DAIKIN

SiBE041103

Service Manual

Inverter Pair
Wall Mounted Type K-Series

[Applied Models]
● **Inverter Pair : Heat Pump**

Inverter Pair Wall Mounted Type K-Series

●Heat Pump

Indoor Unit

FTXN50KV1B
FTXN60KV1B

Outdoor Unit

RXN50KEV1B
RXN60KEV1B

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 the item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.

◯ This symbol indicates the prohibited action.
The prohibited item or action is shown in the illustration or near the symbol.

● This symbol indicates the action that must be taken, or the instruction.
The instruction is shown in the illustration 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 Cautions Regarding Safety of Workers

⚠ Warning	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for repair. Working on the equipment that is connected to the power supply may 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 is discharged during the repair work, do not touch the discharged refrigerant gas. The refrigerant gas may cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, evacuate 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 may cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas may 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 may 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 may cause an electrical shock or fire.	

Warning	
Be sure to wear a safety helmet, gloves, and a safety belt when working at a high place (more than 2 m). Insufficient safety measures may cause a fall accident.	
In case of R-410A refrigerant models, be sure to use pipes, flare nuts and tools for the exclusive use of the R-410A refrigerant. The use of materials for R-22 refrigerant models may cause a serious accident such as a damage of refrigerant cycle as well as an equipment failure.	

Caution	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands may cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water may 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.	
Be sure to conduct repair work with appropriate tools. The use of inappropriate tools may cause injury.	
Be sure to check that the refrigerating cycle section has cooled down enough before conducting repair work. Working on the unit when the refrigerating cycle section is hot may cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room may cause oxygen deficiency.	

1.1.2 Cautions Regarding Safety of Users

Warning	
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 may cause an electrical shock, excessive heat generation or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires may cause an electrical shock, excessive heat generation or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it may cause an electrical shock, excessive heat generation or fire.	
Be sure to use an exclusive power circuit for the equipment, and follow the local 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 may cause an electrical shock or fire.	
Be sure to use the specified cable for wiring 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 may cause excessive heat generation or fire.	
When wiring 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 may cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable may cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable may damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A / R-22) 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 leaking point and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leaking point 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 may generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
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 may fall and cause injury.	

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet securely. If the plug has dust or loose connection, it may cause an electrical shock or fire.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation may cause the equipment to fall, resulting in injury.	For unitary type only 
Be sure to install the product securely in the installation frame mounted on the window frame. If the unit is not securely mounted, it may fall and cause injury.	For unitary type only 
When replacing the coin battery in the remote controller, 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.	

Caution	
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 the combustible gas leaks and remains around the unit, it may cause a fire.	
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 may cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame may cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding may cause an electrical shock.	

Caution	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 MΩ or higher. Faulty insulation may cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage may cause the water to enter the room and wet the furniture and floor.	
Do not tilt the unit when removing it. The water inside the unit may spill and wet the furniture and floor.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water may enter the room and wet the furniture and floor.	For unitary type only 

1.2 Used 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:

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, loose 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

1. Functions

Category	Functions	FTXN50/60KV1B RXN50/60KEV1B	Category	Functions	FTXN50/60KV1B RXN50/60KEV1B
Basic Function	Inverter (with Inverter Power Control)	●	Health & Clean	Air-Purifying Filter	—
	Operation Limit for Cooling (°CDB)	10 ~46		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	●
	Standby Electricity Saving	—			
Compressor	Oval Scroll Compressor	—		Air Filter (Prefilter)	●
	Swing Compressor	●		Wipe-Clean Flat Panel	●
	Rotary Compressor	—		Washable Grille	—
	Reluctance DC Motor	●		MOLD PROOF Operation	—
Comfortable Airflow	Power-Airflow Flap	—		Good-Sleep Cooling Operation	—
	Power-Airflow Dual Flaps	●	Timer	WEEKLY TIMER Operation	—
	Power-Airflow Diffuser	—		24-Hour ON/OFF TIMER	—
	Wide-Angle Louvers	●		Count Up-Down ON/OFF TIMER	●
	Vertical Auto-Swing (Up and Down)	●		NIGHT SET Mode	●
	Horizontal Auto-Swing (Right and Left)	—	Worry Free “Reliability & Durability”	Auto-Restart (after Power Failure)	●
	3-D Airflow	—		Self-Diagnosis (Digital, LED) Display	●
	COMFORT AIRFLOW Operation	—		Wiring Error Check Function	—
Comfort Control	Auto Fan Speed	●		Anti-Corrosion Treatment of Outdoor Heat Exchanger	●
	Indoor Unit Quiet Operation	●			
	NIGHT QUIET Mode (Automatic)	—	Flexibility	Multi-Split / Split Type Compatible Indoor Unit	—
	OUTDOOR UNIT QUIET Operation (Manual)	—			
	INTELLIGENT EYE Operation	—		Flexible Power Supply Correspondence	—
	Quick Warming Function (Preheating Operation)	●		Chargeless	10 m
	Hot-Start Function	●		Either Side Drain (Right or Left)	●
	Automatic Defrosting	●		Power Selection	—
Operation	Automatic Operation	●	Remote Control	5-Room Centralized Controller (Option)	—
	Program Dry Operation	●		Remote Control Adaptor (Normal Open Pulse Contact) (Option)	—
	Fan Only	●			
Lifestyle Convenience	New POWERFUL Operation (Non-Inverter)	—		Remote Control Adaptor (Normal Open Contact) (Option)	—
	Inverter POWERFUL Operation	●		DIII-NET Compatible (Adaptor) (Option)	—
	Priority-Room Setting	—	Remote Controller	Wireless	●
	COOL / HEAT Mode Lock	—		Wired (Option)	●
	HOME LEAVE Operation	—			
	ECONO Operation	—			
	Indoor Unit ON/OFF Button	●			
	Signal Receiving Sign	●			
	R/C with Back Light	—			
	Temperature Display	—			

Note: ● : Holding Functions
— : No Functions

Part 2
Specifications

1. Specifications

50 Hz, 220 - 230 - 240 V

Model	Indoor Unit			FTXN50KV1B		FTXN60KV1B	
	Outdoor Unit			RXN50KEV1B		RXN60KEV1B	
				Cooling	Heating	Cooling	Heating
Capacity Rated (Min. ~ Max.)			kW	5.0 (1.7 ~ 5.7)	5.5 (1.7 ~ 6.8)	6.0 (1.7 ~ 6.5)	6.3 (1.7 ~ 7.6)
			Btu/h	17,100 (5,800 ~ 19,400)	18,800 (5,800 ~ 23,200)	20,500 (5,800 ~ 22,200)	21,500 (5,800 ~ 25,900)
			kcal/h	4,300 (1,460 ~ 4,900)	4,730 (1,460 ~ 5,850)	5,160 (1,460 ~ 5,590)	5,420 (1,460 ~ 6,540)
Moisture Removal			L/h	2.9	—	3.9	—
Running Current Rated			A	7.3 - 6.9 - 6.7	7.3 - 7.0 - 6.7	9.2 - 8.8 - 8.4	8.5 - 8.2 - 7.8
Power Consumption Rated (Min. ~ Max.)			W	1,560 (320 ~ 2,010)	1,570 (320 ~ 2,290)	1,990 (340 ~ 2,420)	1,850 (330 ~ 2,640)
Power Factor			%	97.1 - 98.3 - 97.0	97.8 - 97.5 - 97.6	98.3 - 98.3 - 98.7	98.9 - 98.1 - 98.8
COP Rated (Min. ~ Max.)			W/W	3.21 (5.31 ~ 2.84)	3.50 (5.31 ~ 2.97)	3.02 (5.00 ~ 2.69)	3.41 (5.15 ~ 2.88)
Piping Connections	Liquid		mm	ϕ 6.4		ϕ 6.4	
	Gas		mm	ϕ 12.7		ϕ 12.7	
	Drain	Indoor Unit	mm	I.D. ϕ 14.0, O.D. ϕ 18.0		I.D. ϕ 14.0, O.D. ϕ 18.0	
		Outdoor Unit		I.D. ϕ 18.0 (Hole)		I.D. ϕ 18.0 (Hole)	
Heat Insulation				Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Max. Interunit Piping Length			m	30		30	
Max. Interunit Height Difference			m	20		20	
Chargeless			m	10		10	
Amount of Additional Charge of Refrigerant			g/m	20		20	
Indoor Unit				**FTXN50KV1B**		**FTXN60KV1B**	
Front Panel Color				White		White	
Airflow Rate	H		m³/min (cfm)	14.7 (519)	16.1 (568)	16.2 (572)	17.4 (614)
	M			12.4 (438)	13.9 (491)	13.6 (480)	15.1 (533)
	L			10.3 (364)	11.5 (406)	11.4 (403)	12.7 (448)
	SL			9.5 (335)	10.2 (360)	10.2 (360)	11.4 (403)
Fan	Type			Cross Flow Fan		Cross Flow Fan	
	Motor Output		W	43		43	
	Speed		Steps	5 Steps, Quiet, Auto		5 Steps, Quiet, Auto	
Air Direction Control				Right, Left, Horizontal, Downward		Right, Left, Horizontal, Downward	
Air Filter				Removable / Washable / Mildew Proof		Removable / Washable / Mildew Proof	
Running Current (Rated)			A	0.16 - 0.15 - 0.15	0.17 - 0.16 - 0.16	0.19 - 0.18 - 0.17	0.21 - 0.20 - 0.19
Power Consumption (Rated)			W	34 - 34 - 34	36 - 36 - 36	40 - 40 - 40	45 - 45 - 45
Power Factor			%	96.6 - 98.6 - 94.4	96.3 - 97.8 - 93.8	95.7 - 96.6 - 98.0	97.4 - 97.8 - 98.7
Temperature Control				Microcomputer Control		Microcomputer Control	
Dimensions (H × W × D)			mm	290 × 1,050 × 238		290 × 1,050 × 238	
Packaged Dimensions (H × W × D)			mm	337 × 1,147 × 366		337 × 1,147 × 366	
Weight			kg	12		12	
Gross Weight			kg	17		17	
Operation Sound	H / M / L / SL		dB(A)	43 / 39 / 34 / 31	42 / 38 / 33 / 30	45 / 41 / 36 / 33	44 / 40 / 35 / 32
Sound Power			dB(A)	59	58	61	60
Outdoor Unit				**RXN50KEV1B**		**RXN60KEV1B**	
Casing Color				Ivory White		Ivory White	
Compressor	Type			Hermetically Sealed Swing Type		Hermetically Sealed Swing Type	
	Model			2YC36BXD		2YC36BXD	
	Motor Output		W	1,100		1,100	
Refrigerant Oil	Type			FVC50K		FVC50K	
	Charge		L	0.65		0.65	
Refrigerant	Type			R-410A		R-410A	
	Charge		kg	1.45		1.45	
Airflow Rate	H		m³/min (cfm)	42.6 (1,504)	38.3 (1,352)	48.2 (1,702)	43.4 (1,532)
Fan	Type			Propeller		Propeller	
	Motor Output		W	60		60	
Running Current (Rated)			A	7.14 - 6.75 - 6.55	7.13 - 6.84 - 6.54	9.01 - 8.62 - 8.23	8.29 - 8.0 - 7.61
Power Consumption (Rated)			W	1,526 - 1,526 - 1,526	1,534 - 1,534 - 1,534	1,950 - 1,950 - 1,950	1,805 - 1,805 - 1,805
Power Factor			%	97.1 - 98.3 - 97.1	97.8 - 97.5 - 97.7	98.4 - 98.4 - 98.7	99.0 - 98.1 - 98.8
Starting Current			A	7.3		9.2	
Dimensions (H × W × D)			mm	595 × 795 × 300		595 × 795 × 300	
Packaged Dimensions (H × W × D)			mm	654 × 942 × 400		654 × 942 × 400	
Weight			kg	42		42	
Gross Weight			kg	45		45	
Operation Sound	H		dB(A)	49	51	52	52
Sound Power	H		dB(A)	63	65	66	66
Drawing No.				3D071069C		3D071070C	

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

Cooling	Heating	Piping Length
Indoor ; 27°CDB / 19°CWB Outdoor ; 35°CDB / 24°CWB	Indoor ; 20°CDB Outdoor ; 7°CDB / 6°CWB	5 m

Conversion Formulae
kcal/h = kW × 860 Btu/h = kW × 3412 cfm = m³/min × 35.3

Part 3
Printed Circuit Board Connector Wiring Diagram

1. Indoor Unit

Connectors and Other Parts

PCB (1): Control PCB

1)	S1	Connector for DC fan motor
2)	S6	Connector for swing motor (horizontal blades)
3)	S21	Connector for centralized control (HA)
4)	S26	Connector for buzzer PCB
5)	S28	Connector for signal receiver PCB
6)	S32	Connector for indoor heat exchanger thermistor
7)	H1, H2, H3, FG	Connector for terminal board
8)	JA	Address setting jumper
	JB	Fan speed setting when compressor stops for thermostat OFF
	JC	Power failure recovery function (auto-restart)
		∗ Refer to page 144 for detail.
9)	LED A	LED for service monitor (green)
10)	FU1	Fuse (3.15 A, 250 V)
11)	V1	Varistor

PCB (2): Signal Receiver PCB

1)	S29	Connector for control PCB
2)	SW1 (S1W)	Forced operation ON/OFF button

PCB (3): Buzzer PCB

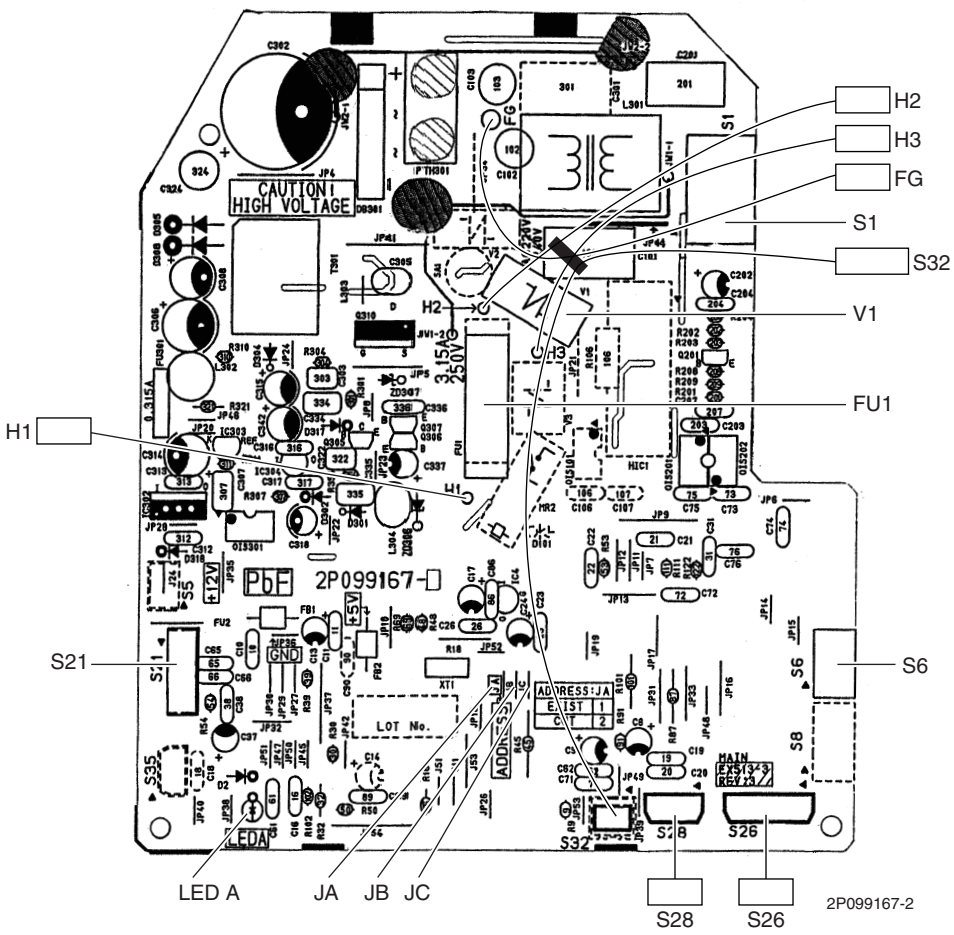
1)	S27	Connector for control PCB
2)	S38	Connector for display PCB
3)	RTH1 (R1T)	Room temperature thermistor

PCB (4): Display PCB

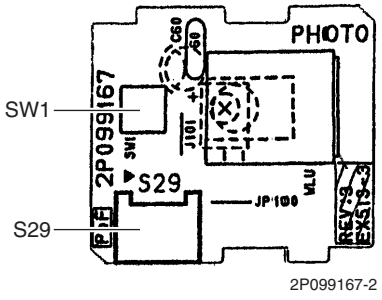
1)	S37	Connector for buzzer PCB
2)	LED1 (H1P)	LED for operation (green)
3)	LED2 (H2P)	LED for timer (yellow)

PCB Detail

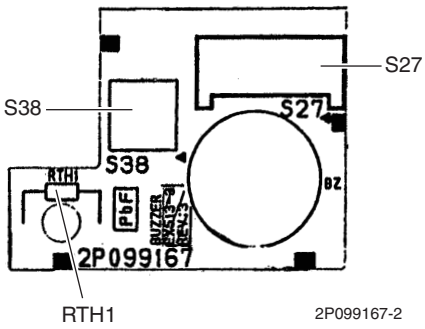
PCB (1): Control PCB



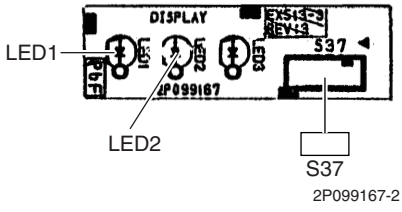
PCB (2): Signal Receiver PCB



PCB (3): Buzzer PCB



PCB (4): Display PCB



★LED3 does not function.

2. Outdoor Unit

Connectors and Other Parts

PCB (1): Filter PCB

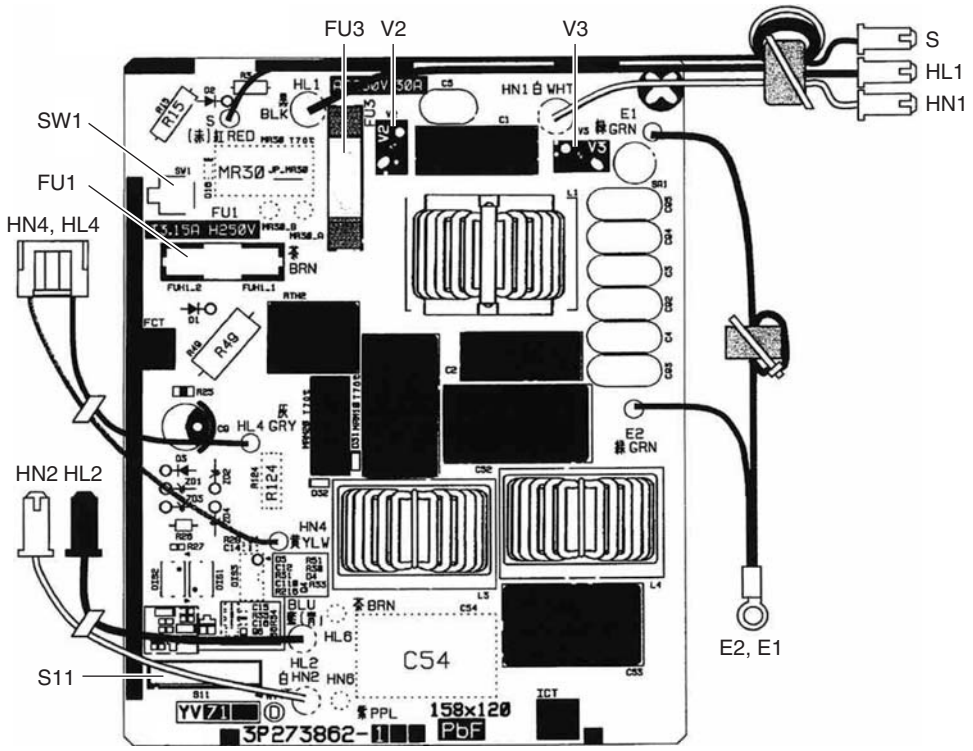
1)	S11	Connector for [S10] on main PCB
2)	HL1, HN1, S	Connector for terminal board
3)	E1, E2	Terminal for earth
4)	HL2, HN2	Connector for [HL3] [HN3] on main PCB
5)	HL4, HN4	Connector for [S12] on main PCB
6)	FU1	Fuse (3.15 A, 250 V)
7)	FU3	Fuse (30 A, 250 V)
8)	V2, V3	Varistor
9)	SW1	Forced cooling operation ON/OFF switch

PCB (2): Main PCB

1)	S10	Connector for [S11] on filter PCB
2)	S12	Connector for [HL4] [HN4] on filter PCB
3)	S20	Connector for electronic expansion valve coil
4)	S40	Connector for overload protector
5)	S70	Connector for fan motor
6)	S80	Connector for four way valve coil
7)	S90	Connector for thermistors (outdoor temperature, outdoor heat exchanger, discharge pipe)
8)	HL3, HN3	Connector for [HL2] [HN2] on filter PCB
9)	U, V, W	Terminal for compressor
10)	FU2	Fuse (3.15 A, 250 V)
11)	LED A	LED for service monitor (green)
12)	V1	Varistor
13)	J8	Jumper for improvement of defrost performance ∗ Refer to page 144 for detail.

PCB Detail

PCB (1): Filter PCB



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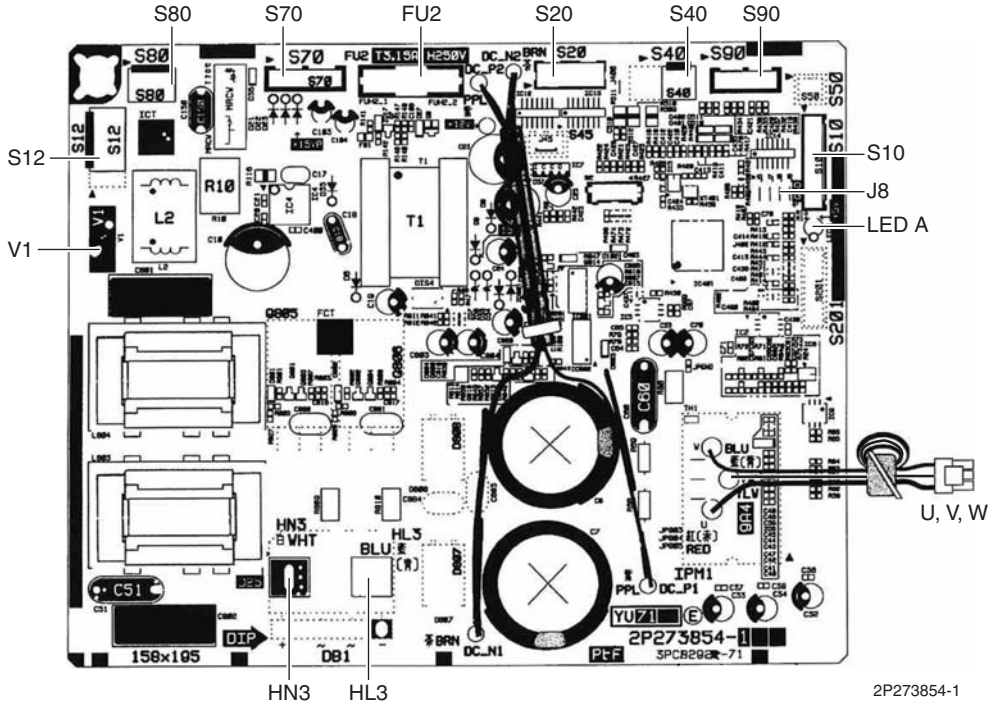
PCB (2): Main PCB



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Part 4
Function and Control

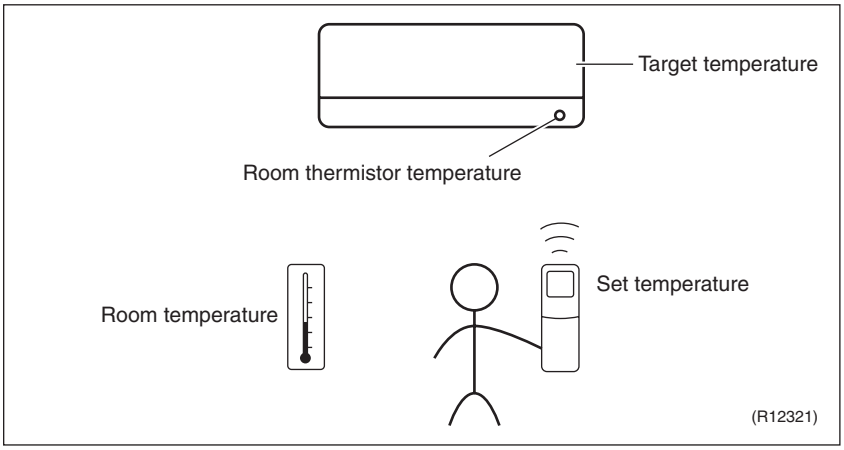
1. Main Functions

1.1 Temperature Control

Definitions of Temperatures

The definitions of temperatures are classified as following.

- Room temperature: temperature of lower part of the room
- Set temperature: temperature set by remote controller
- Room thermistor temperature: temperature detected by room temperature thermistor
- Target temperature: temperature determined by microcomputer



Temperature Control

The temperature of the room is detected by the room temperature thermistor. However, there is difference between the “temperature detected by room temperature thermistor” and the “temperature of lower part of the room”, depending on the type of the indoor unit or installation condition. Practically, the temperature control is done by the “target temperature appropriately adjusted for the indoor unit” and the “temperature detected by room temperature thermistor”.

1.2 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 thermistor temperature and the target temperature

Additional Control Parameters

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

- Frequency restrictions
- Initial settings
- Forced cooling operation

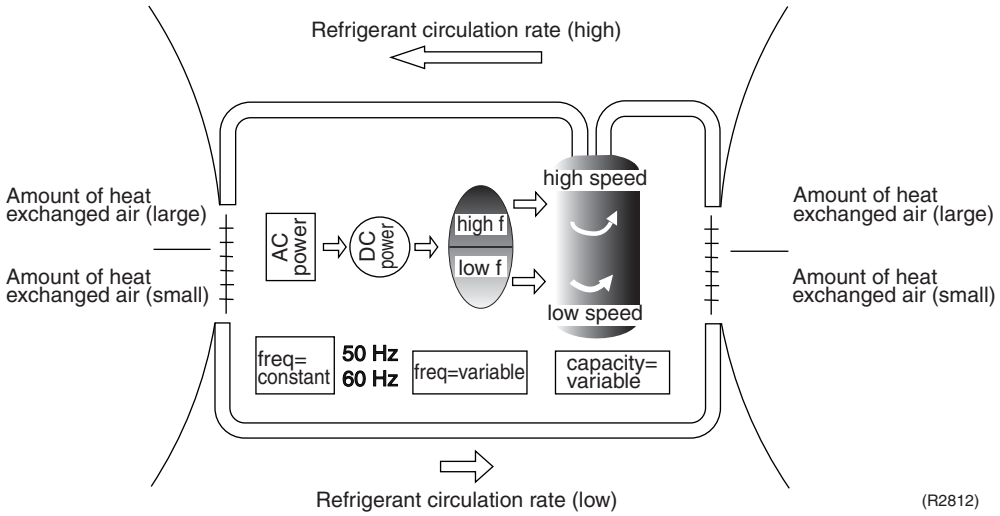
Inverter Principle

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. ■ 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. ■ 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.

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 outdoor temperature and cooling / heating load.
- Quick heating and quick cooling
  The compressor rotational speed is increased when starting the heating (or cooling). This enables to reach the set temperature quickly.
- Even during extreme cold weather, high capacity is achieved. It is maintained even when the outdoor temperature is 2°C.
- Comfortable air conditioning
  A fine adjustment is integrated to keep the room temperature constant.
- 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 functions regulate the minimum and maximum frequency:

Frequency	Functions
Low	■ Four way valve operation compensation. Refer to page 25.
High	■ Compressor protection function. Refer to page 26. ■ Discharge pipe temperature control. Refer to page 26. ■ Input current control. Refer to page 27. ■ Freeze-up protection control. Refer to page 28. ■ Heating peak-cut control. Refer to page 28. ■ Defrost control. Refer to page 30.

Forced Cooling Operation

Refer to page 142 for detail.

1.3 Airflow Direction Control

Power-Airflow Dual Flaps

The large flaps send a large volume of air downward to the floor and provide an optimum control in cooling, dry, and heating mode.

Cooling / Dry Mode

During cooling or dry mode, the flap retracts into the indoor unit. Then, cool air can be blown far and pervaded all over the room.

Heating Mode

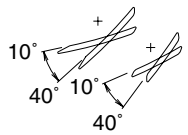
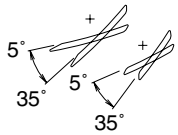
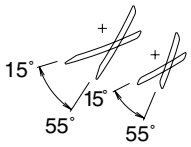
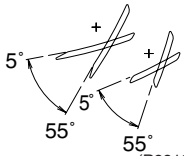
During heating mode, the large flap directs airflow downward to spread the warm air to the entire room.

Wide-Angle Louvers

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

Auto-Swing

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

Vertical Swing (up and down)			
Cooling	Dry	Heating	Fan
 (R2814)	 (R2815)	 (R2813)	 (R2816)

1.4 Fan Speed Control for Indoor Unit

Outline

Phase control and fan speed control contains 9 steps: LLL, LL, SL, L, ML, M, MH, H, and HH. The airflow rate can be automatically controlled depending on the difference between the room thermistor temperature and the target 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 55.

Automatic Fan Speed Control

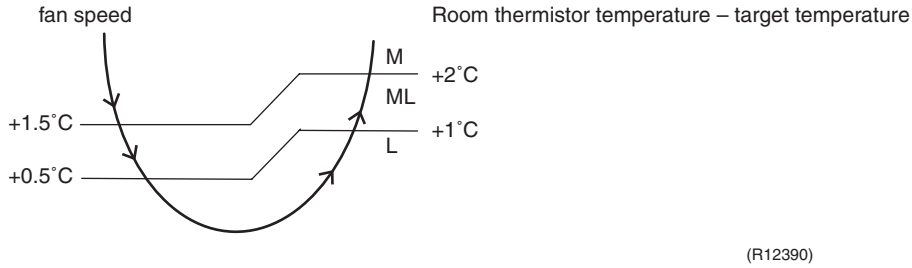
In automatic fan speed operation, the step “SL” is not available.

Step	Cooling	Heating
LLL	 (R6833)	 (R6834)
LL		
L		
ML		
M		
MH		
H		
HH (POWERFUL)		

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

<Cooling>

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



(R12390)

<Heating>

On heating mode, the fan speed is regulated according to the indoor heat exchanger temperature and the difference between the room thermistor temperature and the target temperature.

Note:
1. During POWERFUL operation, fan rotates at H tap + 90 rpm.
2. Fan stops during defrost operation.

1.5 Program Dry Operation

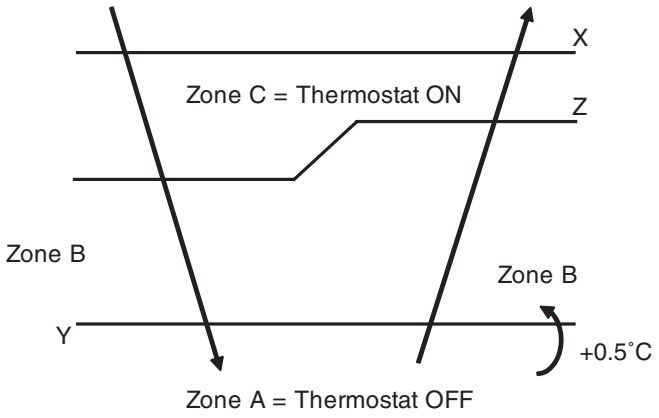
Outline

Program dry operation removes humidity while preventing the room temperature from lowering. Since the microcomputer controls both the temperature and airflow rate, the temperature adjustment and fan adjustment buttons are inoperable in this mode.

Detail

The microcomputer automatically sets the temperature and airflow rate. The difference between the room thermistor temperature at start-up and the target temperature 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 thermistor temperature at start-up	Target temperature X	Thermostat OFF point Y	Thermostat ON point Z
24°C or more	Room thermistor temperature at start-up	X – 2.5°C	X – 0.5°C or Y + 0.5°C (zone B) continues for 10 min.
23.5°C ~ 18°C		X – 2.0°C	X – 0.5°C or Y + 0.5°C (zone B) continues for 10 min.
17.5°C ~	18°C	X – 2.0°C	X – 0.5°C = 17.5°C or Y + 0.5°C (zone B) continues for 10 min.



(R11581)

1.6 Automatic Operation

Outline

Automatic Cooling / Heating Function

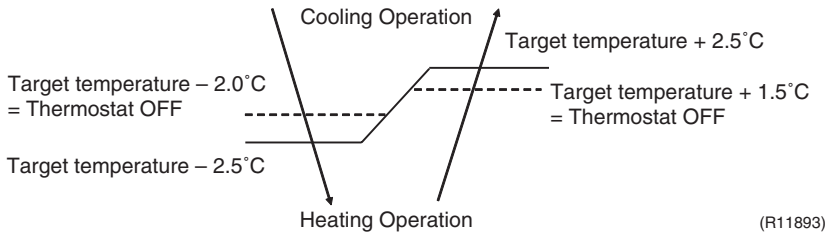
When the AUTO mode is selected with the remote controller, the microcomputer automatically determines the operation mode as cooling or heating according to the room temperature and the set temperature at start-up, and automatically operates in that mode.

The unit automatically switches the operation mode to maintain the room temperature at the set temperature.

Detail

Ts: set temperature (set by remote controller)
Tt: target temperature (determined by microcomputer)
Tr: room thermistor temperature (detected by room temperature thermistor)
C: correction value

1. The set temperature (Ts) determines the target temperature (Tt).
   (Ts = 18 ~ 30°C).
2. The target temperature (Tt) is calculated as;
   Tt = Ts + C
   where C is the correction value.
   C = 0°C
3. Thermostat ON/OFF point and mode switching point are as follows.
   Tr means the room thermistor temperature.
   (1) Heating → Cooling switching point:
   Tr ≥ Tt + 2.5°C
   (2) Cooling → Heating switching point:
   Tr < Tt – 2.5°C
   (3) Thermostat ON/OFF point is the same as the ON/OFF point of cooling or heating operation.
4. During initial operation
   Tr ≥ Ts : Cooling operation
   Tr < Ts : Heating operation



Ex: When the target temperature is 25°C
Cooling → 23°C: Thermostat OFF → 22°C: Switch to heating
Heating → 26.5°C: Thermostat OFF → 27.5°C: Switch to cooling

1.7 Thermostat Control

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

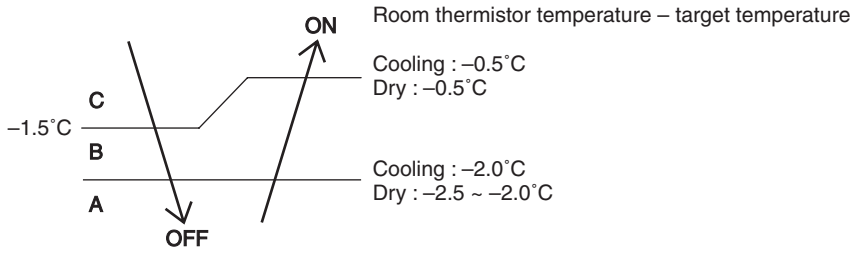
Thermostat OFF Condition

- The temperature difference is in the zone A.

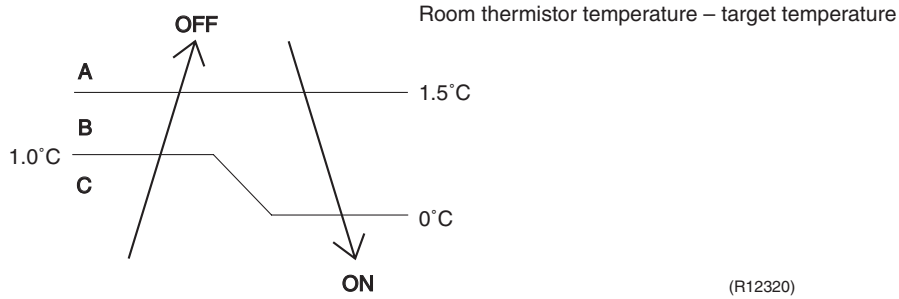
Thermostat ON Condition

- The temperature difference returns to 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>



Refer to “Temperature Control” on page 11 for detail.

1.8 NIGHT SET Mode

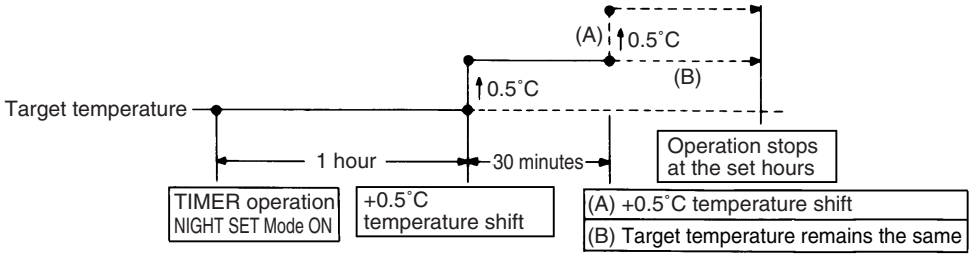
Outline

When the OFF timer is set, the NIGHT SET Mode is automatically activated. The NIGHT SET Mode keeps the airflow rate setting.

Detail

The NIGHT SET Mode continues operation at the target temperature for the first one hour, then automatically raises the target temperature slightly in the case of cooling, or lowers it slightly in the case of heating. This prevents excessive cooling in summer and excessive heating in winter to ensure comfortable sleeping conditions, and also conserves electricity.

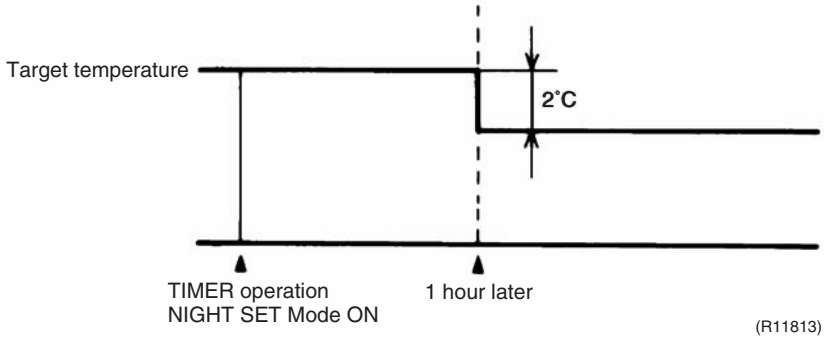
<Cooling>



(A) : When the outdoor temperature is normal and the room temperature is at the set temperature.
(B) : When the outdoor temperature is high (27˚C or higher).

(R14060)

<Heating>



(R11813)

1.9 Inverter POWERFUL Operation

Outline

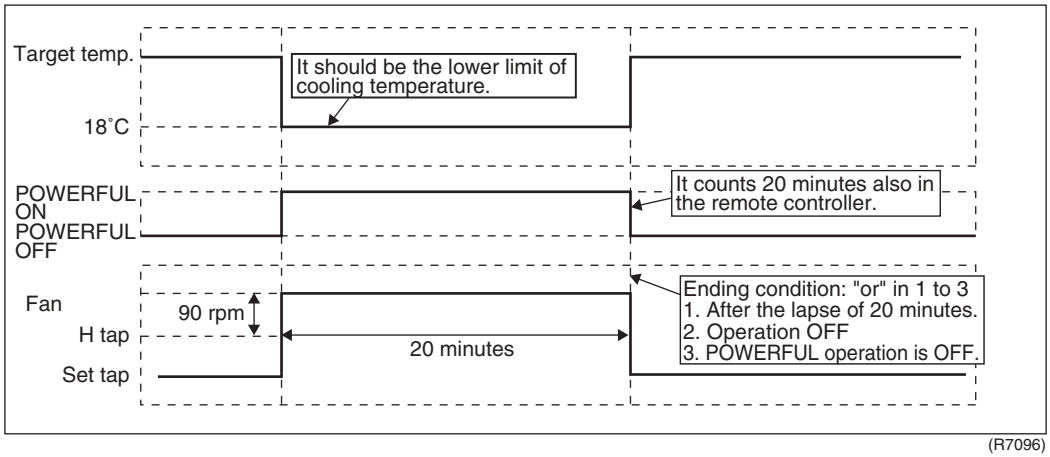
In order to exploit the cooling and heating capacity to full extent, operate the air conditioner by increasing the indoor fan rotating speed and the compressor frequency.

Detail

When POWERFUL button is pressed, the fan speed and target temperature are converted to the following states for 20 minutes.

Operation mode	Fan speed	Target temperature
COOL	H tap + 90 rpm	18°C
DRY	Dry rotating speed + 90 rpm	Lowered by 2.5°C
HEAT	H tap + 90 rpm	32°C
FAN	H tap + 90 rpm	—
AUTO	Same as cooling / heating in POWERFUL operation	The target temperature is kept unchanged.

Ex.) : POWERFUL operation in cooling mode.



(R7096)

1.10 Other Functions

1.10.1 Hot-Start Function

In order to prevent the cold air blast that normally comes when heating operation is started, the temperature of the indoor heat exchanger is detected, and either the airflow 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 is turned ON.

1.10.2 Signal Receiving Sign

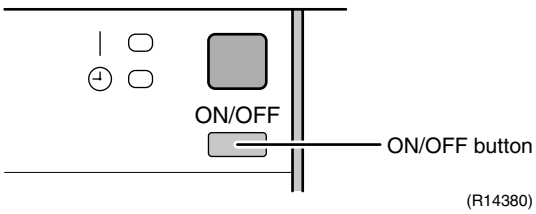
When the indoor unit receives a signal from the remote controller, the unit emits a signal receiving sound.

1.10.3 Indoor Unit ON/OFF Button

An ON/OFF button is provided on the display of the unit.

- Press this button once to start operation. Press once again to stop it.
- This button is useful when the remote controller is missing or the battery has run out.
- The operation mode refers to the following table.

Mode	Temperature setting	Airflow rate
AUTO	25°C	Automatic



<Forced cooling operation>
Forced cooling operation can be started by pressing the ON/OFF button for 5 to 9 seconds while the unit is not operating.
Refer to page 142 for detail.

Note: When the ON/OFF button is pressed for 10 seconds or more, the forced cooling operation is stopped.

1.10.4 Titanium Apatite Photocatalytic Air-Purifying Filter

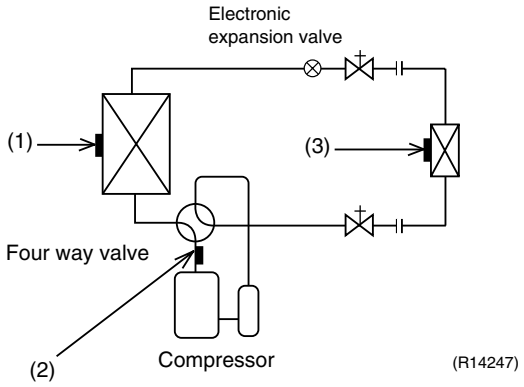
This filter combines the Air-Purifying Filter and Titanium Apatite Photocatalytic Deodorizing Filter as a single highly effective filter. The filter traps microscopic particles, decomposes odors and even deactivates bacteria and viruses. It lasts for 3 years without replacement if washed about once every 6 months.

1.10.5 Auto-restart Function

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

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

2. Function of Thermistor



(1) Outdoor Heat Exchanger Thermistor

1. The outdoor heat exchanger thermistor is used for controlling target discharge pipe temperature. The system sets the 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 pipe temperature can be obtained.
2. In cooling operation, the outdoor heat exchanger thermistor is used for detecting disconnection of the discharge pipe thermistor. When the discharge pipe temperature becomes lower than the outdoor heat exchanger temperature, the discharge pipe thermistor is judged as disconnected.
3. In cooling operation, the outdoor heat exchanger thermistor is used for high pressure protection.

(2) Discharge Pipe Thermistor

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

(3) Indoor Heat Exchanger Thermistor

1. The indoor heat exchanger thermistor is used for controlling target discharge pipe temperature. The system sets the 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 pipe temperature can be obtained.
2. In cooling operation, the indoor heat exchanger thermistor is used for freeze-up protection control. If the indoor heat exchanger temperature drops abnormally, the operating frequency becomes lower or the operation halts.
3. In heating operation, 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.

