HITACHI

PM | NO. 0752E

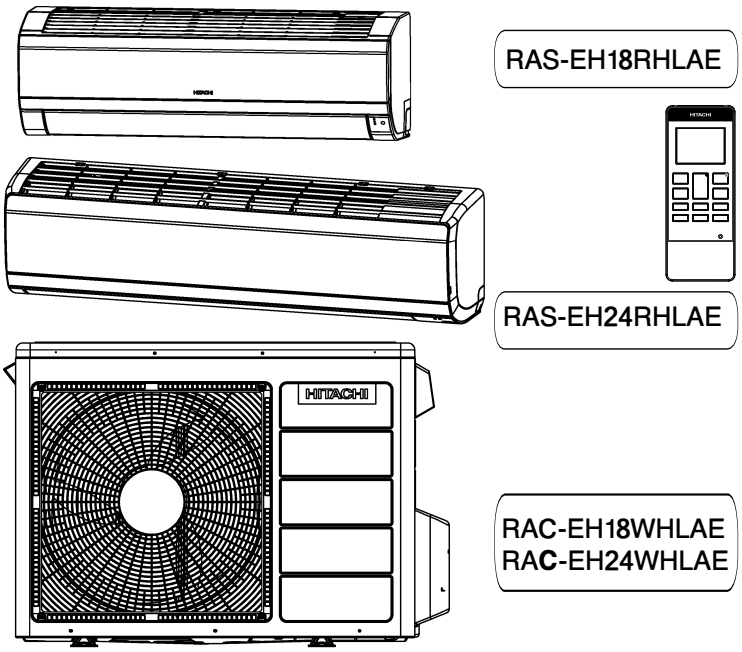
RAS-EH18RHLAE/RAC-EH18WHLAE
RAS-EH24RHLAE/RAC-EH24WHLAE

SERVICE MANUAL

TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY

REFER TO THE FOUNDATION MANUAL



RAS-EH18RHLAE

RAS-EH24RHLAE

RAC-EH18WHLAE
RAC-EH24WHLAE

CONTENTS

SPECIFICATIONS

TYPE			(WALL TYPE)			
			INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL			RAS-EH18RHLAE	RAC-EH18WHLAE	RAS-EH24RHLAE	RAC-EH24WHLAE
POWER SOURCE			1 PHASE 60Hz 208 - 230V			
COOLING	TOTAL INPUT	(w)	1960		2399	
	TOTAL AMPERES	(A)	8.70		10.40	
	CAPACITY	(kW)	5.2		7.0	
		(B.T.U./h)	17600 (5700-18600)		24000 (8200-25200)	
HEATING	TOTAL INPUT	(w)	1930		2210	
	TOTAL AMPERES	(A)	8.50		9.60	
	CAPACITY	(kW)	5.5		7.3	
		(B.T.U./h)	19000 (6700-20500)		25000 (8300-26500)	
DIMENSIONS in (mm)		W	30.70	33.46	43.30	33.46
			(780)	(850)	(1100)	(850)
		H	11.07	25.59	11.81	25.59
			(280)	(650)	(300)	(650)
		D	9.05	11.73	10.23	11.73
			(230)	(298)	(260)	(298)
NET WEIGHT		lb(kg)	17.6 (8)	94.8 (43)	33.1 (15)	97 (44)

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

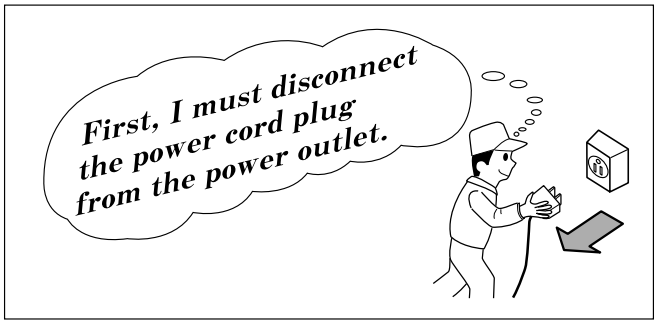
ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

APRIL 2021

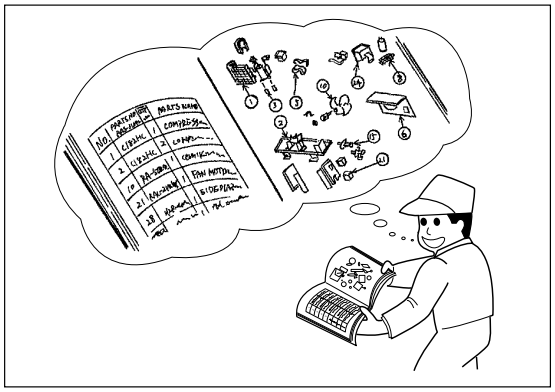
SAFETY DURING REPAIR WORK

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

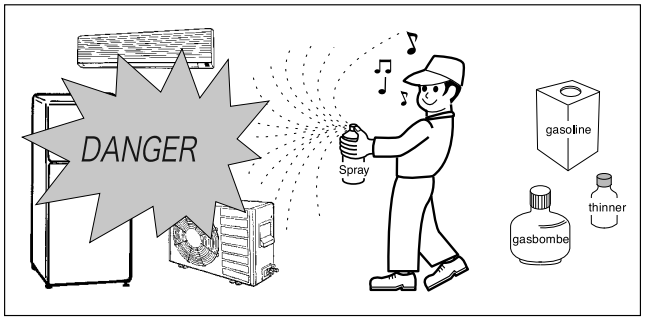
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit. The insulation resistance should be 1MΩ or more as measured by a 500V DC megger.

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

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

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

12. If refrigerant gas leaks during repair work, please ensure there is enough ventilation, leaked refrigerant that accumulates in stagnation, rarely causes any igntition 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 (R32) 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).

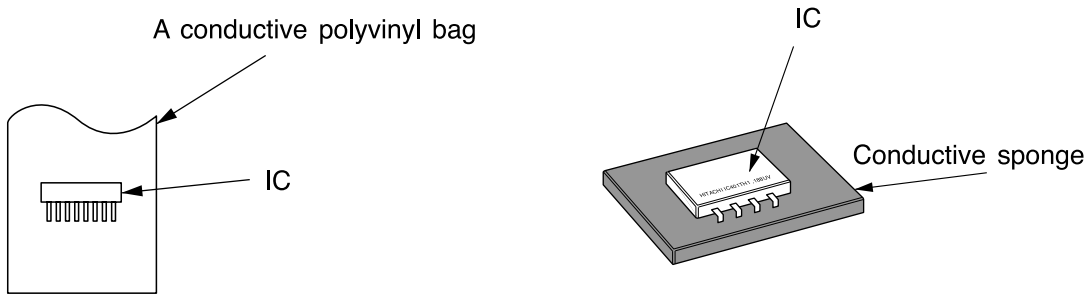


Fig. 1. Conductive container

   (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 1MΩ earth resistance through a ring or bracelet).

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

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

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

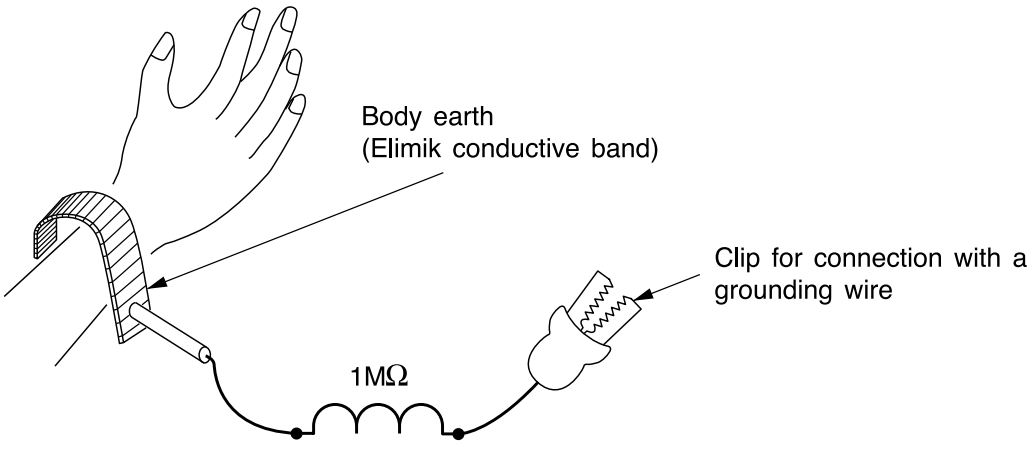


Fig. 2. Body Earth

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

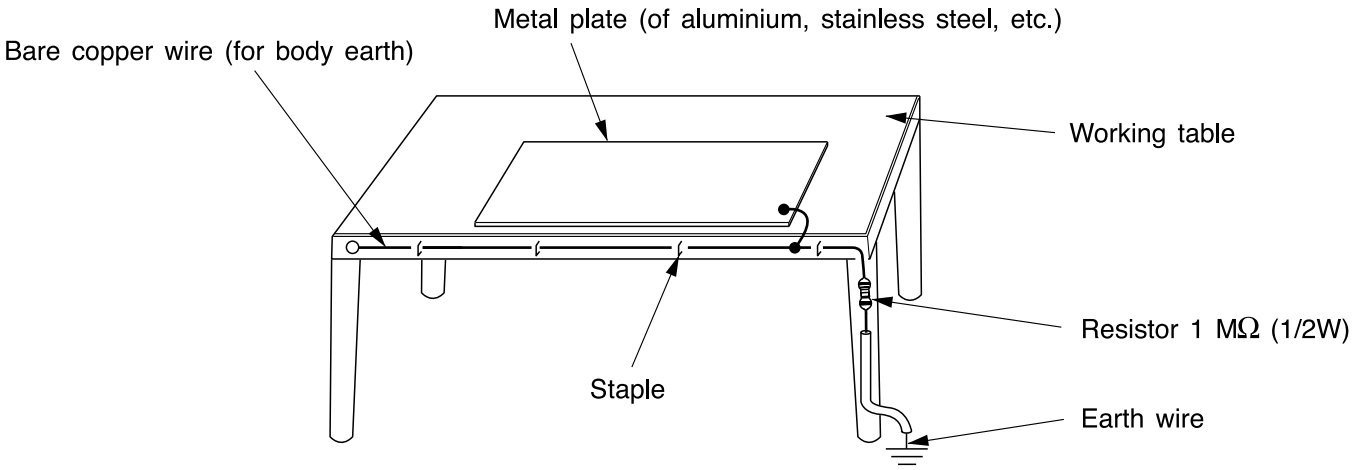


Fig. 3. Grounding of the working table

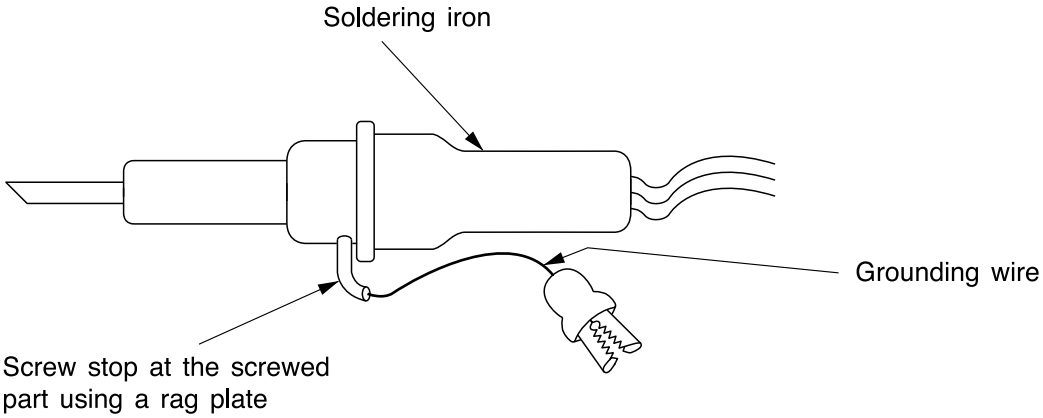


Fig. 4. Grounding a solder iron

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

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

⚠ CAUTION

1. 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

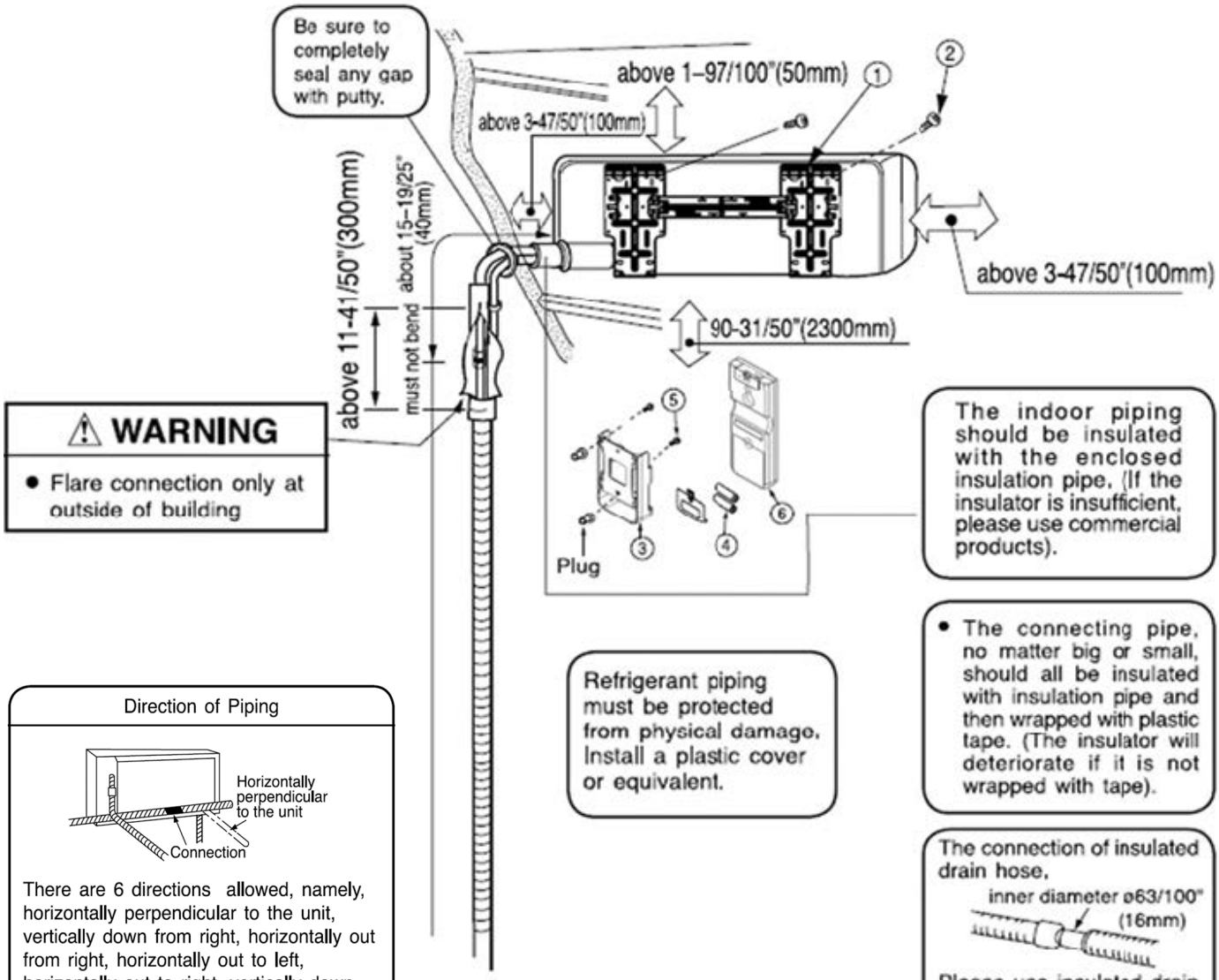
MODEL		RAS-EH18RHLAE	RAS-EH24RHLAE	RAC-EH18WHLAE	RAC-EH24WHLAE
FAN MOTOR		38W	45W	47W	
FAN MOTOR CAPACITOR		NO		NO	
FAN MOTOR PROTECTOR		NO		NO	
COMPRESSOR		NO		ATD141RDNA8JT	ATD186UKQA9LT6A
COMPRESSOR MOTOR CAPACITOR		NO		NO	
OVERLOAD PROTECTOR		NO		NO	
OVERHEAT PROTECTOR		NO		YES	
FUSE (for MICROPROCESSOR)		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	-----	-----	52.2oz (1480g)	70.6oz (2000g)
	PIPES (MAX. 82ft (25m)))	-----	-----	Additional 0.007lb/ft (10g/m) after 26.2ft (8m) length	Additional 0.004lb/ft (6g/m) after 26.2ft (8m) length

INDOOR MODEL : RAS-EH18RHLAE

Figure showing the Installation of Indoor

⚠ CAUTION

Height difference" and "Piping length" of Indoor and Outdoor unit are different by Outdoor unit. Please refer to Installation manual of Outdoor unit.



⚠ WARNING

- Flare connection only at outside of building

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

- The 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).

Refrigerant piping must be protected from physical damage. Install a plastic cover or equivalent.

Direction of Piping

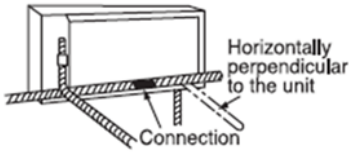
There are 6 directions allowed, namely, horizontally perpendicular to the unit, vertically down from right, horizontally out from right, horizontally out to left, horizontally out to right, vertically down from left.

The connection of insulated drain hose,

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

INDOOR MODEL : RAS-EH24RHLAE

Direction of Piping

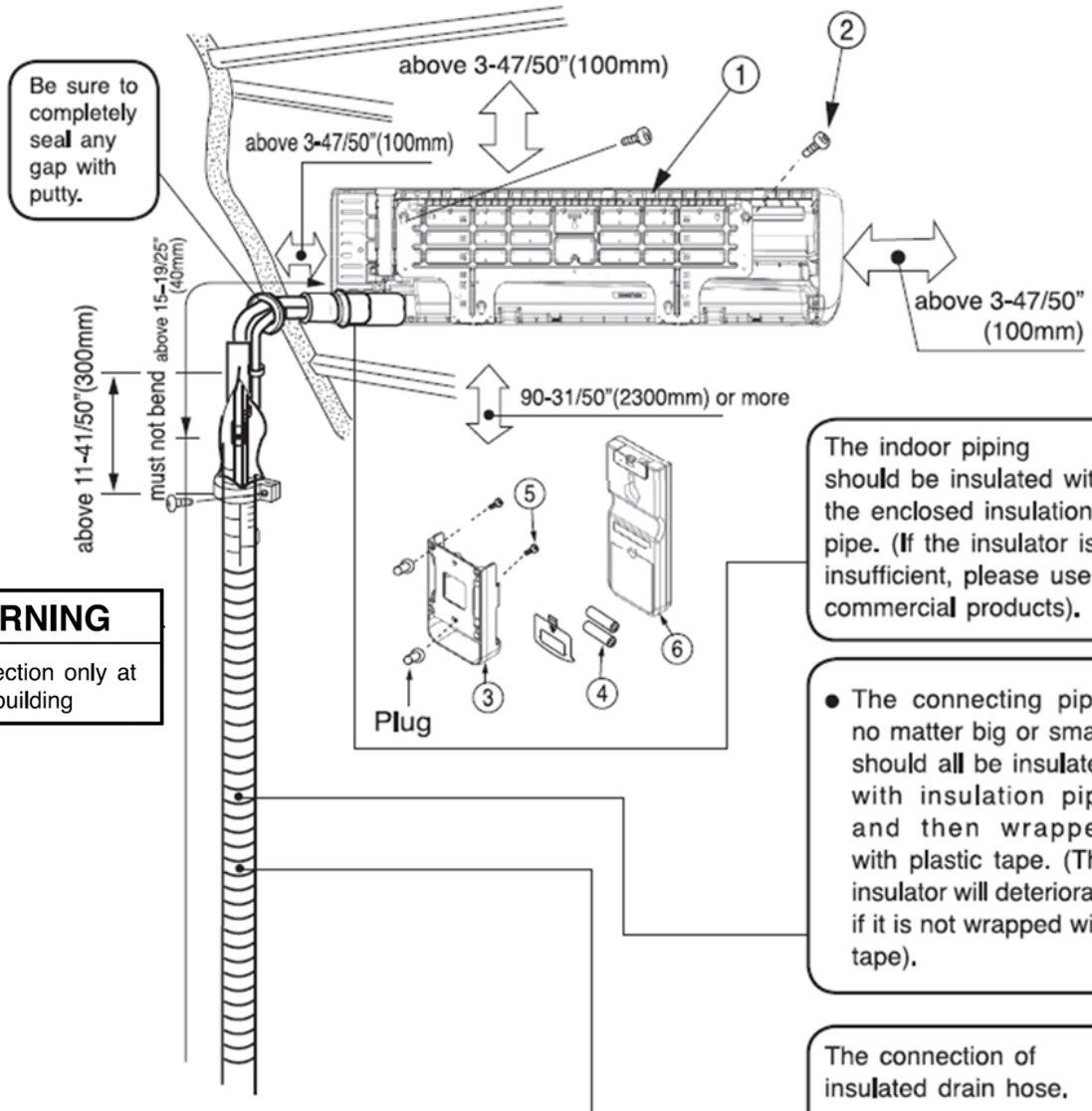


There are 6 directions allowed, namely, horizontally perpendicular to the unit, vertically down from right, horizontally out from right, horizontally out to left, horizontally out to right, vertically down from left.
Don't form the piping downward at the left of the unit.

Figure showing the Installation of Indoor

⚠ 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).



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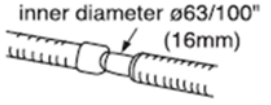
The connection of insulated drain hose.



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

OUTDOOR MODEL : RAC-EH18WHLAE, RAC-EH24WHLAE

Dimension of Mounting Stand of the outdoor unit

(unit : in(mm))

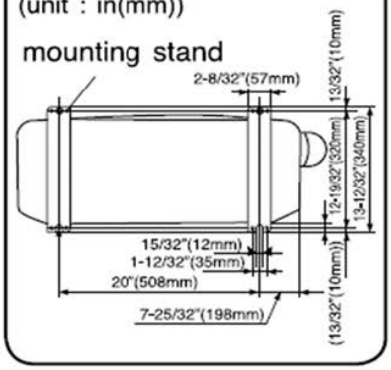


Figure showing the Installation of Outdoor Unit.

⚠ 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-EH18WHLAE	82-1/50(25)	24-61/100(7.5)	0.007(10)
RAC-EH24WHLAE	82-1/50(25)	24-61/100(7.5)	0.004(6)

⚠ WARNING

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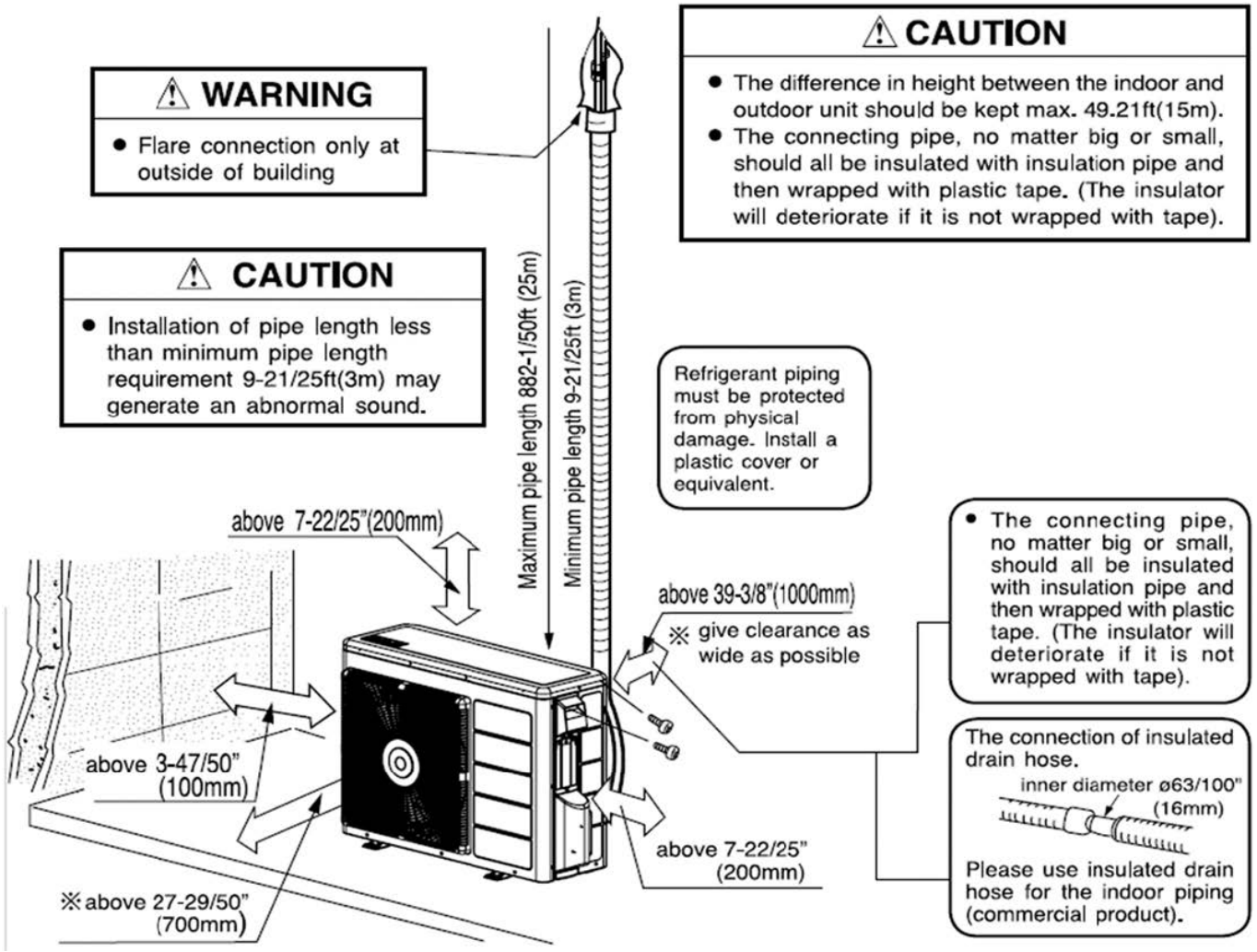
⚠ CAUTION

- Installation of pipe length less than minimum pipe length requirement 9-21/25ft(3m) may generate an abnormal sound.



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

⚠ WARNING	*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	⚠ CAUTION
This mark warns of death or serious injury.	**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

⚠ WARNING

- 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

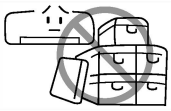
⚠ CAUTION

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

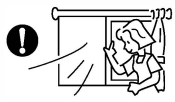
CAUTION

- 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.

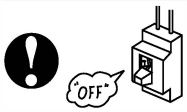


- Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.

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

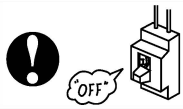
- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.

- 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.



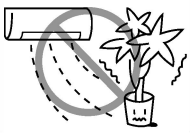
- Please switch off the unit and turn off the circuit breaker during cleaning, the high-speed fan inside the unit may cause danger.

- 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.



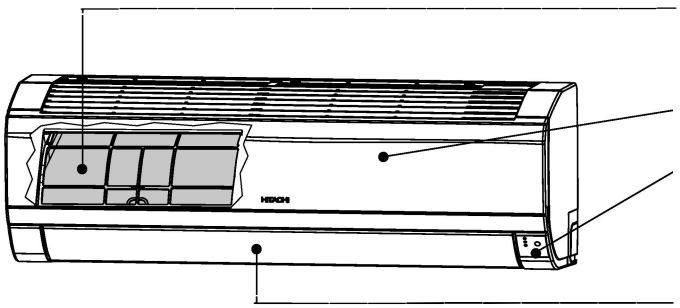
- Do not place plants directly under the air flow as it is bad for the plants.

- 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

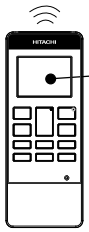


Pre-filter
To prevent dust from coming into the indoor unit.

Front panel

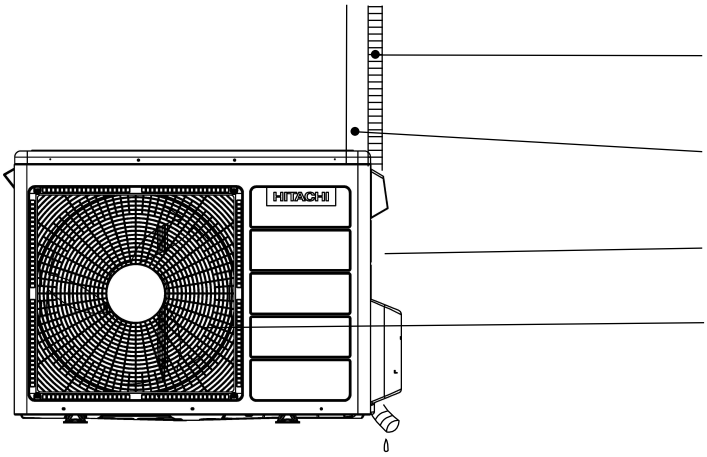
Indoor unit indicators
LED light shows the operating mode.

Horizontal deflector • Vertical deflector (Air Outlet)



Remote controller
Send out operation signal to the indoor unit. So as to operate the whole unit.
Please refer to the Remote Manual provided for functions and operation details.

OUTDOOR UNIT



DRAIN PIPE
Condensed water drain to outside.

CONNECTING CORD AND INSULATION PIPE FOR PIPING

AIR INLET (BACK, LEFT SIDE)

AIR OUTLET

⚠ CAUTION

- When heating operation, drain or defrosted water flows out from outdoor unit. Don't close drain outlet portion in chilly area so as not to freeze these.

MODEL NAME AND DIMENSIONS

MODEL	WIDTH in(mm)	HEIGHT in(mm)	DEPTH in(mm)
RAS-EH18RHLAE	30.70"(780)	11.07" (280)	9.05" (230)
RAC-EH18WHLAE	33.46"(850)	25.59" (650)	11.73" (298)

INDOOR UNIT INDICATORS MODEL RAS-EH18RHLAE

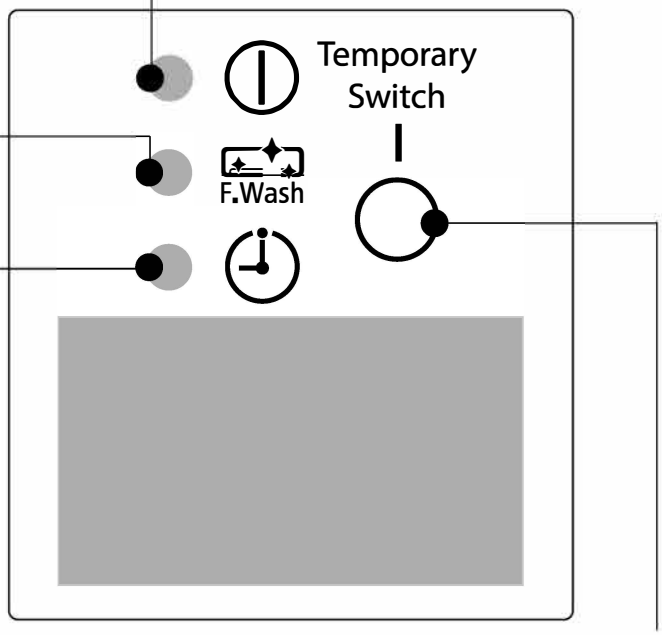
OPERATION LED
This LED lights during operation.
The OPERATION LED flashes/dimming in the following cases during heating.

(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

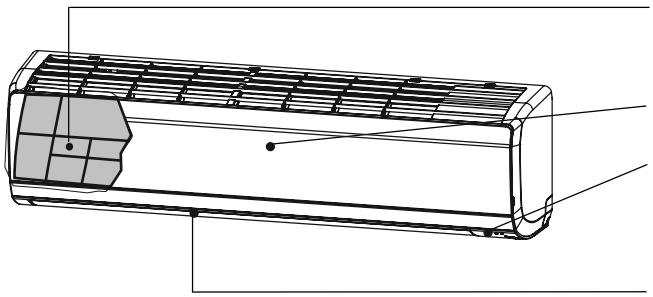
TEMPORARY SWITCH

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.

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT

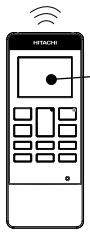


Pre-fi lter
To prevent dust from coming into the indoor unit.

Front panel

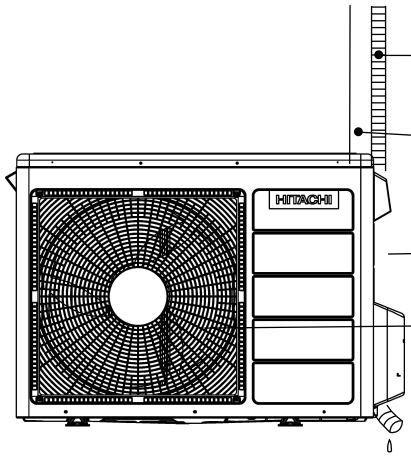
Indoor unit indicators
LED light shows the operating mode.

Horizontal deflector • Vertical deflector (Air Outlet)



Remote controller
Send out operation signal to the indoor unit. So as to operate the whole unit.
Please refer to the Remote Manual provided for functions and operation details.

OUTDOOR UNIT



DRAIN PIPE
Condensed water drain to outside.

CONNECTING CORD AND INSULATION PIPE FOR PIPING

AIR INLET (BACK, LEFT SIDE)

AIR OUTLET

⚠ CAUTION

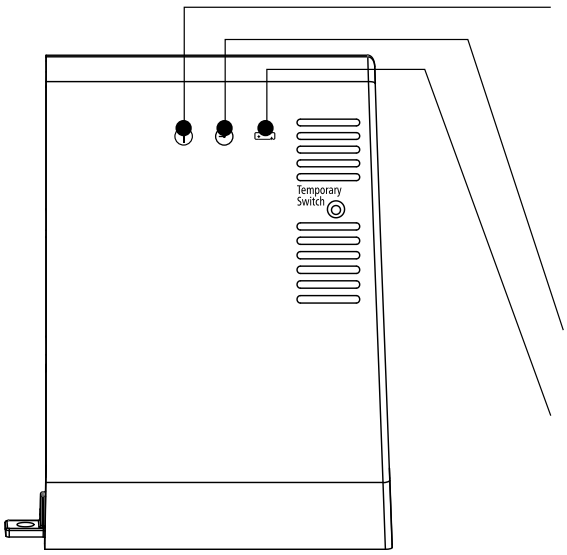
- When heating operation, drain or defrosted water flows out from outdoor unit. Don't close drain outlet portion in chilly area so as not to freeze these.

MODEL NAME AND DIMENSIONS

MODEL	WIDTH in(mm)	HEIGHT in(mm)	DEPTH in(mm)
RAS-EH24RHLAE	43.31"(1100)	11.81" (300)	10.24" (260)
RAC-EH24WHLAE	33.46"(850)	25.59" (650)	11.73" (298)

INDOOR UNIT INDICATORS

MODEL RAS-EH24RHLAE



OPERATION LED

This LED lights during operation.
The OPERATION LED fl ashes/dimming in the following cases during heating.

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

(2) 2) Duri 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.

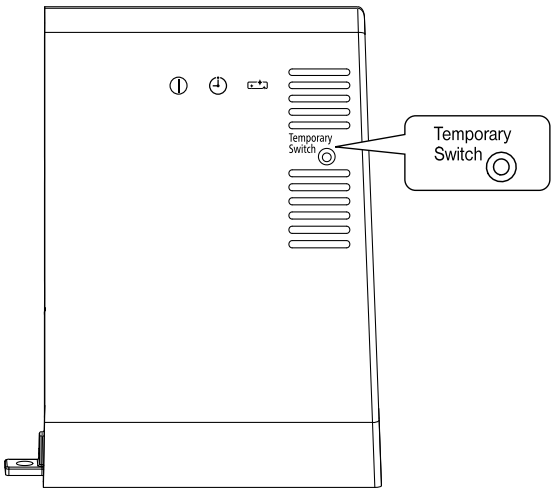
TIMER LED

This LED lights up when the timer is working.

FROST WASH LED

This LED lights when the Frost Wash function is in operation. If the auto Frost Wash function is canceled and operation is stopped, when the device is operated for a total of about 42 hours, the Frost Wash LED blinks to indicate that it is time to operate the manual Frost Wash function.
(not applicable for Multi split connection)

OPERATION INDICATOR



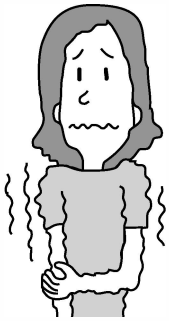
TEMPORARY SWITCH

Use this switch to start and stop when the remote controller does not work. [Use non-conductor stick (example toothpick)]

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

THE IDEAL WAYS OF OPERATION

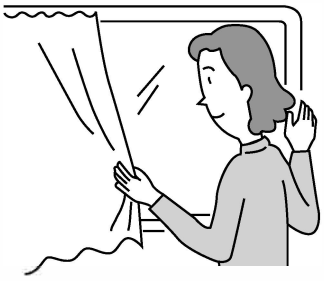
Suitable Room Temperature



⚠ 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.

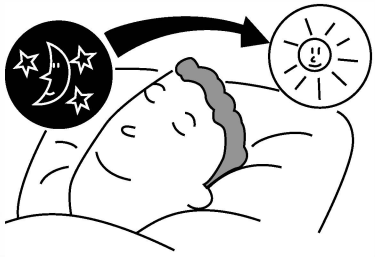
Ventilation

⚠ 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.

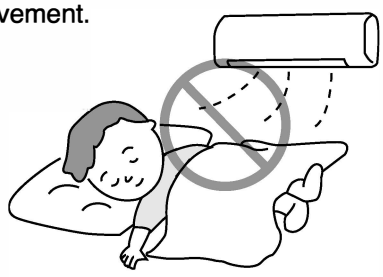


Do Not Forget To Clean The Pre-Filter

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.

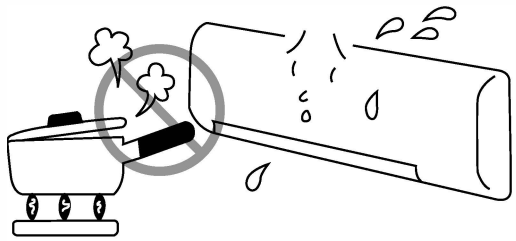


FOR USER'S INFORMATION

The Air Conditioner And The Heat Source In The Room

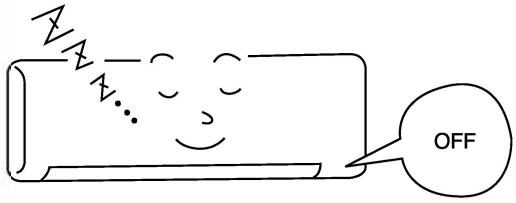
⚠ Caution

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

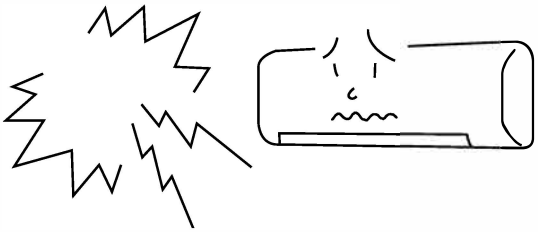
When the indoor unit is not to be used for a long period of time, please switch off the power from the main unit. If the power from main unit remains "ON", the indoor unit still consumes about 3W in the operation control circuit even if it is in "OFF" mode.



When Lightning Occurs

⚠ Warning

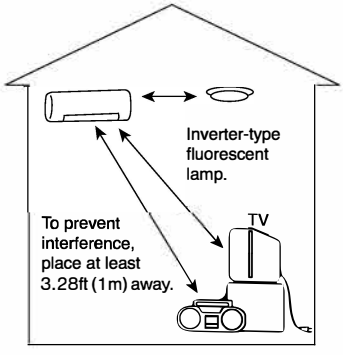
To protect the whole unit during lightning, please stop operating the unit.



Interference From Electrical Products

⚠ Caution

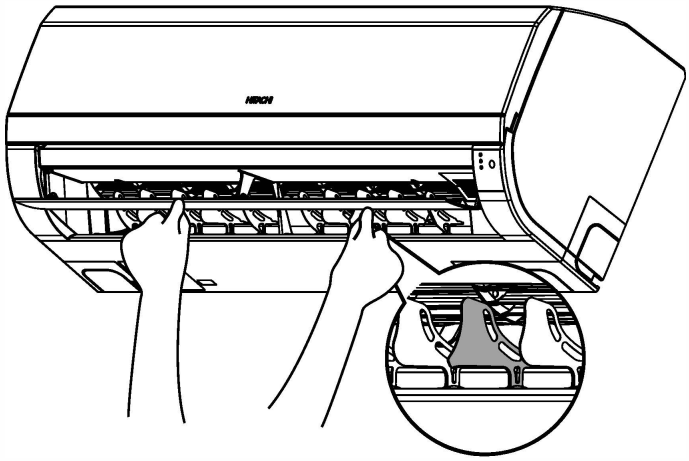
To avoid noise interference, please place the indoor unit and its remote controller at least 3.28ft (1m) away from electrical products.



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.

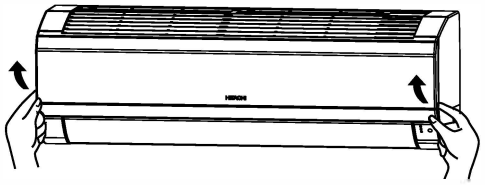
ATTACHING THE AIR PURIFYING FILTERS (RAS-EH18RHLAE)

⚠ CAUTION

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

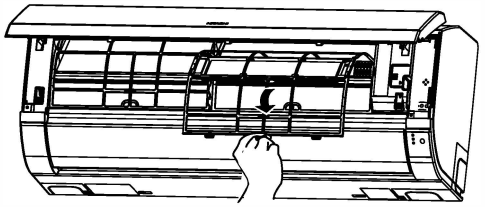
1 **Open the front panel**

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



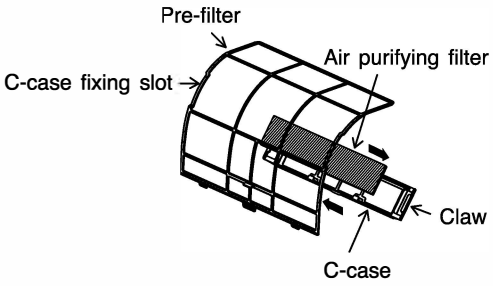
2 **Remove the Pre-filter**

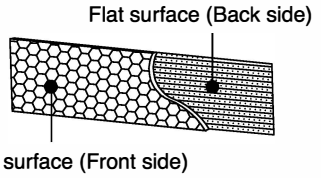
- Push upward to release the clasps and pull out the Pre-filter.



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 it 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).

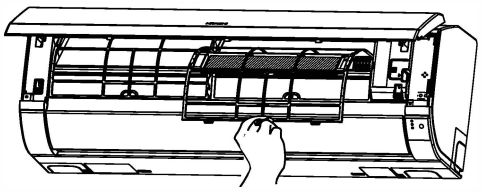




⚠ CAUTION

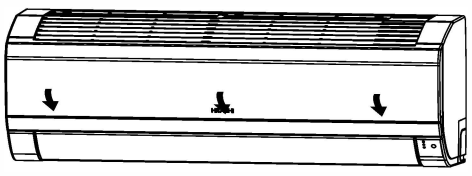
Do not bend the air purifying filter as it may cause damage to the structure.

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.



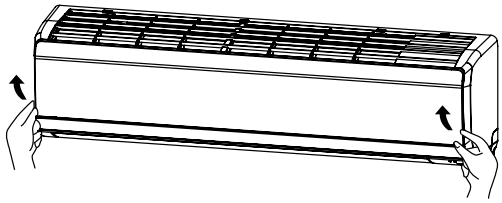
NOTE

- 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 use 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.

ATTACHING THE AIR PURIFYING FILTERS (RAS-EH24RHLAE)

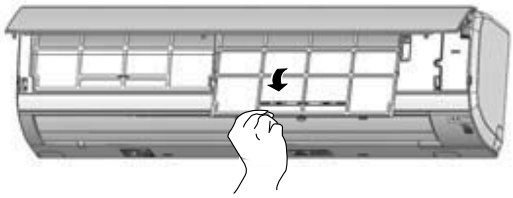
1 **Open the front panel**

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



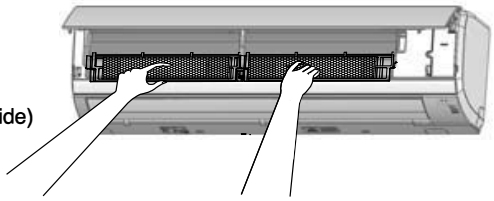
2 **Remove the Prefilter**

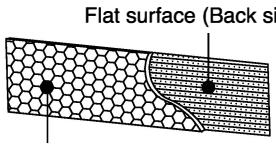
- Push upward to release the clasps and pull out the Pre-filter.



3 **Attaching the air purifying filters**

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

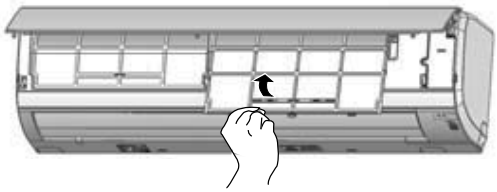




⚠ CAUTION

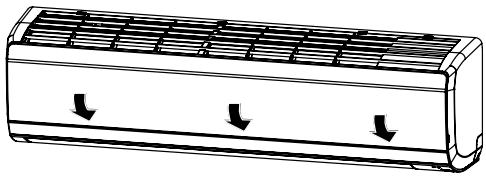
Do not bend the air purifying filter as it may cause damage to the structure.

Please do not smell direct from source of filter.



4 **Attach the Prefilters**

- 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 use 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

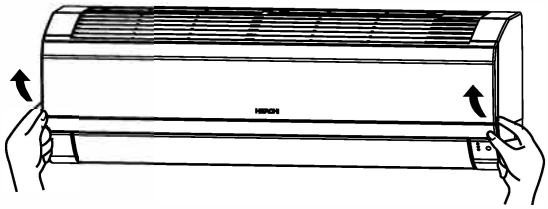
Before cleaning, stop operation and switch off the power supply.

1. PRE-FILTER

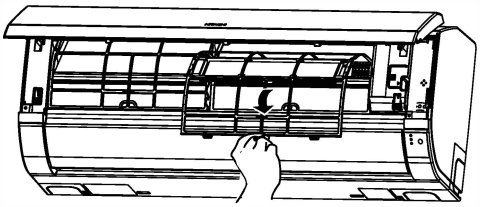
Clean the Pre-filter, as it removes dust inside the room. In case the Pre-filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the Pre-filter following the procedure below.

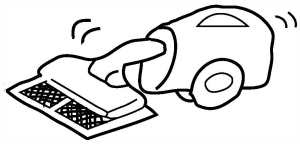
PROCEDURE

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

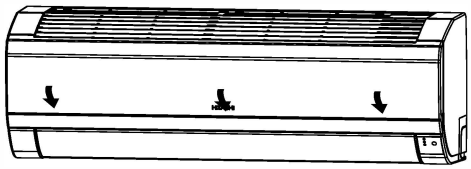


2 Vacuum dust from the Pre-filter and air purifying filter using vacuum cleaner. If there is too much dust, rinse under running tap water and gently brush it with soft bristle brush. Allow filters to dry in shade.





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.

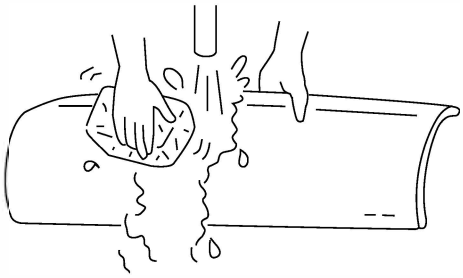


⚠ CAUTION

- 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

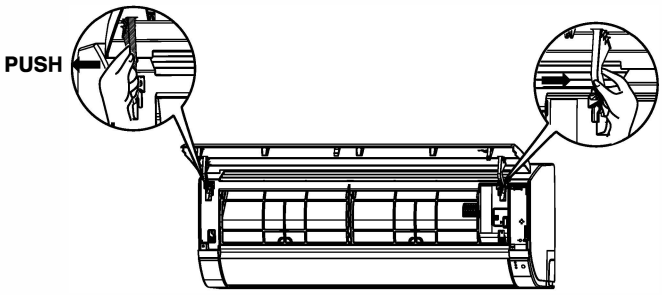
- Remove the front panel and wash with clean water. Wash it with a soft sponge.
  After using mild detergent, wash thoroughly with clean water.



- 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.

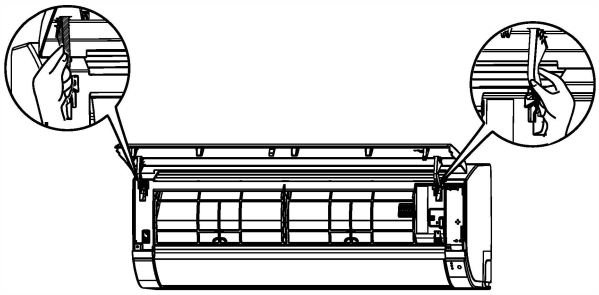
Method of removing the front panel.
Be sure to hold the front panel with both hands to detach and reattach it.

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.

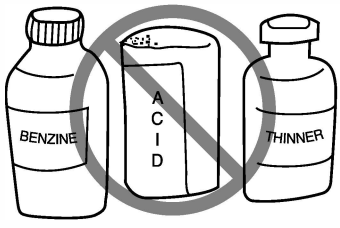
Reattaching the Front Panel



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 an 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

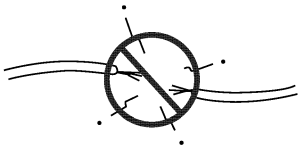
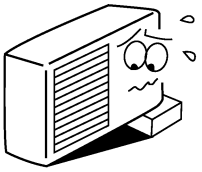
If the supply cord is damaged, it must be replaced with the new cord obtainable at authorized service parts centers.

⚠ 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 hot 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 occassionally occur, but they are not abnormal for the operation.
  (1) Slight flowing noise of refrigerant in the refrigerating cycle.
  (2) Slight rubbing noise from the fan casing which is cooled and then gradually warmed as operation stops.
- The odor will possibly be emitted from the room air conditioner because the various odor, emitted by smoke, foodstuffs, cosmetics and so on, sticks to it. So the 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.

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

Note

- Avoid 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:

Single Split model connection (RAC-EH** series)

		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	–	–	–	–

Multi Split model connection (RAM-SH** series)

		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	–	–	–	–

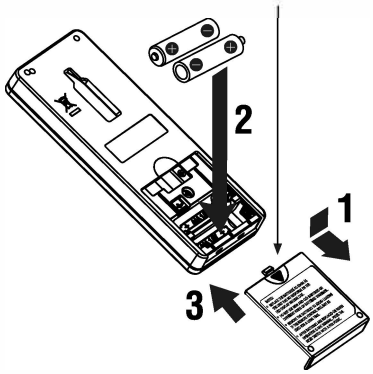
MEMO

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.

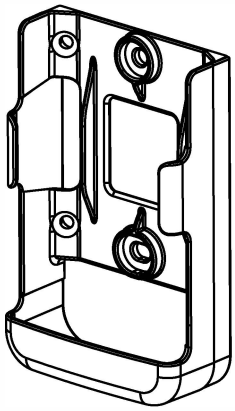
■ To set the batteries

Push and pull to the direction of arrow



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

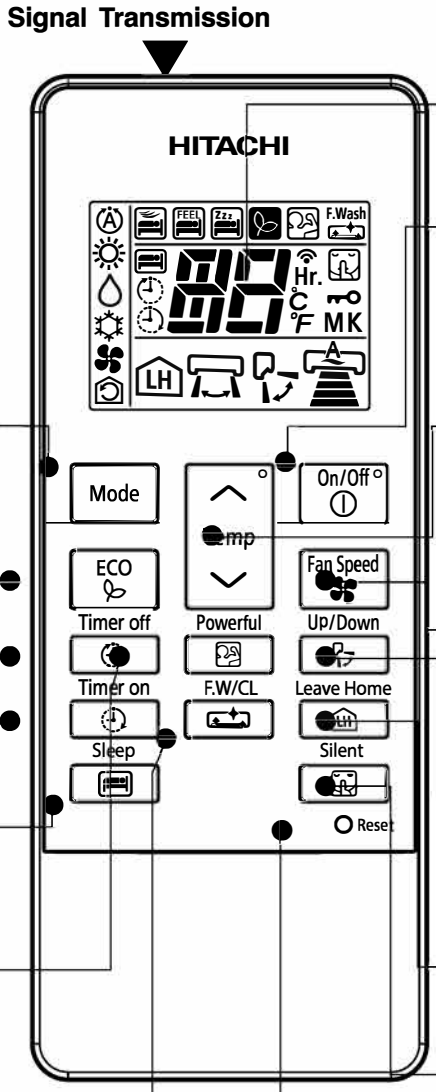
If you replace the batteries, or after pressing 'Reset' button, the temperature display will return to °F. Follow 'Temperature Switching' instruction to change to °C.

⚠ 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.



MODE selector Button
Use this button to select the operating mode. Every time you press this button, the mode will change from Ⓐ (AUTO) → ☼ (HEAT) → ○ (DEHUMIDIFY) → ☼(COOL) and → ✣ (FAN) cyclically. (☞ Page 28 ~ 32)

ECO Button
Use this button to set the ECO mode.(☞ Page 38)

TIMER OFF Button
Select the turn OFF timer. (☞ Page 33)

TIMER ON Button
Select the turn ON timer. (☞ Page 33)

SLEEP Button
Use this button to set sleep timer. (☞ Page 40)

POWERFUL Button
Press this button to start operation. (☞ PPOWERFUL age 34)

Transmission Sign
The transmission sign blinks when a signal has been sent.

ON/OFF Button
Press this button to start operation.
Press it again to stop operation.

TEMPERATURE Button
Room temperature setting.
Value will change quicker when keep pressing.
(☞ Page 28)

FAN SPEED Button
Select the fan speed for cooling and heating mode.
(☞ Page 33)

UP/DOWN Button
Controls the angle of the horizontal air deflector.
(☞ Page 41)

LEAVE HOME Button
(☞ Page 35)

SILENT Button
Use this button to set SILENT mode. (☞ Page 39)

FROST WASH or CLEAN Button
Use this button to perform clean operation. (☞ Page 36~37)

RESET Button
To reset remote controller setting.

