

# Inverter Pair B-Series

## ●Cooling Only

### Indoor Unit

FVKS50BAVMB

### Outdoor Unit

RKS50E2(3)V1B    RN50E2(3)V1B

## ●Heat Pump

### Indoor Unit

FVXS50BAVMB

### Outdoor Unit

RXS50E2(3)V1B

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# 1. Introduction

## 1.1 Safety Cautions

### Cautions and Warnings

- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into “ **Warning**” and “ **Caution**”. The “ **Warning**” items are especially important since they can lead to death or serious injury if they are not followed closely. The “ **Caution**” items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.
- About the pictograms
  - △ This symbol indicates an item for which caution must be exercised.  
The pictogram shows the item to which attention must be paid.
  - This symbol indicates a prohibited action.  
The prohibited item or action is shown inside or near the symbol.
  - This symbol indicates an action that must be taken, or an instruction.  
The instruction is shown inside or near the symbol.
- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

### 1.1.1 Caution in Repair

 <b>Warning</b>	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical shock. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas. The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work. A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

 <b>Caution</b>	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	
Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	

### 1.1.2 Cautions Regarding Products after Repair

 <b>Warning</b>	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only

 <b>Warning</b>	
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A ) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote control, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

 <b>Caution</b>	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

### 1.1.3 Inspection after Repair

 <b>Warning</b>	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	

 <b>Warning</b>	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

 <b>Caution</b>	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 Mohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

## 1.1.4 Using Icons

Icons are used to attract the attention of the reader to specific information. The meaning of each icon is described in the table below:

### 1.1.5 Using Icons List

Icon	Type of Information	Description
 Note:	Note	A “note” provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
 Caution	Caution	A “caution” is used when there is danger that the reader, through incorrect manipulation, may damage equipment, lose data, get an unexpected result or has to restart (part of) a procedure.
 Warning	Warning	A “warning” is used when there is danger of personal injury.
	Reference	A “reference” guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic.

# Part 1

# List of Functions

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# 1. List of Functions

Category	Functions	FVKS50BAVMB RXS50E2(3)V1B	FVKS50BAVMB RN50E2(3)V1B	FVXS50BAVMB RXS50E2(3)V1B	Category	Functions	FVKS50BAVMB RXS50E2(3)V1B	FVKS50BAVMB RN50E2(3)V1B	FVXS50BAVMB RXS50E2(3)V1B	
Basic Function	Inverter (with Inverter Power Control)	○	—	○	Health & Clean	Air Purifying Filter with Bacteriostatic, Virustatic Functions	○	○	○	
	Operation Limit for Cooling (°CDB)	-10 ~46 H1	-10 ~46	-10 ~46 H1		Photocatalytic Deodorizing Filter	○	○	○	
	Operation Limit for Heating (°CWB)	—	—	-15 ~18		Air Purifying Filter with Photocatalytic Deodorizing Function	—	—	—	
	PAM Control	○	○	○		Titanium Apatite Photocatalytic Air-Purifying Filter	—	—	—	
Compressor	Oval Scroll Compressor	—	—	—		Mold Proof Air Filter	○	○	○	
	Swing Compressor	○	○	○		Wipe-clean Flat Panel	—	—	—	
	Rotary Compressor	—	—	—		Mold Proof Operation	—	—	—	
	Reluctance DC Motor	○	○	○		Heating Dry Operation	—	—	—	
Comfortable Airflow	Power-Airflow Flap	—	—	—		Washable Grille	○	○	○	
	Power-Airflow Dual Flaps	—	—	—		Good-Sleep Cooling Operation	—	—	—	
	Power-Airflow Diffuser	—	—	—		Timer	24-Hour On/Off Timer	○	○	○
	Wide-Angle Louvers	○	○	○			Night Set Mode	○	○	○
	Vertical Auto-Swing (Up and Down)	○	○	○		Worry Free "Reliability & Durability"	Auto-Restart (after Power Failure)	○	○	○
	Horizontal Auto-Swing (Right and Left)	—	—	—	Self-Diagnosis (Digital, LED) Display		○	○	○	
	3-D Airflow	—	—	—	Wiring Error Check		—	—	—	
	Comfort Airflow Mode	—	—	—	Anticorrosion Treatment of Outdoor Heat Exchanger		○	○	○	
Comfort Control	3-Step Airflow (H/P Only)	—	—	○	Flexibility	Multi-Split / Split Type Compatible Indoor Unit	○	○	○	
	Auto Fan Speed	○	○	○		Flexible Voltage Correspondence	—	—	—	
	Indoor Unit Silent Operation	○	○	○		Chargeless	10m	10m	10m	
	Night Quiet Mode (Automatic)	—	—	—		Either Side Drain (Right or Left)	○	○	○	
	Outdoor Unit Silent Operation (Manual)	○	H2	○		Power Selection	—	—	—	
	Intelligent Eye	—	—	—		Remote Control	5-Rooms Centralized Controller (Option)	○	○	○
	Quick Warming Function	—	—	○			Remote Control adapter (Normal Open-Pulse Contact) (Option)	○	○	○
	Hot-Start Function	—	—	○			Remote Control adapter (Normal Open Contact) (Option)	○	○	○
Automatic Defrosting	—	—	○	DIII-NET Compatible (adapter) (Option)	○		○	○		
Operation	Automatic Operation	—	—	○	remote control	Wireless	○	○	○	
	Programme Dry Function	○	○	○		Wired	—	—	—	
	Fan Only	○	○	○						
Lifestyle Convenience	New Powerful Operation (Non-Inverter)	—	○	—						
	Inverter Powerful Operation	○	—	○						
	Priority-Room Setting	—	—	—						
	Cooling / Heating Mode Lock	—	—	—						
	Home Leave Operation	○	○	○						
	ECONO Mode	—	—	—						
	Indoor Unit On/Off Switch	○	○	○						
	Signal Reception Indicator	○	○	○						
Temperature Display	—	—	—							

**Note:** ○ : Holding Functions  
— : No Functions

★1: Lower limit can be extended to -15°C by turning switch. (facility use only)

★2: The button on the remote control does not work.

# Part 2

# Specifications

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# 1. Specifications

## 1.1 Cooling Only

50Hz 230V

Model	Indoor Units		FVKS50BAVMB		FVKS50BAVMB	
	Outdoor Units		RKSS50E2(3)V1B		RN50E2(3)V1B	
Capacity Rated (Min.~Max.)		kW	4.8 (0.9~5.3)		4.8	
		Btu/h	16,390 (3,070~18,090)		16,390	
		kcal/h	4,130 (770~4,560)		4,130	
Moisture Removal		L/h	2.9		2.9	
Running Current (Rated)		A	7.5		7.5	
Power Consumption Rated (Min.~Max.)		W	1,700 (450~2,350)		1,700	
Power Factor		%	98.6		98.6	
COP (Rated)		W/W	2.82 (2.00~2.26)		2.82	
Piping Connections	Liquid	mm	φ 6.4		φ 6.4	
	Gas	mm	φ 12.7		φ 12.7	
	Drain	mm	φ 20.0		φ 20.0	
Heat Insulation			Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Max. Interunit Piping Length		m	30		30	
Min. Interunit Piping Length		m	1.5		1.5	
Max. Interunit Height Difference		m	20		20	
Chargeless		m	10		10	
Amount of Additional Charge of Refrigerant		g/m	20		20	
<b>Indoor Unit</b>			<b>FVKS50BAVMB</b>		<b>FVKS50BAVMB</b>	
Front Panel Color			White		White	
Air Flow Rate	ml/min (cfm)	H	10.8 (381)		10.8 (381)	
		M	9.2 (325)		9.2 (325)	
		L	7.7 (272)		7.7 (272)	
		SL	6.7 (237)		6.7 (237)	
Fan	Type		Cross Flow Fan		Cross Flow Fan	
	Motor Output	W	14+14		14+14	
	Speed	Steps	5 Steps, Silent, Auto		5 Steps, Silent, Auto	
Air Direction Control			Right, Left, Horizontal, Upward		Right, Left, Horizontal, Upward	
Air Filter			Removable / Washable / Mildew Proof		Removable / Washable / Mildew Proof	
Running Current		A	0.26		0.26	
Power Consumption		W	55		55	
Power Factor		%	92.0		92.0	
Temperature Control			Microcomputer Control		Microcomputer Control	
Dimensions (H×W×D)		mm	600×650×195		600×650×195	
Packaged Dimensions (H×W×D)		mm	714×770×294		714×770×294	
Weight		kg	13		13	
Gross Weight		kg	19		19	
Operation Sound	H/M/L/SL	dB(A)	44 / 40 / 36 / 33		44 / 40 / 36 / 33	
Sound Power	H	dB(A)	56		56	
<b>Outdoor Unit</b>			<b>RKSS50E2(3)V1B</b>		<b>RN50E2(3)V1B</b>	
Casing Color			Ivory White		Ivory White	
Compressor	Type		Hermetically Sealed Swing Type		Hermetically Sealed Swing Type	
	Model		2YC36BXD#A		2YC36BXD#A	
	Motor Output	W	1,100		1,100	
Refrigerant Oil	Model		FVC50K		FVC50K	
	Charge	L	0.65		0.65	
Refrigerant	Model		R-410A		R-410A	
	Charge	kg	1.5		1.5	
Air Flow Rate	ml/min (cfm)	HH	50.9 (1,798)		50.9 (1,798)	
		H	48.9 (1,727)		48.9 (1,727)	
		L	41.7 (1,473)		41.7 (1,473)	
Fan	Type		Propeller		Propeller	
	Motor Output	W	53		53	
Running Current		A	7.24		7.24	
Power Consumption		W	1,645		1,645	
Power Factor		%	98.8		98.8	
Starting Current		A	8.22		7.5	
Dimensions (H×W×D)		mm	735×825×300		735×825×300	
Packaged Dimensions (H×W×D)		mm	797×960×390		797×960×390	
Weight		kg	47		47	
Gross Weight		kg	52		52	
Operation Sound	H/L	dB(A)	47 / 44		47 / 44	
Sound Power	H	dB(A)	61		61	
Drawing No.			3D052033		3D052034A	

**Note:** ■ The data are based on the conditions shown in the table below.

Cooling	Piping Length
Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	7.5m

■ SL : The silent fan level of the air flow rate setting.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=ml/min×35.3

# 1.2 Heat Pump

50Hz 230V

Model	Indoor Units		FVXS50BAVMB	
	Outdoor Units		RXS50E2(3)V1B	
			Cooling	Heating
Capacity Rated (Min.~Max.)	kW		4.8 (0.9~5.3)	6.0 (0.9~7.7)
	Btu/h		16,390 (3,070~18,090)	20,480 (3,070~26,290)
	kcal/h		4,130 (770~4,560)	5,160 (770~6,620)
Moisture Removal	L/h		2.9	—
Running Current (Rated)	A		7.5	8.2
Power Consumption Rated (Min.~Max.)	W		1,700 (450~2,350)	1,870 (310~2,600)
Power Factor	%		98.6	99.2
COP (Rated)	W/W		2.82 (2.00~2.26)	3.21 (2.90~2.96)
Piping Connections	Liquid	mm	φ 6.4	
	Gas	mm	φ 12.7	
	Drain	mm	φ 20.0	
Heat Insulation			Both Liquid and Gas Pipes	
Max. Interunit Piping Length	m		30	30
Min. Interunit Piping Length	m		1.5	1.5
Max. Interunit Height Difference	m		20	20
Chargeless	m		10	10
Amount of Additional Charge of Refrigerant	g/m		20	20
<b>Indoor Unit</b>			<b>FVXS50BAVMB</b>	
Front Panel Color			White	
Air Flow Rate	ml/min (cfm)	H	10.8 (381)	13.2 (466)
		M	9.2 (325)	11.3 (399)
		L	7.7 (272)	9.4 (332)
		SL	6.7 (237)	8.3 (293)
Fan	Type	Cross Flow Fan		
	Motor Output	W	14+14	
	Speed	Steps	5 Steps, Silent, Auto	
Air Direction Control			Right, Left, Horizontal, Upward	
Air Filter			Removable / Washable / Mildew Proof	
Running Current	A		0.26	0.32
Power Consumption	W		55	70
Power Factor	%		92.0	95.1
Temperature Control			Microcomputer Control	
Dimensions (H×W×D)	mm		600×650×195	
Packaged Dimensions (H×W×D)	mm		714×770×294	
Weight	kg		13	
Gross Weight	kg		19	
Operation Sound	H/M/L/SL	dBA	44 / 40 / 36 / 33	45 / 40 / 36 / 33
Sound Power	H	dBA	56	57
<b>Outdoor Unit</b>			<b>RXS50E2(3)V1B</b>	
Casing Color			Ivory White	
Compressor	Type	Hermetically Sealed Swing Type		
	Model	2YC36BXD#A		
	Motor Output	W	1,100	
Refrigerant Oil	Model	FVC50K		
	Charge	L	0.65	
Refrigerant	Model	R-410A		
	Charge	kg	1.5	
Air Flow Rate	ml/min (cfm)	HH	50.9 (1,798)	—
		H	48.9 (1,727)	45.0 (1,589)
		L	41.7(1,473)	45.0 (1,589)
Fan	Type	Propeller		
	Motor Output	W	53	
Running Current	A		7.24	7.88
Power Consumption	W		1,645	1,800
Power Factor	%		98.8	99.3
Starting Current	A		8.2	
Dimensions (H×W×D)	mm		735×825×300	
Packaged Dimensions (H×W×D)	mm		797×960×390	
Weight	kg		48	
Gross Weight	kg		53	
Operation Sound	H/L	dBA	47 / 44	48 / 45
Sound Power	H	dBA	61	62
Drawing No.			3D052035	

**Note:** ■ The data are based on the conditions shown in the table below.

Cooling	Piping Length
Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	7.5m

■ SL : The silent fan level of the air flow rate setting.

Conversion Formulae

kcal/h=kW×860  
Btu/h=kW×3414  
cfm=ml/min×35.3



# Part 3 Printed Circuit Board Connector Wiring Diagram

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# 1. Printed Circuit Board Connector Wiring Diagram

## 1.1 Indoor Unit

### Connectors

#### PCB(1) (Power Supply PCB)

- |                      |                           |
|----------------------|---------------------------|
| 1) S8, S202,<br>S204 | Connector for control PCB |
|----------------------|---------------------------|

#### PCB(2) (Control PCB)

- |                      |  |
|----------------------|--|
| 1) S6                | Connector for swing motor and lower air outlet motor       |
| 2) S21               | Connector for centralized control                          |
| 3) S23               | Connector for display PCB                                  |
| 4) S31, S32          | Connector for room temperature / heat exchanger thermistor |
| 5) S7, S201,<br>S203 | Connector for power supply PCB                             |
| 6) S25               | Connector for signal receiver PCB                          |
| 7) S301, S302        | Connector for DC fan motors                                |

#### PCB(3) (Signal Receiver PCB)

- |        |                           |
|--------|---------------------------|
| 1) S26 | Connector for control PCB |
|--------|---------------------------|

#### PCB(4) (Display PCB)

- |        |                           |
|--------|---------------------------|
| 1) S24 | Connector for control PCB |
|--------|---------------------------|



#### Note:

Other Designations

#### PCB(2) (Control PCB)

- |          |  |
|----------|--|
| 1) V1    | Varistor   |
| 2) JA    | Address setting jumper   |
| JB       | Fan speed setting when compressor is OFF on thermostat             |
| JC       | Power failure recovery function<br>* Refer to page 157 for detail. |
| 3) FU    | Fuse (3.15A)   |
| 4) LED A | LED for service monitor (green)                                    |

#### PCB(3) (Signal Receiver PCB)

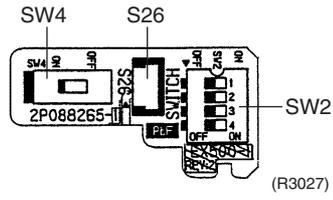
- |        |                                       |
|--------|---------------------------------------|
| 1) SW2 | Changing upward air flow limit switch |
| 2) SW4 | Discharge changeover switch           |

#### PCB(4) (Display PCB)

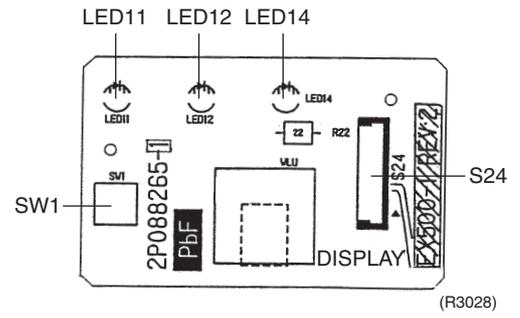
- |              |                                    |
|--------------|------------------------------------|
| 1) SW1 (S1W) | Forced operation ON/OFF switch     |
| 2) LED11     | LED for operation (green)          |
| 3) LED12     | LED for timer (yellow)             |
| 4) LED14     | LED for HOME LEAVE operation (red) |



PCB(3): Signal Receiver PCB



PCB(4): Display PCB



## 1.2 Outdoor Unit

### Connectors

#### PCB(1)(Main PCB)

- |              |  |
|--------------|--|
| 1) S10       | Connector for terminal strip (indoor-outdoor transmission)                     |
| 2) S20       | Connector for electronic expansion valve coil                                  |
| 3) S40       | Connector for overload protector   |
| 4) S51, S101 | Connector for service monitor PCB  |
| 5) S70       | Connector for fan motor  |
| 6) S80       | Connector for four way valve coil  |
| 7) S90       | Connector for thermistors<br>(outdoor air, heat exchanger, and discharge pipe) |
| 8) AC1, AC2  | Connector for terminal strip (power supply)                                    |
| 9) HR1, HR2  | Connector for reactor  |

#### PCB(2)(Service Monitor PCB)

- |              |                           |
|--------------|---------------------------|
| 1) S52, S102 | Connector for control PCB |
|--------------|---------------------------|



#### Note:

Other Designations

#### PCB(1)(Main PCB)

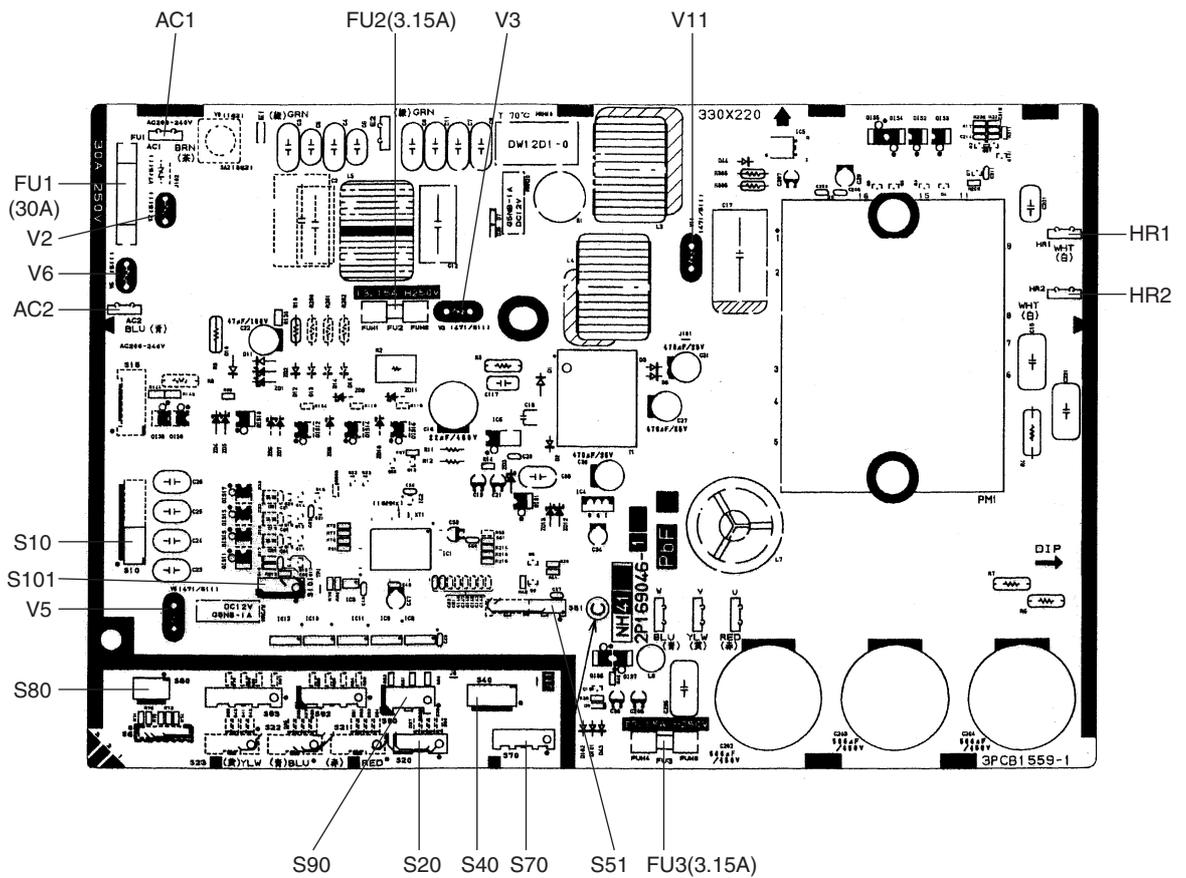
- |                          |              |
|--------------------------|--------------|
| 1) FU1                   | Fuse (30A)   |
| 2) FU2, FU3              | Fuse (3.15A) |
| 3) V2, V3, V5<br>V6, V11 | Varistor     |

#### PCB(2)(Service Monitor PCB)

- |          |                                |
|----------|--------------------------------|
| 1) LED A | Service monitor LED (green)    |
| 2) SW1   | Forced operation ON/OFF switch |
| 3) SW4   | Field setting switch           |
- \*Switch B is for the changeover of the lower limit for cooling. (OFF: -10°C, ON: -15°C)  
Refer to page 41 for detail.

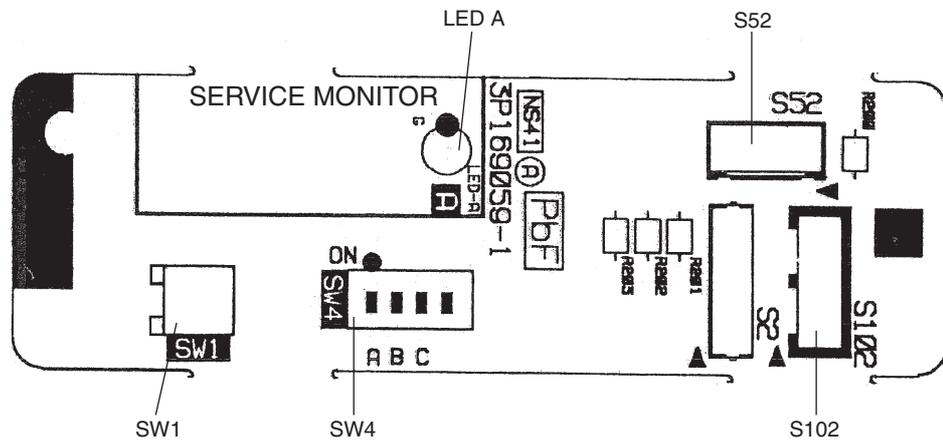
PCB Detail

PCB(1): Main PCB (outdoor unit)



(R5201)

PCB(2): Service Monitor PCB



(R5203)

# Part 4

## Function and Control

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# 1. Main Functions

**i** Note: See the list of functions for the functions applicable to different models.

## 1.1 Frequency Principle

### Main Control Parameters

The compressor is frequency-controlled during normal operation. The target frequency is set by the following 2 parameters coming from the operating indoor unit:

- The load condition of the operating indoor unit
- The difference between the room temperature and the set temperature

### Additional Control Parameters

The target frequency is adapted by additional parameters in the following cases:

- Frequency restrictions
- Initial settings
- Forced cooling operation

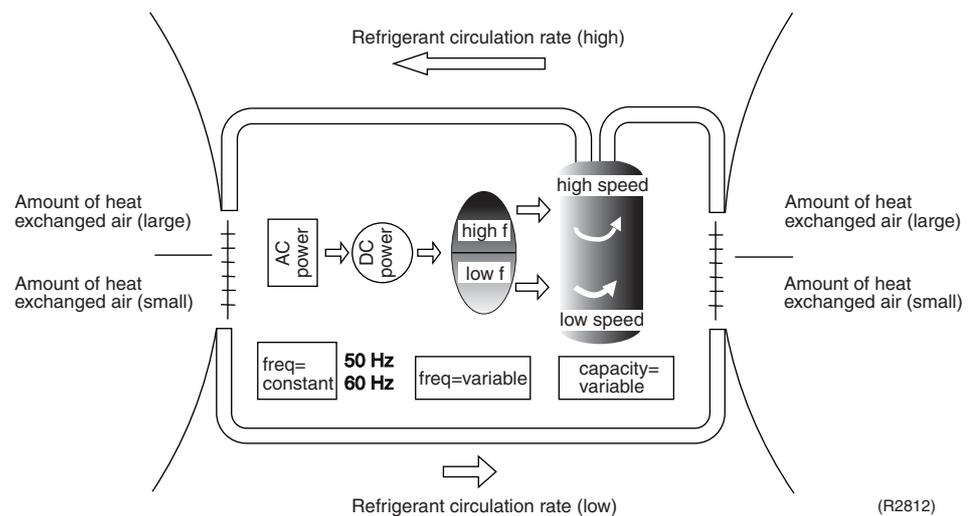
### Inverter Principle

To regulate the capacity, a frequency control is needed. The inverter makes it possible to vary the rotation speed of the compressor. The following table explains the conversion principle:

Phase	Description
1	The supplied AC power source is converted into the DC power source for the present.
2	The DC power source is reconverted into the three phase AC power source with variable frequency. <ul style="list-style-type: none"> <li>■ When the frequency increases, the rotation speed of the compressor increases resulting in an increased refrigerant circulation. This leads to a higher amount of the heat exchange per unit.</li> <li>■ When the frequency decreases, the rotation speed of the compressor decreases resulting in a decreased refrigerant circulation. This leads to a lower amount of the heat exchange per unit.</li> </ul>

### Drawing of Inverter

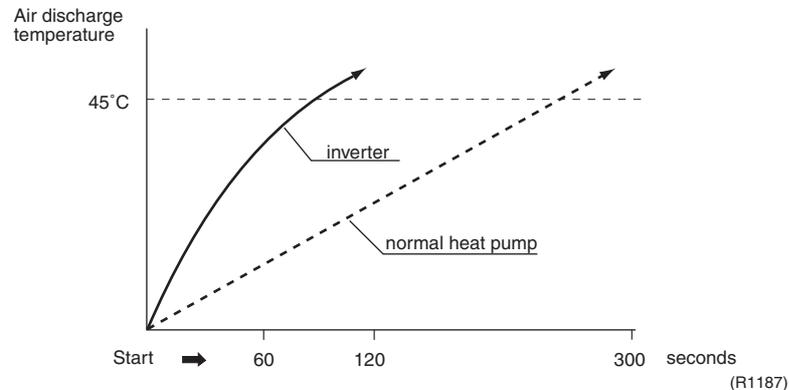
The following drawing shows a schematic view of the inverter principle:



## Inverter Features

The inverter provides the following features:

- The regulating capacity can be changed according to the changes in the outside temperature and cooling/heating load.
- Quick heating and quick cooling  
The compressor rotational speed is increased when starting the heating (or cooling). This enables a quick set temperature.



- Even during extreme cold weather, the high capacity is achieved. It is maintained even when the outside temperature is 2°C.
- Comfortable air conditioning  
A detailed adjustment is integrated to ensure a fixed room temperature. It is possible to air condition with a small room temperature variation.
- Energy saving heating and cooling  
Once the set temperature is reached, the energy saving operation enables to maintain the room temperature at low power.

## Frequency Limits

The following table shows the functions that define the minimum and maximum frequency:

Frequency limits	Limited during the activation of following functions
Low	<ul style="list-style-type: none"> <li>■ Four way valve operation compensation. Refer to page 30.</li> </ul>
High	<ul style="list-style-type: none"> <li>■ Input current control. Refer to page 32.</li> <li>■ Compressor protection function. Refer to page 31.</li> <li>■ Heating peak-cut control. Refer to page 33.</li> <li>■ Freeze-up protection control. Refer to page 33.</li> <li>■ Defrost control. Refer to page 35.</li> </ul>

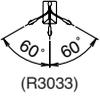
## Forced Cooling Operation

For more information, refer to "Forced operation mode" on page 40.

## 1.2 Wide Angle Louvers and Auto-Swing

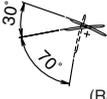
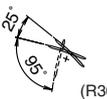
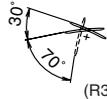
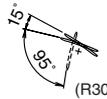
### Wide-Angle Louvers

The louvers, made of elastic synthetic resin, provide a wide range of airflow that guarantees a comfortable air distribution.

	right and left (manual)
upper air outlet	 (R3033)
lower air outlet	 (R3034)

### Auto-Swing

The following table explains the auto-swing process for heating, cooling, dry and fan :

	up and down (automatic)	
	heating	cooling/dry/fan
upward air flow limit OFF	 (R3029)	 (R3030)
upward air flow limit ON	 (R3031)	 (R3032)

# 1.3 Fan Speed Control for Indoor Units

## Control Mode

The airflow rate can be automatically controlled depending on the difference between the set temperature and the room temperature. This is done through phase control and Hall IC control.



For more information about Hall IC, refer to the troubleshooting for fan motor on page 81.

## Phase Steps

Phase control and fan speed control contains 9 steps: LLL, LL, SL, L, ML, M, MH, H and HH.

Step	Cooling	Heating	Dry mode
LLL	 (R2818)	 (R5236)	50 · 60 · 71kW class : 750 - 1000 rpm (During powerful operation : 1050 rpm)
LL			
SL (Silent)			
L			
ML			
M			
MH			
H			
HH (Powerful)			

= Within this range the airflow rate is automatically controlled when the FAN setting button is set to automatic.

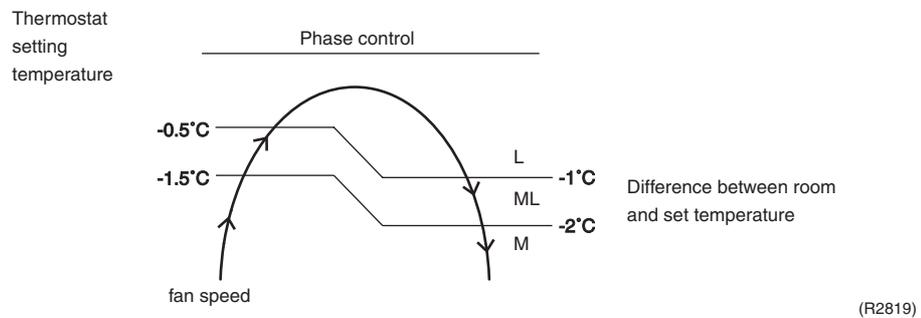


### Note:

1. During powerful operation, fan operates H tap + 50 - 90 rpm.
2. Fan stops during defrost operation.
3. In time of thermostat OFF, the fan rotates at the following speed.  
 Cooling: The fan keeps rotating at the set tap.  
 Heating: The fan keeps rotating at LLL tap.

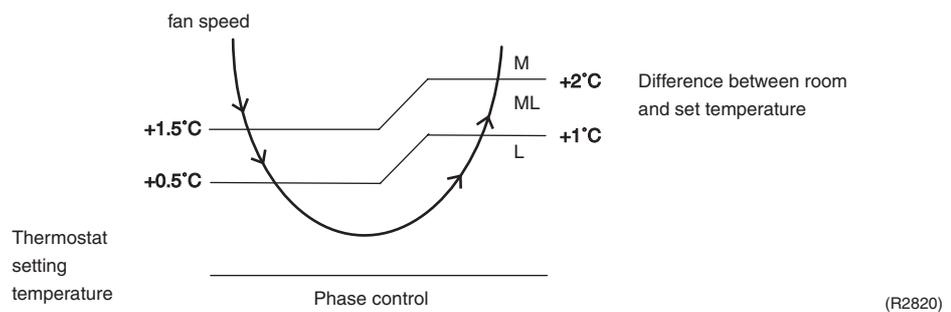
## Automatic Air Flow Control for Heating

The following drawing explains the principle for fan speed control for heating:



## Automatic Air Flow Control for Cooling

The following drawing explains the principle of fan speed control for cooling:



# 1.4 Programme Dry Function

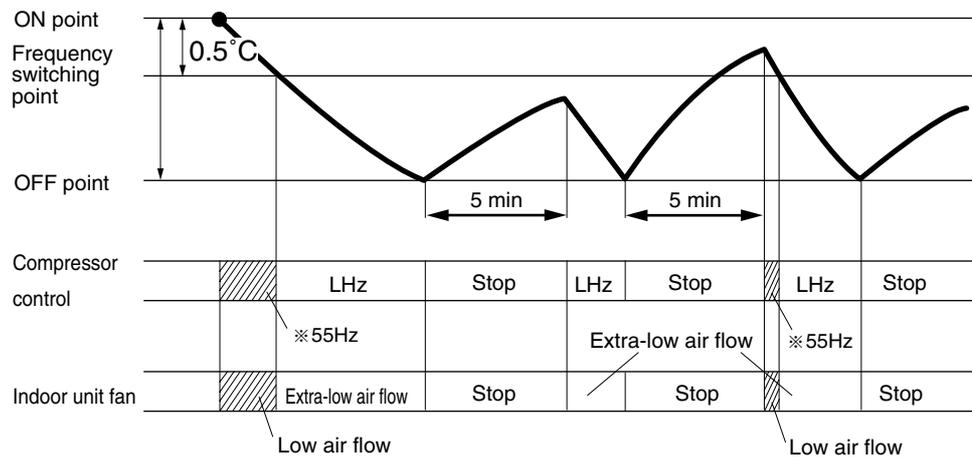
Programme dry function removes humidity while preventing the room temperature from lowering.

Since the microcomputer controls both the temperature and air flow volume, the temperature adjustment and fan adjustment buttons are inoperable in this mode.

## In Case of Inverter Units

The microcomputer automatically sets the temperature and fan settings. The difference between the room temperature at startup and the temperature set by the microcomputer is divided into two zones. Then, the unit operates in the dry mode with an appropriate capacity for each zone to maintain the temperature and humidity at a comfortable level.

Room temperature at startup	Temperature (ON point) at which operation starts	Frequency switching point	Temperature difference for operation stop
24°C	Room temperature at startup	0.5°C	1.5°C
18°C	18°C		1.0°C
17°C		—	



LHz indicates low frequency. Item marked with varies depending on models.

(R1359)

## 1.5 Automatic Operation

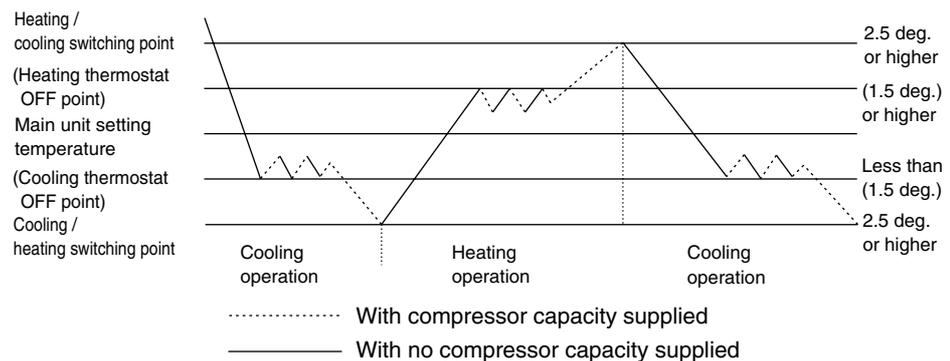
### Automatic Cooling / Heating Function (Heat Pump Only)

When the AUTO mode is selected with the remote control, the microcomputer automatically determines the operation mode from cooling and heating according to the room temperature and setting temperature at the time of the operation startup, and automatically operates in that mode.

The unit automatically switches the operation mode to cooling or heating to maintain the room temperature at the main unit setting temperature.

#### Detailed Explanation of the Function

1. Remote control setting temperature is set as automatic cooling / heating setting temperature (18 to 30°C).
2. Main unit setting temperature equals remote control setting temperature plus correction value (correction value / cooling: 0 deg, heating: 2 deg.).
3. Operation ON / OFF point and mode switching point are as follows.
  - ① Heating → Cooling switching point:  
Room temperature  $\geq$  Main unit setting temperature +2.5 deg.
  - ② Cooling → Heating switching point:  
Room temperature  $<$  Main unit setting temperature -2.5 deg.
  - ③ Thermostat ON / OFF point is the same as the ON / OFF point of cooling or heating operation.
4. During initial operation  
Room temperature  $\geq$  remote control setting temperature: Cooling operation  
Room temperature  $<$  remote control setting temperature: Heating operation



(R1360)

## 1.6 Thermostat Control

Thermostat control is based on the difference between the room temperature and the setpoint.

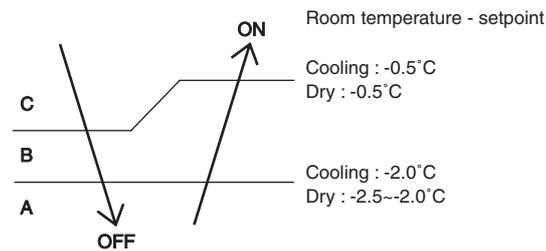
### Thermostat OFF Condition

- ◆ The temperature difference is in the zone A.

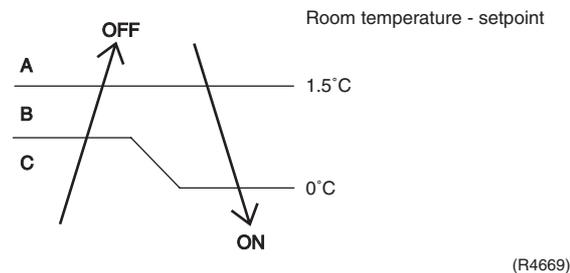
### Thermostat ON Condition

- ◆ The temperature difference is above the zone C after being in the zone A.
- ◆ The system resumes from defrost control in any zones except A.
- ◆ The operation turns on in any zones except A.
- ◆ The monitoring time has passed while the temperature difference is in the zone B.  
(Cooling / Dry : 10 minutes, Heating : 10 seconds)

### Cooling / Dry



### Heating



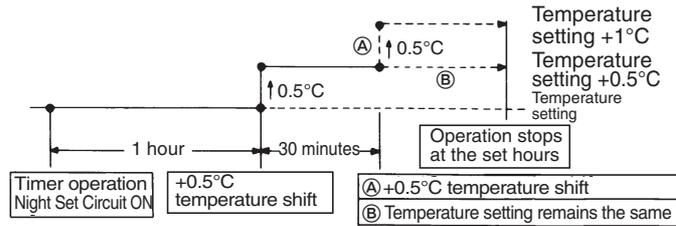
# 1.7 Night Set Mode

When the OFF timer is set, the Night Set circuit automatically activates. The Night Set circuit maintains the airflow setting made by users.

## The Night Set Circuit

The Night Set circuit continues heating or cooling the room at the set temperature for the first one hour, then automatically raises the temperature setting slightly in the case of cooling, or lowers it slightly in the case of heating, for economical operations. This prevents excessive heating in winter and excessive cooling in summer to ensure comfortable sleeping conditions, and also conserves electricity.

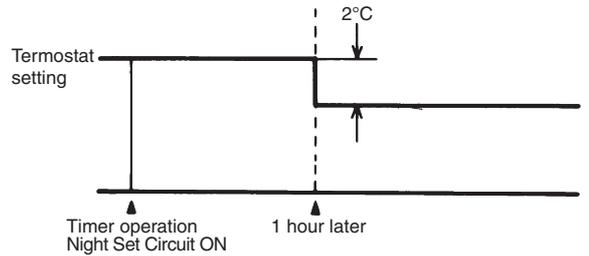
## Cooling Operation



- Ⓐ : • When outside temperature is normal and room temperature is at set temperature.
- Ⓑ : • When outside temperature is high (27°C or higher).

(R1361)

## Heating Operation



(R1362)

## 1.8 HOME LEAVE Operation

### Outline

In order to respond to the customer's need for immediate heating and cooling of the room after returning home or for house care, a measure to switch the temperature and air volume from that for normal time over to outing time by one touch is provided. (This function responds also to the need for keeping up with weak cooling or heating.)

This time, we seek for simplicity of operation by providing the special temperature and air volume control for outing to be set by the exclusive button.

### Detail of the Control

#### 1. Start of Function

The function starts when the [HOME LEAVE] button is pressed in cooling mode or heating mode (including stopping and powerful operation). If this button is pressed while the operation is stopped, the function becomes effective when the operation is started. If this button is pressed in powerful operation, the powerful operation is reset and this function becomes effective.

- The [HOME LEAVE] button is ineffective in dry mode and fan mode.

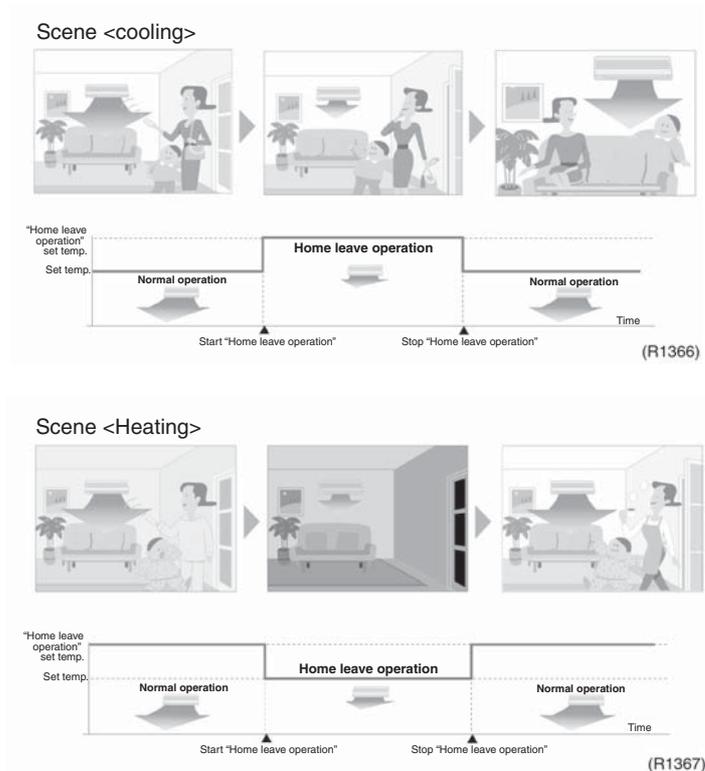
#### 2. Details of Function

A mark representing [HOME LEAVE] is indicated on the liquid crystal display of the remote control. The indoor unit is operated according to the set temperature and air volume for HOME LEAVE which were pre-set in the memory of the remote control.

The LED (Red) of indoor unit representing [HOME LEAVE] lights up. (It goes out when the operation is stopped.)

#### 3. End of Function

The function ends when the [HOME LEAVE] button is pressed again during [HOME LEAVE] operation or when the powerful operation button is pressed.



### Others

The set temperature and set air volume are memorized in the remote control. When the remote control is reset due to replacement of battery, it is necessary to set the temperature and air volume again for [HOME LEAVE].

## 1.9 Inverter POWERFUL Operation

### Outline

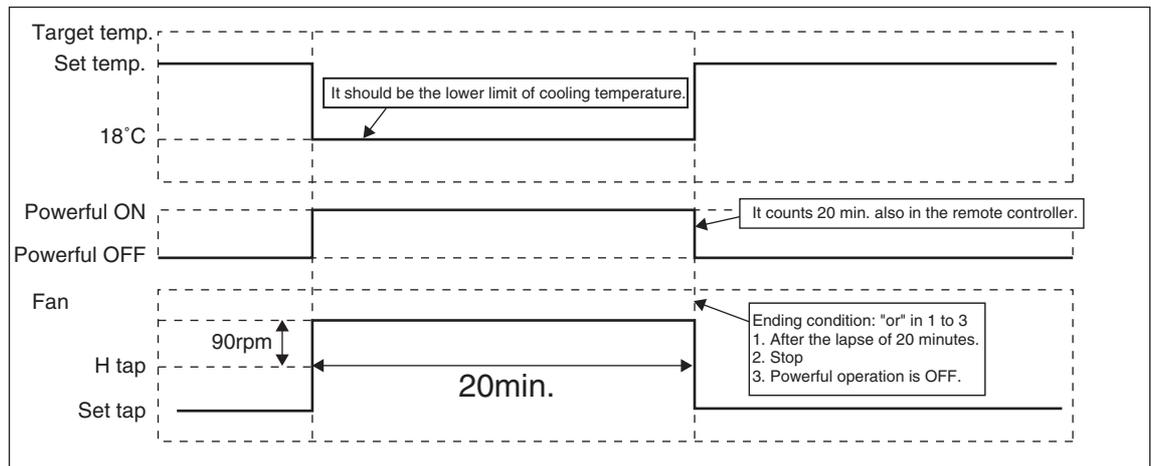
In order to exploit the cooling and heating capacity to full extent, operate the air conditioner by increasing the indoor fan rotating speed and the compressor frequency.

### Details of the Control

When POWERFUL button is pushed in each operation mode, the fan speed/setting temperature will be converted to the following states in a period of twenty minutes.

Operation mode	Fan speed	Target set temperature
Cooling	H tap + 90 rpm	18°C
Dry	Dry rotating speed + 50 rpm	Normally targeted temperature in dry operation; Approx. - 2°C
Heating	H tap + 90 rpm	30°C
Fan	H tap + 90 rpm	—
Automatic	Same as cooling / heating in Powerful operation	The target is kept unchanged

Ex.) : Powerful operation in cooling mode.



(R5166)

## 1.10 Other Functions

### 1.10.1 Hot Start Function

#### Heat Pump Only

In order to prevent the cold air blast that normally comes when heating is started, the temperature of the heat exchanger of the indoor unit is detected, and either the air flow is stopped or is made very weak thereby carrying out comfortable heating of the room.

\*The cold air blast is also prevented using a similar control when the defrosting operation is started or when the thermostat gets turned ON.

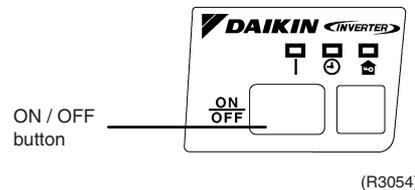
### 1.10.2 Signal Receiving Sign

When the indoor unit receives a signal from the remote control, the unit emits a signal receiving sound.

### 1.10.3 ON/OFF Button on Indoor Unit

An ON/OFF switch is provided on the front panel of the unit. Use this switch when the remote control is missing or if its battery has run out.

