C of the outdoor temperature.



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 is HI at first and varies to MED automatically when the preset temperature has been reached.
- (HI) : Economical as the room will become warm quickly. But you may feel a chill at the beginning.
- (MED) : Fan speed slow.
- (LOW) : Fan speed slower.
- (SILENT) : Fan speed ultra slower.



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

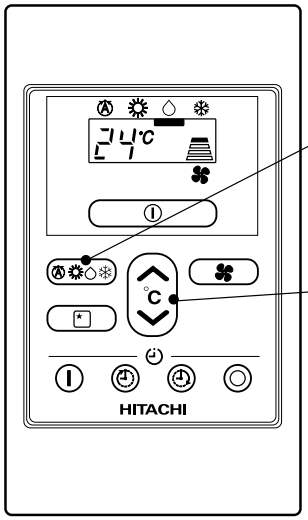
The temperature setting and the actual room temperature may vary somewhat depending on conditions.

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

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

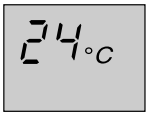
DEHUMIDIFYING OPERATION

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



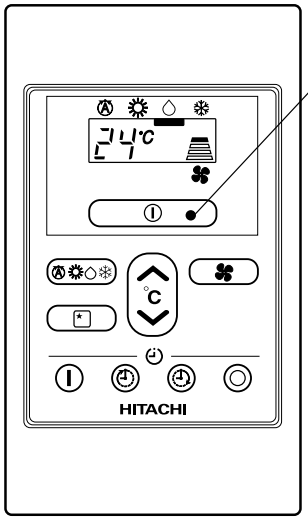
1 Press the FUNCTION selector so that the display indicates ♢ (DEHUMIDIFY).
The FAN SPEED is set at LOW or SILENT.

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



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

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



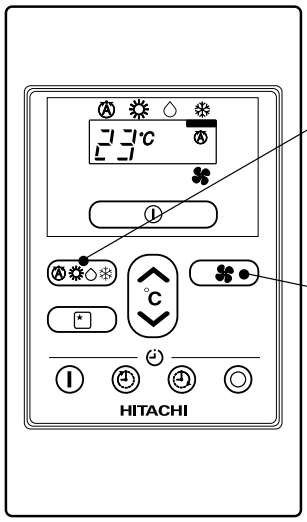
■ As the settings are stored in memory in the remote controller, you only have to press the ⏻ (START/STOP) button next time.

■ Dehumidifying Function

When the room temperature is higher than the temperature setting: The device will dehumidify the room, reducing the room temperature to the preset level.
When the room temperature is lower than the temperature setting: Dehumidifying will be performed at the temperature setting slightly lower than the current room temperature, regardless of the temperature setting. The function will stop (the indoor unit will stop emitting air) as soon as the room temperature becomes lower than the setting temperature.

COOLING OPERATION

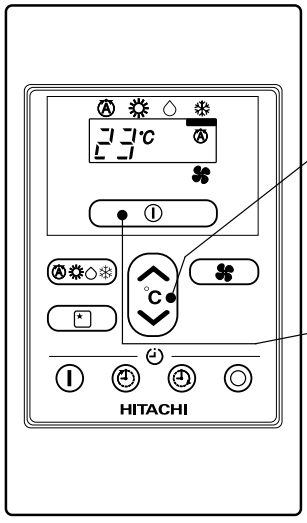
Use the device for cooling when the outdoor temperature is −10 ~ 43°C.
If indoor humidity is very high (80%), some dew may form on the air outlet grille of the indoor unit.



1 Press the 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) : Fan speed slow.
- (LOW) : Fan speed slower.
- (SILENT) : Fan speed ultra slower.



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

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

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

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

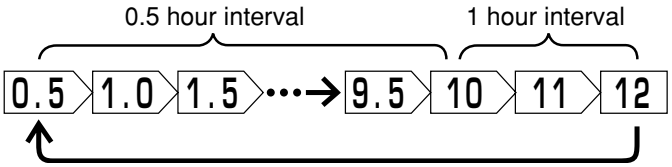
TIMER RESERVATION

■ ON Timer and OFF Timer are available.

OFF Timer Reservation

1 OFF TIME setting

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



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

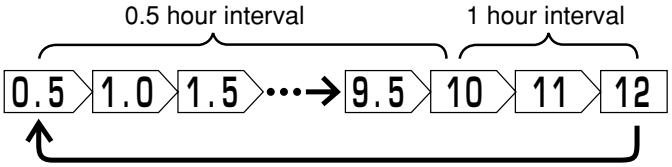
2 Press the (Reserve) button

- OFF TIMER reserved with a signal received sound "beep".
- The (OFF) Mark starts lighting instead of blinking.

ON Timer Reservation

1 ON TIME setting

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



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

2 Press the (Reserve) button

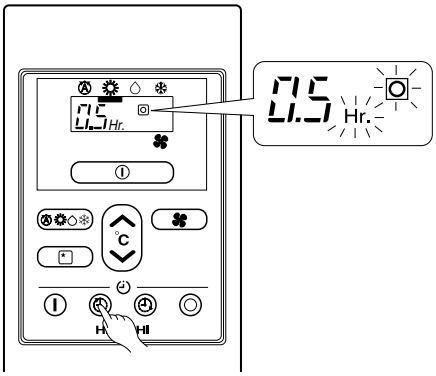
- ON TIMER reserved with a signal received sound "beep".
- The (ON) Mark starts lighting instead of blinking.

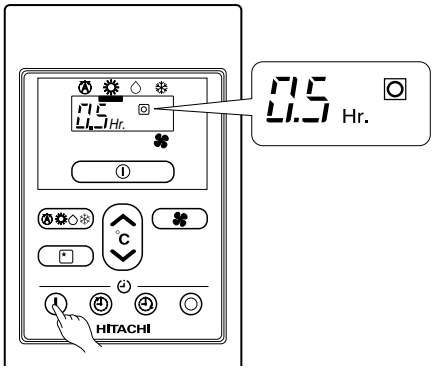
CANCELLATION of Timer Reservation

1 Press the (Cancel) button

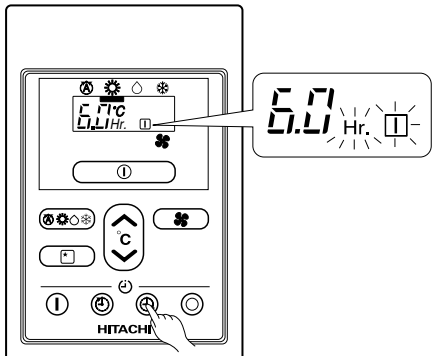
- As the time settings are stored in remote controller memory, you only have to press the (Reserve) button in order to use the same setting next time.

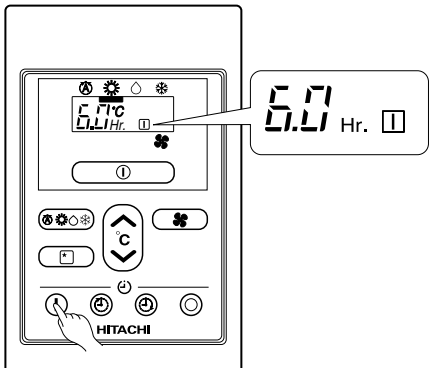
■ Operation stop at setting time



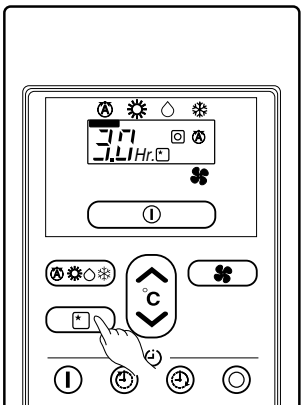


■ Operation will start for setting temperature at setting time (The starting time may different depend on the room temperature and set temperature).





HOW TO SET THE SLEEP TIMER



Example: Setting 3 hours sleep time.

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

Sleep Timer: The device will continue working for the designated number of hours and then turn off.
Press the SLEEP button, indoor unit will produce a beep.
The timer information will be displayed on the remote controller.

How to Cancel Reservation
Press the ○ (CANCEL) button. The ⏻ (RESERVED) sign goes out with a beep.

Explanation of the sleep timer

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

NOTE

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

CIRCUIT BREAKER

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

HOW TO USE THE AIR CONDITIONER EFFECTIVELY

1. **An average room temperature setting is probably the best for you as well as being economical.**
   - Excessive cooling or heating is not recommended for health reasons. High electricity bills may also result.
   - Close the curtains or blinds to prevent heat from flowing into or escaping the room as well as to make more effective use of electricity.

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

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

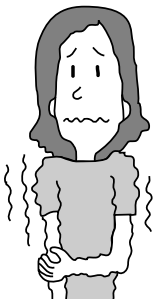
3. **Using the timer is recommended before going to sleep or going out.**

4. **The following must never be used for cleaning the indoor and outdoor units.**
   - Benzine, thinner and scrub can damage plastic surfaces or coating.
   - Hot water above 40°C can shrink the filter and deform plastic parts.

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

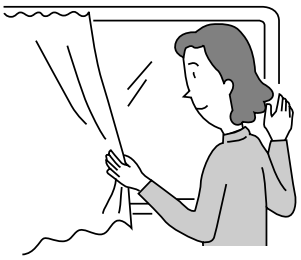
THE IDEAL WAYS OF OPERATION

Suitable Room Temperature



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

Install curtain or blinds



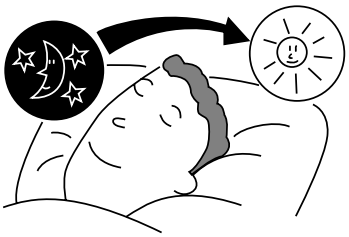
It is possible to reduce heat entering the room through windows.

Ventilation

⚠ Caution
Do not close the room for a long period of time. Occasionally open the door and windows to allow the entrance of fresh air.

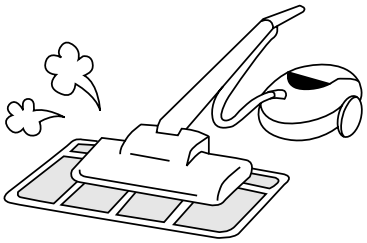
Effective Usage Of Timer

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



Do Not Forget To Clean The Air Filter

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

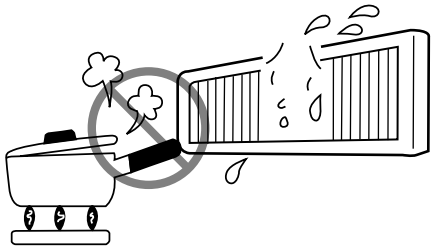


Please Adjust Suitable Temperature For Baby And Children

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

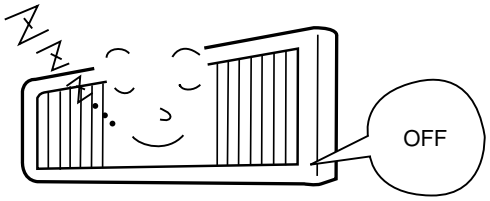
The Air Conditioner And The Heat Source In The Room

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



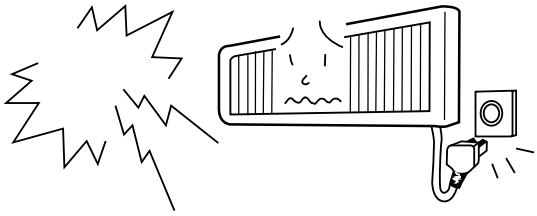
Not Operating For A Long Time

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



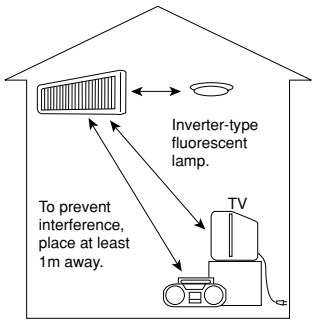
When Lightning Occurs

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



Interference From Electrical Products

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



MAINTENANCE

⚠ WARNING

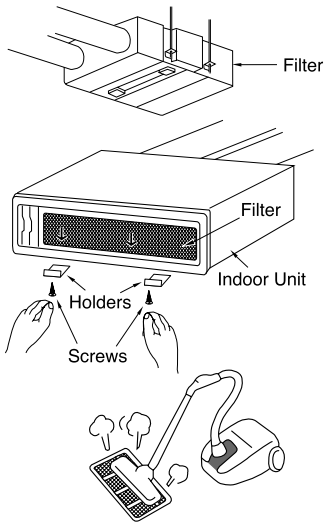
- Before cleaning, stop unit operation with the remote controller and turn off the circuit breaker.

⚠ 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

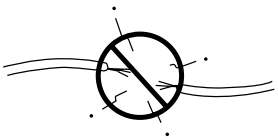
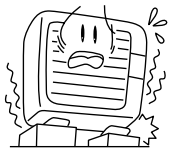
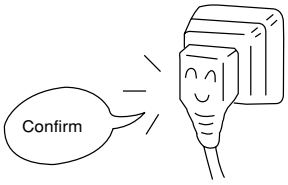
1. Loose the screw and release the filter holders. Pull the filter toward center to take it out from indoor unit (refer to diagram)
2. Remove dust from the filter using a vacuum cleaner. If there is too much dust, use neutral detergent. After using neutral detergent, wash with clean water and dry in the shade.
3. Install the filters. Slightly lift the suction grille and close as original state.

⚠ CAUTION

- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink.
- Do not operate the air conditioner with the filter removed. Dust may enter the air conditioner and cause trouble.

REGULAR INSPECTION

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

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

AFTER SALE SERVICE AND WARRANTY

WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING POINTS.

CONDITION	CHECK THE FOLLOWING POINTS
When it does not operate	● Is the fuse all right? ● Is the voltage extremely high or low? ● Is the circuit breaker “ON”?
When it does not cool well When it does not hot well	● Was the air filter cleaned? ● Does sunlight fall directly on the outdoor unit? ● Is the air flow of the outdoor unit obstructed? ● Are the doors or windows opened, or is there any source of heat in the room? ● Is the set temperature suitable?

Notes

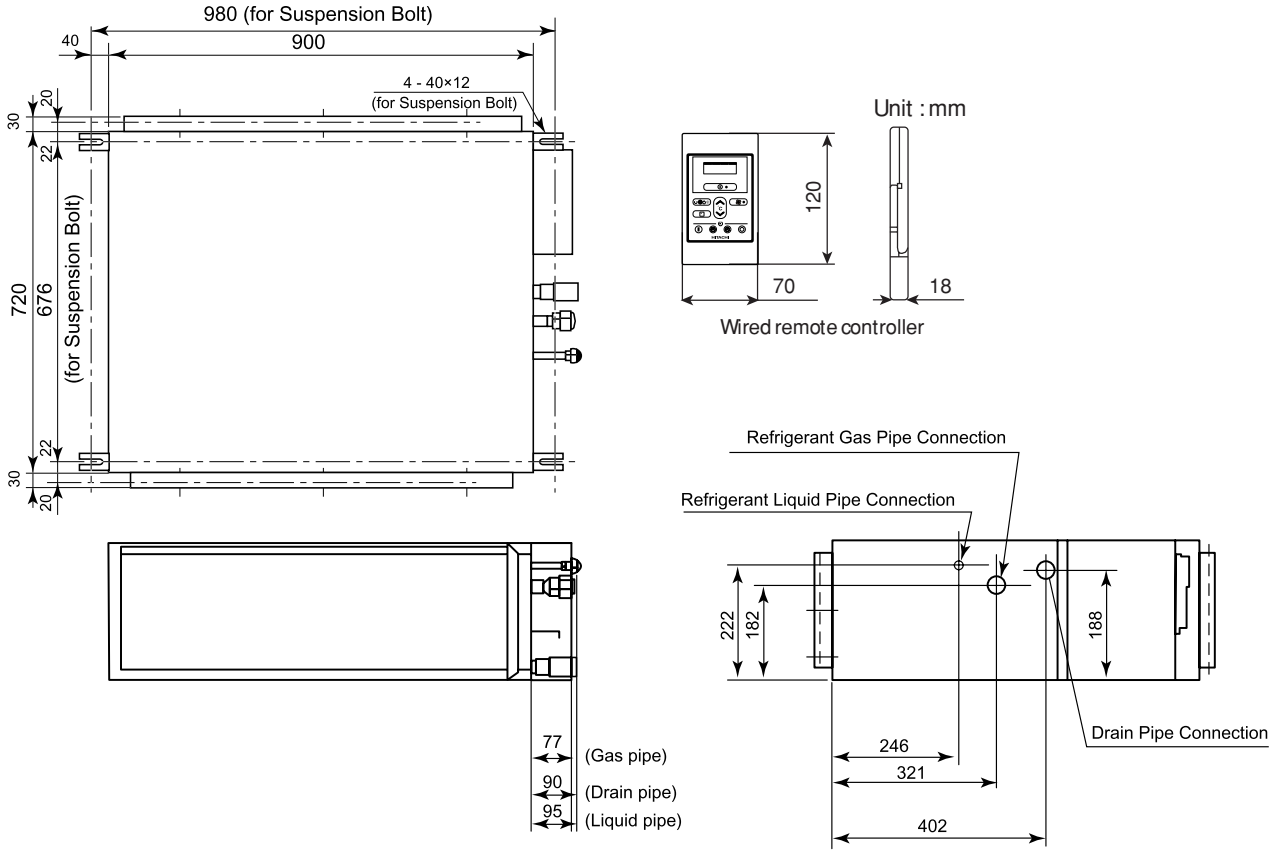
- In quiet or stop operation, the following phenomena may occassionally occur, but they are not abnormal for the operation.
  (1) Slight flowing noise of refrigerant in the refrigerating cycle.
  (2) Slight rubbing noise from the fan casing which is cooled and then gradually warmed as operation stops.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

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

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

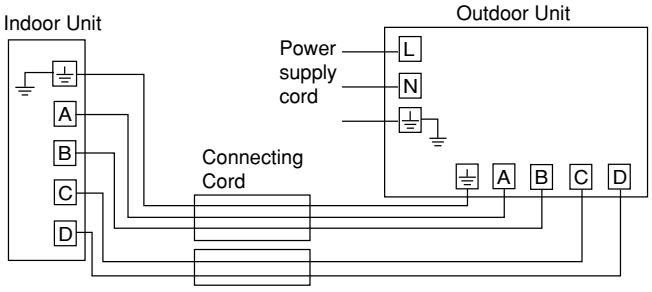
CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAD-50DH7A
RAD-60DH7A
RAD-70DH7A



Note:

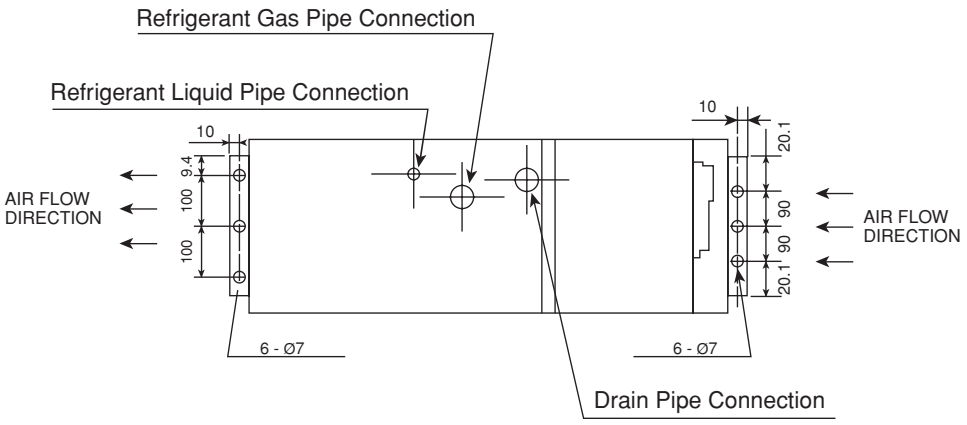
1. Servicing space of 100mm or more is required on the left and right sides of the indoor unit and also 50mm or more space is required above the unit
2. Insulated pipes should be used for both the narrow and wide dia. pipes.
3. Piping length is within 20m
4. Height different of the piping between the indoor unit and the outdoor unit should be within 10m.
5. Power supply cord length is about 2m
6. Connecting cable 2.5mm dia. x 3 (AB Line), 1.6mm dia. x 2 (CD Line) is used for the connection.



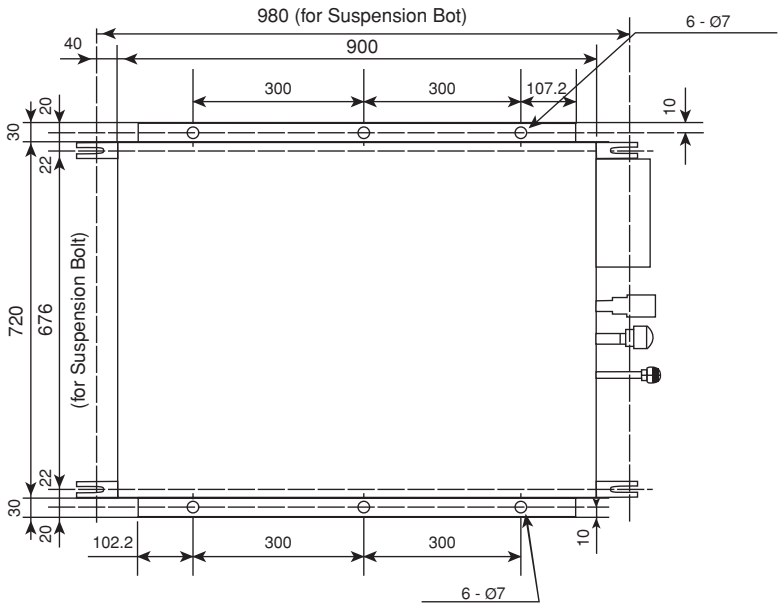
MOUNTING HOLE DIMENSION

MODEL RAD-50DH7A
RAD-60DH7A
RAD-70DH7A

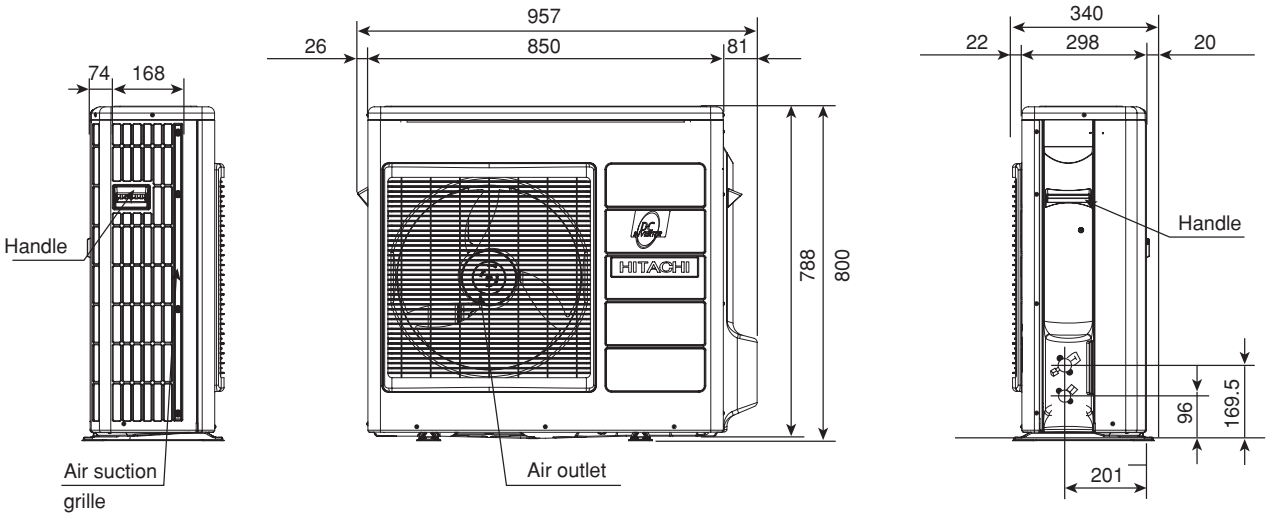
SIDE VIEW

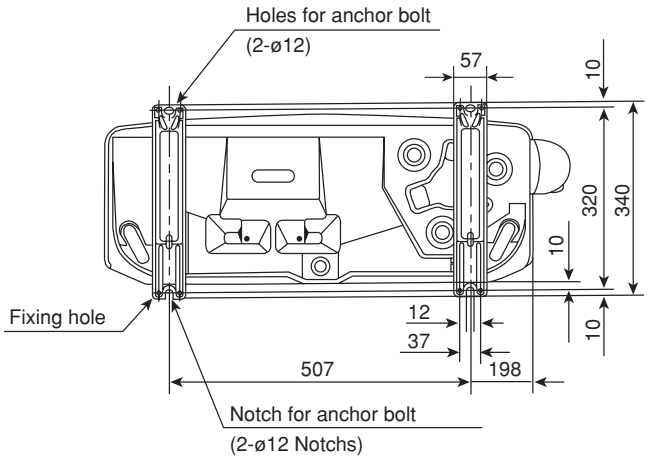


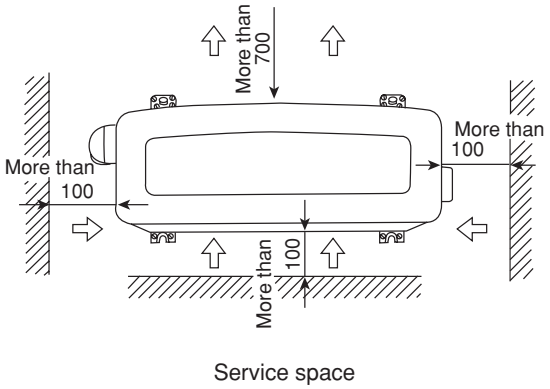
TOP VIEW



MODEL RAC-50DH7
RAC-60DH7
RAC-70DH7







Service space

MAIN PARTS COMPONENT

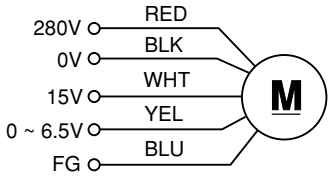
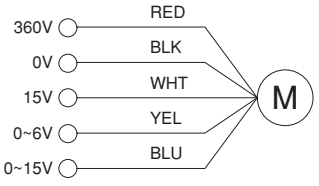
THERMOSTAT (Room Temperature Thermistor)

Thermostat Specifications

MODEL			RAD-50DH7A/RAD-60DH7A/RAD-70DH7A	
THERMOSTAT MODEL			IC	
OPERATION MODE			COOL	HEAT
TEMPERATURE °C (°F)	INDICATION 16	ON	15.6 (60.1)	20.0 (68.0)
		OFF	15.3 (59.5)	20.7 (69.3)
	INDICATION 24	ON	23.6 (74.5)	28.0 (82.4)
		OFF	23.3 (73.9)	28.7 83.7)
	INDICATION 32	ON	31.6 (88.9)	36.0 (96.8)
		OFF	31.3 (88.3)	36.7 (98.1)

FAN MOTOR

Fan Motor Specifications

MODEL	RAD-50DH7A/RAD-60DH7A/RAD-70DH7A	RAC-50DH7/RAC-60DH7/RAC-70DH7
POWER SOURCE	DC: 280V	DC350V
OUTPUT	56W	80W
CONNECTION	 (Control circuit built in)	

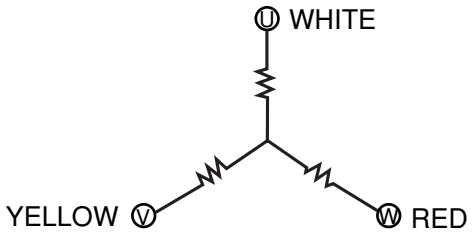
BLU : BLUE YEL : YELLOW BRN : BROWN WHT : WHITE

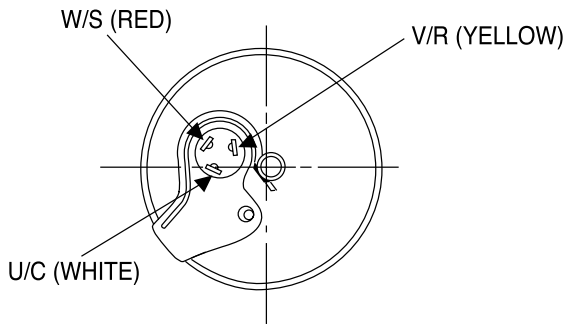
GRY : GRAY ORN : ORANGE GRN : GREEN RED : RED

BLK : BLACK PNK : PINK VIO : VIOLET

COMPRESSOR MOTOR

Compressor Motor Specifications

MODEL		RAC-50DH7/RAC-60DH7/RAC-70DH7
COMPRESSOR MODEL		JU1015D4
PHASE		SINGLE
RATED VOLTAGE		AC 220 ~ 240 V
RATED FREQUENCY		50 Hz
POLE NUMBER		4
CONNECTION		
RESISTANCE VALUE (Ω)	20°C (68°F)	2M = 1.05
	75°C (167°F)	2M = 1.268