3. Control Specification

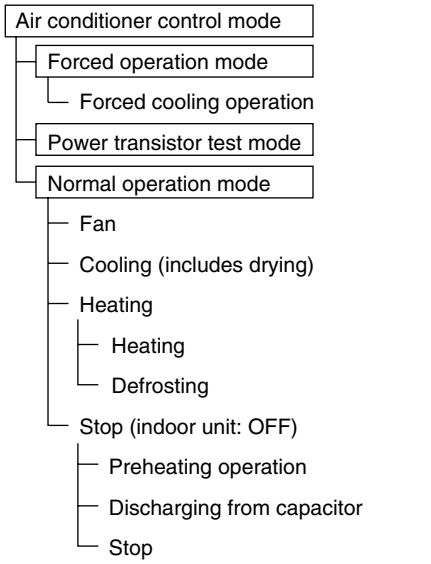
3.1 Mode Hierarchy

Outline

There are two modes; the one is the normal operation mode and the other is the forced operation mode for installation and providing service.

Detail

There are following modes.



(R14248)

Note: Unless specified otherwise, an indoor dry operation command is regarded as cooling operation.

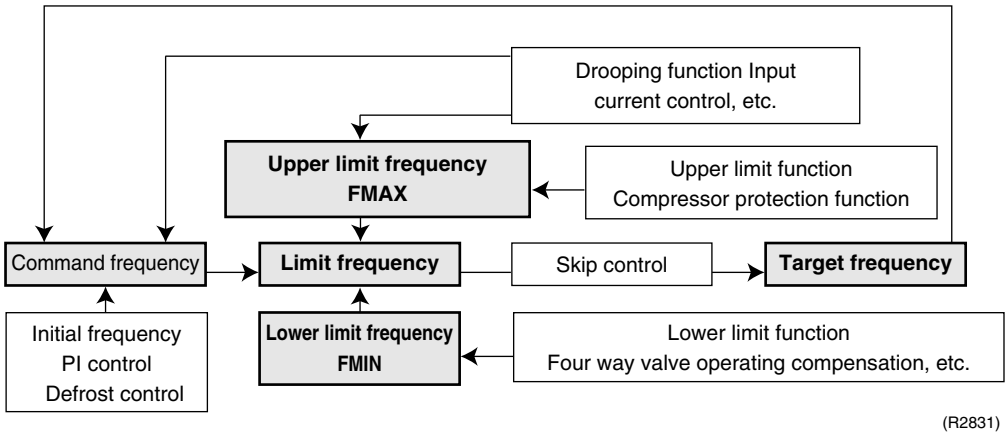
3.2 Frequency Control

Outline

Frequency is determined according to the difference between the room thermistor temperature and the target temperature.
The function is explained as follows.

1. How to determine frequency
2. Frequency command from the indoor unit (Difference between the room thermistor temperature and the target temperature)
3. Frequency initial setting
4. PI control

When the shift of the frequency is less than zero (ΔF<0) by PI control, the target frequency is used as the command frequency.



Detail

How to Determine Frequency
The compressor's frequency is determined by taking the following steps.

1. Determine command frequency

- Command frequency is determined in the following order of priority.

1. Limiting defrost control time
2. Forced cooling
3. Indoor frequency command

2. Determine upper limit frequency

- The minimum value is set as an upper limit frequency among the frequency upper limits of the following functions:
  Compressor protection, input current, discharge pipe temperature, heating peak-cut, freeze-up protection, defrost.

3. Determine lower limit frequency

- The maximum value is set as an lower limit frequency among the frequency lower limits of the following functions:
  Four way valve operation compensation, draft prevention, pressure difference upkeep.

4. Determine prohibited frequency

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

Indoor Frequency Command (∆D signal)

The difference between the room thermistor temperature and the target temperature is taken as the "∆D signal" and is used for frequency command.

Temperature difference	∆D signal	Temperature difference	∆D signal	Temperature difference	∆D signal	Temperature difference	∆D signal
–2.0	∗Th OFF	0	4	2.0	8	4.0	C
–1.5	1	0.5	5	2.5	9	4.5	D
–1.0	2	1.0	6	3.0	A	5.0	E
–0.5	3	1.5	7	3.5	B	5.5	F

∗Th OFF = Thermostat OFF

Frequency Initial Setting

<Outline>

When starting the compressor, the frequency is initialized according to the ∆D value and the Q value of the indoor unit.

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

PI Control (Determine Frequency Up / Down by ∆D Signal)

1. **P control**
   The ∆D value is calculated in each sampling time (15 ~ 20 seconds), and the frequency is adjusted according to its difference from the frequency previously calculated.

2. **I control**
   If the operating frequency does not change for more than a certain fixed time, the frequency is adjusted according to the ∆D value.
   When the ∆D value is small, the frequency is lowered.
   When the ∆D value is large, the frequency is increased.

3. **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.

4. **Upper and lower limit of frequency by PI control**
   The frequency upper and lower limits are set according to the command on indoor unit.
   When the indoor or outdoor unit quiet operation command comes from the indoor unit, the upper limit frequency is lowered than the usual setting.

3.3 Controls at Mode Changing / Start-up

3.3.1 Preheating Operation

Outline

The inverter operation in open phase starts with the conditions of the preheating command from the indoor unit, the outdoor temperature, and the discharge pipe temperature.

Detail

ON Condition

- When the discharge pipe temperature is below 10°C, the inverter operation in open phase starts.

OFF Condition

- When the discharge pipe temperature is higher than 12°C, the inverter operation in open phase stops.

3.3.2 Four Way Valve Switching

Outline

In heating operation, current is conducted, and in cooling and defrosting, current is not conducted. In order to eliminate the switching sound when the heating is stopped, as the four way valve coil switches from ON to OFF, the OFF delay switch of the four way valve is carried out after the operation stopped.

Detail

OFF delay switch of four way valve:
The four way valve coil is energized for 160 seconds after the operation is stopped.

3.3.3 Four Way Valve Operation Compensation

Outline

At the beginning of the operation as the four way valve is switched, the differential pressure to activate the four way valve is acquired by having output frequency which is more than a certain fixed frequency, for a certain fixed time.

Detail

Starting Conditions

1. When starting compressor for heating
2. When the operation mode changes from heating to cooling
3. When starting compressor for defrosting
4. When starting compressor for heating after defrosting
5. When starting compressor for the first time after resetting with the power ON
6. When starting compressor after the fault of switching over cooling / heating

The lower limit of frequency keeps **A** Hz for **B** seconds with any conditions 1 through 6 above.

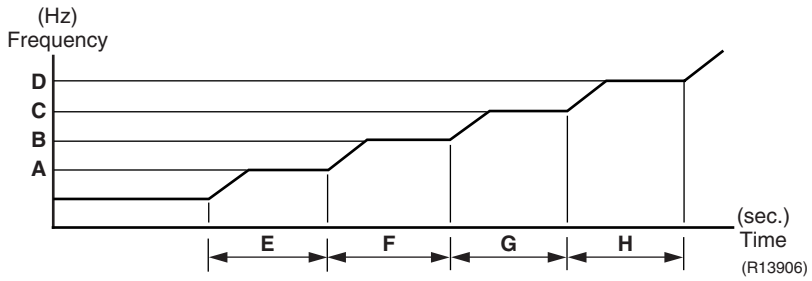
A (Hz)	52
B (seconds)	60

3.3.4 3-minute Standby

Turning on the compressor is prohibited for 3 minutes after turning it off.
(Except when defrosting.)

3.3.5 Compressor Protection Function

When turning the compressor from OFF to ON, the upper limit of frequency is set as follows. (The function is not activated when defrosting.)



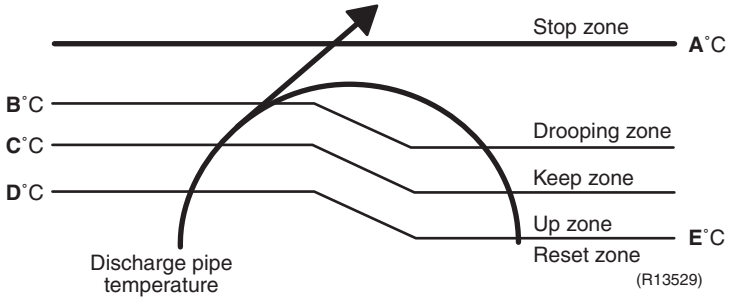
A (Hz)	52
B (Hz)	66
C (Hz)	78
D (Hz)	Cooling: 98, Heating: 96
E (seconds)	120
F (seconds)	120
G (seconds)	480
H (seconds)	60

3.4 Discharge Pipe Temperature Control

Outline

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

Detail



Zone	Control
Stop zone	When the temperature reaches the stop zone, the compressor stops.
Drooping zone	The upper limit of frequency decreases.
Keep zone	The upper limit of frequency is kept.
Up zone	The upper limit of frequency increases.
Reset zone	The upper limit of frequency is canceled.

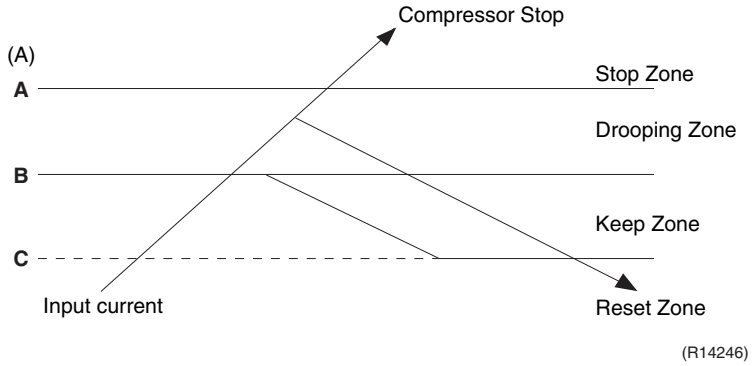
A (°C)	118
B (°C)	108
C (°C)	103
D (°C)	97
E (°C)	85

3.5 Input Current Control

Outline

The microcomputer calculates the input current during the compressor is running, and sets the frequency upper limit from the input current.
In case of heat pump model, this control which is the upper limit control of the frequency takes priority to the lower limit of control of four way valve operation compensation.

Detail



Frequency control in each zone

Stop zone

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

Drooping zone

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

Keep zone

- The present maximum frequency goes on.

Reset zone

- Limit of the frequency is canceled.

	Cooling	Heating
A (A)	14.5	15.0
B (A)	11.5	12.0
C (A)	10.5	11.0

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

- The current droops when outdoor temperature becomes higher than a certain level (depending on the model).

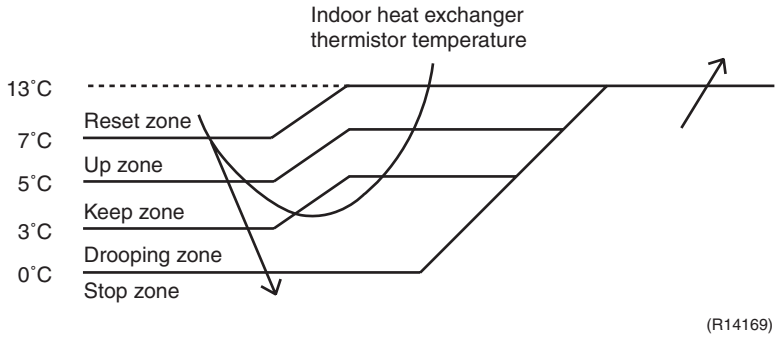
3.6 Freeze-up Protection Control

Outline

During cooling operation, the signal sent from the indoor unit controls the operating frequency limitation and prevents freezing of the indoor heat exchanger. (The signal from the indoor unit is divided into zones.)

Detail

The operating frequency limitation is judged with the indoor heat exchanger temperature.

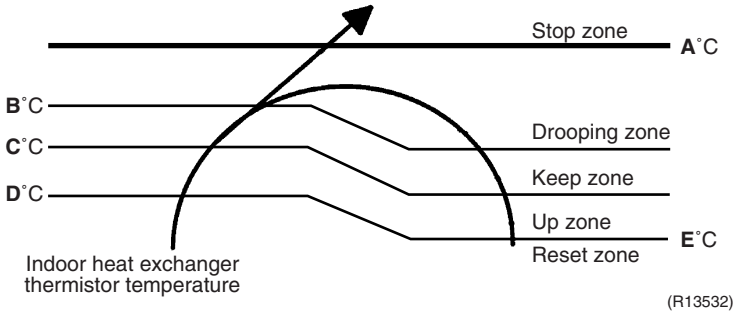


3.7 Heating Peak-cut Control

Outline

During heating operation, the indoor heat exchanger temperature determines the frequency upper limit to prevent abnormal high pressure.

Detail



Zone	Control
Stop zone	When the temperature reaches the stop zone, the compressor stops.
Drooping zone	The upper limit of frequency decreases.
Keep zone	The upper limit of frequency is kept.
Up zone	The upper limit of frequency increases.
Reset zone	The upper limit of frequency is canceled.

A (°C)	60
B (°C)	54
C (°C)	51
D (°C)	49
E (°C)	44

3.8 Outdoor Fan Control

1. Fan ON control to cool down the electrical box
The outdoor fan is turned ON when the electrical box temperature is high while the compressor is OFF.

2. Fan OFF control while defrosting
The outdoor fan is turned OFF while defrosting.

3. Fan OFF delay when stopped
The outdoor fan is turned OFF 70 seconds after the compressor stops.

4. Fan speed control for pressure difference upkeep
The rotation speed of the outdoor fan is controlled for keeping the pressure difference while cooling with low outdoor temperature.
- ♦ When the pressure difference is small, the rotation speed of the outdoor fan is reduced.
- ♦ When the pressure difference is large, the rotation speed of the outdoor fan is controlled as well as normal operation.

5. Fan control while forced cooling operation
The outdoor fan is controlled as well as normal operation while the forced cooling operation.

6. Fan speed control for POWERFUL operation
The rotation speed of the outdoor fan is increased while the POWERFUL operation.

7. Fan speed control while indoor unit quiet operation
The rotation speed of the outdoor fan is reduced by the command of the indoor unit quiet operation.

8. Fan ON/OFF control when operation starts / stops
The outdoor fan is turned ON when the operation starts. The outdoor fan is turned OFF when the operation stops.

3.9 Liquid Compression Protection Function

Outline

In order to obtain the dependability of the compressor, the compressor is stopped according to the outdoor temperature and temperature of the outdoor heat exchanger.

Detail

■ Operation stops depending on the outdoor temperature
Compressor turns off under the conditions that the system is in cooling operation and outdoor temperature is below 0°C.

3.10 Defrost Control

Outline

Defrosting is carried out by the cooling cycle (reverse cycle). The defrosting time or outdoor heat exchanger temperature must be more than a certain value to finish.

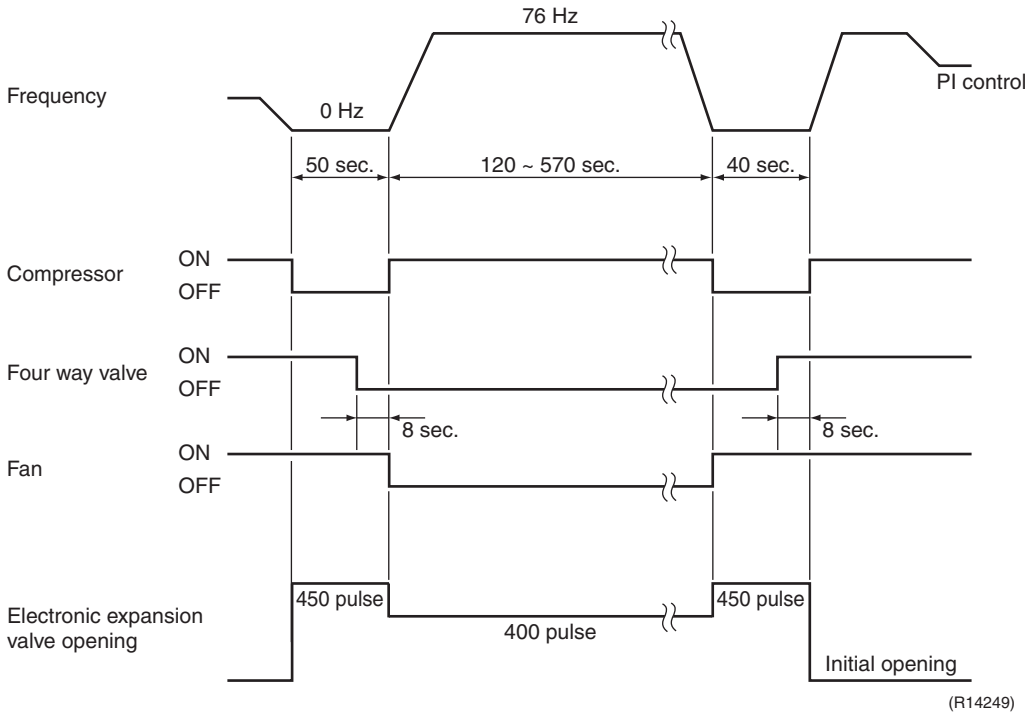
Detail

Conditions for Starting Defrost

- The starting conditions are determined with the outdoor temperature and the outdoor heat exchanger temperature.
- The system is in heating operation.
- The compressor operates for 6 minutes.
- More than 15 ~ 25 minutes (depending on the duration of the previous defrost control) of accumulated time have passed since the start of the operation, or ending the previous defrosting.

Conditions for Canceling Defrost

The judgment is made with outdoor heat exchanger temperature. (6 ~ 30°C)



3.11 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. Electronic expansion valve control when the frequency changes
3. Electronic expansion valve control for defrosting
4. Electronic expansion valve control when the discharge pipe temperature is abnormally high
5. Electronic expansion valve control when the discharge pipe thermistor is disconnected

Feedback Control

1. Target discharge pipe temperature control

Detail

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

● : function – : not function	When the power turns on or when the compressor stops	When the operation starts	When the frequency changes under starting control	During target discharge pipe temperature control	When the frequency changes under target discharge pipe temperature control	When the disconnection of the discharge pipe thermistor is ascertained	When the frequency changes under the control for disconnection of the discharge pipe thermistor	Under defrost control
Cooling								
Starting control	–	●	–	–	–	–	–	–
Control when the frequency changes	–	–	●	–	●	–	–	–
Target discharge pipe temperature control	–	–	–	●	–	–	–	–
Control for disconnection of the discharge pipe thermistor	–	–	–	–	–	●	●	–
High discharge pipe temperature control	–	●	●	●	●	–	–	–
Pressure equalizing control	●	–	–	–	–	–	–	–
Opening limit control	–	●	●	●	●	●	●	–
Heating								
Starting control	–	●	–	–	–	–	–	–
Control when the frequency changes	–	–	●	–	●	–	–	–
Target discharge pipe temperature control	–	–	–	●	–	–	–	–
Control for disconnection of the discharge pipe thermistor	–	–	–	–	–	●	●	–
High discharge pipe temperature control	–	●	●	●	●	–	–	–
Defrost control	–	–	–	–	–	–	–	●
Pressure equalizing control	●	–	–	–	–	–	–	–
Opening limit control	–	●	●	●	●	●	●	–

3.11.1 Fully Closing with Power ON

The electronic expansion valve is initialized when turning on the power. The opening position is set and the pressure equalization is developed.

3.11.2 Pressure Equalizing Control

When the compressor is stopped, the pressure equalizing control is activated. The electronic expansion valve opens, and develops the pressure equalization.

3.11.3 Opening Limit Control

Outline

A maximum and minimum opening of the electronic expansion valve are limited.

Detail

Maximum opening (pulse)	470
Minimum opening (pulse)	17

The electronic expansion valve is fully closed when cooling operation stops, and is opened at fixed degree during defrosting.

3.11.4 Starting Operation Control

The electronic expansion valve opening is controlled when the operation starts, and prevents the superheating or liquid compression.

3.11.5 Control when the frequency changes

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

3.11.6 High Discharge Pipe Temperature Control

When the compressor is operating, if the discharge pipe temperature exceeds a certain value, the electronic expansion valve opens and the refrigerant runs to the low pressure side. This procedure lowers the discharge pipe temperature.

3.11.7 Control for Disconnection of the Discharge Pipe Thermistor

Outline

The disconnection of the discharge pipe thermistor is detected by comparing the discharge pipe temperature with the condensing temperature. If the discharge pipe thermistor is disconnected, the electronic expansion valve opens according to the outdoor temperature and the operation frequency, and operates for a specified time, and then stops.
After 3 minutes of waiting, the operation restarts and checks if the discharge pipe thermistor is disconnected. If the discharge pipe thermistor is disconnected, the system stops after operating for a specified time.
If the disconnection is detected 5 times in succession, then the system is shut down. When the compressor runs for 60 minutes without any error, the error counter is reset.

Detail

When the starting control finishes, the detection timer for disconnection of the discharge pipe thermistor (720 seconds) starts. When the timer is over, the following adjustment is made.

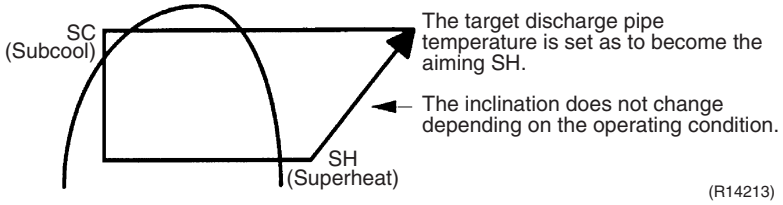
1. When the operation mode is cooling
   When the following condition is fulfilled, the discharge pipe thermistor disconnection is ascertained.
   Discharge pipe temperature + 6°C < outdoor heat exchanger temperature
2. When the operation mode is heating
   When the following condition is fulfilled, the discharge pipe thermistor disconnection is ascertained.
   Discharge pipe temperature + 6°C < indoor heat exchanger temperature

Adjustment when the thermistor is disconnected

When the disconnection is ascertained, the compressor continues operation for 9 minutes and then stops.
When the compressor stops repeatedly, the system is shut down.

3.11.8 Target Discharge Pipe Temperature Control

The target discharge pipe temperature is obtained from the indoor and outdoor heat exchanger temperature, and the electronic expansion valve opening is adjusted so that the actual discharge pipe temperature becomes close to the target discharge pipe temperature. (Indirect SH (superheating) control using the discharge pipe temperature)



The electronic expansion valve opening and the target discharge pipe temperature are adjusted every 20 seconds. The target discharge pipe temperature is controlled by indoor heat exchanger temperature and outdoor heat exchanger temperature. The opening degree of the electronic expansion valve is controlled by followings.

- Target discharge pipe temperature
- Actual discharge pipe temperature
- Previous discharge pipe temperature

3.12 Malfunctions

3.12.1 Sensor Malfunction Detection

Sensor malfunction may occur in the thermistor.

Relating to Thermistor Malfunction

1. Outdoor heat exchanger thermistor
2. Discharge pipe thermistor
3. Radiation fin thermistor
4. Outdoor temperature thermistor

3.12.2 Detection of Overcurrent and Overload

Outline

An excessive output current is detected and, the OL temperature is observed to protect the compressor.

Detail

- If the OL (compressor head) temperature exceeds 120 ~ 130°C, the system shuts down the compressor.
- If the inverter current exceeds about 15 A, the system shuts down the compressor.
  The upper limit of the current decreases when the outdoor temperature exceeds a certain level.

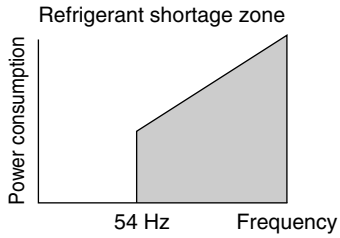
3.12.3 Refrigerant Shortage Control

Outline

I: Detecting by power consumption

If the power consumption is below the specified value and the frequency is higher than the specified frequency, it is regarded as refrigerant shortage.

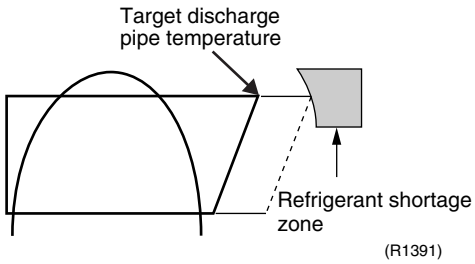
The power consumption is small comparing with that in the normal operation when refrigerant is insufficient, and refrigerant shortage is detected by checking a power consumption.



(R14250)

II: Detecting by discharge pipe temperature

If the discharge pipe temperature is higher than the target discharge pipe temperature, and the electronic expansion valve is fully open for more than the specified time, it is regarded as refrigerant shortage.



(R1391)

III: Detecting by the difference of temperature

If the difference between suction and discharge temperature is smaller than the specified value, it is regarded as refrigerant shortage.

Refer to page 80 for detail.

Part 5
Operation Manual

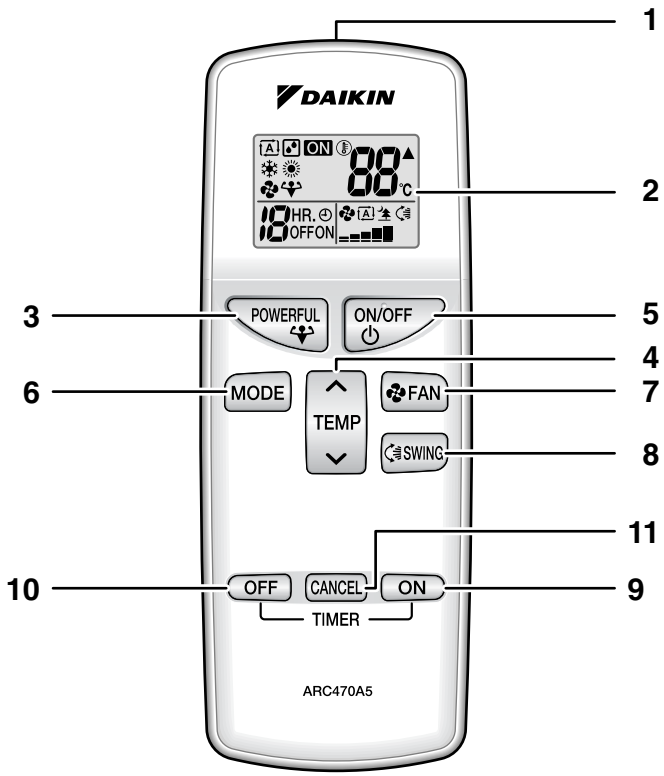
1. System Configuration

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. Operation Manual

2.1 Remote Controller

■ Remote Controller



<ARC470A5>

1. Signal transmitter:
- It sends signals to the indoor unit.

2. Display (LCD):
- It displays the current settings. (In this illustration, each section is shown with its displays on for the purpose of explanation.)

3. POWERFUL button:
POWERFUL operation (page 13)

4. TEMPERATURE adjustment button:
- It changes the temperature setting.

5. ON/OFF button:
- Press this button once to start operation. Press once again to stop it.

6. MODE selector button:
- It selects the operation mode. (AUTO/DRY/COOL/HEAT/FAN) (page 9)

7. FAN setting button:
- It selects the airflow rate setting.

8. SWING button:
- Adjusting the airflow direction. (page 11)

9. ON TIMER button: (page 15)

10. OFF TIMER button: (page 14)
- It cancels the timer setting.

11. TIMER CANCEL button:
- It cancels the timer setting.

2.2 AUTO · DRY · COOL · HEAT · FAN Operation

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

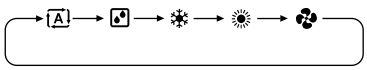
1. Press MODE and select a operation mode.

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

: AUTO : HEAT

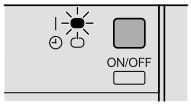
: DRY : FAN

: COOL



2. Press ON/OFF .

- "ON" is displayed on the LCD.
- The OPERATION lamp lights up.



■ To stop operation

3. Press ON/OFF again.

- "ON" disappears from the LCD.
- The OPERATION lamp goes off.

■ To change the temperature setting

4. Press TEMP .

AUTO or COOL or HEAT operation	DRY or FAN operation
Press ∧ to raise the temperature and press ∨ to lower the temperature.	The temperature setting is not variable.
Set to the temperature you like. 	

AUTO · DRY · COOL · HEAT · FAN Operation

■ To change the airflow rate setting

5. Press FAN.

AUTO or COOL or HEAT or FAN operation	DRY operation
5 levels of airflow rate setting from " ▁ " to " ▇ " plus " A " " " are available. 	The airflow rate setting is not variable.

• Indoor unit quiet operation
When the airflow is set to " ", the noise from the indoor unit will become quieter.
Use this when making the noise quieter.

NOTE

■ **Notes 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 HEAT operation, it takes some time before the room gets warmer.
- In HEAT 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.
- A pinging sound may be heard during defrosting operation, which, however does not mean that the air conditioner has failures.

■ **Notes on COOL operation**
- This air conditioner cools the room by releasing the heat in the room outside. Therefore, the cooling performance of the air conditioner may be degraded if the outdoor temperature is high.

■ **Notes 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 airflow rate, so manual adjustment of these functions is unavailable.

■ **Notes on AUTO operation**
- In AUTO operation, the system selects an appropriate operation mode (COOL or HEAT) based on the room and outside temperatures and starts the operation.
- The system automatically reselects setting at a regular interval to bring the room temperature to user-setting level.

■ **Notes on FAN operation**
- This mode is valid for fan only.

■ **Notes on airflow rate setting**
- At smaller airflow rates, the cooling (heating) effect is also smaller.

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2.3 Adjusting the Airflow Direction

Adjusting the Airflow Direction

You can adjust the airflow direction to increase your comfort.

■ To start auto swing

Upper and lower airflow direction

Press SWING.

- "" is displayed on the LCD.
- The flap (horizontal blade) will begin to swing.

■ To set the flap at desired position

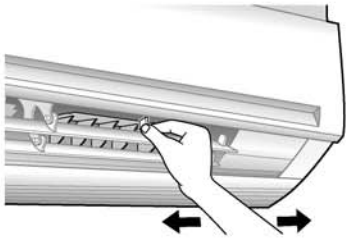
- This function is effective while flap is in auto swing mode.

Press SWING when the flap has reached the desired position.

- The flap will stop moving.
- "" disappears from the LCD.

Adjusting the Airflow Direction

■ To adjust the louvers (vertical blades)



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

- When the unit is installed in the corner of a room, the direction of the louvers should be facing away from the wall.
  If they face the wall, the wall will block off the wind, causing the cooling (or heating) efficiency to drop.

⚠ CAUTION

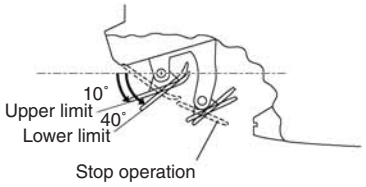
- Always use a remote controller to adjust the angles of the flap. If you attempt to move the flap and louvers forcibly with hand when they are swinging, the mechanism may be broken.
- Be careful when adjusting the louvers. Inside the air outlet, a fan is rotating at a high speed.

NOTE

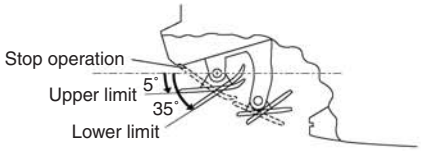
■ **Notes on the angles of the flap**

- The flap swinging range depends on the operation. (See the figure.)
- If the air conditioner is operated in HEAT or DRY operation with the flap kept stopped in the downward direction, the flap will automatically start operating in approximately an hour in order to prevent dew condensation.

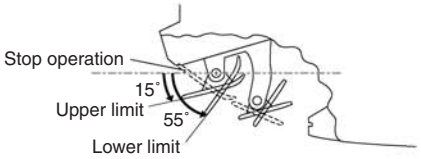
In COOL operation



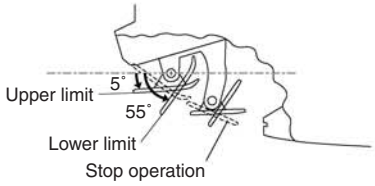
In DRY operation



In HEAT operation



In FAN operation



12

2.4 POWERFUL Operation

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 **.**
   - POWERFUL operation ends in 20 minutes. Then the system automatically operates again with the previous settings which were used before POWERFUL operation.
   - "POWERFUL" is displayed on the LCD.

■ To cancel POWERFUL operation

2. **Press** POWERFUL **again.**
   - "POWERFUL" disappears from the LCD.

NOTE

■ **Notes on POWERFUL operation**
- POWERFUL operation can only be set when the unit is running.
- POWERFUL operation will not increase the capacity of the air conditioner if the air conditioner is already in operation with its maximum capacity demonstrated.
- **In COOL, HEAT and AUTO operation**
  To maximize the cooling (heating) effect, the capacity of outdoor unit is increased and the airflow rate is fixed to the maximum setting.
  The temperature and airflow settings are not variable.
- **In DRY operation**
  The temperature setting is lowered by 2.5˚C and the airflow rate is slightly increased.
- **In FAN operation**
  The airflow rate is fixed to the maximum setting.

2.5 OFF TIMER Operation

OFF 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.

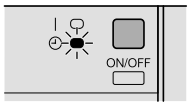
■ To use OFF TIMER operation

1. Press OFF .

" HR. OFF " is displayed on the LCD.

Each pressing of OFF advances the time setting by 1 hour.
The time can be set between 1 to 9 hours.

- The TIMER lamp lights up.



■ To cancel OFF TIMER operation

2. Press CANCEL .

- " HR. OFF " disappears from the LCD.
- The TIMER lamp goes off.

NOTE

■ **Note on TIMER operation**
- Once you set ON/OFF TIMER, the time setting is kept in the memory. The memory is canceled when remote controller batteries are replaced.

■ **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.

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2.6 ON TIMER Operation

ON TIMER Operation

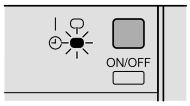
■ To use ON TIMER operation

1. Press (ON) .

" HR. ON " is displayed on the LCD.

Each pressing of (ON) advances the time setting by 1 hour.
The time can be set between 1 to 12 hours.

- The TIMER lamp lights up.



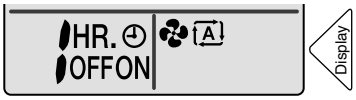
■ To cancel ON TIMER operation

2. Press (CANCEL) .

- " HR. ON " disappears from the LCD.
- The TIMER lamp goes off.

■ To combine ON TIMER and OFF TIMER

- A sample setting for combining the 2 timers is shown below.
- " ON " and " OFF " are displayed on the LCD.



NOTE

■ **In the following cases, set the timer again.**

- After a breaker has turned off.
- After a power failure.
- After replacing batteries in the remote controller.

3P276856-1B

Part 6
Service Diagnosis

1. Troubleshooting with LED

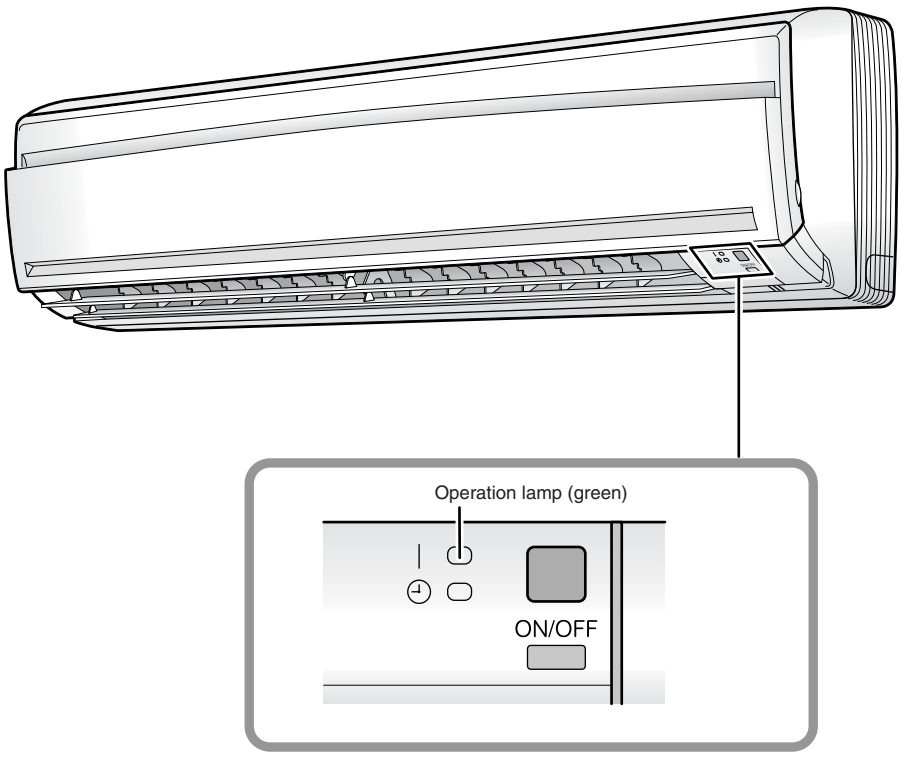
1.1 Indoor Unit

Operation Lamp

The operation lamp blinks 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.
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.



(R14251)

Service Monitor

The indoor unit has one green LED (LED A) on the control PCB. When the microcomputer works in order, the LED A blinks.

1.2 Outdoor Unit

The outdoor unit has one green LED (LED A) on the main PCB. When the microcomputer works in order, the LED A blinks.

2. Problem Symptoms and Measures

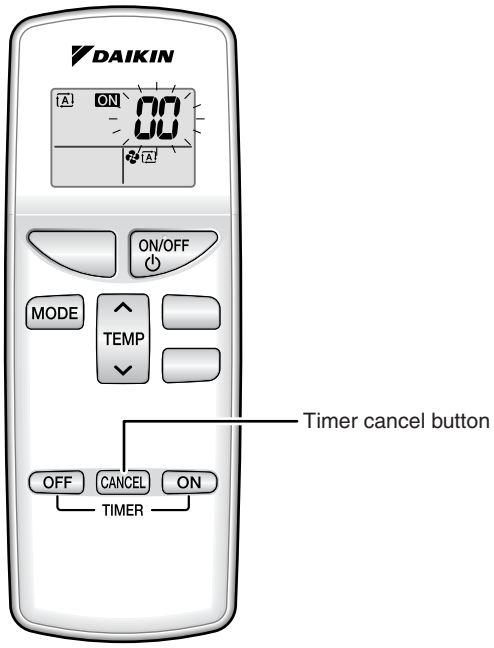
Symptom	Check Item	Details of Measure	Reference Page
The unit does not operate.	Check the power supply.	Check if the rated voltage is supplied.	—
	Check the type of the indoor unit.	Check if the indoor unit type is compatible with the outdoor unit.	—
	Check the outdoor temperature.	Heating operation cannot be used when the outdoor temperature is 24°C or higher, and cooling operation cannot be used when the outdoor temperature is below 10°C.	—
	Diagnose with remote controller indication.	—	51
	Check the remote controller addresses.	Check if address settings for the remote controller and indoor unit are correct.	—
Operation sometimes stops.	Check the power supply.	A power failure of 2 to 10 cycles stops air conditioner operation. (Operation lamp OFF)	—
	Check the outdoor temperature.	Heating operation cannot be used when the outdoor temperature is 24°C or higher, and cooling operation cannot be used when the outdoor temperature is below 10°C.	—
	Diagnose with remote controller indication.	—	51
The unit operates but does not cool, or does not heat.	Check for wiring and piping errors in the connection between the indoor unit and outdoor unit.	—	—
	Check for thermistor detection errors.	Check if the thermistor is mounted securely.	—
	Check for faulty operation of the electronic expansion valve.	Set the unit to cooling operation, and check the temperature of the liquid pipe to see if the electronic expansion valve works.	—
	Diagnose with remote controller indication.	—	51
	Diagnose by service port pressure and operating current.	Check for refrigerant shortage.	80
Large operating noise and vibrations	Check the output voltage of the power module.	—	92
	Check the power module.	—	—
	Check the installation condition.	Check if the required spaces for installation (specified in the installation manual, etc.) are provided.	—

3. Service Check Function

3.1 ARC470 Series

Check Method 1

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



<ARC470 Series> (R14252)

2. Press the timer cancel button repeatedly until a long beep sounds.

■ The code indication changes in the sequence shown below.

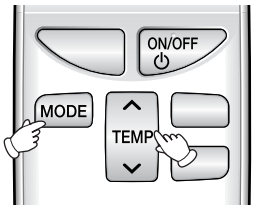
No.	Code	No.	Code	No.	Code
1	00	13	C7	25	UA
2	U4	14	A3	26	UH
3	L5	15	H8	27	P4
4	E6	16	H9	28	L3
5	H6	17	C9	29	L4
6	H0	18	C4	30	H7
7	A6	19	C5	31	U2
8	E7	20	J3	32	EA
9	U0	21	J6	33	AH
10	F3	22	E5	34	FA
11	A5	23	A1	35	H1
12	F6	24	E1	36	P9

Note:

1. A short beep "pi" and two consecutive beeps "pi pi" indicate non-corresponding codes.
2. To return to the normal mode, hold the timer cancel button down for 5 seconds. When the remote controller is left untouched for 60 seconds, it also returns to the normal mode.
3. Not all the error codes are displayed. When you cannot find the error code, try the check method 2. (→ Refer to page 49.)

Check Method 2

1. Press the center of the TEMP button and the MODE button at the same time.

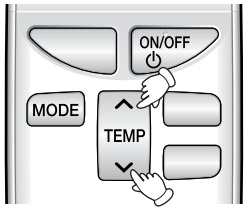


(R14268)

The figure of the ten's place blinks.

(R14269)

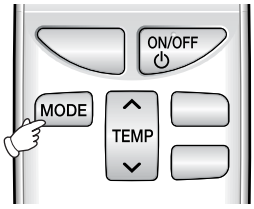
2. Press the TEMP ∧ or ∨ button and change the figure until you hear the sound of "beep" or "pi pi".



(R14270)

3. Diagnose by the sound.
   ★"pi" : The figure of the ten's place does not accord with the error code.
   ★"pi pi" : The figure of the ten's place accords with the error code but the one's not.
   ★"beep" : Both the figures of the ten's and one's place accord with the error code.
   The figures indicated when you hear the "beep" sound are error code.
   (Error codes and description → Refer to page 51.)

4. Press the MODE button.

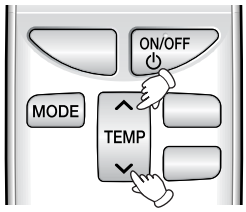


(R14271)

The figure of the one's place blinks.

(R14272)

5. Press the TEMP ∧ or ∨ button and change the figure until you hear the sound of “beep”.

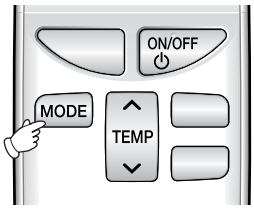


(R14273)

6. Diagnose by the sound.
   ★“pi” : The figure of the ten’s place does not accord with the error code.
   ★“pi pi” : The figure of the ten’s place accords with the error code but the one’s not.
   ★“beep” : Both the figures of the ten’s and one’s place accord with the error code.

7. Determine the error code.
   The figures indicated when you hear the “beep” sound are error code.
   (Error codes and description → Refer to page 51.)

8. Press the MODE button to exit from the diagnosis mode.

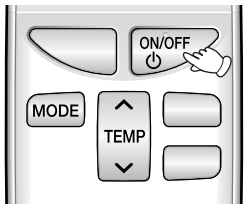


(R14274)

   The display “ 7- ” means the trial operation mode.
   (Refer to page 143 for trial operation.)

(R14275)

9. Press the ON/OFF button twice to return to the normal mode.



(R14276)

Note: When the remote controller is left untouched for 60 seconds, it returns to the normal mode.

4. Troubleshooting

4.1 Error Codes and Description

	Error Codes	Description	Reference Page
System	00	Normal	—
	U0★	Refrigerant shortage	80
	U2	Low-voltage detection or over-voltage detection	82
	U4	Signal transmission error (between indoor unit and outdoor unit)	58
	U8	Unspecified voltage (between indoor unit and outdoor unit)	59
Indoor Unit	A1	Indoor unit PCB abnormality	52
	A5	Freeze-up protection control or heating peak-cut control	53
	A6	Fan motor (DC motor) or related abnormality	55
	C4	Indoor heat exchanger thermistor or related abnormality	57
	C9	Room temperature thermistor or related abnormality	57
Outdoor Unit	E1	Outdoor unit PCB abnormality	60
	E5★	OL activation (compressor overload)	61
	E6★	Compressor lock	62
	E7★	DC fan lock	63
	E8	Input overcurrent detection	64
	EA	Four way valve abnormality	65
	F3	Discharge pipe temperature control	67
	F6	High pressure control in cooling	68
	H0	Compressor system sensor abnormality	69
	H6	Position sensor abnormality	70
	H9	Outdoor temperature thermistor or related abnormality	72
	J3★	Discharge pipe thermistor or related abnormality	72
	J6	Outdoor heat exchanger thermistor or related abnormality	72
	L3	Electrical box temperature rise	74
	L4	Radiation fin temperature rise	76
	L5★	Output overcurrent detection	78
	P4	Radiation fin thermistor or related abnormality	72

★: Displayed only when system-down occurs.

