DAIKIN

Si04-115

Service Manual

Inverter Pair
FTK(X)-J / RK(X)-J Series

[Applied Models]

- **Inverter Pair : Cooling Only**
- **Inverter Pair : Heat Pump**

Inverter Pair
FTK(X)-J / RK(X)-J Series

●Cooling Only

Indoor Unit

FTK25JVE9 FTK25JVEA9 FTK25JVET9 FTK25JV1NB9
FTK35JVE9 FTK35JVEA9 FTK35JVET9 FTK35JV1NB9

Outdoor Unit

RK25JVE9 RK25JVEA9 RK25JVET9 RK25JV1NB9
RK35JVE9 RK35JVEA9 RK35JVET9 RK35JV1NB9

●Heat Pump

Indoor Unit

FTX25JVEA9 FTX25JVET9 FTX25JV1NB9
FTX35JVEA9 FTX35JVET9 FTX35JV1NB9

Outdoor Unit

RX25JVEA9 RX25JVET9 RX25JV1NB9
RX35JVEA9 RX35JVET9 RX35JV1NB9

1. Introduction

1.1 Safety Cautions

Cautions and Warnings

- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into " ⚠ **Warning**" and " ⚠ **Caution**". The " ⚠ **Warning**" items are especially important since they can lead to death or serious injury if they are not followed closely. The " ⚠ **Caution**" items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.
- About the pictograms

△ This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.

◯ This symbol indicates a prohibited action.
The prohibited item or action is shown inside or near the symbol.

● This symbol indicates an action that must be taken, or an instruction.
The instruction is shown inside or near the symbol.

- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer

1.1.1 Caution in Repair.

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

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

1.1.2 Cautions Regarding Products after Repair

⚠ 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 can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	

Warning	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R22) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote 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 a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

1.1.3 Inspection after Repair

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

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

1.1.4 Using Icons

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

1.1.5 Using Icons List

Icon	Type of Information	Description
 Note:	Note	A “note” provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
 Caution	Caution	A “caution” is used when there is danger that the reader, through incorrect manipulation, may damage equipment, 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 Function

1. Functions

1.1 Indoor Unit and Outdoor Unit

Category	Functions	FTK25·35J Series RK25·35J Series	FTX25·35J Series RX25·35J Series	Category	Functions	FTK25·35J Series RK25·35J Series	FTX25·35J Series RX25·35J Series
Basic Function	Inverter (with Inverter Power Control)	○	○	Health Health & Clean	Air Purifying Filter with Bacteriostatic, Virustatic & Deodorizing Functions	○	○
	Operation Limit for Cooling (°C)	10 ~46	10 ~46		Longlife Filter	—	—
	Operation Limit for Heating (°C)	—	-10 ~15		Ultra-Longlife Filter (Option)	—	—
	Microprocessor Control	○	○		Photocatalytic Deodorizing Filter	—	—
	PAM Control	—	—		Photocatalytic Filter with UV Lamp	—	—
Compressor	Horizontal Scroll, Oval Scroll Compressor (DAIKIN SCROLL)	—	—		Mold Proof Air Filter	○	○
	Swing Compressor (DAIKIN ROTARY)	—	—		Washable Grille	○	○
	Rotary Compressor	○	○		Filter Cleaning Indicator	—	—
	Reluctance DC Motor	—	—		Healthy Cooling Operation	—	—
Comfortable Airflow	Dual Flaps	—	—		Good-Sleep Cooling Operation	○	○
	Power-Airflow Dual Flaps	○ 5step	○ 5step	Timer	72-Hour On/Off Timer	—	—
					24-Hour On/Off Timer	○	○
	Power-Airflow Diffuser	—	—		Night Set Mode	○	○
	Wide-Angle Louvers	○	○		Just Fit Thermostatic Timer	—	—
	Vertical Auto-Swing (Up and Down)	○	○	Worry Free “Reliability & Durability”	Auto-Restart (after Power Failure)	○	○
	Horizontal Auto-Swing (Right and Left)	—	—		Self-Diagnosis (Digital, LED) Display	○	○
	3-D Air flow	—	—		The Remote Controller Loss Prevention with the Chain (Option)	○	○
	3-Step Airflow (H/P Only)	—	—				
“Comfortable Control” Comfort Control	Auto Fan Speed	○	○		Wiring Error Check	—	—
	Silent-Operation Control (Automatic)	—	—		Anticorrosion Treatment of Outdoor Hear Exchanger	○	○
	Outdoor Unit Silent Operation (Manual)	—	—				
	Intelligent Eye	○	○	Flexibility	Multi-Split / Split Type Compatible Indoor Unit	○	○
	Quick Warming Function	—	○				
	Hot-Start Function	—	○		Flexible Voltage Correspondence	○	○
	Automatic Defrosting	—	○		High Ceiling Application	—	—
Operation	Automatic Operation	—	○		Chargeless	10m	10m
	Programme Dry Function	○	○	Remote Control	5-Rooms Centralized Controller (Option)	○	○
	Fan Only	○	—				
Lifestyle Convenience	New Powerful Operation (Non-Inverter)	—	—		Field-Supply Timer Operation	○	○
	Inverter Powerful Operation	○	○		Remote Control Adaptor (Option) (Normal Open-Pulse Contact)	○	○
	Priority-Room Setting	—	—				
	Quiet Operation	—	—		Remote Control Adaptor (Normal Open Contact)	○	○
	Laundry Programme Operation	—	—				
	Home Leave Operation	—	—		DIII-NET Compatible (Adaptor)	○	○
	Power Selection	—	—	Remote Controller	Wireless	○	○
	Indoor Unit On/Off Switch	○	○		Wired	—	—
	Signal Reception Indicator	○	○				
	Temperature Display	—	—				

○ : Holding Functions — : No Functions

Part 2
Specification

1. Specifications

1.1 Cooling Only

220 - 230 - 240V, 50Hz
220 - 230V, 60Hz

Model	Indoor Units		FTK25JVE9	FTK35JVE9
	Outdoor Units		RK25JVE9	RK35JVE9
Capacity Rated (Min.~Max.)		kW	2.55 (1.3~3.2)	3.5 (1.4~4.0)
		Btu/h	8,720 (4,400~10,900)	12,000 (4,800~13,700)
		kcal/h	2,200 (1,100~2,750)	3,000 (1,200~3,450)
Moisture Removal		L/h	1.2	1.9
Running Current (Rated)		A	4.6	6.8
Power Consumption Rated (Min.~Max.)		W	880 (430~1,250)	1,150 (500~1,550)
Power Factor		%	87.0 - 83.2 - 79.7 / 87.0 - 83.2	76.9 - 73.5 - 70.5 / 76.9 - 73.5
COP		W/W	2.90	3.04
Piping Connections	Liquid	mm	ϕ6.4	ϕ6.4
	Gas	mm	ϕ9.5	ϕ12.7
	Drain	mm	ϕ18.0	ϕ18.0
Heat Insulation			Both Liquid and Gas Pipes	Both Liquid and Gas Pipes
Indoor Unit			**FTK25JVE9**	**FTK35JVE9**
Front Panel Color			Almond White	Almond White
Air Flow Rate	m³/min (cfm)	H	7.5 (265)	7.8 (275)
		M	6.4 (226)	6.7 (237)
		L	5.4 (191)	5.5 (194)
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output	W	18	18
	Speed	Steps	5 Steps and Auto	5 Steps and Auto
Air Direction Control			Right, Left, Horizontal and Downward	Right, Left, Horizontal and Downward
Air Filter			Removal / Washable / Mildew Proof	Removal / Washable / Mildew Proof
Running Current (Rated)		A	0.17 - 0.18 - 0.18 / 0.21 - 0.21	0.17 - 0.18 - 0.18 / 0.21 - 0.21
Power Consumption (Rated)		W	37 - 40 - 43 / 45 - 48	37 - 40 - 43 / 45 - 48
Power Factor		%	98.9 - 96.6 - 99.5 / 97.4 - 99.4	98.9 - 96.6 - 99.5 / 97.4 - 99.4
Temperature Control			Microcomputer Control	Microcomputer Control
Dimension (H×W×D)		mm	273×784×185	273×784×185
Packaged Dimension		mm	325×834×258	325×834×258
Weight		kg	7.5	7.5
Gross Weight		kg	11	11
Operation Sound	H/M/L	dBA	37 / 34 / 30	38 / 35 / 32
Outdoor Unit			**RK25JVE9**	**RK35JVE9**
Casing Color			Ivory White	Ivory White
Compressor	Type		Hermetically Sealed Rotary Type	Hermetically Sealed Rotary Type
	Model		RC1X26BTNT	RC1X26BTNT
	Motor Output	W	750	750
Refrigerant Oil	Model		SUNISO 4GSD.I.	SUNISO 4GSD.I.
	Charge	L	0.4	0.4
Refrigerant	Model		R22	R22
	Charge	kg	0.72	0.89
Air Flow Rate	m³/min		28.0 - 29.0 - 30.0 / 29.0 - 30.0	26.5 - 27.5 - 28.0 / 27.5 - 28.0
	cfm		988 - 1,024 - 1,059 / 1,024 - 1,059	935 - 971 - 988 / 971 - 988
Fan	Type		Propeller	Propeller
	Motor Output	W	25	25
Running Current (Rated)		A	4.43 - 4.42 - 4.42 / 4.39 - 4.39	6.63 - 6.62 - 6.62 / 6.59 - 6.59
Power Consumption (Rated)		W	843 - 840 - 837 / 835 - 832	1,113 - 1,110 - 1,107 / 1,105 - 1,102
Power Factor		%	86.5 - 82.6 - 78.9 / 86.5 - 82.4	76.3 - 72.9 - 69.7 / 76.2 - 72.7
Starting Current		A	4.6	6.8
Dimensions (H×W×D)		mm	560×695×265	560×695×265
Packaged Dimension		mm	599×797×310	599×797×310
Weight		kg	31	32
Gross Weight		kg	33	35
Operation Sound		dBA	45 - 46 - 47 / 46 - 47	46 - 47 - 48 / 47 - 48
Drawing No.			3D029316	3D029317

Notes:

- MAX. interunit piping length: 25m
- MAX. interunit height difference: 15m
- Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- The data are based on the conditions shows in the table below.

Standard	Cooling	Piping Length
JIS C9612	Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	5m

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

220 - 230 - 240V, 50Hz

Model	Indoor Units		FTK25JVEA9	FTK35JVEA9
	Outdoor Units		RK25JVEA9	RK35JVEA9
Capacity Rated (Min.~Max.)		kW	2.54 (1.3~3.2)	3.6 (1.4~4.0)
		Btu/h	8,700 (4,400~10,900)	12,300 (4,800~13,700)
		kcal/h	2,190 (1,100~2,750)	3,100 (1,200~3,450)
Moisture Removal		L/h	1.2	1.9
Running Current (Rated)		A	5.1	7.0
Power Consumption Rated (Min.~Max.)		W	900 (430~1,250)	1,340 (500~1,550)
Power Factor		%	80.2 - 76.7 - 73.5	87.0 - 83.2 - 79.8
COP (Rated)		W/W	2.82	2.69
Piping Connections	Liquid	mm	ϕ6.4	ϕ6.4
	Gas	mm	ϕ9.5	ϕ12.7
	Drain	mm	ϕ18.0	ϕ18.0
Heat Insulation			Both Liquid and Gas Pipes	Both Liquid and Gas Pipes
Indoor Unit			**FTK25JVEA9**	**FTK35JVEA9**
Front Panel Color			Almond White	Almond White
Air Flow Rate	m³/min (cfm)	H	7.5 (265)	7.8 (275)
		M	6.4 (226)	6.7 (237)
		L	5.4 (191)	5.5 (194)
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output	W	18	18
	Speed	Steps	5 Steps and Auto	5 Steps and Auto
Air Direction Control			Right, Left, Horizontal and Downward	Right, Left, Horizontal and Downward
Air Filter			Removal / Washable / Mildew Proof	Removal / Washable / Mildew Proof
Running Current (Rated)		A	0.17 - 0.18 - 0.18	0.17 - 0.18 - 0.18
Power Consumption (Rated)		W	37 - 40 - 43	37 - 40 - 43
Power Factor		%	98.9 - 96.6 - 99.5	98.9 - 96.6 - 99.5
Temperature Control			Microcomputer Control	Microcomputer Control
Dimension (H×W×D)		mm	273×784×185	273×784×185
Packaged Dimension		mm	325×834×258	325×834×258
Weight		kg	7.5	7.5
Gross Weight		kg	11	11
Operation Sound	H/M/L	dBA	37 / 34 / 30	38 / 35 / 32
Outdoor Unit			**RK25JVEA9**	**RK35JVEA9**
Casing Color			Ivory White	Ivory White
Compressor	Type		Hermetically Sealed Rotary Type	Hermetically Sealed Rotary Type
	Model		RC1X26BTNT	RC1X26BTNT
	Motor Output	W	750	750
Refrigerant Oil	Model		SUNISO 4GSD.I.	SUNISO 4GSD.I.
	Charge	L	0.4	0.4
Refrigerant	Model		R22	R22
	Charge	kg	0.72	0.92
Air Flow Rate	m³/min		28.0 - 29.0 - 30.0	26.5 - 27.5 - 28.0
	cfm		988 - 1,024 - 1,059	935 - 971 - 988
Fan	Type		Propeller	Propeller
	Motor Output	W	25	25
Running Current (Rated)		A	4.93 - 4.92 - 4.92	6.83 - 6.82 - 6.82
Power Consumption (Rated)		W	863 - 860 - 857	1,303 - 1,300 - 1,297
Power Factor		%	79.6 - 76.0 - 72.6	86.7 - 82.9 - 79.2
Starting Current		A	5.1	7.0
Dimensions (H×W×D)		mm	560×695×265	560×695×265
Packaged Dimension		mm	797×310×599	797×310×599
Weight		kg	31	32
Gross Weight		kg	33	35
Operation Sound		dBA	45 - 46 - 47	46 - 47 - 48
Drawing No.			3D029314	3D029315

Notes:

- MAX. interunit piping length: 25m
- MAX. interunit height difference: 15m
- Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- The data are based on the conditions shows in the table below.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

Standard	Cooling	Piping Length
JIS C 9612	Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	5m

The data on the conditions (AS/NZS3823.1):

(Rated)		FTK25JVEA	FTK35JVEA
Capacity	kW	2.5	3.5
Running Current	A	5.1	7.0
Power Consumption	W	960	1,470
COP	W/W	2.60	2.38

(Conditions)

Standard	Cooling	Piping Length	Power Source
AS/NZS3823.1	Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	7.5m	50Hz 230V

220V, 60Hz

Models	**Indoor Units**		**FTK25JVET9**	**FTK35JVET9**
	Outdoor Units		**RK25JVET9**	**RK35JVET9**
Capacity (Min.~Max.)		kW	1.3~3.2	1.4~4.0
		kcal/h	1,100~2,750	1,200~3,450
Moisture Removal		L/h	1.2	1.9
Running Current (Min.~Max.)		A	3.1~7.1	3.4~8.9
Power Consumption (Min.~Max.)		W	470~1,300	520~1,650
Power Factor (Min.~Max.)		%	68.9~83.2	69.5~84.3
COP (Min.~Max.)		W/W	2.77~2.46	2.69~2.42
EER (Min.~Max.)		kcal/h·W	2.34~2.11	2.31~2.09
Piping Connections	Liquid	mm	ϕ6.4	ϕ6.4
	Gas	mm	ϕ9.5	ϕ12.7
	Drain	mm	ϕ18.0	ϕ18.0
Heat Insulation			Both Liquid and Gas Pipes	Both Liquid and Gas Pipes
Indoor Units			**FTK25JVET9**	**FTK35JVET9**
Front Panel Color			Almond White	Almond White
Air Flow Rate	m³/min (cfm)	H	7.5	7.8
		M	6.4	6.7
		L	5.4	5.5
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output	W	18	18
	Speed	Steps	5 Steps and Auto	5 Steps and Auto
Air Direction Control			Right, Left, Horizontal and Downward	Right, Left, Horizontal and Downward
Air Filter			Removal / Washable / Mildew Proof	Removal / Washable / Mildew Proof
Running Current (Rated)		A	0.21	0.21
Power Consumption (Rated)		W	45	45
Power Factor		%	97.4	97.4
Temperature Control			Microcomputer Control	Microcomputer Control
Dimensions (H×W×D)		mm	273×784×185	273×784×185
Packaged Dimensions		mm	834×325×258	834×325×258
Weight		kg	7.5	7.5
Gross Weight		kg	11	11
Operation Sound	H/M/L	dBA	37 / 34 / 30	38 / 35 / 32
Outdoor Units			**RK25JVET9**	**RK35JVET9**
Casing Color			Ivory White	Ivory White
Compressor	Type		Hermetically Sealed Rotary Type	Hermetically Sealed Rotary Type
	Model		RC1X26BTNT	RC1X26BTNT
	Motor Output	W	750	750
Refrigerant Oil	Model		SUNISO 4GSD.I.	SUNISO 4GSD.I.
	Charge	L	0.4	0.4
Refrigerant	Model		R22	R22
	Charge	kg	0.72	0.92
Air Flow Rate	m³/min		29.0	27.5
Fan	Type		Propeller	Propeller
	Motor Output	W	25	25
Running Current (Min.~Max.)		A	2.89~6.89	3.19~8.69
Power Consumption (Min.~Max.)		W	425~1,255	475~1,605
Power Factor (Min.~Max.)		%	66.8~82.8	67.7~84.0
Starting Current		A	4.3	5.5
Dimensions (H×W×D)		mm	560×695×265	560×695×265
Packaged Dimensions (W×D×H)		mm	797×310×599	797×310×599
Weight		kg	31	32
Gross Weight		kg	34	36
Operation Sound		dBA	46	47
Drawing No.			3D029306	3D029307

Notes:

- MAX. interunit piping length: 25m
- MAX. interunit height difference: 15m
- Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- The data are based on the conditions shows in the table below.

Cooling	Piping Length
Indoor ; 27°CDB/19.5°CWB Outdoor ; 35°CDB/24°CWB	5m

- The data on the conditions (CNS3615):

Models		FTK25JVET9	FTK35JVET9
(Rated)		Cooling	
Capacity	kW (kcal/h)	2.0 (1,720)	2.7 (2,350)
Running Current	A	3.9	5.0
Power Consumption	W	755	1,035
COP (EER)	W/W (kcal/h·W)	2.65 (2.27)	2.61 (2.27)

(Conditions)

Standard	Cooling	Piping Length	Power Source
CNS3615	Indoor ; 27°CDB/19.5°CWB Outdoor ; 35°CDB/24°CWB	5m	60Hz 220V

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

230V, 50Hz

Models	**Indoor Units**		**FTK25JAV1NB**	**FTK35JAV1NB**
	Outdoor Units		**RK25JV1NB9**	**RK35JV1NB9**
Capacity Rated (Min.~Max.)		kW	2.5 (1.3~3.0)	3.54 (1.4~3.8)
		Btu/h	8,500 (4,400~10,300)	12,100 (4,800~13,000)
		kcal/h	2,150 (1,100~2,600)	3,050 (1,200~3,300)
Moisture Removal		L/h	1.2	1.9
Running Current (Rated)		A	4.5	6.3
Power Consumption Rated (Min.~Max.)		W	945 (430~1,250)	1,345 (470~1,720)
Power Factor		%	91.3	92.8
COP (Rated)		W/W	2.65	2.63
Piping Connections	Liquid	mm	ϕ6.4	ϕ6.4
	Gas	mm	ϕ9.5	ϕ12.7
	Drain	mm	ϕ18.0	ϕ18.0
Heat Insulation			Both Liquid and Gas Pipes	Both Liquid and Gas Pipes
Indoor Units			**FTK25JAV1NB**	**FTK35JAV1NB**
Front Panel Color			Almond White	Almond White
Air Flow Rate	m³/min (cfm)	H	7.1 (251)	7.4 (261)
		M	5.9 (208)	6.0 (212)
		L	4.6 (162)	4.7 (166)
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output	W	18	18
	Speed	Steps	5 Steps and Auto	5 Steps and Auto
Air Direction Control			Right, Left, Horizontal and Downward	Right, Left, Horizontal and Downward
Air Filter			Removal / Washable / Mildew Proof	Removal / Washable / Mildew Proof
Running Current (Rated)		A	0.18	0.18
Power Consumption (Rated)		W	40	40
Power Factor		%	96.6	96.6
Temperature Control			Microcomputer Control	Microcomputer Control
Dimensions (H×W×D)		mm	273×784×185	273×784×185
Packaged Dimensions		mm	834×325×258	834×325×258
Weight		kg	7.5	7.5
Gross Weight		kg	11	11
Operation Sound	H/M/L	dBA	38 / 32 / 26	39 / 33 / 27
Outdoor Units			**RK25JV1NB9**	**RK35JV1NB9**
Casing Color			Ivory White	Ivory White
Compressor	Type		Hermetically Sealed Rotary Type	Hermetically Sealed Rotary Type
	Model		RC1X26BTNT	RC1X26BTNT
	Motor Output	W	750	750
Refrigerant Oil	Model		SUNISO 4GSD.I.	SUNISO 4GSD.I.
	Charge	L	0.4	0.4
Refrigerant	Model		R22	R22
	Charge	kg	0.72	0.92
Air Flow Rate	m³/min		29.0	27.5
	cfm		1,024	971
Fan	Type		Propeller	Propeller
	Motor Output	W	25	25
Running Current (Rated)		A	4.32	6.12
Power Consumption (Rated)		W	905	1,305
Power Factor		%	91.1	92.7
Starting Current		A	5.1	6.3
Dimensions (H×W×D)		mm	560×695×265	560×695×265
Packaged Dimensions		mm	797×310×599	797×310×599
Weight		kg	33	35
Gross Weight		kg	37	39
Operation Sound		dBA	46	47
Drawing No.			3D027499B	3D027500B

Notes:

- MAX. interunit piping length: 25m
- MAX. interunit height difference: 15m
- Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- The data are based on the conditions shows 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	7.5m

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

1.2 Heat Pump

220-230-240V, 50Hz / 220-230V, 60Hz

Models	Indoor Units		FTX25JVEA9		FTX35JVEA9	
	Outdoor Units		RX25JVEA9		RX35JVEA9	
			Cooling	Heating	Cooling	Heating
Capacity Rated (Min.~Max.)		kW	2.54 (1.3~3.0)	3.4 (1.3~4.0)	3.60 (1.4~3.8)	4.2 (1.4~5.1)
		Btu/h	8,700 (4,400~10,300)	11,600 (4,400~13,600)	12,300 (4,800~13,000)	14,300 (4,800~17,600)
		kcal/h	2,190 (1,100~2,600)	2,920 (1,100~3,440)	3,100 (1,200~3,300)	3,600 (1,200~4,400)
Moisture Removal		L/h	1.2	—	1.9	—
Running Current (Rated)		A	5.1	5.6	7.4	7.3
Power Consumption Rated (Min.~Max.)		W	900 (430~1,250)	1,100 (350~1,350)	1,360 (500~1,720)	1,340 (405~1,900)
Power Factor		%	80.2-76.7-73.5 / 80.2-76.7	89.3-85.4-81.8 / 89.3-85.4	83.5-79.9-76.6 / 83.5-79.9	83.4-79.8-76.5 / 83.4-79.8
COP		W/W	2.82	3.09	2.65	3.13
Piping Connections	Liquid	mm	ϕ6.4		ϕ6.4	
	Gas	mm	ϕ9.5		ϕ12.7	
	Drain	mm	ϕ18.0		ϕ18.0	
Heat Insulation			Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Indoor Units			**FTX25JVEA9**		**FTX35JVEA9**	
Front Panel Color			Almond White		Almond White	
Air Flow Rate	m³/min (cfm)	H	7.5 (265)	8.8 (311)	7.8 (275)	8.7 (307)
		M	6.4 (226)	7.5 (265)	6.7 (237)	7.4 (261)
		L	5.4 (191)	6.2 (219)	5.5 (194)	6.2 (219)
Fan	Type		Cross Flow Fan		Cross Flow Fan	
	Motor Output	W	18		18	
	Speed	Steps	5 Steps and Auto		5 Steps and Auto	
Air Direction Control			Right, Left, Horizontal and Downward		Right, Left, Horizontal and Downward	
Air Filter			Removal / Washable / Mildew Proof		Removal / Washable / Mildew Proof	
Running Current (Rated)		A	0.17-0.18-0.18 / 0.21-0.21	0.17-0.18-0.18 / 0.21-0.21	0.17-0.18-0.18 / 0.21-0.21	0.17-0.18-0.18 / 0.21-0.21
Power Consumption (Rated)		W	37-40-43 / 45-48	37-40-43 / 45-48	37-40-43 / 45-48	37-40-43 / 45-48
Power Factor		%	98.9-96.6-99.5 / 97.4-99.4	98.9-96.6-99.5 / 97.4-99.4	98.9-96.6-99.5 / 97.4-99.4	98.9-96.6-99.5 / 97.4-99.4
Temperature Control			Microcomputer Control		Microcomputer Control	
Dimensions (H×W×D)		mm	273×784×185		273×784×185	
Packaged Dimensions (W×D×H)		mm	834×325×218		834×325×218	
Weight		kg	7.5		7.5	
Gross Weight		kg	11		11	
Operation Sound	H/M/L	dBA	37 / 34 / 30	37 / 33 / 30	38 / 35 / 32	38 / 35 / 31
Outdoor Units			**RX25JVEA9**		**RX35JVEA9**	
Casing Color			Ivory White		Ivory White	
Compressor	Type		Hermetically Sealed Rotary Type		Hermetically Sealed Rotary Type	
	Model		RC1X26BTNT		RC1X26BTNT	
	Motor Output	W	750		750	
Refrigerant Oil	Model		SUNISO 4GSD.I.		SUNISO 4GSD.I.	
	Charge	L	0.4		0.4	
Refrigerant	Model		R22		R22	
	Charge	kg	0.72		0.95	
Air Flow Rate	m³/min		28.0-29.0-30.0 / 29.0-30.0	25.0-25.5-26.5 / 25.5-26.5	26.5-27.5-28.0 / 27.5-28.0	22.5-23.5-24.0 / 23.0-24.0
	cfm		988-1,024-1,059 / 1,024-1,059	883-900-935 / 900-935	935-971-988 / 971-988	794-830-847 / 812-847
Fan	Type		Propeller		Propeller	
	Motor Output	W	25		25	
Running Current (Rated)		A	4.93-4.92-4.92 / 4.89-4.89	5.43-5.42-5.42 / 5.39-5.39	7.23-7.22-7.22 / 7.19-7.19	7.13-7.12-7.12 / 7.09-7.09
Power Consumption (Rated)		W	863-860-857 / 855-852	1,063-1,060-1,057 / 1,055-1,052	1,323-1,320-1,317 / 1,315-1,312	1,303-1,300-1,297 / 1,295-1,292
Power Factor		%	79.6-76.0-72.6 / 79.5-75.8	89.0-85.0-81.3 / 89.0-84.9	83.2-79.5-76.0 / 83.1-79.3	83.1-79.4-75.9 / 83.0-79.2
Starting Current		A	5.6		7.4	
Dimensions (H×W×D)		mm	560×695×265		560×695×265	
Packaged Dimensions (W×D×H)		mm	797×310×599		797×310×599	
Weight		kg	31		32	
Gross Weight		kg	34		36	
Operation Sound		dBA	45-46-47 / 46-47	46-47-48 / 47-48	46-47-48 / 47-48	47-48-49 / 48-49
Drawing No.			3D029308		3D029309	

Notes:

- ■ MAX. interunit piping length: 15m
- ■ MAX. interunit height difference: 15m
- ■ Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- ■ The data are based on the conditions shows in the table below.

Standard	Cooling	Heating	Piping Length
JIS C 9612	Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	Indoor ; 20°CDB Outdoor ; 7°CDB/6°CWB	5m

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

220V, 60Hz

Models	Indoor Units		FTX25JVET9		FTX35JVET9	
	Outdoor Units		RX25JVET9		RX35JVET9	
			Cooling	Heating	Cooling	Heating
Capacity (Min.~Max.)		kW	1.3~3.0	1.3~3.8	1.4~3.8	1.4~4.5
		kcal/h	1,100~2,600	1,100~3,200	1,200~3,250	1,200~4,000
Moisture Removal		L/h	1.2	—	1.9	—
Running Current (Min.~Max.)		A	3.1~7.1	2.8~8.4	3.4~8.9	2.8~9.5
Power Consumption (Min.~Max.)		W	470~1,300	300~1,300	520~1,650	280~1,500
Power Factor (Min.~Max.)		%	68.9~83.2	48.7~70.3	69.5~84.3	45.5~71.8
COP (Min.~Max.)		W/W	2.77~2.31	4.33~2.92	2.77~2.31	5.00~3.00
EER (Min.~Max.)		kcal/h·W	2.34~2.00	3.67~2.46		
Piping Connections	Liquid	mm	ϕ6.4		ϕ6.4	
	Gas	mm	ϕ9.5		ϕ12.7	
	Drain	mm	ϕ18.0		ϕ18.0	
Heat Insulation			Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Indoor Units			**FTX25JVET9**		**FTX35JVET9**	
Front Panel Color			Almond White		Almond White	
Air Flow Rate	m³/min (cfm)	H	7.5	8.8	7.8	8.7
		M	6.4	7.5	6.7	7.4
		L	5.4	6.2	5.5	6.2
Fan	Type		Cross Flow Fan		Cross Flow Fan	
	Motor Output	W	18		18	
	Speed	Steps	5 Steps and Auto		5 Steps and Auto	
Air Direction Control			Right, Left, Horizontal and Downward		Right, Left, Horizontal and Downward	
Air Filter			Removal / Washable / Mildew Proof		Removal / Washable / Mildew Proof	
Running Current (Rated)		A	0.21	0.21	0.21	0.21
Power Consumption (Rated)		W	45	45	45	45
Power Factor		%	97.4	97.4	97.4	97.4
Temperature Control			Microcomputer Control		Microcomputer Control	
Dimensions (H×W×D)		mm	273×784×185		273×784×185	
Packaged Dimensions		mm	834×325×258		834×325×258	
Weight		kg	7.5		7.5	
Gross Weight		kg	11		11	
Operation Sound	H/M/L	dBA	37 / 34 / 30	37 / 33 / 30	38 / 35 / 32	38 / 35 / 31
Outdoor Units			**RX25JVET9**		**RX35JVET9**	
Casing Color			Ivory White		Ivory White	
Compressor	Type		Hermetically Sealed Rotary Type		Hermetically Sealed Rotary Type	
	Model		RC1X26BTNT		RC1X26BTNT	
	Motor Output	W	750		750	
Refrigerant Oil	Model		SUNISO 4GSD.I.		SUNISO 4GSD.I.	
	Charge	L	0.4		0.4	
Refrigerant	Model		R22		R22	
	Charge	kg	0.72		0.95	
Air Flow Rate	m³/min		29.0	25.5	27.5	23.0
Fan	Type		Propeller		Propeller	
	Motor Output	W	25		25	
Running Current (Min.~Max.)		A	2.89~6.89	2.59~8.19	3.19~8.69	2.59~9.29
Power Consumption (Min.~Max.)		W	425~1,255	255~1,255	475~1,605	235~1,455
Power Factor (Min.~Max.)		%	66.8~82.8	44.8~69.7	67.7~84.0	41.2~71.2
Starting Current		A	6.1		7.6	
Dimensions (H×W×D)		mm	560×695×265		560×695×265	
Packaged Dimensions (W×D×H)		mm	797×310×599		797×310×599	
Weight		kg	31		32	
Gross Weight		kg	34		36	
Operation Sound		dBA	46	47	47	48
Drawing No.			3D029312		3D020460	

Notes:

- MAX. interunit piping length: 15m
- MAX. interunit height difference: 15m
- Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- The data are based on the conditions shows in the table below.

Cooling	Heating	Piping Length
Indoor ; 27°CDB/19.5°CWB Outdoor ; 35°CDB/24°CWB	Indoor ; 21°CDB Outdoor ; 7°CDB/6°CWB	5m

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

- The data on the conditions (CNS3615):

Models		FTX25JVET9		FTX35JVET9	
(Rated)		Cooling	Heating	Cooling	Heating
Capacity	kW (kcal/h)	2.0 (1,720)	3.4 (2,970)	2.6 (2,250)	4.2 (3,600)
Running Current	A	3.8	5.5	5.0	6.9
Power Consumption	W	755	1,020	990	1,340
COP (EER)	W/W (kcal/h·W)	2.65 (2.27)	3.33 (2.91)	2.63 (2.27)	3.13 (2.69)

(Conditions)

Standard	Cooling	Heating	Piping Length	Power Source
CNS3615	Indoor ; 27°CDB/19.5°CWB Outdoor ; 35°CDB/24°CWB	Indoor ; 21°CDB Outdoor ; 7°CDB/6°CWB	5m	60Hz 220V

230V, 50Hz

Models	Indoor Units		FTX25JAV1NB		FTX35JAV1NB	
	Outdoor Units		RX25JV1NB9		RX35JV1NB9	
			Cooling	Heating	Cooling	Heating
Capacity Rated (Min.~Max.)		kW	2.5 (1.3~3.0)	3.4 (1.3~4.0)	3.43 (1.4~3.8)	4.1 (1.4~5.1)
		Btu/h	8,500 (4,400~10,300)	11,600 (4,400~13,600)	11,700 (4,800~13,000)	14,000 (4,800~17,600)
		kcal/h	2,150 (1,100~2,600)	2,920 (1,100~3,440)	2,950 (1,200~3,300)	3,500 (1,200~4,400)
Moisture Removal		L/h	1.2	—	1.9	—
Running Current (Rated)		A	4.8	5.3	6.4	6.2
Power Consumption Rated (Min.~Max.)		W	980 (350~1,350)	1,130 (350~1,350)	1,430 (500~1,720)	1,375 (405~1,900)
Power Factor		%	88.8	92.7	97.1	96.4
COP (Rated)		W/W	2.55	3.01	2.4	2.98
Piping Connections	Liquid	mm	ϕ6.4		ϕ6.4	
	Gas	mm	ϕ9.5		ϕ12.7	
	Drain	mm	ϕ18.0		ϕ18.0	
Heat Insulation			Both Liquid and Gas Pipes		Both Liquid and Gas Pipes	
Indoor Units			**FTX25JAV1NB**		**FTX35JAV1NB**	
Front Panel Color			Almond White		Almond White	
Air Flow Rate	m³/min (cfm)	H	7.1 (251)	8.4 (297)	7.4 (261)	8.4 (297)
		M	5.9 (208)	7.0 (247)	6.0 (212)	7.1 (251)
		L	4.6 (162)	5.7 (201)	4.7 (166)	5.9 (208)
Fan	Type		Cross Flow Fan		Cross Flow Fan	
	Motor Output	W	18		18	
	Speed	Steps	5 Steps and Auto		5 Steps and Auto	
Air Direction Control			Right, Left, Horizontal and Downward		Right, Left, Horizontal and Downward	
Air Filter			Removal / Washable / Mildew Proof		Removal / Washable / Mildew Proof	
Running Current (Rated)		A	0.18	0.18	0.18	0.18
Power Consumption (Rated)		W	40	40	40	40
Power Factor		%	96.6	96.6	96.6	96.6
Temperature Control			Microcomputer Control		Microcomputer Control	
Dimensions (H×W×D)		mm	273×784×185		273×784×185	
Packaged Dimensions		mm	834×325×258		834×325×258	
Weight		kg	7.5		7.5	
Gross Weight		kg	11		11	
Operation Sound	H/M/L	dBA	38 / 32 / 26	38 / 32 / 26	39 / 33 / 27	39 / 33 / 27
Outdoor Units			**RX25JV1NB9**		**RX35JV1NB9**	
Casing Color			Ivory White		Ivory White	
Compressor	Type		Hermetically Sealed Rotary Type		Hermetically Sealed Rotary Type	
	Model		RC1X26BTNT		RC1X26BTNT	
	Motor Output	W	750		750	
Refrigerant Oil	Model		SUNISO 4GSD.I.		SUNISO 4GSD.I.	
	Charge	L	0.4		0.4	
Refrigerant	Model		R22		R22	
	Charge	kg	0.72		0.95	
Air Flow Rate	m³/min		29.0	25.5	27.5	23.5
	cfm		1,024	900	970	830
Fan	Type		Propeller		Propeller	
	Motor Output	W	25		25	
Running Current (Rated)		A	4.62	5.12	6.22	6.02
Power Consumption (Rated)		W	940	1,090	1,390	1,335
Power Factor		%	88.5	92.6	97.2	96.4
Starting Current		A	5.3		6.4	
Dimensions (H×W×D)		mm	560×695×265		560×695×265	
Packaged Dimensions		mm	797×310×599		797×310×599	
Weight		kg	33		35	
Gross Weight		kg	37		39	
Operation Sound		dBA	46	47	47	48
Drawing No.			3D027497B		3D027498B	

Notes:

- MAX. interunit piping length: 15m
- MAX. interunit height difference: 15m
- Amount of additional charge of refrigerant 20g/m for piping length exceeding 10m
- The data are based on the conditions shows 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	7.5m

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

Part 3
Printed Circuit Board Connector Wiring Diagram

1. Printed Circuit Board Connector Wiring Diagram and Name

1.1 FTK25/35J Series, FTX25/35J Series

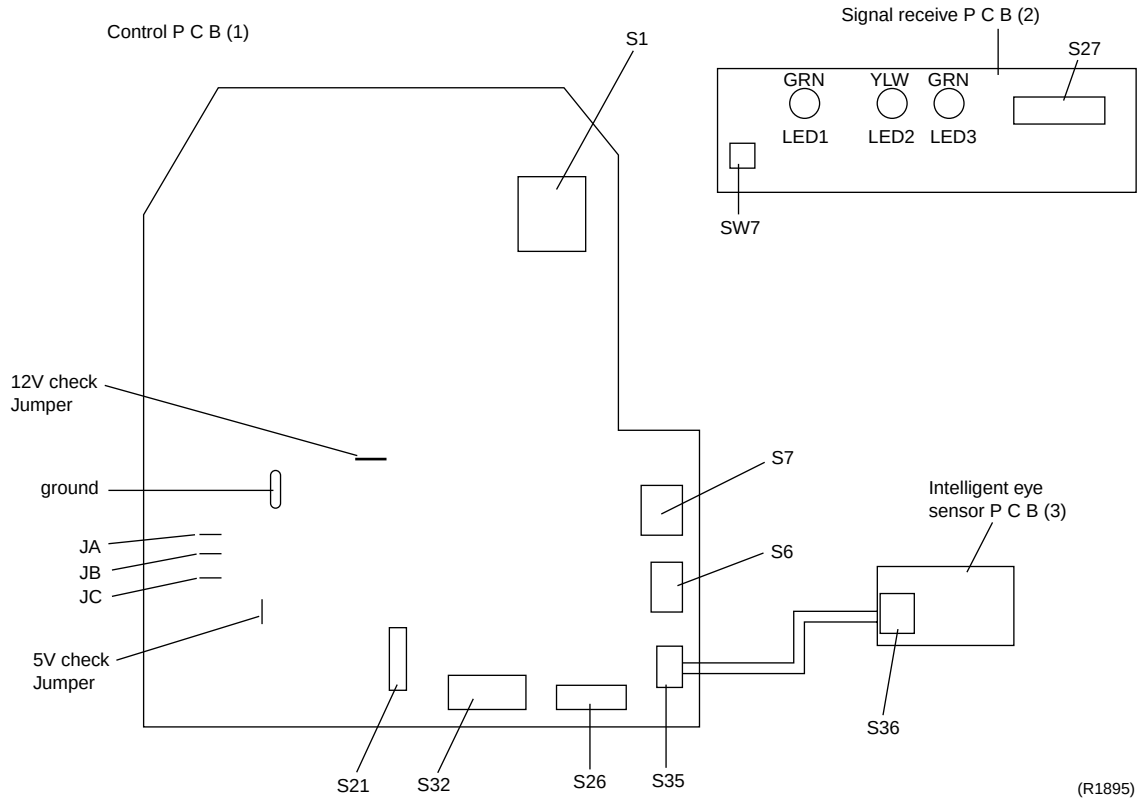
Printed circuit board (1) (Control PCB)
Printed circuit board (2) (Signal Receiver PCB)
Printed circuit board (3) (Intelligent Eye Sensor PCB)

Name of connector		
	1) S1	Connector for fan motor
	2) S6	Connector for swing motor (Horizontal Flap)
	3) S7	Connector for fan motor
	4) S21	Connector for centralized control to 5 rooms
	5) S27, S36	Connector for control PCB
	6) S26	Connector for signal receiver PCB
	7) S32	Connector for room temp/Heat exchanger thermistor
	8) S35	Connector for Intelligent Eye Sensor PCB

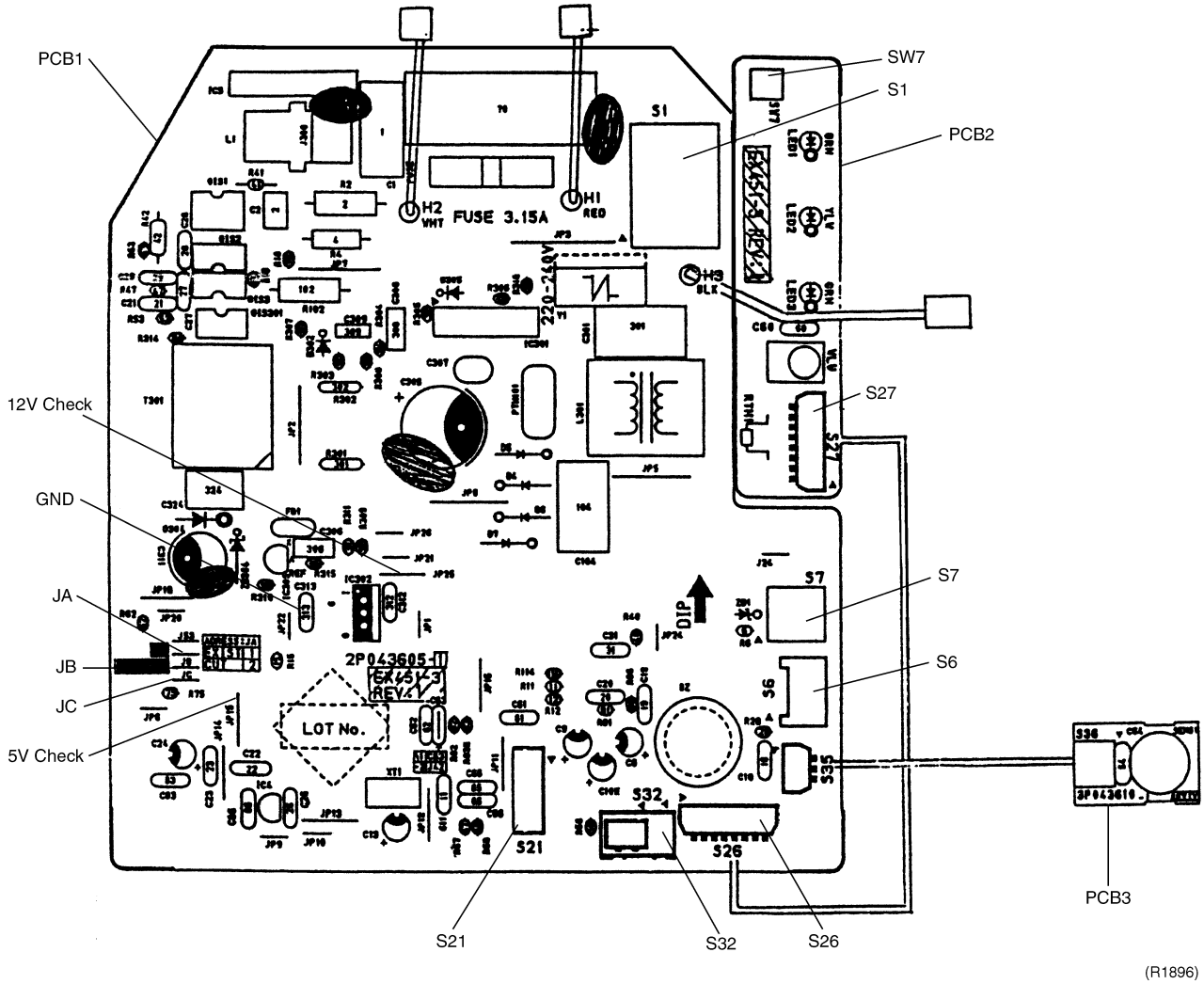
Note: Other designations

1) V1	Varistor
2) JA	ADDRESS SETTING JUMPER
JB	Fan speed setting when compressor is OFF on thermostat.
JC	Power failure recovery function.
	∗ Refer to page 139 for more detail.
3) SW7	OPERATION SWITCH
4) LED1 (GRN)	LED for operation
5) LED2 (YLW)	LED for timer
6) LED3 (GRN)	LED for intelligent eye

Control PCB (1)



P.C.B (1) (Control P.C.B) Detail



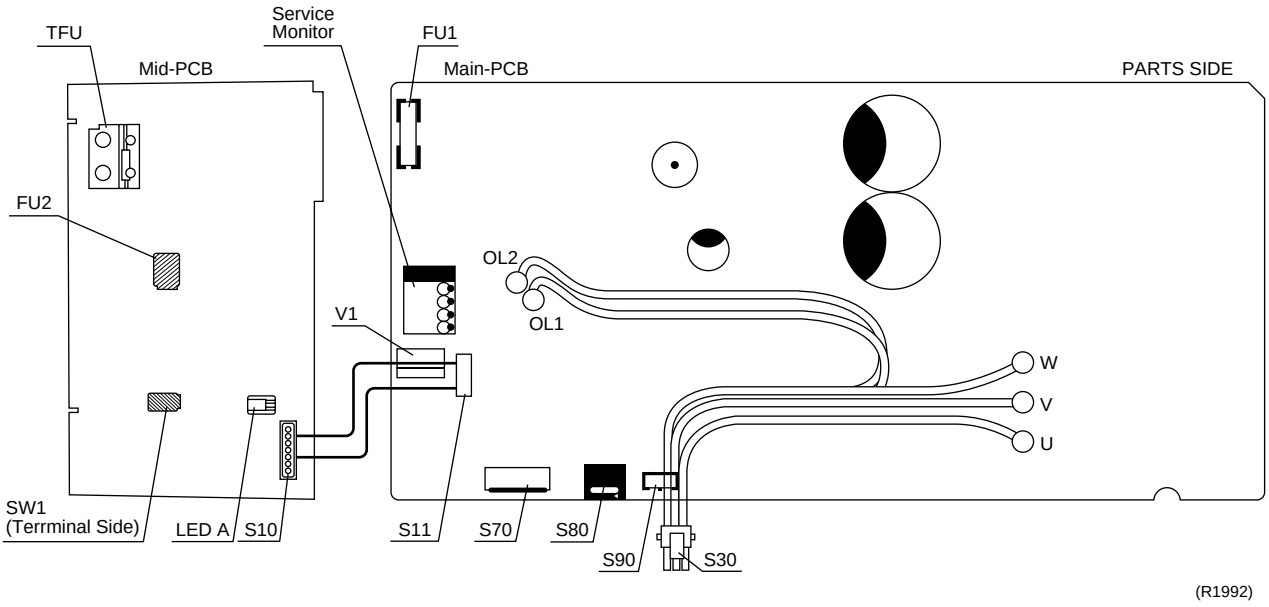
1.2 RK25/35J Series, RX25/35J Series

Printed circuit board (Main-PCB)
Printed circuit board (Mid-PCB)

