DAIKIN

Si21-205

Service Manual

Split System Air Conditioners SkyAir B-Series R410A

[Applied Models]
●SkyAir : Heat Pump
●SkyAir : Cooling Only

Split-System Air Conditioners SkyAir B-Series R410A

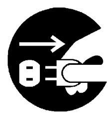
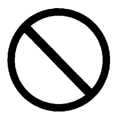
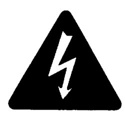
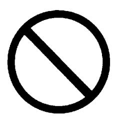
1. Introduction

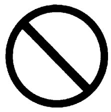
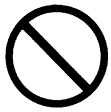
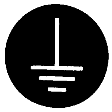
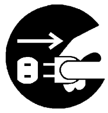
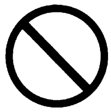
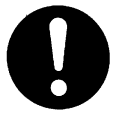
1.1 Safety Cautions

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 be 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 on 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 (R410A) 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
Model Name and Power Supply

1. Models

1.1 Model Name and Power Supply

Indoor Units		Outdoor Units	Power Supply
Ceiling Mounted Multi-flow Cassette Type	FFQ25BV1B	RXS25BVMB	1ϕ, 230V, 50Hz
	FFQ25BV1B	RKS25BVMB	
	FFQ35BV1B	RXS35BVMB	
	FFQ35BV1B	RKS35BVMB	
	FFQ50BV1B	RXS50BVMB	
	FFQ50BV1B	RKS50BVMB	
	FFQ50BV1B	RS50BVMB	
	FFQ50BV1B	RXS50BVMA	1ϕ, 240V, 50Hz
	FFQ50BV1B	RKS50BVMA	
	FFQ60BV1B	RXS60BVMB	1ϕ, 230V, 50Hz
	FFQ60BV1B	RKS60BVMB	
	FFQ60BV1B	RS60BVMB	
	FFQ60BV1B	RXS60BVMA	1ϕ, 240V, 50Hz
	FFQ60BV1B	RKS60BVMA	
Ceiling Suspended Type	FHQ35BUV1B	RXS35BVMB	1ϕ, 230V, 50Hz
	FHQ35BUV1B	RKS35BVMB	
	FHQ50BUV1B	RXS50BVMB	
	FHQ50BUV1B	RKS50BVMB	
	FHQ50BUV1B	RS50BVMB	
	FHQ60BUV1B	RXS60BVMB	
	FHQ60BUV1B	RKS60BVMB	
	FHQ60BUV1B	RS60BVMB	

Note: Power Supply Intake : Outdoor Units

1.2 External Appearance

Indoor Units

FFQ-B

FHQ-BU

Remote Controller

Wireless Type

Wired Type

Outdoor Units

25/35 Class

50/60 Class

Part 2
Functions

1. List of Functions

FFQ / FHQ

Items	Improved Points and Functions		Ceiling Mounted Multi-flow Cassette Type (FFQ)	Ceiling Suspended Type (FHQ)
			25~60BV1B	35~60BUV1B
Model Type	Indoor Units		New	New
	Outdoor Units		New	New
Main Improvement	Appearance Improved		●	○
	Reduction of Dimensions or Weight		●	○
	Reduction of Operation Sound		●	○
For Comfortable Air Conditioning	Auto Restart		○	○
	Fan Operation Mode		○	○
	LCD Remote Controller (Option)		○	○
	Auto Swing Function		○	○
	Ceiling Soiling Prevention		○	—
	Program Dry		○	○
	High Fan Speed Mode		—	—
	High Ceiling Application		—	○
	Two Select Thermostat Sensor	Wired Type	○	○
		Wireless Type	—	—
	Hot Start		○	○
	Timer Selector		○	○
For Easy Construction and Maintenance	Fresh Air Intake Directly from the Unit		○	—
	Drain Pump		○	—(Option)
	Long Life Filter		○	○
	Ultra-Long Life Filter (Option)		—	—
	Mold Resistant Treatment For Filter		○	○
	Filter Sign		○	●
	Mold Resistant Drain Pan		○	○
	Emergency Operation		—	○
	Self Diagnosis Function		○	○
For Flexible Control	Set Back Time Clock		○	○
	Double Remote Control		○	○
	Group Control by 1 Remote Controller		○	○
	Control by External Command	Wired Type	—	○
		Wireless Type	—	—
	Remote/ Centralized Control	Wired Type	○	○
		Wireless Type	○	—

● : Improved Points and Functions
○ : No Change
— : No Functions

Part 3
Specifications

1. Specifications

1.1 Ceiling Mounted Cassette Type

1.1.1 25 class

230V, 50Hz

Model				FFQ25BV1B / RXS25BVMB	FFQ25BV1B / RKS25BVMB
Model	Indoor Units			FFQ25BV1B	FFQ25BV1B
Model	Outdoor Units			RXS25BVMB	RKS25BVMB
★1 Cooling Capacity (Min~Max)			kW	2.5 (1.0~3.0)	2.5 (1.0~3.0)
			Btu/h	8,550 (3,400~10,250)	8,550 (3,400~10,250)
			kcal/h	2,150 (860~2,580)	2,150 (860~2,580)
★1 Heating Capacity (Min~Max)			kW	3.2 (1.0~4.5)	—
			Btu/h	10,900 (3,400~15,350)	—
			kcal/h	2,750 (860~3,870)	—
Piping Connections	Liquid		mm	ϕ6.4	ϕ6.4
	Gas		mm	ϕ9.5	ϕ9.5
	Drain		mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units				**FFQ25BV1B**	**FFQ25BV1B**
Dimensions	H×W×D ★5		mm	260(286)×575×575	260(286)×575×575
Coil	Type			Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)	
	Row×Stages×Fin Pitch			2×10×1.5	2×10×1.5
Fan	Model			D16P52A23	D16P52A23
	Type			Turbo Fan	Turbo Fan
	Motor Output		W	55	55
Air Flow Rate			m³/min.	(H) 9.0 (L) 6.5	(H) 9.0 (L) 6.5
Machine Weight			kg	17.5	17.5
Remote Controller (Option)		Wired		BRC1C517	BRC1C517
		Wireless		BRC7E530W	BRC7E531W
Decoration Panel (Option)	Model			BYFQ60BW1	BYFQ60BW1
	Color			White	White
	Dimensions (H×W×D)		mm	55×700×700	55×700×700
	Air Filter			Removable / Washable / Mildew Proof / Long Life	
	Weight		kg	2.7	2.7
Outdoor Units				**RXS25BVMB**	**RKS25BVMB**
Color				Ivory white	Ivory white
Dimensions	H×W×D		mm	560×695×265	560×695×265
Coil	Type			Cross Fin Coil (Waffle Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×24×1.5	2×24×1.5
Comp.	Model			1YC23GXD#A	1YC23GXD#A
	Type			Hermetically Sealed Swing Type	Hermetically Sealed Swing Type
	Motor Output		kW	0.6	0.6
Fan	Model			MF-220-19-6-2	MF-220-19-6-2
	Type			Propeller	Propeller
	Motor Output		W	19	19
Air Flow Rate	Cooling		m³/min.	(H) 25.3 (L) 17.0	(H) 25.3 (L) 17.0
	Heating		m³/min.	(H) 22.8 (L) 15.3	—
Machine Weight			kg	37	37
Ref. Piping	Max. Length		m	20	25
	Max. Height Difference		m	15	15
Refrigerant	Model			R410A	R410A
	Charge		kg	0.96	0.96
Ref. Oil	Model			FVC50K	FVC50K
	Charge		L	0.40	0.40
Drawing No.				3D040445	3D040444A

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g / m for piping length exceeding 10m.
★5. ( ) : including control box.

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

1.1.2 35 class

230V, 50Hz

Model					
Model	Indoor Units			FFQ35BV1B	FFQ35BV1B
	Outdoor Units			RXS35BVMB	RKS35BVMB
★1 Cooling Capacity (Min.~Max.)			kW	3.4 (1.0~3.7)	3.4 (1.0~3.7)
			Btu/h	11,600 (3,400~12,600)	11,600 (3,400~12,600)
			kcal/h	2,920 (860~3,180)	2,920 (860~3,180)
★1 Heating capacity (Min.~Max.)			kW	4.5 (1.0~5.0)	—
			Btu/h	15,350 (3,400~17,050)	—
			kcal/h	3,870 (860~4,300)	—
Piping Connections	Liquid		mm	ϕ6.4	ϕ6.4
	Gas		mm	ϕ9.5	ϕ9.5
	Drain		mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units				**FFQ35BV1B**	**FFQ35BV1B**
Dimensions	H×W×D ★5		mm	260(286)×575×575	260(286)×575×575
Coil	Type			Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)	
	Row×Stages×Fin Pitch			2×10×1.5	2×10×1.5
Fan	Model			D16P52A23	D16P52A23
	Type			Turbo Fan	Turbo Fan
	Motor Output		W	55	55
Air Flow Rate			m³/min.	(H) 10 (L) 6.5	(H) 10 (L) 6.5
Machine Weight			kg	17.5	17.5
Remote Controller (Option)		Wired		BRC1C517	BRC1C517
		Wireless		BRC7E530W	BRC7E531W
Decoration Panel (Option)	Model			BYFQ60BW1	BYFQ60BW1
	Color			White	White
	Dimensions (H×W×D)		mm	55×700×700	55×700×700
	Air Filter			Removable / Washable / Mildew Proof / Long Life	
	Weight		kg	2.7	2.7
Outdoor Units				**RXS35BVMB**	**RKS35BVMB**
Color				Ivory white	Ivory white
Dimensions	H×W×D		mm	560×695×265	560×695×265
Coil	Type			Cross Fin Coil (Waffle Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×24×1.5	2×24×1.5
Comp.	Model			1YC23GXD#A	1YC23GXD#A
	Type			Hermetically Sealed Swing type	Hermetically Sealed Swing type
	Motor Output		kW	0.6	0.6
Fan	Model			MF-220-19-6-2	MF-220-19-6-2
	Type			Propeller	Propeller
	Motor Output		W	19	19
Air Flow Rate	Cooling		m³/min.	(H) 25.3 (L) 17.0	(H) 25.3 (L) 17.0
	Heating		m³/min.	(H) 22.8 (L) 15.3	—
Machine Weight			kg	37	37
Ref. Piping	Max. Length		m	20	25
	Max. Height Difference		m	15	15
Refrigerant	Model			R410A	R410A
	Charge		kg	1.06	1.06
Ref. Oil	Model			FVC50K	FVC50K
	Charge		L	0.40	0.40
Drawing No.				3D040443	3D040442A

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.
★5. ( ) : including control box.

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

1.1.3 50 class

230V, 50Hz

Model				FFQ50BV1B	FFQ50BV1B	FFQ50BV1B
Model	Outdoor Units			RXS50BVMB	RKS50BVMB	RS50BVMB
★1 Cooling Capacity (Min~Max)			kW	4.7 (0.9~5.6)	4.7 (0.9~5.6)	4.7
			Btu/h	16,050 (3,050~19,100)	16,050 (3,050~19,100)	16,050
			kcal/h	4,040 (770~4,820)	4,040 (770~4,820)	4,040
★1 Heating Capacity (Min~Max)			kW	5.5 (0.9~7.0)	—	—
			Btu/h	18,750 (3,050~23,900)	—	—
			kcal/h	4,730 (770~6,020)	—	—
Piping Connections	Liquid		mm	ϕ6.4	ϕ6.4	ϕ6.4
	Gas		mm	ϕ12.7	ϕ12.7	ϕ12.7
	Drain		mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units				**FFQ50BV1B**	**FFQ50BV1B**	**FFQ50BV1B**
Dimensions	H×W×D ★5		mm	260(286)×575×575	260(286)×575×575	260(286)×575×575
Coil	Type			Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)		
	Row×Stages×Fin Pitch			2×10×1.5	2×10×1.5	2×10×1.5
Fan	Model			D16P52A23	D16P52A23	D16P52A23
	Type			Turbo Fan	Turbo Fan	Turbo Fan
	Motor Output		W	55	55	55
Air Flow Rate			m³/min.	(H) 12 (L) 8	(H) 12 (L) 8	(H) 12 (L) 8
Machine Weight			kg	17.5	17.5	17.5
Remote Controller (Option)		Wired		BRC1C517	BRC1C517	BRC1C517
		Wireless		BRC7E530W	BRC7E531W	BRC7E531W
Decoration Panel (Option)	Model			BYFQ60BW1	BYFQ60BW1	BYFQ60BW1
	Color			White	White	White
	Dimensions (H×W×D)		mm	55×700×700	55×700×700	55×700×700
	Air Filter			Removable / Washable / Mildew Proof / Long Life		
	Weight		kg	2.7	2.7	2.7
Outdoor Units				**RXS50BVMB**	**RKS50BVMB**	**RS50BVMB**
Color				Ivory white	Ivory white	Ivory white
Dimensions	H×W×D		mm	735×825×300	735×825×300	735×825×300
Coil	Type			Cross Fin Coil (Waffle Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch			1×32×1.6	1×32×1.6	1×32×1.6
Comp.	Model			2YC32HXD	2YC32HXD	2YC32HXD
	Type			Hermetically Sealed Swing Type	Hermetically Sealed Swing Type	Hermetically Sealed Swing Type
	Motor Output		kW	1.5	1.5	1.5
Fan	Model			KFD-380-53-8C	KFD-380-53-8C	KFD-380-53-8C
	Type			Propeller	Propeller	Propeller
	Motor Output		W	53	53	53
Air Flow Rate	Cooling		m³/min.	(H) 47.7 (L) 44.1	(H) 47.7 (L) 44.1	(H) 47.7 (L) 44.1
	Heating		m³/min.	(H) 44.1 (L) 44.1	—	—
Machine Weight			kg	49	49	49
Ref. Piping	Max. Length		m	30	30	30
	Max. Height Difference		m	20	20	20
Refrigerant	Model			R410A	R410A	R410A
	Charge		kg	1.20	1.20	1.20
Ref. Oil	Model			FVC50K	FVC50K	FVC50K
	Charge		L	0.65	0.65	0.65
Drawing No.				3D040441	3D040437	3D040438

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.
★5. ( ) : including control box.

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

240V, 50Hz

Model	**Indoor Units**		**FFQ50BV1B**	**FFQ50BV1B**
	Outdoor Units		**RXS50BVMA**	**RKS50BVMA**
★1 Cooling Capacity (Min.~Max.)		kW	4.7 (0.9~5.6)	4.7 (0.9~5.6)
		Btu/h	16,050 (3,050~19,100)	16,050 (3,050~19,100)
		kcal/h	4,040 (770~4,820)	4,040 (770~4,820)
★1 Heating capacity (Min.~Max.)		kW	5.5 (0.9~7.0)	—
		Btu/h	18,750 (3,050~23,900)	—
		kcal/h	4,730 (770~6,020)	—
Piping Connections	Liquid	mm	φ6.4	φ6.4
	Gas	mm	φ12.7	φ12.7
	Drain	mm	I. Dφ20×O. Dφ26	I. Dφ20×O. Dφ26
Indoor Units			**FFQ50BV1B**	**FFQ50BV1B**
Dimensions	H×W×D ★5	mm	260(286)×575×575	260(286)×575×575
Coil	Type		Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)	
	Row×Stages×Fin Pitch		2×10×1.5	2×10×1.5
Fan	Model		D16P52A23	D16P52A23
	Type		Turbo Fan	Turbo Fan
	Motor Output	W	55	55
Air Flow Rate		m³/min.	(H) 13 (L) 8	(H) 13 (L) 8
Machine Weight		kg	17.5	17.5
Remote Controller (Option)	Wired		BRC1C61	BRC1C61
	Wireless		BRC7E530W	BRC7E531W
Decoration Panel (Option)	Model		BYFQ60BW1	BYFQ60BW1
	Color		White	White
	Dimensions (H×W×D)	mm	55×700×700	55×700×700
	Air Filter		Removable / Washable / Mildew Proof / Long Life	
	Weight	kg	2.7	2.7
Outdoor Units			**RXS50BVMA**	**RKS50BVMA**
Color			Ivory white	Ivory white
Dimensions	H×W×D	mm	735×825×300	735×825×300
Coil	Type		Cross Fin Coil (Waffle Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		1×32×1.6	1×32×1.6
Comp.	Model		2YC32HXD	2YC32HXD
	Type		Hermetically Sealed Swing type	Hermetically Sealed Swing type
	Motor Output	kW	1.5	1.5
Fan	Model		KFD-380-53-8C	KFD-380-53-8C
	Type		Propeller	Propeller
	Motor Output	W	53	53
Air Flow Rate	Cooling	m³/min.	(H) 47.7 (L) 44.1	(H) 47.7 (L) 44.1
	Heating	m³/min.	(H) 44.1 (L) 44.1	—
Machine Weight		kg	49	49
Ref. Piping	Max. Length	m	30	30
	Max. Height Difference	m	20	20
Refrigerant	Model		R410A	R410A
	Charge	kg	1.20	1.20
Ref. Oil	Model		FVC50K	FVC50K
	Charge	L	0.65	0.65
Drawing No.			3D040440	3D040439

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.
★5. ( ) : including control box.

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

1.1.4 60 class

230V, 50Hz

Model	Indoor Units		FFQ60BV1B	FFQ60BV1B	FFQ60BV1B
	Outdoor Units		RXS60BVMB	RKS60BVMB	RS60BVMB
★1 Cooling Capacity (Min~Max)		kW	5.8 (0.9~6.0)	5.8 (0.9~6.0)	5.8
		Btu/h	19,800 (3,050~20,450)	19,800 (3,050~20,450)	19,800
		kcal/h	5,000 (770~5,160)	5,000 (770~5,160)	5,000
★1 Heating Capacity (Min~Max)		kW	7.0 (0.9~8.0)	—	—
		Btu/h	23,900 (3,050~27,300)	—	—
		kcal/h	6,020 (770~6,880)	—	—
Piping Connections	Liquid	mm	ϕ6.4	ϕ6.4	ϕ6.4
	Gas	mm	ϕ12.7	ϕ12.7	ϕ12.7
	Drain	mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units			**FFQ60BV1B**	**FFQ60BV1B**	**FFQ60BV1B**
Dimensions	H×W×D ★5	mm	260(286)×575×575	260(286)×575×575	260(286)×575×575
Coil	Type		Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)		
	Row×Stages×Fin Pitch		2×10×1.5	2×10×1.5	2×10×1.5
Fan	Model		D16P52A23	D16P52A23	D16P52A23
	Type		Turbo Fan	Turbo Fan	Turbo Fan
	Motor Output	W	55	55	55
Air Flow Rate		m³/min.	(H) 15 (L) 10	(H) 15 (L) 10	(H) 15 (L) 10
Machine Weight		kg	17.5	17.5	17.5
Remote Controller (Option)	Wired		BRC1C517	BRC1C517	BRC1C517
	Wireless		BRC7E530W	BRC7E531W	BRC7E531W
Decoration Panel (Option)	Model		BYFQ60BW1	BYFQ60BW1	BYFQ60BW1
	Color		White	White	White
	Dimensions (H×W×D)	mm	55×700×700	55×700×700	55×700×700
	Air Filter		Removable / Washable / Mildew Proof / Long Life		
	Weight	kg	2.7	2.7	2.7
Outdoor Units			**RXS60BVMB**	**RKS60BVMB**	**RS60BVMB**
Color			Ivory white	Ivory white	Ivory white
Dimensions	H×W×D	mm	735×825×300	735×825×300	735×825×300
Coil	Type		Cross Fin Coil (Waffle Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch		2×32×1.8	2×32×1.8	2×32×1.8
Comp.	Model		2YC32HXD	2YC32HXD	2YC32HXD
	Type		Hermetically Sealed Swing Type	Hermetically Sealed Swing Type	Hermetically Sealed Swing Type
	Motor Output	kW	1.5	1.5	1.5
Fan	Model		KFD-380-53-8C	KFD-380-53-8C	KFD-380-53-8C
	Type		Propeller	Propeller	Propeller
	Motor Output	W	53	53	53
Air Flow Rate	Cooling	m³/min.	(H) 47.6 (L) 44.1	(H) 47.6 (L) 44.1	(H) 47.6 (L) 44.1
	Heating	m³/min.	(H) 45.5 (L) 45.5	—	—
Machine Weight		kg	53	53	53
Ref. Piping	Max. Length	m	30	30	30
	Max. Height Difference	m	20	20	20
Refrigerant	Model		R410A	R410A	R410A
	Charge	kg	1.70	1.70	1.70
Ref. Oil	Model		FVC50K	FVC50K	FVC50K
	Charge	L	0.65	0.65	0.65
Drawing No.			3D040436	3D040431	3D040433

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.
★5. ( ) : including control box.

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

240V, 50Hz

Model	Indoor Units			FFQ60BV1B	FFQ60BV1B
	Outdoor Units			RXS60BVMA	RKS60BVMA
★1 Cooling Capacity (Min.~Max.)			kW	5.8 (0.9~6.0)	5.8 (0.9~6.0)
			Btu/h	19,800 (3,050~20,450)	19,800 (3,050~20,450)
			kcal/h	5,000 (770~5,160)	5,000 (770~5,160)
★1 Heating capacity (Min.~Max.)			kW	7.0 (0.9~8.0)	—
			Btu/h	23,900 (3,050~27,300)	—
			kcal/h	6,020 (770~6,880)	—
Piping Connections	Liquid		mm	ϕ6.4	ϕ6.4
	Gas		mm	ϕ12.7	ϕ12.7
	Drain		mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units				**FFQ60BV1B**	**FFQ60BV1B**
Dimensions	H×W×D ★5		mm	260(286)×575×575	260(286)×575×575
Coil	Type			Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)	
	Row×Stages×Fin Pitch			2×10×1.5	2×10×1.5
Fan	Model			D16P52A23	D16P52A23
	Type			Turbo Fan	Turbo Fan
	Motor Output		W	55	55
Air Flow Rate			m³/min.	(H) 15.5 (L) 11	(H) 15.5 (L) 11
Machine Weight			kg	17.5	17.5
Remote Controller (Option)		Wired		BRC1C61	BRC1C61
		Wireless		BRC7E530W	BRC7E531W
Decoration Panel (Option)	Model			BYFQ60BW1	BYFQ60BW1
	Color			White	White
	Dimensions (H×W×D)		mm	55×700×700	55×700×700
	Air Filter			Removable / Washable / Mildew Proof / Long Life	
	Weight		kg	2.7	2.7
Outdoor Units				**RXS60BVMA**	**RKS60BVMA**
Color				Ivory white	Ivory white
Dimensions	H×W×D		mm	735×825×300	735×825×300
Coil	Type			Cross Fin Coil (Waffle Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×32×1.8	2×32×1.8
Comp.	Model			2YC32HXD	2YC32HXD
	Type			Hermetically Sealed Swing type	Hermetically Sealed Swing type
	Motor Output		kW	1.5	1.5
Fan	Model			KFD-380-53-8C	KFD-380-53-8C
	Type			Propeller	Propeller
	Motor Output		W	53	53
Air Flow Rate	Cooling		m³/min.	(H) 47.6 (L) 44.1	(H) 47.6 (L) 44.1
	Heating		m³/min.	(H) 45.5 (L) 45.5	—
Machine Weight			kg	53	53
Ref. Piping	Max. Length		m	30	30
	Max. Height Difference		m	20	20
Refrigerant	Model			R410A	R410A
	Charge		kg	1.70	1.70
Ref. Oil	Model			FVC50K	FVC50K
	Charge		L	0.65	0.65
Drawing No.				3D040435	3D040434

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.
★5. ( ) : including control box.

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

1.2 Ceiling Suspended Type

1.2.1 35 class

230V, 50Hz

Model					
Model	Indoor Units			FHQ35BUV1B	FHQ35BUV1B
	Outdoor Units			RXS35BVMB	RKS35BVMB
★1 Cooling Capacity (Min.~Max.)			kW	3.4 (1.0~3.7)	3.4 (1.0~3.7)
			Btu/h	11,600 (3,400~12,600)	11,600 (3,400~12,600)
			kcal/h	2,920 (860~3,180)	2,920 (860~3,180)
★1 Heating Capacity (Min.~Max.)			kW	4.1 (1.0~5.0)	—
			Btu/h	14,000 (3,400~17,050)	—
			kcal/h	3,530 (860~4,300)	—
Piping Connections	Liquid		mm	ϕ6.4	ϕ6.4
	Gas		mm	ϕ9.5	ϕ9.5
	Drain		mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units				**FHQ35BUV1B**	**FHQ35BUV1B**
Color				White	White
Dimensions	H×W×D		mm	195×960×680	195×960×680
Coil	Type			Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)	
	Row×Stages×Fin Pitch			2×12×1.75	2×12×1.75
Fan	Model			D09P62A-20	D09P62A-20
	Type			Sirocco Fan	Sirocco Fan
	Motor Output		W	62	62
Air Flow Rate			m³/min.	(H) 13 (L) 10	(H) 13 (L) 10
Weight			kg	24	24
Remote Controller (Option)		Wired		BRC1C517	BRC1C517
		Wireless		BRC7E63W	BRC7E66
Outdoor Units				**RXS35BVMB**	**RKS35BVMB**
Color				Ivory white	Ivory white
Dimensions	H×W×D		mm	560×695×265	560×695×265
Coil	Type			Cross Fin Coil (Waffle Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×24×1.5	2×24×1.5
Comp.	Model			1YC23GXD#A	1YC23GXD#A
	Type			Hermetically Sealed Swing type	Hermetically Sealed Swing type
	Motor Output		kW	0.6	0.6
Fan	Model			MF-220-19-6-2	MF-220-19-6-2
	Type			Propeller	Propeller
	Motor Output		W	19	19
Air Flow Rate	Cooling		m³/min.	(H) 25.3 (L) 17.0	(H) 25.3 (L) 17.0
	Heating		m³/min.	(H) 22.8 (L) 15.3	—
Weight			kg	37	37
Ref.Piping	Max. Length		m	20	25
	Max. Height Difference		m	15	15
Refrigerant	Model			R410A	R410A
	Charge		kg	1.06	1.06
Ref. Oil	Model			FVC50K	FVC50K
	Charge		L	0.40	0.40
Drawing No.				3D040588	3D040589

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.

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

1.2.2 50 class

230V, 50Hz

Model						
Model	Indoor Units			FHQ50BUV1B	FHQ50BUV1B	FHQ50BUV1B
	Outdoor Units			RXS50BVMB	RKS50BVMB	RS50BVMB
★1 Cooling Capacity (Min.~Max.)			kW	5.0 (0.9~5.6)	5.0 (0.9~5.6)	5.0
			Btu/h	17,050 (3,050~19,100)	17,050 (3,050~19,100)	17,050
			kcal/h	4,300 (770~4,820)	4,300 (770~4,820)	4,300
★1 Heating Capacity (Min.~Max.)			kW	6.0 (0.9~7.0)	—	—
			Btu/h	20,450 (3,050~23,900)	—	—
			kcal/h	5,160 (770~6,020)	—	—
Piping Connections	Liquid		mm	ϕ6.4	ϕ6.4	ϕ6.4
	Gas		mm	ϕ12.7	ϕ12.7	ϕ12.7
	Drain		mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units				**FHQ50BUV1B**	**FHQ50BUV1B**	**FHQ50BUV1B**
Color				White	White	White
Dimensions	H×W×D		mm	195×960×680	195×960×680	195×960×680
Coil	Type			Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)		
	Row×Stages×Fin Pitch			3×12×1.75	3×12×1.75	3×12×1.75
Fan	Model			D09P62A-20	D09P62A-20	D09P62A-20
	Type			Sirocco Fan	Sirocco Fan	Sirocco Fan
	Motor Output		W	62	62	62
Air Flow Rate			m³/min.	(H) 13 (L) 10	(H) 13 (L) 10	(H) 13 (L) 10
Weight			kg	25	25	25
Remote Controller (Option)		Wired		BRC1C517	BRC1C517	BRC1C517
		Wireless		BRC7E63W	BRC7E66	BRC7E66
Outdoor Units				**RXS50BVMB**	**RKS50BVMB**	**RS50BVMB**
Color				Ivory white	Ivory white	Ivory white
Dimensions	H×W×D		mm	735×825×300	735×825×300	735×825×300
Coil	Type			Cross Fin Coil (Waffle Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch			1×32×1.6	1×32×1.6	1×32×1.6
Comp.	Model			2YC32HXD	2YC32HXD	2YC32HXD
	Type			Hermetically Sealed Swing Type	Hermetically Sealed Swing Type	Hermetically Sealed Swing Type
	Motor Output		kW	1.5	1.5	1.5
Fan	Model			KFD-380-53-8C	KFD-380-53-8C	KFD-380-53-8C
	Type			Propeller	Propeller	Propeller
	Motor Output		W	53	53	53
Air Flow Rate	Cooling		m³/min.	(H) 47.7 (L) 44.1	(H) 47.7 (L) 44.1	(H) 47.7 (L) 44.1
	Heating		m³/min.	(H) 44.1 (L) 44.1	—	—
Weight			kg	49	49	49
Ref.Piping	Max. Length		m	30	30	30
	Max. Height Difference		m	20	20	20
Refrigerant	Model			R410A	R410A	R410A
	Charge		kg	1.20	1.20	1.20
Ref. Oil	Model			FVC50K	FVC50K	FVC50K
	Charge		L	0.65	0.65	0.65
Drawing No.				3D040590	3D040591	3D040592

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.

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

1.2.3 60 class

230V, 50Hz

Model					
Model	Indoor Units		FHQ60BUV1B	FHQ60BUV1B	FHQ60BUV1B
	Outdoor Units		RXS60BVMB	RKS60BVMB	RS60BVMB
★1 Cooling Capacity (Min.~Max.)		kW	5.7 (0.9~6.0)	5.7 (0.9~6.0)	5.7
		Btu/h	19,450 (3,050~20,450)	19,450 (3,050~20,450)	19,450
		kcal/h	4,900 (770~5,160)	4,900 (770~5,160)	4,900
★1 Heating Capacity (Min.~Max.)		kW	7.2 (0.9~8.0)	—	—
		Btu/h	24,550 (3,050~27,300)	—	—
		kcal/h	6,190 (770~6,880)	—	—
Piping Connections	Liquid	mm	ϕ6.4	ϕ6.4	ϕ6.4
	Gas	mm	ϕ12.7	ϕ12.7	ϕ12.7
	Drain	mm	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26	I. Dϕ20×O. Dϕ26
Indoor Units			**FHQ60BUV1B**	**FHQ60BUV1B**	**FHQ60BUV1B**
Color			White	White	White
Dimensions	H×W×D	mm	195×1,160×680	195×1,160×680	195×1,160×680
Coil	Type		Cross Fin Coil (Multi Louver Fins and Hi-XSS Tubes)		
	Row×Stages×Fin Pitch		2×12×1.75	2×12×1.75	2×12×1.75
Fan	Model		D09P62A-20	D09P62A-20	D09P62A-20
	Type		Sirocco Fan	Sirocco Fan	Sirocco Fan
	Motor Output	W	62	62	62
Air Flow Rate	Cooling	m³/min.	(H) 17 (L) 13	(H) 17 (L) 13	(H) 17 (L) 13
	Heating	m³/min.	(H) 16 (L) 13	—	—
Weight		kg	27	27	27
Remote Controller (Option)	Wired		BRC1C517	BRC1C517	BRC1C517
	Wireless		BRC7E63W	BRC7E66	BRC7E66
Outdoor Units			**RXS60BVMB**	**RKS60BVMB**	**RS60BVMB**
Color			Ivory white	Ivory white	Ivory white
Dimensions	H×W×D	mm	735×825×300	735×825×300	735×825×300
Coil	Type		Cross Fin Coil (Waffle Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch		2×32×1.8	2×32×1.8	2×32×1.8
Comp.	Model		2YC32HXD	2YC32HXD	2YC32HXD
	Type		Hermetically Sealed Swing Type	Hermetically Sealed Swing Type	Hermetically Sealed Swing Type
	Motor Output	kW	1.5	1.5	1.5
Fan	Model		KFD-380-53-8C	KFD-380-53-8C	KFD-380-53-8C
	Type		Propeller	Propeller	Propeller
	Motor Output	W	53	53	53
Air Flow Rate	Cooling	m³/min.	(H) 47.6 (L) 44.1	(H) 47.6 (L) 44.1	(H) 47.6 (L) 44.1
	Heating	m³/min.	(H) 45.5 (L) 45.5	—	—
Weight		kg	53	53	53
Ref.Piping	Max. Length	m	30	30	30
	Max. Height Difference	m	20	20	20
Refrigerant	Model		R410A	R410A	R410A
	Charge	kg	1.70	1.70	1.70
Ref. Oil	Model		FVC50K	FVC50K	FVC50K
	Charge	L	0.65	0.65	0.65
Drawing No.			3D040593A	3D040594A	3D040595

Notes:

★1. Nominal capacities are based on the following conditions:

Cooling	Heating	Piping length
Indoor: 27°CDB, 19°CWB Outdoor: 35°CDB, 24°CWB	Indoor: 20°CDB Outdoor: 7°CDB, 6°CWB	7.5m

★2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.
★3. In case of drain piping for outdoor unit, drain piping kit (option) is needed.
★4. Amount of additional charge of refrigerant is 20g/m for piping length exceeding 10m.

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

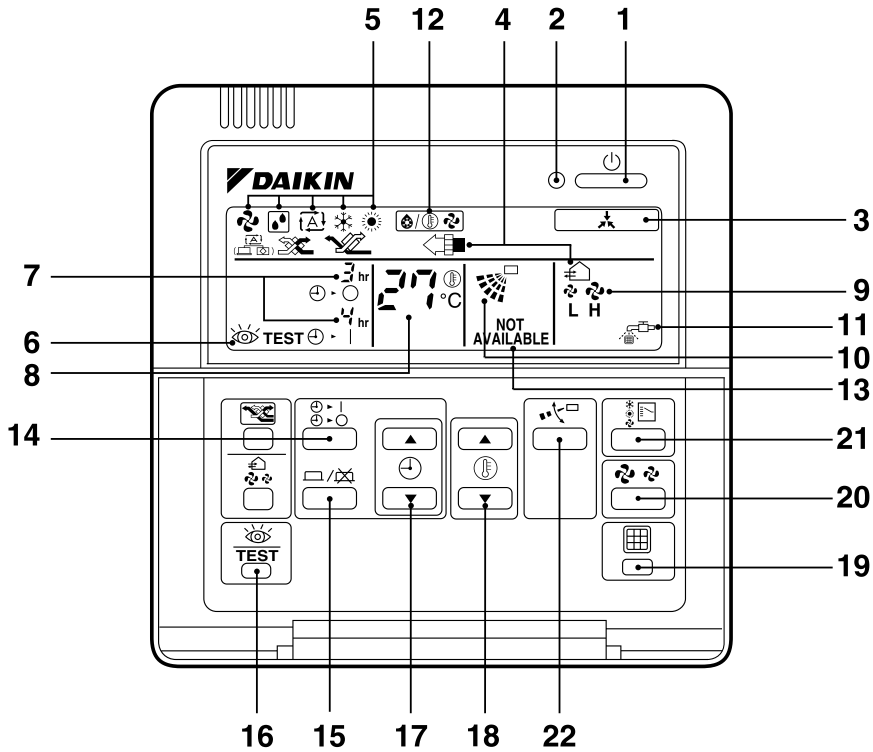
Part 4
Remote Controller

1. Wired Remote Controller

1.1 Features

BRC1C61, BRC1C517	FFQ-B, FHQ-BU

BRC1C61, BRC1C517



3PA59583-16Z-1

1	**ON/OFF BUTTON**	Press the button and the system will start. Press the button again and the system will stop.
2	**OPERATION LAMP (RED)**	The lamp lights up during operation.
3	**DISPLAY “ ” (UNDER CENTRALIZED CONTROL)**	When this display shows, the system is UNDER CENTRALIZED CONTROL.
4	**DISPLAY “ ” “ ” “ ” “ ” (VENTILATION/AIR CLEANING)**	This display shows that the total heat exchange and the air cleaning unit are in operation (These are optional accessories).
5	**DISPLAY “ ” “ ” “ ” “ ” “ ” (OPERATION MODE)**	This display shows the current OPERATION MODE. For cooling only type, “ ” (Auto) and “ ” (Heating) are not installed.
6	**DISPLAY “ TEST” (INSPECTION/TEST OPERATION)**	When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
7	**DISPLAY “ ” (PROGRAMMED TIME)**	This display shows the PROGRAMMED TIME of the system start or stop.
8	**DISPLAY “ ” (SET TEMPERATURE)**	This display shows the set temperature.
9	**DISPLAY “ ” (FAN SPEED)**	This display shows the set fan speed.
10	**DISPLAY “ ” (AIR FLOW FLAP)**	
11	**DISPLAY “ ” (TIME TO CLEAN AIR FILTER)**	
12	**DISPLAY “ ” (DEFROST)**	
13	**NON-FUNCTIONING DISPLAY**	If that particular function is not available, pressing the button may display the words “NOT AVAILABLE” for a few seconds. When running multiple units simultaneously The “NOT AVAILABLE” message will only be appear if none of the indoor units is equipped with the function. If even one unit is equipped with the function, the display will not appear.

14	**TIMER MODE START/STOP BUTTON**	
15	**TIMER ON/OFF BUTTON**	
16	**INSPECTION/TEST OPERATION BUTTON**	This button is used only by qualified service persons for maintenance purposes.
17	**PROGRAMMING TIME BUTTON**	Use this button for programming “START and/or STOP” time.
18	**TEMPERATURE SETTING BUTTON**	Use this button for SETTING TEMPERATURE.
19	**FILTER SIGN RESET BUTTON**	
20	**FAN SPEED CONTROL BUTTON**	Press this button to select the fan speed, HIGH or LOW, of your choice.
21	**OPERATION MODE SELECTOR BUTTON**	Press this button to select OPERATION MODE.
22	**AIR FLOW DIRECTION ADJUST BUTTON**	

NOTE

- For the sake of explanation, all indications are shown on the display in Figure 1 contrary to actual running situations.

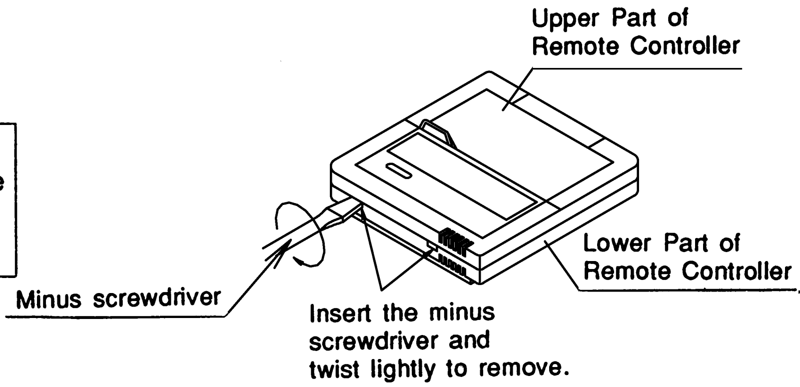
3PA59583-16Z-2

1.2 Installation

1. Remove the upper part of remote controller.

Insert minus screwdriver into the slots in the lower part of remote controller (2 places), and remove the upper part of remote controller.

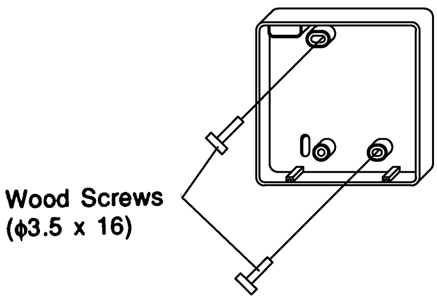
The P C board is mounted in the upper part of remote controller. Be careful not to damage the board with the minus screwdriver.

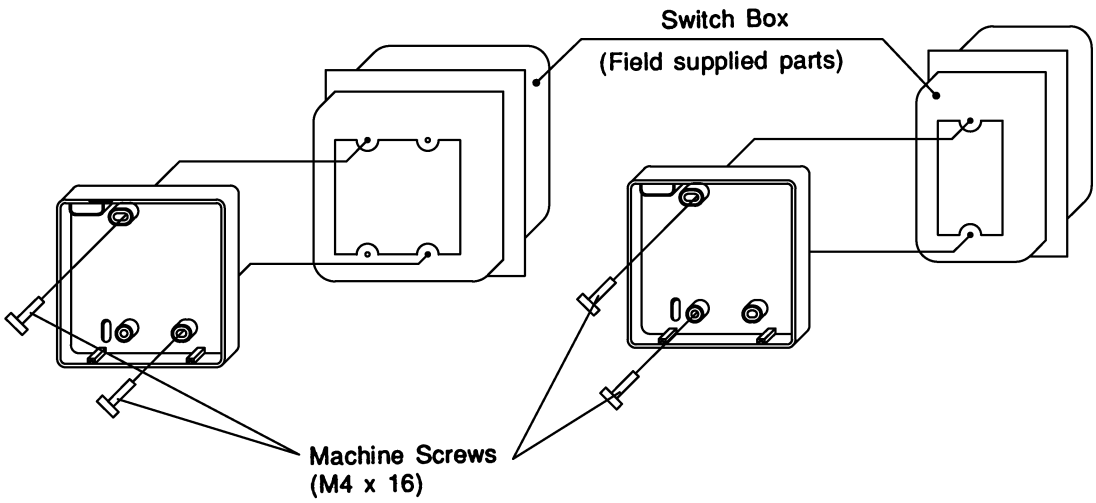


2. Fasten the remote controller.

① For exposed mounting, fasten with the included wood screws (2).

② For flush-mounting, fasten with the included machine screws (2).





For the field supplied switch box, use optional accessories KJB111A or KJB211A.

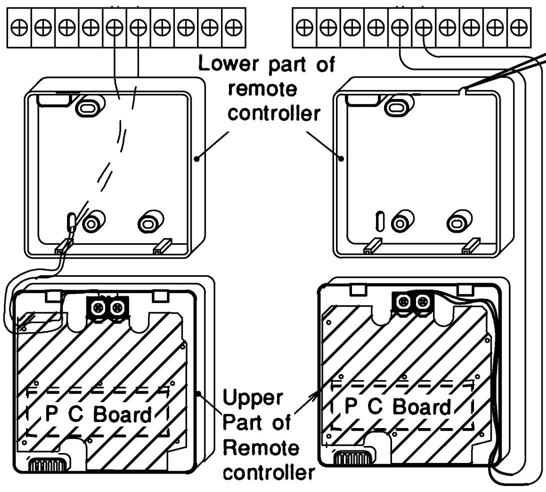
NOTE

Choose the flattest place possible for the mounting surface. Be careful not to distort the shape of the lower part of remote controller by over-tightening the mounting screws.

(S1019)

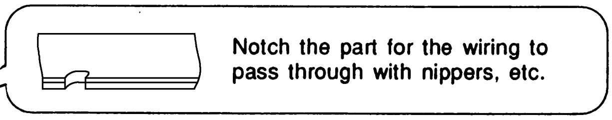
3. Wire the indoor unit.

Connect the terminals on top of the upper part of remote controller(P1, P2), and the terminals of the indoor unit (P1, P2). (P1 and P2 do not have polarity.)



(Wired from the rear) (Wired from the top)

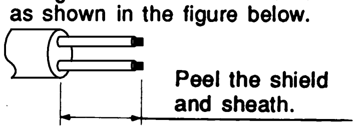
NOTE
When wiring, run the wiring away the power supply wiring in order to avoid receiving electric noise (external noise).



Wiring Specifications

Wiring Type	Sheathed vinyl code or cable (2 wire) (See NOTE 2)
Size	0.75 – 1.25 mm^2

NOTE) 1. Peel the shield and sheath for the part that is to pass through the inside of the remote controller case, as shown in the figure below.



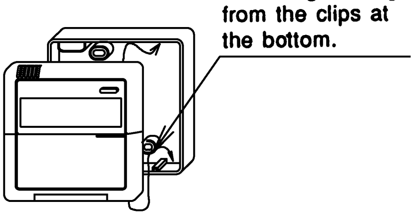
2. Shield wire (2 wire) can be used for remote controller wiring, but it must confirm to EMC (Electromagnetic Compatibility) (Australian regulation).

4. Reattach the upper part of remote controller.

Be careful not to pinch the wiring when attaching.

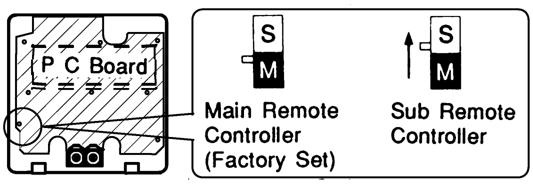
NOTE

1. The switch box and wiring for connection are not included.
2. Do not directly touch the PC board with your hand.



If controlling one indoor unit with two remote controllers

Change the MAIN/SUB changeover switch setting as described below.



Set one remote controller to "main," and the other to "sub."

NOTE

- If controlling with one remote controller, be sure to set it to "main."
- Set the remote controller before turning power supply on.

"88" is displayed for about one minute when the power supply is turned on, and the remote controller cannot be operated in some cases.

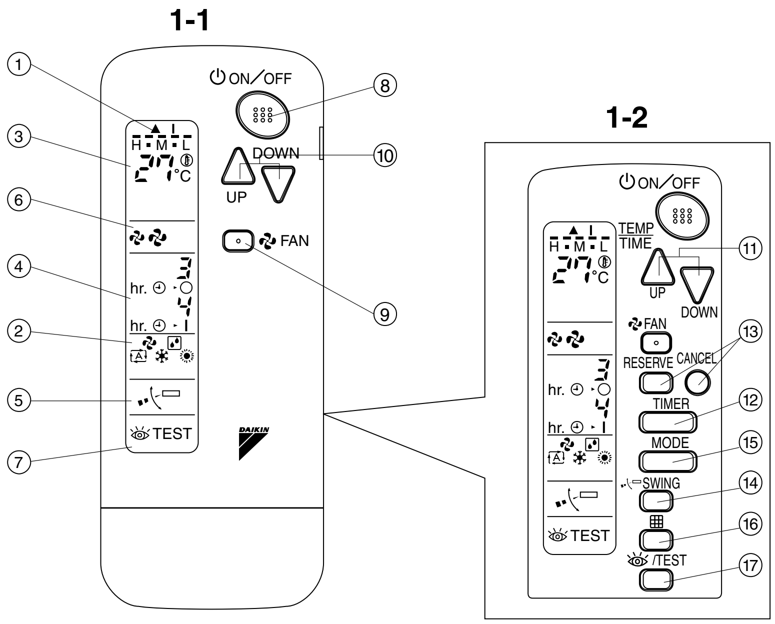
(S1020)

2. Wireless Remote Controller

2.1 Features

Names and Function

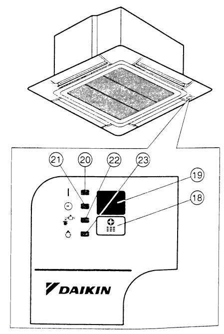
Name of Option		Model Series	
		FFQ-B	FHQ-BU
Remote Controller	H / P	BRC7E530W	BRC7E63W
	C / O	BRC7E531W	BRC7E66



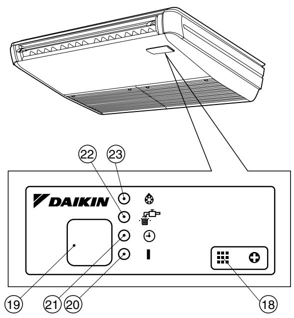
3PA63363-21T-1

Explanation of Receiver

FFQ-B



FHQ-B



3PA63363-21T-2

1	**DISPLAY “ ▲ ” (SIGNAL TRANSMISSION)**	This lights up when a signal is being transmitted.
2	**DISPLAY “ ” “ ” “ ” “ ” “ ” (OPERATION MODE)**	This display shows the current OPERATION MODE. For straight cooling type, “ ” (Auto) and “ ” (Heating) are not installed.
3	**DISPLAY “ ” (SET TEMPERATURE)**	This display shows the set temperature.
4	**DISPLAY “ hr. ⊕ ·3̄ hr. ⊕ ·4 ” (PROGRAMMED TIME)**	This display shows PROGRAMMED TIME of the system start or stop.
5	**DISPLAY “ ” (AIR FLOW FLAP)**	
6	**DISPLAY “ ” “ ” (FAN SPEED)**	The display shows the set fan speed.
7	**DISPLAY “ TEST ” (INSPECTION/ TEST OPERATION)**	When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
8	**ON/OFF BUTTON**	Press the button and the system will start. Press the button again and the system will stop.
9	**FAN SPEED CONTROL BUTTON**	Press this button to select the fan speed, HIGH or LOW, of your choice.
10	**TEMPERATURE SETTING BUTTON**	Use this button for SETTING TEMPERATURE (Operates with the front cover of the remote controller closed.)
11	**PROGRAMMING TIMER BUTTON**	Use this button for programming “START and/or STOP” time. (Operates with the front cover of the remote controller opened.)
12	**TIMER MODE START/STOP BUTTON**	
13	**TIMER RESERVE/CANCEL BUTTON**	
14	**AIR FLOW DIRECTION ADJUST BUTTON**	
15	**OPERATION MODE SELECTOR BUTTON**	Press this button to select OPERATION MODE.
16	**FILTER SIGN RESET BUTTON**	Refer to the section of MAINTENANCE in the operation manual attached to the indoor unit.
17	**INSPECTION/TEST OPERATION BUTTON**	This button is used only by qualified service persons for maintenance purposes.
18	**EMERGENCY OPERATION SWITCH**	This switch is readily used if the remote controller does not work.
19	**RECEIVER**	This receives the signals from the remote controller.
20	**OPERATING INDICATOR LAMP (Red)**	This lamp stays lit while the air conditioner runs. It flashes when the unit is in trouble.
21	**TIMER INDICATOR LAMP (Green)**	This lamp stays lit while the timer is set.
22	**AIR FILTER CLEANING TIME INDICATOR LAMP (Red)**	Lights up when it is time to clean the air filter.
23	**DEFROST LAMP (Orange)**	Lights up when the defrosting operation has started. (For straight cooling type this lamp does not turn on.)

3PA63363-21T-3

Part 5
Field Piping and Wiring

1. Field Piping and Wiring

1.1 Precautions for New Refrigerant (R410A)

1.1.1 Outline

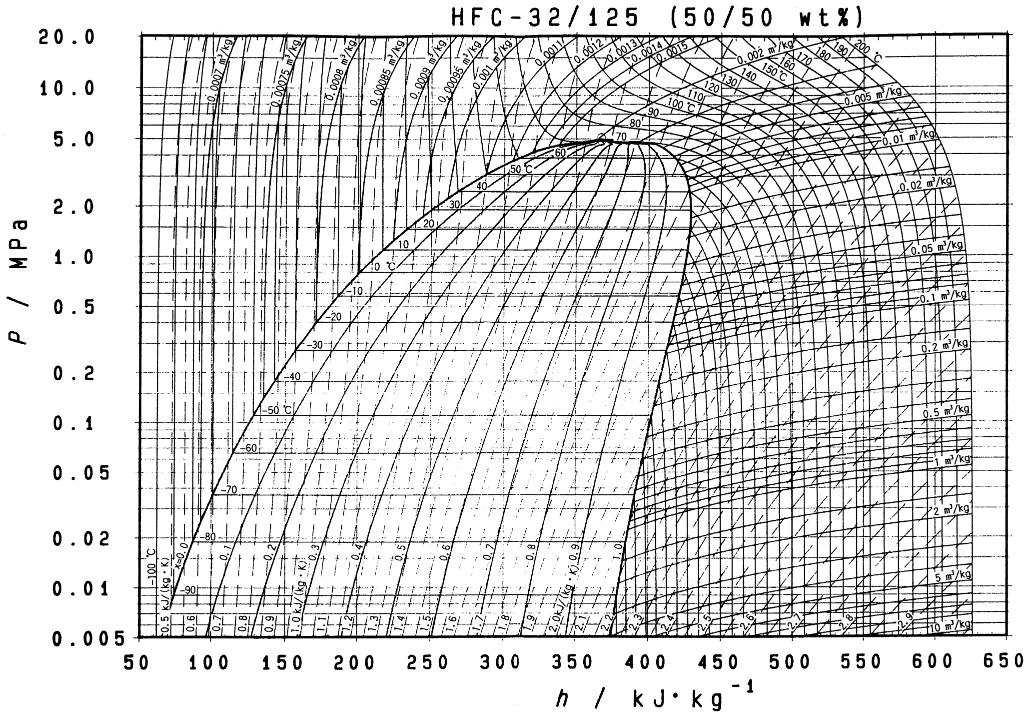
About Refrigerant R410A

- Characteristics of new refrigerant, R410A

1. Performance
   Almost the same performance as R22 and R407C
2. Pressure
   Working pressure is approx. 1.4 times more than R22 and R407C.
3. Refrigerant composition
   Few problems in composition control, since it is a Quasi-azeotropic mixture refrigerant.

	HFC units (Units using new refrigerants)		HCFC units
Refrigerant name	R407C	R410A	R22
Composing substances	Non-azeotropic mixture of HFC32, HFC125 and HFC134a (*1)	Quasi-azeotropic mixture of HFC32 and JFC125 (*1)	Single-component refrigerant
Design pressure	3.2 Mpa (gauge pressure) = 32.6 kgf/cm^2	4.15 Mpa (gauge pressure) = 42.3 kgf/cm^2	2.75Mpa (gauge pressure) = 28.0 kgf/cm^2
Refrigerant oil	Synthetic oil (Ether)		Mineral oil (Suniso)
Ozone destruction factor (ODP)	0	0	0.05
Combustibility	None	None	None
Toxicity	None	None	None

★1. Non-azeotropic mixture refrigerant: mixture of two or more refrigerants having different boiling points.
★2. Quasi-azeotropic mixture refrigerant: mixture of two or more refrigerants having similar boiling points.
★3. The design pressure is different at each product. Please refer to the installation manual for each product.
(Reference) 1 Mpa ≒ 10.19716 kgf / cm^2



Pressure-Enthalpy curves of HFC-32/125 (50/50wt%)

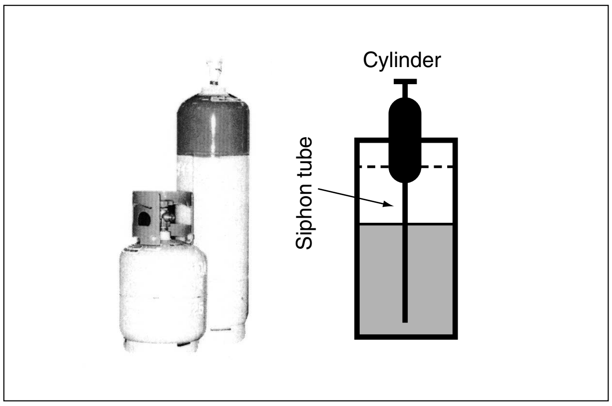
■ Thermodynamic characteristic of R410A

DAIREP ver2.0

Temperature (°C)	Steam pressure (kPa)		Density (kg/m³)		Specific heat at constant pressure (kJ/kgK)		Specific enthalpy (kJ/kg)		Specific entropy (kJ/KgK)	
	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
-70	36.13	36.11	1410.7	1.582	1.372	0.695	100.8	390.6	0.649	2.074
-68	40.83	40.80	1404.7	1.774	1.374	0.700	103.6	391.8	0.663	2.066
-66	46.02	45.98	1398.6	1.984	1.375	0.705	106.3	393.0	0.676	2.058
-64	51.73	51.68	1392.5	2.213	1.377	0.710	109.1	394.1	0.689	2.051
-62	58.00	57.94	1386.4	2.463	1.378	0.715	111.9	395.3	0.702	2.044
-60	64.87	64.80	1380.2	2.734	1.379	0.720	114.6	396.4	0.715	2.037
-58	72.38	72.29	1374.0	3.030	1.380	0.726	117.4	397.6	0.728	2.030
-56	80.57	80.46	1367.8	3.350	1.382	0.732	120.1	398.7	0.741	2.023
-54	89.49	89.36	1361.6	3.696	1.384	0.737	122.9	399.8	0.754	2.017
-52	99.18	99.03	1355.3	4.071	1.386	0.744	125.7	400.9	0.766	2.010
-51.58	101.32	101.17	1354.0	4.153	1.386	0.745	126.3	401.1	0.769	2.009
-50	109.69	109.51	1349.0	4.474	1.388	0.750	128.5	402.0	0.779	2.004
-48	121.07	120.85	1342.7	4.909	1.391	0.756	131.2	403.1	0.791	1.998
-46	133.36	133.11	1336.3	5.377	1.394	0.763	134.0	404.1	0.803	1.992
-44	146.61	146.32	1330.0	5.880	1.397	0.770	136.8	405.2	0.816	1.987
-42	160.89	160.55	1323.5	6.419	1.401	0.777	139.6	406.2	0.828	1.981
-40	176.24	175.85	1317.0	6.996	1.405	0.785	142.4	407.3	0.840	1.976
-38	192.71	192.27	1310.5	7.614	1.409	0.792	145.3	408.3	0.852	1.970
-36	210.37	209.86	1304.0	8.275	1.414	0.800	148.1	409.3	0.864	1.965
-34	229.26	228.69	1297.3	8.980	1.419	0.809	150.9	410.2	0.875	1.960
-32	249.46	248.81	1290.6	9.732	1.424	0.817	153.8	411.2	0.887	1.955
-30	271.01	270.28	1283.9	10.53	1.430	0.826	156.6	412.1	0.899	1.950
-28	293.99	293.16	1277.1	11.39	1.436	0.835	159.5	413.1	0.911	1.946
-26	318.44	317.52	1270.2	12.29	1.442	0.844	162.4	414.0	0.922	1.941
-24	344.44	343.41	1263.3	13.26	1.448	0.854	165.3	414.9	0.934	1.936
-22	372.05	370.90	1256.3	14.28	1.455	0.864	168.2	415.7	0.945	1.932
-20	401.34	400.06	1249.2	15.37	1.461	0.875	171.1	416.6	0.957	1.927
-18	432.36	430.95	1242.0	16.52	1.468	0.886	174.1	417.4	0.968	1.923
-16	465.20	463.64	1234.8	17.74	1.476	0.897	177.0	418.2	0.980	1.919
-14	499.91	498.20	1227.5	19.04	1.483	0.909	180.0	419.0	0.991	1.914
-12	536.58	534.69	1220.0	20.41	1.491	0.921	182.9	419.8	1.003	1.910
-10	575.26	573.20	1212.5	21.86	1.499	0.933	185.9	420.5	1.014	1.906
-8	616.03	613.78	1204.9	23.39	1.507	0.947	189.0	421.2	1.025	1.902
-6	658.97	656.52	1197.2	25.01	1.516	0.960	192.0	421.9	1.036	1.898
-4	704.15	701.49	1189.4	26.72	1.524	0.975	195.0	422.6	1.048	1.894
-2	751.64	748.76	1181.4	28.53	1.533	0.990	198.1	423.2	1.059	1.890
0	801.52	798.41	1173.4	30.44	1.543	1.005	201.2	423.8	1.070	1.886
2	853.87	850.52	1165.3	32.46	1.552	1.022	204.3	424.4	1.081	1.882
4	908.77	905.16	1157.0	34.59	1.563	1.039	207.4	424.9	1.092	1.878
6	966.29	962.42	1148.6	36.83	1.573	1.057	210.5	425.5	1.103	1.874
8	1026.5	1022.4	1140.0	39.21	1.584	1.076	213.7	425.9	1.114	1.870
10	1089.5	1085.1	1131.3	41.71	1.596	1.096	216.8	426.4	1.125	1.866
12	1155.4	1150.7	1122.5	44.35	1.608	1.117	220.0	426.8	1.136	1.862
14	1224.3	1219.2	1113.5	47.14	1.621	1.139	223.2	427.2	1.147	1.859
16	1296.2	1290.8	1104.4	50.09	1.635	1.163	226.5	427.5	1.158	1.855
18	1371.2	1365.5	1095.1	53.20	1.650	1.188	229.7	427.8	1.169	1.851
20	1449.4	1443.4	1085.6	56.48	1.666	1.215	233.0	428.1	1.180	1.847
22	1530.9	1524.6	1075.9	59.96	1.683	1.243	236.4	428.3	1.191	1.843
24	1615.8	1609.2	1066.0	63.63	1.701	1.273	239.7	428.4	1.202	1.839
26	1704.2	1697.2	1055.9	67.51	1.721	1.306	243.1	428.6	1.214	1.834
28	1796.2	1788.9	1045.5	71.62	1.743	1.341	246.5	428.6	1.225	1.830
30	1891.9	1884.2	1034.9	75.97	1.767	1.379	249.9	428.6	1.236	1.826
32	1991.3	1983.2	1024.1	80.58	1.793	1.420	253.4	428.6	1.247	1.822
34	2094.5	2086.2	1012.9	85.48	1.822	1.465	256.9	428.4	1.258	1.817
36	2201.7	2193.1	1001.4	90.68	1.855	1.514	260.5	428.3	1.269	1.813
38	2313.0	2304.0	989.5	96.22	1.891	1.569	264.1	428.0	1.281	1.808
40	2428.4	2419.2	977.3	102.1	1.932	1.629	267.8	427.7	1.292	1.803
42	2548.1	2538.6	964.6	108.4	1.979	1.696	271.5	427.2	1.303	1.798
44	2672.2	2662.4	951.4	115.2	2.033	1.771	275.3	426.7	1.315	1.793
46	2800.7	2790.7	937.7	122.4	2.095	1.857	279.2	426.1	1.327	1.788
48	2933.7	2923.6	923.3	130.2	2.168	1.955	283.2	425.4	1.339	1.782
50	3071.5	3061.2	908.2	138.6	2.256	2.069	287.3	424.5	1.351	1.776
52	3214.0	3203.6	892.2	147.7	2.362	2.203	291.5	423.5	1.363	1.770
54	3361.4	3351.0	875.1	157.6	2.493	2.363	295.8	422.4	1.376	1.764
56	3513.8	3503.5	856.8	168.4	2.661	2.557	300.3	421.0	1.389	1.757
58	3671.3	3661.2	836.9	180.4	2.883	2.799	305.0	419.4	1.403	1.749
60	3834.1	3824.2	814.9	193.7	3.191	3.106	310.0	417.6	1.417	1.741
62	4002.1	3992.7	790.1	208.6	3.650	3.511	315.3	415.5	1.433	1.732
64	4175.7	4166.8	761.0	225.6	4.415	4.064	321.2	413.0	1.450	1.722

1.1.2 Refrigerant Cylinders

- Cylinder specifications
  - The cylinder is painted refrigerant color (pink).
  - The cylinder valve is equipped with a siphon tube.



Refrigerant can be charged in liquid state with cylinder in upright position.

Caution: Do not lay cylinder on its side during charging, since it cause refrigerant in gas state to enter the system.

- Handling of cylinders

(1) Laws and regulations
R410A is liquefied gas, and the High-Pressure Gas Safety Law must be observed in handling them. Before using, refer to the High-Pressure Gas Safety Law.
The Law stipulates standards and regulations that must be followed to prevent accidents with high-pressure gases. Be sure to follow the regulations.

(2) Handing of vessels
Since R410A is high-pressure gas, it is contained in high-pressure vessels.
Although those vessels are durable and strong, careless handling can cause damage that can lead to unexpected accidents. Do not drop vessels, let them fall, apply impact or roll them on the ground.

(3) Storage
Although R410A is not flammable, it must be stored in a well-ventilated, cool, and dark place in the same way as any other high-pressure gases.
It should also be noted that high-pressure vessels are equipped with safety devices that releases gas when the ambient temperature reaches more than a certain level (fusible plug melts) and when the pressure exceeds a certain level (spring-type safety valve operates).

1.1.3 Service Tools

R410A is used under higher working pressure, compared to previous refrigerants (R22,R407C). Furthermore, the refrigerating machine oil has been changed from Suniso oil to Ether oil, and if oil mixing is occurred, sludge results in the refrigerants and causes other problems. Therefore, gauge manifolds and charge hoses that are used with a previous refrigerant (R22,R407C) can not be used for products that use new refrigerants.
Be sure to use dedicated tools and devices.

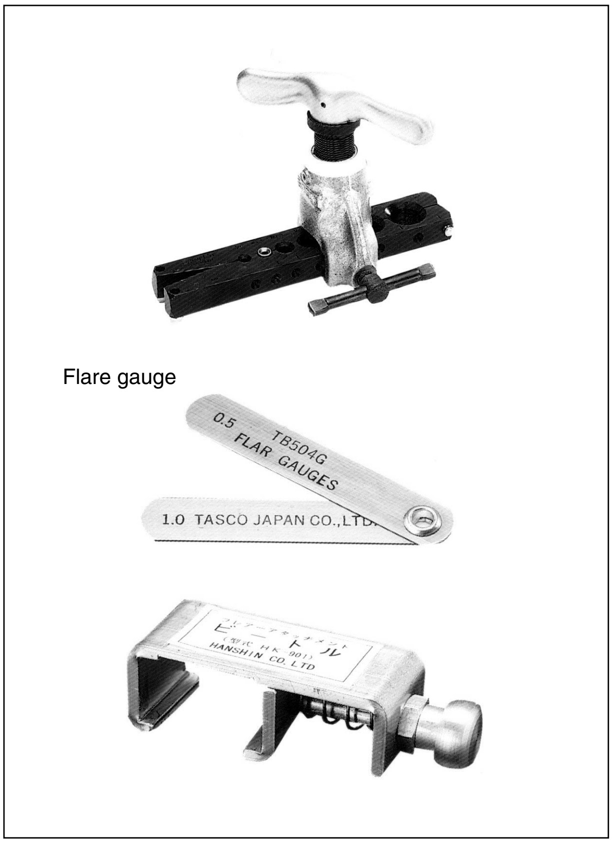
■ Tool compatibility

Tool	Compatibility			Reasons for change
	HFC		HCFC	
	R410A	R407C	R22	
Gauge manifold Charge hose	×			• Do not use the same tools for R22 and R410A. • Thread specification differs for R410A and R407C.
Charging cylinder	×		O	• Weighting instrument used for HFCs.
Gas detector	O		×	• The same tool can be used for HFCs.
Vacuum pump (pump with reverse flow preventive function)	O			• To use existing pump for HFCs, vacuum pump adaptor must be installed.
Weighting instrument	O			
Charge mouthpiece	×			• Seal material is different between R22 and HFCs. • Thread specification is different between R410A and others.
Flaring tool (Clutch type)	O			• For R410A, flare gauge is necessary.
Torque wrench	O			• Torque-up for 1/2 and 5/8
Pipe cutter	O			
Pipe expander	O			
Pipe bender	O			
Pipe assembling oil	×			• Due to refrigerating machine oil change. (No Suniso oil can be used.)
Refrigerant recovery device	Check your recovery device.			
Refrigerant piping	See the chart below.			• Only ϕ19.1 is changed to 1/2H material while the previous material is "O".

As for the charge mouthpiece and packing, 1/2UNF20 is necessary for mouthpiece size of charge hose.

Pipe size	R407C		R410A	
	Material	Thickness t (mm)	Material	Thickness t (mm)
ϕ6.4	O	0.8	O	0.8
ϕ9.5	O	0.8	O	0.8
ϕ12.7	O	0.8	O	0.8
ϕ15.9	O	1.0	O	1.0
ϕ19.1	O	1.0	1/2H	1.0
ϕ22.2	1/2H	1.0	1/2H	1.0
ϕ25.4	1/2H	1.0	1/2H	1.0
ϕ28.6	1/2H	1.0	1/2H	1.0
ϕ31.8	1/2H	1.2	1/2H	1.10
ϕ38.1	1/2H	1.4	1/2H	1.40

1. Flaring tool

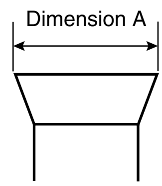


- Specifications
  - Dimension A

Unit:mm

Nominal size	Tube O.D.	$A^{+0}_{-0.4}$	
	Do	Class-2 (R410A)	Class-1 (Conventional)
1/4	6.35	9.1	9.0
3/8	9.52	13.2	13.0
1/2	12.70	16.6	16.2
5/8	15.88	19.7	19.4
3/4	19.05	24.0	23.3

- Differences
  - Change of dimension A



For class-1: R407C
For class-2: R410A

Conventional flaring tools can be used when the work process is changed.
(change of work process)
Previously, a pipe extension margin of 0 to 0.5mm was provided for flaring. For R410A air conditioners, perform pipe flaring with a pipe extension margin of 1.0 to 1.5mm.
(For clutch type only)
Conventional tool with pipe extension margin adjustment can be used.

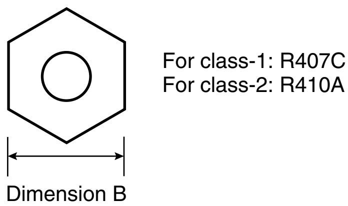
2. Torque wrench

■ Specifications
- Dimension B Unit:mm

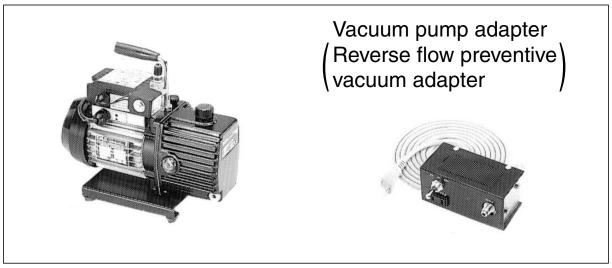
Nominal size	Class-1	Class-2	Previous
1/2	24	26	24
5/8	27	29	27

No change in tightening torque
No change in pipes of other sizes

■ Differences
- Change of dimension B
  Only 1/2", 5/8" are extended



3. Vacuum pump with check valve



■ Specifications
- Discharge speed
  50 l/min (50Hz)
  60 l/min (60Hz)
- Suction port UNF7/16-20(1/4 Flare)
  UNF1/2-20(5/16 Flare) with adapter

● Maximum degree of vacuum
  –100.7 kPa (5 Torr –755 mmHg)

■ Differences
- Equipped with function to prevent reverse oil flow
- Previous vacuum pump can be used by installing adapter.

4. Leak tester

- ■ Specifications
- Hydrogen detecting type, etc.
- Applicable refrigerants
  R410A, R407C, R404A, R507A, R134a, etc.

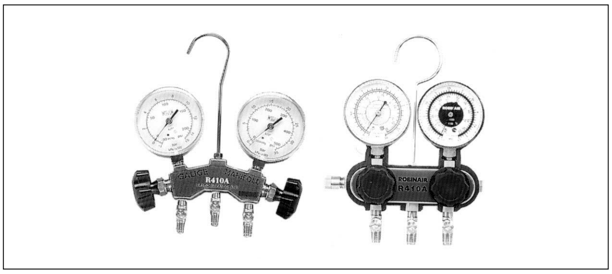
- ■ Differences
- Previous testers detected chlorine. Since HFCs do not contain chlorine, new tester detects hydrogen.

5. Refrigerant oil (Air compal)

- ■ Specifications
- Contains synthetic oil, therefore it can be used for piping work of every refrigerant cycle.
- Offers high rust resistance and stability over long period of time.

- ■ Differences
- Can be used for R410A and R22 units.

6. Gauge manifold for R410A



- ■ Specifications
- High pressure gauge
  - 0.1 to 5.3 MPa (-76 cmHg to 53 kg/cm^2)
- Low pressure gauge
  - 0.1 to 3.8 MPa (-76 cmHg to 38 kg/cm^2)
- 1/4" → 5/16" (2min → 2.5min)
- No oil is used in pressure test of gauges.
  → For prevention of contamination

- Temperature scale indicates the relationship between pressure and temperature in gas saturated state.

■ Differences
- Change in pressure
- Change in service port diameter

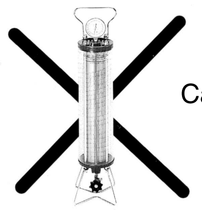
7. Charge hose for R410A

(Hose with ball valve)

■ Specifications
- Working pressure 5.08 MPa (51.8 kg/cm^2)
- Rupture pressure 25.4 MPa (259 kg/cm^2)
- Available with and without hand-operate valve that prevents refrigerant from outflow.

■ Differences
- Pressure proof hose
- Change in service port diameter
- Use of nylon coated material for HFC resistance

8. Charging cylinder



■ Specifications
- Use weigher for refrigerant charge listed below to charge directly from refrigerant cylinder.

■ Differences
- The cylinder can not be used for mixed refrigerant since mixing ratio is changed during charging.

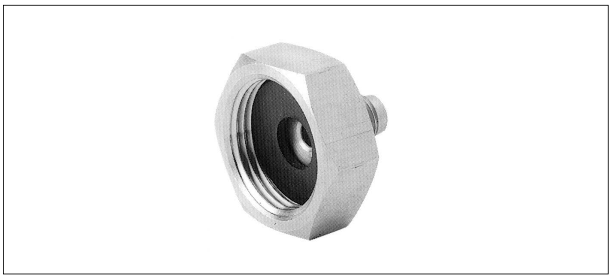
  When R410A is charged in liquid state using charging cylinder, foaming phenomenon is generated inside charging cylinder.

9. Weigher for refrigerant charge

■ Specifications
- High accuracy
  TA101A (for 10-kg cylinder) = ± 2g
  TA101B (for 20-kg cylinder) = ± 5g
- Equipped with pressure-resistant sight glass to check liquid refrigerant charging.
- A manifold with separate ports for HFCs and previous refrigerants is equipped as standard accessories.

■ Differences
- Measurement is based on weight to prevent change of mixing ratio during charging.

10. Charge mouthpiece



■ Specifications
- For R410A, 1/4"→ 5/16" (2min → 2.5min)
- Material is changed from CR to H-NBR.

■ Differences
- Change of thread specification on hose connection side (For the R410A use)
- Change of sealer material for the HFCs use.

1.2 Refrigerant Piping, Drain Piping, and Wiring for FFQ Model

1.2.1 Refrigerant Piping Work For FFQ Model

<For refrigerant piping of outdoor units, see the installation manual attached to the outdoor unit.>
<Execute heat insulation work completely on both sides of the gas piping and the liquid piping. Otherwise, a water leakage can result sometimes.>
(When using a heat pump, the temperature of the gas piping can reach up to approximately 120°C, so use insulation which is sufficiently resistant.)
<Also, in cases where the temperature and humidity of the refrigerant piping sections might exceed 30°C or RH80%, reinforce the refrigerant insulation. (20 mm or thicker) Condensation may form on the surface of the insulating material.>
<Before refrigerant piping work, check which type of refrigerant is used. Proper operation is not possible if the types of refrigerant are not the same.>

Caution

- **Use a pipe cutter and flare suitable for the type of refrigerant.**
- **Apply ester oil or ether oil around the flare portions before connecting.**
- **To prevent dust, moisture or other foreign matter from infiltrating the tube, either pinch the end or cover it with tape.**
- **Do not allow anything other than the designated refrigerant to get mixed into the refrigerant circuit, such as air, etc. If any refrigerant gas leaks while working on the unit, ventilate the room thoroughly right away.**

- The outdoor unit is charged with refrigerant.
- Be sure to use both a spanner and torque wrench together, as shown in the drawing, when connecting or disconnecting pipes to / from the unit.
  (Refer to Fig. 13)
- Refer to “ Table 3” for the dimensions of flare nut spaces.
- When connecting the flare nut, coat the flare section (both inside and outside) with ester oil or ether oil, rotate three or four times first, then screw in.
  (Refer to Fig. 14)

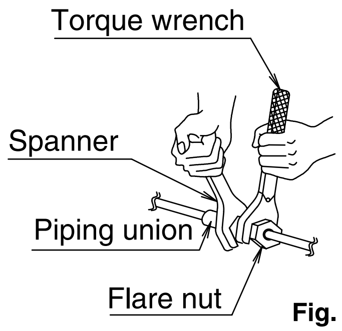


Fig. 13

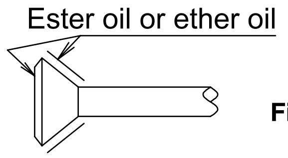


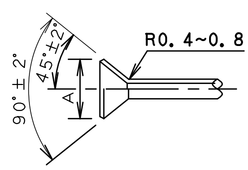
Fig. 14

Caution Over-tightening may damage the flare and cause a refrigerant leakage.

Note:

- Use the flare nut included with the unit main body.

Table 3

Pipe size	Tightening torque	Flare dimensions A (mm)	Flare
ϕ6.4 (1/4")	14.2 - 17.2 N·m (144 - 175 kgf·cm)	8.7-9.1	
ϕ9.5 (3/8")	32.7 - 39.9 N·m (333 - 407 kgf·cm)	12.8-13.2	
ϕ12.7 (1/2")	49.5 - 60.3 N·m (505 - 615 kgf·cm)	16.2 - 16.6	

- Refer to “Table 3” to determine the proper tightening torque.

Caution Over-tightening may damage the flare and cause a refrigerant leakage.

Not recommendable but in case of emergency

You must use a torque wrench but if you are obliged to install the unit without a torque wrench, you may follow the installation method mentioned below.

After the work is finished, make sure to check that there is no gas leak.

When you keep on tightening the flare nut with a spanner, there is a point where the tightening torque suddenly increases. From that position, further tighten the flare nut the angle shown below:

Pipe size	Further tightening angle	Recommended arm length of tool
ϕ6.4 (1/4")	60 to 90 degrees	Approx. 150mm
ϕ9.5 (3/8")	60 to 90 degrees	Approx. 200mm
ϕ12.7 (1/2")	30 to 60 degrees	Approx. 250mm

Caution **CAUTION TO BE TAKEN WHEN BRAZING REFRIGERANT PIPING**

"Do not use flux when brazing refrigerant piping. Therefore, use the phosphor copper brazing filter metal (BCuP) which does not require flux."

(Flux has extremely harmful influence on refrigerant piping systems. For instance, if the chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will damage the refrigerant oil.)

- Before brazing local refrigerant piping, nitrogen gas shall be blown through the piping to expel air from the piping.
  If your brazing is done without nitrogen gas blowing, a large amount of oxide film develops inside the piping, and could cause system malfunction.
- When brazing the refrigerant piping, only begin brazing after having carried out nitrogen substitution or while inserting nitrogen into the refrigerant piping. Once this is done, connect the indoor unit with a flared or a flanged connection.
- Nitrogen should be set to 0.02 Mpa (0.2 kg/cm^2) with a pressure-reducing valve if brazing while inserting nitrogen into the piping. **(Refer to Fig.15)**

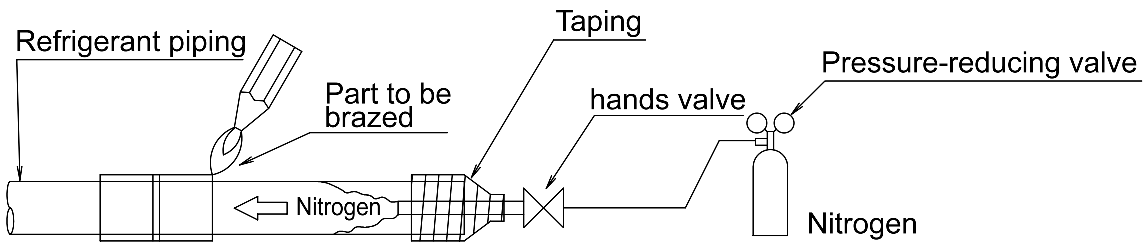


Fig. 15

- Make absolutely sure to execute heat insulation works on the pipe-connecting section after checking gas leakage by thoroughly studying the following figure and using the attached heat insulating materials for fitting (8) and (9). (Fasten both ends with the clamps (4).)
  (Refer to Fig. 16)
- Wrap the sealing pad (11) only around the insulation for the joints on the gas piping side.
  (Refer to Fig. 16)

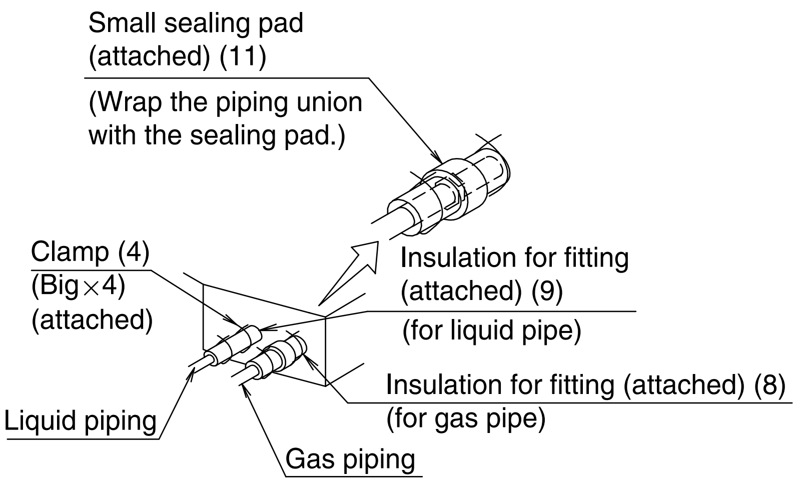


Fig. 16

Caution Be sure to insulate any field piping all the way to the piping connection inside the unit. Any exposed piping may cause condensation or burns if touched.

1.2.2 Drain Piping Work For FFQ Model

(1) Carry out the drain piping

- Lay pipes so as to ensure that drainage can occur with problems.
- Employ a pipe with either the same diameter or with the diameter larger (excluding the raising section) than that of the connecting pipe (PVC pipe, nominal diameter 20 mm, outside diameter 26 mm).
- keep the drain pipe short and sloping downwards at a gradient of at least 1/100 to prevent air pockets from forming.
- If the drain hose cannot be sufficiently set on a slope, refer to PRECAUTIONS FOR DRAIN RAISING PIPING on page 38.
- To keep the drain hose from sagging, space hanger bracket every 1 to 1.5 m.

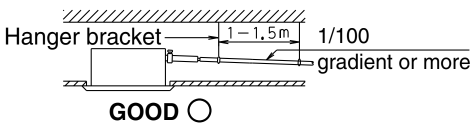


Fig. 17

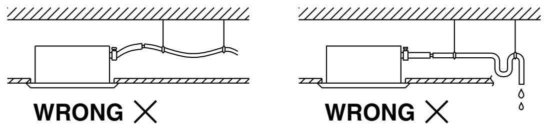


Fig. 18

- Use the attached drain hose (1) and clamp (2).
- Insert the drain hose into the drain socket up to the base, and tighten the clamp securely within the portion of a gray tape of the hose-inserted tip. Tighten the clamp until the screw head is less than 4 mm from the hose.
- Make sure that heat insulation work is executed on the following 2 spots to prevent any possible water leakage due to dew condensation.
  - Indoor drain pipe

- Drain socket
- Wrap the attached sealing pad (10) over the clamp and drain hose to insulate.

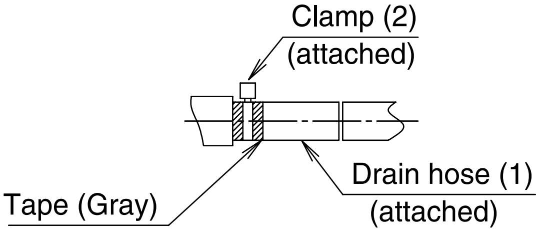


Fig. 19

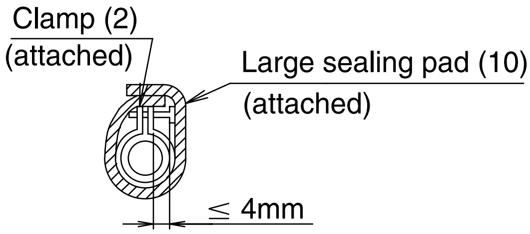


Fig. 20

<PRECAUTIONS FOR DRAIN RAISING PIPING>

- Install the drain raising pipes at a height of less than 545mm.
- Install the drain raising pipes at a right angle to the indoor unit and no more than 300 mm from the unit.

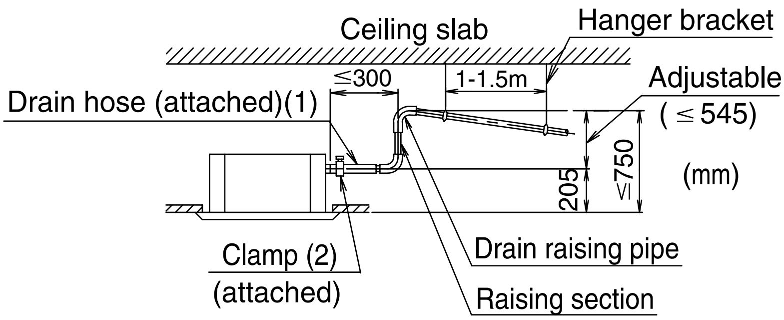


Fig. 21

Note:
- To ensure no excessive pressure is applied to the included drain hose (1), do not bend or twist when installing. (This may cause leakage.)
- If converging multiple drain pipes, install according to the procedure shown below.

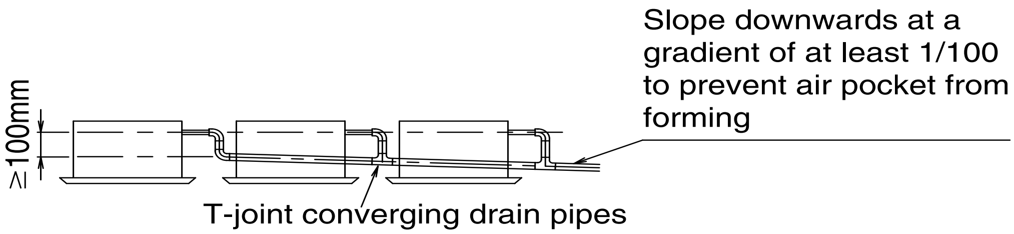


Fig. 22

Select converging drain pipes whose gauge is suitable for the operating capacity of the unit.

(2) After piping work is finished, check if drainage flows smoothly.
- Add approximately 1000 cc of water slowly from the air outlet and check drainage flow.

WHEN ELECTRIC WIRING WORK IS FINISHED
- Check drainage flow during cooling operation.

WHEN ELECTRIC WIRING WORK IS NOT FINISHED
- Remove the control box lid. Connect the single phase power supply (SINGLE PHASE 50Hz 220-240V) to connections No.1 and No.2 on the power supply terminal block. Do not connect to No.3 of the power supply terminal block. (The drain pump will not operate.) When carrying out wiring work around the control box, make sure none of the connectors come undone. Be sure to attach the control box lid before turning on the power.
- After confirming drainage **(Fig.23, Fig.24)**, turn off the power and remove the power supply.
- Attach the control box lid as before.

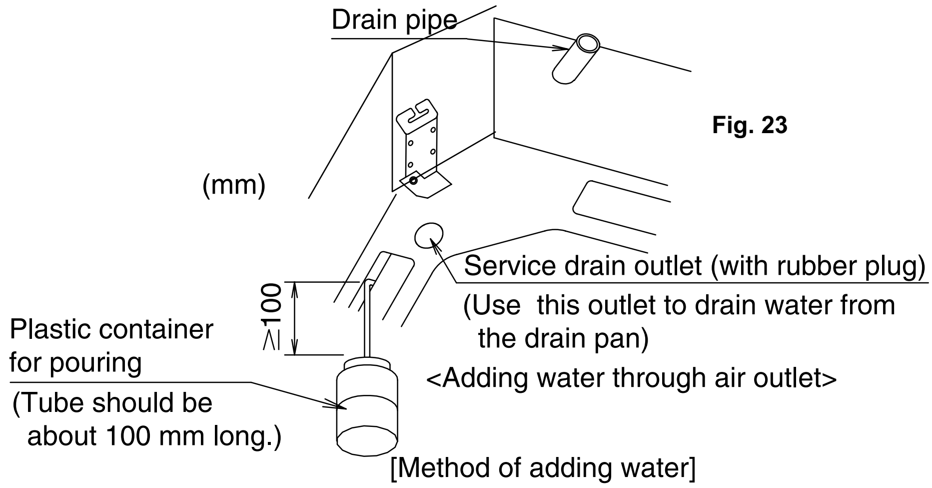


Fig. 23

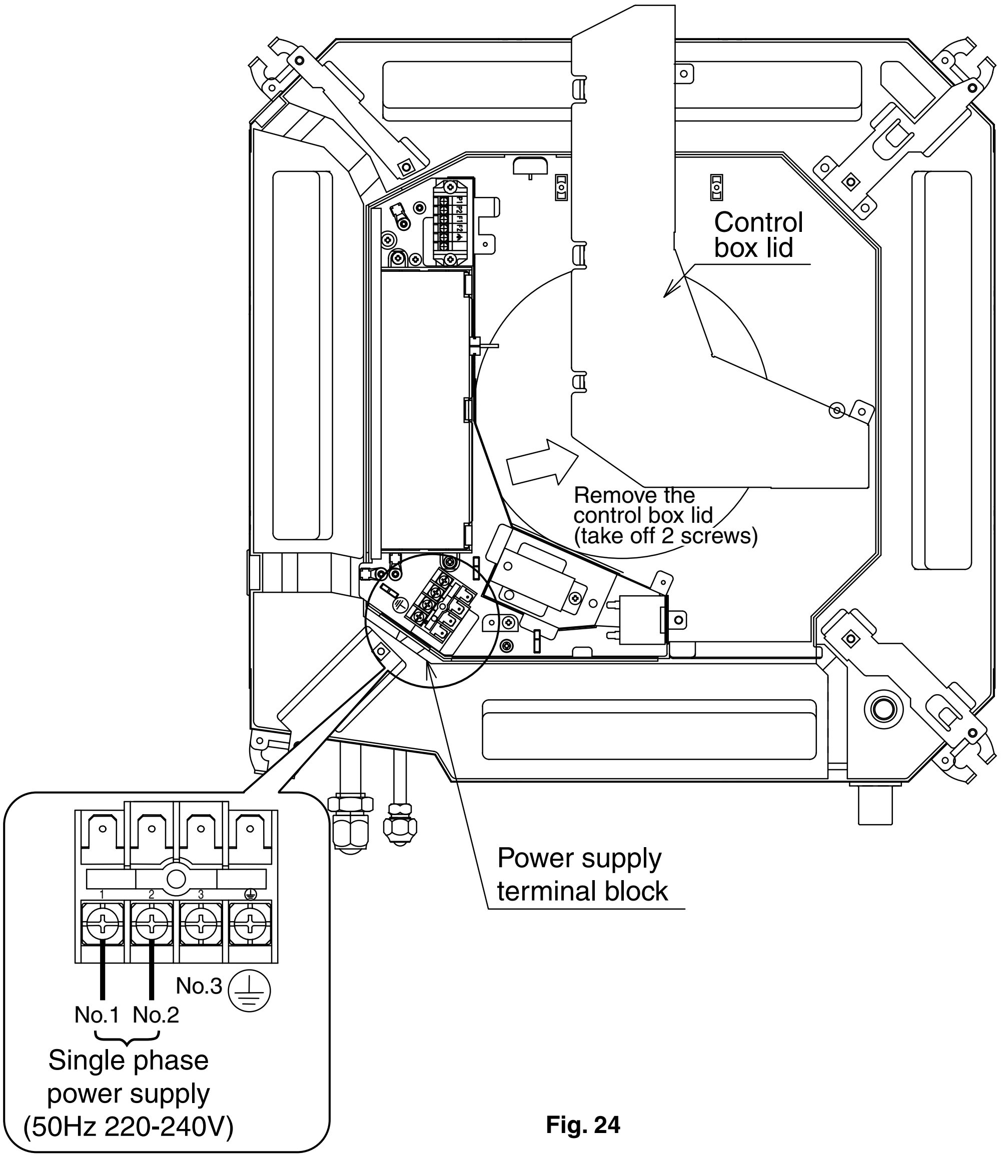


Fig. 24

Caution Drain piping connections

Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.

Keep in mind that it will become the cause of getting drain pipe blocked if water collects on drain pipe

1.2.3 Wiring Example For FFQ Model

For the wiring of outdoor units, refer to the installation manual attached to the outdoor units.

Confirm the system type.

- **Pair type :** 1 remote controller controls 1 indoor unit. (standard system) **(Refer to Fig. 25)**
- **Multi system :** 1 through 4 indoor units connect to 1 outdoor unit. The indoor unit is controlled by remote controller connected to each indoor unit. **(Refer to Fig. 26)** However, the group control is not expected.
- **Group control :** 1 remote controller controls up to 16 indoor units. (All indoor units operate according to the remote controller) **(Refer to Fig. 27)**
- **2 remote controllers control :** 2 remote controllers control 1 indoor unit. **(Refer to Fig. 28)**

Pair type

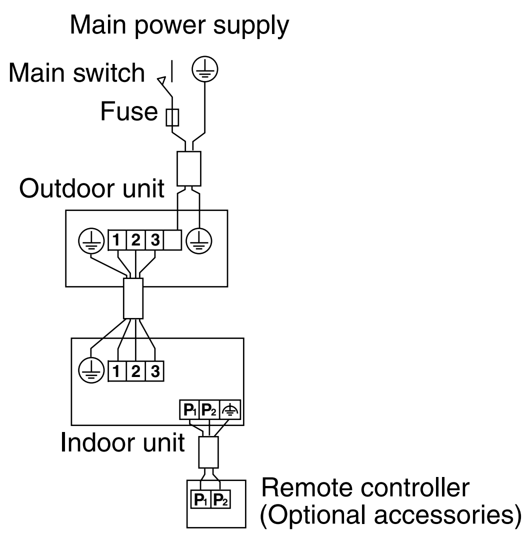


Fig. 25

Multi system

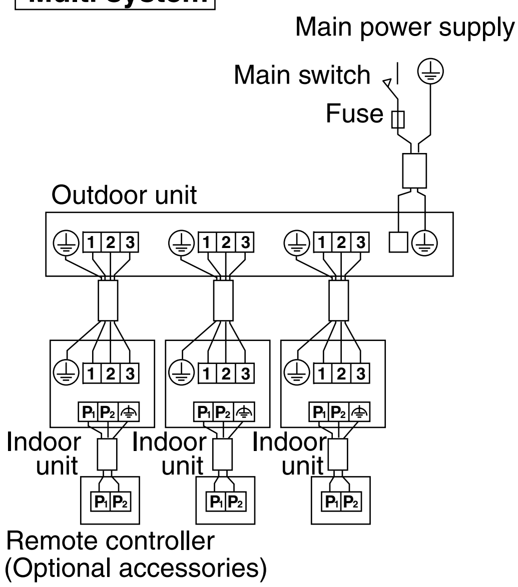


Fig. 26

Group control

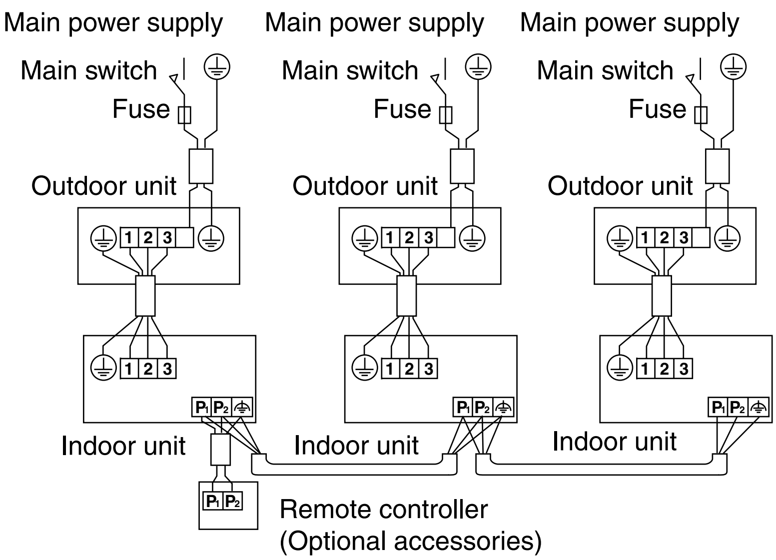


Fig. 27

2 remote controllers control

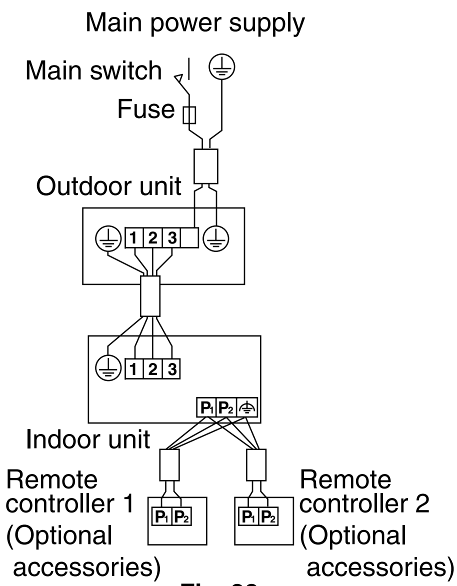


Fig. 28

Note:

1. All transmission wiring except for the remote controller wires is polarized and must match the terminal symbol.
2. In case a shielding wire is to be used, connect a shielded portion with the ⏚ of a remote controller terminal board.(Also, connect the ground for the remote control to a grounded metal part.)
3. For group control remote controller, choose the remote controller that suits the indoor unit which has the most functions (as attached swing flap)

1.2.4 Electric Wiring Work For FFQ Model

- All field supplied parts and materials and electric works must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer to also “Wiring diagram label” attached to the Control box lid.
- For remote controller wiring details, refer to the installation manual attached to the remote controller.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of shutting down power supply to the entire system must be installed.
- Refer to the installation manual attached to the outdoor unit for the size of power supply electric wire connected to the outdoor unit, the capacity of the circuit breaker and switch, and wiring instructions.
- Be sure to ground the air conditioner.
- Do not connect the ground wire to gas and water pipes, lightning rods, or telephone ground wires.
  - Gas pipes : might cause explosions or fire if gas leaks.
  - Water pipes : no grounding effect if hard vinyl piping is used.
  - Telepone ground wires or lightning rods : might cause abnormally high electric potential in the ground during lighting storms.

- **Specifications for field wire**

Table 4

	Wire	Size(mm^2)	Total Length
Wiring between units	H05VV-U4G(NOTE 1)	2.5	Max.200m
Remote controller cord	Vinyl cord with sheath or cable (2 wire) (NOTE 2)	0.75-1.25	Max.500m *
Wiring to ground terminal	Ground wire conform to local codes	2.0	—

*This will be the total extended length in the system when doing group control.

Note:

1. Shows only in case of protected pipes. Use H07RN-F in case of no protection.
2. For European and Asian market : Vinyl cord with sheath or cable (Insulated thickness : 1mm or more) For Australian regular : Shield wire (Insulated thickness : 1mm or more)

Caution

- Arrange the wires and fix a lid firmly so that the lid does not float during wiring work.
- Do not clamp remote controller cords together with wiring between units together. Doing so may cause malfunction.
- Remote controller cords and wiring between units should be located at least 50 mm from other electric wires. Not following this guideline may result in malfunction due to electrical noise.

Connection of wiring between units, ground wire and for the remote control cord (Refer to Fig. 29)

- Wiring between units and ground wire
  Remove the control box lid and connect wires of matching number to the power supply terminal block (4P)inside. And connect the ground wire to the terminal block. In doing this, pull the wires inside through the hole and fix the wires securely with the included clamp (4).
- Give enough slack to the wires between the clamp (4) and power supply terminal block. (Use Fig. 30 as a guide and allow at least 80mm for removing the sheath.)
- Remove the control box lid and pull the wires inside through the hole and connect to the terminal block for remote controller (6P). (no polarity) Securely fix the remote controller cord with the included clamp (4).
- Give enough slack to the wires between the clamp (4) and the terminal block for the remote controller.
- After connection, attach sealing material (12)
- Be sure to attach it to prevent the infiltration of water from the outside.

