

HITACHI

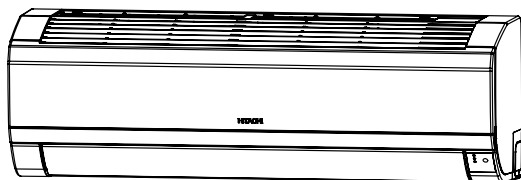
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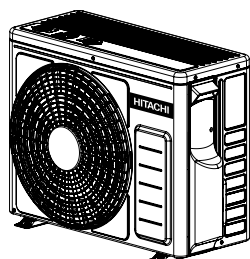
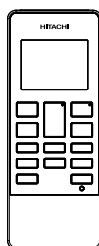
SERVICE MANUAL

TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY



RAS-EH09PHLAB, RAS-EH12PHLAB
RAS-EH07QHLAE, RAS-EH09RHLAE
RAS-EH12RHLAE



RAC-EH09WHLAB
RAC-EH12WHLAB
RAC-EH09WHLAE
RAC-EH12WHLAE

RAS-EH09PHLAB/RAC-EH09WHLAB
RAS-EH12PHLAB/RAC-EH12WHLAB
RAS-EH07QHLAE/(MULTI ONLY)
RAS-EH09RHLAE/RAC-EH09WHLAE
RAS-EH12RHLAE/RAC-EH12WHLAE

REFER TO THE FOUNDATION MANUAL

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SPECIFICATIONS

TYPE			(WALL TYPE)									
			INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL			RAS-EH09PHLAB	RAC-EH09WHLAB	RAS-EH12PHLAB	RAC-EH12WHLAB	RAS-EH07QHLAE	(Multi Only)	RAS-EH09RHLAE	RAC-EH09WHLAE	RAS-EH12RHLAE	RAC-EH12WHLAE
POWER SOURCE			1 PHASE 60Hz 115V						1 PHASE 60Hz 208 - 230V			
COOLING	TOTAL INPUT	(W)	685		1210		REFER TO THE SPECIFICATION OUTDOOR		695		1210	
	TOTAL AMPERES	(A)	6.80		11.20				3.20		5.30	
	CAPACITY	(kW)	2.6		3.5				2.6		3.5	
		(B.T.U./h)	9000 (5450 - 10500)		12000 (5500 - 13200)				9000 (5450 - 10500)		12000 (5500 - 13200)	
HEATING	TOTAL INPUT	(W)	940		1220				960		1220	
	TOTAL AMPERES	(A)	9.40		11.50				4.25		5.40	
	CAPACITY	(kW)	3.1		3.8				3.1		3.8	
		(B.T.U./h)	10500 (4200 - 11500)		13000 (4400 - 14500)				10500 (4200 - 11500)		13000 (4400 - 14500)	
DIMENSIONS in (mm)		W	30-11/16	26	30-11/16	26			30-11/16	26	30-11/16	26
			(780)	(660)	(780)	(660)			(780)	(660)	(780)	(660)
		H	11	20-7/8	11	20-7/8	11	20-7/8	11	20-7/8		
			(280)	(530)	(280)	(530)	(280)	(530)	(280)	(530)		
		D	9-1/16	10-15/16	9-1/16	10-15/16	9-1/16	10-15/16	9-1/16	10-15/16		
			(230)	(278)	(230)	(278)	(230)	(278)	(230)	(278)		
NET WEIGHT		lb(kg)	17.6 (8)	59.5 (27)	17.6 (8)	59.5 (27)	17.6 (8)	59.5 (27)	17.6 (8)	59.5 (27)		

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

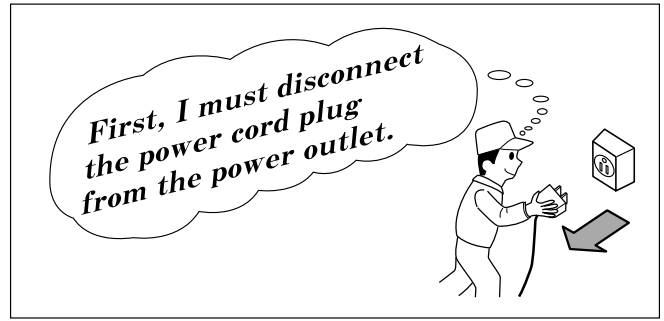
ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

FEBRUARY 2021

SAFETY DURING REPAIR WORK

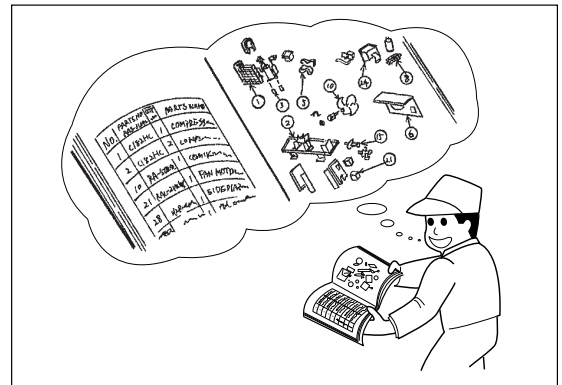
1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



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

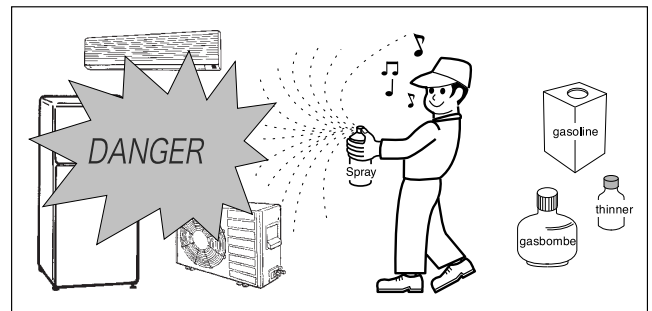
If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them.

3. After completion of repairs, the initial state should be restored.
4. Lead wires should be connected and laid as in the initial state.
5. Modification of the unit by the user himself should absolutely be prohibited.



6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.
7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit. The insulation resistance should be $1M\Omega$ or more as measured by a 500V DC megger.
9. The initial location of installation such as window, floor or the other should be checked for being and safe enough to support the repaired unit again.
If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.
10. Any inflammable object must not be placed about the location of installation.

11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.
12. If refrigerant gas leaks during repair work, please ensure there is enough ventilation, leaked refrigerant that accumulates in stagnation, rarely causes any ignition when in contact with flame (stove, heater). However it will generate toxic fumes.



13. If refrigerant gas leaks, be sure to repair the leak(s) securely before recharge the unit. Refrigerant (R410A) is harmless. However when comes in contact with fire will generate toxic gas.

WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope

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

2. Object parts

- (1) Micro computer
- (2) Integrated circuits (I.C.)
- (3) Field-effective transistor (F.E.T.)
- (4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

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

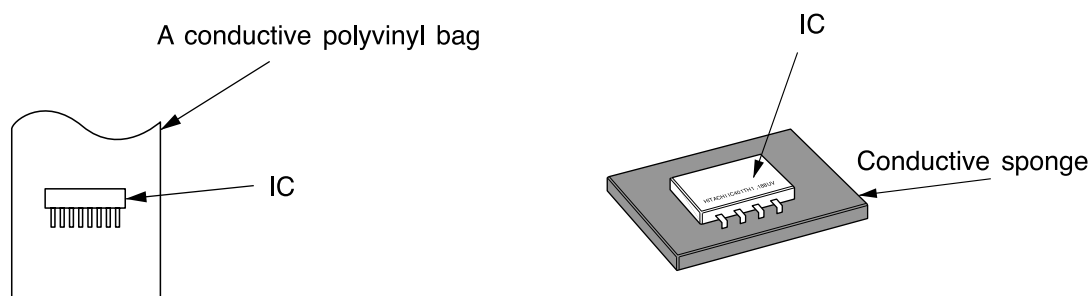


Fig. 1. Conductive container

- (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing $1\text{M}\Omega$ earth resistance through a ring or bracelet).
- (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.
- (4) Be sure to place a part on a metal plate with grounding.
- (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

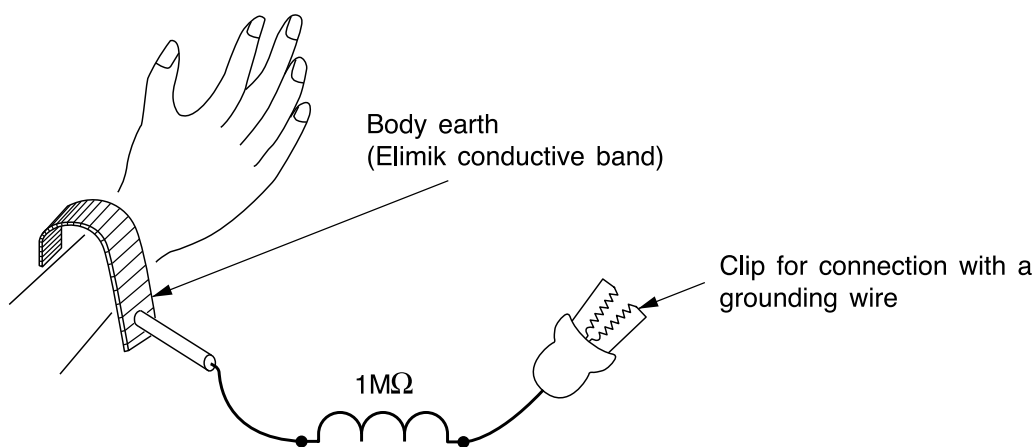


Fig. 2. Body Earth

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

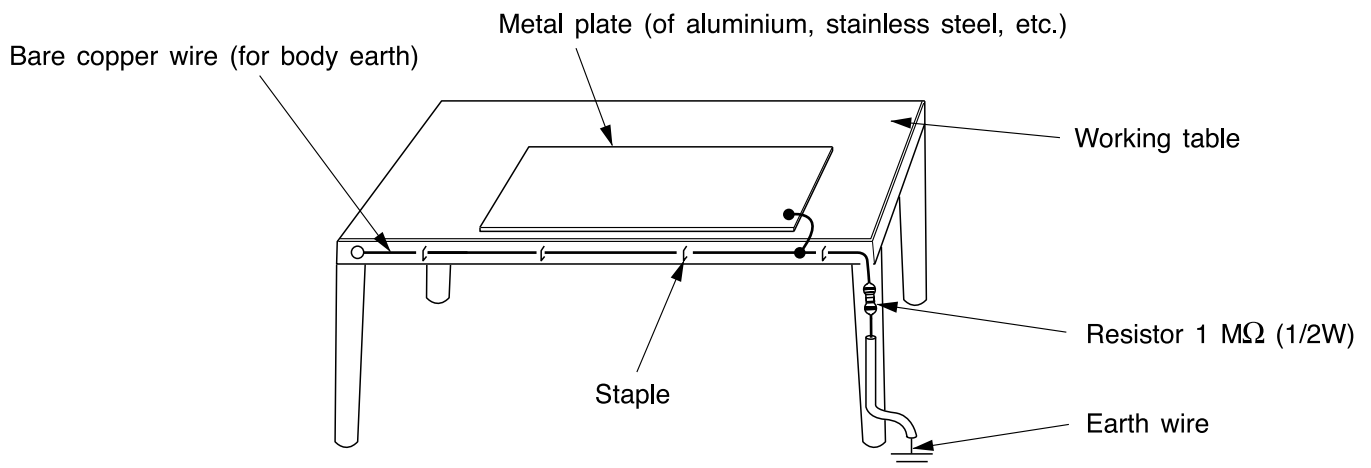


Fig. 3. Grounding of the working table

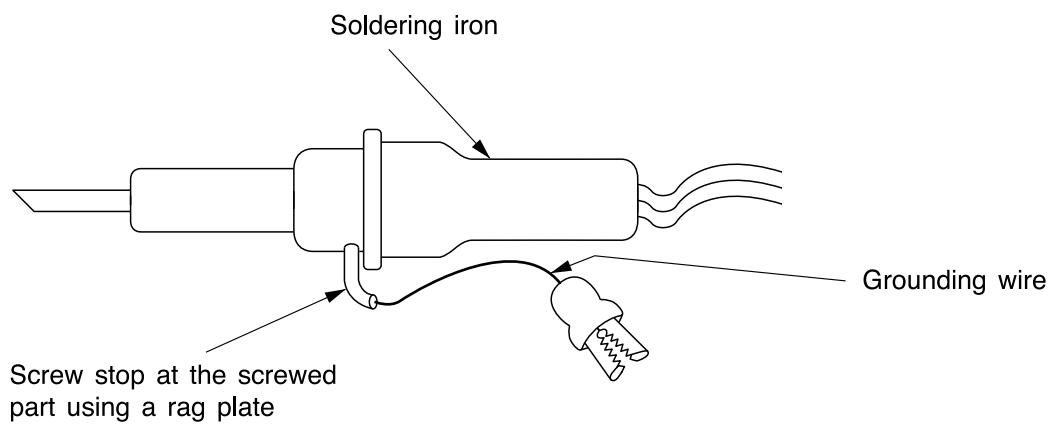


Fig. 4. Grounding a solder iron

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

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

 CAUTION

1. Slight flowing noise of refrigerant in the refrigerating cycle is expected to be heard occasionally in quiet or stop operation and it is normal.
2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.
3. The room air conditioner does not start automatically after recovery of the electric power failure for preventing fuse blowing. Re-press COOLING button after 3 minutes from when unit stopped.
4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling 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.

SPECIFICATIONS

MODEL		RAS-EH09PHLAB RAS-EH12PHLAB	RAS-EH07QHAE RAS-EH09RHAE RAS-EH12RHAE	RAC-EH09WHLAB	RAC-EH12WHLAB	RAC-EH09WHLAE	RAC-EH12WHLAE
FAN MOTOR		21W	38W	47W			
FAN MOTOR CAPACITOR		NO		NO			
FAN MOTOR PROTECTOR		NO		NO			
COMPRESSOR		NO		ASN98D32UER			
COMPRESSOR MOTOR CAPACITOR		NO		NO			
OVERLOAD PROTECTOR		NO		NO			
OVERHEAT PROTECTOR		NO		YES			
FUSE (for MICROPROCESSOR)		NO		2.0A			
POWER RELAY		NO		NO			
POWER SWITCH		NO		NO			
TEMPORARY SWITCH		YES		NO			
SERVICE SWITCH		NO		YES			
TRANSFORMER		NO		NO			
VARISTOR		NO		ZNR			
NOISE SUPPRESSOR		NO		YES			
THERMOSTAT		YES(IC)		YES(IC)			
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES		NO			
REFRIGERANT CHARGING VOLUME (Refrigerant R410A)	UNIT	-----	-----	31.04o (880g)			
	PIPES (MAX. 82ft (25m)))	-----	-----	Additional 0.005lb/ft (7g/m) after 26.2ft (8m) length			

Figure showing the Installation of Indoor and Outdoor Unit.

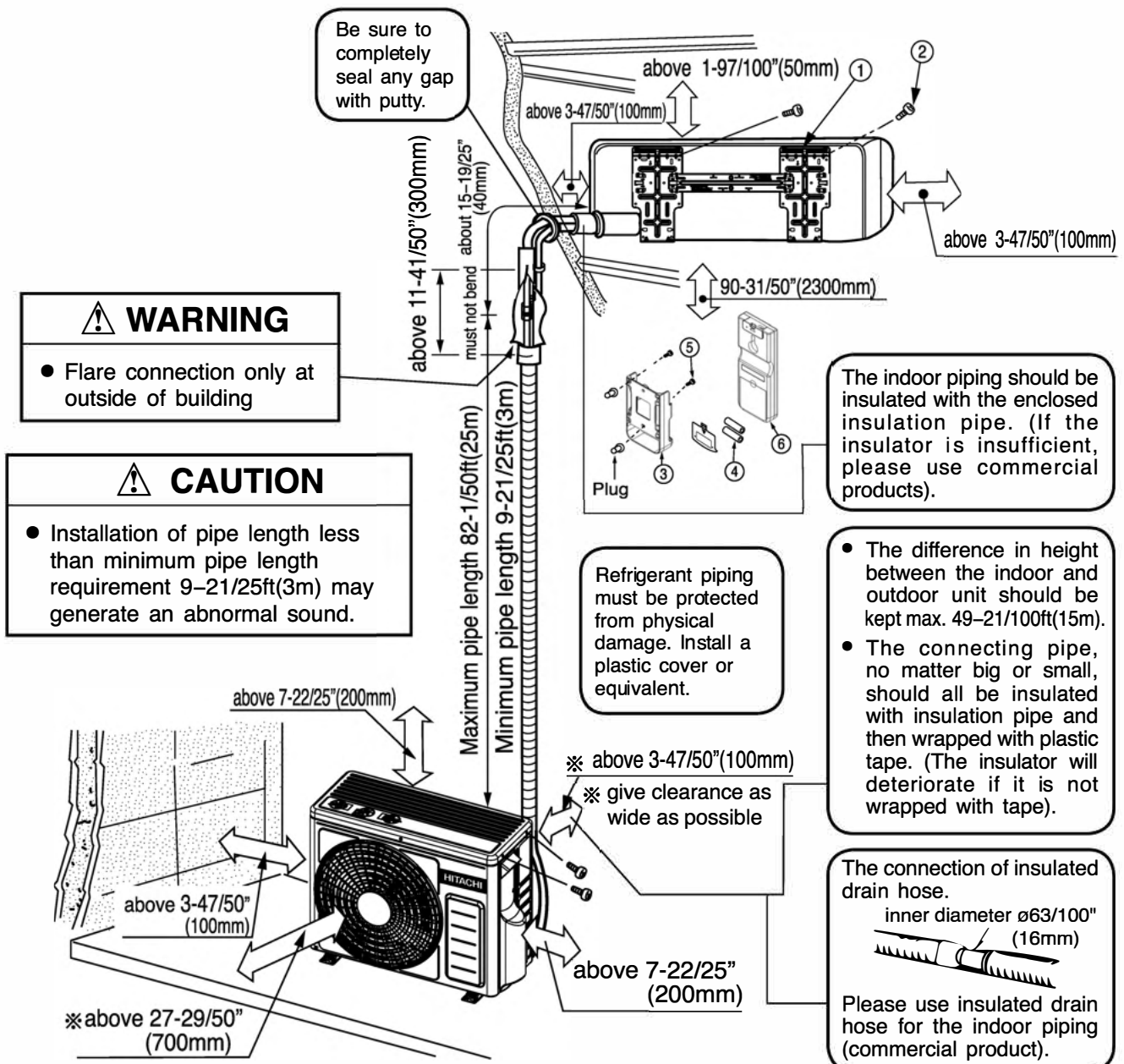
⚠ CAUTION

In case the pipe length is more than the recommended length for chargeless, add refrigerant R410A as below. Do not exceed the maximum pipe length.

Model	Max. Pipe ft(m)	Chargeless up to ft(m)	Additional R410A lbs/ft(g/m)
RAC-EH09WHLAB RAC-EH12WHLAB RAC-EH09WHLAE RAC-EH12WHLAE	82-1/50 (25)	24-61/100(7.5)	0.005(7.0)

⚠ CAUTION

- The difference in height between the indoor and outdoor unit should be kept max. 49.21ft(15m).
- The connecting pipe, no matter big or small, should all be insulated with insulation pipe and then wrapped with plastic tape. (The insulator will deteriorate if it is not wrapped with tape).



Important Notice

- Johnson Controls-Hitachi Air Conditioning North America LLC pursues a policy of continuing improvement in design and performance in its products. As such, Johnson Controls-Hitachi Air Conditioning North America LLC reserves the right to make changes at any time without prior notice.
- Johnson Controls-Hitachi Air Conditioning North America LLC cannot anticipate every possible circumstance that might involve a potential hazard.
- This inverter air conditioning unit is designed for standard air conditioning applications only. Do not use this unit for anything other than the purposes for which it was intended.
- The installer and system specialist shall safeguard against leakage in accordance with local codes. The following standards may be applicable, if local regulations are not available. International Organization for Standardization: (ISO 5149 or European Standard, EN 378). No part of this manual may be reproduced in any way without the expressed written consent of Johnson Controls-Hitachi Air Conditioning North America LLC.
- This air conditioning unit will be operated and serviced in the United States of America and comes with a full complement of the appropriate Safety, Danger, and Caution, Warnings.
- If you have questions, please contact your distributor or contractor.
- This manual provides common descriptions, basic and advanced information to maintain and service this air conditioning unit which you operate as well for other models.
- This air conditioning unit has been designed for a specific temperature range. For optimum performance and long life, operate this unit within the range limits.
- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

Product Inspection upon Arrival

1. Upon receiving this product, inspect it for any damages incurred in transit. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
2. Check the model number, electrical characteristics (power supply, voltage, and frequency rating), and any accessories to determine if they agree with the purchase order.
3. The standard utilization for this unit is explained in these instructions. Use of this equipment for purposes other than what it designed for is not recommended.
4. Please contact your local agent or contractor as any issues involving installation, performance, or maintenance arise. Liability does not cover defects originating from unauthorized modifications performed by a customer without the written consent of Johnson Controls-Hitachi Air Conditioning North America LLC. Performing any mechanical alterations on this product without the consent of the manufacturer will render your warranty null and void.

California Proposition 65



Proposition 65: This product contains chemicals known to the state of California to cause cancer, birth defects, and other reproductive harm. For more information, go to www.P65Warnings.ca.gov



SAFETY PRECAUTION

- Please read the "Safety Precaution" carefully before operating the unit to ensure correct usage of the unit.
- To prevent personal injury or property damage, read this section carefully before you use this product, and be sure to comply with the following safety precautions. Incorrect operation due to failure to follow the instructions may cause harm or damage, the seriousness of which is classified as follows:

WARNING

This mark warns of death or serious injury.

CAUTION

This mark warns of injury or damage to property.



This mark denotes an action that is PROHIBITED.



This mark denotes an action that is COMPULSORY.

- Please keep this manual after reading.

WARNING



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- Please use ground wiring.
Connect the power supply and the ground wiring to the terminals in the electrical box.
Ground wiring must be securely connected.
Use a GFCI (Ground Fault Circuit Interrupter).
Failure to use a GFCI can result in electric shock or fire.
 - Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.
 - 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.
 - 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.
-
- 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.
 - Spray cans and other combustibles should not be located within a meter 3.28ft(1m) of the air outlets of both indoor and outdoor units.
As a spray can's internal pressure can be increased by hot air, a rupture may result.



CAUTION



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

PRECAUTIONS DURING OPERATION

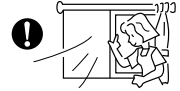
CAUTION

- 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 insufficient oxygen.



- 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 block the flow of condensate to the condensate pan. Condensate might drip on the fan and cause droplets to occasionally drip from the indoor unit.



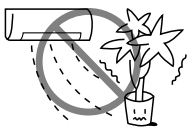
- Please switch off the unit and turn off the circuit breaker during cleaning, the high-speed fan inside the unit may cause danger.

- 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 cause a short circuit.



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

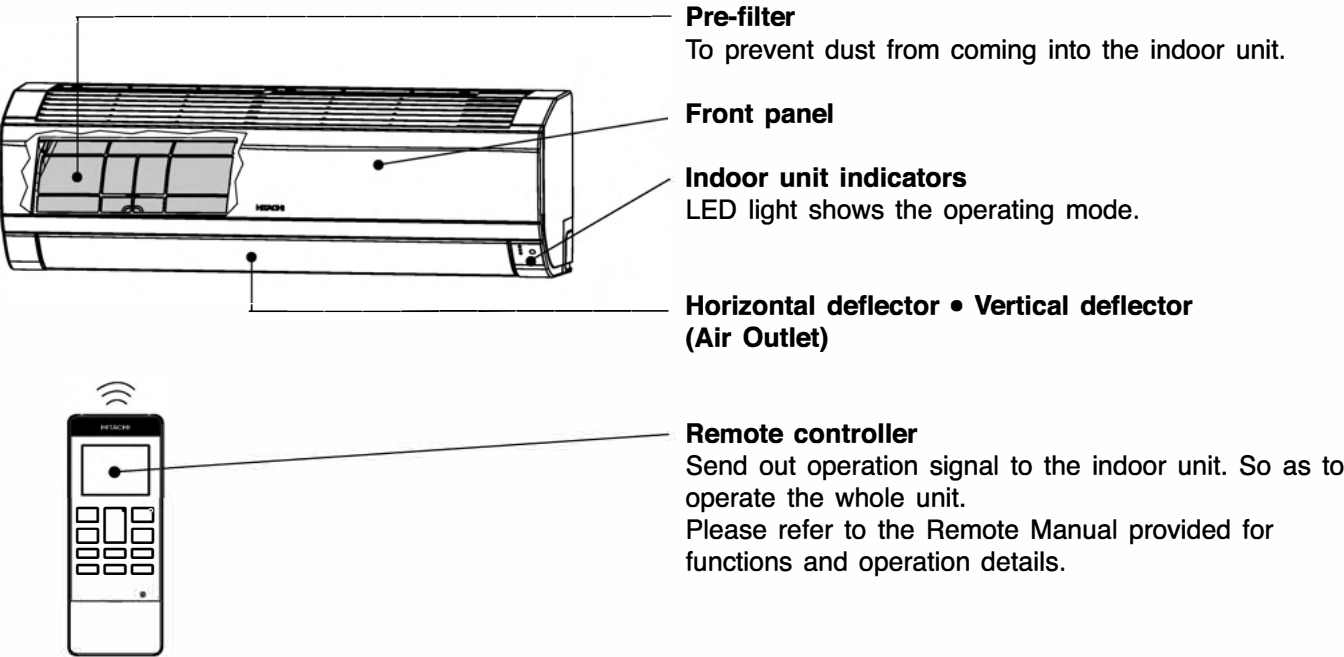
- When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the louver facing down or moving automatically for a long period of time, condensate will condense on the louver and drips down occasionally. This will wet your furniture. Therefore, do not operate under such condition for a long time.

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

- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT



MODEL NAME AND DIMENSIONS

MODEL	WIDTH in(mm)	HEIGHT in(mm)	DEPTH in(mm)
RAS-EH07QHLAE/RAS-EH09RHLAE/ RAS-EH12RHLAE/RAS-EH18RHLAE	30- / "(780)	11-1/32"(280)	9-1/1 "(230)

INDOOR UNIT INDICATORS

OPERATION LED

This LED lights during operation.

The OPERATION LED flashes/dimming in the following cases during heating.

(1) During preheating

For about 2–3 minutes after starting up.

(2) During defrosting

Defrosting is performed about once every one hour when frost forms on the heat exchanger of the outdoor unit, for 5–10 minutes each time.

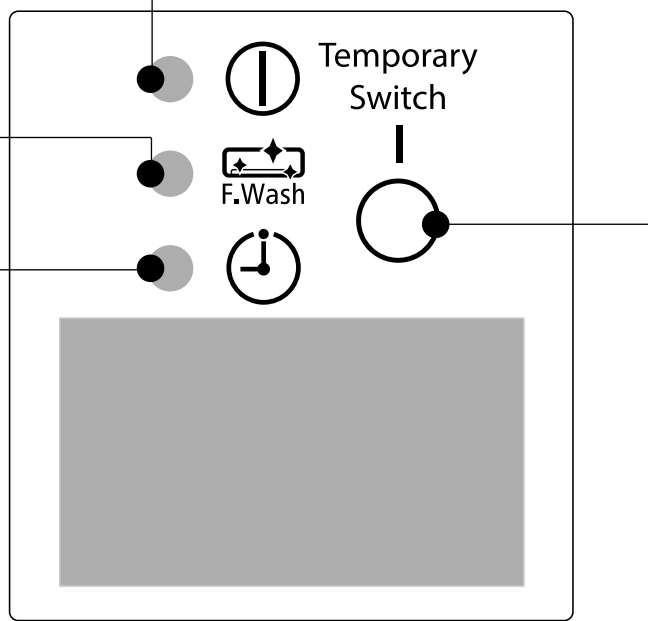
FROST WASH LED

This led lights when the Frost Wash function is in operation.

This led blinks to suggest operating manual FROST WASH operation after 42 hours of air conditioner cumulative usage. (not applicable for Multi split connection)

TIMER LED

This LED lights up when the timer is working.



TEMPORARY SWITCH button

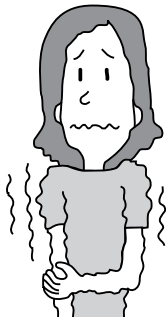
TEMPORARY SWITCH

Use this switch to start and stop when the remote controller does not work.

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

THE IDEAL WAYS OF OPERATION

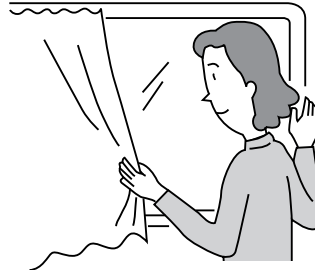
Suitable Room Temperature



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



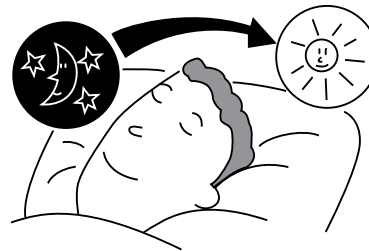
Caution

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



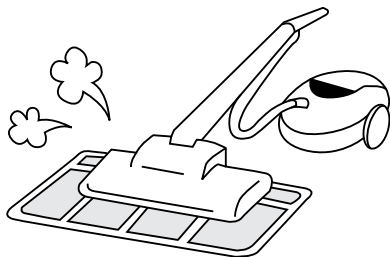
Effective Usage Of Timer

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



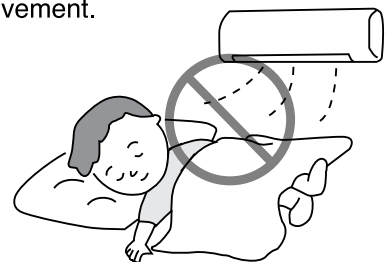
Do Not Forget To Clean The Pre-Filter

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



Please Adjust Suitable Temperature For Baby And Children

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

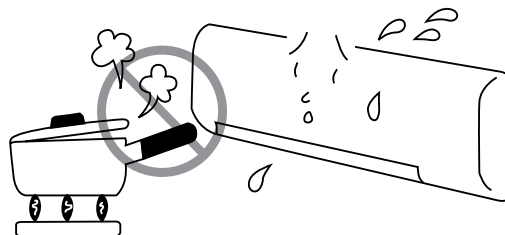


FOR USER'S INFORMATION

The Air Conditioner And The Heat Source In The Room

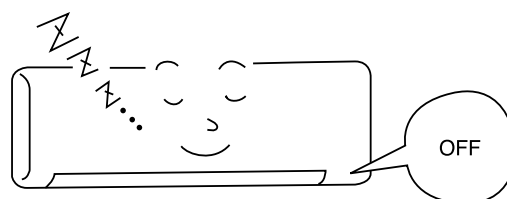
⚠ Caution

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

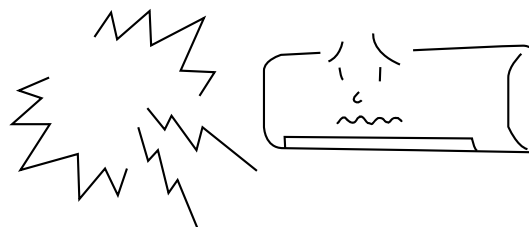
When the indoor unit is not to be used for a long period of time, please switch off the power from the main unit. If the power from main unit remains "ON", the indoor unit still consumes about 3W in the operation control circuit even if it is in "OFF" mode.



When Lightning Occurs

⚠ Warning

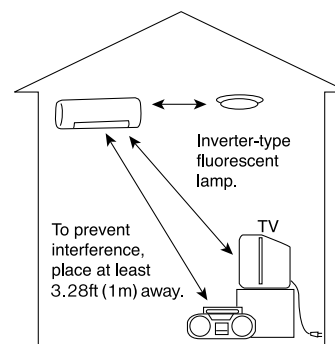
To protect the whole unit during lightning, please stop operating the unit.



Interference From Electrical Products

⚠ Caution

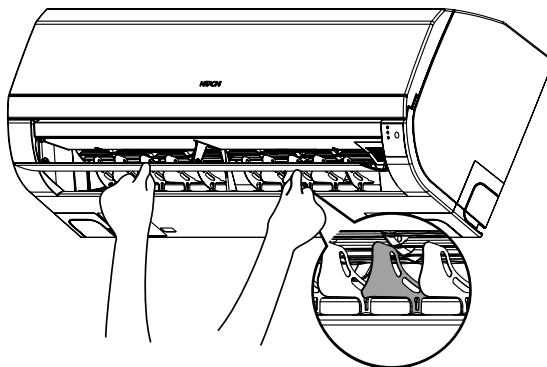
To avoid noise interference, please place the indoor unit and its remote controller at least 3.28ft (1m) away from electrical products.



AIRFLOW LOUVERS ADJUSTMENTS

Adjustment of the conditioned air to the left and right.

Hold the second vertical louver of each set of vertical louver from right as shown in the figure and adjust the conditioned air to the left or right.



WARNING

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 any cleaning or adjusting the louvers, be sure to switch OFF the operation.

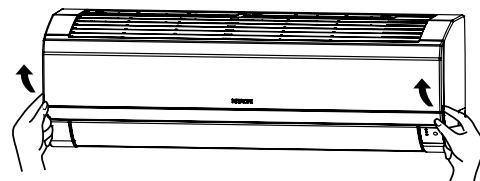
ATTACHING THE AIR PURIFYING FILTERS

⚠ CAUTION

Before cleaning, stop operation and switch off the power supply.

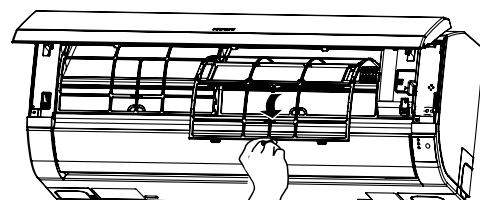
1 Open the front panel

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



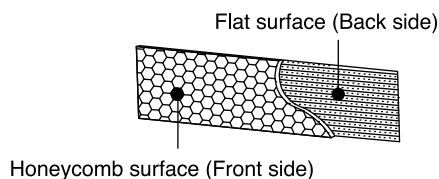
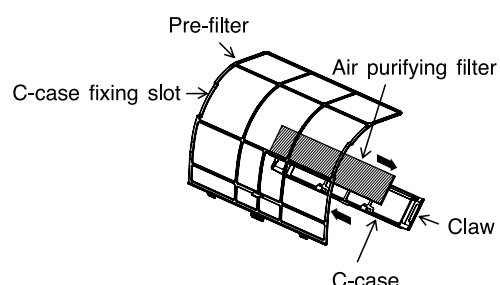
2 Remove the Pre-filter

- Push upward to release the clasps and pull out the Pre-filter.



3 Attaching the air purifying filters

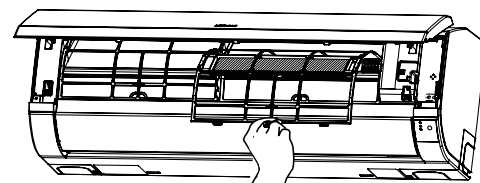
- Attach the air purifying filters to the C-case by gently compress its both sides and release after insertion into filter frame.
- Bring the C-case to the back side of the pre-filter. Insert its claws on left and right to the C-case fixing slot securely. Honeycomb surface shall be on the front side and flat surface shall be on the back side when insert (only for the purifying filter with a flat surface).



⚠ CAUTION

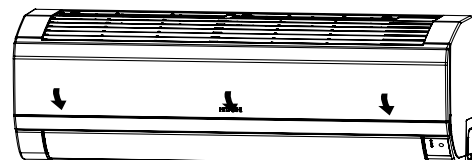
Do not bend the air purifying filter as it may cause damage to the structure.

Please do not smell direct from source of filter.



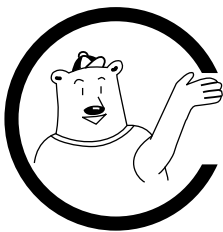
4 Attach the Pre-filters

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



NOTE

- In case of removing the air purifying filters, please follow the above procedures.
- The cooling capacity is slightly weakened and the cooling speed becomes slower when the air purifying filters are used. So, set the fan speed to "HIGH" when using it in this condition.
- Air purifying filters are not washable. It is recommended to use vacuum to clean it. It can be used for 1 year time. Type number for this air purifying filter is <SPX-CFH22AC25>. Please use this number for ordering when you want to renew it. Part can be purchased from an authorized service parts centers.



MAINTENANCE

⚠ CAUTION

Before cleaning, stop operation and switch off the power supply.

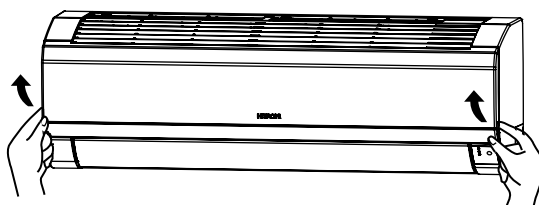
1. PRE-FILTER

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

PROCEDURE

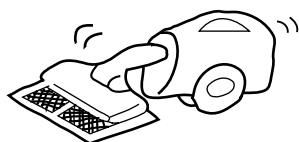
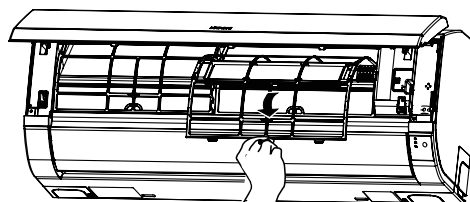
1

- Open the front panel and remove the Pre-filter
 - Gently lift and remove the air purifying filters from the air purifying filter frame.



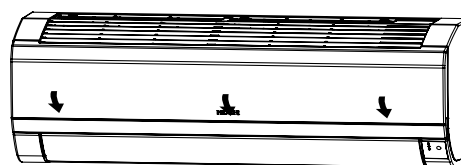
2

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



3

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



⚠ CAUTION

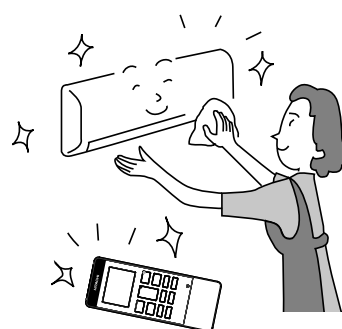
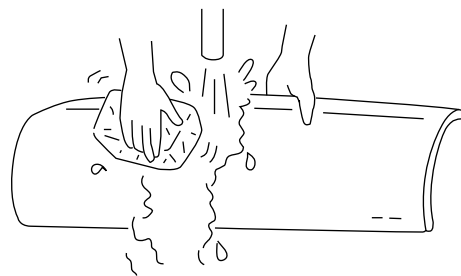
- Do not operate the air conditioner without Pre-filter. Dust may enter the air conditioner and fault may occur.
- Do not wash with hot water at more than 104°F(40°C). The Pre-filters may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The Pre-filters may shrink.
- Do not use detergent on the Pre-filter as some detergent may deteriorate the Pre-filter electrostatic performance.

2. CLEANING OF FRONT PANEL

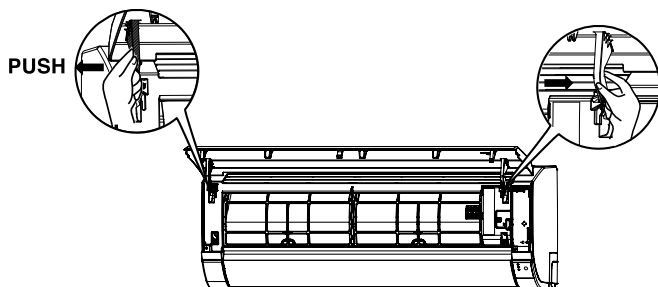
- Remove the front panel and wash with clean water. Wash it with a soft sponge. After using mild detergent, wash thoroughly with clean water.
- When front panel is not removed, wipe it with a soft dry cloth. Wipe the remote controller thoroughly with a soft dry cloth.
- Wipe the water thoroughly.
If water remains at LEDs or signal receiver of indoor unit, it causes trouble.

Method of removing the front panel.

Be sure to hold the front panel with both hands to detach and reattach it.

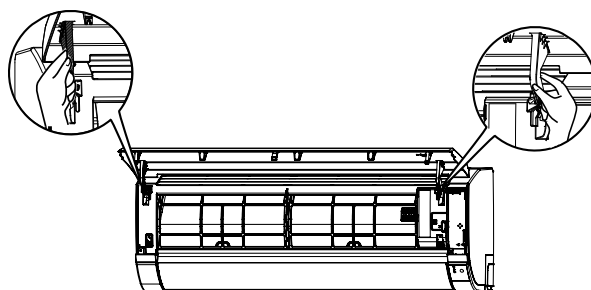


Removing the Front Panel



1. Push the end of the right-side arm outward to release the right tab.
2. Move the left-side arm outward to release the left tab and then pull the panel towards you.

Reattaching the Front Panel



1. Insert the shaft of the left arm along the step on the unit into the hole.
2. Securely insert the shaft of the right arm along the step on the unit into the hole.
3. Make sure that the front panel is securely attached and then close the front panel.

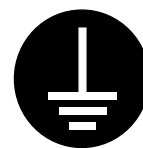
CAUTION

- Never use hot water (above 104°F(40°C)), benzine, gasoline, acid, thinner or a brush, because they will damage the plastic surface and the coating.



⚠ CAUTION

- Please use ground wiring.
Do not place the ground wiring near water or gas pipes, lightning-conductor, or the ground wiring of telephone. Improper installation of ground wiring may cause electric shock.
- A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.



IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

Green-and-yellow : Earth/Ground
White : Neutral
Black : Line

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol (⏏) or coloured green or green-and-yellow.

The wire which is coloured white must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured black must be connected to the terminal which is marked with the letter L or coloured red.

NOTE

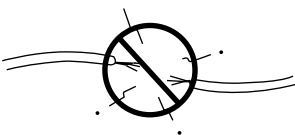
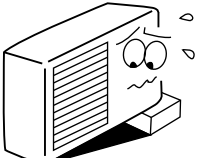
If the supply cord is damaged, it must be replaced with the new cord obtainable at authorized service parts centers.

⚠ CAUTION

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

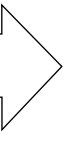
REGULAR INSPECTION

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

1		Is the ground wiring disconnected or broken?
2		Is the mounting frame seriously affected by rust and is the outdoor unit tilted or unstable?

AFTER SALE SERVICE AND WARRANTY

WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING POINTS.

CONDITION	CHECK THE FOLLOWING POINTS
 If the remote controller is not transmitting a signal. (Remote controller display is dim or blank.)	● Do the batteries need replacement? ● Is the polarity of the inserted batteries correct?
 When it does not operate	● Is the fuse blown? ● Is the power supply in normal condition? ● Is the circuit breaker "ON"? ● Is the setting of operation mode different from other indoor units?
 When it does not cool well When it does not heat well	● Is the pre-filter blocked with dust? ● Does sunlight fall directly on the outdoor unit? ● Is the airflow of the outdoor unit obstructed? ● Are the doors or windows opened, or is there any source of heat in the room? ● Is the set temperature suitable? ● Are the air inlets or air outlets of indoor and outdoor units blocked? ● Is the fan speed "LOW" or "SILENT"?



Notes

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

- Please contact your sales agent immediately if the air conditioner still fails to operate normally after the above inspections. Inform your agent of the model of your unit, production number, date of installation. Please also inform him regarding the fault.
- Power supply shall be connected at the rated voltage, otherwise the unit will be broken or could not reach the specified capacity.

NOTE:

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

On switching on the equipment, particularly when the room light is dimmed, a slight brightness fluctuation may occur. This is of no consequence.

The conditions of the local Power Supply Companies are to be observed.

- Avoid using the room air conditioner for cooling operation when the outside temperature is below the minimum recommended temperature.
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	70°F (21°C)	90°F (32°C)	68°F (20°C)	81°F (27°C)
	Wet bulb	59°F (15°C)	73°F (23°C)	–	–
Outdoor	Dry bulb	-0.4°F (-18°C)	114.8°F (46°C)	-0.4°F (-18°C)	75.2°F (24°C)
	Wet bulb	–	–	–	–

		Cooling		Heating	
		Minimum	Maximum	Minimum	Maximum
Indoor	Dry bulb	70°F (21°C)	90°F (32°C)	68°F (20°C)	81°F (27°C)
	Wet bulb	59°F (15°C)	73°F (23°C)	–	–
Outdoor	Dry bulb	14°F (-10°C)	114.8°F (46°C)	-4°F (- 20°C)	75.2°F (24°C)
	Wet bulb	–	–	–	–

MEMO

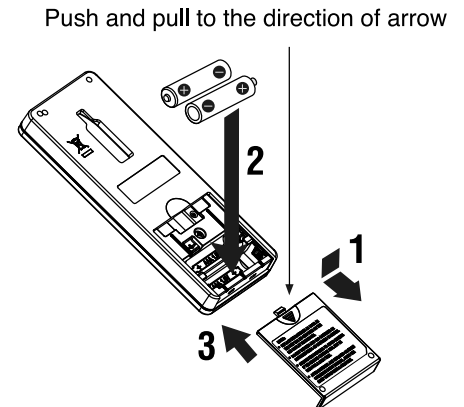
This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

PREPARATION BEFORE OPERATION

When using the remote controller, if there is no response from the air conditioning unit and/or the display has faded and dimmed, the batteries in the remote control need to be removed and replaced with a new set.

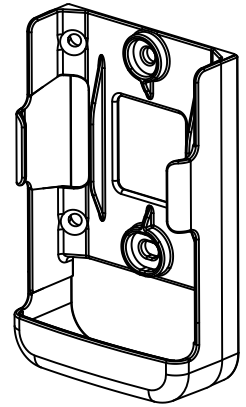
■ To set the batteries

1. Slide the cover to take it off.
2. Set two dry batteries type AAA/LR03 (alkaline).
The batteries must be placed in the position of “+” and “-” polar.
3. Reinstall the battery cover.
4. Press Reset button.



■ To mount the remote controller holder to the wall

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



NOTES

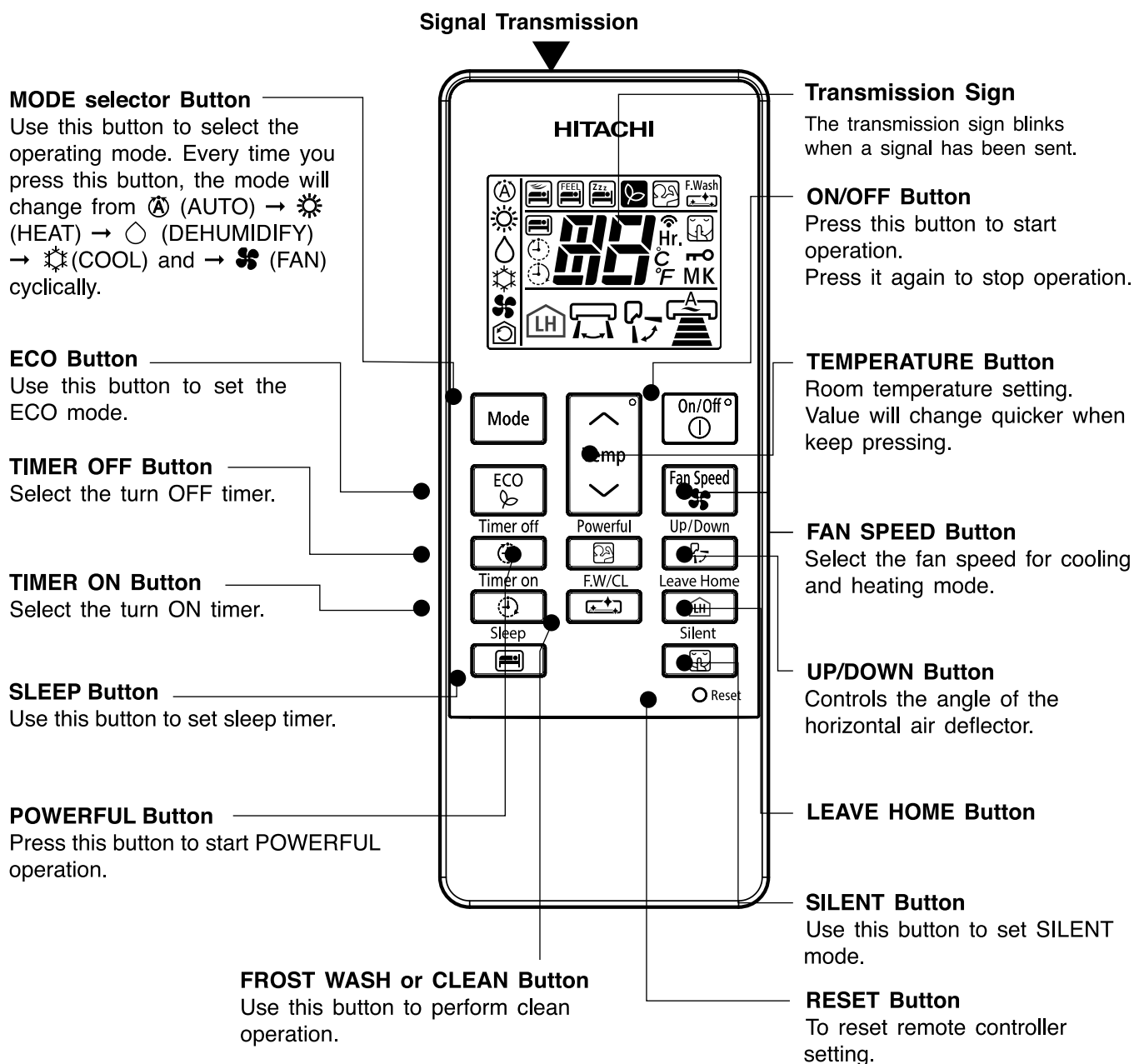
If you replace the batteries, or after pressing 'Reset' button, the temperature display will return to °F. Follow 'Temperature Switching' instruction to change to °C.

▲ CAUTION

1. Do not mix up new and old batteries or different kind of batteries together.
2. Take out the batteries when you do not use the remote controller for 2 or 3 months.
3. Use high quality and high performance AAA batteries to avoid short operating life and electrolytes leakage.
4. After batteries are replaced or when an operation is abnormal, press 'Reset' button using a pen point.

NAMES AND FUNCTIONS OF REMOTE CONTROLLER

This remote controller controls the operation and timer setting of the room air conditioner. The operating range of the remote control from the indoor unit is 23feet (approx. 7m). If inverter lamp is used, the range may become shorter.



Precautions for Use

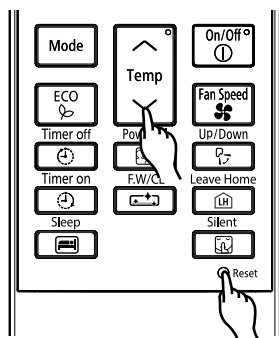
- Do not place the remote controller in the following places.
 - Under direct sunlight.
 - In the vicinity of a heater.
- Handle the remote controller carefully. Do not drop it on the floor, and protect it from water.
- Once the outdoor unit stops, it will not restart for about 3 minutes (unless you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

Temperature Switching

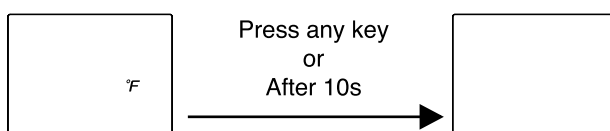
The default temperature display for this model is Fahrenheit (°F).

A To switch the temperature display from Celsius to Fahrenheit

- 1 Press and hold  Reset +  button for 3s.
- 2 Release  Reset button while pressing  until LCD shows Full Segment display.

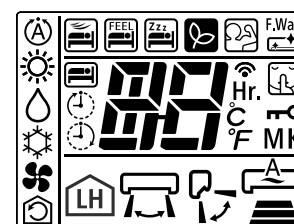
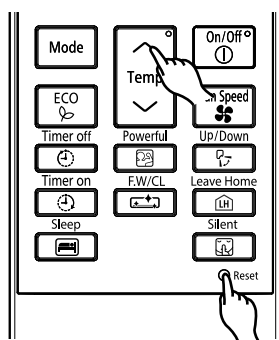


- 3 °F sign appears on the screen. The temperature display has switched to Fahrenheit.

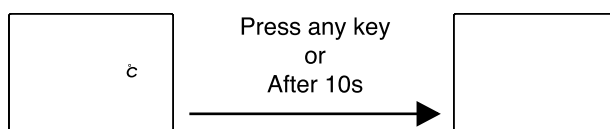


B To switch the temperature display from Fahrenheit to Celsius

- 1 Press and hold  Reset +  button for 3s.
- 2 Release  Reset button while pressing  until LCD shows Full Segment display.



- 3 °C sign appears on the screen. The temperature display has switched to Celsius.



NOTE

- Temperature switching will be initialized after user press 'Reset' button or replace the batteries.

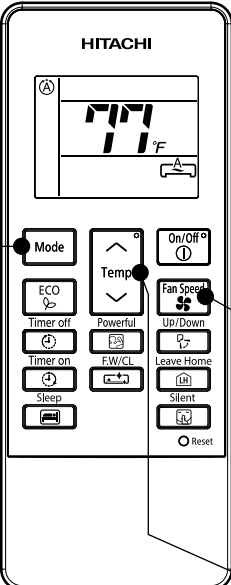
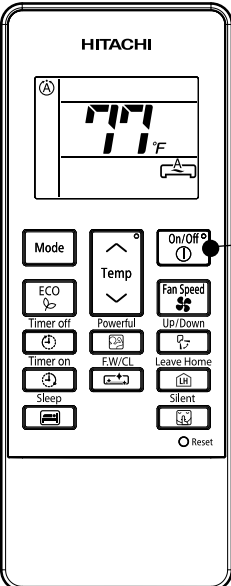
VARIOUS FUNCTIONS

■ Auto Restart Control

- After recovering from power cut, the room air conditioner will automatically restored with operation mode and airflow operation set previously.
(This is because operation is not stopped by the remote controller)
- If you do not require Auto Restart Control, please contact your local sales agent.
- Auto Restart Control is not available when the Timer or Sleep Timer is set.

AUTOMATIC OPERATION

The room air conditioner automatically selects the mode, i.e. HEAT or COOL mode depending on the current room temperature. The selected operation mode will change as the room temperature changes. However, the operation mode does not change when the indoor unit is connected to a Multi Type outdoor unit.

1 Press the MODE selector button to select and display  (AUTO) mode.

- When AUTO mode is selected, the room air conditioner automatically selects either HEAT or COOL mode depending on the current room temperature.
- If the mode that has been automatically selected is not satisfactory, manually change the operation mode (HEAT, DEHUMIDIFY, COOL or FAN).

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

```

    graph LR
      A[AUTO] --> B[HIGH]
      B --> C[MED]
      C --> D[LOW]
      D --> E[SILENT]
      E --> A
    
```

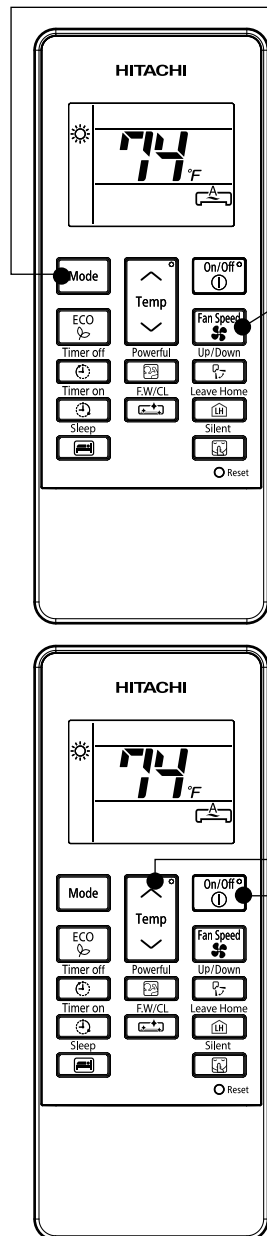
3 Set the desired room temperature using  (TEMP) button. The display indicates the setting.
The temperature setting and the actual room temperature may vary depending on conditions.
Temperature can be set between 60° ~ 90°F (16° ~ 32°C)

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

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

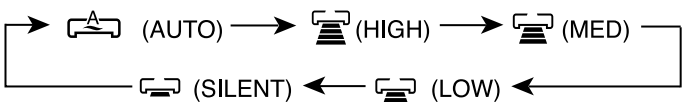
HEATING OPERATION

- Use the room air conditioner for heating when the outdoor temperature lies within the range stated in Indoor Unit Operation Manual.
When the temperature is too warm, the heating operation may not work in order to protect the room air conditioner.
- To maintain the reliability of the room air conditioner, please operate when outdoor temperature is above minimum operating range.



1 Press the MODE selector button to select and display  (HEAT) mode.

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



2 Set the desired room temperature using  (TEMP) button. The display indicates the setting.

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

Temperature can be set between 60° ~ 90°F (16° ~ 32°C)

3 Press the  (ON/OFF) button. Heating operation starts with a beep. Press the button again to stop operation.

START STOP

- As the settings are stored in the memory of the remote controller, you only have to press the  (ON/OFF) button next time.
- During Auto fan, the fan speed automatically changes as shown below:
 - When the difference between room temperature and set temperature is large, the fan starts to run at High speed.
 - The fan speed will be changed to lower speed when the room temperature reaches the preset temperature. This is to maintain optimum room temperature condition for heating.

Defrosting

Defrosting will be performed about 5 ~ 10 minutes for every 1 hour when frost forms on the heat exchanger of the outdoor unit.

During the defrost operation, the operation LED blinks in a cycle of 2 seconds on and 1 second off.

The maximum time for defrosting is 20 minutes.