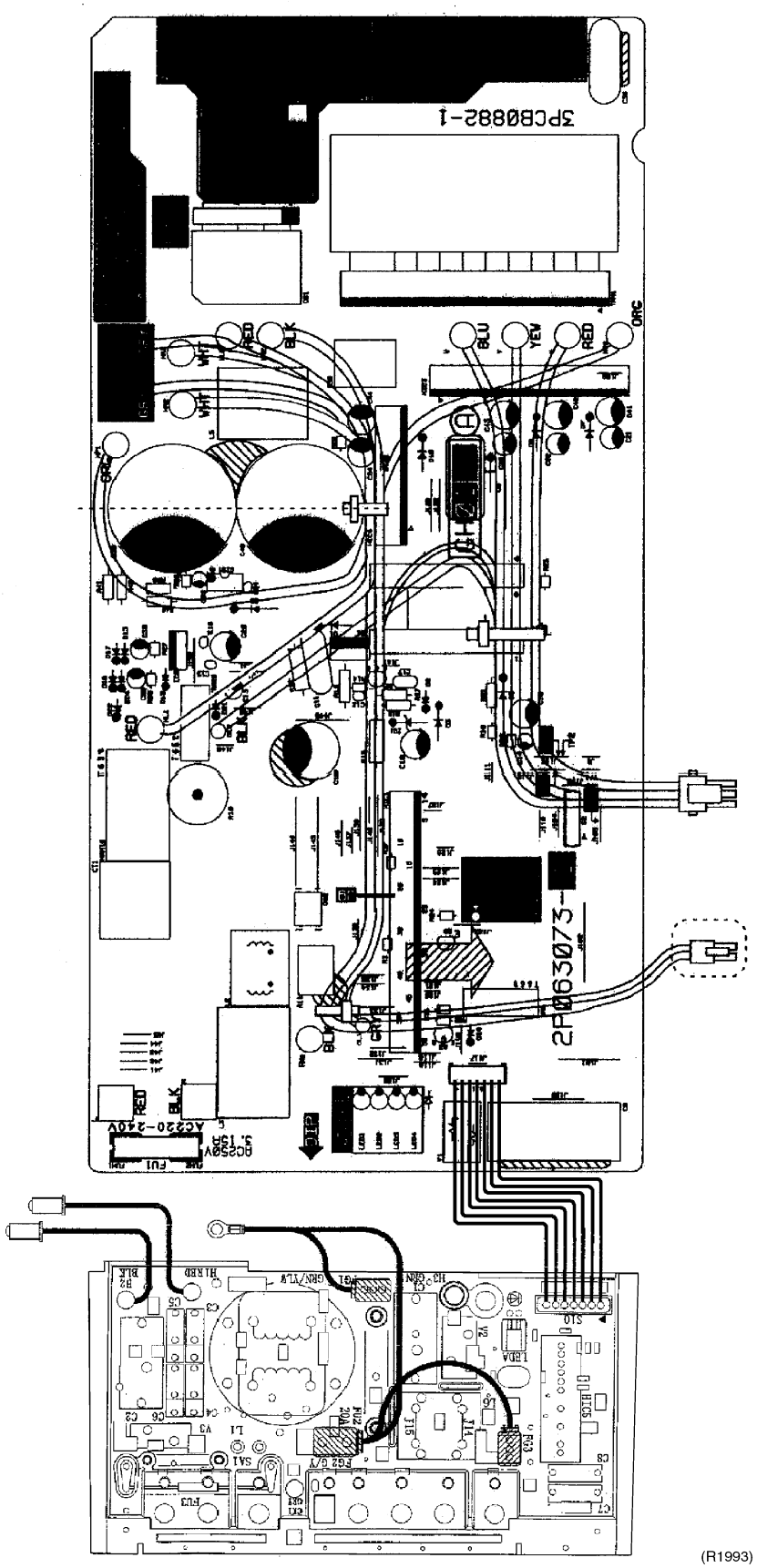
Name of connector

1)	S10	Connector for Main-PCB
2)	S11	Connector for Mid-PCB
3)	S30	Connector for compressor motor (with internal thermostat & OL)
4)	S70	Connector for fan motor
5)	S80	Connector for 4 WAY VALVE COIL (RX25 · 35J Series only)
6)	S90	Connector for THERMISTOR
7)	SW1	NONE (Forced operation ON/OFF switch)

PCB



P.C.B Detail



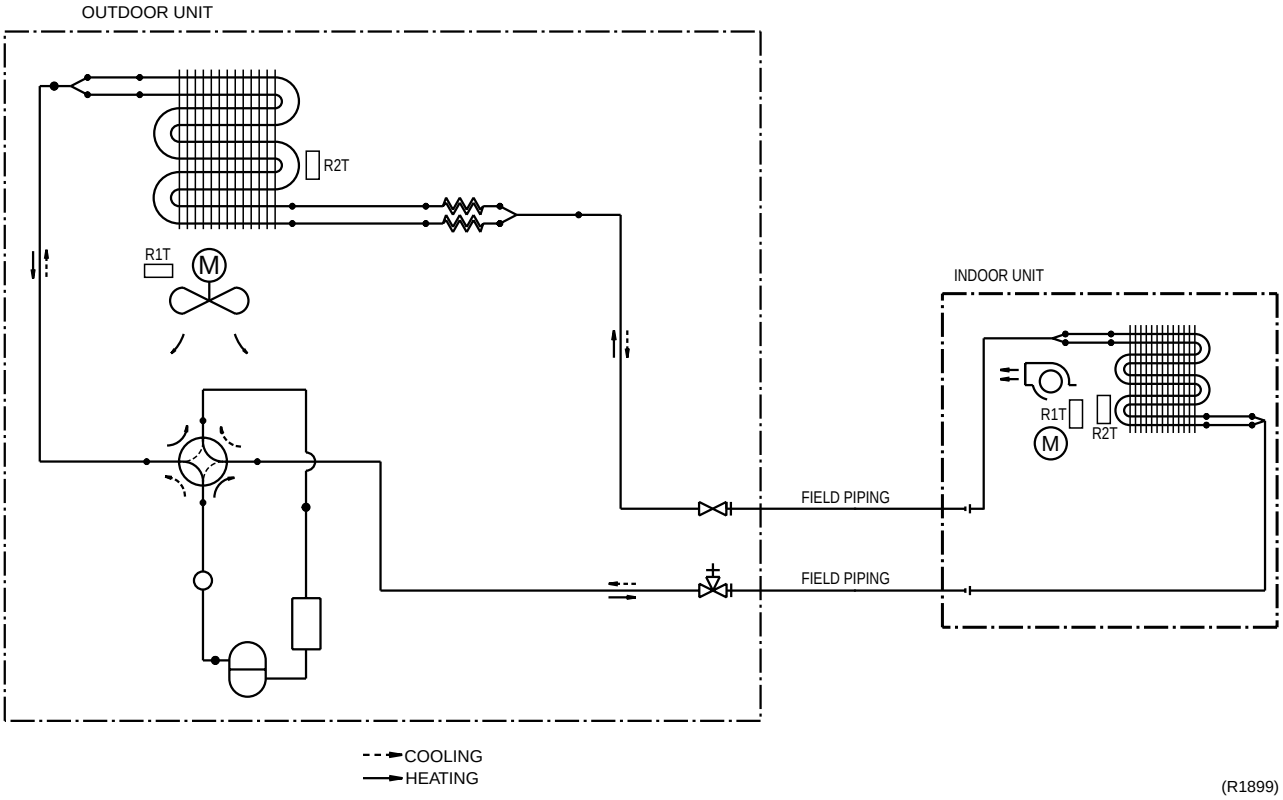
Part 4
Main Function

1. General Functionality

1.1 Functions of Thermistors

Location of thermistors

The thermistors on the drawing below are used to control the system. This control secures a proper cooling and prevents problems of the unit:



(R1899)

Frequency control

The following table shows the thermistors that control the frequency:

Controls	Outdoor heat exchanger thermistor	Outdoor ambient temperature thermistor	Indoor ambient temperature thermistor	Indoor heat exchanger thermistor
Symbol	R2T	R1T	R1T	R2T
Freeze-up prevention. Refer to page 19.	—	—	—	○
Peak cut off. Refer to page 19.	—	—	—	○
Defrost. Refer to page 23.	○	○	—	○
High pressure limitation in heating. Refer to page 19.	○	—	—	○

with ○: available functions and — : no available functions.

Frequency controlled functions

The following table shows the different functions, which are controlled by decreasing or increasing the frequency:

Function	Sensor Thermistor	Why?	How?	Set	Reset	Malfunction
Low outdoor temperature control	outdoor ambient thermistor (R1T)	To avoid condensation in cooling mode. ⚠ This control is not executed when the unit is in forced cooling mode or in test mode.	By setting a high frequency limit.	$T_{outdoor\ ambient}$ < 18°C	$T_{outdoor\ ambient}$ > 25°C	—
High pressure limitation in heating	■ outdoor temperature thermistor (R1T) ■ indoor heat exchanger thermistor (R2T)	To control the pressure.	By setting a high frequency limit.	■ heating mode ■ $T_{outdoor}$ > 16 °C ■ $T_{indoor\ heat\ exchanger}$ > 22 °C ■ compressor on	■ compressor stop ■ timer delay (70 s) has passed	—
Freeze-up prevention	indoor heat exchanger thermistor (R2T)	To prevent the freezing up of the indoor unit in cooling mode.	By setting a high frequency limit.	■ during cooling ■ 0 °C < $T_{indoor\ heat\ exchanger}$ < 8 °C	$T_{indoor\ heat\ exchanger}$ > 8 °C for 2 seconds	$T_{indoor\ heat\ exchanger}$ < 0 °C (result: compressor stop)
Peak cut off	indoor heat exchanger thermistor (R2T)	To prevent an abnormal high temperature on the indoor heat exchanger in heating mode.	By setting a high frequency limit.	■ during heating ■ 50 °C < $T_{indoor\ heat\ exchanger}$ < 67 °C	$T_{indoor\ heat\ exchanger}$ < 50 °C for 2 seconds	$T_{indoor\ heat\ exchanger}$ > 67 °C (result: compressor stop)

1.2 Operating Modes

Modes

There are two operating modes:
- normal operating mode
- forced operating mode.

Overview

The following table shows the different control modes of the Split inverter room air conditioners:

Mode	Item
Normal operating mode	Auto (Heat pump only)
	Cooling
	Dry keep
	Heating (Including Automatic defrost)
	Fan (for Cooling only)
	Stop mode: ■ Pre-heat operation. Refer to “Pre-heat operation”. ■ Stop
Test Operation	Forced cooling / heating
Forced operating mode	Forced cooling

Note: The outdoor unit retains the operating mode, when the thermostat is switched off.

Refer to “Pre-heat operation” on page 28

1.3 Frequency Principle

Main control parameters

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

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

Additional control parameters

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

- frequency limits
- initial settings
- forced cooling/heating operation.

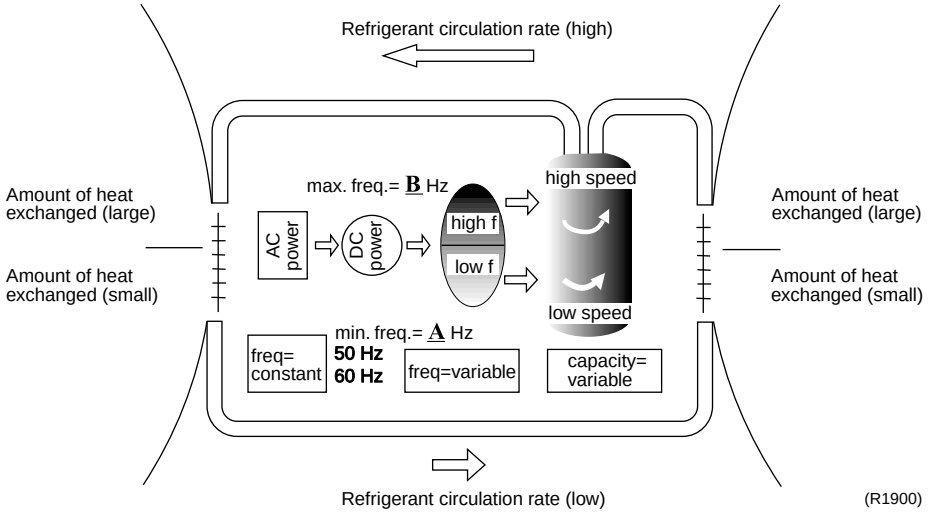
Inverter principle

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 single phase power supply in AC is converted into DC.
2	The single phase power supply DC is converted into a three phase chopped DC voltage with a 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:



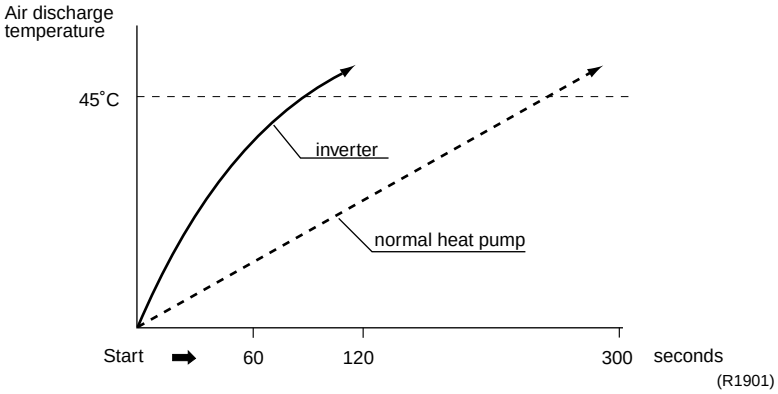
Min. frequency A	J type
Cooling	34
Heating	34

Max. frequency B	J type
Cooling	98
Heating	98

Inverter features

The inverter provides the following features:

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



- Even during extreme cold weather, the high capacity is achieved. It is maintained even when the outside temperature is 0°C.
- Comfortable air conditioning
  A detailed adjustment is integrated to ensure a fixed room temperature. It is possible to air condition with a small room temperature variation.
- Energy saving heating and cooling
  Once the set temperature is reached, the energy saving operation enables to maintain the room temperature at low power.

Frequency limits

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

Frequency limits	Limited during the activation of following functions
Low	■ four way valve operation compensation. Refer to page 37. ■ Wet Operation Protection Function. Refer to page 39.
High	■ Input current control. Refer to page 34. ■ Compressor protection function. Refer to page 38. ■ low outdoor temperature control. Refer to page 19. ■ high pressure limitation. Refer to page 19. ■ peak cut off. Refer to page 19. ■ freeze-up prevention. Refer to page 19. ■ defrost control. Refer to page 23.

Forced cooling/ heating operation

For more information, refer to “Forced mode” on page 24.

1.4 Defrost Control

Principle

Defrost control is carried out by reversing the cycle from heating to cooling.

Start conditions

Defrost control is set by the following conditions:

- during heating
- More than 6 minutes after the compressor has started up
- when condition 1 or 2 in the table below are applicable:

Condition	Description
1	■ **A** minutes of accumulated runtime ■ not yet 90 minutes of accumulated runtime ■ condition 1 or 2 or 3 in the table below
2	■ 90 minutes of accumulated runtime ■ condition 1 or 4 or 5 in the table below

Conditions

The following table shows the different conditions on which defrost control is based:

Conditions	Description
1	$T_{[outdoor\ heat\ exchanger]} <$ **B**°C for 1 min.
2	■ $T_{[ambient\ outdoor]} < 5°C$ ■ $T_{[outdoor\ heat\ exchanger]} < (-5 + T_{[ambient\ outdoor]} \times 0.4)$ ■ check if $T_{[indoor\ heat\ exchanger]}$ decreases 5 times every 10 seconds
3	■ $T_{[ambient\ outdoor]} \geq 5°C$ ■ $T_{[outdoor\ heat\ exchanger]} < -3°C$ ■ check if $T_{[indoor\ heat\ exchanger]}$ decreases 5 times every 10 seconds
4	■ $T_{[ambient\ outdoor]} < 5°C$ for 60 seconds ■ $T_{[outdoor\ heat\ exchanger]} < (-5 + T_{[ambient\ outdoor]} \times 0.4)$ for 60 seconds
5	■ $T_{[ambient\ outdoor]} \geq 5°C$ for 60 seconds ■ $T_{[outdoor\ heat\ exchanger]} < -3°C$ for 60 seconds

Stop conditions

Defrost control is reset by the following conditions:

- $T_{[heat\ exchanger]} > 4°C$ if $T_{[ambient\ outdoor]} < 19°C$
- $T_{[heat\ exchanger]} > 18°C$ if $T_{[ambient\ outdoor]} < -3°C$
- $T_{[heat\ exchanger]} > (-1°C \times T_{[ambient\ outdoor]}) +$ **C** if $-3°C < T_{[ambient\ outdoor]} < 19°C$.

	Class	A	B	C
J type	25	32	-15	17
	35	32	-14	17

1.5 Forced Operation Mode

Forced mode

Item	Forced cooling	Forced heating
Conditions	■ not in the 3-minute stand-by mode ■ normal operation mode ■ outdoor unit off ■ no malfunction in the outdoor unit ■ forced mode: cooling mode.	■ not in the 3-minute stand-by mode ■ normal operation mode ■ outdoor unit off ■ no malfunction in the outdoor unit ■ forced mode: heating mode.
Start Adjustment	1. Keep pushing the operation switch of the indoor unit for 5 to 10 seconds. 2. Change the remote controller setting to a cooling test operation. (Regarding a way to enter the test operation, refer to the note in a margin below) Possible to enter the forced cooling mode by either way of 1. or 2.. ■ Fix operation frequency to 66 Hz. ■ Operation-on timer :15 min. ■ Indoor unit's fan : H tap. ■ Swing flap: the latest set position.	With a change of the remote controller setting to a heating test operation, the unit enters the forced heating mode. (Regarding a way to enter the test operation mode, refer to the note in a margin below) ■ Fix operation frequency to 66 Hz. ■ Operation-on timer :15 min. ■ Indoor unit's fan : H tap. ■ Swing flap: the latest set position.
Reset	1. Push the operation switch of the indoor unit in an usual way. 2. Push the stop button on a remote controller. 3. Operation-on timer : 15 min. overtime.	1. Push the operation switch of the indoor unit in an usual way. 2. Push the stop button on a remote controller. 3. Operation-on timer : 15 min. overtime.

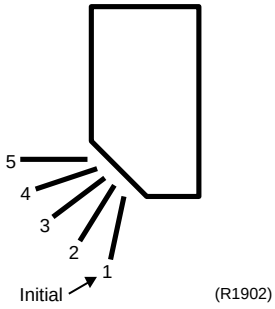
A way to enter the test operation mode by a remote controller.

1. Set on the desirous mode and push ON/OFF button. (operation ON)
2. Two buttons; Center of temperature set buttons "  ", and " Mode" button, should be pushed simultaneously. (then a left figure of the liquid crystal temperature's display number starts to blink.)
3. Moreover, push "MODE" button twice. (If the liquid crystal display becomes " T ", the test operation mode will startup under the mode displayed in a liquid crystal.)

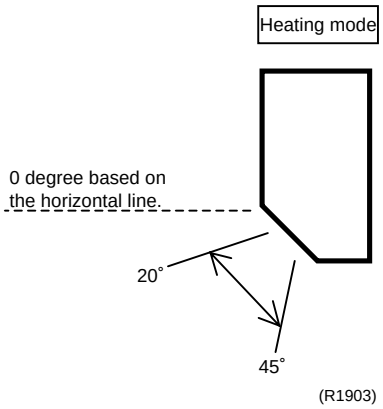
1.6 Wide-angle Flaps, Diffuser, Louveres and Autoswing

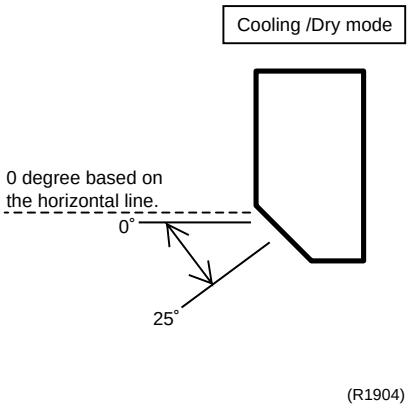
Outline of the action

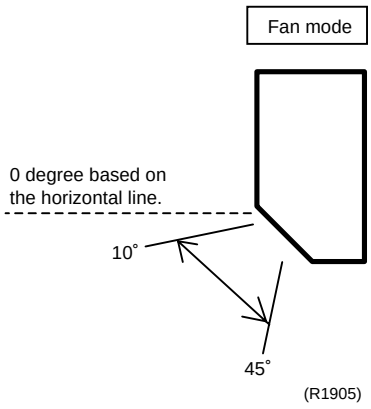
It can be commanded for J type by means of a user setting to select either any one desired position among the five-step directions of air flow adjusted on a remote controller, or Auto-swing.



Although the liquid crystal display of the five-step directions of the air flow is common for the modes of Cooling·Dry/Heating as illustrated above, in fact the range of the swing angle is slightly different in every operation mode.
The position a user set will be selected among the five positions calculated through the preliminary and evenly divided into four partitions which were taken from the upper and lower flap angle's range limits of each mode.
When Auto-swing is chosen, the flap swings in the swing range which meets the operation mode selected.







∗ Fan mode is available for the models of cooling-only.

Others

- The vertical louver can be adjusted manually. The movable range is 60 degrees for left or right, and total 120 degrees.

1.7 Fan Speed Control for Indoor Units

Control mode

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

For more information about Hall IC, refer to ‘Hall IC check (A6)’ on page 68.

Phase steps

Phase control and fan speed control contains 8 steps: LLL, LL, L, ML, M, HM, H and HH.

Step	Cooling	Heating	Dry mode
LLL (Heating thermostat OFF)	 (R1906)	 (R1906)	J type : 800 - 980 rpm (During powerful operation : 1050 rpm)
LL			
L			
ML			
M			
MH			
H			
HH (Powerful)			

= Within this range the airflow rate is automatically controlled when the AIRFLOW ADJUSTING button is set to AUTOMATIC

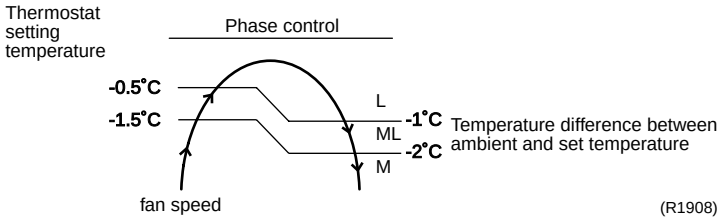
Refer to automatic airflow rate control on page 26.

Note:

1. During powerful operation, fan operate H tap + 50 - 70 rpm.
2. Fan stops during defrost operation.

Automatic air flow control for heating

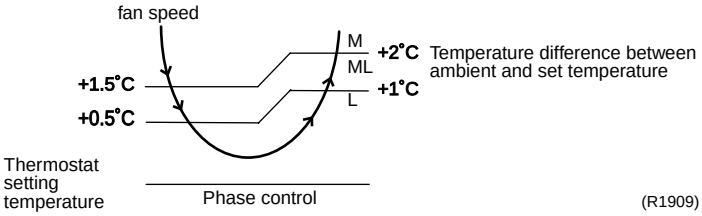
The following drawing explains the principle for fan speed control for heating:



Note: When there is no operation and the night set mode turns on, the step is low. Refer to “Night set mode” on page 29.

Automatic air flow control for cooling

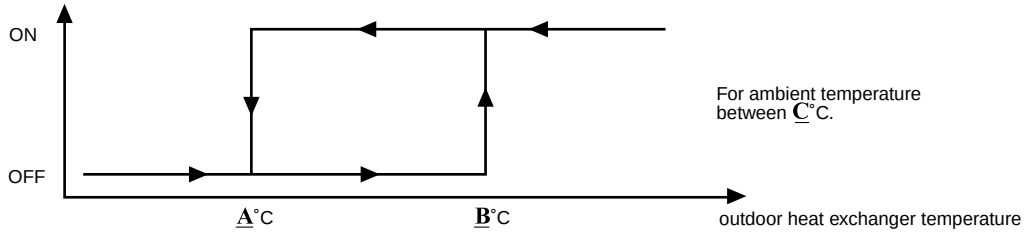
The following drawing explains the principle of fan speed control for cooling:



1.8 Fan Speed Control for Outdoor Units

Control

The following drawing explains the fan speed control:



Fan off delay

When the compressor turns off and $T_{[outdoor\ ambient]}$ > D°C, the outdoor fan stays running at the same speed for E seconds.

	A (°C)	B (°C)	C (°C)	D (°C)	E (sec)
J type	33	39	0 - 9	10	60

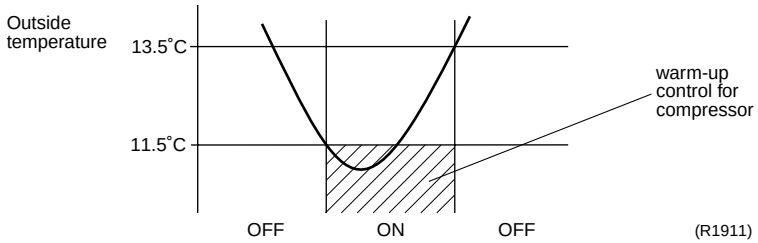
Caution

* J type operates the outdoor unit fans in the cooling mode even at the condition that a compressor is not operated.

1.9 General Functions

Pre-heat operation

When the equipment has stopped and $t_{[outside]}$ < 11.5°C, the compressor is warmed-up by passing a single-phase (U, V phase) current through the compressor motor to speed up the start. The power consumption is 30-40W.



Hot start function

During defrosting or when the thermostat is on in heating mode, the indoor heat exchanger temperature
≥ 29°C to fan starts to avoid cold draft.

Dry mode

The dry mode removes humidity while maintaining the room temperature. The temperature and fan cannot be regulated during dry mode.

<Management>

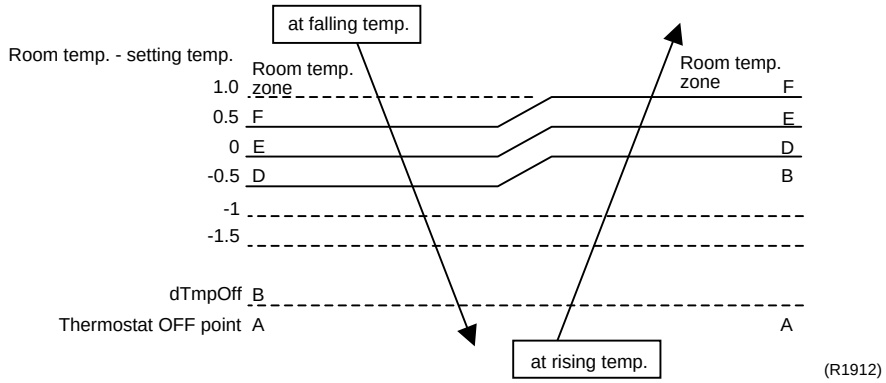
1. Decision of the dry setting temperature

■ When entering the following dry mode,
① Stop → an operation will start with Dry.
② Mode except Dry → changing to dry mode
Thermostat ON/OFF point is decided in accordance with the following conditions.

Room temp. cond. at entering Dry.	Set temp. (thermostat ON)	Thermostat OFF temp.
24°C ≤ Room temp.	Room temp. at the entering.	Room temp. -2°C at the entering.
18°C ≤ Room temp. < 24°C	Room temp. at the entering.	Room temp. -1.5°C at the entering.
Room temp. < 18°C	18°C	17°C

2. Frequency command

■ The frequency command is decided based on a room temperature zone.
The room temperature zone is decided as follows.



- The frequency command for every zone is stated below.
  (Please note that an operation will not carry out in the commanded frequency sometimes in case a protection control like a freeze-protection etc. will be actuated.)

Room temperature	Room temp. zone	Command frequency
		J type (25 / 35)
Room temp. < 18°C	A	0 / 0Hz
	except A	34 / 34Hz
Room temp. ≥ 18°C	A	0 / 0Hz
	B	34 / 34Hz
	D	40 / 40Hz
	E	42 / 42Hz
	F	42 / 42Hz

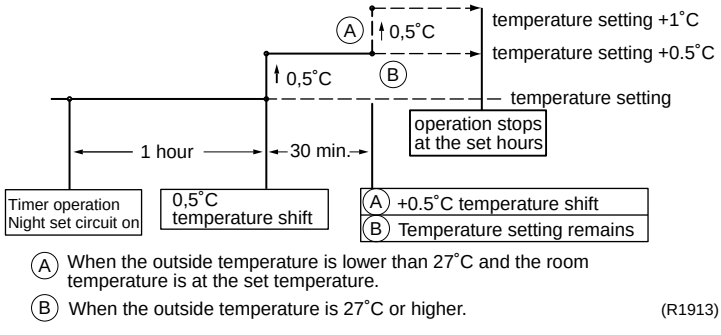
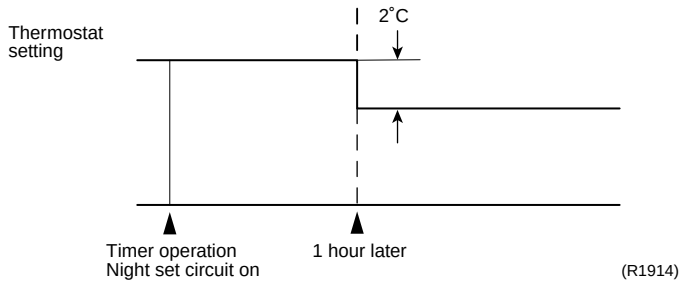
3. Required fan speed

- Fan speed changes the rotation speed every time when a thermostat switches over ON and OFF.
- When the thermostat becomes Off, fan continues to operate 10 minutes more with low speed so as to prevent recovery of humidity caused by reevaporation of the drain water, and then stops.

	Fan rpm (thermostat ON)
	J type (25 / 35)
Thermostat ON	970 / 980rpm
Thermostat OFF	800 / 800rpm
Thermostat ON and dry on powerful operation	1050 / 1050rpm

Night set mode

The night set mode is activated when the off timer is set. It restricts the operation frequency, to minimize the noise.

Item	Description	Drawing
cooling	The set temperature stays on for one hour, then decreases slightly for economical operation.	
heating	The set temperature stays on for one hour, then increases slightly for economical operation.	

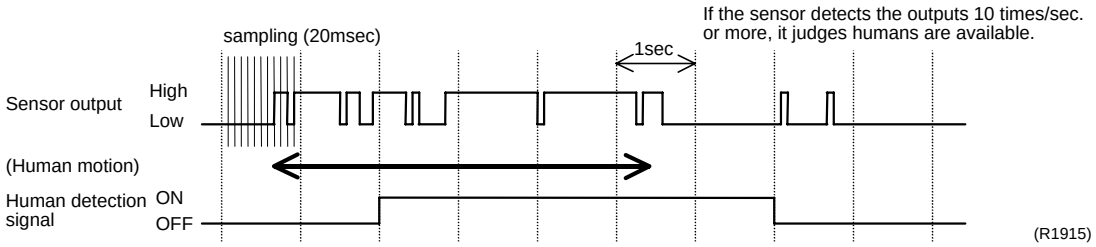
1.10 Intelligent Eye

Outline

The function that detects existence of humans in the air-conditioned room and reduces the capacity when no humans are available in the room in order to save electricity by means of a human motion sensor.

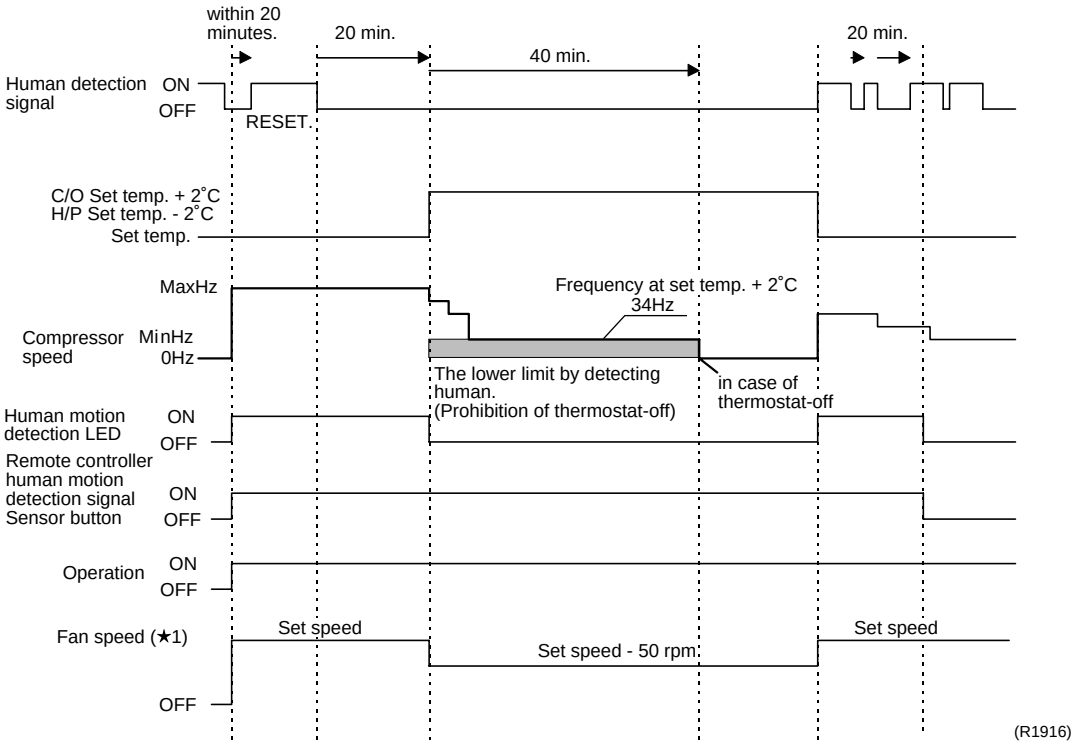
Processing

1. Detection method by human motion sensor



- This sensor detects human motion by receiving infrared rays and displays the pulse wave output.
- A micro computer in an indoor unit carries out a sampling every 20 msec. and if it detects 10 cycles of the wave in one second in total (corresponding to 20msec.× 10 = 100msec.), it judges human is in the room as the motion signal is ON.

2. The motions (for example: in cooling)



- When a micro computer doesn't have a signal from the sensor in 20 minutes, it judges that no body is in the room and turns off the human detection LED, operating the unit in temperature sifted 2°C from the set temperature. (Cooling : 2°C higher, Dry: 1°C higher and Auto : according to the operation mode at that time.)

★1 In case of Fan mode, the fan speed reduces by 50 rpm.

- Since the set temperature is shifted by 2°C higher for 40 minutes, compressor speed becomes low and can realize energy saving operation. But as thermostat is prone to be off by the fact that the set temperature has been shifted, the thermostat-off action is prohibited in 40 minutes so as to prevent this phenomena.
  After this 40 minutes, the prohibition of the thermostat-off is cancelled and it can realize the

conditions to conduct thermostat-off depending on the room temperature. In or after this forty minutes, if the sensor detects human motion detection signal, it turns on “Human detection LED” and let the set temperature and the fan speed return to the original set point, keeping a normal operation.

Others

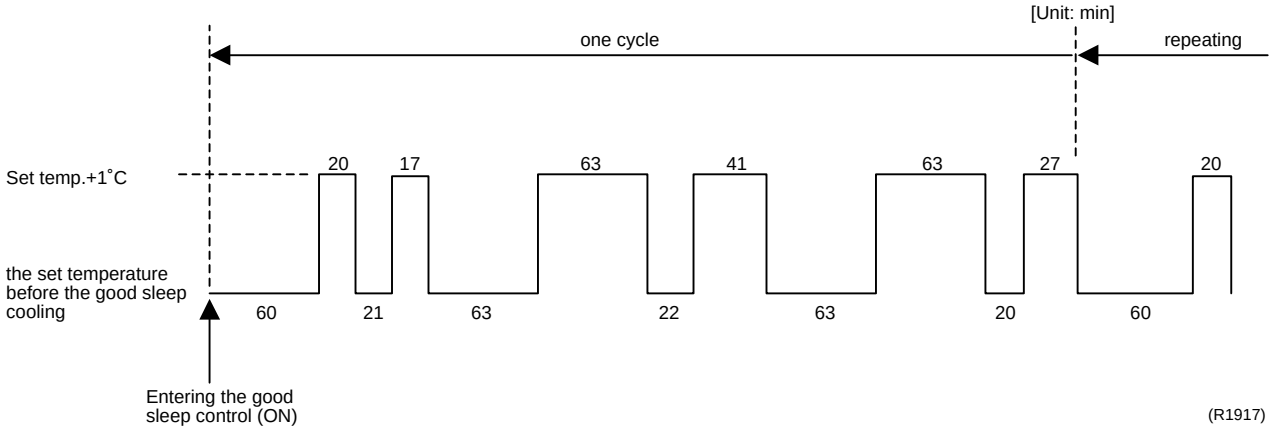
- The dry operation can’t command the setting temperature with a remote controller, but internally the set temperature is shifted by 1°C.

1.11 Good Sleep Cooling Control

Outline

The function to create deep sleeping and to offer good sleep by altering the set temperatures in certain intervals to give temperature variation to a living space based on “1/f temperature fluctuation” principle, in case of going to bed while air conditioner keeps operating in cooling mode.

Processing



Notes:

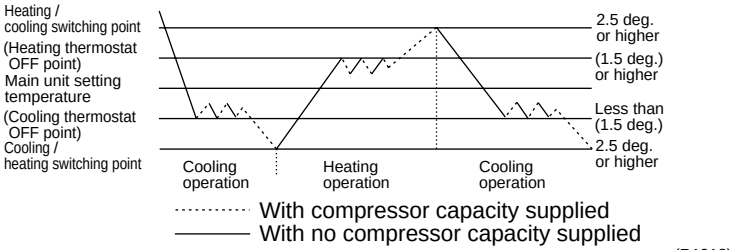
1. Each timer’s counting/stop is not related to a thermostat ON/OFF.
2. When the sleeping control works by the OFF timer, the shift from the set temperature should be just 1°C with this control function.
   (The temperature shift of the normal OFF-timer will not be carried out. However, the passed time should be remembered since the OFF-timer was set.)
3. While operation with the good sleep cooling control and off-timer setting, if the signal of the good sleep cooling OFF signal comes, the level of the set temperature shift should be set corresponding to the same with an existing value in accordance with the passed time since the OFF-timer was set.
4. When the good sleep cooling control is on while a normal operation with a OFF-timer is going on, once returning to the original criterion which doesn’t shift the timer’s set temperature, and the shift alteration at every sequence by 1°C is carried out in accordance with the value above mentioned.
5. Fan speed will change by the alteration of the set temperature by 1°C at the automatic fan speed operation mode, and it causes an alteration of fan noise. So, the fan tap should be fixed at L tap position during the good sleep cooling even at the auto fan speed operation.
6. The function of the good sleep cooling is cancelled, when the good sleep cooling operation is off or operation OFF command is received or also the operation mode changes to the mode except cooling.
7. The priority order for each function is ; ‘Powerful’, ‘Intelligent eye’, ‘Good sleep’, and ‘Night set mode’.

1.12 Automatic Operation

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

Detailed explanation of the function

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



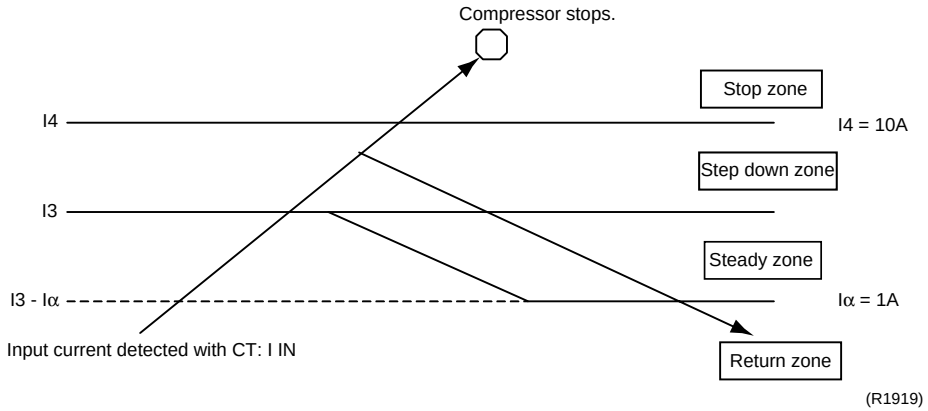
(R1918)

However, in the automatic Powerful cooling/heating mode, the guard timer is set as follows to prevent hunting in cooling / heating mode.

1.13 Input Current Control

Outline

The frequency control will be carried out so that the input current will not exceed the rated value in the zone which is divided by the input current detected with CT as the figure below shows.



- I4, I3, I3-Iα are included in the stop zone, step down, steady zone, respectively.

Processing

1. Frequency control in each zone

- Step down zone (judged as the step down zone with the input current I IN ≥ I3)
  - The upper limit FNYD of the frequency in this control is defined as 'operation frequency - 2 Hz'.
  - After this, the output frequency is dealt with step down by 2 Hz every one second till it will reach the steady zone.
- Steady zone (judged as the step down zone with I3 - Iα ≤ I IN < I3 by step down operation)
  - Keeping the present frequency's upper limit FNYD.
- Return zone (judged as the return zone with I IN < I3 - Iα) (Iα = 1A)
  - Limit of frequency is cancelled.
- Stop zone (judged as the stop zone with I IN ≥ I4)
  - Compressor is stopped and countermeasure for the malfunction is carried out.

2. Current step down : deciding I3

- In cooling mode
  - At outdoor temperature > DOAIC
    I3 = I3C - 0.5 × (outdoor temp. DOAIC) ∗ At POWER FULL, I3CPWF is used instead of I3C.
  - At outdoor temperature ≤ DOAIC
    I3 = I3C ∗ At POWER FULL, I3CPWF is used instead of I3C.

- In heating mode
  - At outdoor temperature > DOAIW
    I3 = I3W - 0.25 × (outdoor temp. - DOAIW) ∗ At POWER FULL, I3WPWF is used instead of I3C.
- ■ At outdoor temperature ≤ DOAIW
  I3 = I3W ∗ At POWER FULL, I3WPWF is used instead of I3W.

(a constant)	J type 25	J type 35
I3C	6.50 A	8.00 A
I3CPWF	7.25 A	8.50 A
DOAIC	40°C	40°C
I3W	6.50 A	7.50 A
I3WPWF	6.50 A	7.50 A
DOAIW	12°C	12°C

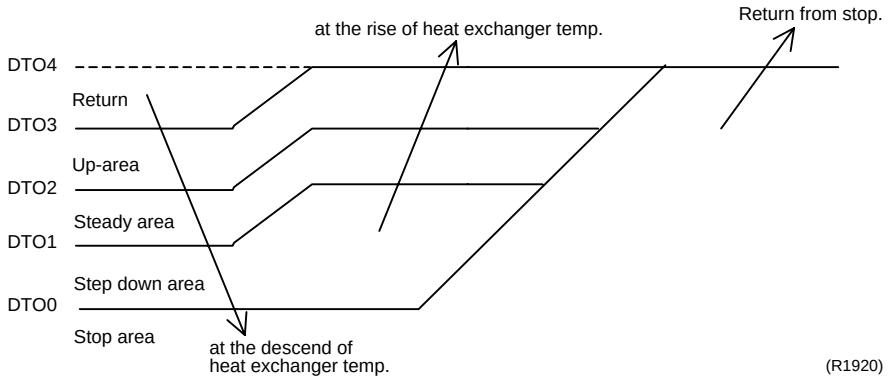
C : Cooling PWF : Powerful W : Heating
DOAIC : Ambient temperature at cooling
DOAIW : Ambient temperature at heating

1.14 Freeze Protection Function in Cooling

Outline

During Cooling/Dry operation, when the heat exchanger's temperature falls down excessively, the capacity supply will be reduced (frequency step down) so as to prevent freeze of the heat exchanger and the creation of dew on a rotor caused by a excessive capacity supply to the indoor unit.

Processing



Setting a constant	J type
DTO4	15°C
DTO3	8°C
DTO2	7°C
DTO1	5°C
DTO0	0°C

* DTO : Freeze protection temperature of heat exchanger

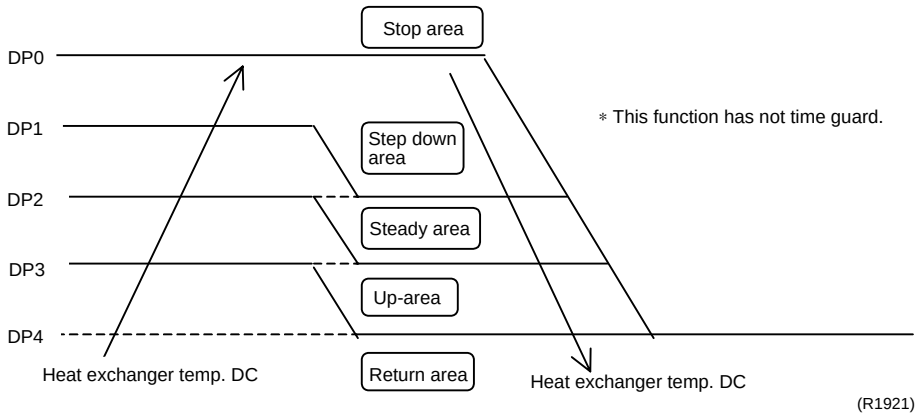
- The restriction for frequency is not conducted in the return area by means of freeze protection control.
- Frequency is increased approximately every 2 Hz/min. in the up-area.
- Frequency alteration in the steady area is not conducted.
- Frequency - down is carried out in the step down area approximately every 2 ~ 4 Hz/min..
- Compressors stop in the stop area. After compressor stops, fan keeps operating in 800 rpm (LL tap), aiming at rising heat exchanger's temperature.