Every press of the switch changes from Operation to Stop or from Stop to Operation



- Push this button once to start operation. Push once again to stop it.
- This button is useful when the remote control is missing.
- The operation mode refers to the following table.

	Mode	Temperature setting	Air flow rate
Cooling Only	COOL	22şC	AUTO
Heat Pump	AUTO	25şC	AUTO

- In the case of multi system operation, there are times when the unit does not activate with this button.

### 1.10.4 Photocatalytic Deodorizing Filter

Photocatalytic Deodorizing Filter demonstrates powerful oxidation characteristics when subjected to harmless ultraviolet light. Photocatalytic deodorizing power is recovered simply by exposing the filter to the sun for 6 hours once every 6 months.

### 1.10.5 Air Purifying Filter

A double structure made up of a bacteriostatic filter and an Air-Purifying Filter traps dust, mildew, mites, tobacco smoke, and allergy-causing pollen. Replace the Air-Purifying Filter once every 3 months.

### 1.10.6 Mold Proof Air Filter

The filter net is treated with mold resisting agent TBZ (harmless, colorless, and odorless). Due to this treatment, the amount of mold growth is much smaller than that of normal filters.

### 1.10.7 Self-Diagnosis Digital Display

The microcomputer continuously monitors main operating conditions of the indoor unit, outdoor unit and the entire system. When an abnormality occur, the LCD remote control displays error code. These indications allow prompt maintenance operations.

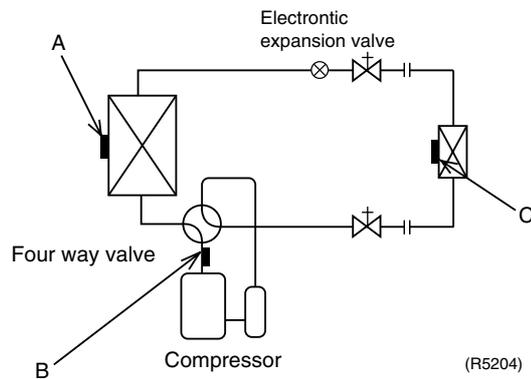
### 1.10.8 Auto-restart Function

Even if a power failure (including one for just a moment) occurs during the operation, the operation restarts in the condition before power failure automatically when power is restored.

(Note) It takes 3 minutes to restart the operation because the 3-minute standby function is activated.

## 2. Function of Thermistor

### 2.1 Heat Pump Model



#### A Outdoor Heat Exchanger Thermistor

1. The outdoor heat exchanger thermistor is used for controlling target discharge temperature. The system sets a target discharge temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. The outdoor heat exchanger thermistor is used for detecting disconnection of the discharge thermistor when cooling.  
When the discharge pipe temperature becomes lower than the outdoor heat exchanger temperature, the discharge pipe thermistor is judged as disconnected.
3. The outdoor heat exchanger thermistor is used for high pressure protection during cooling operation.

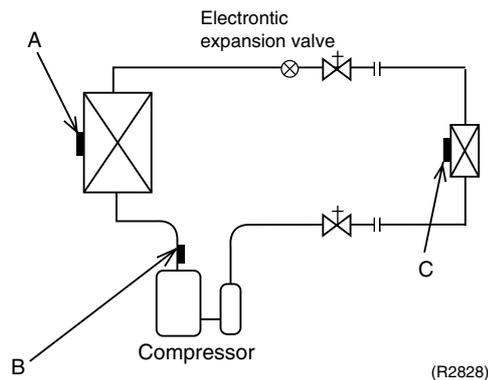
#### B Discharge Pipe Thermistor

1. The discharge pipe thermistor is used for controlling temperature of the discharge pipe. If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation halts.
2. The discharge pipe thermistor is used for detecting disconnection of the discharge thermistor.

#### C Indoor Heat Exchanger Thermistor

1. The indoor heat exchanger thermistor is used for controlling target discharge temperature. The system sets a target discharge pipe temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. The indoor heat exchanger thermistor is used for preventing freezing.  
During the cooling operation, if the temperature drops abnormally, the operating frequency becomes lower, then the operation halts.
3. During heating: the indoor heat exchanger thermistor is used for detecting disconnection of the discharge pipe thermistor.  
When the discharge pipe temperature becomes lower than the indoor heat exchanger temperature, the discharge pipe thermistor is judged as disconnected.

## 2.2 Cooling Only Model



### A Outdoor Heat Exchanger Thermistor

1. The outdoor heat exchanger thermistor is used for controlling target discharge temperature. The system sets a target discharge temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. The outdoor heat exchanger thermistor is used for detecting disconnection of the discharge thermistor when cooling.  
When the discharge pipe temperature becomes lower than the outdoor heat exchanger temperature, the discharge pipe thermistor is judged as disconnected.
3. The outdoor heat exchanger thermistor is used for high pressure protection during cooling operation.

### B Discharge Pipe Thermistor

1. The discharge pipe thermistor is used for controlling temperature of the discharge pipe. If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation halts.
2. The discharge pipe thermistor is used for detecting disconnection of the discharge thermistor.

### C Indoor Heat Exchanger Thermistor

1. The indoor heat exchanger thermistor is used for controlling target discharge temperature. The system sets a target discharge pipe temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. The indoor heat exchanger thermistor is used for preventing freezing.  
During the cooling operation, if the temperature drops abnormally, the operating frequency becomes lower, then the operation halts.

## 3. Control Specification

### 3.1 Mode Hierarchy

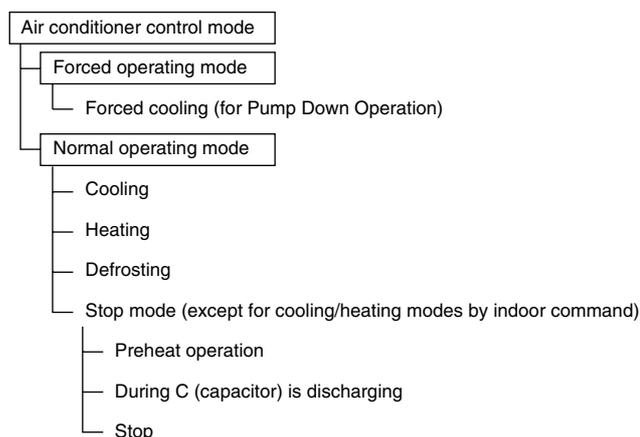
#### Outline

There are two modes; the mode selected in user's place (normal air conditioning mode) and forced operation mode for installation and providing service.

#### Detail

##### 1. For heat pump model

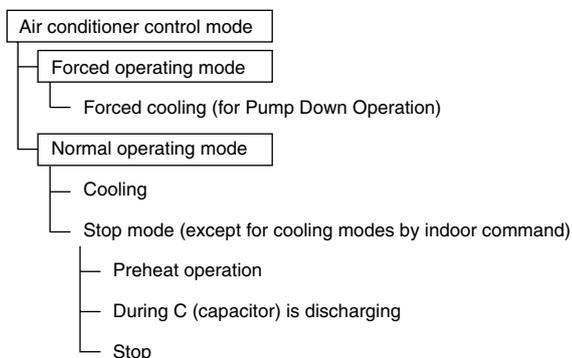
There are following modes; stop, cooling (includes drying), heating (include defrosting)



(R2829)

##### 2. For cooling only model

There are following models; stop and cooling (including drying).



(R2830)



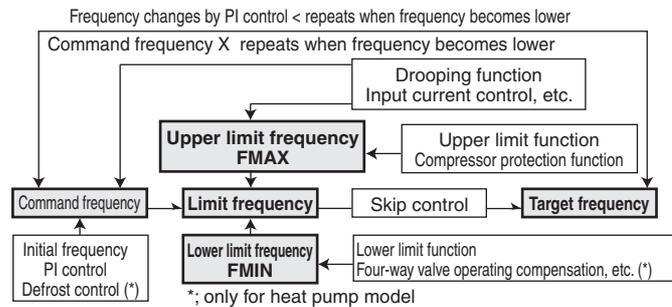
**Note:** Unless specified otherwise, an indoor dry operation command must be regarded as cooling operation.

## 3.2 Frequency Control

### Outline

Frequency will be determined according to the difference between room and set temperature. The function is explained as follows.

1. How to determine frequency.
2. Frequency command from an indoor unit. (The difference between a room temperature and the temperature set by the remote control.)
3. Frequency command from an indoor unit.
4. Frequency initial setting.
5. PI control.



(R2831)

### Detail

#### How to Determine Frequency

The compressor's frequency will finally be determined by taking the following steps.

#### For Heat Pump Model

##### 1. Determine command frequency

- ◆ Command frequency will be determined in the following order of priority.
  - 1.1 Limiting frequency by drooping function
  - ◆ Input current, discharge pipes, low Hz high pressure limit, peak cutting, freeze prevention, dew prevention, fin thermistor temperature.
  - 1.2 Limiting defrost control time
  - 1.3 Forced cooling
  - 1.4 Indoor frequency command

##### 2. Determine upper limit frequency

- ◆ Set a minimum value as an upper limit frequency among the frequency upper limits of the following functions:  
Compressor protection, input current, discharge pipes, Low Hz high pressure, peak cutting, freeze prevention, defrost.

##### 3. Determine lower limit frequency

- ◆ Set a maximum value as a lower limit frequency among the frequency lower limits of the following functions:  
Four way valve operating compensation, draft prevention, pressure difference upkeep.

##### 4. Determine prohibited frequency

- ◆ There is a certain prohibited frequency such as a power supply frequency.

#### For Cooling Only Model

##### 1. Determine command frequency

- ◆ Command frequency will be determined in the following order of priority.
  - 1.1 Limiting frequency by drooping function  
Input current, discharge pipes, freeze prevention, dew prevention, fin thermistor temperature.
  - 1.2 Indoor frequency command

**2. Determine upper limit frequency**

- ◆ Set a minimum value as an upper limit frequency among the frequency upper limits of the following functions:  
Compressor protection, input current, discharge pipes, freeze prevention, dew prevention, fin thermistor temperature.

**3. Determine lower limit frequency**

- ◆ Set a maximum value as a lower limit frequency among the frequency lower limits of the following functions:  
Pressure difference upkeep.

**4. Determine prohibited frequency**

- ◆ There is a certain prohibited frequency such as a power supply frequency.

**Indoor Frequency Command ( $\Delta D$  signal)**

The difference between a room temperature and the temperature set by the remote control will be taken as the " $\Delta D$  signal" and is used for frequency command.

Temperature difference	$\Delta D$ signal						
0	*Th OFF	2.0	4	4.0	8	6.0	C
0.5	1	2.5	5	4.5	9	6.5	D
1.0	2	3.0	6	5.0	A	7.0	E
1.5	3	3.5	7	5.5	B	7.5	F

\*Th OFF = Thermostat OFF

**Frequency Initial Setting****<Outline>**

When starting the compressor, or when conditions are varied due to the change of the room, the frequency must be initialized according to the total of a maximum  $\Delta D$  value of the indoor unit and the Q value of the indoor unit.

Q value: Indoor unit output determined from indoor unit volume, air flow rate and other factors.

**PI Control (Determine Frequency Up/Down by  $\Delta D$  Signal)****1. P control**

Calculate  $\Delta D$  value in each sampling time (20 seconds), and adjust the frequency according to its difference from the frequency previously calculated.

**2. I control**

If the operating frequency is not change more than a certain fixed time, adjust the frequency up and down according to the  $\Delta D$  value, obtaining the fixed  $\Delta D$  value.

When the  $\Delta D$  value is small...lower the frequency.

When the  $\Delta D$  value is large...increase the frequency.

**3. Limit of frequency variation width**

When the difference between input current and input current drooping value is less than 1.5 A, the frequency increase width must be limited.

**4. Frequency management when other controls are functioning**

- ◆ When frequency is drooping;  
Frequency management is carried out only when the frequency droops.
- ◆ For limiting lower limit  
Frequency management is carried out only when the frequency rises.

**5. Upper and lower limit of frequency by PI control**

The frequency upper and lower limits are set depending on indoor unit.

When low noise commands come from the indoor unit or when outdoor unit low noise or quiet commands come from indoor unit, the upper limit frequency must be lowered than the usual setting.

## 3.3 Controls at Mode Changing / Start-up

### 3.3.1 Preheating Operation

<b>Outline</b>	Operate the inverter in the open phase operation with the conditions including the outdoor air temperature, discharge pipe temperature, and fin temperature (internal temperature of PM1).
<b>Detail</b>	<p>Outside temperature <math>\geq 10^{\circ}\text{C}</math> → Control A (preheating for normal state)            Outside temperature <math>&lt; 10^{\circ}\text{C}</math> → Control B (preheating of increased capacity)</p> <p><b>Control A</b></p> <ul style="list-style-type: none"> <li>◆ ON condition               <ul style="list-style-type: none"> <li>Discharge pipe temperature <math>&lt; 6^{\circ}\text{C}</math></li> <li>Fin temperature <math>&lt; 85^{\circ}\text{C}</math></li> </ul> </li> <li>◆ OFF condition               <ul style="list-style-type: none"> <li>Discharge pipe temperature <math>&gt; 8^{\circ}\text{C}</math></li> <li>Fin temperature <math>\geq 90^{\circ}\text{C}</math></li> </ul> </li> </ul> <p><b>Control B</b></p> <ul style="list-style-type: none"> <li>◆ ON condition               <ul style="list-style-type: none"> <li>Discharge pipe temperature <math>&lt; 10.5^{\circ}\text{C}</math></li> <li>Fin temperature <math>&lt; 85^{\circ}\text{C}</math></li> </ul> </li> <li>◆ OFF condition               <ul style="list-style-type: none"> <li>Discharge pipe temperature <math>&gt; 12^{\circ}\text{C}</math></li> <li>Fin temperature <math>\geq 90^{\circ}\text{C}</math></li> </ul> </li> </ul>

### 3.3.2 Four Way Valve Switching

<b>Outline of heating operation</b>	<p><b>Heat Pump Only</b></p> <p>During the heating operation current must be conducted and during cooling and defrosting current must not be conducted. In order to eliminate the switching sound (as the four way valve coil switches from ON to OFF) when the heating is stopped, the delay switch of the four way valve must be carried out after the operation stopped.</p>
<b>Detail</b>	<p>The OFF delay of four way valve            Energize the coil for 150 sec after unit operation is stopped.</p>

### 3.3.3 Four Way Valve Operation Compensation

<b>Outline</b>	<p><b>Heat Pump Only</b></p> <p>At the beginning of the operation as the four way valve is switched, acquire the differential pressure required for activating the four way valve by having output the operating frequency, which is more than a certain fixed frequency, for a certain fixed time.</p>
<b>Detail</b>	<p><b>Starting Conditions</b></p> <ol style="list-style-type: none"> <li>1. The MRC/W turns ON when the compressor starts for heating after the MRC/W has been OFF with compressor halted.</li> <li>2. The MRC/W turns OFF when the compressor starts for cooling after the MRC/W has been ON with compressor running.</li> <li>3. The compressor starts for the first time after reset.</li> <li>4. The compressor starts after suspension caused by the trouble of cooling/heating changeover.            Set the lower limit frequency to 48 Hz for 70 seconds with any conditions 1 through 4 above.</li> </ol>

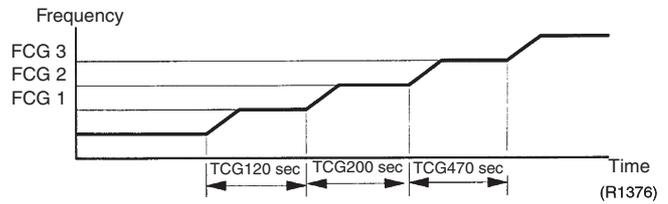
### 3.3.4 3 Minutes Stand-by

Prohibit to turn ON the compressor for 3 minutes after turning it off.  
(Except when defrosting. (Only for Heat Pump Model).)

### 3.3.5 Compressor Protection Function

When turning the compressor from OFF to ON, the upper limit of frequency must be set as follows. (The function must not be used when defrosting (only for heat pump model).)

FCG 3	85
FCG 2	70
FCG 1	55



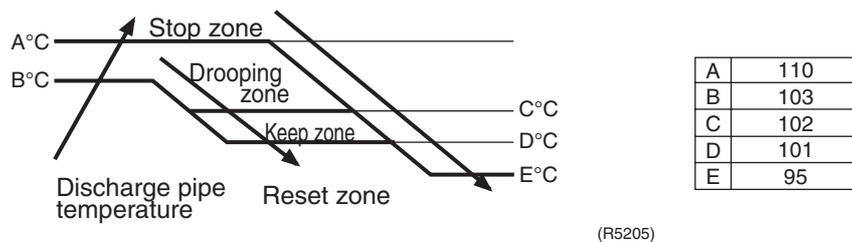
## 3.4 Discharge Pipe Temperature Control

#### Outline

The discharge pipe temperature is used as the compressor's internal temperature. If the discharge pipe temperature rises above a certain level, the operating frequency upper limit is set to keep this temperature from going up further.

#### Detail

##### Divide the Zone



##### Management within the Zones

Zone	Control contents
Stop zone	When the temperature reaches the stop zone, stop the compressor and correct abnormality.
Drooping zone	Start the timer, and the frequency will be drooping.
Keep zone	Keep the upper limit of frequency.
Reset zone	Cancel the upper limit of frequency.

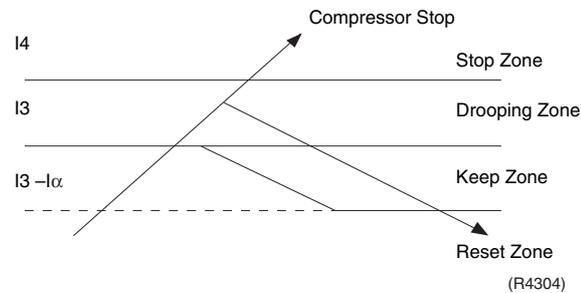
## 3.5 Input Current Control

### Outline

The microcomputer calculates the input current during the compressor is running, and set the frequency upper limit from such input current.

In case of heat pump model, this control is the upper limit control function of the frequency which takes priority of the lower limit of four way valve activating compensation.

### Detail



#### Frequency control in each zone

##### Drooping zone

- ♦ The maximum limit of the compressor frequency in this control is defined as operation frequency – 2Hz.
- ♦ After this, the output frequency is pulled down by 2Hz every second until it reaches the steady zone.

##### Keep zone

- ♦ The present maximum frequency goes on.

##### Reset zone

- ♦ Limit of the frequency is cancelled.

##### Stop zone

- ♦ After 2.5 s in this zone, the compressor is stopped.

		Cooling	Heating
		50 class	50 class
I4	(A)	20	20
I3	(A)	10.0	15.0
I3-l $\alpha$	(A)	9.0	14.0

#### Limitation of current drooping and stop value according to the outdoor air temperature

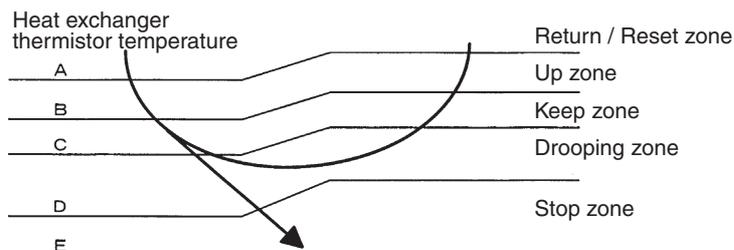
- In case the operation mode is cooling
  - ♦ The current droops when outdoor air temperature becomes higher than a certain level (model by model).
- In case the operation mode is heating (only for heat pump model)
  - ♦ The current droops when outdoor air temperature becomes higher than a certain level (model by model).

## 3.6 Freeze-up Protection Control

**Outline** During cooling operation, the signals being sent from the indoor unit allow the operating frequency limitation and then prevent freezing of the indoor heat exchanger. (The signal from the indoor unit must be divided into the zones as the followings.)

**Detail** **Conditions for Start Controlling**  
Judge the controlling start with the indoor heat exchanger temperature after 2 sec from operation start.

**Control in Each Zone**



(R5172)

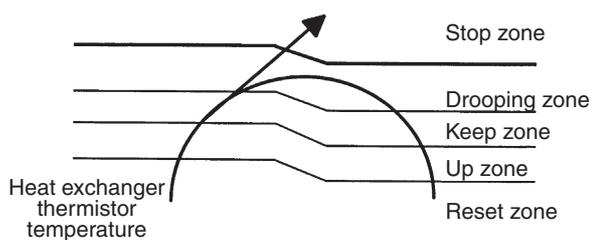
## 3.7 Heating Peak-cut Control

**Outline** **Heat Pump Only**  
During heating operation, the signals being sent from the indoor unit allow the operating frequency limitation and prevent abnormal high pressure. (The signal from the indoor unit must be divided as follows.)

**Detail** **Conditions for Start Controlling**  
Judge the controlling start with the indoor heat exchanger temperature after 5 sec from operation start.

**Control in Each Zone**

The heat exchange intermediate temperature of indoor unit controls the following.



(R5173)

## 3.8 Fan Control

---

### Outline

Fan control is carried out according to the following priority.

1. Fan ON control for electric component cooling fan
  2. Fan control when defrosting
  3. Fan OFF delay when stopped
  4. Fan control for maintaining pressure difference
  5. Fan control when the compressor starts for heating
  6. Fan control in forced operation
  7. Fan control in powerful mode
  8. Fan control in low noise operation
  9. Fan control in silent mode
- 

### Detail

#### Fan OFF Control when Stopped

- ◆ Fan OFF delay for 60 seconds must be made when the compressor is stopped.

## 3.9 Liquid Compression Protection Function 2

---

### Outline

In order to obtain the dependability of the compressor, the compressor must be stopped according to the conditions of the temperature of the outdoor air and outdoor heat exchanger.

---

### Detail

#### Heat Pump Model

- ◆ Operation stop depending on the outdoor air temperature  
Compressor operation turns OFF under the conditions that the system is in cooling operation and outdoor air temperature is below  $-10^{\circ}\text{C}$ .

#### Cooling Only Model

- ◆ Operation stops depending on the outdoor air temperature.  
Compressor operation turns OFF under the condition that outdoor air temperature is below  $-10^{\circ}\text{C}$ .

### 3.10 Low Hz High Pressure Limit

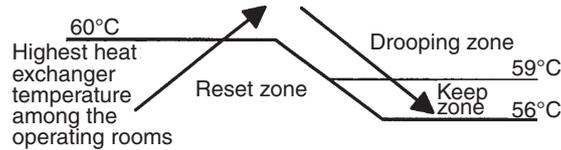
**Outline**

**Heat Pump Only**

Set the upper limit of high pressure in a low Hz zone. Set the upper limit of the indoor heat exchanger temperature by its operating frequency of Hz. Separate into three zones, reset zone, keep zone and drooping zone and the frequency control must be carried out in such zones.

**Detail**

**Separate into Zones**



(R4820)



**Note:** Drooping: The system stops after staying in the drooping zone for 2 minutes.

### 3.11 Defrost Control

**Outline**

**Heat Pump Only**

Defrosting is carried out by the cooling cycle (reverse cycle). The defrosting time or outdoor heat exchanger temperature must be more than its fixed value when finishing.

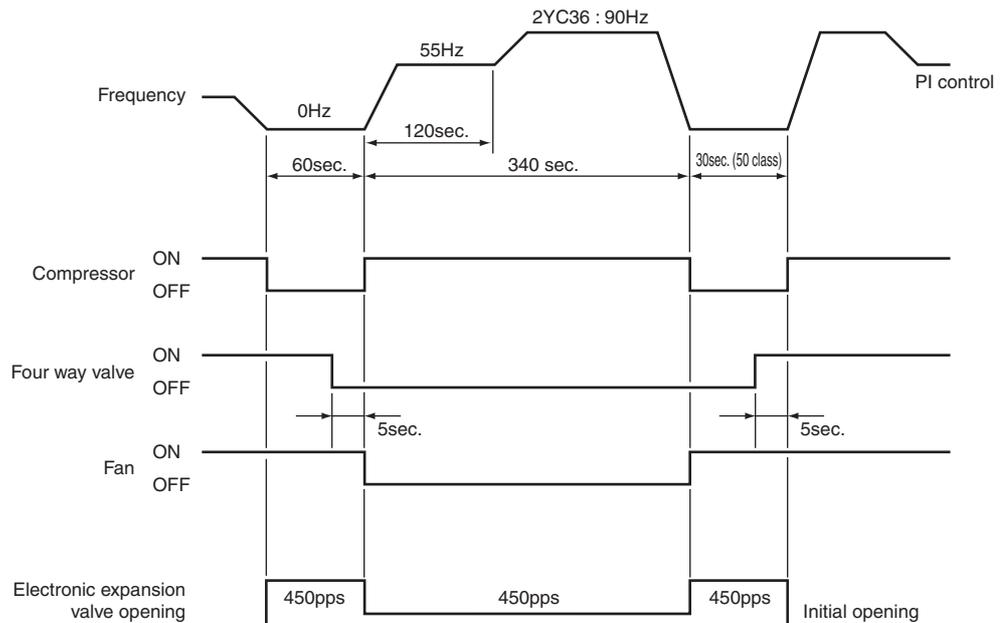
**Detail**

**Conditions for Starting Defrost**

The starting conditions must be made with the outdoor air temperature and heat exchanger temperature. Under the conditions that the system is in heating operation, 6 minutes after the compressor is started and more than 44 minutes of accumulated time pass since the start of the operation or ending the defrosting.

**Conditions for Canceling Defrost**

The judgment must be made with heat exchanger temperature. (4°C~12°C)



(R5224)

### 3.12 Electronic Expansion Valve Control

**Outline**

The following items are included in the electronic expansion valve control.

**Electronic expansion valve is fully closed**

1. Electronic expansion valve is fully closed when turning on the power.
2. Pressure equalizing control

**Open Control**

1. Electronic expansion valve control when starting operation
2. Control when frequency changed
3. Control for defrosting (only for heat pump model)
4. Control when a discharge pipe temperature is abnormally high
5. Control when the discharge pipe thermistor is disconnected

**Feedback Control**

1. Discharge pipe temperature control

**Detail**

The followings are the examples of control which function in each mode by the electronic expansion valve control.

Operation pattern		Control when frequency changed	Control for abnormally high discharge pipe temperature	
When power is turned ON	○ : function × : not function			
↓		Fully closed when power is turned ON	×	×
Cooling operation		Open control when starting	×	○
↓		(Control of target discharge pipe temperature)	○	○
Stop		Pressure equalizing control	×	×
↓		Heating operation (only for heat pump model)		
↓		Open control when starting	×	○
↓		(Control of target discharge pipe temperature)	○	○
↓		(Defrost control FD=1) (only for heat pump model)	×	×
Stop		Pressure equalizing control	×	×
↓		Heating operation (only for heat pump model)		
↓		Open control when starting	×	○
↓	Control of discharge pipe thermistor disconnection	↓	Continue	
↓	Stop	×	×	
↓	Pressure equalizing control	×	×	

(R2833)

### 3.12.1 Fully Closing with Power ON

Initialize the electronic expansion valve when turning on the power, set the opening position and develop pressure equalizing.

### 3.12.2 Pressure Equalization Control

When the compressor is stopped, open and close the electronic expansion valve and develop pressure equalization.

### 3.12.3 Opening Limit

#### Outline

Limit a maximum and minimum opening of the electronic expansion valve.

#### Detail

- ◆ A maximum electronic expansion valve opening : 480 pulses
  - ◆ A minimum electronic expansion valve opening : 54 pulses
- The electronic expansion valve is fully closed in the room where cooling is stopped and is opened with fixed opening during defrosting.

### 3.12.4 Starting Operation Control

Control the electronic expansion valve opening when the system is starting, and prevent the system to be super heated or moistened.

### 3.12.5 High Temperature of the Discharge Pipe

When the compressor is operating, if the discharge pipe temperature exceeds a certain value, open the electronic expansion valve and remove the refrigerant to the low pressure side and lower discharge temperature.

### 3.12.6 Disconnection of the Discharge Pipe Thermistor

#### Outline

Disconnection of the discharge pipe thermistor is detected by comparing the discharge pipe temperature with the heat exchanger temperature. If any is disconnected, open the electronic expansion valve according to the outdoor air temperature and the operating frequency, and operate for 9 minutes, and then stop.  
After 3 minutes of waiting, the compressor restarts and the same process is carried out again. If the disconnection is detected 4 times in succession, then the system will be down.  
When the compressor runs for 60 minutes without any error, the error counter will reset itself.

#### Detail

##### Detect Disconnection

When the 630-seconds timer for open control is over, the following adjustment must be made.

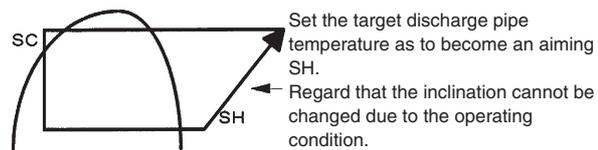
1. When the operation mode is cooling  
When the following condition is fulfilled, the discharge pipe thermistor disconnection is ascertained.  
Discharge pipe temperature  $+6^{\circ}\text{C} < \text{outdoor heat exchanger temperature}$
2. When the operation mode is heating (only for heat pump model)  
When the following condition is fulfilled, the discharge pipe thermistor disconnection is ascertained.  
Discharge pipe temperature  $+6^{\circ}\text{C} < \text{indoor heat exchanger temperature}$

### 3.12.7 Control when frequency is changed

When the target discharge pipe temperature control is active, if the target frequency is changed for a specified value in a certain time period, cancel the target discharge pipe temperature control and change the target opening of the electronic expansion valve according to the shift.

### 3.12.8 Target Discharge Pipe Temperature Control

Obtain the target discharge pipe temperature from the indoor and outdoor heat exchanger temperature, and adjust the electronic expansion valve opening so that the actual discharge pipe temperature become close to that temperature. (Indirect SH control using the discharge pipe temperature)



(R1389)

Determine a correction value of the electronic expansion valve compensation and drive it according to the deflection of the target discharge temperature and actual discharge temperature, and the discharge temperature variation by the 20 sec.

## 3.13 Malfunctions

### 3.13.1 Sensor Malfunction Detection

Sensor malfunction may occur either in the thermistor or current transformer (CT) system.

#### Relating to Thermistor Malfunction

1. Outdoor heat exchanger thermistor
2. Discharge pipe thermistor
3. Fin thermistor
4. Outside air thermistor

#### Relating to CT Malfunction

When the output frequency is more than 55 Hz and the input current is less than 0.5A, carry out abnormal adjustment.

### 3.13.2 Detection of Overload and Over Current

#### Outline

In order to protect the inverter, detect an excessive output current, and for protecting compressor, monitor the OL operation.

#### Detail

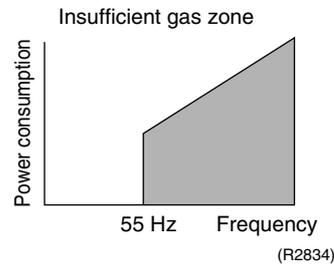
- ◆ If the OL (compressor head) temperature exceeds 120~130°C (depending on the model), the compressor gets interrupted.
- ◆ If the inverter current exceeds 30 A, the compressor gets interrupted too.

### 3.13.3 Insufficient Gas Control

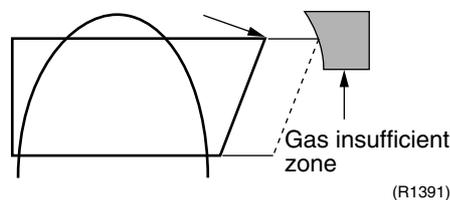
#### Outline

If a power consumption is below the specified value in which the frequency is higher than the specified frequency, it must be regarded as gas insufficient.

In addition to such conventional function, if the discharge temperature is higher than the target discharge pipe temperature, and the electronic expansion valve is fully open (450 pulses) more than the specified time, it is considered as an insufficient gas.



With the conventional function, a power consumption is weak comparing with that in the normal operation when gas is insufficient, and gas insufficiency is detected by checking a power consumption.



When operating with insufficient gas, although the rise of discharge pipe temperature is great and the electronic expansion valve is open, it is presumed as an insufficient gas if the discharge pipe temperature is higher than the target discharge pipe temperature.

**Detail****Judgment by Input Current**

When an output frequency is exceeds 55 Hz and the input current is less than specified value, the adjustment is made for insufficient gas.

**Judgment by Discharge Pipe Temperature**

When discharge pipe temperature is 20~45°C (depending on the model or mode) higher than target value and the electronic expansion valve opening is 480 plus (max.), the adjustment is made for insufficient gas.

## 3.14 Forced Operation Mode

**Outline**

Forced operating mode includes only forced cooling.

**Detail****Forced Cooling**

Item	Forced Cooling
Forced operation allowing conditions	1) The outdoor unit is not abnormal and not in the 3-minute stand-by mode.
	2) The operating mode of the outdoor unit is the stop mode.
	3) The forced operation is ON. The forced operation is allowed when the above "and" conditions are met.
Starting/adjustment	If the forced operation switch is pressed as the above conditions are met.
1) Command frequency	66Hz (cooling), 66Hz (heating)
2) Electronic expansion valve opening	It depends on the capacity of the operating indoor unit.
3) Outdoor unit adjustment	Compressor is in operation
4) Indoor unit adjustment	The command of forced operation is transmitted to the indoor unit.
End	1) When the forced operation switch is pressed again.
	2) The operation is to end automatically after 15 min.
Others	The protect functions are prior to all others in the forced operation.

## 3.15 Additional Function

### 3.15.1 POWERFUL Operation Mode

Compressor operating frequency is increased to PI Max. (Max. Hz of operating room) and outdoor unit airflow rate is increased.

### 3.15.2 Voltage Detection Function

Power supply voltage is detected each time equipment operation starts.

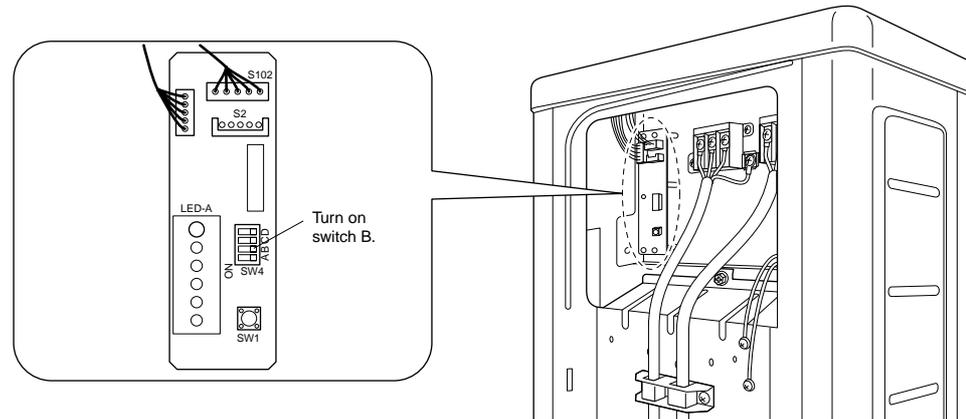
## 3.16 Facility Setting Switch (cooling at low outdoor temperature)

### Outline

This function is limited only for facilities (the target of air conditioning is equipment (such as computer)). Never use it in a residence or office (the space where there is a human).

### Detail

You can expand the operation range to  $-15^{\circ}\text{C}$  by turning on switch B (SW4) on the PCB. If the outdoor temperature falls to  $-20^{\circ}\text{C}$  or lower, the operation will stop. If the outdoor temperature rises, the operation will start again.



(R5209)



### Caution

1. If the outdoor unit is installed where the heat exchanger of the unit is exposed to direct wind, provide a windbreak wall.
2. Intermittent noises may be produced by the indoor unit due to the outdoor fan turning on and off when using facility settings.
3. Do not place humidifiers or other items which might raise the humidity in rooms where facility settings are being used.  
A humidifier might cause dew jumping from the indoor unit outlet vent.
4. Use the indoor unit at the highest level of air flow rate.



# Part 5

# System Configuration

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# 1. System Configuration

After the installation and test operation of the room air conditioner have been completed, it should be operated and handled as described below. Every user would like to know the correct method of operation of the room air conditioner, to check if it is capable of cooling (or heating) well, and to know a clever method of using it.

In order to meet this expectation of the users, giving sufficient explanations taking enough time can be said to reduce about 80% of the requests for servicing. However good the installation work is and however good the functions are, the customer may blame either the room air conditioner or its installation work because of improper handling. The installation work and handing over of the unit can only be considered to have been completed when its handling has been explained to the user without using technical terms but giving full knowledge of the equipment.

## 2. Instruction

### 2.1 Safety precautions

- Keep this manual where the operator can easily find them.
- Read this manual attentively before starting up the unit.
- For safety reason the operator must read the following cautions carefully.
- This manual classifies precautions into WARNING and CAUTION. Be sure to follow all precautions below: they are all important for ensuring safety.

 <b>WARNING</b> If you do not follow these instructions exactly, the unit may cause property damage, personal injury or loss of life.	 <b>CAUTION</b> If you do not follow these instructions exactly, the unit may cause minor or moderate property damage or personal injury.
---	---

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li> Never do.</li> <li> Be sure to earth the air conditioner.</li> <li> Never touch the air conditioner (including the remote control) with a wet hand.</li> </ul> | <ul style="list-style-type: none"> <li> Be sure to follow the instructions.</li> <li> Never cause the air conditioner (including the remote control) to get wet.</li> </ul> |
|---|---|

#### **WARNING**

- In order to avoid fire, explosion or injury, do not operate the unit when harmful, among which flammable or corrosive gases, are detected near the unit. 
- It is not good for health to expose your body to the air flow for a long time.
- Do not put 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.
- Do not attempt to repair, relocate, modify or reinstall the air conditioner by yourself. Incorrect work will cause electric shocks, fire etc.  
For repairs and reinstallation, consult your Daikin dealer for advice and information.
- The refrigerant used in the air conditioner is safe. Although leaks should not occur, if for some reason any refrigerant happens to leak into the room, make sure it does not come in contact with any flame as of gas heaters, kerosene heaters or gas range. 
- If the air conditioner is not cooling (heating) properly, the refrigerant may be leaking, so call your dealer. When carrying out repairs accompanying adding refrigerant, check the content of the repairs with our service staff.
- Do not attempt to install the air conditioner by your self. Incorrect work will result in water leakage, electric shocks or fire. For installation, consult the dealer or a qualified technician.
- In order to avoid electric shock, fire or injury, if you detect any abnormally such as smell of fire, stop the operation and turn off the breaker. And call your dealer for instructions.

#### **CAUTION**

- The air conditioner must be earthed. Incomplete earthing may result in electric shocks. Do not connect the earth line to a gas pipe, water pipe, lightning rod, or a telephone earth line. 
- In order to avoid any quality deterioration, do not use the unit for cooling precision instruments, food, plants, animals or works of art. 
- Never expose little children, plants or animals directly to the air flow.
- Do not place appliances which produce open fire in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion or deformation of the unit due to the heat.
- Do not block air inlets nor outlets. Impaired air flow may result in insufficient performance or trouble.

- Do not stand or sit on the outdoor unit. Do not place any object on the unit to avoid injury, do not remove the fan guard.
  - Do not place anything under the indoor or outdoor unit that must be kept away from moisture. In certain conditions, moisture in the air may condense and drip.
  - After a long use, check the unit stand and fittings for damage.
  - Do not touch the air inlet and aluminum fins of outdoor unit. It may cause injury.
  - The appliance is not intended for use by young children or infirm persons without supervision.
  - Young children should be supervised to ensure that they do not play with the appliance.
- 
- To avoid oxygen deficiency, ventilate the room sufficiently if equipment with burner is used together with the air conditioner. 
  - Before cleaning, be sure to stop the operation, turn the breaker off or pull out the supply cord.
  - Do not connect the air conditioner to a power supply different from the one as specified. It may cause trouble or fire.
  - Depending on the environment, an earth leakage breaker must be installed. Lack of an earth leakage breaker may result in electric shocks.
  - Do not place objects in direct proximity of the outdoor unit and do not let leaves and other debris accumulate around the unit.  
Leaves are a hotbed for small animals which can enter the unit. Once in the unit, such animals can cause malfunctions, smoke or fire when making contact with electrical parts.
  - Arrange the drain hose to ensure smooth drainage. Incomplete draining may cause wetting of the building, furniture etc.
- 
- Do not operate the air conditioner with wet hands. 
- 
- Do not wash the indoor unit with excessive water, only use a slightly wet cloth. 
  - Do not place things such as vessels containing water or anything else on top of the unit. Water may penetrate into the unit and degrade electrical insulations, resulting in an electric shock.
- 

## Installation site

- To install the air conditioner in the following types of environments, consult the dealer.
  - Places with an oily ambient or where steam or soot occurs.
  - Salty environment such as coastal areas.
  - Places where sulfide gas occurs such as hot springs.
  - Places where snow may block the outdoor unit.

The drain from the outdoor unit must be discharged to a place of good drainage.

## Consider nuisance to your neighbours from noises

- For installation, choose a place as described below.
  - A place solid enough to bear the weight of the unit which does not amplify the operation noise or vibration.
  - A place from where the air discharged from the outdoor unit or the operation noise will not annoy your neighbours.

## Electrical work

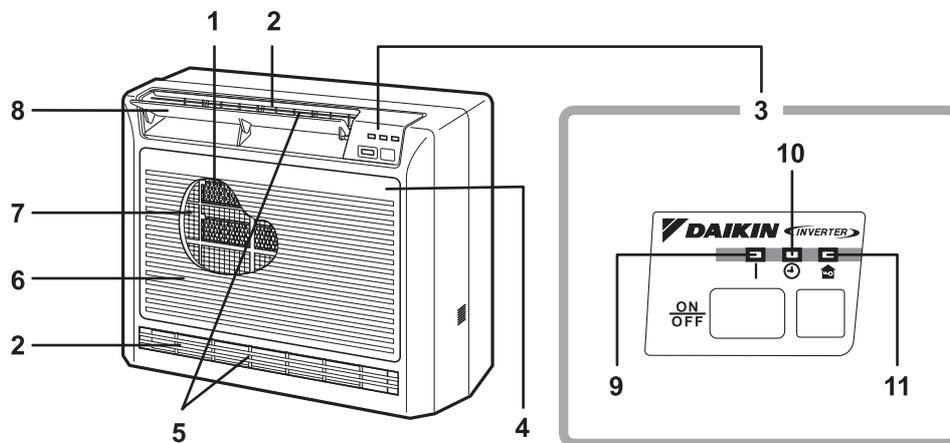
- For power supply, be sure to use a separate power circuit dedicated to the air conditioner.

## System relocation

- Relocating the air conditioner requires specialized knowledge and skills. Please consult the dealer if relocation is necessary for moving or remodeling

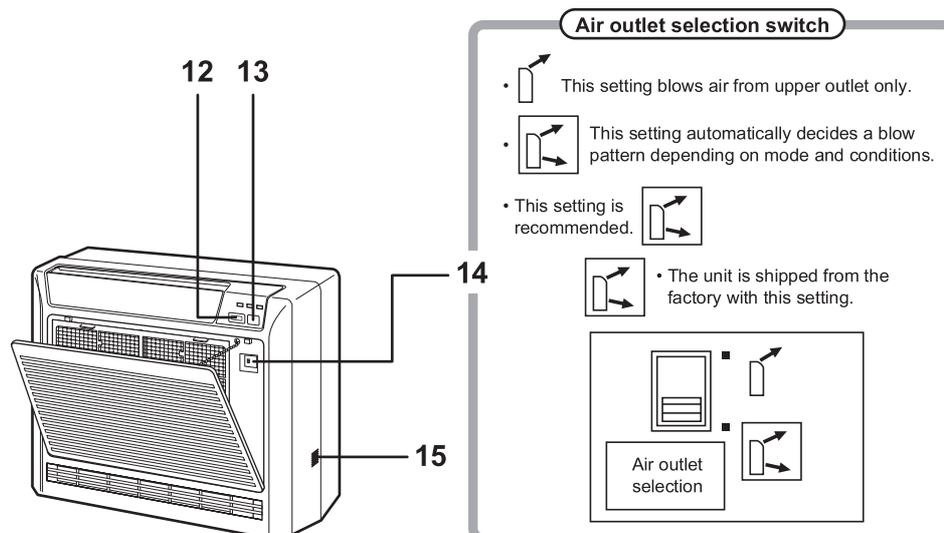
## 2.2 Names of Parts

### ■ Indoor Unit



### ■ Opening the front panel

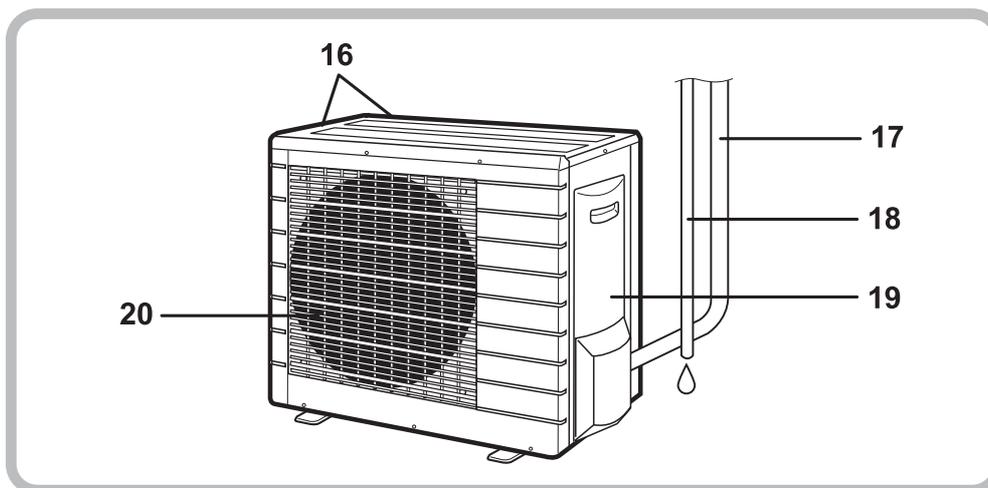
How to open the front panel: (page 63).



### ⚠ CAUTION

- Before opening the front panel, be sure to stop the operation and turn the breaker OFF. Do not touch the metal parts on the inside of the indoor unit, as it may result in injury.

## ■ Outdoor Unit



### ■ Indoor Unit

1. **Photocatalytic deodorizing filter and Air purifying filter:**
  - These filters are attached to the inside of the air filters.
2. **Air outlet**
3. **Display**
4. **Front panel**
5. **Louvers (vertical blades) :** (page 55.)
  - The louvers are inside of the air outlet.
6. **Air inlet**
7. **Air filter**
8. **Flap (horizontal blade):** (page 55.)
9. **Operation lamp (green)**
10. **TIMER lamp (yellow):** (page 61)
11. **HOME LEAVE lamp (red):** (page 61)
12. **Indoor Unit ON/OFF switch:**
  - Push this switch once to start operation. Push once again to stop it.

