SiE18-201

Service Manual

SUPER MULTi PLUS

J Series

[Applied Models]

●Super Multi Plus : Cooling Only

●Super Multi Plus : Heat Pump

Super Multi Plus
J Series

●Heat Pump
Indoor Unit

FTX25JAV1NB	FTXD50JV1B	CDX25HAV1NB	FLX25HV1NB	FHYB35FK7V1
FTX35JAV1NB	FTXD60JV1B	CDX35HAV1NB	FLX35HV1NB	FHYB45FK7V1
	FTXD71JV1B	CDX50HAV1NB	FLX50JV1B	FHYB60FK7V1
FTXD25KZV1B		CDX60HAV1NB	FLX60JV1B	FHYB71FK7V1
FTXD35KZV1B		CDX25JV1NB		
FVX25KZV1B		CDX35JV1NB		FHYC35B7V1
FVX35KZV1B		CDX50JV1NB		FHYC45B7V1
		CDX60JV1NB		FHYC60B7V1
				FHYC71B7V1

Outdoor Unit

RMX140JVMB RMX140JZVMB

BP Unit

BPMK928B42 BPMK928B43

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1. Introduction

1.1 Safety Cautions

Cautions and Warnings

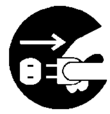
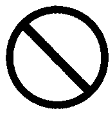
- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into " ⚠ **Warning**" and "⚠ **Caution**". The "⚠ **Warning**" items are especially important since they can lead to death or serious injury if they are not followed closely. The " ⚠ **Caution**"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

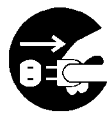
  △ This symbol indicates an item for which caution must be exercised.
  The pictogram shows the item to which attention must be paid.

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

  ● This symbol indicates an action that must be taken, or an instruction.
  The instruction is shown inside or near the symbol.
- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

1.1.1 Cautions in Repair

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

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

1.1.2 Cautions Regarding Products after Repair

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	

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

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

1.1.3 Inspection after Repair

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

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

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List of Function

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1. List of Function

1.1 Function List for Europe R-22

Division			Indoor Unit / Outdoor Unit	Inverter (with Inverter Power Control)	PAM control (Pulse Amplitude Modulation Control)	Horizontal Scroll, Oval Scroll Compressor (DAIKIN SCROLL)	Reluctance DC Motor	Dual Flaps	Power-Airflow Dual Flaps	Power-Airflow Diffuser	Wide-Angle Louvers	Vertical Auto-Swing (Up and Down)	Horizontal Auto-Swing (Right and Left)	3-D Airflow	Auto Fan Speed	Silent Operation Control (Automatic)	Intelligent Eye	Automatic Operation	Programme Dry Function	Fan Only	Inverter Powerful Operation	Home Leave Operation	Indoor Unit On/Off Switch	Air-Purifying Filter with Bacteriostatic, Virustatic & Deodorizing Functions	Mold-Proof Air Filter	Washable Grille	Filter Cleaning Indicator	Good-Sleep Cooling Operation	72-Hour On/Off Timer	24-Hour On/Off Timer	Night Set Mode	Auto-Restart (after Power Failure)	Self-Diagnosis Digital Display	Self-Diagnosis LED Display	Wiring-Error Check	Anticorrosion Treatment of Outdoor Heat Exchanger	Multi-Split/Split Type Compatible Indoor Unit	High-Ceiling Application	Chargeless	Wireless (FHYC: Option)	Wired (FHYC, FDYM: Option)	Group Control by 1 Remote Controller
Heat Pump	Outdoor Unit		RMX 140J	●	●	●	●	–	–	–	–	–	–	–	–	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	–	●	–	–	115 m	–	–	–
	Indoor Unit	Wall Mounted Type	FTX25/ 35JA	●	–	–	–	●	●	–	●	●	–	–	●	–	●	●	●	–	●	–	●	●	●	●	–	●	–	●	●	●	●	–	–	–	●	–	–	●	–	–
			FTXD 25/35KZ	●	–	–	–	–	●	–	●	●	–	–	●	–	●	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
			FTXD 50/60/ 71J	●	–	–	–	●	●	●	●	●	●	●	●	–	–	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Floor/ Ceiling Suspended Dual Type	FLX25/ 35H FLX50/ 60J	●	–	–	–	–	–	–	●	●	–	–	●	–	–	●	●	–	●	★1	●	●	●	–	● ★2	–	–	●	●	●	●	●	–	–	★1	–	–	●	–	–
		Floor Standing Type	FVX25/ 35KZ	●	–	–	–	–	–	–	●	●	–	–	●	–	–	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Ceiling Mounted Cassette Type	FHYC 35/50/ 60/71 B7	–	–	–	–	–	–	–	–	●	–	–	●	–	–	●	●	●	–	–	–	–	●	–	●	–	●	–	–	●	●	●	–	–	●	●	–	●	●	●
		Duct Connected Type	CDX 25/35/ 50/60 HA (J)	●	–	–	–	–	–	–	–	–	–	–	●	–	–	●	●	–	●	–	●	–	–	–	–	–	–	●	●	●	●	●	–	–	–	–	–	●	–	–
			FHYB 35/45/ 60/71 FK7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	●	–	–	–	–	–	–	●	–	●	–	–	●	●	●	–	–	●	–	–	–	●	●

★1 ● : for FLX50/60J
★2 – : for FLX50/60J

1.2 Function List for Singapore, Malaysia, Indonesia

Division			Indoor Unit / Outdoor Unit	Inverter (with Inverter Power Control)	PAM control (Pulse Amplitude Modulation Control)	Horizontal Scroll, Oval Scroll Compressor (DAIKIN SCROLL)	Reluctance DC Motor	Dual Flaps	Power-Airflow Dual Flaps	Power-Airflow Diffuser	Wide-Angle Louvers	Vertical Auto-Swing (Up and Down)	Horizontal Auto-Swing (Right and Left)	3-D Airflow	Auto Fan Speed	Silent Operation Control (Automatic)	Intelligent Eye	Automatic Operation	Programme Dry Function	Fan Only	Inverter Powerful Operation	Home Leave Operation	Indoor Unit On/Off Switch	Air-Purifying Filter with Bacteriostatic, Virustatic & Deodorizing Functions	Mold-Proof Air Filter	Washable Grille	Filter Cleaning Indicator	Good-Sleep Cooling Operation	72-Hour On/Off Timer	24-Hour On/Off Timer	Night Set Mode	Auto-Restart (after Power Failure)	Self-Diagnosis Digital Display	Self-Diagnosis LED Display	Wiring-Error Check	Anticorrosion Treatment of Outdoor Heat Exchanger	Multi-Split/Split Type Compatible Indoor Unit	High-Ceiling Application	Chargeless	Wireless (FHYC, FDYM: Option)	Wired (FHYC, FDYM: Option)	Group Control by 1 Remote Controller
Cooling Only	Outdoor Unit		RMK 140JA	●	●	●	●	–	–	–	–	–	–	–	–	●	–	–	–	–	●	–	–	–	–	–	–	–	–	–	–	–	●	●	–	●	–	–	–	–	–	–
	Indoor Unit	Wall Mounted Type	FTK25/ 35J	●	–	–	–	●	●	–	●	●	–	–	●	–	●	–	●	●	●	–	●	●	●	●	–	●	–	●	●	●	●	–	–	–	●	–	–	●	–	–
			FTKD 50/60/ 71J	●	–	–	–	●	●	●	●	●	●	●	●	–	–	–	●	●	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Floor/ Ceiling Suspended Dual Type	FLK25/ 35/50/ 60H	●	–	–	–	–	–	–	●	●	–	–	●	–	–	–	●	●	●	–	●	●	●	–	●	–	–	●	●	●	●	●	–	–	★1	–	–	●	–	–
		Ceiling Mounted Cassette Type	FHYC 35/50/ 60/71K	–	–	–	–	–	–	–	–	●	–	–	●	–	–	–	●	●	–	–	–	–	●	–	●	–	●	–	–	●	●	●	–	–	●	●	–	●	●	●
		Duct Connected Type	CDK25/ 35/50/ 60HA	●	–	–	–	–	–	–	–	–	–	–	●	–	–	–	●	●	●	–	●	–	–	–	–	–	–	●	●	●	●	●	–	–	–	–	–	●	–	–
			FDYM 60/03FA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	–	–	–	–	–	–	●	–	●	–	–	●	●	●	–	–	●	–	–	●	●	●

1.3 Function List for Australia

Division			Indoor Unit / Outdoor Unit	Inverter (with Inverter Power Control)	PAM control (Pulse Amplitude Modulation Control)	Horizontal Scroll, Oval Scroll Compressor (DAIKIN SCROLL)	Reluctance DC Motor	Dual Flaps	Power-Airflow Dual Flaps	Power-Airflow Diffuser	Wide-Angle Louvers	Vertical Auto-Swing (Up and Down)	Horizontal Auto-Swing (Right and Left)	3-D Airflow	Auto Fan Speed	Silent Operation Control (Automatic)	Intelligent Eye	Automatic Operation	Programme Dry Function	Fan Only	Inverter Powerful Operation	Home Leave Operation	Indoor Unit On/Off Switch	Air-Purifying Filter with Bacteriostatic, Virustatic & Deodorizing Functions	Mold-Proof Air Filter	Washable Grille	Filter Cleaning Indicator	Good-Sleep Cooling Operation	72-Hour On/Off Timer	24-Hour On/Off Timer	Night Set Mode	Auto-Restart (after Power Failure)	Self-Diagnosis Digital Display	Self-Diagnosis LED Display	Wiring-Error Check	Anticorrosion Treatment of Outdoor Heat Exchanger	Multi-Split/Split Type Compatible Indoor Unit	High-Ceiling Application	Chargeless	Wireless (FHYC, FDYM: Option)	Wired (FHYC, FDYM: Option)	Group Control by 1 Remote Controller
Cooling Only	Outdoor Unit		RMK 140J	●	●	●	●	–	–	–	–	–	–	–	–	●	–	–	–	–	●	–	–	–	–	–	–	–	–	–	–	–	●	●	–	●	–	–	115 m	–	–	–
	Indoor Unit	Wall Mounted Type	FTK25/35J	●	–	–	–	●	●	–	●	●	–	–	●	–	●	–	●	●	●	–	●	●	●	●	–	●	–	●	●	●	●	–	–	–	●	–	–	●	–	–
			FTKD 50/60/71J	●	–	–	–	●	●	●	●	●	●	●	●	–	–	–	●	●	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Floor/Ceiling Suspended Dual Type	FLK25/35H 50/60J	●	–	–	–	–	–	–	●	●	–	–	●	–	–	–	●	●	●	★1	●	●	●	–	● ★2	–	–	●	●	●	●	●	–	–	★1	–	–	●	–	–
		Ceiling Mounted Cassette Type	FHYC 35/50/60/71K	–	–	–	–	–	–	–	–	●	–	–	●	–	–	–	●	●	–	–	–	–	●	–	●	–	●	–	–	●	●	●	–	–	●	●	–	●	●	●
		Duct Connected Type	CDK25/35/50/60HA	●	–	–	–	–	–	–	–	–	–	–	●	–	–	–	●	●	●	–	●	–	–	–	–	–	–	●	●	●	●	●	–	–	–	–	–	●	–	–
			FDYM 60/03FA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	–	–	–	–	–	–	●	–	●	–	–	●	●	●	–	–	●	–	–	●	●	●
Heat Pump	Outdoor Unit		RMX 140J	●	●	●	●	–	–	–	–	–	–	–	–	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	–	●	–	–	115 m	–	–	–
	Indoor Unit	Wall Mounted Type	FTX25/35J	●	–	–	–	●	●	–	●	●	–	–	●	–	●	●	●	–	●	–	●	●	●	●	–	●	–	●	●	●	●	–	–	–	●	–	–	●	–	–
			FTXD 50/60/71J	●	–	–	–	●	●	●	●	●	●	●	●	–	–	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Floor/Ceiling Suspended Dual Type	FLX25/35H 50/60J	●	–	–	–	–	–	–	●	●	–	–	●	–	–	●	●	–	●	★1	●	●	●	–	● ★2	–	–	●	●	●	●	●	–	–	★1	–	–	●	–	–
		Ceiling Mounted Cassette Type	FHYC 35/50/60/71K	–	–	–	–	–	–	–	–	●	–	–	●	–	–	●	●	●	–	–	–	–	●	–	●	–	●	–	–	●	●	●	–	–	●	●	–	●	●	●
		Duct Connected Type	CDX25/35/50/60HA	●	–	–	–	–	–	–	–	–	–	–	●	–	–	●	●	–	●	–	●	–	–	–	–	–	–	●	●	●	●	●	–	–	–	–	–	●	–	–
			FDYM 60/03FA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	●	–	–	–	–	–	–	●	–	●	–	–	●	●	●	–	–	●	–	–	●	●	●

★1 ● : for FLK, FLX50/60J
★2 – : for FLK, FLX50/60J

1.4 Function List for Europe R-407C

Division			Indoor Unit / Outdoor Unit	Inverter (with Inverter Power Control)	PAM control (Pulse Amplitude Modulation Control)	Horizontal Scroll, Oval Scroll Compressor (DAIKIN SCROLL)	Reluctance DC Motor	Dual Flaps	Power-Airflow Dual Flaps	Power-Airflow Diffuser	Wide-Angle Louvers	Vertical Auto-Swing (Up and Down)	Horizontal Auto-Swing (Right and Left)	3-D Airflow	Auto Fan Speed	Silent Operation Control (Automatic)	Intelligent Eye	Automatic Operation	Programme Dry Function	Fan Only	Inverter Powerful Operation	Home Leave Operation	Indoor Unit On/Off Switch	Air-Purifying Filter with Bacteriostatic, Virustatic & Deodorizing Functions	Mold-Proof Air Filter	Washable Grille	Filter Cleaning Indicator	Good-Sleep Cooling Operation	72-Hour On/Off Timer	24-Hour On/Off Timer	Night Set Mode	Auto-Restart (after Power Failure)	Self-Diagnosis Digital Display	Self-Diagnosis LED Display	Wiring-Error Check	Anticorrosion Treatment of Outdoor Heat Exchanger	Multi-Split/Split Type Compatible Indoor Unit	High-Ceiling Application	Chargeless	Wireless (FHYC: Option)	Wired (FHYC, FDYM: Option)	Group Control by 1 Remote Controller
Heat Pump	Outdoor Unit		RMX 140JZ	●	●	●	●	–	–	–	–	–	–	–	–	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	–	●	–	–	115 m	–	–	–
	Indoor Unit	Wall Mounted Type	FTX25/ 35JA	●	–	–	–	●	●	–	●	●	–	–	●	–	●	●	●	–	●	–	●	●	●	●	–	●	–	●	●	●	●	–	–	–	●	–	–	●	–	–
			FTXD 25/35KZ	●	–	–	–	–	●	–	●	●	–	–	●	–	●	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
			FTXD 50/60/ 71J	●	–	–	–	●	●	●	●	●	●	●	●	–	–	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Floor/ Ceiling Suspended Dual Type	FLX25/ 35H FLX50/ 60J	●	–	–	–	–	–	–	●	●	–	–	●	–	–	●	●	–	●	★1	●	●	●	–	● ★2	–	–	●	●	●	●	●	–	–	★1	–	–	●	–	–
		Floor Standing Type	FVX25/ 35KZ	●	–	–	–	–	–	–	●	●	–	–	●	–	–	●	●	–	●	●	●	●	●	●	–	–	–	●	●	●	●	●	–	–	●	–	–	●	–	–
		Ceiling Mounted Cassette Type	FHYC 35/50/ 60/71 B7	–	–	–	–	–	–	–	–	●	–	–	●	–	–	●	●	●	–	–	–	–	●	–	●	–	●	–	–	●	●	●	–	–	●	●	–	●	●	●
		Duct Connected Type	CDX 25/35/ 50/60 HA	●	–	–	–	–	–	–	–	–	–	–	●	–	–	●	●	–	●	–	●	–	–	–	–	–	–	●	●	●	●	●	–	–	–	–	–	●	–	–
			FHYB 35/45/ 60/71 FK7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	●	●	–	–	–	–	–	–	●	–	●	–	–	●	●	●	–	–	●	–	–	–	●	●

★1 ● : for FLX50/60J
★2 – : for FLX50/60J

Part 2
Specifications

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1. Specifications

1.1 Outdoor Units

1.1.1 Cooling Only

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

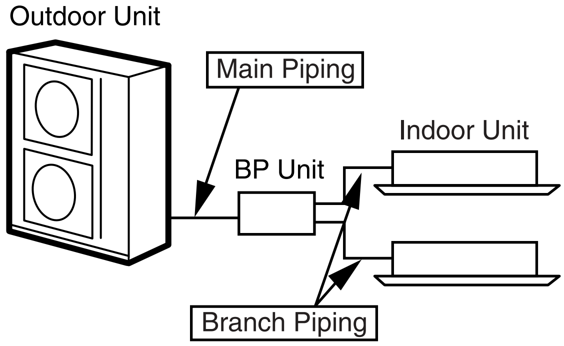
Model			RMK140JVMC9 (8)
Cooling Capacity (19.0˚CWB)		kW	14.5
		kcal/h	12,470
Power Consumption ★		W	5,000
Running Current ★		A	23.2
Casing Color			Ivory White
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)
	Model		JT100FBVD
	Motor Output	W	3,300
Refrigerant Oil	Model		SUNISO 4GSD.I.
	Charge	kg	1.5
Refrigerant	Type		R22
	Charge	kg	9.9
Air Flow Rate	m^3/min	H	114
		L	104
	cfm	H	4,024
		L	3,671
Fan	Type		Propeller
	Motor Output	W	(Upper Side) H : 53 L : 38 (Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45 (Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8 (Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100
Starting Current		A	29.0
Dimensions (H×W×D)		mm	1,345×880×320
Package Dimensions		mm	918×394×1,397
Weight		kg	134
Gross Weight		kg	143
Operation Sound		dBA	53
Piping Connection	Liquid	mm	φ 9.5 (Flare Connection)
	Gas	mm	φ19.1 (Flare Connection)
	Drain	mm	φ18
Heat Insulation			Both Liquid and Gas Pipes
No. of Wiring Connection			3 for Power Supply, 4 for Interunit Wiring (Including Earth Wiring)
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch Piping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)
Amount of Additional Charge		g/m	Chargeless
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Between Indoor or BP Units)
Drawing No.			3D030948A

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shown in the table below.

Cooling	Piping Length
Indoor ; 27˚CDB / 19.0˚CWB Outdoor ; 35˚CDB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3



(Q0143)

60Hz 220V

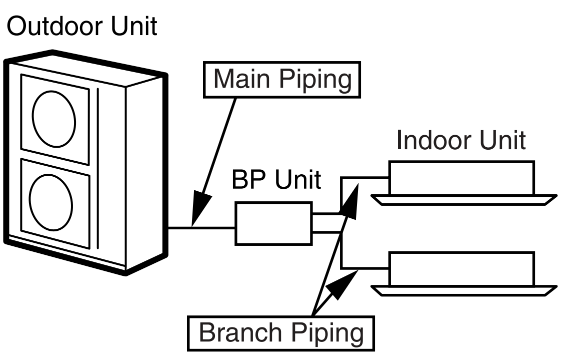
Model			RMK140JVMT9	
Cooling Capacity (19.5˚CWB)		kW	14.5	
		kcal/h	12,500	
Power Consumption ★		W	4,950	
Running Current ★		A	23.0	
Casing Color			Ivory White	
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)	
	Model		JT100FBVD	
	Motor Output	W	3,300	
Refrigerant Oil	Model		SUNISO 4GSD.I.	
	Charge	kg	1.5	
Refrigerant	Type		R22	
	Charge	kg	9.9	
Air Flow Rate	m³/min	H	114	
		L	104	
	cfm	H	4,024	
		L	3,671	
Fan	Type		Propeller	
	Motor Output	W	(Upper Side) H : 53 L : 38	(Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45	(Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8	(Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100	
Starting Current		A	29.0	
Dimensions (H×W×D)		mm	1,345×880×320	
Package Dimensions		mm	918×394×1,397	
Weight		kg	134	
Gross Weight		kg	143	
Operation Sound		dBA	53	
Piping Connection	Liquid	mm	φ 9.5 (Flare Connection)	
	Gas	mm	φ19.1 (Flare Connection)	
	Drain	mm	φ18	
Heat Insulation			Both Liquid and Gas Pipes	
No. of Wiring Connection			3 for Power Supply, 4 for Interunit Wiring (Including Earth Wiring)	
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch Piping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)	
Amount of Additional Charge		g/m	Chargeless	
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Between Indoor or BP Units)	
Drawing No.			3D030949A	

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shown in the table below.

Cooling	Piping Length
Indoor ; 27˚CDB / 19.5˚CWB Outdoor ; 35˚CDB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

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



(Q0143)

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

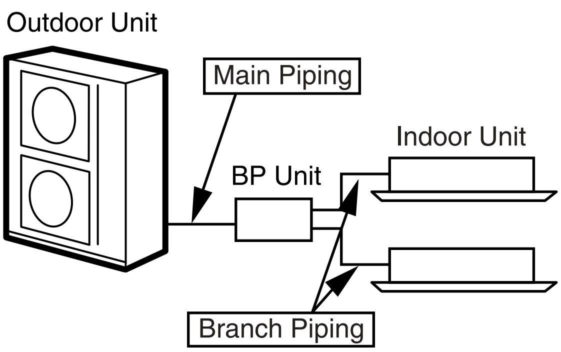
Model			RMK140JAVM
Cooling Capacity (19.0˚CWB)		kW	14.5
		kcal/h	12,470
Power Consumption ★		W	4,650
Running Current ★		A	20.4
Casing Color			Ivory White
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)
	Model		JT100FBVD
	Motor Output	W	3,300
Refrigerant Oil	Model		SUNISO 4GSD.I.
	Charge	kg	1.5
Refrigerant	Type		R22
	Charge	kg	4.5
Air Flow Rate	m³/min	H	114
		L	104
	cfm	H	4,024
		L	3,671
Fan	Type		Propeller
	Motor Output	W	(Upper Side) H : 53 L : 38 (Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45 (Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8 (Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100
Starting Current		A	29.0
Dimensions (H×W×D)		mm	1,345×880×320
Package Dimensions (W×D×H)		mm	918×394×1,397
Weight		kg	111
Gross Weight		kg	120
Operation Sound		dBA	50
Piping Connection	Liquid	mm	φ9.5 (Flare Connection)
	Gas	mm	φ19.1 (Flare Connection)
	Drain	mm	φ18
Heat Insulation			Both Liquid and Gas Pipes
No. of Wiring Connection			3 For Power Supply, 4 For Interunit Wiring
Max. Interunit Piping Length		m	110 (Total Main Piping and Branch PIping) 30 (Total Main Piping), 60 (Total Branch Piping) 20 (Max. Length for Each Room)
Amount of Additional Charge		g/m	Additional refrigerant to be charge : R (kg) R= (Total length of the liquid pipe-line of φ9.5) ×0.05 + (Total length of the liquid pipe-line of φ6.4) × 0.025 ∗If the value of "R" is less than 0.5, additional charging of refrigerant is unnecessary.
Max. Installation Height Difference		m	15 (Between Indoor or BP Unit and Outdoor Unit), 10 (Both between Indoor Units and BP Units)
Drawing No.			3D033202

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shows in the table below.

Cooling	Piping Length
Indoor ; 27˚CDB / 19.0˚CWB Outdoor ; 35˚CDB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

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



(Q0143)

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

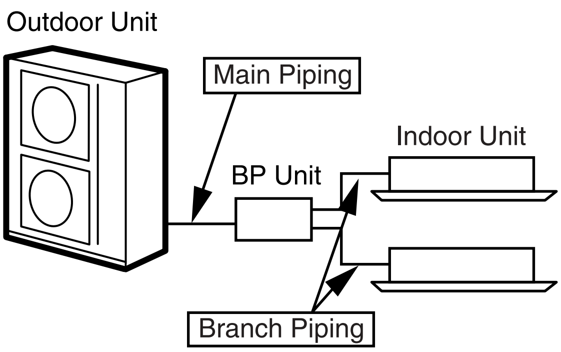
Model			RMK140JZVMA
Cooling Capacity (19.0˚CWB)		kW	14.5
		kcal/h	12,470
Power Consumption ★		W	5,000
Running Current ★		A	23.2-22.2-21.3
Casing Color			Ivory White
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)
	Model		JT100FAVD
	Motor Output	W	3,300
Refrigerant Oil	Model		DAPHNE FVC68D
	Charge	kg	1.5
Refrigerant	Type		R407C
	Charge	kg	9.9
Air Flow Rate	m³/min	H	114
		L	104
	cfm	H	4,024
		L	3,671
Fan	Type		Propeller
	Motor Output	W	(Upper Side) H : 53 L : 38 (Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45 (Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8 (Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100
Starting Current		A	29.0
Dimensions (H×W×D)		mm	1,345×880×320
Package Dimensions (W×D×H)		mm	918×394×1,397
Weight		kg	134
Gross Weight		kg	143
Operation Sound		dBA	53
Piping Connection	Liquid	mm	φ9.5 (Flare Connection)
	Gas	mm	φ19.1 (Flare Connection)
	Drain	mm	φ18
Heat Insulation			Both Liquid and Gas Pipes
No. of Wiring Connection			3 For Power Supply, 4 For Interunit Wiring (Included Earth Wiring)
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch PIping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)
Amount of Additional Charge		g/m	Chargeless
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Both between Indoor Units and BP Units)
Drawing No.			3D031579

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shows in the table below.

Cooling	Piping Length
Indoor ; 27˚CDB / 19.0˚CWB Outdoor ; 35˚CDB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

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



(Q0143)

1.1.2 Heat Pump

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

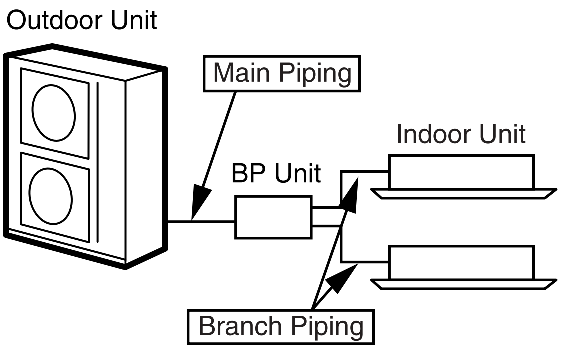
Model			RMX140JVMC9 (8)	
			Cooling	Heating
Cooling Capacity (19.0˚CWB)		kW	14.5	16.5
		kcal/h	12,470	14,190
Power Consumption ★		W	5,000	5,780
Running Current ★		A	23.2	26.8
Casing Color			Ivory White	
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)	
	Model		JT100FBVD	
	Motor Output	W	3,300	
Refrigerant Oil	Model		SUNISO 4GSD.I.	
	Charge	L	1.5	
Refrigerant	Type		R22	
	Charge	kg	9.9	
Air Flow Rate	m^3/min	H	114	
		L	104	
	cfm	H	4,024	
		L	3,671	
Fan	Type		Propeller	
	Motor Output	W	(Upper Side) H : 53 L : 38	(Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45	(Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8	(Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100	
Starting Current		A	29.0	
Dimensions (H×W×D)		mm	1,345×880×320	
Package Dimensions		mm	918×394×1,397	
Weight		kg	136	
Gross Weight		kg	145	
Operation Sound		dBA	53	
Piping Connection	Liquid	mm	ϕ 9.5 (Flare Connection)	
	Gas	mm	ϕ19.1 (Flare Connection)	
	Drain	mm	ϕ18	
Heat Insulation			Both Liquid and Gas Pipes	
No. of Wiring Connection			3 for Power Supply, 4 for Interunit Wiring (Including Earth Wiring)	
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch Piping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)	
Amount of Additional Charge		g/m	Chargeless	
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Between Indoor or BP Units)	
Drawing No.			3D030946A	

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shown in the table below.

Cooling	Heating	Piping Length
Indoor ; 27˚CDB / 19.0˚CWB Outdoor ; 35˚CDB	Indoor ; 21˚CDB Outdoor ; 7˚CDB / 6˚CWB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3



(Q0143)

60Hz 220-230V

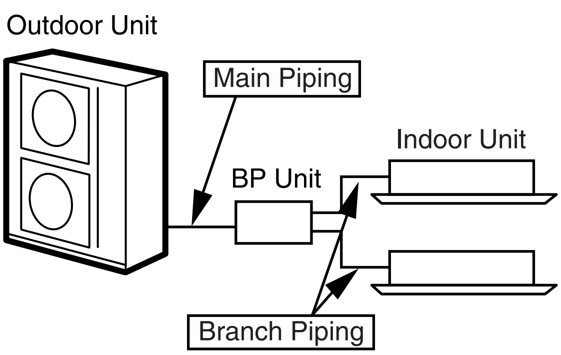
Model			RMX140JVMT9	
			Cooling	Heating
Cooling Capacity (19.5˚CWB)		kW	14.5	16.5
		kcal/h	12,500	14,200
Power Consumption ★		W	4,950	5,870
Running Current ★		A	23.0	27.2
Casing Color			Ivory White	
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)	
	Model		JT100FBVD	
	Motor Output	W	3,300	
Refrigerant Oil	Model		SUNISO 4GSD.I.	
	Charge	L	1.5	
Refrigerant	Type		R22	
	Charge	kg	9.9	
Air Flow Rate	m^3/min	H	114	
		L	104	
	cfm	H	4,024	
		L	3,671	
Fan	Type		Propeller	
	Motor Output	W	(Upper Side) H : 53 L : 38	(Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45	(Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8	(Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100	
Starting Current		A	29.0	
Dimensions (H×W×D)		mm	1,345×880×320	
Package Dimensions		mm	918×394×1,397	
Weight		kg	136	
Gross Weight		kg	145	
Operation Sound		dBA	53	
Piping Connection	Liquid	mm	φ9.5 (Flare Connection)	
	Gas	mm	φ19.1 (Flare Connection)	
	Drain	mm	φ18	
Heat Insulation			Both Liquid and Gas Pipes	
No. of Wiring Connection			3 for Power Supply, 4 for Interunit Wiring (Including Earth Wiring)	
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch Piping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)	
Amount of Additional Charge		g/m	Chargeless	
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Between Indoor or BP Units)	
Drawing No.			3D030947A	

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shown in the table below.

Cooling	Heating	Piping Length
Indoor ; 27˚CDB / 19.5˚CWB Outdoor ; 35˚CDB	Indoor ; 21˚CDB Outdoor ; 7˚CDB / 6˚CWB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3



(Q0143)

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

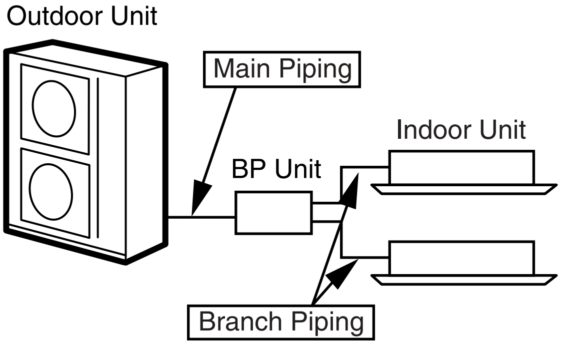
Model			RMX140JVMB	
			Cooling	Heating
Cooling Capacity (19.0˚CWB)		kW	14.5	16.5
		kcal/h	12,470	14,190
Power Consumption ★		W	5,000	5,780
Running Current ★		A	23.2	26.8
Casing Color			Ivory White	
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)	
	Model		JT100FBVD	
	Motor Output	W	3,300	
Refrigerant Oil	Model		SUNISO 4GSD.I.	
	Charge	L	1.5	
Refrigerant	Type		R22	
	Charge	kg	9.9	
Air Flow Rate	m^3/min	H	114	
		L	104	
	cfm	H	4,024	
		L	3,671	
Fan	Type		Propeller	
	Motor Output	W	(Upper Side) H : 53 L : 38	(Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45	(Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8	(Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100	
Starting Current		A	29.0	
Dimensions (H×W×D)		mm	1,345×880×320	
Package Dimensions (W×D×H)		mm	918×394×1,397	
Weight		kg	136	
Gross Weight		kg	145	
Operation Sound		dBA	53	
Piping Connection	Liquid	mm	φ9.5 (Flare Connection)	
	Gas	mm	φ19.1 (Flare Connection)	
	Drain	mm	φ18	
Heat Insulation			Both Liquid and Gas Pipes	
No. of Wiring Connection			3 For Power Supply, 4 For Interunit Wiring (Included Earth Wiring)	
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch PIping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)	
Amount of Additional Charge		g/m	Chargeless	
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Both between Indoor Units and BP Units)	
Drawing No.			3D030950A	

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shown in the table below.

Cooling	Heating	Piping Length
Indoor ; 27˚CDB / 19.0˚CWB Outdoor ; 35˚CDB	Indoor ; 20˚CDB Outdoor ; 7˚CDB / 6˚CWB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3



(Q0143)

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

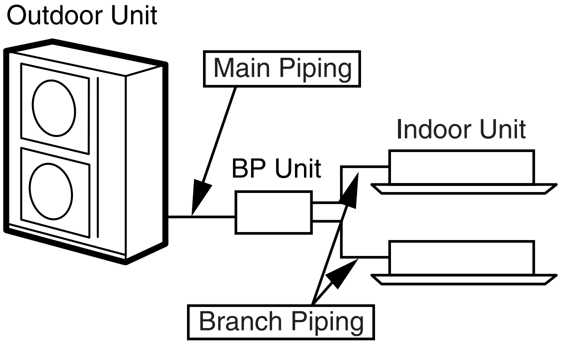
Model			RMX140JZVMB	
			Cooling	Heating
Cooling Capacity (19.0˚CWB)		kW	14.5	16.5
		kcal/h	12,470	14,190
Power Consumption ★		W	5,000	6,050
Running Current ★		A	23.2-22.2-21.3	28.1-26.8-25.7
Casing Color			Ivory White	
Compressor	Type		Hermetically Sealed Scroll Type (Oval Discharge)	
	Model		JT100FAVD	
	Motor Output	W	3,300	
Refrigerant Oil	Model		DAPHNE FVC68D	
	Charge	L	1.5	
Refrigerant	Type		R407C	
	Charge	kg	9.9	
Air Flow Rate	m^3/min	H	114	
		L	104	
	cfm	H	4,024	
		L	3,671	
Fan	Type		Propeller	
	Motor Output	W	(Upper Side) H : 53 L : 38	(Lower Side) H : 41 L : 30
	Running Current	A	(Upper Side) H : 0.50 L : 0.45	(Lower Side) H : 0.47 L : 0.42
	Power Consumption	W	(Upper Side) H : 93.1 L : 78.8	(Lower Side) H : 81.3 L : 68.8
	Power Factor	%	100	
Starting Current		A	29.0	
Dimensions (H×W×D)		mm	1,345×880×320	
Package Dimensions (W×D×H)		mm	918×394×1,397	
Weight		kg	136	
Gross Weight		kg	145	
Operation Sound		dBA	53	
Piping Connection	Liquid	mm	φ9.5 (Flare Connection)	
	Gas	mm	φ19.1 (Flare Connection)	
	Drain	mm	φ18	
Heat Insulation			Both Liquid and Gas Pipes	
No. of Wiring Connection			3 For Power Supply, 4 For Interunit Wiring (Included Earth Wiring)	
Max. Interunit Piping Length		m	115 (Total Main Piping and Branch Piping) 55 (Total Main Piping), 60 (Total Branch Piping) 15 (Max. Length for Each Room)	
Amount of Additional Charge		g/m	Chargeless	
Max. Installation Height Difference		m	30 (Between Indoor or BP Unit and Outdoor Unit), 15 (Both between Indoor Units and BP Units)	
Drawing No.			3D031578	

Notes:

1. ★ Refer to Engineering Data Book.
2. The data are based on the conditions shows in the table below.

Cooling	Heating	Piping Length
Indoor ; 27˚CDB / 19.0˚CWB Outdoor ; 35˚CDB	Indoor ; 21˚CDB Outdoor ; 7˚CDB / 6˚CWB	Main Piping : 5m Branch Piping : 3m (each indoor unit / 71 Class+60 Class)

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3



(Q0143)

1.2 BP Units

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

Model			BPMK928B42			BPMK928B43
Connectable Indoor Units			1~2 Units			1~3 Units
Capacity	Cooling	kW	—			—
	Heating	kW	—			—
Casing Color			Paintingless			
Power Consumption		W	10			10
Running Current		A	0.05			0.05
Refrigerant	Type		—			
	Charge	kg	—			
Dimensions	(H×W×D)	mm	223×400×272			
Package Dimensions		mm	651×342×281			
Machine Weight		kg	7			8
Gross Weight		kg	10			11
Number of Wiring Connections			4 for Interunit Wiring			
Piping Connection (Brazing)	Liquid	mm	Main : ϕ9.5×1/ Branch : ϕ6.4×2			Main : ϕ9.5×1/ Branch : ϕ6.4×3
	Gas	mm	Main : ϕ19.1×1 / Branch : ϕ15.9×2			Main : ϕ19.1×1 / Branch : ϕ15.9×3
	Drain	mm	Drain Processingless			
Heat Insulation			Both Liquid and Gas Pipes			
Max. Piping Length		m	—			
Amount of Additional Charge		g/m	—			
Max. Height Difference		m	—			
Max. Combination		kW	18.9			18.9
Min. Combination		kW	2.5			2.5
Accessories	Installation Manual	pc.	1			
	L Shape Reducer	pc.	For Main (Gas)		1	
			For Branch	Gas	3 (ϕ15.9 / ϕ12.7 / ϕ9.5)	
				Liquid	1 (ϕ9.5)	

Note:

1. BP or Indoor Unit Max. Height - BP or Indoor Unit Min. Height → Max. 15m.
   Set up BP and IU in 15m.
2. The piping connection must be cut so as to suit the piping sizes of the indoor unit which will be connected.
   The same sizes should be used for the piping on the outdoor unit.

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

1.3 Indoor Units (for Europe)

1.3.1 Heat Pump

■ Wall Mounted Type

■ 2.5kW Class · 3.5kW Class

50Hz 230V

Model			FTX25JAV1NB		FTX35JAV1NB	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	2.5	3.4	3.5	4.2
Front Panel Color			Almond White			
Air Flow Rates	m³/min	H	7.1	8.4	7.4	8.4
		M	5.9	7.0	6.0	7.1
		L	4.6	5.7	4.7	5.9
	cfm	H	251	297	261	297
		M	208	247	212	251
		L	162	201	166	208
Fan	Type		Cross Flow Fan			
	Motor Output	W	18			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.18			
Power Consumption ★ (Rated)		W	40			
Power Factor ★		%	96.6			
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	273×784×185			
Package Dimensions (W×D×H)		mm	834×325×258			
Weight		kg	7.5			
Gross Weight		kg	11			
Operation Sound	dBA	H	38	38	39	39
		M	32	32	33	33
		L	26	26	27	27
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	φ 6.4			
	Gas	mm	φ 9.5		φ12.7	
	Drain	mm	φ18.0			
Drawing No.			3D027497B		3D027498B	

50Hz 230V

Model			FTXD25KZV1B		FTXD35KZV1B	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	2.5	3.4	3.5	4.2
Front Panel Color			Almond White			
Air Flow Rates	m³/min	H	7.5	8.0	7.9	8.0
		M	5.8	6.4	6.1	6.5
		L	4.0	4.8	4.3	5.0
	cfm	H	265	282	279	282
		M	203	226	215	229
		L	141	169	152	177
Fan	Type		Cross Flow Fan			
	Motor Output	W	18			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.18			
Power Consumption ★ (Rated)		W	40			
Power Factor ★		%	96.6			
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	273×784×185			
Package Dimensions (W×D×H)		mm	834×325×258			
Weight		kg	8			
Gross Weight		kg	11			
Operation Sound	dBA	H	38	38	39	39
		M	32	32	33	33
		L	25	25	26	26
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	φ 6.4			
	Gas	mm	φ 9.5		φ12.7	
	Drain	mm	φ18.0			
Drawing No.			3D029436		3D029437	

★ Refer to Engineering Data Book.

■ 5.0kW Class · 6.0kW Class

50Hz 230V

Model			FTXD50JV1B		FTXD60JV1B	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	5.0	6.5	6.0	7.2
Front Panel Color			Almond White			
Air Flow Rates	m³/min	H	12.3	14.9	13.0	16.5
		M	10.7	12.8	11.5	13.7
		L	9.1	10.5	9.9	11.1
	cfm	H	434	526	459	582
		M	378	452	406	484
		L	321	371	349	392
Fan	Type		Cross Flow Fan			
	Motor Output	W	54			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.18	0.17	0.20	0.20
Power Consumption ★ (Rated)		W	40	38	45	45
Power Factor ★		%	96.6	97.2	97.8	97.8
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	298×1,050×190			
Package Dimensions (W×D×H)		mm	1,183×367×289			
Weight		kg	12			
Gross Weight		kg	16			
Operation Sound	dBA	H	44	42	45	44
		M	40	37	41	39
		L	35	32	37	34
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4			
	Gas	mm	ϕ12.7		ϕ15.9	
	Drain	mm	ϕ18.0			
Drawing No.			3D029183		3D029184	

■ 7.1kW Class

50Hz 230V

Model			FTXD71JV1B	
			Cooling	Heating
Rating Capacity		kW	7.1	8.5
Front Panel Color			Almond White	
Air Flow Rates	m³/min	H	13.7	17.3
		M	11.8	14.1
		L	9.9	11.1
	cfm	H	484	611
		M	417	498
		L	349	392
Fan	Type		Cross Flow Fan	
	Motor Output	W	54	
	Speed	Steps	5 Steps and Auto	
Air Filter			Removable / Washable / Mildew Proof	
Running Current ★ (Rated)		A	0.22	0.22
Power Consumption ★ (Rated)		W	50	50
Power Factor ★		%	98.8	98.8
Temperature Control			Microcomputer Control	
Dimensions (H×W×D)		mm	298×1,050×190	
Package Dimensions (W×D×H)		mm	1,183×367×289	
Weight		kg	12	
Gross Weight		kg	16	
Operation Sound	dBA	H	46	46
		M	42	40
		L	37	34
Heat Insulation			Both Liquid and Gas Pipes	
Piping Connection	Liquid	mm	ϕ 9.5	
	Gas	mm	ϕ15.9	
	Drain	mm	ϕ18.0	
Drawing No.			3D029185	

★ Refer to Engineering Data Book.

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

■ Duct Connected Type

■ 2.5kW Class · 3.5kW Class

50Hz 230V

Model			CDX25HAV1NB		CDX35HAV1NB	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	2.5	3.86	3.5	4.42
Front Panel Color			—			
Air Flow Rates	m³/min	H	13.0			
		M	12.0			
		L	11.0			
	cfm	H	459			
		M	424			
		L	388			
Fan	Type		Sirocco Fan			
	Motor Output	W	47			
	Speed	Steps	5 Steps and Auto			
Air Filter			—			
Running Current ★ (Rated)		A	0.40			
Power Consumption ★ (Rated)		W	85			
Power Factor ★		%	92.4			
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	260×900×580			
Package Dimensions (W×D×H)		mm	1,070×719×354			
Weight		kg	23			
Gross Weight		kg	32			
Operation Sound	dBA	H	39	40	39	40
		M	37	38	37	38
		L	36	36	36	36
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4			
	Gas	mm	ϕ 9.5			
	Drain	mm	ϕ 27.2(3/4B)			
Drawing No.			3D024989		3D024990	

■ 5.0kW Class · 6.0kW Class

50Hz 230V

Model			CDX50HAV1NB		CDX60HAV1NB	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	5.0	6.13	6.0	7.32
Front Panel Color			—			
Air Flow Rates	m³/min	H	13.0		14.5	
		M	12.0		13.0	
		L	11.0		11.5	
	cfm	H	459		512	
		M	424		459	
		L	388		406	
Fan	Type		Sirocco Fan			
	Motor Output	W	47			
	Speed	Steps	5 Steps and Auto			
Air Filter			—			
Running Current ★ (Rated)		A	0.40		0.45	
Power Consumption ★ (Rated)		W	85		95	
Power Factor ★		%	92.4		91.8	
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	260×900×580			
Package Dimensions (W×D×H)		mm	1,070×719×354			
Weight		kg	24			
Gross Weight		kg	33			
Operation Sound	dBA	H	42	42	44	44
		M	40	40	42	42
		L	39	38	41	40
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4			
	Gas	mm	ϕ12.7		ϕ15.9	
	Drain	mm	ϕ 27.2(3/4B)			
Drawing No.			3D024987		3D024988	

★ Refer to Engineering Data Book.

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

■ 2.5kW Class · 3.5kW Class

50Hz 230V

Model			CDX25JV1NB		CDX35JV1NB	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	2.5	3.86	3.5	4.42
Front Panel Color			—			
Air Flow Rates	m³/min	H	13.0			
		M	12.0			
		L	11.0			
	cfm	H	459			
		M	424			
		L	388			
Fan	Type		Sirocco Fan			
	Motor Output	W	47			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.40			
Power Consumption ★ (Rated)		W	85			
Power Factor ★		%	92.4			
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	260×900×580			
Package Dimensions (W×D×H)		mm	1,070×719×354			
Weight		kg	23			
Gross Weight		kg	32			
Operation Sound	dBA	H	39	40	39	40
		M	37	38	37	38
		L	36	36	36	36
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4			
	Gas	mm	ϕ 9.5			
	Drain	mm	ϕ 27.2(3/4B)			
Drawing No.			3D024989		3D024990	

■ 5.0kW Class · 6.0kW Class

50Hz 230V

Model			CDX50JV1NB		CDX60JV1NB	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	5.0	6.13	6.0	7.32
Front Panel Color			—			
Air Flow Rates	m³/min	H	13.0		14.5	
		M	12.0		13.0	
		L	11.0		11.5	
	cfm	H	459		512	
		M	424		459	
		L	388		406	
Fan	Type		Sirocco Fan			
	Motor Output	W	47			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.40		0.45	
Power Consumption ★ (Rated)		W	85		95	
Power Factor ★		%	92.4		91.8	
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	260×900×580			
Package Dimensions (W×D×H)		mm	1,070×719×354			
Weight		kg	24			
Gross Weight		kg	33			
Operation Sound	dBA	H	42	42	44	44
		M	40	40	42	42
		L	39	38	41	40
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4			
	Gas	mm	ϕ12.7		ϕ15.9	
	Drain	mm	ϕ 27.2(3/4B)			
Drawing No.			3D024987		3D024988	

★ Refer to Engineering Data Book.

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

■ Floor / Ceiling Suspended Dual Type

■ 2.5kW Class · 3.5kW Class

50Hz 230V

Model			FLX25HV1NB		FLX35HV1NB	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	2.5	3.86	3.5	4.42
Front Panel Color			Almond White			
Air Flow Rates	m³/min	H	7.6	9.2	8.7	10.0
		M	6.8	8.3	7.7	9.0
		L	6.0	7.4	6.6	8.0
	cfm	H	268	325	307	353
		M	240	293	270	318
		L	212	261	233	282
Fan	Type		Sirocco Fan			
	Motor Output	W	34			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.32	0.34	0.36	
Power Consumption ★ (Rated)		W	70	74	78	78
Power Factor ★		%	95.1	94.6	94.2	94.2
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	490×1,050×200			
Package Dimensions (W×D×H)		mm	1,100×566×284			
Weight		kg	16			
Gross Weight		kg	22			
Operation Sound	dBA	H	37	37	38	39
		M	34	34	35	36
		L	31	31	32	33
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4		ϕ 6.4	
	Gas	mm	ϕ 9.5		ϕ12.7	
	Drain	mm	ϕ18.0		ϕ18.0	

■ 5.0kW Class · 6.0kW Class

50Hz 230V

Model			FLX50JV1B		FLX60JV1B	
			Cooling	Heating	Cooling	Heating
Rating Capacity		kW	5.0	6.1	5.7	6.7
Front Panel Color			Almond White			
Air Flow Rates	m³/min	H	11.4	12.1	12.0	12.8
		M	9.9	9.8	10.6	10.6
		L	8.5	7.5	9.3	8.4
	cfm	H	402	427	424	452
		M	349	346	374	374
		L	300	265	328	297
Fan	Type		Sirocco Fan			
	Motor Output	W	34			
	Speed	Steps	5 Steps and Auto			
Air Filter			Removable / Washable / Mildew Proof			
Running Current ★ (Rated)		A	0.43	0.42	0.45	0.43
Power Consumption ★ (Rated)		W	96	96	98	96
Power Factor ★		%	97.1	99.4	94.7	97.1
Temperature Control			Microcomputer Control			
Dimensions (H×W×D)		mm	490×1,050×200			
Package Dimensions (W×D×H)		mm	1,100×566×284			
Weight		kg	17			
Gross Weight		kg	24			
Operation Sound	dBA	H	47	46	48	47
		M	43	41	45	42
		L	39	35	41	37
Heat Insulation			Both Liquid and Gas Pipes			
Piping Connection	Liquid	mm	ϕ 6.4		ϕ 6.4	
	Gas	mm	ϕ12.7		ϕ15.9	
	Drain	mm	ϕ18.0		ϕ18.0	
Drawing No.			3D029186		3D029187	

★ Refer to Engineering Data Book.

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

■ Floor Standing Type

■ 2.5kW Class · 3.5kW Class

50Hz 230V

Model				FVX25KZV1B		FVX35KZV1B	
				Cooling	Heating	Cooling	Heating
Rating Capacity			kW	2.5	3.4	3.5	4.2
Front Panel Color				Almond White			
Air Flow Rates	m^3/min		H	8.1	9.2	8.3	9.2
			M	6.2	7.0	6.3	7.1
			L	4.3	4.8	4.3	5.0
	cfm		H	286	325	293	325
			M	219	247	222	251
			L	152	169	152	177
Fan	Type			Cross Flow Fan			
	Motor Output		W	14			
	Speed		Steps	5 Steps and Auto			
Air Filter				Removable / Washable / Mildew Proof			
Running Current ★ (Rated)			A	0.14		0.15	
Power Consumption ★ (Rated)			W	32		34	
Power Factor ★			%	99.4		98.6	
Temperature Control				Microcomputer Control			
Dimensions (H×W×D)			mm	600×650×195			
Package Dimensions (W×D×H)			mm	764×288×702			
Weight			kg	13			
Gross Weight			kg	18			
Operation Sound		dBA	H	38	38	39	39
			M	32	32	33	33
			L	26	26	26	26
Heat Insulation				Both Liquid and Gas Pipes			
Piping Connection	Liquid		mm	ϕ 6.4			
	Gas		mm	ϕ 9.5		ϕ12.7	
	Drain		mm	ϕ 20.0			
Drawing No.				3D029440		3D029441	

★ Refer to Engineering Data Book.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3

Part 3
Printed Circuit Board Connector Wiring Diagram and Name

1. Printed Circuit Board Connector Wiring Diagram and Name 24
   1.1 Branch Provider Unit BPMK928B42, B43 24
   1.2 Outdoor Unit RMX140JVMB, RMX140JZVM 25
   1.3 FTX25 / 35J Series, FTXD25 / 35K Series, FVX25 / 35K Series 28
   1.4 FTXD50~71JV Series.. 30
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   1.6 FLX25~60HV Series, FLX50 / 60JV Series... 34

1. Printed Circuit Board Connector Wiring Diagram and Name

1.1 Branch Provider Unit BPMK928B42, B43

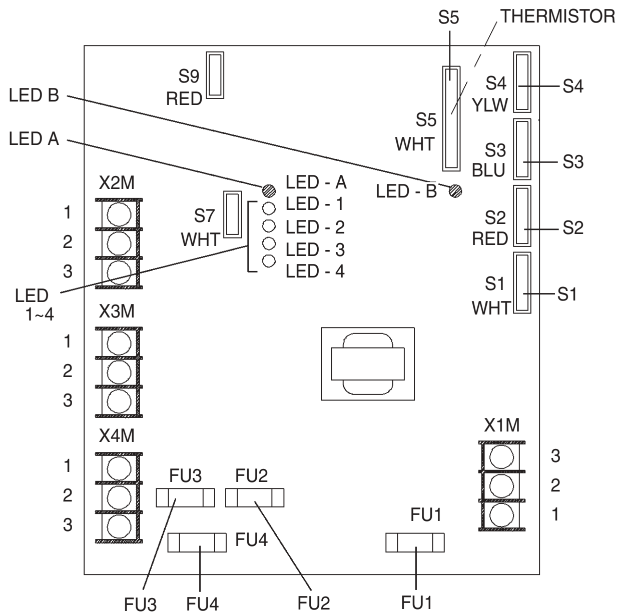
Name of Connector

1) S1 Connector for Bypass Electronic Expansion Valve
2) S2 to S4 Connector for Electronic Expansion Valve to Room A, B and C
3) S5 Connector for Thermistors

Other Designations

1) FU1 Fuse for Transformer
2) FU2 Fuse for Inter Connecting Wire to Room 1
3) FU3 Fuse for Inter Connecting Wire to Room 2
4) FU4 Fuse for Inter Connecting Wire to Room 3
5) LED-A LED for Service Monitor
6) LED-B LED for Service Monitor
7) LED 1 to 4 LED for Fault Indication

Printed Circuit Board



1.2 Outdoor Unit RMX140JVMB, RMX140JZVM

Heat Pump **RMX140JVMB, RMX140JZVMB**

Printed Circuit Board

Printed Circuit Board (1) (Control PCB)
Printed Circuit Board (2) (Filter PCB)
Printed Circuit Board (3) (Fan Control PCB)
Printed Circuit Board (4) (Indicator PCB)

Name of Connector

PCB 1

1) S101	Connector to PCB 3 (to S501)
2) S102	Connector to PCB 3 (to S502)
3) S103	Connector to PCB 2 (to S903)
4) S104	Connector to PCB 2 (to S904)
5) S105	Connector to SP (Low Pressure Sensor)
6) S107	Connector to PCB 2 (to S907)
7) S108	Connector to Y1E EVG (Electronic Expansion Valve)
8) S109	Connector to Y2E EVL (Electronic Expansion Valve)
9) S110	Connector to Y3E EVP (Electronic Expansion Valve)
10) S111	Connector to Y1R (4 Way Valve)
11) S114	Connector to Thermistors
12) S131	Connector to HPS (High Pressure Switch)
13) S132	Connector to PCB 2 (to S908)
14) S140	Connector to Active Module
15) S151	Connector to PCB 2 (to S951)

PCB 2

1) S903	Connector to PCB 1 (to S103)
2) S904	Connector to PCB 1 (to S104)
3) S906	Connector of Communication Wire to Each Indoor Units
4) S907	Connector to PCB 1 (to S107)
5) S908	Connector to PCB 1 (to S132)
6) S951	Connector to PCB 1 (to S151)
7) S952	Connector to Power Supply (N, L)

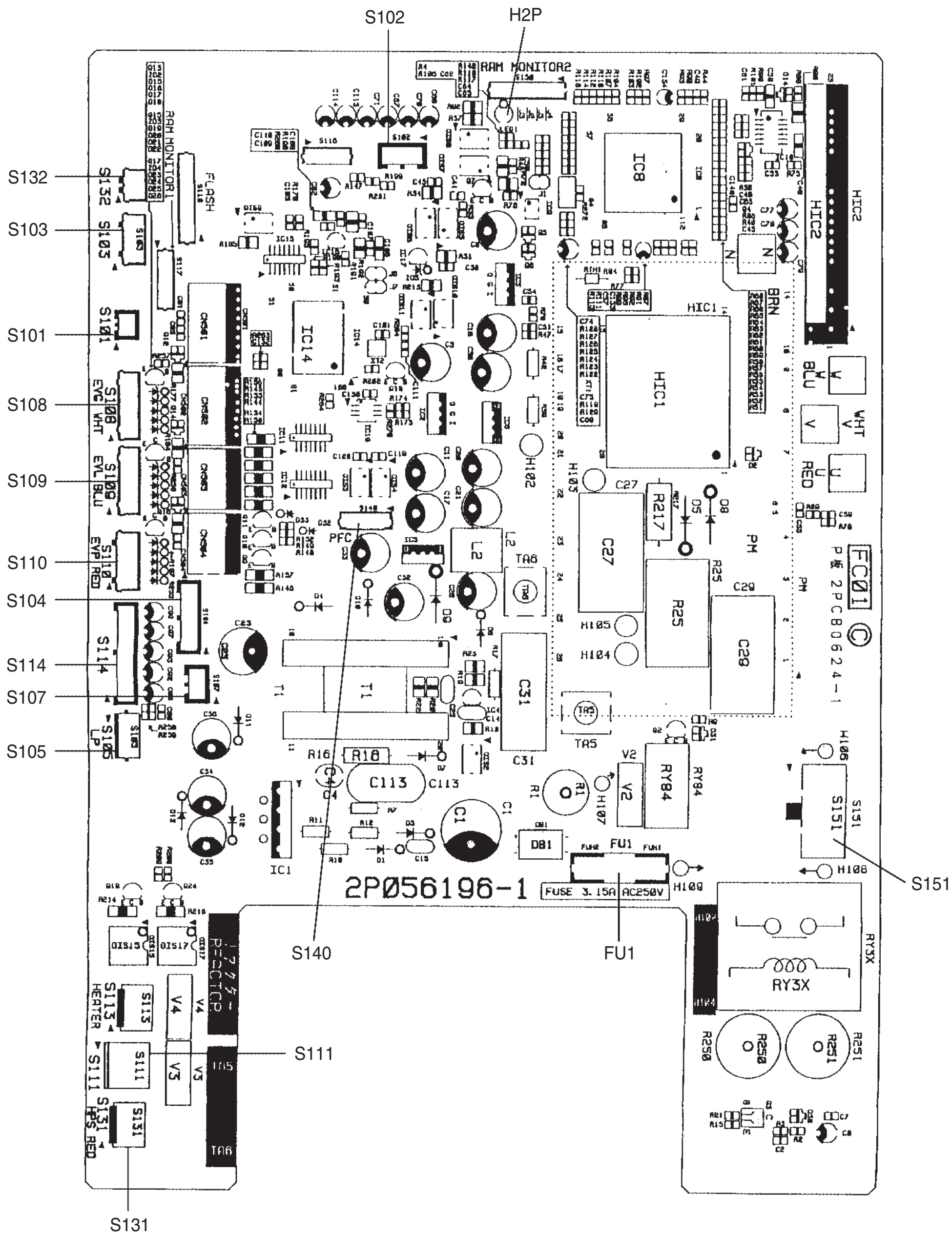
PCB 3

1) S501	Connector to PCB 1 (to S101)
2) S502	Connector to PCB 1 (to S102)
3) S504	Connector to FAN M1F
4) S506	Connector to FAN M2F
5) S514	Connector to FAN M1F
6) S516	Connector to FAN M2F
7) S517	Connector to C1R (Capacitor)