1.15 Peak-Cut Control Function

Outline

In a heating operation, there will be anxiety that a head pressure excessively increases and exceeds the permissible limit in an over load conditions.
For avoiding this fact, when the head pressure increases, frequency step down control is carried out for the protection so that the head pressure will not exceed the permissible limit after detecting the temperature of the indoor unit's heat exchanger (saturation temperature equivalent to head pressure).

Processing



Setting a constant	J type
DP0	67°C
DP1	56°C
DP2	54°C
DP3	53°C
DP4	46°C

∗ J type makes DP1 ~ DP4 increase 2°C in POWER FULL heating operation.
∗ DP : Peak cut temperature of heat exchanger

- The restriction for frequency is not conducted in the return area by means of peak-cut control.
- Frequency is increased approximately every 2 Hz/min. in the up-area.
- Frequency alteration in the steady area is not conducted.
- Frequency - down is carried out in the step down area approximately every 4 Hz/20sec..
- Compressors stop in the stop area.

1.16 Four-Way Valve Function Compensation

Outline

When the initial start of compressors is required after power is on or at operation mode's alteration (Cooling/Dry ↔ Heating) that the a switch-over of a four-way valve takes place, it secures the necessary differential pressure by restricting the operation frequency in the lower limit in a certain period, and the switch-over action is ensured.

Processing

1. If a four-way valve is OFF when compressors stop, it will be ON at this time.
2. If a four-way valve was ON when compressors operated in the last time, it will be ON at this time.
3. At the start of compressors.
4. At the initial start of compressors after power is reset.

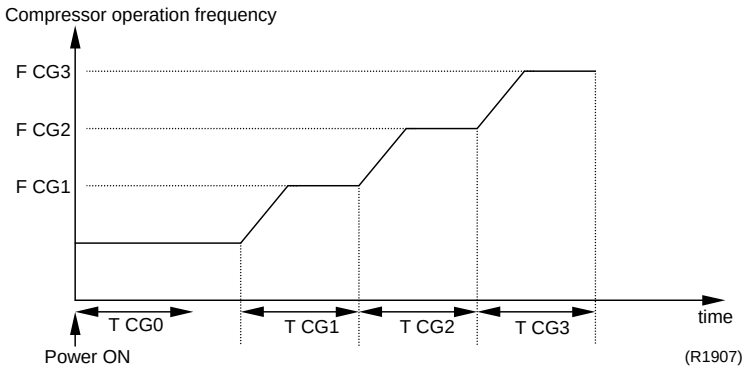
In case 1. and 3. are under the simultaneous condition of AND (it indicates Cooling) or 2. and 3 are under the simultaneous satisfaction of AND (it indicates Heating), or condition 4. is adapted, the processing applies 45 seconds after compressors begin operating and to set 66 Hz for the lower limit of operation frequency.

1.17 Compressor Protection Function

Outline

An refrigeration oil level descent and progression of the dilution which will arise at operation of the compressors will be avoided by controlling the upper limit of frequency at the edge of compressor's changeover from OFF to ON as follows.

Processing



1. A choice of a constant based on the starting conditions.

A constant is chosen in the following conditions at the start of compressors.

① In case TCG0 < TDEN
A type starting is adopted.

② In case TCG0 ≥ TDEN
B type starting is adopted.

∗ TCG0 is set only at power-ON and then start, keep counting regardless of the operation mode.
∗ The judge above should be done only at the start of compressors.
∗ TCG : Timer guard for compressor protection ∗ TDEN : Elapsed time after power-on

2. Frequency control

The following control is carried out after the judge of 1. above. A constant is chosen in accordance with A, B decided in 1).

① Timer TCG1 (A,B) will start at the start of compressors.
The upper limit of output frequency in between TCG1 (A,B) is set at FCG1 (A,B).

② In exceeding TCG1 (A,B), timer TCG2 (A,B) starts and the upper limit of output frequency in between TCG2 (A,B) is set at FCG2(A,B).

③ In exceeding TCG2 (A,B), timer TCG3 (A,B) starts and the upper limit of output frequency in between TCG3 (A,B) is set at FCG3(A,B).

④ In exceeding TCG3 (A,B), the frequency limit is cancelled.

3. Others

① If compressors go off at the start of this function, the timer under counting should be reset and cancelled the frequency limit.

② This function doesn't work under the control of defrosting.

Setting a constant	J type	Setting a constant	J type
FCG1A	46 Hz	TCG1A	120 sec
FCG1B	46 Hz	TCG1B	120 sec
FCG2A	66 Hz	TCG2A	570 sec
FCG2B	66 Hz	TCG2B	360 sec
FCG3A	90 Hz	TCG3A	120 sec
FCG3B	80 Hz	TCG3B	180 sec
		TDEN	30 min

∗ FCG : Frequency guard for compressor protection
∗ TCG : Timer guard for compressor protection

1.18 Wet Operation Protection

Outline

The lower limit of output frequency is limited in two steps in accordance with outdoor conditions in order to secure the reliability of compressor (suction dryness and differential pressure).

Processing

1. at the first step

① During operation of compressors.
② Outdoor temperature ≤ DOA1CG
■ If ① and ② are under the simultaneous condition with AND, the lower limit of frequency in this function is set at FCG7.

③ Compressors stop.
④ Outdoor temperature ≥ DOA2CG
■ If ③ and ④ are under the simultaneous condition with OR, the lower limit of frequency at the first step control is cancelled.

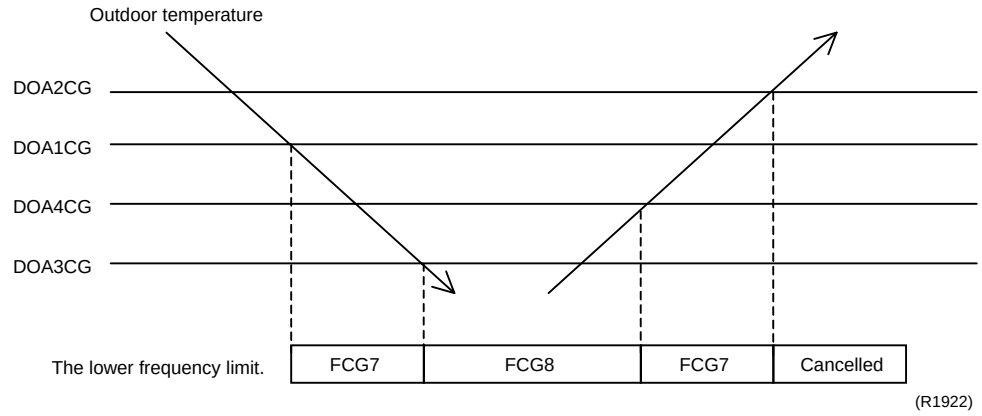
2. at the second step

① During operation of compressors
② Outdoor temperature ≤ DOA3CG
■ If ① and ② are under the simultaneous condition with AND, the lower limit of frequency in this function is set at FCG8.

③ Compressors stop.
④ Outdoor temperature ≥ DOA4CG
■ If ③ and ④ are under the coordinate condition with OR, the lower limit of frequency at the second step control is cancelled.

3. The set of a constant

DOA1CG, DOA2CG, DOA3CG, FCG7 and FCG8 have constants for Cooling /Heating separately and these constants are distinguished with a suffix c/w.



4. Actual constant

(In cooling)	J type 25 / 35
DOA1CGC	18°C
DOA2CGC	20°C
DOA3CGC	14°C
DOA4CGC	16°C
FCG7C	34Hz
FCG8C	34 Hz

(In heating)	J type 25 / 35
DOA1CGW	0°C
DOA2CGW	2°C
DOA3CGW	-4°C
DOA4CGW	-2°C
FCG7W	48 Hz
FCG7W	54 Hz

* DOA : Outdoor air temperature
CGC : Compressor guard for cooling
CGW : Compressor guard for heating
FCG : Frequency guard for compressor protection

1.19 Dew Condensation Sweating Prevention Function

Outline

During Cooling/Dry operation, when the heat exchanger's temperature falls down excessively, the capacity supply will be reduced (frequency step down) so as to prevent dew formation around a discharge grille caused by a excessive capacity supply to an indoor unit.

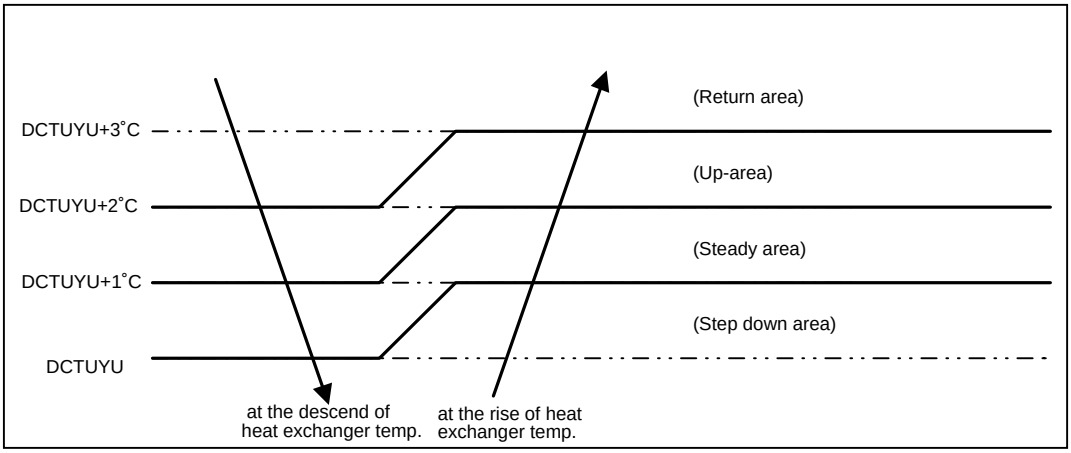
Processing

1. Conditions of beginning/ending for this function.

① Operation mode is in Cooling/Dry.
② Compressors operate.
③ Fan speed < MH tap
④ Outdoor temperature ≤ 32°C
Dew condensation sweating prevention function will start, if ①②③④ are under the simultaneous condition with AND.

⑤ Operation mode is not in Cooling/Dry.
⑥ Compressors stop
⑦ MH tap ≤ fan speed
⑧ Outdoor temperature > 32°C
Dew condensation sweating prevention function will be completed if ⑤⑥⑦⑧ are under the coordinate condition with OR.

2. Control details



(R1923)

- It controls the operation frequency in accordance with the temperature zone in the step down area ~ the return area which are set in every model.
- Frequency limitation by means of freeze protection control will not be carried out in the return area.
- Frequency is increased approximately every 2 Hz/min. in the up-area.
- Frequency alteration will not be conducted in the steady area.
- Frequency - down is carried out in the step down area approximately every 2 ~ 4 Hz/min.

Setting a constant	J type pair	J type multi.
DCTUYU	Room temp. × 0.94 - 12.5	11°C

DCTUYU : Heat exchanger temperature of dew condensation sweating prevention

Part 5
System Configuration

1. Instruction

1.1 FTK25 / 35J, FTX25 / 35J

Safety Precautions

- Read the following warnings and cautions carefully before operating the system and use it correctly.
- This manual classifies the precautions to the user into two categories on the right. Be sure to follow all as they are all important to ensure safety.
- After reading this manual, keep it in a place easily accessible to the user for future reference.

⚠ WARNING	Failure to follow a warning is very likely to result in such grave consequences as death or serious injury.
⚠ CAUTION	Failure to follow a caution may result in serious injury or property damage, and in certain conditions, may result in a grave consequence.

⚠ WARNING

Do not attempt to extend the power cord by joining it to another cord, or by using an extension cord. Do not put any other loads on the power supply socket.
Failure to follow this will cause electric shocks, abnormal heating or fire.

Do not damage or attempt to modify the power cord. Do not use the cord in a damaged state or tied in a bundle.
Applying a heavy weight, heat or tension on the power cord will damage it, causing electric shocks or fire.

Do not expose your body to the cool (heat) air for a long time; do not cool (heat) the room too much.
It will affect your physical conditions and cause health problems.

Do not put a finger, a rod or other objects into the air outlet or inlet.
As the fan is rotating at a high speed, it will cause injury.

Do not attempt to repair, relocate, modify or reinstall the air conditioner by yourself.
Incorrect work will cause electric shocks, fire etc. For repairs and reinstallation, consult the shop where you bought the air conditioner.

If anything abnormal such as a burning smell occurs, stop the operation immediately and turn the breaker OFF.
Continued abnormal operation will cause troubles, electric shocks, fire etc. If anything is abnormal, consult the shop where you bought the air conditioner.

If the air conditioner is not cooling or heating properly, the refrigerant may be leaking, so see the dealer where the unit was purchased. Check with a qualified repairman before attempting any repairs, which might accompany addition of refrigerant.
The refrigerant used in the air conditioner is safe. Although leaks should not occur, if for some reason any refrigerant happens to leak into the room, make sure it does not come in contact with any flame, such as fan heaters, kerosene heaters, or gas ranges, as this may result noxious substances being generated.

⚠ CAUTION

Do not use the air conditioner for preservation purposes.
Do not use it for preserving precision instruments, foods, plants, animals, works of fine arts etc. Performance or quality may deteriorate and animal or plant life may be shorter.

Do not operate the air conditioner with a wet hand.
It may cause an electric shock.

Ventilate the room from time to time.
Be careful especially when using a burning appliance in the same room. Insufficient ventilation may cause shortage of oxygen.

Before cleaning, be sure to stop the operation and turn the breaker OFF.
As a fan is rotating at a high speed, cleaning during operation may cause injury.

After a long use, check the unit stand and fittings for damage.
The unit may drop and cause injury if damage is left unrepaired.

Do not stand or sit on the outdoor unit. Do not place any object on the unit.
The object or the person may fall down or drop, causing injury.

Do not place under the indoor or outdoor unit anything which must be kept away from moisture.
Indoor unit: moisture in the air may condense and drip in certain conditions.
Outdoor unit: during cooling operation, condensation may drip from the piping connections.

Do not wash the unit with water.
It may cause an electric shock.

Do not allow children to mount on the outdoor unit or avoid placing any object on it.
Falling or tumbling may result in injury.

Do not expose plants or animals directly to the air flow.
It may cause adverse effects on the plant or the animal.

Do not place a vessel containing water on the unit.
Water may penetrate into the unit and degrade electrical insulations, resulting in an electric shock.

Do not place a burning appliance in places exposed to the air flow from the unit or under the indoor unit.
It may cause incomplete combustion or deformation of the unit from heat.

Do not block air inlets nor outlets.
Impaired air flow may result in insufficient performance or troubles.

2 (R1924)

Installation

⚠WARNING

Do not attempt to install the air conditioner by yourself.

Consult the service shop or a qualified technician.
Incorrect work will result in water leakage, electric shocks or fire. For installation, consult the service shop where you bought the unit or a qualified technician.

The air conditioner must be earthed.

Incomplete earthing may result in electric shocks.
Do not connect the earth line to a gas pipe, water pipe, lightening rod, or a telephone earth line .

⚠CAUTION

Do not connect the air conditioner to a power supply different from the specification.

It may cause trouble or fire.

Depending on the environment, an earth leakage breaker must be installed.

Lack of an earth leakage breaker may result in electric shocks.

Do not install the air conditioner in places where flammable gas may leak.

If leaked gas should accumulate near the unit, fire may occur.

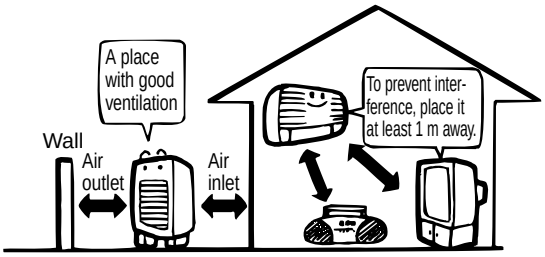
Arrange the drain hose to ensure smooth drainage.

Incomplete drainage may cause wetting of the building, furniture etc.

Installation site

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

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



- For efficient operation, take as large spaces around the unit as site allows.

Consider nuisance to your neighbours from noises.

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

Electrical work

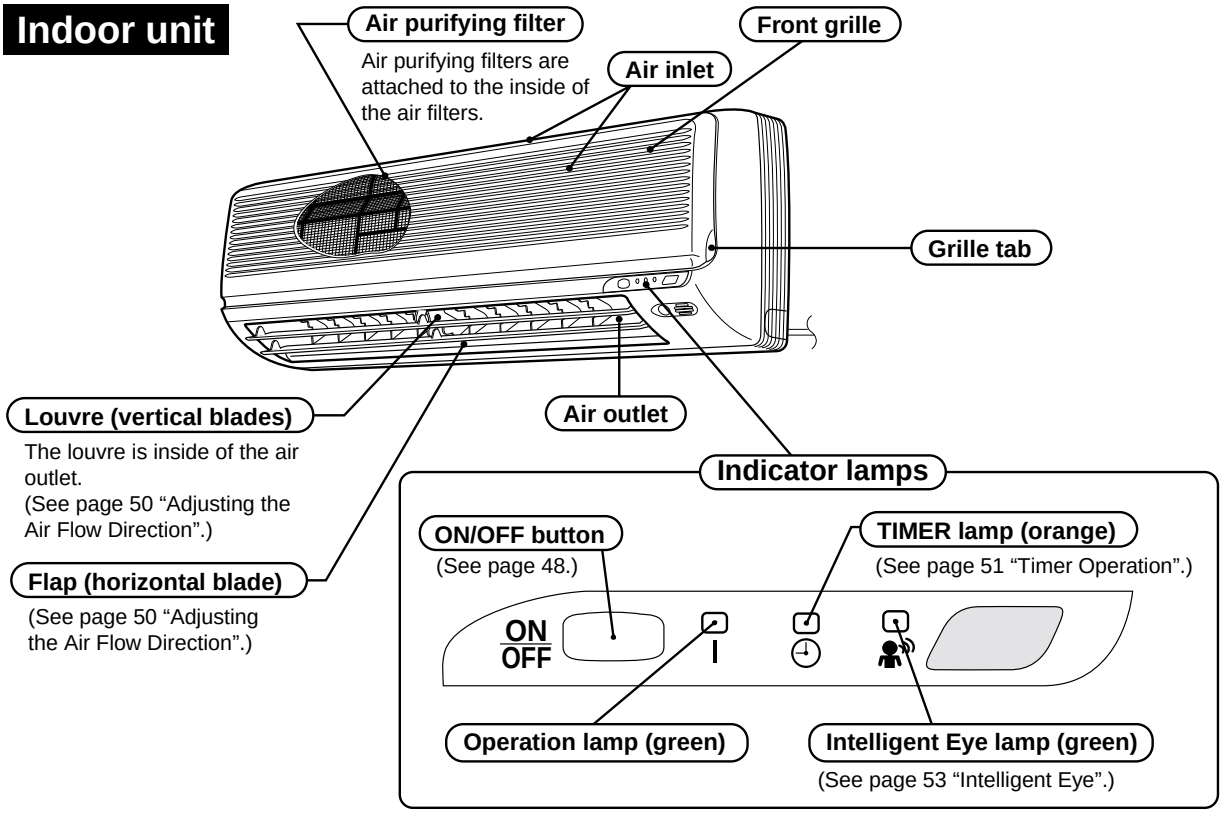
- For power supply, be sure to use a separate power circuit dedicated to the air conditioner.

System relocation

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

Names of Parts

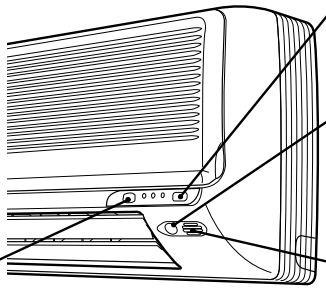
Indoor unit



Receiver explanation

⚠CAUTION

Before opening the front grille, be sure to stop the operation and turn the breaker OFF. If the power is on, the fan may rotate inside and may cause injury.



Receiver:

- It receives signals from the remote controller.
- When the unit receives a signal, you will hear a short beep.

Intelligent Eye:

- It detects the movements of people and automatically switches between normal operation and save operation. (See page 53.)

ON/OFF button

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

	Mode	Temperature setting	Air flow rate
FTK	COOL	22˚C	AUTO
FTX	AUTO	25˚C	AUTO

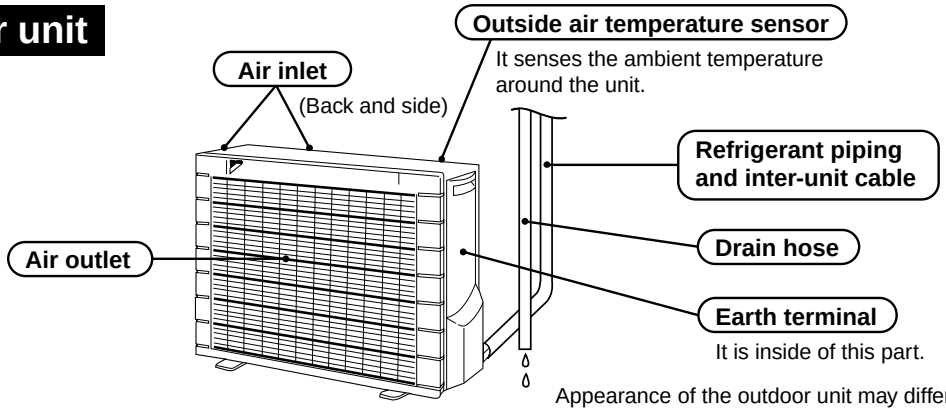
- In the case of multi system operation, there are times when the unit does not activate with this button. (See page 48.)

Room temperature sensor:

- It senses the air temperature around the unit.

Names of Parts

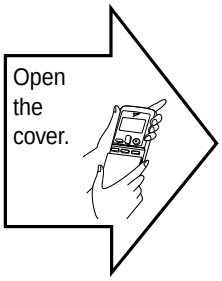
Outdoor unit



Appearance of the outdoor unit may differ with some models.

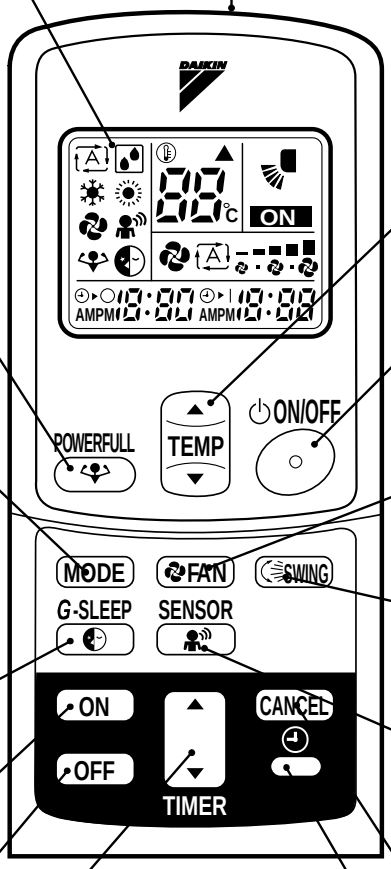
Remote controller

<FTK25, 35 FTX25, 35>



Display
It displays the current settings. (In this illustration, each section is shown with all its displays ON for the purpose of explanation. Some models may not show all its indications.)

Transmitter
It sends signals to the indoor unit.



POWERFULL button
(See page 49 "POWERFUL Operation")

MODE selector button
It selects the operation mode.

<FTK>	<FTX>
: DRY	: AUTO
: COOL	: DRY
: FAN	: COOL
	: HEAT

Good Sleep Cooling Operation (G-SLEEP)
(See page 52 "Good Sleep Cooling Operation (G-SLEEP)")

ON TIMER button
(See page 51 "Timer Operation")

OFF TIMER button

ON TIMER Setting button
It Changes the time setting

TEMPERATURE/TIME adjustment buttons
It changes the temperature setting.

ON/OFF button
Press it once to start operation. To stop it, press it once again.

FAN setting button
It selects the air flow rate setting.

SWING button
(See page 50 "Adjusting the Air Flow Direction")

Intelligent Eye button
(See page 53 "Intelligent Eye Operation")

TIMER CANCEL button
It cancels the timer setting.

CLOCK button
(See page 46 "Preparation Before Operation - Setting the Clock)

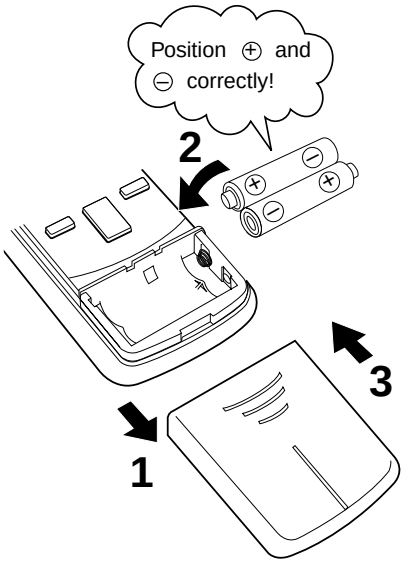
<ARC423A1, ARC423A2>

5
(R1927)

Preparation Before Operation

Remote controller

■ Setting the batteries



1 Press with a finger and slide the front cover to take it off.

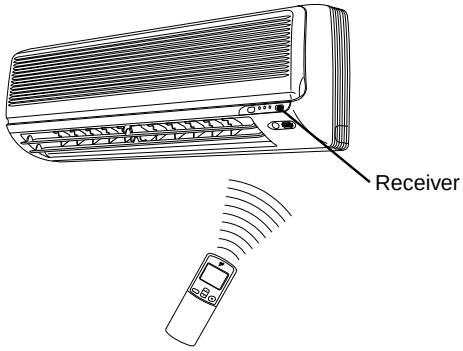
2 Set two dry batteries (AAA).

3 Set the back cover as before.
- This will cause the figures on the display to flash. Set the clock at this point.

ATTENTION

About batteries
- When replacing the batteries, use batteries of the same type, and replace the two old batteries together.
- When the system is not used for a long time, take the batteries out.
- When the operation display screen of the remote controller is hard to see and the reception become hard, replace the batteries with new AAA batteries.
- The attached batteries are provided for the initial use of the system.
  The usable period of the batteries may be short depending on the manufactured date of the air conditioner.

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

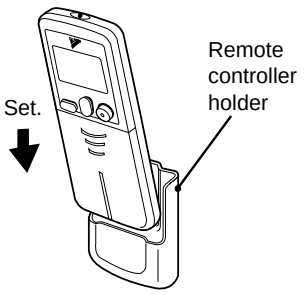


■ To fix the remote controller holder on the wall

1 Choose a place from where the signals reach the unit.

2 Fix the holder to a wall, a pillar, etc. with the screws supplied with the holder.

3 Fit the claw of the holder into the bottom of the remote controller, and push the remote controller onto the wall.



- To remove, pull it upwards.

ATTENTION

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

(R1928)

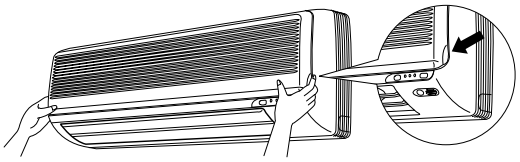
Preparation Before Operation

Indoor unit

■ Setting the air purifying filters

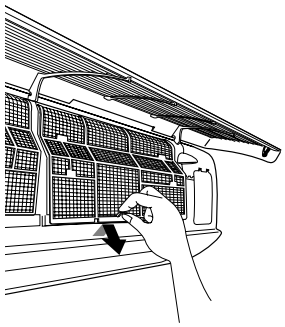
1 **Open the front grille**

- Hold the grille by the tabs on the two sides and lift it until it stops with a click. (about 60˚)



2 **Pull out the air filters.**

- Push upwards the tab at the center of each air filter, then pull it down.



3 **Set the air purifying filters.**

- Attach an air purifying filter to each air filter. (See page 54 "Care and cleaning")

4 **Set the air filters in their original positions and close the front grille.**

- Operation without air filters may result in troubles as dust will accumulate inside the indoor unit.

■ Setting the clock

1 Press .

AM 0:00 is displayed.

blinks.

2 Press to set the clock to the present time. TIMER

- Holding down (▲) or (▼) button rapidly increases or decreases the time display.

3 Press .

: blinks.

(Now the clock is set.)

■ Turn the breaker ON

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

NOTE

Tips for saving energy

- Be careful not to cool (heat) the room too much. Keeping the temperature setting at a moderate level helps save energy.

Recommended temperature setting

For cooling: 26˚C – 28˚C
For heating: 20˚C – 24˚C

- Cover windows with a blind or a curtain. Blocking sunlight and air from outdoors increases the cooling (heating) effect.
- Clogged air filters cause inefficient operation and waste energy. Clean them once in about every two weeks.

Please note

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

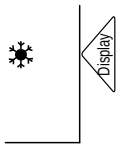
Mode	Operating conditions	If operation is continued out of this range:
COOL	Outdoor temperature : 10 to 46˚C Indoor temperature : 18 to 32˚C Indoor humidity : 80% max.	• A safety device may work to stop the operation. • Condensation may occur on the indoor unit and drip.
HEAT	Outdoor temperature : –10 to 21˚C Indoor temperature : 10 to 30˚C	• A safety device may work to stop the operation.
DRY	Outdoor temperature : 21 to 46˚C Indoor temperature : 18 to 32˚C Indoor humidity : 80% max.	• A safety device may work to stop the operation. • Condensation may occur on the indoor unit and drip.

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

AUTO • DRY • COOL • HEAT • FAN Operation

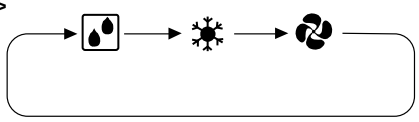
The air conditioner operates with the settings of your choice.
From the next time on, the air conditioner will operate with the same settings.

1 Press MODE and select a mode.

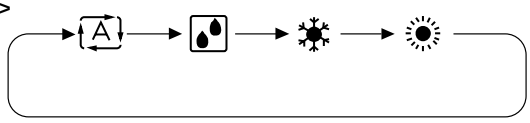


- Each pressing of the button advances the mode setting in sequence.

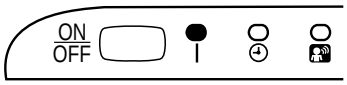
<FTK>



<FTX>



2 Press ⏻ON/OFF . Then OPERATION lamp lights up.

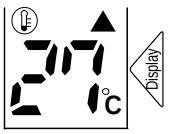


■ To stop:

Press ⏻ON/OFF once again.

Then OPERATION lamp goes off.

■ To change the temperature setting:

DRY or FAN mode	AUTO or HEAT or COOL mode
The temperature setting is not variable.	Press ▲ to raise the temperature and press ▼ to lower the temperature. Set to the temperature you like. 

To change the air flow rate setting:

Press FAN.

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

- At smaller air flow rates, cooling or heating effect is also smallwer.

■ To change the air flow direction:

(See page 50.)

NOTE

<Note on HEAT mode operation>

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

<Note on DRY mode operation>

This operation dehumidifies the indoor air when it is humid.

<Note on AUTO operation>

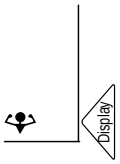
In AUTO operation, the system selects a temperature setting and an appropriate mode (COOL or HEAT) based on the room temperature at the start of the operation.
The system automatically reselects setting at a regular interval to bring the room temperature to user-setting level.
If you do not like AUTO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

POWERFUL Operation

POWERFUL operation quickly maximizes the cooling (heating) effect in any operation mode. You can get the maximum capacity with a touch of a button.

- Pressing the (POWERFUL) button during operation starts POWERFUL operation.
- POWERFUL operation ends in 20 minutes. Then the system automatically operates again with the settings which were used before POWERFUL operation.
- During you use POWERFUL operation, the other function will not go on.

1 Press ( ) .



■ To cancel POWERFUL operation:

Press ( ) .

Notes on POWERFUL operation

- **In COOL and HEAT mode**
  To maximize the cooling and heating effect, the capacity of outdoor unit must be increased and the air flow rate be fixed to the maximum setting.
  The temperature and air flow settings are not variable.
- **In DRY mode**
  The temperature setting is lowered by 3˚C and the air flow rate is slightly increased.
- **In FAN mode**
  The air flow rate is fixed to the maximum setting.

Adjusting the Air Flow Direction

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

Adjusting the horizontal blade (flap)

Press (SWING) while the air conditioner is operating.

- Every time the button is pressed, " " appears or disappears.

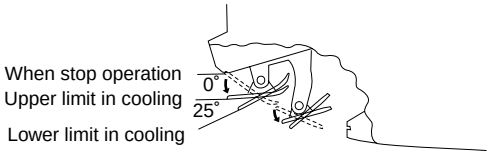
ON ..... The flap automatically swings up and down.

ON ..... To stop the flap at an angle you like, press (SWING) .

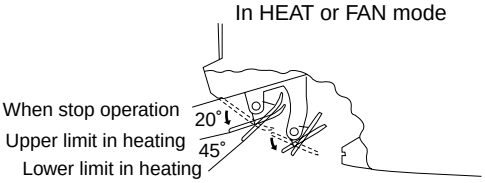
Notes on flap angles

- When (SWING) is selected, the flap swinging range depends on the operation mode. (See the figure.)
- The real flap angles are differ from the display of remote controller.

In DRY mode or COOL mode



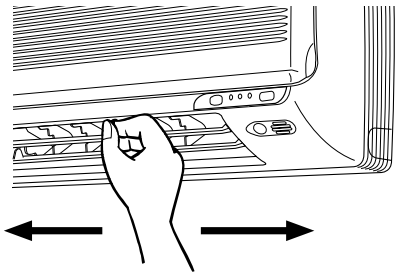
In HEAT or FAN mode



ATTENTION

- Always use a remote controller to adjust the flap angle. If you attempt to move it forcibly with hand when it is swinging, the mechanism may be broken.

Adjusting the louvre



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

ATTENTION

- Be careful when adjusting the louvre. Inside the air outlet, a fan is rotating at a high speed.

(R1932)

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.

OFF TIMER operation

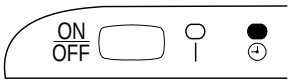
● Check that the clock is correct.
If not, set the clock to the present time. (See page 46.)

1 Press OFF while the air conditioner is operating.

AM 0:00 is displayed.
🕘○ blinks.
*Previous time setting appears on display.

2 Press ▲▼ (TIMER) until the time setting reaches the point you like.
● Every pressing of either button increases or decreases the time setting by 10 minutes. Holding down either button changes the setting rapidly.

3 Press OFF once again.



Then the TIMER lamp lights up.

■ To cancel the timer:

Press CANCEL . Then the TIMER lamp goes off.

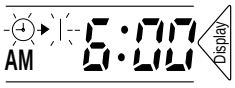
Notes on OFF TIMER

● 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.

ON TIMER operation

● Check that the clock is correct. If not, set the clock to the present time (See page 46).

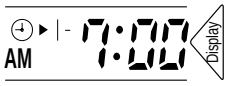
1 Press ON while the air conditioner is not operating.

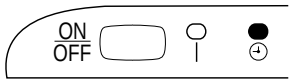


AM 6:00 is displayed.
🕘| blinks.
*Previous time setting appears on display.

2 Press ▲▼ (TIMER) until the time setting reaches the point you like.
● Every pressing of either button increases or decreases the time setting by 10 minutes. Holding down either button changes the setting rapidly.

3 Press ON once again.





Then the TIMER lamp lights up.

■ To cancel the timer:

Press CANCEL .

Then the TIMER lamp goes off.

Combining ON TIMER and OFF TIMER

● A sample setting for combining the two timers is shown below.

(Example)
Present time: 11:00 PM
(The unit operating)
OFF TIMER at 0:00 a.m.) Combined
ON TIMER at 7:00 a.m.)

Notes on ON,OFF TIMER

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

ATTENTION

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

Good Sleep Cooling Operation (G-SLEEP)

- The "Good Sleep Cooling Operation" makes the **1/f Fluctuating Temperature**.
  It brings you comfortable sleep as it prevents from getting chilied.

1 Press G-SLEEP in cooling operation.

■ **To change the temperature setting.** (See page 48.)

■ **To change the air flow rate setting.** (See page 48.)

■ **To change the air flow direction setting.** (See page 50.)

■ **To cancel the "Good Sleep Cooling Operation", press** G-SLEEP **.**
→ Back to the normal cooling opration.

Notes on "Good sleep cooling operation"

- We adopt the 1/f fluctuation rhythm in temperature control.
  A 1/f fluctuation rhythm is used in temperature control. With it, temperature is fluctuated within a ±1˚C range of the set temperature.
  The 1/f fluctuation is comfortable rhythm existed in the natural world. (refer to "What's the 1/f fluctuation")
- Air blow is the lowest when the fan is set to "AUTO".
- If you don't like this function, change the operation mode. (See page 48.)

What is 1/f fluctuation...

It seems irregular but there seems to be a self-resemblance rule in our mother nature.
For example, the waves in the ocean forms irregularly but when you look at the coast line, there are some places where they look similar.
When you look close around you, our heart doesn't beat in regular intervals but shows "1/f fluctuation" in a long term. The research shows this "1/f fluctuation" and comfort has some kind of relation and is applied to the comfort control fiels.

Intelligent Eye

"Intelligent Eye" is the infrared sensor which detecs the human movement.

1 Press SENSOR While the air conditioner is operating. (The Sensor lamp lights up.)

■ To cancel the "Intelligent Eye",

press SENSOR . (The Sensor lamp goes off.)

[EX.]

When somebody in the room
- **Normal operation**
  (The sensor lamp lights up.)

When nobody in the room
- **20 min. after, start save operation.***
  (The sensor lamp goes off.)

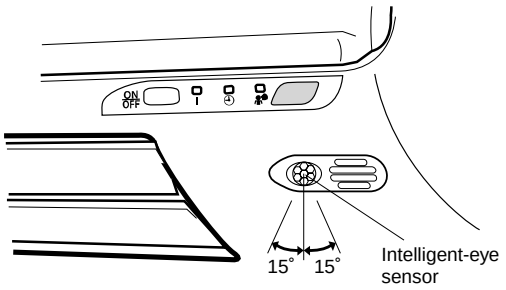
Somebody back in the room
- **Back to normal operation.**
  (The sensor lamp lights up again.)

"Intelligent Eye" is useful for *Energy Saving*

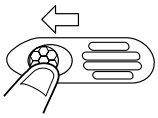
*** Save operation**
- Change the temperature –2˚C in heat/ +2˚C in cool/ +1˚C in dry mode from set temperature.
- Decrease the air flow rate slightly in fan operation.

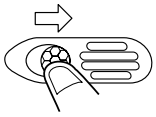
■ Adjusting the angle of the Intelligent-eye sensor

- You can adjust the angle of the Intelligent-eye sensor to remove the detection area. (Adjustable angle: 15˚ to right and left of centre)



- Gently push and slide the sensor to adjust the angle.


Moving the sensor to the left


Moving the sensor to the right

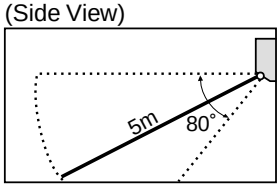
- After adjusting the angle, gently wipe the sensor with a clean cloth, being careful not to scratch the sensor.

CAUTION
- Do not hit or violently push the Intelligent-eye sensor. This can lead to damage and malfunction.

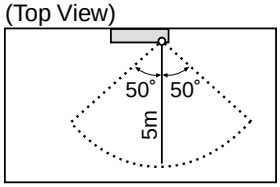
Notes on "Intelligent Eye"

- Application range is as follows.

Vertical angle 40˚ (Side View)



Horizontal angle 50˚ (Top View)



- Sensor may not respond when you are 5m or more away. (Check the application range)
- Sensor detection sensitivity changes according to indoor unit location, the speed of passersby, temperature range, etc.
- The sensor also mistakenly detects pets, sunlight, fluttering curtains and light reflected off of mirrors as passersby.
- Saving operation will not go on during powerful operation.
- Night set mode (see page 51.) will not go on during you use Intelligent Eye.
- You can sleep more comfortablly by using "Good Sleep Cooling Operation (G-SLEEP)" function (see page 52.) at the same time.

CAUTION

Do not place large objects near the sensor.
Also keep heating units or humidifiers outside the sensor's detection area.
This sensor can detect objects it shouldn't as well as not detect objects it should.

Care and Cleaning

⚠ CAUTION

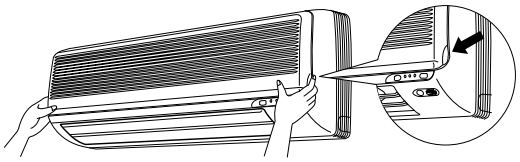
Before cleaning, be sure to stop the operation and turn the breaker OFF.

Cleaning the air filters

(It is recommended to clean them every two weeks.)

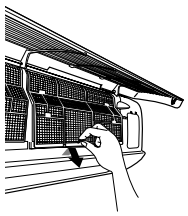
1 Open the front grille

- Hold the grille by the tabs on the two sides and lift it unitl it stops with a click. (about 60˚)



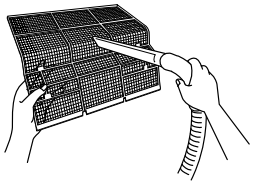
2 Pull out the air filters.

- Push a little upwards the tab at the center of each air filter, then pull it down.

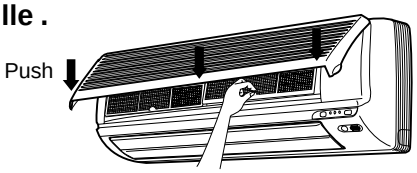


3 Take off the air purifying filters and clean them.

- Wash them with water, or clean them with a vacuum cleaner.
- If the dust does not come off easily, wash them with neutral detergent thinned with lukewarm water, then dry them up in the shade.



4 Set the air purifying filters and the air filters as they were and close the front grille.



- Insert claws of the filters into slots of the front panel. The front grille should lock at both sides and at the point in the middle. Push the grille at the 3 points indicated by ⬇.

NOTE

- In a dusty environment, clean the air filters at least once in every two weeks even before the cleaning lamp lights up.
- Operation with dusty air filters lowers the cooling and heating capacity and wastes energy.

Cleaning the indoor and outdoor units and the remote controller

- Wipe them with dry soft cloth.
  For cleaning, do not use water hotter than 40˚C, benzine, gasoline, thinner, nor other volatile oils, polishing compound, scrubbing brushes nor other hard stuff.

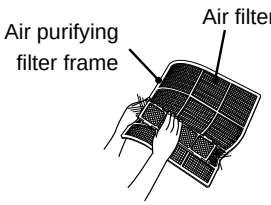
Replacing air purifying filters

(It is recommended to replace them every three months.)

- Air purifying filters need to be replaced regularly.

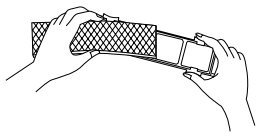
1 Open the front grille and pull out the air filters.

2 Take off the air purifying filters.

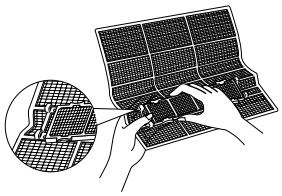


- Hold the recessed parts of the frame and unhook the four claws.

3 Detach the filter element and attach a new one.



4 Attach the air purifying filter.



5 Set the air filters as they were and close the front grille

(Push the grille at the 3 points, two at both sides and in the middle.)

NOTE

- To order air purifying filters, contact the service shop where you bought the air conditioner.
- Once the air purifying filter element gets dirty, it is not reusable but must be thrown away.
- Operation with dirty air purifying filters :
  - cannot clean the air.
  - results in poor cooling.
  - may cause odour.

Item	Part No.
Air purifying filter (with frame)	KAF918A41
Air purifying filter (without frame)	KAF918A42

(R1936)

Care and Cleaning

Cleaning the front grille

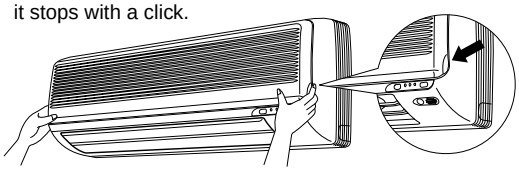
You may remove the front grille for cleaning.

⚠ CAUTION

- When removing or attaching the front grille, use a robust and stable stool and watch your steps carefully.
- When removing or attaching the front grille, support the grille securely with hand to prevent it from falling.
- For cleaning, do not use water hotter than 40˚C, benzine, gasoline, thinner, nor other volatile oils, polishing compound, scrubbing brushes nor othe hard stuff.
- After cleaning, make sure that the front grille is securely fixed.

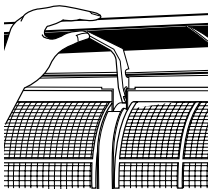
1 Open the front grille.

- Hold the grille by the tabs on the two sides and lift it until it stops with a click.



2 Remove the front grille.

- Supporting the front grille with one hand, release the lock by sliding down the knob with the other hand.
- To remove the front grille, pull it toward yourself with both hands.



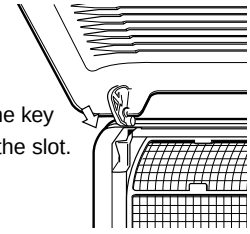
3 Clean the front grille.

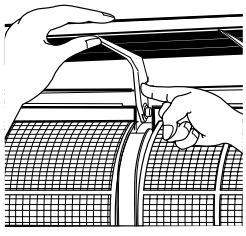
- You may wipe it with a soft cloth soaked in water.
- Only neutral detergent may be used.
- You may wash the grille with water. After washing, dry it with cloth, then dry it up in the shade.

4 Attach the front grille.

- Set the 3 keys of the front grille into the slots and push them in all the way.
- Supporting the front grille with one hand, fit the lock by sliding up the knob with the other hand.
- Close the front grille slowly in this state. (Push the grille at the 3 points, two at both sides and in the middle.)

Fit the key into the slot.





Slide up the knob.

Check

Check that the base, stand and other fittings of the outdoor unit are not decayed or corroded.

Check that nothing blocks the air inlets and the outlets of the indoor unit and the outdoor unit.

Check that the earth wire is not disconnected or broken.

Check that the drain comes smoothly out of the drain hose during COOL or DRY operation.

- If no drain water is seen, water may be leaking from the indoor unit. Stop operation and consult the service shop if this is the case.