- The operation mode refers to the following table.

	Mode	Temperature setting	Air flow rate
FDKS	COOL	22°C	AUTO
FDXS	AUTO	25°C	AUTO

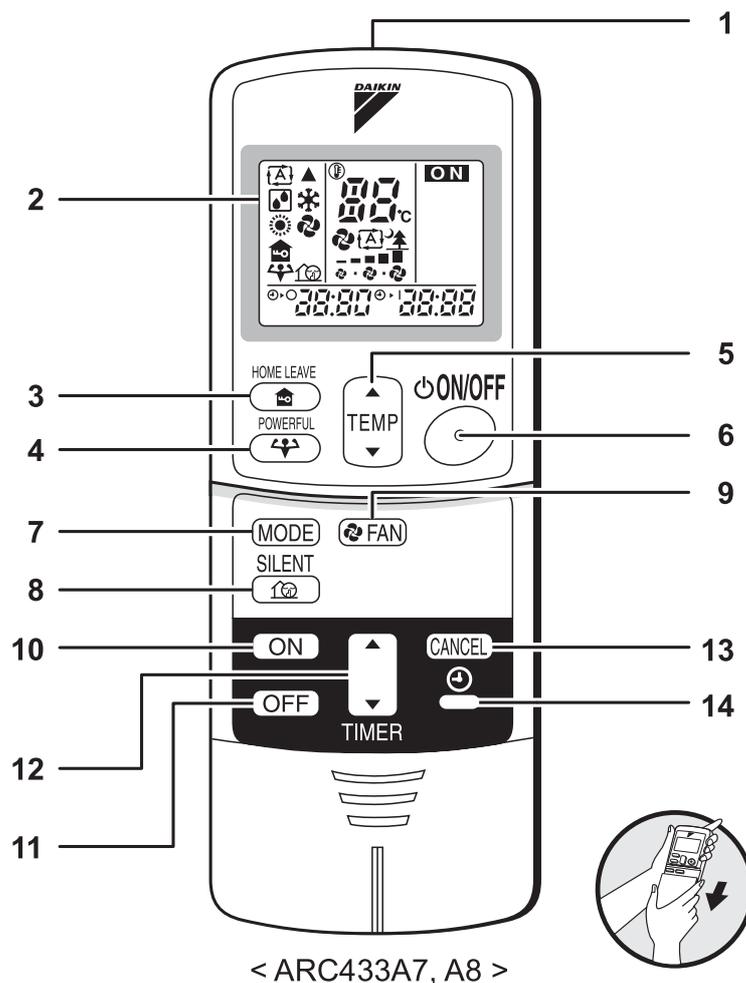
- This switch is useful when the remote control is missing.
- 13. Signal receiver:**
- Signals are received from the remote control.
  - When the unit receives a signal, you will hear a short beep.
    - Operation start.....beep-beep
    - Settings changed...beep
    - Operation stop.....beeeeeep
- 14. Air outlet selection switch**
- 15. Room temperature sensor:**
- It senses the air temperature around the unit.

### ■ Outdoor Unit

16. **Air inlet:** (Back and side)
17. **Refrigerant piping and inter-unit cable**
18. **Drain hose**
19. **Earth terminal:**
  - It is inside of this cover.
20. **Air outlet**

Appearance of the outdoor unit may differ from some models.

## ■ Remote control

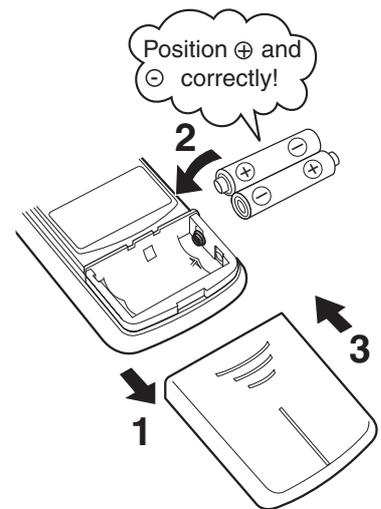


- |  |  |
|--|--|
| <p><b>1. Signal transmitter:</b></p> <ul style="list-style-type: none"> <li>• It sends signals to the indoor unit.</li> </ul> <p><b>2. Display:</b></p> <ul style="list-style-type: none"> <li>• It displays the current settings.<br/>(In this illustration, each section is shown with all its displays ON for the purpose of explanation)</li> </ul> <p><b>3. HOME LEAVE button:</b><br/>HOME LEAVE operation (page 59)</p> <p><b>4. POWERFUL button:</b><br/>POWERFUL operation (page 57)</p> <p><b>5. TEMPERATURE adjustment buttons:</b></p> <ul style="list-style-type: none"> <li>• It changes the temperature setting.</li> </ul> <p><b>6. ON/OFF button:</b></p> <ul style="list-style-type: none"> <li>• Press this button once to start operation.<br/>Press once again to stop it.</li> </ul> | <p><b>7. MODE selector button:</b></p> <ul style="list-style-type: none"> <li>• It selects the operation mode.<br/>(AUTO/DRY/COOL/HEAT/FAN)(page 53)</li> </ul> <p><b>8. SILENT button:</b> OUTDOOR UNIT<br/>SILENT operation (page 58)</p> <p><b>9. FAN setting button:</b></p> <ul style="list-style-type: none"> <li>• It selects the air flow rate setting.</li> </ul> <p><b>10. SWING button:</b> (page 61)</p> <p><b>11. ON TIMER button:</b> (page 61)</p> <p><b>12. TIMER Setting button:</b></p> <ul style="list-style-type: none"> <li>• It changes the timer setting.</li> </ul> <p><b>13. OFF TIMER button:</b> (page 61)</p> <p><b>14. TIMER CANCEL button:</b></p> <ul style="list-style-type: none"> <li>• It cancels the timer setting.</li> </ul> <p><b>15. CLOCK button:</b> (page 50)</p> |
|--|--|

## 2.3 Preparation Before Operation

### ■ To set the batteries

1. Slide the front cover to take it off.
2. Set two dry batteries (AAA).
3. Set the front cover as before.



## ATTENTION

### ■ About batteries

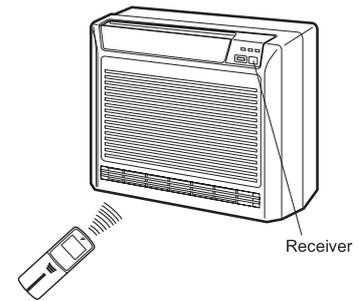
- When replacing the batteries, use batteries of the same type, and replace the two old batteries together.
- When the system is not used for a long time, take the batteries out.
- We recommend replacing once a year, although if the remote controller display begins to fade or if reception deteriorates, please replace with new alkali batteries. Using manganese batteries reduces the lifespan.
- The attached batteries are provided for the initial use of the system. The usable period of the batteries may be short depending on the manufactured date of the air conditioner.

### ■ Replacing the Batteries

- When replacing the battery, remove the old battery, wait one minute, and then insert the new battery.

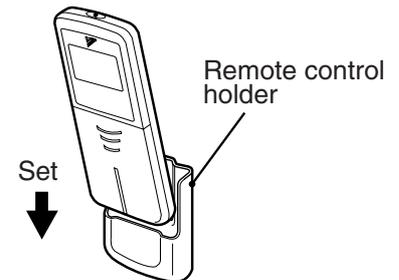
## ■ To operate the remote control

- To use the remote control, aim the transmitter at the indoor unit. If there is anything to block signals between the unit and the remote control, such as a curtain, the unit will not operate.
- Do not drop the remote control. Do not get it wet.
- The maximum distance for communication is about 7m.



## ■ To fix the remote control holder on the wall

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



- To remove, pull it upwards.

## ATTENTION

### ■ About remote control

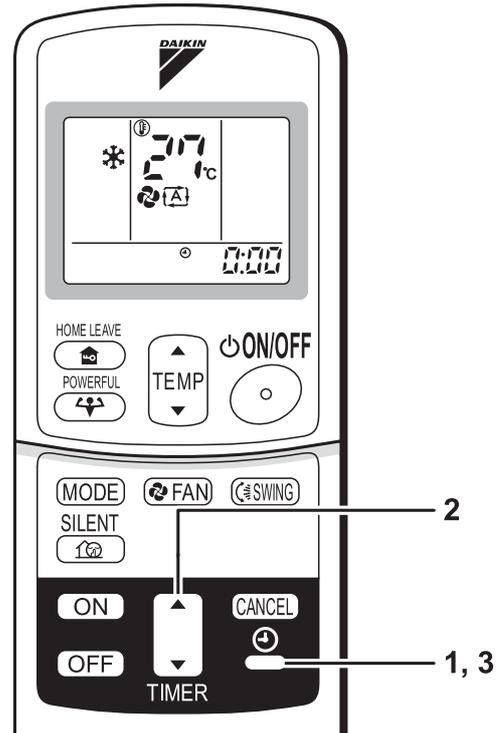
- Never expose the remote control to direct sunlight.
- Dust on the signal transmitter or receiver will reduce the sensitivity. Wipe off dust with soft cloth.
- Signal communication may be disabled if an electronic-starter-type fluorescent lamp (such as inverter-type lamps) is in the room. Consult the shop if that is the case.
- If the remote control signals happen to operate another appliance, move that appliance to some-where else, or consult the shop.

■ To set the clock

1. Press "CLOCK button".  
0:00 is displayed.  
⌚ blinks.
2. Press "TIMER setting button" to set the clock to the present time.  
Holding down "▲" or "▼" button rapidly increases or decreases the time display.
3. Press "CLOCK button".  
: blinks.

■ Turn the breaker ON

- Turning ON the breaker opens the flap, then closes it again. (This is a normal procedure.)



NOTE

■ Tips for saving energy

- Be careful not to cool (heat) the room too much. Keeping the temperature setting at a moderate level helps save energy.
- Cover windows with a blind or a curtain. Blocking sunlight and air from outdoors increases the cooling (heating) effect.
- Clogged air filters cause inefficient operation and waste energy. Clean them once in about every two weeks.

Recommended temperature setting
For cooling: 26°C – 28°C
For heating: 20°C – 24°C

■ Please note

- The air conditioner always consumes 15-35 watts of electricity even while it is not operating.
- If you are not going to use the air conditioner for a long period, for example in spring or autumn, turn the breaker OFF.
- Use the air conditioner in the following conditions.

Mode	Initial setting	Selectable range
COOL	Outdoor temperature: [2MXS] 10 to 46°C [3/4/5MK(X)S] -10 to 46°C [RK(X)S] -10 to 46°C [RN(S)] -10 to 46°C Indoor temperature: 18 to 32°C Indoor humidity: 80% max.	<ul style="list-style-type: none"> <li>• A safety device may work to stop the operation. (In multi system, it may work to stop the operation of the out-door unit only.)</li> <li>• Condensation may occur on the indoor unit and drip.</li> </ul>
HEAT	Outdoor temperature: [2/3/4/5MXS] -15 to 15.5°C [RXS25/35] -15 to 20°C [RXS50] -15 to 18°C Indoor temperature: 10 to 30°C	<ul style="list-style-type: none"> <li>• A safety device may work to stop the operation.</li> </ul>
DRY	Outdoor temperature: [2MXS] -10 to 46°C [3/4/5MK(X)S] -10 to 46°C [RK(X)S] -10 to 46°C [RN(S)] -10 to 46°C Indoor temperature: 18 to 32°C Indoor humidity: 80% max.	<ul style="list-style-type: none"> <li>• A safety device may work to stop the operation.</li> <li>• Condensation may occur on the indoor unit and drip.</li> </ul>

- Operation outside this humidity or temperature range may cause a safety device to disable the system.

## 2.4 AUTO-DRY-COOL-HEAT-FAN Operation

The air conditioner operates with the operation mode of your choice. From the next time on, the air conditioner will operate with the same operation mode.

### ■ To start operation

1. Press "MODE selector button" and select a operation mode.

- Each pressing of the button advances the mode setting in sequence.

Ⓐ : AUTO

☐ : DRY

❄ : COOL

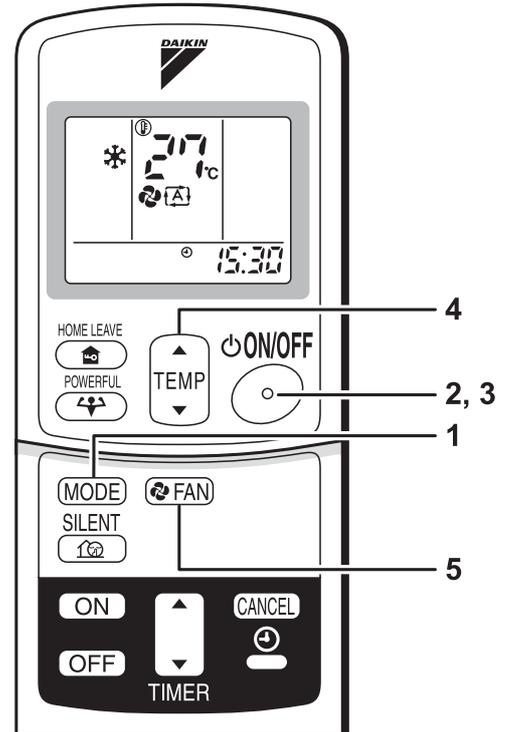
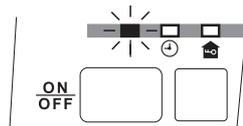
☀ : HEAT

🌀 : FAN



2. Press "ON/OFF button" .

- The OPERATION lamp lights up.



### ■ To stop operation

3. Press "ON/OFF button" again.

- Then OPERATION lamp goes off.

### ■ To change the temperature setting

4. Press "TEMPERATURE adjustment button".

DRY or FAN mode	AUTO or COOL or HEAT mode
The temperature setting is not variable.	Press "▲" to raise the temperature and press "▼" to lower the temperature.
	Set to the temperature you like
	④ 27 t <sub>c</sub>

## ■ To change the air flow rate setting

### 5. Press "FAN setting button".

DRY mode	AUTO or COOL or HEAT or FAN mode
The air flow rate setting is not variable	Five levels of air flow rate setting from " " to " " plus " " " " are available. 

- Indoor unit quiet operation

When the air flow is set to " ", the noise from the indoor unit will become quieter.

Use this when making the noise quieter.

The unit might lose capacity when the air flow rate is set to a weak level.

## NOTE

### ■ Note on heat operation

- Since this air conditioner heats the room by taking heat from outdoor air to indoors, the heating capacity becomes smaller in lower outdoor temperatures. If the heating effect is insufficient, it is recommended to use another heating appliance in combination with the air conditioner.
- The heat pump system heats the room by circulating hot air around all parts of the room. After the start of heating operation, it takes some time before the room gets warmer.
- In heating operation, frost may occur on the outdoor unit and lower the heating capacity. In that case, the system switches into defrosting operation to take away the frost.
- During defrosting operation, hot air does not flow out of indoor unit.
- At the start of heater operation, so that air does not blow directly on an individual, air blows in an upward direction. After the blowing air gets warmer, the air will blow according to memorised air flow direction and rates.

### ■ Note on COOL operation

- This air conditioner cools the room by blowing the hot air in the room outside, so if the outside temperature is high, performance drops.

### ■ Note on DRY operation

- The computer chip works to rid the room of humidity while maintaining the temperature as much as possible. It automatically controls temperature and fan strength, so manual adjustment of these functions is unavailable.

### ■ Note on AUTO operation

- In AUTO operation, the system selects an appropriate operation mode (COOL or HEAT) based on the room temperature at the start of the operation.
- The system automatically reselects setting at a regular interval to bring the room temperature to user-setting level.
- If you do not like AUTO operation, you can manually select the operation mode and setting you like.

### ■ Note on air flow rate setting

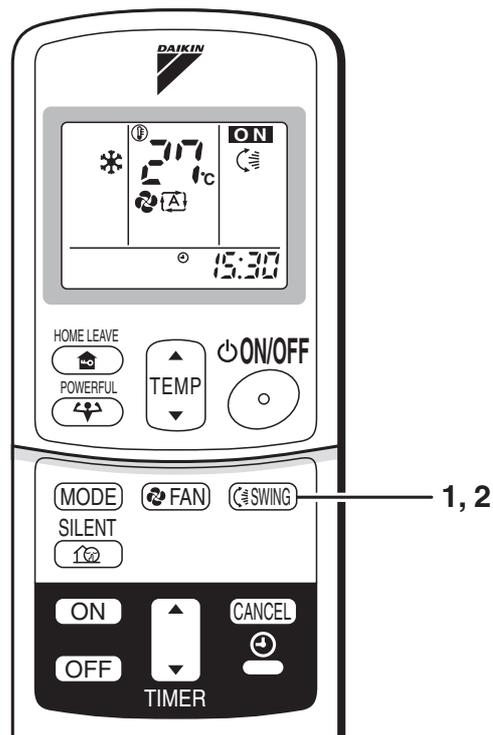
- At smaller air flow rates, the cooling (heating) effect is also smaller.

## 2.5 Adjusting the air flow direction

You can adjust the air flow direction to increase your comfort.

### ■ To adjust the horizontal blades (flaps)

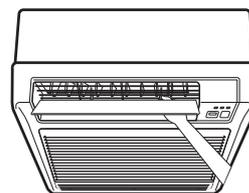
1. Press "SWING button"
  -  The display on the LCD and the flaps will begin to swing.
2. When the flaps have reached the desired position, press "SWING button" once more.
  - The flaps will stop moving.
  -  disappears from the LCD.



### ■ To adjust the vertical blades (louvres)

Hold the knob and move the louvers.

(You will find a knob on the left-side and the right-side blades.)

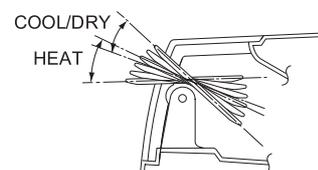


### Notes on flaps and louvres angles

- Unless [SWING] is selected, you should set the flap at a near-horizontal angle in HEAT mode and at an upward position in COOL or DRY mode to obtain the best performance

#### ■ ATTENTION

- When adjusting the flap by hand, turn off the unit, and use the remote control to restart the unit.
- Be careful when adjusting the louvers. Inside the air outlet, a fan is rotating at a high speed.

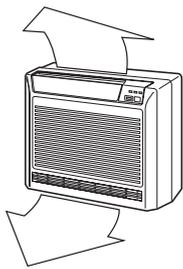


■ **Air flow selection**

- Make air flow selection according to what suits you.

**When setting the air flow selection switch to **

- Air conditioner automatically decides the appropriate blowing pattern depending on the operating mode/situation.

Operating mode	Situation	Blowing pattern
COOL mode	<ul style="list-style-type: none"> <li>• When the room has become fully cool, or when one hour has passed since turning on the air conditioner.</li> </ul>	<ul style="list-style-type: none"> <li>• So that air does not come into direct contact with people, air is blown upper air outlet, room temperature is equilised.</li> </ul>
	<ul style="list-style-type: none"> <li>• At start of operation or other times when the room is not fully cooled.</li> </ul>	<div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>• Air is blown from the upper and lower air outlets for high speed cooling during COOL mode, and for filling the room with warm air during HEAT mode.</li> </ul>
HEAT mode	<ul style="list-style-type: none"> <li>• At times other than below.(Normal time.)</li> </ul>	
	<ul style="list-style-type: none"> <li>• At start or when air temperature is low.</li> </ul>	<ul style="list-style-type: none"> <li>• So that air does not come into direct contact with people. Air is blown upper air outlet.</li> </ul>

- During Dry mode, so that cold air does not come into direct contact with people, air is blown upper air outlet.

**When setting the air outlet selection switch to **

- Regardless of the operating mode or situation, air blows from the upper air outlet.
- Use this switch when you do not want air coming out of the lower air outlet. (While sleeping etc..)

 **CAUTION**

- Do not try to adjust the flap by hand.
- When adjusting by hand, the mechanism may not operate properly or condensation may drip from air outlets.

## 2.6 POWERFUL Operation

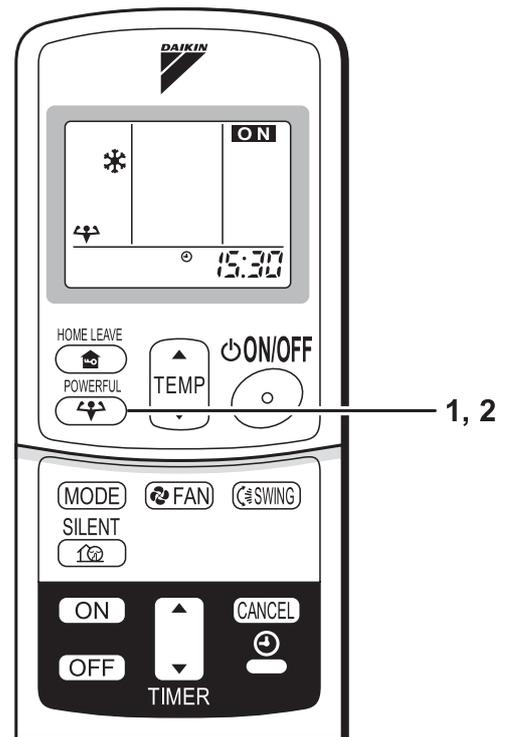
POWERFUL operation quickly maximizes the cooling (heating) effect in any operation mode. You can get the maximum capacity

### ■ To start POWERFUL operation

1. Press "POWERFUL button".
  - POWERFUL operation ends in 20 minutes. Then the system automatically operates again with the settings which were used before POWERFUL operation.
  - When using POWERFUL operation, there are some functions which are not available.
  - "❄️" is displayed on the LCD.

### ■ To cancel POWERFUL operation

2. Press "POWERFUL button" again.
  - "❄️" disappears from the LCD.



## NOTE

### ■ Notes on POWERFUL operation

- **In COOL and HEAT mode**  
To maximize the cooling (heating) effect, the capacity of outdoor unit must be increased and the air flow rate be fixed to the maximum setting. The temperature and air flow settings are not variable.
- **In DRY mode**  
The temperature setting is lowered by 2.5°C and the air flow rate is slightly increased.
- **In FAN mode**  
The air flow rate is fixed to the maximum setting.

## 2.7 OUTDOOR UNIT SILENT Operation

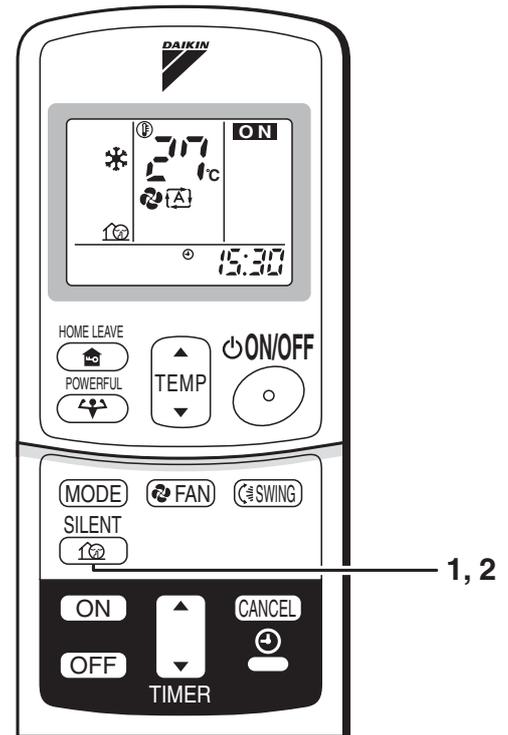
OUTDOOR UNIT SILENT operation lowers the noise level of the outdoor unit by changing the frequency and fan speed on the outdoor unit. This function is convenient during night.

### ■ To start OUTDOOR UNIT SILENT operation

1. Press "SILENT button".
  - "  " is displayed on the LCD.

### ■ To cancel OUTDOOR UNIT SILENT operation

2. Press "SILENT button" again.
  - "  " disappears from the LCD.



## NOTE

### ■ Note on OUTDOOR UNIT SILENT operation

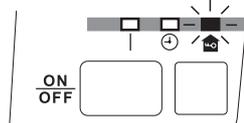
- This function is available in COOL, HEAT, and AUTO modes. (This is not available in FAN and DRY mode.)
- POWERFUL operation and OUTDOOR UNIT SILENT operation cannot be used at the same time. Priority is given to the function of whichever button is pressed last.
- If operation is stopped using the remote control or the main unit ON/OFF switch when using OUTDOOR UNIT SILENT operation, "  " remain on the remote control display.
- This function does not work when connected to the RN50E2V1B

## 2.8 HOME LEAVE Operation

HOME LEAVE operation is a function which allows you to record your preferred temperature and air flow rate settings.

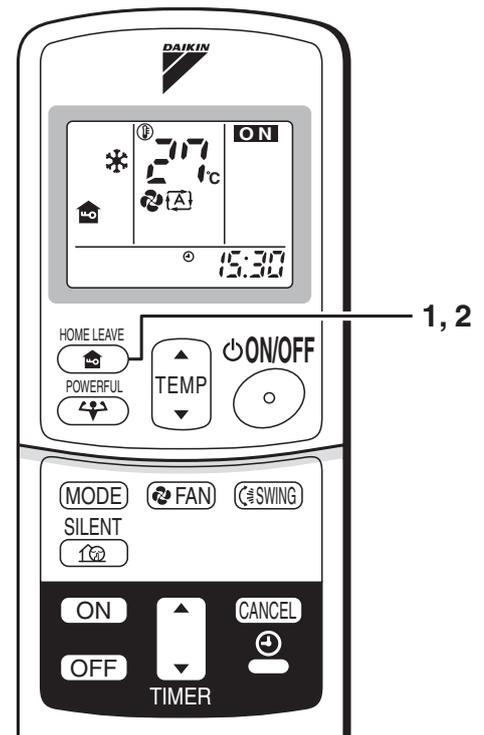
### ■ To start HOME LEAVE operation

1. Press "HOME LEAVE button".
  - "🏠" is displayed on the LCD.
  - The HOME LEAVE lamp lights up.



### ■ To cancel HOME LEAVE operation

2. Press "HOME LEAVE button" again.
  - The HOME LEAVE lamp goes off.
  - "🏠" disappears from the LCD.



## Before using HOME LEAVE operation

### ■ To set the temperature and air flow rate for HOME LEAVE operation

When using HOME LEAVE operation for the first time, please set the temperature and air flow rate for HOME LEAVE operation. Record your preferred temperature and air flow rate.

	Initial setting		Selectable range	
	temperature	Air flow rate	temperature	Air flow rate
Cooling	25°	AUTO	18-32°C	5 step, AUTO and SILENT
Heating	25°	AUTO	10-30°C	5 step, AUTO and SILENT

1. Press "HOME LEAVE button". Make sure "🏠" is displayed in the remote control display.
2. Adjust the set temperature with "▲" or "▼" as you like.
3. Adjust the air flow rate with "FAN" setting button as you like.

Home leave operation will run with these settings the next time you use the unit. To change the recorded information, repeat steps 1 – 3.

## ■ What's the HOME LEAVE operation

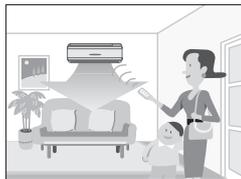
Is there a set temperature and air flow rate which is most comfortable, a set temperature and air flow rate which you use the most? HOME LEAVE operation is a function that allows you to record your favorite set temperature and air flow rate. You can start your favorite operation mode simply by pressing the HOME LEAVE button on the remote control. This function is convenient in the following situations.

## ■ Useful in these cases.

### 1. Use as an energy-saving mode

Set the temperature 2-3°C higher (cooling) or lower (heating) than normal. Setting the fan strength to the lowest setting allows the unit to be used in energy-saving mode. Also convenient for use while you are out or sleeping.

#### • Every day before you leave the house...



When you go out, push the "HOME LEAVE Operation" button, and the air conditioner will adjust capacity to reach the preset temperature for HOME LEAVE Operation.



When you return, you will be welcomed by a comfortably air conditioned room.

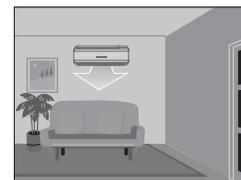


Push the "HOME LEAVE Operation" button again, and the air conditioner will adjust capacity to the set temperature for normal operation.

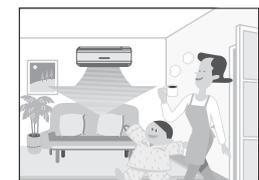
#### • Before bed...



Set the unit to HOME LEAVE Operation before leaving the living room when going to bed.



The unit will maintain the temperature in the room at a comfortable level while you sleep.



When you enter the living room in the morning, the temperature will be just right. Disengaging HOME LEAVE Operation will return the temperature to that set for normal operation. Even the coldest winters will pose no problem!

### 2. Use as a favorite mode

Once you record the temperature and air flow rate settings you most often use, you can retrieve them by pressing HOME LEAVE button. You do not have to go through troublesome remote control operations.

## NOTE

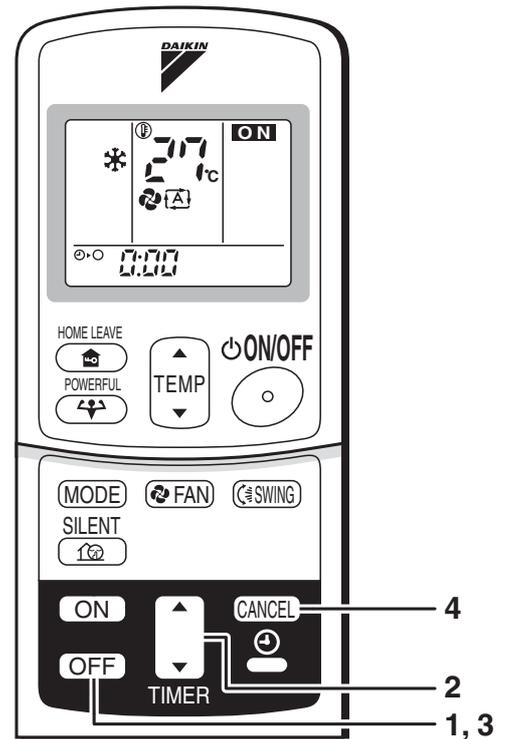
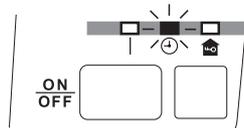
- Once the temperature and air flow rate for HOME LEAVE operation are set, those settings will be used whenever HOME LEAVE operation is used in the future. To change these settings, please refer to the "Before using HOME LEAVE operation" section above.
- HOME LEAVE operation is only available in COOL and HEAT mode. Cannot be used in AUTO, DRY, and FAN mode.
- HOME LEAVE operation runs in accordance with the previous operation mode (COOL or HEAT) before using HOME LEAVE operation.
- HOME LEAVE operation and POWERFUL operation cannot be used at the same time. Last button that was pressed has priority.
- The operation mode cannot be changed while HOME LEAVE operation is being used.
- When operation is shut off during HOME LEAVE operation, using the remote control or the indoor unit ON/OFF switch, "🏠" will remain on the remote control display.

## 2.9 TIMER Operation

Timer functions are useful for automatically switching the air conditioner on or off at night or in the morning. You can also use OFF TIMER and ON TIMER in combination.

### ■ To use OFF TIMER operation

- Check that the clock is correct. If not, set the clock to the present time. (page 50)
1. Press “OFF TIMER button”.  
0:00 is displayed.  
0:01 blinks.
  2. Press “TIMER Setting button” until the time setting reaches the point you like.
    - Every pressing of either button increases or decreases the time setting by 10 minutes. Holding down either button changes the setting rapidly.
  3. Press “OFF TIMER button” again.
    - The TIMER lamp lights up.



### ■ To cancel the OFF TIMER operation

4. Press “CANCEL button”.
  - The TIMER lamp goes off.

## NOTE

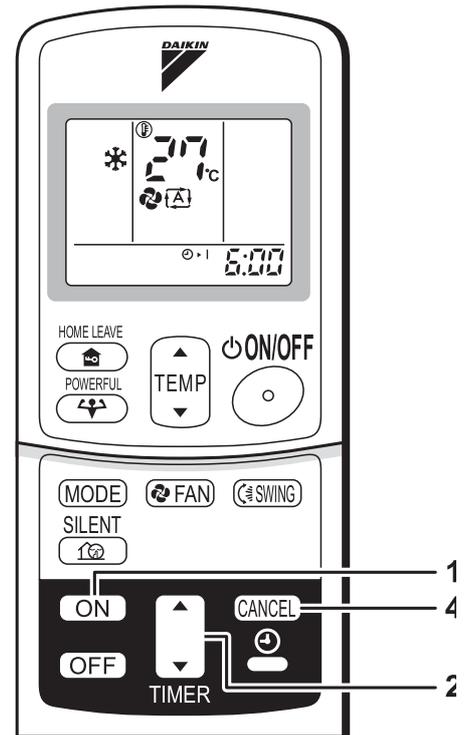
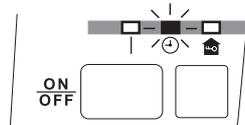
- When TIMER is set, the present time is not displayed.
- Once you set ON, OFF TIMER, the time setting is kept in the memory. (The memory is canceled when remote control batteries are replaced.)
- When operating the unit via the ON/OFF Timer, the actual length of operation may vary from the time entered by the user. (Maximum approx. 10 minutes)

### ■ NIGHT SET MODE

When the OFF TIMER is set, the air conditioner automatically adjusts the temperature setting (0.5°C up in COOL, 2.0°C down in HEAT) to prevent excessive cooling (heating) for your pleasant sleep.

### ■ To use ON TIMER operation

- Check that the clock is correct. If not, set the clock to the present time. (page 50)
- 1. Press “ON TIMER button”.
  - 6:00 is displayed.
  - “” blinks.
- 2. Press “TIMER Setting button” until the time setting reaches the point you like.
  - Every pressing of either button increases or decreases the time setting by 10 minutes. Holding down either button changes the setting rapidly.
- 3. Press “ON TIMER button” again.
  - The TIMER lamp lights up..

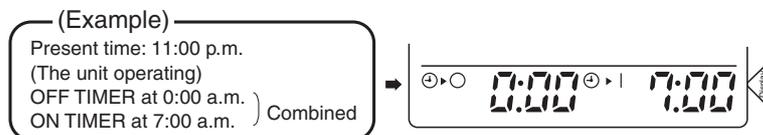


### ■ To cancel the ON TIMER operation

- 4. Press “CANCEL button”.
  - The TIMER lamp goes off.

### ■ To combine ON TIMER and OFF TIMER

- A sample setting for combining the two timers is shown below



## ATTENTION

- In the following cases, set the timer again.
  - After a breaker has turned OFF.
  - After a power failure.
  - After replacing batteries in the remote control.

## 2.10 Care and Cleaning

**CAUTION** Before cleaning, be sure to stop the operation and turn the breaker OFF.  
UNITS

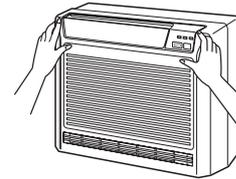
### ■ Indoor unit, Outdoor unit and Remote control

1. Wipe them with dry soft cloth.

### ■ Front panel

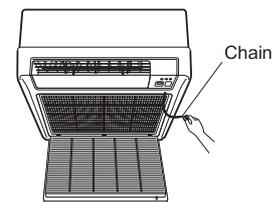
#### 1. Open the front panel.

- Press the two  places on the left and right of the front panel.



#### 2. Remove the front panel.

- Remove the chain.
- Allowing the front panel to fall forward will enable you to remove it.

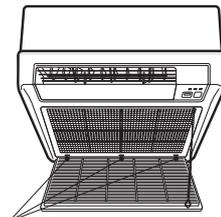


#### 3. Clean the front panel

- Wipe softly with a damp cloth.
- Only neutral detergent may be used.
- In case of washing the front panel dry it with cloth, dry it up in the shade after washing.

#### 4. Attach the front panel.

- Insert the front panel into the grooves of the unit (3 places).
- Attach the chain to the right, inner-side of the front panel.
- Close the panel slowly.

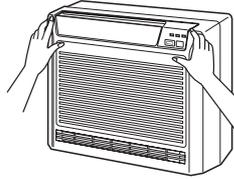
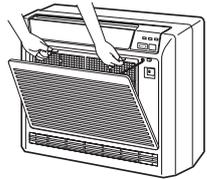
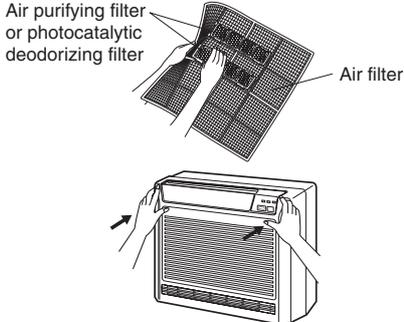
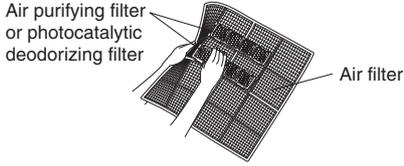
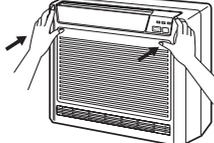
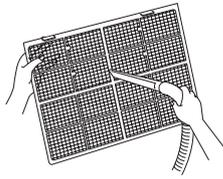
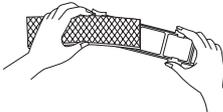
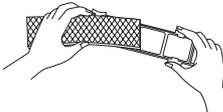
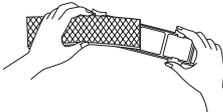
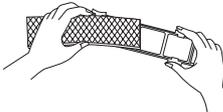
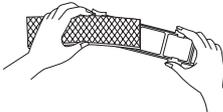


Place front panel in grooves.

### **CAUTION**

- Hold the front grille firmly so that it does not fall.
- When removing or attaching the front panel, use a robust and stable stool and watch your steps carefully.
- When removing or attaching the front panel, support the panel securely with hand to prevent it from falling.
- For cleaning, do not use hot water above 40°C, benzene, gasoline, thinner, nor other volatile oils, polishing compound, scrubbing brushes, nor other hand stuff.
- After cleaning, make sure that the front panel is securely fixed.

## FILTERS

1.
    1. **Open the front panel.**

    2. **Remove the air filter**
      - Press the claws on the right and left of the air filter down slightly, then pull upward.
    3. **Take off the air purifying filter, photocatalytic deodorizing filter.**
      - Hold the tabs of the frame, and remove the claws in 4 places
    4. **Clean or replace each filter**
      - See figure.
    5. **Set the air filter, air purifying filter and photocatalytic deodorizing filter as they were and close the front panel.**
      - Operation without air filters may result in tras dust will accumulate inside the indoor unit.
- 
- 
- 
- 
- 
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- 

### ■ Air Filter

1. **Wash the air filters with water or clean them with vacuum cleaner.**
  - If the dust does not come off easily, wash them with neutral detergent thinned with lukewarm water, then dry them up in the shade.
  - It is recommended to clean the air filters every two weeks.

### ■ Air Purifying Filter (green)

(Replace approximately once every 3 months.)

1. **Detach the filter element and attach a new one.**
  - Insert with the green side up.
  - It is recommended to replace the air purifying filter every three months.

### ■ Photocatalytic Deodorizing Filter (gray)

#### [Maintenance]

1. **Dry the photocatalytic deodorizing filter in the sun.**
  - After removing the dust with a vacuum cleaner, place the filter in the sun for approximately 6 hours. By drying the photocatalytic deodorizing filter in the sun, its deodorizing and antibacterial capabilities are regenerated.
  - Because the filter material is paper, it can not be cleaned with water.
  - It is recommended to dry the filter once every 6 months.

#### [Replacement]

1. **Detach the filter element and attach a new one.**

## Check

Check that the base, stand and other fittings of the outdoor unit are not decayed or corroded.
Check that nothing blocks the air inlets and the outlets of the indoor unit and the outdoor unit.
Check that the drain comes smoothly out of the drain hose during COOL or DRY operation. • If no drain water is seen, water may be leaking from the indoor unit. Stop operation and consult the service shop if this is the case.

## ■ Before a long idle period

1. Operate the "FAN only" for several hours on a fine day to dry out the inside.
  - Press "MODE selector button" and select "FAN" operation.
  - Press "ON/OFF button" and start operation.
2. After operation stops, turn off the breaker for the room air conditioner.
3. Clean the air filters and set them again.
4. Take out batteries from the remote control.

## NOTE

- Operation with dusty air filters lowers the cooling (heating) capacity and wastes energy. Air is also prevented from flowing smoothly through the unit creating a noise.
- Operation with dirty filters :
  - (1) cannot deodorize the air.
  - (2) cannot clean the air.
  - (3) results in poor heating or cooling.
  - (4) may cause odour.
- The air purifying filter and Photocatalytic deodorizing filter cannot be reused, even if washed.
- In principle, there is no need to replace the photocatalytic deodorizing filter. Remove the dust periodically with a vacuum cleaner. However, it is recommended to replace the filter in the following cases.
  - (1) The paper material is torn or broken during cleaning.
  - (2) The filter has become extremely dirty after long use.
- To order air purifying filter or Photocatalytic deodorizing filter, contact to the service shop where you bought the air conditioner.
- Dispose of old air filters as non-burnable waste and Photocatalytic deodorizing filters as burnable waste.

Item	Part No.
Photocatalytic deodorizing filter (with frame)	KAZ917B41
Photocatalytic deodorizing filter (without frame)	KAZ917B42
Air purifying filter (with frame)	KAF925B41
Air purifying filter (without frame)	KAF925B42

## 2.11 Troubleshooting

### These cases are not troubles.

The following cases are not air conditioner troubles but have some reasons. You may just continue using it.

Case	Explanation
<b>Operation does not start soon.</b> <ul style="list-style-type: none"> <li>• When ON/OFF button was pressed soon after operation was stopped.</li> <li>• When the mode was reselected.</li> </ul>	<ul style="list-style-type: none"> <li>• This is to protect the air conditioner. You should wait for about 3 minutes.</li> </ul>
<b>Hot air does not flow out soon after the start of heating operation.</b>	<ul style="list-style-type: none"> <li>• The air conditioner is warming up. You should wait for 1 to 4 minutes. (The system is designed to start discharging air only after it has reached a certain temperature.)</li> </ul>
<b>The heating operation stops suddenly and a flowing sound is heard.</b>	<ul style="list-style-type: none"> <li>• The system is taking away the frost on the outdoor unit. You should wait for about 3 to 8 minutes.</li> </ul>
<b>The outdoor unit emits water or steam.</b>	<ul style="list-style-type: none"> <li>■ In HEAT mode           <ul style="list-style-type: none"> <li>• The frost on the outdoor unit melts into water or steam when the air conditioner is in defrost operation.</li> </ul> </li> <li>■ In COOL or DRY mode           <ul style="list-style-type: none"> <li>• Moisture in the air condenses into water on the cool surface of outdoor unit piping and drips.</li> </ul> </li> </ul>
<b>Mists come out of the indoor unit.</b>	<ul style="list-style-type: none"> <li>■ This happens when the air in the room is cooled into mist by the cold air flow during cooling operation.</li> </ul>
<b>The indoor unit gives out odour</b>	<ul style="list-style-type: none"> <li>■ This happens when smells of the room, furniture, or cigarettes are absorbed into the unit and discharged with the air flow. (If this happens, we recommend you to have the indoor unit washed by a technician. Consult the service shop where you bought the air conditioner.)</li> </ul>
<b>The outdoor fan rotates while the air conditioner is not in operation.</b>	<ul style="list-style-type: none"> <li>■ After operation is stopped:           <ul style="list-style-type: none"> <li>• The outdoor fan continues rotating for another 60 seconds for system protection.</li> </ul> </li> <li>■ While the air conditioner is not in operation:           <ul style="list-style-type: none"> <li>• When the outdoor temperature is very high, the out door fan starts rotating for system protection.</li> </ul> </li> </ul>
<b>The operation stopped suddenly. (OPERATION lamp is on)</b>	<ul style="list-style-type: none"> <li>■ For system protection, the air conditioner may stop operating on a sudden large voltage fluctuation. It automatically resumes operation in about 3 minutes.</li> </ul>

**Check again.**

Please check again before calling a repair person.

<b>Case</b>	<b>Check</b>
<b>The air conditioner does not operate. (OPERATION lamp is off)</b>	<ul style="list-style-type: none"> <li>• Hasn't a breaker turned OFF or a fuse blown?</li> <li>• Isn't it a power failure?</li> <li>• Are batteries set in the remote control?</li> <li>• Is the timer setting correct?</li> </ul>
<b>Cooling (Heating) effect is poor</b>	<ul style="list-style-type: none"> <li>• Are the air filters clean?</li> <li>• Is there anything to block the air inlet or the outlet of the indoor and the outdoor units?</li> <li>• Is the temperature setting appropriate?</li> <li>• Are the windows and doors closed?</li> <li>• Are the air flow rate and the air direction set appropriately?</li> </ul>
<b>Operation stops suddenly. (OPERATION lamp flashes.)</b>	<ul style="list-style-type: none"> <li>• Are the air filters clean?</li> <li>• Is there anything to block the air inlet or the outlet of the indoor and the outdoor units? Clean the air filters or take all obstacles away and turn the breaker OFF. Then turn it ON again and try operating the air conditioner with the remote control. If the lamp still flashes, call the service shop where you bought the air conditioner.</li> </ul>
<b>An abnormal functioning happens during operation.</b>	<ul style="list-style-type: none"> <li>• The air conditioner may malfunction with lightning or radio waves. Turn the breaker OFF, turn it ON again and try operating the air conditioner with the remote control.</li> </ul>

**CALL THE SERVICE SHOP IMMEDIATELY**

 **WARNING**

- When an abnormality (such as a burning smell) occurs, stop operation and turn the breaker OFF. Continued operation in an abnormal condition may result in troubles, electric shocks or fire. Consult the service shop where you bought the air conditioner.
- Do not attempt to repair or modify the air conditioner by yourself. Incorrect work may result in electric shocks or fire. Consult the service shop where you bought the air conditioner.

If one of the following symptoms takes place, call the service shop immediately.

- **The power cord is abnormally hot or damaged.**
- **An abnormal sound is heard during operation.**
- **The safety breaker, a fuse, or the earth leakage breaker cuts off the operation frequently.**
- **A switch or a button often fails to work properly.**
- **There is a burning smell.**
- **Water leaks from the indoor unit.**



Turn the breaker OFF and call the service shop.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>■ <b>After a power failure</b><br/>The air conditioner automatically resumes operation in about 3 minutes. You should just wait for a while.</li> </ul> | <ul style="list-style-type: none"> <li>■ <b>Lightning</b><br/>If lightning may strike the neighbouring area, stop operation and turn the breaker OFF for system protection.</li> </ul> |
|--|--|

**Disposal requirements**



Your air conditioning product is marked with this symbol. This means that electrical and electronic products shall not be mixed with unsorted household waste.