Precautions for Use

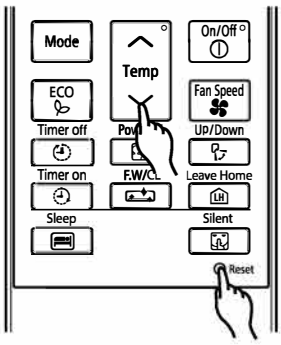
- Do not place the remote controller in the following places.
  - Under direct sunlight.
  - In the vicinity of a heater.
- Handle the remote controller carefully. Do not drop it on the floor, and protect it from water.
- Once the outdoor unit stops, it will not restart for about 3 minutes (unless you 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

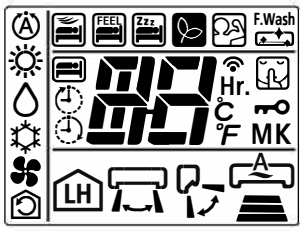
The default temperature display for this model is Fahrenheit (°F).

A To switch the temperature display from Celsius to Fahrenheit

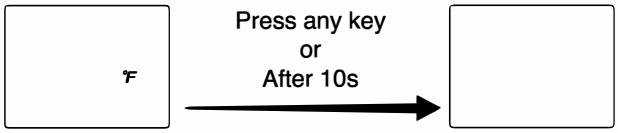
(1) Press and hold ○ Reset + Temp button for 3s.



(2) Release ○ Reset button while pressing Temp until LCD shows Full Segment display.

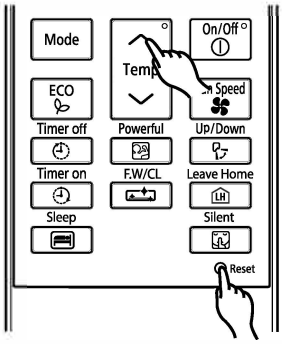


(3) °F sign appears on the screen. The temperature display has switched to Fahrenheit.

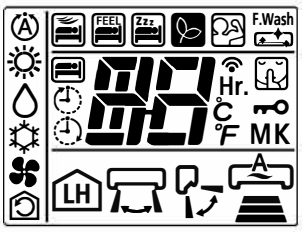


B To switch the temperature display from Fahrenheit to Celsius

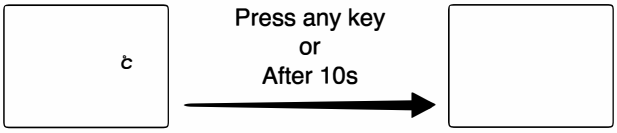
(1) Press and hold ○ Reset + Temp button for 3s.



(2) Release ○ Reset button while pressing Temp 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.

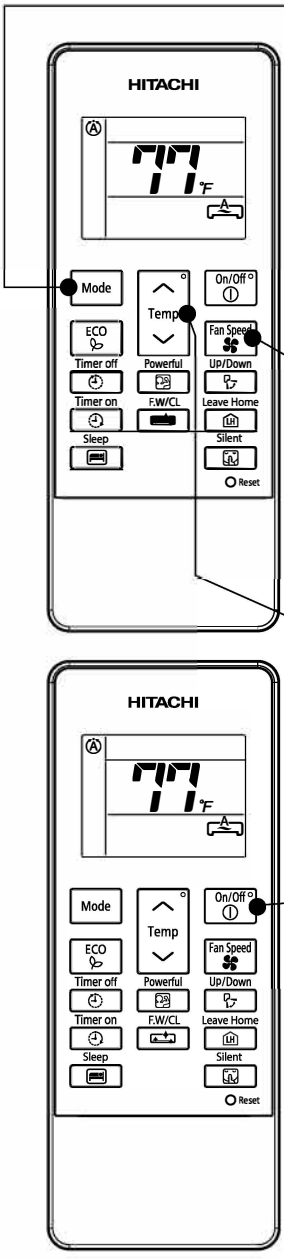
VARIOUS FUNCTIONS

■ 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] (FAN SPEED) button.
The display indicates the setting.

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

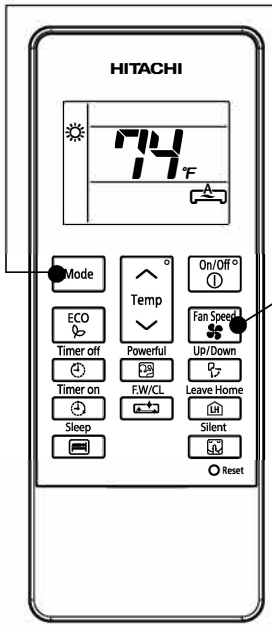
3 Set the desired room temperature using [Temp] (TEMP) button.
The display indicates the setting.
The temperature setting and the actual room temperature may vary depending on conditions.
Temperature can be set between 60° ~ 90°F (16° ~ 32°C)

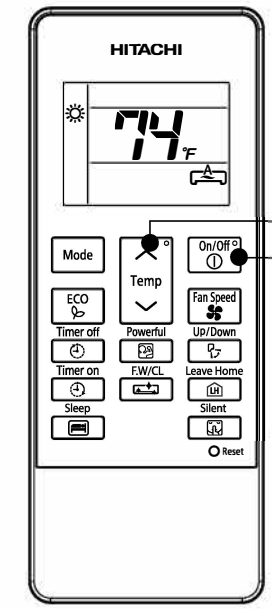
START / STOP Press the [On/Off] (ON/OFF) button.
Operation starts with a beep.
Press the button again to stop operation.

■ As the settings are stored in the memory of the remote controller, you only have to press the [On/Off] (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.

2 Set the desired FAN SPEED using [Fan Speed] (FAN SPEED) button.
The display indicates the setting.

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

3 Set the desired room temperature using [Temp] (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] (ON/OFF) button. Heating operation starts with a beep. Press the button again to stop operation.

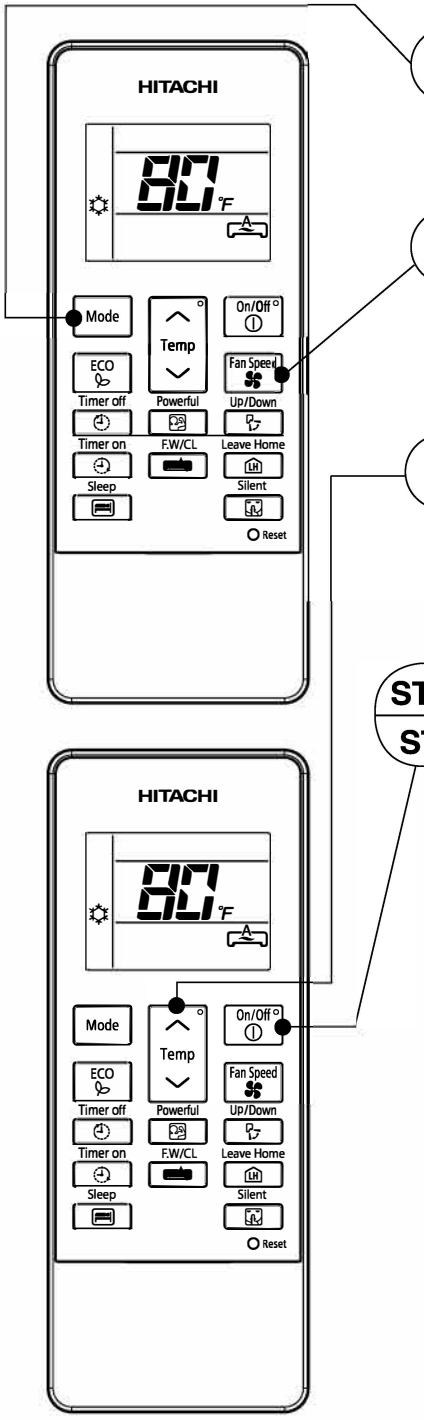
- As the settings are stored in the memory of the remote controller, you only have to press the [On/Off] (ON/OFF) button next time.
- During Auto fan, the fan speed automatically changes as shown below:
  - When the difference between room temperature and set temperature is large, the fan starts to run 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.

2 Set the desired FAN SPEED using [Fan Speed] (FAN SPEED) button. The display indicates the setting.

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

3 Set the desired room temperature using [Temp] (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).

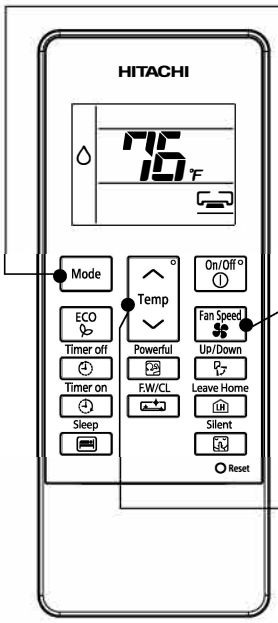
START / STOP Press the [On/Off] (ON/OFF) button. Cooling operation starts with a beep. Press the button again to stop operation. The cooling function does not start if the temperature setting is higher than the current room temperature (even though the ⏻ (OPERATION) lamp lights). The cooling function 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] (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.



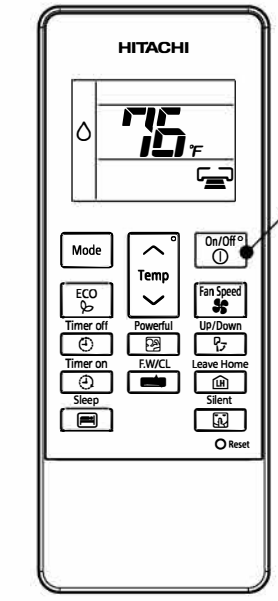
1 Press the MODE selector button to select and display ◯ (DEHUMIDIFY) mode.
The fan speed is set at LOW.

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

→ (LOW) → (SILENT) —

3 Set the desired room temperature using Temp (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 (ON/OFF) button. Dehumidifying operation starts with a beep. Press the button again to stop operation.

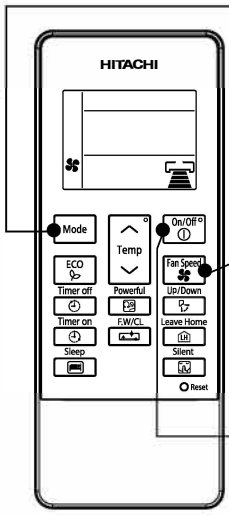
■ As the settings are stored in the memory of the remote controller, you only have to press the On/Off (ON/OFF) button next time.

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 (FAN SPEED) button.

→ (HIGH) → (MED) → (LOW) → (SILENT) →

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

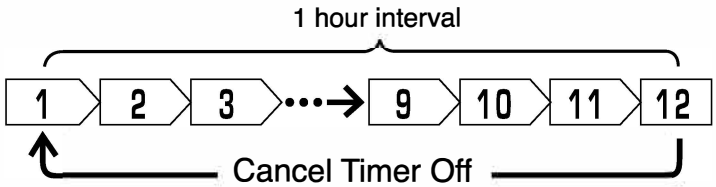
TIMER SETTING

■ ON Timer and OFF Timer are available.

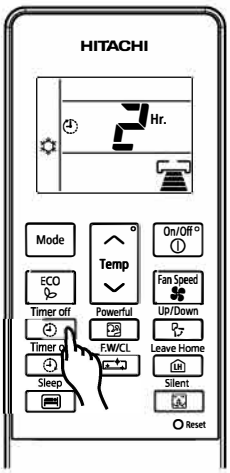
Timer Off setting

● Set the timer to power off the air conditioner.

● Timer setting will change according to the sequence below when Timer Off button is pressed.



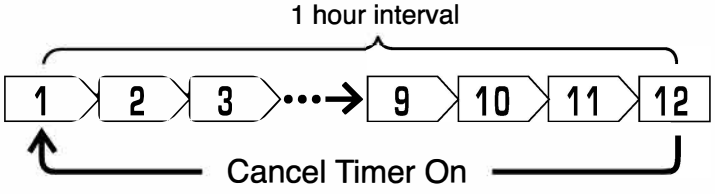
■ Operation stops at set time.



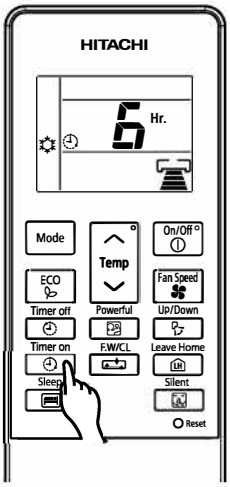
Timer On setting

● Set the timer to power on the air conditioner

● Timer setting will change according to the sequence below when Timer On button is pressed.

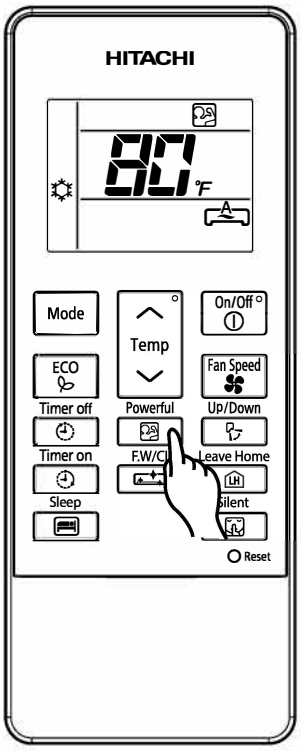


■ Operation starts at set time and temperature.



POWERFUL OPERATION

■ By pressing the Powerful (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 (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 (ON/OFF) button or
- Press the Powerful (POWERFUL) button again.

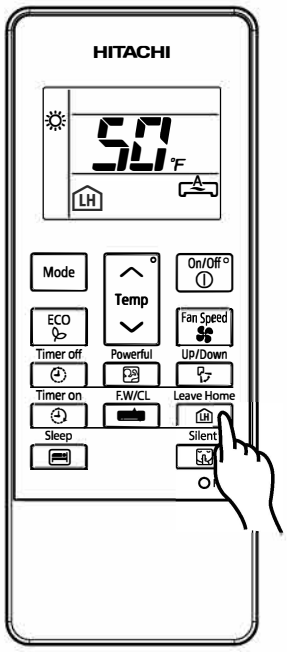
  " " will disappear from the display.

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 (LH) (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 (TEMP) button.

Temperature range can be set between 50°F (10°C) and 60°F (16°C).

"☼", "A", "LH", "SET TEMPERATURE" is displayed on the LCD.

CANCEL

- Press the On/Off (ON/OFF) button, or
- Press the Mode (MODE) button, or
- Press the Leave Home (LH) (LEAVE HOME) button again.

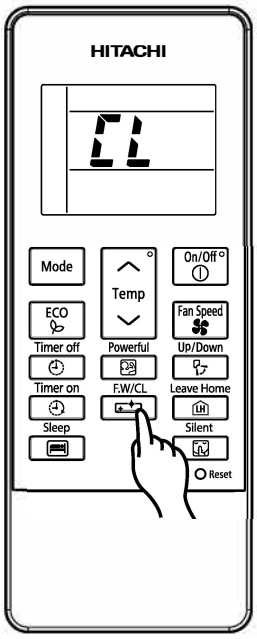
LH will disappear from the display.

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 F.W/CL (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 "CL" is displayed on the LCD.

CANCEL

- Press the On/Off (ON/OFF) button.

NOTE

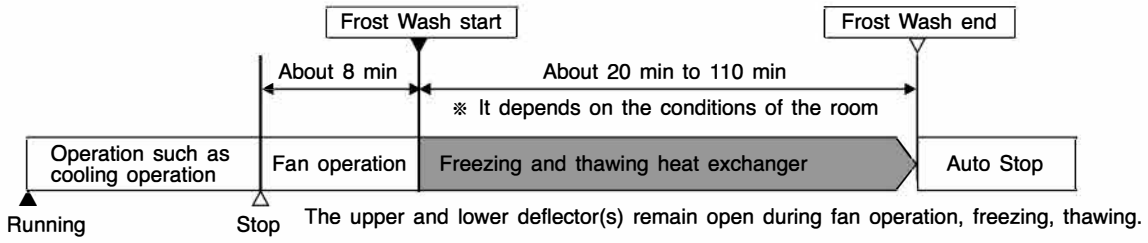
- When CLEAN operation has finished, the unit will enter Standby mode automatically.
- If OFF TIMER or ON TIMER is pre-set, there is a need to cancel those timers before operating CLEAN function.
- For Multi-model connection, when pressing the F.W/CL (FROST WASH/CLEAN), operation is limited to FAN operation 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

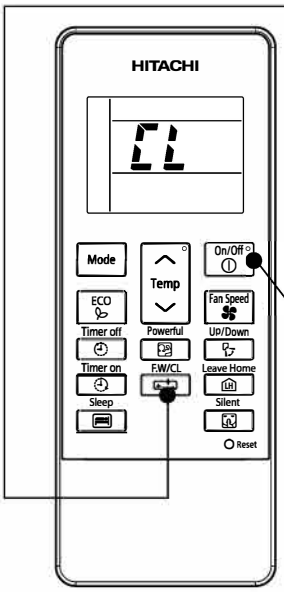
The process of Frost Wash



- " " lamp on the indoor unit lights up during Frost Wash operation.
- If you want to stop Frost Wash operation, press the On/Off (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 F.W/CL (FROST WASH/CLEAN) button, manual Frost Wash will start.



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

1

- Press F.W/CL (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

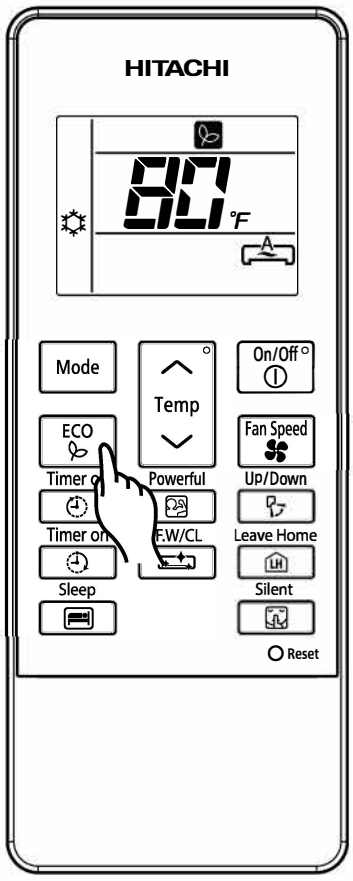
- Press the On/Off (ON/OFF) button, the operation will stop. " " lamp on the indoor unit turns off.

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

When [ECO] (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

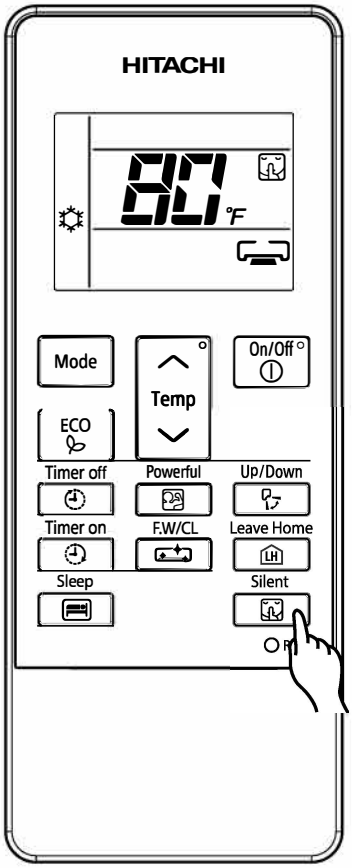
- Press the [On/Off] (ON/OFF) button, or
- Press the [ECO] (ECO) button again.
- " " will disappear from the LCD.

NOTE

- ECO function may not be effective when power consumption is low.
- By pressing the [Powerful] (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 (SILENT) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, fan speed will change to silent fan speed .



START

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

CANCEL

- Press the On/Off (ON/OFF) button, or
- Press the Silent (SILENT) button once again or
- Press the Fan Speed (FAN SPEED) button.

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

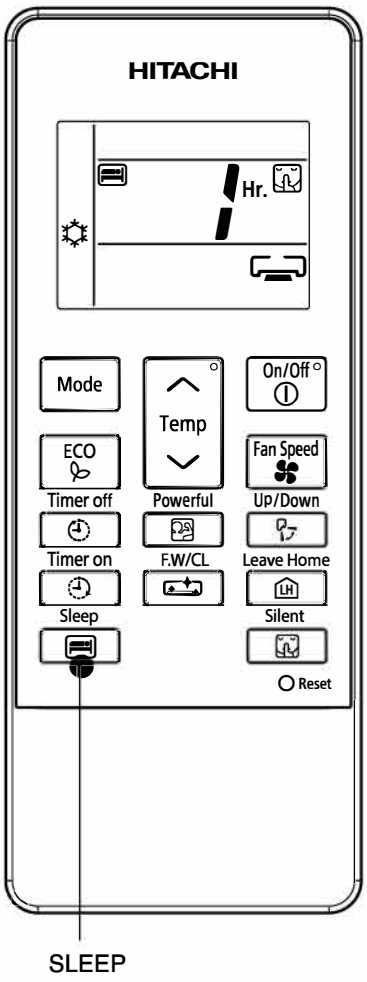
When SILENT operation stops, " " will disappear from the LCD.

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 (SILENT) button, the fan speed will not change.

SLEEP TIMER SETTING

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



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

START

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

When Sleep (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 (ON/OFF) button.

  Room air conditioner will enter Standby mode.

- Press the Sleep (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.

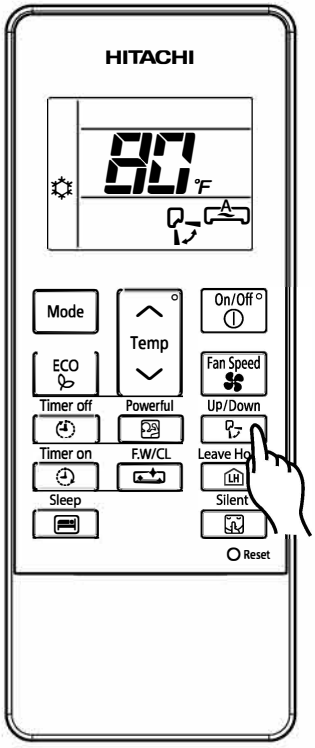
NOTE

- 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] (UP/DOWN) button.



- If the " [Up/Down] (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

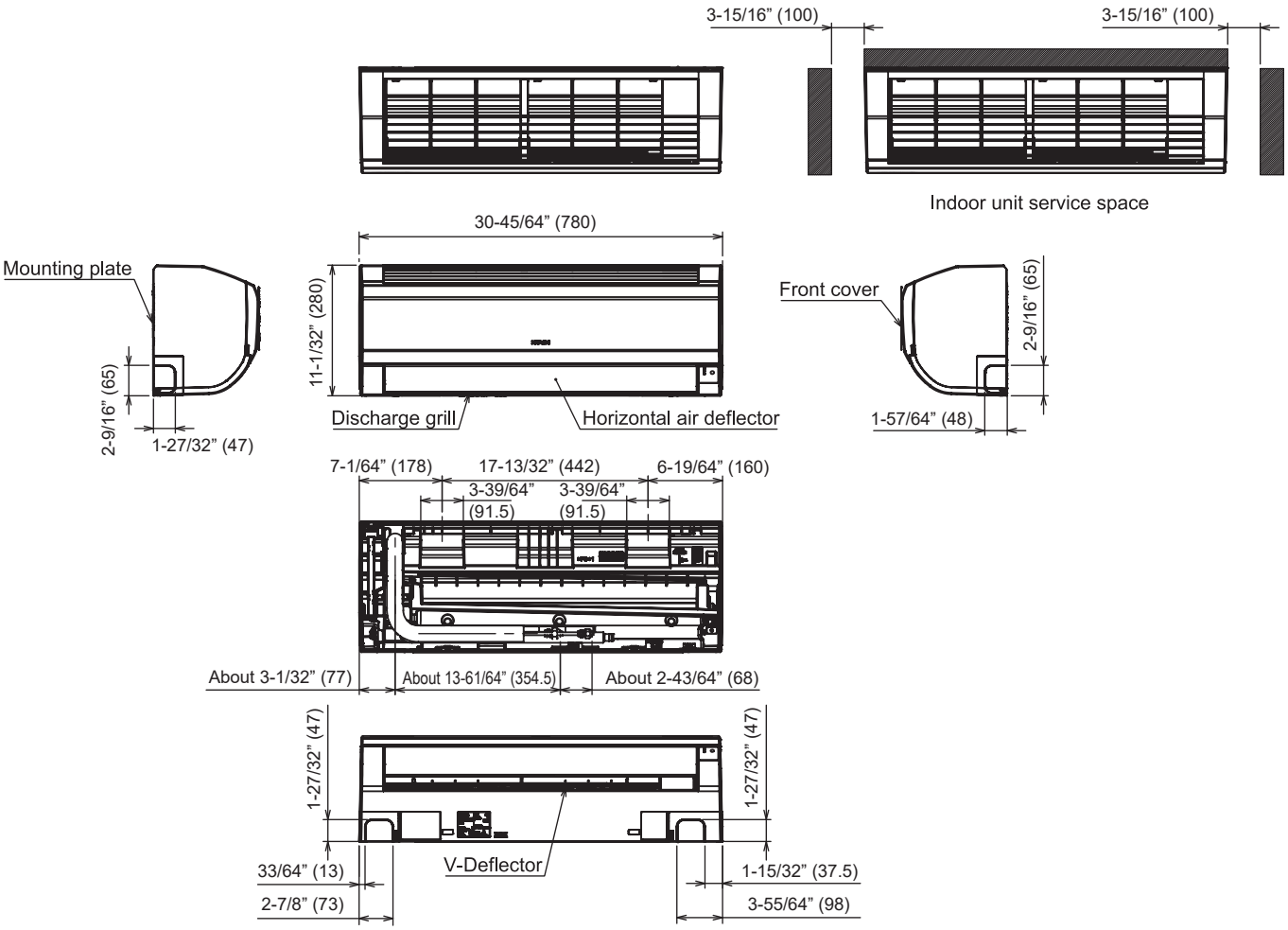
- In "Cooling" operation, do not keep the horizontal air deflector swinging for a long time. Some dew may be formed on the horizontal air deflector and may drop from it.

CONSTRUCTION AND DIMENSIONAL DIAGRAM FOR INDOOR

INDOOR UNIT

MODEL RAS-EH18PHLAE

Unit: Inch (mm)

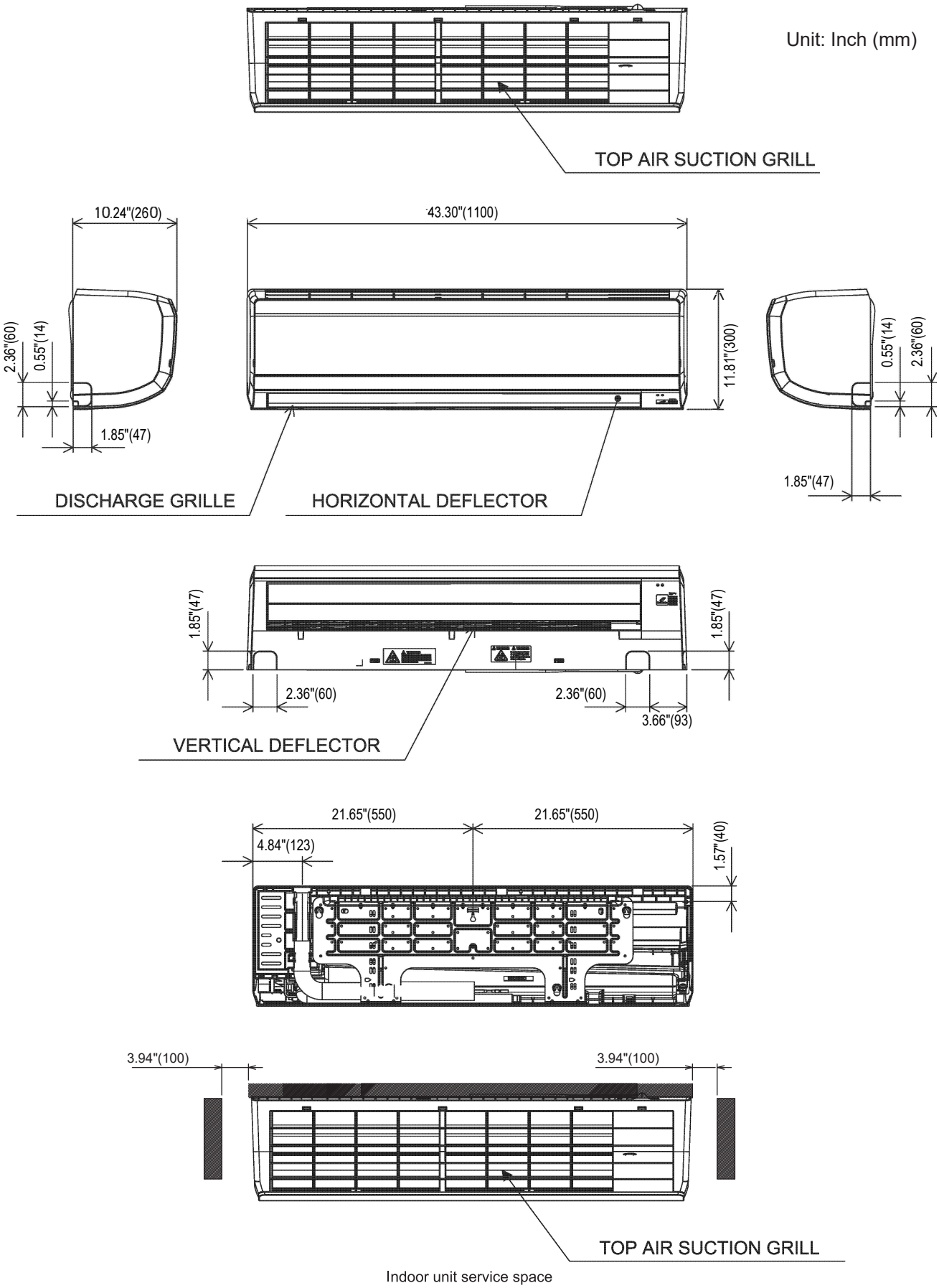


CONSTRUCTION AND DIMENSIONAL DIAGRAM

INDOOR UNIT

MODEL RAS-EH24PHLAE

Unit: Inch (mm)



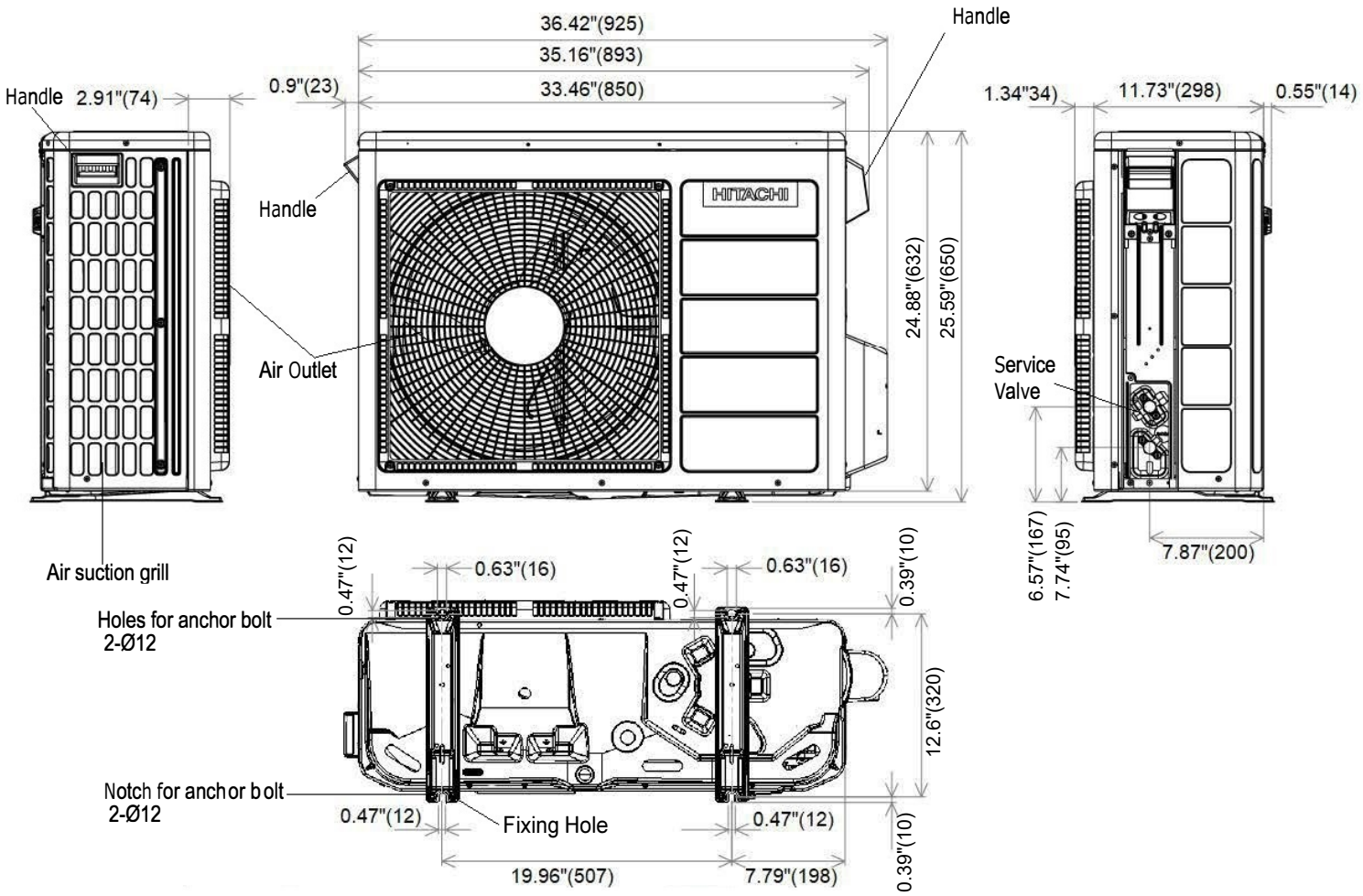
Indoor unit service space

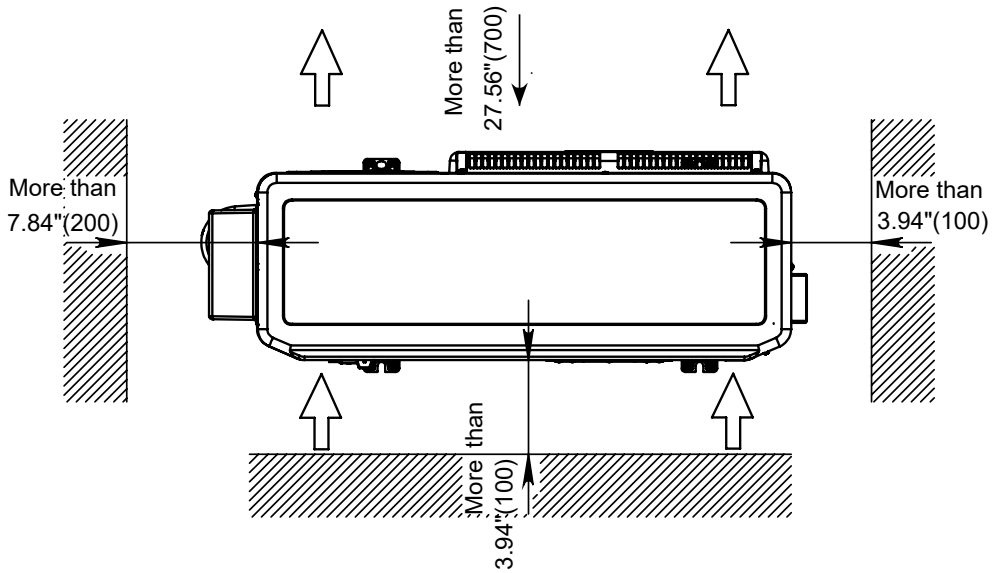
CONSTRUCTION AND DIMENSIONAL DIAGRAM FOR OUTDOOR

Unit: Inch (mm)

OUTDOOR UNIT

MODEL : RAC-EH18WHLAE / RAC-EH24WHLAE





Service space

MAIN PARTS COMPONENT

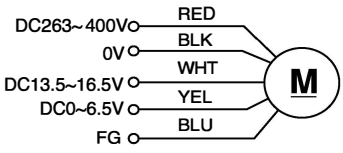
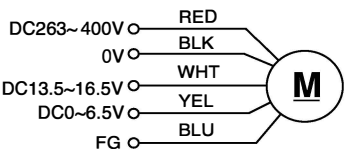
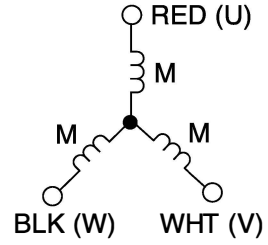
THERMOSTAT

Thermostat Specifications

MODEL			RAS-EH18RHLAE, RAS-EH24RHLAE
THERMOSTAT MODEL			IC
OPERATION			COOL
TEMPERATURE °C	INDICATION 16	ON	16.7 (62.1)
		OFF	16.0 (60.8)
	INDICATION 24	ON	24.7 (76.5)
		OFF	24.0 (75.2)
	INDICATION 32	ON	32.7 (90.9)
		OFF	32.0 (89.6)

FAN MOTOR

Fan Motor Specifications

MODEL		RAS-EH18RHLAE	RAS-EH24RHLAE	RAC-EH18WHLAE RAC-EH24WHLAE
RATED VOLTAGE		DC340V	DC340V	DC120 - 380V
OUTPUT		38 W	38 W	47 W
CONNECTION		 (Control circuit built in)	 (Control circuit built in)	
RESISTANCE VALUE (Ω)	20°C (68°F)	– – – –	– – – –	38.2 ± 3.9

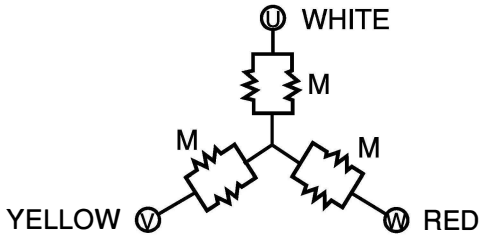
BLU : BLUE YEL : YELLOW BRN : BROWN WHT : WHITE

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

BLK : BLACK

COMPRESSOR MOTOR

Compressor Motor Specifications

MODEL		**RAC-EH18WHLAE**	**RAC-EH24WHLAE**
COMPRESSOR MODEL		ATD141RDNA8JT	ATD186UKQA9LT6A
PHASE		SINGLE	
RATED VOLTAGE		AC 220V - 240V	
RATED FREQUENCY		50/60 Hz	
POLE NUMBER		4 pole	6 Pole
CONNECTION			
RESISTANCE VALUE (Ω)	20°C (68°F)	2M = 1.310 ±7%	2M = 1.354 ±7%
	75°C (167°F)	--------	--------

⚠ CAUTION

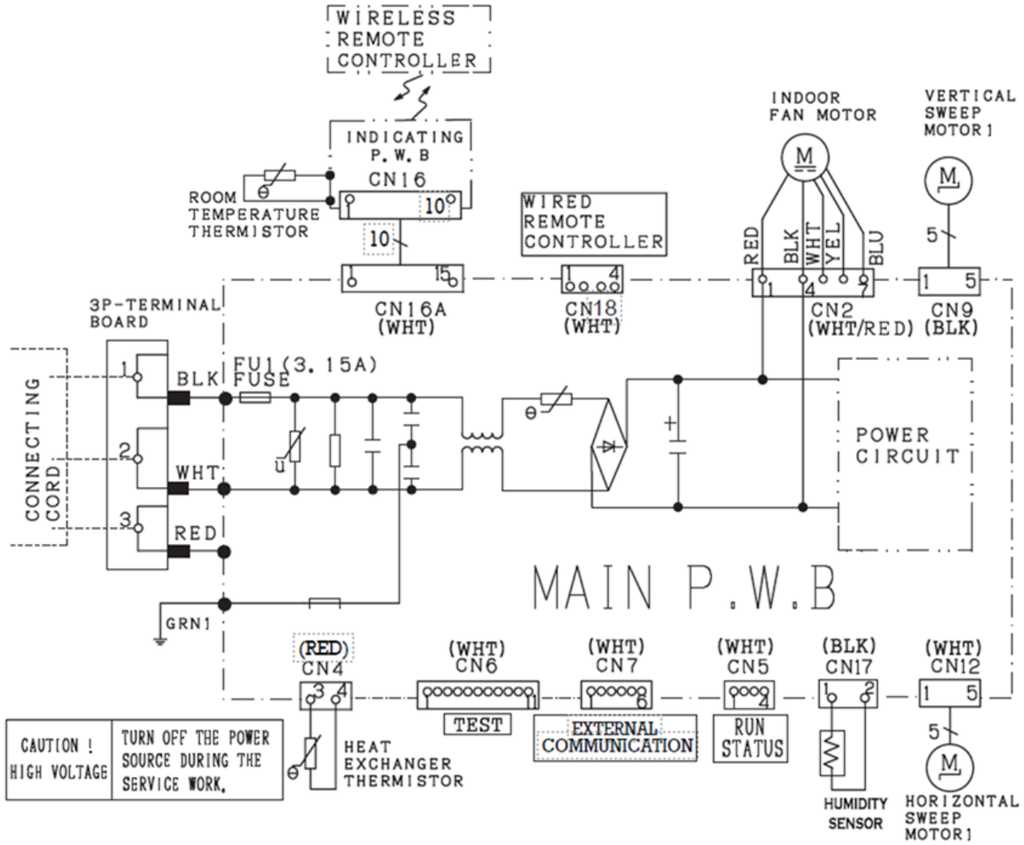
When the Air Conditioner has been operated for a long time with the capillary tubes clogged or crushed or with too little refrigerant, check the color of the refrigerant oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

WIRING DIAGRAM

MODEL RAS-EH18RHLAE

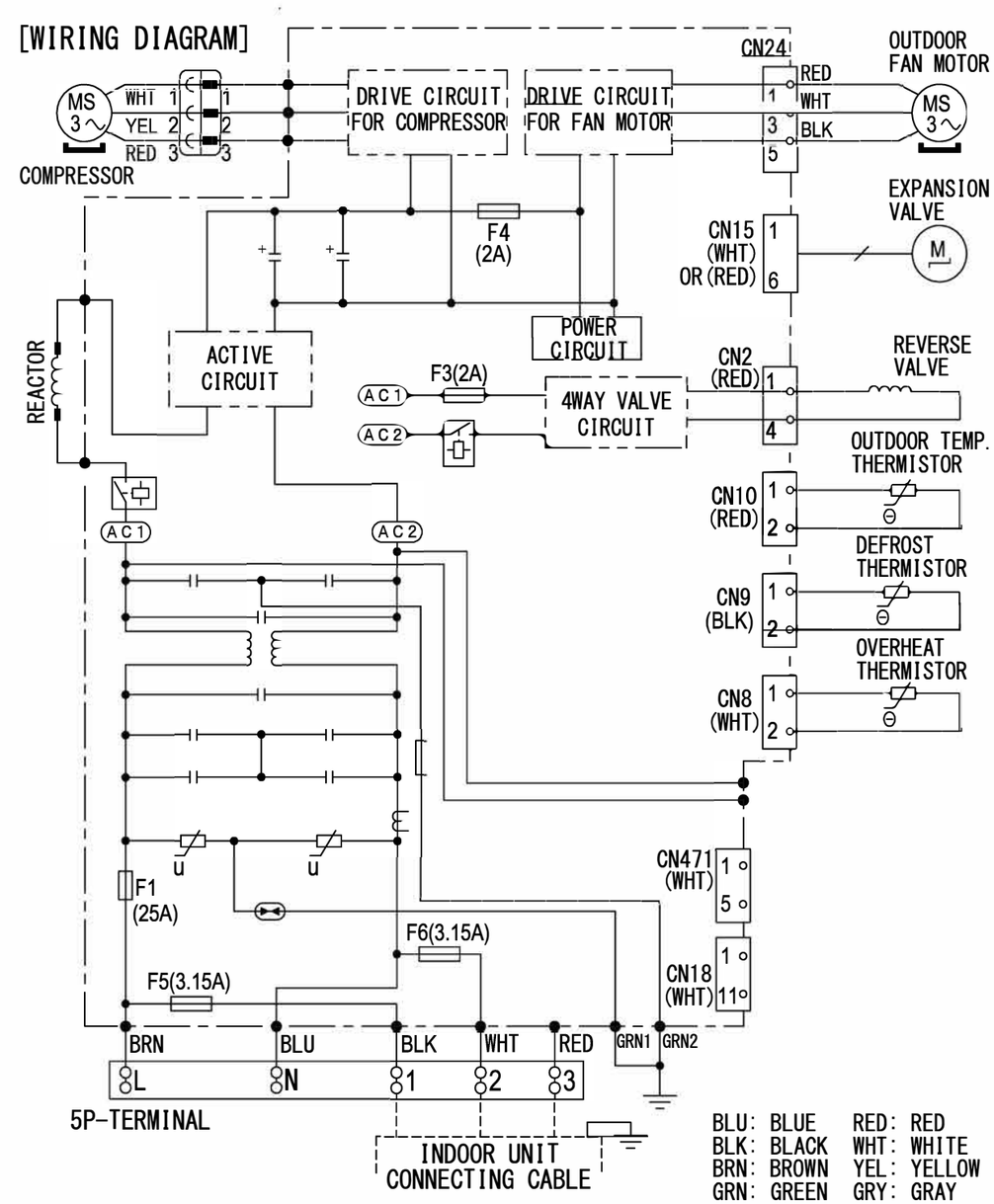
INDOOR UNIT

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-EH18WHLAE

OUTDOOR UNIT

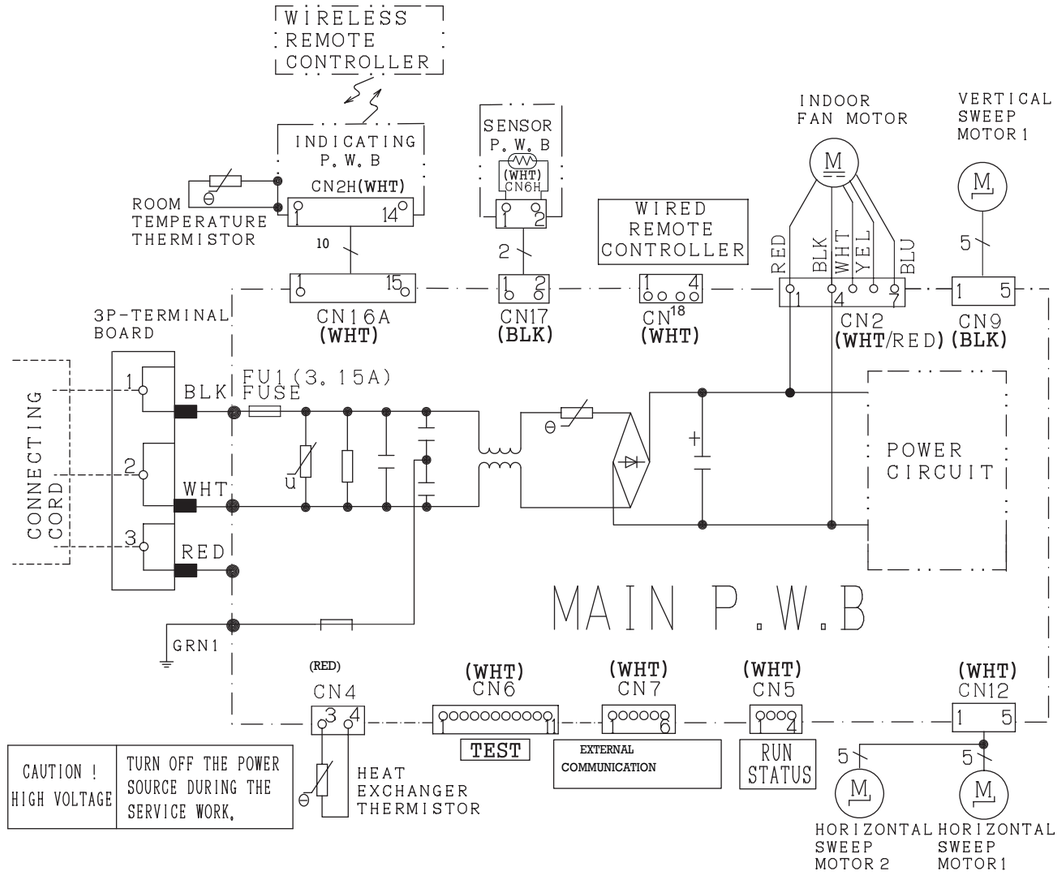


WIRING DIAGRAM

MODEL RAS-EH24RHLAE

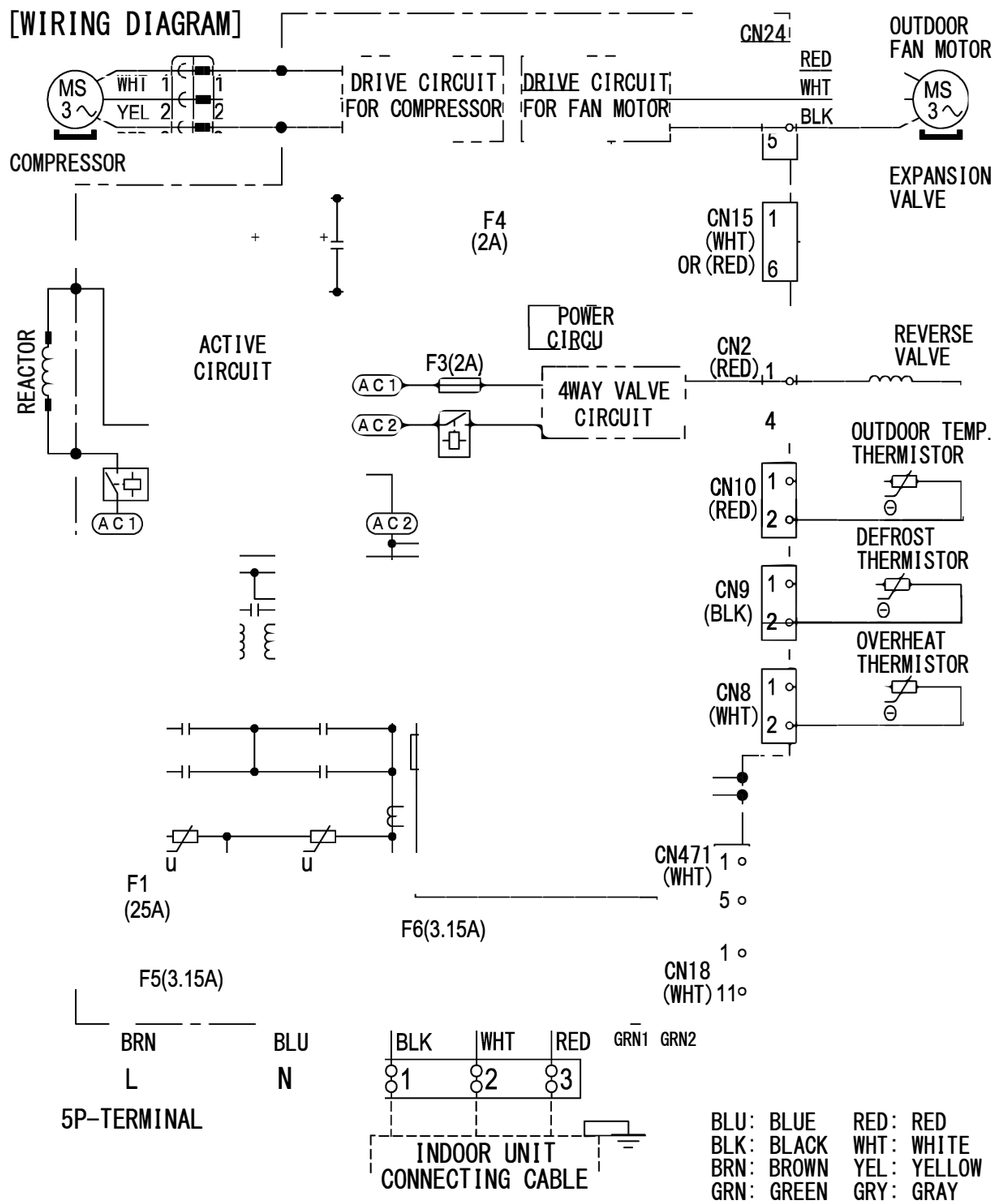
INDOOR UNIT

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



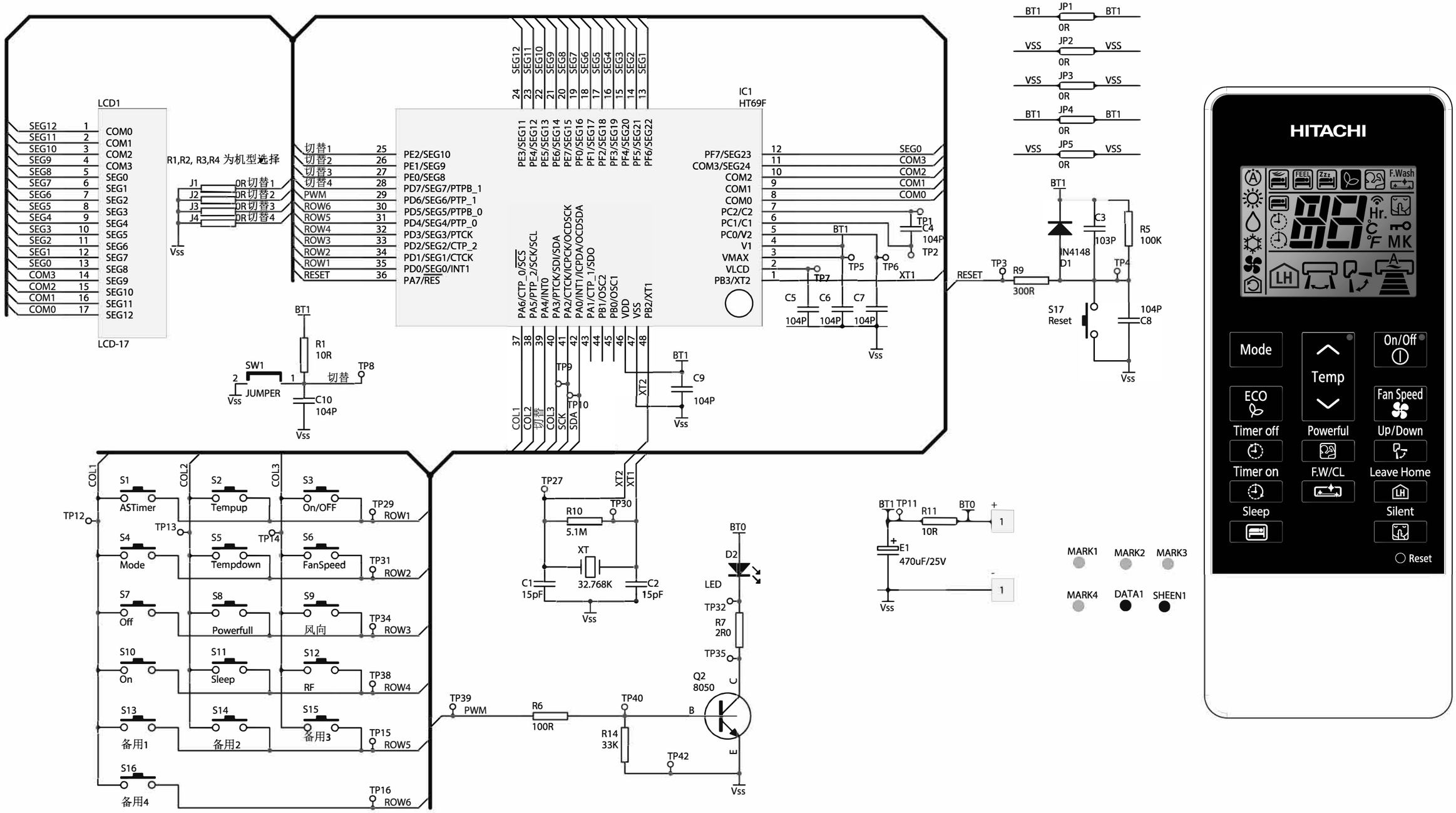
MODEL RAC-EH24WHLAE

OUTDOOR UNIT



CIRCUIT DIAGRAM

Remote Controller



CIRCUIT DIAGRAM

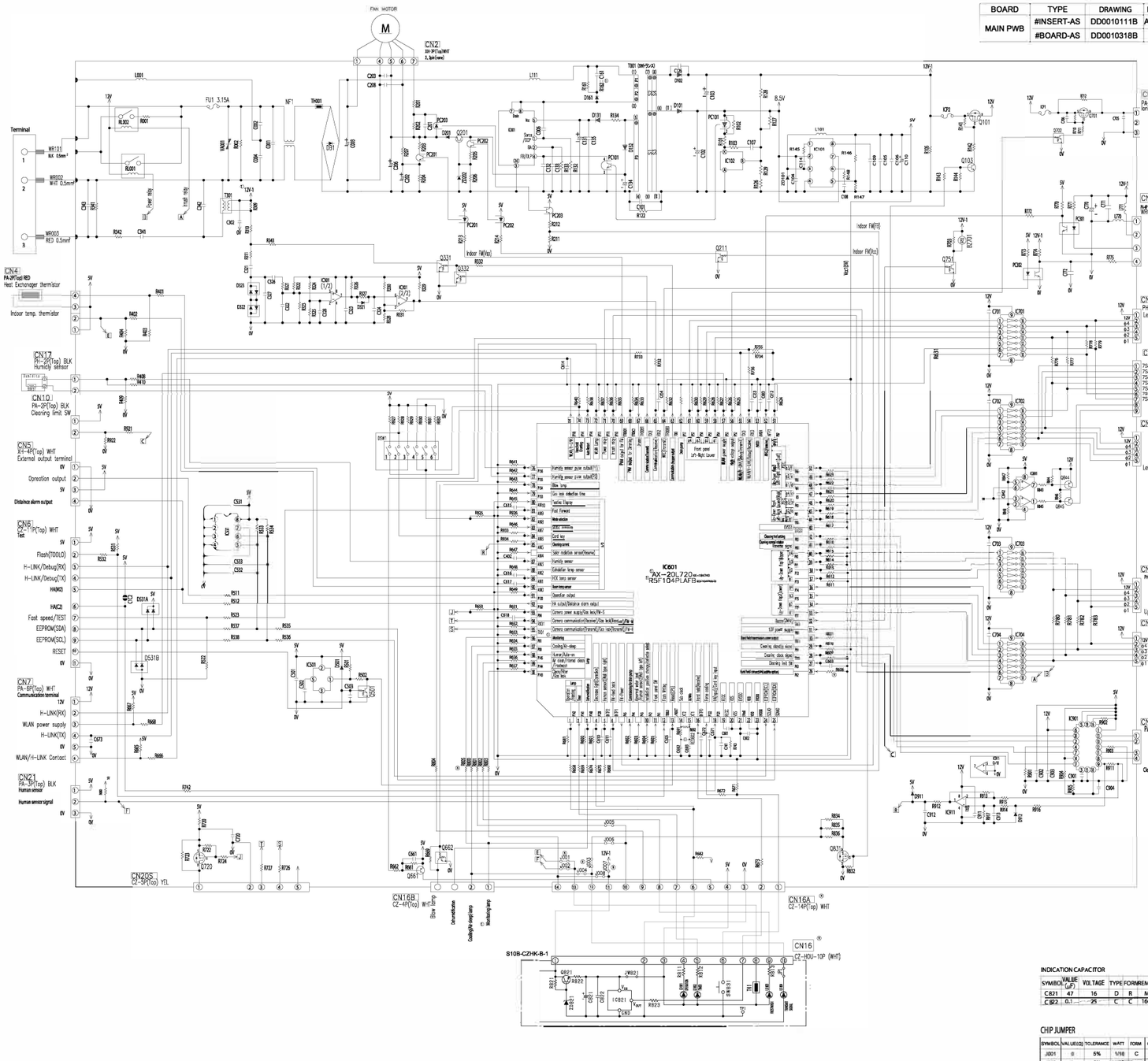
MODEL RAS-EH18RHLAE

NOTES:
1. TYPE OF CAPACITOR
   F- FILM CAPACITOR
   C- CERAMIC CAPACITOR
   D- ELETROLYTIC CAPACITOR
2. MOUNTING TYPE
   A- AXIAL
   R- RADIAL
   P- RADIAL(7.5mm PITCH)
   H- HAND INSERT
   C- SURFACE MOUNT(SMT)
   S- IN ADDITION SURFACE MOUNTING
3. MOUNTING FACE
   A- COMPONENT SIDE
   B- SOLDER SIDE
4. PCB DETAILS:-