Before a long idle period

1 Operate the fan alone for several hours on a fine day to dry out the inside.

<FTK>

1 Press MODE and select " ".

2 Press ON/OFF .

<FTX>

1 Press MODE and select " ".

2 Press TEMP and set the temperature to 32˚C

3 Press ON/OFF .

- Perform this operation when the room temperature is under 28˚C.

2 Clean the air filters and set them again.
3 Take out batteries from the remote controller.
4 Turn OFF the breaker for the room air conditioner.

Trouble Shooting

● **These cases are not troubles.**

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

Case	Explanation
Operation does not start soon. ● When ON/OFF button was pressed soon after operation was stopped. ● When the mode was reselected.	● This is to protect the air conditioner. You should wait for about 3 minutes.
Hot air does not flow out soon after the start of heating operation.	● The air conditioner is warming up. You should wait for 1 to 4 minutes. (The system is designed to start discharging air only after it has reached a certain temperature.)
The heating operation stops suddenly and a flowing sound is heard.	● The system is taking away the frost on the outdoor unit. You should wait for about 3 to 8 minutes.
The outdoor unit emits water or steam.	■ In HEAT mode • The frost on the outdoor unit melts into water or steam when the air conditioner is in defrost operation. ■ In COOL or DRY mode • Moisture in the air condenses into water on the cool surface of outdoor unit piping and drips.
Mists come out of the indoor unit.	■ This happens when the air in the room is cooled into mist by the cold air flow during cooling operation.
The indoor unit gives out odour.	■ This happens when smells of the room, furniture, or cigarettes are absorbed into the unit and discharged with the air flow. (If this happens, we recommend you to have the indoor unit washed by a technician. Consult the service shop where you bought the air conditioner.)
The outdoor fan rotates while the air conditioner is not in operation.	■ After operation is stopped: • The outdoor fan continues rotating for another 30 seconds for system protection. ■ While the air conditioner is not in operation: • When the outdoor temperature is very high, the out door fan starts rotating for system protection.
The operation stopped suddenly. (OPERATION lamp is on)	■ For system protection, the air conditioner may stop operating on a sudden large voltage fluctuation. It automatically resumes operation in about 3 minutes.

Trouble Shooting

● **Check again**

Please check again before calling a repair person.

Case	Check
The air conditioner does not operate. (OPERATION lamp is off)	● Hasn't a breaker turned OFF or a fuse blown? ● Isn't it a power failure? ● Are batteries set in the remote controller? ● Is the address switch in the remote controller set correctly? (See page 39 "Preparation Before Operation".) ● Is the timer setting correct?
Cooling or Heating effect is poor.	● Are the air filters clean? ● Is there anything to block the air inlet or the outlet of the indoor and the outdoor units? ● Is the temperature setting appropriate? ● Are the windows and doors closed? ● Are the air flow rate and the air direction set appropriately? ● Is the unit set to the Intelligent Eye mode? (See page 53.)
Operation stops suddenly. (OPERATION lamp blinks.)	● Are the air filters clean? ● Is there anything to block the air inlet or the outlet of the indoor and the outdoor units? Clean the air filters or take all obstacles away and turn the breaker OFF. Then turn it ON again and try operating the air conditioner with the remote controller. If the lamp still blinks, call the service shop where you bought the air conditioner.
An abnormal functioning happens during operation.	● The air conditioner may malfunction with lightening or radio waves. Turn the breaker OFF, turn it ON again and try operating the air conditioner with the remote controller.

Trouble Shooting

● **Call the service shop immediately.**

⚠ WARNING

■ When an abnormality (such as a burning smell) occurs, stop operation and turn the breaker OFF.

Continued operation in an abnormal condition may result in troubles, electric shocks or fire.
Consult the service shop where you bought the air conditioner.

■ Do not attempt to repair or modify the air conditioner by yourself.

Incorrect work may result in electric shocks or fire.
Consult the service shop where you bought the air conditioner.

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

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

Turn the breaker OFF and call the service shop.

■ After a power failure

The air conditioner automatically resumes operation in about three minutes. You should just wait for a while.

■ Lightening

If lightening may strike the neighbouring area, stop operation and turn the breaker OFF for system protection.

Disposal requirements

Dismantling of the unit, treatment of the refrigerant, oil and eventual other parts, should be done in accordance with the relevant local and national regulations.

We recommend periodical maintenance

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

18

(R1940)

Trouble Shooting

● Fault diagnosis

FAULT DIAGNOSIS BY REMOTE CONTROLLER

IN THE EVENT OF AN ABNORMALITY, THE RELEVANT ABNORMALITY CODE APPEARS FLASHING IN THE REMOTE CONTROLLER'S TEMPERATURE DISPLAY.

	CODE	MEANING
SYSTEM	00	NORMAL
	U0	REFRIGEMENT SHORTAGE
	U2	POWER FACTOR MODULE ABNORMALITY
	U4	INCORRECT INTERUNIT WIRING(INTERUNIT)
	U5	INCORRECT INTERUNIT WIRING (INDOOR UNIT-REMOTE CONTROLLER)
INDOOR UNIT	A5	FREEZE-UP PROTECTOR "OR STOPPED BY HIGH PRESSURE CONTROL"
	A6	FAN MOTOR FAULT
	C4 OR C5	FAULTY HEAT EXCHANGER SENSOR
	C9	FAULTY SUCTION AIR TEMPERATURE SENSOR

	CODE	MEANING
OUTDOOR UNIT	E5	INTERNAL THERMOSTAT WORKED OR HIGH DISCHARGE PIPE TEMPERATURE
	E6	FAULTY COMPRESSOR START
	H8	CT ABNORMALITY
	H9	FAULTY SUCTION AIR TEMPERATURE SENSOR
	J3	FAULTY DISCHARGE PIPE TEMPERATURE SENSOR
	J6	FAULTY HEAT EXCHANGER SENSOR
	J9	FAULTY GAS PIPE TEMPERATURE SENSOR
	L4	HIGH TEMPERERATURE AT INVERTER CIRCUIT HEATSINK
	P4	FAULTY INVERTER CIRCUIT HEATSINK TEMPERATURE SENSOR

Part 6
Service Diagnosis

1. Caution for Diagnosis

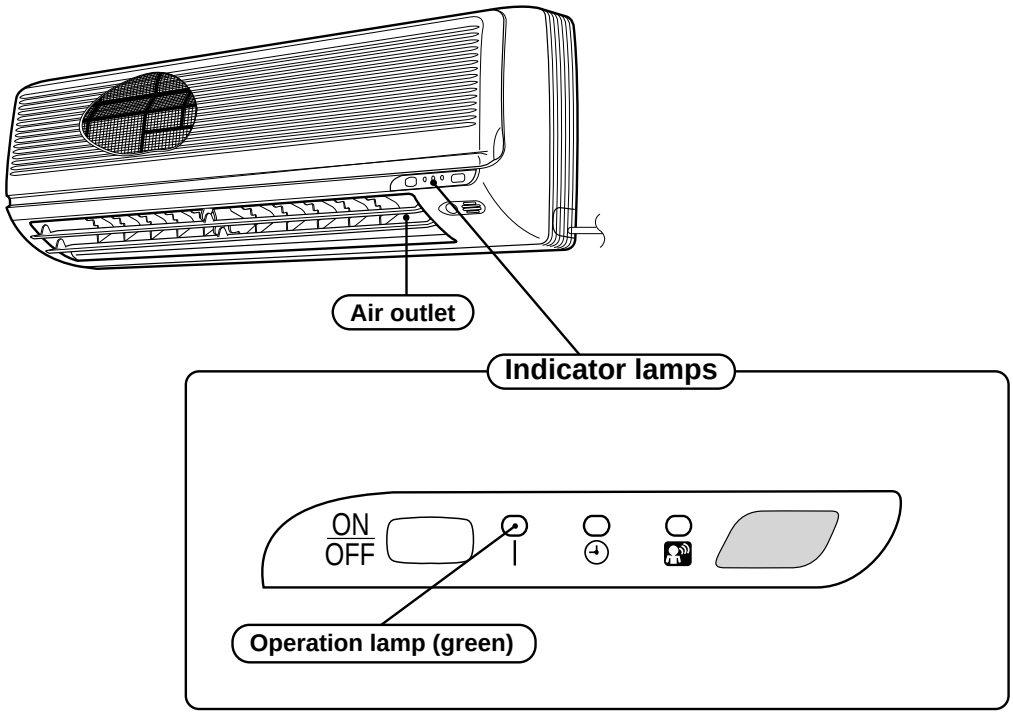
1.1 Troubleshooting with The Operation Lamp

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

1. When a protection device of the indoor or outdoor unit is activated or when the thermistor malfunctions, disabling equipment operation.
2. When a signal transmission error occurs between the indoor and outdoor units.

In either case, conduct the diagnostic procedure described in the following pages.

Location of Operation Lamp



(R1942)

2. Problem Symptoms and Measures

Problem Symptom	Check Item	Details of Measure	Page No. to be referred
None of The Units Operates.	Check the power supply.	Check to make sure that the rated voltage is supplied.	—
	Check the type of the indoor units.	Check to make sure that the indoor unit type is compatible with the outdoor unit.	—
	Check the outside air temperature.	Heating operation cannot be used when the outside temperature is 30°C or higher (only for heat pump model), and cooling operation cannot be used when the outside temperature is below 0 °C.	—
	Check the remote controller addresses.	Check to make sure that 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 can stop air conditioner operation. (Operation lamp OFF)	—
	Check the outside air temperature.	Heating operation cannot be used when the outside temperature is 30°C or higher (only for feat pump model), and cooling operation cannot be used when the outside temperature is below 0°C.	—
Some indoor units do not operate.	Check the type of the indoor units.	Check to make sure that the indoor unit type is compatible with the outdoor unit.	—
Equipment operates but does not cool, or does not heat (only for heat pump model).	Check for thermistor detection errors.	Check to make sure that the main unit's thermistor has not dismounted from the pipe holder.	—
	Diagnosis by service port pressure and operating current	Check for insufficient gas.	91
Large Operating Noise and Vibrations	Check the output voltage of the power transistor.	—	87
	Check the power transistor.	—	—
	Check the installation condition.	Check to make sure that the required spaces for installation (specified in the Technical Guide, etc.) are provided.	—

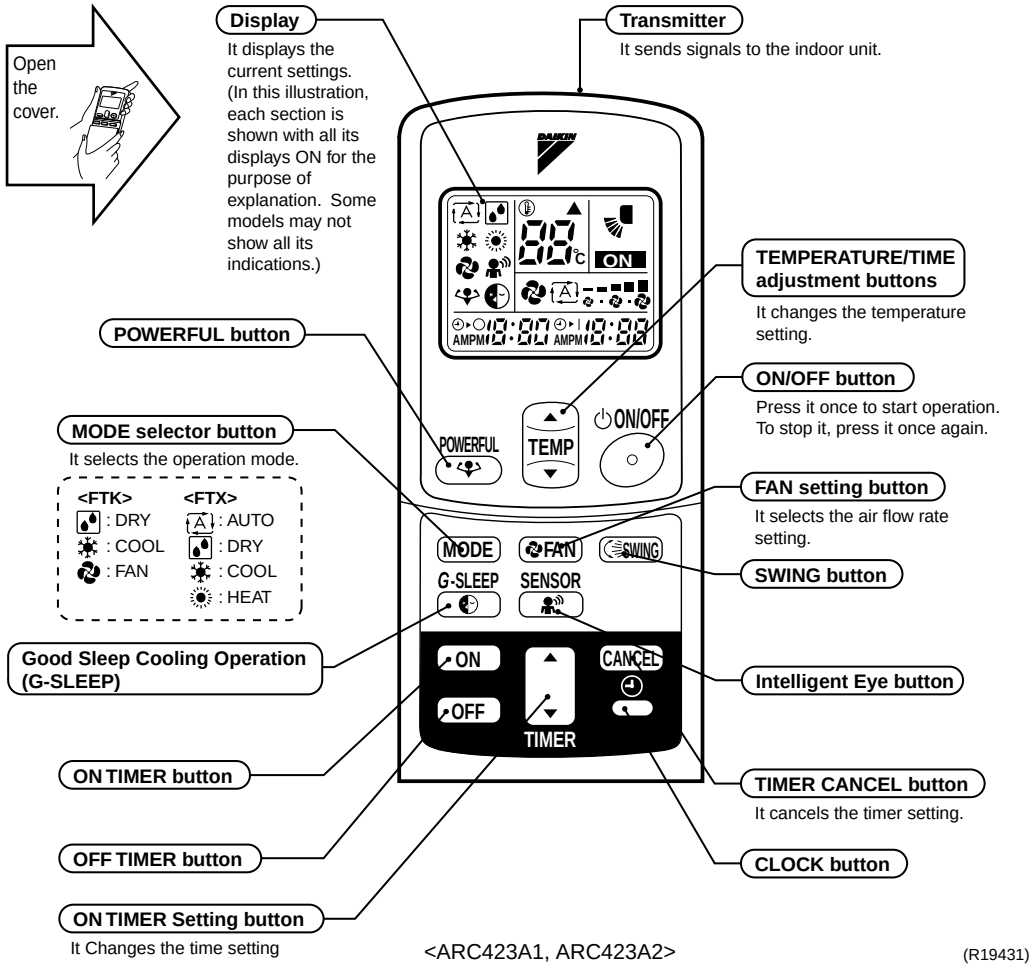
3. Service Check Function

3.1 ARC423 Series

In the ARC423A series, the temperature display sections on the main unit indicate corresponding codes.

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

< Cover in open position >



<ARC423A1, ARC423A2> (R19431)

2. Press the timer cancel button repeatedly until a continuous beep is produced.

■ The code indication changes in the sequence shown below, and notifies with along beep .

No.	Code	No.	Code	No.	Code
1	00	11	E7	21	UA
2	U4	12	C7	22	A5
3	F3	13	H8	23	J9
4	E6	14	J3	24	E8
5	L5	15	A3	25	P4
6	A6	16	A1	26	L3
7	E5	17	C4	27	L4
8	LC	18	C5	28	H6
9	C9	19	H9	29	H7
10	U0	20	J6	30	U2

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

4. Code Indication on The Remote Controller

4.1 Error Codes and Description of Fault

	Code Indication	Description of Problem
System	00	Normal
	U4	Signal transmission error (between indoor and outdoor units)
Indoor Unit	A1	Faulty indoor unit PCB
	A5	Operation halt due to the freeze protection function or high pressure control
	A6	Fan motor or related abnormality
	C4	Heat exchanger temperature thermistor abnormality
	C9	Room temperature thermistor abnormality
	CA	Discharge air temperature thermistor abnormality
Outdoor Unit	E5	Interrupt due to OL Action
	E6	Compressor startup error
	E8	Inverter units - Input overcurrent
	H8	CT or related abnormality
	H9	Outside air thermistor or related abnormality
	J3	Discharge pipe temperature thermistor or related abnormality
	J6	Heat exchanger temperature thermistor or related abnormality
	L5	Inverter units - Output overcurrent

5. Trouble shooting

5.1 Faulty PCB

Remote Controller Display	A1
Indoor unit LED Display	
Method of Malfunction Detection	Evaluation of zero-cross detection of power supply by indoor unit.
Malfunction Decision Conditions	■ When there is no zero-cross detection in approximately 10 continuous seconds. ■ When the information saved in E^2PROM cannot be read.
Supposed Causes	■ Faulty indoor unit PCB
Troubleshooting	■ Replace the indoor unit PCB.

5.2 Operation Shutdown Due to High-Pressure Control or Freeze-Up Protection (Thermistor Activation)

Remote Controller Display

A5

Indoor unit LED Display

Method of Malfunction Detection

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

Malfunction Decision Conditions

- High pressure control
  During heating operations, the temperature detected by the indoor heat exchanger thermistor is above 67°C
- Freeze protection
  When the indoor unit heat exchanger temperature is below 0°C during cooling operation.

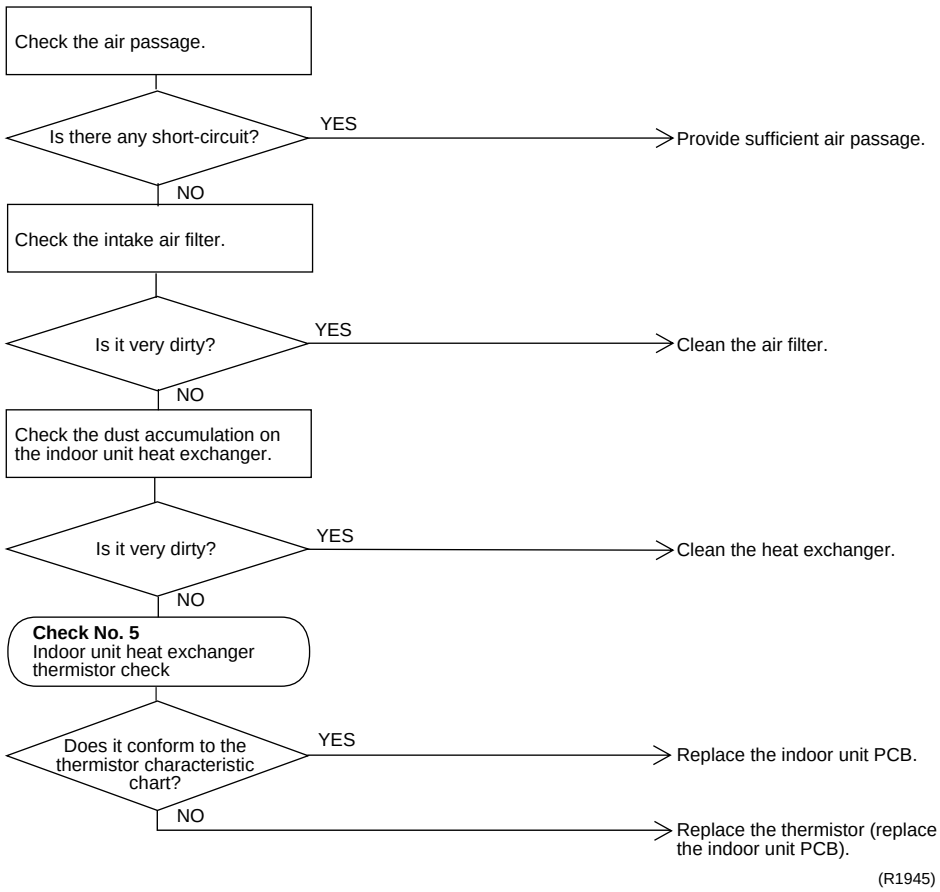
Supposed Causes

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

Troubleshooting

Check No.5
Refer to P.88

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



(R1945)

5.3 Operation Halt Due to Fan Motor (AC Motor) or Related Abnormality

Remote Controller Display

A6

Indoor unit LED 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

When the detected rotation speed is less than 50% of the HH tap under maximum fan motor rotation demand.

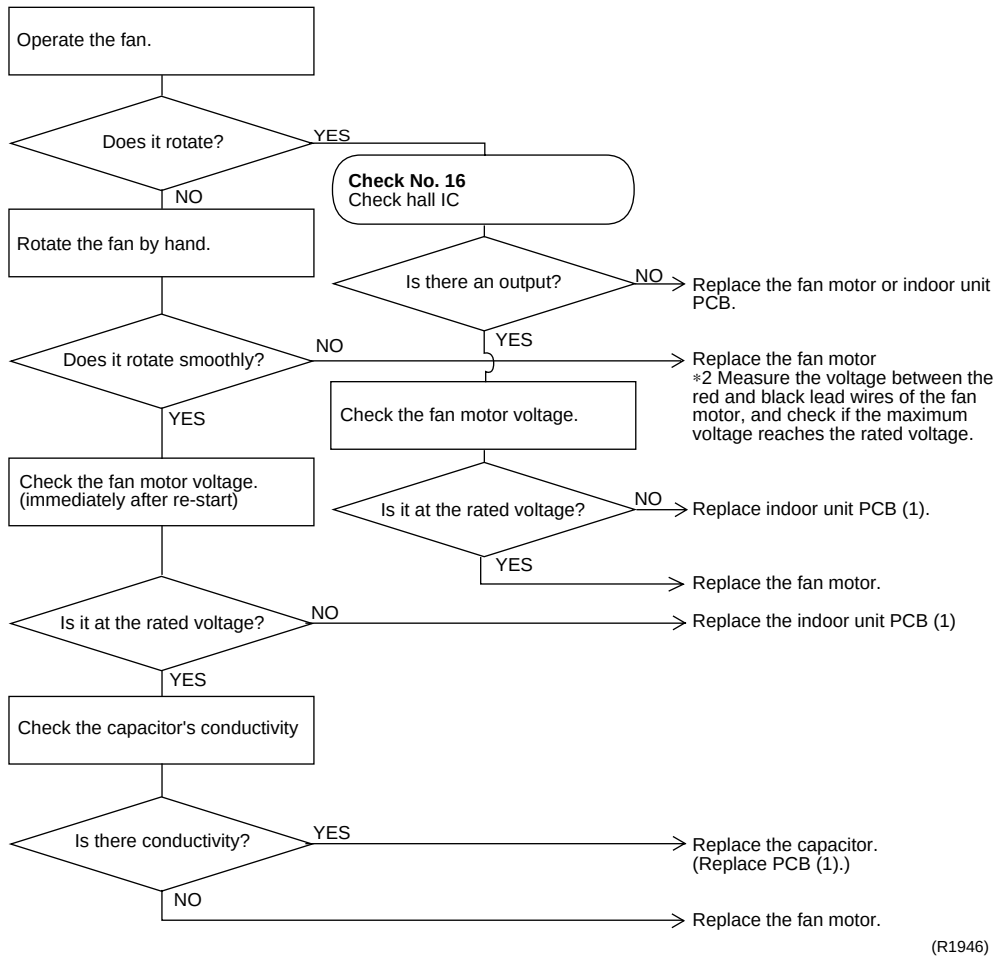
Supposed Causes

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

Troubleshooting

Check No.16
Refer to P.92

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



(R1946)

5.4 Operation Halt Due to Detection of Thermistor or Related Abnormality

Remote Controller Display

C4, C9, CA

Indoor unit LED Display

Method of Malfunction Detection

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

Malfunction Decision Conditions

When the thermistor input is more than 4.96 V or less than 0.04 V during compressor operation*.
* (reference)
When above about 212°C (less than 120 Ω) or below about -50°C (more than 1,860 kΩ).

Note: The values vary slightly in some models.

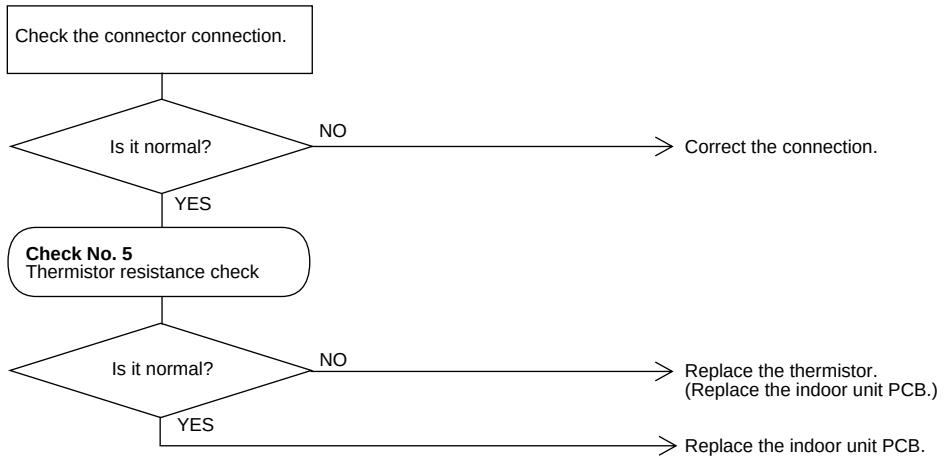
Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

Troubleshooting

Check No.5
Refer to P.88

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



(R1947)

C4 : Heat exchanger temperature thermistor
C9 : Suction air thermistor
CA : Discharge air thermistor

5.5 Faulty Indoor Unit PCB

Remote Controller Display

*

Indoor unit LED Display

Method of Malfunction Detection

The proper program operation of the microcomputer is checked by the program.

Malfunction Decision Conditions

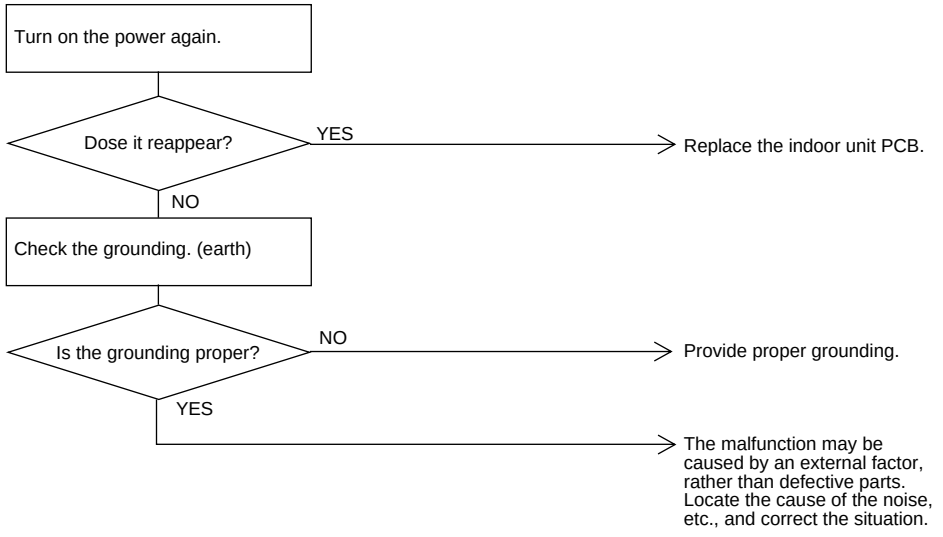
When the microcomputer program does not function properly.

Supposed Causes

- Microcomputer program is in abnormal condition due to an external factor.
  - ∗Noise.
  - ∗Momentary voltage drop.
  - ∗Momentary power failure, etc.
- Faulty indoor unit PCB.

Troubleshooting

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



(R1948)

5.6 Faulty Indoor Unit PCB

Remote Controller Display	*
Indoor unit LED Display	
Method of Malfunction Detection	The condition of the transmission circuit for indoor-outdoor signal transmission is detected.
Malfunction Decision Conditions	When the transmission circuit remains ON.
Supposed Causes	■ Faulty indoor unit PCB
Troubleshooting	■ Replace the indoor unit PCB.

5.7 Power Supply Abnormalities or Faulty Indoor Printed Circuit Boards

Remote Controller Display

* or U4

Indoor unit LED Display

Method of Malfunction Detection

1. The proper program operation of the microcomputer is checked by the program.
2. In indoor-outdoor signal communications, the indoor unit determines whether the outdoor unit receives signals properly by detecting signals transmitted by the outdoor unit to the indoor unit.

Malfunction Decision Conditions

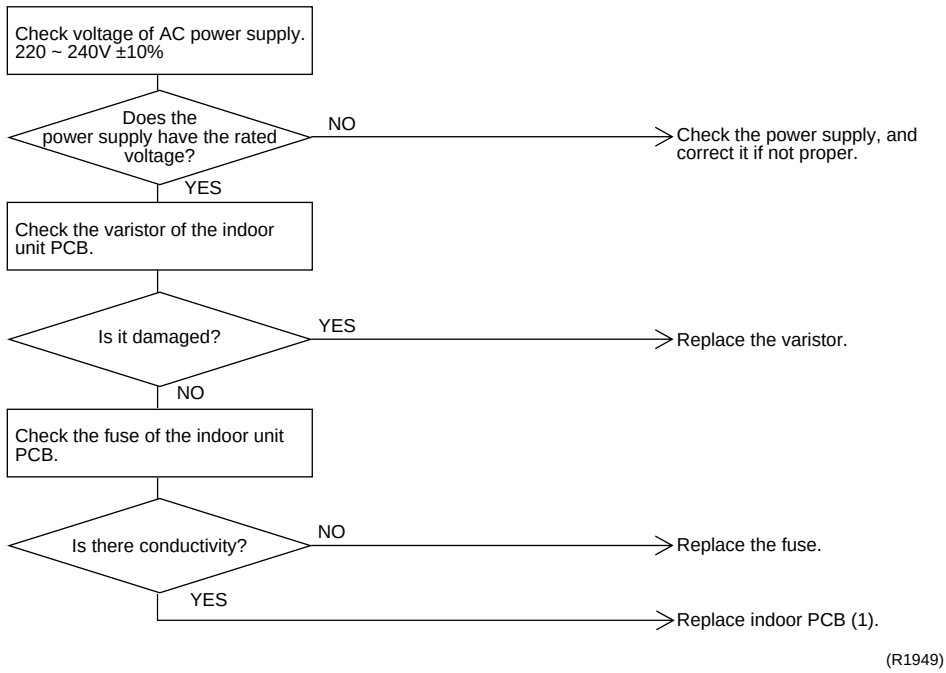
1. When the microcomputer program does not function properly.
2. When the indoor unit determines that the indoor unit does not properly receive signals transmitted by the outdoor unit in indoor-outdoor signal communications.

Supposed Causes

- Display disabled by fault power supply.
- Faulty signal transmitting/receiving circuit in indoor printed circuit boards (1) and (2)
- Microcomputer program is in abnormal condition due to an external factor.
  - Noise.
  - Momentary voltage drop.
  - Momentary power failure, etc.
- Faulty indoor unit PCBs (1) and (2).

Troubleshooting

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



(R1949)

5.8 Signal Transmission Error (Between Indoor and Outdoor Units)

Remote Controller Display

U4

Indoor unit LED Display

Method of Malfunction Detection

The data received from the outdoor unit in indoor unit-outdoor unit signal transmission is checked whether it is normal.

Malfunction Decision Conditions

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

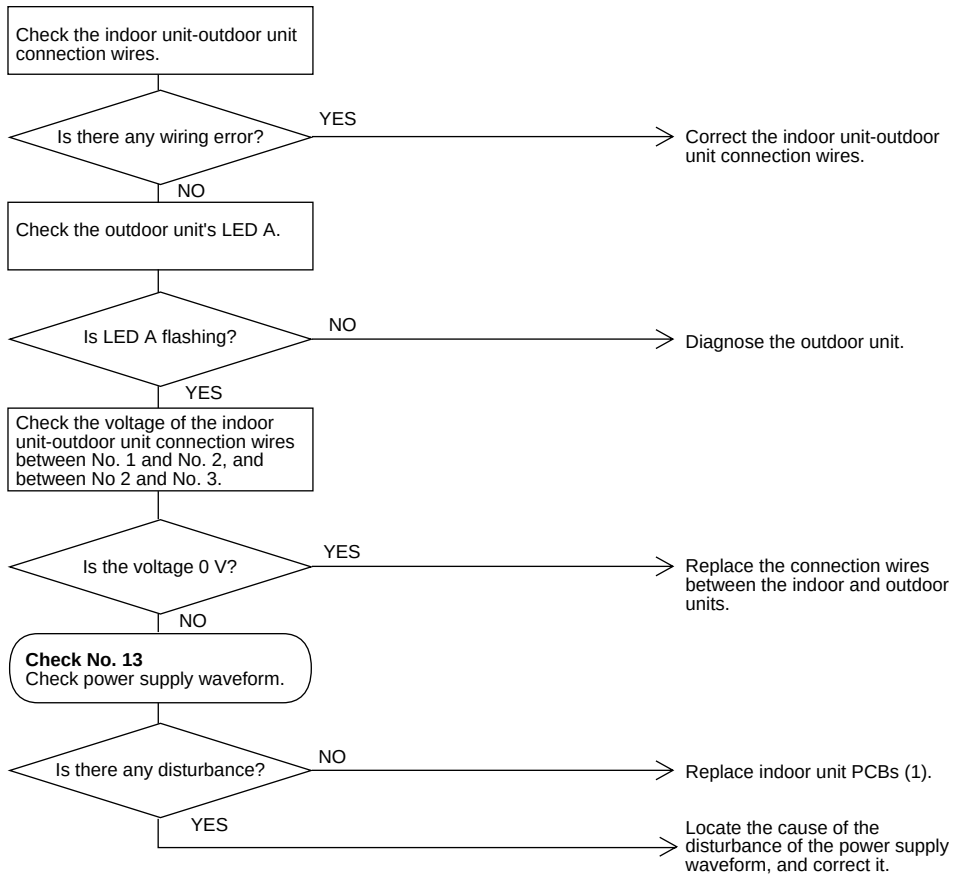
Supposed Causes

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

Troubleshooting

Check No.13
Refer to P.91

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



(R1950)

5.9 Operation Halt Due to Detection of CT Error

Remote Controller Display

H8

Outdoor unit LED Display

A

Method of Malfunction Detection

CT errors are detected using the compressor's operating frequency and the input current detected by the CT.

Malfunction Decision Conditions

When the compressor's operating frequency is more than 62 Hz and the CT input is less than 0.1 V.

* Inlet current 0.75 A

- When a CT error is generated 4 times, the system shuts down.
- The malfunction counter will be reset unless the emergency stop will take place within sixty minutes of the compressor operation time (as integrated time) after the return from the malfunction (including the other emergency stops).

Supposed Causes

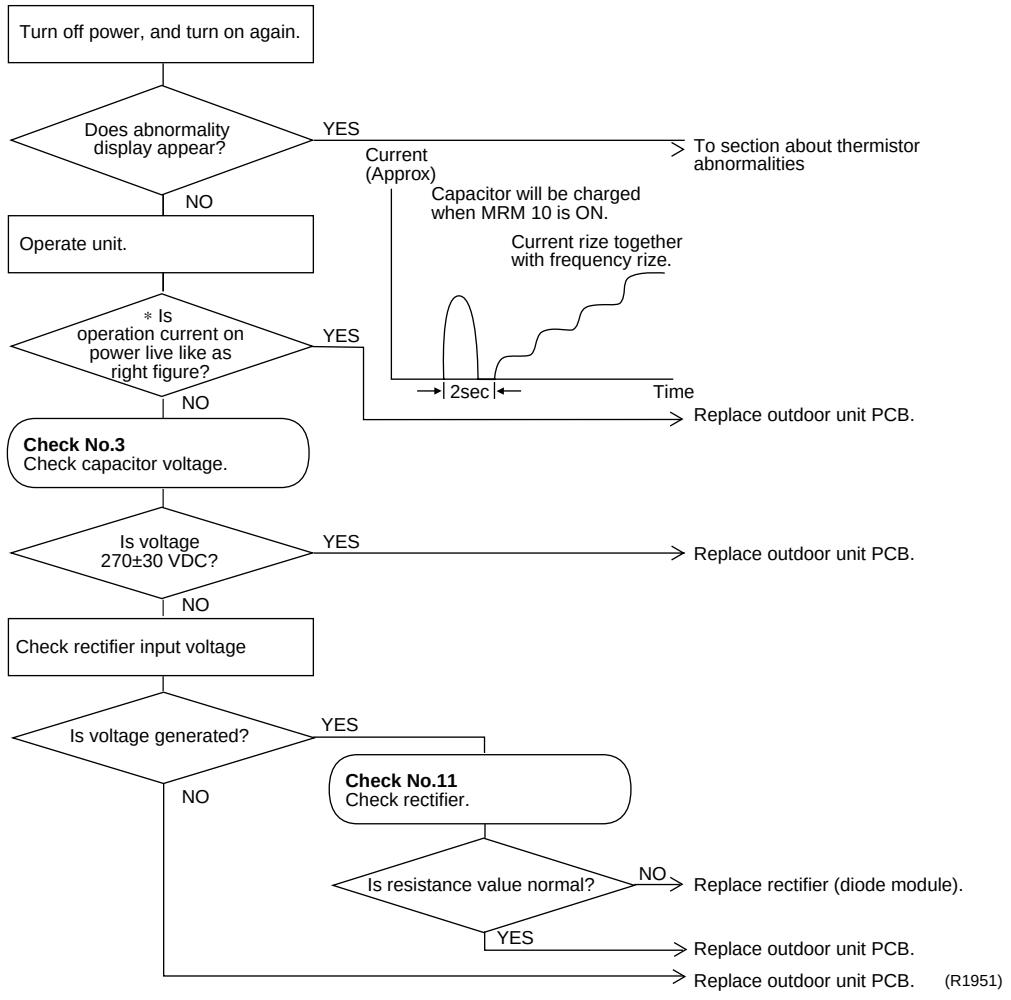
- Faulty power transistor
- Breaking of wire or faulty connection of internal wiring
- Faulty outdoor PCB (1).

Troubleshooting

Check No.3
Refer to P.85

Check No.11
Refer to P.90

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



(R1951)

5.10 Operation Halt Due to Thermistor Error or Disconnection Detection

Remote Controller Display

J3, J6, H9

Outdoor unit LED Display

A

Method of Malfunction Detection

Thermistor errors are detected using thermistor input voltage to micro computer. (Thermistor errors are detected using the temperatures detected by the thermistors.)

Malfunction Decision Conditions

When the thermistor input during compressor operation is more than 4.96 V or less than 0.04 V.
* Value changes depends on models

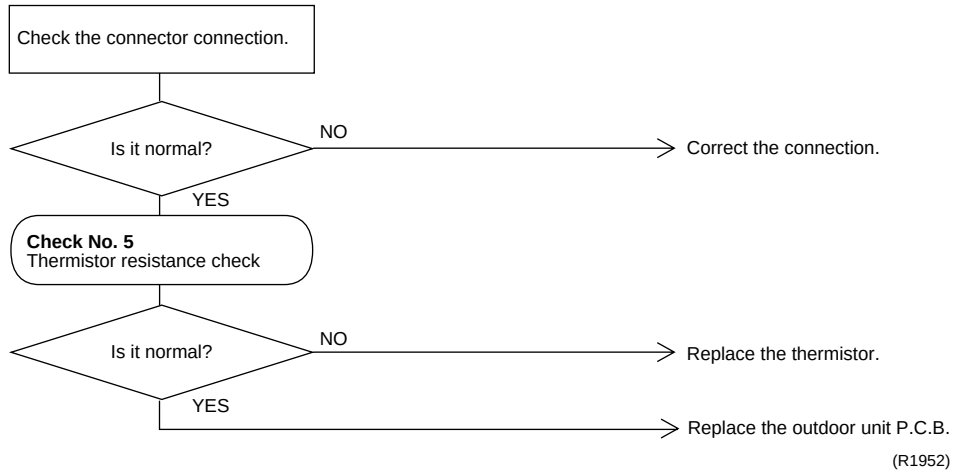
Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

Troubleshooting

Check No.5
Refer to P.88

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



(R1952)

J3 : Discharge pipe thermistor
J6 : Outdoor unit heat exchanger thermistor
H9 : Outside air thermistor

5.11 Operation Halt Due to Compressor Startup Error

Remote Controller Display

E6

Outdoor unit LED Display

A

Method of Malfunction Detection

Compressor startup errors are detected using input current detected by CT and compressor's operation frequency.

Malfunction Decision Conditions

When the inlet current is over the setting value.

* Setting value = (145 / 256 × Output frequency) - 6 (A)

- When a compressor startup error is generated 16 times consecutively, the system shuts down. (The 16 time counter resets itself when OL, insufficient gas or compressor startup error does not occur within 60 minutes of compressor operation time (cumulative time) after the error generation.)

Supposed Causes

- Startup error due to faulty compressor.
- Startup error due to faulty outdoor unit PCB.
- Startup error due to closed stop valve.
- Detection error due to faulty outdoor unit PCB.

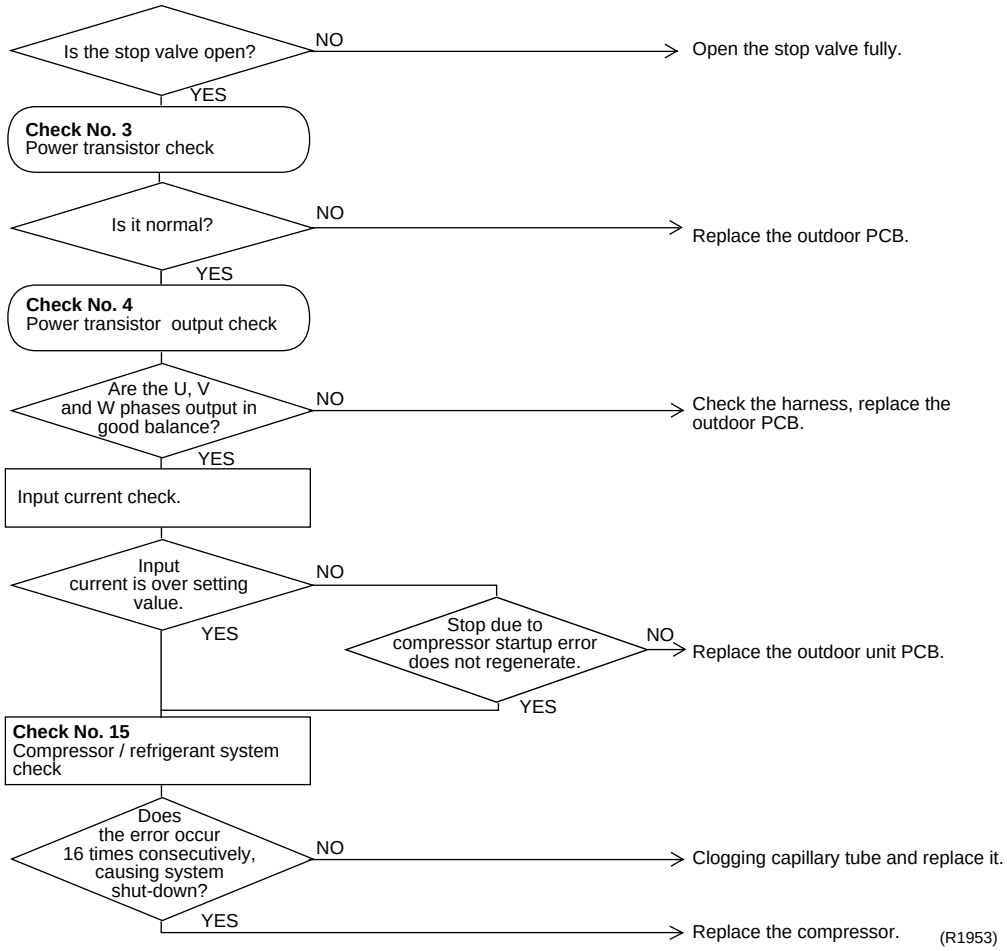
Troubleshooting

Check No.3
Refer to P.85

Check No.4
Refer to P.87

Check No.15
Refer to P.91

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



(R1953)

5.12 Output Overcurrent

Remote Controller Display	L5
Outdoor unit LED Display	A ☼
Method of Malfunction Detection	Detection of output overcurrent based on current flowing in Power transistor. (Inverter direct current part)
Malfunction Decision Conditions	When output overcurrent enters microcomputer from output overcurrent detection circuit. When error occurs 6 times, system shuts down. Condition for error counter reset When compressor operates for 5 minutes without output overcurrent.
Supposed Causes	■ Overcurrent due to faulty power transistor. ■ Overcurrent due to faulty internal wiring. ■ Overcurrent due to supply voltage abnormality. ■ Overcurrent due to faulty PCB. ■ Overcurrent due to closed stop valve. ■ Overcurrent due to faulty compressor. ■ Overcurrent due to improper installation condition.

Troubleshooting

* Erroneous internal wiring can result in output overcurrent in some cases. If system stops due to output overcurrent after parts replacement that requires disconnection of wires, check wiring carefully

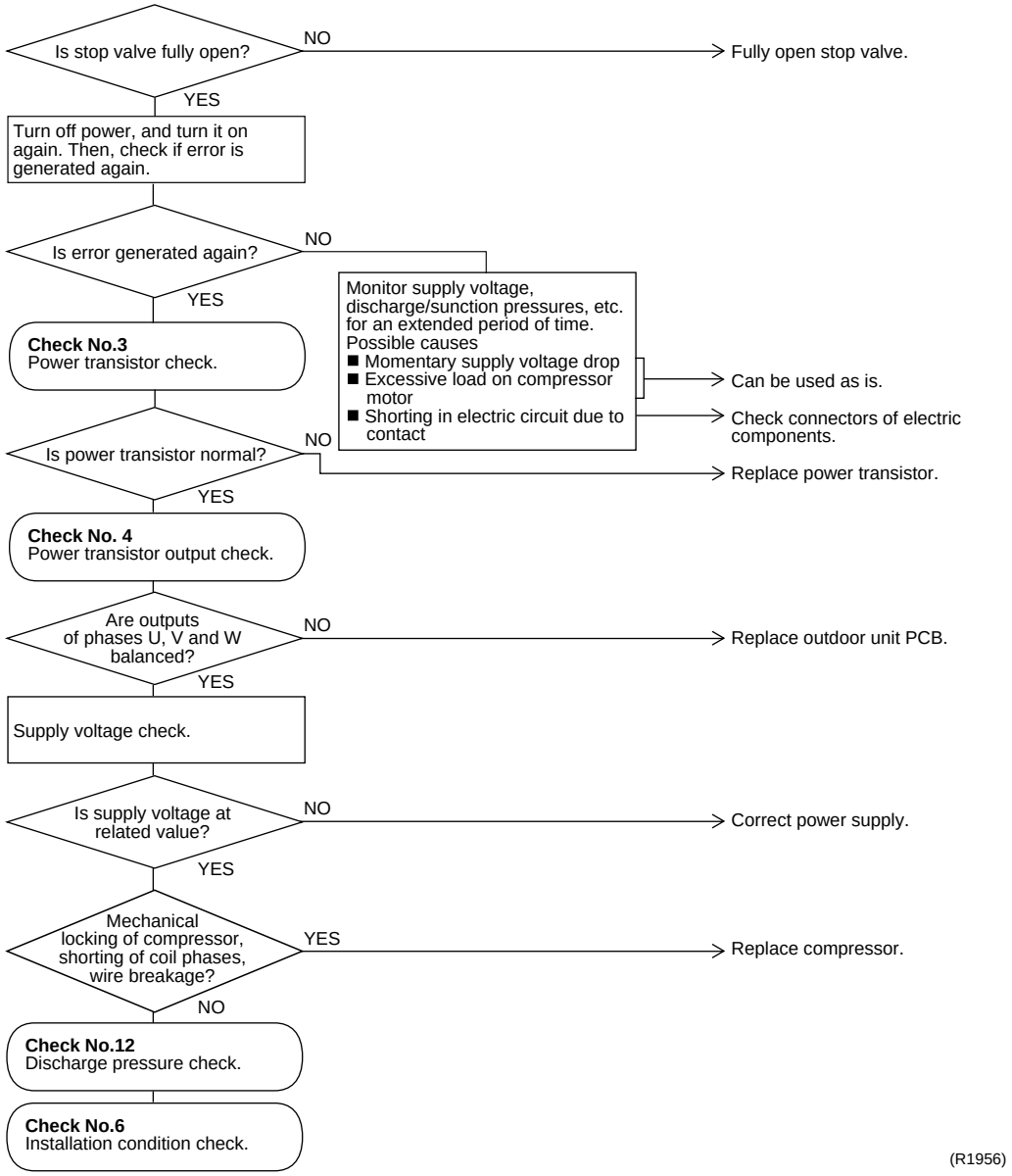
Check No.3
Refer to P.85

Check No.4
Refer to P.87

Check No.12
Refer to P.90

Check No.6
Refer to P.89

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



(R1956)

5.13 Faulty Outdoor Unit PCB

Remote Controller Display

*

Outdoor unit LED Display

A ☼

Method of Malfunction Detection

The proper program operation of the microcomputer is checked by the program.