4.2 Indoor Unit PCB Abnormality

Remote Controller Display

A1

Method of Malfunction Detection

The system checks if the circuit works properly within the microcomputer of the indoor unit.

Malfunction Decision Conditions

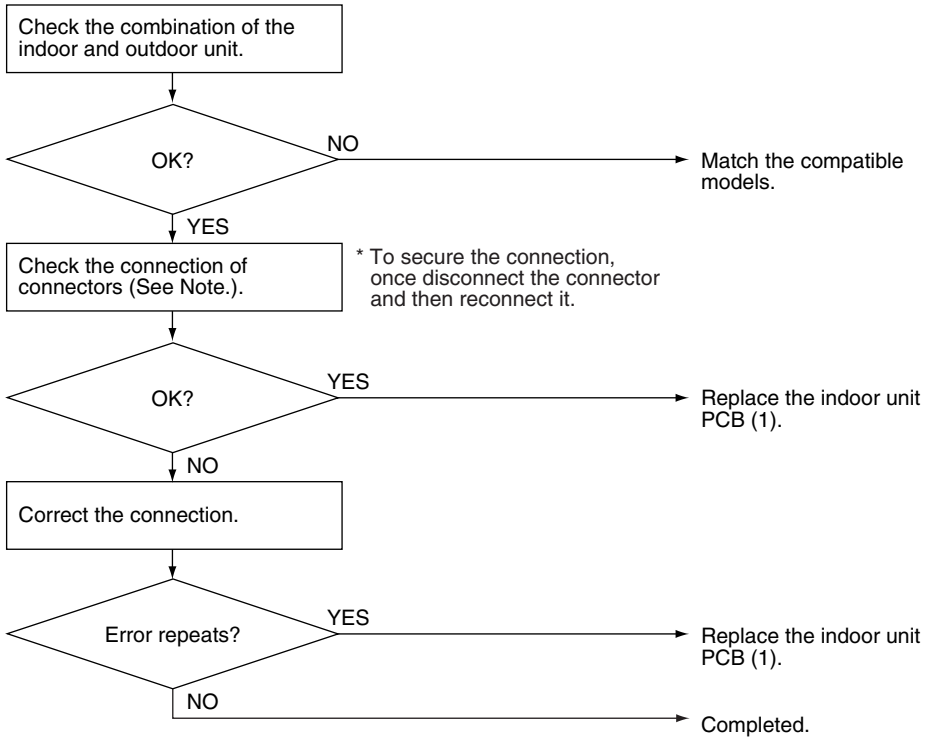
The system cannot set the internal settings.

Supposed Causes

- Wrong models interconnected
- Defective indoor unit PCB
- Disconnection of connector

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R11704)

Note: Check the following connector.

Model Type	Connector
Wall Mounted Type	Terminal board ~ Control PCB

4.3 Freeze-up Protection Control or Heating Peak-cut Control

Remote Controller Display

A5

Method of Malfunction Detection

- Freeze-up protection control
  During cooling operation, the freeze-up protection control (operation halt) is activated according to the temperature detected by the indoor heat exchanger thermistor.
- Heating peak-cut control
  During heating operation, the temperature detected by the indoor heat exchanger thermistor is used for the heating peak-cut control (operation halt, outdoor fan stop, etc.)

Malfunction Decision Conditions

- Freeze-up protection control
  During cooling operation, the indoor heat exchanger temperature is below 0°C.
- Heating peak-cut control
  During heating operation, the indoor heat exchanger temperature is above 65°C

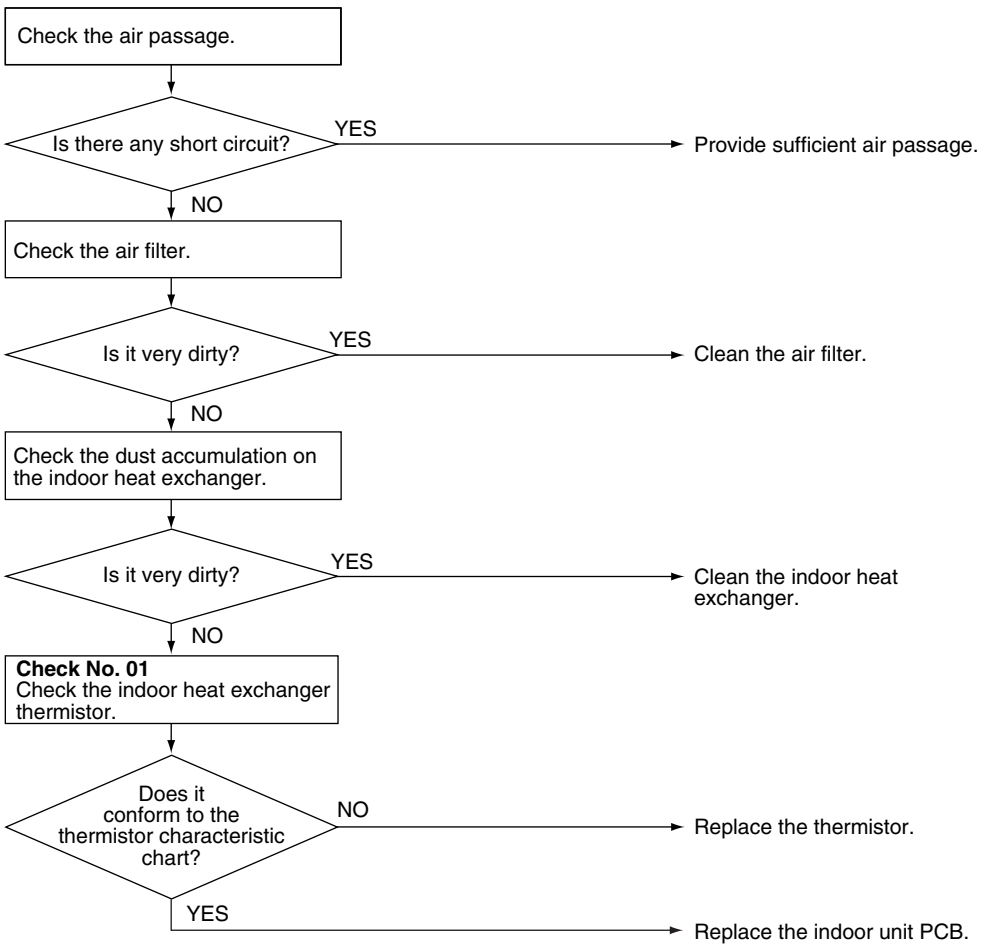
Supposed Causes

- Short-circuited air
- Clogged air filter of the indoor unit
- Dust accumulation on the indoor heat exchanger
- Defective indoor heat exchanger thermistor
- Defective indoor unit PCB

Troubleshooting

Check No.01
Refer to P.84

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14402)

4.4 Fan Motor (DC Motor) or Related Abnormality

Remote Controller Display

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

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.

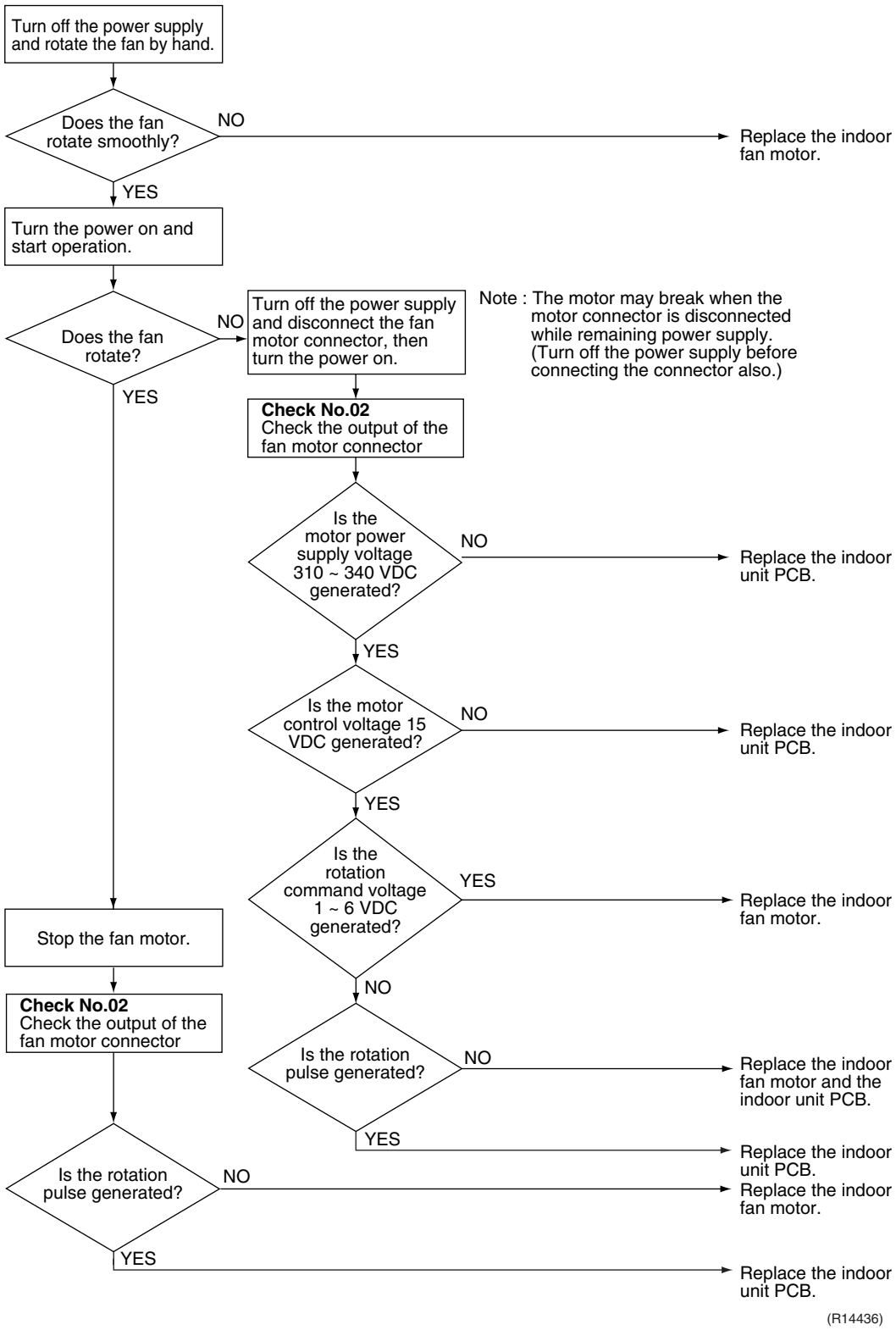
Supposed Causes

- Layer short inside the fan motor winding
- Breaking of wire inside the fan motor
- Breaking of the fan motor lead wires
- Defective capacitor of the fan motor
- Defective indoor unit PCB

Troubleshooting

Check No.02
Refer to P.85

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14436)

4.5 Thermistor or Related Abnormality (Indoor Unit)

Remote Controller Display

C4, C9

Method of Malfunction Detection

The temperatures detected by the thermistors determine thermistor errors.

Malfunction Decision Conditions

The thermistor input is more than 4.96 V or less than 0.04 V during compressor operation.

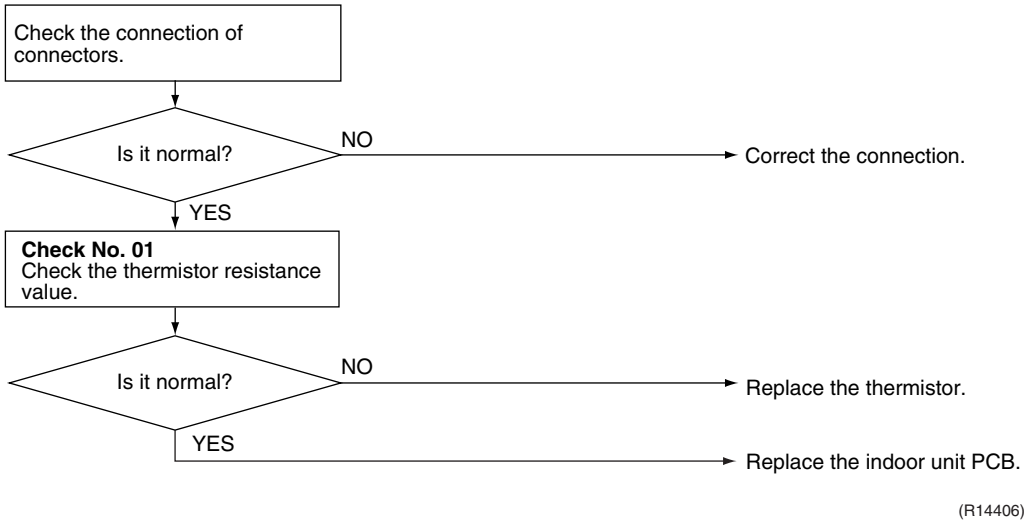
Supposed Causes

- Disconnection of connector
- Defective thermistor
- Defective indoor unit PCB

Troubleshooting

Check No.01 Refer to P.84

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



C4 : Indoor heat exchanger thermistor
C9 : Room temperature thermistor

4.6 Signal Transmission Error (between Indoor Unit and Outdoor Unit)

Remote Controller 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

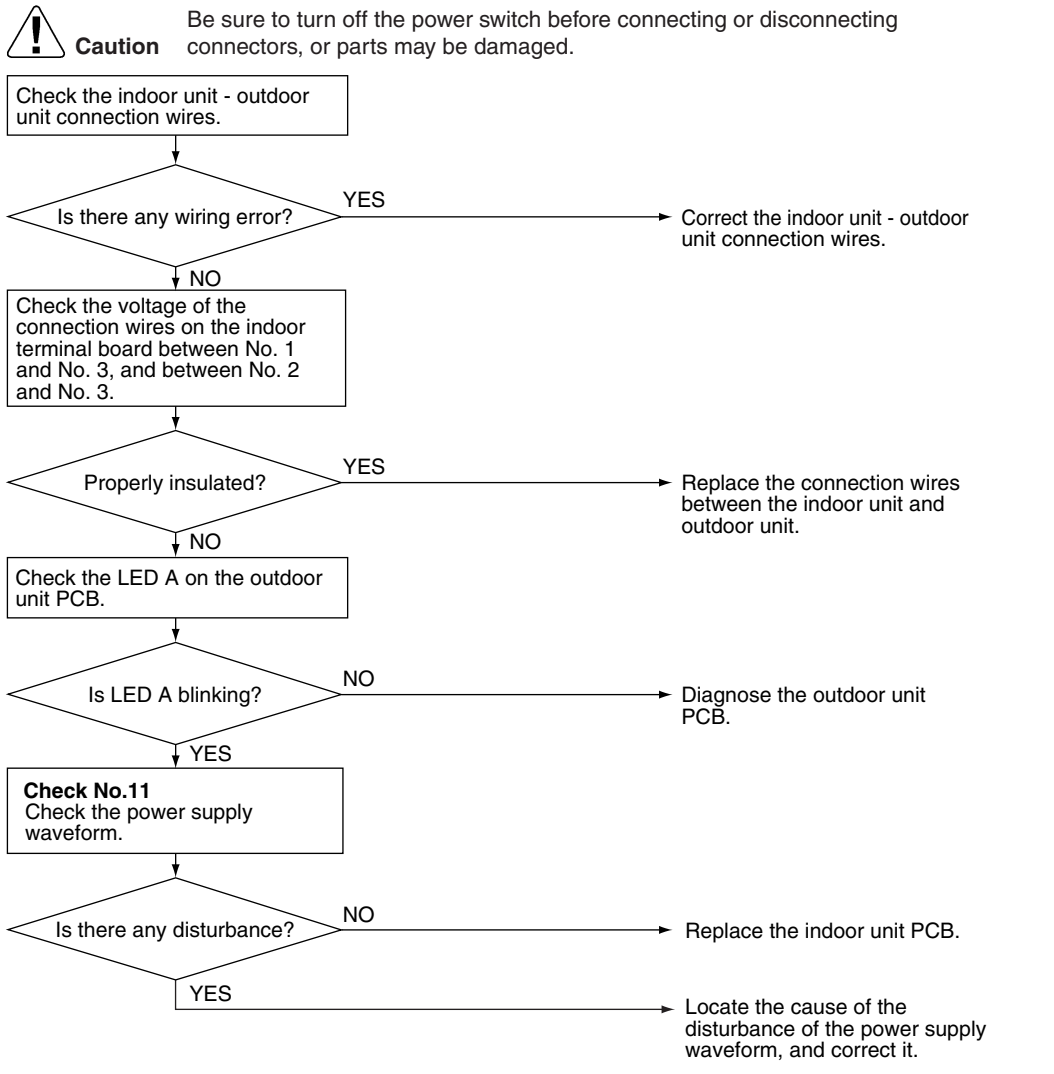
The data sent from the outdoor unit cannot be received normally, or the content of the data is abnormal.

Supposed Causes

- Wiring error
- Breaking of the connection wires between the indoor and outdoor units (wire No. 3)
- Defective outdoor unit PCB
- Defective indoor unit PCB
- Disturbed power supply waveform

Troubleshooting

Check No.11
Refer to P.85



(R14437)

4.7 Unspecified Voltage (between Indoor Unit and Outdoor Unit)

Remote Controller Display

U9

Method of Malfunction Detection

The supply power is detected for its requirements (different from pair type and multi type) by the indoor / outdoor transmission signal.

Malfunction Decision Conditions

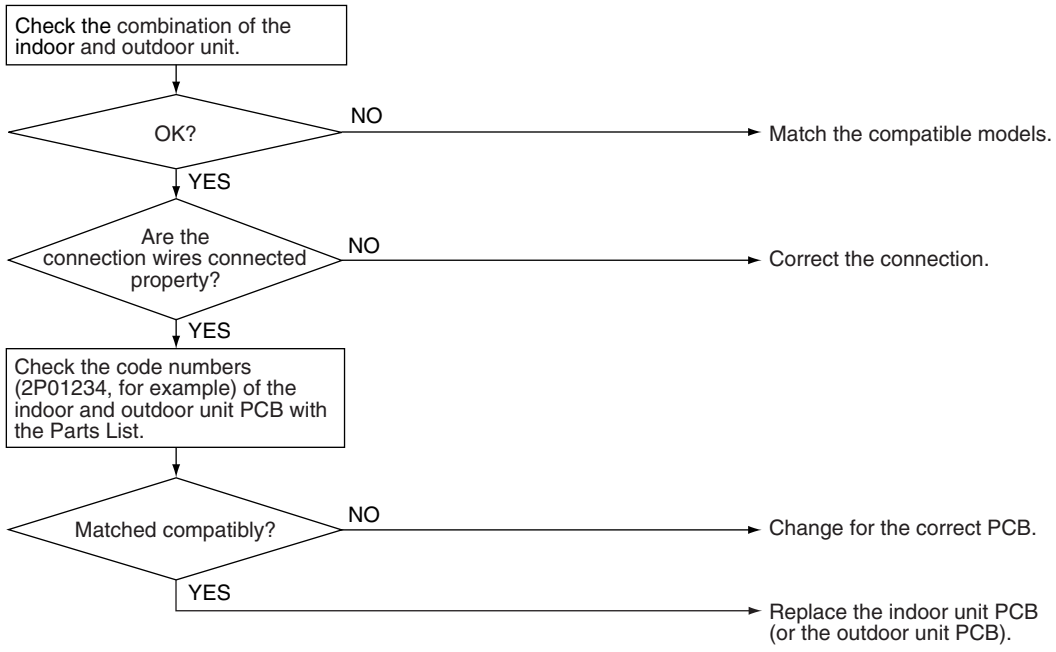
The pair type and multi type are interconnected.

Supposed Causes

- Wrong models interconnected
- Wrong wiring of connecting wires
- Wrong indoor unit PCB or outdoor unit PCB mounted
- Defective indoor unit PCB
- Defective outdoor unit PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R11707)

4.8 Outdoor Unit PCB Abnormality

Remote Controller Display

E1

Method of Malfunction Detection

- The system checks to see if the IPM works in order.
- The system checks to see if the zero-cross signal comes in properly.

Malfunction Decision Conditions

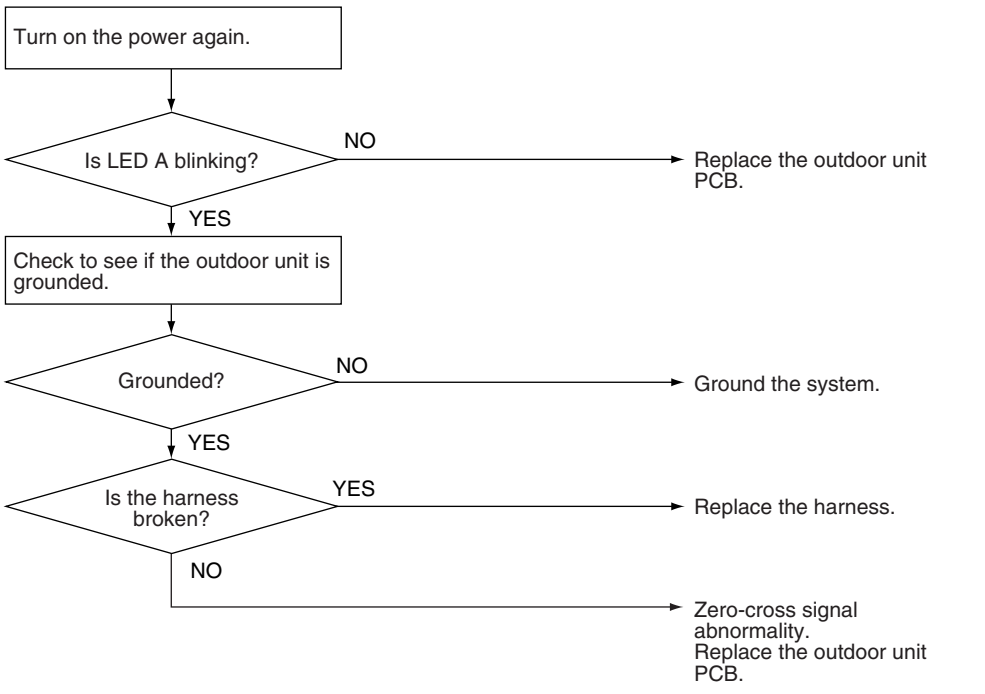
- The IPM sends no signal.
- The zero-cross signal is not detected.

Supposed Causes

- Defective outdoor unit PCB
- Broken harness between PCBs
- Noise
- Momentary fall of voltage
- Momentary power failure

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14253)

4.9 OL Activation (Compressor Overload)

Remote Controller Display

E5

Method of Malfunction Detection

A compressor overload is detected through compressor OL.

Malfunction Decision Conditions

- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

* The operating temperature condition is not specified.

Supposed Causes

- Defective discharge pipe thermistor
- Defective electronic expansion valve or coil
- Defective four way valve or coil
- Defective outdoor unit PCB
- Refrigerant shortage
- Water mixed in refrigerant
- Defective stop valve

Troubleshooting

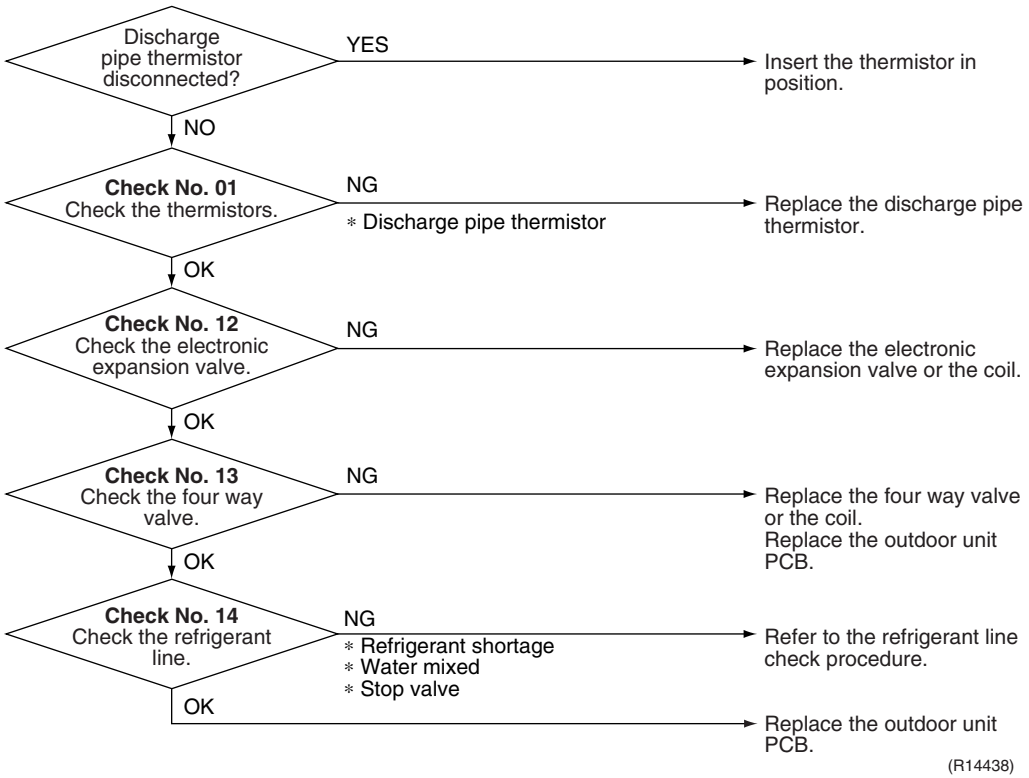
Check No.01
Refer to P.84

Check No.12
Refer to P.86

Check No.13
Refer to P.87

Check No.14
Refer to P.87

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14438)

4.10 Compressor Lock

Remote Controller Display

E6

Method of Malfunction Detection

A compressor lock is detected by the current waveform generated when applying high-frequency voltage to the motor.

Malfunction Decision Conditions

- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 11 minutes without any other error

Supposed Causes

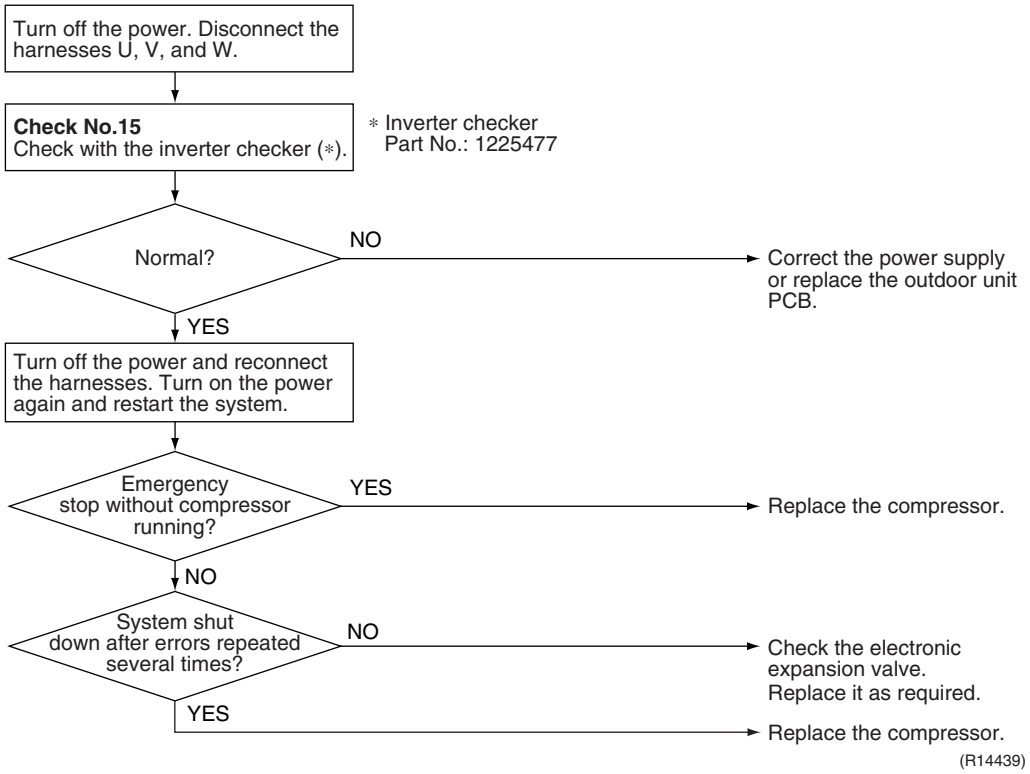
- Compressor locked
- Disconnection of compressor harness

Troubleshooting

Check No.15
Refer to P.88

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

(Precaution before turning on the power again)
Make sure the power has been off for at least 30 seconds.



(R14439)

4.11 DC Fan Lock

Remote Controller Display

E7

Method of Malfunction Detection

An error is determined with the high-voltage fan motor rotation speed detected by the Hall IC.

Malfunction Decision Conditions

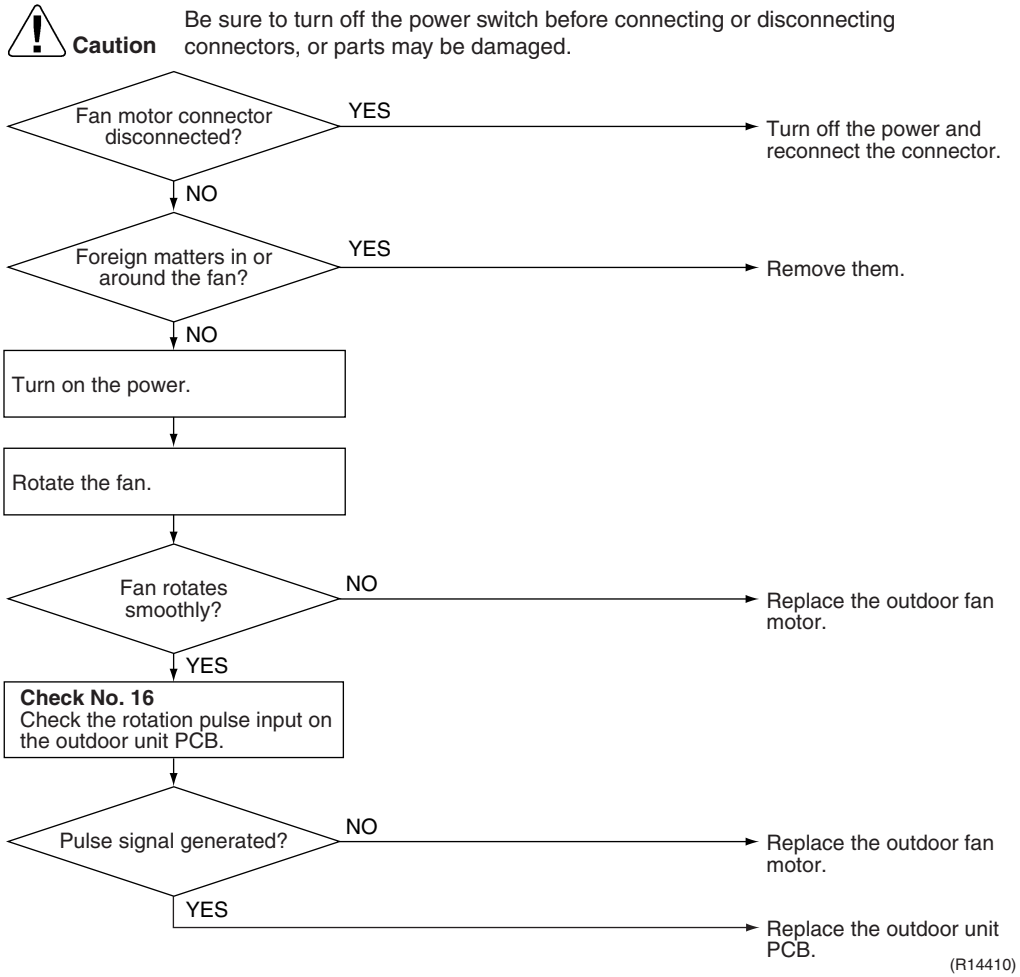
- The fan does not start in 15 ~ 60 seconds (depending on the model) even when the fan motor is running.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 11 minutes without any other error

Supposed Causes

- Disconnection of fan motor
- Foreign matters stuck in the fan
- Defective fan motor
- Defective outdoor unit PCB

Troubleshooting

Check No.16
Refer to P.89



4.12 Input Overcurrent Detection

Remote Controller Display

E8

Method of Malfunction Detection

An input overcurrent is detected by checking the input current value with the compressor running.

Malfunction Decision Conditions

- The following current with the compressor running continues for 2.5 seconds.
  Cooling / Heating: Above about 15 A
  (The upper limit of the current decreases when the outdoor temperature exceeds a certain level.)

Supposed Causes

- Defective compressor
- Defective outdoor unit PCB
- Short circuit

Troubleshooting

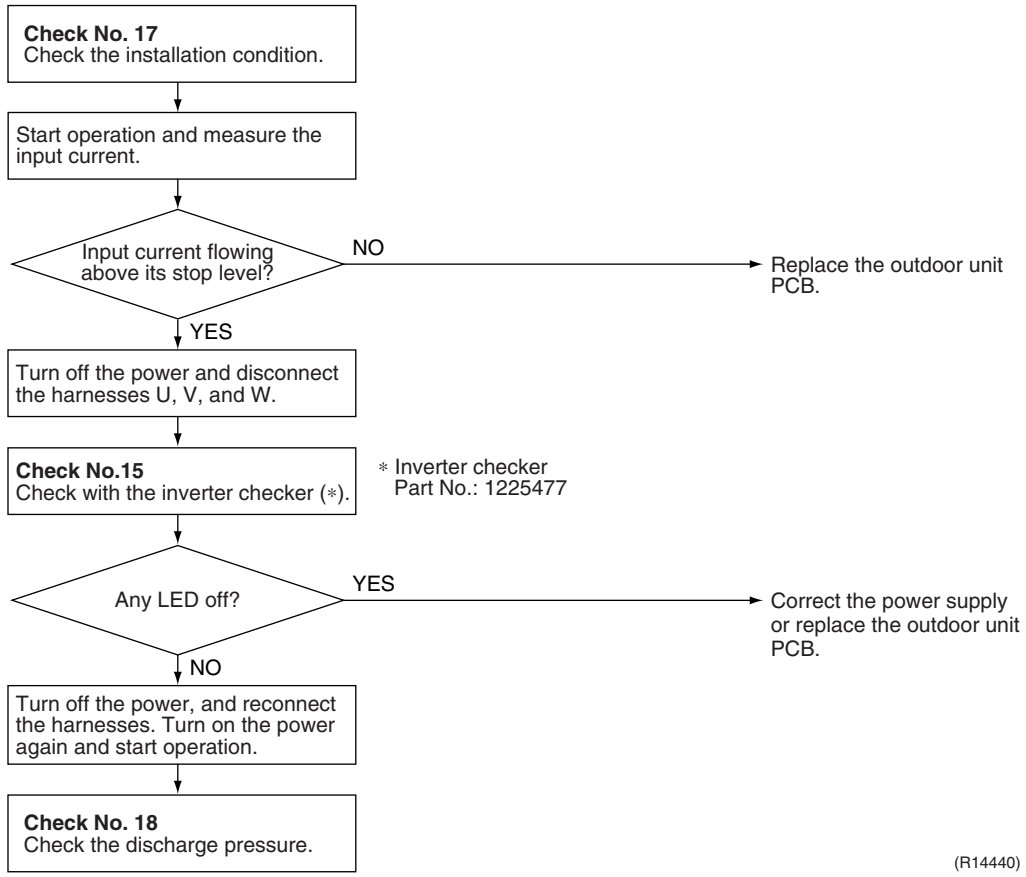
Check No.15
Refer to P.88

Check No.17
Refer to P.90

Check No.18
Refer to P.90

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

∗ An input overcurrent may result from wrong internal wiring. If the system is interrupted by an input overcurrent after the wires have been disconnected and reconnected for part replacement, check the wiring again.



(R14440)

4.13 Four Way Valve Abnormality

Remote Controller Display

E9

Method of Malfunction Detection

The room temperature thermistor, the indoor heat exchanger thermistor, the outdoor temperature thermistor, and the outdoor heat exchanger thermistor are checked if they function within their normal ranges in each operation mode.

Malfunction Decision Conditions

A following condition continues over 10 minutes after operating for 5 minutes.

- Cooling / Dry
  (room thermistor temp. – indoor heat exchanger temp.) < –5°C
- Heating
  (indoor heat exchanger temp. – room thermistor temp.) < –5°C

- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

Supposed Causes

- Disconnection of four way valve coil
- Defective four way valve, coil, or harness
- Defective outdoor unit PCB
- Defective thermistor
- Refrigerant shortage
- Water mixed in refrigerant
- Defective stop valve

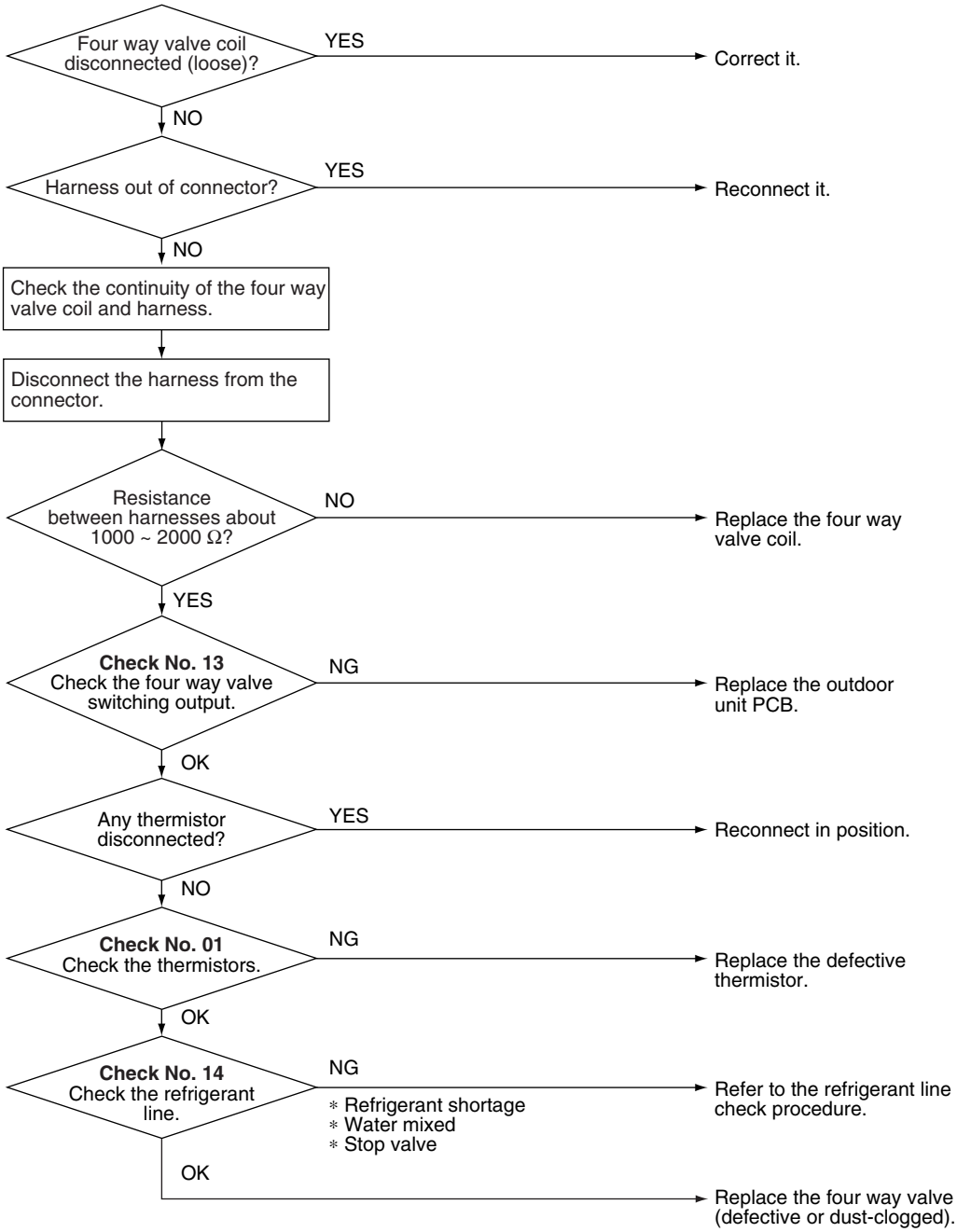
Troubleshooting

Check No.01
Refer to P.84

Check No.13
Refer to P.87

Check No.14
Refer to P.87

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14441)

4.14 Discharge Pipe Temperature Control

Remote Controller Display

F3

Method of Malfunction Detection

An error is determined with the temperature detected by the discharge pipe thermistor.

Malfunction Decision Conditions

- If the temperature detected by the discharge pipe thermistor rises above **A** °C, the compressor stops.
- The error is cleared when the discharge pipe temperature has dropped below **B** °C.

Stop temperatures	**A** (°C)	**B** (°C)
(1) above 50 Hz (rising), above 45 Hz (dropping)	118	85
(2) 35 ~ 50 Hz (rising), 30 ~ 45 Hz (dropping)	110	77
(3) below 35 Hz (rising), below 30 Hz (dropping)	93	60

- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

Supposed Causes

- Defective discharge pipe thermistor
  (Defective outdoor heat exchanger thermistor or outdoor temperature thermistor)
- Defective electronic expansion valve or coil
- Refrigerant shortage
- Defective four way valve
- Water mixed in refrigerant
- Defective stop valve
- Defective outdoor unit PCB

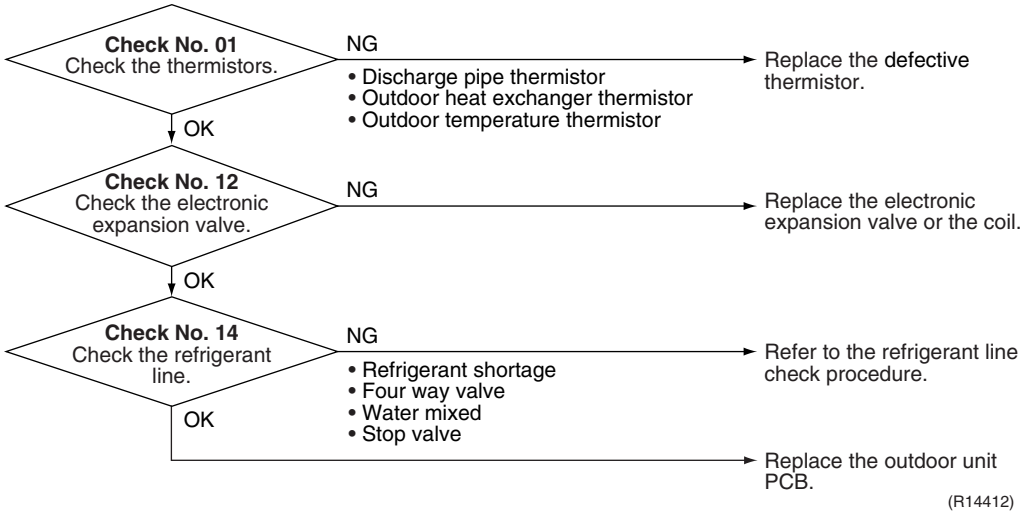
Troubleshooting

Check No.01
Refer to P.84

Check No.12
Refer to P.86

Check No.14
Refer to P.87

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14412)

4.15 High Pressure Control in Cooling

Remote Controller Display

F6

Method of Malfunction Detection

High-pressure control (operation halt, frequency drop, etc.) is activated in cooling operation if the temperature sensed by the outdoor heat exchanger thermistor exceeds the limit.