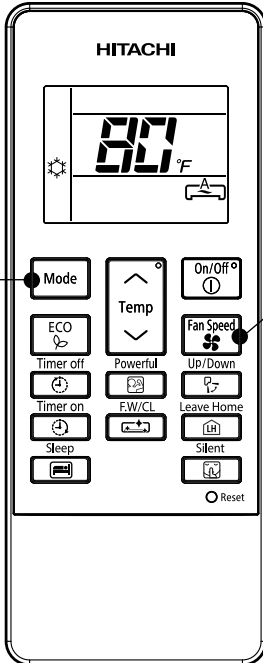
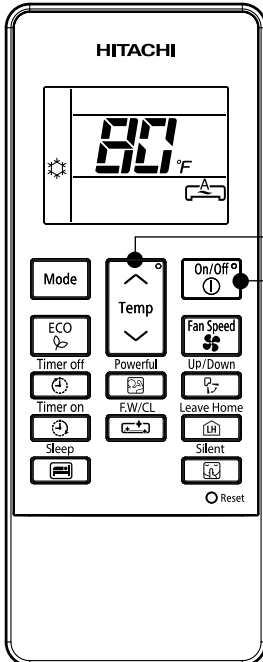
However, if the indoor is connected to a multi type outdoor unit, the maximum time for defrosting is 15 minutes.

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

COOLING OPERATION

Use the room air conditioner for cooling when the outdoor temperature lies within the range stated in Indoor Unit Operation Manual.

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

- 1** Press the MODE selector button to select and display  (COOL) mode.
- Set the desired FAN SPEED using  (FAN SPEED) button. The display indicates the setting.

```

          graph LR
            A[AUTO] --> B[HIGH]
            B --> C[MED]
            C --> D[LOW]
            D --> E[SILENT]
            E --> A
          
```
- Set the desired room temperature using  (TEMP) button. The display indicates the setting.
The temperature setting and the actual room temperature may vary depending on conditions.
Temperature can be set between 60° ~ 90°F (16° ~ 32°C).

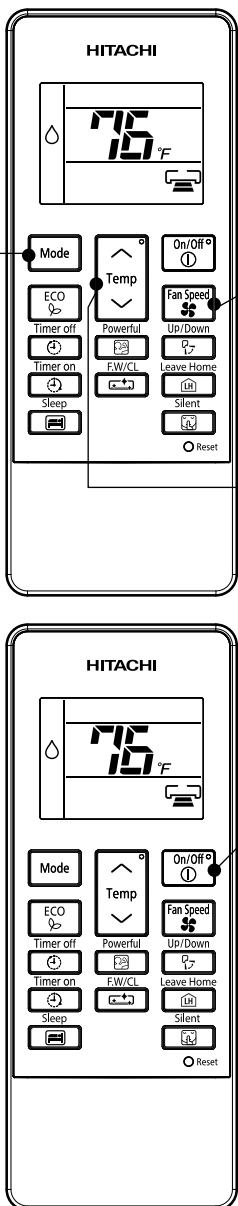
START STOP

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

- As the settings are stored in the memory of the remote controller, you only have to press the  (ON/OFF) button next time.
- During Auto fan, the fan speed automatically changes as shown below:
 - When the difference between room temperature and set temperature is large, the fan starts to run at High speed.
 - The fan speed will be changed to lower speed when the room temperature reaches the preset temperature. This is to maintain optimum room temperature condition for cooling.

DEHUMIDIFYING OPERATION

Use the room air conditioner for dehumidifying when the room temperature is over 60°F (16°C). When it is under 59°F (15°C), the dehumidifying function does not work.



1 Press the MODE selector button to select and display  (DEHUMIDIFY) mode.
The fan speed is set at LOW.

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

→  (LOW) →  (SILENT)

3 Set the desired room temperature using  (TEMP) button. The display indicates the setting.

 The range between 68° ~ 78°F (20° ~ 26°C) is recommended as the room temperature for dehumidifying.
Temperature can be set between 60° ~ 90°F (16° ~ 32°C).

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

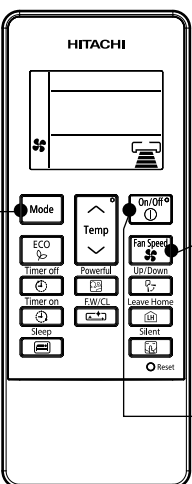
■ As the settings are stored in the memory of the remote controller, you only have to press the  (ON/OFF) button next time.

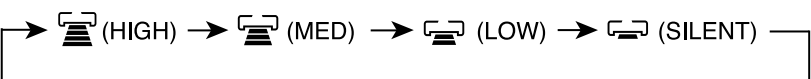
NOTE

- When the room temperature is higher than the set temperature: The device will dehumidify the room, reducing the room temperature to the preset level.
When the room temperature is lower than the set temperature, Dehumidifying will be performed at the temperature setting slightly lower than the actual room temperature, regardless of the temperature setting.
- The preset room temperature may not be reached depending on the number of people present in the room or other room conditions.

FAN OPERATION

Use the unit as an air circulator.



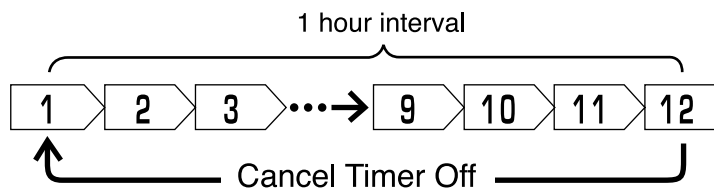
- 1** Press the MODE selector button so that the display indicates  (FAN).
- 2** Press the  (FAN SPEED) button.

- START STOP** Press the  (ON/OFF) button. Fan operation starts with a beep.
Press the button again to stop operation.

TIMER SETTING

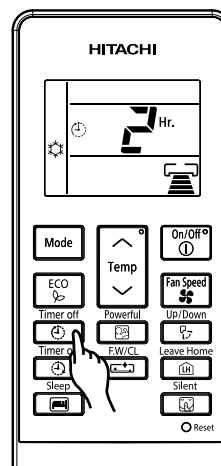
■ ON Timer and OFF Timer are available.

Timer Off setting

- Set the timer to power off the air conditioner.
- Timer setting will change according to the sequence below when Timer Off button is pressed.

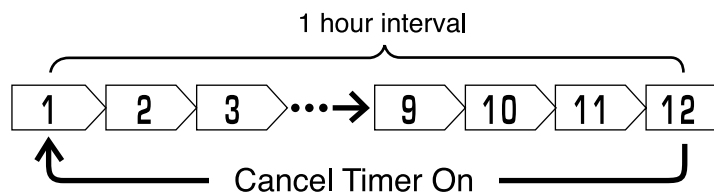


■ Operation stops at set time.

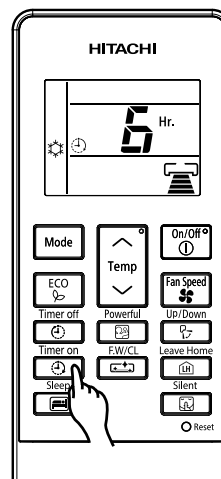


Timer On setting

- Set the timer to power on the air conditioner.
- Timer setting will change according to the sequence below when Timer On button is pressed.

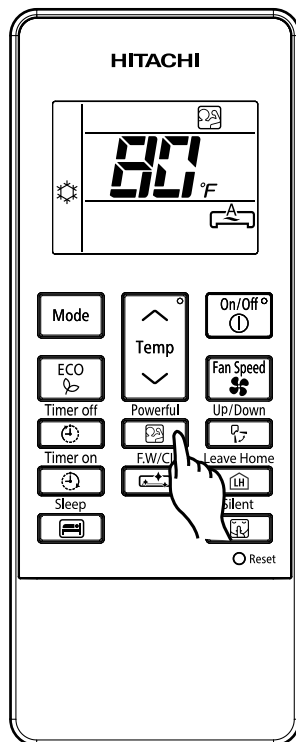


■ Operation starts at set time and temperature.



POWERFUL OPERATION

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



START

Press the  (POWERFUL) button during operation.

- “” is displayed on the LCD.
- POWERFUL operation ends in 20 minutes. Then, the system will automatically return to the previous settings.
- During POWERFUL operation, cooler or warmer air flow will be blown out from the indoor unit for COOLING and HEATING operation respectively.

CANCEL

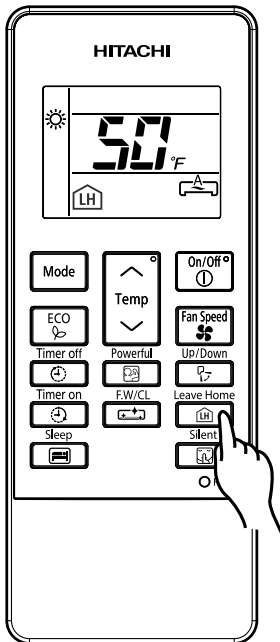
- Press the  (ON/OFF) button or
 - Press the  (POWERFUL) button again.
- “” will disappear from the display.

NOTE

- When ECO mode is selected, POWERFUL operation is cancelled.
- During POWERFUL operation, capacity of the air conditioner will not increase if the air conditioner is already running at maximum capacity.
- After auto restart, POWERFUL operation is cancelled and unit will operate with previous operation.
- For Multi-model connections, POWERFUL operation may not function depending on operation conditions.

LEAVE HOME(LH) OPERATION

Use this function to prevent the room temperature from falling too much when no one is attended at home. The default setting is 50°F (10°C) and the temperature setting is between 50°~ 60°F (10°~ 16°C).



START

- 1 Press the  (LEAVE HOME) button to activate the function.

Room temperature is set at 50°F (10°C) and HEATING operation starts.

- 2 Set the desired room temperature using  (TEMP) button. Temperature range can be set between 50°F (10°C) and 60°F (16°C).

“”, “”, “”, “SET TEMPERATURE” is displayed on the LCD.

CANCEL

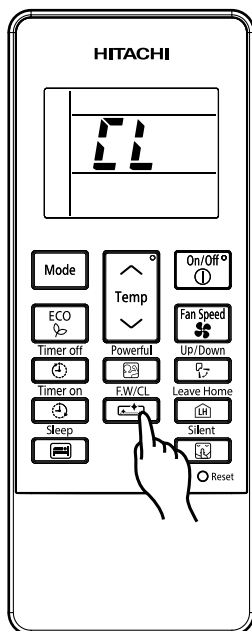
- Press the  (ON/OFF) button, or
- Press the  (MODE) button, or
- Press the  (LEAVE HOME) button again.
 will disappear from the display.

NOTE

- During Leave Home operation, fan speed and horizontal air deflector position cannot be changed.

CLEAN (ONE TOUCH CLEAN) OPERATION (For Multi-model connection)

Use this function to dry the heat exchanger of the indoor unit to prevent formation of mildew.



START

- Press the  (FROST WASH/CLEAN) button when unit is in Standby mode.

Total time taken for One Touch Clean operation is 60 minutes. One Touch Clean operation consists of HEATING and DRYING operation.

During One Touch Clean, operation LED lights up and “11” is displayed on the LCD.

CANCEL

- Press the  (ON/OFF) button.

NOTE

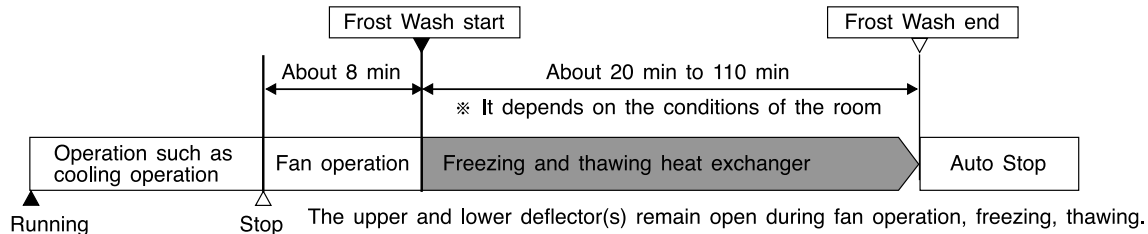
- When CLEAN operation has finished, the unit will enter Standby mode automatically.
- If OFF TIMER or ON TIMER is pre-set, there is a need to cancel those timers before operating CLEAN function.
- For Multi-model connection, when pressing the  (FROST WASH/CLEAN), operation is limited to FAN operation only.
- For Multi-model connection, when one unit is operating CLEAN operation, the other units can operate COOLING, DEHUMIDIFYING & FAN operation. However, when other units need to operate HEATING operation, the air conditioners will be in Standby mode. After CLEAN operation has finished, HEATING operation will start.

FROST WASH OPERATION (For single model connection)

- The dust and dirt adhering to indoor heat exchanger which is the cause of the smell. They are washed away by freezing and thawing of the heat exchanger.
- Frost Wash function can work when the outdoor temperature is 34° to 109°F (1° to 43°C) and indoor humidity is 30% to 70%.

■ Frost Wash

The process of Frost Wash



- “” lamp on the indoor unit lights up during Frost Wash operation.
- If you want to stop Frost Wash operation, press the  (ON/OFF) button once.
- When pressing the button such as cooling during Frost Wash operation, Frost Wash operation is discontinued and start the cooling operation after about 3 minutes.
- In order to protect the product, Frost Wash function cannot be carried out again for about 60 minutes after Frost Wash operation is completed.

■ Frost Wash (Manual mode)

When the unit is off, press  (FROST WASH/CLEAN) button, manual Frost Wash will start.

■ How to start and cancel Frost Wash (Manual mode)

1. Press  (FROST WASH/CLEAN) button, “” is displayed on the LCD. Frost Wash operation will start. “” lamp on the indoor unit lights up.
- After one hour, “” disappears from the LCD. After about two hours, the indoor unit will stop Frost Wash operation,
- In order to protect the product, Frost Wash function cannot be carried out again for about 60 minutes after the Frost Wash operation is completed.

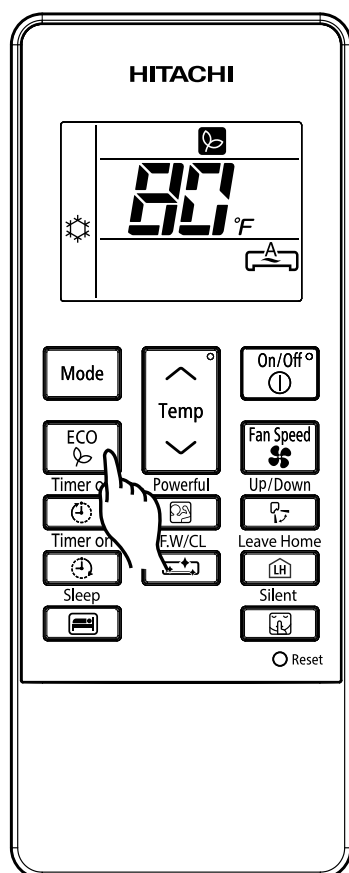
2. Press the  (ON/OFF) button, the operation will stop. “” lamp on the indoor unit turns off.

Precautions for Use

- Do not open windows or doors during frost wash operation. Water will condense on the air deflector and drips down occasionally. This will wet your furniture.
- Do not open or remove the front panel during Frost Wash operation. It may cause injury or malfunction.
- Frost Wash operation does not wash away all dust and dirt.
- Hissing, fizzy or squeaking noise may generate during Frost Wash operation.
- If the air conditioner is continuously running, Frost Wash function is not effective.
- During Frost Wash operation, if power is turned off and then power is restored, Frost Wash function will not restart.
- After turning on the power, please wait a moment if you want to start Frost Wash.

ECO OPERATION

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



START

By pressing the  (ECO) button during HEATING, AUTO, DEHUMIDIFYING or COOLING operation, the unit performs ECO operation.

When  (ECO) button is pressed.

- “” is displayed on the LCD.
- Energy saving operation will start by changing the set temperature higher or lower automatically and limiting the power consumption.

CANCEL

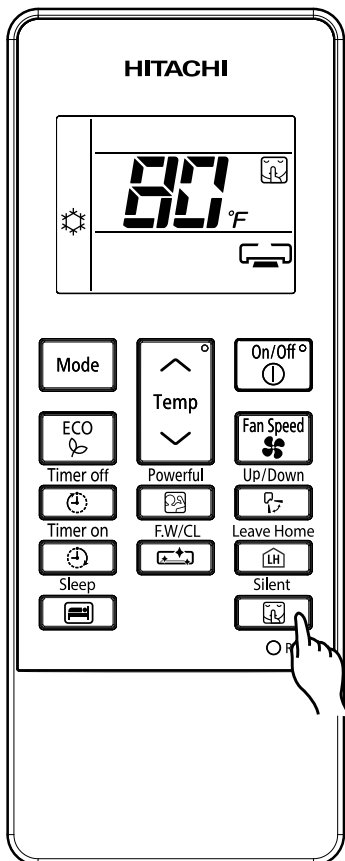
- Press the  (ON/OFF) button, or
- Press the  (ECO) button again.
- “” will disappear from the LCD.

NOTE

- ECO function may not be effective when power consumption is low.
- By pressing the  (POWERFUL) button, ECO operation is cancelled.
- After auto restart, ECO operation is cancelled and unit will operate with previous operation.

SILENT OPERATION

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



START

- When  button is pressed,
- “” will be displayed on the LCD.
- Fan speed will be in silent .

CANCEL

- Press the  (ON/OFF) button, or
- Press the  (SILENT) button once again or
- Press the  (FAN SPEED) button.

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

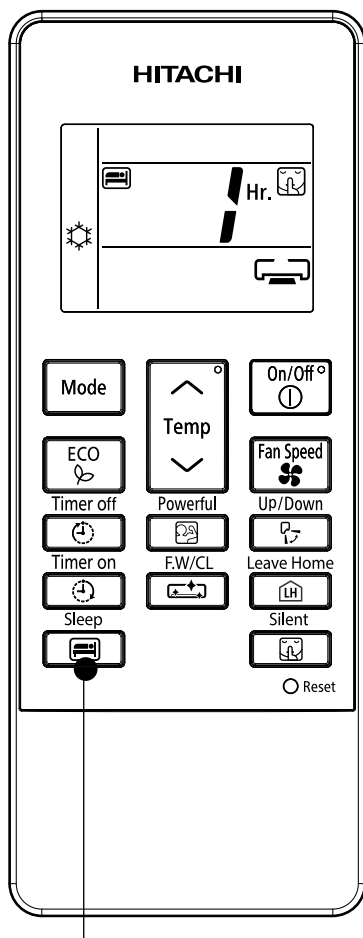
When SILENT operation stops, “” will disappear from the LCD.

NOTE

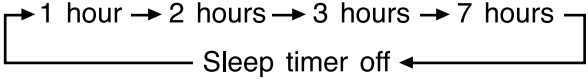
- When POWERFUL operation is selected, SILENT operation will be cancelled. Fan speed will return to the previous speed before SILENT operation.
- After unit auto restart, SILENT operation is cancelled. Fan speed will return to the previous speed before SILENT operation.
- During any operations with silent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

SLEEP TIMER SETTING

By pressing the  (SLEEP) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the unit shifts the room temperature and reduces the fan speed.



SLEEP

Mode	Indication
Sleep timer	

START

During Sleep Timer, the unit will continue working for the designated number of hours.

When  (SLEEP) button is pressed,

- Timer information will be displayed on the LCD.
- The timer LED lights up and a beep sound is emitted from the indoor unit.

CANCEL

- Press the  (ON/OFF) button.

Room air conditioner will enter Standby mode.

- Press the  (SLEEP) button again until timer cancels. "  " and number of hours will disappear from the LCD. The timer LED turns off and a beep sound is emitted from the indoor unit.

NOTE

- If you set SLEEP timer while ON TIMER or OFF TIMER has been pre-set, the sleep timer becomes effective instead ON TIMER or OFF TIMER.
- The indoor fan speed of air conditioner does not change even when fan speed button is pressed.

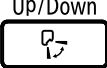
ADJUSTING THE AIRFLOW DIRECTION

1

Adjust the airflow upward and downward

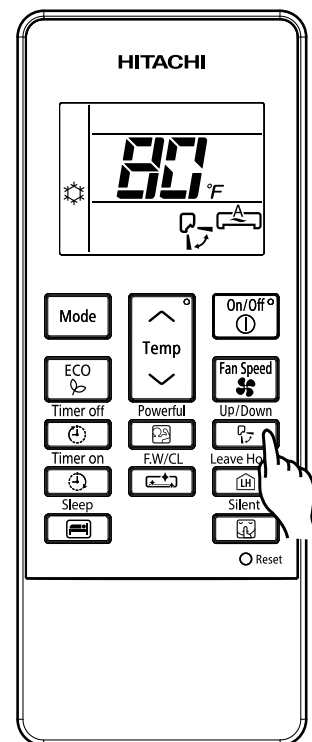
The horizontal air deflector is automatically set to the specific angle that is suitable for each operation. The deflector can swing up and down and set to

desired angle by pressing  (UP/DOWN) button.

- If the “  (UP/DOWN) ” button is pressed once, the horizontal air deflector swings up and down. If the button is pressed again, the deflector stops in the current position.
To have the deflector swinging once again, press the (UP/DOWN) button and it will start moving after several seconds (about 6 seconds).
- When the operation is stopped, the horizontal air deflector moves and stops at the position where the air outlet closes.

CAUTION

- In “Cooling” operation, do not keep the horizontal air deflector swinging for a long time. Some dew may be formed on the horizontal air deflector and may drop from it.

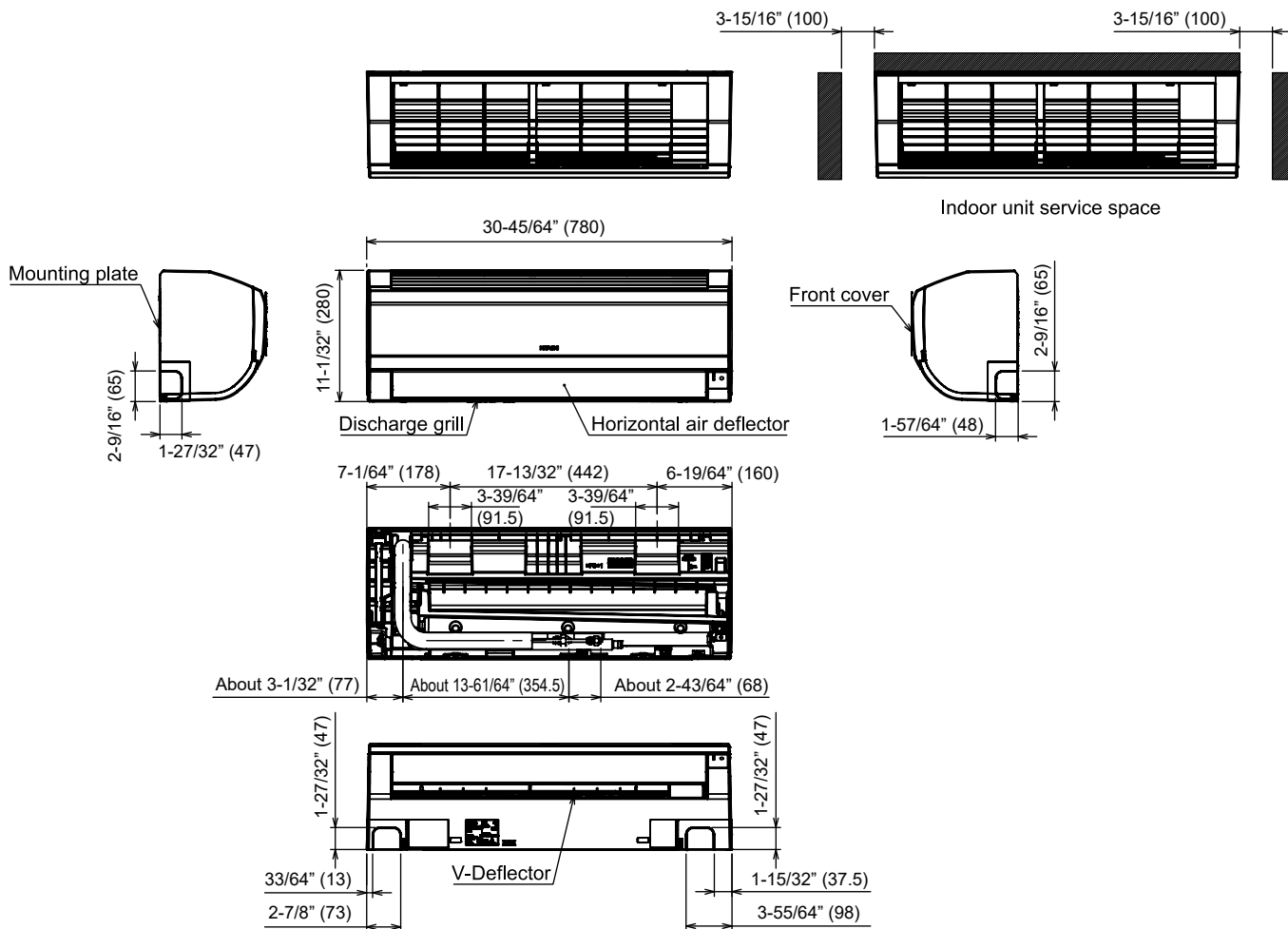


CONSTRUCTION AND DIMENSIONAL DIAGRAM FOR INDOOR

INDOOR UNIT

MODEL RAS-EH09PHLAB/RAS-EH12PHLAB/ RAS-EH07QHLAE
RAS-EH09RHLAE/RAS-EH12RHLAE

Unit: Inch (mm)

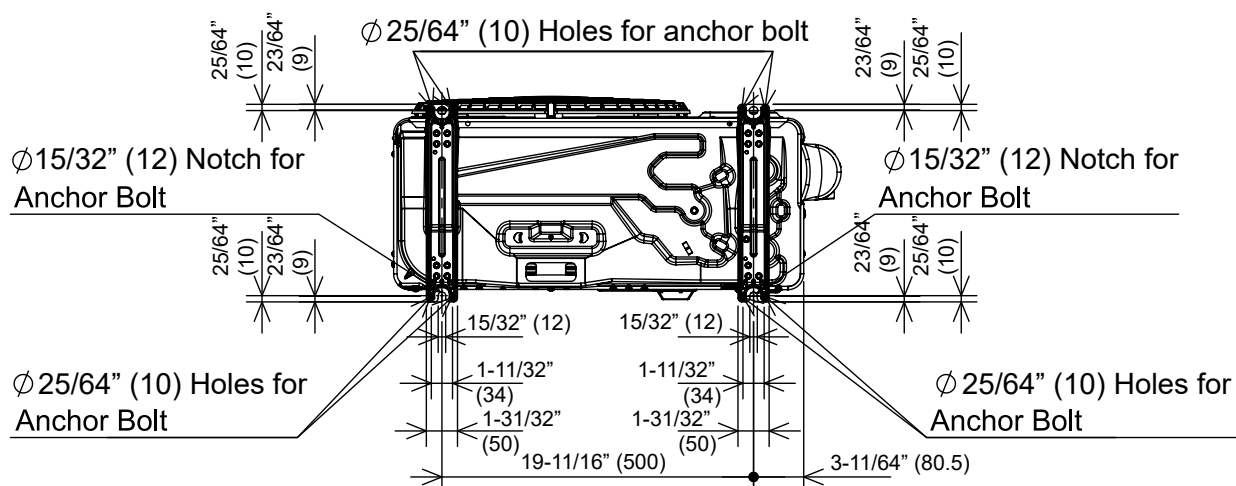
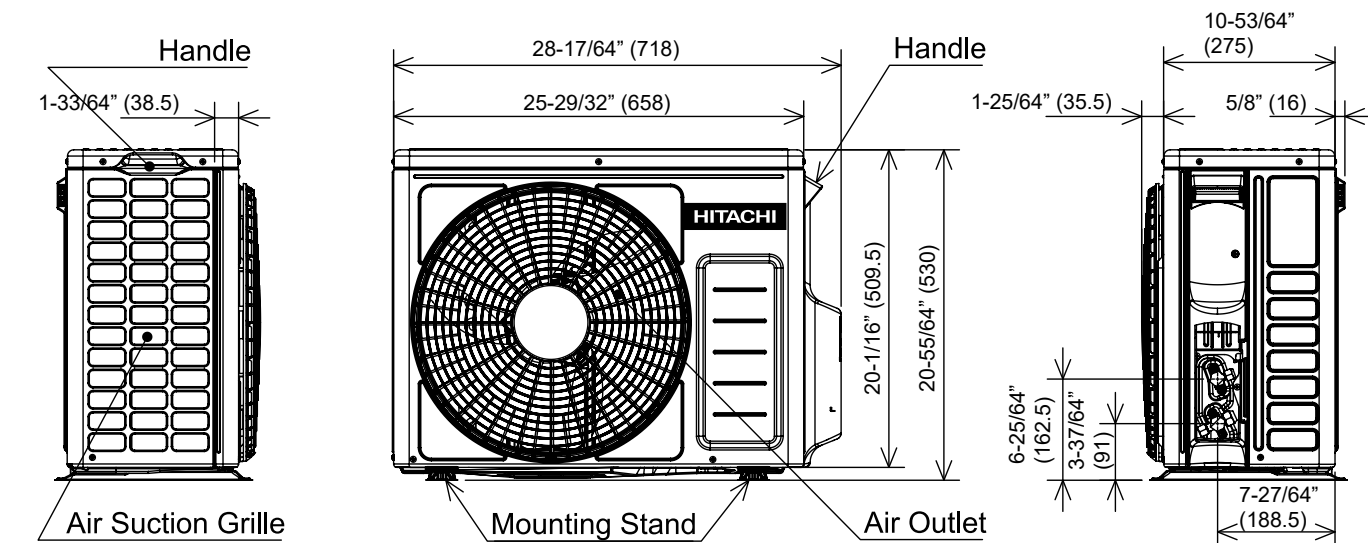


CONSTRUCTION AND DIMENSIONAL DIAGRAM FOR OUTDOOR

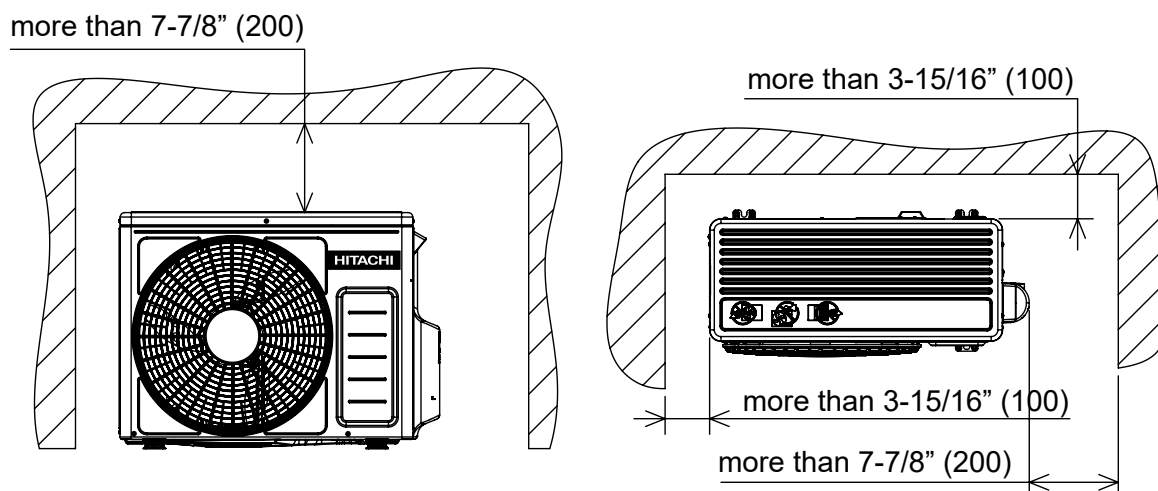
MODEL RAC-EH09WHLAB/RAC-EH12WHLAB/RAC-EH09WHLAE/RAC-EH12WHLAE

Unit: Inch (mm)

OUTDOOR UNIT



Service Space



MAIN PARTS COMPONENT

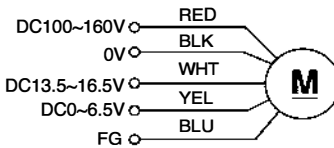
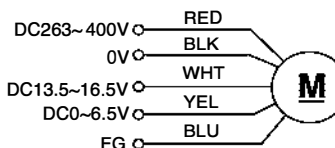
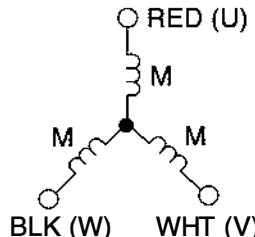
THERMOSTAT

Thermostat Specifications

MODEL			RAS-EH09PHLAB RAS-EH12PHLAB RAS-EH07QHLAE RAS-EH09RHLAE RAS-EH12RHLAE
THERMOSTAT MODEL			IC
OPERATION			COOL
TEMPERATURE °F (°C)	INDICATION 60.8 (16)	ON	62.1 (16.7)
		OFF	60.8 (16.0)
	INDICATION 75.2 (24)	ON	76.5 (24.7)
		OFF	75.2 (24.0)
	INDICATION 89.6 (32)	ON	90.9 (32.7)
		OFF	89.6 (32.0)

FAN MOTOR

Fan Motor Specifications

MODEL		RAS-EH09PHLAB RAS-EH12PHLAB	RAS-EH07QHLAE RAS-EH09RHLAE RAS-EH12RHLAE	RAC-EH09WHLAB RAC-EH12WHLAB RAC-EH09WHLAE RAC-EH12WHLAE
RATED VOLTAGE		DC140V	DC340V	DC120 - 380V
OUTPUT		21 W	38 W	47 W
CONNECTION		 (Control circuit built in)		
RESISTANCE VALUE (Ω)	68°F (20°C)	---		UV = 79 ±10% VW = 79 ±10% WU = 79 ±10%

BLU : BLUE

YEL : YELLOW

BRN : BROWN

WHT : WHITE

GRY : GRAY

ORN : ORANGE

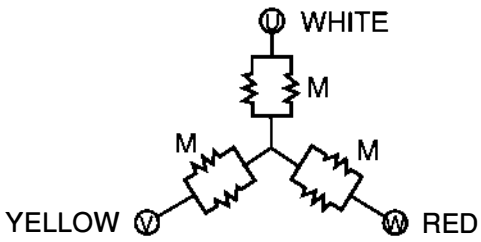
GRN : GREEN

RED : RED

BLK : BLACK

COMPRESSOR MOTOR

Compressor Motor Specifications

MODEL	RAC-EH09WHLAB RAC-EH12WHLAB RAC-EH09WHLAE RAC-EH12WHLAE	
COMPRESSOR MODEL	ASN98D32UER	
PHASE	SINGLE	
RATED VOLTAGE	AC 230V	
RATED FREQUENCY	60 Hz	
POLE NUMBER	6	
CONNECTION		
RESISTANCE VALUE (Ω)	68°F (20°C)	2M = 1.72 ±7%
	167°F (75°C)	-----

⚠ CAUTION

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

WIRING DIAGRAM

MODEL RAS-EH09PHLAB/RAC-EH09WHLAB
RAS-EH12PHLAB/RAC-EH12WHLAB

INDOOR UNIT

- BLU : BLUE

GRY : GRAY

BLK : BLACK
- YEL : YELLOW

ORN : ORANGE

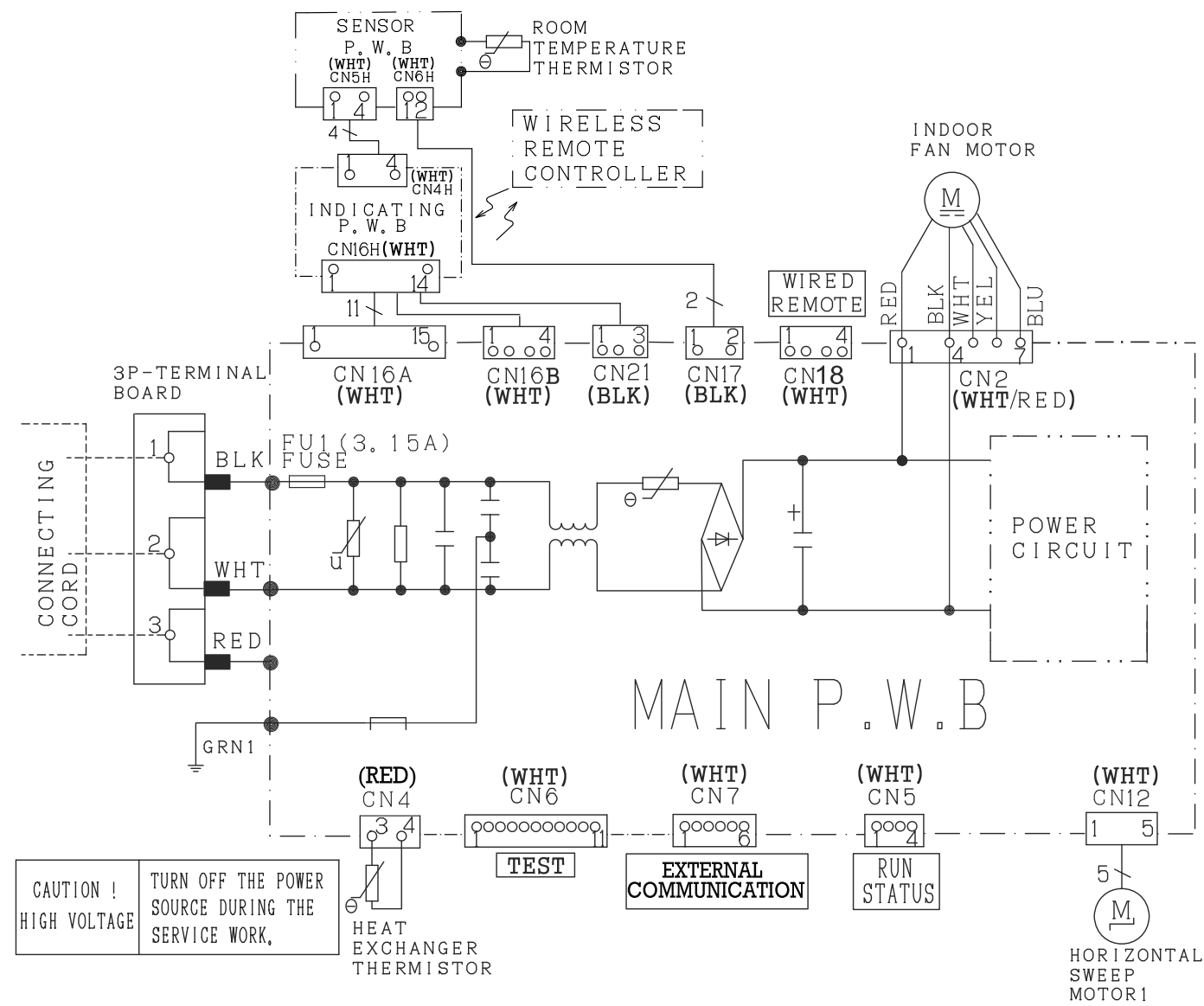
PNK : PINK
- BRN : BROWN

GRN : GREEN

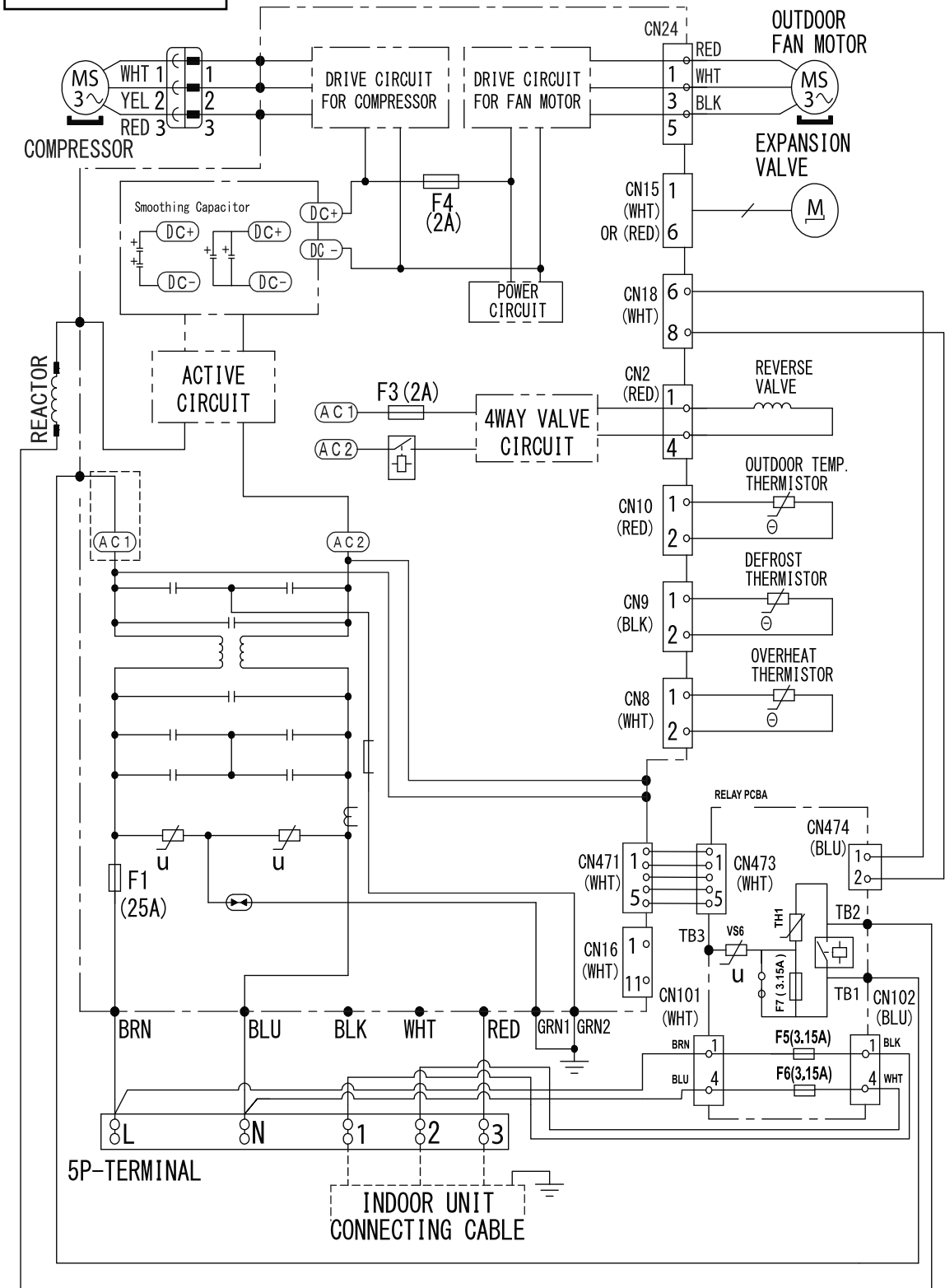
VIO : VIOLET
- WHT : WHITE

RED : RED

IVO : IVORY



OUTDOOR UNIT



- BLU: BLUE

BLK: BLACK

BRN: BROWN

GRN: GREEN
- RED: RED

WHT: WHITE

YEL: YELLOW

GRY: GRAY

MODEL RAS-EH07QHLAE
RAS-EH09RHLAE
RAS-EH12RHLAE

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

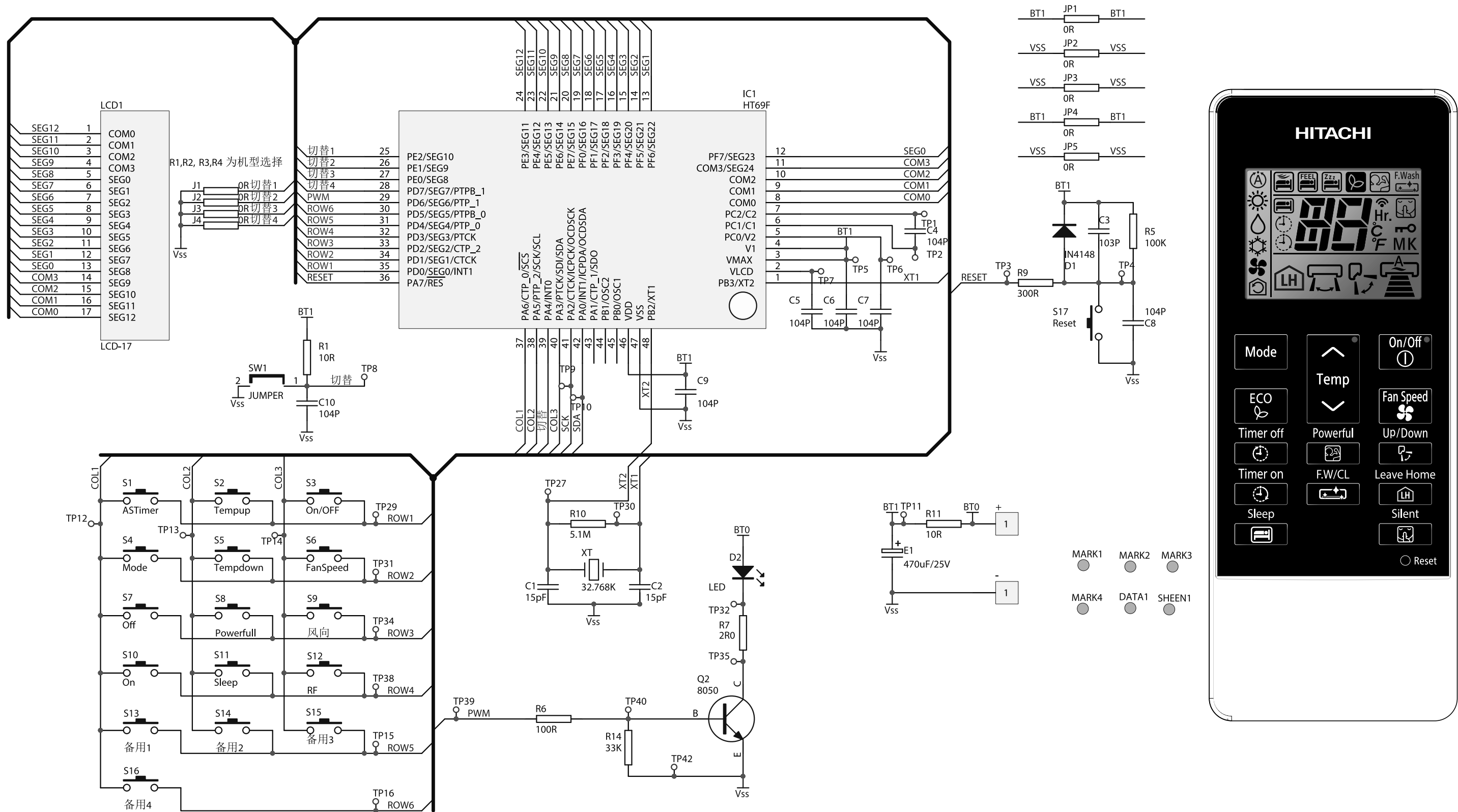


MODEL	RAC-EH09WHLAE
	RAC-EH12WHLAE



CIRCUIT DIAGRAM

Remote Controller



CIRCUIT DIAGRAM

MODEL RAS-EH09PHLAB
RAS-EH12PHLAB
RAS-EH07QHLAE
RAS-EH09RHLAE
RAS-EH12RHLAE

- NOTES:
1. TYPE OF CAPACITOR
F- FILM CAPACITOR
C- CERAMIC CAPACITOR
D- ELETROLYTIC CAPACITOR

3. MOUNTING FACE
A- COMPONENT SIDE
B- SOLDER SIDE

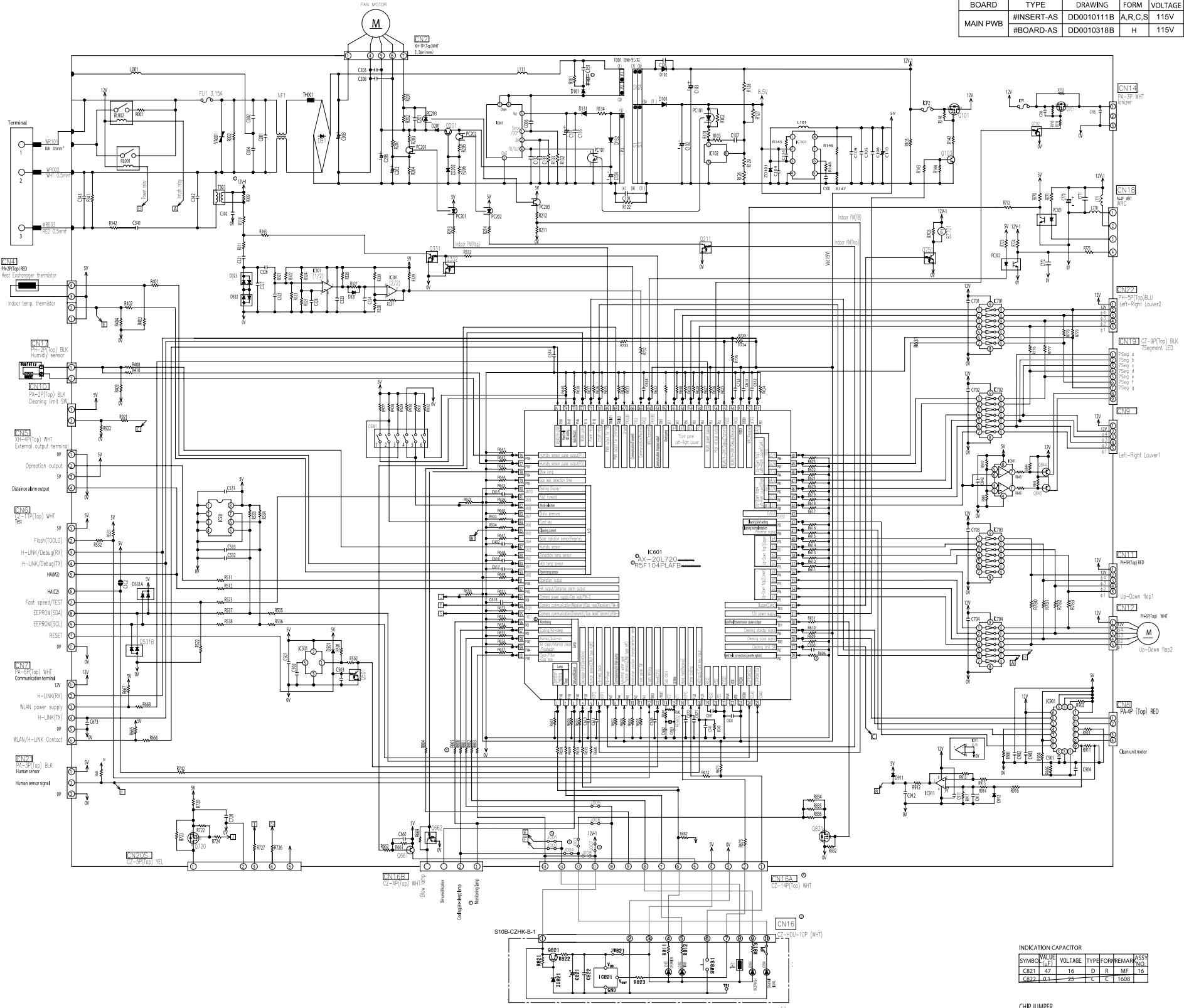
2. MOUNTING TYPE
A- AXIAL
R- RADIAL(7.5mm PITCH)
H- HAND INSERT
C- SURFACE MOUNT(SMT)
S- IN ADDITION SURFACE MOUNTING

PCB DETAILS:-

BOARD	TYPE	DRAWING	FORM	VOLTAGE
MAIN PWB	#INSERT-AS	DD0010111B	A,R,C,S	230V
	#BOARD-AS	DD0010318A	H	230V

PCB DETAILS:-

BOARD	TYPE	DRAWING	FORM	VOLTAGE
MAIN PWB	#INSERT-AS	DD0010111B	A,R,C,S	115V
	#BOARD-AS	DD0010318B	H	115V



INDICATION CAPACITOR

SYMBOL	VALUE	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY NO.
C821	47	5%	1/16	D	R	MF	19
C822	0.1	5%	1/16	C	A	B	168