BOARD	TYPE	DRAWING	FORM	VOLTAGE
MAIN PWB	#INSERT-AS	DD0010111A	A,R,C,S	230V
	#BOARD-AS	DD0010318A	H	230V

5. 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 (μF)	VOLTAGE	TYPE	FORM	REMARK	ASSY NO.
C821	47	16	D	R	MF	16
C822	0.1	25	C	C	1608	

CHIP JUMPER

SYMBOL	VALUE(Ω)	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	
J003	0	5%	1/16	C	A & B	1005	84
J004	0	5%	1/16	C	A & B	1005	
J005	0	5%	1/16	C	A & B	1005	
J006	0	5%	1/16	C	A & B	1005	
J007	0	5%	1/16	C	A & B	1608	48
J008	0	5%	1/16	C	A & B	1005	

RESISTOR

SYMBOL	VALUE (Ω)	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY NO.
R001	51Ω	5%	5	R		RF	
R002	1M	5%	1/4	A	A & B	HVL	17
R101	1k	5%	1/4	C	A & B	3226	18
R102	1.5k	5%	1/10	C	A & B	1608	58
R103	10k	5%	1/10	C	A & B	1608	61
R105	3k	5%	1/10	C	A & B	1608	57
R122	33M	5%	1/2	A		HVL	
R126	16k	1%	1/10	C	A & B	1608	39
R127	330k	1%	1/10	C	A & B	1608	40
R128	100k	1%	1/10	C	A & B	1608	41
R129	8.2k	1%	1/10	C	A & B	1608	46
R132	1.2	5%	1	R	A & B	MOS	7
R133	330k	5%	1/10	C	A & B	1608	63
R134	22	5%	1/2	A	A & B	855	11
R141	100k	5%	1/16	C	A & B	1005	53
R142	100k	5%	1/16	C	A & B	1005	53
R143	3.3k	5%	1/10	C	A & B	1005	77
R144	3.3k	5%	1/16	C	A & B	1005	77
R145	0	5%	1/10	C	A & B	1608	48
R146	40.2k	1%	1/10	C	A & B	1806	35
R147	5.1k	1%	1/10	C	A & B	1806	36
R148	11k	1%	1/10	C	A & B	1608	37
R161	220k	5%	1	R	A & B	WIRE1885	8
R162	68	5%	1	R	A	13	
R201	4.3k	5%	1/4	C	A & B	3216	28
R202	4.3k	5%	1/10	C	A & B	1608	59
R203	4.7k	5%	1/8	C	A & B	2125	43
R204	3.3k	5%	1/10	C	A & B	1608	58
R205	402	1%	1/4	C	A & B	3216	31
R208	33k	5%	1/10	C	A & B	1608	62
R207	100	5%	1/10	C	A & B	1608	62
R211	10k	5%	1/10	C	A & B	1608	61
R212	1k	5%	1/10	C	A & B	1608	60
R213	390	5%	1/8	C	A & B	2125	49
R214	560	5%	1/4	C	A & B	3226	19
R309	680	5%	1/4	C	A & B	3216	29
R310	180	5%	1/8	C	A & B	2125	33
R311	2k	5%	1/8	C	A & B	2012	34
R321	1k	5%	1/16	C	A & B	1005	81
R322	10.5k	1%	1/16	C	A & B	1005	75
R323	10k	1%	1/16	C	A & B	1005	73
R324	7.15k	1%	1/16	C	A & B	1005	76
R325	10k	1%	1/16	C	A & B	1005	73
R326	7.15K	1%	1/16	C	A & B	1005	76
R327	51k	5%	1/16	C	A & B	1005	88
R328	7.15K	1%	1/16	C	A & B	1005	76
R329	5.6K	1%	1/16	C	A & B	1005	71
R330	5.6K	1%	1/16	C	A & B	1005	71
R331	8.25k	1%	1/10	C	A & B	1005	69
R332	5.6k	1%	1/16	C	A & B	1005	71
R341	470k	5%	1/4	A	A & B		18
R342	47	5%	1/2	A	A & B		10
R343	91	1%	1/4	C	A & B	3216	30
R401	1k	5%	1/16	C	A & B	1005	81
R402	1k	5%	1/16	C	A & B	1005	81
R403	12.7k	1%	1/16	C	A & B	1005	67
R404	12.7k	1%	1/16	C	A & B	1005	67
R408	1k	5%	1/16	C	A & B	1005	81
R409	1M	5%	1/16	C	A & B	1005	72
R410	47k	1%	1/16	C	A & B	1005	82
R501	300k	5%	1/16	C	A & B	1005	86
R502	1k	5%	1/16	C	A & B	1005	81
R511	1k	5%	1/16	C	A & B	1005	81
R512	1k	5%	1/16	C	A & B	1005	81
R522	10k	5%	1/16	C	A & B	1005	68
R523	1k	5%	1/16	C	A & B	1005	81
R531	1k	5%	1/16	C	A & B	1005	81
R532	100	5%	1/16	C	A & B	1005	54
R533	2.2k	5%	1/16	C	A & B	1005	78
R534	2.2k	5%	1/16	C	A & B	1005	78
R535	1k	5%	1/16	C	A & B	1005	54
R536	100	5%	1/16	C	A & B	1005	54
R537	100	5%	1/16	C	A & B	1005	54
R538	100	5%	1/16	C	A & B	1005	54
R600	10k	5%	1/16	C	A & B	1005	68
R601	10k	5%	1/16	C		1005	
R602	10k	5%	1/16	C	A & B	1005	68
R603	10k	5%	1/16	C	A & B	1005	68
R604	10k	5%	1/16	C	A & B	1005	68
R605	10k	5%	1/16	C	A & B	1005	68
R606	10k	5%	1/16	C	A & B	1005	68
R608	10k	5%	1/16	C		1005	
R609	10k	5%	1/16	C	A & B	1005	68
R610	10k	5%	1/16	C	A & B	1005	68
R611	10k	5%	1/16	C	A & B	1005	68
R612	10k	5%	1/16	C	A & B	1005	68
R613	10k	5%	1/16	C	A & B	1005	68
R614	10k	5%	1/16	C	A & B	1005	68
R615	10k	5%	1/16	C	A & B	1005	68
R616	10k	5%	1/16	C	A & B	1005	68
R617	10k	5%	1/16	C		1005	
R618	10k	5%	1/16	C		1005	
R619	10k	5%	1/16	C		1005	
R620	10k	5%	1/16	C		1005	
R621	10k	5%	1/16	C	A & B	1005	68
R622	10k	5%	1/16	C	A & B	1005	68
R623	10k	5%	1/16	C	A & B	1005	68
R624	10k	5%	1/16	C	A & B	1005	68
R625	10k	5%	1/16	C	A & B	1005	68
R626	10k	5%	1/16	C		1005	
R627	10k	5%	1/16	C	A & B	1005	68
R628	10k	5%	1/16	C	A & B	1005	68
R629	10k	5%	1/16	C	A & B	1005	68
R630	10k	5%	1/16	C	A & B	1005	68
R631	10k	5%	1/16	C	A & B	1005	68
R632	10k	5%	1/16	C		1005	
R633	10k	5%	1/16	C	A & B	1005	68
R634	10k	5%	1/16	C	A & B	1005	68
R635	10k	5%	1/16	C	A & B	1005	68
R636	10k	5%	1/16	C	A & B	1005	68
R637	10k	5%	1/16	C		1005	
R638	10k	5%	1/16	C	A & B	1005	68
R640	10k	5%	1/16	C	A & B	1005	68
R641	10k	5%	1/16	C		1005	
R642	10k	5%	1/16	C	A & B	1005	68
R643	10k	5%	1/16	C	A & B	1005	68
R644	10k	5%	1/16	C	A & B	1005	68
R645	10k	5%	1/16	C	A & B	1005	68
R646	10k	5%	1/16	C	A & B	1005	68
R647	10k	5%	1/16	C	A & B	1005	68
R648	10k	5%	1/16	C	A & B	1005	68
R649	10k	5%	1/16	C	A & B	1005	68
R650	10k	5%	1/16	C		1005	

RESISTOR

SYMBOL	VALUE (Ω)	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY NO.
R651	10k	5%	1/16	C	A & B	1005	68
R652	10k	5%	1/16	C	A & B	1005	68
R653	10k	5%	1/16	C	A & B	1005	68
R654	10k	5%	1/16	C	A & B	1005	68
R655	10k	5%	1/16	C	A & B	1005	68
R656	10k	5%	1/16	C		1005	
R657	10k	5%	1/16	C	A & B	1005	68
R658	75Ω	5%	1/10	C	A & B	1608	54
R659	39Ω	5%	1/10	C	A & B	1608	89
R660	1k	5%	1/16	C	A & B	1005	81
R661	2.2k	5%	1/10	C	A & B	1608	79
R662	4.3k	5%	1/10	C	A & B	1608	59
R665	10k	5%	1/16	C	A & B	1005	68
R666	1k	5%	1/16	C	A & B	1005	81
R667	10k	5%	1/16	C		1005	
R668	1k	5%	1/16	C	A & B	1005	81
R669	300	5%	1/10	C	A & B	1608	
R671	10k	5%	1/16	C	A & B	1005	68
R672	1k	5%	1/16	C	A & B	1005	81
R673	1k	5%	1/16	C	A & B	1005	81
R674	390	5%	1/10	C		1608	
R675	750	5%	1/10	C	A & B	1608	64
R680	10k	5%	1/16	C	A & B	1005	68
R681	10k	5%	1/16	C	A & B	1005	68
R682	390	5%	1/10	C	A & B	1608	
R691	0	5%	1/16	C	A & B	1005	84
R692		5%	1/16	C		1005	
R703	3.3k	5%	1/10	C	A & B	1608	58
R710	100k	5%	1/16	C		1005	
R711	100k	5%	1/16	C		1005	
R712		5%	1/10	C		1005	
R720	0	5%	1/10	C		1608	
R722	100k	5%	1/16	C		1005	
R723		5%	1/16	C		1608	
R724	51k	5%	1/16	C		1005	
R726	100	5%	1/16	C		1005	
R727	100	5%	1/16	C		1005	
R732	10k	5%	1/16	C	A & B	1005	68
R733	1k	5%	1/16	C	A & B	1005	81
R734	10k	5%	1/16	C	A & B	1005	68
R735	10k	5%	1/16	C	A & B	1005	68
R736	1k	5%	1/16	C	A & B	1005	81
R742	1k	5%	1/16	C	A & B	1005	81
R743	10k	5%	1/16	C	A & B	1005	68
R770	2k	5%	1/10	C	A & B	1608	93
R771	1.2k	5%	1/4	C	A & B	3216	25
R772	1k	5%	1/16	C	A & B	1005	81
R773	560	5%	1/16	C	A & B	1005	71
R774	2k	5%	1/4	C	A & B	3216	92
R775	620	5%	1/8	C	A & B	2125	45
R778	0	5%	1/16	C		1005	
R777	0	5%	1/16	C		1005	
R778	0	5%	1/16	C		1005	
R779	0	5%	1/16	C		1005	
R780	0	5%	1/16	C		1005	
R781	0	5%	1/16	C		1005	
R782	0	5%	1/16	C		1005	
R783	0	5%	1/16	C		1005	
R830	300	5%	1/10	C	A & B	1608	65
R801	200	5%	1/10	C		1608	
R802	300	5%	1/10	C	A & B	1608	65
R803	300	5%	1/10	C		1608	
R804	390	5%	1/10	C	A & B	1608	66
R805	390	5%	1/10	C	A & B	1608	66
R831	3k	5%	1/10	C	A & B	1608	57
R832	3k	5%	1/10	C	A & B	1608	57
R834	75	5%	1/2	C	A & B	5025	38
R835	75	5%	1/2	C	A & B	5025	38
R836	75	5%	1/2	C	A & B	5025	38
R843	10k	5%	1/16	C		1005	
R844	2k	5%	1/16	C		1005	
R845	10k	5%	1/16	C		1005	
R846	2k	5%	1/16	C		1005	
R847	10k	5%	1/16	C		1005	
R848	1k	5%	1/16	C		1005	
R901	1k	5%	1/16	C		1005	
R902	10k	5%	1/16	C		1005	
R903	1.5	2%	1/2	A		MOS	
R904	10k	1%	1/10	C		1608	
R905	9.1k	1%	1/10	C		1608	
R911	1.5	2%	1/2	A		MOS	
R912	2k	5%	1/10	C		1005	
R913	18k	1%	1/16	C		1005	
R914	100k	5%	1/16	C		1005	
R915	2k	5%	1/16	C		1005	
R916	100	5%	1/16	C		1005	
R917	100k	5%	1/16	C		1005	
R921	1k	5%	1/16	C		1005	
R922	10k	5%	1/16	C		1005	
R925	10k	5%	1/16	C	A & B	1005	68
R926	10k	5%	1/16	C	A & B	1005	68
R927	1k	5%	1/16	C	A & B	1005	81
R928	10k	5%	1/16	C	A & B	1005	68
R929	1k	5%	1/16	C	A & B	1005	81
R930	1k	5%	1/16	C	A & B	1005	81
R931	1k	5%	1/16	C	A & B	1005	81
R932	1k	5%	1/16	C	A & B	1005	81
R933	10k	5%	1/16	C	A & B	1005	68
R934	10k	5%	1/16	C	A & B	1005	68

IC

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
IC001	STR6A161HVD	H	A & B	17
IC101	BD1483EFJ-E2	S	A & B	145
IC102	KIA431A-AT/PC	R	A & B	146
IC301	NJM2903CG-TE2	S	A & B	147
IC501	S-8094CNMC	S		
IC531	M24C64-FDWETP	S	A & B	149
IC601	RSF104PLAFB	S	A & B	144
IC701	TBD62003AFWG	S		
IC702	TBD62003AFWG	S	A & B	151
IC703	TBD62003AFWG	S	A & B	151
IC704	TBD62003AFWG	S	A & B	151
IC801	NJM2903CG	S		
IC901	TC7S66CFNHF	S		
IC911	NJM2904CG	S		

RELAY

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
RL001	DK12D1-D(M)	H		
RL002	FTR-F3AA012E	H		

CAPACITOR

SYMBOL	VALUE (μF)	VOLTAGE	TYPE	FORM	GROUP	REMARK	ASSY NO.
C001	0.33	AC310	F	H	A & B	LE334-MX	8
C002	0.01	AC275	F	H		RRCP3411	
C003	R2	450	D	H	A	RRCP339M	8
	200	300	D	H	B	RRCPP3221	7
C004	0.01	AC275	F	H		RRCP3411	
C006	100p	2k	C	R	A & B	DEA	118
C101	1000p	AC300	C	R	A & B	CS65	115
C102	1000	16	D	R	A & B	ZLH	123
C103	1500	18	D	R	A & B	YXH	110
C104	10	25	C	C	A & B	3216	113
C105	10	25	C	C	A & B	3216	113
C106	10	25	C	C	A & B	3216	113
C107	0.1	16	C	C	A & B	1005	108
C108	2200p	50	C	C	A & B	1608	102
C109	0.1	16	C	C	A & B	1608	126
C110	330	10	D	R	A & B	ZLH	126
C114	0.1	16	C	C	A & B	1608	108
C126	2200p	10	C	R			
C131	22	35	D	R	A & B	ML	125
C132	220Cp	50	C	C	A & B	1608	102
C133	1000p	50	C	C	A & B	1608	103
C134	100	50	D	R	A & B	YXG	122
C135	0.1	50	C	C	A & B	1608	99
C161	1000p	1k	C	R	A	RRCPP2261	114
C201	1000p	50	C	C	A & B	1608	103
C202	10	50	D	R	A & B	PX	121
C203	0.1	25	C	C	A & B	1608	107
C206	4.7	50	D	R	A & B	PX	124
C208	0.1	25	C	C	A & B	1608	107
C302	0.1	25	C	C	A & B	1608	107
C321	0.022	50	C	C	A & B	1005	105
C322	2200p	50	C	C	A & B	1005	104
C323	0.1	16	C	C	A & B	1005	106
C324	0.01	16	C	C	A & B	1005	97
C326	0.022	50	C	C	A & B	1005	105
C327	47p	50	C	C	A & B	1005	96
C328	0.1	16	C	C	A & B	1005	106
C341	0.1	AC310	F	H	A & B		9
C342	0.018	50	F	R	A & B		130
C343	4700p	250	C	R	A & B		117
C402	0.01	16	C	C	A & B	1005	97
C501	0.1	16	C	C		1005	
C502	0.01	16	C	C		1005	
C503	0.1	16	C	C	A & B	1005	106
C505	0.1	16	C	C	A & B	1005	106
C531	0.1	16	C	C	A & B	1005	106
C532	470p	50	C	C	A & B	1608	90
C533	470p	50	C	C	A & B	1608	90
C801	0.47	25	C	C	A & B	1608	98
C802	0.1	16	C	C	A & B	1005	108
C803	10k	5%	1/16	C	A & B	1005	68
C831	0.01	16	C	C	A & B	1005	97
C871	0.1	16	C	C	A & B	1005	106
C872	1000p	25	C	C	A & B	1005	94
C873	1000p	50	C	C	A & B	1005	101
C892	6p	50	C	C	A & B	1005	111
C893	7p	50	C	C	A & B	1005	112
C701	0.1	25	C	C		1608	
C702	0.1	25	C	C	A & B	1608	107
C703	0.1	25	C	C	A & B	1608	107
C704	0.1	25	C	C	A & B	1608	107
C705	0.1	25	C	C		1608	
C706	0.01	50	C	C		1608	
C720	10	25	C	C		3216	
C733	1000p	50	C	C	A & B	1005	101
C741	0.1	16	C	C	A & B	1005	106
C770	100	25	D	R	A & B	LXZ	116
C771	0.1	25	C	C	A & B	1608	107
C772	1000p	50	C	C	A & B	1608	103
C842	0.1	25	C	C		1608	
C901	220p	50	C	C		1005	
C902			C	C		1005	
C903	0.1	25	C	C		1608	
C904	0.1	16	C	C		1005	
C911	0.1	25	C	C		1608	
C912	0.01	16	C	C		1005	
C913	1	25	C	C		1608	

PHOTO COUPLER

SYMBOL	MODEL	FORM	GROUP	REMARK	ASSY NO.
PC101	LTV-817S-TA1	S	A & B	CTR:D	172
PC1201	LTV-817S-TA1	S	A & B	CTR:D	172
PC1202	LTV-817S-TA1	S	A & B	CTR:D	172
PC1203	LTV-817S-TA1	S	A & B	CTR:D	172
PC1301	LTV-817S-TA1	S	A & B	CTR:D	172
PC1302	LTV-817S-TA1	S	A & B	CTR:D	172

WIREHARNESS

SYMBOL	MODEL	FORM	GROUP	REMARK	ASSY NO.
TB001	B6226	H			
WR001	AWG12(BLK)	H			
WR002	AWG20	H	A & B	WHITE	77
WR003	AWG20	H	A & B	RED	78
WR005	AWG20(GRN)	H		GREEN	
WR101	AWG20	H	A & B	BLACK	76

DIODE

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
D101	D1FT15A	C	A & B	160
D102	D0L20U	A	A & B	159
D131	D1NL40U	A	A & B	155
D132	D1NL40U	A	A & B	155
D191	SAR501	A	A	158
D201	KDS180	C	A & B	161
D321	KDS180	C	A & B	161
D323	BAV99	C	A & B	162
D323	BAV99	A	A & B	162
D501	KDS160	C	A & B	161
D531A	1SS184	C	A & B	164
D531B	1SS181	C	A & B	166
D911	KDS160	C		
D912	KDS160	C		
DB1	D3SB80A	H	A & B	19
ZD101	UDZVTE-17128	C	A & B	167
ZD202	BZT52H-B16	C	A & B	168

TRANSISTOR

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
Q101	RRB040P03TL	C	A & B	133
Q103	KTC3875S-GR/TK	C	A & B	134
Q201	2SCR292P5T100	C	A & B	135
Q211	DTC023YEBTL	C	A & B	138
Q331	DTC023YEBTL	C	A & B	136
Q332	DTD543ZEBTL	C	A & B	137
Q501	DTC014EEBTL	C	A & B	136
Q661	KTA2012E	C	A & B	139
Q662	DTC023YEB	C		
Q701	PJA3407	C		
Q702	DTC023YEB	C		
Q72C	RRR015P03TL	C		
Q751	DTC014EEBTL	C	A & B	136
Q831	UT2302G-AE3-R	C	A & B	131
Q844	2SA2098	C		
Q845	2SA2098	C		

COIL

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
INT	ES11H-10062-CH	H	A & B	29
T001	ST-22159	H	A & B	28
T301	LVAL/F	H	A & B	26
L001	BC0610RBH-8-3-N-/-	H		
L101	BC0610B-100	H	A & B	41
L111	BC0610RBH-8-3-N-1	H	A & B	42
L770	BL01RN1A1F1A	A	A & B	142
L771	BL01RN1A1F1A	A	A & B	143

VARISTOR / POWER THERMISTOR / BUZZER

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
VA001	B72214S2321K581/V87	R	A	174
	ERZVA9V221	R	B	175
TH001	5D2-08LCS	H	A & B	22
BZ701	PS1720P02	H	A & B	45

OTHERS

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
FU1	3.15A-F-WE	H	A & B	
FU1-COVER	8483294-03	H		
RESISTOR	NX3215SA	C	A & B	176
ICP1	ERB8RE1R25V	C		
ICP2	ERB8RE1R25V	C	A & B	170
DSW1	KSD62	H	A & B	21

CONNECTOR

SYMBOL	MODEL	FORM	REMARK	GROUP	ASSY NO.
CN2	B5CF-2.3(B-XH-A	H	WHITE	A & B	49
CN4	B02B-PARK	H	RED	A & B	52
CN5	B4B-XH-A	H	WHITE	A & B	50
CN6	B11B-CZHK-B-1	H	WHITE	A & B	53
CN7	B05B-PASK1	H	WHITE	A & B	54
CN8	B04B-PARK-1	H			
CN9	B5B-PH-K-K	H	BLACK	A & B	51
CN10	B02B-PAKK-1	H			
CN11	B5B-PH-K-R	H	RED	A & B	81
CN12	B5B-PH-K-S	H	WHITE	A & B	55
CN14	B3B-PASK-1	H			
CN16A	B14B-CZHK-B-1	H	WHITE	A & B	88
CN16B	B04B-CZHK-B-1	H	WHITE	A & B	80
CN17	B2B-PH-K-K	H	BLACK	A & B	87
CN18	B4B-PASK-1	H	WHITE	A & B	89
CN19	B09B-CZHK-B-1	H			
CN20S	B05B-CZYK-B-1	H			
CN21	B03B-PAKK-1	H	BLACK	A & B	58
CN22	B-5B-PH-K-E	H			

INDICATION DIODE

SYMBOL	TYPE	FORM	REMARK	ASSY NO.
ZD821	RD5.6UM2	C		14

INDICATION SWITCH

SYMBOL	TYPE	FORM	ASSY NO.
SW881	KDS6613B	H	19

INDICATION CONNECTOR

SYMBOL	TYPE	FORM	ASSY NO.
CN18	S10B-CZHK-B-1	H	25
TP	RT-01T-1.28	H	28

INDICATION LED

SYMBOL	TYPE	FORM	REMARK	ASSY NO.
LD801	LTL17KSLSD-042A	R	YELLOW	20
LD802	LTL17KSLSD-042A	R	ORANGE	21
LD803	LTL17KSLSD-042A	R	GREEN	22
LD804	SIR-343F3F	H	WHITE	23

INDICATION IC

SYMBOL	TYPE	FORM	REMARK	ASSY NO.
IC831	GP1UM561R	H		18

INDICATION THERMISTOR

SYMBOL	TYPE	FORM	ASSY NO.
TH1	NRD31G7400Y0S52H1	H	27

INDICATION TRANSISTOR

SYMBOL	TYPE	FORM	ASSY NO.
QR21	2SC4212K-R	C	13

INDICATION RESISTOR

SYMBOL	VALUE (Ω)	TOLERANCE	WATT	FORM	REMARK	ASSY NO.
R811	820	5%	1/10	C	1608	5
R812	2.2k	5%	1/10	C	1608	6
R813	100	5%	1/10	C	1608	7
R821	2.7k	5%	1/10	C	1608	8
R822	47	5%	1/10	C	1608	10
R823	1k	5%	1/10	C	1608	11
JW821	47	5%	1/10	C	1608	10
JP1	0	5%	1/4	C	3216	12

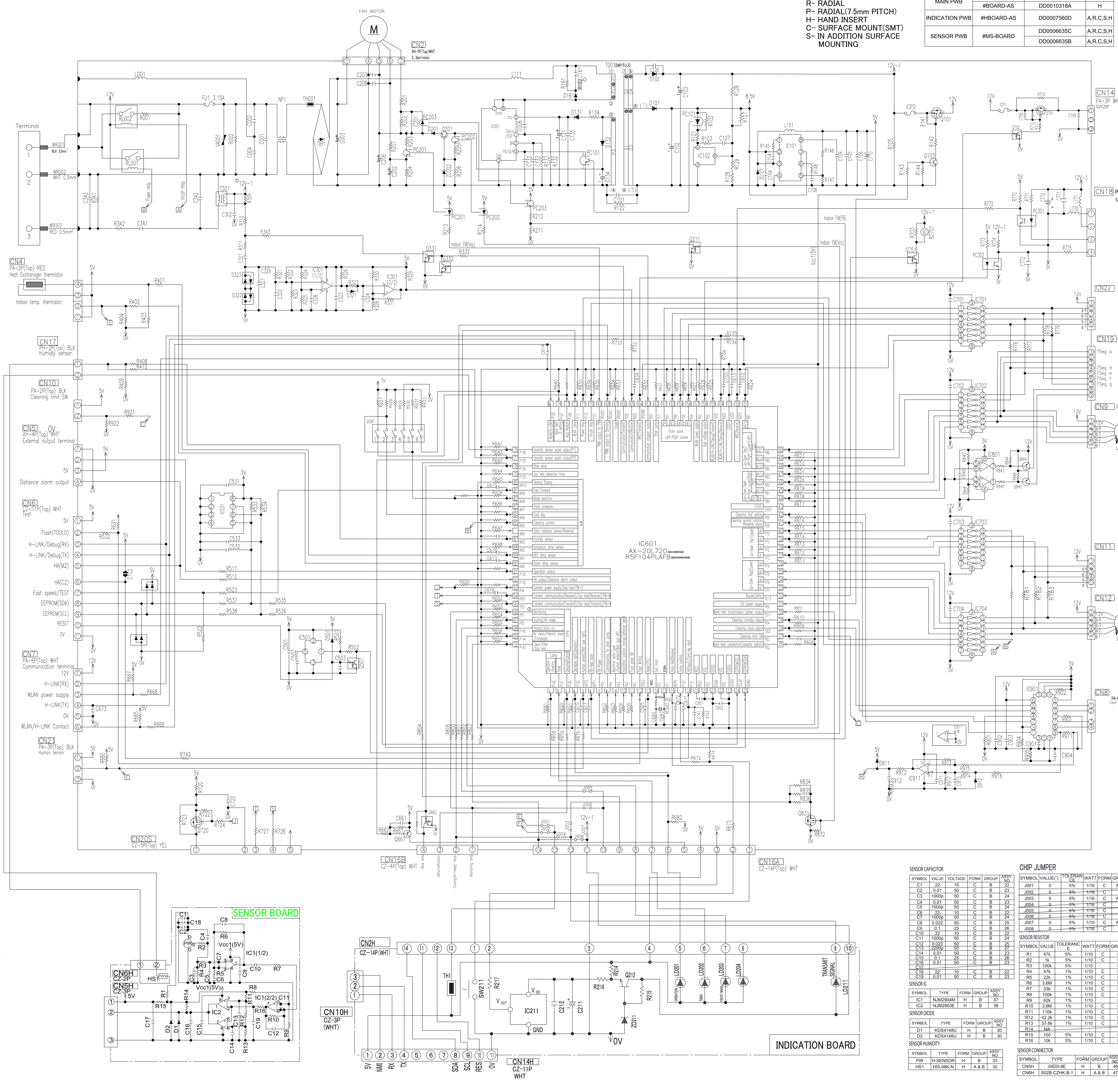
CIRCUIT DIAGRAM

MODEL RAS-EH24RHLAE

NOTES:

1. TYPE OF CAPACITOR
   - F- FILM CAPACITOR
   - C- CERAMIC CAPACITOR
   - D- ELETROLYTIC CAPACITOR
2. MOUNTING TYPE
   - A- AXIAL
   - R- RADIAL
   - P- RADIAL(7.5mm PITCH)
   - H- HAND INSERT
   - C- SURFACE MOUNT(SMT)
   - S- IN ADDITION SURFACE MOUNTING
3. MOUNTING FACE
   - A- COMPONENT SIDE
   - B- SOLDER SIDE
4. PCB DETAILS:-

BOARD	TYPE	DRAWING	FORM
MAIN PWB	#INSERT-AS	DD0010111A	A,R,C,S
	#BOARD-AS	DD0010318A	H
INDICATION PWB	#HBOARD-AS	DD0007560D	A,R,C,S,H
SENSOR PWB	#MS-BOARD	DD0006635C	A,R,C,S,H
		DD0006635B	A,R,C,S,H



RESISTOR

SYMBOL	VALUE (Ω)	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY. NO
R001	510	5%	5	H		RF	
R002	1M	5%	1/4	A	A , B	HVL	17
R101	1k	5%	1/4	C	A , B	3226	18
R102	1.5k	5%	1/10	C	A , B	1608	56
R103	10k	5%	1/10	C	A , B	1608	61
R105	3k	5%	1/10	C	A , B	1608	57
R122	33M	5%	1/2	A	A , B	HVL	
R126	16k	1%	1/10	C	A , B	1608	39
R127	330k	1%	1/10	C	A , B	1608	40
R128	100k	1%	1/10	C	A , B	1608	41
R129	6.2k	1%	1/10	C	A , B	1608	46
R132	1.2	5%	1	R	A , B	MOS	7
R133	330k	5%	1/10	C	A , B	1608	63
R134	22	5%	1/2	A	A , B	RSS	11
R141	100k	5%	1/16	C	A , B	1005	53
R142	100k	5%	1/16	C	A , B	1005	53
R143	3.3k	5%	1/16	C	A , B	1005	77
R144	3.3k	5%	1/16	C	A , B	1005	77
R145	0	5%	1/10	C	A , B	1608	48
R146	40.2k	1%	1/10	C	A , B	1608	35
R147	9.1k	1%	1/10	C	A , B	1608	36
R148	11k	1%	1/10	C	A , B	1608	37
R161	220k	5%	1	R	A , B	RRTE1925	8
R162	68	5%	1	R	A , B		12
R201	4.3k	5%	1/4	C	A , B	3216	28
R202	4.3k	5%	1/10	C	A , B	1608	59
R203	4.7k	5%	1/8	C	A , B	2125	43
R204	3.3k	5%	1/10	C	A , B	1608	58
R205	402	1%	1/4	C	A , B	3216	31
R206	33k	5%	1/10	C	A , B	1608	62
R207	100	5%	1/10	C	A , B	1608	52
R211	10k	5%	1/10	C	A , B	1608	61
R212	1k	5%	1/10	C	A , B	1608	60
R213	390	5%	1/8	C	A , B	2125	49
R214	560	5%	1/4	C	A , B	3226	19
R309	680	5%	1/4	C	A , B	3216	29
R310	180	5%	1/8	C	A , B	2125	33
R311	3.3k	1%	1/8	C	A , B	2125	34
R321	1k	5%	1/16	C	A , B	1005	81
R322	10.5k	1%	1/16	C	A , B	1005	75
R323	10k	1%	1/16	C	A , B	1005	73
R324	7.15k	1%	1/16	C	A , B	1005	76
R325	10k	1%	1/16	C	A , B	1005	73
R326	7.15K	1%	1/16	C	A , B	1005	76
R327	51k	5%	1/16	C	A , B	1005	85
R328	7.15K	1%	1/16	C	A , B	1005	76
R329	5.6K	1%	1/16	C	A , B	1005	71
R330	5.6K	1%	1/16	C	A , B	1005	71
R331	8.25K	1%	1/10	C	A , B	1005	69
R332	5.6k	1%	1/16	C	A , B	1005	71
R341	470k	5%	1/4	A	A , B		16
R342	47	5%	1/2	A	A , B		10
R343	91	1%	1/4	C	A , B	3216	30
R401	1k	5%	1/16	C	A , B	1005	81
R402	1k	5%	1/16	C	A , B	1005	81
R403	12.7k	1%	1/16	C	A , B	1005	67
R404	12.7k	1%	1/16	C	A , B	1005	67
R408	1k	5%	1/16	C	A , B	1005	81
R409	1M	5%	1/16	C	A , B	1005	72
R410	47k	1%	1/16	C	A , B	1005	82
R501	300k	5%	1/16	C	A , B	1005	86
R502	1k	5%	1/16	C	A , B	1005	81
R511	1k	5%	1/16	C	A , B	1005	81
R512	1k	5%	1/16	C	A , B	1005	81
R522	10k	5%	1/16	C	A , B	1005	68
R523	1k	5%	1/16	C	A , B	1005	81
R531	1k	5%	1/16	C	A , B	1005	81
R532	100	5%	1/16	C	A , B	1005	54
R533	2.2k	5%	1/16	C	A , B	1005	78
R534	2.2k	5%	1/16	C	A , B	1005	78
R535	100	5%	1/16	C	A , B	1005	54
R536	100	5%	1/16	C	A , B	1005	54
R537	100	5%	1/16	C	A , B	1005	54
R538	100	5%	1/16	C	A , B	1005	54
R600	10k	5%	1/16	C	A , B	1005	68
R601	10k	5%	1/16	C		1005	
R602	10k	5%	1/16	C	A , B	1005	68
R603	10k	5%	1/16	C	A , B	1005	68
R604	10k	5%	1/16	C	A , B	1005	68
R605	10k	5%	1/16	C	A , B	1005	68
R606	10k	5%	1/16	C	A , B	1005	68
R607	10k	5%	1/16	C		1005	
R608	10k	5%	1/16	C		1005	
R609	10k	5%	1/16	C	A , B	1005	68
R610	10k	5%	1/16	C	A , B	1005	68
R611	10k	5%	1/16	C	A , B	1005	68
R612	10k	5%	1/16	C	A , B	1005	68
R613	10k	5%	1/16	C	A , B	1005	68
R614	10k	5%	1/16	C	A , B	1005	68
R615	10k	5%	1/16	C	A , B	1005	68
R616	10k	5%	1/16	C	A , B	1005	68
R617	10k	5%	1/16	C		1005	
R618	10k	5%	1/16	C		1005	
R619	10k	5%	1/16	C		1005	
R620	10k	5%	1/16	C		1005	
R621	10k	5%	1/16	C	A , B	1005	68
R622	10k	5%	1/16	C	A , B	1005	68
R623	10k	5%	1/16	C	A , B	1005	68
R624	10k	5%	1/16	C	A , B	1005	68
R625	10k	5%	1/16	C	A , B	1005	68
R626	10k	5%	1/16	C		1005	
R627	10k	5%	1/16	C	A , B	1005	68
R628	10k	5%	1/16	C	A , B	1005	68
R629	10k	5%	1/16	C	A , B	1005	68
R630	10k	5%	1/16	C	A , B	1005	68
R631	10k	5%	1/16	C	A , B	1005	68
R632	10k	5%	1/16	C		1005	
R633	10k	5%	1/16	C	A , B	1005	68
R634	10k	5%	1/16	C	A , B	1005	68
R635	10k	5%	1/16	C	A , B	1005	68
R636	10k	5%	1/16	C	A , B	1005	68
R637	10k	5%	1/16	C		1005	
R638	10k	5%	1/16	C	A , B	1005	68
R640	10k	5%	1/16	C	A , B	1005	68
R641	10k	5%	1/16	C		1005	
R642	10k	5%	1/16	C		1005	
R643	10k	5%	1/16	C	A , B	1005	68
R644	10k	5%	1/16	C	A , B	1005	68
R645	10k	5%	1/16	C	A , B	1005	68
R646	10k	5%	1/16	C	A , B	1005	68
R647	10k	5%	1/16	C	A , B	1005	68
R648	10k	5%	1/16	C	A , B	1005	68
R649	10k	5%	1/16	C	A , B	1005	68
R650	10k	5%	1/16	C		1005	

RESISTOR

SYMBOL	VALUE (Ω)	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY NO.
R651	10k	5%	1/16	C	A , B	1005	68
R652	10k	5%	1/16	C	A , B	1005	68
R653	10k	5%	1/16	C	A , B	1005	68
R654	10k	5%	1/16	C	A , B	1005	68
R655	10k	5%	1/16	C	A , B	1005	68
R656	10k	5%	1/16	C		1005	
R657	10k	5%	1/16	C	A , B	1005	68
R658	750	5%	1/10	C	A , B	1608	64
R659	390	5%	1/10	C	A , B	1608	88
R660	1k	5%	1/16	C	A , B	1005	81
R661	2.2k	5%	1/10	C	A , B	1608	79
R662	4.3k	5%	1/10	C	A , B	1608	59
R665	10k	5%	1/16	C	A , B	1005	68
R666	1k	5%	1/16	C	A , B	1005	81
R667	10k	5%	1/16	C	A , B	1005	
R668	1k	5%	1/16	C	A , B	1005	81
R669	300	5%	1/10	C		1608	
R671	10k	5%	1/16	C	A , B	1005	68
R672	1k	5%	1/16	C	A , B	1005	81
R673	1k	5%	1/16	C	A , B	1005	81
R674	390	5%	1/10	C		1608	
R675	750	5%	1/10	C	A , B	1608	64
R680	10k	5%	1/16	C	A , B	1005	68
R682	390	5%	1/10	C		1608	
R691	0	5%	1/16	C	A , B	1005	84
R692		5%	1/16	C		1005	
R703	3.3k	5%	1/10	C	A , B	1608	58
R710	100k	5%	1/16	C		1005	
R711	100k	5%	1/16	C		1005	
R712		5%	1/10	C		1005	
R720	0	5%	1/10	C		1608	
R722	100k	5%	1/16	C		1005	
R723		5%	1/16	C		1005	
R724	51k	5%	1/16	C		1005	
R726	100	5%	1/16	C		1005	
R727	100	5%	1/16	C		1005	
R732	10k	5%	1/16	C	A , B	1005	68
R733	1k	5%	1/16	C	A , B	1005	81
R734	10k	5%	1/16	C	A , B	1005	68
R735	10k	5%	1/16	C	A , B	1005	68
R736	1k	5%	1/16	C	A , B	1005	81
R742	1k	5%	1/16	C	A , B	1005	81
R743	10k	5%	1/16	C	A , B	1005	68
R770	2k	5%	1/10	C	A , B	1608	93
R771	1.2k	5%	1/4	C	A , B	3216	25
R772	1k	5%	1/16	C	A , B	1005	81
R773	560	5%	1/10	C	A , B	1608	89
R774	2k	5%	1/4	C	A , B	3216	92
R775	620	5%	1/8	C	A , B	2125	45
R776	0	5%	1/16	C		1005	
R777	0	5%	1/16	C		1005	
R778	0	5%	1/16	C		1005	
R779	0	5%	1/16	C		1005	
R780	0	5%	1/16	C		1005	
R781	0	5%	1/16	C		1005	
R782	0	5%	1/16	C		1005	
R783	0	5%	1/16	C		1005	
R800	300	5%	1/10	C	A , B	1608	65
R801	200	5%	1/10	C		1608	
R802	300	5%	1/10	C	A , B	1608	88
R803	300	5%	1/10	C		1608	
R804	390	5%	1/10	C	A , B	1608	88
R805	390	5%	1/10	C	A , B	1608	88
R831	3k	5%	1/10	C	A , B	1608	57
R832	3k	5%	1/10	C	A , B	1608	57
R834	75	5%	1/2	C	A , B	5025	38
R835	75	5%	1/2	C	A , B	5025	38
R836	75	5%	1/2	C	A , B	5025	38
R843	10k	5%	1/16	C		1005	
R844	2k	5%	1/16	C		1005	
R845	10k	5%	1/16	C		1005	
R846	2k	5%	1/16	C		1005	
R847	10k	5%	1/16	C		1005	
R848	10k	5%	1/16	C		1005	
R901	1k	5%	1/16	C		1005	
R902	10k	5%	1/16	C		1005	
R903	1.5	2%	1/2	A		MOS	
R904	10k	1%	1/10	C		1608	
R905	9.1k	1%	1/10	C		1608	
R911	1.5	2%	1/2	A		MOS	
R912	2k	5%	1/10	C		1005	
R913	18k	1%	1/16	C		1005	
R914	100k	5%	1/16	C		1005	
R915	2k	5%	1/16	C		1005	
R916	100	5%	1/16	C		1005	
R917	100k	5%	1/16	C		1005	
R921	1k	5%	1/16	C		1005	
R922	10k	5%	1/16	C		1005	
R925	10k	5%	1/16	C	A , B	1005	68
R926	10k	5%	1/16	C	A , B	1005	68
R927	1k	5%	1/16	C	A , B	1005	81
R928	10k	5%	1/16	C	A , B	1005	68
R929	1k	5%	1/16	C	A , B	1005	81
R930	1k	5%	1/16	C	A , B	1005	81
R931	1k	5%	1/16	C	A , B	1005	81
R932	1k	5%	1/16	C	A , B	1005	81
R933	10k	5%	1/16	C	A , B	1005	68
R934	10k	5%	1/16	C	A , B	1005	68

IC

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
IC001	STR6A161HVD	H	A , B	17
IC101	BD1482EFJ-E2	S	A , B	145
IC102	KIA431A-AT/PC	R	A , B	146
IC301	NJM2903CG-TE2	S	A , B	147
IC501	S-80942CNMC	S		
IC531	M24C64-FDW6TP	S	A , B	149
IC601	R5F104PLAFB	S	A , B	144
IC701	TBD62003AFWG	S		
IC702	TBD62003AFWG	S	A , B	151
IC703	TBD62003AFWG	S		
IC704	TBD62003AFWG	S	A , B	151
IC801	NJM2903CG	S		
IC901	TC78S600FNG	S		
IC911	NJM2904CG	S		

RELAY

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
RL001	DX12D1-O(M)	H		
RL002	FTR-F3AA012E	H		

CAPACITOR

SYMBOL	VALUE (µF)	VOLTAGE	TYPE	FORM	GROUP	REMARK	ASSY NO.
C001	0.33	AC310	F	H	A , B	LE334-MX	8
C002	0.01	AC300	F	H	A , B	RRCP3411	127
C003	82	450	D	H	A , B	RRCP3384	6
	200	200	D	H		RRCPP323	7
C004	0.01	AC300	F	H	A , B	RRCP3411	127
C006	100p	2k	C	R	A , B	RRCPP418	118
C101	1000p	AC300	C	R	A , B	CS65	115
C102	1000	16	D	R	A , B	ZLH	123
C103	1500	16	D	R	A , B	YXH	110
C104	10	25	C	C	A , B	3216	113
C105	10	25	C	C	A , B	3216	113
C106	10	25	C	C	A , B	3216	113
C107	0.1	16	C	C	A , B	1005	108
C108	2200p	50	C	C	A , B	1608	102
C109	0.1	16	C	C	A , B	1608	128
C110	330	10	D	R	A , B	ZLH	126
C114	0.1	16	C	C	A , B	1608	128
C126	2200p	10	C	R			
C131	22	35	D	R	A , B	ML	125
C132	2200p	50	C	C	A , B	1608	102
C133	1000p	50	C	C	A , B	1608	103
C134	100	50	D	R	A , B	YXG	122
C135	0.1	50	C	C	A , B	1608	99
C161	1000p	1k	C	R	A , B	RRCPP296	114
C201	1000p	50	C	C	A , B	1608	103
C202	10	50	D	R	A , B	PX	121
C203	0.1	25	C	C	A , B	1608	107
C206	4.7	50	D	R	A , B	PX	124
C208	0.1	25	C	C	A , B	1608	107
C302	0.1	25	C	C	A , B	1608	107
C321	0.022	50	C	C	A , B	1005	105
C322	2200p	50	C	C	A , B	1005	104
C323	0.1	16	C	C	A , B	1005	108
C324	0.01	16	C	C	A , B	1005	97
C326	0.022	50	C	C	A , B	1005	105
C327	47p	50	C	C	A , B	1005	96
C328	0.1	16	C	C	A , B	1005	108
C341	0.1	AC310	F	H	A , B		9
C342	0.018	50	F	R	A , B		130
C343	4700p	250	C	R	A , B		117
C402	0.01	16	C	C	A , B	1005	97
C501	0.1	16	C	C		1005	
C502	0.01	16	C	C		1005	
C503	0.1	16	C	C	A , B	1005	108
C505	0.1	16	C	C	A , B	1005	108
C531	0.1	16	C	C	A , B	1005	108
C532	470p	50	C	C	A , B	1608	90
C533	470p	50	C	C	A , B	1608	90
C601	0.47	25	C	C	A , B	1608	98
C602	0.1	16	C	C	A , B	1005	108
C603	10k	5%	1/16	C	A , B	1005	68
C610	0.1	25	C	C	A , B	1608	107
C611	1000p	50	C	C	A , B	1608	103
C612	1000p	50	C	C	A , B	1608	103
C613	0.1	16	C	C	A , B	1005	108
C614	0.1	25	C	C	A , B	1608	107
C615	0.1	16	C	C	A , B	1005	108
C616	0.1	16	C	C	A , B	1005	108
C617	0.1	16	C	C	A , B	1005	108
C618	10k	5%	1/16	C	A , B	1005	68
C634	0.022	50	C	C	A , B	1608	106
C661	0.01	16	C	C	A , B	1005	97
C671	0.1	16	C	C	A , B	1005	108
C672	1000p	25	C	C	A , B	1005	94
C673	1000p	50	C	C	A , B	1005	101
C692	8p	50	C	C	A , B	1005	111
C693	7p	50	C	C	A , B	1005	112
C701	0.1	25	C	C		1608	
C702	0.1	25	C	C	A , B	1608	107
C703	0.1	25	C	C		1608	
C704	0.1	25	C	C	A , B	1608	107
C705	0.1	25	C	C		1608	
C706	0.01	50	C	C		1608	
C720	10	25	C	C		3216	
C733	1000p	50	C	C	A , B	1005	101
C741	0.1	16	C	C	A , B	1005	108
C770	100	25	D	R	A , B	LXZ	116
C771	0.1	25	C	C	A , B	1608	107
C772	1000p	50	C	C	A , B	1608	103
C842	0.1	25	C	C		1608	
C901	220p	50	C	C		1005	
C902			C	C		1005	
C903	0.1	25	C	C		1608	
C904	0.1	16	C	C		1005	
C911	0.1	25	C	C		1608	
C912	0.01	16	C	C		1005	
C913	1	25	C	C		1608	

PHOTO COUPLER

SYMBOL	MODEL	FORM	GROUP	REMARK	ASSY NO.
PC101	LTV-817S-TA1	S	A , B	CTR:D	172
PC201	LTV-817S-TA1	S	A , B	CTR:D	172
PC202	LTV-817S-TA1	S	A , B	CTR:D	172
PC203	LTV-817S-TA1	S	A , B	CTR:D	172
PC301	LTV-817S-TA1	S	A , B	CTR:D	172
PC302	LTV-817S-TA1	S	A , B	CTR:D	172

WIREHARDNESS

SYMBOL	MODEL	FORM	GROUP	REMARK	ASSY NO.
TB001	86028	H			
WR001	AWG12(BLK)	H			
WR002	AWG20	H	A , B	WHITE	77
WR003	AWG20	H	A , B	RED	78
WR005	AWG20(GRN)	H	A , B	GREEN	75
WR101	AWG20	H	A , B	BLACK	76

DIODE

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
D101	D1FT15A	C	A , B	160
D102	D2L20U	A	A , B	159
D131	D1NL40U	A	A , B	155
D132	D1NL40U	A	A , B	155
D161	SARS01	A	A , B	158
D201	KDS160	C	A , B	161
D321	KDS160	C	A , B	161
D322	BAV99	C	A , B	162
D323	BAV99	C	A , B	162
D501	KDS160	C	A , B	161
D531A	1SS184	C	A , B	164
D531B	1SS181	C	A , B	165
D911	KDS160	C		
D912	KDS160	C		
DB1	D2SB60A	H	A , B	19
ZD101	UDZVTE-1712B	C	A , B	167
ZD202	BZT52H-B16	C	A , B	168

TRANSISTOR

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
Q101	RRR040P03TL	C	A , B	133
Q103	KTC3875S-GR-FTK	C	A , B	134
Q201	2SCR293P5T100	C	A , B	135
Q211	DTC023YEBTL	C	A , B	138
Q331	DTC023YEBTL	C	A , B	138
Q332	DTC043ZEBTL	C	A , B	137
Q501	DTC014EEBTL	C	A , B	136
Q661	KTA2012E	C	A , B	139
Q662	DTC023YEB	C		
Q701	PJA3407	C		
Q702	DTC023YEB	C		
Q720	RRR015P03TL	C		
Q751	DTC014EEBTL	C	A , B	136
Q831	UT2302G-AE3-R	C	A , B	131
Q844	2SA2056	C		
Q845	2SA2056	C		