Malfunction Decision Conditions

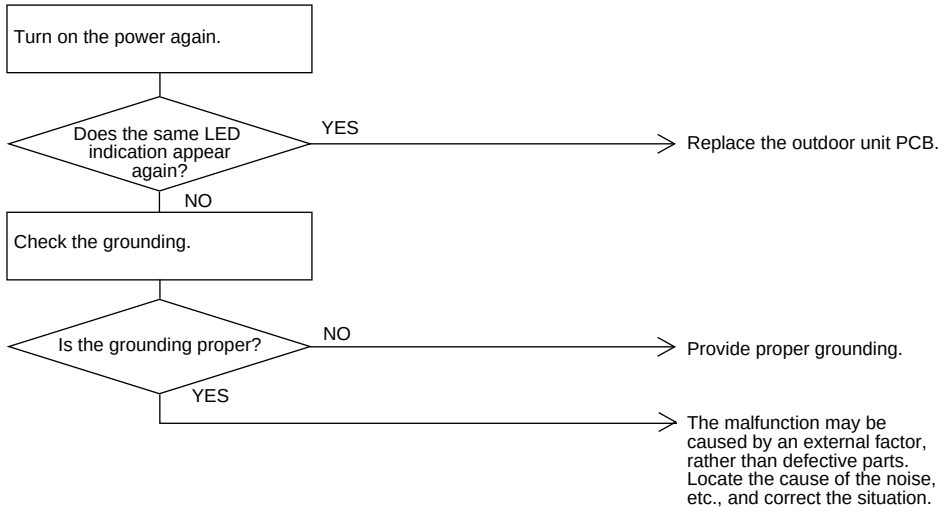
When the microcomputer program does not function properly.

Supposed Causes

- Microcomputer program run-away due to an external factor.
  - ∗Noise
  - ∗Momentary voltage drop
  - ∗Momentary power failure, etc.
- Faulty outdoor unit PCB.

Troubleshooting

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



(R1957)

5.14 Faulty Outdoor Unit PCB and Transmitting/Receiving Circuit

Remote Controller Display

*

Outdoor unit LED Display

A ●

Method of Malfunction Detection

1. The proper program operation of the microcomputer is checked by the program.
2. Signals transmitted from the outdoor unit to the indoor unit are received by the outdoor unit itself in indoor unit -outdoor unit signal transmission mode, and proper receiving of the signals by the indoor unit is checked.

Malfunction Decision Conditions

1. When the microcomputer program does not function properly.
2. When the signals transmitted from the outdoor unit to the indoor unit are received by the outdoor unit itself in indoor unit-outdoor unit signal transmission mode, but not properly.
3. When the zero cross signal is not detected over 10 seconds.

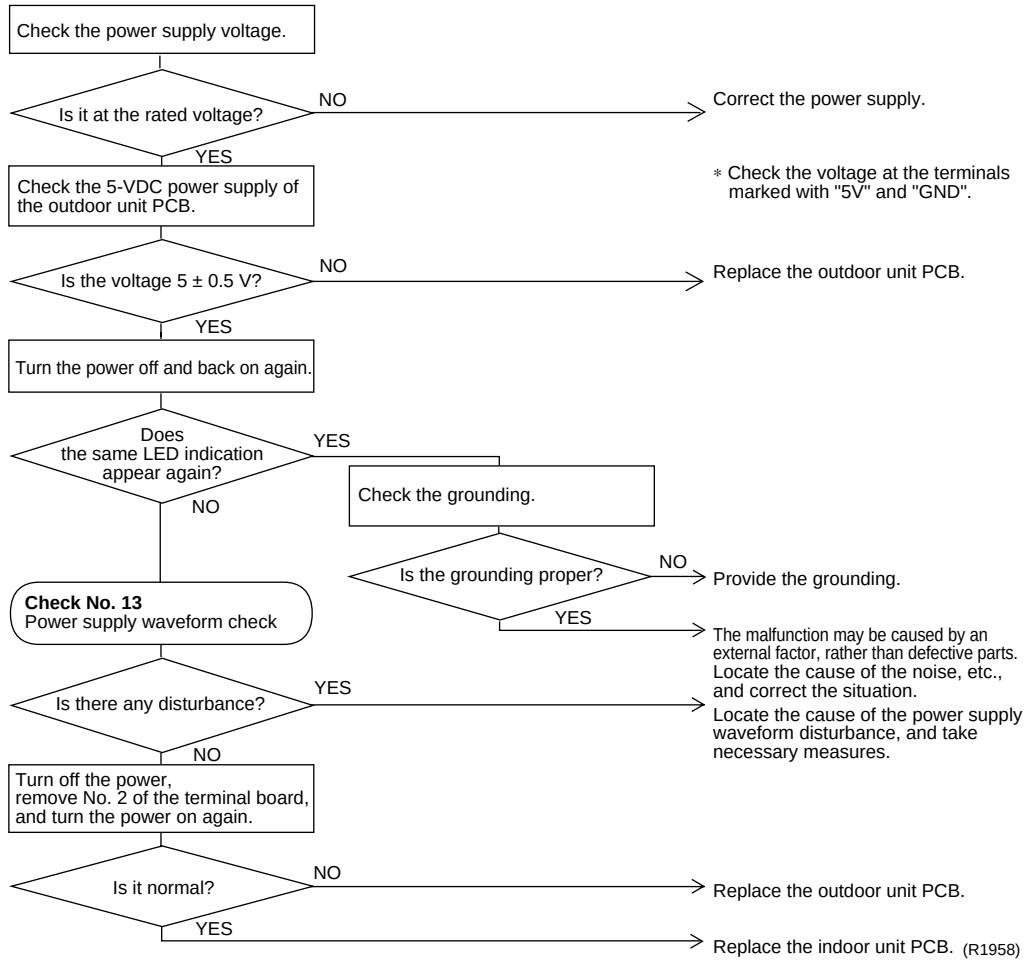
Supposed Causes

- Display disabled by faulty power supply.
- Microcomputer program run-away due to an external factor.
  - ∗Noise
  - ∗Momentary voltage drop
  - ∗Momentary power failure, etc.
- Faulty outdoor unit PCB.

Troubleshooting

Check No.13
Refer to P.91

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



(R1958)

5.15 Operation Halt Due to Detection of Input Over Current

Remote Controller Display

E8

Outdoor unit LED Display

A

Method of Malfunction Detection

Input over current is checked using the input current detected by the CT during compressor operation.

Malfunction Decision Conditions

When the CT input remains above the value shown in the below table for 2.5 seconds during compressor operation.
Table for constant

Model	Input current (A)
RK(X)25, 35 Series	10.0

Supposed Causes

- Over current due to faulty compressor.
- Over current due to faulty power transistor.
- Over current due to faulty electrolytic capacitor of the main inverter circuit.
- Over current due to faulty PCB.
- Detection error due to faulty PCB.
- Over current due to short-circuit.

Troubleshooting

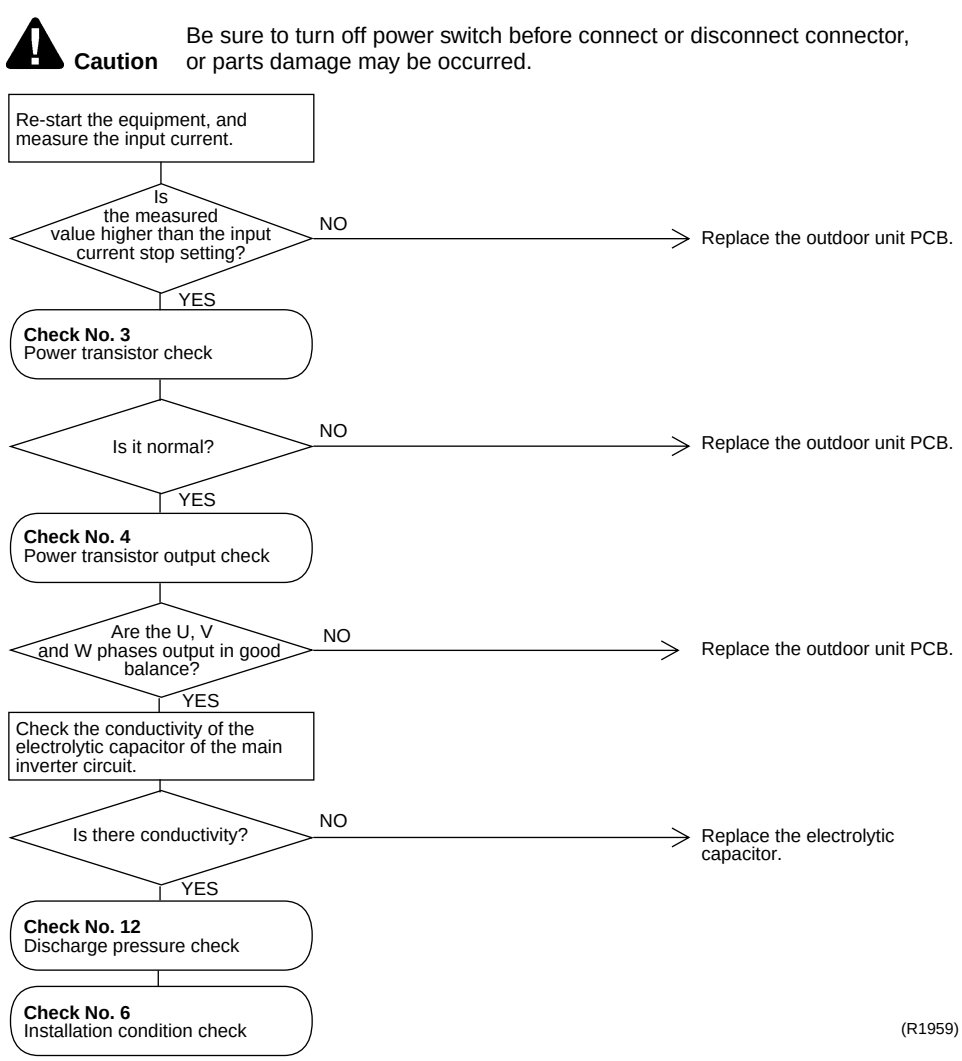
∗ Internal wiring errors can cause an input over current. If the equipment stops due to an input over current after the wires are disconnected and connected again for parts replacement, etc., check for wiring errors.

Check No.3
Refer to P.85

Check No.4
Refer to P.87

Check No.12
Refer to P.90

Check No.6
Refer to P.89



5.16 Interrupt due to OL Action

Remote Controller Display

E5

Outdoor unit LED Display

A ☼

Method of Malfunction Detection

- OL action detected by the opening of OL contact.

Malfunction Decision Conditions

If an OL action signal has come to the microcomputer.

- OL action detected twice, resulting in a shutdown of the system.
  (The dual-action counter will reset itself if any of the following troubles does not occur for a total one operating hour of the compressor since the interruption: OL failure, radiation fin temperature rise, gas shortage, or compressor failure to start.
  OL setting : Open at 130±3°C
  Closed at 95±10°C

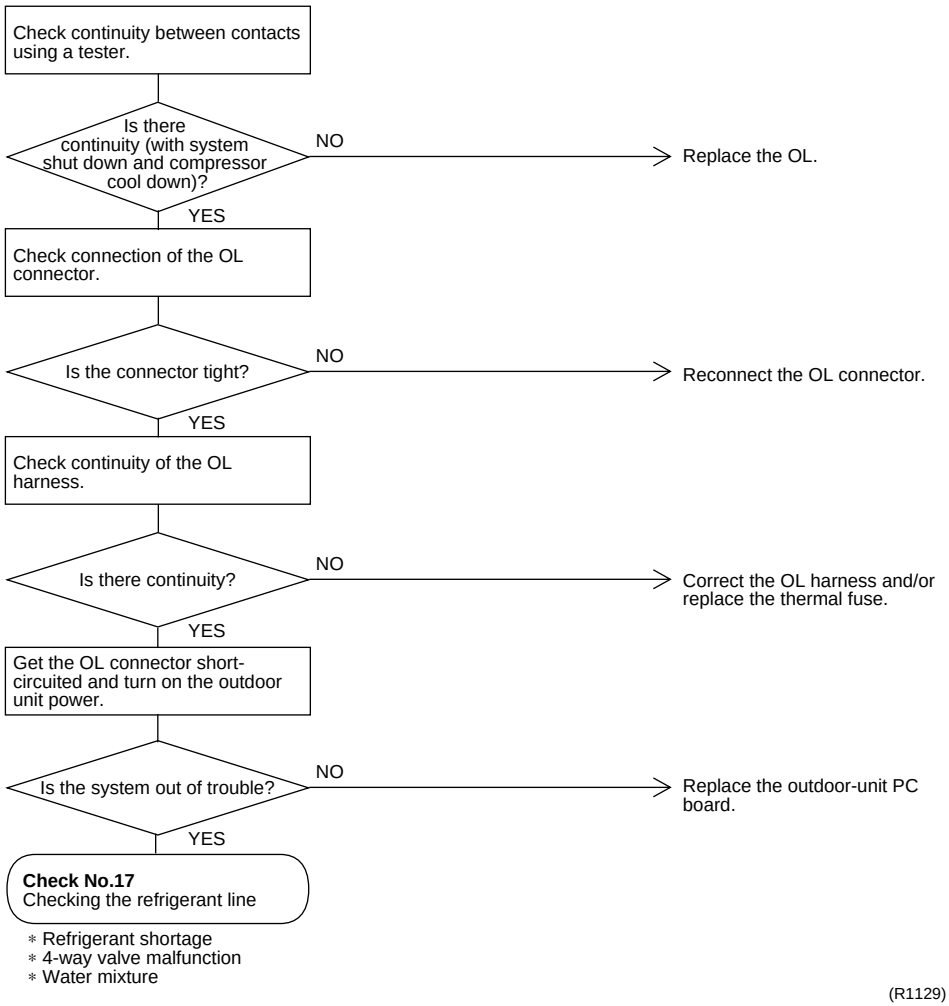
Supposed Causes

- OL action because of refrigerant shortage
- OL action because of 4-way valve failure
- Error detection due to an opening of OL contact
- Error detection due to connector in poor contact
- Error detection due to broken OL harness
- Error detection due to outdoor-unit PC board failure
- OL action because of mixture of tap water in the field

Troubleshooting

Check No.17
Refer to P.92

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



(R1129)

6. Check

6.1 How to Check

6.1.1 Power transistor check
Capacitor voltage check

Check No.3 1. Power transistor check

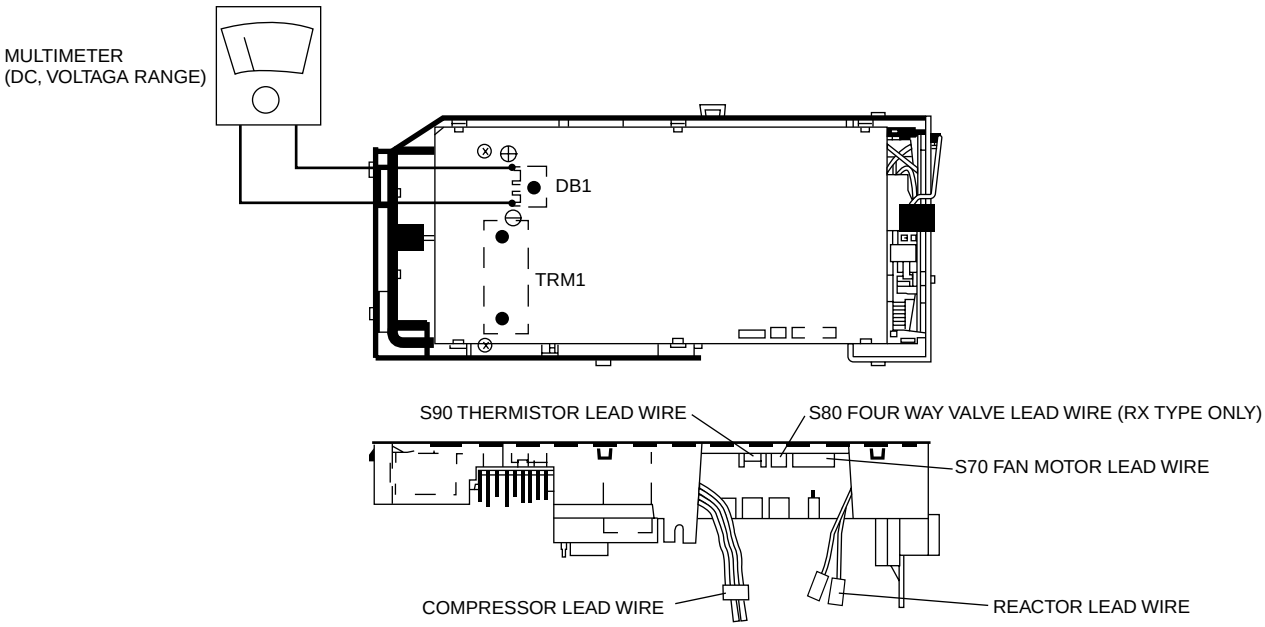
Note: Check to make sure that the voltage between the terminal of Power transistor (+) and (-) is approx. 0 volt before checking power transistor.

< Measuring method >
Disconnect the compressor harness connector from the outdoor unit PCB. To disengage the connector, press the protrusion on the connector.
Then, follow the procedure below to measure resistance between power transistor (+) and (-) and the U, V and W terminals of the compressor connector with a multi-tester. Evaluate the measurement results for a pass/fail judgment.

<Power transistor check>

Negative (-) terminal of tester (positive terminal (+) for digital tester)	Power transistor (+)	UVW	Power transistor (-)	UVW
Positive (+) terminal of tester (negative terminal (-) for digital tester)	UVW	Power transistor (+)	UVW	Power transistor (-)
Normal resistance	Several kΩ to several MΩ (*)			
Unacceptable resistance	Short (0 Ω) or open			

<Measuring positions>



2. Capacitor voltage check

< Measuring method >
Before measuring, operate the unit for several minutes, then shut down the operation by force using the circuit breaker.

- If the unit is shut down using the remote controller instead of the circuit breaker, the capacitor discharges the electric load, thus disallowing accurate measurement.

Note: The charge section is applied with high voltage. Therefore, exercise caution during measurement to prevent electric shock.

< Measuring positions >

Take measurements at the power transistor (+) and (-) terminals in the same way as described in section 1.
Set the multi-tester to DC and VOLTAGE RANGE before measurement.

* Since capacitor (+) and (-) are connected to power transistor (+) and (-), capacitor voltage can be measured at the power transistor (+) and (-) terminals.

6.1.2 Power Transistor Output Check

Check No.4 Measure the output current and voltage of the power transistor.

Output Current Measurement

Remove the front panel, and measure the current in the red, yellow and blue wire harness inside the compressor using a clamp meter.

1. Attach the clamp meter to the red, yellow and blue wire harness, and conduct forced cooling operation.
2. When the output frequency has stabilized, measure the output current of each phase.
3. If the current outputs of all the phase are balanced, it is normal.
4. If even one phase is out of balance, replace the outdoor unit PCB.
5. If the compressor stops before the output frequency stabilizes, measure the output voltage.

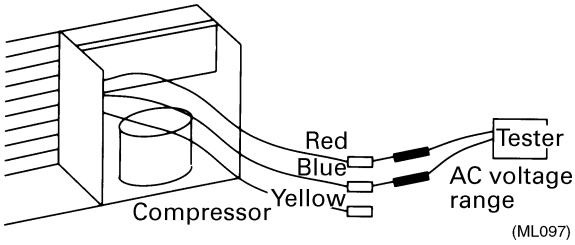
Output Voltage Measurement

Remove the front panel, and disconnect the red, yellow and blue wire harness inside the compressor from the terminals. Measure the output voltage of the red, yellow and blue wires using a tester.

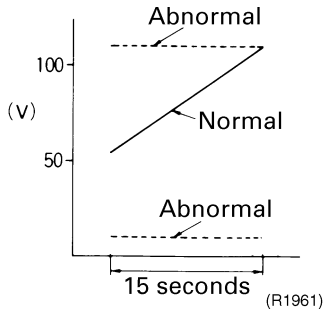
1. Conduct forced cooling operation with the equipment in the condition shown in Fig.1.
2. Measure the voltage between the operation start (when the outdoor unit fan starts rotating) to operation halt caused by an CT error (about 15 seconds).
3. Reset the power, and repeat steps (1) to (3) for each phase of U-V, V-W and W-U.
4. If the voltages of all the phases show results similar to the solid line in the graph shown in Fig.2, the outdoor PCB is normal.
5. If the voltage of even one phase deviates from the solid line shown in Fig.2, conduct the following test.

■ Check the harness between the power transistor and compressor (check items: breaking of wire and wiring errors). If the harness is normal, replace the PCB..

[Fig.1]



[Fig.2]



Note:

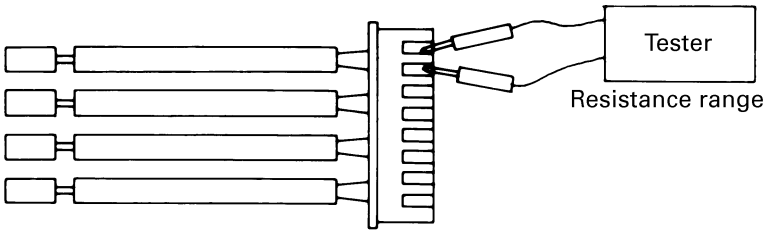
1. Do not touch the terminals of the red, yellow and blue wires when the power is supplied. (Touching them is very dangerous since a voltage of over 100V is applied.)
2. Do not short-circuit the terminals of the red, yellow, and blue wires.

6.1.3 Thermistor Resistance Check

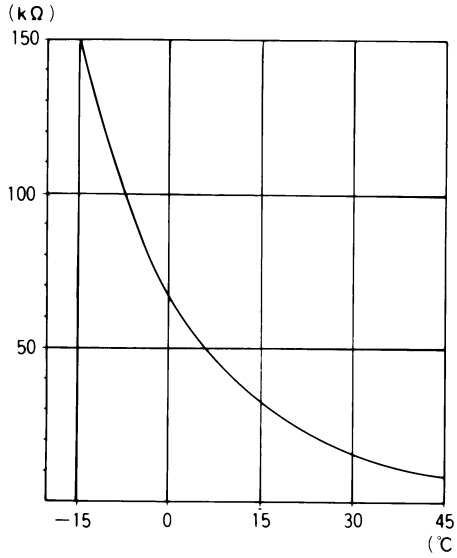
Check No.5

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

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



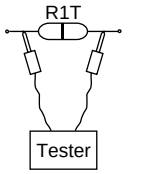
（R25＝20kΩ、B＝3950）



(R1962)

For the models whose thermistor is directly equipped on the printed circuit board;

- Remove the signal receiver and the display printed circuit board (disconnect the connector too), and then measure ohm by an ohmmeter at the both ends.
- Electric resistance cannot be precisely measured when a wire harness is connected directly to a printed circuit board instead of using a connector. When error display reappears, replace the PCB.
- The relation between temperature and resistance is in common with the existing models.

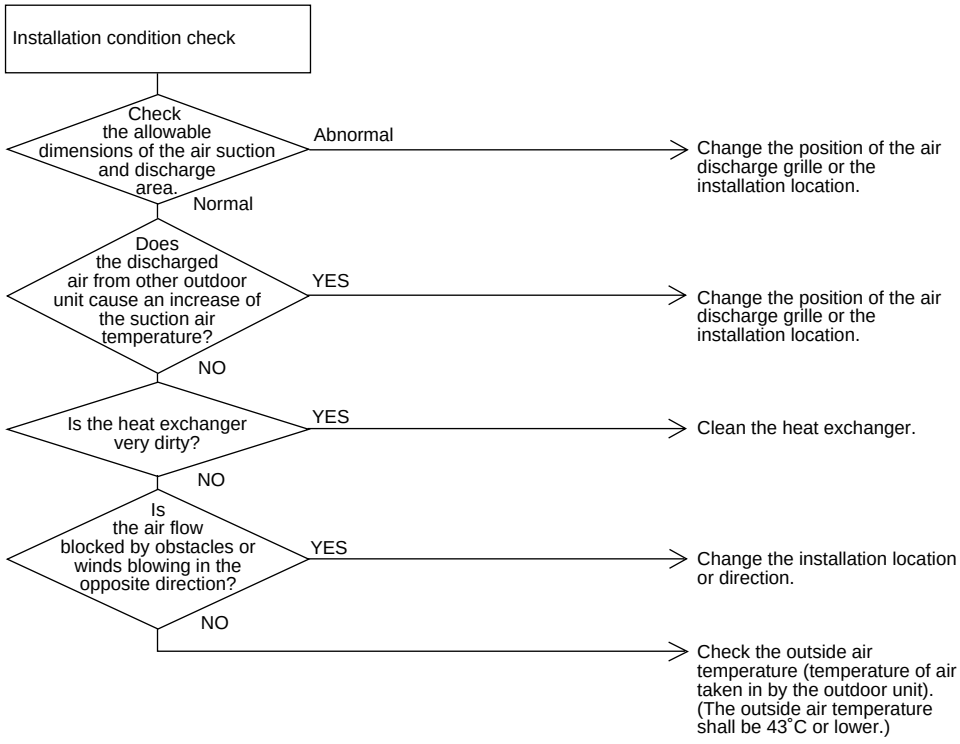


(R1963)

6.1.4 Installation Condition Check

Check No.6

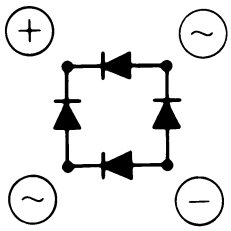
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

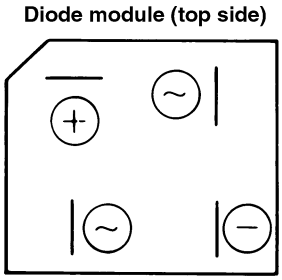


(R1964)

6.1.5 Rectifier Check

Check No.11





(R1965)

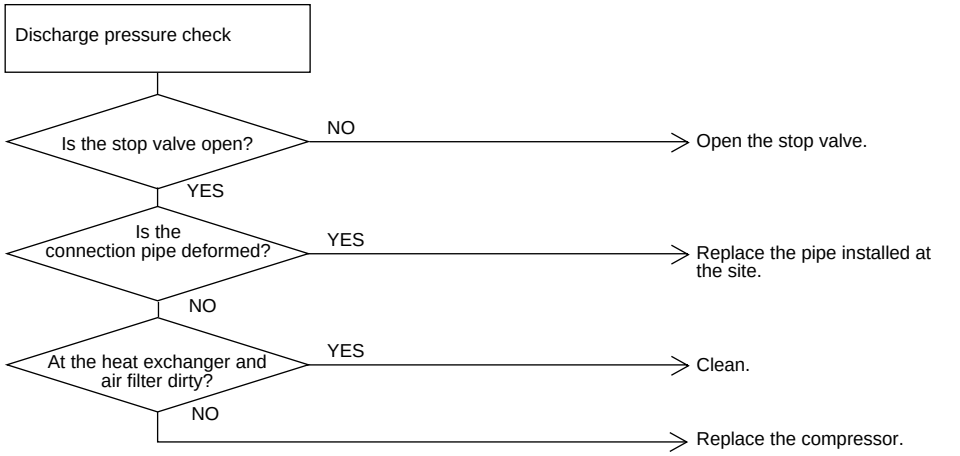
There are several different terminal position patterns. Therefore, be sure to check the terminal marks.

Negative (-) terminal of tester (positive terminal (+ for digital tester)	~	+	~	-
Positive (+) terminal of tester (negative terminal (-) for digital tester)	+	~	-	~
Normal resistance	Several KΩ to MΩ	∞	∞	Several KΩ to MΩ
Unacceptable resistance	0 or ∞	0	0	0 or ∞

6.1.6 Discharge Pressure Check

Check No.12

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



(R1974)

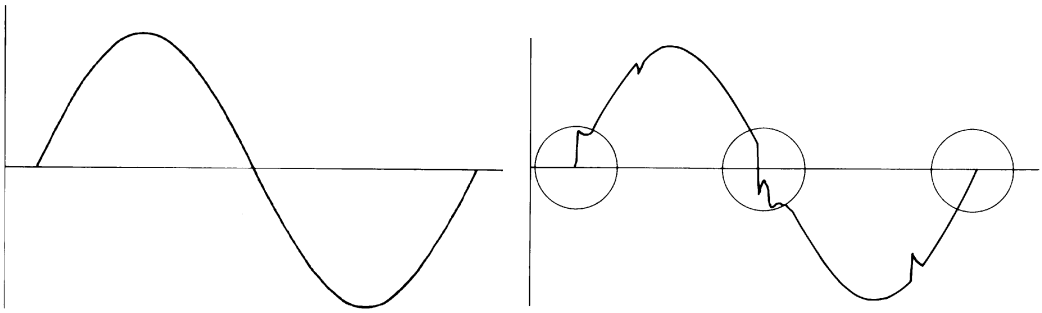
6.1.7 Power Supply Waveforms Check

Check No.13

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

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

[Fig.1] [Fig.2]

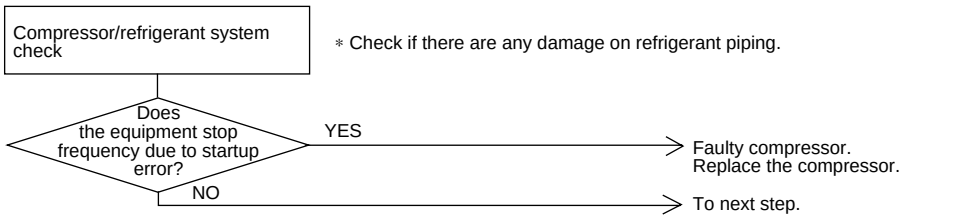


(R1975) (R1966)

6.1.8 Inverter Units Compressor/Refrigerant System Check

Check No.15

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



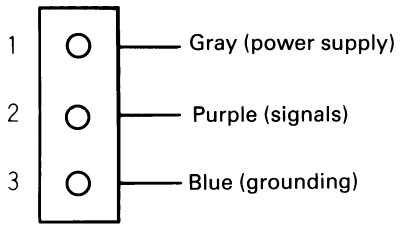
(R1967)

6.1.9 Hall IC Check

Check No.16

1. Check the connector connection.
2. With the power ON, operation OFF, and the connector connected, check the following.
   ∗Output voltage of about 5 V between pins 1 and 3.
   ∗Generation of 3 pulses between pins 2 and 3 when the fan motor is operating.

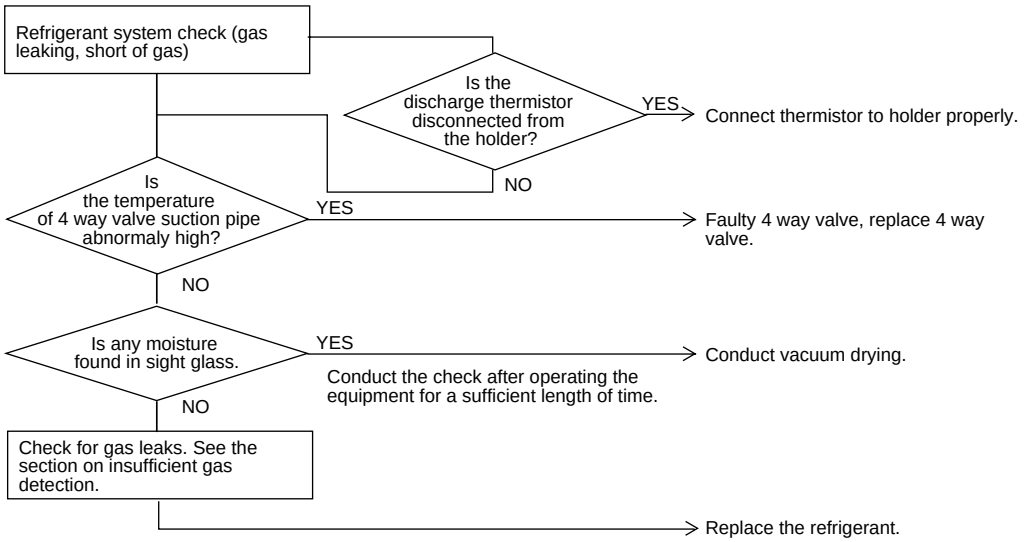
Failure of (1) → faulty PCB → Replace the PCB.
Failure of (2) → faulty hall IC → Replace the fan motor.
Both (1) and (2) result → Replace the PCB.



(R1968)

6.1.10 Refrigerant System Check

Check No.17



(R1079)

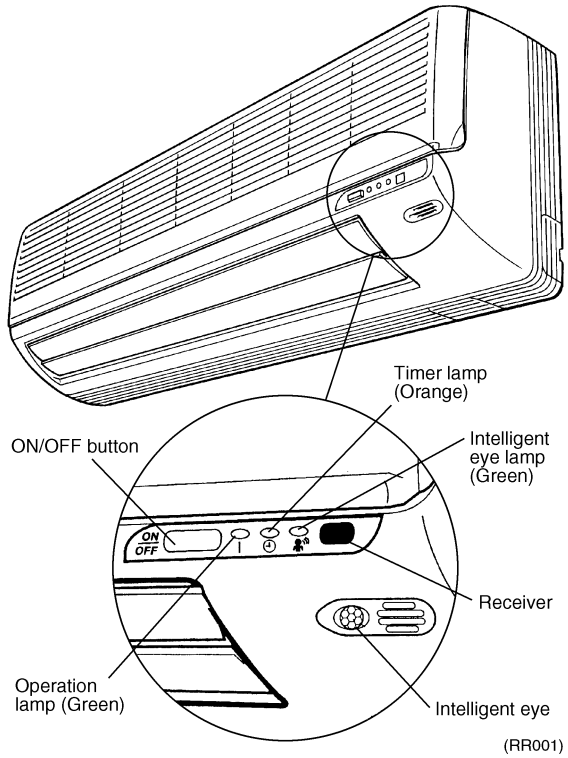
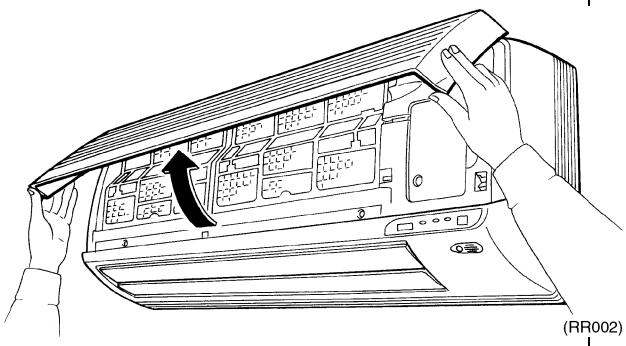
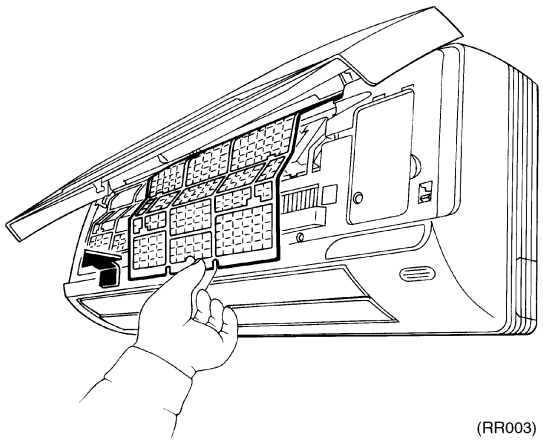
Part 7
Removal Procedure

1. For FTK25J, FTK35J, FTX25J, FTX35J

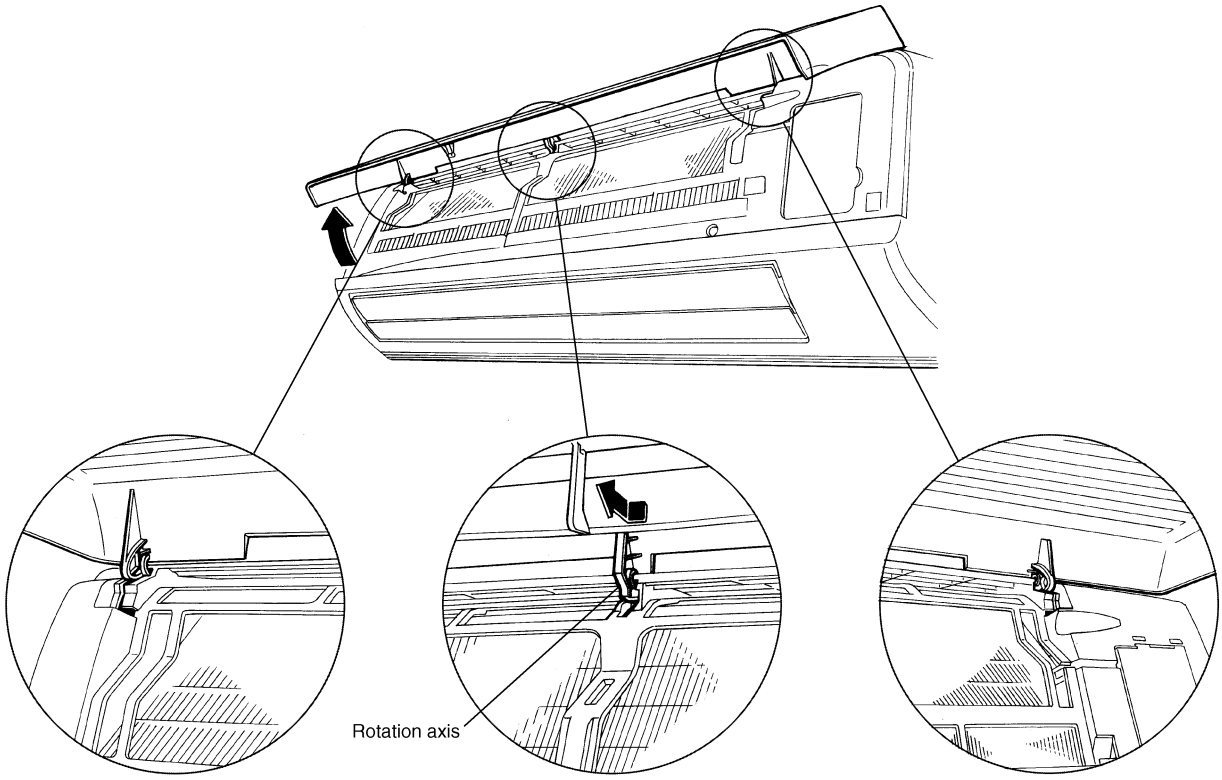
1.1 Removal of Air Filter

Procedure

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

Step	Procedure	Points
1. External features		■ If ON/OFF button is kept pushing for 5 seconds, a forced cooling operation will be carried out for approx. 15 minutes.
2. Removing air filters		
1 Pull protrusions on left and right sides of panel with fingers and open front grille all the way.		
2 Lift center section of air filter and disengage hooks. Remove air filter by pulling forward.		■ Left and right filters are interchangeable. ■ To re-install, insert air filter along the guide.

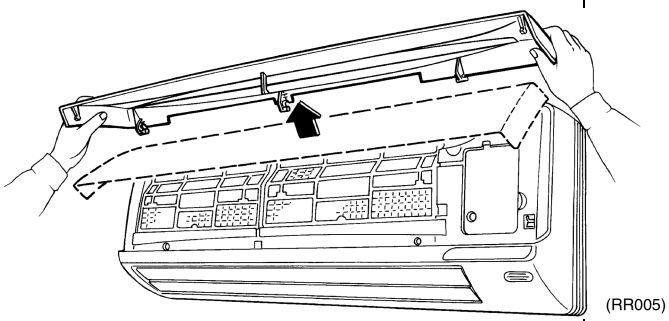
Step	Procedure	Points
3. Opening and shutting front panel		
1	Hook a finger onto the projection part provided on the both sides of the unit's panel and open up the panel to the position higher than it will stop.	Support the front panel by one hand, while remove the rotation axis at the upper center by the other hand. ■ And pull out the front panel forward to remove.



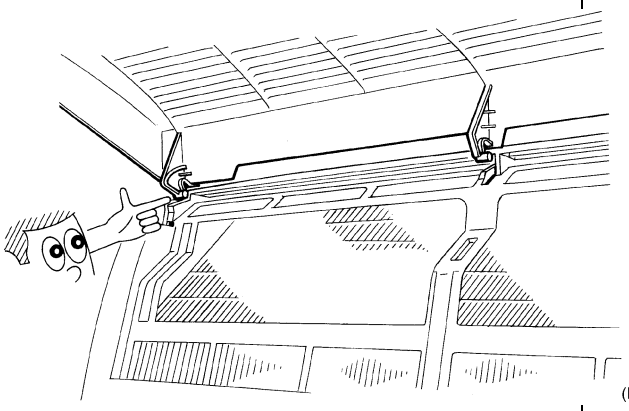
Slide the center rotary axis the left and remove it out.

(RR004)

2	Remove front panel from the unit.	



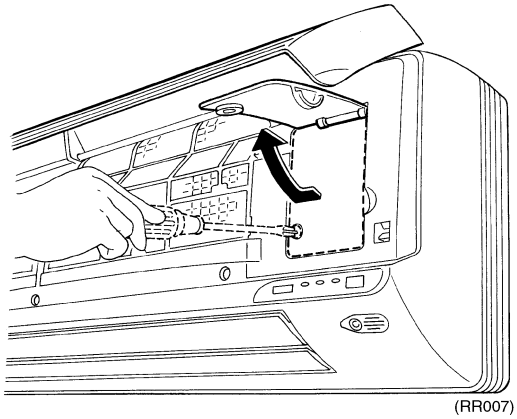
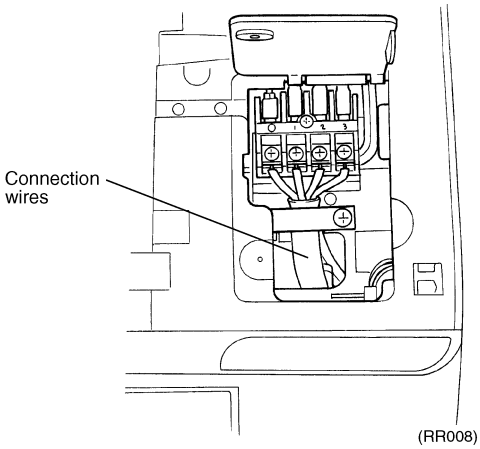
(RR005)

Step	Procedure		Points
3	When restoring the air filter, make sure that the projection parts on the panel are in the guide groove, and then shut the panel.	 (RR006)	

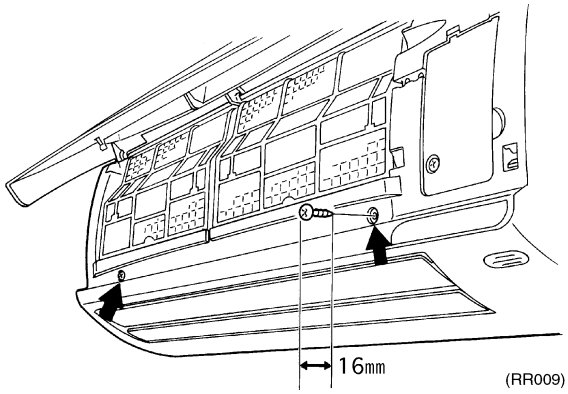
1.2 Removal of Front Grille

Procedure

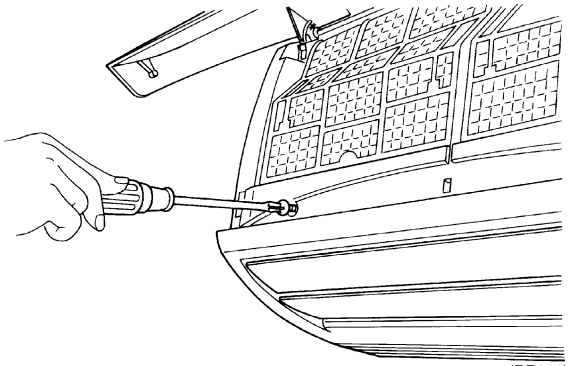
⚠ Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work..

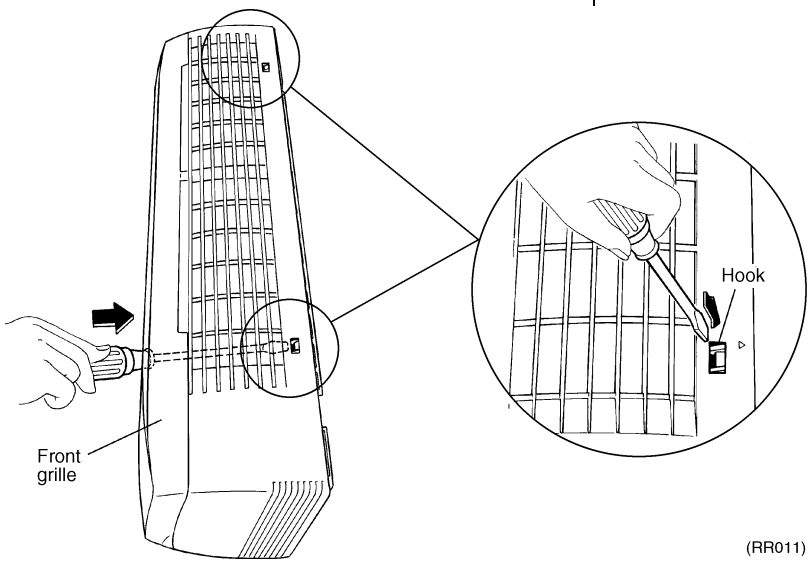
Step	Procedure		Points
1. Opening and closing of service cover			
1	Remove a service cover mounting screw. Open service cover upward	 (RR007)	
		 (RR008)	■ A switch for field setting is not provided in particular.