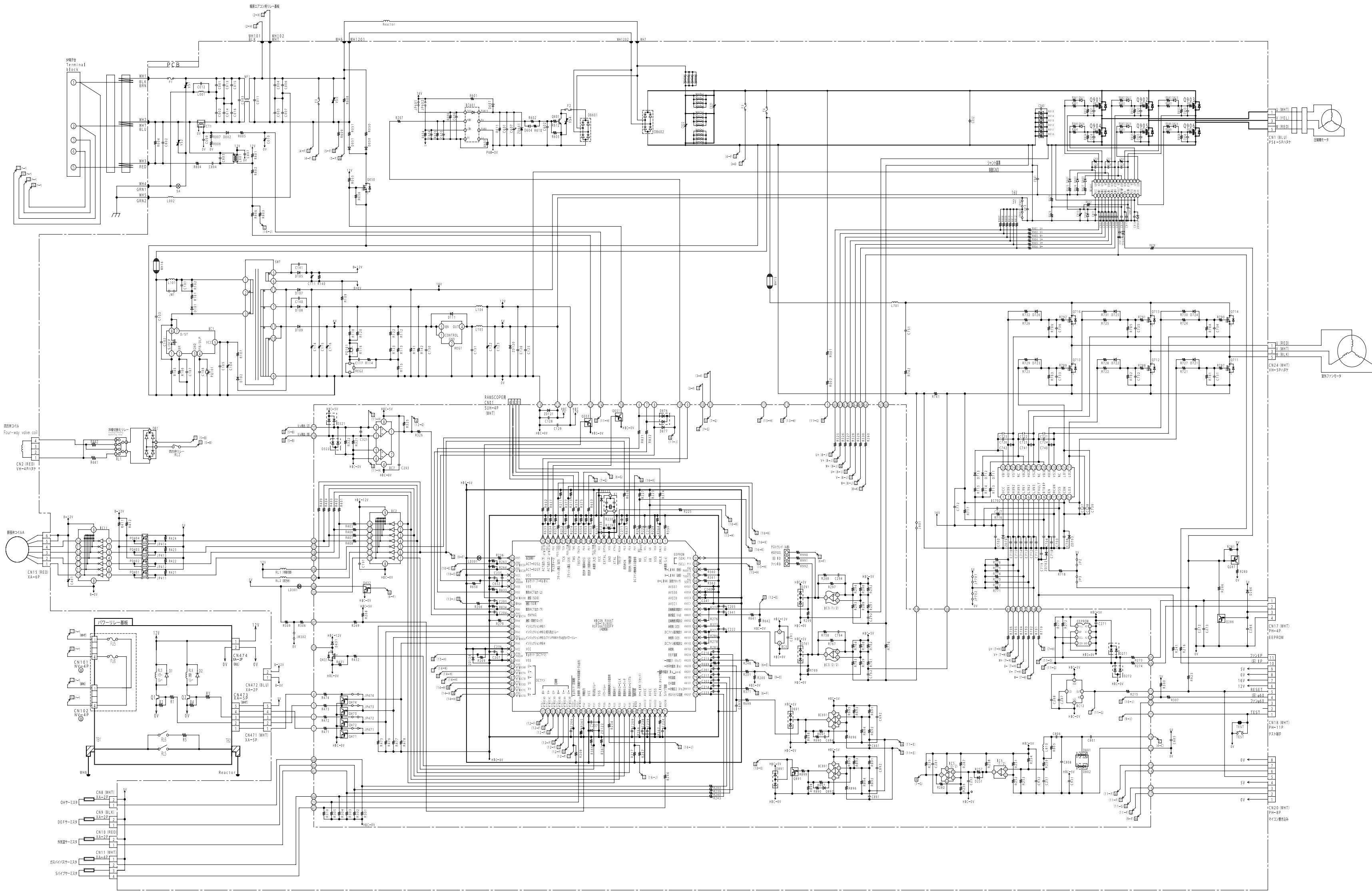
CHIP JUMPER

SYMBOL	VALUE	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY NO.
J001	0	5%	1/16	C	A	B	1005 84
J002	0	5%	1/16	C	A	B	1005 85
J003	0	5%	1/16	C	A	B	1005 86
J004	0	5%	1/16	C	A	B	1005 87
J005	0	5%	1/16	C	A	B	1005 88
J006	0	5%	1/16	C	A	B	1005 89
J007	0	5%	1/16	C	A	B	1005 90
J008	0	5%	1/16	C	A	B	1005 91
J009	0	5%	1/16	C	A	B	1005 92
J010	0	5%	1/16	C	A	B	1005 93
J011	0	5%	1/16	C	A	B	1005 94
J012	0	5%	1/16	C	A	B	1005 95
J013	0	5%	1/16	C	A	B	1005 96
J014	0	5%	1/16	C	A	B	1005 97
J015	0	5%	1/16	C	A	B	1005 98
J016	0	5%	1/16	C	A	B	1005 99
J017	0	5%	1/16	C	A	B	1005 100
J018	0	5%	1/16	C	A	B	1005 101
J019	0	5%	1/16	C	A	B	1005 102
J020	0	5%	1/16	C	A	B	1005 103
J021	0	5%	1/16	C	A	B	1005 104
J022	0	5%	1/16	C	A	B	1005 105
J023	0	5%	1/16	C	A	B	1005 106
J024	0	5%	1/16	C	A	B	1005 107
J025	0	5%	1/16	C	A	B	1005 108
J026	0	5%	1/16	C	A	B	1005 109
J027	0	5%	1/16	C	A	B	1005 110
J028	0	5%	1/16	C	A	B	1005 111
J029	0	5%	1/16	C	A	B	1005 112
J030	0	5%	1/16	C	A	B	1005 113
J031	0	5%	1/16	C	A	B	1005 114
J032	0	5%	1/16	C	A	B	1005 115
J033	0	5%	1/16	C	A	B	1005 116
J034	0	5%	1/16	C	A	B	1005 117
J035	0	5%	1/16	C	A	B	1005 118
J036	0	5%	1/16	C	A	B	1005 119
J037	0	5%	1/16	C	A	B	1005 120
J038	0	5%	1/16	C	A	B	1005 121
J039	0	5%	1/16	C	A	B	1005 122
J040	0	5%	1/16	C	A	B	1005 123
J041	0	5%	1/16	C	A	B	1005 124
J042	0	5%	1/16	C	A	B	1005 125
J043	0	5%	1/16	C	A	B	1005 126
J044	0	5%	1/16	C	A	B	1005 127
J045	0	5%	1/16	C	A	B	1005 128
J046	0	5%	1/16	C	A	B	1005 129
J047	0	5%	1/16	C	A	B	1005 130
J048	0	5%	1/16	C	A	B	1005 131
J049	0	5%	1/16	C	A	B	1005 132
J050	0	5%	1/16	C	A	B	1005 133
J051	0	5%	1/16	C	A	B	1005 134
J052	0	5%	1/16	C	A	B	1005 135
J053	0	5%	1/16	C	A	B	1005 136
J054	0	5%	1/16	C	A	B	1005 137
J055	0	5%	1/16	C	A	B	1005 138
J056	0	5%	1/16	C	A	B	1005 139
J057	0	5%	1/16	C	A	B	1005 140
J058	0	5%	1/16	C	A	B	1005 141
J059	0	5%	1/16	C	A	B	1005 142
J060	0	5%	1/16	C	A	B	1005 143
J061	0	5%	1/16	C	A	B	1005 144
J062	0	5%	1/16	C	A	B	1005 145
J063	0	5%	1/16	C	A	B	1005 146
J064	0	5%	1/16	C	A	B	1005 147
J065	0	5%	1/16	C	A	B	1005 148
J066	0	5%	1/16	C	A	B	1005 149
J067	0	5%	1/16	C	A	B	1005 150
J068	0	5%	1/16	C	A	B	1005 151
J069	0	5%	1/16	C	A	B	1005 152
J070	0	5%	1/16	C	A	B	1005 153
J071	0	5%	1/16	C	A	B	1005 154
J072	0	5%	1/16	C	A	B	1005 155
J073	0	5%	1/16	C	A	B	1005 156
J074	0	5%	1/16	C	A	B	1005 157
J075	0	5%	1/16	C	A	B	1005 158
J076	0	5%	1/16	C	A	B	1005 159
J077	0	5%	1/16	C	A	B	1005 160
J078	0	5%	1/16	C	A	B	1005 161
J079	0	5%	1/16	C	A	B	1005 162
J080	0	5%	1/16	C	A	B	1005 163
J081	0	5%	1/16	C	A	B	1005 164
J082	0	5%	1/16	C	A	B	1005 165
J083	0	5%	1/16	C	A	B	1005 166
J084	0	5%	1/16	C	A	B	1005 167
J085	0	5%	1/16	C	A	B	1005 168
J086	0	5%	1/16	C	A	B	1005 169
J087	0	5%	1/16	C	A	B	1005 170
J088	0	5%	1/16	C	A	B	1005 171
J089	0	5%	1/16	C	A	B	1005 172
J090	0	5%	1/16	C	A	B	1005 173
J091	0	5%	1/16	C	A	B	1005 174
J092	0	5%	1/16	C	A	B	1005 175
J093	0	5%	1/16	C	A	B	1005 176
J094	0	5%	1/16	C	A	B	1005 177
J095	0	5%	1/16	C	A	B	1005 178
J096	0	5%	1/16	C	A	B	1005 179
J097	0	5%	1/16	C	A	B	1005 180
J098	0	5%	1/16	C	A	B	1005 181
J099	0	5%	1/16	C	A	B	1005 182
J100	0	5%	1/16	C	A	B	1005 183
J101	0	5%	1/16	C	A	B	1005 184
J102	0	5%	1/16	C	A	B	1005 185
J103	0	5%	1/16	C	A	B	1005 186
J104	0	5%	1/16	C	A	B	1005 187
J105	0	5%	1/16	C	A	B	1005 188
J106	0	5%	1/16	C	A	B	1005 189
J107	0	5%	1/16	C	A	B	1005 190
J108	0	5%	1/16	C	A	B	1005 191
J109	0	5%	1/16	C	A	B	1005 192
J110	0	5%	1/16	C	A	B	1005 193
J111	0	5%	1/16	C	A	B	1005 194
J112	0	5%	1/16	C	A	B	1005 195
J113	0	5%	1/16	C	A	B	1005 196
J114	0	5%	1/16	C	A	B	1005 197
J115	0	5%	1/16	C	A	B	1005 198
J116	0	5%	1/16	C	A	B	1005 199
J117	0	5%	1/16	C	A	B	1005 200
J118	0	5%	1/16	C	A	B	1005 201
J119	0	5%	1/16	C	A	B	1005 202
J120	0	5%	1/16	C	A	B	1005 203
J121	0	5%	1/16	C	A	B	1005 204
J122	0	5%	1/16	C	A	B	1005 205
J123	0	5%	1/16	C	A	B	1005 206
J124	0	5%	1/16	C	A	B	1005 207
J125	0	5%	1/16	C	A	B	1005 208
J126	0	5%	1/16	C	A	B	1005 209
J127	0	5%	1/16	C	A	B	1005 210
J128	0	5%	1/16	C	A	B	1005 211
J129	0	5%	1/16	C	A	B	1005 212
J130	0	5%	1/16	C	A	B	1005 213
J131	0	5%	1/16	C	A	B	1005 214
J132	0	5%	1/16	C	A	B	1005 215
J133	0	5%	1/16	C	A	B	1005 216
J134	0	5%	1/16	C	A	B	1005 217
J135	0	5%	1/16	C	A	B	1005 218
J136	0	5%	1/16	C	A	B	1005 219
J137	0	5%	1/16	C	A	B	1005 220
J138	0	5%	1/16	C	A	B	1005 221
J139	0	5%	1/16	C	A	B	1005 222
J140	0	5%	1/16	C	A	B	1005 223
J141	0	5%	1/16	C	A	B	1005 224
J142	0	5%	1/16	C	A	B	1005 225
J143	0	5%	1/16	C	A	B	1005 226
J144	0	5%	1/16	C	A	B	1005 227
J145	0	5%	1/16	C	A	B	1005 228
J146	0	5%	1/16	C	A	B	1005 229
J147	0	5%	1/16	C	A	B	1005 230
J148	0	5%	1/16	C	A	B	1005 231
J149	0	5%	1/16	C	A	B	1005 232
J150	0	5%	1/16	C	A	B	1005 233
J151	0	5%	1/16	C	A	B	1005 234
J152	0	5%	1/16	C	A	B	1005 235
J153	0	5%	1/16	C	A	B	1005 236
J154	0	5%	1/16	C	A	B	1005 237
J155	0	5%	1/16	C	A	B	1005 238
J156	0	5%	1/16	C	A	B	1005 239
J157	0	5%	1/16	C	A	B	1005 240
J158	0	5%	1/16	C	A	B	1005 241
J159	0	5%	1/16	C	A	B	1005 242
J160	0	5%	1/16	C	A	B	1005 243
J161	0	5%	1/16	C	A	B	1005 244
J162	0	5%	1/16	C	A	B	1005 245
J163	0	5%	1/16	C	A	B	1005 246
J164	0	5%	1/16	C	A	B	1005 247
J165	0	5%	1/16	C	A	B	1005 248
J166	0	5%	1/16	C	A	B	1005 249
J167	0	5%	1/16	C	A	B	1005 250
J168	0	5%	1/16	C	A	B	1005 251
J169	0	5%	1/16	C	A	B	1005 252
J170	0	5%	1/16	C	A	B	1005 253
J171	0	5%	1/16	C	A	B	1005 254
J172	0	5%	1/16	C	A	B	1005 255
J173	0	5%	1/16	C	A	B	1005 256
J174	0	5%	1/16	C	A	B	1005 257
J175	0	5%	1/16	C	A	B	1005 258
J176	0	5%	1/16	C	A	B	1005 259
J177	0	5%	1/16	C	A	B	1005 260
J178	0	5%	1/16	C	A	B	1005 261
J179	0	5%	1/16	C	A	B	1005 262
J180	0	5%	1/16	C	A	B	1005 263
J181	0	5%	1/16	C	A	B	1005 264
J182	0	5%	1/16	C	A	B	1005 265
J183	0	5%	1/16	C	A	B	1005 266
J184	0	5%	1/16	C	A	B	1005 267
J185	0	5%	1/16	C	A	B	1005 26

CIRCUIT DIAGRAM

MODEL: RAC-EH09WHLAB, RAC-EH12WHLAB

MAIN PWB, H1C PWB, RELAY PWB



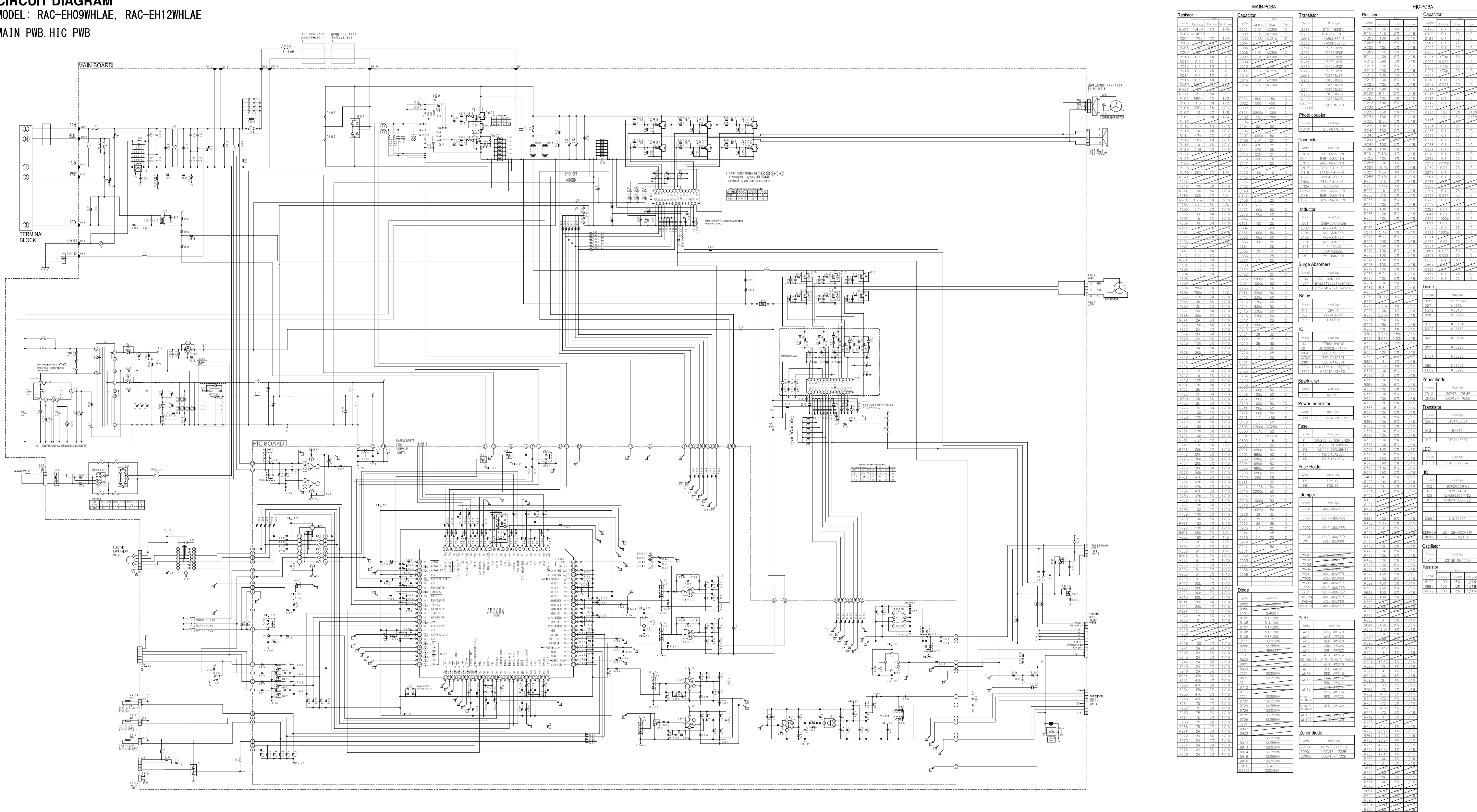
MAIN-PCB

Resistor										Connector										Diode																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Label	Resistance	Val	Power W	Temp Co	Label	Resistance	Val	Power W	Temp Co	Label	Type	Val	Power W	Temp Co	Label	Type	Val	Power W	Temp Co	Label	Type	Val	Power W	Temp Co	Label	Type	Val	Power W	Temp Co																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
R001	100	Ω	0.25	±1%	R002	100	Ω	0.25	±1%	R003	100	Ω	0.25	±1%	R004	100	Ω	0.25	±1%	R005	100	Ω	0.25	±1%	R006	100	Ω	0.25	±1%	R007	100	Ω	0.25	±1%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
R008	100	Ω	0.25	±1%	R009	100	Ω	0.25	±1%	R010	100	Ω	0.25	±1%	R011	100	Ω	0.25	±1%	R012	100	Ω	0.25	±1%	R013	100	Ω	0.25	±1%	R014	100	Ω	0.25	±1%	R015	100	Ω	0.25	±1%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
R016	100	Ω	0.25	±1%	R017	100	Ω	0.25	±1%	R018	100	Ω	0.25	±1%	R019	100	Ω	0.25	±1%	R020	100	Ω	0.25	±1%	R021	100	Ω	0.25	±1%	R022	100	Ω	0.25	±1%	R023	100	Ω	0.25	±1%	R024	100	Ω	0.25	±1%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
R025	100	Ω	0.25	±1%	R026	100	Ω	0.25	±1%	R027	100	Ω	0.25	±1%	R028	100	Ω	0.25	±1%	R029	100	Ω	0.25	±1%	R030	100	Ω	0.25	±1%	R031	100	Ω	0.25	±1%	R032	100	Ω	0.25	±1%	R033	100	Ω	0.25	±1%	R034	100	Ω	0.25	±1%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
R035	100	Ω	0.25	±1%	R036	100	Ω	0.25	±1%	R037	100	Ω	0.25	±1%	R038	100	Ω	0.25	±1%	R039	100	Ω	0.25	±1%	R040	100	Ω	0.25	±1%	R041	100	Ω	0.25	±1%	R042	100	Ω	0.25	±1%	R043	100	Ω	0.25	±1%	R044	100	Ω	0.25	±1%	R045	100	Ω	0.25	±1%	R046	100	Ω	0.25	±1%	R047	100	Ω	0.25	±1%	R048	100	Ω	0.25	±1%	R049	100	Ω	0.25	±1%	R050	100	Ω	0.25	±1%	R051	100	Ω	0.25	±1%	R052	100	Ω	0.25	±1%	R053	100	Ω	0.25	±1%	R054	100	Ω	0.25	±1%	R055	100	Ω	0.25	±1%	R056	100	Ω	0.25	±1%	R057	100	Ω	0.25	±1%	R058	100	Ω	0.25	±1%	R059	100	Ω	0.25	±1%	R060	100	Ω	0.25	±1%	R061	100	Ω	0.25	±1%	R062	100	Ω	0.25	±1%	R063	100	Ω	0.25	±1%	R064	100	Ω	0.25	±1%	R065	100	Ω	0.25	±1%	R066	100	Ω	0.25	±1%	R067	100	Ω	0.25	±1%	R068	100	Ω	0.25	±1%	R069	100	Ω	0.25	±1%	R070	100	Ω	0.25	±1%	R071	100	Ω	0.25	±1%	R072	100	Ω	0.25	±1%	R073	100	Ω	0.25	±1%	R074	100	Ω	0.25	±1%	R075	100	Ω	0.25	±1%	R076	100	Ω	0.25	±1%	R077	100	Ω	0.25	±1%	R078	100	Ω	0.25	±1%	R079	100	Ω	0.25	±1%	R080	100	Ω	0.25	±1%	R081	100	Ω	0.25	±1%	R082	100	Ω	0.25	±1%	R083	100	Ω	0.25	±1%	R084	100	Ω	0.25	±1%	R085	100	Ω	0.25	±1%	R086	100	Ω	0.25	±1%	R087	100	Ω	0.25	±1%	R088	100	Ω	0.25	±1%	R089	100	Ω	0.25	±1%	R090	100	Ω	0.25	±1%	R091	100	Ω	0.25	±1%	R092	100	Ω	0.25	±1%	R093	100	Ω	0.25	±1%	R094	100	Ω	0.25	±1%	R095	100	Ω	0.25	±1%	R096	100	Ω	0.25	±1%	R097	100	Ω	0.25	±1%	R098	100	Ω	0.25	±1%	R099	100	Ω	0.25	±1%	R100	100	Ω	0.25	±1%	R101	100	Ω	0.25	±1%	R102	100	Ω	0.25	±1%	R103	100	Ω	0.25	±1%	R104	100	Ω	0.25	±1%	R105	100	Ω	0.25	±1%	R106	100	Ω	0.25	±1%	R107	100	Ω	0.25	±1%	R108	100	Ω	0.25	±1%	R109	100	Ω	0.25	±1%	R110	100	Ω	0.25	±1%	R111	100	Ω	0.25	±1%	R112	100	Ω	0.25	±1%	R113	100	Ω	0.25	±1%	R114	100	Ω	0.25	±1%	R115	100	Ω	0.25	±1%	R116	100	Ω	0.25	±1%	R117	100	Ω	0.25	±1%	R118	100	Ω	0.25	±1%	R119	100	Ω	0.25	±1%	R120	100	Ω	0.25	±1%	R121	100	Ω	0.25	±1%	R122	100	Ω	0.25	±1%	R123	100	Ω	0.25	±1%	R124	100	Ω	0.25	±1%	R125	100	Ω	0.25	±1%	R126	100	Ω	0.25	±1%	R127	100	Ω	0.25	±1%	R128	100	Ω	0.25	±1%	R129	100	Ω	0.25	±1%	R130	100	Ω	0.25	±1%	R131	100	Ω	0.25	±1%	R132	100	Ω	0.25	±1%	R133	100	Ω	0.25	±1%	R134	100	Ω	0.25	±1%	R135	100	Ω	0.25	±1%	R136	100	Ω	0.25	±1%	R137	100	Ω	0.25	±1%	R138	100	Ω	0.25	±1%	R139	100	Ω	0.25	±1%	R140	100	Ω	0.25	±1%	R141	100	Ω	0.25	±1%	R142	100	Ω	0.25	±1%	R143	100	Ω	0.25	±1%	R144	100	Ω	0.25	±1%	R145	100	Ω	0.25	±1%	R146	100	Ω	0.25	±1%	R147	100	Ω	0.25	±1%	R148	100	Ω	0.25	±1%	R149	100	Ω	0.25	±1%	R150	100	Ω	0.25	±1%	R151	100	Ω	0.25	±1%	R152	100	Ω	0.25	±1%	R153	100	Ω	0.25	±1%	R154	100	Ω	0.25	±1%	R155	100	Ω	0.25	±1%	R156	100	Ω	0.25	±1%	R157	100	Ω	0.25	±1%	R158	100	Ω	0.25	±1%	R159	100	Ω	0.25	±1%	R160	100	Ω	0.25	±1%	R161	100	Ω	0.25	±1%	R162	100	Ω	0.25	±1%	R163	100	Ω	0.25	±1%	R164	100	Ω	0.25	±1%	R165	100	Ω	0.25	±1%	R166	100	Ω	0.25	±1%	R167	100	Ω	0.25	±1%	R168	100	Ω	0.25	±1%	R169	100	Ω	0.25	±1%	R170	100	Ω	0.25	±1%	R171	100	Ω	0.25	±1%	R172	100	Ω	0.25	±1%	R173	100	Ω	0.25	±1%	R174	100	Ω	0.25	±1%	R175	100	Ω	0.25	±1%	R176	100	Ω	0.25	±1%	R177	100	Ω	0.25	±1%	R178	100	Ω	0.25	±1%	R179	100	Ω	0.25	±1%	R180	100	Ω	0.25	±1%	R181	100	Ω	0.25	±1%	R182	100	Ω	0.25	±1%	R183	100	Ω	0.25	±1%	R184	100	Ω	0.25	±1%	R185	100	Ω	0.25	±1%	R186	100	Ω	0.25	±1%	R187	100	Ω	0.25	±1%	R188	100	Ω	0.25	±1%	R189	100	Ω	0.25	±1%	R190	100	Ω	0.25	±1%	R191	100	Ω	0.25	±1%	R192	100	Ω	0.25	±1%	R193	100	Ω	0.25	±1%	R194	100	Ω	0.25	±1%	R195	100	Ω	0.25	±1%	R196	100	Ω	0.25	±1%	R197	100	Ω	0.25	±1%	R198	100	Ω	0.25	±1%	R199	100	Ω	0.25	±1%	R200	100	Ω	0.25	±1%	R201	100	Ω	0.25	±1%	R202	100	Ω	0.25	±1%	R203	100	Ω	0.25	±1%	R204	100	Ω	0.25	±1%	R205	100	Ω	0.25	±1%	R206	100	Ω	0.25	±1%	R207	100	Ω	0.25	±1%	R208	100	Ω	0.25	±1%	R209	100	Ω	0.25	±1%	R210	100	Ω	0.25	±1%	R211	100	Ω	0.25	±1%	R212	100	Ω	0.25	±1%	R213	100	Ω	0.25	±1%	R214	100	Ω	0.25	±1%	R215	100	Ω	0.25	±1%	R216	100	Ω	0.25	±1%	R217	100	Ω	0.25	±1%	R218	100	Ω	0.25	±1%	R219	100	Ω	0.25	±1%	R220	100	Ω	0.25	±1%	R221	100	Ω	0.25	±1%	R222	100	Ω	0.25	±1%	R223	100	Ω	0.25	±1%	R224	100	Ω	0.25	±1%	R225	100	Ω	0.25	±1%	R226	100	Ω	0.25	±1%	R227	100	Ω	0.25	±1%	R228	100	Ω	0.25	±1%	R229	100	Ω	0.25	±1%	R230	100	Ω	0.25	±1%	R231	100	Ω	0.25	±1%	R232	100	Ω	0.25	±1%	R233	100	Ω	0.25	±1%	R234	100	Ω	0.25	±1%	R235	100	Ω	0.25	±1%	R236	100	Ω	0.25	±1%	R237	100	Ω	0.25	±1%	R238	100	Ω	0.25	±1%	R239	100	Ω	0.25	±1%	R240	100	Ω	0.25	±1%	R241	100	Ω	0.25	±1%	R242	100	Ω	0.25	±1%	R243	100	Ω	0.25	±1%	R244	100	Ω	0.25	±1%	R245	100	Ω	0.25	±1%	R246	100	Ω	0.25	±1%	R247	100	Ω	0.25	±1%	R248	100	Ω	0.25	±1%	R249	100	Ω	0.25	±1%	R250	100	Ω	0.25	±1%	R251	100	Ω	0.25	±1%	R252	100	Ω	0.25	±1%	R253	100	Ω	0.25	±1%	R254	100	Ω	0.25	±1%	R255	100	Ω	0.25	±1%	R256	100	Ω	0.25	±1%	R257	100	Ω	0.25	±1%	R258	100	Ω	0.25	±1%	R259	100	Ω	0.25	±1%	R260	100	Ω	0.25	±1%	R261	100	Ω	0.25	±1%	R262	100	Ω	0.25	±1%	R263	100	Ω	0.25	±1%	R264	100	Ω	0.25	±1%	R265	100	Ω	0.25	±1%	R266	100	Ω	0.25	±1%	R267	100	Ω	0.25	±1%	R268	100	Ω	0.25	±1%	R269	100	Ω	0.25	±1%	R270	100	Ω	0.25	±1%	R271	100	Ω	0.25	±1%	R272	100	Ω	0.25	±1%	R273	100	Ω	0.25	±1%	R274	100	Ω	0.25	±1%	R275	100	Ω	0.25	±1%	R276	100	Ω	0.25	±1%	R277	100	Ω	0.25	±1%	R278	100	Ω	0.25	±1%	R279	100	Ω	0.25	±1%	R280	100	Ω	0.25	±1%	R281	100	Ω	0.25	±1%	R282	100	Ω	0.25	±1%	R283	100	Ω	0.25	±1%	R284	100	Ω	0.25	±1%	R285	100	Ω	0.25	±1%	R286	100	Ω	0.25	±1%	R287	100	Ω	0.25	±1%	R288	100	Ω	0.25	±1%	R289	100	Ω	0.25	±1%	R290	100	Ω	0.25	±1%	R291	100	Ω	0.25	±1%	R292	100	Ω	0.25	±1%	R293	100	Ω	0.25	±1%	R294	100	Ω	0.25	±1%	R295	100	Ω	0.25	±1%	R296	100	Ω	0.25	±1%	R297	100	Ω	0.25	±1%	R298	100	Ω	0.25	±1%	R299	100	Ω	0.25	±1%	R300	100	Ω	0.25	±1%	R301	100	Ω	0.25	±1%	R302	100	Ω	0.25	±1%	R303	100

CIRCUIT DIAGRAM

MODEL : RAC-EH09WHLAE, RAC-EH12WHLAE

MAIN PWB, HIC PWB

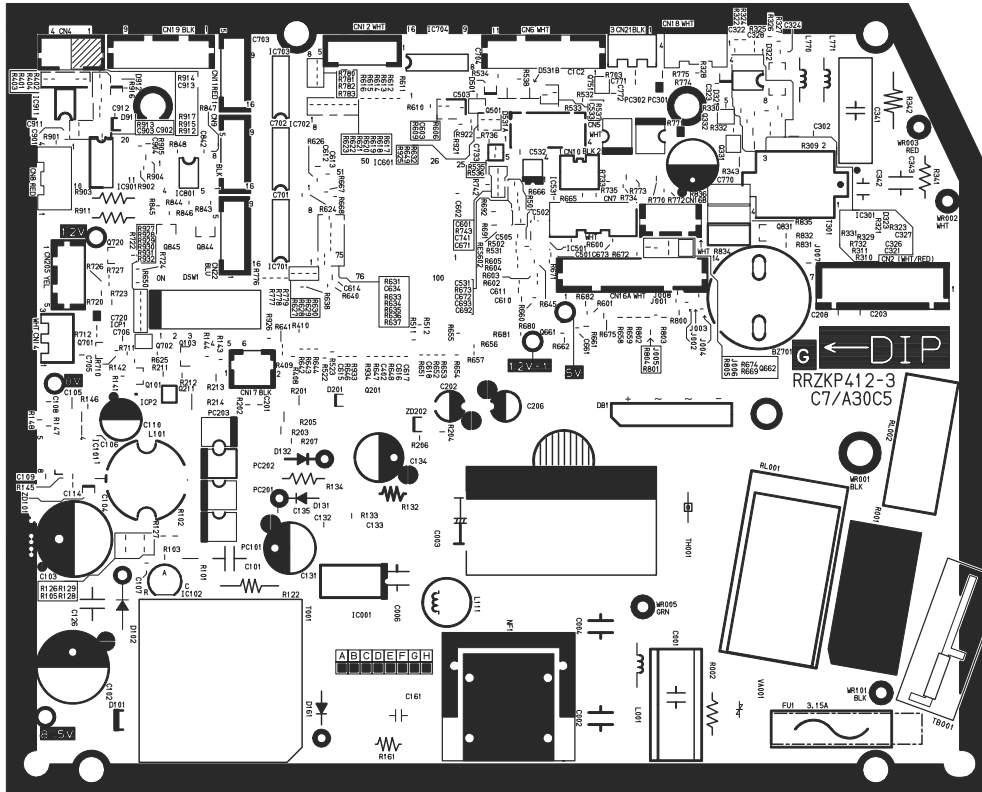


PRINTED BOARD LOCATION DIAGRAM

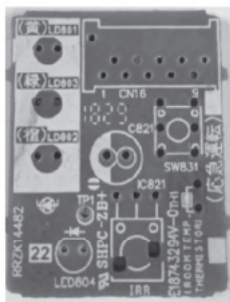
MODEL: RAS-EH09PHLAB, RAS-EH12PHLAB,
RAS-EH09RHLAE, RAS-EH12RHLAE,
RAS-EH07QHLAE

MAIN P.W.B

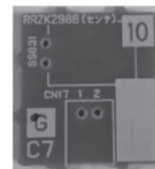
Marking on P.W.B



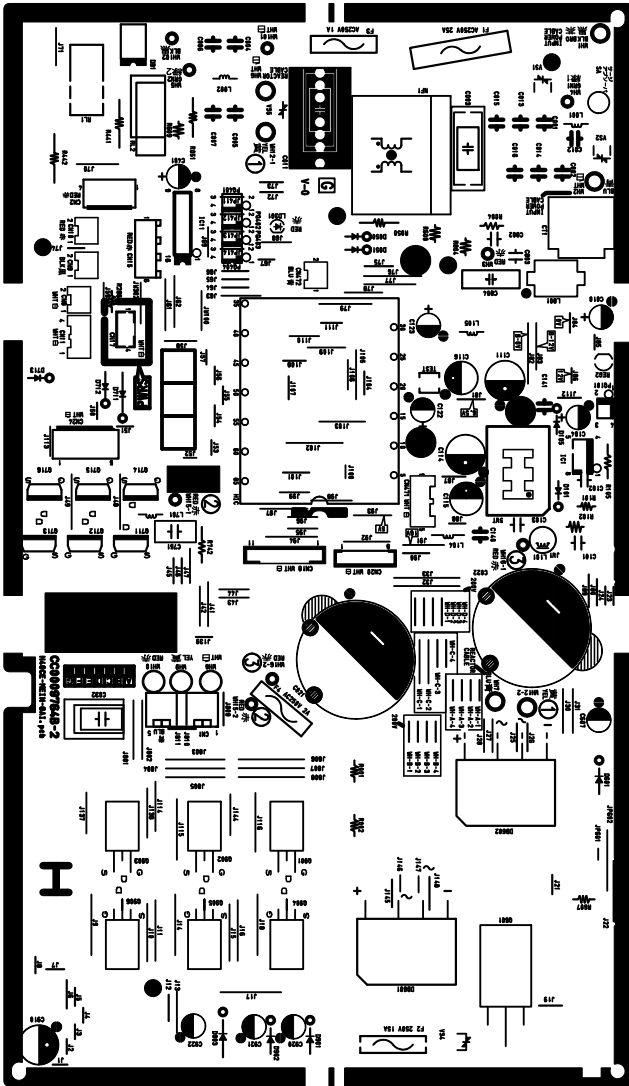
RECEIVING P.W.B
Marking on P.W.B



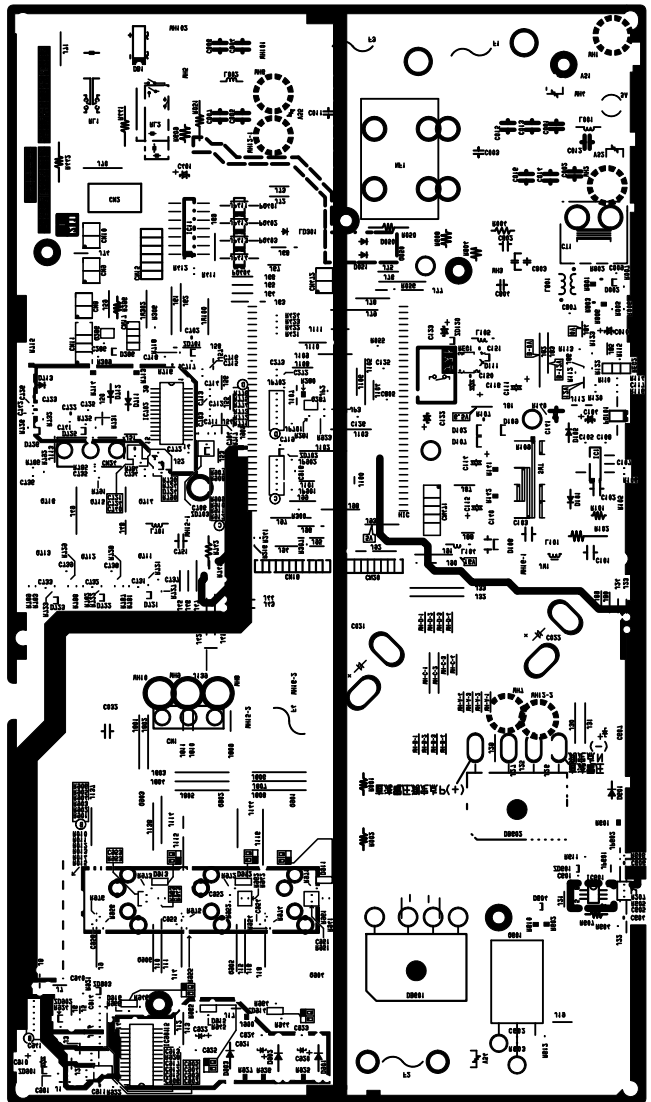
SENSOR P.W.B
Marking on P.W.B



MODEL RAC-EH09WHLAB, RAC-EH12WHLAB
MAIN PWB



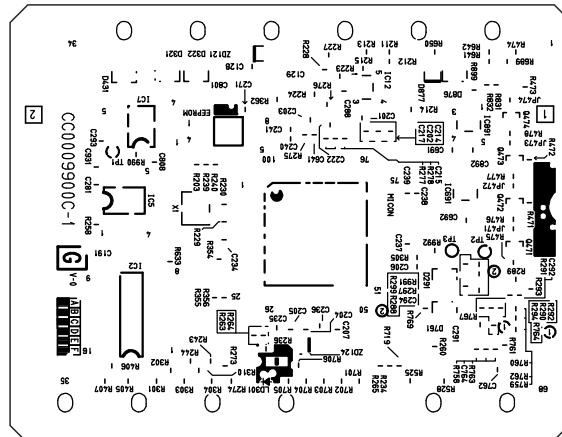
Top side



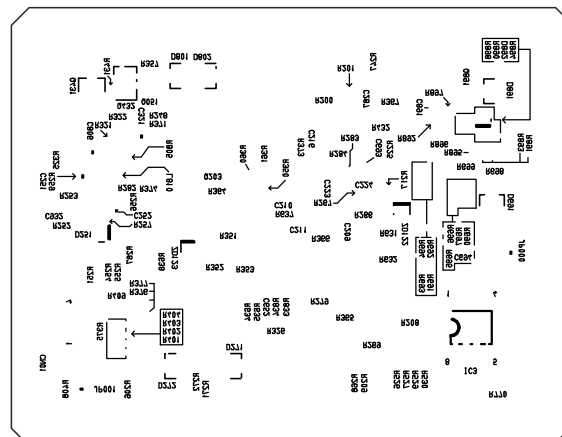
Bottom side

MODEL RAC-EH09WHLAB, RAC-EH12WHLAB

HIC PWB

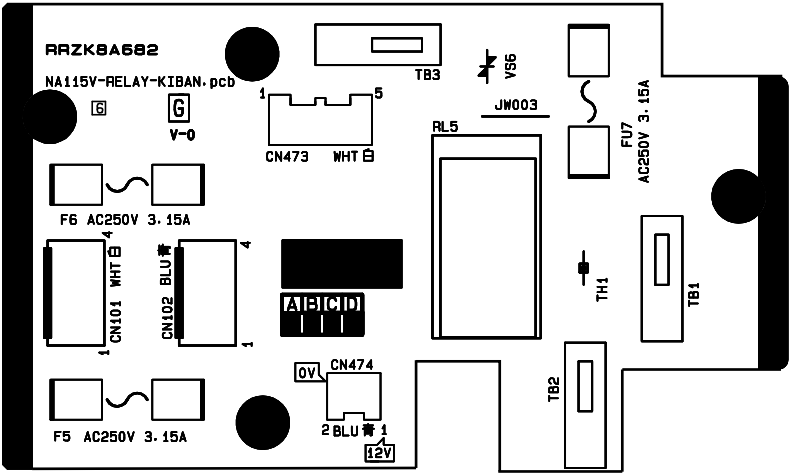


Top Side

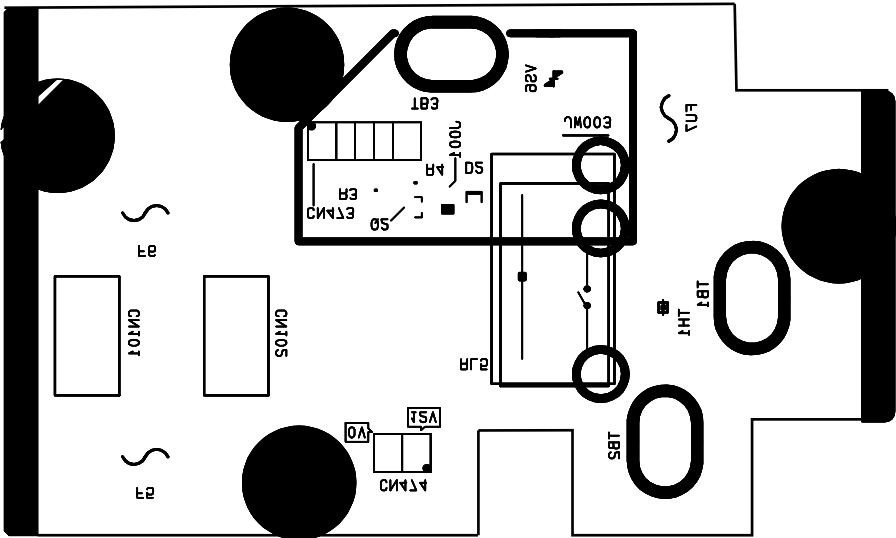


Bottom Side

MODEL RAC-EH09WHLAB, RAC-EH12WHLAB
RELAY PWB



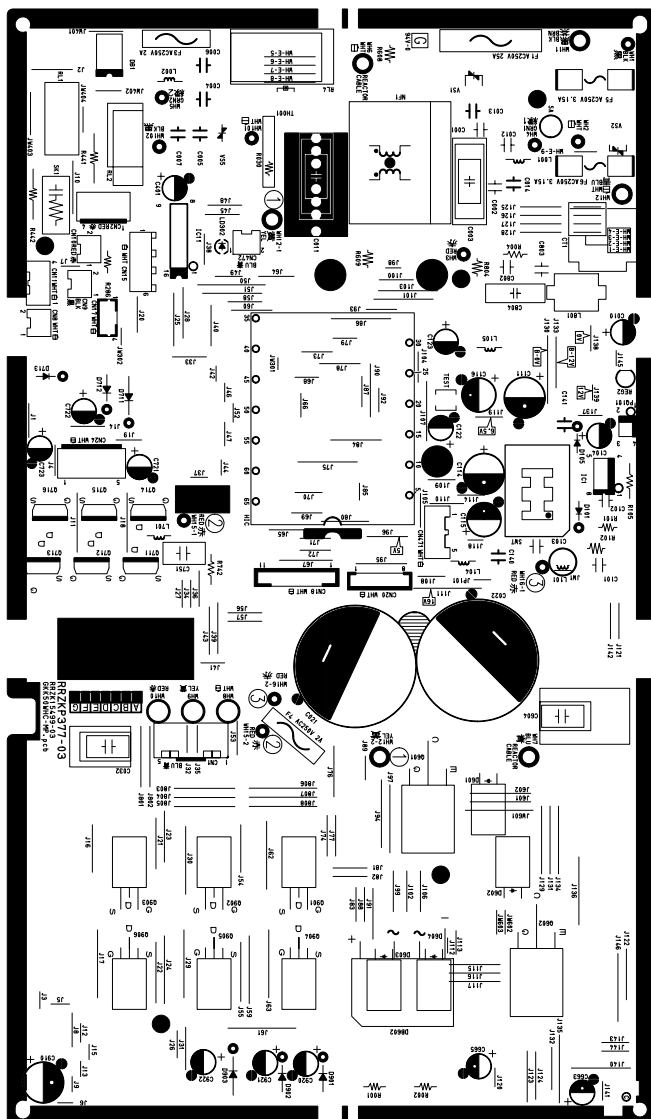
Top Side



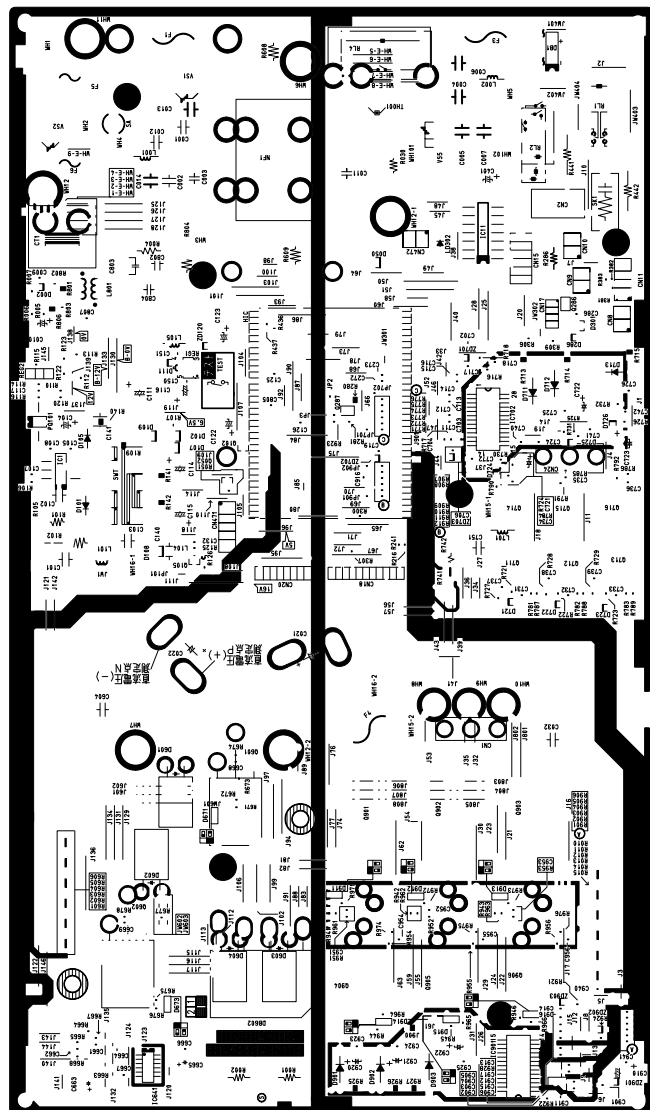
Bottom Side

MODEL RAC-EH09WHLAE, RAC-EH12WHLAE

MAIN PWB

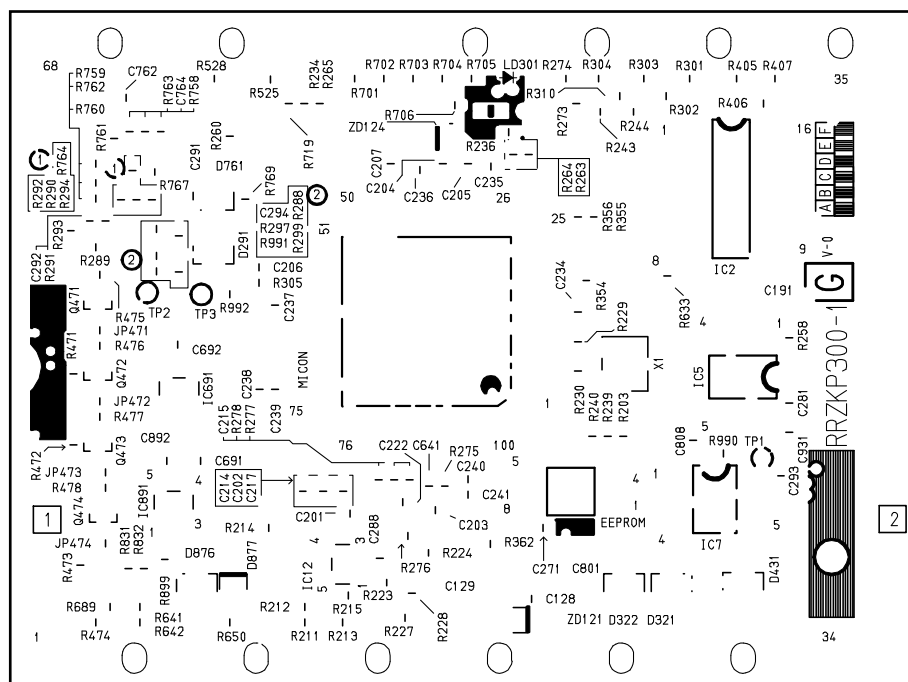


Top side

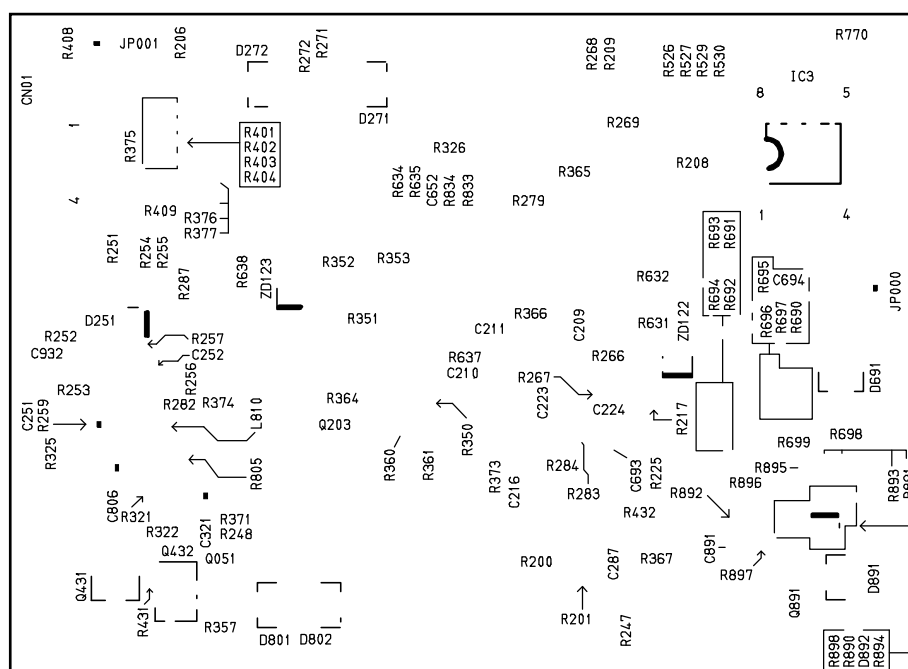


Bottom side

HIC PWB

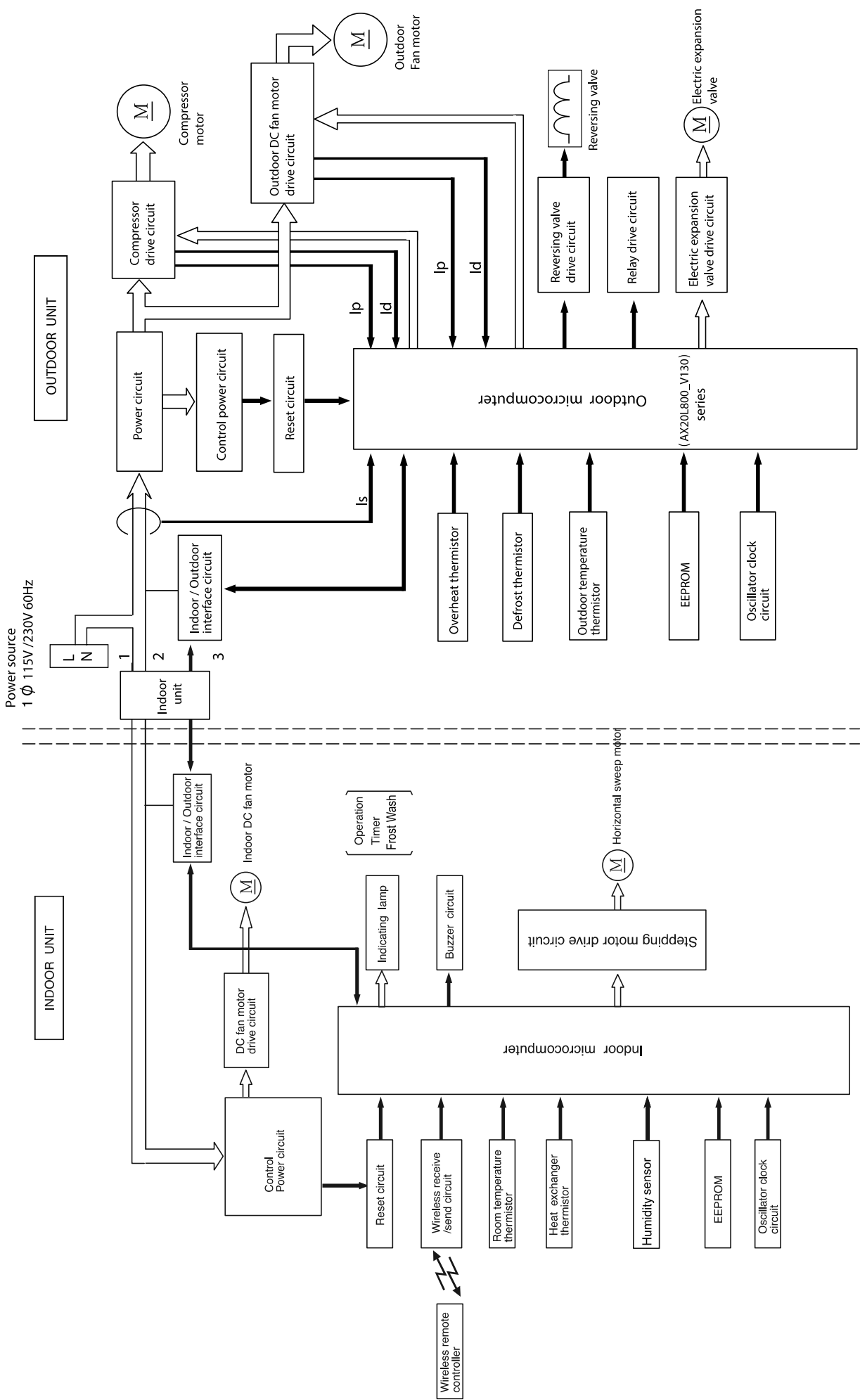


Top side



Bottom side

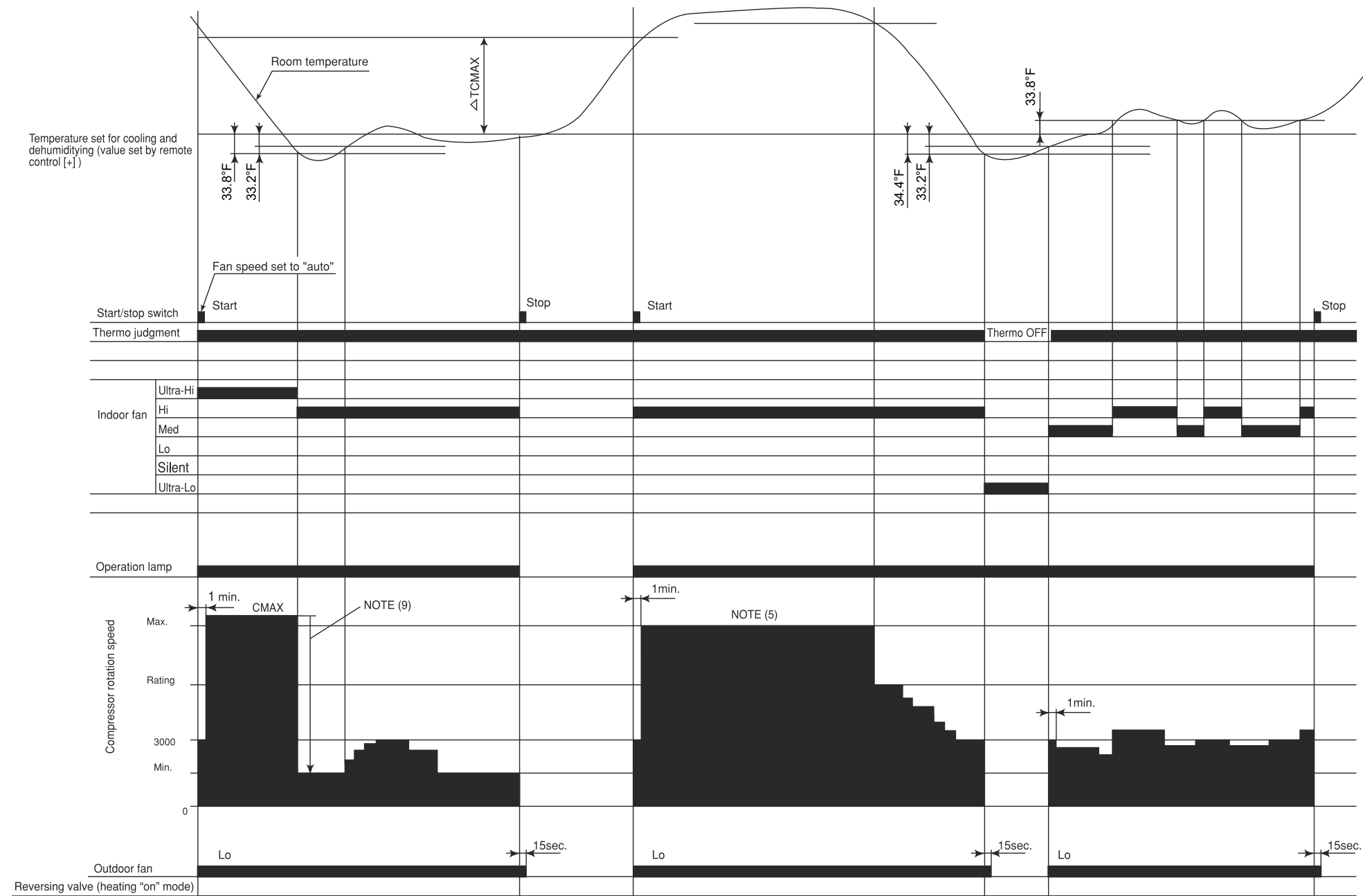
BLOCK DIAGRAM



BASIC MODE

Operation mode		Fan	Cooling	Dehumidifying	Heating	Auto
Basic operation of start/stop button		Start/stop button Operation lamp Start Stop Start Stop				
Timer functions	Off-timer	Start/stop button Reserve button Cancel button Operation lamp Timer lamp Timer memory Start Stop Start Stop Start Stop Start Stop Start Stop Start Stop Start Stop Start Stop (Off-timer during stop) (Change in reserved time)				
	On-timer	Start/stop button Reserve button Cancel button Operation lamp Timer lamp Timer memory Start Stop Start Stop Start Stop Start Stop Start Stop Start Stop Start Stop Start Stop (Change in reserved time) (On-timer during operation)				
Fan speed mode (indoor fan)	Auto		Changes from “Hi” to “Med” or “Lo” depending on room temperature. SFTDSC OFF ON OFF ON 33.2°F 33.2°F 33.2°F 33.2°F 33.2°F Thermo judgment Compressor Hi Med Lo 3' (Compressor stopped forcibly for 3 minutes) 1. Runs at “Hi” until room temperature reaches to “setting temperature-SFTDSC” after operation is started. 2. Runs at “ultra-Lo” when thermo is off.		Set to “ultra-Lo”, “Silent”, “Lo”, “Med”, “Hi”, “ultra-Hi” or “stop” depending on the room temperature, time and heat exchanger temperature. Set to “stop” if the heat exchanger temperature is “DNZKOF” during Thermo OFF.(When reach at “DNZKON”, fan speed set to “ultra-Lo” again.) When the compressor is running at maximum speed during hot-dash or when recovered from defrosting. DASUPHH DASUPH DASUPL DASUPS DNZKON DNZKOF NORUPH NORUPL NORUPS DASDNH DASDNL DASDNS NORDPH NORDNL NORDNS Ultra-High High Med Low Silent 90" Fan speed UP/DOWN delay time 90" Fan speed UP/DOWN delay time	Operating mode is judged by room temperature. (1) Judging by room temperature (Initial judgement) (a) Conditions for judgment (any of the followings). When auto operation is started after the previous auto mode operation. When auto operation is started after the previous manual mode operation. When the operating mode is switched to auto while operating at manual mode. (b) Judging method [Cooling] : Room temperature ≥ Remote controller setting [Heating] : Room temperature < Remote controller setting [Room temperature setting of remote controller] Cooling Heating
	Hi	Operates at “Hi” regardless of the room temperature.	Set to “ultra-Hi” when the compressor runs at cold dash mode speed, and to “Hi” in other modes. Runs at “ultra-Lo” when thermo is off.		Set to “ultra-Lo”, “Silent”, “Lo”, “Med”, “Hi”, “ultra-Hi” or “stop” depending on the room temperature, time and heat exchanger temperature. Set to “stop” if the heat exchanger temperature is “DNZKOF” during Thermo OFF.(When reach at “DNZKON”, fan speed set to “ultra-Lo” again.)	(2) Judging by room temperature (continuous judgement)
	Med	Operates at “Med” regardless of the room temperature.	Operates at “Med” regardless of the room temperature. Runs at “ultra-Lo” when thermo is off.		Set to “ultra-Lo”, “Silent”, “Lo”, “Med”, “Hi”, “ultra-Hi” or “stop” depending on the room temperature, time and heat exchanger temperature. Set to “stop” if the heat exchanger temperature is “DNZKOF” during Thermo OFF.(When reach at “DNZKON”, fan speed set to “ultra-Lo” again.)	(a) Judging condition
	Lo	Operates at “Lo” regardless of the room temperature.	Operates at “Lo” regardless of the room temperature. Runs at “ultra-Lo” when thermo is off.	Set to “Lo” in modes other than when the compressor stops.	Set to “ultra-Lo”, “Silent”, “Lo”, “Med”, “Hi”, “ultra-Hi” or “stop” depending on the room temperature, time and heat exchanger temperature. Set to “stop” if the heat exchanger temperature is “DNZKOF” during Thermo OFF.(When reach at “DNZKON”, fan speed set to “ultra-Lo” again.) The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram:	(1) 1st interval [auttmn1_8u] (2) 2nd interval [auttmn2_8u] (3) 3rd and next interval [auttmn3_8u]
	Silent	Operates at “Silent” regardless of the room temperature.	Operates at “Silent” regardless of the room temperature. Runs at “ultra-Lo” when thermo is off.	Set to “Silent” in modes other than when the compressor stops.	PDCIN2 PDCOF2 “Med”, “Lo”, “Silent” × 108% “Med”, “Lo”, “Silent”	(b) Judging method
Basic operation of temperature controller	Performs only fan operation at the set speed regardless of the room temperature.	See page 56	See page 59	See page 61	Follow basic cooling or heating operation	

Basic Cooling Operation



Notes:

- (1) Condition for entering into Cool Dashed mode. When fan set to "Hi" or "Auto" and when the compressor speed (P section) due to temperature difference between setting temperature (including the correction shift only) and room temperature is CMAX or higher.
- (2) Cool Dashed will release when i) a maximum 25 minutes is lapsed and ii) room temperature is lower than set temperature 26.6°F (thermo off) and iii) when room temperature has achieved setting temperature 30.2°F 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) - 26.6°F. After thermo off, operation continues 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 constraint if indoor temperature is higher than CLMXTP.
- (6) When fan is set to "Hi", compressor rpm will be limited to CSTD.
- (7) When fan is set to "Med", compressor rpm will be limited to CJKMAX.
- (8) When fan is set to "Lo", compressor rpm will be limited to CBEMAX.
- (9) During Cool Dashed, when room temperature reaches set temperature 30.2°F compressor rpm is actual rpm x DWNRATEC.