COIL

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
NF1	SS11H-10062-CH	H	A , B	25
T001	ST-22159	H	A , B	28
T301	UU9LF	H	A , B	26
L001	BC0610R6H-B-3-N-1	H	A , B	42
L101	RCH108-100	H	A , B	41
L111	BC0610R6H-B-3-N-1	H	A , B	42
L770	BL01RN1A1F1A	A	A , B	142
L771	BL01RN1A1F1A	A	A , B	142

VARISTOR / POWER THERMISTOR / BUZZER

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
VA001	B72214S2321K591V87	R	A , B	174
	ERZVA9V221	R		175
TH001	5D2-08LCS	H	A , B	22
BZ701	PS1720P02	H	A , B	45

OTHERS

SYMBOL	MODEL	FORM	GROUP	ASSY NO.
FU1	3.15A-F-WE	H	A , B	30
FU1-COVER	845220A-23	H		
RES602	NX3215SA	C	A , B	176
ICP1	ERBRE1R25V	C		
ICP2	ERBRE1R25V	C	A , B	170
DSW1	KSD62	H	A , B	21

CONNECTOR

SYMBOL	MODEL	FORM	REMARK	GROUP	ASSY NO.
CN2	B5(7-2.3)B-XH-A	H	WHITE	A , B	49
CN4	B02B-PARK-1	H	RED	A , B	52
CN5	B4B-XH-A	H	WHITE	A , B	50
CN6	B11B-CZHK-B-1	H	WHITE	A , B	53
CN7	B06B-PASK-1	H	WHITE	A , B	54
CN8	B04B-PARK-1	H			
CN9	B5B-PH-K-K	H	BLACK	A , B	51
CN10	B02B-PAKK-1	H			
CN11	B5B-PH-K-R	H			
CN12	B5B-PH-K-S	H	WHITE	A , B	55
CN14	B3B-PASK-1	H			
CN16A	B14B-CZHK-B-1	H	WHITE	A , B	56
CN16B	B04B-CZHK-B-1	H	WHITE	A , B	60
CN17	B2B-PH-K-K	H	BLACK	A , B	57
CN18	B4B-PASK-1	H	WHITE	A , B	59
CN19	B09B-CZHK-B-1	H			
CN20S	B05B-CZYK-B-1	H			
CN21	B03B-PAKK-1	H	BLACK	A , B	58
CN22	B-5B-PH-K-E	H			

INDICATION RESISTOR

SYMBOL	VALUE	TOLERANCE	WATT	FORM	REMARK	GROUP	ASSY NO.
R214	0	5%	1/10	C	1608	A , B	8
R215	2.7k	5%	1/10	C	1608	A , B	5
R216	47	5%	1/10	C	1608	A , B	7
R217	1k	5%	1/10	C	1608	A , B	6

INDICATION CAPACITOR

SYMBOL	VALUE	VOLTAGE	TYPE	FORM	REMARK	GROUP	ASSY NO.
C211	47	16	D	R	MF	A , B	12
C212	0.1	25	C	C	1608	A , B	13

INDICATION LED

SYMBOL	TYPE	FORM	REMARK	GROUP	ASSY NO.
LD201	SLR-332YC3F	H	OPERATION	A , B	17
LD202	SLR-332DC3F	H	TIMER	A , B	18
LD203	SLR-332MC3F	H	FROSTWASH	A , B	19
LD204		H			
LD211	SIR-34ST3F	H	TRANSMIT	A , B	15

INDICATION CONNECTOR

SYMBOL	TYPE	FORM	GROUP	ASSY NO.
CN2H	S14B-CZYK-B-1	H	A , B	25
CN10H	S03B-CZHK-B-1	H	A , B	
CN14H	B11B-CZHK-B-1	H	A , B	27

INDICATION OTHERS

SYMBOL	TYPE	FORM	GROUP	ASSY NO.
TH1	THERMISTOR	H	A , B	31
SW211	SKRGALD010	H	A , B	22

INDICATION DIODE

SYMBOL	TYPE	FORM	GROUP	ASSY NO.
ZD211	RD5.6UJN2	C	A , B	21

INDICATION IC AND TRANSISTOR

SYMBOL	TYPE	FORM	GROUP	ASSY NO.
IC211	GP1UM261RKVF	C	A , B	29
Q212	2SC2412K-R	C	A , B	23

SENSOR CAPACITOR

SYMBOL	VALUE	VOLTAGE	FORM	GROUP	ASSY. NO
C1	22	10	C	B	22
C2	0.01	50	C	B	23
C3	1000p	50	C	B	24
C4	0.01	50	C	B	23
C5	1000p	50	C	B	24
C6	22	10	C	B	22
C7	1000p	50	C	B	24
C8	0.022	50	C	B	25
C9	0.1	25	C	B	26
C10	22	10	C	B	22
C11	1000p	50	C	B	24
C12	0.022	50	C	B	25
C13	2200p	50	C	B	27
C14	0.01	50	C	B	23
C15	0.1	25	C	B	26
C16	0.01	50	C	B	23
C17					
C18	22	10	C	B	22
C19	0.01	50	C	B	23

SENSOR IC

SYMBOL	TYPE	FORM	GROUP	ASSY. NO
IC1	NJM2904M	H	B	37
IC2	NJM2903E	H	B	38

SENSOR DIODE

SYMBOL	TYPE	FORM	GROUP	ASSY. NO
D1	KDS4148U	H	B	30
D2	KDS4148U	H	B	30

SENSOR HUMIDITY

SYMBOL	TYPE	FORM	GROUP	ASSY. NO
PIR	H-SENSOR	H	B	33
HS1	HIS-06K-N	H	A & B	35

CHIP JUMPER

SYMBOL	VALUE(Ω)	TOLERANCE	WATT	FORM	GROUP	REMARK	ASSY. NO
J001	0	5%	1/16	C	A , B	1005	84
J002	0	5%	1/16	C		1005	
J003	0	5%	1/16	C	A , B	1005	84
J004	0	5%	1/16	C		1005	
J005	0	5%	1/16	C		1005	
J006	0	5%	1/16	C		1005	
J007	0	5%	1/10	C	A , B	1608	48
J008	0	5%	1/16	C		1005	

SENSOR RESISTOR

SYMBOL	VALUE	TOLERANCE	WATT	FORM	GROUP	ASSY. NO
R1	47k	5%	1/10	C	B	4
R2	1k	5%	1/10	C	B	5
R3	100k	5%	1/10		B	6
R4	47k	1%	1/10	C	B	4
R5	22k	1%	1/10	C	B	7
R6	3.6M	1%	1/10	C	B	8
R7	33k	1%	1/10	C	B	9
R8	100k	1%	1/10	C	B	10
R9	62k	1%	1/10		B	11
R10	3.6M	1%	1/10	C	B	8
R11	110k	1%	1/10	C	B	13
R12	42.2k	1%	1/10	C	B	14
R13	57.6k	1%	1/10	C	B	15
R14	NA					
R15	100	5%	1/10	C	B	16
R16	10k	5%	1/10	C	B	17

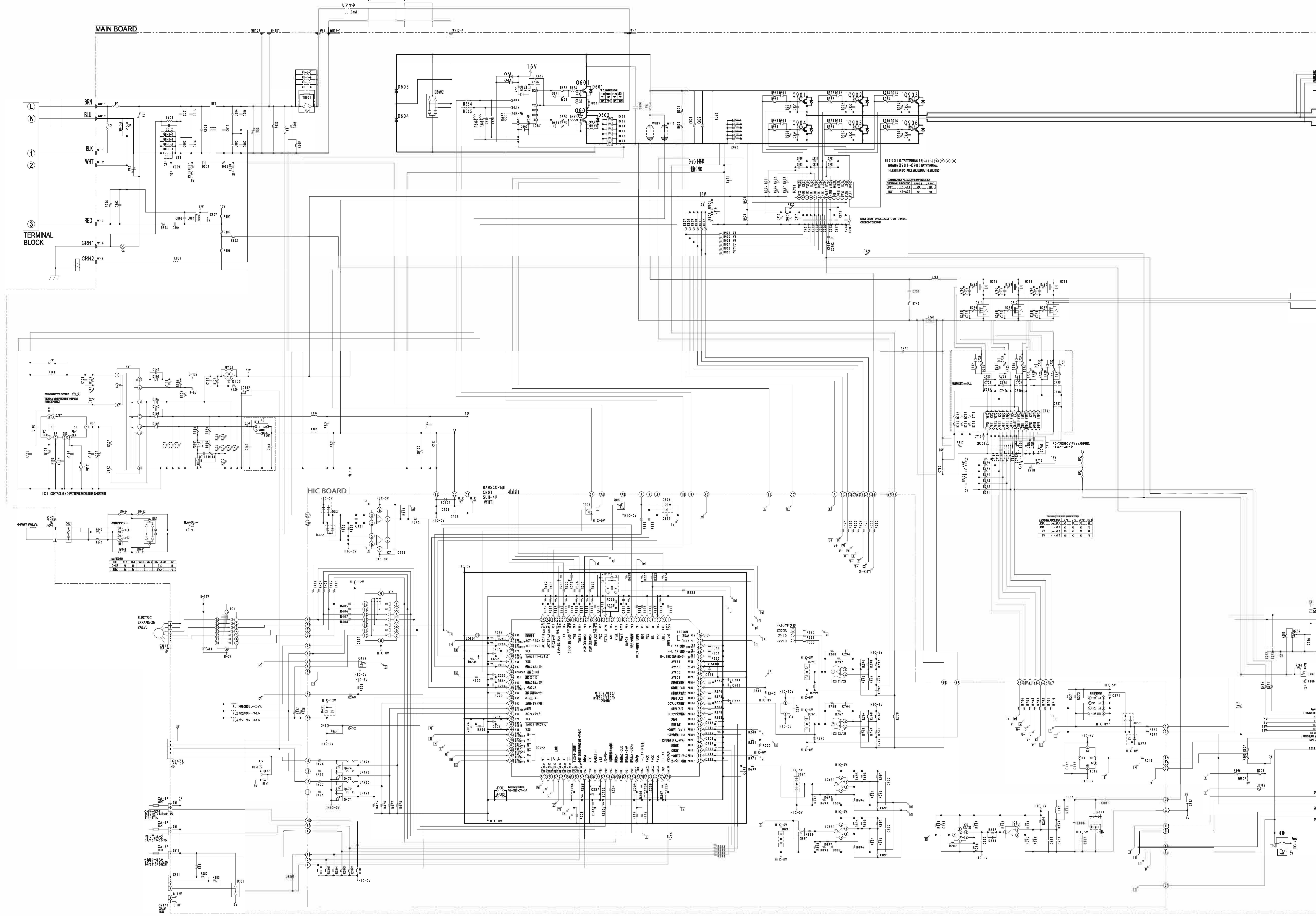
SENSOR CONNECTOR

SYMBOL	TYPE	FORM	GROUP	ASSY. NO
CN5H	04DS-8E	H	B	46
CN6H	S02B-CZHK-B-1	H	A & B	47

CIRCUIT DIAGRAM

MODEL: RAC-EH18WHLAE, RAC-EH24WHLAE

MAIN PWB,HIC PWB



MAIN-PCBA

Resistor

Symbol	Resistance	Tolerance	Electric power
R001	1.43M	1%	1/4
R002	JUMPER		
R004	470k	5%	1/4
R005	1.96k	1%	1/10
R006	1k	0.5%	1/10
R007	20	1%	1/10
R010	0.1	1%	2
R011	0.1	1%	2
R012	0.1	1%	2
R013	0.1	1%	2
R014	0.1	1%	2
R015	0.1	1%	2
R030	560k	5%	1/2
R051	10k	5%	1/10
R101	22	5%	1
R102	680k	5%	1/2
R105	1.5	5%	1/2
R106	330k	5%	1/10
R107	10	5%	1/8
R109	0	5%	1/4
R110			
R112	11k	1%	1/10
R113	3k	1%	1/10
R114	47k	5%	1/10
R115	10k	1%	1/10
R116	1k	1%	1/10
R120	3.3k	5%	1/10
R122			
R123			
R125			
R126			
R140	20k	5%	1/4
R141			
R142			
R216	100	5%	1/10
R241	100	5%	1/10
R280	200	5%	1/4
R281	1.96k	1%	1/10
R286	1.2k	5%	1/6
R300	5.1k	5%	1/10
R306	10k	5%	1/10
R307	1k	5%	1/10
R309	10k	5%	1/10
R381	1k	1%	1/16
R382	1k	1%	1/16
R383	1k	1%	1/16
R436			1/6
R437			
R441	1.3k	5%	2
R442	1.3k	5%	2
R601	0.02	1%	2
R602	0.02	1%	2
R603	0.02	1%	2
R604	0.02	1%	2
R605			
R606			
R608	750k	1%	1/2
R609	750k	1%	1/2
R663	510	5%	1/10
R664	3k	5%	1/10
R665	3k	5%	1/10
R667	20k	5%	1/10
R668	20k	5%	1/10
R671	24	5%	1/10
R672	150	5%	1/10
R673	24	5%	1/10
R674	20k	5%	1/10
R675	24	5%	1/10
R676	150	5%	1/10
R677	24	5%	1/10
R678	20k	5%	1/10
R713			
R714			
R715			
R716	1M	5%	1/10
R717	1k	5%	1/10
R718	100	5%	1/10
R721	2k	5%	1/10
R722	2k	5%	1/10
R723	2k	5%	1/10
R724	2k	5%	1/10
R725	2k	5%	1/10
R726	2k	5%	1/10
R727	100	5%	1/10
R728	100	5%	1/10
R729	100	5%	1/10
R730	100	5%	1/10
R731	100	5%	1/10
R732	100	5%	1/10
R741	0.24	1%	2
R742	10	5%	1/2
R771	20k	5%	1/10
R772	20k	5%	1/10
R773	20k	5%	1/10
R774	20k	5%	1/10
R775	20k	5%	1/10
R776	20k	5%	1/10
R781	47k	5%	1/10
R782	47k	5%	1/10
R783	47k	5%	1/10
R784	47k	5%	1/10
R785	47k	5%	1/10
R786	47k	5%	1/10
R787	100	5%	1/10
R788	100	5%	1/10
R789	100	5%	1/10
R790	100	5%	1/10
R791	100	5%	1/10
R792	100	5%	1/10
R801	680	5%	1/4
R802	180	5%	1/8
R803	2k	5%	1/8
R804	47	5%	1/2
R806	91	1%	1/4
R901	51	5%	1/10
R902	51	5%	1/10
R903	51	5%	1/10
R904	51	5%	1/10
R905	51	5%	1/10
R906	51	5%	1/10
R907	20k	5%	1/10
R908	20k	5%	1/10
R909	20k	5%	1/10
R910	20k	5%	1/10
R911	20k	5%	1/10
R912	20k	5%	1/10
R921	51	1%	1/10
R922	1M	5%	1/10
R923	0	5%	1/10
R924			
R925			
R926			
R927			
R928	100	5%	1/10
R941	24	5%	1/10
R942	24	5%	1/10
R943	24	5%	1/10
R944	24	5%	1/10
R945	24	5%	1/10
R946	24	5%	1/10
R951	47k	5%	1/10
R952	47k	5%	1/10
R953	47k	5%	1/10
R954	47k	5%	1/10
R955	47k	5%	1/10
R956	47k	5%	1/10
R961	75	5%	1/10
R962	75	5%	1/10
R963	75	5%	1/10
R964	75	5%	1/10
R965	75	5%	1/10
R966	75	5%	1/10
R971	24	5%	1/10
R972	24	5%	1/10
R973	24	5%	1/10
R974	24	5%	1/10
R975	24	5%	1/10
R976	24	5%	1/10

Capacitor

Symbol	Capacity	Voltage	Type
C001	0.01	AC300	C
C002	0.01	AC300	C
C003	0.68	AC310	F
C004			
C005			
C006	0.01	AC300	C
C007	0.01	AC300	C
C009	0.1	50	C
C010	100	10	D
C011	3.3	AC275	F
C012			
C013	0.01	AC300	C
C014	0.01	AC300	C
C021	500	450	D
C022	500	450	D
C032	0.1	450	F
C101	2200p	1000	C
C102	33p	1000	C
C103			
C104	22	50	D
C105			
C107	1000p	50	C
C108	0.01	25	C
C111	470	25	D
C114	470	25	D
C115	220	25	D
C116	330	16	D
C117	0.1	25	C
C122			
C123	100	10	D
C125			
C126			
C132			
C140			
C141			
C150	0.33	25	C
C151	2.2	25	C
C272	100p	50	C
C273	100p	50	C
C286	0.1	16	C
C401	100	25	D
C604	1	450	F
C661	100p	50	C
C662	100p	50	C
C663	100	25	D
C664	1	25	C
C665	39	35	D
C666	0.1	25	C
C667	0.1	25	C
C668			
C669			
C702	1	25	C
C703	2200p	50	C
C704	1000p	50	C
C706	0.1	16	C
C711	330p	50	C
C712	330p	50	C
C713	330p	50	C
C714	330p	50	C
C715	330p	50	C
C716	330p	50	C
C717	0.1	25	C
C718	1000p	50	C
C719			
C721	39	35	D
C722	39	35	D
C723	39	35	D
C724	0.1	25	C
C725	0.1	25	C
C726	0.1	25	C
C731			
C732			
C733			
C734			
C735			
C736			
C737	100p	50	C
C738	100p	50	C
C739	100p	50	C
C740	100p	50	C
C741	100p	50	C
C742	100p	50	C
C751	0.1	450	F
C772	0.1	50	C
C802	4700p	AC250	C
C803	0.018	50	F
C804	0.1	AC310	F
C805	0.1	16	C
C807	0.1	25	C
C901	680p	50	C
C902	680p	50	C
C903	680p	50	C
C904	680p	50	C
C905	680p	50	C
C906	680p	50	C
C910	220	25	D
C911	1	25	C
C912	0.068	50	C
C913	2200p	50	C
C914	0.1	50	C
C915	1000p	50	C
C916			
C917	1000p	50	C
C920	39	35	D
C921	39	35	D
C922	39	35	D
C923	0.1	25	C
C924	0.1	25	C
C925	0.1	25	C
C940			
C941	0.1	50	C
C951			
C952			
C953			
C954			
C955			
C956			

Diode

Symbol	Model type
D002	KDS4148U-RTK
D050	1SS355VM
D101	SARS01
D102	M1FL20U
D105	D1NL40U
D107	M1FL20U
D108	M1FL20U
D109	M1FL20U
D111	1SS355VM
D286	1SS355VM
D301	KDS226
D601	
D602	
D603	
D604	
D671	1SS355VM
D673	1SS355VM
D711	
D712	
D713	
D721	1SS355VM
D722	1SS355VM
D723	1SS355VM
D724	1SS355VM
D725	1SS355VM
D726	1SS355VM
D901	
D902	
D903	
D911	1SS355VM
D912	1SS355VM
D913	1SS355VM
D914	1SS355VM
D915	1SS355VM
D916	1SS355VM
DB1	S1WB60
DB602	D25XB60

Transistor

Symbol	Model type
Q286	DTC114EEBTL
Q287	DTA023EEBTL
Q601	IKW50N65EH5
Q602	IKW50N65EH5
Q711	P5F50HP2F
Q712	P5F50HP2F
Q713	P5F50HP2F
Q714	P5F50HP2F
Q715	P5F50HP2F
Q716	P5F50HP2F
Q901	RGT30TM65
Q902	RGT30TM65
Q903	RGT30TM65
Q904	RGT30TM65
Q905	RGT30TM65
Q906	RGT30TM65
Q901–Q906	RGT50TM65D

Photo coupler

Symbol	Model type
PQ101	LTV-817CHA

Connector

Symbol	Model type
CN10	B2B-XARK-1N
CN11	B4B-XASK-1N
CN15	B6B-XASK-1N
CN17	B4B-PH-K-S
CN18	B11B-PH-K-S
CN2	B2P4-VH-R
CN20	B8B-PH-K-S
CN24	B3P5-VH
CN471	B5B-XASK-1N
CN8	B2B-XASK-1N
CN9	B2B-XAKK-1N

Inductor

Symbol	Model type
L001	CKBW25X45X08
L002	AXL-JUMPER
L104	AXL-JUMPER
L105	AXL-JUMPER
L701	AXL-JUMPER
L801	IF-TRANS
NF1	TC38T-22220R
SWT	SW-TRANS-H

Surge Absorbers

Symbol	Model type
SA	RA-102M-C6
VS1	B72214S2321K591V87
VS2	B72214S2321K591V87

Relay

Symbol	Model type
RL1	G5V-2
RL2	FTR-F3-RY
RL4	DX12D1

IC

Symbol	Model type
IC1	STR6A169HVD
IC11	ULN2003L-D16-T
IC641	2EDL23N06PJ
IC702	6EDL04I06PT
IC901	6EDL04I06PT
REG1	NJM2884U1-05(TE1)
REG2	KIA431A-AT/PC

Spark killer

Symbol	Model type
SK1	RE1201

Power thermistor

Symbol	Model type
TH001	PTC-B59412U1130B

Fuse

Symbol	Model type
F1	GDU250 25(SSP)2H26
F3	FJL250 2(EM)8H17
F4	FJL250 2(EM)8H17
F5	TSD3.15A250V
F6	TSD3.15A250V

Fuse Holder

Symbol	Model type
F5	FC51FL
F6	FC51FL

Jumper

Symbol	Model type
JP101	AXL-JUMPER
JP3	CHIP-JUMPER
JP702	CHIP-JUMPER
JP902	CHIP-JUMPER
JW1	AXL-JUMPER
JW401	AXL-JUMPER
JW402	AXL-JUMPER
JW403	AXL-JUMPER
JW404	AXL-JUMPER
JW601	AXL-JUMPER
JW602	AXL-JUMPER
JW603	AXL-JUMPER
J900	CHIP-JUMPER
J901	CHIP-JUMPER
WH-E1~4	AXL-JUMPER
WH-E5~8	AXL-JUMPER
WH-E-9	AXL-JUMPER

WIRE

Symbol	Model type
WH1	BLK, AWG20
WH2	WHT, AWG20
WH3	RED, AWG20
WH4	GRN, AWG20
WH5	GRN, AWG20
WH6	WHT, AWG14
WH7–WH12	BLU(WH7)-YEL(WH12) AWG14
WH8	WHT, AWG16
WH9	YEL, AWG16
WH10	RED, AWG16
WH11	BLK, AWG14 BRN, AWG14
WH12	WHT, AWG14 BLU, AWG14
WH15-1~WH15-2	RED, AWG22
WH16-1~WH16-2	RED, AWG22
WH101	BLK, AWG20
WH102	WHT, AWG20

Zener diode

Symbol	Model type
ZD120	UDZVTE-176.8B
ZD901	UDZVTE-1722B
ZD902	UDZVTE-1722B

HIC-PCBA

Resistor

Symbol	Resistance	Tolerance	Electric power
R200	10k	1%	1/16
R201	510	5%	1/16
R203	100	5%	1/16
R206	5.1k	5%	1/16
R208	10k	5%	1/16
R209	10k	5%	1/16
R211	10k	5%	1/16
R212	390	5%	1/16
R213	10k	5%	1/16
R214	390	5%	1/16
R215	100	5%	1/16
R217	10k	5%	1/16
R223	10k	5%	1/16
R224	390	5%	1/16
R225	5.1k	5%	1/16
R227	10k	5%	1/16
R228	390	5%	1/16
R229			
R230	330	5%	1/16
R234	100	5%	1/16
R236	2.2k	5%	1/16
R239	100	5%	1/16
R240	100	5%	1/16
R243			
R244	1k	5%	1/16
R247	100	5%	1/16
R248	100	5%	1/16
R251	7.15k	1%	1/16
R252	10k	1%	1/16
R253	10k	1%	1/16
R254	10.5k	1%	1/16
R255	5.6k	1%	1/16
R256	7.15k	1%	1/16
R257	51k	5%	1/16
R258	7.15k	1%	1/16
R259	1k	5%	1/16
R260	510	5%	1/16
R263	10k	5%	1/16
R264	10k	5%	1/16
R265	100	5%	1/16
R266	10k	5%	1/16
R267	10k	5%	1/16
R268			
R269			
R271	5.1k	5%	1/16
R272	5.1k	5%	1/16
R273	390	5%	1/16
R274	390	5%	1/16
R275	100	5%	1/16
R276	100	5%	1/16
R277	100	5%	1/16
R278	100	5%	1/16
R279	10k	5%	1/16
R282	8.2k	1%	1/16
R283	10k	5%	1/16
R284	10k	5%	1/16
R287	5.6k	1%	1/16
R288			
R289	30.1k	1%	1/16
R290			
R291	5.23k	1%	1/16
R292	10k	1%	1/16
R293	5.23k	1%	1/16
R294	15k	1%	1/16
R297	15k	1%	1/16
R299	10k	1%	1/16
R301	3.74k	0.5%	1/16
R302	3.01k	0.5%	1/16
R303	3.01k	0.5%	1/16
R304			
R305	10k	5%	1/16
R310	1k	5%	1/16
R321	1.8k	1%	1/16
R322	1.8k	1%	1/16
R325	10k	5%	1/16
R326	0	5%	1/16
R350	10k	5%	1/16
R351	10k	5%	1/16
R352	10k	5%	1/16
R353	10k	5%	1/16
R354	10k	5%	1/16
R355	10k	5%	1/16
R356	10k	5%	1/16
R357	10k	5%	1/16
R360	10k	5%	1/16
R361	10k	5%	1/16
R362	10k	5%	1/16
R364	10k	5%	1/16
R365	10k	5%	1/16
R366	10k	5%	1/16
R367	10k	5%	1/16
R371	100	5%	1/16
R373	10k	5%	1/16
R374	390	5%	1/16
R375	390	5%	1/16
R376	390	5%	1/16
R377	390	5%	1/16
R401	1k	5%	1/16
R402	1k	5%	1/16
R403	1k	5%	1/16
R404	1k	5%	1/16
R405			
R406			
R407			
R408			
R409			
R431	10k	5%	1/16
R432	5.1k	5%	1/16
R471	1k	5%	1/16
R472	1k	5%	1/16
R473	1k	5%	1/16
R474	1k	5%	1/16
R475	10k	5%	1/16
R476	10k	5%	1/16
R477	10k	5%	1/16
R478	10k	5%	1/16
R525	430	5%	1/16
R526	430	5%	1/16
R527	430	5%	1/16
R528	430	5%	1/16
R529	430	5%	1/16
R530	430	5%	1/16
R631	100	5%	1/16
R632	100	5%	1/16
R633	0	5%	1/16
R634	10k	5%	1/16
R635	10k	5%	1/16
R637			
R638	0	5%	1/16
R641	160	5%	1/16
R642	13.3k	1%	1/16
R650	10k	5%	1/16
R689	10k	5%	1/16
R690			
R691	7.15k	1%	1/16
R692	1k	1%	1/16
R693			
R694	16.5k	1%	1/16
R695	10k	1%	1/16
R696	1k	1%	1/16
R697	10k	1%	1/16
R698	2k	1%	1/16
R699	100	5%	1/16
R701	470	5%	1/16
R702	470	5%	1/16
R703	470	5%	1/16
R704	470	5%	1/16
R705	470	5%	1/16
R706	470	5%	1/16
R719	0	5%	1/16
R758			
R759	34.8k	1%	1/16
R760	23.2k	1%	1/16
R761	4.22k	1%	1/16
R762	23.2k	1%	1/16
R763	4.22k	1%	1/16
R764	17.4k	1%	1/16
R767	17.4k	1%	1/16
R769	10k	1%	1/16
R805	0	5%	1/16
R831	100	5%	1/16
R832	100	5%	1/16
R833	10k	5%	1/16
R834	10k	5%	1/16
R890			
R891	30.1k	1%	1/16
R892	1k	1%	1/16
R893			
R894	60.4k	1%	1/16
R895	10k	1k	1/16

Capacitor

Symbol	Capacity	Voltage	Type
C128	0.1	25	C
C129	0.1	25	C
C191	0.1	25	C
C201	0.1	25	C
C202	0.1	25	C
C203			
C204	470p	50	C
C205	0.047	25	C
C206	470p	50	C
C207	470p	50	C
C209			
C210	0.47	16	C
C211	0.047	25	C
C214			
C215			
C216	0.1	25	C
C217	0.1	25	C
C222			
C223	10kΩ	5%	1/16W
C224	10kΩ 0.1	5% 25	1/16W C
C234	0.1	25	C
C235	0.1	25	C
C236	0.1	25	C
C237	0.1	25	C
C238	0.1	25	C
C239	0.1	25	C
C240	0.1	25	C
C241	0.1	25	C
C251	2200p	50	C
C252	0.01	25	C
C271	0.1	25	C
C281	0.1	25	C
C287	0.1	16	
C288	0.1	16	
C291	0.1	25	C
C292	0.047	25	C
C293	0.1	25	C
C294			
C321	0.01	50	C
C641	0.01	25	C
C652	1000p	50	C
C691	0.01	25	C
C692	0.1	25	C
C693	1000p	50	C
C694			
C762	0.01	25	C
C764			
C801	0.022	50	C
C806	0.022	50	C
C808	47p	50	C
C891	0.01	25	C
C892	0.1	16	C
C931	0.1	25	C
C932	0.1	25	C

Diode

Symbol	Model type
D251	1SS355VM
D271	KDS184
D272	KDS181
D291	KDS226
D321	KDS184
D322	KDS181
D431	KDS184
D691	KDS226
D761	KDS226
D801	KDS226
D802	KDS226

Zener diode

Symbol	Model type
ZD121	UDZVTE-176.8B
ZD122	UDZVTE-176.8B

Transistor

Symbol	Model type
Q203	DTC143EEBT
Q431	BCX19
Q471	DTC114EEBT

LED

Symbol	Model type
LD301	SML-D12D8W

IC

Symbol	Model type
IC2	TBD62003AFWG
IC3	NJM2742M
IC5	NJM2903CG-TE2
IC7	NJM2903CG-TE2
IC691	NJU7046F
EEPROM	M24128-BRDW6TP
MICON	R5F566TEBDFP

Oscillator

Symbol	Model type
X1	CSTNE10M0G55

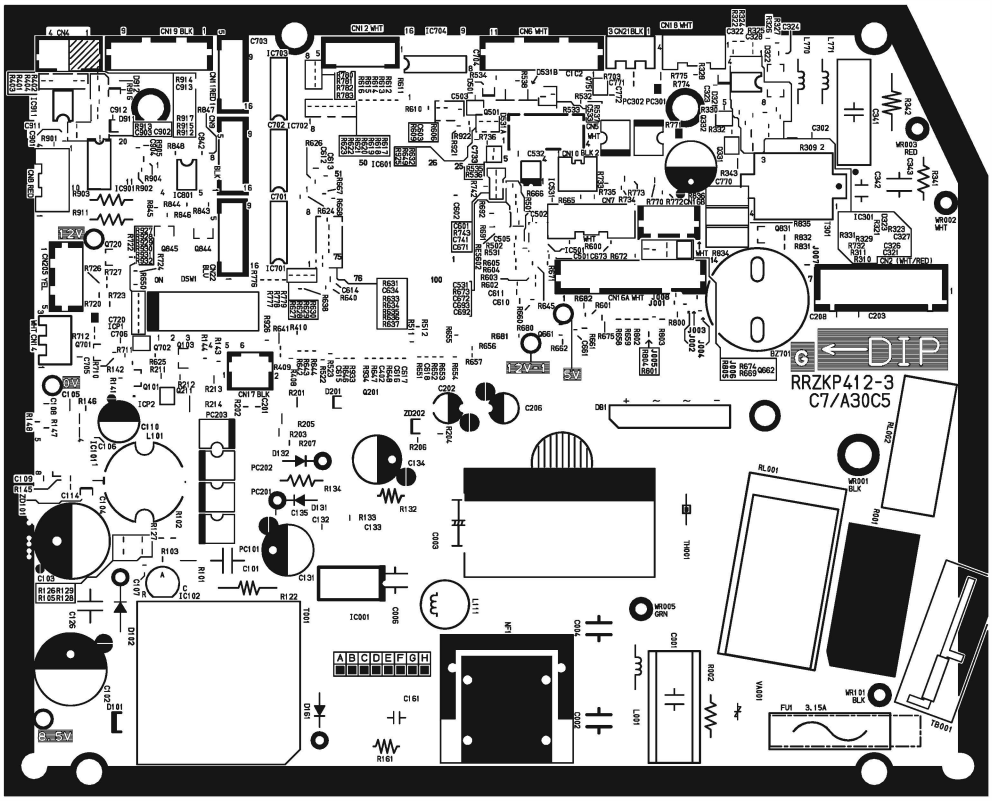
Resistor

Symbol	Resistance	Tolerance	Electric power
R990	100	5%	1/16
R991	100	5%	1/16
R992	100	5%	1/16

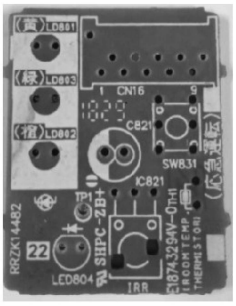
PRINTED BOARD LOCATION DIAGRAM

MODEL: RAS-EH18RHLAE

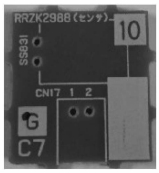
MAIN P.W.B
Marking on P.W.B



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



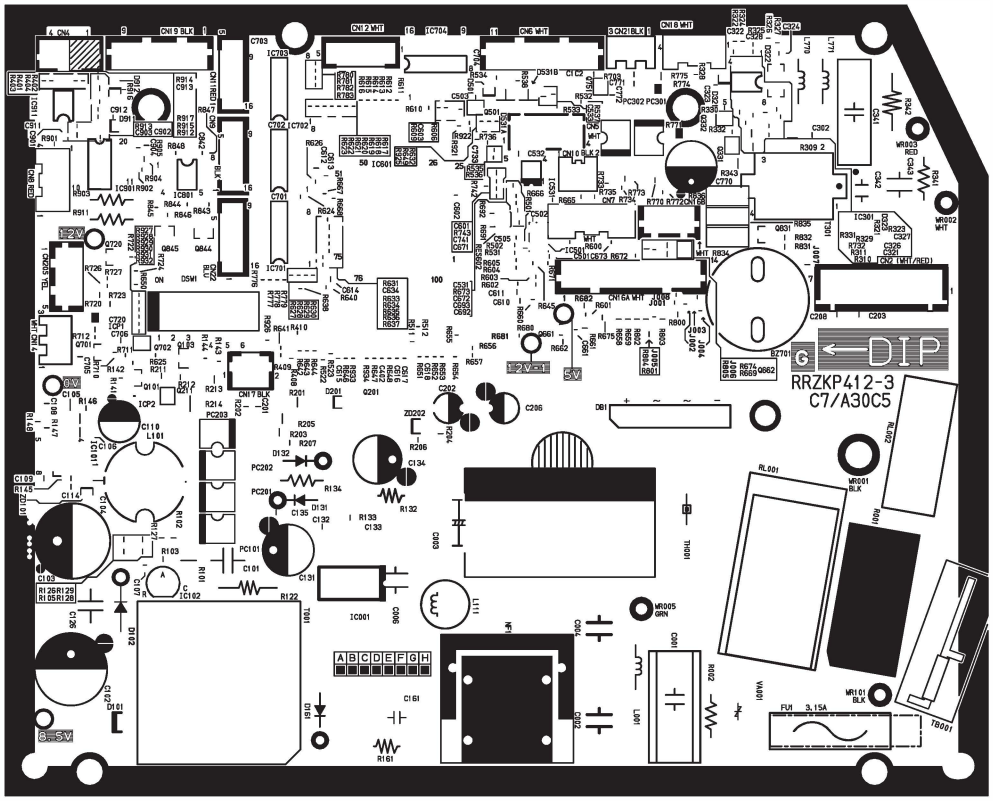
SENSOR P.W.B
Marking on P.W.B



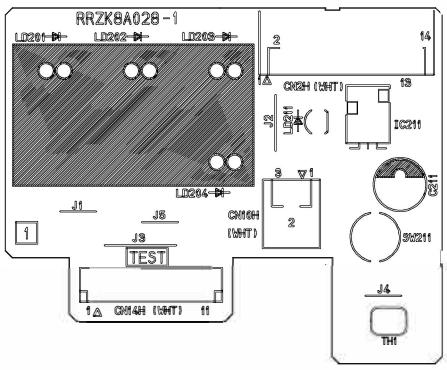
PRINTED BOARD LOCATION DIAGRAM

MODEL: RAS-EH24RHLAE

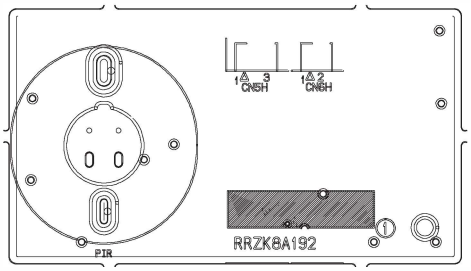
MAIN P.W.B
Marking on P.W.B



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

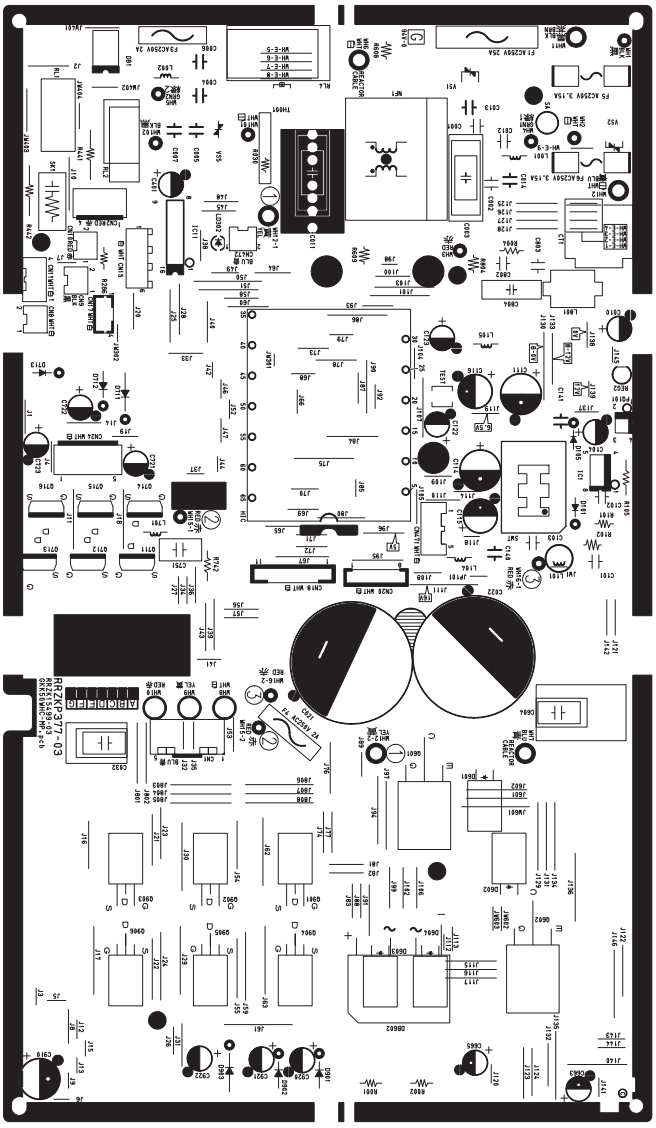


SENSOR P.W.B
Marking on P.W.B

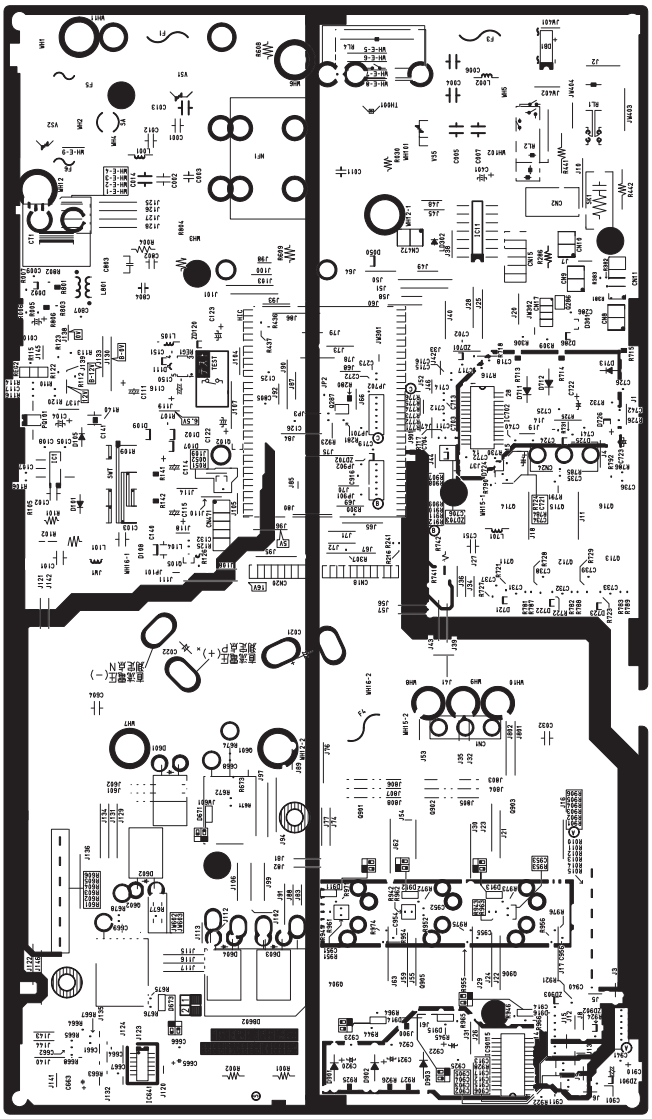


MAIN PWB

MODEL RAC-EH18WHLAE
RAC-EH24WHLAE

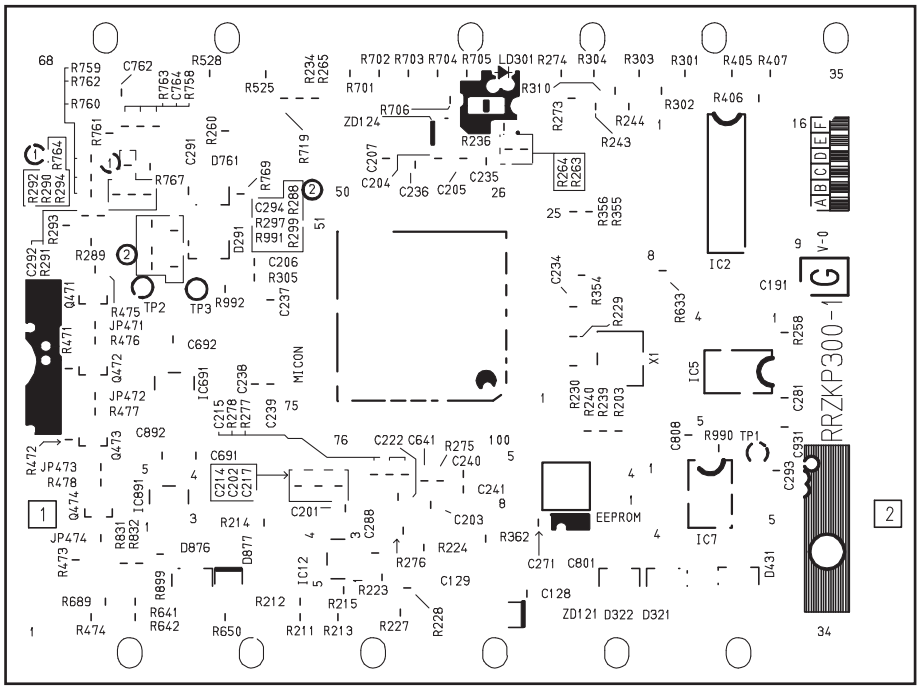


Top side

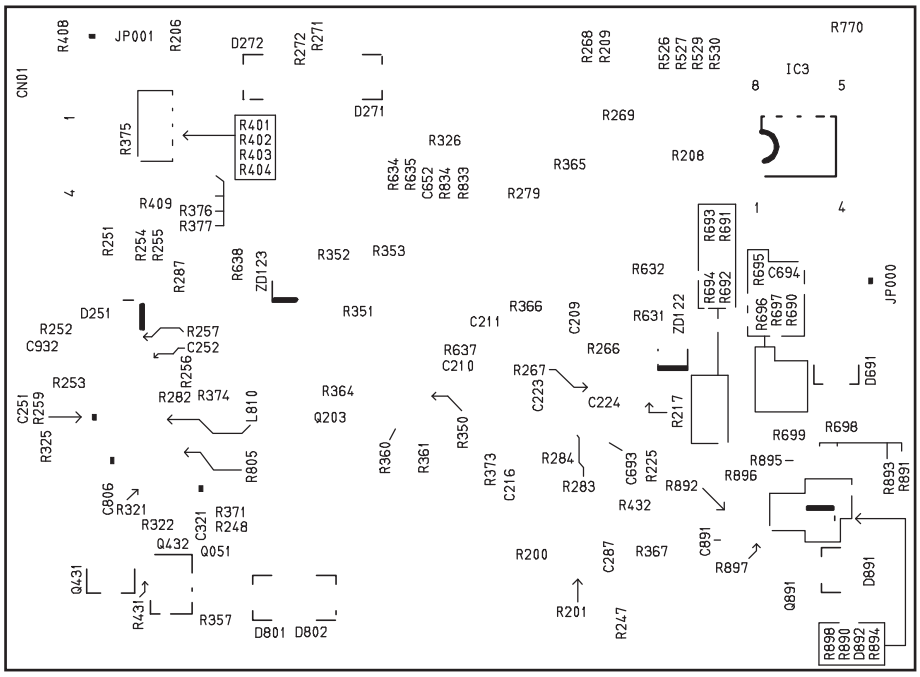


Bottom side

HIC PWB

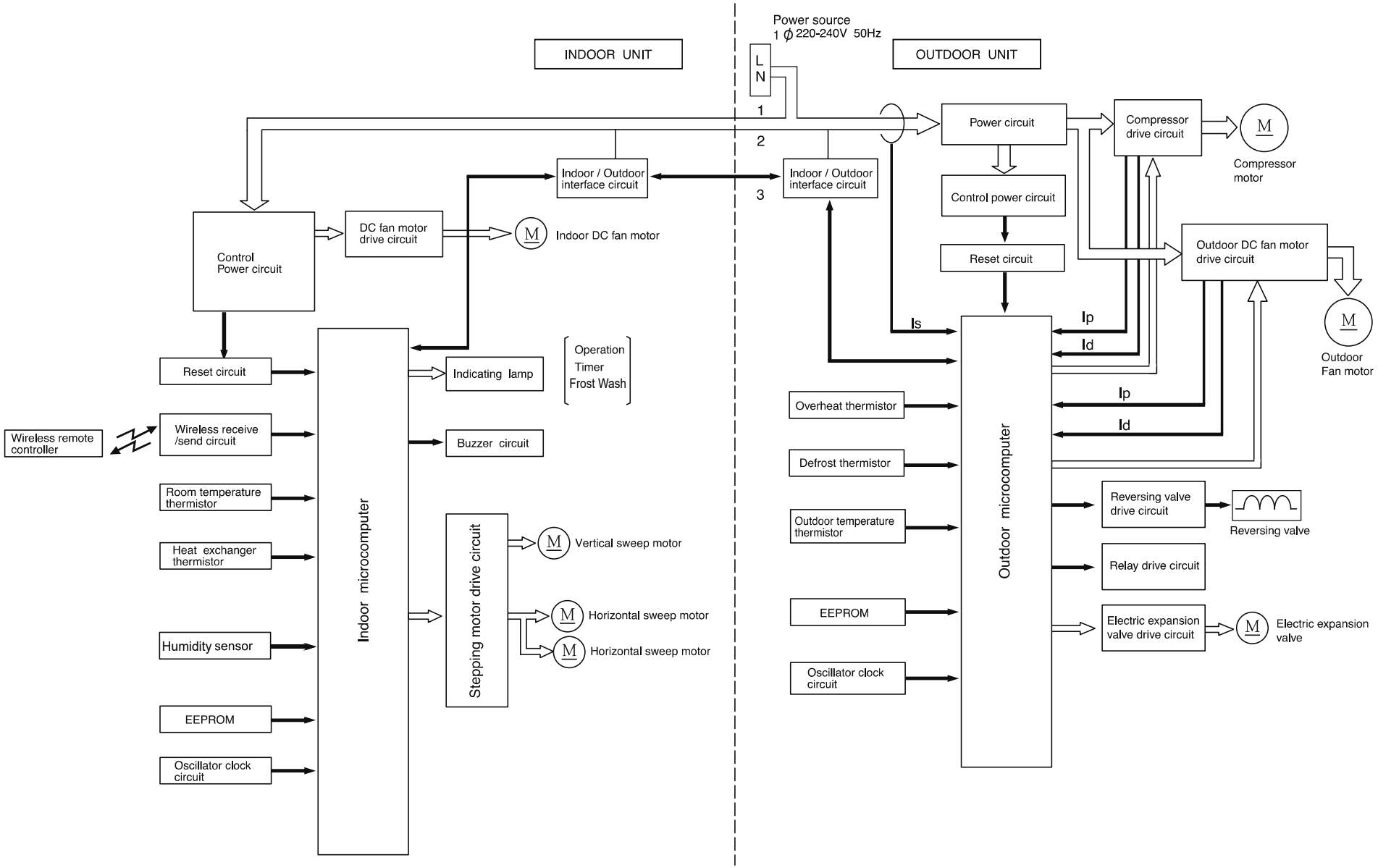


Top side

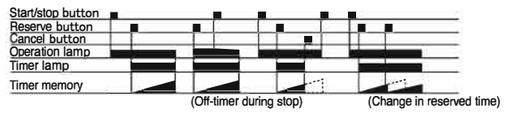
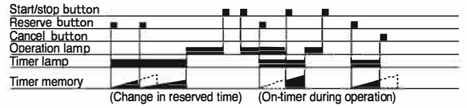
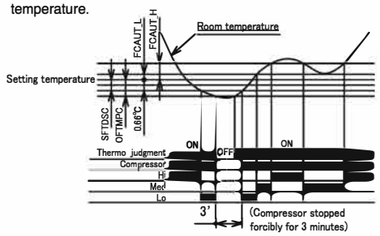


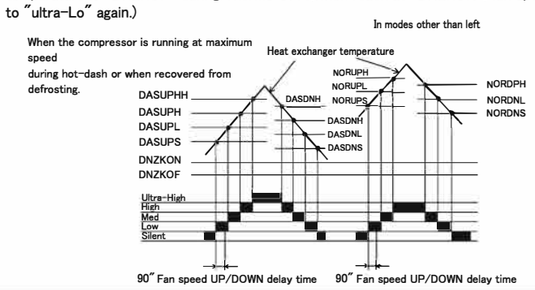
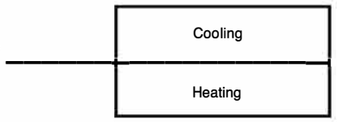
Bottom side

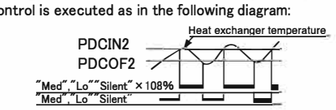
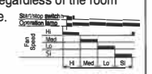
BLOCK DIAGRAM



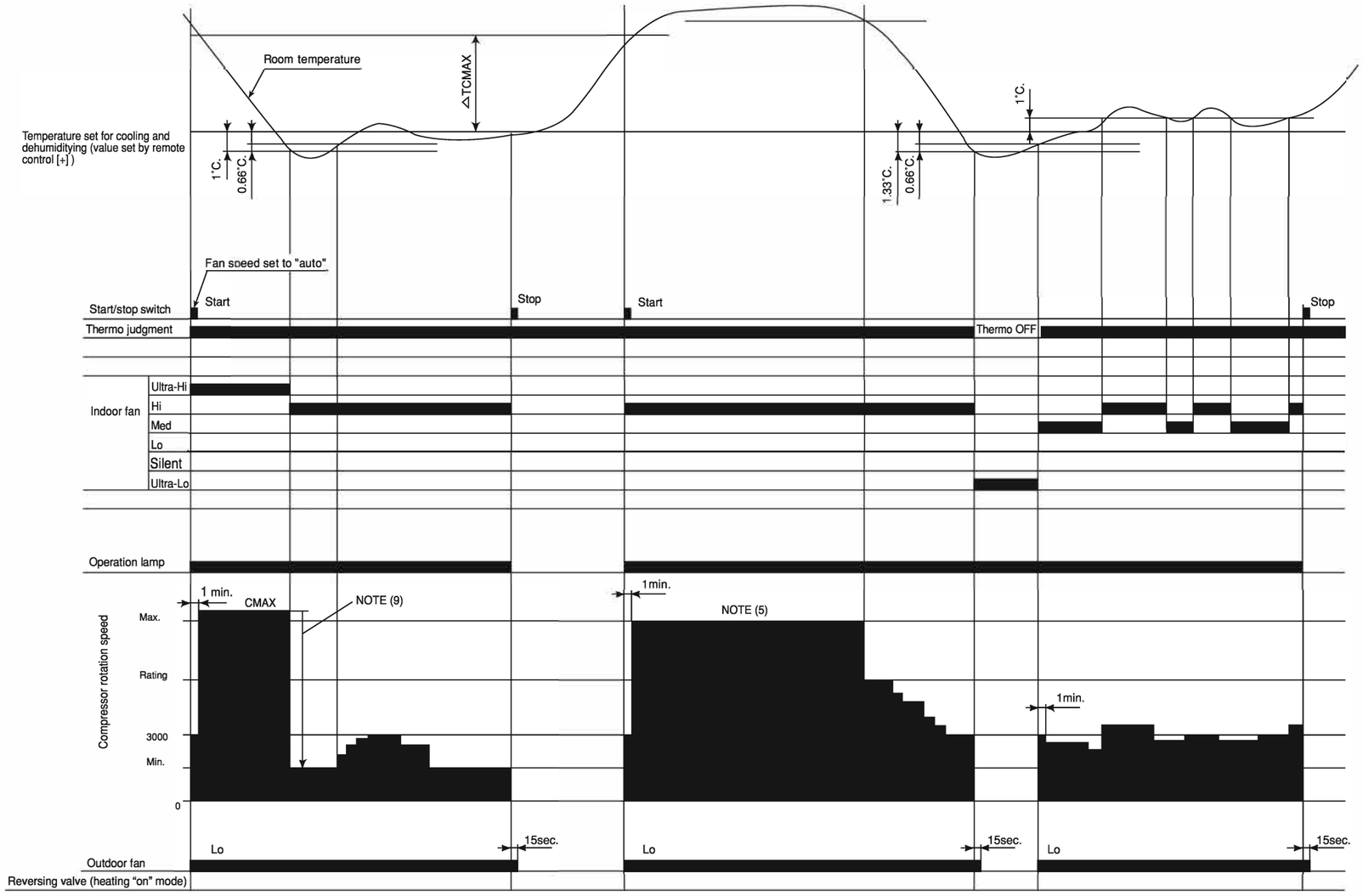
BASIC MODE

<table>
<tr><th colspan="2">Operation mode</th><th>Fan</th><th>Cooling</th><th>Dehumidifying</th><th>Heating</th><th>Auto</th></tr>
<tr><td colspan="2">Basic operation of start/stop button</td><td colspan="5"> 
</td></tr>
<tr><td rowspan="2">Timer functions</td><td>Off-timer</td><td colspan="5"> 
</td></tr>
<tr><td>On-timer</td><td colspan="5"> 
</td></tr>
<tr><td rowspan="5">Fan speed mode (indoor fan)</td><td>Auto</td><td></td><td>Changes from “Hi” to “Med” or “Lo” depending on room temperature.
 