Do not try to dismantle the system yourself: the dismantling of the air conditioning system, treatment of the refrigerant, of oil and of other parts must be done by a qualified installer in accordance with relevant local and national legislation.

Air conditioners must be treated at a specialized treatment facility for re-use, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health. Please contact the installer or local authority for more information.

Batteries must be removed from the remote control and disposed of separately in accordance with relevant local and national legislation.

**We recommend periodical maintenance**

In certain operating conditions, the inside of the air conditioner may get foul after several seasons of use, resulting in poor performance. It is recommended to have periodical maintenance by a specialist aside from regular cleaning by the user. For specialist maintenance, contact the service shop where you bought the air conditioner.

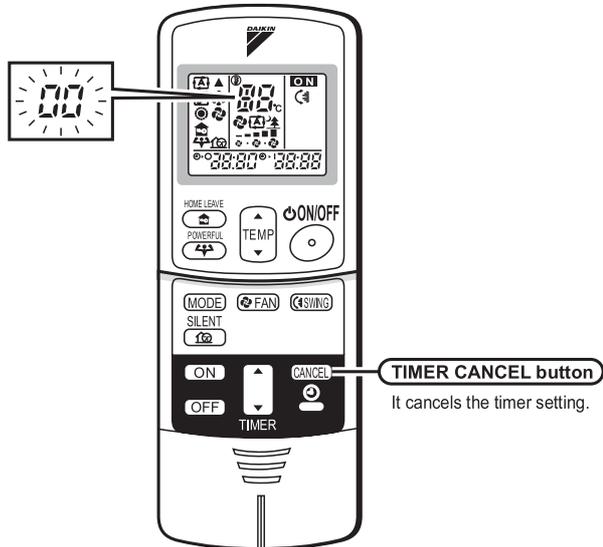
The maintenance cost must be born by the user.

**FAULT DIAGNOSIS**

**FAULT DIAGNOSIS BY REMOTE CONTROL**

In the ARC433A series, the temperature display sections on the main unit indicate corresponding codes.

1. When the **TIMER CANCEL** button is held down for 5 seconds, a “00” indication flashes on the temperature display section.



2. Press the **TIMER CANCEL** button repeatedly until a continuous beep is produced.
  - The code indication changes as shown below, and notifies with a long beep.

	CODE	MEANING
<b>SYSTEM</b>	00	NORMAL
	U0	REFRIGERANT SHOTAGE
	U2	DROP VOLTAGE OR MAIN CIRCUIT OVERVOLTAGE
	U4	FAILURE OF TRANSMISSION (BETWEEN INDOOR UNIT AND OUTDOOR UNIT)
<b>INDOOR UNIT</b>	A1	INDOOR PCB DEFECTIVENESS
	A5	HIGH PRESSURE CONTROL OR FREEZE-UP PROTECTOR
	A6	FAN MOTOR FAULT
	C4	FAULTY HEAT EXCHANGER TEMPERATURE SENSOR
	C9	FAULTY SUCTION AIR TEMPERATURE SENSOR
<b>OUTDOOR UNIT</b>	EA	COOLING-HEATING SWITCHING ERROR
	E5	OL STARTED
	E6	FAULTY COMPRESSOR START UP
	E7	DC FAN MOTOR FAULT
	E8	OPERATION HALT DUE TO DETECTION OF INPUT OVER CURRENT
	F3	HIGH TEMPERATURE DISCHARGE PIPE CONTROL
	F6	HIGH PRESSURE CONTROL (IN COOLING)
	H6	OPERATION HALT DUE TO FAULTY POSITION DETECTION SENSOR
	H8	CT ABNORMALITY
	H9	FAULTY SUCTION AIR TEMPERATURE SENSOR
	J3	FAULTY DISCHARGE PIPE TEMPERATURE SENSOR
	J6	FAULTY HEAT EXCHANGER TEMPERATURE SENSOR
	L4	HIGH TEMPERATURE AT INVERTER CIRCUIT HEATSINK
	L5	OUTPUT OVERCURRENT
P4	FAULTY INVERTER CIRCUIT HEATSINK TEMPERATURE SENSOR	

**NOTE**

1. A short beep and two consecutive beeps indicate non-corresponding codes.
2. To cancel the code display, hold the **TIMER CANCEL** button down for 5 seconds. The code display also cancel itself if the button is not pressed for 1 minute.



# Part 6

## Service Diagnosis

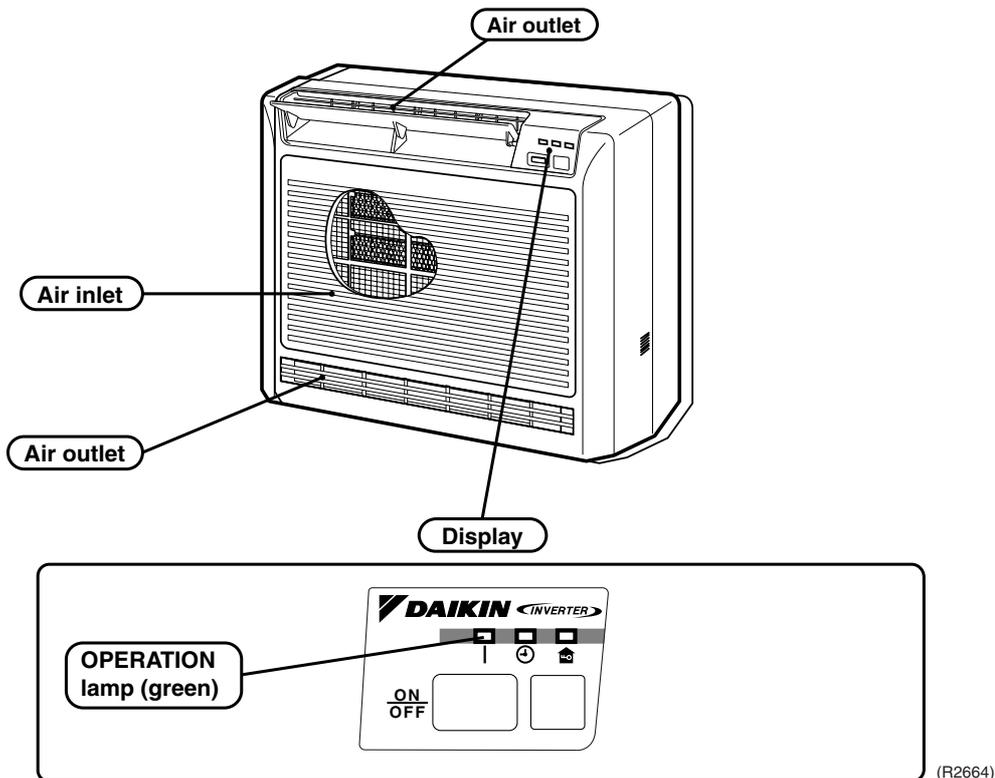
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# 1. Caution for Diagnosis

The Operation lamp flashes when any of the following errors is detected.

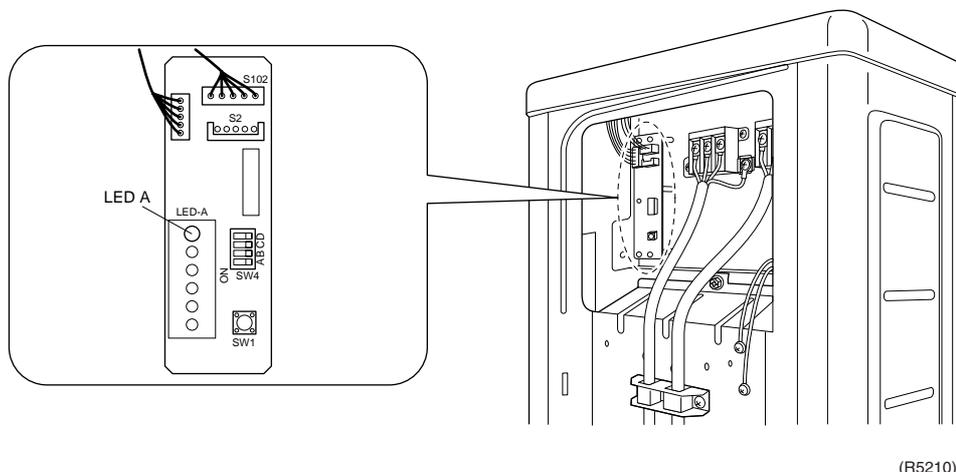
1. When a protection device of the indoor or outdoor unit is activated or when the thermistor malfunctions, disabling equipment operation.
  2. When a signal transmission error occurs between the indoor and outdoor units.
- In either case, conduct the diagnostic procedure described in the following pages.

## Location of Operation Lamp



## Troubleshooting with the LED Indication

### Outdoor Unit



The outdoor unit has one green LED (LED A) on the PCB. The flashing green LED indicates normal condition of microcomputer operation.

## 2. Problem Symptoms and Measures

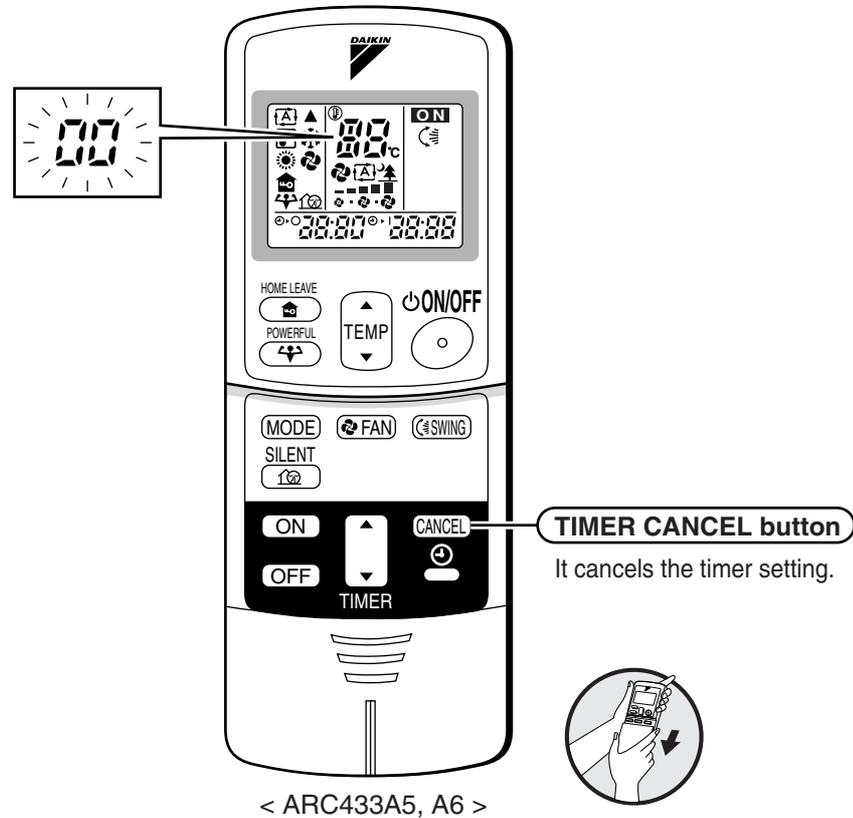
Symptom	Check Item	Details of Measure	Reference
			Page
None of the units operates.	Check the power supply.	Check to make sure that the rated voltage is supplied.	—
	Check the type of the indoor units.	Check to make sure that the indoor unit type is compatible with the outdoor unit.	—
	Check the outdoor air temperature.	Heating operation cannot be used when the outdoor air temperature is 18°C or higher (only for heat pump model), and cooling operation cannot be used when the outdoor air temperature is below -10°C.	—
	Diagnosis with remote control indication	—	77
	Check the remote control addresses.	Check to make sure that address settings for the remote control and indoor unit are correct.	—
Operation sometimes stops.	Check the power supply.	A power failure of 2 to 10 cycles can stop air conditioner operation. (Operation lamp OFF)	—
	Check the outdoor air temperature.	Heating operation cannot be used when the outdoor air temperature is 18°C or higher (only for heat pump model), and cooling operation cannot be used when the outdoor air temperature is below -10°C.	—
	Diagnosis with remote control indication	—	77
Equipment operates but does not cool, or does not heat (only for heat pump model).	Check for wiring and piping errors in the indoor and outdoor units connection wires and pipes.	Conduct the wiring/piping error check described on the product diagnosis nameplate.	—
	Check for thermistor detection errors.	Check to make sure that the main unit's thermistor has not dismantled from the pipe holder.	—
	Check for faulty operation of the electronic expansion valve.	Set the units to cooling operation, and compare the temperatures of the liquid side connection pipes of the connection section among rooms to check the opening and closing operation of the electronic expansion valves of the individual units.	—
	Diagnosis with remote control indication	—	77
	Diagnosis by service port pressure and operating current	Check for insufficient gas.	115
Large operating noise and vibrations	Check the output voltage of the power transistor.	—	116
	Check the power transistor.	—	—
	Check the installation condition.	Check to make sure that the required spaces for installation (specified in the Technical Guide, etc.) are provided.	—

### 3. Service Check Function

In the ARC433A series remote control, the temperature display sections on the main unit indicate corresponding codes.

#### Check Method 1

1. When the timer cancel button is held down for 5 seconds, a "00" indication flashes on the temperature display section.



(R3035)

2. Press the timer cancel button repeatedly until a continuous beep is produced.
  - The code indication changes in the sequence shown below, and notifies with a long beep.

No.	Code	No.	Code	No.	Code
1	00	12	C7	23	H0
2	U4	13	H8	24	E1
3	F3	14	J3	25	P4
4	E6	15	R3	26	L3
5	L5	16	R1	27	L4
6	R6	17	C4	28	H6
7	E5	18	C5	29	H7
8	F6	19	H9	30	U2
9	C9	20	J6	31	UH
10	U0	21	UR	32	ER
11	E7	22	R5	33	RH

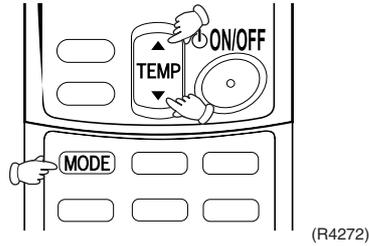


#### Note:

1. A short beep and two consecutive beeps indicate non-corresponding codes.
2. To cancel the code display, hold the timer cancel button down for 5 seconds. The code display also cancels itself if the button is not pressed for 1 minute.

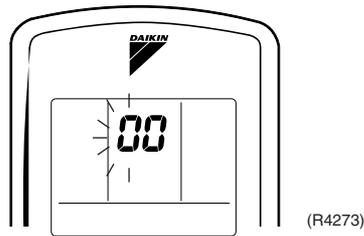
## Check Method 2

1. Enter the diagnosis mode.  
Press the 3 buttons (TEMP▲,TEMP▼, MODE) simultaneously.

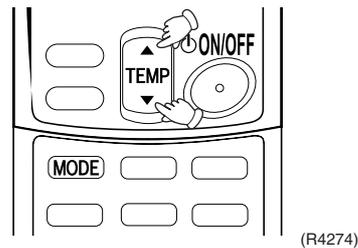


The digit of the number of tens blinks.

★Try again from the start when the digit does not blink.

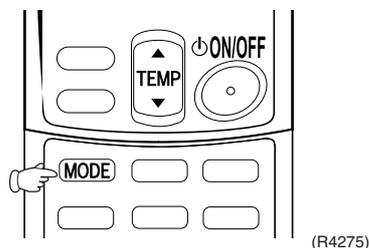


2. Press the TEMP button.  
Press TEMP▲ or TEMP▼ and change the digit until you hear the sound of “beep” or “pi pi”.

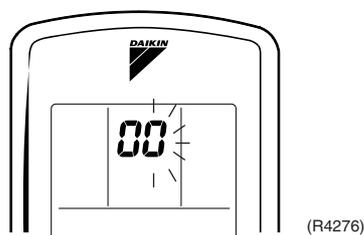


3. Diagnose by the sound.
  - ★“pi” : The number of tens does not accord with the error code.
  - ★“pi pi” : The number of tens accords with the error code.
  - ★“beep” : The both numbers of tens and units accord with the error code. (→ See 7.)

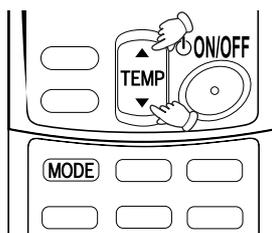
4. Enter the diagnosis mode again.  
Press the MODE button.



The digit of the number of units blinks.

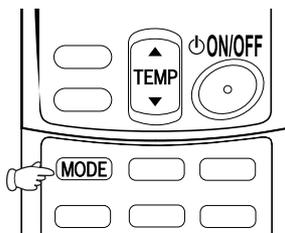


5. Press the TEMP button.  
Press TEMP▲ or TEMP▼ and change the digit until you hear the sound of “beep”.



(R4277)

6. Diagnose by the sound.
  - ★“pi” : The both numbers of tens and units do not accord with the error code.
  - ★“pi pi” : The number of tens accords with the error code.
  - ★“beep” : The both numbers of tens and units accord with the error code.
7. Determine the error code.  
The digits indicated when you hear the “beep” sound are error code.  
(Error codes and description → Refer to page 77.)
8. Exit from the diagnosis mode.  
Press the MODE button.



(R4278)

## 4. Troubleshooting

### 4.1 Error Codes and Description

	Code Indication	Description	Reference Page
System	00	Normal	—
	U0★	Insufficient gas	105
	U2	Low-voltage detection or over-voltage detection	107
	U4	Signal transmission error (between indoor and outdoor units)	84
Indoor Unit	R1	Indoor unit PCB abnormality	78
	R5	Freeze-up protection control or high pressure control	79
	R6	Fan motor or related abnormality	81
	C4	Heat exchanger thermistor abnormality	83
	C9	Room temperature thermistor abnormality	83
Outdoor Unit	E1	Outdoor unit PCB abnormality	85
	E5★	OL activation (compressor overload)	86
	E6★	Compressor lock	87
	E7	DC fan lock	88
	E8	Input over current detection	89
	F3	Discharge pipe temperature control	91
	H0	Sensor abnormality	92
	H6	Position sensor abnormality	94
	H8	CT or related abnormality	95
	H9	Outdoor air thermistor or related abnormality	97
	J3	Discharge pipe thermistor or related abnormality	97
	J6	Heat exchanger thermistor or related abnormality	97
	L3	Electrical box temperature rise	99
	L4	Radiation fin temperature rise	101
	L5	Output over current detection	103
	P4	Radiation fin thermistor or related abnormality	97
U7	Signal transmission error	108	

★: Displayed only when system-down occurs.

## 4.2 Indoor Unit PCB Abnormality

Remote Control Display *A1*

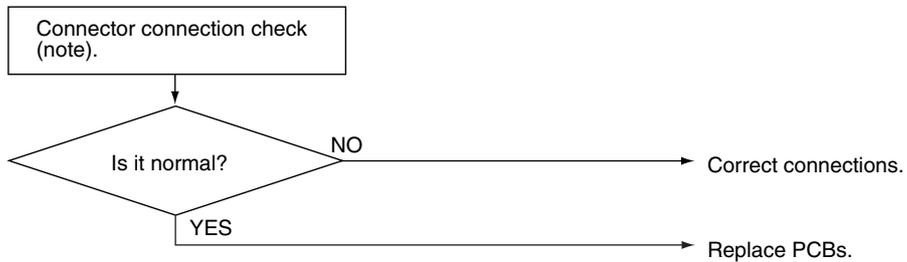
**Method of Malfunction Detection** Evaluation of zero-cross detection of power supply by indoor unit.

**Malfunction Decision Conditions** When there is no zero-cross detection in approximately 10 continuous seconds.

- Supposed Causes**
- Faulty indoor unit PCB
  - Faulty connector connection

**Troubleshooting**

 **Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(R1400)

 **Note:** Connector Nos. vary depending on models.

Model Type	Connector No.
Floor Standing Type	Control PCB (indoor unit) : S7, S201, S203 Power Supply PCB (indoor unit) : S8, S202, S204

## 4.3 Freeze-up Protection Control or High Pressure Control

Remote Control *A5*  
Display

### Method of Malfunction Detection

- High pressure control (heat pump model only)  
During heating operations, the temperature detected by the indoor heat exchanger thermistor is used for the high pressure control (stop, outdoor fan stop, etc.)
- The freeze-up protection control (operation halt) is activated during cooling operation according to the temperature detected by the indoor unit heat exchanger thermistor.

### Malfunction Decision Conditions

- High pressure control  
During heating operations, the temperature detected by the indoor heat exchanger thermistor is above 65°C
- Freeze-up protection  
When the indoor unit heat exchanger temperature is below 0°C during cooling operation.

### Supposed Causes

- Operation halt due to clogged air filter of the indoor unit.
- Operation halt due to dust accumulation on the indoor unit heat exchanger.
- Operation halt due to short-circuit.
- Detection error due to faulty indoor unit heat exchanger thermistor.
- Detection error due to faulty indoor unit PCB.

Troubleshooting

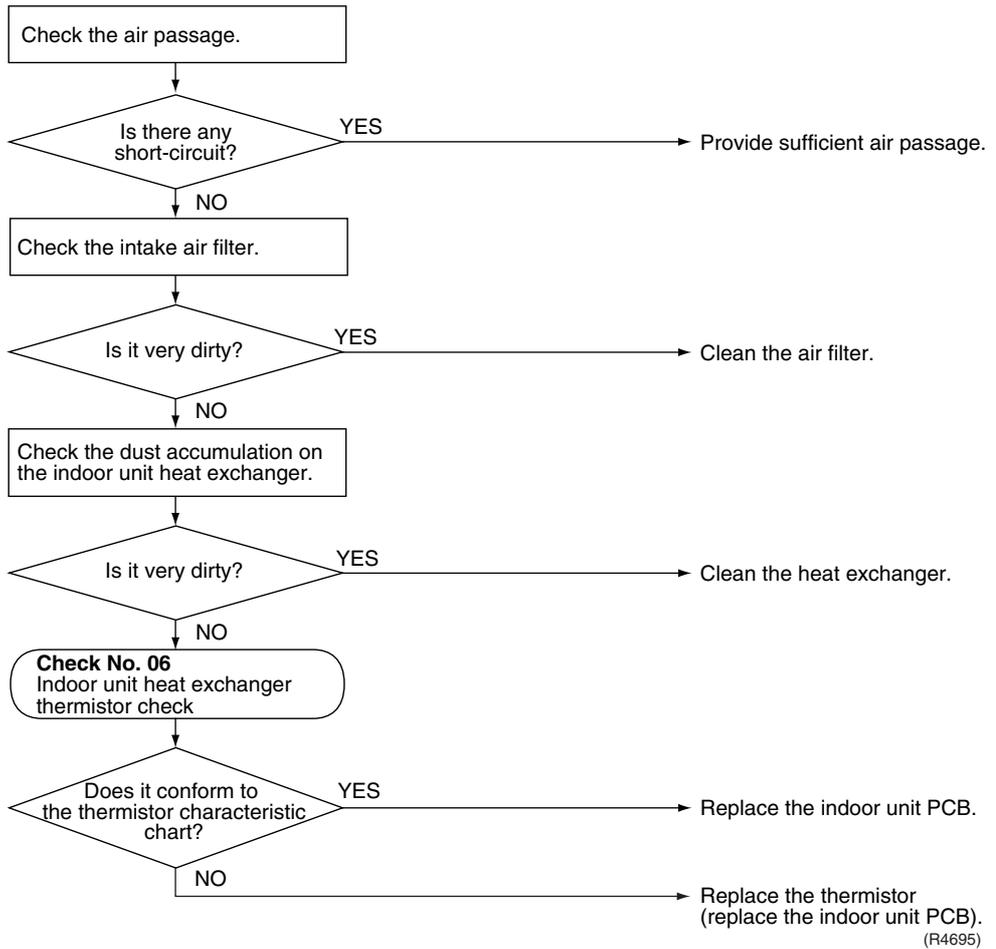


**Check No.06**  
Refer to P.112



**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



## 4.4 Fan Motor (DC Motor) or Related Abnormality

---

Remote Control  
Display

*AB*

---

Method of  
Malfunction  
Detection

The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor operation.

---

Malfunction  
Decision  
Conditions

When the detected rotation speed does not reach the demanded rotation speed of the target tap, and is less than 50% of the maximum fan motor rotation speed.

---

Supposed  
Causes

- Operation halt due to short circuit inside the fan motor winding.
- Operation halt due to breaking of wire inside the fan motor.
- Operation halt due to breaking of the fan motor lead wires.
- Operation halt due to faulty capacitor of the fan motor.
- Detection error due to faulty indoor unit PCB (1).

Troubleshooting



**Check No.01**  
Refer to P.109

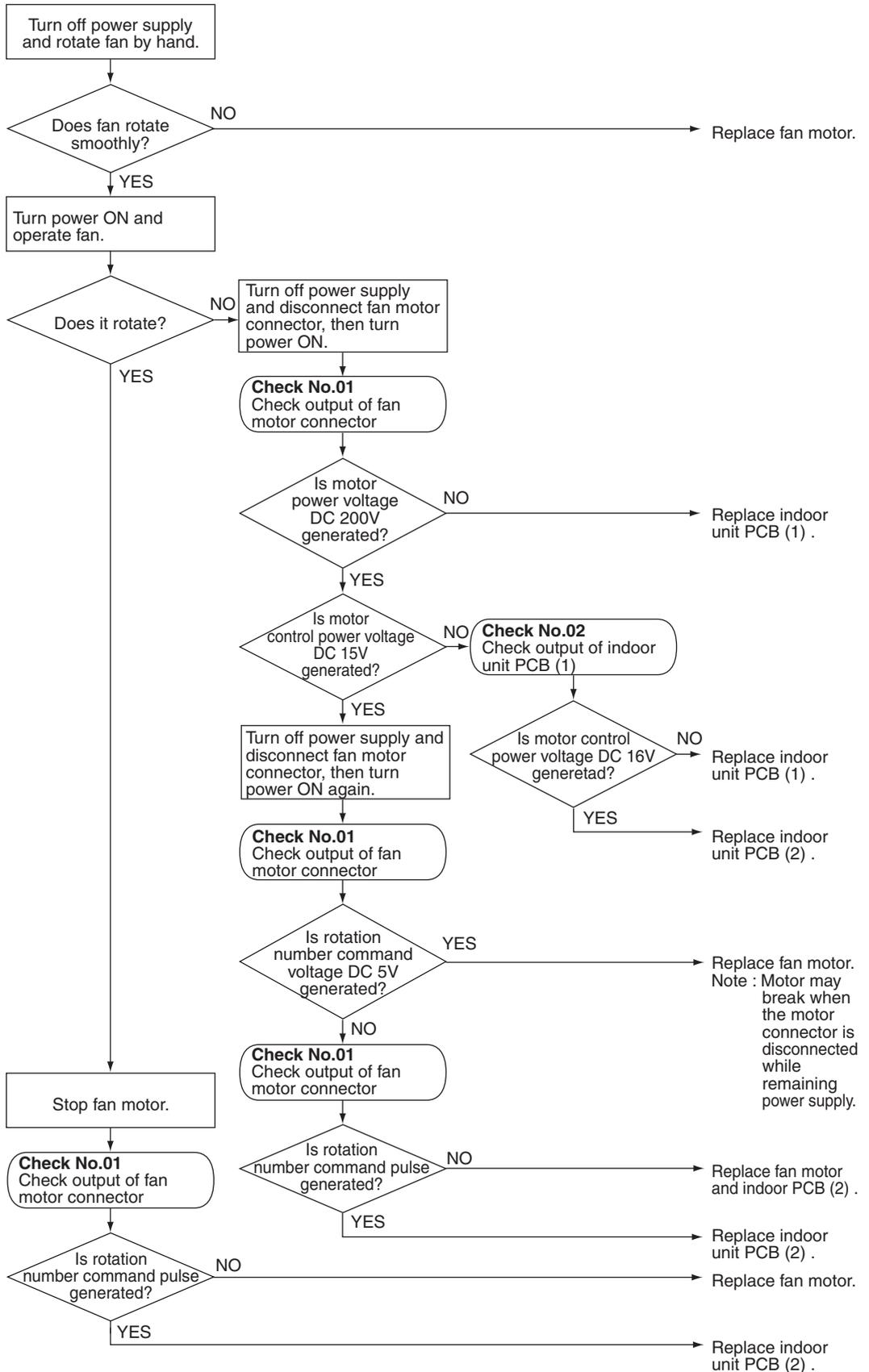


**Check No.02**  
Refer to P.109



**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(R1214)

## 4.5 Thermistor or Related Abnormality (Indoor Unit)

Remote Control *Ⓒ4, Ⓒ9*  
Display

### Method of Malfunction Detection

The temperatures detected by the thermistors are used to determine thermistor errors.

### Malfunction Decision Conditions

When the thermistor input is more than 4.96 V or less than 0.04 V during compressor operation\*.

\* (reference)

When above about 212°C (less than 120 Ω) or below about -50°C (more than 1,860 kΩ).



**Note:** The values vary slightly in some models.

### Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

### Troubleshooting

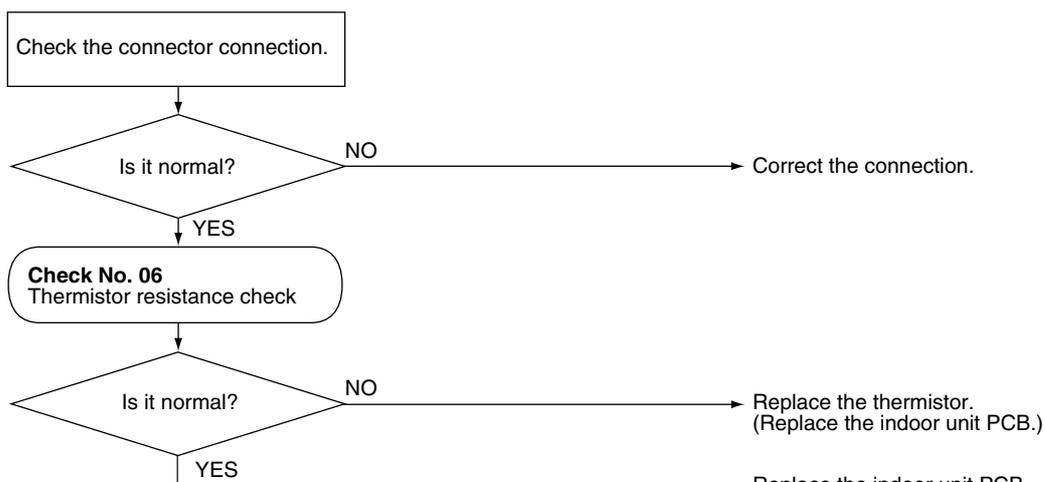


**Check No.06**  
Refer to P.112



#### Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Ⓒ

Ⓒ9 : Room temperature thermistor

(R4696)

## 4.6 Signal Transmission Error (between Indoor and Outdoor Units)

Remote Control Display **U4**

**Method of Malfunction Detection** The data received from the outdoor unit in indoor unit-outdoor unit signal transmission is checked whether it is normal.

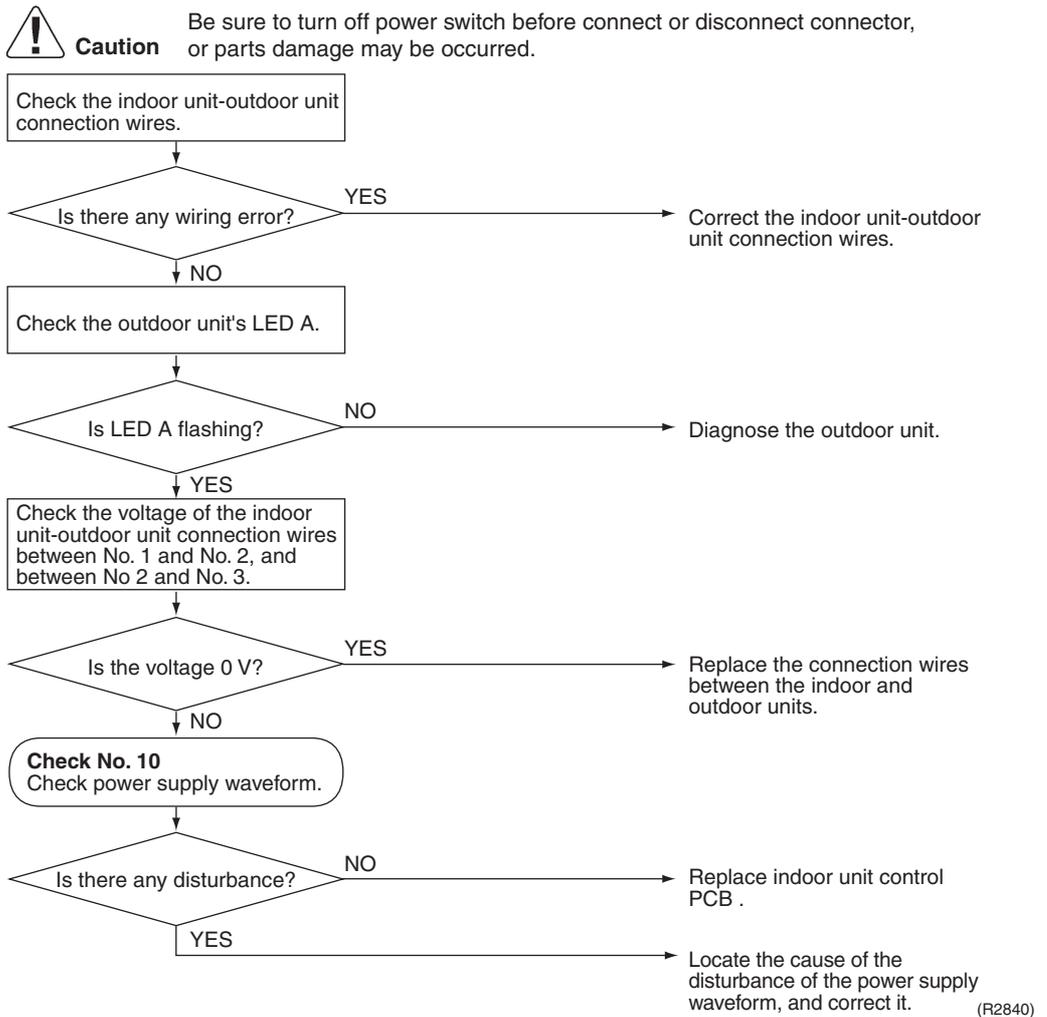
**Malfunction Decision Conditions** When the data sent from the outdoor unit cannot be received normally, or when the content of the data is abnormal.

- Supposed Causes**
- Faulty outdoor unit PCB.
  - Faulty indoor unit PCB.
  - Indoor unit-outdoor unit signal transmission error due to wiring error.
  - Indoor unit-outdoor unit signal transmission error due to disturbed power supply waveform.
  - Indoor unit-outdoor unit signal transmission error due to breaking of wire in the connection wires between the indoor and outdoor units (wire No. 2).

**Troubleshooting**



**Check No.10**  
Refer to P.115



## 4.7 Outdoor Unit PCB Abnormality

Remote Control  
Display

*E1*

Method of  
Malfunction  
Detection

- Detect within the programme of the microcomputer that the programme is in normal running order.

Malfunction  
Decision  
Conditions

- When the programme of the microcomputer is in abnormal running order.

Supposed  
Causes

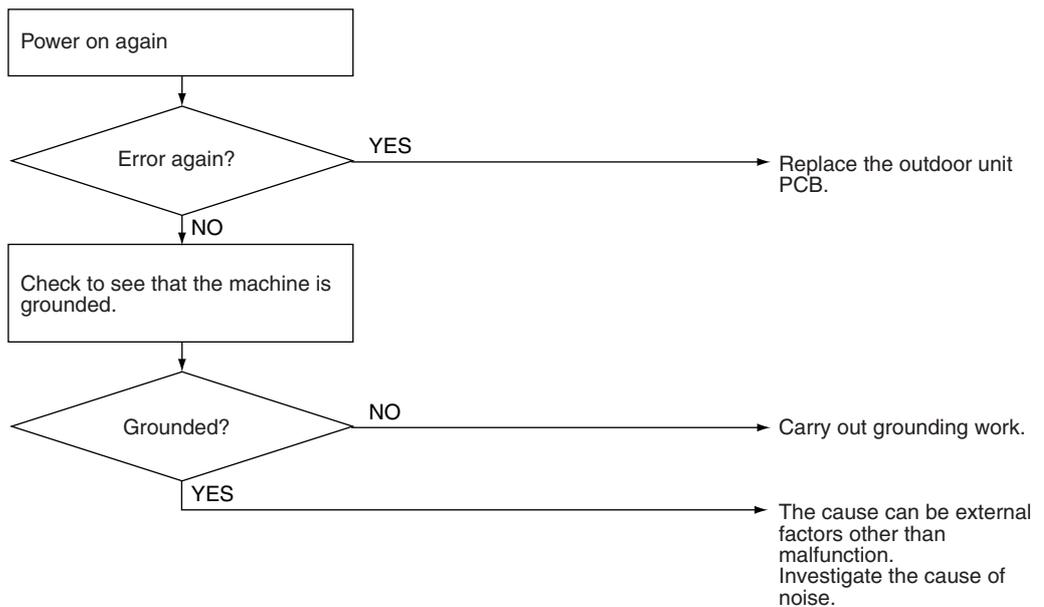
- Out of control of microcomputer caused by external factors
  - Noise
  - Momentary fall of voltage
  - Momentary power loss
- Defective outdoor unit PCB

### Troubleshooting



**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(R5142)

## 4.8 OL Activation (Compressor Overload)

Remote Control Display *E5*

Method of Malfunction Detection  
A compressor overload is detected through compressor OL.

Malfunction Decision Conditions

- If the compressor OL is activated twice, the system will be shut down.
- The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).

\* The operating temperature condition is not specified.

Supposed Causes

- Refrigerant shortage
- Four way valve malfunctioning
- Outdoor unit PCB defective
- Water mixed in the local piping
- Electronic expansion valve defective
- Stop valve defective

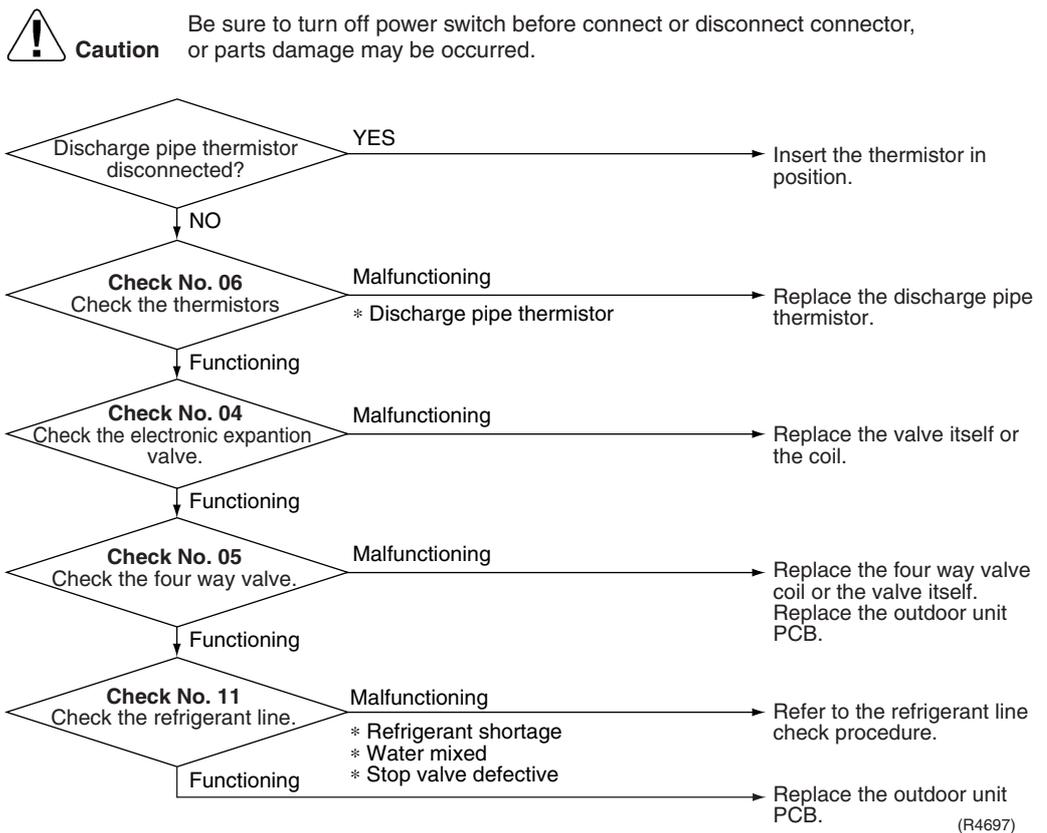
### Troubleshooting

  
Check No.04  
Refer to P.110

  
Check No.05  
Refer to P.111

  
Check No.06  
Refer to P.112

  
Check No.11  
Refer to P.115



## 4.9 Compressor Lock

Remote Control  
Display

EE

Method of  
Malfunction  
Detection

A compressor lock is detected by checking the compressor running condition through the position detection circuit.

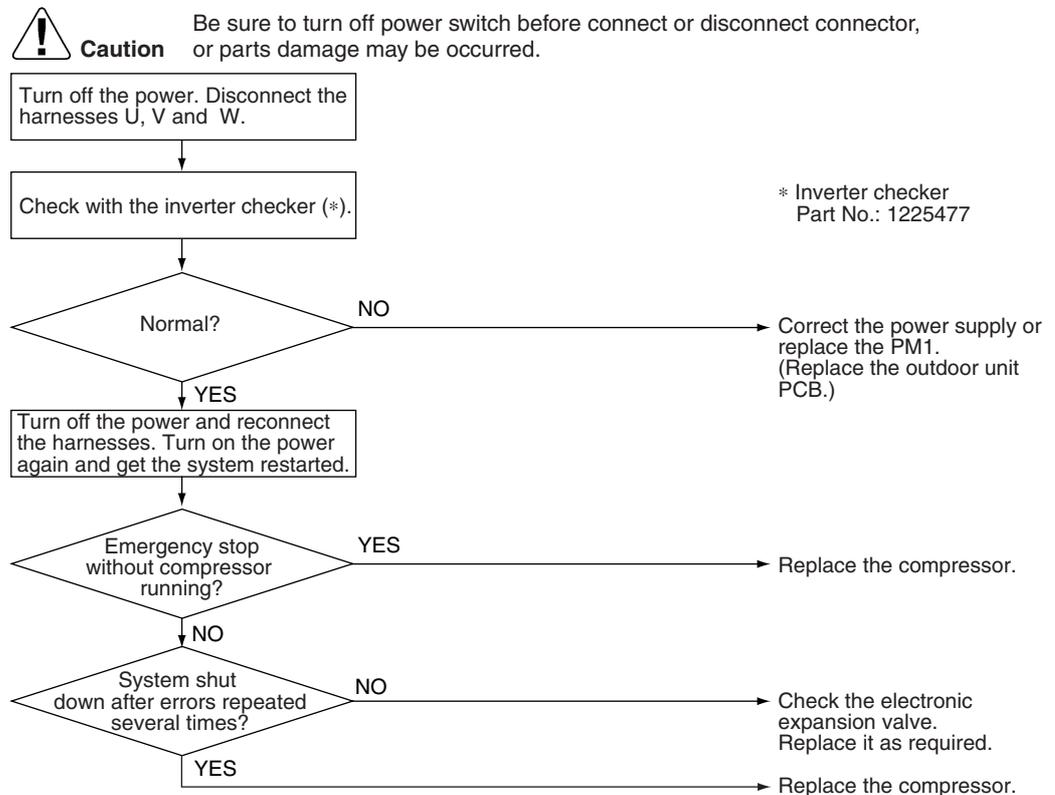
Malfunction  
Decision  
Conditions

- Judging from current waveform generated when applying high-frequency voltage to the motor.
- The system will be shut down if the error occurs 16 times.
- Clearing condition: Continuous run for about 5 minutes (normal)

Supposed  
Causes

- Compressor locked

Troubleshooting



(R5212)

## 4.10 DC Fan Lock

Remote Control Display **E7**

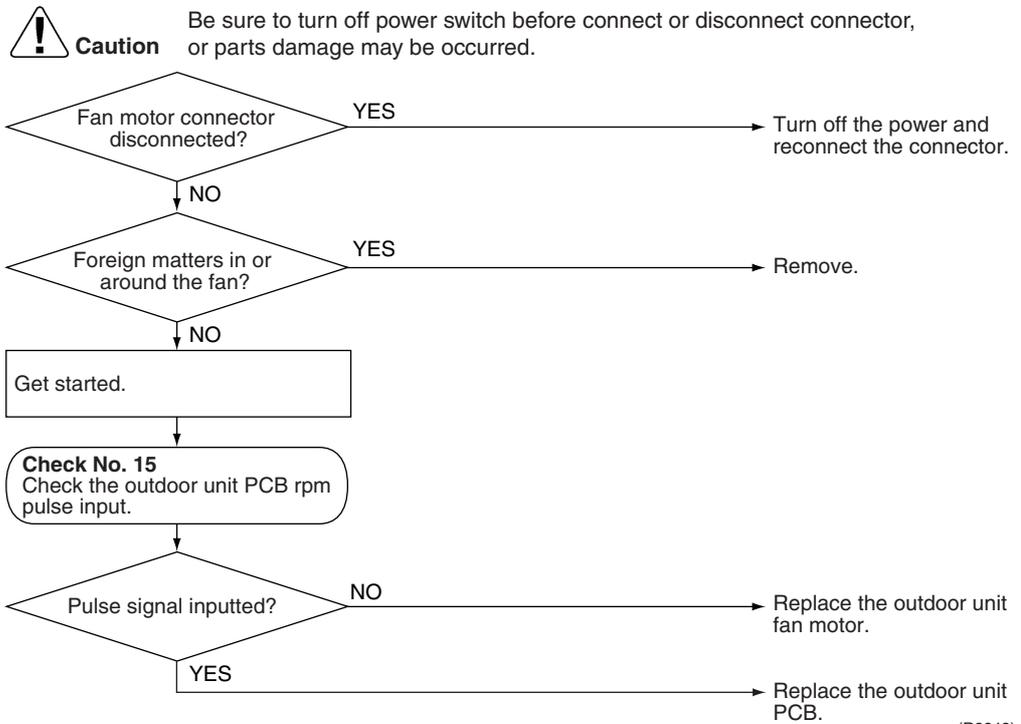
**Method of Malfunction Detection** A fan motor or related error is detected by checking the high-voltage fan motor rpm being detected by the Hall IC.