Cooling Defrost

The diagram illustrates the Cooling Defrost cycle with the following components and timing:

- Indoor heat exchange temperature:** A line graph showing temperature decreasing during the defrost period and then recovering.
- TEIOF (Thermostat Error Indication Off):** A horizontal line indicating the thermostat is not in error.
- TEION (Thermostat Error Indication On):** A horizontal line indicating the thermostat is in error.
- Cooling defrost signal:** A black bar indicating the duration of the defrost cycle.
- Indoor fan:** Operates in Hi, Med, and Lo speeds. The Med speed is active during the defrost period. Arrows indicate "See basic operation." for the Hi and Lo speeds.
- Outdoor fan:** Operates in Lo speed. A 15sec. delay is shown between the start of the defrost signal and the start of the outdoor fan.
- Reversing valve (heating "on" mode):** A black bar indicating the valve is in the heating position during the defrost cycle.
- Compressor speed:** A black bar indicating the compressor speed. A 3min. "Balance period" is shown between the start of the defrost signal and the start of the compressor speed. A 1min. delay is shown between the end of the defrost signal and the end of the compressor speed.

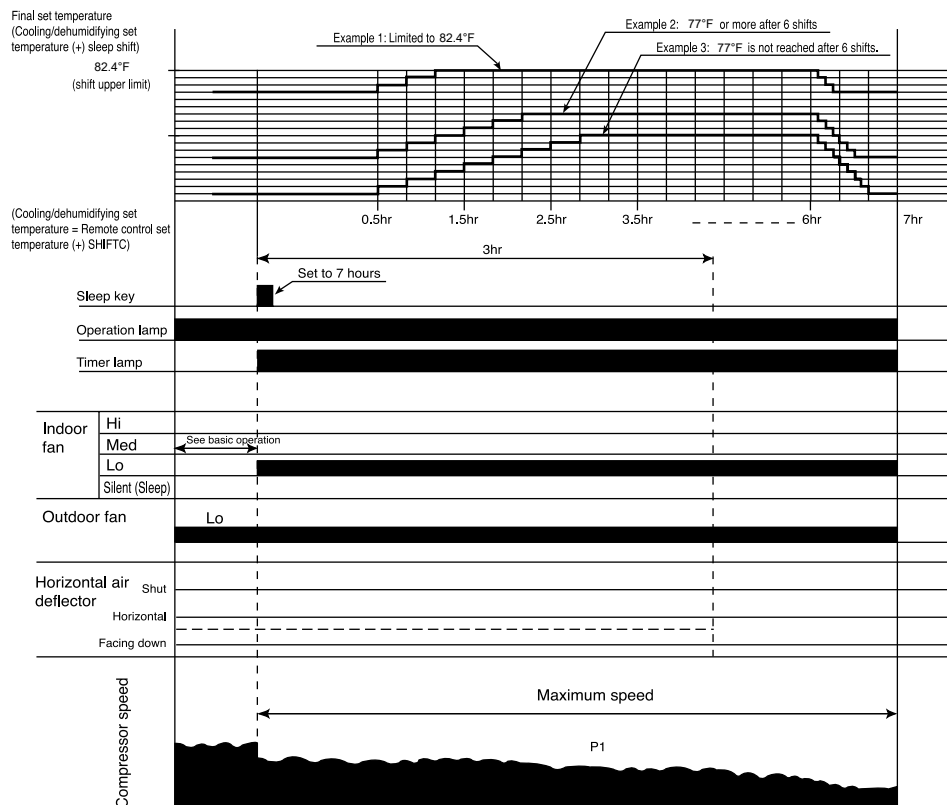
Cooling Powerful Operation

The diagram illustrates the timing of the Cooling Powerful Operation. It features three horizontal axes: "POWERFUL" setting, Temperature setting, and Compressor speed. The "POWERFUL" setting transitions from OFF to ON, with a 20-minute duration indicated. The Temperature setting shows a downward step labeled PWSFTC when the powerful operation begins. The Compressor speed shows a corresponding increase during the 20-minute powerful operation period, indicated by a shaded area.

Notes :

- (1) Pressing the "POWERFUL" button will reduce the temperature setting by PWSFTC.
- (2) The powerful operation is for 20 minutes after setting.
- (3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
- (4) Pressing the "START/STOP" button and "POWERFUL" button during powerful operation will cancel the powerful operation.
- (5) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
- (6) When the powerful operation is set, the fan speed will be set to "HIGH" and the compressor's maximum speed will be set to CMAX2 during powerful operation. The compressor's lower limit speed is CKYMIN_PW.
- (7) The fan speed increases by FNUPPW_C.
- (8) After the powerful operation is ended, the system automatically operates with the previous settings used before the powerful operation.

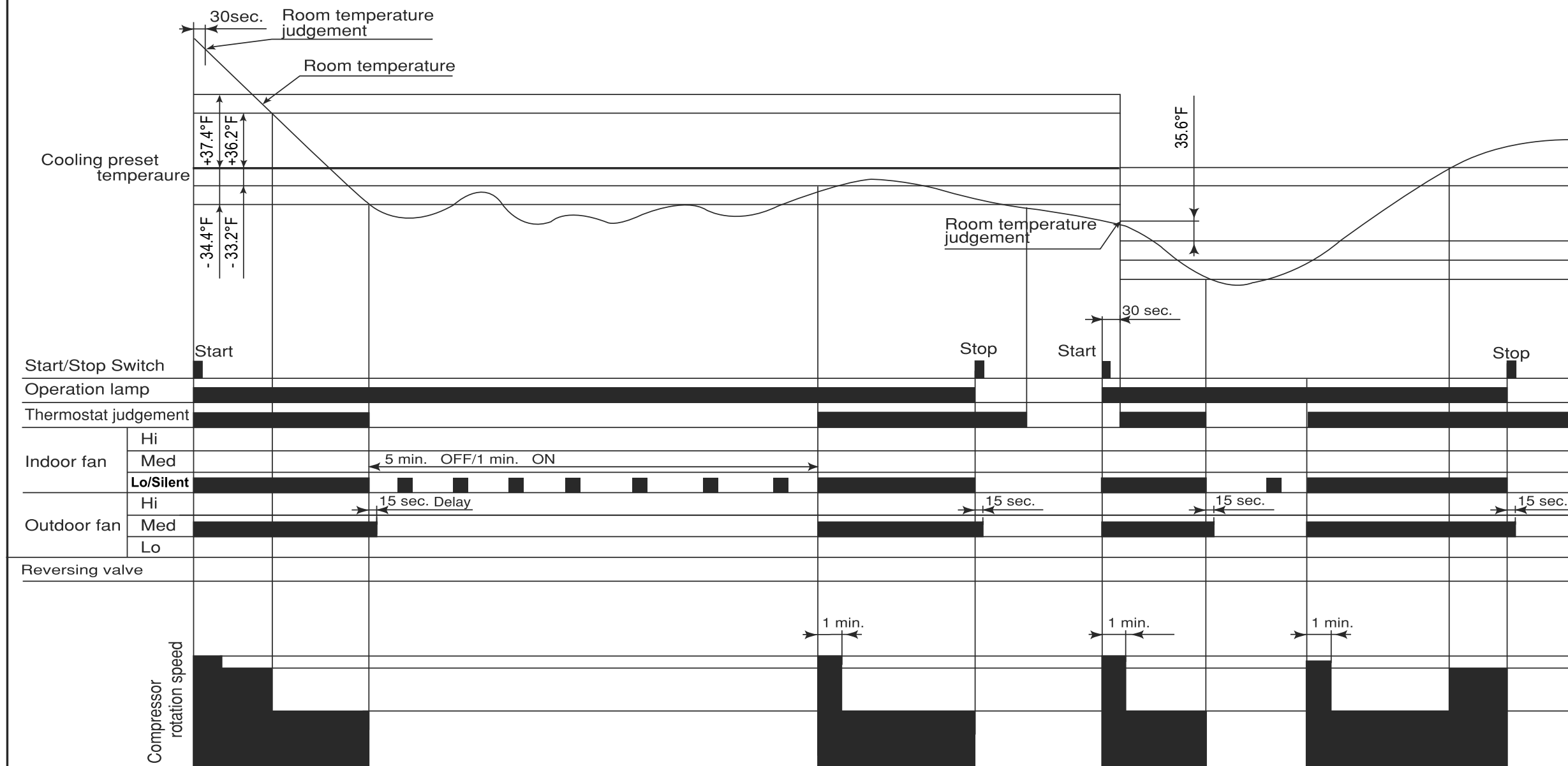
Cooling Sleep Operation



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".
- (3) 30 minutes after the sleep key is set, the sleep shift of temperature starts, and upper shift is made at least 6 times. If 77°F (25°C) is not reached after 6 shifts, shifts repeat until 77°F (25°C) is reached.
- (4) The sleep shift upper value of set temperature is 82.4°F (28°C)
- (5) After 6 hours, a shift down to the initial set temperature is made at a rate of 32.6°F/5 min. (0.33°C/5 min.).
- (6) If the operation mode is changed during sleep operation, the set temperature is cleared, and shift starts from the point when switching is made.
- (7) The indoor fan speed does not change even when the fan speed mode is changed.
- (8) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
- (9) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (10) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.

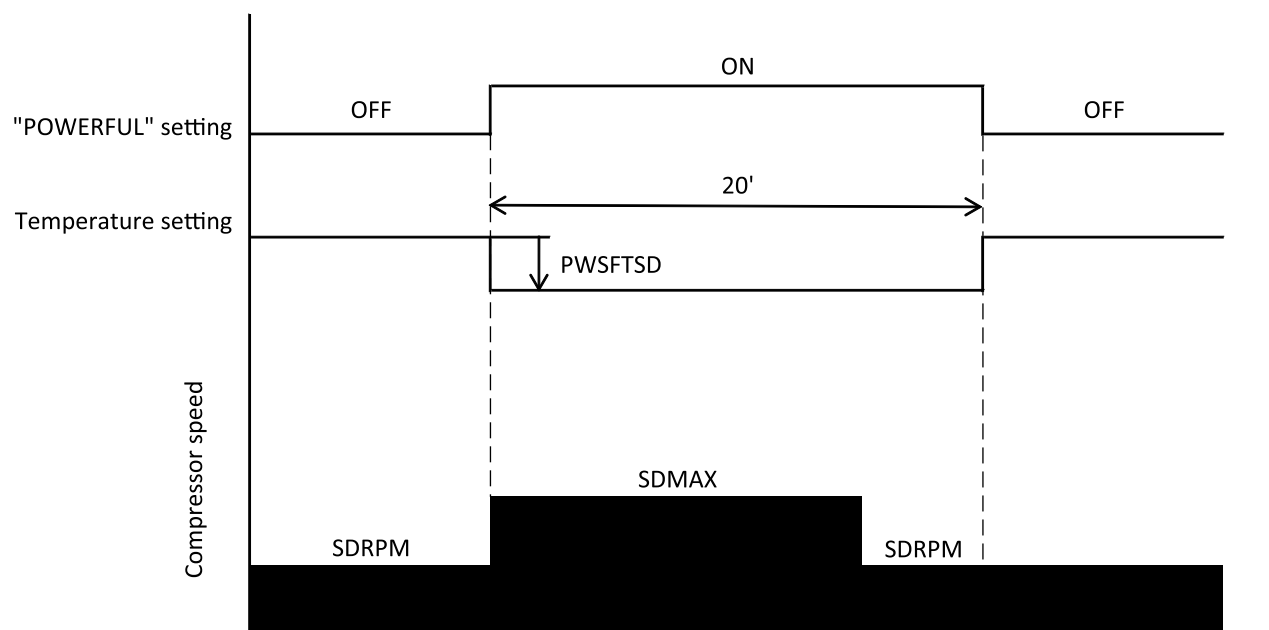
Dehumidifying



Notes:

- (1) If the room temperature is (cooling preset temperature) - (34.4°F) or less after 30 seconds from starting the operation, the operation is done assuming as the preset temperature = (room temperature at the time) - (35.6°F)
- (2) The indoor fan is operated in the "Lo" or "Silent" mode. During thermo OFF, indoor fan will be OFF 5 minutes and ON for 1 minute
- (3) When the operation is started by the thermostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.
- (4) The compressor is operated forcedly for 3 minutes after operation is started.
- (5) The minimum ON time and OFF time of the compressor are 3 minutes.

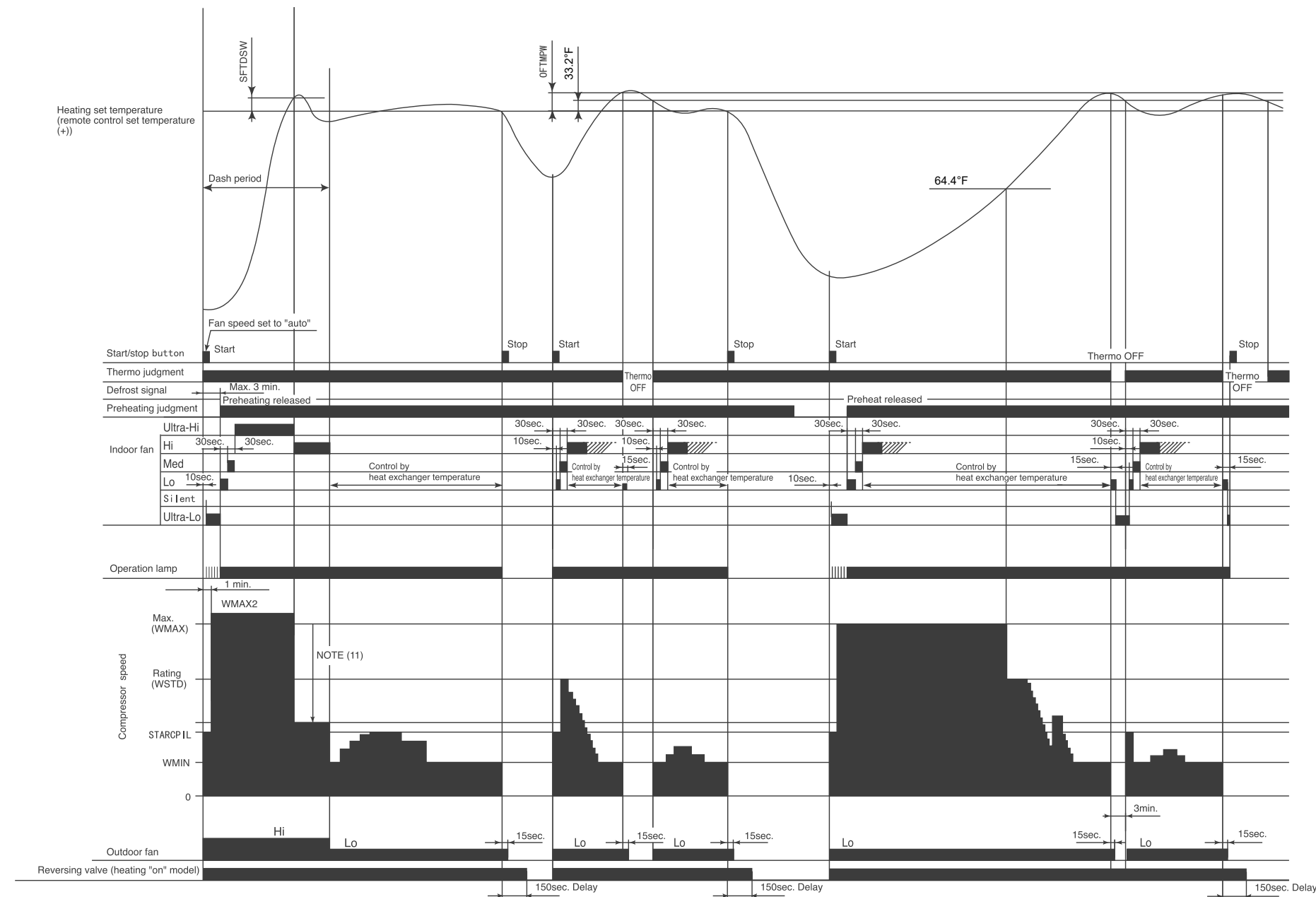
Dehumidifying Powerful Operation



Notes :

- (1) Pressing the "POWERFUL" button will reduce the temperature setting by PWSFTSD.
- (2) The powerful operation is for 20 minutes after setting.
- (3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
- (4) Pressing the "START/STOP" button and "POWERFUL" button during powerful operation will cancel the powerful operation.
- (5) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
- (6) If the differential (the room temperature - the temperature setting) is "the differential $\geq 37.4^{\circ}\text{F}$ (3°C)" after powerful setting, the compressor's maximum speed during powerful operation will be set to SDMAX. Then the differential reduce "the differential $\leq 36.2^{\circ}\text{F}$ (2.33°C)" during powerful operation, the compressor's speed will be set to SDRPM.
If the differential (the room temperature - the temperature setting) is "the differential $< 37.4^{\circ}\text{F}$ (3°C)" after powerful setting, the compressor's minimum speed during powerful operation will be set to SDRPM.
- (7) After the powerful operation is ended, the system automatically operates with the previous settings used before the powerful operation.

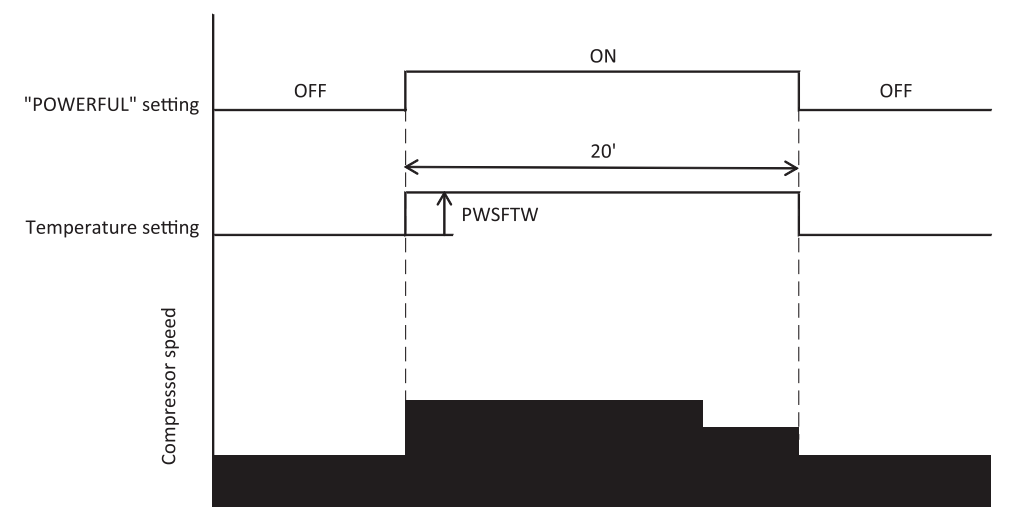
Basic Heating Operation



Notes:

- (1) Condition for entering into hot dashed mode. When fan set to "Hi" or "Auto" and i) room temperature is 64.4°F or less, and ii) outdoor temperature is 50°F or less, and iii) compressor speed (P section) due to temperature difference between setting temperature(including shift value only) and room temperature is WMAX or more.
- (2) The maximum compressor speed period during hot dash is finished when i) room temperature has reached the setting temperature + SFTDSW. ii) thermo off.
- (3) During hot dashed operation, thermo off temperature is setting temperature (with shift value) + 37.4°F. After thermo off, operation continue inn Fuzzy control mode.
- (4) Minimum "ON" time and minimum "OFF" time of compressor operation is 3 minutes.
- (5) During normal heating mode, compressor maximum rpm WMAX will maintain for 120 minutes. No time limit constrain if room temperature is 64.4°F or less and outdoor temperature is 35.6°F or less.
- (6) During preheating or defrosting or auto fresh defrosting mode, indoor unit operation lamp will blink at interval of 2 seconds "ON" and 1 second "OFF".
- (7) When heating mode starts, it will enter into preheating mode if indoor heat exchanger temperature is less than YNEOF + 32.6°F
- (8) When fan is set to "Med" or "Lo" or "Silent", compressor rpm will be limited to "WJKMAX" or "WBEMAX" or "WSZMAX".
- (9) During "Ultra-Lo" mode, heat exchanger temp 64.4°F or less, indoor fan will stop. If hex temperature is 64.4°F + 32.6°F or more, fan will continue in "Ultra-Lo" mode. However, "Ultra-Lo" mode during preheating or preheating after defrosting does not stop if room temperature is 64.4°F or less.
- (10) During hot dashed or outdoor temperature is 23°F or less, compressor rpm is WMAX2.
- (11) During hot dashed, when room temperature reaches setting temperature + SFTDSW compressor rpm is actual rpm x DWNRATEW.

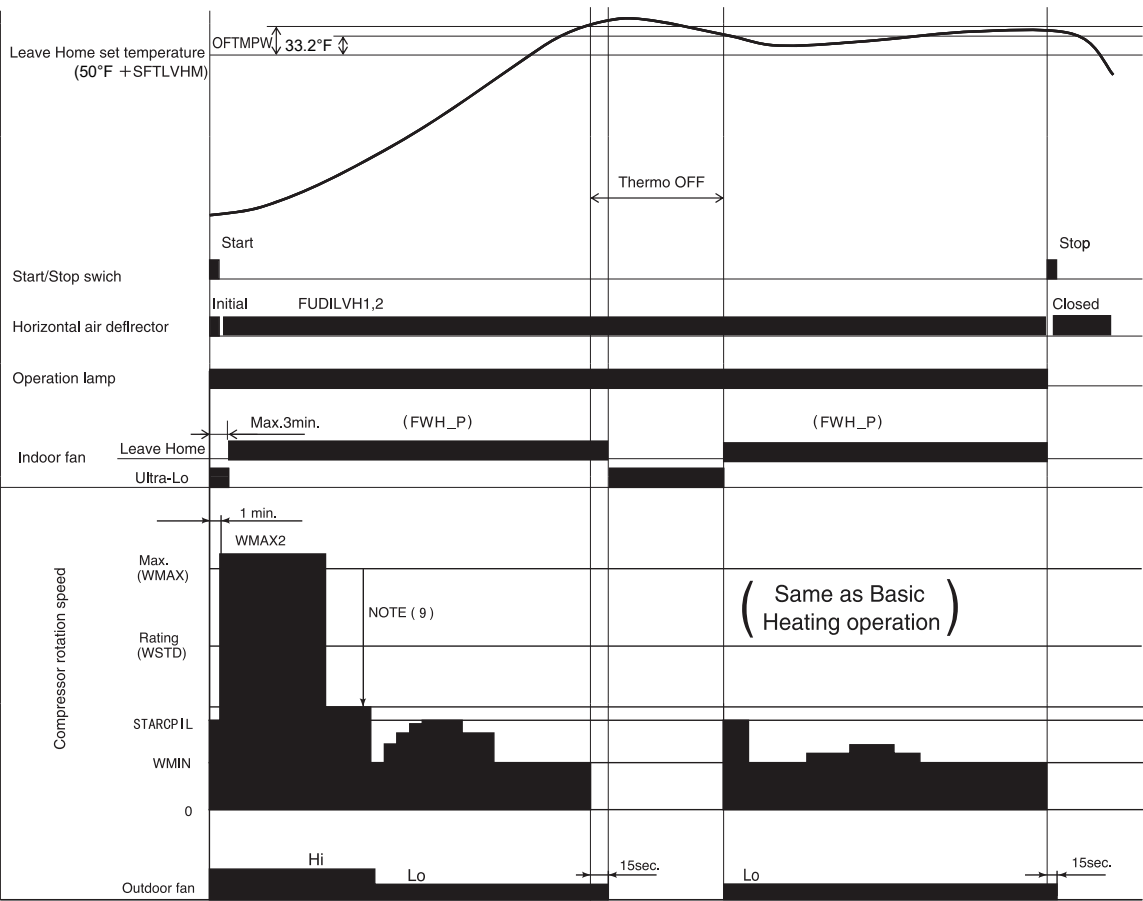
Heating Powerful Operation



Notes :

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

Leave Home

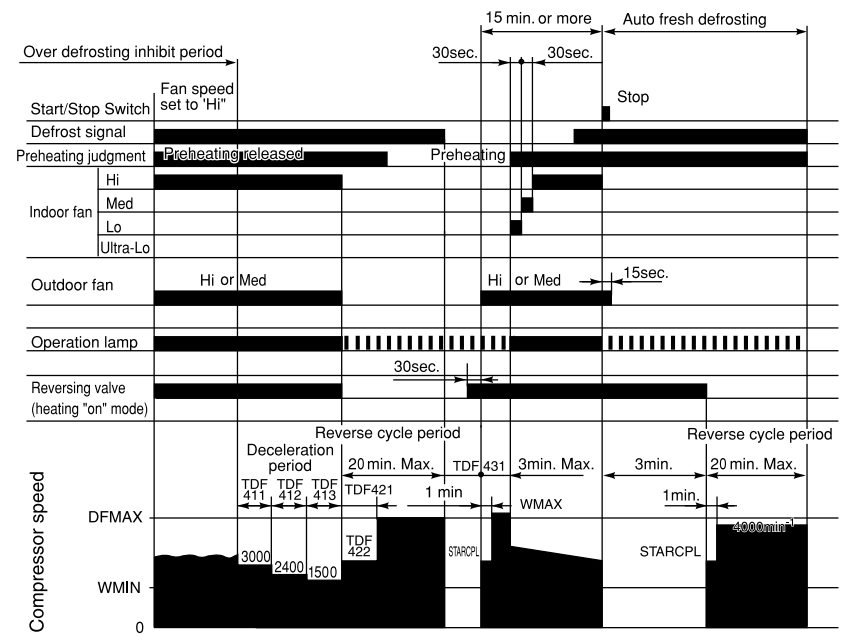


Notes:

Perform Leave Home operation according to the following control contents.

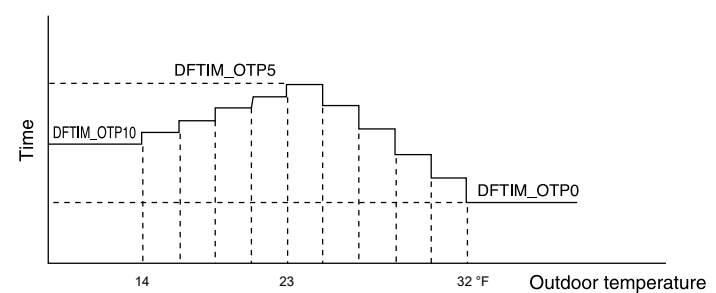
- (1) Operation mode : Heating
- (2) Setting temperature : 50°F
- (3) Shift value : + SFTLVHM
- (4) Indoor fan speed : FWH_P
- (5) Outdoor fan speed :
- (6) Compressor start control: } Same as Basic Heating operation
- (7) Compressor speed :
- (8) Operation lamp : ON

Reversing Valve Defrosting



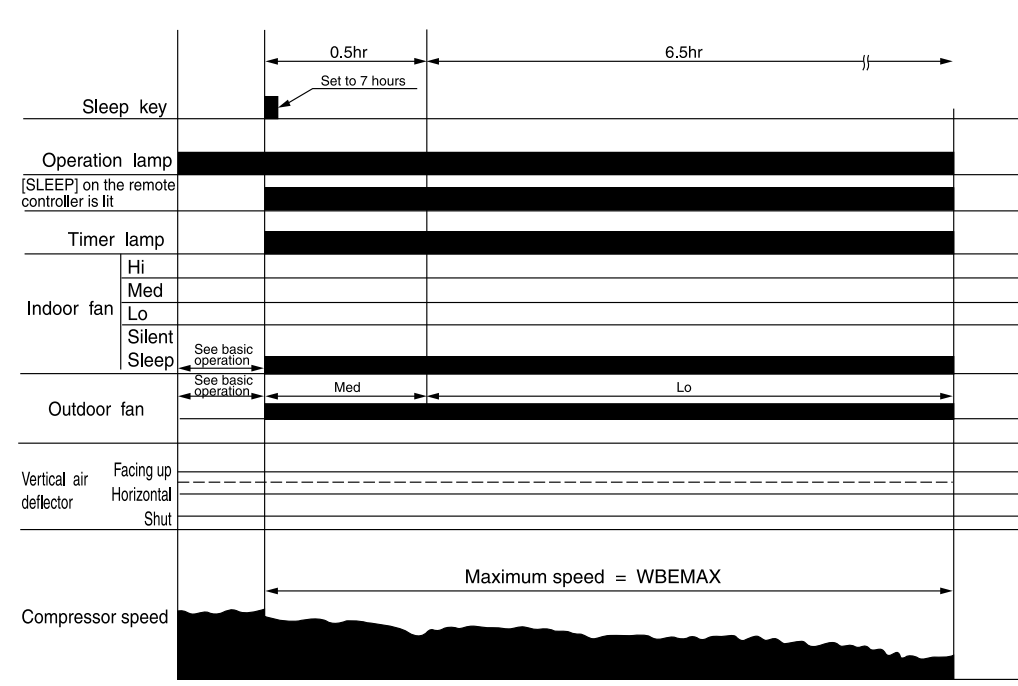
- Notes:
- (1) The defrosting inhibit period is set as shown in the diagram below. When defrosting has finished once, the inhibit period is newly set, based on the outdoor temperature when the compressor was started. During this period, the defrost signal is not accepted.
 - (2) If the difference between the room and outdoor temperatures is large when defrosting is finished, the maximum compressor speed (WMAX) or (WMAX2) can be continued for 120 minutes maximum.
 - (3) The defrosting period is 20 minutes maximum.
 - (4) When operation is stopped during defrosting, it is switched to auto refresh defrosting.
 - (5) Auto refresh defrosting cannot be engaged within 15 minutes after operation is started or defrosting is finished.

Setting Defrosting Inhibit Period

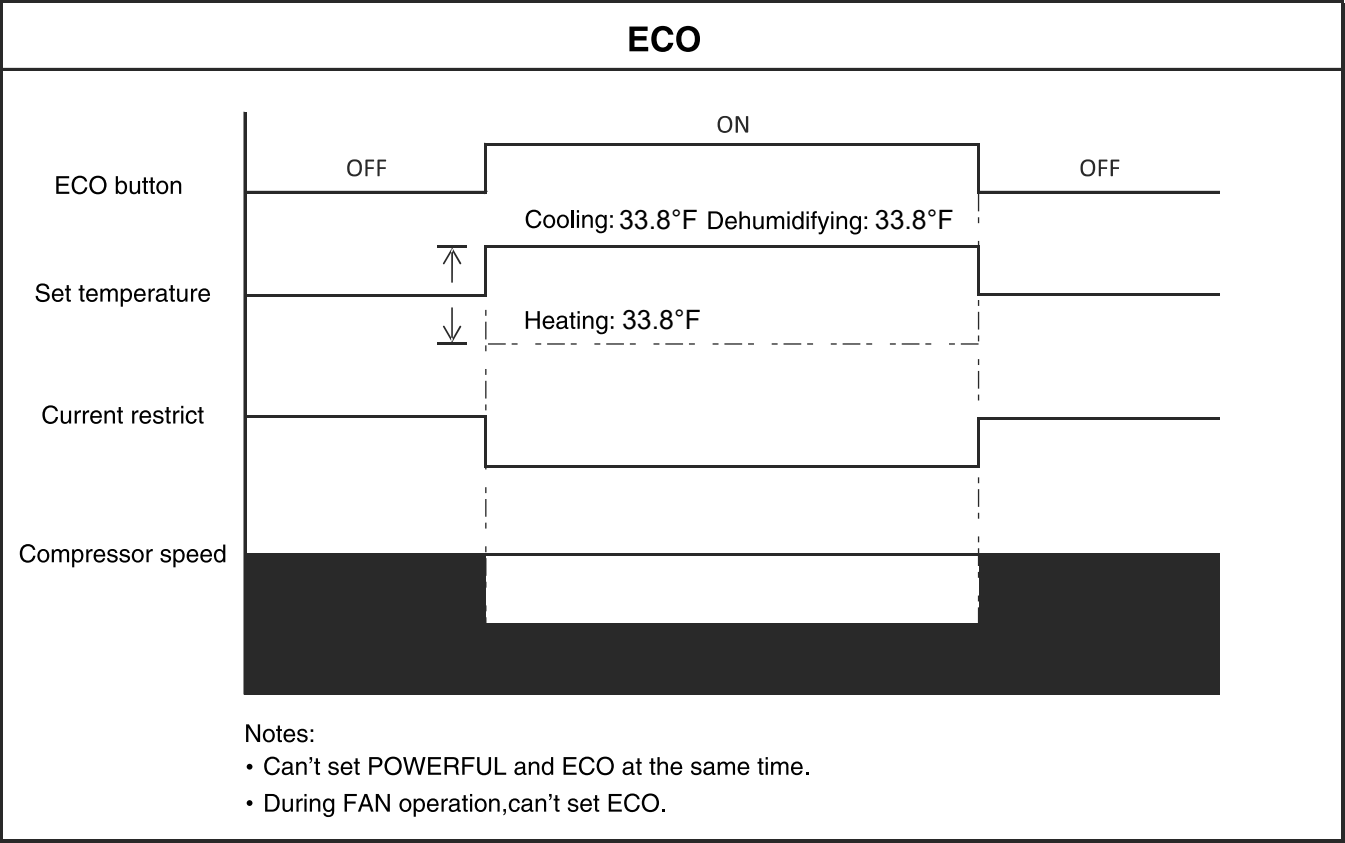


- Notes:
- (1) The first inhibit time after operation start is set to DFTIM_OTP0.
 - (2) From the second time onwards, the inhibit time is set according to the time required for defrosting.
Reverse cycle operation time ≥ [DEFCOL] : DFTIM_OTP0 is set.
Reverse cycle operation time < [DEFCOL] : The time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

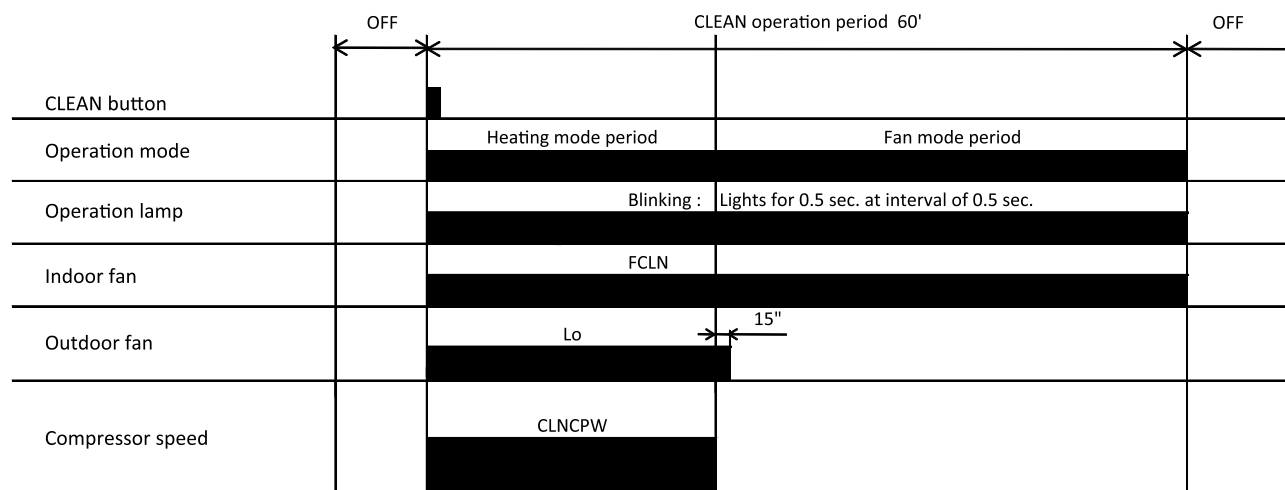
Heating Sleep Operation



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



Clean Operation



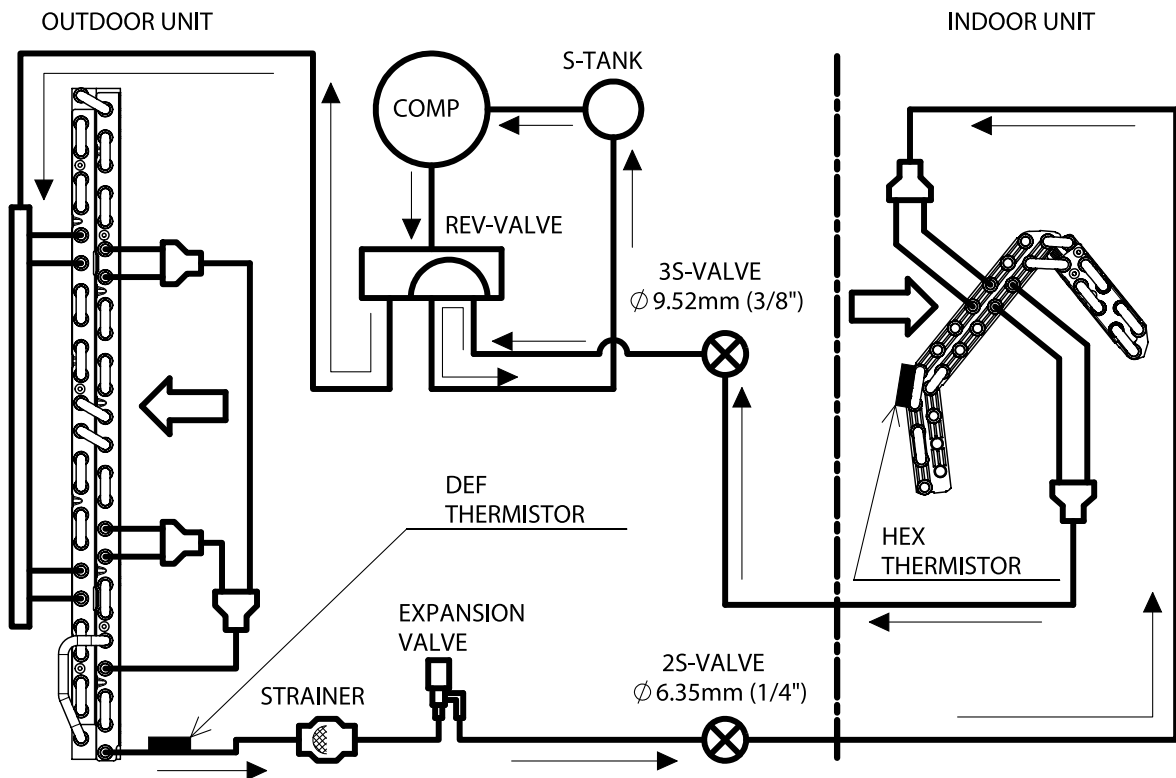
Notes :

- (1) During CLEAN operation period, heating mode will change to fan mode when HEX temperature is "CLNEVP" or more except force 3 minutes operation.
- (2) For multi connections, CLEAN operation is limited to fan mode.

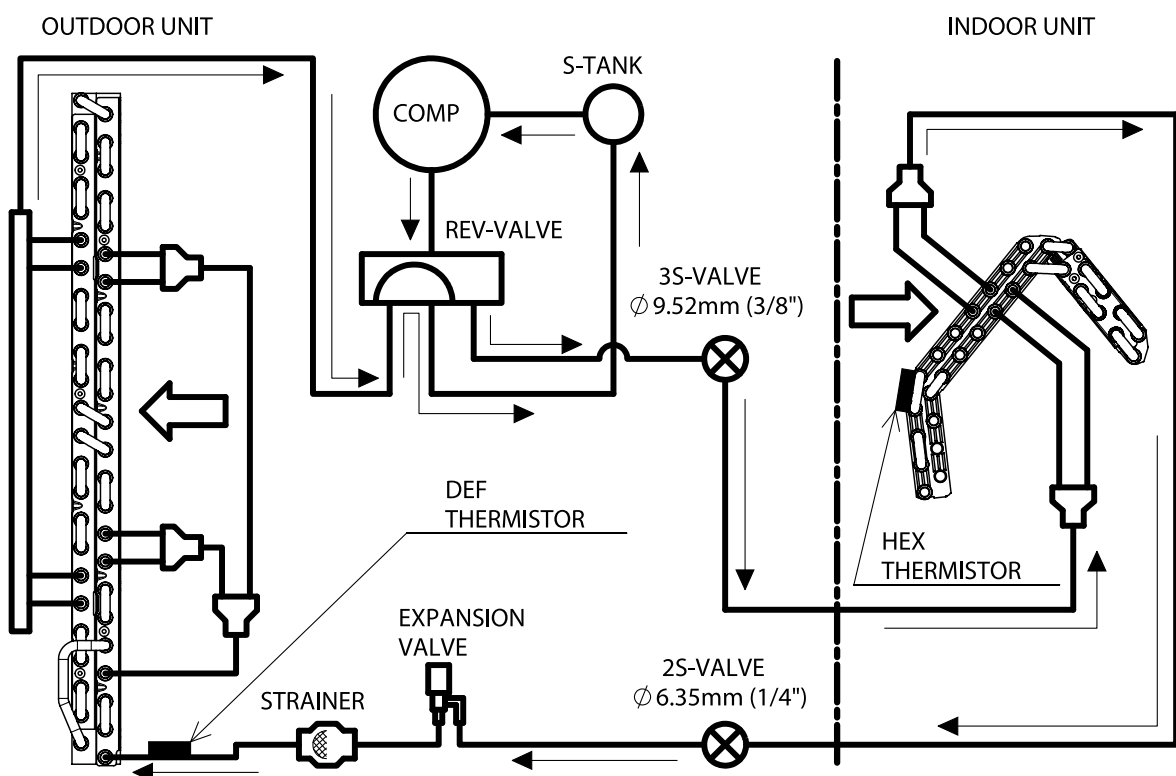
REFRIGERATING CYCLE DIAGRAM

RAS-EH09PHLAB / RAC-EH09WHLAB
 RAS-EH12PHLAB / RAC-EH12WHLAB
 RAS-EH07QHLAE / (MULTI ONLY)
 RAS-EH09RHLAE / RAC-EH09WHLAE
 RAS-EH12RHLAE / RAC-EH12WHLAE

COOLING, DEHUMIDIFYING, DEFROSTING



HEATING



AUTO SWING FUNCTION

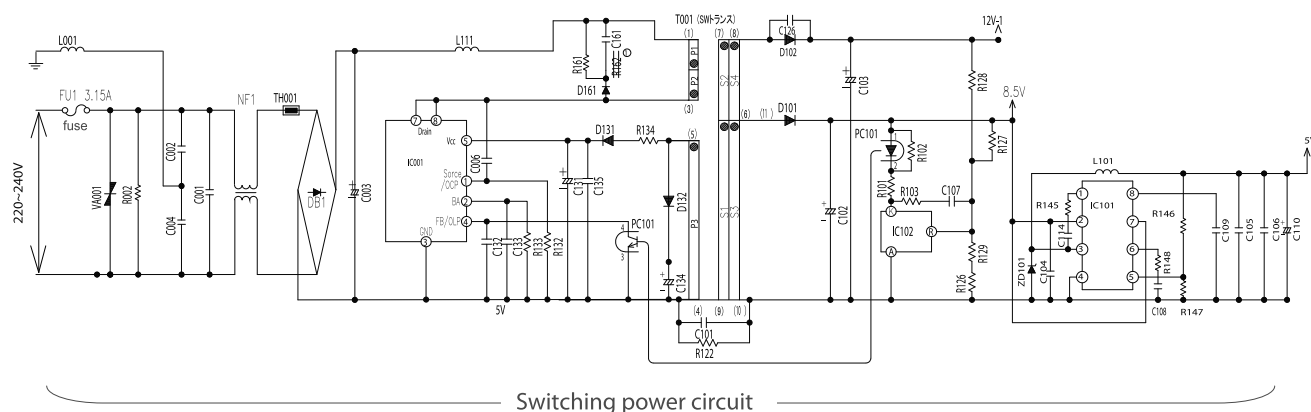
INPUT SIGNAL	PRESENT CONDITION			OPERATING SPECIFICATION	REFERENCE
	OPERATION	OPERATION MODE	AIR DEFLECTOR		
KEY INPUT	STOP	EACH MODE	STOP	ONE SWING (CLOSING AIR DEFLECTOR) ① DOWNWARD ② UPWARD	INITIALIZE AT NEXT OPERATION.
			DURING ONE SWING	STOP AT THE MOMENT.	
	DURING OPERATION	COOL DRY	STOP	START SWINGING ① DOWNWARD ② UPWARD ③ DOWNWARD	
			DURING SWINGING	STOP AT THE MOMENT.	
THERMO. ON (INTERNAL FAN ON)	DURING OPERATION	DRY	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 DRY	STOP DURING ONE SWING	INITIALIZE ① DOWNWARD ② UPWARD	
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 RAS-EH09PHLAB, RAS-EH12PHLAB

RAS-EH07QHLAE, RAS-EH09RHLAE, RAS-EH12RHLAE

1. Control power circuit



2. Reset Circuit

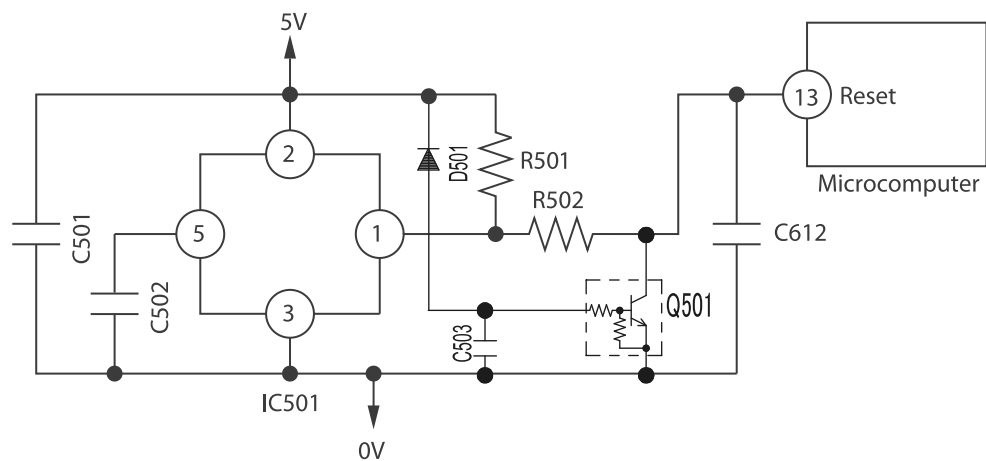


Fig. 3-1

Timing chart

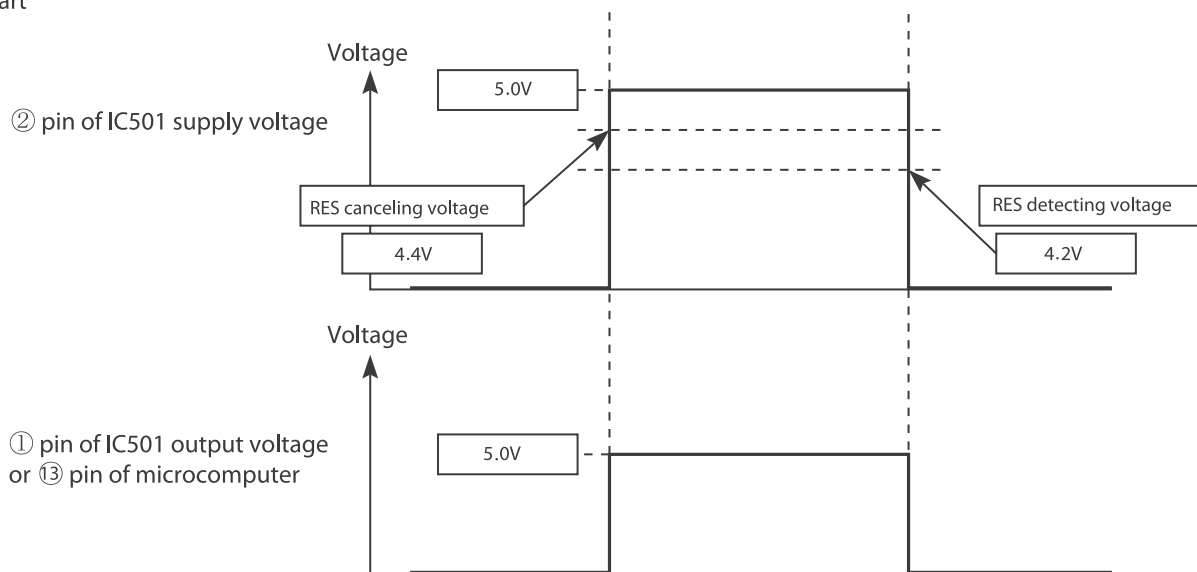


Fig. 3-2

- Reset circuit is to initialize the indoor unit microcomputer when switching ON the power or after recovering from power failure.
- Low voltage at pin ⑬ resets the microcomputer and Hi activates the microcomputer.
- Waveform of each part when switching ON the power and when shutting down is shown in the Fig. 3-2.
- After switching ON the power, ① pin of IC501 supply voltage and ⑬ pin of microcomputer becomes Hi when DC5V line rises and reaches approximately 4.4V or higher.
Then, resetting will be cancelled and microcomputer starts operating.
- After shutting down the power, ① pin of IC501 supply voltage and ⑬ pin of microcomputer becomes Lo when DC5V line falls and reaches approximately 4.2V or lower.
Then, the microcomputer will be in reset condition.

3. Drive circuit of the indoor fan motor

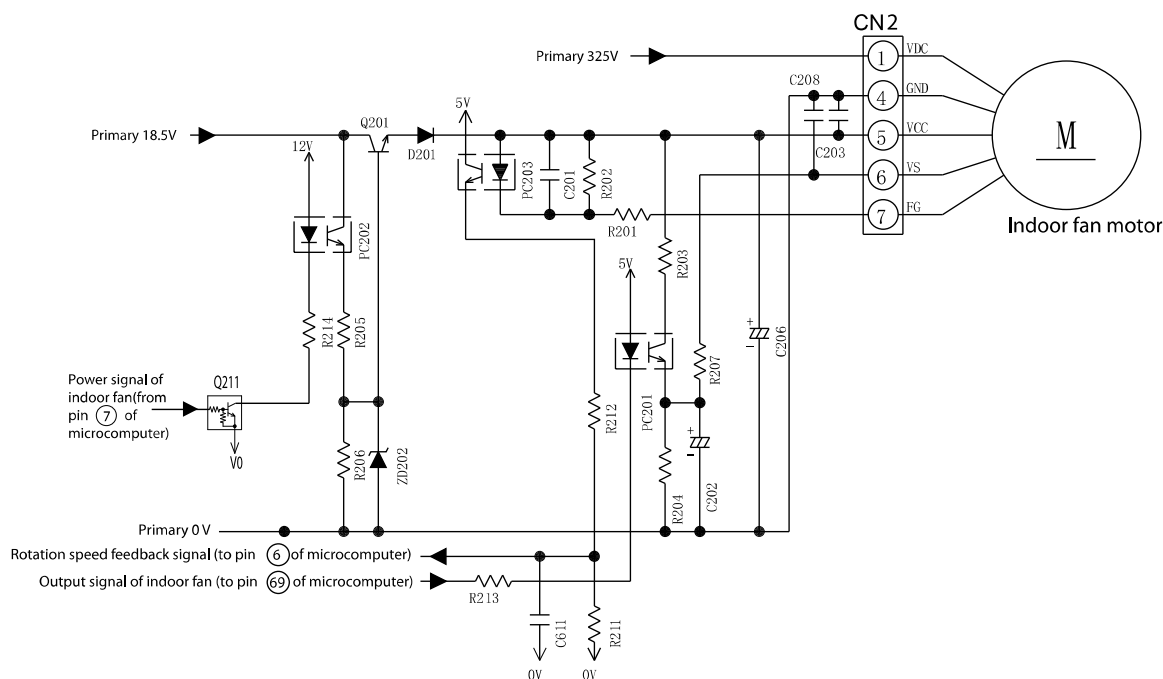


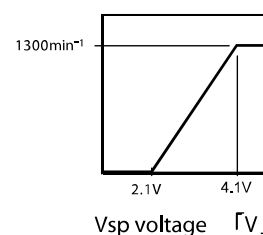
Fig. 3-1

< The circuit check (For test) >

Name	Test point	Test voltage
Motor drive power	CN2 ① pin- ④ pin	About 325V
Motor control power	CN2 ⑤ pin- ④ pin	About 15V
Motor speed signal	CN2 ⑥ pin- ④ pin	About 2-6V
Motor rotation speed debug	CN2 ⑦ pin- ④ pin	About 7.5V

- * The voltage above is all motor operation vol. when you start the test, take care of your connector, do not touch the different pin together.
- * The voltage of pin ⑥ - pin ④, pin ⑦ - ④ maybe different from above.

< Pin 6 - Pin 4 voltage one example >



- * The different mode maybe have different FAN rotation speed.

< Typical circuit waveform >

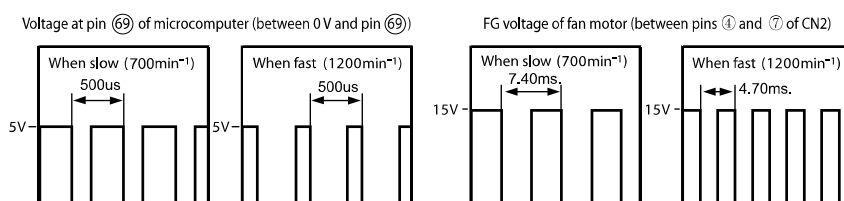


Fig. 3-2

- The indoor fan motor receives VDC (motor drive power supply), VCC (power supply for the control circuit inside the motor), and VS (speed command voltage) from CN2. The indoor fan motor returns an FG signal of a frequency that matches the rotation speed.
- VCC stabilizes the primary 18.5 V power supply into 15 V by using Q201 and supplies it.
- While on standby for a remote control signal, the Q201 shuts down the VCC and reduces the standby power.
- The VS receives a command voltage from the microcomputer. The VS terminal undergoes an analog voltage that matches the Lo level time ratio of the pulse signal from pin ⑥9 of the microcomputer. (See Fig. 3-2.)
- The FG terminal undergoes a signal of 12 pulses per revolution of the motor shaft. By counting the pulse rate, the microcomputer recognizes the motor speed, thereby performing feedback control.