⚠ CAUTION

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

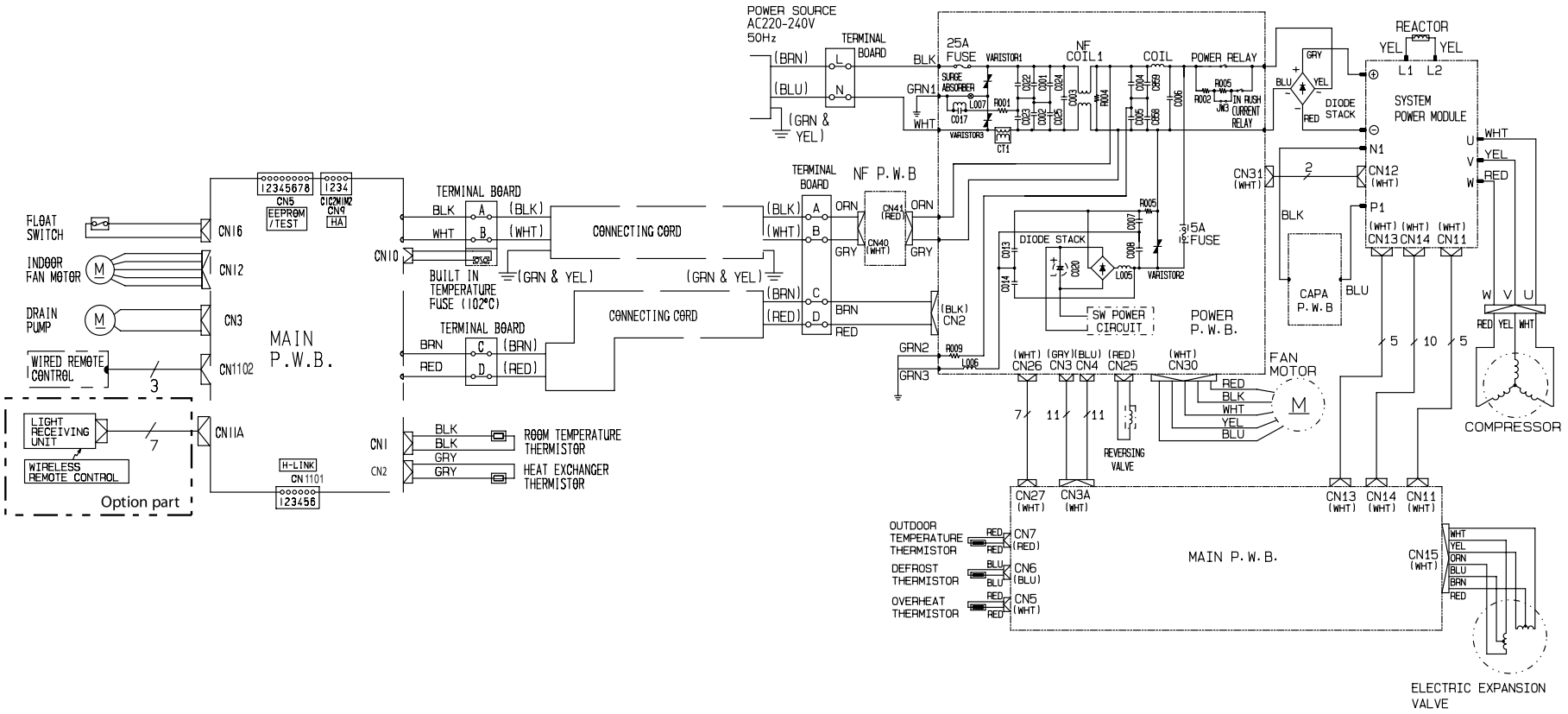
WIRING DIAGRAM

MODEL RAD-50DH7A/RAD-60DH7A/RAD-70DH7A
RAC-50DH7/RAC-60DH7/RAC-70DH7

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

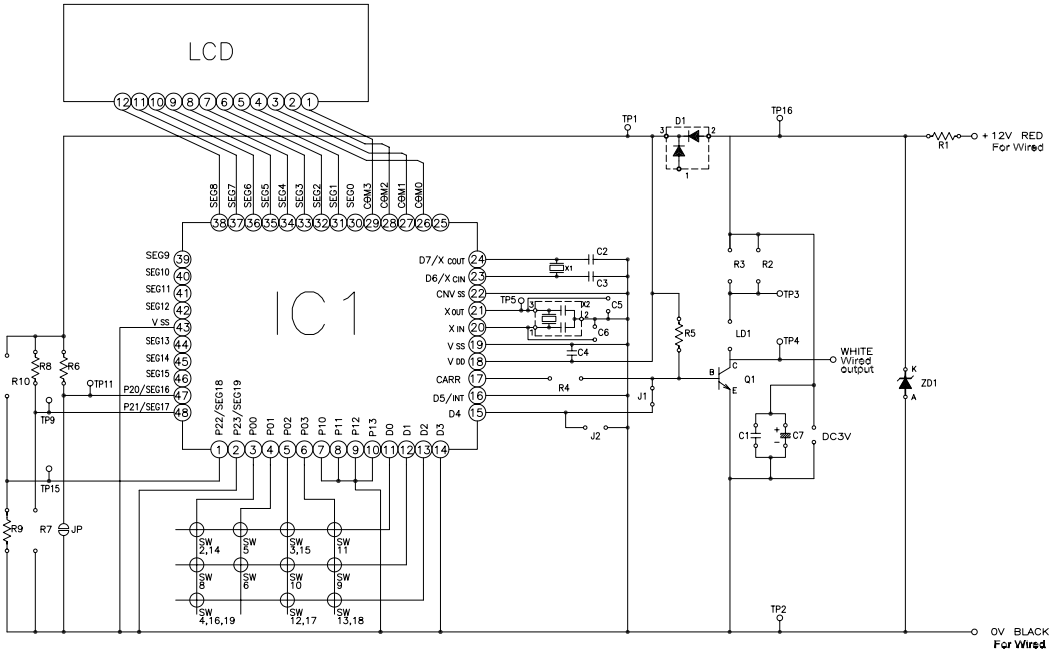
INDOOR UNIT

OUTDOOR UNIT



CIRCUIT DIAGRAM

Wired Remote Control



IC

Symbol	Specification	Form
IC1	M34552G8HFP···OTPMICON	F
	M34552M4H-116FP···MASKMICON	

LCD

Symbol	Specification	Form
LCD	LCD-53WA	H

Diode

Symbol	Specification	Form
D1	RB425D	C

Zenner diode

Symbol	Specification	Form
ZD1	HZK3BTR	C

D-Capacitor

Symbol	Specification	Form
C7	100μF, 6.3V	F

Transistor

Symbol	Specification	Form
Q1	2SD1328S-TX	C

Size of Resistor and C-Capacitor
3 · · · 3216 Size
2 · · · 2125 Size
1 · · · 1608 Size

Resonators

Symbol	Specification	Form
X1	C-R002RX 32.768kHz	H
X2	CSTCC3.64MG0H6 3.64MHz	F

Resistor

Symbol	Specification	Size	Form
R1	1.5kΩ, 1/8W	2	C
R5	3kΩ, 1/16W	1	C
R6	100kΩ, 1/16W	1	C
R8	10kΩ, 1/16W	1	C
R9	10kΩ, 1/16W	1	C

Chip-jumper

Symbol	Specification	Size	Form
J1	0Ω	1	C

C-Capacitor

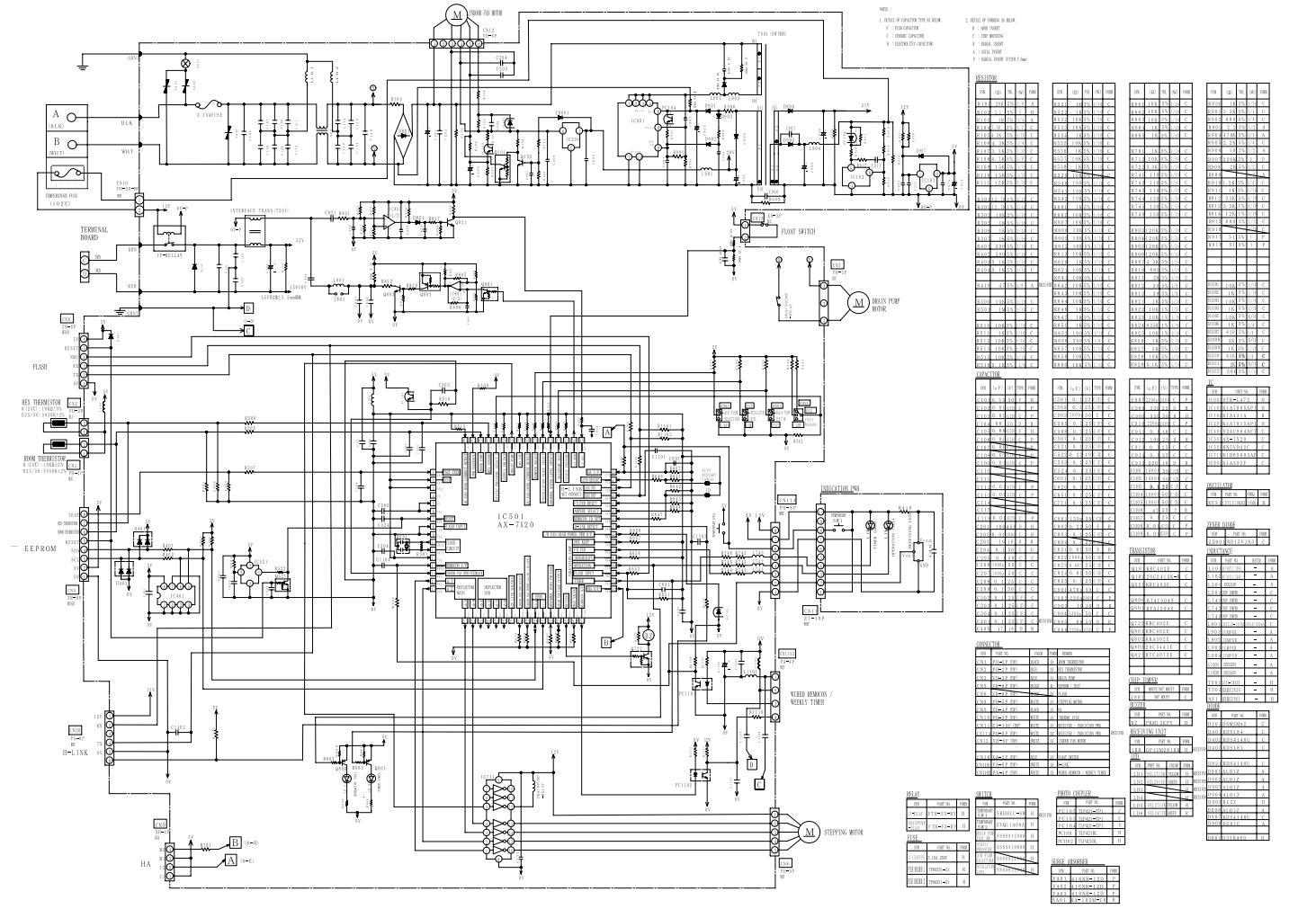
Symbol	Specification	Characteristics	Size	Form
C1	1μF,16V	F	2	C
C2	22pF,50V	CH	2	C
C3	22pF,50V	CH	2	C
C4	1μF,16V	F	2	C

Table1 Key-matrix table

	P00	P01	P02	P03
D0				
D1				
D2				

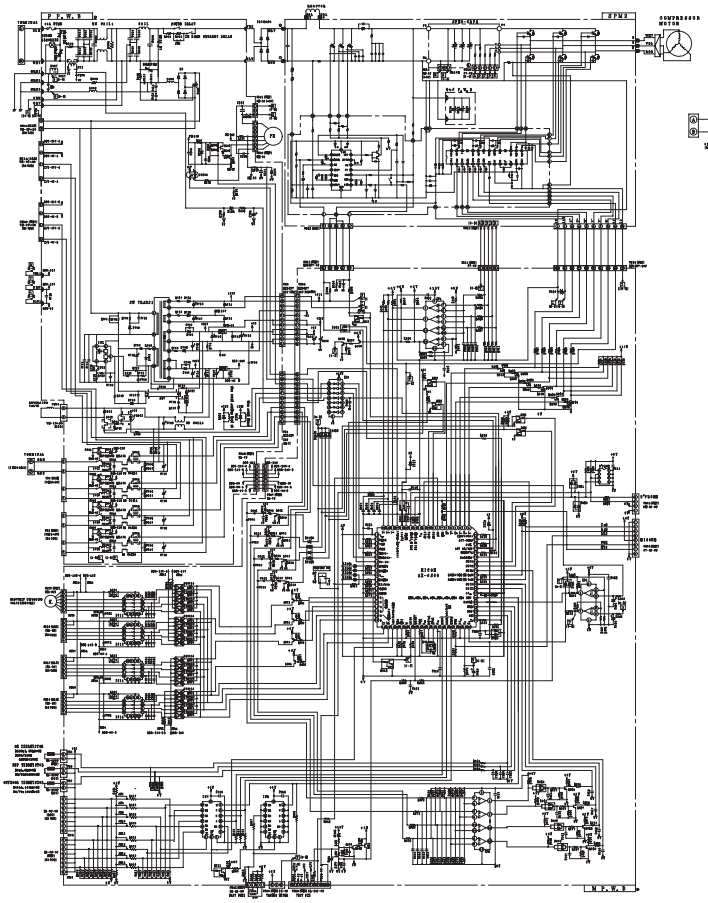
CIRCUIT DIAGRAM

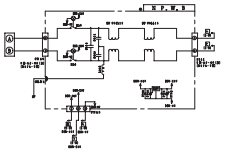
MODEL RAD-50DH7A, RAD-60DH7A, RAD-70DH7A



CIRCUIT DIAGRAM

MODEL RAC-50DH7/RAC-60DH7/RAC-70DH7





BLOCK DIAGRAM
MODEL RAD-50DH7A/RAC-50DH7
RAD-60DH7A/RAC-60DH7
RAD-70DH7A/RAC-70DH7

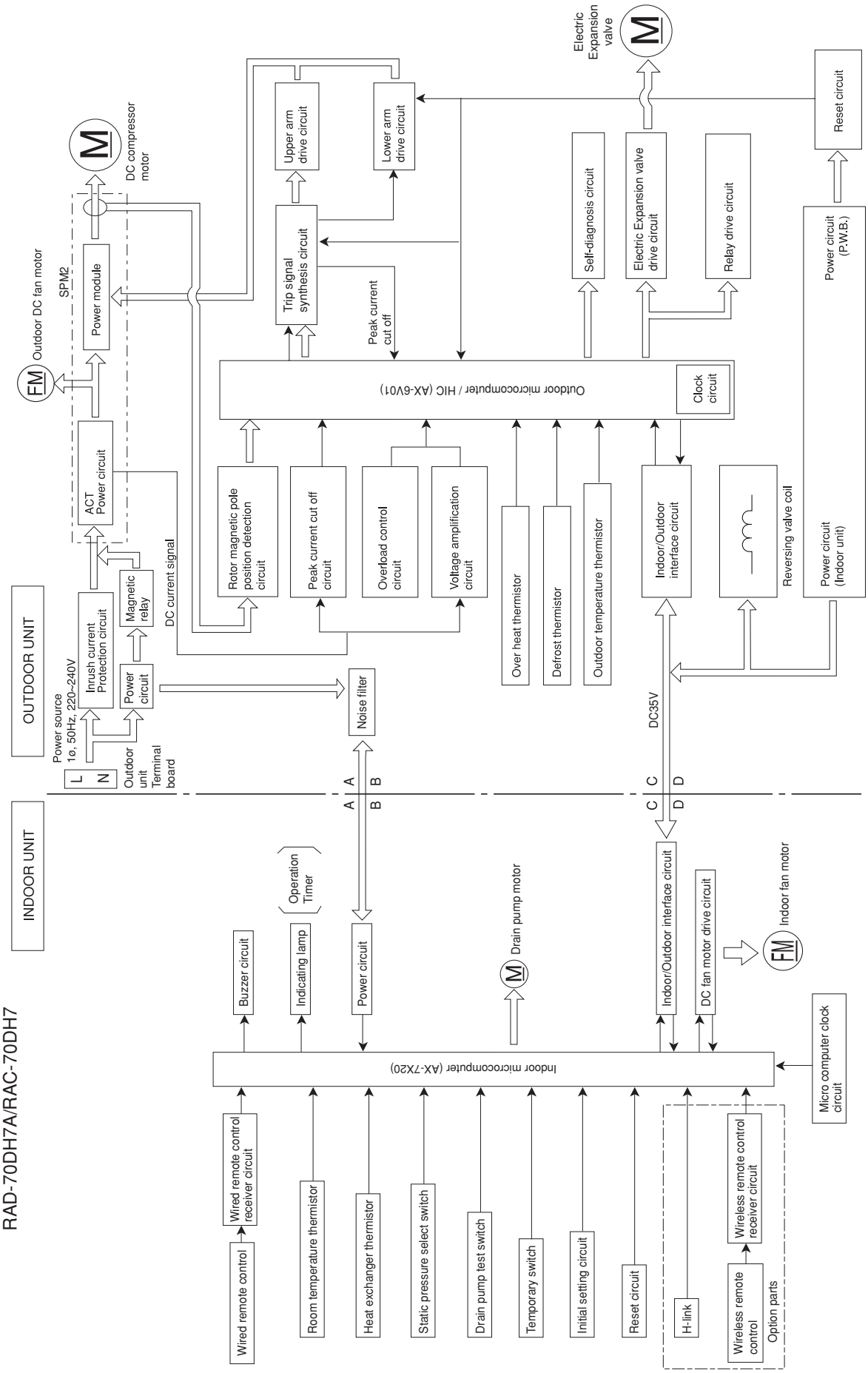
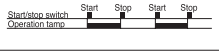
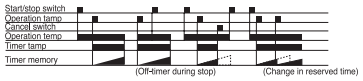
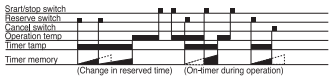
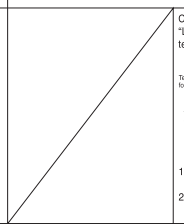
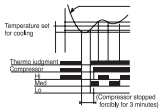
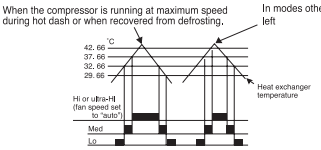
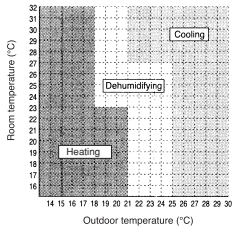


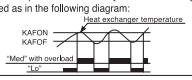
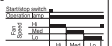
Table 1 Mode data file

	RAD-50DH7A	RAD-60DH7A	RAD-70DH7A
LABEL NAME	**VALUE**		
WMAX	5800 min^{-1}		
WMAX2	5800 min^{-1}		
WSTD	4950 min^{-1}		
CMAX	5200 min^{-1}		
CSTD	5000 min^{-1}		
WMIN	1500 min^{-1}		
CMIN	1600 min^{-1}		
STARTMC	60 Seconds		
DWNRATEW	100%		
DWNRATEC	100%		
SHIFTW	2.00°C		
SHIFTC	1.00°C		
CLMXTP	30.00°C		
YNEOF	20.00°C		
TEION	0.00°C		
TEIOF	9.00°C		
SFTDSW	2.00°C		
DFTIM1	60 Minutes		
DFTIM2	60 Minutes		

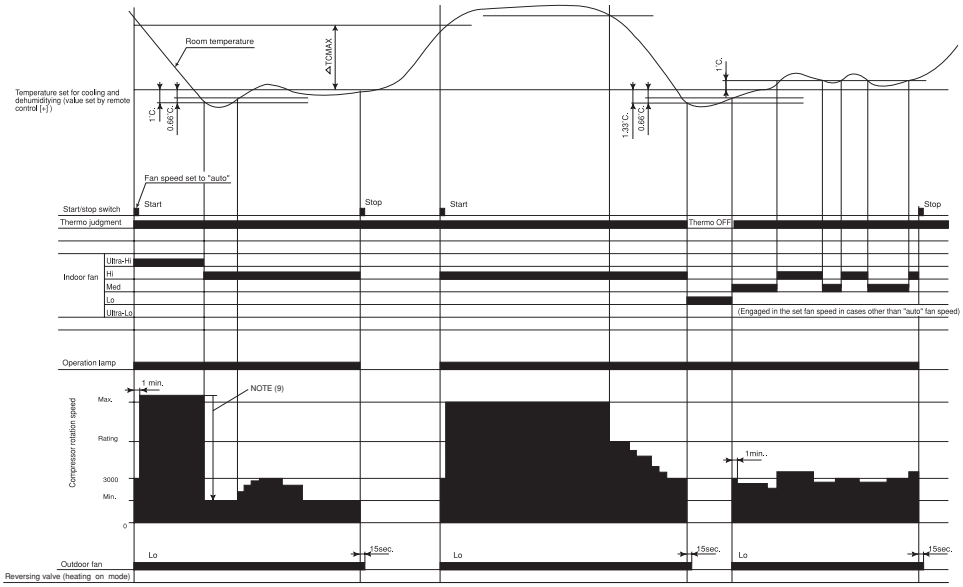
BASIC MODE

<table>
<tr><th>Operation mode</th><th>Fan</th><th>Cooling</th><th>Dehumidifying (dehumidifying operation by the function select button only, not including that engaged by the dehumidify button)</th><th>Heating</th><th>Auto</th></tr>
<tr><td colspan="2">Basic operation of start/stop switch</td><td colspan="5"> 
</td></tr>
<tr><td rowspan="3">Timer functions</td><td>Off-timer</td><td colspan="5"> 
</td></tr>
<tr><td>On-timer</td><td colspan="5"> 
</td></tr>
<tr><td>Off -> On
On -> Off timer</td><td colspan="5"> 
</td></tr>
<tr><td rowspan="4">Fan speed mode (indoor fan)</td><td>Auto</td><td>  </td><td>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.</td><td>Changes between “Lo” and “Med” depending on the room temperature.
<table><tr><th>Temperature division</th><th>Fan speed</th></tr><tr><td>Division 1</td><td>Lo</td></tr><tr><td>Division 2</td><td>Lo</td></tr><tr><td>Division 3</td><td>Med</td></tr><tr><td>Division 4</td><td>Med</td></tr></table>1. The indoor fan also stops when the compressor is in stop status.</td><td>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).
 
</td><td rowspan="4">Judging by room temperature and outdoor temperature,
• Outdoor temperature ≧25°C or 21°C ≦ outdoor temperature < 25°C, room temperature >27°C, restricted to cooling.
• Outdoor temperature <18°C or 18°C ≦ outdoor temperature < 21°C, room temperature ≦23°C, restricted to heating.
• 21°C ≦ outdoor temperature < 25°C, room temperature ≦27°C or 18°C ≦ outdoor temperature < 21°C, room temperature >23°C, restricted to dehumidifying.
 

Below setting temperature can be corrected by remote controller ± 3°C.
27°C : Cooling
23°C : Heating
Current room temperature: Dehumidifying
(25°C < room temperature < 27°C)</td></tr>
<tr><td>Hi</td><td>Operates at “Hi” regardless of the room temperature.</td><td>Set to “ultra-Hi” when the compressor runs at maximum speed, and to “Hi” in other modes.</td><td>Set to “Hi” in modes other than when the compressor stops.</td><td>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.</td></tr>
<tr><td>Med</td><td>Operates at “Med” regardless of the room temperature.</td><td>Same as at left.</td><td>Set to “Med” in modes other than when the compressor stops.</td><td>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).</td></tr>
<tr><td>Lo</td><td>Operates at “Lo” regardless of the room temperature.</td><td>Same as at left.</td><td>Set to “Lo” in modes other than when the compressor stops.</td><td>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:
 
</td></tr>
<tr><td colspan="2">Basic operation of temperature controller</td><td>Performs only fan operation at the set speed regardless of the room temperature.
 
</td><td>See page 49.</td><td>See page 53.</td><td>See page 55.</td></tr>
<tr><td colspan="2">Sleep operation (with sleep button ON)</td><td>• Enters sleep operation after set as on the left.
• Action during sleep operation Lo (sleep) operation</td><td>• Same as at left
• See page 51.</td><td>• Same as at left
• See page 53.</td><td>• Same as at left
• See page 57.</td><td>• Same as at left.
• Performs the sleep operation of each operation mode.</td></tr>
</table>

Basic Cooling Operation



Notes:

(1) Condition for entering into Cool Dashed mode. When fan set to “Hi” or “Auto mode” and temperature difference between indoor temperature and set temperature has a corresponding compressor rpm (calculated value in Table 2) larger than WMAX.

(2) Cool Dashed will release when i) a maximum 25 minutes is lapsed and ii) room temperature is lower than set temperature –3°C (thermo off) and iii) when room temperature has achieved setting temperature –1°C then maximum Cool Dashed time will be revised to 20 minutes. And iv) indoor fan is set to Lo and Med fan mode and v) change operation mode.

(3) During Cool Dashed operation, thermo off temperature is set temperature (with shift value) –3°C. After thermo off, operation continue in Fuzzy control mode.

(4) Compressor minimum “ON” time and “OFF” time is 3 minutes.

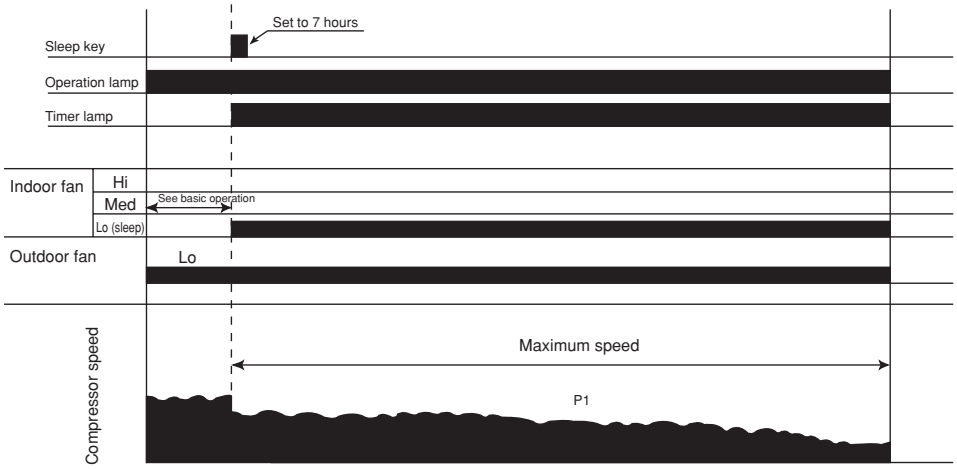
(5) During normal cooling mode, compressor maximum rpm CMAX will maintain for 60 minutes if indoor temperature is lower than CLMXTP. No time constrain if indoor temperature is higher than CLMXTP.

(6) During Cool Dashed, when room temperature reaches set temperature –1°C compressor rpm is actual rpm x DWNRATEC.

Table 2 ΔTCMAX

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

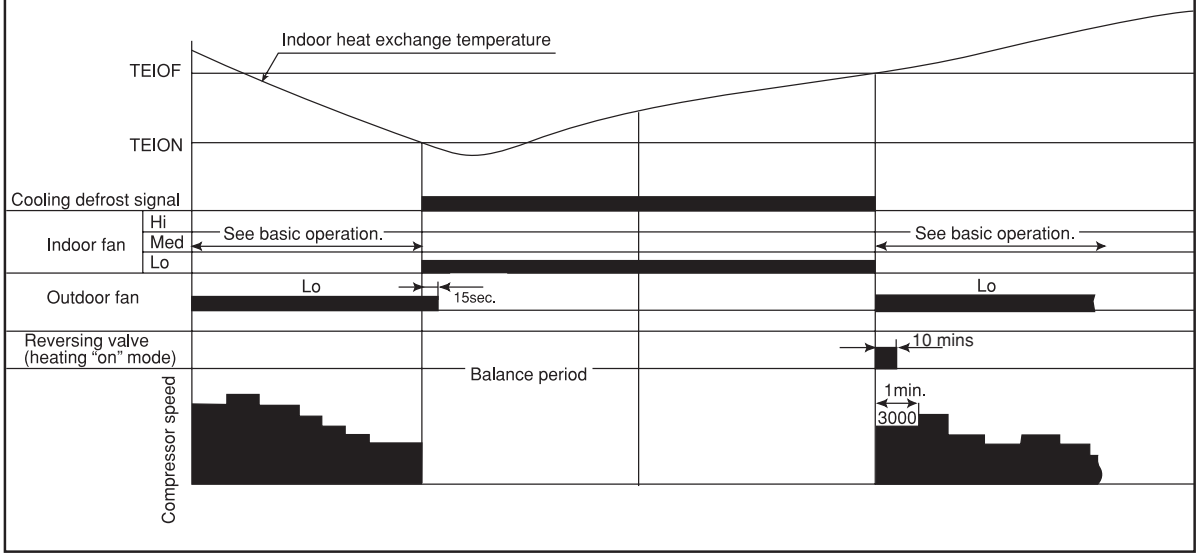
Cooling Sleep Operation



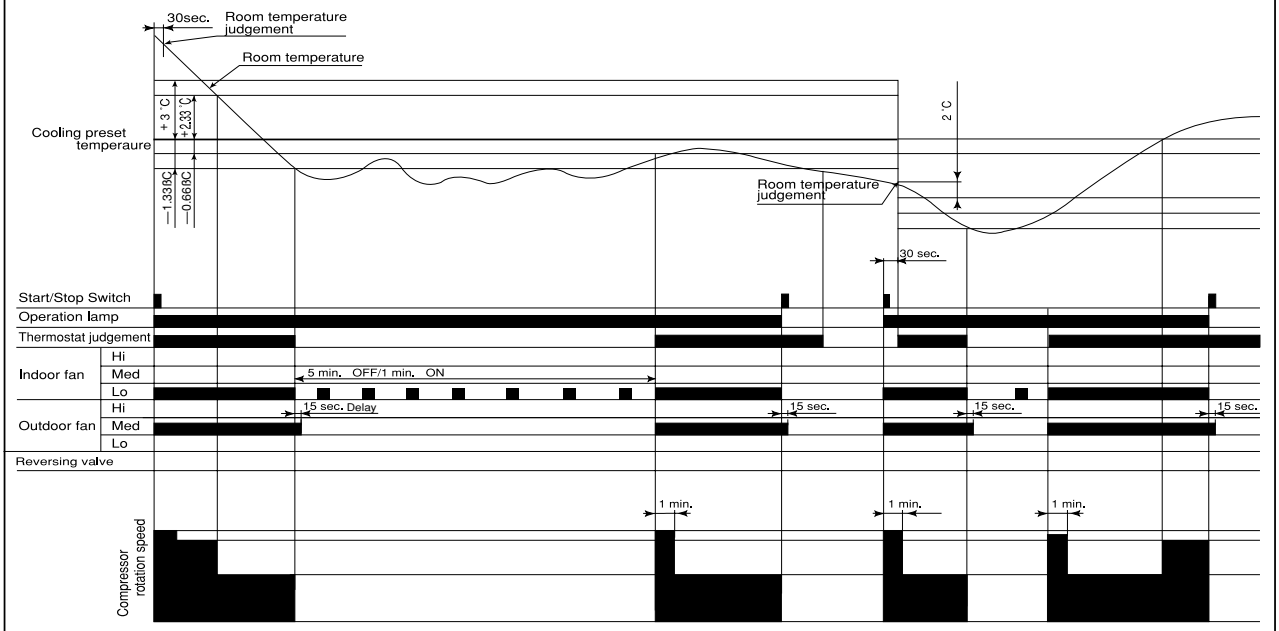
Notes:

(1) The sleep operation starts when the sleep key is pressed.
(2) When the sleep key is set, the maximum compressor speed is limited, and the indoor fan is set to “sleep Lo”.
(3) The indoor fan speed does not change even when the fan speed mode is changed.
(4) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
(5) If the set lime is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
(6) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.