Malfunction Decision Conditions

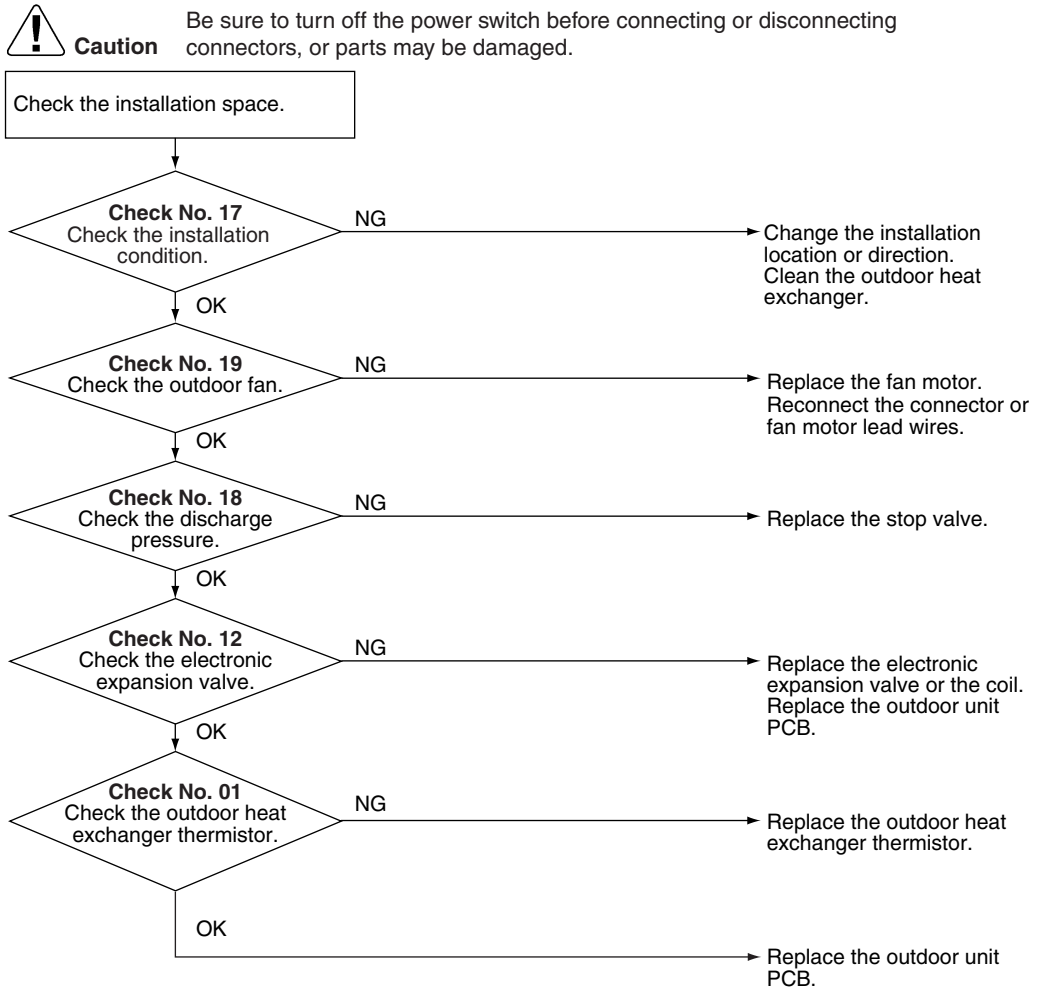
- The temperature sensed by the outdoor heat exchanger thermistor rises above about 60°C.
- The error is cleared when the temperature drops below about 50°C.

Supposed Causes

- The installation space is not large enough.
- Dirty outdoor heat exchanger
- Defective outdoor fan motor
- Defective stop valve
- Defective electronic expansion valve or coil
- Defective outdoor heat exchanger thermistor
- Defective outdoor unit PCB

Troubleshooting

Check No.01 Refer to P.84
Check No.12 Refer to P.86
Check No.17 Refer to P.90
Check No.18 Refer to P.90
Check No.19 Refer to P.91



4.16 Compressor System Sensor Abnormality

Remote Controller Display

H0

Method of Malfunction Detection

- The system checks the DC current before the compressor starts.

Malfunction Decision Conditions

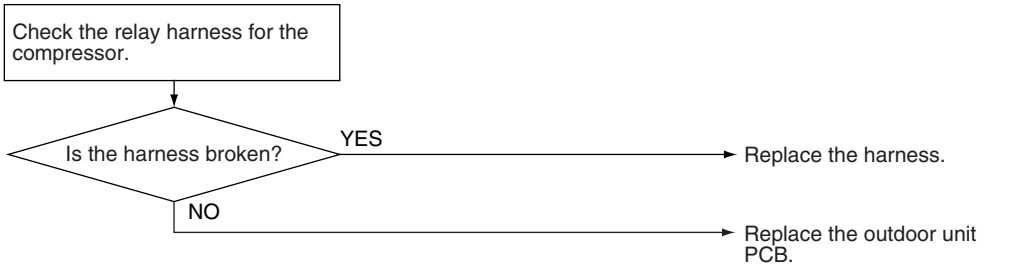
- The DC current before compressor start-up is out of the range 0.5 ~ 4.5 V (sensor output converted to voltage value)
- The DC voltage before compressor start-up is below 50 V.

Supposed Causes

- Broken or disconnection of harness
- Defective outdoor unit PCB

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14383)

4.17 Position Sensor Abnormality

Remote Controller Display

H6

Method of Malfunction Detection

A compressor start-up 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.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 11 minutes without any other error

Supposed Causes

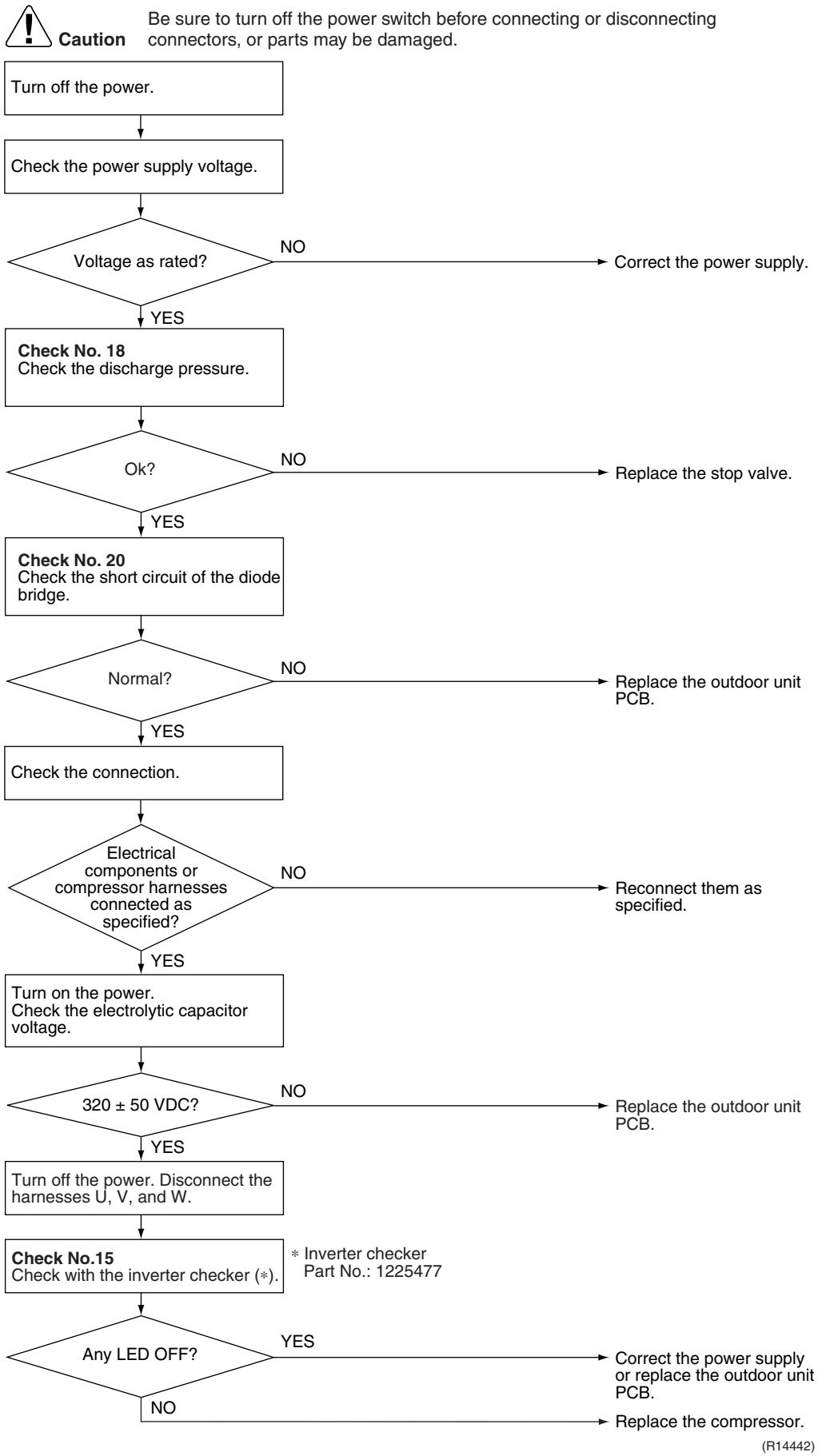
- Disconnection of compressor relay harness
- Defective compressor
- Defective outdoor unit PCB
- Start-up failure caused by the closed stop valve
- Input voltage is out of specification

Troubleshooting

Check No.15
Refer to P.88

Check No.18
Refer to P.90

Check No.20
Refer to P.91



4.18 Thermistor or Related Abnormality (Outdoor Unit)

Remote Controller Display

H9, J3, J6, P4

Method of Malfunction Detection

This fault is identified based on the thermistor input voltage to the microcomputer.
A thermistor fault is identified based on the temperature sensed by each thermistor.

Malfunction Decision Conditions

- The thermistor input voltage is above 4.96 V or below 0.04 V with the power on.
- J3 error is judged if the discharge pipe temperature is lower than the heat exchanger temperature.

Supposed Causes

- Disconnection of the connector for the thermistor
- Defective thermistor corresponding to the error code
- Defective heat exchanger thermistor in the case of J3 error (outdoor heat exchanger thermistor in cooling operation, or indoor heat exchanger thermistor in heating operation)
- Defective outdoor unit PCB

Troubleshooting

In case of "P4"

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

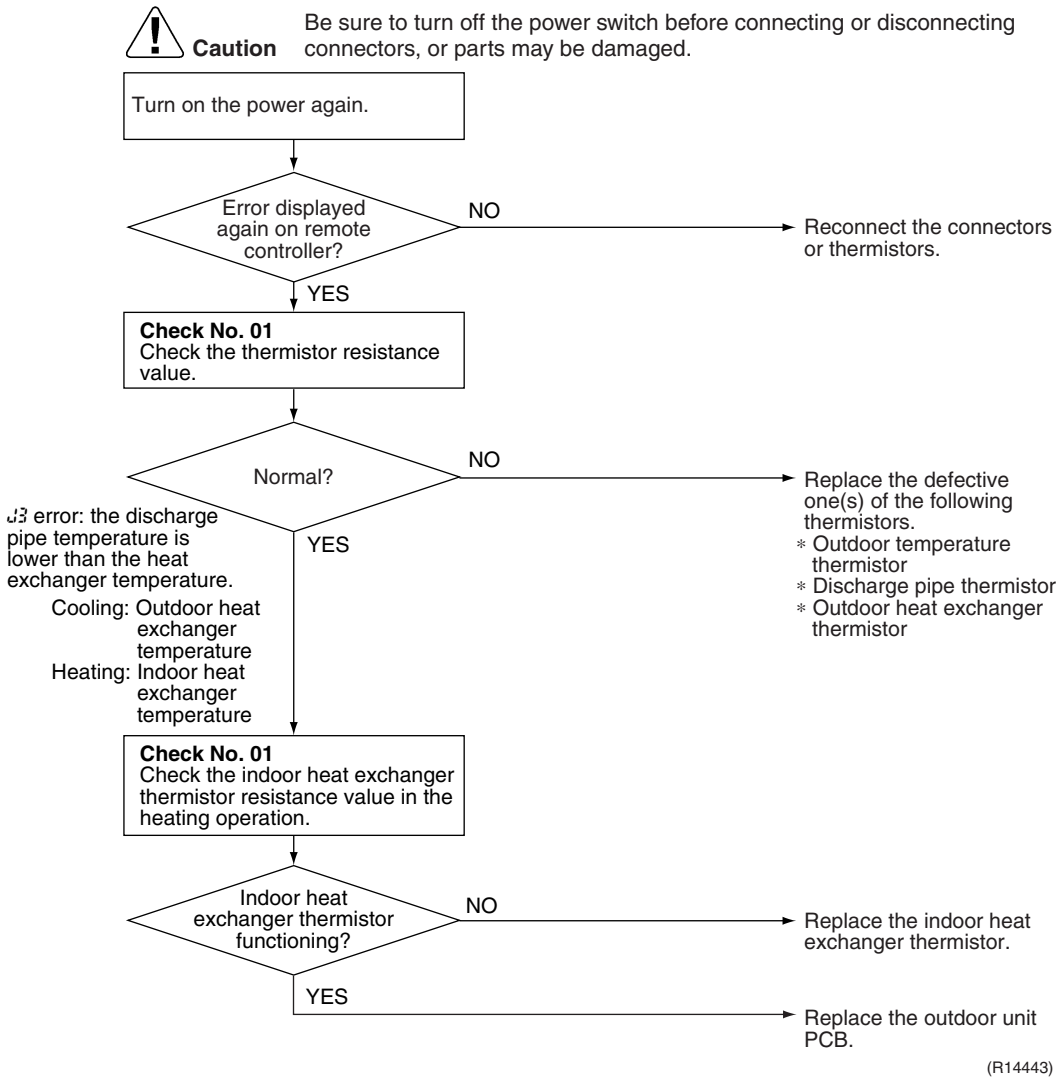
Replace the outdoor unit PCB.

P4 : Radiation fin thermistor

Troubleshooting

In case of "H9" "J3" "J6"

Check No.01
Refer to P.84



H9 : Outdoor temperature thermistor
J3 : Discharge pipe thermistor
J6 : Outdoor heat exchanger thermistor

4.19 Electrical Box Temperature Rise

Remote Controller 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 **A** °C.
- The error is cleared when the radiation fin temperature drops below **B** °C.
- To cool the electrical components, the outdoor fan starts when the radiation fin temperature rises above **C** °C and stops when it drops below **B** °C.

A (°C)	**B** (°C)	**C** (°C)
122	64	113

Supposed Causes

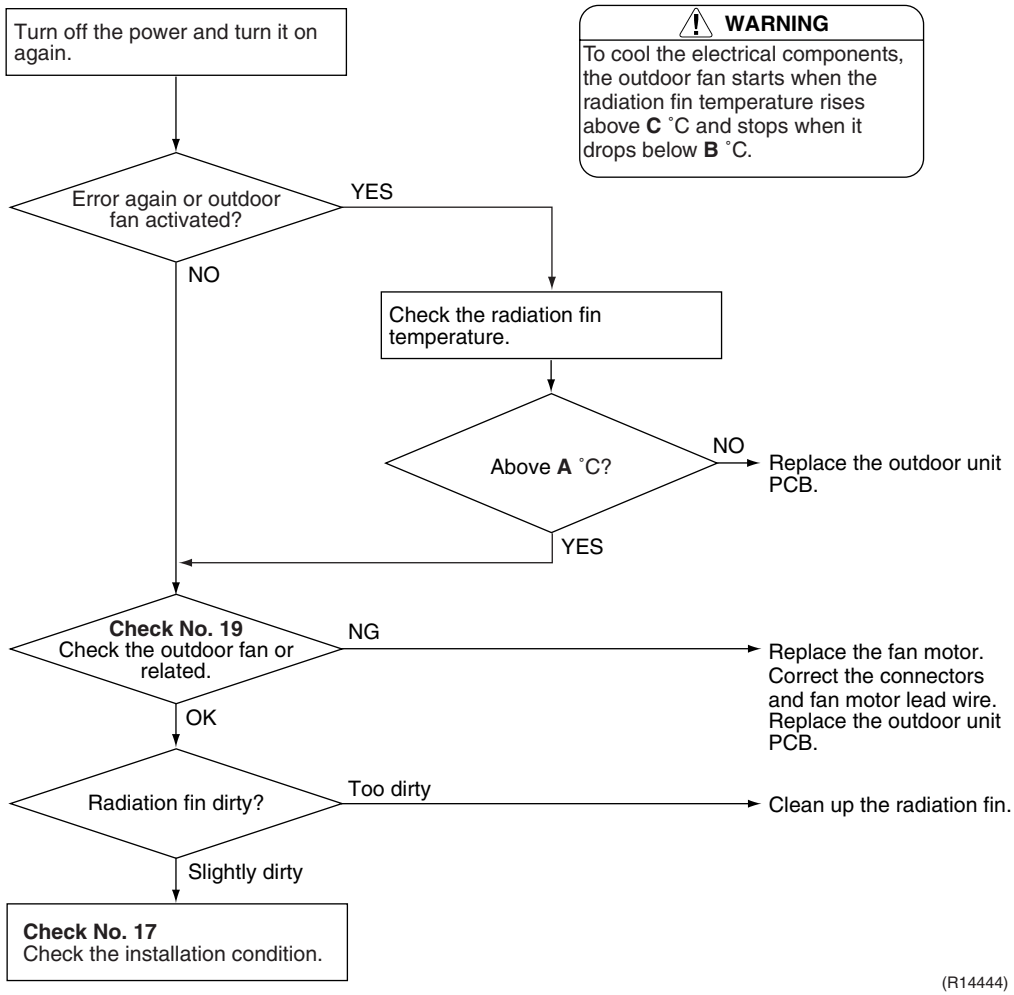
- Defective outdoor fan motor
- Short circuit
- Defective radiation fin thermistor
- Disconnection of connector
- Defective outdoor unit PCB

Troubleshooting

Check No.17
Refer to P.90

Check No.19
Refer to P.91

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14444)

A (°C)	**B** (°C)	**C** (°C)
122	64	113

4.20 Radiation Fin Temperature Rise

Remote Controller 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 **A** °C.
- The error is cleared when the radiation fin temperature drops below **B** °C.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

A (°C)	**B** (°C)
85	56

Supposed Causes

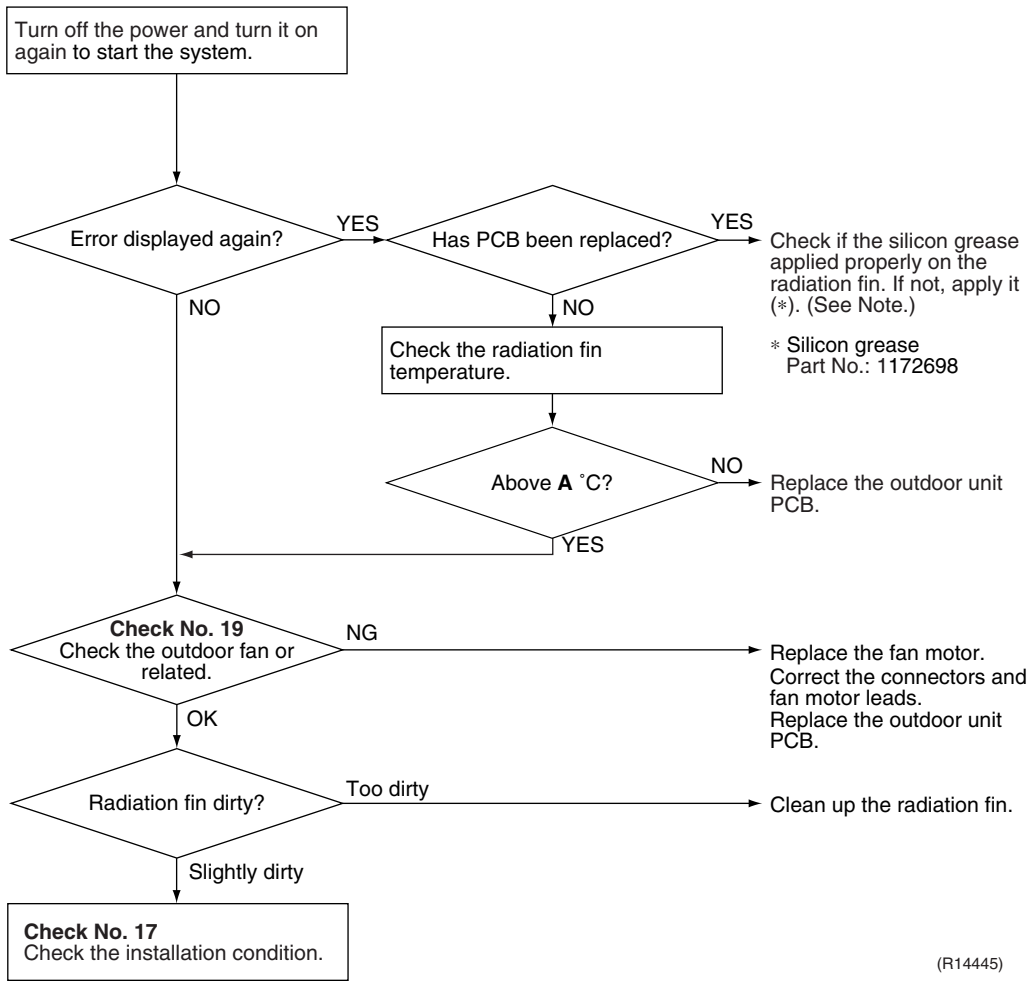
- Defective outdoor fan motor
- Short circuit
- Defective radiation fin thermistor
- Disconnection of connector
- Defective outdoor unit PCB
- Silicon grease is not applied properly on the radiation fin after replacing the outdoor unit PCB.

Troubleshooting

Check No.17
Refer to P.90

Check No.19
Refer to P.91

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



A (°C)
85

Note: Refer to “Application of silicon grease to a power transistor and a diode bridge” on page 145 for detail.

4.21 Output Overcurrent Detection

Remote Controller Display

L5

Method of Malfunction Detection

An output overcurrent 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 overcurrent signal is fed from the output overcurrent detection circuit to the microcomputer.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 11 minutes without any other error

Supposed Causes

- Poor installation condition
- Closed stop valve
- Defective power module
- Wrong internal wiring
- Abnormal supply voltage
- Defective outdoor unit PCB
- Defective compressor

Troubleshooting

Check No.15
Refer to P.88

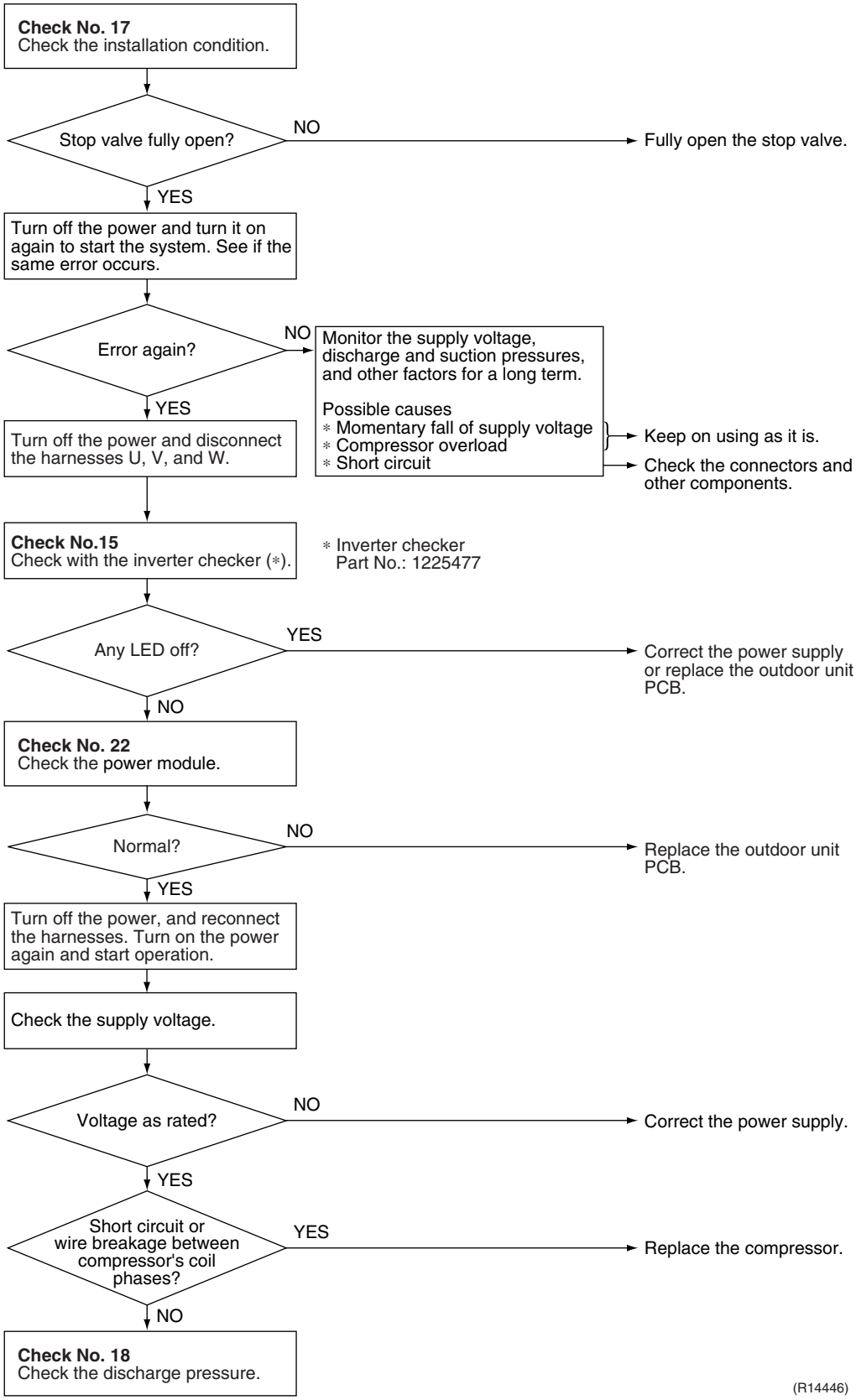
Check No.17
Refer to P.90

Check No.18
Refer to P.90

Check No.22
Refer to P.92

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

* An output overcurrent may result from wrong internal wiring. If the system is interrupted by an output overcurrent after the wires have been disconnected and reconnected for part replacement, check the wiring again.



4.22 Refrigerant Shortage

Remote Controller Display

U0

Method of Malfunction Detection

Refrigerant shortage detection I:
Refrigerant shortage is detected by checking the input current value and the compressor running frequency. If the refrigerant is short, the input current is smaller than the normal value.

Refrigerant shortage detection II:
Refrigerant shortage is detected by checking the discharge pipe temperature and the opening of the electronic expansion valve. If the refrigerant is short, the discharge pipe temperature tends to rise.

Refrigerant shortage detection III:
Refrigerant shortage is detected by checking the difference between suction and discharge temperature.

Malfunction Decision Conditions

Refrigerant shortage detection I:
The following conditions continue for 7 minutes.

- Input current × input voltage ≤ **A** × output frequency + **B**
- Output frequency > **C**

A (–)	**B** (W)	**C** (Hz)
2000/256	–181	54

Refrigerant shortage detection II:
The following conditions continue for 80 seconds.

- Opening of the electronic expansion valve ≥ **D**
- Discharge pipe temperature > **E** × target discharge pipe temperature + **F**

D (pulse)	**E** (–)	**F** (°C)
470	128/128	20

Refrigerant shortage detection III:
When the difference of the temperature is smaller than **G** °C, it is regarded as refrigerant shortage.

		G (°C)
Cooling	room thermistor temperature – indoor heat exchanger temperature	4.0
	outdoor heat exchanger temperature – outdoor temperature	4.0
Heating	indoor heat exchanger temperature – room thermistor temperature	4.0
	outdoor temperature – outdoor heat exchanger temperature	4.0

- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

Supposed Causes

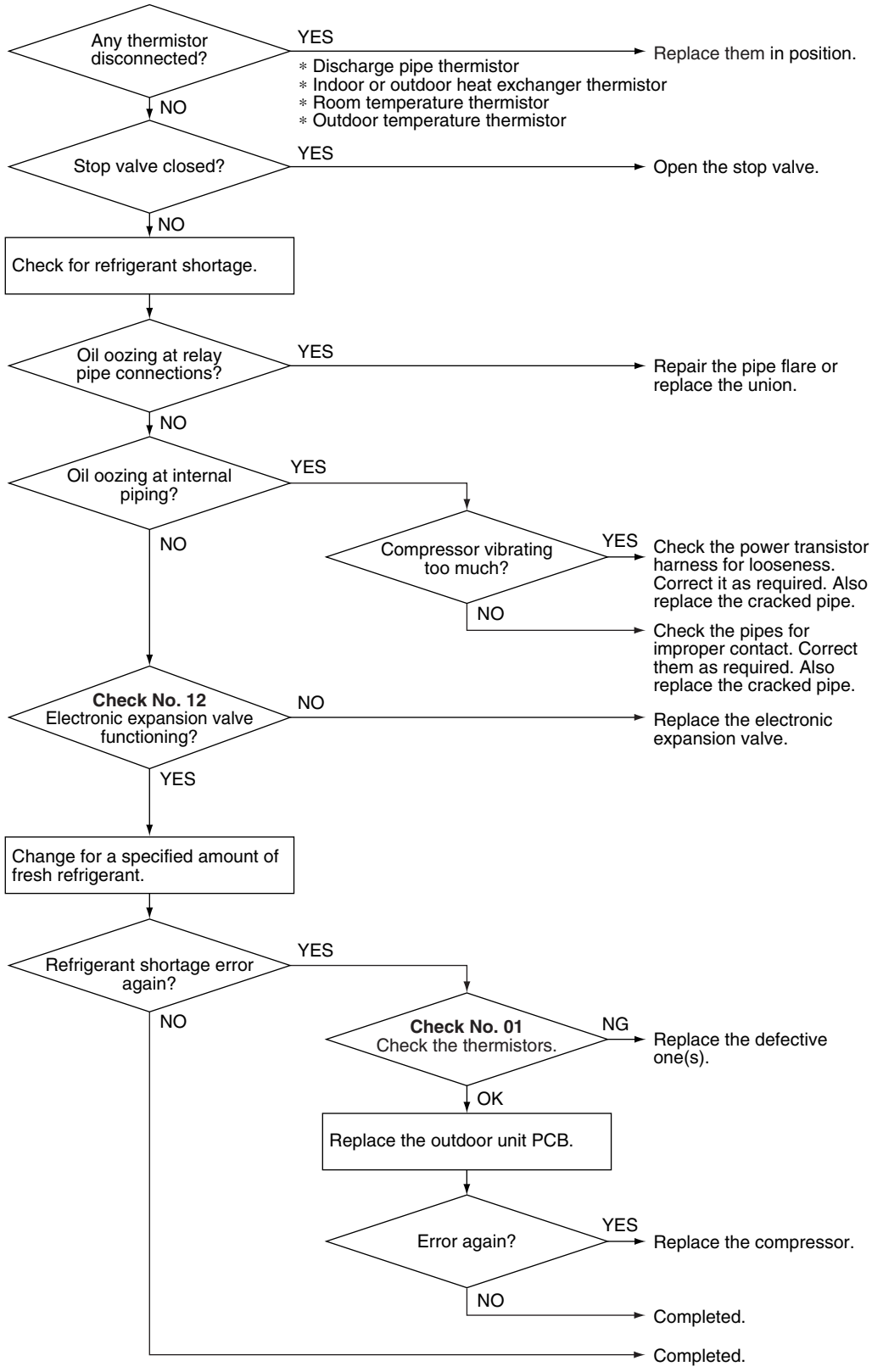
- Disconnection of discharge pipe thermistor, indoor or outdoor heat exchanger thermistor, room or outdoor temperature thermistor
- Closed stop valve
- Refrigerant shortage (refrigerant leakage)
- Poor compression performance of compressor
- Defective electronic expansion valve

Troubleshooting

Check No.01
Refer to P.84

Check No.12
Refer to P.86

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.



(R14447)

4.23 Low-voltage Detection or Over-voltage Detection

Remote Controller Display

U2

Method of Malfunction Detection

Low-voltage detection:
An abnormal voltage drop is detected by the DC voltage detection circuit.

Over-voltage detection:
An abnormal voltage rise is detected by the over-voltage detection circuit.

Malfunction Decision Conditions

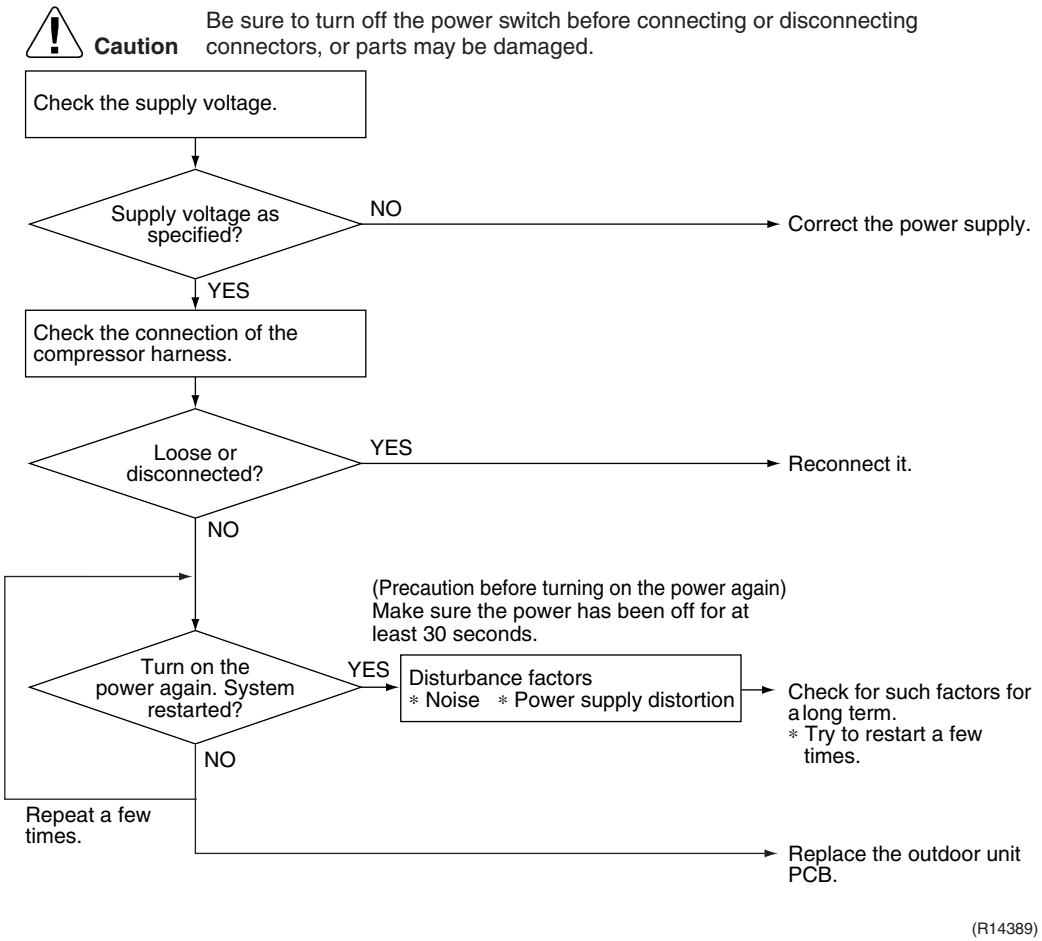
Low-voltage detection:
- The voltage detected by the DC voltage detection circuit is below 150 ~ 180 V (depending on the model).

Over-voltage detection:
- An over-voltage signal is fed from the over-voltage detection circuit to the microcomputer. (The voltage is over 400 V.)
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 11 minutes without any other error

Supposed Causes

- Supply voltage is not as specified.
- Defective DC voltage detection circuit
- Defective over-voltage detection circuit
- Defective PAM control part
- Disconnection of compressor harness
- Noise
- Momentary fall of voltage
- Momentary power failure

Troubleshooting



(R14389)

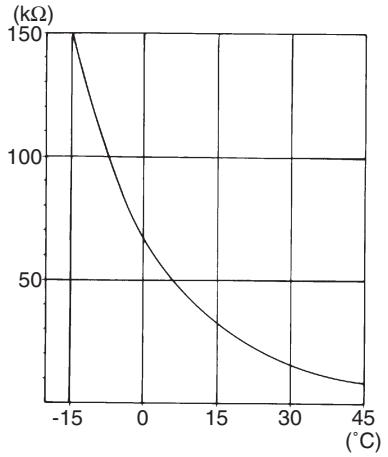
5. Check

5.1 Thermistor Resistance Check

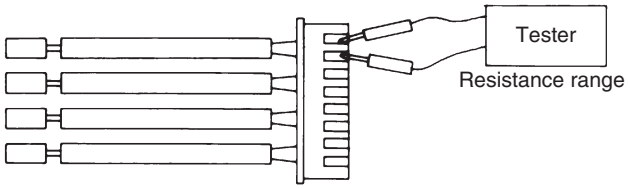
Check No.01 Disconnect the connectors of the thermistors from the PCB, and measure the resistance of each thermistor using tester.
The relationship between normal temperature and resistance is shown in the table and the graph below.

Thermistor temperature (°C)	Resistance (kΩ)
–20	211.0
–15	150.0
–10	116.5
–5	88.0
0	67.2
5	51.9
10	40.0
15	31.8
20	25.0
25	20.0
30	16.0
35	13.0
40	10.6
45	8.7
50	7.2

(R25°C = 20 kΩ, B = 3950 K)

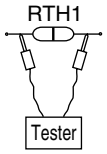


(R11905)



(R11906)

- For the models in which the thermistor is directly mounted on the PCB, disconnect the connector for the PCB and measure.

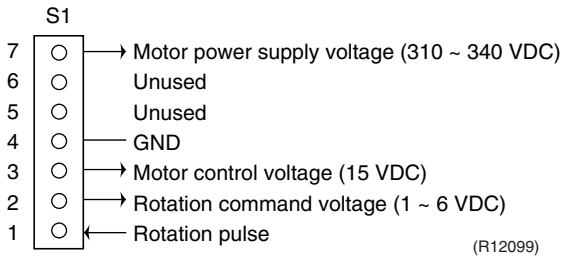


(R3460)

5.2 Fan Motor Connector Check

Check No.02

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



5.3 Power Supply Waveforms Check

Check No.11

Measure the power supply waveform between No. 1 and No. 2 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

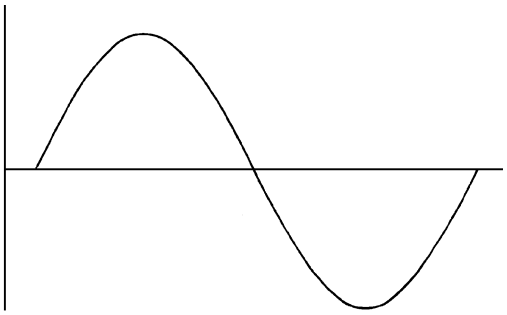
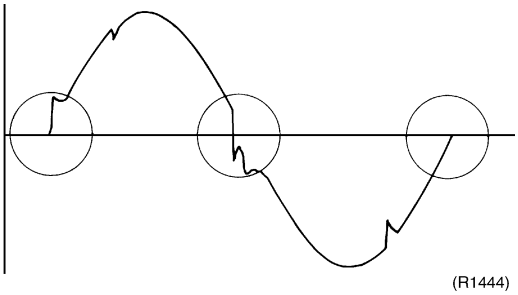


Fig.2

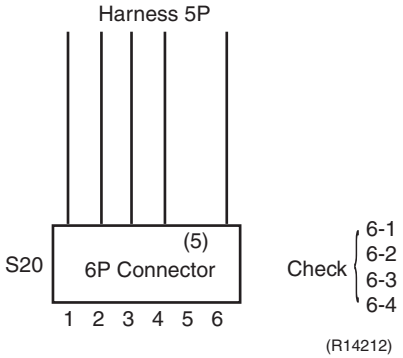


5.4 Electronic Expansion Valve Check

Check No.12

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

1. Check to see if the EV connector is correctly connected to the PCB.
2. Turn the power off and on again, and check to see if the EV generate latching sound.
3. If the EV does not generate latching sound in the above step 2, disconnect the connector and check the continuity using a tester.
4. Check the continuity between the pins 1 - 6, 2 - 6, 3 - 6, and 4 - 6. If there is no continuity between the pins, the EV coil is faulty.

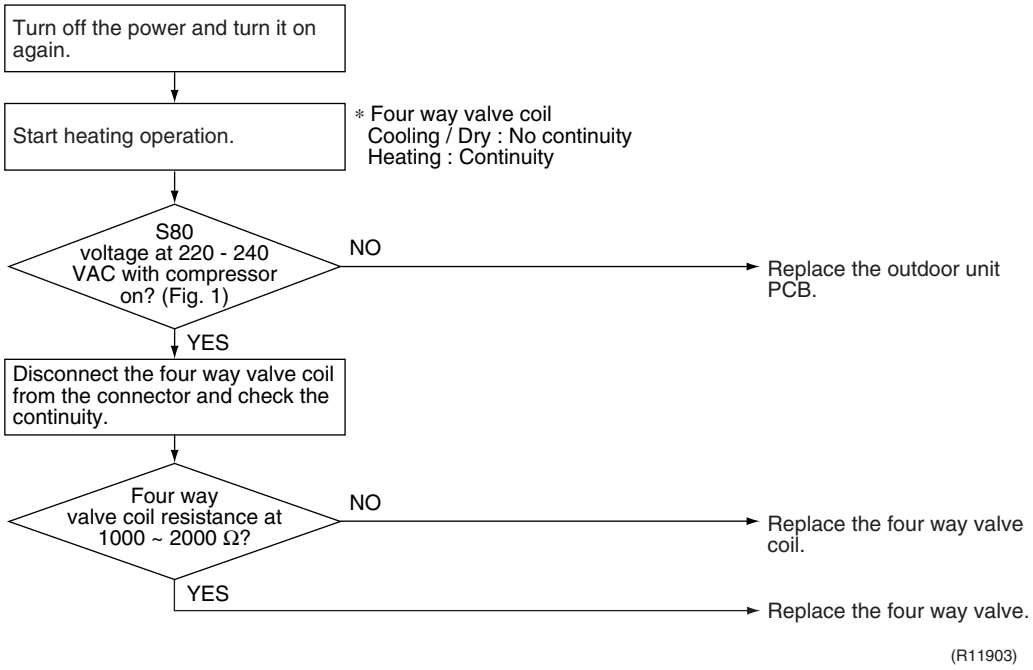


5. If the continuity is confirmed in the above step 3, the outdoor unit PCB is faulty.

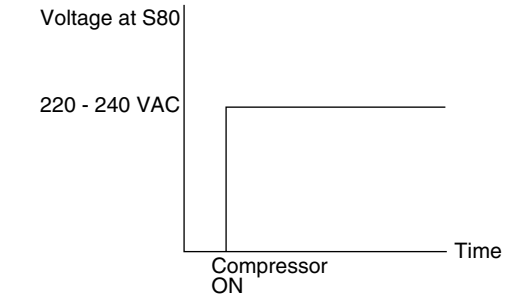
Note: Please note that the latching sound varies depending on the valve type.

5.5 Four Way Valve Performance Check

Check No.13



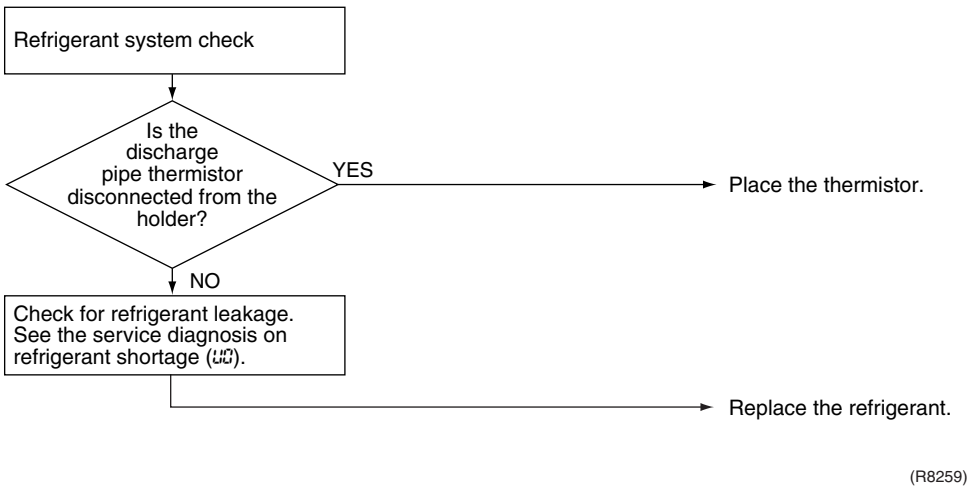
(Fig. 1)



(R11904)

5.6 Inverter Unit Refrigerant System Check

Check No.14



5.7 “Inverter Checker” Check

Check No.15

■ **Characteristics**

If abnormal stop occurs due to compressor startup failure or overcurrent output when using inverter unit, it is difficult to judge whether it is caused by the compressor failure or other failure (control PCB, power module, etc.). The inverter checker makes it possible to judge the cause of trouble easily and securely. (Connect this checker as a quasi-compressor instead of compressor and check the output of inverter)

■ **Operation Method**

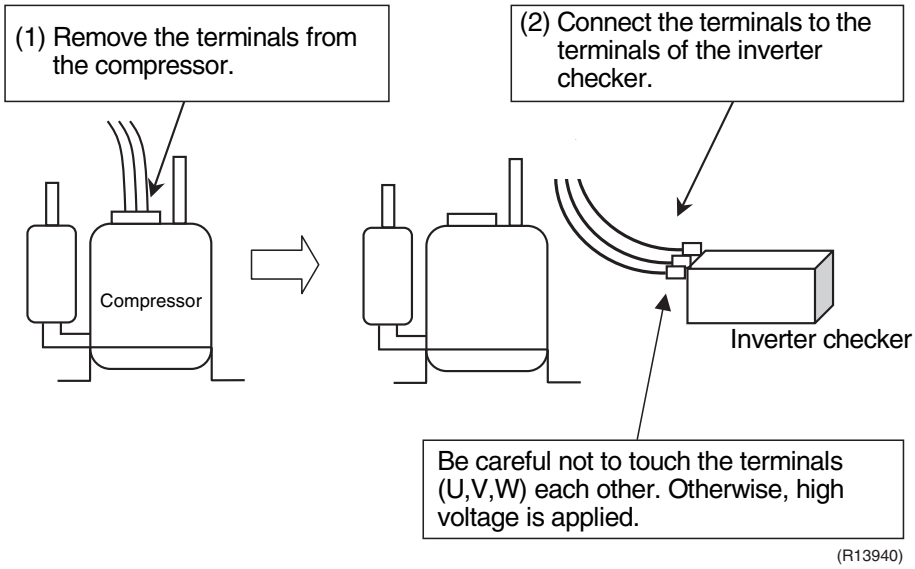
Step 1

Be sure to turn the power off.