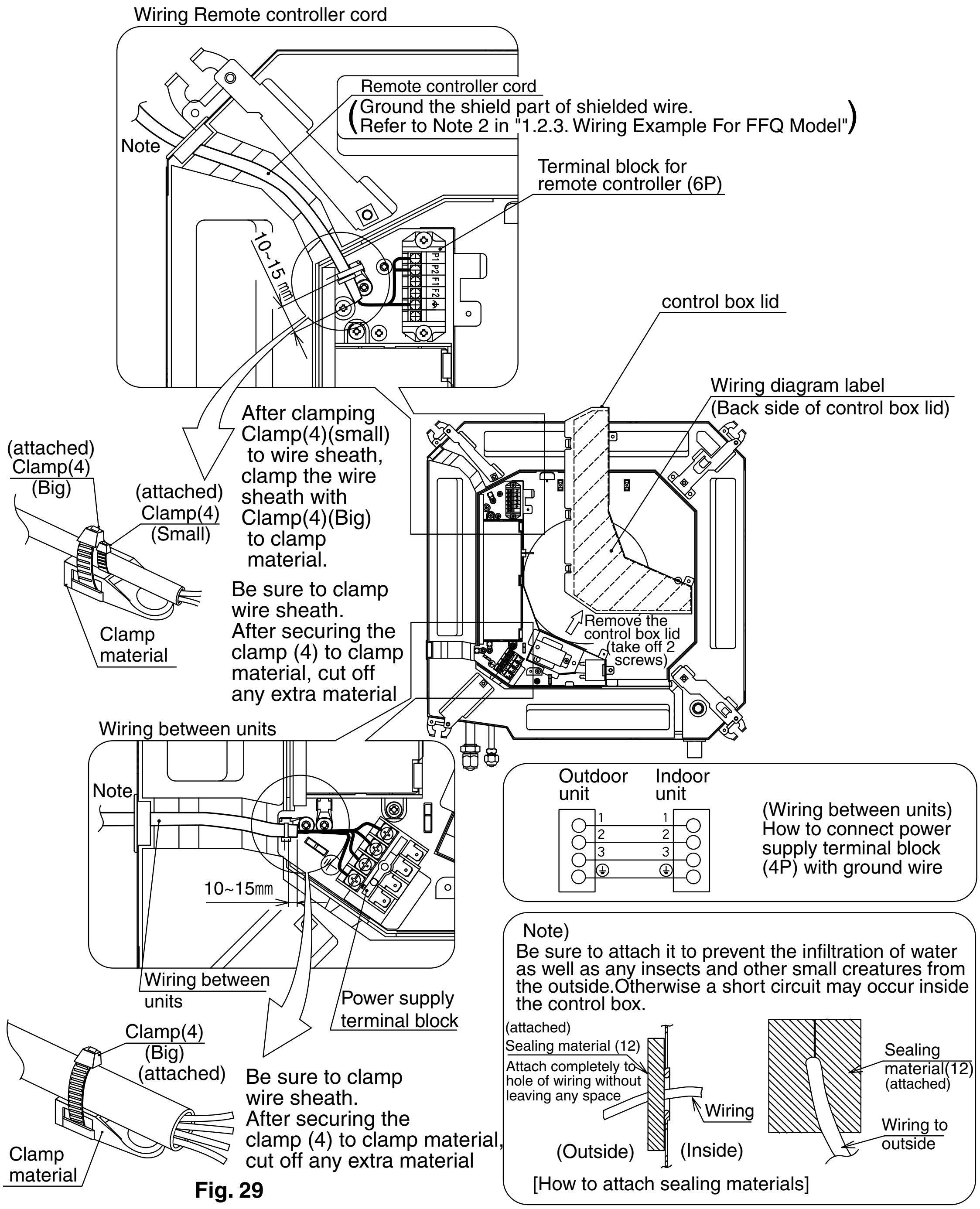


Fig. 29

Observe the notes mentioned below when wiring to the power supply terminal block.

Tightening torque for the terminal blocks.

- Use the correct screwdriver for tightening the terminal screws. If the blade of screwdriver is too small, the head of the screw might be damaged, and the screw will not be properly tightened.
- If the terminal screws are tightened too hard, screws might be damaged.
- Refer to the table below for the tightening torque of the terminal screws.

	Tightening torque
Terminal block for remote controller (6P)	0.79 - 0.97 N·m
Power supply terminal block (4P)	1.18 - 1.44 N·m

Precautions to be taken for power supply wiring

Use a round crimp-style terminal for connection to the power supply terminal block. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.
Be sure to peel off the sheath of wiring between units more than 80 mm.
(Refer to Fig. 30)

- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that external forces are not applied to the terminals.

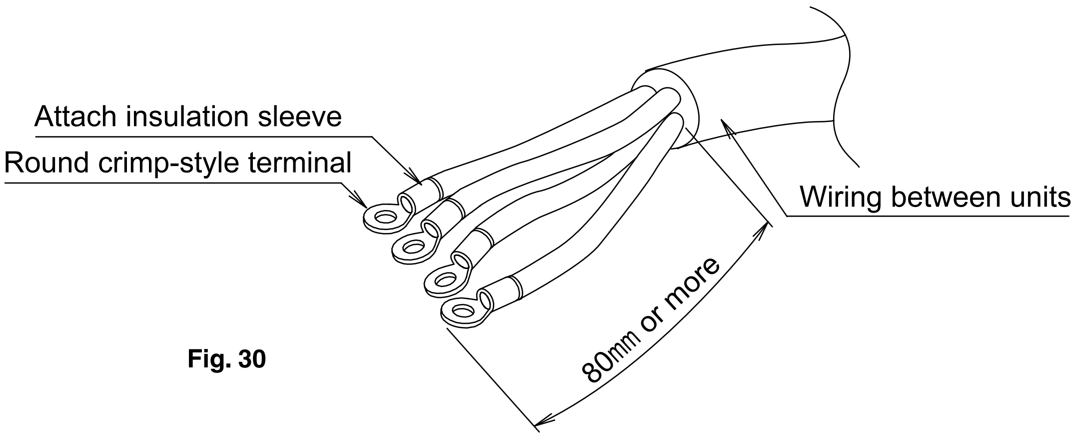


Fig. 30

Caution When clamping the wires, be sure no pressure is applied to the wire connections by using the included clamping material to make appropriate clamps. Also, when wiring, make sure the lid on the control box fits snugly by arranging the wires neatly and attaching the control box lid firmly. When attaching the control box lid, make sure no wires get caught in the edges. Pass wiring through the wiring through holes to prevent damage to them.
Make sure the remote control cord, the wiring between units, and other electrical wiring do not pass through the same locations outside the machine, separating them by at least 50mm, otherwise electrical noise (external static) could cause mistaken operation or breakage.

1.3 Refrigerant Piping, Drain Piping, and Wiring for FHQ Model

1.3.1 Refrigerant Piping Work

〈For refrigerant piping of outdoor units, see the installation manual attached to the outdoor unit.〉
〈Execute heat insulation work completely on both sides of the gas piping and the liquid piping. Otherwise, a water leakage can result sometimes.〉
(When using a heat pump, the temperature of the gas piping can reach up to approximately 120°C, so use insulation which is sufficiently resistant.)
〈Also, in cases where the temperature and humidity of the refrigerant piping sections might exceed 30°C or RH80 %, reinforce the refrigerant insulation. (20 mm or thicker) Condensation may form on the surface of the insulating material.〉
〈Before refrigerant piping work, check which type of refrigerant is used. Proper operation is not possible if the types of refrigerant are not the same.〉

Caution

- **Use a pipe cutter and flare suitable for the type of refrigerant.**
- **Apply ester oil or ether oil around the flare section before connecting.**
- **To prevent dust, moisture or other foreign matter from infiltrating the tube, either pinch the end or cover it with tape.**
- **Do not allow anything other than the designated refrigerant to get mixed into the refrigerant circuit, such as air, etc. If any refrigerant gas leaks while working on the unit, ventilate the room thoroughly right away.**

- The outdoor unit is charged with refrigerant.
- Use copper alloy seamless pipes (ISO 1337).
- Be sure to use both a spanner and torque wrench together, as shown in the drawing, when connecting or disconnecting pipes to/ from the unit. **(Refer to Fig. 10)**
- Refer to “Table 2” for the dimensions of flare nut spaces.
- When connecting the flare nut, coat the flare section (both inside and outside) with ester oil or ether oil, rotate three or four times first, then screw in. **(Refer to Fig. 11)**

Fig. 10

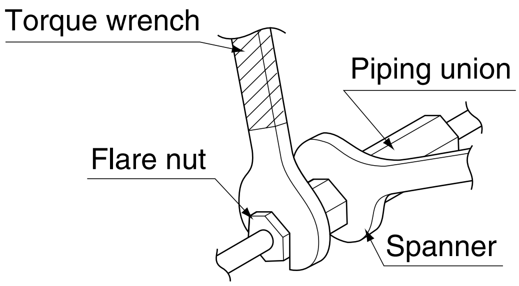
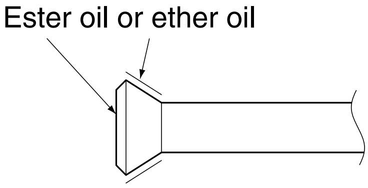
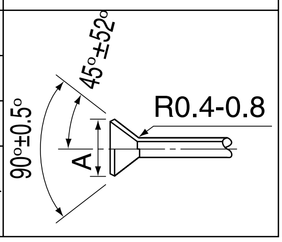


Fig. 11



Note: Use the flare nut included with the unit main body.

Table 2

Pipe size	Tightening torque	Flare dimensions A (mm) R22, R407C	Flare dimensions A (mm) R410A	Flare
Type of refrigerant / Applicable model		FH(Y)-BJV1 FHYP-BV1, FH-BZV1	FHQ-BUV1B	
ϕ6.4(1/4”)	14.2-17.2 N • m (144-175kgf • cm)	8.6 – 9.0	8.7 – 9.1	
ϕ9.5(3/8”)	32.7-39.9 N • m (333-407kgf • cm)	12.6 – 13.0	12.8 – 13.2	
ϕ12.7(1/2”)	49.5-60.3 N • m (505-615kgf • cm)	15.8 – 16.2	16.2 – 16.6	
ϕ15.9(5/8”)	61.8-75.4 N • m (630-769kgf • cm)	19.0 – 19.4	19.3 – 19.7	
ϕ19.1(3/4”)	97.2-118.8 N • m (991-1211kgf • cm)	23.3 – 23.7	———	

- Refer to “Table 2” to determine the proper tightening torque.

Caution Overtightening may damage the flare and cause a refrigerant leakage.

Not recommendable but in case of emergency
You must use a torque wrench but if you are obliged to install the unit without a torque wrench, you may follow the installation method mentioned below.

After the work is finished, make sure to check that there is no gas leak.

When you keep on tightening the flare nut with a spanner, there is a point where the tightening torque suddenly increases. From that position, further tighten the flare nut the angle shown below:

Pipe size	Further tightening angle	Recommended arm length of tool
ϕ6.4 (1/4”)	60 to 90 degrees	Approx. 150mm
ϕ9.5 (3/8”)	60 to 90 degrees	Approx. 200mm
ϕ12.7 (1/2”)	30 to 60 degrees	Approx. 250mm
ϕ15.9 (5/8”)	30 to 60 degrees	Approx. 300mm
ϕ19.1 (3/4”)	20 to 35 degrees	Approx. 450mm

Caution

CAUTION TO BE TAKEN WHEN BRAZING REFRIGERANT PIPING
“Do not use flux when brazing refrigerant piping. Therefore, use the phosphor copper brazing filter metal (BCuP) which does not require flux.”
(Flux has extremely harmful influence on refrigerant piping systems. For instance, if the chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will damage the refrigerant oil.)

- Before brazing local refrigerant piping, nitrogen gas shall be blown through the piping to expel air from the piping.
  If you brazing is done without nitrogen gas blowing, a large amount of oxide film develops inside the piping, and could cause system malfunction.
- When brazing the refrigerant piping, only begin brazing after having carried out nitrogen substitution or while inserting nitrogen into the refrigerant piping. Once this is done, connect the indoor unit with a flared or a flanged connection.
- Nitrogen should be set to 0.02 Mpa (0.2 kg/cm^2) with a pressure-reducing valve if brazing while inserting nitrogen into the piping. **(Refer to Fig. 12)**

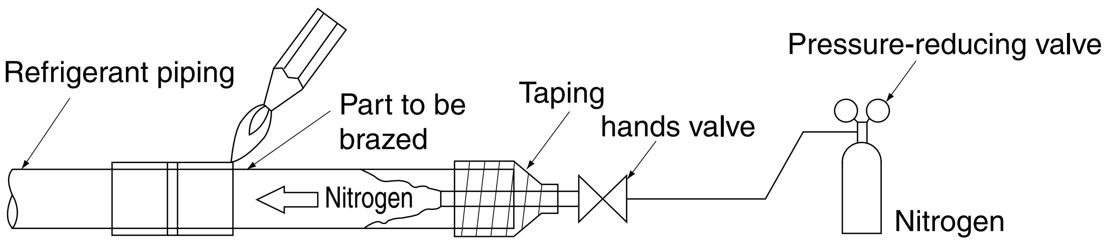


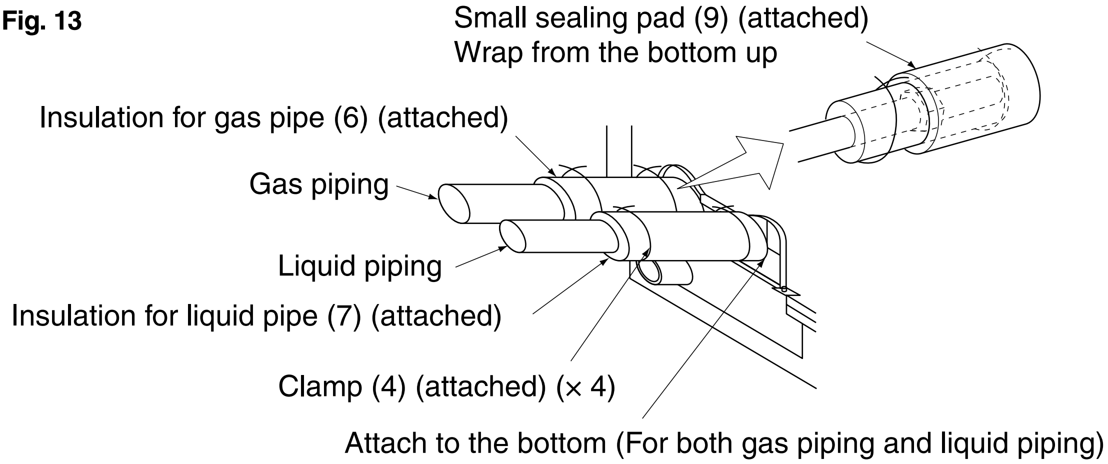
Fig. 12

- Make absolutely sure to execute heat insulation works on the pipe-connecting section after checking gas leakage by thoroughly studying the following figure and using the attached heat insulating materials for fitting (6) and (7). (Fasten both ends with the clamps (4).) **(Refer to Fig. 13)**
- Wrap the sealing pad (9) only around the insulation for the joints on the gas piping side. **(Refer to Fig. 13)**

Caution

- Be sure to insulate any field piping all the way to the piping connection inside the unit. Any exposed piping may cause condensation or burns if touched.

Fig. 13



(1) For piping facing back.
- Remove the rear penetration lid and set the piping. **(Refer to Fig. 14.16)**

(2) For piping facing up.
- When setting the piping to face up, the L-shaped branch piping kit sold separately is required.
- Removing the top penetration lid and use the L-shaped branch piping kit sold separately to set the piping. **(Refer to Fig. 14.15)**

(3) For piping facing right.
- Cut out a slit hole on the dressing board (right) and set the piping. **(Refer to Fig. 16)**

Fig. 14

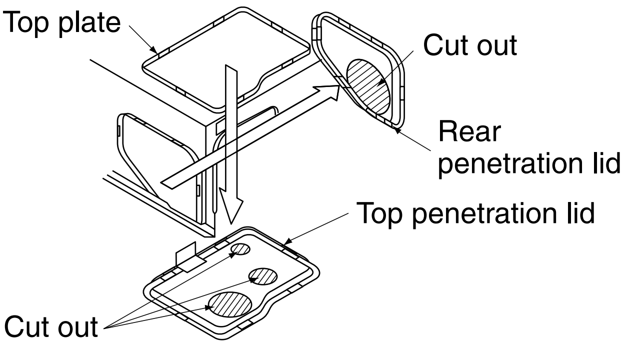


Fig. 15

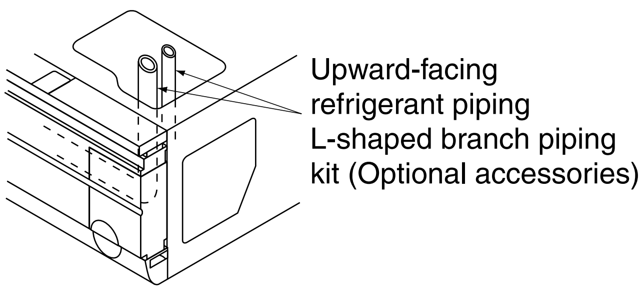


Fig. 16

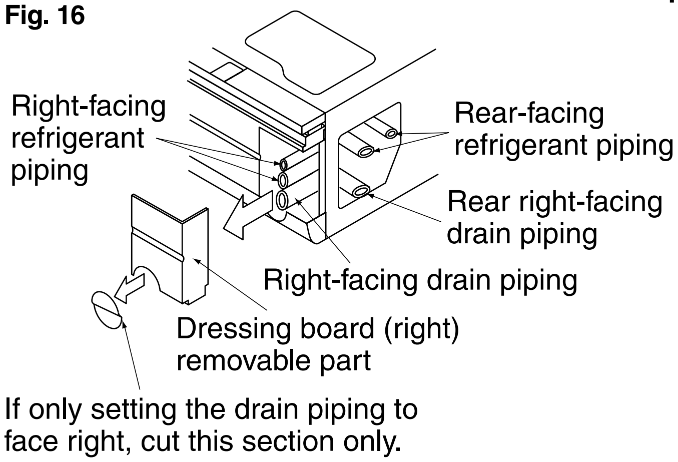
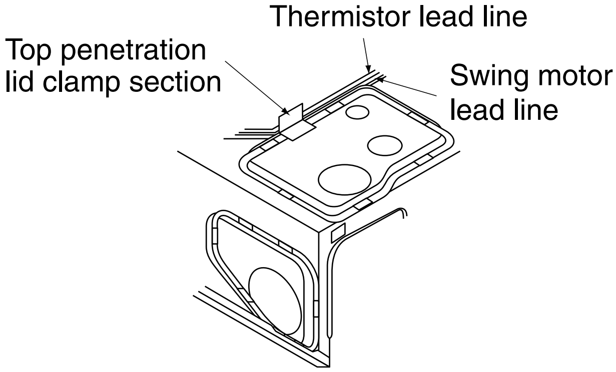


Fig. 17



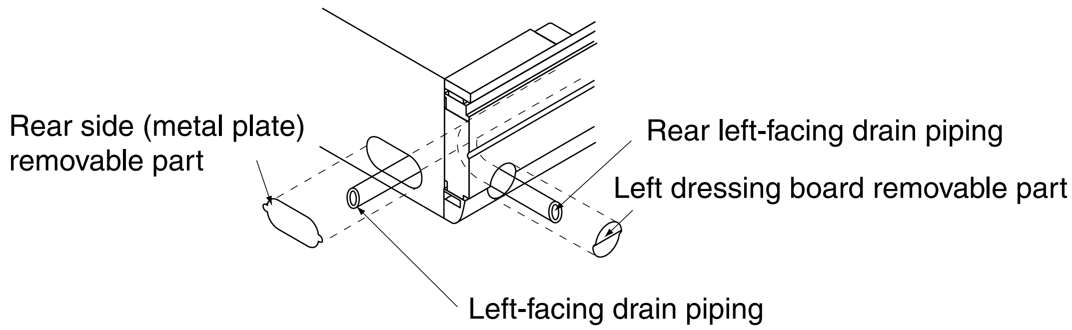
- When piping is complete, cut the removed penetration lid into the shape of the piping using scissors and attach. As when before removing the top penetration lid, secure the lead lines for the swing motor and thermistor by passing them through the clamp section on the top penetration lid. **(Refer to Fig. 14.17)**
- When doing this, block any gaps between the piping penetration lid and the pipes using putty to prevent dust from entering the indoor unit.

1.3.2 Drain Piping Work

(1) Carry out the drain piping.

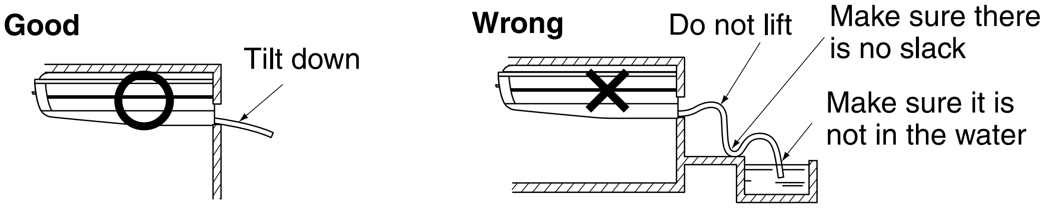
- Make sure piping provides proper drainage.
- You can select whether to bring the drain piping our from the rear right, right, rear left, or left. For rear right-facing and right-facing situations, refer to "1.3.1. Refrigerant Piping Work" on page 44 for rear left-facing and left-facing situations. **(Refer to Fig. 18)**

Fig. 18



- When setting piping facing left, move the rubber stopper and insulation which are attached to the drain pipe connection hole on the left side of the indoor unit to the right-side drain pipe connection hole. When doing this, insert the rubber stopper all the way in to prevent a water leakage.
- Make sure the pipe diameter is the same or bigger than the branch piping. (vinyl-chloride piping, nominal diameter 20 mm, external diameter 26 mm)
- Make sure the piping is short, has at least a 1/100 slope, and can prevent air pockets from forming. **(Refer to Fig. 19)**

Fig. 19



- Be sure to use the included drain hose (1) and clamp (2).
  Also, insert the drain hose completely into the drain socket, and securely attach the clamp bracket inside the gray tape area on the inserted tip of the drain hose. **(Refer to Fig. 20)**
  Screw the screws on the clamp bracket until there is 4 mm left. (Pay attention to the direction of the attachment to prevent the clamp bracket from coming into contact with the suction grille.) **(Refer to Fig. 21)**

Fig. 20

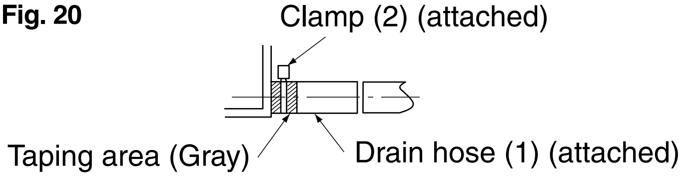


Fig. 22

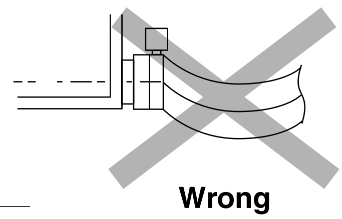
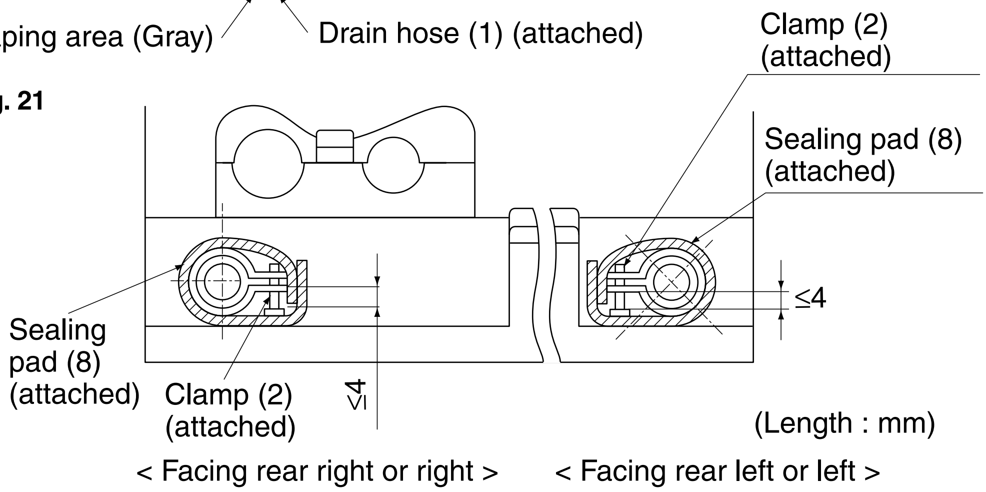


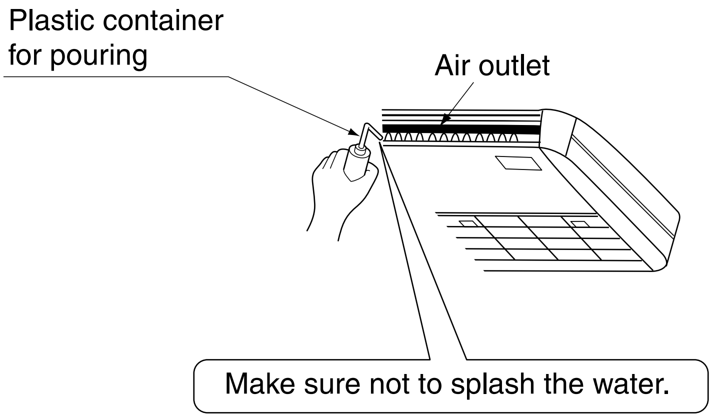
Fig. 21



- Insulate the clamp bracket and drain hose from the bottom using the included sealing pad (8). **(Refer to Fig. 21)**
- Be sure to insulate all drain piping running indoors.
- Do not allow any slack to gather in the drain hose inside the indoor unit. **(Refer to Fig. 22)** (Slack in the drain hose can cause the suction grille to break.)

(2) Check to make sure the drain flows smoothly after piping is complete.

- Slowly pour 600 ml of drain-checking water into the drain pan through the air outlet.



Caution Drain piping connections

Do not connect the drain piping directly to sewage pipes that smell of ammonia. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.

1.3.3 Wiring Example

For the wiring of outdoor units, refer to the installation manual attached to the outdoor units.

Confirm the system type.

- **Pair or Multi system** : 1 remote controller controls 1 indoor unit. (standard system) **(Refer to Fig. 23)**
- **Simultaneous operation system** : 1 remote controller controls 2 indoor units. (2 indoor units operates equally) **(Refer to Fig. 24)**
- **Group control** : 1 remote controller controls up to 16 indoor units. (All indoor units operate according to the remote controller) **(Refer to Fig. 25)**
- **Two remote controllers control** : 2 remote controllers control 1 indoor unit. **(Refer to Fig. 26)**

Fig. 23

Pair or Multi system

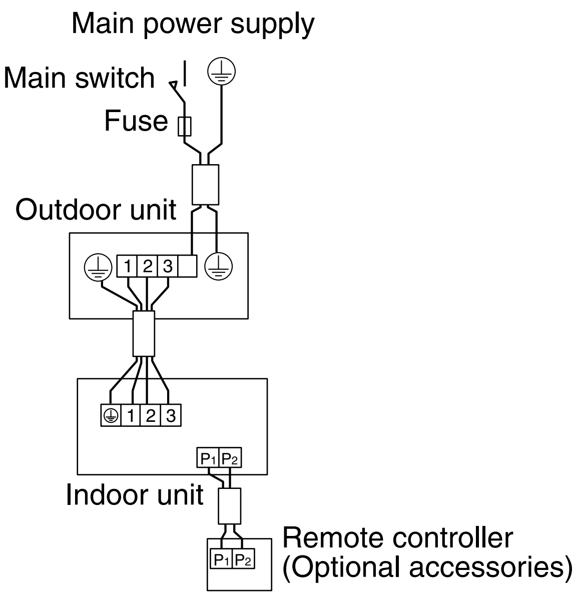


Fig. 24

Simultaneous operation system

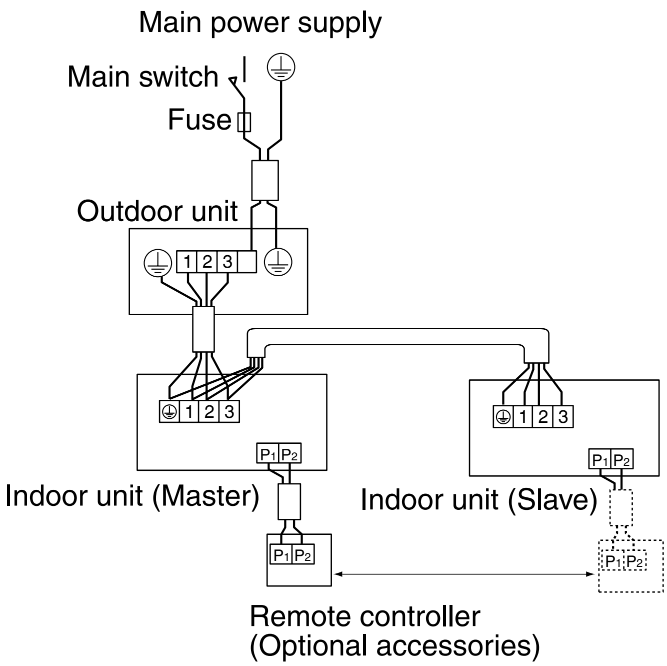


Fig. 25

Group control

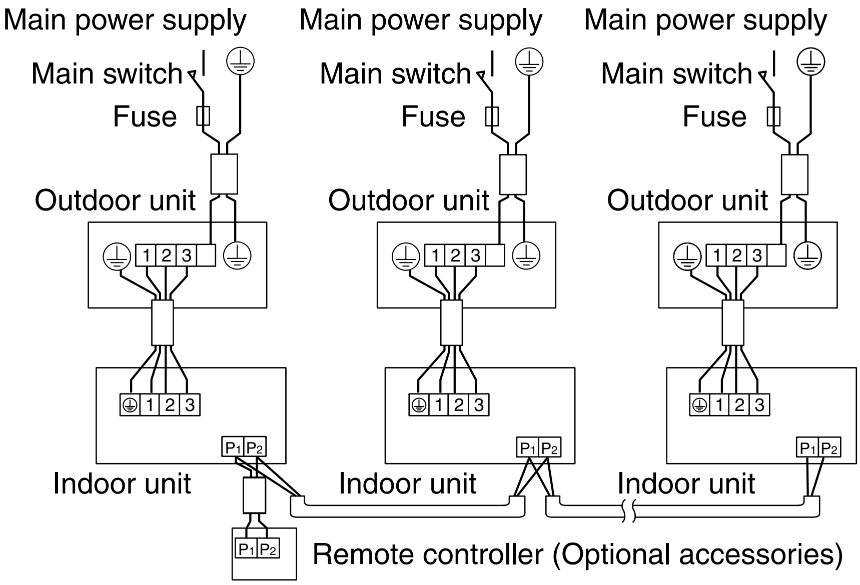
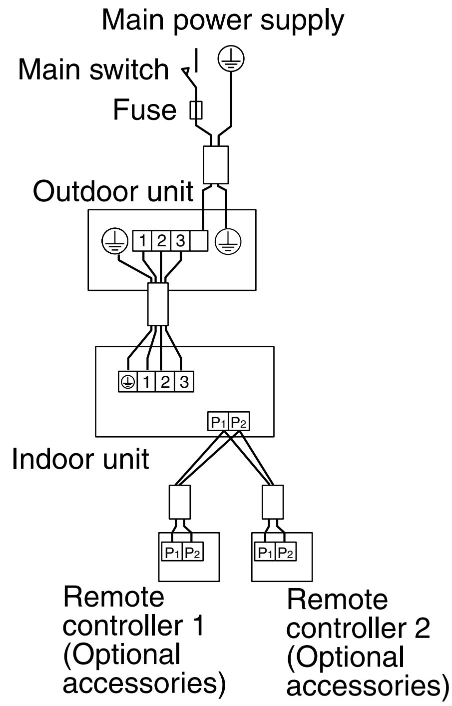


Fig. 26

Two remote controllers control



Note:
1. All transmission wiring except for the remote controller wires is polarized and must match the terminal symbol.
2. In case of group control, perform the remote controller wiring to the master unit when connecting to the simultaneous operation system. (wiring to the slave unit is unnecessary)
3. For group control remote controller, choose the remote controller that suits the indoor unit which has the most functions (as attached swing flap)
4. When controlling the simultaneous operation system with 2 remote controllers, connect it to the master unit. (wiring to the slave unit is unnecessary)

1.3.4 Electric Wiring Work

- All field supplied parts and materials and electric works must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer to also “1.3.3. Wiring Example” on page 49 attached to the unit body.
- For remote controller wiring details, refer to the installation manual attached to the remote controller.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of shutting down power supply to the entire system must be installed.
- Refer to the installation manual attached to the outdoor unit for the size of power supply electric wire connected to the outdoor unit, the capacity of the circuit breaker and switch, and wiring instructions.
- Be sure to ground the air conditioner.
- Do not connect the ground wire to gas pipes, water pipes, lightning rods, or telephone ground wires.
  - Gas pipes: might cause explosions or fire if gas leaks.
  - Water pipes: no grounding effect if hard vinyl piping is used.
  - Telephone ground wires or lightning rods: might cause abnormally high electric potential in the ground during lighting storms.

- **Specifications for field wire**

Table 3

	Wire	Size (mm^2)	Total Length
Wiring between units	H05VV - U4G (NOTE 1, 3)	2.5	Max. 200 m
Remote controller cord	Vinyl cord with sheath or cable (2 wires) (NOTE 2)	0.75 - 1.25	Max. 500 m (NOTE 3)

Note:
1. Shows only in case of protected pipes. Use H07RN-F in case of no protection. (Sheath thickness: 1mm or more)
2. Use double insulated wire for remote controller (Sheath thickness: 1mm or more) or run wires through a wall or conduit so that the user cannot come in contact with them.
3. This length shall be the total extended length in the system of the group control.

Caution
- Even if the top or rear penetration lid is removed, pull the remote controller cord and the wiring between units inside the unit using conduits for each, so that the wiring does not come into contact with the opening section of the metal casing.
- Pass conduits through the wall and secure along with the refrigerant piping in order to prevent external pressure being applied to the remote controller cord and wiring between units.
- Prevent dust from entering into the unit by filling the gap between the conduits and the penetration lid (top or rear) with corking or putty.
- Arrange the wires and fix a lid firmly so that the lid does not float during wiring work.
- Do not clamp remote controller cord together with wiring between units together. Doing so may cause malfunction.
- Remote controller cord and wiring between units should be located at least 50 mm from other electric wires. Not following this guideline may result in malfunction due to electrical noise.

Connection of wiring between units and for the remote control cord (Refer to Fig. 27)

- Wiring between units
  Holding the control box lid, loosen the two securing screws, remove the control box lid, match up the phases on the power source terminal block inside (3P), and make the connections.
  After this is done, use the attached clamp (4) to bind wiring between units to the anchor point. **(Refer to Fig. 28)**
- Remote controller cord: The simultaneous operation multi sub-unit is not required. **(Refer to Fig. 27.29)**
  Connect to the remote control terminal block (2P). (There is no polarity.) After this is done, use the attached clamp (4) to bind remote controller cord to the anchor point.
  (Refer to Fig. 28)

Attaching the suction grille and the dressing boards

- Once wiring is complete, firmly attach the dressing side board by reversing the steps taken to remove the suction grille.

Fig. 27

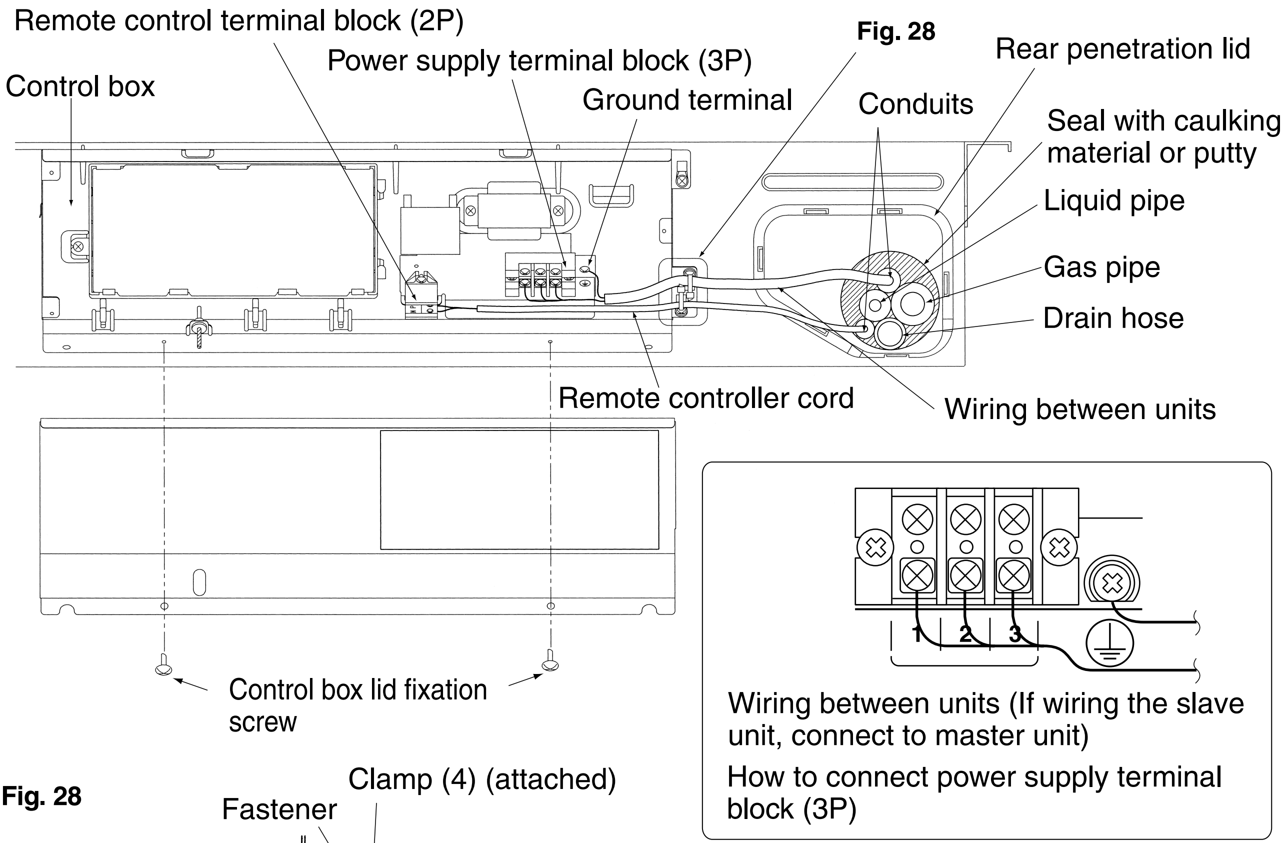


Fig. 28

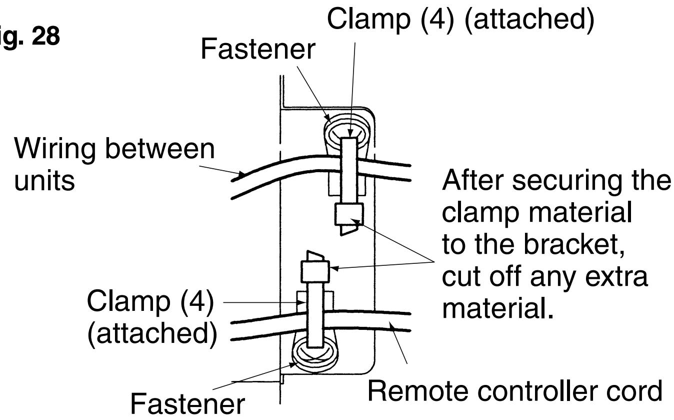
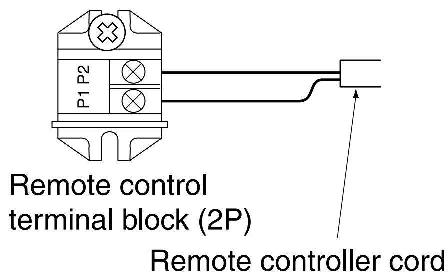


Fig. 29



Observe the notes mentioned below when wiring to the terminals.

Tightening torque for the terminal screws.

- Use the correct screwdriver for tightening the terminal screws. If the blade of screwdriver is too small, the head of the screw might be damaged, and the screw will not be properly tightened.
- If the terminal screws are tightened too hard, screws might be damaged.
- Refer to the table below for the tightening torque of the terminal screws.

Terminal	Size	Tightening torque
Remote controller terminal block (2P)	M3.5	0.79 - 0.97 N•m
Power supply terminal block (3P)	M4	1.18 - 1.44 N•m
Ground terminal	M4	1.18 - 1.44 N•m

Precautions to be taken for power supply wiring
Use a round crimp-style terminal for connection to the power supply terminal block.
In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions. **(Refer to Fig. 30)**

- Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.) **(Refer to Fig. 31)**
- When connecting wires of the same gauge, connect them according to. **(Refer to Fig. 31)**
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that external forces are not applied to the terminals.

Fig. 30

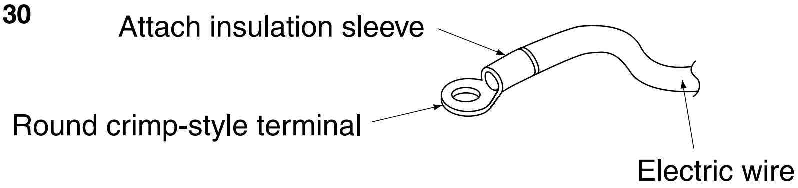
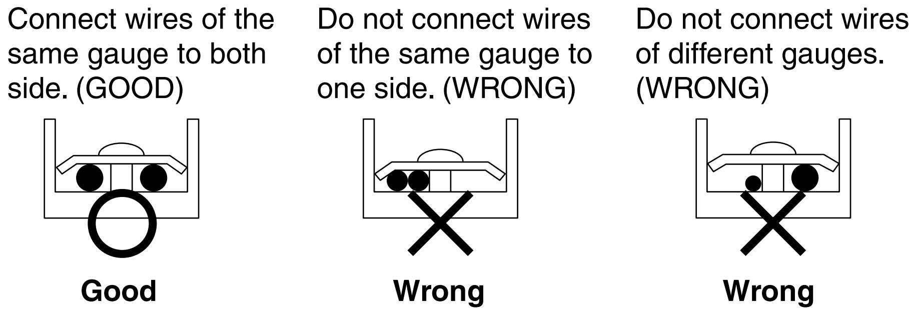


Fig. 31



Part 6
Field Setting

1. Method of Field Set (Reset after Maintenance Inspection/Repair)

1.1 Explanation

Field set is carried out from the remote controller. At time of installation, or after maintenance inspection/repair, carry out field set according to the explanation below. Incorrect settings will cause a malfunction to occur. (The indoor unit settings are sometimes changed if optional accessories are mounted on the indoor unit. Refer to the optional accessory manual.)

1.2 Field Setting

1.2.1 Wired Remote Controller

Notes: (Field setting must be made from the remote controller in accordance with the installation conditions.)

- Setting can be made by changing the “Mode number”, “FIRST CODE NO.”, and “SECOND CODE NO.”.
- Refer to the following procedures for Field setting.

Procedure

① When in the normal mode, press the “ TEST ” button for a minimum of four seconds, and the FIELD SET MODE is entered.

② Select the desired MODE NO. with the “ ” button.

③ During group control, when setting by each indoor unit (mode No. 20, 21 and 23 have been selected), push the “ ” button and select the INDOOR UNIT NO to be set. (This operation is unnecessary when setting by group.)

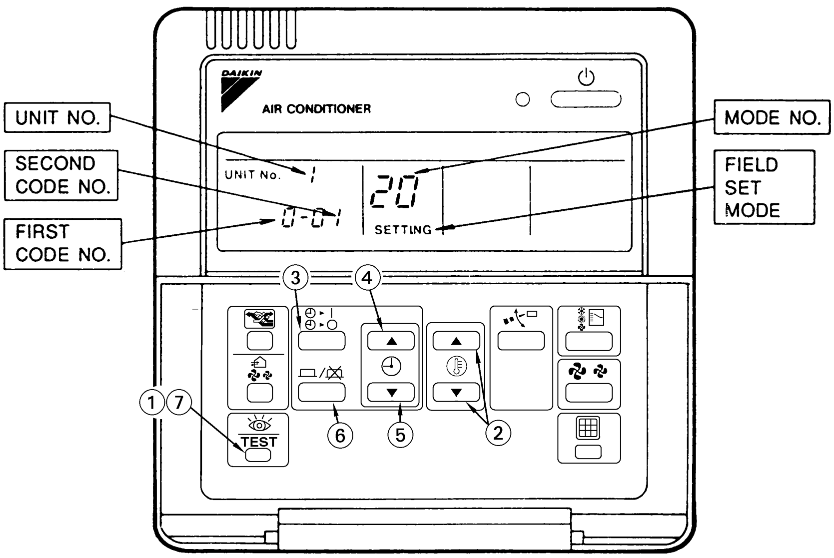
④ Push the “ ” upper button and select FIRST CODE NO.

⑤ Push the “ ” lower button and select the SECOND CODE NO.

⑥ Push the “ ” button once and the present settings are SET.

⑦ Push the “ TEST ” button for about one second to return to the NORMAL MODE.

(Example) If during group setting and the time to clean air filter is set to FILTER CONTAMINATION - HEAVY, SET MODE NO. to “10,” FIRST CODE NO. to “0,” and SECOND CODE NO. to “02.”



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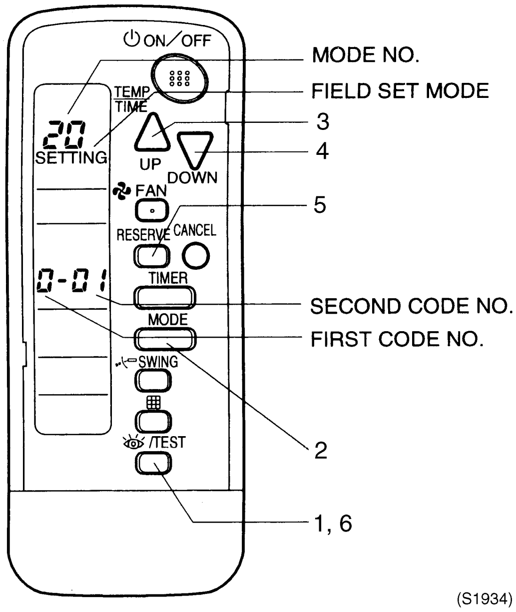
1.2.2 Wireless Remote Controller

Note: If optional accessories are mounted on the indoor unit, the indoor unit setting may have to be changed. Refer to the instruction manual (optional hand book) for each optional accessory.

Procedure

1. When in the normal mode, push the " /TEST " button for a minimum of four seconds, and the FIELD SET MODE is entered.
2. Select the desired MODE NO. with the " MODE " button.
3. Push the " UP " button and select the FIRST CODE NO.
4. Push the " DOWN " button and select the SECOND CODE NO.
5. Push the " RESERVE " button and the present settings are SET.
6. Push the " /TEST " button to return to the NORMAL MODE.



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1.3 Initial Setting Contents

Setting Contents Indoor Models		Filter Sign	Filter Sign Estimation of Accumulated Operating Hours	High Air Outlet Velocity (for Application to Ceiling Higher than 2.7m)	Selection of Air Flow Direction F, T, W	Air Flow Direction Adjust	Air Flow Direction Range Setting	External Static Pressure	Long Life Filter Type	Fan Speed Up	Simul-taneous operation (Twin)
Ceiling Suspended type (FHQ)	(Heat Pump) FHQ 35~60 BUV1B	○	○	○							
Ceiling Mounted Cassette type (FFQ)	(Heat Pump) FFQ 25~60 BV1B	○	○		○	○	○		○		

1.4 Local Setting Mode No.

Example

To set the filter sign time to “filter contamination - heavy” for all units in a group:
Set mode No. to “10,” setting switch No. to “0,” and setting position No. to “02.”

Table (FHQ & FFQ)

Mode No. Note 1	Setting Switch No.	Setting Description		Setting Position No. *Note 2				
				01		02		03
10 (20)	0	Filter contamination - heavy / light (Setting of operating hours for filter sign indication) (Change setting when reducing filter sign indication time to half due to quick soiling of filter)	Long-Life Type	Light	Approx. 2,500 hours	Heavy	Approx. 1,250 hours	—
	1	Long-life filter type (Setting of filter sign indication time) (Change setting when Ultra-long-life filter is installed)		Long-Life Filter		—		—
	2	Remote control thermostat (Set when remote control thermostat sensor is used.)		Use		Not use		
	3	Estimation of filter operating hour (Change setting when filter sign indication is not used)		ON		OFF		—
11 (21)	2	Indoor unit fan OFF when thermostat OFF in cooling/heating		—		Fan OFF		—
12 (22)	5	Automatic restart after power failure reset *Note 4		OFF		ON		—
13 (23)	0	High Ceiling	Ceiling-suspended type(FHQ only)	2.7 m or Lower		2.7~3.5 m		—
	1	Air flow direction selection (Change setting when blocking kit is installed) *Note 3		F		T		W
	4	Setting of air flow direction adjustment range		Upward		Standard		Downward

Notes:

1. Setting is made in all units in a group. To set for individual indoor units or to check the setting, use the mode Nos. (with “2” in upper digit) in parentheses ( ).
2. The setting position No. is set to “01” at the factory, except for the following cases in which “02” is set.
   - Setting of air flow direction adjustment range 13(23)-4
   - Automatic restart after power outage. 12(22)-5
   - Remote control thermostat 10(20)-2
   - Filter sign indication (only for ceiling-mounted duct type) 10(20)-3
3. Since drafts may result, carefully select the installation location.
4. When power returns, units resume the settings made before the power failure.

Caution When “auto restart after power failure reset” is set, be sure to turn off air conditioners, then cut off the power supply before conducting maintenance, inspection and other work. If the power supply is cut off with the power switch left ON, air conditioners will automatically start operating when the power supply is turned on.

5. Do not set any items other than those listed in the above table.
6. Functions that indoor units are not equipped with will not be displayed.
7. When returning to normal mode, “88” may be displayed on the LCD section of the remote controller due to initialization operation.

1.5 Detailed Explanation of Setting Modes

1.5.1 Air Flow Direction Setting (FFQ)

Set the air flow direction of indoor units as given in the table below. (Set when optional air outlet blocking pad has been installed.) The second code No. is factory set to “01.”

Setting Table

Mode No.	First Code No.	Second Code No.	Setting
13 (23)	1	01	F : 4-direction air flow
		02	T : 3-direction air flow
		03	W : 2-direction air flow

1.5.2 Filter Sign Setting (FHQ & FFQ)

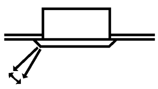
If switching the filter sign ON time, set as given in the table below.

Set Time

Setting \ Filter Specs.		Long Life
Contamination Light	01	2,500
Contamination Heavy	02	1,250

1.5.3 Range of Air Flow Direction Setting (FFQ)

Make the following air flow direction setting according to the respective purpose.



(S2537)

Mode No.	First Code No.	Second Code No.	Setting
13 (23)	4	01	Upward (Draft prevention)
		02	Standard
		03	Downward (Ceiling soiling prevention)

1.5.4 Fan Speed OFF When Thermostat is OFF (FFQ & FHQ)

When the cool/heat thermostat is OFF, you can stop the indoor unit fan by switching the setting to “Fan OFF.”

∗ Used as a countermeasure against odor for barber shops and restaurants.

Setting Table

Mode No.	First Code No.	Second Code No.	Setting
11(21)	2	01	—
		02	Fan OFF

1.5.5 Fan Speed Changeover When Thermostat is OFF (FFQ & FHQ)

By setting to “Set Fan Speed,” you can switch the fan speed to the set fan speed when the heating thermostat is OFF.

∗ Since there is concern about draft if using “fan speed up when thermostat is OFF,” you should take the setup location into consideration.

Setting Table

Mode No.	First Code No.	Second Code No.	Setting
12(22)	3	01	LL Fan Speed
		02	Set Fan Speed

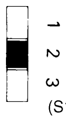
1.5.6 Wireless Setting (Address and MAIN/SUB Setting)

Explanation

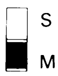
If several wireless remote controller units are used together in the same room (including the case where both group control and individual remote controller control are used together), be sure to set the addresses for the receiver and wireless remote controller. (For group control, see the attached installation manual for the indoor unit.) If using together with a wired remote controller, you have to change the main/sub setting or the receiver.

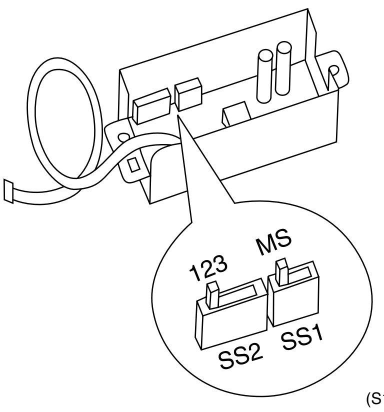
Receiver Setting

Set the wireless address switch (SS2) on the transmitter board according to the table below.

Unit No.	No.1	No.2	No.3
Wireless Address Switch (SS2)	 (S1935)	 (S1936)	 (S1937)

When using both a wired and a wireless remote controller for 1 indoor unit, the wired controller should be set to MAIN. Therefore, set the MAIN/SUB switch (SS1) of the transmitter board to SUB.

	MAIN	SUB
MAIN/SUB Switch (SS1)	 (S1938)	 (S1939)



(S1940)

After completing setting, seal off the opening of the address switch and the MAIN/SUB switch with the attached sealing pad.

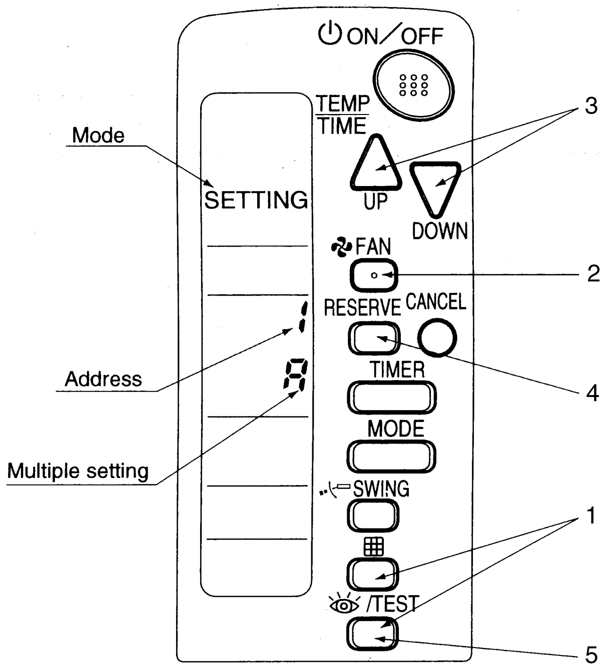
Address Setting (It is Factory Set to "1")

<Setting from the remote controller>

1. Hold down the " ⊞ " button and the " /TEST " button for at least 4 seconds, to get the FIELD SET MODE. (Indicated in the display area in the figure at below).
2. Press the " FAN " button and select a multiple setting (A/b). Each time the button is pressed the display switches between "A" and "b".
3. Press the " UP " button and " DOWN " button to set the address.

   1 → 2 → 3 → 4 → 5 → 6 (S1941)

   Address can be set from 1 to 6, but set it to 1 ~ 3 and to same address as the receiver. (The receiver does not work with address 4 ~ 6.)
4. Press the " RESERVE " button to enter the setting.
5. Hold down the " /TEST " button for at least 1 second to quit the FIELD SET MODE and return to the normal display.



(S1942)

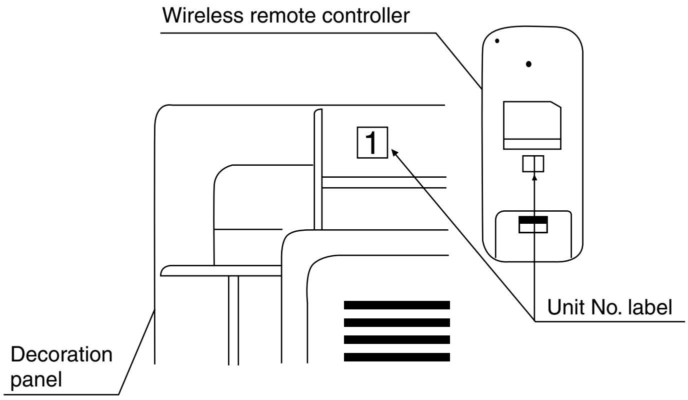
Multiple Settings A/b

When the indoor is being operating by outside control (central remote controller, etc.), it sometimes does not respond to ON/OFF and temperature setting commands from this remote controller. Check what setting the customer wants and make the multiple setting as shown below.

Remote Controller		Indoor Unit	
Multiple Setting	Remote Controller Display	Controlled by other Air Conditioners and Devices	For other than on Left
A: Standard	All items Displayed.	Commands other than ON/OFF and Temperature Setting Accepted. (1 LONG BEEP or 3 SHORT BEEPS Emitted)	
b: Multiple display	Operations set only is displayed shortly after execution.	All Commands Accepted (2 SHORT BEEPS)	

After Setting

Stick the Unit No. label at decoration panel air discharge outlet as well as on the back of the wireless remote controller.



PRECAUTIONS

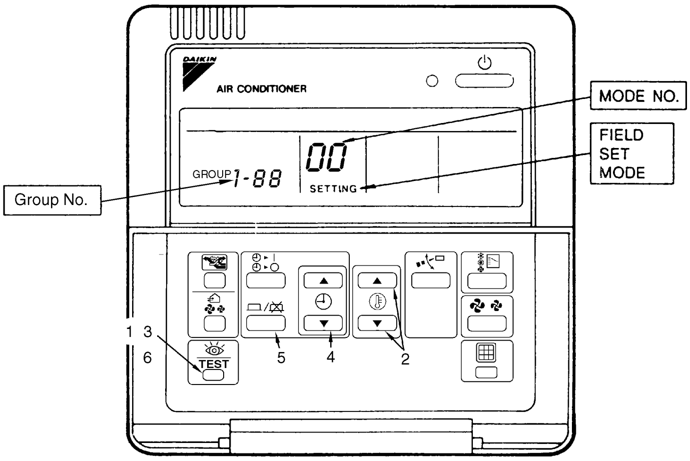
Set the Unit No. of the receiver and the wireless remote controller to be equal. If the settings differ, the signal from the remote controller cannot be transmitted.

1.6 Centralized Group No. Setting

- If carrying out centralized control with a central remote controller and unified ON/OFF controller, you have to set the group No. for each group by remote controller.
- To set the group No., first turn on the power supply of the central remote controller, unified ON/OFF controller and indoor unit.

Centralized Group No. Setting by Remote Controller

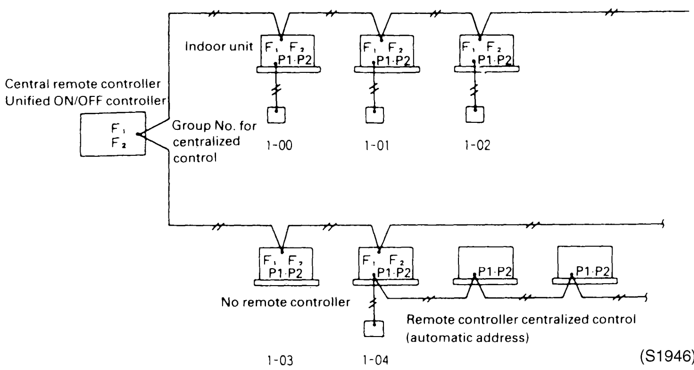
1. If the inspection/test button is pushed for 4 seconds or more when in the normal mode, operation enters the “field set mode.”
2. Using the temperature control buttons, set the mode No. to “00.”
3. Push the inspection/test button to inspect the group No. display.
4. Using the programming time button, set the group No. for each group. (Group No. rises in the order of 1-00, 1-01, ...1-15, 2-00 ...4-15, etc. The unified ON/OFF controller however displays only the range of group numbers selected by the switch for setting each address.)
5. Push the timer ON/OFF button and enter the selected group No.
6. Push the inspection/test button and return to the normal mode.



(S1095)

∗ If the address has to be set individually for each unit for power consumption counting, etc., set the mode No. to “30.”

Group No. Setting Example



(S1946)

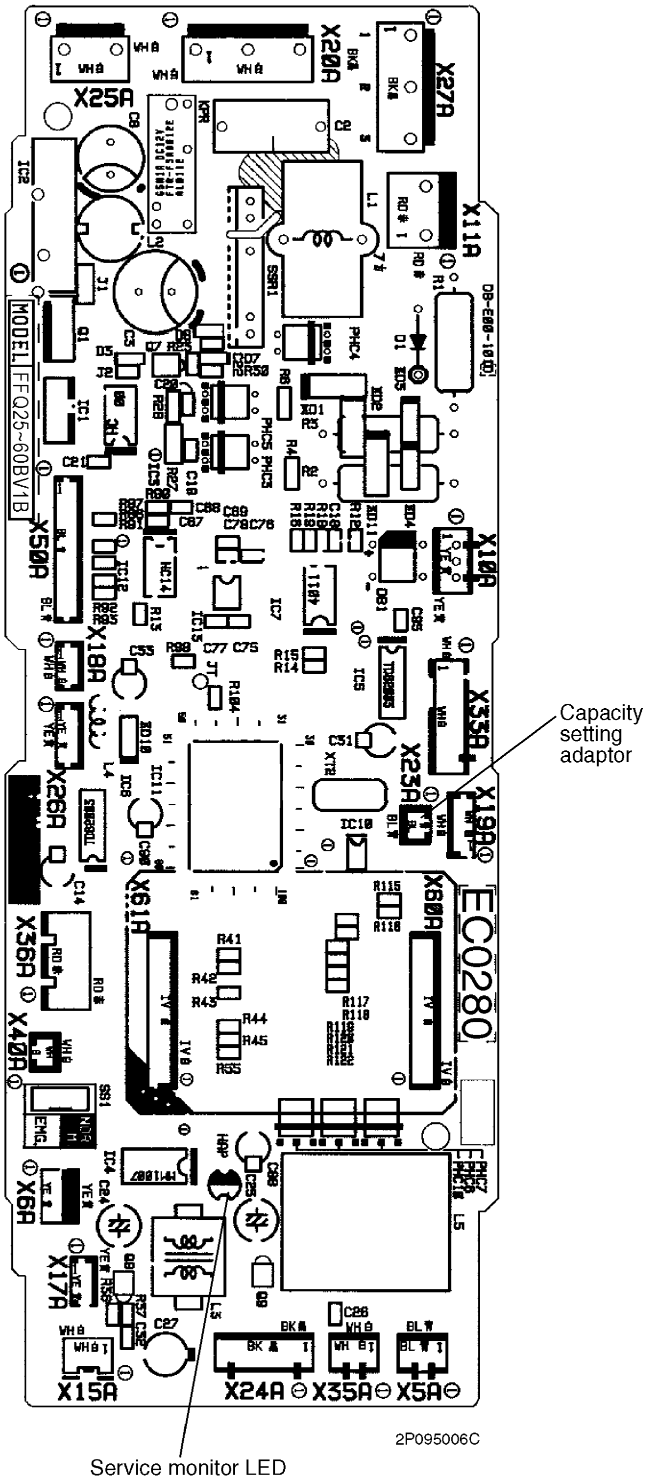
Note:

1. “F1,F2” indicates interface adaptor for SkyAir series.
2. If not using remote controllers, temporarily connect a remote controller to set the group No., set the group No. for centralized control, and then disconnect the controller.

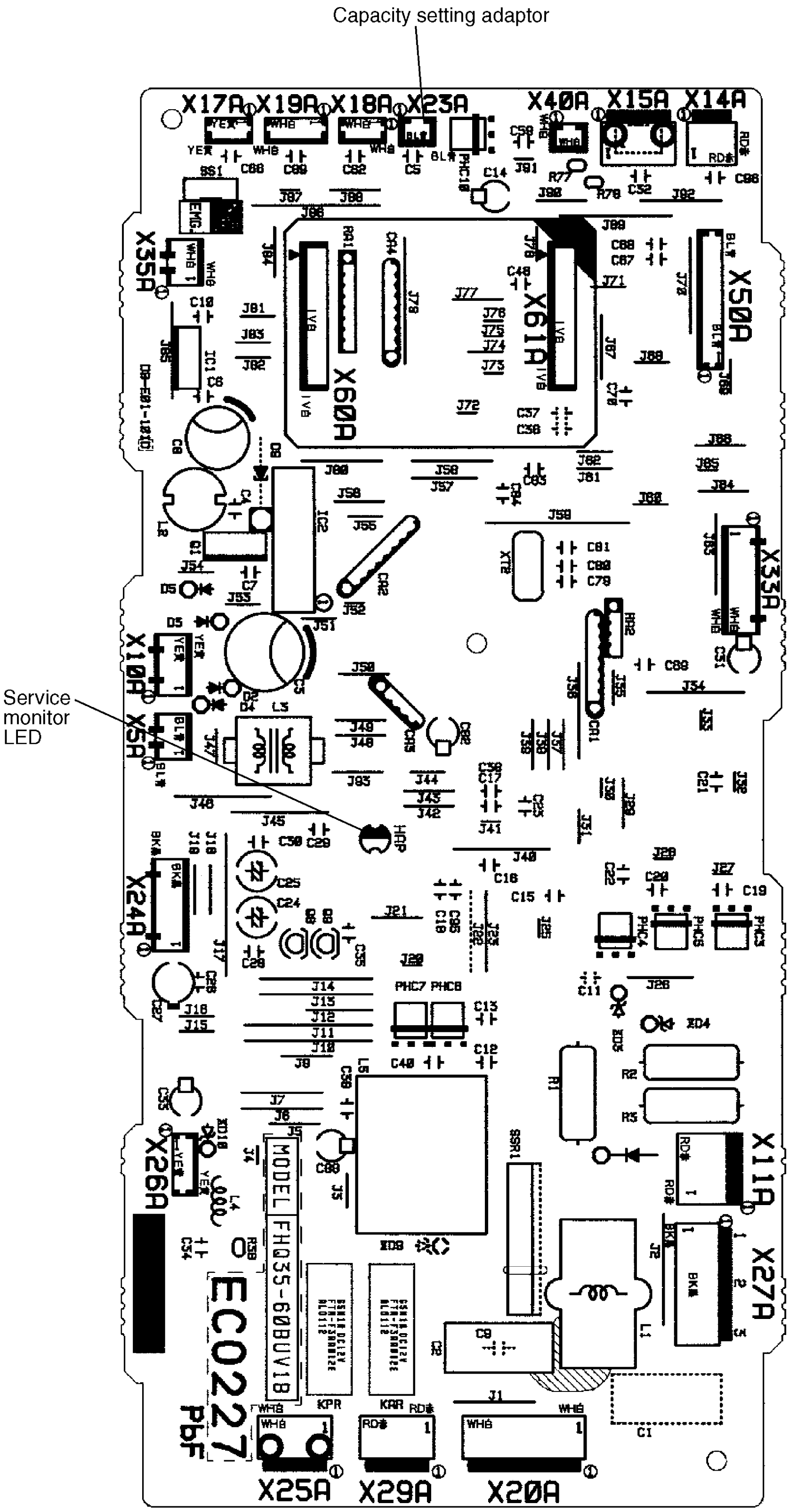
2. Settings Concerning Maintenance

2.1 Indoor Unit PCB

FFQ-B



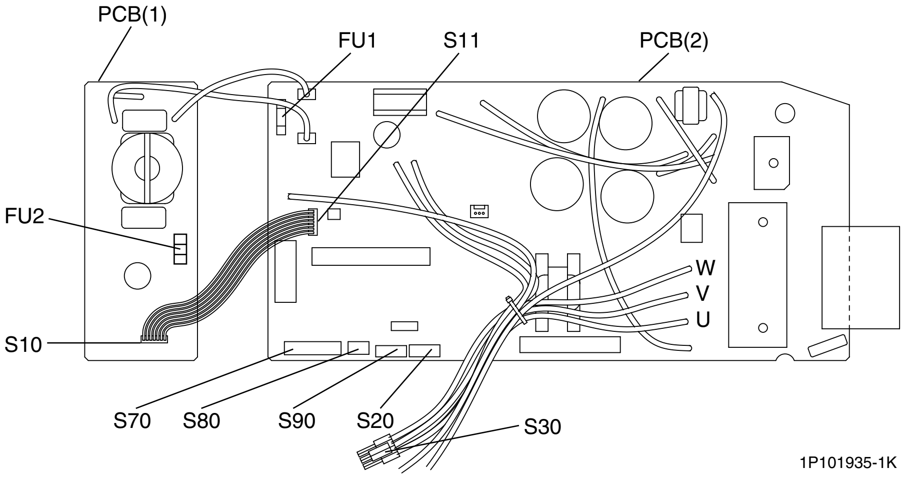
FHQ-B



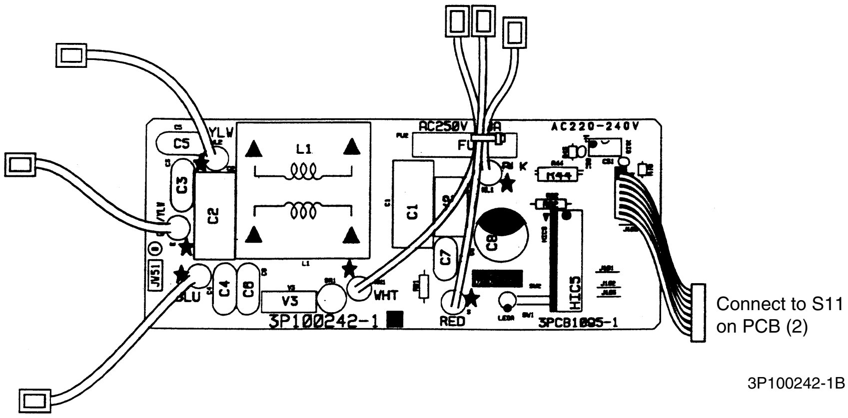
2P095007C

2.2 Outdoor Unit PCB (25/35 class)

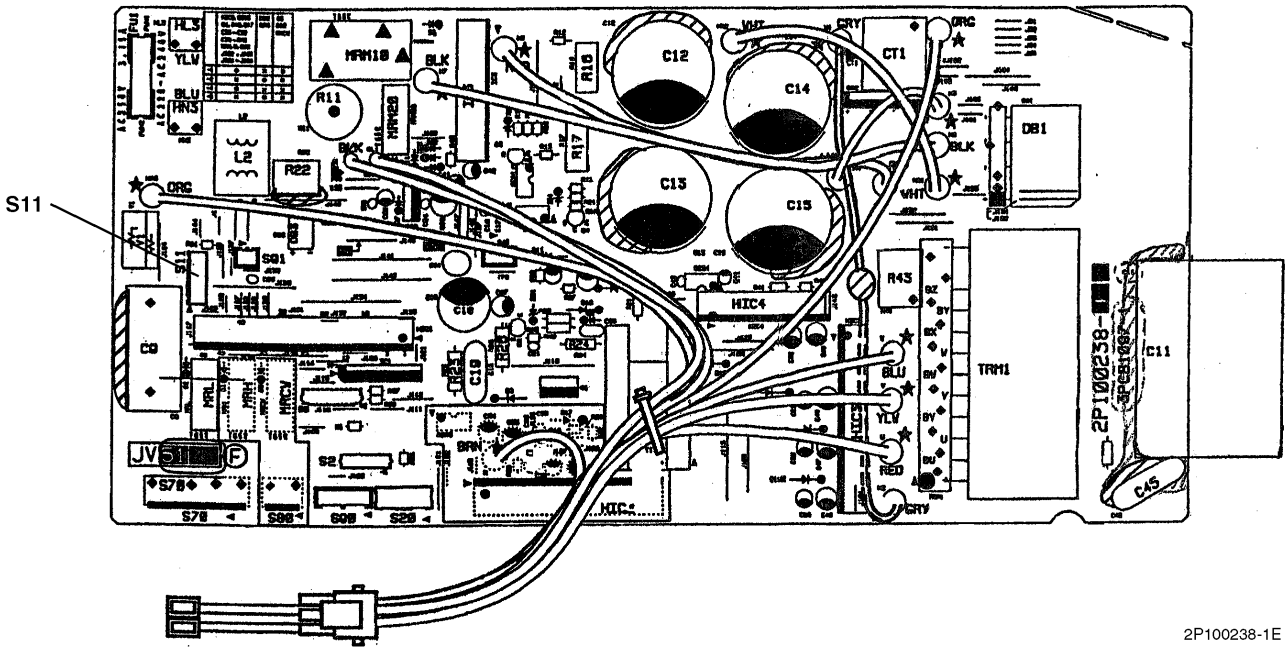
Outline of PCB



Detail of PCB (1)

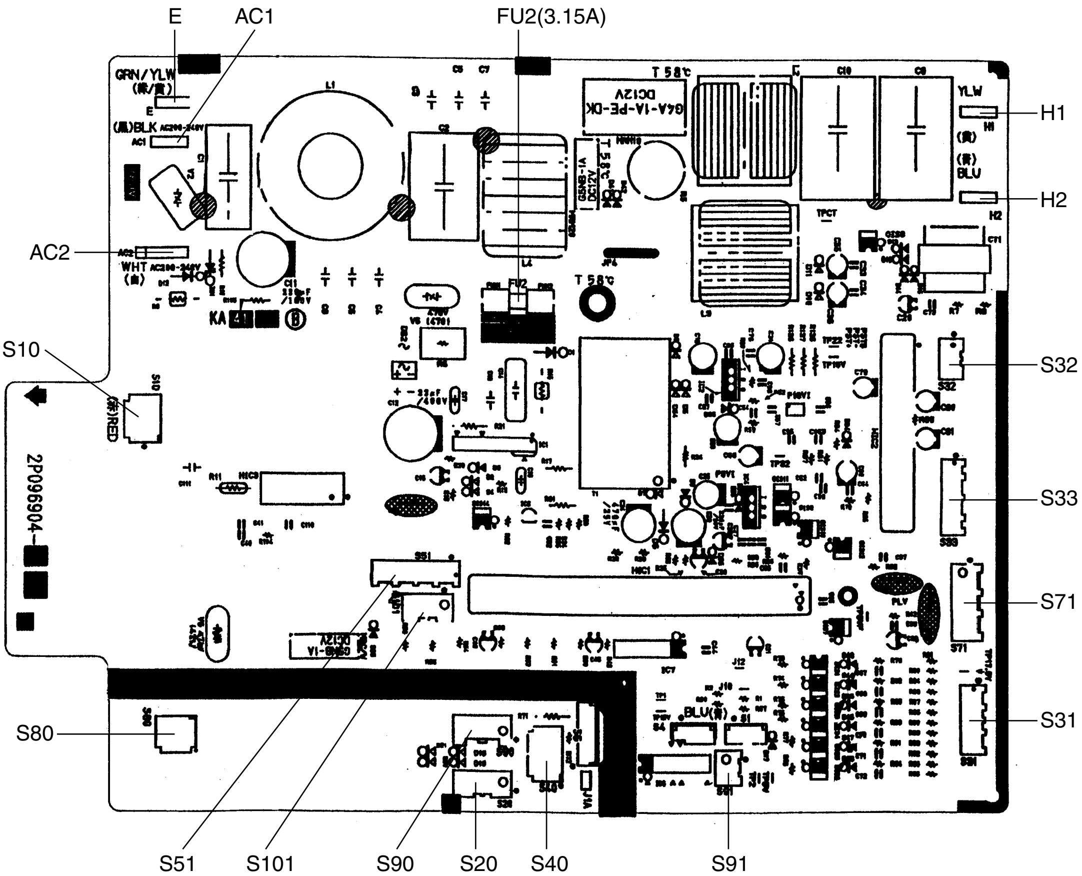


Detail of PCB (2)



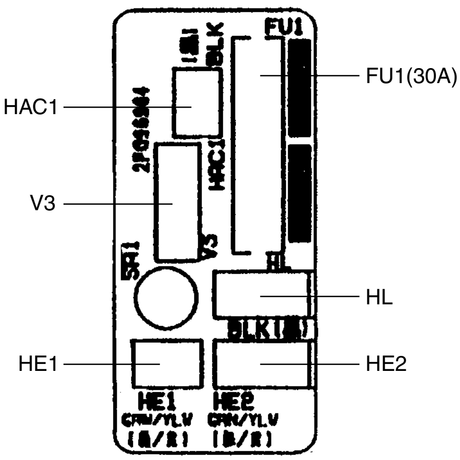
2.3 Outdoor Unit PCB (50/60 class)

PCB(1): Control PCB (outdoor unit)



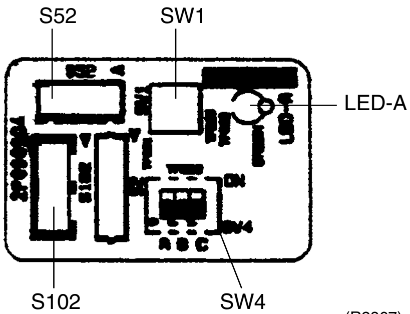
(R2865)

PCB(2): Power Supply PCB



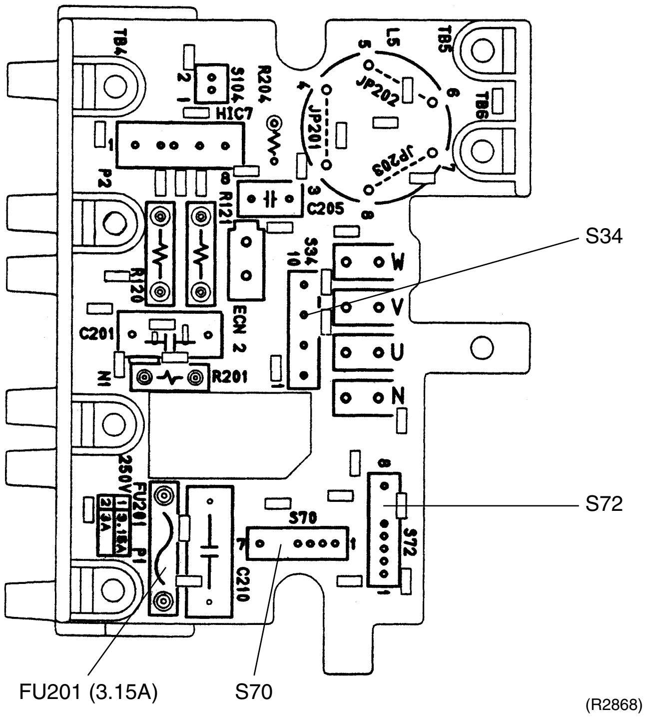
(R2866)

Service Monitor PCB



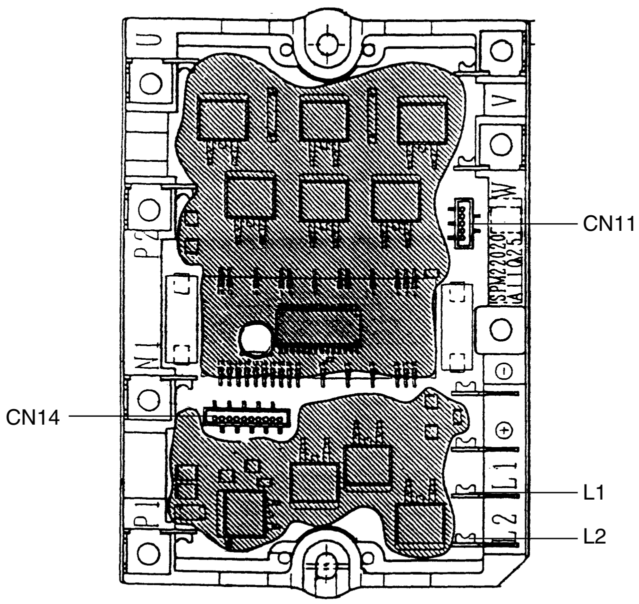
(R2867)

MID



(R2868)

SPM



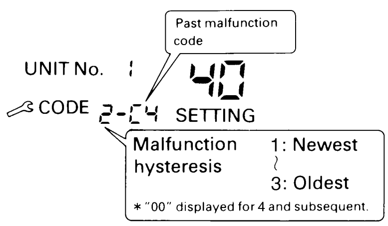
(R2869)

3. Maintenance Mode Setting

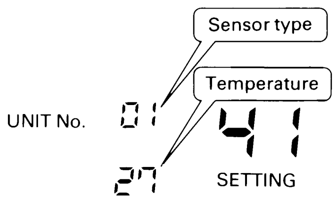
Procedure

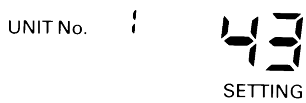
1. Enter the field set mode.
   Continue to push the inspection / test operation button for a minimum of 4 seconds.
2. Enter the maintenance mode.
   After having entered the field set mode, continue to push the inspection / test operation button for a minimum of 4 seconds.
3. Select the mode No.
   Set the desired mode No. with the up/down temperature setting button.
4. Select the unit No.
   Select the indoor unit No. set with the time mode START/STOP button.
5. Carry out the necessary settings for each mode. (Modes 41, 44 and 45)
   See the table below for details.
6. Enter the setting contents. (Modes 44 and 45)
   Enter by pushing the timer ON/OFF button.
7. Return to the normal operation mode.
   Tap the inspection / test operation button one time.

Table

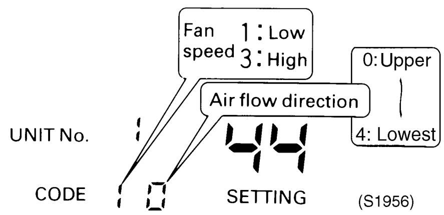
<table>
<tr><th>Mode No.</th><th>Function</th><th>Content and Operation Method</th><th>Example of Remote Controller Display</th></tr>
<tr><td>40</td><td>Malfunction Hysteresis</td><td>You can change the history with the programming time up-down button.</td><td>

(S1958)</td></tr>
<tr><td>41</td><td>Sensor Data Display</td><td>Select the display sensor with the programming time up-down button

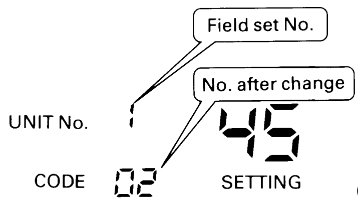
Display sensor
00 Remote control sensor
01 Suction (R1T)
02 Heat exchange(R2T)
03 Heat exchange(R3T)</td><td>

(S1954)</td></tr>
<tr><td>43</td><td>Forced Fan ON</td><td>Turns the fan ON for each unit individually.</td><td>

(S1955)</td></tr>
<tr><td>44</td><td>Individual Setting</td><td>Sets fan speed and air flow direction for each unit individually when using group control.

Settings are made using the "air flow direction adjust" and "fan speed adjust" buttons.</td><td>

(S1956)</td></tr>
<tr><td>45</td><td>Unit No. Change</td><td>Changes unit No.

Set the unit No. after changing with the programming time up-down button.</td><td>

(S1957)</td></tr>
</table>

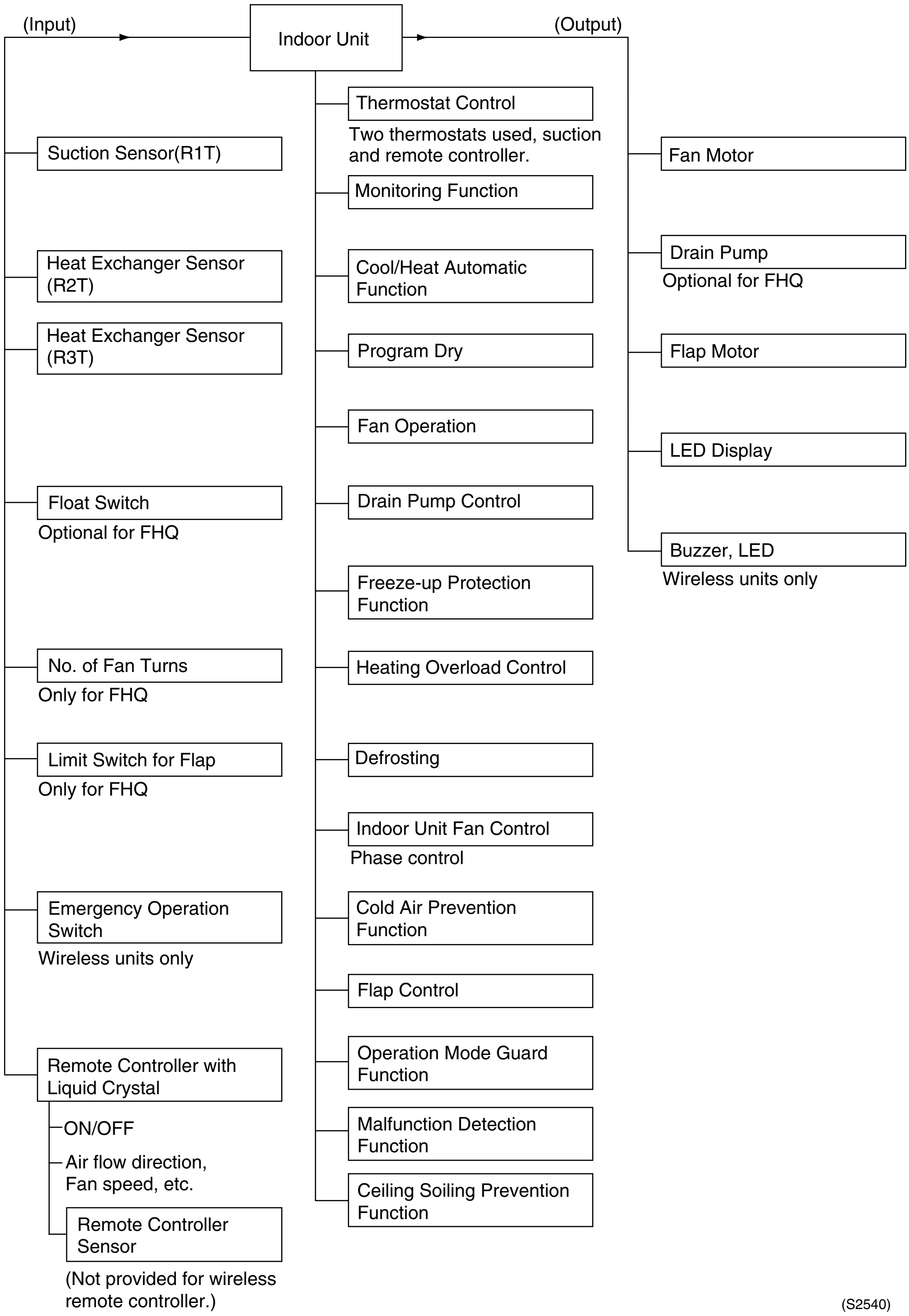
Operation is not reset by malfunction code reset for inspection.
(Cannot be reset because the count is updated each time a malfunction occurs.)

Part 7
Function and Control

1. Indoor Unit

1.1 Function Outline

FFQ-B, FHQ-B



1.2 Electric Function Parts

FFQ – BV1B

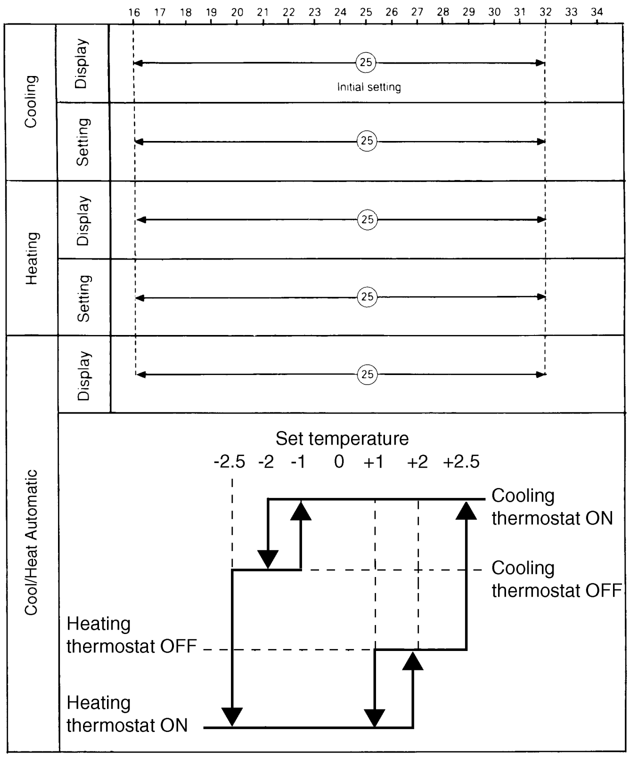
		Capacity 25	35	50	60	Remarks
Wired remote controller		BRC1C517 (BRC1C61 for Australia)				Optional Accessory
Wireless remote controller	Heat pump	BRC7E530W				Optional Accessory
	Cooling only	BRC7E531W				
Electronic control unit		[2P095006-2] EC0280				
Fan motor		[3P104408-1] 4P 55W				
Fan motor capacitor		4.0MF 440VAC				
Swing flap motor		MP35HCA [3P080801-1]				
Float switch		[4P104167-1] FS-0211				
Drain pump		[3P103929-1] PLD-12230 DM-17				

FHQ – BUV1B

		Capacity 35	50	60	Remarks
Wired remote controller		BRC1C517			Optional Accessory
Wireless remote controller	Heat pump	BRC7E63W			Optional Accessory
	Cooling only	BRC7E66			
Electronic Control Unit		[2P095007-1] EC0227			
Fan Motor		[3PN04213-1] 4P 62W			
Fan Motor Capacitor		3.0MF 400V			
Swing Motor		[3PN04208-1]			

1.3 Function Details

Thermostat Control

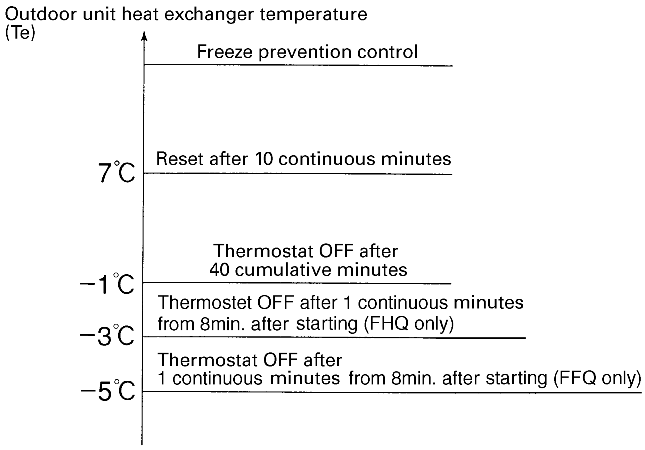


(S1962)

Freeze-up Protection Control

The thermostat turns OFF under the following temperature conditions to prevent freezing of the indoor unit heat exchanger.

- The motorized valve is controlled to maintain the indoor unit heat exchanger temperature (Te) above 0°C.
- The outdoor unit fan speed is reduced to prevent freeze-up protection control from activating during cooling operation under low outside air temperature. (For details, see the section on cooling operation under low outside air temperature.)

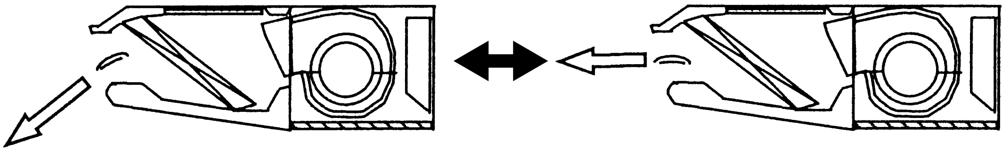


(S1116)

Condensation Avoidance Control (FHQ Only)

Continuous 30 minutes operation of cooling

One hour drying



After continuous 30 minutes of operation with downward horizontal blade position, change the blade position to level, and after one hour, the unit operation can be reset.

The unit operation can be reset with changing operation mode into "heating" , changing air flow direction or turning "ON" or "OFF" the unit operation.

(S1117)

Note:

1. Regardless of thermostat ON or OFF, the control can be functioned with the operation mode of " cooling (automatic cooling) " or " programmed drying ".
2. The function is not provided for models other than FHQ models.

Outdoor Unit Identification Function

If the indoor unit is for both a heat pump and cooling only type, this function differentiates whether the outdoor unit is functioning as a heat pump or cooling only unit, and automatically decides the which operation modes can be set.

■ Operation modes which can be set

Heat pump : Fan / cool / dry / auto / heat

Drain Pump Control FFQ and FHQ (OPTION)

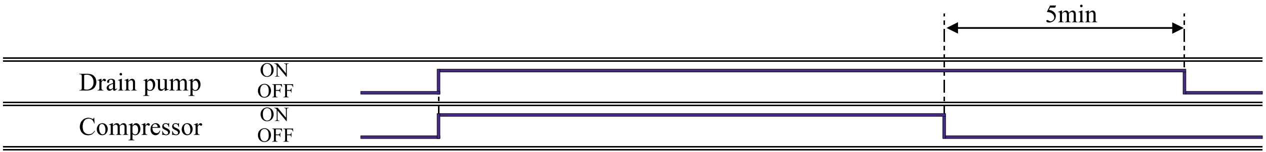
Time A shown in below diagram
(Period from occurrence of drain water level abnormality to compressor stop)

	A [sec]
FHQ	10
Other than FHQ	0

1 Cooling and dry operation

1-1 Basic operation

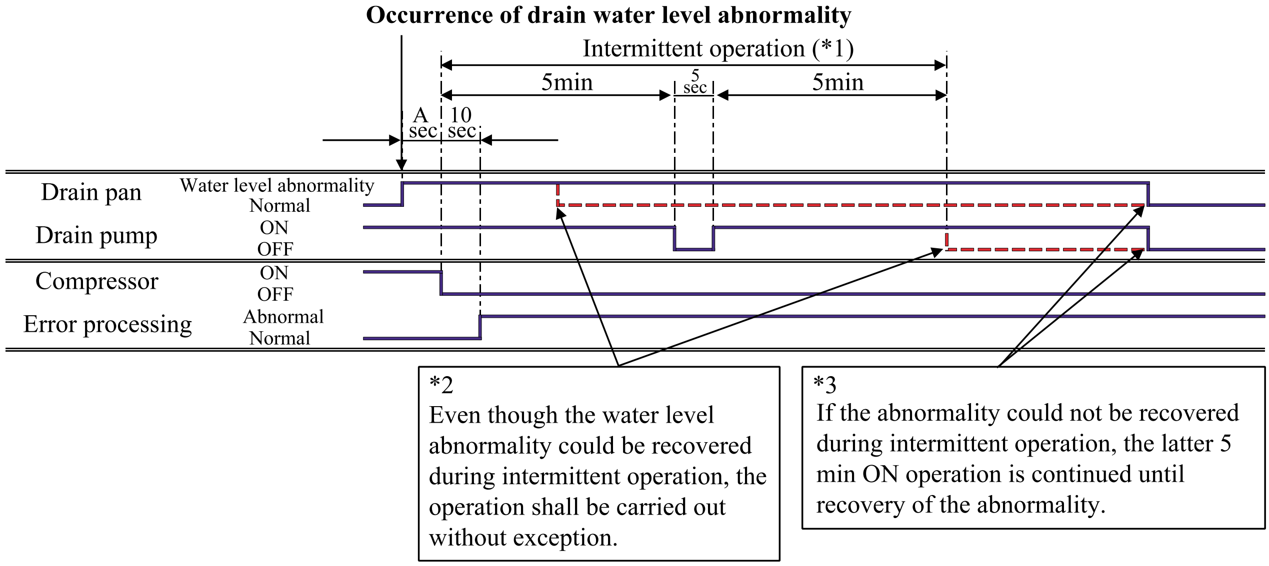
For cooling or dry operation mode, drain pump is turned ON on compressor starting while turned OFF when residual operation for 5 minutes is complete after compressor stopped.



1-2 Operations when an occurrence of water level abnormality

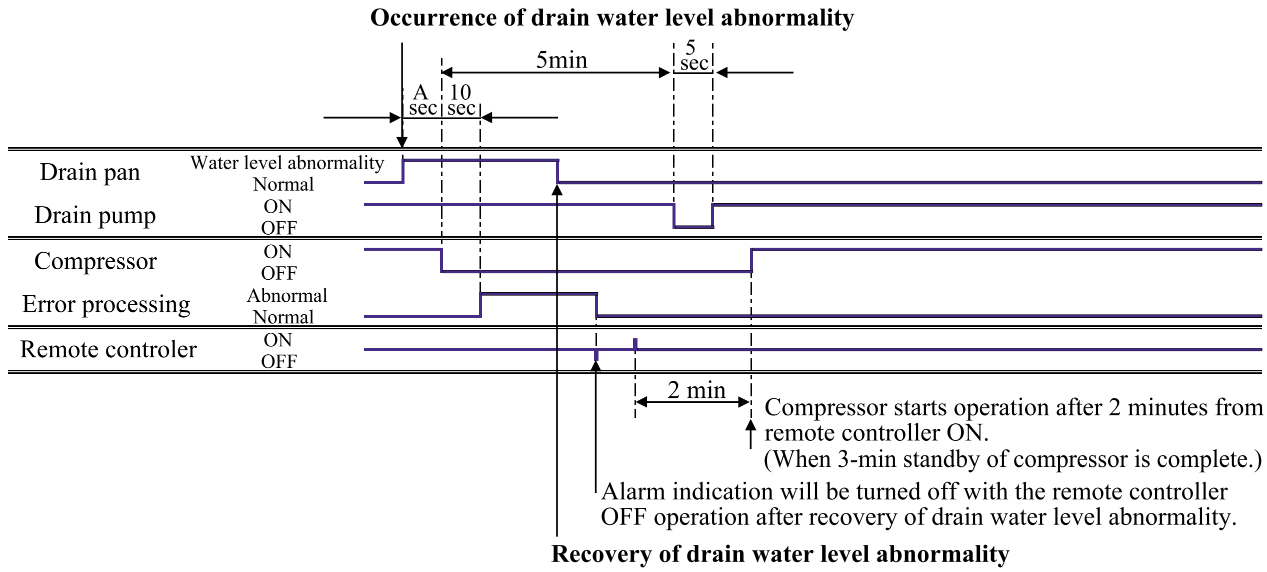
1-2-a) Behavior between occurrence and recovery of water level abnormality

After compressor stops due to water level abnormality, drain pump is operated intermittently, i.e. 5 min ON, 5 sec OFF and 5 min ON. (*1) The intermittent operation is executed regardless of recovery of water level abnormality during the intermittent operation. (*2) When the water level abnormality can not be recovered, the latter 5 min ON operation is continued until recovery of the abnormality. (*3)



1-2-b) Behavior when the unit restarts by remote controller after the water level abnormality is recovered

Water level abnormality shall be cancelled simultaneausly when the unit is turned off with remote controller after recovery of the water level abnormality. When the unit is turned on with remote controller thereafter, compressor starts operation 2 minutes later from the remote controller ON. (Below diagram shows an example of the case that the water level abnormality is recovered during the former 5 min intermittent operation.)



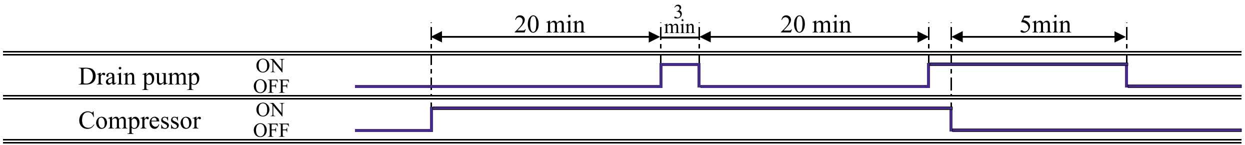
Note : (1 On the whole of cooling and dry operation)
Recovery operation for drain water level abnormality does not activate when the water level can be returned normal within A + 10 seconds.