Cooling Defrost



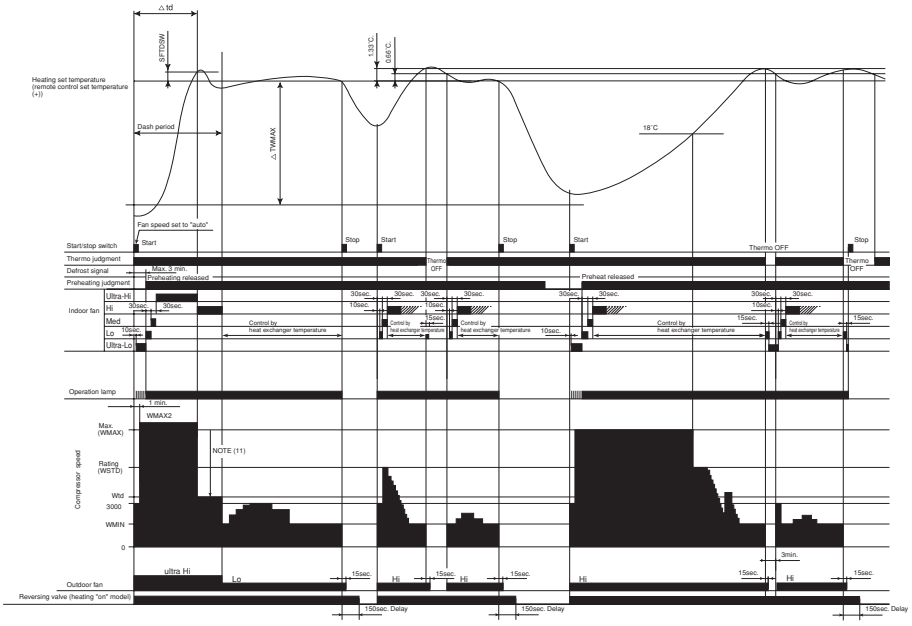
Dehumidifying



Notes:

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

Basic Heating Operation



Notes:

(1) Condition for entering into Hot Dashed mode. When fan set to “Hi” or “Auto mode” and i) Indoor temperature is lower than 18°C, and ii) outdoor temperature is lower than 10°C, and iii) Temperature difference between indoor temperature and set temperature has a corresponding compressor rpm (calculated value in Table 3) larger than WMAX.

(2) Hot Dashed will release when i) Room temperature has achieved the set temperature + SFTDSW. ii) Thermo off.

(3) During Hot Dashed operation, thermo off temperature is set temperature (with shift value) +3°C. After thermo off, operation continue in Fuzzy control mode.

(4) Compressor minimum “ON” time and “OFF” time is 3 minutes.

(5) During normal heating mode, compressor maximum rpm WMAX will maintain for 120 minutes if indoor temperature is higher than 18°C. No time limit constrain if indoor temperature is lower than 18°C and outdoor temperature is lower than 2°C.

(6) During Hotkeep or Defrost mode, indoor operation lamp will blink at interval of 3 seconds “ON” and 0.5 second “OFF”.

(7) When heating mode starts, it will enter into Hotkeep mode if indoor heat exchanger temperature is lower than YNEOF + 0.33°C.

(8) In “Ultra-Lo” fan mode, if indoor temperature is lower than 18°C, indoor fan will stop. If indoor temperature is higher than 18°C + 0.33°C, fan will continue in “Ultra-Lo” mode. During Hotkeep or Defrost mode, fan will continue in “Ultra-Lo” mode.

(9) During Hot Dashed or outdoor temperature is lower than –5°C, compressor rpm is WMAX2.

(10) During Hot Dashed, when room temperature reaches set temperature + SFTDSW compressor rpm is actual rpm x DWNRATEW.

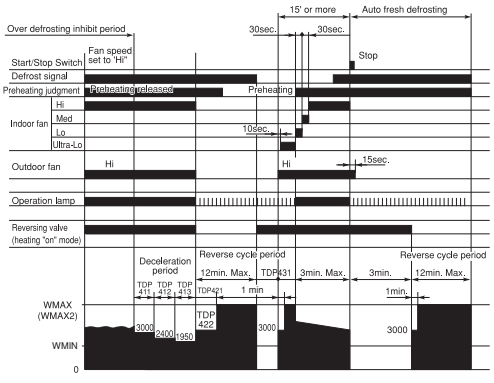
Table 3 ΔTWMAX

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

Notes:

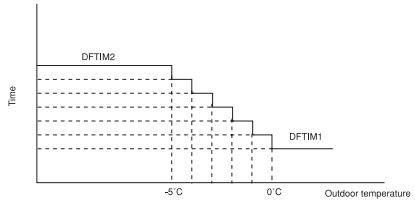
1. See the data in Table 1 on page 47 for each constant in capital letters in the diagrams.

Reversing Valve Defrosting



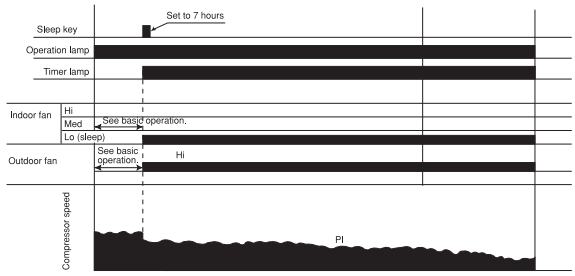
Notes:
(1) The defrosting inhibit period is set as shown in the diagram below. When defrosting has finished once, the inhibit period is newly set, based on the outdoor temperature when the compressor was started. During this period, the defrost signal is not accepted.
(2) If the difference between the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

Setting Defrosting Inhibit Period



Notes:
(1) The time is set according to the outdoor temperature when it is between 0˚C and -5˚C.
(2) DFTIM is used when the outdoor temperature ≧ 0˚C.
(3) DFTIM2 is used when the outdoor temperature ≦ -5˚C.

Heating Sleep Operation

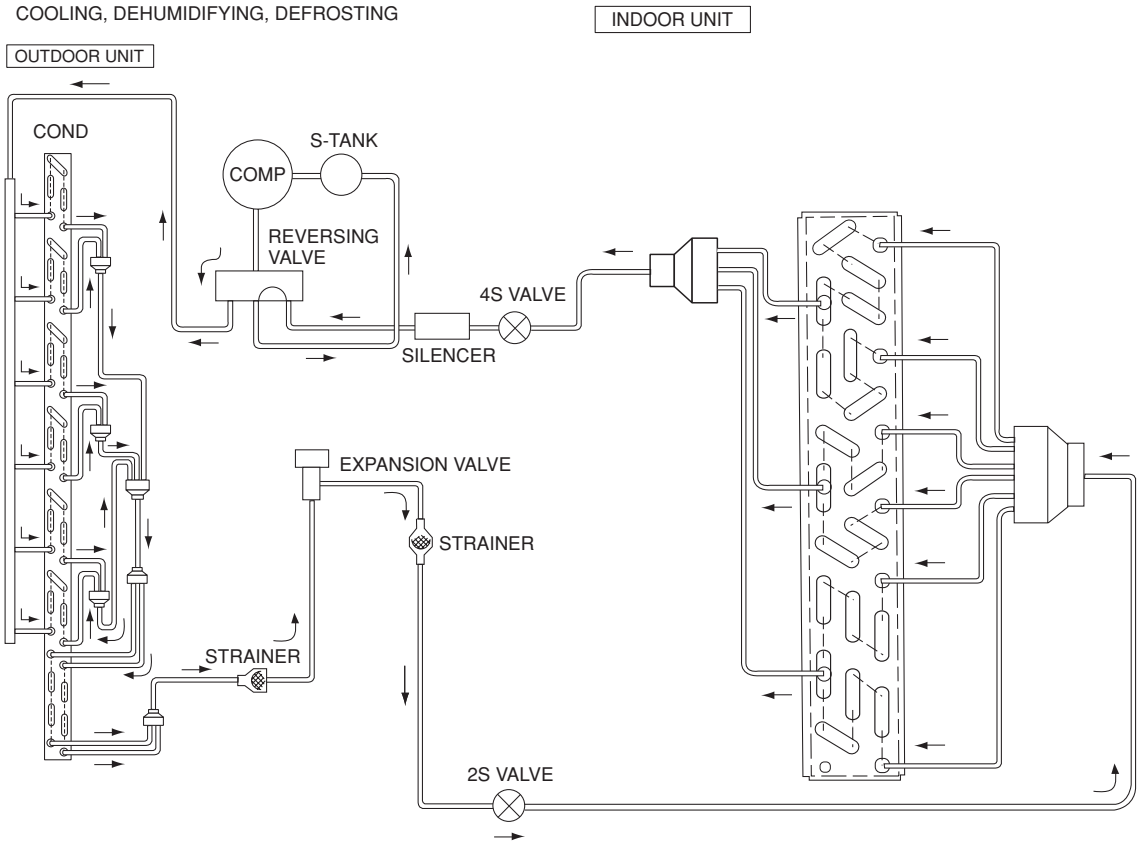


Notes:
(1) The sleep operation starts when the sleep key is pressed.
(2) When the sleep key is set, the maximum compressor speed is limited to WSTD+2000/2, and the indoor fan is set to "sleep Lo".
(3) If the operation mode is changed during sleep operation, the changed operation mode is set and sleep 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 canceled by the cancel key or sleep key, all data is cleared.

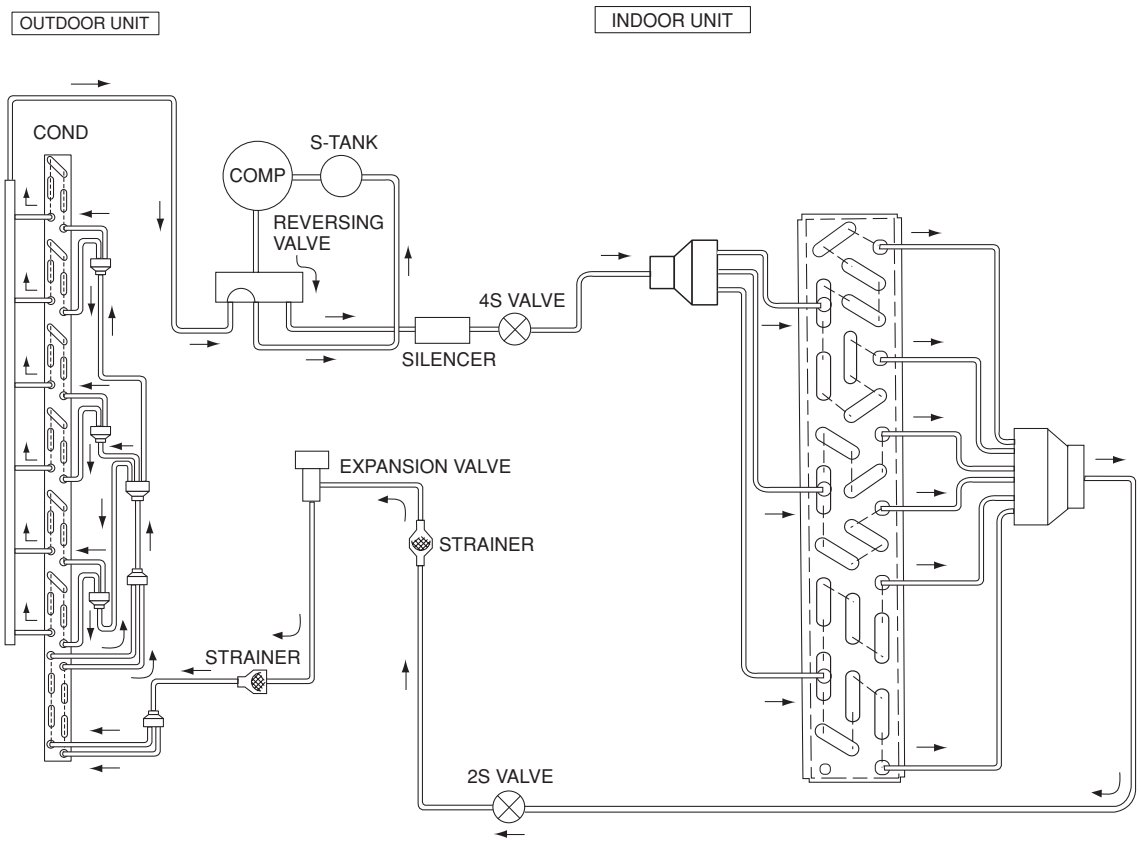
REFRIGERATING CYCLE DIAGRAM

MODEL RAD-50DH7A/RAC-50DH7
RAD-60DH7A/RAC-60DH7

COOLING, DEHUMIDIFYING, DEFROSTING

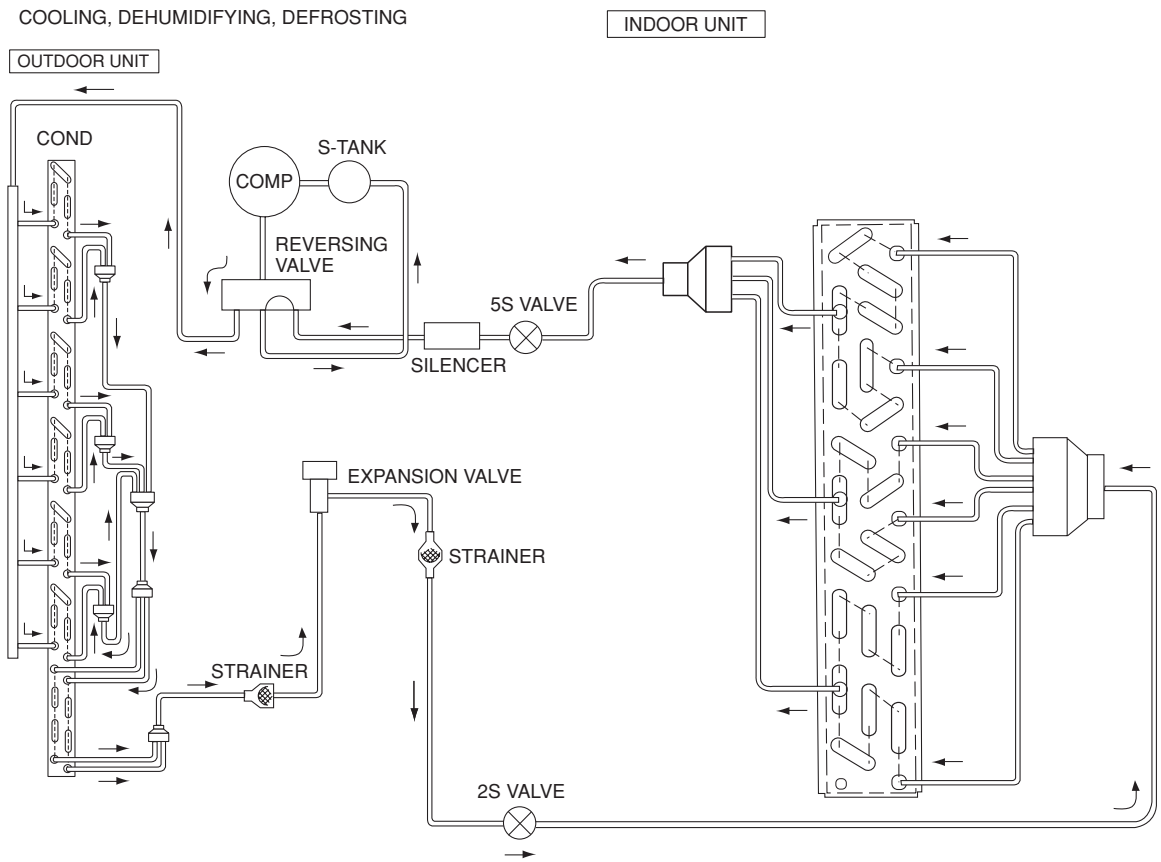


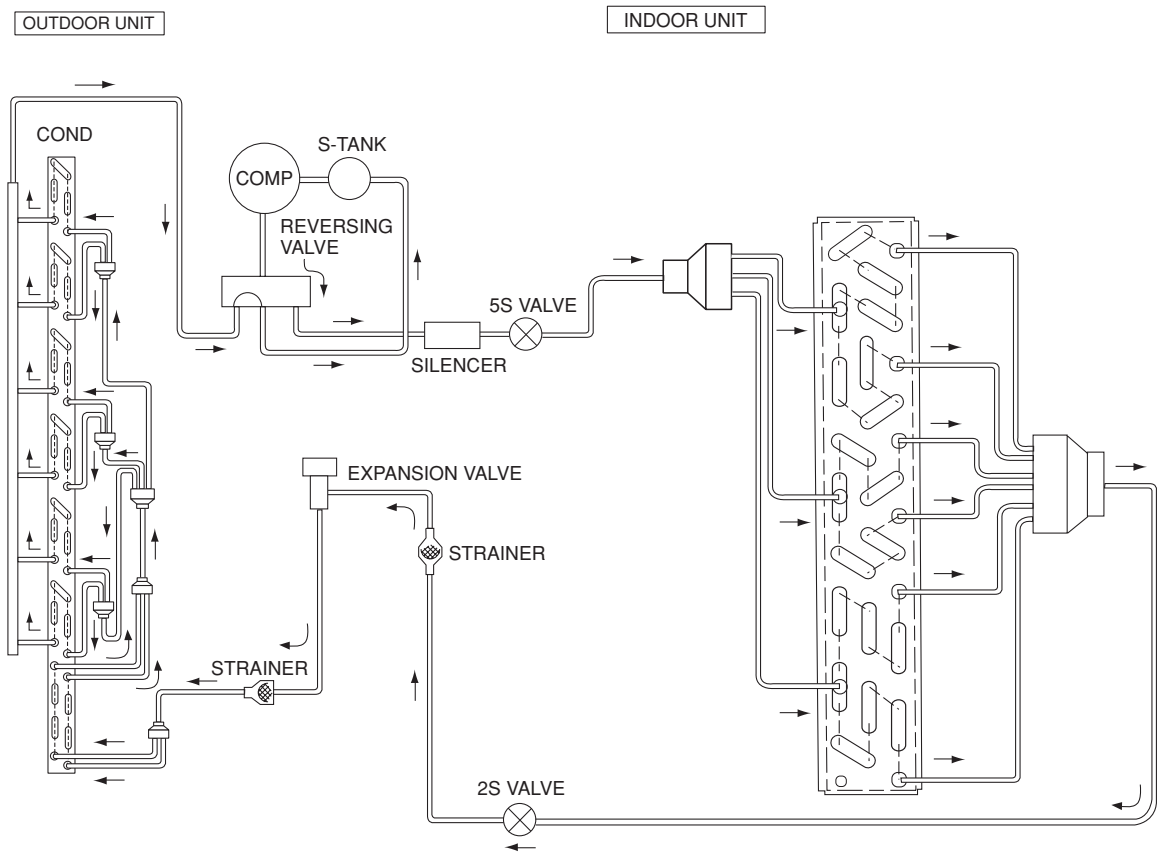
HEATING



REFRIGERATING CYCLE DIAGRAM

MODEL RAD-70DH7A/RAC-70DH7





AUTO SWING FUNCTION

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

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAD-50DH7A, RAD-60DH7A, RAD-70DH7A

1. Reset Circuit

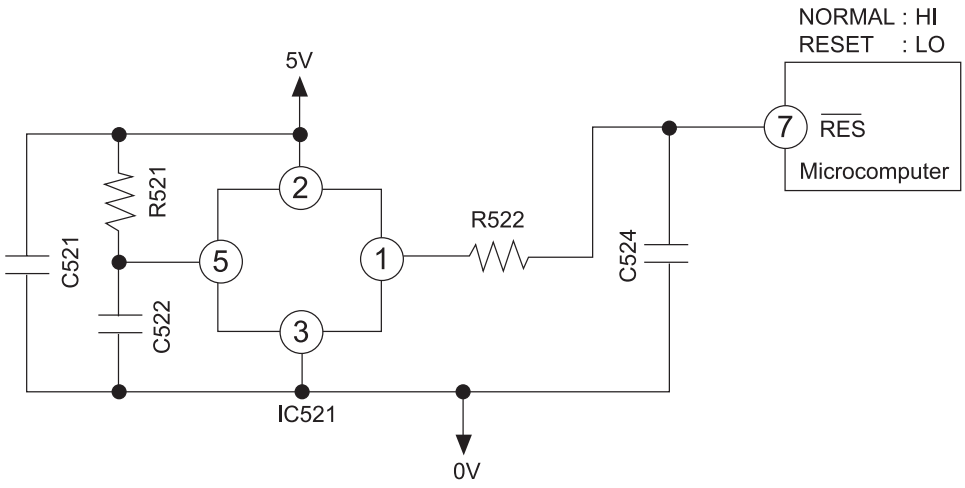


Fig. 1-1

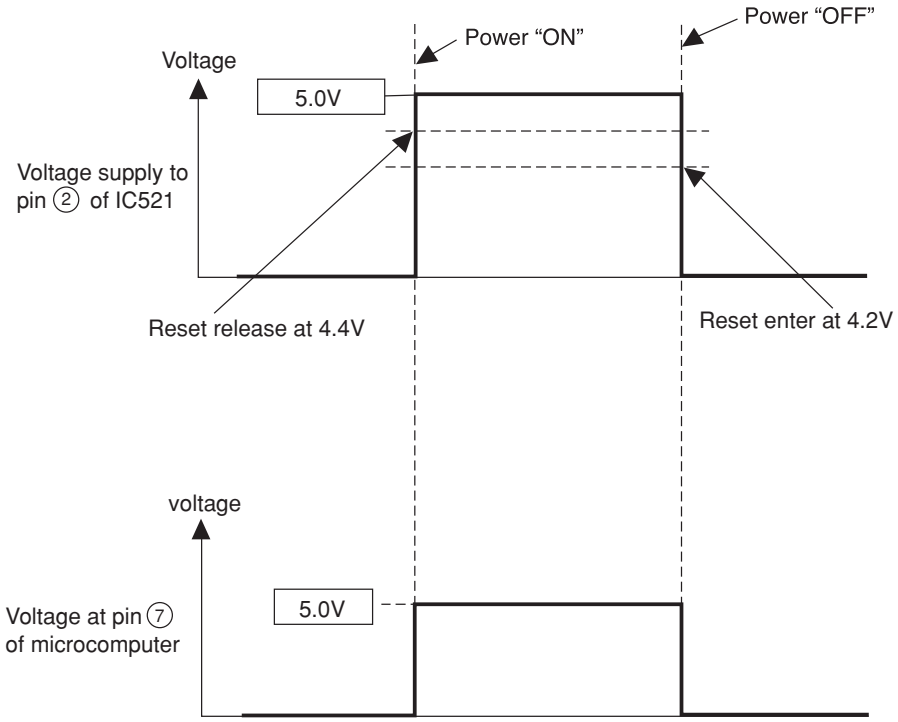


Fig. 1-2

- The reset circuit initializes the microcomputer program when power is ON or OFF.
- Low voltage at pin ⑦ resets the microcomputer and Hi activates the microcomputer.
- When power "ON" 5V voltage rises and reaches 4.4V, pin ① of IC521 is set to "Hi". At this time the microcomputer starts operation.
- When power "OFF" voltage drops and reaches 4.2V, pin ① of IC521 is set to "Low". This will RESET the microcomputer.

2. Buzzer Circuit

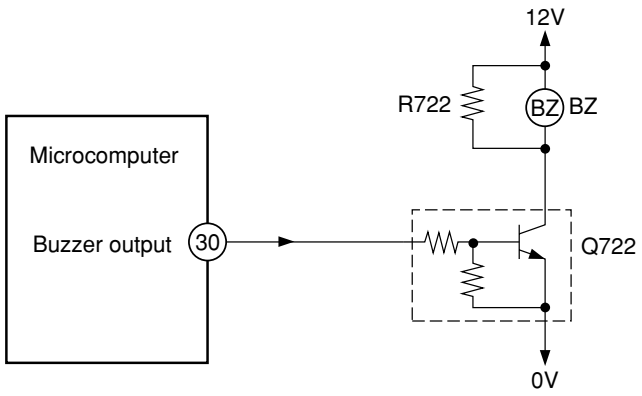


Fig. 2-1 Buzzer Circuit

- When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin (30) of the microcomputer. 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.

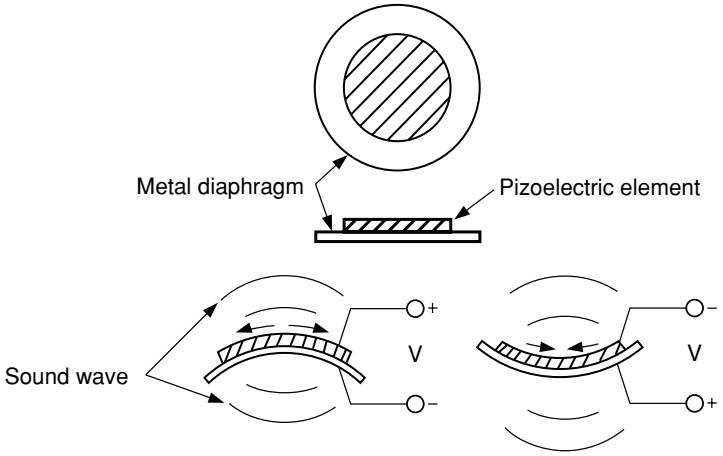


Fig. 2-2 Buzzer Operation

3. 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.

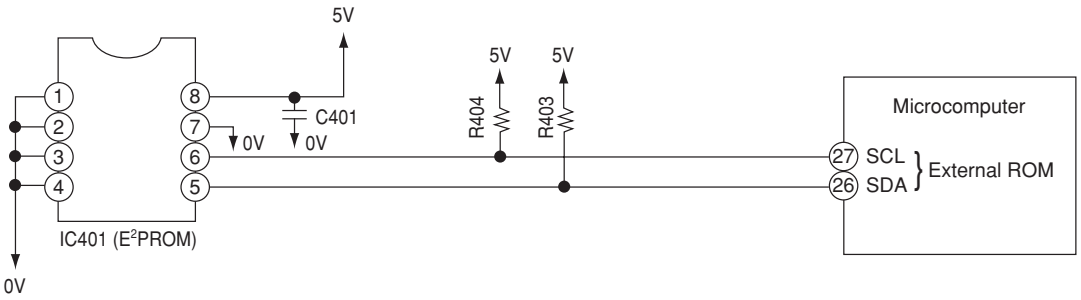


Fig. 3-1

4. Room Temperature Thermistor Circuit

- Fig. 4-1 shows the room temperature thermistor circuit.
- The voltage at Ⓐ depends on the room temperature as shown in Fig. 5-2.

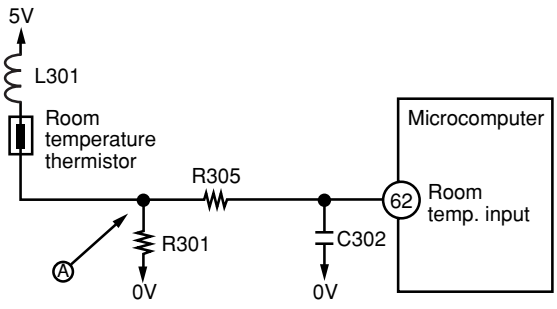


Fig. 4-1

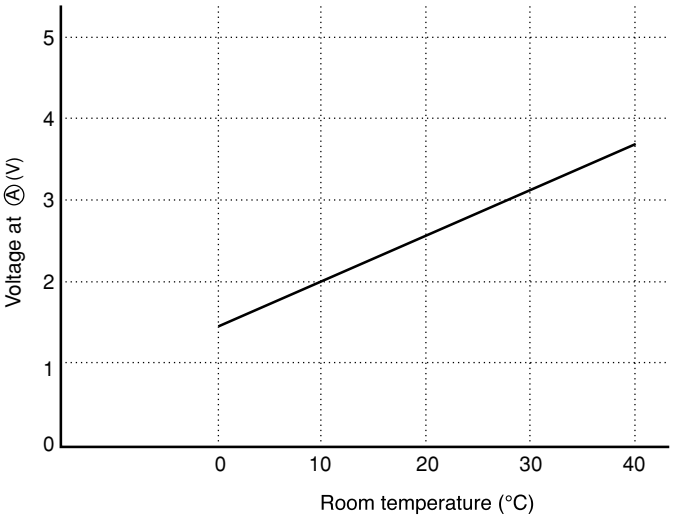


Fig. 4-2

5. Heat exchanger temperature thermistor circuit

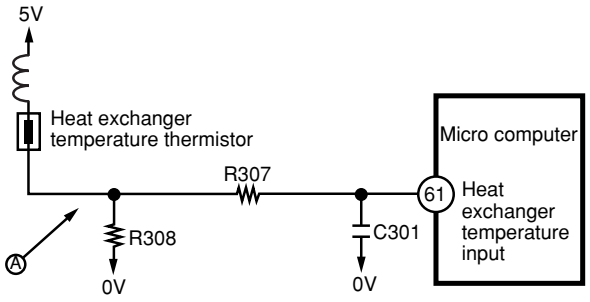


Fig. 5-1

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

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

  The voltage at Ⓐ depends on the heat exchanger temperature as shown in Fig. 5-2.

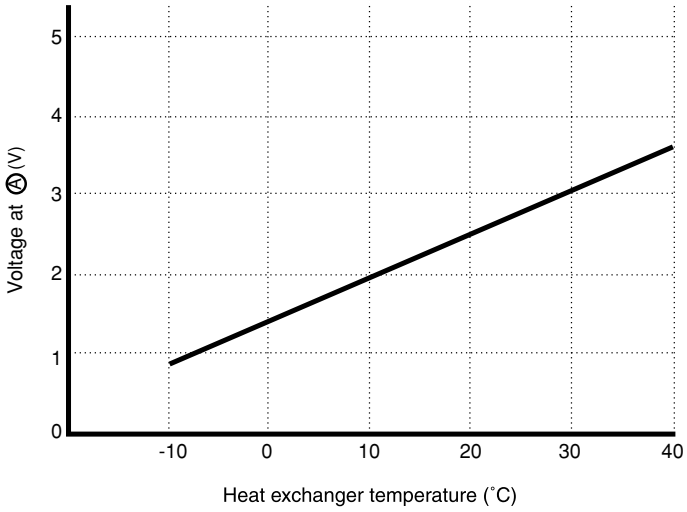


Fig. 5-2

6. Temporary Switch

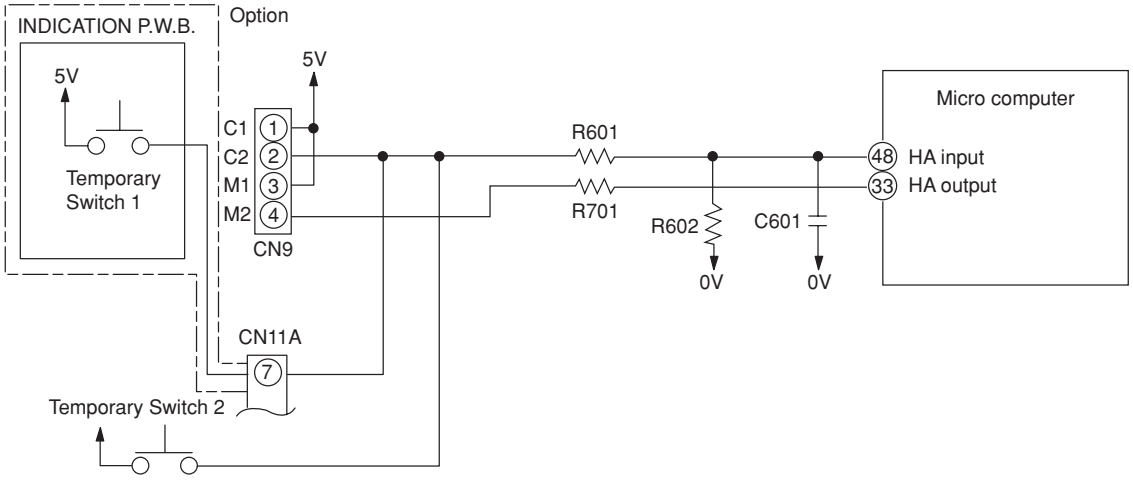
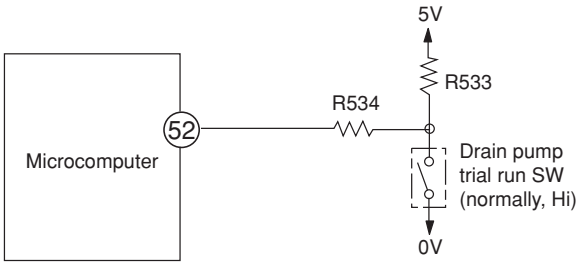


Fig. 6-1

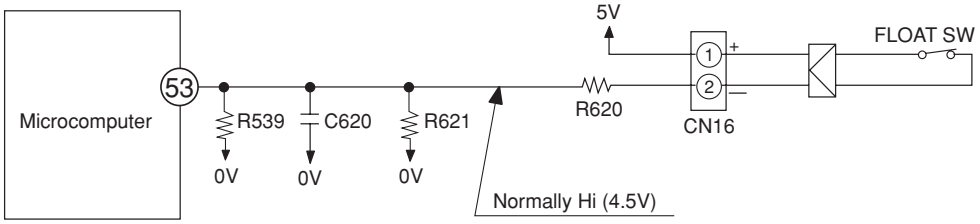
- The temporary switch is used to operate the air conditioner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the previous mode at the previously set temperature. However, when the power switch is set to OFF, it starts automatic operation.