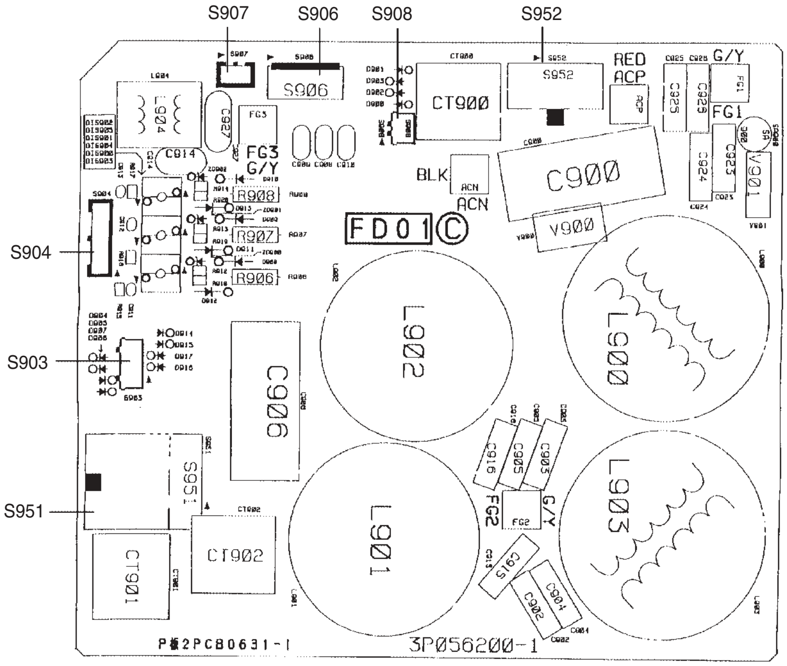
Other Designations

1) H1P (LED A on PCB 4)	LED for Outdoor Unit Status-normal
2) H2P (PCB 1)	LED for Outdoor Unit Status-normal
3) H3P (PCB 3)	LED for Outdoor Unit Fan Status-normal
4) H4P (PCB 3)	LED for Outdoor Unit Fan Status-normal
5) LED 2~4 (PCB 4)	Digital Service Monitor
6) SW1, SW2 (PCB 4)	Address Selection Switches
7) SW3 (PCB 4)	Forced Operation Mode Selection Switch (Cool↔Heat)
8) SW4 (PCB 4)	Pump Down Switch (Service Mode No. Down Switch)
9) SW5 (PCB 4)	Pump Down Switch (Service Mode No. Up Switch)
10) SW6 (PCB 4)	Initialize Switch
11) SW7 (PCB 4)	Test Operation Switch
12) FU1 (PCB 1)	Fuse 3.15Amps
13) JP	Silent Select Switch

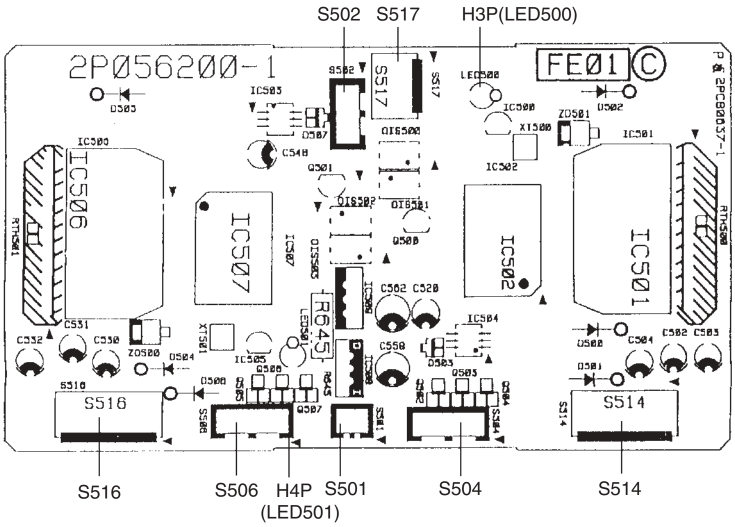
Printed Circuit Board (1) (Control PCB)



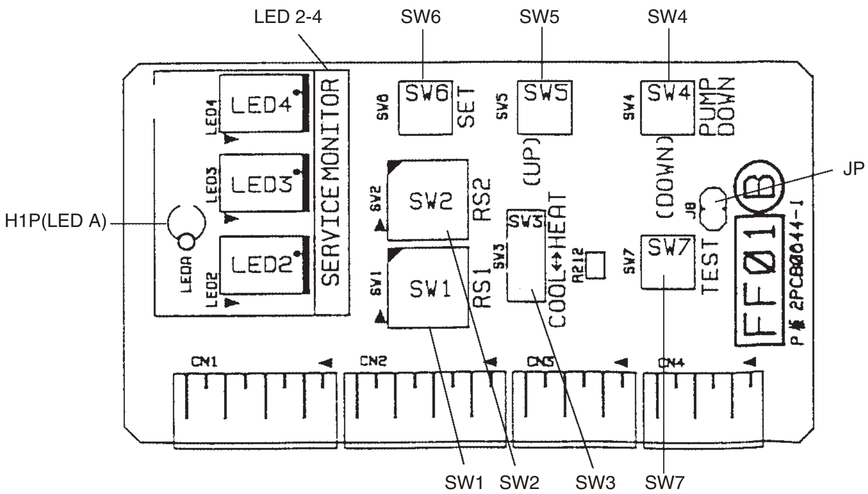
Printed Circuit Board (2) (Filter PCB)



Printed Circuit Board (3) (Fan Control)



Printed Circuit Board (4) (Indicator PCB)



1.3 FTX25 / 35J Series, FTXD25 / 35K Series, FVX25 / 35K Series

Heat Pump	**FTX25 / 35JAV1NB, FTXD25 / 35KZV1B, FVX25 / 35KZV1B**
Printed Circuit Board	**Printed Circuit Board (1) (Control PCB)** **Printed Circuit Board (2) (Signal Receiver PCB)** **Printed Circuit Board (3) (Intelligent Eye Sensor PCB)**

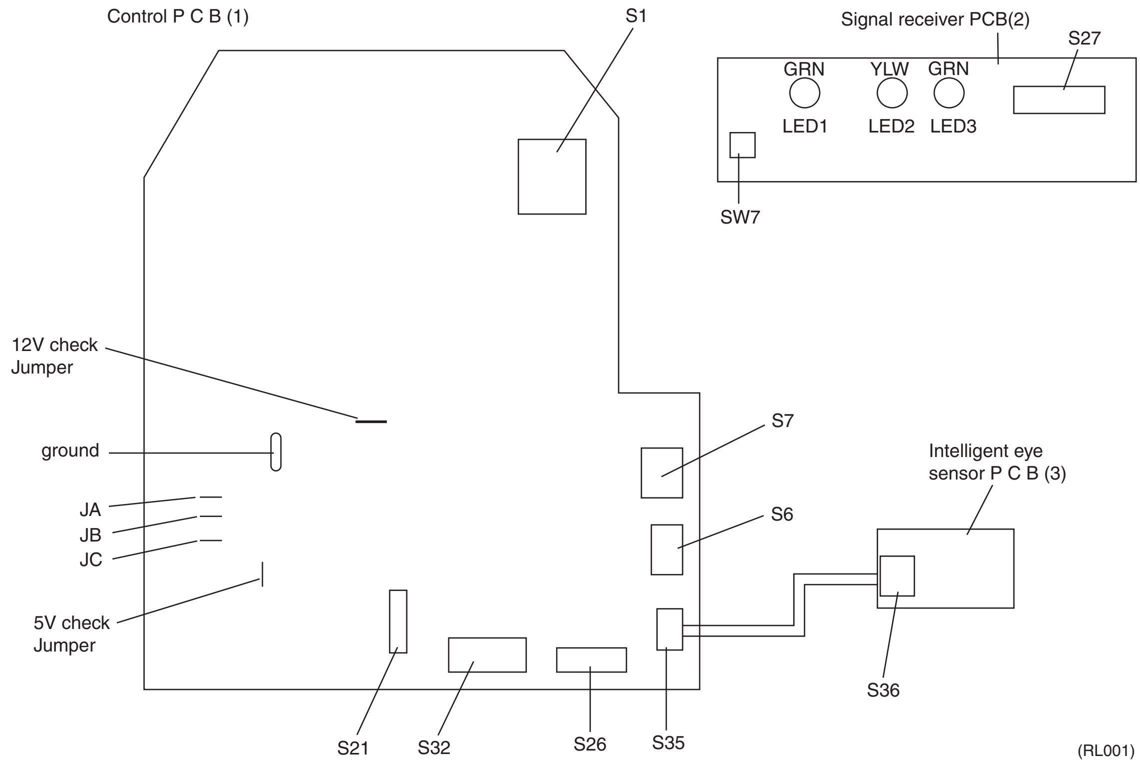
Name of Connector

1) S1	Connector for Fan Motor
2) S6	Connector for Swing Motor (Horizontal Flap)
3) S7	Connector for Fan Motor
4) S21	Connector for Centralized Control to 5 Rooms
5) S27, S36	Connector for Control PCB
6) S26	Connector for Signal Receiver PCB
7) S32	Connector for Room Temp/Heat Exchanger Thermistor
8) S35	Connector for Intelligent Eye Sensor PCB

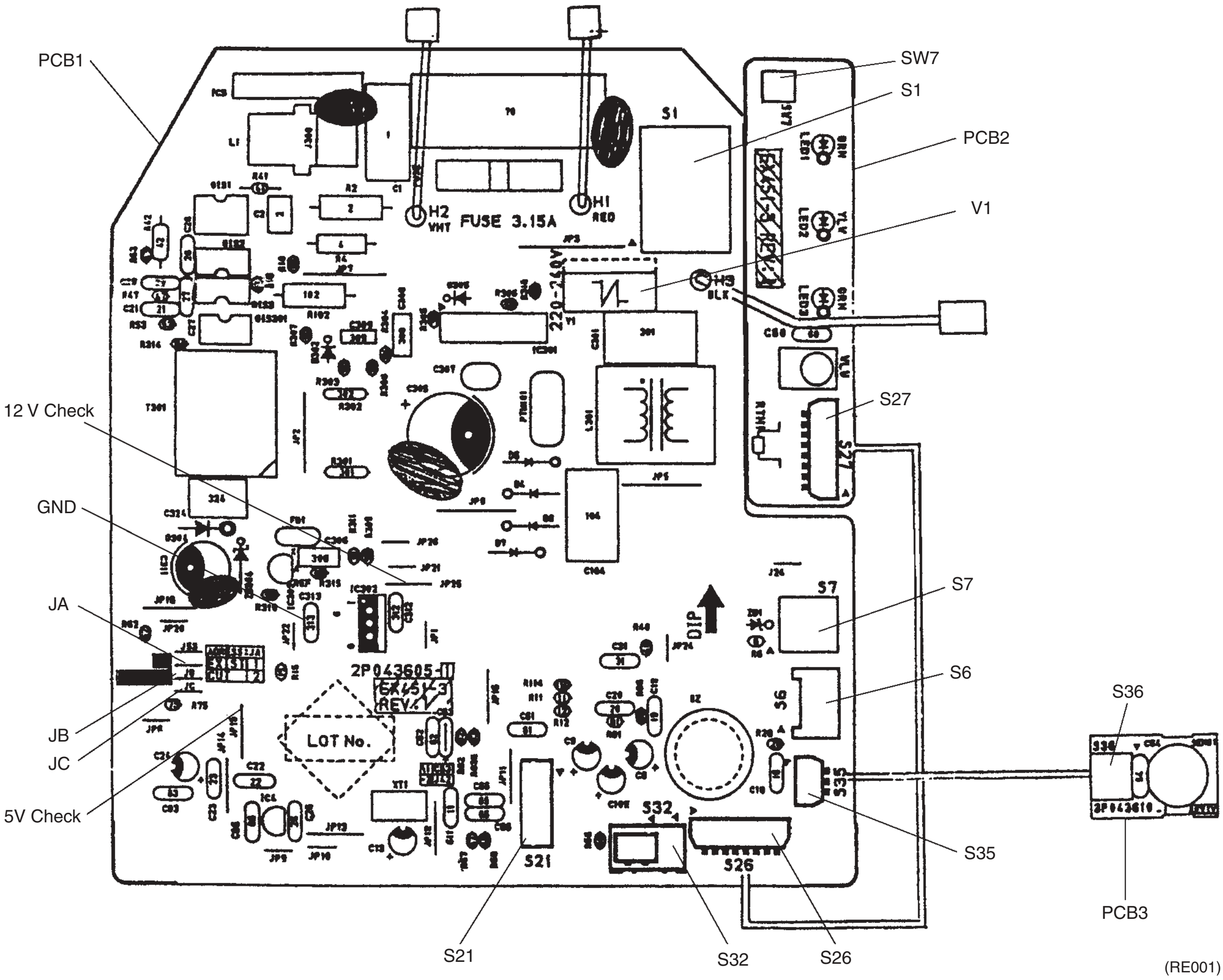
Note: Other designations

1) V1	Varistor
2) JA	Address Setting Jumper
JB	Fan Speed Setting when Compressor is OFF on Thermostat.
JC	Power Failure Recovery Function.
3) SW7	Operation Switch
4) LED1 (GRN)	LED for Operation
5) LED2 (YLW)	LED for Timer
6) LED3 (GRN)	LED for Intelligent Eye

Printed Circuit Board (1)~(3)



Printed Circuit Board (1)~(3) Detail



1.4 FTXD50~71JV Series

Heat Pump **FTXD50 / 60 / 71JV1B**

Printed Circuit Board

Printed Circuit Board (1) (Control PCB)
Printed Circuit Board (2) (Power Supply PCB)
Printed Circuit Board (3) (Display PCB)
Printed Circuit Board (4) (Signal Receiver PCB)

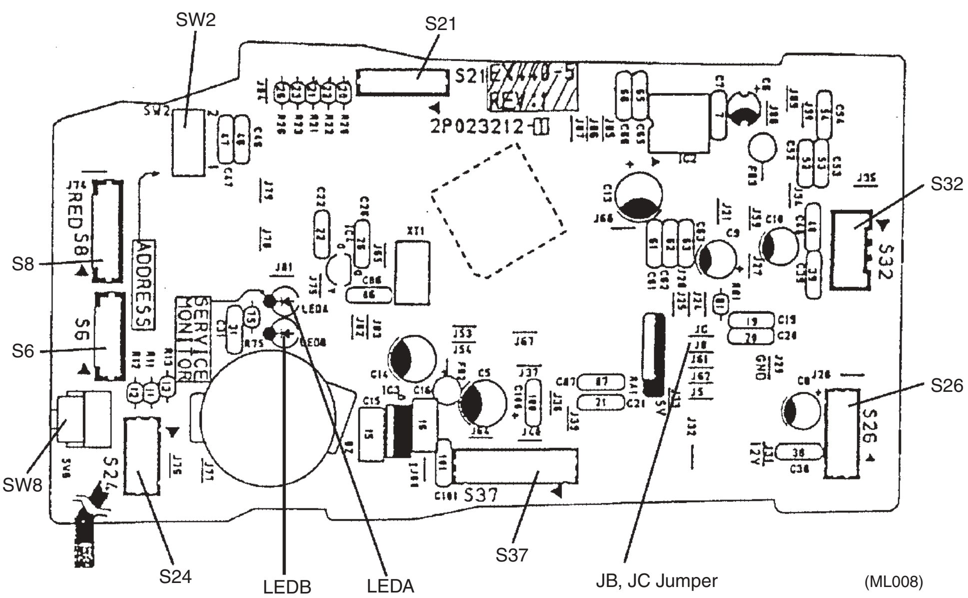
Name of Connector

1) S1	Connector for Fan Motor
2) S6	Connector for Swing Motor (Horizontal Flap)
3) S8	Connector for Swing Motor (Vertical Flap)
4) S21	Connector for Centralized Control to 5 Rooms
5) S24	Connector for Display PCB
6) S25, S27, S36	Connector for Control PCB
7) S26	Connector for Signal Receiver PCB
8) S31, S32	Connector for Room Temp/Heat Exchanger Thermistor
9) S37	Connector for Power Supply PCB

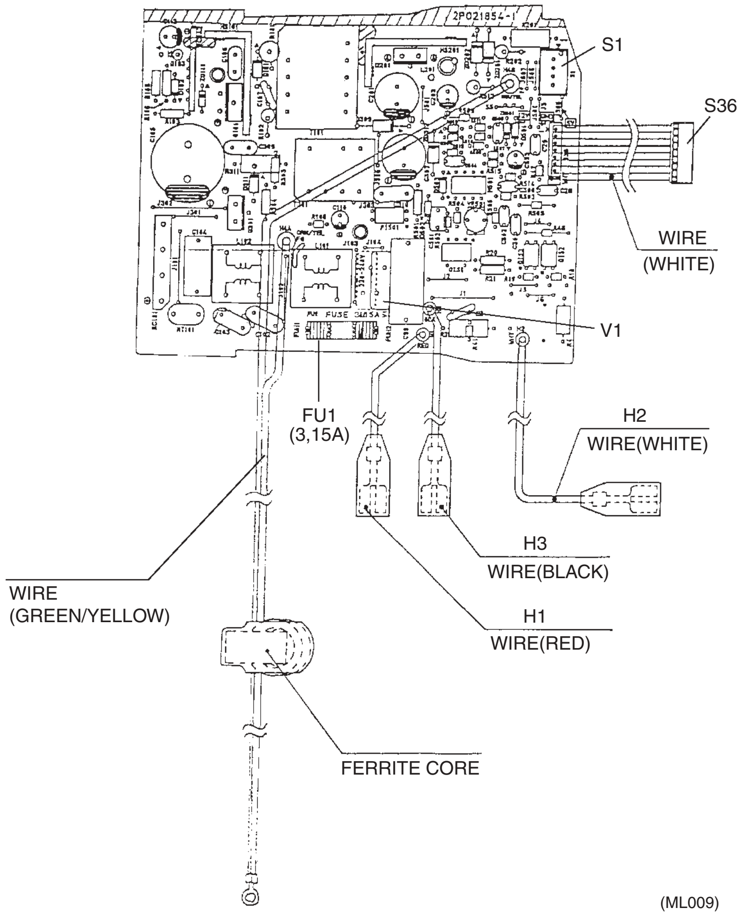
Other Designations

1) V1	Varistor
2) SW7 (S1W)	Operation Switch
3) SW2 (S2W)	Address Switch
4) SW8 (S8W)	Cleaning Indicator Reset Switch
5) LED3 (GRN)	LED for Operation
6) LED4 (YLW)	LED for Timer
7) LED5 (RED)	LED for Cleaning
8) LED A, LED B	LED for Service Monitor

Printed Circuit Board (1) (Control PCB)

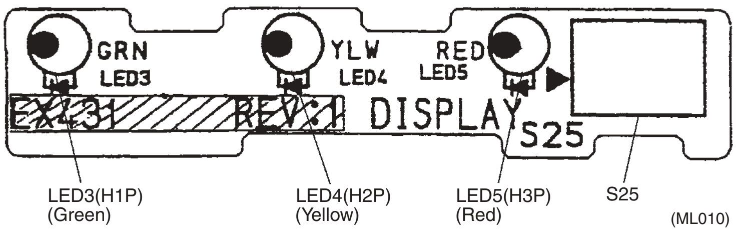


Printed Circuit Board (2) (Power Supply PCB)



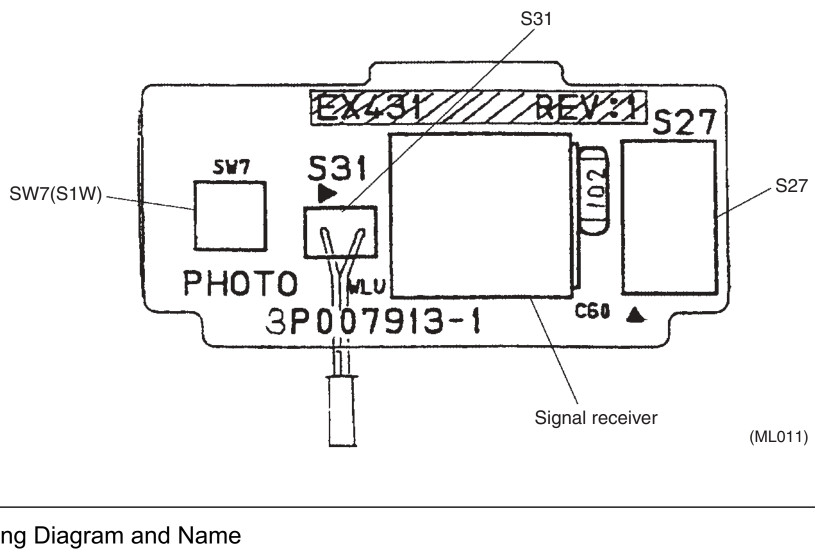
(ML009)

Printed Circuit Board (3) (Display PCB)



(ML010)

Printed Circuit Board (4) (Signal Receiver PCB)



(ML011)

1.5 CDX25~60HAV Series, CDX25~60JV Series

Heat Pump	**CDX25 / 35 / 50 / 60HAV1NB, CDX25 / 35 / 50 / 60JV1NB**
Printed Circuit Board	**Printed Circuit Board (1) (Control PCB) Printed Circuit Board (3) (Intelligent Eye Sensor PCB)**

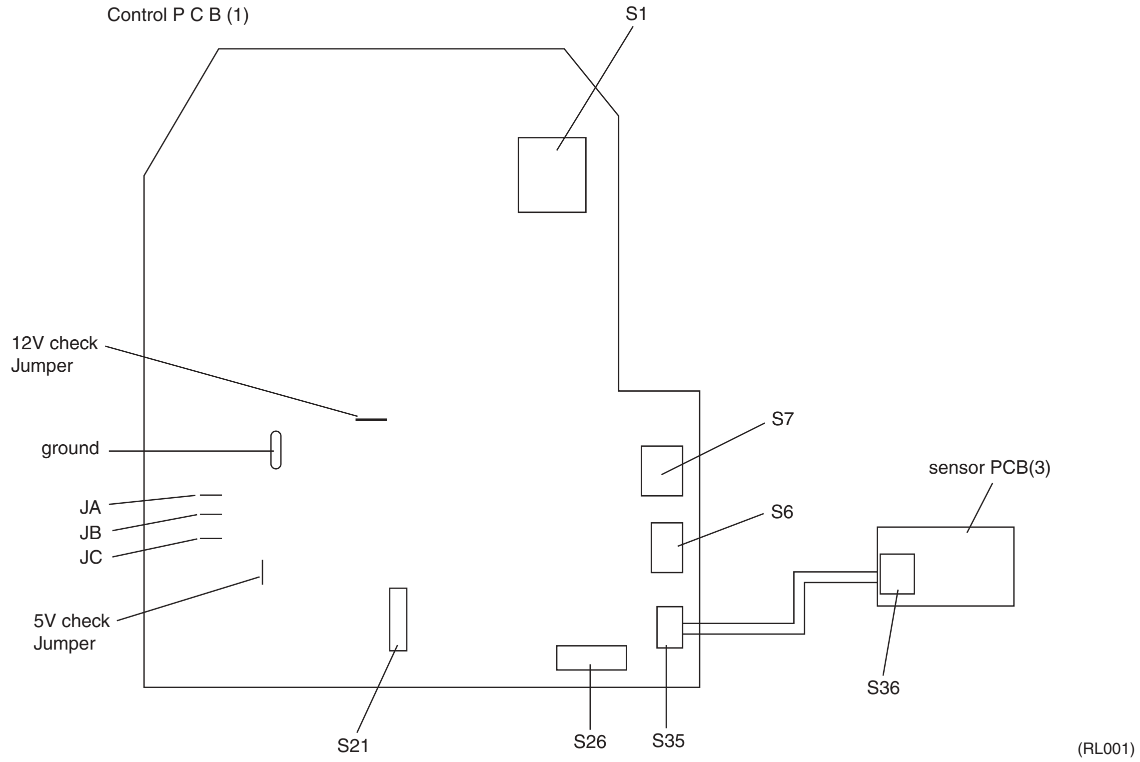
Name of Connector

1) S1 Connector for Fan Motor
2) S6 Connector for Swing Motor (Horizontal Flap)
3) S7 Connector for Fan Motor
4) S21 Connector for Centralized Control to 5 Rooms
5) S36 Connector for Control PCB
6) S26 Connector for Signal Receiver PCB
7) S35 Connector for Intelligent Eye Sensor PCB

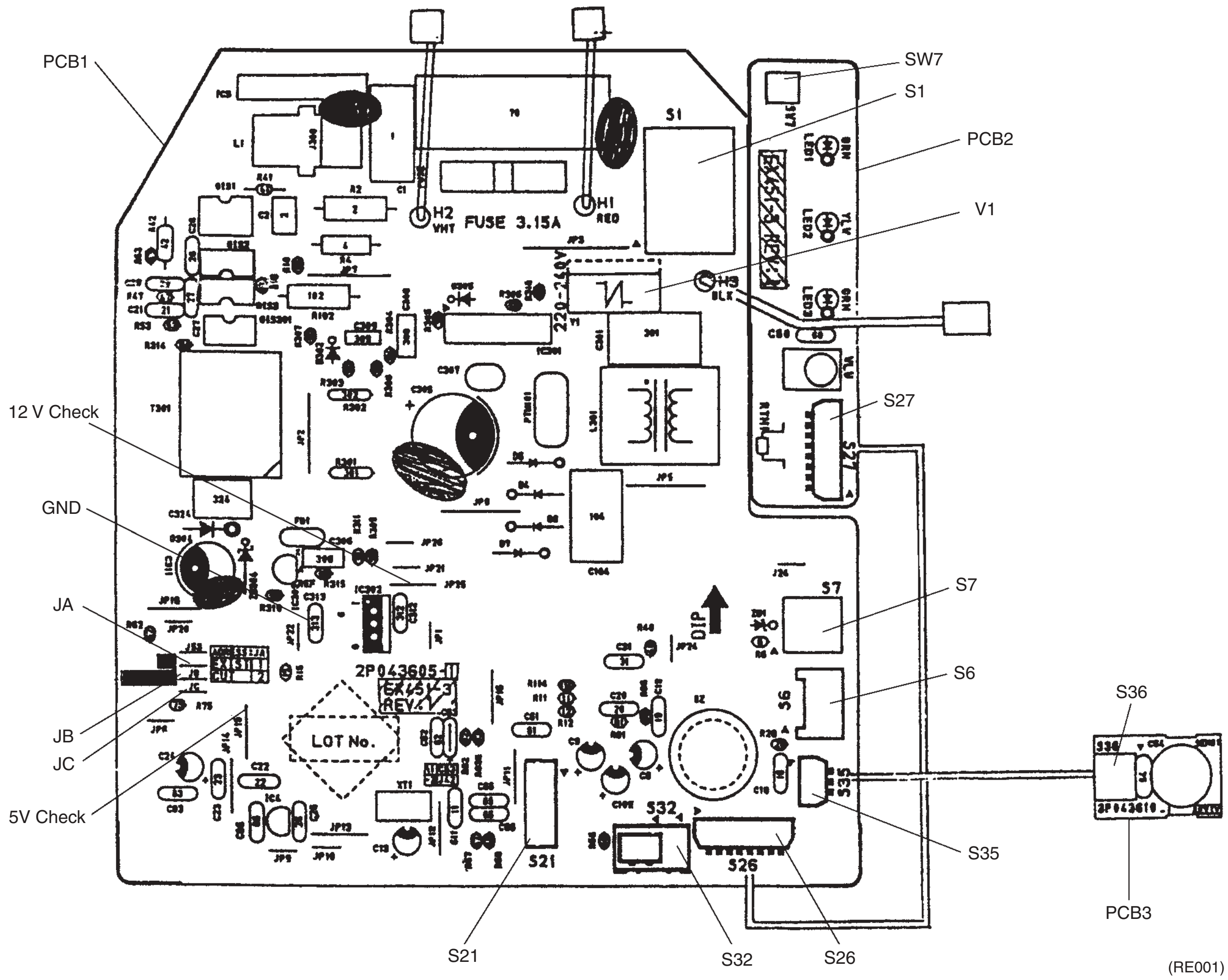
Note: Other designations

1) V1 Varistor
2) JA Address Setting Jumper
   JB Fan Speed Setting when Compressor is OFF on Thermostat.
   JC Power Failure Recovery Function.
3) LED1 (GRN) LED for Operation
4) LED2 (YLW) LED for Timer
5) LED3 (GRN) LED for Intelligent Eye

Printed Circuit Board (1)~(3)



Printed Circuit Board (1)~(3) Detail



1.6 FLX25~60HV Series, FLX50 / 60JV Series

Heat Pump **FLX25 / 35HV1NB, FLX50 / 60JV1B**

Printed Circuit Board

Printed Circuit Board(1) (Control PCB)
Printed Circuit Board(2) (Power Supply PCB)
Printed Circuit Board(3) (Display PCB)
Printed Circuit Board(4) (Signal Receiver PCB)

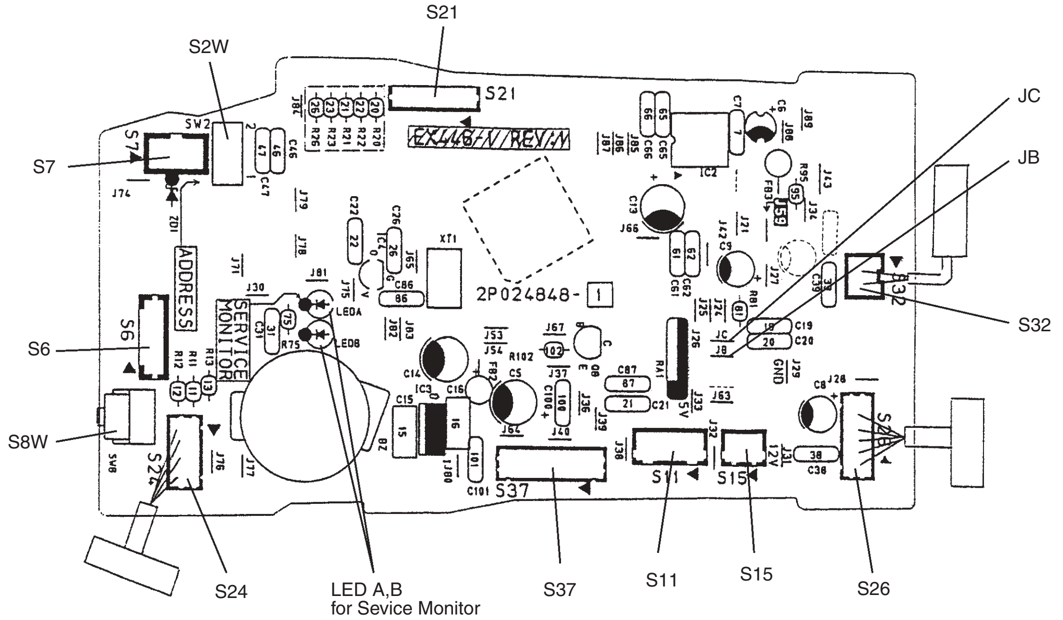
Name of Connector

1) S1	Connector for Fan Motor (Power Supply)
2) S6	Connector for Swing Motor
3) S7	Connector for Fan Motor
4) S21	Connector for Centralized Control
5) S24	Connector for PCB3 (to S25)
6) S25	Connector for PCB1 (to S24)
7) S26	Connector for PCB4 (to S27)
8) S27	Connector for PCB1 (to S26)
9) S31	Connector for Thermistor (R1T)
10) S32	Connector for Thermistor (R2T,R3T)
11) S36	Connector for PCB1 (to S37)
12) S37	Connector for PCB2 (to S36)

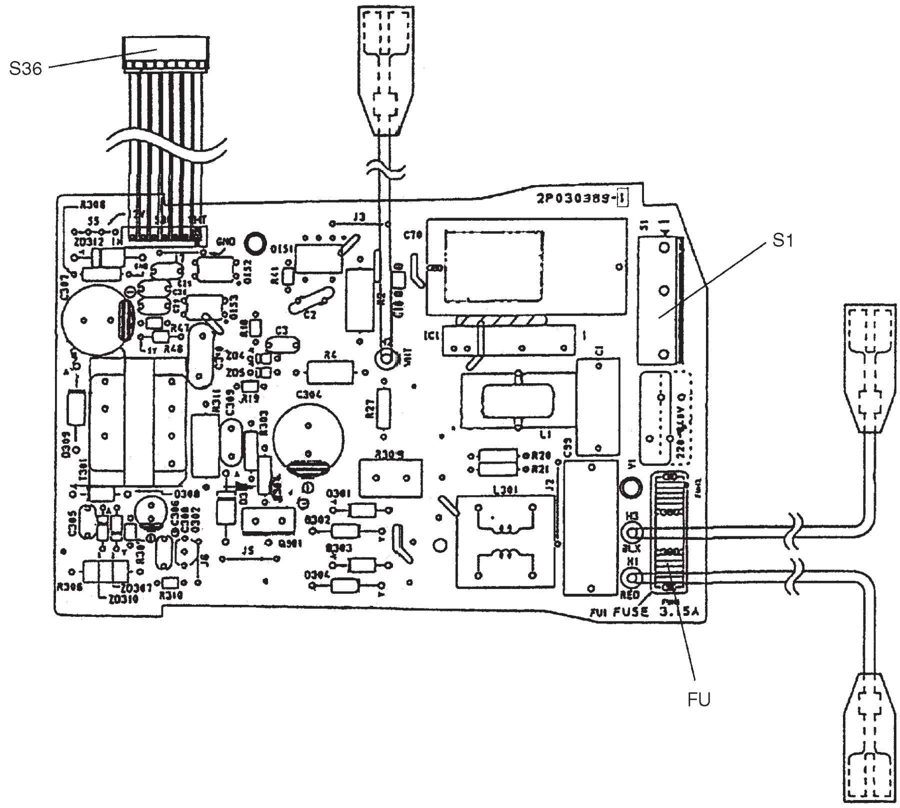
Other Designation

1) FU	Fuse 3.15A
2) S2W	Address Switch
3) S7W	Operation Switch
4) S8W	Cleaning Indicator Reset Switch
5) H1P	LED for Filter Sign
6) H2P	LED for Timer
7) H3P	LED for Operation
8) LED A,B	LED for Service Monitor
9) JB	Control Function Change Jumper (When cut → Setting of Fan RPM “0” during Thermostat Off)
10) JC	Control Function Change Over (When cut → No Auto Restart Function)

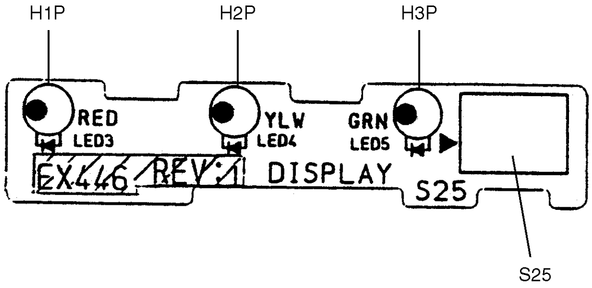
Printed Circuit Board (1) (Control PCB)



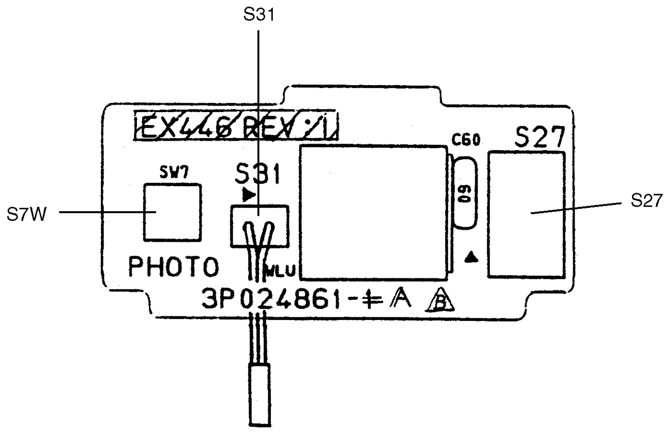
Printed Circuit Board (2) (Power Supply PCB)



Printed Circuit Board (3) (Display PCB)



Printed Circuit Board (4) (Signal Receiver PCB)



Part 4 Main Functions Indoor Unit

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1.1 Main Functions in Split Type 38
1.2 SkyAir 51
1.3 Cautions when SkyAir [Auto] [FAN] are used.. 53

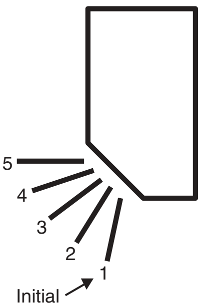
1. Main Functions

1.1 Main Functions in Split Type

1.1.1 Wide Angle Flaps, Louvers and Auto-Swing

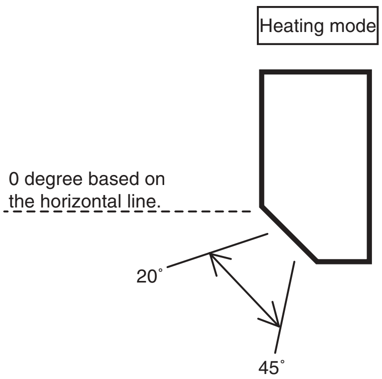
For FTX25/35J Series Only
Outline of the Action

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

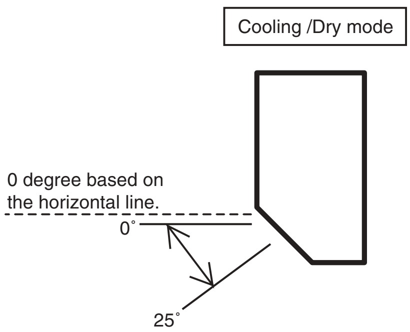


(RL006)

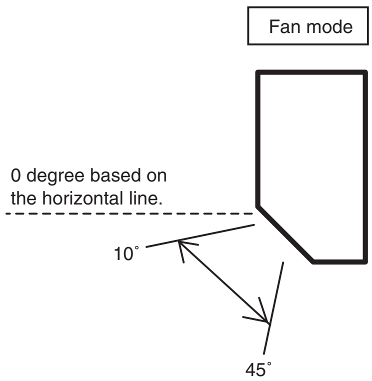
Although the liquid crystal display of the five-step directions of the air flow is common for the modes of Cooling·Dry/Heating as illustrated above, in fact the range of the swing angle is slightly different in every operation mode.
The position a user sets will be selected among the five positions calculated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



(RL007)



(RL008)



(RL009)

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

Others

- The vertical louver can be adjusted manually. The movable range is 60 degrees for left or right, and total 120 degrees.
- A diffuser is not available for J type.

1.1.2 Fan Speed Control for Indoor Units

For FTX25/35J Series Control Mode

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

For more information about Hall IC, refer to 'Hall IC check (A6)' on page 258.

Phase Steps

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

Step	Cooling	Heating	Dry mode
LLL (Heating thermostat OFF)			H type : 500 - 860 rpm (During powerful operation : 850 - 910 rpm) J type : 800 - 980 rpm (During powerful operation : 1050 rpm)
LL (Cooling thermostat OFF)			
L			
ML			
M			
MH			
H			
HH (Powerful)	(RL010)	(RL010)	

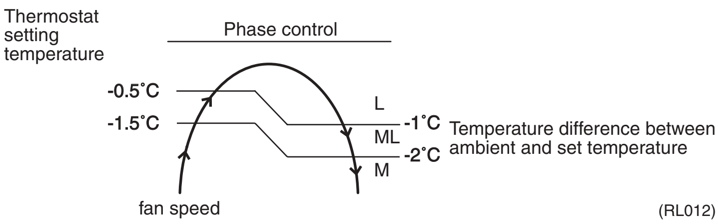
= Within this range the airflow rate is automatically controlled when the AIRFLOW ADJUSTING button is set to AUTOMATIC

Note:

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

Automatic Air Flow Control for Heating

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



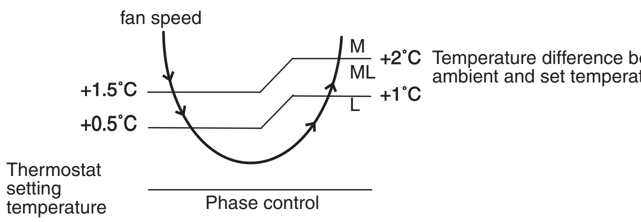
(RL012)

Note:

When there is no operation and the night set mode turns on, the step is low. Refer to "Night set mode" on page 42.

Automatic Air Flow Control for Cooling

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



(RL013)

1.1.3 Signal Receiving Sign

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

1.1.4 Air Purifying Filter

For FTX25/35 J Series

The air purifying filter (electrostatic filter) catches pollen or smoke of cigarette as small as 0.01 micron through electro static charging. An activated carbon deodorizing filter in a net shape is also mounted to absorb and minimize fine odor particles.

1.1.5 Washable Grille

Washable grille is for FTK(X)25/35 J

Note: Refer to P97 in Si12-001 for FTK25/35 J Series “Cleaning the air filters.”

1.1.6 Mold Proof Air Filter

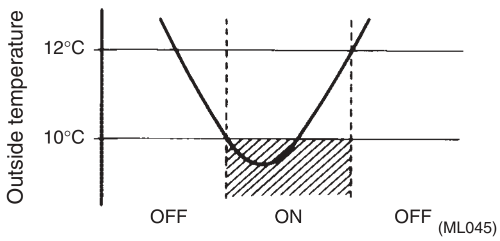
For FTK(X)25/35 J Series

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

1.1.7 Pre-Heat Operation (Heat Pump Only)

For FTK(X)25/35 J Series

1. When the equipment has been stopped, the compressor is warmed up by passing a small single-phasing current through the compressor motor so that the start up is speeded up.
2. The power consumption during warming up is about 15 to 35W.
3. This function operates only when the outside temperature is low (less than about 10ºC) so that power saving is achieved.



1.1.8 Hot Start Function (Heat Pump Only)

In order to prevent the cold air blast that normally comes when heating is started, the temperature of the heat exchanger of the indoor unit is detected, and either the air flow is stopped or is made very weak thereby carrying out comfortable heating of the room.
*The cold air blast is also prevented using a similar control when the defrosting operation is started or when the thermostat gets turned ON.
During defrosting or when the thermostat is on in heating mode, the indoor heat exchanger temperature
≥ 29˚C to fan starts to avoid cold draft.

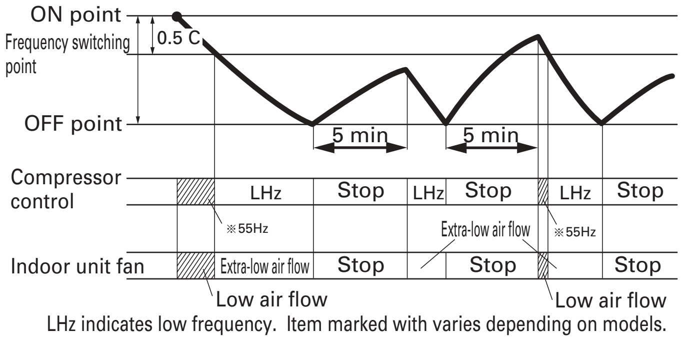
1.1.9 Program Dry Function

Program dry function removes humidity while preventing the room temperature from lowering. Since the microcomputer controls both the temperature and air flow volume, the temperature adjustment and fan adjustment buttons are inoperable in this mode.

In the Case of Inverter Units

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

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



(ML047)

1.1.10 Automatic Operation (Heat Pump Only)

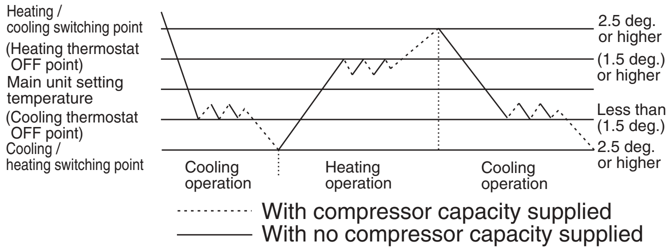
Automatic Cooling/Heating Function

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

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

Detailed explanation of the function

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



(RL022)

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

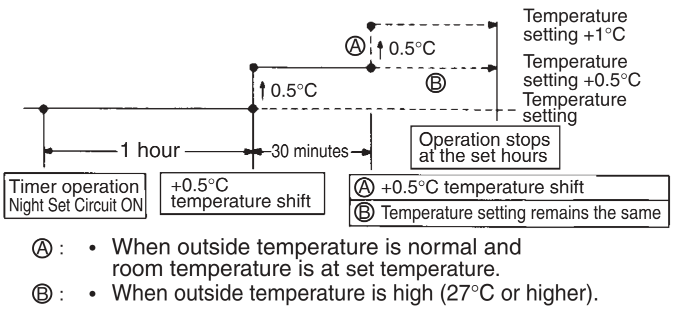
1.1.11 Night Set Mode

When the OFF Timer is set, the New Night Set Circuit automatically activates.
The Night Set Circuit automatically switches the fan speed to a low setting to minimize operating noise. On the other hand, the New Night Set Circuit maintains the airflow setting made by users. (Some models are equipped with an Night Set Circuit ON switch.)

The Night Set Circuit

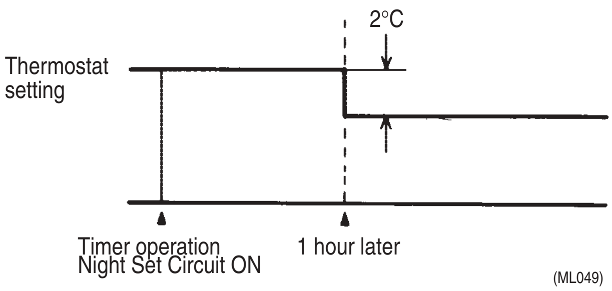
The Night Set Circuit continues heating or cooling the room at the set temperature for the first one hour, then automatically lowers the temperature setting slightly in the case of cooling, or raises it slightly in the case of heating, for economical operations. This prevents excessive heating in winter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

Cooling Operation



(ML048)

Heating Operation



(ML049)

1.1.12 Self-Diagnosis Digital Display

The microcomputer continuously monitors main operating conditions of the indoor unit, outdoor unit and the entire system. Should an abnormality occur, the LCD remote controller displays information and the indicators on the indoor and outdoor units light. These indications allow prompt maintenance operations.

1.1.13 Self-Diagnosis LED Display

The lighting patterns of the indoor unit LEDs (Operation, Timer and Dry/Hot Start indicators) and the LEDs on the outdoor unit's printed circuit board allow diagnosis of problem areas and faulty conditions of the interconnecting wire.

Note: Self-Diagnosis LED display is not equipped for FTX25/35 J series.

1.1.14 Auto-Restart Function

Even if a power failure (including one for just a moment) occurs during the operation, the operation restarts in the condition before power failure automatically when power is restored.
(Note) It takes 3 minutes to restart the operation because the 3-minute standby function is activated.

1.1.15 Intelligent Eye

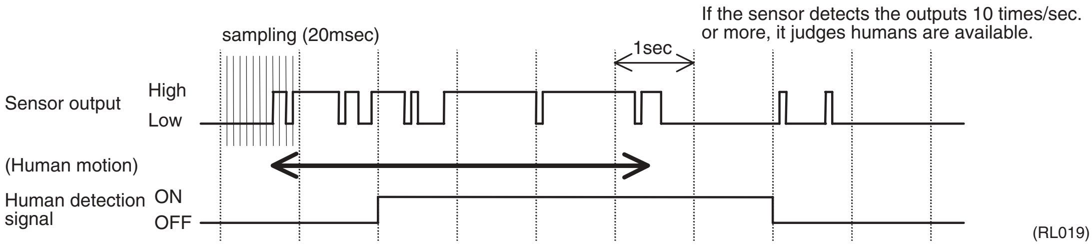
For FTX25/35 J Series Only

Outline

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

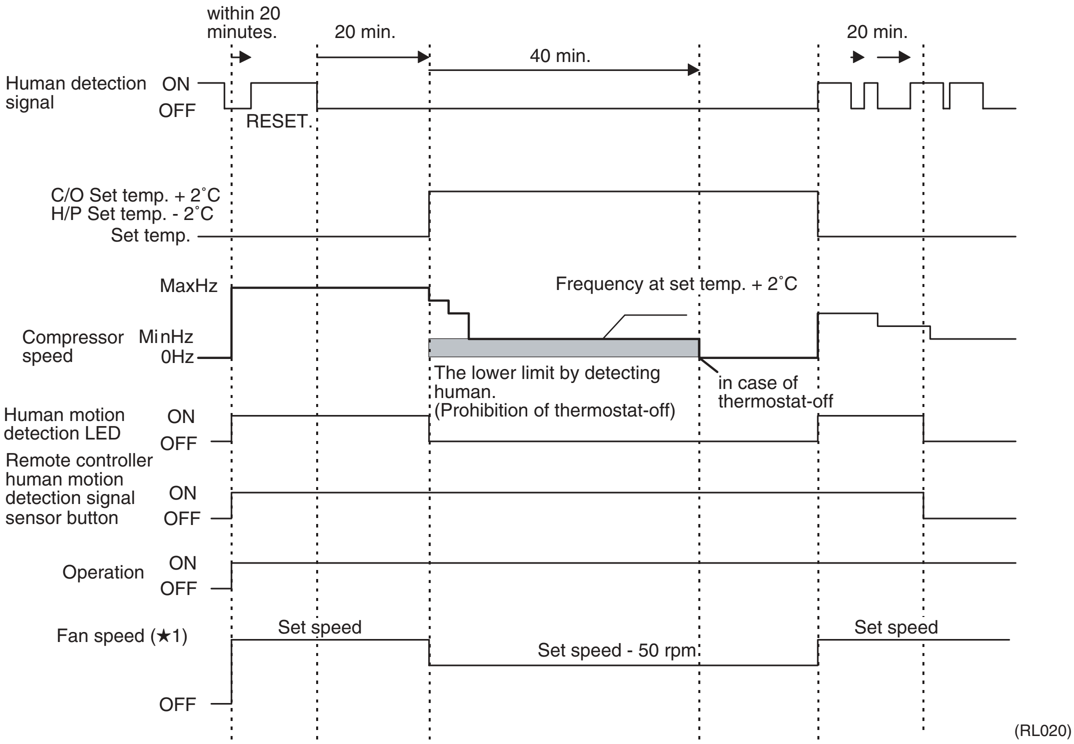
Processing

1. Detection method by human motion sensor



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

2. The motions (for example: in cooling)



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

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

- Since the set temperature is shifted by 2˚C higher for 40 minutes, compressor speed becomes low and can realize energy saving operation. But as thermostat is prone to be off by the fact that the set temperature has been shifted, the thermostat-off action is prohibited in 40 minutes so as to prevent this phenomena.
  After this 40 minutes, the prohibition of the thermostat-off is cancelled and it can realize the conditions to conduct thermostat-off depending on the room temperature. In or after this forty minutes, if the sensor detects human motion detection signal, it turns on “Human detection LED” and let the set temperature and the fan speed return to the original set point, keeping a normal operation.

Others

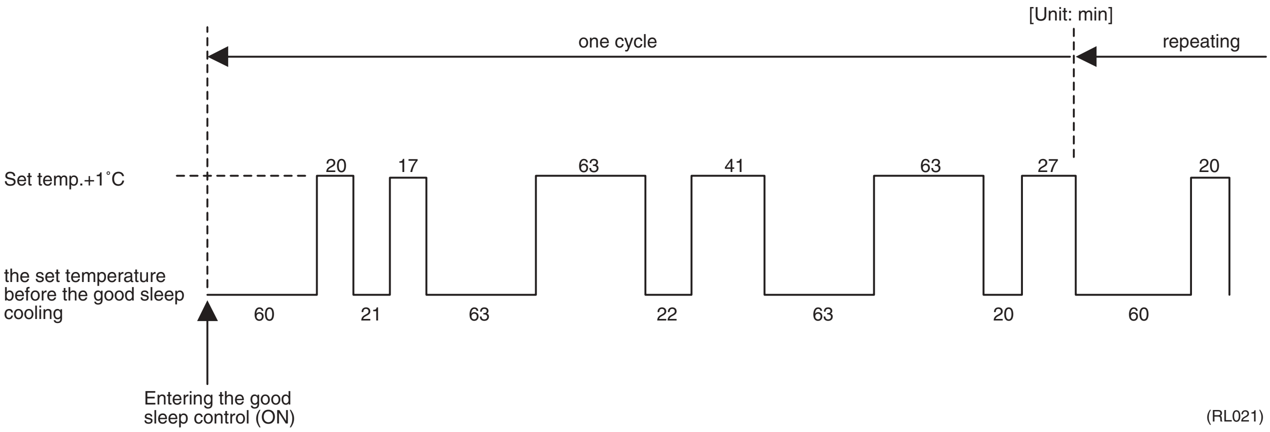
- The dry operation can’t command the setting temperature with a remote controller, but internally the set temperature is shifted by 1˚C.

1.1.16 Good Sleep Cooling Control

For FTX25/35 J Series Only
Outline

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

Processing



Notes:

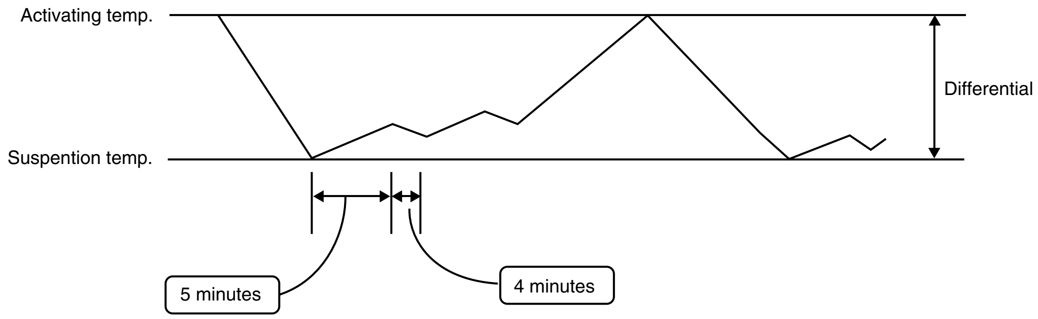
1. Each timer’s counting/stop is not related to a thermostat ON/OFF.
2. When the sleeping control works by the OFF timer, the shift from the set temperature should be just 1˚C with this control function.
   (The temperature shift of the normal OFF-timer will not be carried out. However, the passed time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

1.1.17 Program Dry Operation

By the function of the microcomputer, program dry operation reduces the humidity keeping the temperature in a minimum drop. Room temperature and air volume can not be controlled by room temperature adjusting button and air volume adjusting button because they are controlled automatically. When the program dry function starts, dry operation is provided, and then it repeats 5 minute suspension and 4-minute dry operation alternately. When the room temperature rises, it repeats the above process from the beginning.

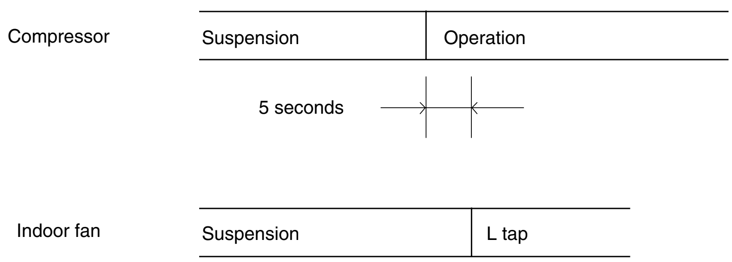
Room temperature at starting of program dry operation	Program dry activating temperature ★1	Differential ★2
Above 24˚C	Room temperature at starting of program dry operation	1.5 deg
18˚C~24˚C	Room temperature at starting of program dry operation	1.0 deg
Below 18˚C	18˚C	1.0 deg

★1 Dry operation activating (compressor on) temperature
★2 Room temperature difference between activation and suspension of dry operation



(RL001)

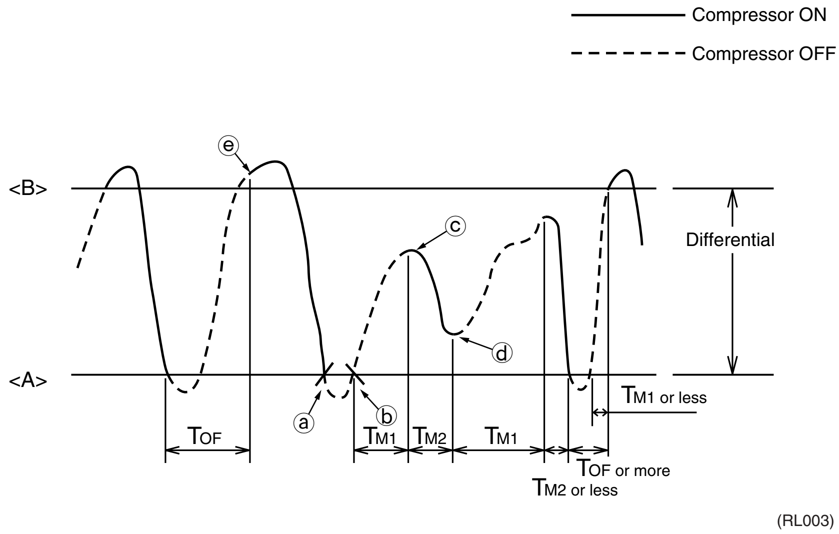
Note:
1. The program dry function is not operated when the room temperature is at 18˚C or less.
2. In monitoring operation, fan rotates 5 seconds after the compressor starts its operation.



(RL002)

1.1.18 Cooling Monitoring Function

Monitoring function is activated while cooling and program dry operation are suspended.



TOF: Compressor recycling guard timer (3-minute timer)
TM1: 5-minute timer
TM2: 4-minute timer
<A> At cooling: Temperature set by wireless remote controller
At program dry operation: Temperature at suspension
<B> Temperature set by wireless remote controller + 1 deg. (Cooling operation)
Temperature set (Program dry operation)
Even if the suction temperature remains in the differential range, a compressor is cycled ON and OFF.