2. Heating

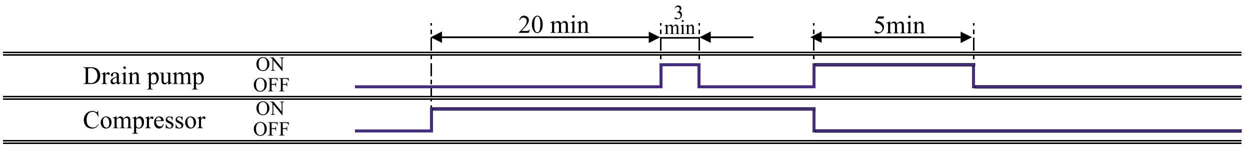
2-1 Basic operation

In heating operation of the unit equipped with a humidifier, when "Interlocking of drain pump / humidifier" (15(25)-3) is set to "yes" (02), the drain pump operates 20-min OFF and 3-min ON repeatedly during compressor is in operation.
After compressor stops, residual operation will be conducted for 5 minutes.

2-1-1 When compressor stops during drain pump ON after compressor operation started



2-1-2 When compressor stops during drain pump OFF after compressor operation started



2-2 Operations when an occurrence of drain water level abnormality

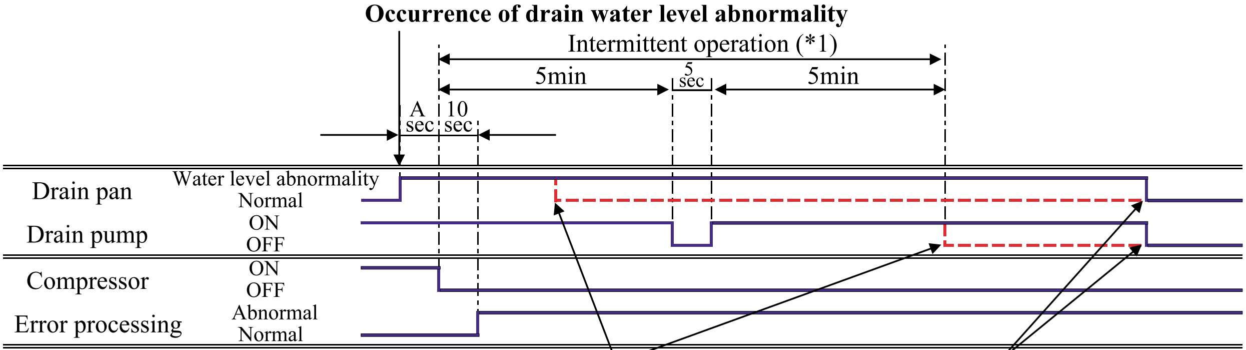
2-2-a) Behavior between occurrence and recovery of drain water level abnormality

After compressor stops due to water level abnormality, drain pump is operated intermittently, i.e. 5 min ON, 5 sec OFF and 5 min ON. (*1) The intermittent operation is executed regardless of recovery of abn. Water level during the intermittent operation. (*2) When the abn. water level can not be recovered, the latter 5 min ON operation is continued until recovery of the abnormality. (*3) On above diagram, the system operation in the event of a water level abnormality occurrence differs between the drain pump ON and OFF. The details are as follows.

2-2-a)-1 When a water level abnormality occurs during drain pump ON

1 The same operation as 1-2-a) "Behavior between occurrence and recovery of drain water level abnormality" in the mode of cooling or dry.

Occurrence of drain water level abnormality



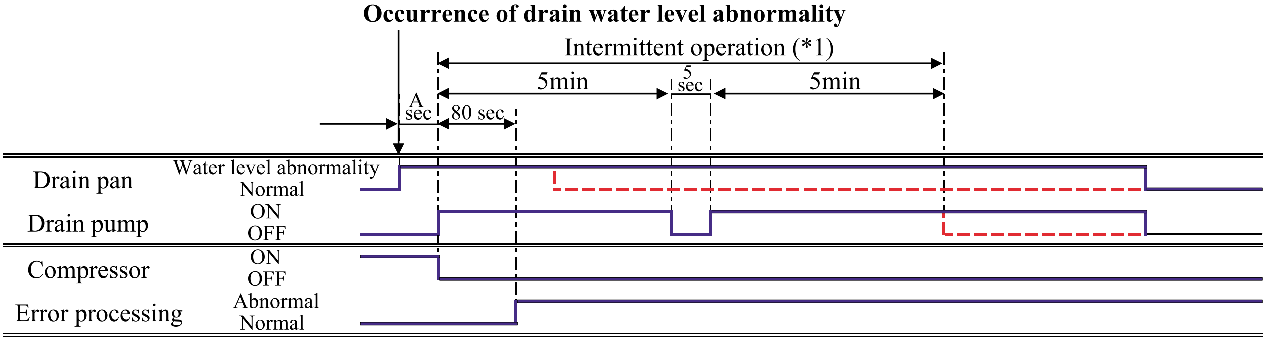
*2
Even though the water level abnormality could be recovered during intermittent operation, the operation shall be carried out without exception.

*3
If the abnormality could not be recovered during intermittent operation, the latter 5 min ON operation is continued until recovery of the abnormality.

Note : ((2-2-a)-1 When a water level abnormality occurs during drain pump ON)
Recovery operation for drain water level abnormality does not activate when the water level can be returned normal within A + 10 seconds.

2-2-a)-2 When a water level abnormality occurs during drain pump OFF

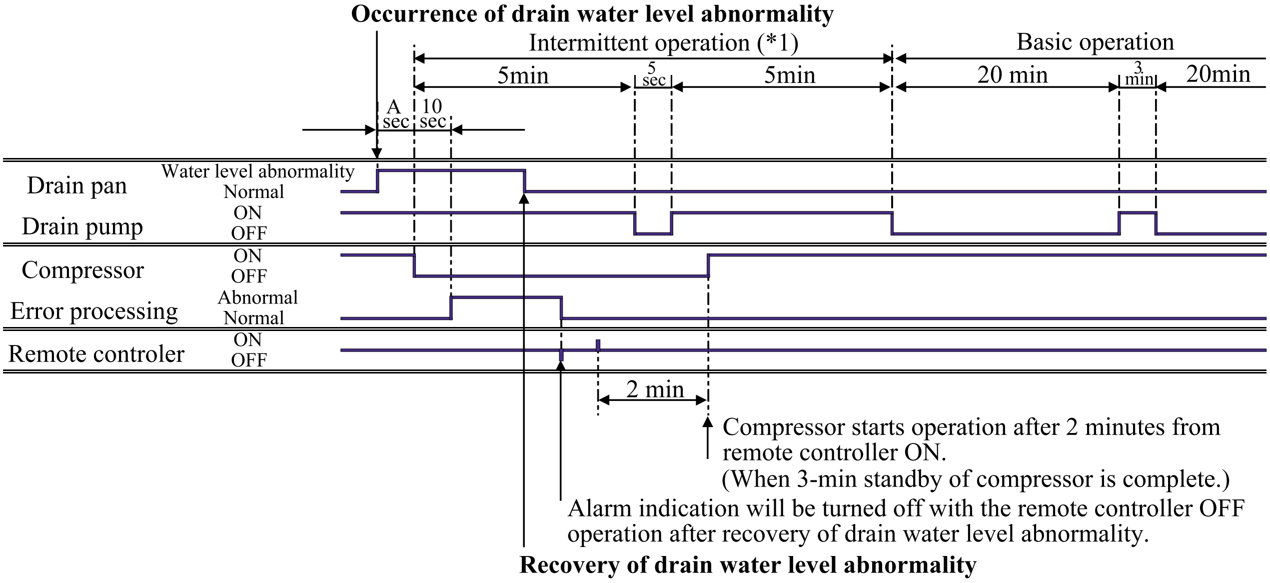
The abnormality is determined when 80 seconds elapse from compressor stop. Other than above, behavior is same as 2-2-a).



Note : ((2-2-a)-2 When a water level abnormality occurs during drain pump OFF)
Recovery operation for drain water level abnormality does not activate when the water level can be returned normal within A + 80 seconds.

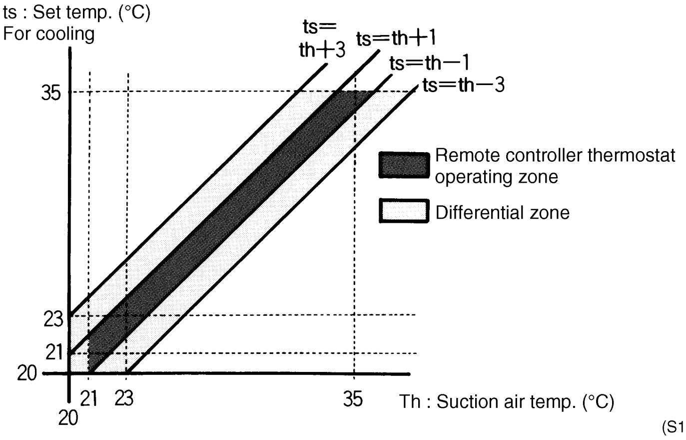
2-2-b) Behavior when the unit restarts by remote controller after the water level abnormality is recovered

Abnormal water level shall be cancelled simultaneausly when the unit is turned off with remote controller after recovery of abnormal water level. When the unit is turned on with remote controller thereafter, compressor starts operation 2 minutes later from the remote controller ON. (Below diagram shows an example of the case that the water level abnormality is recovered during the former 5 min intermittent operation after the abnormality occurred during drain pump ON.)

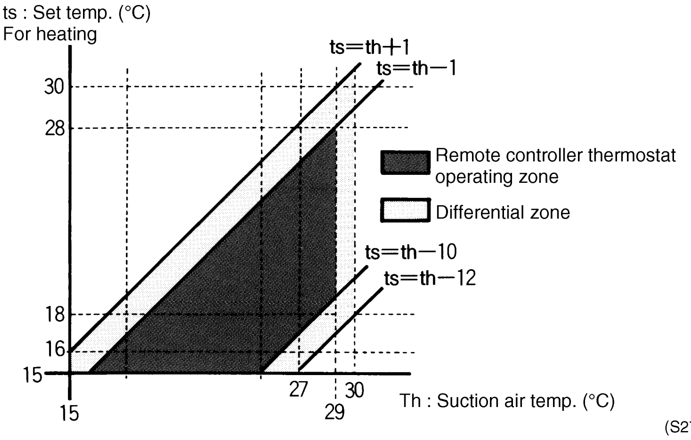


Using Conditions for Remote Controller Thermostat

(Applicable models: FHQ & FFQ only)
Remote controller thermostat is equipped only in wired remote controller.
Even when “ use remote controller thermostat ” is selected in service mode, the remote controller thermostat may not be used.
< Conditions not to use >
1. When the remote controller thermostat malfunctions.
2. When the one remote controller group control is applied.
   (Excluding simultaneous ON/OFF operation)
3. When conditions relating set temperature with remote controller and suction air temperature are out of the operating zone of remote controller thermostat shown in below diagram.
   (Excluding when automatic operation mode is selected. Whenever operation is in the automatic mode, remote controller thermostat can be used.)



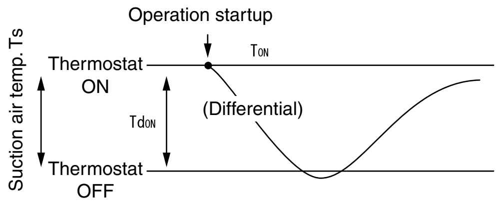
(S1118)



(S2746)

Program Dry Operation Function

The points of thermostat ON or OFF are determined according to the suction air temperature at the startup of unit operation.
The set temperature and flow rate are not displayed on remote controller.



(S1120)

1. Thermostat ON point (T_{ON}) according to suction air temp. (T_S).

Suction air temp	T_{ON}(°C)	Td_{ON}(°C)
Ts>24°C 24°C≥ Ts>16°C 16°C≥ Ts	Ts Ts 16°C	1.5 1.0 1.0

2. Operation condition

Compressor condition	ON	OFF
Setting of flow rate Angle of flap Air flow direction set with remote controller	L operation Set angle Set angle	OFF Set angle Set angle

Auto-restart Function

If there is a power cut when the unit is operating, it will automatically resume the same operating mode when the power is restored.

Caution

When performing maintenance and the power supply is to be shut off, be sure to turn the remote controller's ON/OFF switch OFF first.

Shutting the power supply switch off while the ON/OFF switch is still ON is dangerous because the "power failure automatic reset function" will cause the indoor fan to start turning immediately, or the outdoor unit fan to automatically start turning three minutes after the power supply is turned back on.

Fan and flap operations

			Fan	Flap FHQ & FFQ	Remote Controller Indication
Heating Operation	Hot Start from Defrost	In Swing Operation	OFF	Horizontal	Swing
		In Airflow Direction Setting	OFF	Horizontal	Set Position
	Defrost	In Swing Operation	OFF	Horizontal	Swing
		In Airflow Direction Setting	OFF	Horizontal	Set Position
	Thermostat OFF	In Swing Operation	LL	Horizontal	Swing
		In Airflow Direction Setting	LL	Horizontal	Set Position
	Hot Start from Thermostat OFF (Cold Air Prevention)	In Swing Operation	LL	Horizontal	Swing
		In Airflow Direction Setting	LL	Horizontal	Set Position
	Stop (Error)	In Swing Operation	OFF	Horizontal	—
		In Airflow Direction Setting	OFF	Horizontal	—
	Overload Thermostat OFF	In Swing Operation	LL	Horizontal	Swing
		In Airflow Direction Setting	LL	Horizontal	Set Position
Cooling Operation	Thermostat ON in Program Dry Mode	In Swing Operation	L	Swing	Swing
		In Airflow Direction Setting	L	Setting	Set Position
	Thermostat OFF in Program Dry Mode	In Swing Operation	OFF	Swing	Swing
		In Airflow Direction Setting	OFF	Setting	Set Position
	Cooling Thermostat OFF	In Swing Operation	Setting	Swing	Swing
		In Airflow Direction Setting	Setting	Setting	Set Position
	Stop (Error)	In Swing Operation	OFF	Horizontal	—
		In Airflow Direction Setting	OFF	Setting	—
	Freeze Prevention in Program Dry Mode (Including Cooling Operation)	In Swing Operation	L ★1	Swing	Swing
		In Airflow Direction Setting	L ★1	Setting	Set Position

★1: L or LL operation for FFQ-BV1 only.
(L for 4way outlet and LL for 2way or 3way outlet)

Mode Conflict

[Overview]
While the indoor unit for another room and the outdoor unit are operating, when the indoor unit for the own room is activated, the operation mode which can be selected in the own room has some restrictions as mentioned below.

i) In case an priority for operation mode selection is given to the own room by setting the dip switch of outdoor unit;
→The own room can be operated in any mode.

ii) In case an priority for operation mode selection is not given to the own room by setting the dip switch of outdoor unit;
→The unit can be operated as follows:

Outdoor unit operation mode when an operation mode for the own room is selected. (The outdoor unit is operated in the mode as mentioned below.)	Operation mode selected in the own room			
	Cooling or Automatic cooling (Note)	Dry	Blowing	Heating or Automatic heating (Note)
Cooling	○	○	○	×
Heating	×	×	×	○
Blowing	○	○	○	○*

○:Operational ∗:The unit for another room is switched into non-operational condition.
× : Non-operational

* Operation of the indoor unit for the own room during non-operation.

- Fan = OFF
- Louver = becomes horizontal position.
- ON LED on the remote controller = blinks.
- Indication of "under central control" on the remote controller = displayed.

Note): During automatic operation, at the time of changing operation mode to Automatic cooling or Automatic heating, the unit is operated as the table shown above.

Non-operating Room Dew Prevention Fan Control

[Overview]
After operating an indoor unit for the own room in the cooling mode or dry mode, stop the unit using the remote controller. Under the condition, when an unit for another room is started operation in the heating mode, the fan in the own room may rotate in the LL mode even though the remote controller of the fan is in stop mode.

[Purpose]
On multiple units, when units of other rooms start heating operation after unit of the own room starts cooling or dry operation, high-temperature refrigerant flows to the unit of the own room, thus resulting in evaporation of condensate retained in heat exchanger or drain pan. At this time, if casing temperature is below dew point, dew gets condensed. In order to prevent the dew condensation, this control is used to operate the fan for a specified period of time, thus discharging the moisture from the indoor unit.

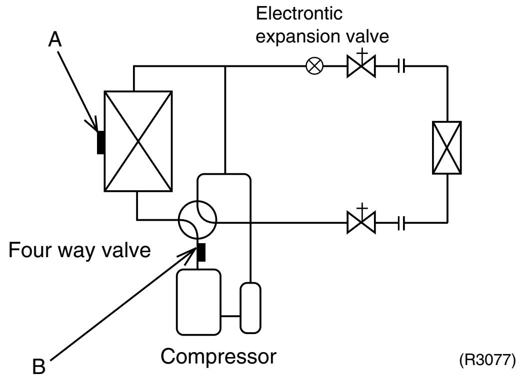
[Outline]
- The fan rotates in LL mode even though the unit is turned off by the use of remote controller.
- This control can be reset only by conducting the cooling or dry operation of the unit of the own room with thermostat ON.
- This control is enabled within 8 hours after the “Outdoor unit operation mode” has changed from cooling or dry operation to heating operation.
- During the 8 hours, this control is activated for a cumulative period of 40 minutes.

■ Emergency operation is not conducted.
The outdoor unit has no emergency function. Therefore, in the case of connecting to Split or Split Multi outdoor unit, only the fan operation is conducted even though the dip switch of indoor unit is set to EMERGENCY.

2. Outdoor Unit (25/35 class)

2.1 Function of Thermistor

2.1.1 Heat Pump Model



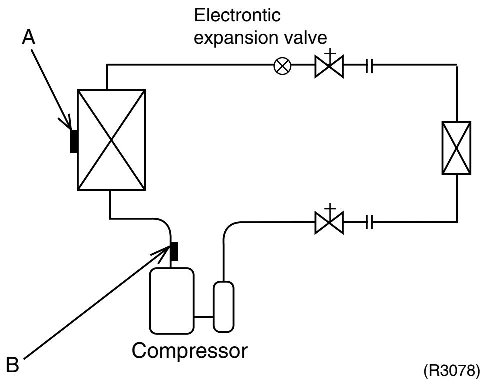
A Outdoor Heat Exchanger Thermistor (DCB)

1. The outdoor heat exchanger thermistor is used for controlling target discharge temperature.
   Set a target discharge temperature depending on the outdoor and indoor heat exchanger temperature.
   Control the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. The outdoor heat exchanger thermistor is used for detecting the discharge thermistor disconnected when cooling.
   When the temperature of the discharge piping is lower than the temperature of outdoor heat exchanger, a disconnected discharge thermistor can be detected.
3. The outdoor heat exchanger thermistor is used for high pressure protection during cooling operation.

B Discharge Pipe Thermistor (DOT)

1. The discharge pipe thermistor is used to control the discharge pipe.
   If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation must be halted.
2. The discharge pipe thermistor is used for detecting the discharge thermistor disconnected.

2.1.2 Cooling Only Model



A **Outdoor Heat Exchanger Thermistor (DCB)**

1. The outdoor heat exchanger thermistor is used for controlling target discharge temperature.
   Set a target discharge temperature depending on the outdoor and indoor heat exchanger temperature.
   Control the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. When cooling: an outdoor heat exchanger thermistor is used for detecting the discharge thermistor disconnected.
3. When the temperature of the discharge piping is lower than the temperature of outdoor heat exchanger, a disconnected discharge thermistor can be detected.
4. The outdoor heat exchanger thermistor is used for high pressure protection during cooling operation.

B **Discharge Pipe Thermistor (DOT)**

1. The discharge pipe thermistor is used to control the discharge pipe.
2. If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation must be halted.
3. The discharge pipe thermistor is used for detecting the discharge thermistor disconnected.

2.2 Mode Hierarchy

Outline

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

Detail

1. For heat pump model
   There are following modes; stop, cooling (includes drying), heating (include defrosting)

- Air conditioner control mode
  - Forced operating mode
    - Forced cooling (for Pump Down Operation)
  - Normal operating mode
    - Cooling
    - Heating
    - Defrosting
    - Stop mode (except for cooling/heating modes by indoor command)
      - Preheat operation
      - During C (capacitor) is discharging
      - Stop

(R2829)

2. For cooling only model
   There are following models; stop and cooling (including drying).

- Air conditioner control mode
  - Forced operating mode
    - Forced cooling (for Pump Down Operation)
  - Normal operating mode
    - Cooling
    - Stop mode (except for cooling modes by indoor command)
      - Preheat operation
      - During C (capacitor) is discharging
      - Stop

(R2830)

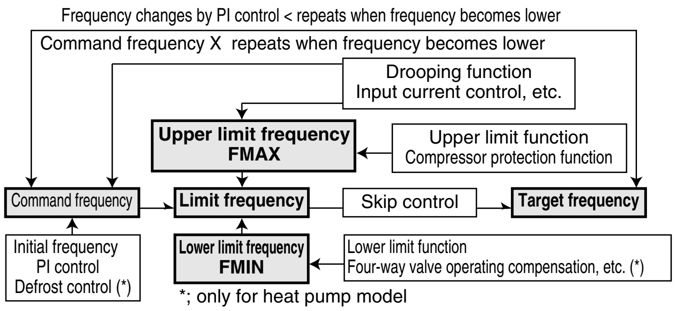
Note: Unless specified otherwise, an indoor dry operation command must be regarded as cooling operation.

2.3 Frequency Control

Outline

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

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



(R2831)

Detail

How to Determine Frequency

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

For Heat Pump Model

1. Determine command frequency
- Command frequency will be determined in the following order of priority.

1.1 Limiting frequency by drooping function
- Input current, discharge pipes, low Hz high pressure limit, peak cutting, freeze-up protection, dew prevention, fin thermistor temperature.

1.2 Limiting defrost control time
1.3 Forced cooling
1.4 Indoor frequency command

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

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

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

For Cooling Only Model

1. Determine command frequency
- Command frequency will be determined in the following order of priority.

1.1 Limiting frequency by drooping function
Input current, discharge pipes, freeze-up protection, dew prevention, fin thermistor temperature.
1.2 Indoor frequency command

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

3. Determine lower limit frequency
- Set a maximum value as an lower limit frequency among the frequency lower limits of the following functions:
  Pressure difference upkeep.
4. Determine prohibited frequency
- There is a certain prohibited frequency such as a power supply frequency.

Indoor Frequency Command (∆D signal)
The difference between a room temperature and the temperature set by the remote controller will be taken as the "∆D signal" and is used for frequency command.

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

*Th OFF = Thermostat OFF

Frequency Initial Setting
- Outline

When starting the compressor, or when conditions are varied due to the change of the room, the frequency must be initialized according to the ∆D value of the indoor unit and the Q value of the indoor unit.
Q value: Indoor unit output determined from indoor unit volume, air flow rate and other factors.

PI Control (Determine Frequency Up / Down by ∆D Signal)
1. P control
   Calculate ∆D value in each sampling time (20 seconds), and adjust the frequency according to its difference from the frequency previously calculated.
2. I control
   If the operating frequency is not change more than a certain fixed time, adjust the frequency up and down according to the ∆D value, obtaining the fixed ∆D value.
   When the ∆D value is small...lower the frequency.
   When the ∆D value is large...increase the frequency.
3. Limit of frequency variation width
   When the difference between input current and input current drooping value is less than 1.5 A, the frequency increase width must be limited.
4. Frequency management when other controls are functioning
- When frequency is drooping;
  Frequency management is carried out only when the frequency droops.
- For limiting lower limit
  Frequency management is carried out only when the frequency rises.
5. Upper and lower limit of frequency by PI control
   The frequency upper and lower limits are set depending on indoor unit.
   When low noise commands come from the indoor unit or when outdoor unit low noise or quiet commands come from indoor unit, the upper limit frequency must be lowered than the usual setting.

2.4 Controls at Mode Changing / Start-up

2.4.1 Preheating Operation

Outline

Operate the inverter in the open phase operation with the conditions including the preheating command (only for heat pump model) from the indoor, the outdoor air temperature and discharge pipe temperature.

Detail

Preheating ON Condition

- When outdoor air temperature is below 10.5°C and discharge pipe temperature is below 10.5°C, inverter in open phase operation starts.

OFF Condition

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

2.4.2 Four Way Valve Switching

Outline of Heating Operation

Heat Pump Only

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

Detail

The OFF delay of four way valve
Energize the coil for 150 sec after unit operation is stopped.

2.4.3 Four Way Valve Operation Compensation

Outline

Heat Pump Only

At the beginning of the operation as the four way valve is switched, acquire the differential pressure required for activating the four way valve by having output the operating frequency, which is more than a certain fixed frequency, for a certain fixed time.

Detail

Staring Conditions

1. When starting compressor for cooling.
2. When the operating mode changes from the previous time.
3. When starting compressor for rushing defrosting or resetting.
4. When starting compressor for the first time after the reset with the power is ON.
   Set the lower limit frequency to 66 (model by model) Hz for 45 seconds with the OR conditions with 1 through 4 above.

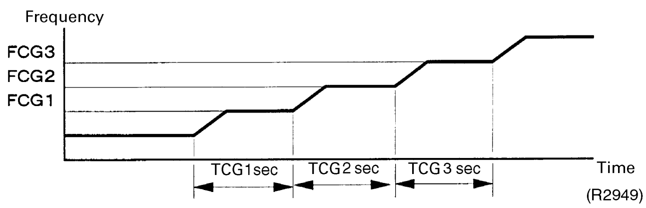
2.4.4 3 Minutes Stand-by

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

2.4.5 Compressor Protection Function

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

FCG 3	94
FCG 2	96
FCG 1	50
TCG 1	240
TCG 2	240
TCG 3	120



(R2949)

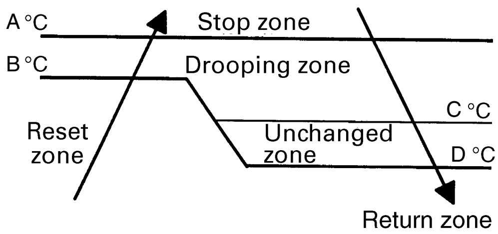
2.5 Discharge Pipe Temperature Control

Outline

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

Detail

Divide the Zone



A	110
B	103
C	102
D	101

(R2836)

Management within the Zones

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

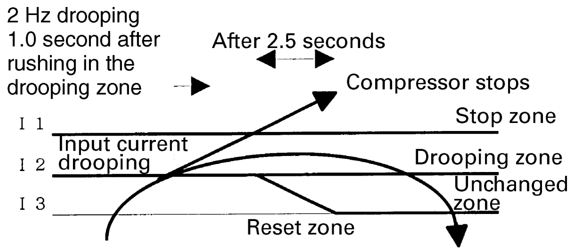
2.6 Input Current Control

Outline

Detect an input current by the CT during the compressor is running, and set the frequency upper limit from such input current.
In case of heat pump model, this control is the upper limit control function of the frequency which takes priority of the lower limit of four way valve activating compensation.

Detail

The frequency control will be made within the following zones.



(R1378)

When a “stop current” continues for 2.5 seconds after rushing on the stop zone, the compressor operation stops.
If a “drooping current” is continues for 1.0 second after rushing on the drooping zone, the frequency will be 2 Hz drooping.
Repeating the above drooping continues until the current rushes on the drooping zone without change.
In the unchanged zone, the frequency limit will remain.
In the return / reset zone, the frequency limit will be cancelled.

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

1. In case the operation mode is cooling
- The current droops when outdoor air temperature becomes higher than a certain level (model by model).

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

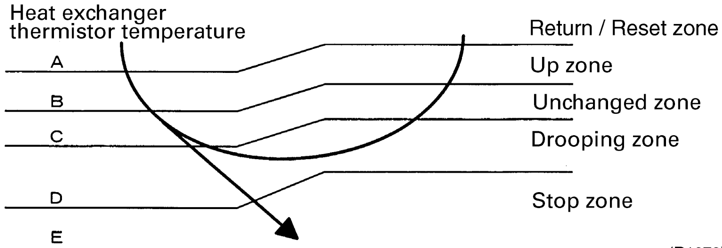
2.7 Freeze-up Protection Control

Outline

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

Detail

Conditions for Start Controlling
Judge the controlling start with the indoor heat exchanger temperature after 2 sec from operation start.
Control in Each Zone



(R1379)

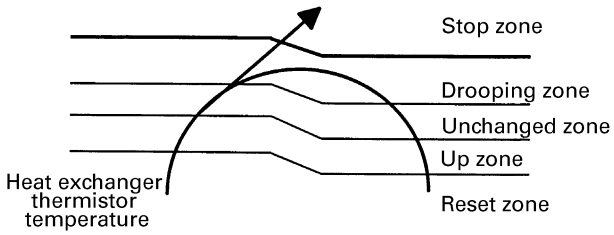
2.8 Heating Peak-cut Control

Outline

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

Detail

Conditions for Start Controlling
Judge the controlling start with the indoor heat exchanger temperature after 2 min from operation start.
Control in Each Zone
The heat exchange intermediate temperature of indoor unit controls the following.



(R1380)

2.9 Fan Control

Outline

Fan control is carried out according to the following priority.
1. Fan ON control for electric component cooling fan
2. Fan control when defrosting
3. Fan OFF delay when stopped
4. ON/OFF control when cooling operation
5. Tap control when drooping function is working
6. Fan control when forced operation
7. Fan control during heating operation
8. Fan control for pressure difference upkeep

Detail

Fan OFF Control when Stopped

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

2.10 Moisture Protection Function 1 (Securing of Differential Pressure and Blown Air Temperature)

Outline

To secure the reliability of the compressor (for dryness of suction refrigerant and differential pressure) which is the primary purpose of the compressor, the lower limit of the output frequency is limited to two stages under the condition of outside air temperature. This time, in addition to this purpose, this function is adopted also for prevention of cold draught by securing the blown air temperature at the time of heating operation by low-temperature out side air.

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

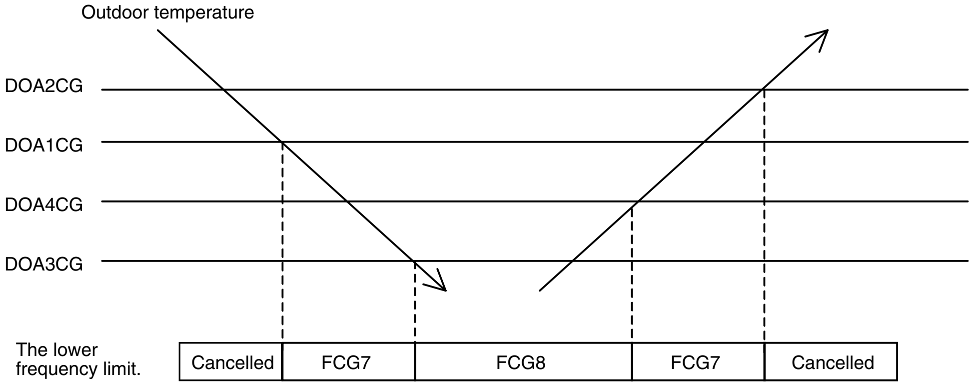
■ If ① and ② are under the simultaneous condition with AND, the lower limit of frequency in this function is set at FCG8.

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.



(R1044)

4. Actual constant

Cooling	
DOA1CGC	18°C
DOA2CGC	19°C
DOA3CGC	0°C
DOA4CGC	1°C
FCG7C	44 Hz
FCG8C	54 Hz

Heating	
DOA1CGW	0°C
DOA2CGW	2°C
DOA3CGW	-4°C
DOA4CGW	-2°C
FCG7W	37 Hz
FCG8W	52 Hz

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

∗ Common setting for 25/35 class

2.11 Moisture Protection Function 2

Outline

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

Detail

■ Operation stop depending on the outdoor air temperature

Compressor operation turns OFF under the conditions that the system is in cooling operation and outdoor air temperature is below –10°C.

2.12 Defrost Control

Outline

Heat Pump Only

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

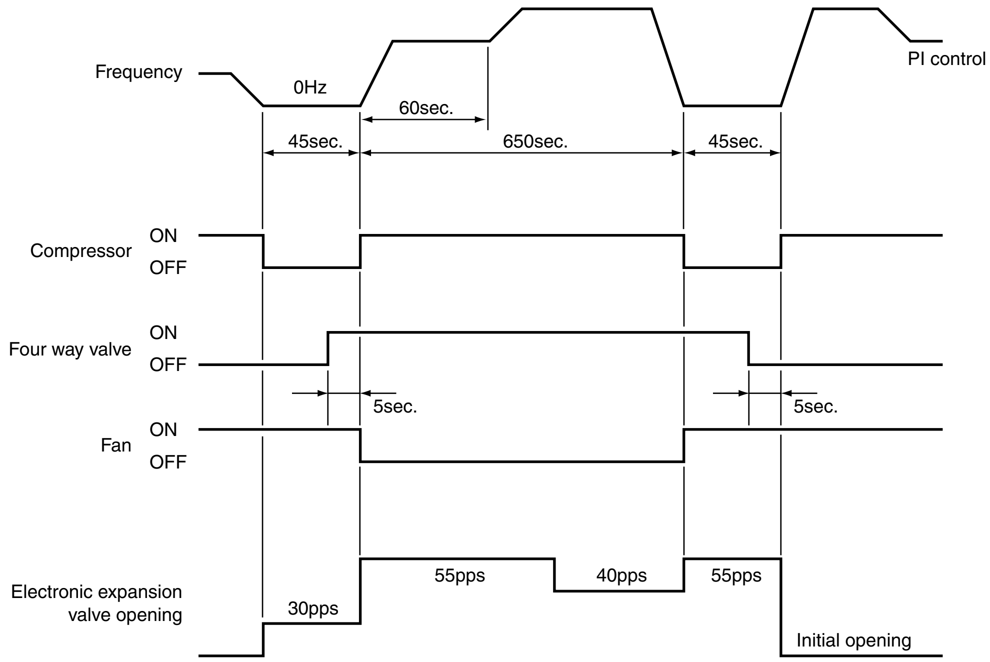
Detail

Conditions for Starting Defrost

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

Conditions for Canceling Defrost

The judgment must be made with heat exchanger temperature. (4°C~22°C)



(R2945)

2.13 Electronic Expansion Valve Control

Outline

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

Electronic expansion valve is fully closed

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

Open Control

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

Feedback Control

1. Discharge pipe temperature control

Detail

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

○ : function
× : not function

Operation pattern		Control when frequency changed	Control for abnormally high discharge pipe temperature
When power is turned ON	Fully closed when power is turned ON	×	×
Cooling operation	Open control when starting	×	○
	(Control of target discharge pipe temperature)	○	○
Stop	Pressure equalizing control	×	×
Heating operation (only for heat pump model)	Open control when starting	×	○
	(Control of target discharge pipe temperature)	○	○
	(Defrost control FD=1) (only for heat pump model)	×	×
Stop	Pressure equalizing control	×	×
Heating operation (only for heat pump model)	Open control when starting	×	○
Control of discharge pipe thermistor disconnection	Continue	×	×
Stop	Pressure equalizing control	×	×

(R2833)

2.13.1 Fully Closing with Power ON

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

2.13.2 Pressure Equalization Control

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

2.13.3 Opening Limit

Outline

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

Detail

- A maximum electronic expansion valve opening : 55 pulses
- A minimum electronic expansion valve opening : 4 pulses

The electronic expansion valve is fully closed in the room where cooling is stopped and is opened with fixed opening during defrosting.

2.13.4 Starting Operation Control

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

2.13.5 High Temperature of the Discharge Pipe

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

2.13.6 Disconnection of the Discharge Pipe Thermistor

Outline

Detect a disconnected discharge pipe thermistor by comparing the discharge pipe temperature with the condensation temperature. If any is disconnected, open the electronic expansion valve according to the outdoor air temperature and the operating frequency and operate for a specified time, and then stop.
After 3 minutes of waiting, restart the unit and check if any is disconnected. If any is disconnected stop the system after operating for a specified time. If the disconnection is detected 4 times in succession, then the system will be down.

Detail

Detect Disconnection

If a 570-second timer for open control becomes over, and a 9-minute timer for the compressor operation continuation is not counting time, the following adjustment must be made.

1. When the operation mode is cooling
   When the discharge pipe temperature is lower than the outdoor heat exchanger temperature, the discharge pipe thermistor disconnection must be ascertained.
2. When the operation mode is heating (only for heat pump model)
   When the discharge pipe temperature is lower than the max temperature of indoor unit heat exchanger, the discharge pipe thermistor disconnection must be ascertained.

Adjustment when the thermistor is disconnected

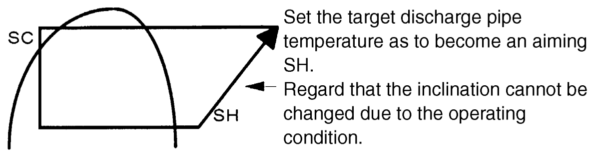
When compressor stop repeats specified time, the system should be down.

2.13.7 Control when frequency is changed

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

2.13.8 Target Discharge Pipe Temperature Control

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



(R1389)

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

2.14 Malfunctions

2.14.1 Sensor Malfunction Detection

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

Relating to Thermistor Malfunction

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

Relating to CT Malfunction

When the output frequency is more than 62 Hz and the input current is less than 0.5A, carry out abnormal adjustment.

2.14.2 Detection of Overload and Over Current

Outline

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

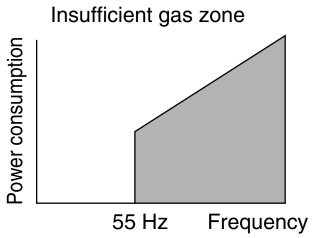
Detail

- **If the OL (compressor head) temperature exceeds 120~130°C (depending on the model), the compressor gets interrupted.**
- **If the inverter current exceeds 22 A, the compressor gets interrupted too.**

2.14.3 Insufficient Gas Control

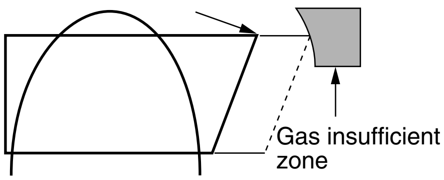
Outline

If a power consumption is below the specified value in which the frequency is higher than the specified frequency, it must be regarded as gas insufficient.
In addition to such conventional function, if the discharge temperature is higher than the target discharge pipe temperature, and the electronic expansion valve is fully open (55 pulses) more than the specified time, it is considered as an insufficient gas.



(R2834)

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



(R1391)

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

Detail

Judgment by Input Current

When an output frequency is exceeds 65 Hz and the input current is less than specified value, the adjustment is made for insufficient gas.

Judgment by Discharge Pipe Temperature

When discharge pipe temperature is 30°C higher than target value and the electronic expansion value opening is 55 plus (max.), the adjustment is made for insufficient gas.

2.15 Forced Operation Mode

Outline

Forced operating mode includes only forced cooling.

Detail

Forced Cooling

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

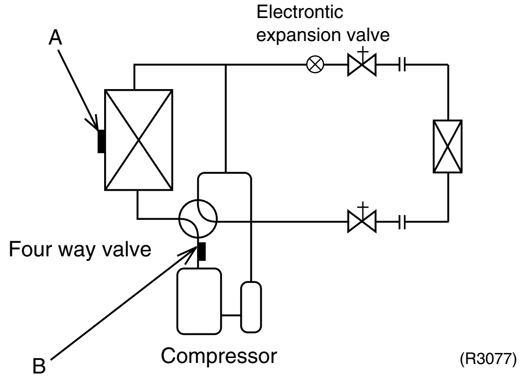
2.16 Voltage Detection Function

Power supply voltage is detected each time equipment operation starts.

3. Outdoor Unit (50/60 class)

3.1 Function of Thermistor

3.1.1 Heat Pump Model



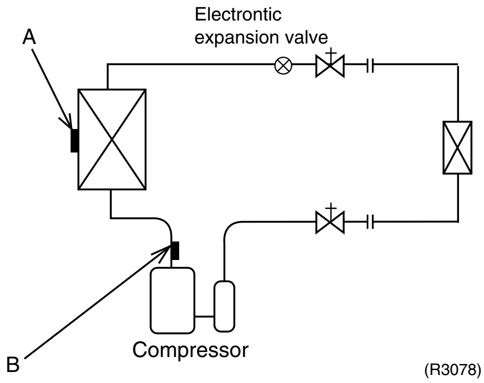
A Outdoor Heat Exchanger Thermistor (DCB)

1. The outdoor heat exchanger thermistor is used for controlling target discharge temperature.
   Set a target discharge temperature depending on the outdoor and indoor heat exchanger temperature.
   Control the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. The outdoor heat exchanger thermistor is used for detecting the discharge thermistor disconnected when cooling.
   When the temperature of the discharge piping is lower than the temperature of outdoor heat exchanger, a disconnected discharge thermistor can be detected.
3. The outdoor heat exchanger thermistor is used for high pressure protection during cooling operation.

B Discharge Pipe Thermistor (DOT)

1. The discharge pipe thermistor is used to control the discharge pipe.
   If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation must be halted.
2. The discharge pipe thermistor is used for detecting the discharge thermistor disconnected.

3.1.2 Cooling Only Model



A Outdoor Heat Exchanger Thermistor (DCB)

1. The outdoor heat exchanger thermistor is used for controlling target discharge temperature. Set a target discharge temperature depending on the outdoor and indoor heat exchanger temperature.
   Control the electronic expansion valve opening so that the target discharge temperature can be obtained.
2. When cooling: an outdoor heat exchanger thermistor is used for detecting the discharge thermistor disconnected.
   When the temperature of the discharge piping is lower than the temperature of outdoor heat exchanger, a disconnected discharge thermistor can be detected.
3. The outdoor heat exchanger thermistor is used for high pressure protection during cooling operation.

B Discharge Pipe Thermistor (DOT)

1. The discharge pipe thermistor is used to control the discharge pipe.
   If the temperature of discharge pipe (used in place of the inner temperature of the compressor) rises abnormally, the operating frequency drops or the operation must be halted.
2. The discharge pipe thermistor is used for detecting the discharge thermistor disconnected.

3.2 Mode Hierarchy

Outline

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

Detail

1. For heat pump model
   There are following modes; stop, cooling (includes drying), heating (include defrosting)

- Air conditioner control mode
  - Forced operating mode
    - Forced cooling (for Pump Down Operation)
  - Normal operating mode
    - Cooling
    - Heating
    - Defrosting
    - Stop mode (except for cooling/heating modes by indoor command)
      - Preheat operation
      - During C (capacitor) is discharging
      - Stop

(R2829)

2. For cooling only model
   There are following models; stop and cooling (including drying).

- Air conditioner control mode
  - Forced operating mode
    - Forced cooling (for Pump Down Operation)
  - Normal operating mode
    - Cooling
    - Stop mode (except for cooling modes by indoor command)
      - Preheat operation
      - During C (capacitor) is discharging
      - Stop

(R2830)

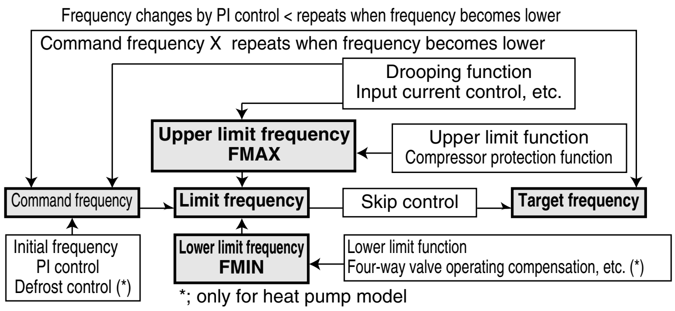
Note: Unless specified otherwise, an indoor dry operation command must be regarded as cooling operation.

3.3 Frequency Control

Outline

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

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



(R2831)

Detail

How to Determine Frequency

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

For Heat Pump Model

1. Determine command frequency
- Command frequency will be determined in the following order of priority.

1.1 Limiting frequency by drooping function
- Input current, discharge pipes, low Hz high pressure limit, peak cutting, freeze-up protection, dew prevention, fin thermistor temperature.

1.2 Limiting defrost control time
1.3 Forced cooling
1.4 Indoor frequency command

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

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

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

For Cooling Only Model

1. Determine command frequency
- Command frequency will be determined in the following order of priority.

1.1 Limiting frequency by drooping function
Input current, discharge pipes, freeze-up protection, dew prevention, fin thermistor temperature.
1.2 Indoor frequency command

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

3. Determine lower limit frequency
- Set a maximum value as an lower limit frequency among the frequency lower limits of the following functions:
  Pressure difference upkeep.
4. Determine prohibited frequency
- There is a certain prohibited frequency such as a power supply frequency.

Indoor Frequency Command (ΔD signal)
The difference between a room temperature and the temperature set by the remote controller will be taken as the “ΔD signal” and is used for frequency command.

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

∗Th OFF = Thermostat OFF

Frequency Initial Setting
- Outline

When starting the compressor, or when conditions are varied due to the change of the room, the frequency must be initialized according to the total of a maximum ΔD value of the indoor unit and the Q value of the indoor unit.
Q value: Indoor unit output determined from indoor unit volume, air flow rate and other factors.

PI Control (Determine Frequency Up/Down by ΔD Signal)
1. P control
   Calculate ΔD value in each sampling time (20 seconds), and adjust the frequency according to its difference from the frequency previously calculated.
2. I control
   If the operating frequency is not change more than a certain fixed time, adjust the frequency up and down according to the ΔD value, obtaining the fixed ΔD value.
   When the ΔD value is small...lower the frequency.
   When the ΔD value is large...increase the frequency.
3. Limit of frequency variation width
   When the difference between input current and input current drooping value is less than 1.5 A, the frequency increase width must be limited.
4. Frequency management when other controls are functioning
- When frequency is drooping;
  Frequency management is carried out only when the frequency droops.
- For limiting lower limit
  Frequency management is carried out only when the frequency rises.
5. Upper and lower limit of frequency by PI control
   The frequency upper and lower limits are set depending on indoor unit.
   When low noise commands come from the indoor unit or when outdoor unit low noise or quiet commands come from indoor unit, the upper limit frequency must be lowered than the usual setting.

3.4 Controls at Mode Changing / Start-up

3.4.1 Preheating Operation

Outline

Operate the inverter in the open phase operation with the conditions including the preheating command (only for heat pump model) from the indoor, the outdoor air temperature and discharge pipe temperature.

Detail

Preheating ON Condition

- When outdoor air temperature is below 10.5°C and discharge pipe temperature is below 10.5°C, inverter in open phase operation starts.

OFF Condition

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

3.4.2 Four Way Valve Switching

Outline of heating operation

Heat Pump Only

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

Detail

The OFF delay of four way valve

Energize the coil for 150 sec after unit operation is stopped.

3.4.3 Four Way Valve Operation Compensation

Outline

Heat Pump Only

At the beginning of the operation as the four way valve is switched, acquire the differential pressure required for activating the four way valve by having output the operating frequency, which is more than a certain fixed frequency, for a certain fixed time.

Detail

Staring Conditions

1. When starting compressor for heating.
2. When the operating mode changes from the previous time.
3. When starting compressor for starting defrosting or resetting.
4. When starting compressor for the first time after the reset with the power is ON.
   Set the lower limit frequency to 55 (model by model) Hz for 70 seconds with the OR conditions with 1 through 4 above.

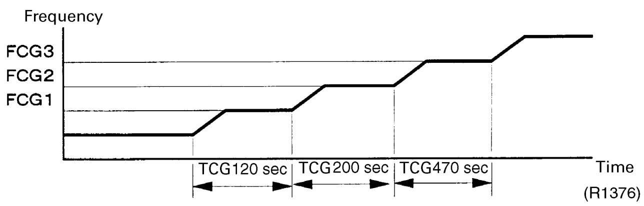
3.4.4 3 Minutes Stand-by

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

3.4.5 Compressor Protection Function

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

FCG 3	85
FCG 2	70
FCG 1	55



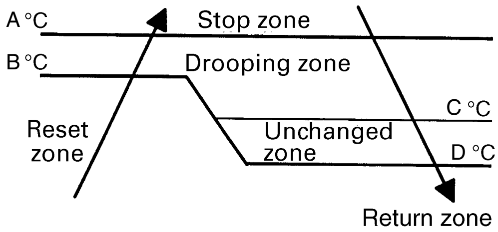
3.5 Discharge Pipe Temperature Control

Outline

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

Detail

Divide the Zone



A	110
B	103
C	102
D	101

(R2836)

Management within the Zones

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

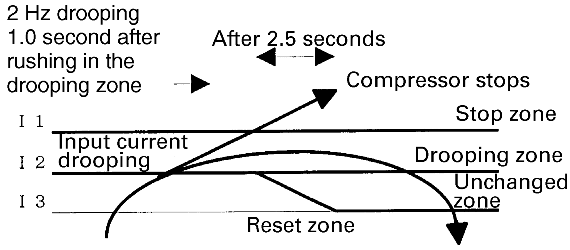
3.6 Input Current Control

Outline

Detect an input current by the CT during the compressor is running, and set the frequency upper limit from such input current.
In case of heat pump model, this control is the upper limit control function of the frequency which takes priority of the lower limit of four way valve activating compensation.

Detail

The frequency control will be made within the following zones.



(R1378)

When a “stop current” continues for 2.5 seconds after rushing on the stop zone, the compressor operation stops.
If a “drooping current” is continues for 1.0 second after rushing on the drooping zone, the frequency will be 2 Hz drooping.
Repeating the above drooping continues until the current rushes on the drooping zone without change.
In the unchanged zone, the frequency limit will remain.
In the return / reset zone, the frequency limit will be cancelled.

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

1. In case the operation mode is cooling

■ The current droops when outdoor air temperature becomes higher than a certain level (model by model).

2. In case the operation mode is heating (only for heat pump model)

■ The current droops when outdoor air temperature becomes higher than a certain level (model by model).

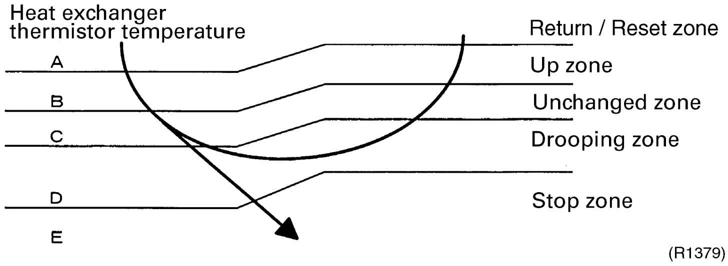
3.7 Freeze-up Protection Control

Outline

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

Detail

Conditions for Start Controlling
Judge the controlling start with the indoor heat exchanger temperature after 2 sec from operation start.
Control in Each Zone



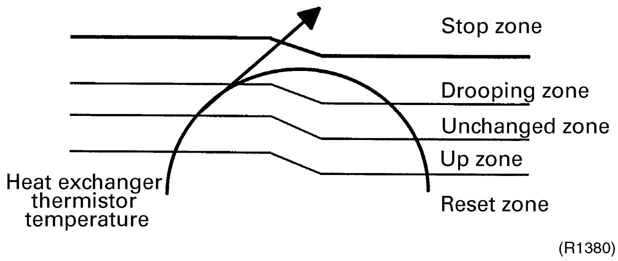
3.8 Heating Peak-cut Control

Outline

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

Detail

Conditions for Start Controlling
Judge the controlling start with the indoor heat exchanger temperature after 2 min from operation start.
Control in Each Zone
The heat exchange intermediate temperature of indoor unit controls the following.



3.9 Fan Control

Outline

Fan control is carried out according to the following priority.

1. Fan ON control for electric component cooling fan
2. Fan control when defrosting
3. Fan OFF delay when stopped
4. ON/OFF control in cooling operation
5. Tap control when drooping function is working
6. Fan control in forced operation
7. Fan control in normal operation

Detail

Fan OFF Control when Stopped

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

Tap Control in indoor/outdoor unit silent operation

1. When Cooling Operation
   When the outdoor air temperature is lower than 37°C, the fan tap must be set to L.
2. When Heating Operation
   When the outdoor air temperature is higher than 4°C, the fan tap must be turned to L (only for heat pump model).

3.10 Moisture Protection Function 2

Outline

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

Detail

Heat Pump Model

■ Operation stop depending on the outdoor air temperature

Compressor operation turns OFF under the conditions that the system is in cooling operation and outdoor air temperature is below –10°C .

Cooling Only Model

■ Operation stops depending on the outdoor air temperature.

Compressor operation turns OFF under the condition that outdoor air temperature is below –12°C .

3.11 Low Hz High Pressure Limit

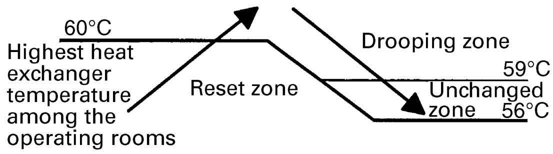
Outline

Heat Pump Only

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

Detail

Separate into Zones



(R1382)

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

3.12 Defrost Control

Outline

Heat Pump Only

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

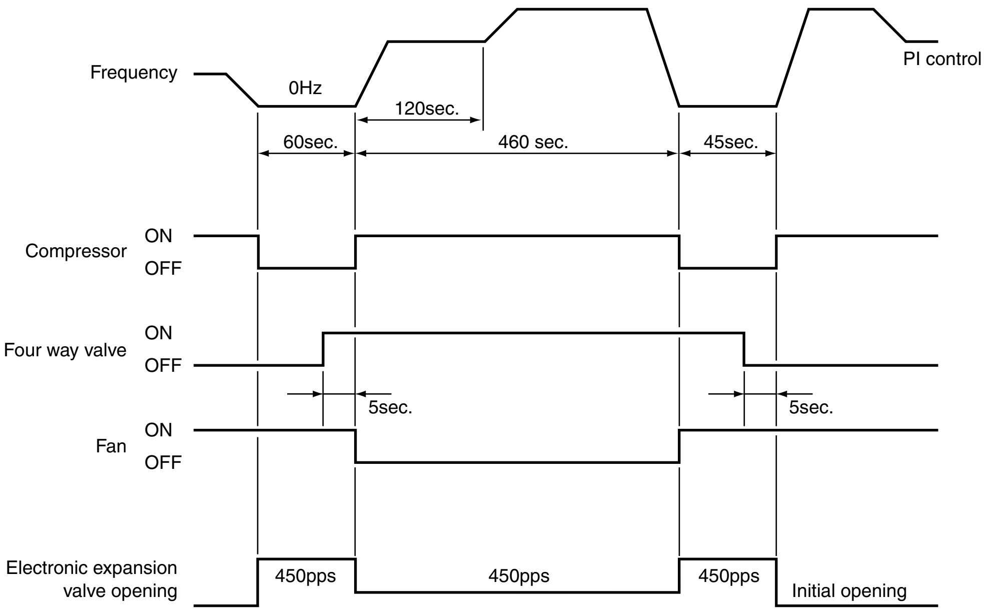
Detail

Conditions for Starting Defrost

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

Conditions for Canceling Defrost

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



(R2832)

3.13 Electronic Expansion Valve Control

Outline

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

Electronic expansion valve is fully closed

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

Open Control

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

Feedback Control

1. Discharge pipe temperature control

Detail

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

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

(R2833)

3.13.1 Fully Closing with Power ON

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

3.13.2 Pressure Equalization Control

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

3.13.3 Opening Limit

Outline

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

Detail

- A maximum electronic expansion valve opening : 450 pulses
- A minimum electronic expansion valve opening : 54 pulses

The electronic expansion valve is fully closed in the room where cooling is stopped and is opened with fixed opening during defrosting.

3.13.4 Starting Operation Control

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

3.13.5 High Temperature of the Discharge Pipe

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

3.13.6 Disconnection of the Discharge Pipe Thermistor

Outline

Detect a disconnected discharge pipe thermistor by comparing the discharge pipe temperature with the condensation temperature. If any is disconnected, open the electronic expansion valve according to the outdoor air temperature and the operating frequency, and operate for a specified time, and then stop.
After 3 minutes of waiting, restart the unit and check if any is disconnected. If any is disconnected stop the system after operating for a specified time. If the disconnection is detected 4 times in succession, then the system will be down.

Detail

Detect Disconnection
If a 630-second timer for open control becomes over, and a 9-minute timer for the compressor operation continuation is not counting time, the following adjustment must be made.

1. When the operation mode is cooling
   When the discharge pipe temperature is lower than the outdoor heat exchanger temperature, the discharge pipe thermistor disconnection must be ascertained.
2. When the operation mode is heating (only for heat pump model)
   When the discharge pipe temperature is lower than the max temperature of operating room heat exchanger, the discharge pipe thermistor disconnection must be ascertained.

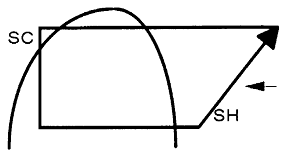
Adjustment when the thermistor is disconnected
When compressor stop repeats specified time, the system should be down.

3.13.7 Control when frequency is changed

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

3.13.8 Target Discharge Pipe Temperature Control

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



Set the target discharge pipe temperature as to become an aiming SH.
Regard that the inclination cannot be changed due to the operating condition.

(R1389)

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

3.14 Malfunctions

3.14.1 Sensor Malfunction Detection

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

Relating to Thermistor Malfunction

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

Relating to CT Malfunction

When the output frequency is more than 55 Hz and the input current is less than 1.25A, carry out abnormal adjustment.

3.14.2 Detection of Overload and Over Current

Outline

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

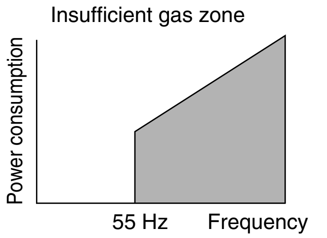
Detail

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

3.14.3 Insufficient Gas Control

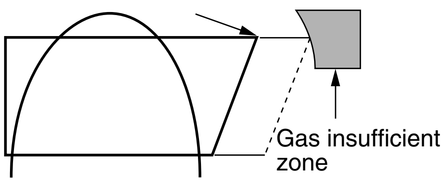
Outline

If a power consumption is below the specified value in which the frequency is higher than the specified frequency, it must be regarded as gas insufficient.
In addition to such conventional function, if the discharge temperature is higher than the target discharge pipe temperature, and the electronic expansion valve is fully open (450 pulses) more than the specified time, it is considered as an insufficient gas.



(R2834)

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



(R1391)

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

Detail

Judgment by Input Current

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

Judgment by Discharge Pipe Temperature

When discharge pipe temperature is 20°C higher than target value and the electronic expansion value opening is 450 plus (max.), the adjustment is made for insufficient gas.

3.15 Forced Operation Mode

Outline

Forced operating mode includes only forced cooling.

Detail

Forced Cooling

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

3.16 Voltage Detection Function

Power supply voltage is detected each time equipment operation starts.

Part 8
Troubleshooting

1. Troubleshooting Based on Equipment Condition

	Equipment Condition	Remedy
1	Equipment does not operate.	See page 120
2	Indoor fan operates, but compressor does not.	See page 121
3	Cooling / heating operation starts but stops immediately.	See page 123
4	After shutting down, equipment does not restart for a while.	See page 124
5	Equipment operates but does not provide cooling.	See page 125
6	Equipment operates but does not provide heating.	See page 127
7	Equipment discharges white mist.	See page 128
8	Equipment produces loud noise or shakes.	See page 129
9	Equipment discharges dust.	See page 130
10	Remote controller LCD displays "88."	See page 131
11	Equipment emits odor.	Room smell and cigarette odors accumulated inside the indoor unit are discharged with air. Inside of the indoor unit must be cleaned.
12	Flap operates when power is turned on.	It is normal. The flap initializes for accurate positioning.
13	Change of operation mode causes flap to move.	It is normal. There is a control function that moves the flap when operation mode is changed.
14	Fan operates in "M" mode during heating even if remote controller is set to "Low."	It is normal. It is caused by the activation of the overload control (airflow shift control).
15	Flap automatically moves during cooling.	It is normal. It is caused by the activation of the dew prevention function or ceiling soiling prevention function.
16	Indoor unit fan operates in "L" mode for 1 minute in microcomputer-controlled dry mode even if compressor is not operating.	It is normal. The monitoring function forcibly operates the fan for one minute.
17	In simultaneous ON/OFF multi-system setup, indoor unit (sub) does not operate in sync with the other indoor unit (main). (Flat, fan, etc.)	It is normal. It is caused by a signal transmission lag.
18	Indoor unit fan operates after heating operation stops.	It is normal. The fan operates in the "LL" mode for 60 to 100 seconds to dissipate the residual heat in the heater.
19	Drain pump operates when equipment is not operating.	It is normal. The drain pump continues to operate for several minutes after equipment is turned off.
20	Horizontal wing sends air to different directions in cooling and heating even if it is set to the same position.	It is normal. The airflow direction in cooling/dry operation is different from that in heating/fan operation.
21	Flap remains horizontal even if it is set to Swing.	It is normal. The flap does not swing in the thermostat OFF mode.

1.1 Equipment does not operate.

Applicable Model

All models of SkyAir series

Error Detection Method

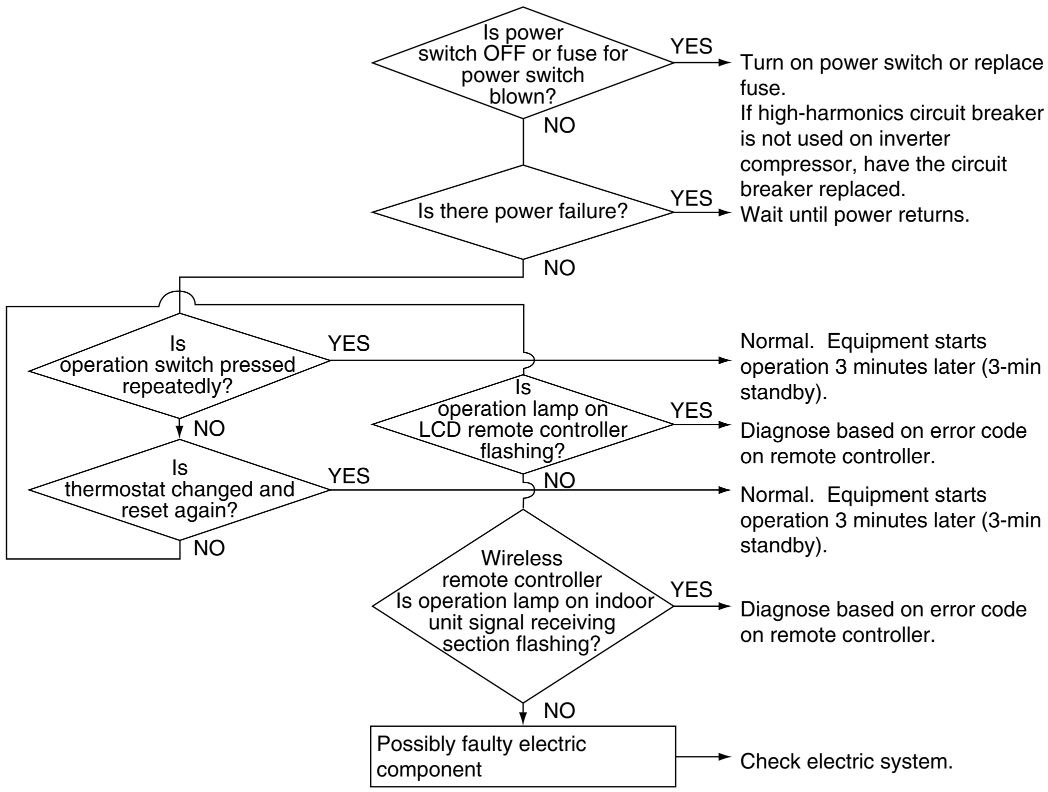
Error Generating Condition

Possible Causes

- Fuse blown or disorder of contact in operation circuit
- Faulty operation switch or contact point
- Faulty magnetic switch for fan motor
- Activation or fault of overcurrent relay for fan motor
- Faulty overcurrent relay for compressor
- Faulty compressor protection thermostat
- Insufficient insulation in electric system
- Faulty contact point of magnetic switch for compressor
- Malfunction of compressor

Troubleshooting

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



(S2575)

1.2 Indoor fan operates, but compressor does not.

Applicable Model All models of SkyAir series

Method of Malfunction Detection

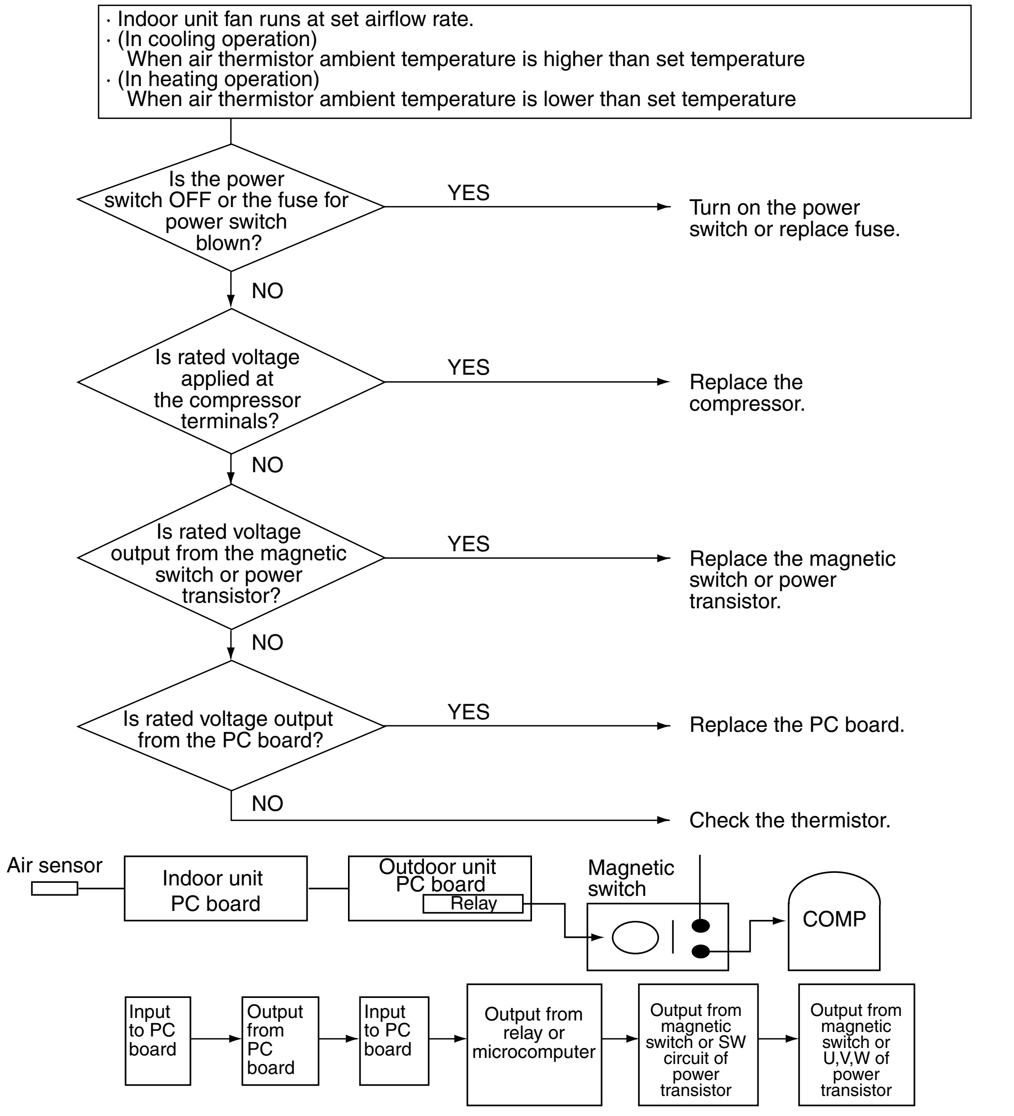
Malfunction Decision Conditions

Possible Causes

- Faulty thermistor
- Faulty indoor/outdoor unit PCB
- Faulty magnetic switch
- Faulty power transistor
- Faulty compressor

Troubleshooting

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



(S2576)

1.3 Cooling / Heating operation starts but stops immediately.

Applicable Model All models of SkyAir series

Error Detection Method

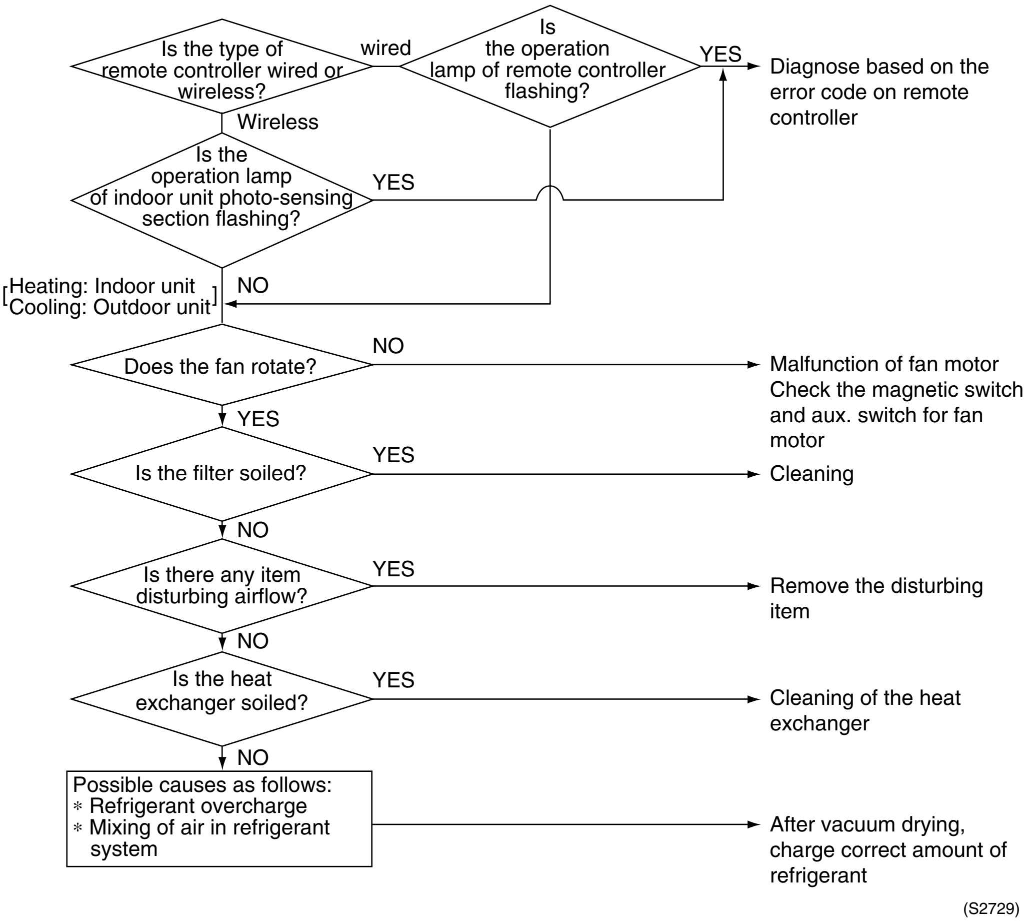
Error Generating Condition

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Faulty magnetic switch for outdoor unit fan motor
- Faulty aux. relay for outdoor unit fan motor
- Soiled heat exchanger of outdoor unit
- There is an interfering item in air flow of outdoor unit
- Malfunction of outdoor unit fan
- Soiled air filter of indoor unit
- Soiled heat exchanger of indoor unit
- There is some interfering item in airflow of indoor unit
- Malfunction of indoor unit fan

Troubleshooting

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



1.4 After shutting down, equipment does not restart for a while.

Applicable Model All models of SkyAir series

Error Detection Method

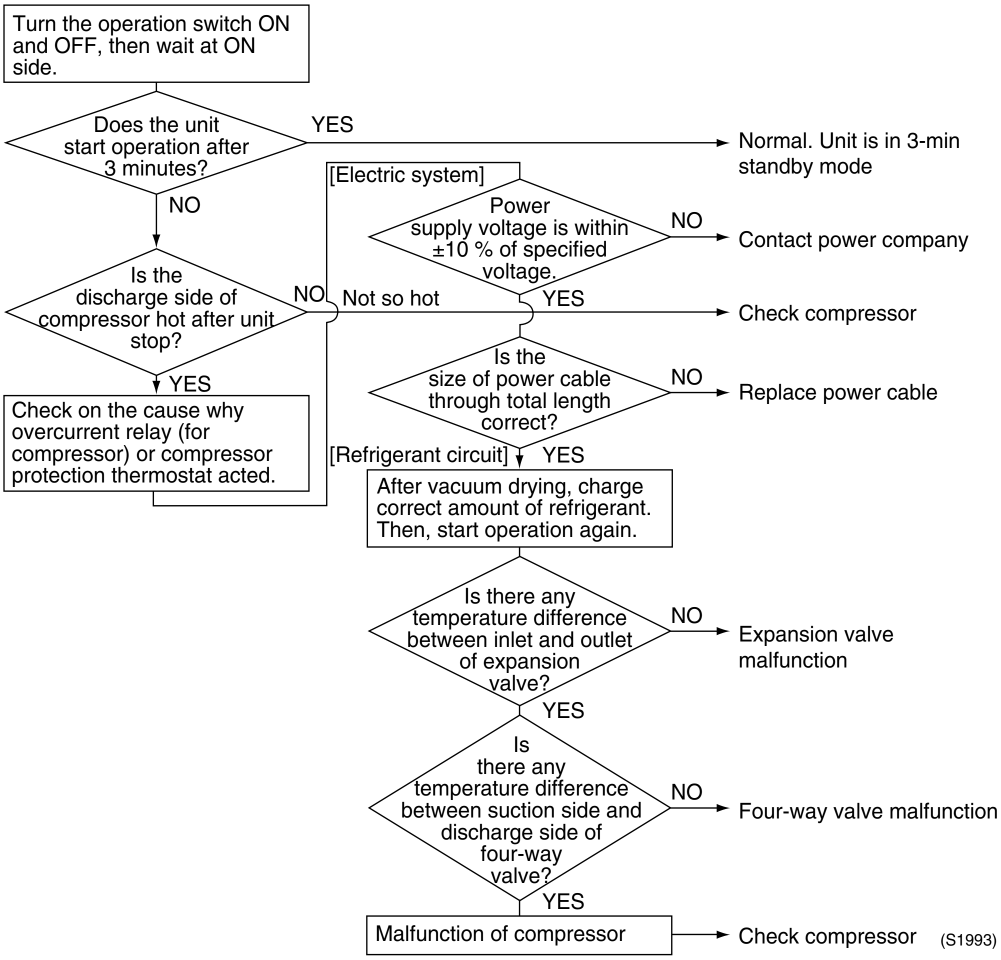
Error Generating Condition

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient size of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Internal leakage of four-way valve (There is no difference between suction and discharge temperature)
  Insufficient compression of compressor
  Incorrect refrigerant
  Faulty expansion valve
  Insufficient circulation of refrigerant

Troubleshooting

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



1.5 Equipment operates but does not provide cooling.

Applicable Model

All models of SkyAir series

Error Detection Method

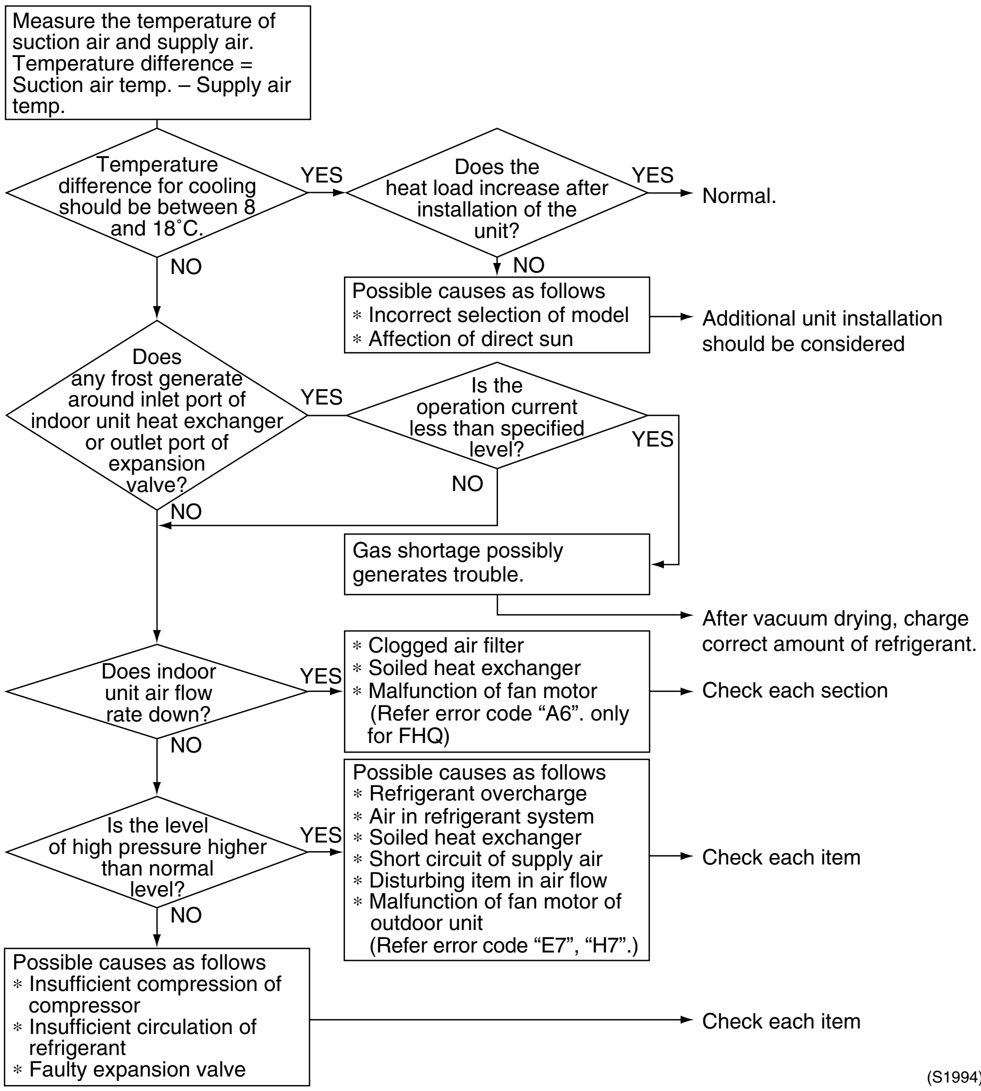
Error Generating Condition

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient size of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Internal leakage of four-way valve (There is no difference between suction and discharge temperature)
  Insufficient compression of compressor
  Incorrect refrigerant
  Faulty expansion valve
  Insufficient circulation of refrigerant

Troubleshooting

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



(S1994)

1.6 Equipment operates but does not provide heating.

Applicable Model All models of SkyAir series

Error Detection Method

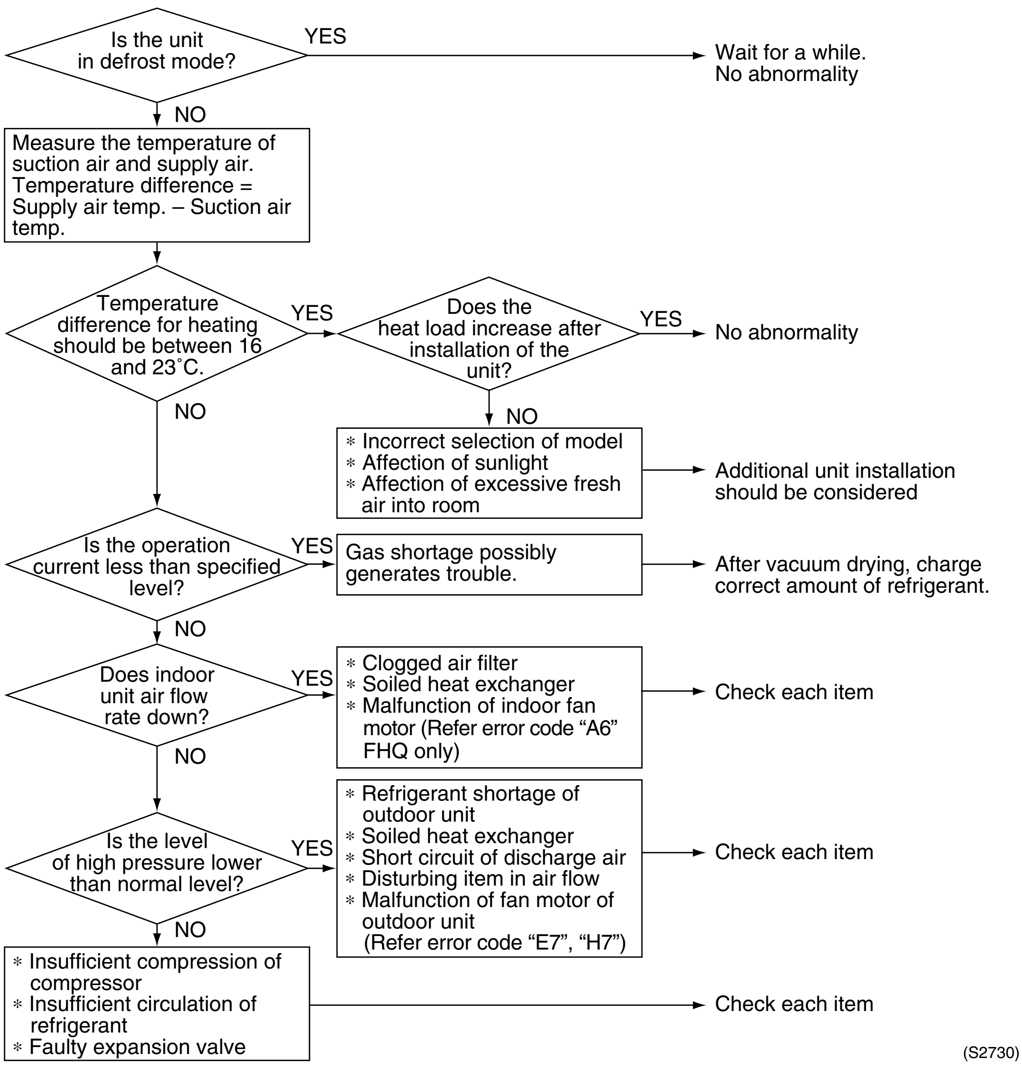
Error Generating Condition

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Faulty magnetic switch for outdoor unit fan motor
- Faulty aux. relay for outdoor unit fan motor
- Soiled heat exchanger of outdoor unit
- There is an interfering item in air flow of outdoor unit
- Malfunction of outdoor unit fan
- Soiled air filter of indoor unit
- Soiled heat exchanger of indoor unit
- There is some interfering item in airflow of indoor unit
- Malfunction of indoor unit fan

Troubleshooting

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



1.7 Equipment discharges white mist.

Applicable Model All models of SkyAir series

Error Detection Method

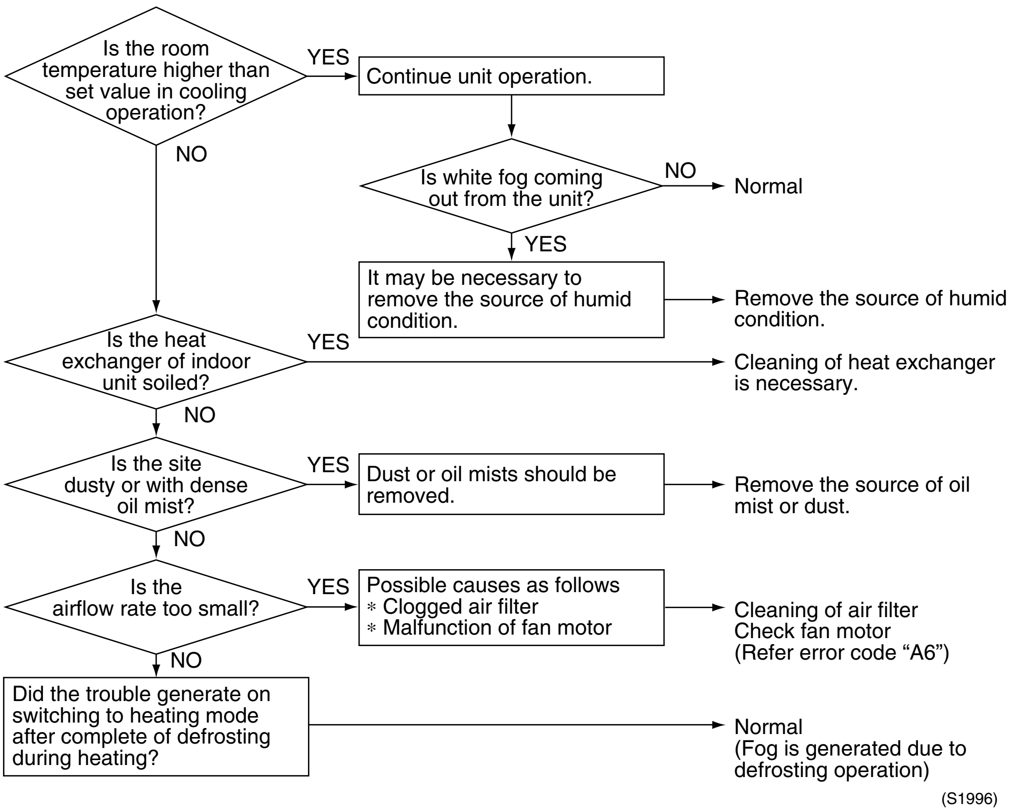
Error Generating Condition

Possible Cause

- Humid installation site
- Installation site is dirty and with dense oil mists.
- Soiled heat exchanger
- Clogged air filter
- Malfunction of fan motor

Troubleshooting

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



1.8 Equipment produces loud noise or shakes.

Applicable Model All models of SkyAir series

Error Detection Method

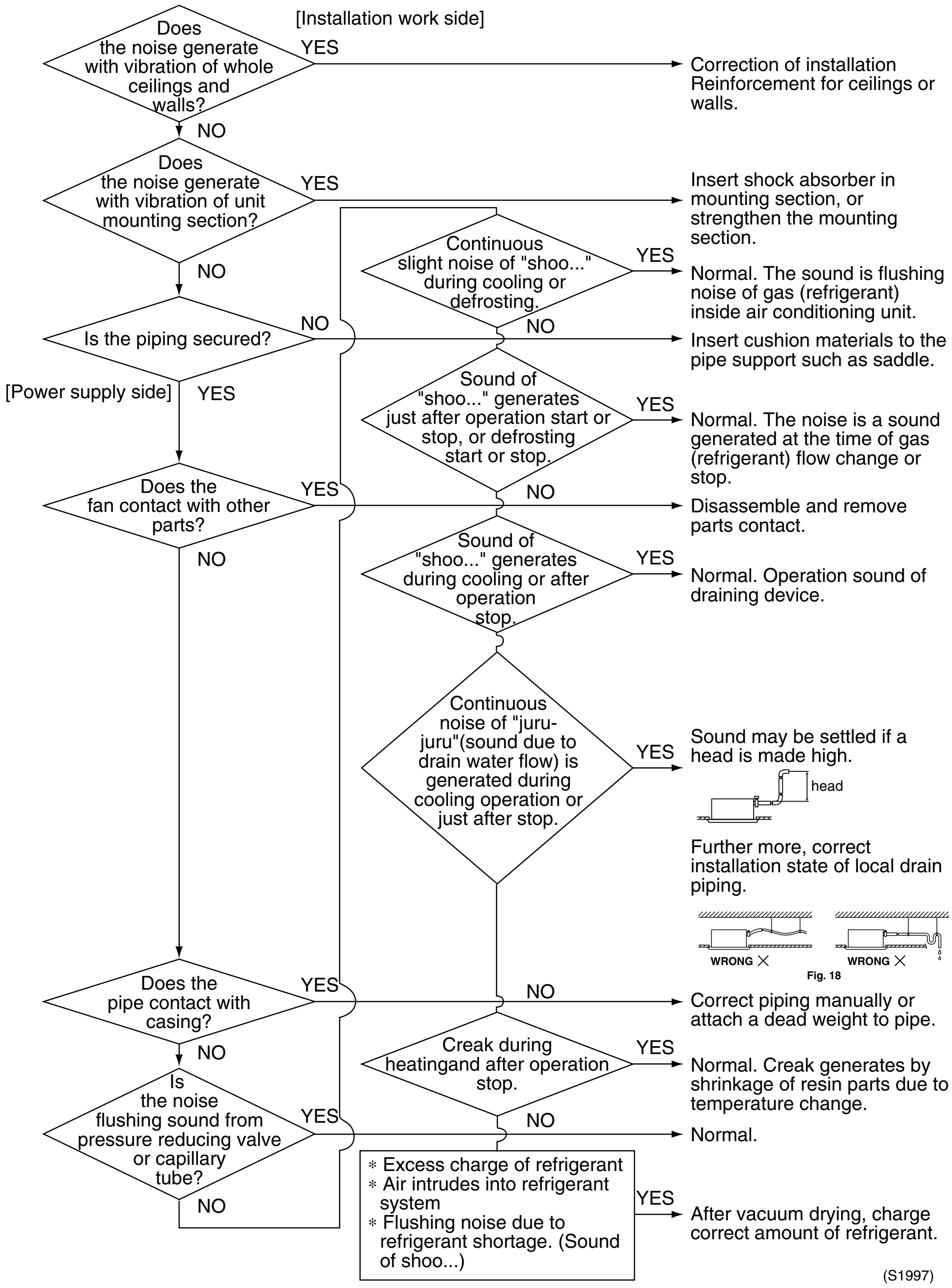
Error Generating Condition

Possible Cause

- Faulty installation
- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Flushing noise due to refrigerant shortage. (Sound of shoo...)

Troubleshooting

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



1.9 Equipment discharges dust.

Applicable Model All models of SkyAir series

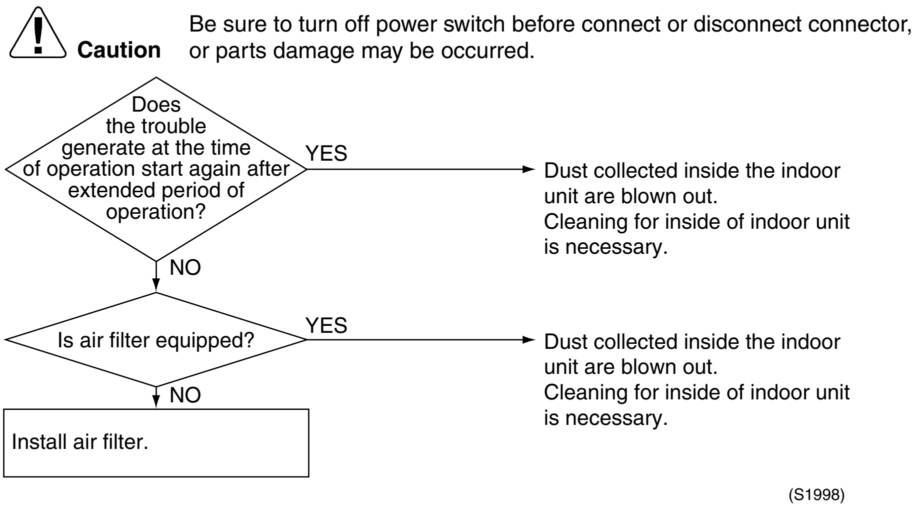
Error Detection Method

Error Generating Condition

Possible Cause

- Carpet spread room
- Animal's hair

Troubleshooting



1.10 Remote controller LCD displays "88".

Applicable Model All models of SkyAir series

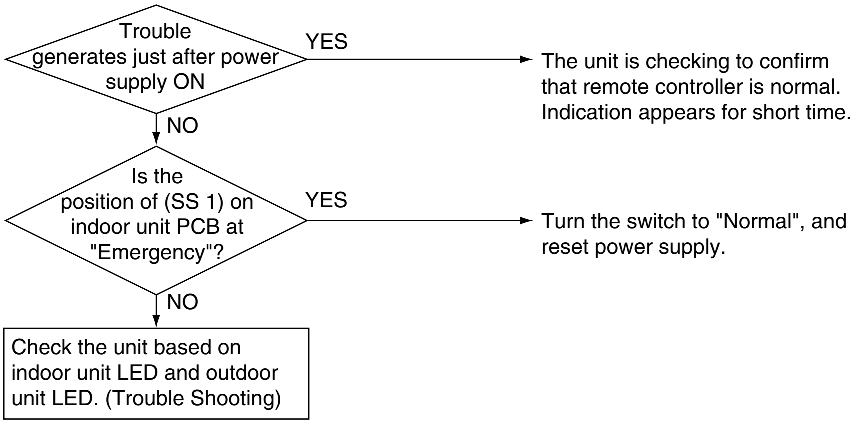
Error Detection Method

Error Generating Condition

Possible Cause

Troubleshooting

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



(S1999)

1.11 Swing flap does not operate.

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Utilizes ON/OFF of the limit switch when the motor turns.

Malfunction Decision Conditions

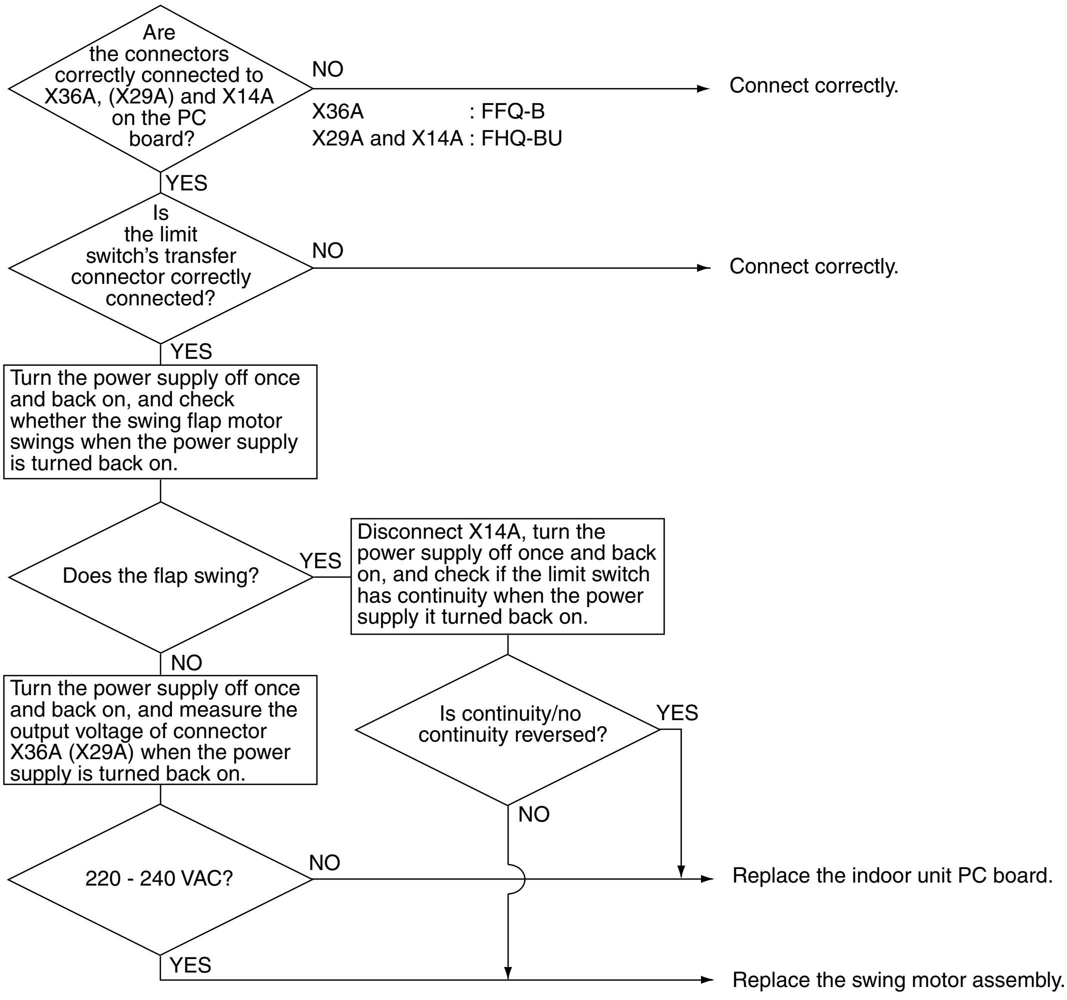
When ON/OFF of the micro switch for positioning cannot be reversed even through the swing flap motor for a specified amount of time (about 30 seconds).

Possible Causes

- Faulty swing motor
- Faulty micro switch
- Faulty connector connection
- Faulty indoor unit PC board

Troubleshooting

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



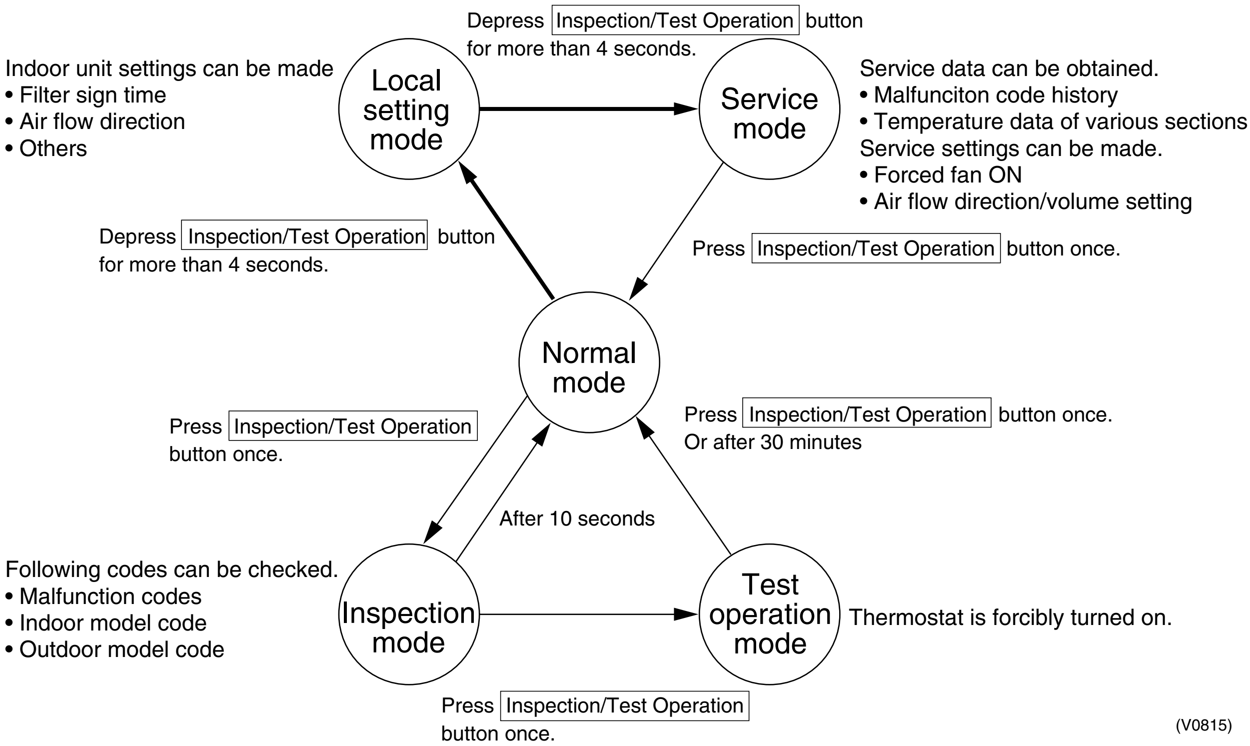
2. Self-Diagnosis by Remote Controller

2.1 The INSPECTION/TEST Button

Explanation

The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.