7. Drain pump trial run switch



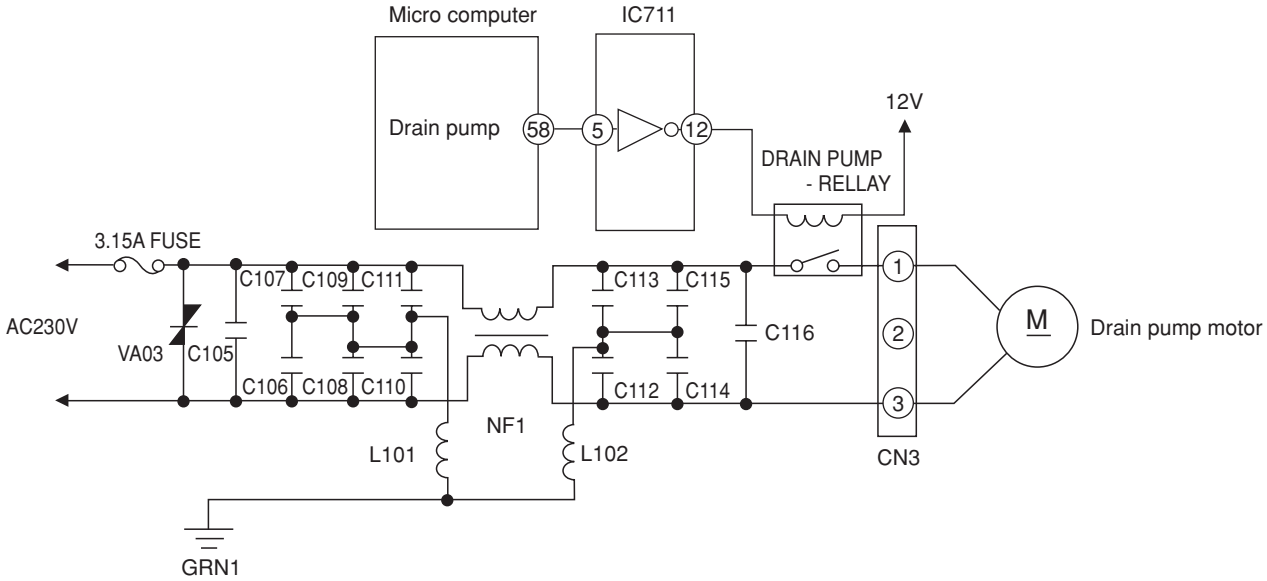
- This switch forcibly turns the drain pump on. When the drain pump trial run switch is turned on, the timer indicator will blink seven times, and no remote signal will be accepted.

8. Float switch



- This is a float type switch that monitors the drain level of drain pan. The switch will be activated and will stop operation if the drain pump is faulty or drain hose is stopped up, disabling drainage, causing the drain level to rise abnormally.
- When the float switch is activated, the timer indicator will flash six times. Note that the float switch will also be activated, disabling operation if the connector of float switch has defective contact or is connected incompletely.

9. Drain pump drive circuit



Drain pump drive circuit is using drain pump relay that control by micro computer pin no 58 to drive the drain pump.

10. Indoor Fan Motor Feedback Circuit

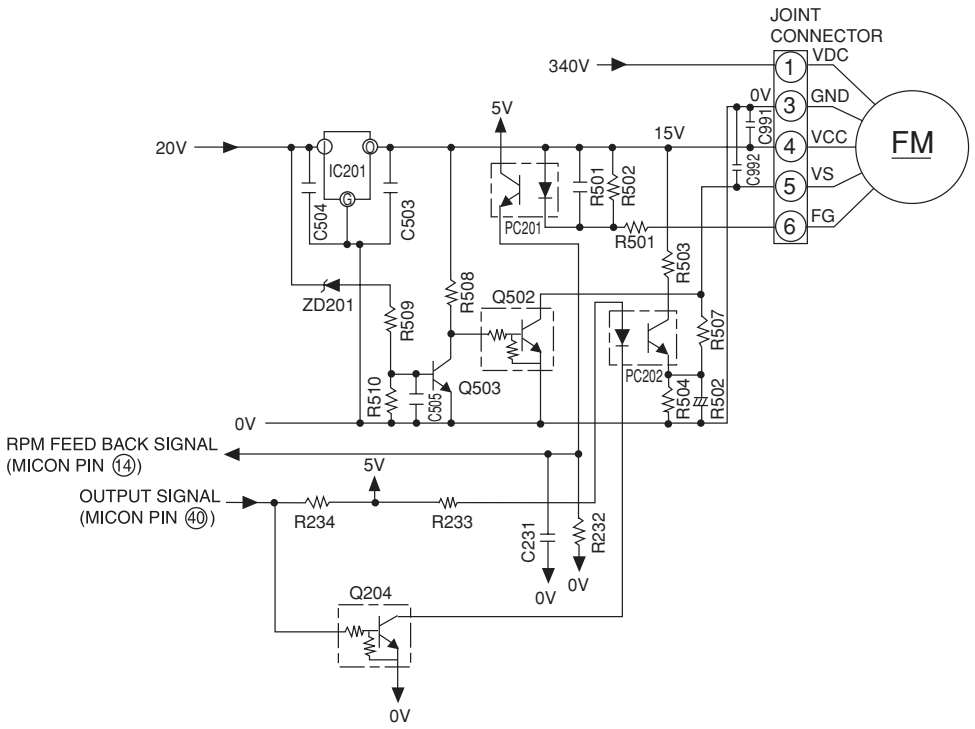


Fig. 10-1

- <Exp. of circuit wave>

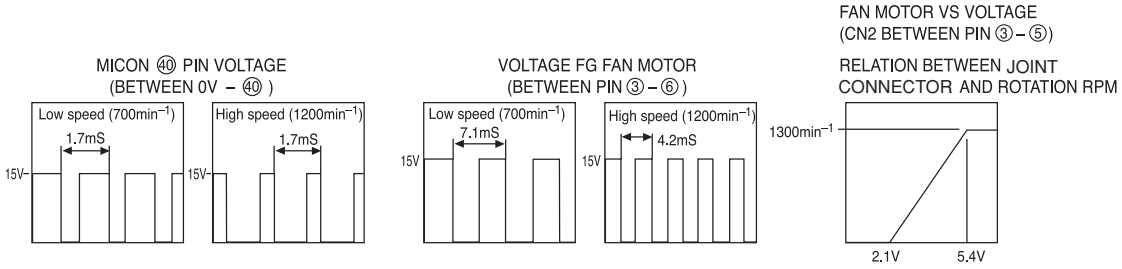


Fig. 10-2

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

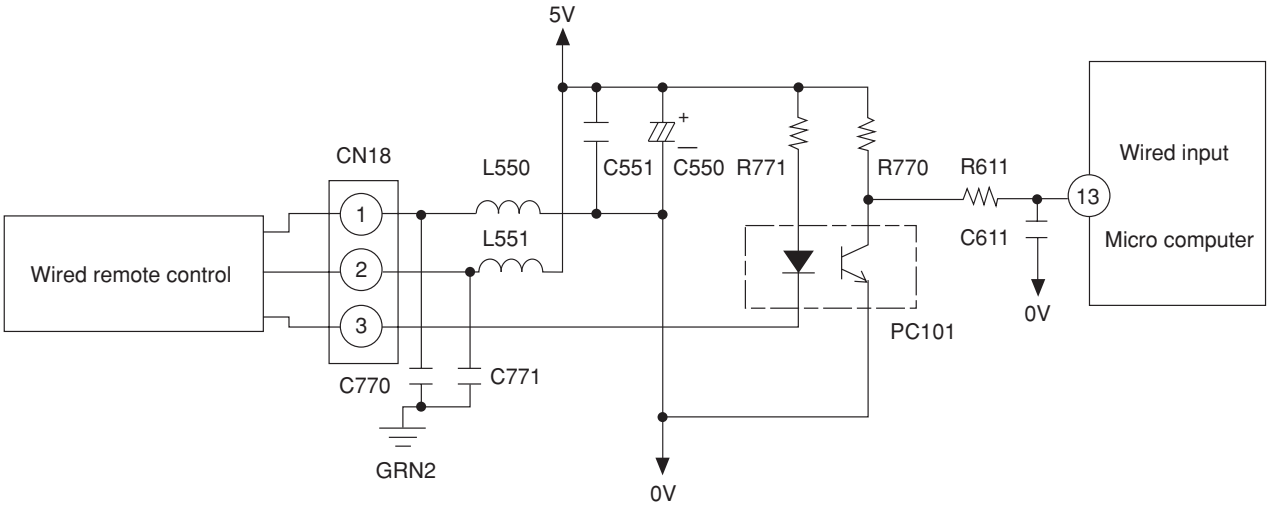
⚠ CAUTION 1

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

⚠ CAUTION 2

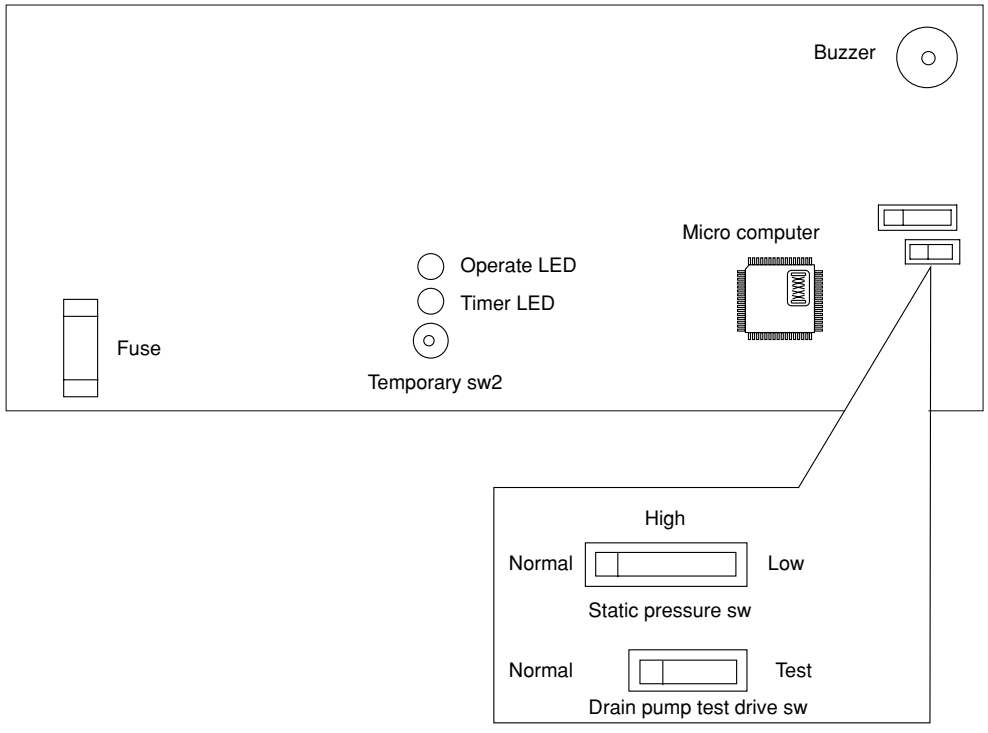
Please do not disconnect the fan motor connector during running due to the high voltage supply, it will cause the damage at fan motor and PWB.

11. Wired remote control receiver circuit



The signal from wired remote control is send to micro computer pin no 13 by using photo coupler (PC101). L550, L551, C770 and C771 act as a filter to reduce the noise from the wired remote control.

12. Static-pressure switch



Static pressure switch
When set to High, the revolution per minute will increase 100 min^{-1} and when set to Low, the revolution per minute will decrease 200 min^{-1}.

1. Power Circuit

RAC-50DH7, RAC-60DH7, RAC-70DH7

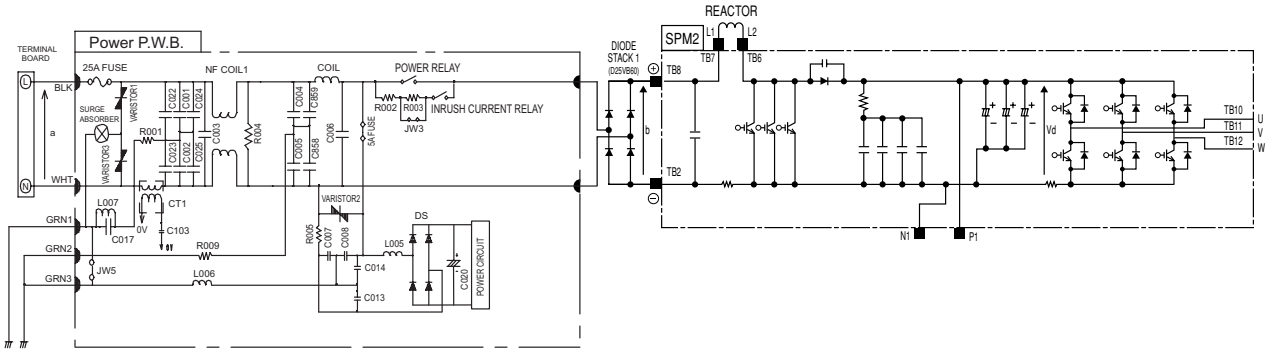


Fig. 1-1

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

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

(1) Active module

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

(2) Diode stacks

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

< Reference >

- In case of malfunction or defective connection: Immediately after the compressor starts, it may stop due to “abnormally low speed” active error, etc.

  The compressor may continue to operate normally, but the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.
- In case of active module faulty or defective connection:

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

< Reference >

- If diode stack 1 is faulty, the compressor may stop due to “lp”, “anbormally low speed”, etc. immediately after it starts, or it may not operate at all because no DC voltage is generated between the positive ⊕ and negative ⊖ terminals.

  If diode stack 1 is faulty, be aware that the 25A fuse might also have blown.
- If diode stack 2 is faulty, DC voltage may not be generated and the compressor may not operate at all. Also, be aware that the 5A fuse might have blown.

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

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

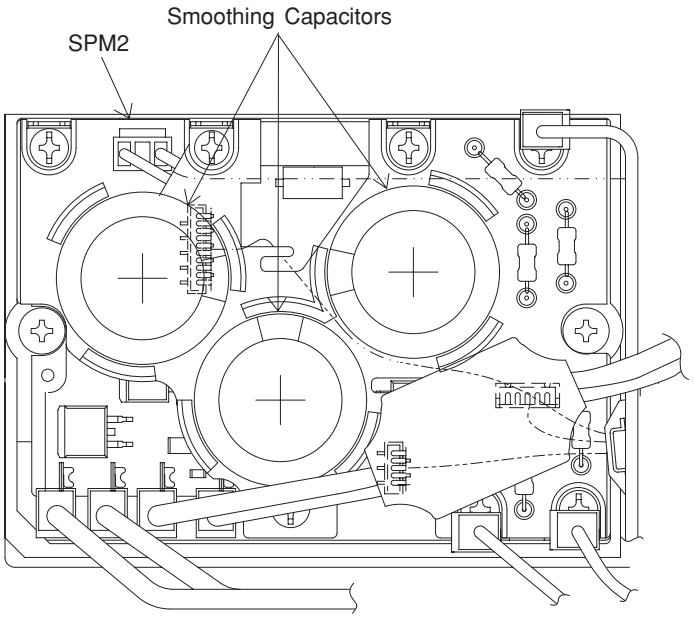


Fig. 1-2

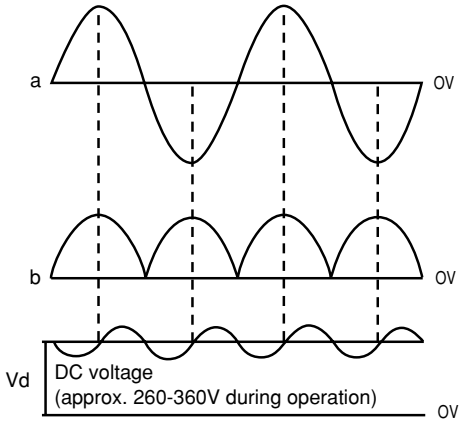


Fig. 1-3

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

(4) Smoothing capacitor (C020)
This smoothes (averages) the voltage rectified by the diode stack2. A DC voltage is generated in the same way as in Fig. 1-3.
Voltage between + side of C020 is about 330V.

(5) C001 to C003, C012 to C015, C007, C008, NF COIL1, COIL, C22 ~ C25 absorb electrical noise generated during operation of compressor, and also absorb external noise entering from power line to protect electronic parts.

(6) Surge absorber, Varistor 1, 2, 3,
absorbs external power surge.

(7) Inrush protective resistor (R002, R003)
This works to protect from overcurrent when power is turned on.

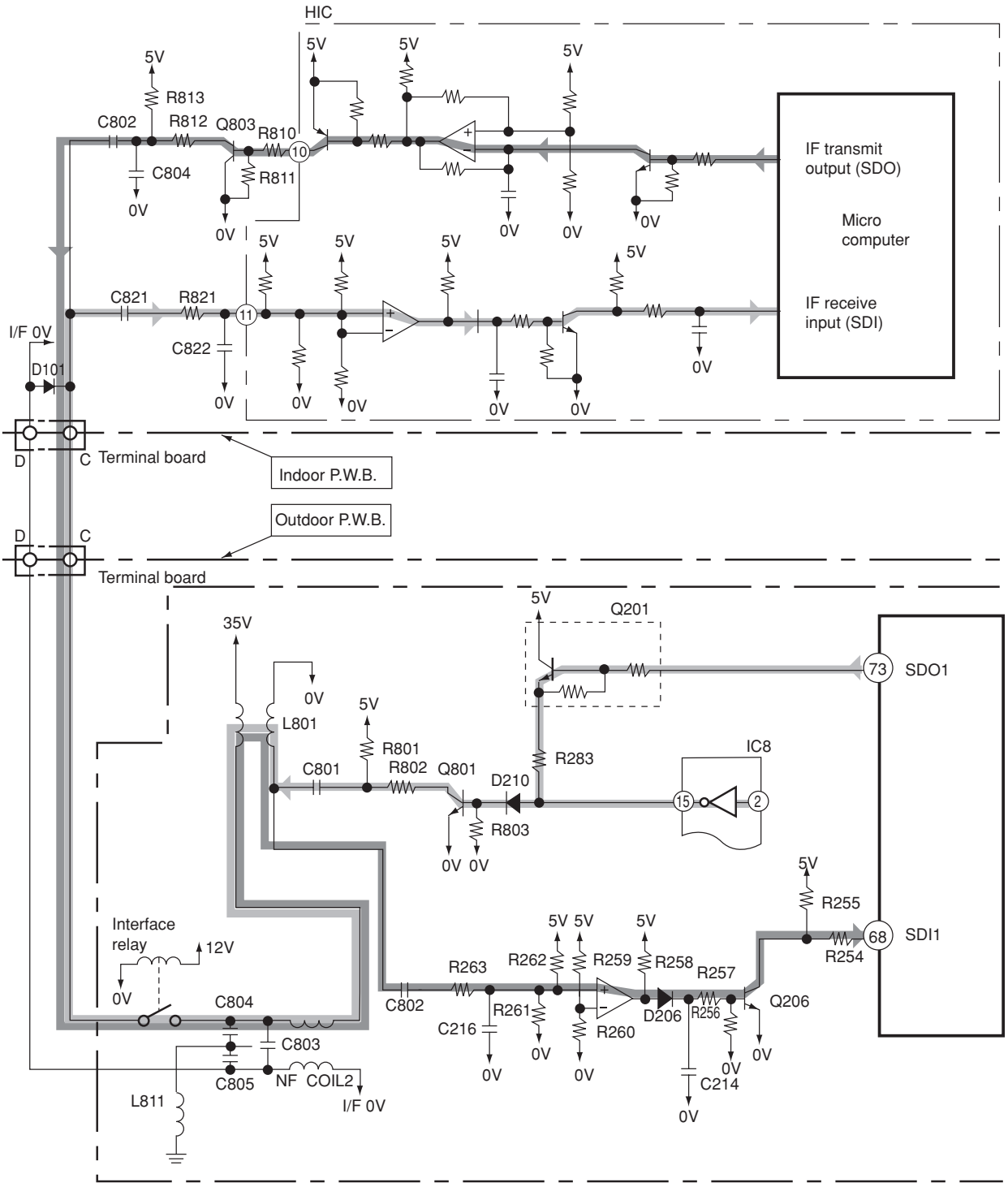
< Reference >

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

2. Indoor/Outdoor Interface Circuit

- The interface circuit superimposes an interface signal on the DC 35V line supplied from the outdoor unit to perform communications between indoor and outdoor units. This circuit consists of a transmiting circuit which superimposes an interface signal transmit from the microcomputer on the DC 35V line and a transmiting circuit which detects the interface signal on the DC 35V line and outputs it to the microcomputer.
- Communications are performed by mutually transmiting and receiving the 4-frame outdoor request signal one frame of which consists of a leader of approx. 100 ms., start bit, 8-bit data and stop bit and the command signal with the same format transmit from the indoor unit.
- From outdoor microcomputer to indoor microcomputer.
  The request signal output from microcomputer pin ⑦③ , ⑦④ , ⑨ is input to the transmitting circuit. The transmitting circuit modulates this signal by approx. 38kHz high-frequency. This high-frequency signal is amplified by a transistor, superimposed on the DC 35V line via C801 (or C811, C821) and L801 (or L802, L803), and supplied to the indoor unit.
  To prevent erroneous reception, the outdoor microcomputer is designed so that it cannot receive a signal while is is outputting a request signal.
  The receiving circuit in the indoor unit consists of a comparator and transistor. The interface signal from the outdoor unit on the DC 35V line is supplied to C821, where DC components are eliminated, and is then shaped by the comparator. The shaped signal is detected by diode, amplified by amp, and supplied to receiving input of the indoor microcomputer.
  Fig. 2-2 shows the voltages at each component when data is transferred from the outdoor microcomputer to the indoor microcomputer.
- Indoor microcomputer to outdoor microcomputer.
  The communications from the indoor microcomputer to the outdoor micro computer are the same. Fig. 2-3 shows the voltages and waveforms at each circuit.

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



(Communications from indoor micro computer to outdoor micro computer)

(Communications from outdoor micro computer to indoor micro computer)

Fig. 2-1 Indoor / Outdoor interface Circuit

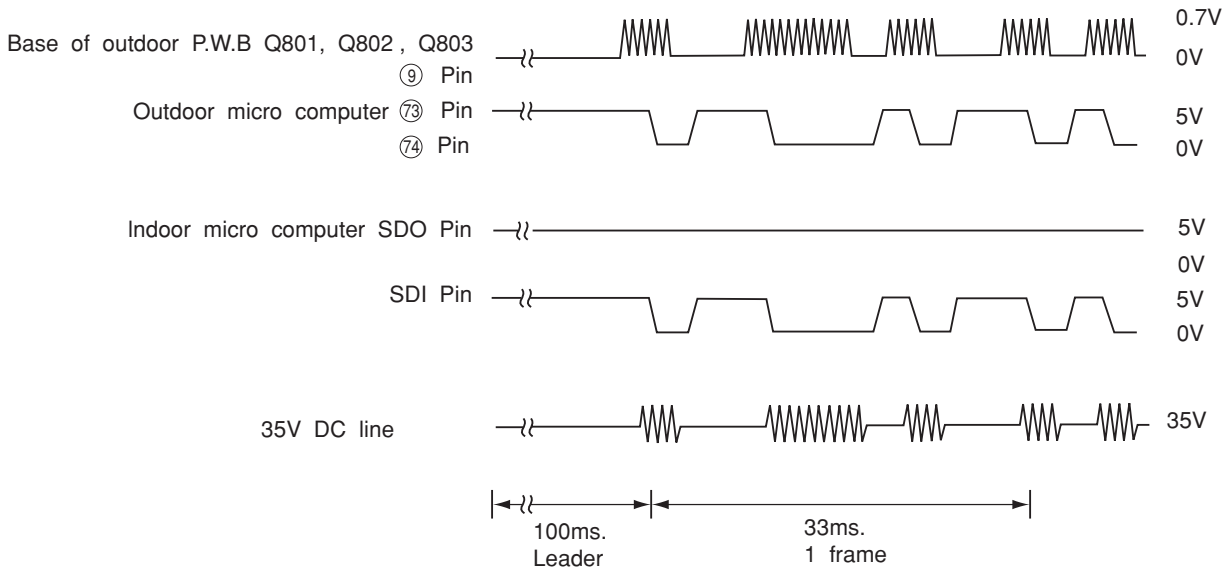


Fig. 2-2 Voltages Waveforms of indoor / Outdoor Micro computers (Outdoor to Indoor Communications)

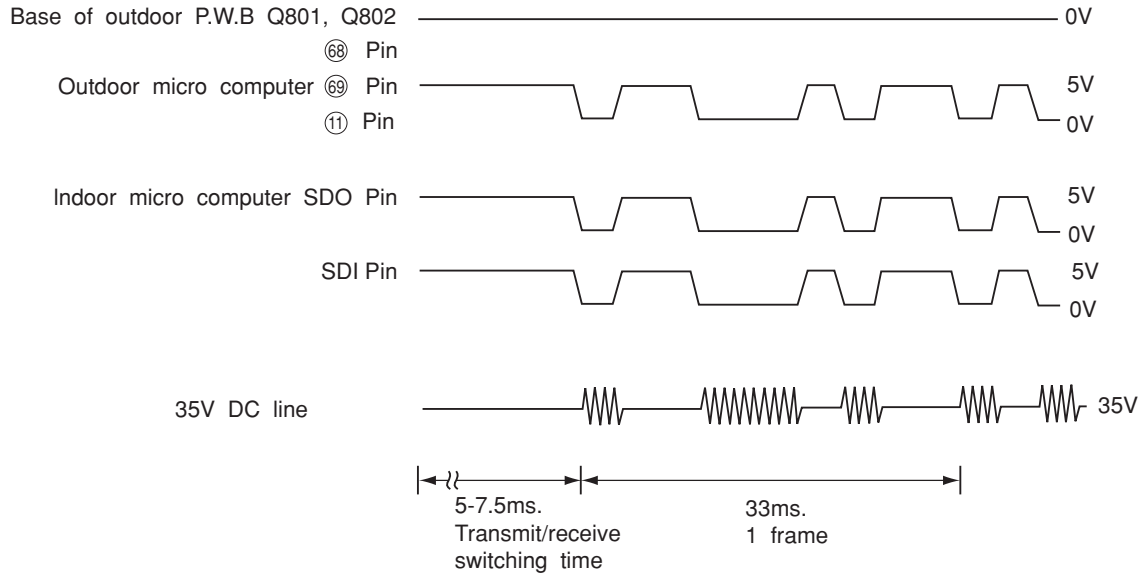


Fig. 2-3 Voltages Waveforms of indoor / Outdoor Micro computers (Indoor to Outdoor Communications)

3. Power Module Circuit

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

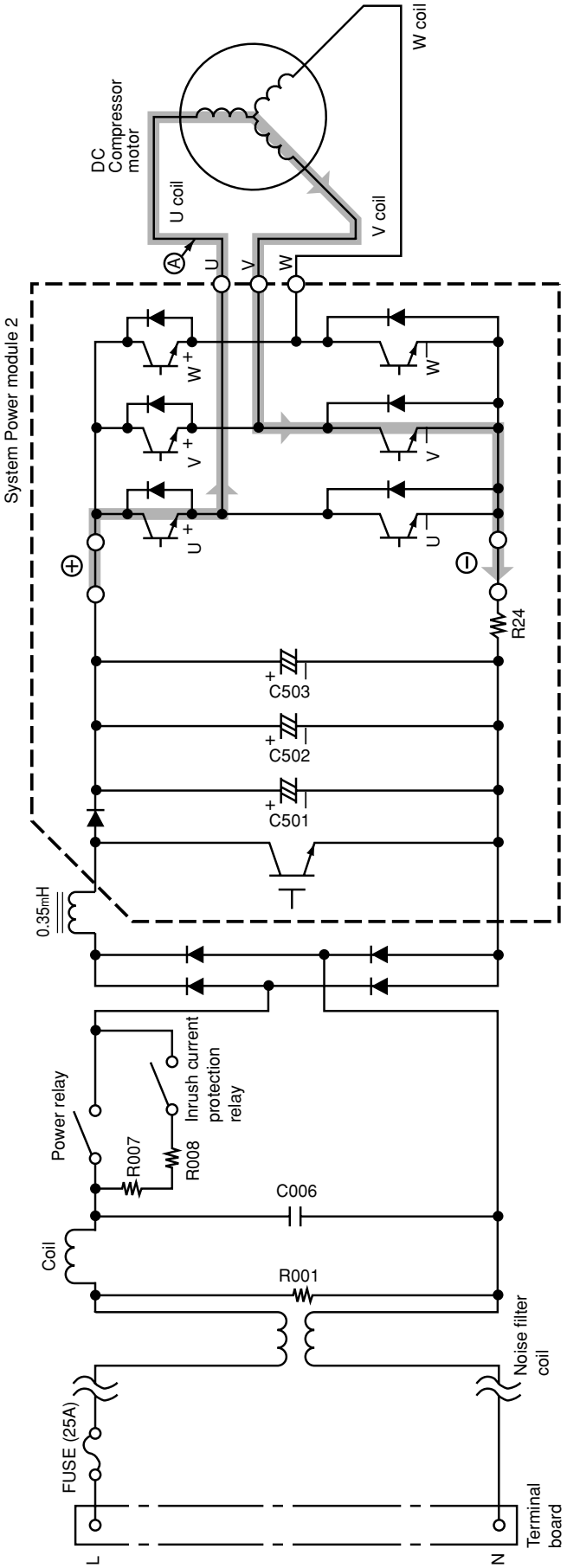


Fig. 3-1 Power module circuit (U^+ is ON, V^- is ON)