DETAIL: When the suction temperature rises again to <A> (point b) after the suction temperature is dropped to <A> and the compressor turns OFF (point a) the 5-minute timer starts.
After that, when the suction temperature is within the differential range, even after a lapse of 5 minutes, the compressor is forced to turn ON (point c).
When the suction temperature is still in the differential range, after another 4 minutes of compressor ON, the compressor is forced to turn OFF (point d).
The 5 and 4-minute timers are effective only within the differential temperature range, and when the air suction temperature is reached to <B> or <A> while the timers are counting, timers are reset and the compressor is turned ON or OFF.
(Note, however, that function of placing the compressor in a 3-minute compressor recycling guard timer is provided at point e.)

While the compressor is OFF, the indoor fan operation is controlled by tap A during cooling mode.
In the program dry mode, the indoor fan starts operating five seconds after the compression starts, and it stops operating when the compressor shuts down.

	A
FLE18HV1LS, FL35/50HV1	Remote controller setting

1.1.19 Freeze Protection Function

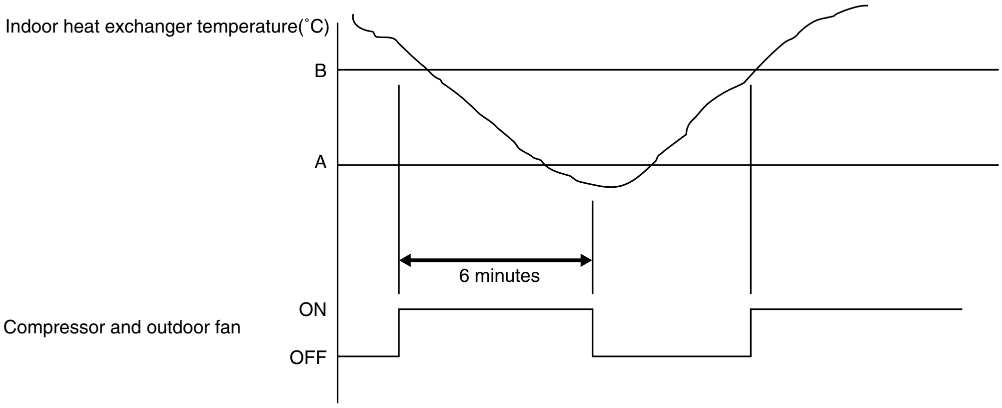
When the indoor heat exchanger temperature falls below “A”˚C in cooling or program dry operation,

- the compressor and the outdoor fan are forced to turn OFF, and
- the indoor fan rotates at the L tap (in cooling operation) or W2 tap (in program dry operation).

Note that this function is not activated for 6 minutes after compressor turns ON.

When the indoor heat exchanger reaches “B”˚C, the compressor and the outdoor fan restart the operations. However, because the compressor recycling guard timer (3-minute timer) takes priority, the compressor and the outdoor fan don’t restart the operation during this timer is ON.

	A	B	W2
FLE18HV1LS, FL35/50HV1	3	13	LL



(RG001)

1.1.20 Auto-Restart Function

Even if a power failure (including one for just a moment) occurs during the operation, the operation restarts in the condition before power failure automatically when power is restored. (Note) It takes 3 minutes to restart the operation because the 3-minute standby function is activated.

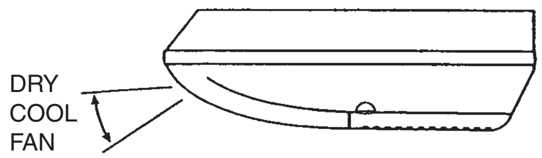
1.1.21 3-Minutes Standby Function

When the compressor turns OFF, it doesn’t turn ON for 3 minutes

1.1.22 Auto-Swing of Flap(s)

Auto-swing angles are about “A” degrees when the fan is ON, and about “B” degrees when the cooling or program dry operation is ON. The up-and-down swing of the flaps widens the direction of wind.

When [SWING] is selected, the flap swinging range depends on the operation mode. (See the figure.)



NOTE

- Unless [SWING] is selected, you should set the flap at a near- horizontal angle in COOL or DRY mode to obtain the best performance.
- In DRY mode, if the flap is fixed at a upward position, the flap automatically moves in about 60 minutes to prevent condensation on it.

ATTENTION

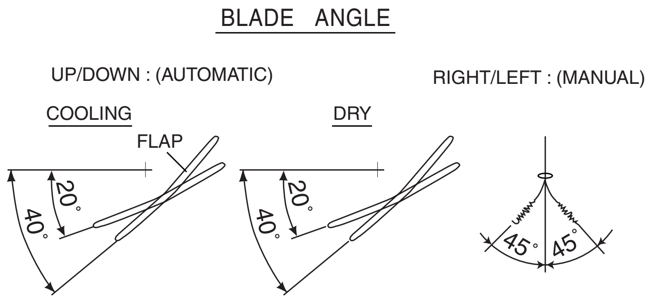
- Always use a remote controller to adjust the flap angle. If you attempt to move it forcibly with a hand when it is swinging, the mechanism may be broken.

(RL004)

Note: Notes on flap angles

1.1.23 Air Flow Automatic (Auto Fan Speed)

In cooling operation, if automatic airflow has been selected, the wind flow is determined according to the room temperature and the temperature setting.

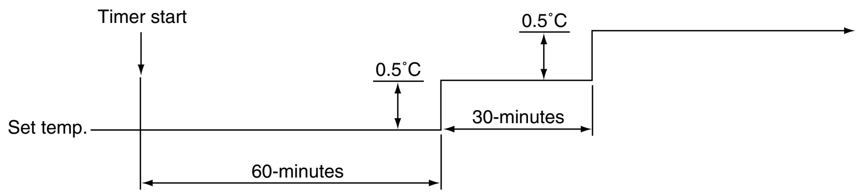


(RL005)

1.1.24 Night Set Mode Function

This mode automatically keeps temperature slightly higher than the temperature setting. In this way, there is no need to worry about overcooling while sleeping, and it also saves on electricity.

- **Set the OFF timer.**
- **The unit will cool the room at the set temperature for 1 hour from when the timer starts counting.**
- **After that, the unit will raise temperature 0.5˚C higher than the set temperature and cool for 30 minutes.**
- **After that, the unit will raise temperature another 0.5˚C and continue cooling at that temperature.**
- **Setting the OFF timer forcibly changes the airflow adjustment to the tap-L setting.**
- **It is possible to change the airflow setting while the OFF timer is in operation. However, changing the airflow setting cancels the shift-up of the set temperature.**



(M1101)

Note: No higher temperature setting on program Dry or Auto operation.

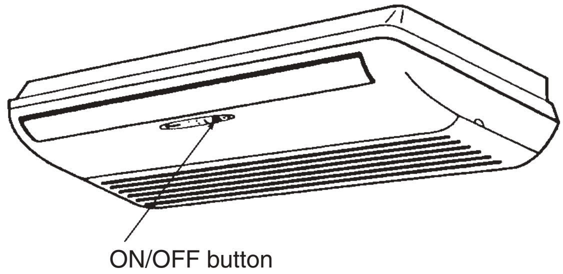
1.1.25 Emergency Operation Function (ON/OFF Switch)

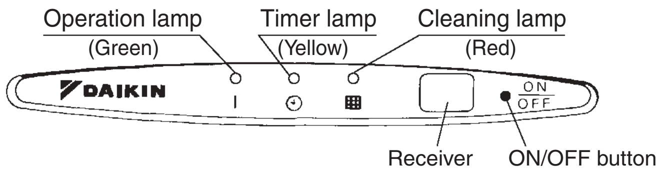
The unit can be turned ON only by pressing ON/OFF operation switch. This is convenient when the remote controller cannot be found or if the batteries are dead.

The operation condition is as follows:

Operation mode	Cool
Fan speed	Auto
Set temperature	22˚C

Pressing the switch again will turn the unit OFF.





(M1102)

1.1.26 Powerful Operation

During cool and program dry operation, when the POWERFUL button on the remote controller is pressed, the thermistor setting is changed to the lowest setting of the remote controller and the fan runs at the maximum rpm (Note). During fan operation, air is blown at the maximum fan rpm.

Note: Max. fan rpm = H tap set by remote controller + 50 rpm

Notes on POWERFUL Operation

- In COOL mode
  To maximize the cooling effect, the temperature setting is fixed to 18˚C and the air flow rate is fixed to the maximum setting. (H tap + 50 r.p.m)
  The temperature and air flow settings are not variable.
- In DRY mode
  The temperature setting is lowered by 3˚C and the air flow rate is slightly increased. You can repeat POWERFUL operation if you need even more dehumidification.

1.1.27 Filter Check Indicator

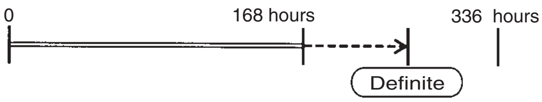
- **The filter check indicator located at the center of the unit will indicate the time for cleaning the air filters.**

The indicator will indicate an appropriate cleaning time depending on the environment (dusty place or not). This will prevent you from forgetting filter cleaning and also prevent performance drop that might be caused by using clogged filters and wasteful use of electricity by approximately 8%.

<Contents of indication>

- **Sensed by the operation hours and the fan motor voltage**

1. Filter clogging (★)



(M1103)

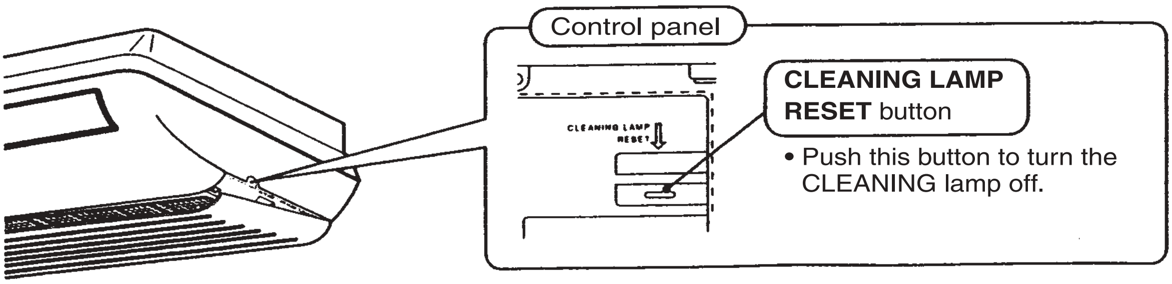
2. Accumulated operation hours

(M1104)

Indicates the earlier one of the above 1 or 2.

★ This indicator utilizes the characteristic that the fan motor voltage drops as the crossflow fan gets clogged; it does not detects the amount of filter clogging.

Note:
- When the power supply is reset, the accumulated operation hour is not reset.
- After cleaning and mounting the filters, press the reset button located inside the panel of the unit.

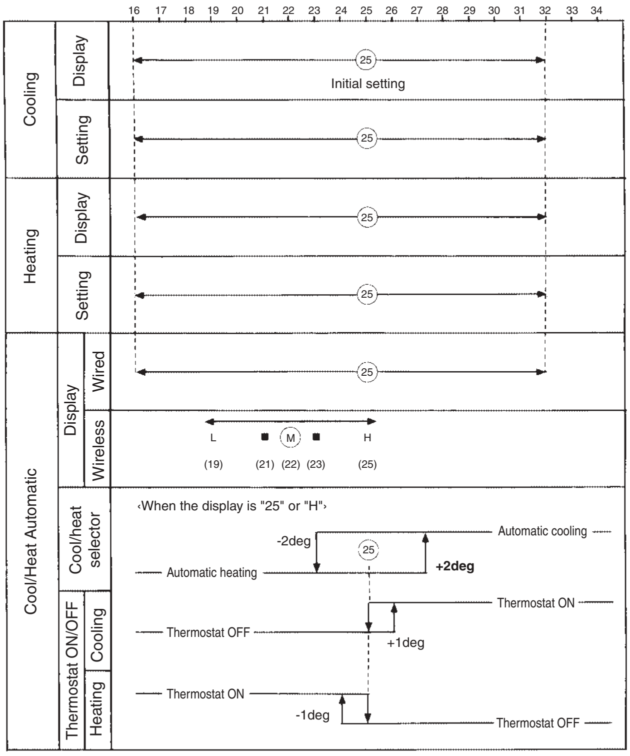


(M1105)

1.2 SkyAir

Thermostat Control

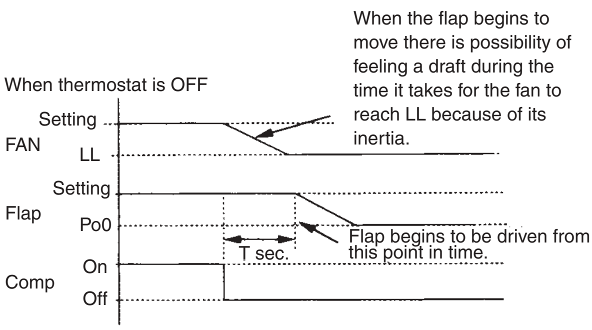
Existing cooling/heating preset temperature range has been changed.



(SL017)

Draft Avoidance Control 1

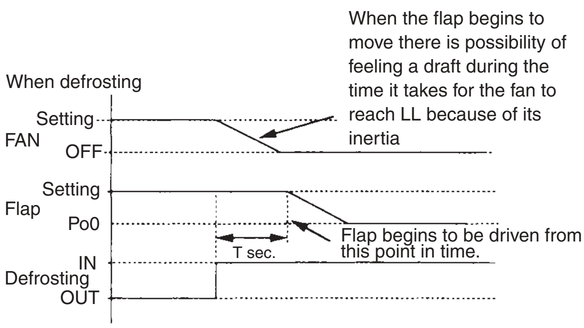
Draft is circumvented by delaying transfer of the flap to the Po0 (horizontal) position for a certain amount of time when defrosting and in the heating mode with the thermostat OFF.



T: 5 sec (FH(Y)C~K)

T: 20 sec (Other models)

(SL018)



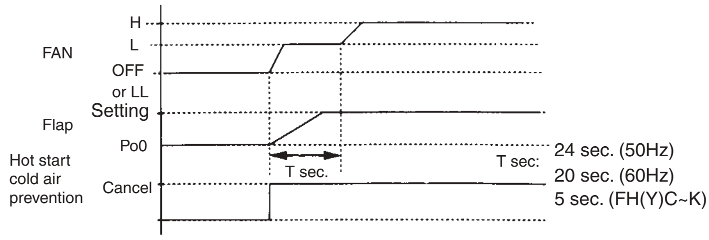
T: 5 sec (FH(Y)C~K)

T: 20 sec (Other models)

(SL019)

Draft Avoidance Control 2

When hot start is cancelled or when cold air prevention control is finished, if the fan speed is set to “H,” the fan turns at L speed for a certain amount of time, thus avoiding draft while the flap is moving.



(SL020)

Air Flow Volume Shift Control

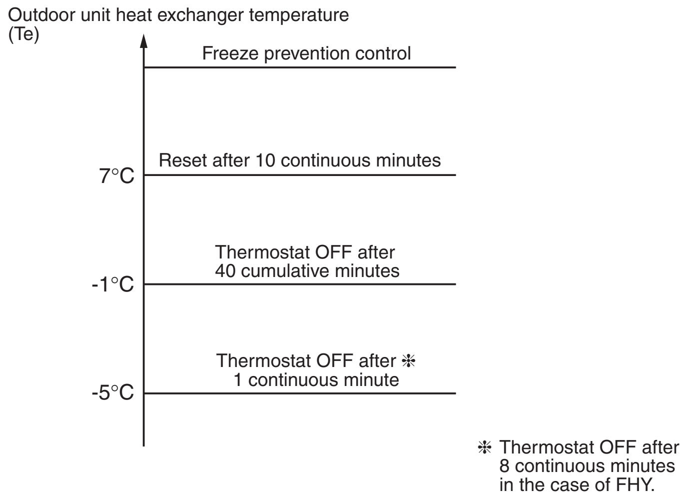
The air flow volume of an indoor unit is varied to prevent shutdown due to a rise in the high pressure level.
(Air volume up at heating operation)

1. When indoor unit suction air temperature is 25˚C or higher
   ON condition Tc≥60˚C
   Reset condition Tc<50˚C
   Note that the air flow volume is varied for a preset time when the thermostat is ON.
2. When indoor unit suction air temperature is lower than 25˚C
   ON conditionTc≥60˚C
   Reset conditionTc<59˚C

Freeze Prevention 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 prevention control from activating during cooling operation under low outside air temperature. (For details, see the section on cooling operation under low outside air temperature.)



(SE011)

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.

1.3 Cautions when SkyAir [Auto] [FAN] are used

1.3.1 Heat Pump Model

The Corresponding Models

FHYB35 / 45 / 60 / 71FK7V1
FNQC35 / 45 / 60 / 71B7V1

Cautions

1. In case of plural and simultaneous operation including the corresponding models stated above, the mode change (Cooling → Heating, or Heating → Cooling) will not be carried out automatically, even if [Auto] is selected.
   Accordingly, when operation mode change is required, once stop the operation of the corresponding model and then choose a mode after starting the model again.
2. SkyAir [FAN Only] mode can’t be operated.
   If [FAN Only] mode is chosen, [ ] is displayed once but disappears after a few seconds.
   (The indoor unit’s fan once starts but soon will stop).

Part 5
Main Functions
Outdoor Unit / BP Unit

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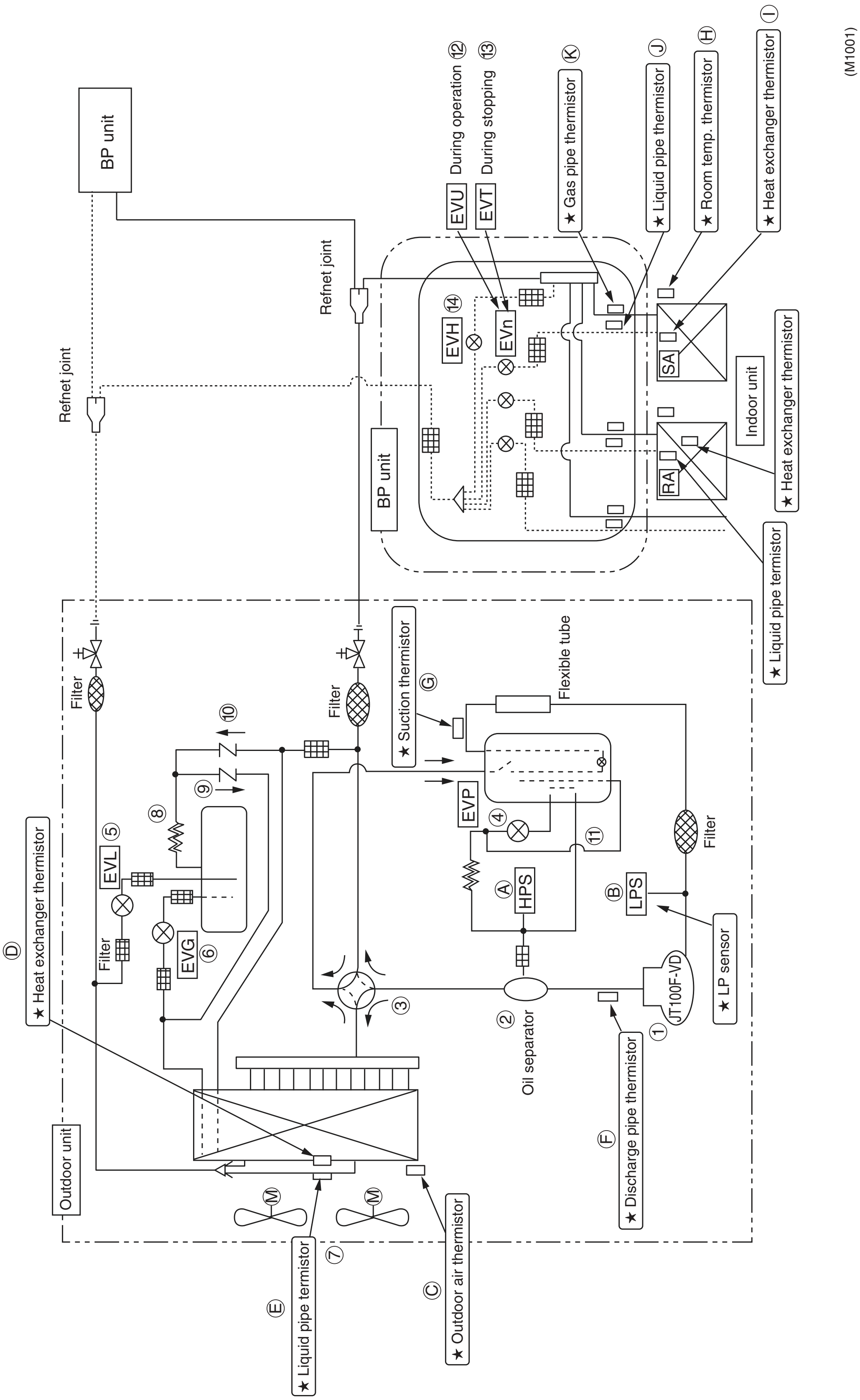
1. Refrigerant System and Function of Functional Parts of Outdoor Unit

1.1 Refrigerant System and Function of Functional Parts of Outdoor Unit



1.2 Major Functional Parts

① **Compressor : JT100F-VD**
The application of Inverter drive enables the capacity control for 1 Hz/step at 25 to 98Hz in cooling operation or at 30 to 105Hz in heating operation.

② **Oil separator**
Collects oil discharged from the compressor. The oil discharged passes through filter, capillary tube and accumulator to return to the compressor.

③ **4-way valve**
Carries out switching of the cooling/heating operations.

④ **EVP : Discharge to Suction bypass motorized valve**
Motorized valve for capacity control.
[When small-capacity indoor unit is operating, opens to activate the high pressure rising protection function (in heating operation) or the freeze protection function (in cooling operation)]

⑤ **EVL : Liquid pipe motorized valve**
In cooling operation, it judges based on outdoor unit's SC control whether there is surplus refrigerant or not, and EVL opens or closes to adjust the surplus refrigerant amount in the receiver.
In heating operation, if EVG is opened, when the surplus refrigerant is in receiver the entire system control is provided.

⑥ **EVG : Gas pipe motorized valve**
In cooling operation, if EVL is opened, when the surplus refrigerant is in receiver the entire system control is provided. In heating operation, if surplus refrigerant treatment is required (the opening of EVT is minimum), feed the surplus refrigerant in the receiver with reverse discharge pipe temperature control. If small-capacity indoor unit is connected and the high pressure rises, open the EVG to increase auxiliary heat exchanger capacity and decrease the high pressure.

⑦ **Outdoor unit fan**
The upper limit of the fan speed is provided to secure the differential pressure in low-temperature cooling operation. The fan runs with H-tap in overloaded cooling and low-temperature heating. For other cases the fan runs with L-tap.

⑧ **Capillary tube for gas purge**
When the unit is operated in pump down mode, this tube serves as gas purging capillary tube.

⑨ **Check valve**
When the liquid refrigerant in the receiver overflows, flows the liquid refrigerant to accelerate the evaporation in cooling operation, or prevent the liquid refrigerant from intrusion into the receiver in heating operation.

⑩ **Check valve**
When the liquid refrigerant in the receiver overflows, prevents the liquid refrigerant from flowing into the suction pipe in cooling operation, or prevent the liquid refrigerant from EVL from flowing into the discharge side when heating.

⑪ **Cooling piping**
When EVP is open, cools the discharged gas once and protects the EVP from abnormal high temperature.

⑫ **EVU : Motorized valve in operating room BP unit**
When EVL opens in cooling operation, activates SH control to carry out self-determination of the refrigerant control in BP unit. When EVL is closed, carries out the entire system control and distribution control (gas pipe isothermal control). In heating operation, carries out the controls equal to Super-multi unit control (entire system control and SC control).

⑬ **EVT : Motorized valve in non-operating room BP unit**
In cooling operation, fully closed.
In heating operation, carries out the control equal to Super-multi unit control (entire system control).

⑭ **EVH : Bypass motorized valve in BP unit**
Opens at specified opening degree when oil collecting operation is conducted in heating mode.
The EVH opens as well when oil collecting and defrosting operation is conducted in cooling mode.

1.3 Protective Devices, Thermistors, Sensors

A HPS
When the high pressure rose abnormally, HPS is actuated to stop the compressor.

B Low pressure sensor
Carries out controls such as low pressure protection (compressor protection), and ending pump down operation, and judgement of gas shortage.

C Outdoor air thermistor
Carries out controls such as fan tap control (H/L switching), determination of initial frequency, and compressor protection control.

D Outdoor unit heat exchanger thermistor
Carries out the target discharge pipe temperature control and the judgement of defrosting start.

E Outdoor unit liquid pipe thermistor
In cooling operation, carries out the outdoor unit SC control (subcooling control) and the judgement on defrost resetting.

F Discharge pipe thermistor
Carries out the compressor internal temperature protection control (operation halts due to the discharge pipe abnormal high temperature, gas shortage, etc.)
Carries out the judgement of open-phase operation and the system control.

G Suction pipe thermistor
Carries out the pump down operation.

H Indoor unit room temperature thermistor
Instructs the capacity supply to BP unit using the room temperature.

I Indoor unit heat exchanger thermistor
Carries out various protection functions and controls of capacity (peak cut, freeze protection, heat exchanger isothermal control in heating operation, target discharge pipe temperature control, SH control in cooling operation, SC control in heating operation).

J BP unit liquid pipe thermistor
In heating operation, carries out the indoor unit SC control.

K BP unit gas pipe temperature thermistor
In cooling operation, carries out the indoor unit SH control and the cooling gas pipe isothermal control.

2. Protection Device

2.1 Outdoor Unit

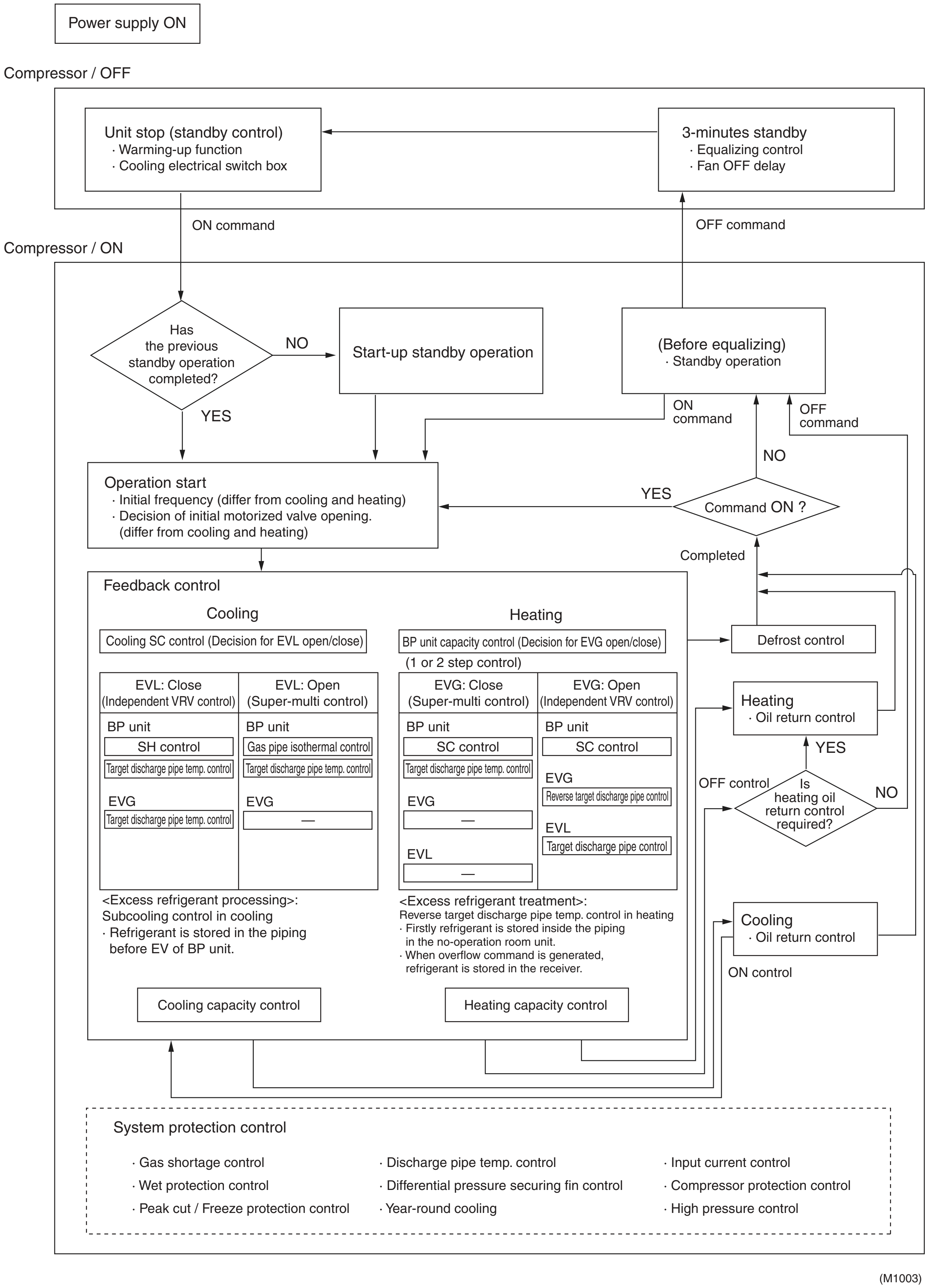
		RMX140JVM	
M1C	Compressor	JT100F-VD	3.3kW ° 1 Scroll
J1HC	Crankcase Heater	—	
HPS	High Pressure Protection	(3SA45022-1) OFF: 2.94MPa ON: 2.16MPa	
SP	Low Pressure Sensor	(3SA48112-1) PS8040A 0~0.98MPa	
Y1E (EV_G)	Electronic Expansion Valve	Main Body (2SB45422-1) Coil (3SB45348-8)	LAM-B30YHDM-1
Y2E (EV_L)	Electronic Expansion Valve	Main Body (2SB45422-1) Coil (3SB45348-1)	LAM-B30YHDM-1
Y3E (EV_P)	Electronic Expansion Valve	Main Body (3SA52028-1) Coil (3P002169-1)	EKV-30D36
Y1R	4-Way Valve	Main Body (3SA52023-1) V40100B Coil (3SA52037-5-KU)	V40100B H/p Only
M1F	Fan Motor (Lower)	(3SB40509-1) H41, L30-W ° 1 8P Propeller	
M2F	Fan Motor (Upper)	(3SB40509-1) H53, L38-W ° 1 8P Propeller	
C1R	Capacitor for Fan Motor	(3EB60099-1) 2,500µF	
L1R	Direct Current Reactor	(3EB75084-1)	
L2R	Direct Current Reactor	(3EB75084-1)	
F1U	FUSE	(3EB82010-1) (250)V (3.15)A	
R1T	Thermistor (Condenser)	(3EB70006-19) R25 = 20kΩ B = 3,950	
R2T	Thermistor (Liquid)	(3EB70006-29) R25 = 20kΩ B = 3,950	
R3T	Thermistor (Outdoor)	(3EB70001-9) R25 = 20kΩ B = 3,950	
R4T	Thermistor (Suction)	(3EB70006-19) R25 = 20kΩ B = 3,950	
R5T	Thermistor (Discharge)	(3EB70006-19) R25 = 20kΩ B = 3,950	

2.2 BP Unit

		BPMK928B42, BPMK928B43	
FU1 ~ 4	FUSE	(3EB82010-1) 250V 3.15A	
Y1E (EV_H)	Electronic Expansion Valve	Main Body (2SB45422-1) Coil (3SB45348-10)	LAM-B30YHDM-1
Y2E	Electronic Expansion Valve	Main Body (2SB45422-1) Coil (3SB45348-10)	
Y3E	Electronic Expansion Valve	Main Body (2SB45422-1) Coil (3SB45348-10)	
Y4E	Electronic Expansion Valve	Main Body (2SB45422-1) Coil (3SB45348-10)	

3. System control

3.1 Outline of System Control



3.2 Mode Configuration

Air Conditioner Control Mode

Air conditioner control mode

Standby Mode	Standby Control at Power ON
	Cooling Standby Operation
	Heating Standby Operation
	Pressure-Equalizing Control
Installation/Servicing Operation Mode	Pump-Down Operation
	Cooling Test Operation
	Heating Test Operation
Normal Operation Mode	Cooling Mode
	Heating Mode
	Stop Mode
Malfunction Processing	

Determination of Normal Operation Mode

The operation mode signal sent from each BP unit is analysed in the following procedure, and this signal is used to determine the operation mode of the outdoor unit.

The operation mode is determined based on the first button pressed.

The following shows operation mode instructions sent from two BP units.
Operation mode command HA is issued from BP 1, and HB is sent from BP2.

1. When HA = HB: Indoor unit command is used.
2. When HA = Stop and HB = Operation (cooling, dry, heating), or HA = Operation (cooling, dry, heating) and HB = Stop: Control room command is used.
3. When HA = Operation, HB = Operation and HA ≠ HB: Due to mode batting, the following operation mode is used.
   The first operation mode entered takes precedence. (operation based on first button pressed)

Note The dry mode is treated as cooling mode, and the two entered modes do not result in mode batting.

4. The current operation mode (of outdoor unit) is sent to all BP units.

3.3 Standby Control at Power ON

Purpose of the Function

To initialize the motorized valve at power ON, to determine the valve opening degree and promote pressure equalization, and to conduct a standby operation.

The reason for promoting pressure equalization at power ON is to prevent the compressor from locking due to insufficient pressure equalization that could result if units are restarted immediately after reset during operation (due to momentary power outage and others). The standby operation collects refrigerant in the receiver to ensure sufficient oil level and dilution in the compressor immediately after startup.

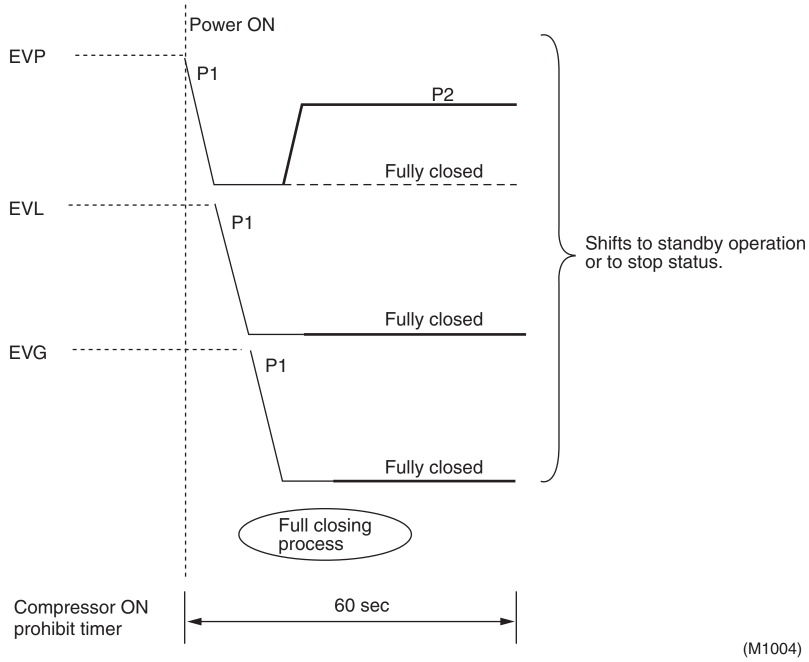
* The standby operation and pressure equalization are described in the next section.

Explanation of The Function

[Detail]

1. Compressor ON prohibit timer (60 seconds) starts when power is turned on.
   P1 pulses is closed, and the current opening degree is set to 0 pulse (full closing process)
2. Compressor ON prohibit timer reaches the set time, a standby operation is activated.

Note When the compressor ON prohibit timer is in counting operation, operation of the compressor is prohibited.
During standby operation, operation command from BP units are ignored.



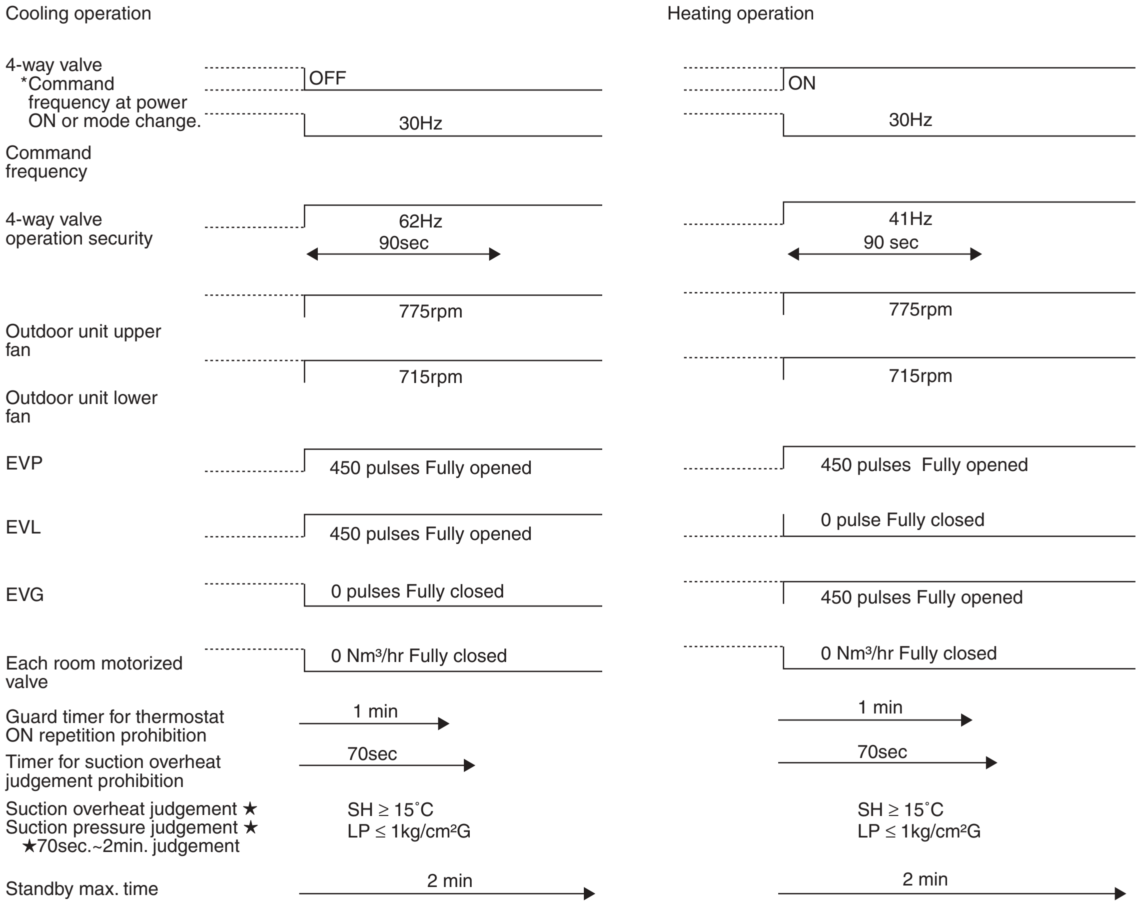
Note Regarding initialization of BP motorized valves at power ON, refer to the section on BP motorized valve full closing on page 107.

3.4 Cooling / Heating Standby Operation at Startup

Purpose of the Function

To prepare for the next startup after operation shutdown and to collect refrigerant into the receiver in order to prevent liquid refrigerant from returning to the accumulator and compressor at startup.

Standby Operation



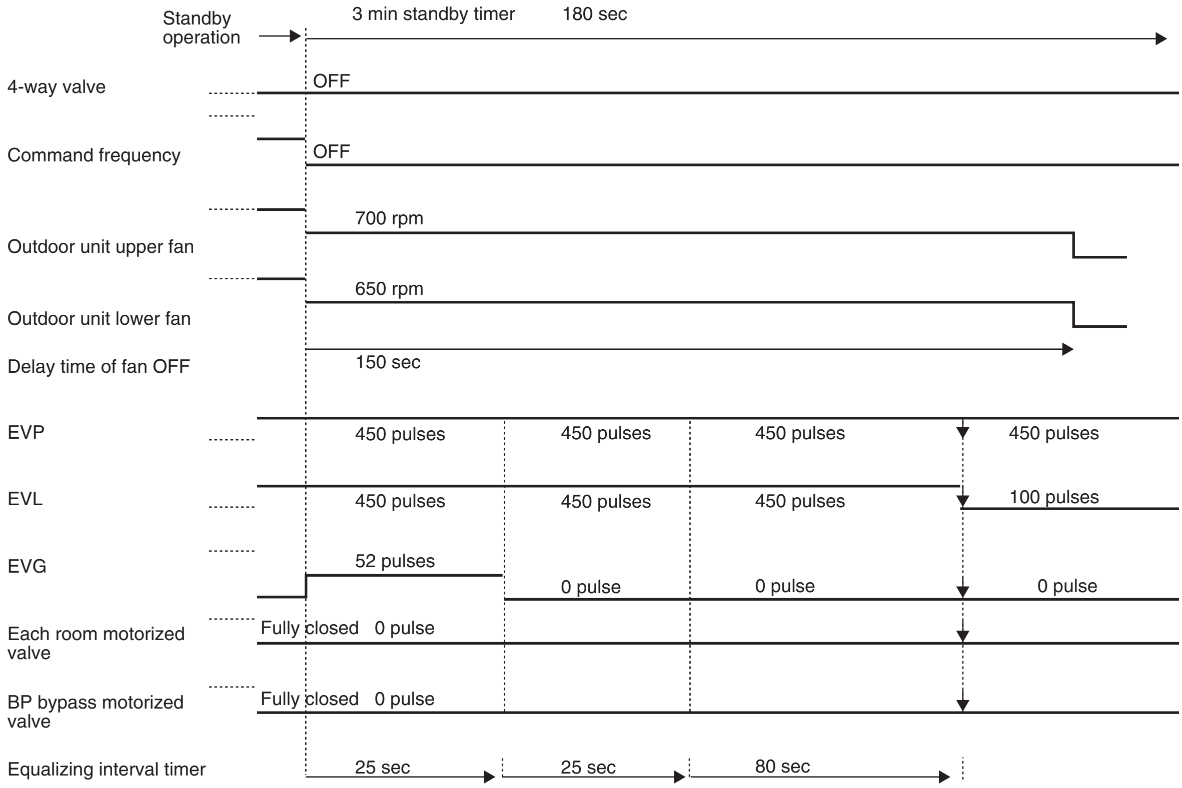
(M1005)

3.5 Equalizing Control

Purpose of the Function

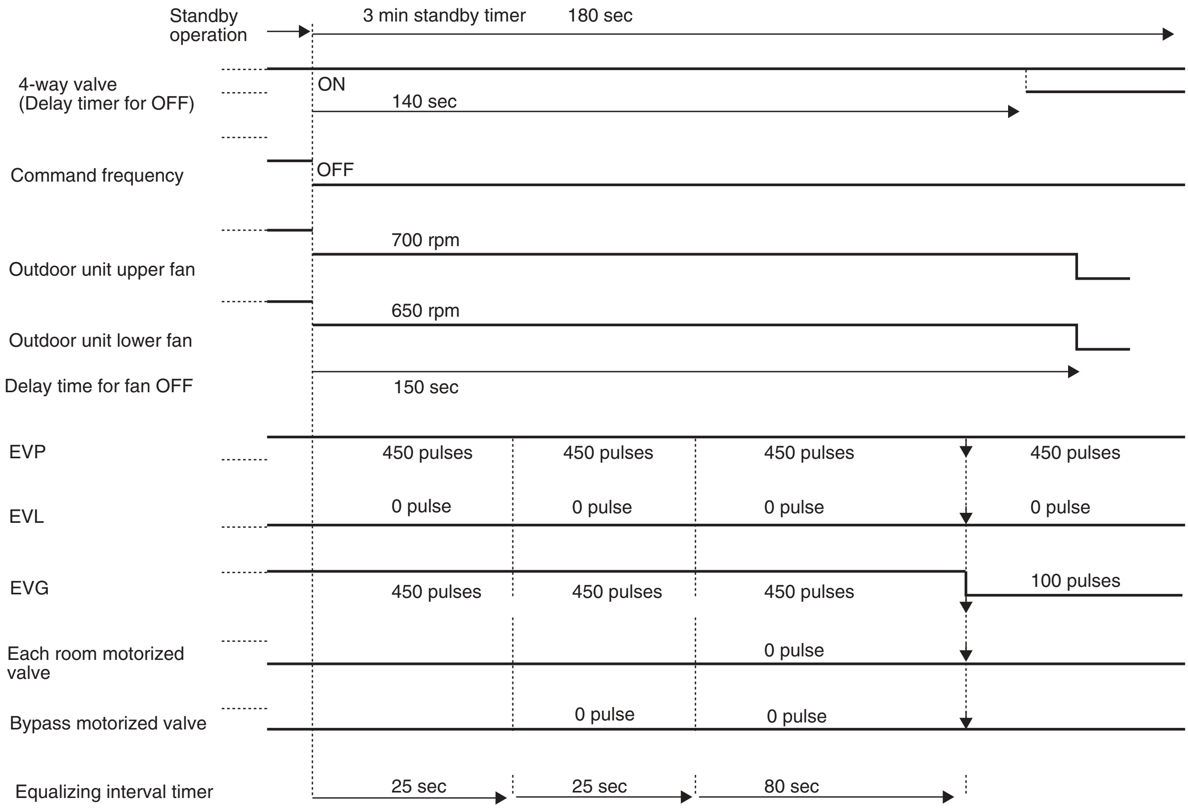
To provide equalizing control after a standby operation in order to prevent the compressor from locking due to insufficient equalizing and to ensure smooth compressor startup.

Equalizing Control in Cooling



(M1006)

Equalizing Control in Heating



(M1007)

3.6 Determination of Initial Frequency

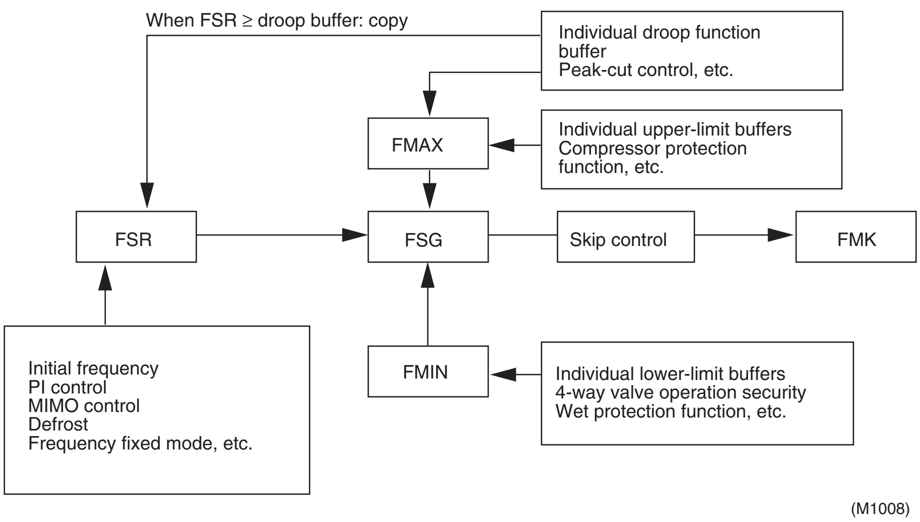
3.6.1 Determination of Operation Frequency

Purpose of the Function

To control the operating frequency in order to ensure compressor reliability and optimise the operating condition.

Outline

ΔD signals (difference between room temperature and temperature setting) from BP units are used to determine the frequency corresponding to the capacities of the indoor units connected to the BP units.
This function is also described in the following section.
Method of determining frequency



Method of determining frequency
The compressor operating frequency is determined in the following steps.

1. Selection of command frequency FSR
2. Selection of upper-limit frequency FMAX
3. Selection of lower-limit frequency FMIN
4. Selection of restriction frequency FSG
5. Execution of prohibit frequency skip control
6. Selection of target frequency FMK

3.6.2 BP Unit Command Conversion

1. ΔD (room temperature – temperature setting) signals from BP units are converted to α values.

ΔD signals from BP units are used as the α value in frequency commands (excludes when Powerful function is in operation).

ΔD Signal	α Value	Temperature Difference	
0	0	0	←Thermostat OFF
1	0	0.5	
2	1	1.0	
3	2	1.5	
4	3	2.0	
5	4	2.5	
6	5	3.0	
7	6	3.5	
8	7	4.0	
9	8	4.5	
A	9	5.0	
B	A	5.5	
C	B	6.0	
D	C	6.5	
E	D	7.0	
F	E	7.5	←Regarding thermostat OFF Temperature difference between BP thermostat OFF point and room temperature

2. Processing during Powerful operation mode

(1) When Powerful command is received from indoor units (one or more units)
(2) Thermostats are not OFF in room units from which Powerful commands are issued

When the above conditions are met, the Powerful operation mode is activated, and the following processes are conducted.

(3) Based on the α value determined by ΔD signal from indoor unit, the following calculation is performed.
α value = α value + α PWR

3. Determination of S value

There are two types of indoor unit capacities from individual BP units. One is the ΣS value of the connected indoor unit, and the other is the ΣS value of the indoor unit which receives an operation demand for the same mode as that of the outdoor unit. They are called H/U connection ΣS value and BP operation ΣS value, respectively. The sums of those S values of BP units are called outdoor unit connection ΣS value and outdoor unit operation ΣS value.
In this manual, outdoor unit connection ΣS value is referred to as ΣS value, and outdoor unit connection ΣS value is referred to as ΣS value.

3.6.3 Determination of Initial Frequency

Initial frequency setting (determination of initial operating frequency based on S value and ΔD signal (α value))

Outline

When the compressor starts and when a change occurs in the conditions such as change of room unit operations, the sum of the maximum α value (MAXα) of each H/U unit, the total of S values of operating indoor units (ΣSU) and the total of S values of non-operating room units (ΣST) is used for the frequency initialization.
(Addition of non-operating room unit correction to S value classification)
Non-operating room unit refers to an indoor unit with thermostat OFF.
To ensure appropriate capacity supply in accordance with outside temperature, correction is provided based on the outside temperature.
Furthermore, for improved startup in heating cold start, frequency correction is provided based on the detection of cold start or hot start (change in the number of rooms) using the discharge pipe temperature.

Description

Determination of S value classification
The sum of S values sent form each BP unit of operating rooms (ΣSu) and non-operating rooms (ΣST) are used to determine the S value of outdoor unit (system).
For cooling: ΣS= ΣSu
For heating: ΣS= ΣSu + 0.25 ~ ΣST
When S value changes in above case, the initial frequency is determined according to the following matrix and set as FINI 1.

Note No change is made in ΣS during defrost control (FD = 1).

The frequency obtained by substituting FINI 1, outside air temperature and discharge pipe temperature in the following equation is set as command frequency FSR.

Whereas,
Discharge pipe temperature DO ≥45˚C: KFIDO = 1
Discharge pipe temperature DO < 45˚C: KFIDO = 1.4

S value : Frequency constant
ΣS : Total of S value

Determination of initial frequency for cooling

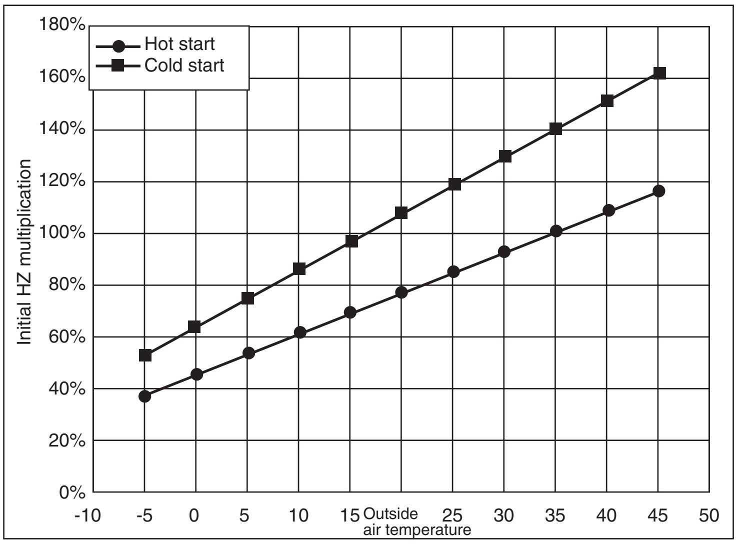
Initial frequency FSR is determined based on the correction of outside air temperature (DOA) and discharge pipe temperature (DO) in accordance with the above matrix.

FSR = KFIDO ° (2/128 ° (DOA - 35˚C) ° FINI1+FINI1)

KFIDO varies depending on discharge pipe temperature DO

When DO ≥ DOFINI (45˚C): KFIDO = KFIDOH (128/128) --- Hot start

When DO < DOFINI (45˚C): KFIDO = KFIDOL (179/128) --- Cold start



(M1009)

Reference Outside Air Temperature	Hot Start	Cold Start
35˚C	128/128	179/128

Outside Air Temperature	Hot Start	Cold Start
-5	37.5%	52.4%
0	45.3%	63.4%
5	53.1%	74.3%
10	60.9%	85.2%
15	68.8%	96.1%
20	76.6%	107.1%
25	84.4%	118.0%
30	92.2%	128.9%
35	100.0%	139.8%
40	107.8%	150.8%
45	115.6%	161.7%

Determination of initial frequency for heating

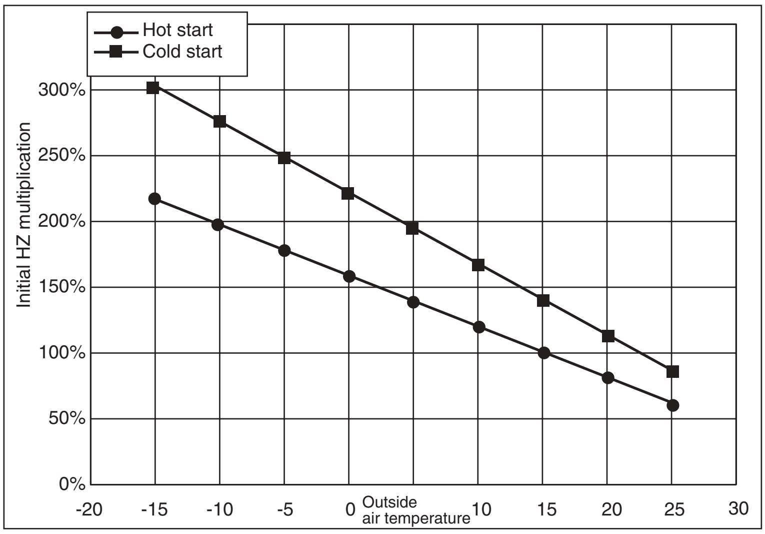
Initial frequency FSR is determined based on the correction of outside air temperature (DOA) and discharge pipe temperature (DO) in accordance with the above matrix.

FSR = KFIDO ° (-5/128 ° (DOA - 15˚C) ° FINI1+FINI1)

3/ KFIDO varies depending on discharge pipe temperature DO

When DO ≥ DOFINI (45˚C): KFIDO = KFIDOH (128/128) --- Hot start

When DO < DOFINI (45˚C): KFIDO = KFIDOL (179/128) --- Cold start



(M1010)

Reference Outside Air Temperature	Hot Start	Cold Start
15˚C	128/128	179/128

Outside Air Temperature	Hot Start	Cold Start
-15	217.2%	303.7%
-10	197.7%	276.4%
-5	178.1%	249.1%
0	158.6%	221.8%
5	139.1%	194.5%
10	119.5%	167.2%
15	100.0%	139.8%
20	80.5%	112.5%
25	60.9%	85.2%

3.7 Oil Return Operation

Purpose of the Function

To collect refrigerating machine oil that adheres on the internal connection pipe wall during regular operation and send it to the compressor.

Outline

The oil recovery operation is conducted in the cooling cycle in both heating and cooling modes. The oil recovery operation collects oil dissolved in liquid refrigerant from High Hz and Low Hz (two types in both cooling and heating) and the section between Refnet joint and branch unit if there is a non-operating branch unit during cooling operation.

Oil recovery function in cooling operation

	Integral Timer		Oil Recovery Time	
Oil recovery from non-operating branch unit	TRAC1	1.5 hours	TRBC1	2 minutes
Oil recovery during High Hz appearing	TRAC2	5 hours	TRBC2	2 minutes
Oil recovery during Low Hz operation	TRAC3	8 hours	TRBC3	2 minutes

The opening of bypass motorized valve in branch unit shall be 450 pulses during oil recovery operation.

Oil recovery function in heating operation
Similar to the reverse cycle defrost, oil is collected by the cooling cycle.
The opening of bypass motorized valve in branch unit shall be 100 pulses during oil recovery operation.
The oil recovery interval setting timer is set to 3 hours.