1. Runs at “Hi” until room temperature reaches to “setting temperature–SFTDSC” after operation is started.
2. Runs at “ultra–Lo” when thermo is off.</td><td></td><td>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.
In modes other than left
 
</td><td>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]
 

(2) Judging by room temperature (continuous judgement)
(a) Judging condition
• Operating mode will be judge again after auto mode interval time
(1) 1st interval [auttmn1_8u]
(2) 2nd interval [auttmn2_8u]
(3) 3rd and next interval [auttmn3_8u]
(b) Judging method
• Judging method will follow as below
• Final set temperature is remote controller setting including shift value
[Current operation is COOLING]
• Room temperature ≦ Final set temperature - [nwautw_8u], change to HEATING
• Room temperature ＞ Final set temperature - [nwautw_8u], continue in COOLING
[Current operation is HEATING]
• Room temperature ≧ Final set temperature + [nwautc_8u], change to COOLING
• Room temperature ＞ Final set temperature + [nwautc_8u], continue in HEATING</td></tr>
<tr><td>Hi</td><td>Operates at “Hi” regardless of the room temperature.</td><td>Set to “ultra-Hi” when the compressor runs at cold dash mode speed, and to “Hi” in other modes. Runs at “ultra–Lo” when thermo is off.</td><td></td><td>Set to ″ultra–Lo″,″Silent″,″Lo″,″Med″,″Hi″,″ultra–Hi″ or ″stop″ depending on the room temperature, time and heat exchanger temperature. Set to ″stop″ if the heat exchanger temperature is ″DNZKOF″ during Thermo OFF.(When reach at ″DNZKON″, fan speed set to ″ultra–Lo″ again.)
Set to″ultra–Hi″ when the compressor is running at maximum speed during hot dash or when recovered from defrosting.</td><td></td></tr>
<tr><td>Med</td><td>Operates at “Med” regardless of the room temperature.</td><td>Operates at “Med” regardless of the room temperature. Runs at “ultra–Lo” when thermo is off.</td><td></td><td>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.)</td><td></td></tr>
<tr><td>Lo</td><td>Operates at “Lo” regardless of the room temperature.</td><td>Operates at “Lo” regardless of the room temperature. Runs at “ultra–Lo” when thermo is off.</td><td>Set to “Lo” in modes other than when the compressor stops.</td><td>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:
 
</td><td></td></tr>
<tr><td>Silent</td><td>Operates at “Silent” regardless of the room temperature.</td><td>Operates at “Silent” regardless of the room temperature. Runs at “ultra–Lo” when thermo is off.</td><td>Set to “Silent” in modes other than when the compressor stops.</td><td></td><td></td></tr>
<tr><td colspan="2">Basic operation of temperature controller</td><td>Performs only fan operation at the set speed regardless of the room temperature.
 
</td><td>See page 49.</td><td>See page 53.</td><td>See page 57.</td><td>Follow basic cooling or heating operation</td></tr>
</table>

Basic Cooling Operation



Notes:

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

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

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

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

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

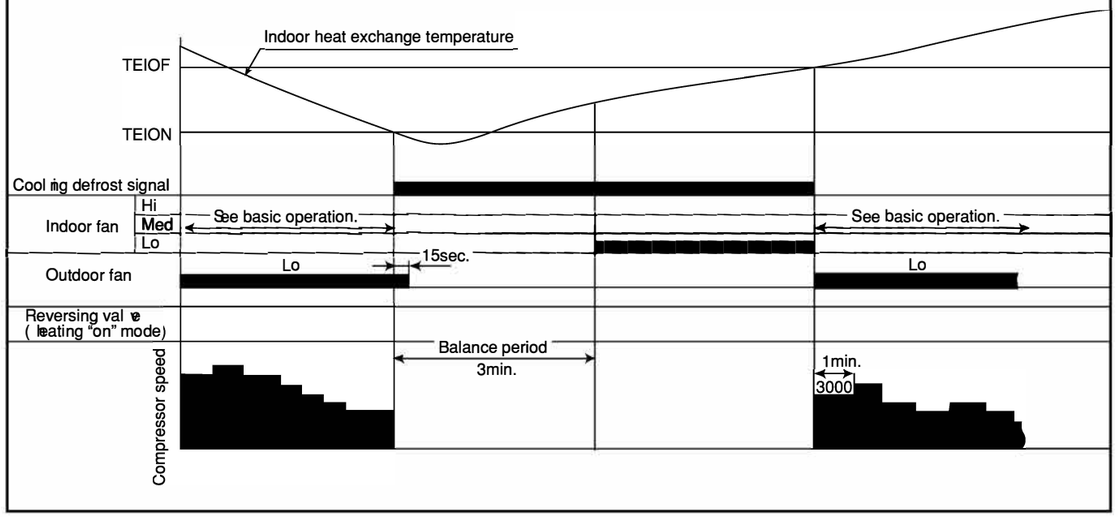
(6) When fan is set to “Hi”, compressor rpm will be limited to CSTD.

(7) When fan is set to “Med”, compressor rpm will be limited to CJKMAX.

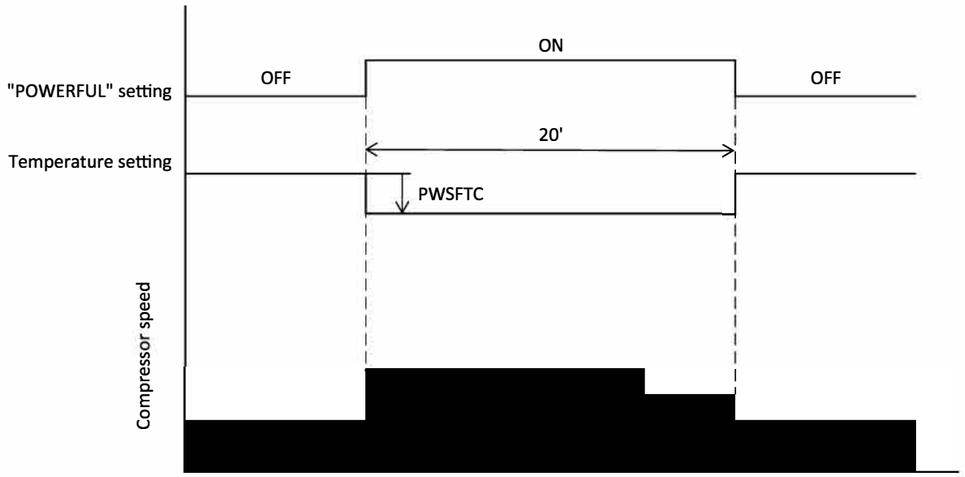
(8) When fan is set to “Lo”, compressor rpm will be limited to CBEMAX.

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

Cooling Defrost



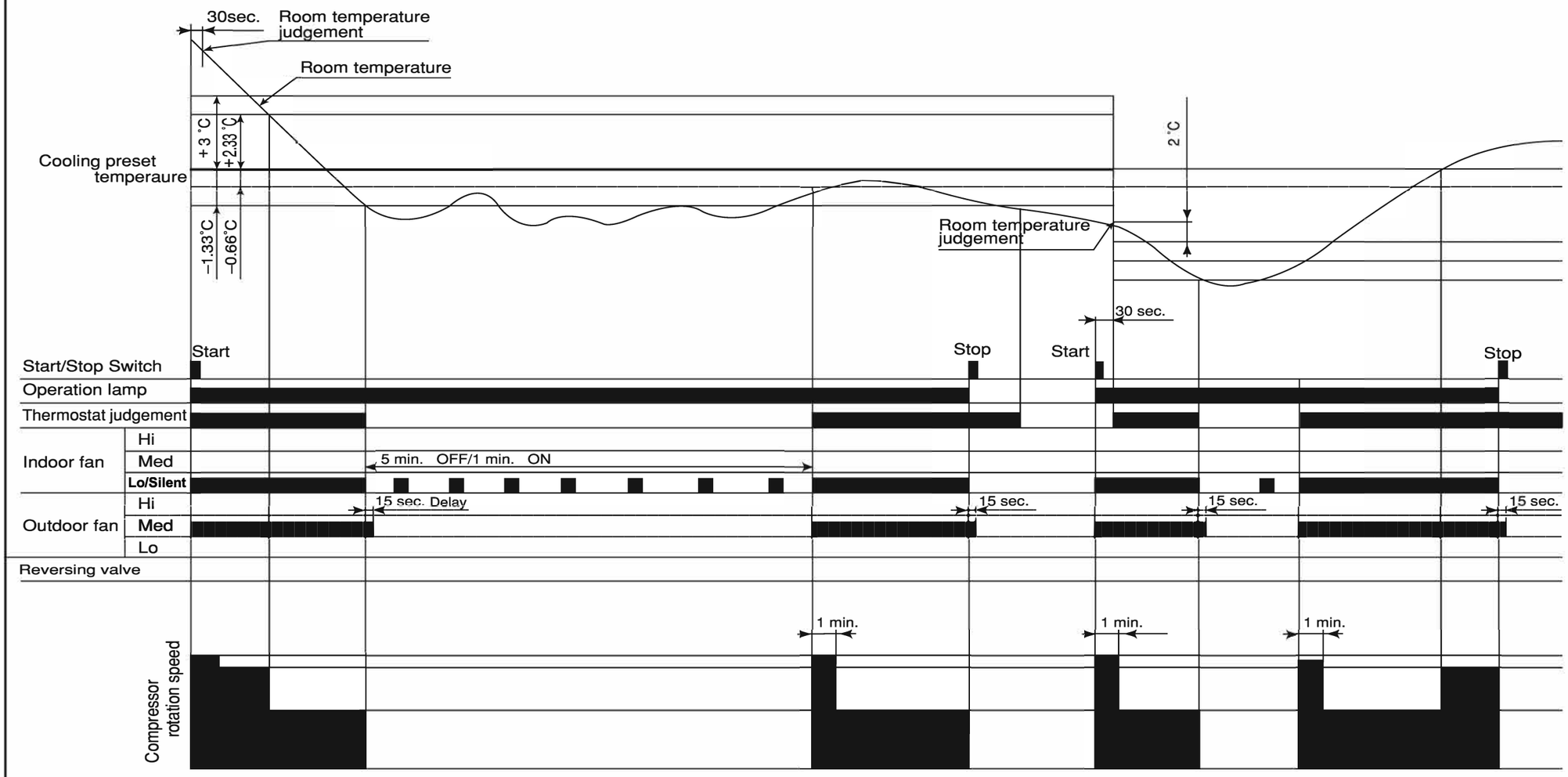
Cooling Powerful Operation



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 wil 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.

Dehumidifying



Notes:

(1) If the room temperature is (cooling preset temperature) - (1.33°C) or less after 30 seconds from starting the operation, the operation is done assuming as the preset temperature = (room temperature at the time) - (2°C).

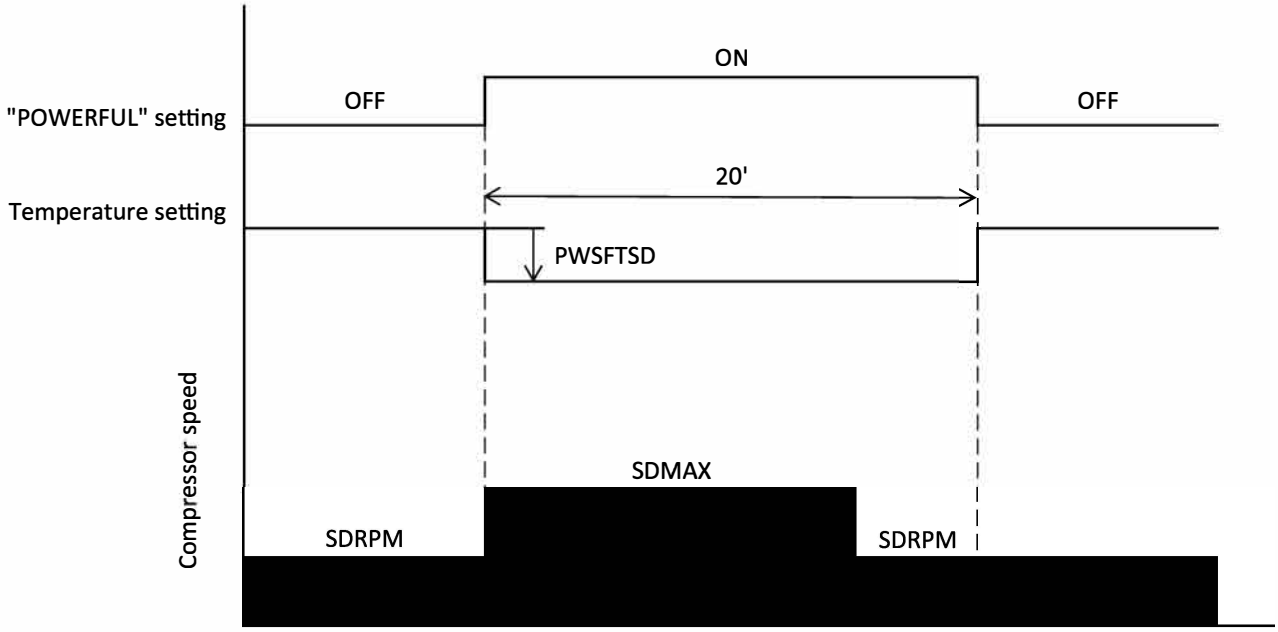
(2) The indoor fan is operated in the "Lo" or "Silent" mode. During thermo OFF, indoor fan will be OFF 5 minutes and ON for 1 minute

(3) When the operation is started by the themostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.

(4) The compressor is operated forcedly for 3 minutes after operation is started.

(5) The minimum ON time and OFF time of the compressor are 3 minutes.

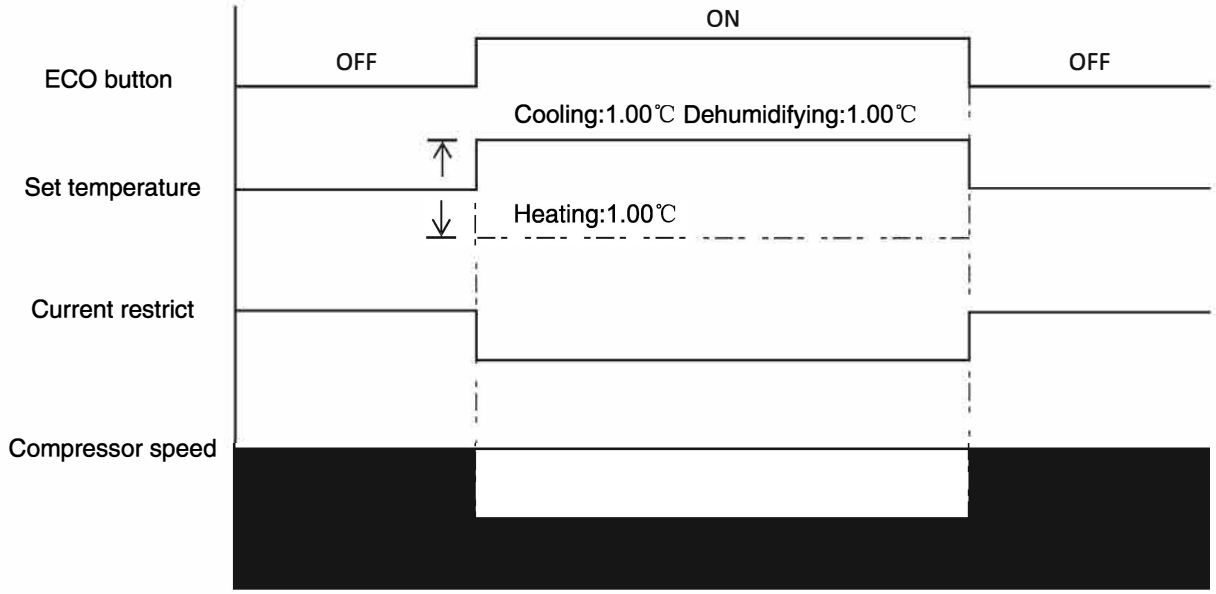
Dehumidifying Powerful Operation



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 wil 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≧3 ℃" after powerful setting , the compressor's maximum speed during powerful operation will be set to SDMAX. Then the differential reduce "the differential ≦2.33 ℃" during powerful operation,the compressor's speed will be set to SDRPM.
If the differential(the room temperature - the temperature setting) is "the differential ＜ 3 ℃" 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.

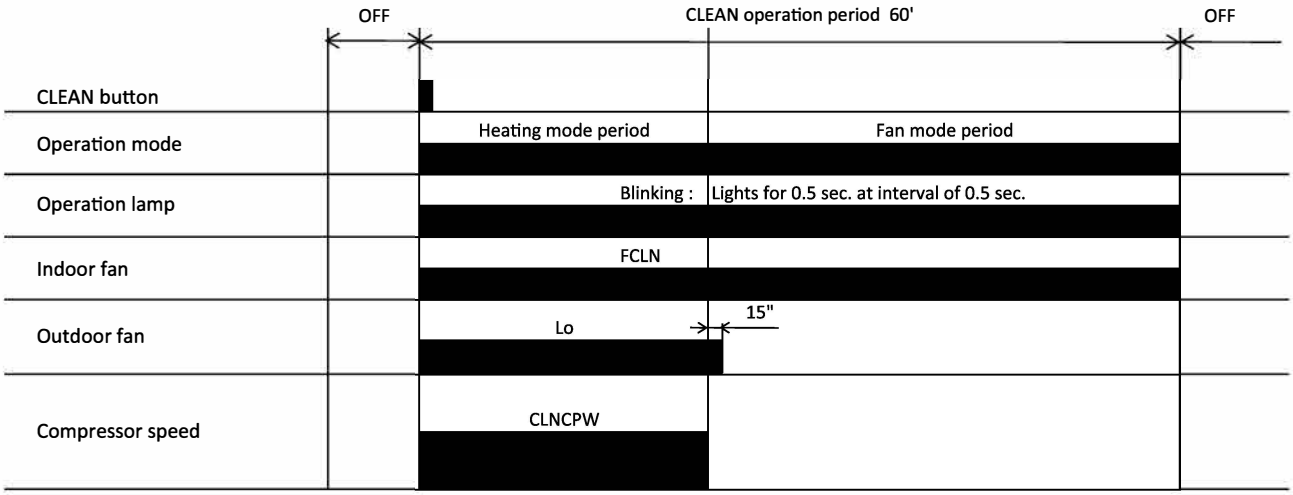
ECO



Notes:

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

Clean Operation



Notes :

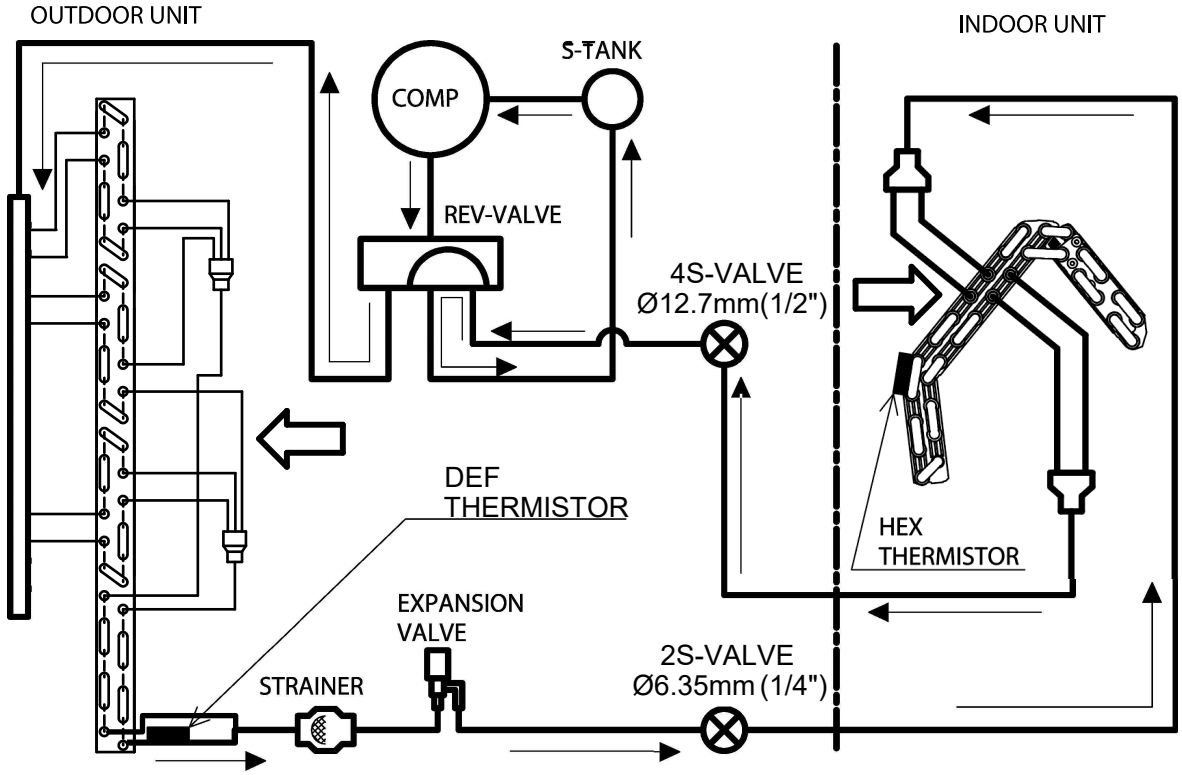
(1) During CLEAN operation period, heating mode will change to fan mode when HEX temparature is "CLNEVP" or more except force 3 minutes operation.

(2) For multi connections, CLEAN operation is limited to fan mode.

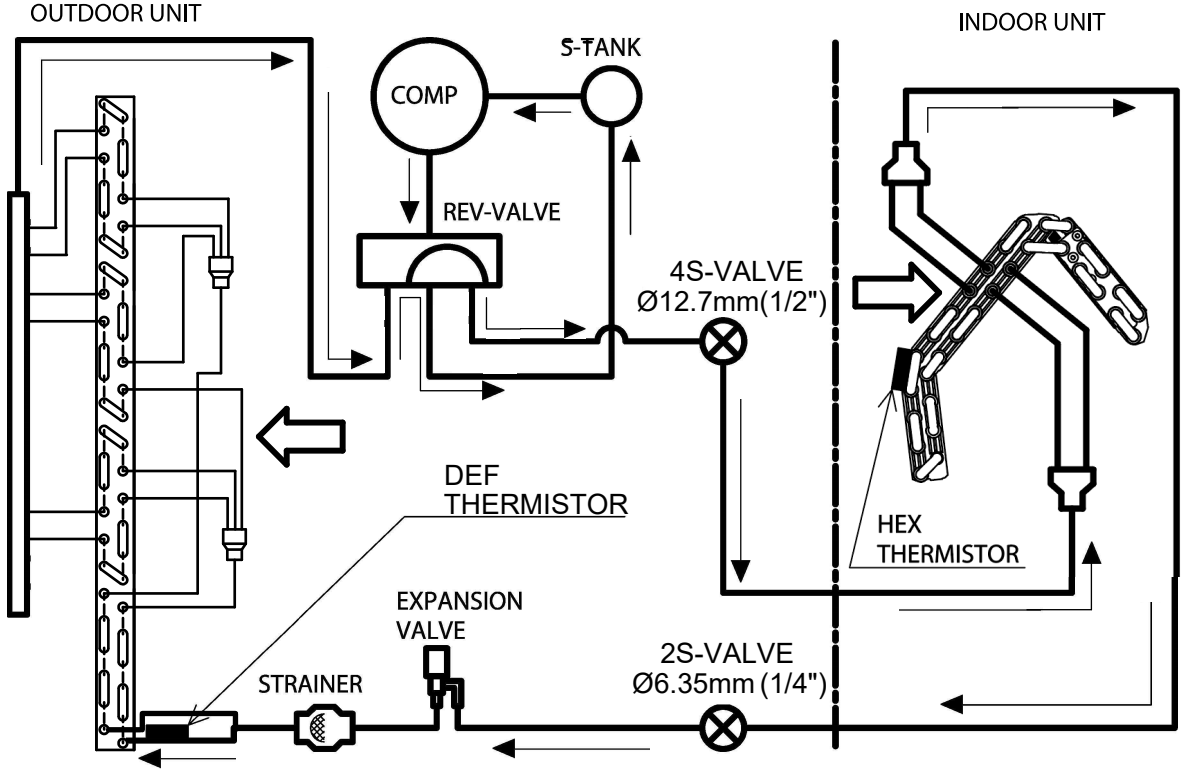
REFRIGERATING CYCLE DIAGRAM

MODEL : RAS-EH18RHLAE / RAC-EH18WHLAE

COOLING, DEHUMIDIFYING, DEFROSTING



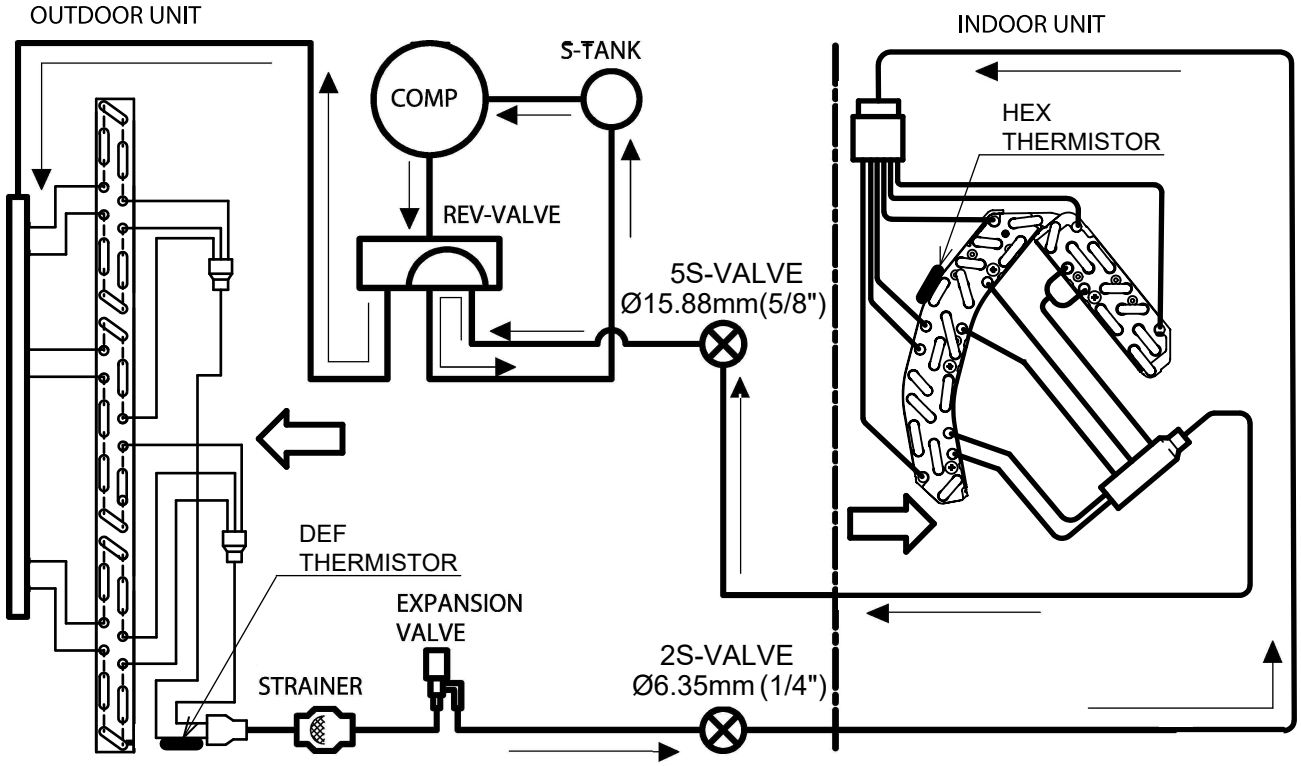
HEATING



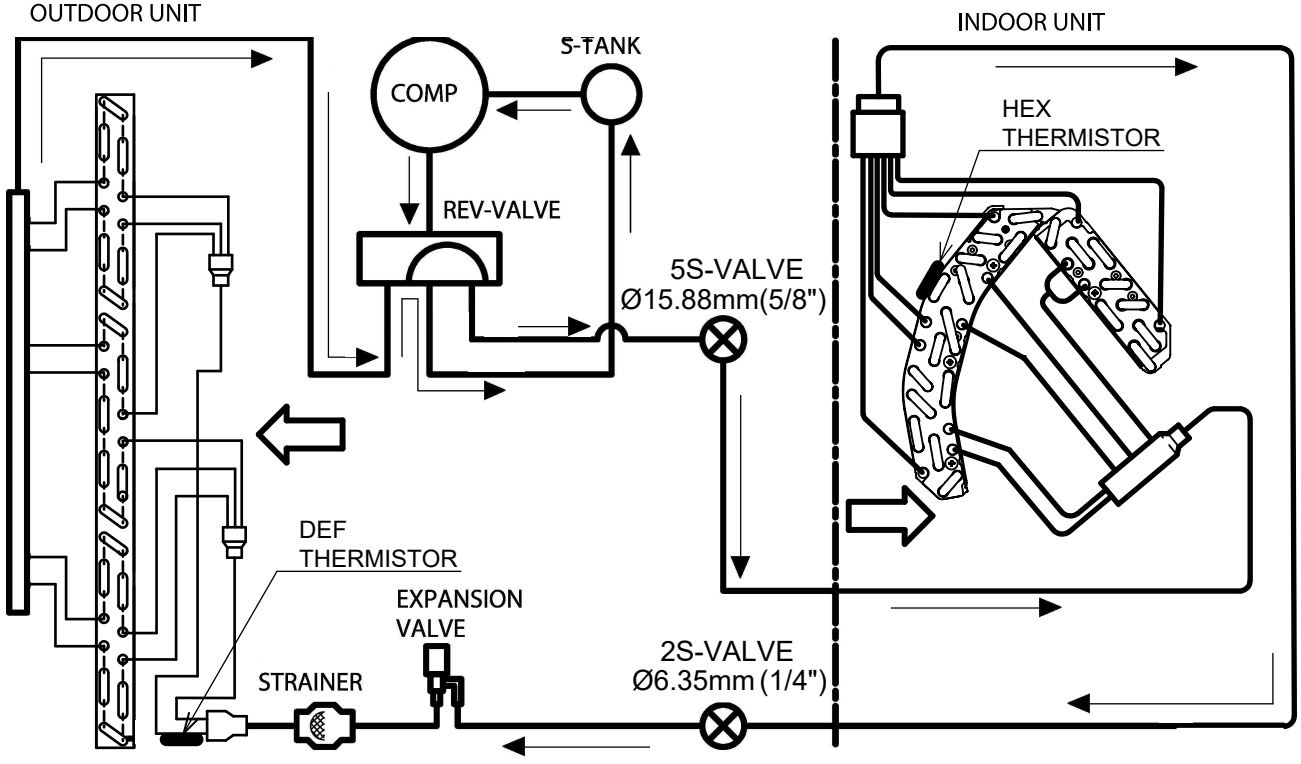
REFRIGERATING CYCLE DIAGRAM

MODEL : RAS-EH24RHLAE / RAC-EH24WHLAE

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.	

1. Control power circuit

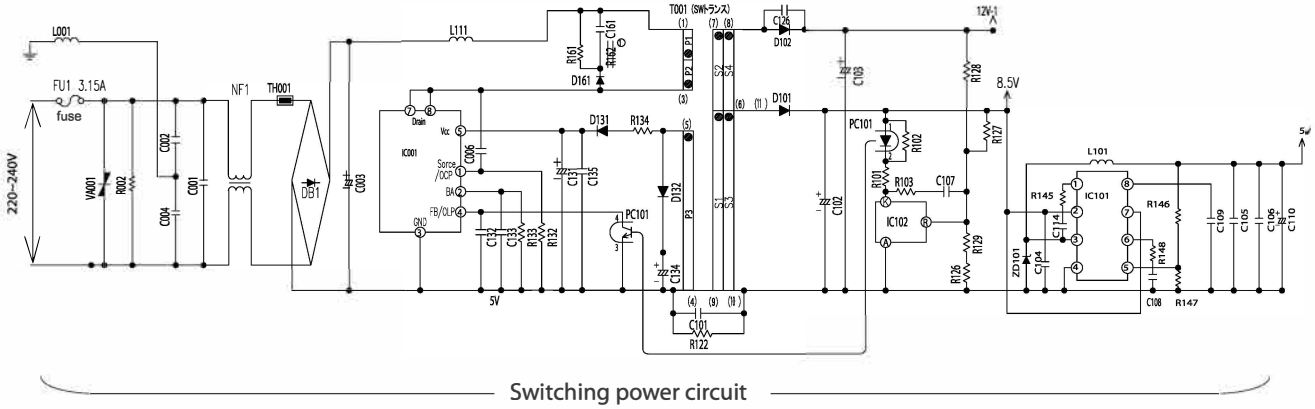


Fig.1-1

- An AC power supply from indoor unit passes through the 3.15A fuse, varistor (VA001), and noise filter circuit and rectified and smoothed by DB1 and C003 to become a DC current 325V. It is then supplied to indoor fan motor drive circuit,and switching power circuit.
- The switching power circuit, as controlled by IC001, drives the primary winding of the transformer (T001) to produce a specified voltage at the output winding. [The output terminal (pin ⑤) of IC001 has a switching voltage. But it changes in voltage peak and oscillation period depending on the power load. usually,the oscillation frequency when the air condition operation is about 64.5kHz. In the standby state, the oscillation frequency is lowered to a level as low as 64.5kHz or so to reduce the standby power.]
- The outputs of the output windings of the transformer is rectified and smoothed to become DC voltages at primary 18.5V, 12V, and 8.5V respectively. The primary 18.5V is supplied to the drive circuit of the indoor fan motor, the 12V is supplied to each vane motor and to the drive circuits of the cleaning unit driving motor and other equipment, and the 8.5V is adjusted to a stable 5V by IC101 and supplied to the microcomputer peripheral circuit.

Check

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

Check

If an abnormally high voltage is applied to the power supply, the 3.15A fuse and varistor (VA001) will prevent further damage. If a high voltage results in the 3.15A fuse melted down, the varistor (VA001) should have deteriorated and destroyed. Therefore replace it at the same time.

Caution

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

2. Reset Circuit

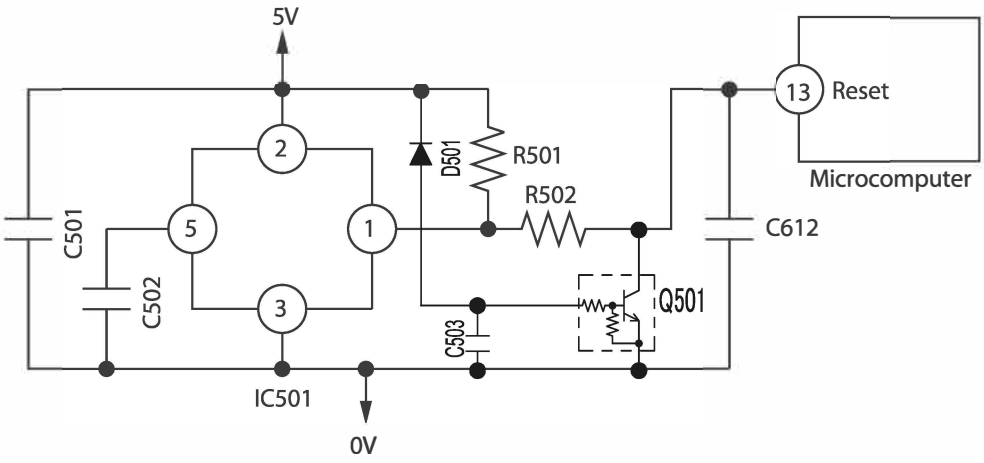


Fig. 3-1

Timing chart

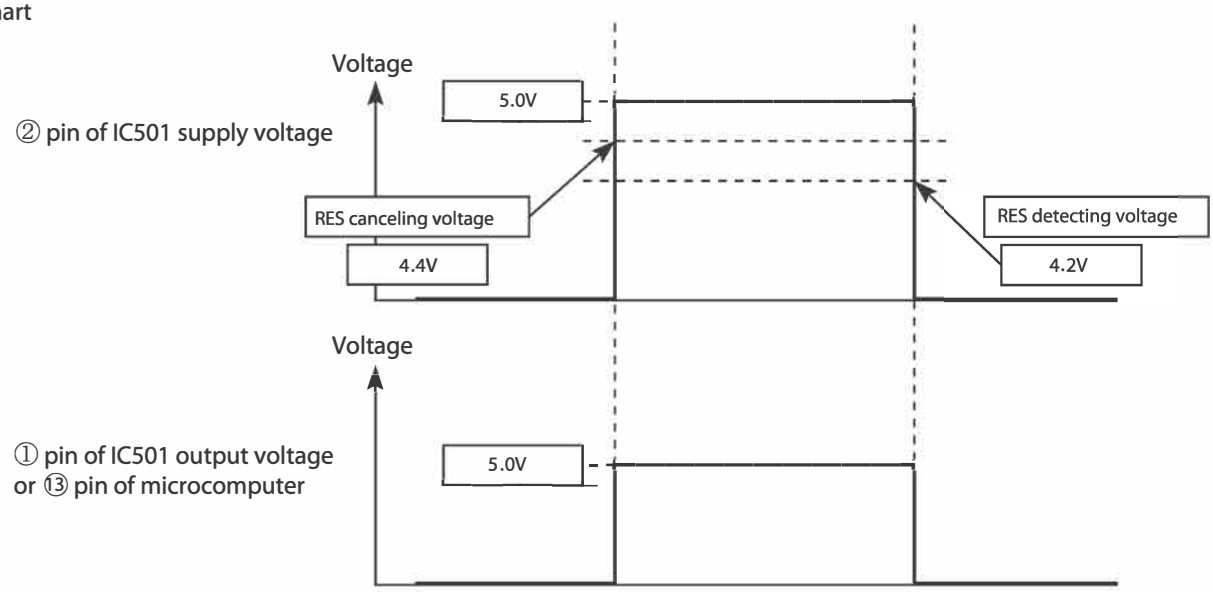


Fig. 3-2

- 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

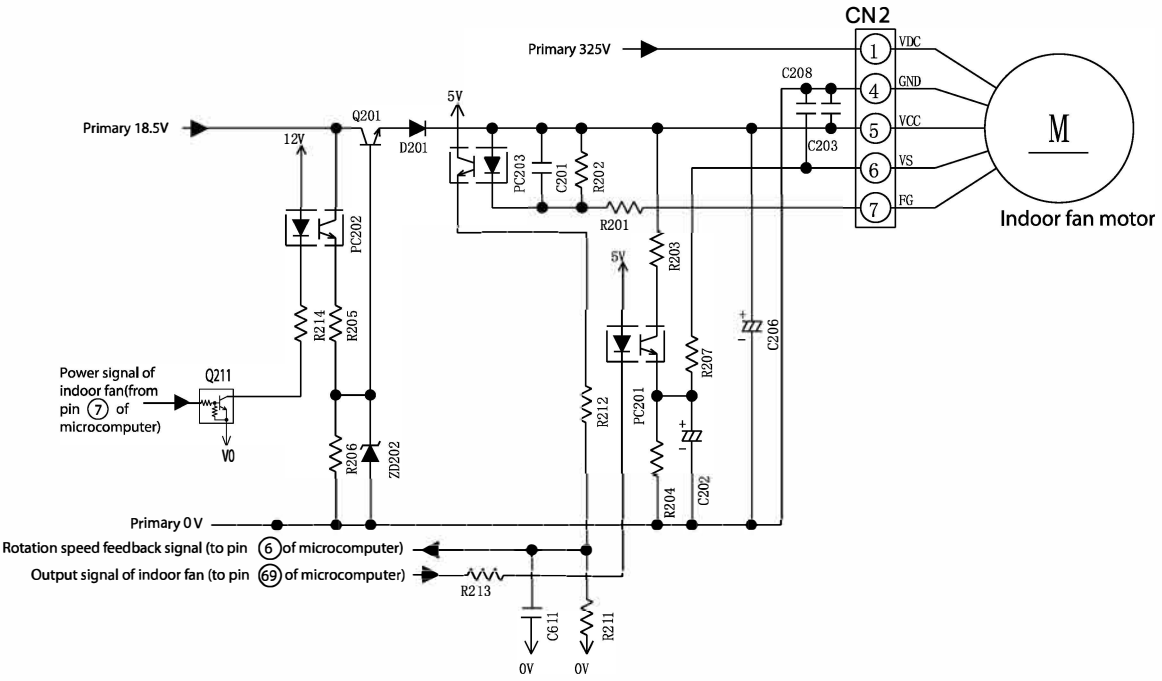


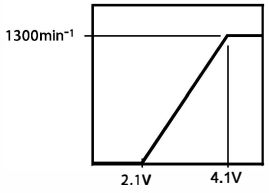
Fig. 3-1

< The circuit check (For test) >

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

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

< Pin 6 - Pin 4 voltage one example >



Vsp voltage 「V」

* The different mode maybe have diffevent FAN rotation speed.

< Typical circuit waveform >

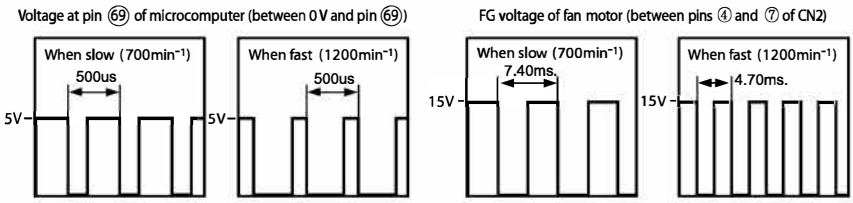


Fig. 3-2

- 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

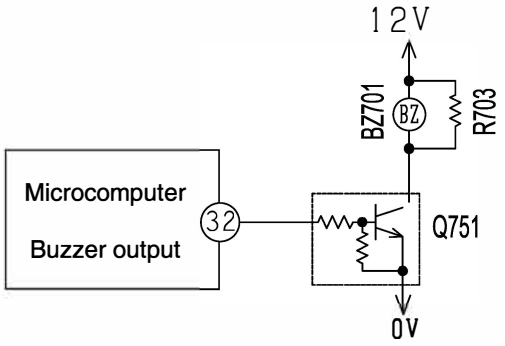


Fig.4-1 Buzzer Circuit

- 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.

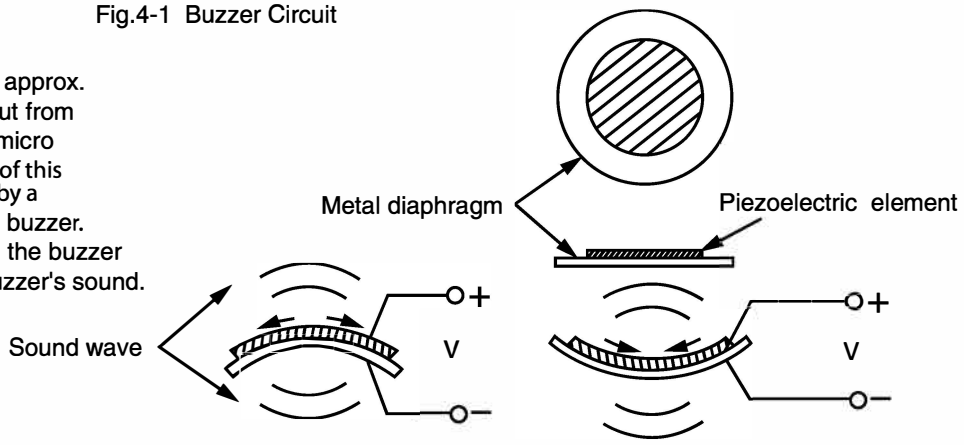


Fig.4-2 Buzzer Operation

5 . Remote control reception circuit

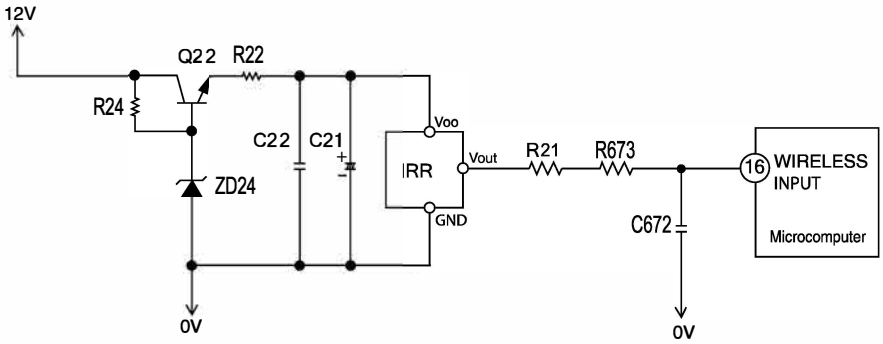


Fig.5-1

[Typical communication waveform]

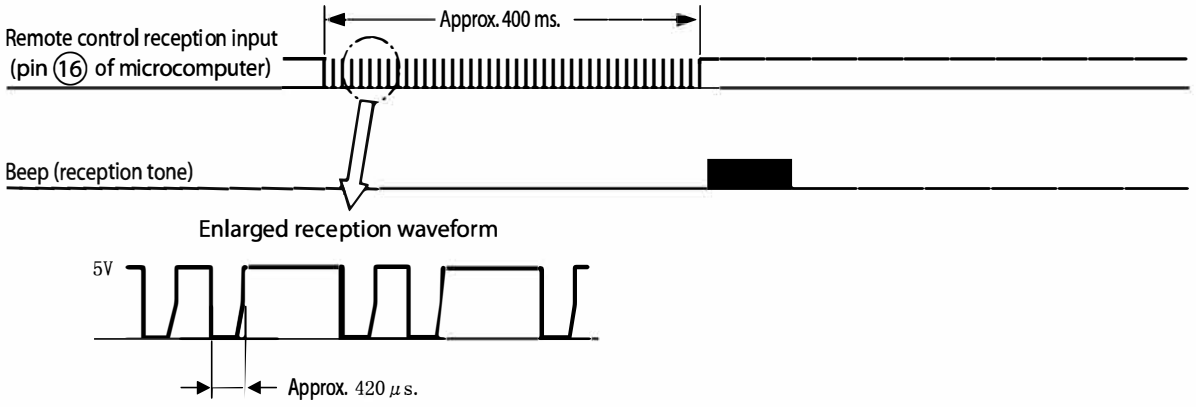
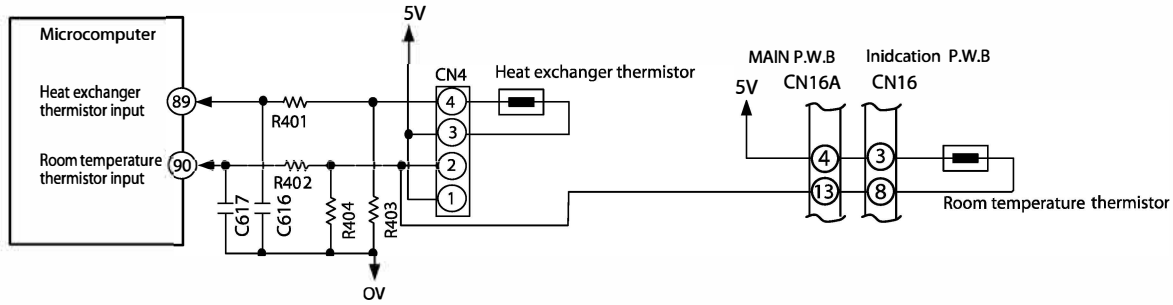


Fig. 5-2

- 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".

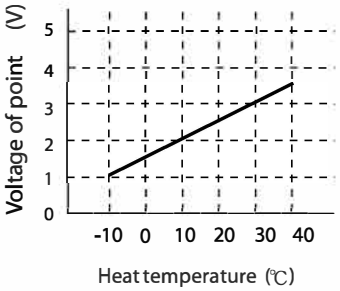


Fig. 6-1

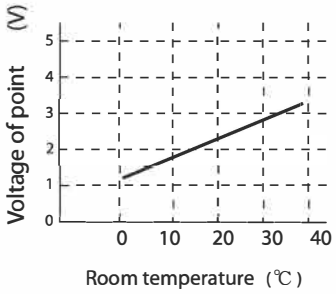


Fig. 6-2

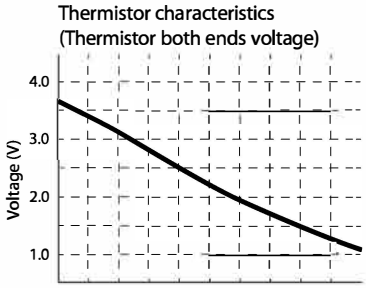


Fig. 6-3

7. Dip switch

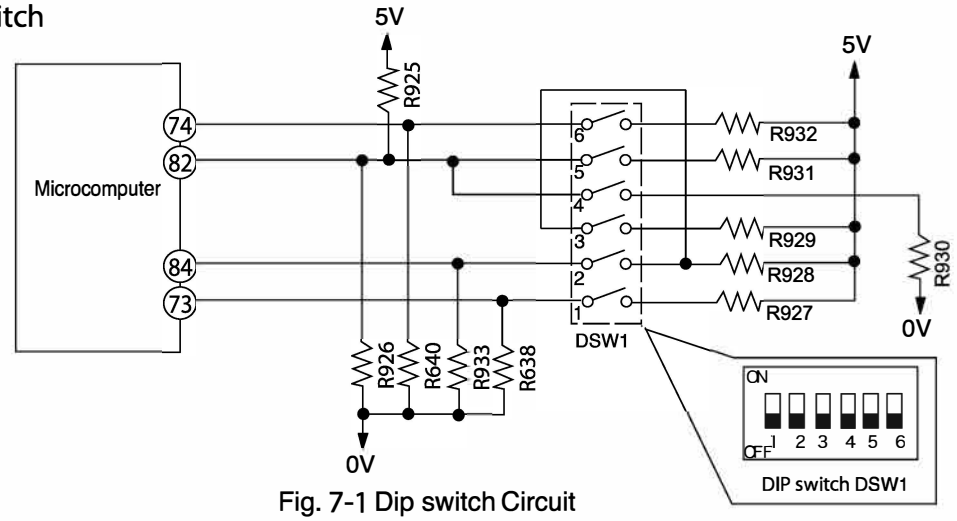


Fig. 7-1 Dip switch Circuit

- 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	ON	COOLING ONLY
5	HEATING/COOLING ONLY MODE SELECT	OFF*		ON		OFF	
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 (E^2PROM) and sets the preheating activation value and the rating and maximum speed of the compressor, etc. to their initial values.
- Data of self-diagnosis mode is stored in IC531; data will not be erased even when power is turned off.

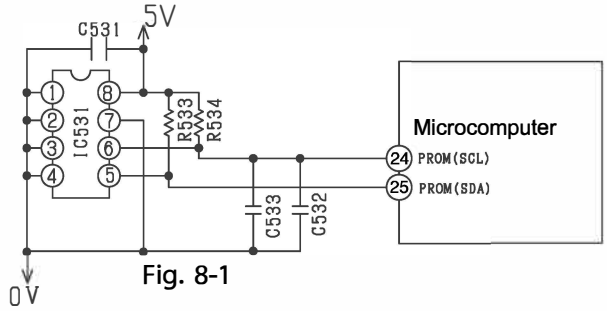


Fig. 8-1

9. Temporary Switch Circuit

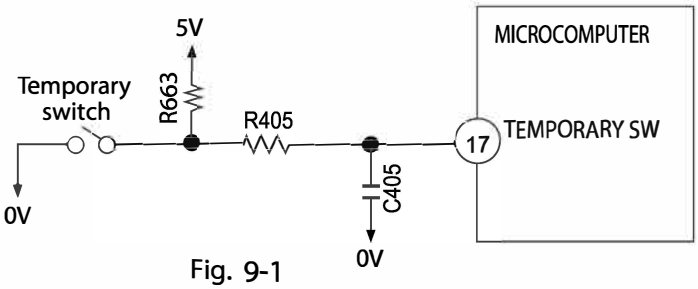


Fig. 9-1

- The temporary switch is used to operate the air conditioner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the 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

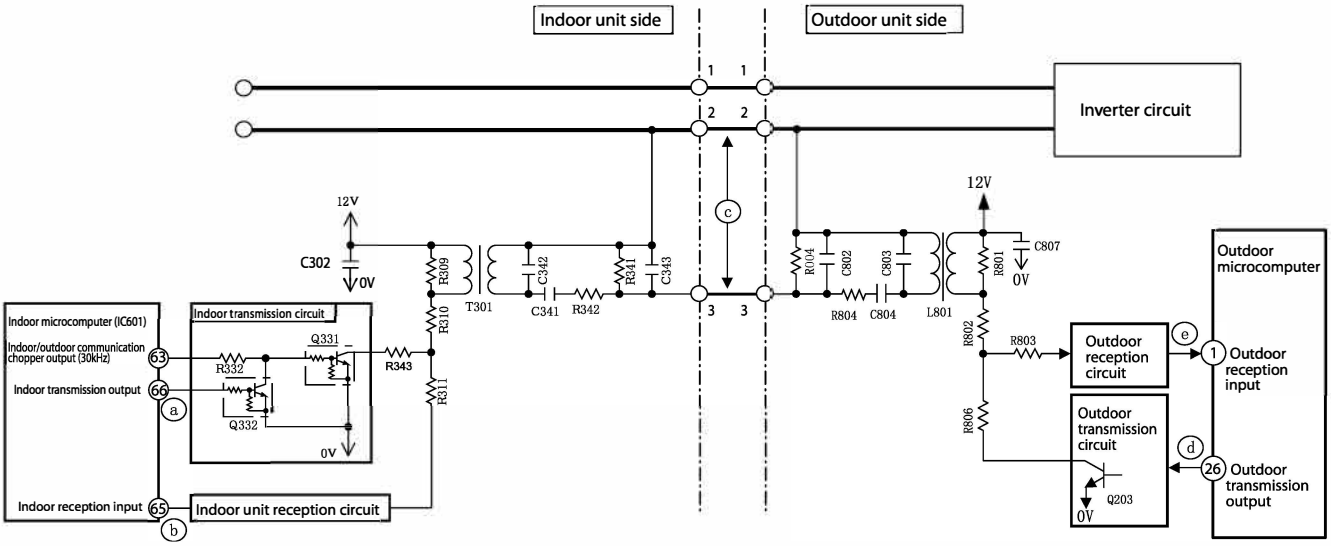


Fig. 10-1

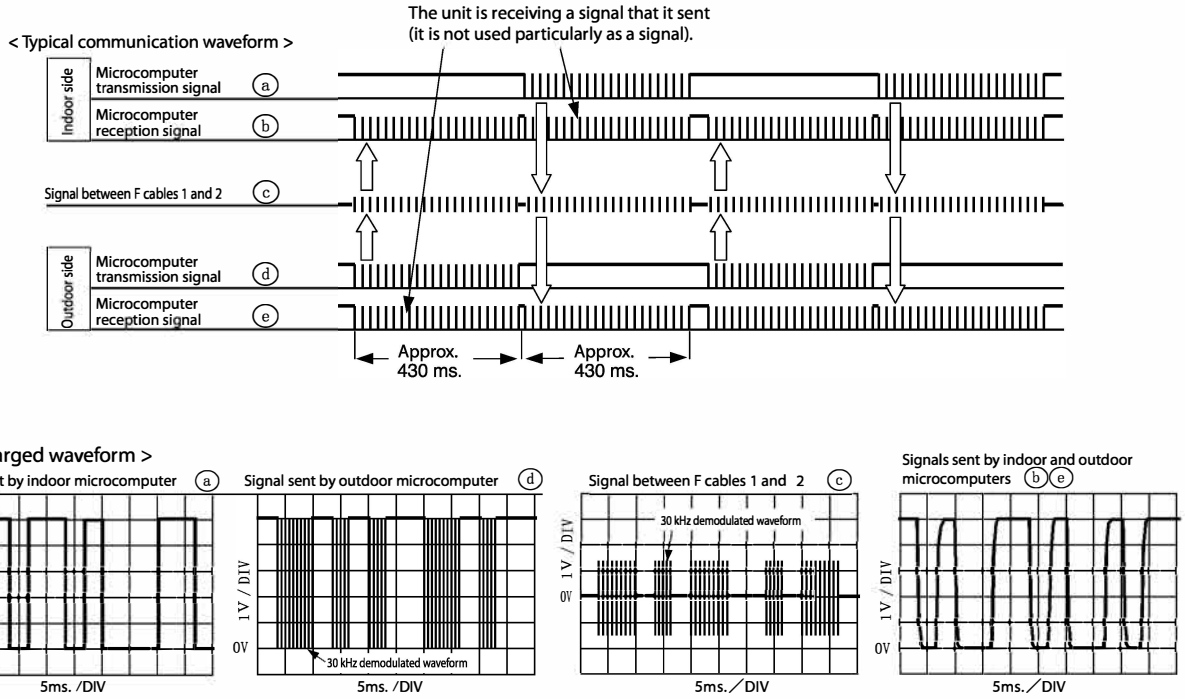


Fig. 10-2

- 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.)