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

[※ At point E: U^+ is ON, V^- is ON (circuit in Fig. 3-1)
※ At point F: U^+ is chopped (OFF), V^- is ON (circuit in Fig. 3-4)]

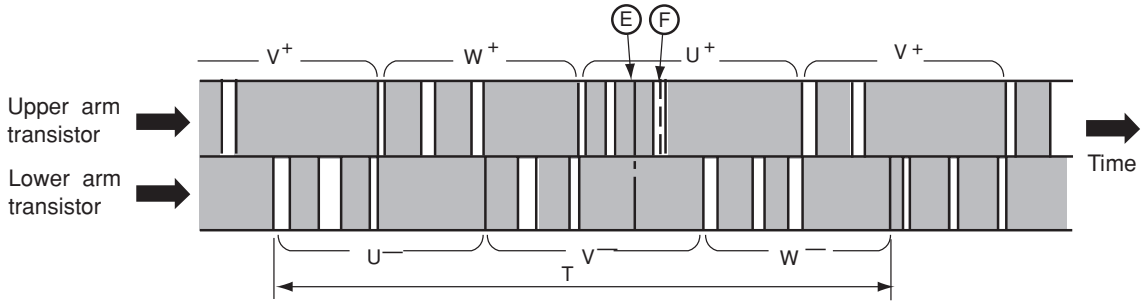


Fig. 3-2 Switching order of power module

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

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

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

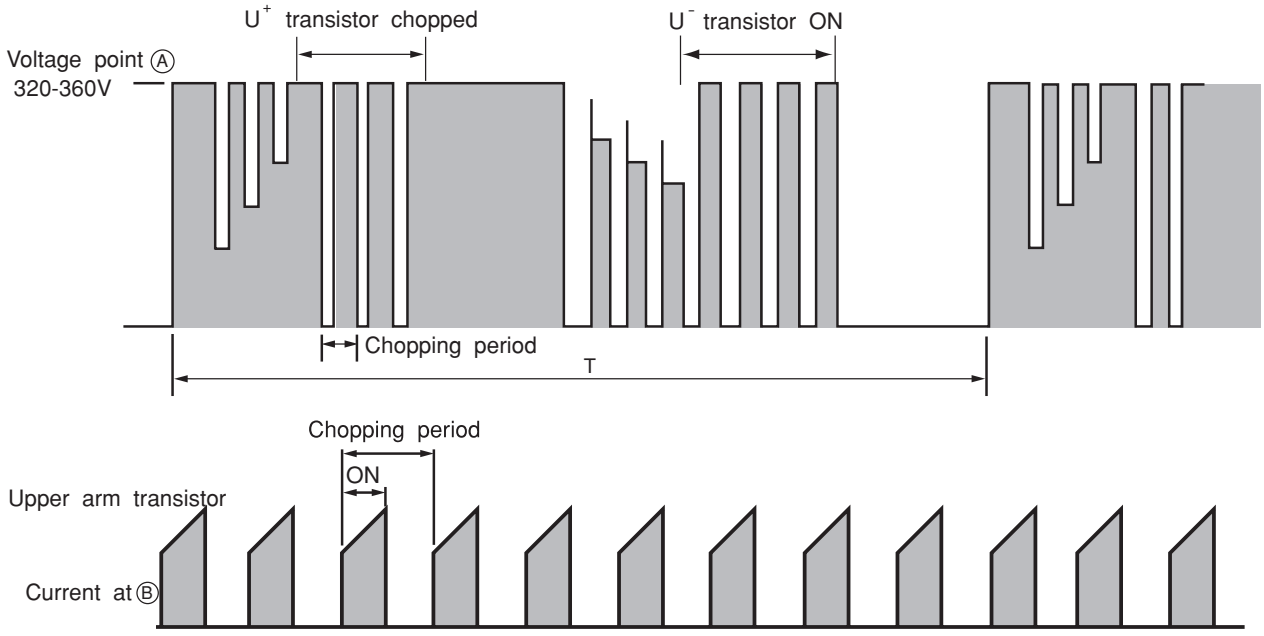


Fig. 3-3 Voltage waveform at each point

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

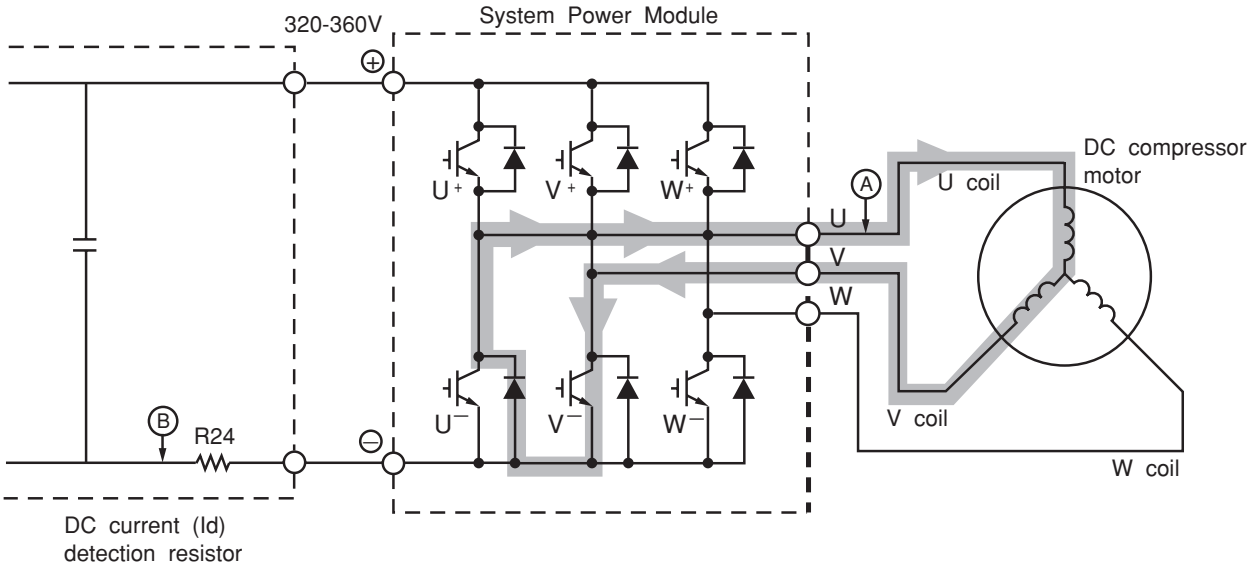


Fig. 3-4 System Power module circuit (U^+ is OFF, V^- is ON)

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

<Reference>

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

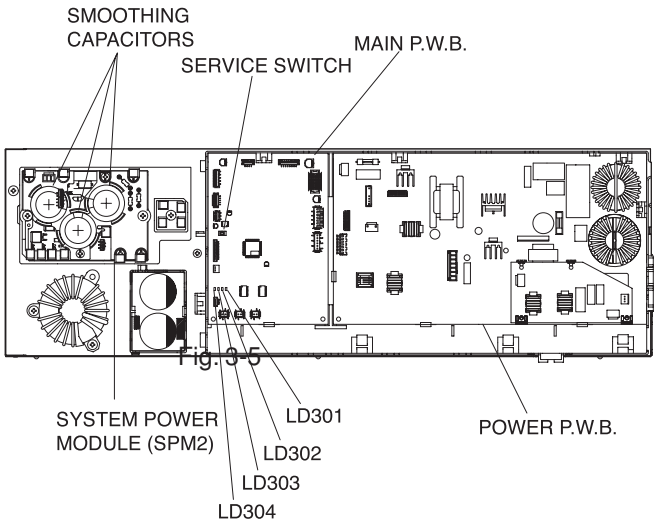


Fig. 3-5

Table 3-1

Self-diagnosis	Self-diagnosis lamp and mode	
Ip (peak current cut)	LD301	Blinks 2 times
Abnormal low speed rotation	LD301	Blinks 3 times
Switching incomplete	LD301	Blinks 4 times

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

4. Power Supply Circuit

- Fig. 4-1 shows the power circuit.

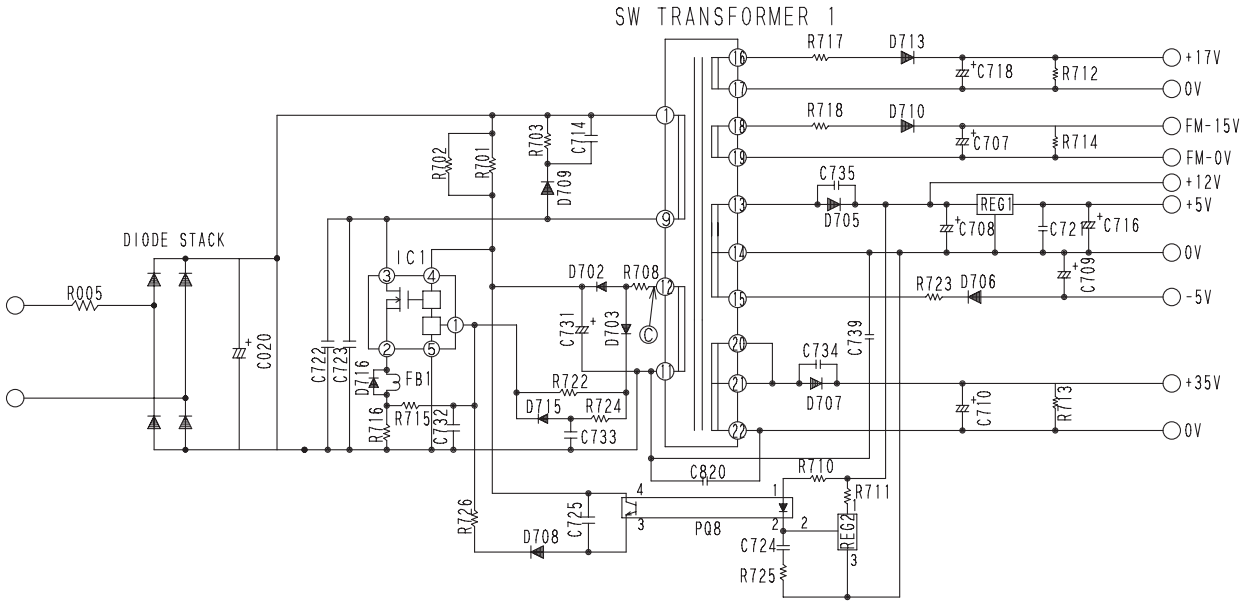


Fig. 4-1 Power circuit for P.W.B.

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

(1) Shifting from OFF to ON

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

(2) During ON

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

(3) Shifting from ON to OFF

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

(4) During OFF

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

  Energy=$LI^2/2$. Here, L : Primary inductance

  I : Current when IC1 is off

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

<Reference>

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

(1) Make sure that 5V, 12V, 15V, 17V and -5V on the control P.W.B. power voltage are the specified values.

(2) When only the 5V output is low:
REG 1 (regulator) faulty, 5V-0V shorted, output is too high, or REG 1 is abnormal.

(3) When 12V and 5V are abnormal:
The following defects can be considered:
① Fan, operation, power, rush prevention relay (shorting in relay, etc.)
② REG 1 (regulator is abnormal), etc.
Shorting on primary circuits.
When shorting occurs in the secondary circuits, there is no abnormality in the primary circuits because of overcurrent protection.
The voltage rises when an opening occurs in the primary circuits, or the feedback system is abnormal.

(4) When 15V and 17V power supply are abnormal:
D710, D713 or Drive circuit is abnormal.

(5) When all voltage are abnormal:
IC1, R716, may possibly be defective. Also D cable may possibly be reverse connected.
If IC1 is abnormal, be aware that other components, such as the power module, REG (regulator), etc. are possibly defective.

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

6. Rotor magnetic pole position detection circuit

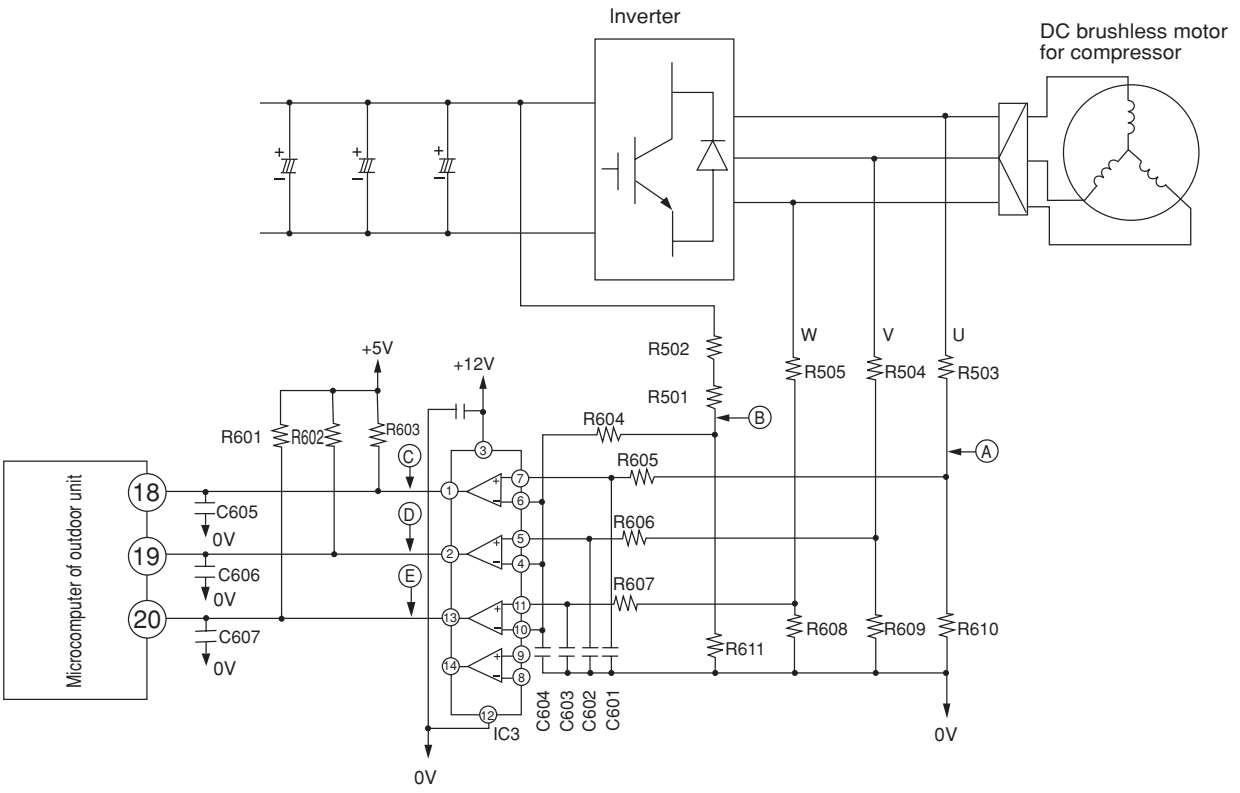


Fig. 6-1 Rotor magnetic pole position detection circuit

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

7. Peripheral circuit of microcomputer

- Fig. 7-1 shows the microcomputer and its peripheral circuits.
  Table 7-1, the basic operations of each circuit block, and Fig. 7-2, the system configuration.

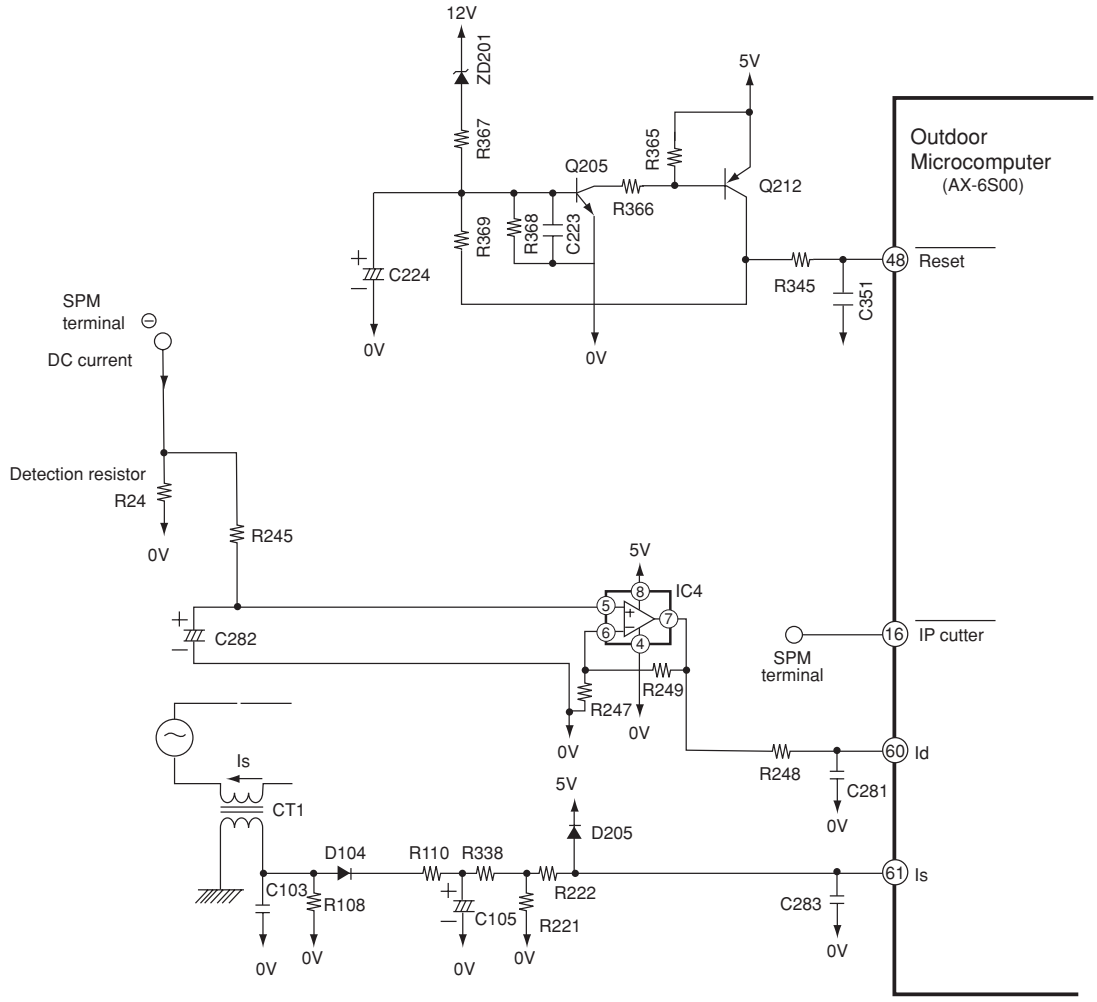


Fig. 7-1 Peripheral circuit of microcomputer (AX-6V)

Table 7-1

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

8. Overload control circuit (OVL control circuit)

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

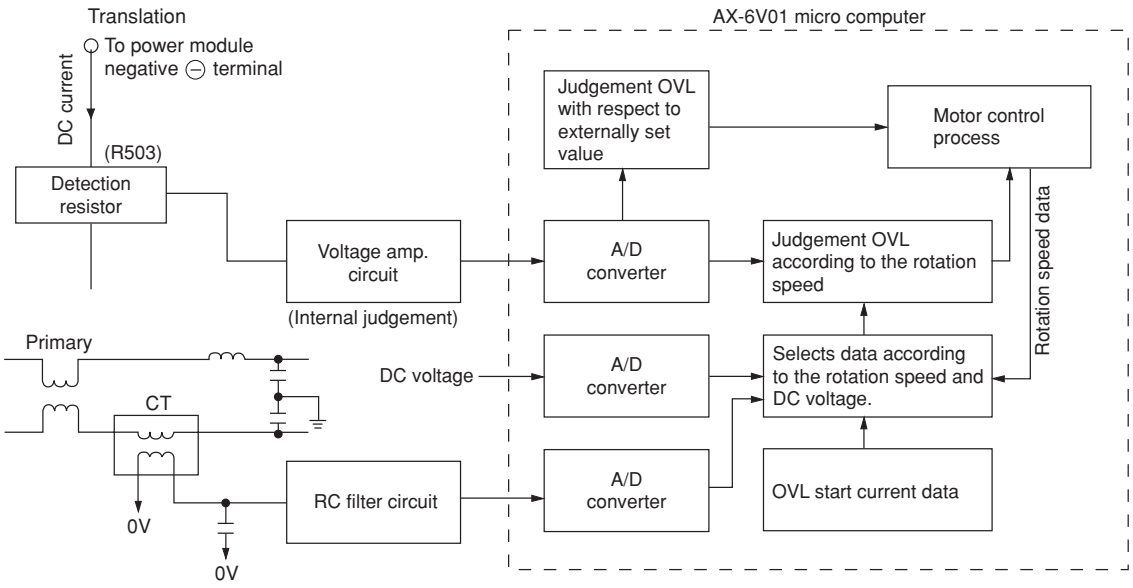


Fig. 8-1 Overload Control System Configuration

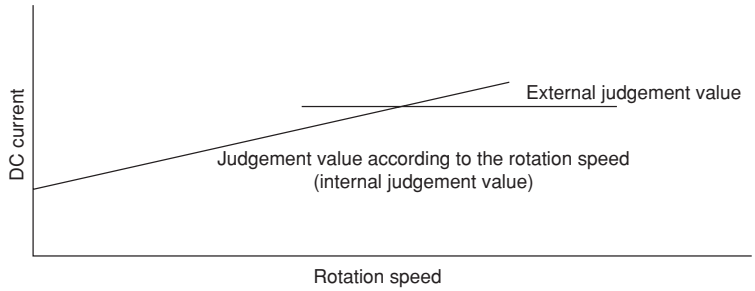


Fig. 8-2

9. Reset Circuit

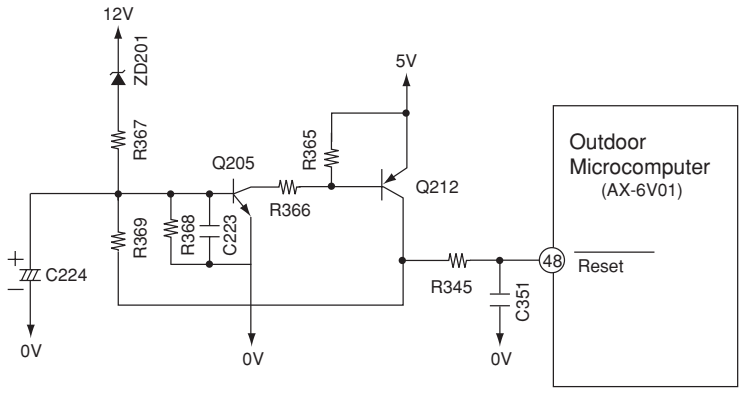


Fig. 9-1

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

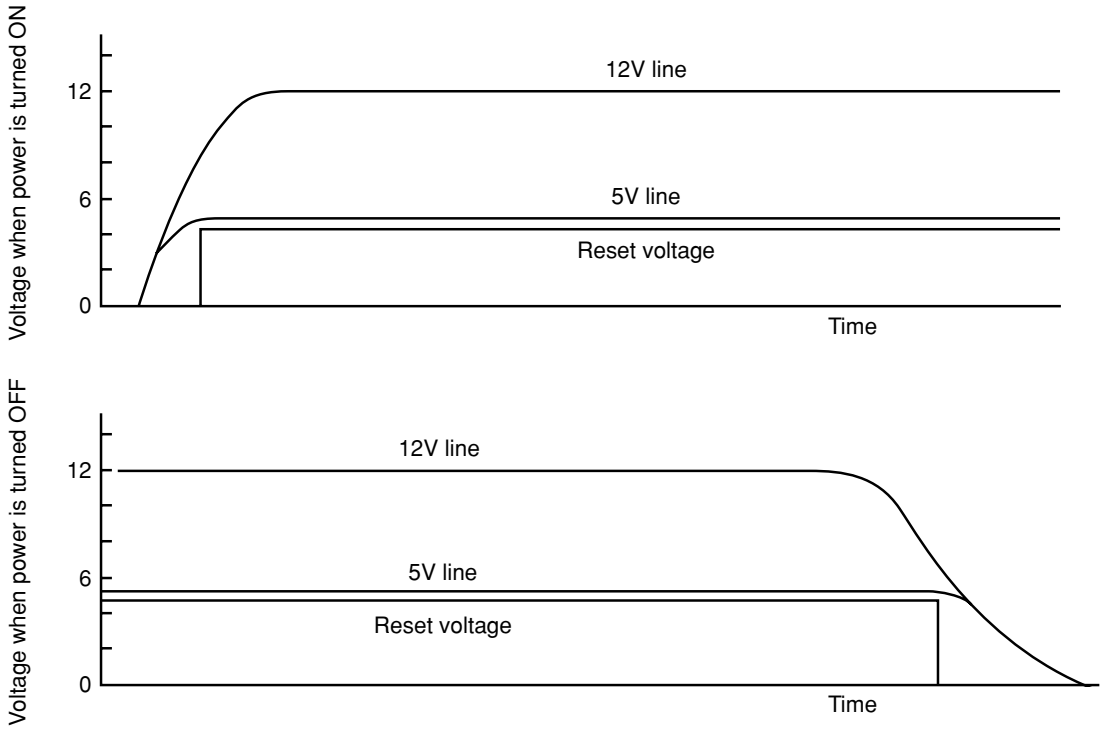


Fig. 9-2

10. Temperature Detection Circuit

- The outdoor units (this model) provides with the outdoor temperature thermistor, DEF (defrost) thermistor, OH (overheat) thermistor and electric expansion valve thermistor so that they detect the temperatures of the unit and control the system.
- The circuit of the thermistors is shown as Fig. 10-1 for model RAS-70YHA1/RAS-80YHA1, and their roles and temperature measuring points are shown as Table 10-1.

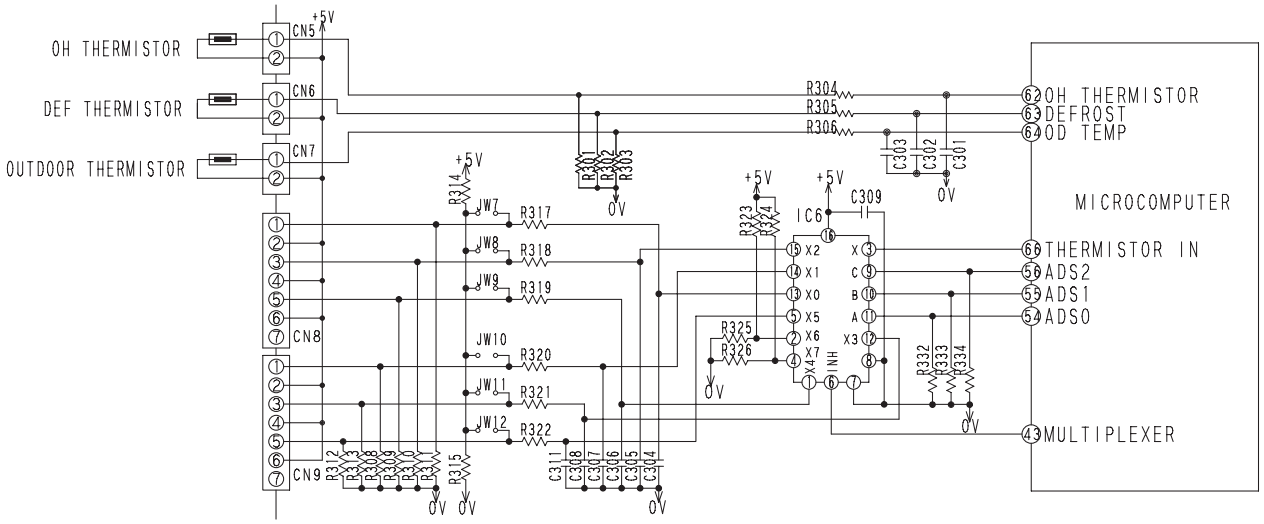


Fig. 10-1 Temperature Detection Circuit

Table 10-1 Name and Role of each thermistor

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

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

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

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

- When the connectors of the thermistors are disconnected or the thermistors is open or short, LD301 (red) lights and LD302 (red) blinks so that they indicate troubled parts. Combinations of LD301 and LD302 are set up for indicating troubled thermistors. The correspondences between the number of blink time and troubled parts are shown as Table 10-3. Look in the table (LD301 and LD302 blink) for troubled parts, and if the disconnections of them are checked out, they are replaced.

- If you can see two or more troubled thermistors, a small number of blink takes precedence of others.

- The electric expansions valve thermistor is put togrther with 3 pieces, when replacing the thermistor, replace one set of 3 pieces as taking care of positioning. If you don't do so, the unit may not operate normally and its cooling performance may drop.

- Be ware that only an open-circuit for OH thermistor has to be checked in 5 minutes after the compressor starts.

- If the unit operates abnormally after replacing the thermistor, replace the control P.W.B. because it malfunctions.

11. Electric expansion valve

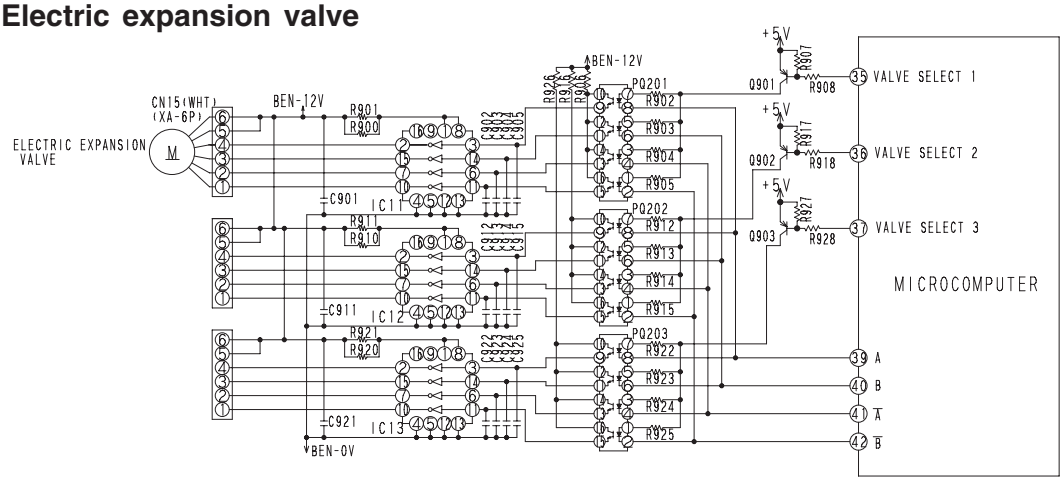


Table 11-1

- The electric expansion valve is driven by DC 12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below.