Step	Procedure	Points
2. Removal of front grille assembly.		
1	Remove the two screws, in the right and the left, which fix the main body with the front grille.	■ Screw stoppers inside the flap which were equipped in the existing models are not provided.
2	Disengage the two hooks on the upper part. In case that the hooks are not pressed from above, remove the front panel and then remove the grille while pushing the hook through a clearance between the front grille and the heat exchanger.	■ At the upper part there are two hooks in the left and the right. ■ Disengage the hooks by pressing knobs with a screwdriver.

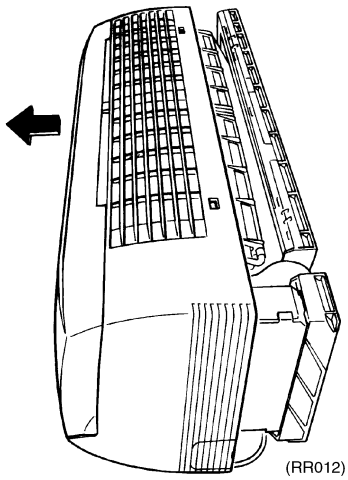
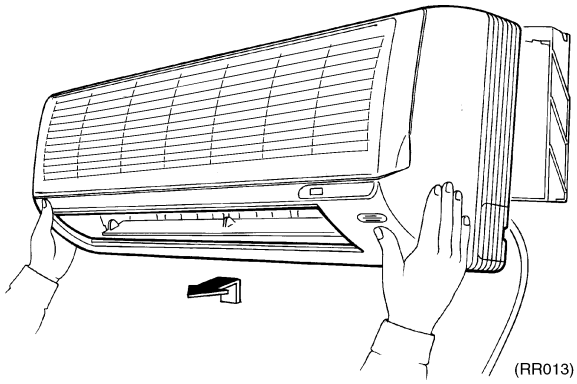


(RR009)


(RR010)



(RR011)

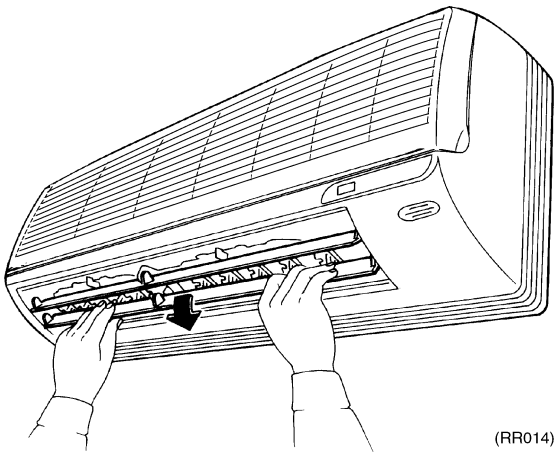
Step	Procedure		Points
3	The front grille can be removed in a manner to pull out the upper part forward and lift up the lower part.	 (RR012)  (RR013)	■ When restoring the grille, Make sure whether each hook is set as it was.

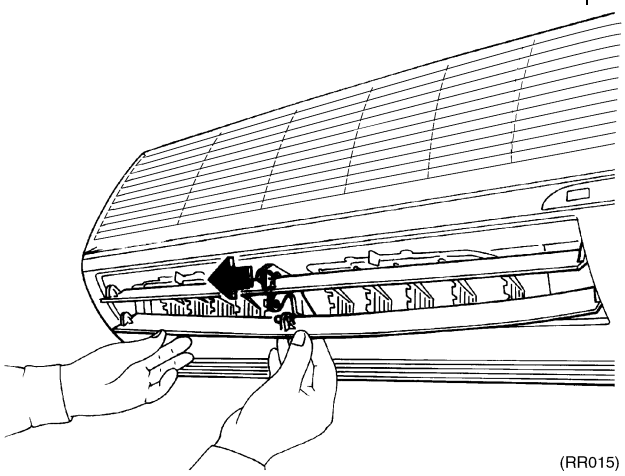
1.3 Removal of Horizontal Blade and Vertical Blade

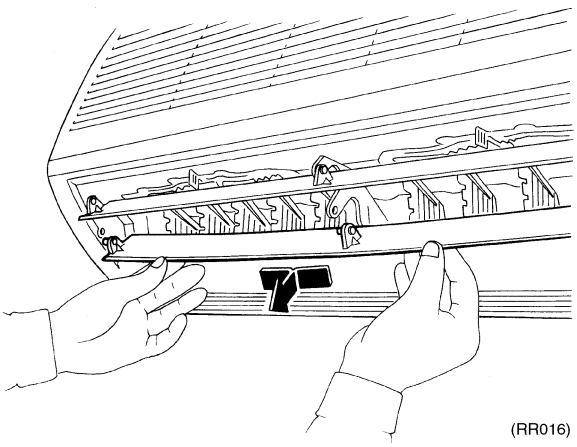
Procedure

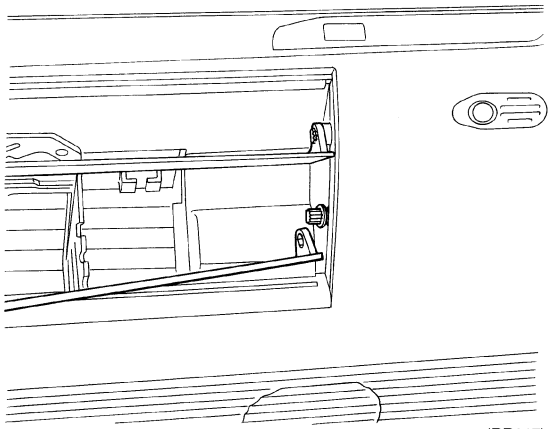
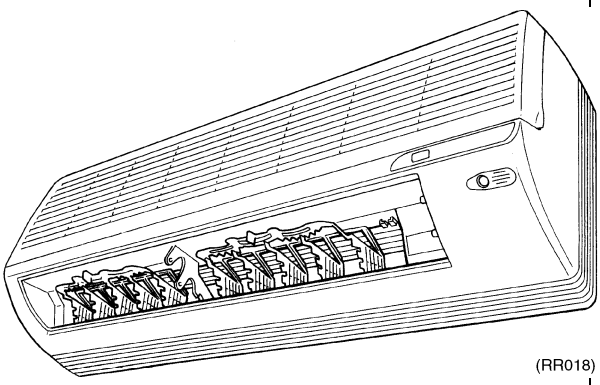
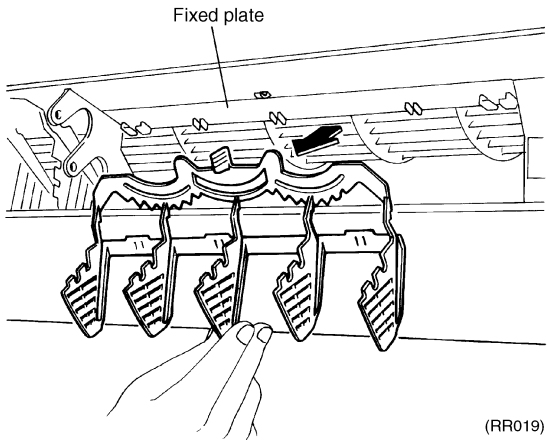
⚠ Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

Step	Procedure	Points
1. Remove horizontal blade.		
1	Lift horizontal blade to open position.	■ Screw stoppers inside the flap which were equipped in the existing models are not provided.
2	Disengage horizontal blade from blade retaining section.	
3	Bend blade slightly and remove it from the unit.	





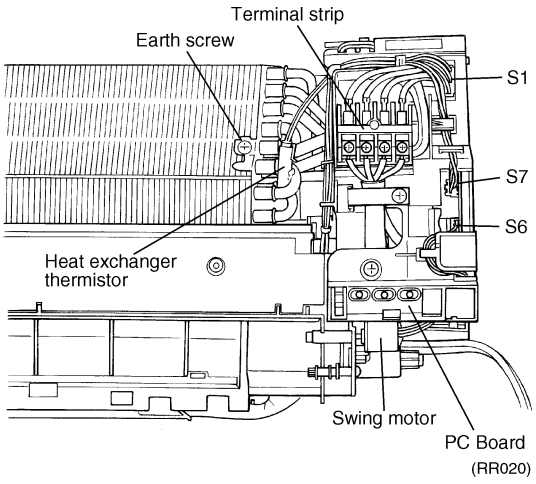
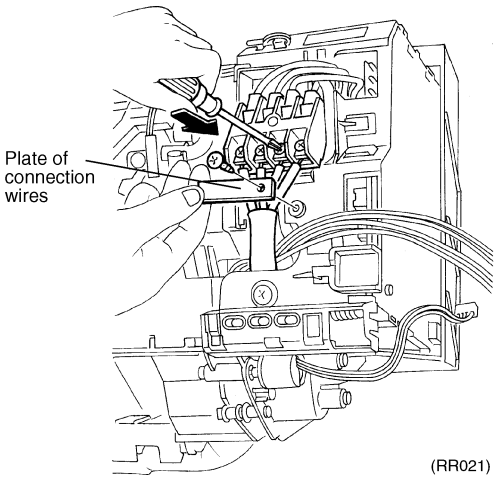
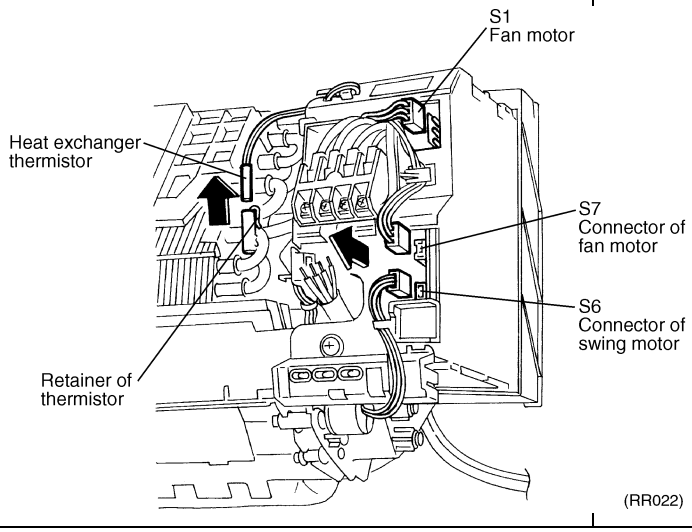


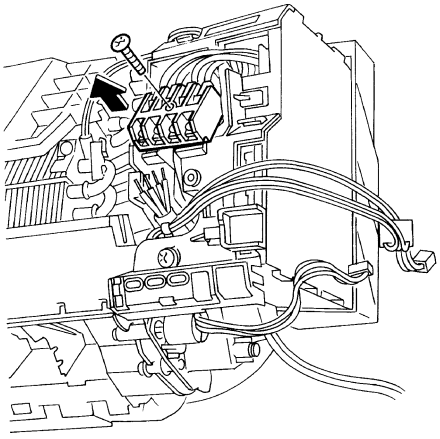
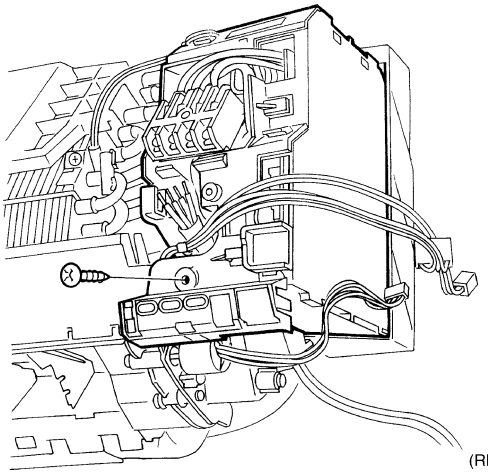
Step	Procedure		Points
		 (RR017)	■ For restoring. 1. Since the key pattern hook is provided on the left side, insert the edge of the blade to the tip while rotating it. 2. Restore the two fixed parts of the horizontal blade onto the hook.
2. Removal of vertical blade			
1	Disengage the vertical blade's joint from the fixed plate.	 (RR018)	
2	Remove the blade forward.	 (RR019)	■ Five vertical blades are integrated with the joint rod. (so, only one blade can't be exchanged.)

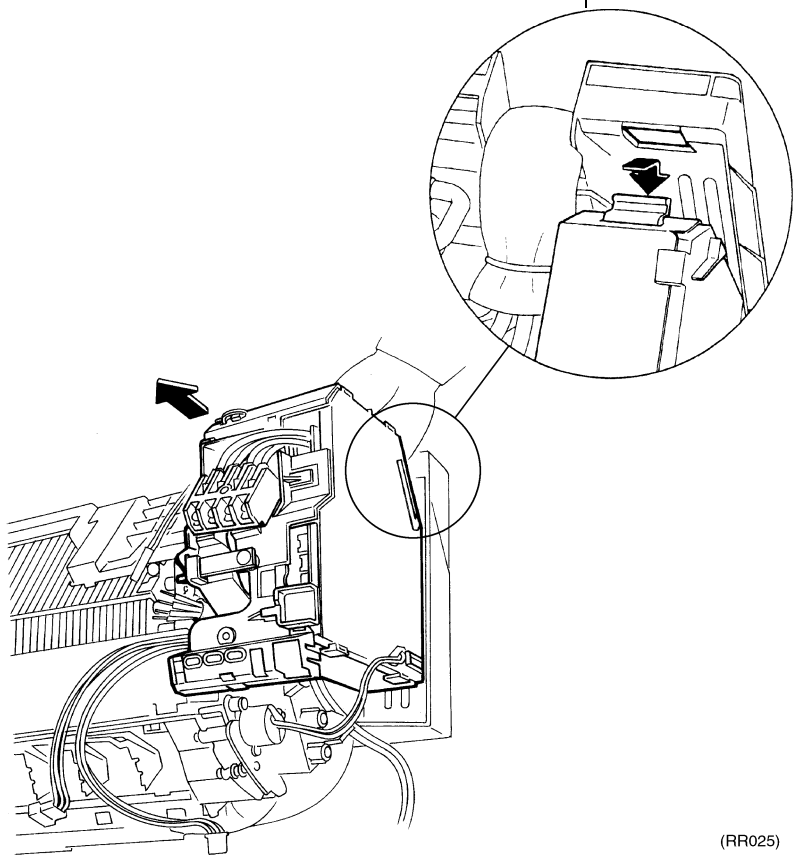
1.4 Removal of Switch Box, PC Board and Swing Motor

Procedure

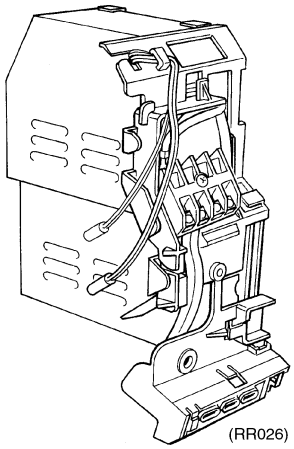
⚠ Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

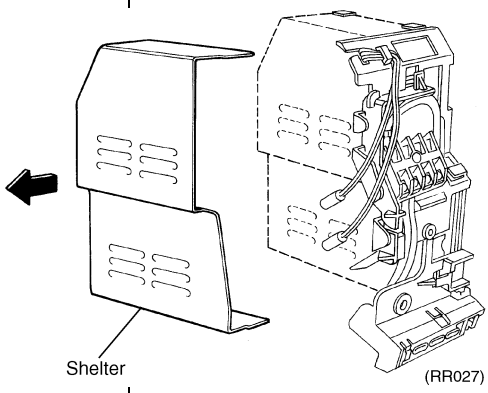
Step	Procedure	Points
■ Remove front grill.		
1. Remove switch box. 1 Disconnect the connection wires. 2 Disconnect connectors (S1 and S7) of fan motor. 3 Disconnect one connector (S6) of swing motor. 4 Remove heat exchanger thermistor.	 	■ Pay attention to the direction of the retainer of the thermister so that the retainer will not touch the harness (same as the existing models.)

Step	Procedure		Points
5	Remove a screw on the terminal strip.	 (RR023)	■ The switch box can be removed instead of disengaging the terminal strip.
6	Remove a screw on the switch box.	 (RR024)	

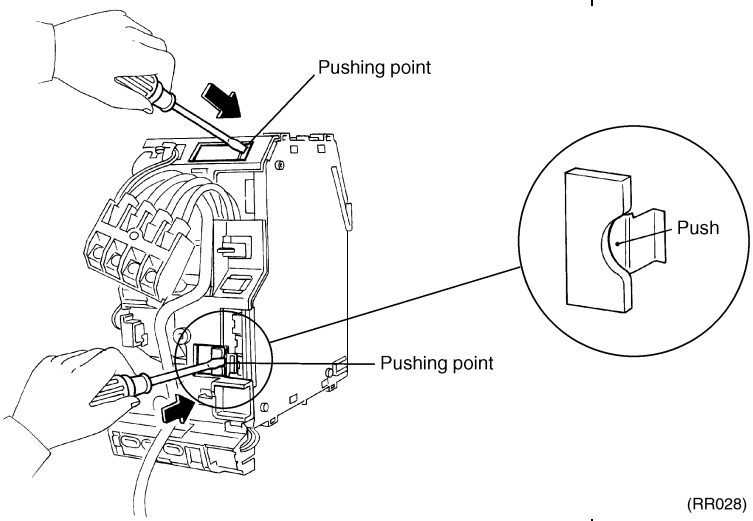
Step	Procedure		Points
7	Pull up the switch box forward to remove.	 (RR025)	■ A hook is provided on the behind.

Step	Procedure	Points
2. Removal of printed circuit board		
1	Remove the shelter.	
2	Disengage the front plate of the switch box. Disengage the knobs by pushing the two hooks at the top and the bottom.	
3	Sliding to the left, the front part of the switch box can be removed.	

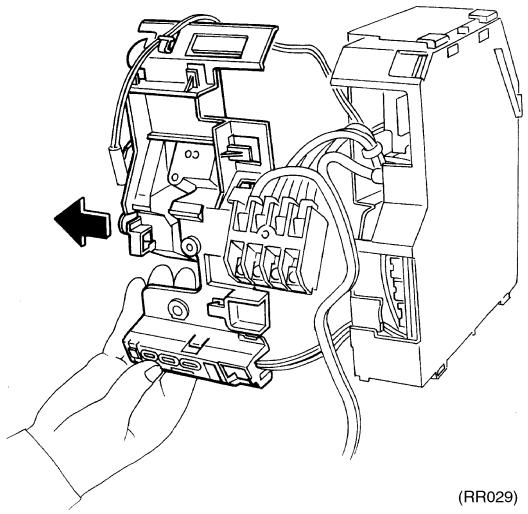

(RR026)



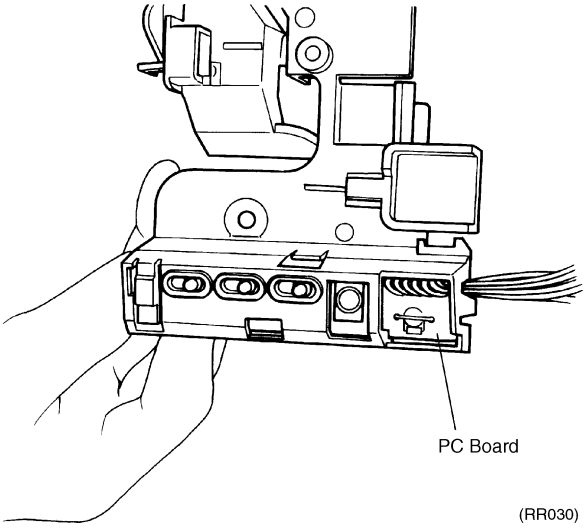
(RR027)

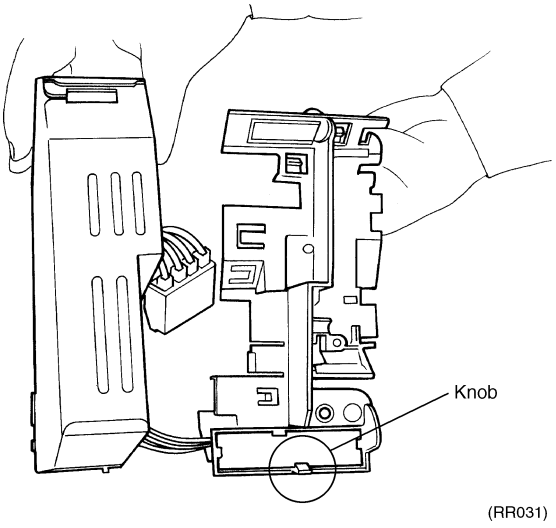


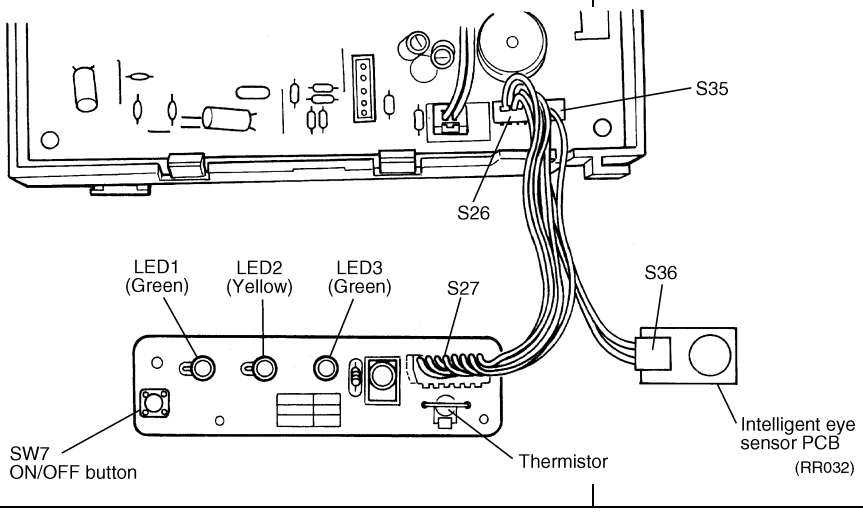
(RR028)

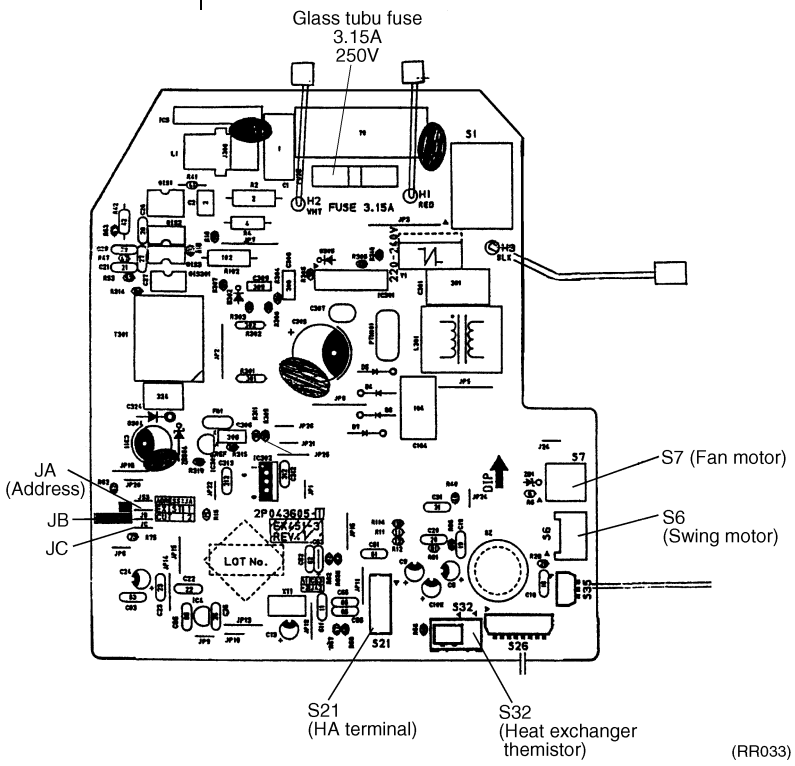
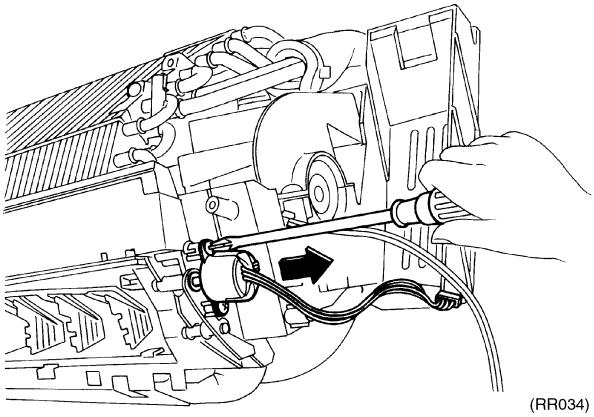
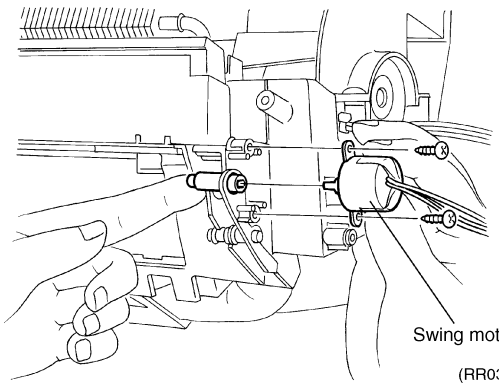

(RR029)

Step	Procedure	Points
4	Disengage the four knobs on the back of the display printed circuit board.	
5	Display printed circuit board.	





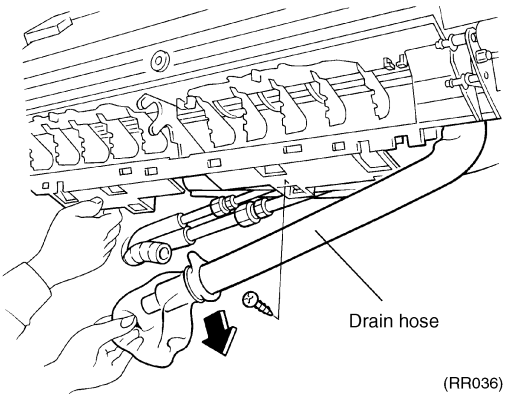
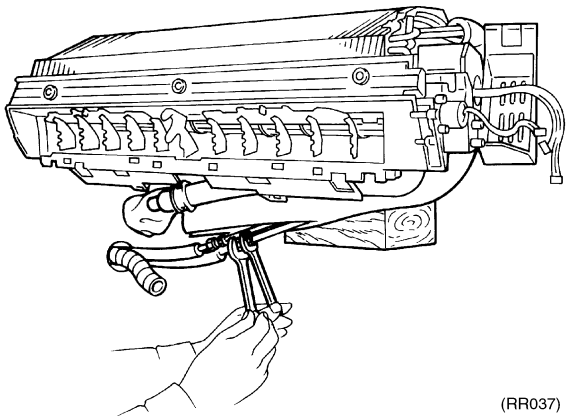


Step	Procedure	Points
6	Control printed circuit board. 	■ The control printed circuit board is integrated with the power supply printed circuit board.
3. Remove swing motor assembly.		
1	To remove swing motor assembly, remove two screws. (Manual adjusting for the vertical blades.)  	■ Provide a supporter so that the joint link will not drop off, in case the horizontal blade assembly is removed.

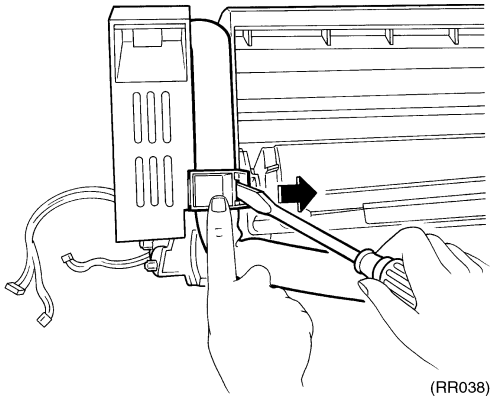
1.5 Removal of Heat Exchanger

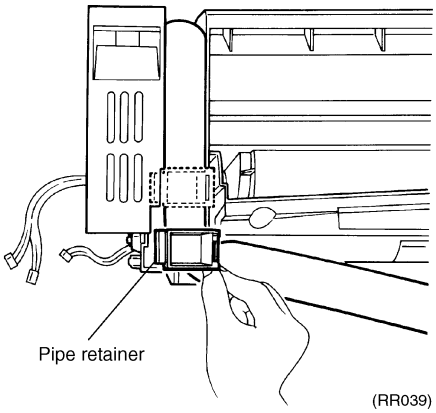
Procedure

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

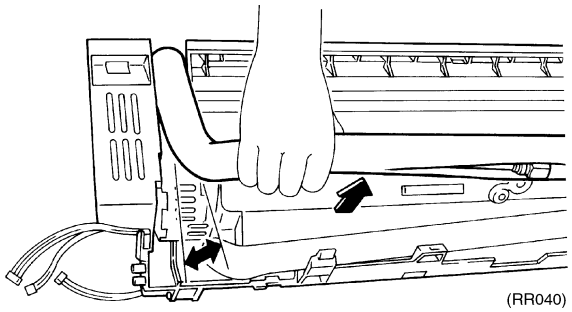
Step	Procedure		Points
■ Conduct pump-down operation. ■ Remove the installation frame from the mounting plate.			**Warning!** **If gas leaks, repair the leak location, then connect all refrigerant from the unit. Conduct vacuum drying, and charge proper amount of refrigerant.** **Warning!** **Do not mix any gas (including air) other than the specified refrigerant (R22) into refrigerating cycle. (Mixing of air or other gas causes abnormal temperature rise in refrigerating cycle, and this results in pipe rupture or personal injuries.)**
1	Remove the drain hose. Make curing so that the residual drain water will not leak out.		■ Pay attention so that the residual drain will not make a floor dirty. ■ In case that a drain hose is buried inside a wall, remove it after the drain hose in the wall is pulled out.
2 3	Disengage the insulation tube and disconnect the flare nuts for the gas line and the liquid line. Disengage the indoor unit from the installation plate.		■ Use two wrenches to disconnect pipe. ■ After pipes are disconnected, close all pipe openings with caps to prevent dust and moisture from entering pipes.

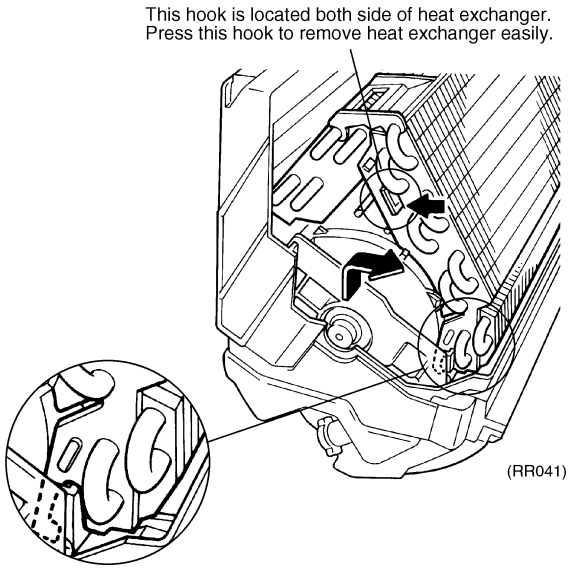
Step	Procedure	Points
4	Disengage the hooks of the pipe retainer on the back.	
5	Pull auxiliary pipe forward to an angle of 10 to 20 degrees.	■ Be careful to prevent pipe deformation.
6	Disengage hooks located right and left side, and pull heat exchanger forward. The hooks are symmetrically placed in the right and the left.	■ Lifting the heat-exchanger slightly upward to the right, the left hook comes to be disengaged easily.


(RR038)

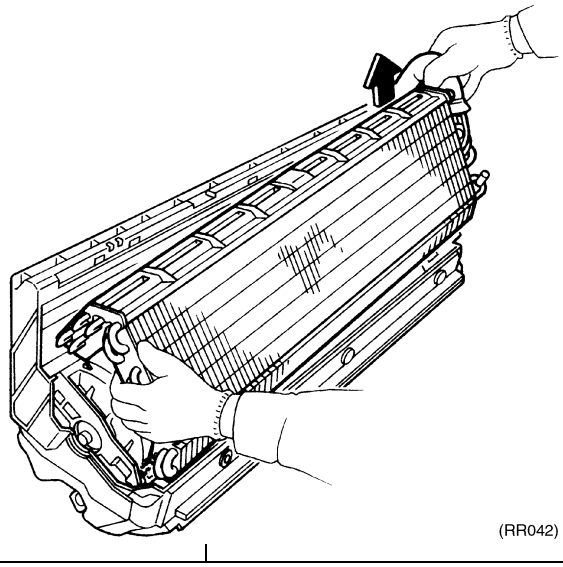


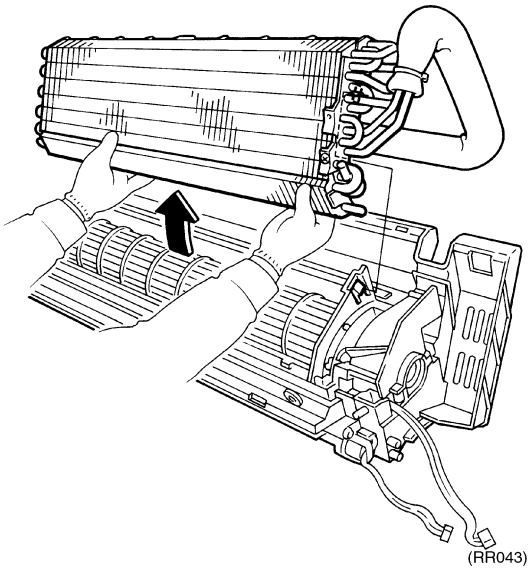
(RR039)


(RR040)



(RR041)

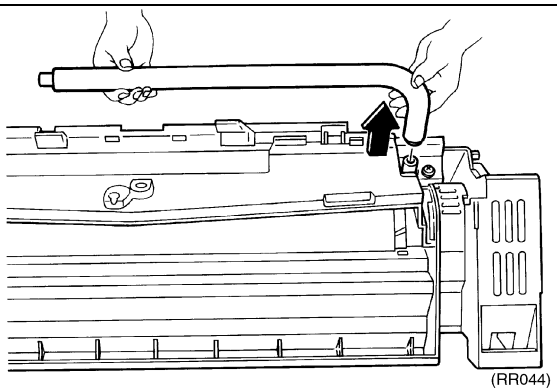
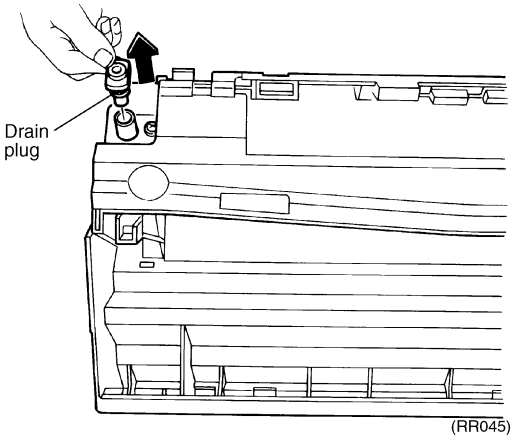
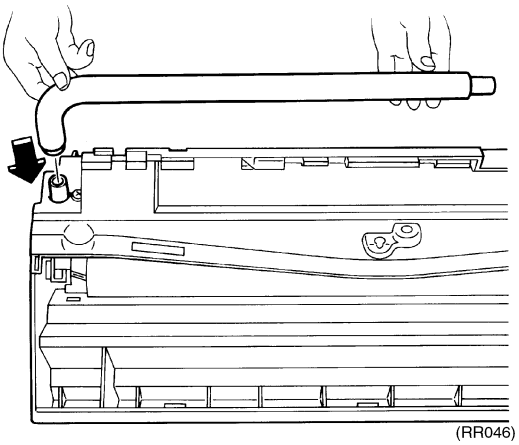
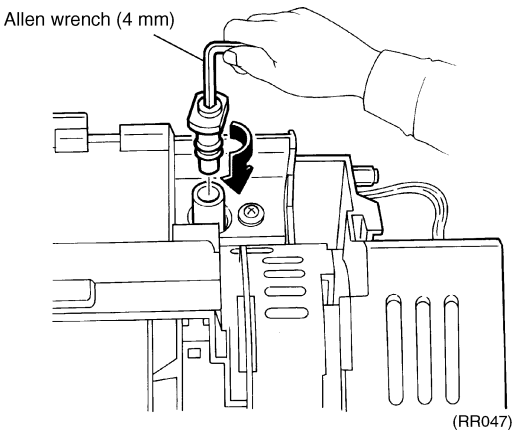

(RR042)

Step	Procedure		Points
7	Lift and remove heat exchanger.	 (RR043)	**Caution!** **When removing or re-installing heat exchanger, be sure to wear protective gloves or wrap heat exchanger with cloths. (Fins can cut fingers.)**

1.6 Install of Drain Plug

Procedure

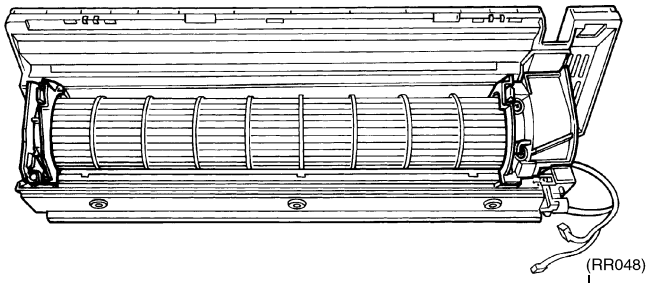
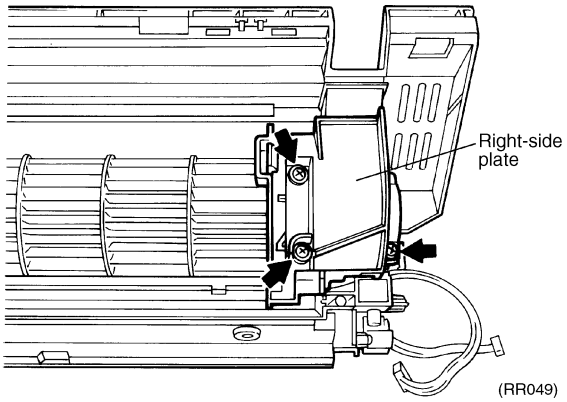
⚠ Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

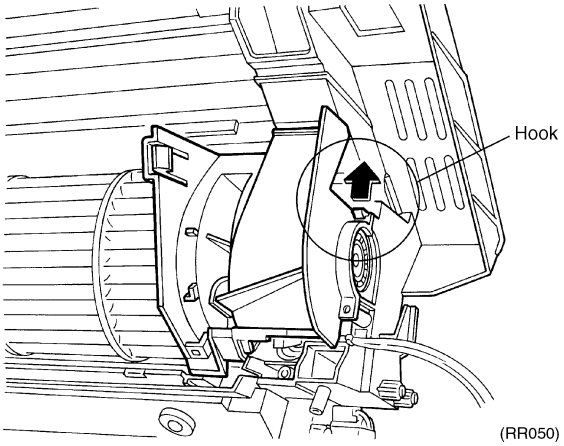
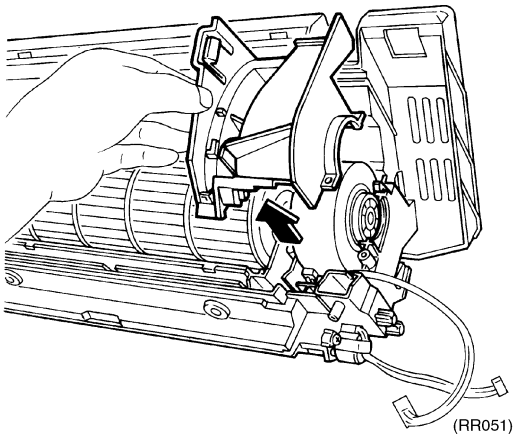
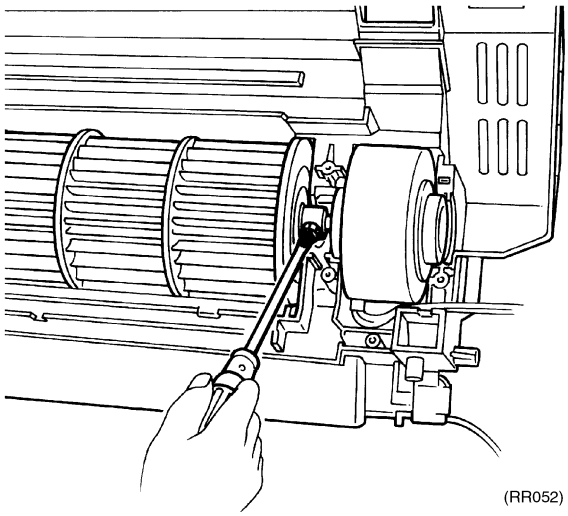
Step	Procedure		Points
1	Disconnect drain hose.	 (RR044)	■ The drain pan is integrated with the bottom plate.
2	Pull out the drain plug in the left on the drain pan by hand.	 (RR045)	
3	Insert the drain hose,	 (RR046)	■ Push it into the inner part firmly.
4	Push the drain plug into the right by Allen wrench.	 (RR047)	■ Push it into the inner part firmly.

1.7 Removal of Fan Rotor and Motor

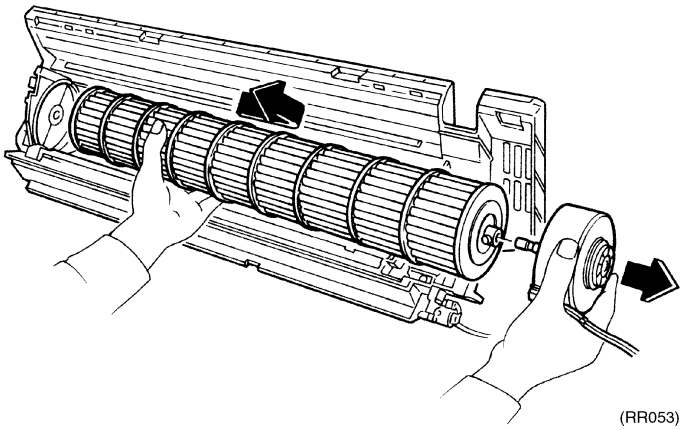
Procedure

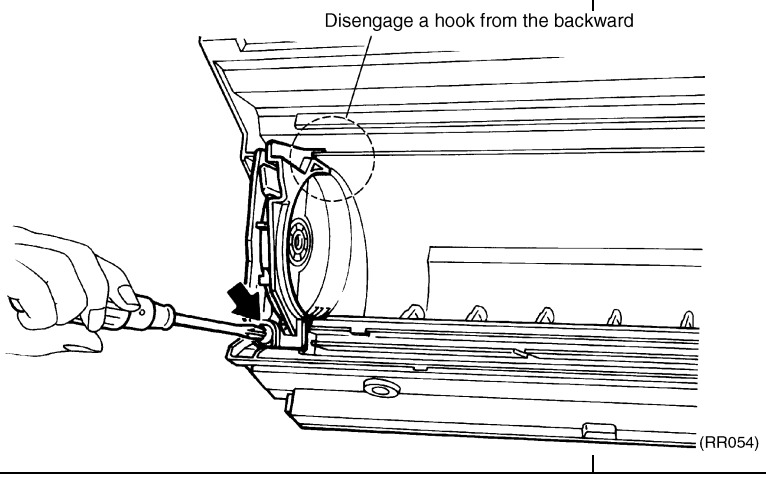
Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

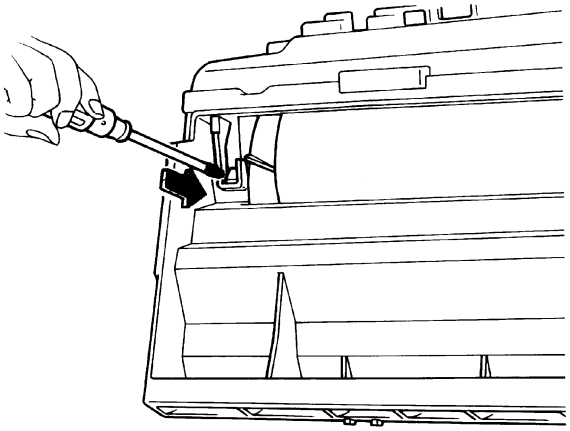
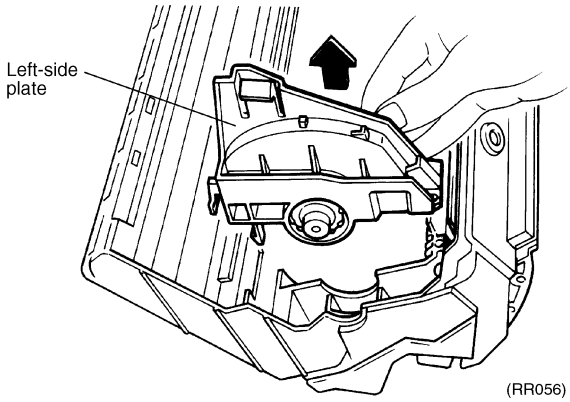
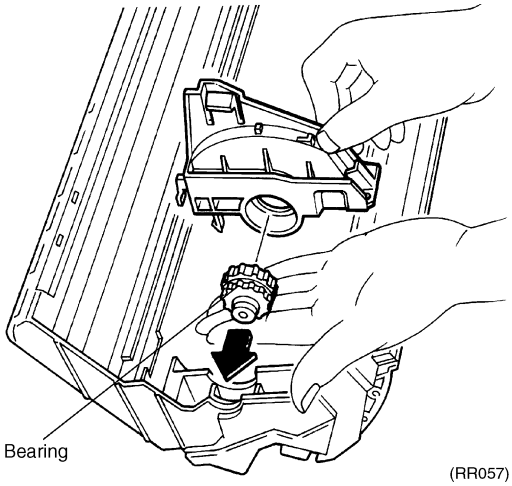
Step	Procedure	Points
■ Remove heat exchanger.	 (RR048)	
1	To remove right side panel, remove three screws.	 (RR049)

Step	Procedure		Points
2	Disengage hook.	 (RR050)  (RR051)	
3	Loosen the hexagon head set screw on the fan rotor.	 (RR052)	

Step	Procedure	Points
4	Remove the motor and fan rotor.	
5	Remove a screw on the left side panel.	