Details

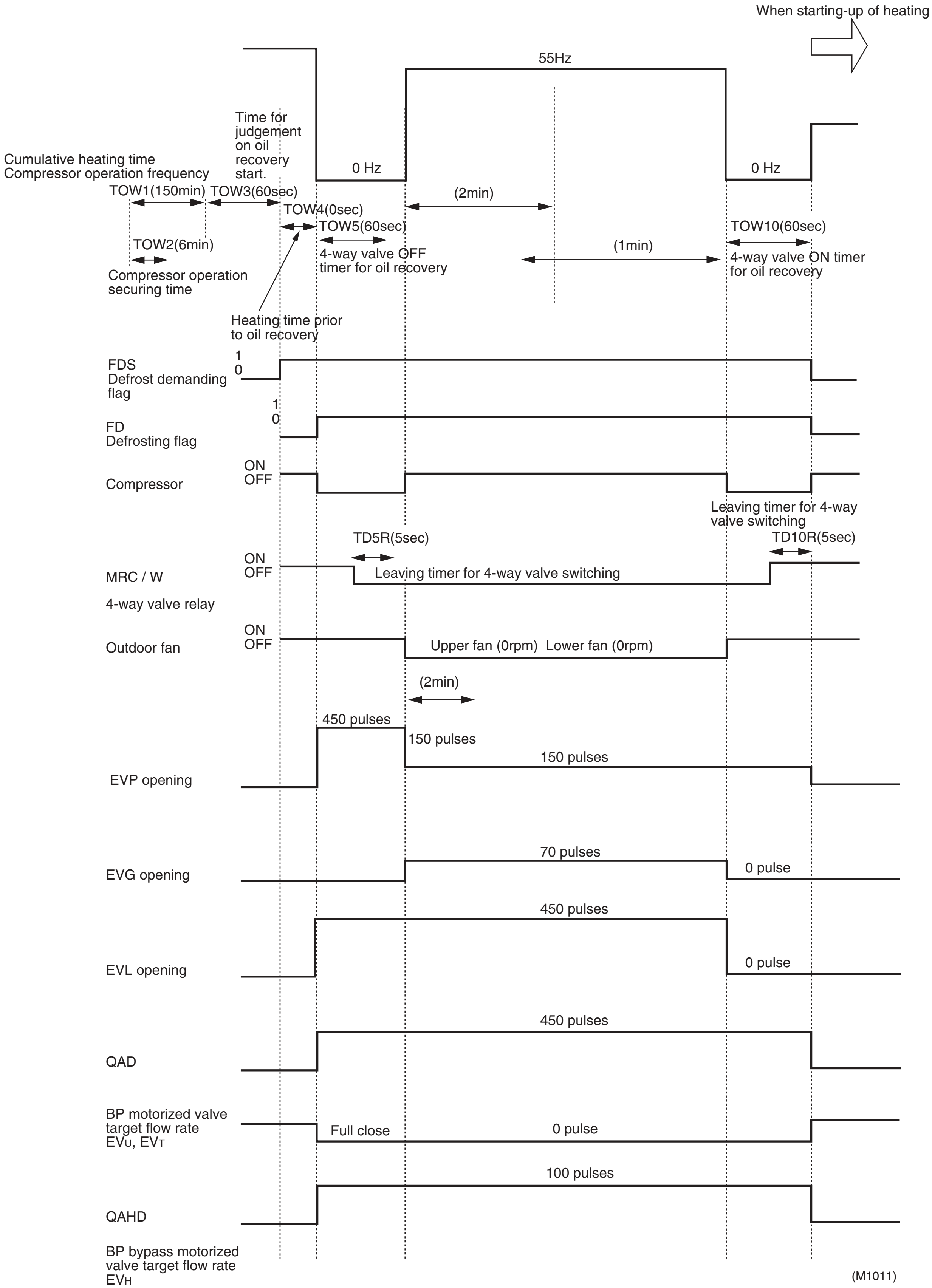
Oil recovery operation in cooling mode
In cooling operation, two types of oil recovery operations are conducted. One type of operation collects refrigerating machine oil adhered on the main pipe wall and sends it to the compressor. The other type, called non-operating BP oil recovery operation, collects refrigerating machine oil seeping into non-cooling room units.
The intervals of operations to recover oil from the main pipe become shorter when the operating frequency exceeds the specified frequency.

Main pipe oil recovery operation
When the operating frequency exceeds 75 Hz even once after an oil recovery operation, the oil recovery operation interval becomes 5 hours. When the operating frequency does not exceed 75 Hz, the operation interval is 8 hours.

The minimum time of main pipe oil recovery operation time is 2 minutes. The maximum time is 5 minutes when High Hz appears. Under normal Hz, the operation time is 5 minutes.
During a main pipe oil recovery operation, the opening of the EVHs of BP units are set to 450 pulses when High Hz appears, but under normal Hz the opening are set to 450 pulses.

Non-operating BP oil recovery operation
When a BP unit with non-operating room units remain in that condition for 90 minutes while room units of other BP units are operating, an oil recovery operation is activated to collect oil from non-operating room units.
The opening of the EVHs of BPs for which the non-operating BP oil recovery operation is conducted are set to 450 pulses.
The opening of the EVHs of BPs for which the non-operating room unit oil recovery operation is conducted are set to 450 pulses.
The minimum and maximum times of non-operating BP oil recovery operation are 2 minutes and 5 minutes, respectively.

Oil recovery operation in heating mode

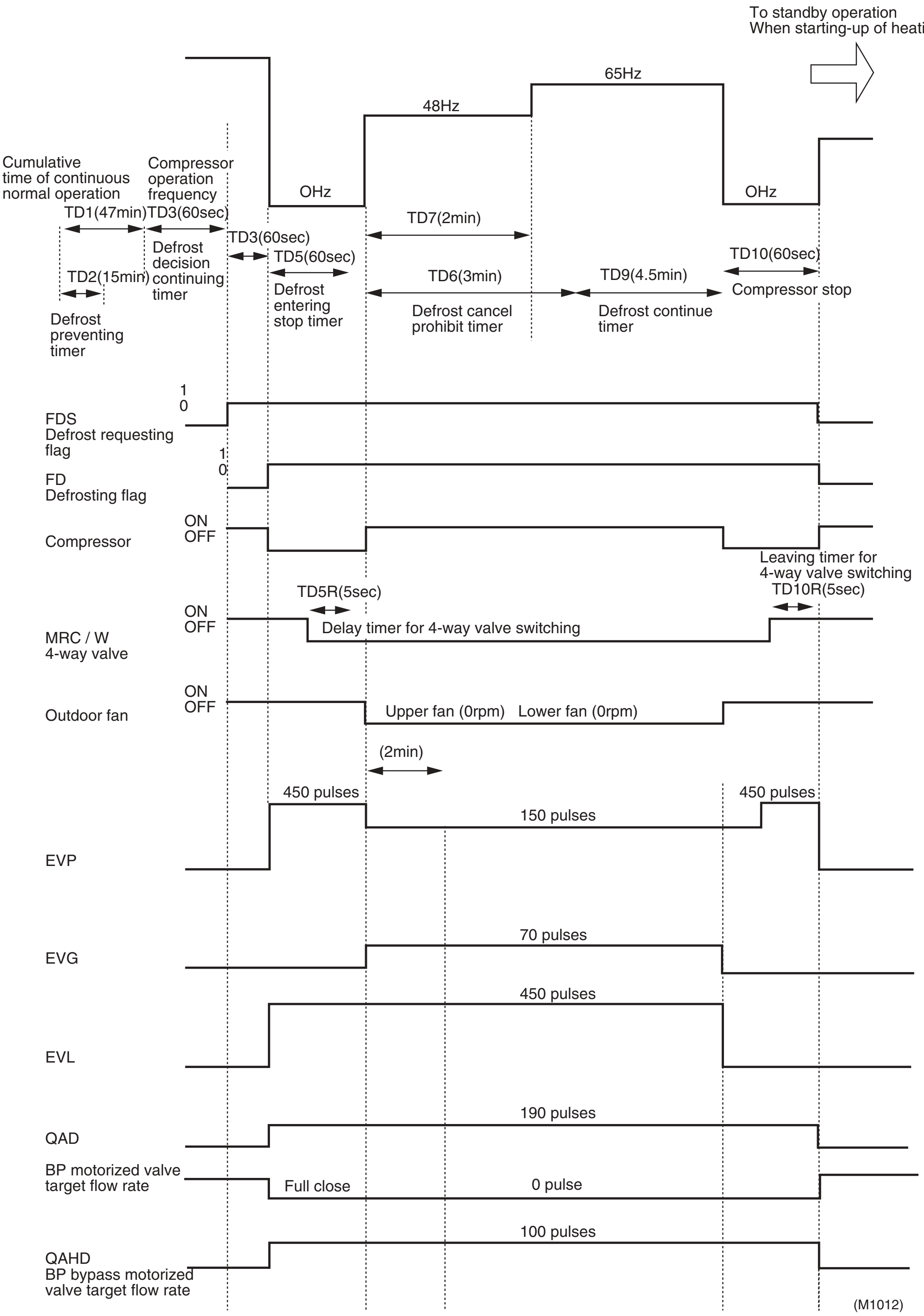


3.8 Defrost Operation

Outline

During heating operation, the outdoor heat exchanger intermediate temperature of a frosted unit is estimated based on the outdoor temperature and compressor output frequency. If the outdoor heat exchanger intermediate temperature is lower than the estimated defrosting temperature, the unit is considered to be frosted; therefore, the compressor is stopped and the cooling cycle is activated for a defrosting operation (reverse cycle defrost). The defrosting operation stops when a certain time elapse or when the outdoor heat exchanger liquid pipe temperature reaches the preset temperature level.

Details

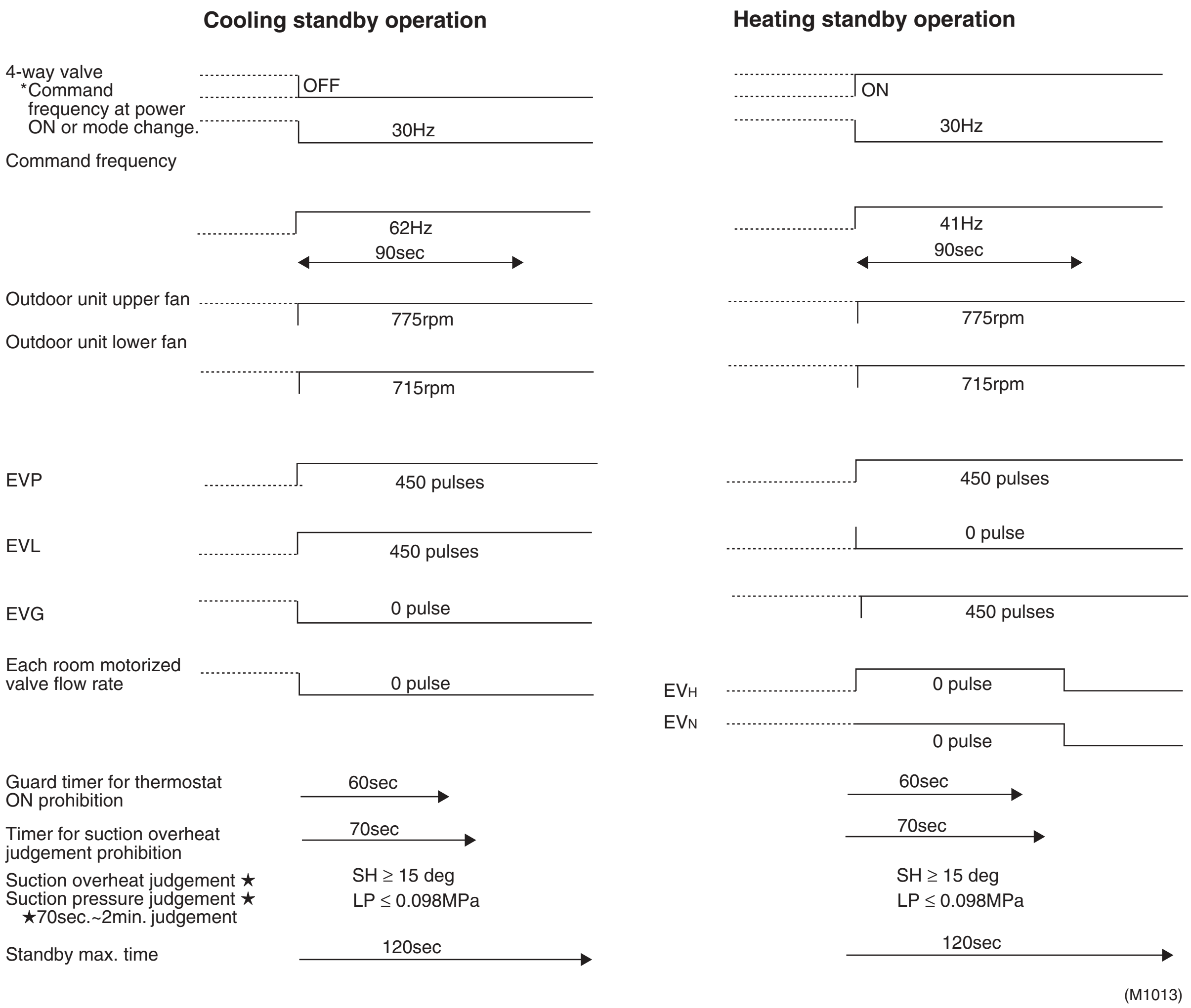


3.9 Pre-Equalization Standby Operation

Outline

In local air conditioner control mode and frequency fix mode, this function collects surplus refrigerant in the receiver before the operation mode is changed from cooling or the compressor stops due to thermostat OFF.
This ensures proper oil level and dilution for the next startup operation.
This function is also activated before cooling operation starts in units that have not completed the standby operation.

Details



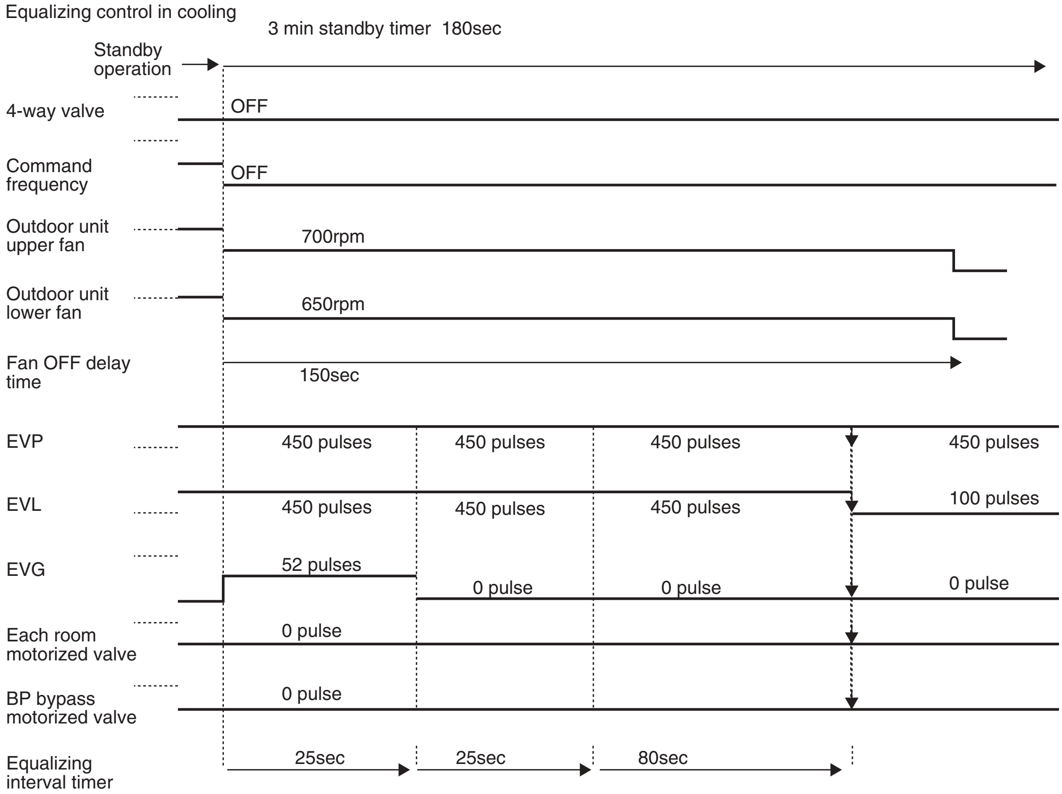
3.10 Equalizing Control

Outline

This function provides equalizing control after a standby operation in order to prevent the compressor from
locking due to insufficient equalization and to ensure smooth compressor startup.

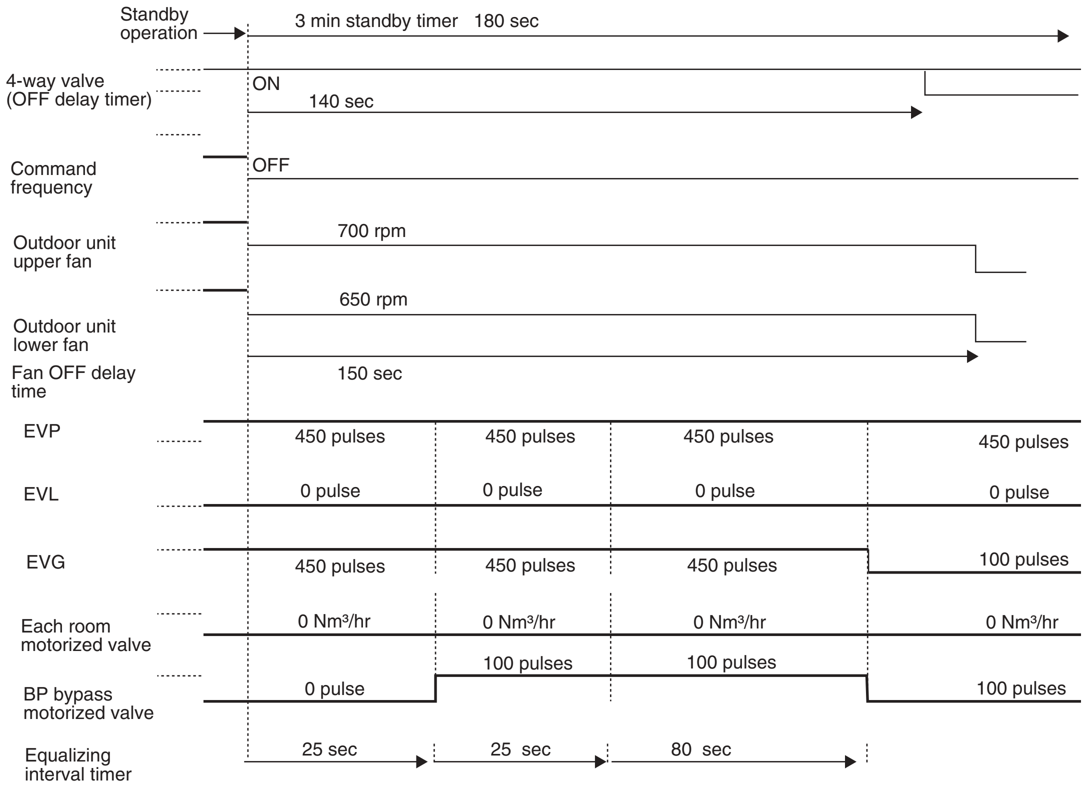
Details

Equalizing control in cooling



(M1014)

Equalizing control in heating



(M1015)

3.11 Capacity Control

3.11.1 Outdoor Unit Motorized Valve Low Pressure (Cooling Capacity) Control

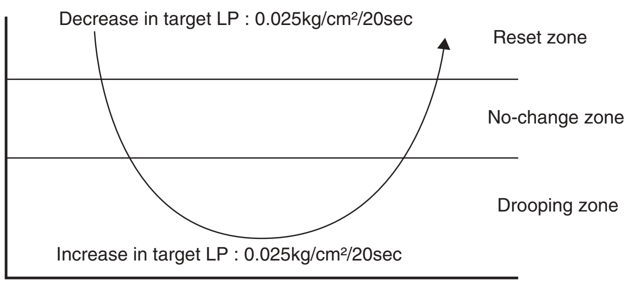
Outline

This functions forms a discharge-suction bypass circuit to prevent the suction pressure from dropping (freezing of indoor unit) during cooling due to excessively low indoor heat exchange capacity even when operating at the minimum frequency.
The freeze prevention status from the indoor unit is used to calculate target suction pressure LPMK, and the discharge bypass motorized valve is controlled to achieve the target suction pressure.

Details

Zones are produced based on the freeze prevention status sent from the BP unit (indoor unit), and the freeze prevention control provides cooling capacity control when the operating frequency reaches the minimum frequency.

The cooling capacity control adjusts the EVP to vary the target low temperature based on the freeze prevention status so the target low pressure is attained.



(M1016)

EVP (discharge bypass motorized valve) operating amount

The suction pressure is detected during each sampling operation (20 sec). The difference target LP is used to determine the amount of valve operation.
In case of Target LP < Current LP, EVP: close
In case of Target LP > Current LP, EVP: open

The capacity control ends when 60 seconds elapse from the time the EVP closes fully.

3.11.2 Outdoor Unit Motorized Valve High Pressure (Heating Capacity) Control

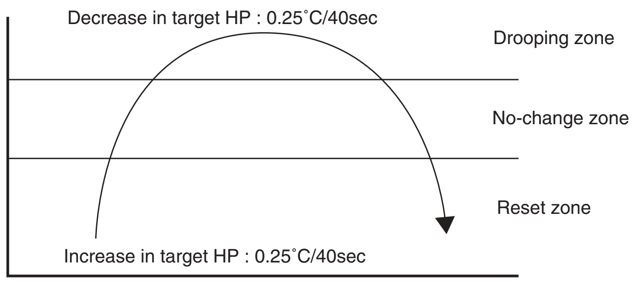
Outline

This function opens the gas pipe motorized valve then forms a discharge-suction bypass circuit to prevent high pressure rise during cooling due to excessively low indoor heat exchange capacity even when operating at the minimum frequency.
The peak-cut control, low Hz high pressure control and high pressure control lower the operating frequency to the minimum level. If the high pressure is high, target high pressure saturation temperature TDSET is calculated, and the gas pipe motorized valve and discharge bypass motorized valve are controlled to attain the target high pressure saturation temperature.

Details

When the operating frequency lowers to the minimum frequency due to the peak-cut control and high pressure control, the heating capacity control is activated.
The heating capacity control provides 2-step control.
1st step: Opens the EVG to increase the condensing capacity of the auxiliary heat exchanger located under the outdoor heat exchanger in order to decrease the high pressure.
2nd step: Opens the EVG fully. If the high pressure is high, the discharge bypass is used for the capacity control.

The heating capacity control adjusts the EVG and EVP to vary the target high pressure equivalent saturation temperature based on the peak-cut and high pressure control zones so the target high pressure equivalent saturation temperature is attained.



(M1017)

The upper-limit and lower-limit values of target high pressure equivalent saturation temperature shall be
between 48˚C and 66˚C respectively.
The target high pressure equivalent saturation temperature at start is 56˚C.

Determination of motorized valve operating amount
The target high pressure equivalent saturation temperature is detected during each sampling operation. The difference from the target high pressure equivalent saturation temperatures is used to determine the amount of valve operation.

In case of high pressure equivalent saturation temperature > Target high pressure equivalent saturation
temperature,EVG or EVP: To be opened
In case of high pressure equivalent saturation temperature < Target high pressure equivalent saturation
temperature,EVG or EVP: To be closed

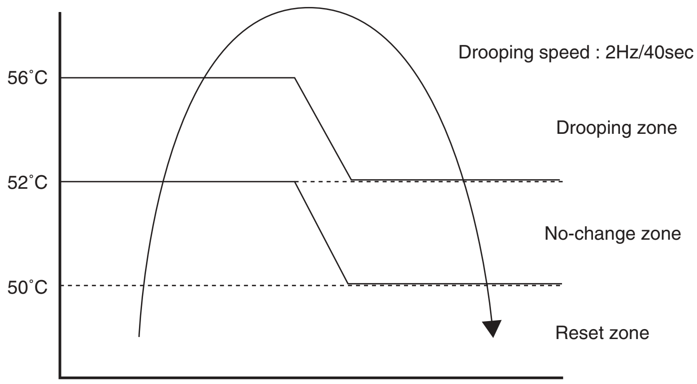
3.12 Peak Cut Control

Outline

Based on the indoor heat exchanger intermediate temperature signal sent from the indoor unit, the compressor output frequency is regulated to lower the compressor capacity in order to prevent an abnormal increase of the high pressure.

Details

Zones are produced based on the heat exchanger temperature signal sent from the BP unit (indoor unit), and the peak-cut control prevents an abnormal rise of the high pressure.



(M1018)

A change of 2 Hz is made when each zone fluctuates.
The reset zone is set for 30 seconds when the operation mode is changed, for 30 seconds when the number of operating room units increase, and for 20 seconds when the number of operating room units decrease.
With each operation of the HPS operation counter, the above zone judgment temperature is decreased by 2˚C.
With each operation of the peak-cut abnormal operation counter , the above drooping speed is increased by 1 Hz.

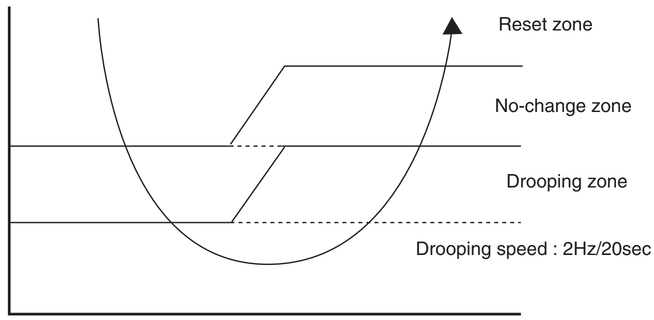
3.13 Freeze-Up Prevention

Outline

According to the freeze prevention status sent from the BP unit, the compressor output frequency is regulated to decrease the compressor capacity in order to prevent the indoor heat exchanger from freezing.

Details

Zones are produced based on the freeze prevention status signal sent from the BP unit (indoor unit), and the freeze prevention control prevents freezing of the indoor unit.



(M1019)

A change of 2 Hz is made when each zone fluctuates.
The reset zone is set for 6 minutes when the operation mode is changed, for 30 seconds when the number of operating room units increase, and for 30 seconds when the number of operating room units decrease.
With each operation of the freeze prevention operation counter, the drooping speed is increased by 1 Hz.

3.14 Gas Shortage Malfunction

Outline

A gas shortage malfunction is detected by using electric current and by judging the discharge pipe temperature and motorized valve opening degree.

Details

Gas shortage detection based on current

The current-based gas shortage detection is conducted when the operating frequency exceeds 55 Hz. When the following condition is met, a gas shortage malfunction is determined.
Input current ≤ (23/256) ° Operating frequency +(-3.5) A

Gas shortage detection based on discharge pipe temperature and motorized valve opening degree

This gas shortage detection method uses either the opening of the motorized valve of the BP or outdoor unit.

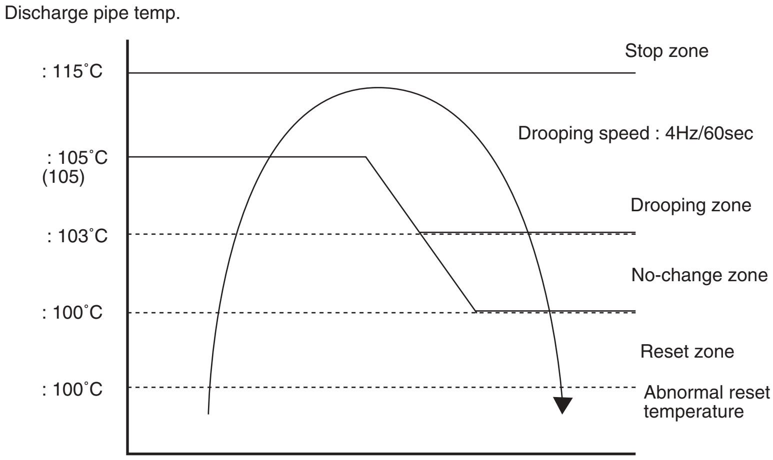
1. **Gas shortage detection based on BP motorized valve opening and discharge pipe temperature**
   Gas shortage malfunction is determined when the following condition is met during discharge pipe temperature control.
   When discharge pipe temperature (DO) > 1 ° target discharge pipe temperature (DOSET) + 20˚C, motorized valve MAX flow rate signal from operating BP is continuously received for 80 seconds.
2. **Gas shortage detection based on outdoor unit motorized valve opening and discharge pipe temperature**
   Gas shortage malfunction is determined when the following condition is met during cooling mode discharge pipe temperature control.
   When discharge pipe temperature (DO) > 1 ° target discharge pipe temperature (DOSET) + 20˚C, condition (EVG ≥ 450 pulses) remains for 80 seconds.
   Shortage of refrigerant charge is judged when the following condition are satisfied during discharge temperature control in heating operation.
   At Discharge pipe temp. (DO) > Target discharge temperature +20ºC and when the condition of
   EVL > 450 pulse continue 80 seconds.

3.15 Discharge Pipe Control

Outline

With the internal compressor temperature used as a substitute of the discharge pipe temperature, when the
discharge pipe temperature exceeds the specified level, the discharge pipe control regulates the upper limit of the output frequency to prevent the internal pressure from rising.
(This function serves the same purpose as the discharge pipe high temperature control that regulates the motorized valve.)

Details



(M1020)

With each operation of the discharge pipe temperature malfunction operation counter, the above zone judgment temperature is decreased by 2.5˚C.

3.16 Input Current Control

3.16.1 Input Current Control I

Outline

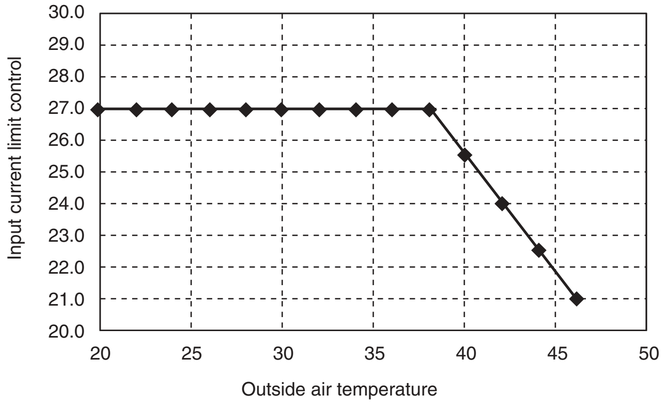
The input current is detected by CT during compressor operation, and the input current value is used to control the upper limit of the frequency.
As shown in the diagram below, the constraint frequency is varied differently in the stop, drooping, no-change and reset zones.
When the constraint frequency remains in the stop zone for the specified period time, the compressor is stopped.
The lower-limit current (input current droop value) in the drooping zone; I3 varies according to the JIS mode or outside temperature (to stay within the system use area).
The input current control I is a higher-level constraint function that takes precedence over the lower-limit control for 4-way valve operation guarantee.

Note Only 4-way valve operation guarantee has precedence, but not other lower-limit control.

Details

The input current is used to control the upper limit of the operating frequency in order to maintain the temperature around the electric parts under a certain level during cooling overload condition.

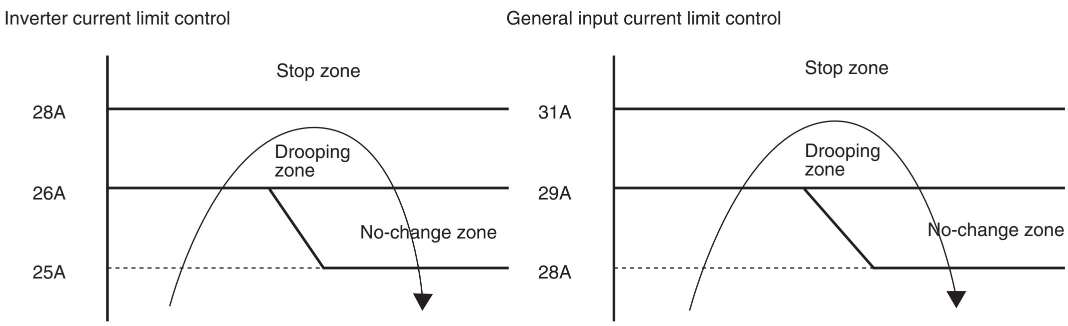
When the outside temperature (DOA) is higher than 38˚C, input current upper-limit value I3CH (27) A is decreased at a rate of (96/128) A/˚C.



(M1021)

Outside Air Temperature	I3CH
20	27.0
22	27.0
24	27.0
26	27.0
28	27.0
30	27.0
32	27.0
34	27.0
36	27.0
38	27.0
40	25.5
42	24.0
44	22.5
46	21.0

Similarly, the input current value in controlled in inverter microcomputers to protect the inverter parts.



(M1022)

3.16.2 Input Current Control II (High Pressure Control)

Outline

Based on the input current and input voltage, the compressor output frequency is regulated to decrease the compressor capacity in order to prevent abnormal rising of the high pressure.

Note

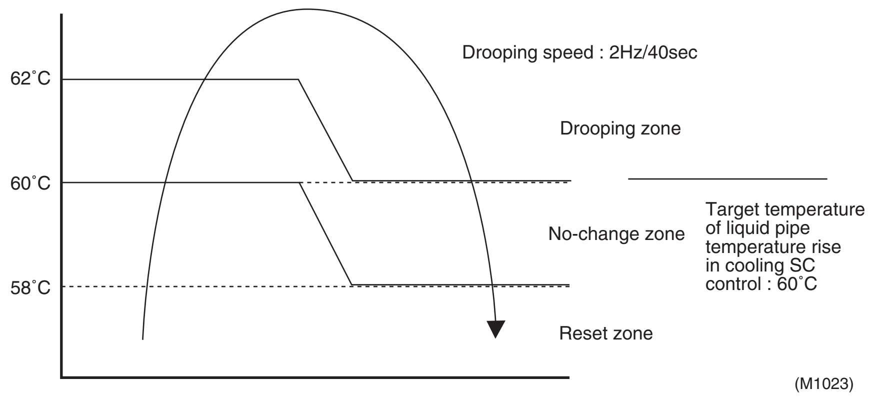
The peak-cut control is similar to this function, but it cannot effectively detect high pressure during transitional condition due to the thermistor's tracing performance; therefore, the high pressure can increase abnormally in some cases. This function droops the compressor when a transitional condition occurs or the high pressure rises suddenly in order to prevent abnormal rising of the high pressure.
Therefore, the function start area is set higher that the high pressure setting of the peak-cut control.

The high pressure saturation temperature is estimated from the power consumption (input voltage, input current), output frequency and suction pressure, and three zones (reset, no-change and drooping zones). When the high pressure saturation temperature is in one of the zone, the output frequency limit is varied depending on the type of the zone.

Details

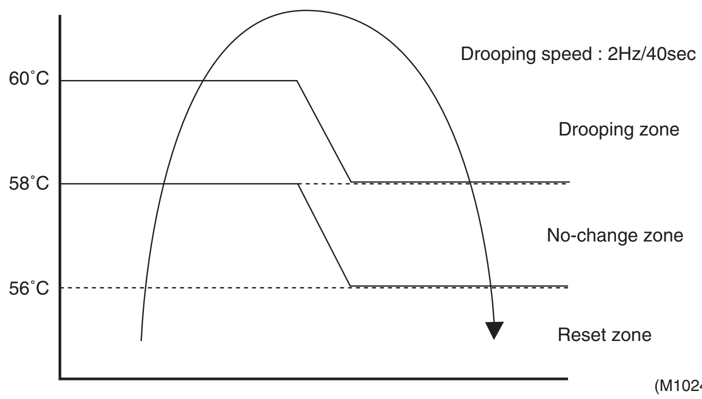
The high pressure is estimated based on the high pressure estimation function (operating frequency, input current, suction pressure), and the estimated high pressure is used to obtain the saturation temperature. When the heat exchanger intermediate temperature enters the overcooling zone, if the peak-cut control does not function, this function prevents abnormal rising of the high pressure.

Cooling



(M1023)

Heating



(M1024)

A change of 2 Hz is made when each zone fluctuates.
The reset zone is set for 30 sec when compressor operation is started, for 30 sec when the number of operating room units increase, and for 2 sec when the number of operating room units decrease.
With each operation of the HPS operation counter, the zone judgement temperature is decreased by 2˚C.

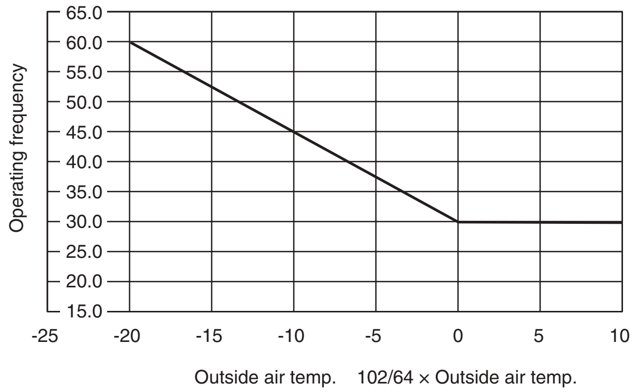
3.17 Wet Protection Control I

Outline

When the outside air temperature is low, the lower limit of operating frequency is restricted to ensure the compressor suction air humidity.

Details

The lower limit of operating frequency (FCG) is set according to following formula and diagram when the outside air temperature (DOA) is 6.5˚C or lower during heating operation.
FCG = KCG1W °outside air temp. (DOA) + FCG7W = 102/64 ° (DOA) + 28



(M1025)

Outside Air Temp.	Lower Limit of Frequency
6	30
4	30
2	30
0	30
-2	32
-4	35
-6	38
-8	41
-10	44
-12	48
-14	51
-16	54
-18	57
-20	60

3.18 Electric Parts Cooling and Electric Parts / Fin Temperature Control

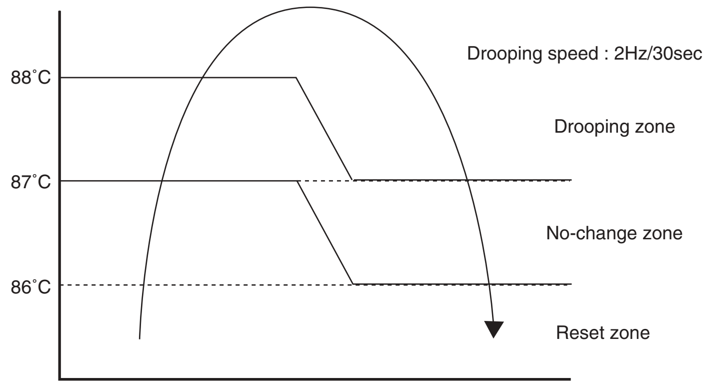
Outline

This function cools the electric parts (outside fan ON control) and turns off the inverter to prevent excessive heating that can cause malfunctions of the electric parts and reduces their service life.

Details

Fin temperature Hz drooping function

Based on the fin temperature detected by the inverter microcomputer, this function prevents generation of inverter stop processing when the fin temperature rises.



(M1026)

A change of 2 Hz is made when each zone fluctuates.
With each operation of the fin temperature abnormal operation counter, the zone judgement temperature is decreased by 2˚C.

Fan control during electric parts cooling

With the compressor turned off (not in pressure equalization control), when box (electrical box) temperature DTR ≥ 75˚C, the top fan rotation is set to 775 rpm and the bottom fan to 715 rpm for the cooling of the electric parts.
When box (electrical box) temperature DTR < 70˚C, the outside fans are turned off.

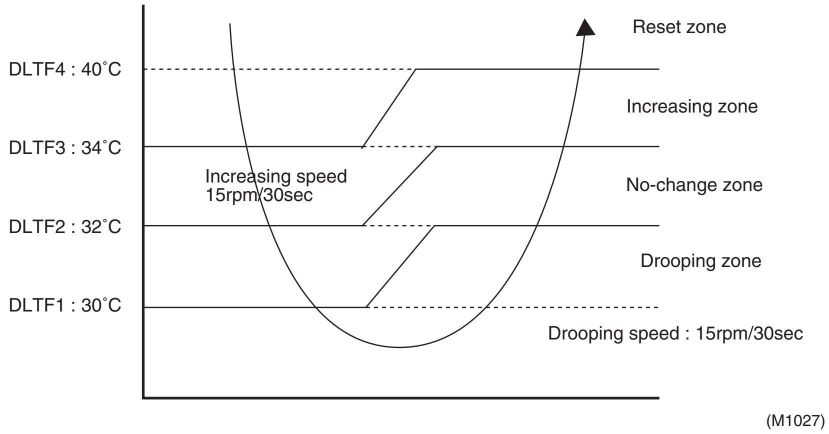
3.19 Differential Pressure Control

Outline

This function sets an upper limit for the fan rotation speed according to the outside temperature and outdoor heat exchanger temperature during cooling operation with low outside temperature. By limiting the fan rotation, the function ensures sufficient differential pressure.

Details

In cooling operation (outside temperature DOA ≤ 30ºC) or in heating mode oil recovery operation, this function provides an upper-limit control of the fan rotation according to the temperature zone of the high pressure equivalent saturation temperature, as shown below.



A change of 2 Hz is made when each zone fluctuates.
The mask time is 30 seconds at the time of heating mode oil recovery operation start, and the reset zone is set for 30 seconds when the number of operating room units changes.

When 330 rpm operation remains for 10 continuous minutes during normal cooling operation, the thermostat is turned off.
When 330 rpm operation remains for 10 continuous minutes during heating mode oil recovery operation, the fans are turned off.

3.20 Year-Round Cooling-Only Function

Outline

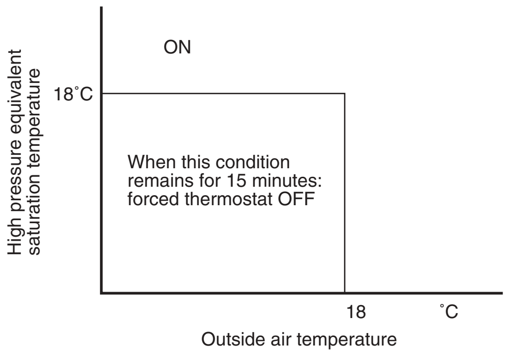
This function turns off the compressor based on the conditions of the outside temperature and high pressure equivalent saturation temperature to ensure compressor reliability.

Details

The year-round cooling-only function provides two types of shutdown function. One is based on the outside temperature and high pressure equivalent saturation temperature, and the other is based only on the outside temperature.

The shutdown function based on the outside temperature and high pressure equivalent saturation temperature stops the operation when sufficient differential pressure cannot be ensured in the compressor.
The shutdown function based on the outside temperature prevent compressor operation when the temperature is outside of the operation area.

■ Shutdown based on outside temperature and high pressure equivalent saturation temperature



(M1028)

■ Shutdown based on outside temperature only

When outside temperature is -5˚C or lower: forced thermostat OFF

3.21 Nighttime Low Noise Control

Purpose of the Function

This function lowers the operating sound when the noise causes problems during the night.

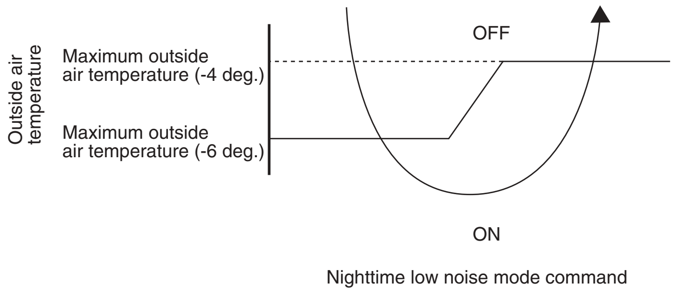
Outline

The function turns the nighttime low-noise instruction ON and OFF according to the outside temperature condition.

* Function start condition
When the nighttime low-noise permit is set (jumper setting), the following control is activated.

Details

During normal cooling operation, outside temperature DOA is detected every 90 minutes. The maximum value of 16 outside temperature measurements is compared with the outside temperature, and the nighttime low noise is determined based on the following condition.



(M1029)

3.22 PI Control

Outline

Based on the ΔD signal, MAXα of the command frequency is monitored every 20 seconds, and PI control is provided accordingly. (Coefficient of PI control varies for each S value.)

P Control

At every sampling time TFSMP, the maximum value (MAXα) of α value is calculated, and if the result differs from the previous value, the frequency is changed according to the amount of fluctuation.
When the previous MAXα is MAXα1 and the newest MAXα is MAXα0, the upper-limit value of MAXα is
MAX_ALFA_MX(9).
Operating frequency operating amount ΔF: ΔF = KP ° (MAXα0 - MAXα1)
P control is prohibited under the following conditions
(Equation (A))
MAX_ALFA_P1(3) ≤ MAXα0 ≤ MAX_ALFA_P2(5)
MAX_ALFA_P1(3) ≤ MAXα1 ≤ MAX_ALFA_P2(5)
P control is prohibited under left condition.

I Control

When the ΔD signal does not change for the specified time, the frequency is increased or decreased according to the MAXα value to set the MAXα value to the specified level.
When MAXα value is small → Frequency is decreased
When MAXα value is large → Frequency is increased

When MAXα at TFSMP(20) timer time-over is MAXα0:
If MAXα0 ≥ MAX_ALFA_12(6)
When frequency does not change for TFSMP ° M(120 sec)
Operating frequency operating amount ΔF is set to ΔF = KI ° (MAXα0 - MAX_ALFA_MK(3))
If MAXα0 ≤ MAX_ALFA_11(2)
Operating frequency is decreased at every TFSMP(20 sec)
Operating frequency operating amount ΔF is set to ΔF = -KI ° BI(1)
I control is prohibited when MAX_ALFA_11(2) < MAXα0 < MAX_ALFA_12(6)

3.23 Warm-Up Function

Outline

This function operates the inverter in a open-phase mode to warm up the compressor when it receives a warm-up command under certain outdoor air temperature and discharge pipe temperature conditions.

Details

1. Preheat conditions

When the stop mode remains for 63 minutes or more and when the capacitor is not discharging

(1) When preheat permit command is issued (EEPROM constant)
① Outside temperature DOA < DOAY1
② Discharge temperature DO < DOY1

(2) When no preheat permit command is issued (EEPROM constant)
① Outside temperature DOA < DOAYS1
② Discharge temperature DO < DOYS1
When conditions ① and ② in (1) are met or when conditions ① and ② in (2) are met

(3) Relay MRM1 turns on

(4) Inverter starts operation in open-phase mode

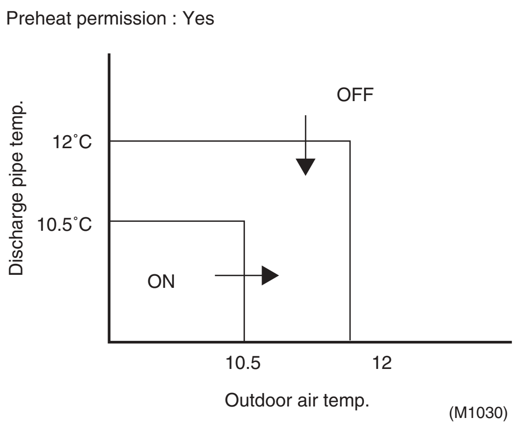
2. Cancellation conditions

(1) When preheat permit command is issued (EEPROM constant)
① Outside temperature DOA > DOAY2 + DOAY1
② Discharge temperature DO > DOY2 + DOY1

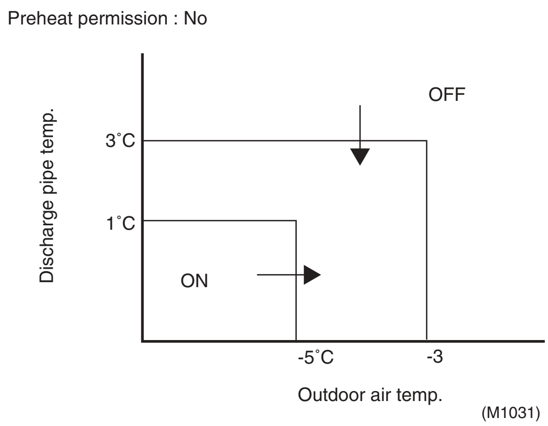
(2) When no preheat permit command is issued (EEPROM constant)
① Outside temperature DOA > DOAYS2 + DOAYS1
② Discharge temperature DO > DOYS2 + DOYS2
When condition ① or ② in (1) is met or when condition ① or ② in (2) is met

(3) Relay MRM1 turns off

(4) Inverter stops operating in open-phase mode



(M1030)



(M1031)

3.24 Compressor Protection Control

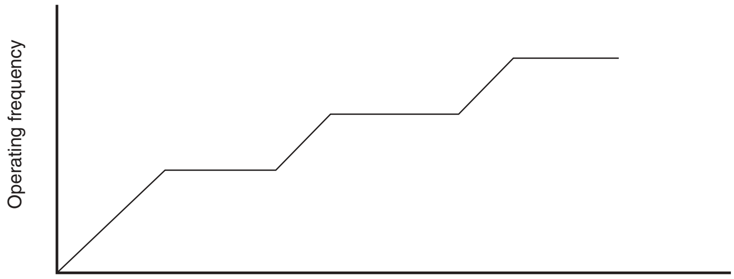
Purpose of the Function

This function ensures appropriate compressor oil level and dilution at startup.

Outline

The following upper-limit frequency control is provided at the compressor OFF→ON edge.
(This function is inactive during defrost control.)

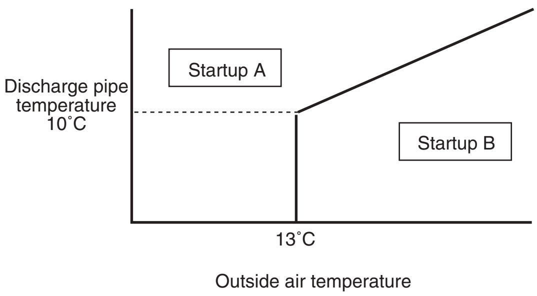
Details



(M1032)

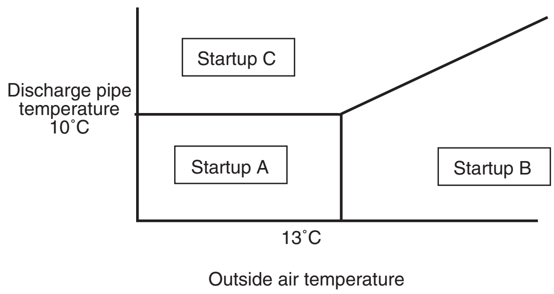
	1st stage		2nd stage		3rd stage		Remarks
Startup A	55	Hz	70	Hz	85	Hz	See the diagram below.
	180	sec	120	sec	150	sec	
Startup B	55	Hz	70	Hz	85	Hz	See the diagram below.
	180	sec	120	sec	150	sec	
Startup C	70	Hz	70	Hz	85	Hz	See the diagram below.
	180	sec	120	sec	150	sec	
Startup D	70	Hz	70	Hz	85	Hz	Standby operation not completed 2 hours after completion of standby operation
	180	sec	120	sec	150	sec	
Startup E	70	Hz	70	Hz	85	Hz	Startup pattern in defrost reset and in heating oil recovery reset
	180	sec	120	sec	150	sec	

More than 2 hours after power reset



(M1033)

When 2 minutes elapsed after power supply resetting.



(M1034)

3.25 Fan Control

Purpose of the Function

This function changes the fan rotation speed or stop the fan operation according to the operating condition in order to prevent abnormal system operation (overload operation) and ensure compressor reliability.

3.25.1 Fan Control under Normal Condition

Outline

The following fan control functions are provided in normal operation.
1. Stop mode fan control.
2. Fan OFF function when the number of heating room units decreases.
3. Low-noise fan control when nighttime low-noise command is issued.
4. Fan control in Powerful operation mode.
5. Fan control in low-noise mode.
6. Fan control in normal cooling mode.
7. Fan control in normal heating mode.

The fan control functions are listed in the priority order.
(The priority order is for the above functions only, and there are fan control functions that take precedence over these.)
→ Refer to the section regarding fan relay control.

Details

Cooling stop/heating stop/stop fan control
The outdoor fans are turned off when the outdoor unit operating mode is in the stop, cooling stop and heating stop modes.

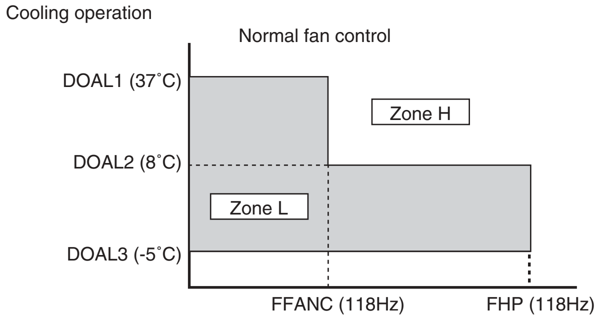
Fan OFF function when the number of heating room units decreases
The outdoor unit fans are turned off for 30 seconds if outside temperature DOA is 10˚C or higher when the number of heating room units decreases (includes change of operating room units that results in the same number of operating room units).
(When the number of operating room units decreases again during the operation of the 30-second counter, the timer is reset and restarted.)

Fan control in Powerful operation mode
1. Control start conditions
   ① Powerful command received from BP unit (even by one room unit).
   ② Room unit receiving Powerful command is not in thermostat OFF status.
   ③ No nighttime low-noise command.

When conditions ①, ② and ③ are met, the Powerful operation mode is activated, and the fan rotation speed is increased 50 rpm from the rotation speed in normal operation.

Fan control in low-noise mode
Refer to the section regarding low-noise fan control on page 93.

Fan control in normal cooling mode
Due to outside air temperature DOA and output frequency FOUT, conditions ① and ② or conditions ③ and ④ listed below are met, the silent mode is activated and sets the fan rotation speed to FANLC.
① DOA < 37˚C
② FOUT < FFAN
③ DOA < 8˚C
④ FFAN ≤ FOUT ≤ FHP



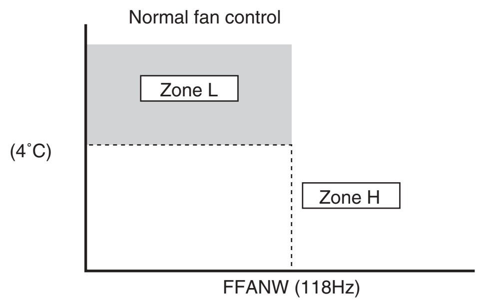
(M1035)

Fan control in normal heating mode

Due to outside air temperature DOA and output frequency FOUT, conditions ① and ② listed below are met, the silent mode is activated and sets the fan rotation speed to FANLW.

① DOA > 4˚C

② FOUT < FFANW



(M1036)

3.25.2 Fan OFF Delay Control

Outline

This function delays the OFF timing of the fan relay for a period of TFOF during compressor ON → OFF
operation.
(This function is not activated after pump-down operation.)

- For the purpose of giving priority to capacitor discharge function after pump-down operation.

Note

- Fan rotation speed shall be FANOF rpm.
- In the case of HPS activation, insufficient power supply voltage and momentary overcurrent abnormality, the fan OFF delay control does not activate because the main relay turns off.

Details

During compressor ON → OFF operation, the function set the upper fan rotation speed to FANOF1 (700) rpm and the lower fan rotation speed to FANOF2 (650) rpm in order to delay the OFF operation of the relay for a period of TFOF(150) sec.

3.26 Motorized Valve Control of Outdoor Unit

3.26.1 Outline of Motorized Valve Control

Outline

The EVL and EVG valve opening operations switch the with/without-receiver selection.

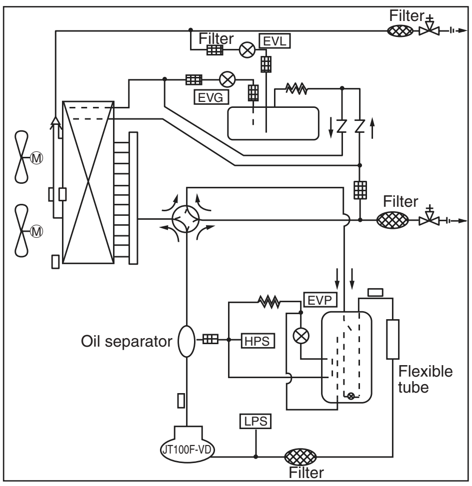
Cooling mode

- When EVL is fully closed (without receiver), the BP motorized valve provides the system control and distribution control.
  EVU ... Target discharge pipe temperature control, gas pipe isothermal control
  EVT ... Fully closed
  EVG ... Target discharge pipe temperature control
- When EVL is not fully closed (with receiver), EVG provides the system control.
  H/U's motorized valve provides individual control. (SH control)
  EVU ... SH control
  EVG ... Target discharge pipe temperature control
- Common
  EVL ... Outdoor unit SC control
  EVP ... Capacity control (low pressure control)

Heating mode

- When EVG is fully closed (without receiver), the BP motorized valve provides the system control and distribution control.
  EVU ... Target discharge pipe temperature control, SC control
  EVT ... Target discharge pipe temperature control
  * Surplus refrigerant processing is conducted in non-operating room units.
  * When motorized valves of non-operating room units are at minimum opening:
  The receiver function ON is set (EVG opens).
  EVL ... Target discharge pipe temperature control
- When EVG is not fully closed (with receiver)
  Not in capacity control
  EVU ... Target discharge pipe temperature control, SC control
  EVT ... Target discharge pipe temperature control
  EVL ... Target discharge pipe temperature control
  EVG ... Target discharge pipe temperature control + Capacity control (high pressure control)
  EVP ... Capacity control (high pressure control)

- ◆ System control ... Provides SH control of refrigerant system, particularly suction control
  Examples: SH control, target discharge pipe temperature control
- ◆ Distribution control ... Distributes refrigerant volume to individual indoor units according to loads. (This function does not control the absolute volume.)
  Examples: Gas pipe isothermal control, liquid pipe isothermal control
- ◆ Individual control ... Controls refrigerant amounts of refrigerant supplied to individual room units based on the absolute volume.
  Examples: SH control (determined by individual indoor units), SC control



(M1037)

EVL: Liquid pipe motorized valve
EVG: Gas pipe motorized valve
EVP: Discharge bypass motorized valve

3.26.2 Outdoor Unit Motorized Valve Opening Restriction

Outline

This function restricts the opening degree of the outdoor unit motorized valves (discharge bypass motorized valve, gas pipe motorized valve and liquid pipe motorized valve) in order to quickly stabilize and control the system.

1. EVP opening restriction

There are two types of EVP control: complete closing and completely closing with retightening
EVP's max. opening is set to EVPMAX.
EVP's min. opening is set to EVPMIN.

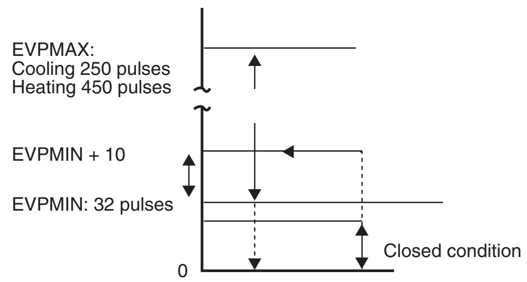
The motorized valve operates as follows when it is fully closed and at min. opening.

① When EVP closes from open condition ("EVP open condition"), EVPMIN is set as the lower limit. When it closes from EVPMIN, the next motorized valve opening degree is set to 0 pulse ("fully closed condition").

② EVP is in the "fully closed condition" from 0 pulse to EVPDP pulses, and the opening degree increments. In the fully closed condition, EVPDP pulses is set as the upper limit. When it opens from the EVPDP condition, the next valve opening degree is set to EVPMIN+EVPDP to achieve "EVP open condition."