  When power is supplied, voltages at pins 4 to 1 of CN15 are about 0.9V; they are about 12V when no power is supplied. When power is reset, initialization is performed for 10 or 20 seconds.

  During initialization, measure all voltages at pins 4 to 1 of CN15 using mutimeter. If there is any pin with voltage that has not changed from around 0.9V or 12V, expansion valve or microcomputer is defective.
- Fig. 11-2 shows logic waveform when expansion valve is operating.

Table 11-2

Pin phase No.	Lear wire	Drive status							
		1	2	3	4	5	6	7	8
④	White	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
③	Yellow	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
②	Orange	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
①	Blue	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

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

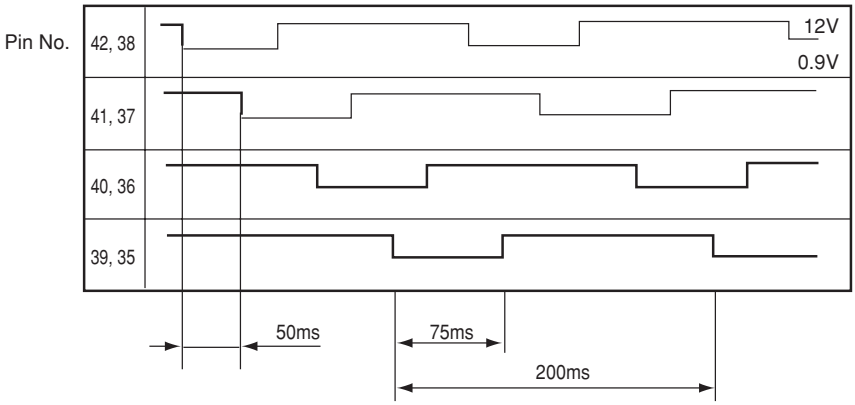


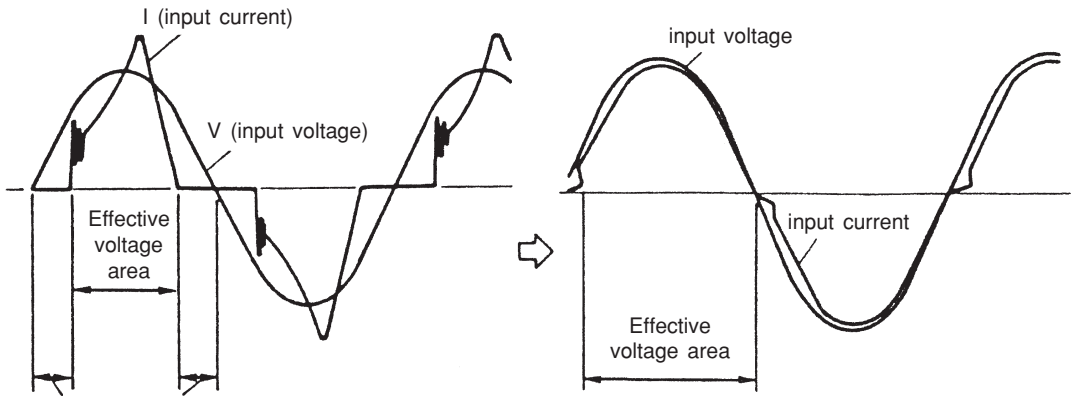
Fig. 11-2

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

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

12. Power Factor Control Circuit

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



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

SERVICE CALL Q & A

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

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

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

DEHUMIDIFYING MODE

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

A2 Normal sound when refrigerant flows in pipe.

Q3 Compressor occasionally does not operate during dehumidifying.

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

HEATING MODE

Q4 The circulation stops occasionally during Heating mode.

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

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

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

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

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

AUTO FRESH DEFROSTING

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

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

AUTO OPERATION

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

A8 At this point fan speed is automatic.

NICE TEMPERATURE RESERVATION

Q9 When on-timer has been programmed, operation starts before the preset time has been reached.

A9 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.

Q10 Does “Nice temperature reservation” function operate during dehumidifying?

A10 It does not work. It works only during cooling and heating.

Q11 Even if the same time is preset, the operation start time varies.

A11 This is because “Nice temperature reservation” function is operating. The start time varies according to the load of room. Since load varies greatly during heating, the operation start time is corrected, so it will vary each day.

INFRARED REMOTE CONTROL

Q12 Timer cannot be set.

A12 Has the clock been set? Timer cannot be set unless the clock has been set.

Q13 The current time display disappears soon.

A13 The current time disappears in approx. 10 seconds. The time set display has priority.

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

Q14 The timer has been programmed, but the preset time disappears.

A14 Is the current time past the preset time? When the preset time reaches the current time, it disappears.

OTHERS

Q15 The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)

A15 This is because the cool wind prevention function is operating, and does not indicate a fault.

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

Q16 Loud noise from the outdoor unit is heard when operation is started.

A16 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.

Q17 Noise from the outdoor unit occasionally changes.

A17 The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature. This does not indicate a fault.

Q18 There is a difference between the set temperature and room temperature.

A18 There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable for the space.

Q19 Air does not flow immediately after operation is started.

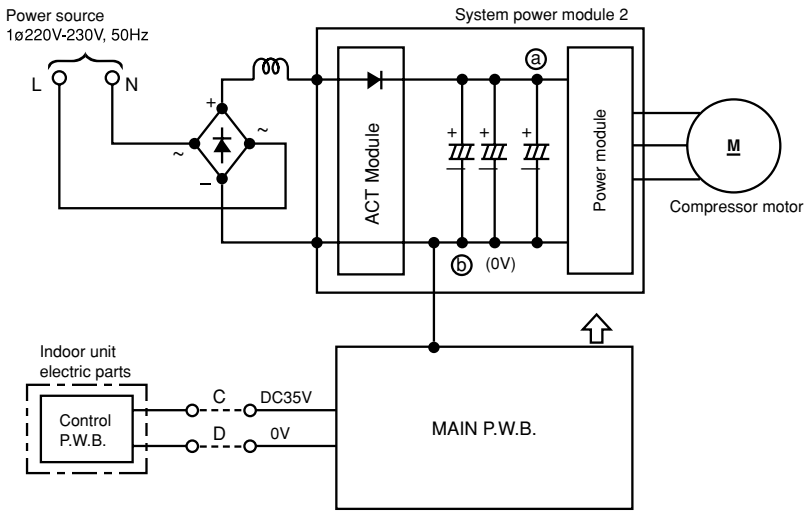
A19 Preliminary operation is performed for one minute when the power switch on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

TROUBLE SHOOTING

PRECAUTIONS FOR CHECKING

DANGER

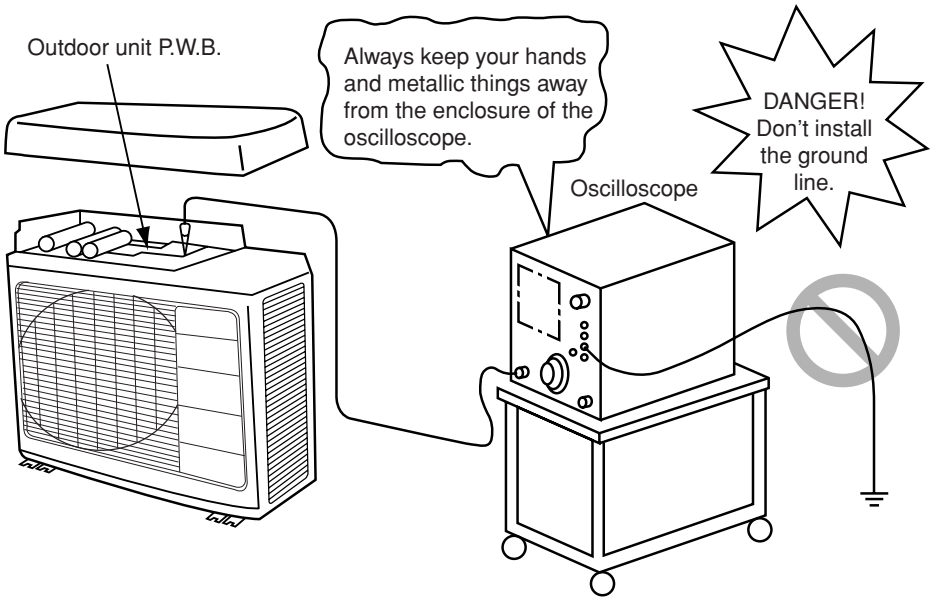
1. Remember that the 0V line is biased to 155-170V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltage fall after the power switch is turned off.



Across ⓐ – ⓑ (0V line)..... approx 260-360V
Across ⓐ – ground..... approx 155-170V
Across ⓑ (0V line)– ground..... approx 155-170V

DANGER

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

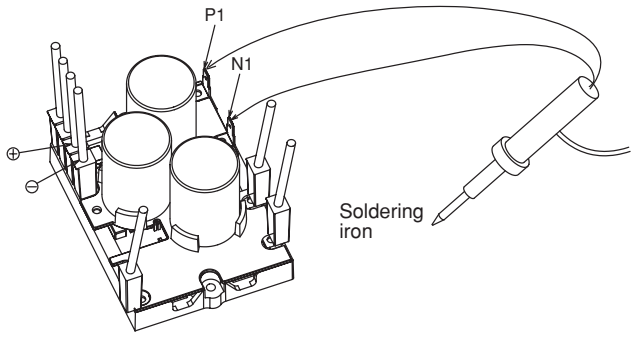


DISCHARGE PROCEDURE AND POWER SHUT OFF METHOD FOR POWER CIRCUIT

WARNING

Caution
- Voltage of about 300-330V is charged between both ends of smoothing capacitors
- During continuity check for each part of circuit in indoor unit electrical parts, disconnect red/gray lead wire connected from diode stack to system power module (SPM2) to prevent secondary trouble. (Be sure to discharge smoothing capacitor)

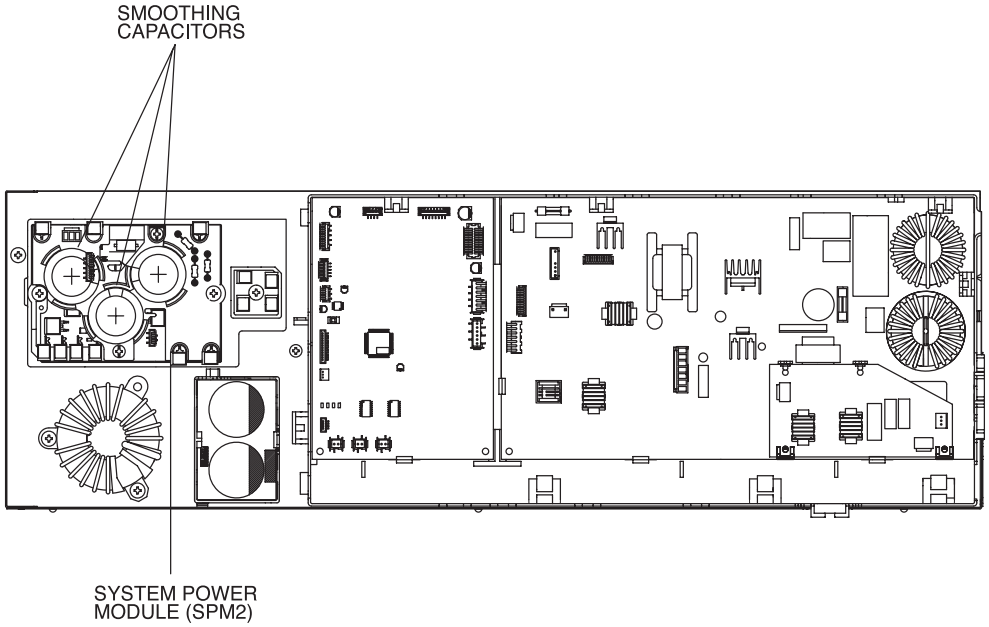
1. Turn OFF the Power supply to the outdoor unit.
2. After power is turned off, wait for 10 minutes or more. Then, remove electrical parts cover and apply soldering iron of 30 to 75W for 15 seconds or more to P2 and N1 terminals on system power module, in order to discharge voltage in smoothing capacitor.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



System power module

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

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



TROUBLESHOOTING WHEN TIMER LAMP BLINKS

Model RAD-50DH7A, RAD-60DH7A, RAD-70DH7A

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

SELF-DIAGNOSIS LIGHTING MODE

Model: RAD-50DH7A, RAD-60DH7A, RAD-70DH7A

<Remark>

If using wired remote controller, electrical cover have to be opened so that timer lamp at indoor p.w.b can be seen as Fig. 1.

If using wireless remote controller (optional part), no need to open electrical cover. Refer the timer lamp at panel-as (Fig. 2).

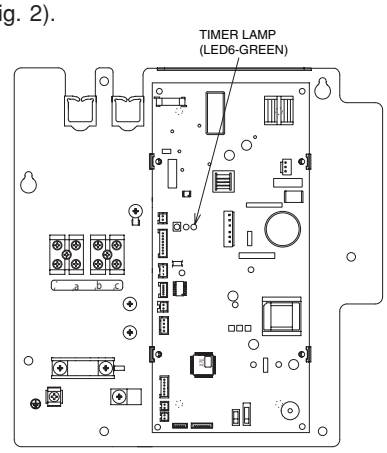


Fig. 1

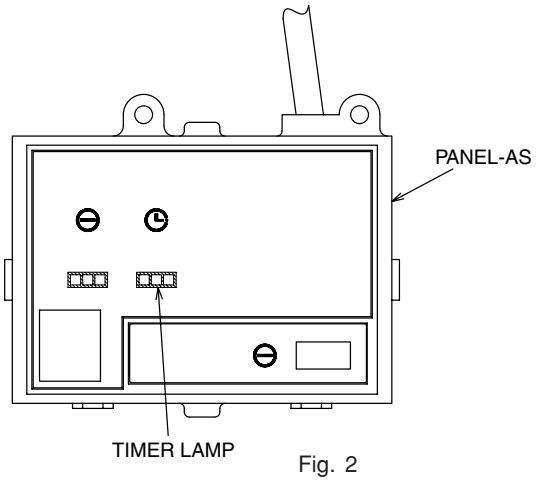


Fig. 2

No.	Timer indicator flashing mode	Reason for display	Section of estimated fault
1	2 sec. – – – – – – – – Once	**Four-way valve faulty** The room heat exchange temperature is low during heating, or it is high during cooling.	(1) Four-way valve faulty. (2) Disconnection in heat exchange thermistor (only during heating)
2	2 sec. – – – – – – – Twice	**Outdoor unit forced operation** The outdoor unit is in forced operation or undergoing balancing after forced operation.	Service SW in outdoor electrical parts turned ON.
3	2 sec. – – – – – – 3 times	**Indoor/outdoor interface faulty** The interface signal from the outdoor unit has been interrupted.	(1) Indoor interface circuit (2) Outdoor interface circuit
4	2 sec. – – 4 times	**Outdoor electrical assembly defective.**	Please check at the outdoor electrical led lamp blinking (LD301) and refer to self diagnosis lighting mode for outdoor unit.
5	2 sec. – – 6 times	**Abnormal water level detection** All stop when the float switch has been activated.	(1) Drain stopped up (2) Drain pump (3) Float switch
6	2 sec. – – 7 times	**Drain pump forced operation.** When the knob of drain pump test switch at Indoor P.W.B main slide to 'test' position.	(1) Indoor P.W.B. Main.
7	2 sec. – – 9 times	**Room thermistor or heat exchanger thermistor is faulty** When room thermistor or heat exchanger thermistor is opened circuit or short circuit.	(1) Room thermistor (2) Heat exchanger thermistor
8	2 sec. – – 10 times	**DC fan motor overcurrent detection** Overcurrent in indoor DC fan motor has been detected.	(1) Indoor fan locked (2) Indoor fan motor (3) Indoor P.W.B. Main
※1 9	2 sec. – – 13 times	**IC401 data reading fault** There was error in the data read from IC401	IC401 faulty

(▮ – – 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 to see if the connecting cable is connected or disconnected.

(3) To check operation again when the timer lamp is blinking, you can use the remote control for operation (except for mode mark ※1).

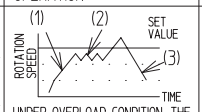
SELF-DIAGNOSIS LIGHTING MODE

MODEL RAC-50DH7, RAC-60DH7, RAC-70DH7

DANGER (DC360V)

- SWITCH OFF MAIN POWER SUPPLY TO THE OUTDOOR UNIT AT LEAST 10 MINUTES BEFORE START THE SERVICING WORK.
- MAKE SURE THE DC VOLTAGE LEVEL AT MEASURING POSITION (P1) AND (N1) IS LESS THAN 10V.
- DO NOT TOUCH THE SCREWS OF THE SYSTEM POWER MODULE WHEN THE UNIT IS TURNED ON. HIGH VOLTAGE STILL REMAIN EVEN AFTER THE UNIT IS TURNED OFF.
- DO NOT TOUCH ANY OTHER PARTS EXCEPT THE SERVICE SWITCH WHEN SERVICE OPERATION IS CONDUCTED.

SELF-DIAGNOSIS LIGHTING MODE ■ LIT ▨ BLINKING □ OFF

LD301 RED	LD302 RED	LD303 RED	LD304 GRN	SELF-DIAGNOSIS NAME	DETAILS	MAIN CHECK POINT
				[1] DURING OPERATION		
□	□	■	□	NORMAL OPERATION	COMPRESSOR OPERATION	NOT MALFUNCTION
■	□	■	□	OVERLOAD (1)		THIS SHOWS AN OVERLOAD, NOT MALFUNCTION.
□	■	■	□	OVERLOAD (2)		
■	■	■	□	OVERLOAD (3)		

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

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

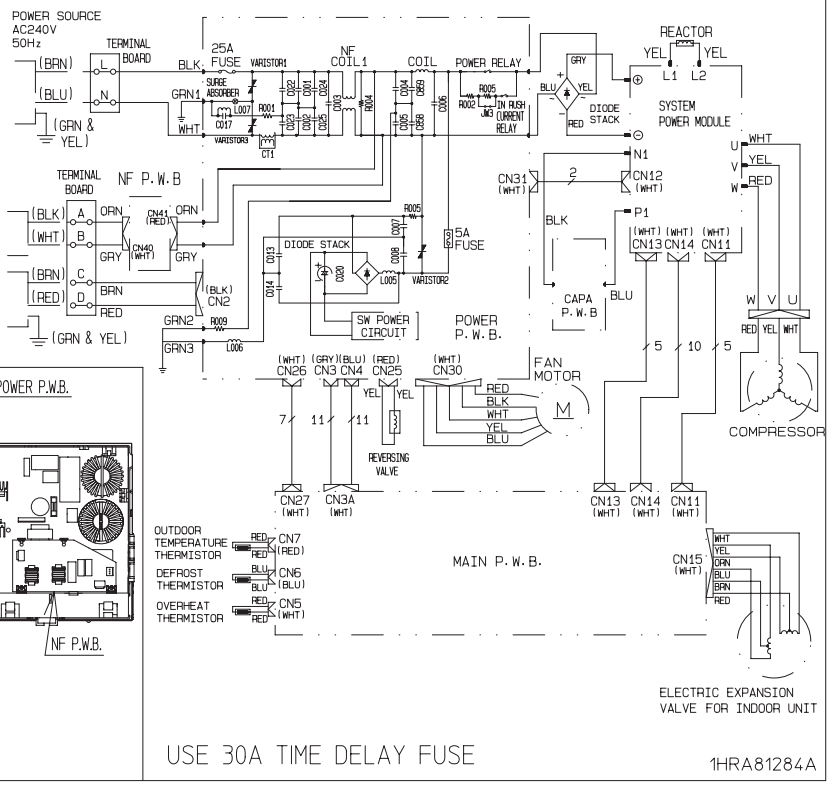
CORRESPONDENCE TABLE FOR ABNORMAL THERMISTOR

BLINKING TIME	ABNORMAL THERMISTOR
1 TIME	OVERHEAT THERMISTOR
2 TIMES	DEFROST THERMISTOR
3 TIMES	OUTDOOR TEMPERATURE THERMISTOR

LD301	LD302	LD303	LD304	[2] DURING STOP		
□	□	□	□	NORMAL STOP	INDOOR THERMOSTAT OFF. MAIN OPERATION OFF.	NOT MALFUNCTION.
▨	□	□	□	RESET STOP 1 TIME	WHEN STOPPED WITH POWER RESET. (NORMAL WHEN POWER HAS BEEN TURNED ON).	① P.W.B.s (POWER CIRCUIT,HIC, ETC.)
▨	□	□	□	PEAK CURRENT CUT 2 TIMES	OVER CURRENT IS DETECTED.	① COMPRESSOR ② P.W.B.s
▨	▨	□	□			① SYSTEM POWER MODULE ② P.W.B.s
▨	□	□	□	ABNORMAL LOW SPEED ROTATION 3 TIMES	POSITION DETECTION SIGNAL IS NOT INPUT DURING OPERATION.	① SYSTEM POWER MODULE ② COMPRESSOR ③ P.W.B.s
▨	□	□	□	SWITCHING FAILURE 4 TIMES	FAIL TO SWITCH FROM INITIAL LOW FREQUENCY SYNC. TO POSITION DETECTION SYNC. .	① SYSTEM POWER MODULE ② COMPRESSOR ③ P.W.B.s
▨	□	□	□	OVERLOAD LOWER LIMIT CUT 5 TIMES	OVERLOAD CONDITION STILL PERSISTING EVEN WHEN ROTATION SPEED IS BELOW THE LOWER RPM LIMIT.	① OUTDOOR UNIT IS EXPOSED TO DIRECT SUNLIGHT OR ITS AIRFLOW BLOCKED. ② FAN MOTOR ③ FAN MOTOR CIRCUIT ④ THE VOLTAGE IS EXTREMELY LOW.
▨	□	□	□	OH THERMISTOR TEMP. RISE 6 TIMES	OH THERMISTOR IS OPERATING.	① LEAK OF REFRIGERANT ② COMPRESSOR ③ OH THERMISTOR CIRCUIT ④ FAN MOTOR ⑤ FAN MOTOR CIRCUIT
▨	□	□	□	ACCELERATION DEFECTIVE 8 TIMES	NO ACCELERATION ABOVE THE LOWER LIMIT OF THE ROTATION SPEED.	① LEAK OF REFRIGERANT ② COMPRESSOR
▨	□	□	□	POWER SUPPLY VOLTAGE ERROR 10 TIMES	POWER SUPPLY VOLTAGE IS INCORRECT.	① POWER SUPPLY VOLTAGE ② RECEPTACLE OF WIRE AT SYSTEM POWER MODULE IS NOT PROPERLY INSERTED
▨	□	□	□	FAN LOCK ERROR 12 TIMES	OUTDOOR FAN RPM IS NOT ROTATE AS INTENDED RPM.	① FAN MOTOR ② FAN MOTOR CIRCUIT
▨	□	□	□	EEPROM READING ERROR 13 TIMES	MICROCOMPUTER CANNOT READ THE DATA IN EEPROM.	① MAIN P.W.B.
▨	□	□	□	ACTIVE CONVERTER DEFECTIVE 14 TIMES	OVER VOLTAGE IS DETECTED BY SYSTEM POWER MODULE.	① SYSTEM POWER MODULE
■	▨	□	□	ABNORMAL THERMISTOR LIT 1~3 TIMES	THERMISTOR IS OPENED OR SHORTED. REFER TO TABLE "CORRESPONDENCE TABLE FOR ABNORMAL THEMISTOR"	① THERMISTOR ② CONNECTION OF THERMISTOR IS FAULTY ③ THERMISTOR CIRCUIT
□	□	□	▨	COMMUNICATION ERROR BETWEEN INDOOR AND OUTDOOR UNIT 1 TIMES	WHEN INDOOR UNIT IS NOT CONNECTED, IT BLINKS SIMILARLY. NOT MULFUNTION.	① CABLE IS WRONG CONNECTED ② CABLE IS OPEN ③ INTERFACE CIRCUIT BETWEEN INDOOR AND OUTDOOR UNIT.

WIRING DIAGRAM

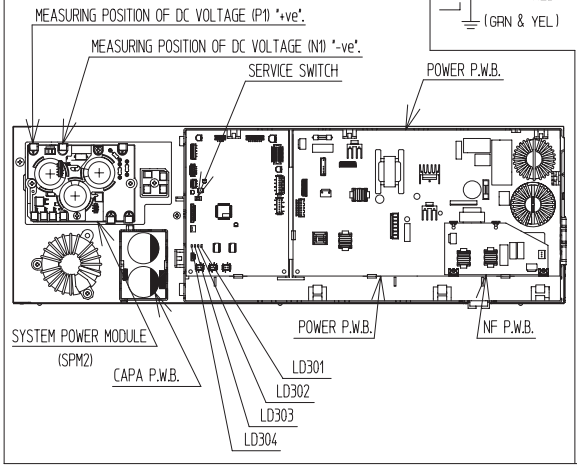
BLK : BLACK GRY : GRAY
BLU : BLUE RED : RED
BRN : BROWN WHT : WHITE
GRN : GREEN YEL : YELLOW
ORN : ORANGE



SERVICE OPERATION

COLLECT REFRIGERANT FROM INDOOR UNIT AND STORE AT OUTDOOR UNIT.

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



USE 30A TIME DELAY FUSE

1HRA81284A

CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

Unit does not operate

Yes

Open electrical cover of indoor unit.

Does the timer lamp on the indoor unit blink?

Timer lamp

See Troubleshooting when the timer lamp blinks . Refer page 85.

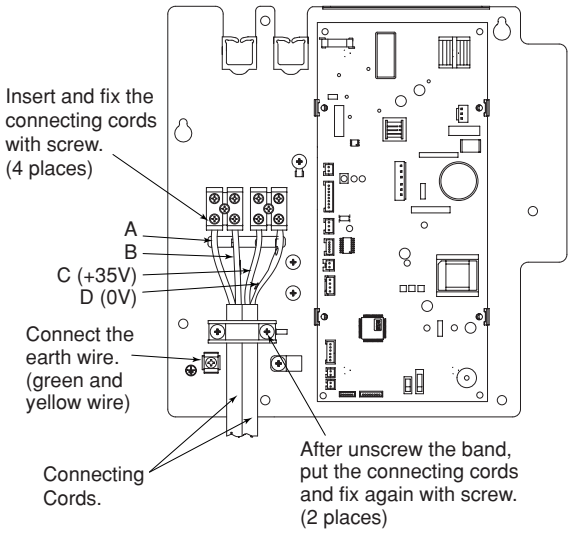
No

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

Does the operation lamp on the indoor unit start to light or blink?

No

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



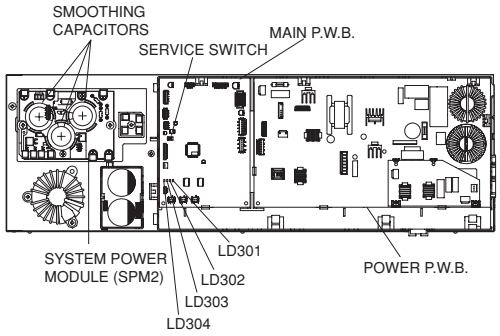
Yes

Is the compressor in the outdoor unit operating?

Yes

No

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



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

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

No

Yes

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

Normal

Blinking other than one time

One-time blinking

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

Yes

See Out door unit self-diagnosis lamp lighting mode .

No

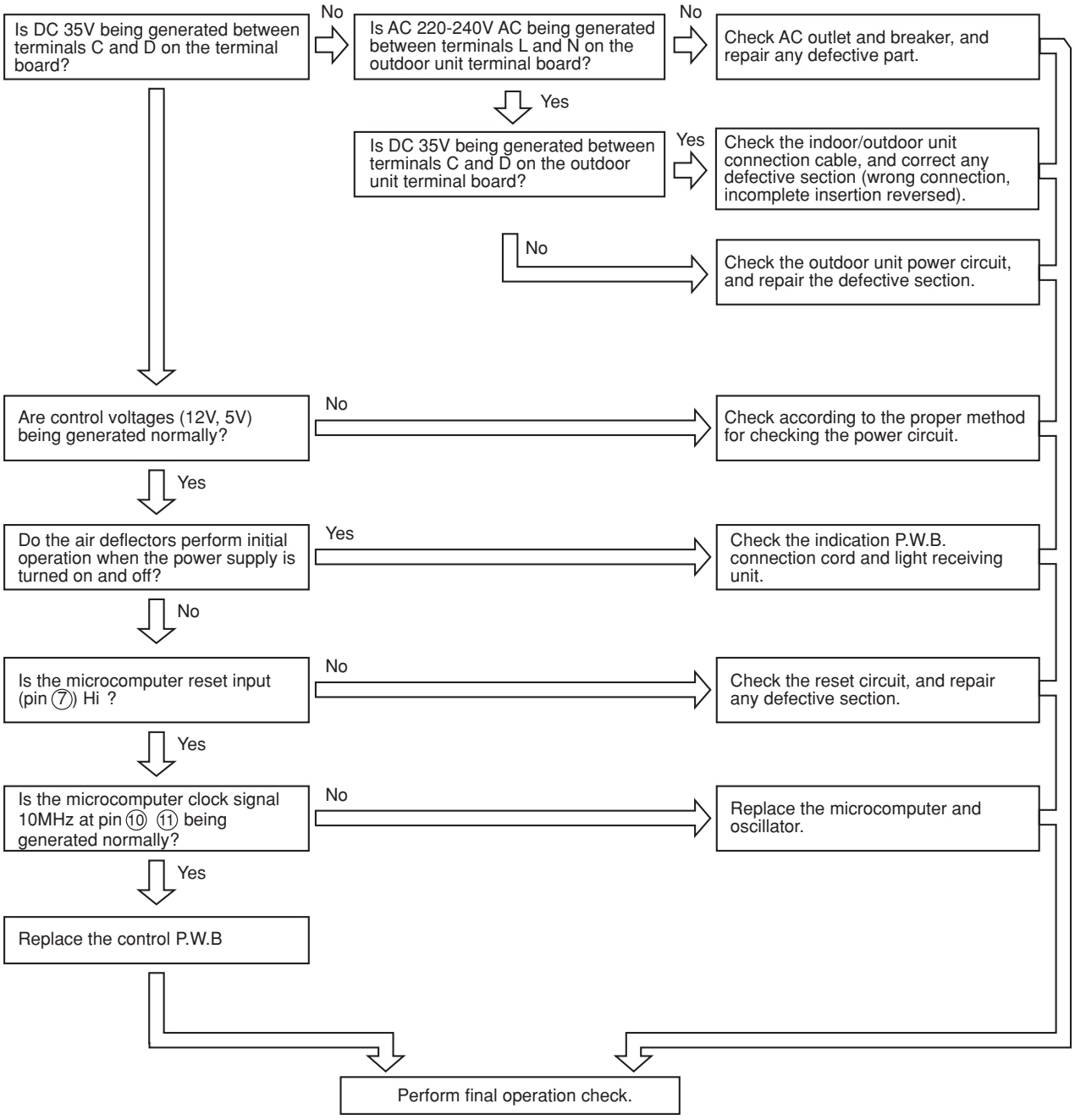
Check the refrigerating cycle.