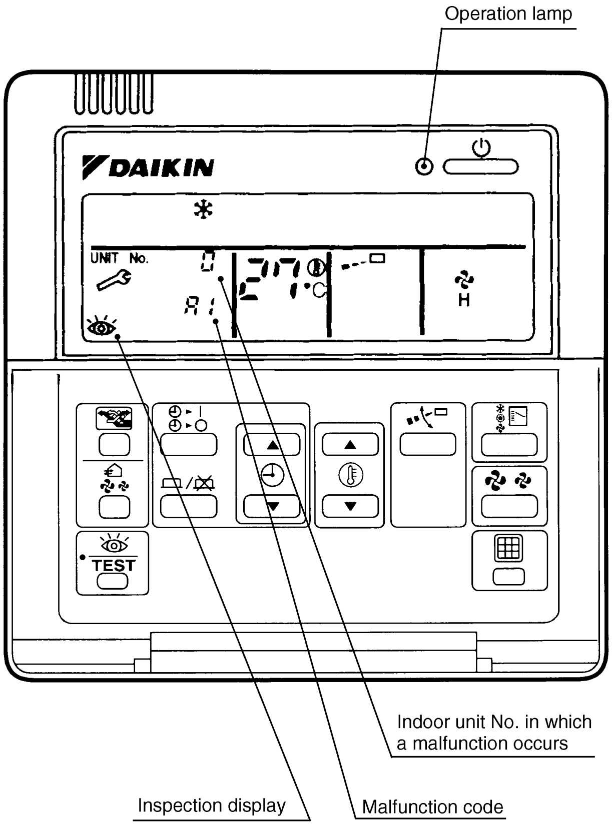
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



2.2 Self-Diagnosis by Wired Remote Controller

Explanation

If operation stops due to malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when the inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 137 for malfunction code and malfunction contents.



(S2001)

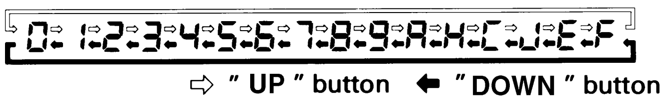
2.3 Self-Diagnosis by Wireless Remote Controller

If equipment stops due to a malfunction, the operation indicating LED on the light reception section flashes.
The malfunction code can be determined by following the procedure described below. (The malfunction code is displayed when an operation error has occurred. In normal condition, the malfunction code of the last problem is displayed.)

Procedure

1. Press the INSPECTION/TEST button to select “Inspection.”
   The equipment enters the inspection mode. The “Unit” indication lights and the Unit No. display shows flashing “0” indication.
2. Set the Unit No.
   Press the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
   ∗1 Number of beeps
   3 short beeps : Conduct all of the following operations.
   1 short beep : Conduct steps 3 and 4.
   Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the malfunction code is confirmed.
   Continuous beep : No abnormality.
3. Press the MODE selector button.
   The left “0” (upper digit) indication of the malfunction code flashes.
4. Malfunction code upper digit diagnosis
   Press the UP or DOWN button and change the malfunction code upper digit until the malfunction code matching buzzer (*2) is generated.

- ■ The upper digit of the code changes as shown below when the UP and DOWN buttons are pressed.

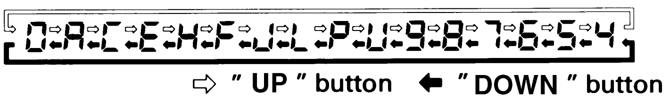


(S2002)

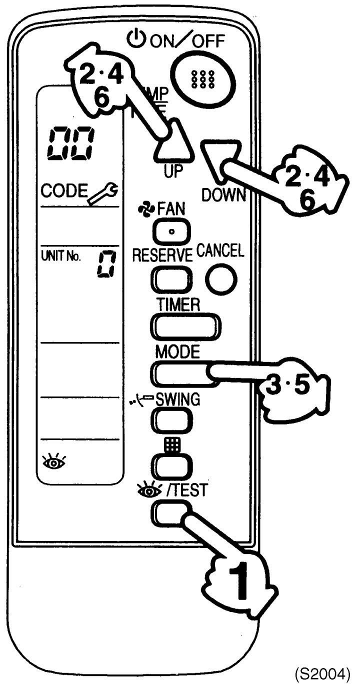
∗2 Number of beeps
Continuous beep : Both upper and lower digits matched.(Malfunction code confirmed)
2 short beeps: Upper digit matched.
1 short beep : Lower digit matched.

5. Press the MODE selector button.
   The right “0” (lower digit) indication of the malfunction code flashes.
6. Malfunction code lower digit diagnosis
   Press the UP or DOWN button and change the malfunction code lower digit until the continuous malfunction code matching buzzer (*2) is generated.

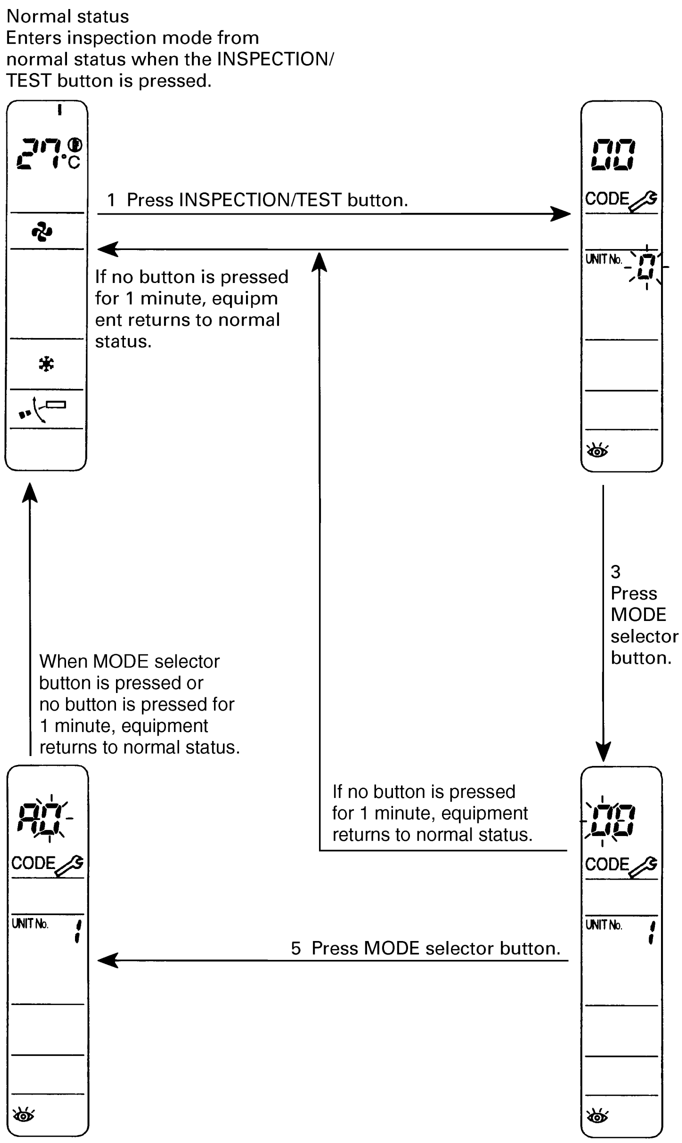
- ■ The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.



(S2003)


ON/OFF
2·4
6
UP
DOWN
2·4
6
CODE
UNIT No.
FAN
RESERVE
CANCEL
TIMER
MODE
3·5
SWING
/TEST
1

(S2004)


Normal status
Enters inspection mode from normal status when the INSPECTION/TEST button is pressed.
1 Press INSPECTION/TEST button.
If no button is pressed for 1 minute, equipm ent returns to normal status.
CODE
UNIT No.
3
Press
MODE
selector
button.
When MODE selector button is pressed or no button is pressed for 1 minute, equipment returns to normal status.
If no button is pressed for 1 minute, equipment returns to normal status.
5 Press MODE selector button.

(S2005)

2.4 Remote Controller Display Malfunction Code and Contents

Code	Malfunction / Remarks
A1	Indoor unit’s PC board faulty
A3	Drain water level abnormal
A5	Freeze-up protector “or stopped by high pressure control”
A6	Indoor fan motor overloaded, overcurrent or locked (Note 1)
A7	Swing flap motor malfunction/Lock
AF	Failure of Drain System
AH	Air cleaner faulty
	Only the air cleaner does not function.
AJ	Type set improper
	Capacity data is wrongly preset. Or there is nothing programmed in the data hold IC.
C4	Sensor (R2T) for heat exchanger temperature is fault
C5	Sensor (R3T) for heat exchanger temperature is fault
C9	Sensor for suction air temperature is fault
CJ	Sensor for remote controller is fault
	The remote controller thermistor does not function, but the system thermo run is possible.
U4	Transmission error (indoor unit-outdoor unit) (Note 1)
	Incorrect wiring between indoor and outdoor units or malfunction of the PC board mounted on the indoor and the outdoor units. If UF is shown, the wiring between the indoor and outdoor units is not properly wired. Therefore, immediately disconnect the power supply and correct the wiring. (The compressor and the fan mounted on the outdoor unit may start operation independent of the remote controller operation.)
U5	Transmission error (indoor unit-outdoor unit)
	Transmission is improper between the indoor unit and the remote controller.
U8	Malfunction in transmission between main and sub remote controls. (Malfunction in sub remote control.)
UA	Miss setting for multi system
	Setting is wrong for selector switch of multi-system. (see switch SS2 on the main unit’s PC board) Incorrect combination with indoor unit and outdoor unit
UC	Central control address overlapping

Notes: 1. There is a possibility of open phase power supply, check power supply also.

3. Self-Diagnosis by LED

3.1 Self-Diagnosis with the LED on the Indoor Unit

Foreword

Troubleshooting can be carried out by service monitor LED (green). (Blinks when normal)

☼ : LED on ● : LED off ◑ : LED blinks — : No connection with troubleshooting

Microcomputer Normal Monitor	Contents/Processing
HAP	New Refrigerant (R410A)
◑	Incorrect wiring between indoor and outdoor unit If outdoor unit's HAP is off, proceed outdoor unit's trouble shooting. If outdoor unit's HAP blinks, failure of wiring or indoor or outdoor unit P.C board ass'y. (Note 4)
☼	Failure of indoor unit PC board ass'y (Note 5)
●	Malfunction of power supply or failure of PC board ass'y or broken transmission wire between indoor and outdoor unit. (Note 5)

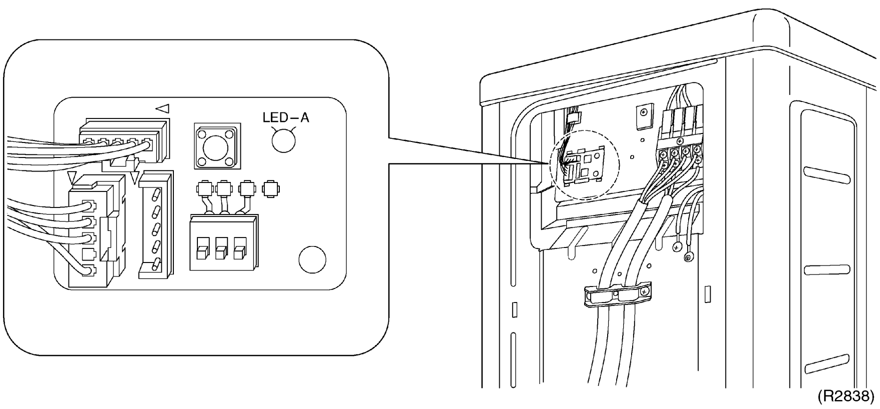
Notes:

1. When the INSPECTION/TEST button of remote controller is pushed, **INSPECTION** display blinks entering **INSPECTION** mode.
2. In the **INSPECTION** mode, when the ON/OFF button is pushed and held for 5 seconds or more, the aforementioned malfunctioning history display is off. In this case, after the malfunction code blinks 2 times, the code display turns to "00" (=Normal) and the unit No. turns to "0". The INSPECTION mode automatically switches to the normal mode (set temperature display).
3. Operation halts due to malfunction depending on the model or condition.
4. The wiring between indoor and outdoor unit may be incorrect or disconnected. Before performing the previously described troubleshooting, check the wiring. If the outdoor unit is inverter unit, the outdoor unit fuse may be blown.
5. Troubleshoot by turning off the power supply for a minimum of 5 seconds, turning it back on, and then rechecking the LED display.

3.2 Self-Diagnosis with the LED on the Outdoor Unit

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

Outdoor Unit (The figure shows 50/60 class model.)



4. Error Codes and LED Indication

Symbols

◑ : Blinks ☼ : On ● : Off — : No connection with troubleshooting

◎ : High probability of malfunction
○ : Possibility of malfunction
□ : Low probability of malfunction
— : No possibility of malfunction (do not replace)

System

Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
	Other than PC Board	PC Board				
		Outdoor Unit	Indoor Unit	Remote Controller		
U4	◎	○	○	—	Transmission error (between indoor and outdoor unit)	156
U5	◎	—	○	○	Transmission error (between indoor and remote controller)	157
U8	◎	—	○	○	Transmission error between “main” remote controller and “sub” remote controller	158
UA	◎	—	○	—	Excessive indoor units connected to this system.	159
UC	◎	—	—	○	Centralized address setting error	161

Indoor Unit

Indoor Unit LED Display	Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
H1P		Other than PC Board	PC Board				
			Outdoor Unit	Indoor Unit	Remote Controller		
◑		—	—	—	—	Normal → to outdoor unit	—
◑ ☼ ●	A1	—	—	○	—	Failure of indoor unit PC board (For self-diagnosis by LED, refer to p.138.)	142
◑	A3	◎	—	—	—	Malfunction of drain water level system	143
◑	AF	◎	—	—	—	Float switch operation during compressor stop	145
◑	A6 (FHQ only)	◎	—	□	—	Indoor unit fan motor overload / overcurrent / lock	146,147
◑	A7	◎	—	□	—	Swing flap motor Malfunction / Lock	149
◑	AJ	◎	—	○	—	Failure of capacity setting	151
◑	C4	◎	—	□	—	Malfunction of heat exchanger temperature sensor system (R2T)	152
◑	C5	◎	—	□	—	Malfunction of heat exchanger temperature sensor system (R3T)	153
◑	C9	◎	—	□	—	Malfunction of suction air temperature sensor system	154
◑	CJ	—	—	□	—	Malfunction of remote control air temperature sensor system	155

Outdoor Unit

Code Indication	Description	Reference Page	
		25/35 class	50/60 class
E5★	OL activation (compressor overload)	164	195
E6★	Compressor lock	165	196
E7	DC fan lock	—	197
E8	Input over current detection	166	198
EA	Four way valve abnormality	167	200
F3	Discharge pipe temperature control	169	202
F6	High pressure control in cooling	184	217
H6	Position sensor abnormality	170	203
H8	CT or related abnormality	171	204
H9	Outdoor air thermistor or related abnormality	173	206
J3	Discharge pipe thermistor or related abnormality	173	206
J6	Heat exchanger thermistor or related abnormality	173	206
L3	Electrical box temperature rise	175	208
L4	Radiation fin temperature rise	177	210
L5	Output over current detection	179	212
P4	Radiation fin thermistor or related abnormality	173	206
U0★	Insufficient gas	181	214
U2	Over-voltage detection	183	—
	Low-voltage detection	—	216

★: Displayed only when system-down occurs.

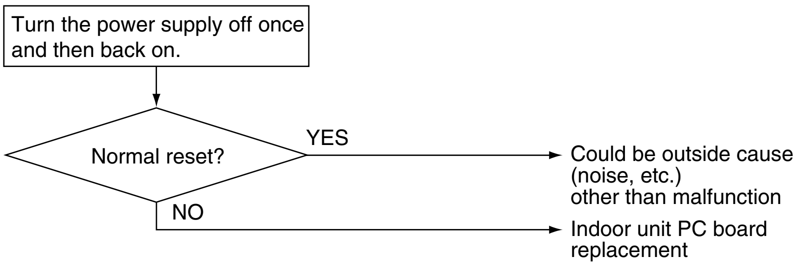
5. Troubleshooting for Indoor Unit

5.1 Failure of Indoor Unit PC Board

Remote Controller Display	A1
Applicable Models	FFQ-B & FHQ-BU
Method of Malfunction Detection	Check data from E²PROM.
Malfunction Decision Conditions	When data could not be correctly received from the E²PROM E²PROM : Type of nonvolatile memory. Maintains memory contents even when the power supply is turned off.
Supposed Causes	■ Failure of PC board

Troubleshooting

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



(S2006)

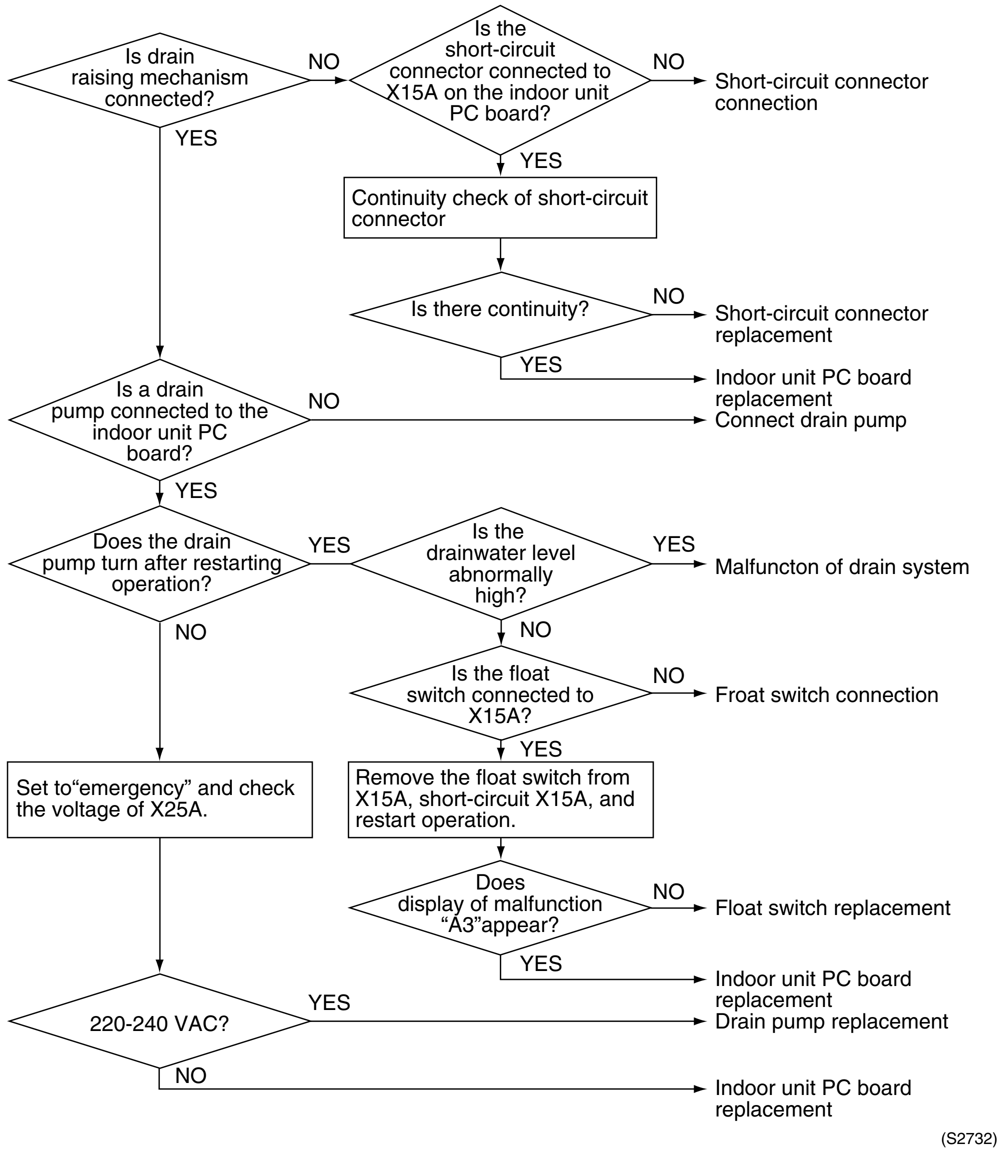
5.2 Malfunction of Drain Water Level System (Float Type)

Remote Controller Display	A3
Applicable Models	FFQ-B & FHQ-BU
Method of Malfunction Detection	By float switch OFF detection
Malfunction Decision Conditions	When rise of water level is not a condition and the float switch goes OFF.
Supposed Causes	■ Failure of drain pump ■ Improper drain piping work ■ Drain piping clogging ■ Failure of float switch ■ Failure of indoor unit PC board ■ Failure of short-circuit connector

Troubleshooting

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

If "A3" is detected by a PC board which is not mounted with X15A, the PC board is defective.

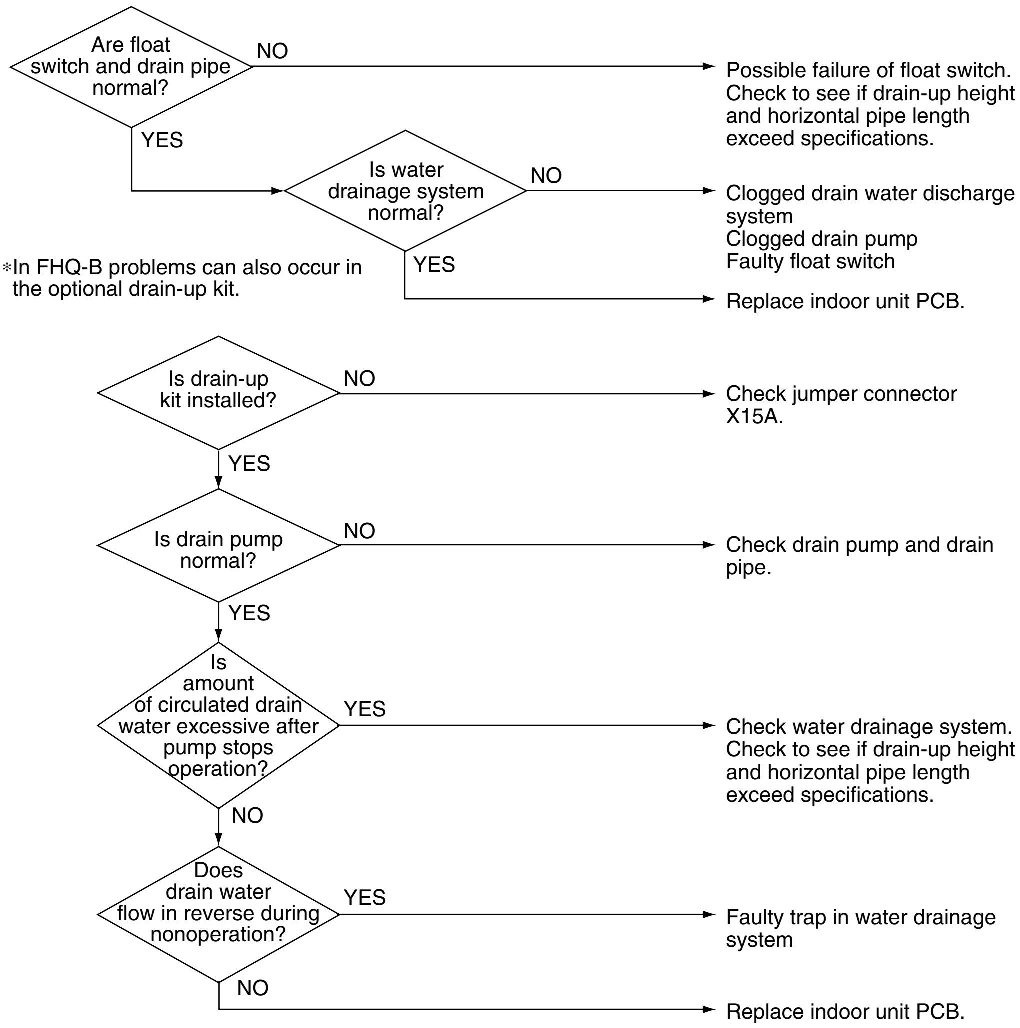


5.3 Failure of Drain System

Remote Controller Display	AF
Applicable Models	FHQ-BU
Method of Malfunction Detection	Water leakage is detected based on float switch ON/OFF operation while the compressor is in non-operation.
Malfunction Decision Conditions	When the float switch changes from ON to OFF while the compressor is in non-operation.
Supposed Causes	■ Error in drain pipe installation ■ Faulty float switch ■ Faulty indoor unit PCB

Troubleshooting

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



(S2733)

5.4 Indoor Unit Fan Motor Lock

Remote Controller Display

A6

Applicable Models

FHQ-BU

Method of Malfunction Detection

Detection by failure of signal for detecting number of turns to come from the fan motor

Malfunction Decision Conditions

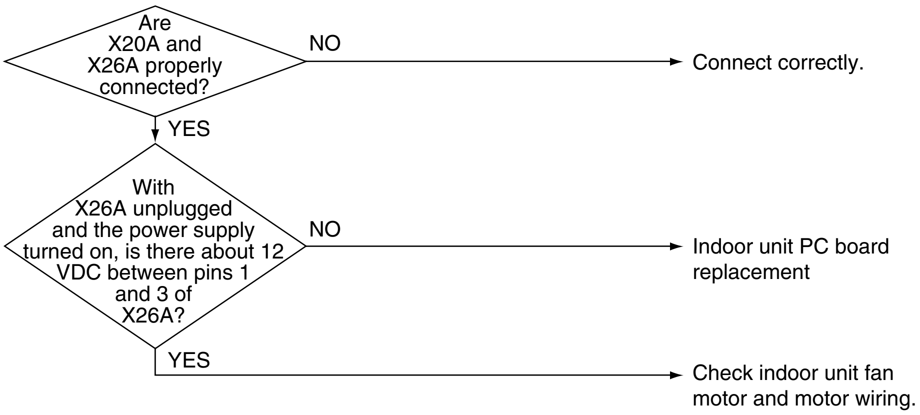
When number of turns can't be detected even when output voltage to the fan is maximum

Supposed Causes

- Failure of indoor unit fan motor
- Broken or disconnected wire
- Failure of contact
- Failure of indoor unit PC board

Troubleshooting

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



(S2008)

5.5 Malfunction of Indoor Unit Fan Motor

Remote Controller Display	A6
Applicable Models	FFQ-B
Method of Malfunction Detection	Detection of abnormal fan speed by signal from the fan motor
Malfunction Decision Conditions	When fan speed does not increase

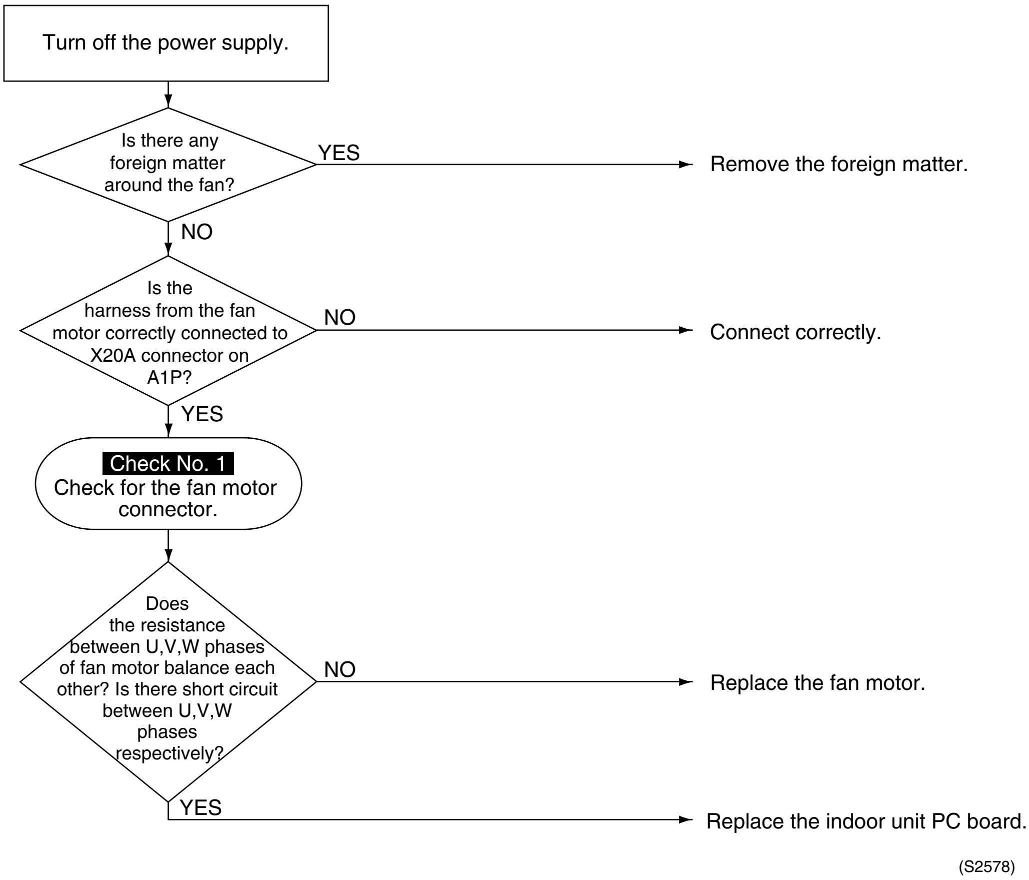
Supposed Causes

- Disconnection, short circuit or disengagement of connector in fan motor harness
- Faulty fan motor (disconnection, poor insulation)
- Abnormal signal from fan motor (faulty circuit)
- Faulty PC board
- Instantaneous fluctuation of power supply voltage
- Fan motor lock
  (Caused by motor or other external factors)
- Fan does not turn due to a tangle of foreign matters.

Troubleshooting

Check No.1
Refer to P.162

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

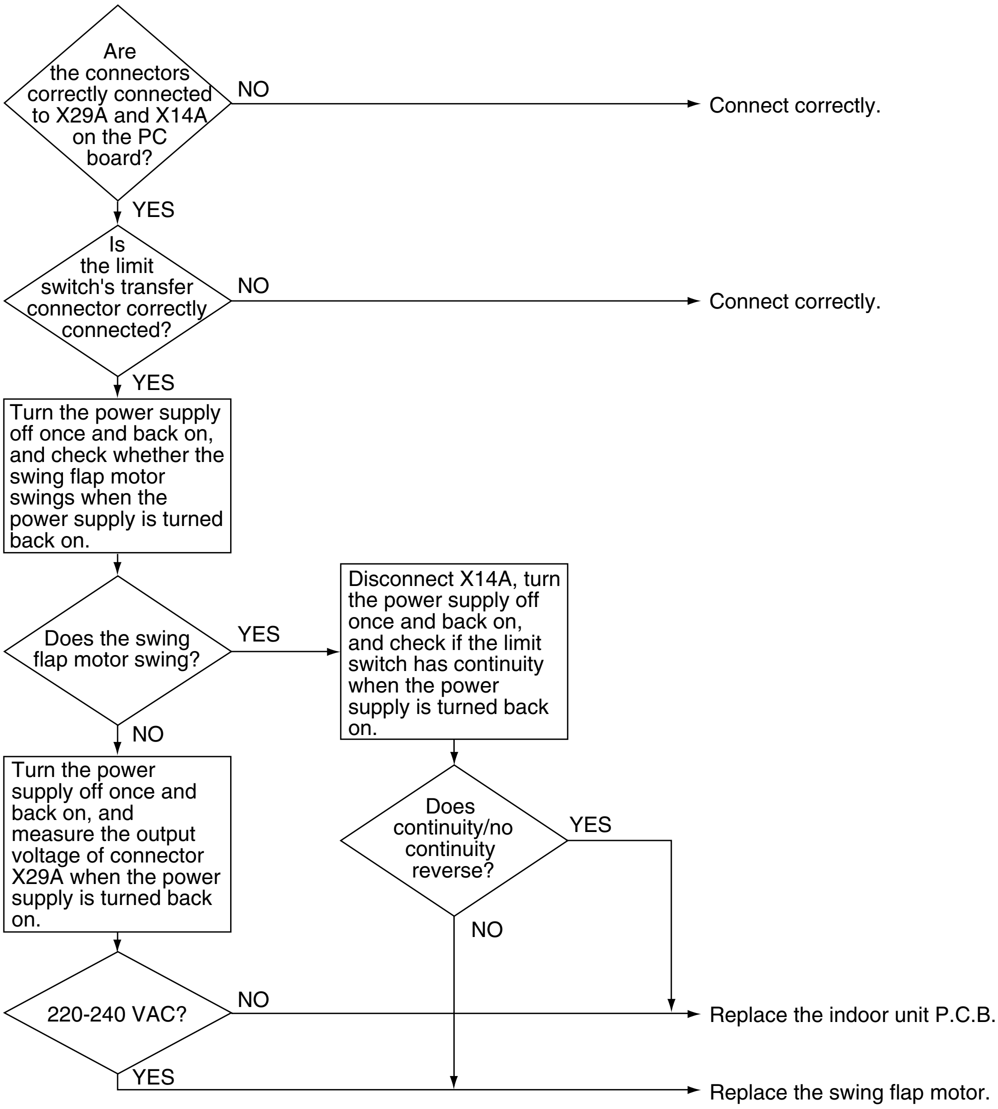


5.6 Swing Flap Motor Malfunction / Lock

Remote Controller Display	A7
Applicable Models	FHQ-BU
Method of Malfunction Detection	Utilizes ON/OFF of the limit switch when the motor turns.
Malfunction Decision Conditions	When ON/OFF of the microswitch for positioning cannot be reversed even though the swing flap motor is energized for a specified amount of time (about 30 seconds).
Supposed Causes	■ Failure of motor ■ Failure of microswitch ■ Failure of connector connection ■ Failure of indoor unit PC board

Troubleshooting

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



(S2009)

5.7 Failure of Capacity Setting

Remote Controller Display

AJ

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Capacity is determined according to resistance of the capacity setting adaptor and the memory inside the IC memory on the indoor unit PC board, and whether the value is normal or abnormal is determined.

Malfunction Decision Conditions

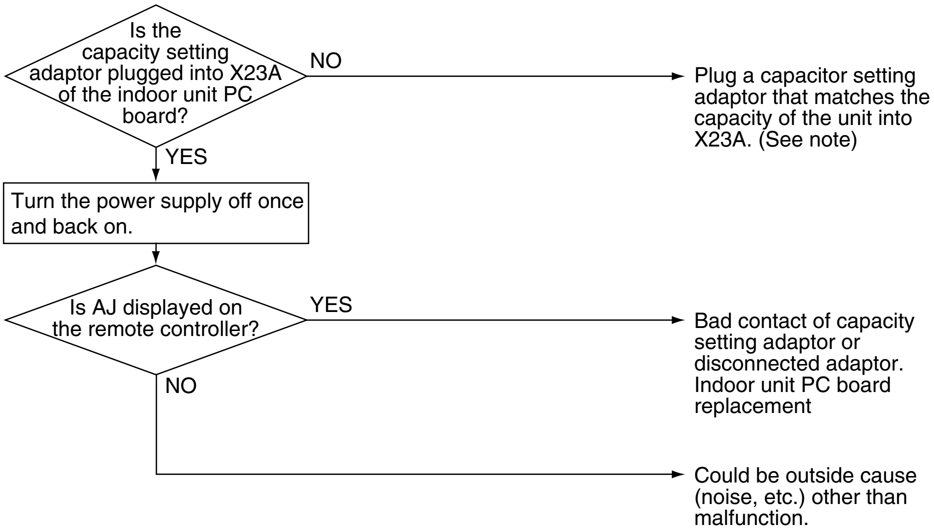
Operation and:
(1)When the capacity code is not contained in the PC board's memory, and the capacity setting adaptor is not connected.
(2)When a capacity that doesn't exist for that unit is set.

Supposed Causes

- Failure of capacity setting adaptor connection
- Failure of indoor unit PC board

Troubleshooting

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



(S2579)

Note: Capacity is factory set in the data IC on the PC board. A capacity setting adaptor that matches the capacity of the unit is required in the following case.
If the indoor PC board installed at the factory is for some reason changed at the installation site, the capacity will not be contained in the replacement PC board.
If you connect a capacity setting adaptor to a PC board in which the capacity is memorized, the capacity setting for the PC board will become the capacity setting of the adaptor. (Priority of capacity setting adaptor)

5.8 Malfunction of Heat Exchanger Thermistor (R2T)

Remote Controller Display

C4

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Malfunction detection is carried out by temperature detected by heat exchanger sensor.

Malfunction Decision Conditions

When the heat exchanger thermistor becomes disconnected or shorted while the unit is running.

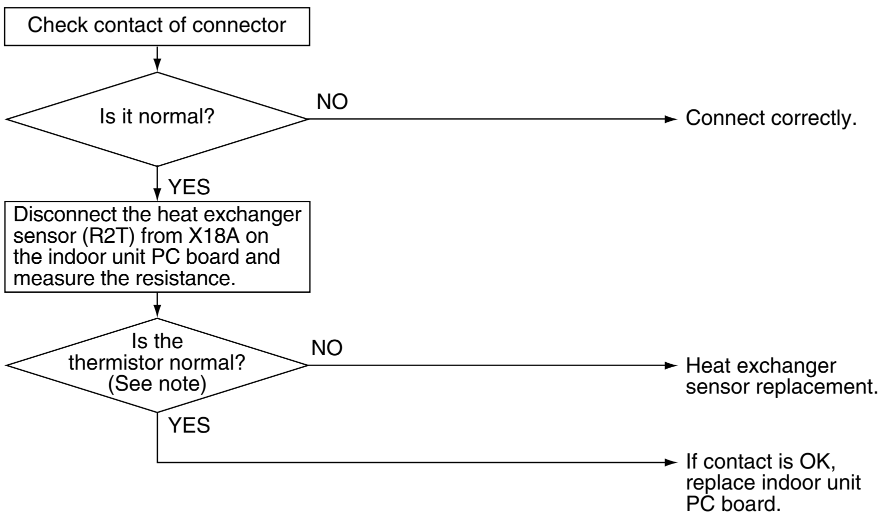
Supposed Causes

- Failure of the sensor itself
- Broken or disconnected wire
- Failure of electronic circuitry (indoor unit PC board)
- Failure of connector contact

Troubleshooting

Check No.2
Refer to P.163

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



★See Check No. 2 for "Thermistor temperature and resistance characteristics".

(S2734)

5.9 Malfunction of Heat Exchanger Thermistor (R3T)

Remote Controller Display

C5

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Malfunction detection is carried out by temperature detected by heat exchanger sensor (R3T).

Malfunction Decision Conditions

When the heat exchanger thermistor becomes disconnected or shorted while the unit is running.

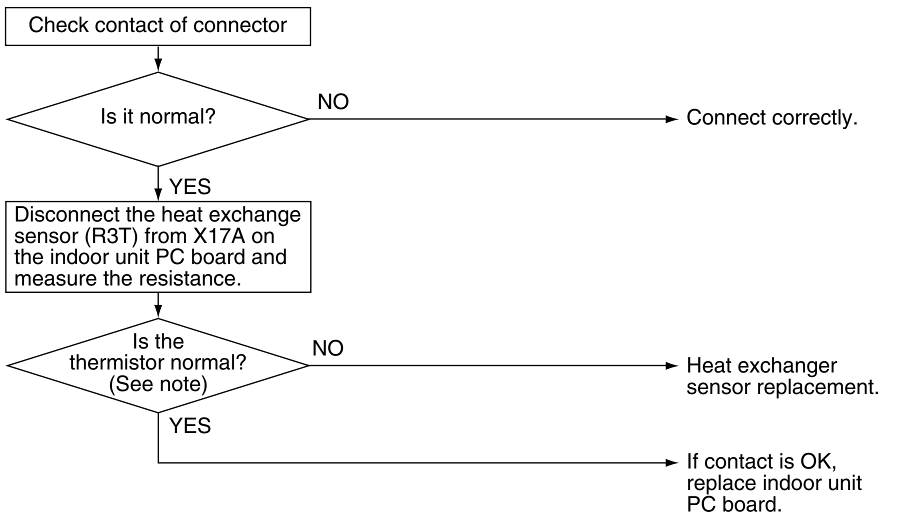
Supposed Causes

- Failure of the sensor itself
- Broken or disconnected wire
- Failure of electronic circuitry (indoor unit PC board)
- Failure of connector contact

Troubleshooting

Check No.2
Refer to P.163

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



★See Check No. 2 for “Thermistor temperature and resistance characteristics”.

(S2722)

5.10 Malfunction of Suction Air Thermistor

Remote Controller Display

C9

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Malfunction detection is carried out by temperature detected by suction air temperature sensor.

Malfunction Decision Conditions

When the suction air temperature sensor's thermistor becomes disconnected or shorted while the unit is running.

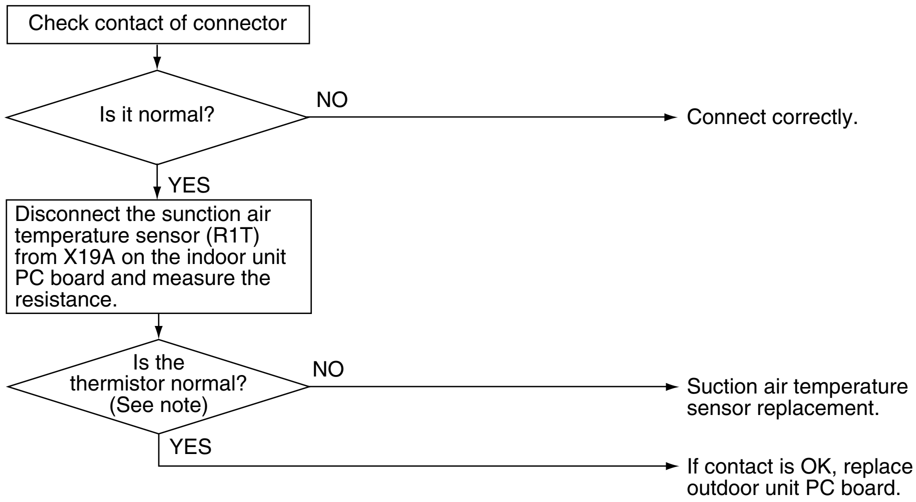
Supposed Causes

- Failure of the sensor itself
- Broken or disconnected wire
- Failure of indoor unit PC board
- Failure of connector contact

Troubleshooting

Check No.2
Refer to P.163

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



★See Check No. 2 for "Thermistor temperature and resistance characteristics".

(S2012)

5.11 Malfunction of Remote Controller Thermistor

Remote Controller Display

CJ

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Even if remote controller thermistor is faulty, system is possible to operate by system thermistor. Malfunction detection is carried out by temperature detected by remote controller thermistor.

Malfunction Decision Conditions

When the remote controller thermistor becomes disconnected or shorted while the unit is running.

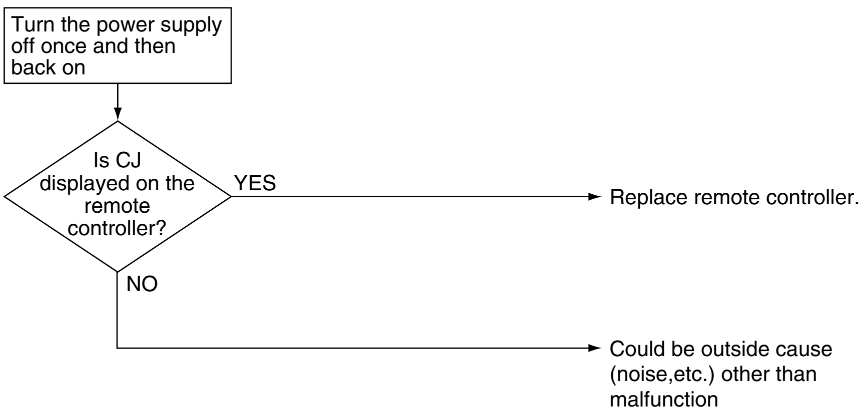
Supposed Causes

- Failure of sensor itself
- Broken wire

Troubleshooting

Check No.2
Refer to P.163

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



★See Check No. 2 for “Thermistor temperature and resistance characteristics”.

(S1168)

5.12 Transmission Error (Between Indoor and Outdoor Unit)

Remote Controller Display

U4

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Microcomputer checks if transmission between indoor and outdoor units is normal.

Malfunction Decision Conditions

When transmission is not carried out normally for a certain amount of time

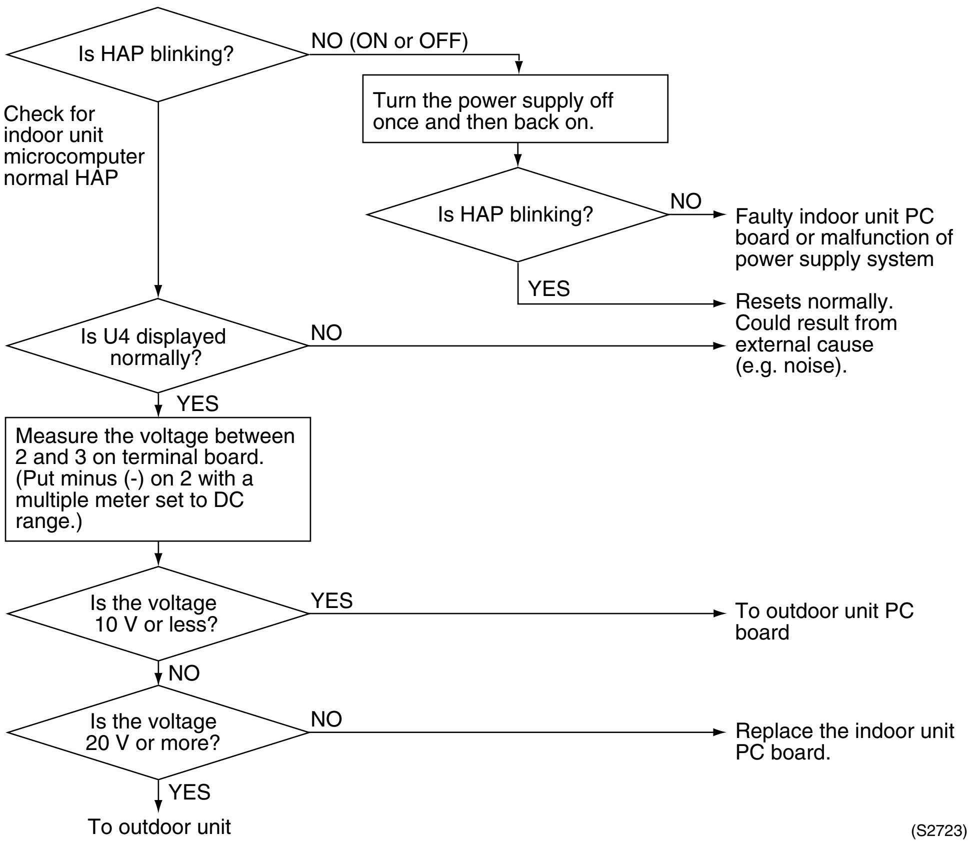
Supposed Causes

- Wiring indoor-outdoor transmission wire is incorrect.
- Failure of indoor unit PC board
- Failure of outdoor unit PC board
- Outside cause (noise, etc.)
- Power supply -open phase

Troubleshooting

Diagnosis of incorrect or broken/disconnected wiring
If the LEDs on the indoor unit PC board are off, it indicates that the transmission wiring between indoor and outdoor units may be incorrect or broken/disconnected.

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



5.13 Transmission Error (Between Indoor Unit and Remote Controller)

Remote Controller Display

U5

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

Microcomputer checks if transmission between indoor unit and remote controller is normal.

Malfunction Decision Conditions

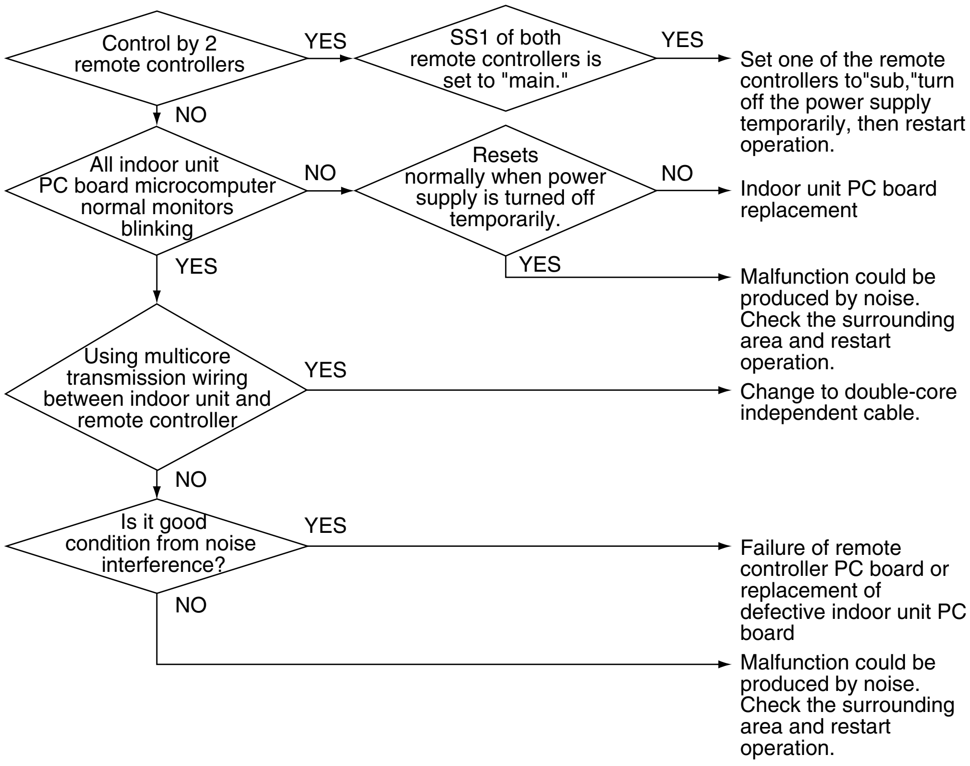
When transmission is not carried out normally for a certain amount of time

Supposed Causes

- Failure of remote controller
- Failure of indoor PC board
- Outside cause (noise, etc.)
- Connection of 2 master remote controllers (When using 2 remote controllers)

Troubleshooting

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



(S2041)

5.14 Transmission Error (Between Main and Sub Remote Controller)

Remote Controller Display

U8

Applicable Models

FFQ-B, FHQ-BU

Method of Malfunction Detection

In case of controlling with 2- remote controller, check the system using microcomputer if signal transmission between indoor unit and remote controller (main and sub) is normal.

Malfunction Decision Conditions

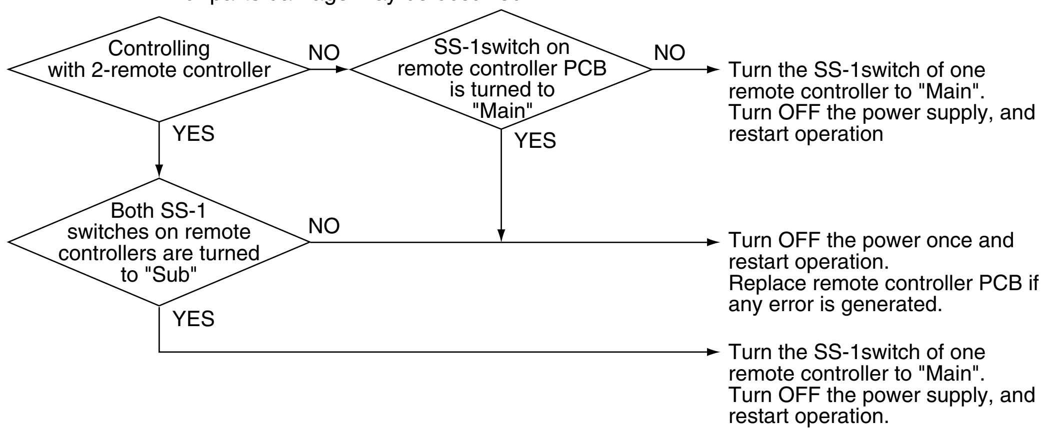
Normal transmission does not continue for specified period.

Supposed Causes

- Transmission error between Main remote controller and Sub remote controller
- Connection among “Sub” remote controllers
- Faulty remote controller PCB

Troubleshooting

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



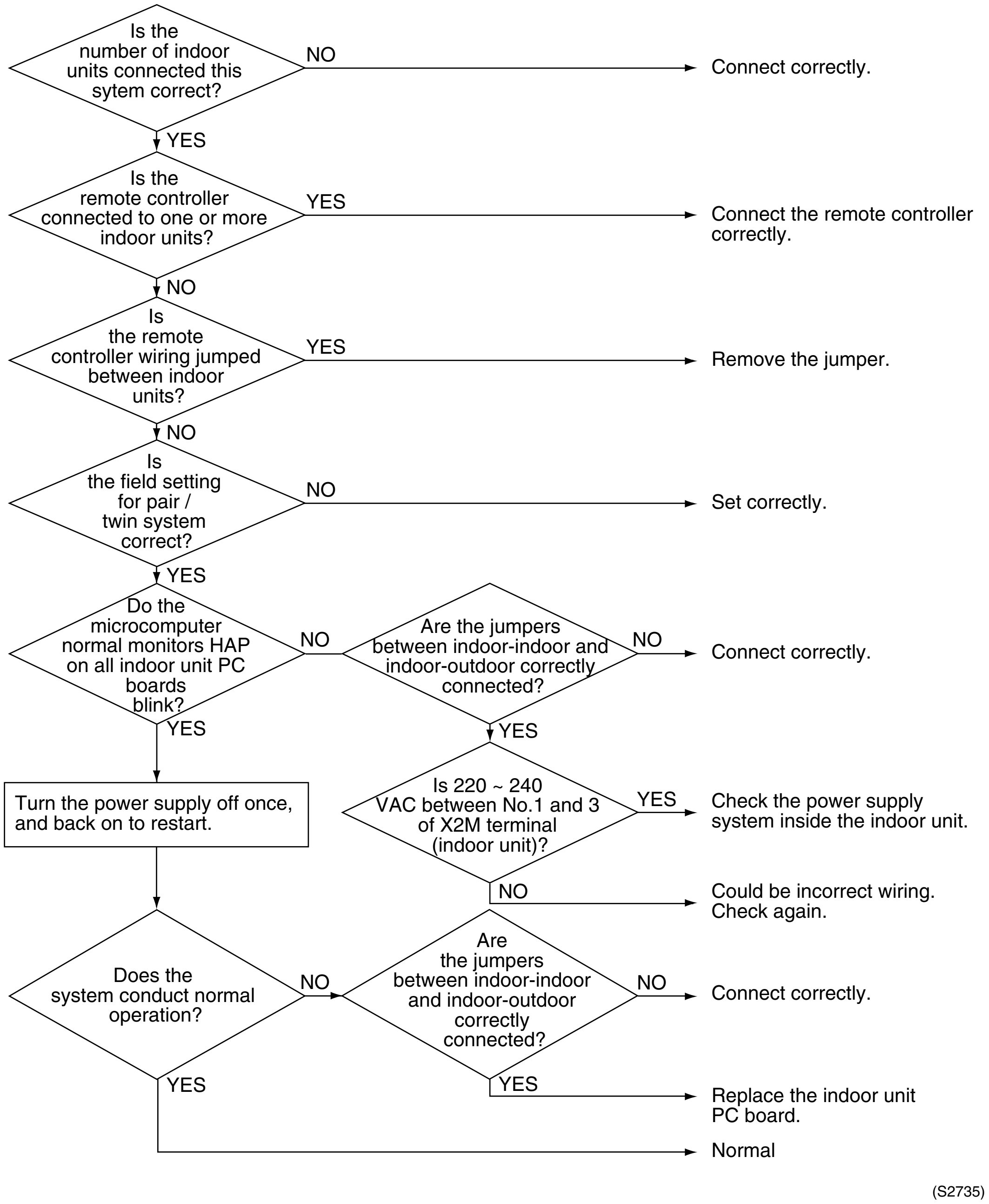
(S2042)

5.15 Malfunction of Field Setting Switch

Remote Controller Display	UA
Applicable Models	FFQ-B, FHQ-BU
Method of Malfunction Detection	
Malfunction Decision Conditions	Incorrect field setting The number of indoor units connected to this system is more than limited.
Supposed Causes	■ Indoor-Outdoor, Indoor-Indoor transmission line ■ Faulty remote controller wiring

Troubleshooting

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

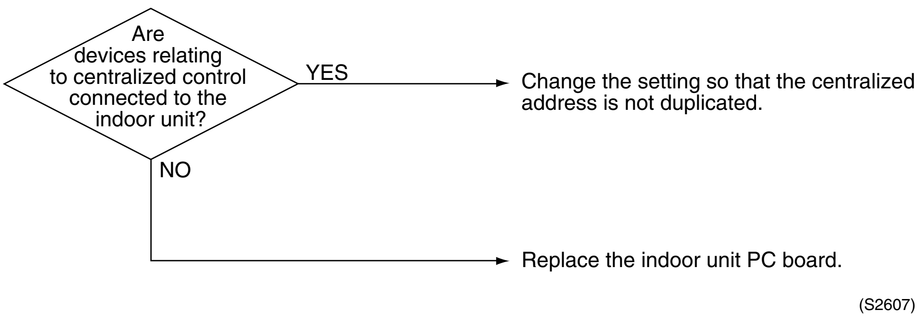


5.16 Centralized Address Setting Error

Remote Controller Display	UC
Applicable Models	FFQ-B, FHQ-BU
Method of Malfunction Detection	Indoor unit microcomputer detects and judges the centralized address signal according to the transmission between indoor units.
Malfunction Decision Conditions	When the microcomputer judges that the centralized address signal is duplicated
Supposed Causes	■ Faulty centralized address setting ■ Faulty indoor unit PC board

Troubleshooting

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

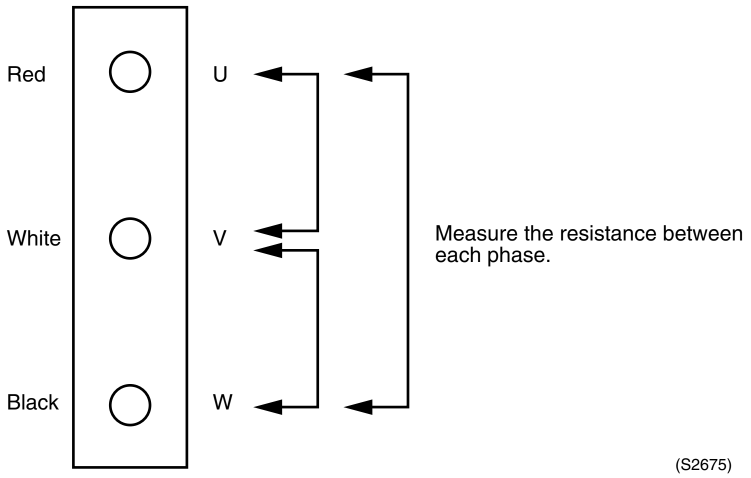


5.17 Checks for Indoor Unit

Check No. 1

Check for Fan Motor Connector (Power Supply Line)

(1) Turn the power supply off.
With the relay connector disconnected, measure the resistance between UVW phases of the connector (3 cores) at the motor side, then make sure that the resistance between each phase is balanced and not short-circuited.



Check No. 2 Check for Thermistors

Disconnect the thermistor connector from PC board, then measure the resistance by using a tester.

Thermistor temperature and resistance characteristics Unit : kΩ

Temperature °C	A	B
-6.0	90.8	88.0
-4.0	81.7	79.1
-2.0	73.5	71.1
0.0	66.3	64.1
2.0	59.8	57.8
4.0	54.1	52.3
6.0	48.9	47.3
8.0	44.3	42.9
10.0	40.2	38.9
12.0	36.5	35.3
14.0	33.2	32.1
16.0	30.2	29.2
18.0	27.5	26.6
20.0	25.1	24.3
22.0	23.0	22.2
24.0	21.0	20.3
26.0	19.2	18.5
28.0	17.6	17.0
30.0	16.2	15.6
32.0	14.8	4.2
34.0	13.6	13.1
36.0	12.5	12.0
38.0	11.5	11.1
40.0	10.6	10.3
42.0	9.8	9.5
44.0	9.1	8.8
46.0	8.4	8.2
48.0	7.8	7.6
50.0	7.2	7.0
52.0	6.9	6.7
54.0	6.2	6.0
56.0	5.7	5.5
58.0	5.3	5.2
Application	● Heat exchanger (Indoor/Outdoor units) ● Suction air ● Remote controller ● Air ● Outdoor air ● Suction pipe	● Radiator fin

6. Troubleshooting for Outdoor Unit (25/35 class)

6.1 OL Activation (Compressor Overload)

Remote Controller Display

E5

Method of Malfunction Detection

A compressor overload is detected through compressor OL.

Malfunction Decision Conditions

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

∗ The operating temperature condition is not specified.

Supposed Causes

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

Troubleshooting

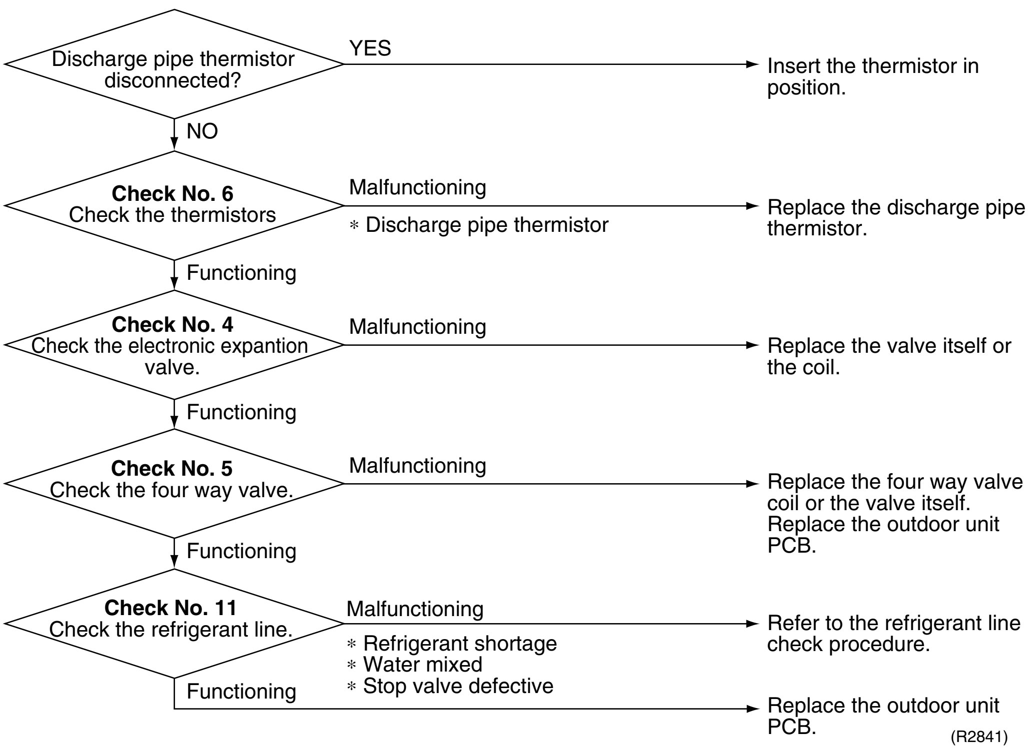
Check No.4
Refer to P.187

Check No.5
Refer to P.188

Check No.6
Refer to P.189

Check No.11
Refer to P.192

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



6.2 Compressor Lock

Remote Controller Display

E6

Method of Malfunction Detection

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

Malfunction Decision Conditions

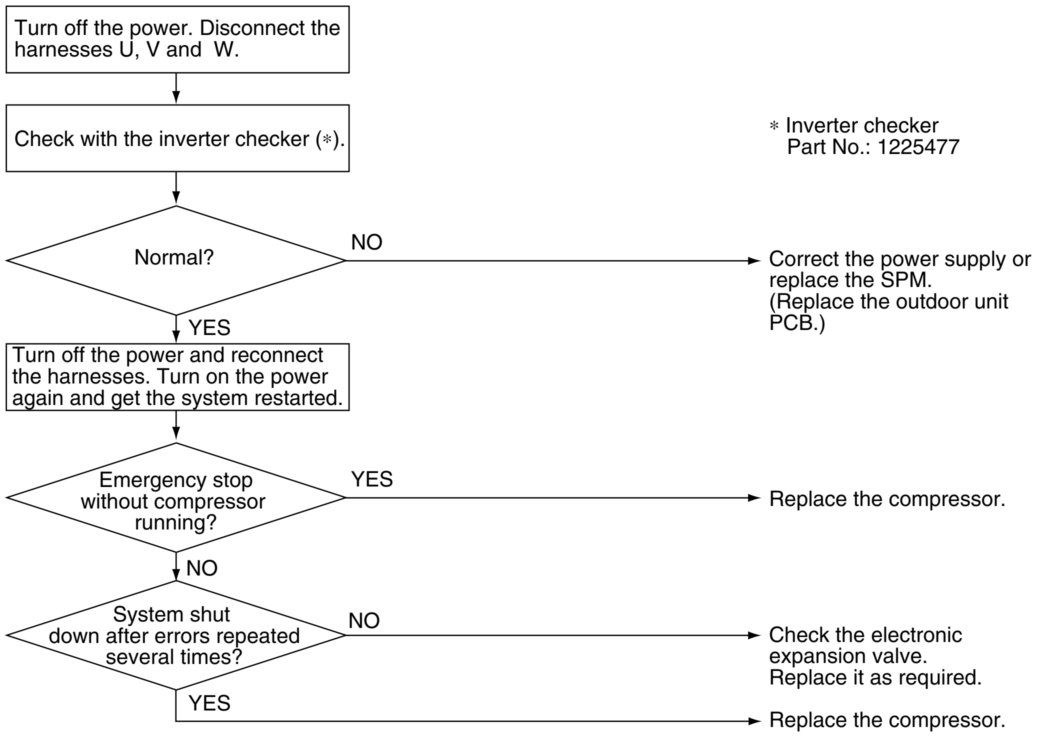
- The system judges the compressor lock, and stops due to over current.
- The system judges the compressor lock, and cannot operation with position detection within 15 seconds after start up.
- The system will be shut down if the error occurs 16 times.
- Clearing condition: Continuous run for about 5 minutes (normal)

Supposed Causes

- Compressor locked

Troubleshooting

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



(R2842)

Note: If the model doesn't have SPM, replace the outdoor unit PCB.

6.3 Input Over Current Detection

Remote Controller Display

E8

Method of Malfunction Detection

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

Malfunction Decision Conditions

- The following CT input with the compressor running continues for 2.5 seconds.
  Cooling: Above 11A, Heating: Above 13A

Supposed Causes

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

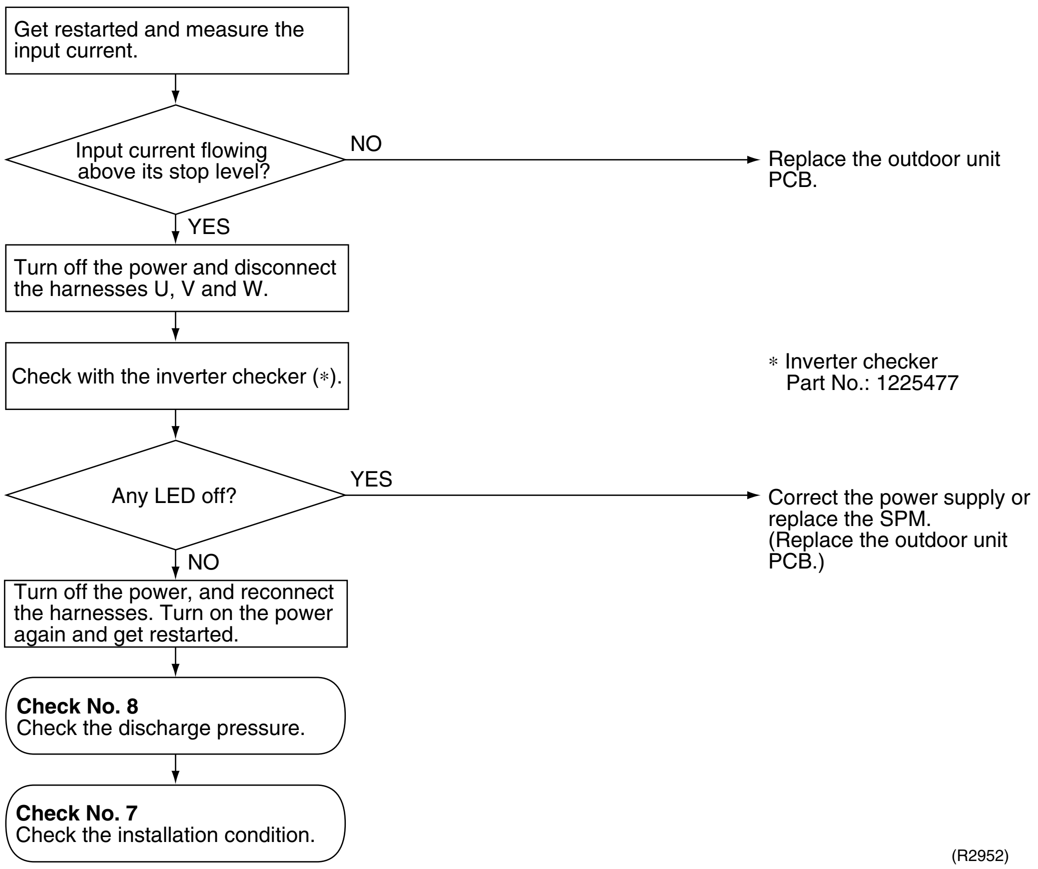
Troubleshooting

Check No.7
Refer to P.190

Check No.8
Refer to P.190

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

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



Note: If the model doesn't have SPM, replace the outdoor unit PCB.

6.4 Four Way Valve Abnormality

Remote Controller Display

EA

Method of Malfunction Detection

The indoor air temperature thermistor, the indoor unit heat exchanger thermistor, the outdoor temperature thermistor and the outdoor unit heat exchanger thermistor are checked to see if they function within their normal ranges in the operating mode.

Malfunction Decision Conditions

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

- Cooling / dry operation
  (room temp. – indoor heat exchanger temp.) < –10°C
- Heating
  (indoor unit heat exchanger temp. – room temp.) < –10°C

Supposed Causes

- Connector in poor contact
- Thermistor defective
- Outdoor unit PCB defective
- Four way valve coil or harness defective
- Four way valve defective
- Foreign substance mixed in refrigerant
- Insufficient gas

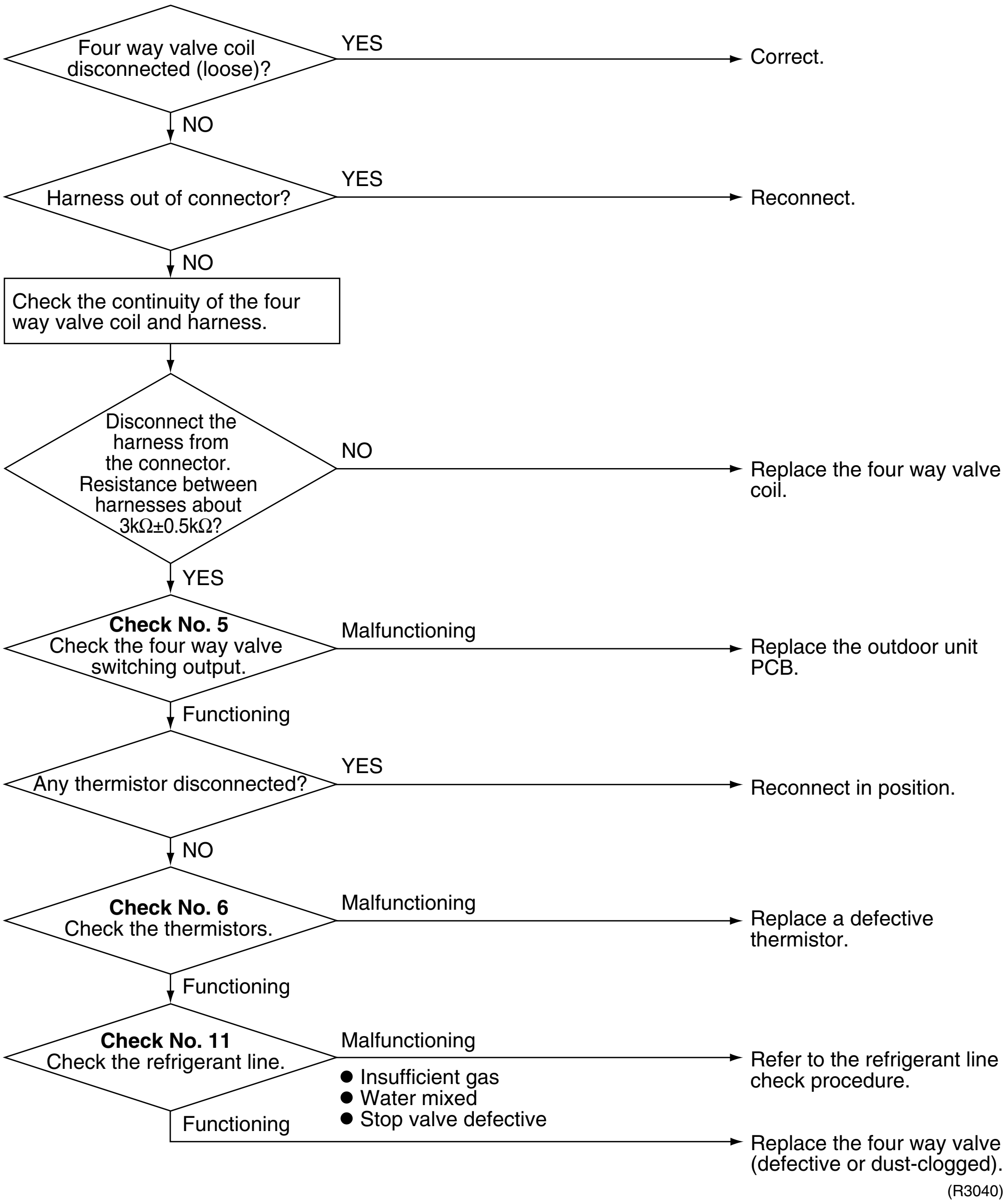
Troubleshooting

Check No.5
Refer to P.188

Check No.6
Refer to P.189

Check No.11
Refer to P.192

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



6.5 Discharge Pipe Temperature Control

Remote Controller Display

F3

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

Stop temperatures

	A	B
(1) above 45Hz (rising), above 40Hz (dropping)	120	80
(2) 130~45Hz (rising), 25~40Hz (dropping)	110	70
(3) below 30Hz (rising), below 25Hz (dropping)	105	65

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

Supposed Causes

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

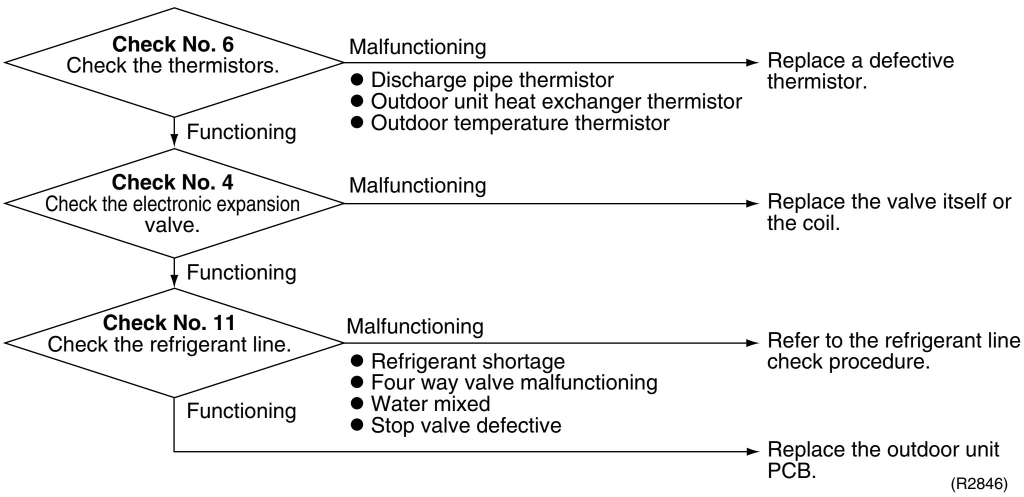
Troubleshooting

Check No.4
Refer to P.187

Check No.6
Refer to P.189

Check No.11
Refer to P.192

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



6.6 Position Sensor Abnormality

Remote Controller Display

H6

Method of Malfunction Detection

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

Malfunction Decision Conditions

- The compressor fails to start in about 15 seconds after the compressor run command signal is sent.
- Clearing condition: Continuous run for about 5 minutes (normal)
- The system will shut down if the error occurs 16 times.

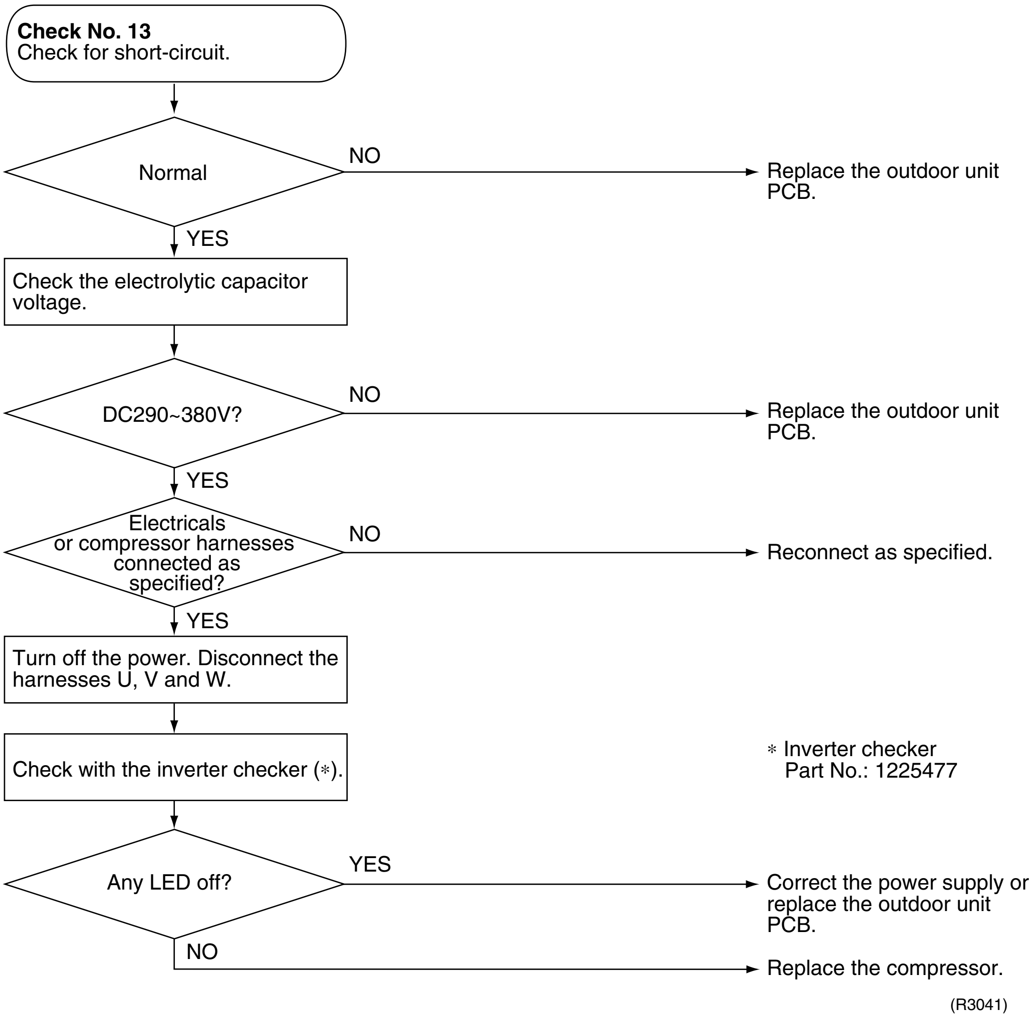
Supposed Causes

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

Troubleshooting

Check No.13
Refer to P.193

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



6.7 CT or Related Abnormality

Remote Controller Display

H8

Method of Malfunction Detection

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

Malfunction Decision Conditions

The compressor running frequency is below 62 Hz and the CT input is below 0.1 V.
(The input current is also below 0.5 A.)

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

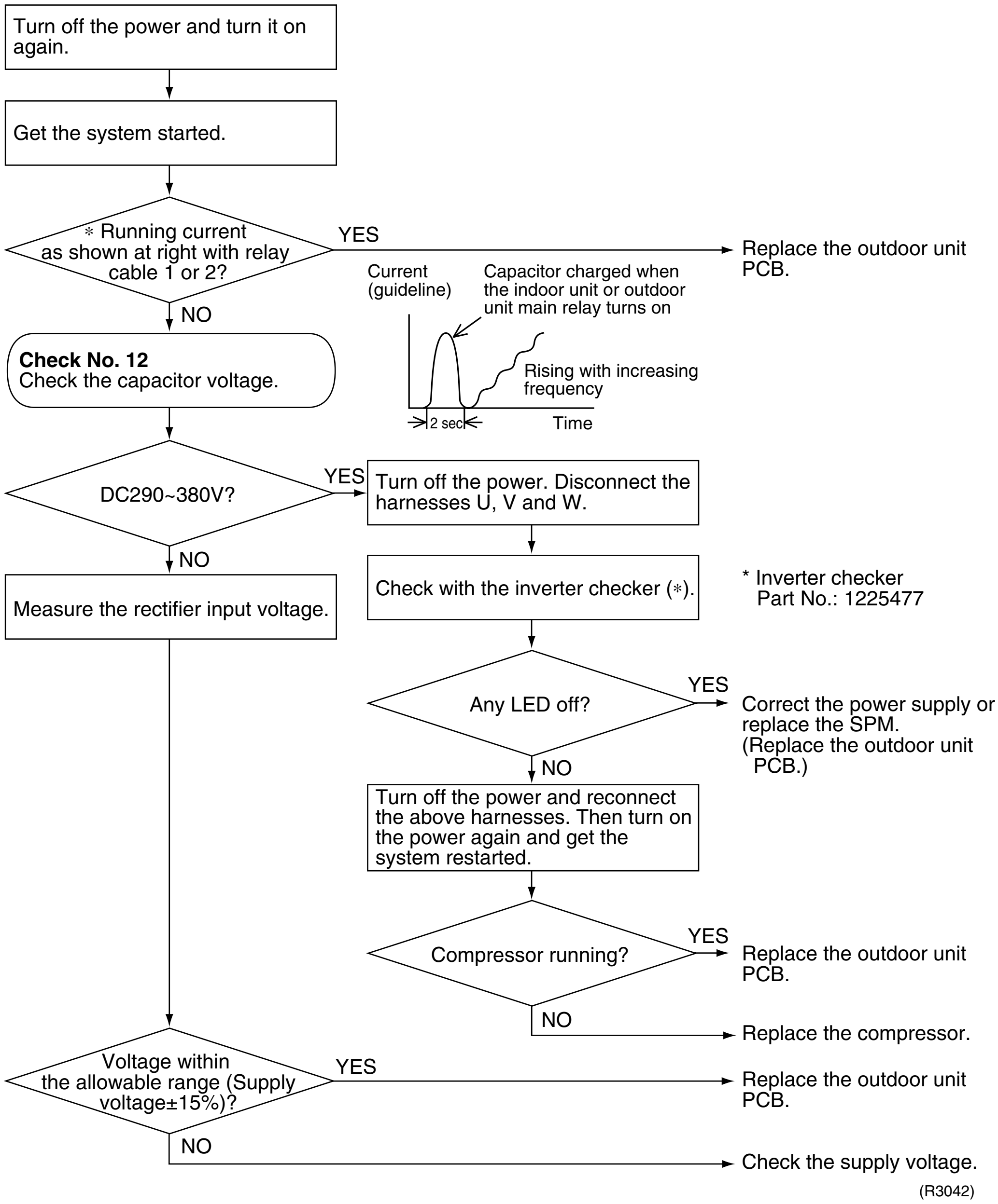
Supposed Causes

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

Troubleshooting

Check No.12
Refer to P.193

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



6.8 Thermistor or Related Abnormality (Outdoor Unit)

Remote Controller Display

P4, J3, J6, H9

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

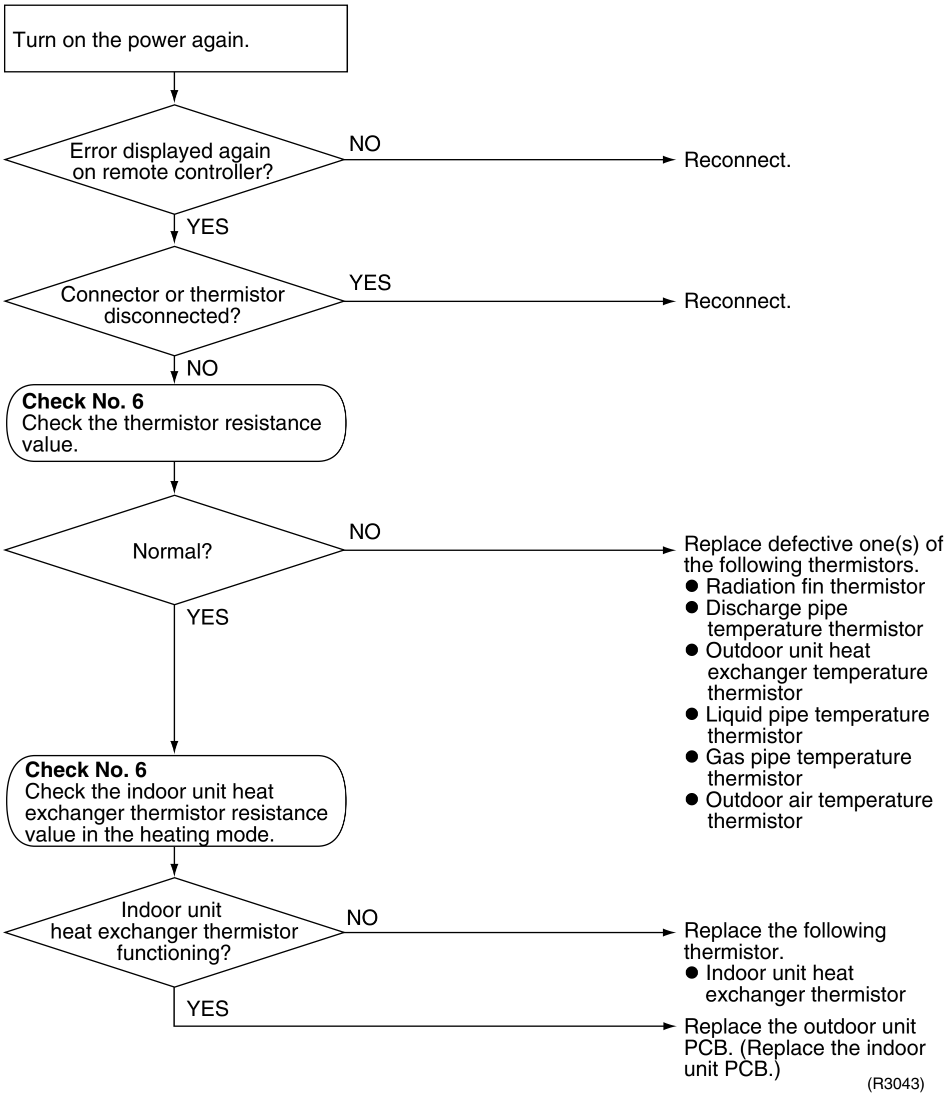
Supposed Causes

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

Troubleshooting

Check No.6
Refer to P.189

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



P4 : Radiation fin thermistor
J3 : Discharge pipe thermistor
J6 : Outdoor heat exchanger thermistor
H9 : Outdoor air thermistor

6.9 Electrical Box Temperature Rise

Remote Controller Display

L3

Method of Malfunction Detection

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

Malfunction Decision Conditions

With the compressor off, the radiation fin temperature is above 122°C. (Reset is made when the temperature drops below 113°C.)

Supposed Causes

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

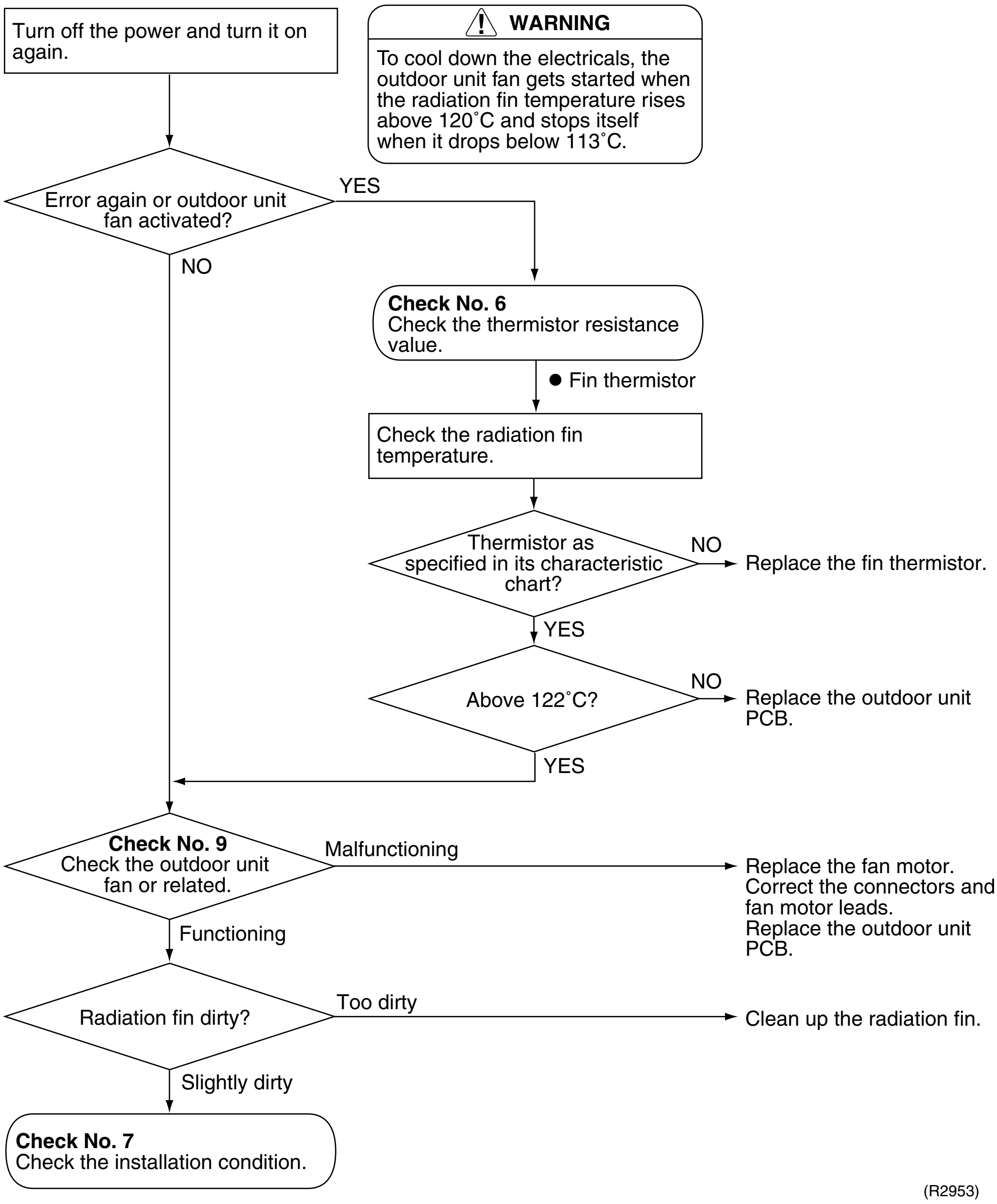
Troubleshooting

Check No.6
Refer to P.189

Check No.7
Refer to P.190

Check No.9
Refer to P.191

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



6.10 Radiation Fin Temperature Rise

Remote Controller Display

L4

Method of Malfunction Detection

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

Malfunction Decision Conditions

If the radiation fin temperature with the compressor on is above 81°C,

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

Supposed Causes

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

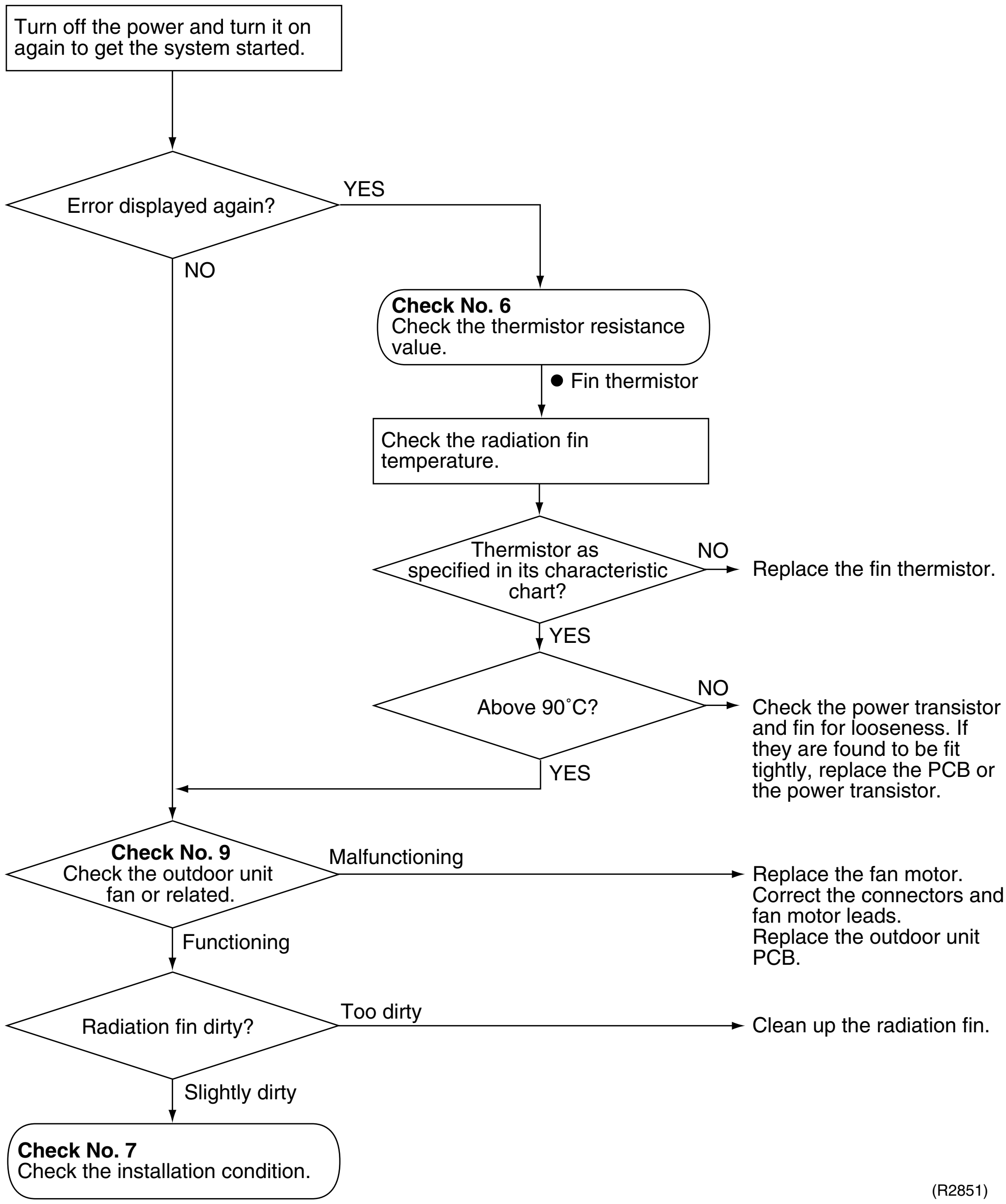
Troubleshooting

Check No.6
Refer to P.189

Check No.7
Refer to P.190

Check No.9
Refer to P.191

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



6.11 Output Over Current Detection

Remote Controller Display

L5

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

Supposed Causes

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

Troubleshooting

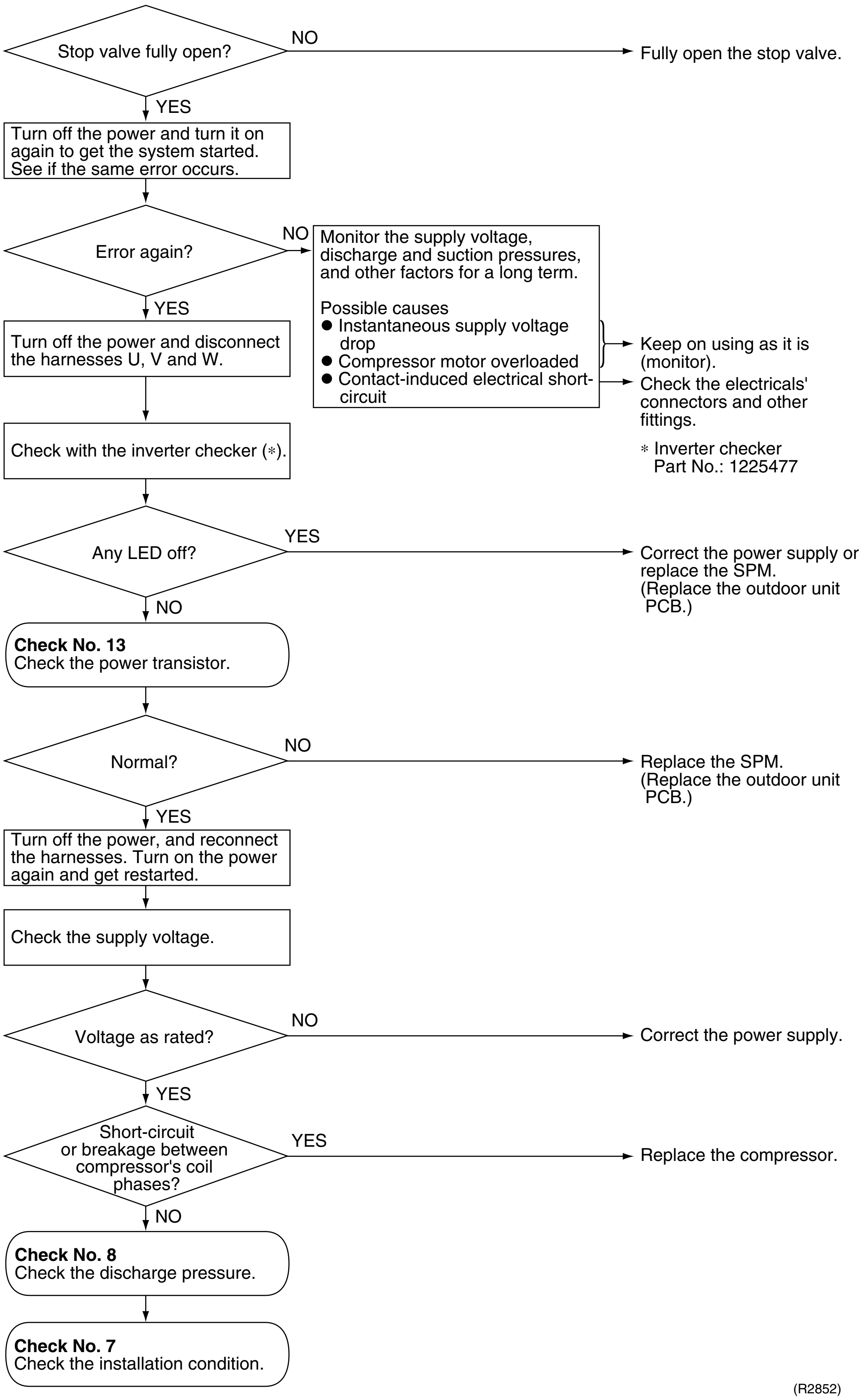
Check No.7
Refer to P.190

Check No.8
Refer to P.190

Check No.13
Refer to P.193

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

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



Note: If the model doesn't have SPM, replace the outdoor unit PCB.

6.12 Insufficient Gas

Remote Controller Display

U0

Method of Malfunction Detection

Gas shortage detection I : A gas shortage is detected by checking the CT-detected input current value and the compressor running frequency.
Gas shortage detection II : A gas shortage is detected by checking the difference between indoor unit heat exchanger temperature and room temperature as well as the difference between outdoor unit heat exchanger temperature and room temperature.

Malfunction Decision Conditions

Gas shortage detection I :
Input current < 𝔸 (A/Hz) x Compressor running frequency × Voltage + 𝔹
However, when the status of running frequency > ℂ (Hz) is kept on for a certain time.
Note : The values are different from model to model.