Step 2

Install the inverter checker instead of a compressor.

Note:
Make sure the charged voltage of the built-in smoothing electrolytic capacitor drops to 10 VDC or below before carrying out the service work.



Reference:
If the terminals of the compressor are not FASTON terminals (difficult to remove the wire on the terminals), it is possible to connect wires available on site to the outdoor unit from output side of PCB. (Do not connect them to the compressor at the same time, otherwise it may result in incorrect detection.)

Step 3

Activate power transistor test operation from the outdoor unit.

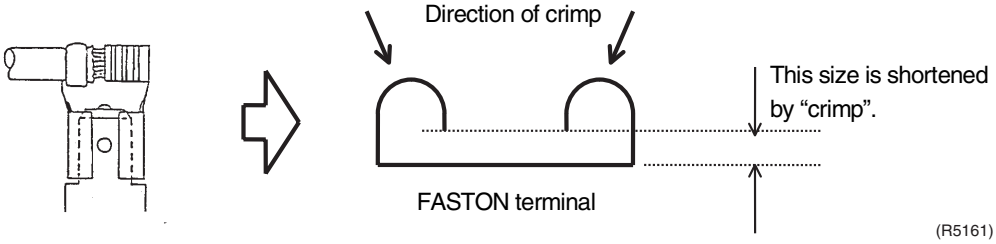
1) Press the forced cooling operation ON/OFF button for 5 seconds.
   (Refer to page 142 for the position.)
   → Power transistor test operation starts.

■ **Diagnose method (Diagnose according to 6 LEDs lighting status.)**

(1) When all the LEDs are lit uniformly, the compressor is defective.
→ Replace the compressor.
(2) When the LEDs are not lit uniformly, check the power module.
→ Refer to **Check No.13**.
(3) If NG in **Check No.13**, replace the power module (PCB).
If OK in **Check No.13**, check if there is any solder cracking on the PCB.
(4) If any solder cracking is found, replace the PCB or repair the soldered section.
If there is no solder cracking, replace the PCB.

Caution

(1) When the output frequency is low, the LEDs blink slowly. As the output frequency increases, the LEDs blink quicker. (The LEDs look like they are lit.)
(2) On completion of diagnose by the inverter checker, be sure to re-crimp the FASTON terminals. Otherwise, the terminals may be burned due to loosening.



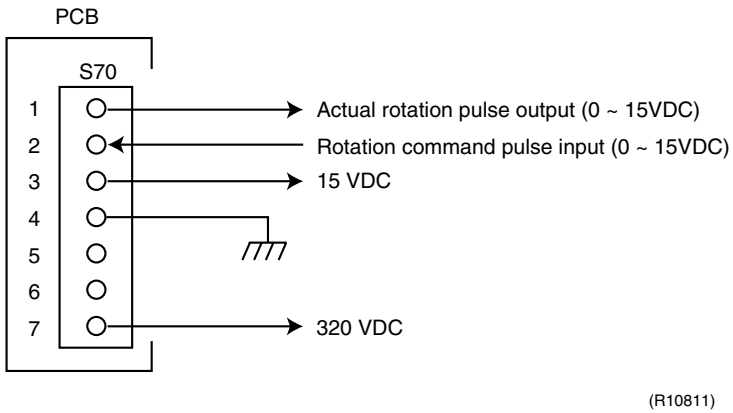
5.8 Rotation Pulse Check on the Outdoor Unit PCB

Check No.16

Make sure that the voltage of 320 ± 30 V is applied.

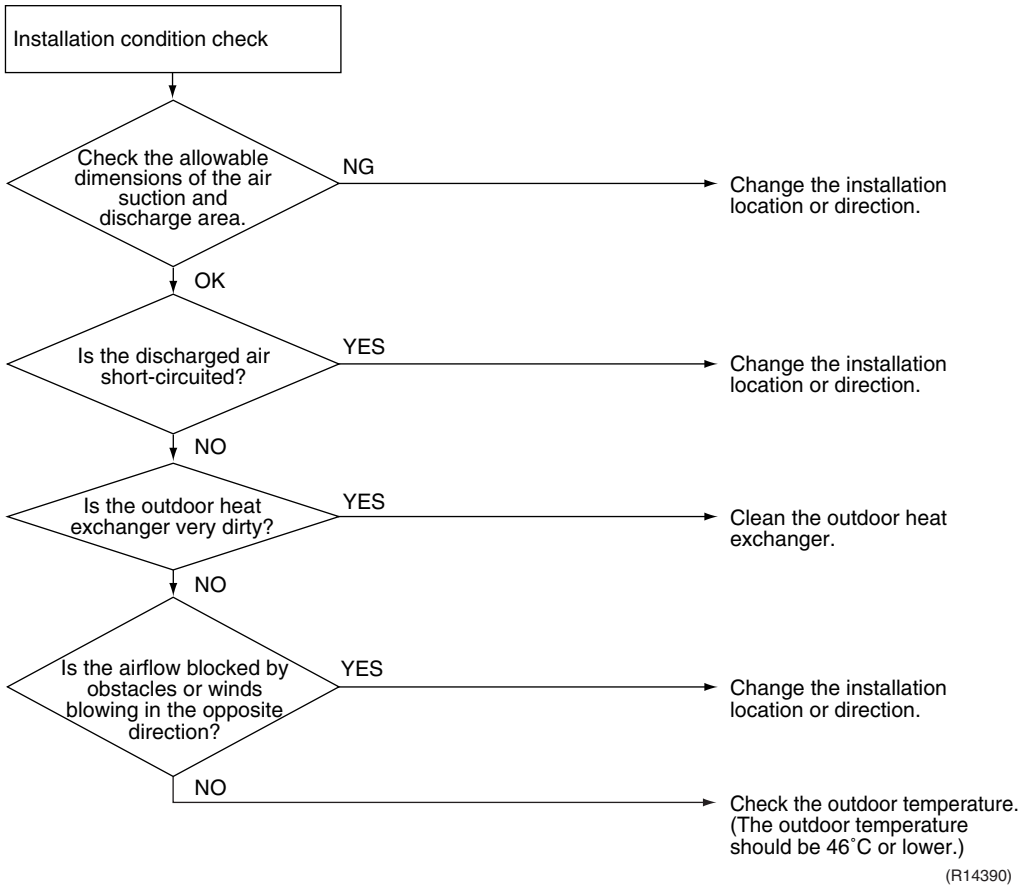
1. Set operation off and power off. Disconnect the connector S70.
2. Check that the voltage between the pins 4 - 7 is 320 VDC.
3. Check that the control voltage between the pins 3 - 4 is 15 VDC.
4. Check that the rotation command voltage between the pins 2 - 4 is 0 ~ 15 VDC.
5. Keep operation off and power off. Connect the connector S70.
6. Check whether 2 pulses (0 ~ 15 VDC) are output at the pins 1 - 4 when the fan motor is rotated 1 turn by hand.

When the fuse is melted, check the outdoor fan motor for proper function.
If NG in step 2 → Defective PCB → Replace the outdoor unit PCB.
If NG in step 4 → Defective Hall IC → Replace the outdoor fan motor.
If OK in both steps 2 and 4 → Replace the outdoor unit PCB.



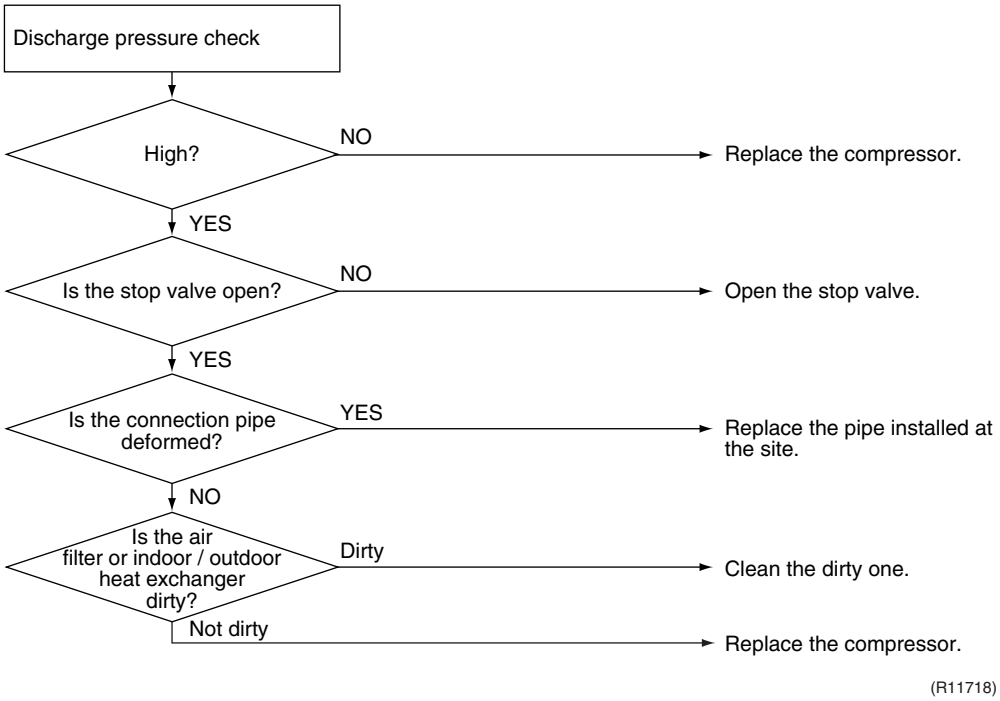
5.9 Installation Condition Check

Check No.17



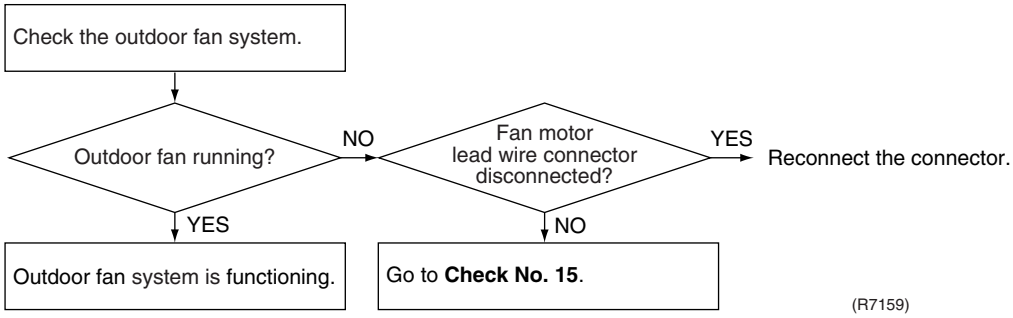
5.10 Discharge Pressure Check

Check No.18



5.11 Outdoor Fan System Check

Check No.19 **DC motor**



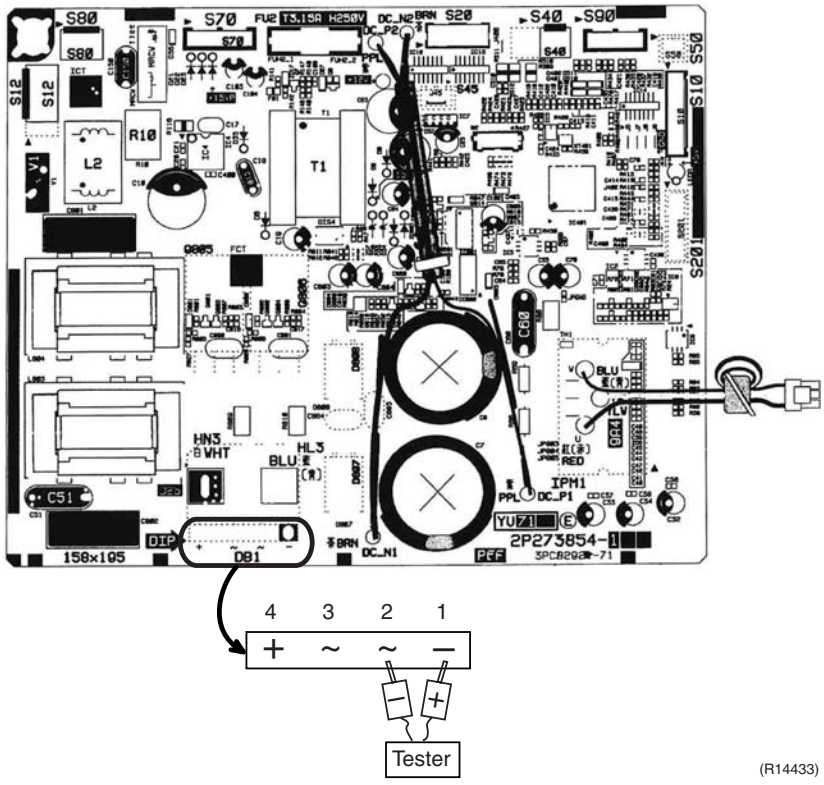
5.12 Main Circuit Short Check

Check No.20

Note: Check to make sure that the voltage between (+) and (–) of the diode bridge (DB1) is approx. 0 V before checking.

- Measure the resistance between the pins of the DB1 as below.
- If the resistance is ∞ or less than 1 kΩ, short circuit occurs on the main circuit.

(–) terminal of the tester (in case of digital, (+) terminal)	~ (2, 3)	+ (4)	~ (2, 3)	− (1)
(+) terminal of the tester (in case of digital, (–) terminal)	+ (4)	~ (2, 3)	− (1)	~ (2, 3)
Resistance in OK	several kΩ ~ several MΩ	∞	∞	several kΩ ~ several MΩ
Resistance in NG	0 Ω or ∞	0	0	0 Ω or ∞



5.13 Power Module Check

Check No.22

Note: Check to make sure that the voltage between (+) and (–) of the diode bridge (DB1) is approx. 0 V before checking.

- Disconnect the compressor harness connector from the outdoor unit PCB. To disengage the connector, press the protrusion on the connector.
- Follow the procedure below to measure resistance between the terminals of the DB1 and the terminals of the compressor with a multi-tester. Evaluate the measurement results for a judgment.

Negative (–) terminal of tester (positive terminal (+) for digital tester)	DB1 (+)	UVW	DB1 (–)	UVW
Positive (+) terminal of tester (negative terminal (–) for digital tester)	UVW	DB1 (+)	UVW	DB1 (–)
Resistance in OK	several kΩ ~ several MΩ			
Resistance in NG	0 Ω or ∞			

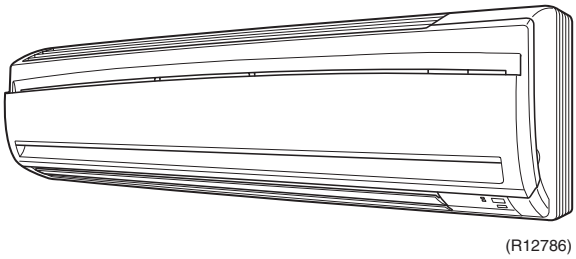
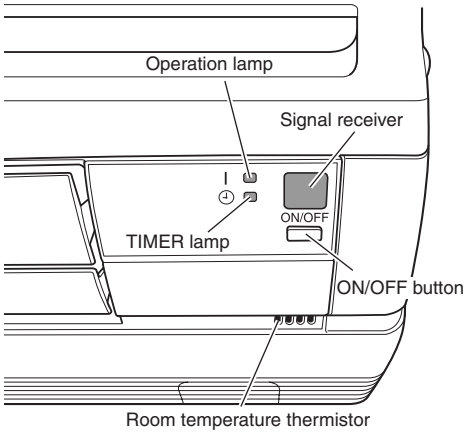
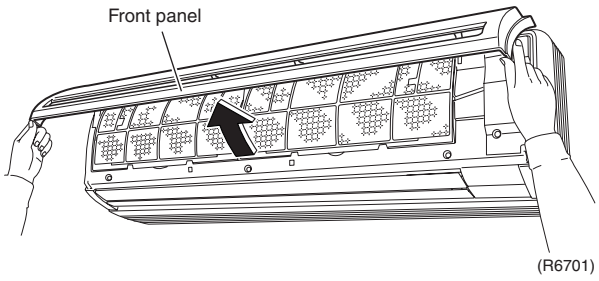
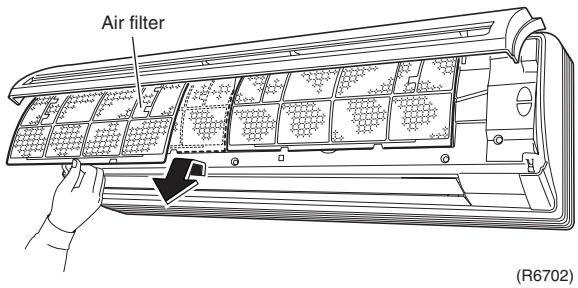
Part 7
Removal Procedure

1. Indoor Unit

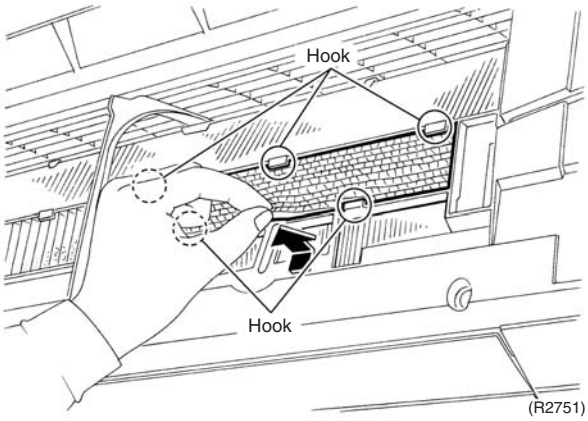
1.1 Removal of Air Filters / Front Panel

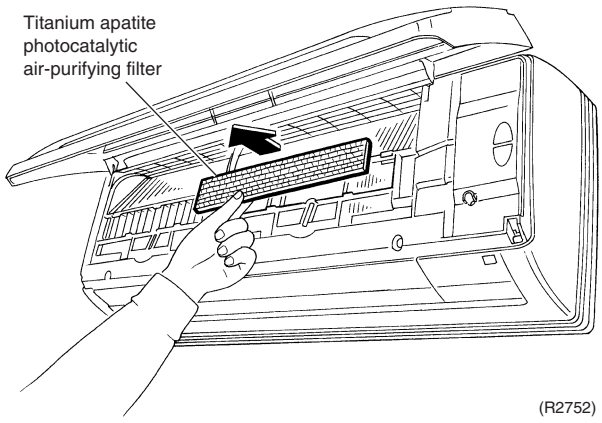
Procedure

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

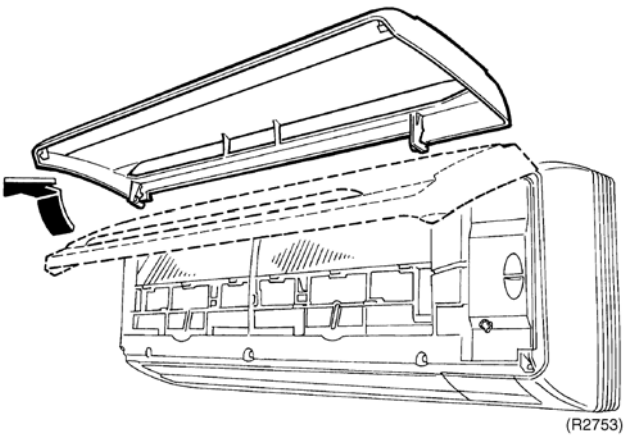
Step	Procedure		Points
		 (R12786)  (R12787)	**Warning** **Dangerous: High voltage** **A high voltage is applied to all the electric circuits of this product including thermistors.** ■ When the signal receiver catches a signal from the remote controller, the receiving tone sounds and the operation lamp blinks immediately to confirm the signal reception. ■ When the ON/OFF button is kept pressed for 5 seconds, the forced cooling operation is performed for about 15 minutes.
1. Remove the air filters.			
1	Open the front panel to the position where it stops.	 (R6701)	
2 3	Slightly push up the center knob of the air filter and unfasten the hooks. Pull out the air filter downward and remove it.	 (R6702)	■ The air filter is not marked for difference between the right and left sides. ■ The air filter can be set easily by inserting it along the guides. ■ Insert the air filter with the "FRONT" mark faced up. ■ Be sure to insert the hooks (at 2 lower positions) when mounting the air filter.

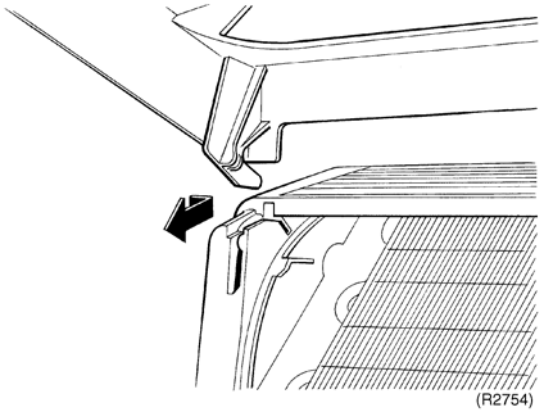
Step	Procedure	Points
2. Remove the Titanium apatite photocatalytic air-purifying filters.		
1	Push up the bottom of the Titanium apatite photocatalytic air-purifying filter to unfasten the hooks (2 on lower, 3 on upper) and take the filter out.	■ The right and left filters are interchangeable.

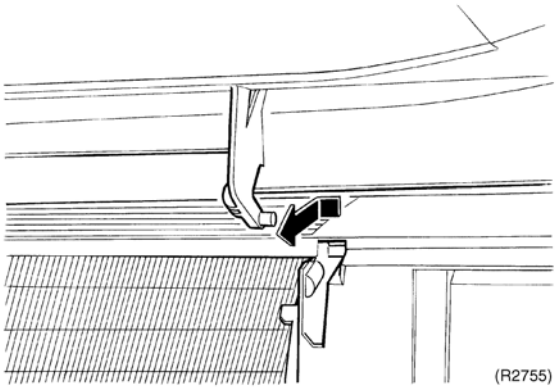




Step	Procedure	Points
3. Remove the front panel.		
1	While opening the front panel further than it stops, release both the shafts and remove the front panel.	■ Slide the front panel from side to side to release each shaft. ■ When reassembling the front panel, fit the right and left rotary shafts one by one into the grooves and fully push them in position.

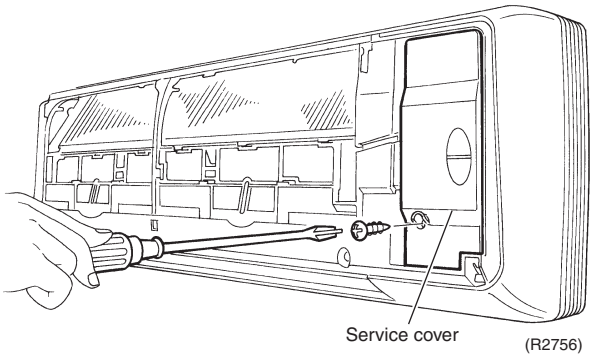
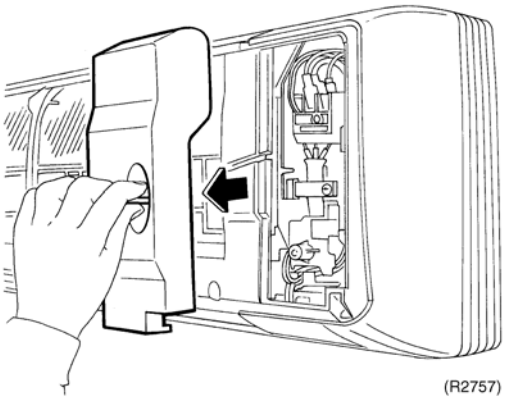
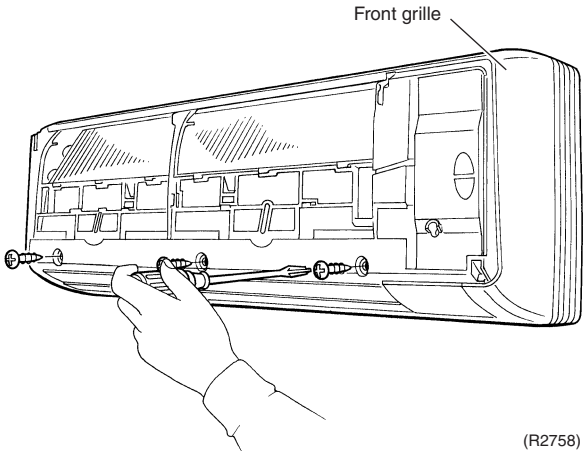

(R2753)

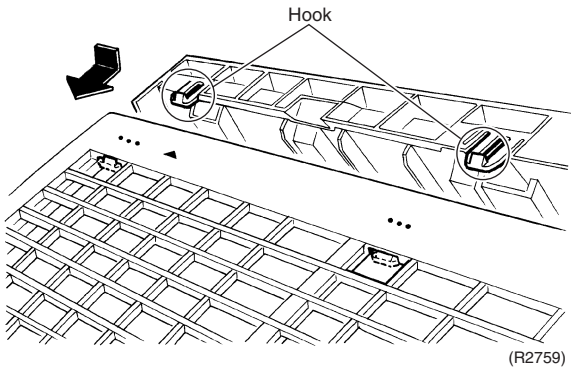
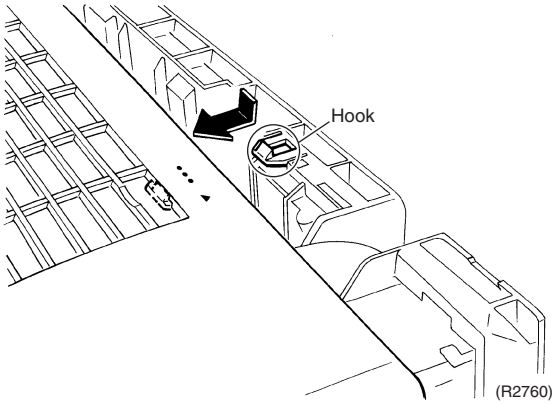
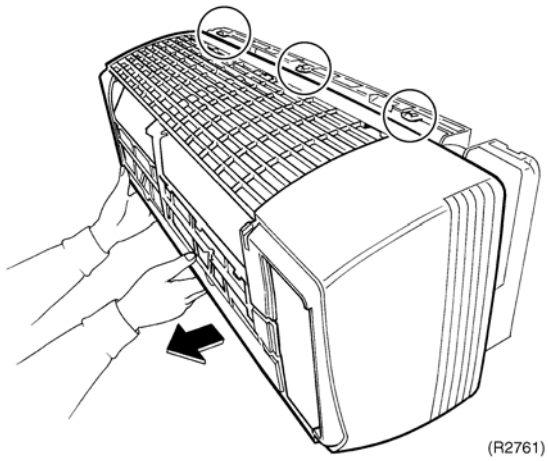
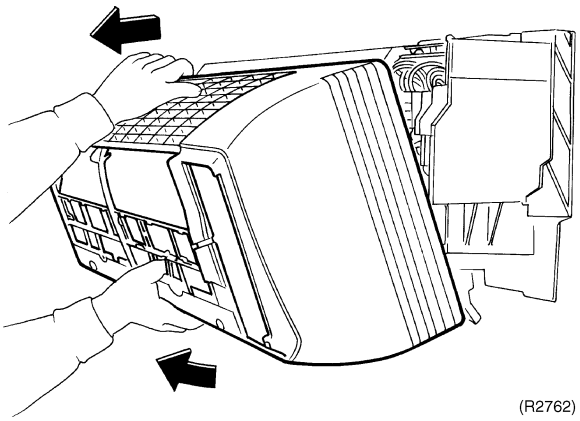

(R2754)


(R2755)

1.2 Removal of Front Grille

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

Step	Procedure	Points
1. Remove the service cover.		**Preparation** ■ Remove the front panel according to "Removal of the Air Filters / Front Panel".
1 Remove the screw and remove the service cover.		■ You can remove the front grille without detaching the service cover.
2. Remove the front grille.		
1 Remove the 3 screws of the front grille.		■ Refer to the removal procedure in a reverse way when reassembling.

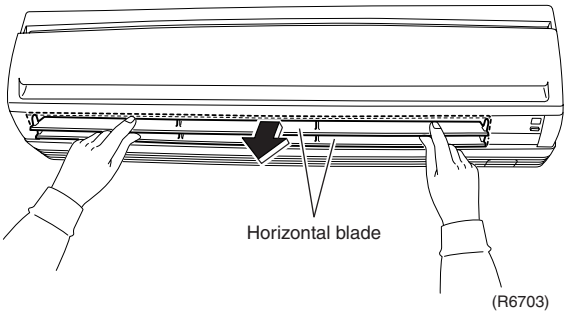
Step	Procedure		Points
2	Unfasten the 3 hooks on the top of the front grille.	 (R2759)  (R2760)  (R2761)	■ The convex marks (...) on the front panel indicate the position of the hooks.
3	Pull the upper part of the front grille out and lift the lower part up, and then remove the front grille.	 (R2762)	■ Make sure that all the 3 hooks are engaged securely when reassembling.

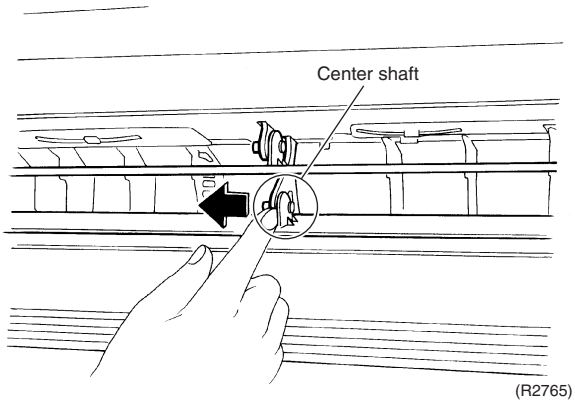
1.3 Removal of Horizontal Blades / Vertical Blades

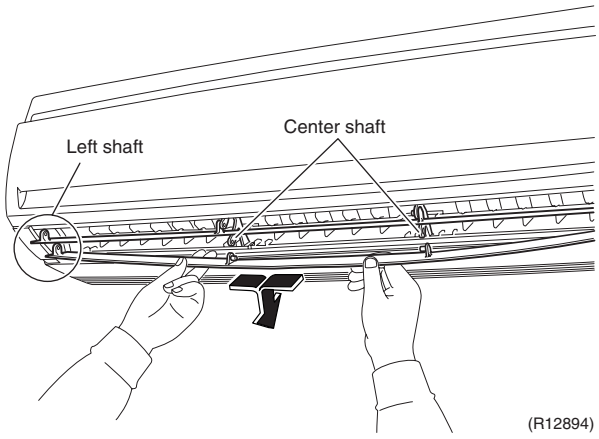
Procedure

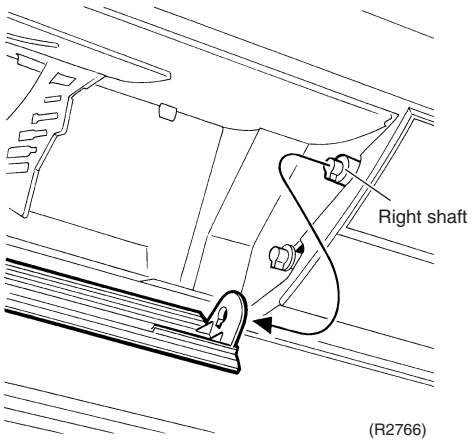
Warning **Be sure to wait for 10 minutes or more after turning off all power supplies before disassembling work.**

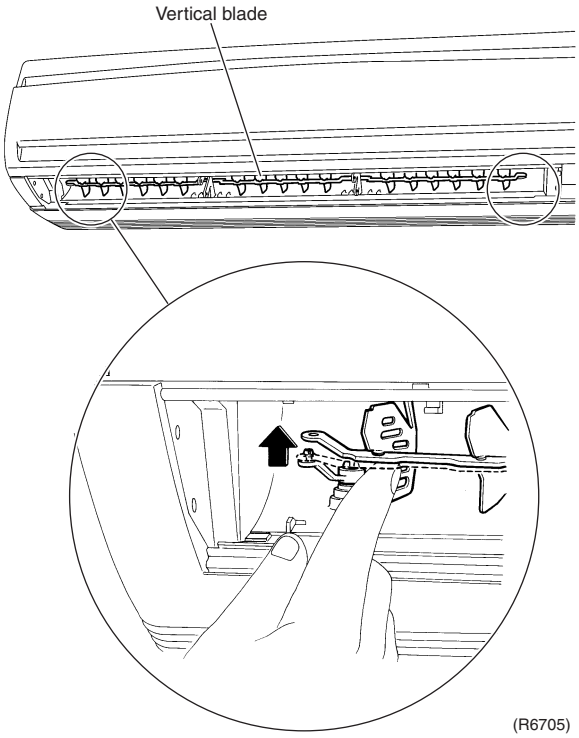
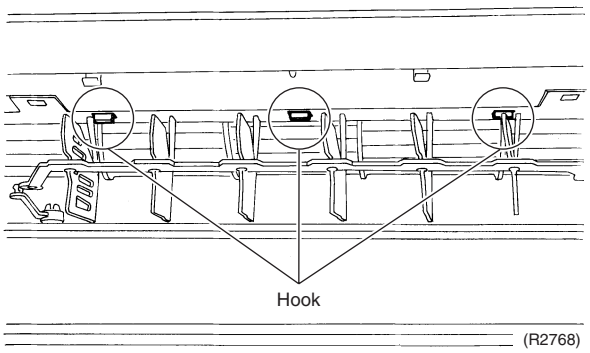
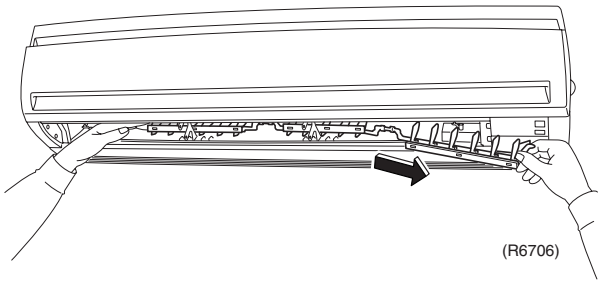
Step	Procedure	Points
1. Remove the horizontal blades.		
1	Open the horizontal blades.	
2	Bend the horizontal blade slightly and release the center shaft. (2 locations)	■ Remove both the horizontal blades (upper and lower) in the same way.
3	Release the left shaft.	
4	Slide the horizontal blade to the left and release the right shaft.	■ Installation procedure 1. Since the key pattern hook is provided, rotate the blade and fit it to the right shaft first. 2. Fit the blade to the center and left shafts.





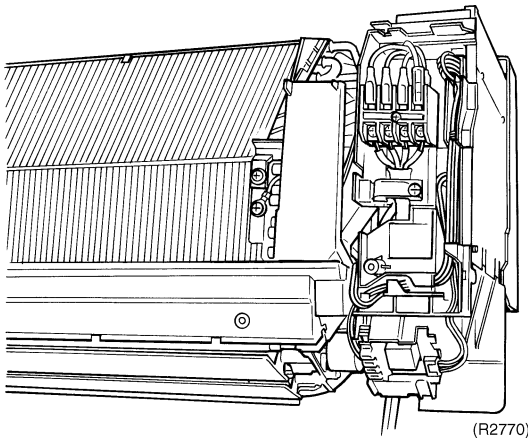
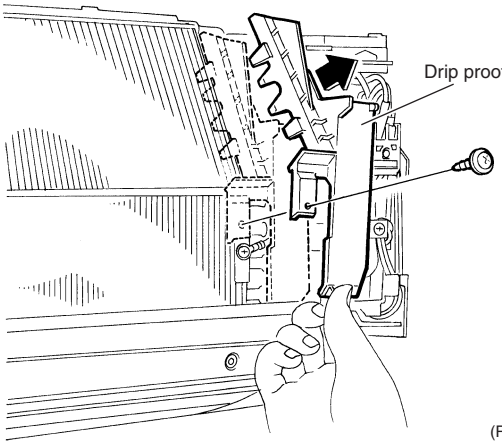
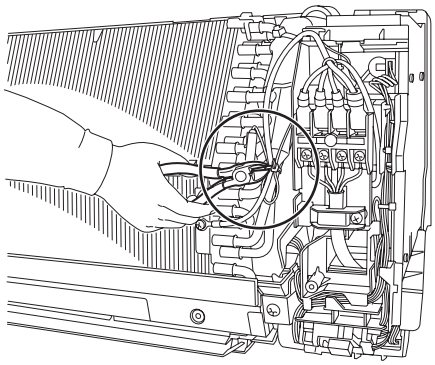
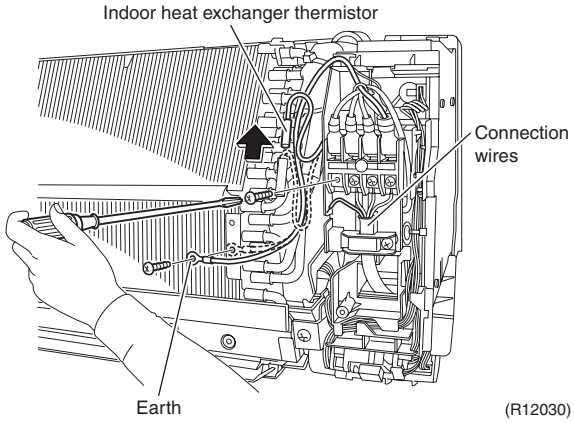
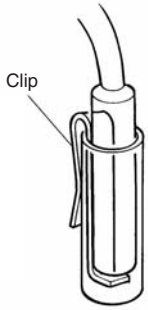


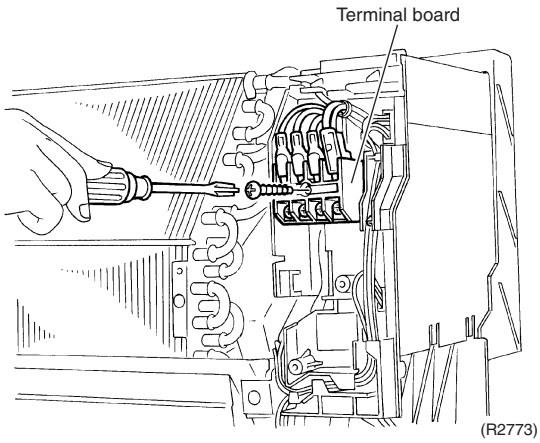
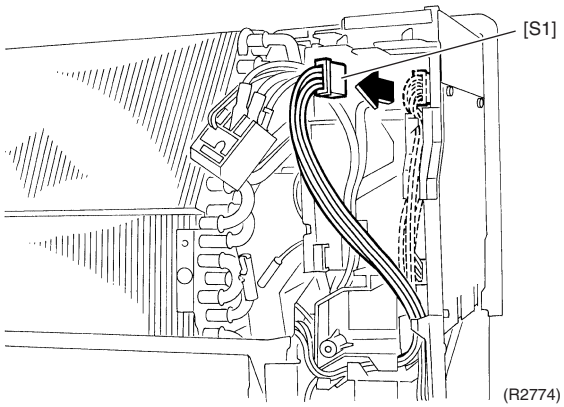
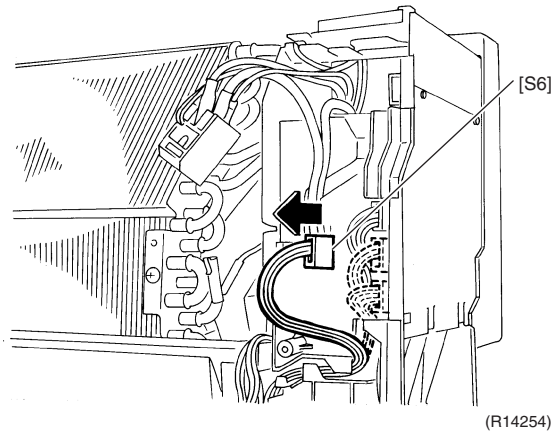
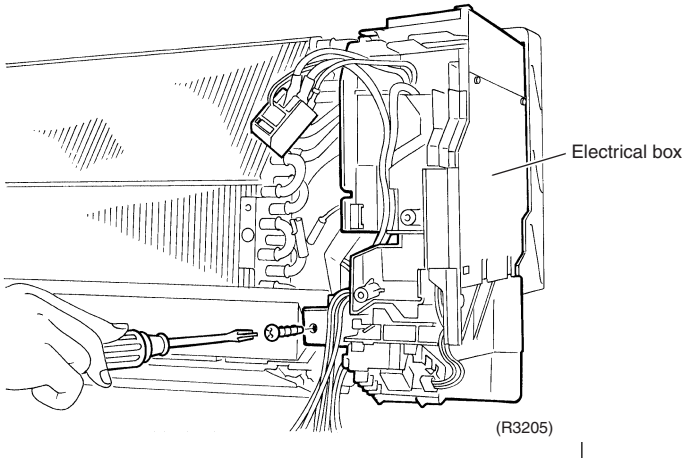


Step	Procedure	Points
2. Remove the vertical blades.		■ Remove the fan guards beforehand. ■ The unit has 3 sets of vertical blades linked one another with interlock rods.
1 Release the right and left shafts.		
2 Unfasten the 3 hooks for each set of vertical blades.		
3 Pull the vertical blades rightward and remove them.		

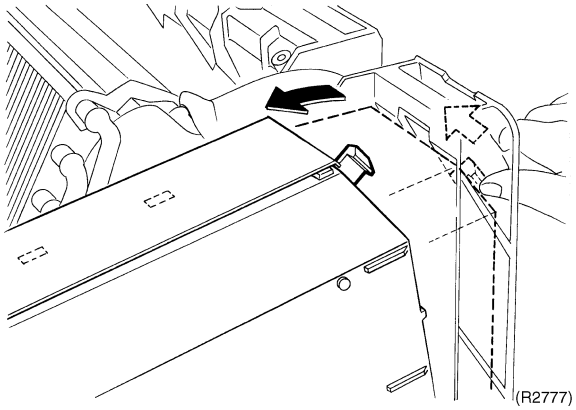
1.4 Removal of Electrical Box / PCBs / Swing Motors

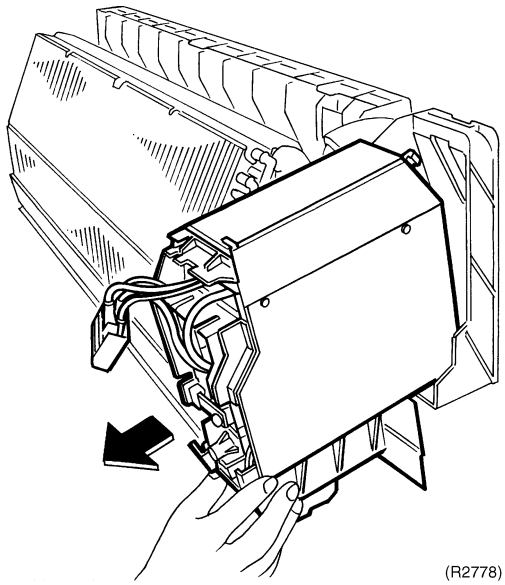
Procedure **Warning** **Be sure to wait for 10 minutes or more after turning off all power supplies before disassembling work.**

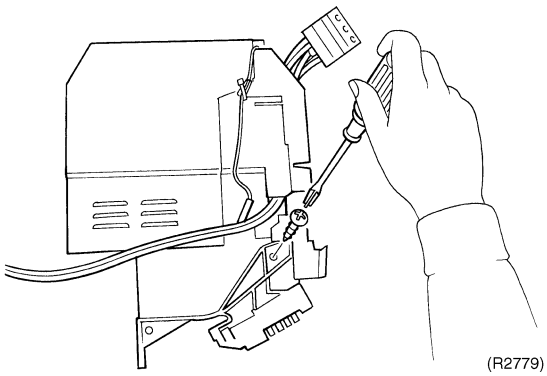
Step	Procedure	Points
1. Remove the electrical box.	 (R2770)	**Preparation** ■ Remove the front grille according to the “Removal of Front Grille”.
1 Remove the screw and remove the drip proof plate.	 (R2771)	
2 Cut the clamp.	 (R6707)	
3 Pull out the indoor heat exchanger thermistor. 4 Remove the screw of the earth. 5 Remove the screws of the connection wires.	 (R12030)	■ Be careful not to lose the clip for the thermistor.  (R11234)

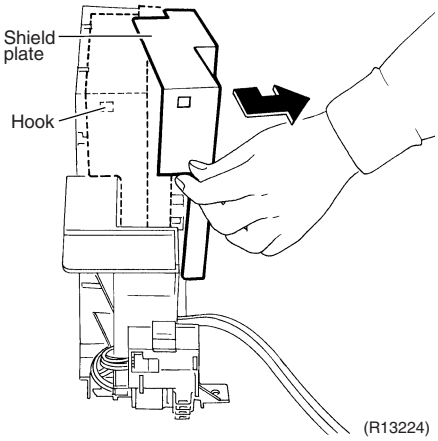
Step	Procedure		Points
6	Remove the screw and remove the terminal board.		■ You can remove the electrical box without detaching the terminal board. ■ Screw: M4 × 30
7	Disconnect the connector for the fan motor [S1].		
8	Disconnect the connector for the swing motor [S6].		[S6]: for horizontal blades
9	Remove the screw of the electrical box.		