Check the outdoor electrical parts.

Check the indoor electrical parts.

CHECKING INDOOR UNIT ELECTRICAL PARTS

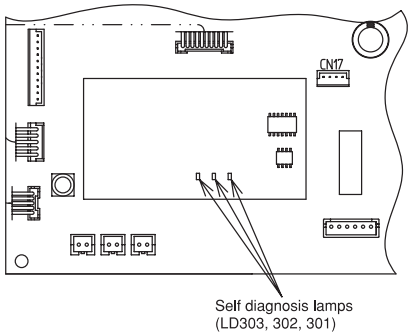
1. Power does not come on (no operation)



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

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

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



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

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

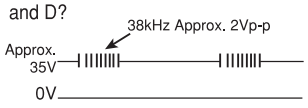
Check the heat exchanger thermistor; if it is defective, replace it.
<Normal values>
10°C → approx. 20kΩ
25°C → approx. 10kΩ
30°C → approx. 8kΩ

No

Does outdoor electrical part LD301 blink nine times?

Yes

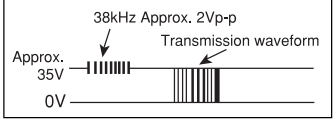
Is the indoor/outdoor unit communication signal superimposed on 35V DC of connection wires C and D?



No → Check outdoor electrical parts, and repair any defective parts (around the outdoor interface transmitting circuit).

Yes

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



No → Check the indoor interface transmitting circuit. Replace IC801.

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

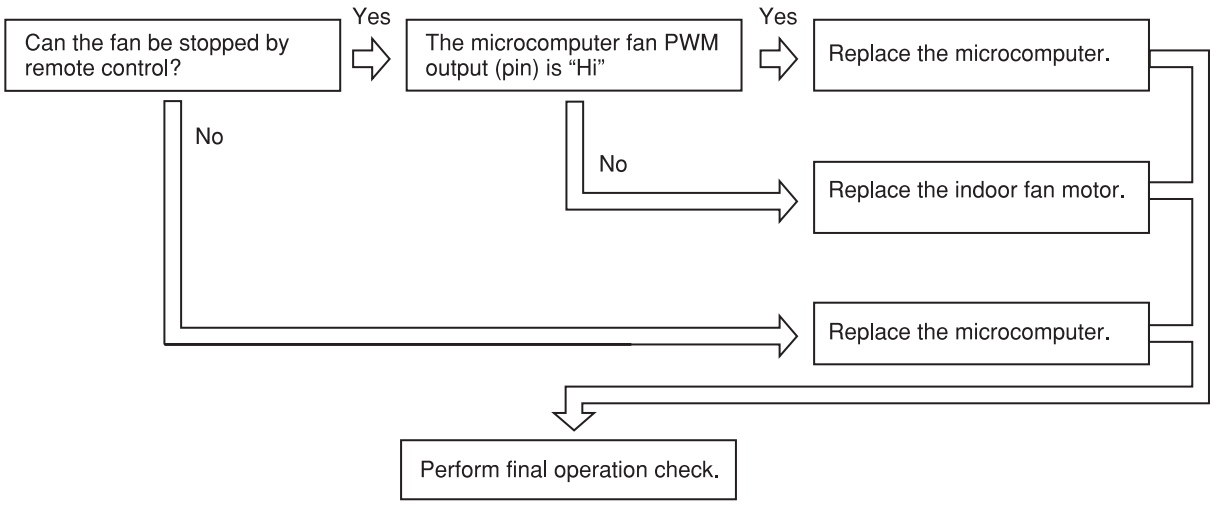
No

Does LD303 switch off several second after it lights?

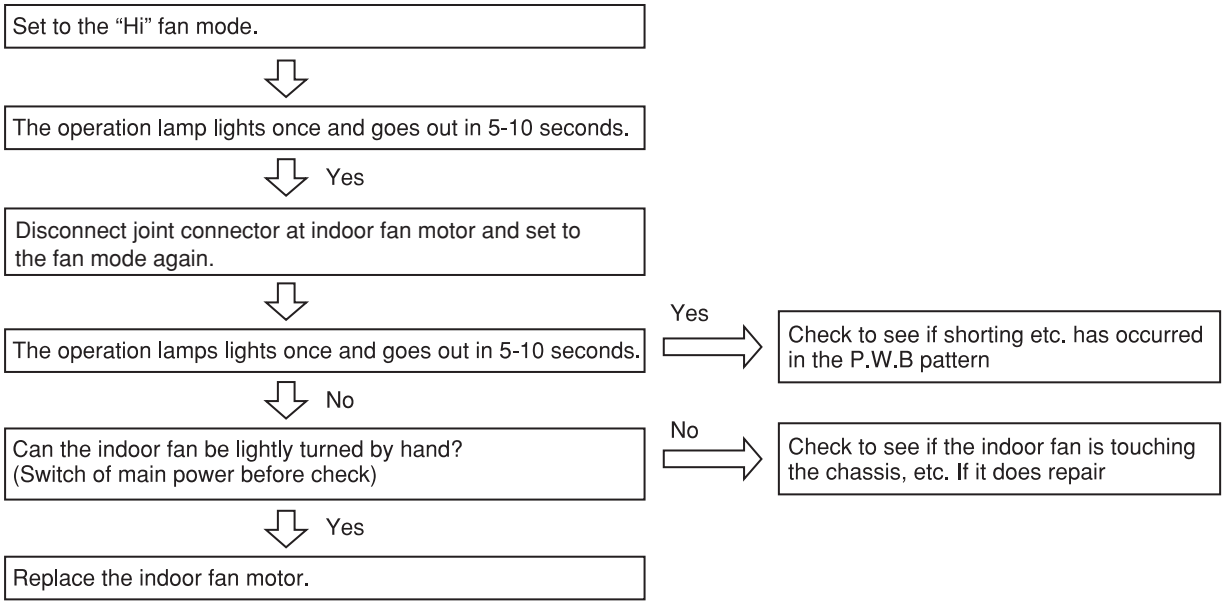
Yes → Check outdoor electrical parts, and repair any defective parts.

Perform final operation check.

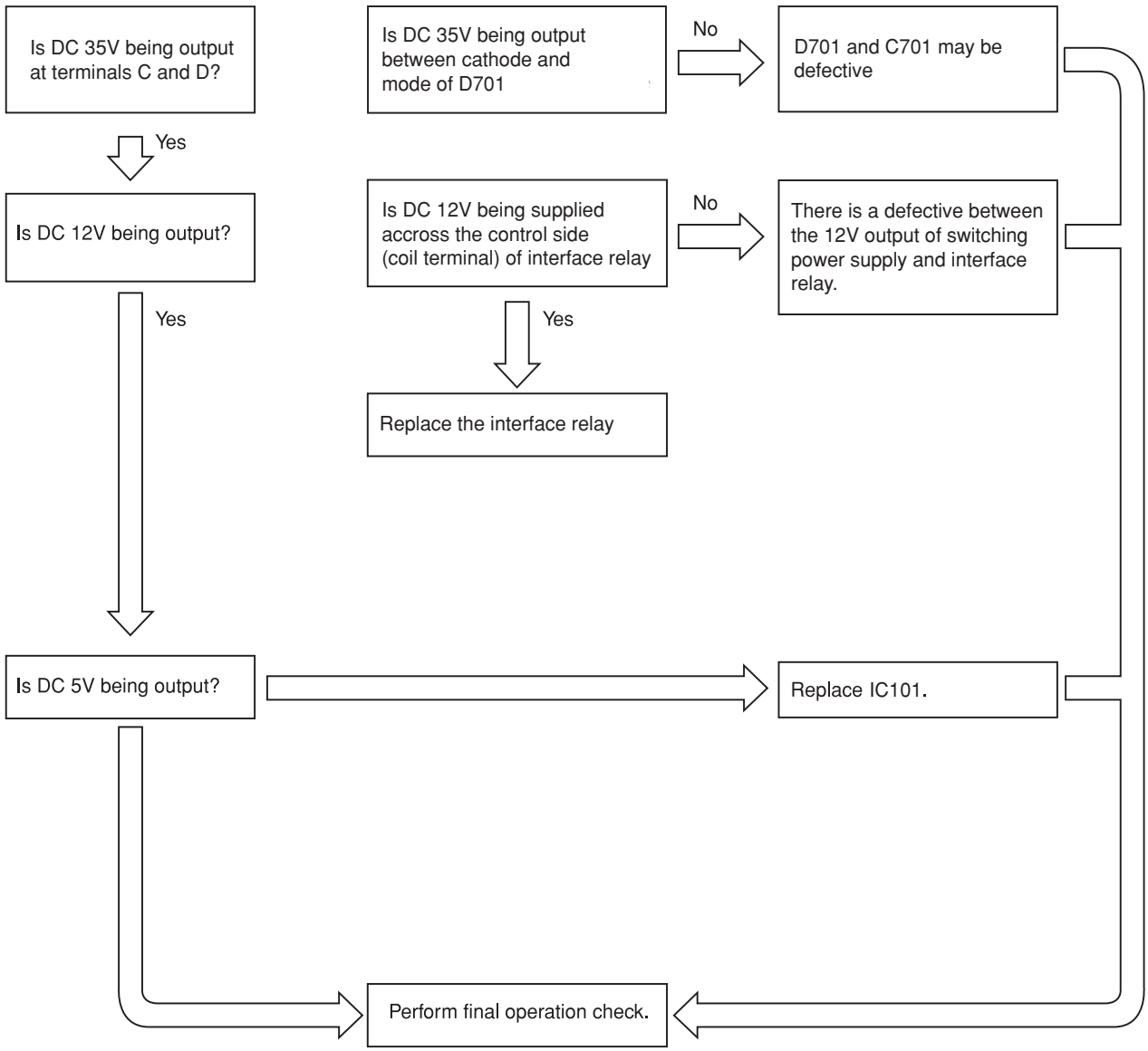
3. Only indoor fan does not operate (other is normal)



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



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



CHECKING THE REMOTE CONTROLLER

Is battery polarity correct?

No

Install the battery in the correct polarity.

Yes

Is the battery check sign + − flashing?

Yes

Replace the battery.

No

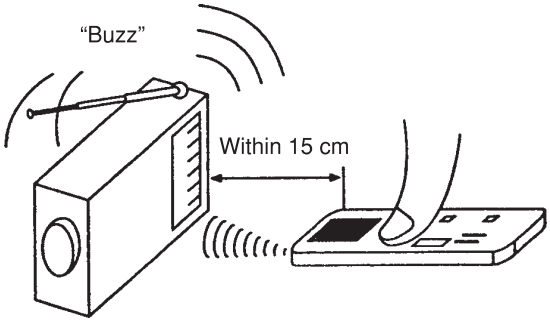
Turn on an AM radio, bring the remote control switch within 15 cm of the radio, and press the ON/OFF button.

Does the radio buzz noisily?

No

Check the LED (D1) with a multimeter.

Yes



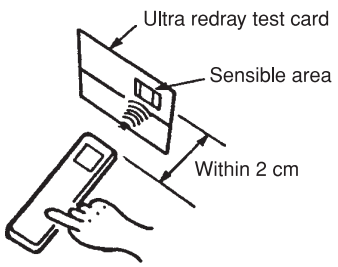
[AM radio]

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

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

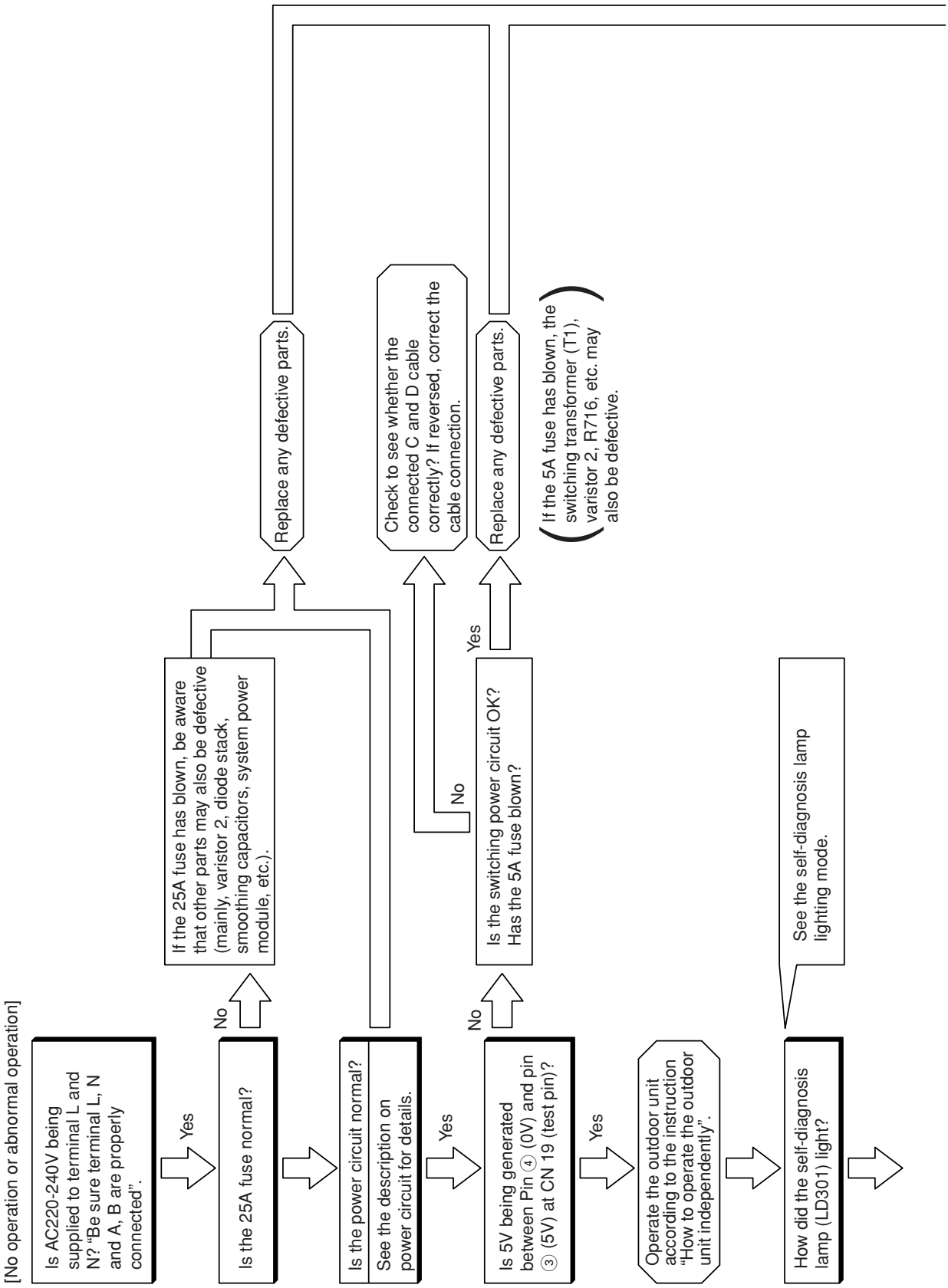
You can check the remote control switch by other methods as explained below.

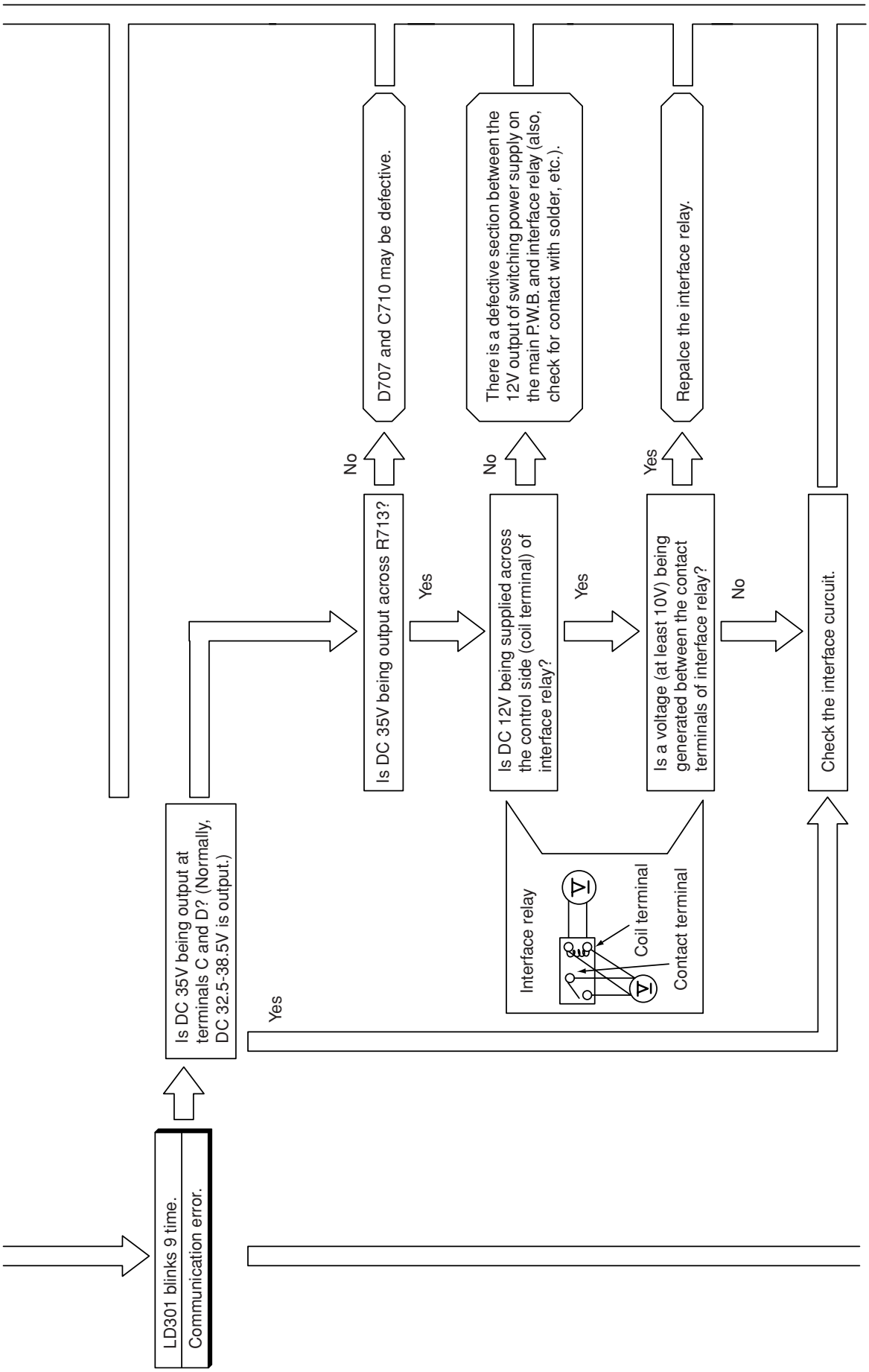
Using the test card

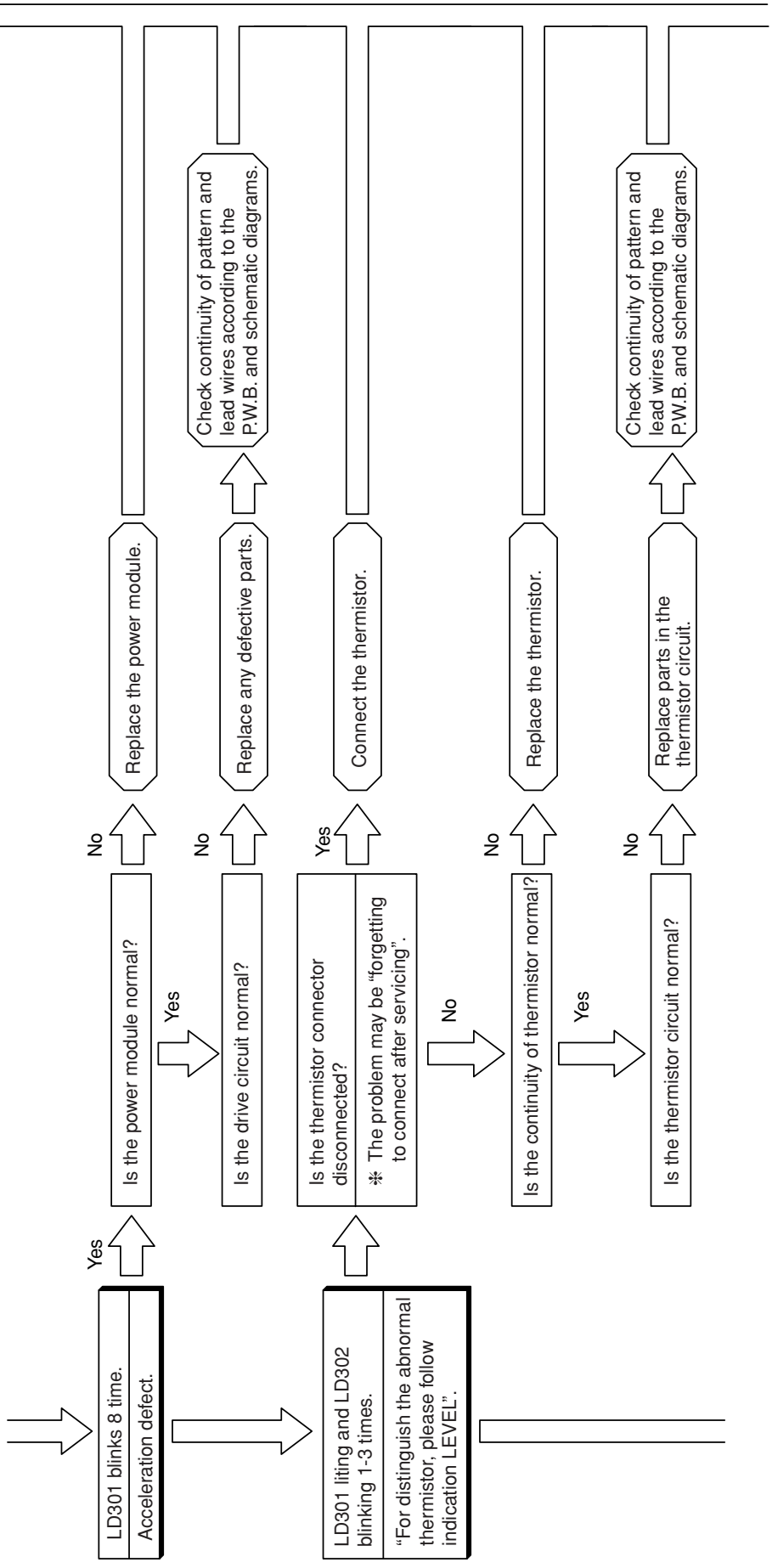


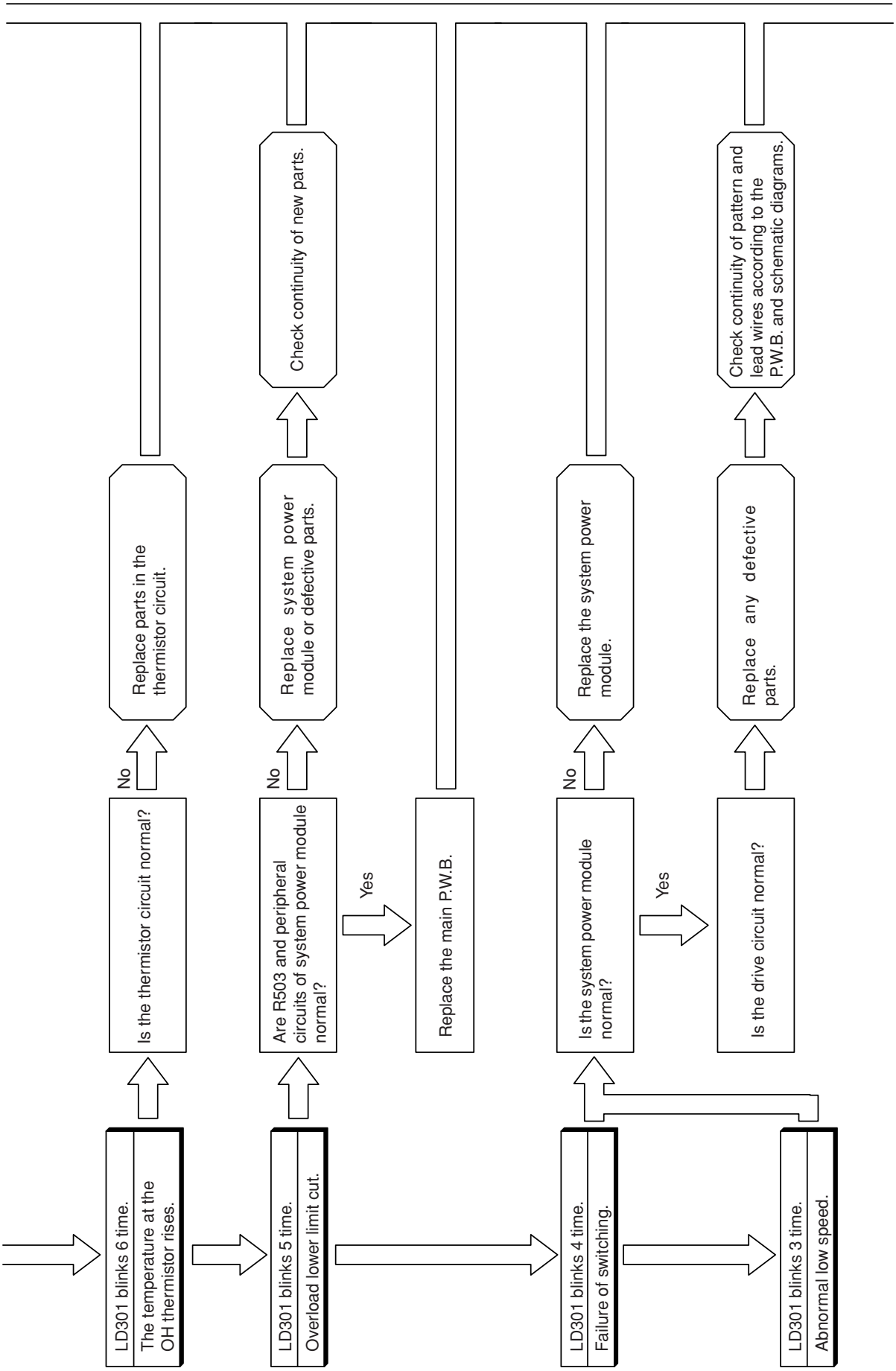
The sensible area should flash in orange when you operate the remote control unit if it is good.