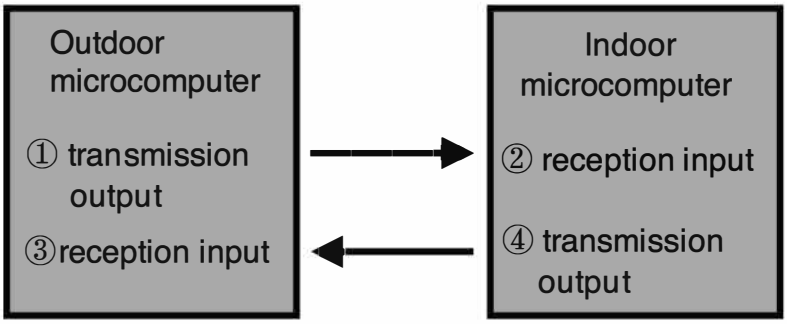
Check

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

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

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

11. Stepping motor drive circuit

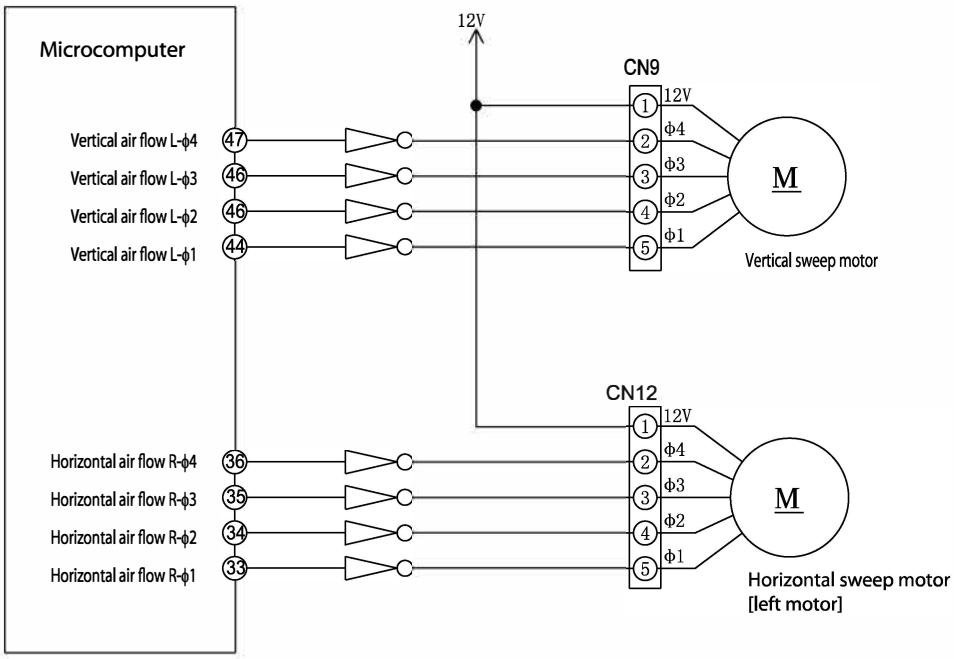


Fig. 11-1

[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

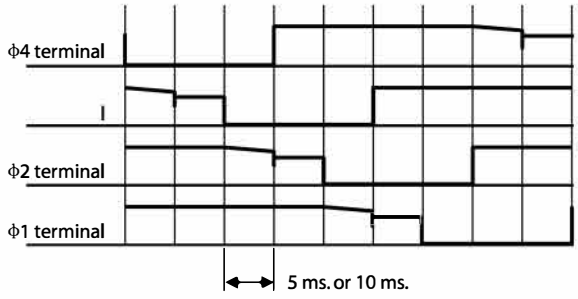


Fig. 11-2

- 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

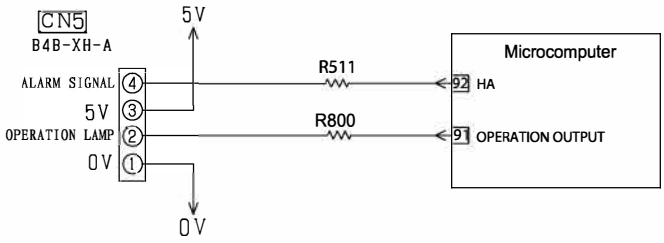


Fig.12-1

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.

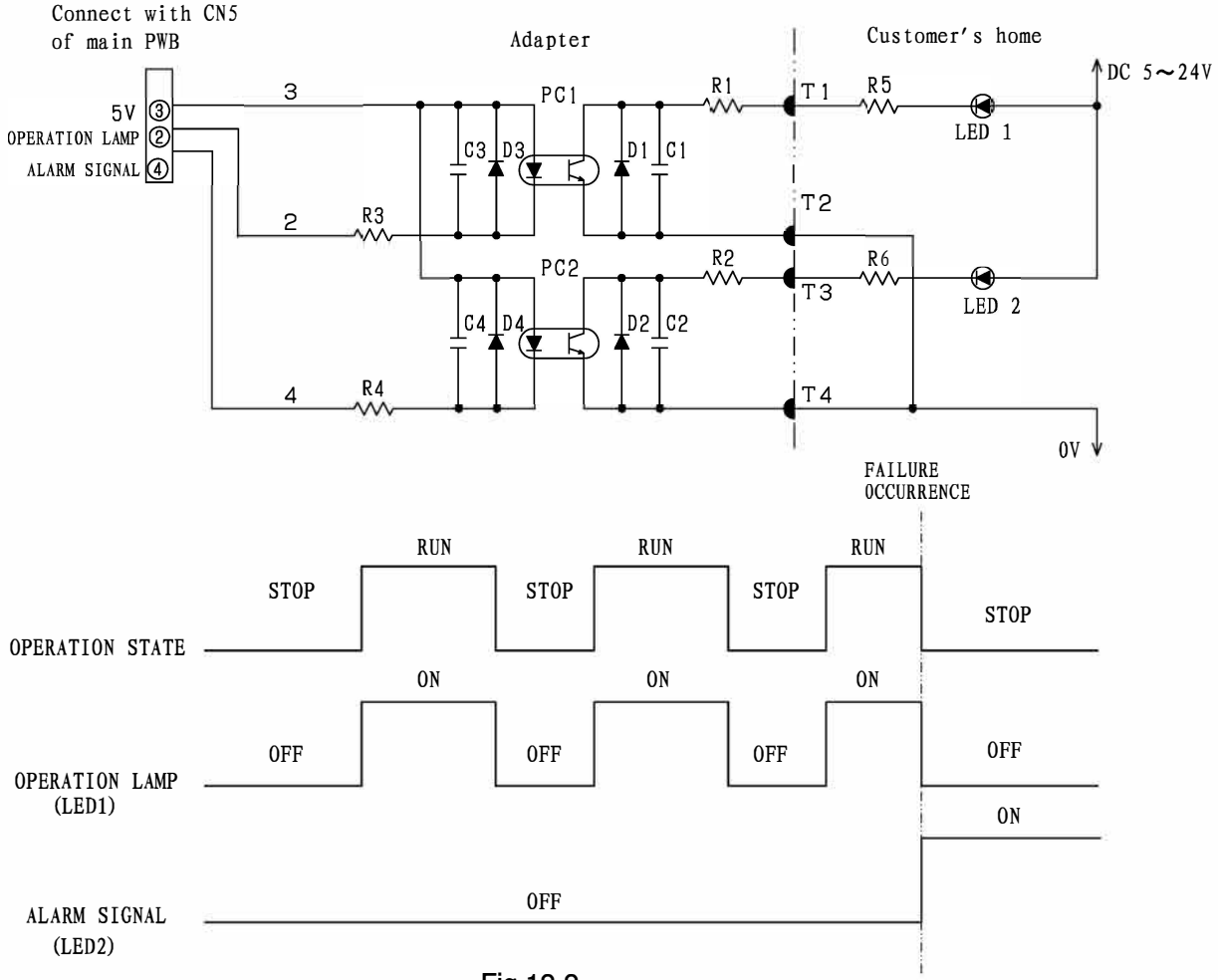


Fig.12-2

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

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL: RAC-EH18WHLAE, RAC-EH24WHLAE

1. Power Circuit.

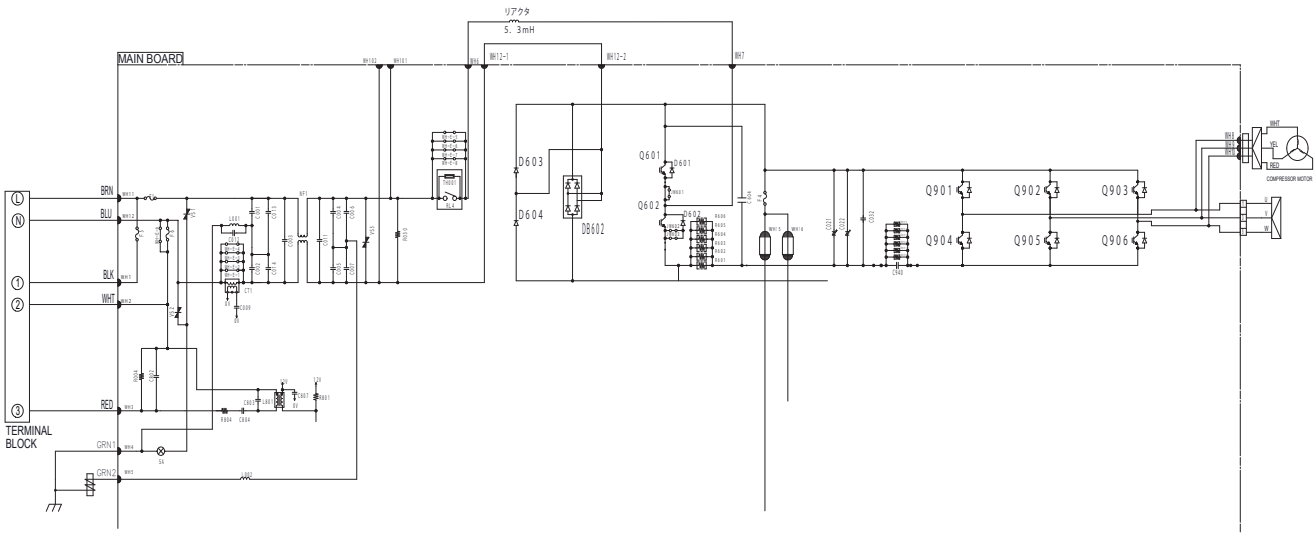


Fig. 1-1

※ 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.

<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.

(2) Diode stack (DB602).
The diode stack rectify AC Voltage 230V applied between the Terminal board L and N to DC Voltage.

<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.

(3) Smoothing capacitor (C021 to C022, 610uF, 450V).

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

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

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

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

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

(6) Noise filter (C001, C002, C006, C007, C013, C014, NF Coil). The noise filter absord electrical noise generated when the compressor operates and when exogenous noiseis mixed through the power line. In order to protect electronic parts.

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

2. Power Circuit (Low Voltage)

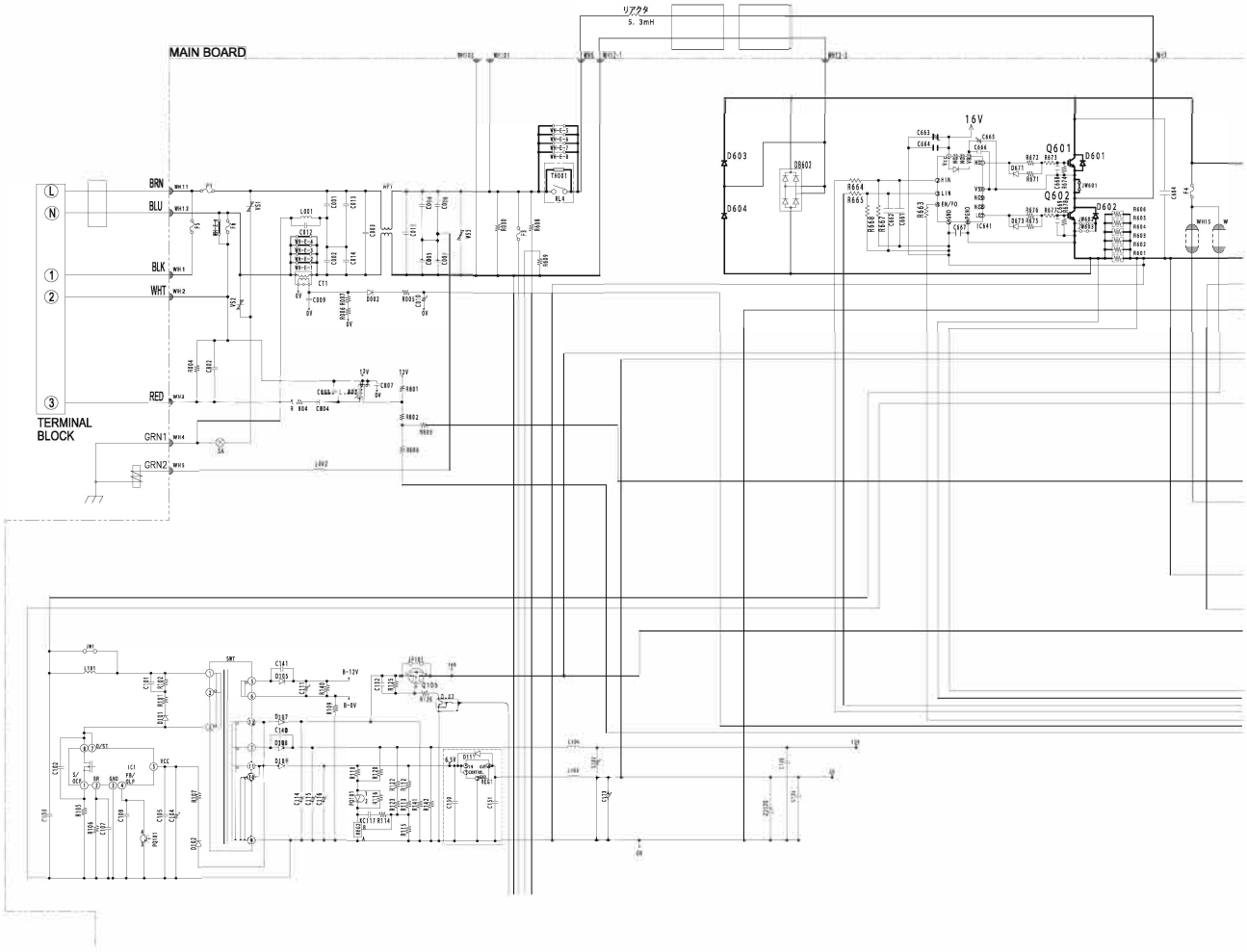
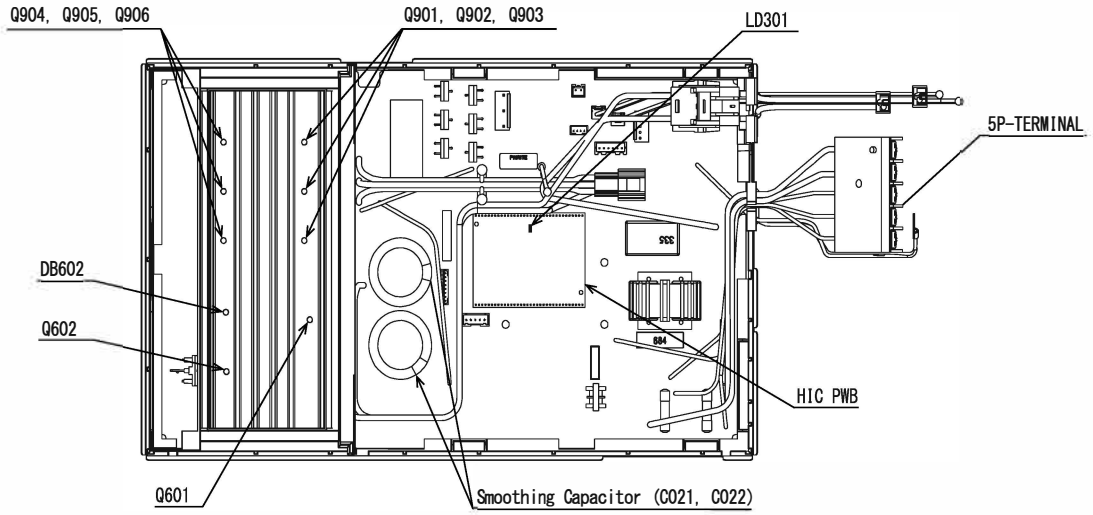


Fig. 2-1

- 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.



※ 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	$5^{\pm 0.4}$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	$12^{\pm 1}$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	$15.5^{\pm 1.5}$V	Compressor Inverter Ciruit 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^{+3}_{-1}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

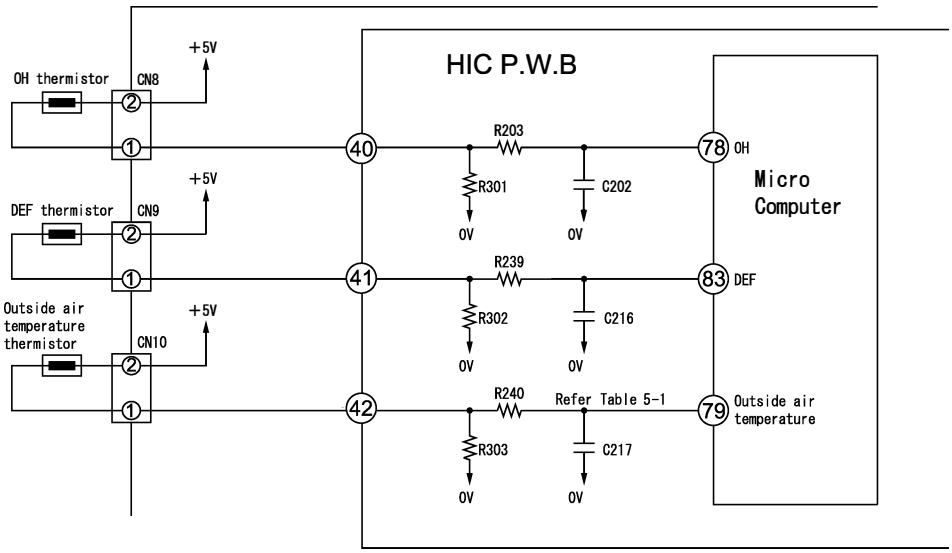


Fig.4-1

- 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 ⊕ 5V is divided by OH thermistor and R301 and the voltage at pin ⑱ of microcomputer.
- Compare the voltage at microcomputer pin ⑱ 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 (℃)	−10	0	10	20	30	40
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

<Reference>

When the thermistor is open,open condition or disconnect, microcomputer pin⑱⑲㉓are 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.

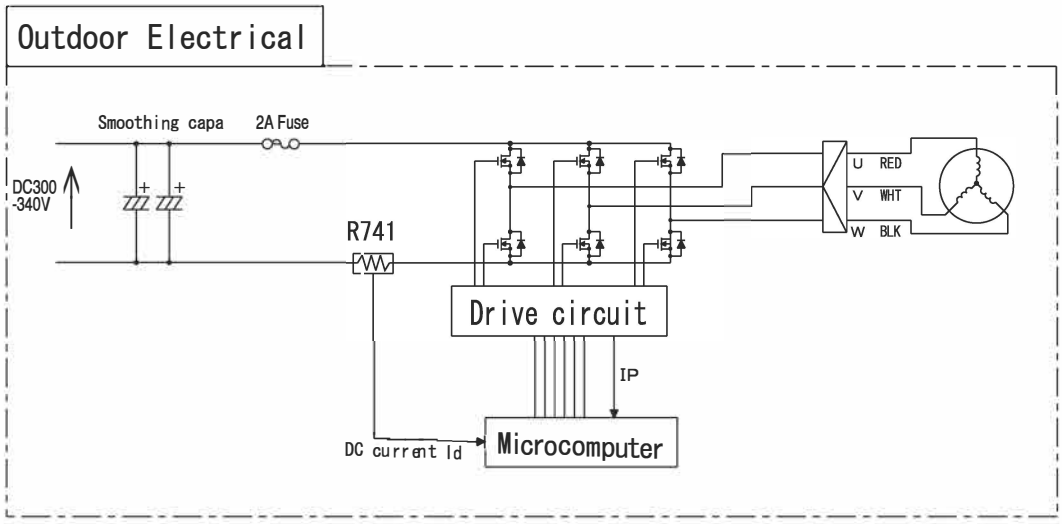


Fig 6-1

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

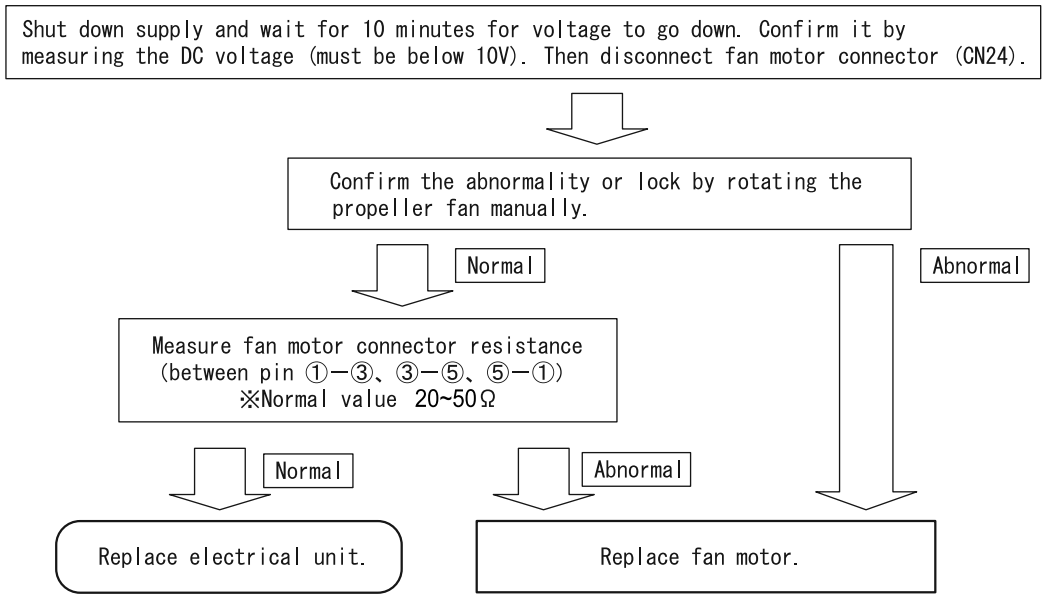
There is a case where fan rpm is reducing during rotating caused by interference of strong wind If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking) The unit will restart according to control as per during start (1).

(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

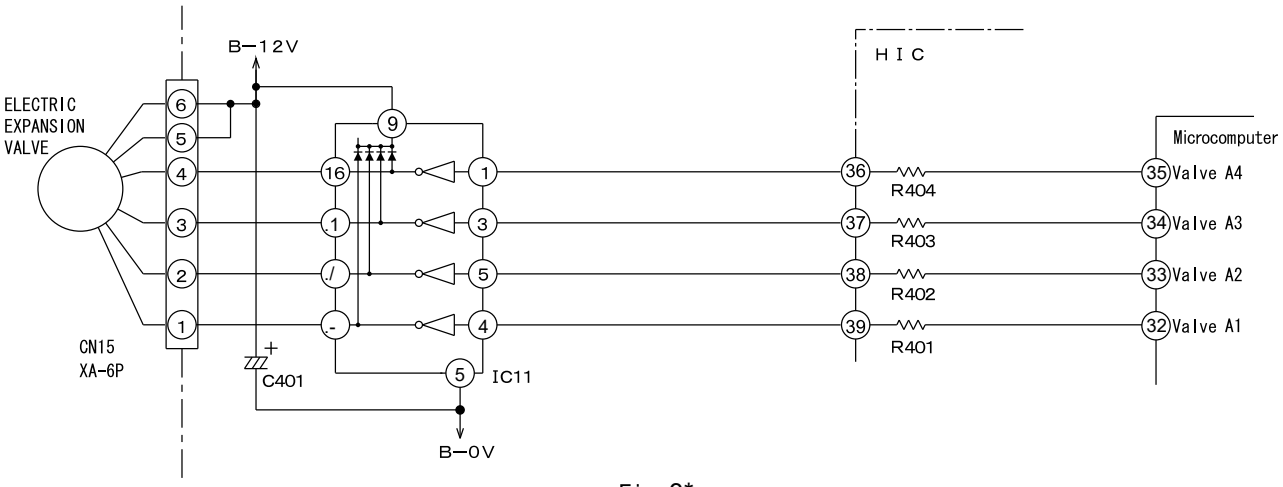


Fig.3*.

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

Table 3*.

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

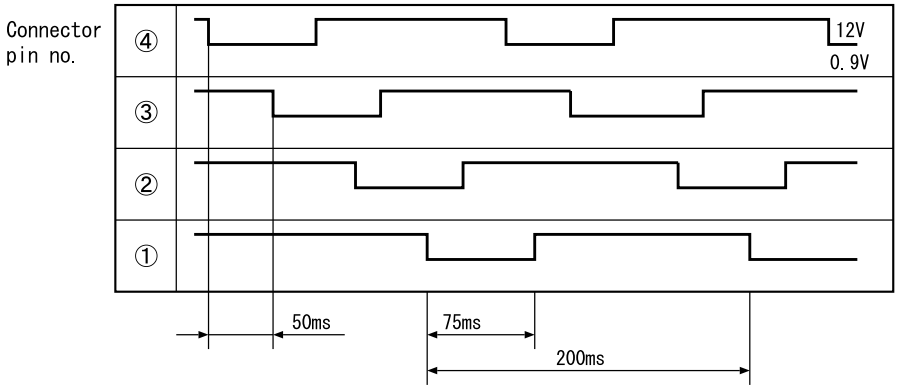


Fig.3*/

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.

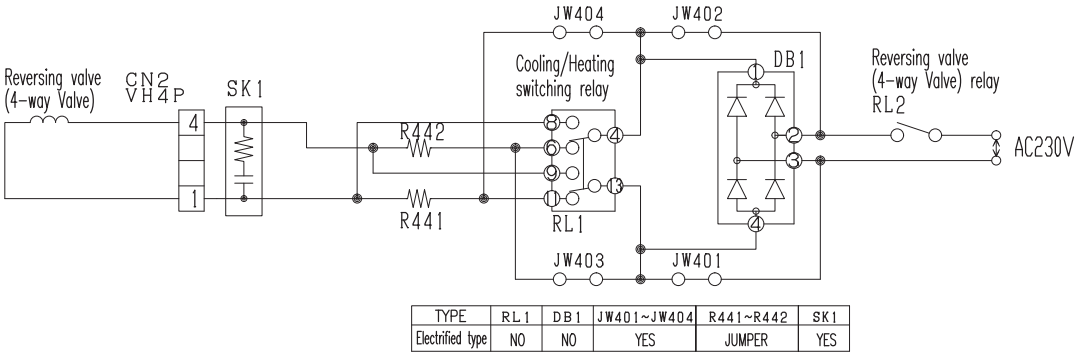
7. Reversing valve control circuit.

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

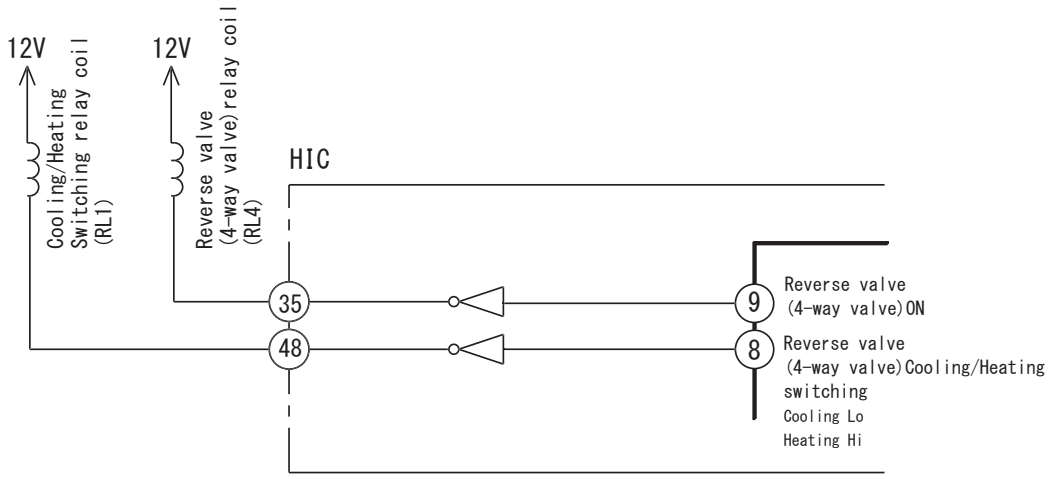
The relay ON/OFF has different type when in the different operation mode.

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

Operation Mode \ Point		Micon⑨ pin-0V	HIC ㉟ pin-0V	CN2①- CN2④
Cooling	Normal Cooling	Hi	0V	AC230V
Heating	Normal Heating	Lo	12V	0V
	Defrost	Hi	0V	AC230V



TYPE	RL1	DB1	JW401~JW404	R441~R442	SK1
Electrified type	NO	NO	YES	JUMPER	YES



SERVICE CALL Q & A

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

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

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

DEHUMIDIFYING MODE

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

A1 Normal sound when refrigerant flows in pipe.

Q2 Cold air comes out during a dehumidifying operation.

A2 To improve the dehumidification efficiency performs quiet fan operation. Therefore the air is cold and it is not a malfunction.

Q3 The operation does not stop even by setting the temperature higher than room temperature on the remote controller.

A3 It sets to perform dehumidifying operation by setting the temperature slightly lower than remote controller setting.

AT STARTING OPERATION

Q1 When only the circuit breaker is turned ON, the deflector at the air outlet move even if the cooling button is not pressed.

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

OTHERS

Q1 Loud noise from the outdoor unit is heard when operation is started.

A1 When operation is started, the compressor rotation speed goes to maximum to increase the cooling capability, so noise becomes slightly louder.
This does not indicate a fault.

Q2 Noise from the outdoor unit occasionally changes.

A2 The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature.
This does not indicate a fault.

Q3 There is a difference between the set temperature and room temperature.

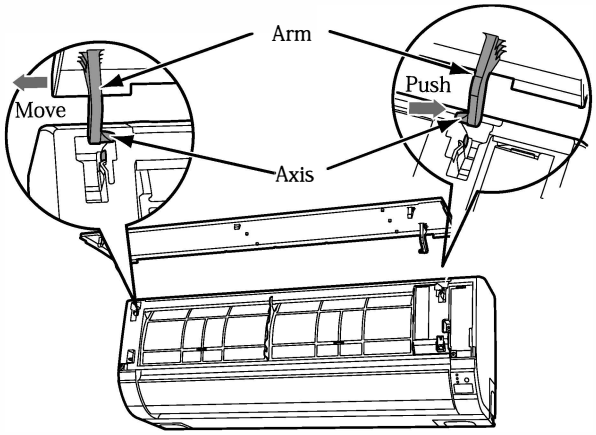
A3 There may be a difference between the set temperature and room temperature because of construction of room, air current etc. Set the temperature at a confortable level for the space.

Disassembly and assembly procedure.

MODEL: RAS-EH18RHLAE

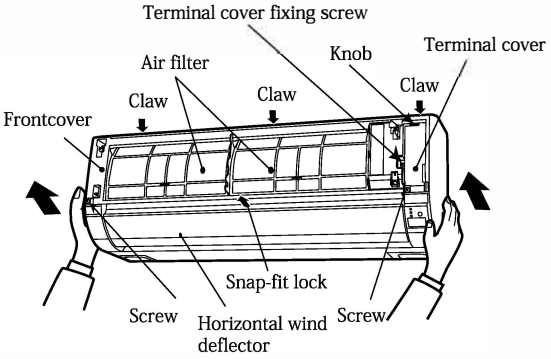
1. Front panel

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.

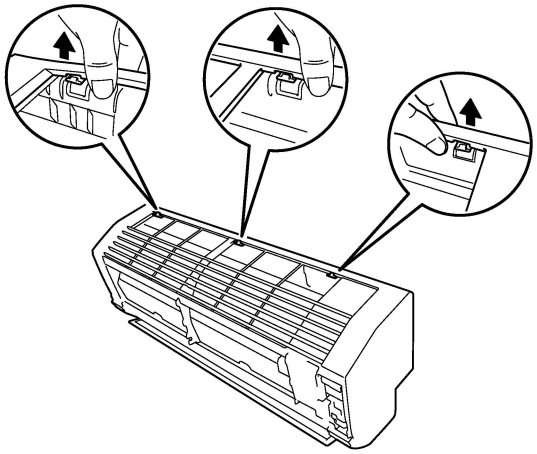


2. Frontcover

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.

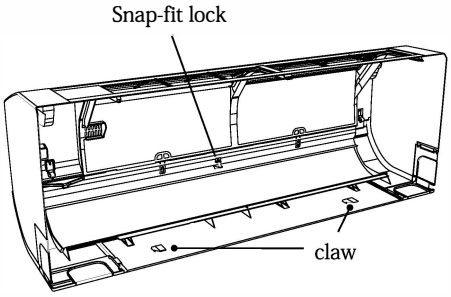


5) Release the claws on the top (3 places) and pull the lower side of the frontcover towards you to remove it.



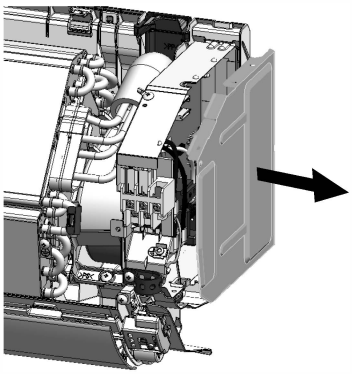
Caution at the time of assembly

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.

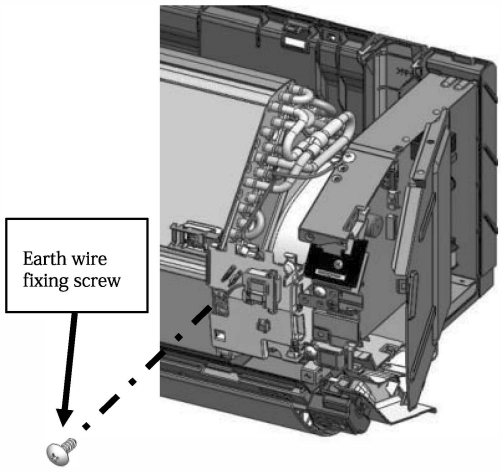


3. Indoor Electrical

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

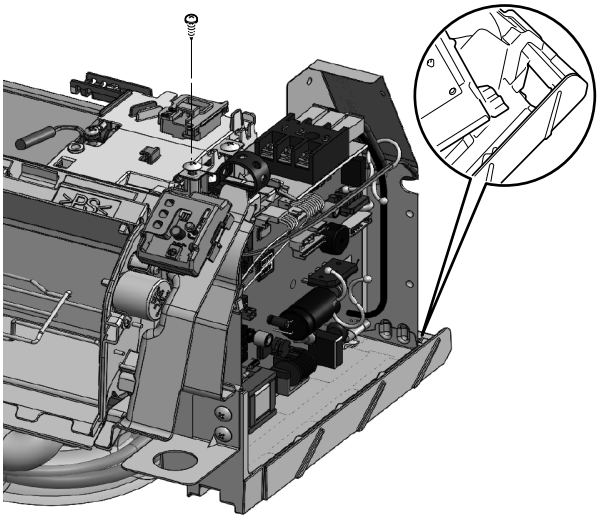


2) Remove the heat exchanger earth wire fixing screw.
3) Remove the P lock and each lead wire connector.



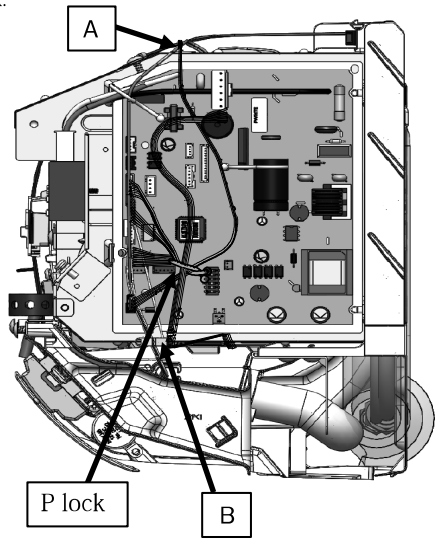
4) Remove a screw on the front left of the electrical.

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.



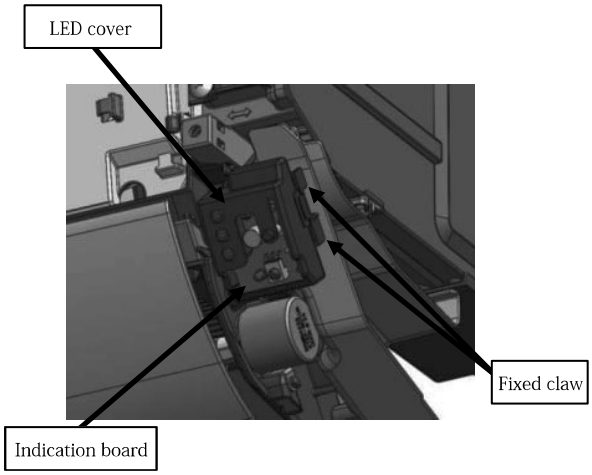
2) Path of lead wires as shown in the table below.
* The motor for CN9 left / right air direction deflector is not compatible with this series.

Lead wire through hole "A"	
CN4	Room heat exchange thermistor

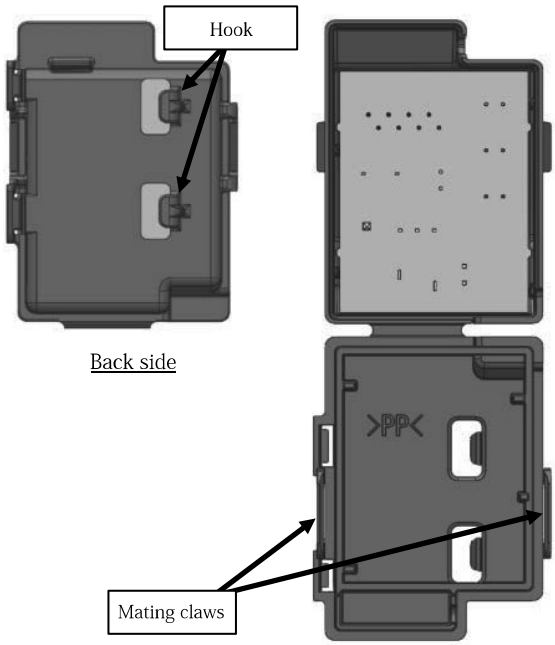
Lead wire through hole "B"	
CN2	Indoor fan motor
CN9	Motor for left and right wind direction
CN12	Motor for up and down wind direction
CN16A	Indication board
CN17	Humidity sensor

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.

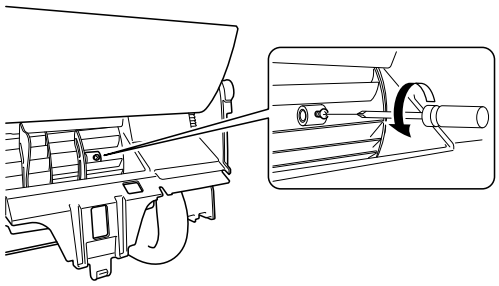


2) Remove the LED cover mating claw, open the LED cover, and remove the board.

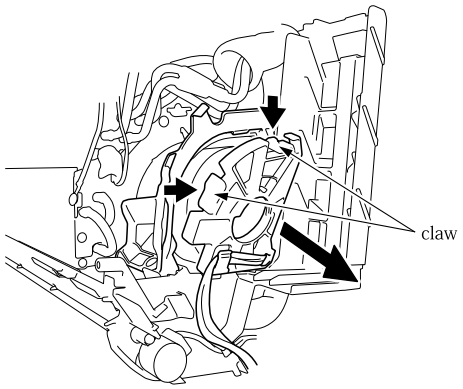


5. Fan motor and tangential fan

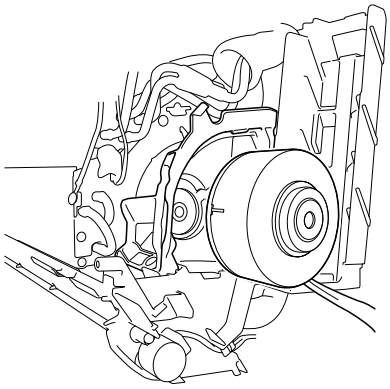
1) Loosen the fan motor fixing screw.



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.

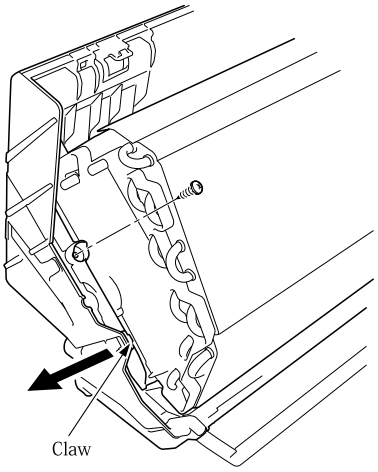


3) Pull out the fan motor to the right.

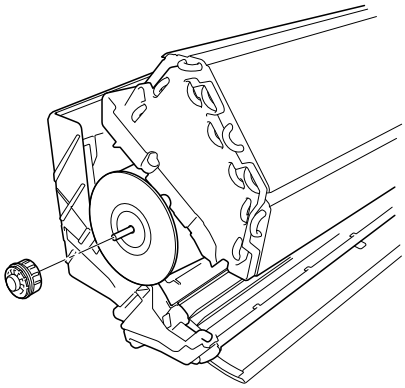


4) Remove the fixing screw on the left side of the evaporator.

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.

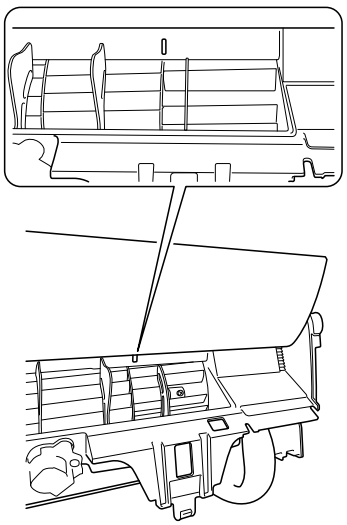


6) While shifting up the evaporator, pull out the bearing and tangential fan to the left to remove.



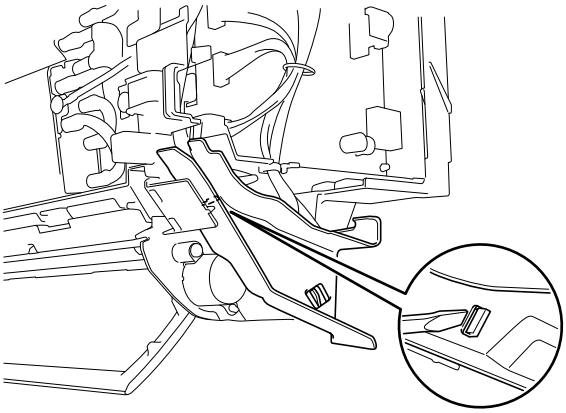
Cautions when assembling fan motor and tangential fan

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.

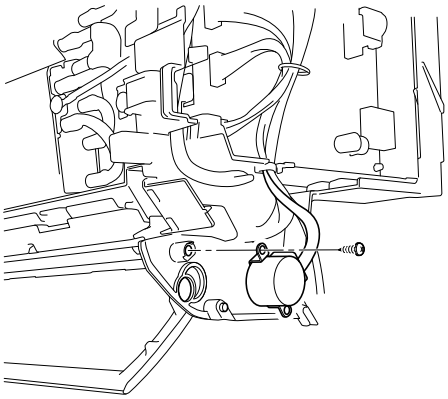


6. Motor for flap (up and down wind direction deflector)

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 Disassemble and Reassemble

MODEL : RAS-EH24RHLAE

1. Front Panel

(1) Pull the panel by holding it both lower sides with both hands.

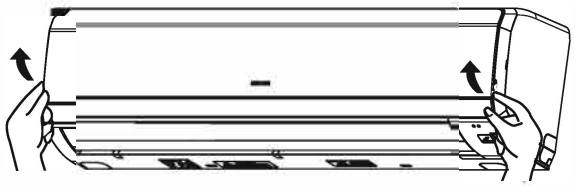


Fig. 1

(2) When the panel opens full, pull the inner part of the right arm inward and pull the panel forward while closing it gradually.

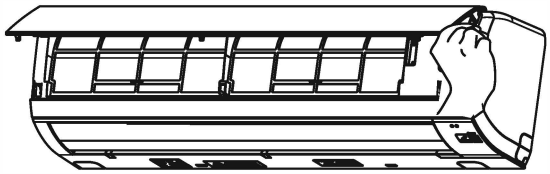


Fig. 2

2. Front Cover

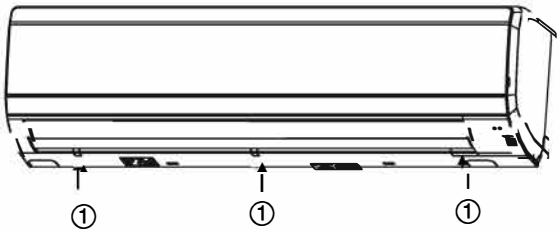


Fig. 3

(1) Remove the caps and uncrew at lower portion of the front cover.

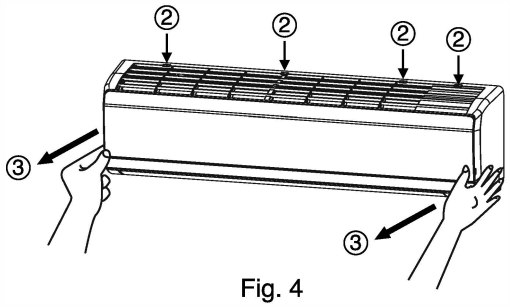


Fig. 4

(2) Firmly press 4 hooks at top of front cover by tools until the hook release from slot.

(3) Pull the front cover to front side.

3. Main P.W.B and Reception/Indication P.W.B

(1) Remove each connector from the lead wire.

(2) Remove the two P.W.B supports from the main P.W.B.

(3) After removing the reception/indication P.W.B cover, pull the support hook at the right side of the reception/indication P.W.B and pull out the P.W.B forward.

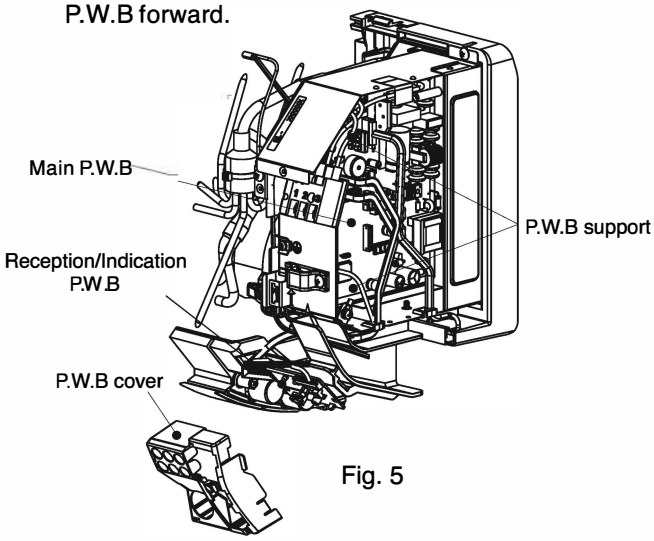


Fig. 5

4. Tangential air flow fan

(1) Press to unhook (2 places) between drain pan and cabinet and pull the claw forward to remove the drain pan.

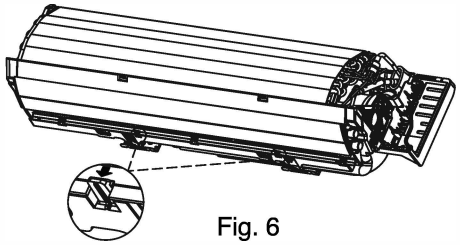


Fig. 6

(2) Unscrew 2 portions at evaporator support and tangential fan.

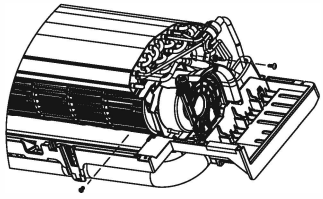


Fig. 7

(3) Remove the locking hook of the bearing cover from the cabinet. Gently pull up the evaporator with bearing cover by holding it at lower side and pull out tangential fan.

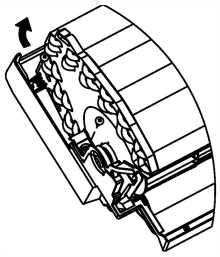


Fig. 8

(4) Remove the two lock screws from the fan motor holder and one screw from the evaporator support plate.
(5) Pull up the evaporator by holding it at the lower side. Insert a screwdriver through the space between the evaporator and fan motor holder and loosen the fan lock screws to remove the air fow fan and fan motor.

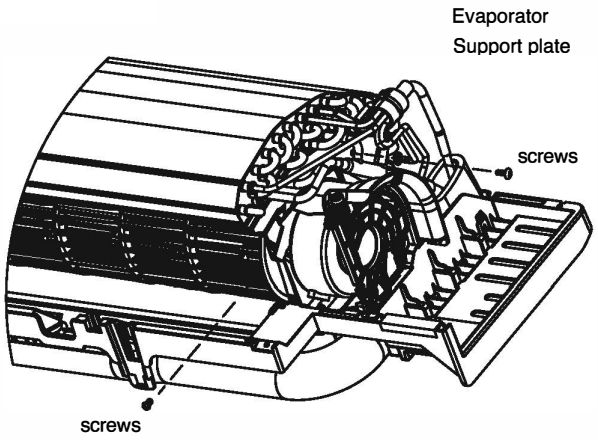
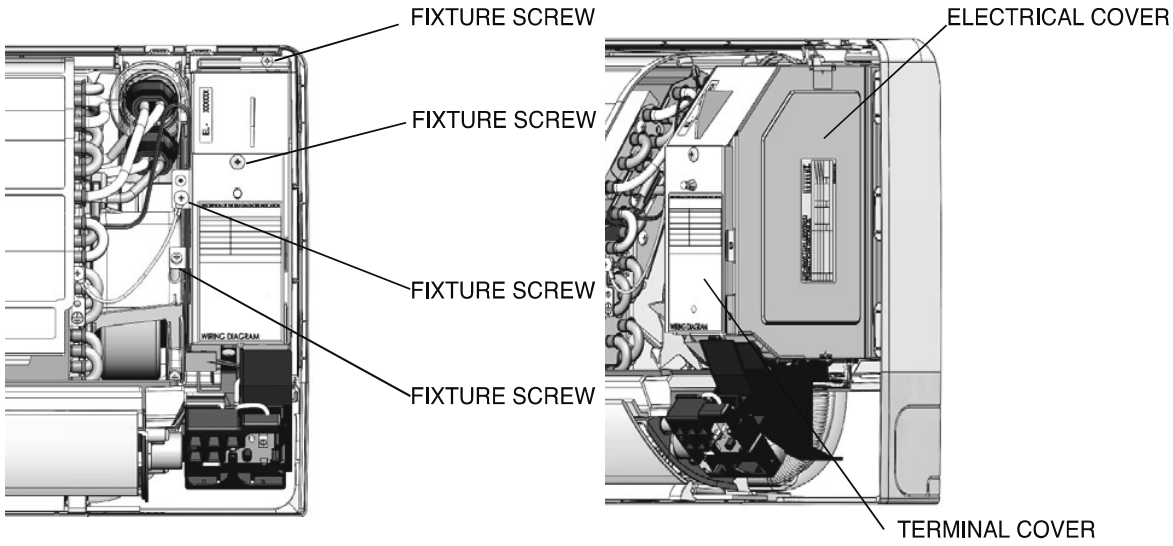


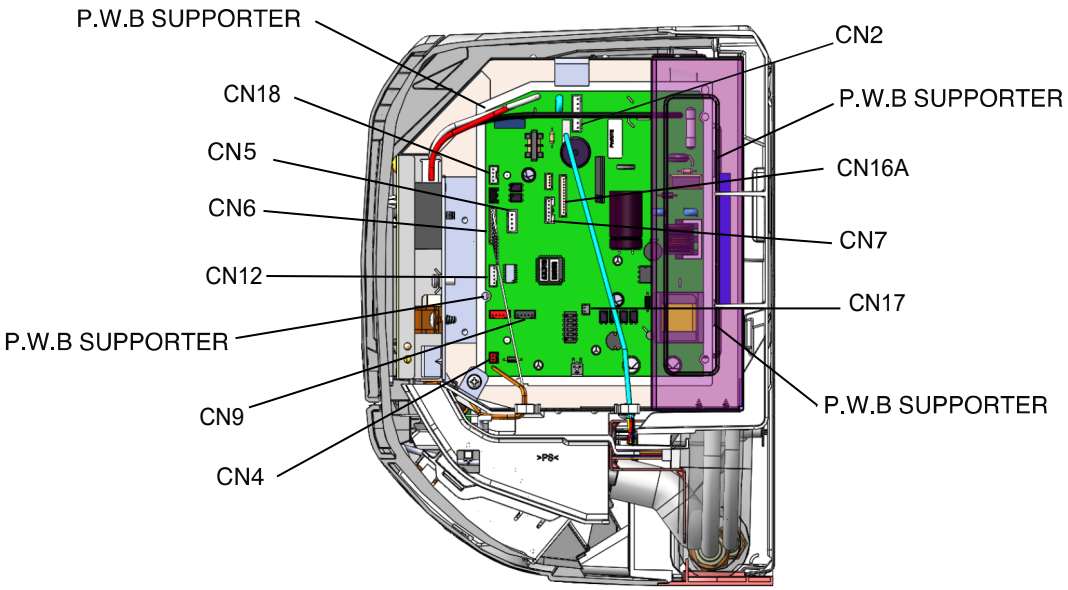
Fig. 8

STRUCTURE OF AN INDOOR UNIT ELECTRIC PARTS



Removing electrical parts

1. Remove the electrical parts cover.
2. Remove the connectors from the CN4 (heat exchange thermistor), CN9 (Vertical sweep motor) and CN2 (fan motor), **CN12** (horizontal sweep motor).
3. Remove four lock screws.