Step	Procedure	Points
10	Dislocate the electrical box to the left and unfasten the back hook.	■ The electrical box has a hook on its back.
11	Pull the electrical box out.	■ Catch the back hook of the electrical box when reassembling.
2. Remove the PCBs.		
1	Remove the screw on the electrical box.	■ Screw: M4 × 16
2	Pull the shield plate and release the hook.	■ The shield plate also has 2 hooks on the upper side.

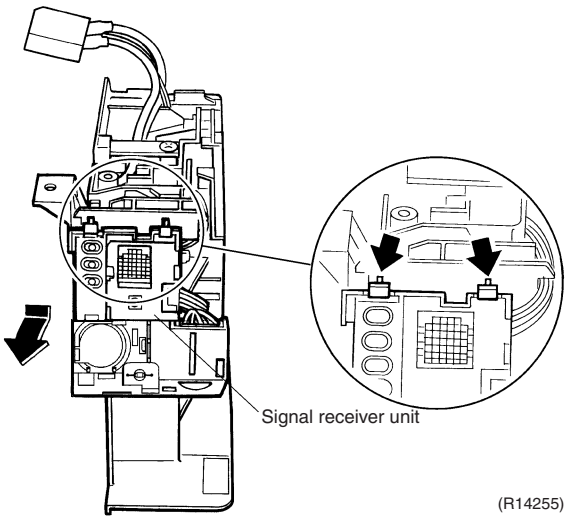
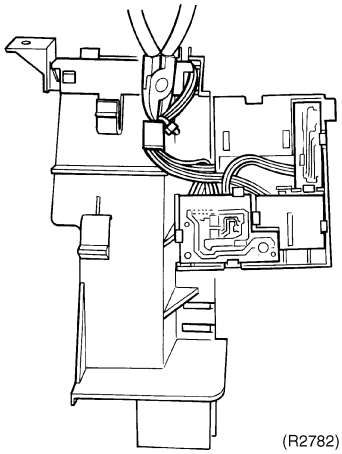
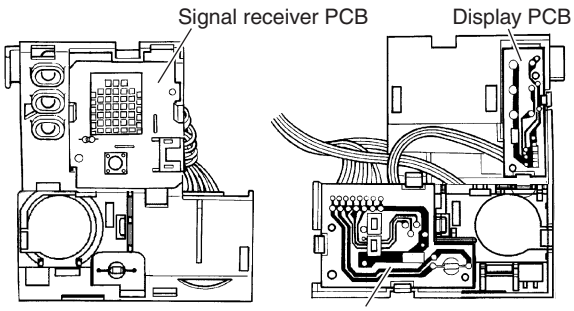
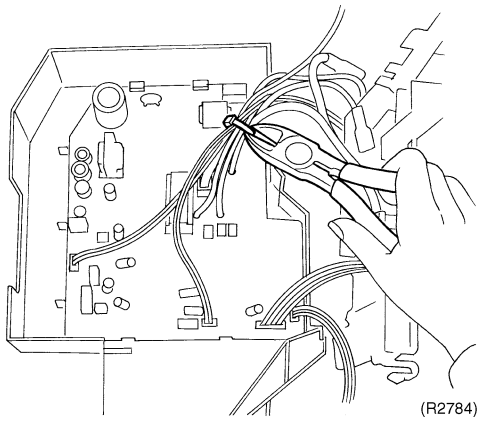

(R2777)


(R2778)

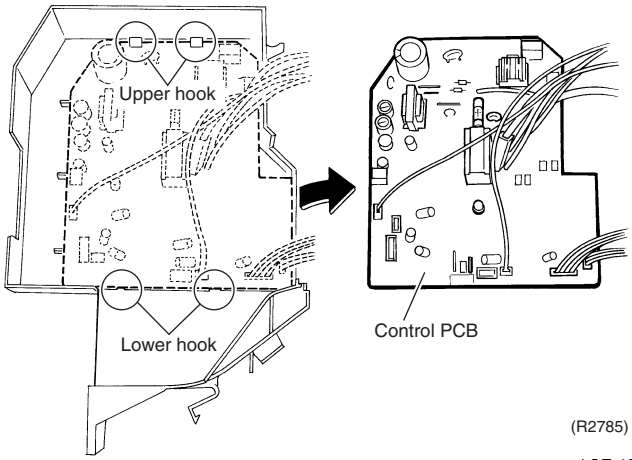

(R2779)



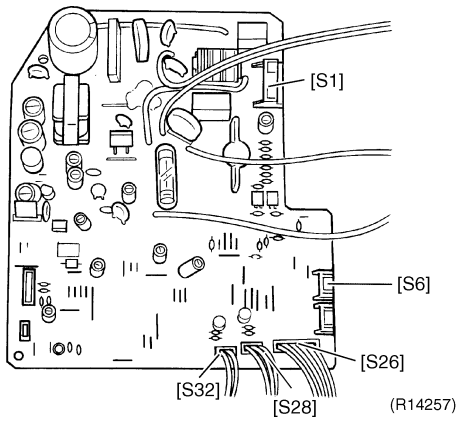
(R13224)

Step	Procedure		Points
3	Press the signal receiver unit down and unfasten the hooks on the upper side, and then unfasten the hooks on the lower side.	 (R14255)	
4	Cut the clamp.	 (R2782)	
5	The signal receiver unit has 3 PCBs. Unfasten the hooks and remove each PCB. Disconnect every connector from each PCB.	 (R14256)	■ Remove the signal receiver unit while pushing the hooks of connectors.
6	Cut the clamp.	 (R2784)	

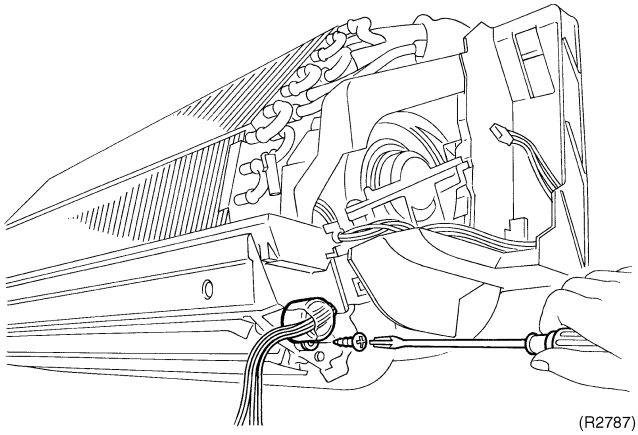
Step	Procedure	Points
7	Unfasten the 2 hooks on the lower side, and then the 2 hooks on the upper side. Remove the control PCB.	[S1]: DC fan motor [S6]: swing motor for horizontal blades [S26]: buzzer PCB [S28]: signal receiver PCB [S32]: indoor heat exchanger thermistor ■ Refer to page 7 for detail.
3.	Remove the swing motor for horizontal blades.	
1	Remove the screw of the swing motor.	
2	Remove the swing motor.	

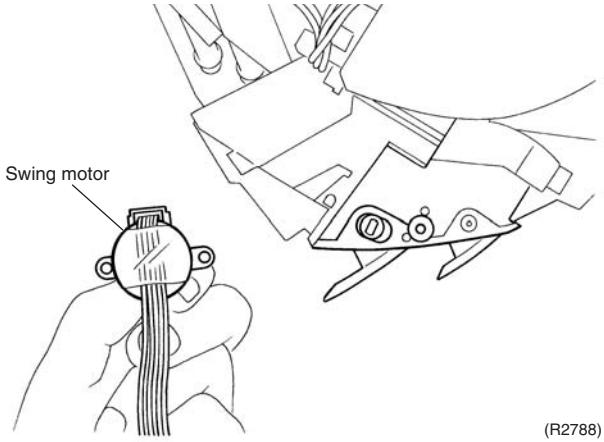


(R2785)



(R14257)


(R2787)

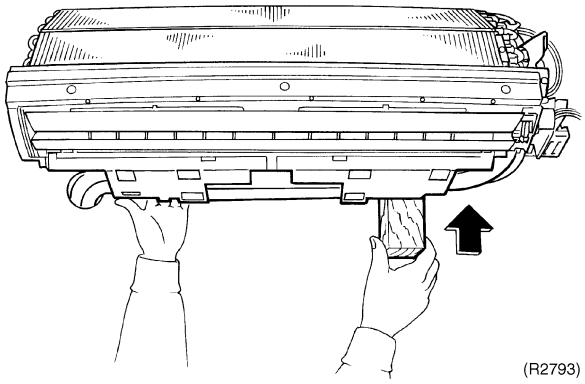
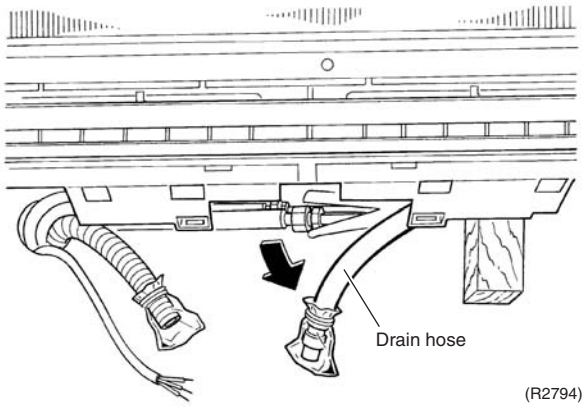
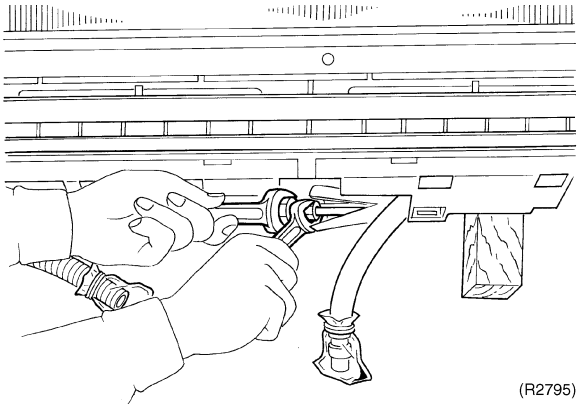
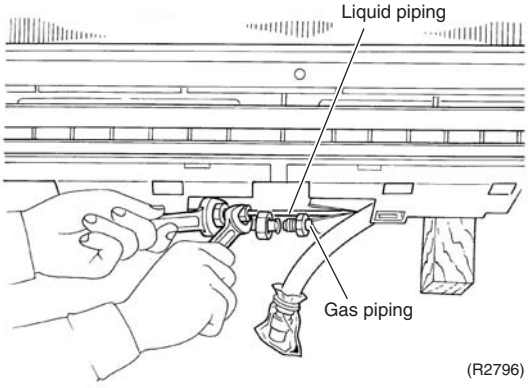


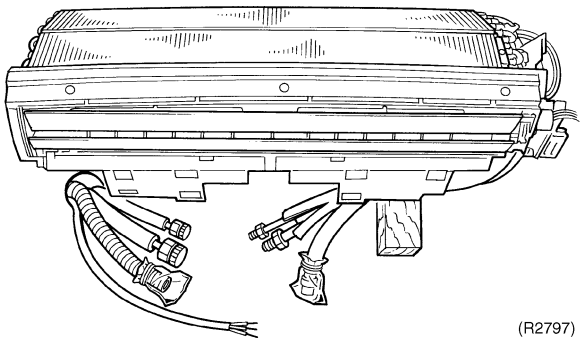
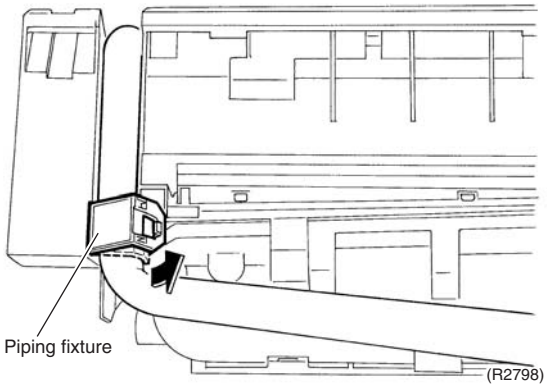
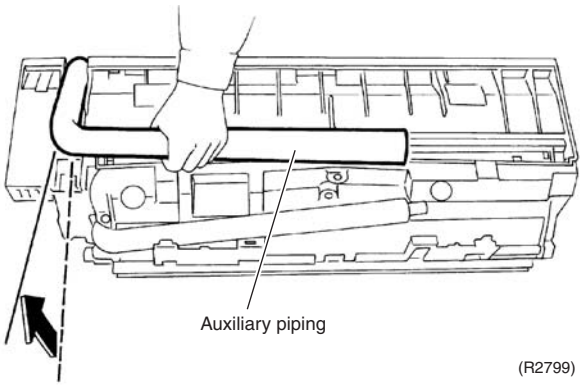
(R2788)

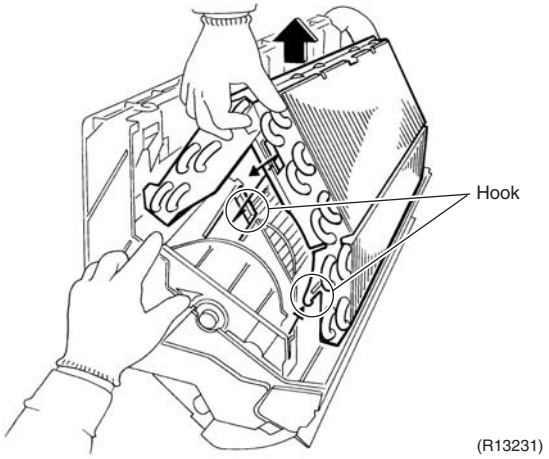
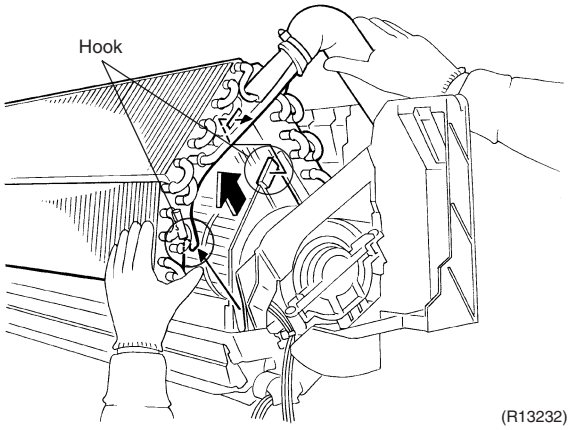
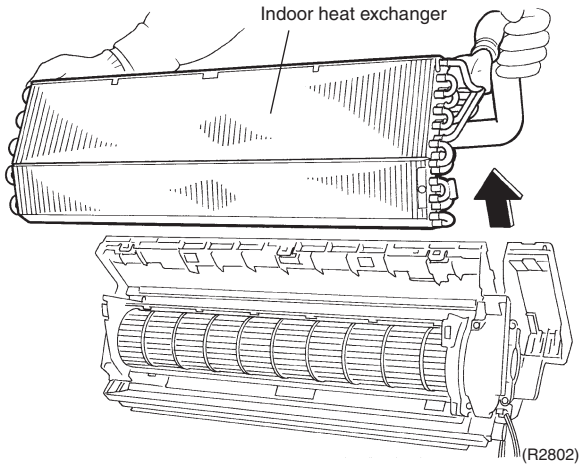
1.5 Removal of Indoor Heat Exchanger

Procedure

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

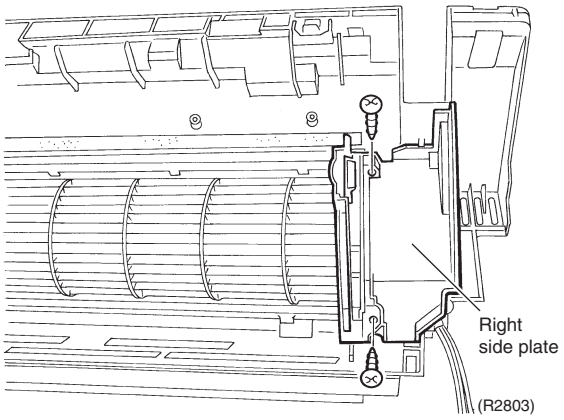
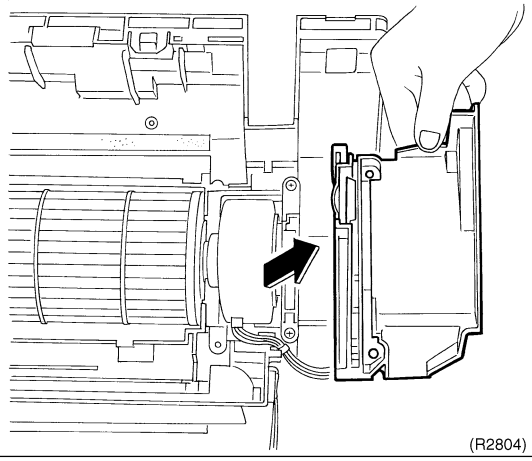
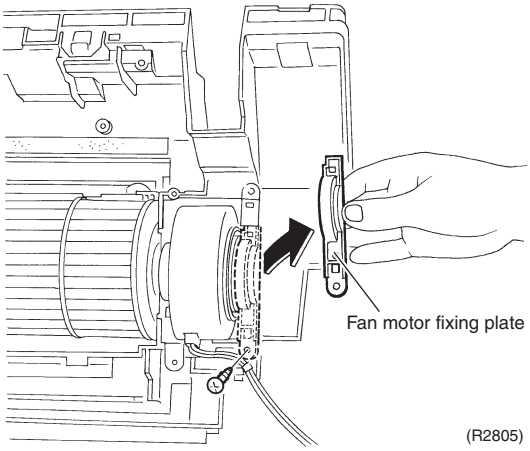
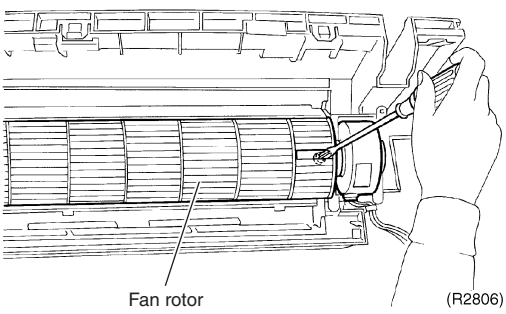
Step	Procedure		Points
1. Disconnect the refrigerant piping.			**Preparation** ■ Remove the electrical box according to the “Removal of Electrical Box / PCBs / Swing Motors”.
1	Hold the indoor unit up with a piece of wood etc.	 (R2793)	**Caution** **If the refrigerant leaks, repair the spot of leaking, then collect all refrigerant from the unit. After conducting vacuum drying, recharge proper amount of refrigerant.**
2	Pull out the drain hose.	 (R2794)	**Caution** **In pump-down work, be sure to stop the compressor before disconnecting the refrigerant pipe. If the refrigerant pipe is disconnected with the compressor operating and the stop valve open, air may be sucked in and may generate an over-pressure in refrigeration cycle, thus resulting in pipe rupture or accidental injury.**
3	Unscrew the flare nut for gas piping with 2 wrenches.	 (R2795)	■ Place a plastic sheet under the drain pan to prevent from wetting the floor with remaining drain. ■ If the drain hose is embedded in the wall, disconnect the drain hose beforehand. ■ Carry out the removal works with 2 wrenches. ■ When the pipings are disconnected, protect both the openings of pipe and unit from entering of moisture.
4	Unscrew the flare nut for liquid piping with 2 wrenches.	 (R2796)	

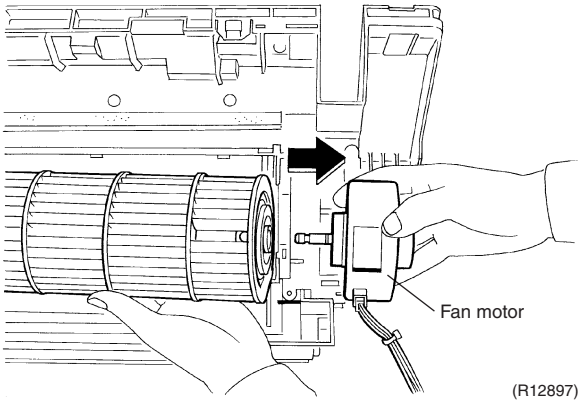
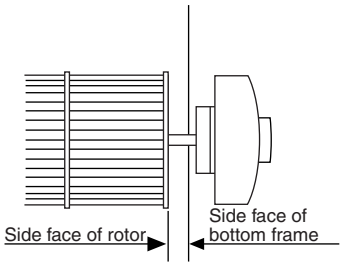
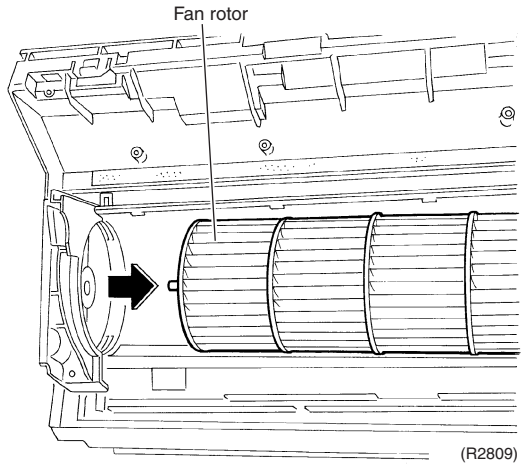
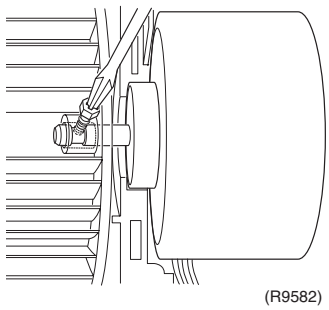
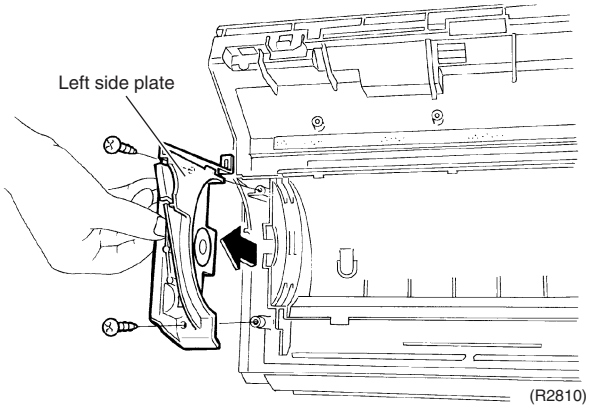
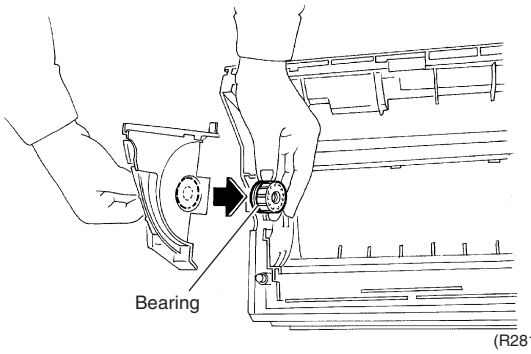
Step	Procedure	Points
2. Remove the indoor unit.		
1 Remove the indoor unit from the installation plate.	 (R2797)	
3. Remove the indoor heat exchanger.		
1 Unfasten the hook of the piping fixture at the back of the indoor unit and pull out the piping.	 Piping fixture (R2798)	
2 Widen the auxiliary piping to the extent of 10° ~ 20°.	 Auxiliary piping (R2799)	

Step	Procedure		Points
3	Unfasten the hooks on the left side.		**Caution** **When removing or reassembling the indoor heat exchanger, be sure to wear protective gloves or wrap the indoor heat exchanger with cloths. (You may be injured by the fins.)**
4	Push the hooks on the right side and unfasten them.		
5	Pull the indoor heat exchanger to the front side and unfasten the hooks completely, and then lift it.		

1.6 Removal of Fan Motor / Fan Rotor

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

Step	Procedure	Points
1. Remove the right side plate.		
1 Remove the 2 screws.		■ You can remove the fan rotor without detaching the right side plate.
2 Lift the right side plate and remove it.		
2. Remove the fan motor and rotor.		
1 Remove the screw and remove the fan motor fixing plate.		
2 Remove the screw of the fan rotor.		

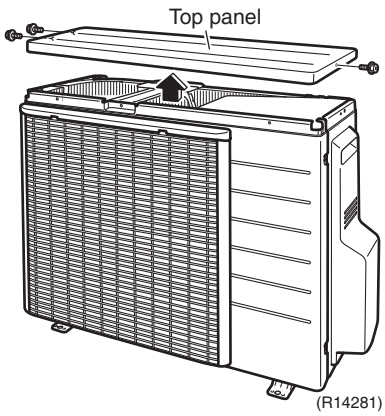
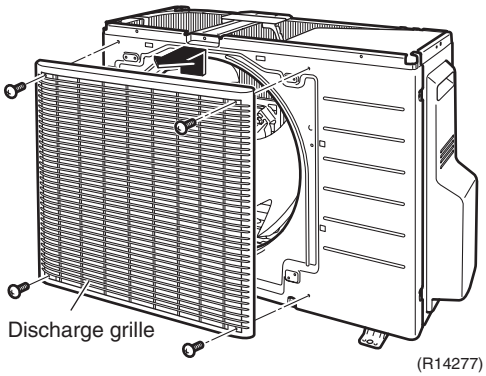
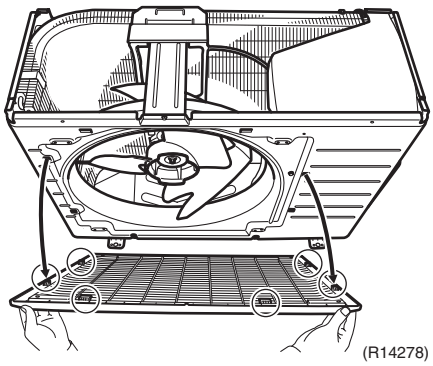
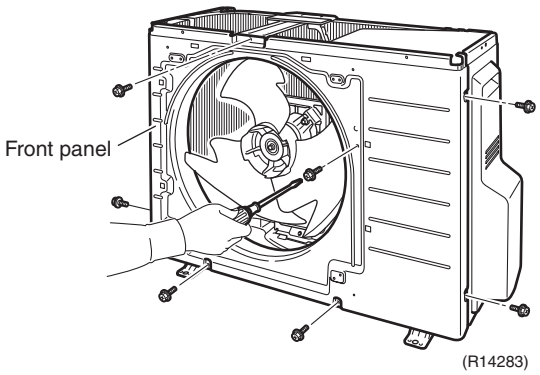
Step	Procedure		Points
3	Remove the fan motor.	 (R12897)	■ When reassembling the fan motor and the fan rotor, provide as much as 5 mm of play between the side face of the rotor and the bottom frame.  (R2808)
4	Remove the fan rotor.	 (R2809)	 (R9582) (1) Insert the fan motor with approx. 5 mm left. (2) Tighten the screw until it stops. Then give the screw one more turn. (3) Rotate the fan rotor and confirm the fan motor and the fan rotor are installed appropriately. (4) Tighten the screw completely if appropriate. (5) If not appropriate, go back to (1).
5	Remove the 2 screws and remove the left side plate.	 (R2810)	
6	The bearing is made of rubber. Push it inward and remove it.	 (R2811)	

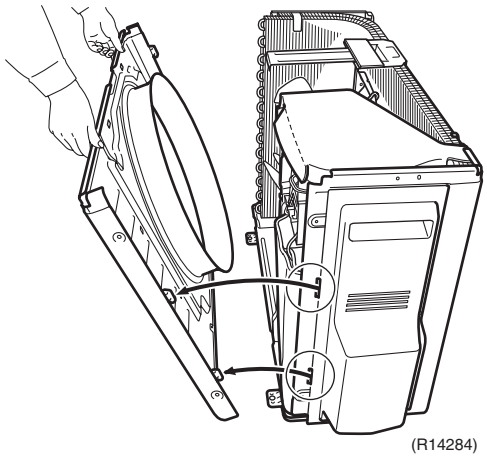
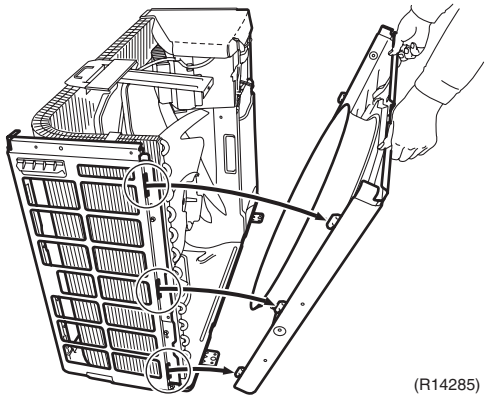
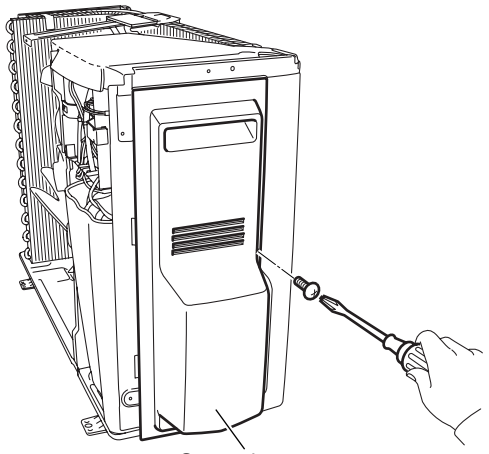
2. Outdoor Unit

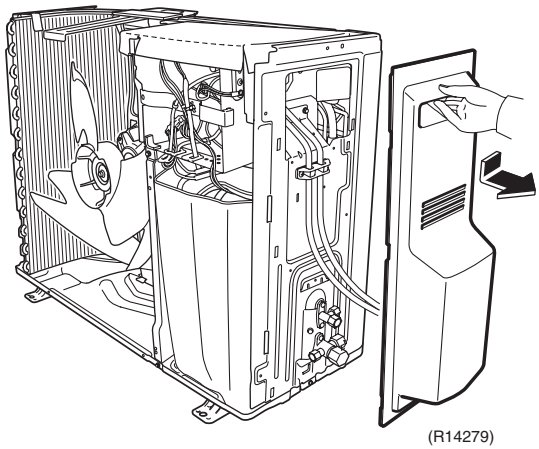
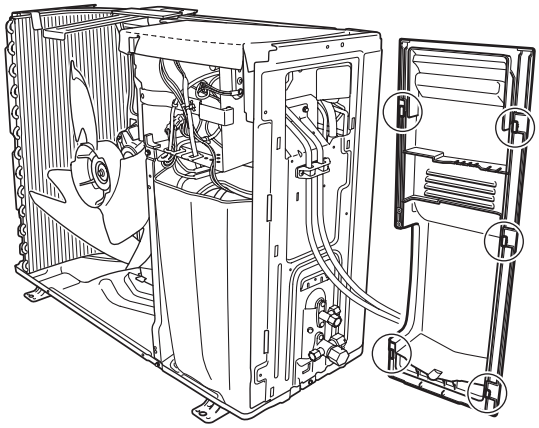
2.1 Removal of Outer Panels

Procedure

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

Step	Procedure		Points
1	Remove the 3 screws and lift the top panel.	 (R14281)	■ Take care not to cut your finger by the fins of the outdoor heat exchanger.
2	Remove the 4 screws and remove the discharge grille.	 (R14277)	■ Slide the discharge grille upwards and remove it.
		 (R14278)	■ The discharge grille has 6 hooks.
3	Remove the 7 screws of the front panel.	 (R14283)	

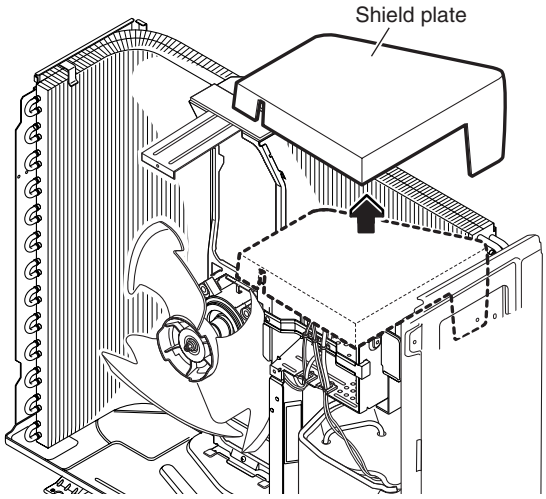
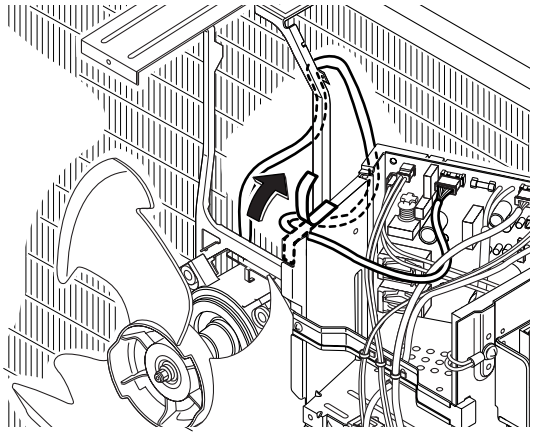
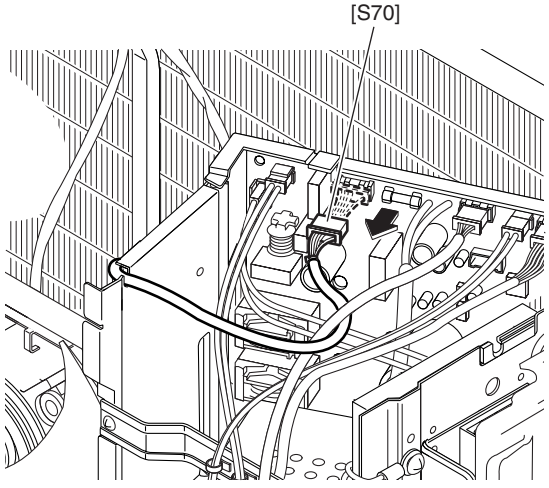
Step	Procedure		Points
4	Unfasten the right side hooks.	 (R14284)	
5	Unfasten the left side hooks. Remove the front panel.	 (R14285)	■ When reassembling, fit the left side of the front panel first.
6	Remove the screw of the stop valve cover.	 Stop valve cover (R14286)	

Step	Procedure	Points
7	Pull down the stop valve cover to unfasten the hooks and remove it.  (R14279)  (R14280)	■ The stop valve cover has 5 hooks.

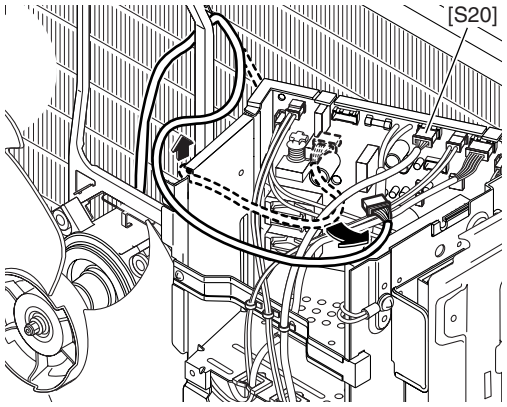
2.2 Removal of Outdoor Fan / Fan Motor

Procedure

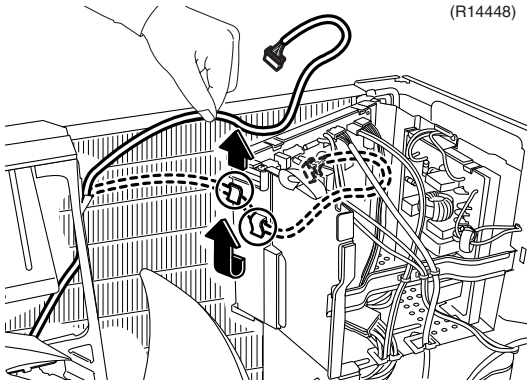
Warning **Be sure to wait for 10 minutes or more after turning off all power supplies before disassembling work.**

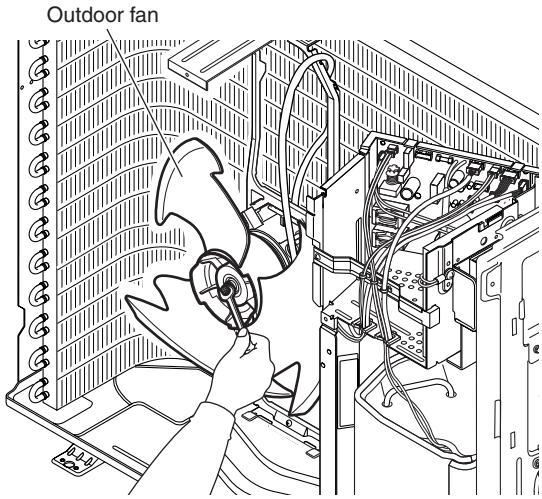
Step	Procedure		Points
1	Remove the shield plate.	 (R14287)	**Preparation** ■ Remove the top panel and the front panel according to the “Removal of Outer Panels”. ■ This procedure is not necessary to remove the outdoor fan only.
2	Peel off the filament tape.	 (R14288)	
3	Disconnect the connector for the fan motor [S70].	 (R14289)	

Step	Procedure	Points
4	Release the fan motor lead wire from the groove and the 2 hooks of the partition plate.	■ The harnesses of [S70] and [S20] cross each other.
5	Remove the nut of the outdoor fan.	■ Nut size: M6
		■ When reassembling, align ▼ mark of the outdoor fan with D-cut section of the motor shaft.