Outdoor unit valve opening restriction

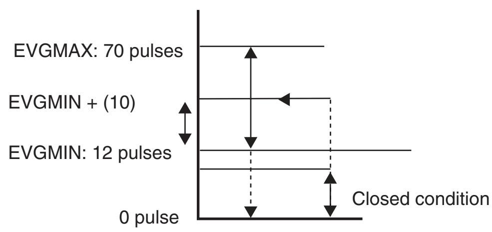
EVP (discharge bypass motorized valve)



(M1055)

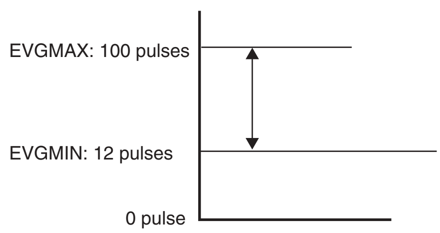
2. EVG (gas pipe motorized valve) opening restriction

■ Not in capacity control during normal heating operation



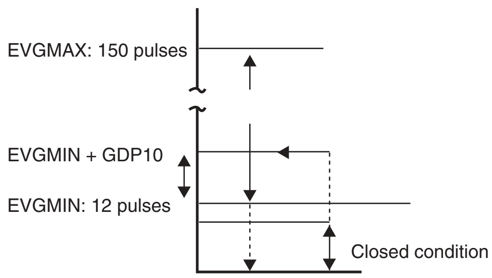
(M1038)

■ ELV fully closed during normal cooling operation (after TEVGARD elapsed 30 sec or more)



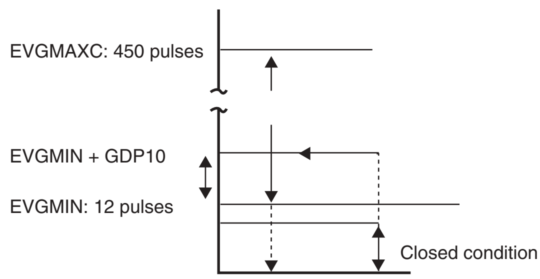
(M1039)

■ In capacity control during normal heating operation



(M1040)

■ EVL not fully closed during normal cooling operation

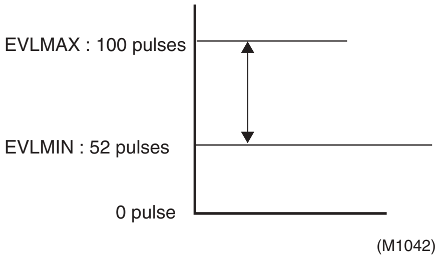


(M1041)

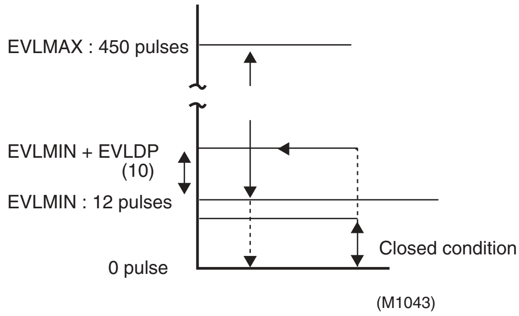
3. EVL (liquid pipe motorized valve) opening restriction

EVL (liquid pipe motorized valve)

■ ELV fully closed during normal heating operation (after elapsed 30 sec or more)



■ Other than the condition mentioned left



3.26.3 Outdoor Unit Motorized Valve Control in Startup and During the Number of Operating Room Units Change

Outline

① This function improves the convergibility of refrigerating cycle during startup (operation startup, when the number of operating room unit changes, in thermostat reset).
② It also ensures sufficient oil level for compressor startup (low-temperature heating operation start).

The adverse effects caused by the motorized valve opening to the operation control in startup are as follows.
When the motorized valve opening is more than the appropriate degree;
Poor control of refrigerant flowing noise (due to lack of subcooling, the convergibility is insufficient)
(HP does not increase, LP does not decrease → no warm/cool air).
Prolonged wet operation (presently no standard set for wet operation).
When the motorized valve opening is less than the appropriate degree;
Prolonged pull-down (increase of compressor internal temperature).
Reduced oil return (low oil level).
Rotor due condensation during cooling.

Details

Initial opening of outdoor unit motorized valve.
Initial opening of outdoor unit motorized valve during cooling operation is according to the followings:
KBP = FPIMN / initial frequency

- In case of FPIMN / initial frequency < 1.2
  When initial frequency is larger than FPIMN/1.2 = 0.83
  EVL = 0
  EVG = 50
  EVP = 0

- In case of 1.2 ≤ FPIMN / initial frequency
  When initial frequency is equal or smaller than FPIMN/1.2 = 0.83
  EVL = 52
  EVG = 90
  EVP = 330 ° KBP - 346

Initial opening of outdoor unit motorized valve during heating operation is according to the followings:
KBP = FPIMN/initial frequency

- In case of FPIMN / initial frequency < 1
  When initial frequency is larger than FPIMN,
  EVL = 52
  EVG = 60
  EVP = 0

- In case of 1 ≤ FPIMN / initial frequency < 1.5
  When initial frequency is between 0.67 (= FPIMN/1.5) and 1,
  EVL = 52
  EVG = 260 ° KBP + 60
  EVP = 0

- In case of KBPIW 1.5 ≤ FPIMN / initial frequency
  When initial frequency is equal or smaller than FPIMN / 1.5 = 0.67,
  EVL = 52
  EVG = 450
  EVP = 267 ° KBP - 349

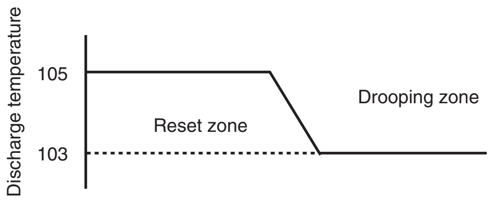
The ending condition for startup control and the control when the number of operating room unit changes,
Cooling mode
DO > DE > 36˚C
Heating mode
DO > DGMNT - 5 > DCMXT > 29˚C

3.26.4 Outdoor Unit Motorized Valve Control During High Discharge Pipe Temperature

Outline

When the discharge pipe temperature exceeds a certain level during compressor operation, this function opens the motorized valve to return the refrigerant to a low pressure side in order to cool the compressor with refrigerant and lower the discharge temperature.

Details



(M1044)

Motorized valve operation in drooping zone
Motorized valve is operated every 20 seconds.

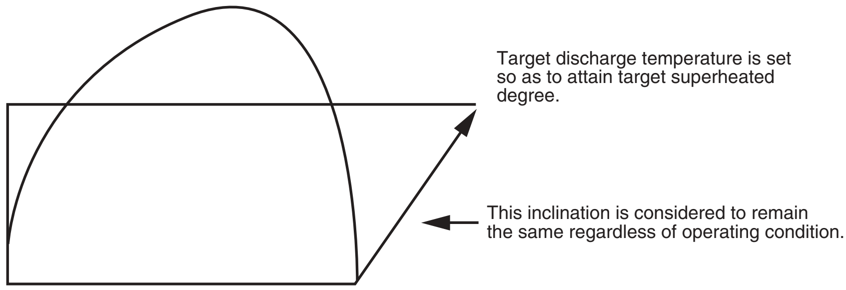
Outdoor motorized valves
Receiver function ON or EVN in fully open condition
- Normal cooling operation
  EVG = EVG + 5 pulses
  EVL = EVL + 5 pulses
- Normal heating operation
  EVG = EVG - 5 pulses
  EVL = EVL + 5 pulses

BP motorized valve
Regardless of receiver function ON/OFF
- Normal cooling operation
  Open the motorized valve in operating room unit for 5 to 30 pulses.
- Normal heating operation
  Open the motorized valve in connecting room unit for 5 to 30 pulses.

3.26.5 Outdoor Units Motorized Valve Control by Target Discharge Pipe Temperature

Outline

This function adjusts the motorized valve opening in order to set the actual discharge pipe temperature close to the target discharge pipe temperature obtained from the indoor heat exchanger temperature and outdoor heat exchanger temperature.



(M1045)

Target discharge temperature = α ° Condensation temperature - β ° evaporating temp. + γ

The correction value for the motorized valve is determined based on the table (fuzzy table) of deviation of the target discharge temperature and actual discharge temperature and per-unit-time change amount of discharge temperature, and used for the operation of the motorized valve.

3.27 Cooling Outdoor Unit SC Control

Outline

This function controls the subcooling of the outdoor heat exchanger in order to ensure maximum use of the outdoor heat exchanger capacity.

- Normal cooling operation ... Controls the difference between the high pressure and outside temperature to the temperature difference most suitable for the heat exchanger capacity.
- Cooling operation under low outside temperature ... Since the fan control alone cannot maintain appropriate compressor differential pressure, the control function sends surplus refrigerant to the outdoor heat exchanger in order to reduce the heat exchanger performance and maintain the high pressure.

When excessive liquid refrigerant is collected in outdoor heat exchanger;
→ Reduction of outdoor heat exchanger performance → Increase of high pressure
→ High pressure saturation temperature rises higher than target high pressure saturation temperature
→ EVL is opened to send surplus refrigerant (subcooled liquid) to receiver

3.28 BP Unit Motorized Valve Control

Purpose of the Function

This function provides instructions regarding the absolute flow rate, relative flow rate and fully closing from the outdoor unit to the BP unit in order to ensure outdoor unit compressor safety and optimum refrigerating cycle of the system.
When the specification of the BP unit or outdoor unit is changed, the air flow rate is used as the transmission data to maintain compatibility.
With the transmission a permit/prohibit flag for each distribution control in the BP unit, the distribution control startup timing is controlled by the outdoor unit.

3.28.1 BP Unit Motorized Valve Control at Startup and During The Number of Operating Room Units Change

Outline

Heating operation startup under low outside air temperature
① To ensure sufficient oil level.
② To prevent refrigerant flowing noise in indoor units.
③ To improve heating operation startup performance.
The motorized valve is moved slightly in the closing direction.
In cooling operation
① The valve opens slightly more than at the stable position to prevent rotor dew condensation.

3.28.2 BP Unit Motorized Valve Control During Frequency Change

This function improves the convergibility and stability of refrigerating cycle when the frequency varies significantly.

Outline

When the target frequency (FMK) fluctuates as much as the specified frequency range for a certain time duration (10 sec) during discharge pipe temperature control, the discharge pipe temperature control is stopped and the target motorized valve opening is adjusted according to the amount of frequency change.

3.28.3 Motorized Valve Flow Rate Restriction

This function prevents the deviation from the motorized valve specification range by restricting the motorized valve flow rates of the operating and non-operating room units during compressor operation. It also prevents the generation of abnormal noise such as refrigerant flowing sound by restricting the circulation of refrigerant according to the operating conditions (unit ON/OFF) of room units.

Outline

Restriction of motorized valve opening degrees of operating room units;
... Restriction of maximum and minimum flow rates based on constant
Restriction of motorized valve opening degrees of non-heating room units;
... Restriction of minimum flow rate based on constant
... Maximum flow rate determined based on flow rates of operating room units

3.28.4 Full Closing of Motorized Valves

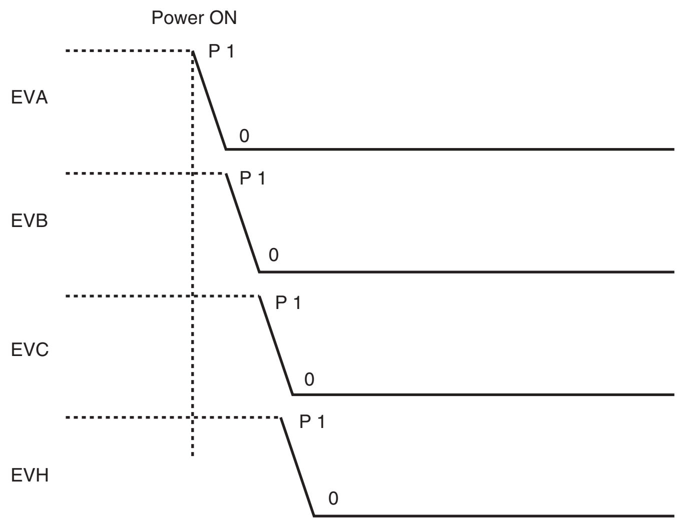
Purpose of the Function

The motorized valves are initialized when the power is turned on.

Details

The following processes are conducted.

1. Conducts P1 pulses close when power is turned on, and sets current opening to 0 pulse (fully closing process).
2. Sends motorized valve initialization signal to outdoor unit.
3. Closes the motorized valve of each chamber (sets the motorized-valve pulse to 0).
4. Stops transmission of motorized valve initialization signal when EVH retightening is completed.



(M1047)

3.28.5 Control Based on Absolute Flow Rate Instruction

Purpose of the Function

This function operates the motorized valve based on the absolute flow rate instruction sent from the outdoor unit.

Outline

The motorized valve flow rate operation based on the absolute flow rate instruction provides the following functions.

1) Flow rate distribution for motorized valves of individual room units.
2) Retightening based on retightening instruction from outdoor unit.
3) Operation of motorized valves during oil recovery operation.

3.28.6 Control Based on Relative Flow Rate Instruction

Purpose of the Function

This function operates the motorized valve based on the relative flow rate instruction sent from the outdoor unit.

Outline

This function distributes the relative flow rate instruction sent from the outdoor unit to each room unit in connection, and obtain the amount of change in the target motorized valve flow rate.

- Base on absolute flow rate QR sent from the outdoor unit, the corrected flow rate value for each room unit is obtained with the following equation.
  QRDA = QR ° KSQA / (ΣKSQRU + βR ° ΣKSQRT)
  QRDB and QRDC are obtained in the same way.
  QRDA = QR ° (βR ° KSQRA) / (ΣKSQRU + βR ° ΣKSQRT)
  In case of the room A unit does not operate, QRDA can be obtained with the following equation.
  QRDB and QRDC are also obtained in the same way.
- The target flow rate of motorized value (QAMK) is corrected using this function.
  ΣQRA = ΣQRA + QRDA
  ΣQRB = ΣQRB + QRDA
  ΣQRC = ΣQRC + QRDA

3.29 Gas Pipe Isothermal Control in Cooling Operation

Purpose of the Function

This function ensures appropriate refrigerant distribution when many room units are operating in the cooling mode.

Outline

The gas pipe temperatures of operating room units are detected by the gas pipe thermistors, and the motorized valves' flow rates are corrected so as to equalize the temperatures of the gas pipes.

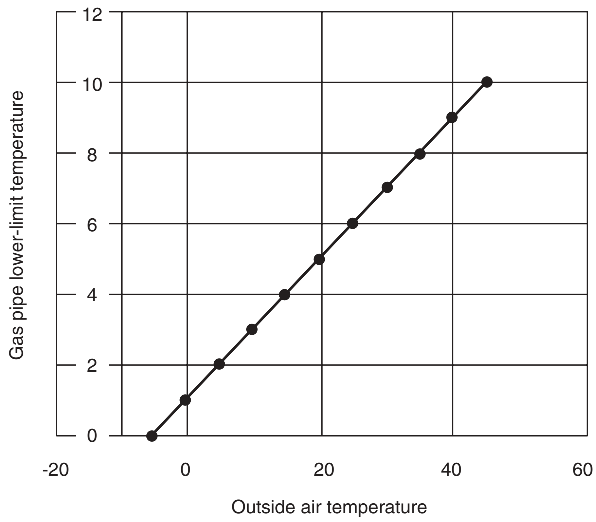
When gas pipe temperature is higher than average → Opens the valve of that room unit
When gas pipe temperature is lower than average → Closes the valve of that room unit

However, the closing operation is restricted to prevent the valve operation that results in a flow rate that exceeds a certain level at one time.
(Protection function to prevent rotor frosting)

Details

The gas pipe temperature is detected at every sampling (40 SEC) operation of the gas pipe isothermal control, and average value DGAV of each gas pipe temperature is obtained.

In order to prevent dew condensation in the connection pipe, when DGAV < Gas pipe lower limit temp., DGAV = Gas pipe lower limit temp.
Gas pipe lower limit temp. = 0.2 ° DOA + 1



(M1048)

Outside Air Temperature	Gas Pipe Lower-Limit Temperature
-5	0
0	1
5	2
10	3
15	4
20	5
25	6
30	7
35	8
40	9
45	10

The motorized valve operating amount is determined based on deviation EGA between each room unit's gas pipe temperature and of DGAV after GFTUYU correction and previous deviation EGAZ.
(Example) The following example is based on room A.
EGA = DGA - DGAV
When the operating flow rate of EVA is QRGA
QRGA = KPCB (0.05) ° ((EGA-EGAZ) + KIB (0.32) ° (EGA + EGAZ))
= 0.05 ° (EGA - EGAZ) + 0.016 ° (EGA + EGAZ)
When QRGA ≤ QHENC(-0.12), the following condition is set: QRGA ≤ QHENC (-0.12 Nm^3/hr).

3.30 SH Control in Cooling Operation

Purpose of the Function

This function ensures appropriate refrigerant distribution when many room units are operating in the cooling mode.

Outline

The heat exchanger temperatures and gas pipe temperatures of operating room units are detected by the gas pipe thermistors, and the motorized valves' flow rates are corrected so as to adjust each room unit's heat exchanger temperature and gas pipe temperature (hereafter referred to as SH) close to the target values.

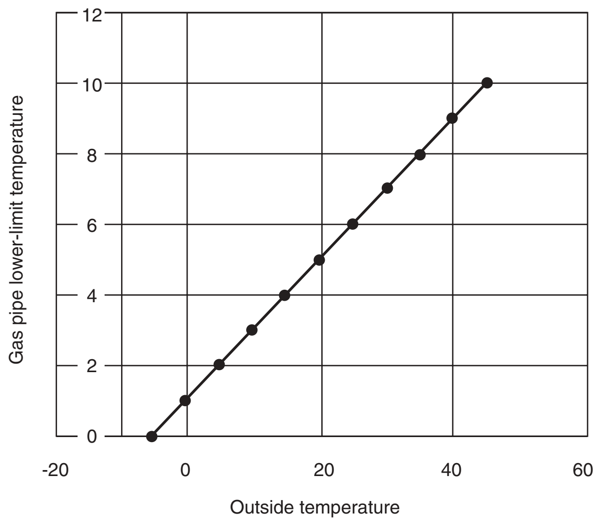
When SH is higher than average → Opens the valve of that room unit
When SH is lower than average → Closes the valve of that room unit

However, the closing operation is restricted to prevent the valve operation that results in a flow rate that exceeds a certain level at one time. When the liquid pipe temperature is higher than the heat exchanger temperature, the motorized valve is opened without providing the above control. (Protection function to prevent rotor dew condensation)

Details

The gas pipe temperature and indoor heat exchanger temperature are detected at the time of every sampling time of 40 sec for the cooling SH control.

In order to prevent dew condensation in connection pipe, gas pipe lower-limit temperature is set as follows.
Gas pipe lower-limit temperature = 0.2 ° DOA + 1



(M1049)

Outside Temperature	Gas Pipe Lower-Limit Temperature
-5	0
0	1
5	2
10	3
15	4
20	5
25	6
30	7
35	8
40	9
45	10

Regarding target superheated degree SH

(Example) The following example is based on room A.

When the sum of heat exchanger temperature (DCA) and target superheated degree is smaller than gas pipe lower limit temperature, the following condition is set: DSH = Gas pipe lower-limit temperature – DCA.

When DLA < DCA (when liquid pipe temperature is exceeded due to heat exchanger intermediate superheating), the motorized valve is opened based on the fixed value determined by QRSHA = (0.12 Nm^3/hr), with QRSHA being the flow rate operating amount (relative value) provided by the SH control.

In normal condition (DLA ≥ DCA), when SHA = (DGA – DCA) – DSH and the previous value is SHAZ QRSHA = 0.05 ° ((SHA – SHAZ) + 0.32 ° (SHA + SHAZ))
= 0.05 ° (SHA – SHAZ) + 0.016 ° (SHA + SHAZ)
Where QRSHA ≤ QHENCS, QRSHA = QHENCS1

Notes:

1. In Sky Air models, the indoor units are equipped with distribution capillary tubes ; therefore, the heat exchangers may superheat even when the condition is met.
2. In Sky Air models, the heat exchanger intermediate position is provided on the liquid connection pipe side; as a result, superheated condition is difficult to detect.

3.31 SC Control in Heating Operation

Purpose of the Function

This function ensures appropriate refrigerant distribution when room units are operating in the heating mode.

Outline

The function serves the following two main purposes.

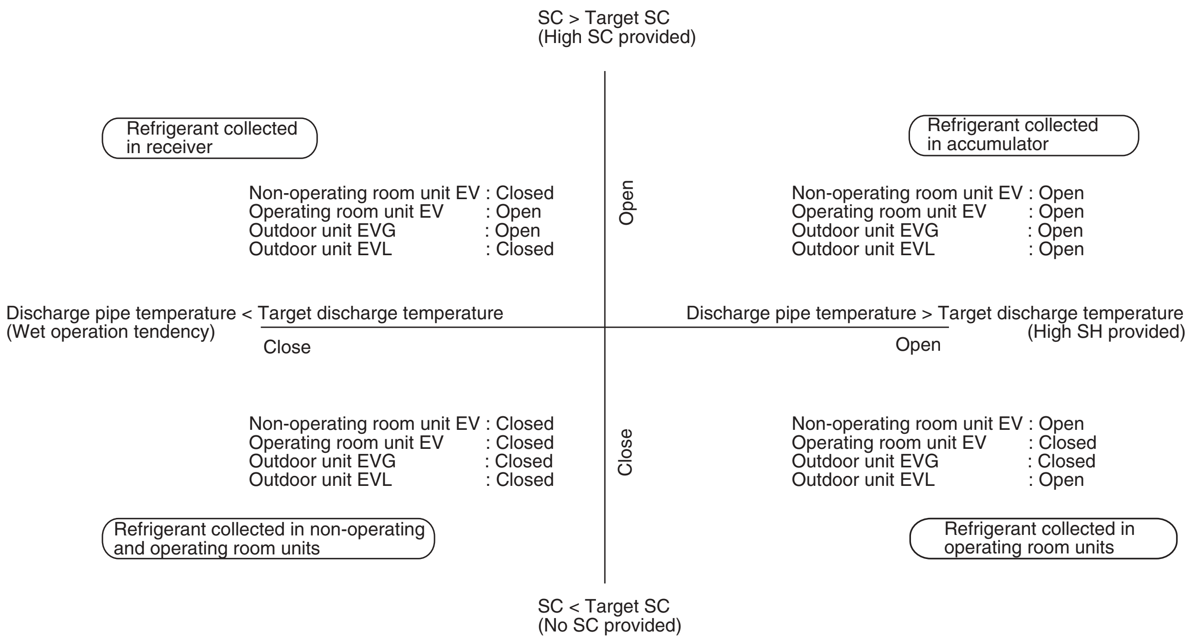
1) Appropriate refrigerant distribution to each room unit
   In the case of heating SC control 2, the motorized valves of only operating room units are regulated. In the case of heating SC control 1, the motorized valves of all room units including non-operating units are operated.
2) Determination of the location (accumulator, receiver, non-operating room units, operating room units) to collect refrigerant in accordance with the connection pattern (extended piping, single-room connection).

■ To ensure appropriate refrigerant distribution to each room unit, each room unit's liquid pipe temperature and heat exchanger intermediate temperature are detected, and the motorized valve opening degrees are corrected so SC reaches the target SC (determined based on the supply capacity and the temperature difference between the discharge pipe temperature and target discharge pipe temperature).

When SH is higher than target SC → Opens the valve of that room unit
When SH is lower than target SC → Closes the valve of that room unit

However, the valve operating amount is restricted to prevent a flow rate that exceeds a certain level at one time.
(For improvement of stability and convergibility performance)

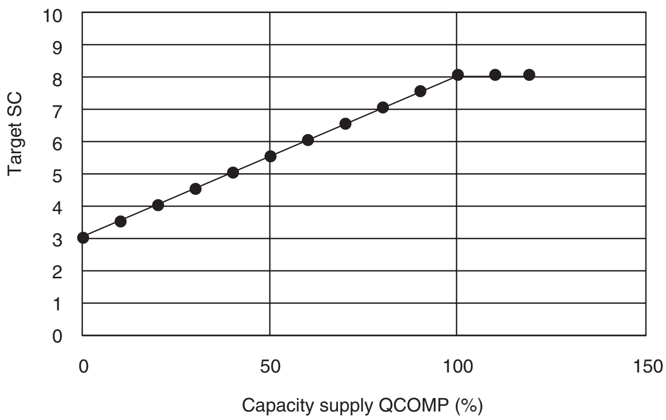
■ The determination of the location (accumulator, receiver, non-operating room units, operating room units) to collect refrigerant is determined in accordance with the connection pattern (extended piping, single-room connection).



(M1056)

Details

The heat exchanger intermediate temperature and liquid pipe temperature are detected at every sampling time of 60 sec of the heating SC control.
The range of target SC : 3˚C ≤ SC1 ≤ 8˚C



(M1050)

The motorized valve of operating room unit is operated to obtain the target SC.
Target SC > Current SC : Evr closed
Target SC < Current SC : Evr opened

3.32 Heat Exchanger Isothermal Control in Heating Operation

Purpose of the Function

This function ensures appropriate refrigerant distribution when room units are operating in the heating mode.
It prevents abnormal increase of the high pressure and operation with gas shortage due to uneven refrigerant distribution (Protection function).

Outline

The indoor unit heat exchanger thermistors (of all connected room units including non-operating room units) in heating operation are detected. Then, the highest heat exchanger temperature DCMXT is compared with the heat exchanger temperature of each room unit. If the temperature difference exceeds the predetermined value, it is judged that that indoor unit heat exchanger thermistor position in subcooled zone, and the motorized valves of room units with the temperature difference exceeding the predetermined level is opened to return to the saturation zone.
Since this is a protection function, it is effective for all connected room units in heating operation excluding those in defrosting operation. This function is inactive in room units with transmission problems.

Details

The heat exchanger temperature is detected at every sampling time of 20 sec of the heat exchanger isothermal control, and maximum value DCMXT of each heat exchanger temperature is obtained.

If the temperature difference between the heat exchanger temperature and maximum heat exchanger temperature value exceeds 10˚C, it is judged that the heat exchanger intermediate is in the subcooled zone, and the motorized valve is opened.

3.33 BP Unit Motorized Valve Control in High Discharge Pipe Temperature

When the discharge pipe temperature exceeds a certain level during compressor operation, this function opens the motorized valve to return the refrigerant to a low pressure level in order to cool the compressor with refrigerant and lower the discharge temperature.

3.34 Inter-BP Units Heating Heat Exchanger Isothermal Control

Purpose of the Function

This function ensures appropriate refrigerant distribution to each BP unit in heating operation. It prevents abnormal increase of the high pressure and operation with gas shortage due to uneven refrigerant distribution (Protection function).

Outline

The indoor unit heat exchanger thermistors (of all connected room units including non-operating room units) in heating operation are detected. Then, the highest heat exchanger temperature DCMXT is compared with the heat exchanger temperature of each room unit. If the temperature difference exceeds the predetermined value, it is judged that that indoor unit heat exchanger thermistor position in subcooled zone, and the motorized valves of room units with the temperature difference exceeding the predetermined level is opened to return to the saturation zone.

Details

The maximum value of DCMXT of BP units is compared with DCMXT of each room. If the temperature difference exceeds DCABC (10˚C), open the motorized valve of that BP unit.

3.35 Inter-BP Units Gas Pipe Isothermal Control

Purpose of the Function

This function ensures appropriate refrigerant distribution to each BP unit when many room units are operating in the cooling mode.

Outline

The gas pipe temperatures of operating room units are detected by the gas pipe thermistors, and the opening degrees of the motorized valves are corrected so as to equalize the gas pipe temperatures of the room units.

When gas pipe temperature is higher than average gas pipe temperature → Opens the valve of that room unit

When liquid pipe temperature is lower than average gas pipe temperature → Closes the valve of that room unit

In this control, the following conditions are also effective.
When the difference between the gas pipe temperature of each room unit and the average value is small, no correction is provided.

→ Judged as stable. (Set as PI control prohibit zone to prevent hunting)

The motorized valve opening degree correction of this function is restricted to prevent the valve closing past a certain level.

→ For improvement of stability and convergibility performance

Details

The temperature difference ∆DCG1 between the min. value of the heat exchanger temperatures of BP units and the min. gas pipe temperature is calculated. If it is lower than the average value of total temperature difference (-5˚C), open the motorized valve of the applicable BP unit.

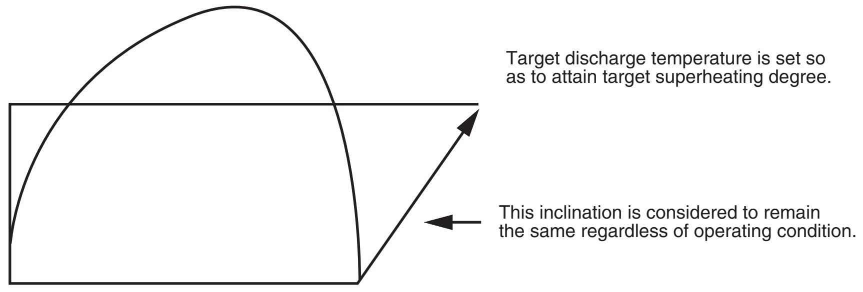
3.36 BP Unit Motorized Valve Control by Target Discharge Pipe Temperature

Purpose of the Function

This function uses the discharge pipe temperature to provide indirect SH control. It also enables the management of the discharge temperature and wet operation (control in wet zone).

Outline

The target discharge pipe temperature is obtained based on the indoor heat exchanger temperature and outdoor heat exchanger temperature, the motorized valves' flow rates are regulated so as to adjust the actual discharge pipe temperature close to the calculated value.



(M1051)

Target discharge temp. = α ° condensing temp. - β ° evaporating temp. + γ

The correction value for the motorized valve is determined based on the table (fuzzy table) of deviation of the target discharge temperature and actual discharge temperature and per-unit-time fluctuation of discharge temperature, and used for the operation of the motorized valve.

3.37 4-Way Valve Operation

3.37.1 4-Way Valve Operation Security

Purpose of the Function

This function ensures proper operation of the 4-way valve. (Because the pilot-system drive method is used, the current from the coil cannot provide fail-proof 4-way valve operation. Therefore, the difference of pressure before and after the valve is used to ensure proper valve operation.)

Outline

Because the pilot-system drive method is used, the current from the coil cannot provide fail-proof 4-way valve operation. Therefore, the use of the difference of pressure before and after the valve is required. At the time of operation when the 4-way valve switches, the operating frequency exceeding a specified frequency is output for a predetermined time duration to ensure differential pressure necessary for the 4-way valve operation.

Details

	Cooling	Heating
Continuing time of 4-way valve operation	90sec	90sec
Frequency of 4-way valve operation	62Hz	41Hz

3.37.2 4-Way Valve Switching

Outline

When the outdoor heat exchanger is used as a condenser (in cooling and defrosting), the 4-way valve is not supplied with current. When the indoor heat exchanger is used as a condenser, it is supplied with current. To reduce the switching noise when heating operation stops (ON → OFF), the 4-way valve switching after heating operation shutdown is delayed.

Details

The 4-way valve switching delay is 140 seconds for OFF delay.
To reduce power consumption during current flow, a OFF process is conducted when the heating thermostat OFF time exceeds 60 minutes.

3.38 JIS Mode

Purpose of the Function

This aims to minimize capacity deviations at the time the JIS mode is determined.

Outline

When the JIS mode is determined, the function fixes the operating frequency (command frequency), target
discharge temperature and target SC.

Details

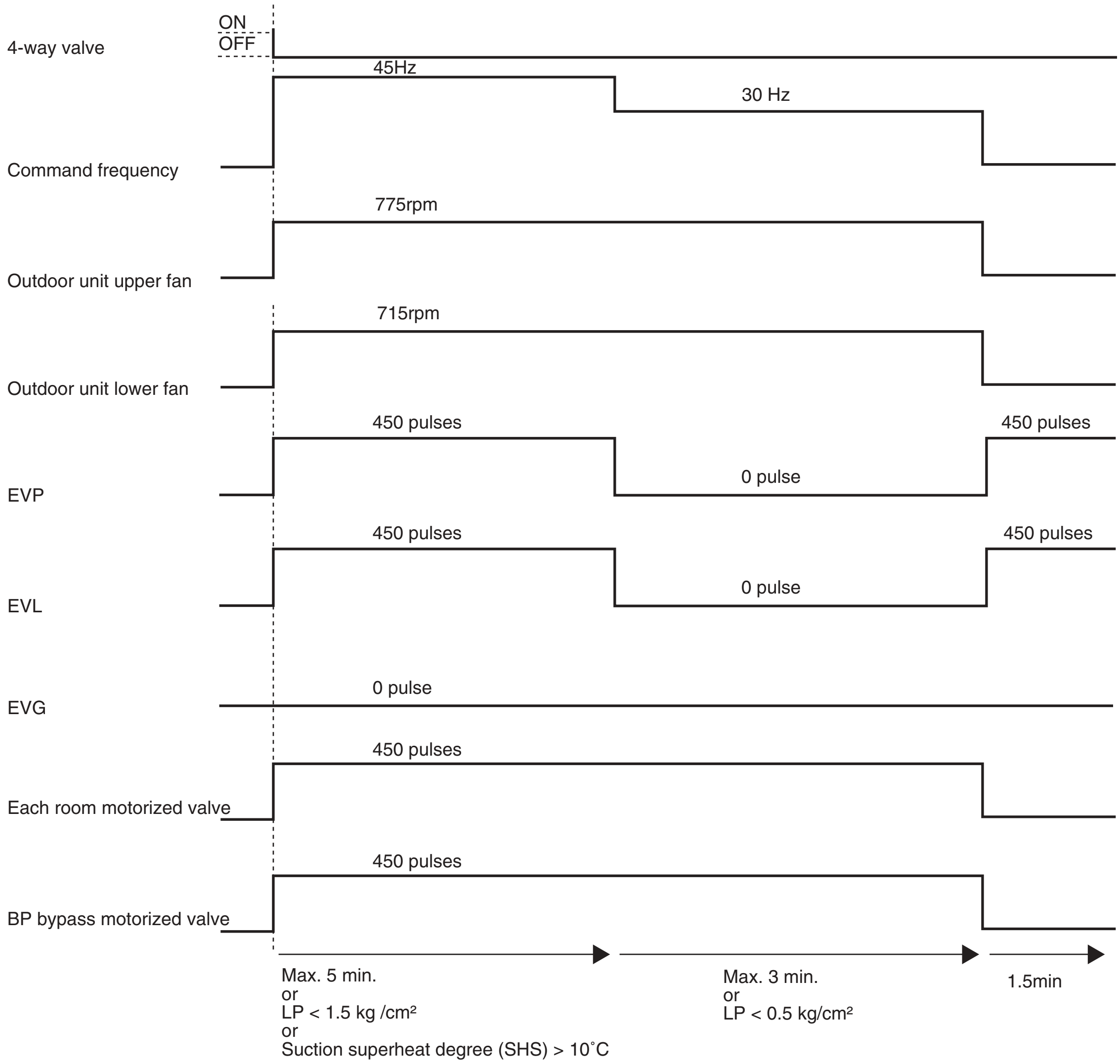
Instruction frequency FSR is set as follows: FSR = FJIS. Cooling operation: 90 Hz Heating operation: 98 Hz
Target discharge pipe temperature DOSET is set as follows: DOSET = DOSTJS.
Cooling operation: 85˚C
Heating operation: 75˚C
Outdoor fan tap is set to FANJIS.
Cooling ... Upper fan: 775 rpm Lower fan: 715 rpm
Heating ... Upper fan: 775 rpm Lower fan: 715 rpm
Heating heat exchanger isothermal control is prohibited.

3.39 Pump Down Operation

Outline

When the Pump-down button is pressed, the following control is provided to collect refrigerant in the receiver.

Details



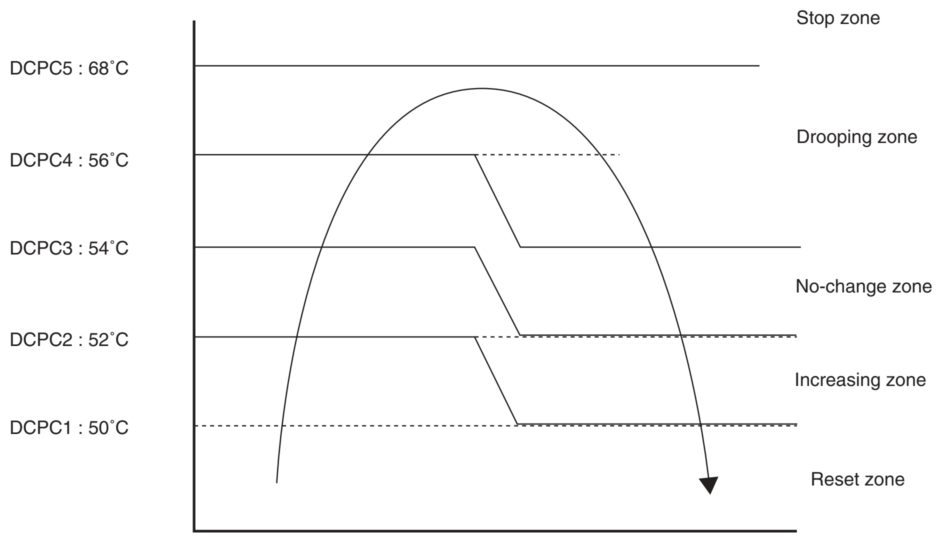
(M1052)

3.40 Protection Control of SkyAir Indoor Units

SkyAir Indoor Unit Peak-Cut Zone

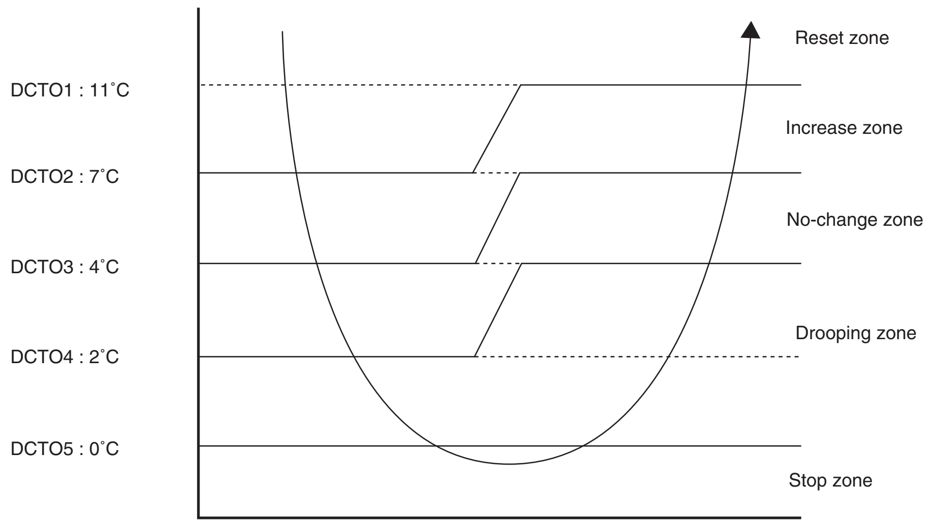
The zones for SkyAir indoor unit peak-cut control is produced in the BP unit.

Peak-cut control
Based on the heat exchanger temperature information sent from the indoor unit, the zones are produced to prevent abnormal rise of the high pressure.



(M1053)

Freeze-up prevention control
Based on the freeze-up prevention status information sent from the BP unit (indoor unit), the zones are produced to prevent freezing-up of the indoor heat exchanger.



(M1054)

Even if the stop zone is reached, the zone remains as the drooping zone for 540 sec.

Monitoring Function During SkyAir Indoor Unit Heating Thermostat OFF

In the case of SkyAir indoor units, the fan operates at the L tap during heating thermostat OFF. Therefore, the refrigerant continues to flow into the indoor heat exchanger. This can cause condensation, causing liquid trap.
To prevent this, the BP unit sends a defrost signal (FD+FDS) to turn off the fan.
However, since the room temperature thermistor of the SA indoor unit is installed inside the equipment, there is a possibility that the thermostat may not reset due to the continuous flow of refrigerant during heating operation.
To solve this problem, the fan ON/OFF control is provided at predetermined intervals (ON time: 300 sec, OFF time: 90 sec) for indoor unit thermostat monitoring.

Abnormality Processing

Icing prevention function for non-operating room units
When 10 minutes pass from the time a room unit stops operating while the compressor is in operation, room temperature DAT and heat exchanger temperature DCT of the non-operating room unit are detected.
① DAT - DCT ≥ 10 deg
② DCT ≤ 1˚C
When conditions ① and ② remain for (5 minutes), an icing abnormality of the non-operating room unit is determined.

The motorized valve of the abnormal room unit is opened to 2.3 Nm^3/hr from the time an icing abnormality is determined to the time the compressor stops.

Part 6
Flow of Refrigerant

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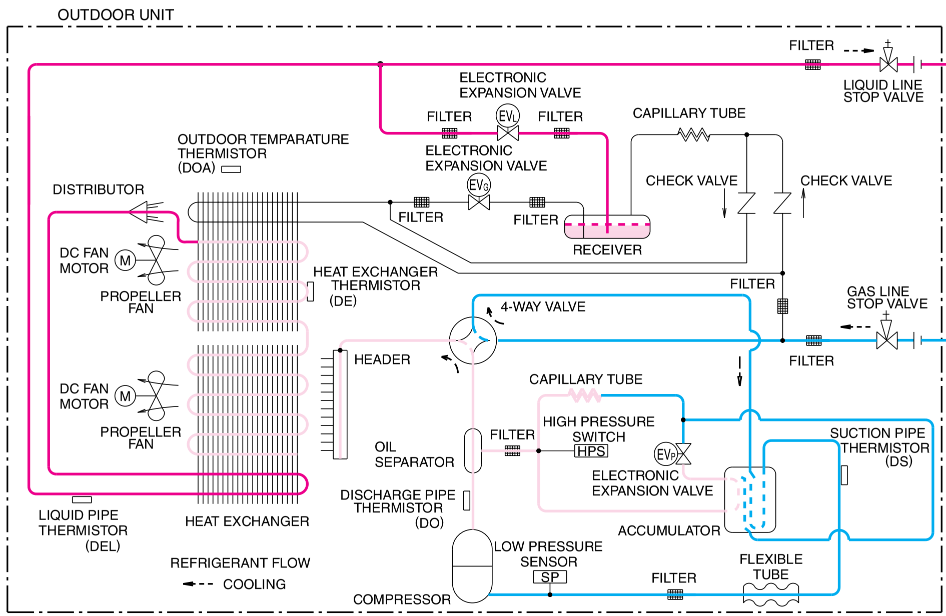
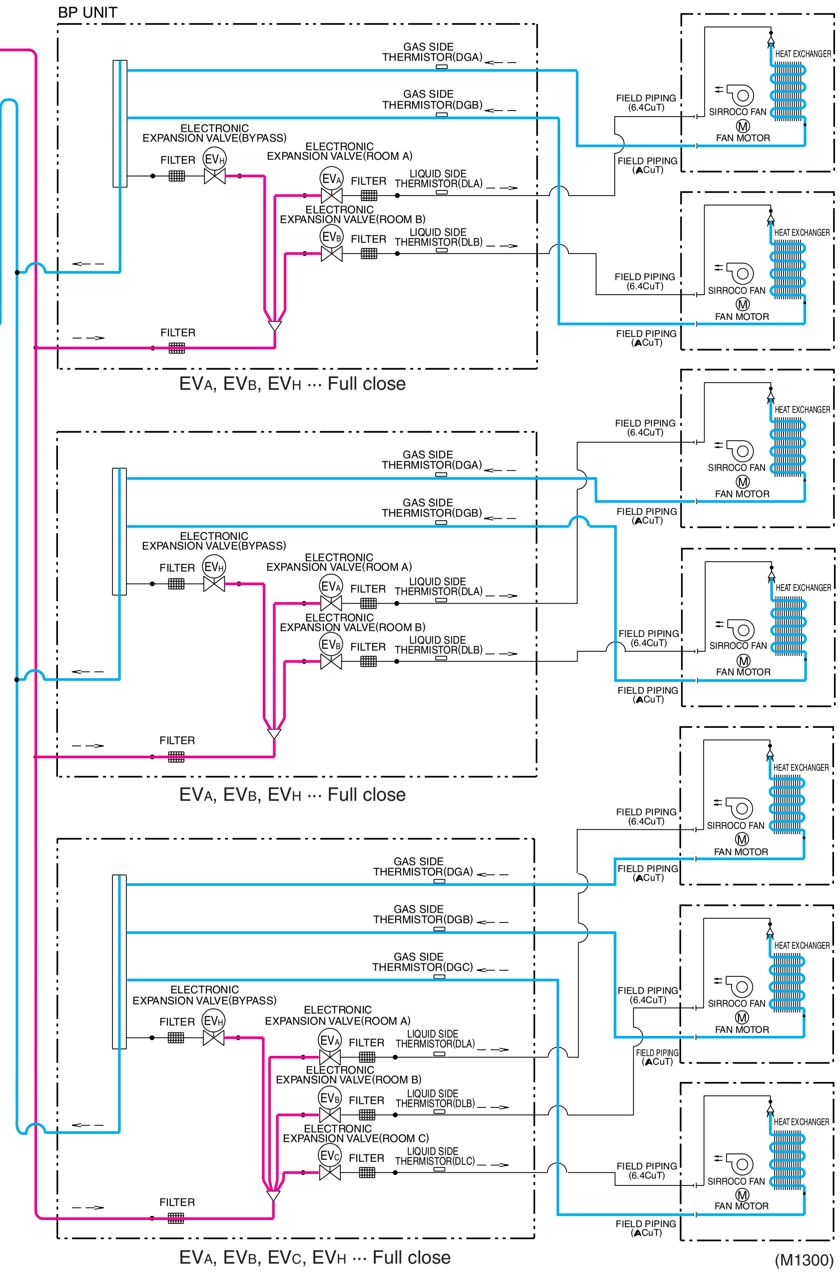
1. Flow of Refrigerant

1.1 Flow of Refrigerant

Operation Mode	No.	Operating Status ○: Fixed opening (step) ◎: Variable opening ●: Fully closed status The figures in ( ) are for applicable range.		Excess refrigerant	4-way valve	EVP Discharge Bypass Motorized Valve		EVG Outdoor Unit Gas Pipe Motorized Valve		EVL Outdoor Unit Liquid Pipe Motorized Valve		EVA,B,C- Operating Room Unit BP Unit each Room Motorized Valve		EVA,B,C- Non-Operating Room Unit BP Unit each Room Motorized Valve		EVH BP Unit Bypass Motorized Valve	
					■ Cooling/ Heating changeover ■ Defrost control ■ Oil collection in heating	■ Capacity linear control ■ Equalizing control ■ Freeze protection control ■ Peak cut control ■ At starting		<Cooling> ■ Surplus refrigerant amount adjustment ■ Target discharge pipe temperature control <Heating> ■ Reverse target discharge pipe temperature control ■ Capacity linear control (1-step)		<Cooling> ■ Subcooling control <Heating> ■ Target discharge pipe temperature control		■ Main reducing valve ■ Refrigerant distribution control <Cooling> ■ Gas pipe isothermal control ■ SH control <Heating> ■ Subcooling control		<Cooling> ■ Refrigerant distribution OFF <Heating> ■ Target discharge pipe temperature control		■ Main pipe liquid stagnation prevention control at starting ■ Oil return control ■ Defrost control	
Cooling	1.2	Standby Operation		—	OFF	○	450 pls	●	0 pls	○	120 pls	●	0 pls	●	0 pls	●	0 pls
Cooling	1.3	Equalizing Control		—	OFF	○	450 pls	○	52 → 0 pls	○	450 → 100 pls	●	0 pls	●	0 pls	●	0 pls
Cooling	1.4	Oil Return Operation	Main Gas Pipe Oil Return	—	OFF	◎	0~200	◎	60~100 or 450	◎	100~450	◎	52~450 pls	●	0 pls	○	450 pls
Cooling	1.5	Low Outside Air Temperature Cooling	2.5kW 1-Room Operation	NO	OFF	◎	0~200	◎	0~100 (EVL=0)	●	0 pls	◎	52~450 pls	●	0 pls	●	0 pls
Cooling	1.6	All-Room Operation		NO	OFF	●	0 pls	◎	0~100 (EVL=0)	●	0 pls	◎	52~450 pls	●	0 pls	●	0 pls
Cooling	1.7	Multi-Room Operation		NO	OFF	●	0 pls	◎	0~100 (EVL=0)	●	0 pls	◎	52~450 pls	●	0 pls	●	0 pls
Cooling	1.8	Multi-Room Operation	(Partial Loading)	YES	OFF	●	0 pls	◎	0~450 (EVL≠0)	◎	12~450	◎	52~450 pls	●	0 pls	●	0 pls
Cooling	1.9	1-Room Operation	Indoor Unit Large Capacity	YES	OFF	●	0 pls	◎	0~450 (EVL≠0)	◎	12~450	◎	52~450 pls	●	0 pls	●	0 pls
Cooling	1.10	1-Room Operation	Indoor Unit Small Capacity (2.5 kW)	YES	OFF	◎	0~200	◎	0~450 (EVL≠0)	◎	12~450	◎	52~450 pls	●	0 pls	●	0 pls
Heating	1.11	Standby Operation		—	ON	○	450 pls	○	450 pls	●	0 pls	●	0 pls	●	0 pls	●	0 pls
Heating	1.12	Equalizing Control		—	ON	○	450 pls	○	450 → 100 pls	●	0 pls	●	0 pls	●	0 pls	○	0 → 100 → 0 pls
Heating	1.13	Oil return Operation		—	OFF	○	450 → 0 → 150 → 450 pls	●	0 pls	●	0 pls	○	190 pls	●	0 pls	○	0 → 232 → 0 pls
Heating	1.14	Defrost		—	OFF	○	450 → 150 → 450 pls	○	0 → 70 → 0 pls	○	450 → 0 pls	○	190 pls	●	0 pls	○	100 pls
Heating	1.15	All-Room Operation		NO	ON	●	0 pls	●	0 pls	◎	0~100 (EVG=0)	◎	52~450 pls	◎	52~420 pls	●	0 pls
Heating	1.16	Multi-Room Operation		NO	ON	●	0 pls	●	0 pls	◎	0~100 (EVG=0)	◎	52~450 pls	◎	52~420 pls	●	0 pls
Heating	1.17	Multi-Room Operation	(Partial Loading)	YES	ON	●	0 pls	◎	0~70	◎	0~450 (EVG≠0)	◎	52~450 pls	◎	52~420 pls	●	0 pls
Heating	1.18	1-Room Operation	Indoor Unit Large Capacity	YES	ON	●	0 pls	◎	0~70	◎	0~450 (EVG≠0)	◎	52~450 pls	◎	52~420 pls	●	0 pls
Heating	1.19	1-Room Operation	Indoor Unit Small Capacity (2.5kW)	YES	ON	◎	0~450	◎	0~150	◎	0~450 (EVG≠0)	◎	52~450 pls	◎	52~420 pls	●	0 pls
—	—	Pump Down Operation		—	OFF	○	0~450	●	0 pls	○		○		○		○	

1.2 Standby Operation (Cooling)





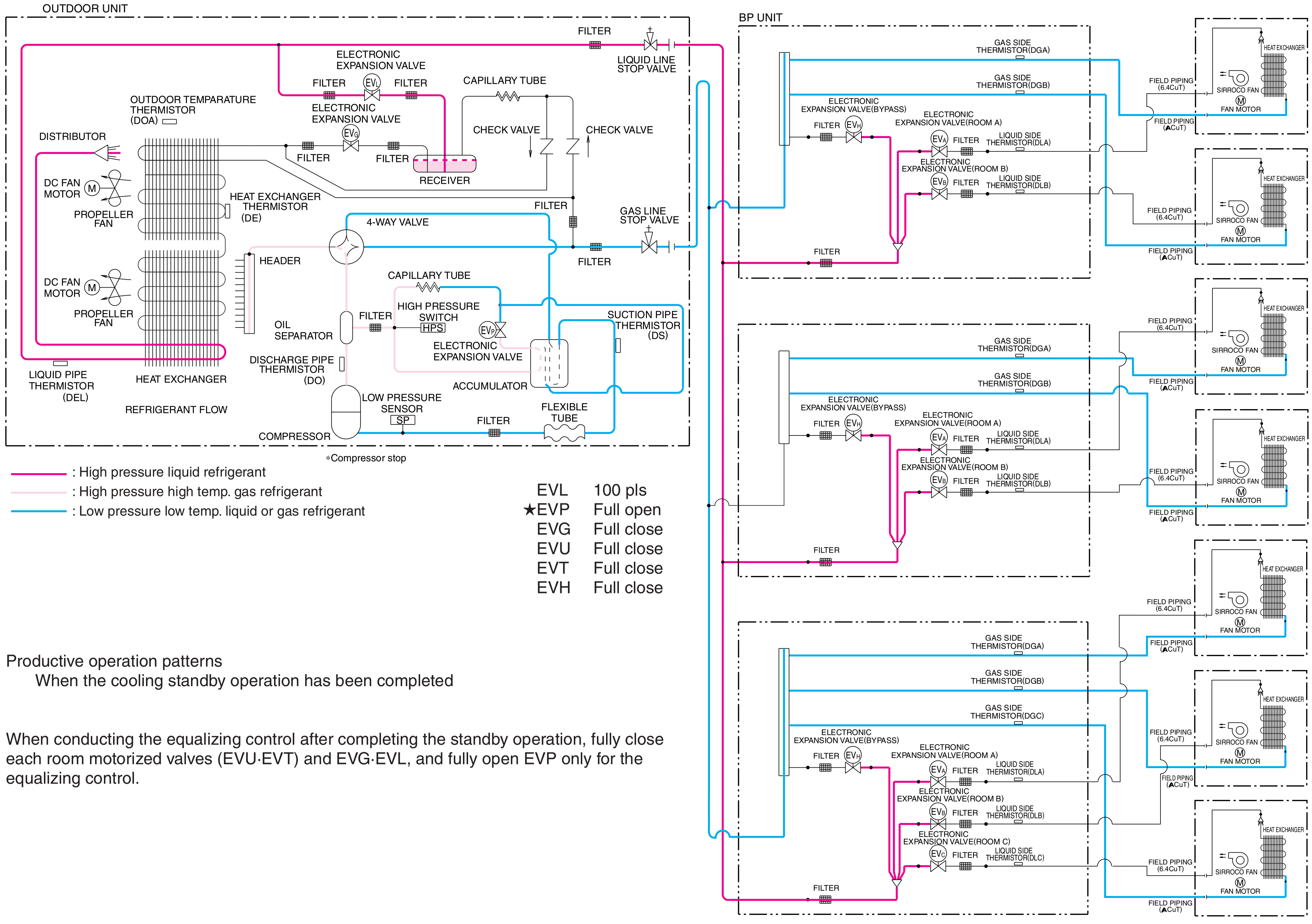
: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

★EVL	120 pls
★EVP	Full open
EVG	Full close
EVU	Full close
EVT	Full close
EVH	Full close

Productive operation patterns
- On stopping the cooling operation
- On starting the cooling operation
- (When cooling standby operation has not completed yet)

Securing the reliability (oil dilution proof in particular) of the compressor by the liquid return to accumulator when starting the cooling operation, the unit drains the refrigerant in the accumulator, and storage the liquid refrigerant in the condenser and receiver after stopping the cooling operation.
Consequently, fully open the EVP to evaporate the liquid refrigerant in the accumulator, fully close each indoor unit motorized valves (EVU·EVT), fully open EVL in order to storage the liquidrefrigerant in the receiver, while fully close EVG.

1.3 Equalizing Control (Cooling)

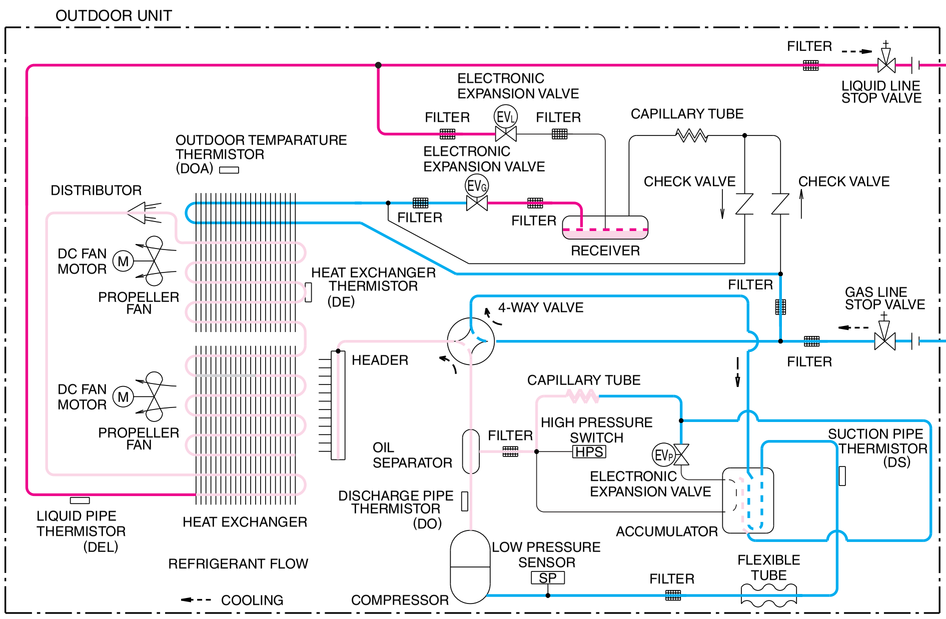


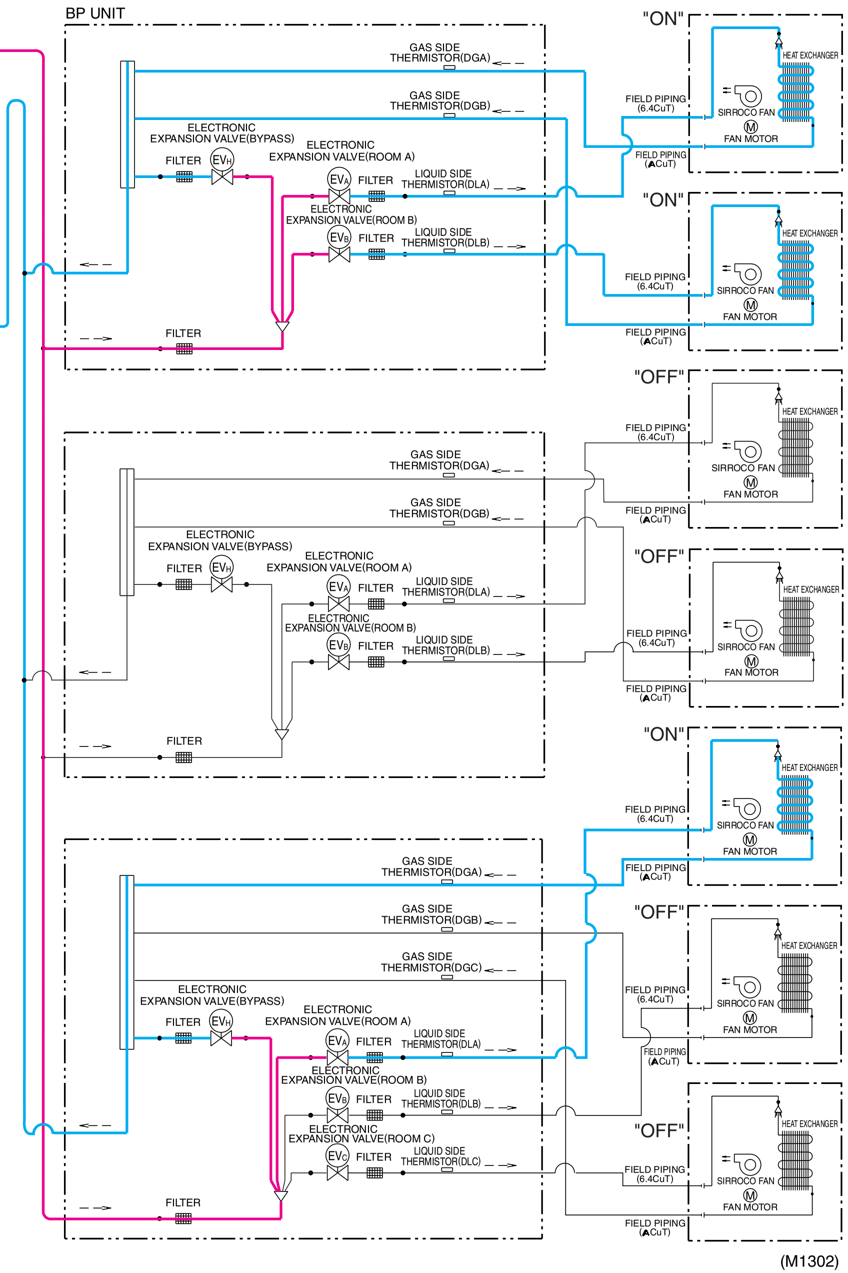
Productive operation patterns

When the cooling standby operation has been completed

When conducting the equalizing control after completing the standby operation, fully close each room motorized valves (EVU·EVT) and EVG·EVL, and fully open EVP only for the equalizing control.