Removing control P.W.B.

. Pull off all the wires from terminal 1,2,3 or remove the terminal [1,2,3] from the chassis.

2. Remove the P.W.B from the P.W.B support.

Remove the indicating P.W.B.

1. Remove the connector from the CN16A on the control P.W.B.
2 Remove the upper hook from the indicating P.W.B. lock resin, pull the P.W.B. forward a little and remove it.

Procedure for Disassembly and Reassembly

OUTDOOR UNIT

MODEL RAC-EH18WHLAE, RAC-EH24WHLAE

1. Electrical Parts

(1) Remove the top cover fixing screws and lift the cover to remove it.

(2) Remove the handle cover fixing screws and push it down to take it out.

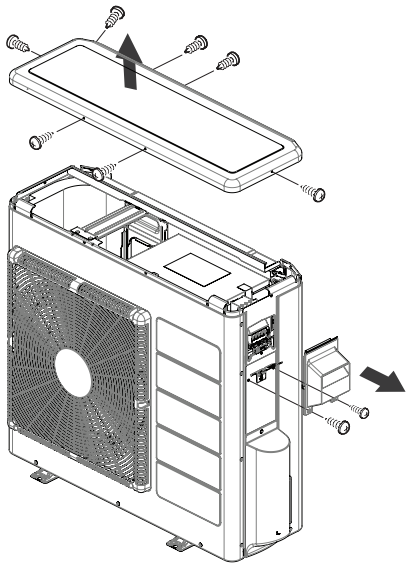


Fig. 9

(3) Remove the electrical box fixing screws.

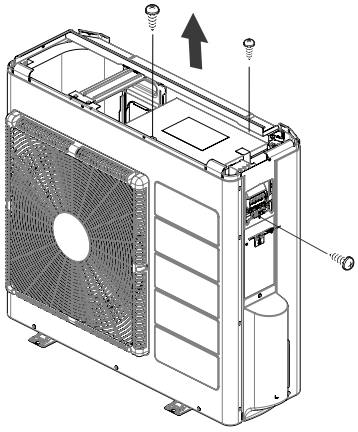
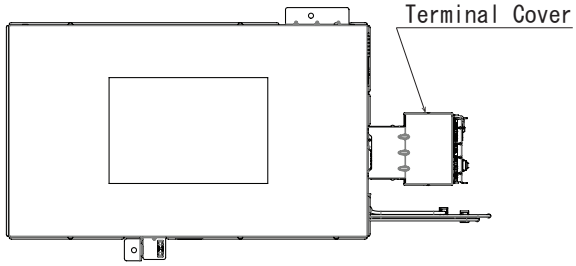


Fig. 10

2. Dismantle procedure of MAIN PWB.

(1) Remove terminal cover.



(2) Remove the terminal block screw, inductance line, line clip, GRN wire, LN123 wire.

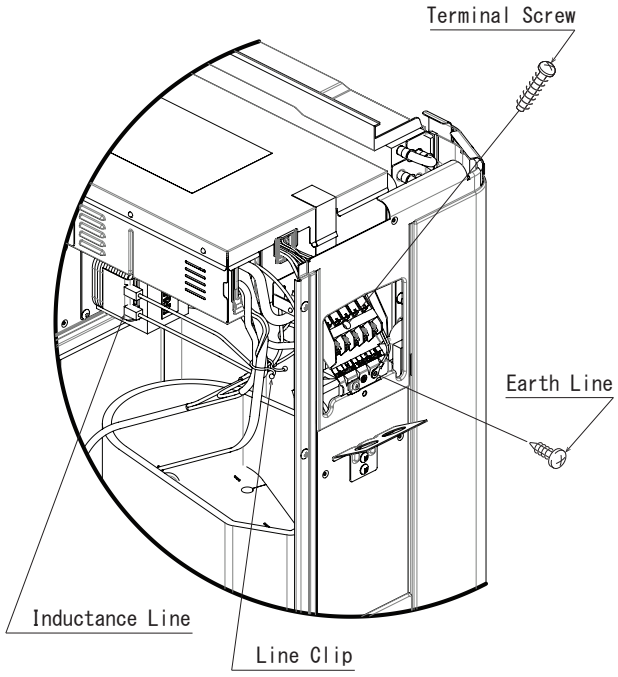


Fig. 11

(3) Set the electrical box upside down.

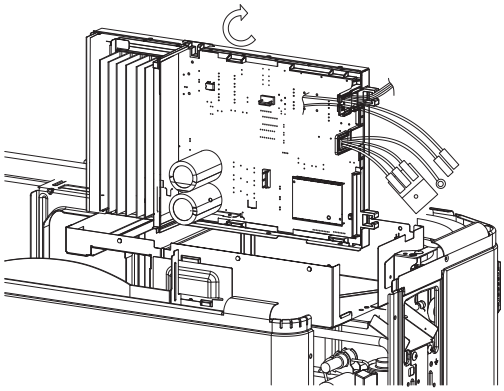


Fig. 12

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

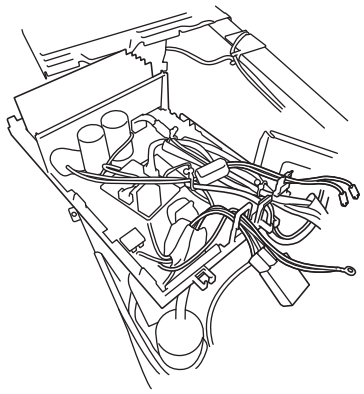


Fig. 13

3. The PWB.

(1) Remove the electrical cover.

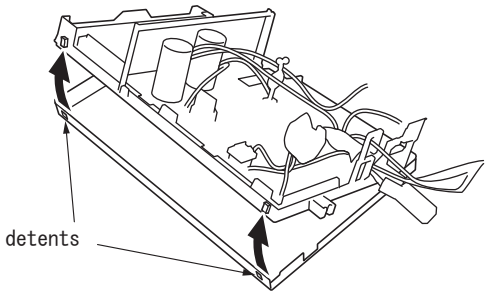


Fig. 14

(2) Remove the PWB from the support.

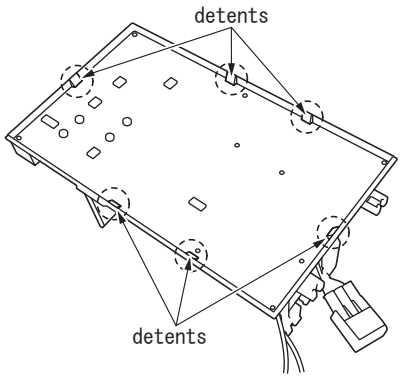
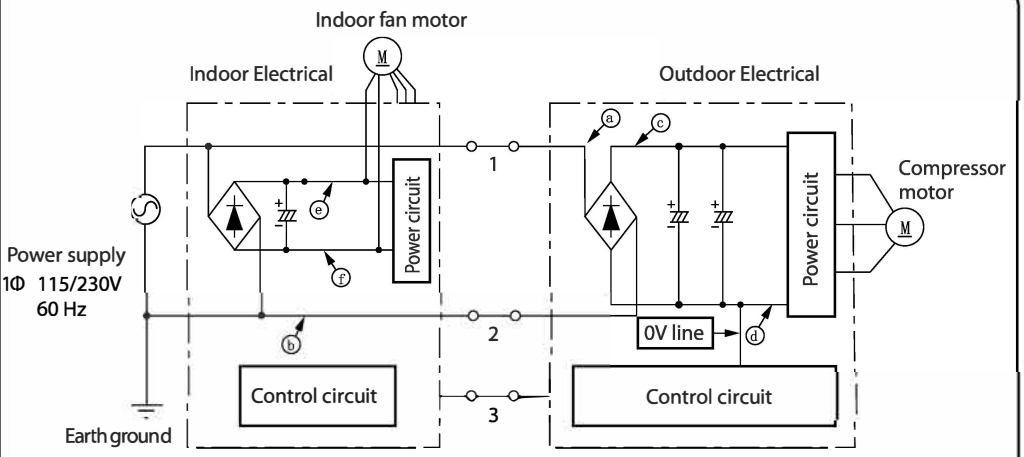


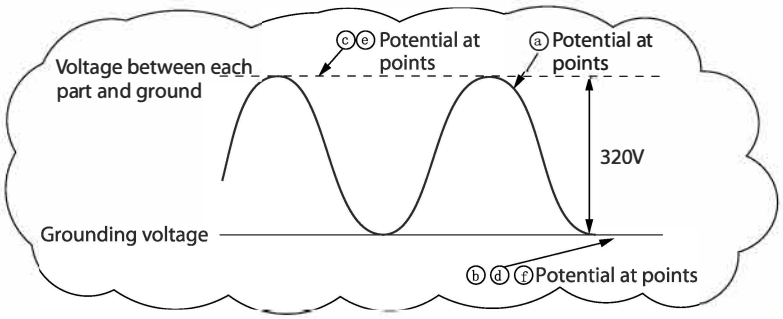
Fig. 15

Inspection instructions

Warning

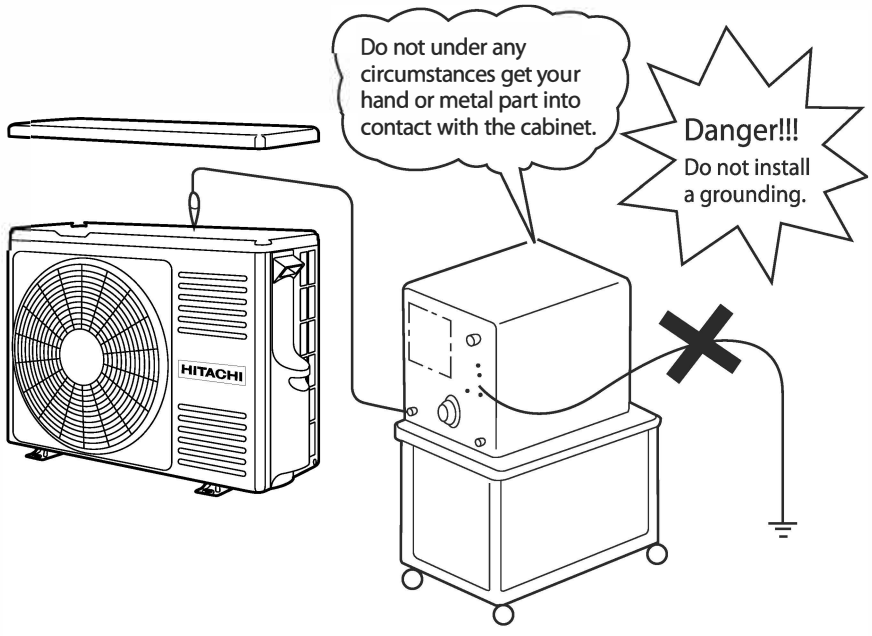
Note that the 0 V line of the outdoor electrical parts and the primary power circuit of the indoor electrical parts have voltages to ground as illustrated in the right-hand figure.





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.



Troubleshooting support

№	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

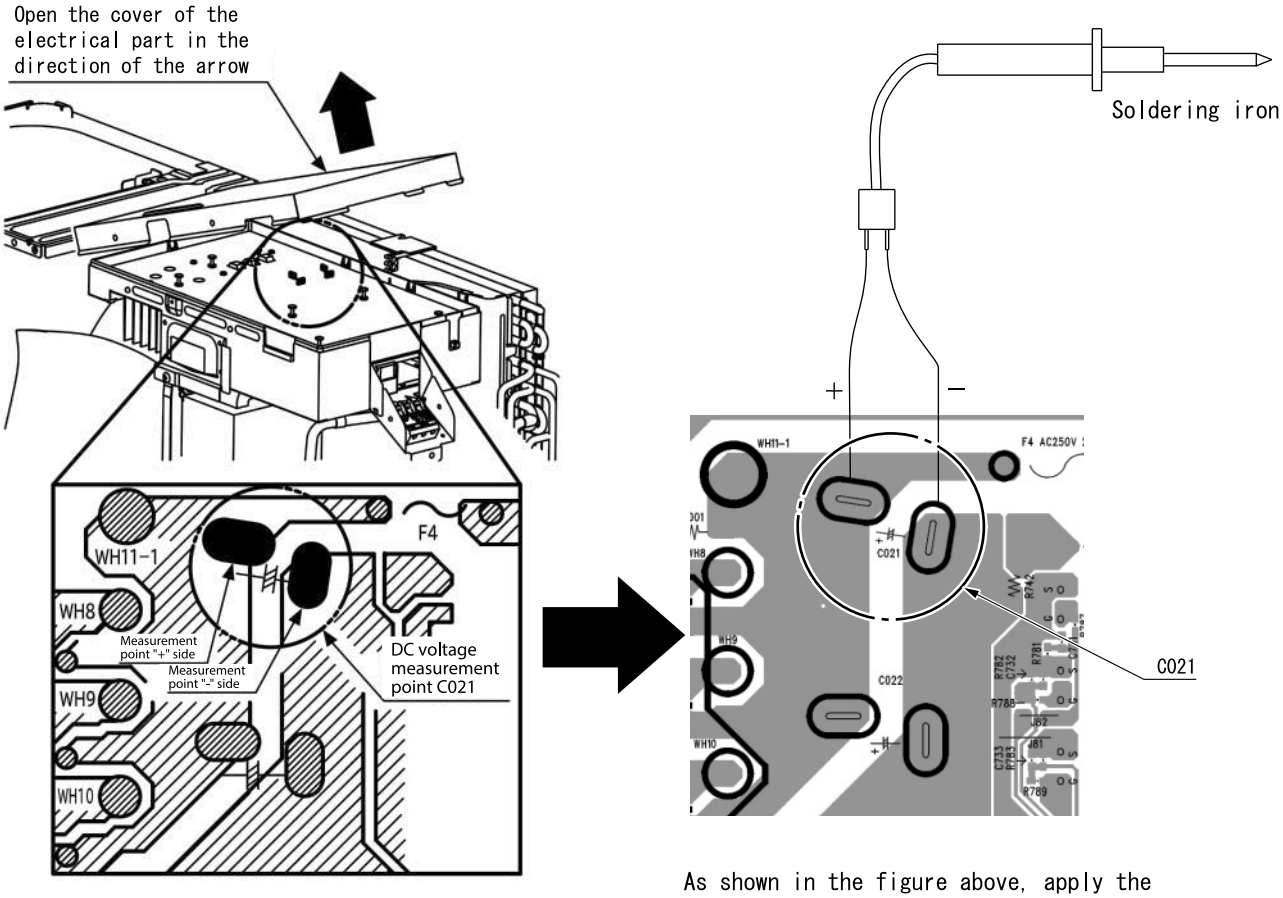
Caution

- 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.



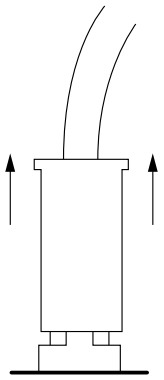
As shown in the figure above, apply the soldering iron to the "+" and "−" terminals of C021 to dicharge the charging voltage of the smoothing capacitor.

Other instructions

(1) Detaching and reattaching the receptacles for tab terminal

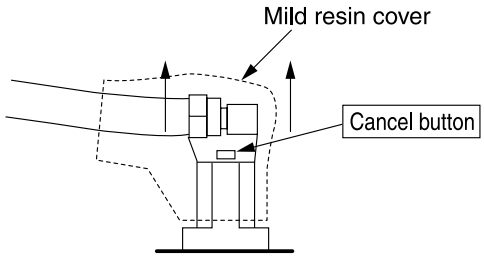
All the receptacles for connecting tab terminals are with a locking mechanism. Forcibly pulling any such receptacle without unlocking it will destroy it. Be on guard.
When reconnecting it, insert it securely all the way home.

· Receptacle types and how to unlock them



Vertical (with a resin case)

Hold the resin case and pull it out.



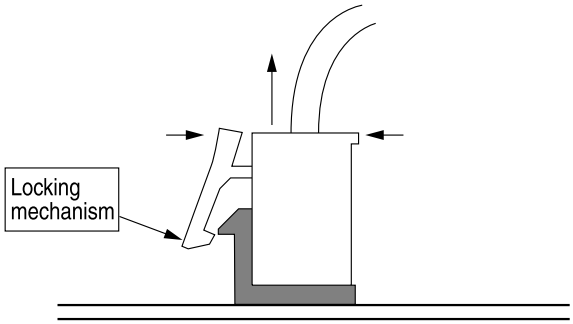
Horizontal (with a mild resin cover)

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]

2. 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
2 SEC — ONCE	REFRIGERANT CYCLE DEFECTIVE
2 SEC — 2 TIMES	FORCED OPERATION OF OUTDOOR UNIT
2 SEC — 3 TIMES	INDOOR INTERFACE CIRCUIT
2 SEC — 4 TIMES	OUTDOOR ELECTRICAL ASSEMBLY DEFECT
2 SEC — 9 TIMES	ROOM OR HEAT EXCHANGER THERMISTOR OR HUMIDITY SENSOR DEFECT
2 SEC — 10 TIMES	OVERCURRENT IN DC FAN MOTOR
2 SEC — 12 TIMES	OUTDOOR INTERFACE CIRCUIT
2 SEC — 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 DOSE 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

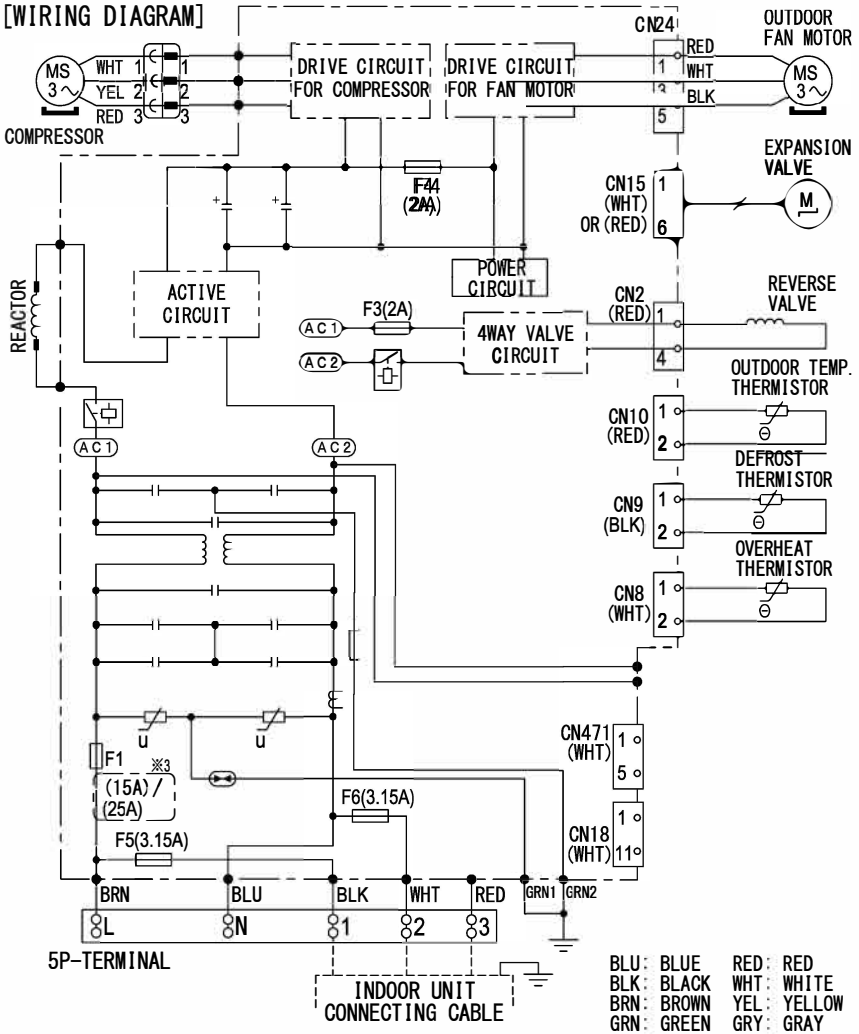
⚠ ⚠ DANGER (ABOUT DC350V)

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	
LD301	OPERATION STATUS
LIT	NORMAL
BLINK REPEATINGLY WITH 2 SECONDS LIT - 0.3 SECONDS OFF	OVERLOAD (NORMAL)

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

[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	CHECKING POINT AND REPAIR METHOD
OFF	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
	NORMAL STOP	NOT MALFUNCTION
1 TIME BLINK	RESET STOP	FAN OPERATION※1, WAITING COMPRESSOR TO START → NORMAL OTHER → IF STILL NOT SOLVE AFTER CHECK THE CONNECTION CABLE, CHANGE ODU CONTROLLER
2 TIMES BLINK	PEAK CURRENT CUT	SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE COMPRESSOR CONNECTOR NOT CONNECTED → CHECK CONNECTOR OUTDOOR UNIT SURROUNDING IS BLOCKED → REMOVE THE CAUSE OF BLOCKING. THE CYCLE PIPE ABNORMAL → CHECK THE CYCLE PIPE (ODU(※4) CONTROLLER IS ABNORMAL OR COMPRESSOR IS ABNORMAL REFER TO THE SERVICE MANUAL [SELF-CHECK])
3 TIMES BLINK	ABNORMAL LOW SPEED ROTATION	
4 TIMES BLINK	SWITCHING FAILURE	
5 TIMES BLINK	OVERLOAD LOWER LIMIT CUT	
6 TIMES BLINK	COMPRESSOR TEMPERATURE RISE	SERVICE VALVE NOT OPEN, REFRIGERANT LEAK → CHECK SERVICE VALVE, RE-CHARGE THE REFRIGERANT BAD CONNECTOR INSERTION, CIRCUIT DEFECT → CHECK THE CONNECTOR, CHANGE ODU CONTROLLER
7 TIMES BLINK	THERMISTOR ABNORMAL	THERMISTOR CONNECTOR HALF INSERT → INSERT CONNECTOR SECURELY THERMISTOR WIRE SHORTED OR CUT, CIRCUIT DEFECT → CHANGE THERMISTOR, CHANGE ODU CONTROLLER
9 TIMES BLINK	COMMUNICATION ERROR	CABLE MISS CONNECTION, DISCONNECTIN → CHECK THE F CABLE COMMUNICATION CIRCUIT ABNORMAL → CHANGE ODU CONTROLLER
10 TIMES BLINK	POWER SUPPLY VOLTAGE ERROR	AC VOLTAGE ABNORMAL (BEYOND RATED VOLTAGE ±10% → SUPPLY CORRECT VOLTAGE AC VOLTAGE NORMAL (WITHIN RATED VOLTAGE ±10% → CHANGE ODU CONTROLLER
11 TIMES BLINK	FAN STOP BY STRONG WIND	TEMPORARY STOP DUE TO STRONG WIND → FAN WILL RE-START AFTER WIND BECOME WEAK
12 TIMES BLINK	FAN LOCK STOP	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
13 TIMES BLINK	EEPROM READING ERROR	CHANGE ODU CONTROLLER
14 TIMES BLINK	DC VOLTAGE ABNORMAL	CONFIRM AC POWER SUPPLY & DC VOLTAGE IS NORMAL → CHANGE ODU CONTROLLER COMPRESSOR LOAD ABNORMAL → INSPECT THE COMPRESSOR
15 TIMES BLINK	CIRCUIT ABNORMAL	CHANGE ODU CONTROLLER (SOME MODELS HAVE NOT 15 TIMES BLINK)
16 TIMES BLINK	HIGH LOAD DURING STOP	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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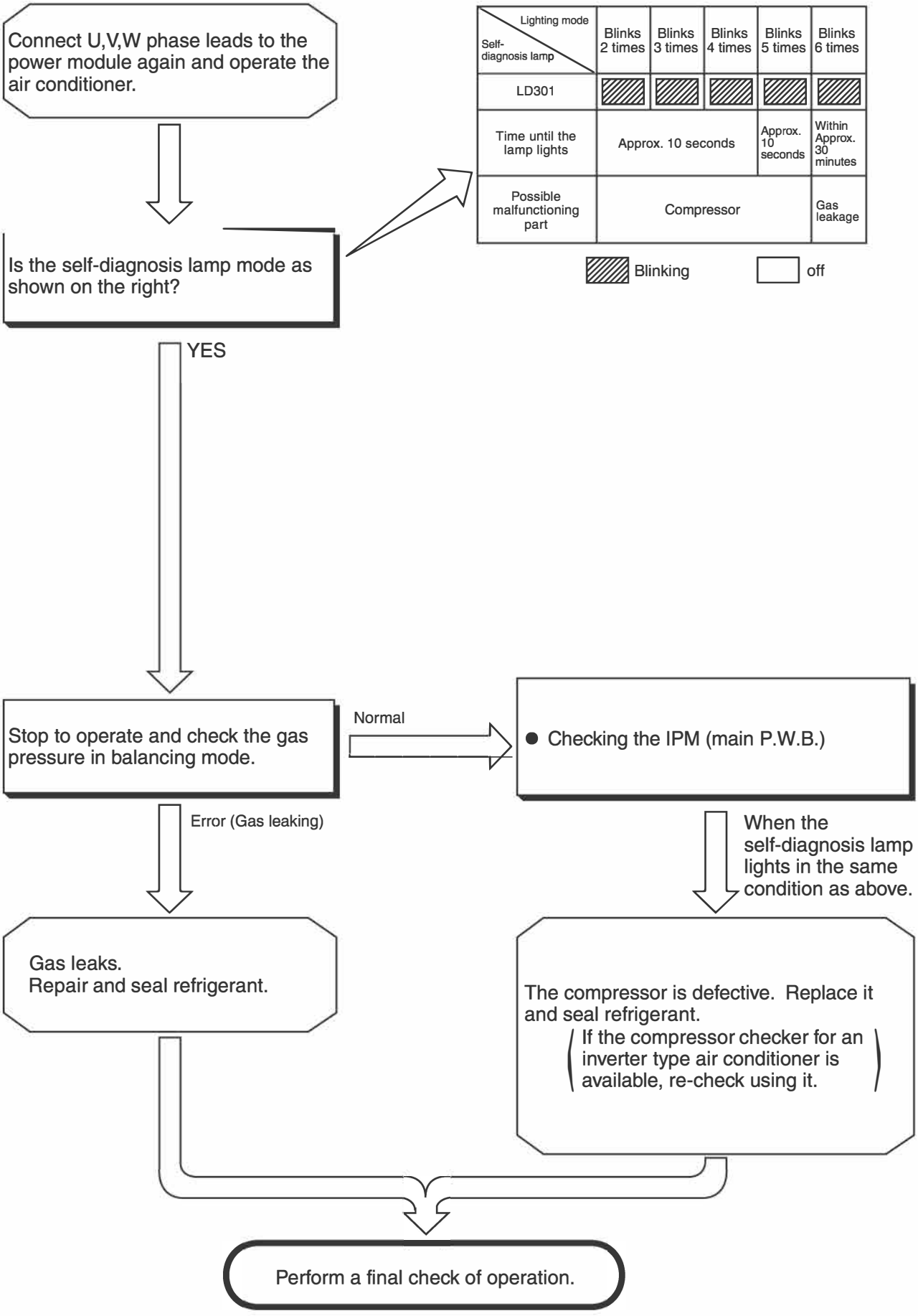
CHECKING THE REFRIGERATING CYCLE (JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

1. Troubleshooting procedure (No operation, No cooling)



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 scond)
2. Press the [Mode (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 32°C by pressing the [Temp (Temp Up)] button.
5. Set which failure information that need to be redisplay by using [Fan Speed (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 (Temp Up)] button and [On/Off (On/Off)] button simultaneously.
   (The remote controler 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>

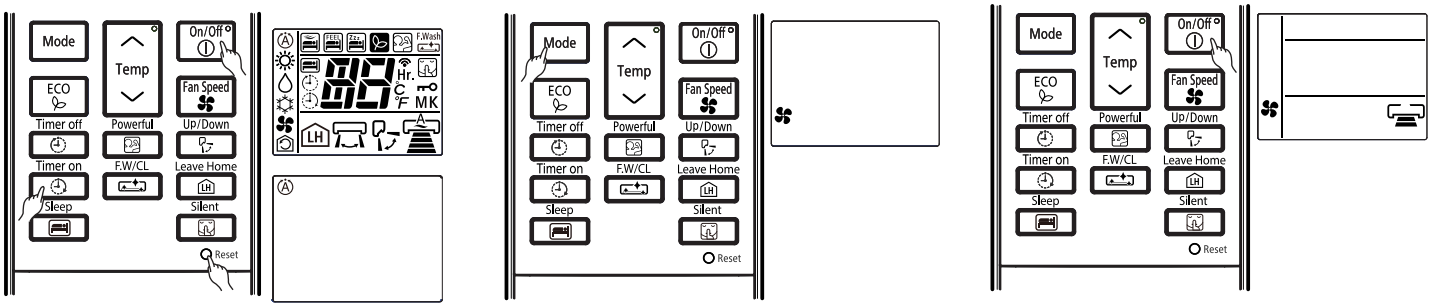
1. Conduct the redisplay of failure mode. (Follow above procedure)
2. Turn the circuit breaker OFF. (Wait for 5sec or more)
3. Press the [Mode (MODE)] button and select [Dry mode (◇)]. The remote should be in 'Standby' mode.
4. Turn the circuit breaker ON.
5. Set the room temperature on the remote controller to 16°C by pressing the [Temp (Temp Down)] button.
6. While directing the remote controller towards the receiver of the indoor unit, press [Temp (Temp Down)] button and [On/Off (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

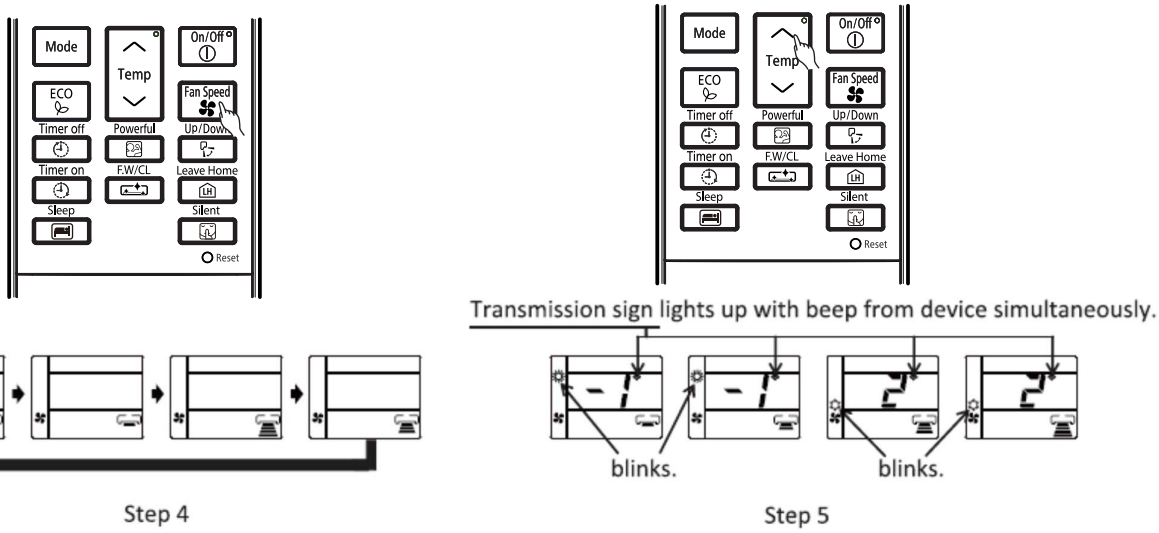
1. While pressing and holding ⏻ (ON/OFF) button and ⏲ button, press RESET [RESET] button on the same. Release RESET [RESET] button only and make sure that all marks on the remote controller display are indicated then release the ⏻ (ON/OFF) button and ⏲ button. Remote controller now enters "Shift Value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



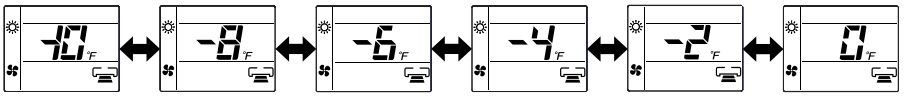
4. Set the FAN SPEED with the Fan Speed (FAN SPEED) button according to the following FAN speed setting in order to choose the desired operation mode that is required for shift value setting temperature modiÿcation.

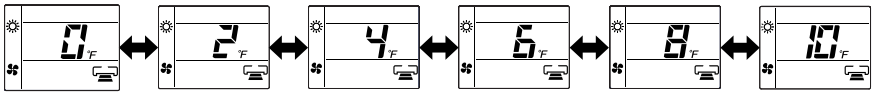
– To change the shift value for COOLING mode operation, select either (HIGH) or (MED) FAN SPEED
– To change the shift value for HEATING mode operation, select either (LOW) or (SILENT) FAN SPEED

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



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 o° t he power.
3. If "O" 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.

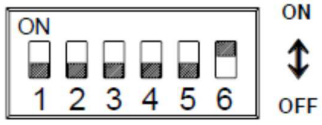
b.) Remove the back cover of the remote control.

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 cotrol to check the available models of corresponding indoor machines.

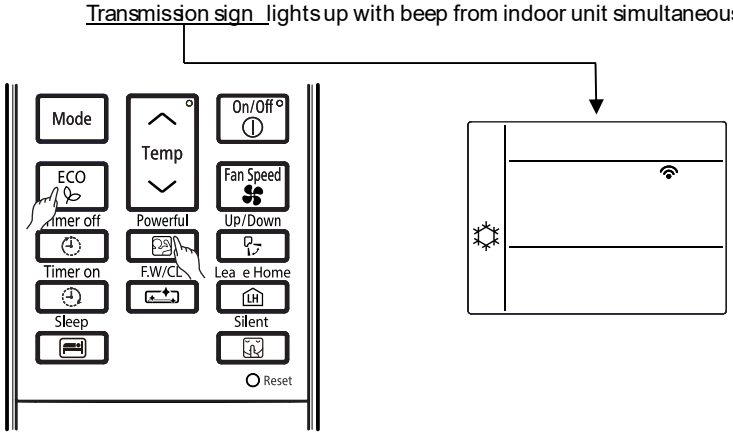
HOW TO CHANGE THE FAN SPEED IN COOLING MODE DURING THERMO OFF

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 [POWERFUL] button and ECO [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 o˜
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 o˜ .
(2) If Timer reservation has been set, it will be canceled.
(3) During time setting and timer setting, this operation cannot be set.

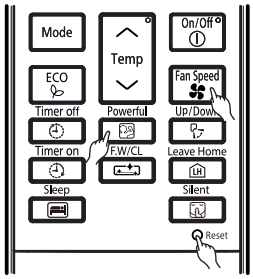
HOW TO CHANGE THE INTERMITTENT FAN HEATING SETTING

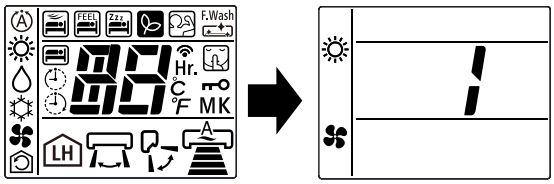
The intermittent fan control during thermo o˜ in Heating mode can be changed by the remote controller.
(The procedure should be done only by service personnel.)
It is possible to select from 3 patterns.

PROCEDURE

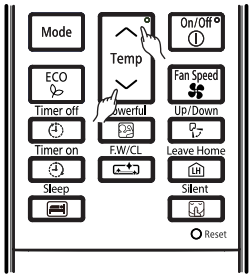
Press Powerful (POWERFUL) button, Fan Speed (FAN SPEED) button and press RESET [RESET] button simultaneously.

Release RESET [RESET] button only and make sure that all marks on the remote controller display are indicated, then release Powerful (POWERFUL) button and Fan Speed (FAN SPEED) button.
Remote controller now enters "Intermittent Fan Control Change Mode".

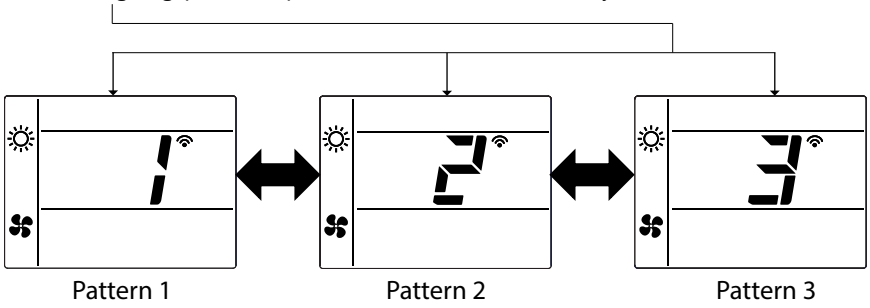




Press [ROOM TEMPERATURE setting] [∧ (UP) / ∨ (DOWN)] button.
(The intermittent pattern changed with indoor unit beep sound)



Transmission sign lights 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.

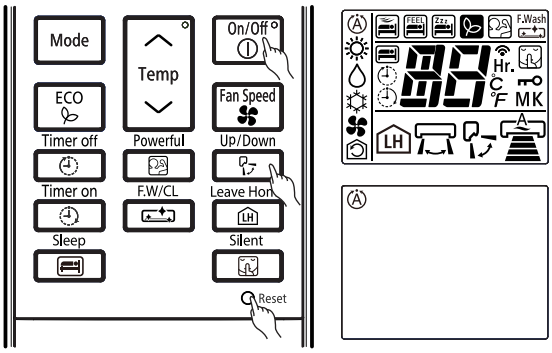
(2) The selected intermittent pattern will remain unchanged after the unit is truned o˜.

DISPLAY OPERATION MODE SETTING

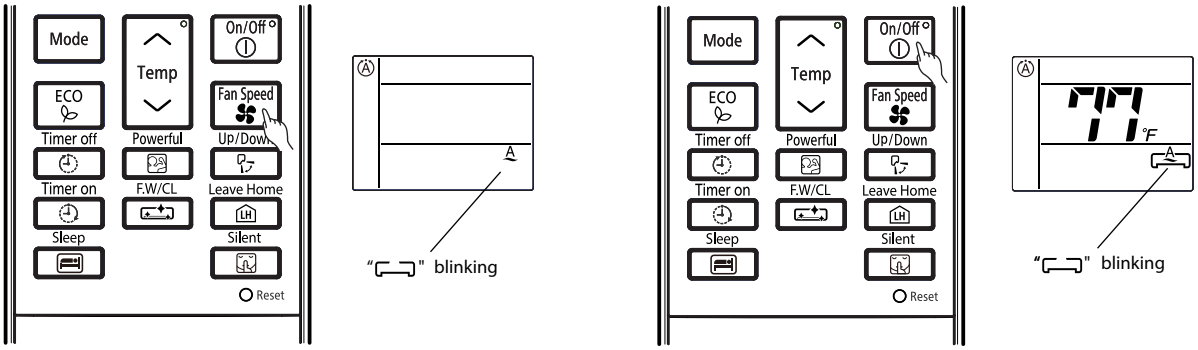
For operating indoor unit independently (without outdoor unit connection), remote controller must be set according to below procedures before send the signal to the indoor unit. New communication format between indoor and outdoor is required to communicate with outdoor unit.

PROCEDURE

1. While pressing and holding (ON/OFF) button and (UP/DOWN) button, 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.



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

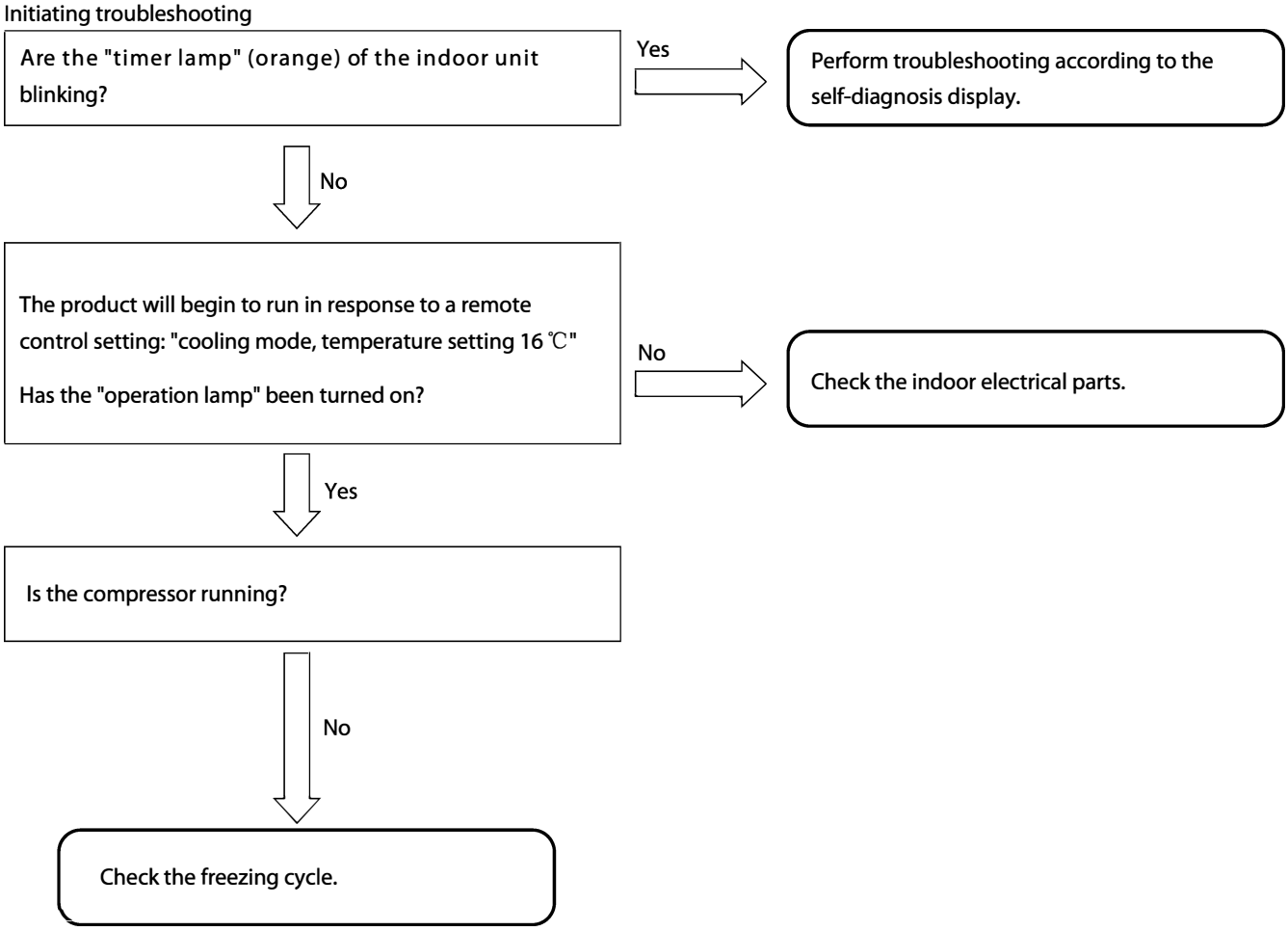


NOTE :

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

Diagnosis and troubleshooting of indoor electric parts, outdoor electric parts and refrigerating cycle

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

Is the "timer lamp" (orange) of the indoor unit blinking?

Yes → How many times does the time lamp blinking

- not 4 times → Check indoor timer indicator blinking
- 4 times → Check outdoor electrical unit

No

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 16℃ 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

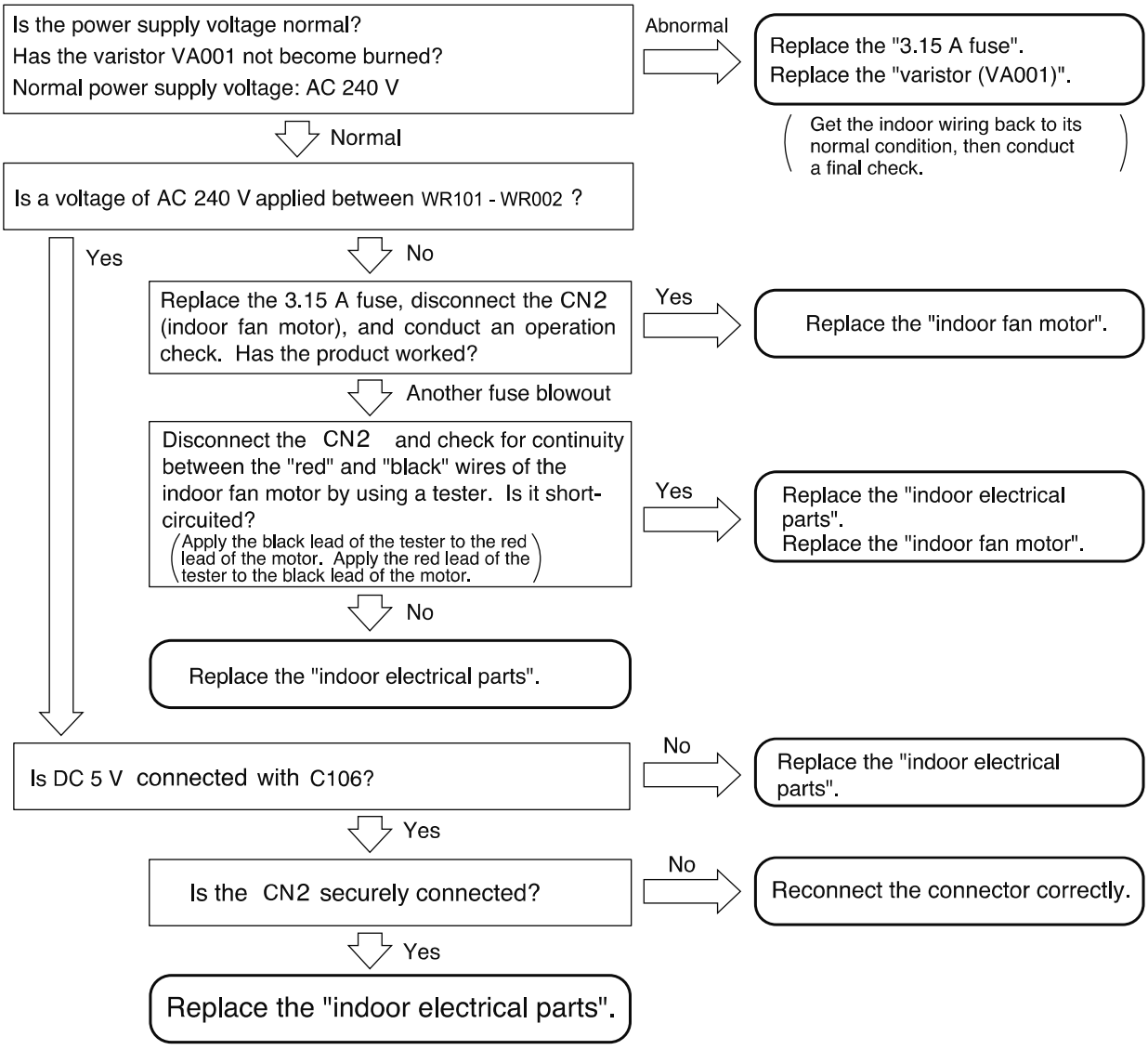
Estimated cause of fuse blowout
- Abnormally high voltage applied to the power supply
- Indoor fan motor out of order
- Power circuit out of order

［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.

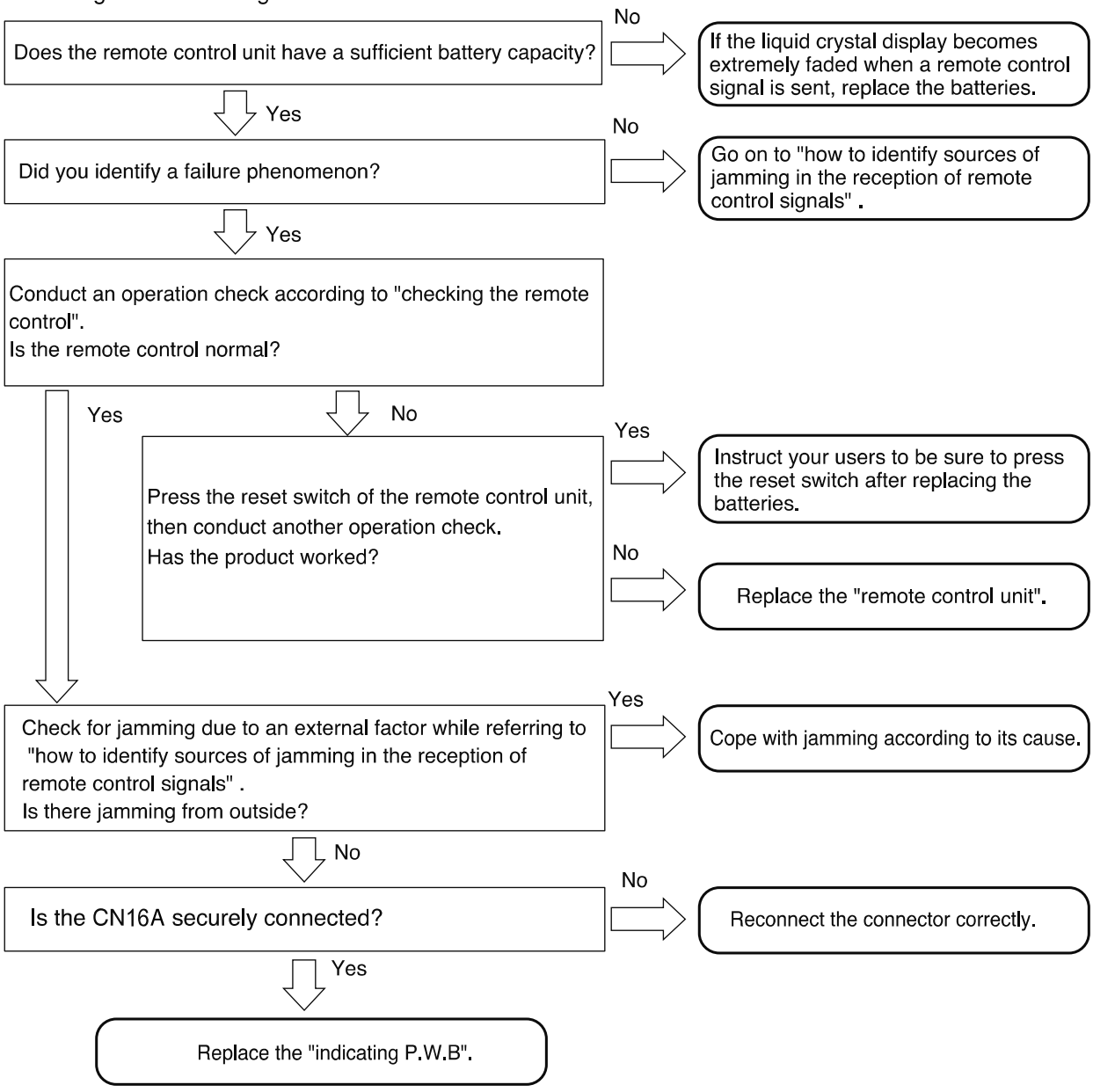
［Situation ］ The product does not receive a remote control signal. It is not very responsive.
(The product does run normally in response to the emergency operation switch.)

［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.

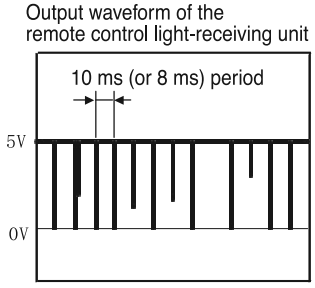
- Indoor lighting equipment (quantity, type, location)
- Remote control units of other electrical products and equipment
- Is the grounding for the air-conditioner shared with other equipment?
- Are the surroundings of the air-conditioner clear of wireless antenna?
- Is the remote control light-receiving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

[Checking and actions]

Effects of lighting equipment (fluorescent lamps)

Checking points

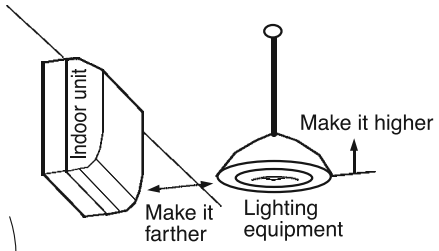
- Turn on and off the lighting equipment and check for its effects on the reception of remote control signals.
- When cold, the fluorescent lamp tends to emit infrared rays with wavelengths close to those used in remote control.
  If you cannot detect the phenomenon about which your user is complaining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



Actions proposed

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

   (This will also affect the reception of remote control signals. Therefore, set the range to be covered with tape to a range that is problem-free in practice, while checking the reception status.)