- Malfunction Decision Conditions**
- The fan does not start in 30 seconds even when the fan motor is running.
  - The system will be shut down if the error occurs 16 times.
  - Clearing condition: Continuous run for about 5 minutes (normal)

- Supposed Causes**
- Fan motor breakdown
  - Harness or connector disconnected between fan motor and PCB or in poor contact
  - Foreign matters stuck in the fan

### Troubleshooting

  
**Check No.15**  
 Refer to P.117



(R2843)

## 4.11 Input Over Current Detection

---

Remote Control  
Display

*EE*

---

Method of  
Malfunction  
Detection

An input over-current is detected by checking the input current value being detected by CT with the compressor running.

---

Malfunction  
Decision  
Conditions

- The following CT input with the compressor running continues for 2.5 seconds.  
CT input : Above 20 A
  - The system will be shut down if the error occurs 16 times.
  - Clearing condition : Continuous run for about 5 minutes (normal)
- 

Supposed  
Causes

- Over-current due to compressor failure
- Over-current due to defective power transistor
- Over-current due to defective inverter main circuit electrolytic capacitor
- Over-current due to defective outdoor unit PCB
- Error detection due to outdoor unit PCB
- Over-current due to short-circuit

Troubleshooting



**Check No.07**  
Refer to P.113



**Check No.08**  
Refer to P.114



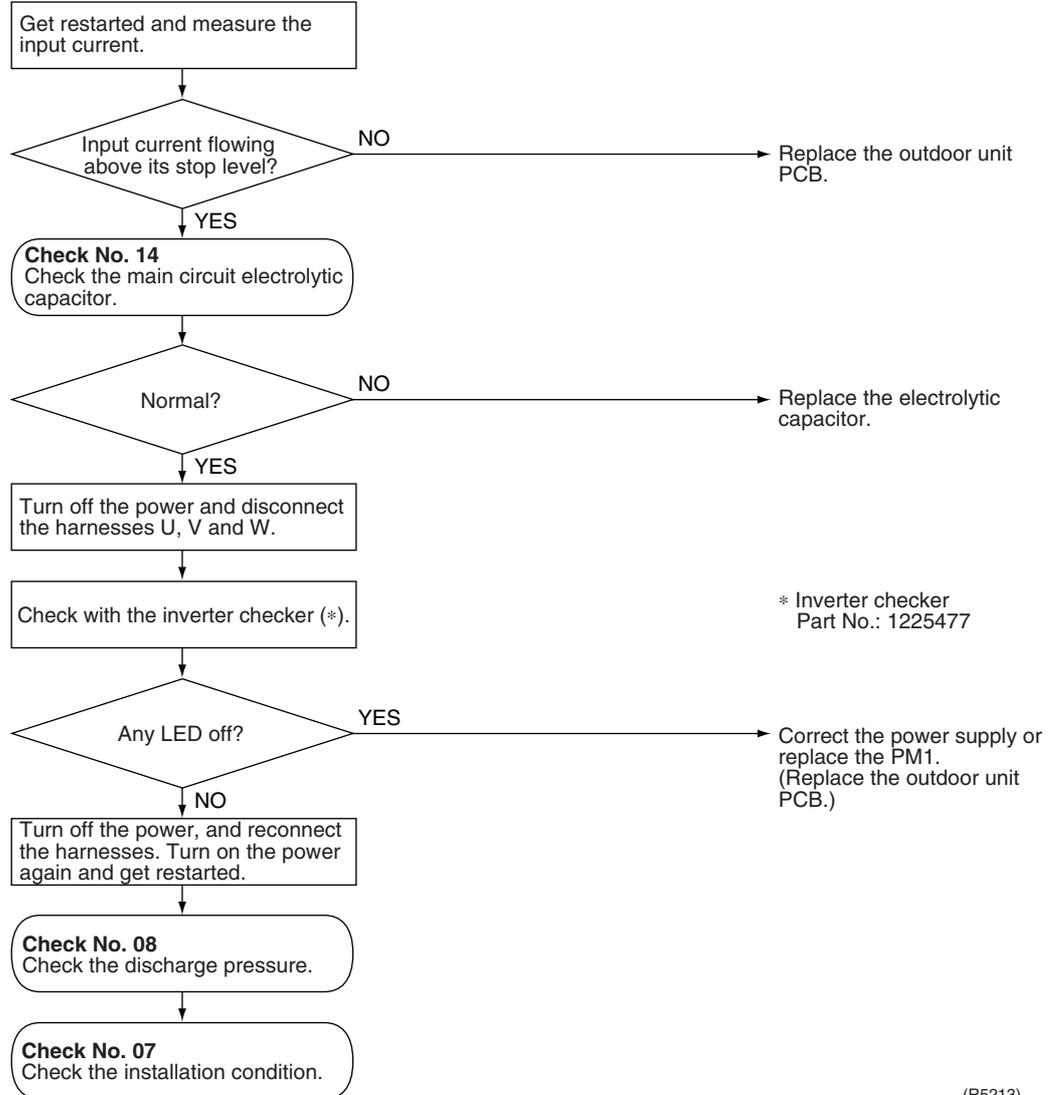
**Check No.14**  
Refer to P.117



**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

\* An input over-current may result from wrong internal wiring. If the wires have been disconnected and reconnected for part replacement, for example, and the system is interrupted by an input over-current, take the following procedure.



\* Inverter checker  
Part No.: 1225477

(R5213)

## 4.12 Discharge Pipe Temperature Control

Remote Control Display **F3**

**Method of Malfunction Detection** The discharge pipe temperature control (stop, frequency drooping, etc.) is checked with the temperature being detected by the discharge pipe thermistor.

**Malfunction Decision Conditions**

- If a stop takes place 6 times successively due to abnormal discharge pipe temperature, the system will be shut down.
- If the temperature being detected by the discharge pipe thermistor rises above  $\text{A}^{\circ}\text{C}$ , the compressor will stop. (The error is cleared when the temperature has dropped below  $\text{B}^{\circ}\text{C}$ .)

	50 class
A	110
B	95

- The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).

**Supposed Causes**

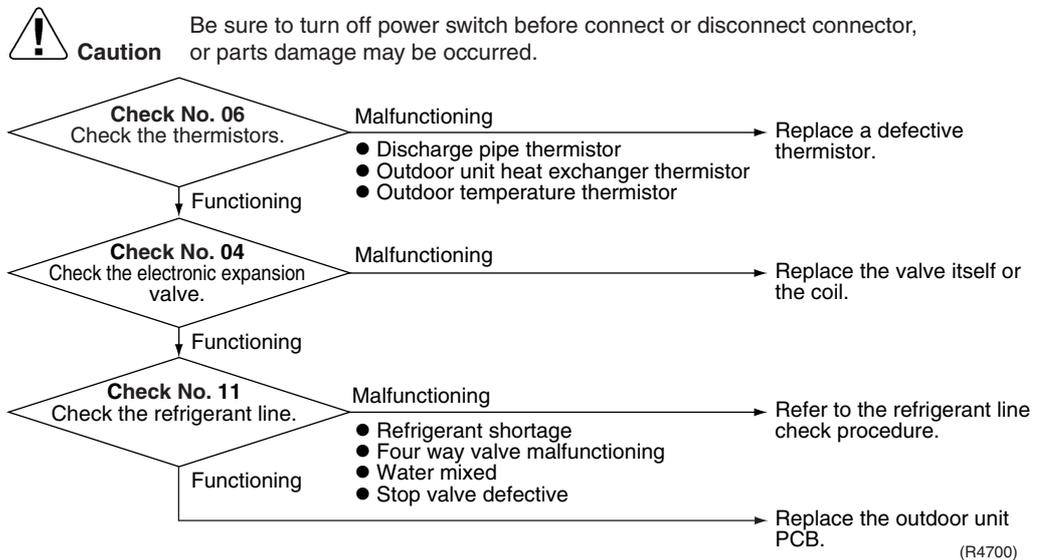
- Refrigerant shortage
- Four way valve malfunctioning
- Discharge pipe thermistor defective (heat exchanger or outdoor temperature thermistor defective)
- Outdoor unit PCB defective
- Water mixed in the local piping
- Electronic expansion valve defective
- Stop valve defective

### Troubleshooting

  
**Check No.04**  
 Refer to P.110

  
**Check No.06**  
 Refer to P.112

  
**Check No.11**  
 Refer to P.115



## 4.13 Compressor Sensor System Abnormality

Remote Control  
Display

*HO*

**Method of  
Malfunction  
Detection**

- Fault condition is identified by the supply voltage and the DC voltage which is detected before the compressor startup.
- Fault condition is identified by compressor current which is detected right after the compressor startup.

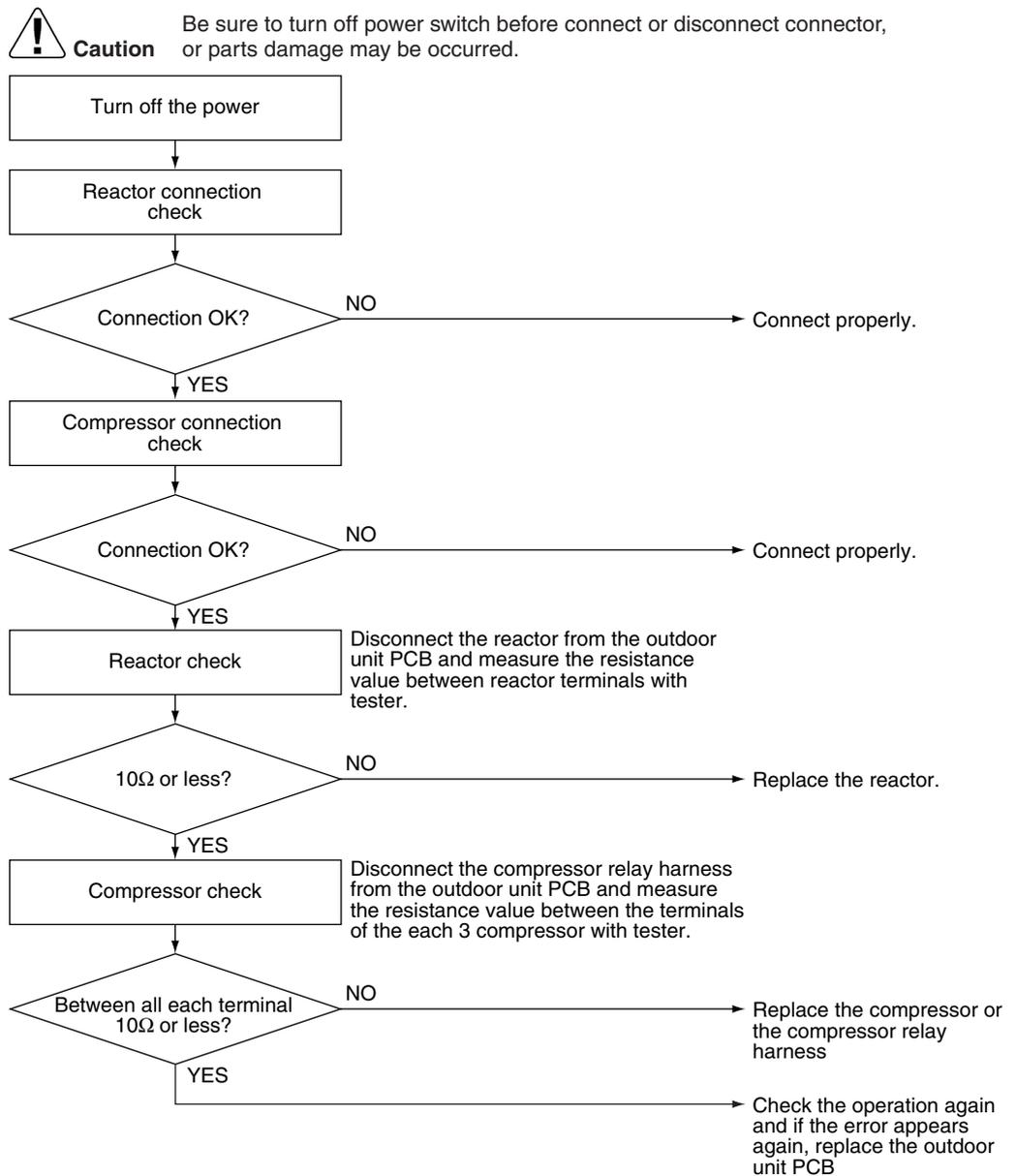
**Malfunction  
Decision  
Conditions**

- The detected value of the supply voltage and the DC voltage is obviously low or high.
- The compressor current doesn't run when the compressor is started.

**Supposed  
Causes**

- Reactor disconnection
- Compressor disconnection
- Outdoor unit PCB defective
- Compressor defective

## Troubleshooting



(R5131)

## 4.14 Position Sensor Abnormality

Remote Control Display *H6*

**Method of Malfunction Detection**

A compressor startup failure is detected by checking the compressor running condition through the position detection circuit.

**Malfunction Decision Conditions**

- The compressor fails to start in about 15 seconds after the compressor run command signal is sent.
- Clearing condition: Continuous run for about 5 minutes (normal)
- The system will be shut down if the error occurs 8 times.

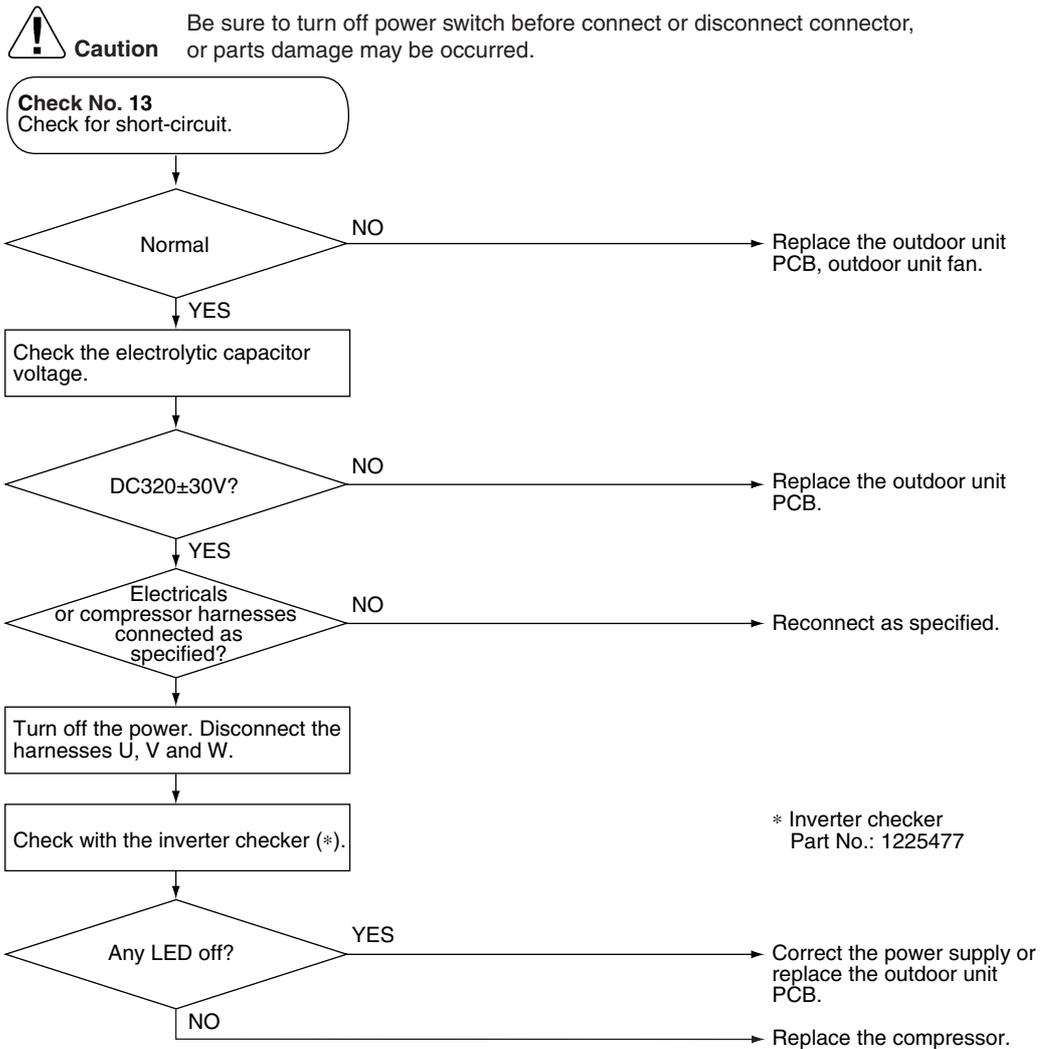
**Supposed Causes**

- Compressor relay cable disconnected
- Compressor itself defective
- Outdoor unit PCB defective
- Stop valve closed
- Input voltage out of specification

### Troubleshooting



**Check No.13**  
Refer to P.116



(R5211)

## 4.15 CT or Related Abnormality

---

Remote Control  
Display

*H8*

---

Method of  
Malfunction  
Detection

A CT or related error is detected by checking the compressor running frequency and CT-detected input current.

---

Malfunction  
Decision  
Conditions

The compressor running frequency is below 55 Hz and the CT input is below 0.1 V.  
(The input current is also below 0.5 A.)

- If this error repeats 4 times, the system will be shut down.
  - The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).
- 

Supposed  
Causes

- Power transistor defective
- Internal wiring broken or in poor contact
- Reactor defective
- Outdoor unit PCB defective

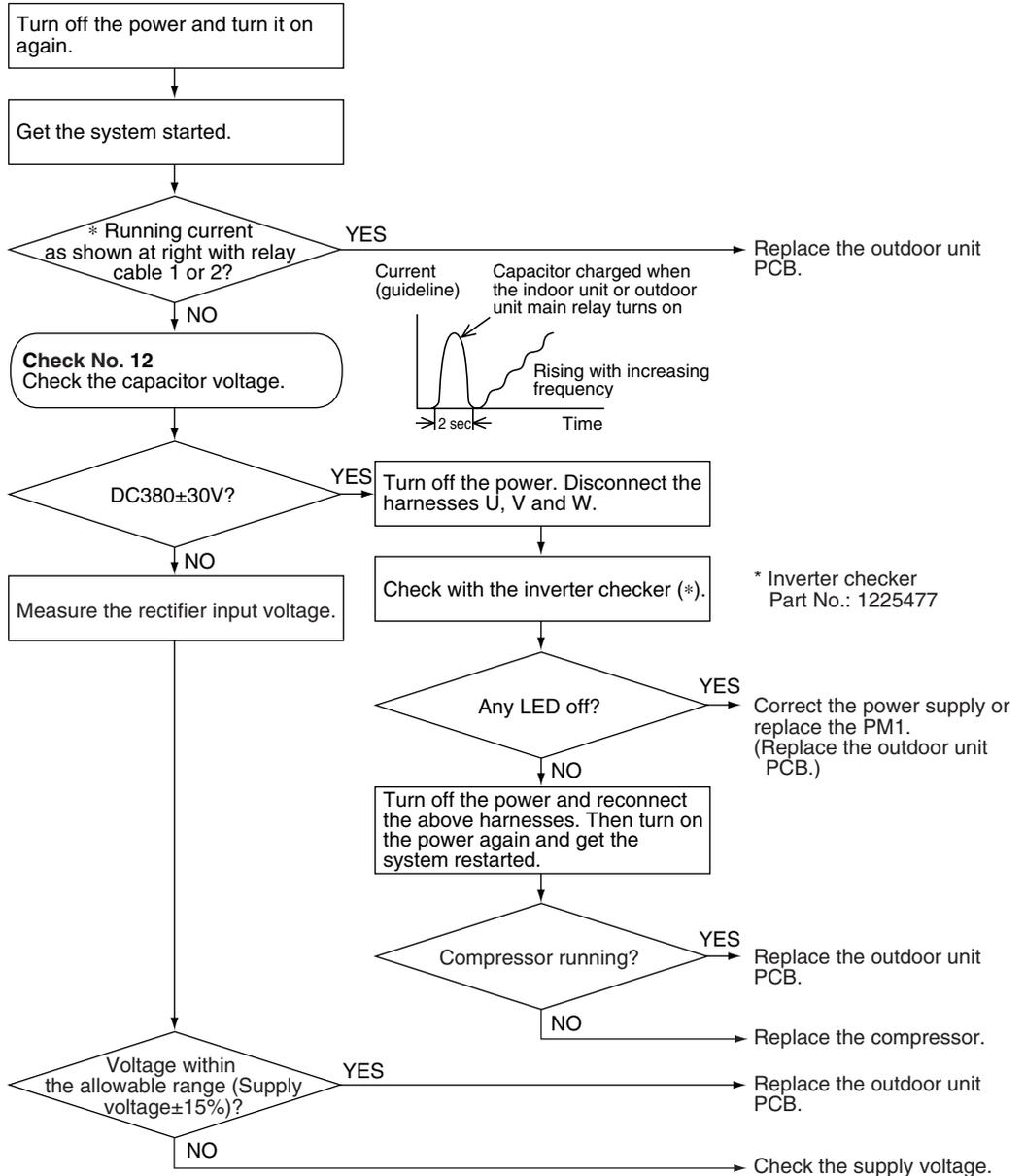
Troubleshooting



**Check No.12**  
Refer to P.116



**Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



\* Inverter checker  
Part No.: 1225477

(R5214)

## 4.16 Thermistor or Related Abnormality (Outdoor Unit)

---

Remote Control  
Display

*P4, J3, J6, H9*

---

**Method of  
Malfunction  
Detection**

This type of error is detected by checking the thermistor input voltage to the microcomputer.  
[A thermistor error is detected by checking the temperature.]

---

**Malfunction  
Decision  
Conditions**

The thermistor input is above 4.96 V or below 0.04 V with the power on.  
Error *J3* is judged if the discharge pipe thermistor temperature is smaller than the condenser thermistor temperature.

---

**Supposed  
Causes**

- Connector in poor contact
- Thermistor defective
- Outdoor unit PCB defective
- Indoor unit PCB defective
- Condenser thermistor defective in the case of *J3* error (outdoor unit heat exchanger thermistor in the cooling mode, or indoor unit heat exchanger thermistor in the heating mode)

Troubleshooting

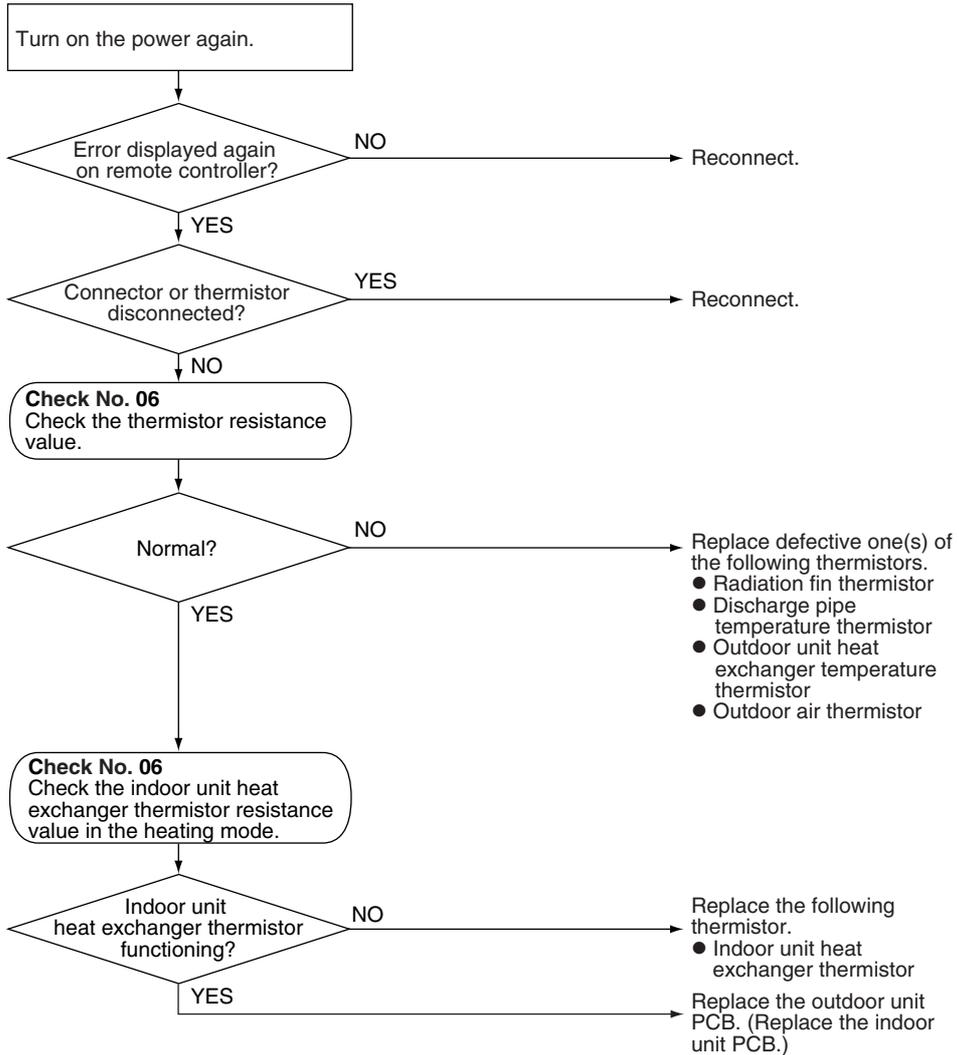


**Check No.06**  
Refer to P.112



**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



- F7 : Radiation fin thermistor
- J3 : Discharge pipe thermistor
- J5 : Outdoor heat exchanger thermistor
- H9 : Outdoor air thermistor

(R4711)

## 4.17 Electrical Box Temperature Rise

---

Remote Control  
Display

*L3*

---

Method of  
Malfunction  
Detection

An electrical box temperature rise is detected by checking the radiation fin thermistor with the compressor off.

---

Malfunction  
Decision  
Conditions

With the compressor off, the radiation fin temperature is above 95°C. (Reset is made when the temperature drops below 80°C.)

---

Supposed  
Causes

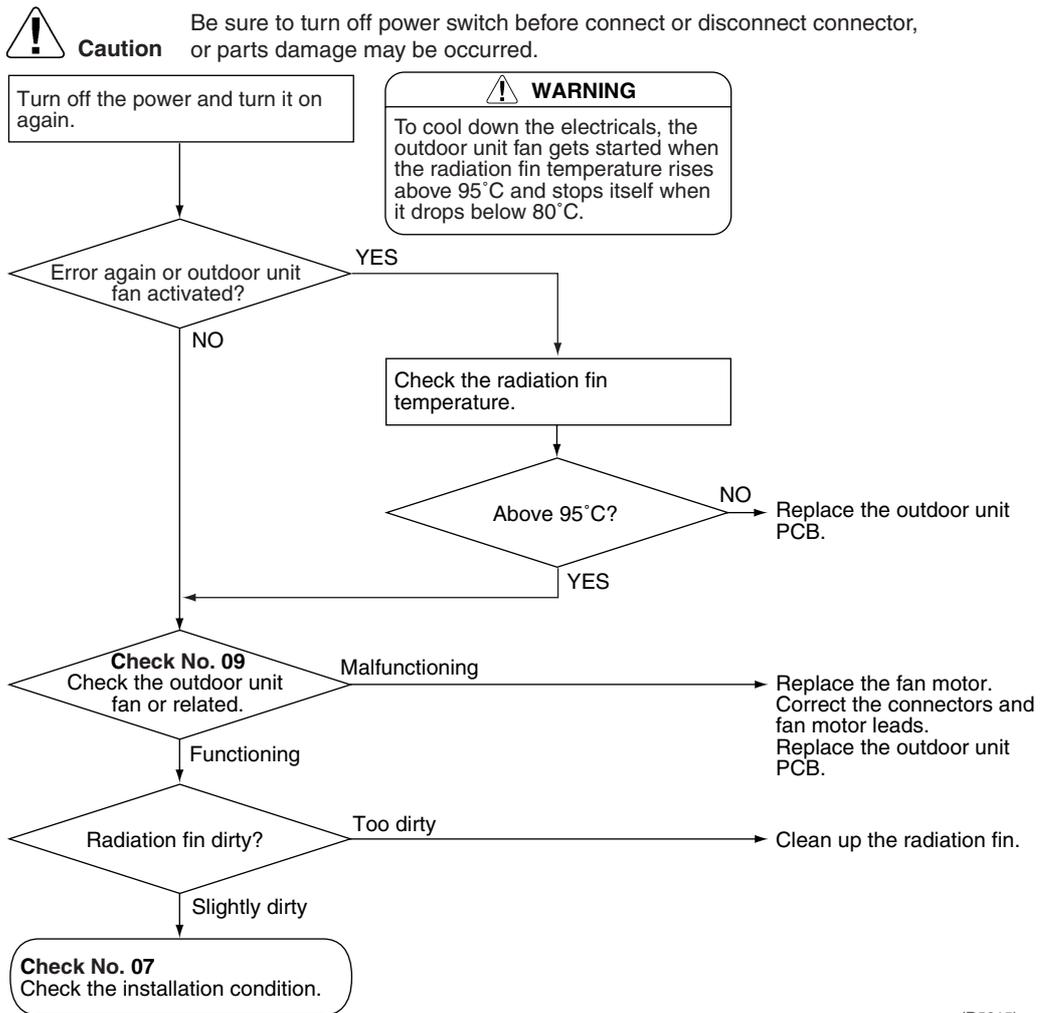
- Fin temperature rise due to defective outdoor unit fan
- Fin temperature rise due to short-circuit
- Fin thermistor defective
- Connector in poor contact
- Outdoor unit PCB defective

Troubleshooting

  
**Check No.06**  
 Refer to P.112

  
**Check No.07**  
 Refer to P.113

  
**Check No.09**  
 Refer to P.114



(R5215)

## 4.18 Radiation Fin Temperature Rise

---

Remote Control  
Display

L4

---

**Method of  
Malfunction  
Detection**

A radiation fin temperature rise is detected by checking the radiation fin thermistor with the compressor on.

---

**Malfunction  
Decision  
Conditions**

- If the radiation fin temperature with the compressor on is above 105°C,
  - The error is cleared when the temperature drops below 99°C.
  - If a radiation fin temperature rise takes place 4 times successively, the system will be shut down.
  - The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).
- 

**Supposed  
Causes**

- Fin temperature rise due to defective outdoor unit fan
- Fin temperature rise due to short-circuit
- Fin thermistor defective
- Connector in poor contact
- Outdoor unit PCB defective

Troubleshooting



**Check No.06**  
Refer to P.112



**Check No.07**  
Refer to P.113

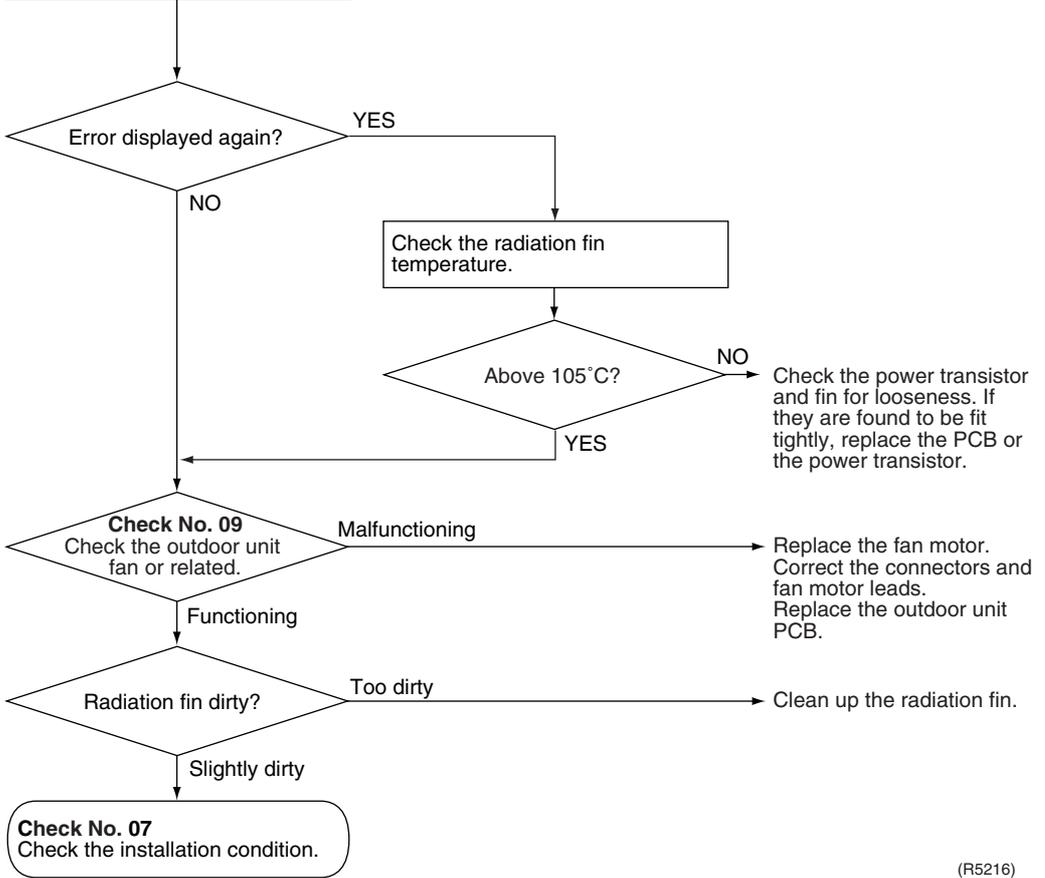


**Check No.09**  
Refer to P.114



**Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Turn off the power and turn it on again to get the system started.



(R5216)

## 4.19 Output Over Current Detection

---

Remote Control  
Display

*L5*

---

Method of  
Malfunction  
Detection

An output over-current is detected by checking the current that flows in the inverter DC section.

---

Malfunction  
Decision  
Conditions

- A position signal error occurs while the compressor is running.
  - A speed error occurs while the compressor is running.
  - An output over-current input is fed from the output over-current detection circuit to the microcomputer.
  - The system will be shut down if the error occurs 16 times.
  - Clearing condition: Continuous run for about 5 minutes (normal)
- 

Supposed  
Causes

- Over-current due to defective power transistor
- Over-current due to wrong internal wiring
- Over-current due to abnormal supply voltage
- Over-current due to defective PCB
- Error detection due to defective PCB
- Over-current due to closed stop valve
- Over-current due to compressor failure
- Over-current due to poor installation condition

Troubleshooting



**Check No.07**  
Refer to P.113



**Check No.08**  
Refer to P.114

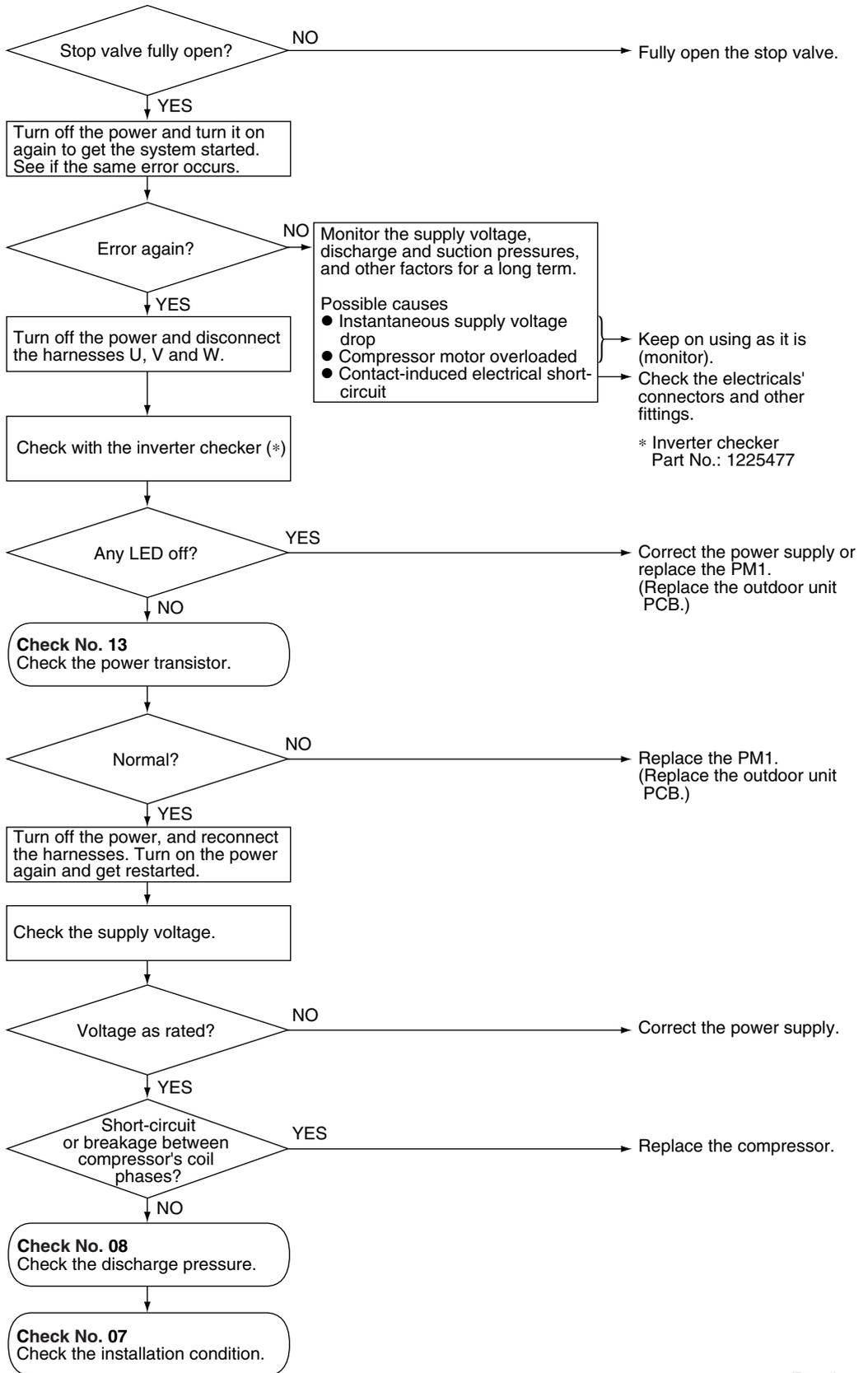


**Check No.13**  
Refer to P.116



**Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

\* An output over-current may result from wrong internal wiring. If the wires have been disconnected and reconnected for part replacement, for example, and the system is interrupted by an output over-current, take the following procedure.



\* Inverter checker  
Part No.: 1225477

(R5235)

## 4.20 Insufficient Gas

Remote Control  
Display

U0

Method of  
Malfunction  
Detection

Gas shortage detection I : A gas shortage is detected by checking the CT-detected input current value and the compressor running frequency.

Gas shortage detection II : A gas shortage is detected by checking the difference between indoor unit heat exchanger temperature and room temperature as well as the difference between outdoor unit heat exchanger temperature and room temperature.

Malfunction  
Decision  
Conditions

Gas shortage detection I :

DC current  $\leq A$  (A/Hz)  $\times$  Output frequency + B

However, when the status of running frequency > 55 (Hz) is kept on for a certain time.

Note : The values are different from model to model.

	A	B
50 class	18 / 1000	0.7

Gas shortage detection II :

If a gas shortage error takes place 4 times successively, the system will be shut down. The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).

Supposed  
Causes

- Refrigerant shortage (refrigerant leakage)
- Poor compression performance of compressor
- Discharge pipe thermistor disconnected, or indoor unit or outdoor unit heat exchanger thermistor disconnected, room or outside air temperature thermistor disconnected
- Stop valve closed
- Electronic expansion valve defective

Troubleshooting



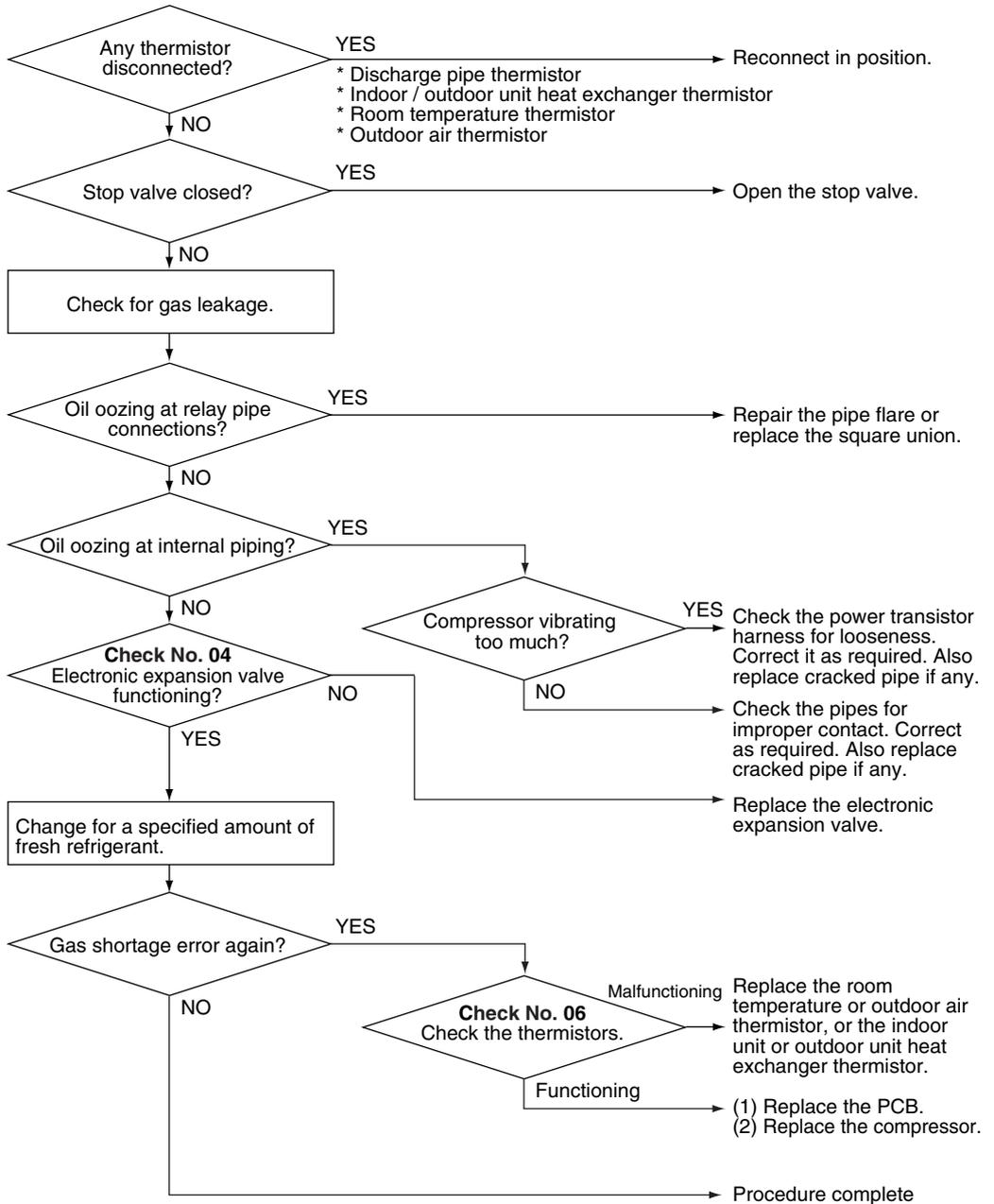
Check No.04  
Refer to P.110



Check No.06  
Refer to P.112



**Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(R5218)

## 4.21 Low-voltage Detection or Over-voltage Detection

Remote Control  
Display

U2

Method of  
Malfunction  
Detection

An abnormal voltage rise or drop is detected by checking the detection circuit or DC voltage detection circuit.

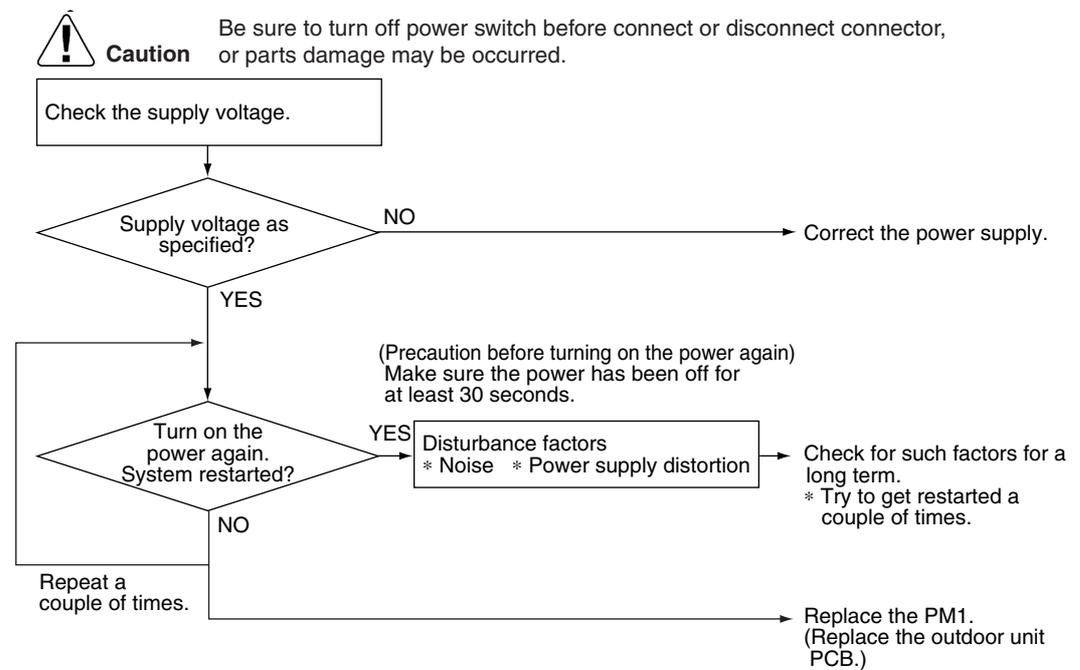
Malfunction  
Decision  
Conditions

- An over-voltage signal is fed from the over-voltage detection circuit to the microcomputer, or the voltage being detected by the DC voltage detection circuit is judged to be below 150 V for 0.1 second.
- The system will be shut down if the error occurs 16 times.
- Clearing condition: Continuous run for about 60 minutes (normal)

Supposed  
Causes

- Supply voltage not as specified
- Over-voltage detector or DC voltage detection circuit defective
- PAM control part(s) defective

Troubleshooting



(R5219)

## 4.22 Signal Transmission Error on Outdoor Unit PCB

Remote Control Display

U7

Method of Malfunction Detection

Communication error between microcomputer mounted on the main microcomputer and PM1.

Malfunction Decision Conditions

- When the data sent from the PM1 can not be received successively for 9 sec.
- The abnormality is determined if the above fault conditions occurs once.
- Fault counter is reset when the data from the PM1 can be successfully received.