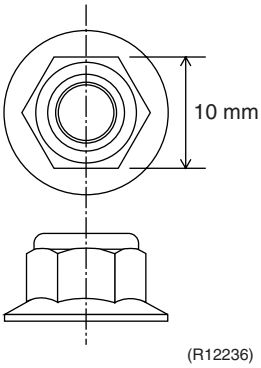


(R14448)

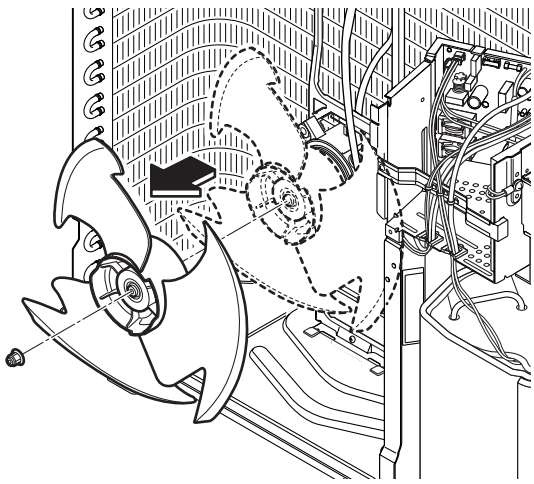

(R14304)

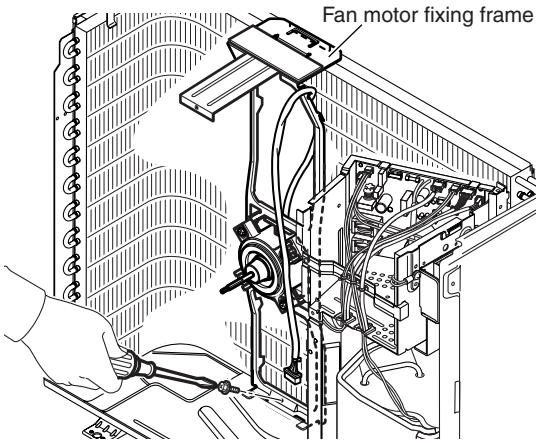
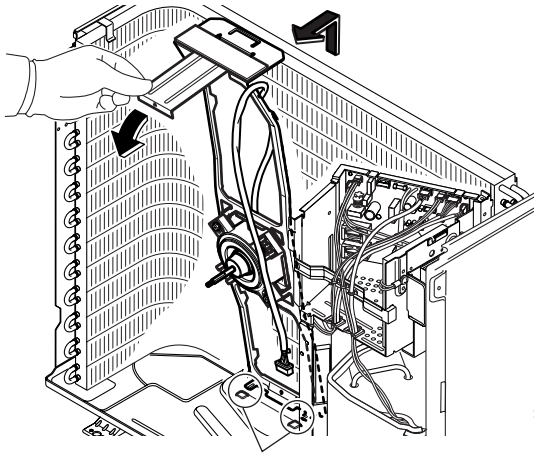
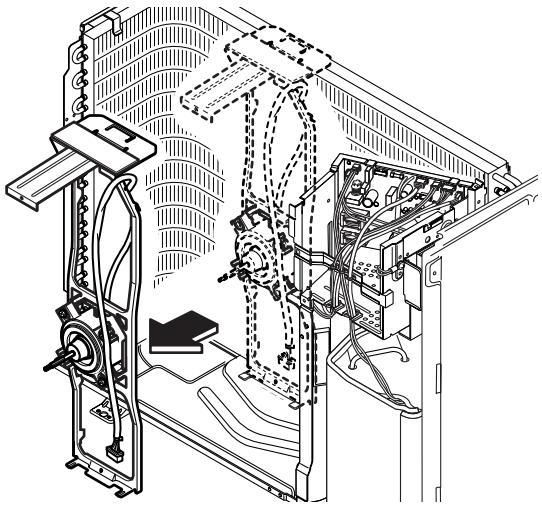


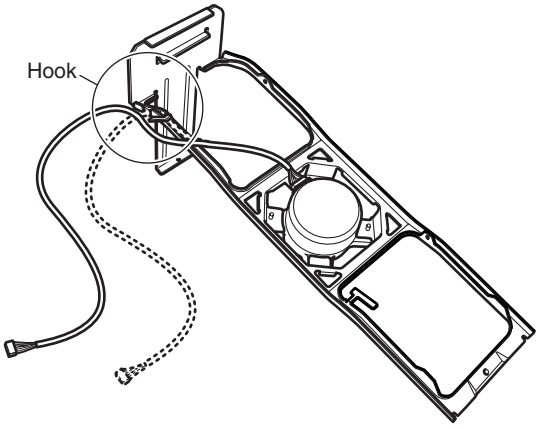
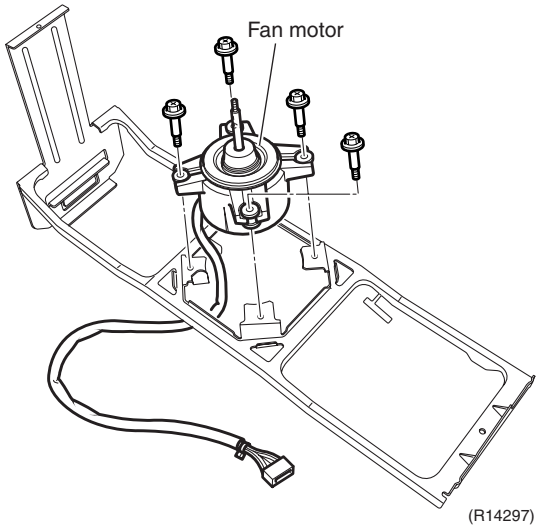
(R14291)



(R12236)


(R14292)

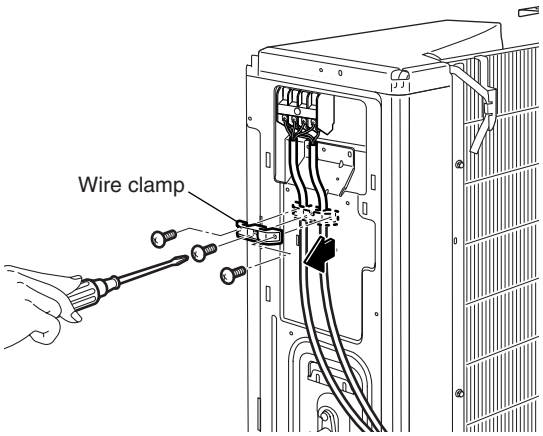
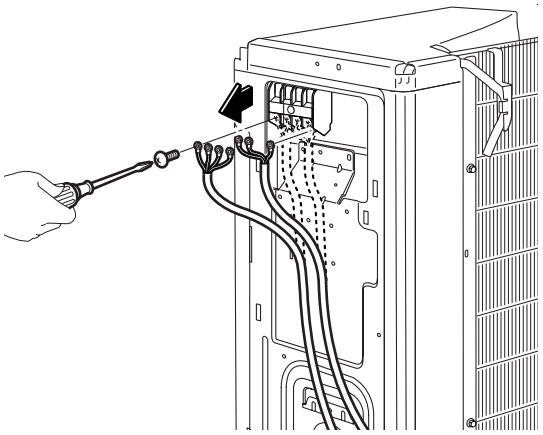
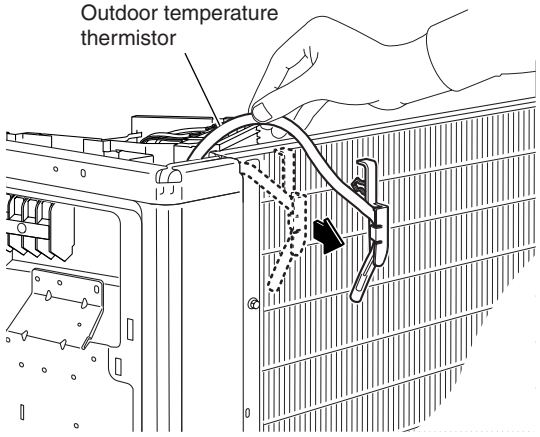
Step	Procedure		Points
6	Remove the screw of the fan motor fixing frame.	 (R14293)	
7	Pull down the fan motor fixing frame to unfasten the 2 hooks at the bottom.	 (R14294)	
8	Remove the fan motor fixing frame.	 (R14295)	

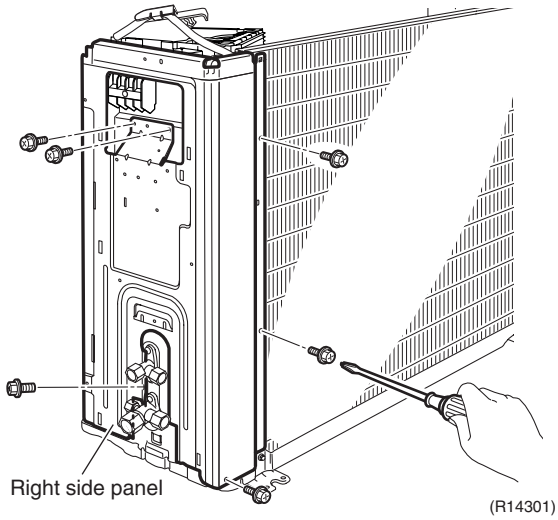
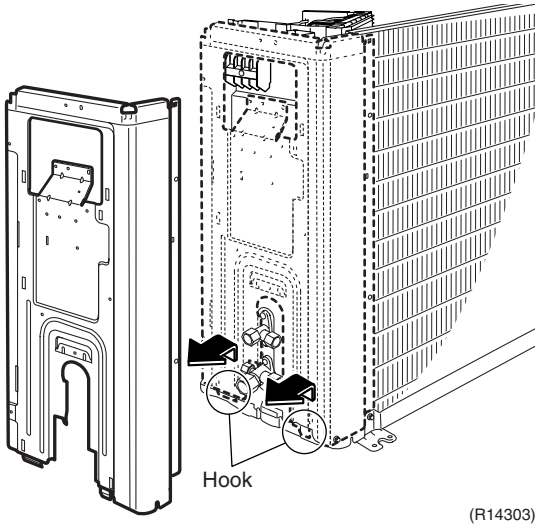
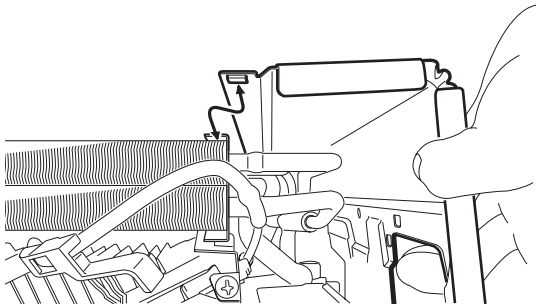
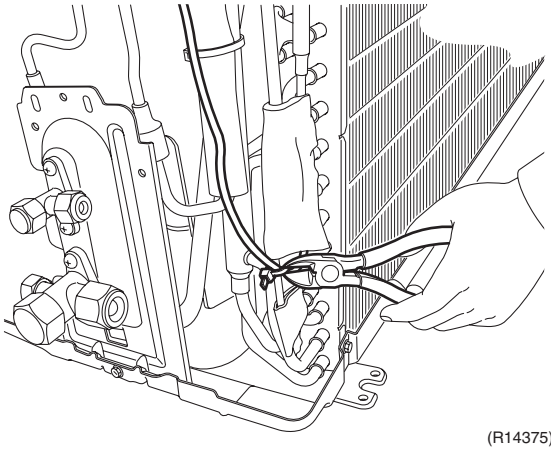
Step	Procedure		Points
9	Open the hook and release the fan motor lead wire.	 (R14296)	
10	Remove the 4 screws and remove the fan motor.	 (R14297)	

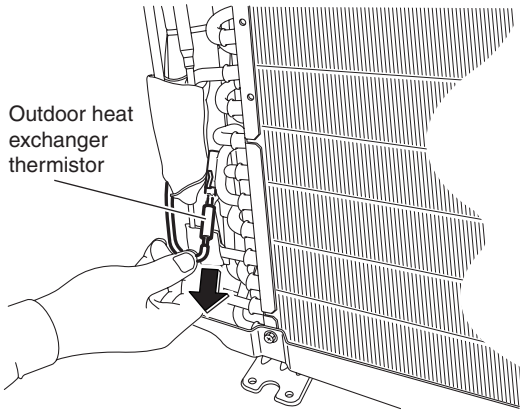
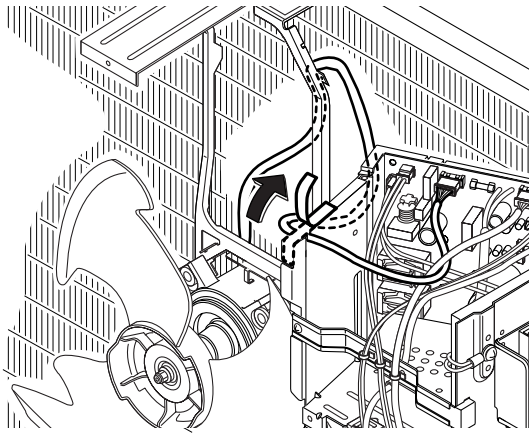
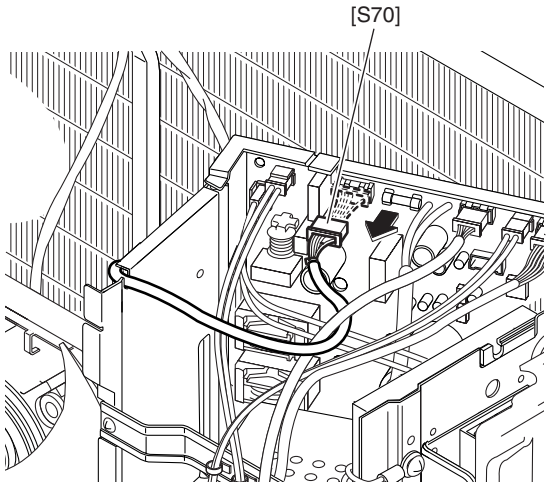
2.3 Removal of Electrical Box

Procedure

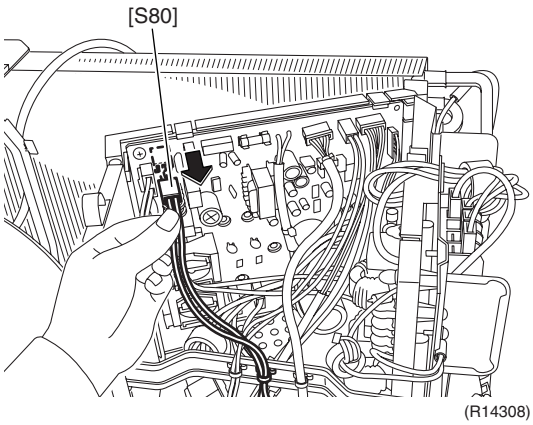
Warning **Be sure to wait for 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1	Remove the 3 screws and remove the wire clamp.	 (R14298)	
2	Remove the screws and remove the connecting wires.	 (R14299)	
3	Pull out the outdoor temperature thermistor.	 (R14300)	

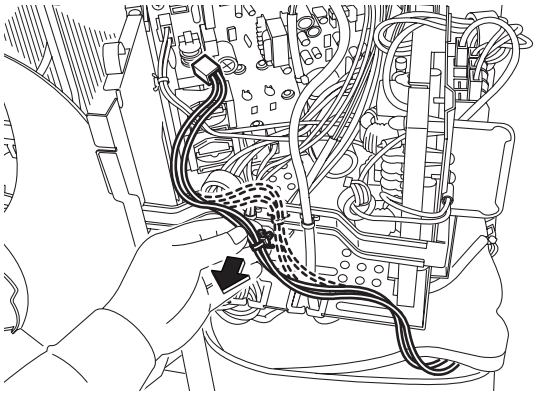
Step	Procedure		Points
4	Remove the 6 screws of the right side panel.	 (R14301)	
5	Unfasten the 2 lower hooks and the 1 upper hook. Remove the right side panel.	 (R14303)	■ When reassembling, insert the 2 lower hooks and the 1 upper hook of the back.
		 (R14302)	
6	Cut the clamp.	 (R14375)	

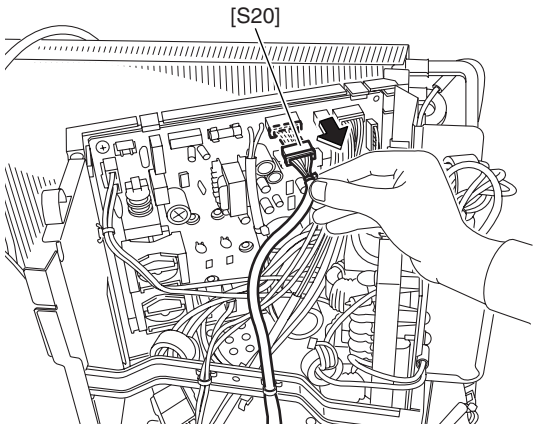
Step	Procedure	Points
7	Pull out the outdoor heat exchanger thermistor.  (R14376)	
8	Peel off the filament tape.  (R14288)	
9	Disconnect the connector for the fan motor [S70].  (R14289)	

Step	Procedure	Points
10	Disconnect the connector for the four way valve coil [S80].	
11	Pull out the clamp.	
12	Disconnect the connector for the electronic expansion valve coil [S20].	
13	Pull out the clamp.	

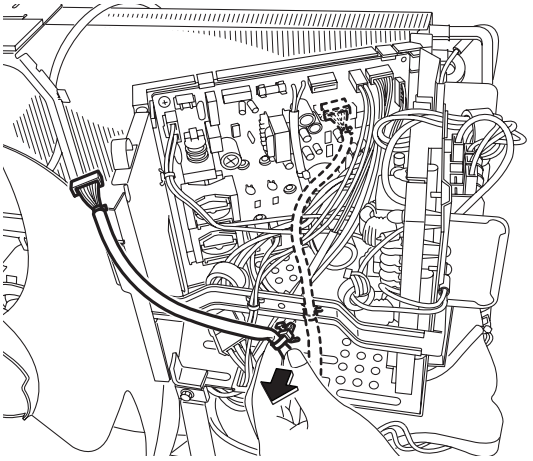


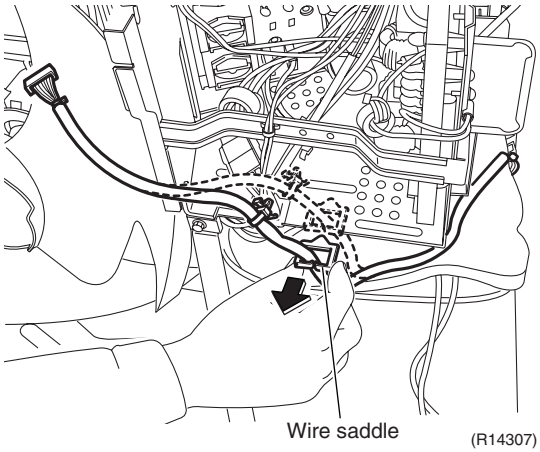
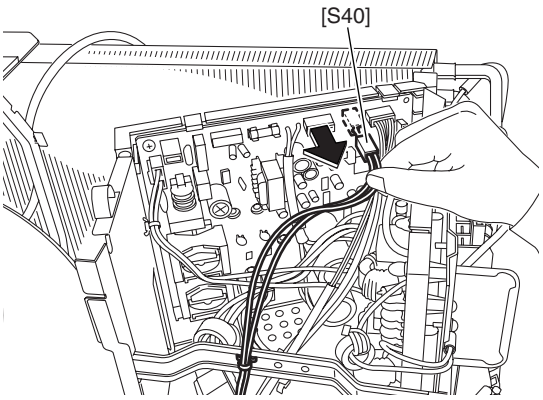
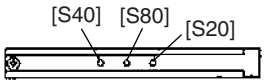
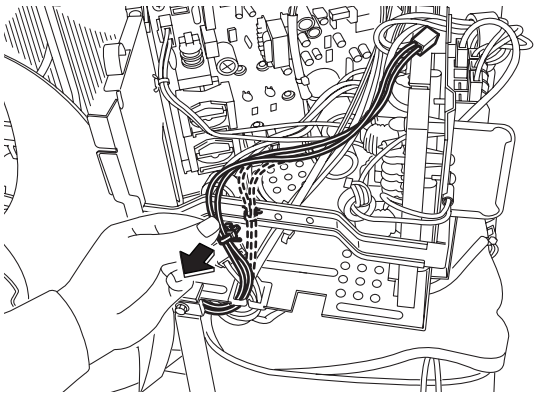
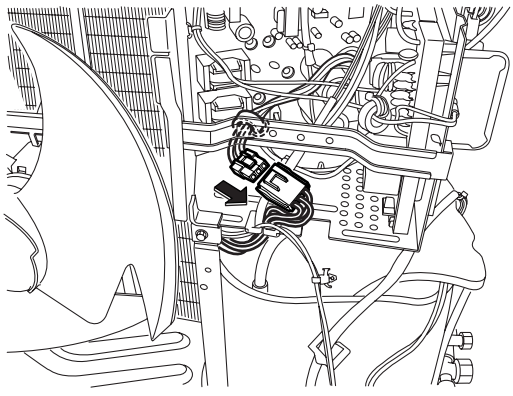
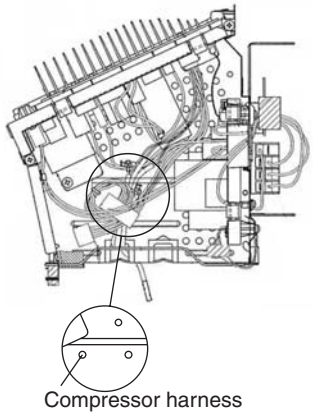
(R14308)

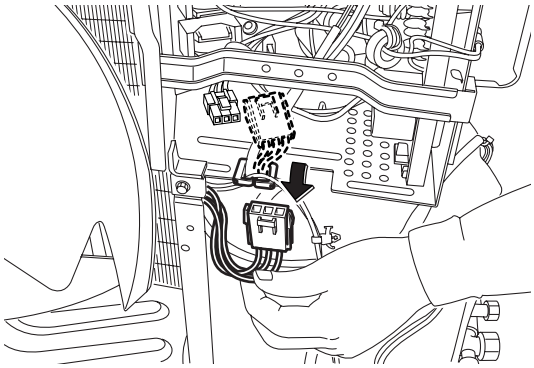
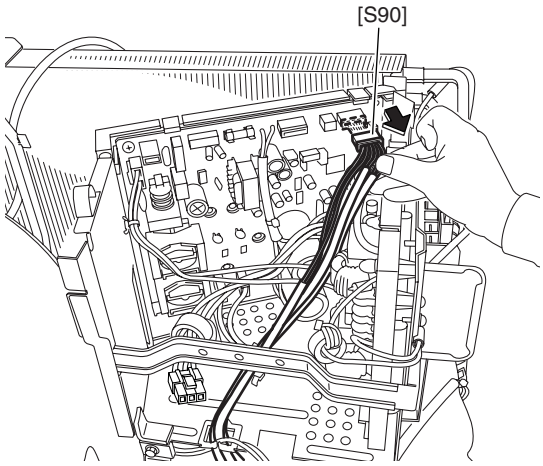
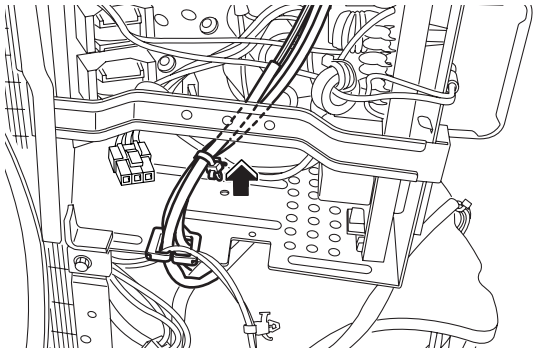
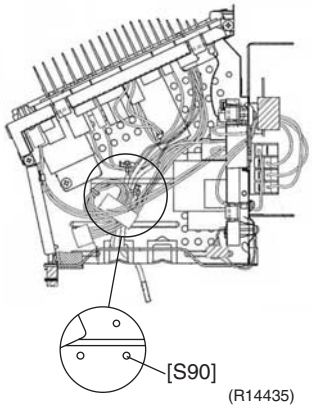
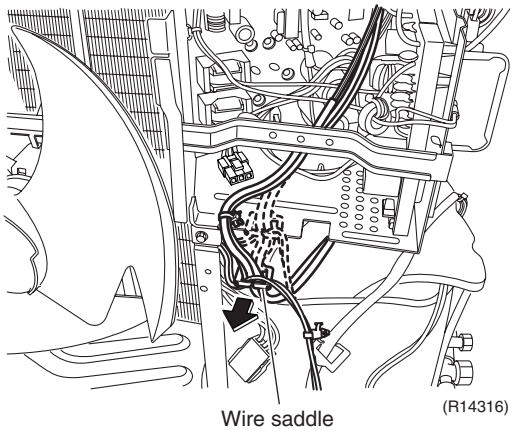

(R14309)

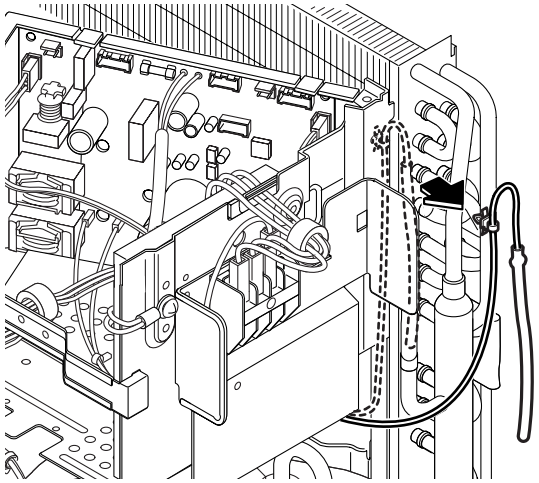
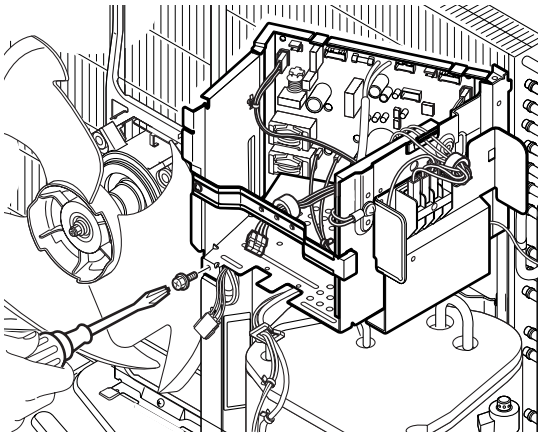
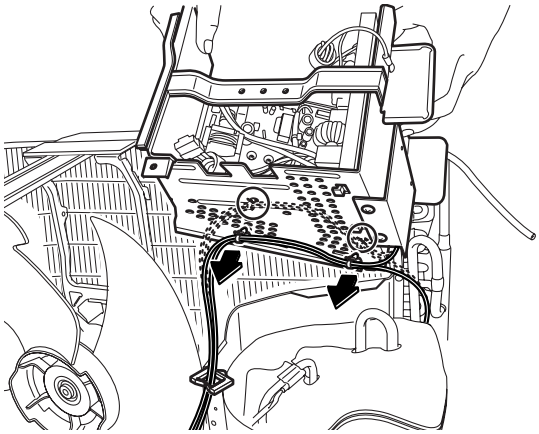
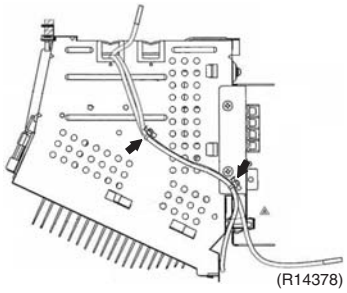


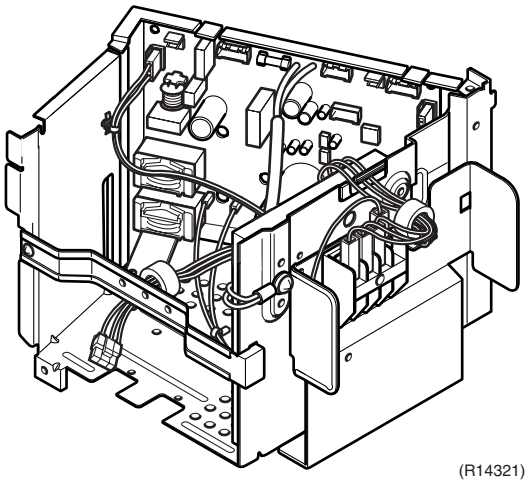
(R14305)


(R14306)

Step	Procedure		Points
14	Remove the wire saddle.	 (R14307)	
15	Disconnect the connector for the overload protector [S40].	 (R14310)	■ Insert the clamps of harnesses as below.  (R14363)
16	Pull out the clamp.	 (R14311)	■ When reassembling, connect the connectors in the following order. (1) [S40] (2) [S20] (3) [S80] (4) [S70]
17	Disconnect the relay connector for the compressor.	 (R14312)	■ The compressor harness has a clamp. When reassembling, insert the clamp as below.  (R14434)

Step	Procedure	Points
18	Release the harness of the relay connector from the wire saddle.  (R14313)	
19	Disconnect the connector for the thermistor [S90].  (R14314)	
20	Pull out the clamp.  (R14315)	■ When reassembling, insert the clamp as below.  (R14435)
21	Remove the wire saddle.  (R14316)	

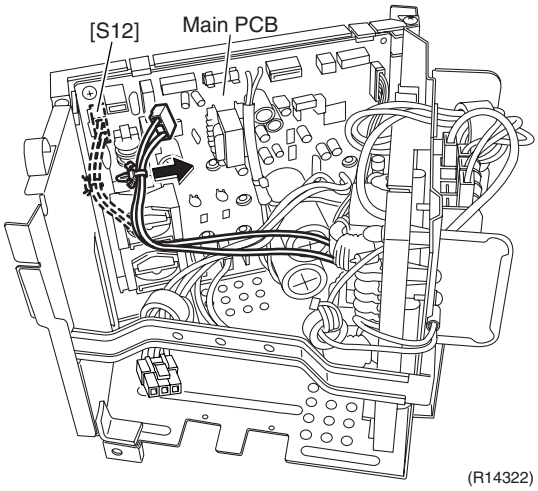
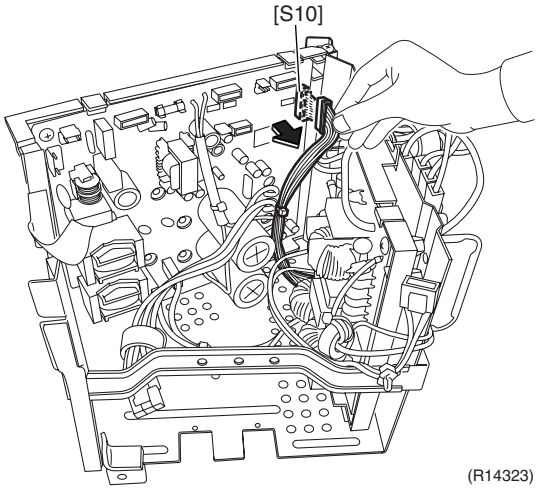
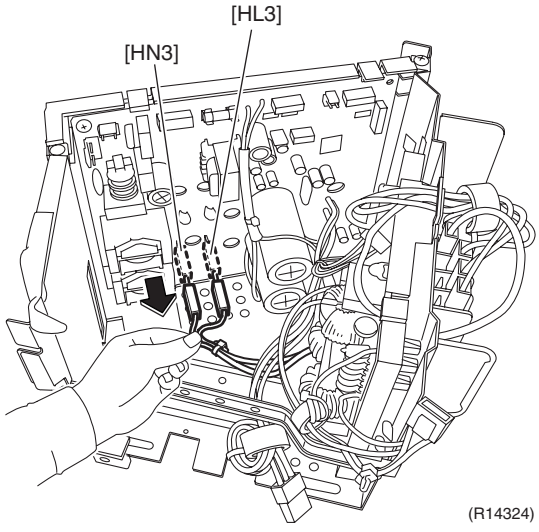
Step	Procedure		Points
22	Pull out the clamp.	 (R14317)	
23	Remove the screw.	 (R14318)	
24	Pull out the 2 clamps at the bottom of the electrical box.	 (R14320)	■ When reassembling, insert the 2 clamps of the thermistor ASSY into the holes as below.  (R14378)

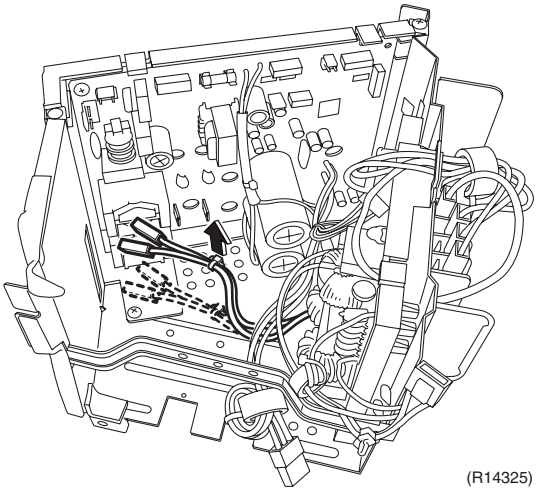
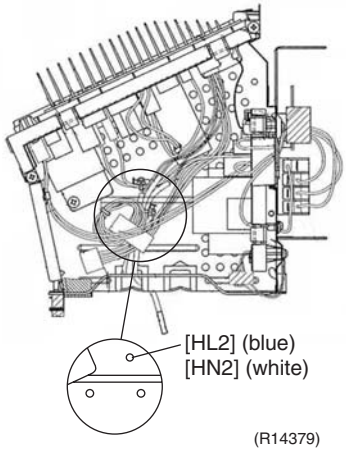
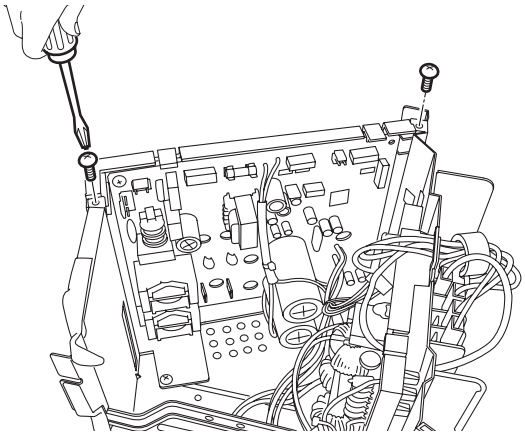
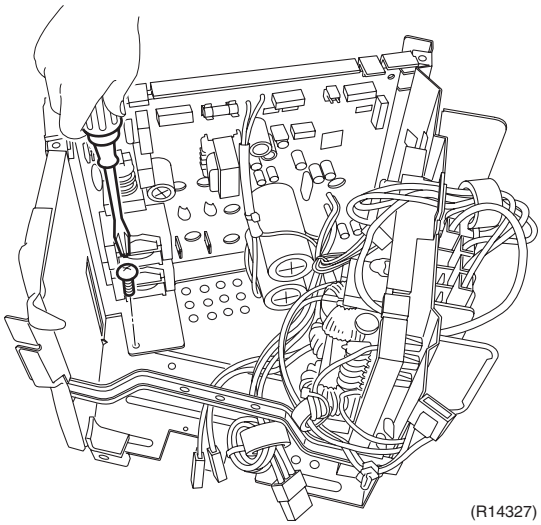
Step	Procedure		Points
25	Remove the electrical box.	 (R14321)	

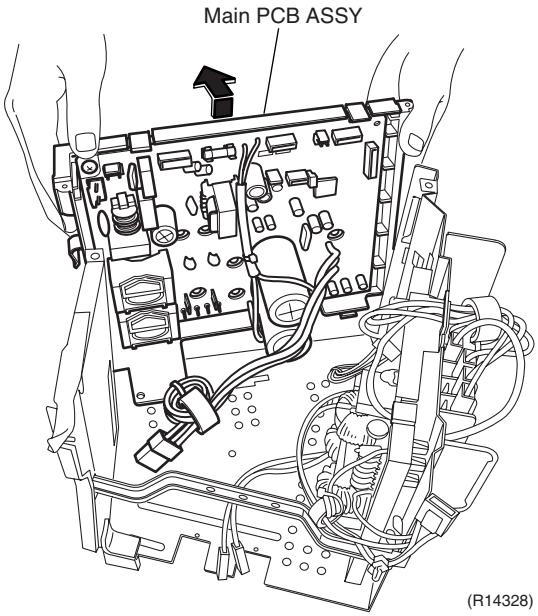
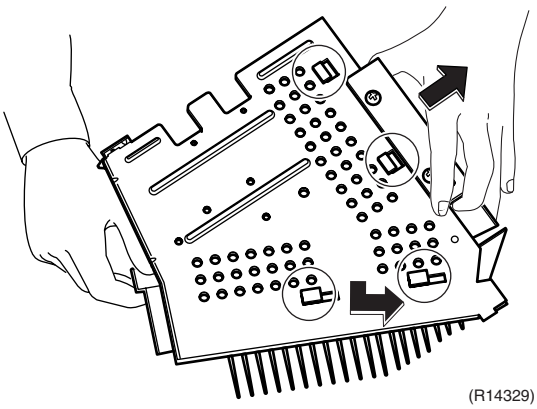
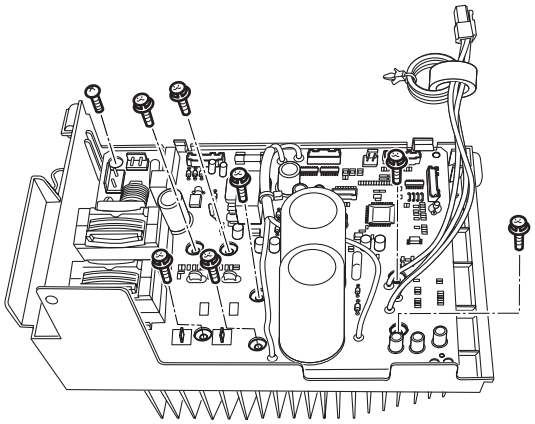
2.4 Removal of PCBs

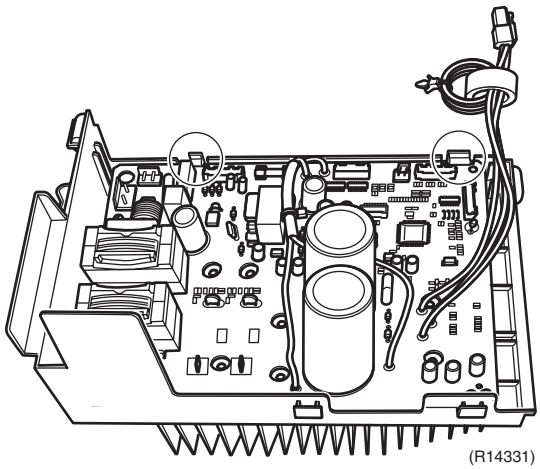
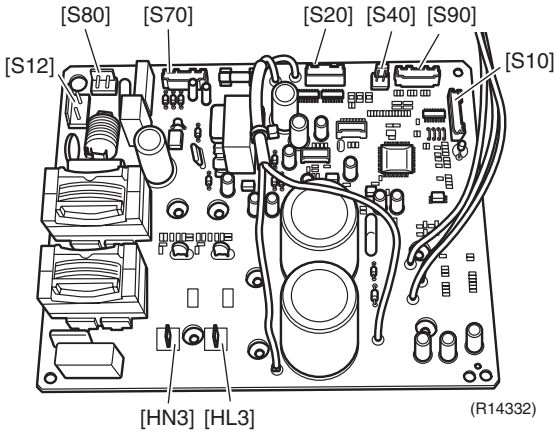
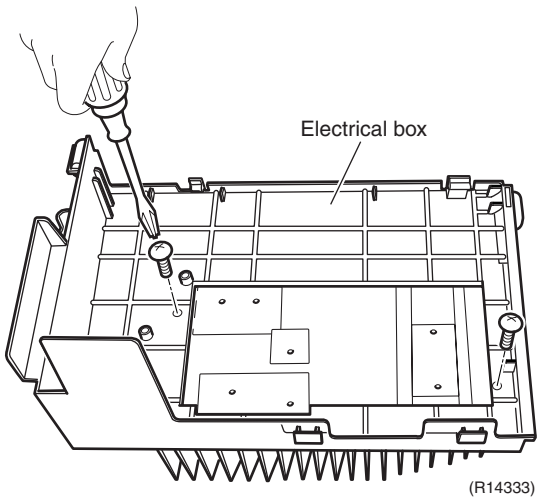
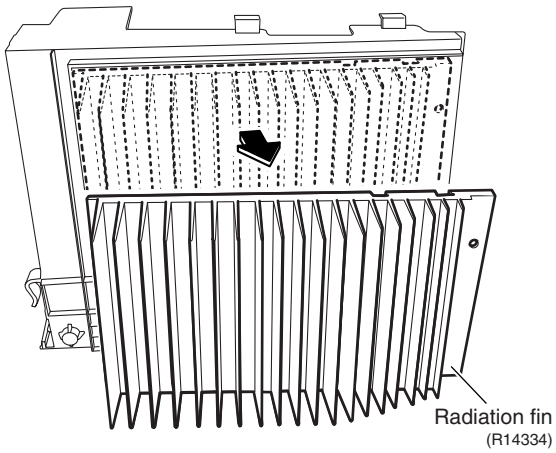
Procedure

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

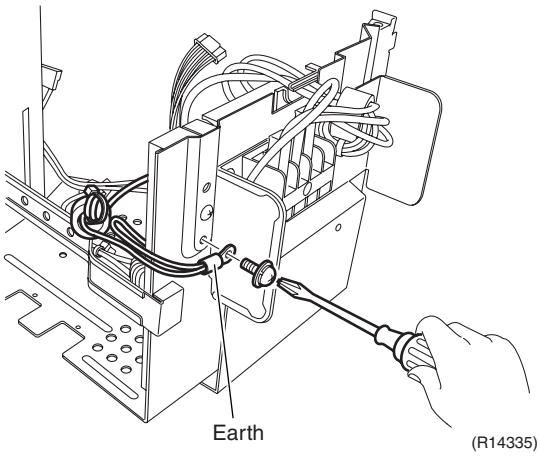
Step	Procedure	Points
1. Remove the main PCB.		[S12]: for [HL4] [HN4] on filter PCB
1 Disconnect the connector [S12] and pull out the clamp.		
2 Disconnect the connector [S10].		[S10]: for [S11] on filter PCB
3 Disconnect the connectors [HN3] [HL3].		[HL3] [HN3]: for [HL2] [HN2] on filter PCB

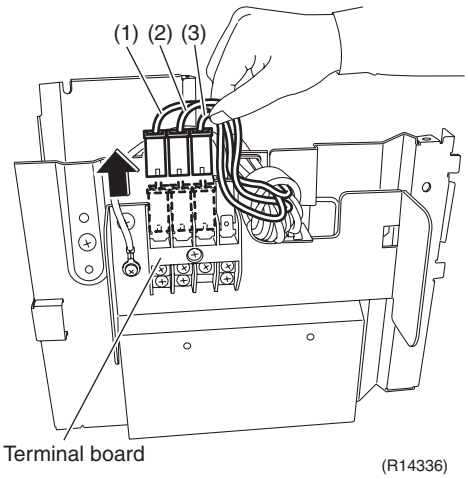
Step	Procedure		Points
4	Pull out the clamp.	 (R14325)	■ When reassembling, insert the clamp as below.  (R14379)
5	Remove the 2 upper screws.	 (R14326)	
6	Remove the 1 lower screw.	 (R14327)	

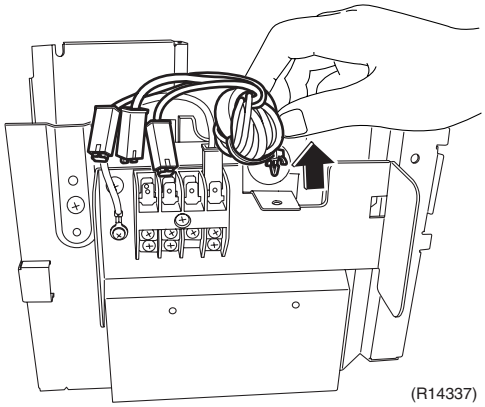
Step	Procedure	Points
7	Lift the main PCB ASSY.  (R14328)	
8	Unfasten the 4 hooks at the bottom.  (R14329)	
9	Remove the 8 screws.  (R14330)	

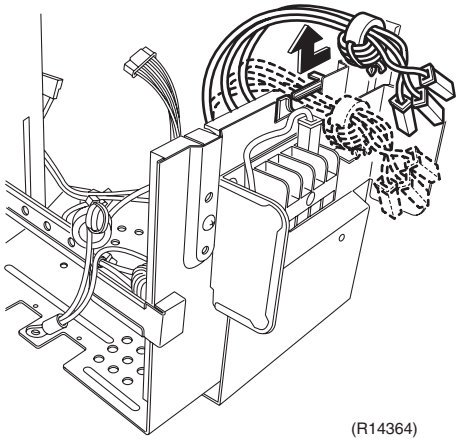
Step	Procedure		Points
10	Unfasten the 2 hooks.	 (R14331)	■ Refer to page 9 for detail.
11	Remove the main PCB.	 (R14332)	[S10]: filter PCB [S12]: filter PCB [S20]: electronic expansion valve coil [S40]: overload protector [S70]: fan motor [S80]: four way valve coil [S90]: thermistors [HL3] [HN3]: filter PCB
2. Remove the radiation fin.			
1	Remove the 2 screws on the bottom of the electrical box.	 (R14333)	
2	Remove the radiation fin.	 (R14334)	

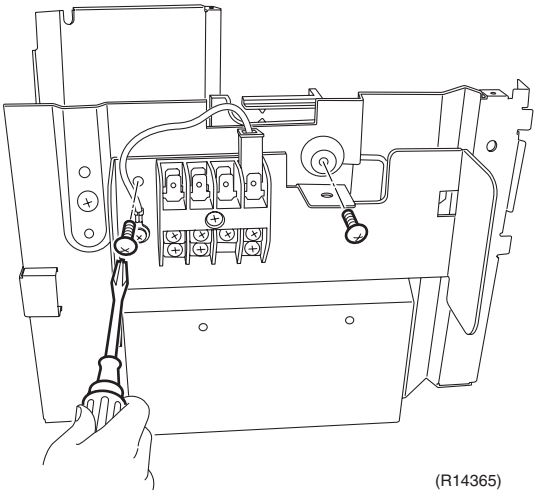
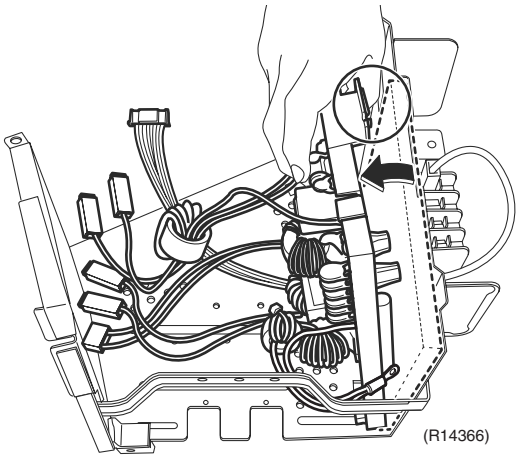
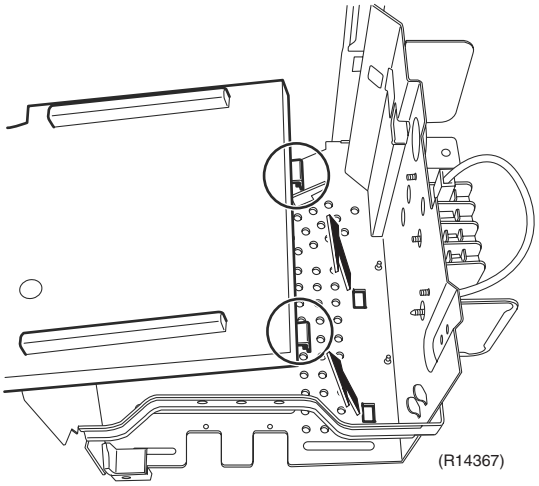
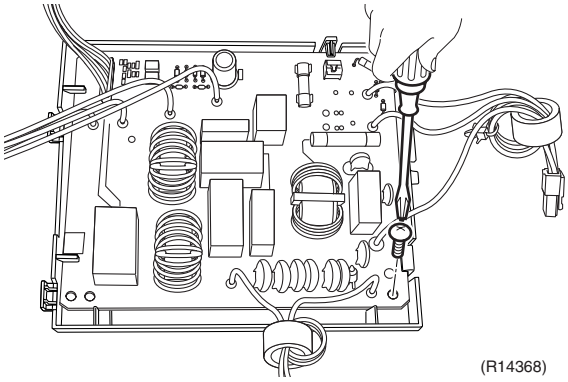
Step	Procedure	Points
3. Remove the filter PCB.		
1	Remove the earth screw.	
2	Pull out the terminals from the terminal board.	(1): black (2): white (3): red
3	Pull out the clamp.	
4	Release the harnesses from the groove.	