4. Buzzer Circuit

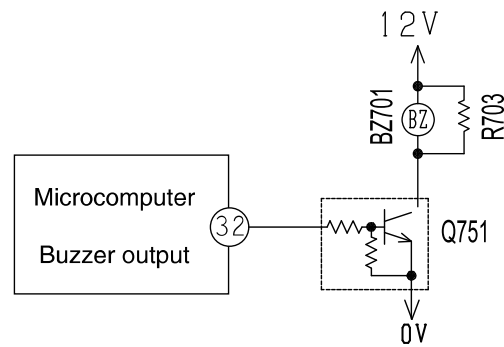


Fig.4-1 Buzzer Circuit

- When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin (32) of the micro computer. After the amplitude of this signal has been set to 12Vp-p by a transistor, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

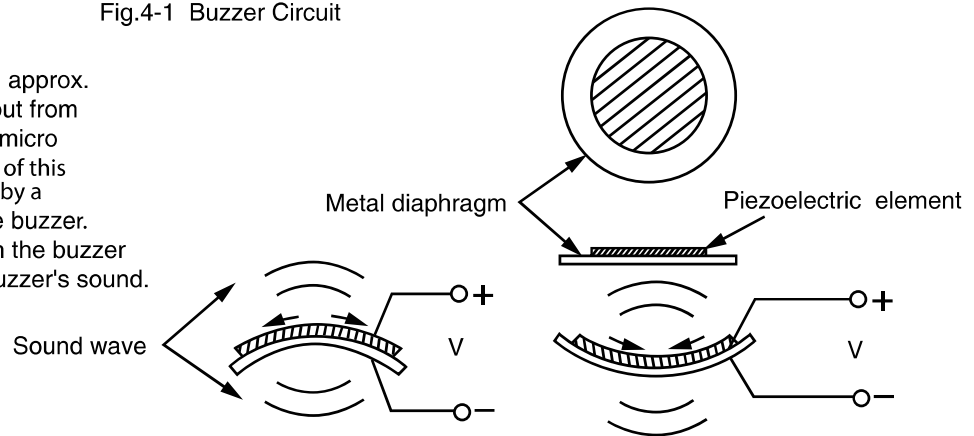


Fig.4-2 Buzzer Operation

5 . Remote control reception circuit

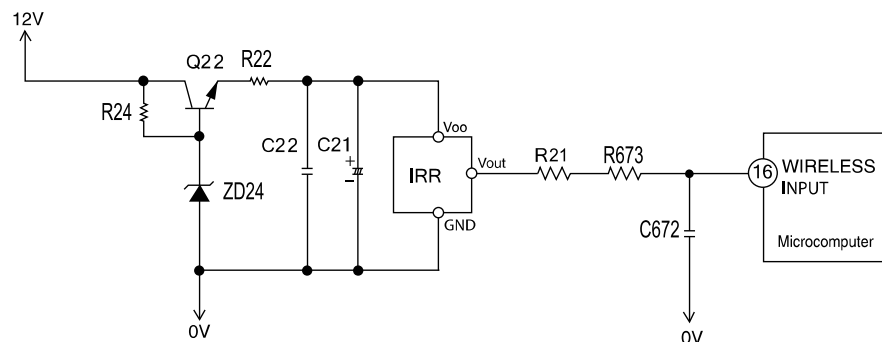


Fig.5-1

[Typical communication waveform]

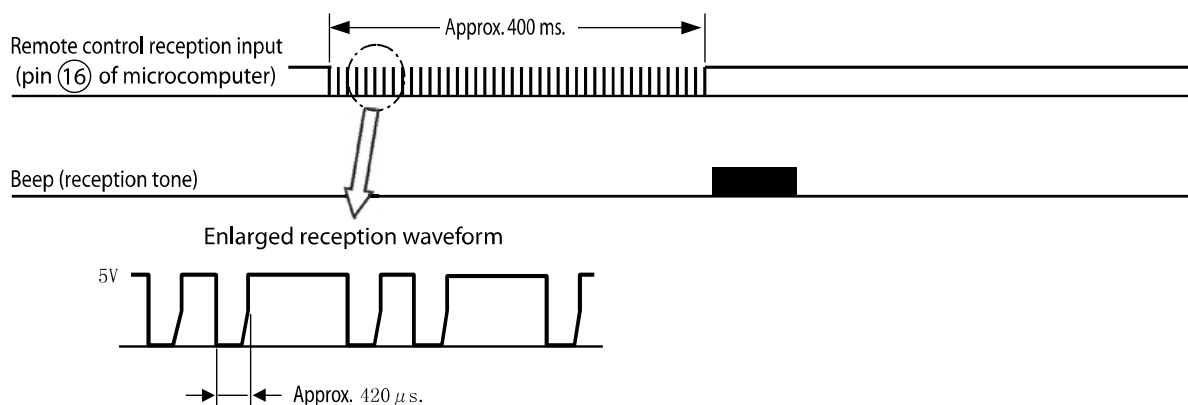
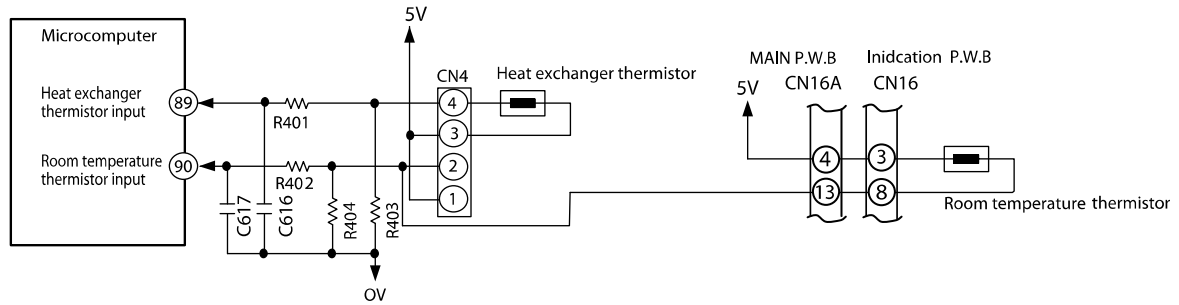


Fig.5-2

- An infrared signal from the remote control unit is converted to an electrical signal by the remote control light-receiving unit and is received by the microcomputer. Data is transmitted as digital data 0 and 1 by changing the interval of the basic pulses at about 420 μs.

6. Room temperature, heat exchanger thermistor circuits



- The thermistor is used for detecting the room temperature and indoor unit heat exchanger pipe temperature.
- The thermistor is a sensor that changes its resistance value according to the temperature of the element and the microcomputer recognizes the analog voltage provided by the resistance voltage division with the fixed resistor as temperature signals.
- The relationship between the temperature of the thermistor and the circuit voltage is roughly as shown in Fig.6-1 and Fig.6-2. When it is easy to measure between the terminals of CN4 in actual measurement, use the graph of Fig. 6-3

"Thermistor both ends voltage".

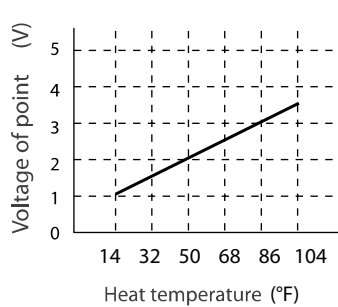


Fig. 6-1

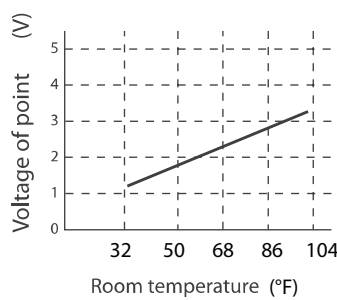


Fig. 6-2

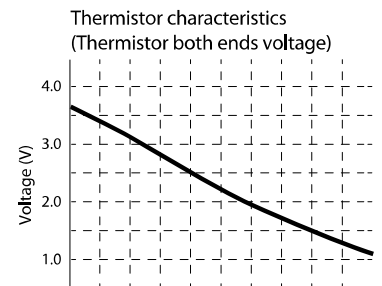


Fig. 6-3

7. Dip switch

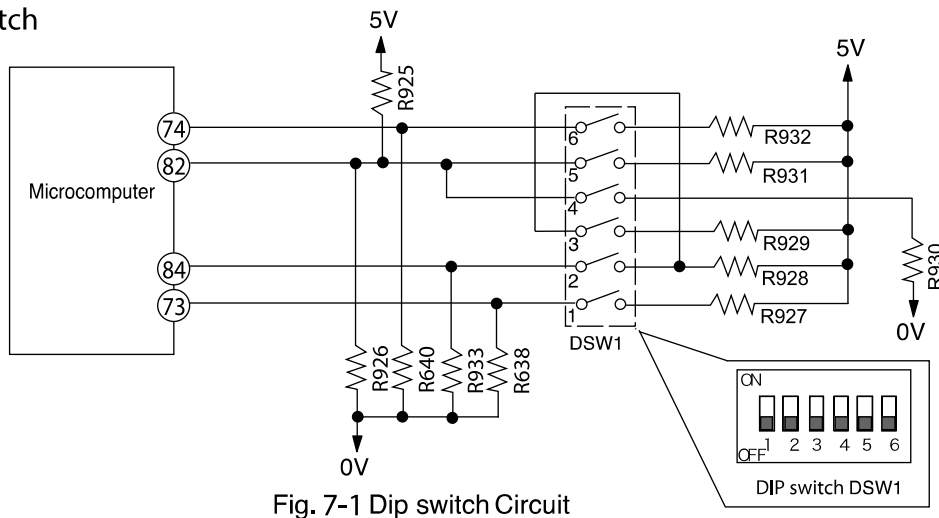


Fig. 7-1 Dip switch Circuit

- Fig. 7-1 shows the dip switch circuit; the table shown in Fig. 7-2 are function and setting position from ①—⑥ of the switch No.

SW No.	I T E M	F U N C T I O N			
1	AUTO RESTART	OFF*	ENABLE	ON	DISABLE
2	CARD KEY MODE	OFF*	DISABLE	ON	ENABLE
3	CARD KEY LOGIC SELECT	OFF*	INPUT HIGH ACTIVE	ON	INPUT LOW ACTIVE
4	HEATING/COOLING ONLY MODE SELECT	OFF*	HEATING & COOLING	OFF	HEATING ONLY
5	HEATING/COOLING ONLY MODE SELECT	OFF*	HEATING & COOLING	ON	COOLING ONLY
6	REMOCON ID SELECT	OFF*	FACTORY	ON	SELECT

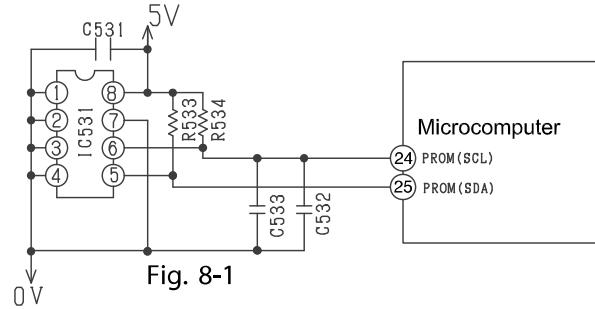
Fig. 7-2 Functions of Dip switch

NOTE:

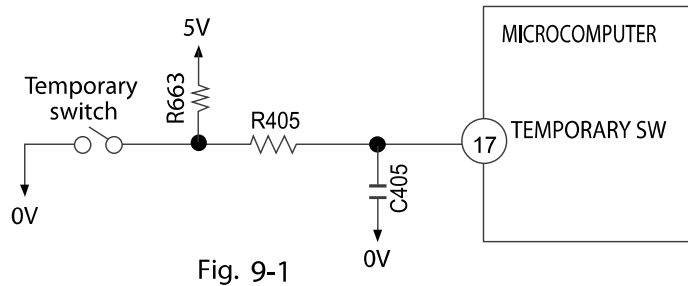
* Marking is position of shipping [FACTORY default setting]

8. Initial Setting Circuit (IC531)

- When power is supplied, the microcomputer reads the data in IC531 (E²PROM) 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 IC531; data will not be erased even when power is turned off.



9. Temporary Switch Circuit



- 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 automatic mode by pressing the temporary switch. If the power switch is set to OFF then ON it also operates in the automatic mode when the temporary switch is pressed.

10. Indoor/outdoor communication circuits

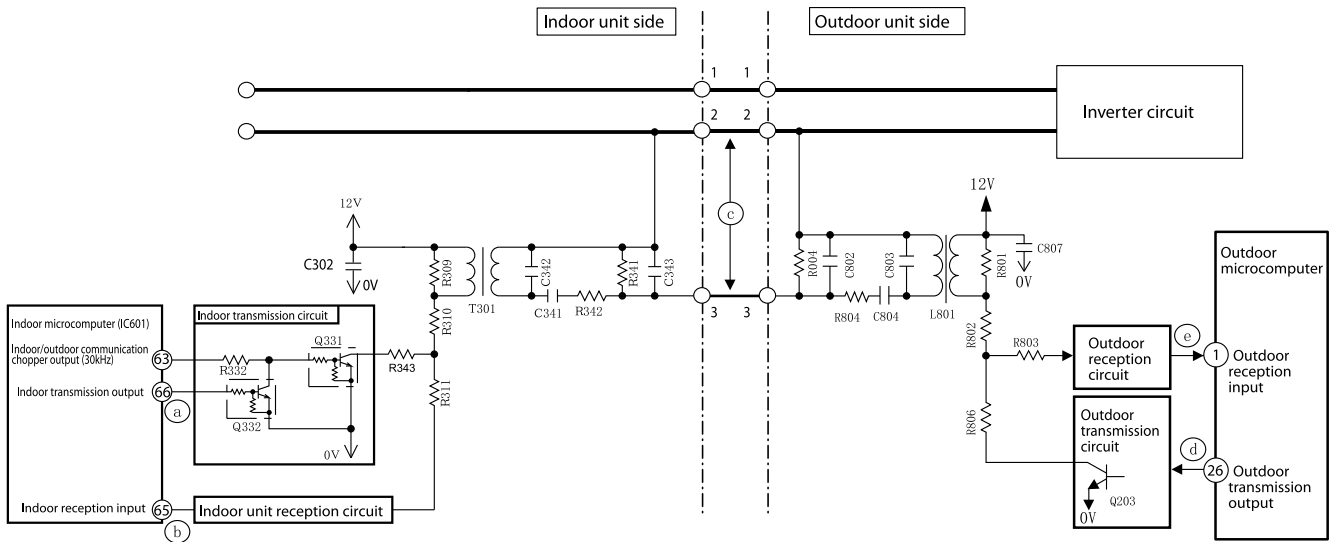


Fig. 10-1

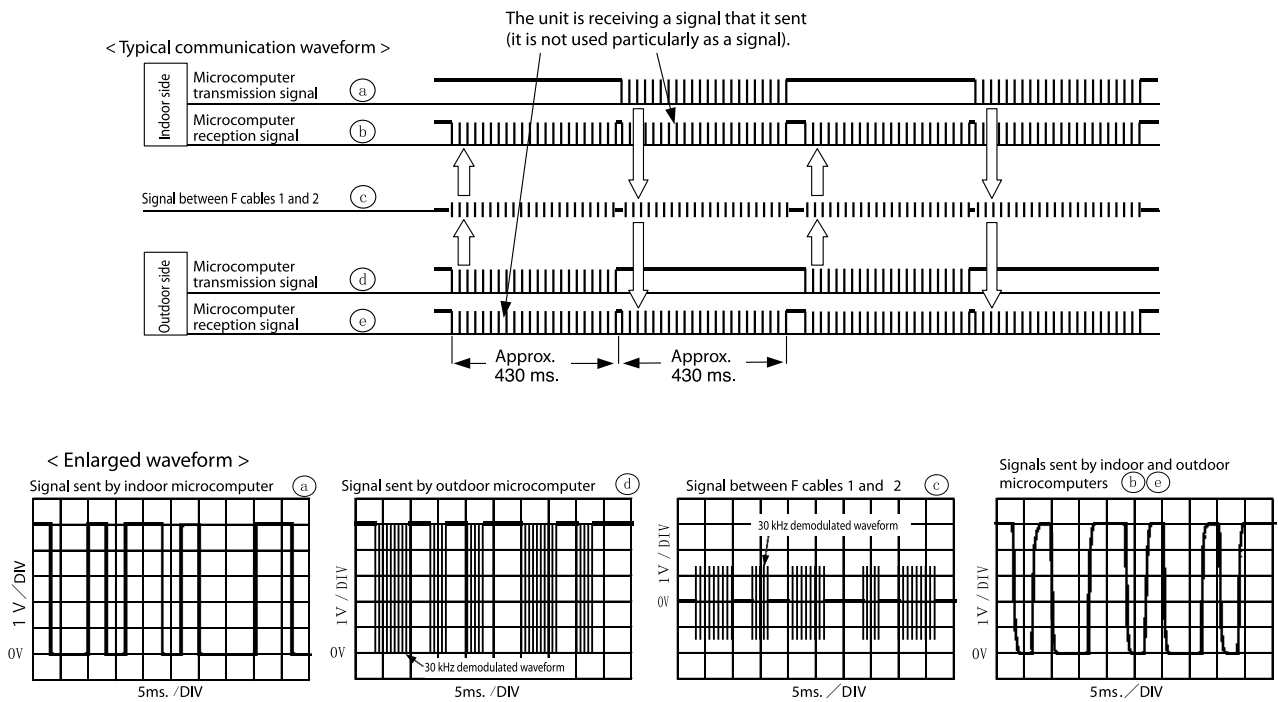


Fig. 10-2

- Indoor and outdoor communications are conducted by using lines 2 and 3 of F cable. Line 2 of F cable is shared with a transmission channel that powers the outdoor unit.
- Data communicated between the indoor and outdoor units are outputted from the microcomputer as serial signals and are transmitted as demodulated by a 30 kHz carrier wave. (Both the indoor and outdoor microcomputers directly output a signal demodulated at 30 kHz.)

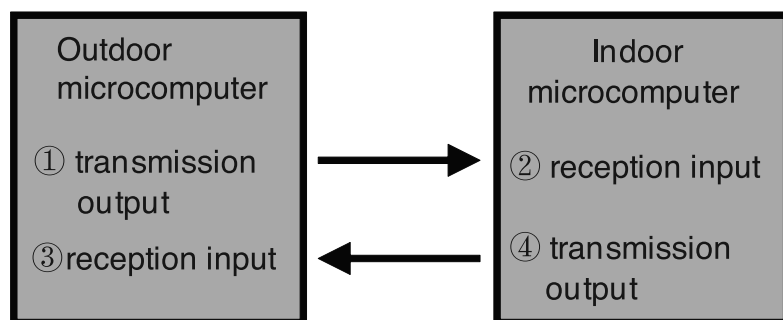
Check

If a cable poorly inserted in the indoor terminal board or some other failure overheats the terminal board and the temperature fuse of the terminal board blows out, the power to the indoor communication circuit will be shut down to stop the communications function.

Check

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

Indoor/Outdoor communication fault circuit judgement



1. Failure happen during unit running

- 【If ① failure】 Outdoor: LD301 blinking 9 times / Indoor: no failure display
- 【If ② failure】 Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times
- 【If ③ failure】 Outdoor: LD301 blinking 9 times / Indoor: no failure display
- 【If ④ failure】 Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times

2. Failure happen during standby mode but outdoor unit not yet enter hibernation mode

- 【If ① failure】 Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 12 times
- 【If ② failure】 Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times
- 【If ③ failure】 Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 12 times
- 【If ④ failure】 Outdoor: LD301 blinking 9 times / Indoor: the timer lamp blinking 3 times

3. Failure happen during standby mode but outdoor unit already enter hibernation mode

- 【If ① failure】 Outdoor: no failure display / Indoor: the timer lamp blinking 12 times
- 【If ② failure】 Outdoor: no failure display / Indoor: the timer lamp blinking 3 times
- 【If ③ failure】 Outdoor: no failure display / Indoor: the timer lamp blinking 12 times
- 【If ④ failure】 Outdoor: no failure display / Indoor: the timer lamp blinking 3 times

When outdoor unit is in hibernation mode, outdoor microcomputer is off, so the outdoor unit can't display the failure.

11. Stepping motor drive circuit

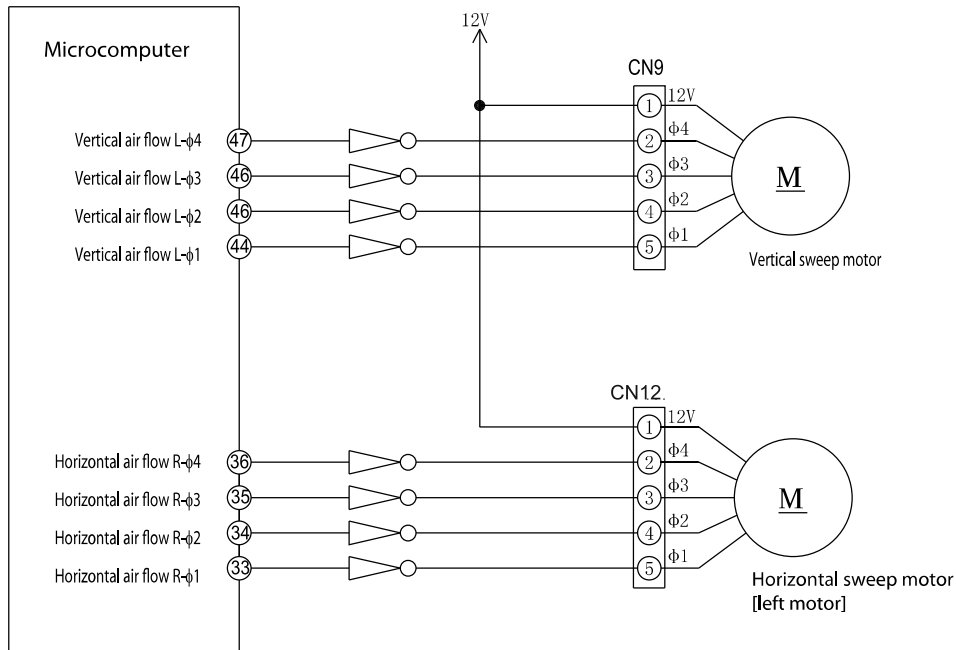


Fig. 11-1

[Connector circuit waveform while the motor runs]

Voltage waveforms of different phases as viewed from the OV line while the motor rotor is turning counterclockwise as viewed from the shaft side

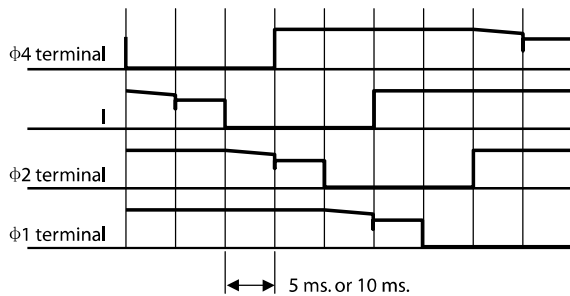


Fig. 11-2

- Each stepping motor runs as excited in 1 or 2 phases at 100 PPS or 200 PPS.
- The excitation pattern passes the microcomputer (IC601) and then the driver IC and excites the coil of each stepping motor.
- Some models not need to install the horizontal sweep motor.

12. Run status and alarm signal output circuit

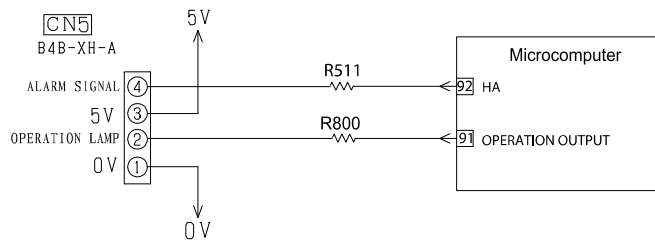


Fig.12-1

Fig.12-1 is the control circuit of run status and signal output in main PWB. The pin ② of CN5 is used to show run status and the pin ④ of CN5 is used to warn people when failure occurrence. If customer want to use this function, need to use the adapter(sold separately) to achieve it. the adapter is optional and the detail circuit refer to following circuit.

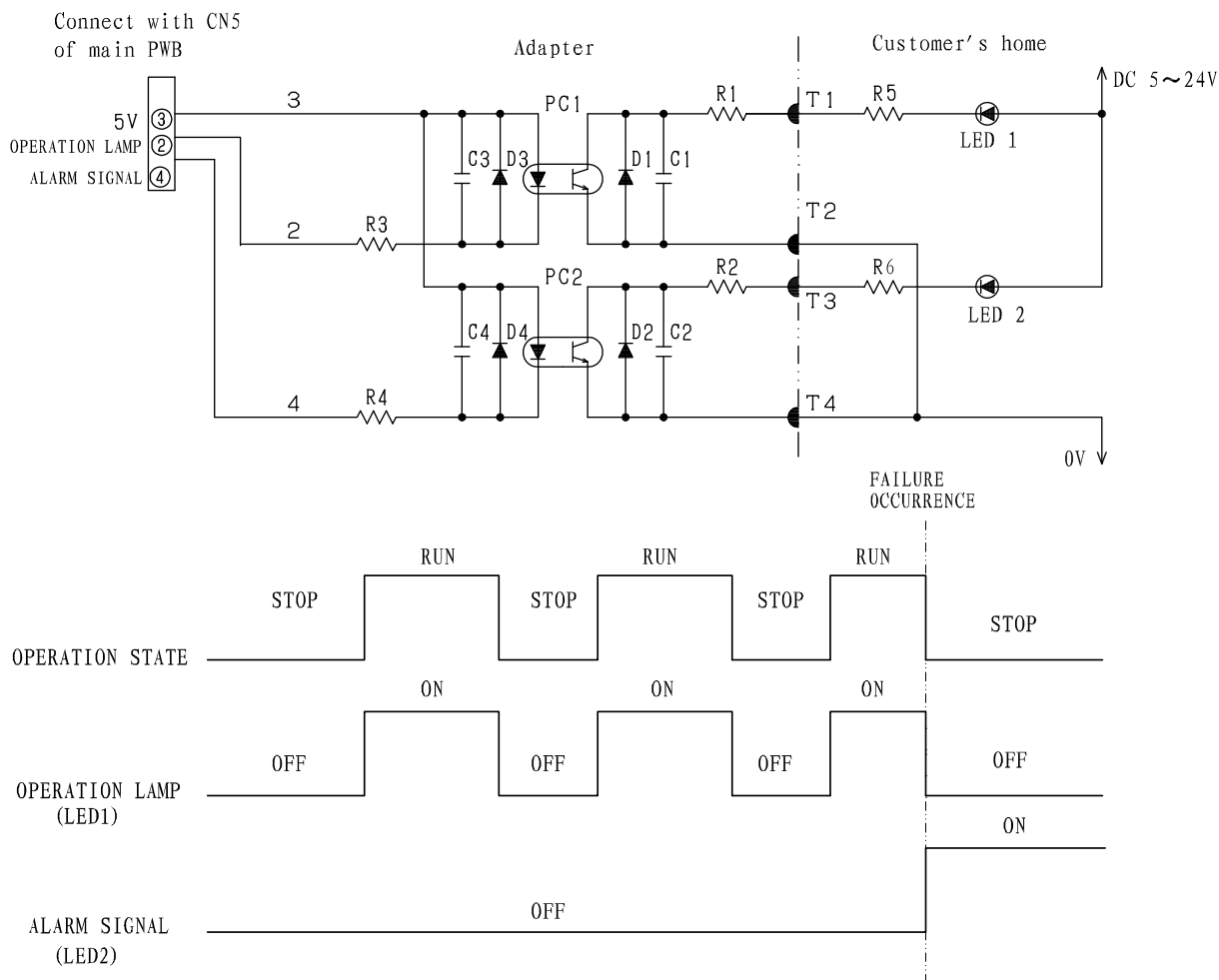


Fig.12-2

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

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

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAC-EH09WHLAB, RAC-EH12WHLAB

1. Power Circuit.

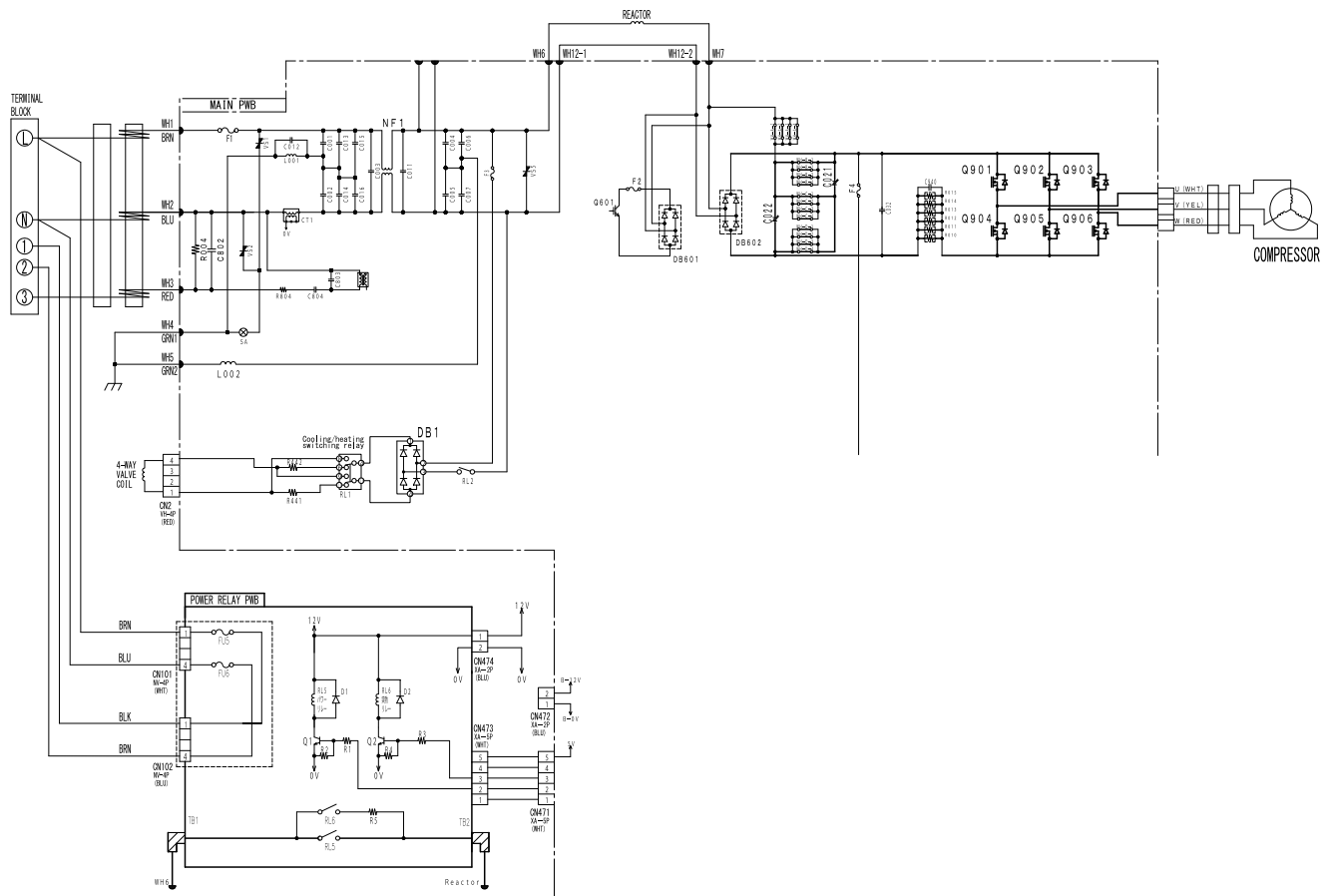


Fig.1-1

※ This circuit rectifies the AC voltage 115V applied between terminal L and N and creates a DC voltage.

The voltage become 250-270V when the compressor is operated.

※ Importance components.

- (1) Inverter circuit for compressor (Q901 to Q906).
The elements constitute the inverter part.
- (2) Diode stack (DB1, DB601, DB602).
The diode stack rectify AC Voltage 115V applied between the Terminal board L and N to DC Voltage.
- (3) Smoothing capacitor (C021 to C022, 2000uF, 220V).

<Reference>

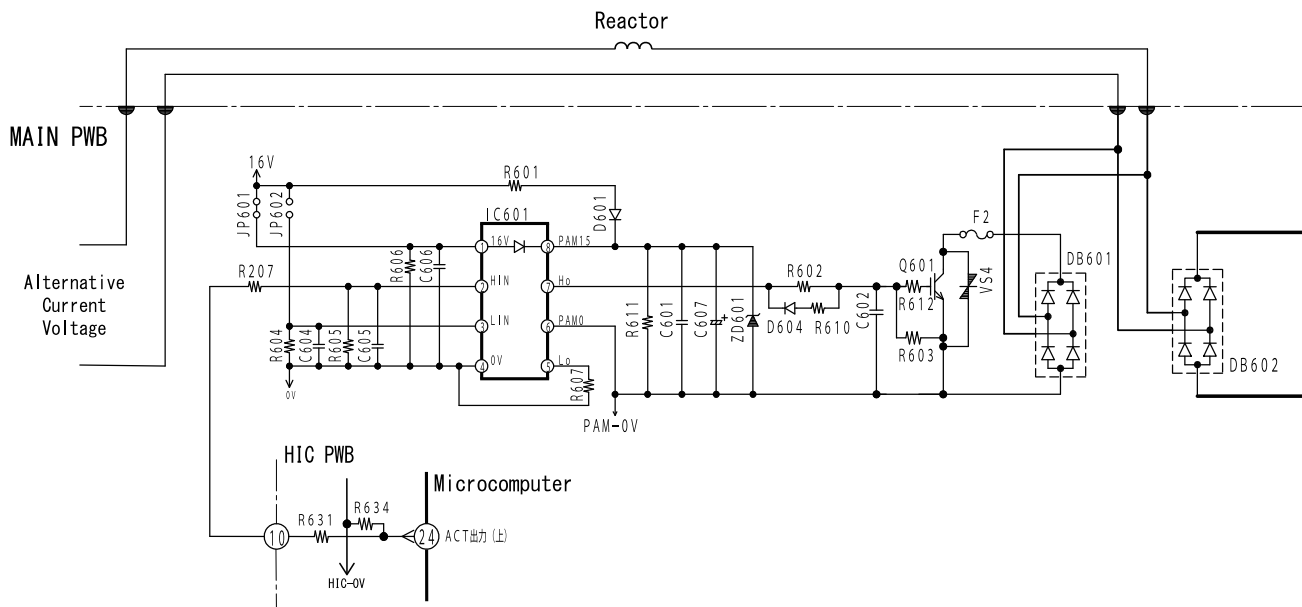
※ When the inverter circuits for compressor (Q901 to Q906) have a failure or improper connection, the compressor may stop immediately after its starts, due to "Abnormal low speed", "Switch failure", "IP Stop", etc.

<Reference>

※ When the diode stack (DB602) has failure, DC voltage can not be generated, completely disabling the operation of the compressor. Also note that 2A fuse may have blown.

<Reference>

※ The smoothing capacitor smoothes (average) voltage rectifier by the diode bridge.



- (4) IGBT for the power factor improvement (Q601).

- (5) Surge absorber, varistor 1 and 2.
The surge absorber and varistor absorb exogenous surge, including inductive lightning.

- (6) Noise filter (C004, C005, C015, C016, NF Coil).
The noise filter absorb electrical noise generated when the compressor operates and when exogenous noise is mixed through the power line. In order to protect electronic parts.

<Reference>

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

<Reference>

- ※ Be sure to ground the surge absorber and varistor.
without grounding, the surge absorber and varistor
do not operate normally.

<Reference>

- ※ Without grounding, the noise filter on the left do not operated normally.

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAC-EH09WHLAE, RAC-EH12WHLAE

1. Power Circuit.

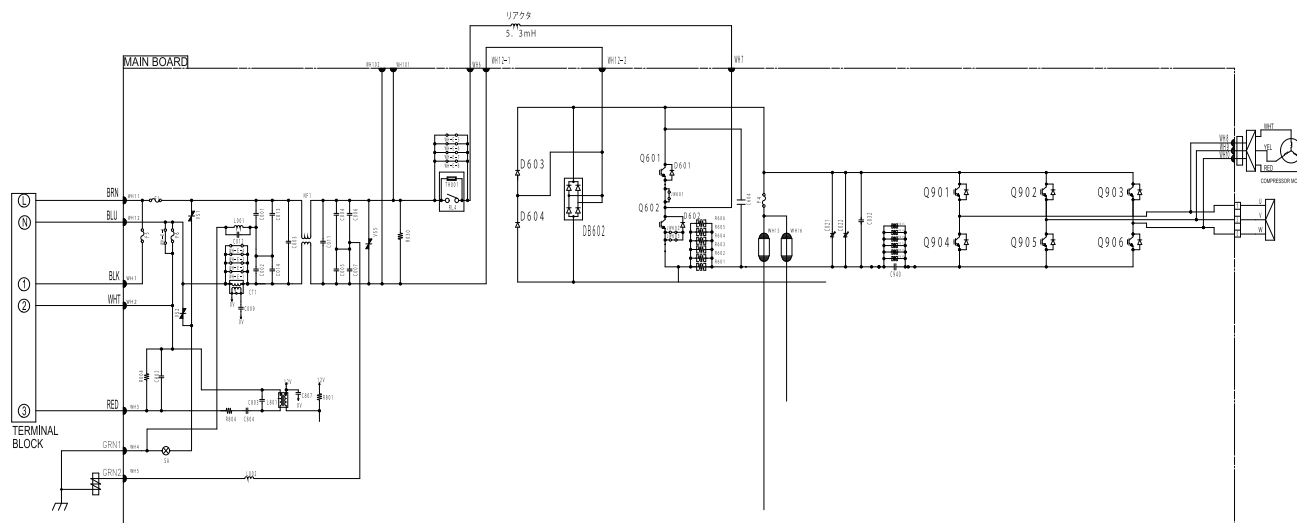


Fig. 1-1

※ This circuit rectifies the AC voltage 230V applied between terminal L and N and creates a DC voltage.

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

※ Importance components.

- (1) Inverter circuit for compressor (Q901 to Q906).
The elements constitute the inverter part.
- (2) Diode stack (DB1, DB602).
The diode stack rectify AC Voltage 230V applied between the Terminal board L and N to DC Voltage.
- (3) Smoothing capacitor (C021 to C022, 500uF, 450V).
- (4) IGBT for the power factor improvement (Q601).
- (5) Surge absorber, varistor 1 and 2.
The surge absorber and varistor absorb exogenous surge, including inductive lightning.
- (6) Noise filter (C001, C002, C006, C007, C013, C014, NF Coil). The noise filter absorb electrical noise generated when the compressor operates and when exogenous noise is mixed through the power line. In order to protect electronic parts.

<Reference>

※ When the inverter circuits for compressor (Q901 to Q906) have a failure or improper connection, the compressor may stop immediately after its starts, due to "Abnormal low speed", "Switch failure", "IP Stop", etc.

<Reference>

※ When the diode stack (DB602) has failure, DC voltage can not be generated, completely disabling the operation of the compressor. Also note that 2A fuse may have blown.

<Reference>

※ The smoothing capacitor smoothes (average) voltage rectifier by the diode bridge.

<Reference>

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

<Reference>

※ Be sure to ground the surge absorber and varistor. without grounding, the surge absorber and varistor do not operate normally.

<Reference>

※ Without grounding, the noise filter on the left do not operated normally.

2. Power Circuit (Low Voltage)

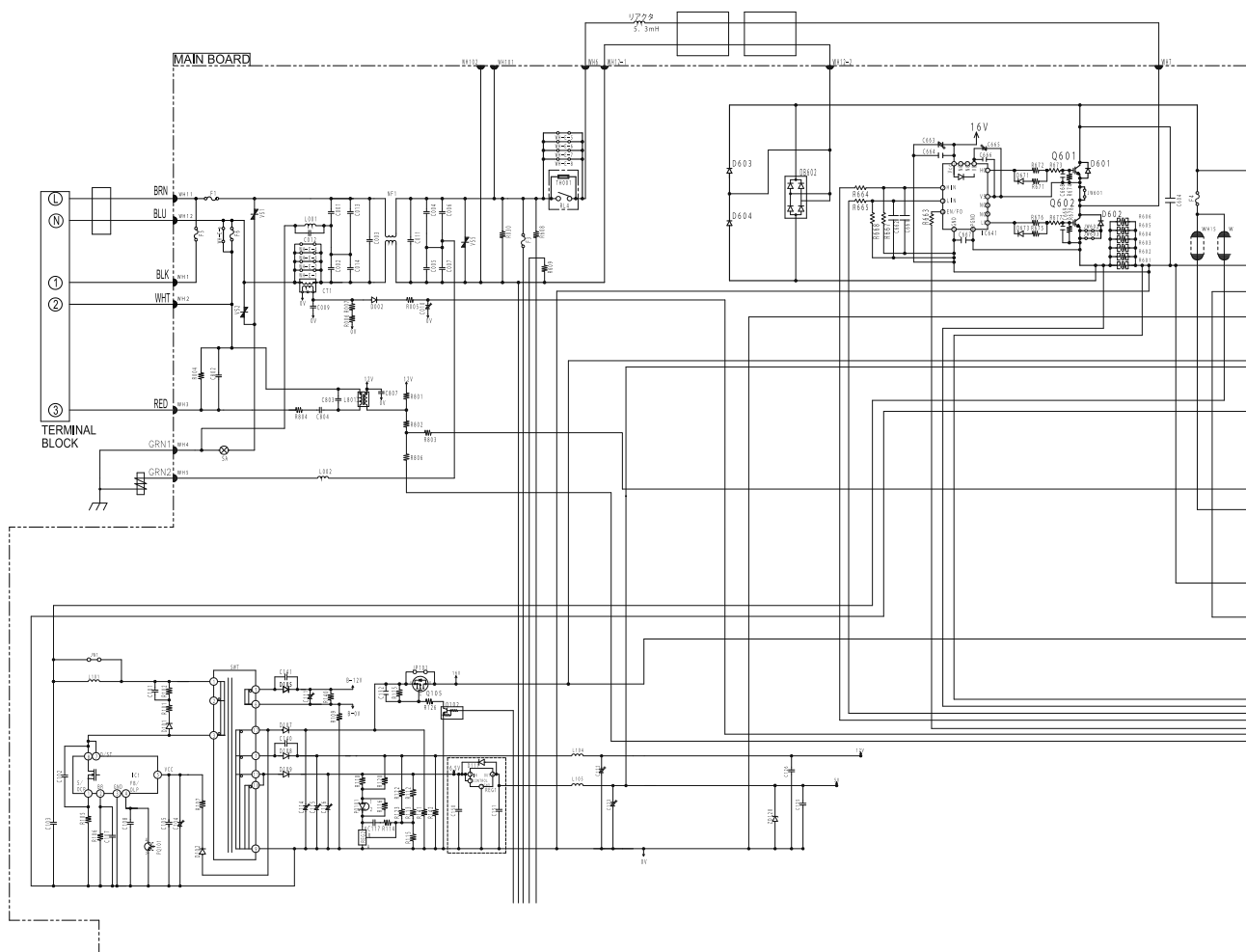
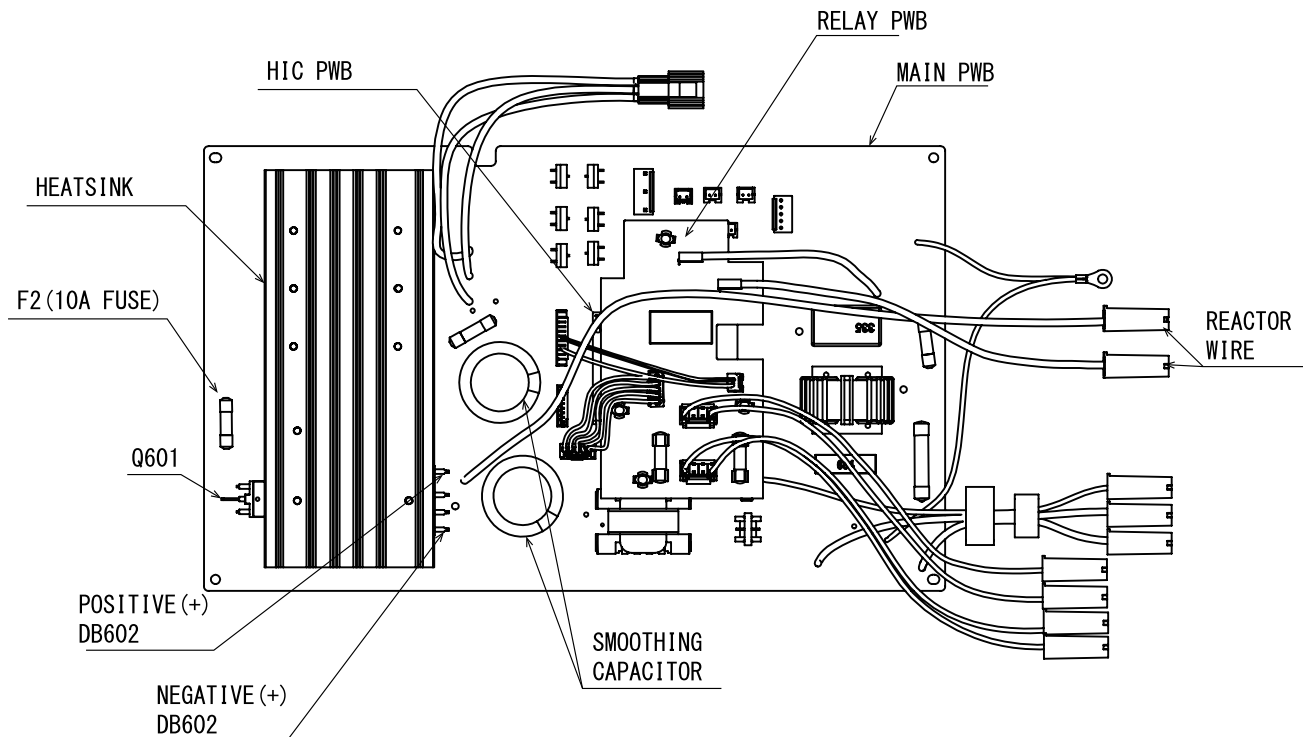


Fig. 2-1

- The 230V VAC voltage is rectified to DC voltage (B-12V, 16V, 12V, 5V) pass through switching control IC (IC1), switching transformer.
 - (1) B-12 Power supply for electrical expansion valve.
 - (2) 16V Power supply for driver circuit of compressor and fan motor, IGBT action.
 - (3) 12V Power supply for 4-way valve relay, power relay, motor current amplification.
 - (4) 5V Power supply for microcomputer, peripheral circuit.

MODEL RAC-EH09WHLAB, RAC-EH12WHLAB



※ Because high voltage flows, be careful about electric shock. Also, be careful about short-circuit accidents by improper connection of measuring instruments, which can damage the board.

3. Power Supply Circuit for Board

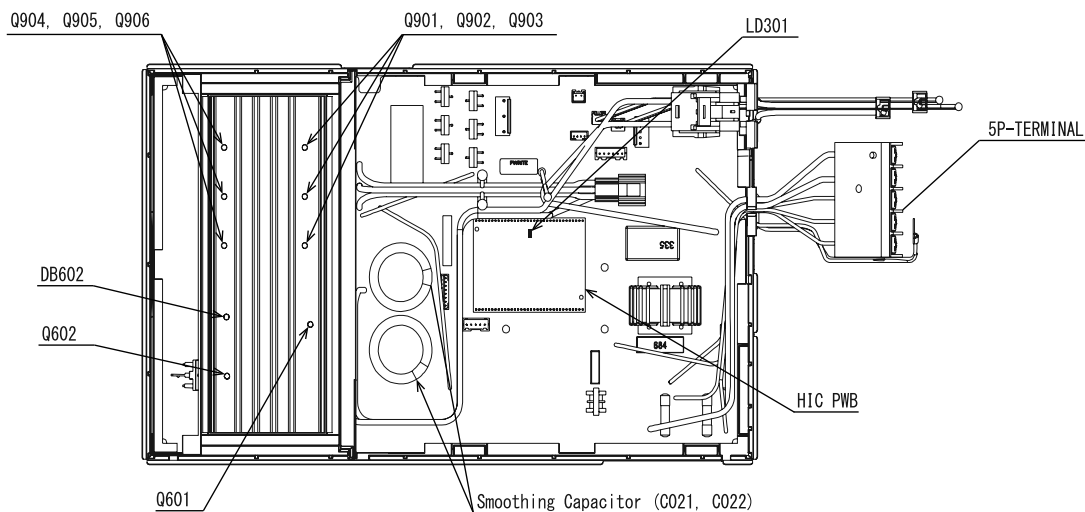
The voltage specification of the power supply circuit are as follow.

<Checking points>

Output Name	Voltage Specifications Value	Main Load	±Measurement Position	Example of failure mode for each output failure (Reference)
5V Output	$5 \pm 0.4 \text{ V}$	Microcomputer Thermistor	Tester (+) terminal: J93 (5V indication) Tester (-) terminal: J84 (0V indication)	The troubleshooting lamp LD301 does not indicate and the outdoor unit does not operate.
12V Output	$12 \pm 1 \text{ V}$	Microcomputer IC2, 3 and 4 Relay Circuit	Tester (+) terminal: J86 (12V indication) Tester (-) terminal: J84 (0V indication)	The troubleshooting lamp LD301 does not indicate and the outdoor unit does not operate.
16V Output	$15.5 \pm 1.5 \text{ V}$	Compressor Inverter Circuit Fan Inverter Circuit	Tester (+) terminal: J91 (16V indication) Tester (-) terminal: J84 (0V indication)	The troubleshooting lamp LD301 blinks 3, 4 or 12 times and the outdoor unit stops.
B-12V Output	$12 \pm 0.3 \text{ V}$	Expansion Valve	Tester (+) terminal: J83 (B-12V indication) Tester (-) terminal: J82 (B-0V indication)	The troubleshooting lamp LD301 blinks 5 times and the outdoor unit stops.

※ When checking each voltage, if the voltage specifications above are met, the power supply circuit for the board is functioning normally.

MODEL RAC-EH09WHLAE, RAC-EH12WHLAE



※ Because high voltage flows, be careful about electric shock. Also, be careful about short-circuit accidents by improper connection of measuring instruments, which can damage the board.

3. Power Supply Circuit for Board

The voltage specification of the power supply circuit are as follow.

<Checking points>

Output Name	Voltage Specifications Value	Main Load	±Measurement Position	Example of failure mode for each output failure (Reference)
5V Output	$5 \pm 0.4 \text{ V}$	Microcomputer Thermistor	Tester (+) terminal: J96 (5V indication) Tester (-) terminal: J138 (0V indication)	The troubleshooting lamp LD301 does not indicate and the outdoor unit does not operate.
12V Output	$12 \pm 1 \text{ V}$	Microcomputer IC2, 3 and 4 Relay Circuit	Tester (+) terminal: J139 (12V indication) Tester (-) terminal: J138 (0V indication)	The troubleshooting lamp LD301 does not indicate and the outdoor unit does not operate.
16V Output	$15.5 \pm 1.5 \text{ V}$	Compressor Inverter Circuit Fan Inverter Circuit	Tester (+) terminal: J111 (16V indication) Tester (-) terminal: J138 (0V indication)	The troubleshooting lamp LD301 blinks 3, 4 or 12 times and the outdoor unit stops.
B-12V Output	$12 \pm 3 \text{ V}$	Expansion Valve	Tester (+) terminal: J133 (B-12V indication) Tester (-) terminal: J130 (B-0V indication)	The troubleshooting lamp LD301 blinks 5 times and the outdoor unit stops.

※ When checking each voltage, if the voltage specifications above are met, the power supply circuit for the board is functioning normally.

4. Temperature Detection Circuit

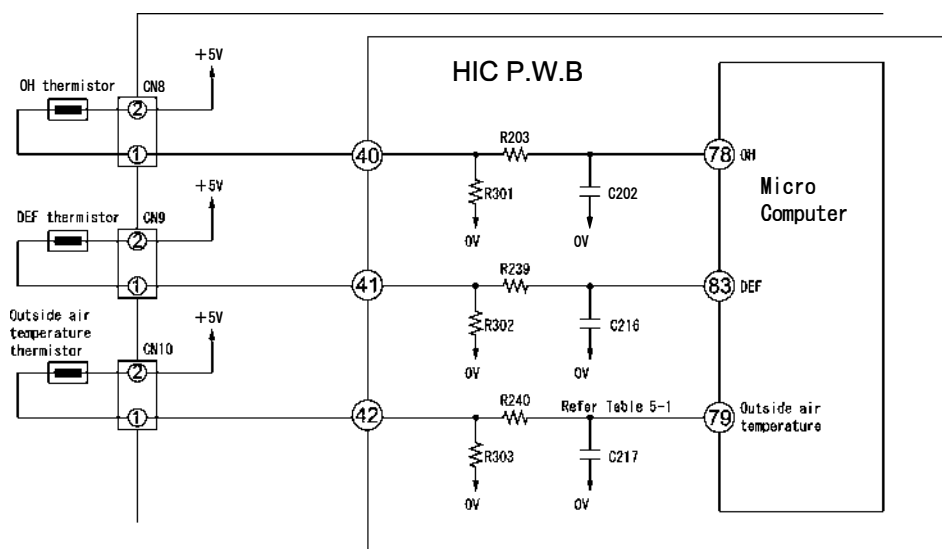


Fig. 4-1

- OH thermistor circuit detect the temperature at the surface of compressor head, DEF thermistor circuit detect the defrosting operation temperature.
- A thermistor is a negative resistor element which has characteristics that the higher(lower) the temperature, the lower(higher) the resistance.
- When the compressor is heated, the resistance of the OH thermistor becomes low and $\oplus 5V$ is divided by OH thermistor and R301 and the voltage at pin ⑦⑧ of microcomputer.
- Compare the voltage at microcomputer pin ⑦⑧ and setting value stored inside. If the value exceed the set value, microcomputer will judge that the compressor is overheated and stop the operation.
- The microcomputer read the outdoor temperature by Outside Air thermistor and transfer it to the indoor unit, thus controlling the compressor rotation speed according to the set value in the EEPROM of indoor unit and switching the operation mode (outdoor fan on/off etc.) to DRY mode.

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

Table 4-1

Outside Air Temperature (°F)	14	32	50	68	86	104
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

<Reference>

When the thermistor is open, open condition or disconnect, microcomputer pin ⑦⑧⑨ are approx. 0V;

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

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

5. Outdoor DC fan motor control circuit

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

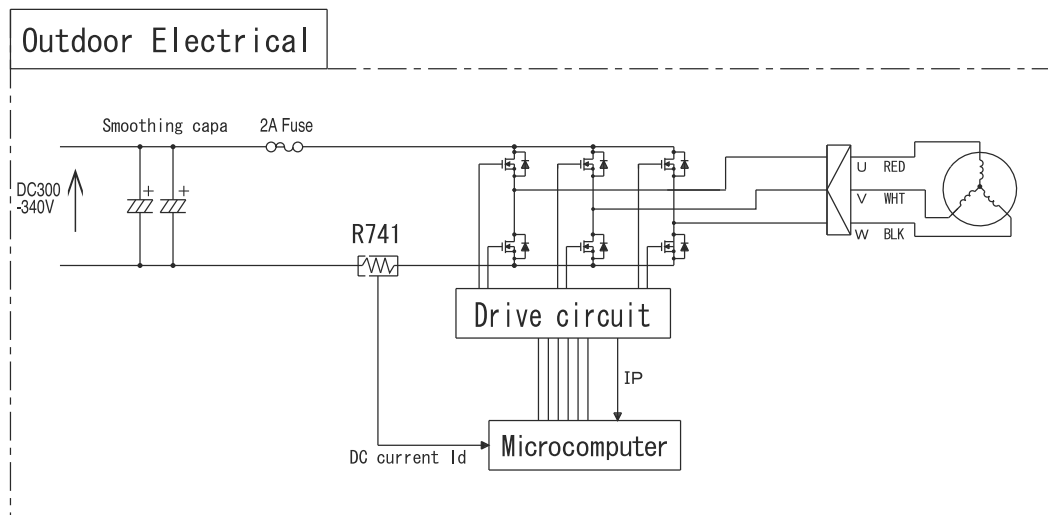


Fig 6-1

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

(1) Fan motor speed controller during starting

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

In addition, the fair wind is define as wind that blow to outside direction using Mouth Ring part. At strong and contrary wind ... The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

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

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

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

(2) Fan motor speed controller during unit operating

There is a case where fan rpm is reducing during rotating caused by interference of strong wind

If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking)

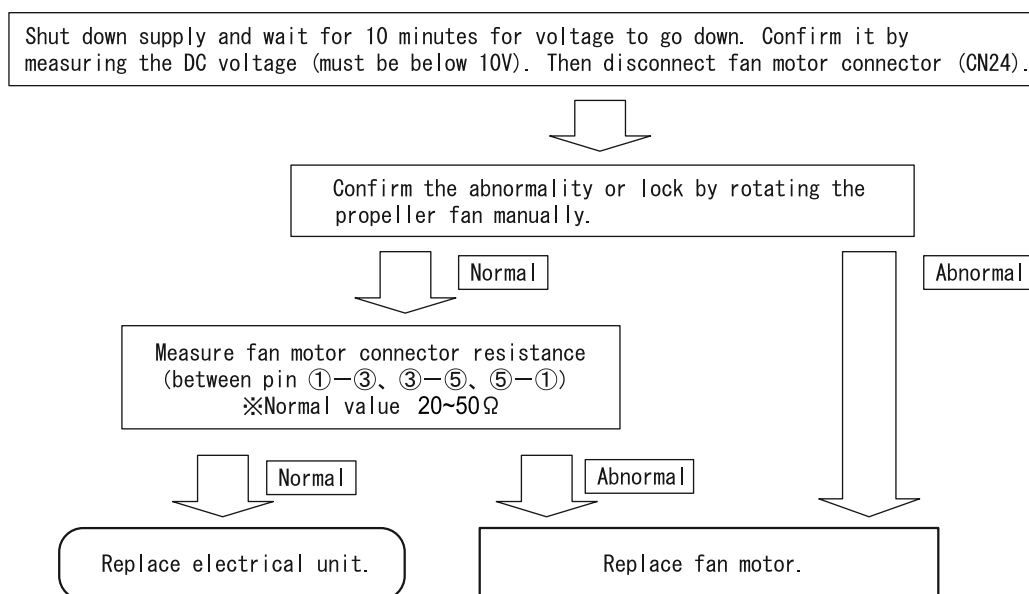
The unit will restart according to control as per during start (1).

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

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

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

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found 2Afuse blown.

If fan motor is broken, replace both electrical unit and fan motor.

Caution

※Beware of electric shock due to high voltage when conducting an operation check.

Power supply for DC fan motor and compressor is common (DC260-360V).