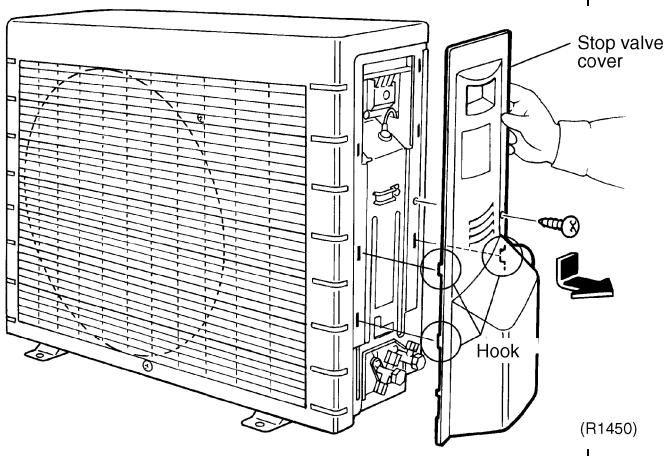
Step	Procedure		Points
6	Disengage a hook from the backward.	 (RR055)	
		 (RR056)	
7	Since the fan bearing is made of rubber, push it strongly off from the inside. The bearing can be removed just as the left-side plate is attached with.	 (RR057)	

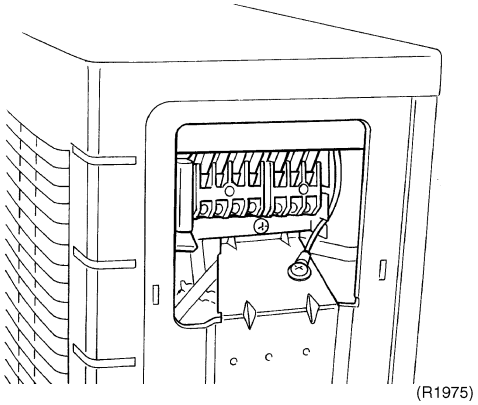
2. For RK25J, RK35J, RX25J, RX35J

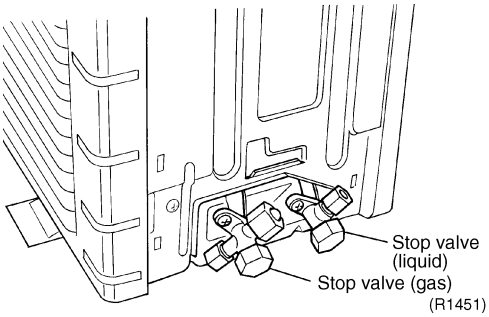
2.1 Removal of External Casing

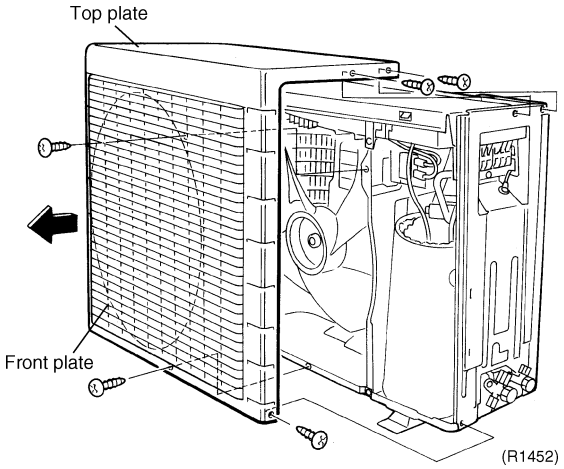
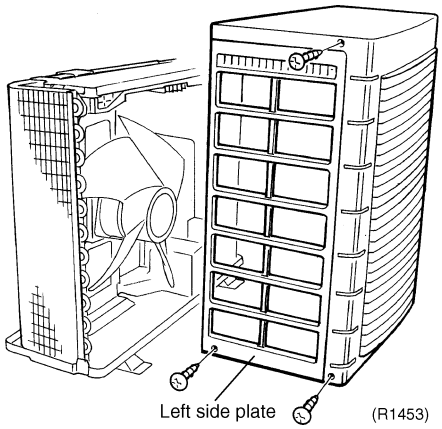
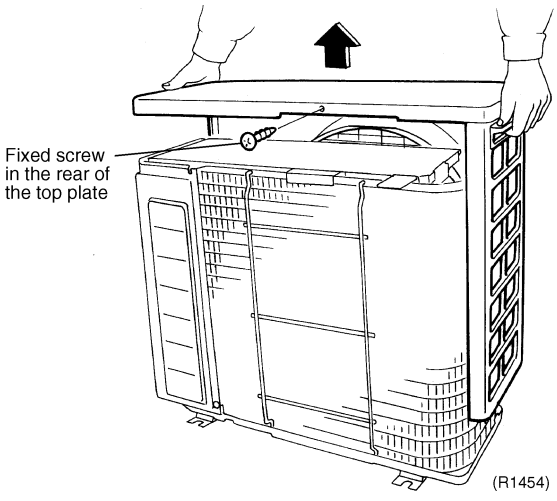
Procedure **Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.**

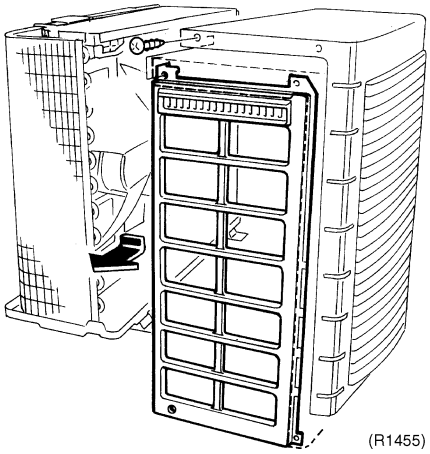
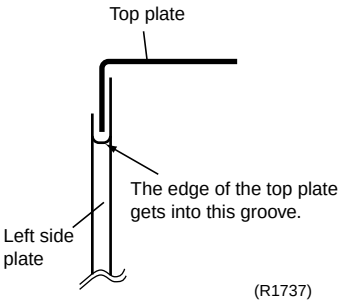
Step	Procedure	Points
1	The stop valve cover can be removed when the fixed screw is removed.	■ As three hooks are provided, slide the cover downward to remove. ■ The forced cooling operation in the pumping down mode can be carried out by pushing the operation switch on the main unit for five seconds. (The existing models can do it through the switch on the PC board just as well.) ■ The layout of the connection ports for the flares has been changed to horizontal position from vertical position.







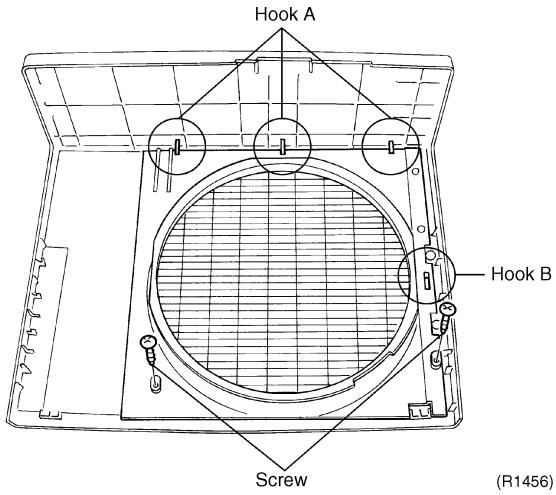
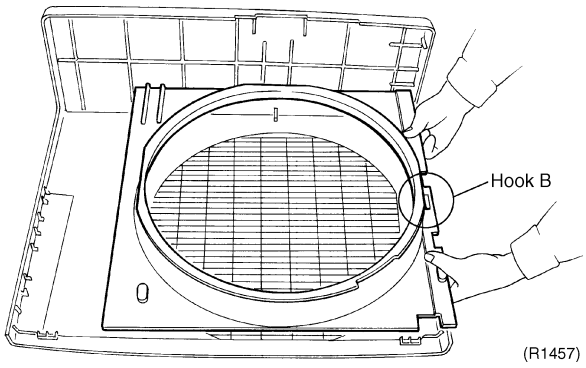
Step	Procedure		Points
2	The top plate and the front plate are constructed in a monoblock. Remove the three screws on the right side and the two screws on the front plate.		
3	Remove the three screws on the left side.		
4	Remove the one fixed screw in the rear of the top plate. Once lift the top plate and then remove it forward.		■ The left side plate and the bell mouth can be removed all at once. ■ When restoring the top plate, move it horizontally and get it down for the easy work.

Step	Procedure		Points
5	The front plate and the left side plate can be removed when the one fixed screw is removed.	 (R1455)	■ Sectional view at the front.  (R1737)

2.2 Removal of Bell mouth and Left Side Plate

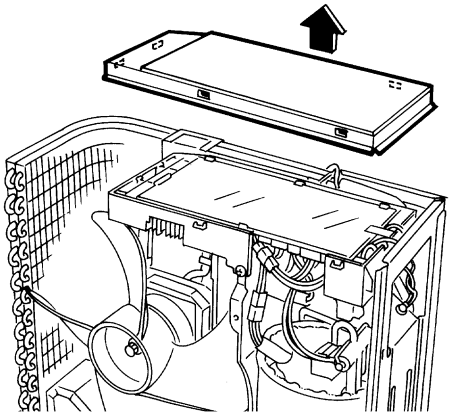
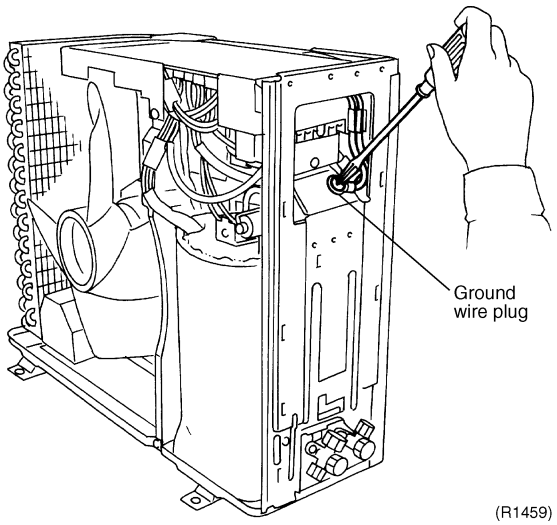
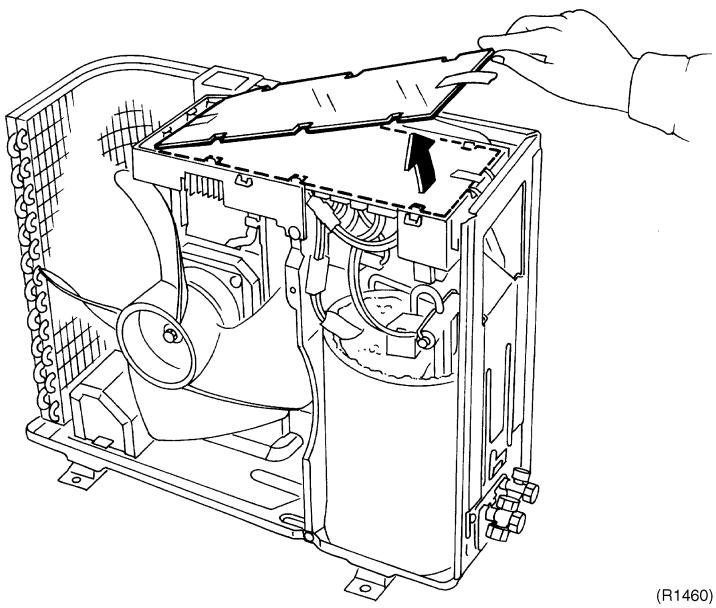
Procedure

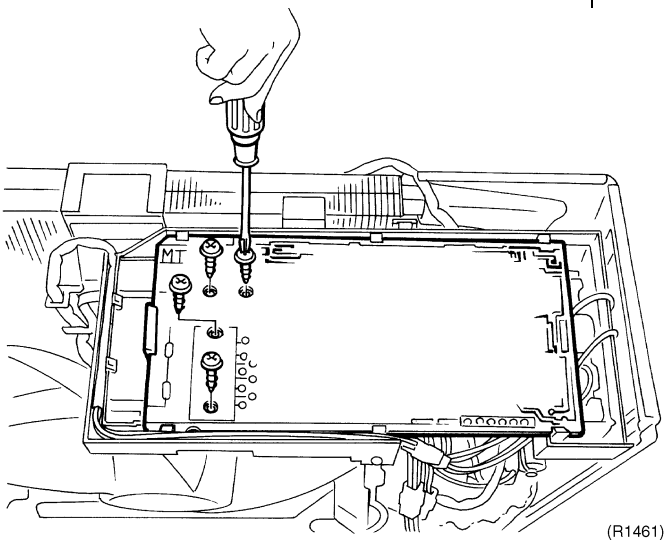
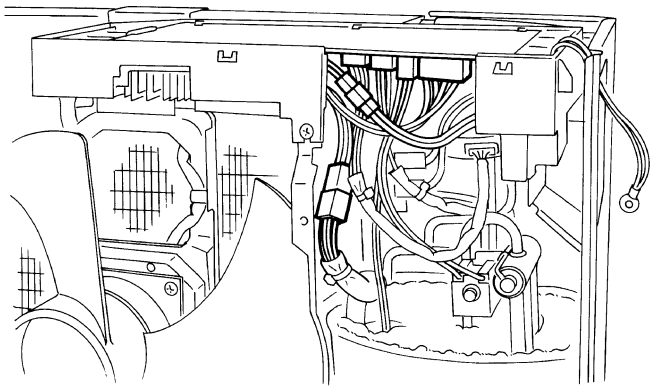
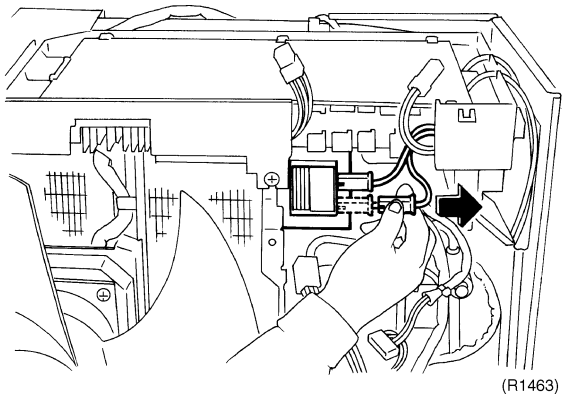
Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.

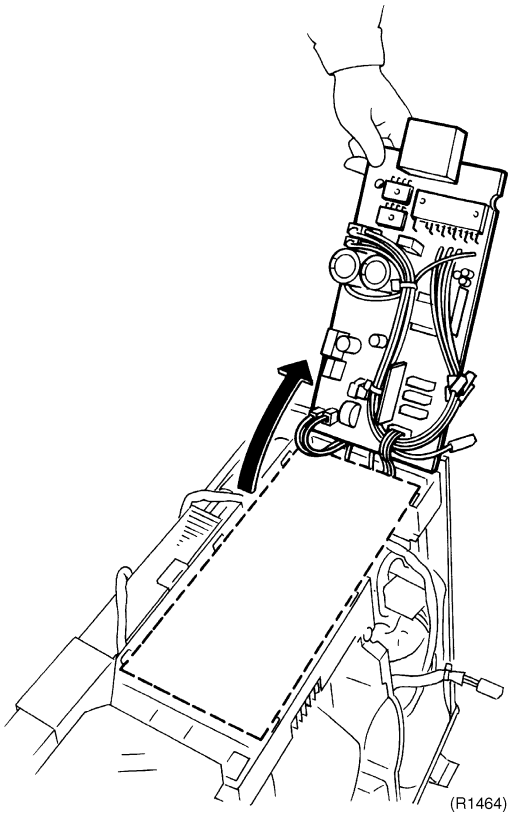
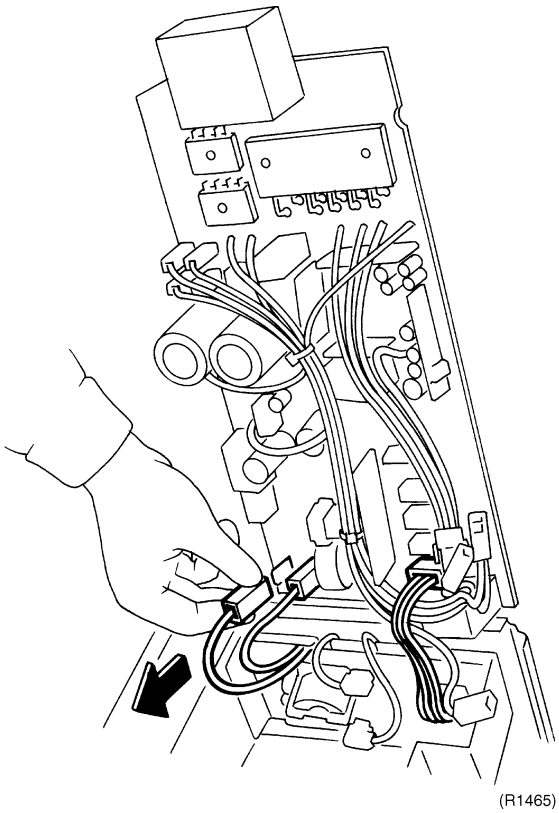
Step	Procedure		Points
1	The bell mouth is attached to the front plate with two screws and four hooks.		■ Remove the bell mouth from the front plate after removing the two screws which are set below.
2	Remove the two screws and undo the four hooks to release the bell mouth.		■ Slide the bell mouth in the arrow direction to disengage the hook B.

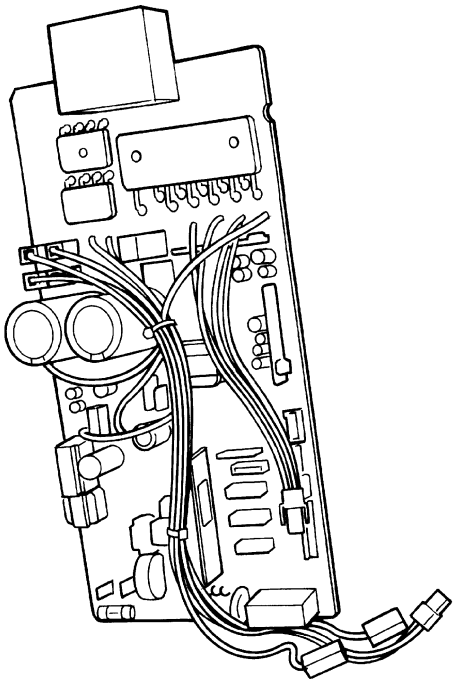
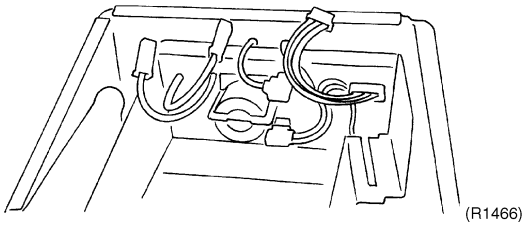
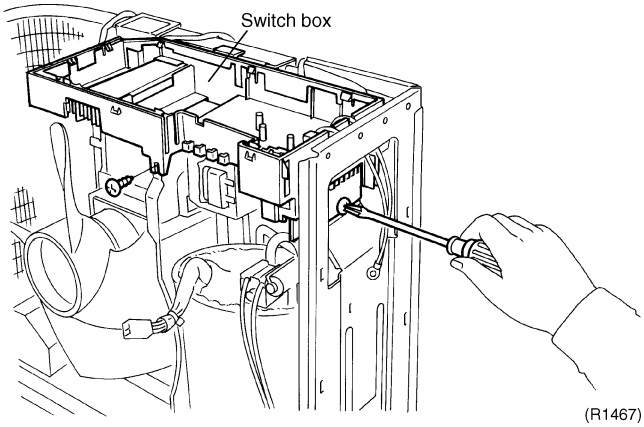
2.3 Removal of PC Board and Switch Box

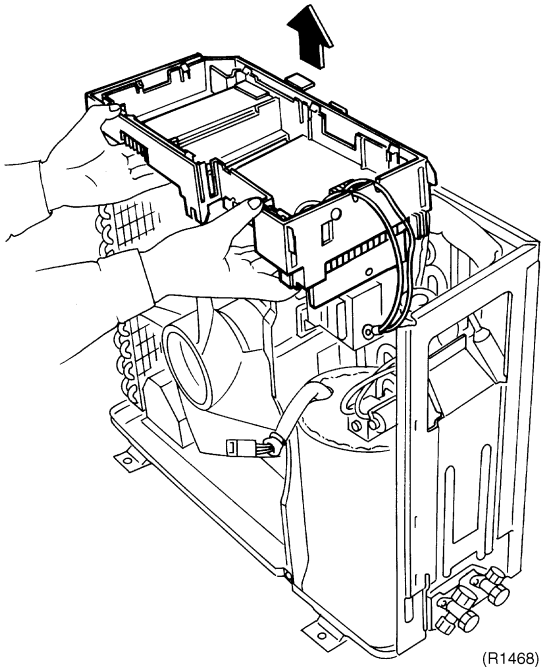
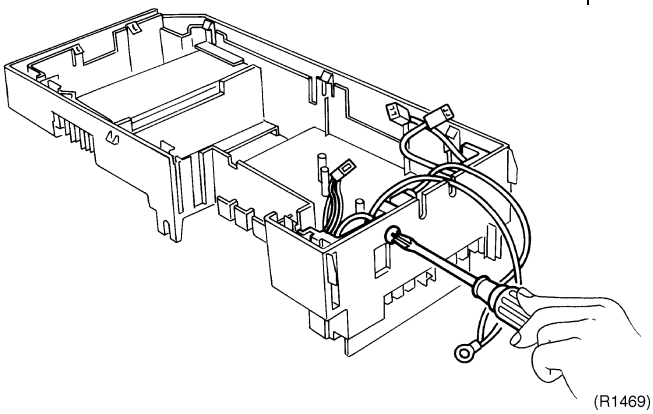
Procedure **Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.**

Step	Procedure	Points
1. Remove the shelter.	 (R1458)	■ The shelter has five hooks. ■ Be sure to avoid forgetting to restore the shelter and to avoid loosing or damaging it.
1 Undo the five hooks and remove the shelter.		
2. Remove the printed circuit board.	 (R1459)	
1 Disconnect the ground wire.	 (R1460)	

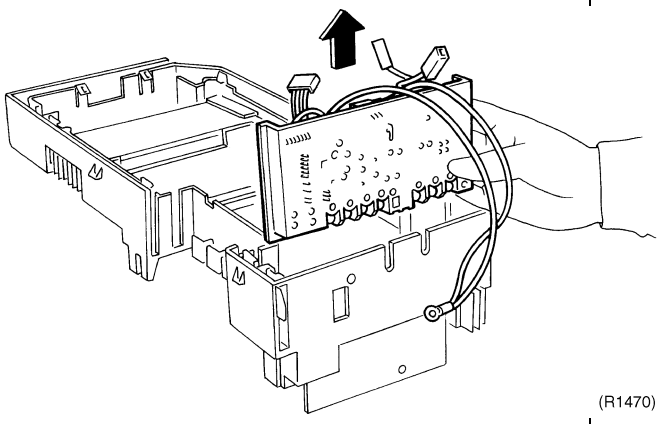
Step	Procedure		Points
2	Remove the four screws fixing the printed circuit board.	 (R1461)	
3	Disconnect the wire harness.	 (R1462)	
4	Disconnect the two connectors of the reactor.	 (R1463)	

Step	Procedure		Points
5	Undo the eight hooks and the printed circuit board can be disengaged.	 (R1464)	■ The printed circuit board has eight hooks.
6	Disconnect the three wires from the printed circuit board.	 (R1465)	

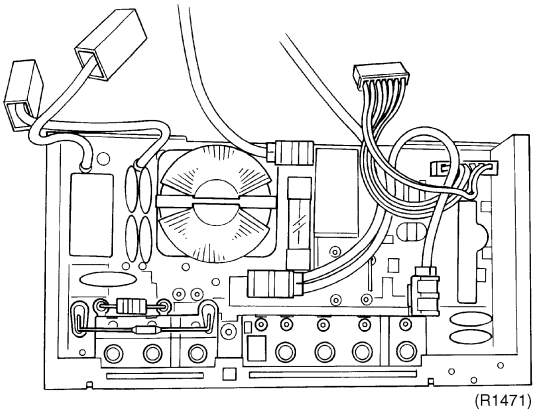
Step	Procedure		Points
7	The printed circuit board can completely be released.	  (R1466)	
3. Remove the switch box.			
1	Remove the two screws fixing the switch box.	 (R1467)	

Step	Procedure		Points
2	Lift and remove the switch box.	 (R1468)	
4. Remove the molded interconnect device (MID).			
1	Remove the one screw fixing the MID.	 (R1469)	

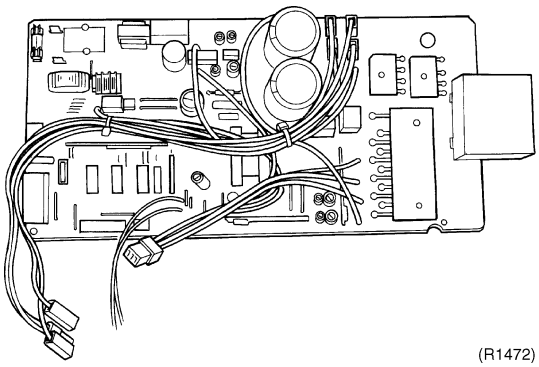
Step	Procedure	Points
2	Slide the MID upward and release.	



(R1470)



(R1471)

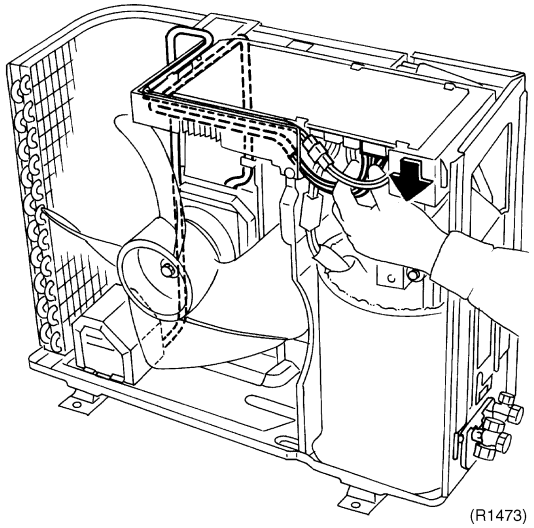
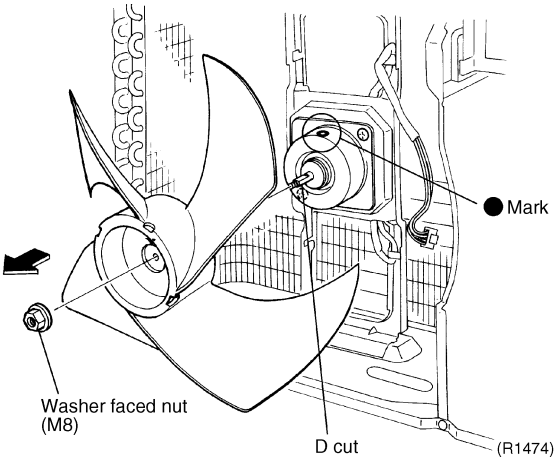
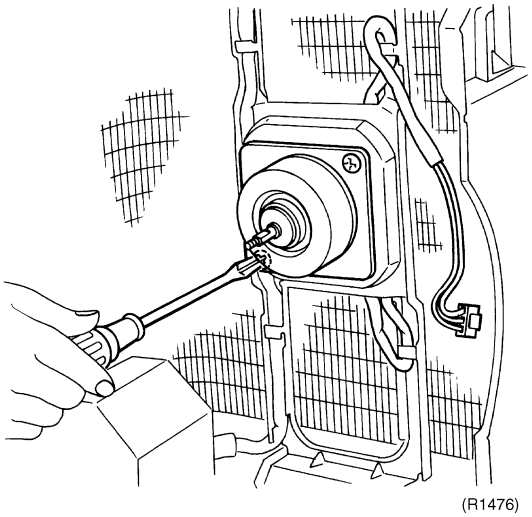


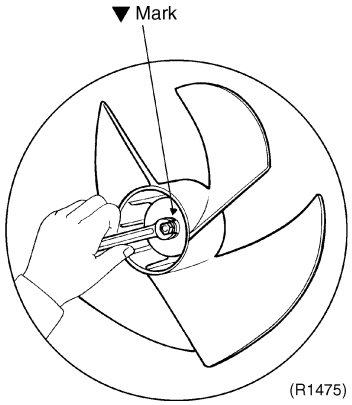
(R1472)

2.4 Removal of Propeller Fan and Fan Motor

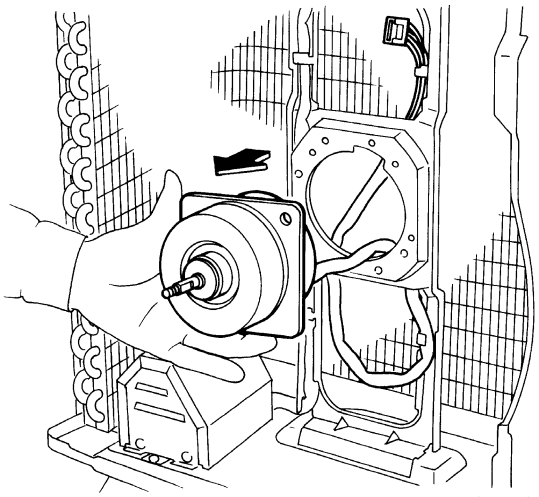
Procedure

⚠ Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.

Step	Procedure	Points
■ Disconnect the fan motor connector S70.	 (R1473)	■ Remove the external plates and the drip proof cover protecting the electric parts. ■ Be sure to avoid forgetting to restore the shelter and to avoid loosing or damaging it.
1 Release the lead-wires of the fan motor from the groove of the switch box.		
2 The propeller fan can be removed when the washer faced nut (M8) is removed.	 (R1474)	■ When restoring, match the ▼ mark of the propeller fan with the D-cut of the motor shaft. ■ The fan should be restored so that the mark ● will be at upper part of the fan motor.
3 Remove two screws for removing the fan motor. The lead wires are disengaged by raising the hooks which fix the lead wires.	 (R1476)	

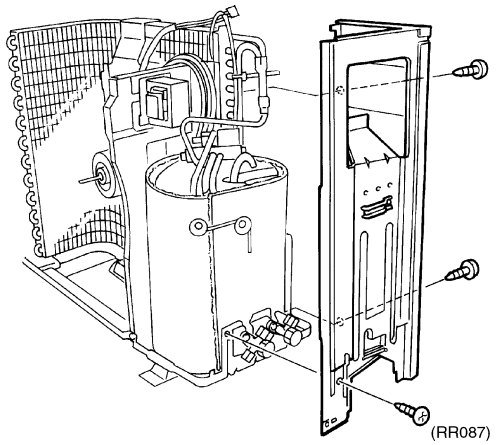
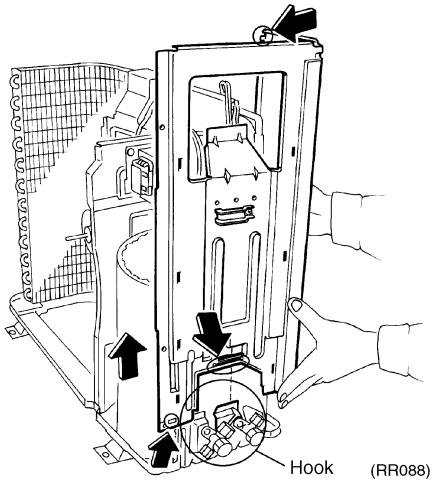
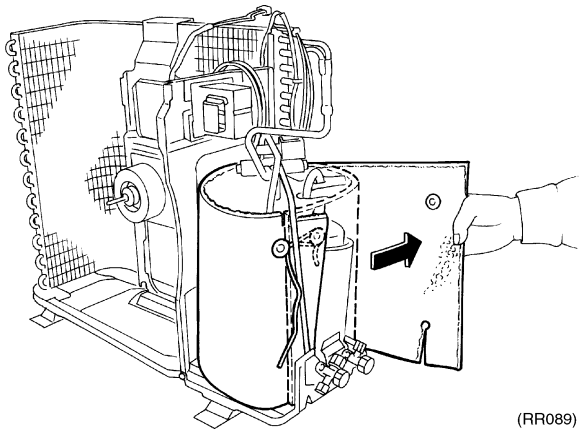


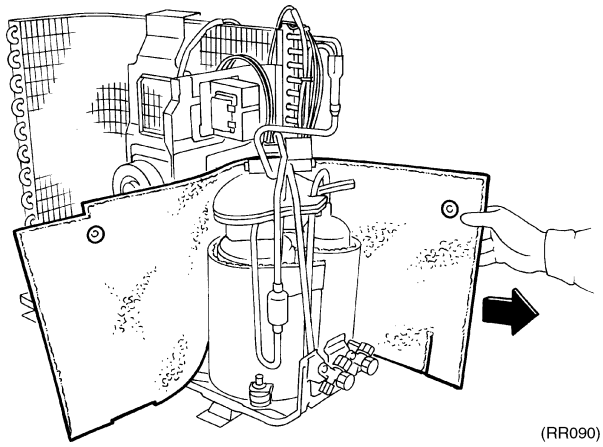
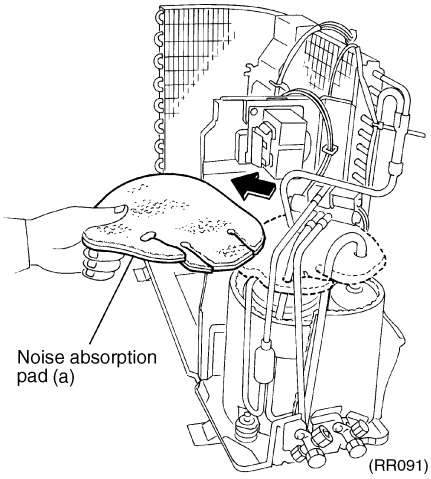
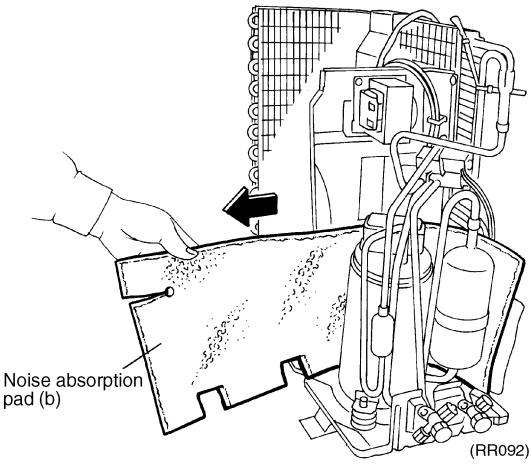
(R1475)

Step	Procedure		Points
4	Remove the fan motor.	 (R1477)	

2.5 Removal of Compressor Noise Absorption Pad

Procedure **Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.**

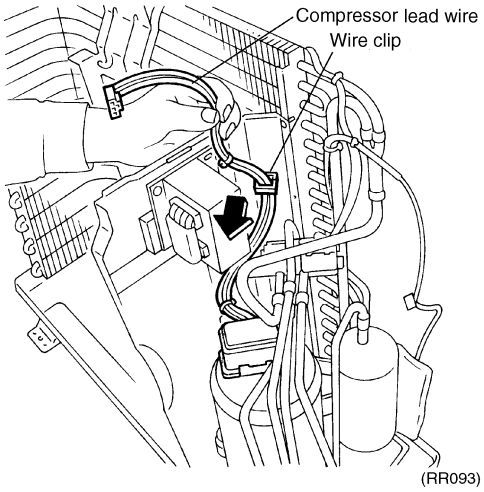
Step	Procedure	Points
1. To remove the right side plate.	 (RR087)	
1 Remove the three screws for removing the right side plate.		
2 Lift the right side plate to disengage the hooks.	 Hook (RR088)	■ Insert the three hooks for the restoration.
2. To remove the noise absorber	 (RR089)	■ Since the slit prepared for the piping connection on the noise absorption pad is torn easily, remove the pad carefully. ■ When restoring, the noise absorption pad should pass the internal side of the piping.
1 Untie the string fixing the body of the compressor noise absorption pad.		

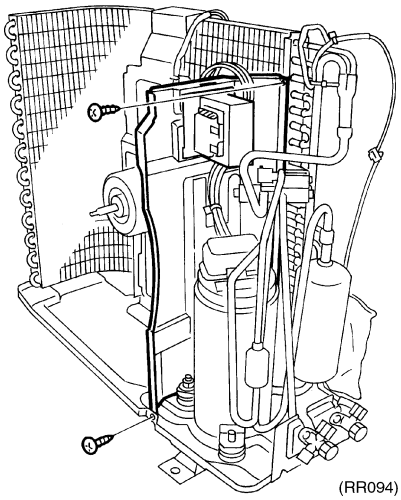
Step	Procedure		Points
2	Pull out the body of the noise absorption pad.	 (RR090)	
3	Pull out the top pad of the noise absorption (a).	 (RR091)	■ Since the slit prepared for the piping on the noise absorption pad is torn easily, remove the pad carefully.
4	Pull out the body of the noise absorption pad (b).	 (RR092)	■ When restoring, the noise absorption pad should pass the internal side of the piping.

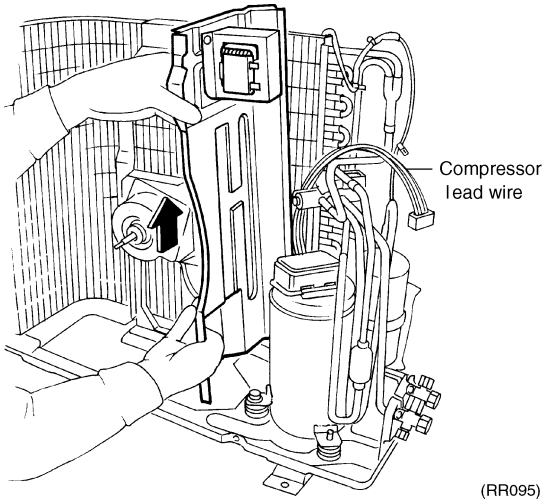
2.6 Removal of Partition Plate and Reactor

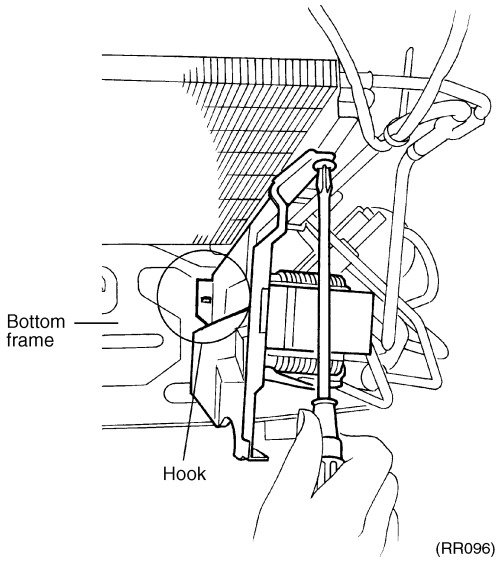
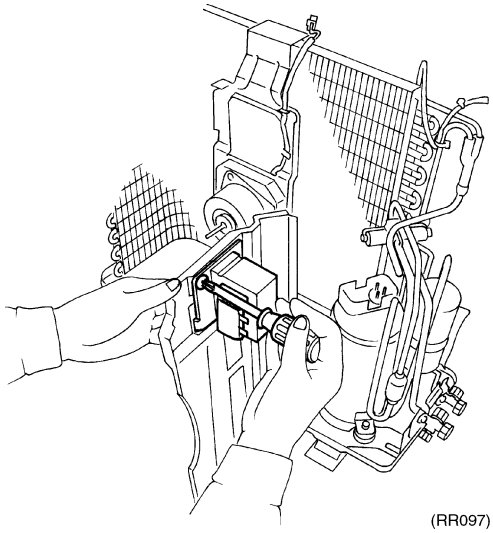
Procedure **Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.**

Step	Procedure	Points
1. To remove the partition plate.		
1	Disengage the lead wires from the wire clip.	
2	Remove the two screws fixing the partition plate.	
3	Pull the partition plate upward to remove.	





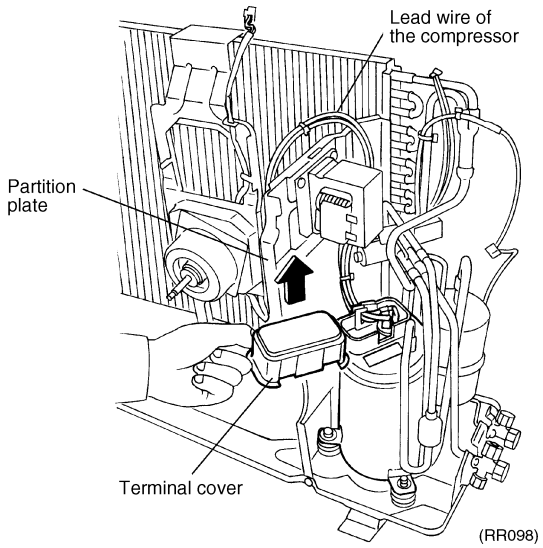


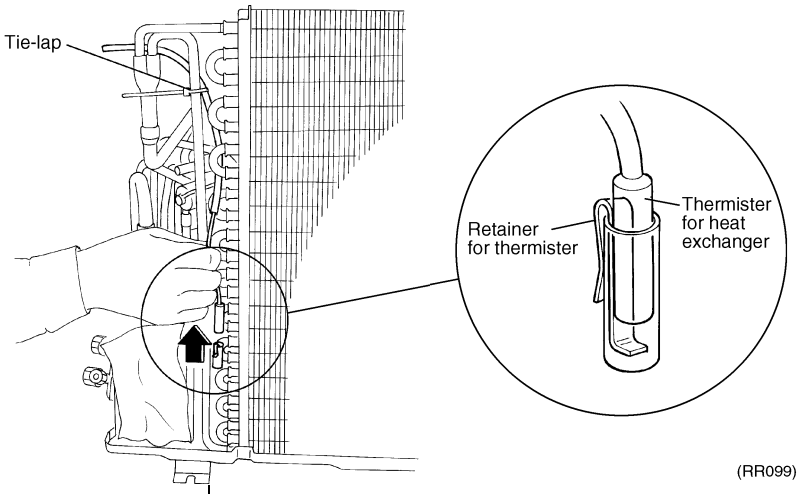
Step	Procedure		Points
4	When restoring the partition plate, put the hook into the bottom frame.		
2. To remove the reactor			
1	The reactor can be removed by removing the fixed screw.		

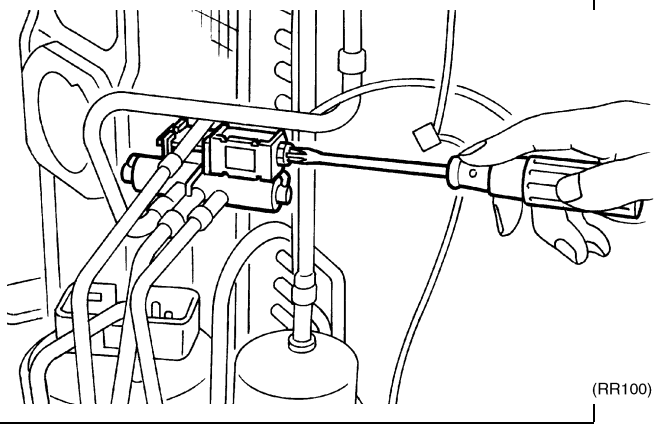
2.7 Removal of Four-way Valve

Procedure **Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.**

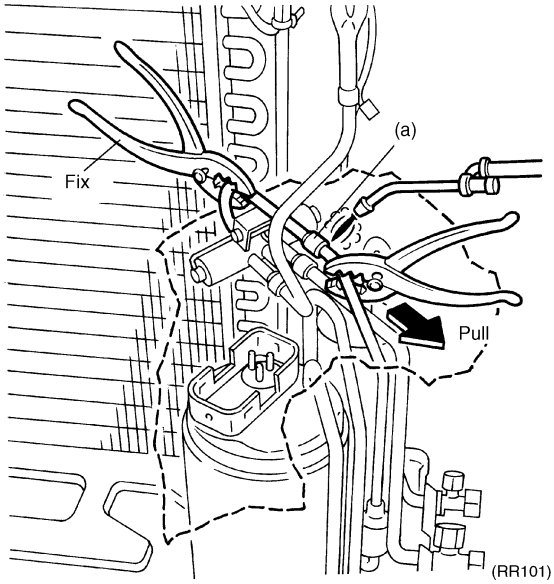
Step	Procedure	Points
1. To remove the parts around the four-way valve.		
1	Remove the terminal cover, the lead wires of the compressor and the partition plate so as not to be burnt out by a gas brazing machine.	
2	Remove the thermister for the heat exchanger.	■ The thermister for heat exchanger is fixed by a tie-lap at one portion. Be sure to fix the thermister on the original position when restoring. **Warning! Ventilate when refrigerant leaks during the work. (If refrigerant contacts fire, it will cause to arise toxic gas).**
3	Remove the four-way valve's coil.	■ Pay attention so as not to loose the retainer for the thermister.