Supposed Causes

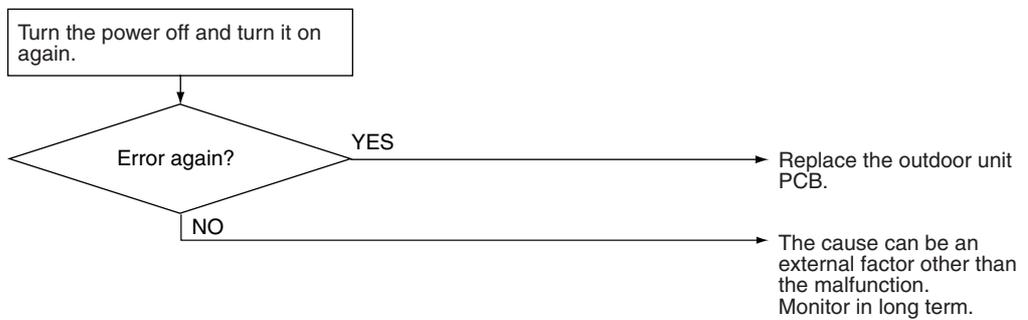
- Defective outdoor unit PCB

Troubleshooting



**Caution**

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(R5152)

## 5. Check

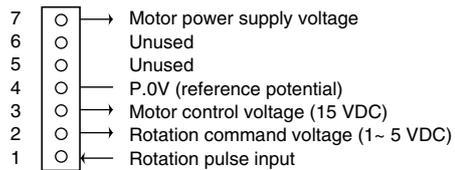
### 5.1 How to Check

#### 5.1.1 Fan Motor Connector Output Check

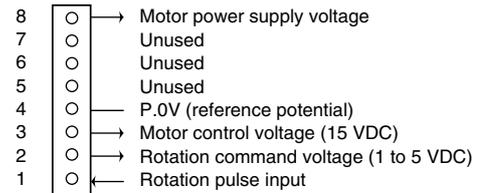
##### Check No.01

1. Check connector connection.
2. Check motor power supply voltage output (pins 4-7 and 4-8).
3. Check motor control voltage (pins 4-3).
4. Check rotation command voltage output (pins 4-2).
5. Check rotation pulse input (pins 4-1).

Upper fan connector



Lower fan connector

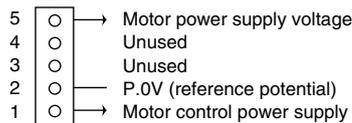


(R1224)

##### Check No.02

1. Check connector connection.
2. Check motor control voltage output (pins 2-1).

S202

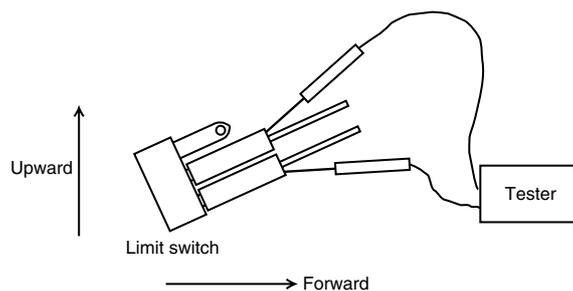


(R1073)

#### 5.1.2 Limit Switch Continuity check

##### Check No.03

Remove the front grille. The limit switch is located at the left side of the drain pan assembly. Check the continuity of the switch connection.



Shutter status	Open	Closed
Continuity	Continuity	No continuity

(Q0363)

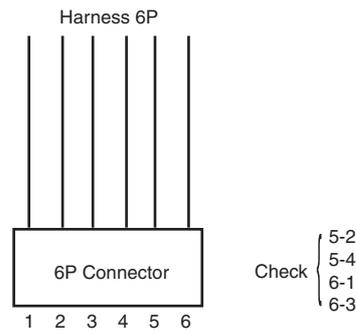
- \* The shutter can be opened and closed with hand. Keep the shutter open and closed all the way for each continuity check steps.

### 5.1.3 Electronic Expansion Valve Check

#### Check No.04

Conduct the followings to check the electronic expansion valve (EV).

1. Check to see if the EV connector is correctly inserted in the PCB. Compare the EV unit and the connector number.
2. Turn the power off and back on again, and check to see if all the EVs generate latching sound.
3. If any of the EVs does not generate latching noise in the above step 2, disconnect that connector and check the conductivity using a tester.  
Check the conductivity between pins 1, 3 and 6, and between pins 2, 4 and 5. If there is no conductivity between the pins, the EV coil is faulty.



(R1082)

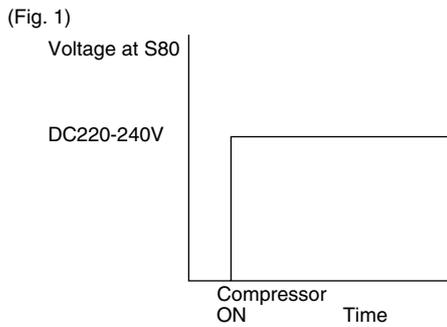
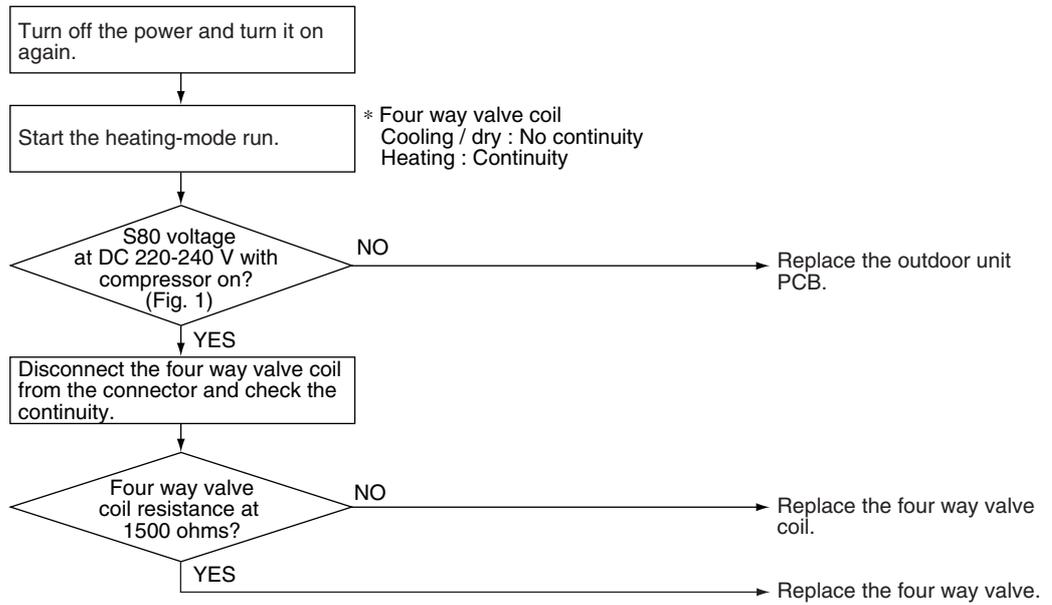
4. If no EV generates latching sound in the above step 2, the outdoor unit PCB is faulty.
5. If the conductivity is confirmed in the above step 2, mount a good coil (which generated latching sound) in the EV unit that did not generate latching sound, and check to see if that EV generates latching sound.
  - \*If latching sound is generated, the outdoor unit PCB is faulty.
  - \*If latching sound is not generated, the EV unit is faulty.



**Note:** Please note that the latching sound varies depending on the valve type.

### 5.1.4 Four Way Valve Performance Check

Check No.05



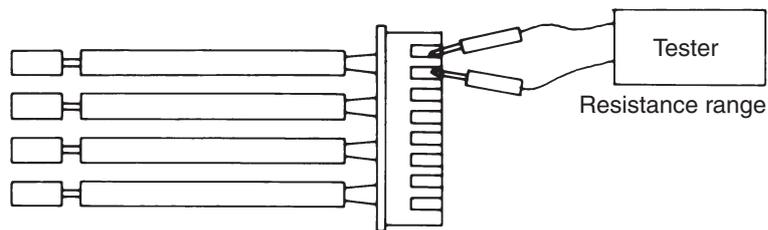
(R5220)

### 5.1.5 Thermistor Resistance Check

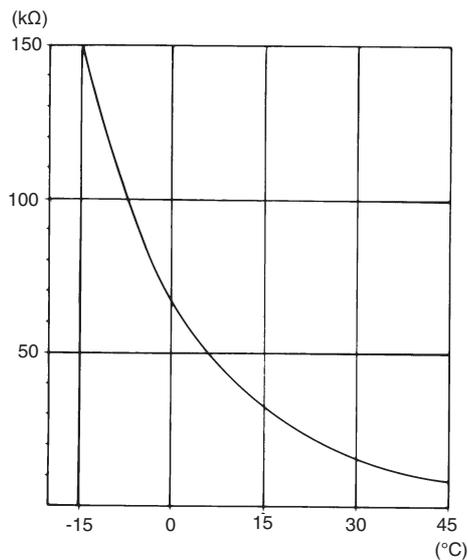
**Check No.06**

Remove the connectors of the thermistors on the PCB, and measure the resistance of each thermistor using tester.  
 The relationship between normal temperature and resistance is shown in the graph and the table below.

Temperature (°C)	Thermistor R25°C=20kΩ B=3950
-20	211.0 (kΩ)
-15	150
-10	116.5
-5	88
0	67.2
5	51.9
10	40
15	31.8
20	25
25	20
30	16
35	13
40	10.6
45	8.7
50	7.2



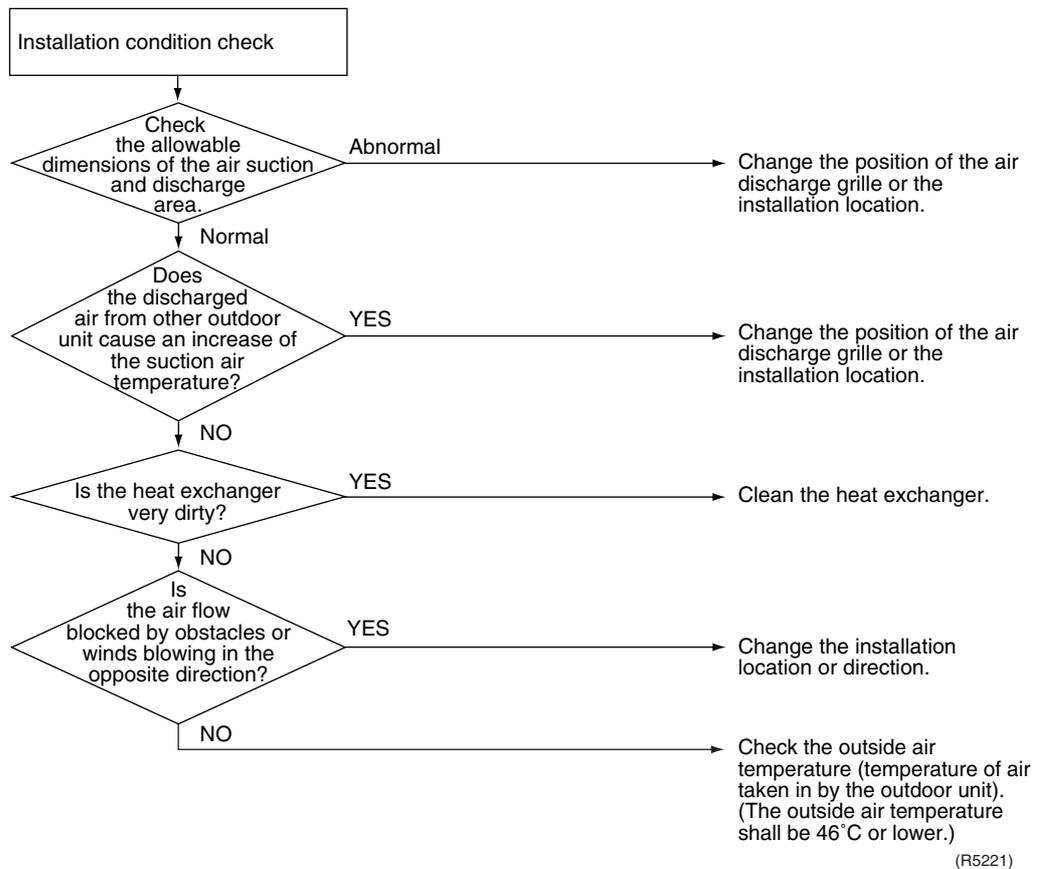
(R25=20kΩ, B=3950)



(R1437)

## 5.1.6 Installation Condition Check

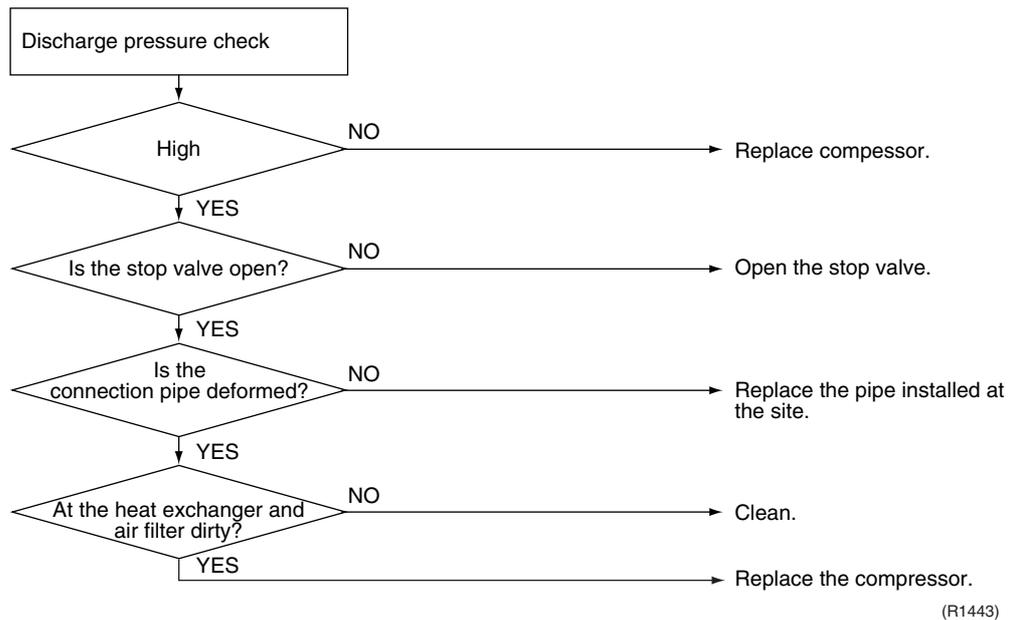
### Check No.07



(R5221)

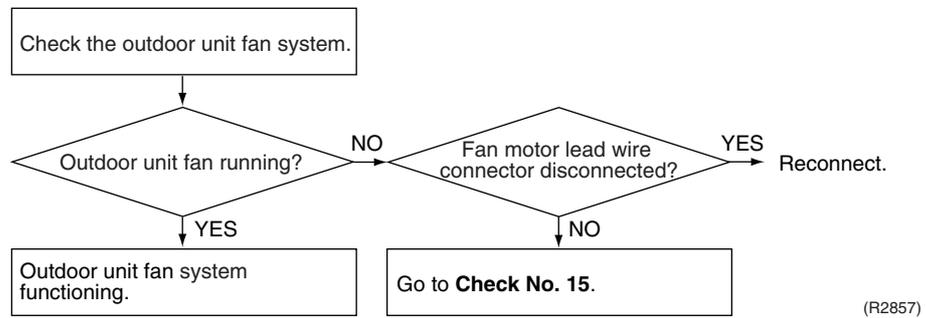
### 5.1.7 Discharge Pressure Check

Check No.08



### 5.1.8 Outdoor Unit Fan System Check (With DC Motor)

Check No.09



### 5.1.9 Power Supply Waveforms Check

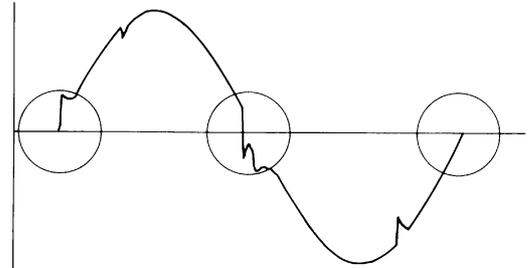
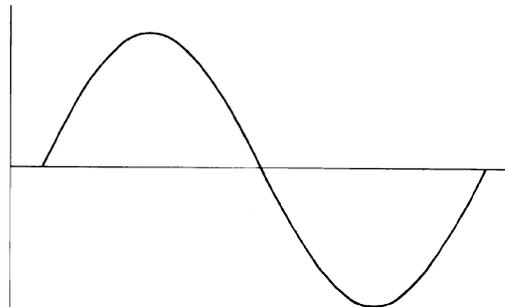
**Check No.10**

Measure the power supply waveform between pins 1 and 3 on the terminal board, and check the waveform disturbance.

- Check to see if the power supply waveform is a sine wave (Fig.1).
- Check to see if there is waveform disturbance near the zero cross (sections circled in Fig.2)

[Fig.1]

[Fig.2]

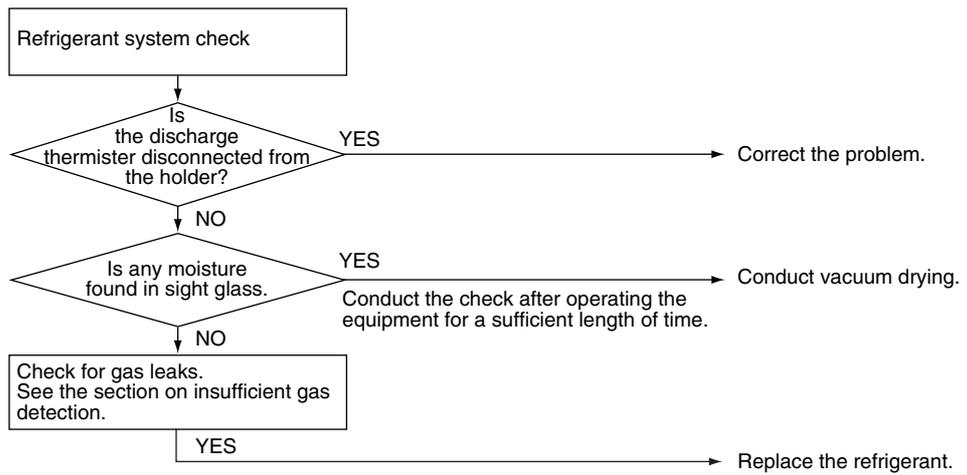


(R1736)

(R1444)

### 5.1.10 Inverter Units Refrigerant System Check

**Check No.11**



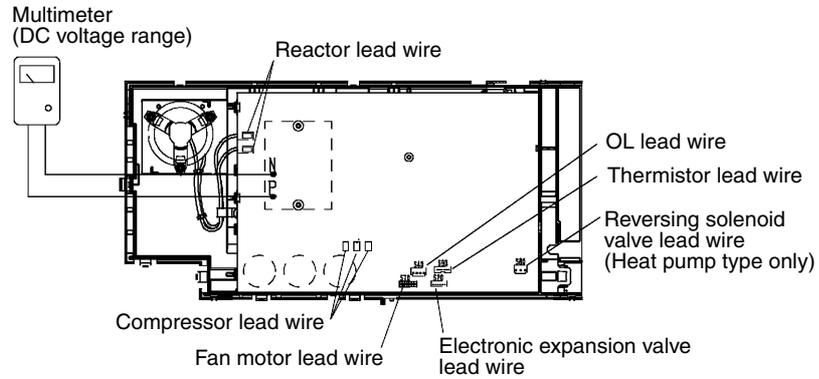
(R1445)

### 5.1.11 Capacitor Voltage Check

**Check No.12**

Before this checking, be sure to check the main circuit for short-circuit.

- Checking the capacitor voltage
- With the circuit breaker still on, measure the voltage according to the drawing of the model in question. Be careful never to touch any live parts.



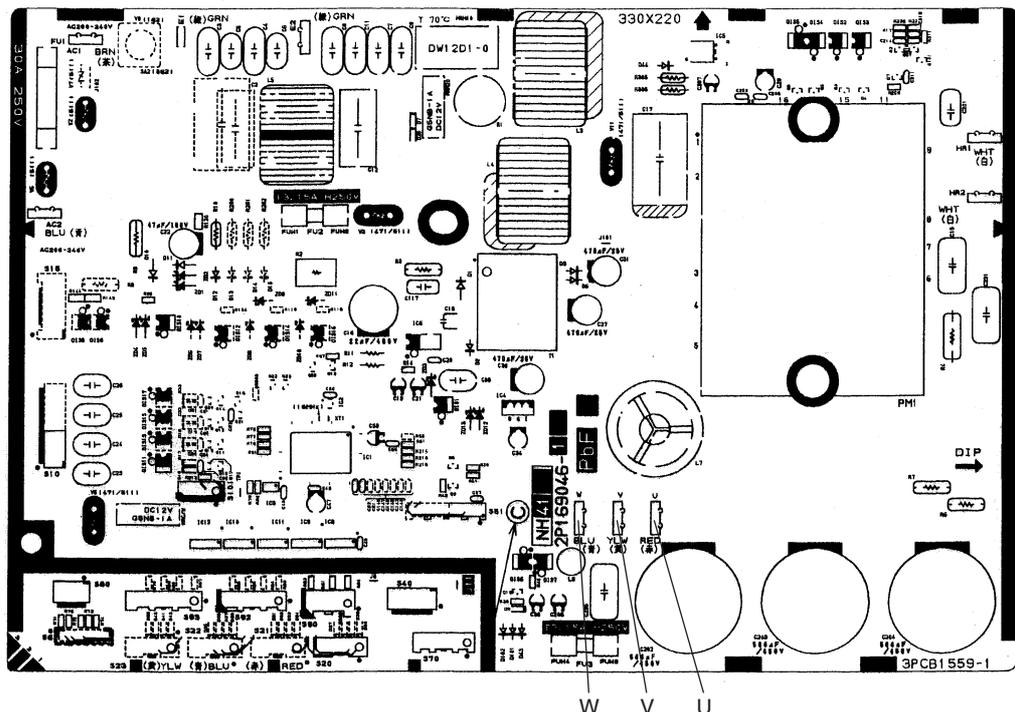
(R5222)

### 5.1.12 Power Transistor Check

**Check No.13**

- Checking the power transistor
- Never touch any live parts for at least 10 minutes after turning off the circuit breaker.
- If unavoidably necessary to touch a live part, make sure the power transistor's supply voltage is below 50 V using the tester.
- For the UVW, make measurements at the Faston terminal on the board or the relay connector.

Tester's negative terminal	Power transistor (+)	UVW	Power transistor (-)	UVW
Tester's positive terminal	UVW	Power transistor (+)	UVW	Power transistor (-)
Normal resistance	Several kΩ to several MΩ			
Abnormal resistance	0 or ∞			

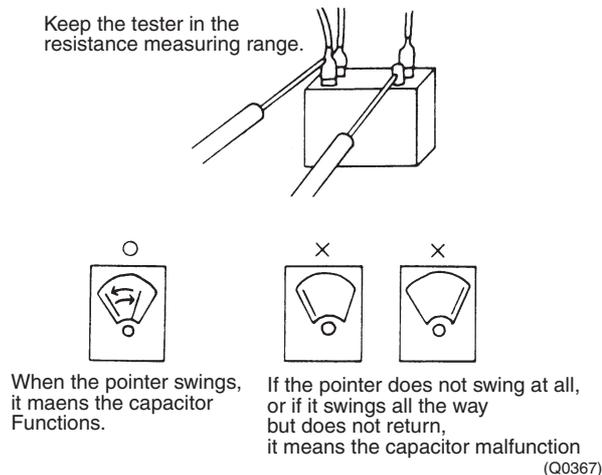


(R5237)

## 5.1.13 Main Circuit Electrolytic Capacitor Check

### Check No.14

- Checking the main circuit electrolytic capacitor
- Never touch any live parts for at least 10 minutes after turning off the circuit breaker.
- If unavoidably necessary to touch a live part, make sure there is no DC voltage using the tester.
- Check the continuity with the tester. Reverse the pins and make sure there is continuity.



## 5.1.14 Turning Speed Pulse Input on the Outdoor Unit PCB Check

### Check No.15

<Propeller fan motor>

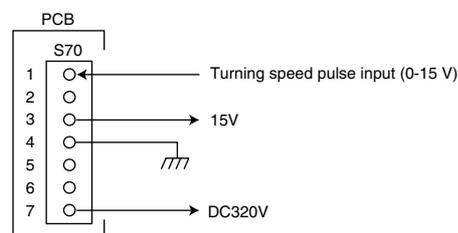
Make sure the voltage of  $320\pm 30V$  is being applied.

- (1) Stop the operation first and then the power off, and disconnect the connector S70.
- (2) Make sure there is about DC 320 V between pins 4 and 7.
- (3) With the system and the power still off, reconnect the connector S70.
- (4) Make a turn of the fan motor with a hand, and make sure the pulse (0-15 V) appears twice at pins 1 and 4.

If the fuse for fan motor protection is blown out, the outdoor-unit fan may also be in trouble. Check the fan too.

If the voltage in Step (2) is not applied, it means the PCB is defective. Replace the PCB.

If the pulse in Step (4) is not available, it means the Hall IC is defective. Replace the DC fan motor. If there are both the voltage (2) and the pulse (4), replace the PCB.



(R5223)

\* Propeller fan motor : S70



# Part 7

## Removal Procedure

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# 1. Indoor Unit

## 1.1 Removal of the Air Filter / Front Panel

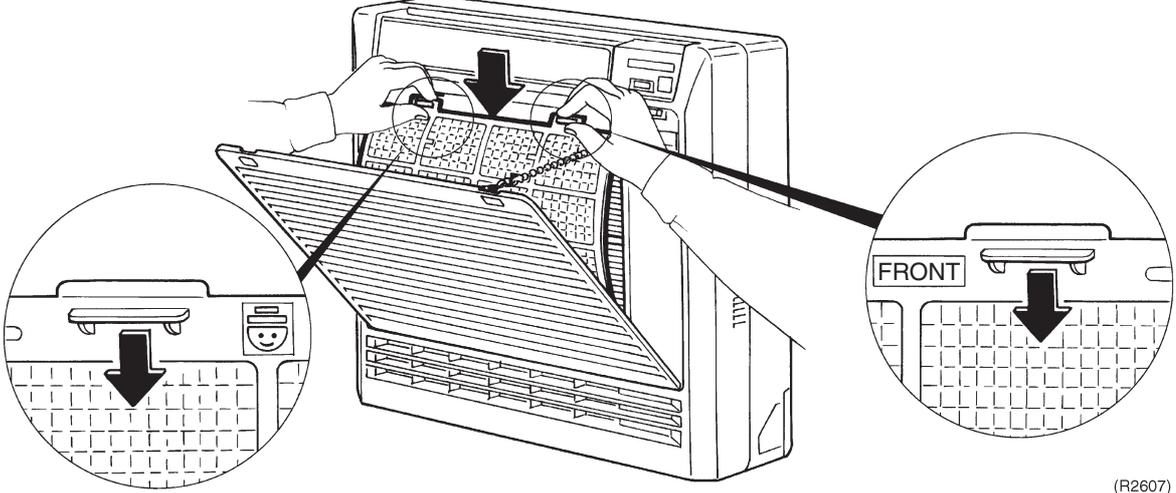
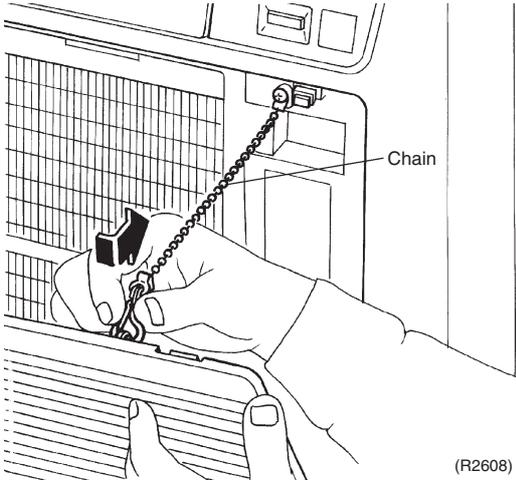
**Procedure**

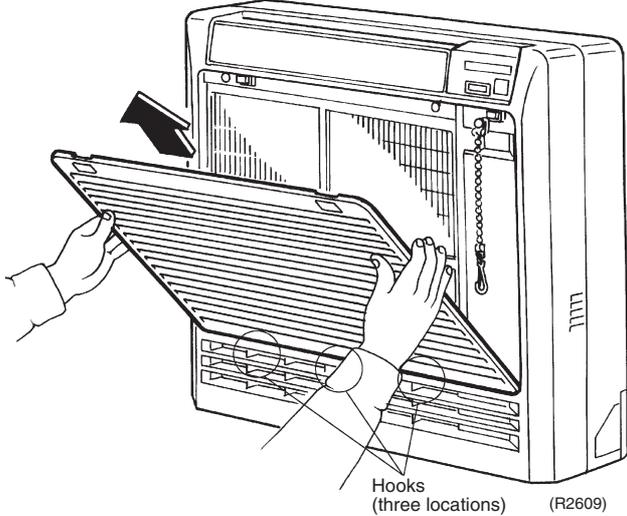
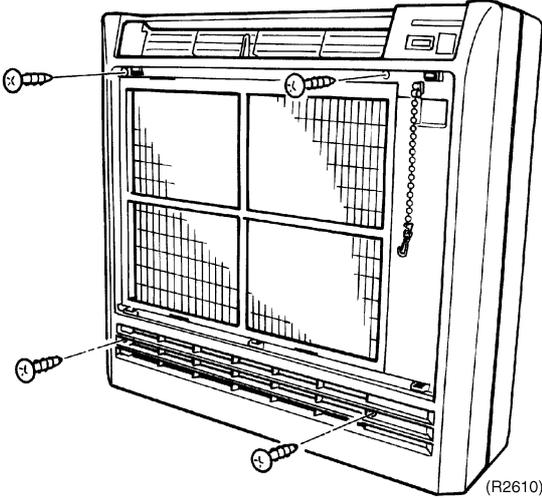
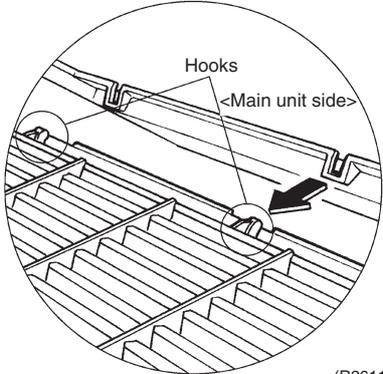


**Warning**

Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Procedure	Points
1	<p>Appearance</p> <ul style="list-style-type: none"> <li>Enlarged illustration shows operation panel section.</li> </ul>	<p>Top discharge port</p> <p>Front panel (Suction port)</p> <p>Bottom discharge port</p>	<p>Operation panel</p> <p>Signal receiving section</p> <p>(R2604)</p>
2	<p>Remove the front panel from the unit. Push on the left and right upper parts of the panel marked with "PUSH" to open the front panel.</p>		<p>Motion of push lock</p> <p>When push the knob, the lock plate draws in.</p> <p>When push it again, the plate comes out.</p> <p>(R2605)</p> <p>Push lock</p> <p>AIR OUTLET SELECTION</p> <p>(R2606)</p>

Step	Procedure	Points
3	<p data-bbox="204 219 448 409">Press down the 2 hooks located at left and right side upper parts of the air filter, then bend slightly the air filter to remove it.</p>  <p data-bbox="1380 920 1444 943">(R2607)</p>	
4	<p data-bbox="204 969 411 1003">Unhook the chain.</p>  <p data-bbox="970 1464 1034 1487">(R2608)</p>	

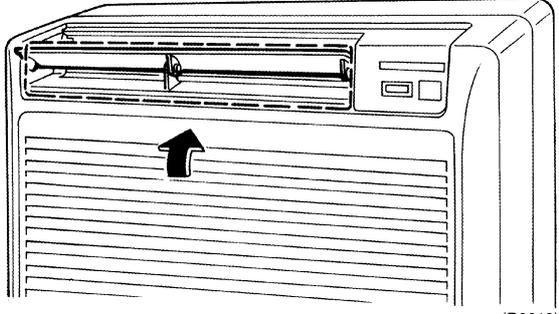
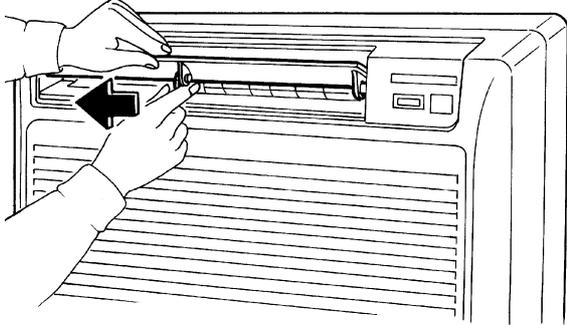
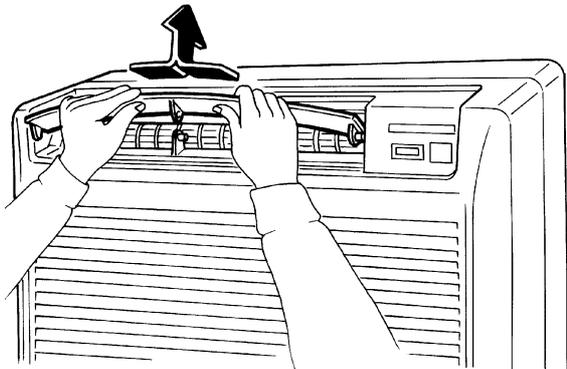
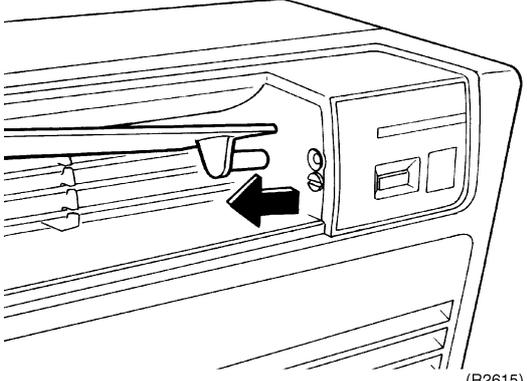
Step	Procedure	Points
5	<p>Disengage the 3 hooks on the bottom of the front panel.</p>  <p>Hooks (three locations) (R2609)</p>	
6	<p>Remove the 4 screws to take out the front grille.</p>  <p>(R2610)</p>	 <p>Hooks &lt;Main unit side&gt; (R2611)</p> <ul style="list-style-type: none"> <li>■ Mounting screw M4 × 16</li> </ul>

## 1.2 Removal of the Horizontal Blade

**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
1	<p>Open the horizontal blade.</p>  <p style="text-align: right;">(R2612)</p>	
2	<p>Disengage the supporting bracket at the center position.</p>  <p style="text-align: right;">(R2613)</p>	
3	<p>Bend the horizontal blade slightly to disengage the shafts at left and right side of the blade.</p>  <p style="text-align: right;">(R2614)</p>  <p style="text-align: right;">(R2615)</p>	<p>■ For installation, engage the supporting bracket at center of the blade after insert the shafts at both ends to the pivot holes.</p>

# 1.3 Removal of the Electrical Box

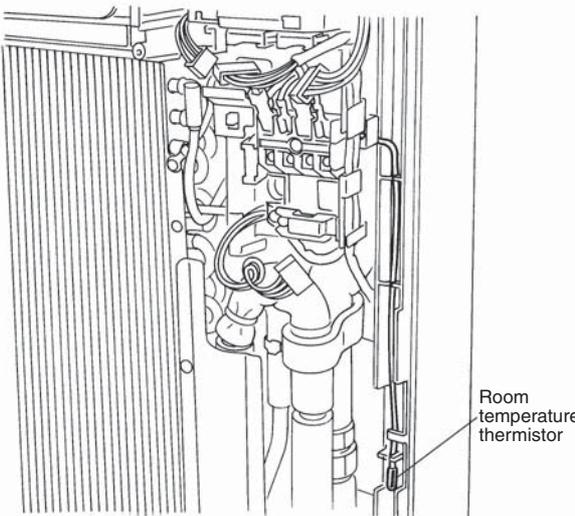
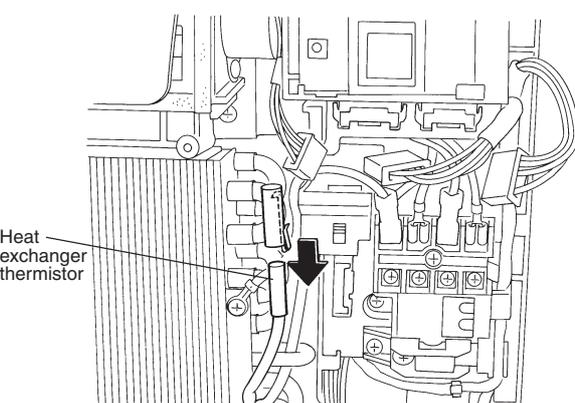
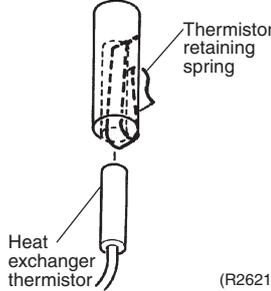
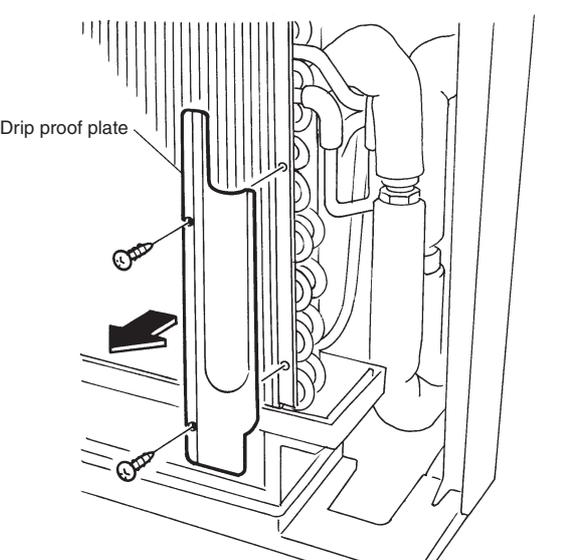
**Procedure**

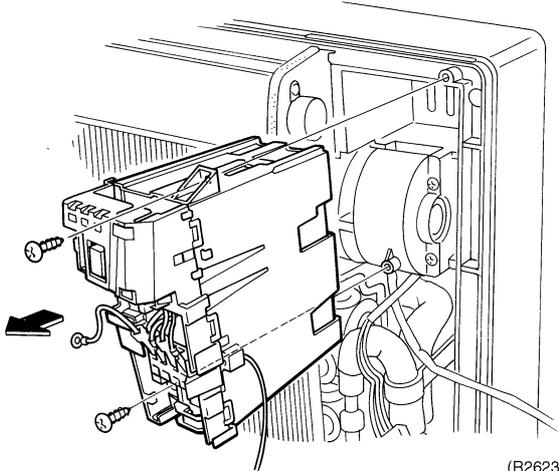
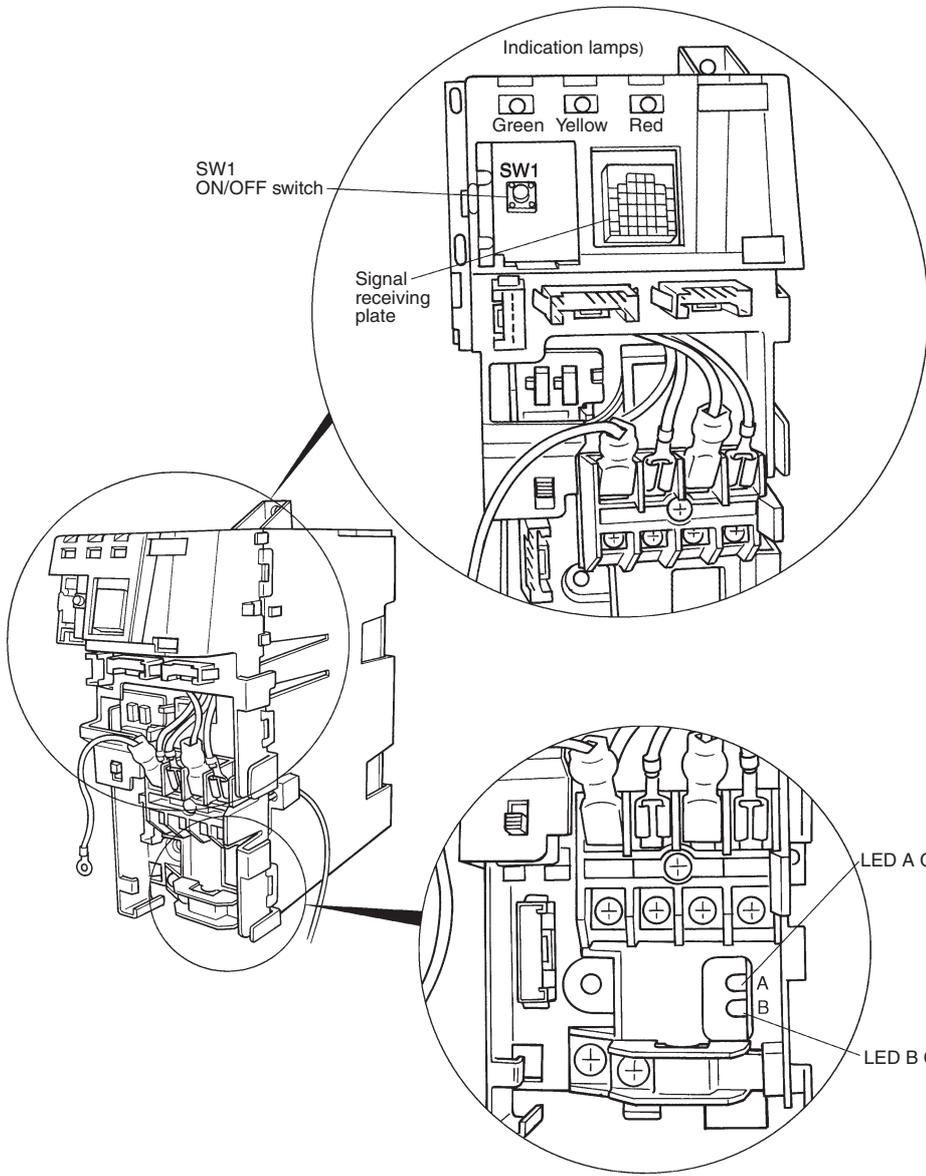


**Warning**

Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
1	Set the horizontal blade in horizontal position to take out the front grille forward.	
	<p style="text-align: right;">(R2616)</p>	
2	Remove the setting screw to remove the wire clamp.	
	<p style="text-align: right;">(R2617)</p>	
3	Disconnect the 4 connectors of the lead wire.	
	<p style="text-align: center;">Lead wire for swing motor</p> <p style="text-align: right;">(R2618)</p>	

Step	Procedure	Procedure	Points
4	Remove the room temperature thermistor.		
5	Remove the heat exchanger thermistor.		 <ul style="list-style-type: none"> <li>■ Be sure not to drop the thermistor retaining spring</li> </ul>
6	Dismount the 2 screws to remove the drip proof plate.		<ul style="list-style-type: none"> <li>■ Mounting screw M4 × 8</li> </ul>

Step		Procedure	Points
7	To remove the electrical box, dismantle the 2 fixing screws and pull out the box forward.	 <p>(R2623)</p>	<ul style="list-style-type: none"> <li>■ Mounting screw M4 × 16</li> </ul>
8	Illustration shows parts in the electrical box.	 <p>Indication lamps) Green Yellow Red</p> <p>SW1 ON/OFF switch</p> <p>Signal receiving plate</p> <p>LED A Green</p> <p>LED B Green</p> <p>A B</p>	<p>(R2624)</p>

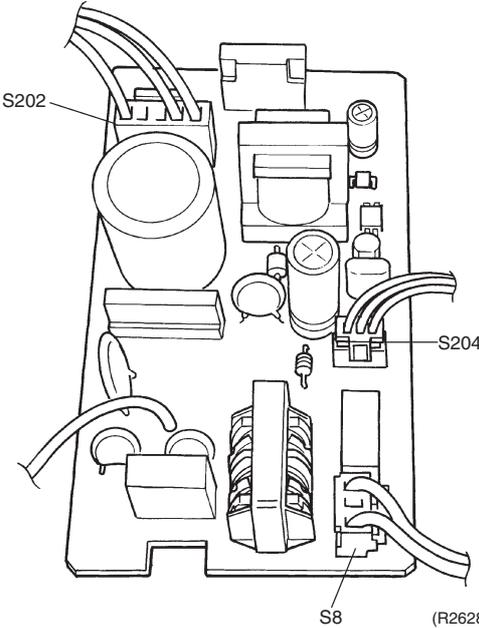
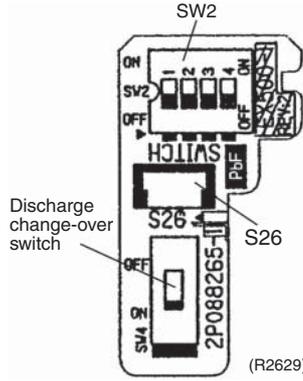
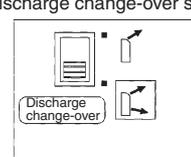
# 1.4 Removal of the PCB

**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
<p>1 Dismount the fixing screw to remove PCBs from the electrical box.</p>	<p>Power supply PCB</p> <p>Service PCB</p> <p>Control PCB (R2625)</p> <p>Operation lamp</p> <p>Timer lamp</p> <p>Home Leave Operation lamp</p> <p>LED11 Green</p> <p>LED12 Yellow</p> <p>LED14 Red</p> <p>Main unit ON/OFF switch SW1</p> <p>Signal receiving section (R2626)</p>	<p>■ Display PCB</p>
<p>2 Illustration shows the control PCB (indoor unit).</p>	<p>S6</p> <p>S23</p> <p>S25</p> <p>S302</p> <p>S301</p> <p>S21</p> <p>S203</p> <p>S32</p> <p>S31</p> <p>S7</p> <p>S201</p> <p>2P088265-1 P6F</p> <p>CONTROL</p> <p>AC250V 3.15A</p> <p>FUSE</p> <p>0.315A</p> <p>RED H3</p> <p>WHT H2</p> <p>BLK HI</p> <p>(R2627)</p>	