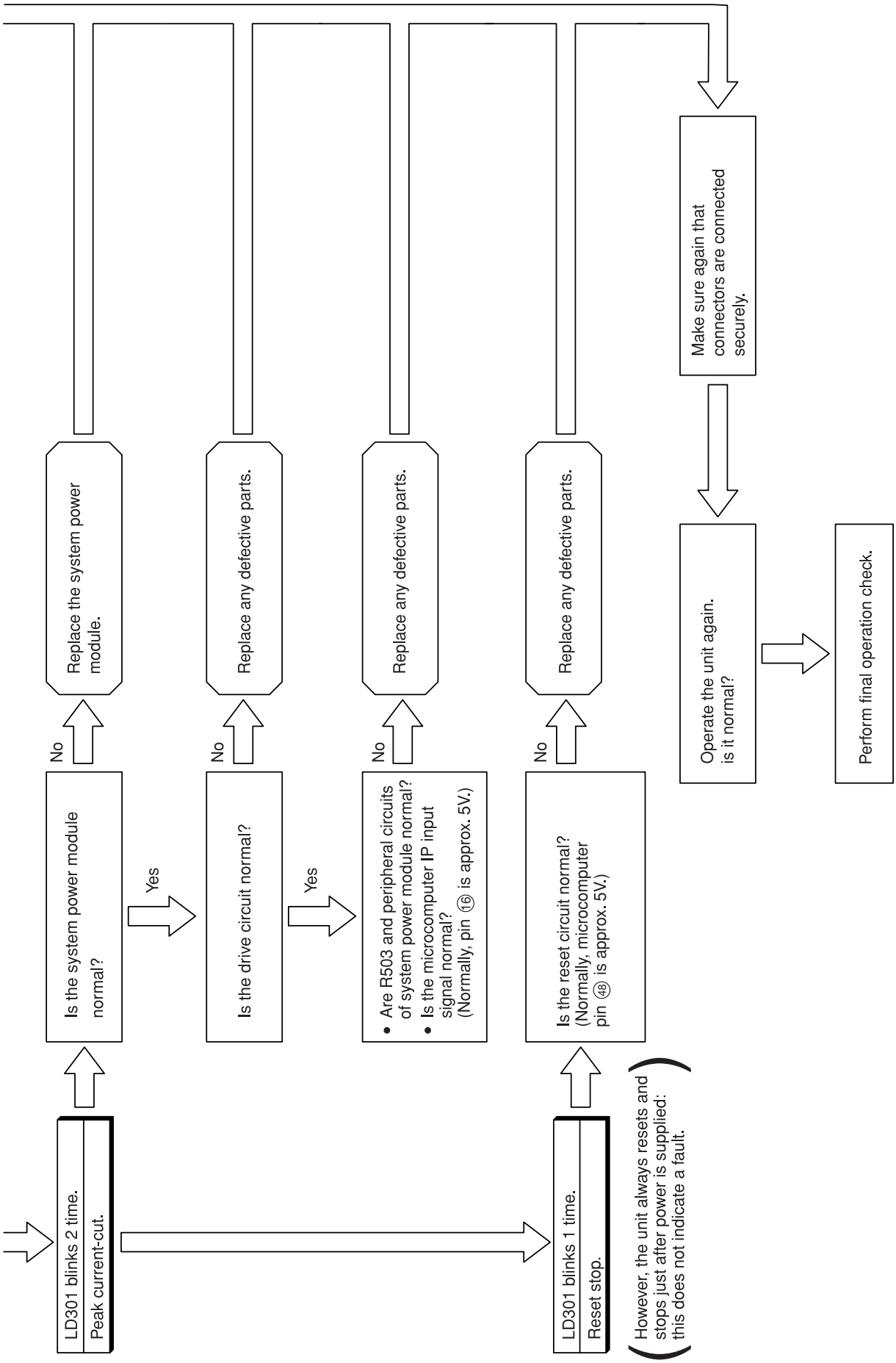
CHECKING THE OUTDOOR UNIT ELECTRICAL PARTS





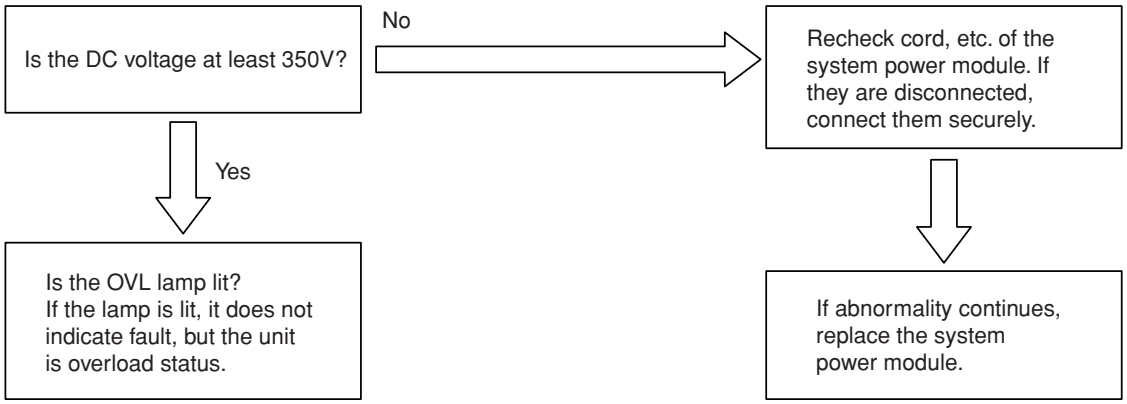






POWER CIRCUIT

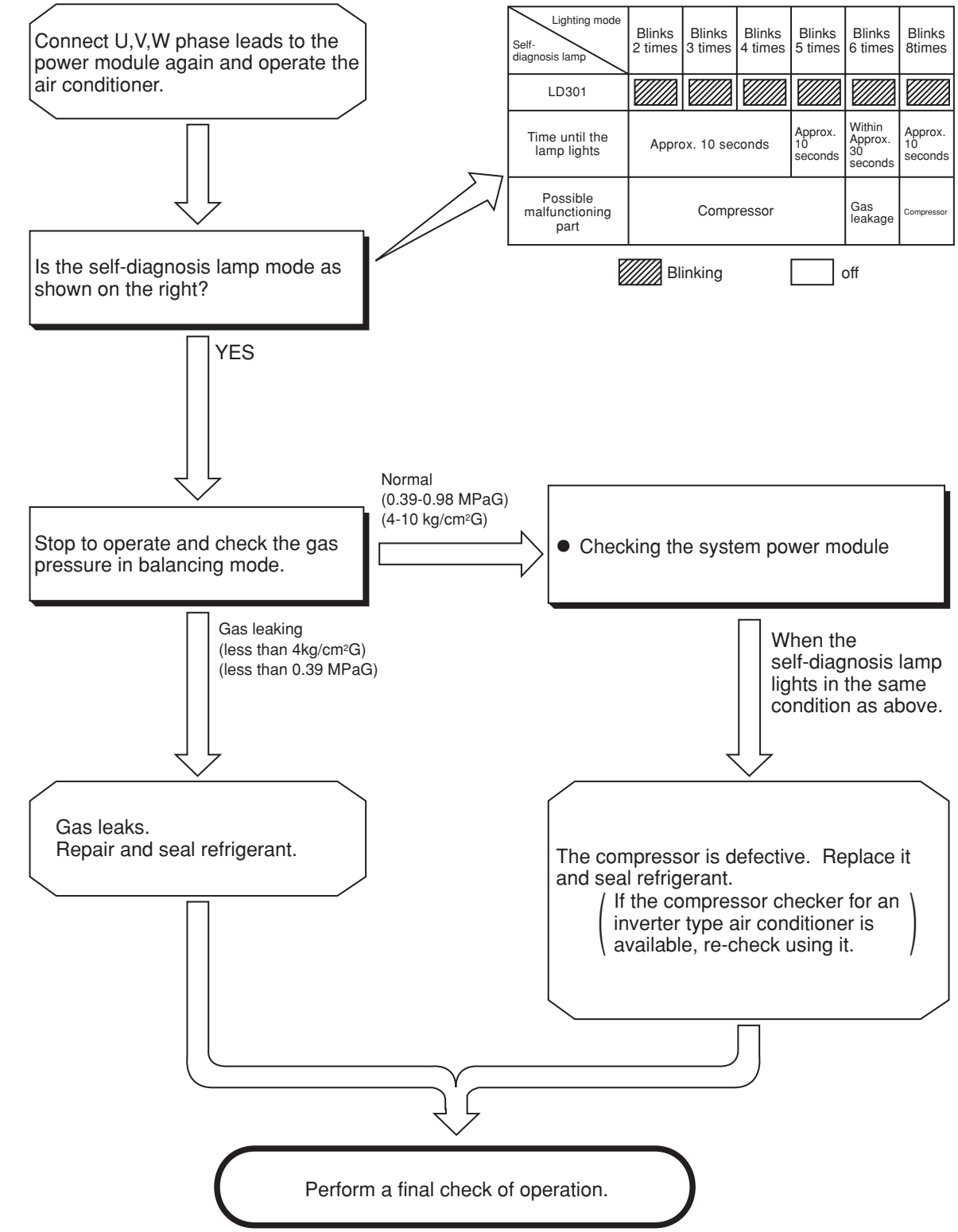
Phenomenon 1 <Rotation speed does not increase>



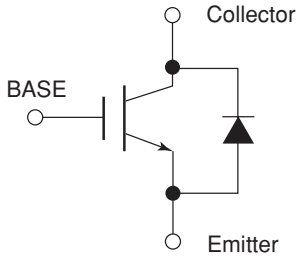
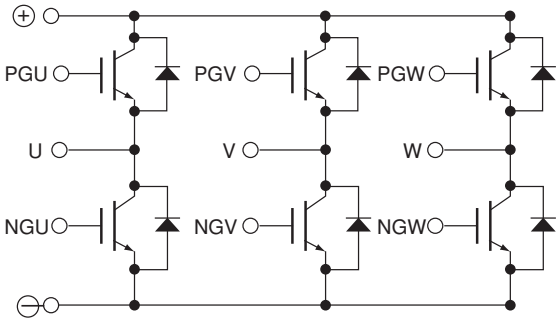
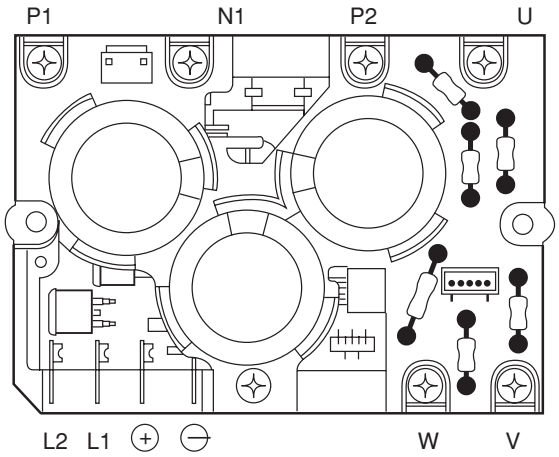
Overvoltage defect: system power module faulty (15-times blinking)

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

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



SYSTEM POWER MODULE DIAGNOSIS

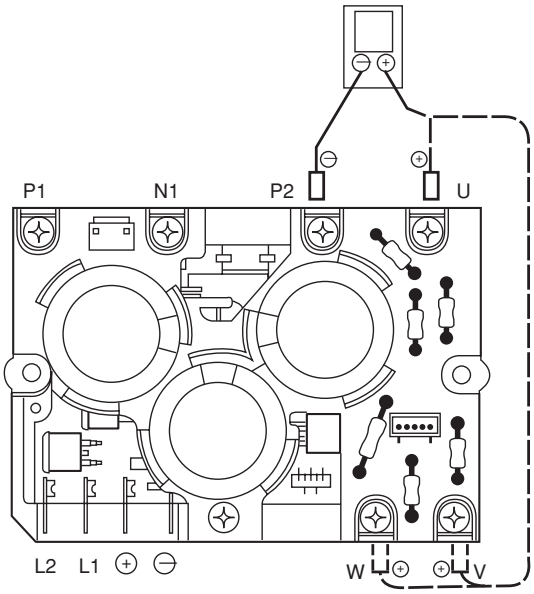
Circuit diagram of the device (excepting the reflux diode)	
Circuit diagram of the module	
Terminals symbol mark of the module ※ See next page for measuring value using tester	

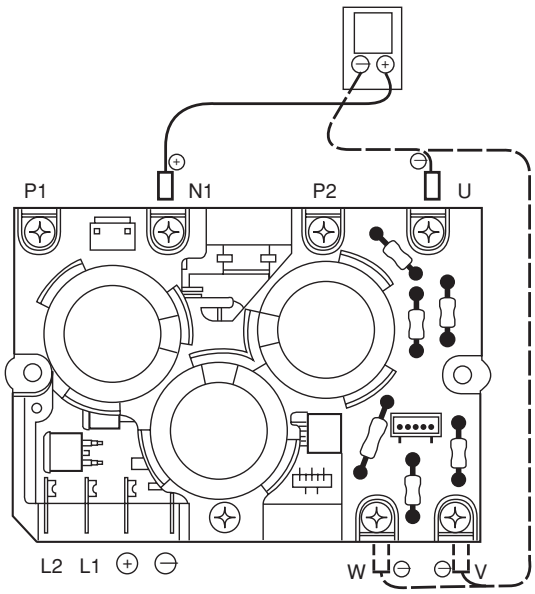
HOW TO CHECK SYSTEM POWER MODULE

Checking system power module using tester
Set tester to resistance range (X 100)
If indicator does not swing in the following conductivity check, the system power module is normal.
(In case of digital tester, since built-in battery is set in reverse direction, ⊕ and ⊖ terminals are reversed.)

⚠ CAUTION

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



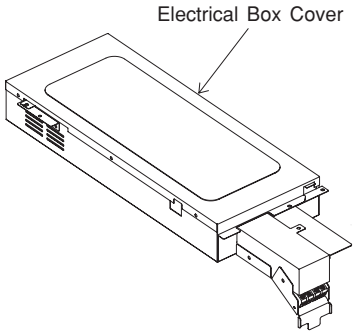


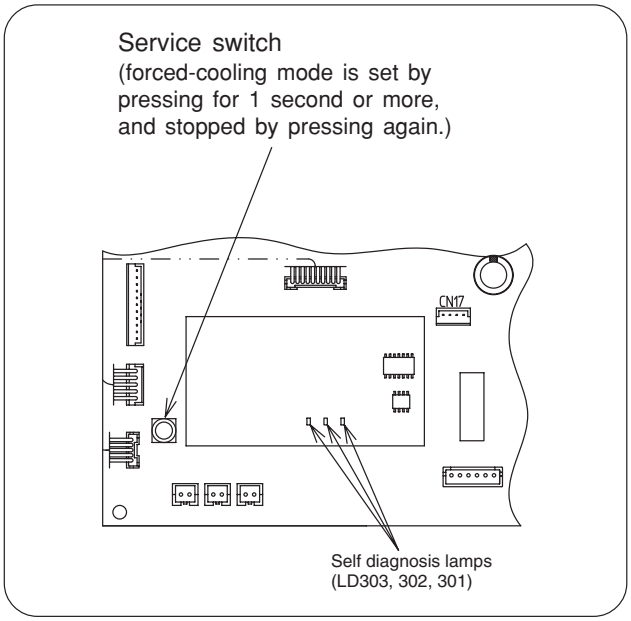
HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

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

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

Never operate the unit for more than 5 minutes.





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

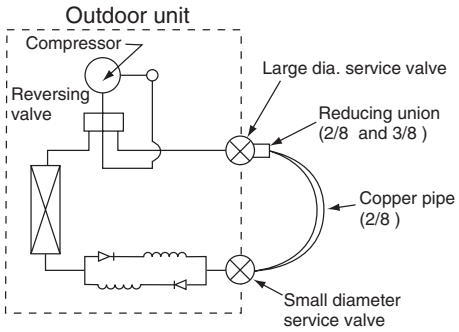
Be sure to push the service switch again to stop the forced cool operation.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

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

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

Charge refrigerant of 300g after vacuuming (※ 1)



Parts to be prepared

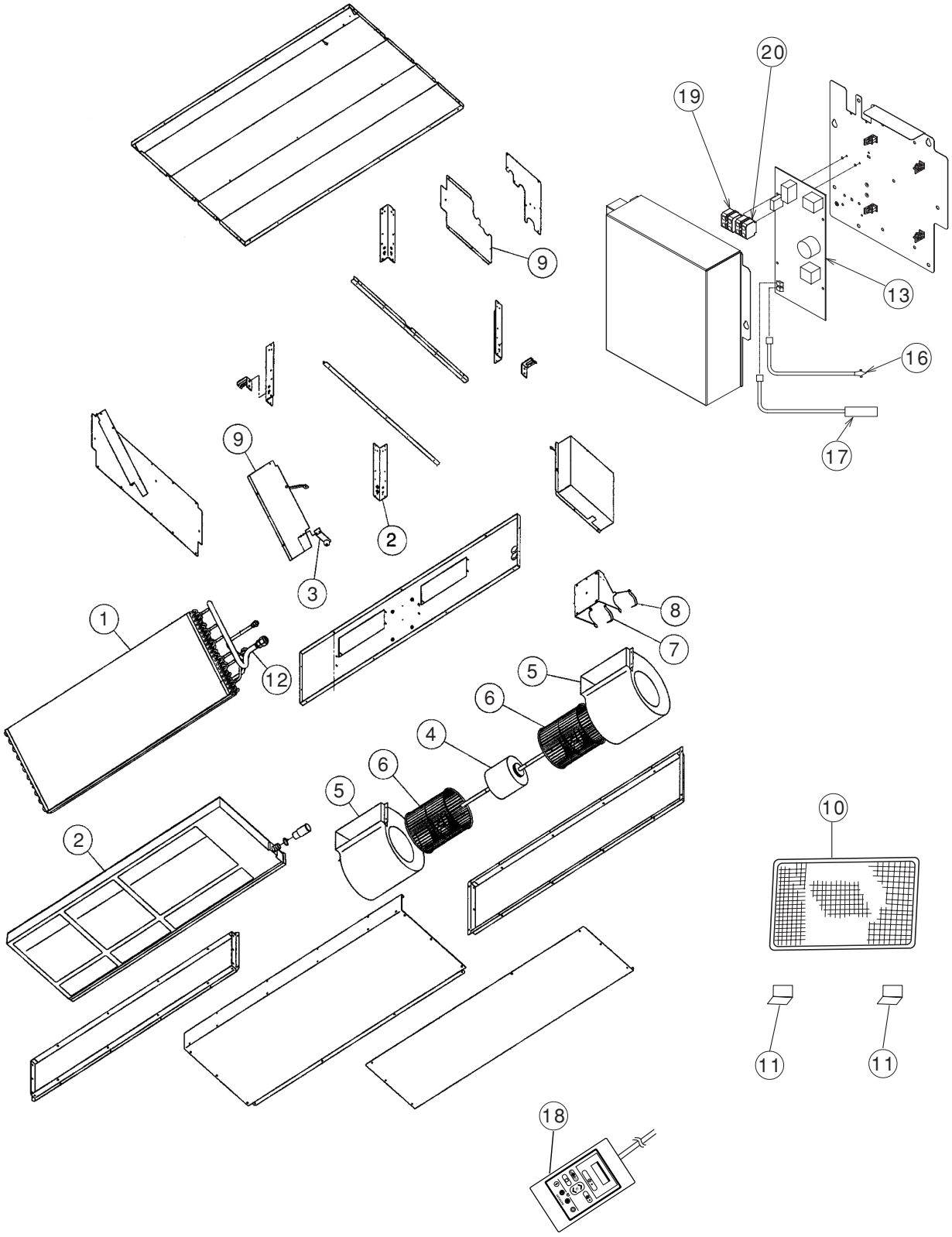
(1) Reducing union
2/8" (6.35mm)
1/2" (12.7mm)
(2) Copper pipe (2/8" and 1/2")

Do not operate for more than 5 minutes

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

PARTS LIST AND DIAGRAM

INDOOR UNIT
MODEL : RAD-50DH7A/RAD-60DH7A/RAD-70DH7A



MODEL RAD-50DH7A

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAD-50DH7 002	1	CYCLE ASSY
2	PMRAD-50DH7 003	1	DRAIN PAN ASSY
3	PMRAD-50DH7 004	1	FLOAT SWITCH
4	PMRAD-50DH7 005	1	FAN MOTOR
5	PMRAD-50DH7 006	2	FAN CASING
6	PMRAD-50DH7 007	2	FAN
7	PMRAD-50DH7 008	1	BAND (L)
8	PMRAD-50DH7 009	1	BAND (R)
9	PMRAD-50DH7 010	1	DRAIN PUMP
10	PMRAD-50DH7 011	1	FILTER
11	PMRAD-50DH7 012	2	FILTER PLATE
12	PMRAD-50DH7 013	1	THERMISTOR SUPPORT
13	PMRAD-50DH7A R01	1	P.W.B MAIN
16	PMRAD-50DH7 014	1	ROOM THERMISTOR
17	PMRAD-50DH7 015	1	THERMISTOR
18	PMRAD-18NH7A R02	1	WIRE REMOTE CONTROL
19	PMRAS-70YHA 011	1	2P TERMINAL WITH FUSE
20	PMRAC-07CV1 R06	1	2P TERMINAL

MODEL RAD-60DH7A

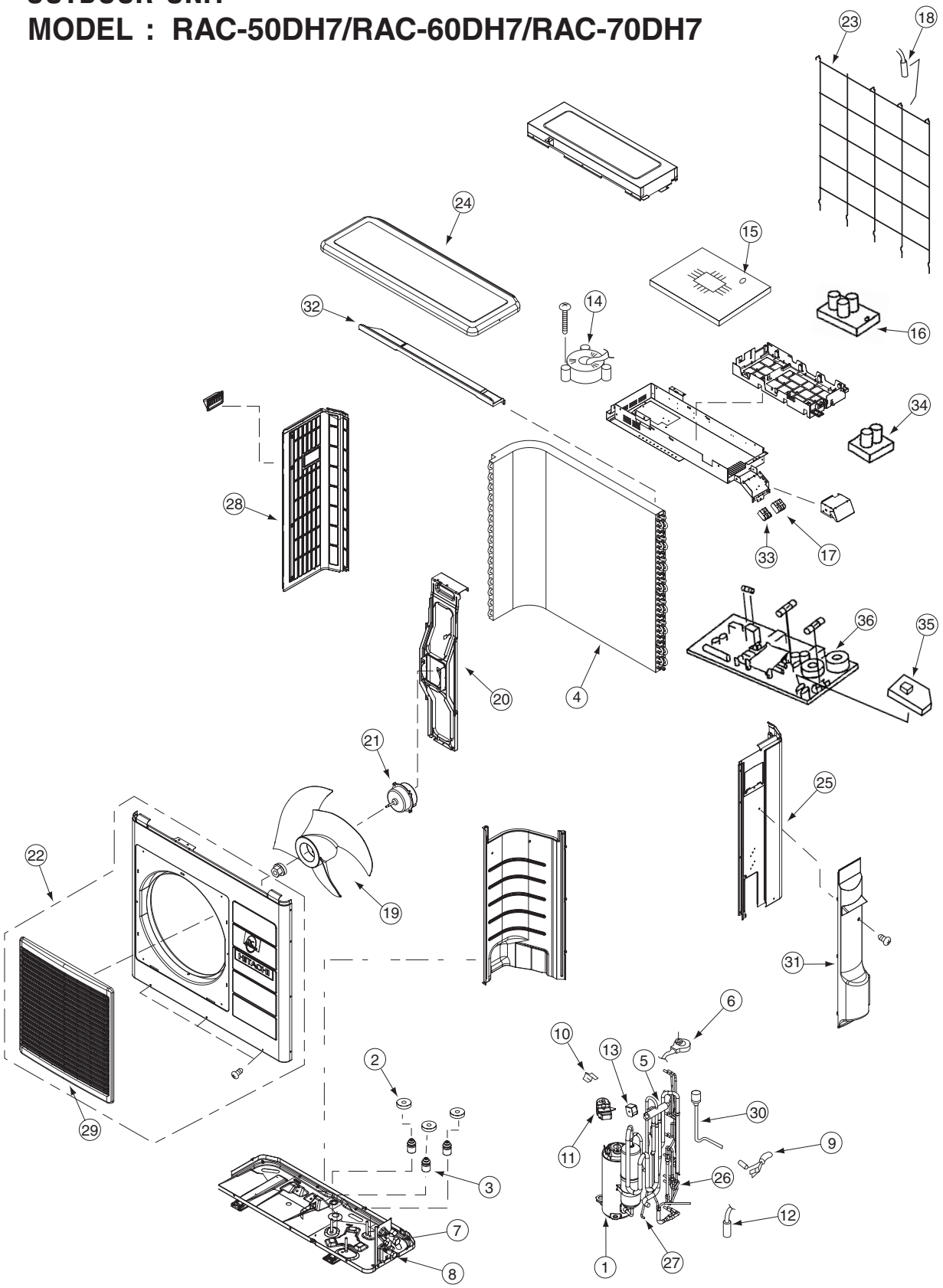
NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAD-50DH7 002	1	CYCLE ASSY
2	PMRAD-50DH7 003	1	DRAIN PAN ASSY
3	PMRAD-50DH7 004	1	FLOAT SWITCH
4	PMRAD-50DH7 005	1	FAN MOTOR
5	PMRAD-50DH7 006	2	FAN CASING
6	PMRAD-50DH7 007	2	FAN
7	PMRAD-50DH7 008	1	BAND (L)
8	PMRAD-50DH7 009	1	BAND (R)
9	PMRAD-50DH7 010	1	DRAIN PUMP
10	PMRAD-50DH7 011	1	FILTER
11	PMRAD-50DH7 012	2	FILTER PLATE
12	PMRAD-50DH7 013	1	THERMISTOR SUPPORT
14	PMRAD-60DH7A R01	1	P.W.B MAIN
16	PMRAD-50DH7 014	1	ROOM THERMISTOR
17	PMRAD-50DH7 015	1	THERMISTOR
18	PMRAD-18NH7A R02	1	WIRE REMOTE CONTROL
19	PMRAS-70YHA 011	1	2P TERMINAL WITH FUSE
20	PMRAC-07CV1 R06	1	2P TERMINAL

MODEL RAD-70DH7A

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAD-70DH7 002	1	CYCLE ASSY
2	PMRAD-50DH7 003	1	DRAIN PAN ASSY
3	PMRAD-50DH7 004	1	FLOAT SWITCH
4	PMRAD-50DH7 005	1	FAN MOTOR
5	PMRAD-50DH7 006	2	FAN CASING
6	PMRAD-50DH7 007	2	FAN
7	PMRAD-50DH7 008	1	BAND (L)
8	PMRAD-50DH7 009	1	BAND (R)
9	PMRAD-50DH7 010	1	DRAIN PUMP
10	PMRAD-50DH7 011	1	FILTER
11	PMRAD-50DH7 012	2	FILTER PLATE
12	PMRAD-50DH7 013	1	THERMISTOR SUPPORT
15	PMRAD-70DH7A R01	1	P.W.B MAIN
16	PMRAD-50DH7 014	1	ROOM THERMISTOR
17	PMRAD-50DH7 015	1	THERMISTOR
18	PMRAD-18NH7A R02	1	WIRE REMOTE CONTROL
19	PMRAS-70YHA 011	1	2P TERMINAL WITH FUSE
20	PMRAC-07CV1 R06	1	2P TERMINAL

PARTS LIST AND DIAGRAM

OUTDOOR UNIT
MODEL : RAC-50DH7/RAC-60DH7/RAC-70DH7



MODEL RAC-50DH7

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAC-50YHA1 902	1	COMPRESSOR
2	KPNT1 001	6	PUSH NUT
3	RAC-2226HV 805	3	COMPRESSOR RUBBER
4	PMRAC-70YHA S03	1	CONDENSER
5	PMRAC-50YHA1 905	1	REVERSING VALVE
6	PMRAC-25NH4 S03	1	ELECTRICAL EXPANSION COIL
7	PMRAC-50NH4 S04	1	VALVE (4S)
8	PMRAC-50NH4 S03	1	VALVE (2S)
9	PMRAC-80YHA S14	1	THERMISTOR (OH)
10	PMRAC-25NH4 S09	1	OVERHEAT THERMISTOR SUPPORT
11	PMRAC-25NH4 910	1	OVERLOAD RELAY COVER
12	PMRAC-70YHA S13	1	THERMISTOR (DEFROST)
13	PMRAC-60YHA1 902	1	COIL (REVERSING VALVE)
14	PMRAC-18SH4 S01	1	REACTOR
15	PMRAC-50DH7 901	1	P.W.B (MAIN)
16	PMRAC-80YHA S10	1	SYSTEM POWER MODULE
17	PMRAC-25NH4 S13	1	TERMINAL BOARD (4P)
18	PMRAM-65QH4 S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
19	PMRAC-70YHA 907	1	PROPELLER FAN
20	PMRAC-70YHA S12	1	SUPPORT (FAN MOTOR)
21	PMRAC-70YHA S04	1	FAN MOTOR
22	PMRAC-70YHA S01	1	CABINET
23	PMRAC-70YHA S06	1	NET
24	PMRAC-24CP5 905	1	TOP COVER
25	PMRAC-70YHA S09	1	SIDE PLATE-R
26	PMRAC-70YHA 911	1	STRAINER (COND)
27	PMRAC-70YHA 910	1	STRAINER (PIPE)
28	PMRAC-70YHA 908	1	SIDE PLATE-L
29	PMRAC-70YHA S05	1	GRILL
30	PMRAC-80YHA 906	1	EXPANSION VALVE
31	PMRAC-70YHA 915	1	SV-COVER
32	PMRAC-70YHA 916	1	NET COVER
33	PMRAC-63CA1 S02	1	TERMINAL BOARD (2P)
34	PMRAC-80YHA S12	1	CAPACITOR BOARD
35	PMRAC-70YHA S18	1	NOISE FILTER BOARD
36	PMRAC-50DH7 902	1	POWER BOARD

MODEL RAC-60DH7

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAC-50YHA1 902	1	COMPRESSOR
2	KPNT1 001	6	PUSH NUT
3	RAC-2226HV 805	3	COMPRESSOR RUBBER
4	PMRAC-70YHA S03	1	CONDENSER
5	PMRAC-50YHA1 905	1	REVERSING VALVE
6	PMRAC-25NH4 S03	1	ELECTRICAL EXPANSION COIL
7	PMRAC-50NH4 S04	1	VALVE (4S)
8	PMRAC-50NH4 S03	1	VALVE (2S)
9	PMRAC-80YHA S14	1	THERMISTOR (OH)
10	PMRAC-25NH4 S09	1	OVERHEAT THERMISTOR SUPPORT
11	PMRAC-25NH4 910	1	OVERLOAD RELAY COVER
12	PMRAC-70YHA S13	1	THERMISTOR (DEFROST)
13	PMRAC-60YHA1 902	1	COIL (REVERSING VALVE)
14	PMRAC-18SH4 S01	1	REACTOR
15	PMRAC-60DH7 901	1	P.W.B (MAIN)
16	PMRAC-80YHA S10	1	SYSTEM POWER MODULE
17	PMRAC-25NH4 S13	1	TERMINAL BOARD (4P)
18	PMRAM-65QH4 S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
19	PMRAC-70YHA 907	1	PROPELLER FAN
20	PMRAC-70YHA S12	1	SUPPORT (FAN MOTOR)
21	PMRAC-70YHA S04	1	FAN MOTOR
22	PMRAC-70YHA S01	1	CABINET
23	PMRAC-70YHA S06	1	NET
24	PMRAC-24CP5 905	1	TOP COVER
25	PMRAC-70YHA S09	1	SIDE PLATE-R
26	PMRAC-70YHA 911	1	STRAINER (COND)
27	PMRAC-70YHA 910	1	STRAINER (PIPE)
28	PMRAC-70YHA 908	1	SIDE PLATE-L
29	PMRAC-70YHA S05	1	GRILL
30	PMRAC-80YHA 906	1	EXPANSION VALVE
31	PMRAC-70YHA 915	1	SV-COVER
32	PMRAC-70YHA 916	1	NET COVER
33	PMRAC-63CA1 S02	1	TERMINAL BOARD (2P)
34	PMRAC-80YHA S12	1	CAPACITOR BOARD
35	PMRAC-70YHA S18	1	NOISE FILTER BOARD
36	PMRAC-50DH7 902	1	POWER BOARD

MODEL RAC-70DH7

NO.	PART N0.	Q'TY / UNIT	PARTS NAME
1	PMRAC-50YHA1 902	1	COMPRESSOR
2	KPNT1 001	6	PUSH NUT
3	RAC-2226HV 805	3	COMPRESSOR RUBBER
4	PMRAC-70YHA S03	1	CONDENSER
5	PMRAC-50YHA1 905	1	REVERSING VALVE
6	PMRAC-25NH4 S03	1	ELECTRICAL EXPANSION COIL
7	PMRAC-80YHA 905	1	VALVE (5S)
8	PMRAC-50NH4 S03	1	VALVE (2S)
9	PMRAC-80YHA S14	1	THERMISTOR (OH)
10	PMRAC-25NH4 S09	1	OVERHEAT THERMISTOR SUPPORT
11	PMRAC-25NH4 910	1	OVERLOAD RELAY COVER
12	PMRAC-70YHA S13	1	THERMISTOR (DEFROST)
13	PMRAC-60YHA1 902	1	COIL (REVERSING VALVE)
14	PMRAC-18SH4 S01	1	REACTOR
15	PMRAC-70DH7 901	1	P.W.B (MAIN)
16	PMRAC-80YHA S10	1	SYSTEM POWER MODULE
17	PMRAC-25NH4 S13	1	TERMINAL BOARD (4P)
18	PMRAM-65QH4 S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
19	PMRAC-70YHA 907	1	PROPELLER FAN
20	PMRAC-70YHA S12	1	SUPPORT (FAN MOTOR)
21	PMRAC-70YHA S04	1	FAN MOTOR
22	PMRAC-70YHA S01	1	CABINET
23	PMRAC-70YHA S06	1	NET
24	PMRAC-24CP5 905	1	TOP COVER
25	PMRAC-70YHA S09	1	SIDE PLATE-R
26	PMRAC-70YHA 911	1	STRAINER (COND)
27	PMRAC-70YHA 910	1	STRAINER (PIPE)
28	PMRAC-70YHA 908	1	SIDE PLATE-L
29	PMRAC-70YHA S05	1	GRILL
30	PMRAC-80YHA 906	1	EXPANSION VALVE
31	PMRAC-70YHA 915	1	SV-COVER
32	PMRAC-70YHA 916	1	NET COVER
33	PMRAC-63CA1 S02	1	TERMINAL BOARD (2P)
34	PMRAC-80YHA S12	1	CAPACITOR BOARD
35	PMRAC-70YHA S18	1	NOISE FILTER BOARD
36	PMRAC-50DH7 902	1	POWER BOARD

HITACHI

RAD-50DH7A/RAC-50DH7
RAD-60DH7A/RAC-60DH7
RAD-70DH7A/RAC-70DH7

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