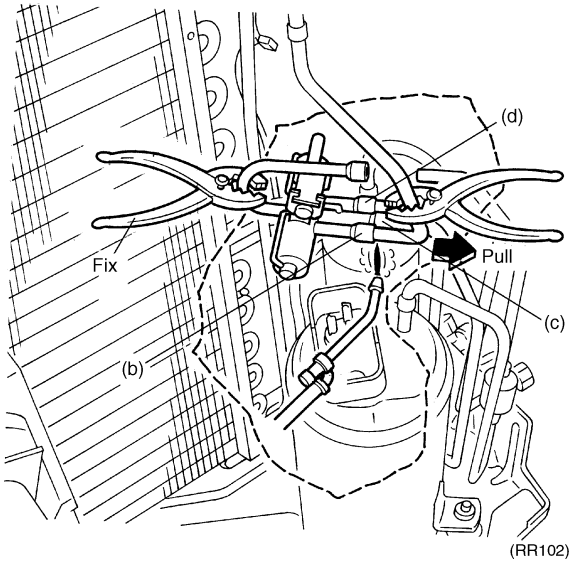


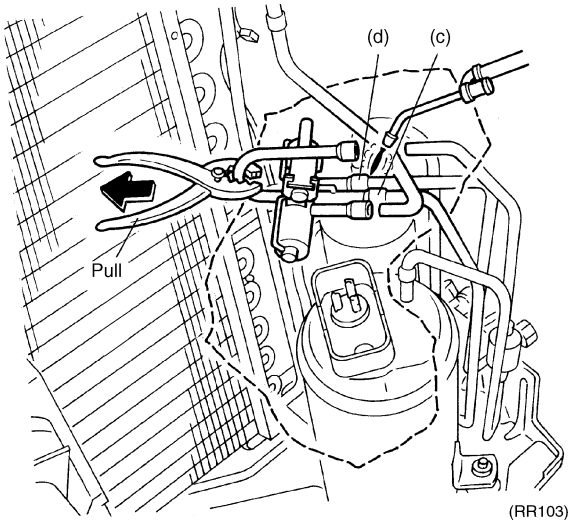




Step	Procedure	Points
■ Begin your work after recognizing complete empty of refrigerant in the refrigerant circuit.		**Caution** **Be careful about four-way valve, pipes and so on, which were heated up by a gas brazing machine, so as not to get burnt on your hands.** **Cautions at the restoration.** 1. Restore the piping by non-oxidation brazing. Braze it quickly unless nitrogen gas can be used. 2. It is required to prevent the carbonization of the oil inside the four-way valve and the deterioration of the gaskets affected by heat. For the sake of this, rap the four-way valve with wet cloth and make up water so that the cloth will not be dried and avoid excessive heating.(it keeps below 120 degree C).
4	Provide a protective sheet or a steel plate so that the brazing flame can't influence the circumstance around the four-way valve.	
5	Heat up the four portions of brazing parts on the four-way valve. Remove the four-way valve in the order of (a),(b),(c),(d).	■ Be careful so as not to break pipes by pressing the pipes excessively by a plier when withdrawing the piping.
6	Heat up the blazing parts and withdraw the pipes connected to the four-way valve by a plier and so on.	In case that the removal seems to be hard; 1. Remove the piping connection part (brazing part) easy to remove and restore. 2. Cut the pipes on the main unit by a miniature copper tube cutter in order to make it easy to remove. **NOTE:** Don't use a metal saw for cutting pipes by all means because the chips come into the circuit.



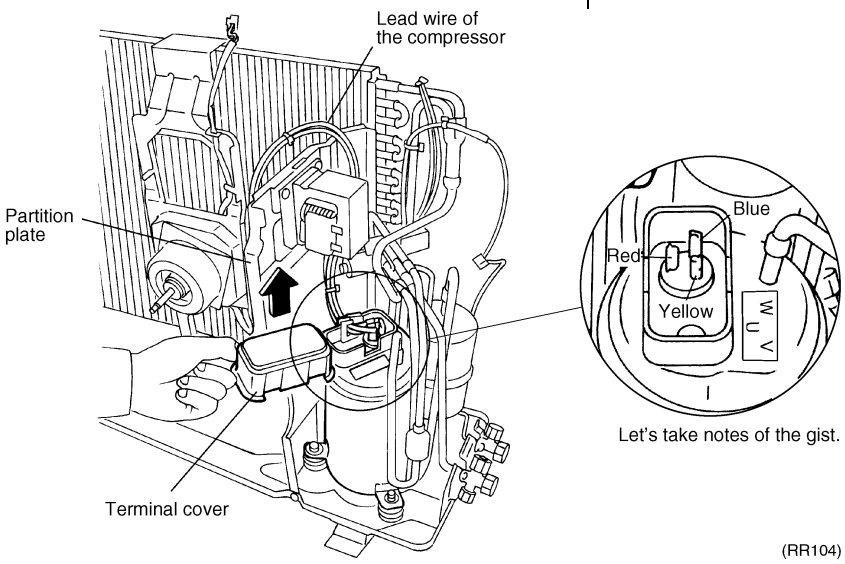


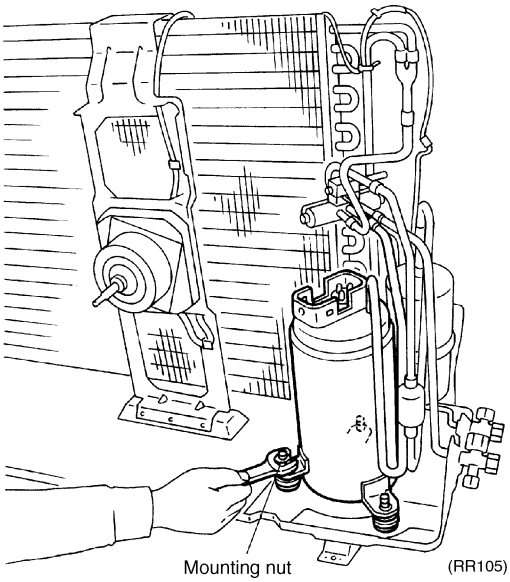
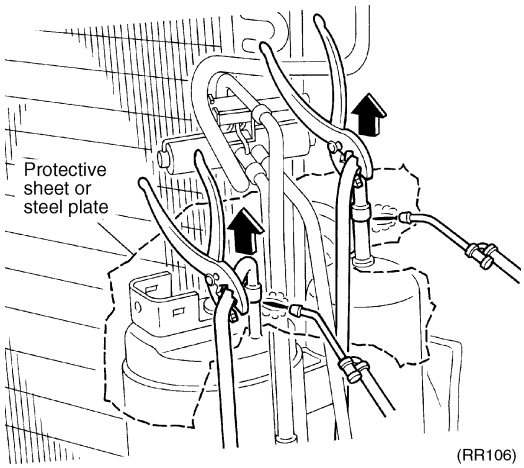


2.8 Removal of Compressor

Procedure **Warning Be sure to turn off all power supplies at least 10 min. before disassembling work.**

Step	Procedure	Points
1. To Remove the Parts Around the Compressor.		■ Be careful so as not to burn the compressor terminals or the name plate.
1	Remove the terminal cover, the lead wires of the compressor and the partition plate so as not to be burnt out by a gas brazing machine.	



Step	Procedure		Points
2	The compressor's mounting nut to be removed is one piece.		**Warning** **Since it may happen that refrigeration oil in the compressor will catch fire, prepare wet cloth so as to extinguish fire quickly.**
3	Remove the nut by means of an open-end wrench.		
■ Begin your work after recognizing complete empty of refrigerant in the refrigerant circuit.			
■ Be sure to apply nitrogen's permutation when heating up the brazing part.			**Warning!** **Ventilate when refrigerant leaks during the work.(If refrigerant contacts fire, it will cause to arise toxic gas).**
1	Remove the brazing part on the compressor discharge side.		
2	Heat up the brazing part on the compressor suction part and then remove it.		**Caution** **Be careful about pipes and so on, which were heated up by a gas brazing machine, so as not to get burnt on your hands.**
3	Lift the compressor and remove it.		■ Pay attention so that the heat exchanger's fins will not be burnt.

Part 8
Others

1. Others

1.1 Explanation

1.1.1 Test Run from the Remote Controller (For Heat Pump Model Only)

Trial Operation and Testing

1. Measure the supply voltage and make sure that it falls in the specified range.
2. Trial operation should be carried out in either cooling or heating mode.

For Heat pump

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

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

For Cooling operation in case of low ambient temperature

Select the lowest programmable temperature.

- Trial operation in cooling mode may be disabled depending on the room temperature. Use the remote control for trial operation as described below.

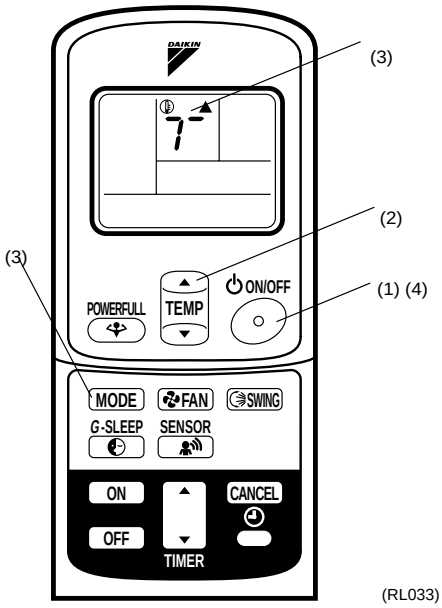
Trial operation from Remote Controller

(1) Press ON/OFF button to turn on the system.
(2) Simultaneously press center of TEMP button and MODE buttons.
(3) Press MODE button twice.
("*T*" will appear on the display to indicate that Trial Operation mode is selected.)
(4) Trial run mode terminates in approx. 15 minutes and switches into normal mode. To quit a trial operation, press ON/OFF button.

- After trial operation is complete, set the temperature to a normal level (26°C to 28°C).
- For protection, the machine disables restart operation for 3 minutes after it is turned off.

3. Carry out the test operation in accordance with the Operation Manual to ensure that all functions and parts, such as louver movement, are working properly.

- The air conditioner requires a small amount of power in its standby mode. If the system is not to be used for some time after installation, shut off the circuit breaker to eliminate unnecessary power consumption.
- If the circuit breaker trips to shut off the power to the air conditioner, the system will restore the original operation mode when the circuit breaker is opened again.



1.1.2 Method of Operating Air Conditioners Individually (When Two Units are Installed in One Room) For Cooling Only and Heat Pump Model

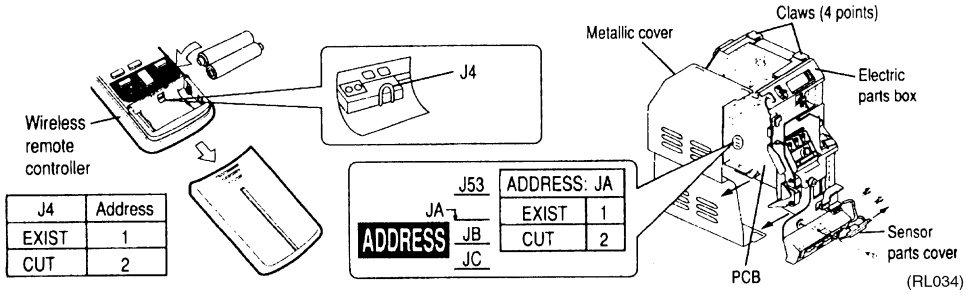
- **How to set the different addresses.**
- When two indoor units are installed in one room, the two wireless remote controllers can be set for different addresses.

PCB in the indoor unit

- Remove the front panel.
- Remove the sensor parts cover (2-screws), then remove the electric parts box (1-screw).
- Slide the metallic cover to remove it. (4-claws on the electric parts box.)
- Cut the jumper JA on PCB.

Wireless remote controller

- Cut the jumper J4.



1.1.3 Centralized Control (For KRC72, 7 KRP413A1S)

For an explanation on usage, see the option handbook. However, do the following when using the KRP413A1S (Contact connection centralized control PC board).

Cut jumper JC on the indoor PC Bord.

(ML112)

Note : The power failure recovery function is controlled by the ON signal from the centralized control PC Board. The following may occur if the unit is used without cutting jumper JC.

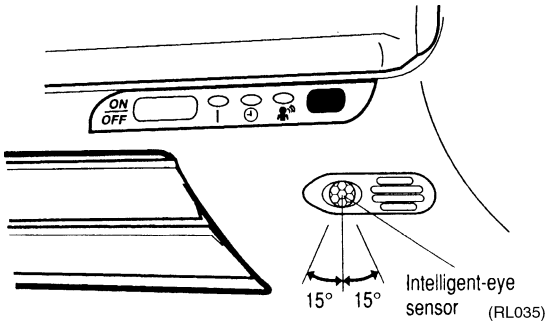
- If the unit was running when a power failure occurred, it may not resume operation after recovering from a power failure.

1.1.4 Dry Keep Change-over Switch (All Indoor Models) For Cooling Only and Heat Pump Model

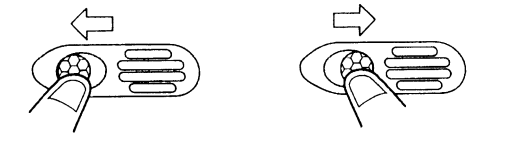
Jumper (On indoor PC Board)	Function	When connected (factory set)	When cut
JC	Power failure recovery function	Auto start	Unit does not resume operation after recovering from a power failure. Timer ON-OFF settings are cleared.
JB	Fan speed setting when compressor is OFF on thermostat.	Fan speed setting ; Remote controller setting	Fan rpm is set to “0” <Fan stop>

1.1.5 Adjusting the Angle of the Intelligent-eye Sensor

- Once installation of the indoor unit is complete, adjust the angle of the Intelligent-eye sensor to ensure the detection area properly covers the room.
  (Adjustable angle : 15° to right and left of center)



- Gently push and slide the sensor to adjust the angle. Aim so that the sensor is pointing to the center of the room, or to the part of the room that is most frequently used.



- After adjusting the angle, gently wipe the sensor with a clean cloth, being careful not to scratch the sensor.

Caution

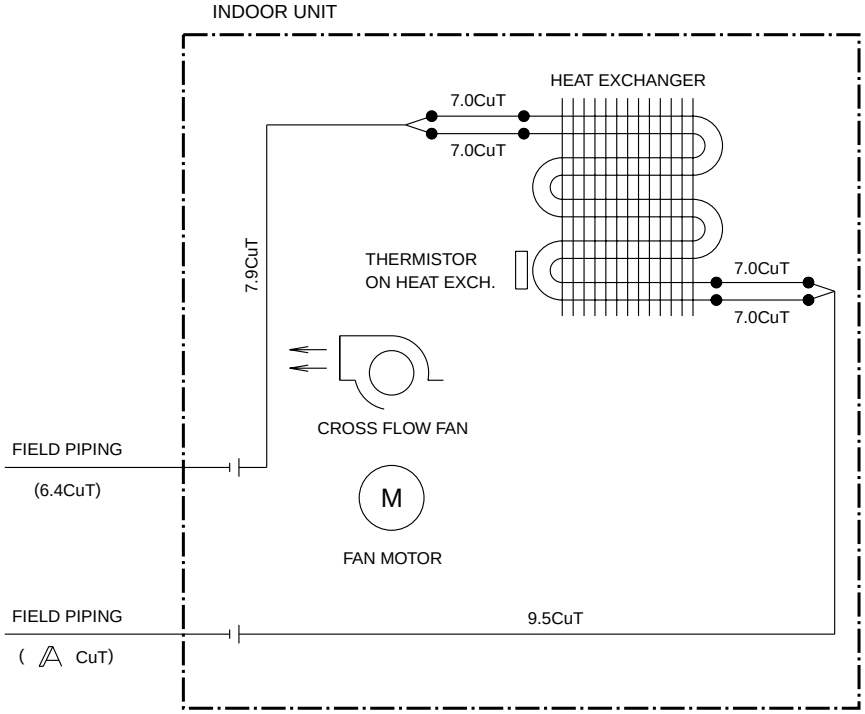
- Do not hit or violently push the Intelligent-eye sensor. This can lead to damage and malfunction.
- Do not place large objects near the sensor. Also keep heating units or humidifiers outside the sensor's detection area.

Part 9
Appendix

1. Piping Diagram

1.1 Indoor Unit

1.1.1 Cooling Only and Heat Pump



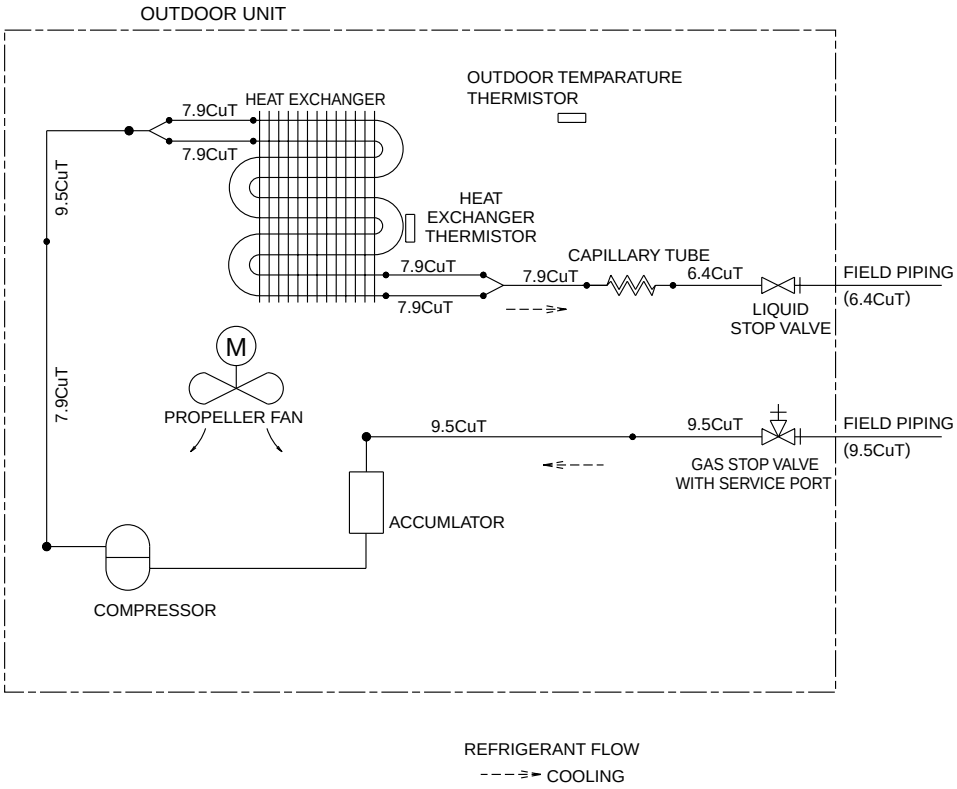
	A
FTK25- FTX25-	9.5
FTK35- FTX35-	12.7

4D019960D

1.2 Outdoor Unit

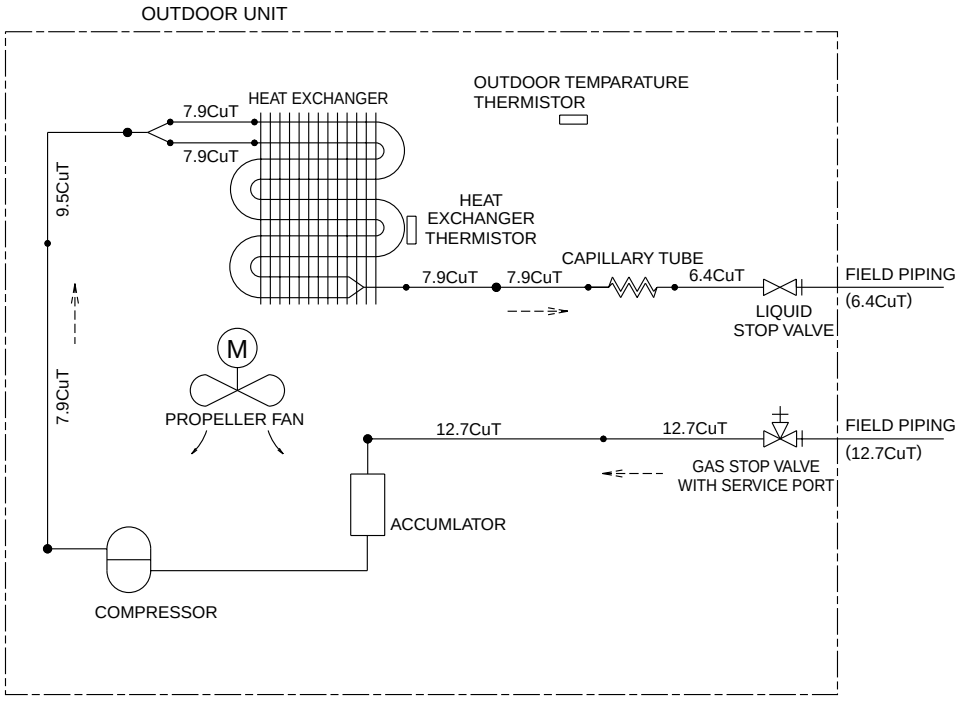
1.2.1 Cooling Only

RK25JVE9, RK25JVEA9, RK25JVET9, RK25JV1NB9



3D019958B

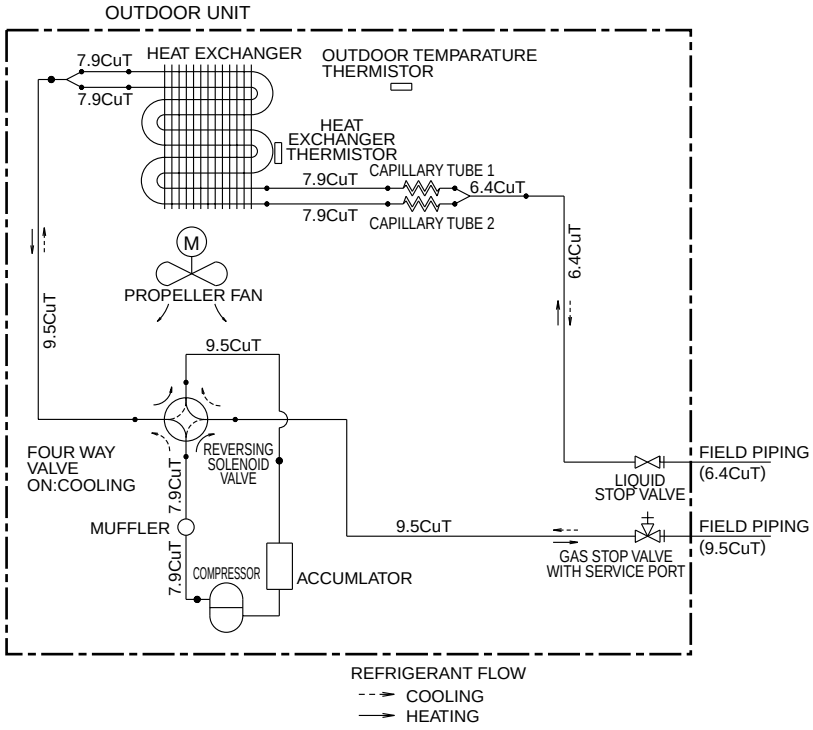
RK35JVE9, RK35JVEA9, RK35JVET9, RK35JV1NB9



3D019956B

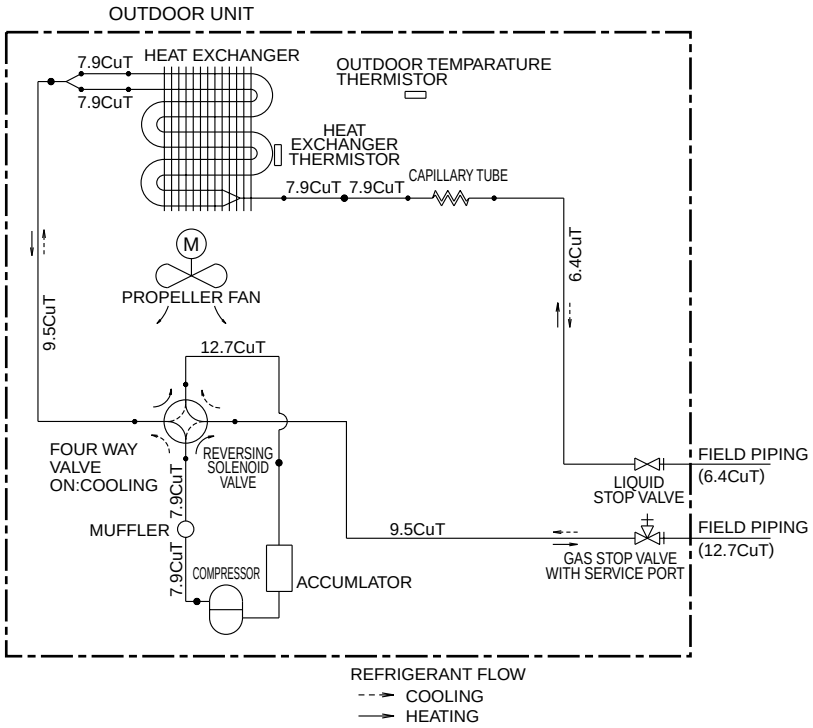
1.2.2 Heat Pump

RX25JVEA9, RX25JVET9, RX25JV1NB9



3D019959B

RX35JVEA9, RX35JVET9, RX35JV1NB9



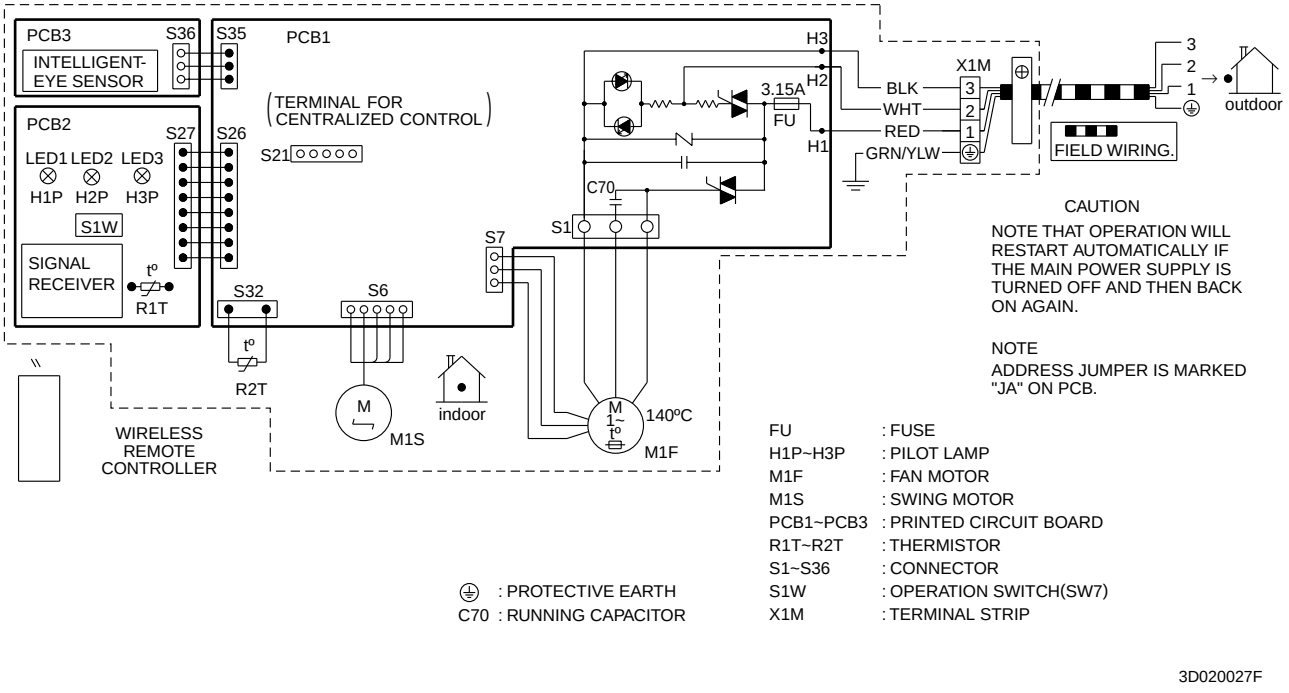
3D019957B

2. Wiring Diagram

2.1 Indoor Unit

2.1.1 Cooling Only

FTK25JVE9, FTK25JVEA9, FTK25JVET9, FTK25JV1NB9
FTK35JVE9, FTK35JVEA9, FTK35JVET9, FTK35JV1NB9



CAUTION

NOTE THAT OPERATION WILL RESTART AUTOMATICALLY IF THE MAIN POWER SUPPLY IS TURNED OFF AND THEN BACK ON AGAIN.

NOTE

ADDRESS JUMPER IS MARKED "JA" ON PCB.

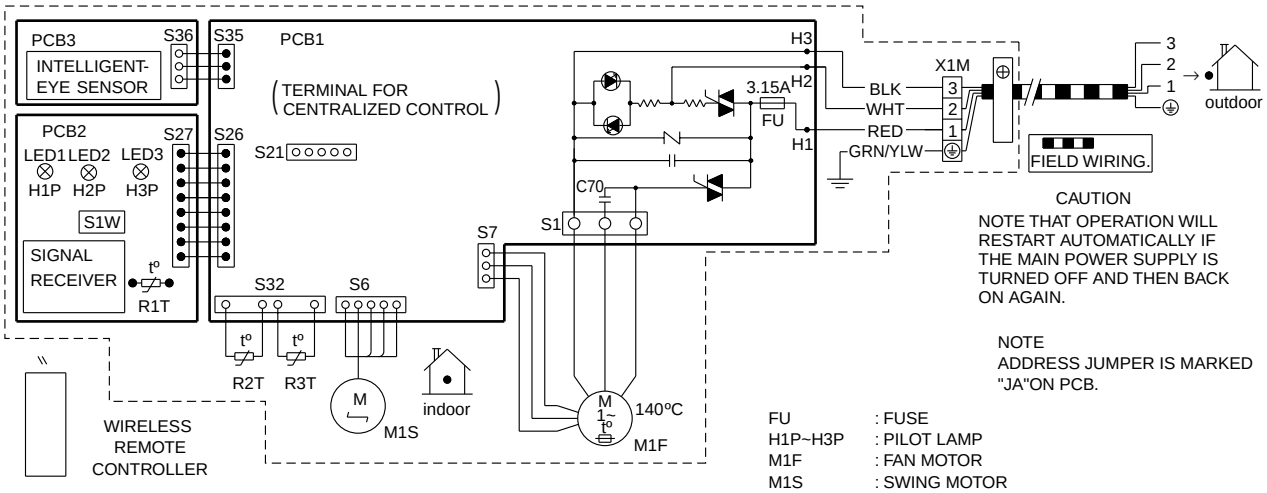
FU	: FUSE
H1P~H3P	: PILOT LAMP
M1F	: FAN MOTOR
M1S	: SWING MOTOR
PCB1~PCB3	: PRINTED CIRCUIT BOARD
R1T~R2T	: THERMISTOR
S1~S36	: CONNECTOR
S1W	: OPERATION SWITCH(SW7)
X1M	: TERMINAL STRIP

⏚ : PROTECTIVE EARTH
C70 : RUNNING CAPACITOR

3D020027F

2.1.2 Heat Pump

FTX25JVEA9, FTX25JVET9, FTX25JV1NB9
FTX35JVEA9, FTX35JVET9, FTX35JV1NB9

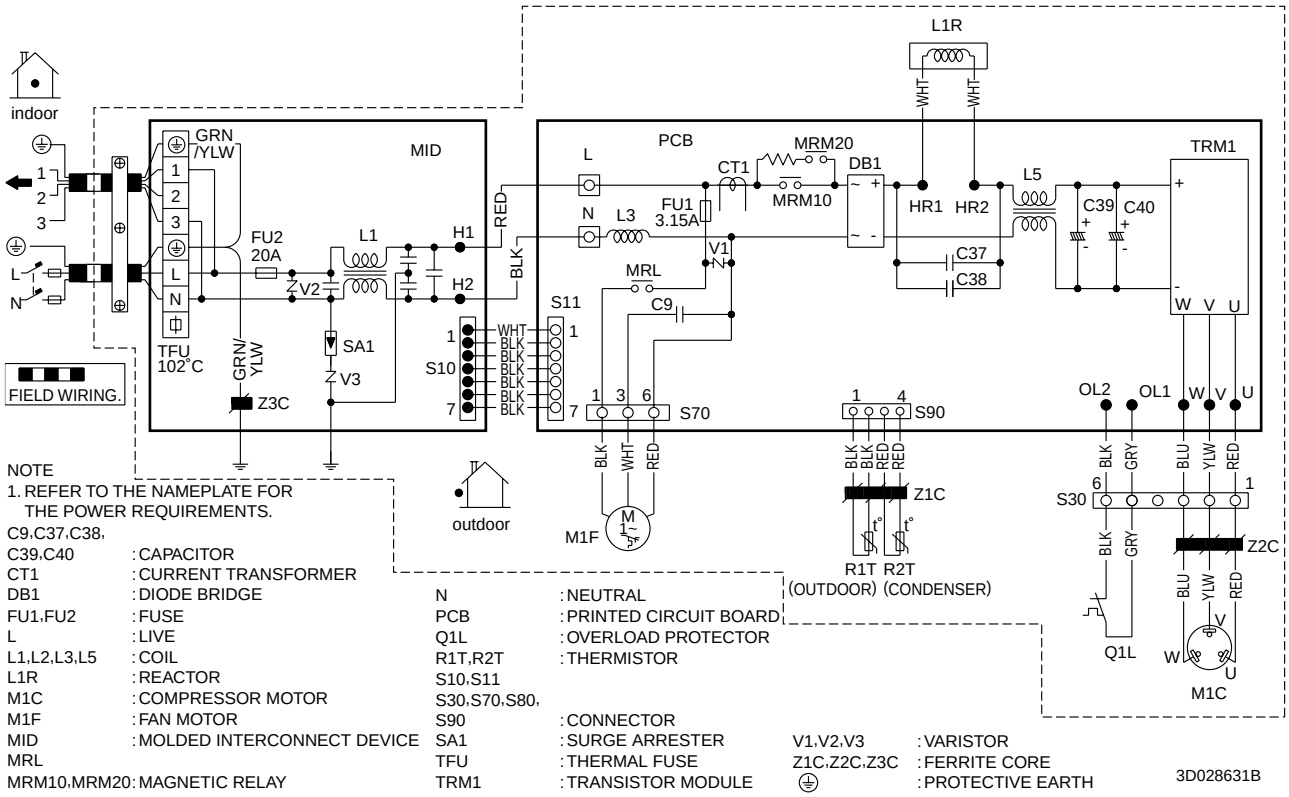


3D020026E

2.2 Outdoor Unit

2.2.1 Cooling Only

RK25JVE9, RK25JVEA9, RK25JVET9
RK35JVE9, RK35JVEA9, RK35JVET9

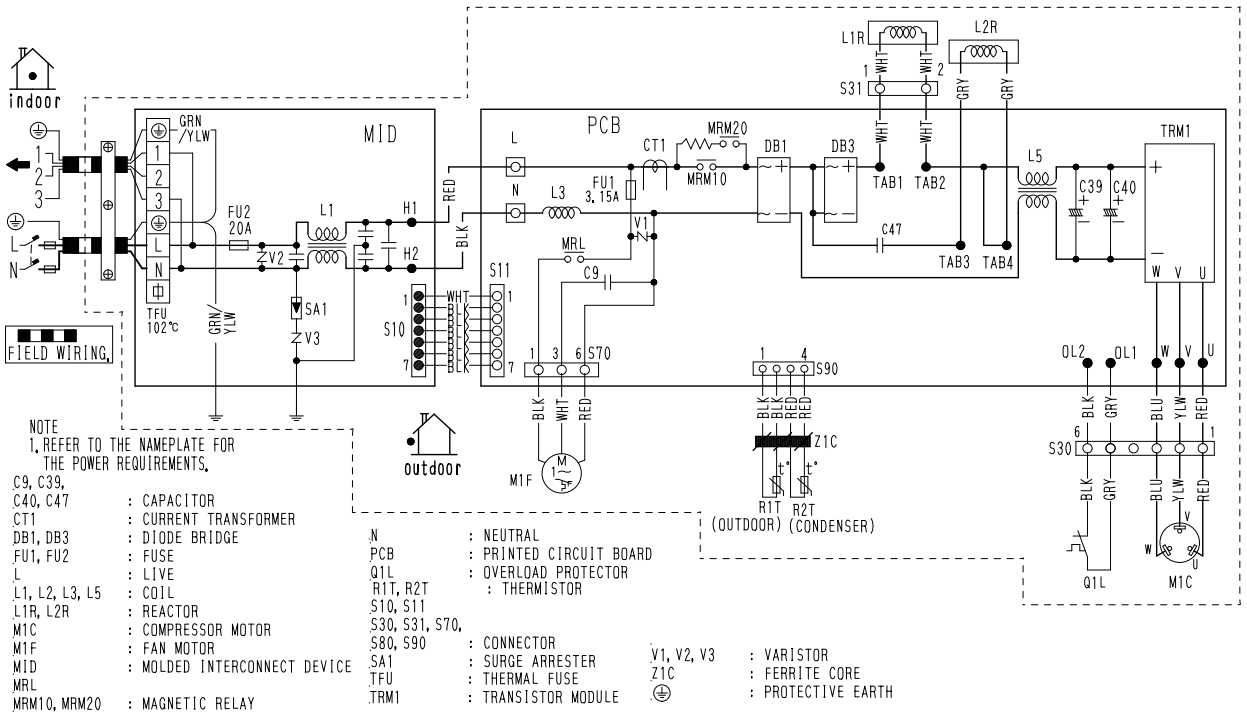


NOTE
1. REFER TO THE NAMEPLATE FOR THE POWER REQUIREMENTS.

C9,C37,C38, C39,C40	: CAPACITOR	N	: NEUTRAL		
CT1	: CURRENT TRANSFORMER	PCB	: PRINTED CIRCUIT BOARD		
DB1	: DIODE BRIDGE	Q1L	: OVERLOAD PROTECTOR		
FU1,FU2	: FUSE	R1T,R2T	: THERMISTOR		
L	: LIVE	S10,S11			
L1,L2,L3,L5	: COIL	S30,S70,S80,			
L1R	: REACTOR	S90	: CONNECTOR		
M1C	: COMPRESSOR MOTOR	SA1	: SURGE ARRESTER	V1,V2,V3	: VARISTOR
M1F	: FAN MOTOR	TFU	: THERMAL FUSE	Z1C,Z2C,Z3C	: FERRITE CORE
MID	: MOLDED INTERCONNECT DEVICE	TRM1	: TRANSISTOR MODULE	⏚	: PROTECTIVE EARTH
MRL					
MRM10,MRM20	: MAGNETIC RELAY				

3D028631B

RK25JV1NB9, RK35JV1NB9



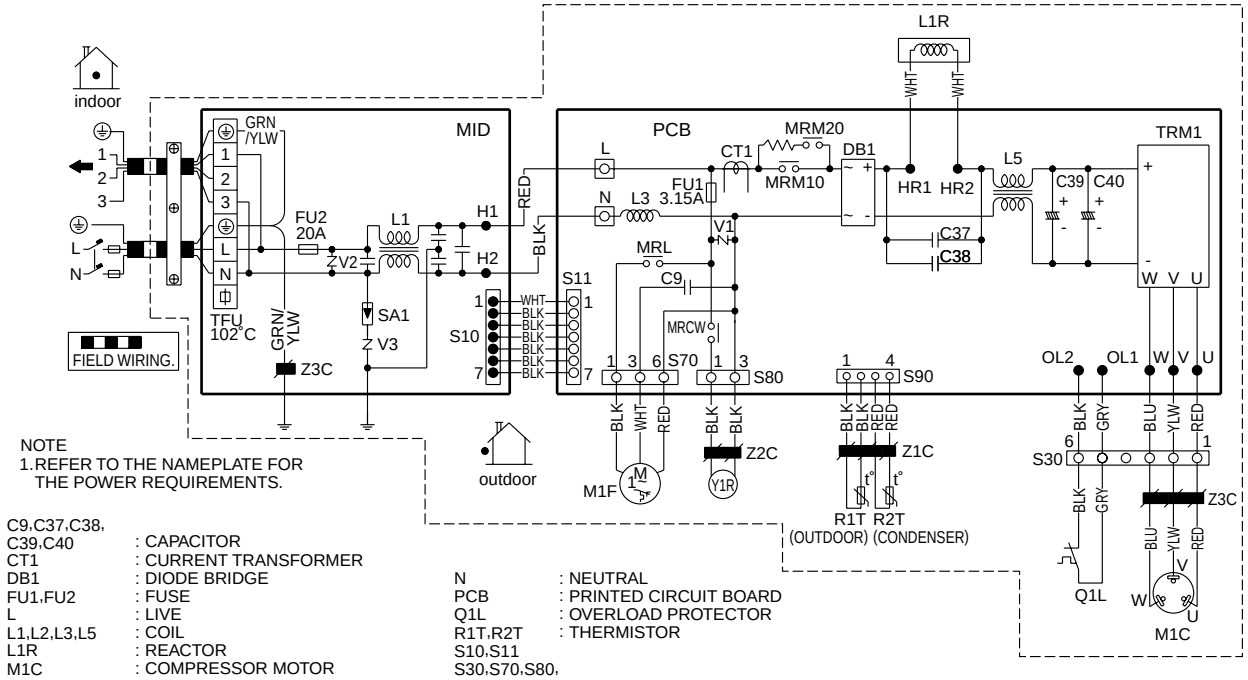
NOTE
1. REFER TO THE NAMEPLATE FOR THE POWER REQUIREMENTS.

C9, C39, C40, C47	: CAPACITOR	N	: NEUTRAL		
CT1	: CURRENT TRANSFORMER	PCB	: PRINTED CIRCUIT BOARD		
DB1, DB3	: DIODE BRIDGE	Q1L	: OVERLOAD PROTECTOR		
FU1, FU2	: FUSE	R1T, R2T	: THERMISTOR		
L	: LIVE	S10, S11			
L1, L2, L3, L5	: COIL	S30, S31, S70,			
L1R, L2R	: REACTOR	S80, S90	: CONNECTOR		
M1C	: COMPRESSOR MOTOR	SA1	: SURGE ARRESTER	V1, V2, V3	: VARISTOR
M1F	: FAN MOTOR	TFU	: THERMAL FUSE	Z1C	: FERRITE CORE
MID	: MOLDED INTERCONNECT DEVICE	TRM1	: TRANSISTOR MODULE	⏚	: PROTECTIVE EARTH
MRL					
MRM10, MRM20	: MAGNETIC RELAY				

3D028632

2.2.2 Heat Pump

RX25JVEA9, RX25JVET9
RX35JVEA9, RX35JVET9

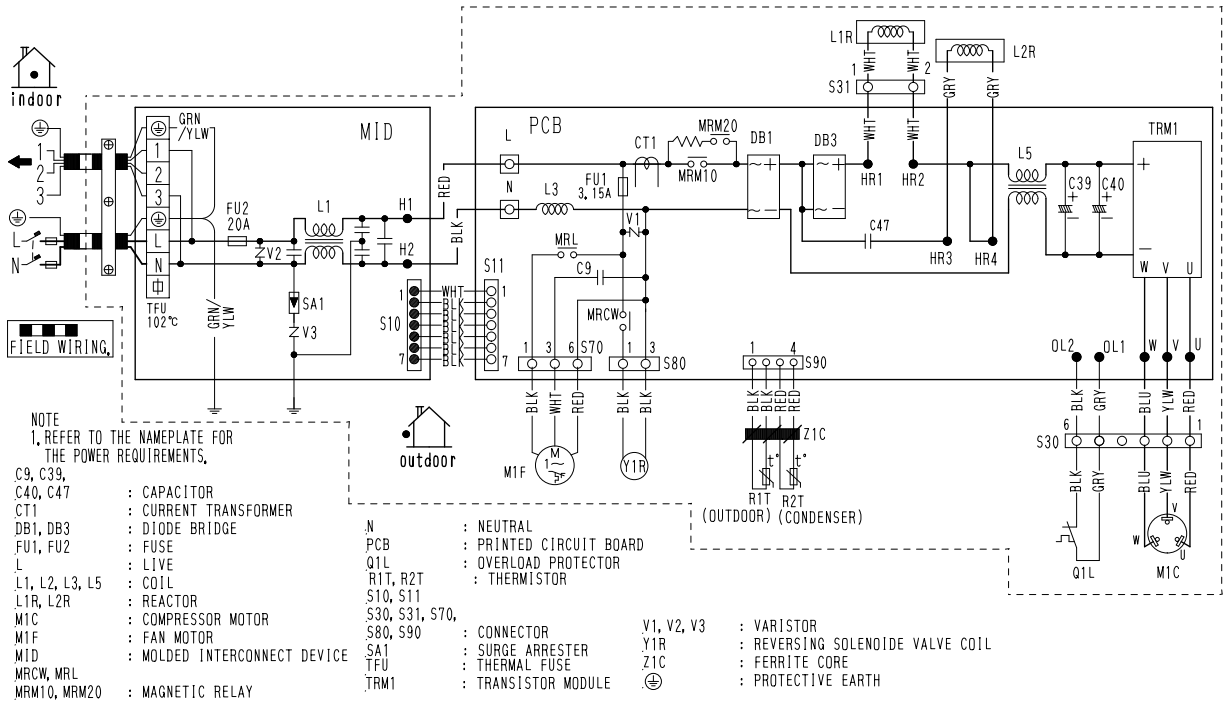


NOTE
1. REFER TO THE NAMEPLATE FOR THE POWER REQUIREMENTS.

C9,C37,C38, C39,C40	: CAPACITOR	N	: NEUTRAL	V1,V2,V3	: VARISTOR
CT1	: CURRENT TRANSFORMER	PCB	: PRINTED CIRCUIT BOARD	Y1R	: REVERSING SOLENOIDE VALVE COIL
DB1	: DIODE BRIDGE	Q1L	: OVERLOAD PROTECTOR	Z1C,Z2C,Z3C	: FERRITE CORE
FU1,FU2	: FUSE	R1T,R2T	: THERMISTOR	⏚	: PROTECTIVE EARTH
L	: LIVE	S10,S11			
L1,L2,L3,L5	: COIL	S30,S70,S80, S90	: CONNECTOR		
L1R	: REACTOR	SA1	: SURGE ARRESTER		
M1C	: COMPRESSOR MOTOR	TFU	: THERMAL FUSE		
M1F	: FAN MOTOR	TRM1	: TRANSISTOR MODULE		
MID	: MOLDED INTERCONNECT DEVICE				
MRCW,MRL MRM10,MRM20	: MAGNETIC RELAY				

3D028628B

RX25JV1NB9, RX35JV1NB9



NOTE
1. REFER TO THE NAMEPLATE FOR THE POWER REQUIREMENTS.

C9, C39, C40, C47	: CAPACITOR	N	: NEUTRAL	V1, V2, V3	: VARISTOR
CT1	: CURRENT TRANSFORMER	PCB	: PRINTED CIRCUIT BOARD	Y1R	: REVERSING SOLENOIDE VALVE COIL
DB1, DB3	: DIODE BRIDGE	Q1L	: OVERLOAD PROTECTOR	Z1C	: FERRITE CORE
FU1, FU2	: FUSE	R1T, R2T	: THERMISTOR	⏚	: PROTECTIVE EARTH
L	: LIVE	S10, S11			
L1, L2, L3, L5	: COIL	S30, S31, S70, S80, S90	: CONNECTOR		
L1R, L2R	: REACTOR	SA1	: SURGE ARRESTER		
M1C	: COMPRESSOR MOTOR	TFU	: THERMAL FUSE		
M1F	: FAN MOTOR	TRM1	: TRANSISTOR MODULE		
MID	: MOLDED INTERCONNECT DEVICE				
MRCW, MRL MRM10, MRM20	: MAGNETIC RELAY				

3D028629

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