6. Electric expansion valve circuit

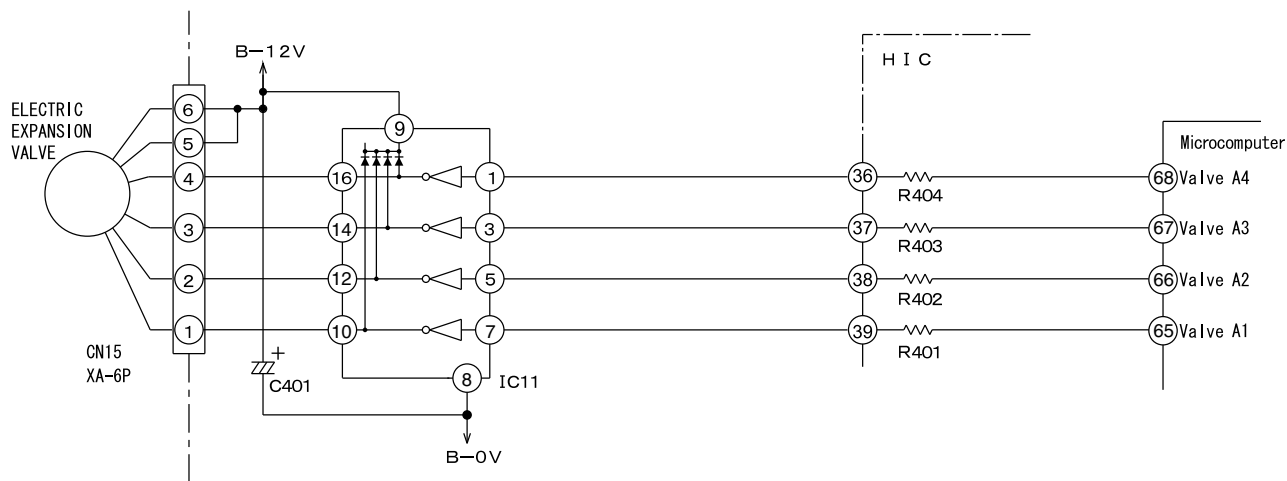


Fig. 6-1

- The electric expansion valve is driven by DC12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control the opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below. When power is supplied, voltages at pins④to①of CN15 are about 0.9V and 12V when no power is supplied. When power is reset, initial operation is performed for 10 or 20 seconds. During initial operation, measure all voltages at pin④to①of CN15 by using a multimeter. If there is any pin with voltage that has not changed from 0.9V or 12V, expansion valve or microcomputer is broken.
- Fig. 6-2 shows logic waveform when expansion valve is operating.

Table 6-1

CN15 pin no.	Wire	Drive status							
		1	2	3	4	5	6	7	8
①	WHT	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
②	YEL	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
③	ORG	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
④	BLU	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Operation mode									
1→2→3→4→5→6→7→8 VALVE CLOSE									
8→7→6→5→4→3→2→1 VALVE OPEN									

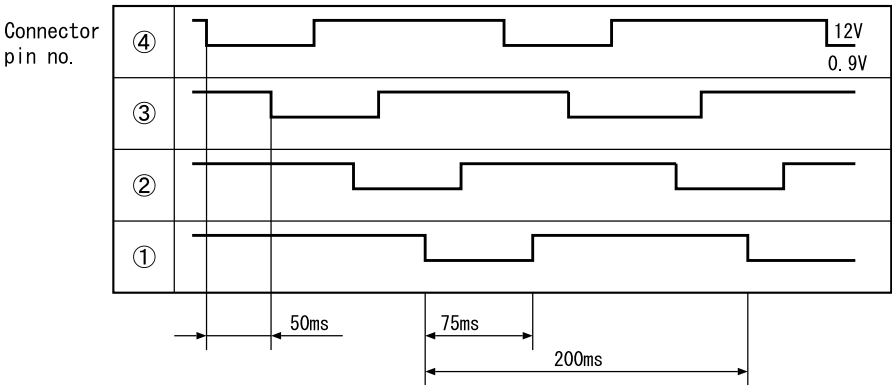


Fig. 6-2

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

7. Reversing valve (4-way valve) control circuit

- This model equipped with a reversing valve (4-way valve).
- The reversing valve (4-way valve) "slides" the valve in the specified direction for each operating mode and switches the route refrigerant and holds the route with a built-in permanent magnet.
- According to an operation command from the indoor unit microcomputer, the reversing valve (4-way valve) control circuit applies current to the reversing valve (4-way valve) coil in the specified direction, for each operating mode and slide the valve.
- Just before the compressor starts operation, the current is applied twice at the interval of 1 sec as shown in Fig.2-1.
- During forced cooling operation, just after the forced cooling switch turns on, the current is applied twice at the interval of 1 sec as shown in Fig.2-1.
- When the operation stops, the position of the valve before the stop is held.

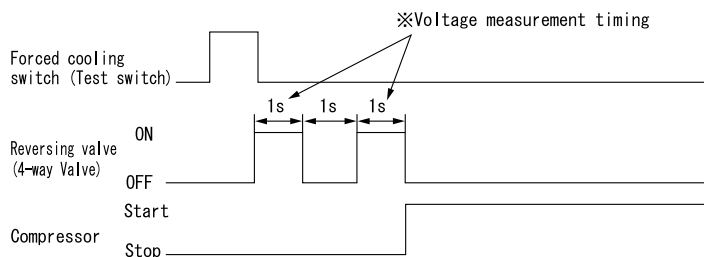


Fig. 2-1

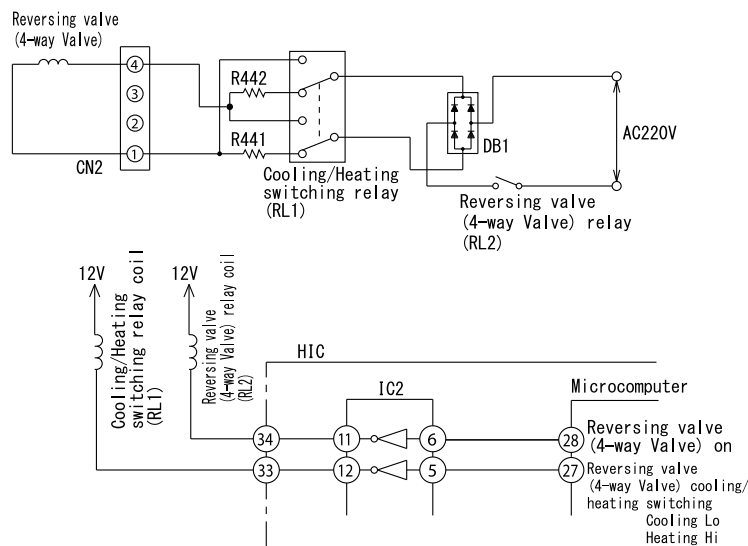


Fig. 2-2

- Before checking the application of current to the reversing valve (4-way valve), disconnect the connector (CN2) and measure the resistance of both ends of the connector, to see if it is $[2500\Omega \pm 10\%]$. Only when the resistance is normal, check the application of current using the following procedures. If the resistance is abnormal, it is caused by either: breakage of a lead wire, or failure of the reversing valve (4-way valve).
- The voltage, when measured by a tester during the application of current to the reversing valve (4-way valve) (when the voltage is measured)

※Switches the indoor unit to "Ion mist and air cleaning operation", and keep pressing the "Test switch" of the outdoor unit electrical part from 1 sec to below 5 sec (while the self-diagnosis lamp LD301 is ON). Afterwards, when the "Test switch" is released, the application of current starts after 1 sec elapses. (Forced cooling operation).

Operating mode		Cooling operation (including forced cooling operation)	(Reference) Heating operation
Tester and CN2 terminal connection point		⊕ terminal of tester to CN2 pin ④ ⊖ terminal of tester to CN2 pin ①	⊕ terminal of tester to CN2 pin ① ⊖ terminal of tester to CN2 pin ④
Types of testers	Analog tester	The tester indicates about 80 VDC and returns to 0V, and indicates about 80VDC again.	The tester indicates about 160 VDC and returns to 0V, and indicates about 160VDC again.
	Digital tester	The tester indicates about a larger value for an instant and returns to 0V, and indicates about a larger value again.	The tester indicates about a larger value for an instant and returns to 0V, and indicates about a larger value again.

※In each operating mode, if the tester is reverse-connected to the CN2 terminal, the tester indicates a value on the -ve (negative) side.

- At the voltage measurement timing, when the voltage is measured with a tester, if the tester indicates the values as shown in the table above, the circuit is functioning normally. (Each tester indicates values differently. Since it is often difficult to read the values of a digital tester, it is recommended to measure voltage with an analog tester).

※Since the current is applied only twice in 1 sec, if the timing is missed, correct operations cannot be measured.

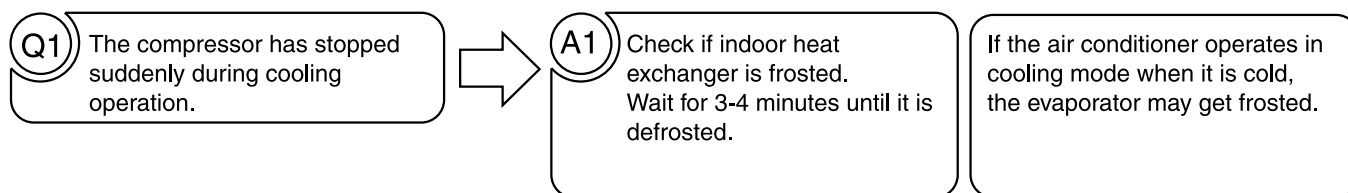
※If the main body of the reversing valve (4-way valve) is functioning normally, it clicks twice synchronously with the voltage measurement timing.

If the sound is heard, the reversing valve (4-way valve) is functioning normally.

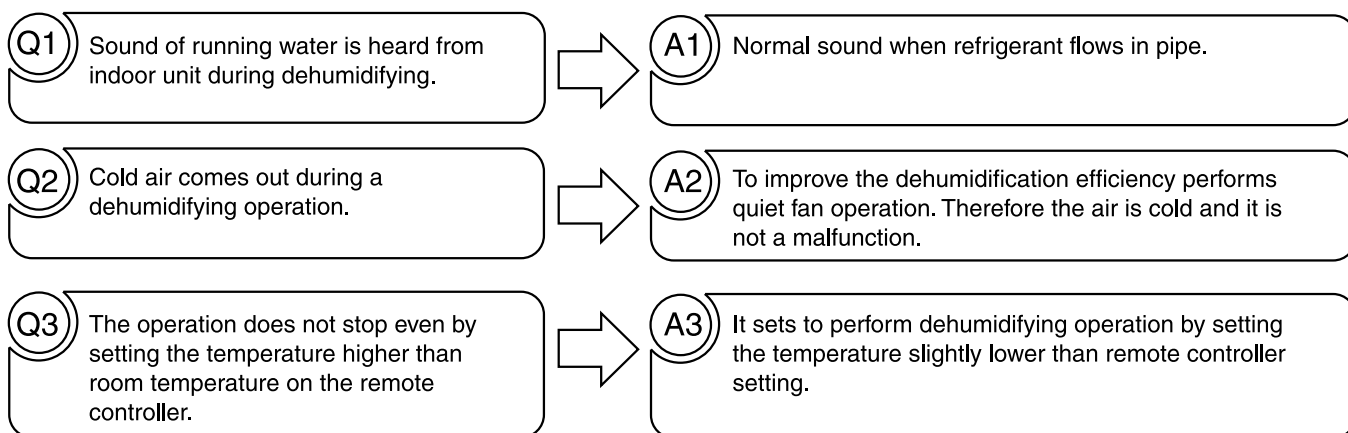
※If the checking of the application of current becomes abnormal, it is a failure of an electrical part.

SERVICE CALL Q & A

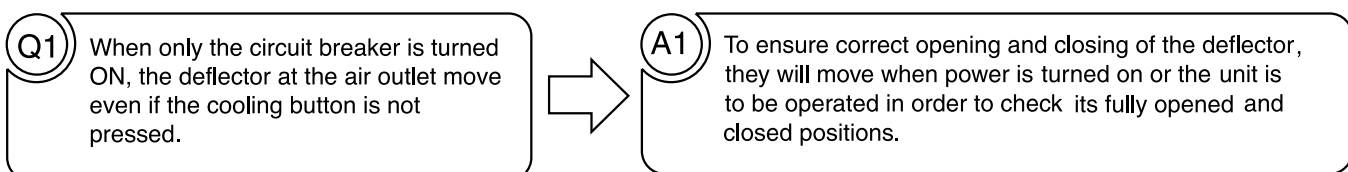
COOLING MODE



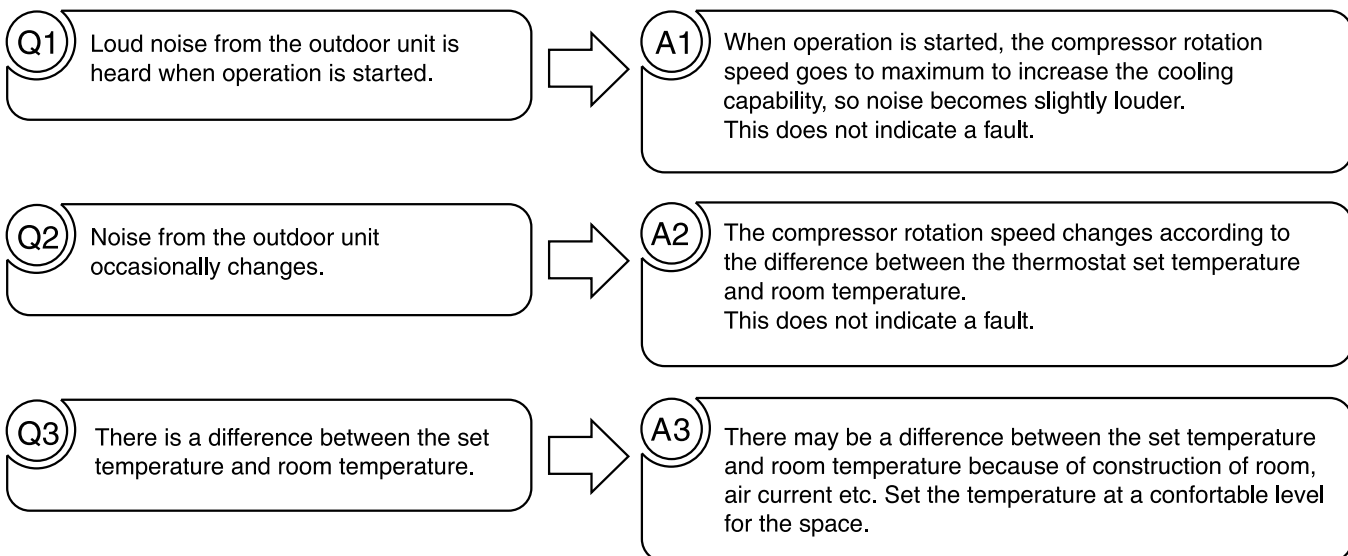
DEHUMIDIFYING MODE



AT STARTING OPERATION



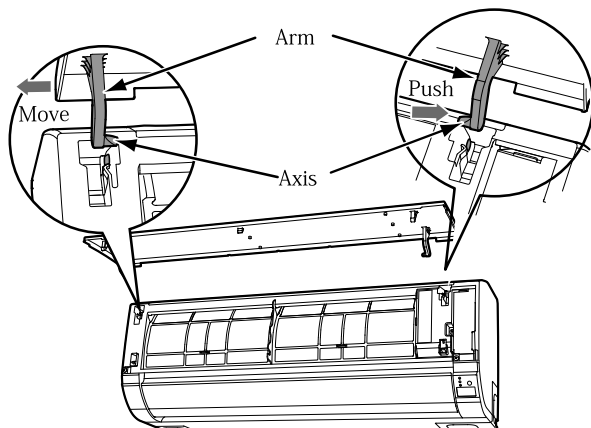
OTHERS



Disassembly and assembly procedure.

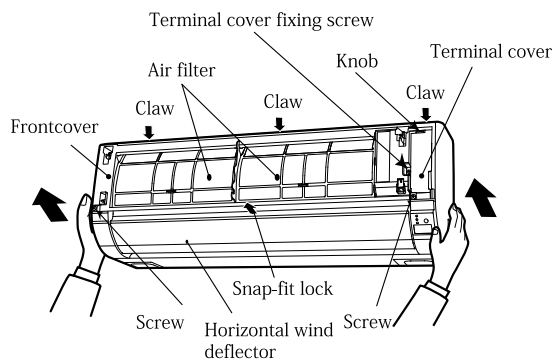
1. Front panel

- 1) Be sure to hold the lower left and right sides of the front panel with both hands and pull it towards you to open it until it is completely open.
- 2) Push the axis of the right arm outward to release the axis.
- 3) Move the front panel to the left to release the axis of the left arm.

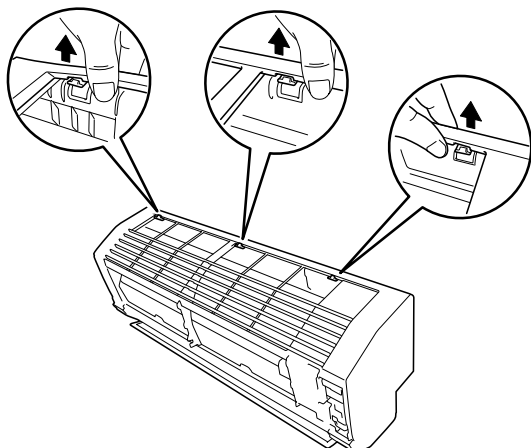


2. Frontcover

- 1) Remove the terminal cover fixing screw and hold the knob to remove the terminal cover.
- 2) Remove the 2 frontcover fixing screws.
- 3) Open the horizontal wind deflector a little, and open the frontcover to a position where it can be removed.
- 4) Release the snap-fit lock (inside the frontcover) by pulling the center portion of the frontcover.

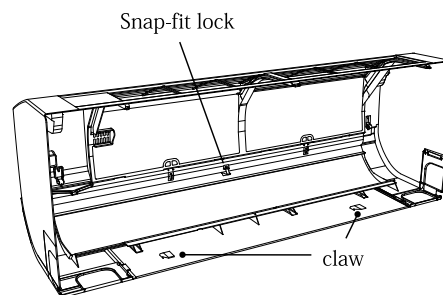


- 5) Release the claws on the top (3 places) and pull the lower side of the frontcover towards you to remove it.



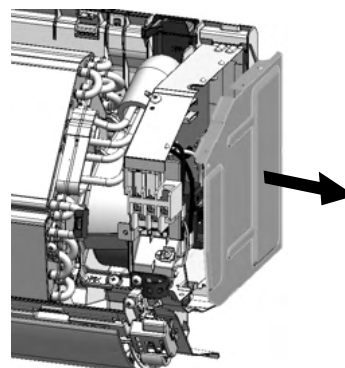
Caution at the time of assembly

- 1) Open the horizontal wind deflector a little, and fit the claws (2 places) inside the frontcover securely.
- 2) Insert the snap-fit lock (inside the frontcover) securely by pushing the frontcover center side of where the snap-fit lock is located.
- 3) Firmly fit the claws (3 places) on the top portion of the frontcover.

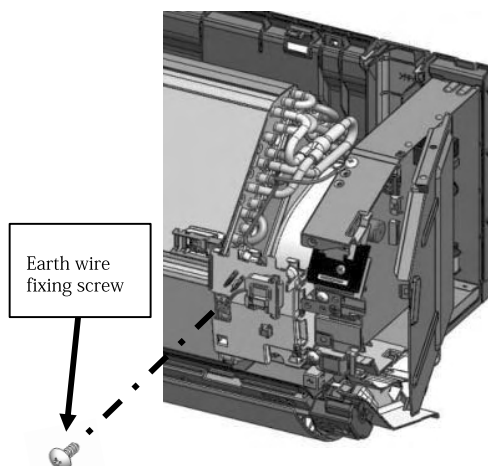


3. Indoor Electrical

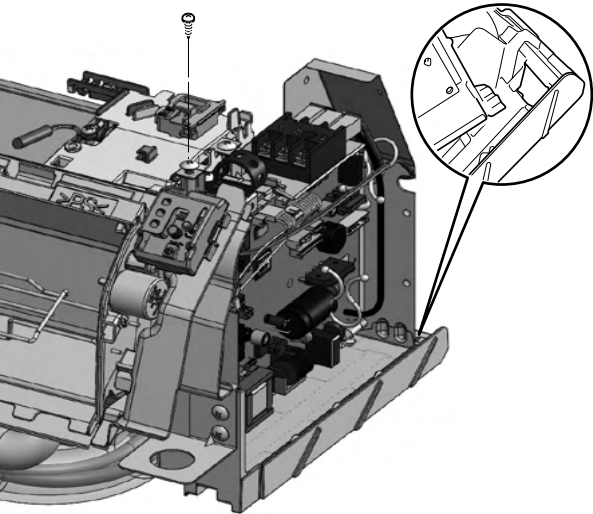
- 1) Open the electrical side elec-cover to the right and remove it.



- 2) Remove the heat exchanger earth wire fixing screw.
- 3) Remove the P lock and each lead wire connector.

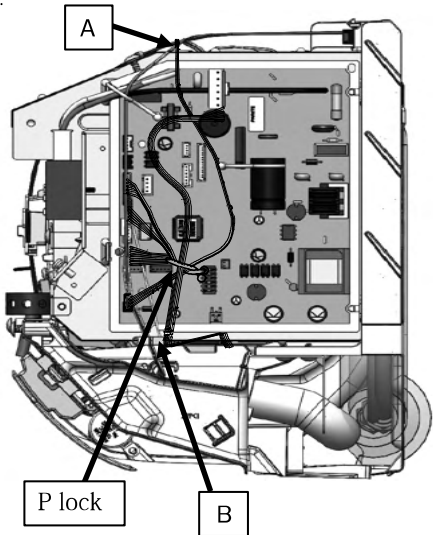


- 4) Remove a screw on the front left of the electrical.
- 5) Lift the lower part of the electrical product and remove the hooks at the top of the cabinet.



Caution at the time of assembly.

- 1) Fix the electrical parts and bundle each lead wire with P lock.

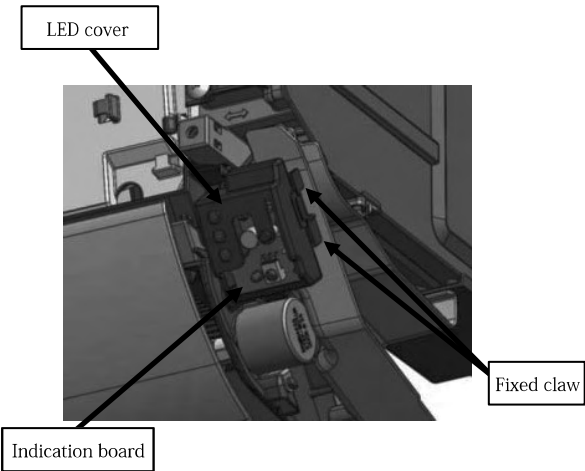


- 2) Path of lead wires as shown in the table below.
* The motor for CN9 left / right air direction deflector is not compatible with this series.

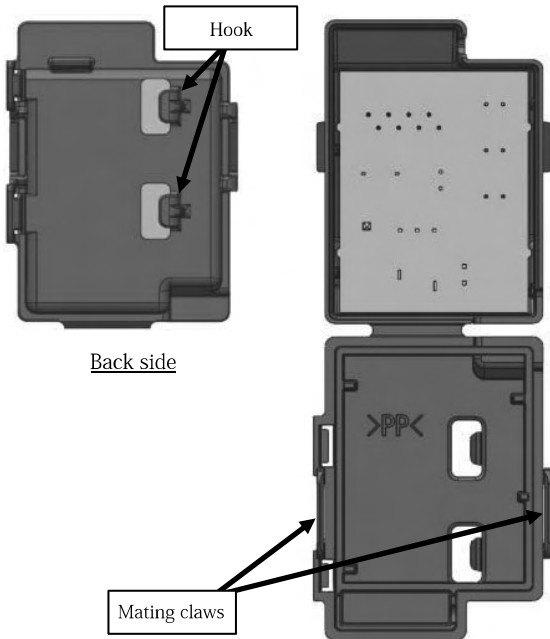
Lead wire through hole "A"	
CN4	Room heat exchange thermistor
Lead wire through hole "B"	
CN2	Indoor fan motor
CN9	Motor for left and right wind direction
CN12	Motor for up and down wind direction
CN16A	Indication board
CN17	Humidity sensor

4. Light receiving and indication board assembly

- 1) Remove the fixed claws (2 places) on the light receiving / indication board and remove it, slide the LED cover to the left and release the hooks (2 places) on the back side to remove it.

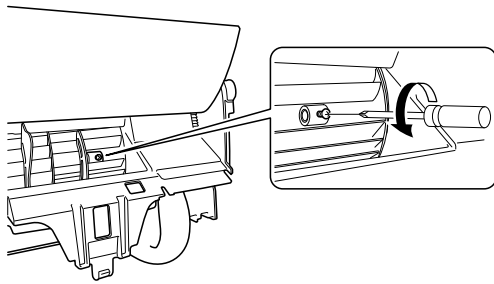


- 2) Remove the LED cover mating claw, open the LED cover, and remove the board.

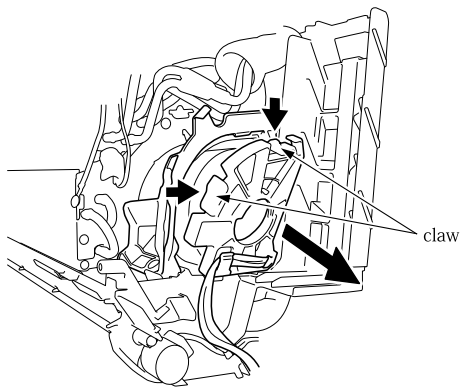


5. Fan motor and tangential fan

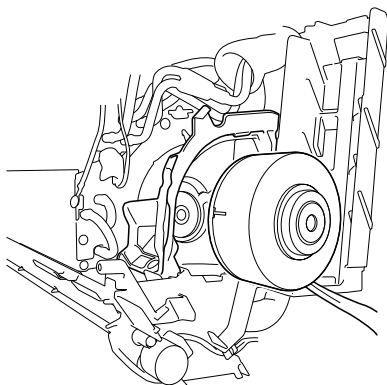
- 1) Loosen the fan motor fixing screw.



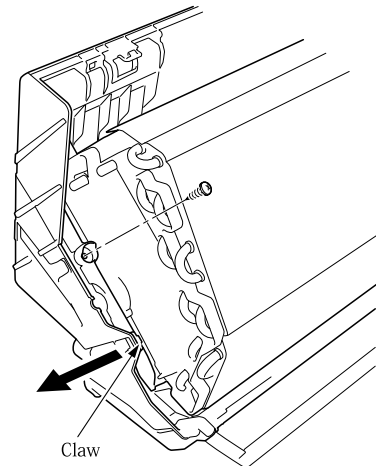
- 2) Press the fixing claws (2 places) on the right side of the fan motor holder and open it to the right to remove it.



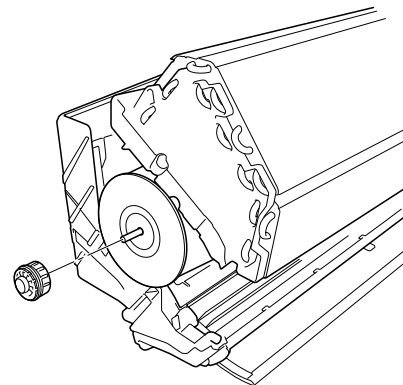
- 3) Pull out the fan motor to the right.



- 4) Remove the fixing screw on the left side of the evaporator.
- 5) Open the fixed claw on the lower side of the evaporator slightly to the left, remove it from the fixed claw and shift up the evaporator.

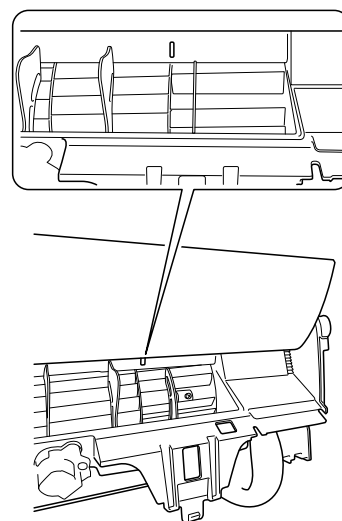


- 6) While shifting up the evaporator, pull out the bearing and tangential fan to the left to remove.



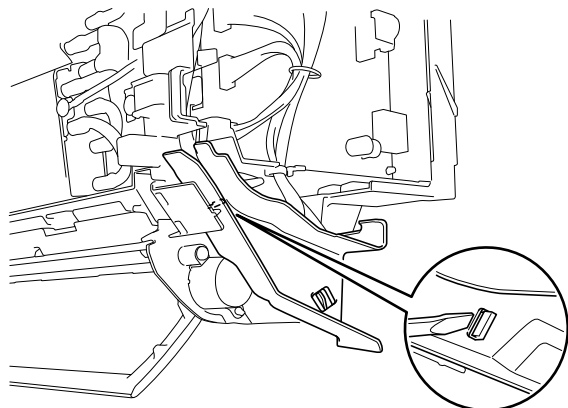
Cautions when assembling fan motor and tangential fan

- 1) For tangential fan installation, mark the top of the dew plate and tighten the screws according to the first plate of the flow fan.

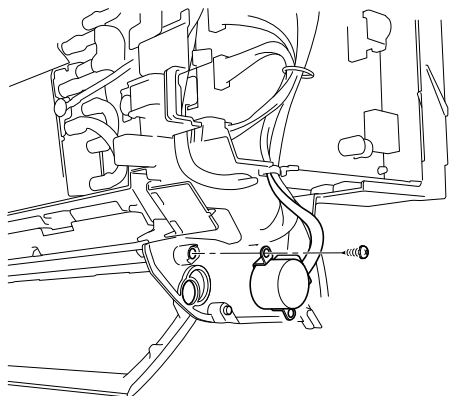


6. Motor for flap (up and down wind direction deflector)

- 1) Press the fixing claw on the upper side of the cable guide with a screwdriver then open it to the right, and push the cable guide backward to remove it.



- 2) Remove the motor fixing screw and remove it from the hook.



Procedure for Disassembly and Reassembly

OUTDOOR UNIT

MODEL RAC-EH09WHLAB, RAC-EH12WHLAB
RAC-EH09WHLAE, RAC-EH12WHLAE

1. Electrical Part.

- (1) Remove the upper cover fixing screws and lift the cover to remove it.
- (2) Remove the service valve cover.
- (3) Remove the terminal plate cover.
- (4) Remove the right side cover.

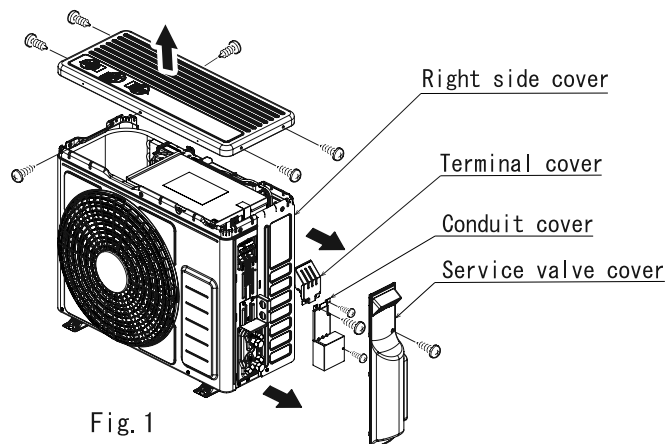


Fig. 1

- (5) Remove the electrical box fixing screws, Terminal block screw, and GRN wire.

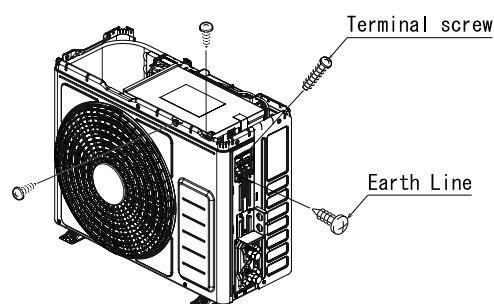


Fig. 2

2. Dismantle procedure of MAIN PWB.

- (1) Set the electrical box upside down.

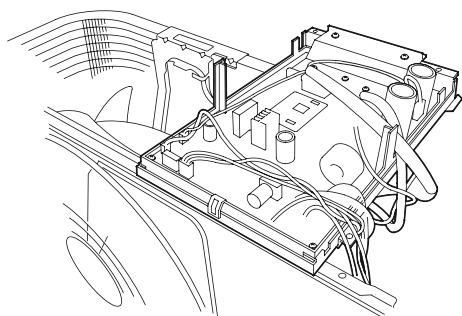


Fig. 3

- (2) Remove each connector and earth cable from the lead wire. Then, remove the electrical box.

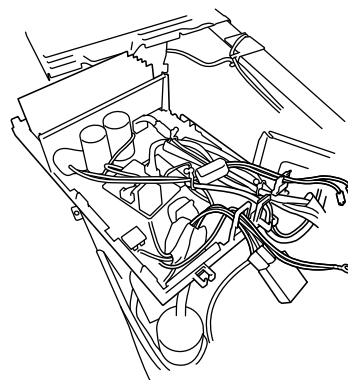


Fig. 4

3. The PWB.

- (1) Remove the electrical cover.

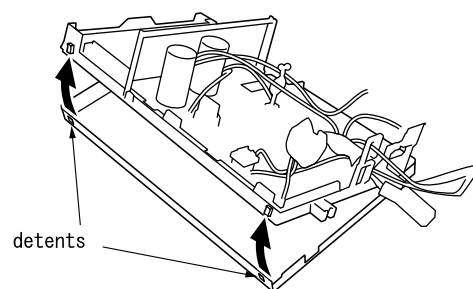


Fig. 5

- (2) Remove the PWB from the support.

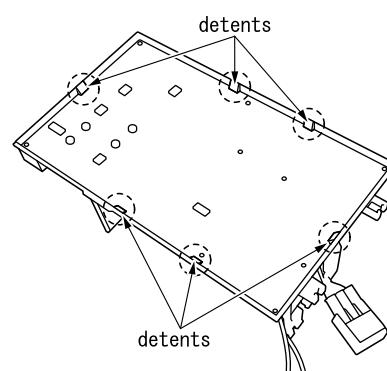


Fig. 6

- (3) Remove each connector and earth cable from the lead wire. Then, remove the electrical box.

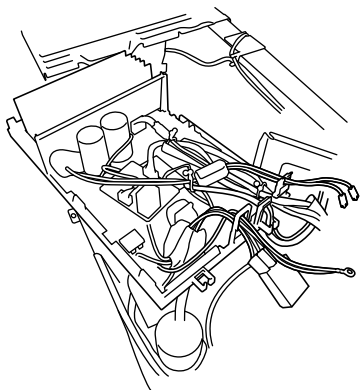


Fig. 13

3. The PWB.

- (1) Remove the electrical cover.

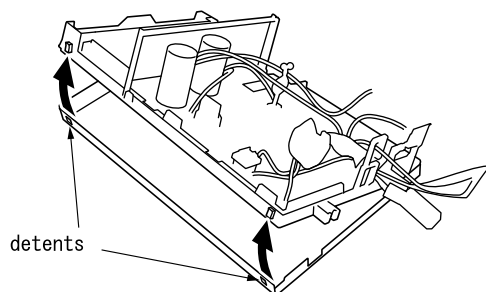


Fig. 14

- (2) Remove the PWB from the support.

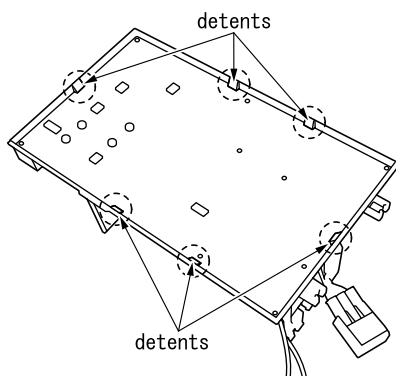


Fig. 15

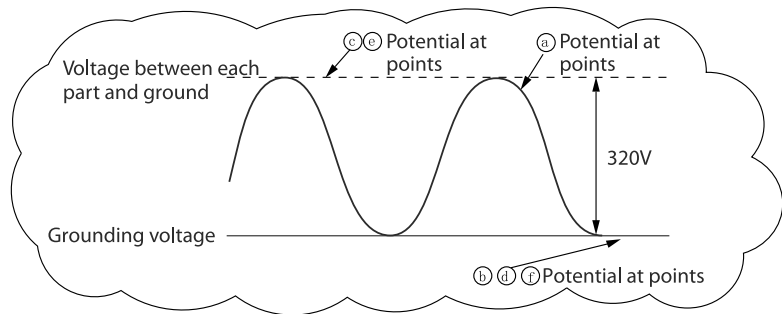
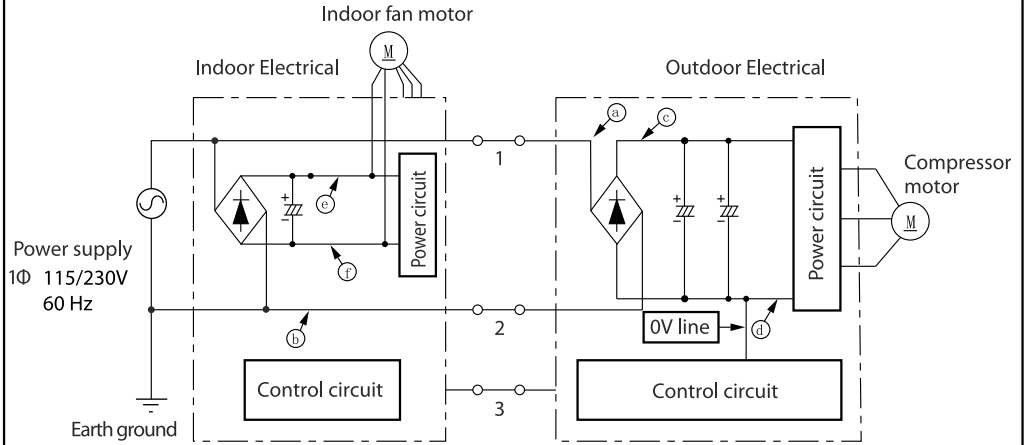
TROUBLE SHOOTING

Inspection instructions



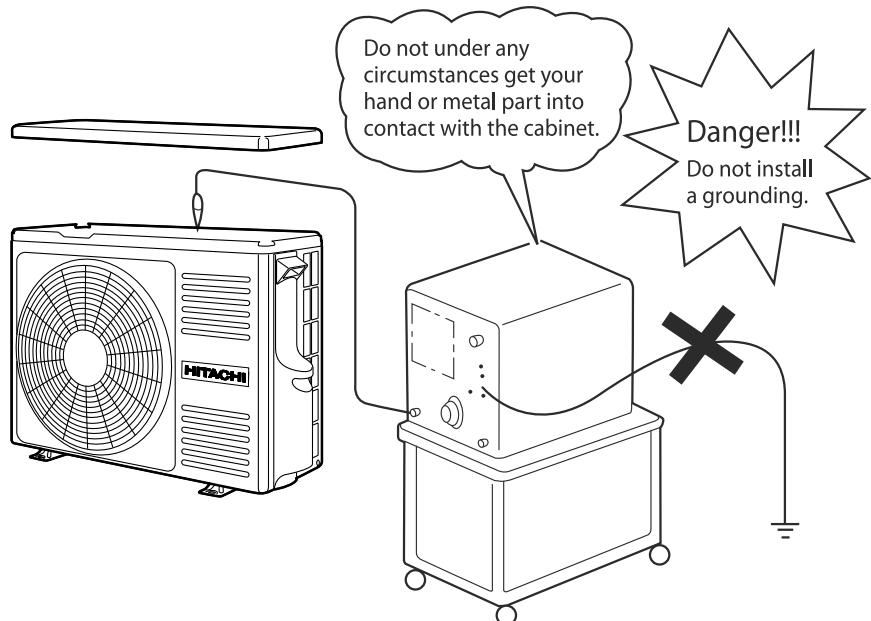
Warning

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



Warning

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



No	Function	Description
1	Self-diagnosis display [Display on the indoor unit side]	- The failure mode detected on the indoor unit side is displayed by blinking the "timer lamp". And a failure detected on the outdoor unit side will be indicated by the "timer lamp" blinking 4 times. - If the outdoor unit side detects a failure, the product will first conduct several operation retrials. There are some failure modes with no lamp display while retrials are continued. [Failure mode where retrials are continued and the indoor unit lamp does not end up giving a display] - OH thermistor heat-up - Overload lower limit cut - Low-frequency things
	[Display on the outdoor unit side]	The failure mode detected on the outdoor unit side is displayed by blinking the "LD301". Detecting a failure will stop the outdoor unit and keep blinking the LD301 until it is restarted. (The communication error will persist until the communication is reestablished.)
2	Self-diagnosis memory	- The failure modes detected on the indoor and outdoor unit sides are stored in the nonvolatile memory of the indoor unit and can be read later on. (The memory will remain even after power-off.) - The failure modes detected on the outdoor unit side are written in memory every time any such mode occurs. The failure mode can therefore be detected on the indoor unit side without waiting for the retry frequency to reach the display of the indoor unit lamp. Moreover, the normal self-diagnosis display function which rarely occurs will store and display failure modes that do not end up displaying the indoor unit lamp. (Any such mode may be unable to be stored if indoor or outdoor communications is in a failure.) - The product stores 5 last-stored failure modes. - There is a function for deleting memory. Once you clear the memory and run the product for several days, you can read the failure modes and check them, thereby detecting the less frequent failure phenomena. - Failure modes can be checked by both the blinking of the lamp of the indoor unit and the display of the remote control liquid crystal display.

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

DISCHARGE, PROCEDURE AND POWER SHUT OFF METHOD FOR POWER CIRCUIT



WARNING



Caution

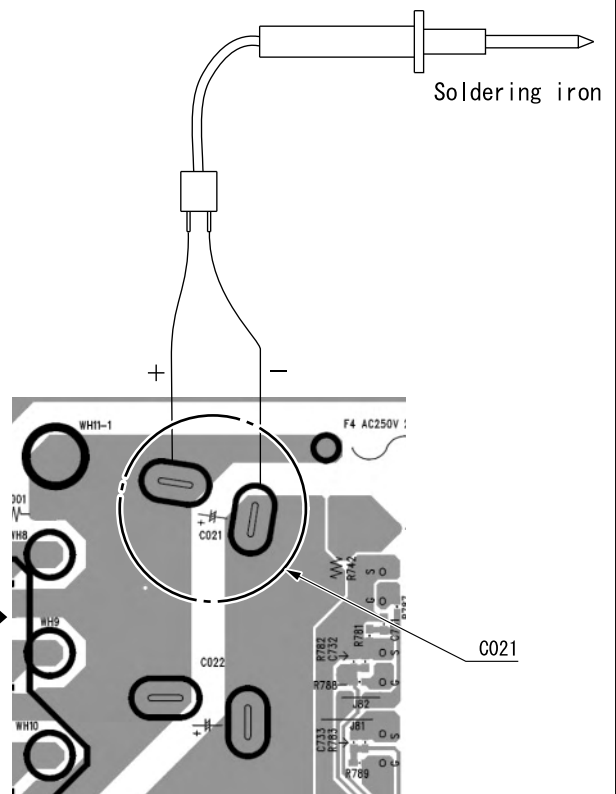
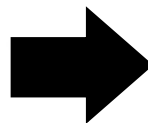
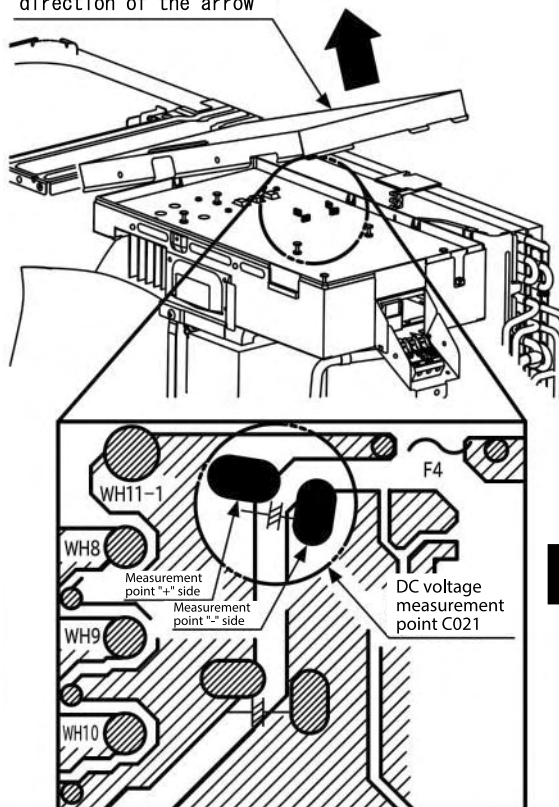
- Voltage of about 325V is charged between the terminal of smoothing capacitor.
- During continuity check for each circuit part of the outdoor unit, be sure to discharge the smoothing capacitors.

Discharge Procedure

1. Turn of the power.
2. After power 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 (+) Positive (-) Negative terminals on the Main PWB as shown in the figure below, in order to discharge voltage in smoothing capacitor.

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

Open the cover of the electrical part in the direction of the arrow



As shown in the figure above, apply the soldering iron to the "+" and "-" terminals of C021 to discharge the charging voltage of the smoothing capacitor.

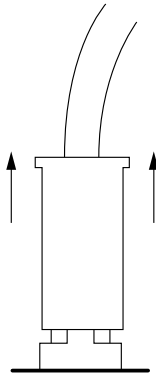
Other instructions

(1) Detaching and reattaching the receptacles for tab terminal

All the receptacles for connecting tab terminals are with a locking mechanism. Forcibly pulling any such receptacle without unlocking it will destroy it. Be on guard.

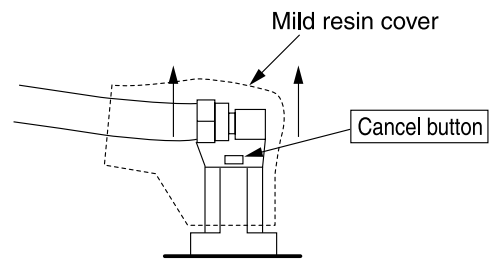
When reconnecting it, insert it securely all the way home.

· Receptacle types and how to unlock them



Vertical (with a resin case)

Hold the resin case and pull it out.



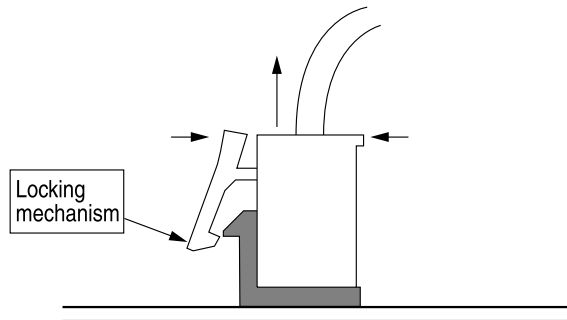
Horizontal (with a mild resin cover)

Hold the cancel button down on the mild resin cover while pulling it out.

(2) Detaching and reattaching the board connector

The product comes equipped with many board connectors provided with lock mechanism. Forcibly pulling any such part without unlocking it will destroy it. Be on guard. When reconnecting it, insert it securely all the way home.

Pinch the locking mechanism with your fingers and pull it out unlocked.



(3) Do not detach or reattach the connectors while energized

Do not under any circumstances detach or reattach the connectors while energized. That would destroy the board components and fan motor. For both the indoor and outdoor boards, ensure that the smoothing capacitor has discharged its electricity fully before you do your work.

SELF-DIAGNOSIS DISPLAY MODE (INDOOR SIDE)

While the "timer lamp" (orange), of the indoor unit is blinking, troubleshoot the product while referring to the table below.

1. How to count the lamp blinking frequency

- The product will repeat blinking with 2-second intermissions.
- The blinking speed is as follows: on for 0.35 seconds and off for 0.35 seconds.

[An example of 5-time blinking]



- If you wish to try another operation while the lamp is blinking, operate the START/STOP button on the remote control unit twice. The first push will reset the indoor microcomputer, while the second will activate the product

Refer to the table below if the timer indicator (orange) is blinking.

LAMP BLINKING MODE	MAIN DEFECTIVE
ONCE	REFRIGERANT CYCLE DEFECTIVE
2 TIMES	FORCED OPERATION OF OUTDOOR UNIT
3 TIMES	INDOOR INTERFACE CIRCUIT
4 TIMES	OUTDOOR ELECTRICAL ASSEMBLY DEFECT
9 TIMES	ROOM OR HEAT EXCHANGER THERMISTOR OR HUMIDITY SENSOR DEFECT
10 TIMES	OVERCURRENT IN DC FAN MOTOR
12 TIMES	OUTDOOR INTERFACE CIRCUIT
13 TIMES	IC531 OR EEPROM DATA DEFECT
(- LIGHT FOR 0.35 SEC AT INTERVAL OF 0.35 SEC)	

- * IF THE INTERFACE CIRCUIT IS DEFECTIVE WHEN THE POWER IS TURNED ON. THE SELF-DIAGNOSIS INDICATION WILL NOT WORK.
- * IF THE INDOOR UNIT CAN NOT BE OPERATED AT ALL.

REFER TO THE BELOW TABLE IF THE INDOOR UNIT DOES NOT WORK AT ALL.

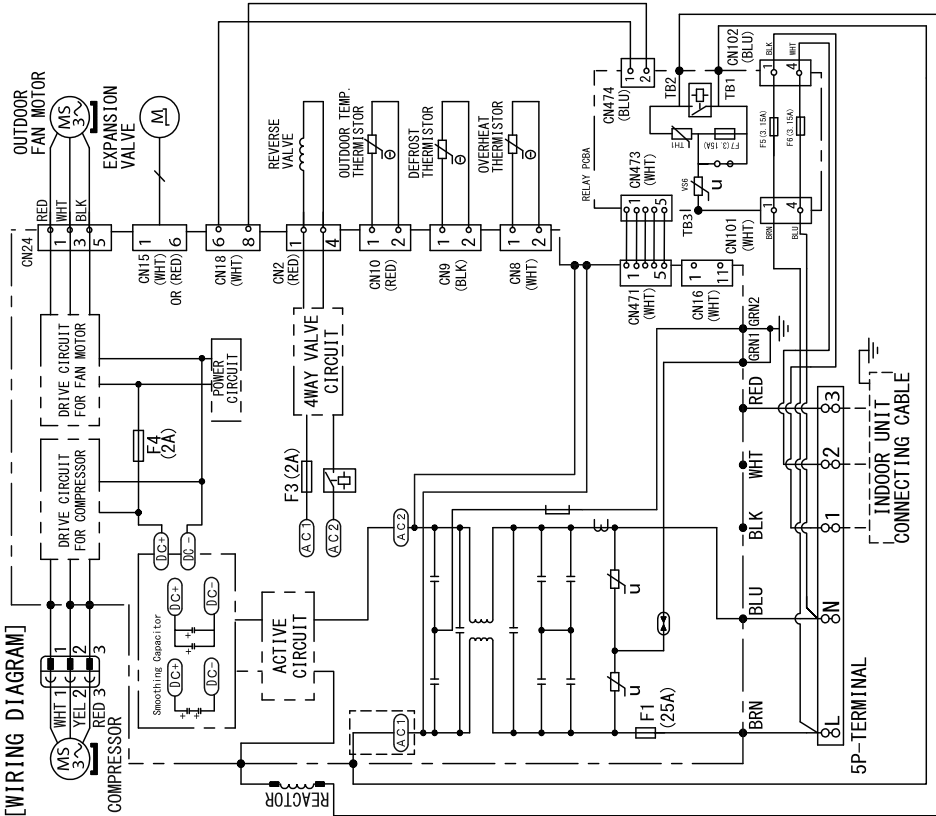
FIX CN2 CONNECTOR	ACTION /REPLACEMENT PARTS, etc
FU1 (3.15A) FUSE BLOWN	REPLACE THE PART WHICH CAUSED BLOWING/DISCONNECTION OF FU1(3.15A) FUSE
COME OFF OR DISCONNECTION OF THE CONNECTOR FOR INDICATING P.W.B	FIX CN16 CONNECTOR
FAILURE OF CONTROL P.W.B	REFER TO THE SERVICE GUIDE FOR HOW TO DETERMINE THE FAILED PART

⚠ DANGER (ABOUT DC350V)

CUT THE POWER SOURCE AND WAIT MORE THAN 10 MINUTES BEFORE SERVICING WORK.
MEASURE DC VOLTAGE (※1) AND CONFIRMED THAT IT IS MUST BE LESS THAN 10V.

LED (※1) INDICATION DURING COMPRESSOR OPERATE	OPERATION STATUS
LD301	NORMAL
LIT	OVERLOAD
BLINK REPEATINGLY WITH 2 SECONDS LIT - 0.3 SECONDS OFF (NORMAL)	(NORMAL)

[WIRING DIAGRAM]



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

LED INDICATION DURING STOP	
LD301	SELF-DIAGNOSE CONTENT
OFF	NO POWER SUPPLY AT TERMINAL "L - N" → CHECK POWER CABLE CONNECTING CABLE MISCONNECTION → CHECK CONNECTING CABLE REACTOR CONNECTOR HALF INSERTION → CHECK REACTOR CONNECTOR F4 (2A FUSE) BLOWN → REPLACE FUSE AND CHECK OUTDOOR FAN MOTOR
1 TIME BLINK	NORMAL STOP
2 TIMES BLINK	FAN OPERATION※1 WAITING COMPRESSOR TO START → NORMAL OTHER → IF STILL NOT SOLVE AFTER CHECK THE CONNECTION CABLE, CHANGE ODU CONTROLLER
3 TIMES BLINK	SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE
4 TIMES BLINK	COMPRESSOR CONNECTOR NOT CONNECTED → CHECK CONNECTOR
5 TIMES BLINK	OUTDOOR UNIT SURROUNDING IS BLOCKED → REMOVE THE CAUSE OF BLOCKING.
6 TIMES BLINK	THE CYCLE PIPE ABNORMAL → CHECK THE CYCLE PIPE
7 TIMES BLINK	(ODU (※2) CONTROLLER IS ABNORMAL OR COMPRESSOR IS ABNORMAL) REFER TO THE SERVICE MANUAL [SELF-CHECK]
8 TIMES BLINK	SERVICE VALVE NOT OPEN, REFRIGERANT LEAK → CHECK SERVICE VALVE, RE-CHARGE THE REFRIGERANT
9 TIMES BLINK	BAD CONNECTOR INSERTION, CIRCUIT DEFECT → CHECK THE CONNECTOR, CHANGE ODU CONTROLLER
10 TIMES BLINK	THERMISTOR CONNECTOR HALF INSERT → INSERT CONNECTOR SECURELY
11 TIMES BLINK	THERMISTOR WIRE SHORTED OR CUT, CIRCUIT DEFECT → CHANGE THERMISTOR, CHANGE ODU CONTROLLER
12 TIMES BLINK	CABLE MISS CONNECTION, DISCONNECT → CHECK THE F CABLE COMMUNICATION CIRCUIT ABNORMAL → CHANGE ODU CONTROLLER
13 TIMES BLINK	AC VOLTAGE ABNORMAL (BEYOND RATED VOLTAGE ±10% → SUPPLY CORRECT VOLTAGE
14 TIMES BLINK	AC VOLTAGE NORMAL (WITHIN RATED VOLTAGE ±10% → CHANGE ODU CONTROLLER
15 TIMES BLINK	TEMPORARY STOP DUE TO STRONG WIND → FAN WILL RE-START AFTER WIND BECOME WEAK
16 TIMES BLINK	TEMPORARY STOP DUE TO STRONG WIND → FAN WILL RE-START MOVING LATER
17 TIMES BLINK	SOMETHING BLOCKED SURROUND OUTDOOR UNIT → REMOVE THE OBSTRUCTION
18 TIMES BLINK	CONDUCT OUTDOOR FAN MOTOR CHECK → REPLACE THE DEFECT PART
19 TIMES BLINK	CHANGE ODU CONTROLLER
20 TIMES BLINK	CONFIRM AC POWER SUPPLY & DC VOLTAGE IS NORMAL → CHANGE ODU CONTROLLER
21 TIMES BLINK	COMPRESSOR LOAD ABNORMAL → INSPECT THE COMPRESSOR
22 TIMES BLINK	CHANGE ODU CONTROLLER (SOME MODELS HAVE NOT 15 TIMES BLINK)
23 TIMES BLINK	SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE
24 TIMES BLINK	SOMETHING BLOCKED SURROUND OUTDOOR UNIT → REMOVE THE CAUSE OF BLOCKING
25 TIMES BLINK	DUST ON INDOOR UNIT FILTER → CLEAN UP THE FILTER

[OUTDOOR FAN MOTOR CHECK] DIAGNOSIS METHOD	OTHERS CHECKING POINT
1. SWITCH OFF MAIN POWER SUPPLY. 2. UN-INSERT OUTDOOR FAN MOTOR CONNECTOR CN24. 3. MAKE SURE NO ABNORMALITIES AT THE FAN SHAFT. 4. MEASURE RESISTANCE AT FAN MOTOR CONNECTOR CONTACT. NORMAL RESISTANCE BETWEEN EACH TERMINAL REFER TO THE SERVICE MANUAL. 5. IF NO ABNORMAL AND FAN MOTOR NORMAL, CHANGE ODU CONTROLLER.	1. [REVERSING VALVE NOT OPERATE ERROR] → UN-INSERT THE CONNECTOR AND CHECK CHECK THE LEAD WIRE. → IF OK CHECK F3(2A) FUSE. IF BROKEN, REPLACE THE FUSE OR ODU CONTROLLER. 2. [COMMUNICATION ERROR] OR OUTDOOR UNIT NO OPERATION → CHECK CONNECTING CABLE BETWEEN INDOOR UNIT AND OUTDOOR UNIT.

※1 DC VOLTAGE VALIDATION , LED VALIDATION AND FAN OPERATION REFER TO THE SERVICE MANUAL.

※2 ODU = OUTDOOR UNIT.