Step	Procedure	Points
3	<p>Illustration shows the power supply PCB (indoor unit).</p> 	<ul style="list-style-type: none"> <li>■ SW2 SW2-1: unused SW2-2: unused SW2-3: unused SW2-4: OFF-initial set ON-limit upward air flow</li> </ul>
4	<p>Illustration shows the signal receiver PCB.</p> 	<p>&lt;Discharge change-over switch&gt;</p>  <ul style="list-style-type: none"> <li>■ Select  to discharge air only from top discharge port.</li> <li>■ Select  to discharge air with automatic pattern decided in accordance with operation mode and operation conditions.</li> <li>■ It is recommendable to select .</li> <li>■  has been selected before factory shipment.</li> </ul>

# 1.5 Removal of the Heat Exchanger

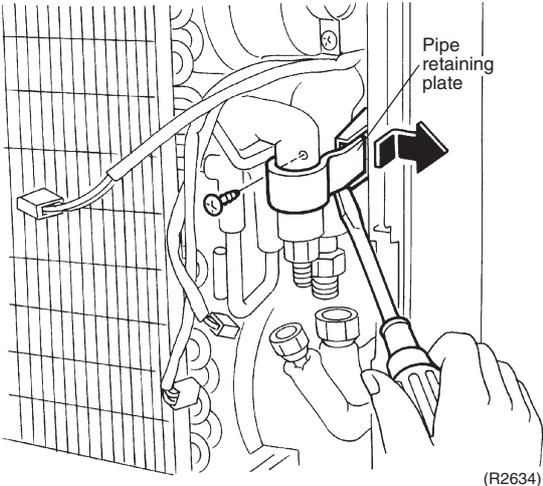
**Procedure**



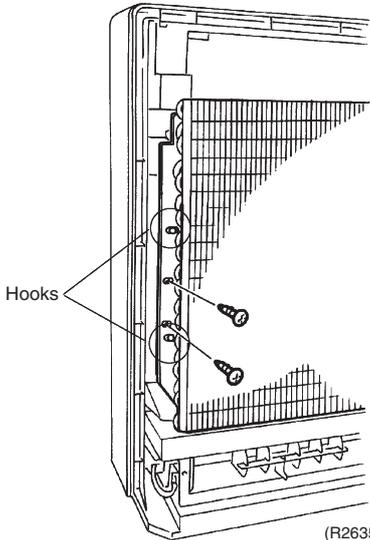
**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
<ul style="list-style-type: none"> <li>■ Conduct pump-down operation and check that gas has been purged completely before starting service work.</li> </ul>	<p style="text-align: right;">(R2631)</p>	<ul style="list-style-type: none"> <li>■ Mounting screw M4 × 16</li> </ul>
<p>1 Dismount the 2 screws to remove the top discharge grille.</p>	<p style="text-align: right;">(R2632)</p>	<p><b>Warning</b> If refrigerant gas leaks during service work, ventilate work area. (Toxic gas may be generated when refrigerant gas contacts with flame.)</p>
<p>2 Remove the heat exchanger.</p>	<p style="text-align: right;">(R2633)</p>	<ul style="list-style-type: none"> <li>■ 14/17 double ended wrench</li> </ul>
<p>3 Disconnect the flared joint of liquid pipe using 2 wrenches.</p>	<p style="text-align: right;">(R2633)</p>	<ul style="list-style-type: none"> <li>■ 17/23 double ended wrench</li> </ul> <p><b>Caution</b> Do not contaminate any gas (including air) other than the specified refrigerant (R-410A) (Contaminating of air or other gas causes abnormal temperature rise in refrigerating cycle, and this results in pipe breakage or personal injuries.)</p> <ul style="list-style-type: none"> <li>■ After pipes are disconnected, close all pipe openings with caps to prevent dust and moisture from entering pipes.</li> </ul>
<p>4 Disconnect the flared joint of gas pipe using 2 wrenches.</p>		

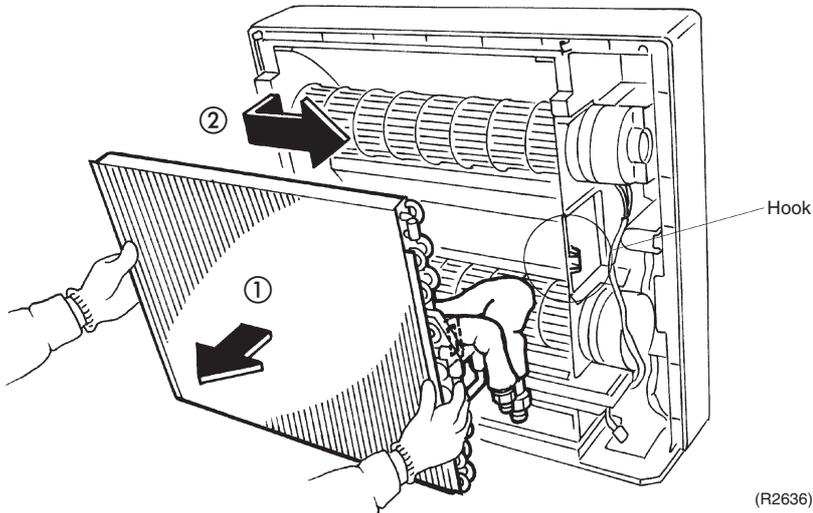
Step	Procedure	Points
5	<p>Dismount the fixing screw to remove the pipe retaining plate of the heat exchanger. Push the pipe retaining plate backward to disengage hook, then open the retaining plate using straight edge of screw-driver to remove the plate.</p>	<p>■ Mounting screw M4 × 16</p>
6	<p>Remove the 2 screws located at left side of the heat exchanger.</p>	<p>■ Mounting screw M4 × 16</p>
7	<p>Pull forward left side of the heat exchanger ①, slide to right to disengage hook ② and remove the heat exchanger.</p>	<p><b>⚠ Caution</b>  <b>When removing or re-installing heat exchanger, be sure to wear protective gloves or wrap heat exchanger with cloths. (Fins can cut fingers.)</b></p>



(R2634)



(R2635)



(R2636)

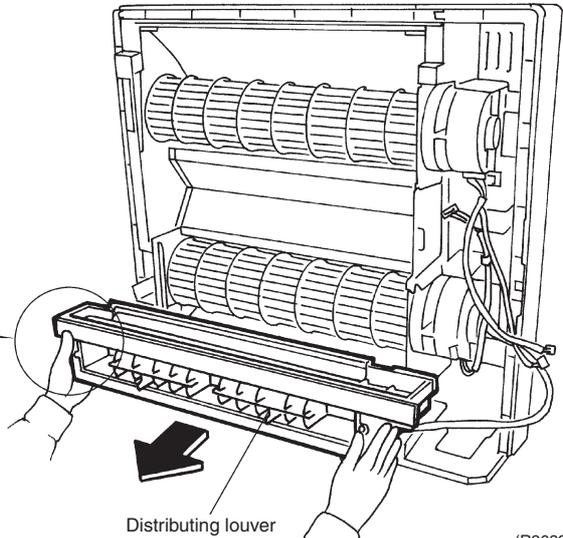
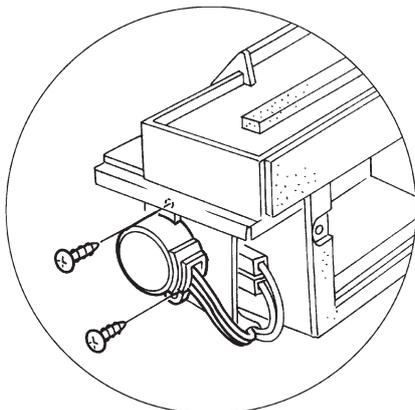
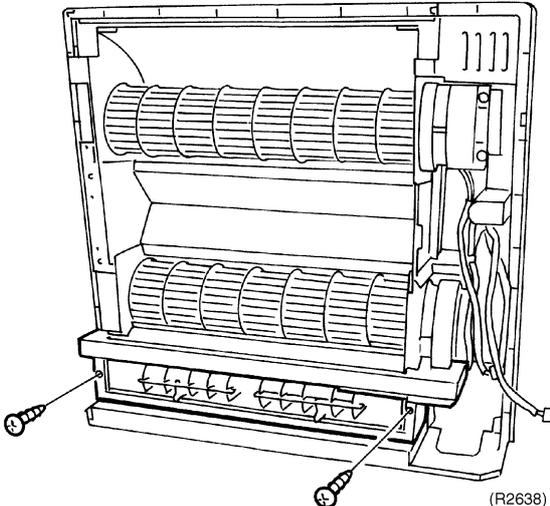
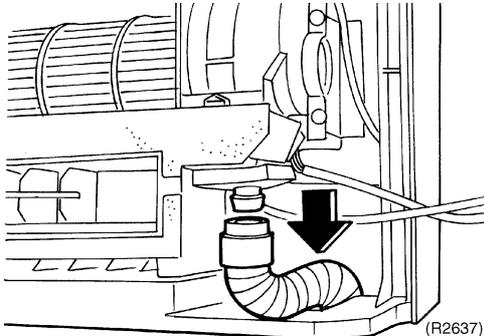
# 1.6 Removal of the Fan Rotor / Fan Motor

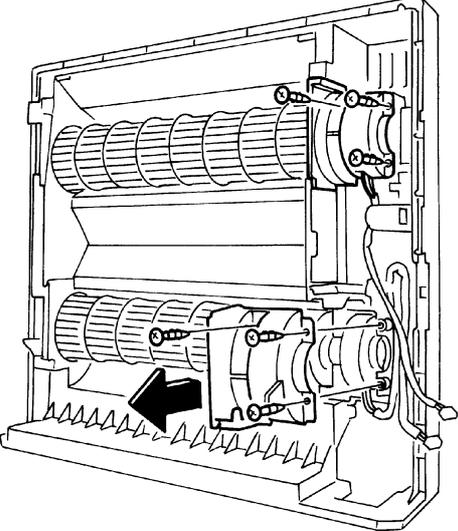
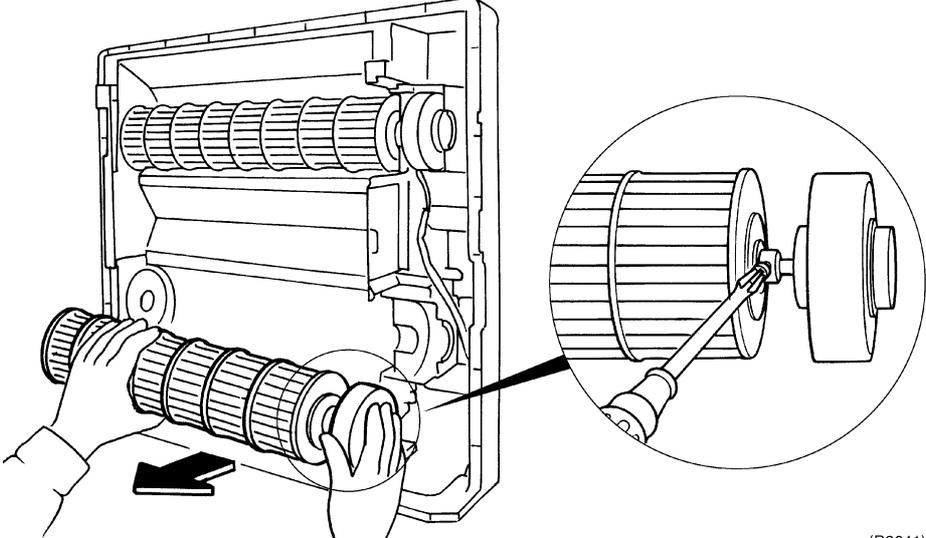
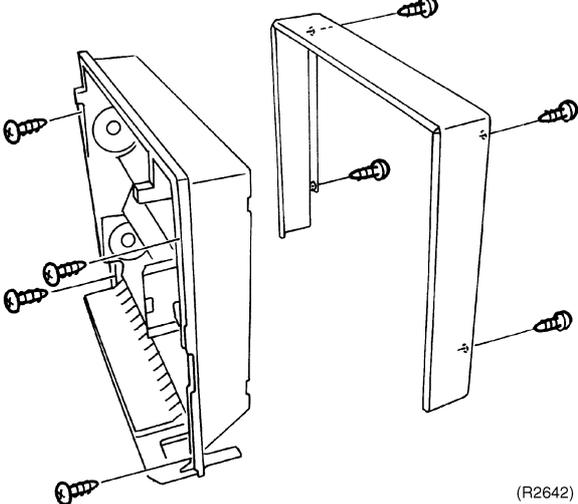
**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
1	For removal of the drain pan, disconnect the drain hose, then dismount the 2 screws located at left and right sides.	<ul style="list-style-type: none"> <li>■ Be careful not to wet the floor with drain water.</li> </ul>
2	Remove the drain pan.	<ul style="list-style-type: none"> <li>■ Disengage harness for drain pan from right side hook.</li> </ul>
3	To remove the swing motor on discharge port of the drain pan, dismount the 2 fixing screws.	<ul style="list-style-type: none"> <li>■ This swing motor is for down flow shutter.</li> </ul>



Step	Procedure	Procedure	Points
4	Dismount the 6 screws (3 for the upper side motor and 3 for the bottom one) to remove the fan motors.	 <p style="text-align: right;">(R2640)</p>	<ul style="list-style-type: none"> <li>■ Short lead wire: for the upper fan motor</li> <li>Long lead wire: for the bottom fan motor</li> <li>■ Mounting screw M4 × 16</li> </ul>
5	Remove the motors and cross flow fans.	 <p style="text-align: right;">(R2641)</p>	<ul style="list-style-type: none"> <li>■ Loosen the fixing screw to separate the fan and motor.</li> </ul>
6	To remove the casing, dismount the 4 screws at front side and the other 4 screws at rear side.	 <p style="text-align: right;">(R2642)</p>	<ul style="list-style-type: none"> <li>■ Casing mounting screw</li> <li>Front: M4 × 16</li> <li>Rear: M4 × 14</li> </ul> <p><b>Condition : Casing</b></p> <ul style="list-style-type: none"> <li>Protruded : Not to be removed</li> <li>Semi-sink : To be removed</li> <li>Sink : Not to be removed</li> </ul>

## 2. Outdoor Unit

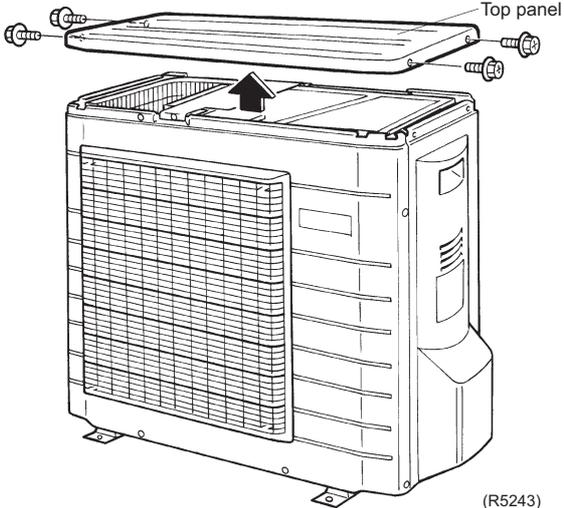
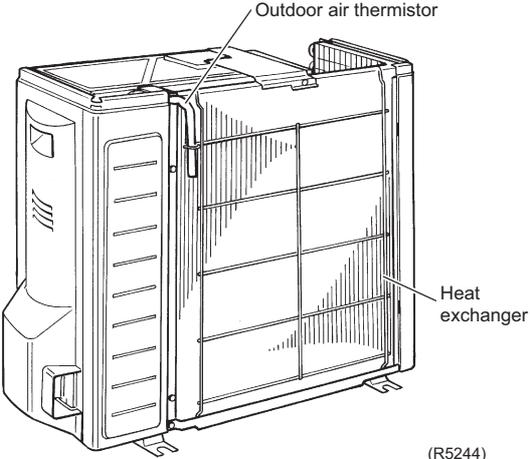
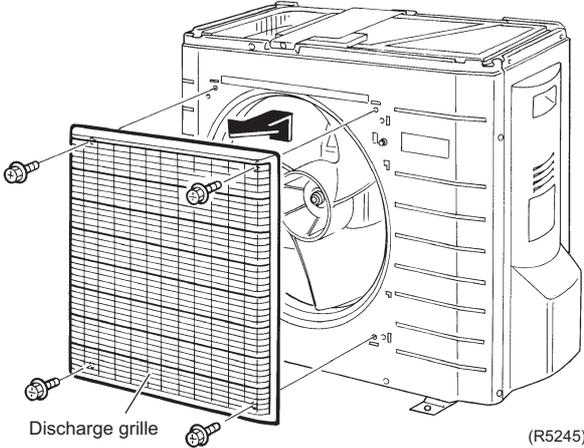
### 2.1 Removal of the Panels and Plates

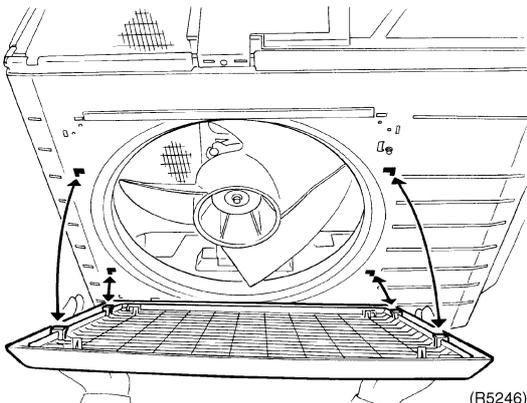
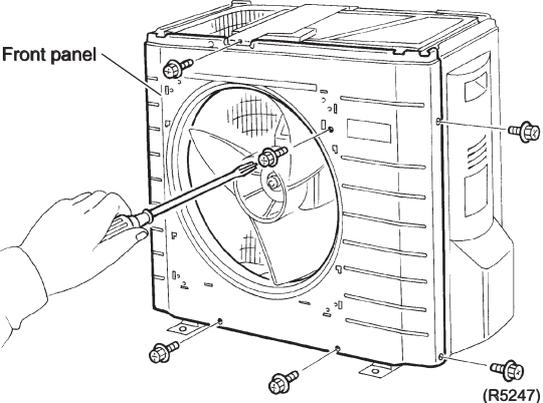
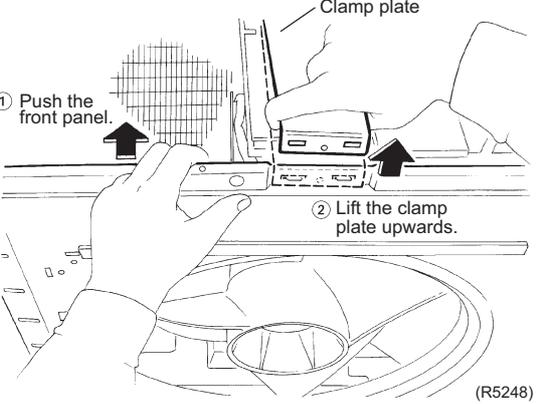
#### Procedure



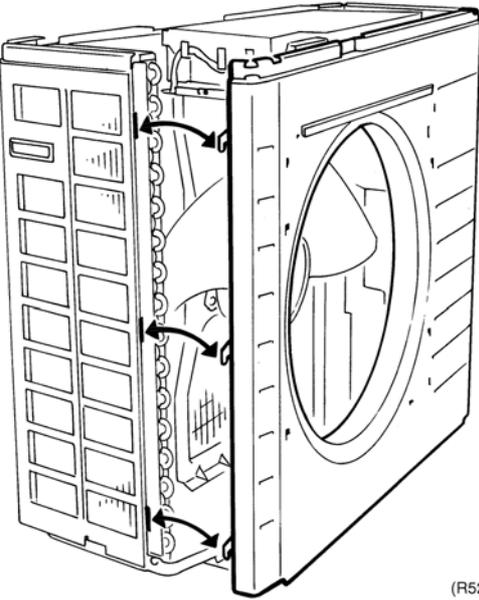
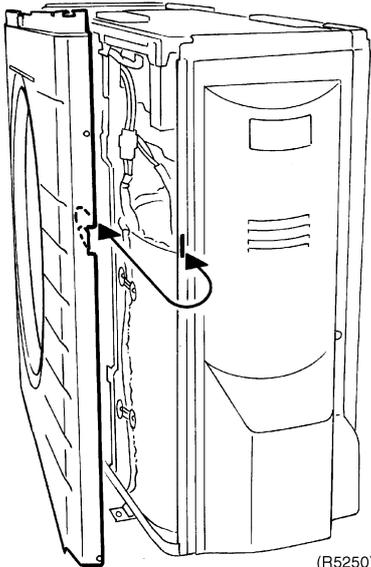
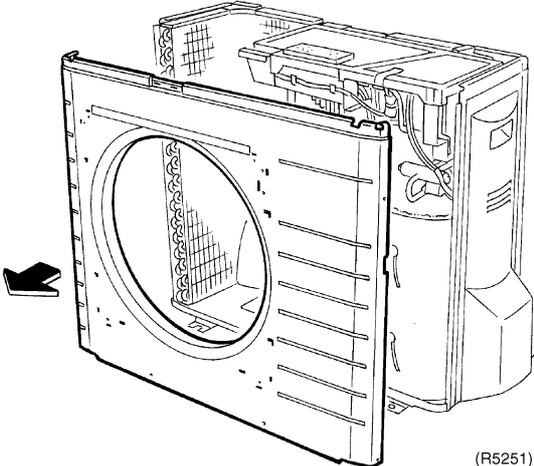
#### Warning

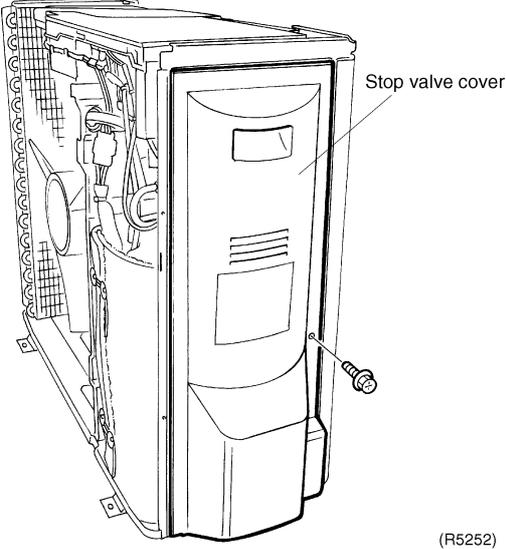
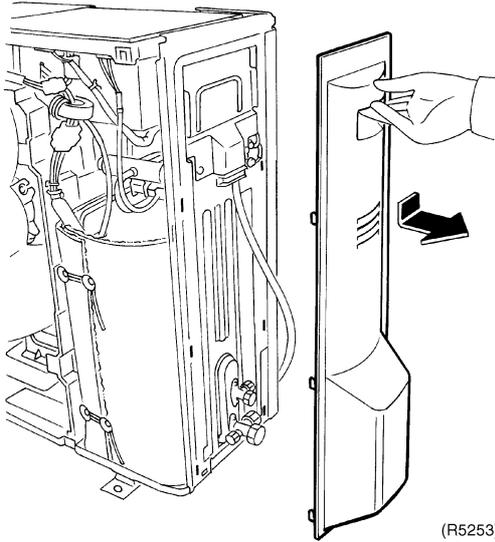
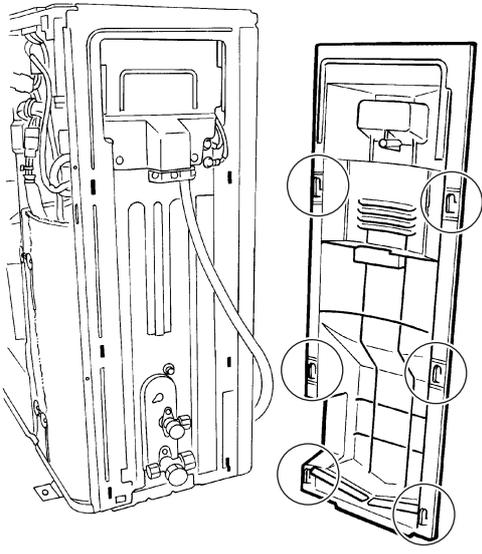
Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
1. Remove the panels and plates.		
1	<p>Loosen the 4 screws and lift the top panel.</p>  <p>(R5243)</p>  <p>(R5244)</p>	<ul style="list-style-type: none"> <li>Take care not to cut your finger by the fins of the heat exchanger.</li> </ul>
2	<p>Loosen the 4 screws and remove the discharge grille.</p>  <p>(R5245)</p>	

Step	Procedure	Points
3	Loosen the 6 screws of the front panel.	 <p>(R5246)</p>
4	Push the front panel and undo the hooks. Lift the clamp plate and remove it.	 <p>(R5247)</p>  <p>(R5248)</p>

■ The front grille has 4 hooks. Slide the discharge grille upwards and remove it.

Step	Procedure	Points
5	<p>Undo the left side hooks, and then the right side hook. Remove the front panel.</p>	<ul style="list-style-type: none"> <li>■ Lift the front panel and remove it while pushing the right side panel inwards.</li> </ul>
	 <p>(R5249)</p>	
	 <p>(R5250)</p>	
	 <p>(R5251)</p>	<ul style="list-style-type: none"> <li>■ Lift the front panel and undo the right side hook.</li> <li>■ Fit the right side of the front panel first when installing.</li> </ul>

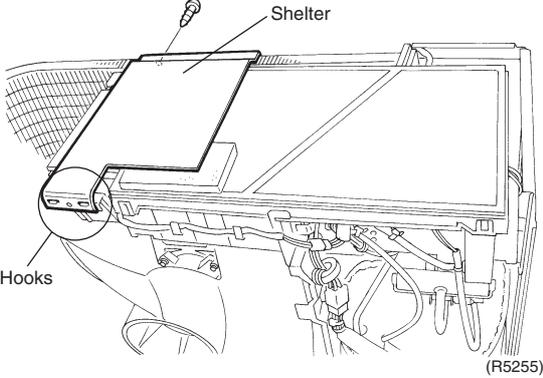
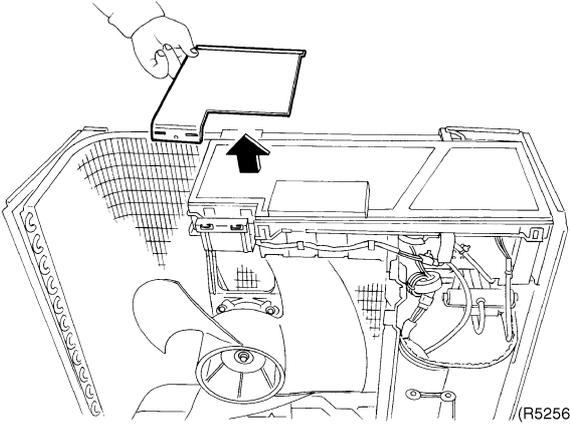
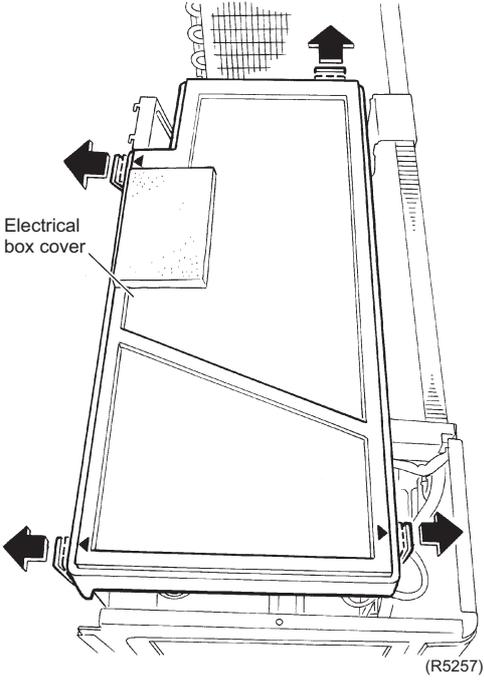
Step	Procedure	Points
2. Remove the stop valve cover.	<p data-bbox="199 280 470 347">1 Loosen the screw of the stop valve cover.</p>  <p data-bbox="199 891 470 985">2 Pull down the stop valve cover to undo the hooks and remove it.</p>  	<p data-bbox="1093 1489 1444 1556">■ The stop valve cover has 6 hooks.</p>

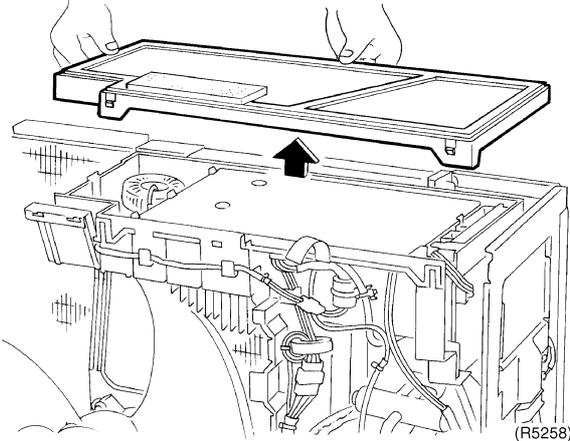
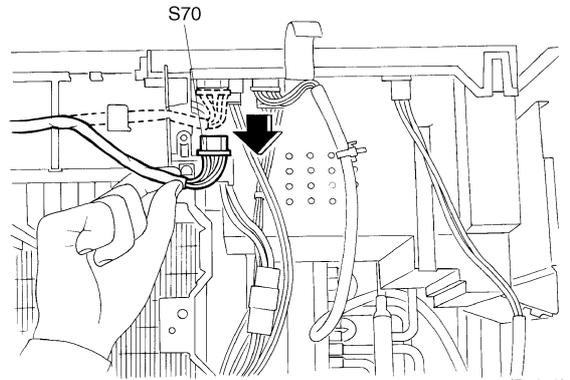
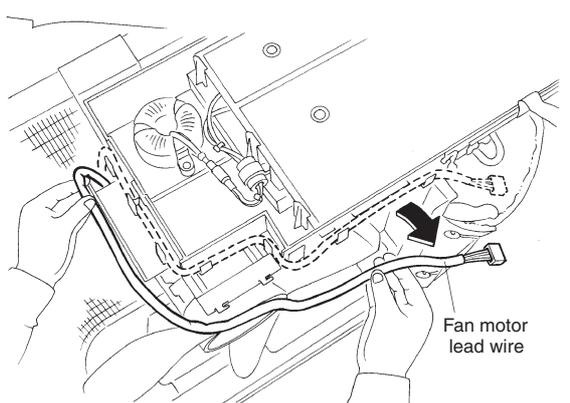
## 2.2 Removal of the Fan Motor / Propeller Fan

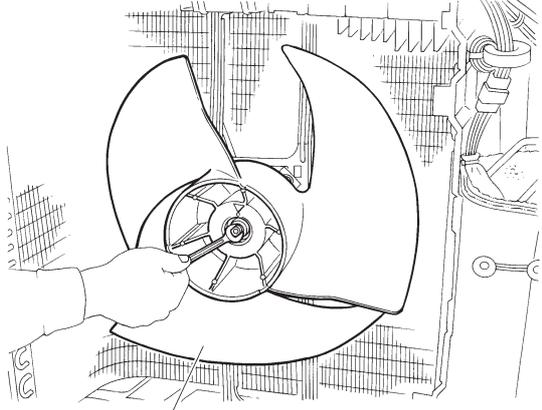
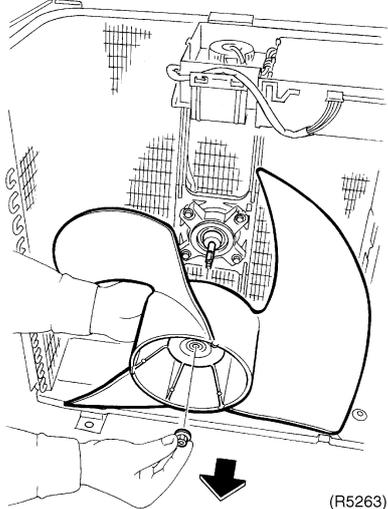
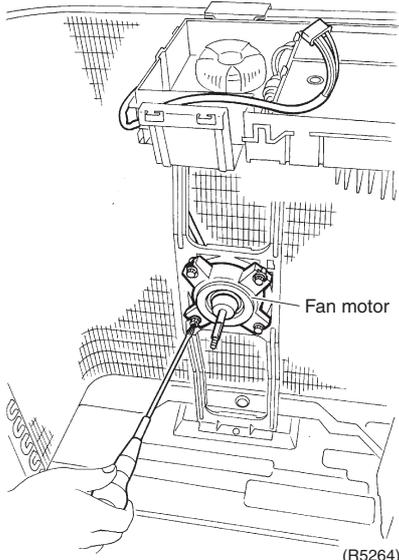
**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
<p>■ Remove the top panel and the front panel.</p>		
<p>1. Remove the electrical box cover.</p>		<p>■ This procedure is not necessary to remove the propeller fan only.</p>
<p>1 Loosen the screw on the back of the shelter.</p>		
<p>2 Undo the 2 hooks and remove it.</p>		<p>■ The hooks have been released since the front panel was removed.</p>
<p>3 Release the 4 hooks of the electrical box cover and remove it.</p>		

Step	Procedure	Points
	 <p>(R5258)</p>	
<p>2. Remove the fan motor.</p> <p>1</p> <p>2</p>	<p>Disconnect the connector for fan motor (S70).</p>  <p>(R5259)</p> <p>The illustration shows arrangement of the fan motor lead wire.</p>  <p>Fan motor lead wire</p> <p>(R5260)</p>	

Step	Procedure	Points
3	<p>Unscrew the washer-fitted nut (M10) of the propeller fan with a spanner.</p>  <p>Propeller fan (R5262)</p>  <p>(R5263)</p>	<ul style="list-style-type: none"> <li>Align ▼ mark of the propeller fan with D-cut section of the motor shaft when reassembling.</li> </ul>
4	<p>Remove the 4 screws from the fan motor.</p>  <p>Fan motor (R5264)</p>	

Step	Procedure	Points
5	Pull the fan motor out.	<ul style="list-style-type: none"> <li>Put the lead wire through the back of the motor when reassembling (so as not to be entangled with the propeller fan).</li> </ul>

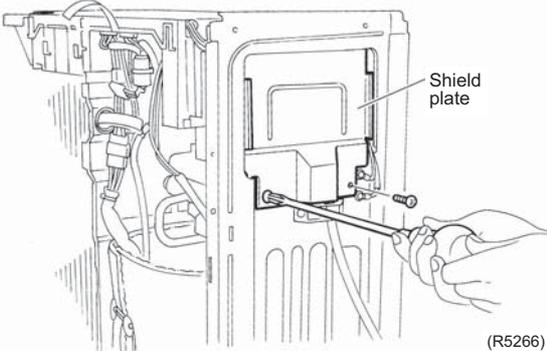
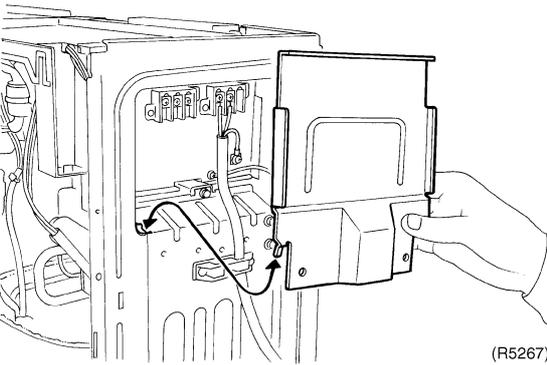
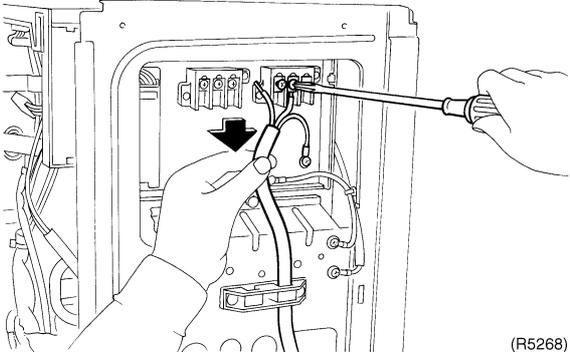
(R5265)

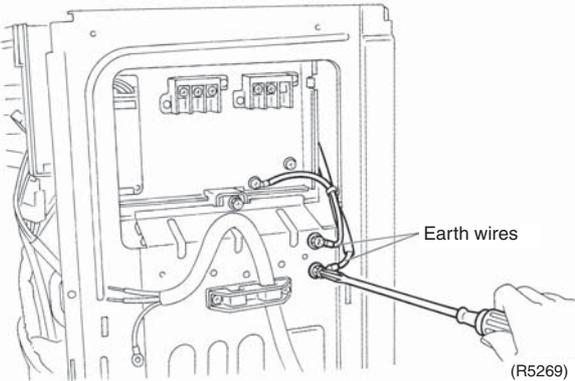
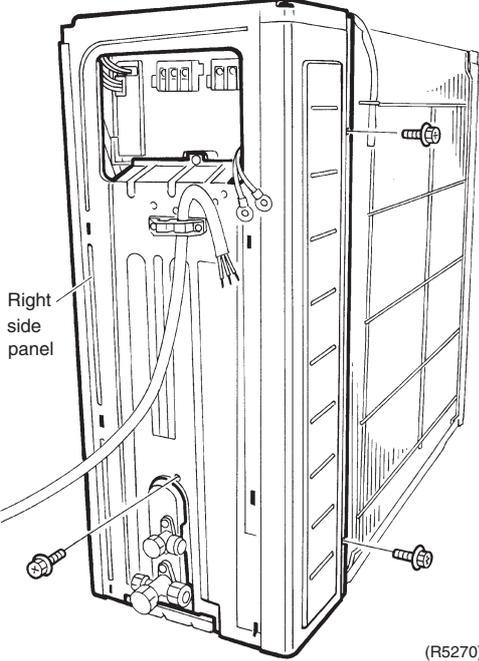
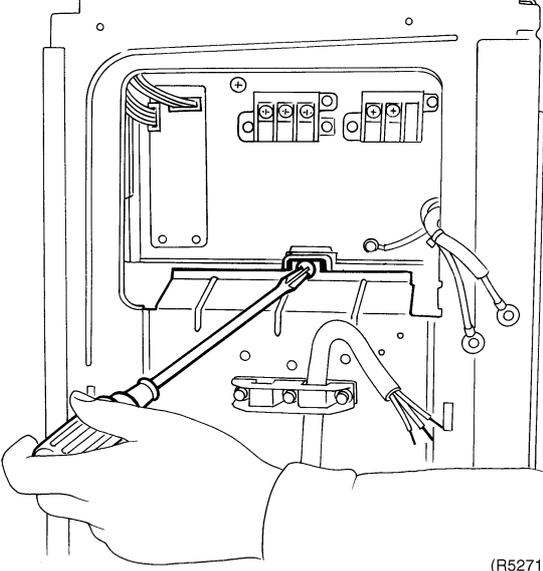
## 2.3 Removal of the Electrical Box

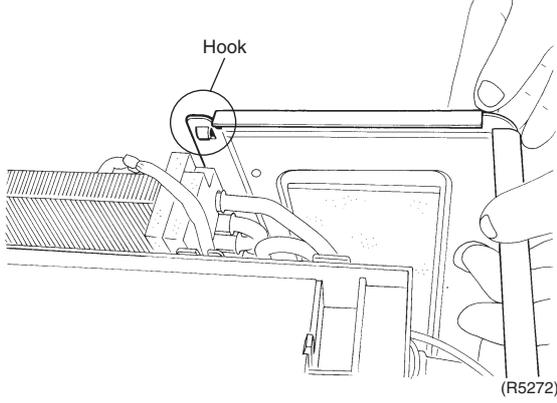
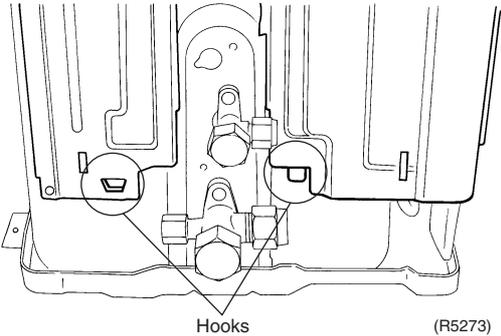
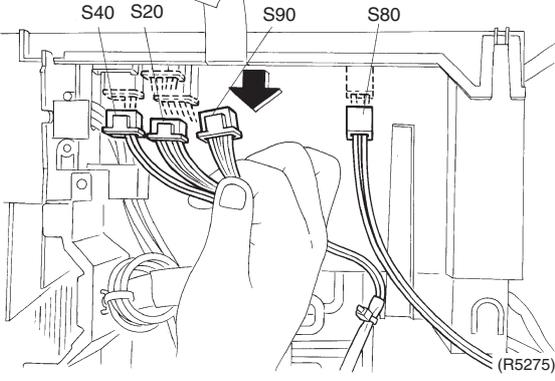
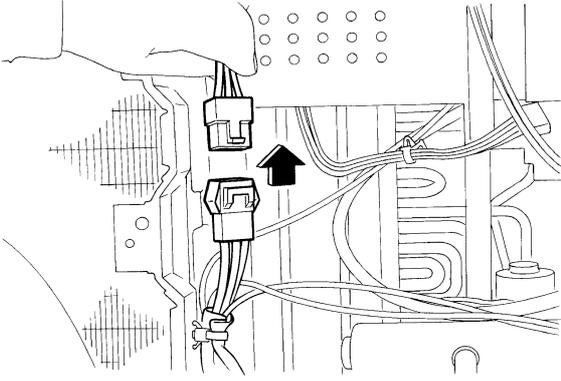
### Procedure

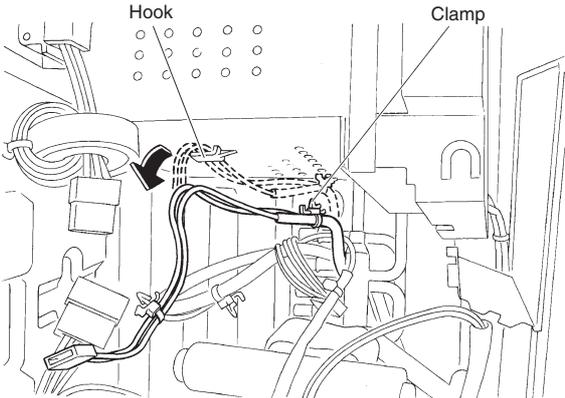
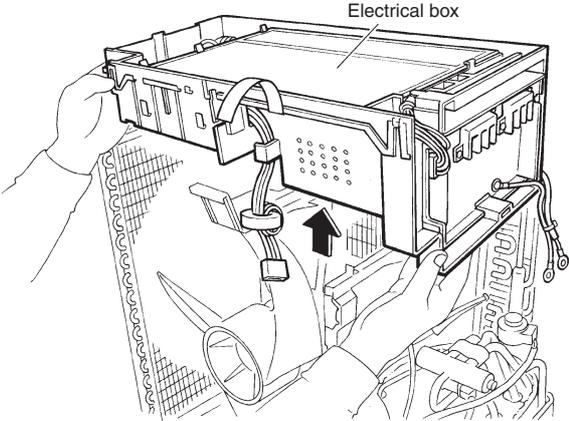


**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
<p>■ Remove the top panel and the front panel.</p>		
<p>1. Remove the shield plate.</p>		
<p>1 Loosen the 2 screws.</p>	 <p>(R5266)</p>	
<p>2 Slide the cover upward to undo the one hook on the bottom left, and then remove the plate.</p>	 <p>(R5267)</p>	
<p>3 Disconnect the 2 power supply cables and the 1 earth wire.</p>	 <p>(R5268)</p>	

Step	Procedure	Points
4	<p>Disconnect the 2 earth wires.</p>  <p>(R5269)</p>	
5	<p>Loosen the 3 screws of the right side panel.</p>  <p>(R5270)</p>	
6	<p>Loosen the fixing screw of the electrical box.</p>  <p>(R5271)</p>	

Step	Procedure	Points
	 <p style="text-align: right;">(R5272)</p>  <p style="text-align: center;">Hooks (R5273)</p>	<ul style="list-style-type: none"> <li>■ Insert the 2 hooks of the lower part and the 1 hook of the upper back when reassembling.</li> </ul>
7	<p>Disconnect the connectors of the front side.</p> <p>S20: electronic expansion valve  S40: overload protector  S80: four way valve  S90: thermistors (discharge pipe, outdoor air, heat exchanger)</p>  <p style="text-align: right;">(R5275)</p>	
8	<p>Disconnect the relaying wire connector for the compressor.</p>  <p style="text-align: right;">(R5276)</p>	

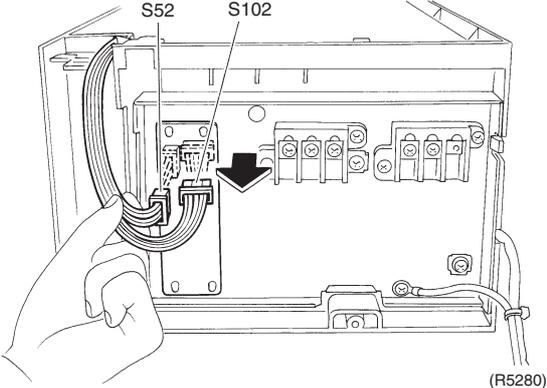
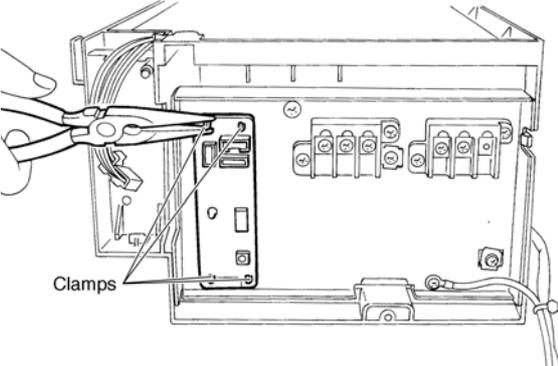
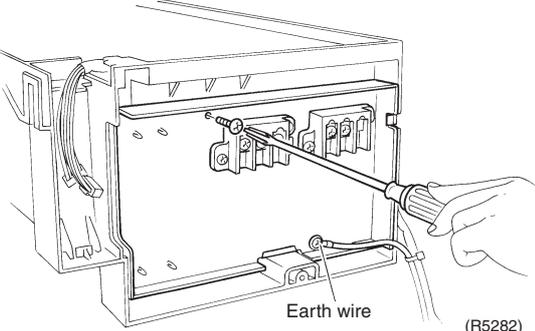
Step	Procedure	Procedure	Points
9	Release the clamp and undo the wire from the hook.	 <p style="text-align: right;">(R5278)</p>	
10	Lift the electrical box and remove it.	 <p style="text-align: right;">(R5279)</p>	