1.4 Oil Return Operation (Cooling)





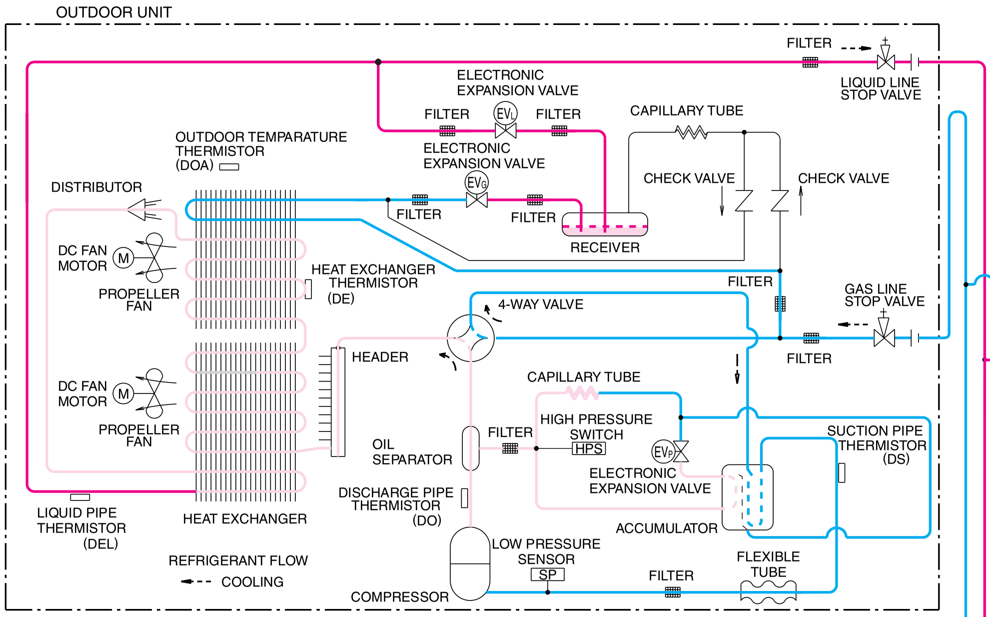
: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

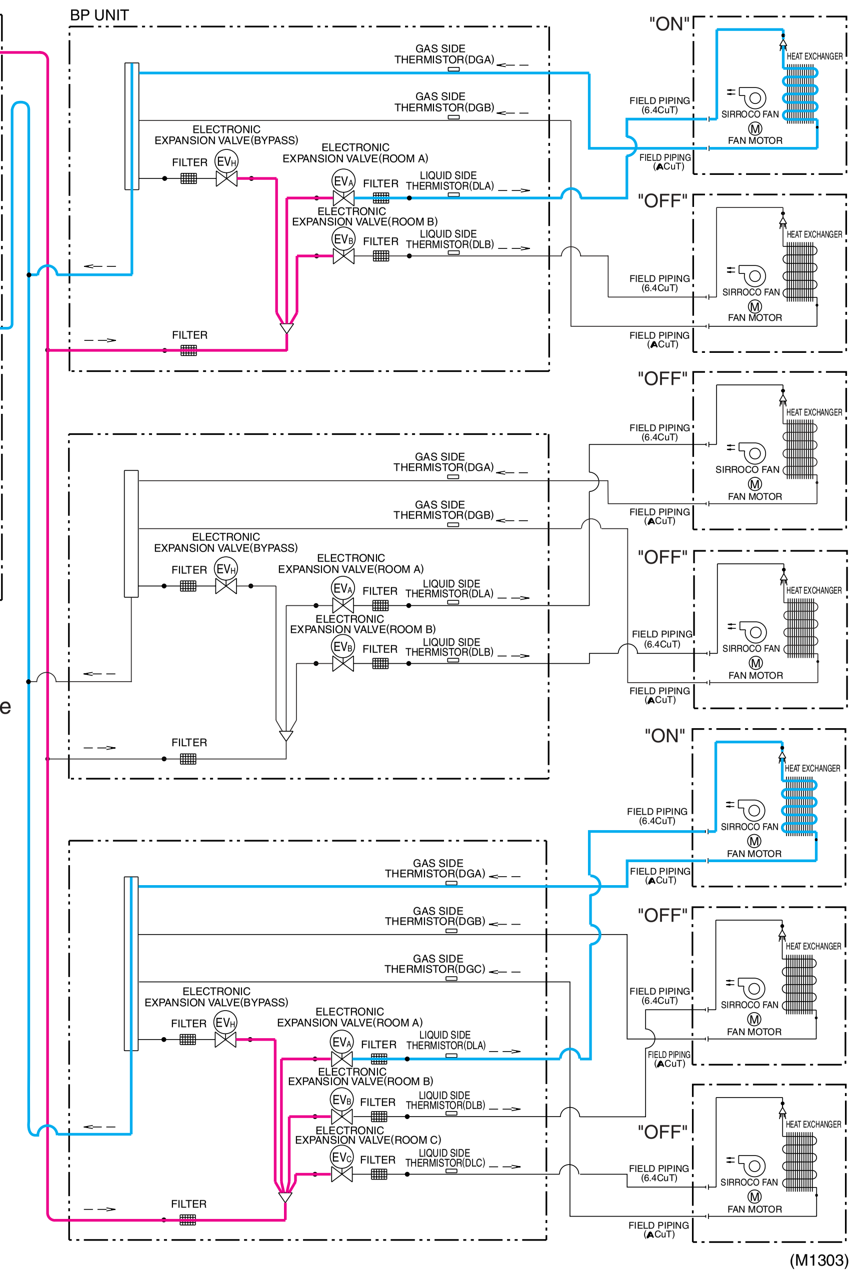
EVL	100~450 pls
EVP	0~200 pls
★EVG	Full open or 60~100 pls
EVU	Ordinal control
EVT	Ordinal control (CLOSE)
★EVH	Full open

Productive operation patterns
Oil collecting operation in cooling

(1) Oil collecting operation in main pipe
This operation aims to collect oil in the main gas pipe. Full closing EVP / EVL and increasing the operating frequency for enlarging the gas flow rate result the drop of low pressure.
There fore set the EVH to specified opening to conduct oil collecting operation.
(2) Oil collecting operation of non-operating room BP unit
In case other BP has operating room unit(s) and rest BP with non-operating room units continues for 90 minutes, for the purpose of collecting oil in the liquid refrigerant stagnated between refnet joint and BP unit, fully open EVH of BP unit of the non-operating room to conduct oil collecting operation.

1.5 Low Outside Air Temperature Cooling





: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

★EVL	SC control (Not fully closed)
★EVP	Freeze-up protection control
★EVG	Target discharge pipe temperature control
EVU	SH control
EVT	Full close
EVH	Full close

Productive operation patterns

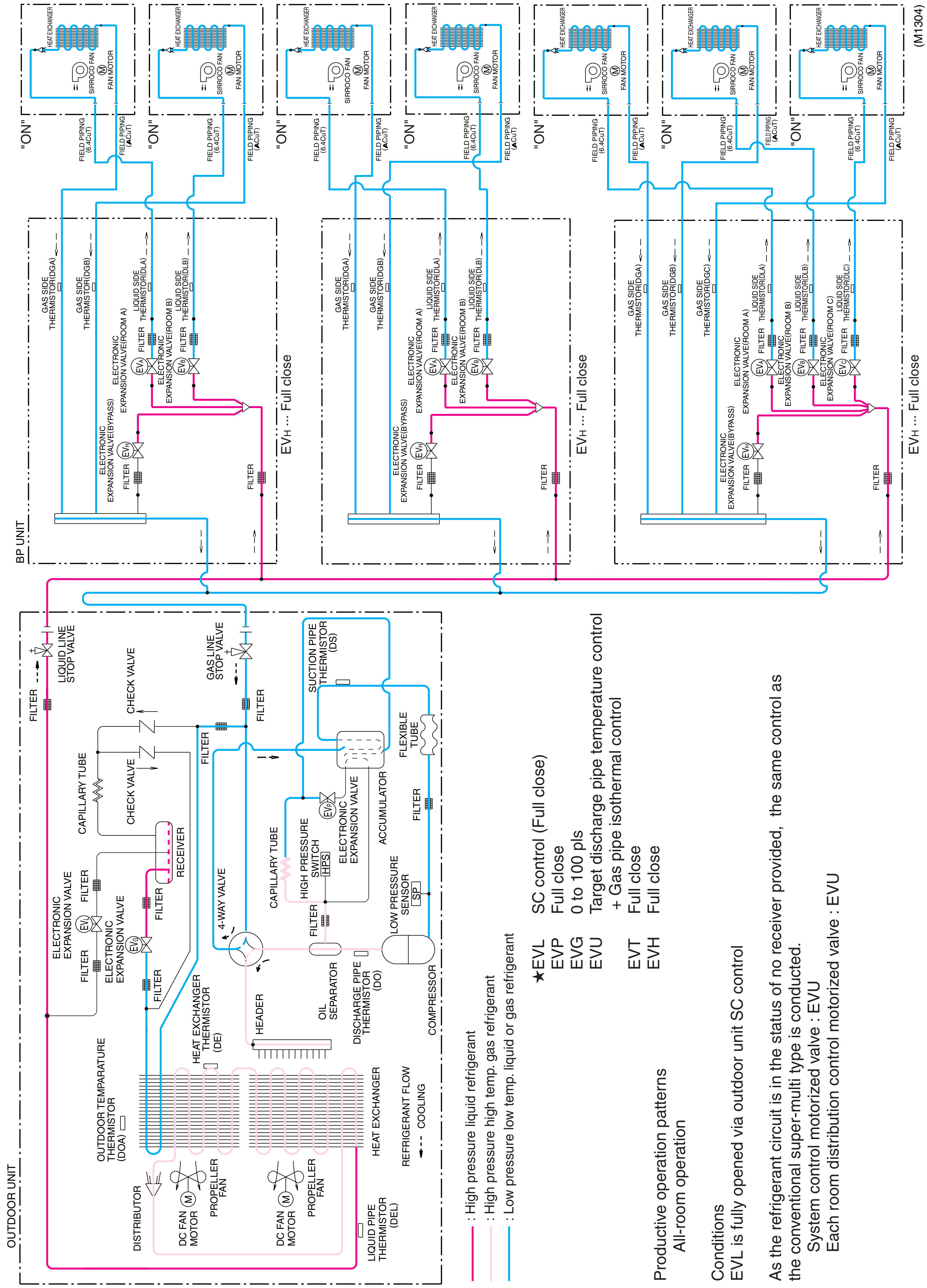
Cooling 1-room operation (2.5kW, 1-room operation with low outside air temperature)

A pressure difference must be kept in cooling mode with low outside temperature in order to maintain the compressor reliability. To ensure such pressure difference, keep the EVL fully open and let the refrigerant stay in the outdoor heat exchanger.

System control motorized valve : EVG

Each room distribution control motorized valve : EVU

1.6 All-Room Operation (Cooling)



: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

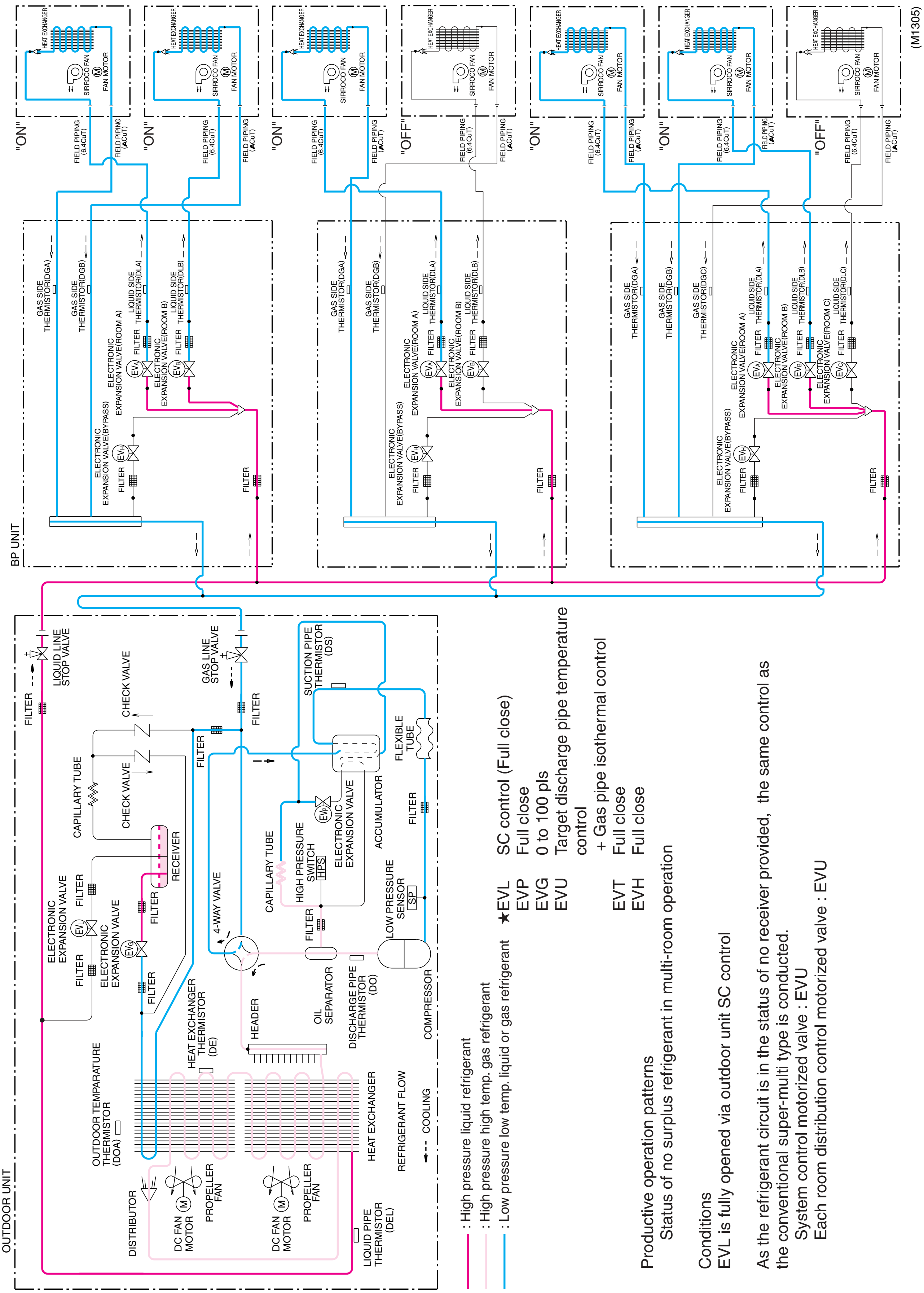
★EVL	SC control (Full close)
EVP	Full close
EVG	0 to 100 pls
EVU	Target discharge pipe temperature control + Gas pipe isothermal control
EVT	Full close
EVH	Full close

Productive operation patterns
All-room operation

Conditions
EVL is fully opened via outdoor unit SC control

As the refrigerant circuit is in the status of no receiver provided, the same control as the conventional super-multi type is conducted.
System control motorized valve : EVU
Each room distribution control motorized valve : EVU

1.7 Multi-Room Operation (No Surplus Refrigerant) (Cooling)



: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

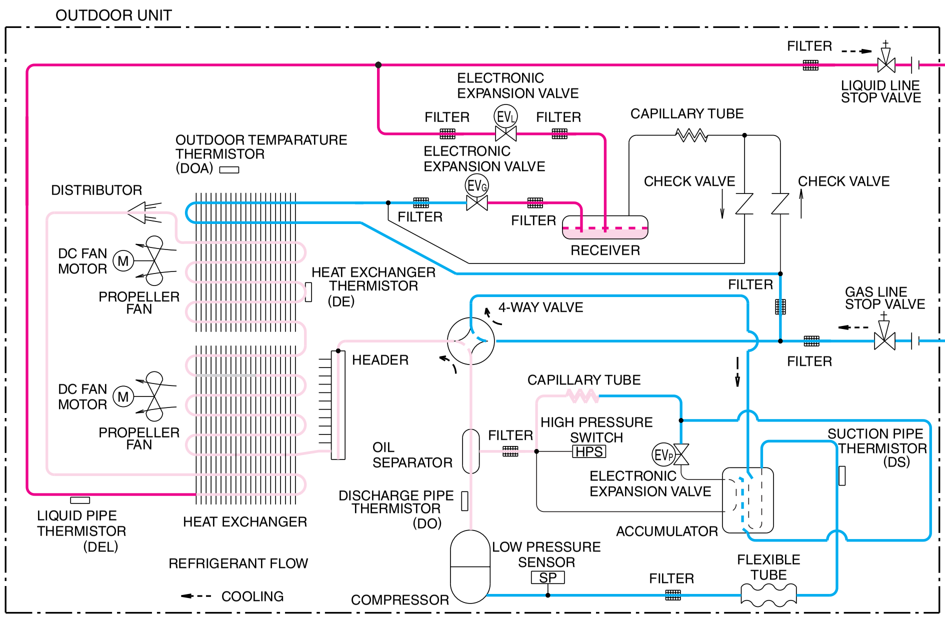
★EVL	SC control (Full close)
EVP	Full close
EVG	0 to 100 pls
EVU	Target discharge pipe temperature control + Gas pipe isothermal control
EVT	Full close
EVH	Full close

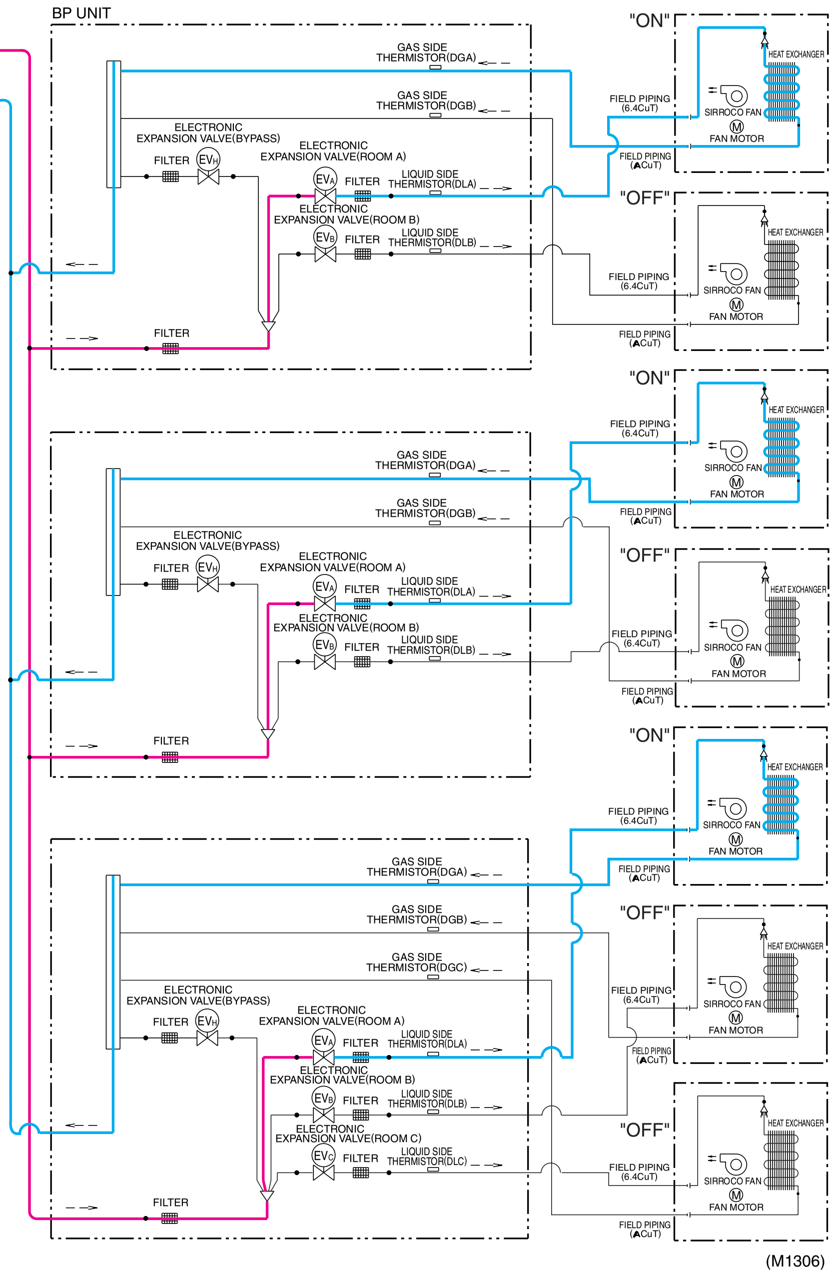
Productive operation patterns
Status of no surplus refrigerant in multi-room operation

Conditions
EVL is fully opened via outdoor unit SC control

As the refrigerant circuit is in the status of no receiver provided, the same control as the conventional super-multi type is conducted.
System control motorized valve : EVU
Each room distribution control motorized valve : EVU

1.8 Multi-Room Operation (Cooling) (with Surplus Refrigerant)





: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

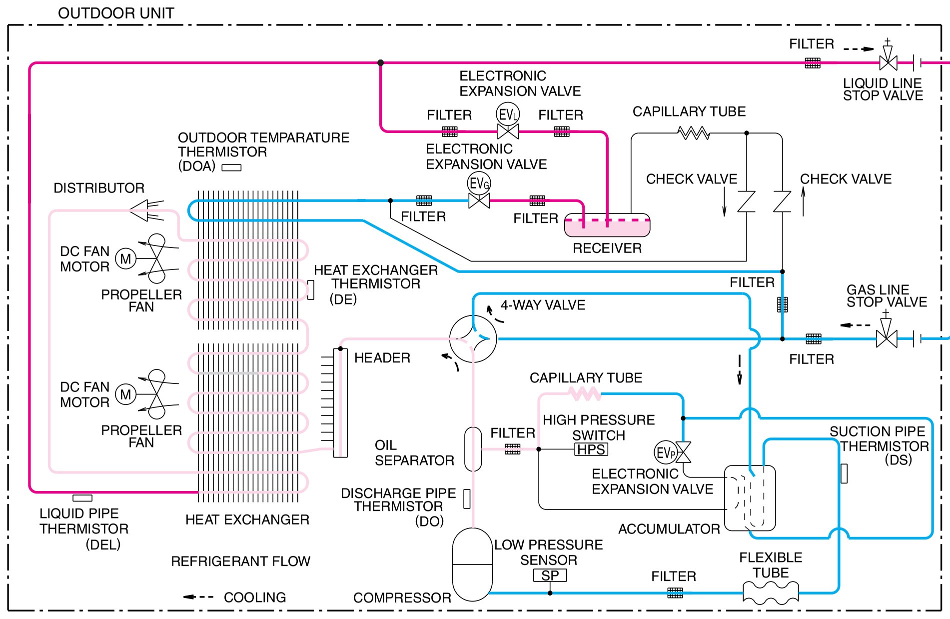
★EVL	SC control (Not Fully closed)
EVP	Full close
EVG	Target discharge pipe temperature control
EVU	SH control
EVT	Full close
EVH	Full close

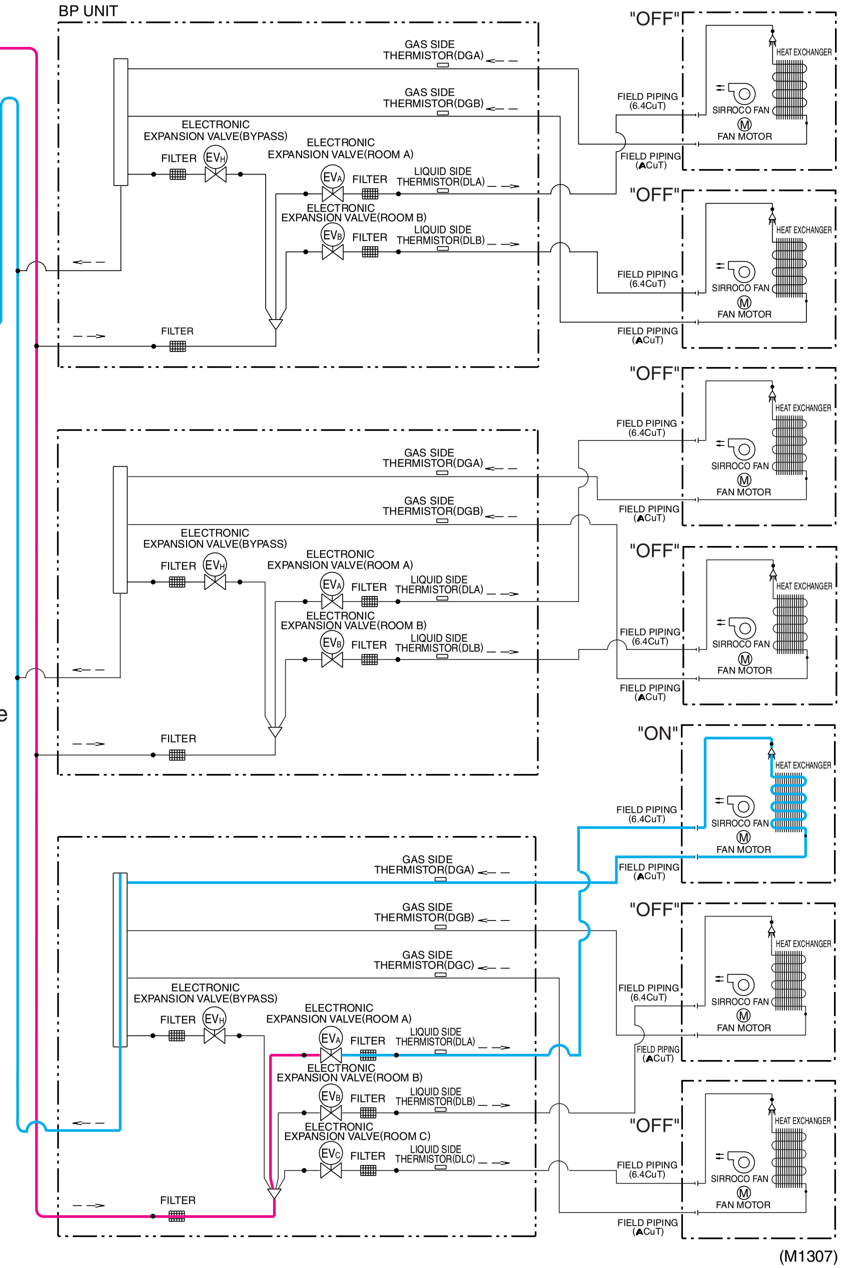
Productive operation patterns
Partial load operation

Conditions
EVL is not fully closed via outdoor unit SC control.

As the surplus refrigerant is treated with the receiver, opening EVL stagnates the liquid refrigerant in the receiver.
The entire system control (suction overheat) is conducted by the adjustment of the surplus refrigerant amount in the receiver via EVG. BP motorized valve is exclusively used for the distribution control, and EVU is used for SH control.
System control motorized valve : EVG
Each room distribution control motorized valve: EVU

1.9 1-Room Operation — Indoor Unit with Large Capacity (Cooling)





: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

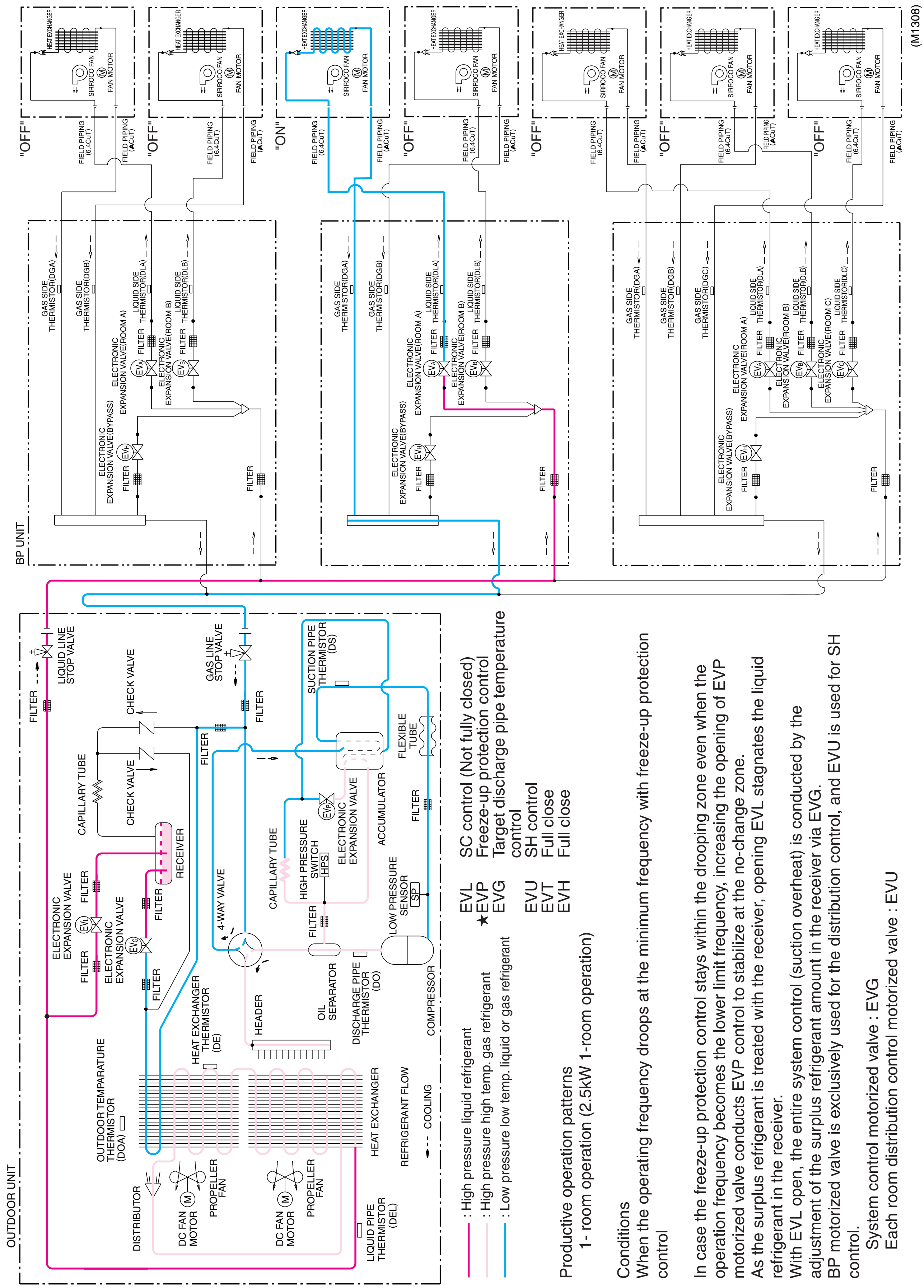
EVL	SC control (Not fully closed)
EVP	Full close
★EVG	Target discharge pipe temperature control
EVU	SH control
EVT	Full close
EVH	Full close

Productive operation patterns
1- room operation (with large capacity indoor unit)

Conditions
EVL is not fully closed via outdoor unit SC control.

As the surplus refrigerant is treated with the receiver, opening EVL dwells the liquid refrigerant in the receiver.
The entire system control (suction overheat) is conducted by the adjustment of the surplus refrigerant amount in the receiver via EVG. BP motorized valve is exclusively used for the distribution control, and EVU is used for SH control.
System control motorized valve : EVG
Each room distribution control motorized valve: EVU

1.10 1-Room Operation — Indoor Unit with Small Capacity (2.5 kW) (Cooling)



: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

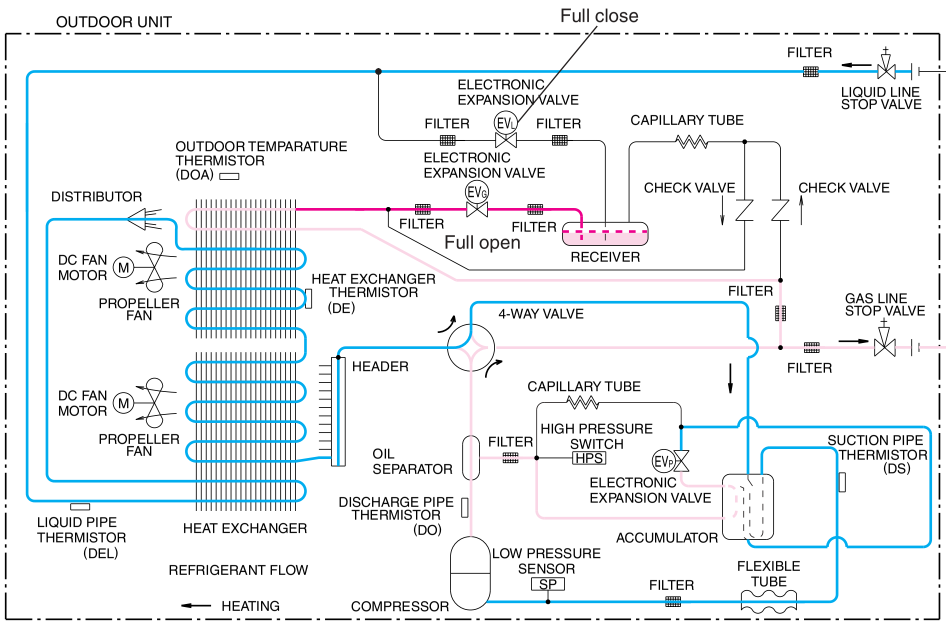
EVL	SC control (Not fully closed)
★EVP	Freeze-up protection control
EVG	Target discharge pipe temperature control
EVU	SH control
EVT	Full close
EVH	Full close

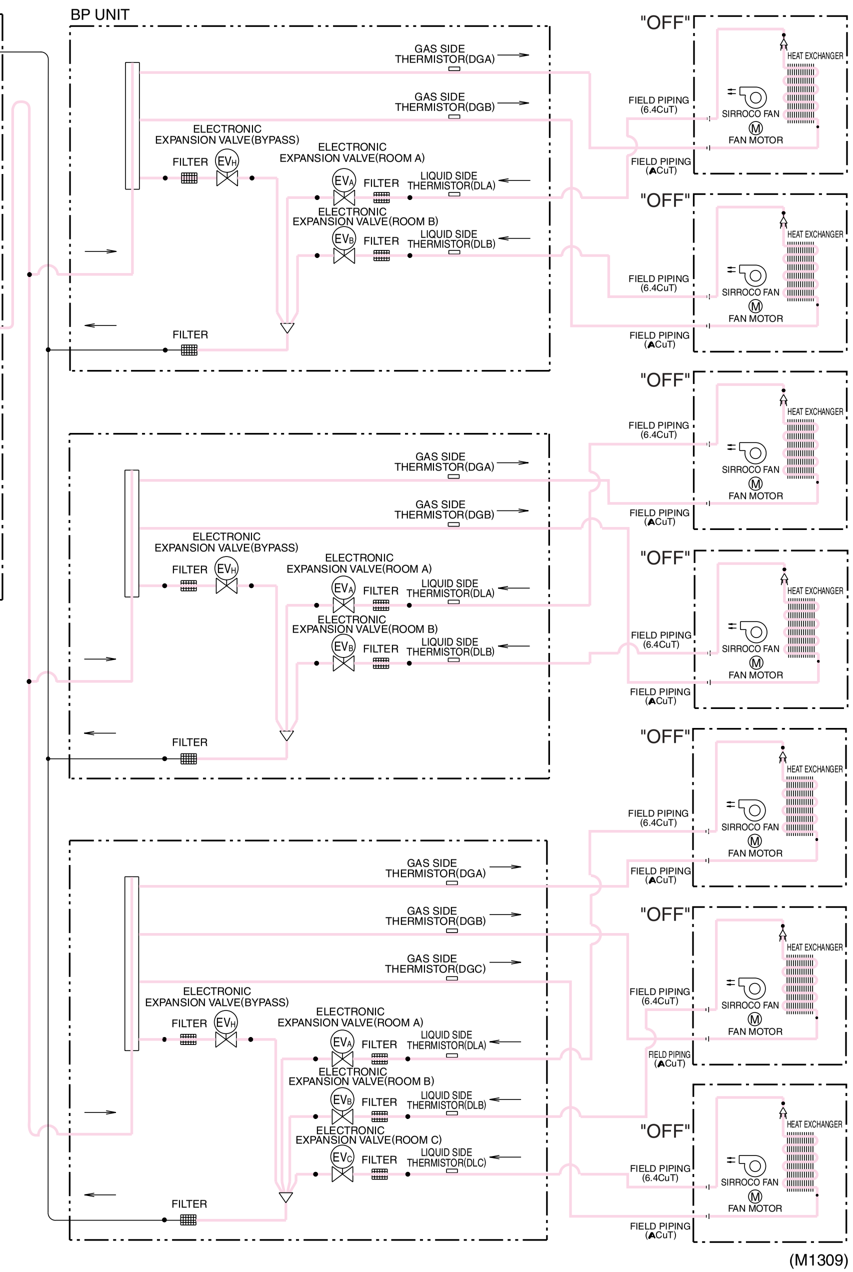
Productive operation patterns
1- room operation (2.5kW 1-room operation)

Conditions
When the operating frequency droops at the minimum frequency with freeze-up protection control

In case the freeze-up protection control stays within the drooping zone even when the operation frequency becomes the lower limit frequency, increasing the opening of EVP motorized valve conducts EVP control to stabilize at the no-change zone.
As the surplus refrigerant is treated with the receiver, opening EVL stagnates the liquid refrigerant in the receiver.
With EVL open, the entire system control (suction overheat) is conducted by the adjustment of the surplus refrigerant amount in the receiver via EVG.
BP motorized valve is exclusively used for the distribution control, and EVU is used for SH control.
System control motorized valve : EVG
Each room distribution control motorized valve : EVU

1.11 Standby Operation (Heating)





: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

★EVG	Full open
EVL	Full close
★EVP	Full open
EVU	Full close
EVT	Full close
EVH	Full close

Productive operation patterns

On stopping the heating operation

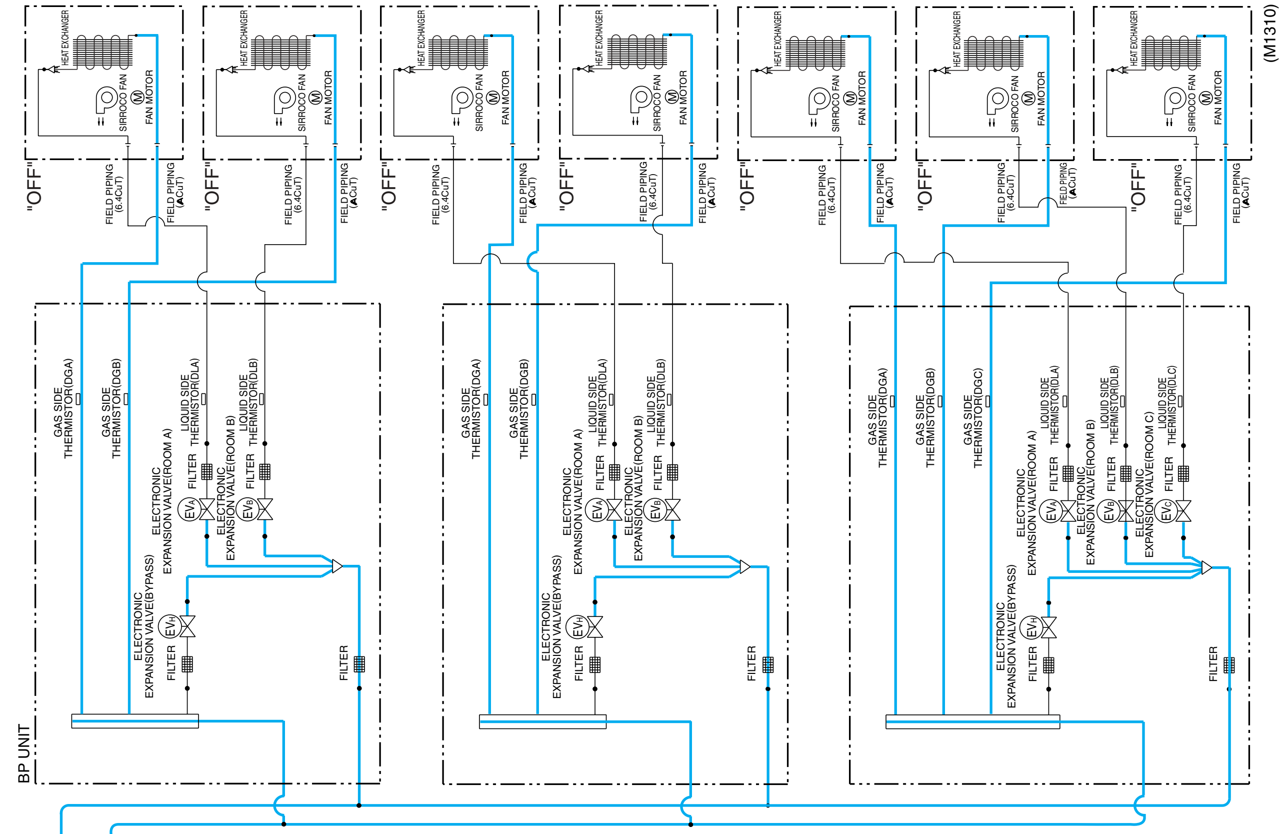
On starting the heating operation

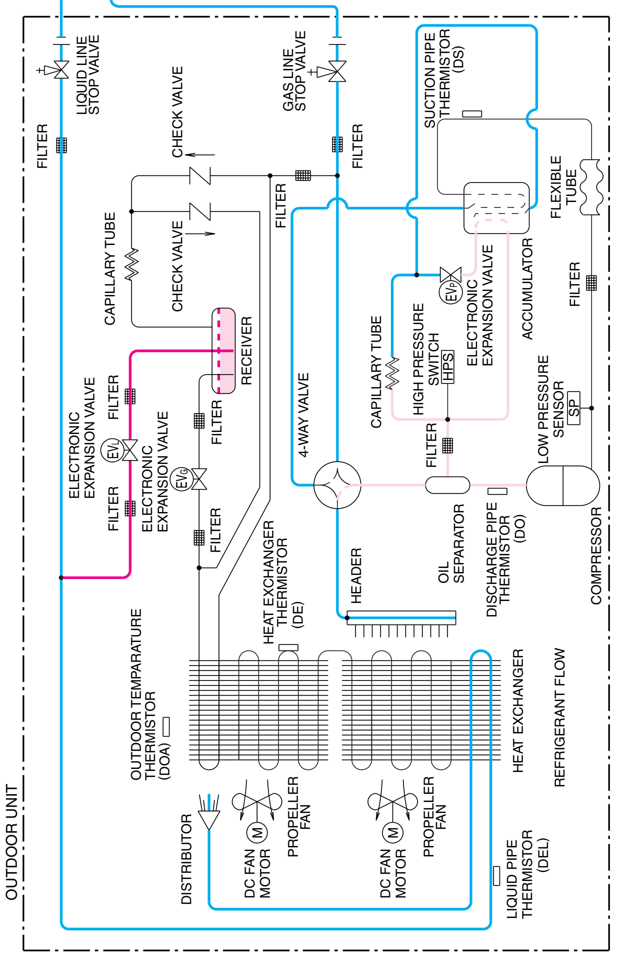
(When the standby operation has not been completed yet before unit operation stop)

Securing the reliability (oil dilution proof in particular) of the compressor by the liquid return to accumulator when starting the heating operation, the unit drains the refrigerant in the accumulator, and stagnates the liquid refrigerant in the condenser and receiver after stopping the heating operation.
Consequently, fully open EVP to evaporate the liquid refrigerant in the accumulator, fully close each indoor unit motorized valves (EVU / EVT), fully open EVG to feed the liquid refrigerant in the receiver, and then fully close EVL.

When conducting the equalizing control after completing the standby operation, fully open each room motorized valves (EVU·EVT) and EVG·EVL, and fully open EVP only for the equalizing control.

1.12 Equalizing Control (Heating)





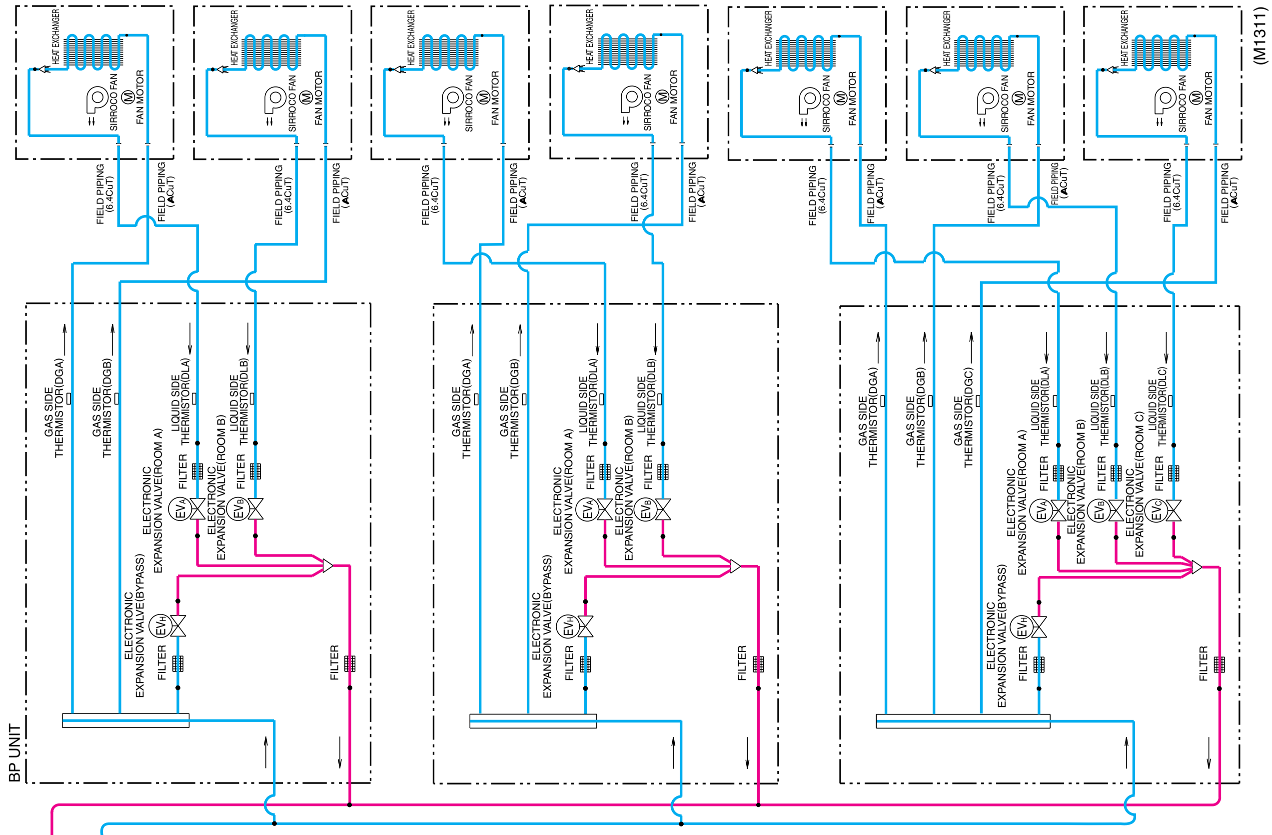
: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

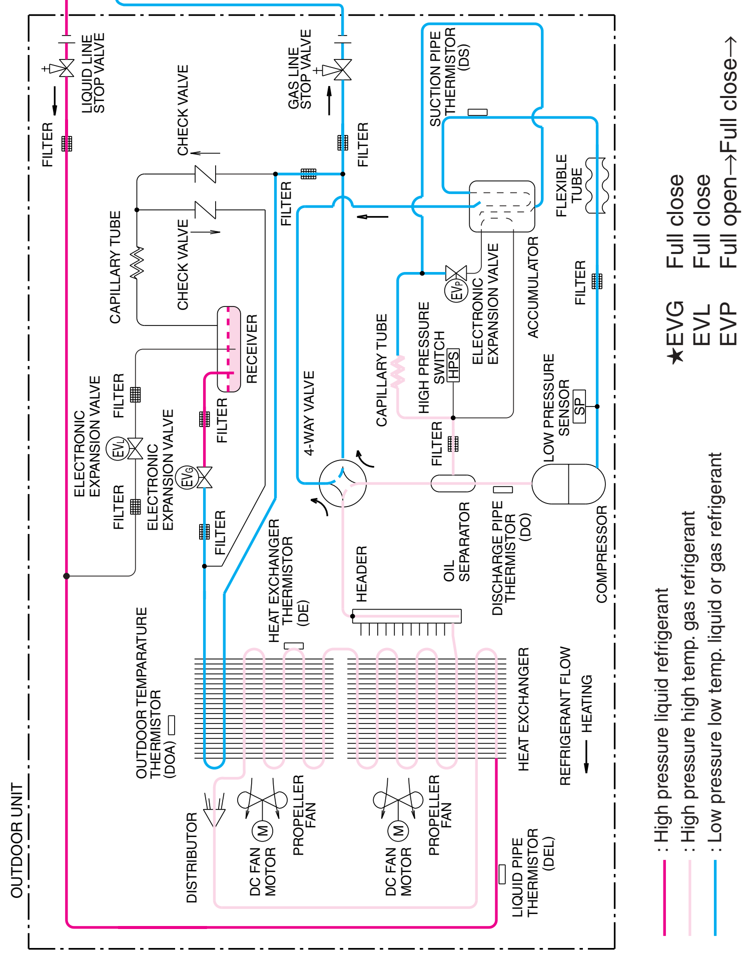
EVL	Full close
★EVP	Full open→Full close→ 150 pls→Full open
EVG	100 pls
EVU	Full close
EVT	Full close
EVH	Full close

Productive operation patterns
When the heating standby operation has been completed

When conducting the equalizing control after completing the standby operation, fully close each room motorized valves (EVU·EVT) and EVG·EVL, and fully open EVP only for the equalizing control.

1.13 Oil Return Operation (Heating)



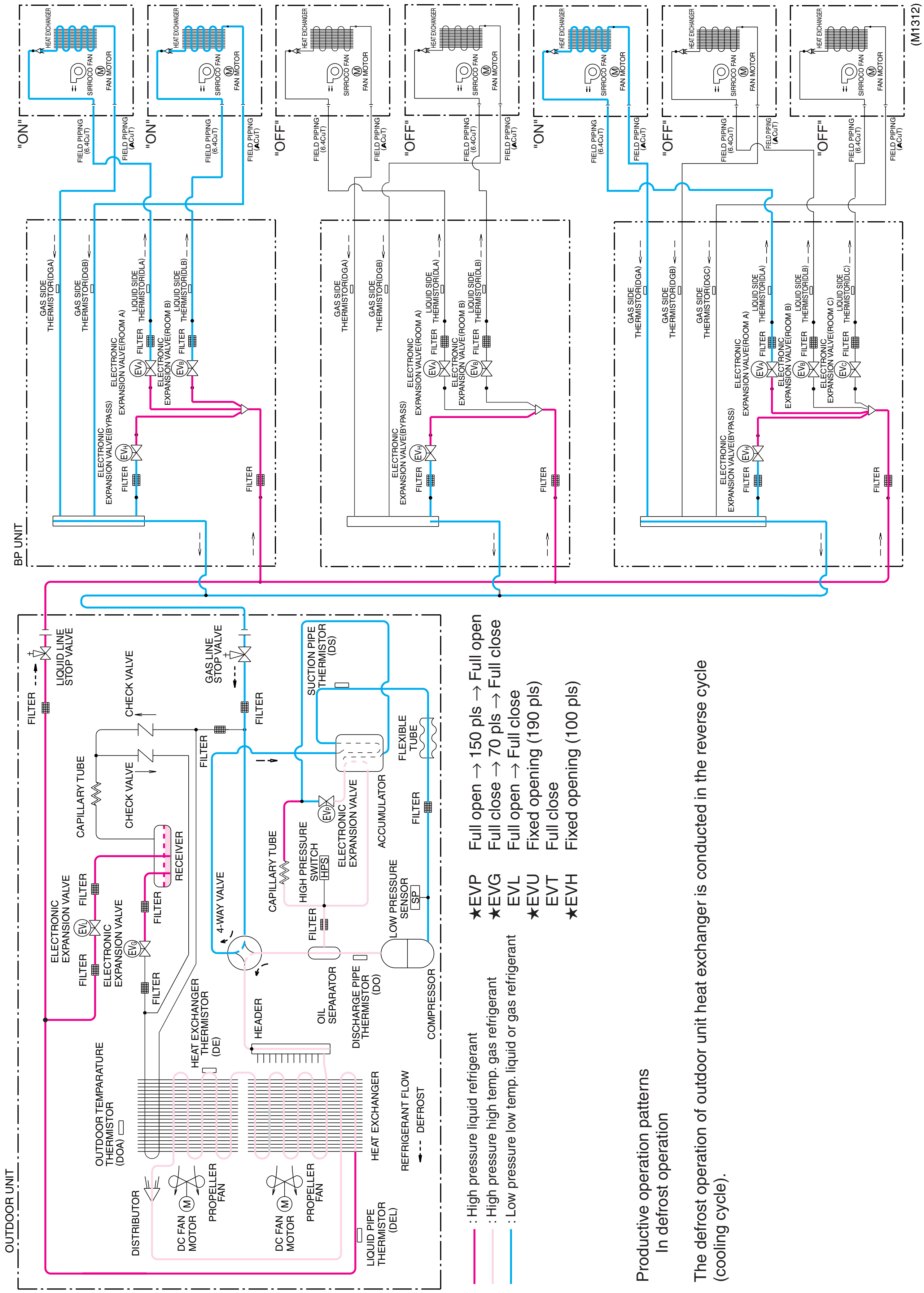


★EVG	Full close
EVL	Full close
EVP	Full open→Full close→150 pls→Full open
★EVU	Fixed opening (190pls)
★EVT	Full close
★EVH	Fixed flow rate setting

Productive operation patterns
Oil collecting operation in heating

The oil collecting operation is conducted in the reverse cycle (cooling cycle).