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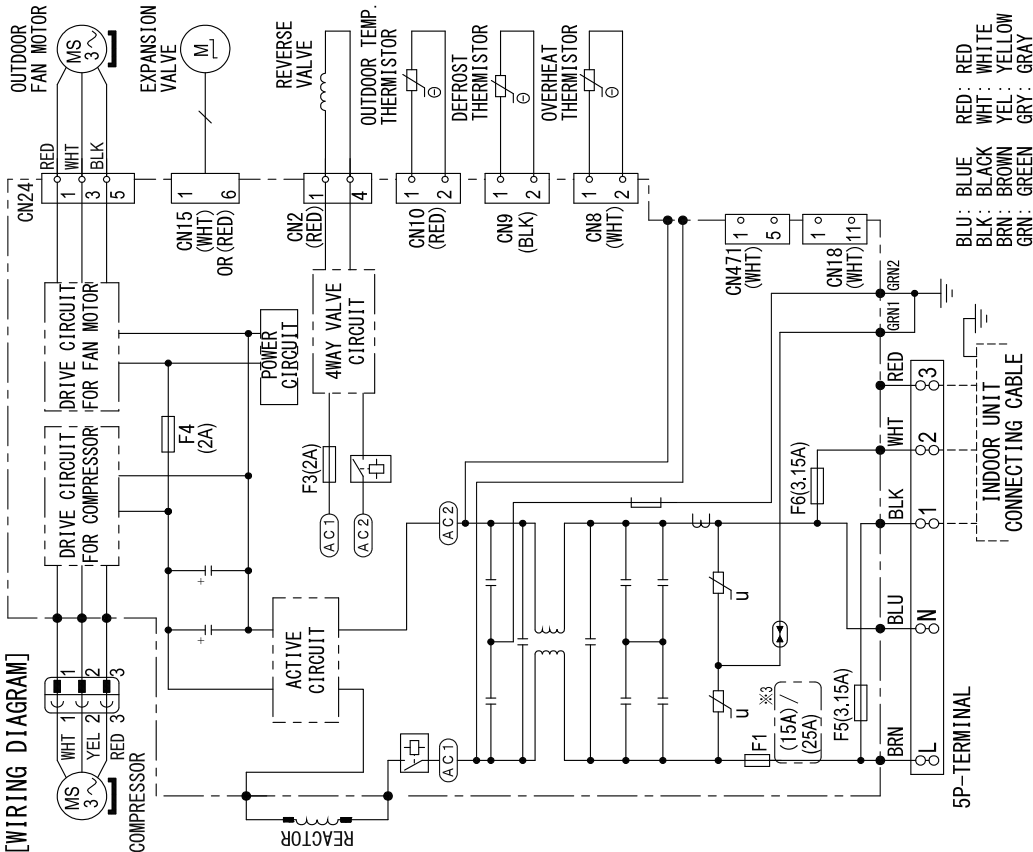
MODEL RAC-EH09WHLAE, RAC-EH12WHLAE

⚠ DANGER (ABOUT DC350V)

CUT THE POWER SOURCE AND WAIT MORE THAN 10 MINUTES BEFORE SERVICING WORK.
MEASURE DC VOLTAGE (※1) AND CONFIRMED THAT IT IS MUST BE LESS THAN 10V.

※1 DC VOLTAGE VALIDATION, LED POSITION AND FAN OPERATION REFER TO THE SERVICE MANUAL.

[WIRING DIAGRAM]



LED (※1) INDICATION DURING COMPRESSOR OPERATION	OPERATION STATUS
LD301	NORMAL
LIT	OVERLOAD (NORMAL)
BLINK REPEATINGLY WITH 2 SECONDS LIT - 0.3 SECONDS OFF (NORMAL)	

SELF-DIAGNOSE CONTENT	LED INDICATION DURING STOP	CHECKING POINT AND REPAIR METHOD
LD301		
NO POWER SUPPLY		NO POWER SUPPLY AT TERMINAL "L - N" → CHECK POWER CABLE CONNECTING CABLE MISCONNECTION → CHECK CONNECTING CABLE REACTOR CONNECTOR HALF INSERTION → CHECK REACTOR CONNECTOR F4 (2A FUSE) BLOWN → REPLACE FUSE AND CHECK OUTDOOR FAN MOTOR NOT MALFUNCTION
1 TIME BLINK		FAN OPERATION※1. WAITING COMPRESSOR TO START → NORMAL OTHER → IF STILL NOT SOLVE AFTER CHECK THE CONNECTION CABLE, CHANGE ODU CONTROLLER
2 TIMES BLINK		SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE
3 TIMES BLINK		COMPRESSOR CONNECTOR NOT CONNECTED → CHECK CONNECTOR OUTDOOR UNIT SURROUNDING IS BLOCKED → REMOVE THE CAUSE OF BLOCKING.
4 TIMES BLINK		THE CYCLE PIPE ABNORMAL → CHECK THE CYCLE PIPE (ODU(※4) CONTROLLER IS ABNORMAL OR COMPRESSOR IS ABNORMAL) REFER TO THE SERVICE MANUAL [SELF-CHECK]
5 TIMES BLINK		OVERLOAD LOWER LIMIT CUT
6 TIMES BLINK		COMPRESSOR TEMPERATURE RISE
7 TIMES BLINK		SERVICE VALVE NOT OPEN, REFRIGERANT LEAK → CHECK SERVICE VALVE, RE-CHARGE THE REFRIGERANT
8 TIMES BLINK		BAD CONNECTOR INSERTION, CIRCUIT DEFECT → CHECK THE CONNECTOR, CHANGE ODU CONTROLLER
9 TIMES BLINK		THERMISTOR CONNECTOR HALF INSERT → INSERT CONNECTOR SECURELY THERMISTOR WIRE SHORTED OR CUT, CIRCUIT DEFECT → CHANGE THERMISTOR, CHANGE ODU CONTROLLER
10 TIMES BLINK		CABLE MISS CONNECTION, DISCONNECT → CHECK THE F CABLE COMMUNICATION CIRCUIT ABNORMAL → CHANGE ODU CONTROLLER
11 TIMES BLINK		AC VOLTAGE ABNORMAL (BEYOND RATED VOLTAGE ±10% → SUPPLY CORRECT VOLTAGE AC VOLTAGE NORMAL (WITHIN RATED VOLTAGE ±10% → CHANGE ODU CONTROLLER
12 TIMES BLINK		TEMPORARY STOP DUE TO STRONG WIND → FAN WILL RE-START AFTER WIND BECOME WEAK
13 TIMES BLINK		TEMPORARY STOP DUE TO STRONG WIND → FAN WILL RE-START MOVING LATER SOMETHING BLOCKED SURROUND OUTDOOR UNIT → REMOVE THE OBSTRUCTION CONDUCT OUTDOOR FAN MOTOR CHECK → REPLACE THE DEFECT PART
14 TIMES BLINK		CHANGE ODU CONTROLLER
15 TIMES BLINK		CONFIRM AC POWER SUPPLY & DC VOLTAGE IS NORMAL → CHANGE ODU CONTROLLER COMPRESSOR LOAD ABNORMAL → INSPECT THE COMPRESSOR
16 TIMES BLINK		CHANGE ODU CONTROLLER (SOME MODELS HAVE NOT 15 TIMES BLINK)
17 TIMES BLINK		SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE SOMETHING BLOCKED SURROUND OUTDOOR UNIT → REMOVE THE CAUSE OF BLOCKING DUST ON INDOOR UNIT FILTER → CLEAN UP THE FILTER

[OUTDOOR FAN MOTOR CHECK] DIAGNOSIS METHOD	OTHERS CHECKING POINT
1. SWITCH OFF MAIN POWER SUPPLY. 2. UN-INSERT OUTDOOR FAN MOTOR CONNECTOR CN24. 3. MAKE SURE NO ABNORMALITIES AT THE FAN SHAFT. 4. MEASURE RESISTANCE AT FAN MOTOR CONNECTOR CONTACT. NORMAL RESISTANCE BETWEEN EACH TERMINAL REFER TO THE SERVICE MANUAL. 5. IF NO ABNORMAL AND FAN MOTOR NORMAL, CHANGE ODU CONTROLLER.	1. [REVERSING VALVE NOT OPERATE ERROR] → UN-INSERT THE CONNECTOR AND CHECK CHECK THE LEAD WIRE → IF OK CHECK F3 (2A) FUSE, IF BROKEN REPLACE THE FUSE OR ODU CONTROLLER. 2. [COMMUNICATION ERROR] OR OUTDOOR UNIT NO OPERATION → CHECK CONNECTING CABLE BETWEEN INDOOR UNIT AND OUTDOOR UNIT.

※3 F1 CURRENT VALUE BE DIFFERENT FOR DIFFERENT MODELS.
※4 ODU = OUTDOOR UNIT.

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CHECKING THE REFRIGERATING CYCLE

(JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

1. Troubleshooting procedure (No operation, No cooling)

Connect U,V,W phase leads to the power module again and operate the air conditioner.

Is the self-diagnosis lamp mode as shown on the right?

Lighting mode Self-diagnosis lamp	Blinks 2 times	Blinks 3 times	Blinks 4 times	Blinks 5 times	Blinks 6 times
LD301					
Time until the lamp lights	Approx. 10 seconds			Approx. 10 seconds	Within Approx. 30 minutes
Possible malfunctioning part	Compressor				Gas leakage



Blinking



off

YES

Stop to operate and check the gas pressure in balancing mode.

Normal

● Checking the IPM (main P.W.B.)

Error (Gas leaking)

Gas leaks.
Repair and seal refrigerant.

When the self-diagnosis lamp lights in the same condition as above.

The compressor is defective. Replace it and seal refrigerant.

(If the compressor checker for an inverter type air conditioner is available, re-check using it.)

Perform a final check of operation.

Self Diagnosis Memory Function

Failure mode are stored in the non-volatile memory of indoor unit and can be redisplay by operating the remote controller. This function is very useful in checking the failure modes when either unintentionally switching OFF power supply or restarting the unit operation without conforming the number of blinking of self diagnosis lamp. Remote controller can be redisplay up to last 5 failure modes from the memory. However, failure modes which are rarely occur are also stored in the memory which caused the number of failure easily become more than 5. Thus, for some failure modes which are unable to retrieve because of the remote controller limit to redisplay only 5 failure modes, it can be found by clearing up the memory first then recheck the memory content again during the visit at the customer place.

<How to redisplay failure diagnosis>

1. Turn OFF the circuit breaker on the unit side. (wait for around 5 second)
2. Press the [ (MODE)] button and select [Cool mode ()]. The remote should be in 'Standby' mode.
3. Turn the circuit breaker ON.
4. Set the room temperature on the remote controller to 89.6°F (32°C) by pressing the [ (Temp Up)] button.
5. Set which failure information that need to be redisplay by using [ (Fan Speed)] button.
(Refer to the corresponding table below)

Fan Speed		Failure data stored
Auto		Latest
Hi		2nd latest
Med		3rd latest
Lo		4th latest
Silent		Oldest

6. While directing the remote controller towards the receiver of the indoor unit, press [ (Temp Up)] button and [ (On/Off)] button simultaneously.
(The remote controller perform signal transmission with the indoor unit)
7. The indoor unit beep [Pi-] to indicate that it has just received the signal to redisplay the failure mode.
8. Start counting the number of blinking of the Timer lamp (indicating indoor error) and Operation lamp (indicating outdoor error) and confirm it with indoor unit or outdoor unit self-diagnosis table.
9. After everything is completed, turn OFF the circuit breaker (must do without fail).

<How to clear the stored data>

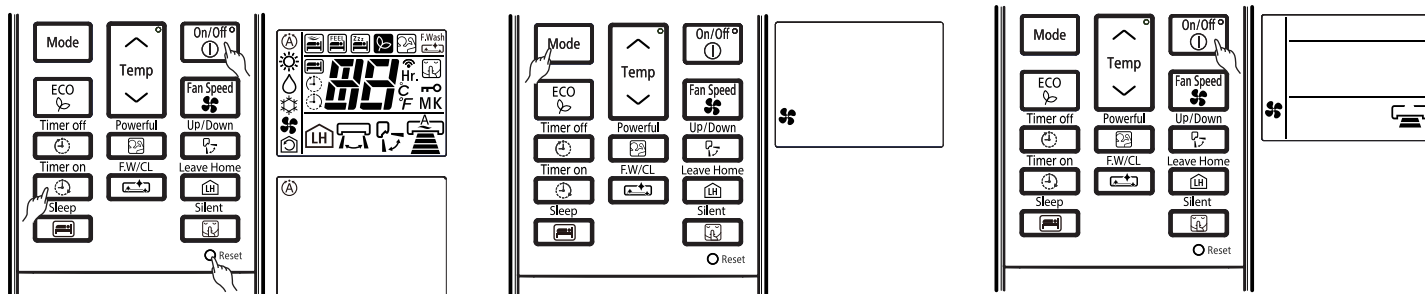
1. Conduct the redisplay of failure mode. (Follow above procedure)
2. Turn the circuit breaker OFF. (Wait for 5sec or more)
3. Press the [ (MODE)] button and select [Dry mode ()]. The remote should be in 'Standby' mode.
4. Turn the circuit breaker ON.
5. Set the room temperature on the remote controller to 60.8°F (16°C) by pressing the [ (Temp Down)] button.
6. While directing the remote controller towards the receiver of the indoor unit, press [ (Temp Down)] button and [ (On/Off)] button simultaneously.
(The remote controller perform signal transmission with the indoor unit.)
7. The indoor unit beep for a few second [Pi-] to indicate that it has just receive the signal. The data has been cleared.
8. After everything is completed, turn OFF the circuit breaker (must do without fail).

Notes:

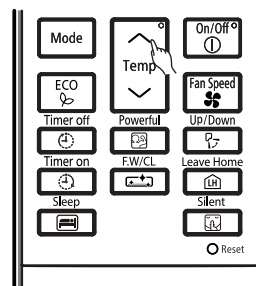
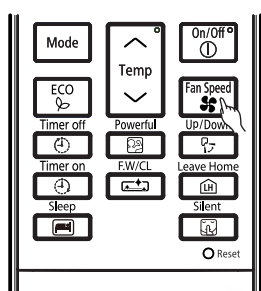
- * This function is valid only once right after the power supply is turned ON and it will not work if other remote controller operation was made prior to it.
Also, this function will not work if above steps were not followed accordingly. (If the above procedures are not working, please repeat from the start.)
- * If nothing was stored in the memory, the lamp does not blink even the redisplay operation is carried out.
- * To carry out normal operation, turn OFF the power supply. After redisplay operation, the remote controller reception will not work as normal.

HOW TO CHANGE THE SHIFT VALUE SETTING TEMPERATURE

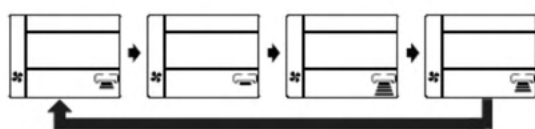
1. While pressing and holding  (ON/OFF) button and  button, press  [RESET] button on the same. Release  [RESET] button only and make sure that all marks on the remote controller display are indicated then release the  (ON/OFF) button and  button. Remote controller now enters "Shift Value Change Mode".
2. Press the  (MODE) selector button so that the display indicates  (FAN) mode.
3. Press the  (ON/OFF) button and FAN operation will be started.



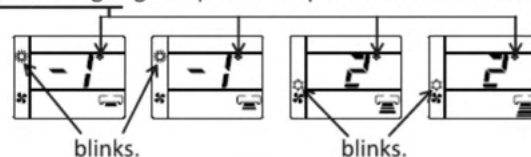
4. Set the FAN SPEED with the  (FAN SPEED) button according to the following FAN speed setting in order to choose the desired operation mode that is required for shift value setting temperature modification.
 - To change the shift value for COOLING mode operation, select either  (HIGH) or  (MED) FAN SPEED.
 - To change the shift value for HEATING mode operation, select either  (LOW) or  (SILENT) FANSPEED.
5. Press the (TEMP  or ) button to change the shift value. (The shift value changed with device producing beep sound.)



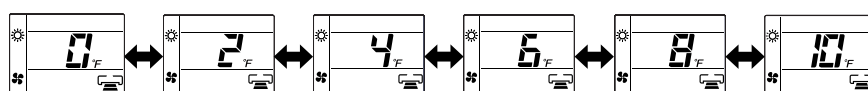
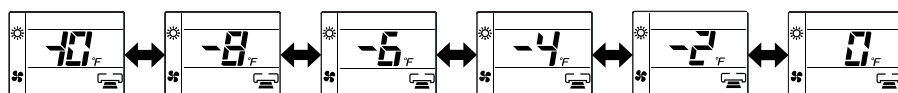
Transmission sign lights up with beep from device simultaneously.



Step 4



Step 5



NOTE :

1. The displayed shift value,  (HEAT) and  (COOL) symbol on the remote controller display will disappear after 10 seconds.
2. The changed shift value will remain unchanged after turned off the power.
3. If "0" is displayed on the remote controller display, it indicates the shift value is now at the initial setting.

SETTING THE PREVENTION OF MUTUAL INTERFERENCE FOR REMOTE CONTROLLER

a.) Other indoor circuit breakers should be disconnected.

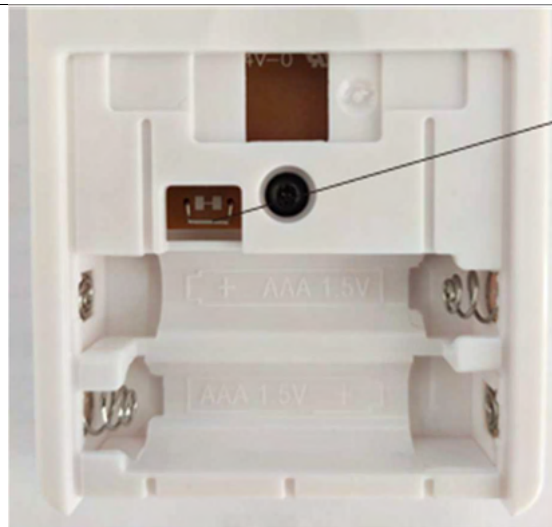


b.) Remove the back cover of the remote control.

c.) Cut the jumper as shown below.

d.) Press "Reset" button after installing the battery.

e.) Corresponding to the room electrical box dial code 6 to dial on.



Cut (Attention: Remove the battery before cutting. Do not cut with electricity).



f.) Please use the remote control to check the available models of corresponding indoor machines.

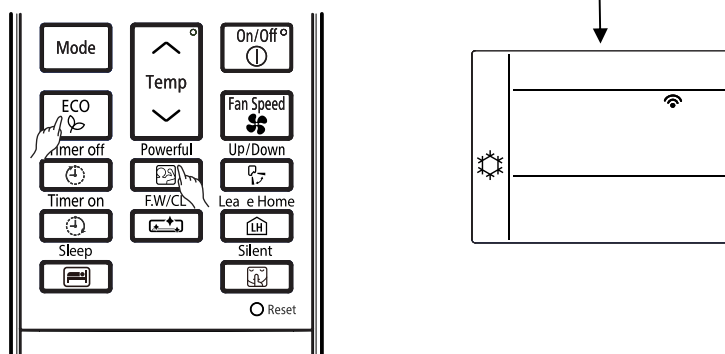
HOW TO CHANGE THE FAN SPEED IN COOLING MODE DURING THERMO OFF

The fan speed in Cooling Mode during thermo off can be changed by the remote controller.
(This procedure shall be implemented strictly by service personnel only.)
It is possible to return it to the default setting.

PROCEDURE

Press  [POWERFUL] button and  [ECO] button simultaneously for about 5 seconds when the remote controller is OFF.

Transmission sign lights up with beep from indoor unit simultaneously.



Beep sound pattern :
1) Default setting : Short beep
2) Changed setting : Double beep

	Fan speed during thermo off
Default Setting	Ultra low
Changed Setting	Set fan speed (When auto fan speed is set, the fan speed is low)

NOTE :

- (1) The selected fan speed will remain unchanged after the unit is turned off.
- (2) If Timer reservation has been set, it will be canceled.
- (3) During time setting and timer setting, this operation cannot be set.

HOW TO CHANGE THE INTERMITTENT FAN HEATING SETTING

The intermittent fan control during thermo off in Heating mode can be changed by the remote controller.

(The procedure should be done only by service personnel.)

It is possible to select from 3 patterns.

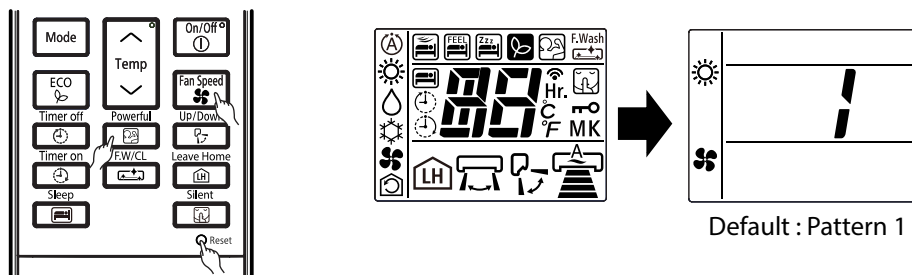
PROCEDURE

Press  (POWERFUL) button,  (FAN SPEED) button and press  [RESET] button simultaneously.

Release  [RESET] button only and make sure that all marks on the remote controller display are indicated, then release

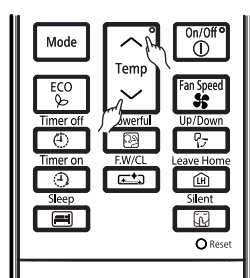
 (POWERFUL) button and  (FAN SPEED) button.

Remote controller now enters "Intermittent Fan Control Change Mode".

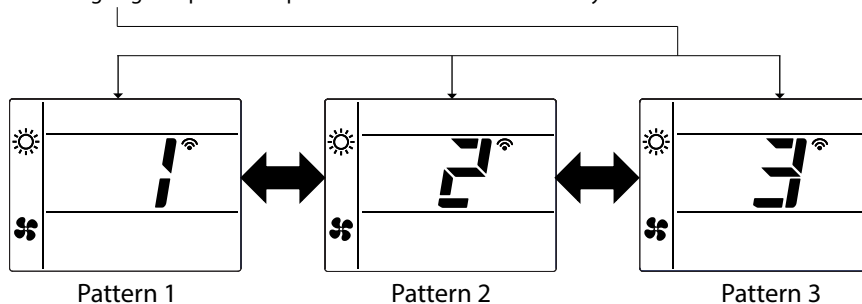


Press [ROOM TEMPERATURE setting] [ (UP) /  (DOWN)] button.

(The intermittent pattern changed with indoor unit beep sound)



Transmission sign lights up with beep from indoor unit simultaneously.



	Pattern 1	Pattern 2	Pattern 3
Single model	Continuous	30sec ON / 210sec OFF repeatedly	50sec ON / 190sec OFF repeatedly
Multi	30sec ON / 210sec OFF repeatedly	50sec ON / 190sec OFF repeatedly	Continuous

NOTE:

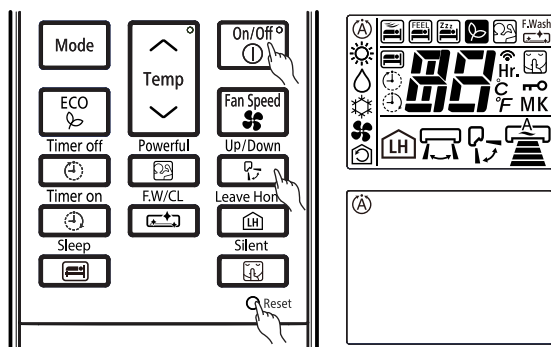
- (1) The indication of the selected intermittent pattern will disappear after 10 seconds.
- (2) The selected intermittent pattern will remain unchanged after the unit is turned off.

DISPLAY OPERATION MODE SETTING

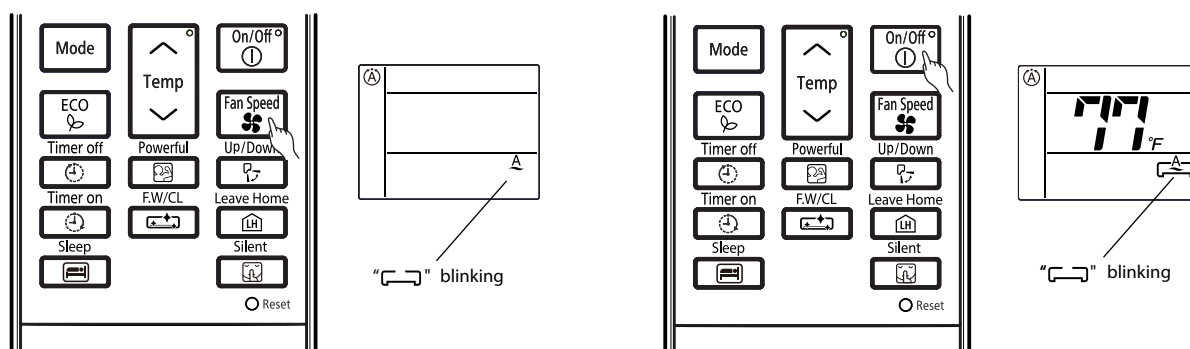
For operating indoor unit independently (without outdoor unit connection), remote controller must be set according to below procedures before send the signal to the indoor unit. New communication format between indoor and outdoor is required to communicate with outdoor unit.

PROCEDURE

- While pressing and holding  (ON/OFF) button and , press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the LCD display are indicated, then release the  (ON/OFF) button and  (UP/DOWN) button. Remote controller now enters "DISPLAY OPERATION MODE" for the indoor unit to run independently. Please ensure that when pressing  (FAN SPEED) button, " will be blinking.



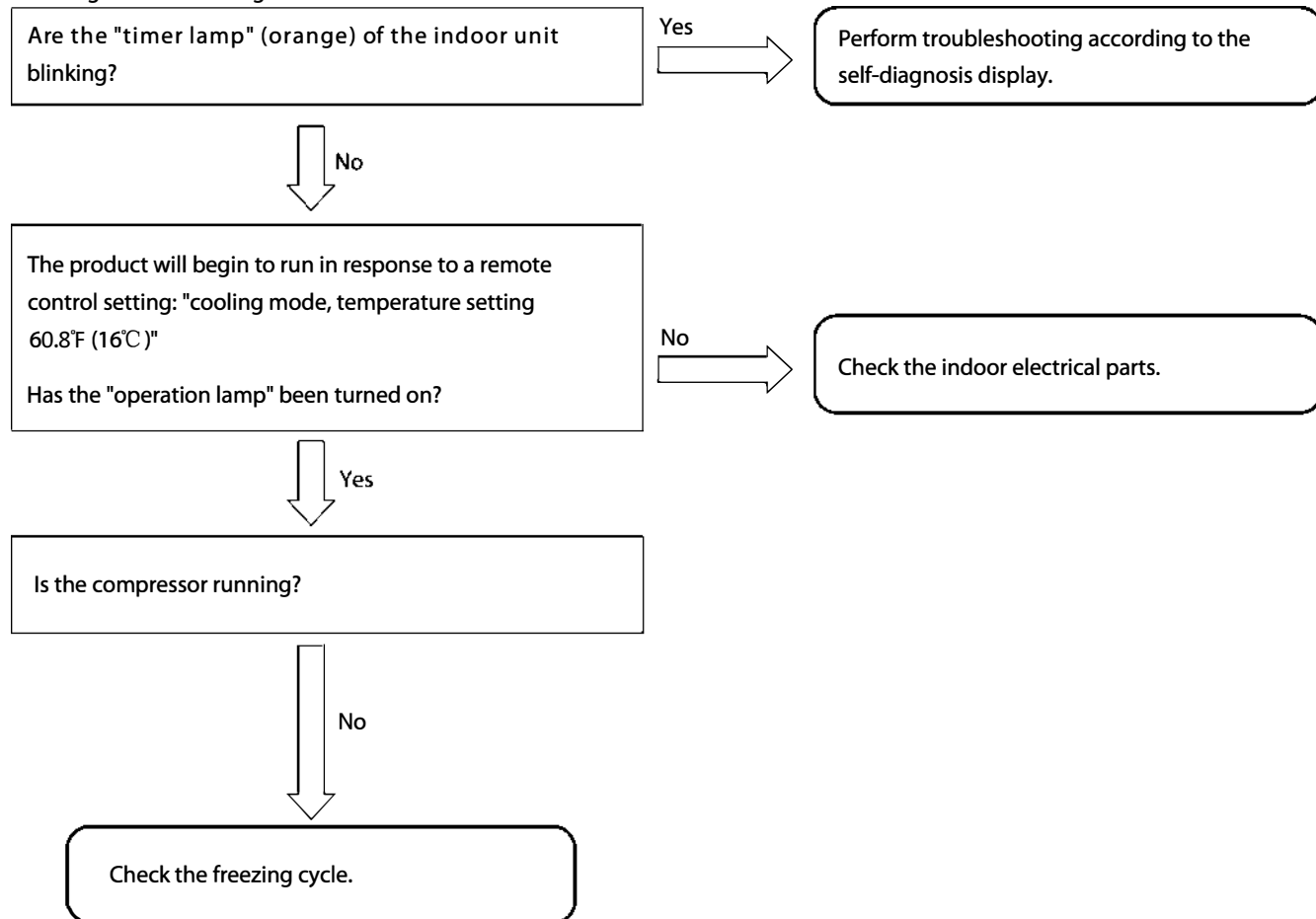
- Press the  (MODE) selector button to choose the desired operation mode.
- Press  (ON/OFF) button.
Then, the indoor unit will start to operate independently according to the selected operation mode.



NOTE :

- (1) During "DISPLAY OPERATION MODE", " blinks on LCD of remote controller.
- (2) When operation stops, "DISPLAY OPERATION MODE" is canceled.

Initiating troubleshooting

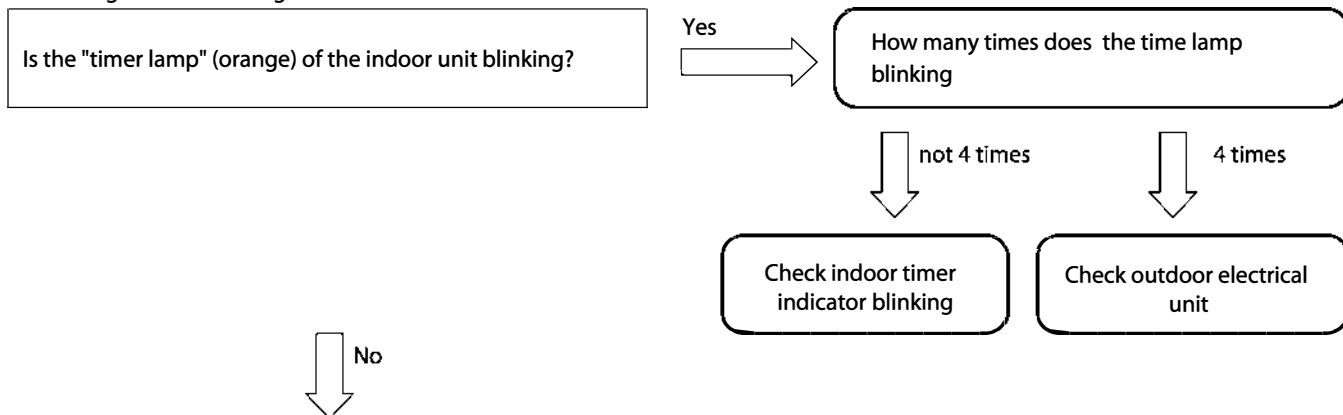


Checking the indoor unit electrical parts

Introduction

First check the failure phenomenon and status, and then move on to elaborate diagnosis.

Initiating troubleshooting



Turn off the power, wait at least 5 seconds, turn it back on, and observe the way the horizontal vanes move for about 30 seconds.

Check 1: Have the horizontal vanes moved? (Yes/No)



Set the remote control unit to cooling mode, temperature setting 60. °F (16°C) and operate the product.

Check 2: Has the product received the remote control signal and has the "operation lamp" gone on? (Yes/No)

If you responded "Yes" to Check 2:

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

If you responded "No" to Check 2:

Check 4: Does the "Temporary operation switch" work? (Yes/No)

Check results and next check items

Check 1	Check 2	Check 3	Check 4	Next check item
No	No	—	No	Go to "The power does not turn on".
Yes	No	—	Yes	Go to "The unit does not receive signals from the remote controller".
Yes	Yes	No	—	Go to outdoor side to check failure. Please refer diagnosis table for further checking if outdoor show fault.

1. Failure phenomenon: The power will not become turned on.

[Situation] Neither initialization, remote control, nor any other step works on the vane position at power-on.

[Estimated failure locations]

- 3.15 A fuse blown out
- Control power circuit
- Connector loose, wire break

Estimated cause of fuse blowout

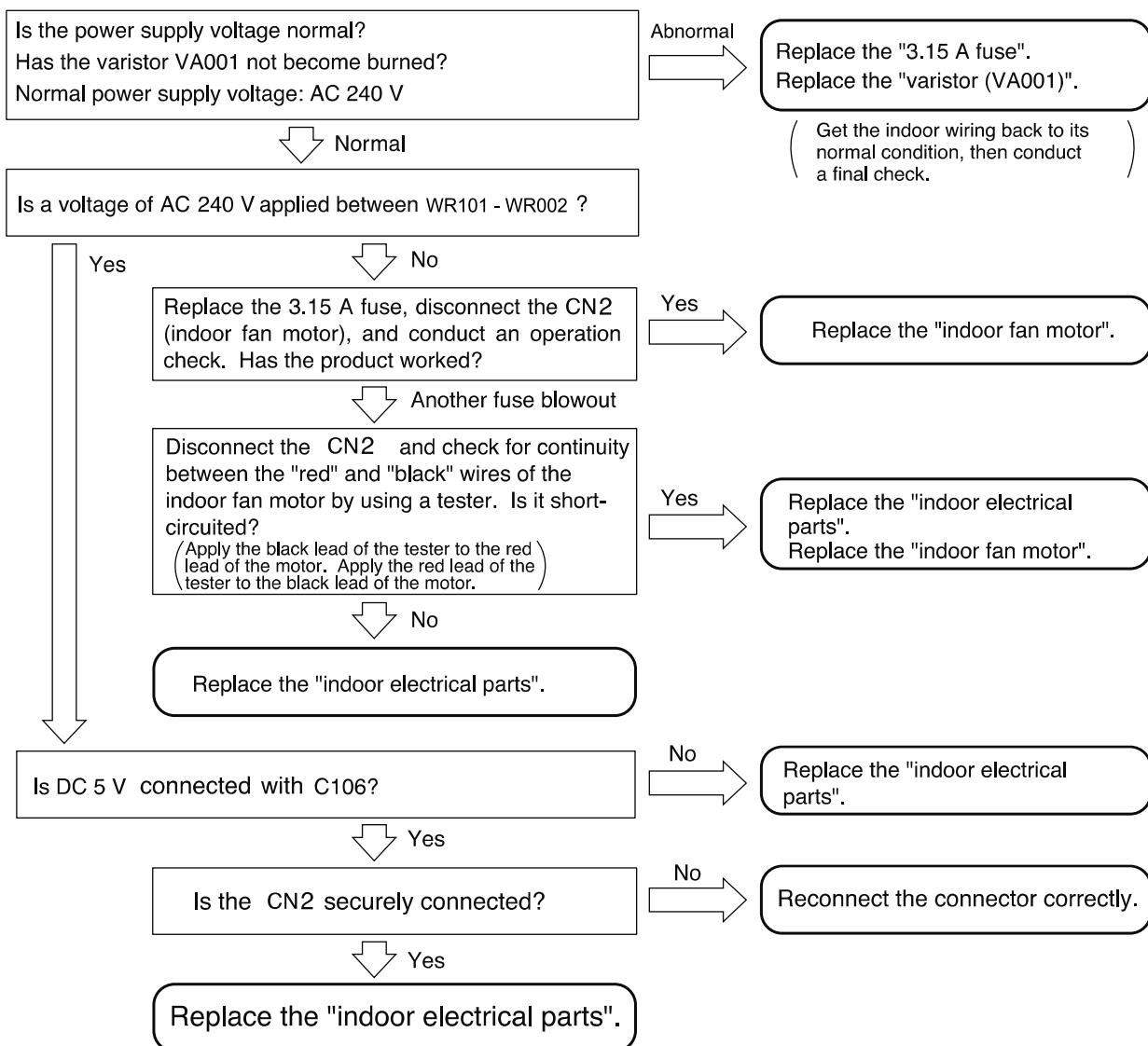
- Abnormally high voltage applied to the power supply
- Indoor fan motor out of order
- Power circuit out of order

[Cautions]

- Before work, check the power supply voltage. An abnormal voltage may be being supplied in some rare occasions due to a defect in the indoor wiring (a wire break in the neutral wire of the single-phase 3-wire power supply).
- If the 3.15 A fuse has blown out, eliminate the cause of the fuse blowout. Otherwise, there will occur another fuse blowout.
- If the 3.15 A fuse has blown out due to an abnormally high voltage to the power supply, the varistor (VA001) will deteriorate and become destroyed as well.
- On a repair service visit due to the failure phenomenon of "The power will not become turned on", take a "3.15 A fuse" and a "varistor" with you.

[Diagnosis flow]

Initiating troubleshooting

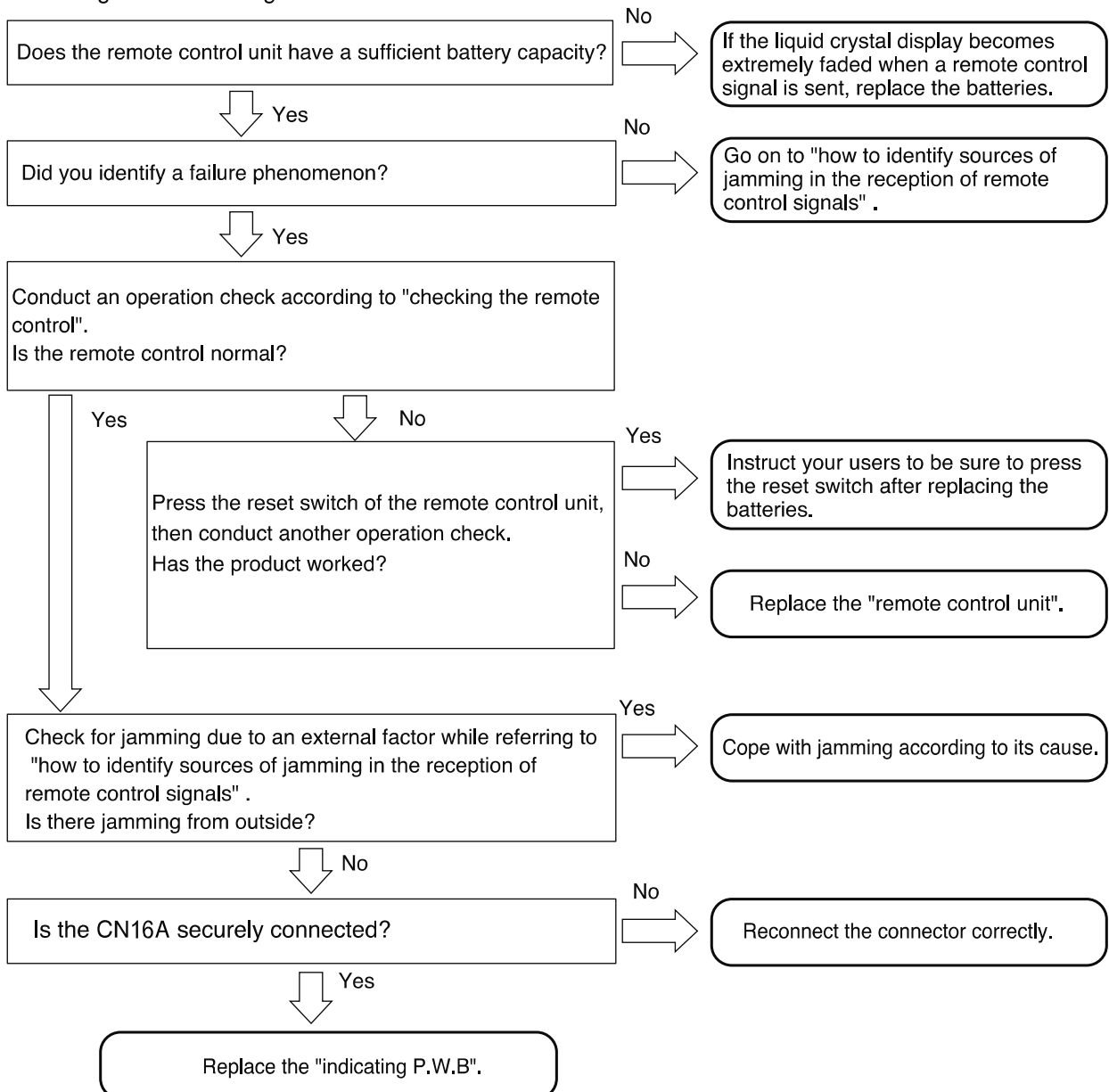


2.Failure phenomenon: The product will not receive a remote control signal.

- [Situation] The product does not receive a remote control signal. It is not very responsive.
(The product does run normally in response to the emergency operation switch.)
- [Estimated failure locations]
- Remote control failure, remote control low battery level, remote control poorly set
 - Remote control light-receiving unit
 - Connector loose, wire break
 - Normal product (external factors: the remote control units for lighting equipment and other equipment, electrical noise, etc.)
- [Cautions]
- Even if the product is trouble-free, a factor coming from outside the product may hamper the reception of signals from the remote control unit.
 - Batteries may decline in capacity at low temperatures. Old batteries decline particularly much in voltage in the morning and evening of winter, resulting in the poor arrival of remote control signals. Instruct your users to use new alkaline batteries.

[Diagnosis flow]

Initiating troubleshooting



[Cautions in replacing the indicating P.W.B] Be sure to replace the indicating P.W.B. components.

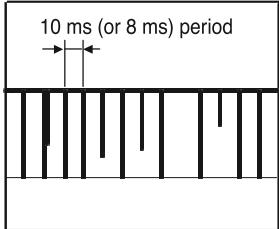
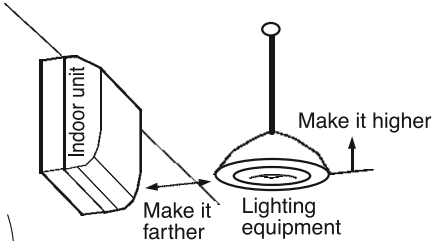
How to identify sources of jamming in the reception of remote control signals

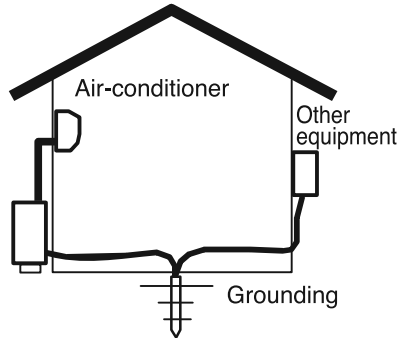
[Situation] The product may become poorly responsive to remote control signals due to external factors even though the product itself is trouble-free.

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

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

[Checking and actions]

Effects of lighting equipment (fluorescent lamps)	<u>Checking points</u> · Turn on and off the lighting equipment and check for its effects on the reception of remote control signals. · When cold, the fluorescent lamp tends to emit infrared rays with wavelengths close to those used in remote control. If you cannot detect the phenomenon about which your user is complaining at the time of your visit, such as "the product sometimes fails to receive remote control signals" and "the product fails to receive remote control signals in the morning alone", then turn off the lighting for about 20-30 minutes and wait for the fluorescent lamps to cool down before conducting another check. There are even cases where the product fails to receive remote control signals for 1 to 2 minutes only after the lighting equipment is turned on. · The noise status may vary with the dimming of the lighting equipment. In the case of lighting equipment with a dimmer, therefore, conduct a check with all the light intensities. · If the lighting equipment is the source of the jamming, the remote control light-receiving unit output usually shows a noise waveform as shown in the right-hand figure. In the case of slight jamming, this kind of waveform will not cause practical problems. However, intense degrees of jamming will disable the reception of remote control signals. · When the fluorescent lamp is old and is flickering, it may cause disorders in the reception of remote control signals. <u>Output waveform of the remote control light-receiving unit</u>  <u>Actions proposed</u> 1. Make it hard for light of the lighting equipment to enter the remote control light-receiving unit. · Separate the lighting equipment from the indoor unit. · Raise the lighting equipment. · Cover the upper half of the light-receiving panel from its rear side with aluminum tape or black vinyl tape. (This will also affect the reception of remote control signals. Therefore, set the range to be covered with tape to a range that is problem-free in practice, while checking the reception status.) 2. Add an interference filter to the front panel of the remote control light-receiving unit. ※ Lighting equipment that produces strong jamming exists although rarely. - Some problems may therefore be unsolvable by managing the air-conditioner side alone. 
Effects of the remote control units of other equipment	<u>Checking points</u> · If, on the remote control unit of a TV or audio equipment, its sound volume key or something similar is left pressed, infrared signals become continuously sent, thereby jamming the reception of remote control signals. · Check how the remote control unit and related components are stored, thereby checking if there is any possibility that a button may be inadvertently left pressed on the remote control unit of other equipment. <u>Actions proposed</u> If there is any such possibility, give explanations to your users to that effect and instruct them to exercise caution. 

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

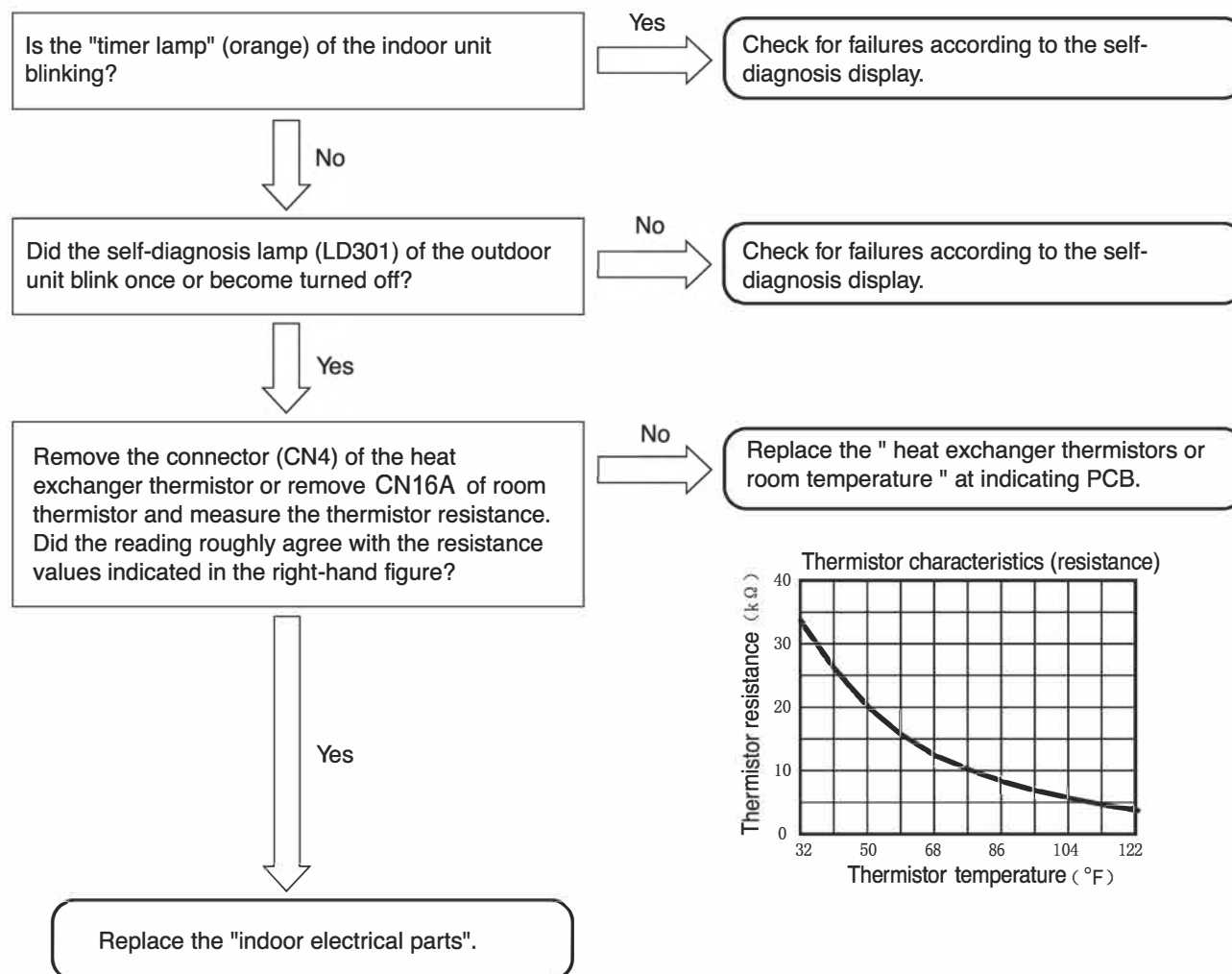
3. Failure phenomenon: The compressor will not run.

[Situation] The compressor will not run (the same state as the thermometer turned off), the product receives remote control signals normally. The self-diagnosis lamp (LD301) of the outdoor unit blinks once or becomes turned off.

[Estimated failure locations] · Room temperature thermistor, heat exchanger thermistor
· Microcomputer peripheral circuit

[Diagnosis flow]

Initiating troubleshooting



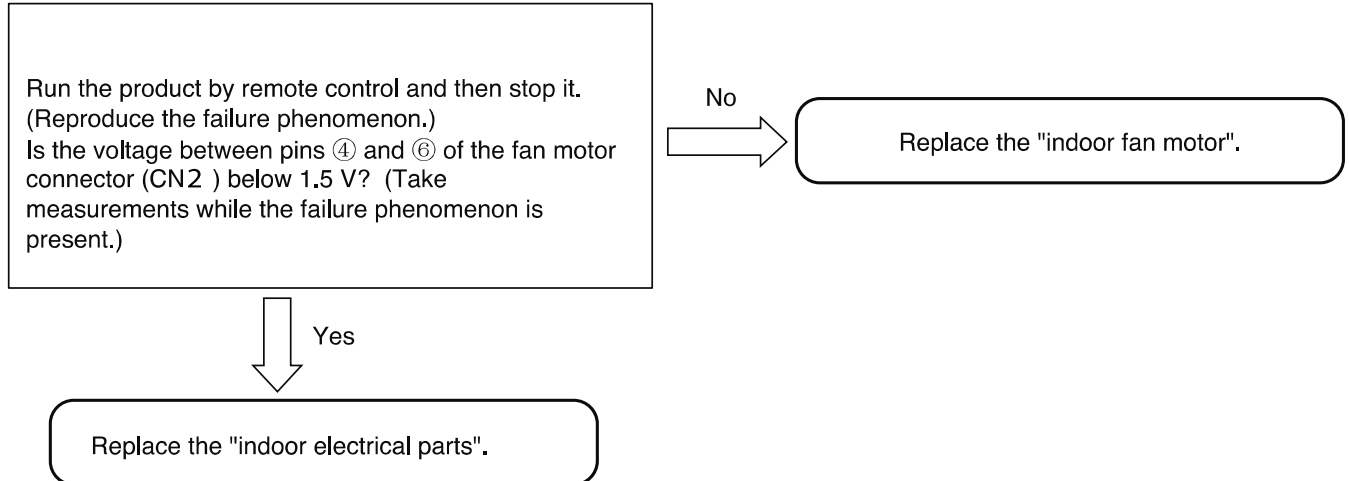
4. Failure phenomenon: The fan motor will not stop.

[Estimated failure locations]

- Indoor fan motor
- Fan motor drive circuit

[Diagnosis flow]

Initiating troubleshooting



5. Timer lamp blinking: blinking once

[Situation] The timer lamp blinks one time and the product will not operate.
(This is not a sign of a breakdown.)

[Estimated failure locations] · Reversing valve defective.
· The refrigerating cycle block gas leak.

6. Timer lamp blinking: blinking twice

[Situation] The product is giving a display to indicate that it is performing forcible cooling.
(This is not a sign of a breakdown.)

7. Timer lamp blinking: blinking three times

[Situation] The timer lamp blinks three times and the product will not operate.

[Estimated failure locations] · Meltdown of the terminal board (the terminal board poorly inserted into the connecting cable)
· Outdoor communication circuit out of order

[Cautions] · If a terminal board is replaced to counter the meltdown of the terminal board, ensure that the connecting cable to be inserted into the terminal board has the appropriate dimension for peeling the insulation sheathing and that the insertion region is unbent before inserting it into the terminal board securely.

8. Timer lamp blinking: blinking four times

[Situation] The timer lamp blinks four times and the product will not operate.

[Estimated failure locations] · Outdoor unit error.
· Please confirm the times of the LD301 blinking, and then see the outdoor selfcheck table.

9. Timer lamp blinking: blinking 9 times

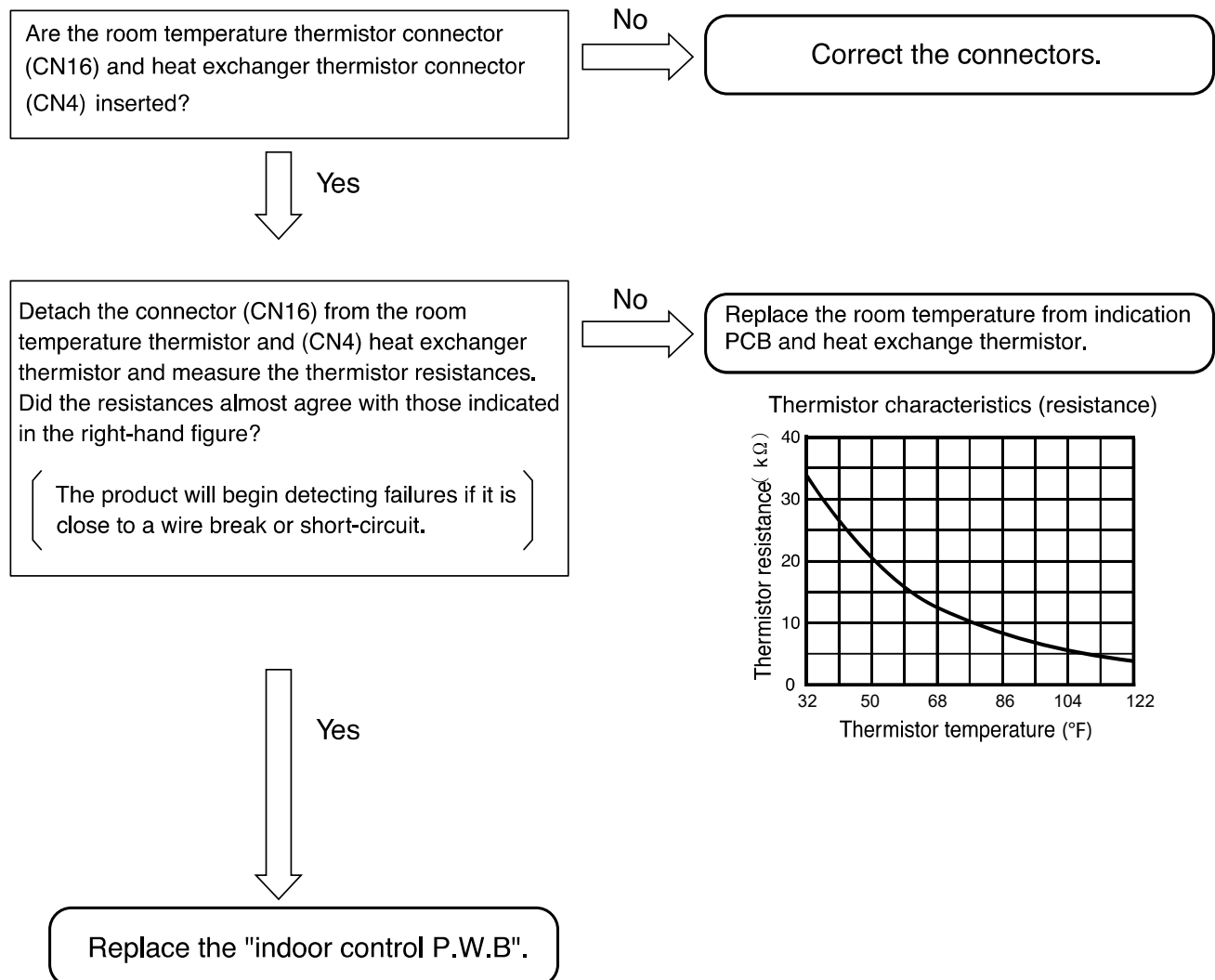
[Situation] The timer lamp blinks 9 times and the product will not run.

[Estimated failure location] · Loose connector, wire break, or short-circuit in the room temperature thermistor or heat exchanger thermistor.

[Cautions] · Starting the product by remote control will initiate failure detection.
(Merely turning on the power will not activate the failure detection function.)