𝔸	𝔹	ℂ
1120 / 256	–80	65

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

Supposed Causes

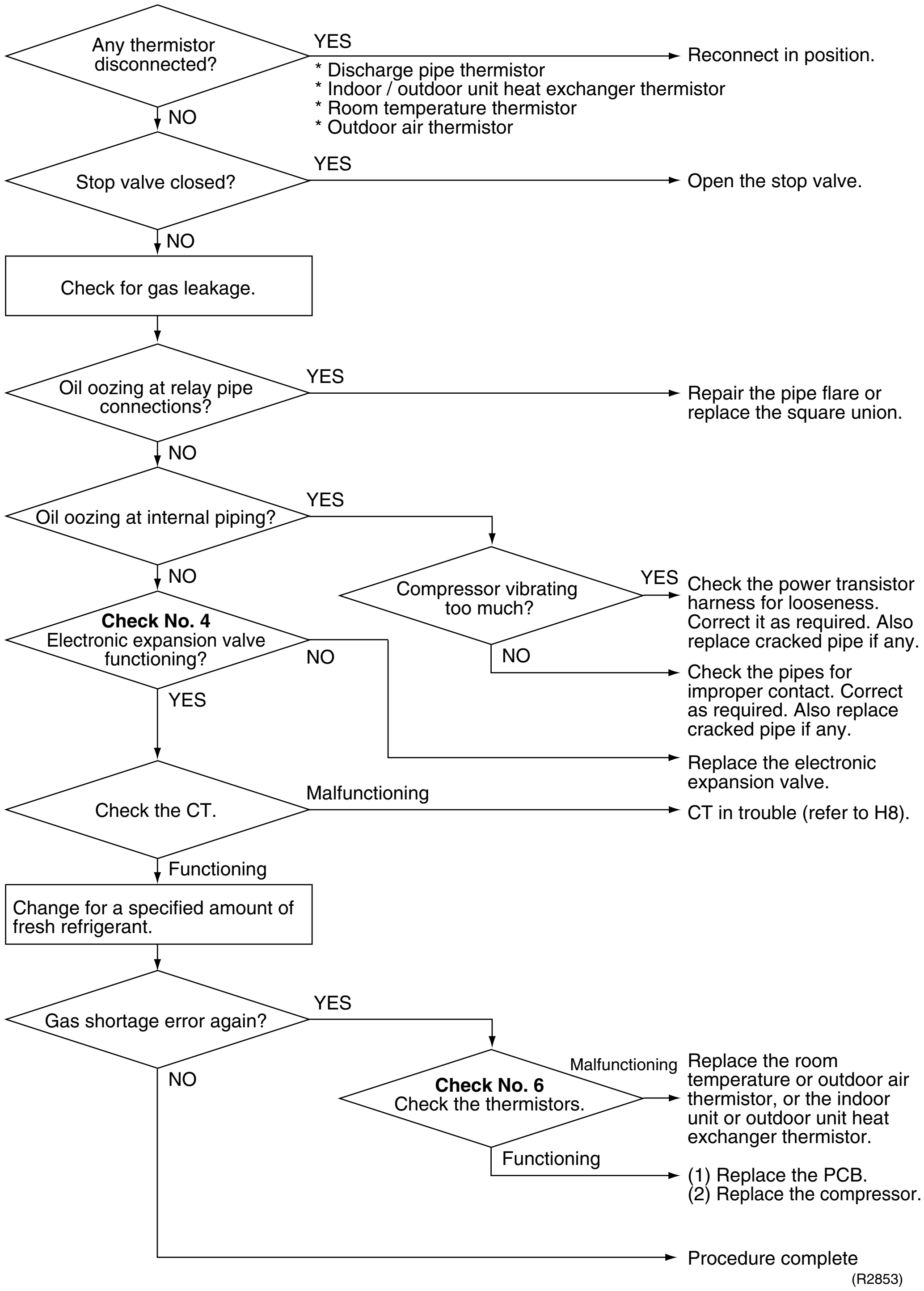
- Refrigerant shortage (refrigerant leakage)
- Poor compression performance of compressor
- Discharge pipe thermistor disconnected, or indoor unit or outdoor unit heat exchanger thermistor disconnected, room or outdoor air temperature thermistor disconnected
- Stop valve closed
- Electronic expansion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

Troubleshooting

Check No.4
Refer to P.187

Check No.6
Refer to P.189

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



6.13 Over-voltage Detection

Remote Controller Display

U2

Method of Malfunction Detection

An abnormal voltage rise is detected by checking the specified over-voltage detection circuit.

Malfunction Decision Conditions

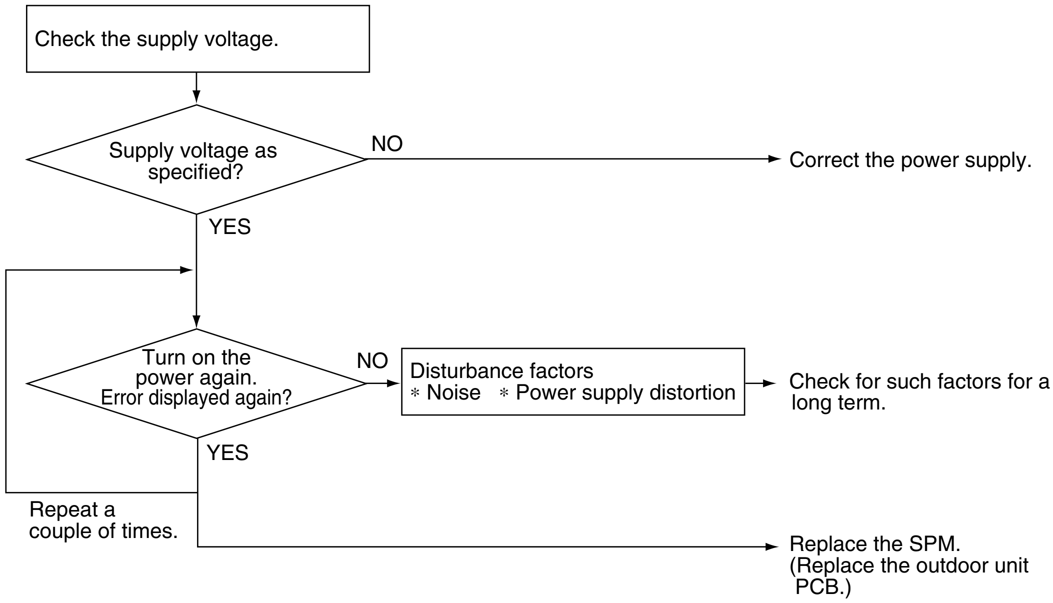
- An over-voltage signal is fed from the over-voltage detection circuit to the microcomputer (The voltage is over 400V).
- The system will be shut down if the error occurs 5 times.
- Clearing condition: Continuous run for about 60 minutes (normal)

Supposed Causes

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

Troubleshooting

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



(R2957)

Note: If the model doesn't have SPM, replace the outdoor unit PCB.

6.14 High Pressure Control in Cooling

Remote Controller Display

F6

Method of Malfunction Detection

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

Malfunction Decision Conditions

Activated when the temperature being sensed by the heat exchanger thermistor rises above 60°C. (Deactivated when the said temperature drops below 50°C.)

Supposed Causes

- The installation space is not large enough.
- Faulty outdoor unit fan
- Faulty electronic expansion valve
- Faulty defrost thermistor
- Faulty outdoor unit PCB
- Faulty stop valve
- Dirty heat exchanger

Troubleshooting

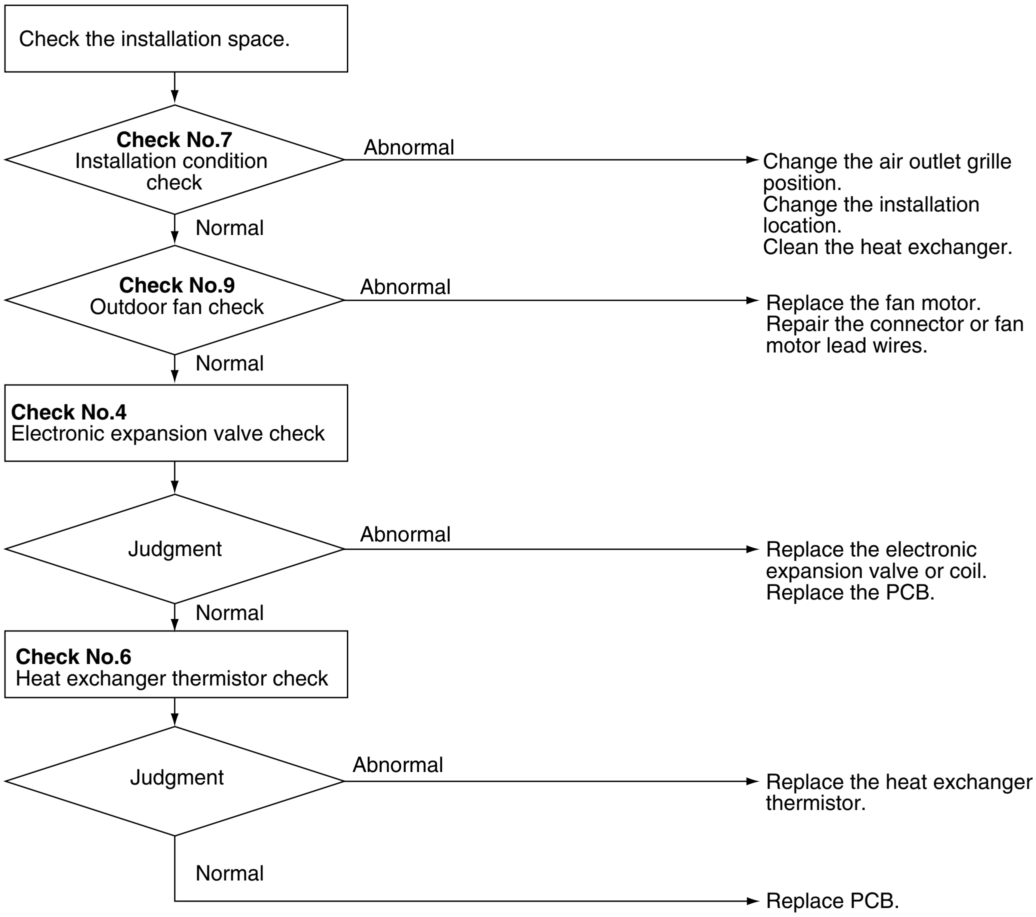
Check No.4
Refer to P.187

Check No.6
Refer to P.189

Check No.7
Refer to P.190

Check No.9
Refer to P.191

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



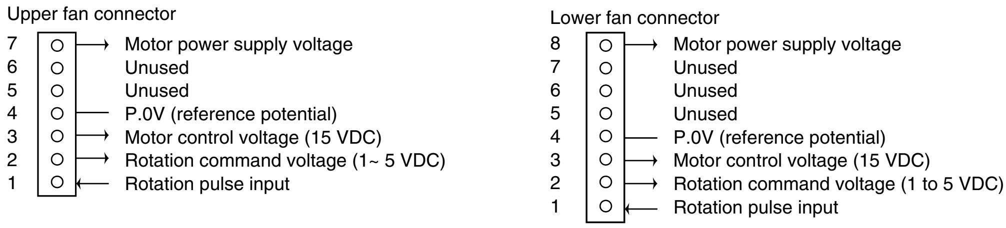
(R2855)

6.15 Checks for Outdoor Unit (25/35 class)

6.15.1 Fan Motor Connector Output Check

Check No.01

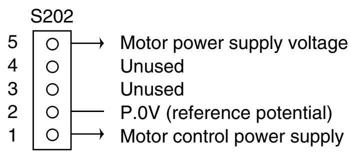
1. Check connector connection.
2. Check motor power supply voltage output (pins 4-7 and 4-8).
3. Check motor control voltage (pins 4-3).
4. Check rotation command voltage output (pins 4-2).
5. Check rotation pulse input (pins 4-1).



(R1224)

Check No.02

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



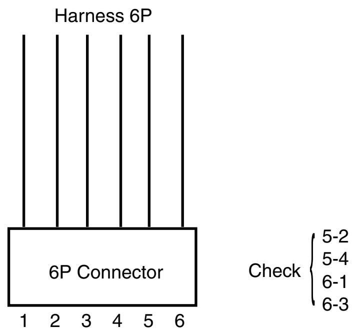
(R1073)

6.15.2 Electronic Expansion Valve Check

Check No.4

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

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



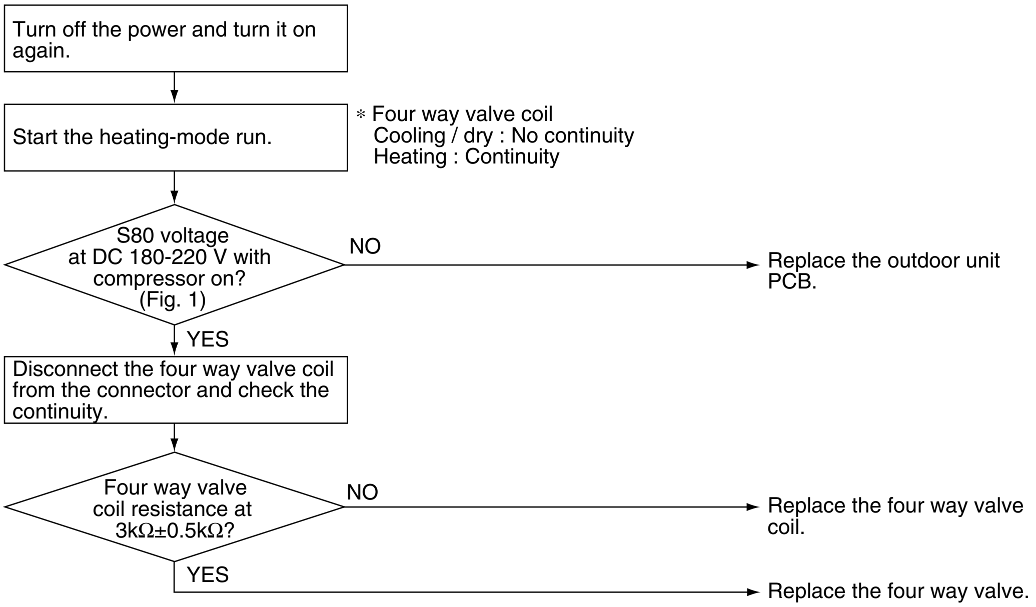
(R1082)

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

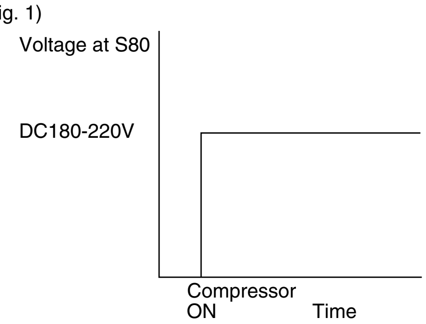
Note: Please note that the latching sound varies depending on the valve type.

6.15.3 Four Way Valve Performance Check

Check No.5



(Fig. 1)



(R3047)

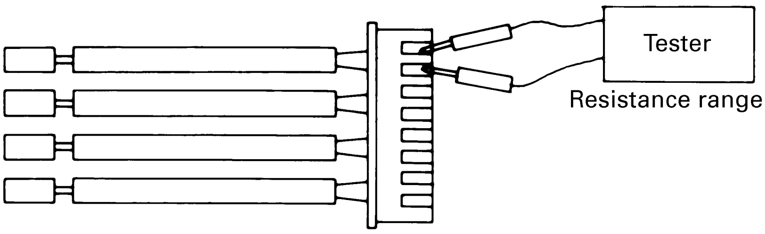
6.15.4 Thermistor Resistance Check

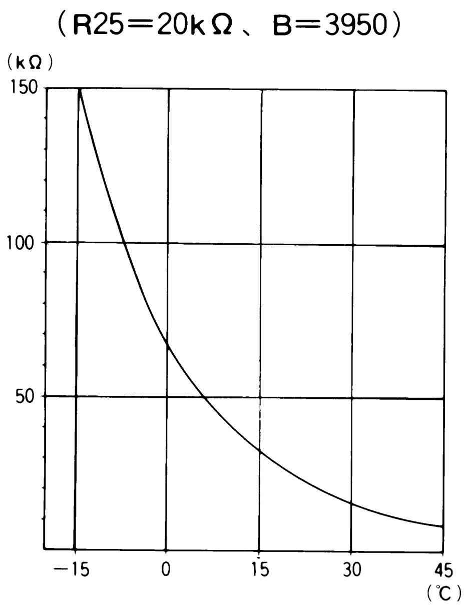
Check No.6

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

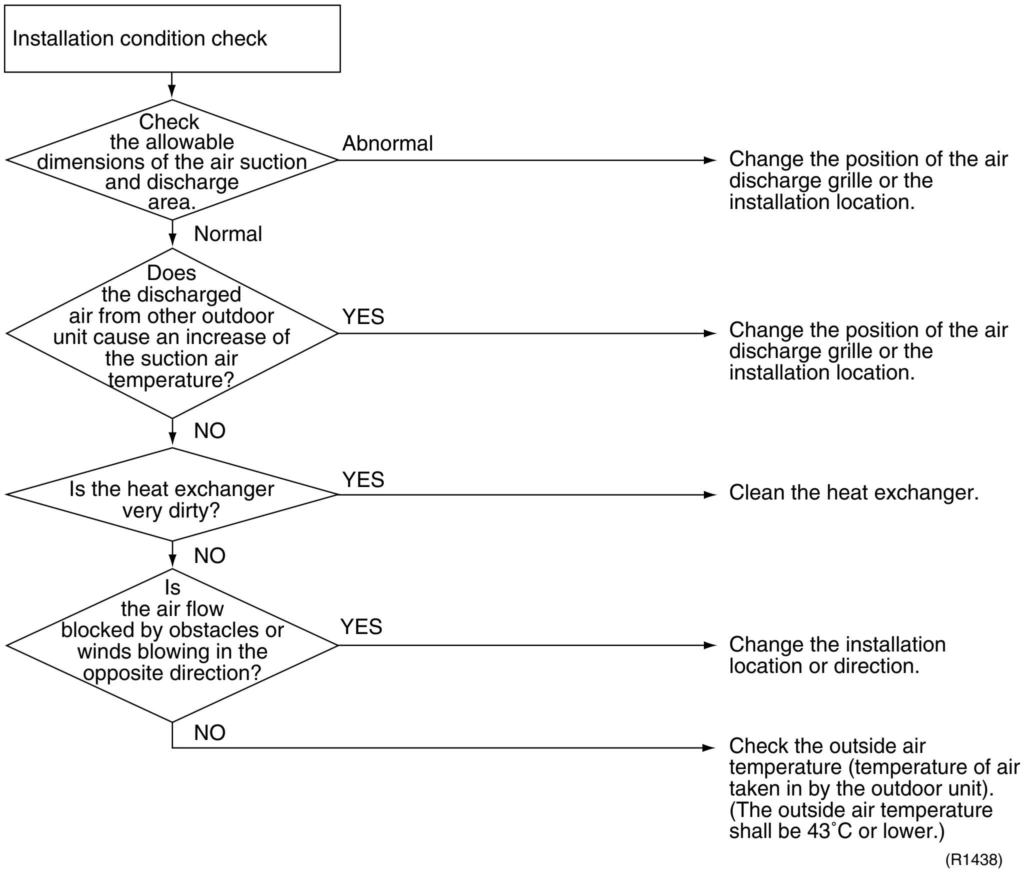




(R1437)

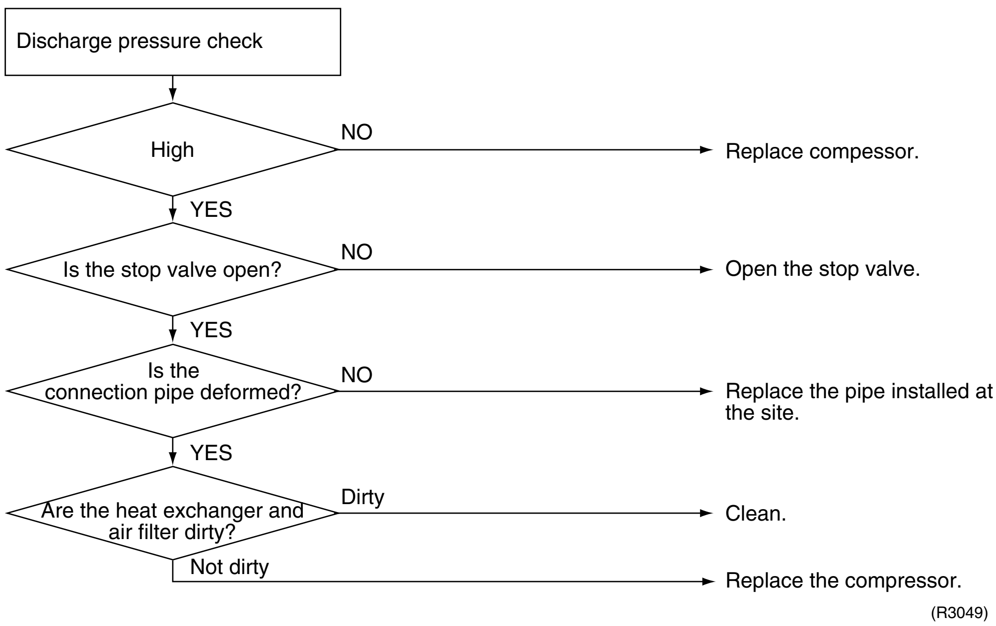
6.15.5 Installation Condition Check

Check No.7



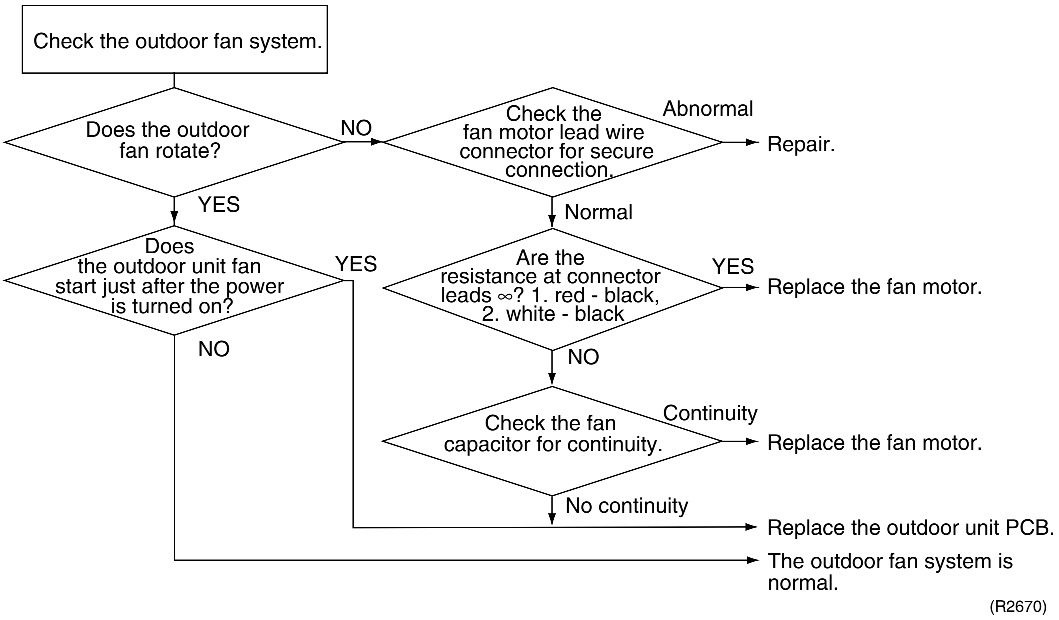
6.15.6 Discharge Pressure Check

Check No.8



6.15.7 Outdoor Unit Fan System Check (With AC Motor)

Check No.9



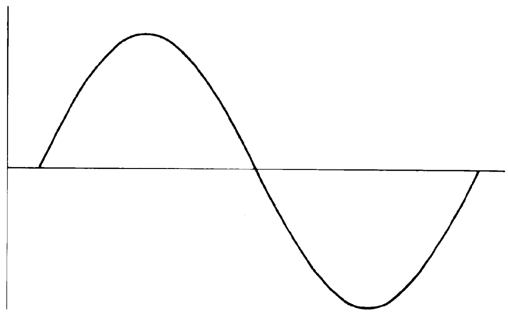
6.15.8 Power Supply Waveforms Check

Check No.10

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

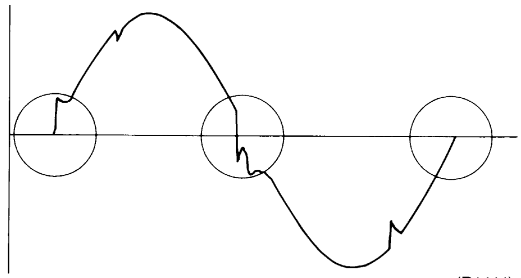
- Check to see if the power supply waveform is a sine wave (Fig.1).
- Check to see if there is waveform disturbance near the zero cross (sections circled in Fig.2)

[Fig.1]



(R1736)

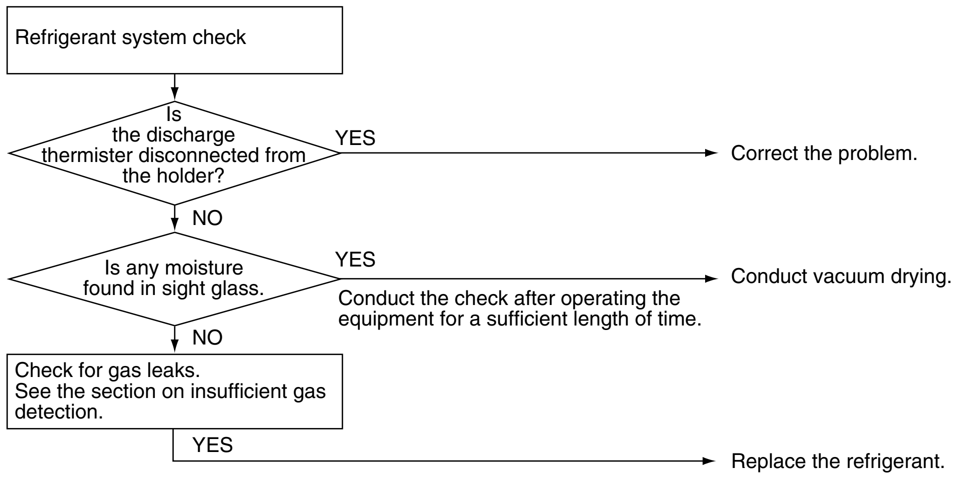
[Fig.2]



(R1444)

6.15.9 Inverter Units Refrigerant System Check

Check No.11



(R1445)

6.15.10 Capacitor Voltage Check

Check No.12

< 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.

6.15.11 Power Transistor Check

Check No.13

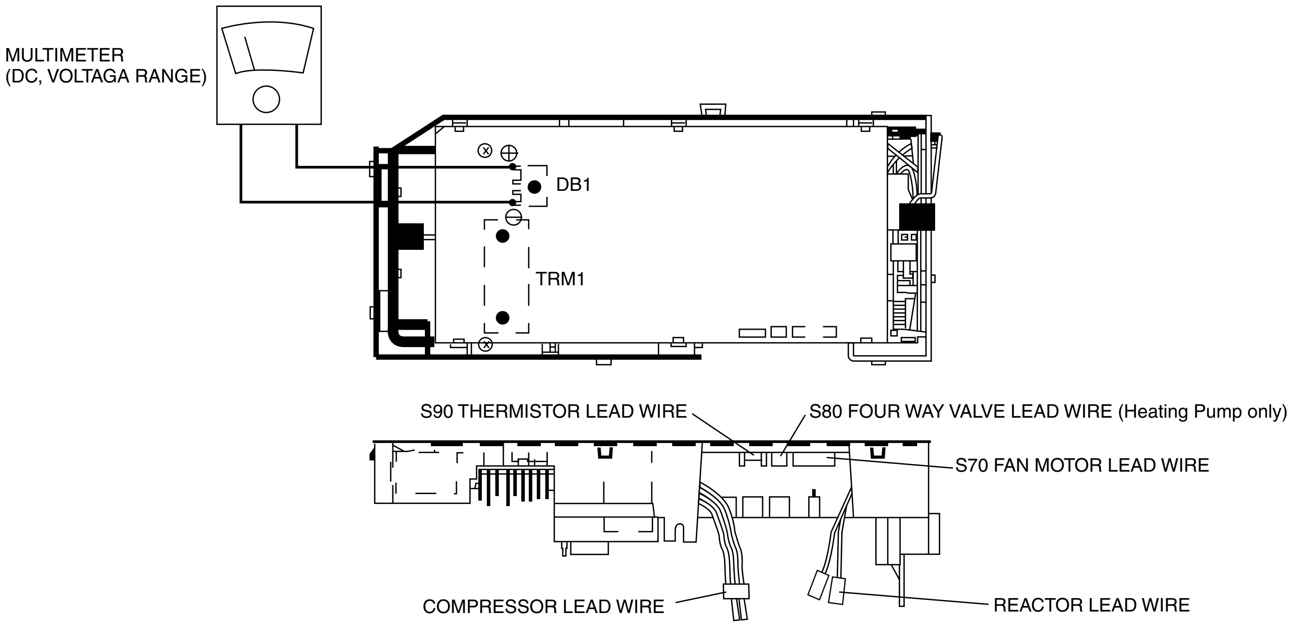
Note: Check to make sure that the voltage between the terminal of Power transistor (+) and (-) is approx. 0 volt before checking power transistor.

< 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>



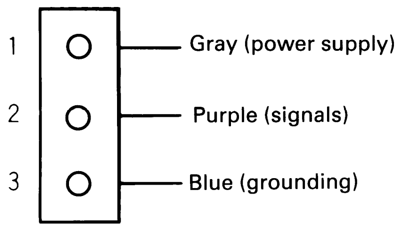
(R2956)

6.15.12 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)

7. Troubleshooting for Outdoor Unit (50/60 class)

7.1 OL Activation (Compressor Overload)

Remote Controller Display

E5

Method of Malfunction Detection

A compressor overload is detected through compressor OL.

Malfunction Decision Conditions

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

∗ The operating temperature condition is not specified.

Supposed Causes

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

Troubleshooting

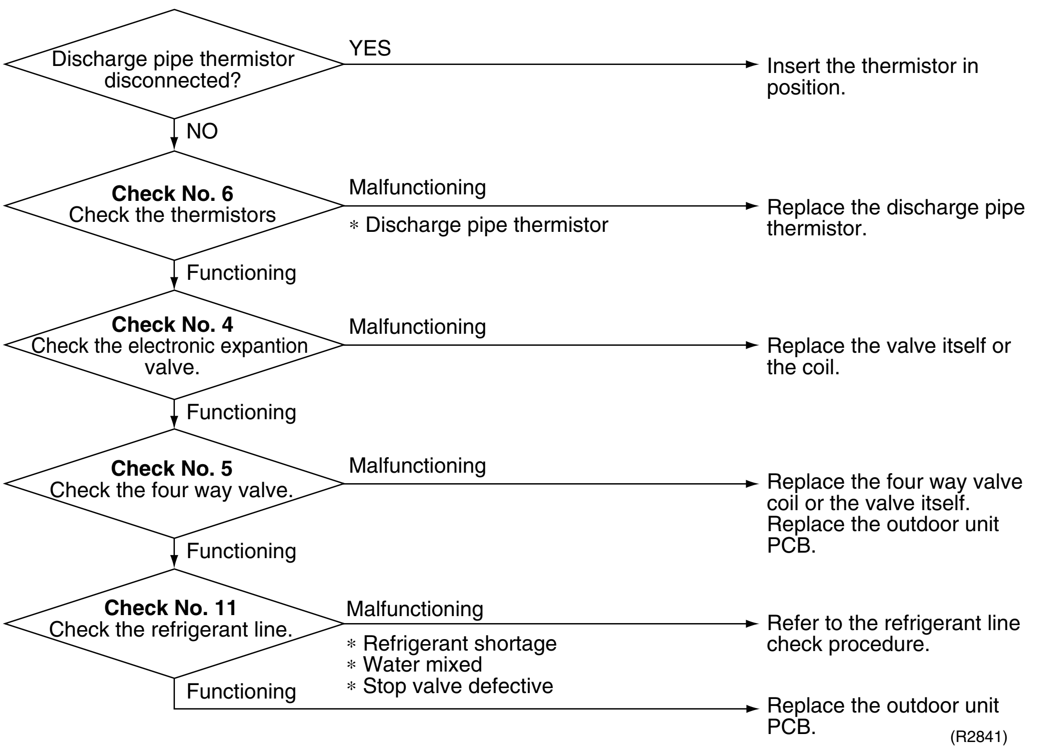
Check No.4
Refer to P.220

Check No.5
Refer to P.221

Check No.6
Refer to P.222

Check No.11
Refer to P.225

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



7.2 Compressor Lock

Remote Controller Display

E6

Method of Malfunction Detection

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

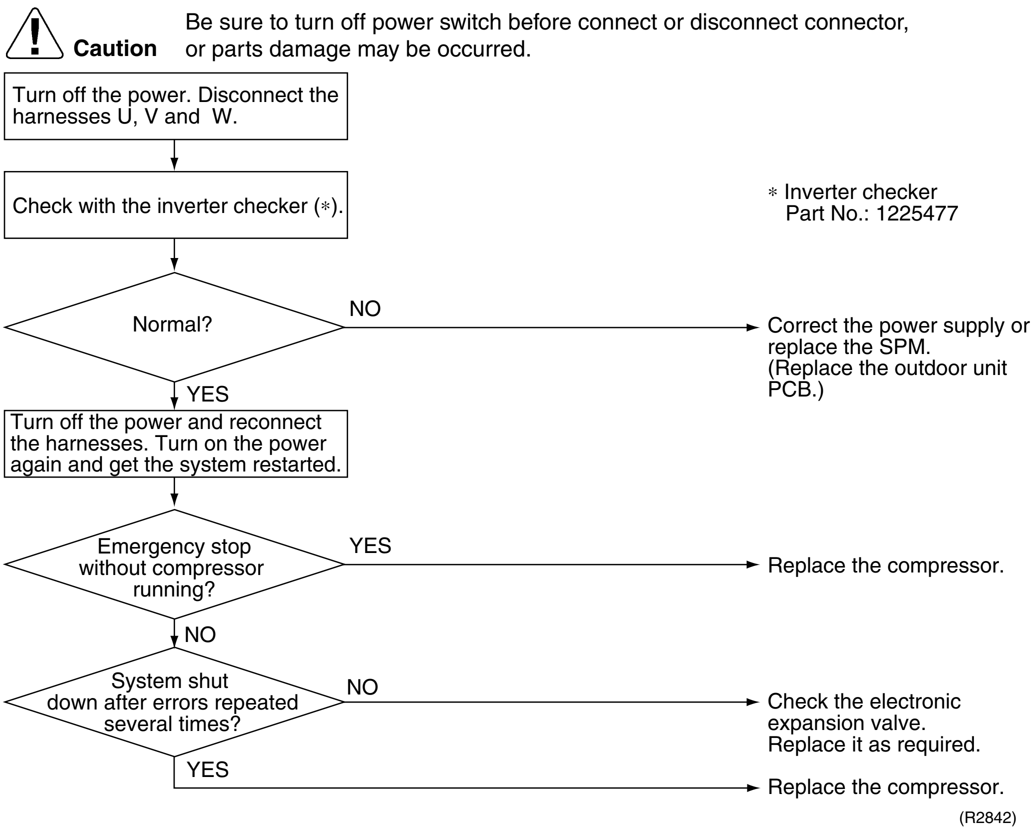
Malfunction Decision Conditions

- The position detection circuit detects a compressor frequency of below 10 Hz for 20 seconds or a frequency of above 160 Hz.
- 40 seconds after the compressor has started, the position detection circuit detects a compressor frequency of above 180 Hz.
- The system will be shut down if the error occurs 16 times.
- Clearing condition: Continuous run for about 5 minutes (normal)

Supposed Causes

- Compressor locked

Troubleshooting



7.3 DC Fan Lock

Remote Controller Display

E7

Method of Malfunction Detection

A fan motor or related error is detected by checking the high-voltage fan motor rpm being detected by the hall IC.

Malfunction Decision Conditions

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

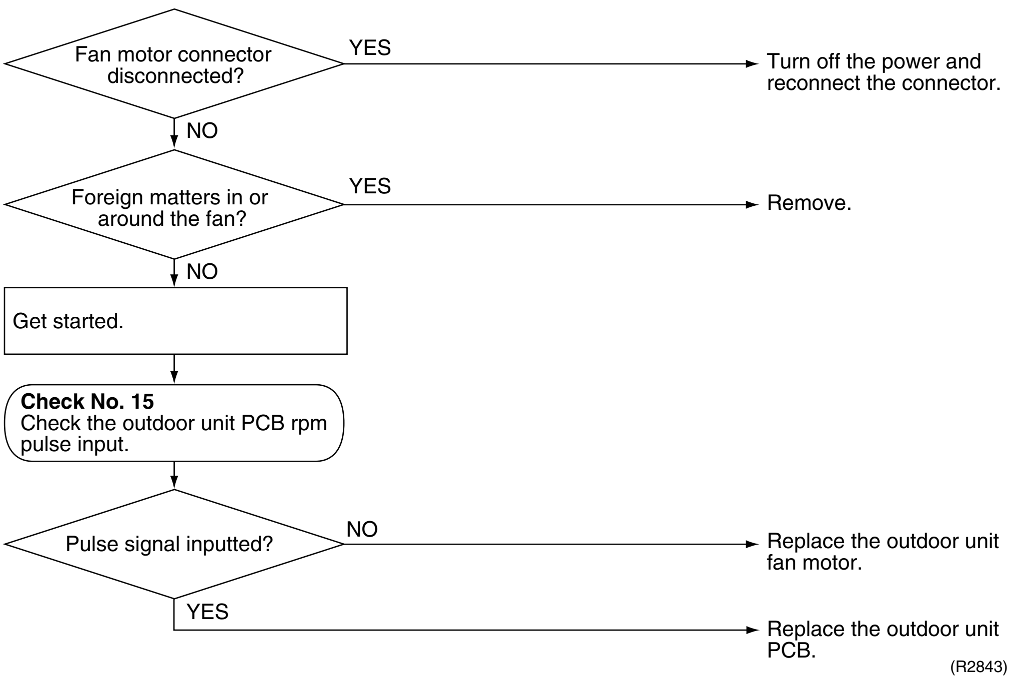
Supposed Causes

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

Troubleshooting

Check No.15
Refer to P.227

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



7.4 Input Over Current Detection

Remote Controller Display

E8

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

Supposed Causes

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

Troubleshooting

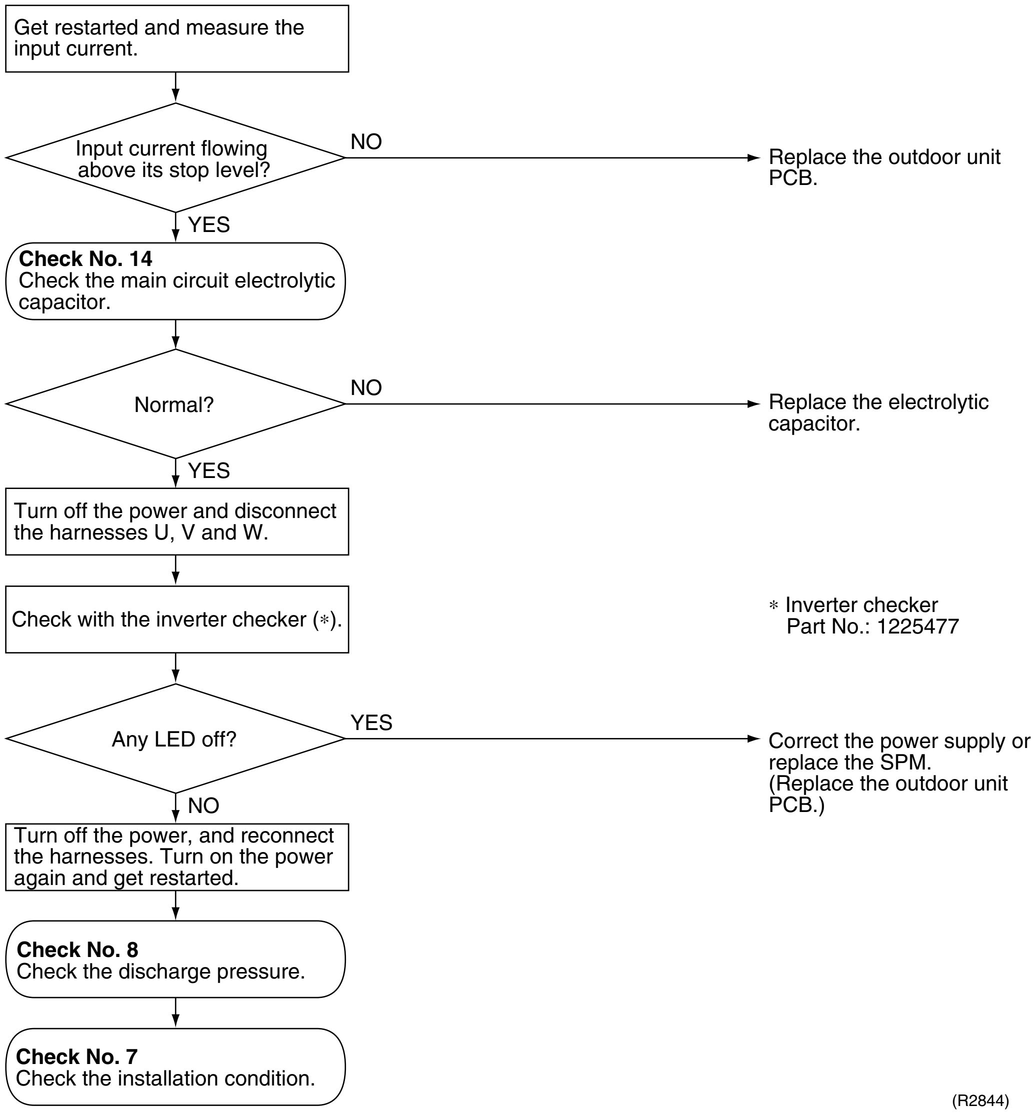
Check No.7
Refer to P.223

Check No.8
Refer to P.224

Check No.14
Refer to P.227

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

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



(R2844)

7.5 Four Way Valve Abnormality

Remote Controller Display

EA

Method of Malfunction Detection

The room temperature thermistor, the indoor unit heat exchanger thermistor, the outdoor temperature thermistor and the outdoor unit heat exchanger thermistor are checked to see if they function within their normal ranges in the operating mode.

Malfunction Decision Conditions

A following condition continues over 1 minute after operating 10 minutes.

- Cooling / dry operation
  (room temp. – indoor heat exchanger temp.) < -10°C
- Heating
  (indoor unit heat exchanger temp. – room temp.) < -10°C

Supposed Causes

- Connector in poor contact
- Thermistor defective
- Outdoor unit PCB defective
- Four way valve coil or harness defective
- Four way valve defective
- Foreign substance mixed in refrigerant
- Insufficient gas

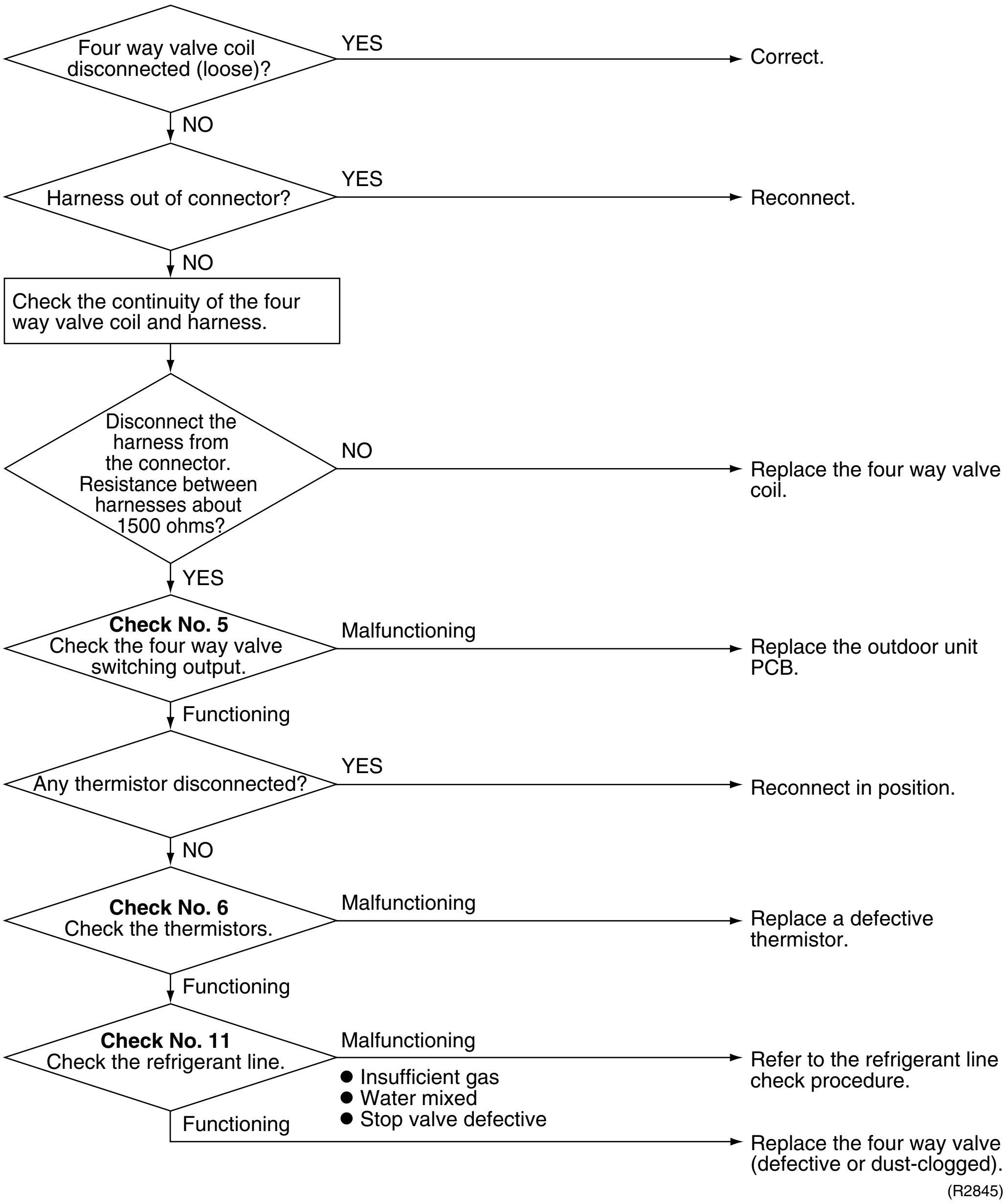
Troubleshooting

Check No.5
Refer to P.221

Check No.6
Refer to P.222

Check No.11
Refer to P.225

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



7.6 Discharge Pipe Temperature Control

Remote Controller Display

F3

Method of Malfunction Detection

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

Malfunction Decision Conditions

- If a stop takes place 6 times successively due to abnormal discharge pipe temperature, the system will be shut down.
- If the temperature being detected by the discharge pipe thermistor rises above 120°C, the compressor will stop. (The error is cleared when the temperature has dropped below 107°C.)

Stop temperatures (in case of 5.0kW class)
(1) 110°C : above 45Hz (rising), above 40Hz (dropping)
(2) 102°C : 30~45Hz (rising), 25~40Hz (dropping)
(3) 98°C : below 30Hz (rising), below 25Hz (dropping)

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

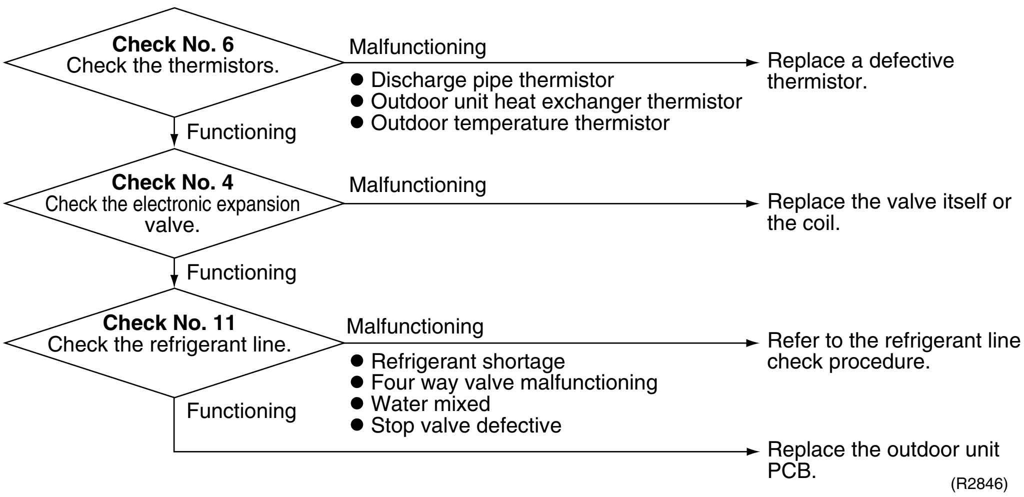
Supposed Causes

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

Troubleshooting

Check No.4
Refer to P.220
Check No.6
Refer to P.222
Check No.11
Refer to P.225

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



7.7 Position Sensor Abnormality

Remote Controller Display

H6

Method of Malfunction Detection

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

Malfunction Decision Conditions

- The compressor fails to start in about 15 seconds after the compressor run command signal is sent.
- Clearing condition: Continuous run for about 5 minutes (normal)
- The system will be shut down if the error occurs 16 times.

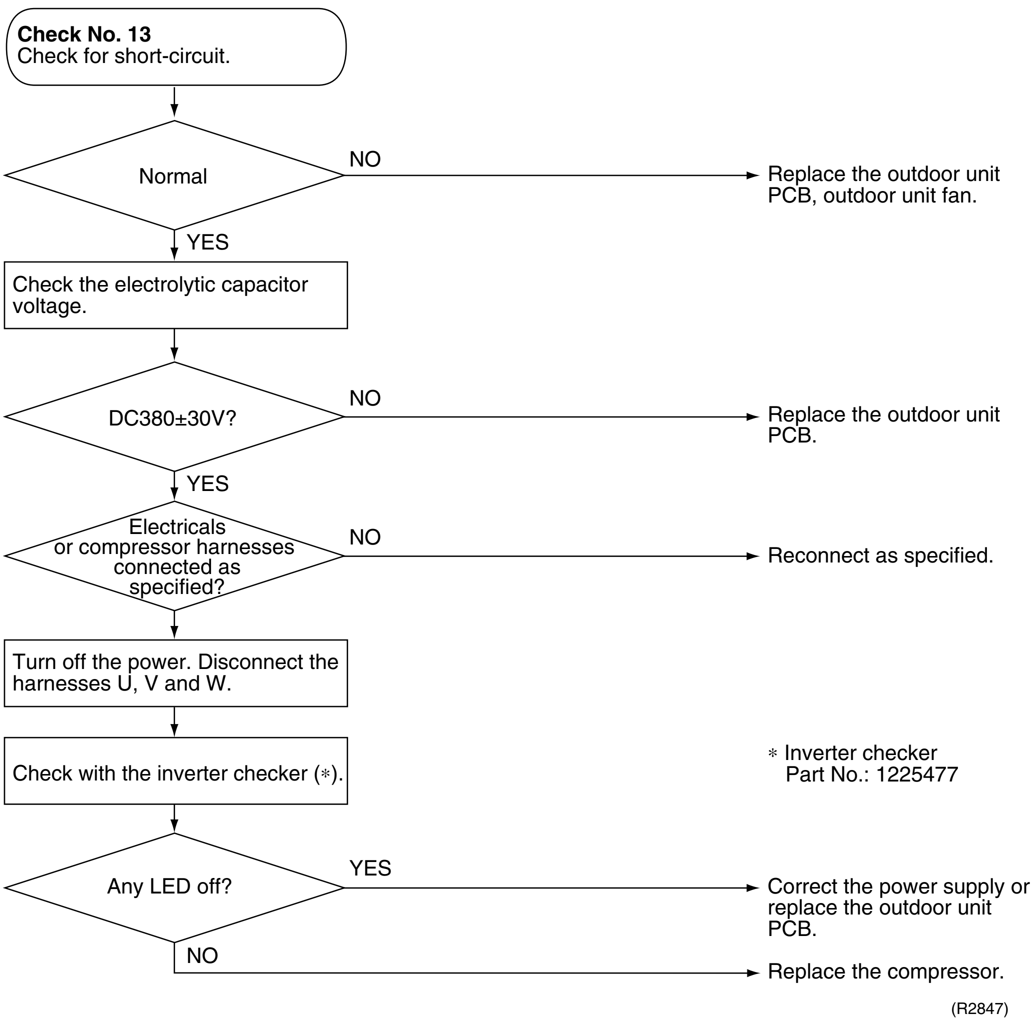
Supposed Causes

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

Troubleshooting

Check No.13
Refer to P.226

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



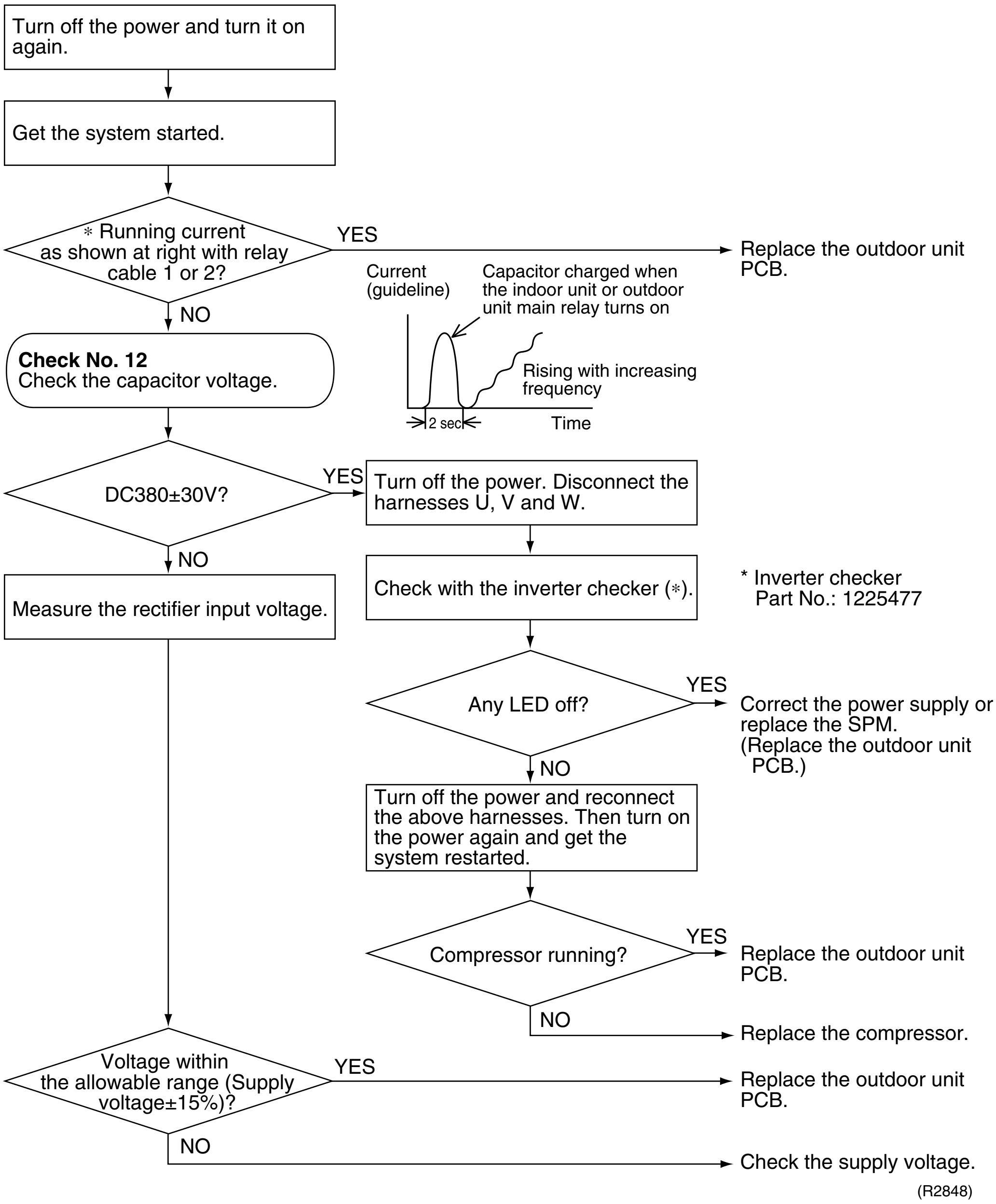
7.8 CT or Related Abnormality

Remote Controller Display	H8
Method of Malfunction Detection	A CT or related error is detected by checking the compressor running frequency and CT-detected input current.
Malfunction Decision Conditions	The compressor running frequency is below 55 Hz and the CT input is below 0.1 V. (The input current is also below 1.25 A.) ■ If this error repeats 4 times, the system will be shut down. ■ The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).
Supposed Causes	■ Power transistor defective ■ Internal wiring broken or in poor contact ■ Reactor defective ■ Outdoor unit PCB defective

Troubleshooting

Check No.12
Refer to P.226

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



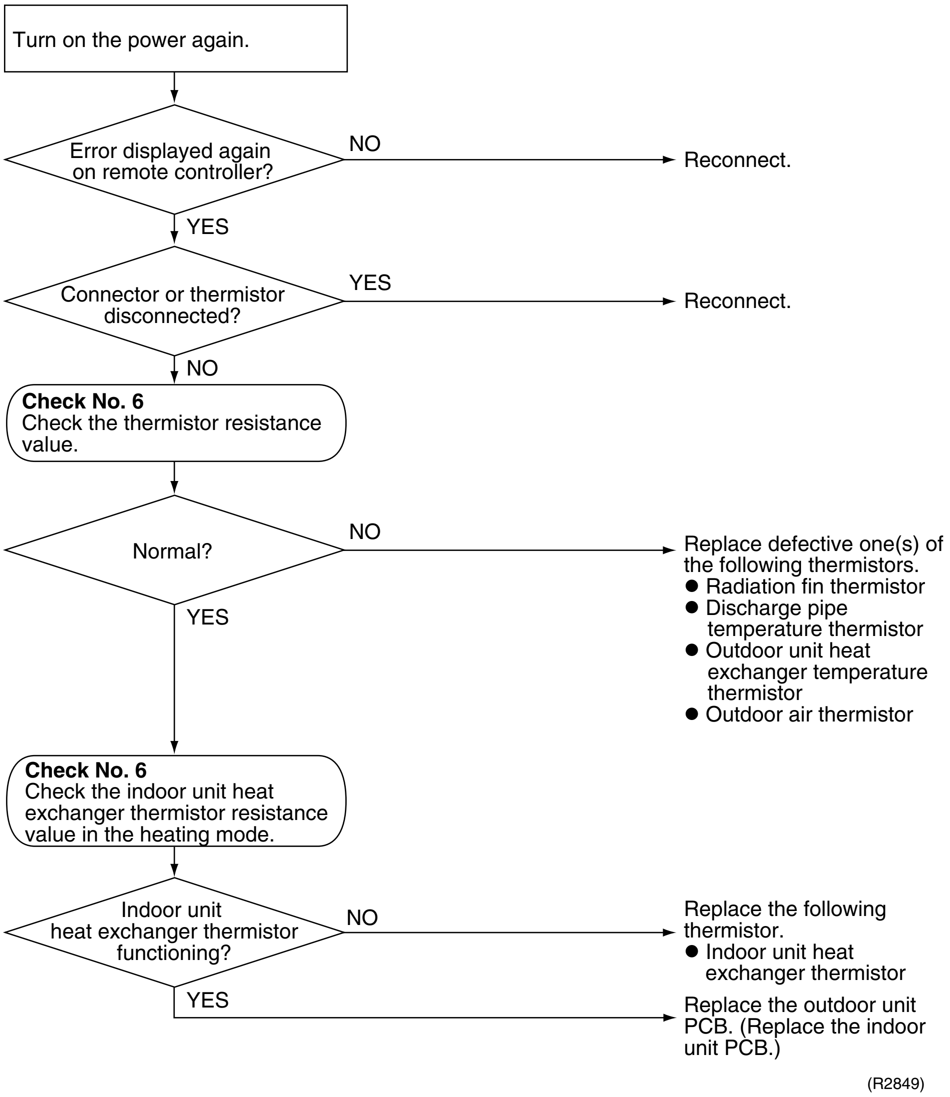
7.9 Thermistor or Related Abnormality (Outdoor Unit)

Remote Controller Display	P4, J3, J6, H9
Method of Malfunction Detection	This type of error is detected by checking the thermistor input voltage to the microcomputer. [A thermistor error is detected by checking the temperature.]
Malfunction Decision Conditions	The thermistor input is above 4.96 V or below 0.04 V with the power on. Error J3 is judged if the discharge pipe thermistor temperature is smaller than the condenser thermistor temperature.
Supposed Causes	■ Connector in poor contact ■ Thermistor defective ■ Outdoor unit PCB defective ■ Indoor unit PCB defective ■ Condenser thermistor defective in the case of J3 error (outdoor unit heat exchanger thermistor in the cooling mode, or indoor unit heat exchanger thermistor in the heating mode)

Troubleshooting

Check No.6
Refer to P.222

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



P4 : Radiation fin thermistor
J3 : Discharge pipe thermistor
J6 : Outdoor heat exchanger thermistor
H9 : Outdoor air thermistor

7.10 Electrical Box Temperature Rise

Remote Controller Display

L3

Method of Malfunction Detection

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

Malfunction Decision Conditions

With the compressor off, the radiation fin temperature is above 80°C. (Reset is made when the temperature drops below 70°C.)

Supposed Causes

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

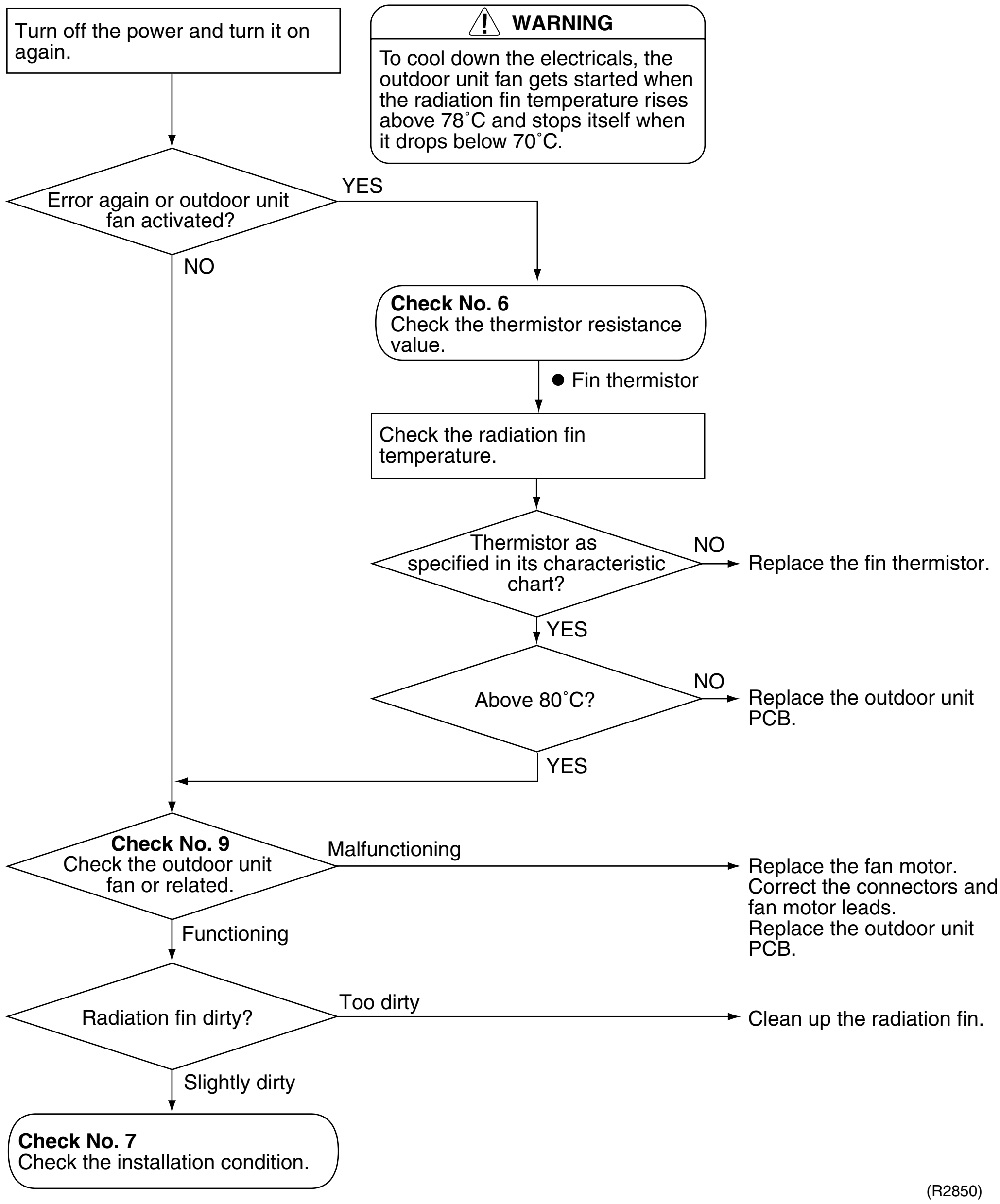
Troubleshooting

Check No.6
Refer to P.222

Check No.7
Refer to P.223

Check No.9
Refer to P.224

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



7.11 Radiation Fin Temperature Rise

Remote Controller Display	L4
Method of Malfunction Detection	A radiation fin temperature rise is detected by checking the radiation fin thermistor with the compressor on.
Malfunction Decision Conditions	If the radiation fin temperature with the compressor on is above 90°C, ■ If a radiation fin temperature rise takes place 4 times successively, the system will be shut down. ■ The error counter will reset itself if this or any other error does not occur during the following 60-minute compressor running time (total time).
Supposed Causes	■ Fin temperature rise due to defective outdoor unit fan ■ Fin temperature rise due to short-circuit ■ Fin thermistor defective ■ Connector in poor contact ■ Outdoor unit PCB defective

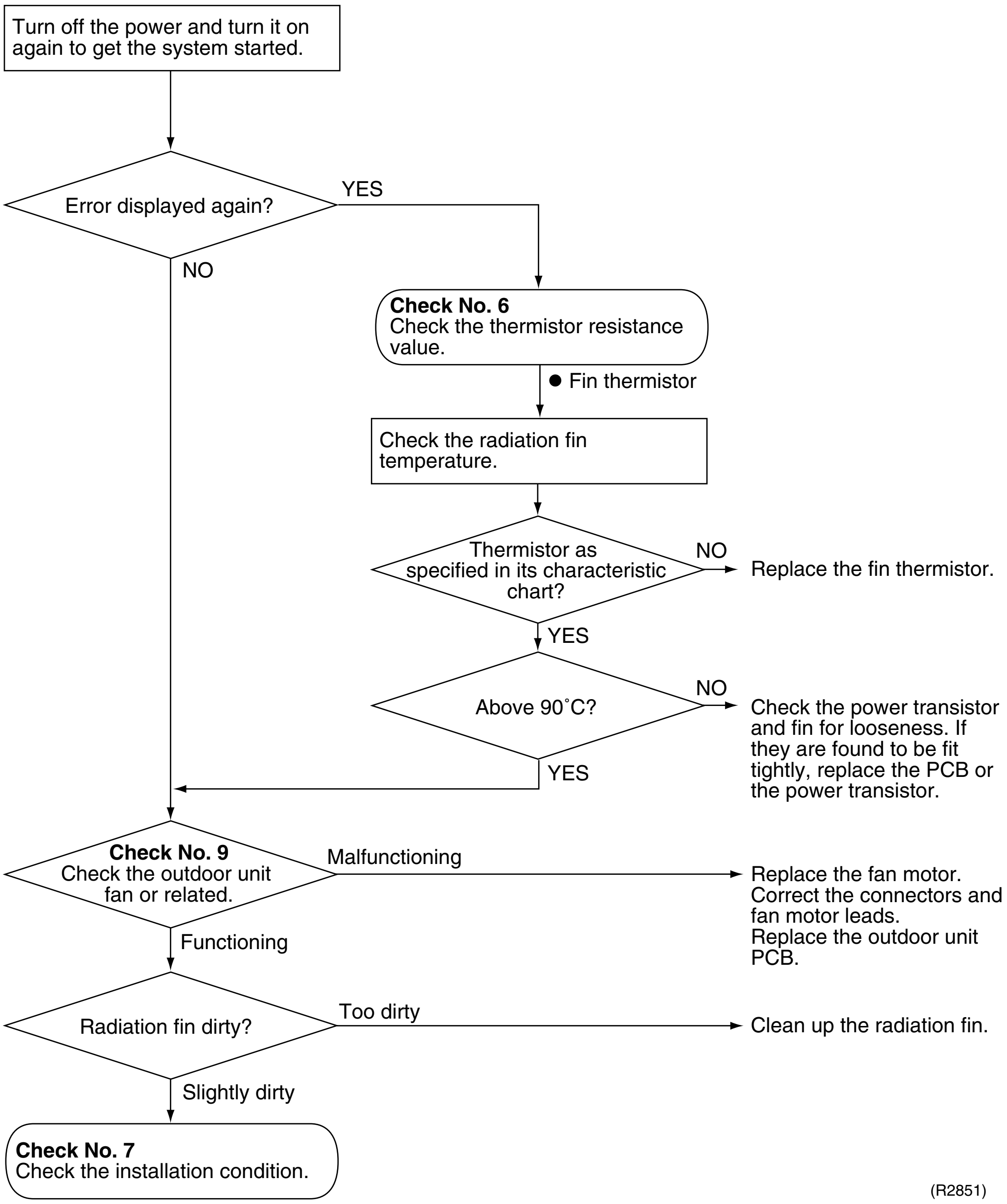
Troubleshooting

Check No.6
Refer to P.222

Check No.7
Refer to P.223

Check No.9
Refer to P.224

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



7.12 Output Over Current Detection

Remote Controller Display	L5
Method of Malfunction Detection	An output over-current is detected by checking the current that flows in the inverter DC section.
Malfunction Decision Conditions	■ A position signal error occurs while the compressor is running. ■ A speed error occurs while the compressor is running. ■ An output over-current input is fed from the output over-current detection circuit to the microcomputer. ■ The system will be shut down if the error occurs 16 times. ■ Clearing condition: Continuous run for about 5 minutes (normal)
Supposed Causes	■ Over-current due to defective power transistor ■ Over-current due to wrong internal wiring ■ Over-current due to abnormal supply voltage ■ Over-current due to defective PCB ■ Error detection due to defective PCB ■ Over-current due to closed stop valve ■ Over-current due to compressor failure ■ Over-current due to poor installation condition

Troubleshooting

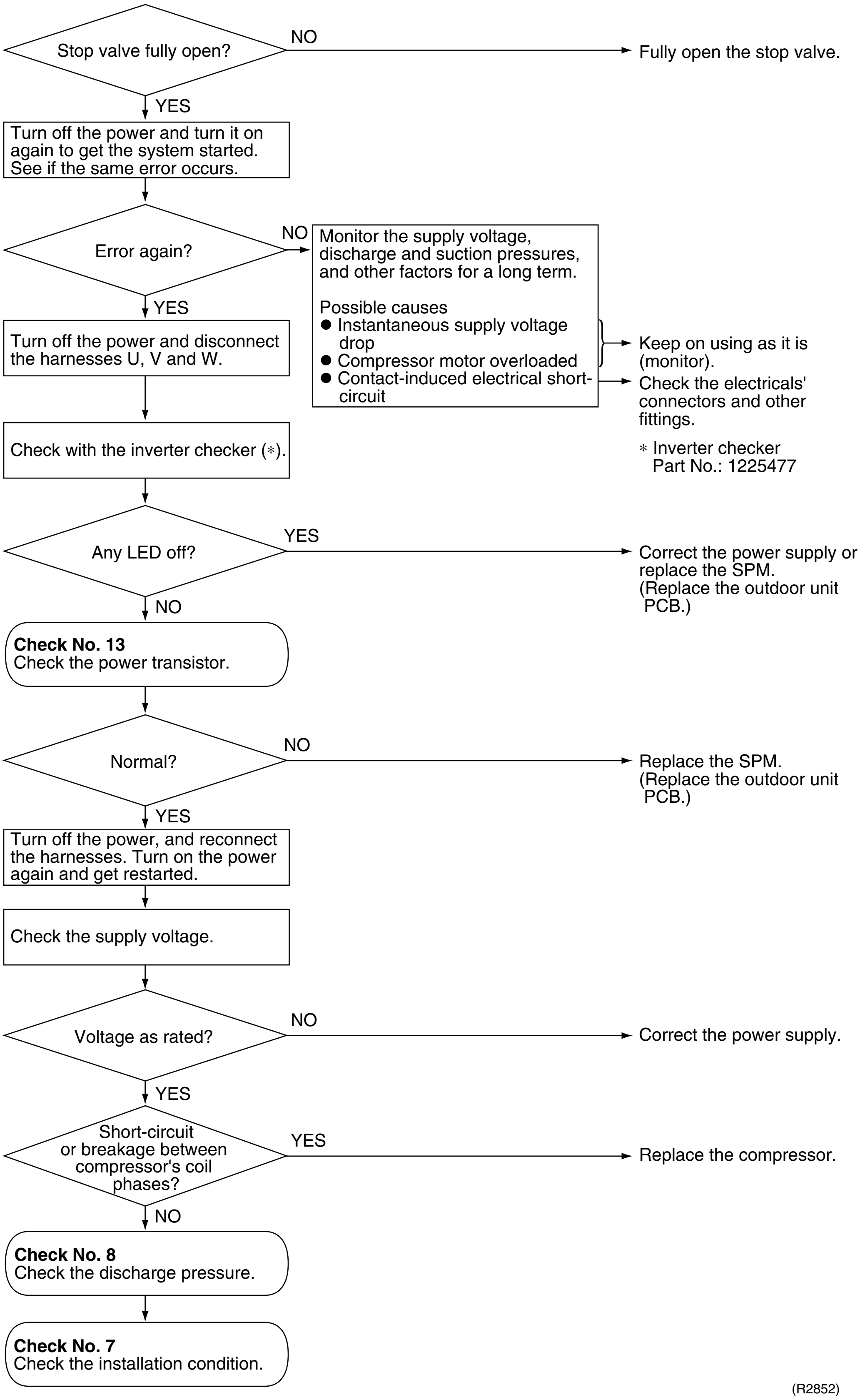
Check No.7
Refer to P.223

Check No.8
Refer to P.224

Check No.13
Refer to P.226

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

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



(R2852)

7.13 Insufficient Gas

Remote Controller Display

U0

Method of Malfunction Detection

Gas shortage detection I : A gas shortage is detected by checking the CT-detected input current value and the compressor running frequency.
Gas shortage detection II : A gas shortage is detected by checking the difference between indoor unit heat exchanger temperature and room temperature as well as the difference between outdoor unit heat exchanger temperature and room temperature.

Malfunction Decision Conditions

Gas shortage detection I :
Input current < 𝔸 (A/Hz) x Compressor running frequency × Voltage + 𝔹
However, when the status of running frequency > 55 (Hz) is kept on for a certain time.
Note : The values are different from model to model.

	𝔸	𝔹
R410A	1756 / 256	–50

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

Supposed Causes

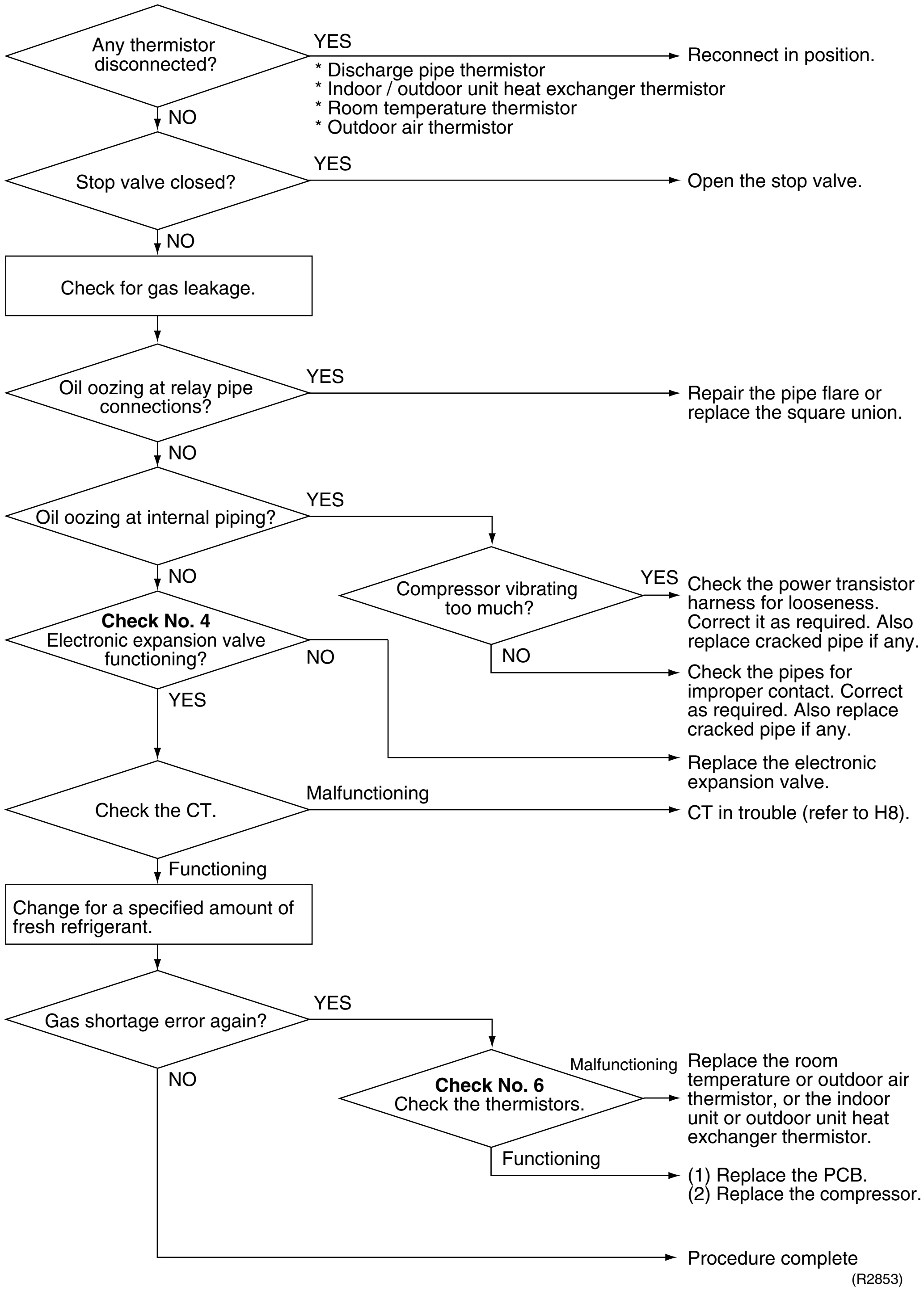
- Refrigerant shortage (refrigerant leakage)
- Poor compression performance of compressor
- Discharge pipe thermistor disconnected, or indoor unit or outdoor unit heat exchanger thermistor disconnected, room or outside air temperature thermistor disconnected
- Stop valve closed
- Electronic expansion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

Troubleshooting

Check No.4
Refer to P.220

Check No.6
Refer to P.222

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



7.14 Low-voltage Detection

Remote Controller Display

U2

Method of Malfunction Detection

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

Malfunction Decision Conditions

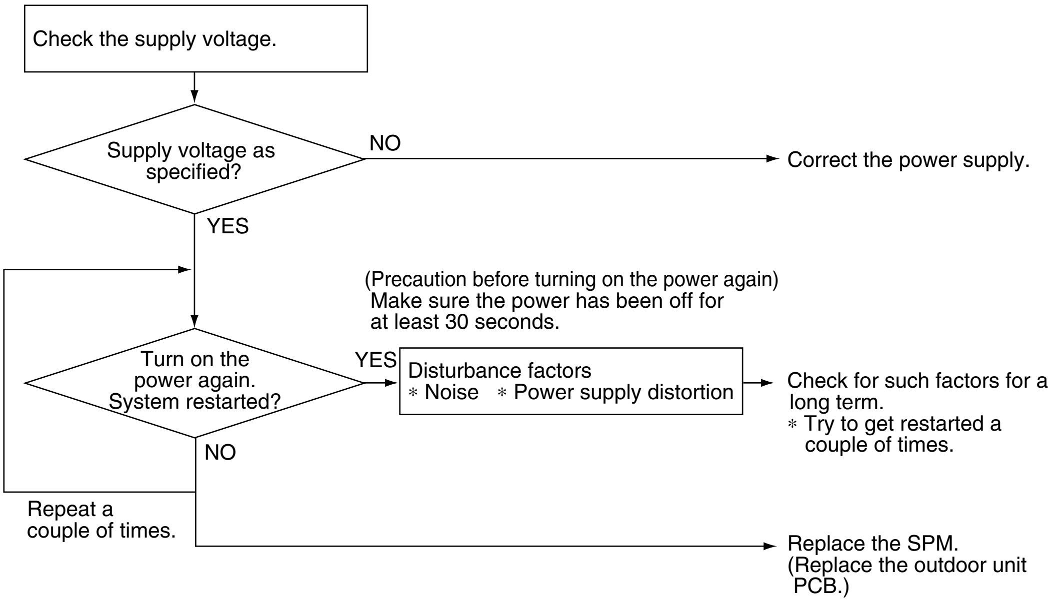
- An over-voltage signal is fed from the over-voltage detection circuit to the microcomputer, or the voltage being detected by the DC voltage detection circuit is judged to be below 150 V for 0.1 second.
- The system will be shut down if the error occurs 16 times.
- Clearing condition: Continuous run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

Supposed Causes

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

Troubleshooting

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



(R2854)

7.15 High Pressure Control in Cooling

Remote Controller Display	F6
Method of Malfunction Detection	High-pressure control (stop, frequency drop, etc.) is activated in the cooling mode if the temperature being sensed by the heat exchanger thermistor exceeds the limit.
Malfunction Decision Conditions	Activated when the temperature being sensed by the heat exchanger thermistor rises above 60°C. (Deactivated when the said temperature drops below 50°C.)
Supposed Causes	■ The installation space is not large enough. ■ Faulty outdoor unit fan ■ Faulty electronic expansion valve ■ Faulty defrost thermistor ■ Faulty outdoor unit PCB ■ Faulty stop valve ■ Dirty heat exchanger

Troubleshooting

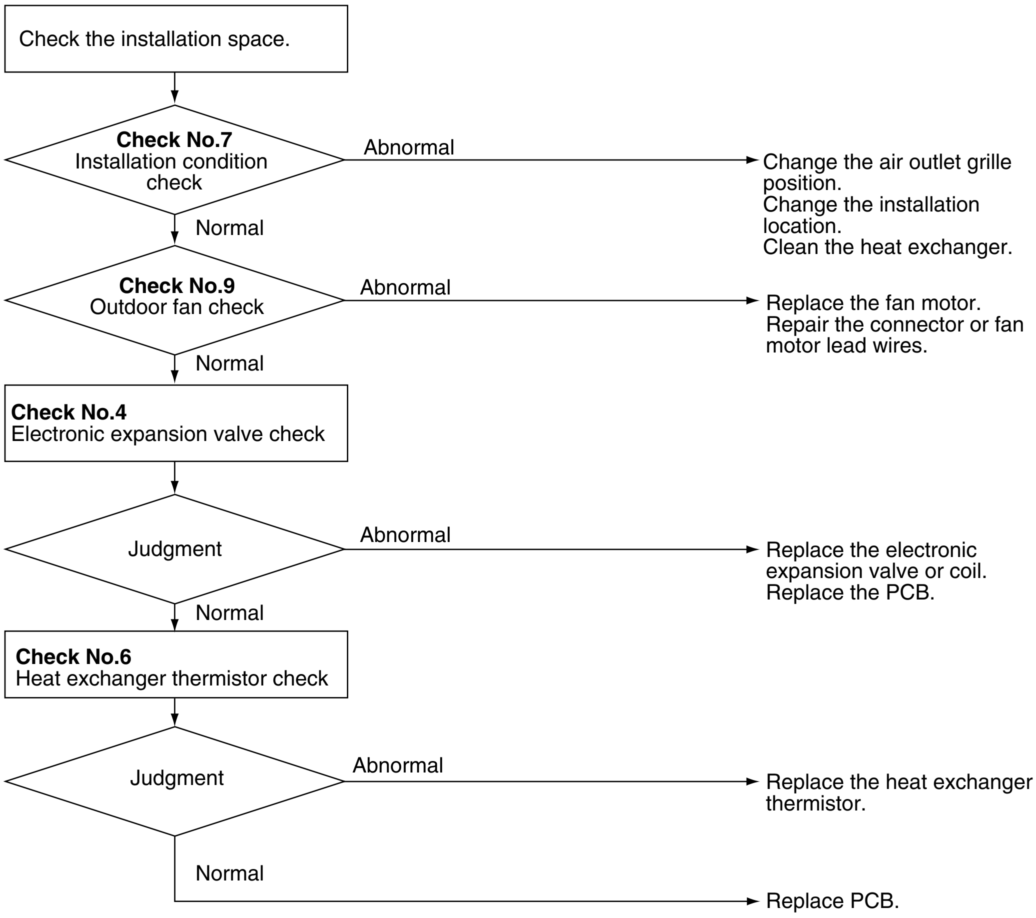
Check No.4
Refer to P.220

Check No.6
Refer to P.222

Check No.7
Refer to P.223

Check No.9
Refer to P.224

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



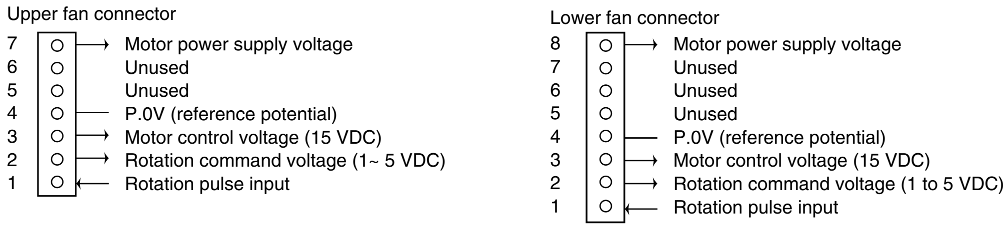
(R2855)

7.16 Checks for Outdoor Unit (50/60 class)

7.16.1 Fan Motor Connector Output Check

Check No.01

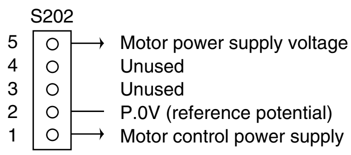
1. Check connector connection.
2. Check motor power supply voltage output (pins 4-7 and 4-8).
3. Check motor control voltage (pins 4-3).
4. Check rotation command voltage output (pins 4-2).
5. Check rotation pulse input (pins 4-1).



(R1224)

Check No.02

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



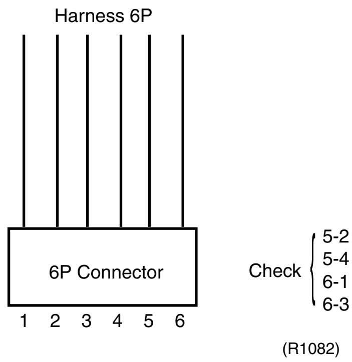
(R1073)

7.16.2 Electronic Expansion Valve Check

Check No.4

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

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

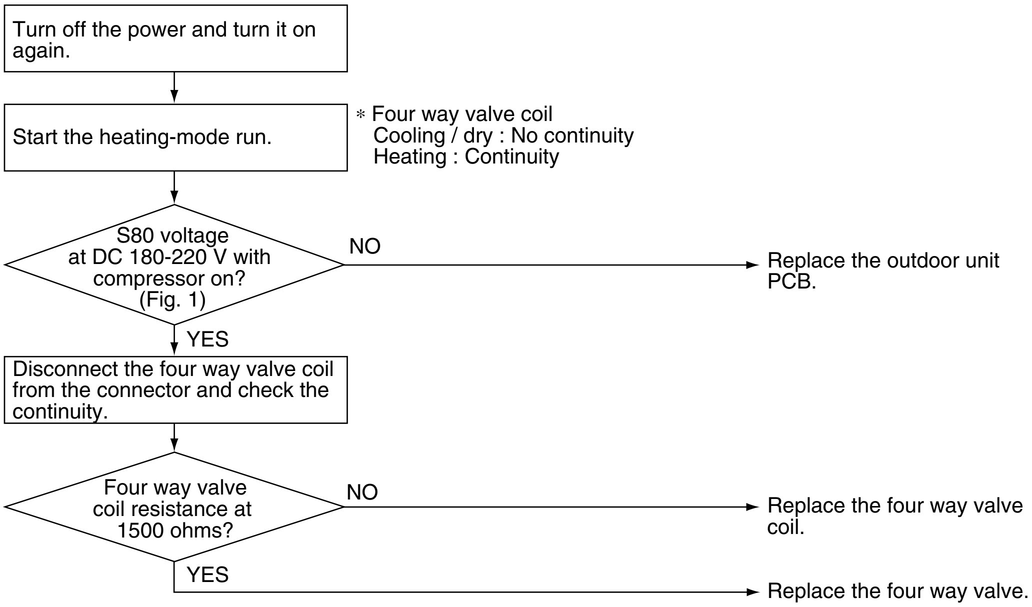


4. If no EV generates latching sound in the above step 2, the outdoor unit PCB is faulty.
5. If the conductivity is confirmed in the above step 2, mount a good coil (which generated latching sound) in the EV unit that did not generate latching sound, and check to see if that EV generates latching sound.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

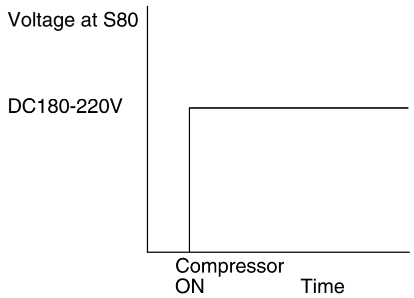
Note: Please note that the latching sound varies depending on the valve type.

7.16.3 Four Way Valve Performance Check

Check No.5



(Fig. 1)



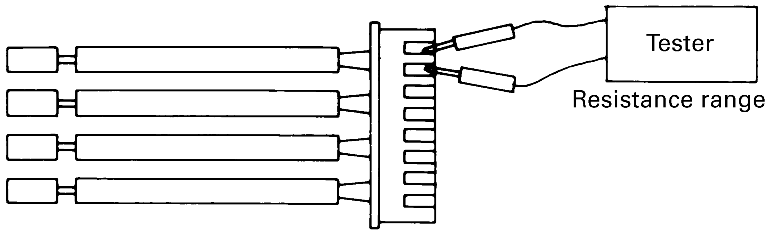
(R2856)

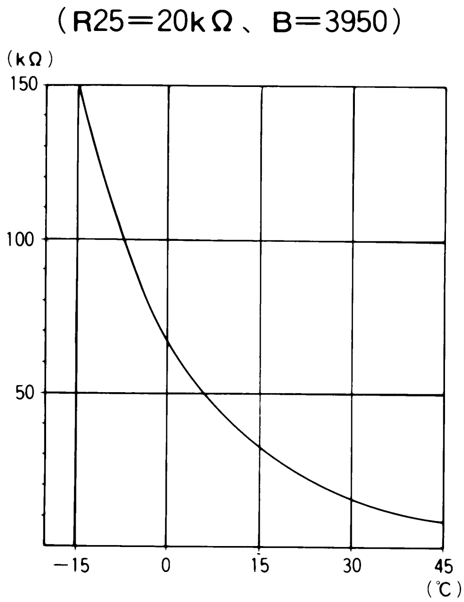
7.16.4 Thermistor Resistance Check

Check No.6

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

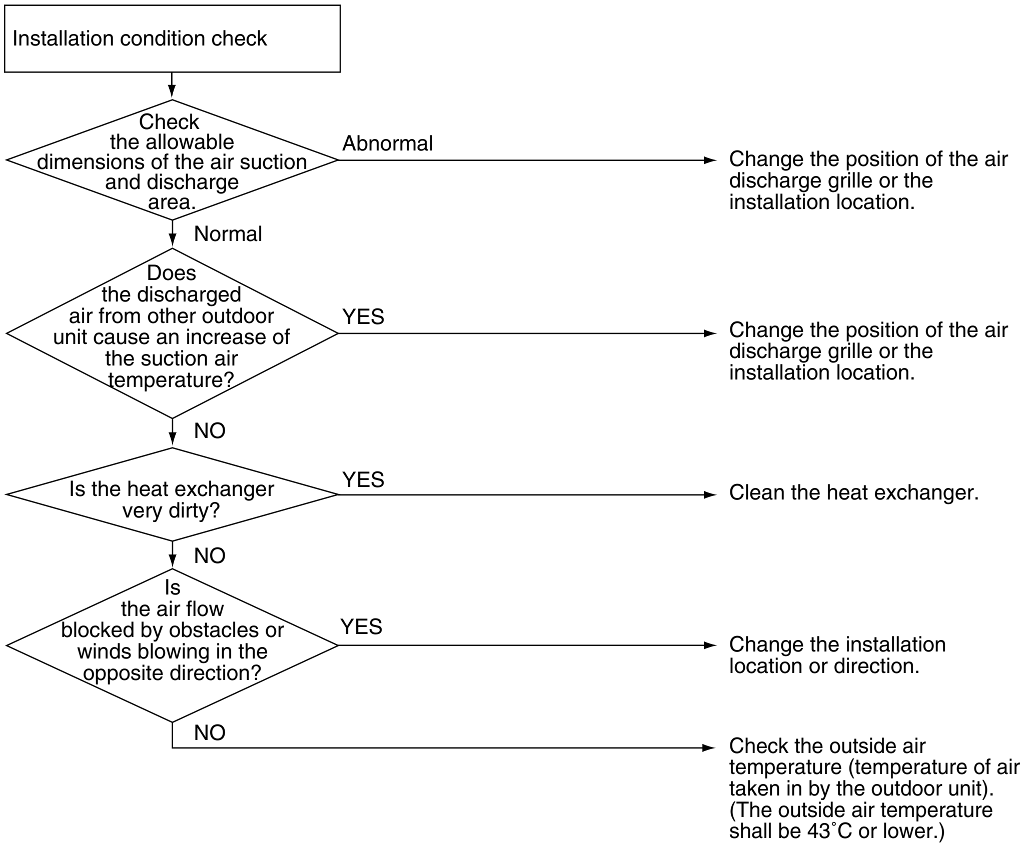




(R1437)

7.16.5 Installation Condition Check

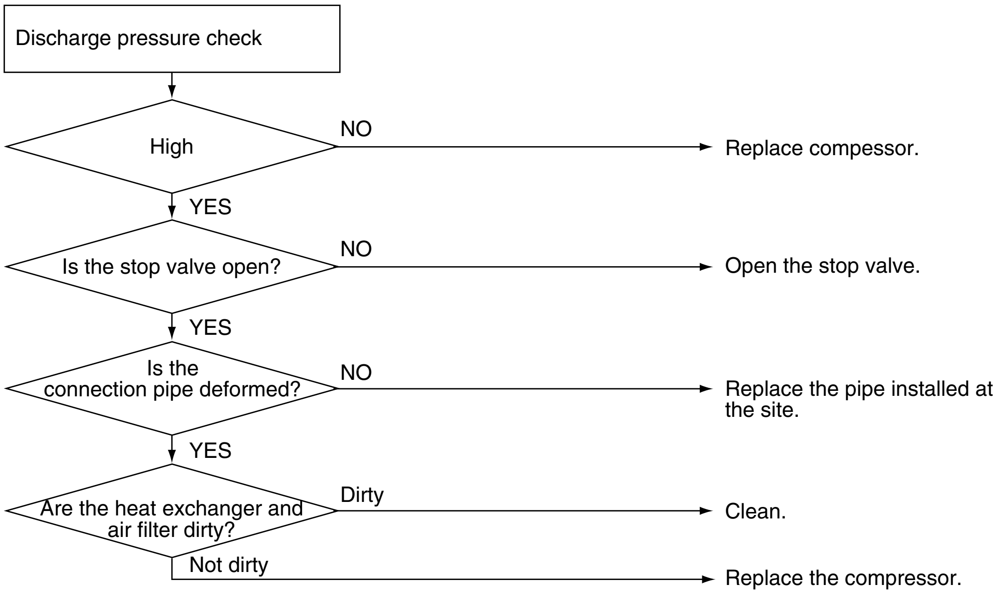
Check No.7



(R1438)

7.16.6 Discharge Pressure Check

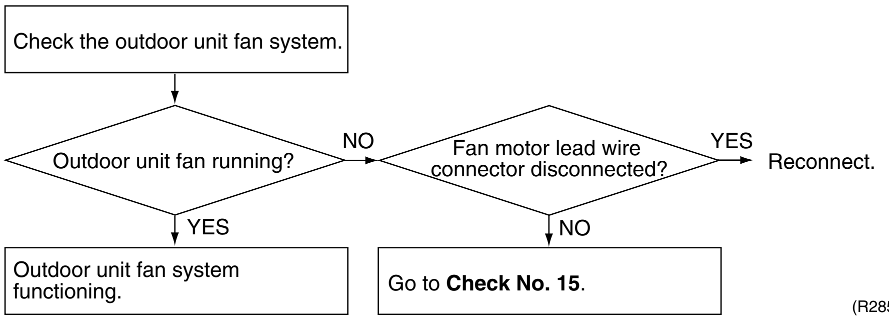
Check No.8



(R3049)

7.16.7 Outdoor Unit Fan System Check (With DC Motor)

Check No.9



(R2857)

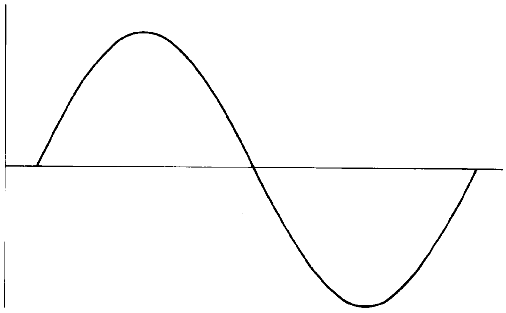
7.16.8 Power Supply Waveforms Check

Check No.10

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

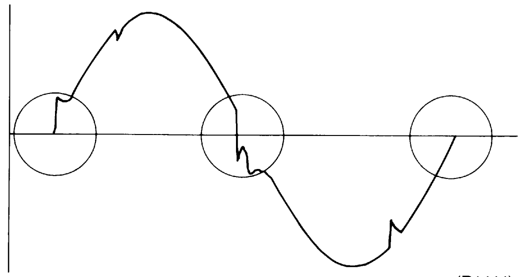
- Check to see if the power supply waveform is a sine wave (Fig.1).
- Check to see if there is waveform disturbance near the zero cross (sections circled in Fig.2)

[Fig.1]



(R1736)

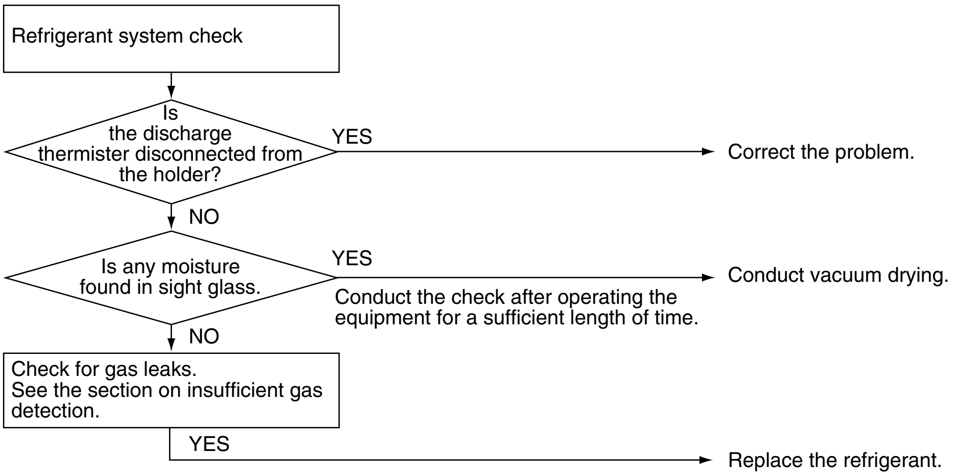
[Fig.2]



(R1444)

7.16.9 Inverter Units Refrigerant System Check

Check No.11



(R1445)

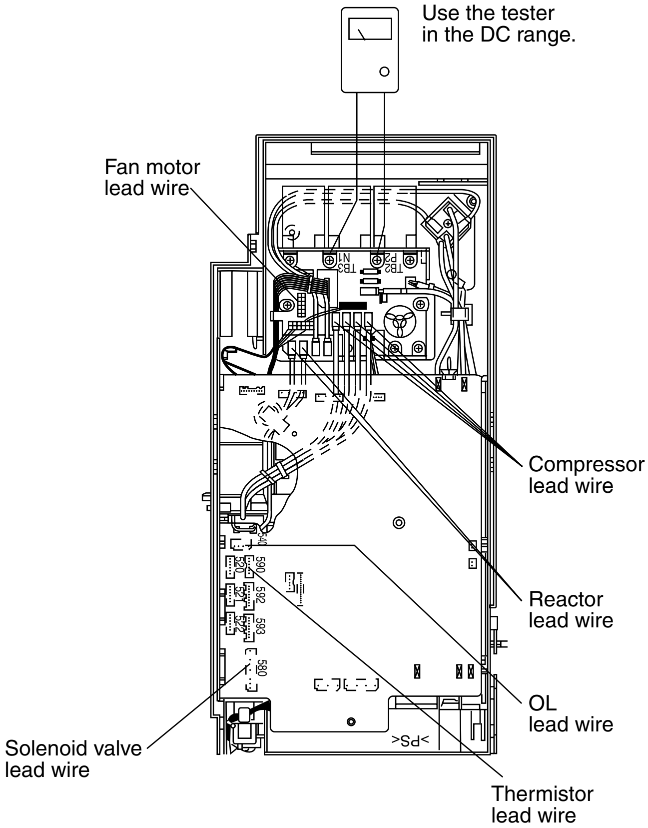
7.16.10 Capacitor Voltage Check

Check No.12

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

■ Checking the capacitor voltage

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



(R2858)

7.16.11 Power Transistor Check

Check No.13

■ Checking the power transistor

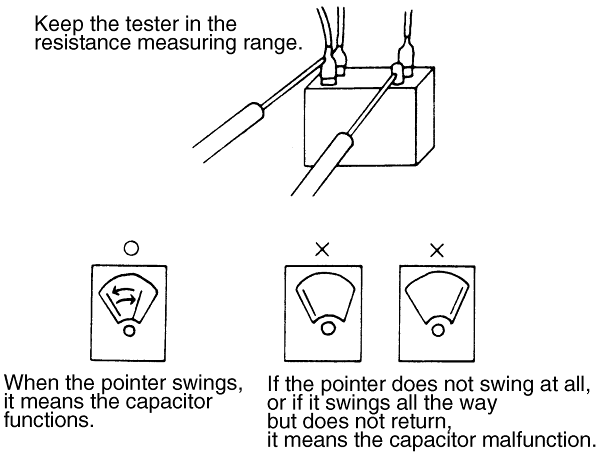
- Never touch any live parts for at least 10 minutes after turning off the circuit breaker.
- If unavoidably necessary to touch a live part, make sure the power transistor's supply voltage is below 50 V using the tester.
- For the UVW, make measurements at the Faston terminal on the board or the relay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

Tester's negative terminal	Power transistor (+)	UVW	Power transistor (–)	UVW
Tester's positive terminal	UVW	Power transistor (+)	UVW	Power transistor (–)
Normal resistance	Several kohms to several Mohms			
Abnormal resistance	0 or ∞			

7.16.12 Main Circuit Electrolytic Capacitor Check

Check No.14

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



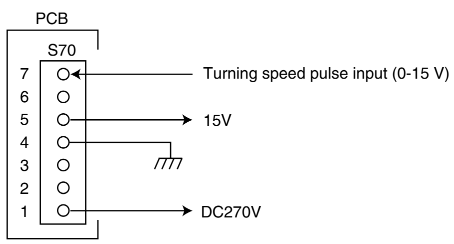
(Q0367)

7.16.13 Turning Speed Pulse Input on the Outdoor Unit PCB Check

Check No.15

<Propeller fan motor>
Make sure the voltage of 270±30V is being applied.
(1) Stop the operation first and then the power off, and disconnect the connector S70.
(2) Make sure there is about DC 270 V between pins 4 and 7.
(3) With the system and the power still off, reconnect the connector S70.
(4) Make a turn of the fan motor with a hand, and make sure the pulse (0-15 V) appears twice at pins 1 and 4.