1.14 Defrost Operation



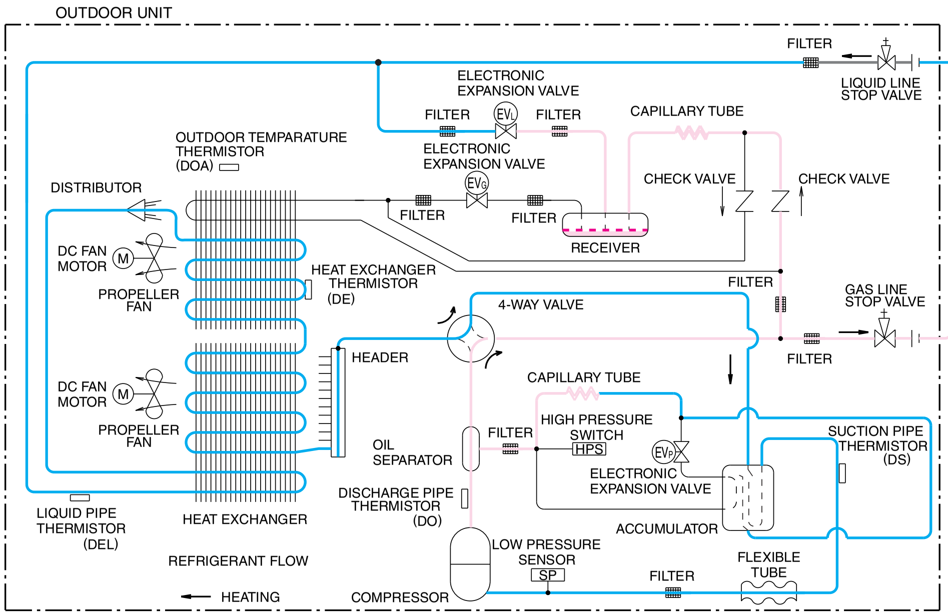
: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

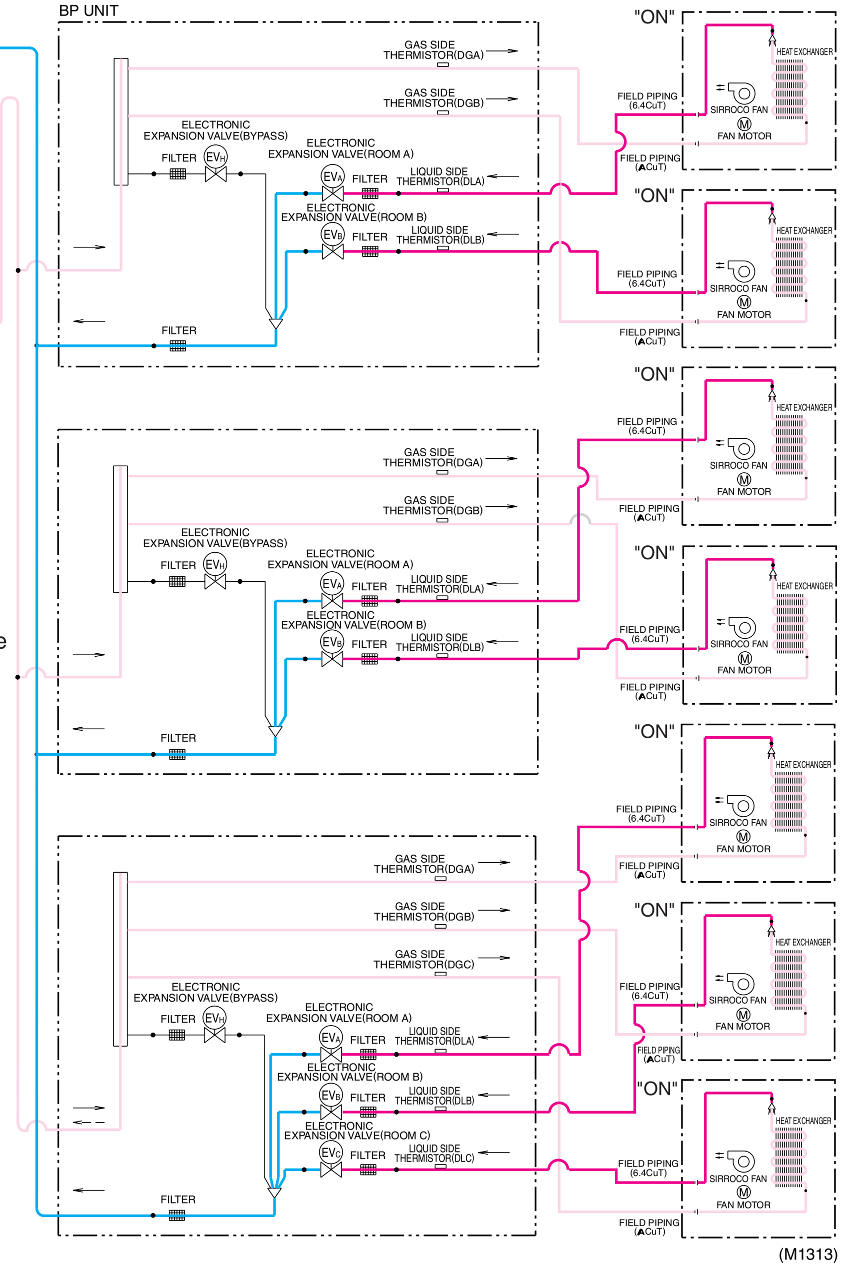
★EVP Full open → 150 pls → Full open
★EVG Full close → 70 pls → Full close
EVL Full open → Full close
★EVU Fixed opening (190 pls)
EVT Full close
★EVH Fixed opening (100 pls)

Productive operation patterns
In defrost operation

The defrost operation of outdoor unit heat exchanger is conducted in the reverse cycle (cooling cycle).

1.15 All-Room Operation (Heating)





: High pressure liquid refrigerant

: High pressure high temp. gas refrigerant

: Low pressure low temp. liquid or gas refrigerant

EVG	Full close (Reverse target discharge pipe temperature control)
★EVL	Target discharge pipe temperature control
EVP	Full close
★EVU	Heating SC control
EVH	Full close
★EVT	Target discharge pipe temperature control

Productive operation patterns

All-room operation

Conditions

(1) Unit is not in the capacity control

(The operating frequency does not droop to the minimum frequency by high pressure control system protection.)

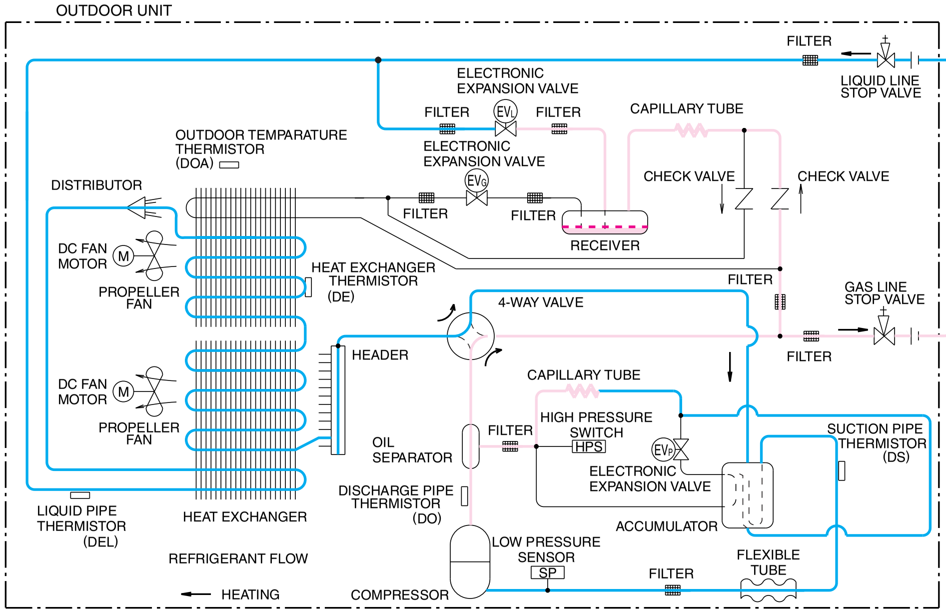
(2) All-room units in operation

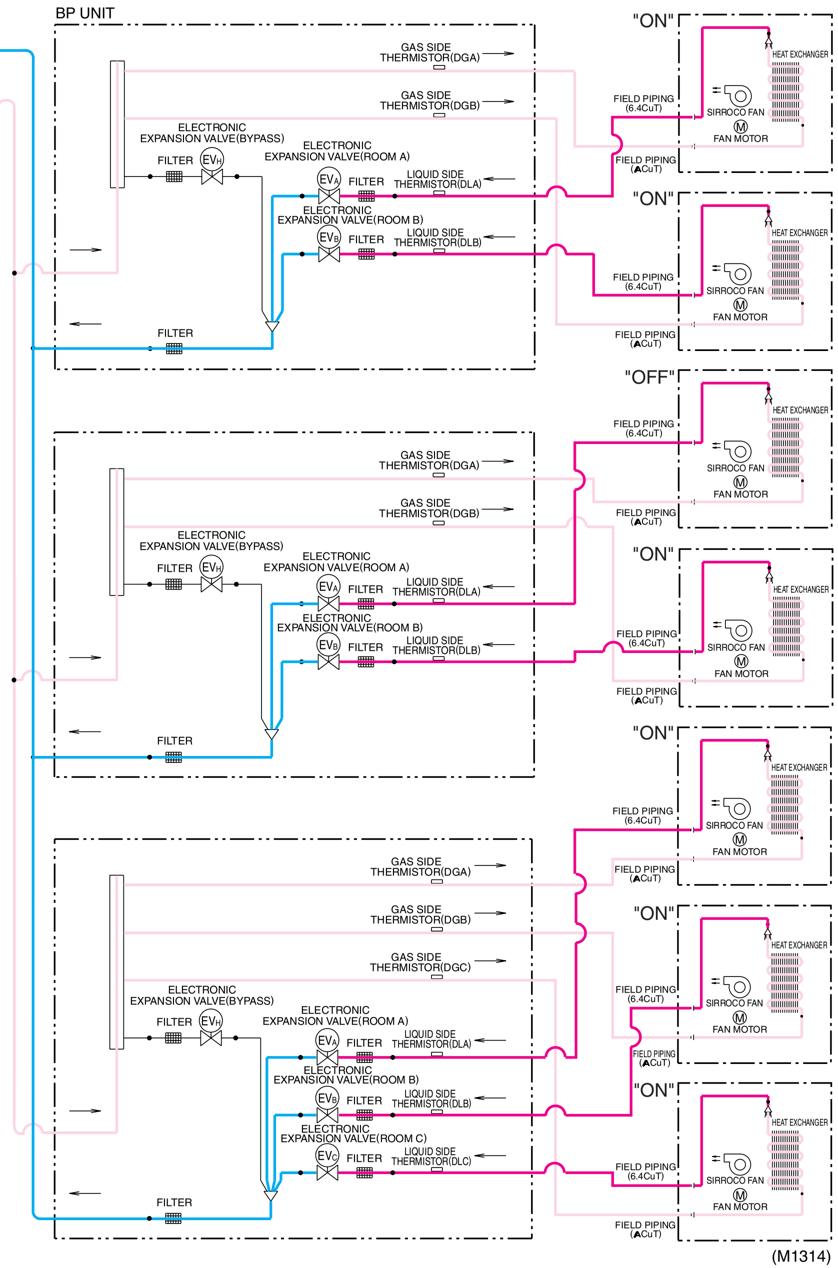
As the refrigerant circuit is in the status of no receiver provided, the same control as the conventional multi type (M-5) is conducted.

System control motorized valve : EVT·(EVU)

Each room distribution control motorized valve : EVU

1.16 Multi-Room Operation (with non-Operating Room Unit) (Heating)





: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

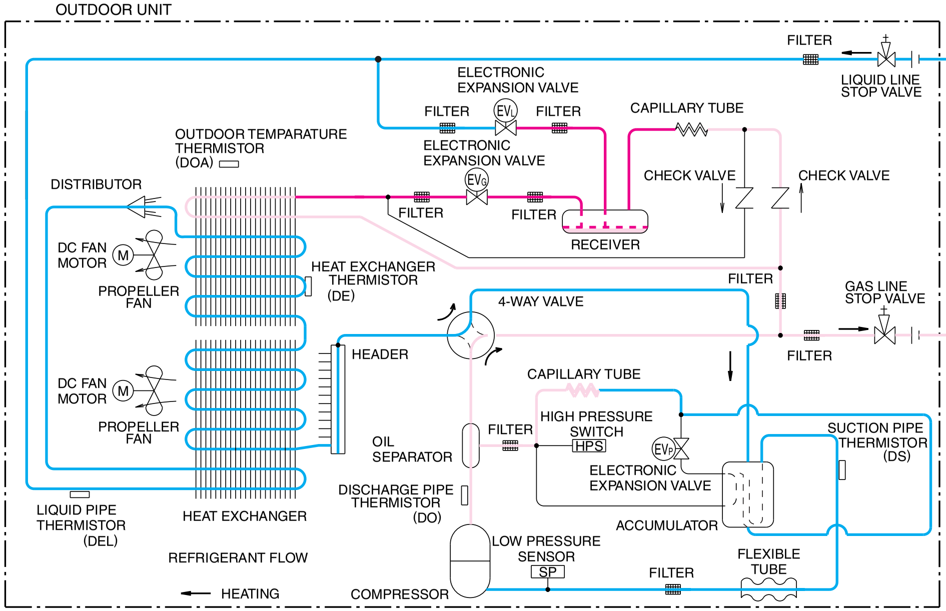
EVG	Full close (Reverse target discharge pipe temperature control)
★EVL	Target discharge pipe temperature control (with upper limit of opening)
EVP	Full close
EVU	Target discharge pipe temperature control + SC control
★EVT	Target discharge pipe temperature control
EVH	Full close

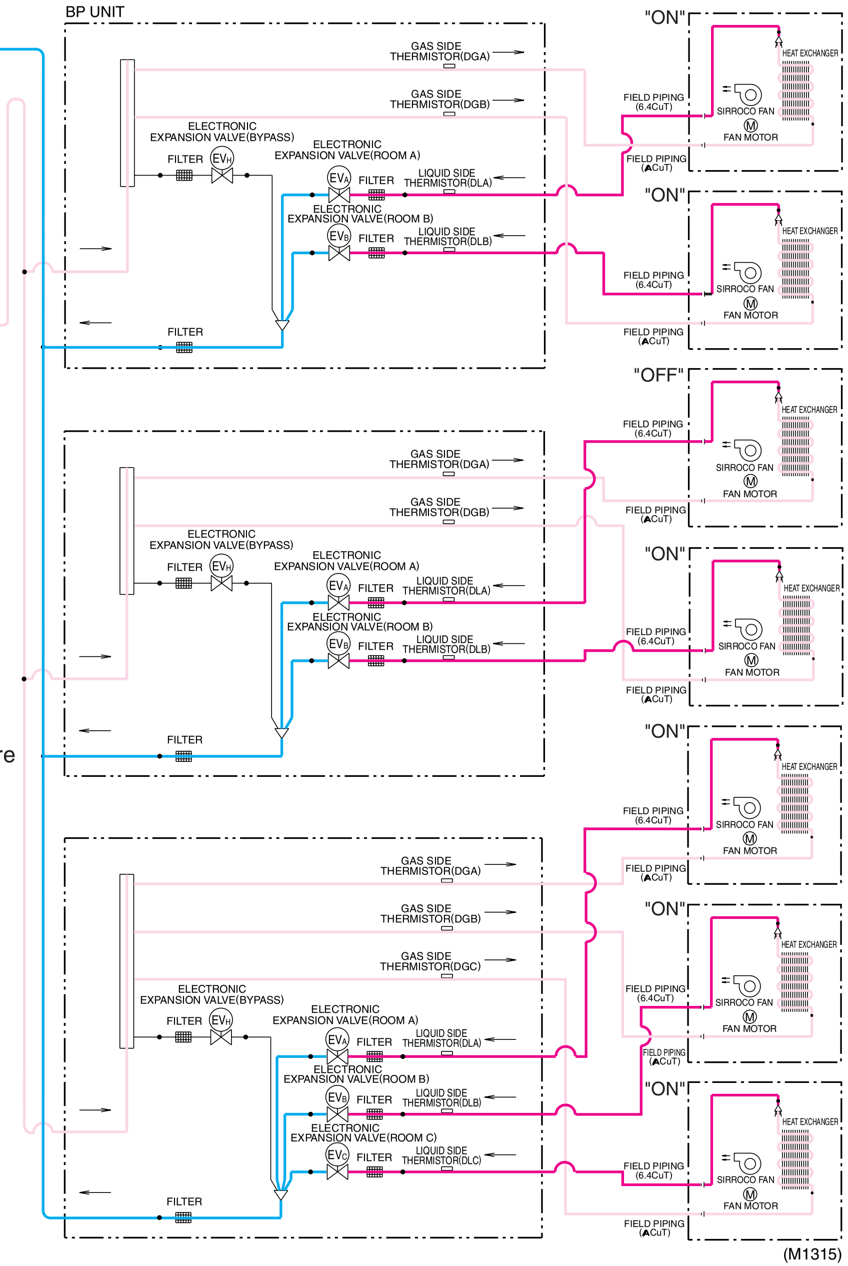
Productive operation patterns
Multi-room operation (with non-operating room unit)

Conditions
(1) Not in the capacity control
(The operating frequency does not droop to the minimum frequency by high pressure control system protection.)
(2) Not in all-room unit operation
(3) All non-operating room units motorized valve opening is not at minimum.
In case that the conditions (1), (2) and (3) are met.

The defrost operation of outdoor unit heat exchanger is conducted in the reverse cycle (cooling cycle).

1.17 Multi-Room Operation (Heating)





: High pressure liquid refrigerant
: High pressure high temp. gas refrigerant
: Low pressure low temp. liquid or gas refrigerant

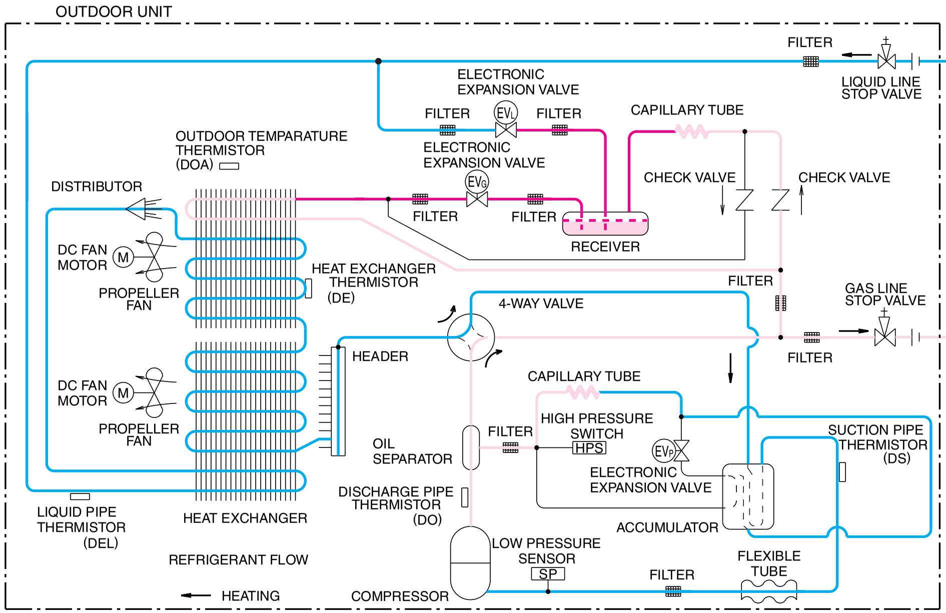
★EVG	Reverse target discharge pipe temperature control
★EVL	Target discharge pipe temperature control
EVP	Full close
EVU	SC control (+ Target discharge pipe temperature control)
★EVT	Target discharge pipe temperature control (Min. opening)
EVH	Full close

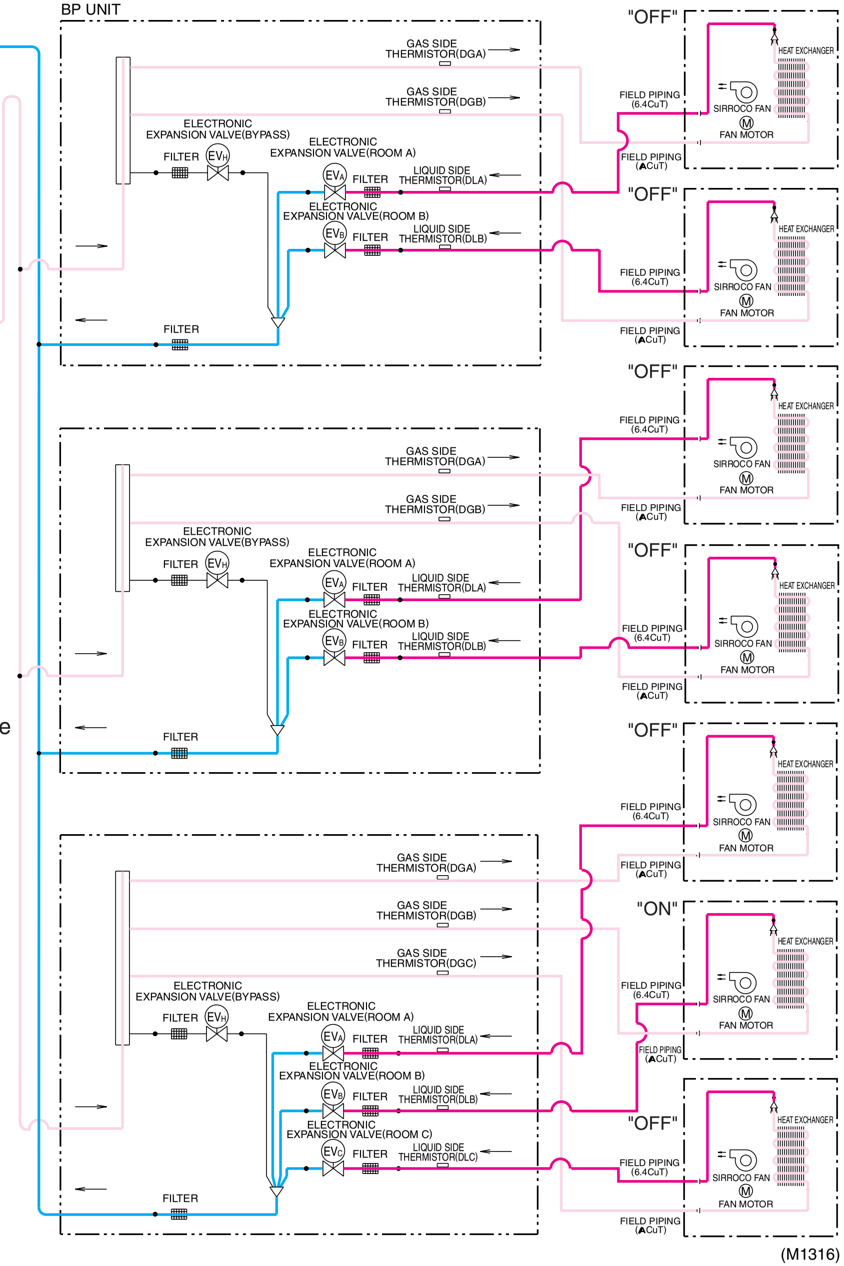
Productive operation patterns
    Partial load operation

Conditions
(1) Not in the capacity control
    (The operating frequency does not droop to the minimum frequency by high pressure control system protection)
(2) In all-room unit operation
(3) All non-operating room units motorized valve opening is minimum.
In case that the conditions (1) and [(2) or (3)] are met.

As the surplus refrigerant is treated with the receiver, opening EVG stagnates the refrigerant condensed through the auxiliary heat exchanger. (Providing a motorized valve at the downstream side of the auxiliary heat exchanger clears the heat resistant temperature of the motorized valve.)
The entire system control (suction overheat) is conducted by the adjustment of the surplus refrigerant amount in the receiver via EVL. BP motorized valve is exclusively used for the distribution control, and EVU for SC control.
    System control motorized valve : EVL·(EVT)
    Each room distribution control motorized valve : EVU

1.18 1-Room Operation — Indoor Unit with Large Capacity (Heating)





: High pressure liquid refrigerant	
: High pressure high temp. gas refrigerant	
: Low pressure low temp. liquid or gas refrigerant	

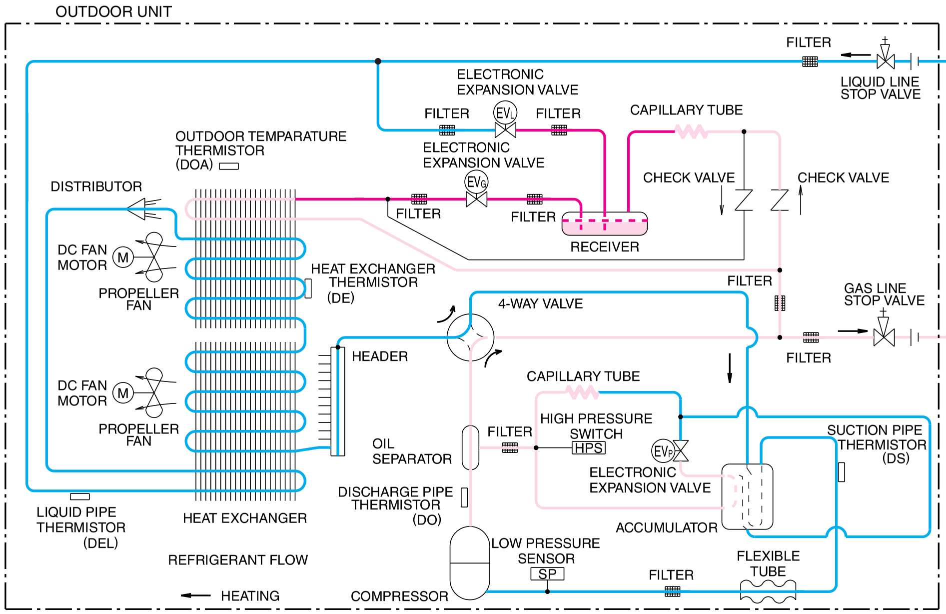
★EVG	High pressure system control
★EVL	Target discharge pipe temperature control
EVP	Full close
EVU	SC control (+ Target discharge pipe temperature control)
★EVT	Target discharge pipe temperature control
EVH	Full close

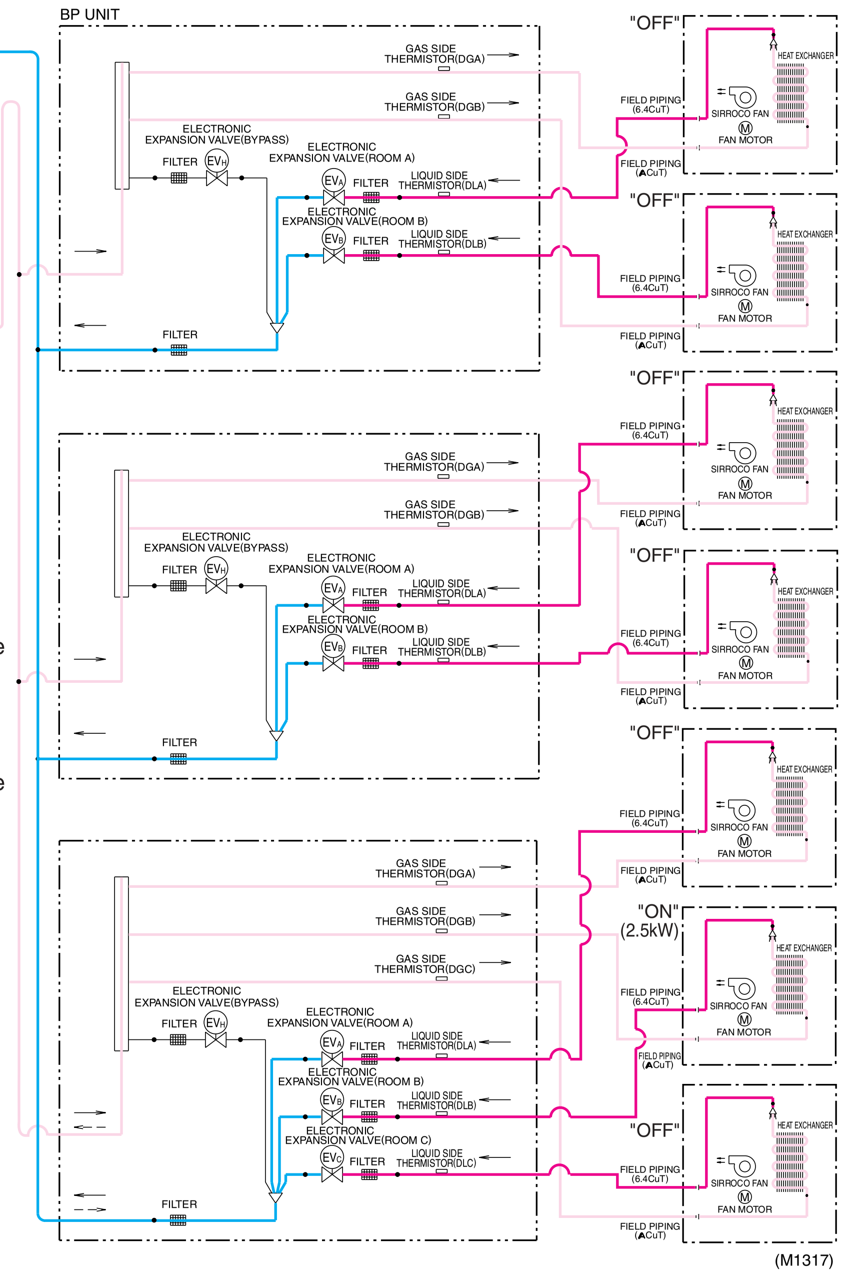
Productive operation patterns
Heating 1-room operation (with large indoor unit capacity)

Conditions
(1) In capacity control : Capacity control range : (small)
(when the operating frequency droops to the minimum frequency by the protective function of high pressure control system)

In case the peak-cut control stays within the drooping zone even when the operating frequency becomes the lower limit frequency, increasing the opening of EVG motorized valve increases the condensing capacity of auxiliary heat exchanger and conducts EVG control to stabilize the unit operation at the no-change zone.
As the surplus refrigerant is treated with the receiver, opening EVL dwells the liquid refrigerant In the receiver.
With opened EVG, the entire system control (suction overheat) is conducted by the adjustment of the surplus refrigerant in the receiver via EVL.
BP motorized valve is exclusively used for the distribution control. EVU and EVT are operated by SC control.
System control motorized valve : EVL (EVT)
Each room distribution control motorized valve : EVU

1.19 1-Room Operation — Indoor Unit with Small Capacity (2.5 kW) (Heating)





: High pressure liquid refrigerant	
: High pressure high temp. gas refrigerant	
: Low pressure low temp. liquid or gas refrigerant	

EVG	0~150 pls
EVL	Target discharge pipe temperature control
★EVP	High pressure system control
EVU	SC control (+ Target discharge pipe temperature control)
EVT	Target discharge pipe temperature control
EVH	Full close

Productive operation patterns
Heating 1-room operation (2.5kW 1-room operation)

Conditions
(1) In capacity control : Capacity control range : (large)
(When the operating frequency droops to the minimum frequency with high pressure control system protection function control)

In case the peak-cut control stays within the drooping zone even when the operating frequency becomes the lower limit frequency, although EVG motorized value is fully opened, the peak-cut control is still remaining in drooping zone, conduct peak-cut control by opening EVP to obtain a stable unit operation in change zone.
With opened EVG, the entire system control (suction overheat) is conducted by the adjustment of the surplus refrigerant in the receiver via EVL.
BP motorized valve is exclusively used for the distribution control. EVU and EVT are operated by SC control.
System control motorized valve : EVL (EVT)
Each room distribution control motorized valve : EVU

Part 7
Operations

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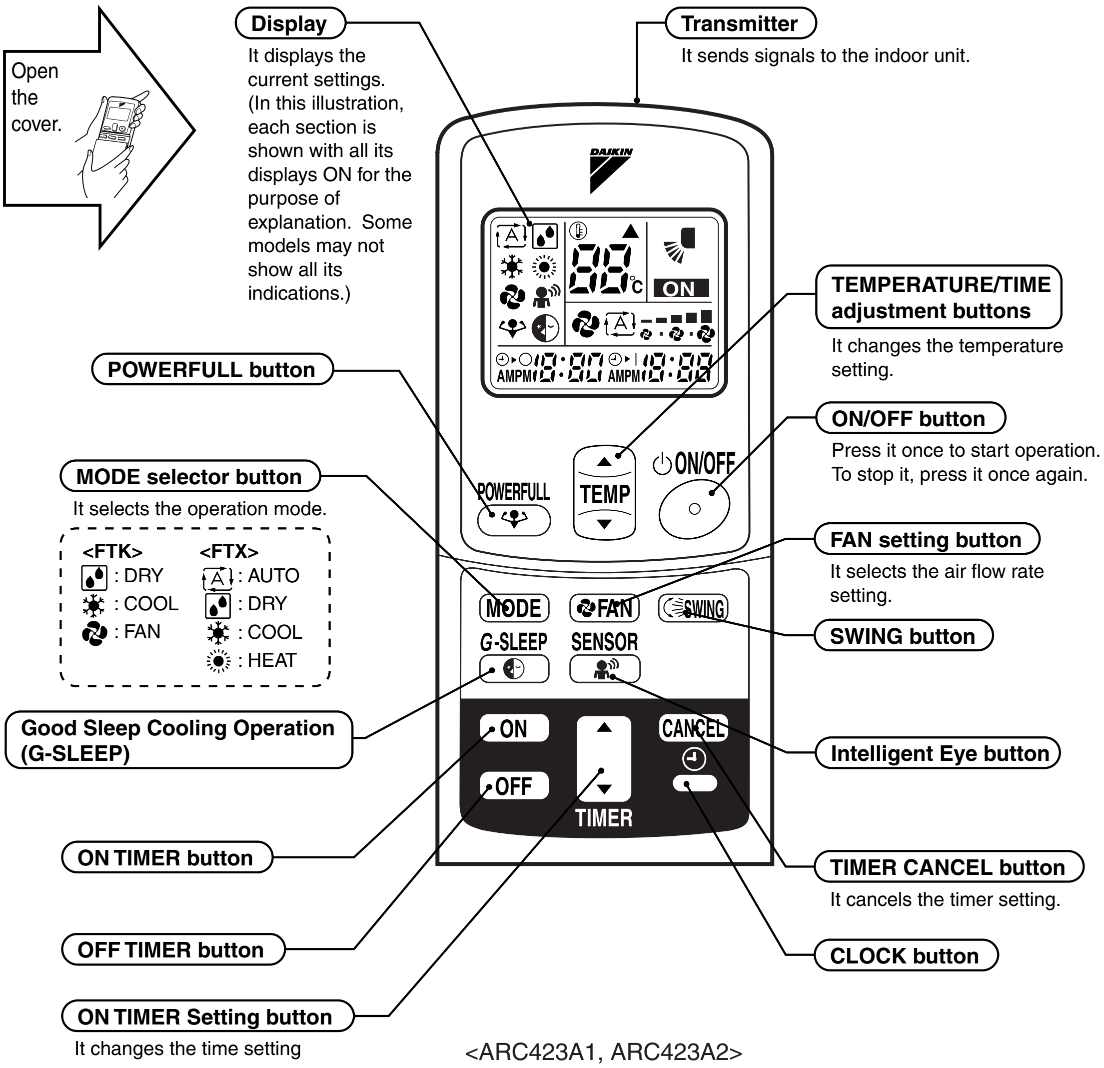
1. Remote Controller

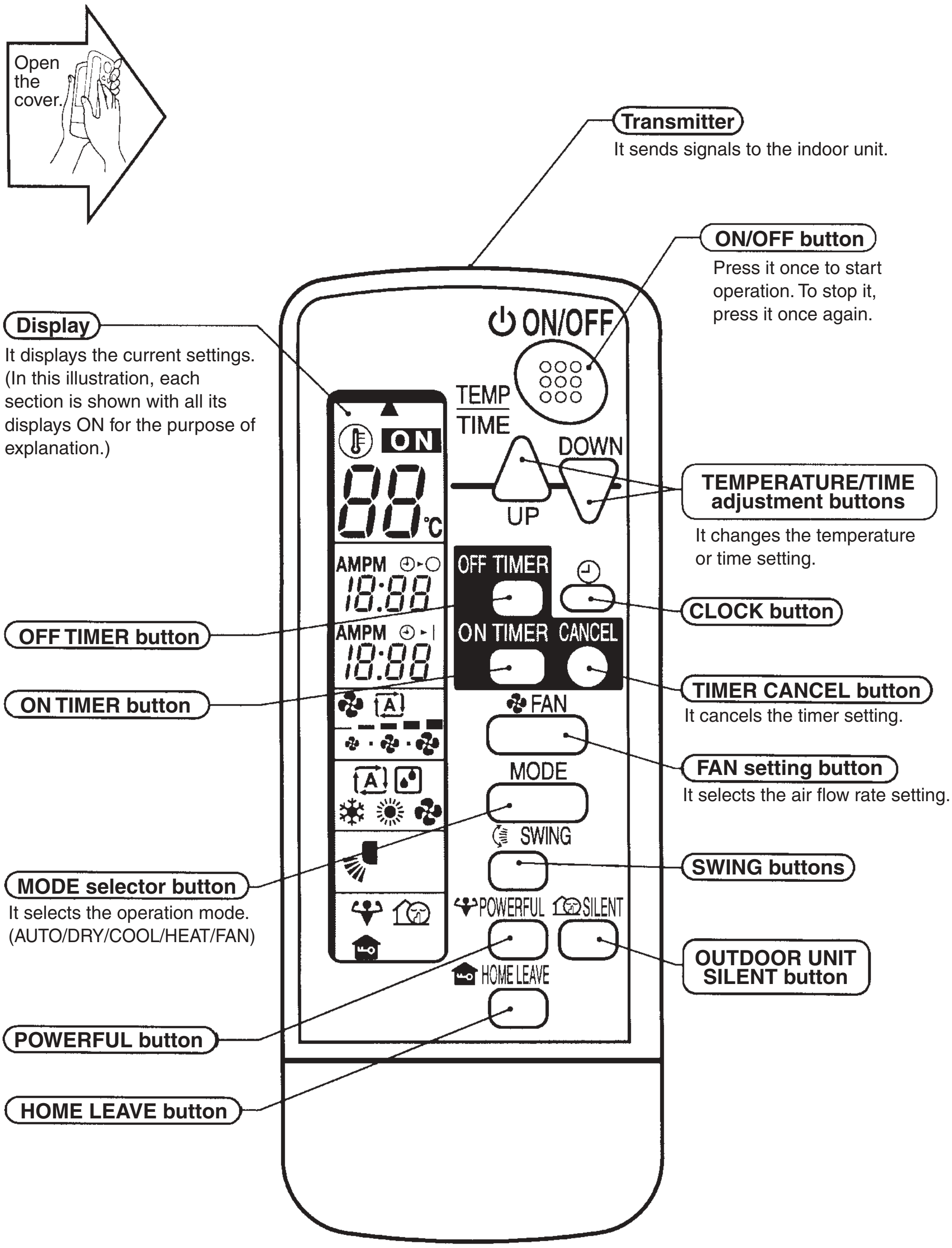
1.1 Wireless Remote Controller

1.1.1 FTX25 / 35J



<ARC423A1, ARC423A2>

1.1.2 FVX25 / 35KZ



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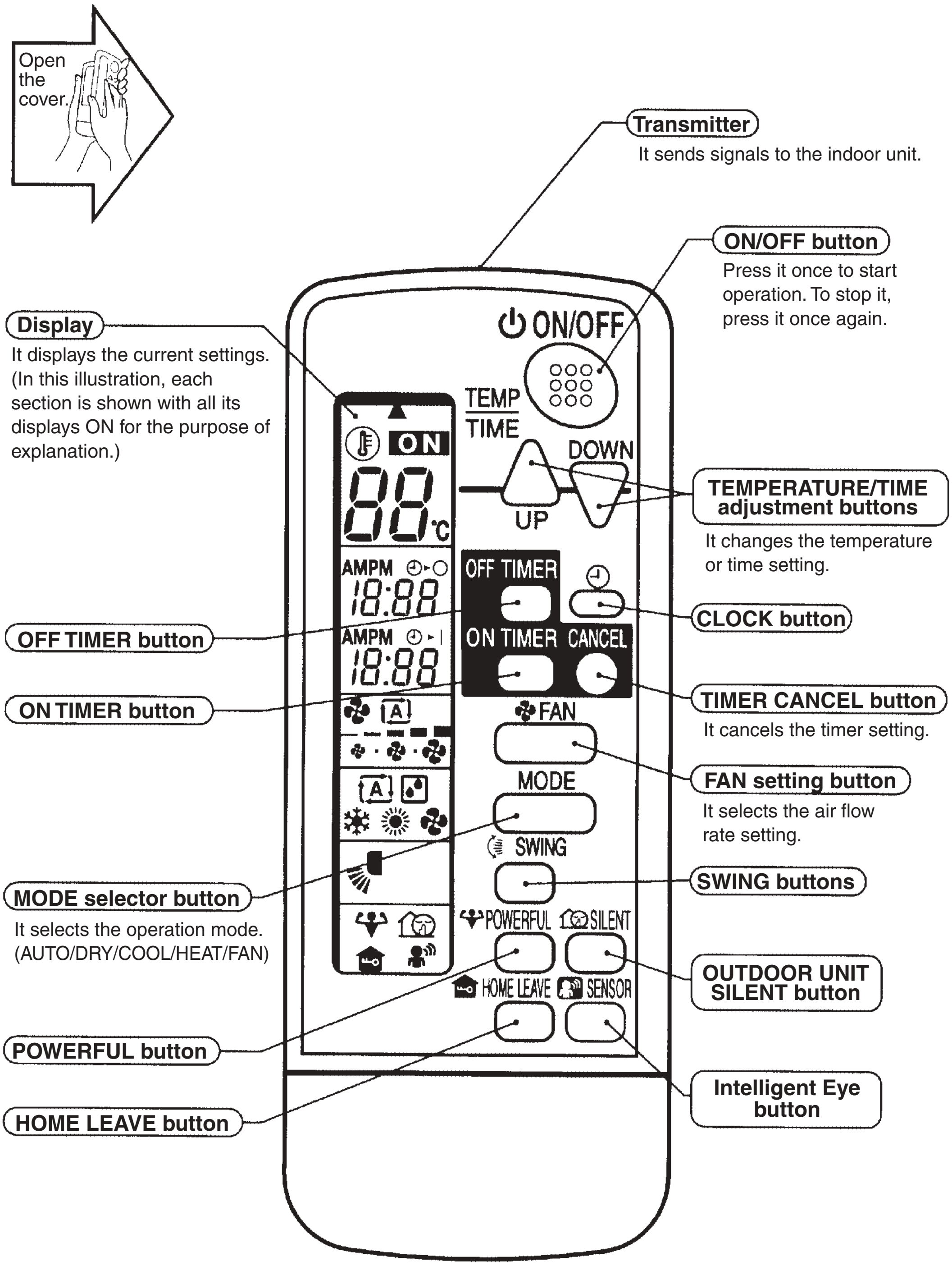
(Q0331)

1.1.3 FTXD25 / 35KZ



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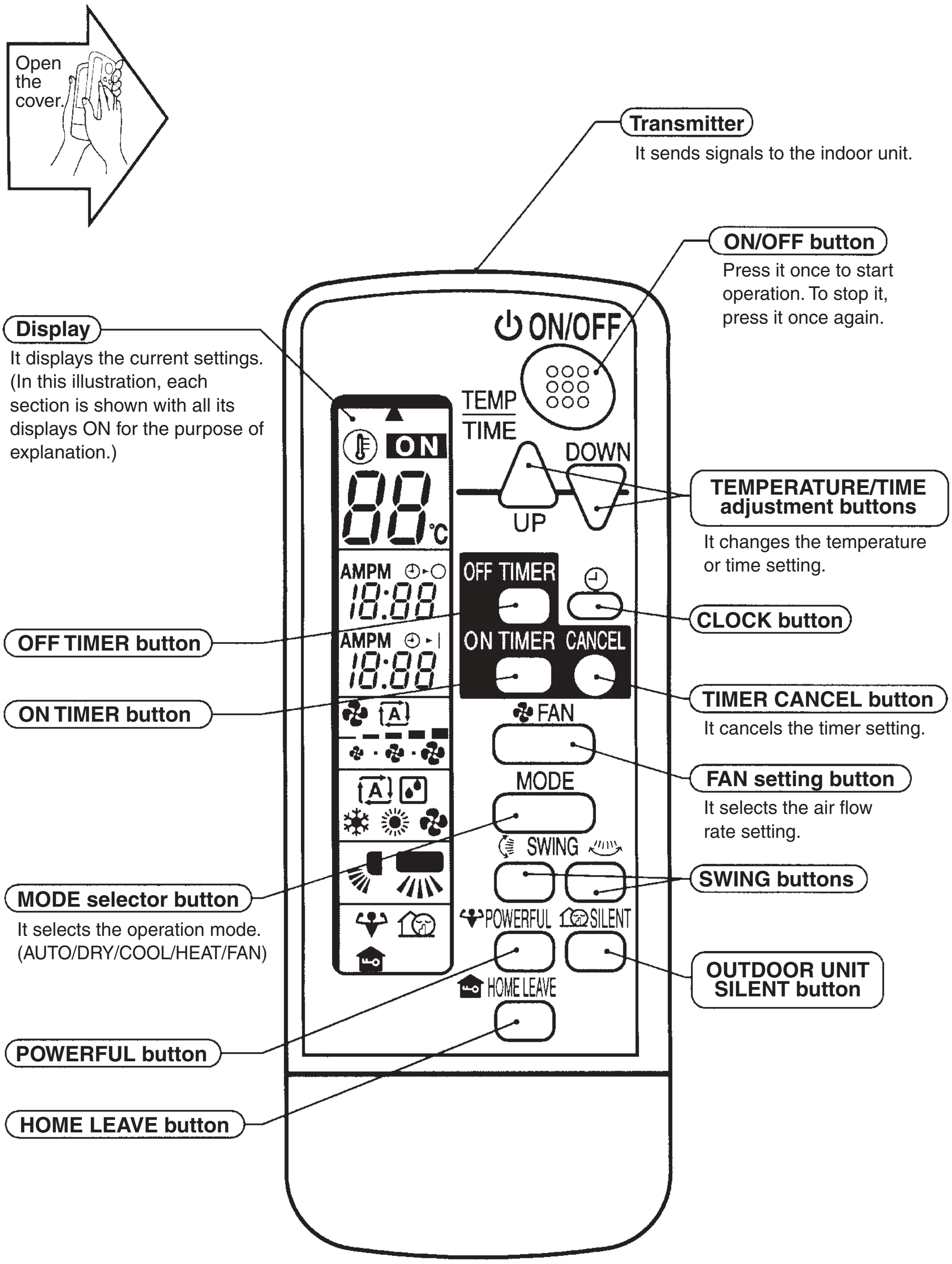
(Q0330)

1.1.4 FTXD50 / 60 / 71J



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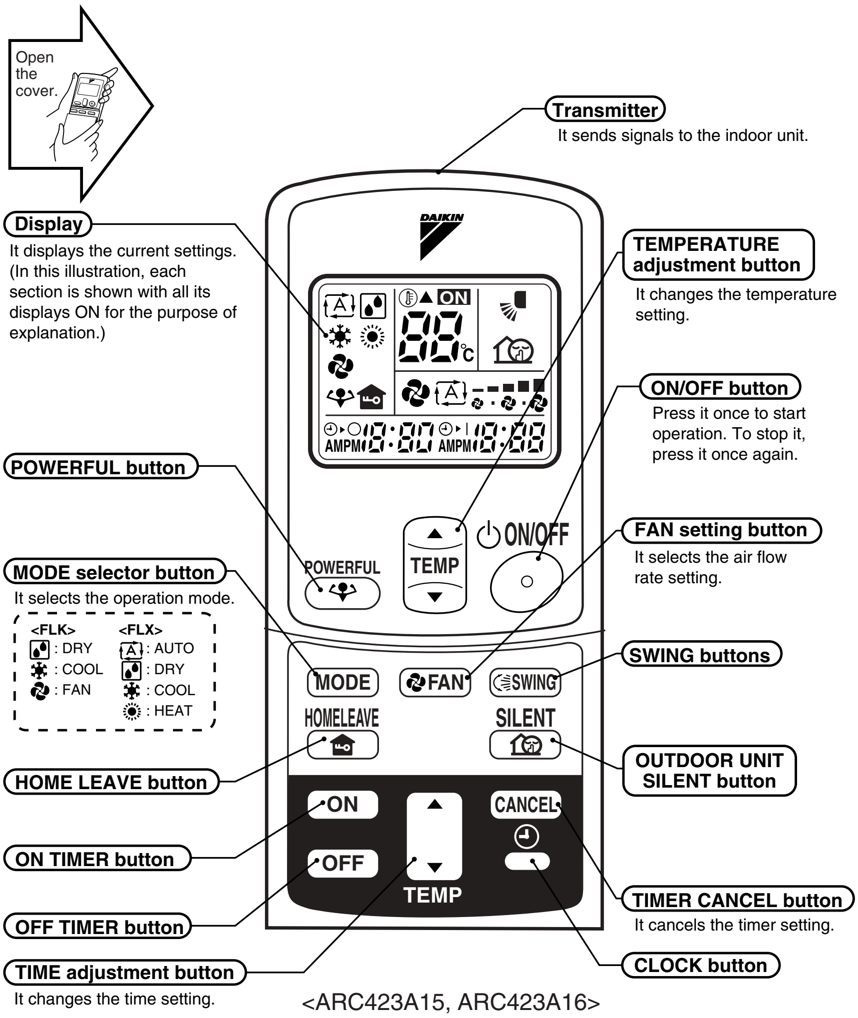
(Q0163)

1.1.5 FLX50 / 60J



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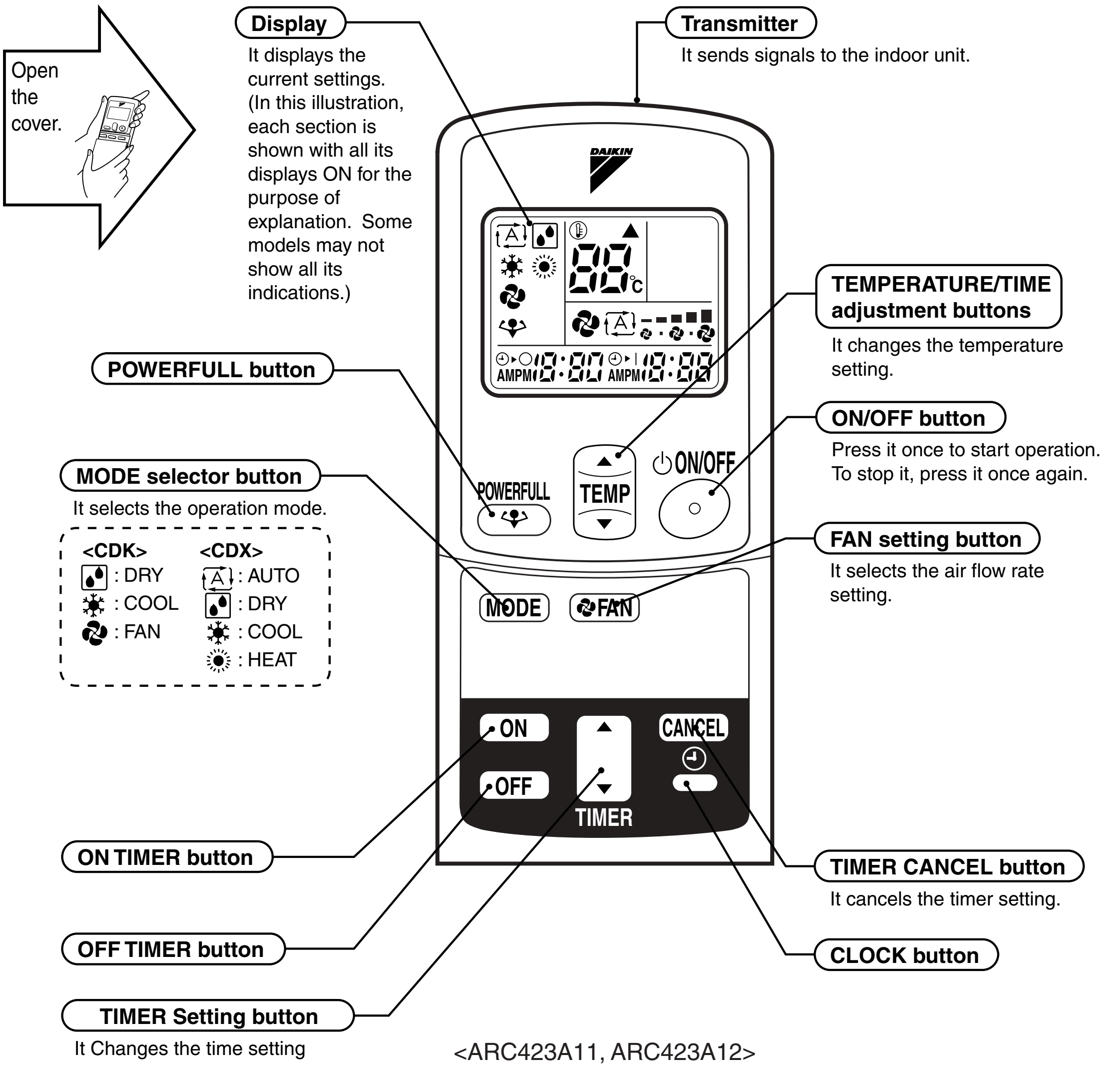
(Q0166)

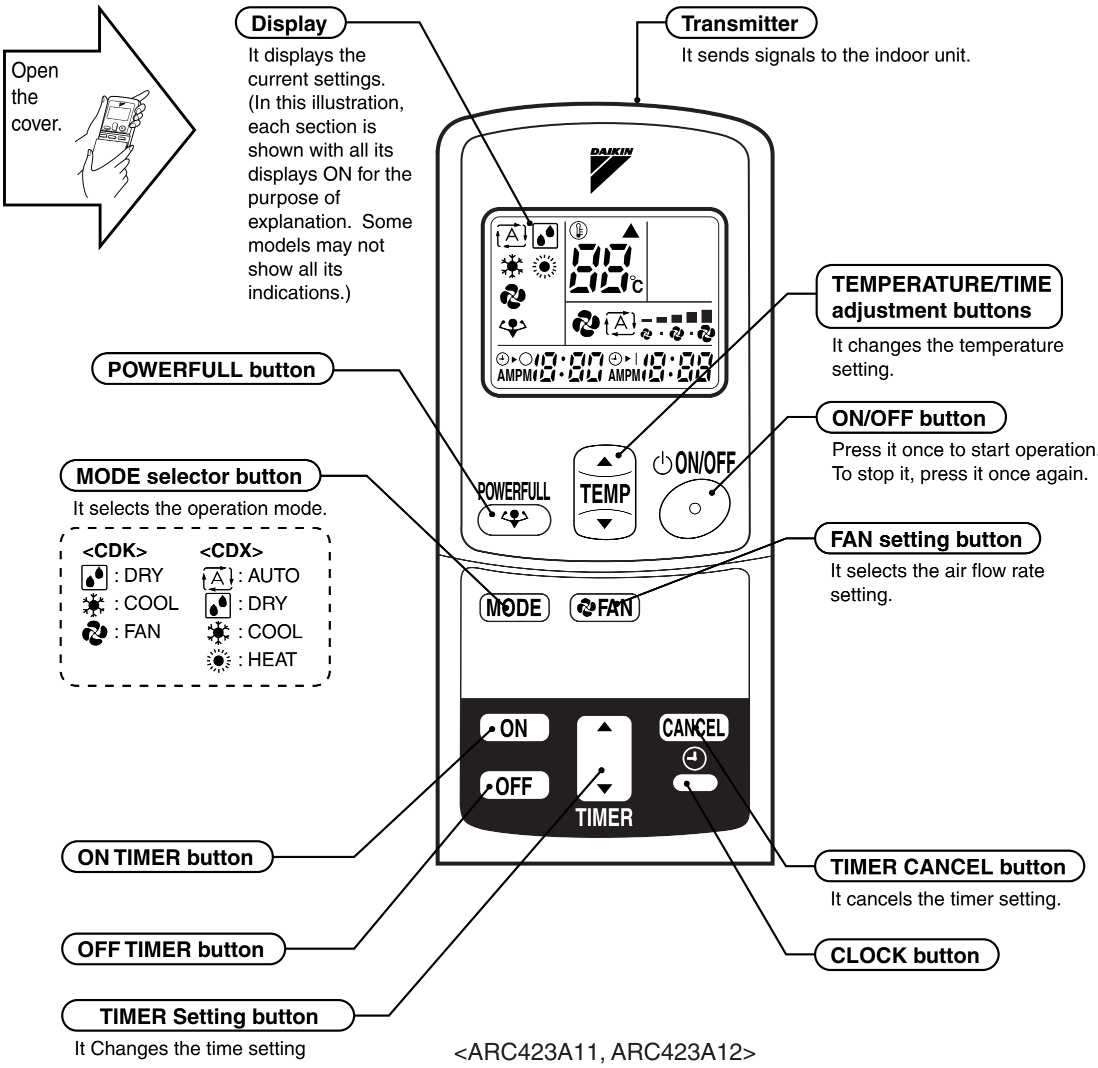
1.1.6 CDX25 / 35 / 50 / 60J



<ARC423A11, ARC423A12>

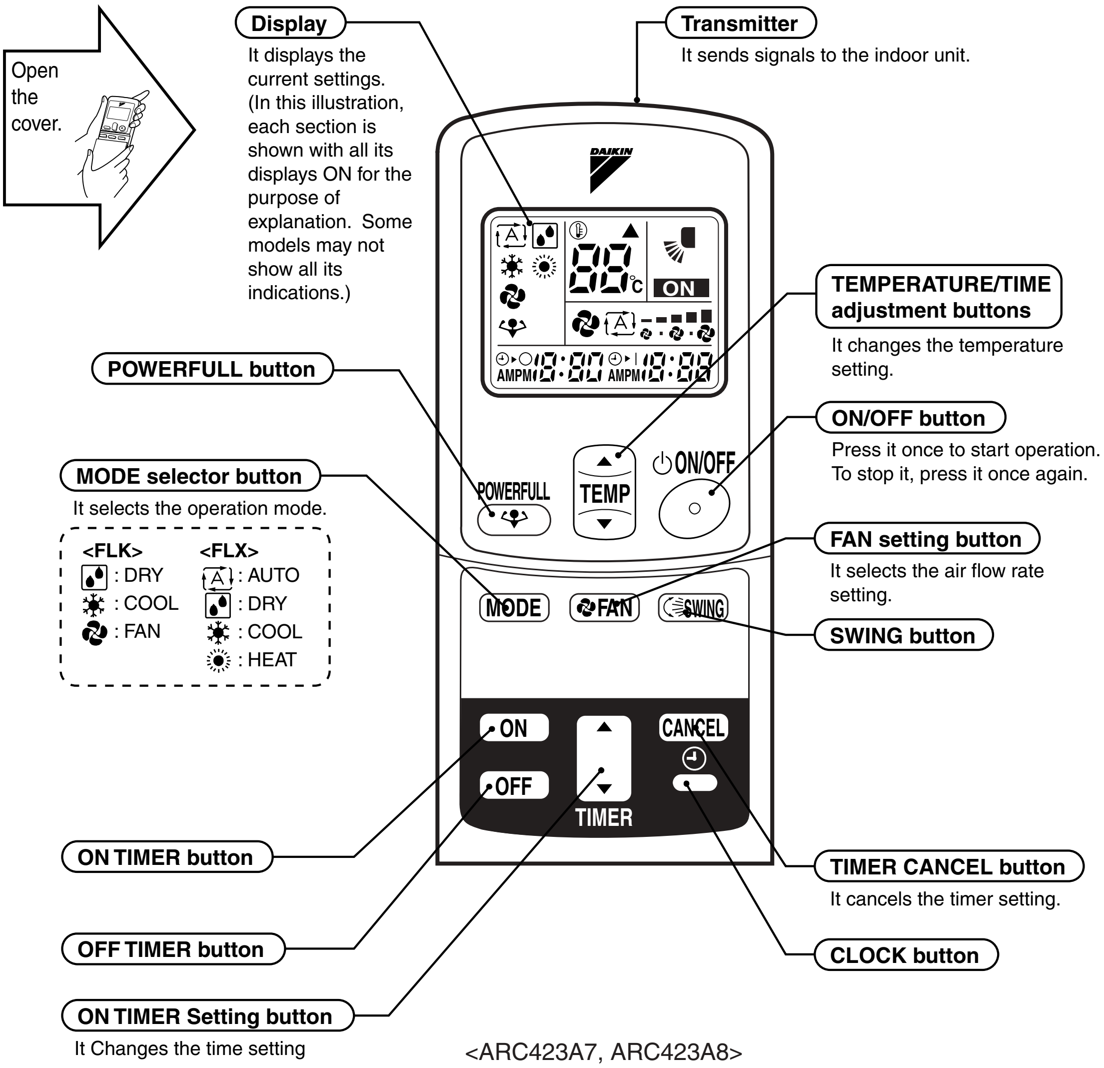
∗ARC423A13, ARC423A14 for CDK25 / 35 / 50 / 60HAVEC, CDX25 / 35 / 50 / 60HAVEC

1.1.7 CDX25 / 35 / 50 / 60HA



<ARC423A11, ARC423A12>

1.1.8 FLX25 / 35H

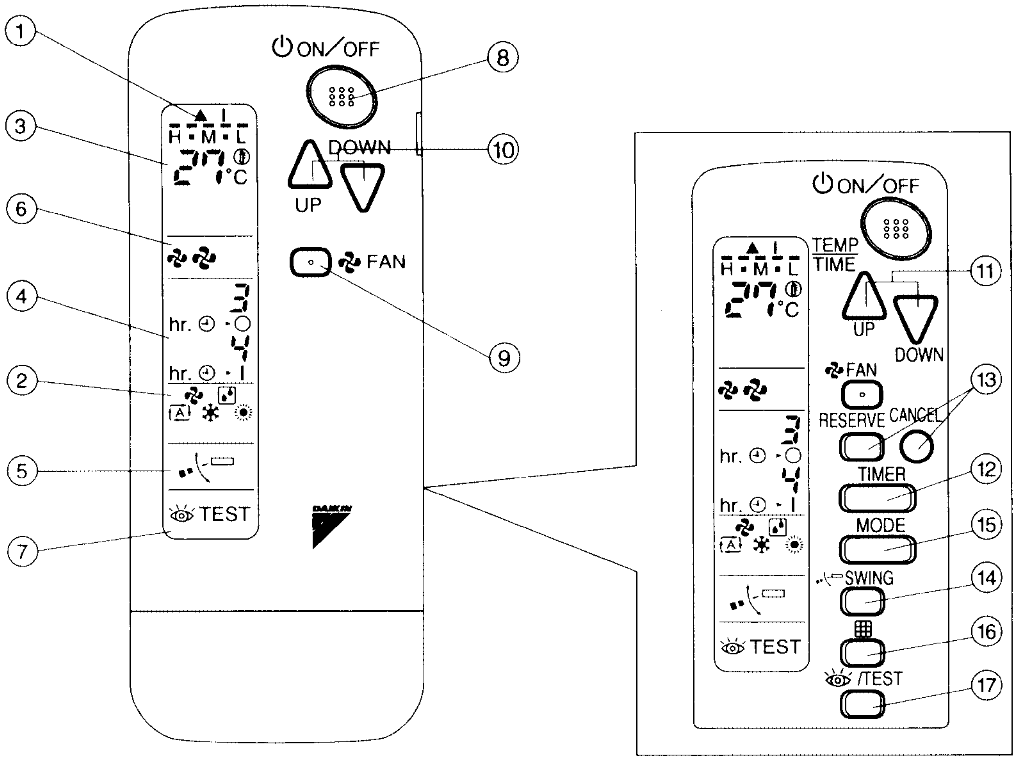


<ARC423A7, ARC423A8>

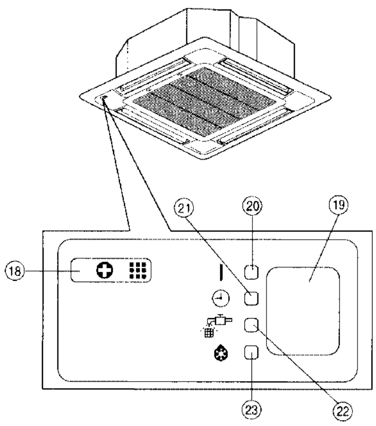
∗ARC423A9, ARC423A10 for FLK25 / 35 / 50 / 60HVEC, FLX25 / 35 / 50 / 60HVEC

1.1.9 FHYC35 / 45 / 60 / 71B7V1 (Optional Accessory)

BRC7C513WC



(S0015)



(S0016)

NAMES AND FUNCTIONS OF THE OPERATING SECTION (Fig. 1, 2)

No.	Name	Function
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 " H•M•L 27 °C " (SET TEMPERATURE)	This display shows the set temperature
④	DISPLAY " 3hr 4hr " (PROGRAMMED TIME)	This display shows PROGRAMMED TIME of the system start or stop.
⑤	DISPLAY " " (AIR FLOW FLAP)	
⑥	DISPLAY " " " " (FAN SPEED)	This 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 TIME 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.)