[Diagnosis flow]

Initiating troubleshooting



10. Timer lamp blinking: blinking 10 times

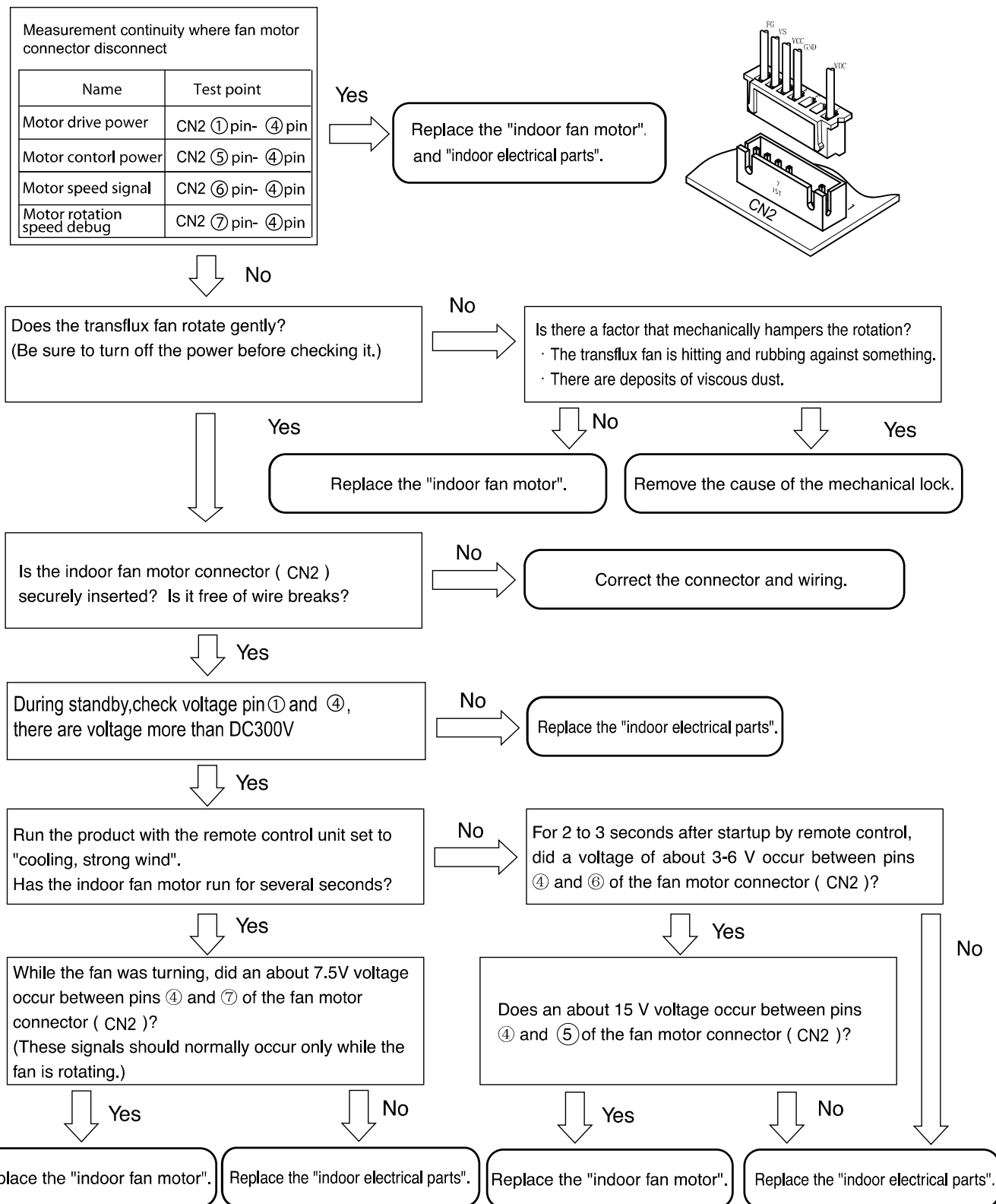
[Situation] The timer lamp blinks 10 times and the product will not run.

[Estimated failure locations]

- Loose connector or wire break in the indoor fan motor
- Indoor fan motor mechanically locked
- Indoor fan motor
- Indoor fan motor drive circuit

[Diagnosis flow]

Initiating troubleshooting



11. Timer lamp blinking :blinking 12 times

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

[Estimated failure locations]

- Erroneous connection in the indoor-outdoor connection line (connecting cable)
- Wire break or poor insertion of the indoor-outdoor connection line (connecting cable)
- Electrical parts in the outdoor unit (communication circuit, power circuit error)
- Communication error due to noise in other home electronics

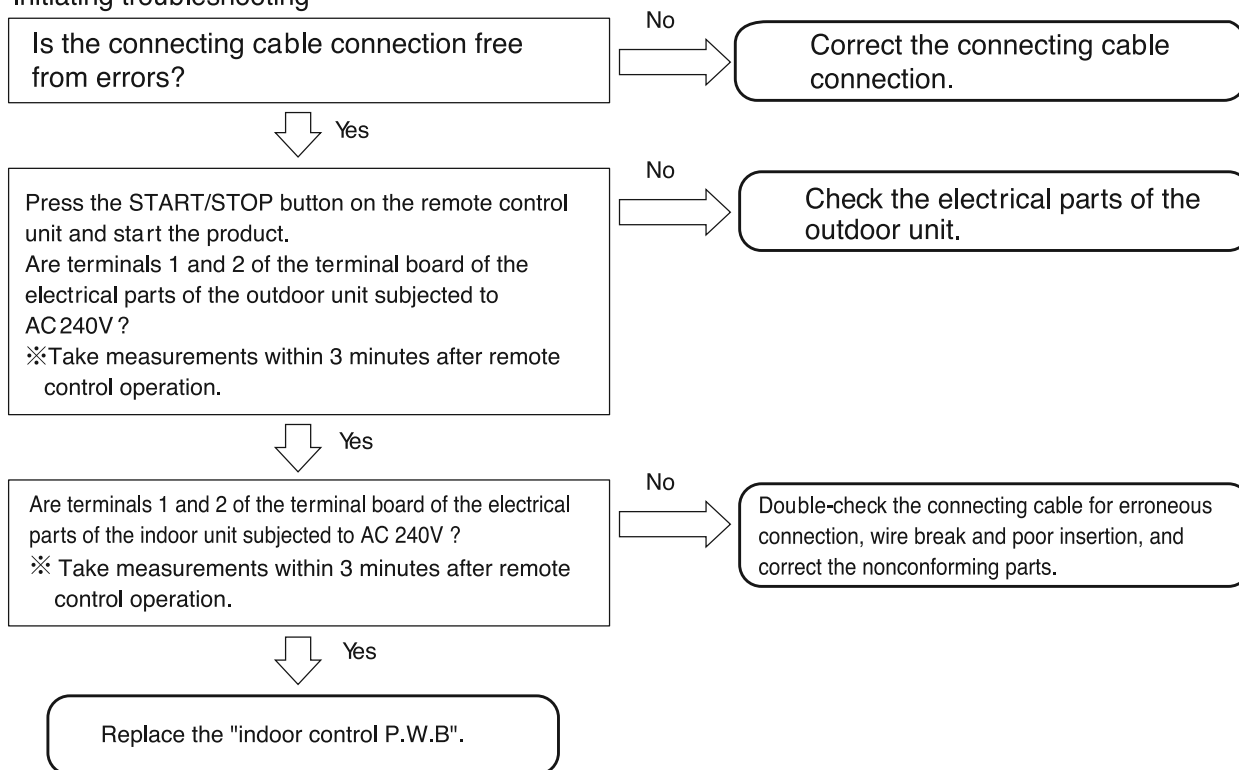
※This does not constitute a failure in the air-conditioner

[Cautions]

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

[Diagnosis flow]

Initiating troubleshooting



12. Timer lamp blinking :blinking 13 times

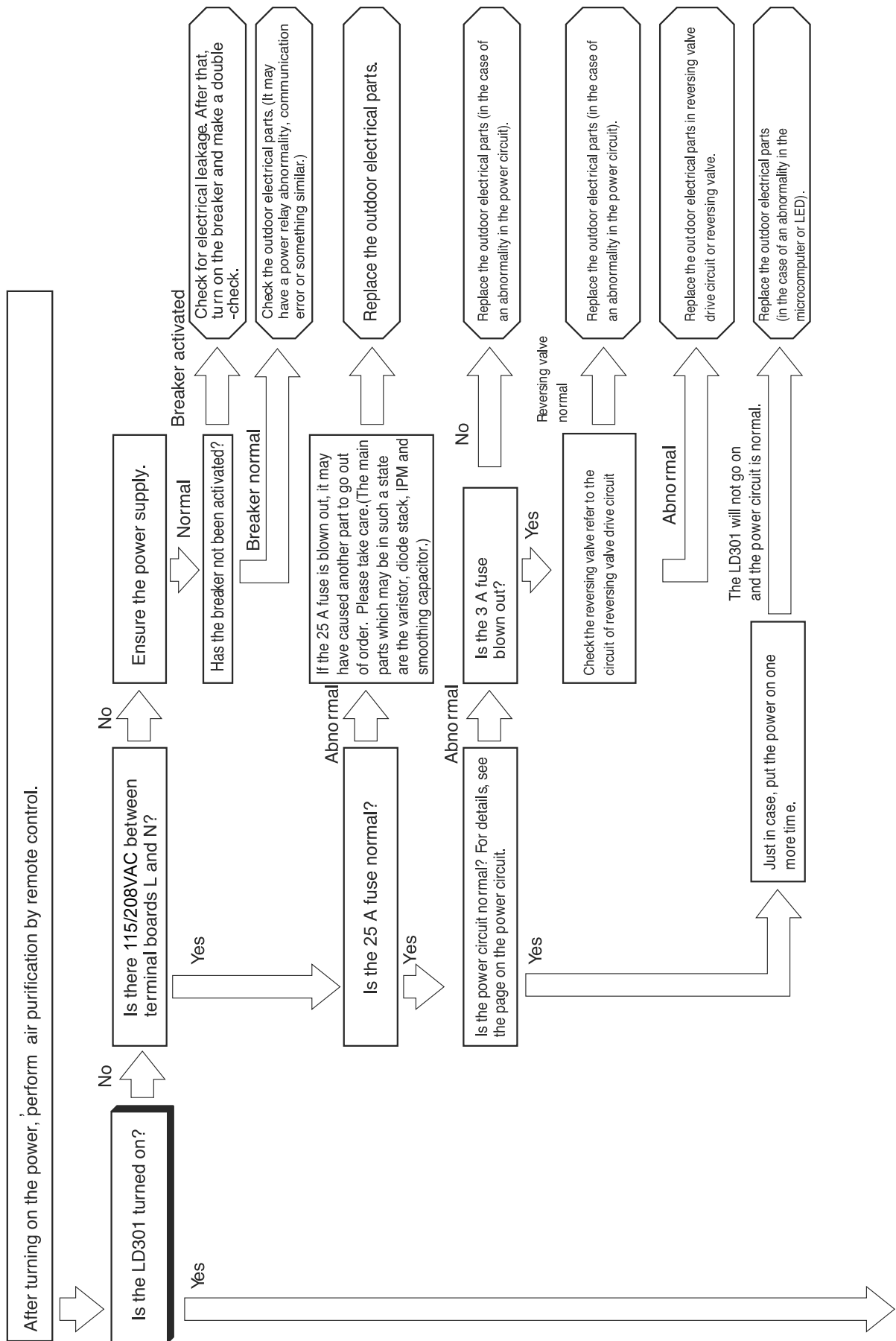
[Situation] The timer lamp blinks 13 times and the product will not run.

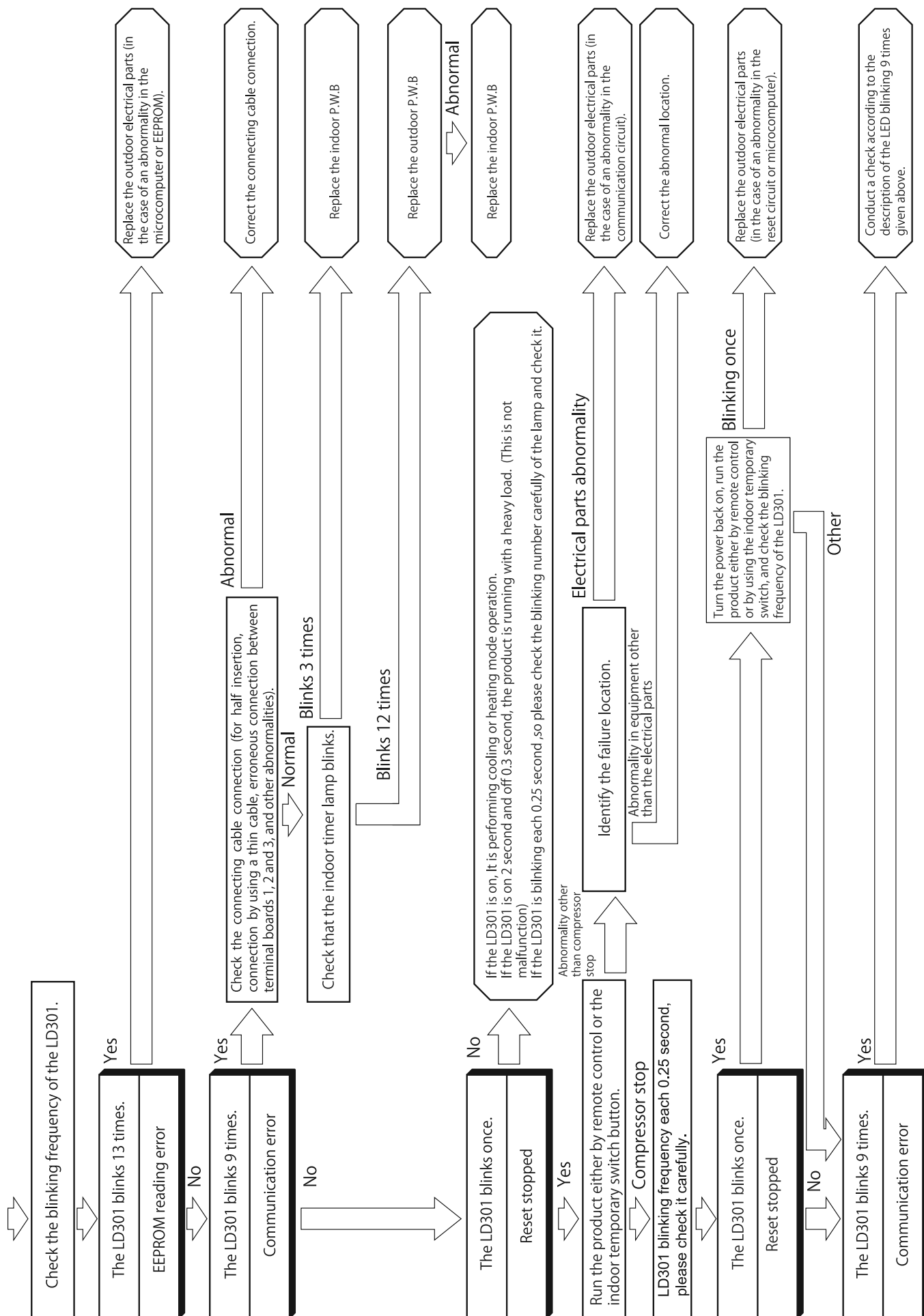
[Estimated failure location] • EEPROM, microcomputer

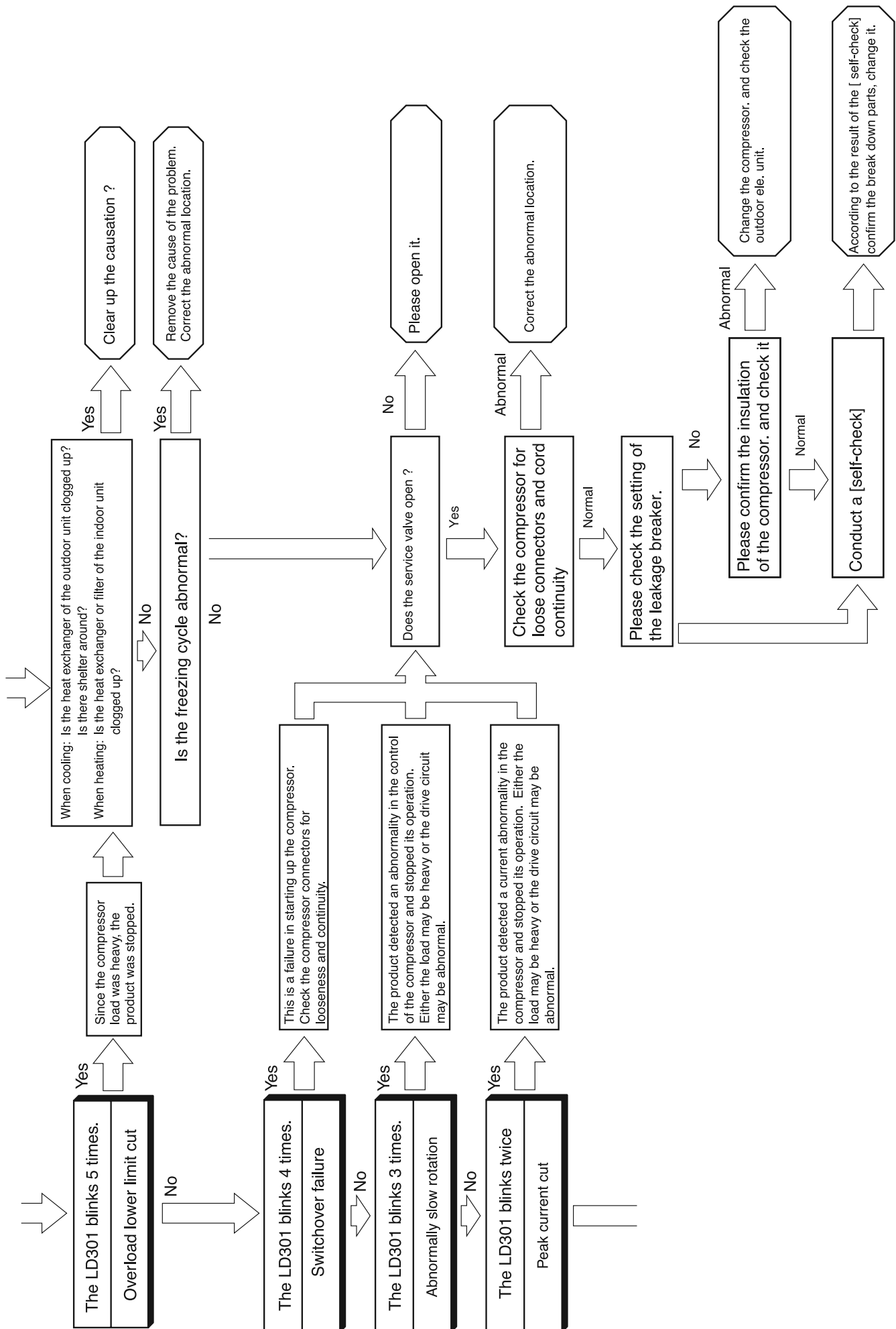
[Diagnosis flow]

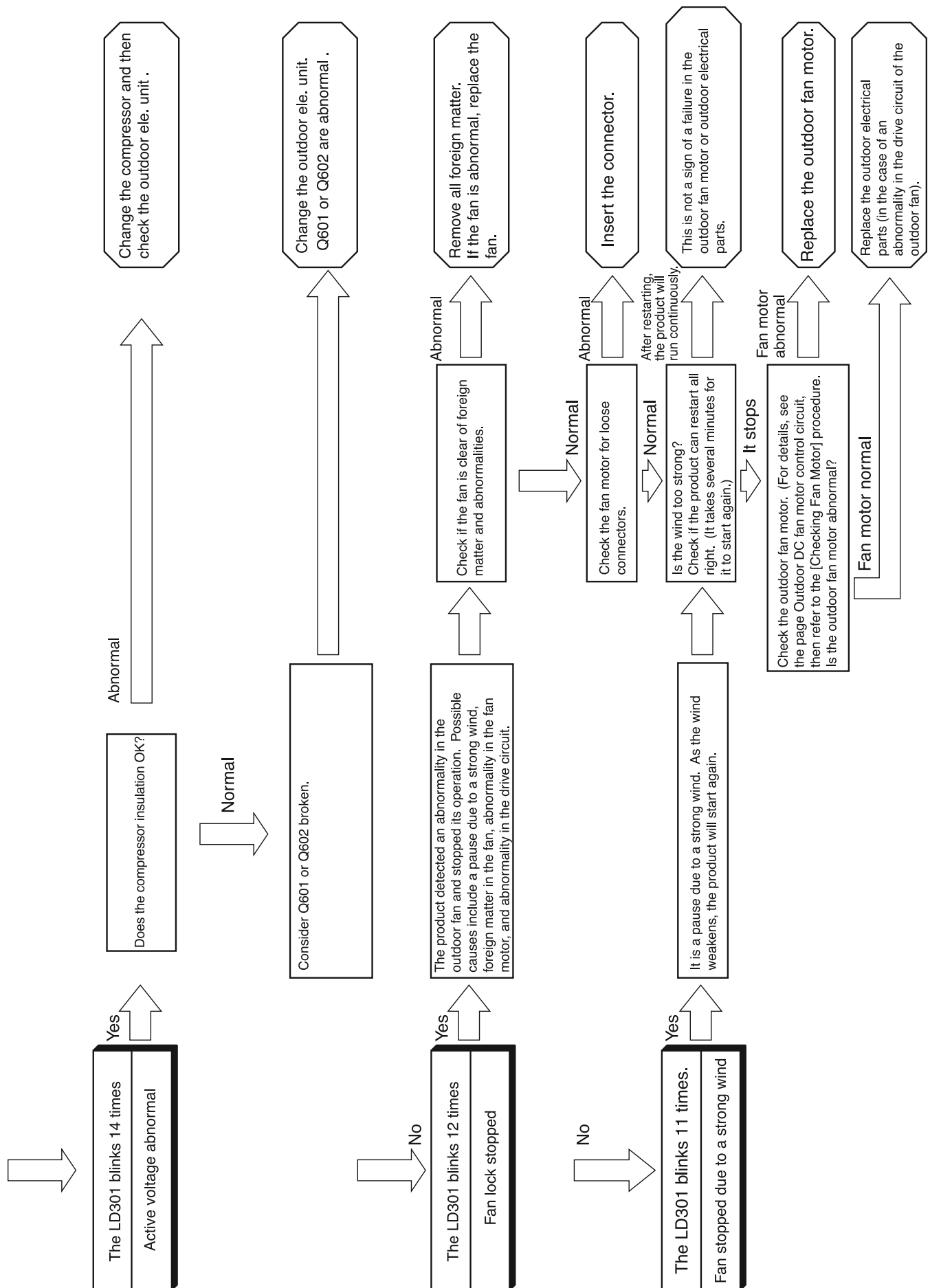
Replace the "indoor control P.W.B".

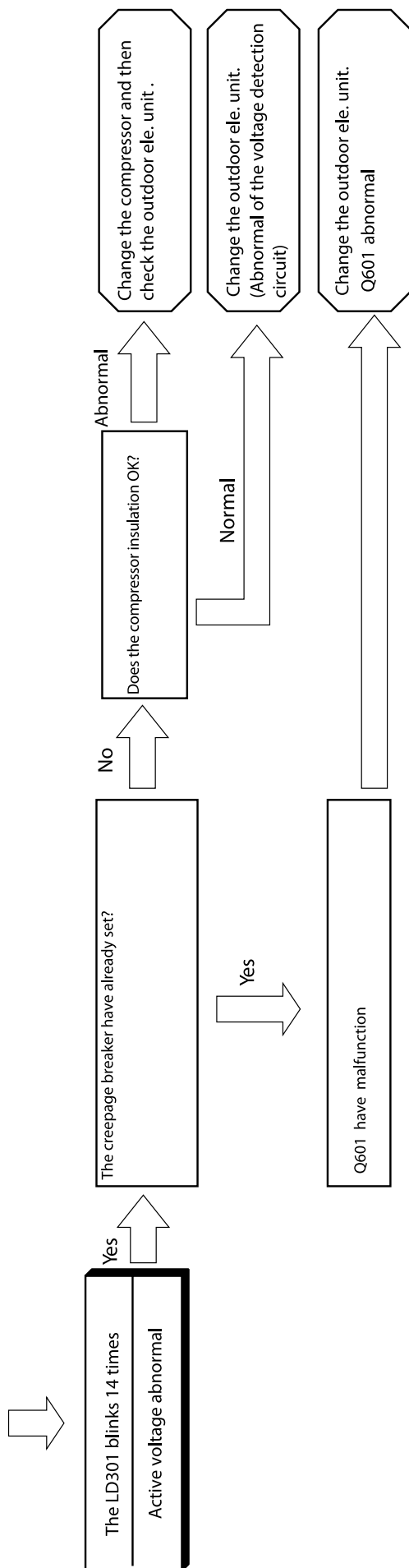
Checking the electrical parts of outdoor unit



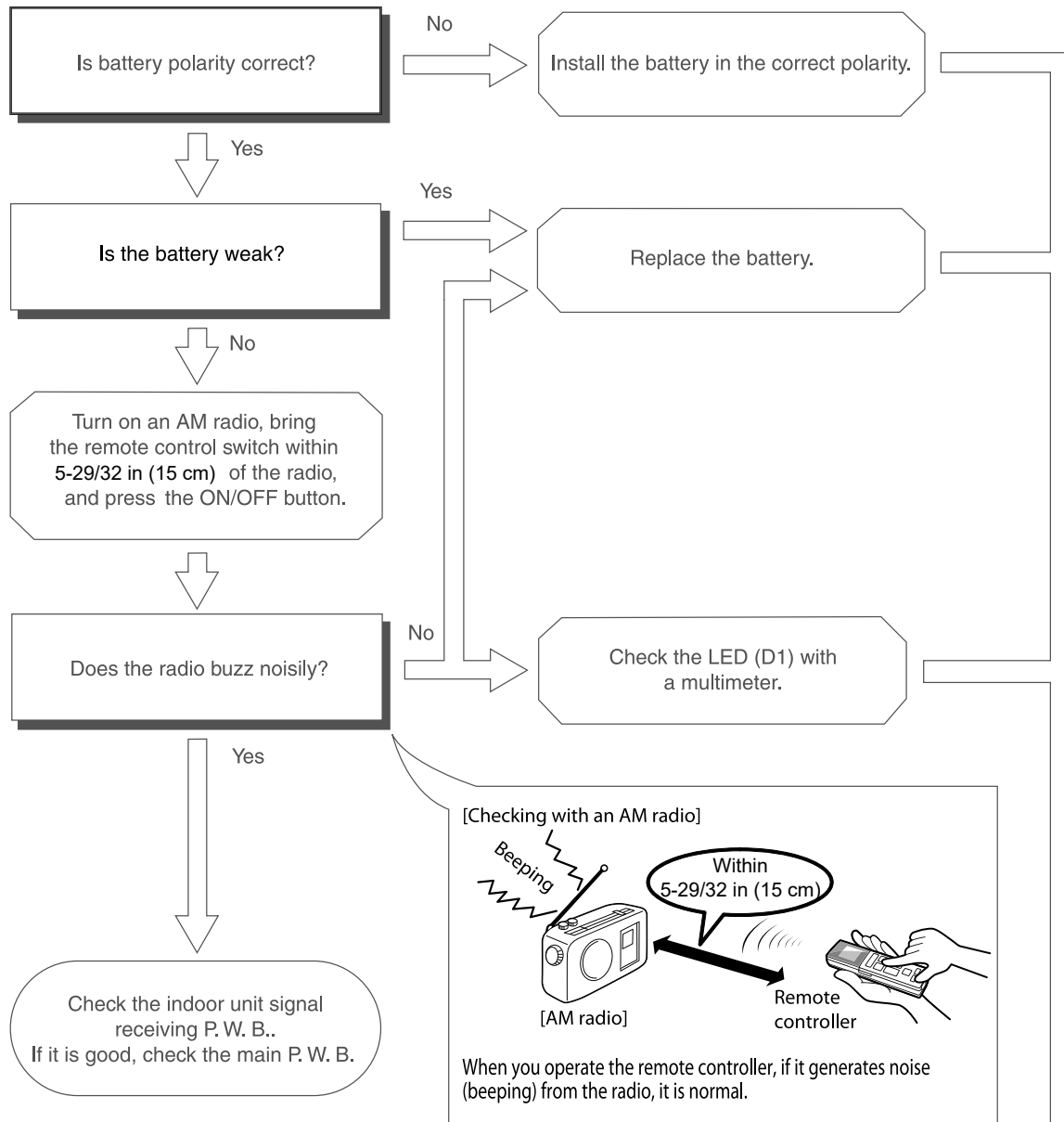






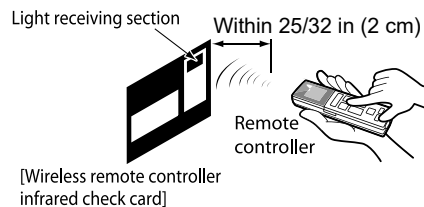


CHECKING THE REMOTE CONTROLLER



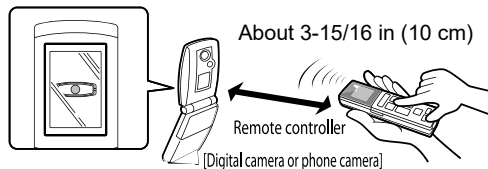
You can check the remote control switch by other methods as explained below.

[Checking with the remote controller check card]



When you operate the remote controller, if the light receiving section reflects in orange, it is normal.

[Checking with Digital camera or phone camera]



- (1) Set the mobile phone so that the transmission part of the remote controller is reflected on the camera's monitor screen.
- (2) When you operate the remote controller, if the transmission part emits light on the monitor screen, it is normal.

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

How to run the product with the outdoor unit test switch

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

1. Turn OFF main power supply.
2. Unplug the TB1, TB2 and CN18 connectors.
3. Short the white cord from TB1 and TB2 using commercially available terminal tab.
4. Connect the test switch jig to CN18.
5. Confirm that the "LD301" blinks once from the terminal side of the outdoor unit. Afterwards (when about 30 sec elapses after the power turns ON), confirm that the "LD301" changes to blinking 9 times (communication error).
6. When the "LD301" is blink 9 times, if you press the Test Switch, the "LD301" lights up.

If you release your finger from the test switch within 1 sec to 4 sec after pressing the switch, the forced cooling operation starts.

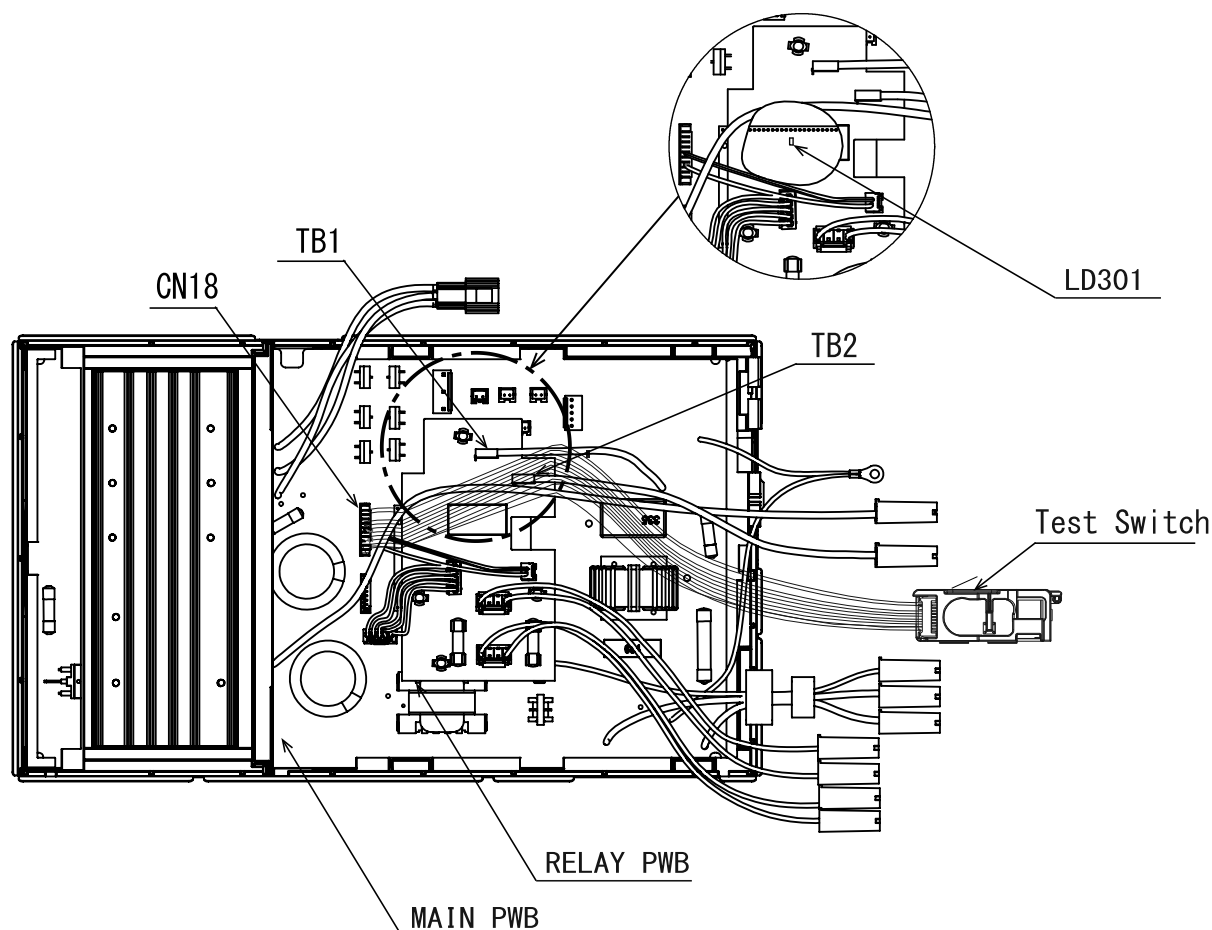
※ (If you press the test switch for 5 sec or longer, the self-check diagnosis starts. In this case, turn the power off and start the procedure from 1 again.)

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

7. When you press the Test Switch again for 1 sec or longer, the unit stops the operation.

※ Caution:

After setting, apply the power supply voltage and start test. Be careful as incorrect connection may result electric shock or malfunction. After test run, remove the test switch jig and be sure to reconnect the connectors (TB1, TB2 and CN18).



RAC-EH09WHLAB/RAC-EH12WHLAB

How to run the product with the outdoor unit test switch

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

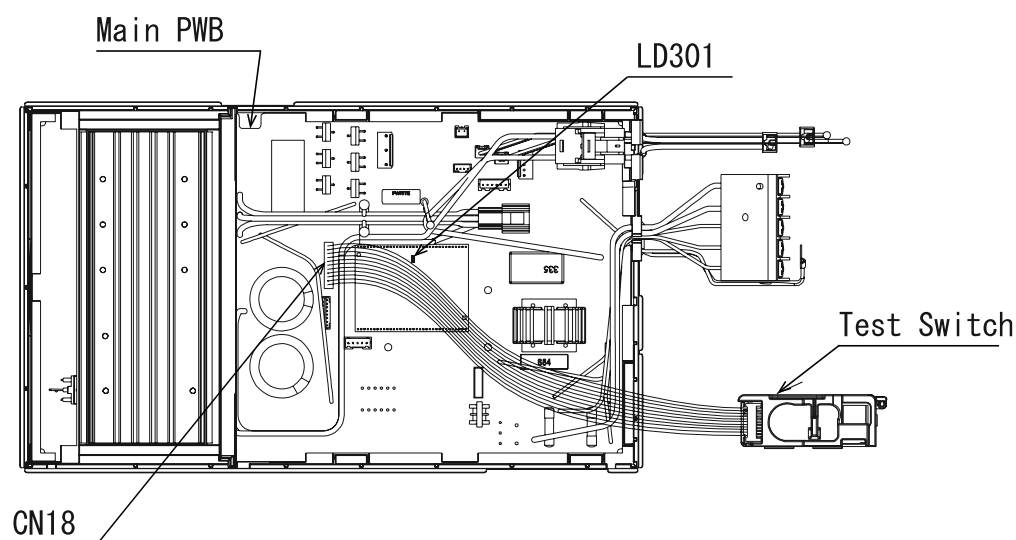
1. Turn OFF main power supply.
2. Connect the Test Switch jig connector to CN18.
3. Turn ON the outdoor terminal board L and N (230V AC).
4. Confirm that the "LD301" blinks once from the terminal side of the outdoor unit. Afterwards (when about 30 sec elapses after the power turns ON), confirm that the "LD301" changes to blinking 9 times (communication error).
5. When the "LD301" is blink 9 times, if you press the Test Switch, the "LD301" lights up.

If you release your finger from the test switch within 1 sec to 4 sec after pressing the switch, the forced cooling operation starts.

※ (If you press the test switch for 5 sec or longer, the self-check diagnosis starts. In this case, turn the power off and start the procedure from 1 again.)

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

6. When you press the Test Switch again for 1 sec or longer, the unit stops the operation.



RAC-EH09WHLAE/RAC-EH12WHLAE

Self-check

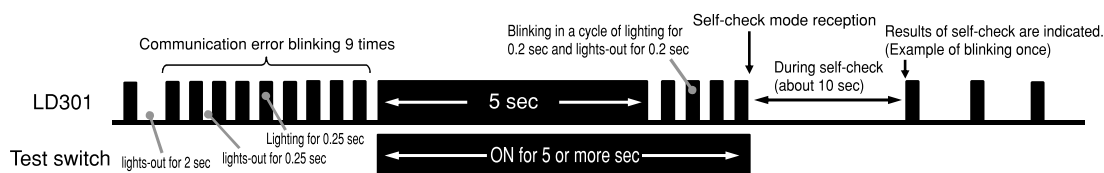
If you cannot judge if it is an abnormality on the electrical part or the compressor by the “Blinking twice, 3 times, 4 times or 5 times” of the self-diagnosis indicator, perform the megger check to check the isolation of the compressor has no problems, perform the following [self-check].
(The inverter should be checked).

How to make the self-check diagnosis

1. Turn the power OFF and wait for 10 min or longer.
2. Disconnect communication wire indoor outdoor (Terminal pin no.3).
3. Insert external service switch at CN18.
4. Turn ON power supply (wait until LD301 9 times blinking).
5. Press service switch 5 sec or longer until LD301 blink fast and then release the switch.
6. Self-check result will display by LD301 blinking times.

While the test switch has been pressed, the LD301 lights up and, if it is pressed for 5 sec or longer, the LD301 repeats a cycle of “Lighting for 0.2 sec and lights-out for 0.2 sec”.
When blinking starts, remove your finger from the test switch.

If you release your finger from the switch below 5 sec, the forced cooling operation starts.

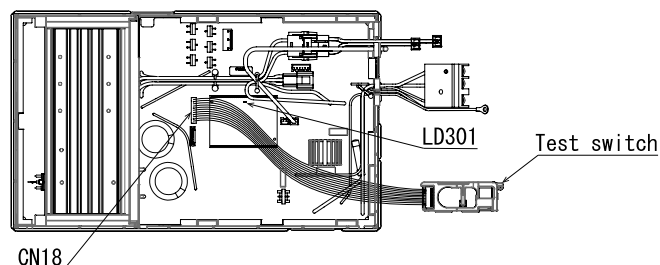


7. The result of self-check diagnosis are indicated. The contents of the result of diagnosis are shown in the table below.
8. The self-check complete.

Result of the self-check diagnosis

SELF-CHECK DIAGNOSIS RESULTS		
LD301	Self-diagnosis description	Solution
Blink 1 time	No problem with electrical parts.	Replace compressor.
Blink 2 times	Peak current cut signal.	Replace electrical parts.
Blink 7 times	Motor current error.	Compressor connector become disconnected. ⇒ Adjust connector. Compressor connector properly connected. ⇒ Check compressor, then replace electrical parts.
Blink 10 times	DC voltage error.	Abnormal AC input power supply (outside range of rated voltage $\pm 10\%$). ⇒ Connect to proper power supply. Normal AC input power supply (inside range of rated voltage $\pm 10\%$). ⇒ Replace electrical parts.
Blink 13 times	EEPROM read error.	Replace electrical parts.

Location of the test switch and LD301



If the judgement results show abnormality, check the connecting wire and, if it is not disconnected, replace the failed parts according to the correcting method.

Cautions

1. The self-check is effective only when the power is turned on for the first time. If the LD301 does not lights up, even if the test switch is pressed, turn the power off and wait for 10 min and start the procedure from the beginning.
2. After the self-check mode is complete, it is not necessary to turn the power off (normal operation is restored). However, note that the self-check results continue blinking until the compressor starts operating.

※Cautions

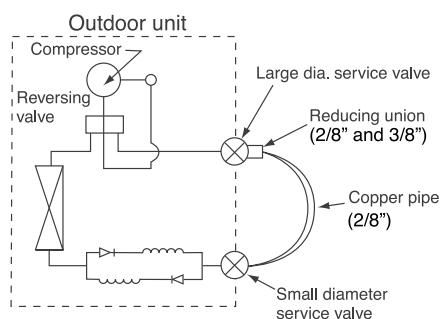
1. Before making the connections, be sure to turn off the breaker.
2. Do not under any circumstances run the product for more than 5 minutes.
3. Doing work with the compressor connector removed will cause the LD301 to blink 4 times. It will not start.
4. For another test run, turn off the breaker and turn it back on. (The test switch is accepted only once after power-on. After operation by remote control, it is not accepted.)
5. When the operation with the test switch is over, turn off the breaker.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

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

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

Charge refrigerant of 10.6oz (300g) after vacuuming (※1)



Parts to be prepared

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

Do not operate for more than 5 minutes

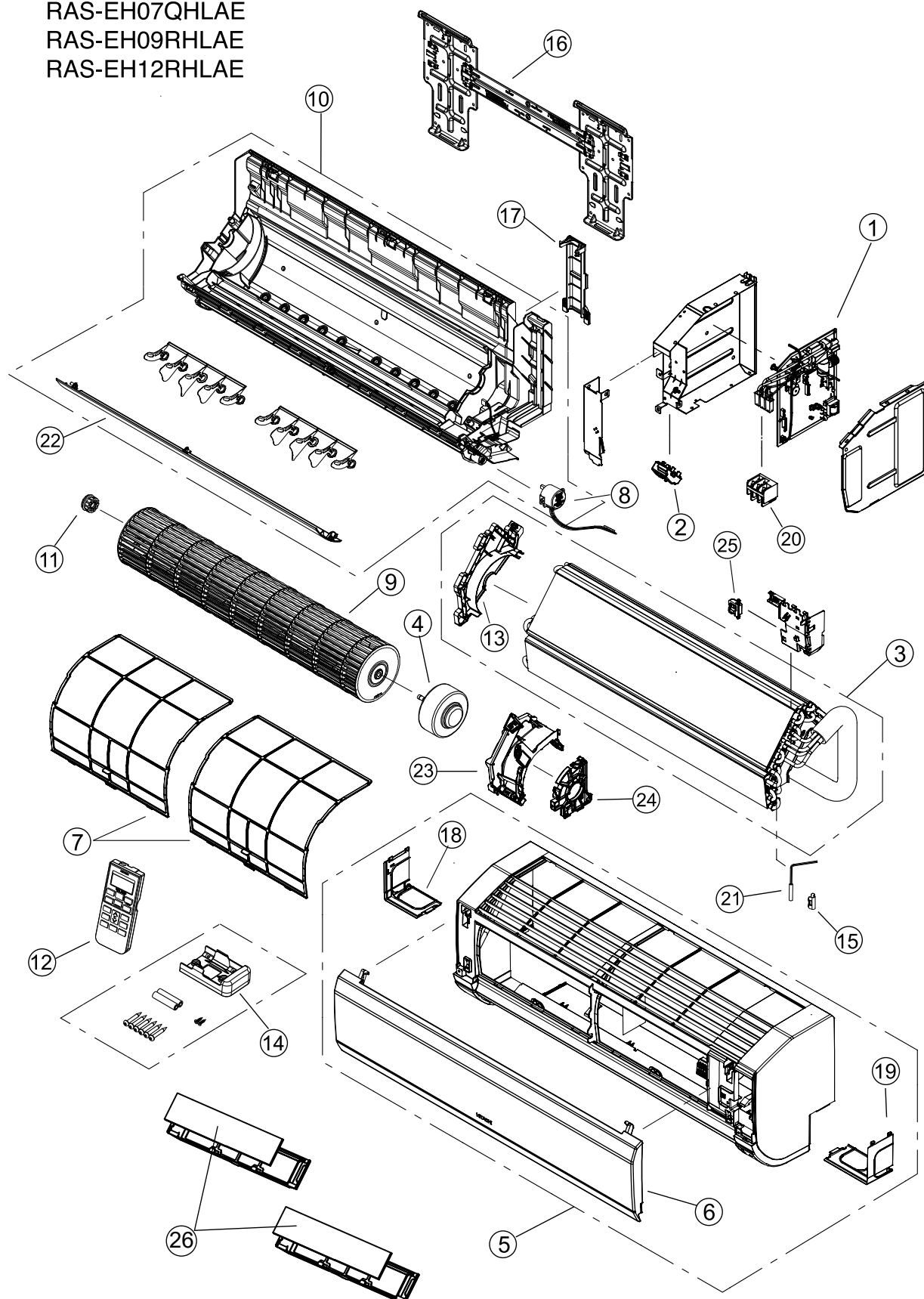
The operation method is the same as "How to operate using the connector to servicing the outdoor unit".

※1 The charging amount of 10.6oz (300g) is equivalent to the load in normal operation.

PARTS LIST AND DIAGRAM

INDOOR UNIT

MODEL : RAS-EH09PHLAB
RAS-EH12PHLAB
RAS-EH07QHLE
RAS-EH09RHLAE
RAS-EH12RHLAE



MODEL RAS-EH09 HLA /RAS-EH12 HLA

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	PMS-EH09PHLAB	R01	1	P.W.B (MAIN) (RAS-EH09PHLAB)
1	PMS-EH12PHLAB	R01	1	P.W.B (MAIN) (RAS-EH12PHLAB)
2	PMS-EH09PHLAB	R02	1	P.W.B (RECEIVER)
3	PMRAS-EH10CKT	R04	1	CYCLE ASSY
4	PMS-EH09PHLAB	R03	1	FAN M T R
5	PMS-EH09PHLAB	R04	1	FR NT C VER ASSY
	PMRAS-EH10CKT	R14	1	FR NT NEL
7	PMS-EH09PHLAB	R05	2	AIR FI ER
8	PMRAS-S18CPA	R02	1	A T SWEEP M T R
9	PMRAS-EH10CKT	R0	1	TAN ENTIAL N
10	PMS-EH09PHLAB	R0	1	CABINET
11	PMRAS-25YH4	908	1	P-BEARIN ASSY
12	PMS-EH09PHLAB	R07	1	REM TE C NTR L ASSEMB
13	PMRAS-EH10CKT	R19	1	BEARIN C VER
14	PMRAS-VX13CET	R10	1	REM TE C NTR L S PP RT
15	PMRAS-10C8M	R03	1	THERMIST R S PP RT
1	PMRAS-EH10CKT	R07	1	M NTIN PLATE
17	PMRAS-EH10CKT	R12	1	PIPE S PP RT
18	PMRAS-EH10CKT	R1	1	S-C VER L
19	PMRAS-EH10CKT	R17	1	S-C VER R
20	PMRAK-50PPD	R07	1	TERMINAL B ARD (3P)
21	PMRAS-XH10CKT	R0	1	THERMIST R
22	PMRAS-EH10CKT	R09	1	H-DEFLECT
23	PMRAS-EH10CKT	R10	1	FM-BASE-L
24	PMRAS-EH10CKT	R11	1	FM-BASE-R
25	PMRAS-XH10CKT	R07	1	SENS R ASSEMBLY
2	SPX-CFH22AC25		2	ACL-FILTER

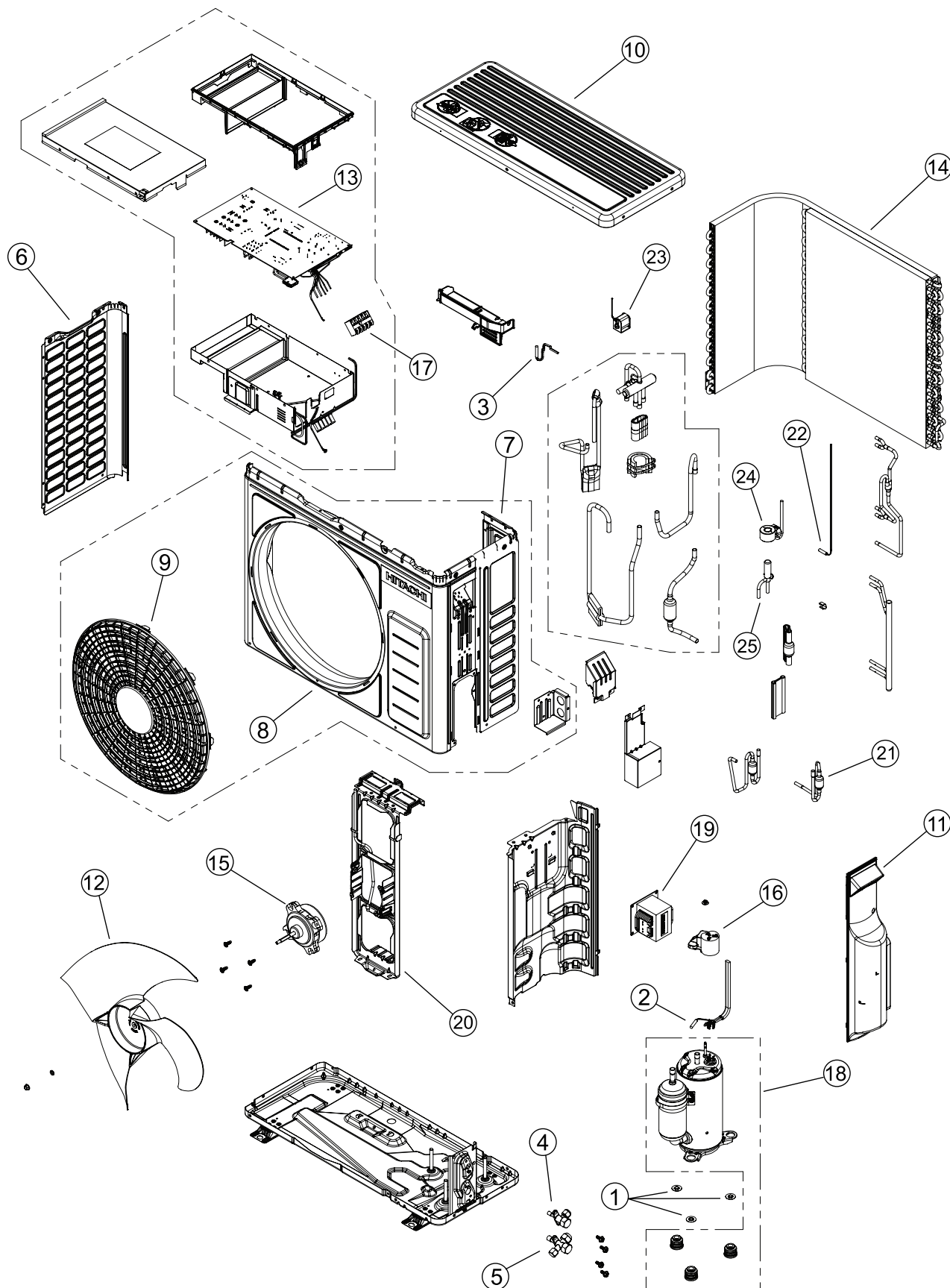
MODEL RAS-EH07QH LAE/RAS-EH09RH LAE/RAS-EH12RH LAE

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	PMS-EH07 H LAE	R01	1	P.W.B (MAIN) (RAS-EH07 H LAE)
1	PMS-EH09RH LAE	R01	1	P.W.B (MAIN) (RAS-EH09RH LAE)
1	PMS-EH12RH LAE	R01	1	P.W.B (MAIN) (RAS-EH12RH LAE)
2	PMS-EH09PH LAB	R02	1	P.W.B (RECEIVER)
3	PMRAS-EH10CKT	R04	1	CYCLE ASSY
4	PMS-EH09RH LAE	R02	1	FAN M T R
5	PMS-EH09PH LAB	R04	1	FR NT C VER ASSY
	PMRAS-EH10CKT	R14	1	FR NT NEL
7	PMS-EH09PH LAB	R05	2	AIR FI ER
8	PMRAS-S18CPA	R02	1	A T SWEEP M T R
9	PMRAS-EH10CKT	R0	1	TAN ENTIAL N
10	PMS-EH09PH LAB	R0	1	CABINET
11	PMRAS-25YH4	908	1	P-BEARIN ASSY
12	PMS-EH09PH LAB	R07	1	REM TE C NTR L ASSEMB
13	PMRAS-EH10CKT	R19	1	BEARIN C VER
14	PMRAS-VX13CET	R10	1	REM TE C NTR L S PP RT
15	PMRAS-10C8M	R03	1	THERMIST R S PP RT
1	PMRAS-EH10CKT	R07	1	M NTIN PLATE
17	PMRAS-EH10CKT	R12	1	PIPE S PP RT
18	PMRAS-EH10CKT	R1	1	S-C VER L
19	PMRAS-EH10CKT	R17	1	S-C VER R
20	PMRAK-50PPD	R07	1	TERMINAL B ARD (3P)
21	PMRAS-XH10CKT	R0	1	THERMIST R
22	PMRAS-EH10CKT	R09	1	H-DEFLECT
23	PMRAS-EH10CKT	R10	1	FM-BASE-L
24	PMRAS-EH10CKT	R11	1	FM-BASE-R
25	PMRAS-XH10CKT	R07	1	SENS R ASSEMBLY
2	SPX-CFH22AC25		2	ACL-FILTER

PARTS LIST AND DIAGRAM

OUTDOOR UNIT

MODEL : RAC-EH09WHLAB
 RAC-EH12WHLAB
 RAC-EH09WHLAE
 RAC-EH12WHLAE



MODEL RAC-EH09WHLA /RAC-EH12WHLA

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	PMKPNT1	001	3	PUSH NUT
2	PMC-EH09WHLAB	S08	1	THERMISTOR (OH)
3	PMC-EH09WHLAB	S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
	PMRAC-EH10CKT	S0	1	VALVE 2S
5	PMRAC-EH10CKT	S05	1	VALVE 3S
	PMRAC-EH10CKT	S0	1	SIDE PLATE (L)
	PMC-EH09WHLAB	S05	1	SIDE PLATE (R)
8	PMRAC-EH10CKT	S09	1	CABINET
9	PMRAC-EH10CKT	S10	1	D-GRILL
10	PMC-EH09WHLAB	S0	1	TOP COVER
11	PMC-EH09WHLAB	S0	1	SV-COVER
12	PMRAC-F10CJ	S03	1	PROPELLER FAN
13	PMC-EH09WHLAB	S09	1	P.W.B (MAIN) (RAC-EH09WHLAB)
13	PMC-EH12WHLAB	S01	1	P.W.B (MAIN) (RAC-EH12WHLAB)
1	PMC-EH09WHLAB	S02	1	CONDENSER
15	PMRAC-XH18CKT	S02	1	FAN MOTOR
1	PMC-EH09WHLAB	S13	1	OLR COVER
1	PMC-EH09WHLAB	S03	1	TERMINAL BOARD (5P)
18	PMC-EH09WHLAB	S01	1	COMPRESSOR
19	PMRAM-33NP2E	S05	1	REACTOR
20	PMRAC-PH18CMT	S0	1	SUPPORT (FAN MOTOR)
21	PMC-EH09WHLAB	S0	1	STRAINER
22	PMC-EH09WHLAB	S11	1	THERMISTOR (DEFROST)
23	PMC-EH09WHLAB	S12	1	MG-COIL-SH
2	PMRAC-25NPA	S02	1	ELECTRICAL EXPANSION COIL
25	PMRAC-X10CGT	S05	1	EXPANSION VALVE

MODEL RAC-EH09WHLAE/RAC-EH12WHLAE

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	PMKPNT1	001	3	PUSH NUT
2	PMC-EH09WHLAB	S08	1	THERMISTOR (OH)
3	PMC-EH09WHLAB	S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
	PM RAC-EH 1 0CKT	S0	1	VALVE 2S
5	PM RAC-EH 1 0CKT	S05	1	VALVE 3S
	PMRAC-EH10CKT	S0	1	SIDE PLATE (L)
	PMC-EH09WHLAB	S05	1	SIDE PLATE (R)
8	PM RAC-EH 1 0CKT	S09	1	CABINET
9	PMRAC-EH10CKT	S10	1	D-GRILL
10	PMC-EH09WHLAB	S0	1	TOP COVER
11	PMC-EH09WHLAB	S0	1	SV-COVER
12	PMRAC-F10CJ	S03	1	PROPELLER FAN
13	PMC-EH09WHLAE	S01	1	P.W.B (MAIN) (RAC-EH09WHLAE)
13	PMC-EH12WHLAE	S01	1	P.W.B (MAIN) (RAC-EH12WHLAE)
1	PMC-EH09WHLAB	S02	1	CONDENSER
15	PMRAC-XH18CKT	S02	1	FAN MOTOR
1	PMC-EH09WHLAB	S13	1	OLR COVER
1	PMC-EH09WHLAB	S03	1	TERMINAL BOARD (5P)
18	PMC-EH09WHLAB	S01	1	COMPRESSOR
19	PMRAM-33NP2E	S05	1	REACTOR
20	PMRAC-PH18CMT	S0	1	SUPPORT (FAN MOTOR)
21	PMC-EH09WHLAB	S0	1	STRAINER
22	PMC-EH09WHLAB	S11	1	THERMISTOR (DEFROST)
23	PMC-EH09WHLAE	S02	1	MG-COIL-SH
2	PMRAC-25NPA	S02	1	ELECTRICAL EXPANSION COIL
25	PMRAC-X10CGT	S05	1	EXPANSION VALVE

HITACHI

RAS-EH09PHLAB/RAC-EH09WHLAB
RAS-EH12PHLAB/RAC-EH12WHLAB
RAS-EH07QHLAE/(MULTI ONLY)
RAS-EH09RHLAE/RAC-EH09WHLAE
RAS-EH12RHLAE/RAC-EH12WHLAE

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