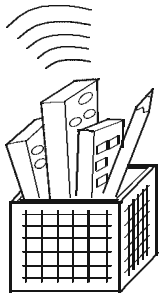


2. Add an interference filter to the front panel of the remote control light-receiving unit.
   ※ Lighting equipment that produces strong jamming exists although rarely. Some problems may therefore be unsolvable by managing the air-conditioner side alone.

Effects of the remote control units of other equipment

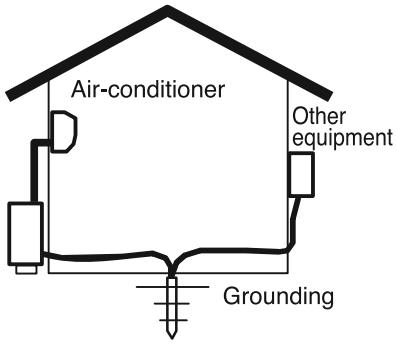
Checking points

- If, on the remote control unit of a TV or audio equipment, its sound volume key or something similar is left pressed, infrared signals become continuously sent, thereby jamming the reception of remote control signals.
- Check how the remote control unit and related components are stored, thereby checking if there is any possibility that a button may be inadvertently left pressed on the remote control unit of other equipment.



Actions proposed

If there is any such possibility, give explanations to your users to that effect and instruct them to exercise caution.

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

3. Failure 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

Is the "timer lamp" (orange) of the indoor unit blinking?

Yes → Check for failures according to the self-diagnosis display.

No ↓

Did the self-diagnosis lamp (LD301) of the outdoor unit blink once or become turned off?

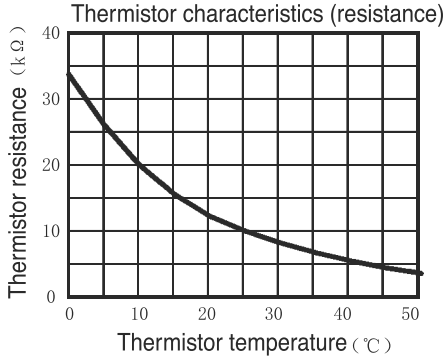
No → Check for failures according to the self-diagnosis display.

Yes ↓

Remove the connector (CN4) of the heat exchanger thermistor or remove CN16A of room thermistor and measure the thermistor resistance. Did the reading roughly agree with the resistance values indicated in the right-hand figure?

No → Replace the " heat exchanger thermistors or room temperature " at indicating PCB.

Thermistor characteristics (resistance)



Yes ↓

Replace the "indoor electrical parts".

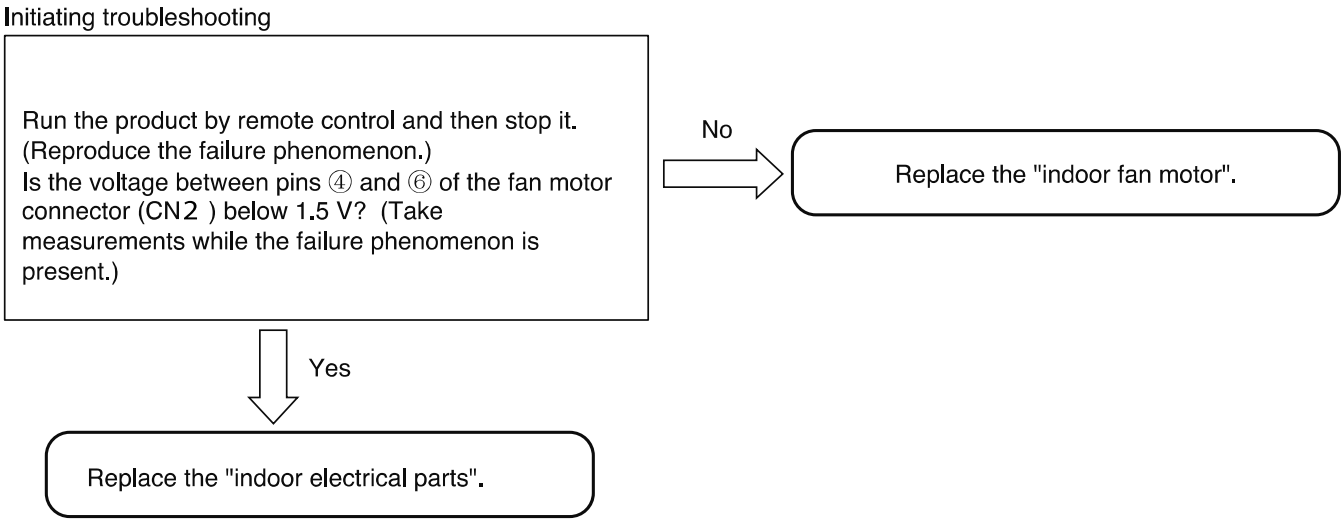
4. Failure phenomenon: The fan motor will not stop.

［Estimated failure locations ］

· Indoor fan motor

· Fan motor drive circuit

［Diagnosis flow ］



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 lable.

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

Are the room temperature thermistor connector (CN16) and heat exchanger thermistor connector (CN4) inserted?

No → Correct the connectors.

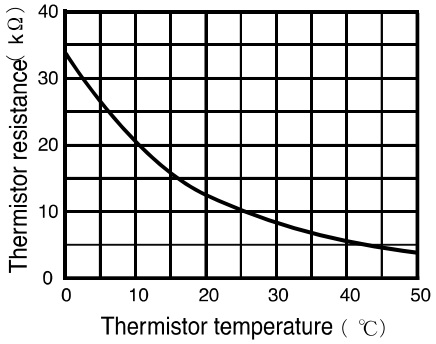
Yes ↓

Detach the connector (CN16) from the room temperature thermistor and (CN4) heat exchanger thermistor and measure the thermistor resistances. Did the resistances almost agree with those indicated in the right-hand figure?

(The product will begin detecting failures if it is close to a wire break or short-circuit.)

No → Replace the room temperature from indication PCB and heat exchange thermistor.

Thermistor characteristics (resistance)



Yes ↓

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

10. Timer lamp blinking: blinking 10 times

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

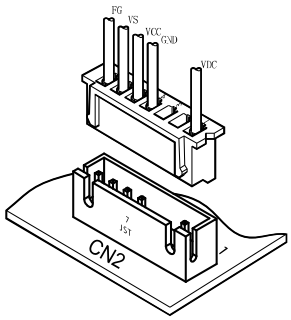
[Estimated failure locations]
- Loose connector or wire break in the indoor fan motor
- Indoor fan motor mechanically locked
- Indoor fan motor
- Indoor fan motor drive circuit

[Diagnosis flow]
Initiating troubleshooting

Measurement continuity where fan motor connector disconnect

Name	Test point
Motor drive power	CN2 ①pin- ④pin
Motor contorl power	CN2 ⑤pin- ④pin
Motor speed signal	CN2 ⑥pin- ④pin
Motor rotation speed debug	CN2 ⑦pin- ④pin

Yes → Replace the "indoor fan motor". and "indoor electrical parts".



No

Does the transflux fan rotate gently?
(Be sure to turn off the power before checking it.)

No → Is there a factor that mechanically hampers the rotation?
- The transflux fan is hitting and rubbing against something.
- There are deposits of viscous dust.

Yes → Replace the "indoor fan motor".

No → Yes → Remove the cause of the mechanical lock.

Is the indoor fan motor connector (CN2) securely inserted? Is it free of wire breaks?

No → Correct the connector and wiring.

Yes

During standby,check voltage pin① and ④, there are voltage more than DC300V

No → Replace the "indoor electrical parts".

Yes

Run the product with the remote control unit set to "cooling, strong wind".
Has the indoor fan motor run for several seconds?

No → For 2 to 3 seconds after startup by remote control, did a voltage of about 3-6 V occur between pins ④ and ⑥ of the fan motor connector (CN2)?

Yes

While the fan was turning, did an about 7.5V voltage occur between pins ④ and ⑦ of the fan motor connector (CN2)?
(These signals should normally occur only while the fan is rotating.)

Yes → Replace the "indoor fan motor".

No → Replace the "indoor electrical parts".

Yes → Does an about 15 V voltage occur between pins ④ and ⑤of the fan motor connector (CN2)?

Yes → Replace the "indoor fan motor".

No → Replace the "indoor electrical parts".

No → Replace the "indoor electrical parts".

11. Timer lamp blinking : blinking 12 times

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

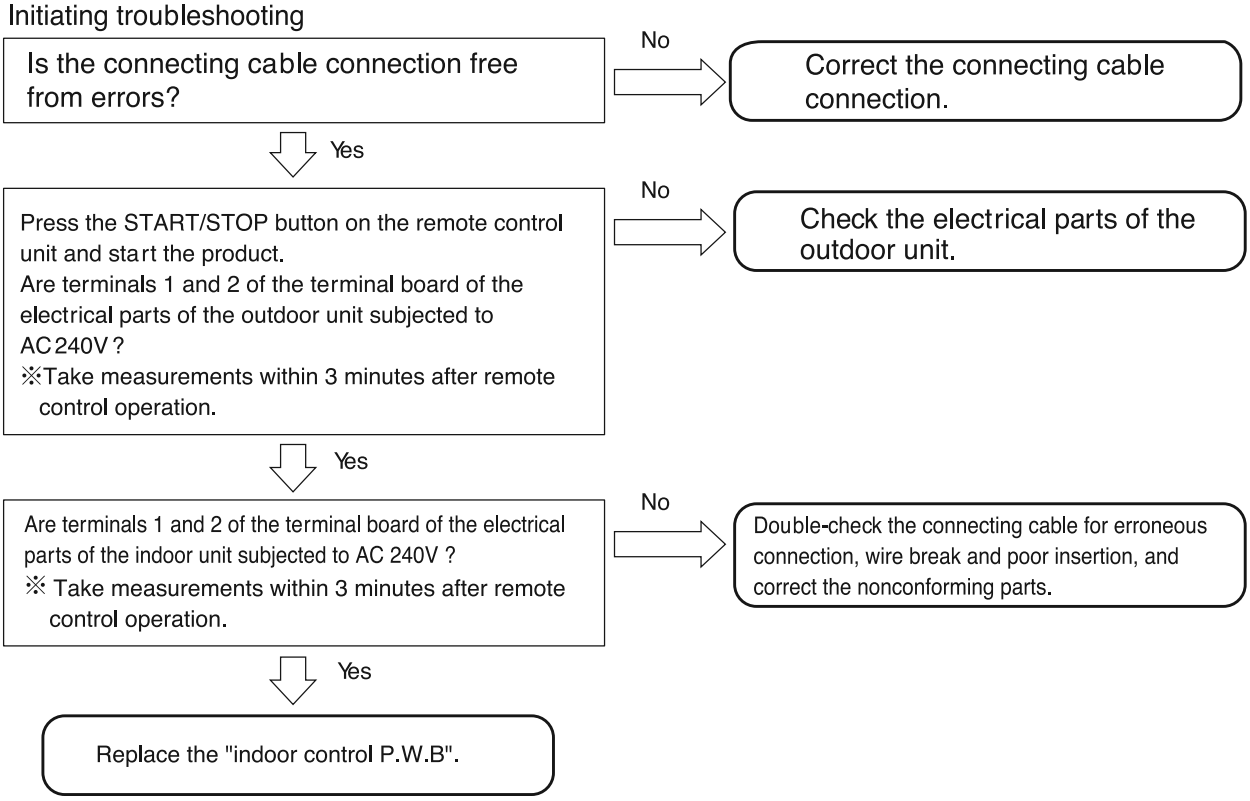
[Estimated failure locations]
- Erroneous connection in the indoor-outdoor connection line (connecting cable)
- Wire break or poor insertion of the indoor-outdoor connection line (connecting cable)
- Electrical parts in the outdoor unit (communication circuit, power circuit error)
- Communication error 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

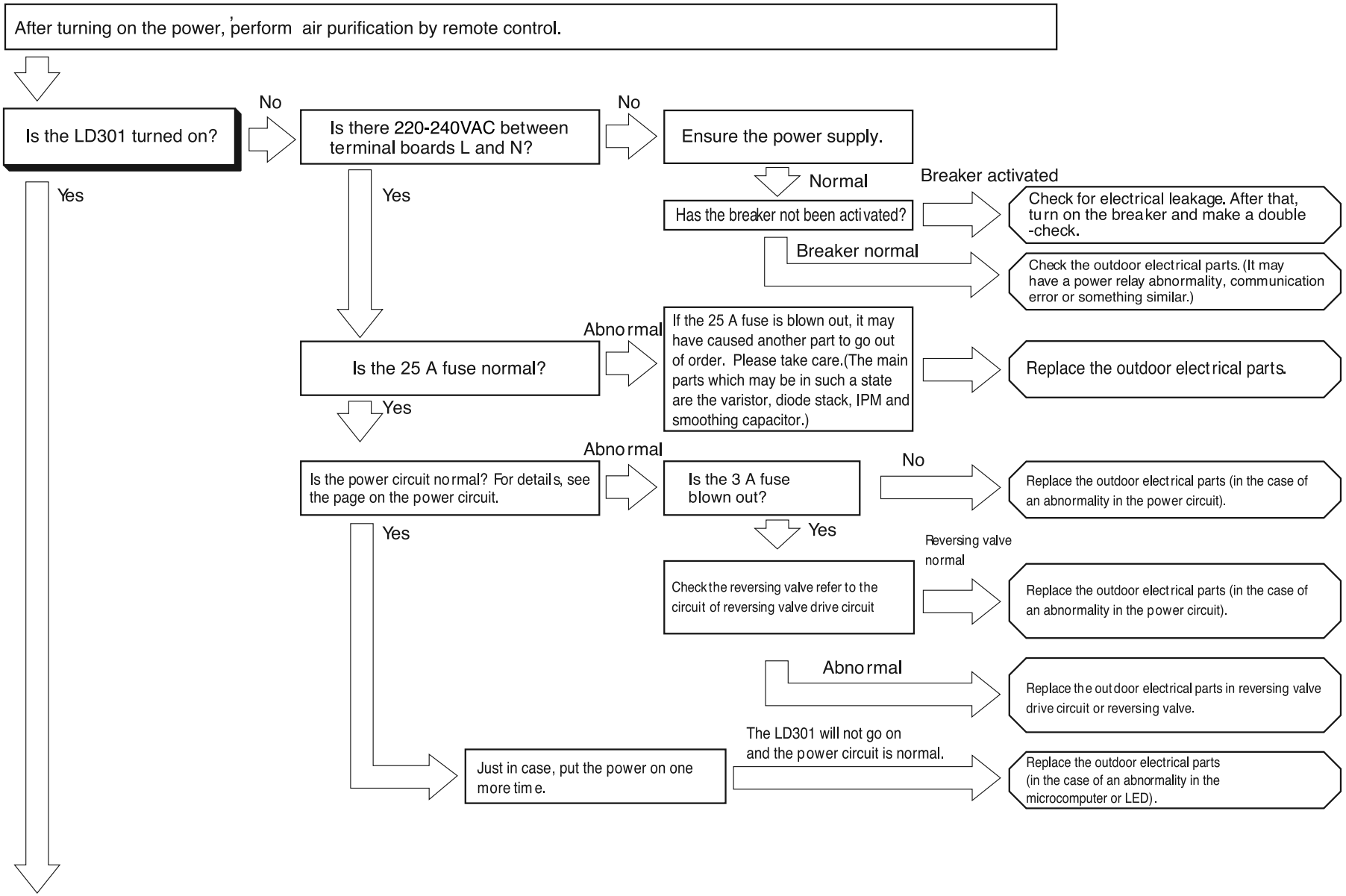
[Situation] The timer lamp blinks 13 times and the product will not run.

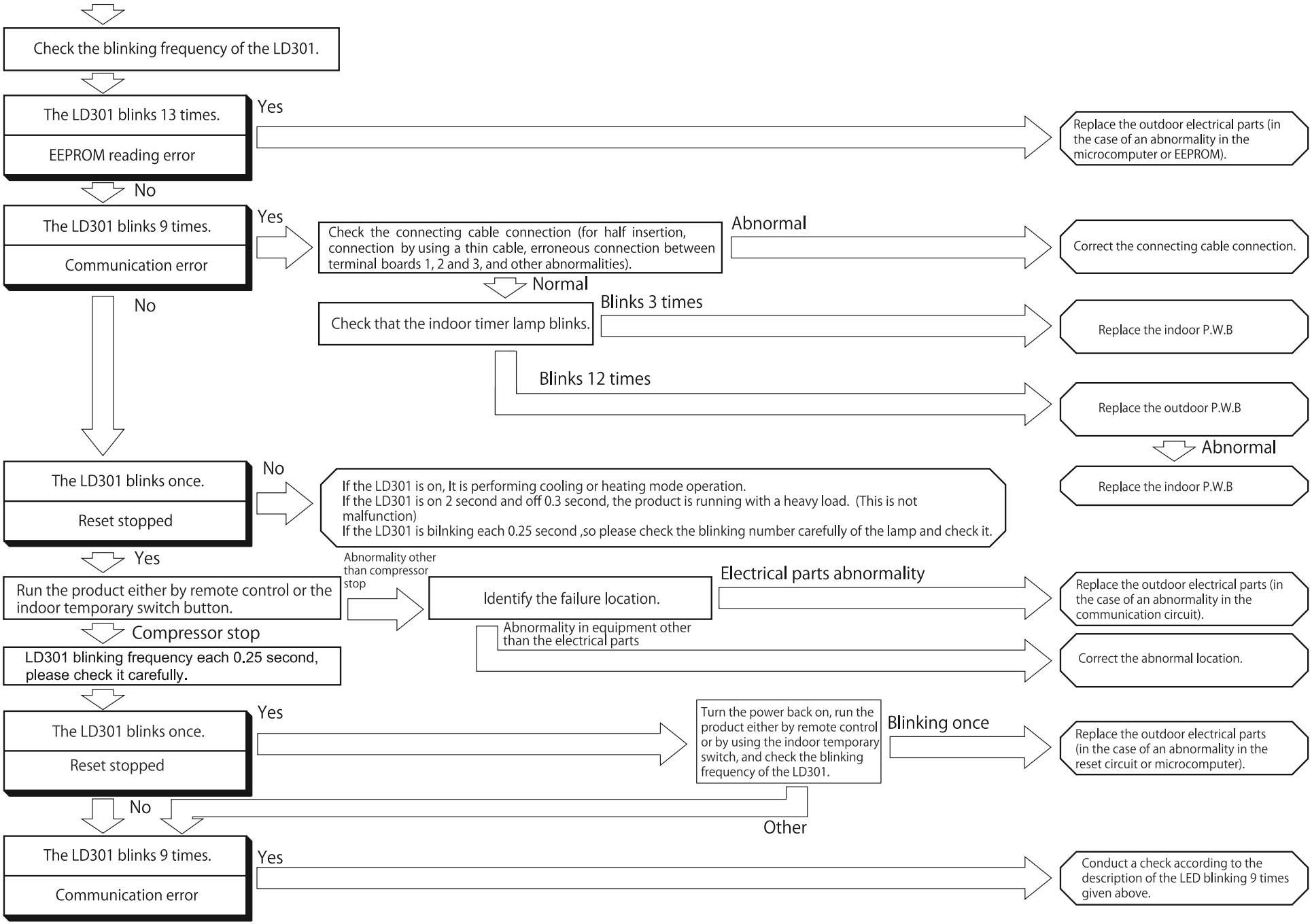
[Estimated failure location] • EEPROM, microcomputer

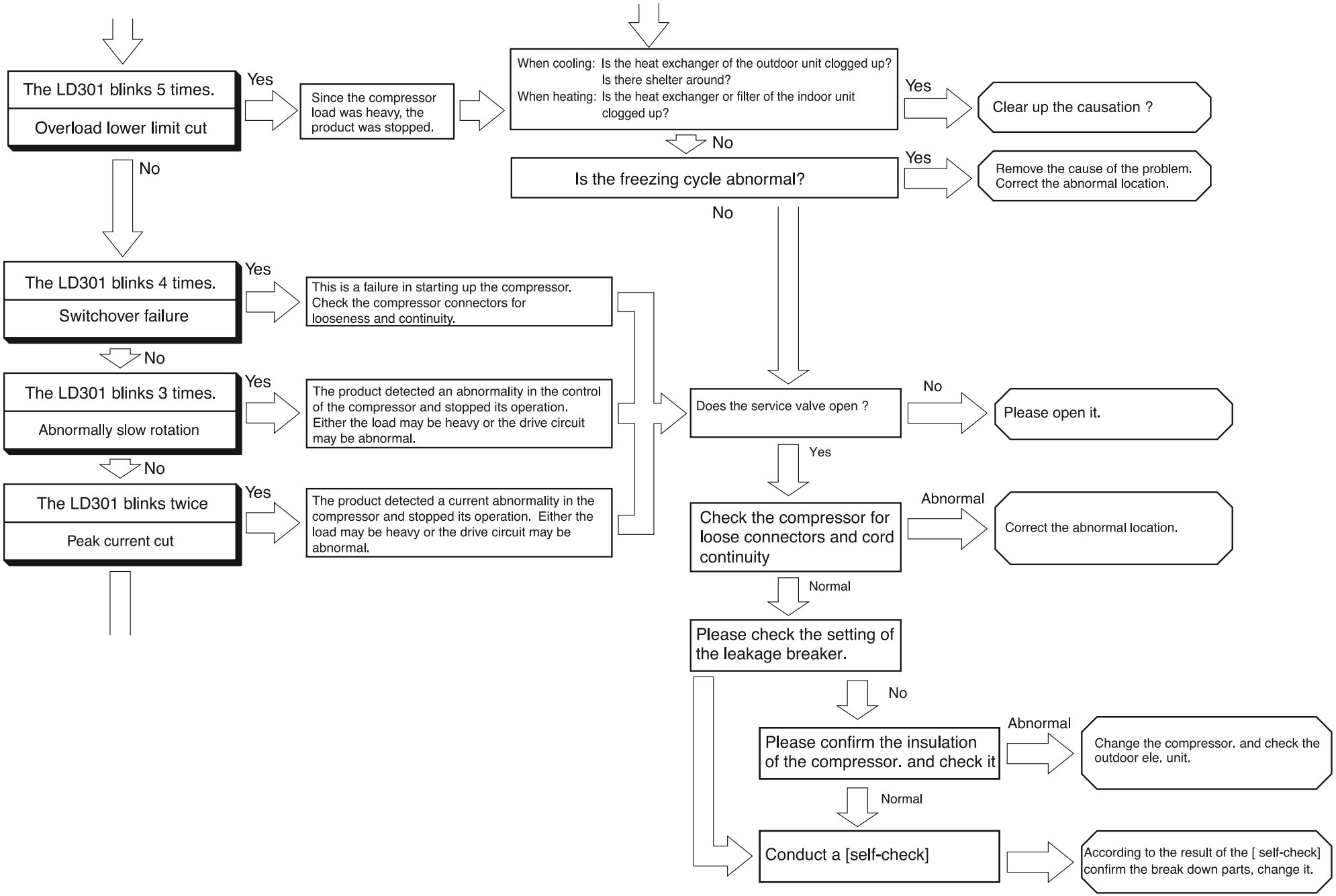
[Diagnosis flow]

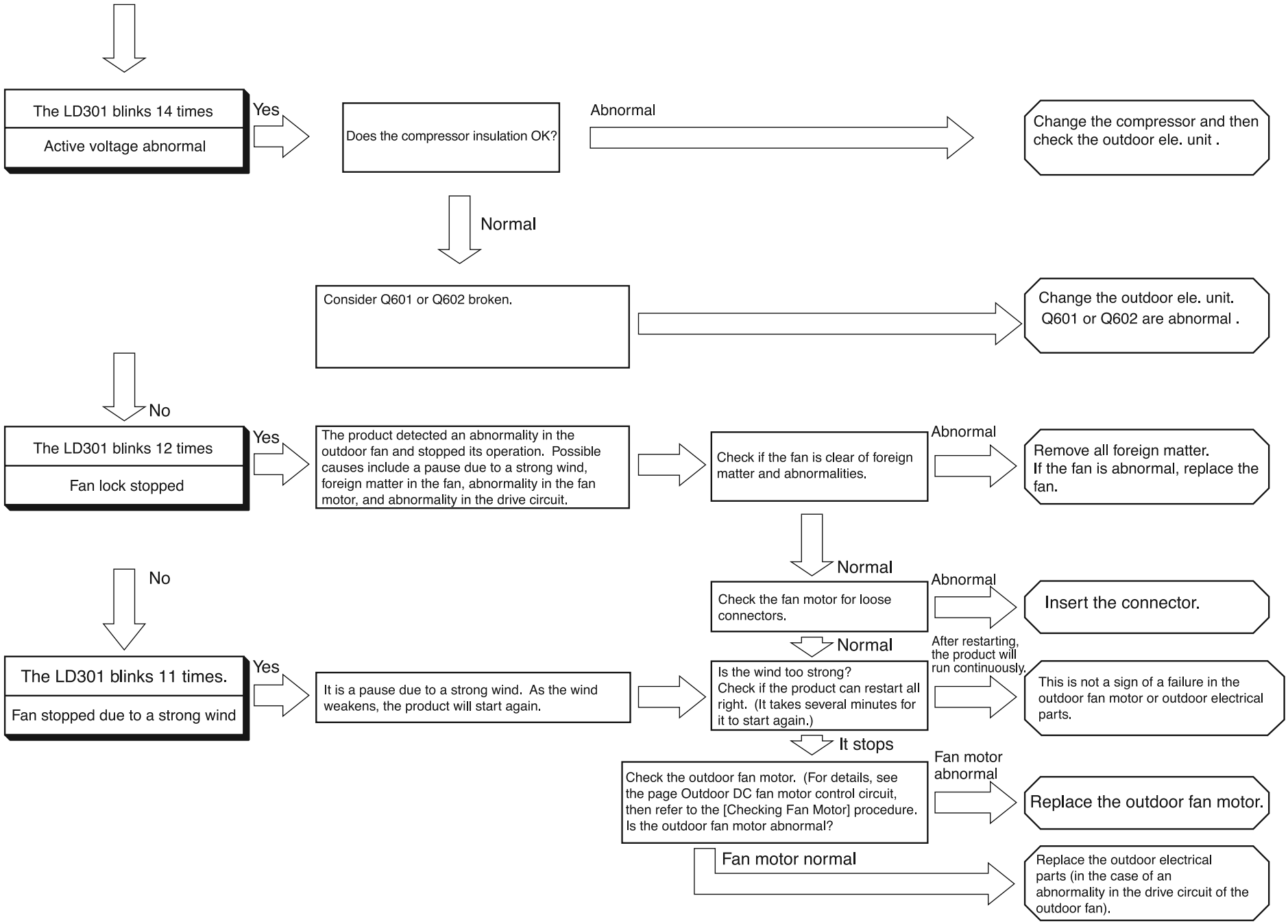
Replace the "indoor control P.W.B".

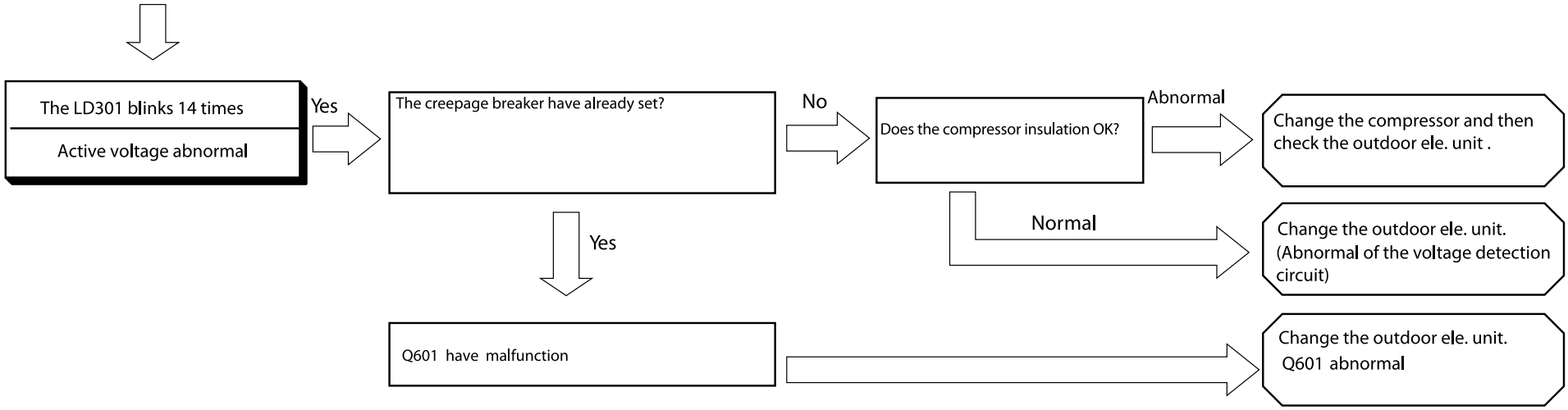
Checking the electrical parts of outdoor unit




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


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


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


The LD301 blinks 14 times
Active voltage abnormal
Yes
The creepage breaker have already set?
No
Does the compressor insulation OK?
Abnormal
Change the compressor and then check the outdoor ele. unit .
Normal
Change the outdoor ele. unit. (Abnormal of the voltage detection circuit)
Yes
Q601 have malfunction
Change the outdoor ele. unit. Q601 abnormal

CHECKING THE REMOTE CONTROLLER

Is battery polarity correct?

No

Install the battery in the correct polarity.

Yes

Is the battery weak?

Yes

Replace the battery.

No

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

Does the radio buzz noisily?

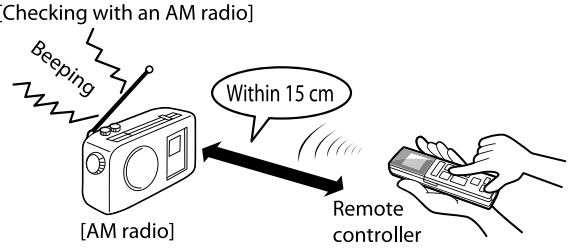
No

Check the LED (D1) with a multimeter.

Yes

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

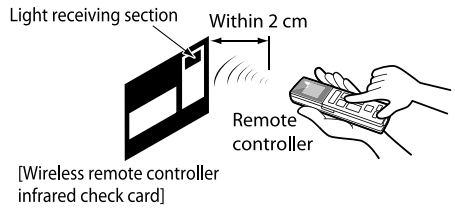
[Checking with an AM radio]



When you operate the remote controller, if it generates noise (beeping) from the radio, it is normal.

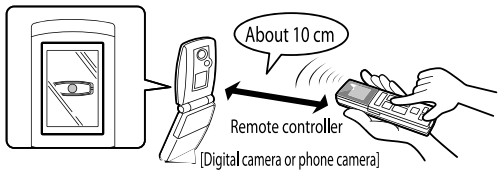
You can check the remote control switch by other methods as explained below.

[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

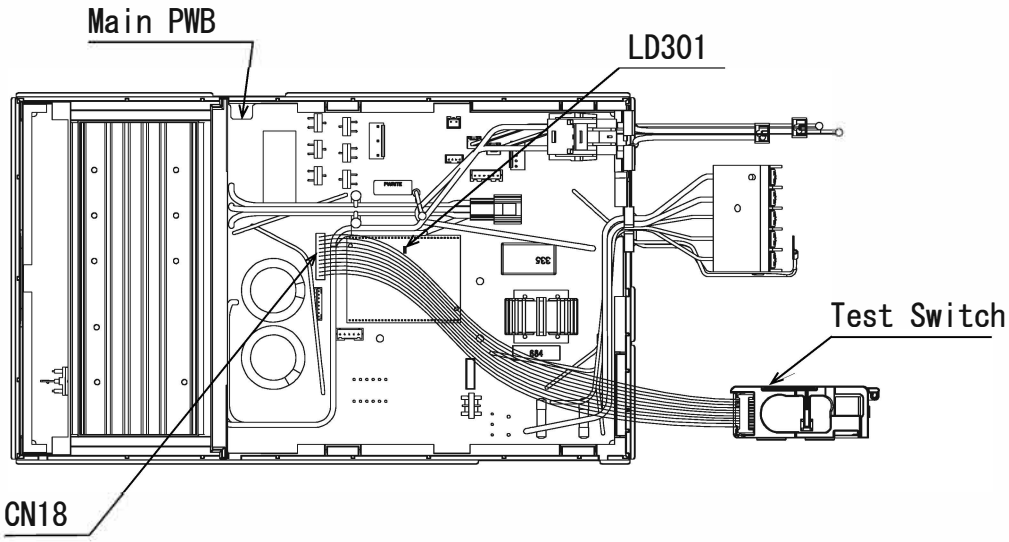
If the indoor electrical parts is out of order and if you wish to run the outdoor unit.

1. Turn OFF main power supply.
2. 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-EH18WHLAE/RAC-EH24WHLAE

Self-check

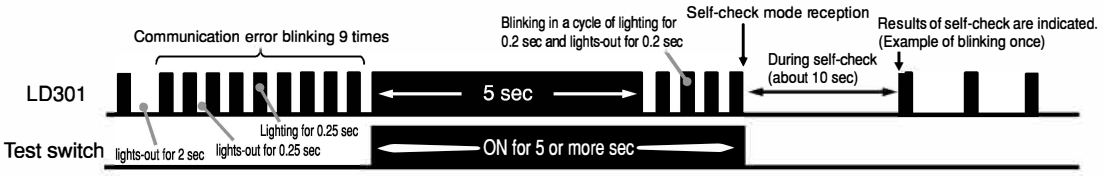
If you cannot judge if it is an abnormality on the electrical part or the compressor by the "Blinking twice, 3 times, 4 times or 5 times" of the self-diagnosis indicator, perform the megger check to check the isolation of the compressor has no problems, perform the following [self-check].
(The inverter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

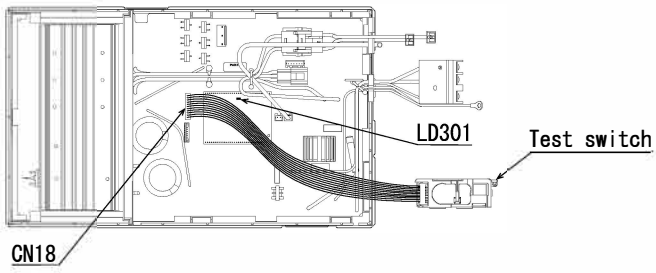


7. The result of self-check diagnosis are indicated. The contents of the result of diagnosis are shown in the table below.
8. The self-check complete.

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 ±10%). ➥Connect to proper power supply. Normal AC input power supply (inside range of rated voltage ±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

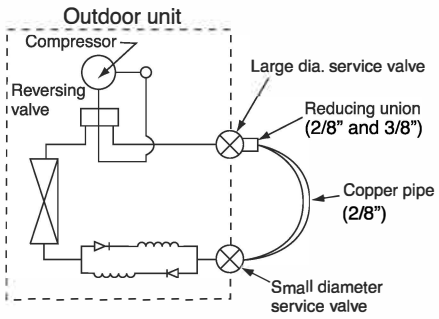
1. **Before making the connections, be sure to turn off the breaker.**
2. **Do not under any circumstances run the product for more than 5 minutes.**
3. **Doing work with the compressor connector removed will cause the LD301 to blink 4 times. It will not start.**
4. **For another test run, turn off the 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 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")

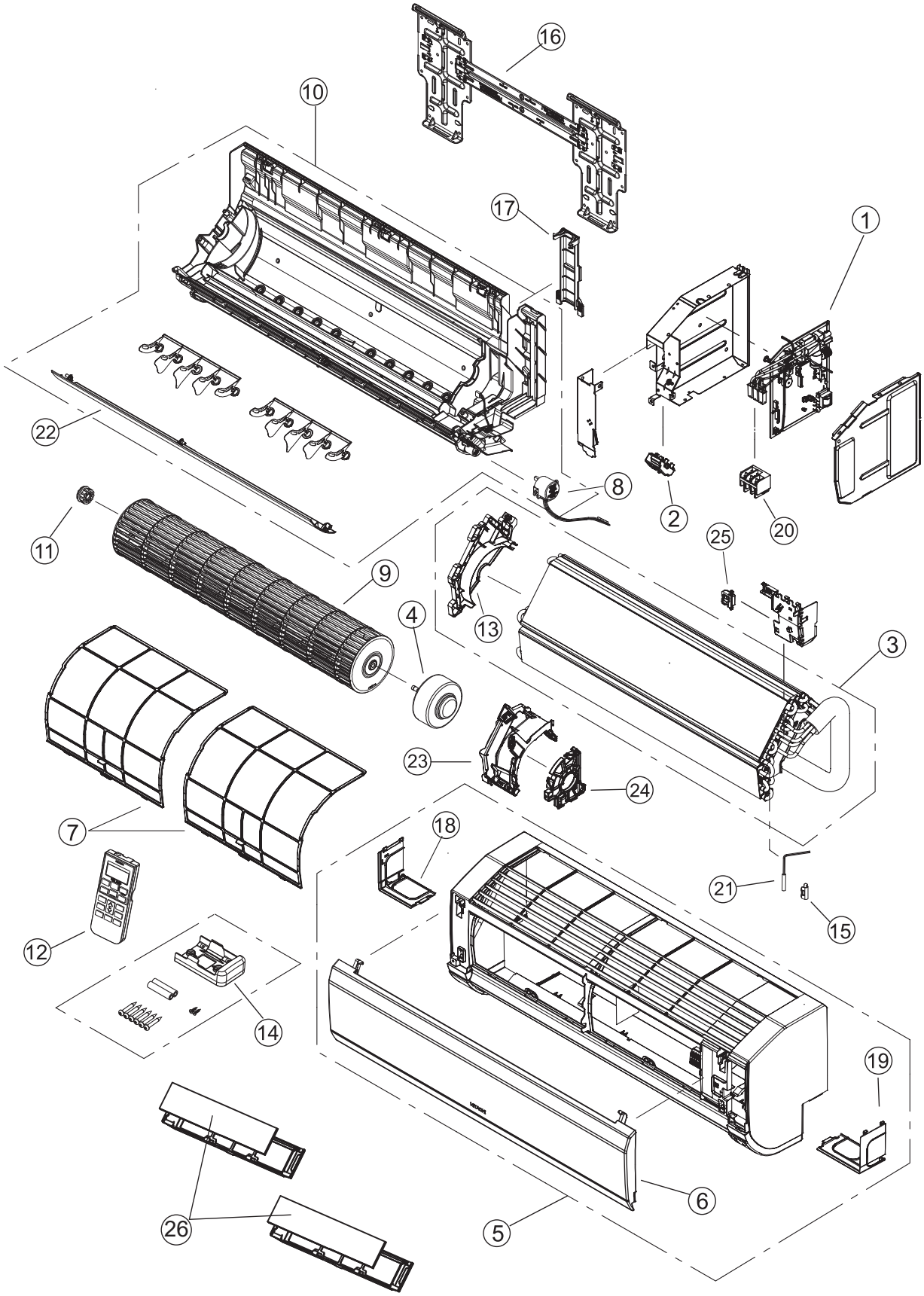
Do not operate for more than 5 minutes

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

PARTS LIST AND DIAGRAM

INDOOR UNIT

MODEL : RAS-EH18RHLAE

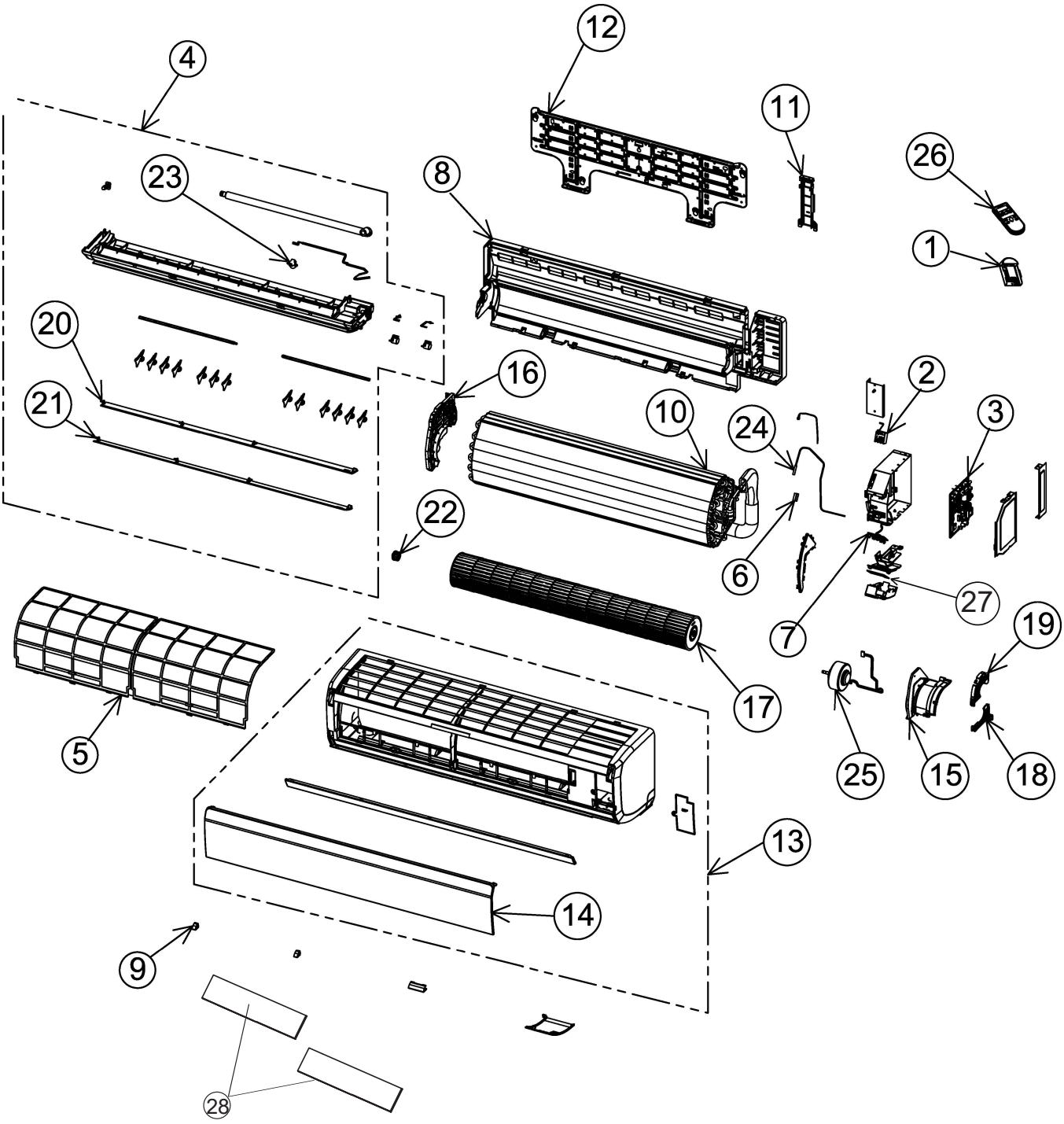


MODEL RAS-EH18RHLAE

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	PMS-EH18RHLAE	R01	1	P.W.B (MAIN) (RAS-EH18RHLAE)
2	PMS-EH09PHLAB	R02	1	P.W.B (RECEIVER)
3	PMS-EH18RHLAE	R02	1	CYCLE ASSY
4	PMS-EH09RHLAE	R02	1	FAN MOTOR
5	PMS-EH09PHLAB	R04	1	FRONT COVER ASSY
6	PMRAS-EH10CKT	R14	1	FRONT PANEL
7	PMS-EH09PHLAB	R05	2	AIR FILTER
8	PMRAS-S18CPA	R02	1	AUTO SWEEP MOTOR
9	PMRAS-EH10CKT	R06	1	TANGENTIAL FAN
10	PMS-EH09PHLAB	R06	1	CABINET
11	PMRAS-25YH4	908	1	P-BEARING ASSY
12	PMS-EH09PHLAB	R07	1	REMOTE CONTROL ASSEMBLY
13	PMRAS-EH10CKT	R19	1	BEARING COVER
14	PMRAS-VX13CET	R10	1	REMOTE CONTROL SUPPORT
15	PMRAS-10C8M	R03	1	THERMISTOR SUPPORT
16	PMRAS-EH10CKT	R07	1	MOUNTING PLATE
17	PMRAS-EH10CKT	R12	1	PIPE SUPPORT
18	PMRAS-EH10CKT	R16	1	S-COVER L
19	PMRAS-EH10CKT	R17	1	S-COVER R
20	PMRAK-50PPD	R07	1	TERMINAL BOARD (3P)
21	PMRAS-XH10CKT	R06	1	THERMISTOR
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	SENSOR ASSEMBLY
26	SPX-CFH22AC25		2	ACL-FILTER

PARTS LIST AND DIAGRAM

INDOOR UNIT
MODEL : RAS-EH24RHL AE



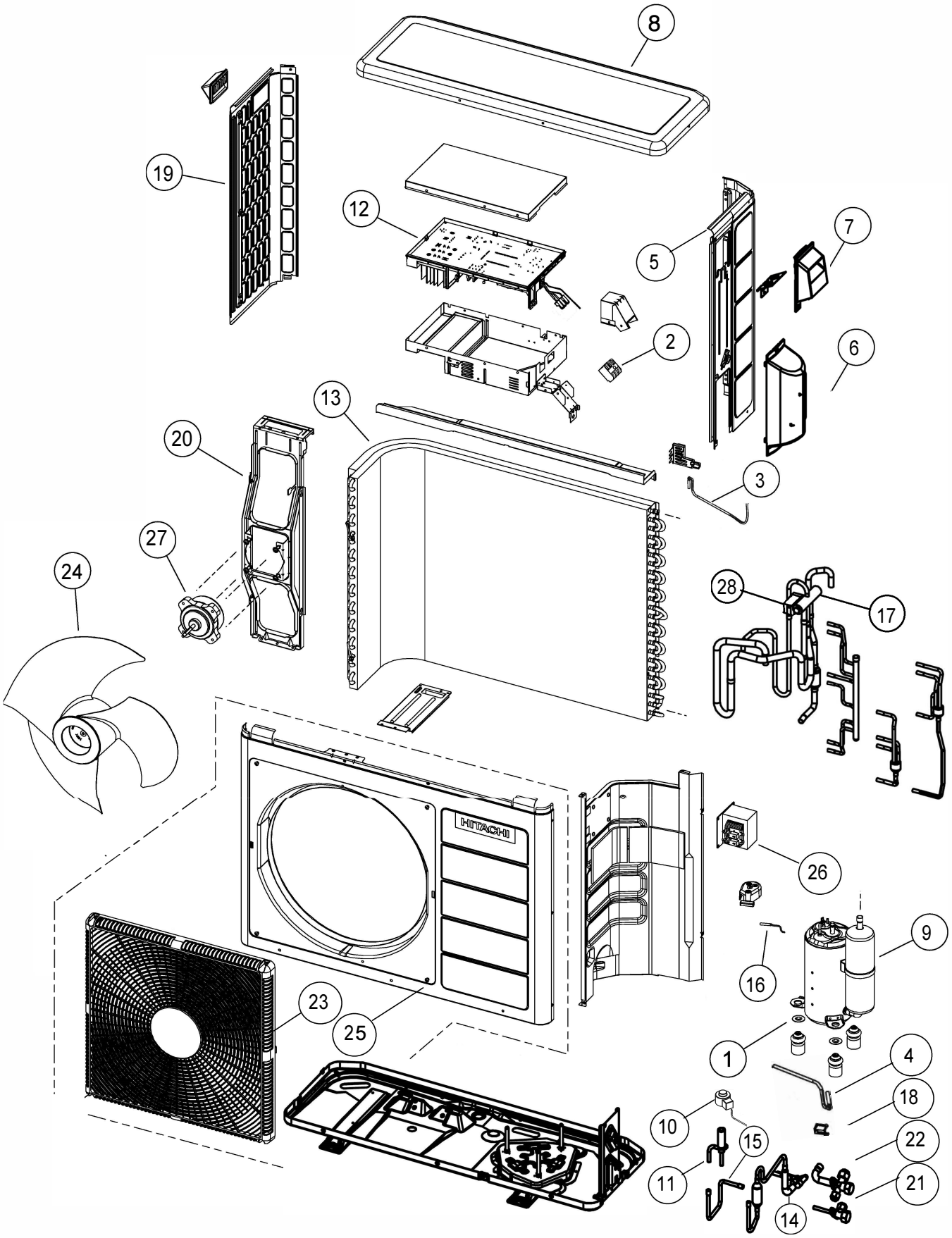
MODEL RAS-EH24RHLAE

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	PMRAS-VX13CET	R10	1	REMOTE CONTROL SUPPORT
2	PMRAK-50PPD	R07	1	TERMINAL BOARD (3P)
3	PMS-EH24RHLAE	R01	1	P.W.B (MAIN)
4	PMS-EH24RHLAE	R02	1	DRAIN PAN ASSY
5	PMS-SH18RHLAE	R03	2	FILTER
6	PMRAS-10C8M	R03	1	THERMISTOR SUPPORT
7	PMRAS-S50YHAB	R02	1	PWB RECEIVER
8	PMRAS-70YHA4	R04	1	CABINET
9	PMRAS-70YHA4	R05	1	CAP
10	PMRAS-70YHA4	R07	1	CYCLE ASSY
11	PMRAS-70YHA4	R08	1	PIPE SUPPORT
12	PMRAS-70YHA4	R09	1	MOUNTING PLATE
13	PMRAS-70YHA4	R10	1	FRONT COVER ASSY
14	PMRAS-70YHA4	R11	1	FRONT PANEL
15	PMRAS-70YHA4	R12	1	FAN MOTOR BASE
16	PMRAS-70YHA4	R13	1	BEARING COVER
17	PMRAS-X30HGT	R02	1	TANGENTIAL FLOW FAN
18	PMRAS-70YHA4	R15	1	FAN MOTOR SUPP-RS
19	PMRAS-70YHA4	R16	1	FAN MOTOR SUPP-RU
20	PMRAS-70YHA4	R17	1	H-DEFLECT 1
21	PMRAS-70YHA4	R18	1	H-DEFLECT 2
22	PMRAS-25YH4	908	1	P-BEARING ASSY
23	PMRAS-72CHA3	R01	1	AUTO SWEEP MOTOR
24	PMRAS-XH10CKT	R06	1	THERMISTOR
25	PMRAS-VX13CET	R04	1	FAN MOTOR
26	PMRAS-E25YCAB	R01	1	REMOTE CONTROL
27	PMS-EH24RHLAE	R03	1	MS-BOARD
28	SPX-CFH22AC25		2	ACL-FILTER

PARTS LIST AND DIAGRAM

OUTDOOR UNIT

MODEL: RAC-EH18WHLAE, RAC-EH24WHLAE



MODEL RAC-EH18WHLAE

NO.	PART NO.	Q'TY / UNIT	PARTS NAME
1	KPNT1 001	3	PUSH NUT
2	PMC-EH09WHLAB S03	1	TERMINAL BOARD(5P)
3	PMC-EH09WHLAB S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
4	PMC-EH09WHLAB S11	1	THERMISTOR (DEFROST)
5	PMC-EH18WHLAE S03	1	SIDE PLATE (R)
6	PMC-EH18WHLAE S05	1	SV-COVER-B
7	PMC-EH18WHLAE S06	1	SV-C0VER-T
8	PMC-EH18WHLAE S07	1	TOP COVER
9	PMC-EH18WHLAE S01	1	COMPRESSOR
10	PMRAC-25NPA S02	1	ELECTRICAL EXPANSION COIL
11	PMRAC-25NPA S03	1	EXPANSION VALVE
12	PMC-EH18WHLAE S02	1	P.W.B MAIN
13	PMRAC-50NH4 S02	1	CONDENSER
14	PMC-EH18WHLAE S04	1	STRAINER(COND)
15	PMC-EH18WHLAE S10	1	STRAINER(PIPE)
16	PMRAC-XH10CKT S09	1	THERMISTOR (OH)
17	PMC-EH24WHLAE S09	1	REVERSING VALVE
18	PMRAC-25NH4 S09	1	OVERHEAR THERMISTOR SUPPORT
19	PMRAC-40CNH2 926	1	SIDE PLATE (L)
20	PMRAC-40CNH2 S18	1	SUPPORT (FAN MOTOR)
21	PMRAC-50NH4 S03	1	VALVE 2S
22	PMRAC-50NH4 S04	1	VALVE 4S
23	PMRAC-50NPD S07	1	D-GRILL
24	PMRAC-70YHA S07	1	PROPELLER FAN
25	PMRAC-PH24CLT S01	1	CABINET
26	PMRAC-X18CD S04	1	REACTOR
27	PMRAC-XH24CKT S02	1	FAN MOTOR
28	PMRAM-33NP2B S06	1	MG-COIL(REVERSING VALVE)

MODEL RAC-EH24WHLAE

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	KPNT1	001	3	PUSH NUT
2	PMC-EH09WHLAB	S03	1	TERMINAL BOARD(5P)
3	PMC-EH09WHLAB	S10	1	THERMISTOR (OUTSIDE TEMPERATURE)
4	PMC-EH09WHLAB	S11	1	THERMISTOR (DEFROST)
5	PMC-EH18WHLAE	S03	1	SIDE PLATE (R)
6	PMC-EH18WHLAE	S05	1	SV-COVER-B
7	PMC-EH18WHLAE	S06	1	SV-C0VER-T
8	PMC-EH18WHLAE	S07	1	TOP COVER
9	PMC-EH24WHLAE	S01	1	COMPRESSOR
10	PMRAC-25NPA	S02	1	ELECTRICAL EXPANSION COIL
11	PMRAC-25NPA	S03	1	EXPANSION VALVE
12	PMC-EH24WHLAE	S04	1	P.W.B MAIN
13	PMRAC-50NH4	S02	1	CONDENSER
14	PMC-EH24WHLAE	S06	1	STRAINER(COND)
15	PMC-EH24WHLAE	S07	1	STRAINER(PIPE)
16	PMRAC-XH10CKT	S09	1	THERMISTOR (OH)
17	PMC-EH24WHLAE	S09	1	REVERSING VALVE
18	PMRAC-25NH4	S09	1	OVERHEAR THERMISTOR SUPPORT
19	PMRAC-40CNH2	926	1	SIDE PLATE (L)
20	PMRAC-40CNH2	S18	1	SUPPORT (FAN MOTOR)
21	PMRAC-50NH4	S03	1	VALVE 2S
22	PMRAC-50NH4	S04	1	VALVE 4S
23	PMRAC-50NPD	S07	1	D-GRILL
24	PMRAC-70YHA	S07	1	PROPELLER FAN
25	PMRAC-PH24CLT	S01	1	CABINET
26	PMRAC-X18CD	S04	1	REACTOR
27	PMRAC-XH24CKT	S02	1	FAN MOTOR
28	PMRAM-33NP2B	S06	1	MG-COIL(REVERSING VALVE)

HITACHI

RAS-EH18RHLAE / RAC-EH18WHLAE
RAS-EH24RHLAE / RAC-EH24WHLAE

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LIT 12013820