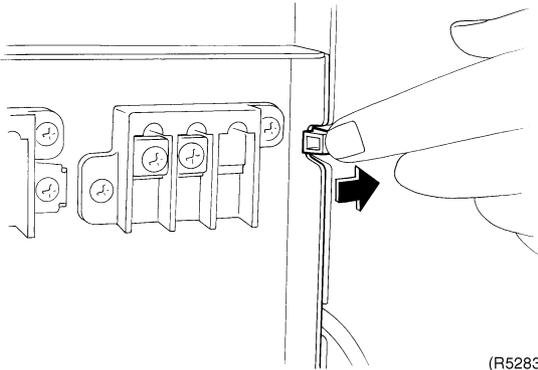
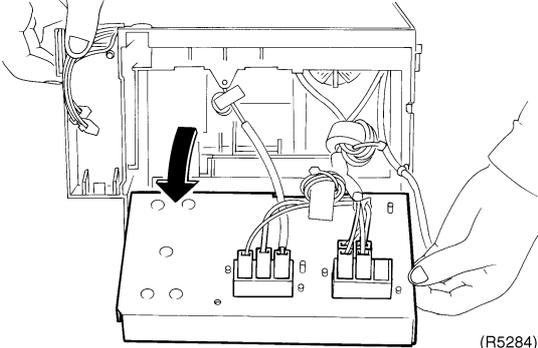
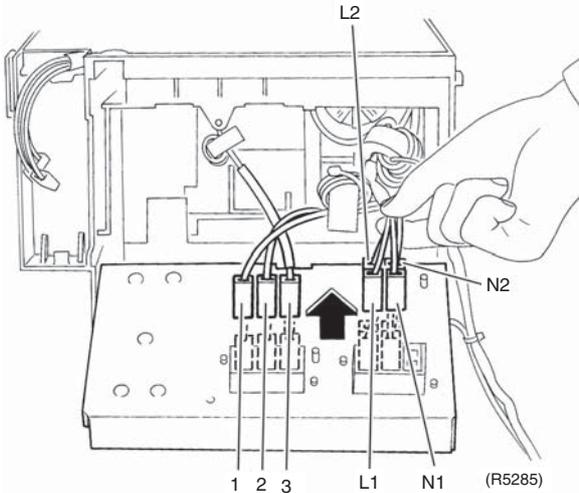
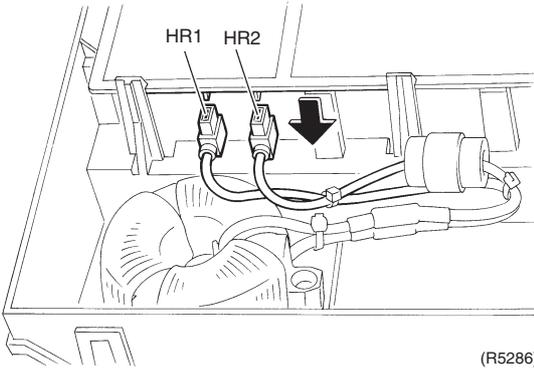
## 2.4 Removal of the PCB

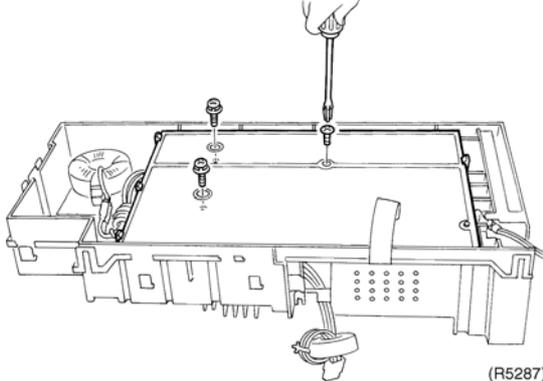
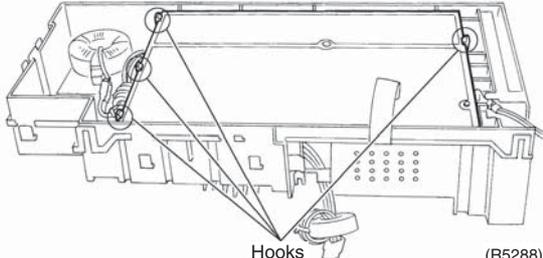
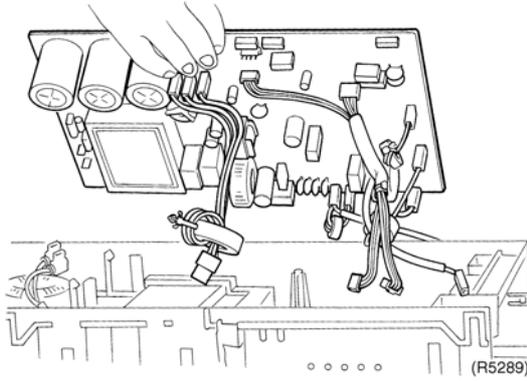
### Procedure



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
<p>■ Remove the electrical box.</p>		
<p>1. Remove the PCB.</p>		
<p>1 Disconnect the connectors for the control PCB (S52, S102).</p>	 <p>(R5280)</p>	
<p>2 Undo the 4 clamps by pliers.</p>	 <p>(R5281)</p>	
<p>3 Loosen the fixing screw of the cable way board and disconnect the earth wire.</p>	 <p>(R5282)</p>	

Step	Procedure	Points
4	Undo the hook on the right.	
	 <p>(R5283)</p>	
5	Open the cable way board.	
	 <p>(R5284)</p>	
6	Disconnect the harnesses.	<p>1: Black                  2: White                  3: Red                  L1: Black                  L2: Brown                  N1: White                  N2: Blue</p>
	 <p>(R5285)</p>	
7	Disconnect the 2 harnesses for the reactor (HR1, HR2).	
	 <p>(R5286)</p>	

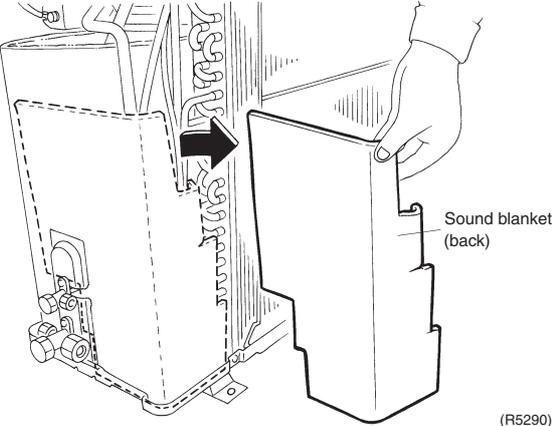
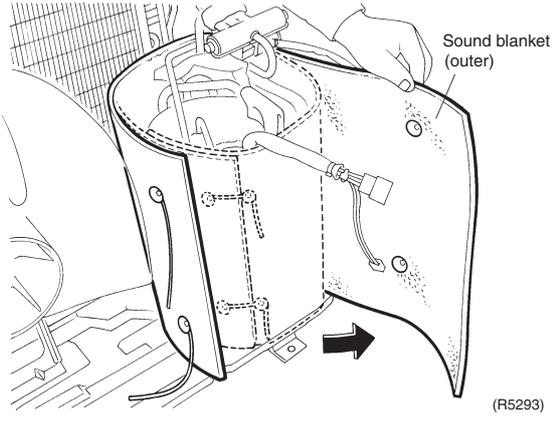
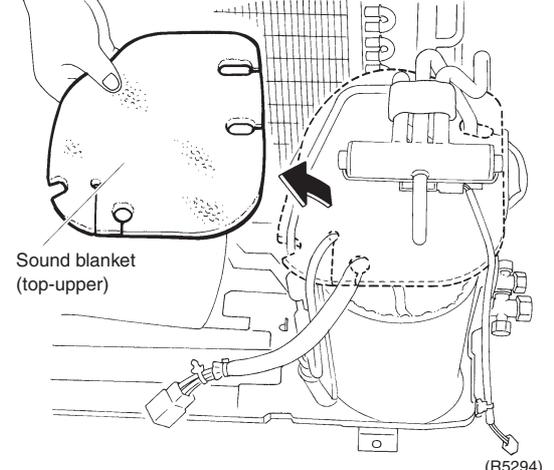
Step	Procedure	Points
8	<p>Loosen the 3 fixing screws for the main PCB.</p>  <p>(R5287)</p>	
9	<p>Undo the 4 hooks.</p>  <p>Hooks (R5288)</p>	
10	<p>Lift up and remove the PCB.</p>  <p>(R5289)</p>	

## 2.5 Removal of the Sound Blanket

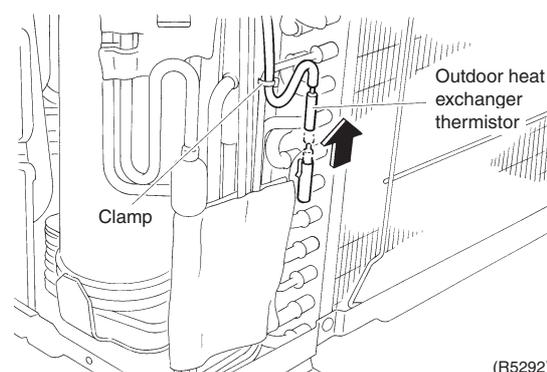
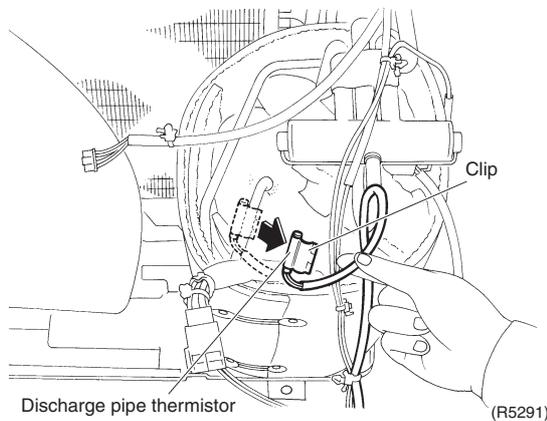
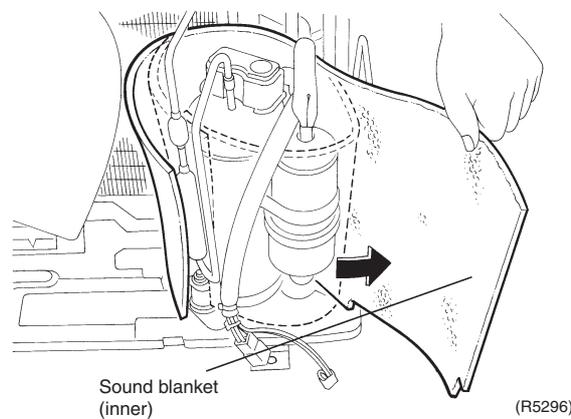
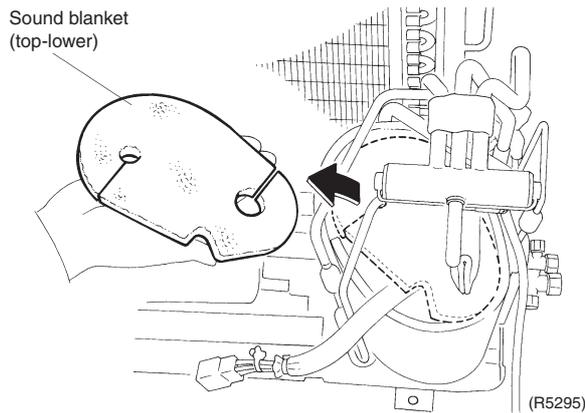
**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Procedure	Points
1	Remove the sound blanket (back).	 <p>(R5290)</p>	
2	Remove the sound blanket (outer).	 <p>(R5293)</p>	<ul style="list-style-type: none"> <li>Since the piping ports on the sound blanket (outer) are torn easily, remove the blanket carefully.</li> </ul>
3	Remove the sound blanket (top-upper).	 <p>(R5294)</p>	

Step	Procedure	Points
4	Remove the sound blanket (top-lower).	
5	Remove the sound blanket (inner).	<ul style="list-style-type: none"> <li>■ Since the piping ports on the sound blanket (inner) are torn easily, remove the blanket carefully.</li> </ul>
6	Release the discharge pipe thermistor.	<ul style="list-style-type: none"> <li>■ Pay attention to the direction of the clip so as not to touch the lead wire of the thermistor when reassembling.</li> </ul>
7	Cut the clamp by nippers. Disconnect the outdoor heat exchanger thermistor.	<ul style="list-style-type: none"> <li>■ Clamps should be always available. Fix it as it was before.</li> </ul>

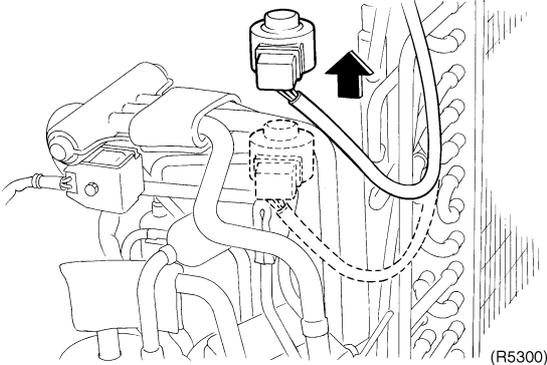
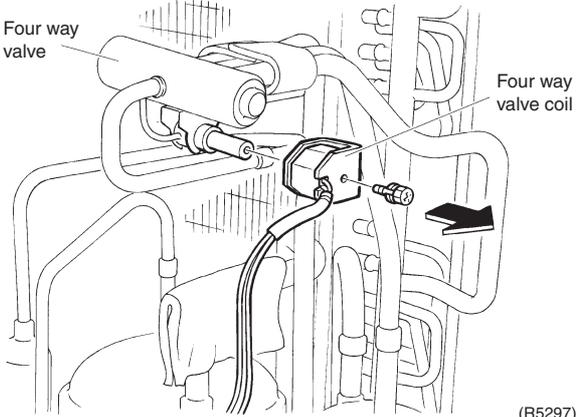
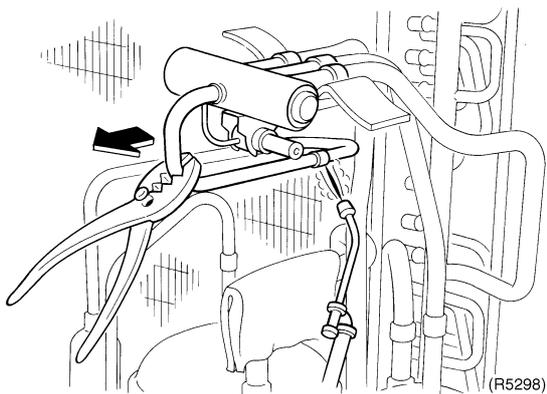


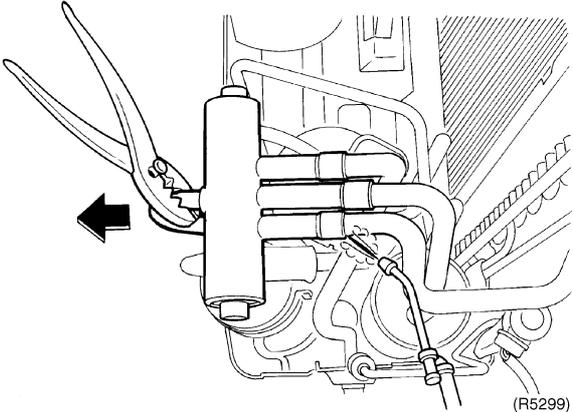
## 2.6 Removal of the Four Way Valve

**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Procedure	Points
1	Remove the electronic expansion valve coil.	 <p>(R5300)</p>	<ul style="list-style-type: none"> <li>■ The illustration is for heat pump models as representative.</li> </ul>
2	Loosen the screw of the four way valve coil.	 <p>(R5297)</p>	<ul style="list-style-type: none"> <li>■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.</li> <li>■ Be careful so as not to break the pipes by pressing it excessively by pliers when withdrawing it.</li> </ul> <p><b>Caution</b>   Be careful about the four way valve, pipes and so on, which were heated up by a gas brazing machine, so as not to get burnt your hands.</p>
3	Heat up the brazed part of the four way valve and disconnect.  <ul style="list-style-type: none"> <li>■ Be sure to apply nitrogen replacement when heating up the brazed part.</li> </ul>	 <p>(R5298)</p>	<p><b>Cautions for restoration</b></p> <ol style="list-style-type: none"> <li>1. Restore the piping by non-oxidation brazing. Braze it quickly when no nitrogen gas can be used.</li> <li>2. It is required to prevent the carbonization of the oil inside the four way valve and the deterioration of the gaskets affected by heat. For the sake of this, wrap the four way valve with wet cloth and provide water so that the cloth will not be dried and avoid excessive heating. (Keep below 120°C)</li> </ol>

Step	Procedure	Points
4	Heat up every brazed part in turn and disconnect.	 <p>(R5299)</p>

**In case of the difficulty with gas brazing machine**

1. Disconnect the brazed part where is easy to disconnect and restore.
2. Cut pipes on the main unit by a miniature copper tube cutter in order to make it easy to disconnect.

■ **i Note:** Do not use a metal saw for cutting pipes by all means because the sawdust come into the circuit.

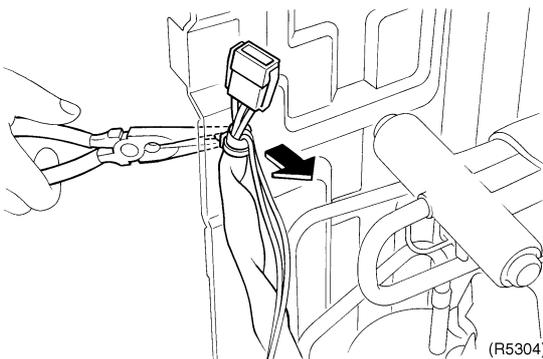
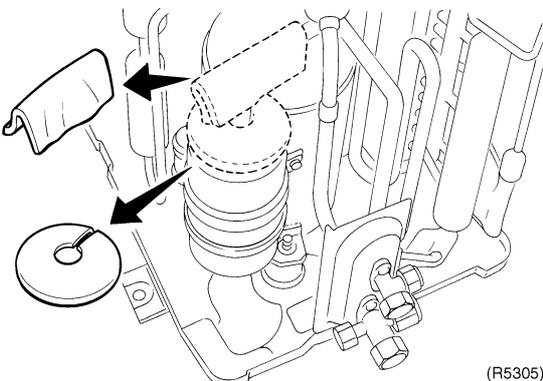
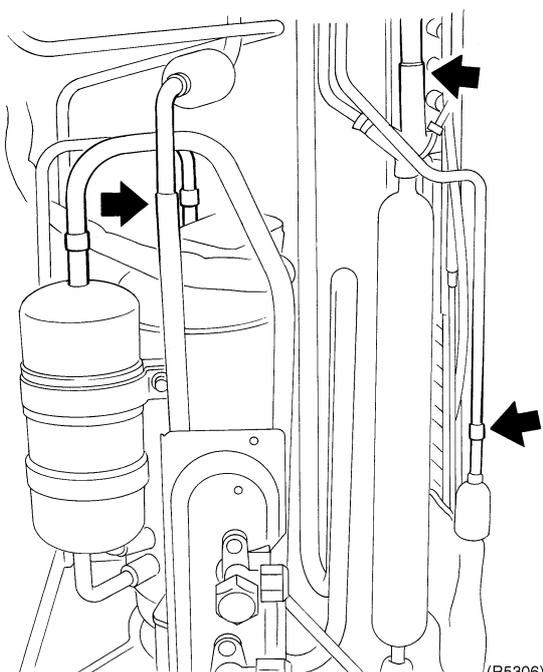
## 2.7 Removal of the Compressor

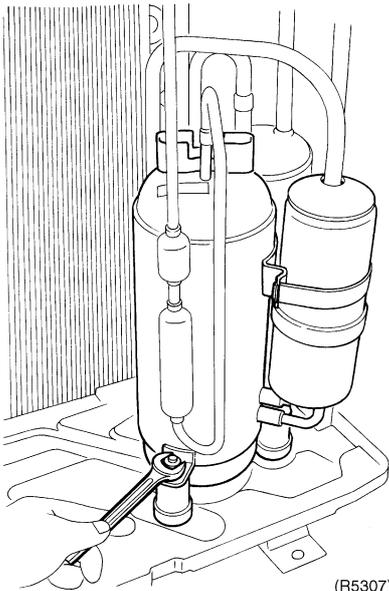
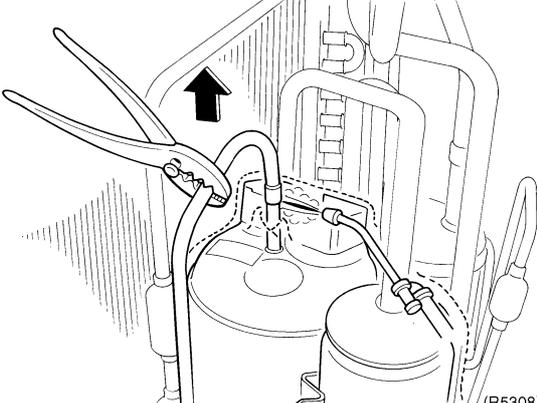
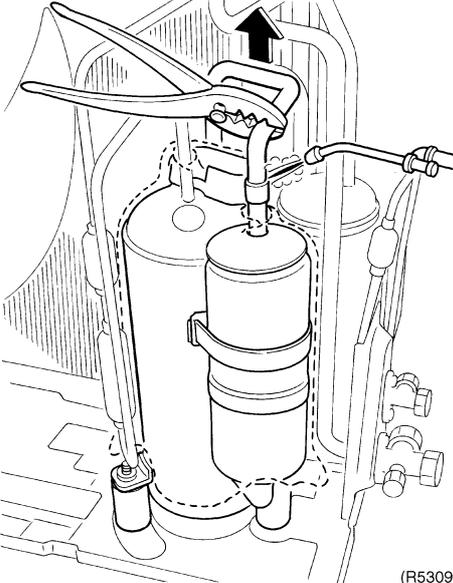
**Procedure**



**Warning** Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Procedure	Points
1	Remove the terminal cover.	<p>(R5301)</p> <p>(R5202)</p>	
2	Disconnect the lead wires of the compressor.	<p>(R5303)</p>	<p>■ Be careful so as not to burn the compressor terminals or the name plate.</p> <p>Make a note.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">U V W</p> </div> <p>U : red V : yellow W : blue</p>

Step	Procedure	Procedure	Points
3	Release the clamp by pliers to detach the wire harness for the compressor.	 <p>(R5304)</p>	
4	Remove the putty. <ul style="list-style-type: none"> <li>■ Before working, make sure that the refrigerant is empty in the circuit.</li> <li>■ Be sure to apply nitrogen replacement when heating up the brazed part.</li> </ul>	 <p>(R5305)</p>	<ul style="list-style-type: none"> <li>■ The illustration is for heat pump models as representative.</li> </ul>
5	Heat up the brazed parts indicated by the arrows.	 <p>(R5306)</p>	<ul style="list-style-type: none"> <li>■ The illustration is for heat pump models as representative.</li> </ul> <p><b>⚠ Warning</b>  <b>Ventilate when refrigerant leaks during the work.</b>  <b>(If refrigerant contacts fire, it will cause to arise toxic gas.)</b></p> <ul style="list-style-type: none"> <li>■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.</li> <li>■ Be careful so as not to burn the compressor terminals or the name plate.</li> <li>■ Be careful so as not to burn the heat exchanger fin.</li> </ul> <p><b>⚠ Warning</b>  <b>Since it may happen that refrigeration oil in the compressor will catch fire, prepare wet cloth so as to extinguish fire immediately.</b></p>

Step	Procedure	Procedure	Points
<p>3 Unscrew the nut of the compressor.</p> <ul style="list-style-type: none"> <li>■ Before working, make sure that the refrigerant is empty in the circuit.</li> <li>■ Be sure to apply nitrogen replacement when heating up the brazed part.</li> </ul>		 <p>(R5307)</p>	
<p>4 Heat up the brazed part of the discharge side and disconnect.</p>		 <p>(R5308)</p>	<p><b>Warning</b>              ⚠ Ventilate when refrigerant leaks during the work. (If refrigerant contacts fire, it will cause to arise toxic gas.)</p> <ul style="list-style-type: none"> <li>■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.</li> <li>■ Be careful so as not to burn the compressor terminals or the name plate.</li> </ul>
<p>5 Heat up the brazed part of the suction side and disconnect.</p>		 <p>(R5309)</p>	<ul style="list-style-type: none"> <li>■ Be careful so as not to burn the heat exchanger fin.</li> </ul>
<p>6 Lift the compressor up and remove it.</p>			<p><b>Warning</b>              ⚠ Since it may happen that refrigeration oil in the compressor will catch fire, prepare wet cloth so as to extinguish fire immediately.</p>

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# 1. Others

## 1.1 Test Run from the remote control

### For Heat pump

In cooling mode, select the lowest programmable temperature; in heating mode, select the highest programmable temperature.

- Trial operation may be disabled in either mode depending on the room temperature.
- After trial operation is complete, set the temperature to a normal level.  
(26°C to 28°C in cooling mode, 20°C to 24°C in heating mode)
- For protection, the system disables restart operation for 3 minutes after it is turned off.

### For Cooling Only

Select the lowest programmable temperature.

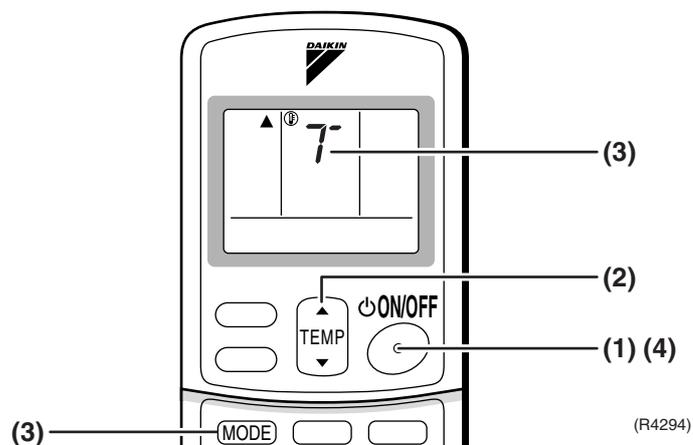
- Trial operation in cooling mode may be disabled depending on the room temperature. Use the remote control for trial operation as described below.
- After trial operation is complete, set the temperature to a normal level (26°C to 28°C).
- For protection, the machine disables restart operation for 3 minutes after it is turned off.

### Trial Operation and Testing

1. Measure the supply voltage and make sure that it falls in the specified range.
  2. Trial operation should be carried out in either cooling or heating mode.
  3. Carry out the test operation in accordance with the Operation Manual to ensure that all functions and parts, such as louver movement, are working properly.
- The air conditioner requires a small amount of power in its standby mode. If the system is not to be used for some time after installation, shut off the circuit breaker to eliminate unnecessary power consumption.
  - If the circuit breaker trips to shut off the power to the air conditioner, the system will restore the original operation mode when the circuit breaker is opened again.

### Trial operation from remote control

- (1) Press ON/OFF button to turn on the system.
- (2) Simultaneously press center of TEMP button and MODE buttons.
- (3) Press MODE button twice.  
(“T” will appear on the display to indicate that Trial Operation mode is selected.)
- (4) Trial run mode terminates in approx. 30 minutes and switches into normal mode. To quit a trial operation, press ON/OFF button.



(R4294)

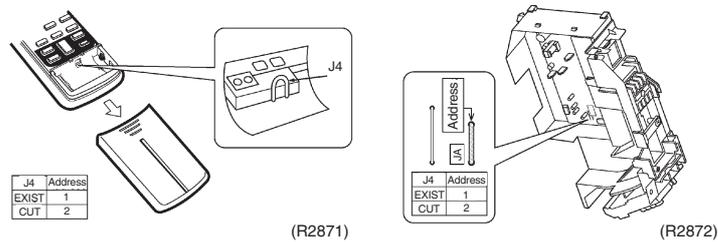
## 1.2 Jumper Settings

### 1.2.1 When Two Units are Installed in One Room

When two indoor units are installed in one room, the two infrared remote controls can be set for different addresses.

#### How to set the different addresses

- Control PCB of the indoor unit
  - (1) Remove the front grille. (3 screws)
  - (2) Remove the electrical box (1-screw).
  - (3) Remove the drip proof plate. (4 tabs)
  - (4) Cut the address jumper JA on control PCB.
  
- infrared remote control
  - (1) Slide the front cover and take it off.
  - (2) Cut the address jumper J4.



### 1.2.2 Jumper Setting

Jumper (On indoor control PCB)	Function	When connected (factory set)	When cut
JC	Power failure recovery function	Auto start	Unit does not resume operation after recovering from a power failure. Timer ON-OFF settings are cleared.
JB	Fan speed setting when compressor is OFF on thermostat. (effective only at cooling operation)	Fan speed setting ; remote control setting	Fan rpm is set to "0" <Fan stop>



# Part 9 Appendix

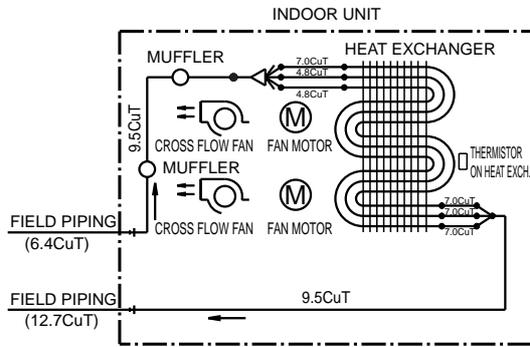
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# 1. Piping Diagrams

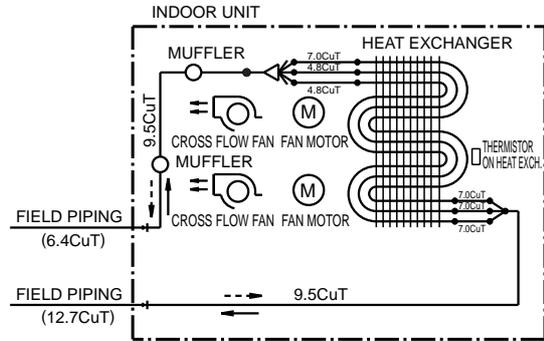
## 1.1 Indoor Units

FVKS50BAVMB

FVXS50BAVMB



REFRIGERANT FLOW  
 → COOLING



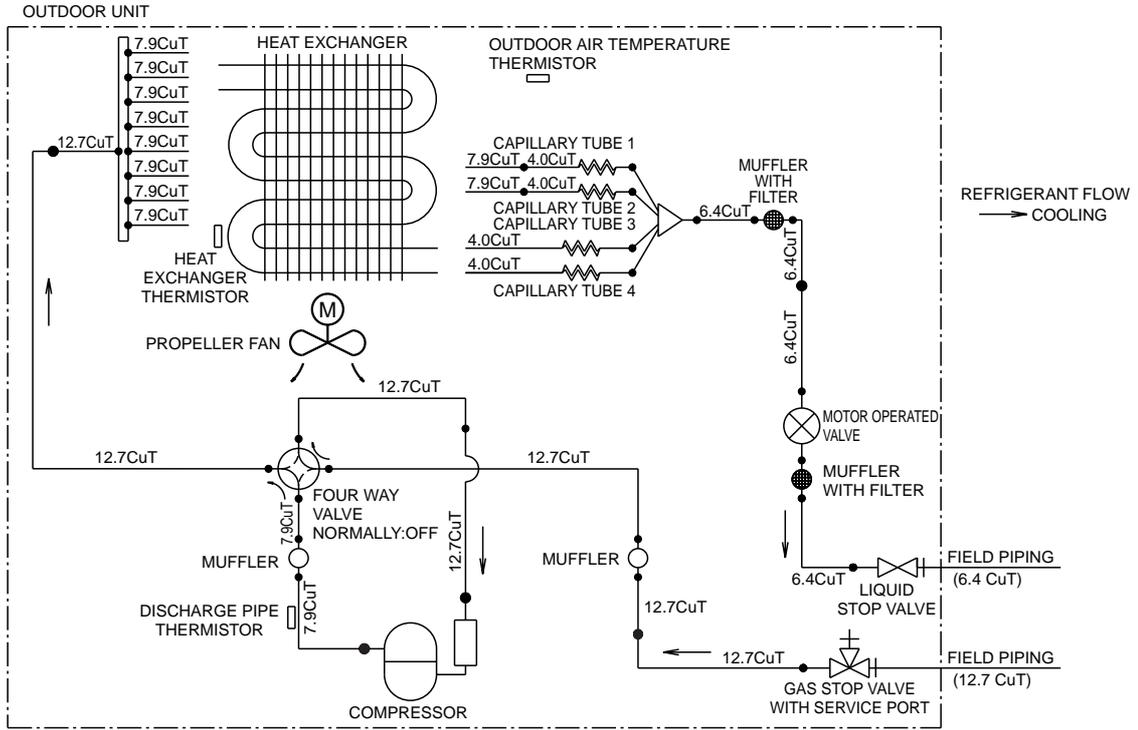
REFRIGERANT FLOW  
 → COOLING  
 - - - HEATING

4D050804

4D020911D

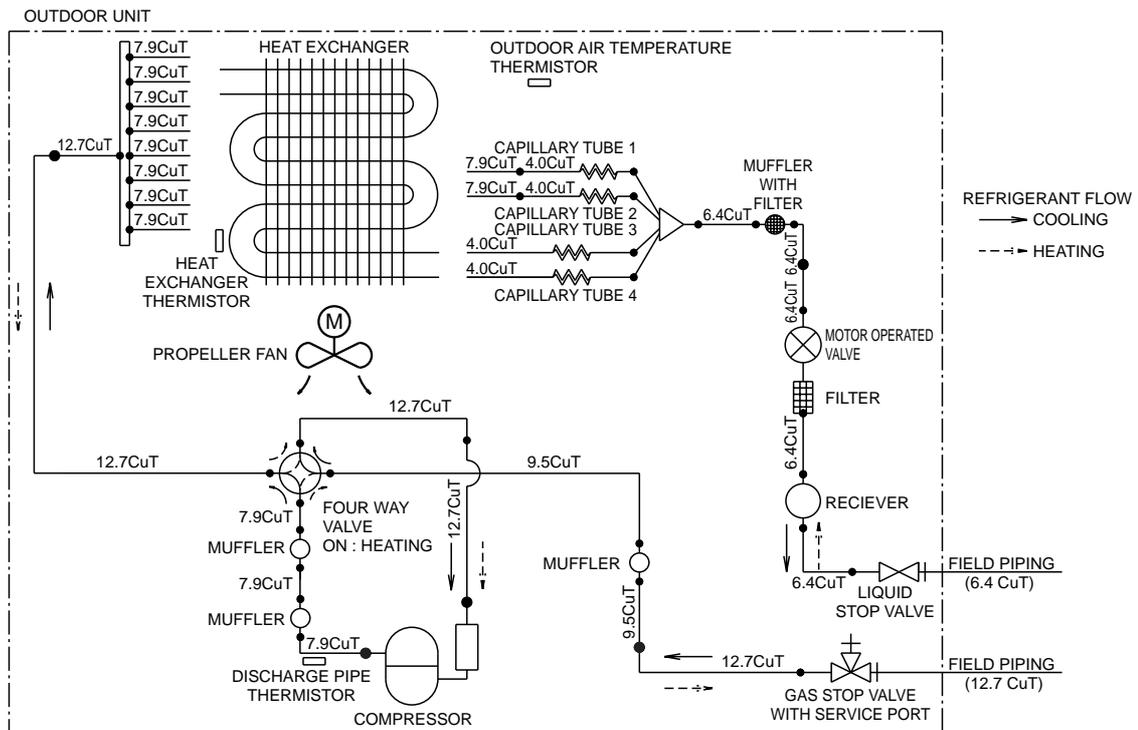
# 1.2 Outdoor Units

## RKS50E2(3)V1B, RN50E2(3)V1B



3D051636B

## RXS50E2(3)V1B

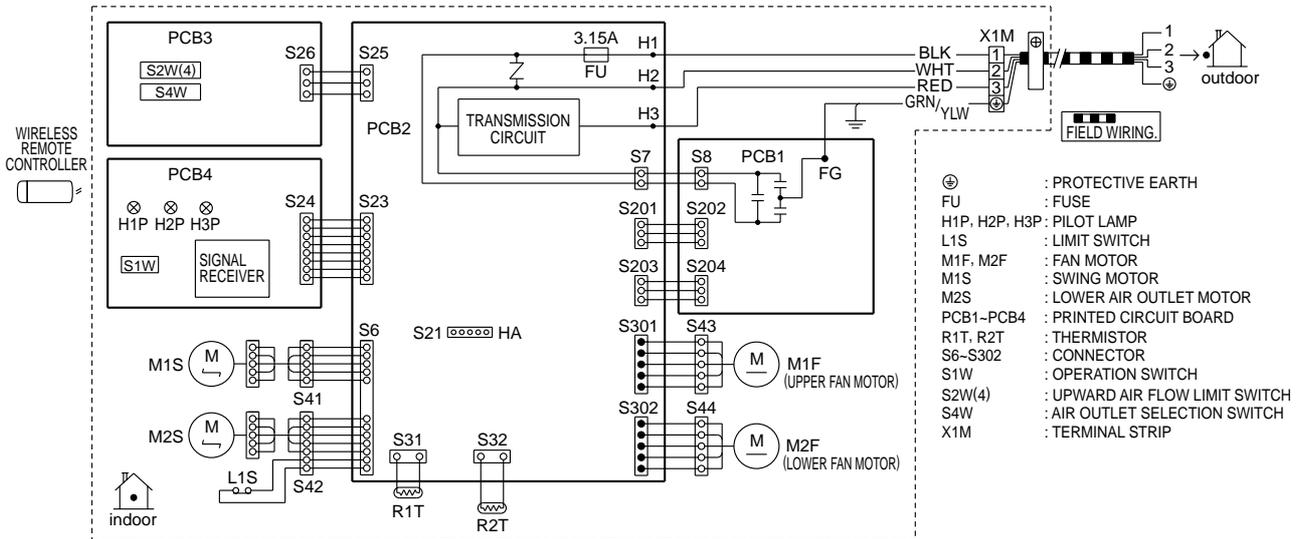


3D051637B

# 2. Wiring Diagrams

## 2.1 Indoor Units

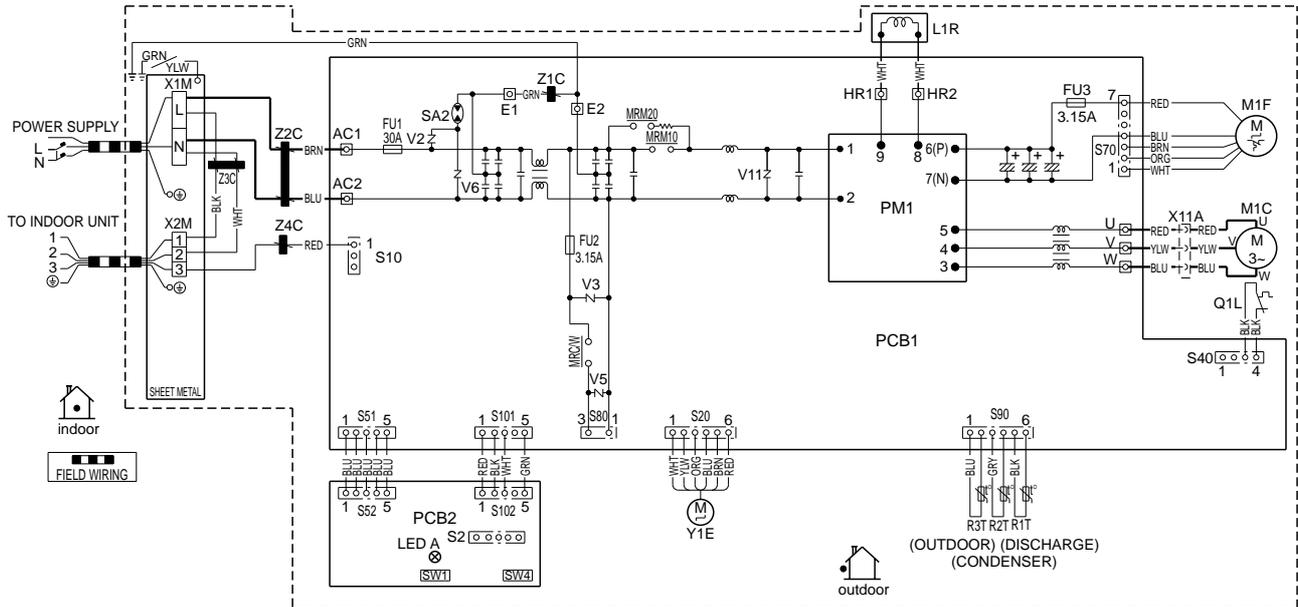
FVKS50BAVMB, FVXS50BAVMB



3D034713C

## 2.2 Outdoor Units

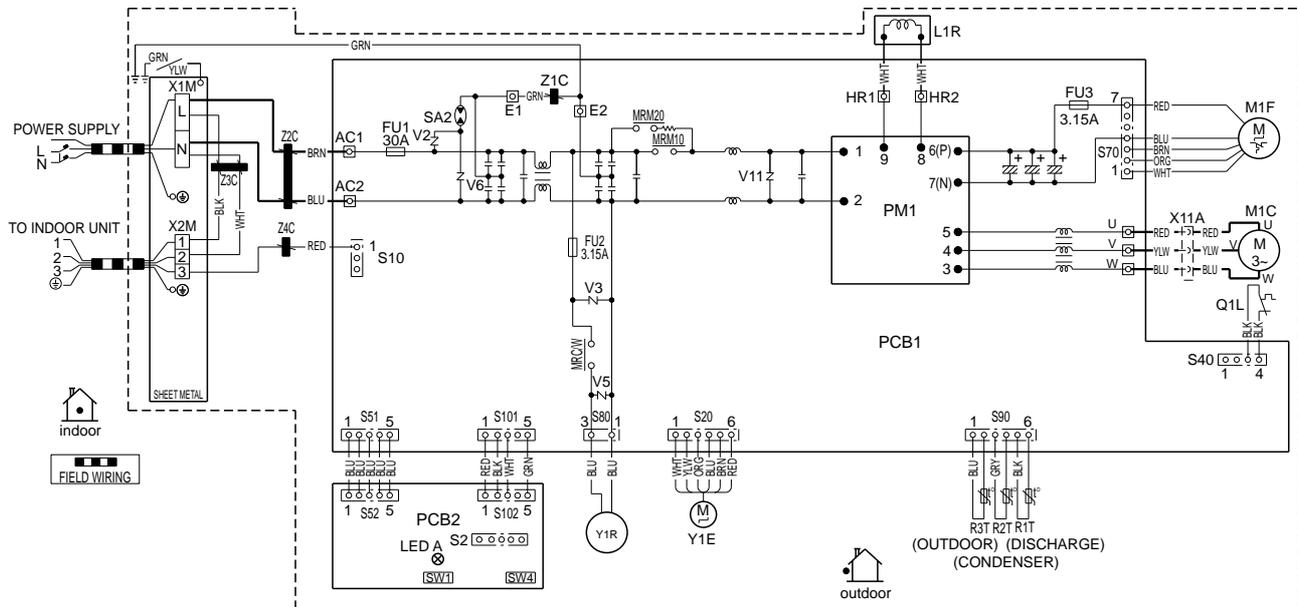
### RKS50E2(3)V1B, RN50E2(3)V1B



- |                     |                                   |              |                  |     |                                   |             |                              |
|---------------------|-----------------------------------|--------------|------------------|-----|-----------------------------------|-------------|------------------------------|
| Z1C ~ Z4C           | : FERRITE CORE                    | MRM10, MRM20 | : MAGNETIC RELAY | L   | : LIVE                            | M1C         | : COMPRESSOR MOTOR           |
| X1M, X2M            | : TERMINAL STRIP                  | MRC/W        | : THERMISTOR     | N   | : NEUTRAL                         | M1F         | : FAN MOTOR                  |
| Y1E                 | : ELECTRONIC EXPANSION VALVE COIL | R1T ~ R3T    | : THERMISTOR     | SW1 | : FORCED OPERATION ON/OFF SW(SW1) | L1R         | : REACTOR                    |
| V2, V3, V5, V6, V11 | : VARISTOR                        | S2 ~ S102    | : CONNECTOR      | SW4 | : LOCAL SETTING SW (SW4)          | Q1L         | : OVERLOAD PROTECTOR         |
| SA2                 | : SURGE ARRESTER                  | LEDA         | : PILOT LAMP     |     |                                   | PM1         | : POWER MODULE               |
| FU1, FU2, FU3       | : FUSE                            |              |                  |     |                                   | PCB1, 2     | : PRINTED CIRCUIT BOARD      |
| AC1, AC2            |                                   |              |                  |     |                                   | STEEL METAL | : TERMINAL STRIP FIXED PLATE |
| U, V, W, X11A       |                                   |              |                  |     |                                   |             |                              |
| E1, E2              |                                   |              |                  |     |                                   |             |                              |
| HR1, HR2            | : CONNECTOR                       |              |                  |     |                                   |             |                              |

3D050981B

### RXS50E2(3)V1B



- |                     |                                   |              |                  |     |                                   |             |                                 |
|---------------------|-----------------------------------|--------------|------------------|-----|-----------------------------------|-------------|---------------------------------|
| Z1C ~ Z4C           | : FERRITE CORE                    | MRM10, MRM20 | : MAGNETIC RELAY | L   | : LIVE                            | M1C         | : COMPRESSOR MOTOR              |
| X1M, X2M            | : TERMINAL STRIP                  | MRC/W        | : THERMISTOR     | N   | : NEUTRAL                         | M1F         | : FAN MOTOR                     |
| Y1E                 | : ELECTRONIC EXPANSION VALVE COIL | R1T ~ R3T    | : THERMISTOR     | SW1 | : FORCED OPERATION ON/OFF SW(SW1) | L1R         | : REACTOR                       |
| V2, V3, V5, V6, V11 | : VARISTOR                        | S2 ~ S102    | : CONNECTOR      | SW4 | : LOCAL SETTING SW (SW4)          | Q1L         | : OVERLOAD PROTECTOR            |
| SA2                 | : SURGE ARRESTER                  | LEDA         | : PILOT LAMP     |     |                                   | PM1         | : POWER MODULE                  |
| FU1, FU2, FU3       | : FUSE                            |              |                  |     |                                   | PCB1, 2     | : PRINTED CIRCUIT BOARD         |
| AC1, AC2            |                                   |              |                  |     |                                   | Y1R, 2      | : REVERSING SOLENOID VALVE COIL |
| U, V, W, X11A       |                                   |              |                  |     |                                   | STEEL METAL | : TERMINAL STRIP FIXED PLATE    |
| E1, E2              |                                   |              |                  |     |                                   |             |                                 |
| HR1, HR2            | : CONNECTOR                       |              |                  |     |                                   |             |                                 |

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