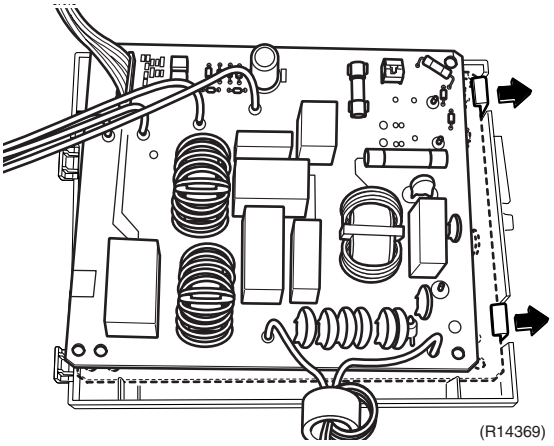
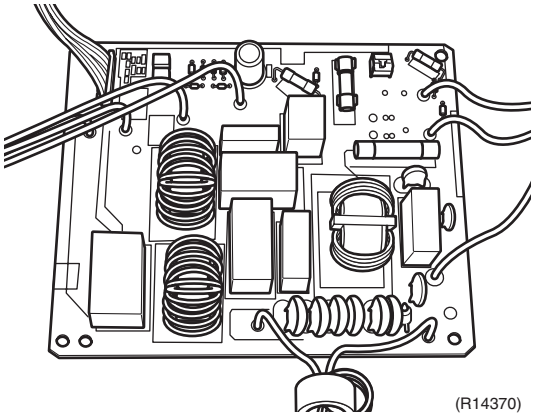








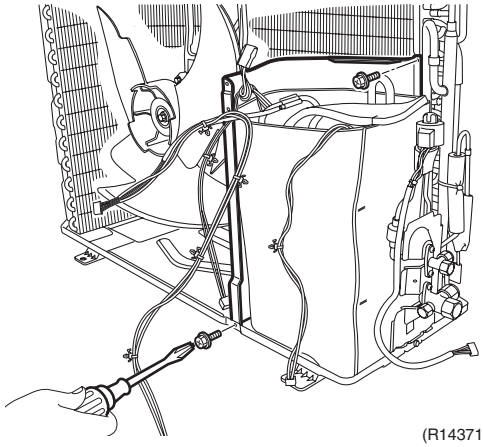
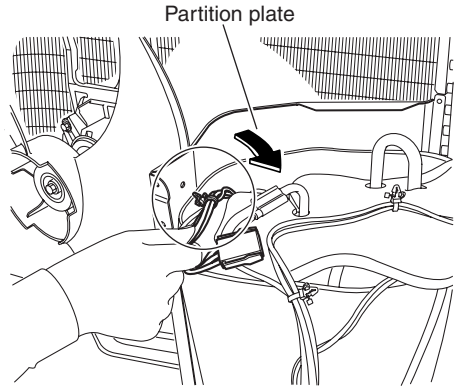
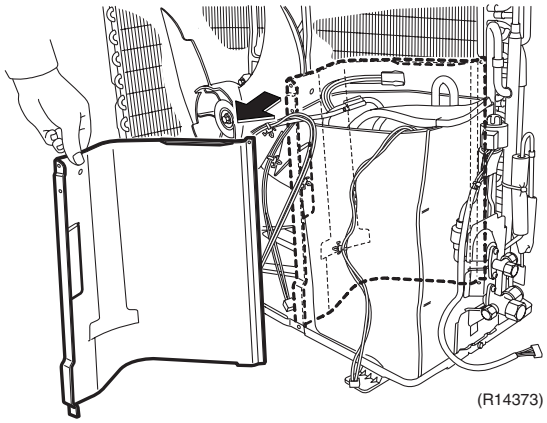
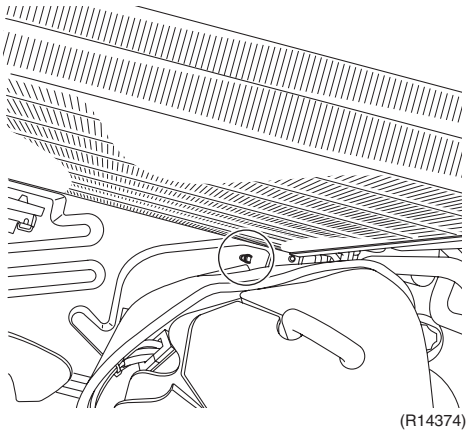
Step	Procedure	Points
5	Remove the 2 screws.  (R14365)	
6	Unfasten the 3 hooks of the filter PCB ASSY.  (R14366)	
	 (R14367)	
7	Remove the 1 screw.  (R14368)	

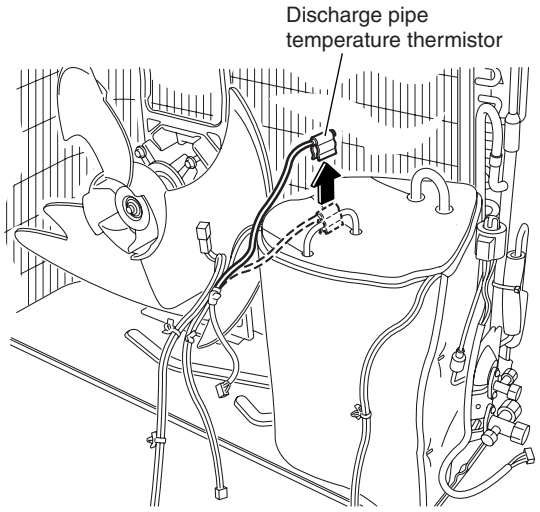
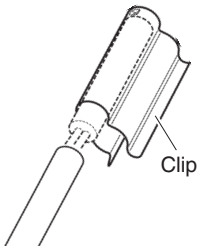
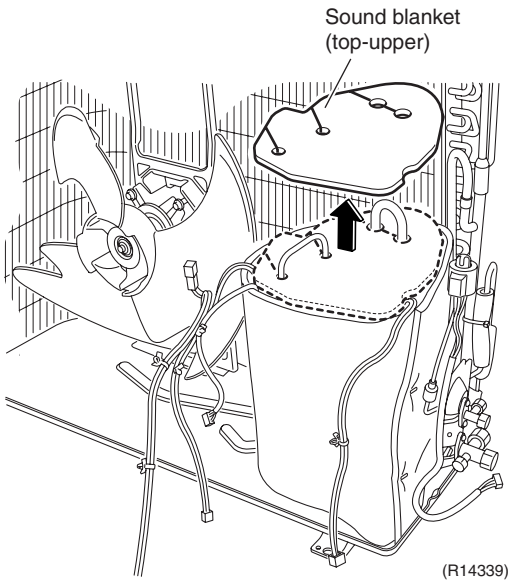
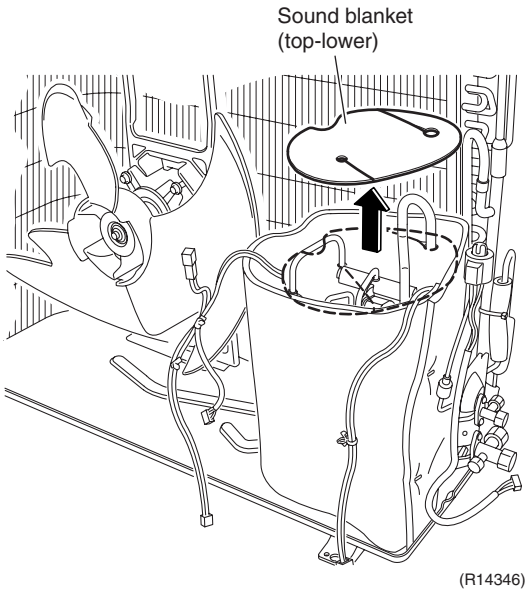
Step	Procedure		Points
8	Unfasten the 2 hooks.	 (R14369)	
9	Remove the filter PCB.	 (R14370)	■ Refer to page 9 for detail.

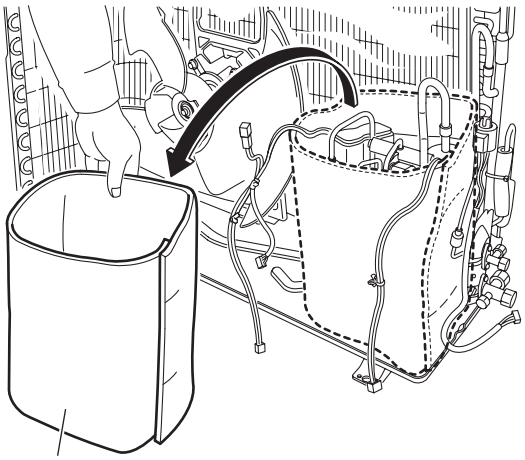
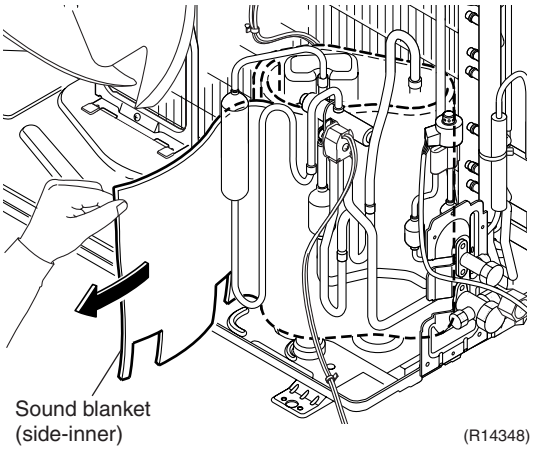
2.5 Removal of Sound Blankets

Procedure

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

Step	Procedure	Points
1. Remove the partition plate.	 (R14371)	
1 Remove the 2 screws.		
2 Pull out the clamp from the partition plate.	 (R14372)	
3 Remove the partition plate.	 (R14373)  (R14374)	■ When reassembling, insert the hook of bottom.

Step	Procedure	Points
2. Remove the sound blankets.		■ Since the piping ports are torn easily, remove the sound blanket carefully. ■ Be careful not to lose the clip for the thermistor.
1 Release the discharge pipe temperature thermistor.	 (R14338)	 (R12287)
2 Remove the sound blanket (top-upper).	 (R14339)	
3 Remove the sound blanket (top-lower).	 (R14346)	

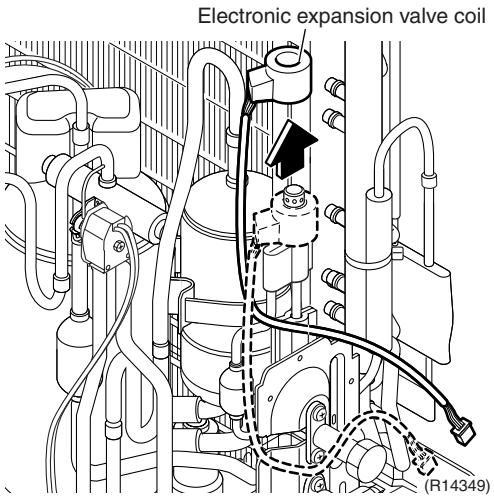
Step	Procedure	Points
4	Remove the sound blanket (side-outer).  	
5	Remove the sound blanket (side-inner).  	

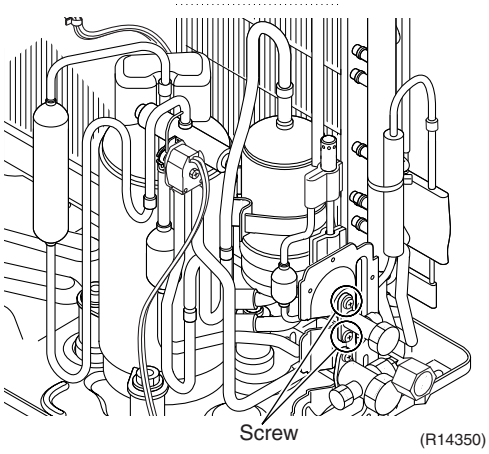
2.6 Removal of Electronic Expansion Valve ASSY

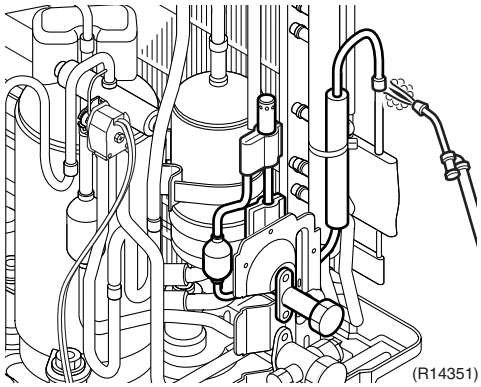
Procedure

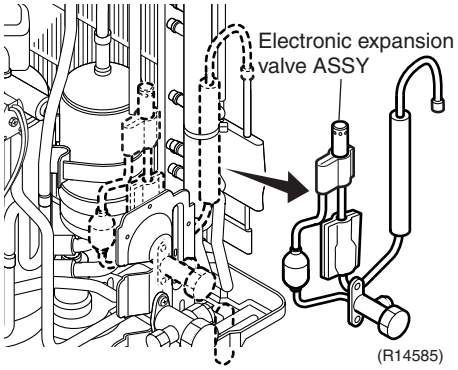
Warning **Be sure to wait for 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure	Points
1	Pull out the electronic expansion valve coil.	
2	Remove the 2 screws.	**Caution** Never remove the electronic expansion valve because it contains plastic parts. They may melt with heat and cause operation failure. Replace the whole assembly.
	■ Before working, make sure that the refrigerant gas is empty in the circuit. ■ Be sure to apply nitrogen replacement when heating up the brazed part.	**Caution** Do not directly heat the electronic expansion valve. Wrap the electronic expansion valve with wet cloth and provide water so that the cloth does not dry. (Keep below 120°C.)
3	Heat up the brazed part.	**Warning** Be careful not to get yourself burnt with the pipes and other parts that are heated by the gas brazing machine.
4	Remove the electronic expansion valve ASSY.	**Warning** If the refrigerant gas leaks during work, ventilate the room. (If the refrigerant gas is exposed to flames, toxic gas may be generated.) **Caution** From the viewpoint of global environment protection, do not discharge the refrigerant gas in the atmosphere. Make sure to collect all the refrigerant gas.







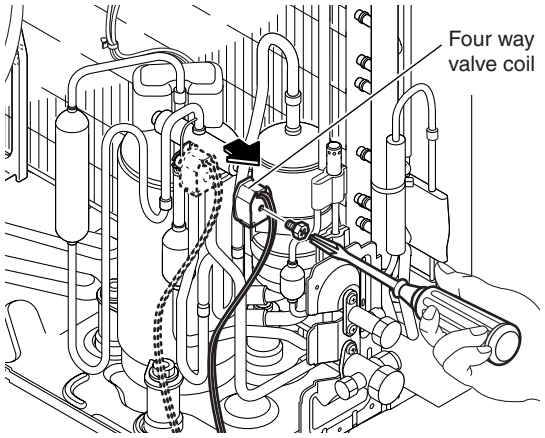


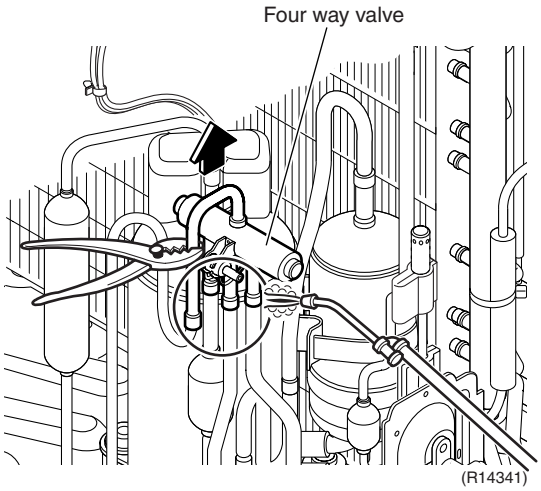
2.7 Removal of Four Way Valve

Procedure

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

Step	Procedure	Points
1	Remove the screw and remove the four way valve coil.	**Warning** **Be careful not to get yourself burnt with the pipes and other parts that are heated by the gas brazing machine.** **Warning** **If the refrigerant gas leaks during work, ventilate the room. (If the refrigerant gas is exposed to flames, toxic gas may be generated.)** **Caution** **From the viewpoint of global environment protection, do not discharge the refrigerant gas in the atmosphere. Make sure to collect all the refrigerant gas.** **Cautions for restoration** 1. Restore the piping by non-oxidation brazing. 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. (Keep below 120°C.) For the sake of this, wrap the four way valve with wet cloth and provide water so that the cloth does not dry. **Note:** ■ Do not use a metal saw for cutting pipes by all means because the sawdust comes into the circuit. ■ When withdrawing the pipes, be careful not to pinch them firmly with pliers. The pipes may get deformed. ■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.
	■ Before working, make sure that the refrigerant gas is empty in the circuit. ■ Be sure to apply nitrogen replacement when heating up the brazed part.	
2	Heat up the brazed parts of the four way valve and disconnect.	

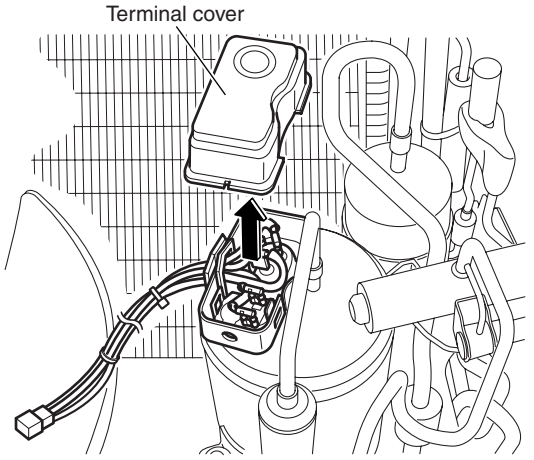
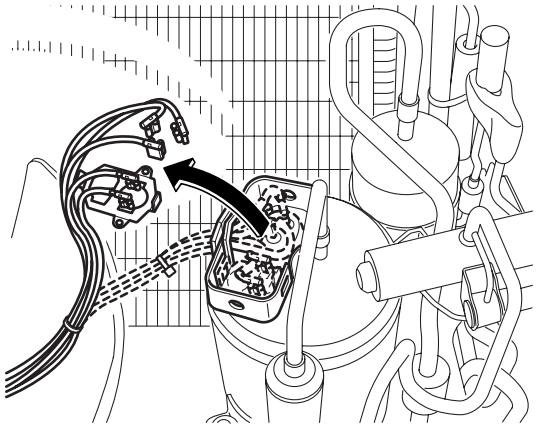
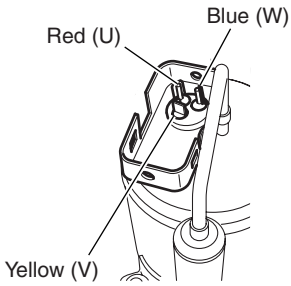
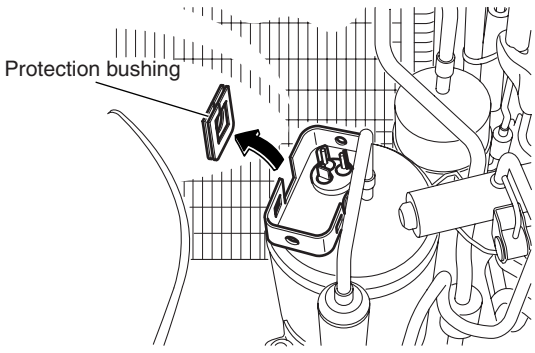




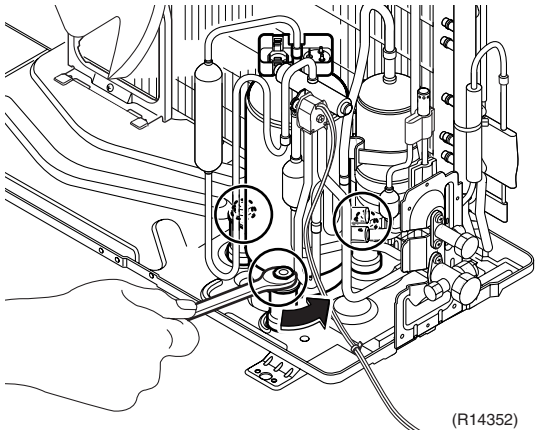
2.8 Removal of Compressor

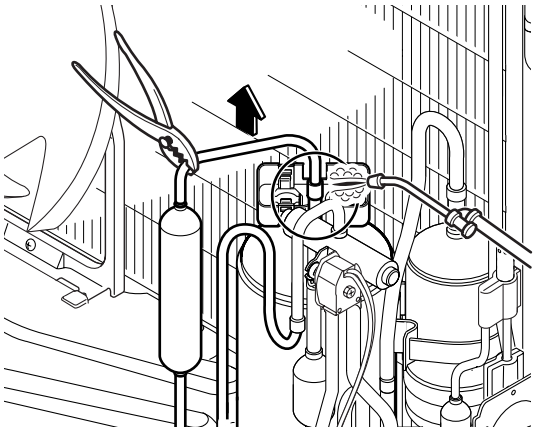
Procedure

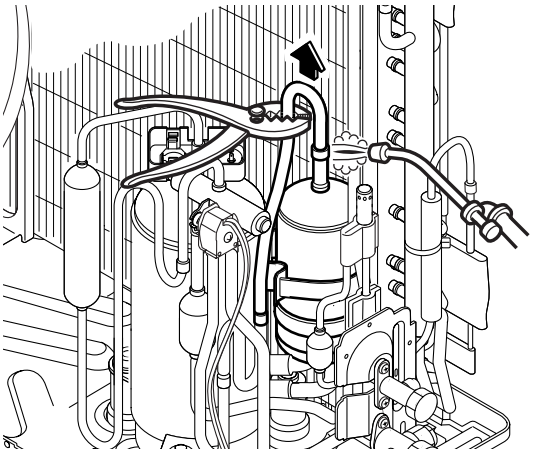
Warning **Be sure to wait for 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1	Remove the terminal cover.	 (R14343)	
2	Disconnect the compressor lead wires and the overload protector.	 (R14344)	 (R14377)
3	Remove the protection bushing.	 (R14345)	

Step	Procedure	Points
4	Remove the 3 nuts of the compressor.	**Cautions for restoration** 1. Restore the piping by non-oxidation brazing. 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. (Keep below 120°C.) For the sake of this, wrap the four way valve with wet cloth and provide water so that the cloth does not dry.
■ Before working, make sure that the refrigerant gas is empty in the circuit. ■ Be sure to apply nitrogen replacement when heating up the brazed part.		
5	Heat up the brazed part of the discharge side and disconnect.	**In case of difficulty with gas brazing machine** 1. Disconnect the brazed part where is easy to disconnect and restore. 2. Cut pipes on the main unit with a tube cutter in order to make it easy to disconnect.
6	Heat up the brazed part of the suction side and disconnect.	
7	Lift the compressor up and remove it.	
⚠ Warning **Be careful not to get yourself burnt with the pipes and other parts that are heated by the gas brazing machine.**		
⚠ Warning **If the refrigerant gas leaks during work, ventilate the room. (If the refrigerant gas is exposed to flames, toxic gas may be generated.)**		
⚠ Warning **Since it may happen that the refrigerant oil in the compressor catches fire, prepare wet cloth so as to extinguish fire immediately.**		
⚠ Caution **From the viewpoint of global environment protection, do not discharge the refrigerant gas in the atmosphere. Make sure to collect all the refrigerant gas.**		


(R14352)


(R14353)


(R14354)

Note:

■ Do not use a metal saw for cutting pipes by all means because the sawdust comes into the circuit.

■ When withdrawing the pipes, be careful not to pinch them firmly with pliers. The pipes may get deformed.

■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.

■ Be careful so as not to burn the compressor terminals, the name plate, the heat exchanger fin.

Part 8
Trial Operation and Field Settings

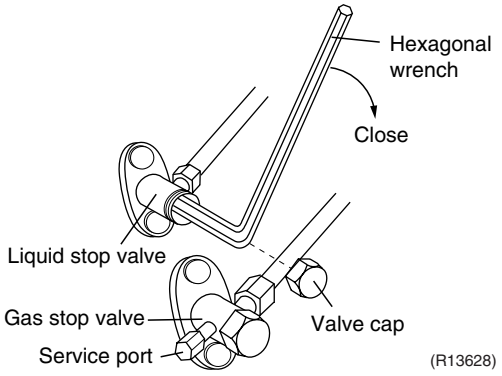
1. Pump Down Operation

Outline

In order to protect the environment, be sure to conduct pump down operation when relocating or disposing the unit.

Detail

1) Remove the valve caps from the liquid stop valve and the gas stop valve.
2) Carry out forced cooling operation.
3) After 5 to 10 minutes, close the liquid stop valve with a hexagonal wrench.
4) After 2 to 3 minutes, close the gas stop valve and stop the forced cooling operation.

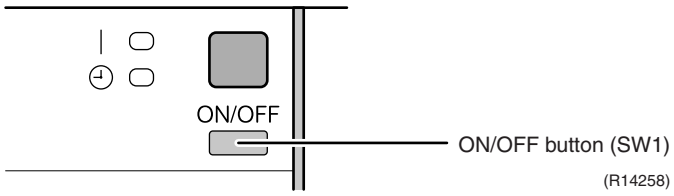


Refer to page 142 for forced cooling operation.

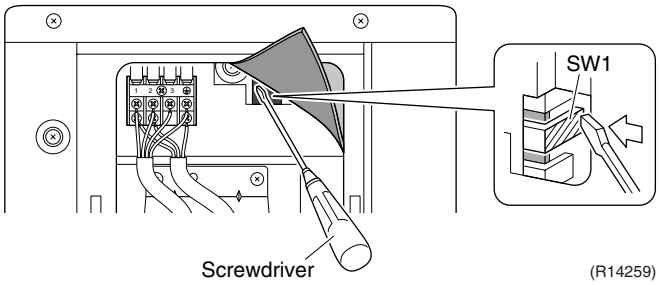
2. Forced Cooling Operation

Item	Forced Cooling
Conditions	The forced cooling operation is allowed when both the following conditions are met. 1) The outdoor unit is not abnormal and not in the 3-minute standby mode. 2) The outdoor unit is not operating.
Start	The forced cooling operation starts when any of the following conditions is fulfilled. 1) Press the forced cooling operation ON/OFF button (SW1) on the indoor unit for 5 seconds. 2) Press the forced cooling operation ON/OFF switch (SW1) on the outdoor unit.
Command frequency	68 Hz
End	The forced cooling operation ends when any of the following conditions is fulfilled. 1) The operation ends automatically after 15 minutes. 2) Press the forced cooling operation ON/OFF button (SW1) on the indoor unit again. 3) Press the ON/OFF button on the remote controller. 4) Press the forced cooling operation ON/OFF switch (SW1) on the outdoor unit again.
Others	The protection functions are prior to all others in the forced cooling operation.

Indoor Unit



Outdoor Unit



3. Trial Operation

Outline

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 trial 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 backs up the operation mode. The system then restarts operation with the previous mode when the circuit breaker is restored.

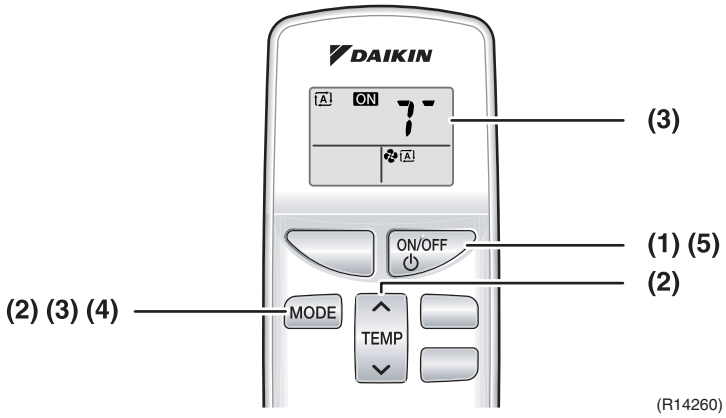
In cooling mode, select the lowest programmable temperature; in heating mode, select the highest programmable temperature.

- 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 does not start for 3 minutes after it is turned off.

Detail

ARC470 Series

(1) Press the ON/OFF button to turn on the system.
(2) Press the center of the TEMP button and the MODE button at the same time.
(3) Press the MODE button twice.
("7-" appears on the display to indicate that trial operation is selected.)
(4) Press the MODE button and select operation mode.
(5) Trial operation terminates in approx. 30 minutes and switches into normal mode. To quit a trial operation, press the ON/OFF button.



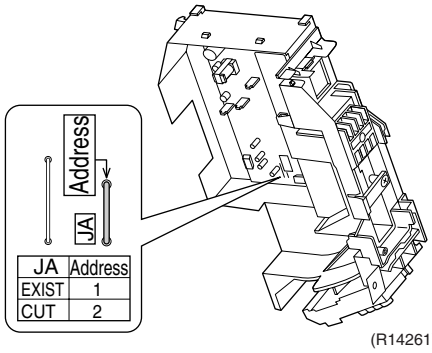
4. Field Settings

4.1 When 2 Units are Installed in 1 Room

When 2 indoor units are installed in 1 room, 1 of the 2 pairs of indoor unit and wireless remote controller can be set for different address.
Both the indoor unit PCB and the wireless remote controller need alteration.

Indoor Unit PCB

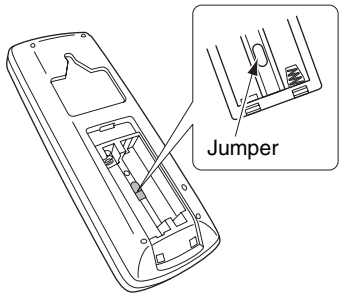
- Cut the address setting jumper JA on the control PCB.



(R14261)

Wireless Remote Controller

- Cut the address setting jumper.



	Address
EXIST	1
CUT	2

(R14262)

4.2 Jumper Settings

Jumper	Function	When connected (factory set)	When cut
JB (on indoor unit PCB)	Fan speed setting when compressor stops for thermostat OFF. (effective only at cooling operation)	Fan speed setting; Remote controller setting	Fan rpm is set to “0” <Fan stop>
JC (on indoor unit PCB)	Power failure recovery function	Auto-restart	The unit does not resume operation after recovering from a power failure. Timer ON/OFF settings are cleared.
J8 (on outdoor unit PCB)	Improvement of defrost performance	Standard control	Reinforced control (ex. The frequency increases, the duration time of defrost lengthens.)

For the location of the jumper, refer to the following pages.
Indoor unit; page 7
Outdoor unit; page 9

5. Application of Silicon Grease to a Power Transistor and a Diode Bridge

Applicable Models

All outdoor units using inverter type compressor for room air conditioner.

When the printed circuit board (PCB) of an outdoor unit is replaced, it is required that silicon grease (*1) is certainly applied to the heat radiation part (the contact point to the radiation fin) of the power transistor and diode bridge.

*1: Parts number of the silicon grease – 1172698 (Drawing number 3FB03758-1)

Details

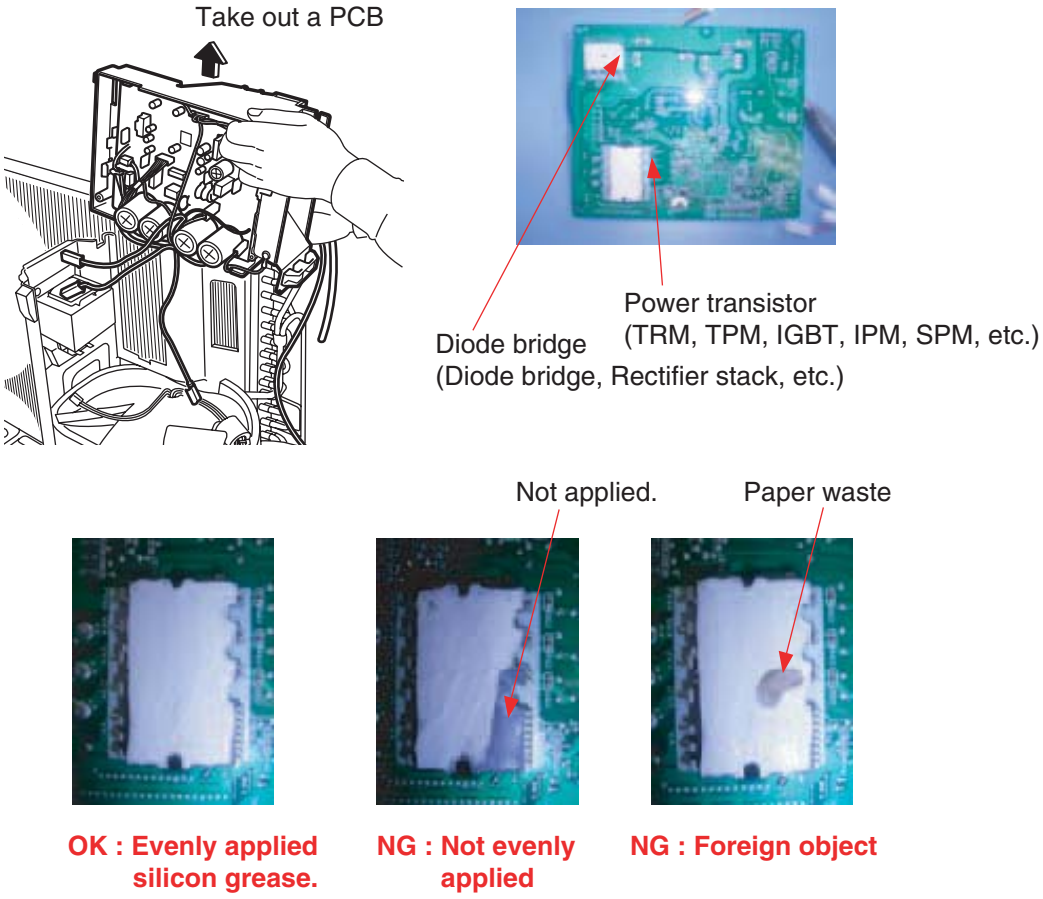
The silicon grease is an essential article for encouraging the heat radiation of the power transistor and the diode bridge. Applying the paste should be implemented in accordance with the following instruction.

Remark: There is the possibility of failure with smoke in case of bad heat radiation.

- Wipe off the old silicon grease completely on a radiation fin.
- Apply the silicon grease evenly to the whole.
- Do not leave any foreign object such as solder or paper waste between the power transistor and the radiation fin, and also the diode bridge, and the radiation fin.
- Tighten the screws of the power transistor and the diode bridge, and contact to the radiation fin without any gap.

<Example>

The shape of electrical box and PCB vary depending on the model.



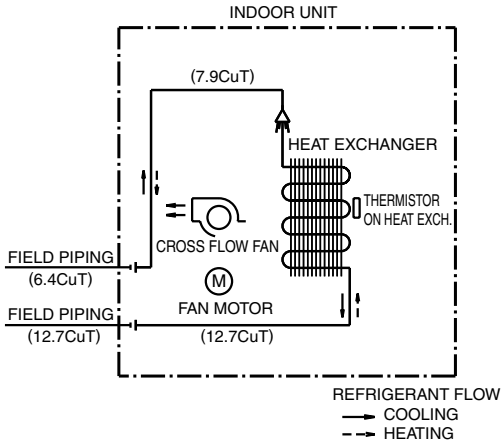
(R9056)

Part 9
Appendix

1. Piping Diagrams

1.1 Indoor Unit

FTXN50/60KV1B



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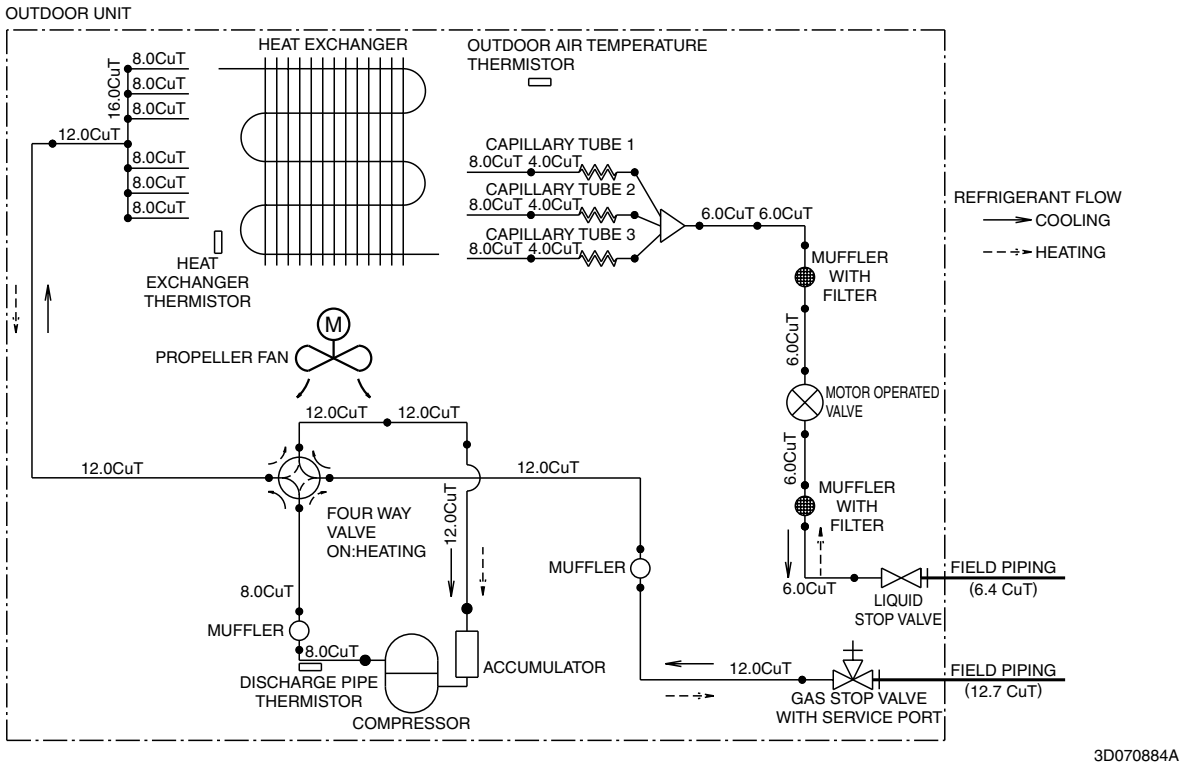
1.2 Outdoor Unit

RXN50/60KEV1B



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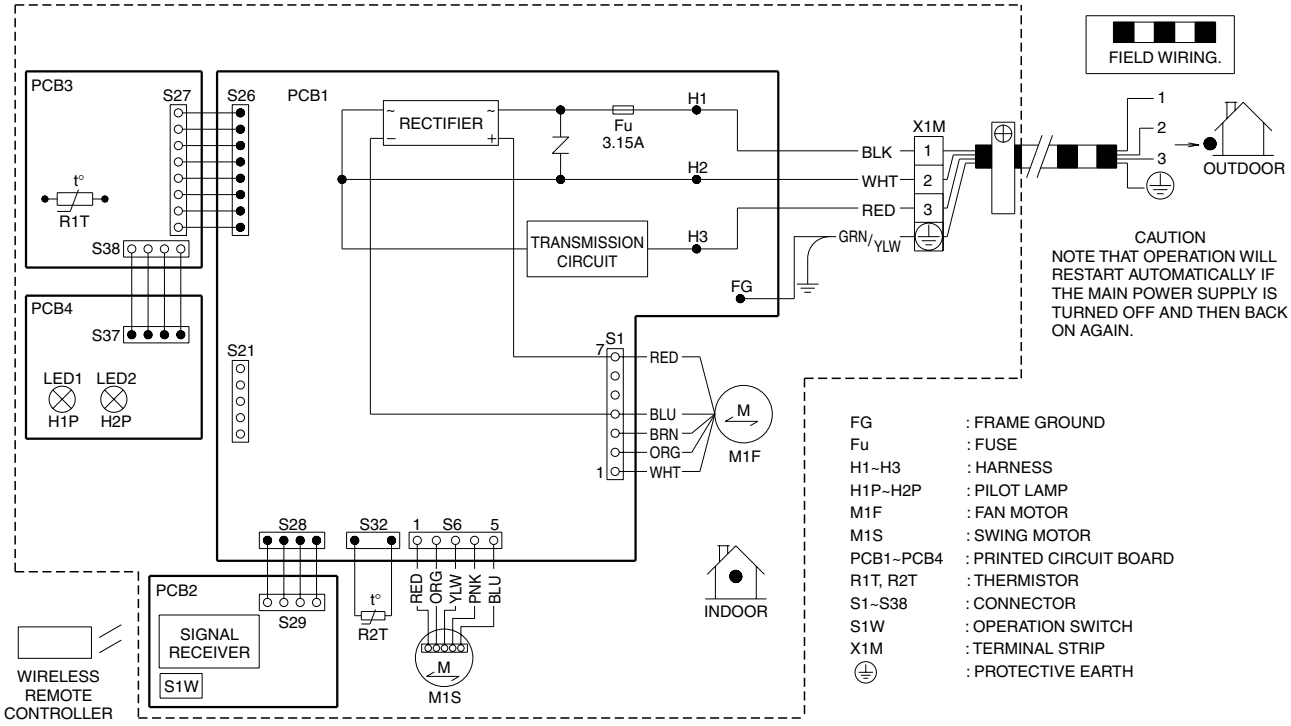
2. Wiring Diagrams

2.1 Indoor Unit

FTXN50/60KV1B



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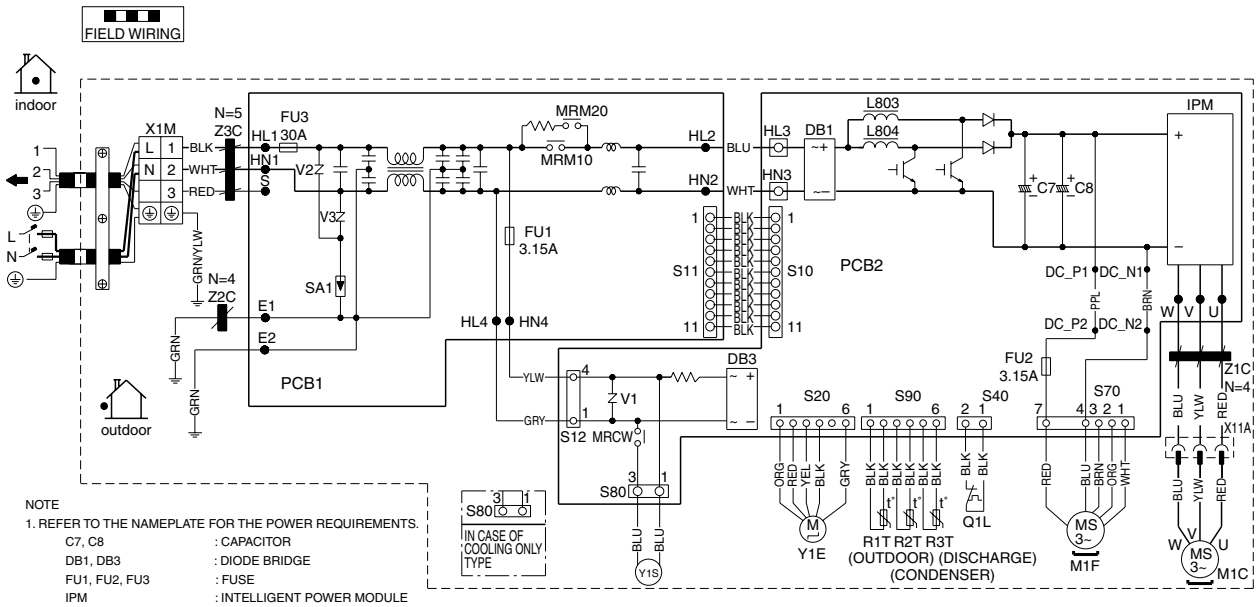
2.2 Outdoor Unit

RXN50/60KEV1B



3D070732

Warning

- Daikin products are manufactured for export to numerous countries throughout the world. Prior to purchase, please confirm with your local authorised importer, distributor and/or retailer whether this product conforms to the applicable standards, and is suitable for use, in the region where the product will be used. This statement does not purport to exclude, restrict or modify the application of any local legislation.
- Ask a qualified installer or contractor to install this product. Do not try to install the product yourself. Improper installation can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Use only those parts and accessories supplied or specified by Daikin. Ask a qualified installer or contractor to install those parts and accessories. Use of unauthorised parts and accessories or improper installation of parts and accessories can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Read the User's Manual carefully before using this product. The User's Manual provides important safety instructions and warnings. Be sure to follow these instructions and warnings.

If you have any enquiries, please contact your local importer, distributor and/or retailer.

Cautions on product corrosion

1. Air conditioners should not be installed in areas where corrosive gases, such as acid gas or alkaline gas, are produced.
2. If the outdoor unit is to be installed close to the sea shore, direct exposure to the sea breeze should be avoided. If you need to install the outdoor unit close to the sea shore, contact your local distributor.

JMI-0107

Organization:
DAIKIN INDUSTRIES, LTD.
AIR CONDITIONING MANUFACTURING DIVISION

Scope of Registration:
THE DESIGN/DEVELOPMENT AND MANUFACTURE OF COMMERCIAL AIR CONDITIONING, HEATING, COOLING, REFRIGERATING EQUIPMENT, COMMERCIAL HEATING EQUIPMENT, RESIDENTIAL AIR CONDITIONING EQUIPMENT, HEAT RECLAIM VENTILATION, AIR CLEANING EQUIPMENT, MARINE TYPE CONTAINER REFRIGERATION UNITS, COMPRESSORS AND VALVES.

JQA-1452

Organization:
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Scope of Registration:
THE DESIGN/DEVELOPMENT AND MANUFACTURE OF AIR CONDITIONERS AND THE COMPONENTS INCLUDING COMPRESSORS USED FOR THEM

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