If the fuse is blown out, the outdoor-unit fan may also be in trouble. Check the fan too.
If the voltage in Step (2) is not applied, it means the PCB is defective. Replace the PCB.
If the pulse in Step (4) is not available, it means the Hall IC is defective. Replace the DC fan motor.If there are both the voltage (2) and the pulse (4), replace the PCB.



(R2859)

⁎ Propeller fan motor : S70

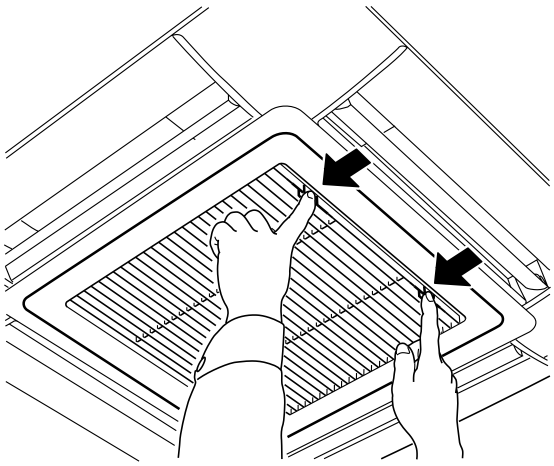
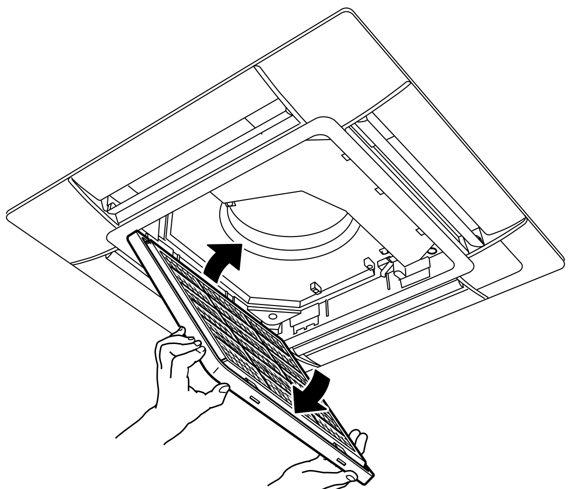
Part 9
Removal Procedure

1. FFQ25/35/50/60BV1B

1.1 Removal of Suction Grille

Procedure

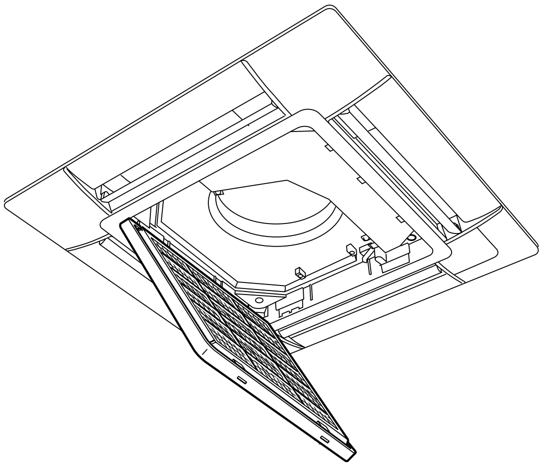
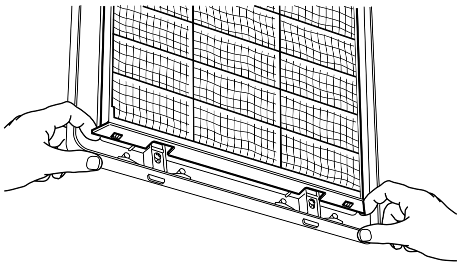
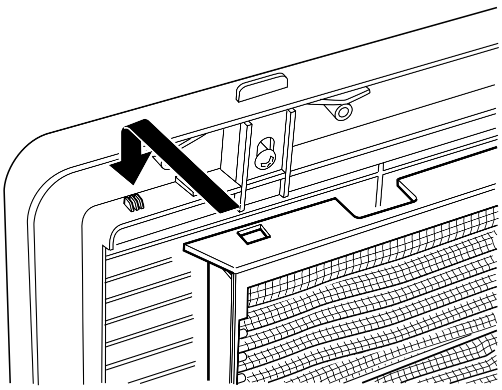
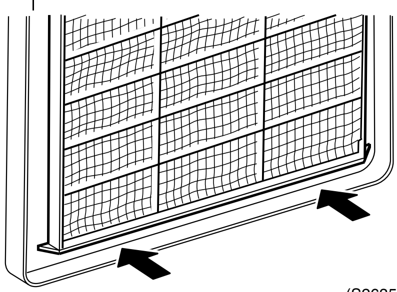
⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1. Removing the suction grille			
1	To remove the suction grille, slide the two tabs simultaneously and pull the suction grille down slowly. ■ The grille can be installed freely in four directions.	 (S2630)	■ When closing, push up the grille slowly.
2	With the suction grille open at an angle of 45°, lift it up to remove it.	 (S2631)	

1.2 Removal of Air Filter

Procedure

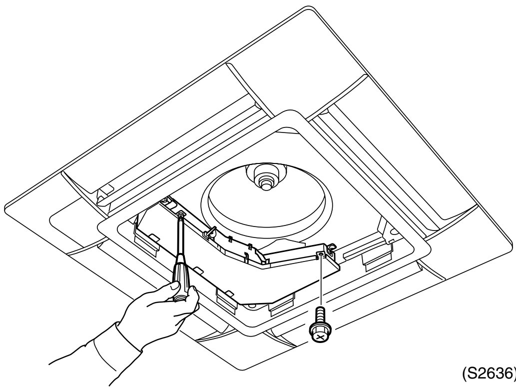
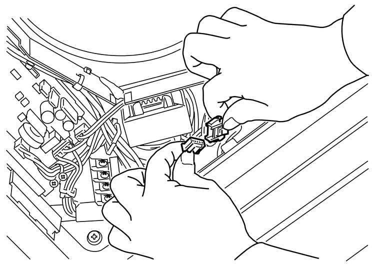
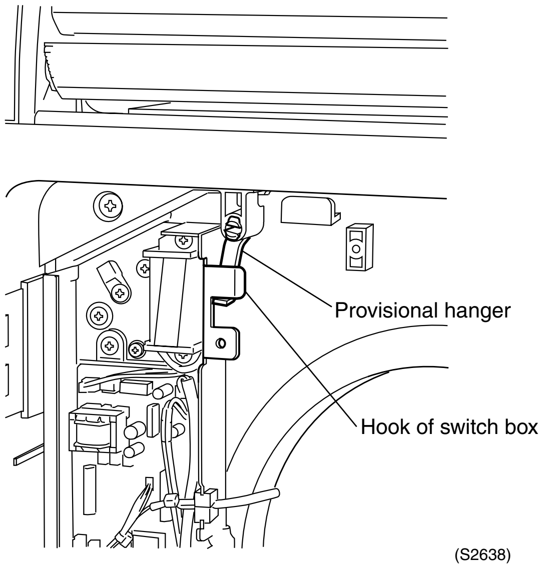
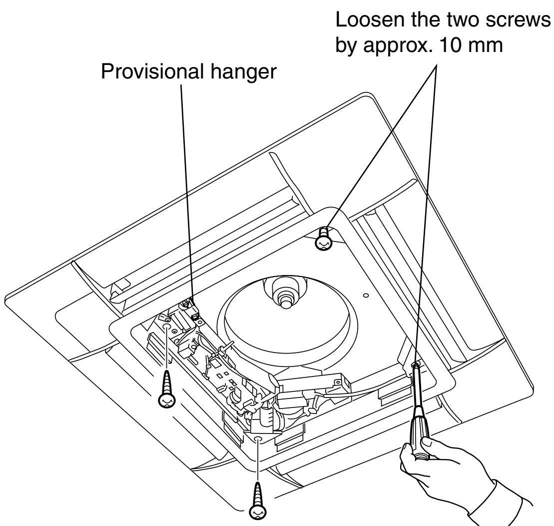
⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

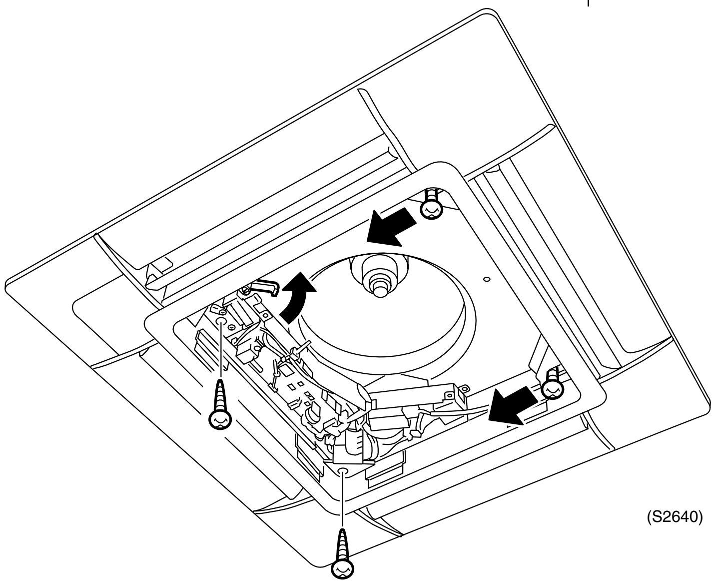
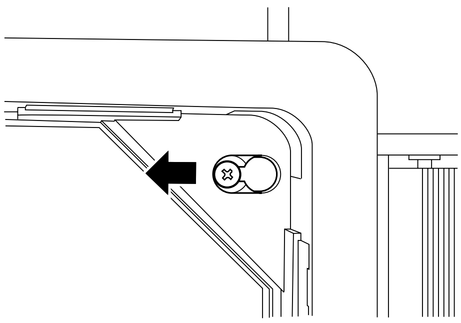
Step	Procedure		Points
1. Removing the air filter			
1	Open the suction grille. (See the "Removal of Suction Grille".)	 (S2632)	
2	Disengage the hooks of the air filter by pulling the filter downward at an angle, and remove the filter.	 (S2633)	
2. Installation of the air filter			
1	Hook the air filter to the protrusions located at the top of the suction grille.	 (S2634)	
2	Push the lower section of the air filter into the protrusions located at the bottom of the suction grille to secure the air filter in place.		 (S2635)

1.3 Removal of Decoration Panel

Procedure

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

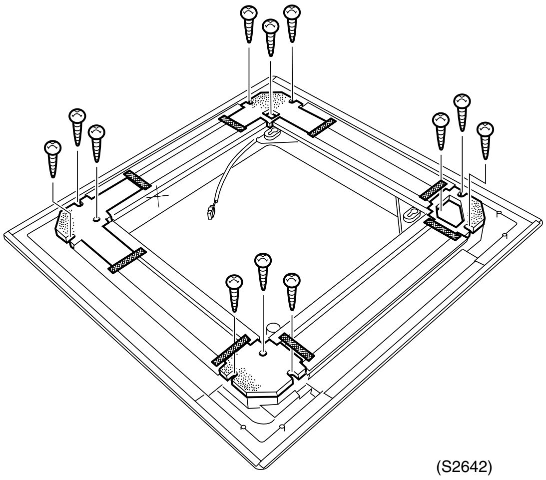
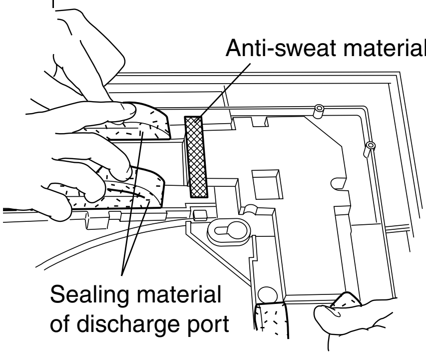
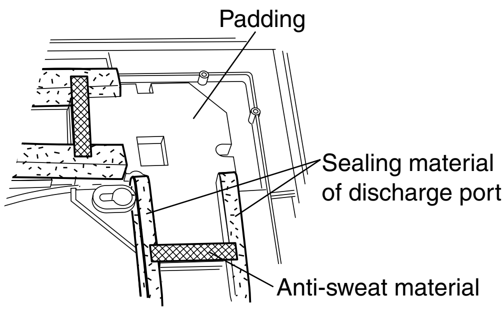
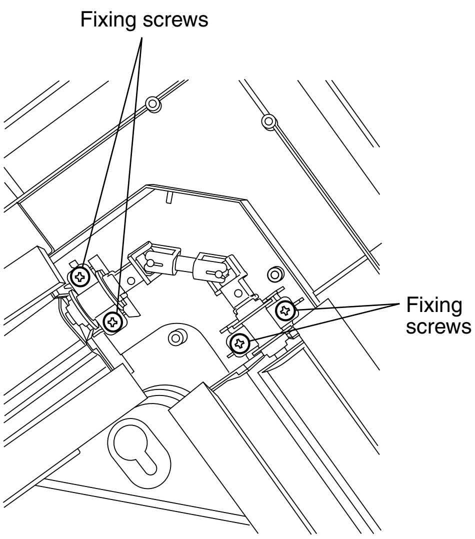
Step		Procedure	Points
1. Removing the decoration panel			
1	Remove the switch box cover and disconnect the connector of swing motor from the harness connector of electric parts.	 (S2636)	 (S2637)
2	Check that the provisional hanger is in the position where it can be engaged with the hook of switch box.	 (S2638)	
3	The decoration panel is attached with 4 mounting screws. Remove the two fixing screws at the switch box side first.	 (S2639)	
4	Loosen the other two screws by approx. 10 mm. The decoration panel is hung with these two fixing screws and the provisional hanger.		

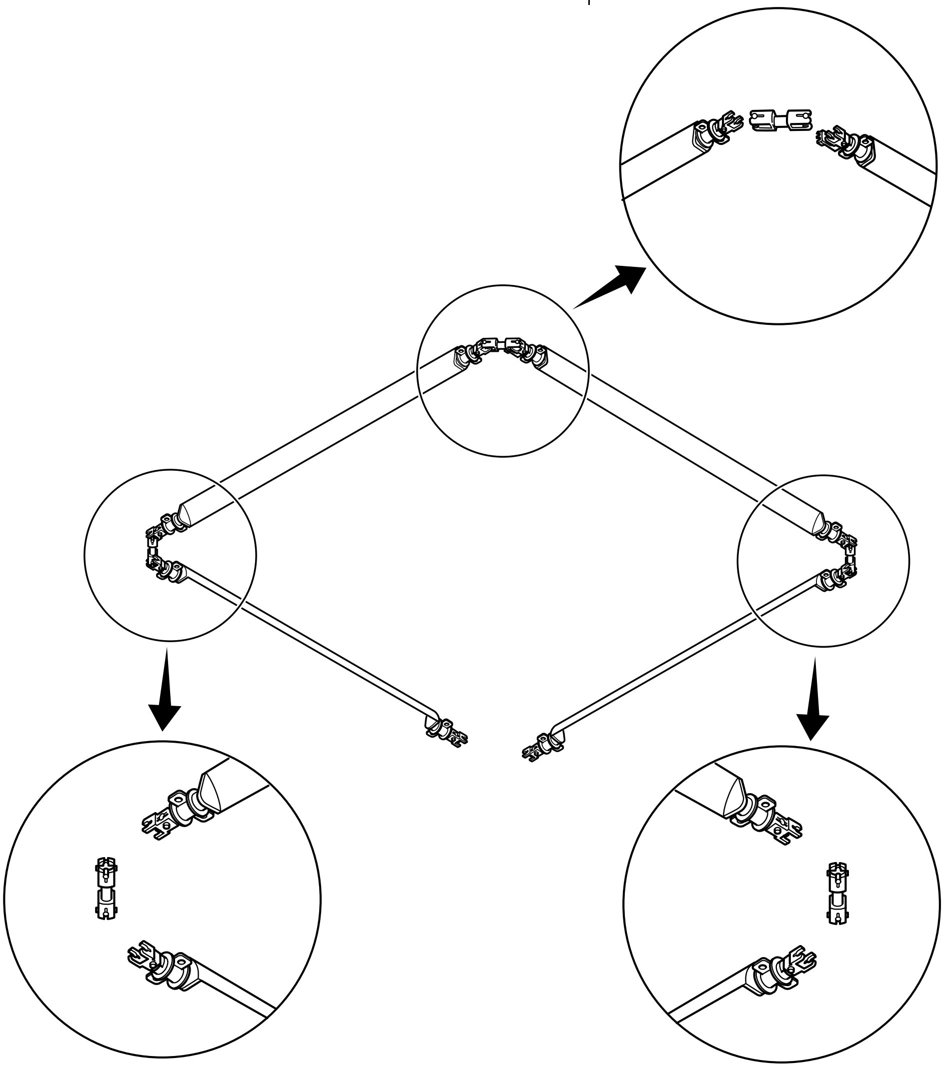
Step	Procedure		Points
5	Turn the provisional hanger to disengage it from the hook of switch box, and slide the decoration panel in the arrow direction to remove the panel.	 (S2640)  (S2641)	

1.4 Removal of Horizontal Vane

Procedure

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

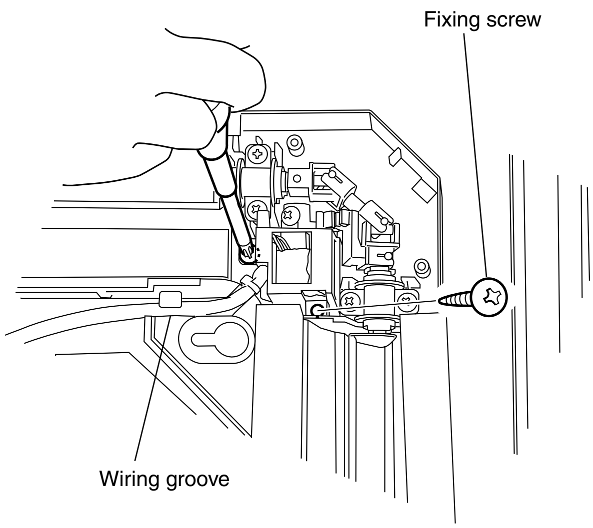
Step	Procedure		Points
1	Removing the decoration panel ■ Refer to the "Removal of Decoration Panel"		
2	Remove the padding at four corners of frame fixed with three screws each. At that time, peel the end of black sealing material of discharge port in part.	 (S2642)	■ Peel not the anti-sweat material but only sealing material of discharge port.  (S2643)
	Note) When restore the sealing material of discharge port, be careful that no clearance exists between padding and sealing material as original installation. (Otherwise, due dripping may occur due to leakage of cool air.)	 (S2644)	
3	Remove the two screws for each bearing of horizontal vane (16 screws in total).	 (S2645)	

Step	Procedure		Points
4	Remove the horizontal vane.	 (S2646)	

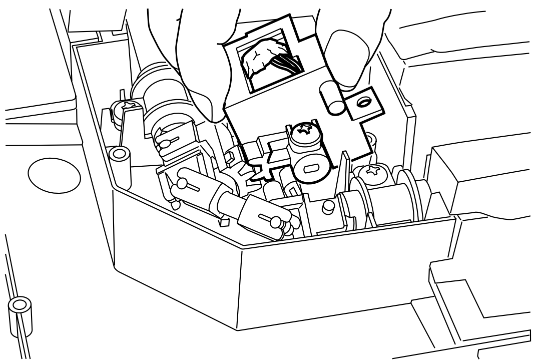
1.5 Removal of Swing Motor

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

Step	Procedure	Points
1	Removing the decoration panel ■ Refer to the "Removal of Decoration Panel"	
2	Pull out the swing motor harness from the wiring groove.	
3	Remove two mounting screws for swing motor mounting plate to remove the plate.	
4	Turn the horizontal vane to downward manually, and turn up the panel side gear to disengage the motor side gear.	
5	Remove the swing motor.	

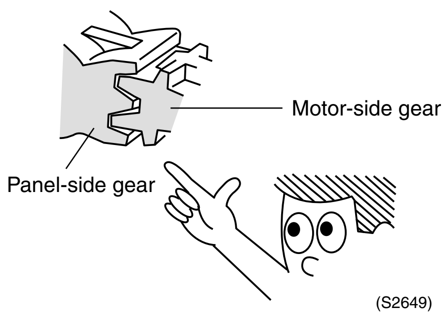


(S2647)


(S2648)

■ Precaution during swing motor installation

Step	Procedure	Points
1	Engage the swing motor-side gear with the panel-side one. (Otherwise, faulty swinging operation or abnormal noise may be caused.) Install the motor after checking of correct gear engagement.	
2	Install the swing motor in reverse process of removal procedure.	■ When install the decoration panel, be careful not to catch the lead wire.
3	After installing the swing motor, be sure to turn on the power switch for resetting (for initializing the vane positions).	



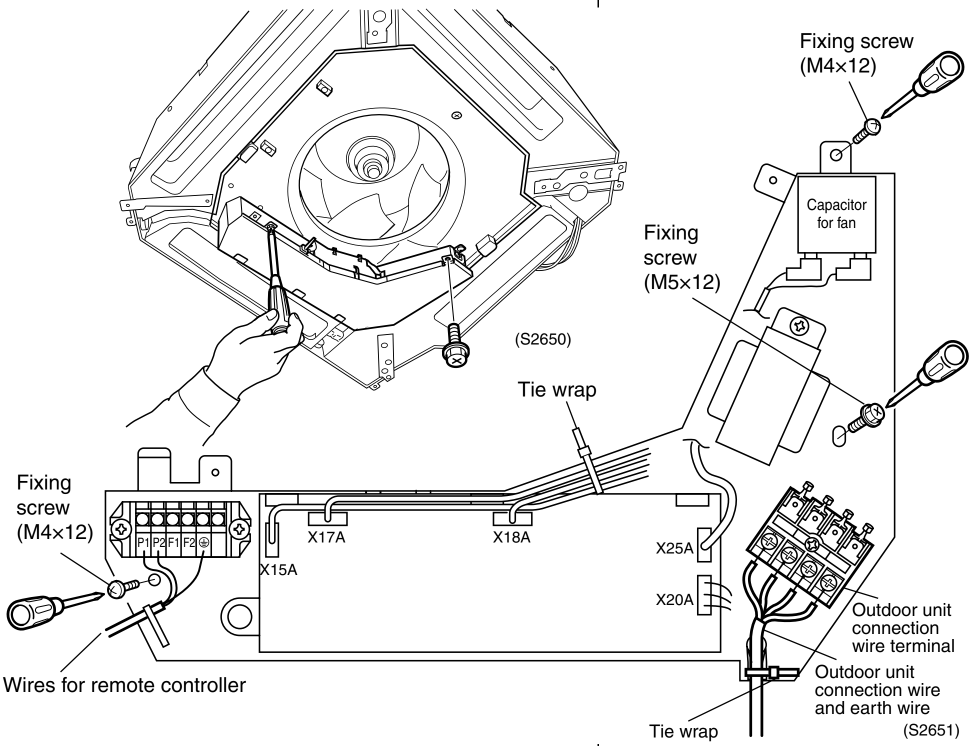
(S2649)

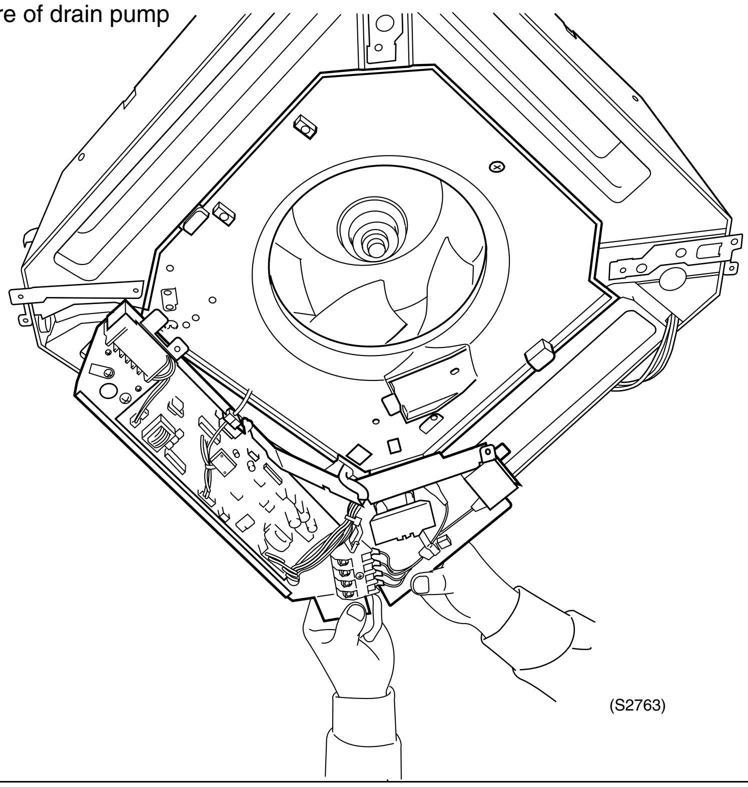
1.6 Removal of Switch Box

Procedure

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

Step	Procedure	Points
Remove decoration panel first.		
1	Remove the lid of switch box. (Two pieces of M4 screws)	
2	Disconnect the connection wires for outdoor units and earth wire. At this time, cut the tie wrap fixing the connection wires. Disconnect wire of remote controller also. At this time, cut the tie wrap fixing the wire of remote controller.	
3	Remove five pieces of lead wires from PCB on the switch box and lead wire connected to the capacitor for fan motor. (Refer to the list shown in the right.)	* Five pieces lead wires shown below (connect to the PCB) and lead wire connected to the capacitor for fan motor. X15A······Lead wire of float switch X17A······Lead wire of thermistor for heating X18A······Lead wire of liquid pipe thermistor X20A······Lead wire of fan motor X25A······Lead wire of drain pump
4	Cut tie wraps fixing lead wires of float switch, thermistor for heating and liquid pipe thermistor.	
5	Remove two fixing screws located at both ends of switch box and one screw inside the box.	
6	Remove the switch box.	

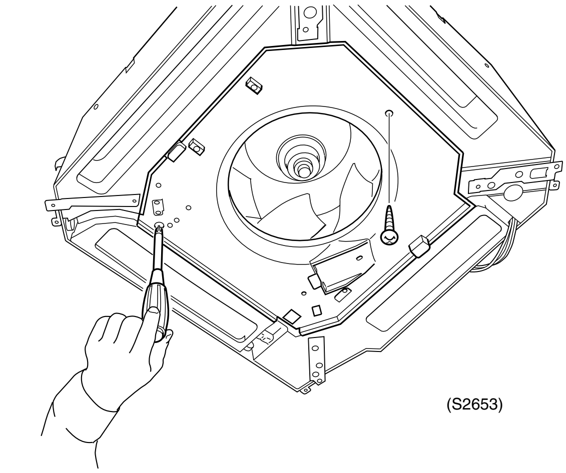
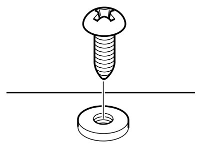
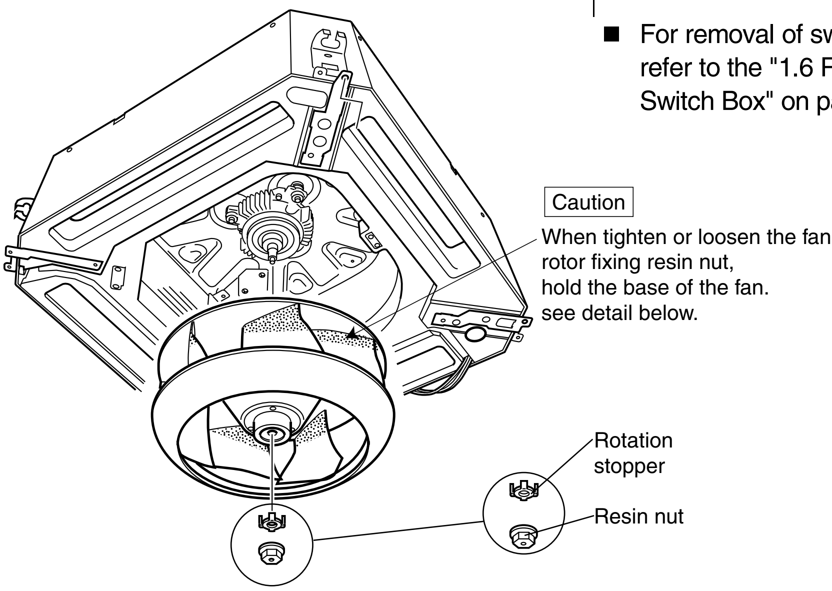
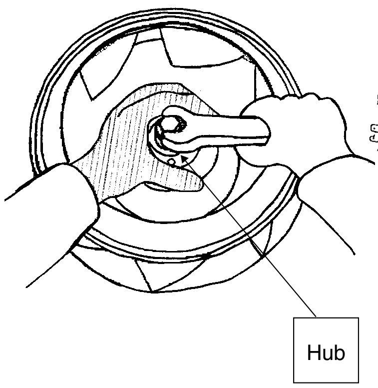
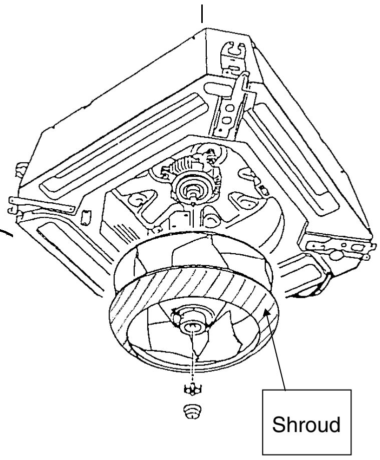


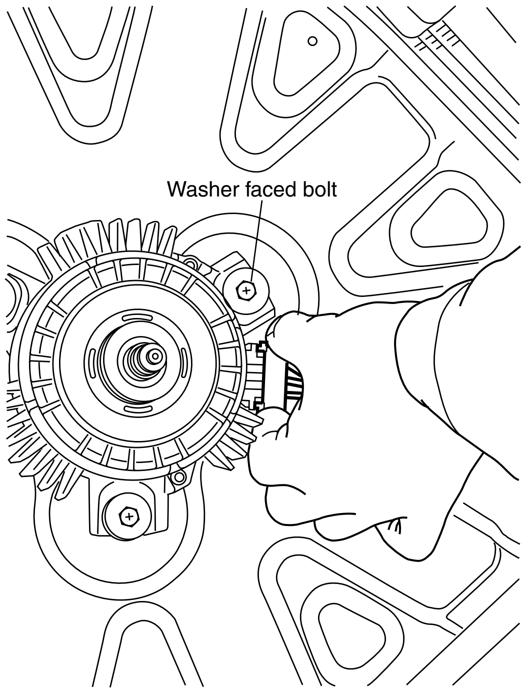
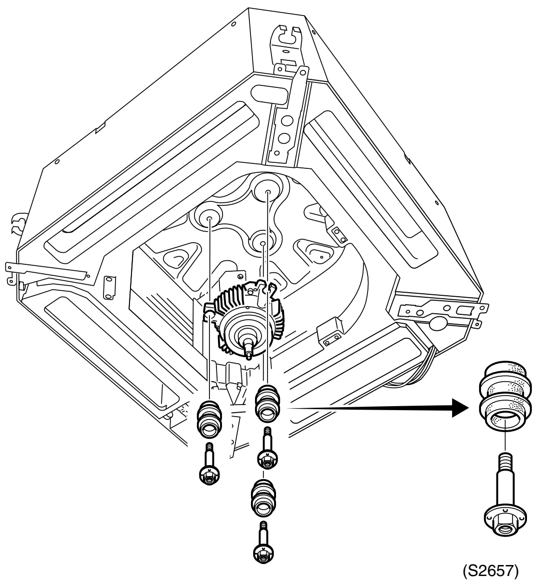


1.7 Removal of Fan Rotor and Fan Motor

Procedure

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

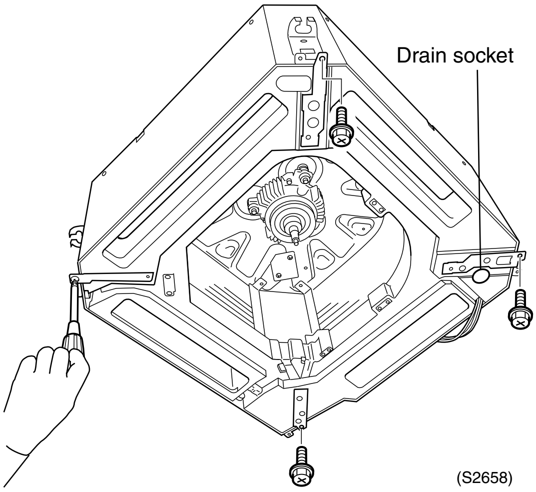
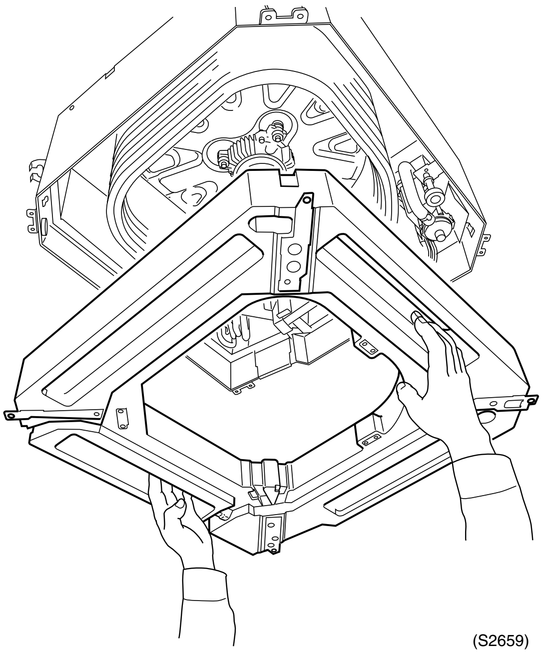
Step		Procedure	Points
■ Remove the switch box. ■ Remove the bell mouth (Two screws)		 (S2653)	■ A convex protrusion is provided at the position of bell mouth fixing screw to prevent misjudgment with switch box fixing position.  (S2654)
1. Removing the fan rotor			
1	Remove the resin nut and rotation stopper to dismount the fan rotor.	 (S2655)	■ For removal of switch box, refer to the "1.6 Removal of Switch Box" on page 237.
2	Remove the resin nut with spanner.		
3	Pull down the fan rotor slowly.		
4	Make sure to hold the hub as shown in Fig.1 when tightening or loosening the fan fixing nut with a spanner.To avoid deformation and vibration of the fan, do not apply excessive torque to the shroud (the slash part of Fig.2). Note) There is no problem to hold the shroud when carrying or lifting the fan.	 Fig. 1 Fan fixing method  Fig. 2 Do not apply excessive torque to the area shown in slash (S2764)	

Step		Procedure	Points
2. Removing the fan motor			
1	Disconnect the harness connector for motor from the motor.	(S2656)	
2	Remove the three washer faced bolts.		
3	Pull down the fan motor slowly.	(S2657)	

1.8 Removal of Drain Pan

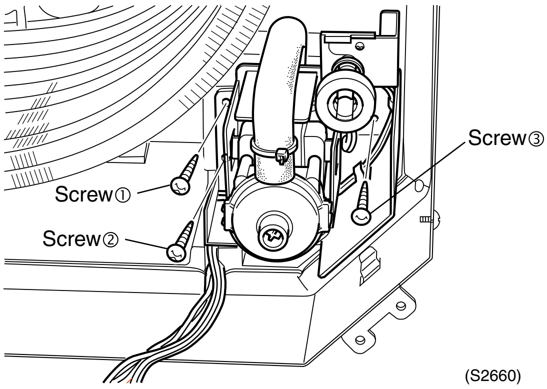
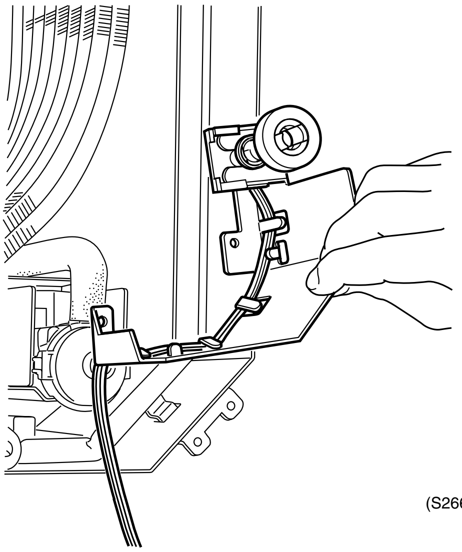
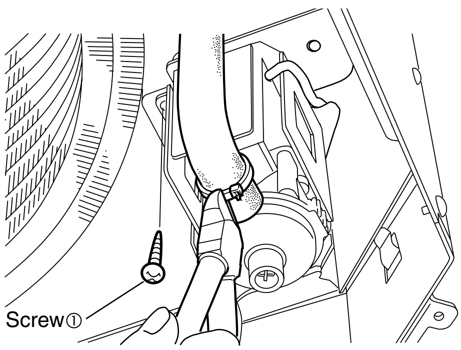
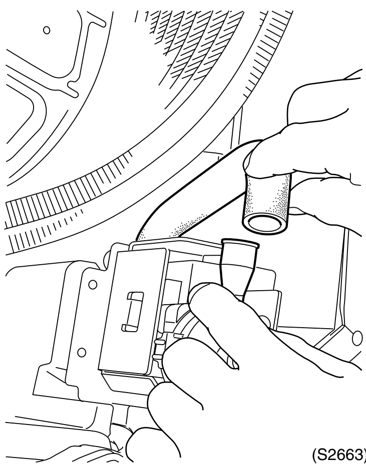
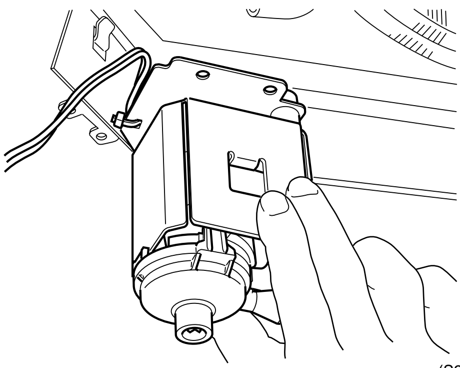
Procedure

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

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>1</td><td>Remove the drain socket to drain water from the drain hole.</td><td rowspan="2">(S2658)</td><td rowspan="2">■ Remove the drain socket to drain water from the drain hole.
■ If water is in the drain pan, it can spill and wet the floor. Drain water completely or cover the floor with a vinyl sheet before removing the drain pan.</td></tr>
<tr><td>2</td><td>Remove the 4 mounting screws to remove the drain pan.</td></tr>
<tr><td>3</td><td>Pull down the drain pan straight down.</td><td>(S2659)</td><td></td></tr>
</table>

1.9 Removal of Drain Pump

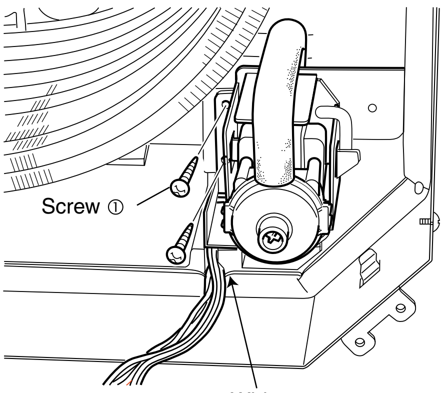
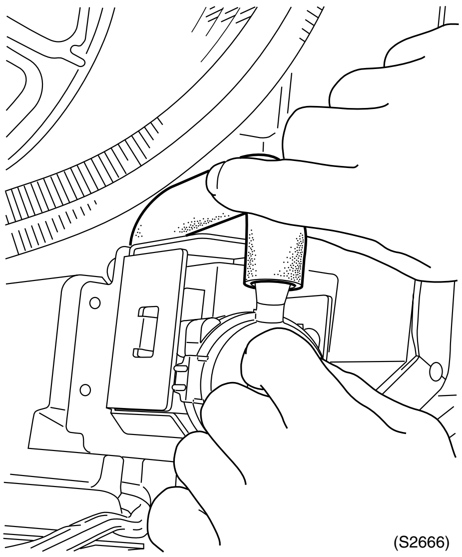
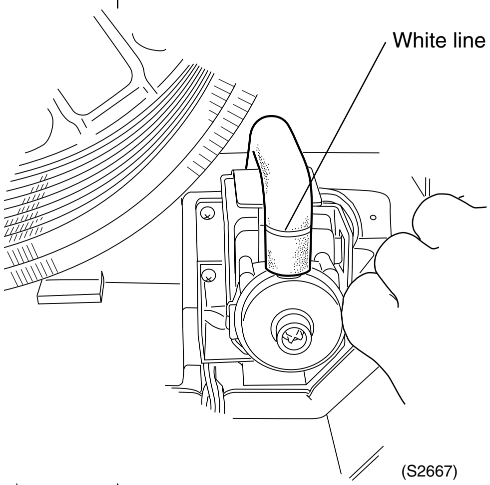
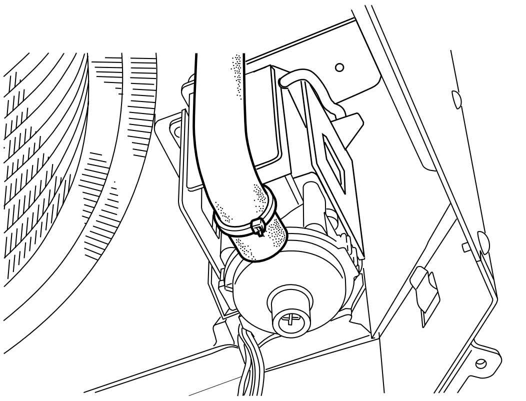
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

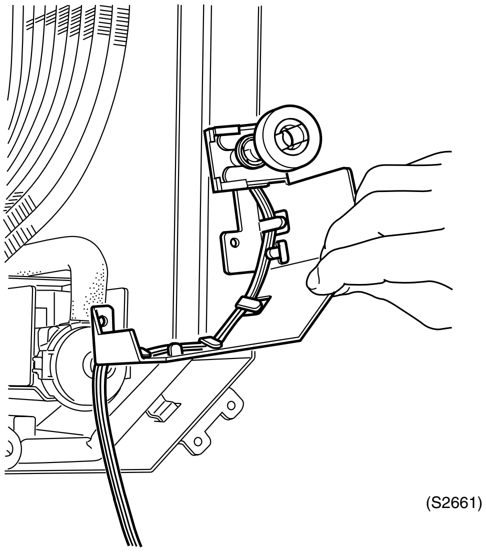
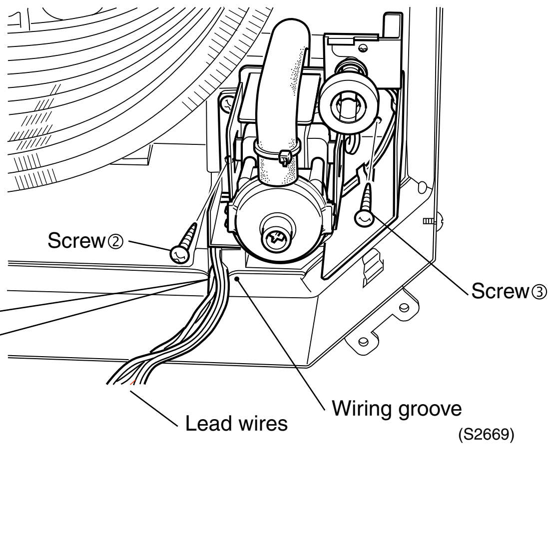
Step	Procedure		Points
1. Removing the drain pump			
1	Remove two screws fixing float switch ass'y. (Screw②and③)	(S2660)	
2	Remove the float switch ass'y.	(S2661)	■ Remove the float switch before removing drain pump in order to prevent the float switch from damage.
3	Cut the tie wrap fixing the drain hose. Remove the screw ①	(S2662)	■ When pulling out the drain hose, be sure to wear safety gloves to prevent your finger from injury with heat exchanger fin.
4	Pull out the drain hose.		(S2663)
5	Remove the drain pump.	(S2664)	

1.10 Installation of Drain Pump

Procedure

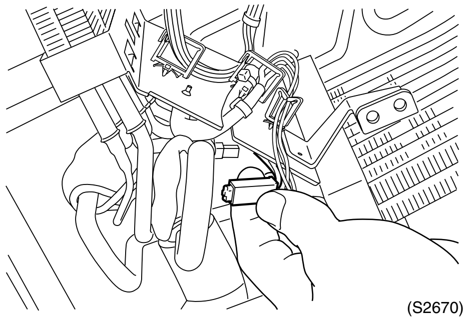
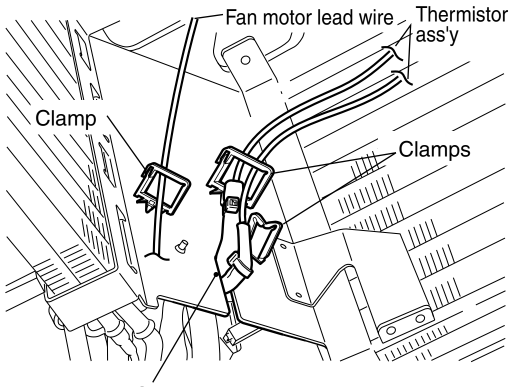
⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

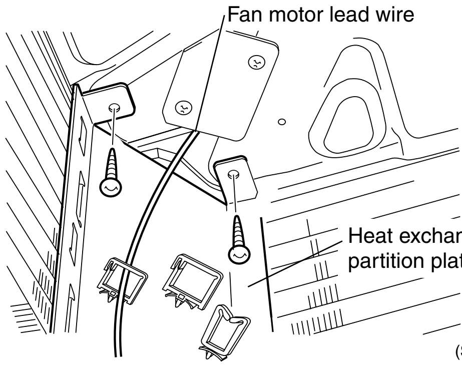
Step	Procedure		Points
1. Installing the drain pump			
1	Put the lead wire in the wiring groove properly, fix the drain pump ass'y with screw ① and insert the drain hose.	 (S2665)	
2	Insert the drain hose into the hose plug of the drain pump up to the root of plug securely.	 (S2666)	■ Inserting the drain hose should be executed before installation of float switch in order to prevent the float switch from damage. ■ Put the tie wrap on the white line on the hose inserted.  (S2667)
3	Put the tie wrap on the hose.	 (S2668)	■ When inserting the drain hose, be sure to wear safety gloves to prevent your finger from injury with heat exchanger fin.

Step	Procedure		Points
4	Insert the float switch ass'y. At this time, put the lead wires in the wiring groove properly.	 (S2661)	
5	Install the drain pump together with the float switch with screw② and ③. When install the drain pan, put the lead wires of float switch and drain pump in wiring groove and pass the lead wires above on the black sealing material on the drain pan. (Otherwise, due dripping may occur due to leakage of cool air.)	 (S2669)	

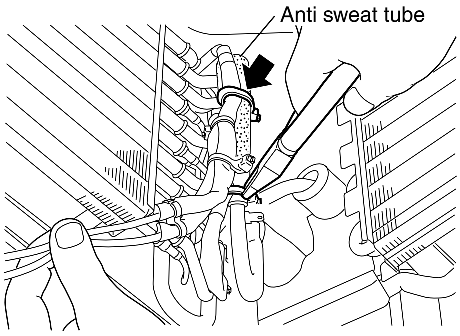
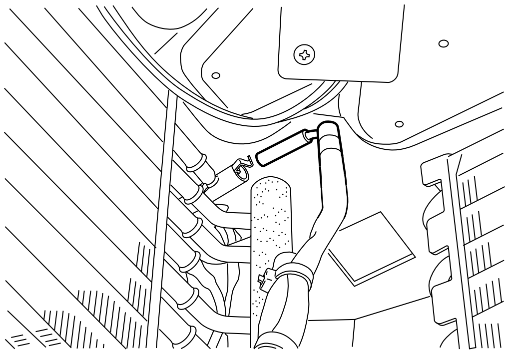
1.11 Replacement of Heat Exchanger Thermistor

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

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>1</td><td>Disconnect the grounding terminal from the header.</td><td>
(S2670)</td><td></td></tr>
<tr><td>2</td><td>Pull apart the thermistor ass'y and motor lead wire from the clamps.</td><td rowspan="2">

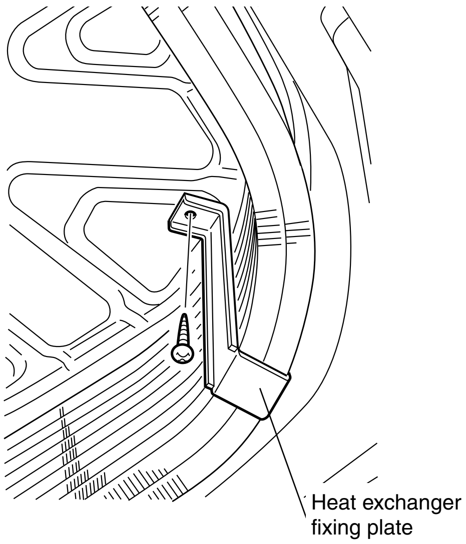
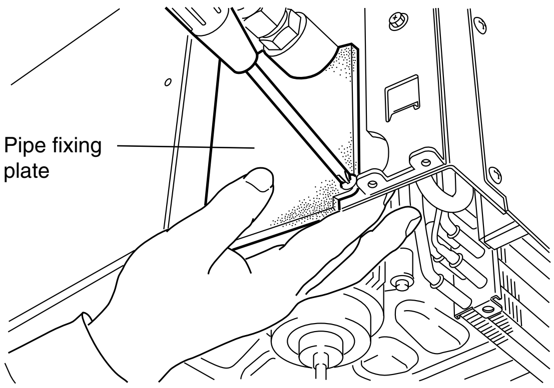
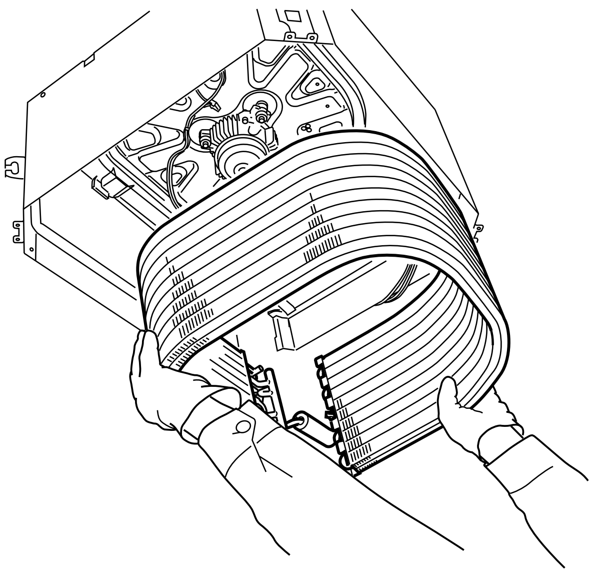
(S2671)</td><td></td></tr>
<tr><td>3</td><td>Pull out the thermistor from the slit of heat exchanger partition plate.</td><td></td></tr>
<tr><td>4</td><td>Remove two screws to the top panel, then, pull the partition plate of heat exchanger downward.</td><td>

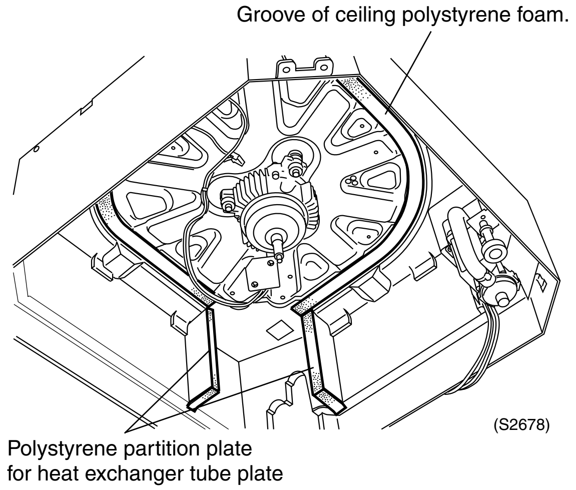
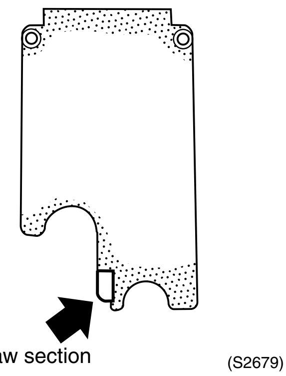
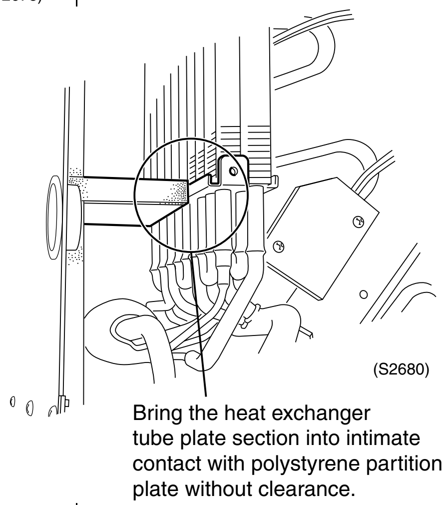
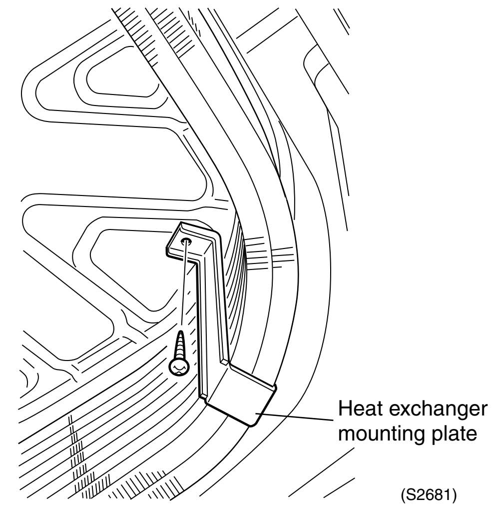
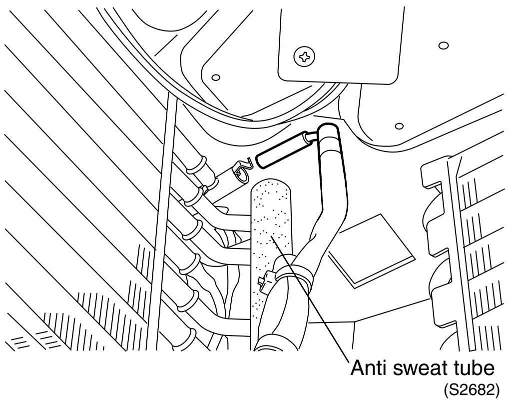
(S2672)</td><td></td></tr>
</table>

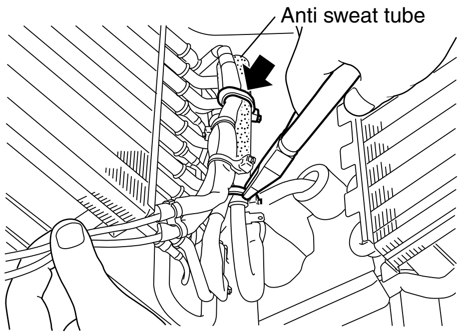
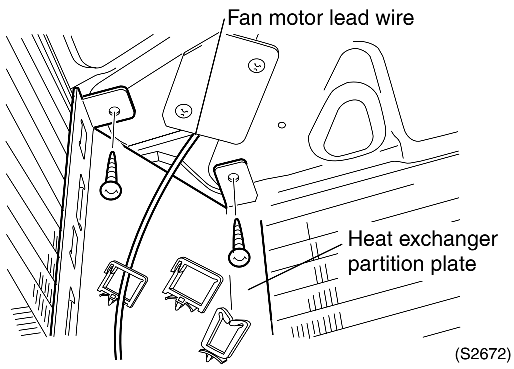
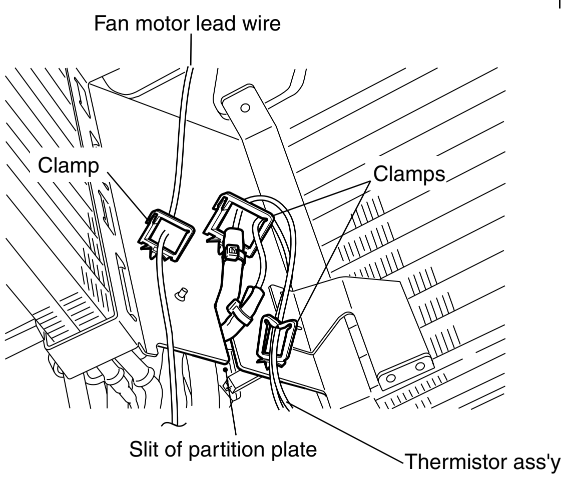
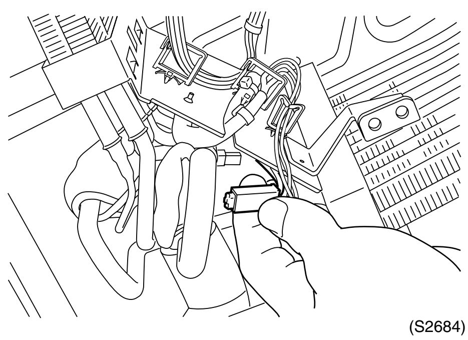
Step	Procedure		Points
5	Take out the two tie wraps fixing the anti sweat tube of header and thermistor. (Be sure not to take out other tie wrap.)	 (S2673)	■ Heat resistance tie wrap is used. Be sure to use a heat resistance tie wrap when installing new thermistor. ∗Heat resistance tie wrap Parts No. :1278921 (Drg No. :4SA90202-1)
6	Pull out the thermistor from the insertion pipe. Thermistor for heating : The upper one wrapped with a yellow tape Thermistor for liquid pipe : The lower one without taping	 (S2674)	■ Replace thermistor as an ass'y. (Two thermistors are bound with special heat resistance tube.)

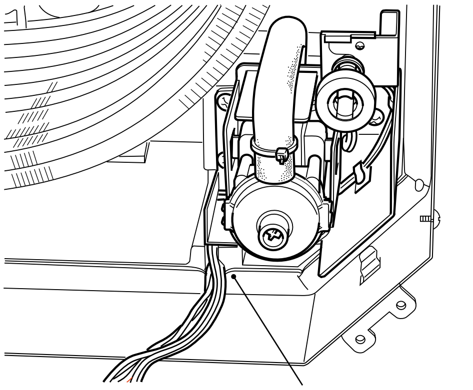
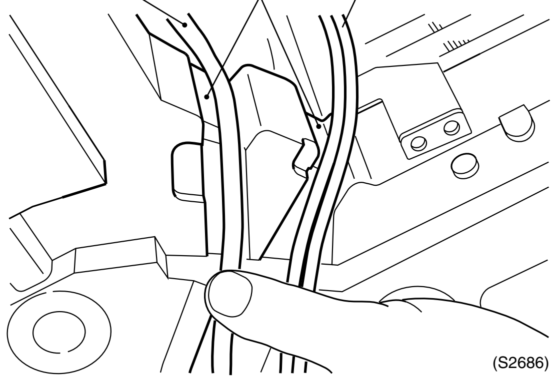
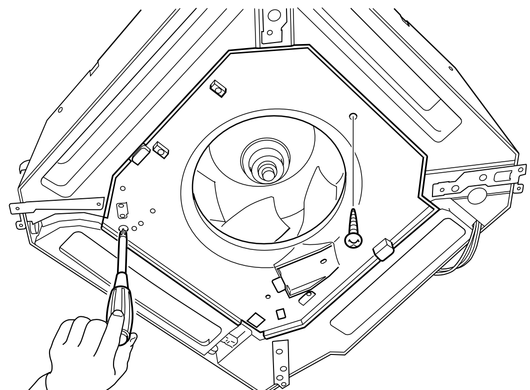
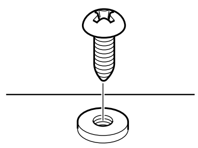
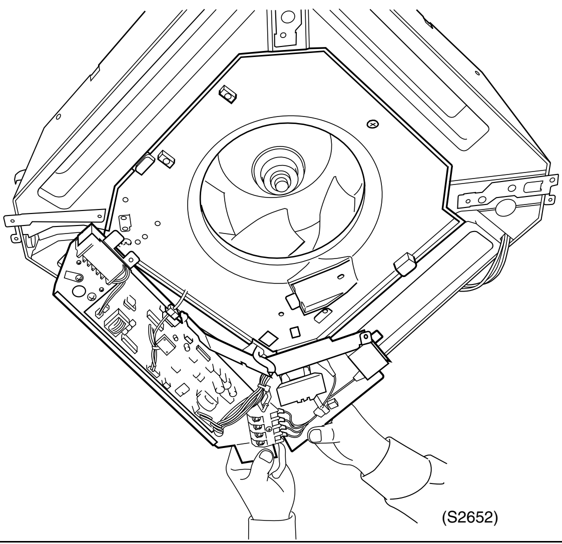
1.12 Replacement of Heat Exchanger

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

Step		Procedure	Points
1. Removing the heat exchanger			
1	Remove the refrigerant pipe after completion of refrigerant collection and pump down operation.		■ This work should be performed with two personnel including one person for supporting the heat exchanger to avoid falling down during the work.
2	Remove the fixing plate of heat exchanger.	 (S2675)	
3	Remove the pipe fixing plate mounted with two screws.	 (S2676)	
4	Remove the heat exchanger.	 (S2677)	

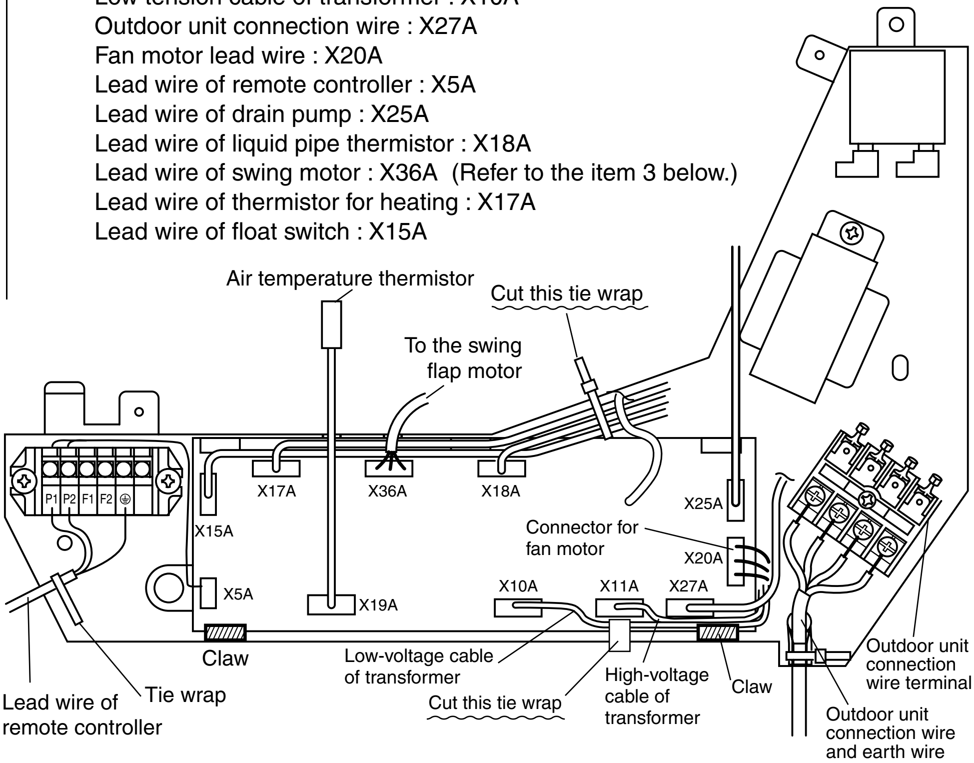
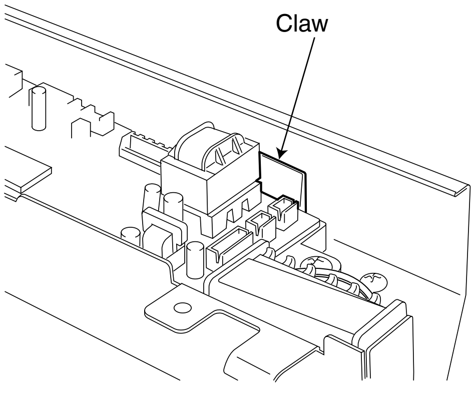
Step		Procedure	Points
2. Installing the heat exchanger			
1	Insert the heat exchanger in the groove of ceiling polystyrene foam properly, and bring the tube plate section of heat exchanger into intimate contact with the polystyrene partition plate correctly.		
2	Insert the claw section of pipe fixing plate into the contracted part of the external plate securely.		
3	Install the heat exchanger mounting plate.		
4	Insert two thermistors. Then cover the header by anti sweat tube.		■ Set the lead wire with yellow tape (for heating) upper side while that with no tape (for liquid) lower side.

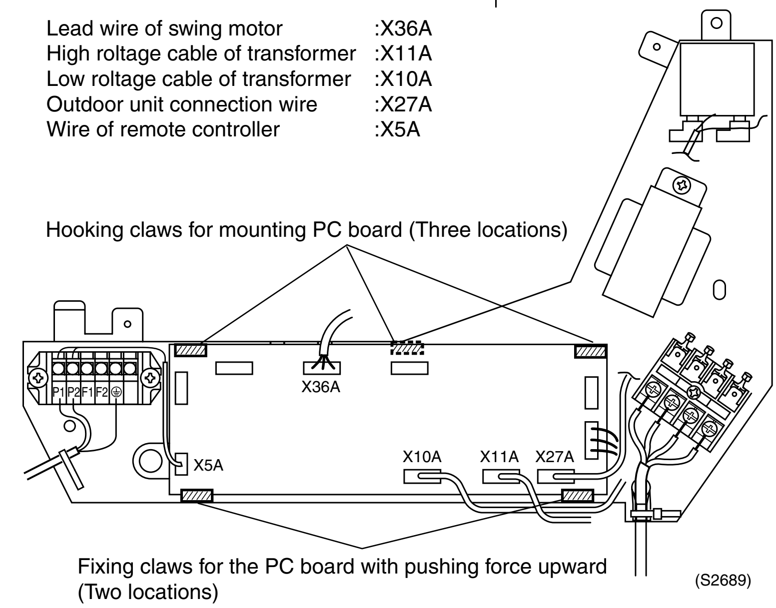
Step	Procedure		Points
5	Reinstall the lead wire of thermistor and anti sweat tube on the original position by using two pieces of heat resistance tie wrap.	 (S2673)	∗ Heat resistance tie wrap Parts No.:1278921 (Drg No.:4SA90202-1)
6	Put the heat exchanger partition plate inside and fix them with two screws.	 (S2672)	
7	Pass the thermistor ass'y through the clamps and the slit of partition plate securely as the original state. Pass the lead wire of motor also through the clamp securely.	 (S2683)	
8	Insert the grounding terminal to the header.	 (S2684)	

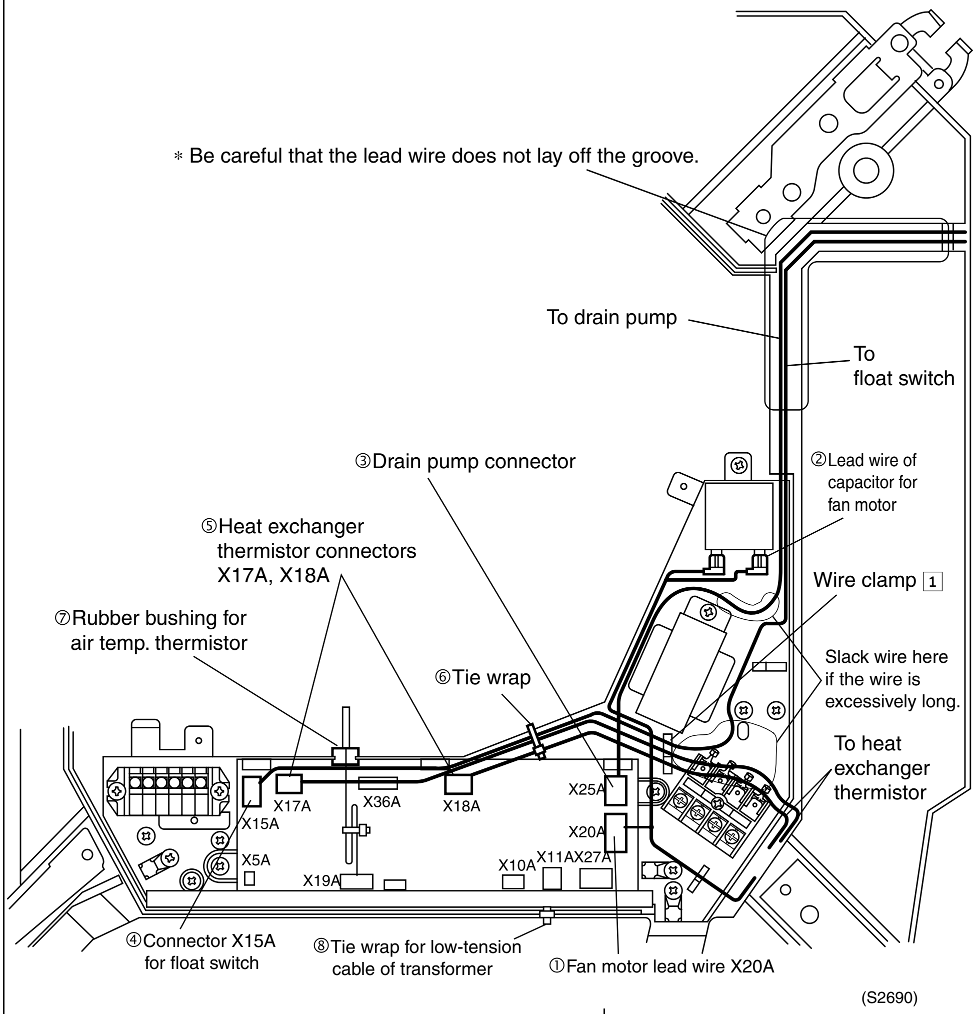
<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>9</td><td>Install the drain pan putting the lead wire of float switch and drain pump into the wire groove securely.
When install the drain pan, put the lead wires in wiring groove and pass the lead wires above the black sealing material on the drain pan securely. (Otherwise, due dripping may occur due to leakage of cool air.)</td><td>
(S2685)</td><td></td></tr>
<tr><td>10</td><td>Installing the bell mouth.
When install the bell mouth, put the lead wires of fan motor and thermistor into the wiring groove securely as they were, taking care that the wires do not contact with fan rotor.</td><td>
(S2686)</td><td></td></tr>
<tr><td>11</td><td>Tighten the two screws to install the bell mouth. (Bell mouth is formed with step.)</td><td>
(S2653)</td><td>■ A convex protrusion is provided at the position of bell mouth fixing screw to prevent misjudgment with switch box fixing position.

(S2654)</td></tr>
<tr><td>12</td><td>Install the switch box with two M4 screws and one M5 screw.</td><td>
(S2652)</td><td>■ For installation of the switch box, refer to the "Removal of Switch Box" on page 237.
■ For re-wiring inside the switch box, refer to the "Replacement of PC Board" on page 250.</td></tr>
</table>

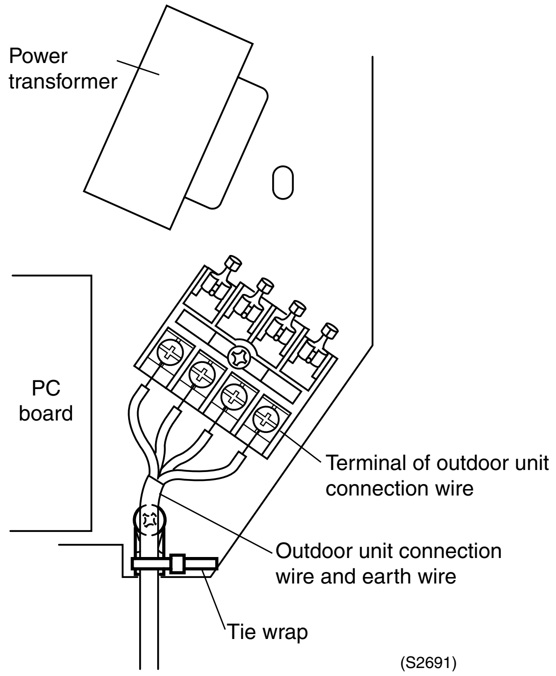
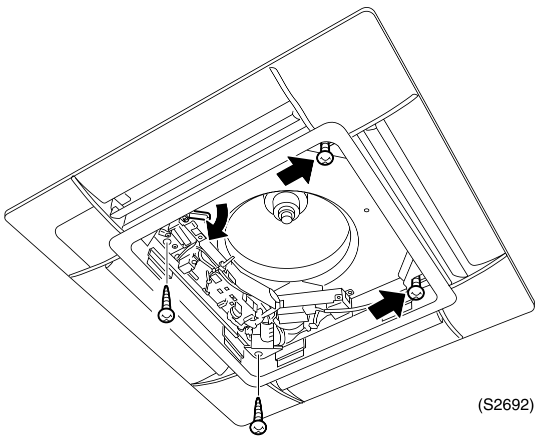
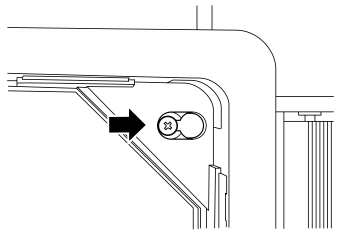
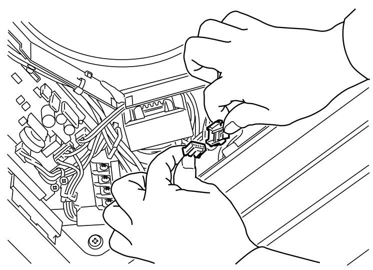
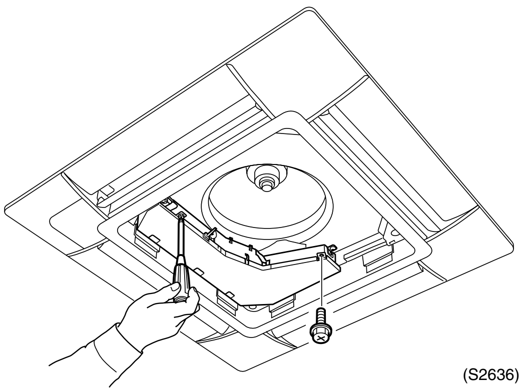
1.13 Replacement of PC Board

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

Step	Procedure		Points
1. Removing the PC Board			
1	Remove the switch box cover. (M4 screw×2)	Air temperature thermistor : X19A High tension cable of transformer : X11A Low tension cable of transformer : X10A Outdoor unit connection wire : X27A Fan motor lead wire : X20A Lead wire of remote controller : X5A Lead wire of drain pump : X25A Lead wire of liquid pipe thermistor : X18A Lead wire of swing motor : X36A (Refer to the item 3 below.) Lead wire of thermistor for heating : X17A Lead wire of float switch : X15A  (S2687)	
2	Disconnect the connectors shown in the right connected to the PC board. Cut the tie wrap fixing the low tension cable (blue) to the switch box.		
3	Press two claws supporting the PC board to disengage one side of the PCB, then tilt the board and disconnect the lead wire for swing flap. (X36A)	 (S2688)	

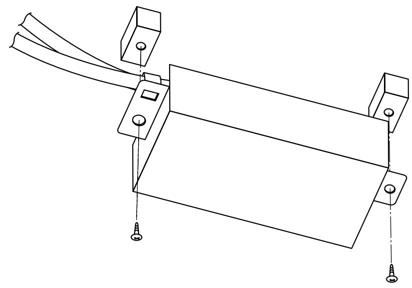
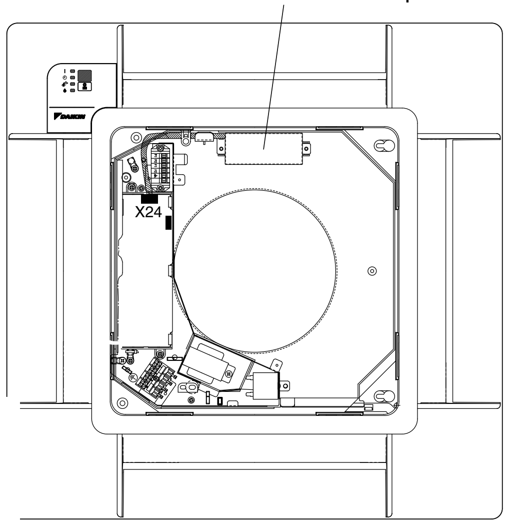
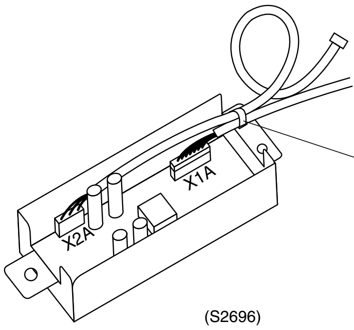
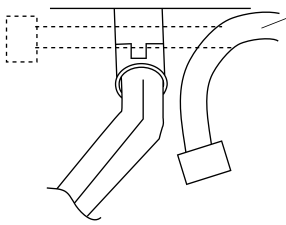
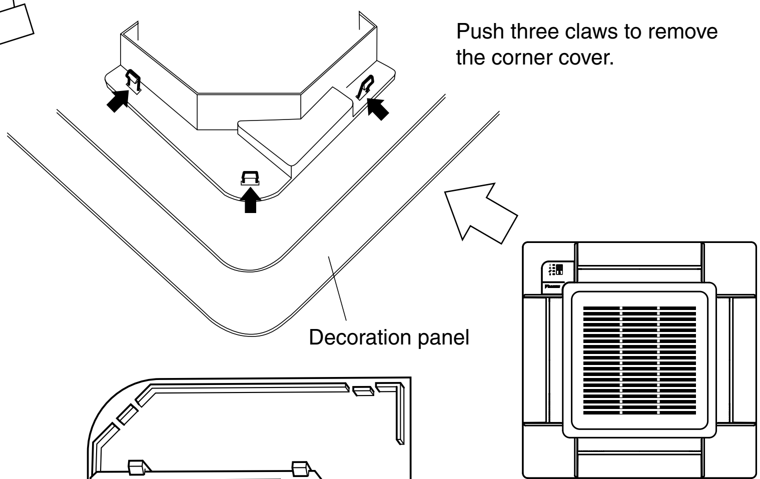
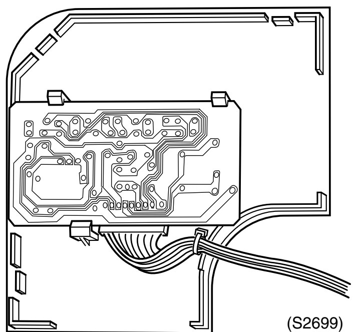
<table>
<tr><th>Step</th><th></th><th>Procedure</th><th>Points</th></tr>
<tr><td colspan="2">2. Installing the PC board and re-wiring inside the switch box</td><td rowspan="3">

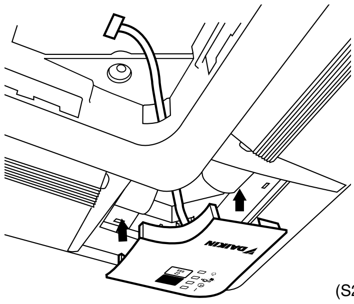
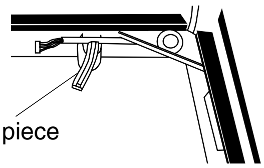
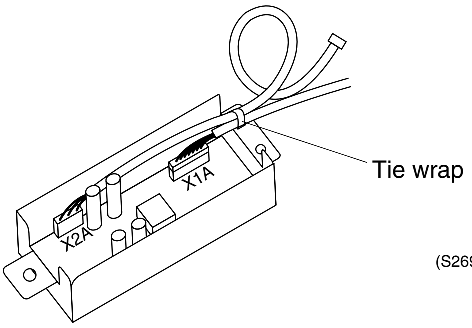
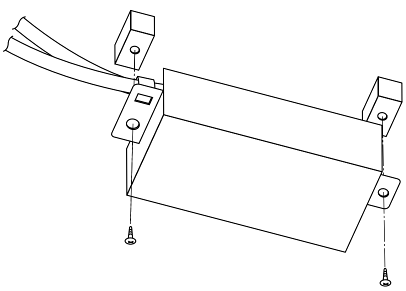
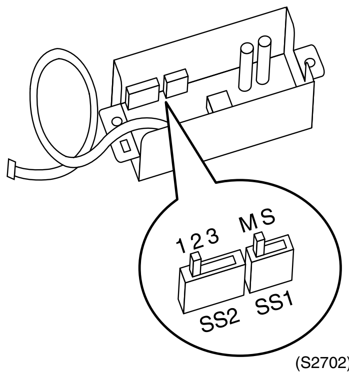
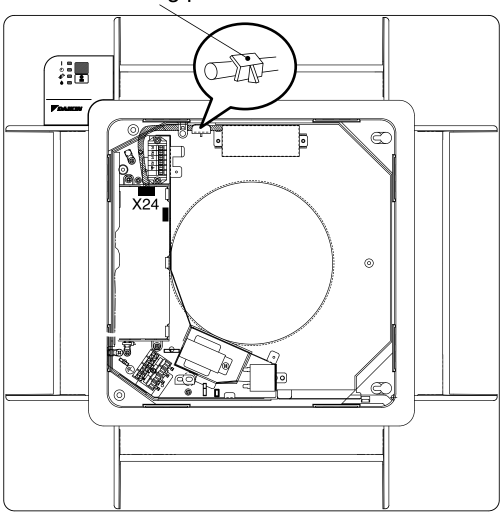

</td><td rowspan="3"></td></tr>
<tr><td>1</td><td>Engage the PC board with two claws shown in the right figure, push up the board until a click sound is generated, then connect the lead wires shown right.</td></tr>
<tr><td>2</td><td>Next connect the lead wires in the route shown below and fix them with tie wrap in the following order.
① Connect the fan motor lead wire to the connector X20A.
② Connect the lead wire of capacitor for fan motor to the capacitor.
③ Insert the lead wire of drain pump to the connector X25A.
④ Connect the lead wire of float switch to X15A through the specified path and wire clamp 1 .
⑤ Insert two thermistors to the connector matching the color with X17A and X18A through the wire clamp 1
(e.g. connect the wire with yellow tape to the yellow connector).
Connect the lead wire of float switch and two pieces of wire of thermistor to the switch box by using tie wrap⑥.
(Use tie wrap properly to prevent the wire from contact with hot part of the PC board.)
Insert the rubber bushing of air temperature thermistor ⑦ into the slit of switch box.
Then, check that it is connected to the connector X19A.</td></tr>
</table>

Step	Procedure		Points
3	Re-connect the outdoor unit connection wire, the earth wire and wire of remote controller as they were, and fix them securely with tie wrap. (Only when install the switch box)	 (S2691)	■ Be sure to fix the lead wire to be connected to the connector X10A for low-tension cable of transformer to the switch box with tie wrap ⑧. (The tie wrap is used for preventing the wire from contact with a hot part on the PC board.)
3. Installing the decoration panel			
1	Put the two holes on the decoration panel to the panel mounting screws and slide the panel, turn the stoppers to prevent the panel from falling down, then install the remainder two screws.	 (S2692)	■ When installing the decoration panel, be careful not to catch the lead wire.  (S2693)
2	Insert the lead wires of swing flap to the connector on the PC board.	 (S2637)	
3	Install the cover of switch box and the grille.	 (S2636)	

1.14 Replacement of Receiver Section of Wireless Remote Controller

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

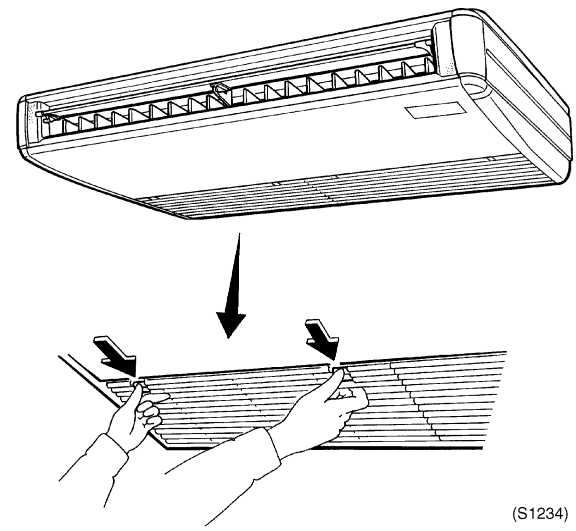
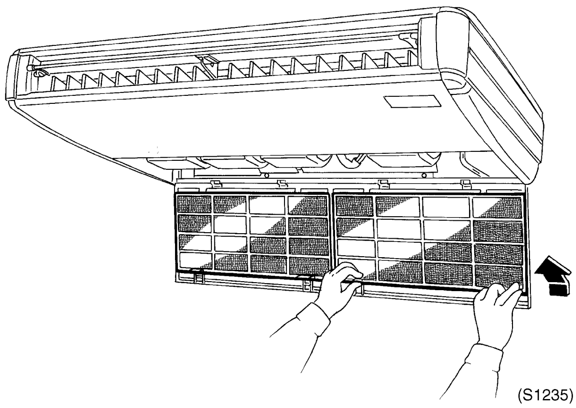
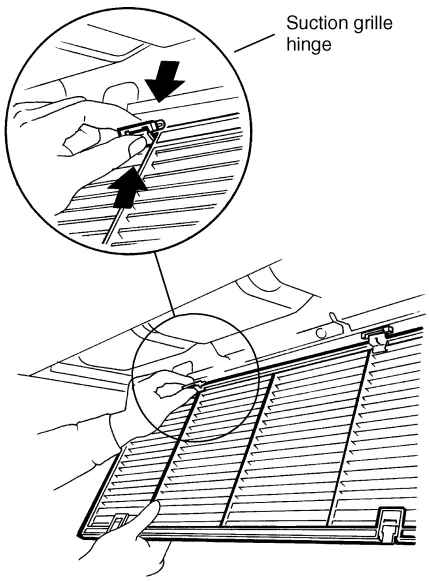
Step		Procedure	Points
1. Removing the receiver section			
1	Remove two screws of the transmission parts box to remove the box.	 (S2694)  (S2695)	
2	Cut the tie wrap fixing transmission parts box and harness and disconnect the connector X1A.	 (S2696)	
3	Disconnect the lead wire of the transmission parts box from the connector X24A on the indoor unit PC board.		
4	Removing the decoration panel ■ Refer to the "Removal of Decoration Panel"	 (S2697)	
5	Pull out the lead wire of receiver section from wiring groove.		
6	Push three claws on the rear side of panel to remove the corner cover (receiver section).	 (S2698)  (S2699)	

Step		Procedure	Points
2. Installing the receiver section			
1	Pass through the lead wire of the receiver section, and insert the corner cover.	 (S2700)	
2	Put the wire in the wiring groove on the hooking piece securely.	 (S2701)	
3	Install the switch box and the decoration panel.	 (S2696)	■ When install the decoration panel, be careful not to catch the lead wire.
4	Insert the lead wire of the receiver section to connector X1A, and bind the two wires with tie wrap.		
5	Set the dip switches.	 (S2694)	■ Setting the dip switches  (S2702)
6	Mount the transmission parts box with two screws after checking that the tie wrap is in the fixing position and the lead wire is caught with fixing part of tie wrap and can not come out.		
7	Insert the lead wire from the transmission parts box to the connector X24A on indoor unit. Pass through the lead wire to be connected to X24A on the indoor unit PC board under the hooking piece.	 (S2703)	Set the dip switches with same conditions as those of the transmission parts box removed. (For details of setting, refer to the instruction manual of wireless remote controller kit.)

2. FHQ35/50/60BUV1B

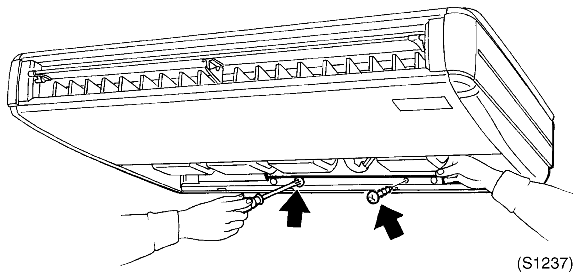
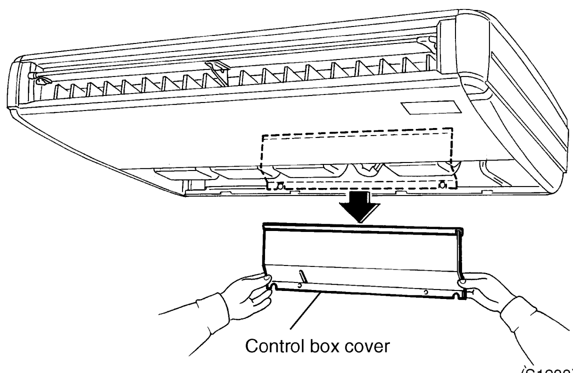
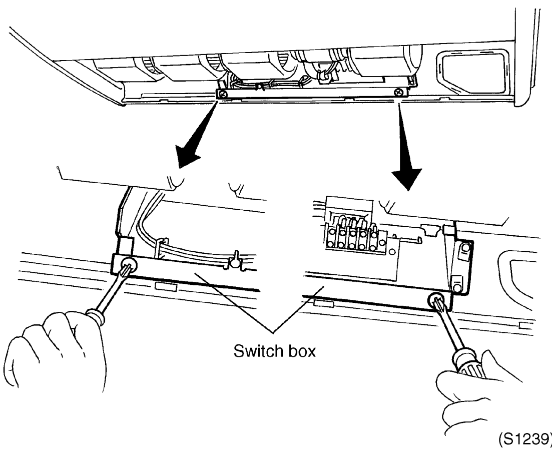
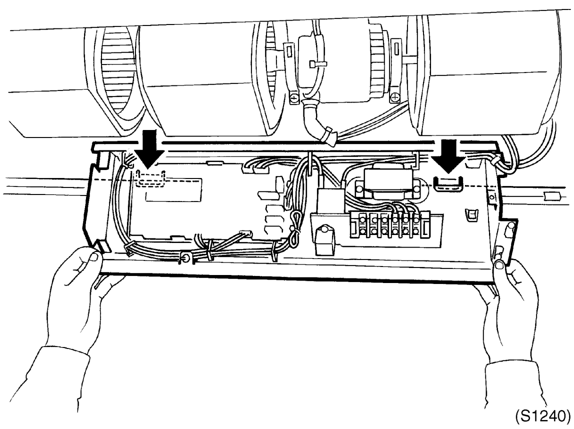
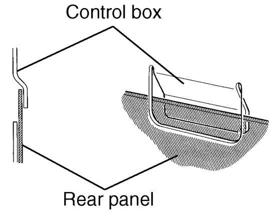
2.1 Removal of Air Filter and Suction Grille

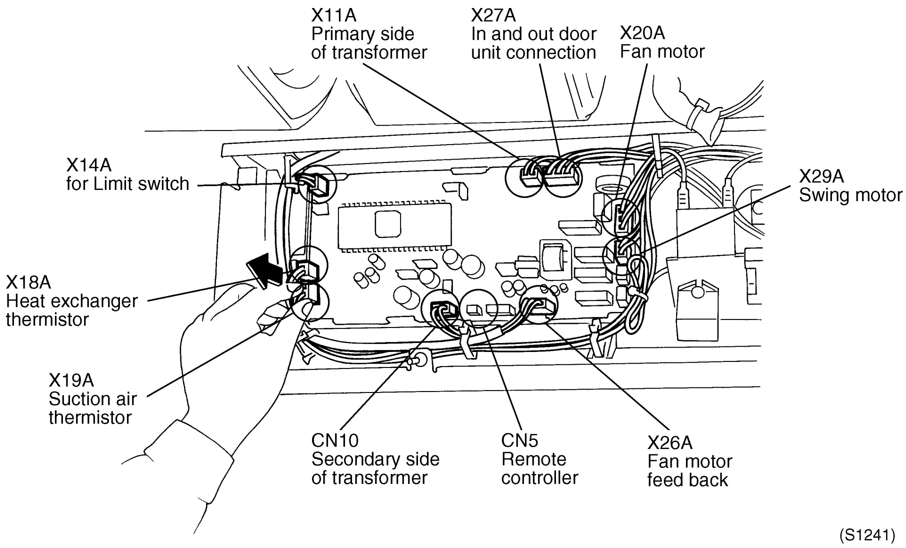
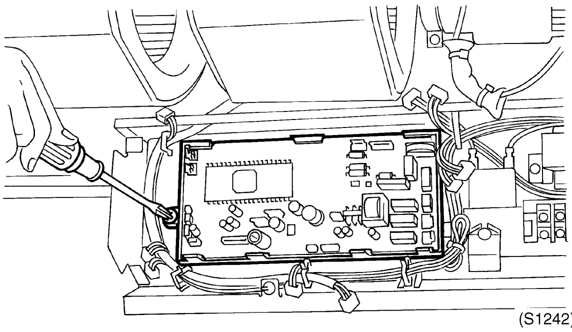
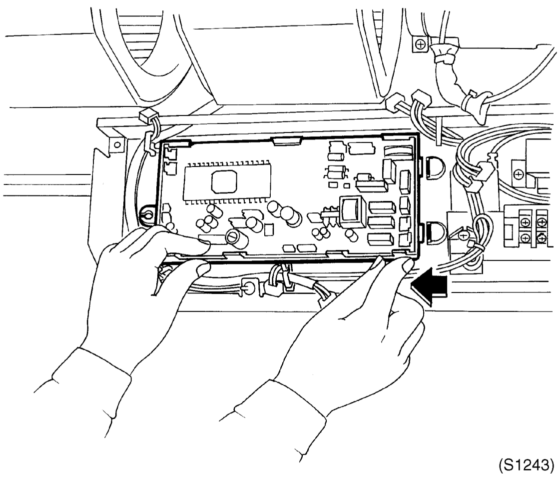
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1	Push the 2 tabs and open the suction grilles.	 (S1234)	
2	Push the air filter installation panel from 2 places in the direction of the arrow, and pull the air filter out toward yourself.	 (S1235)	
3	Grip the suction grille hinge strongly and remove the suction grille.	 (S1236)	

2.2 Removal of Electrical Parts and PC Boards

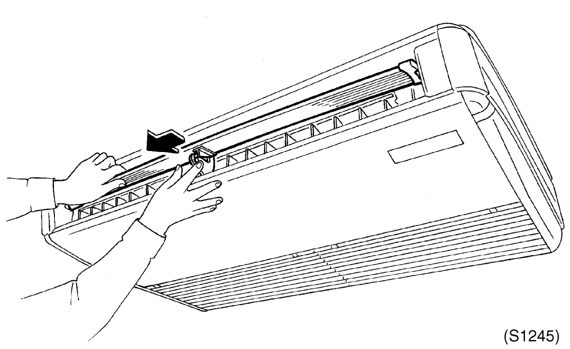
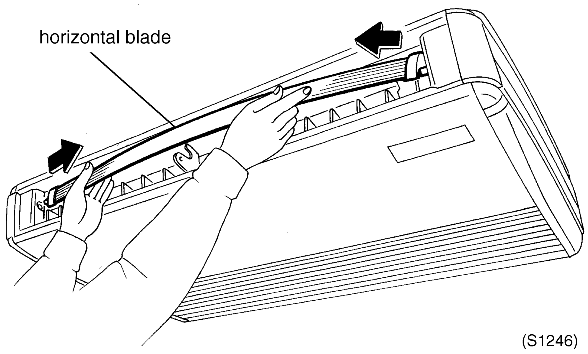
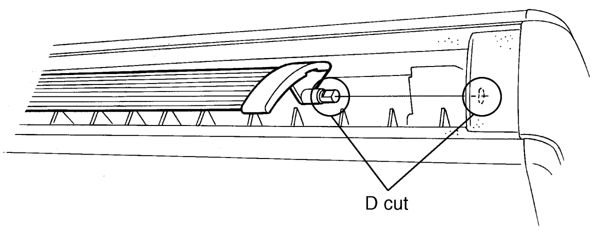
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1	Loosen the 2 screws of the control box cover and remove the control box cover.	 (S1237)  (S1238)	
2	Remove the 2 screws of the control box.	 (S1239)	
3	Pull down the control box and let it hang by the 2 locations in the rear. Electrical parts can now be removed.	 (S1240)	 (S1244)

Step	Procedure		Points
4	Disconnect the connector mounted on the PC board.	 (S1241)	
5	Remove the PC board installation screw.	 (S1242)	
6	Slide the PC board to the left away from the tabs on the right, and remove the PC board.	 (S1243)	

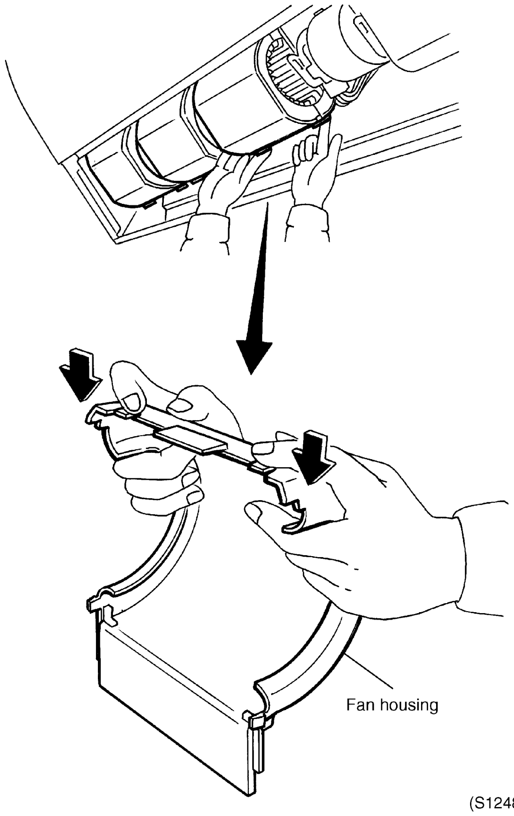
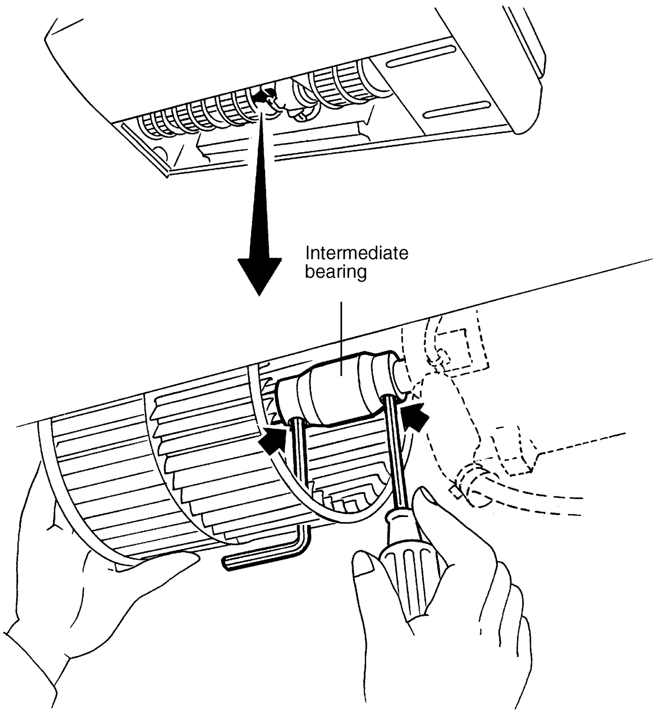
2.3 Removal of Horizontal Blade

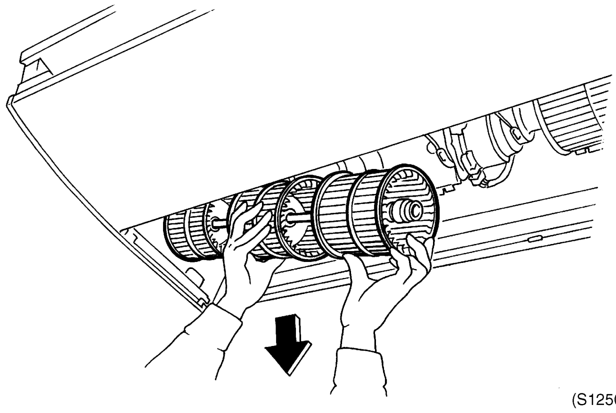
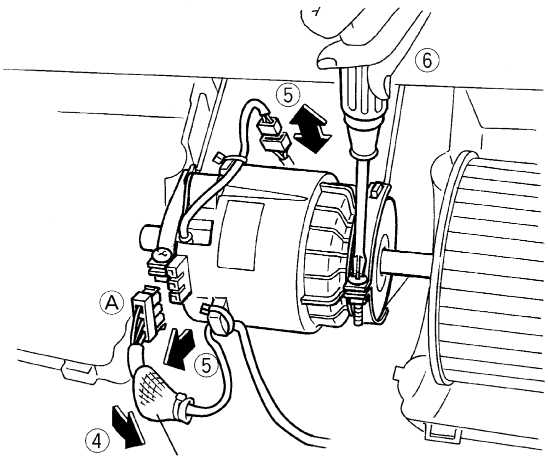
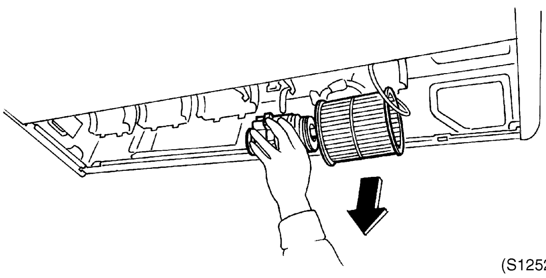
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1	Gently bend the support plate located at the center of the horizontal blade, and detach the center shaft. (Two shafts provided on Types 140 and 160.)	 (S1245)	
2	Then gently bend the center of the horizontal blade, and take both the end shafts out of their bearings.	 (S1246)	■ When removing the horizontal blade from the bearings at both ends, be careful not to get the blow port thermal insulation scratched.
Reassembling precautions			
1	The shaft at the right end of the horizontal blade is cut in D shape. Fit this D-shaped end to the D-profiled bearing. Reattach the horizontal blade at the right side first.	 (S1247)	

2.4 Removal of Fan Rotor and Fan Motor

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

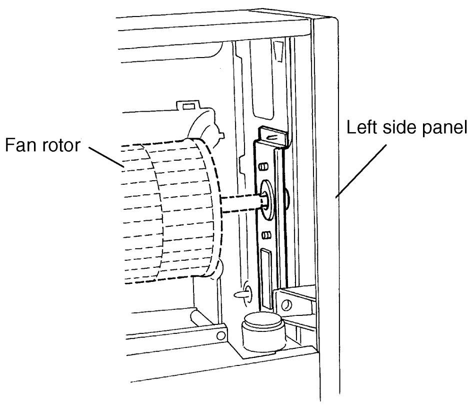
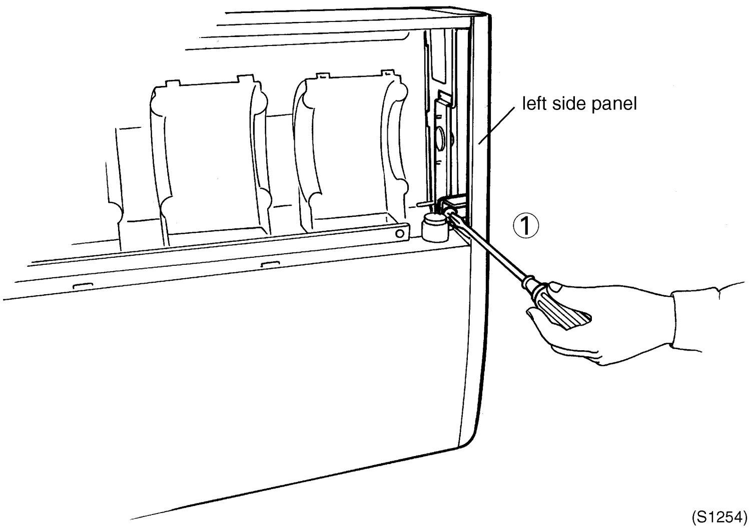
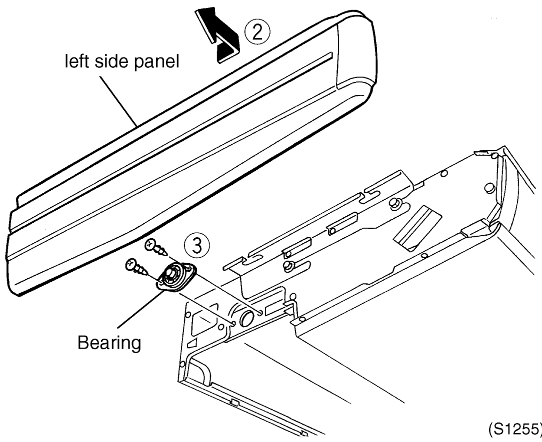
Step	Procedure		Points
1	Push the 2 tabs of the fan housing toward the inside with your fingers, and pull out the fan housing.	 (S1248)	
2	Loosen the 2 hexagon set screws of the intermediate bearing.	 (S1249)	

Step	Procedure		Points
3	Slide the intermediate bearing to the right and remove the fan rotor ass'y.	 (S1250)	
4	Cut off the tie-wrap of the glass tube cover over the fan motor connector. Slide the glass tube and get the connector exposed.	 (S1251)	■ Ⓐconnectors Connector (1) handles high voltage (220-240 V), so be sure to turn of the power supply before disconnecting.
5	Disconnect the 2 fan motor connecting connectors.		
6	Remove the 2 fan motor fasteners.		
7	Remove the fan motor.	 (S1252)	■ Finally reconnect the fan motor connector, cover it with the glass tube and secure it with the tie-wrap.

2.5 Removal of Fan Bearing

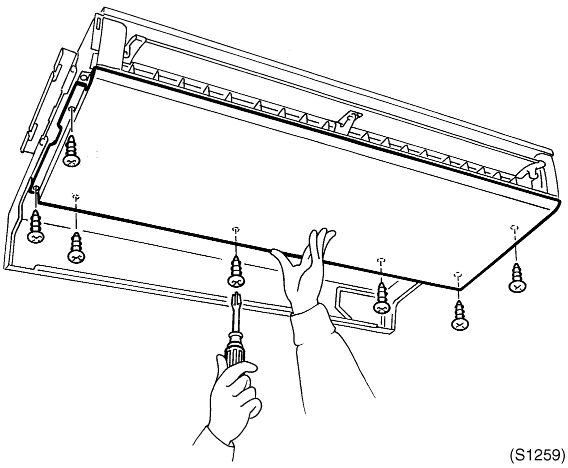
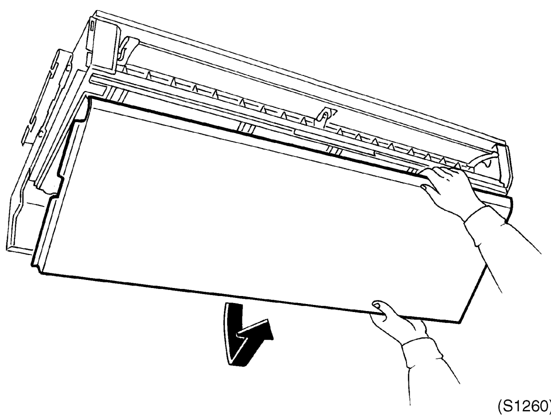
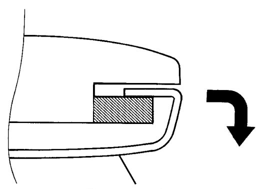
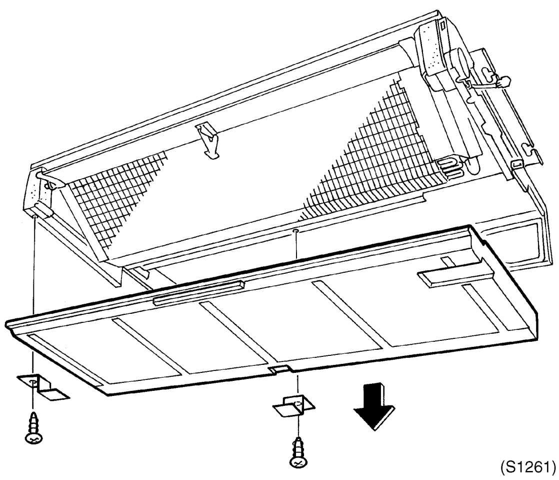
Procedure

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

Step	Procedure		Points
★	Remove the fan rotor according to the procedures for removing the fan rotor and fan motor.	 (S1253)	
1	Remove the left side panel installation screw.	 (S1254)	
2	Slide the left side panel toward the front of the unit and remove.	 (S1255)	
3	Remove the 2 bearing installation screws and remove the bearing.		

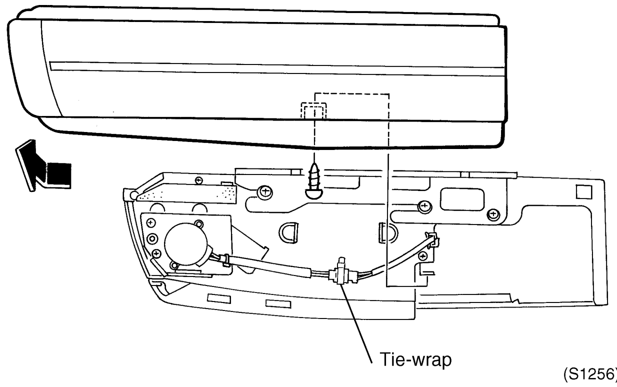
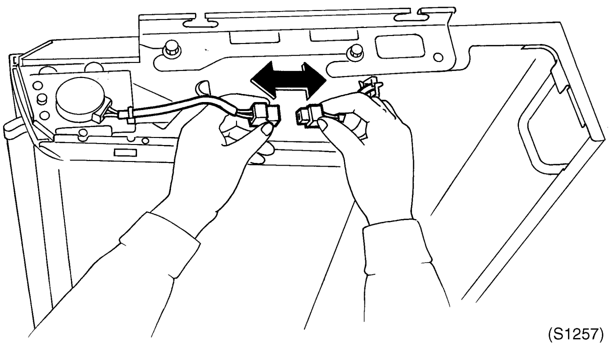
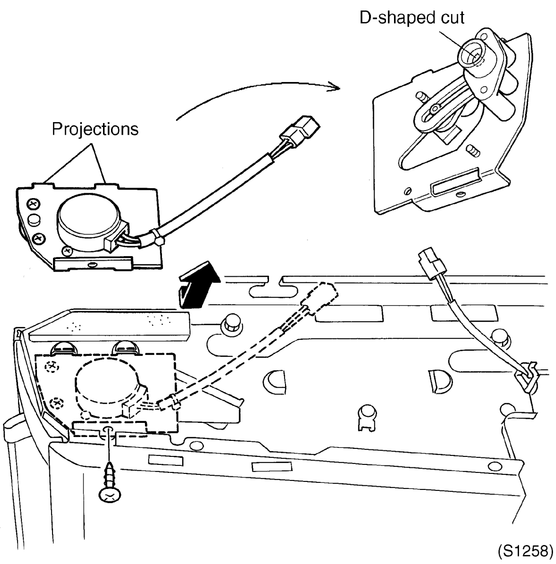
2.6 Removal of Bottom Panel and Drain Pan

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

Step	Procedure		Points
1	Remove the 7 bottom panel installation screws (2 each on the left and right, 3 in the rear), and remove the bottom panel.	 (S1259)	Remove the rear surface screws (2 each on the left and right), and remove the center screw while supporting the bottom panel from underneath.
2	Let down the rear of the bottom panel, push out toward the front (removed from the hooking part) and remove.	 (S1260)	 (S2765)
3	Remove the drain pan retainer (2 screw).	 (S1261)	

2.7 Removal of Swing Motor

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

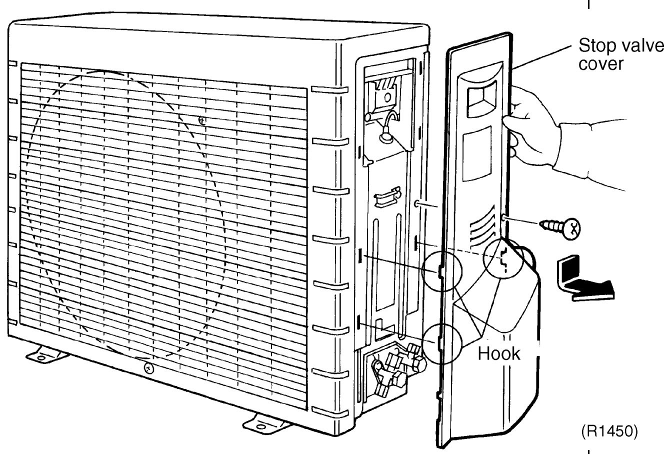
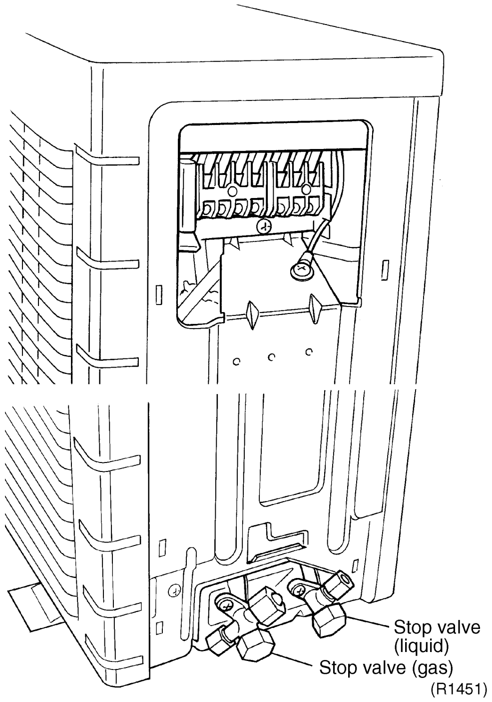
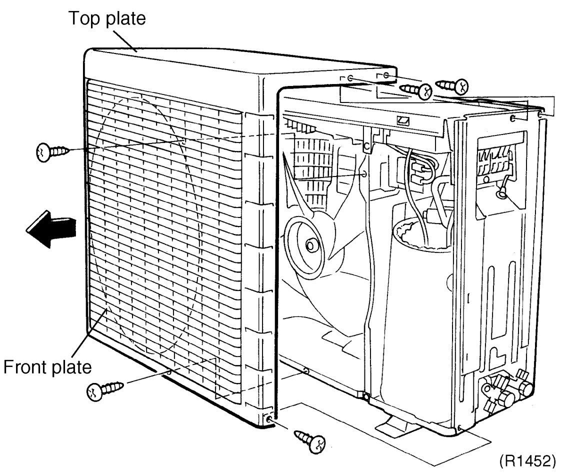
Step	Procedure		Points
1	Remove the screw from the right side panel. Slide the right side panel toward the front and detach it.	 (S1256)	
2	Cut off the tie-wrap of the swing motor connector.		
3	Disconnect the connector from the swing motor connector.	 (S1257)	
4	Remove the screw from the swing motor. The swing motor has two projections on it. Lower the swing motor and take it out.	 (S1258)	■ When reassembling, fit the horizontal blade shaft end to the D-profiled bearing. Apply the tie-wrap to the connectors to secure them in place.

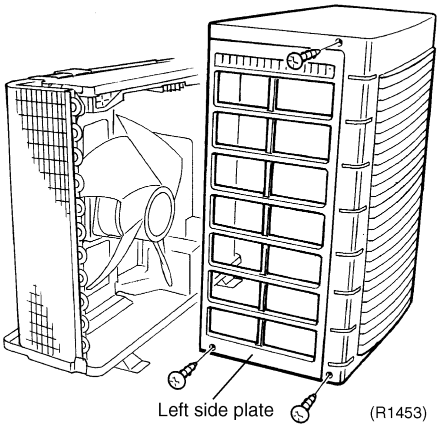
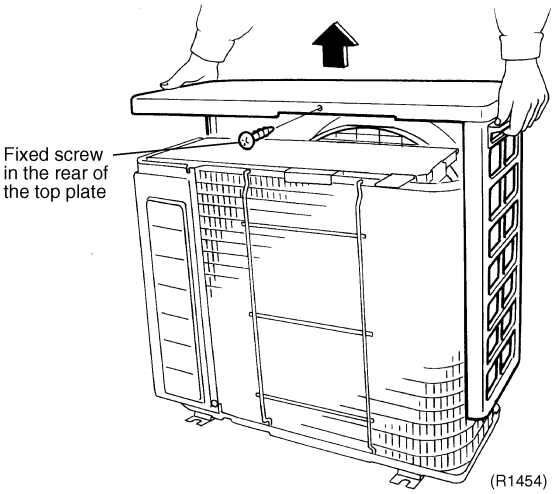
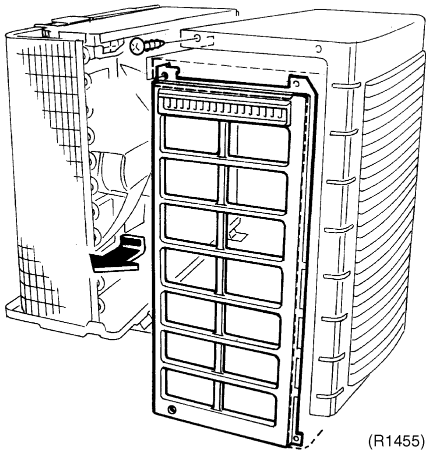
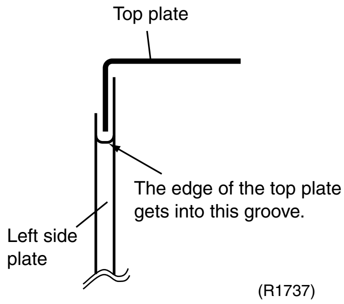
3. Outdoor Unit (25/35 class)

3.1 Removal of External Casing

Procedure

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

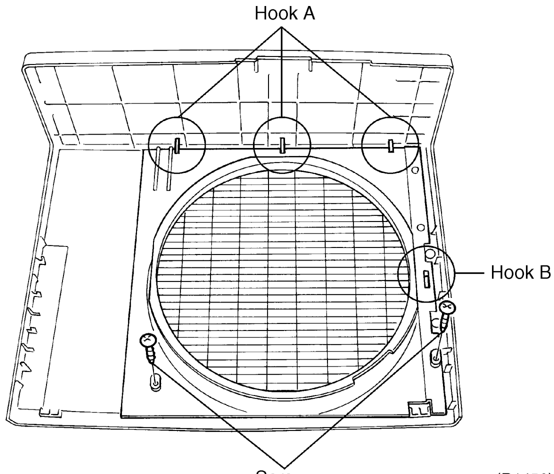
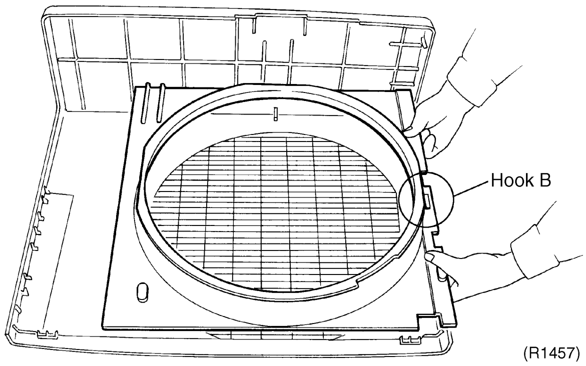
Step	Procedure		Points
1	The stop valve cover can be removed when the fixed screw is removed.	 	■ As three hooks are provided, slide the cover downward to remove. ■ The forced cooling operation in the pumping down mode can be carried out by pushing the operation switch on the main unit for five seconds. (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.
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.		

Step	Procedure		Points
3	Remove the three screws on the left side.	 (R1453)	
4	Remove the one fixed screw in the rear of the top plate. Once lift the top plate and then remove it forward.	 (R1454)	■ The left side plate and the bellmouth can be removed all at once. ■ When restoring the top plate, move it horizontally and get it down for the easy work.
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)

3.2 Removal of Bellmouth

Procedure

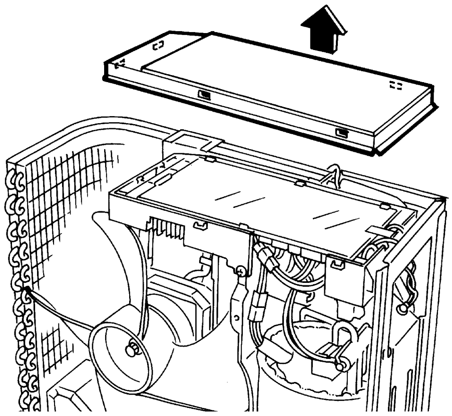
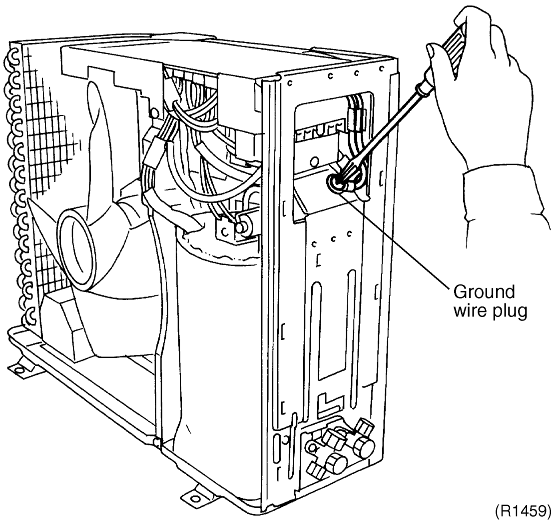
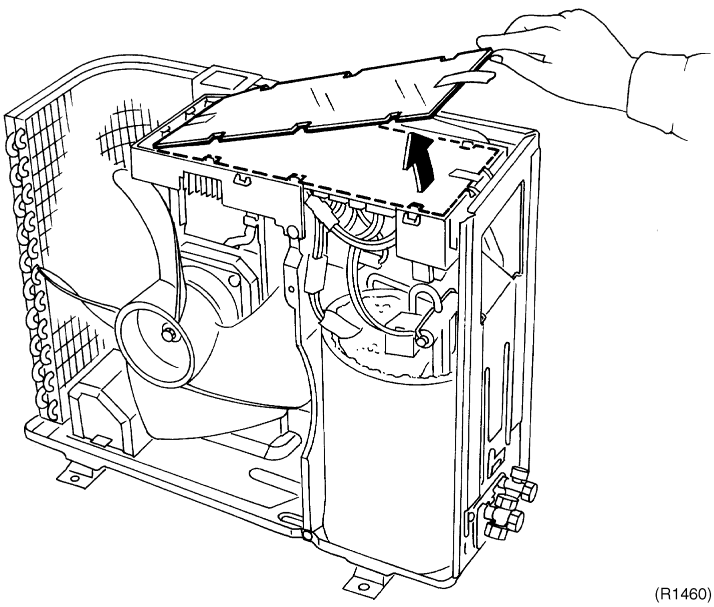
⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

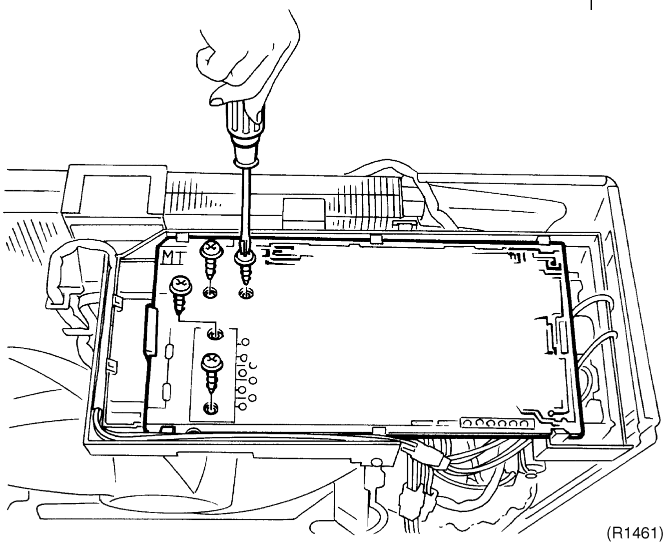
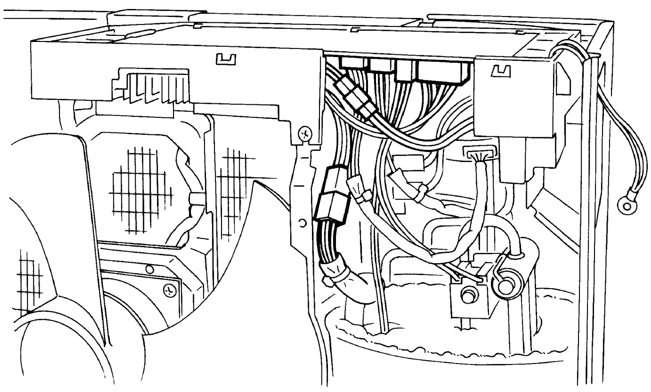
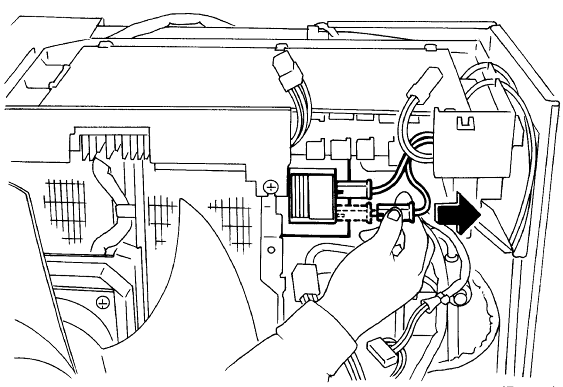
Step	Procedure		Points
1	The bellmouth is attached to the front plate with two screws and four hooks.	 (R1456)	■ Remove the bellmouth from the front plate after removing the two screws which are set below.
2	Remove the two screws and undo the four hooks to release the bellmouth.	 (R1457)	■ Slide the bellmouth in the arrow direction to disengage the hook B.

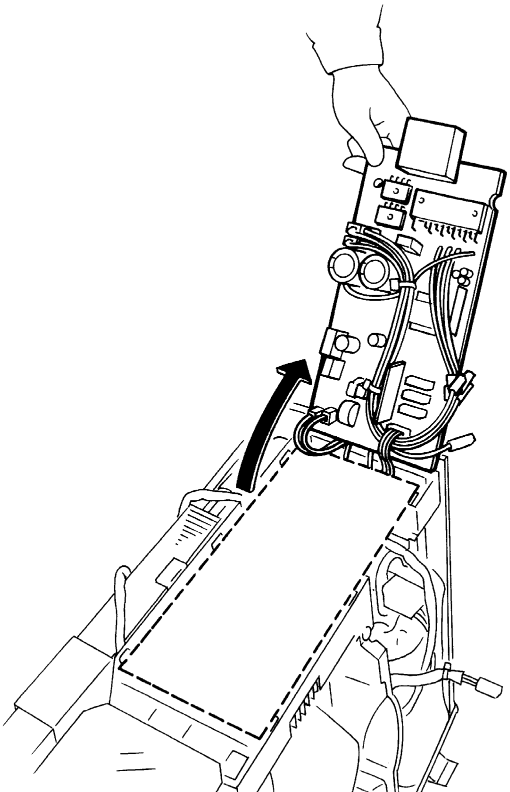
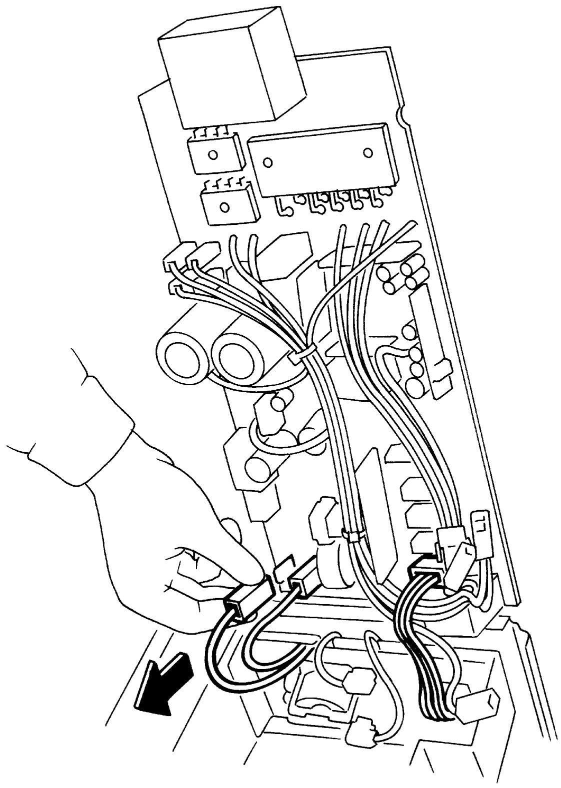
3.3 Removal of PCB and Electrical Box

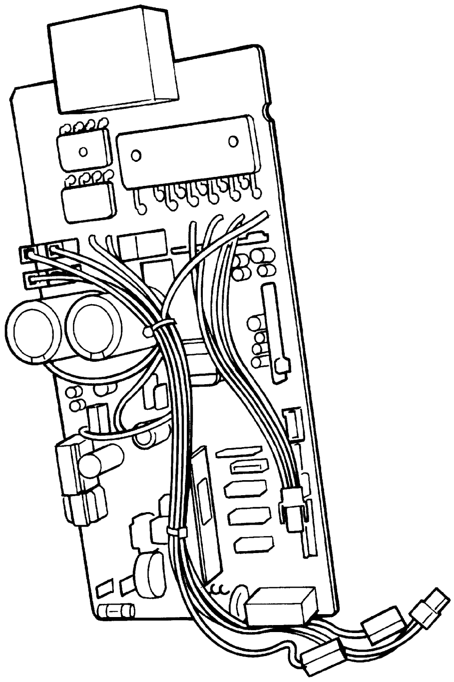
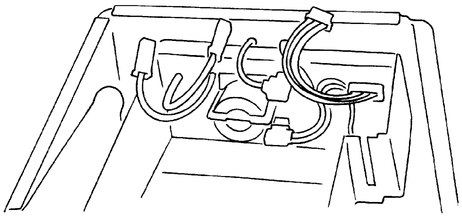
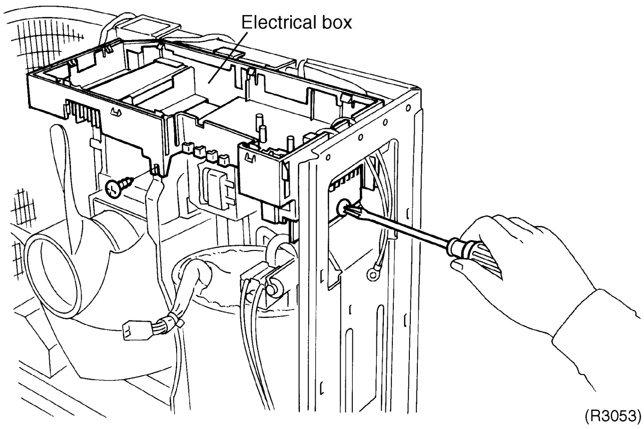
Procedure

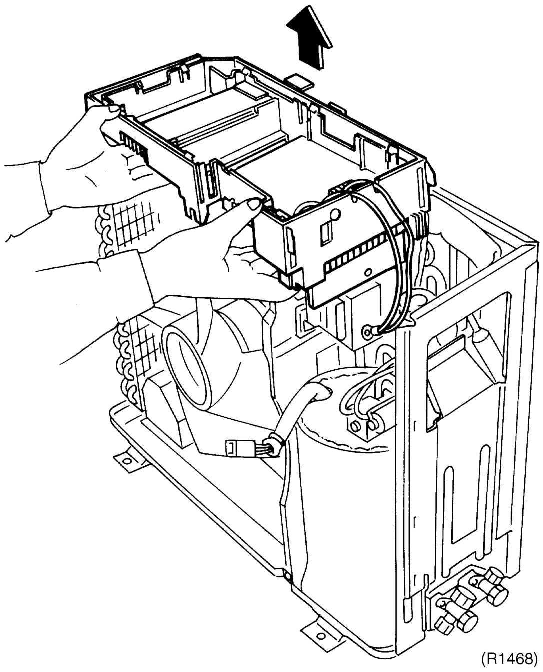
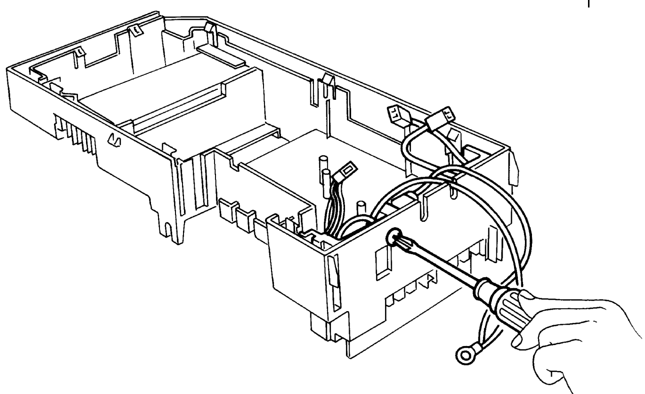
⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

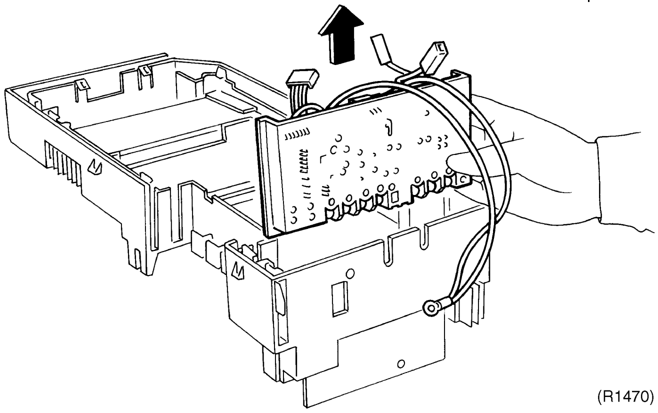
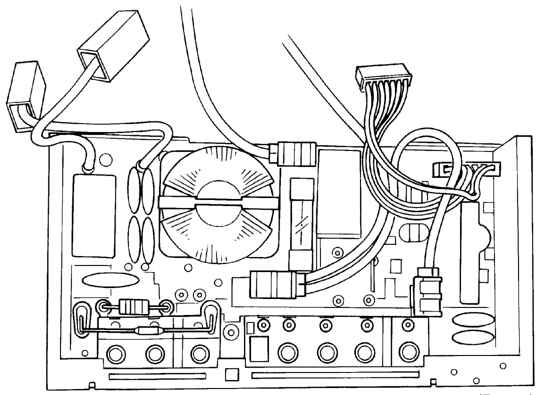
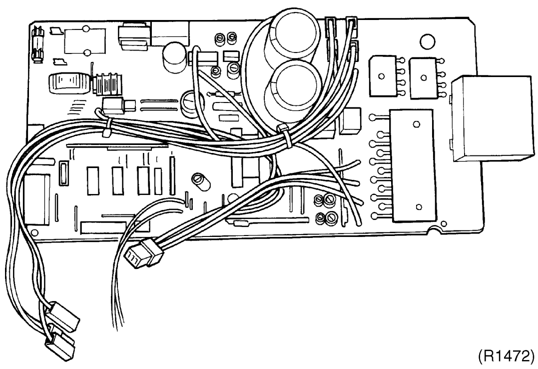
Step		Procedure	Points
1. Remove the shelter.		 (R1458)	■ The shelter has five hooks. ■ Be sure to avoid forgetting to restore the shelter and to avoid losing or damaging it.
1	Undo the five hooks and remove the shelter.		
2. Remove the PCB.		 (R1459)	
1	Disconnect the ground wire.	 (R1460)	

Step	Procedure		Points
2	Remove the four screws fixing the PCB.	 (R1461)	
3	Disconnect the six wire harness.	 (R1462)	
4	Disconnect the two connectors of the reactor.	 (R1463)	■ There is another reactor located on bottom frame. ■ Fasten clamp materials as before when re-assembling.

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

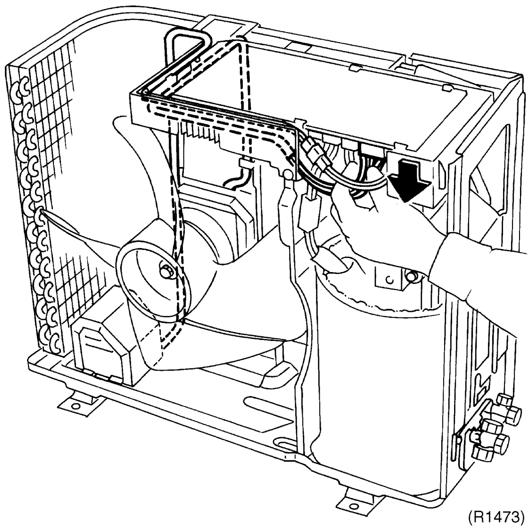
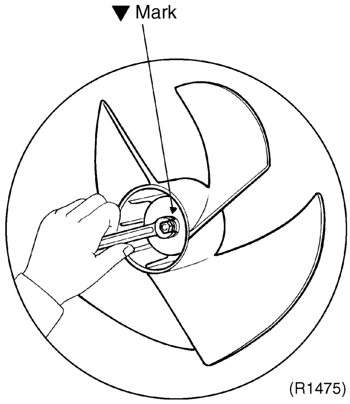
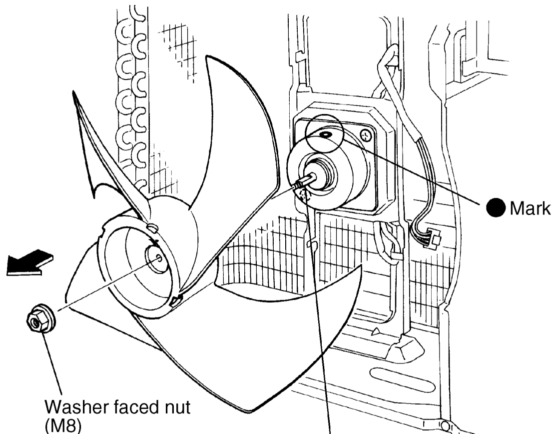
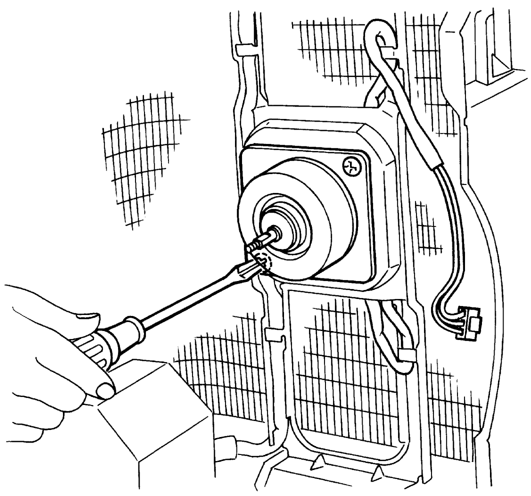
Step	Procedure		Points
7	The PCB can completely be released.	  (R1466)	
3. Remove the electrical box.			
1	Remove the two screws fixing the electrical box.	 (R3053)	

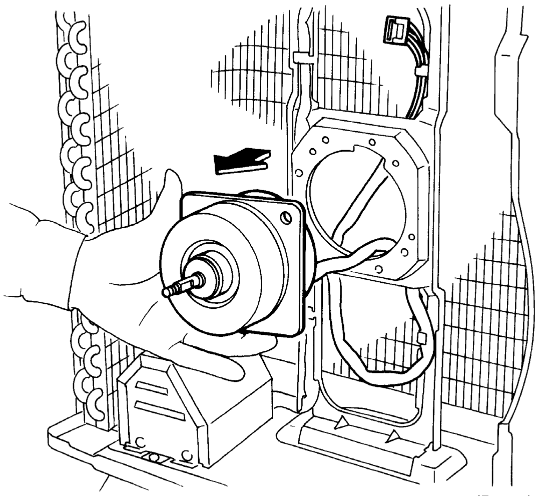
Step	Procedure		Points
2	Lift and remove the electrical box.	 (R1468)	
4. Remove the molded interconnect device (MID).			
1	Remove the one screw fixing the MID.	 (R1469)	

Step	Procedure		Points
2	Slide the MID upward and release.	 (R1470)  (R1471)  (R1472)	

3.4 Removal of Propeller Fan and Fan Motor

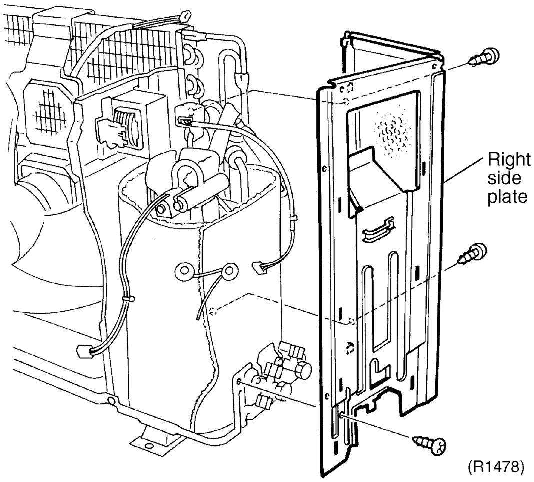
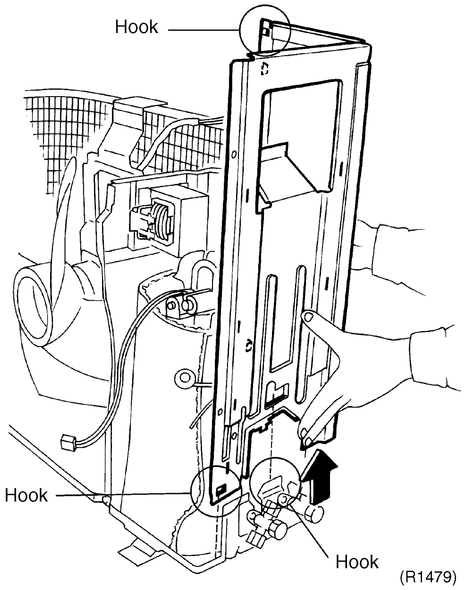
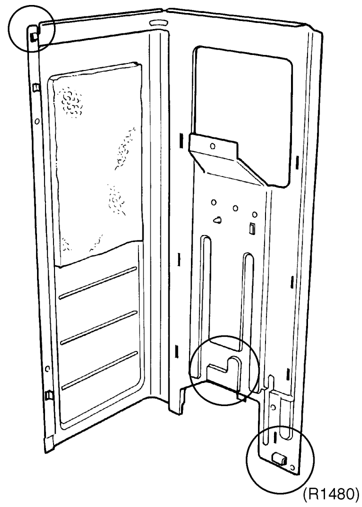
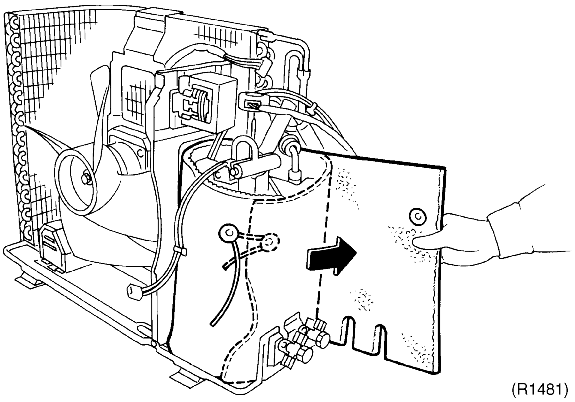
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

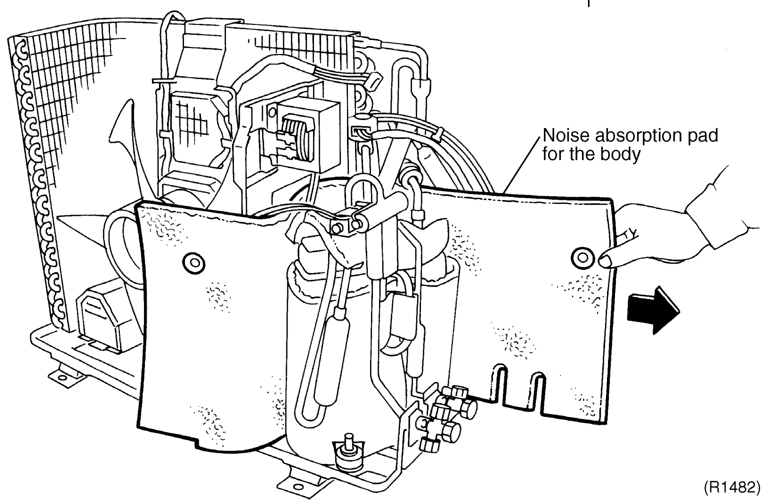
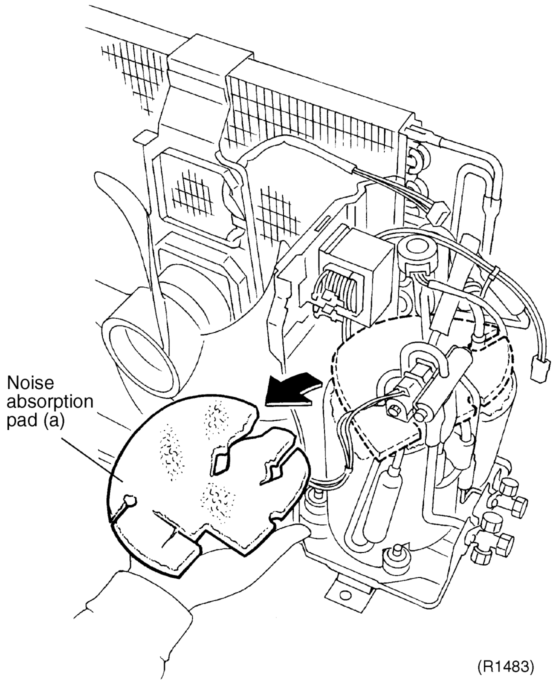
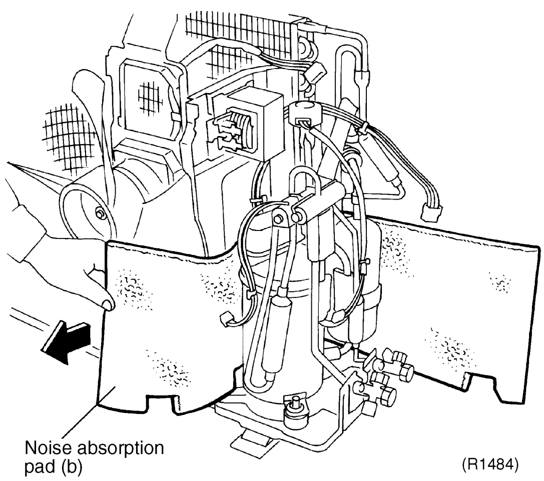
Step		Procedure	Points
1. Disconnect the fan motor connector S70.			
1	Release the lead-wires of the fan motor from the groove of the switch box.	 (R1473)	■ Remove the external plates and the drip proof cover protecting the electric parts. ■ Be sure to avoid forgetting to restore the shelter and to avoid losing or damaging it.  (R1475)
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)	

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

3.5 Removal of Compressor Noise Absorption Pad

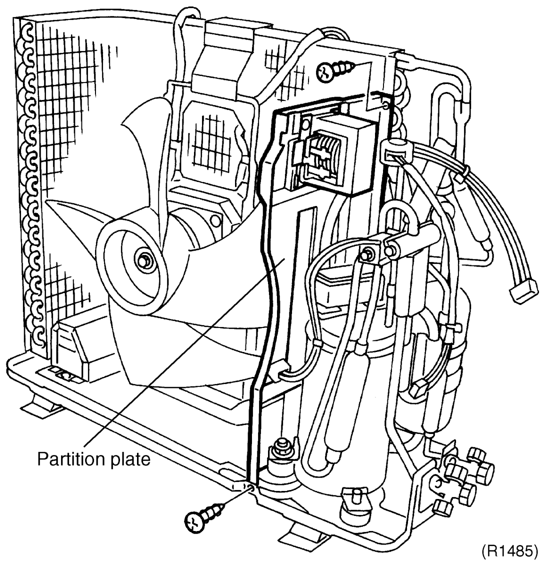
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

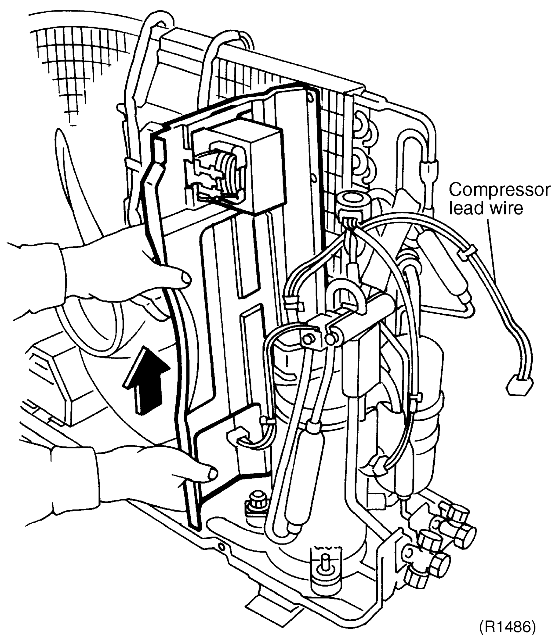
Step		Procedure	Points
1. Remove the right side plate.			
1	Remove the three screws for removing the right side plate.		
2	Lift the right side plate to disengage the hooks.		■ Insert the three hooks for the restoration. 
2. Remove the noise absorber.			■ Since the slit prepared for the piping connection 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 noise absorption pad for the body to the compressor.		

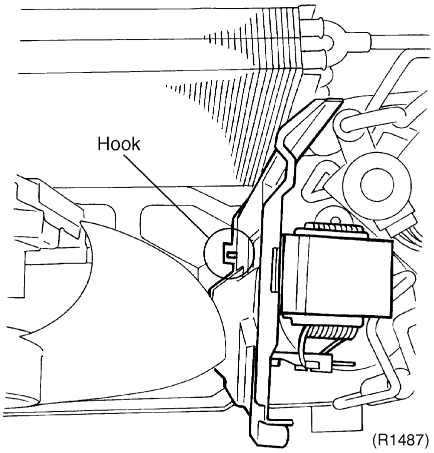
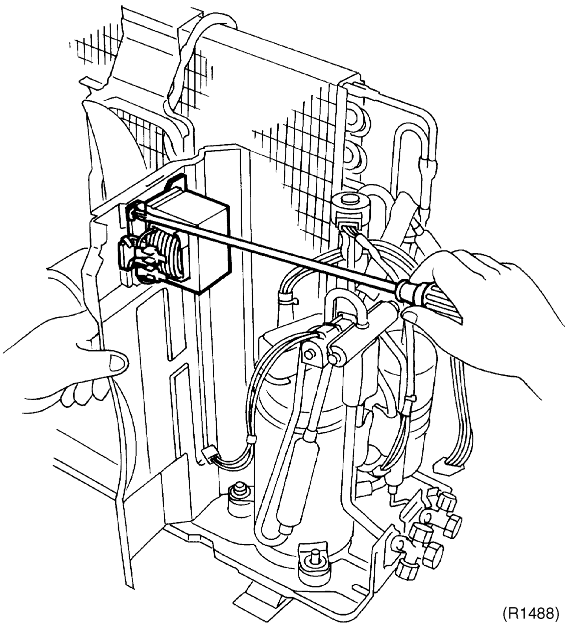
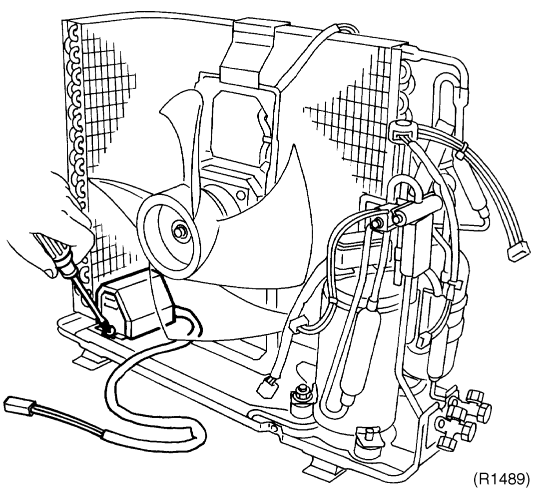
<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>2</td><td>Pull out the noise absorption pad for the body.</td><td></td><td></td></tr>
<tr><td>3</td><td>Pull out the top pad of the noise absorption (a).</td><td></td><td>■ Since the slit prepared for the piping on the noise absorption pad is torn easily, remove the pad carefully.</td></tr>
<tr><td>4</td><td>Pull out the noise absorption pad (b).</td><td></td><td>■ When restoring, the noise absorption pad should pass the internal side of the piping.</td></tr>
</table>

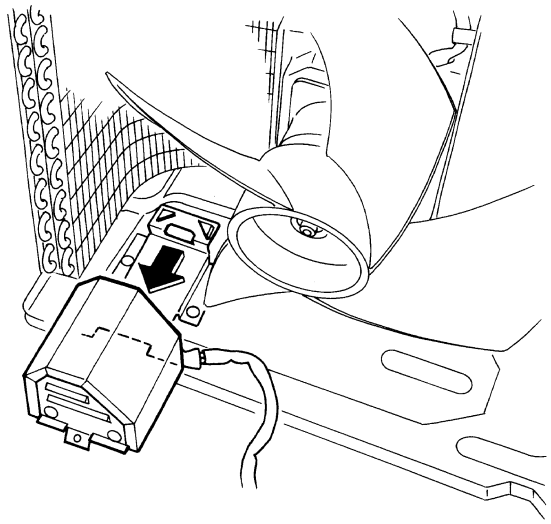
3.6 Removal of Partition Plate and Reactor

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

<table>
<tr><th>Step</th><th></th><th>Procedure</th><th>Points</th></tr>
<tr><td colspan="2">1. Remove the partition plate.</td><td rowspan="3">


</td><td rowspan="3"></td></tr>
<tr><td>1</td><td>Remove the two screws fixing the partition plate.</td></tr>
<tr><td>2</td><td>Pull the partition plate upward to remove.</td></tr>
</table>

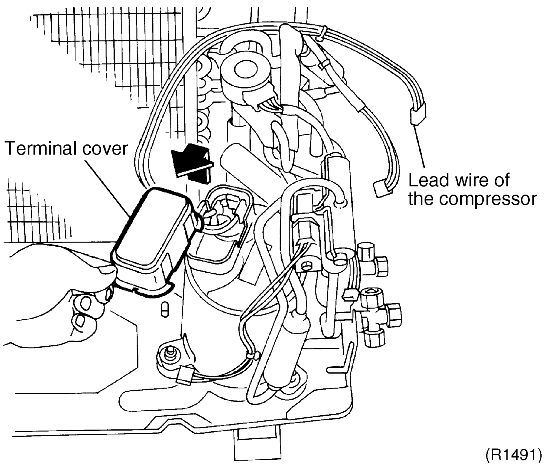
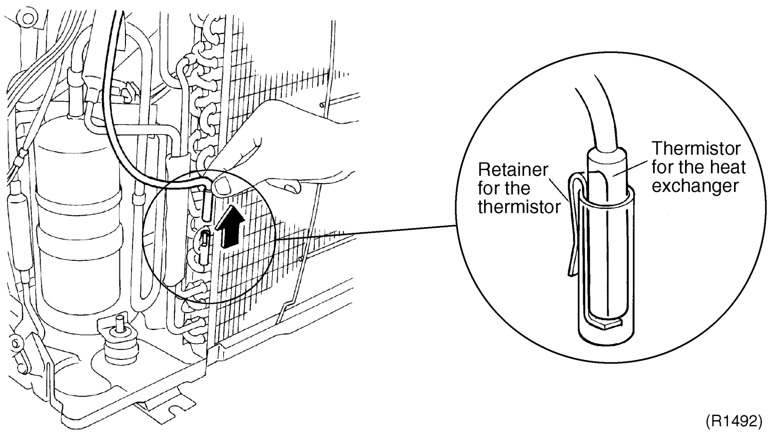
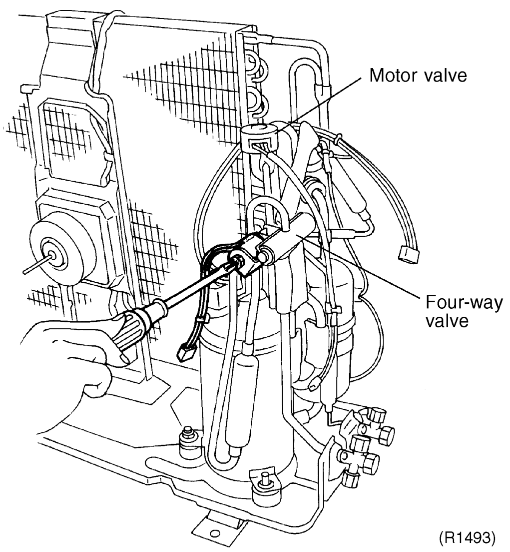
Step	Procedure		Points
3	When restoring the partition plate, fit the hook into the bottom frame.	 (R1487)	
2. Remove the reactor.		 (R1488)	
1	The reactor can be released by removing the fixed screw.		
3. Remove the reactor assembly.		 (R1489)	
1	Remove the one screw fixing the reactor assembly to the bottom frame.		

Step	Procedure		Points
2	Slide the reactor assembly this side and release.	 (R1490)	

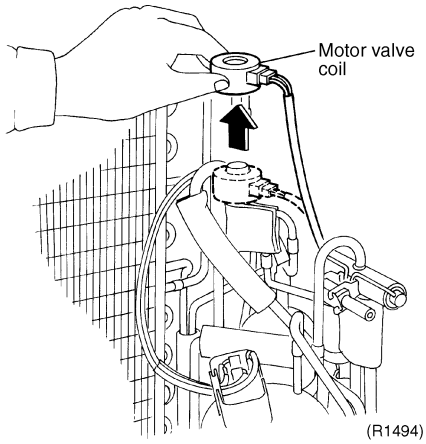
3.7 Removal of Four Way Valve and Motor Valve

Procedure

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

Step		Procedure	Points
1. Remove the parts around the four way valve.			
1	Remove the terminal cover and the lead wires of the compressor so as not to be burnt out by a gas brazing machine.	 (R1491)	
2	Remove the thermistor for the heat exchanger.	 (R1492)	■ The thermistor for the heat exchanger is fixed by a clamp material at one portion. Be sure to fix the thermistor back on the original position when restoring. ⚠ **Warning!** **Ventilate when the refrigerant leaks during the work. (If the refrigerant is exposed to the fire, it will cause toxic gas.)**
3	Remove the four way valve's coil.	 (R1493)	■ Pay attention so as not to loose the retainer for the thermistor.

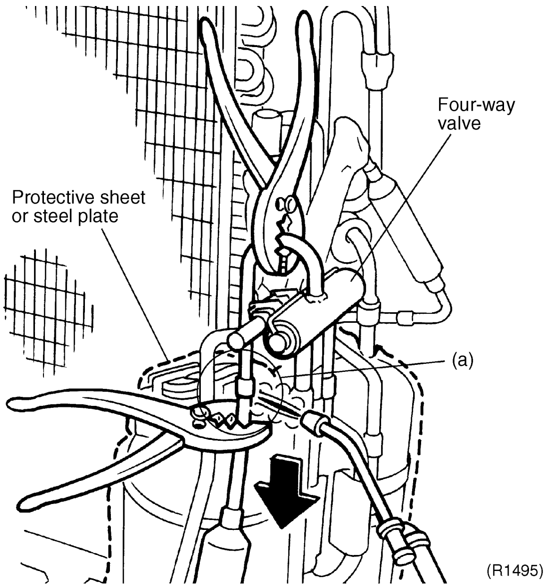
<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>4</td><td>Remove the motor valve coil.</td><td>

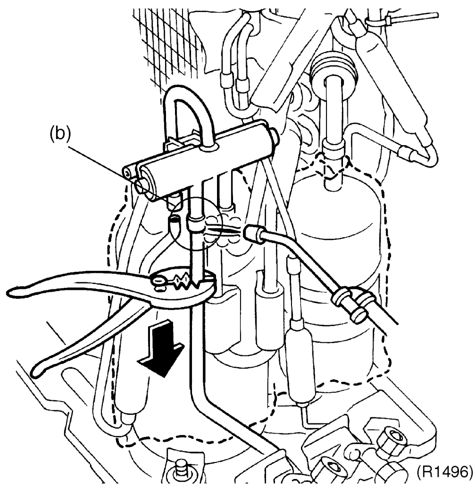


</td><td></td></tr>
<tr><td colspan="2">

■ Confirm that the refrigerant is completely empty in the refrigerant circuit before starting work.

</td><td rowspan="2">





</td><td rowspan="2">

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.

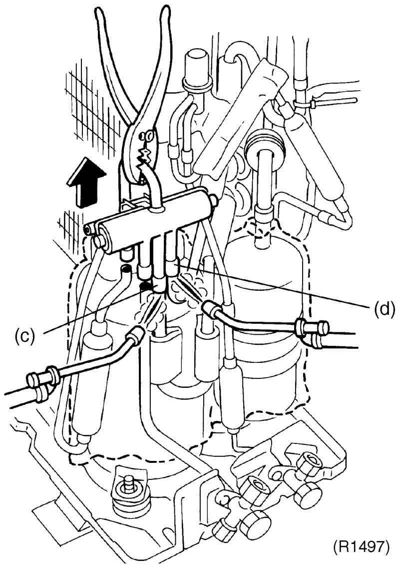
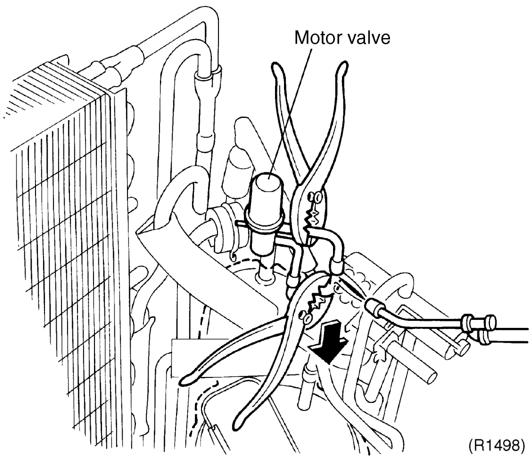
Cautions at the restoration.

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, wrap 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°C).

■ Be careful so as not to break pipes by pressing the pipes excessively by pliers when withdrawing the piping.

</td></tr>
<tr><td>5

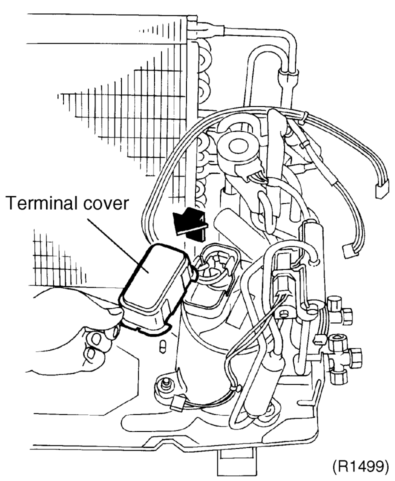
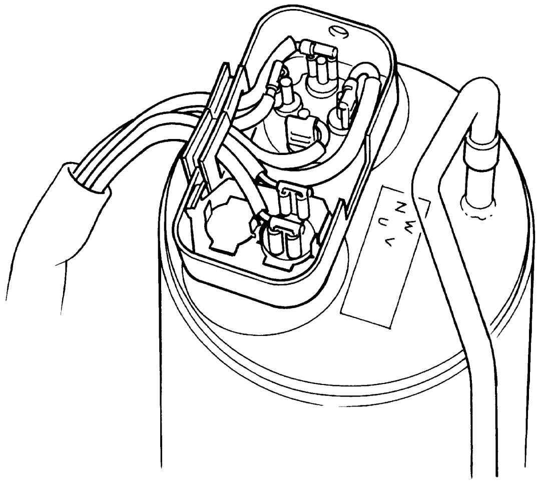
6</td><td>Provide a protective sheet or a steel plate so that the brazing flame can't influence the circumstance around the four way valve.
Heat up the four portions of brazing parts on the four way valve. Remove the four way valve (a), (b), (c), (d).</td></tr>
</table>

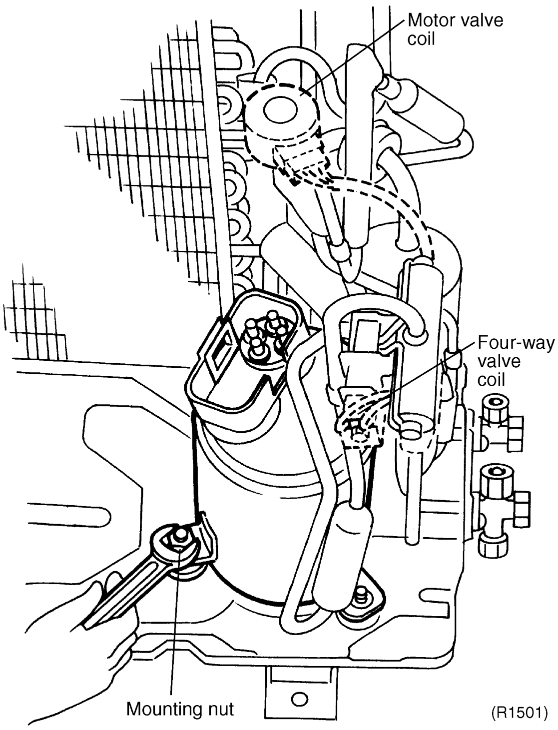
Step	Procedure		Points
7	Heat up the brazing parts and withdraw the pipes connected to the four way valve by pliers and so on.		In case that the removal seems to be hard; 1. Remove the piping connection part (brazing part) which is easy to remove and restore. 2. Cut the pipes on the main unit by a miniature 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.
8	Heat up the two portions of brazing parts on the motor valve and remove.		**Cautions at the restoration.** Wrap the motor valve with wet cloth and make up water so that the cloth will not be dried and avoid excessive heating. **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.**

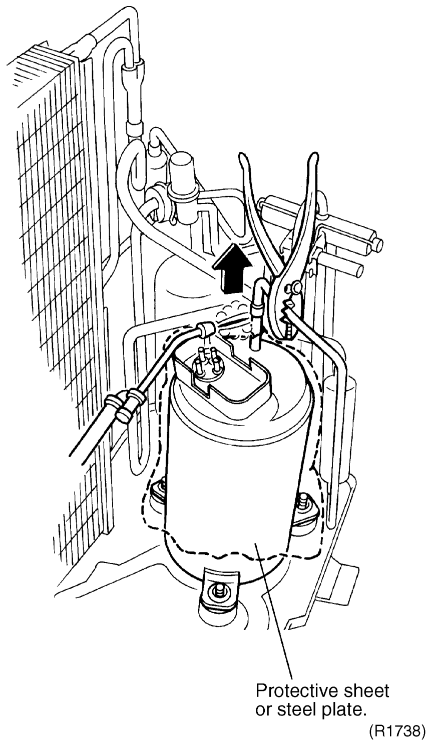
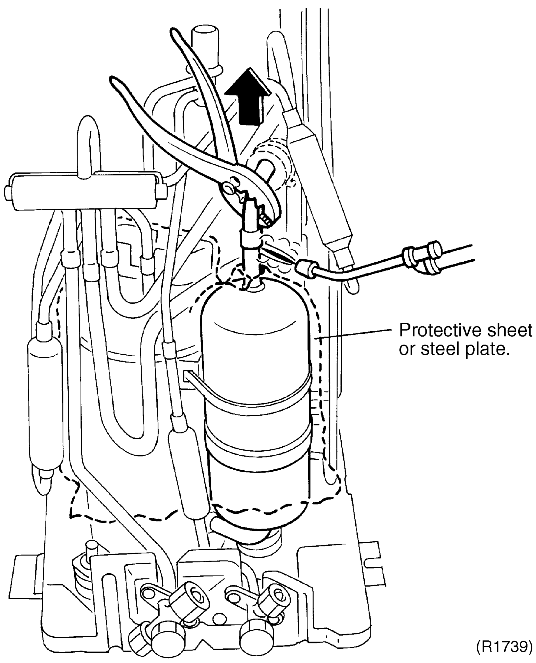
3.8 Removal of Compressor

Procedure

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

Step		Procedure	Points
1. Remove the parts around the compressor.		(R1499) (R1500)	■ Be careful so as not to burn the compressor terminals or the name plate.
1	Remove the terminal cover and the lead wires of the compressor so as not to be burnt out by a gas brazing machine.		

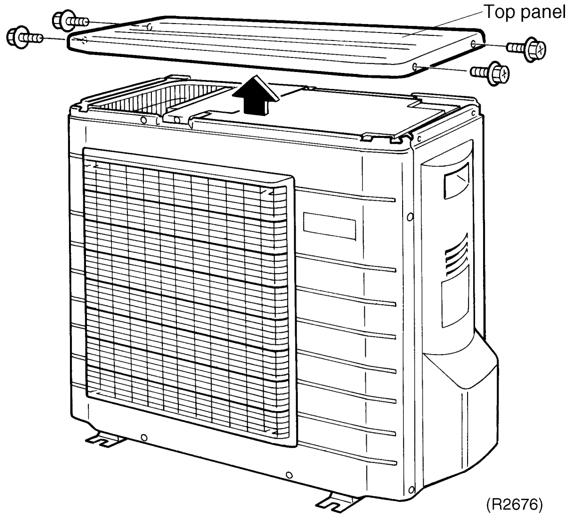
Step	Procedure		Points
2	The mounting nut for the compressor is only one piece.		■ Remove the four way valve and the motor valve also so as not to be burnt out.
3	Remove the nut by an open-end wrench.		

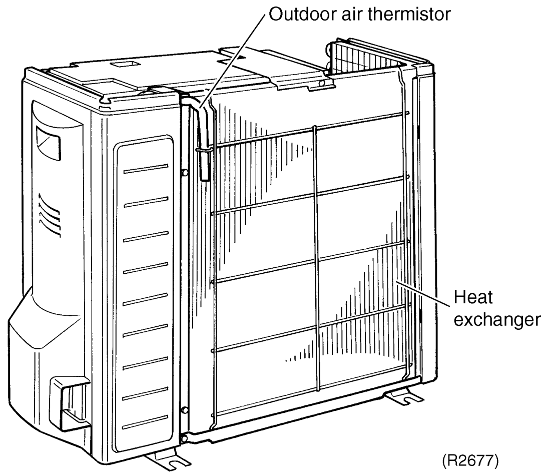
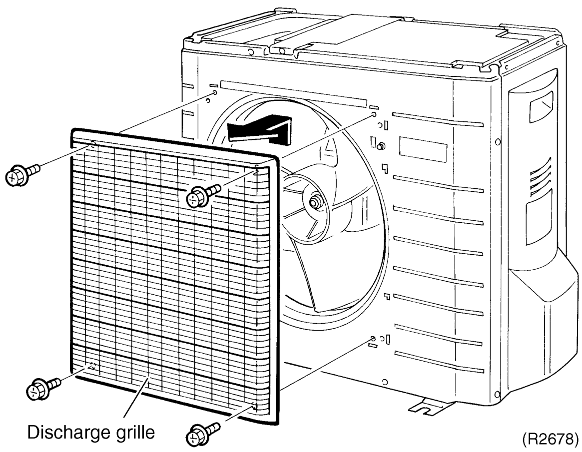
Step	Procedure	Points
■ Confirm that the refrigerant is completely empty in the refrigerant circuit before starting work. ■ Be sure to apply nitrogen's replacement when heating up the brazing part. 1 Remove the brazing part on the discharge side of the compressor. 2 Heat up the brazing part on the suction side of the compressor and then remove it. 3 Lift the compressor and remove it.		**Warning!** **Since it may happen that refrigeration oil in the compressor will catch fire, prepare wet cloth so as to extinguish the fire quickly.** **Warning!** **Ventilate when the refrigerant leaks during the work. (If the refrigerant is exposed to the fire, it will cause toxic gas).** **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.** ■ Pay attention so that the fins of the heat exchanger will not be burnt.

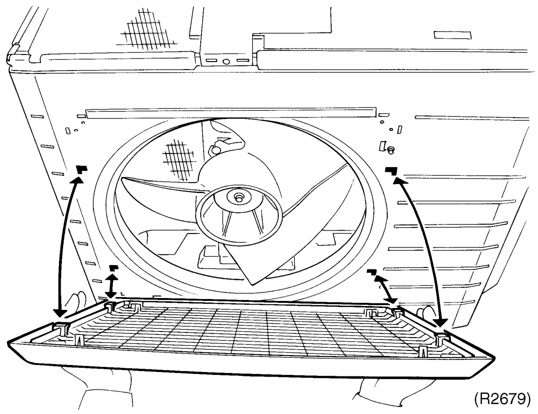
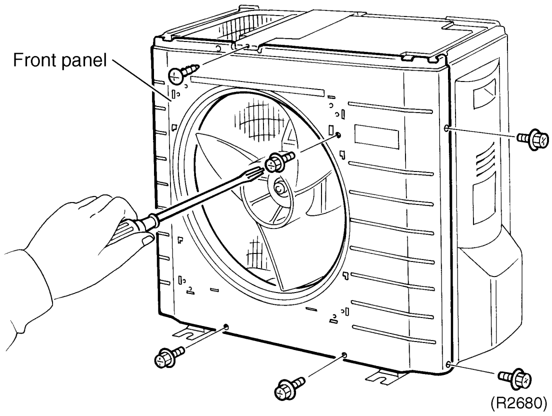
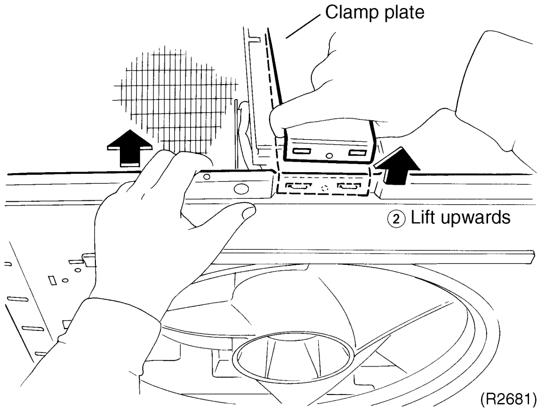
4. Outdoor Unit (50/60 class)

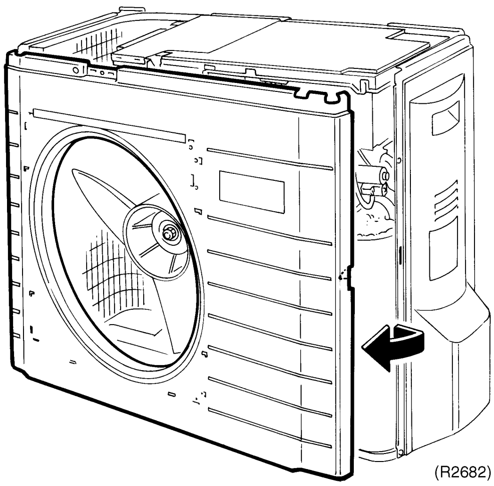
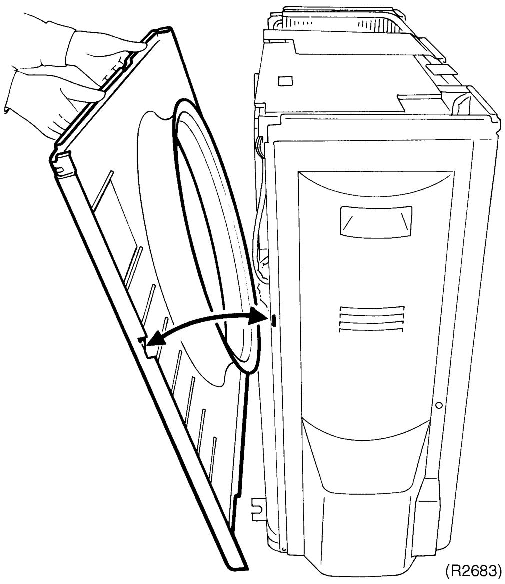
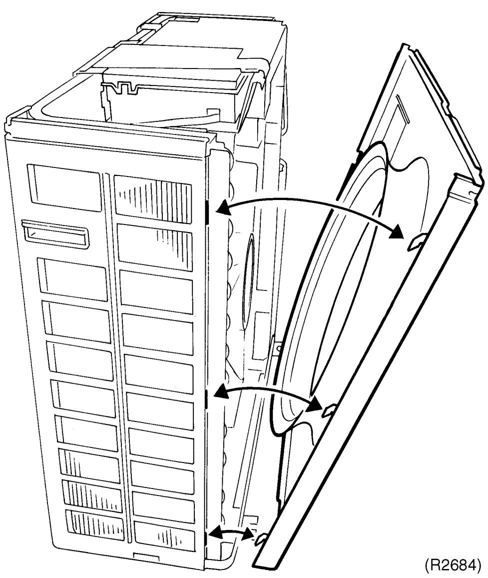
4.1 Removal of the Panels and Plates

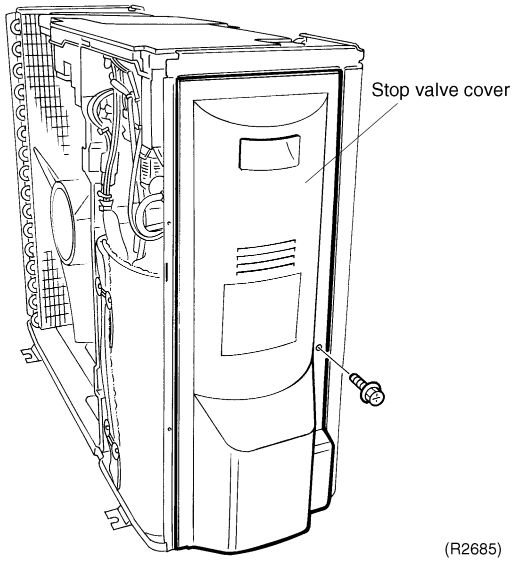
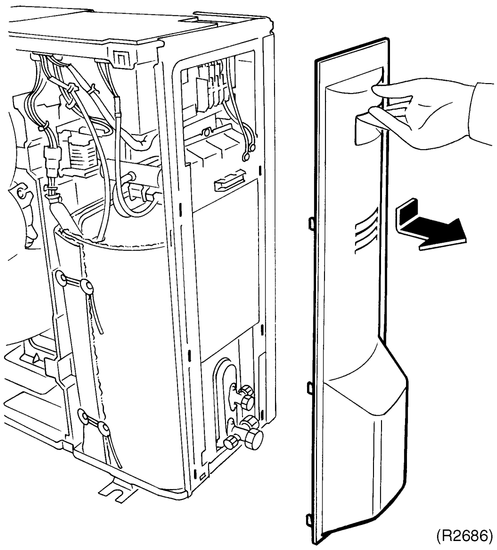
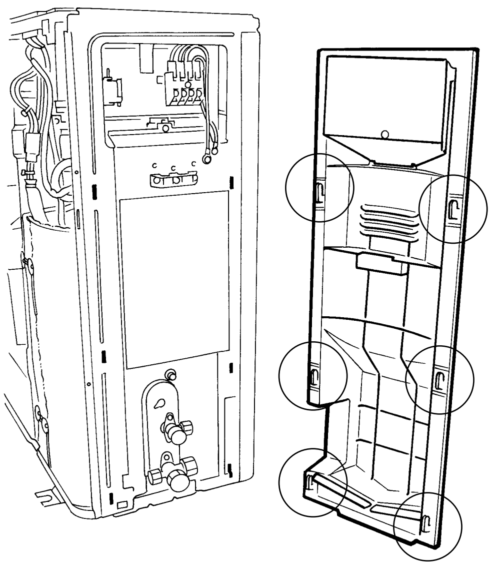
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td colspan="2">1. Remove the panels and plates.</td><td rowspan="2">


</td><td rowspan="2">■ Take care not to cut your finger by the fins of the heat exchanger.</td></tr>
<tr><td>1</td><td>Loosen the four screws and lift the top panel.</td></tr>
<tr><td>2</td><td>Loosen the four screws and remove the discharge grille.</td><td>
</td><td></td></tr>
</table>

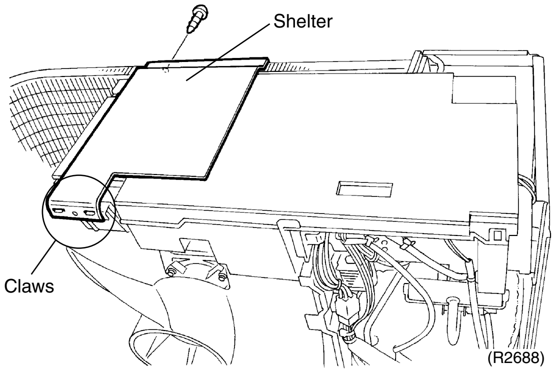
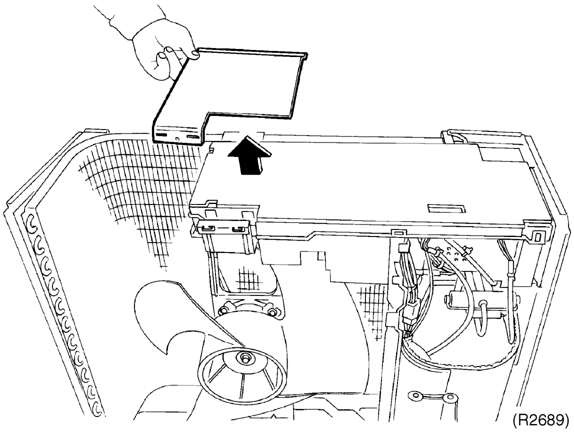
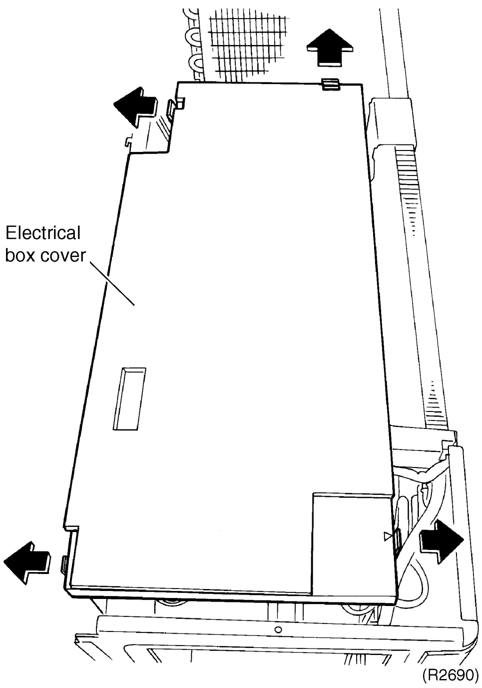
Step	Procedure		Points
		 (R2679)	■ The front grille has four claws. Slide the discharge grille upwards and remove it.
3	Loosen the six screws of the front panel.	 (R2680)	
4	Push the front panel and undo the claw. Lift the clamp plate and remove it.	 (R2681)	

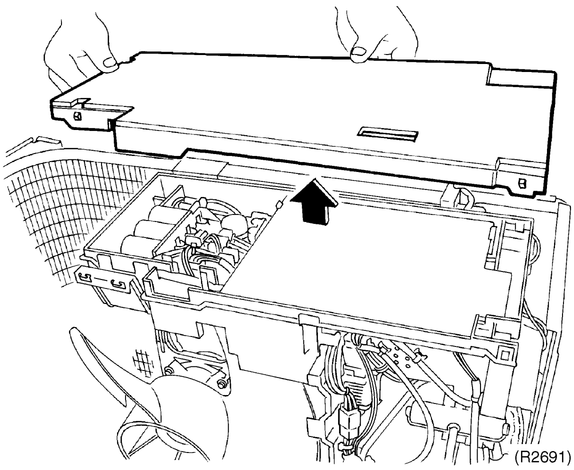
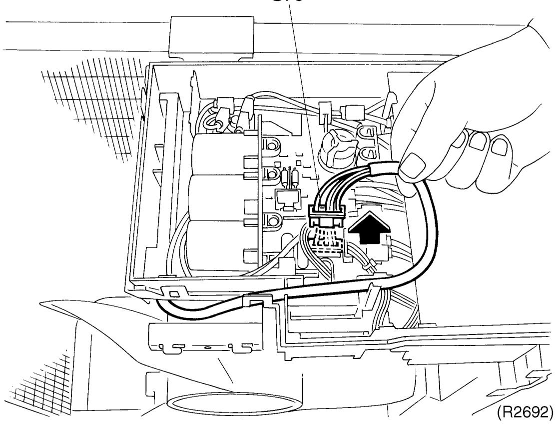
Step	Procedure		Points
5	Undo the right side claw, and then the left side claws. Remove the front panel.	 (R2682)  (R2683)  (R2684)	■ Lift the front panel and remove it while pushing the right side panel inwards. ■ Lift the front panel and undo the left side claws. ■ Fit the left side of the front panel first when installing.

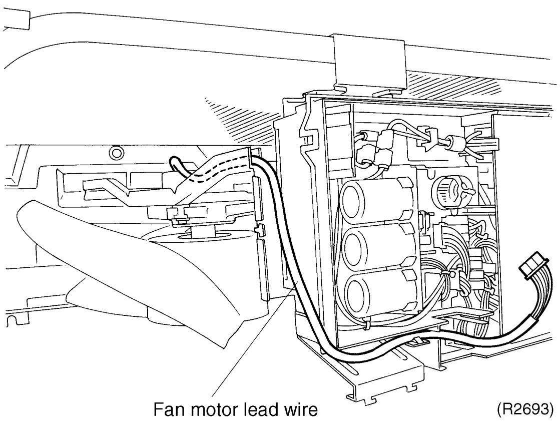
Step		Procedure	Points
2. Remove the stop valve cover.			
1	Loosen the screw of the stop valve cover.	 (R2685)	
2	Pull down the stop valve cover to undo the claws and remove it.	 (R2686)  (R2687)	■ The stop valve cover has six claws.

4.2 Removal of the Fan Motor / Propeller Fan

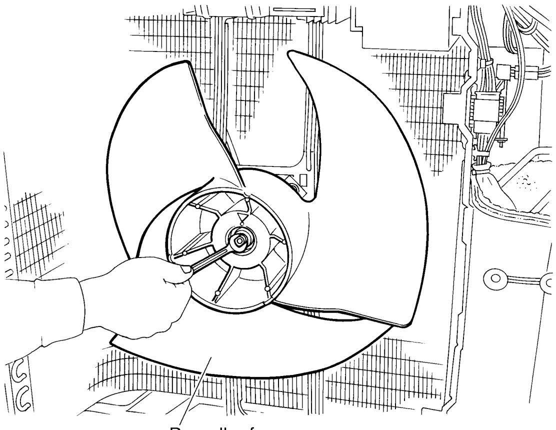
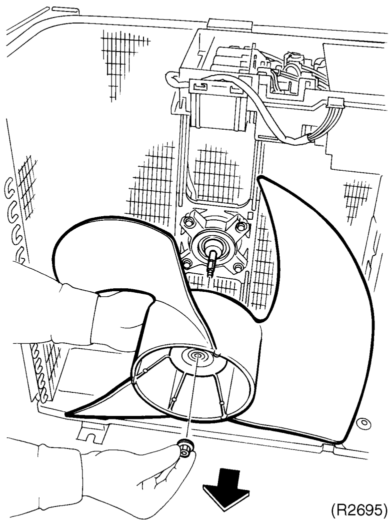
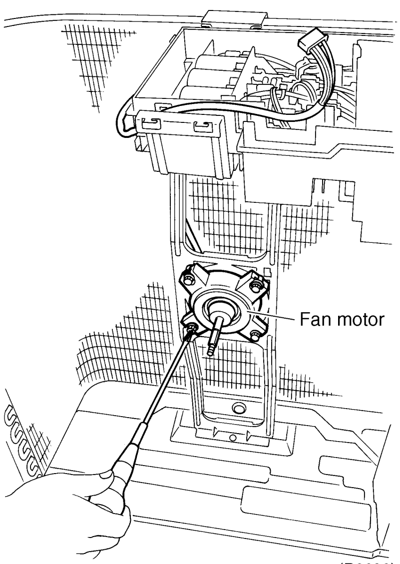
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

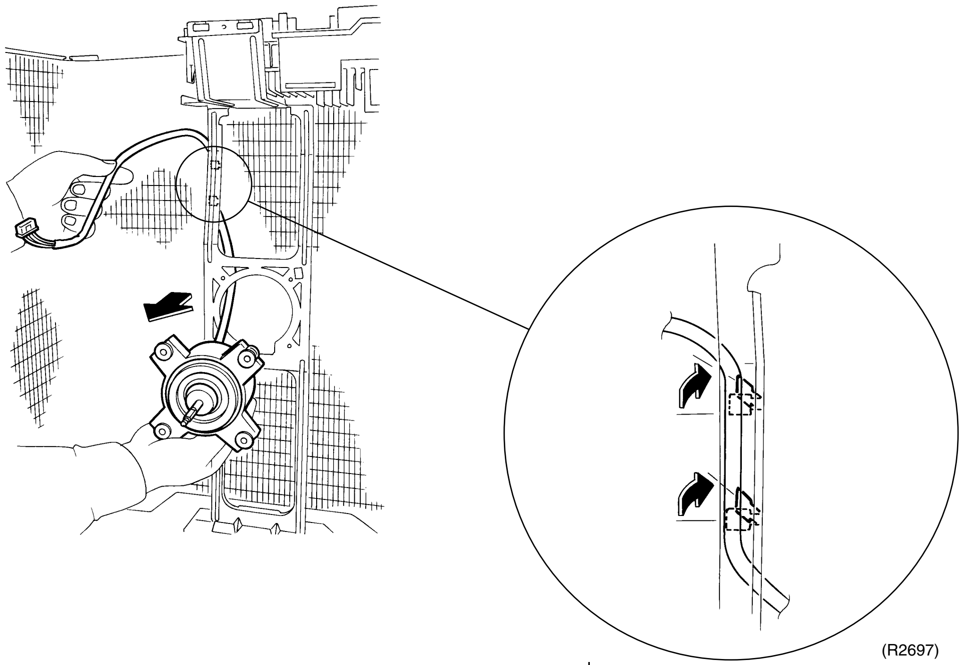
Step	Procedure		Points
■ Remove the top panel and the front panel.			
1. Remove the electrical box cover.		 	■ This procedure is not necessary to remove the propeller fan only.
1	Loosen the screw on the back of the shelter.		
2	Undo the two claws and remove it.	 	■ The claws have been released since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

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td></td><td></td><td>
(R2691)</td><td></td></tr>
<tr><td colspan="2">2. Remove the fan motor.</td><td rowspan="3">

(R2692)


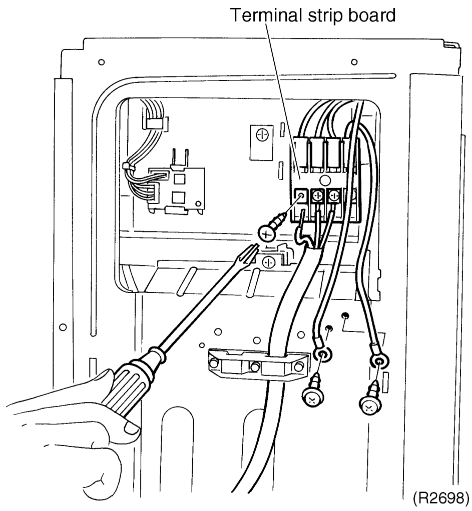
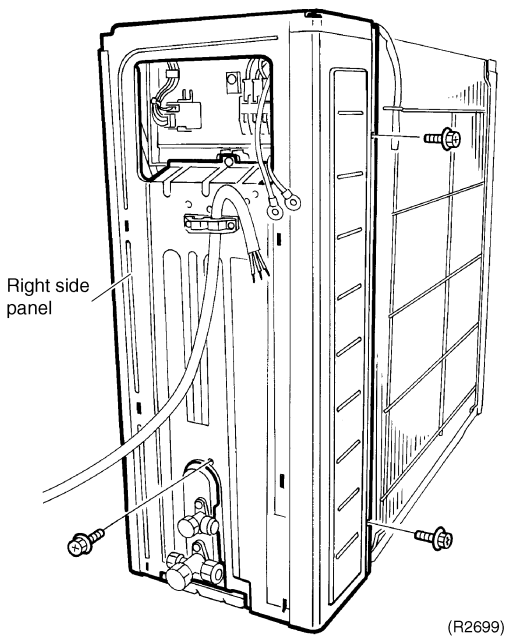
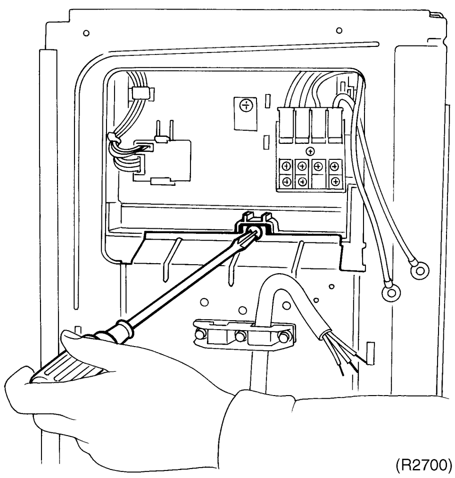
(R2693)</td><td rowspan="3"></td></tr>
<tr><td>1</td><td>Disconnect the connector for fan motor (S70).</td></tr>
<tr><td>2</td><td>The illustration shows arrangement of the fan motor lead wire.</td></tr>
</table>

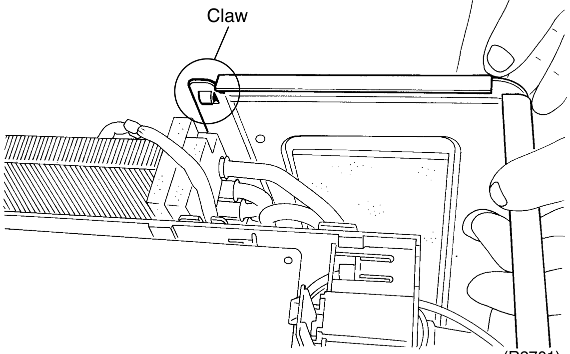
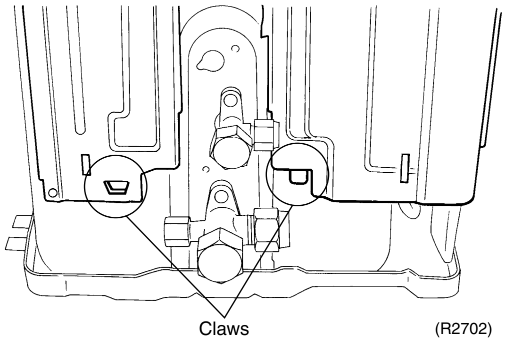
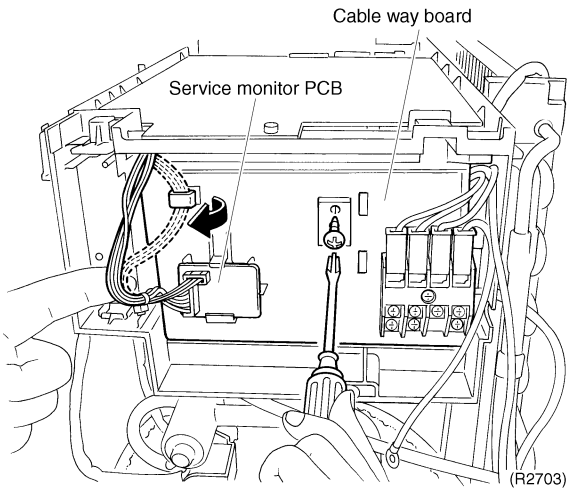
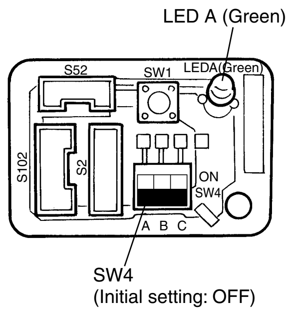
Step	Procedure		Points
3	Unscrew the washer-fitted nut (M10) of the propeller fan with a spanner.	(R2694) (R2695)	■ Align ▼ mark of the propeller fan with D-cut section of the motor shaft when reassembling.
4	Remove the four screws from the fan motor.	(R2696)	

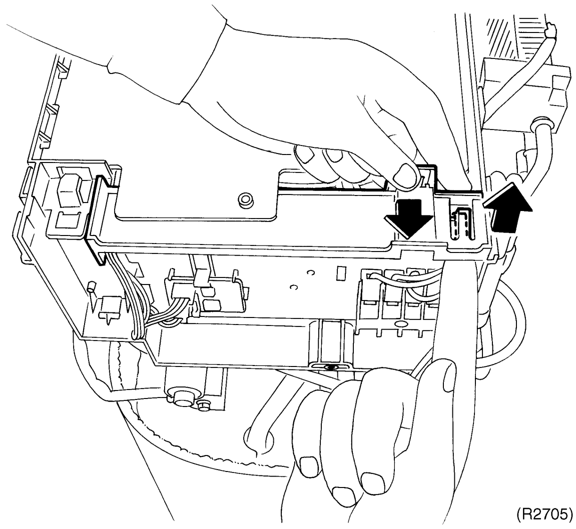
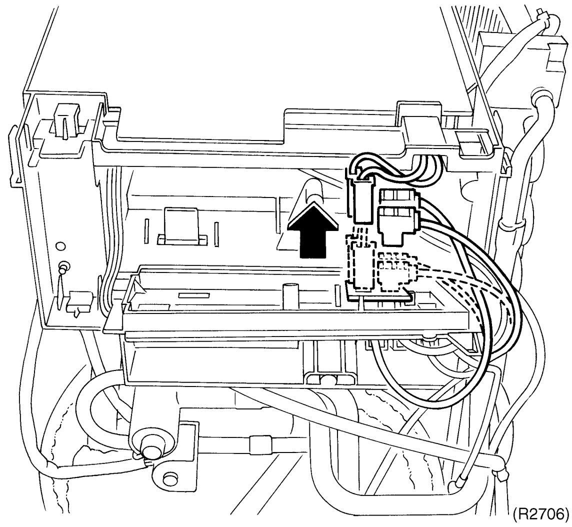
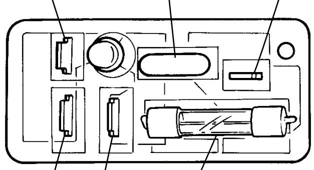
Step	Procedure		Points
5	Pull the fan motor out.	 (R2697)	■ Put the lead wire through the back of the motor when reassembling. (so as not to be entangled with the propeller fan)

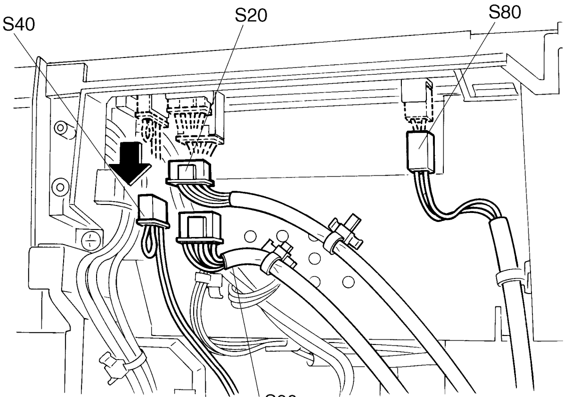
4.3 Removal of the PCB / Electrical Box

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

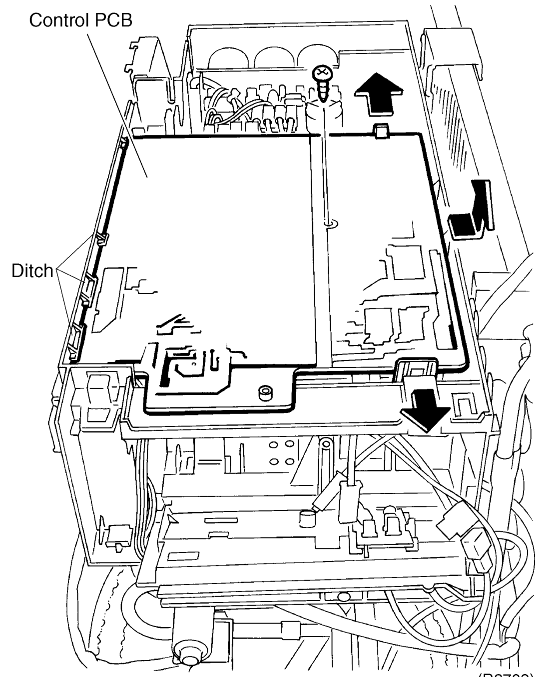
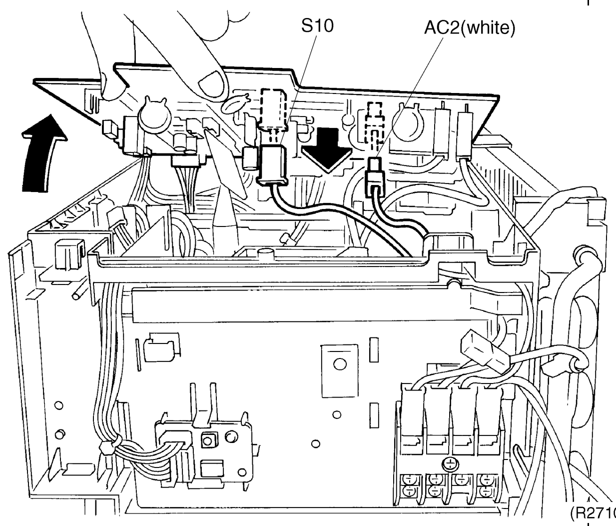
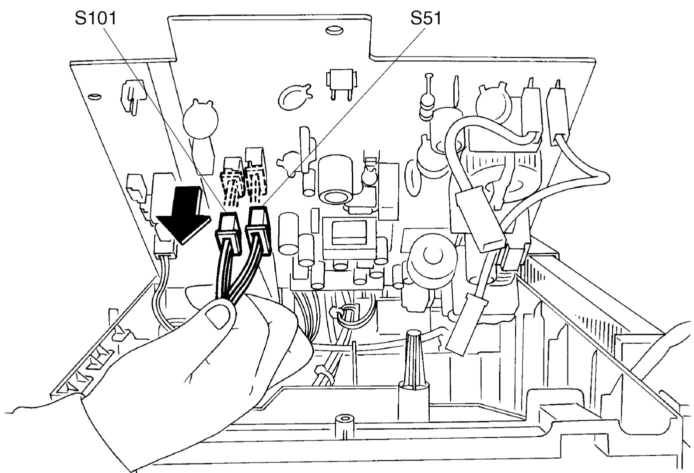
Step	Procedure		Points
■	Remove the top panel and the front panel.		
1.	Remove the right side panel.		
1	Disconnect the three connection wirings and the two earth wires.		Terminal strip number black (1) ----- power supply white (2) ----- power supply red (3) ----- transmission yellow / green (⏚) ----- earth
2	Loosen the three screws of the right side panel.		
3	Loosen the fixing screw of the electrical box.		

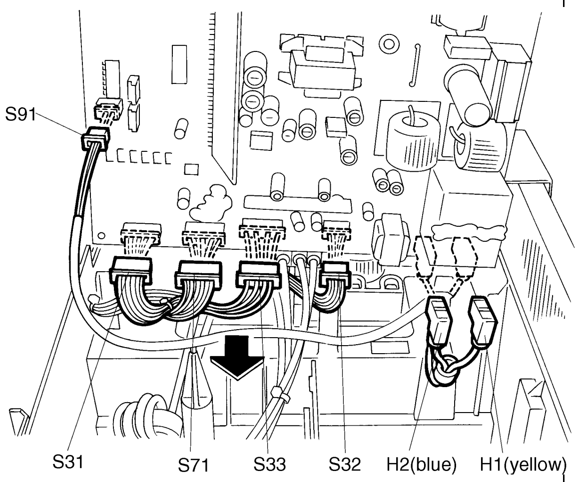
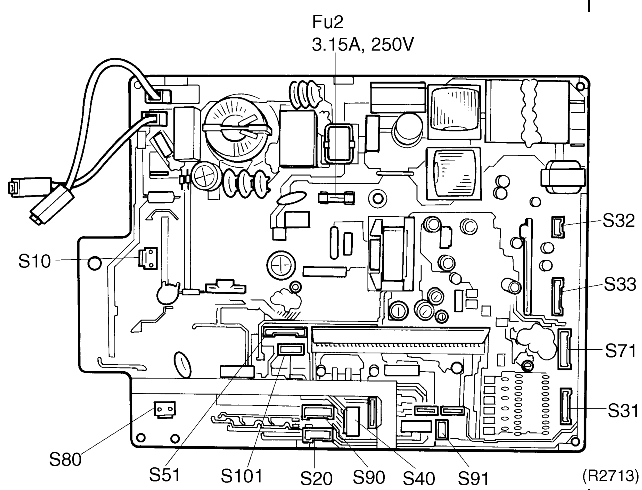
Step	Procedure		Points
		 (R2701)  (R2702)	■ Insert the two claws of the lower part and the one claw of the upper back when reassembling.
2. Disconnect harnesses.		 (R2703)	■ Service monitor PCB  (R2704)
1	Loosen the fixing screw of the cable way board.		

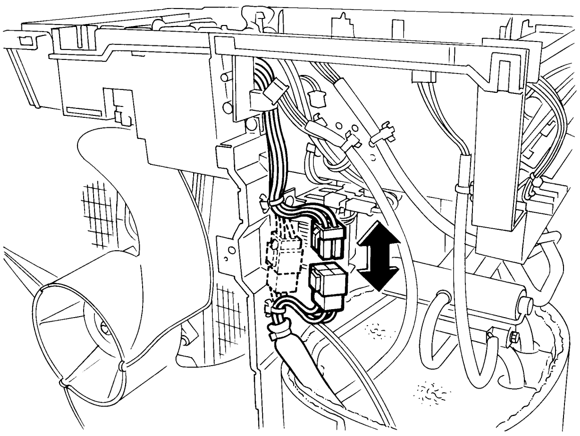
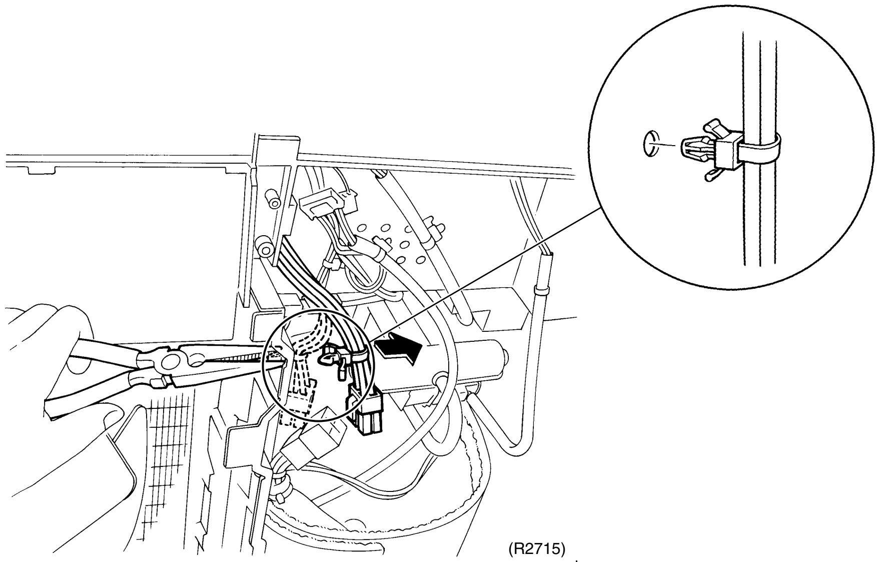
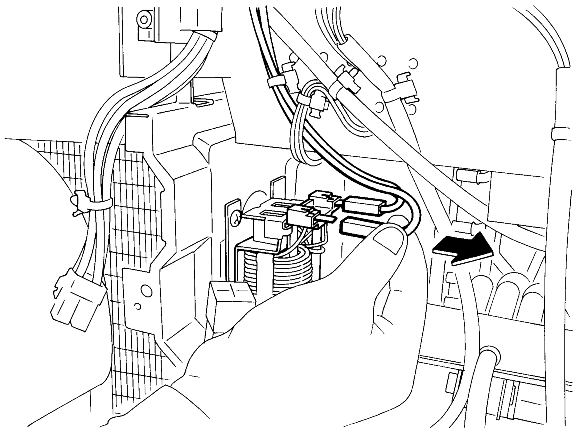
<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>2</td><td>Push the claw up to release the cable way board.
Open the cable way board.</td><td>
(R2705)</td><td></td></tr>
<tr><td>3</td><td>Disconnect the harnesses from the power supply PCB.
HL (black) ···· to the terminal strip
HE2 (yellow / green) ···· to the terminal strip (earth)
HAC1 (black) ···· from the control PCB (AC1)
HE1 (yellow / green) ···· from the control PCB (E)</td><td>
(R2706)</td><td>■ Power supply PCB


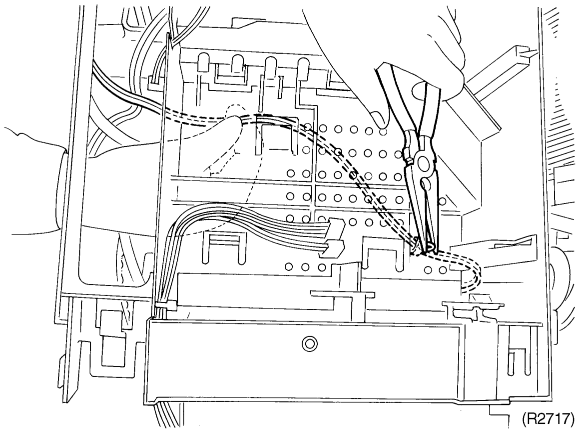
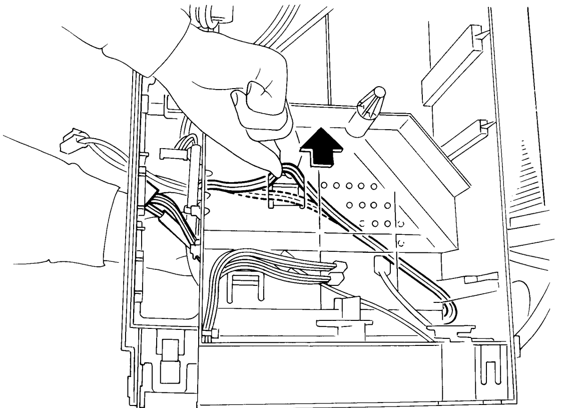
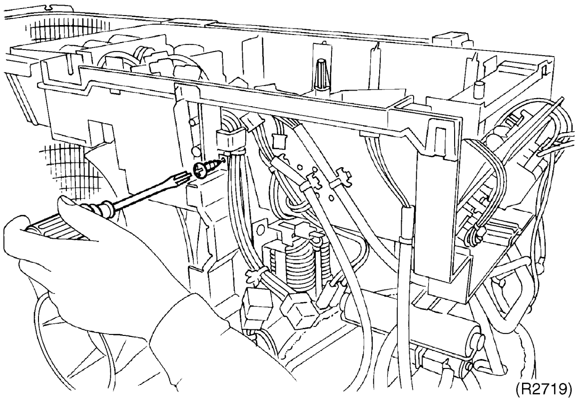
(R2707)</td></tr>
<tr><td>4</td><td>Disconnect the connectors of the front side.
S20: electronic expansion valve
S40: overload protector
S80: four way valve
S90: thermistors (discharge pipe, outdoor air, heat exchanger)</td><td>

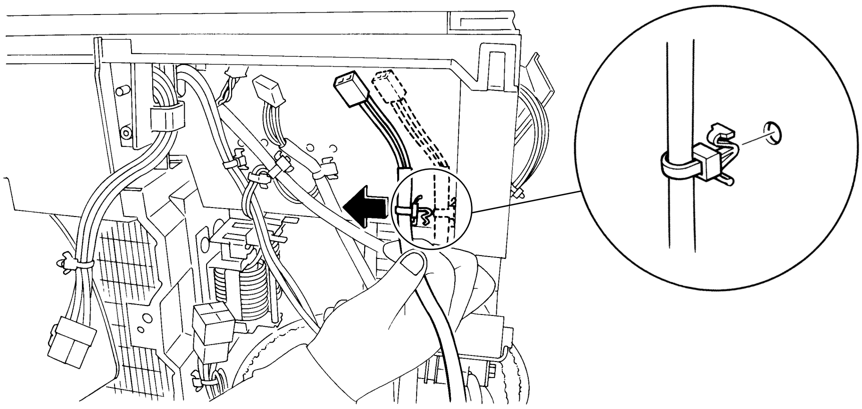
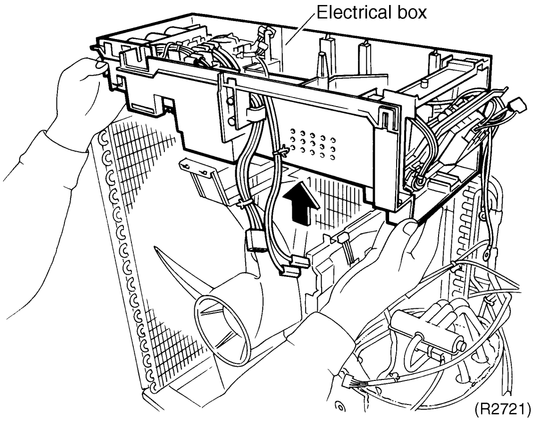
(R2708)</td><td></td></tr>
</table>

Step	Procedure		Points
5	Loosen the screw of the control PCB.	 (R2709)	
6	Undo the two claws and release the control PCB from the ditch of the front side.		
7	Disconnect the harnesses while opening the control PCB. S10: to the terminal strip AC2: to the terminal strip	 (R2710)	
8	Disconnect the connectors. S51: to the service monitor PCB S101: to the service monitor PCB	 (R2711)	

Step	Procedure		Points
9	Disconnect the connectors. S31: to the SPM S32: to the SPM S33: to the MID S71: to the MID S91: fin thermistor	(R2712)	
10	Control PCB (outdoor unit) S10: to the terminal strip S20: electronic expansion valve S31: to CN14 of the SPM S32: to CN11 of the SPM S33: to S34 of the MID S40: overload protector S51: to S52 of the service monitor PCB S71: to S72 of the MID S80: four way valve S90: thermistors (discharge pipe, outdoor air, heat exchanger) S91: fin thermistor S101: to S102 of the service monitor PCB	(R2713)	

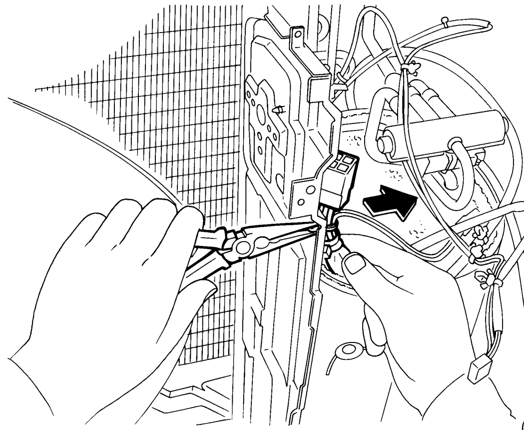
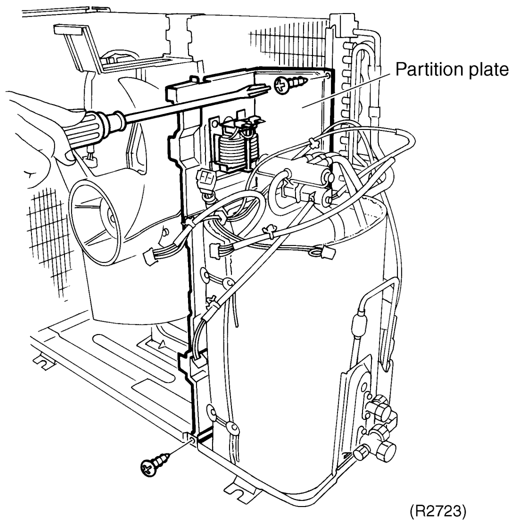
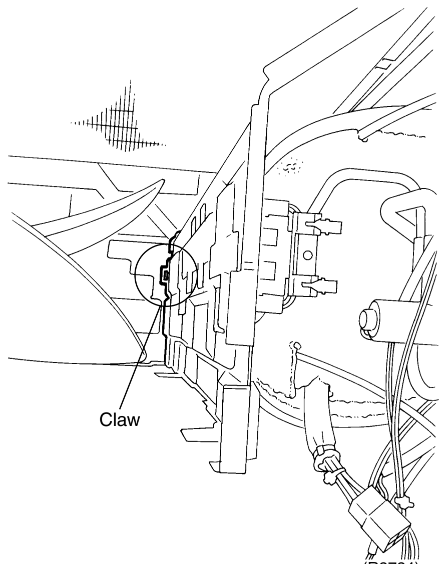
Step	Procedure		Points
11	Disconnect the relaying wire connector for the compressor.	 (R2714)	
12	Release the clamp by pliers.	 (R2715)	
13	Disconnect the reactor harness.	 (R2716)	

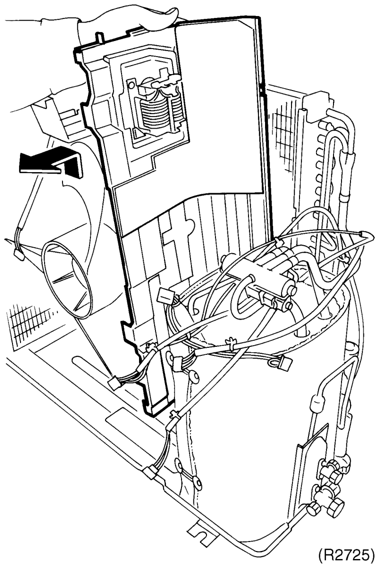
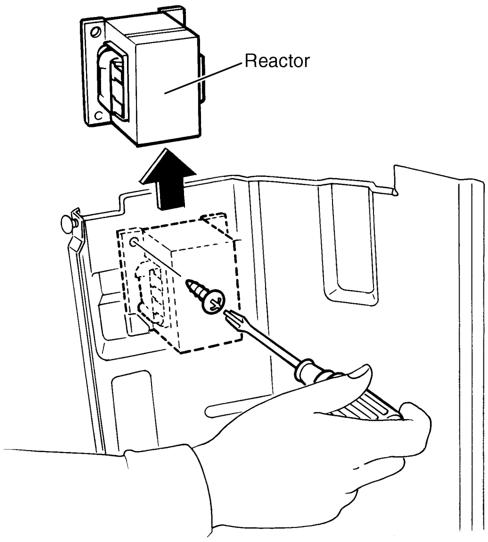
Step	Procedure		Points
14	Pull the clamp and draw the thermistor harness out from the back of the electrical box.	 (R2717)  (R2718)	
15	Loosen the screw of the electrical box.	 (R2719)	

Step	Procedure		Points
16	Release the clamp of the four way valve harness.	 (R2720)	
17	Lift the electrical box and remove it.	 (R2721)	

4.4 Removal of the Reactor

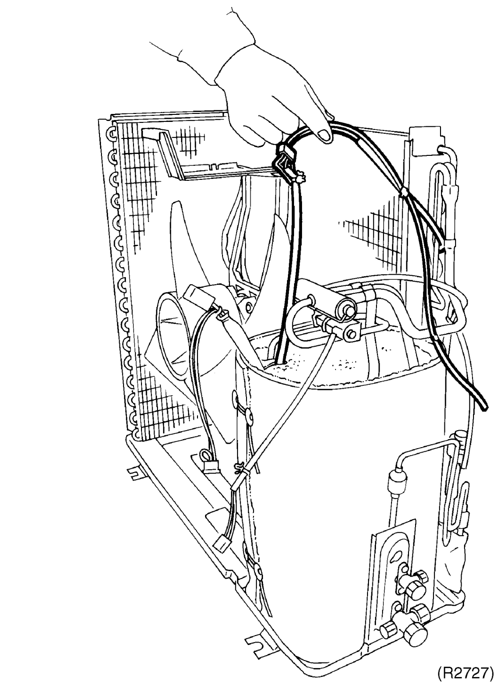
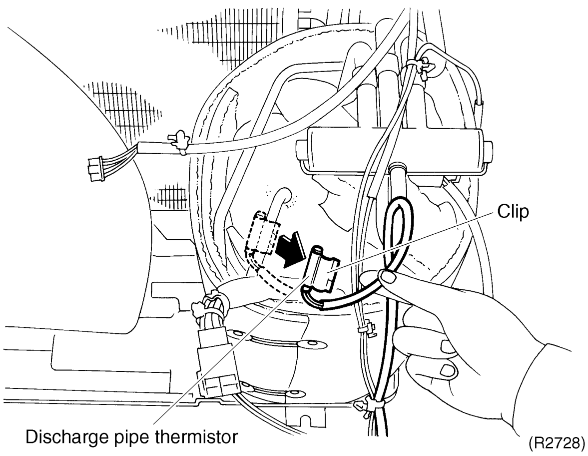
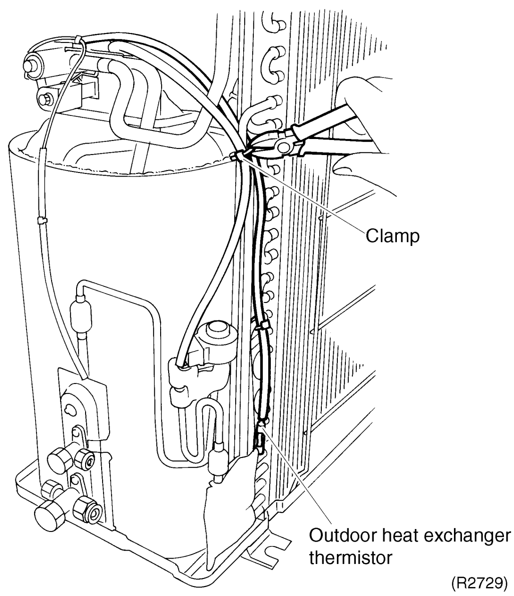
Procedure ⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

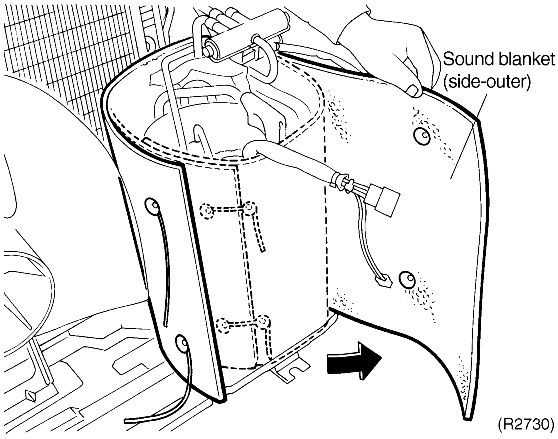
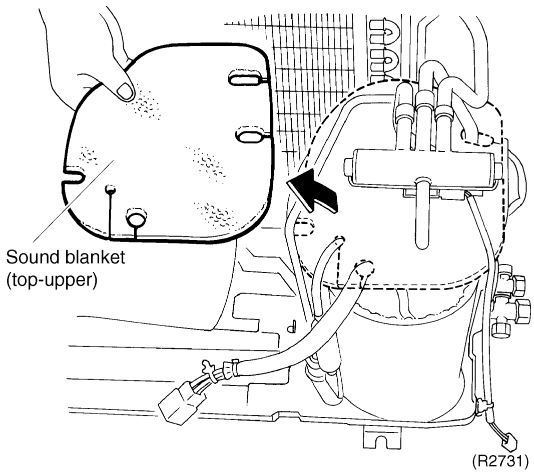
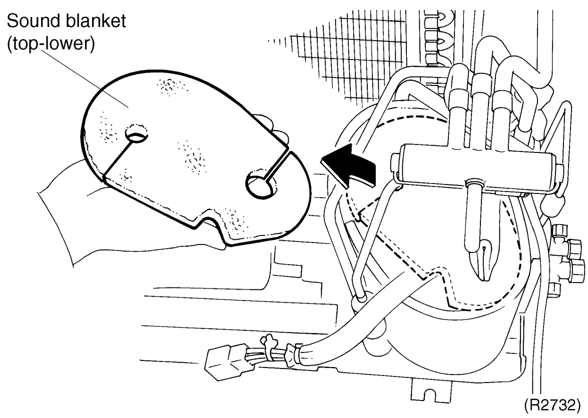
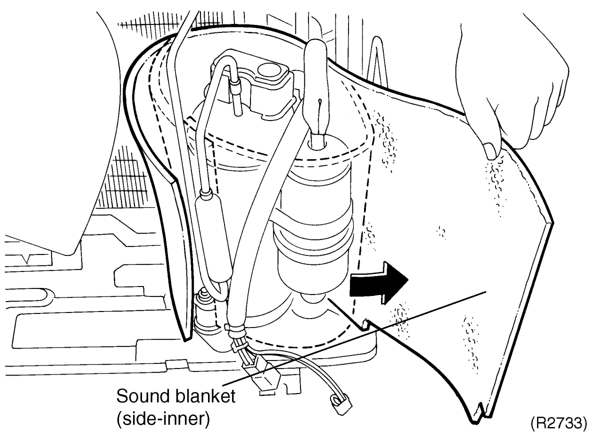
Step	Procedure		Points
■ Remove the electrical box.			
1. Remove the partition plate.			
1	Release the clamp by pliers.	 (R2722)	
2	Loosen the two screws of the partition plate.	 (R2723)	
		 (R2724)	■ The partition plate is fixed to the bottom frame with a claw.

Step	Procedure		Points
3	Lift the partition plate and remove it.	 (R2725)	
4	Loosen the screw. Slide the reactor and remove it from the partition plate.	 (R2726)	

4.5 Removal of the Sound Blanket

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

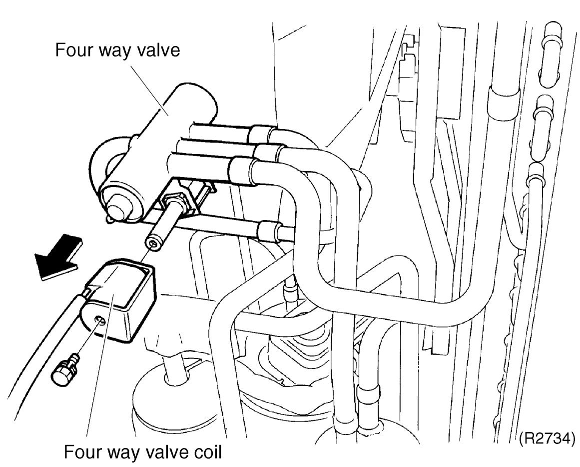
Step	Procedure		Points
1	Disconnect the harness of each thermistor.		
2	Release the discharge pipe thermistor.		■ Pay attention to the direction of the clip so as not to touch the lead wire of the thermistor when reassembling.
3	Cut the clamp by nippers. Disconnect the outdoor heat exchanger thermistor.		■ Clamps should be always available. Fix it as it was before.

Step	Procedure		Points
4	Remove the sound blanket (side-outer).		■ Since the piping ports on the sound blanket (side-outer) are torn easily, remove the blanket carefully.
5	Remove the sound blanket (top-upper).		
6	Remove the sound blanket (top-lower).		
7	Remove the sound blanket (side-inner).		■ Since the piping ports on the sound blanket (side-inner) are torn easily, remove the blanket carefully.

4.6 Removal of the Four Way Valve

Procedure

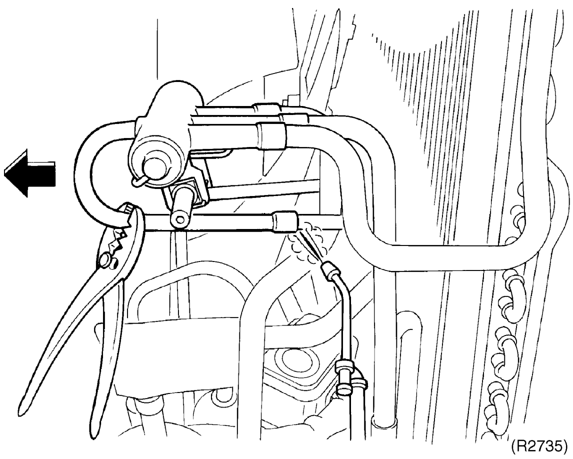
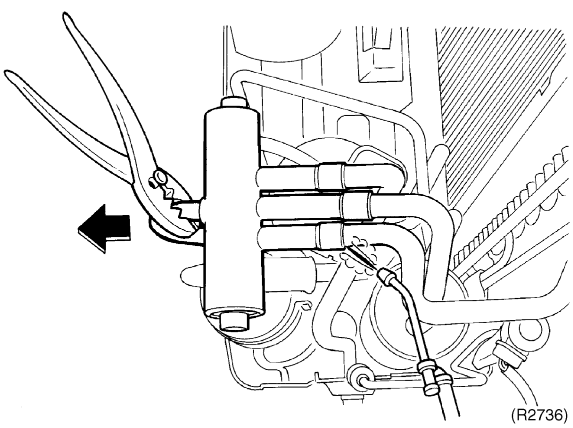
⚠ **Warning** **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>1</td><td>Loosen the screw of the four way valve coil.</td><td></td><td rowspan="3">■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries.
■ Be careful so as not to break the pipes by pressing it excessively by pliers when withdrawing it.

⚠ Caution
Be careful about the four way valve, pipes and so on, which were heated up by a gas brazing machine, so as not to get burnt your hands.

Cautions for restoration
1. Restore the piping by non-oxidation brazing. Braze it quickly when no 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, wrap the four way valve with wet cloth and provide water so that the cloth will not be dried and avoid excessive heating. (Keep below 120°C)
In case of the difficulty with gas brazing machine
1. Disconnect the brazed part where is easy to disconnect and restore.
2. Cut pipes on the main unit by a miniature copper tube cutter in order to make it easy to disconnect.

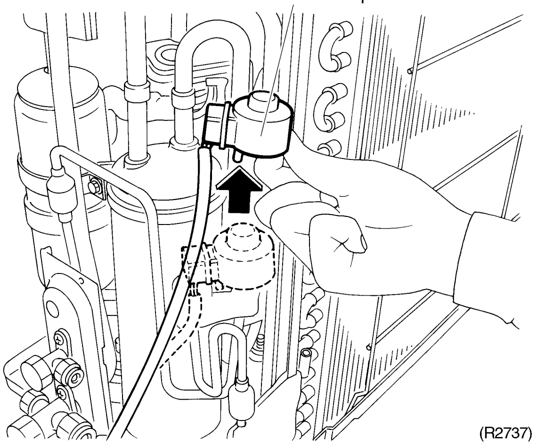
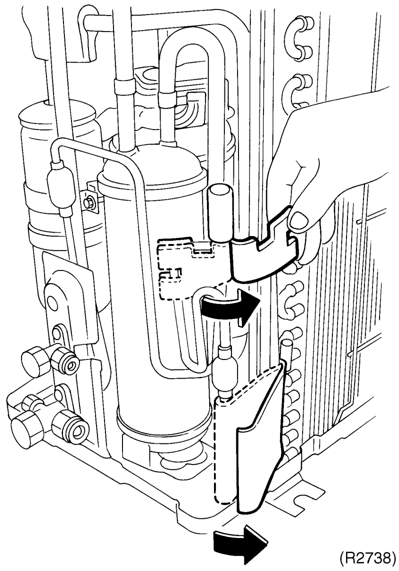
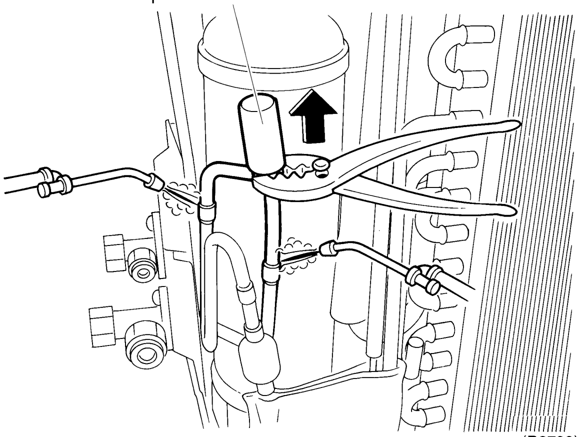
Note: Do not use a metal saw for cutting pipes by all means because the sawdust come into the circuit.</td></tr>
<tr><td>2</td><td>Heat up the brazed part of the four way valve and disconnect.

■ Be sure to apply nitrogen replacement when heating up the brazed part.</td><td></td></tr>
<tr><td>3</td><td>Heat up every brazed part in turn and disconnect.</td><td></td></tr>
</table>

4.7 Removal of the Electronic Expansion Valve

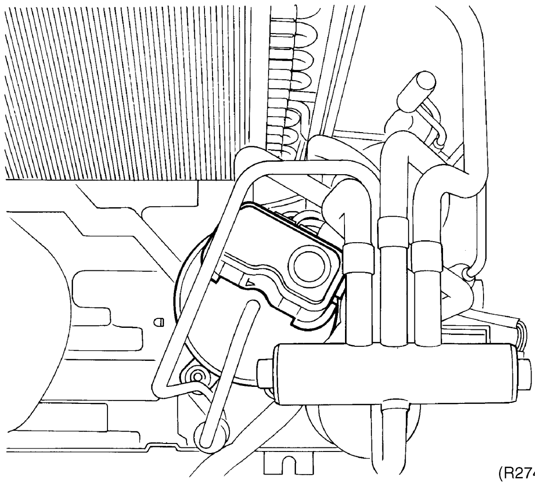
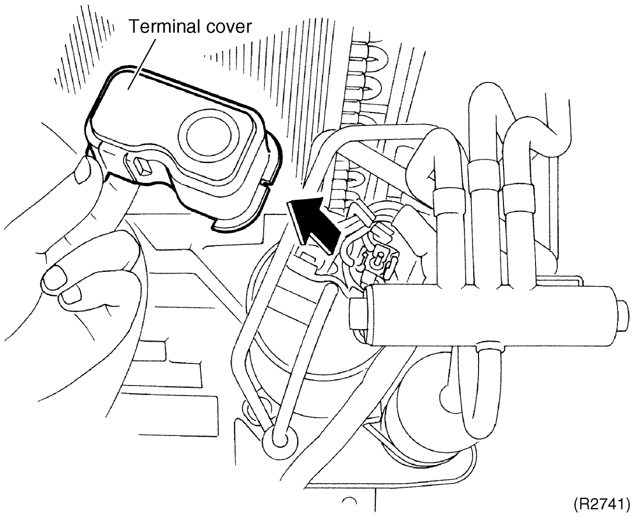
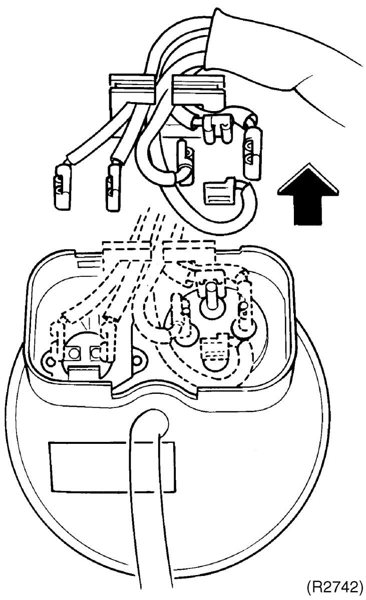
Procedure

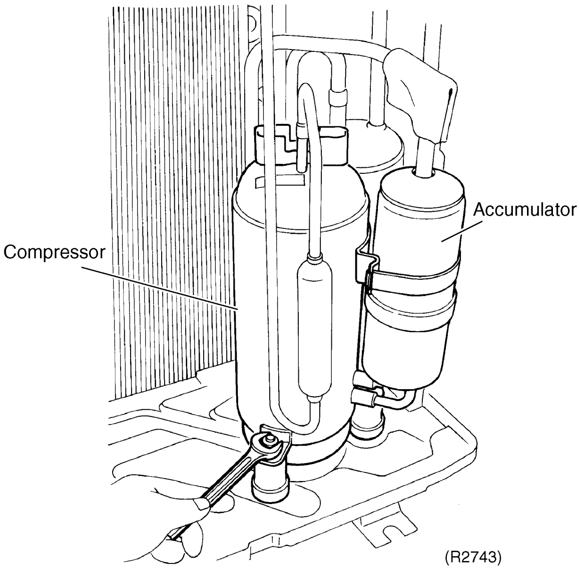
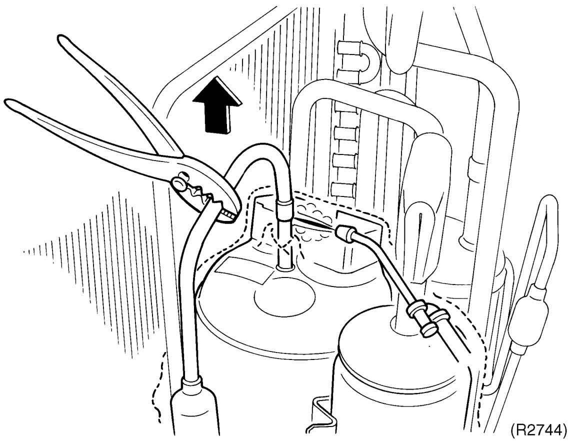
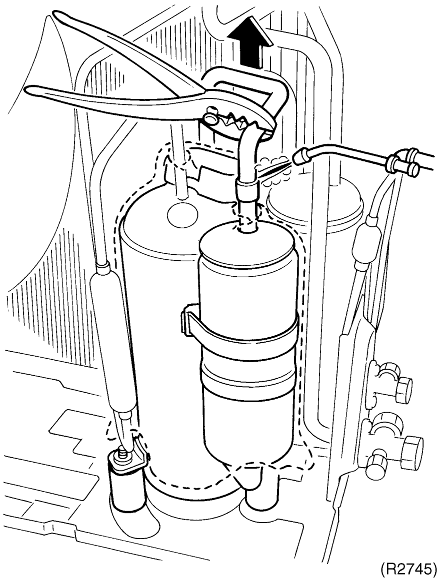
Warning **Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure		Points
1	Remove the electronic expansion valve coil.		
2	Remove the sheets of putty. ■ Before working, make sure that the refrigerant is empty in the circuit.		
3	Heat up the two brazed parts of the electronic expansion valve and disconnect. ■ Be sure to apply nitrogen replacement when heating up the brazed part.		**Caution** **Be careful about the electronic expansion valve, pipes and so on, which were heated up by a gas brazing machine, so as not to get burnt your hands.** **Warning** **Ventilate when refrigerant leaks during the work.** **(If refrigerant contacts fire, it will cause to arise toxic gas.)**

4.8 Removal of the Compressor

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

Step	Procedure		Points
1	Remove the terminal cover.	 (R2740)  (R2741)	
2	Disconnect the lead wires of the compressor.	 (R2742)	■ Be careful so as not to burn the compressor terminals or the name plate. Make a note. U V N W U : red V : yellow W: blue N : brown

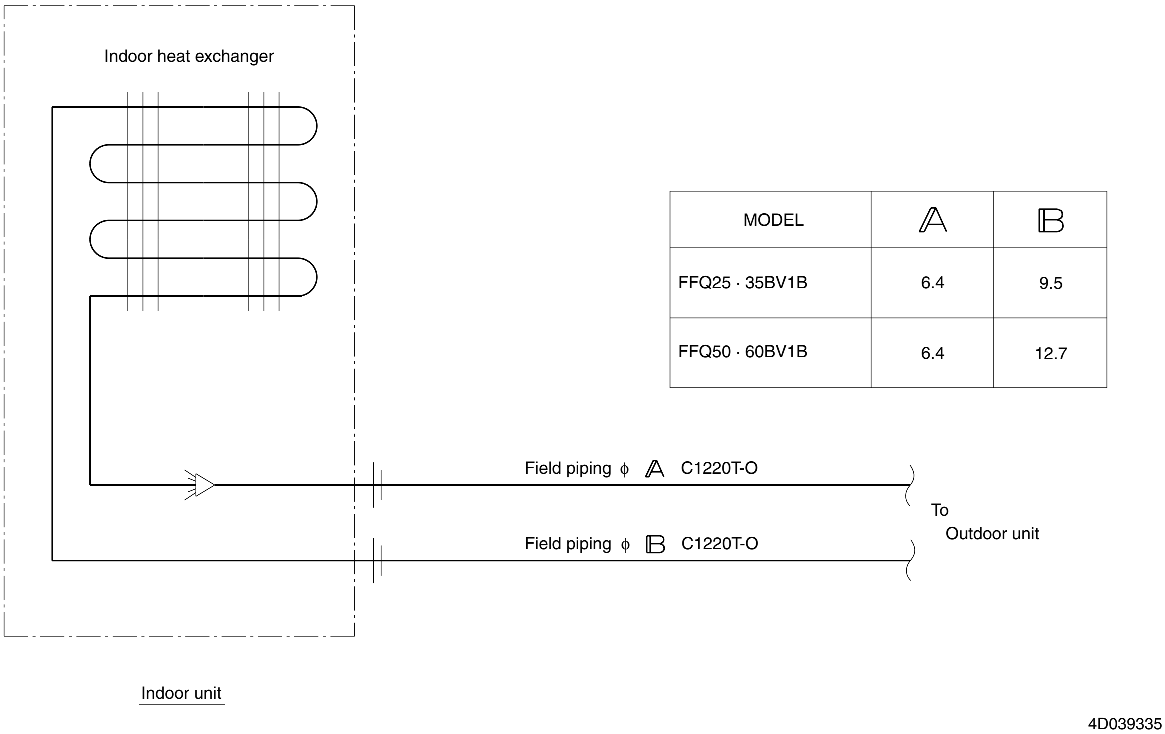
Step	Procedure		Points
3	Unscrew the nut of the compressor.	 (R2743)	
4	Remove the putty of the accumulator.		
	■ Before working, make sure that the refrigerant is empty in the circuit. ■ Be sure to apply nitrogen replacement when heating up the brazed part.	 (R2744)	**Warning** **Ventilate when refrigerant leaks during the work.** **(If refrigerant contacts fire, it will cause to arise toxic gas.)** ■ Provide a protective sheet or a steel plate so that the brazing flame cannot influence peripheries. ■ Be careful so as not to burn the compressor terminals or the name plate.
5	Heat up the brazed part of the discharge side and disconnect.		
6	Heat up the brazed part of the suction side and disconnect.	 (R2745)	■ Be careful so as not to burn the heat exchanger fin. **Warning** **Since it may happen that refrigeration oil in the compressor will catch fire, prepare wet cloth so as to extinguish fire immediately.**
7	Lift the compressor up and remove it.		

Part 10 Appendix

1. Piping Diagrams

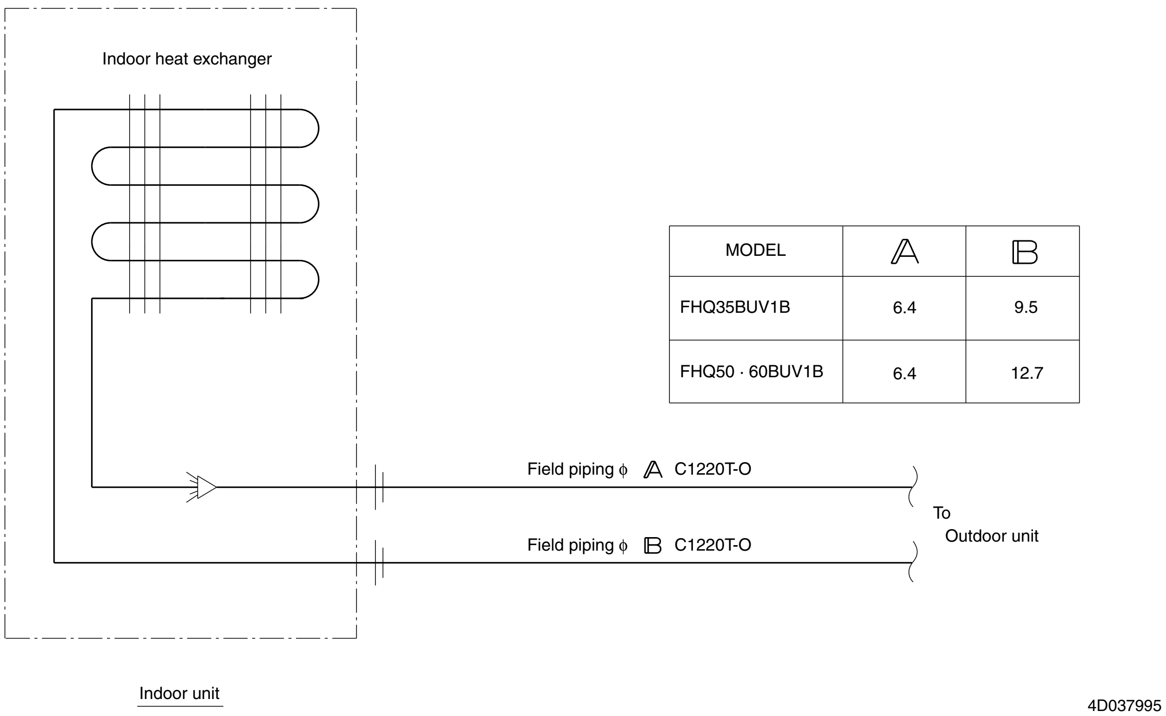
1.1 Indoor Units

FFQ 25/35/50/60 BV1B



MODEL	A	B
FFQ25 · 35BV1B	6.4	9.5
FFQ50 · 60BV1B	6.4	12.7

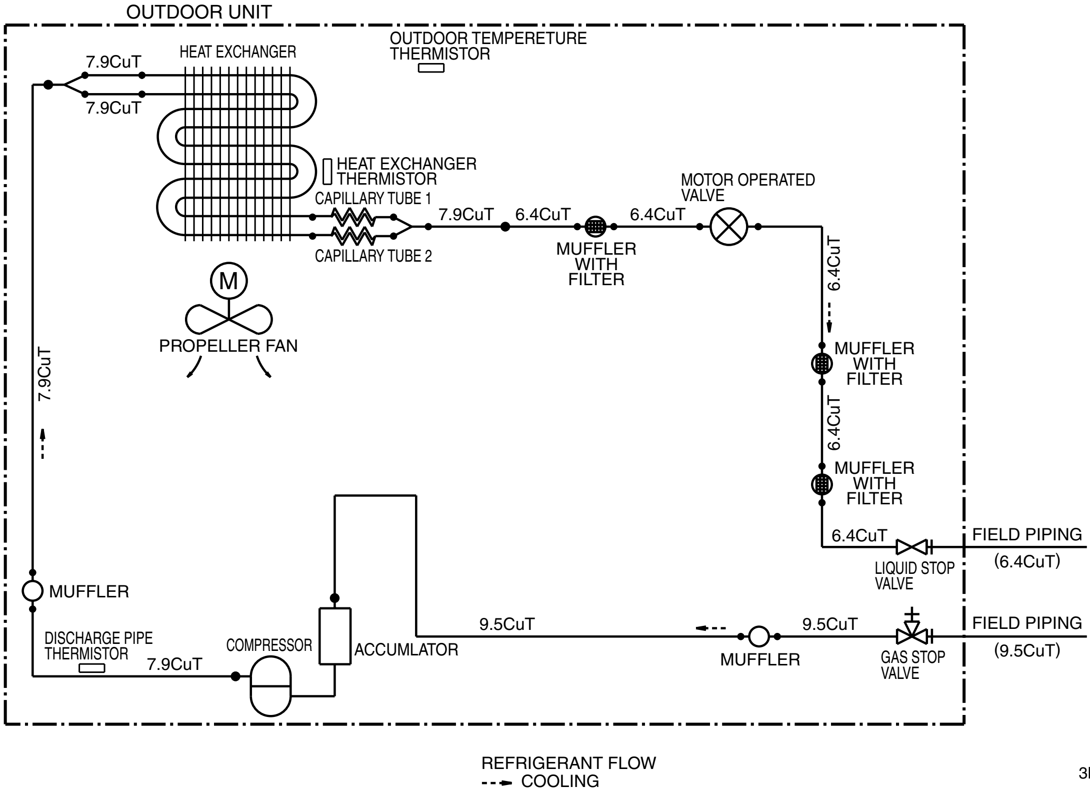
FHQ 35/50/60 BUV1B



MODEL	A	B
FHQ35BUV1B	6.4	9.5
FHQ50 · 60BUV1B	6.4	12.7

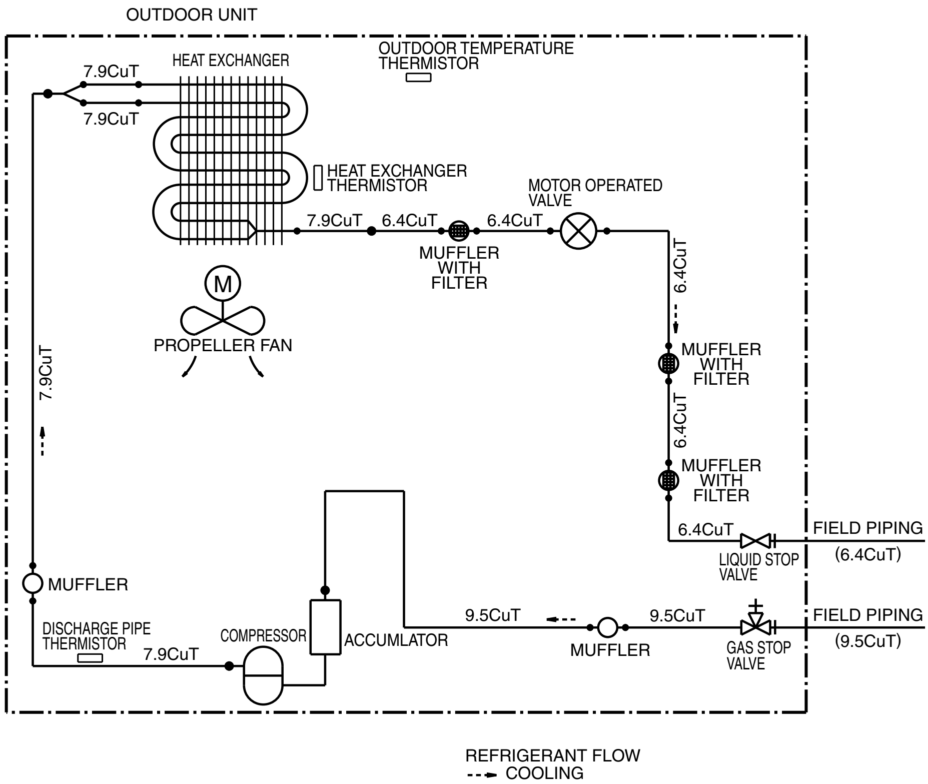
1.2 Outdoor Units (25/35 class)

RKS25BVMB



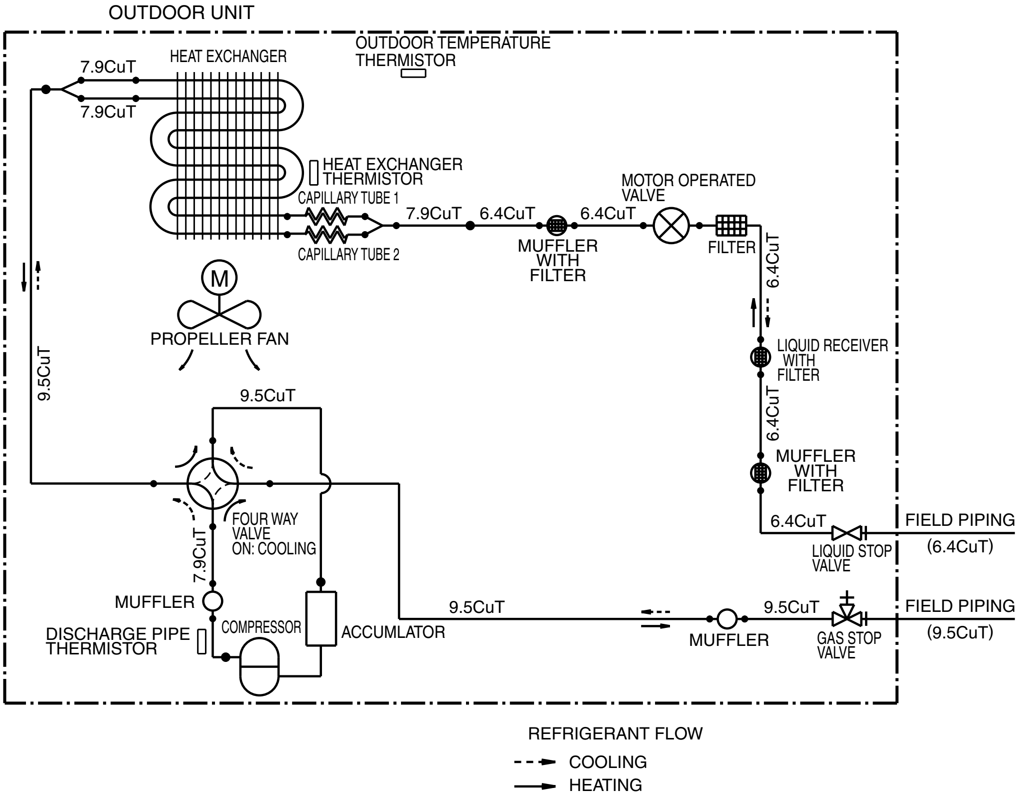
3D039303

RKS35BVMB



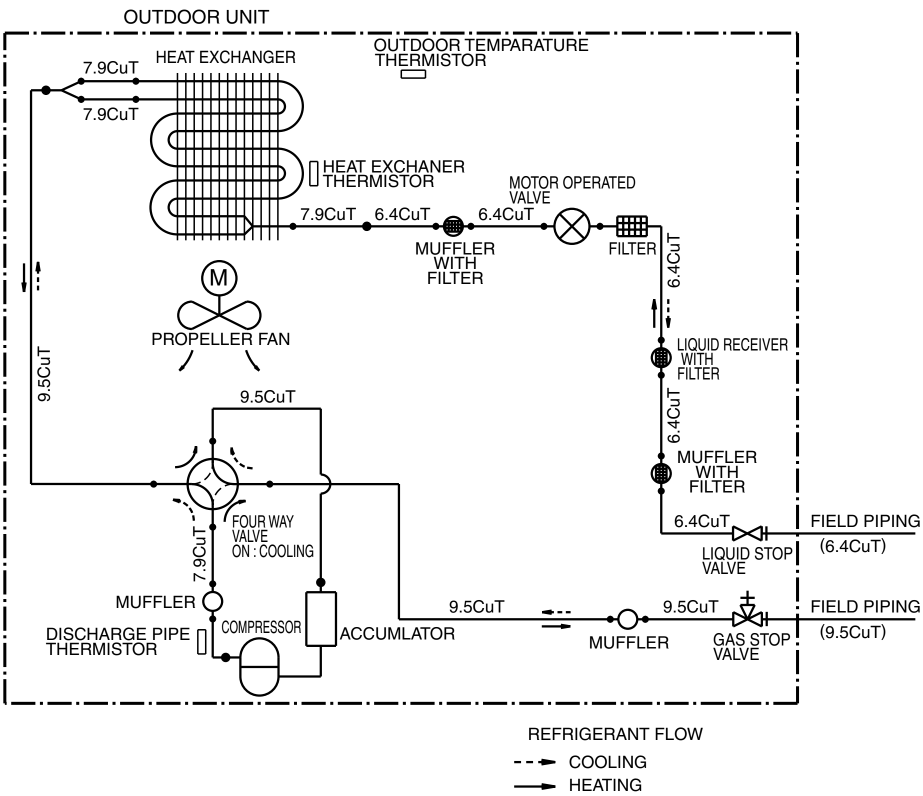
3D039304

RXS25BVMB



3D039301

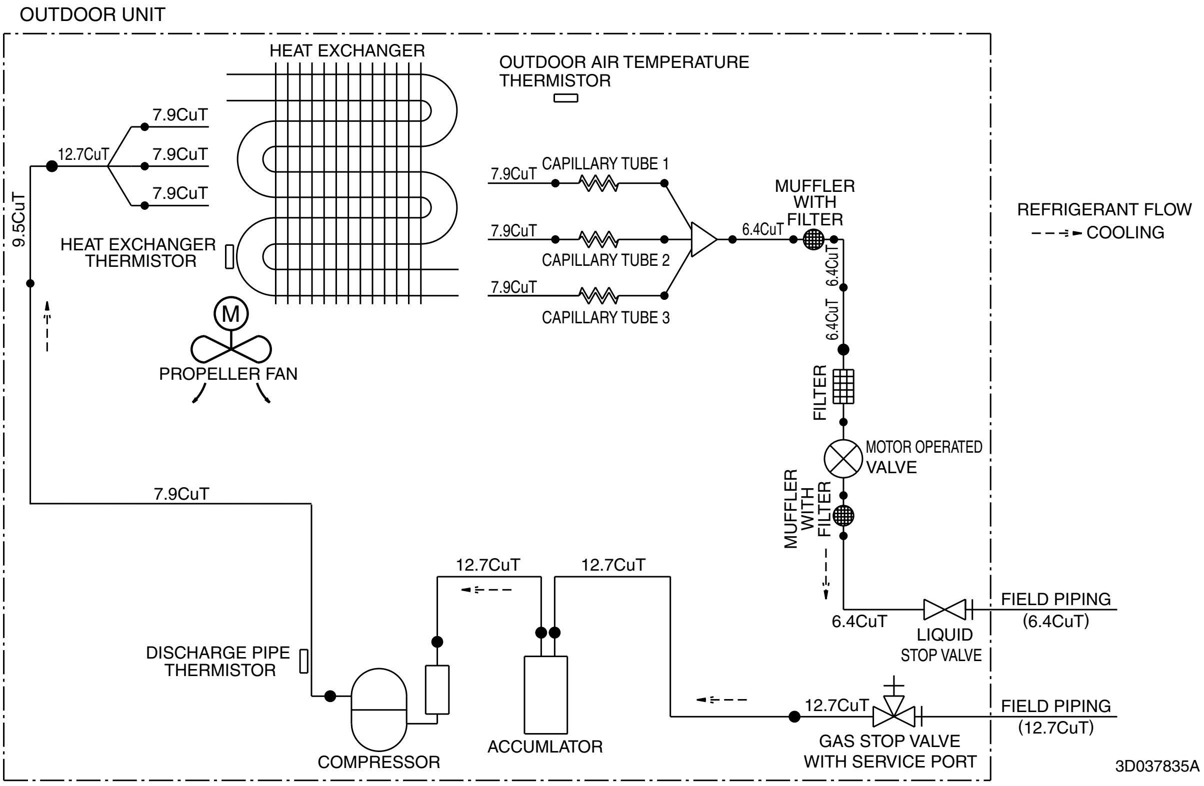
RXS35BVMB



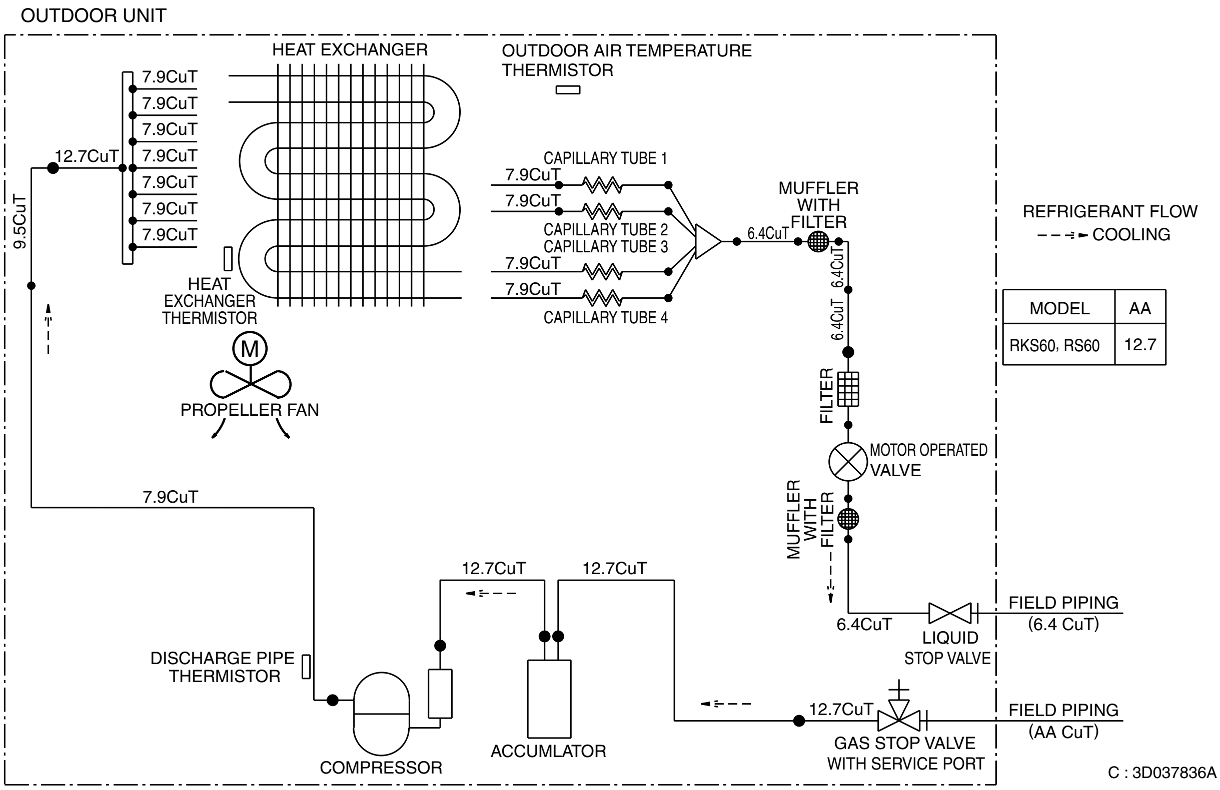
C: 3D039302

1.3 Outdoor Units (50/60 class)

RKS50BVMA, RKS50BVMB, RS50BVMB

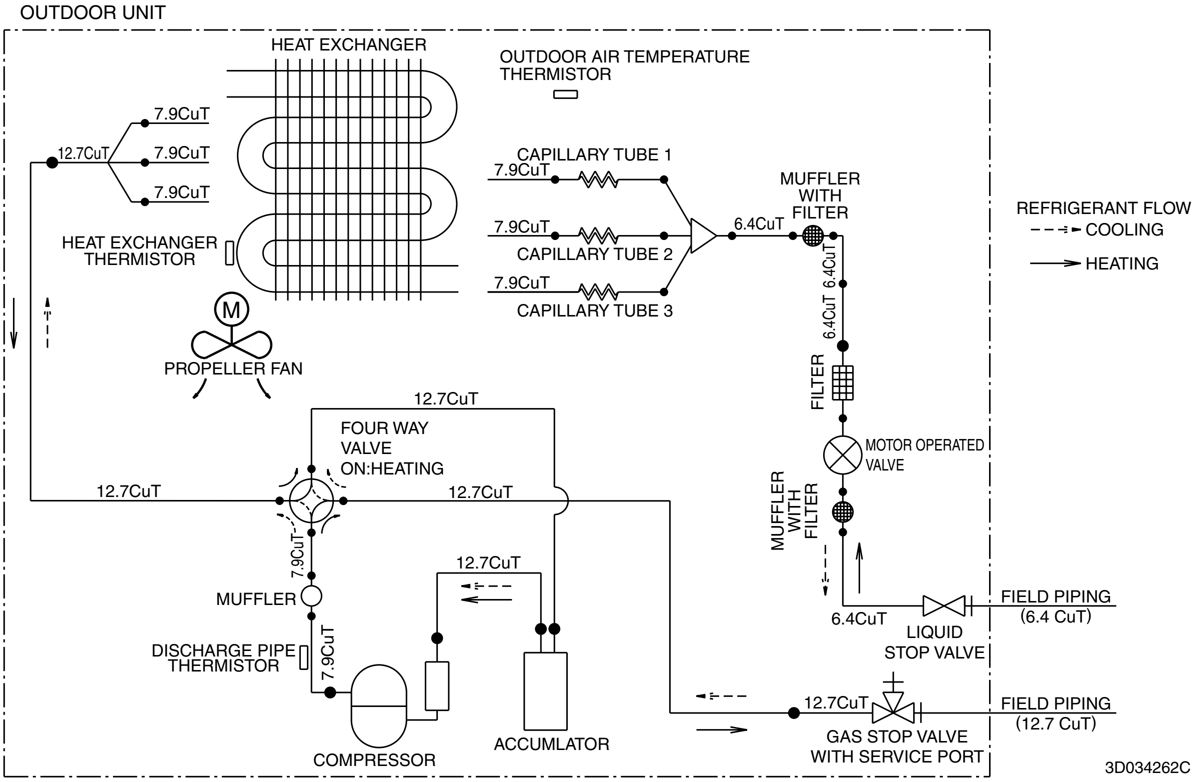


RKS60BVMA, RKS60BVMB, RS60BVMB

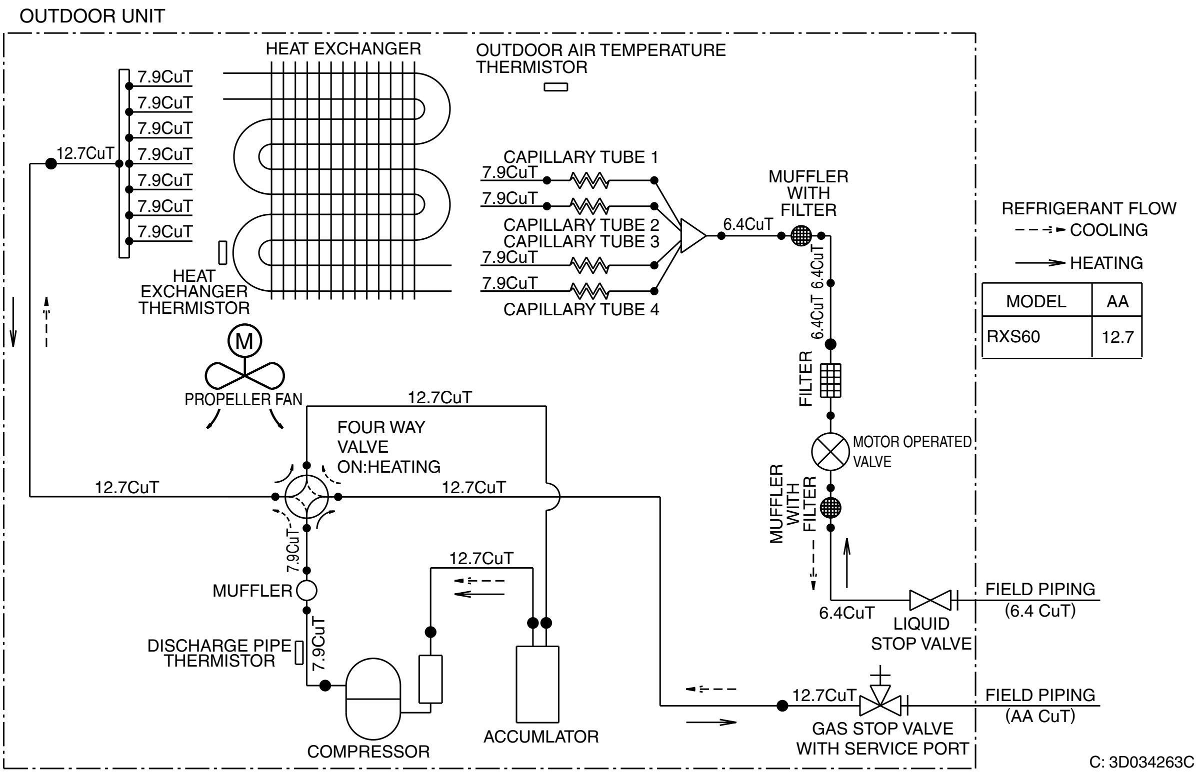


MODEL	AA
RKS60, RS60	12.7

RXS50BVMA, RXS50BVMB



RXS60BVMA, RXS60BVMB

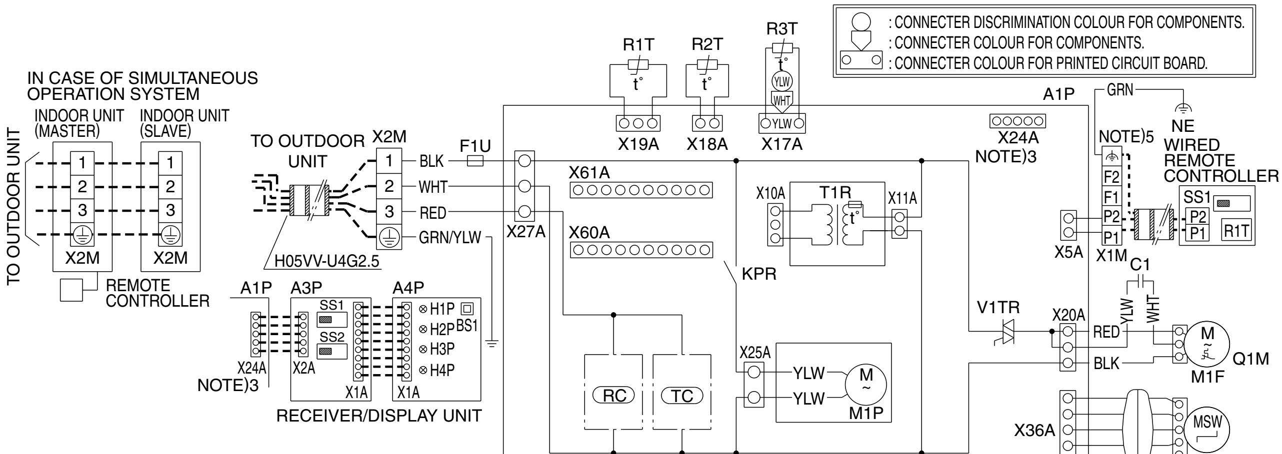


MODEL	AA
RXS60	12.7

2. Wiring Diagrams

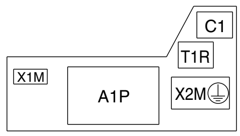
2.1 Indoor Units

FFQ 25/35/50/60 BV1B



NOTES)

1. : TERMINAL
   : FIELD WIRING
   , : CONNECTOR
2. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTALLATION MANUAL.
3. X24A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS BEING USED.
4. REMOTE CONTROLLER MODEL VARIES ACCORDING TO THE COMBINATION SYSTEM, CONFIRM ENGINEERING MATERIALS AND CATALOGS, ETC. BEFORE CONNECTING.
5. GROUND THE SHIELD OF THE REMOTE CONTROLLER CORD TO THE INDOOR UNIT(IN CASE OF USING SHIELD WIRE).
6. SYMBOLS SHOW AS FOLLOWS: RED: RED BLK: BLACK WHT: WHITE YLW: YELLOW PRP: PURPLE GRY: GRAY BLU: BLUE

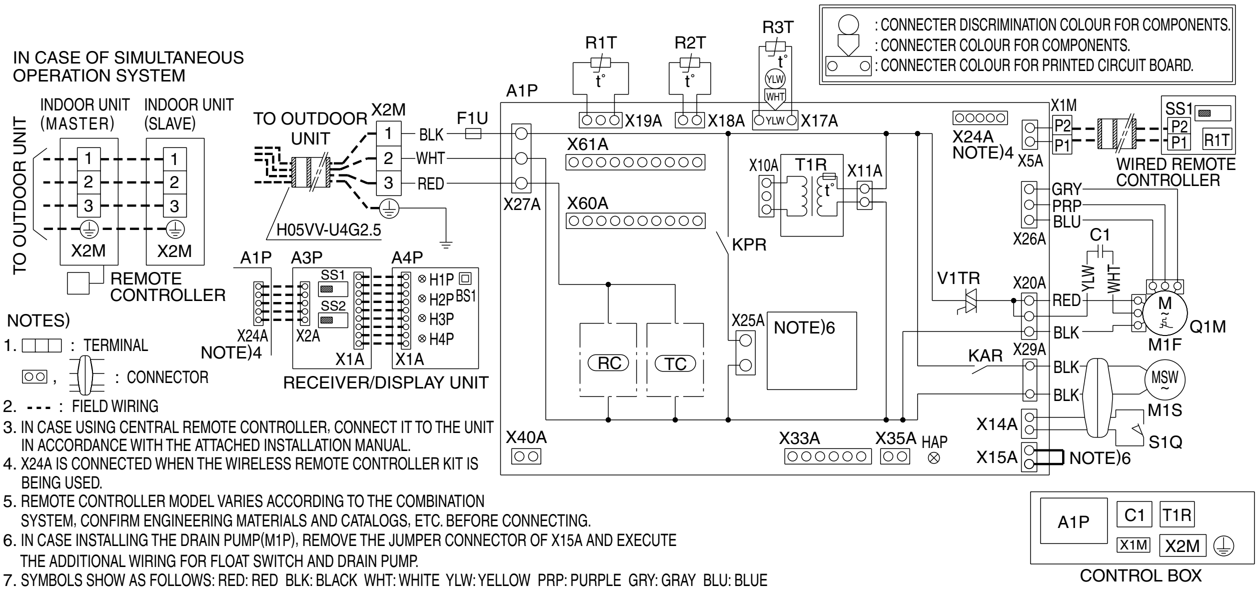


CONTROL BOX

A1P	PRINTED CIRCUIT BOARD	BS1	PUSH BUTTON(ON/OFF)
C1	CAPACITOR(M1F)	H1P	LIGHT EMITTING DIODE (ON-RED)
F1U	FUSE(F5A 250V)		
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR GREEN)	H2P	LIGHT EMITTING DIODE (TIMER-GREEN)
KPR	MAGNETIC RELAY(M1P)	H3P	LIGHT EMITTING DIODE (FILTER SIGN-RED)
M1F	MOTOR(INDOOR FAN)		
M1P	MOTOR(DRAIN PUMP)	H4P	LIGHT EMITTING DIODE (DEFROST-ORANGE)
M1S	MOTOR(SWING FLAP)		
Q1M	THERMO SWITCH(M1F EMBEDDED)	SS1	SELECTOR SWITCH (MAIN/SUB)
R1T	THERMISTOR(AIR)		
R2T	THERMISTOR(COIL-1)	SS2	SELECTOR SWITCH (WIRELESS ADDRESS SET)
R3T	THERMISTOR(COIL-2)		
S1L	FLOAT SWITCH	CONNECTOR FOR OPTIONAL PARTS	
T1R	TRANSFORMER(220-240V/22V)	X33A	CONNECTOR (ADAPTOR FOR WIRING)
V1TR	PHASE CONTROL CIRCUIT		
X1M	TERMINAL STRIP	X35A	CONNECTOR (GROUP CONTROL ADAPTOR)
X2M	TERMINAL STRIP		
RC	SIGNAL RECEIVER CIRCUIT	X40A	CONNECTOR (ON/OFF INPUT FROM OUTSIDE)
TC	SIGNAL TRANSMISSION CIRCUIT		
WIRED REMOTE CONTROLLER		X60A X61A	CONNECTOR (INTERFACE ADAPTOR FOR SKYAIR SERIES)
R1T	THERMISTOR(AIR)		
SS1	SELECTOR SWITCH(MAIN/SUB)		
WIRELESS REMOTE CONTROLLER (RECEIVER/DISPLAY UNIT)			
A3P	PRINTED CIRCUIT BOARD		
A4P	PRINTED CIRCUIT BOARD		

3D038357B

FHQ 35/50/60 BUV1B



NOTES)

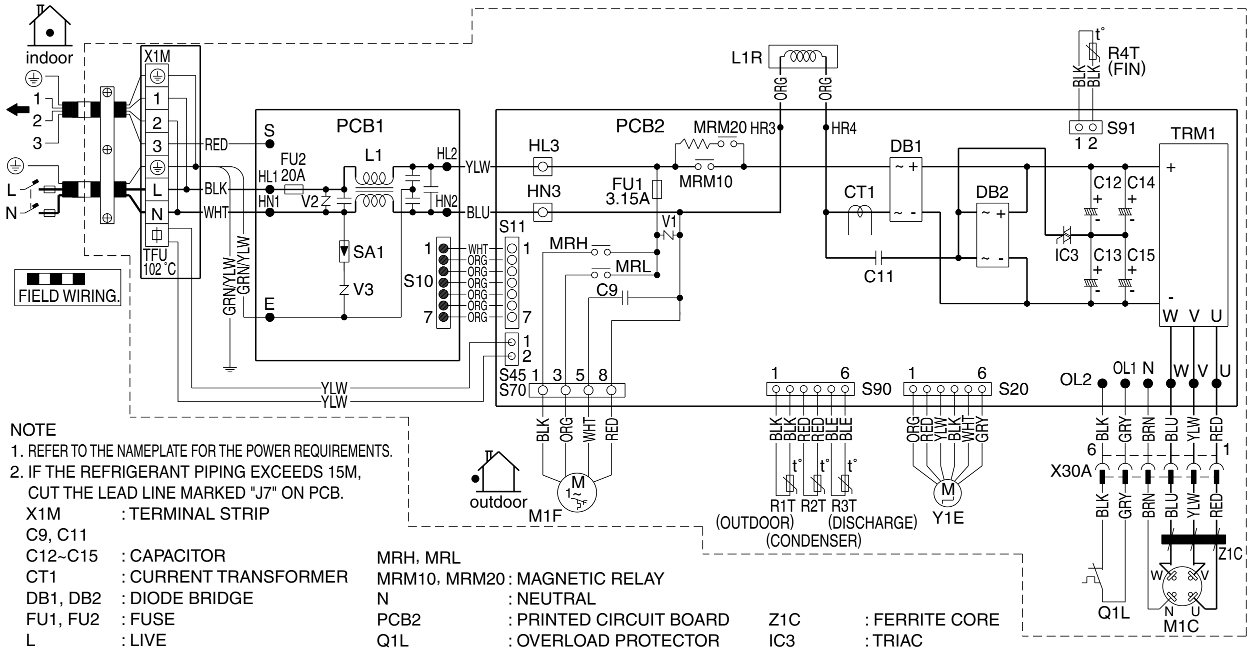
1. ▭▭▭ : TERMINAL
   ◎◎ , : CONNECTOR
2. - - - : FIELD WIRING
3. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THE UNIT IN ACCORDANCE WITH THE ATTACHED INSTALLATION MANUAL.
4. X24A IS CONNECTED WHEN THE WIRELESS REMOTE CONTROLLER KIT IS BEING USED.
5. REMOTE CONTROLLER MODEL VARIES ACCORDING TO THE COMBINATION SYSTEM, CONFIRM ENGINEERING MATERIALS AND CATALOGS, ETC. BEFORE CONNECTING.
6. IN CASE INSTALLING THE DRAIN PUMP(M1P), REMOVE THE JUMPER CONNECTOR OF X15A AND EXECUTE THE ADDITIONAL WIRING FOR FLOAT SWITCH AND DRAIN PUMP.
7. SYMBOLS SHOW AS FOLLOWS: RED: RED BLK: BLACK WHT: WHITE YLW: YELLOW PRP: PURPLE GRY: GRAY BLU: BLUE

A1P	PRINTED CIRCUIT BOARD	BS1	PUSH BUTTON(ON/OFF)
C1	CAPACITOR(M1F)	H1P	LIGHT EMITTING DIODE
F1U	FUSE(F5A 250V)		(ON-RED)
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR GREEN)	H2P	LIGHT EMITTING DIODE (TIMER-GREEN)
KAR	MAGNETIC RELAY(M1S)	H3P	LIGHT EMITTING DIODE
KPR	MAGNETIC RELAY(M1P)		(FILTER SIGN-RED)
M1F	MOTOR(INDOOR FAN)	H4P	LIGHT EMITTING DIODE
M1S	MOTOR(SWING FLAP)		(DEFROST-ORANGE)
Q1M	THERMO SWITCH(M1F EMBEDDED)	SS1	SELECTOR SWITCH
R1T	THERMISTOR(AIR)		(MAIN/SUB)
R2T	THERMISTOR(COIL-1)	SS2	SELECTOR SWITCH
R3T	THERMISTOR(COIL-2)		(WIRELESS ADDRESS SET)
S1Q	LIMIT SWITCH(SWING FLAP)	CONNECTOR FOR OPTIONAL PARTS	
T1R	TRANSFORMER(220-240V/22V)	X15A	CONNECTOR(FLOAT SWITCH)
V1TR	PHASE CONTROL CIRCUIT	X25A	CONNECTOR(DRAIN PUMP)
X1M	TERMINAL BLOCK	X33A	CONNECTOR
X2M	TERMINAL BLOCK		(ADAPTOR FOR WIRING)
RC	SIGNAL RECEIVER CIRCUIT	X35A	CONNECTOR
TC	SIGNAL TRANSMISSION CIRCUIT		(GROUP CONTROL ADAPTOR)
WIRED REMOTE CONTROLLER		X40A	CONNECTOR
R1T	THERMISTOR(AIR)		(ON/OFF INPUT FROM OUTSIDE)
SS1	SELECTOR SWITCH(MAIN/SUB)	X60A	CONNECTOR
WIRELESS REMOTE CONTROLLER		X61A	(INTERFACE ADAPTOR
(RECEIVER/DISPLAY UNIT)			FOR SKYAIR SERIES)
A3P	PRINTED CIRCUIT BOARD		
A4P	PRINTED CIRCUIT BOARD		

3D037842C

2.2 Outdoor Units (25/35 class)

RKS25BVMB, RKS35BVMB

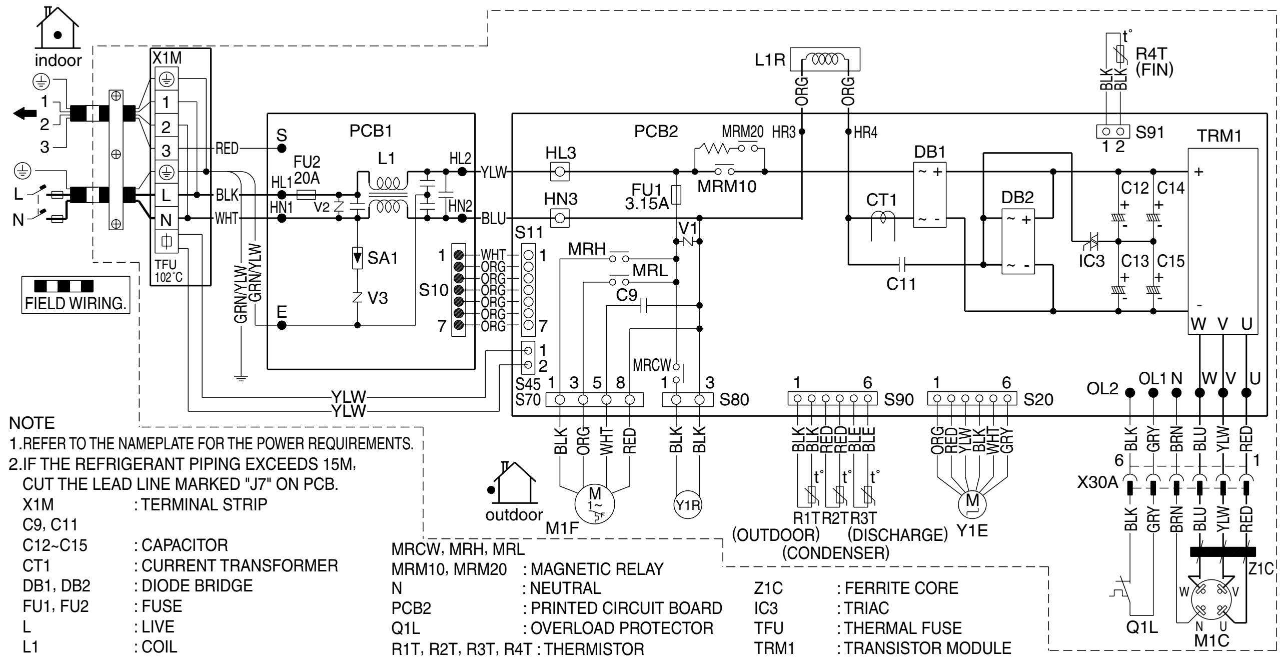


NOTE
1. REFER TO THE NAMEPLATE FOR THE POWER REQUIREMENTS.
2. IF THE REFRIGERANT PIPING EXCEEDS 15M, CUT THE LEAD LINE MARKED "J7" ON PCB.

X1M	: TERMINAL STRIP
C9, C11	
C12~C15	: CAPACITOR
CT1	: CURRENT TRANSFORMER
DB1, DB2	: DIODE BRIDGE
FU1, FU2	: FUSE
L	: LIVE
L1	: COIL
L1R	: REACTOR
M1C	: COMPRESSOR MOTOR
M1F	: FAN MOTOR
PCB1	: PRINTED CIRCUIT BOARD
MRH, MRL	
MRM10, MRM20	: MAGNETIC RELAY
N	: NEUTRAL
PCB2	: PRINTED CIRCUIT BOARD
Q1L	: OVERLOAD PROTECTOR
R1T, R2T, R3T, R4T	: THERMISTOR
S10, S11, S20, S45,	
S70, S90, S91,	
HL3, HN3	: CONNECTOR
SA1	: SURGE ARRESTER
Z1C	: FERRITE CORE
IC3	: TRIAC
TFU	: THERMAL FUSE
TRM1	: TRANSISTOR MODULE
V1, V2, V3	: VARISTOR
Y1E	: ELECTRONIC EXPANSION VALVE COIL
⏚	: PROTECTIVE EARTH

3D038018A

RXS25BVMB, RXS35BVMB



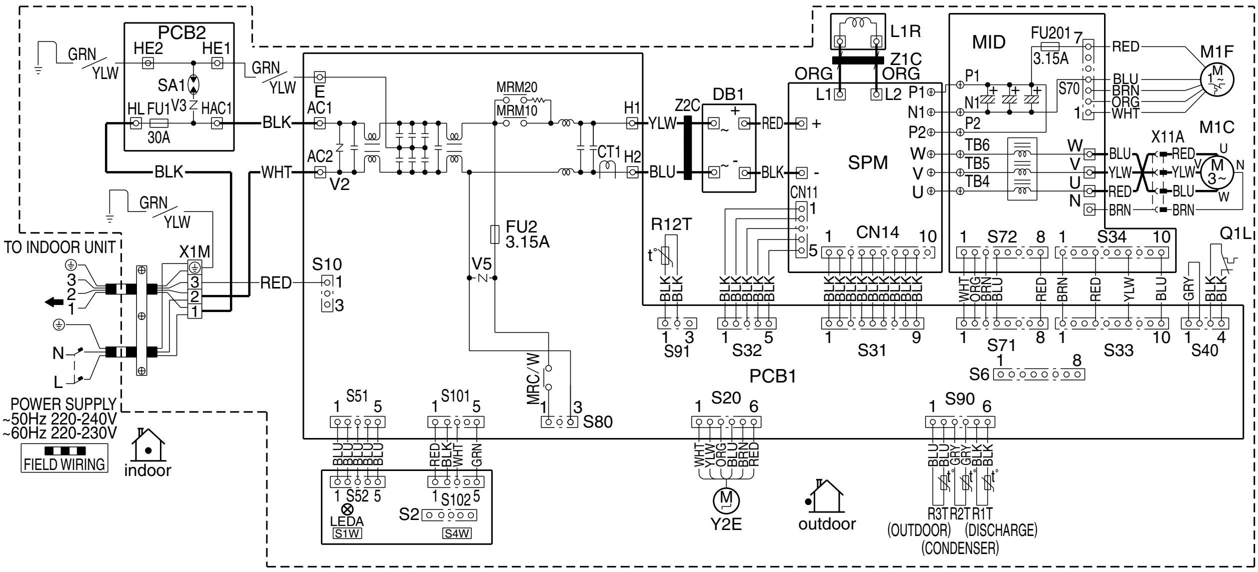
NOTE
1.REFER TO THE NAMEPLATE FOR THE POWER REQUIREMENTS.
2.IF THE REFRIGERANT PIPING EXCEEDS 15M, CUT THE LEAD LINE MARKED "J7" ON PCB.

X1M	: TERMINAL STRIP
C9, C11	
C12~C15	: CAPACITOR
CT1	: CURRENT TRANSFORMER
DB1, DB2	: DIODE BRIDGE
FU1, FU2	: FUSE
L	: LIVE
L1	: COIL
L1R	: REACTOR
M1C	: COMPRESSOR MOTOR
M1F	: FAN MOTOR
PCB1	: PRINTED CIRCUIT BOARD
MRCW, MRH, MRL	
MRM10, MRM20	: MAGNETIC RELAY
N	: NEUTRAL
PCB2	: PRINTED CIRCUIT BOARD
Q1L	: OVERLOAD PROTECTOR
R1T, R2T, R3T, R4T	: THERMISTOR
S10, S11, S20, S45,	
S70, S80, S90,	
S91, HL3, HN3	: CONNECTOR
SA1	: SURGE ARRESTER
Z1C	: FERRITE CORE
IC3	: TRIAC
TFU	: THERMAL FUSE
TRM1	: TRANSISTOR MODULE
V1, V2, V3	: VARISTOR
Y1E	: ELECTRONIC EXPANSION VALVE COIL
Y1R	: REVERSING SOLENOIDE VALVE COIL
⏚	: PROTECTIVE EARTH

3D038015A

2.3 Outdoor Units (50/60 class)

RKS 50/60 BVMA, RKS 50/60 BVMB, RS 50/60 BVMB



Z1C,Z2C : FERRITE CORE
X1M : TERMINAL STRIP
Y2E : ELECTRONIC EXPANSION VALVE
V2~V5 : VARISTOR
FU1, FU2, FU201 : FUSE
HE1,HE2,HAC1
E,AC1,AC2
H1, H2, HL
L1,L2,X11A : CONNECTOR
MRM10,MRM20
MRC/W : MAGNETIC RELAY
R1T~R3T : THERMISTOR

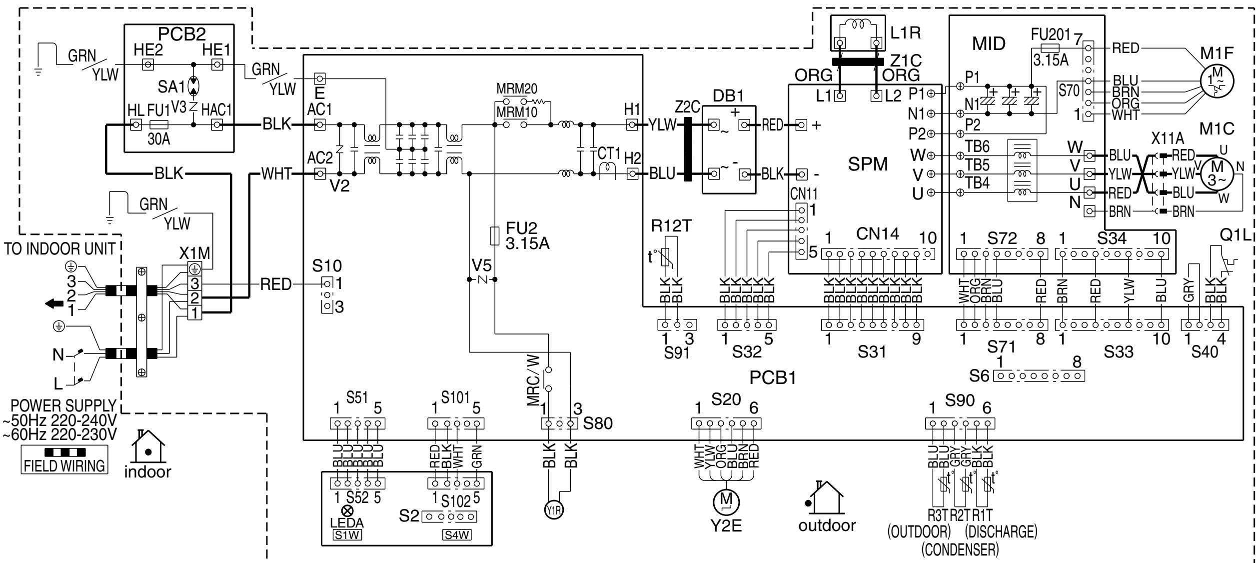
S2~S102 : CONNECTOR
LEDA : PILOT LAMP
PCB1,PCB2 : PRINTED CIRCUIT BOARD
L : LIVE
N : NEUTRAL
S1W : FORCED OPERATION ON/OFF SW (SW1)
S4W : LOCAL SETTING SW (SW4)
SA1 : SURGE ARRESTER
DB1 : DIODE BRIDGE
M1C : COMPRESSOR MOTOR
M1F : FAN MOTOR
L1R : REACTOR

Q1L : OVERLOAD PROTECTOR
CT1 : CURRENT TRANSFORMER
MID : MOLDED INTER CONNECT DEVICE
SPM : SYSTEM POWER MODULE

ASSIGNMENTS OF TERMINALS OF THE COMP.
U V N W

3D037866D

RXS 50/60 BVMA, RXS 50/60 BVMB



Z1C,Z2C : FERRITE CORE
X1M : TERMINAL STRIP
Y2E : ELECTRONIC EXPANSION VALVE
V2~V5 : VARISTOR
FU1, FU2, FU201 : FUSE
HE1,HE2,HAC1
E,AC1,AC2
H1, H2, HL
L1,L2,X11A : CONNECTOR
MRM10,MRM20
MRC/W : MAGNETIC RELAY
R1T~R3T : THERMISTOR

S2~S102 : CONNECTOR
LEDA : PILOT LAMP
PCB1,PCB2 : PRINTED CIRCUIT BOARD
L : LIVE
N : NEUTRAL
S1W : FORCED OPERATION ON/OFF SW (SW1)
S4W : LOCAL SETTING SW (SW4)
SA1 : SURGE ARRESTER
Y1R : REVERSING SOLENOID VALVE COIL
DB1 : DIODE BRIDGE
M1C : COMPRESSOR MOTOR
M1F : FAN MOTOR

L1R : REACTOR
Q1L : OVERLOAD PROTECTOR
CT1 : CURRENT TRANSFORMER
MID : MOLDED INTER CONNECT DEVICE
SPM : SYSTEM POWER MODULE

ASSIGNMENTS OF TERMINALS OF THE COMP.
U V N W

3D037854D

Index

Drawings & Flow Charts

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- For further improvement, specifications or designs are subject to change without prior notice.

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