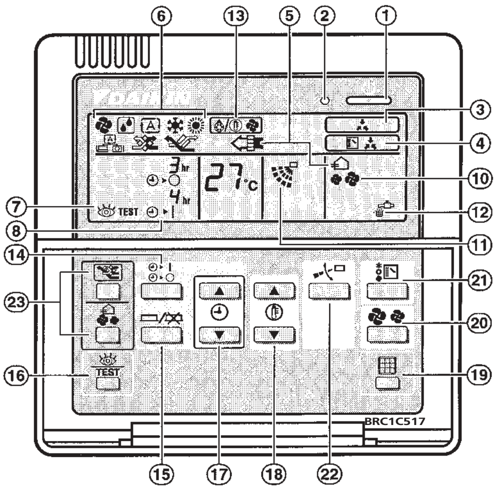
(NOTE)
- For the sake of explanation, all indications are shown on the display in Figure contrary to actual running situations.
- If the air filter cleaning time indicator lamp lights up, clean the air filter as explained in the operation manual provided with the indoor unit. After cleaning and reistalling the air filter, press the filter sign reset button on the remote controller. The air filter cleaning time indicator lamp on the receiver will go out.

1.2 Wired Remote Controller

1.2.1 FHYC35 / 45 / 60 / 71B (Optional Accessory)

BRC1C517

REMOTE CONTROLLER



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 CENTRALISED CONTROL)**
	When this display shows, the system is UNDER CENTRALISED CONTROL. (This is not a standard specification).
4	**DISPLAY ‘ ‘ (CHANGEOVER UNDER CONTROL)**
	This display shows when the outdoor unit is individual operation system.
5	**DISPLAY “ “,” ”,” ”,” ”,” ” (VENTILATION / AIR CLEANING)**
	This display shows that the total heat exchange unit and the air cleaning unit are in operation. These are optional accessories.
6	**DISPLAY ‘ ’ ‘ ’ ‘ ’ ‘ ’ ‘ ’ (OPERATION MODE)**
	This display shows the current OPERATION MODE. For cooling only type, ‘ ’ (Auto) and ‘ ’ (Heating) are not installed.
7	**DISPLAY ‘ ’ (INSPECTION/TEST OPERATION)**
	When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
8	**DISPLAY ‘ ’ (PROGRAMMED TIME)**
	This display shows PROGRAMMED TIME of the system start or stop.

9	**DISPLAY ‘27°C’ (SET TEMPERATURE)**
	This display shows the set temperature.
10	**DISPLAY ‘ ’ (FAN SPEED)**
	The display shows the set fan speed.
11	**DISPLAY ‘ ’ (AIR FLOW FLAP)**
12	**DISPLAY ‘ ’ (TIME TO CLEAN AIR FILTER)**
13	**DISPLAY ‘ ’ (DEFROST)**
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**
23	**NOT APPLICABLE**

Note For the sake of explanation, all indications are shown on the display contrary to actual running situaltions.

Part 8
Operating Test

1. Operating Test 158
1.1 Operating Test 158
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1. Operating Test

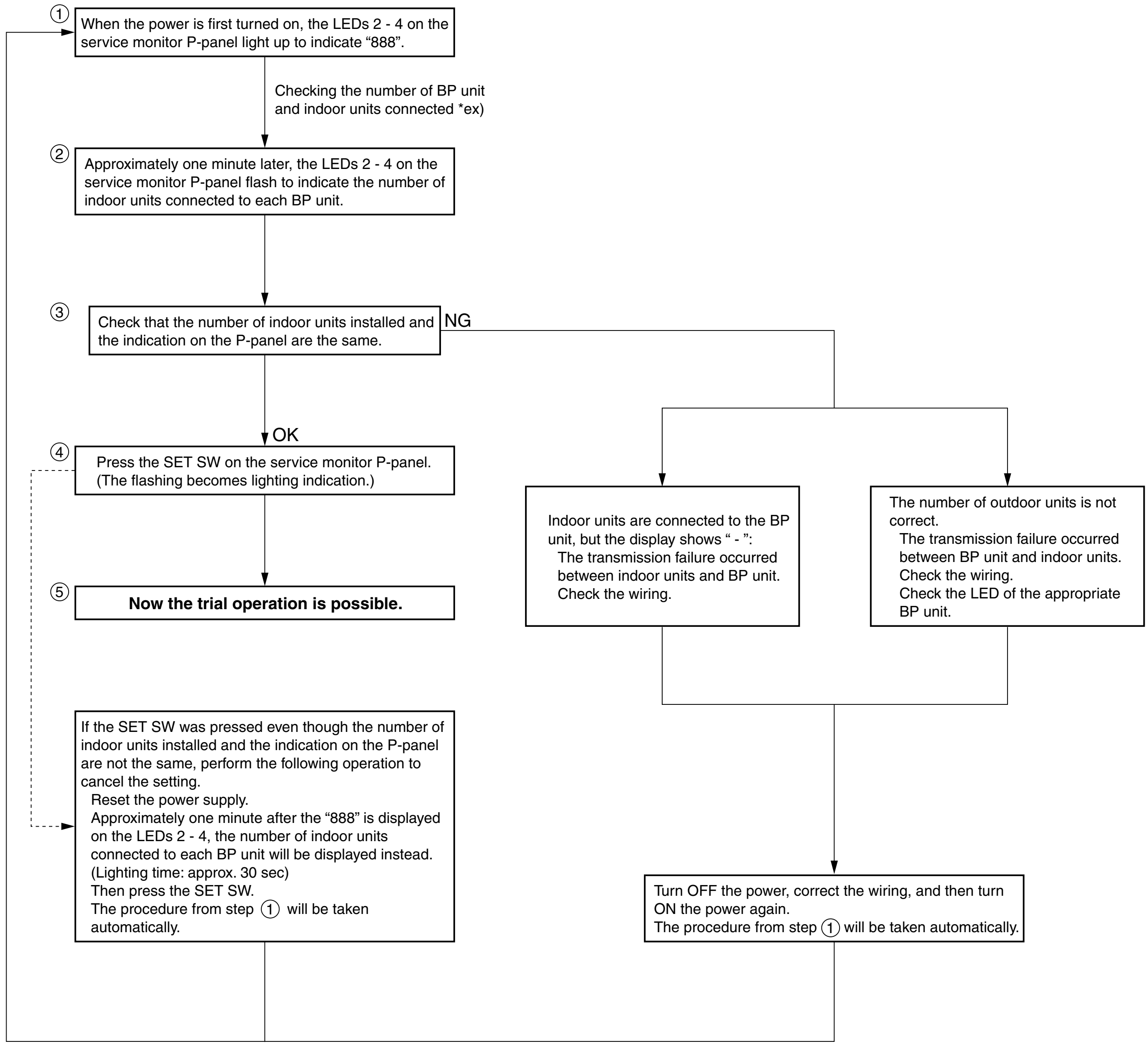
1.1 Operating Test

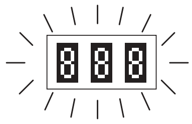
1 OPERATING TEST

Before performing a trial operation

*Check the connection status.
Be sure to carry out initial settings.

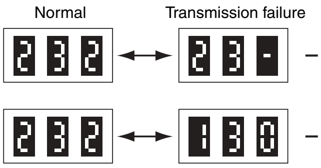
Check Flow





"-"	: BP unit unconnected, or transmission failure between outdoor units and BP unit
"Numeral value"	: The number of indoor units connected to each BP unit

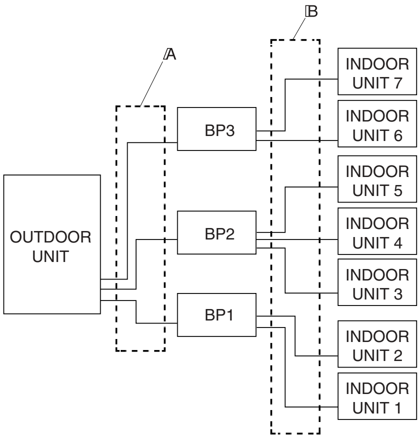
*ex.) : Connect indoor units (2 rooms) to BP1.
Connect indoor units (3 rooms) to BP2.
Connect indoor units (2 rooms) to BP3.

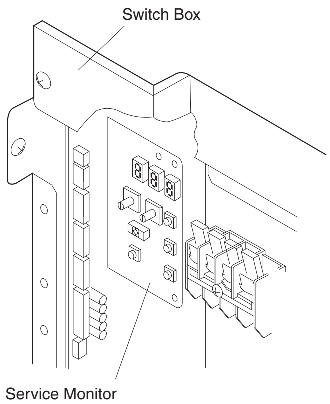


The indoor units for 2 rooms are connected to BP3, but the display indicates "BP unit unconnected." There is a transmission failure between outdoor units and BP unit.
Check the connecting wiring in part A in the diagram below.

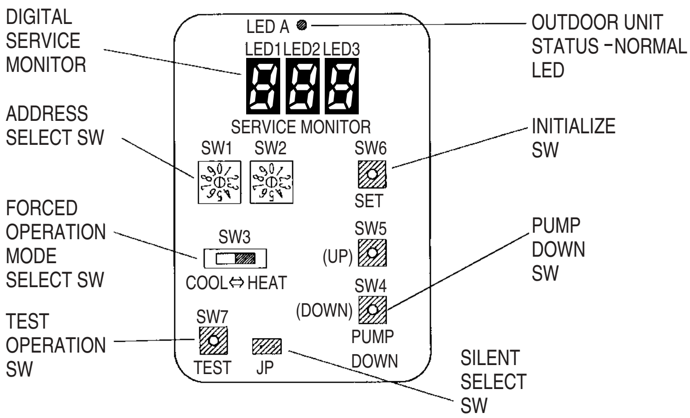
The numbers of indoor units connected to BP1 and BP3 do not agree with the indication. There is transmission failures between BP units and indoor units.
Check the connecting wiring in part B in the diagram below.

* When checking the connecting wiring, make sure the wire numbering is correct and that there are no numbers missing.





SERVICE MONITOR RAYOUT (ON PCB)



1. Record the installation location of each BP unit in the centralized name plate attached to the front panel (2) of the indoor unit.
↓
2. Open the liquid/gas closing valves.
↓
3. Check for improper wiring and piping.
With a remote controller, start the cooling operation in one single room only.
(Operating condition: indoor/outdoor temperature of –5˚C or higher)
Set the temperature to 18˚C.
After operating for 5 minutes, check that the temperature difference between inlet and outlet of the indoor unit is 8˚C or higher.
Likewise, perform the above step with all indoor units.
If some improper wiring or piping is found, correct them, and then check again.
* Before the operation check is completed on one unit, start the operation of the next indoor unit to be checked so that some trial operation time can be saved. (If the trial operation is performed on every indoor unit one by one, since the compressor is stopped after each operation, it will take some time to restart for the next operation.)
↓
4. After checking for improper piping and wiring, record the installation locations of indoor units connected to the BP unit in the wiring name plate attached to the BP main body.
↓
5. After checking that all the piping and wiring is done properly, start the trial operation in heating mode.
With a remote controller, perform the heating operation for all rooms. (Set the temperature to 32˚C.)
After operating for 60 minutes, check that the temperature difference between inlet and outlet is 15˚C or higher.
↓
6. Upon completion of the trial operation, stop the operation for all rooms with the remote controller.

Note: 1. When performing a trial operation, check that the indoor/outdoor temperatures satisfy the following conditions:
Cooling: –5˚C or higher
Heating: 25˚C or lower
2. For the pump down procedure, refer to the trouble diagnostic name plate attached to the front panel (2).

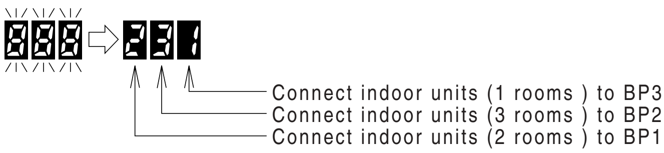
1P058917A
1P058918A

INITIALIZE SETTING

Check the number of indoor units connected to the BP unit before test operation. Press INITIALIZE SW[SW6] to make the setting.
("888" : Blinking → Number of connected units appears → Setting)

<CAUTION>
The setting must be made in order to operate the unit. Cannot be operated unless BP1 is connected first. (Connect BP unit in order starting from BP1)

[SETTING OPERATION]
After power is turned ON, "888" blinks in the digital display. After **1minute**, the digital display will show the following information.



If the unit correctly displays the number of connected rooms, press SW6 to make the setting.

<CAUTION>

1) Transmission error display

- : BP unconnected, or transmission failure between outdoor unit and BP unit.

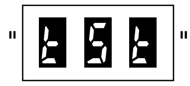
2) Set in spite of transmission error (Cancel setting)

① Reset the power supply.
② Approximately 1 minute after the "888" is displayed on the LEDS 2－4, number of indoor units connected to each BP unit will be displayed instead. (Lighting time : Approx. 30 sec)
③ Then press the SET SW[SW6].

1.2 Test Operation Switch

TEST OPERATION SWITCH [SW7]

Digital display:



Blinking

Press the FORCED OPERATION SWITCH [SW7]
Aftrer sellecting the COOL/HEAT SWITCH [SW3]
<CAUTIONS>
1) Test operation stops automatically in about 60 minutes.
2) Cooling test operation cannot be performed if the outside air temperature is –5˚C or lower
3) Operate SkyAir indoor unit in the same mode.
[TO CONTINUE TEST OPERATION]
Press the TEST SW [SW7] again.
[TO RESET TEST OPERATION]
Press the TEST SW [SW7], wait at least 3 seconds and press the TEST SW again.

(Q0001)

1.3 Pump Down Operation Switch

1. Close the liquid side stop valve of outdoor unit.
2. Pump down

PUMP DOWN OPERATION SWITCH [SW4]

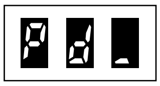
Press the PUMP DOWN OPERATION SWITCH [SW4]

PUMP DOWN OPERATION STOPS when LP (Low Pressure) COMES TO 0.5kg/cm2, or automatically in about 8 minutes.

<CAUTIONS>

1) If the LP is 1kg/cm2 or less, the LP display blinks.
2) If the LP fails to drop below the specified level within the specified time during pump down operation,  appears in the display. (This means that the outside air is low and the pipes are long and cold.) Repeat the pump down operation.

Digital display:

"  "

After "Pd_" Blinks in the digital display, the LP (Low Pressure) indicator activates.

<CAUTIONS>

After all indoor units have stopped, PUMP DOWN is performed for the next operation.

[Approx. 5 minutes]

(Q0002)

3. Close the gas side stop valve of outdoor unit after completion of pump down procedure.
4. After completion of repair works for site piping, BP units or indoor units, make sure to open gas and liquid side stop valves.

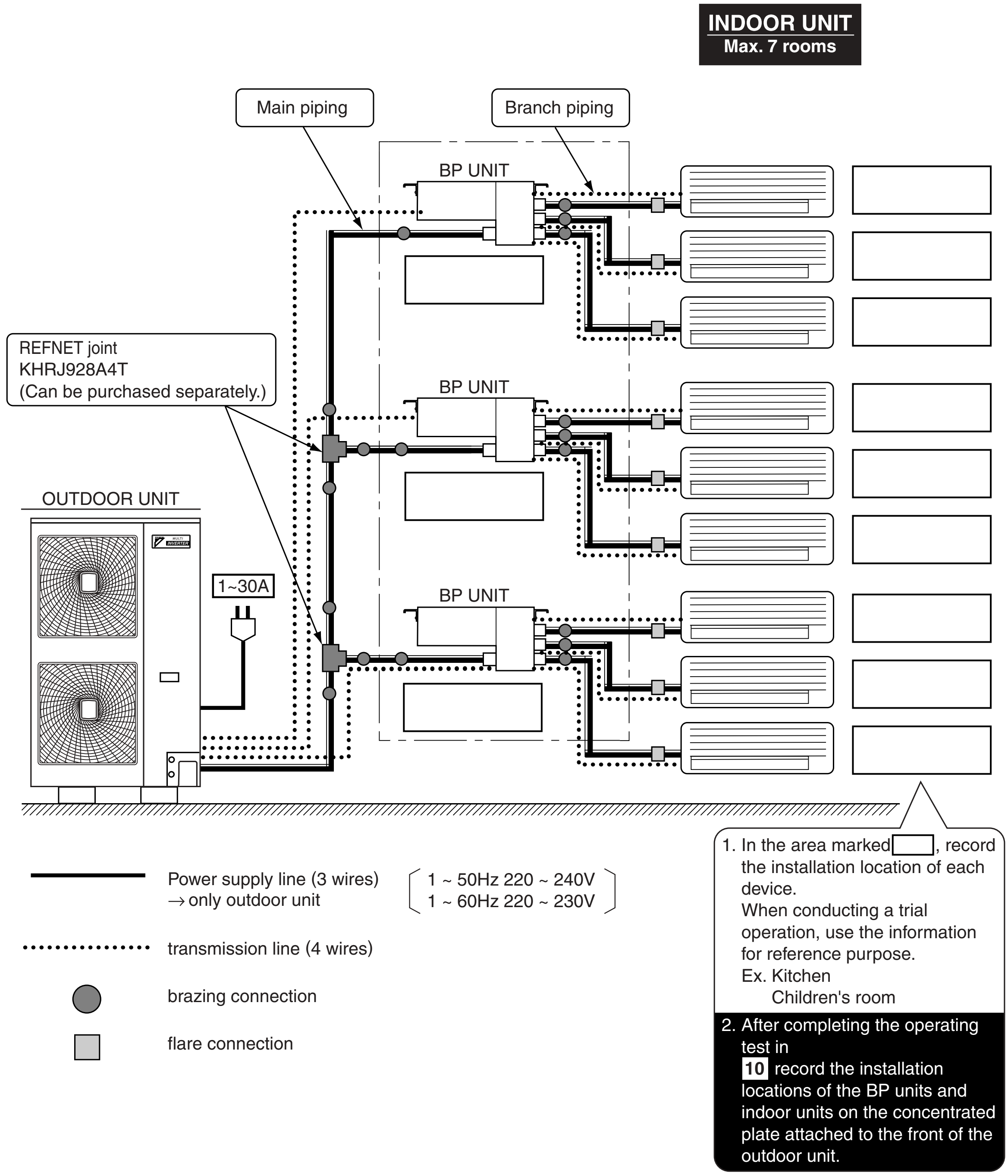
1.4 Record of the Installation Position

Be sure to enter the system unit installation position.

1 SYSTEM LAYOUT

BP unit model
FOR 3 rooms : BPMK928A43
FOR 2 rooms : BPMK928A42

Do not connect more than 7 indoor units together. Choose the BP unit type (2 rooms or 3 rooms) according to the installation pattern.



2. Method of Field Set

2.1 Field Setting

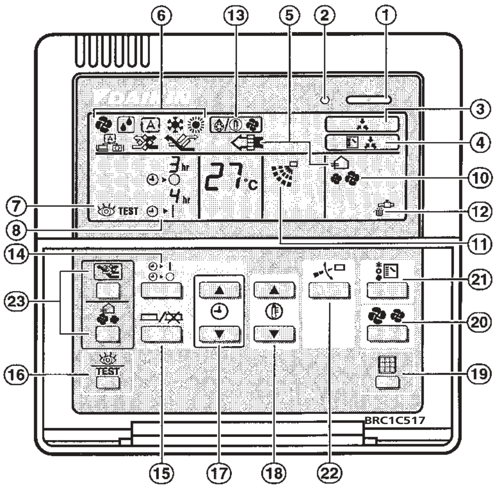
Wired Remote Controller

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. Press the " " button for 4 seconds or more on normal mode to change to "FIELD SETTING MODE"
2. Press the " " button and choose the desired "MODE NO.".
3. If the unit is under group control, it is unified set (factory set).However, if setting on each indoor unit bases or confirming after the setting, use the MODE NO. in the ( ) for the setting. Under group control, press the " " button and select the indoor unit no. that you are setting to set on each indoor unit bases.
(Unnecessary at unified setting of group control and the UNIT NO. is not displayed)
4. Press the " " upper part of the button and select the "FIRST CODE NO.".
5. Press the " " lower part of the button and select the "SECOND CODE NO.".
6. Press the " " button once to FIX the change of the setting.
7. Press the " " button for about one second and return to the "NORMAL MODE"

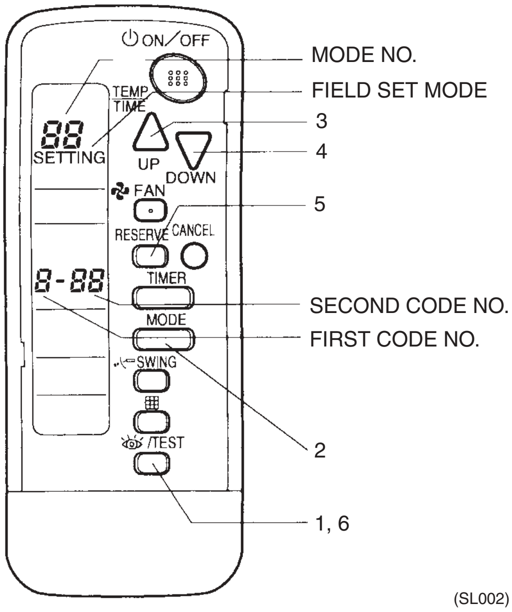


Wireless Remote Controller

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.



(SL002)

2.1.1 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	Air Flow Direction Adjust	Air Flow Direction Adjust Range Setting	Twin System No. of Connected Indoor Units	Twin System Individual Set	External Static Pressure	Long Life Filter Type	Fan Speed Up
Ceiling Mounted Cassette Type	(H/P) FHYC 35~140	○	○	○	○		○	○	○		○	
Ceiling Mounted Built-in Type	(H/P) FDYM 60~03	○	○							○	○	

Note: A heat pump type indoor unit is used for cooling only twin system in case of using ceiling mounted cassette and ceiling suspended types.

2.1.2 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

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)	Ultra-Long-Life Type	Light	Approx. 10,000 hours	Heavy	Approx. 5,000 hours	—
			Long-Life Type		Approx. 2,500 hours		Approx. 1,250 hours	
			Standard Type		Approx. 200 hours		Approx. 100 hours	
	1	Long-life filter type (Setting of filter sign indication time) (Change setting when Ultra-long-life filter is installed)		Long-Life Filter		Ultra-Long-Life Filter (1)		Setting Description Ultra-Long-Life Filter (2)
	3	Estimation of filter operating hour (Change setting when filter sign indication is not used)		ON		OFF		—
11(21)	0	No. of Sky Air indoor units connected for simultaneous ON-OFF multi system (Change setting when simultaneous operation multi system is used) *Note 3		Pair		Twin		Triple
	1	Simultaneous operation multi-unit individual setting		Unified		Individual		—
	2	Indoor unit fan OFF when cooling/heating is OFF		—		Fan OFF		—
12(22)	3	Change to set fan speed when heater thermostat is OFF *Note 5		Fan Speed LL		Set Fan Speed		—
	5	Automatic restart after power outage reset *Note 6		OFF		ON		—
13(23)	0	High Ceiling	Ceiling-mounted built-in multi-flow cassette type, Ceiling suspended cassette type	N		H		S
			Ceiling-suspended type, wall-mounted type	2.7 m or Lower		2.7~3.5 m		—
		Fan speed increase (wall-mounted type)		Standard		Slight Increase		Normal Increase
	1	Air flow direction selection (Change setting when blocking kit is installed) *Note 4		F		T		W
	3	Air flow direction adjustment (Change setting when decorative air outlet panel is installed)		Installed		Not Installed		—
	4	Setting of air flow direction adjustment range		Upward		Standard		Downward
	5	On-site fan speed change by air outlet (When using phase control)		Standard		Option 1		Option 2
	6	External static pressure setting (To be set according to connected duct resistance) (High ceiling setting in the case of FHYK)		Standard (Standard)		High Static Pressure (High Ceiling Setting)		Low Static Pressure

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
- Automatic restart after power outage.
- Remote control thermostat
- Filter sign indication (only for ceiling-mounted duct type)

3. When installing Sky Air simultaneous operation multi-unit, set to either “twin” or “triple.” Only when the factory setting is changed, it is necessary to make a setting using a remote controller.
4. For further details, see the installation instruction.
5. Since drafts may result, carefully select the installation location.
6. When power returns, units resume the settings made before the power outage.

Caution When “auto restart after power outage 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.

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

2.1.3 Detailed Explanation of Setting Modes

Ceiling Type Setting Switch for Air Flow Adjustment

Make the following setting according to the ceiling height. The setting position No. is set to “01” at the factory.

■ **In the Case of FHYC (35 to 71 class)**

		No. of Air Outlets Used		
		4-way Outlets	3-way Outlets	2-way Outlets
Ceiling Height	Standard (N)	Lower than 2.7 m	Lower than 3.0 m	Lower than 3.5 m
	High Ceiling ① (H)	Lower than 3.0 m	Lower than 3.3 m	Lower than 3.8 m
	Higher Ceiling ② (S)	Lower than 3.5 m	Lower than 3.5 m	—

Air Flow Direction Setting

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

Filter Sign Setting

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

Set Time

Filter Specs. / Setting	Long Life	Standard	Ultra Long Life Filter
Contamination Light	2,500 hrs.	200 hrs.	10,000 hrs.
Contamination Heavy	1,100 hrs. *	100 hrs.	5,000 hrs.

*FH(Y)C and FH(Y) only are 1,250 hrs.

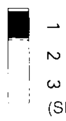
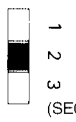
Wireless Setting (Address and MAIN/SUB Setting)

Explanation

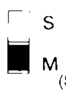
If several wireless remote controller units are used together in the same room (including the case where both group control and individual remote controller control are used together), be sure to set the addresses for the receiver and wireless remote controller. (For group control, see the attached installation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

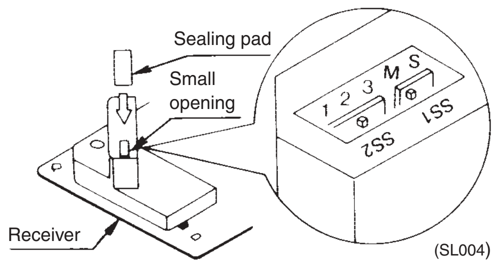
Setting the Receiver

Through the small opening on the back of the receiver, set the wireless address switch (SS2) on the printed circuit board according to the table below.

Unit No.	No.1	No.2	No.3
Wireless Address Switch (SS2)	 (SE001)	 (SE002)	 (SE003)

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 receiver to SUB.

	MAIN	SUB
MAIN/SUB Switch (SS1)	 (SE004)	 (SE005)



(SL004)

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

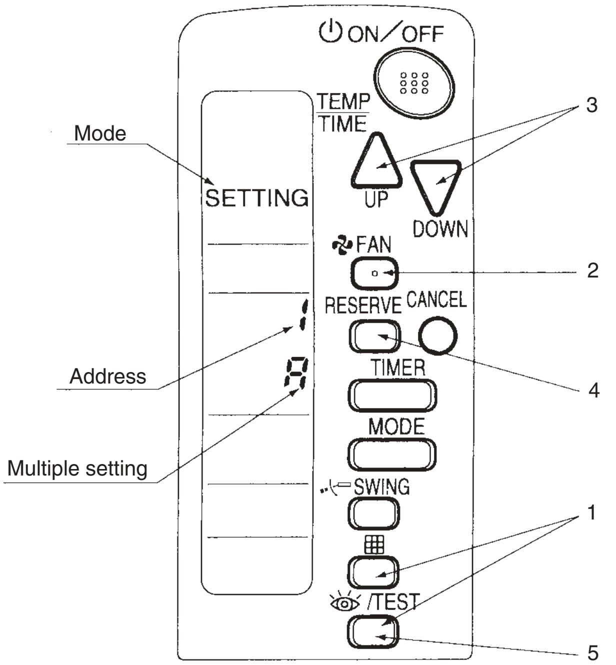
Setting the Address of Wireless Remote Controller (It is Factory Set to “1”)

<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 right).
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 (SL041)

   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.



(SL006)

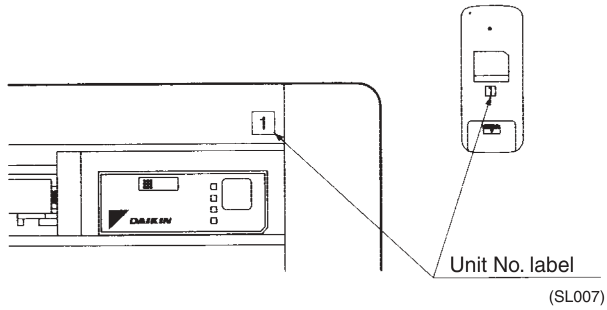
Multiple Settings A/b

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: Multi System	Operations Remain 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 setting differs, the signal from the remote controller cannot be transmitted.

1. Do not use any settings not listed in the table.
2. For group control with a wireless remote controller, initial settings for all the indoor units of the group are equal. (For group control, refer to the installation manual attached to the indoor unit for group control.)

Fan Speed OFF when Thermostat is OFF

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

Ultra-Long-Life Filter Sign Setting

When a Ultra-long-life filter is installed, the filter sign timer setting must be changed.

Setting Table

Mode No.	Setting Switch No.	Setting Position No.	Setting
10 (20)	1	01	Long-Life Filter
		02	Ultra-Long-Life Filter (1)
		03	Ultra-Long-Life Filter (2)

Fan Speed Changeover when Thermostat is OFF

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

Main/Sub Setting when Using 2 Remote Controllers

Set the switch on the remote controller’s PC board.

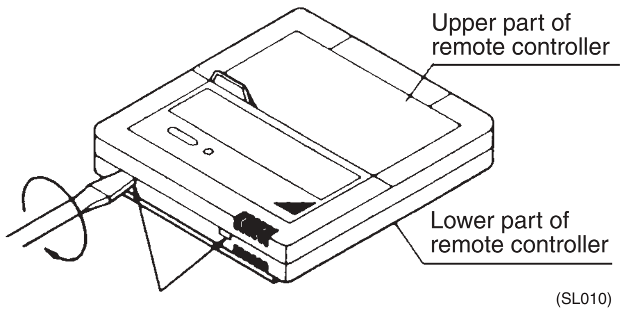
Control by 2 Remote Controllers (controlling 1 indoor unit with 2 remote controllers)

■ When using 2 remote controllers, one of either the control panel or the separate remote controller must be set to “MAIN” and the other to “SUB”.

(MAIN/SUB CHANGEOVER)

Procedure

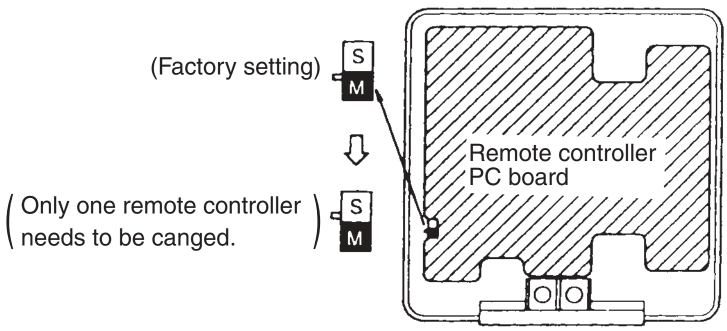
1. Insert a “ - “ screwdriver into the recess between the upper and lower part of remote controller and, working from the 2 positions, pry off the upper part. (The remote controller PC board is attached to the upper part of remote controller.)



(SL010)

Insert the screwdriver here and gently work off the upper part of remote controller.

2. Turm the MAIN/SUB CHANGEOVER SWITCH on one of the two remote controller PC boards to “S”. (Leave the switch of the other remote controller set to “M”.)



(SL011)

2.2 Interface Adaptor for Room Airconditioner <KRP928A1S>

Safety Precautions

- Read these Safety Precautions carefully to ensure correct installation.

This manual classifies precautions into WARNINGS and CAUTIONS.

⚠ WARNING : Faillure to follow any WARNING is tikely to result in death or serious injury.
⚠ CAUTION : Faillure to follow any CAUTION may in some cases result in injury or damage to property.

Be sure to follow all theprecautions below; they are all important for ensuring safety.

⚠ WARNING
• **Installation should be left to the dealer or another qualified professional.** Improper installation may cause malfunction, electrical shock or fire. • **Install the set according to the instructions given in this manual.** Incomplete or improper installation may cause malfunction, electrical shock, or fire • **Be sure to use the supplied or specified parts.** Use of other parts may cause malfunction, electrical shock, or fire. • **Disconnect power to the connected equipment before starting installation.** Faillure to do so may cause malfunction, electrical shock or fire.

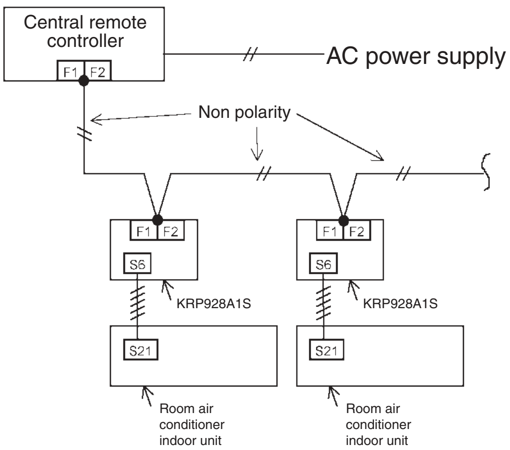
⚠ CAUTION
• **An earth leakage breaker should be installed.** If the breaker is not installed, electrical shock may occur. • **Do not install the set in a location where there is danger of exposure to inflammable gas.** Gas build up around the unit may cause fire. • **To prevent damage due to electrostatic discharge, touch your hand to a nearby the metal object (doorknob, aluminium sash, etc.) before touching this kit to disharge static electricity from your body.** Static electricity can damage this kit.

- After installation is complete, test the operation of the PCB set to check for problems, and explain how to use the set to the end-user.

1. Overview and Features

This kit is an interface between central control equipment (central remote controller, unified ON/OFF controller, schedule timer, etc.)and the room air conditioner. Combined with the central control equipment, the set sets the batch on/off operation, timer operation or remote controller operation mode setting, and display the operational status.

2. System Structure and Wiring



3. Compatible Models

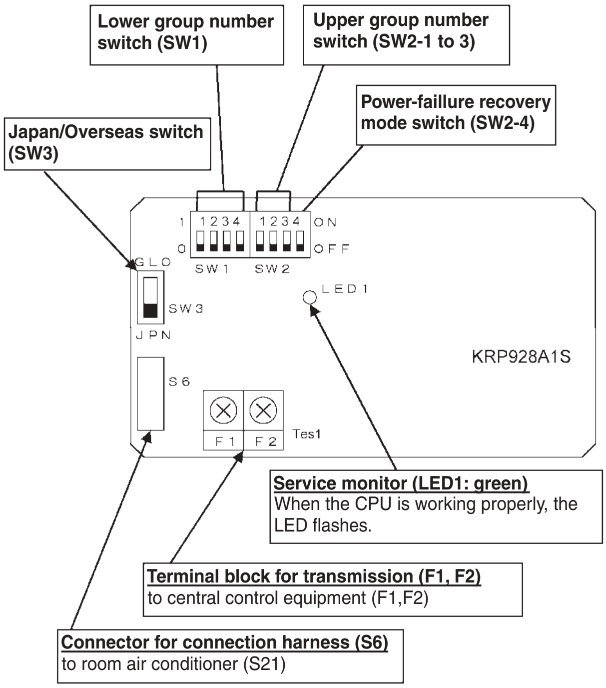
This kit is used with room air conditioners with S21 connector for remote control. But it is not compatible with some models. Please consult your dealer for details.

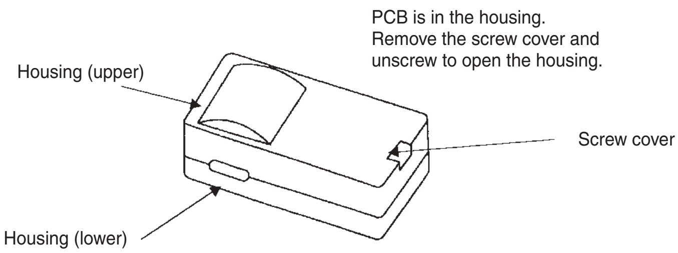
4. Components

This kit includes the following components. Check to ensure that none are missing.

PCB for remote control with housing (PCB ass'y is included in the housing)	1 set
Connection harness with connector	1 set
Mounting screws	3 pcs.
Binding band	1 pc.
Double-sided tape	2 pcs.
Installation manual	

5. Name and Function of Parts





6. Function

(1) The following operations and control functions are possible using this kit with central control equipment.

	Operation and control
1. On/Off	Starts or stops room air conditioner.
2. Operation/Alert monitor	Monitors operational status and malfunctions.
3. Mode select	Cooling/heating can be selected. Ventilation is not possible. About Auto mode, see 7. Setting (1)-③
4. Temperature setting	20 to 32°C during cooling 16 to 28°C during heating
5. Remote controller operation mode setting	Select whether to accept or to reject the operation from the remote controller regarding the operation stop, mode select and air flow direction. (Last command priority or, remote` controller rejection, etc.)
6. Malfunction code display	Display the contents of a malfunction.
7. Zone control	One or more of air conditioners can be controlled togheter

(2) This kit does not support the following controls.

	Operation and control
1. Group control	One or more of air conditioners can be controlled by one remote controller.
2. Monitoring items to the right:	Room temperature, Heat status, Compressor operation status, Indoor fan operation status, Electric heater / humidifier operation status.
3. Control items to the right:	Forced thermo OFF, Filter sign display and reset. Air flow and air flow direction settings, Charge control
4. Energy-saving command	Temperature is reduced by 2°C (thermo OFF).
5. Low noise command	Power is saved with reduced operational noise.
6. Demand command	Power is saved with reduced power consumption.

(3) Notes
1) This kit cannot be used togheter with room air conditioner central controllers (KRC72): and PCBs for remote control Adapter (KRP413A1(s) and KRP 413A2(S)).
2) The functions described above refer to the kit itself. Actual functionality will vary depending on the central control equipment.
3) Do not enter zone information for zones containing a heat pump or cooling only unit, or for equipment other than room air conditioners.
4) Cooling/Heating switchover cannot be operated for cooling-only units.

7. Settings

(3) Switch settings

① Setting group numbers (SW1, SW2-1 to 3)

Group numbers must be set when using a central remote controller and unified ON/OFF controller. Set as shown in the table below (Numbers in the following ranges can be set: 1-00 to 1-15, 2-00 to 2-15. etc., to a maximum number of 8-15. The same number cannot be set for more than two units.)

SW2 setting	Upper group No.
1 2 3	1 –
1 2 3	2 –
1 2 3	3 –
1 2 3	4 –
1 2 3	5 –
1 2 3	6 –
1 2 3	7 –
1 2 3	8 –

SW1 setting	Lower group No.	SW1 setting	Lower group No.
1 2 3 4	0 0	1 2 3 4	0 8
1 2 3 4	0 1	1 2 3 4	0 9
1 2 3 4	0 2	1 2 3 4	1 0
1 2 3 4	0 3	1 2 3 4	1 1
1 2 3 4	0 4	1 2 3 4	1 2
1 2 3 4	0 5	1 2 3 4	1 3
1 2 3 4	0 6	1 2 3 4	1 4
1 2 3 4	0 7	1 2 3 4	1 5

② Auto restart ON/OFF (SW2-4)

This function determines whether the unit returns to the previous operation mode when recovering from a power faillure. When an auto restart ON/OFF jumper is provided in the indoor unit, control from this kit takes priority.
The following status information is stored regardless of on/off state.

- Operation mode
- Set temperature
- Remote controller operation mode

	SW2 setting	Setting
ON / OFF	4	Operation mode is always off when recovering from power failure. (delivery setting)
ON / OFF	4	Returning to the operation mode prior to power failure

② Setting for overseas and Japanese models (SW3)

This function must be programmed because temperature control in Auto Mode differs between overseas and Japanese models.

SW3	Setting
GLO JPN	When connecting to Japanese models. (delivery setting) Auto Mode cannot be selected from central control equipment. When Auto Mode is selected using the remote controller, cooling or heating is displayed at the central remote control. (At this time, the temperature display is fixed at 25°C.)
GLO JPN	When connecting to overseas models Auto Mode can be selected from central control equipment. When Auto Mode is selected using the remote controller, Auto Cooling or Auto Heating is displayed at the central remote control.

(2) Control code

When the central remote controller is used, control codes and controls of the wireless remote controller for room air conditioners are as follows.

Remote controller operation mode	Control code	Control by remote controller: Unified operation, individual operation by central remote controller, or operation controlled by timer.	Control by remote controller: Unified stop, individual stop by central remote controller, or timer stop.
ON/OFF control is rejected by remote controller	0 1 3	ON/OFF operation timer setting is not possible.	
	10 11	Only air flow and air direction can be set.	
Only OFF control is accepted by remote controller	2 12~19	Only off operation, air flow and air direction can be set	
Central priority	4	Last command takes priority	Only off operation, air flow and air direction can be set
	5	Last command takes priority	ON/OFF operation, timer setting is not possible
Last command priority	6 7	Last command takes priority	
Timer operation is accepted by remote controller	8	Last command takes priority	Only off operation, air flow and air direction can be set
	9	Last command takes priority	ON/OFF operation, timer setting is not possible

(3) Installing on a wall or an indoor unit

After all settings for this kit are complete, mount the housing with the supplied screws and double-sided tape.

*Installing on a wall
After the lower part of the housing is fixed with the 3 supplied screws, attach the upper part of the housing in this original position.

*Installing on the indoor unit
After the lower part of the housing is fixed with the 3 supplied screws, attach the upper part of the housing in this original position.

2P058222

Note: Setting of Centralized Controller
<DCS301B61, DCS302B61, KRC72>
Please refer to Operating Installations of each controllers.

2.3 Precautions: For RMK140J / RMX140J Outdoor Unit Users

■ Applicable model series

* If you use the indoor unit listed below, and have it connected to the multi-type outdoor unit (RMK140J/RMX140J), be sure to read this precautions.
* Use the furnished remote controller.
  For the ceiling-mounted cassette type, the remote controller is an option.
  Choose one of the following remote controllers.
  (1) Wired type: BRC1C517 (C) (2) Wireless type: BRC7C512W (C) (H/P)

Outdoor Unit			Heat Pump RMX140J
Indoor Unit	Package Air Conditioner	Ceiling-Mounted Cassette Type	FHYC35/45/60/71B7V1, FHYB35/45/60/71FK7V1
		Duct-Connected Type	FDYM60/03FV1, FDYM60/03FV1C, FDYM60/03FVAL
	Room Air Conditioner	Wall-Mounted Type	FTX25/35J
		Ceiling-Mounted Duct Type	CDX25/35/50/60HA (J)
		Floor/Ceiling-suspended Dual Type	FLX25/35/50/60H

■ Outside air temperature for operation

	Heat pump
Cooling Operation	-5 ~ 46 ˚CDB
Heating Operation	-15 ~ 15.5 ˚CWB

■ These cases are not troubles

(1) All indoor units

In heating operation, when all indoor units are stopped, the outdoor unit stops its operation automatically after 5 minutes. This is a part of preparation process for the next operation, not a failure.
In heating operation, no warm air may come out temporarily. This is to protect the outdoor unit, not a failure. At this point, "DEFROST" is displayed on the wired-type remote controller.
In simultaneous operation in two or more rooms, when heating operation is performed in one room, cooling operation cannot be performed in other rooms. The mode in the room where operation began first is given priority.

(2) Floor/ceiling-suspended dual type units

With the thermostat OFF (*1), the fan may start/stop automatically; this is not a failure.

(3) Skyair indoor units

With the thermostat OFF (*1), the fan may start/stop automatically; this is not a failure. At this point, "DEFROST" is displayed on the wired-type remote controller.
In heating operation, fan operation cannot be performed. If the fan operation is selected, the remote controller will display it as a current mode. However, the fan operation will not be performed.

(*1) Thermostat OFF: After the room temperature reaches the set temperature, indoor units enter the operation stand-by state.

2P042644-17G

Part 9
Service Diagnosis

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1. Troubleshooting - Split Type Indoor Unit

1.1 Troubleshooting with the Operation Lamp

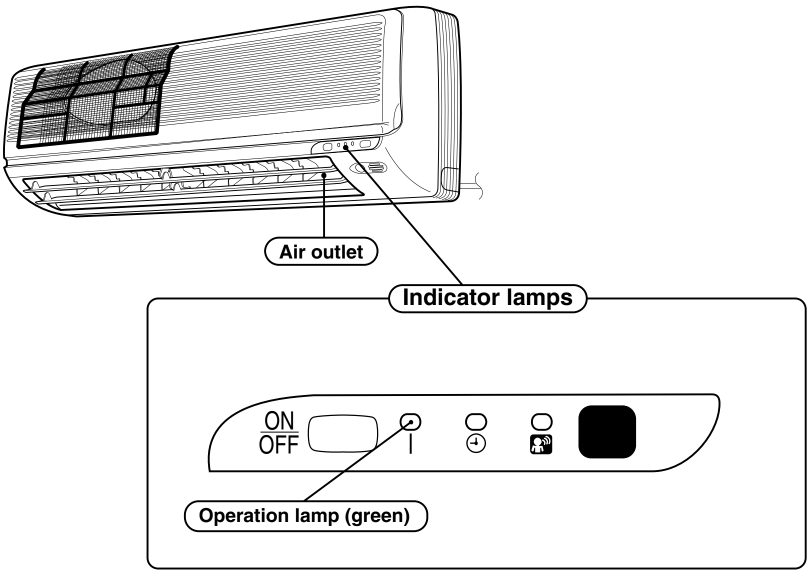
The Operation lamp flashes when any of the following errors is detected.

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

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

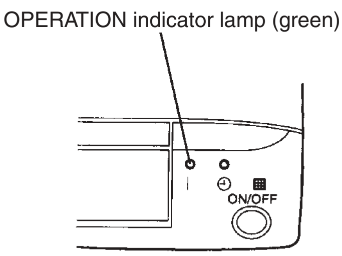
Location of Operation Lamp

In case of
FTK(X)25/35J Series



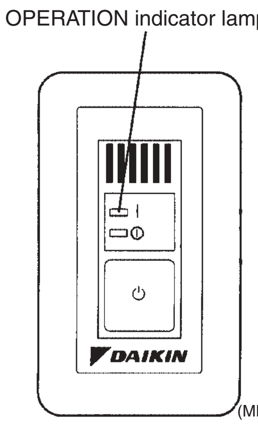
(RL029)

In case of
FTK50/60H Series
FTX50/60H Series



(ML087)

In case of
CDX25~60H Series
CDX25~60H Series



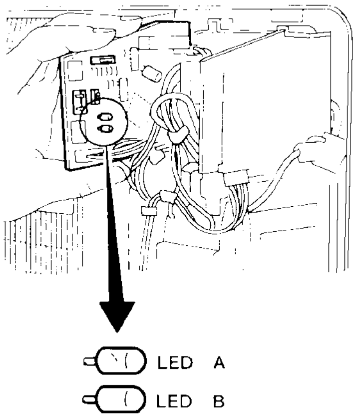
(ML088)

Caution: Operation stops suddenly.(Operation lamp blinks.)
Cause of above trouble could be "Operation mode butting".
Check followings;
Are the operation modes all the same for indoor units connected to Multi system outdoor unit?
If not set all indoor units to the same operation mode and confirm that the operation lamp is not blinking.
Moreover, when the operation mode is in "Auto", set all indoor unit operation mode to "Cool" or "Heat" and check again if the operation lamp is normal.
If the lamp stops blinking after the above steps, there is no malfunction.

★Operation stops and operation lamp blinks only for indoor unit which the different operation mode is set later. (The first set operation mode has priority.)

Troubleshooting with the LED Indication

Indoor Unit
(For example,
FTK50/60H Series,
FTX50/60H Series)



(ML089)

There are green and red LEDs on the PCB. The flashing green LED indicates normal equipment condition, and the OFF condition of the red LED indicates normal equipment condition. (Troubleshooting with the green LED)
Even after the error is cancelled and the equipment operates in normal condition, the LED indication remains.

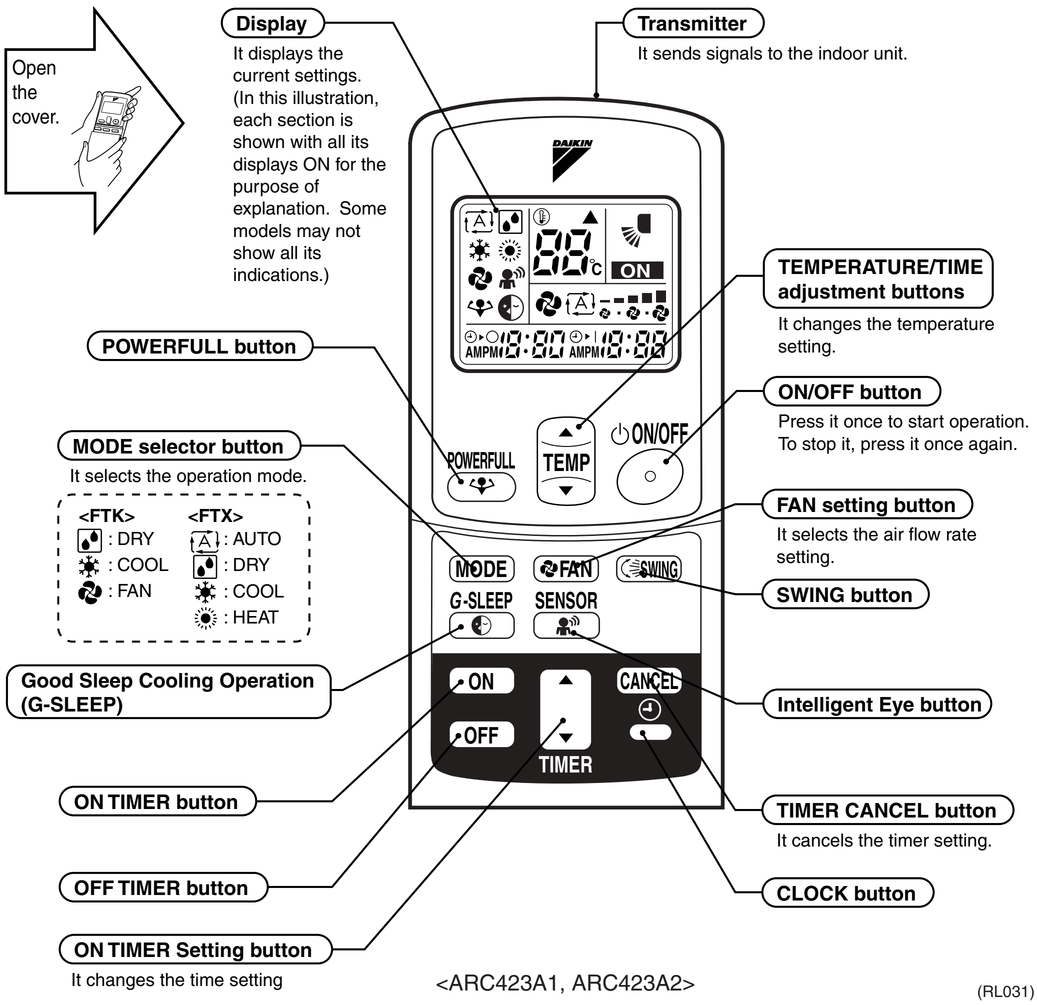
1.2 Service Check Function

1.2.1 ARC423 Series (FTX25/35J Series)

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

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

< Cover in open position >



<ARC423A1, ARC423A2> (RL031)

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

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

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

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

1.3 Code Indication on the Remote Controller

1.3.1 Error Codes and Description of Fault

	Code Indication	Description of Problem
System	00	Normal
	U0	Insufficient gas
	U2	Power factor module abnormality
	U4	Signal transmission error (between indoor and outdoor units)
	U5	Signal transmission error (between indoor unit and remote controller)
Indoor Unit	A1	Faulty indoor unit PCB
	A3	Faulty drainage
	A5	Operation halt due to the freeze protection function or high pressure control
	A6	Fan motor or related abnormality
	C4 or C5	Heat exchanger temperature thermistor abnormality
	C9	Room temperature thermistor abnormality
	CA	Discharge air temperature thermistor abnormality
Outdoor Unit	E5	OL activation (IT activation) or High discharge pipe temperature
	E6	Compressor startup error
	F3	Operation halt due to discharge pipe control function
	H8	CT or related abnormality
	H9	Outside air thermistor or related abnormality
	J3	Discharge pipe temperature thermistor or related abnormality
	J6	Heat exchanger temperature thermistor or related abnormality
	J9	Gas pipe temperature thermistor or related abnormality
	L4	Radiation fin temperature rise
	P3	Heat radiation fin thermistor or related abnormality
	P4	Heat radiation fin thermistor or related abnormality
	E0	Protectors Function

1.4 Troubleshooting

1.4.1 Indoor Units

FTX25/35 J Series

- : Not used for troubleshooting
∗ : Varies depending on the cases.

Indication on the remote controller	Description of the Fault		Details of fault (Refer to the indicated page.)
00 or ∗	Indoor unit in normal condition (Conduct a diagnosis of the outdoor unit.)		—
A1	Inverter unit - Faulty indoor unit PCB		181
A5	Operation halt due to the freeze protection function or high pressure control (heat pump model only)		182
A6	Faulty fan motor (AC motor stop)	AC motor	184
C4	Heat exchanger temperature thermistor or related abnormality		185
C9	Suction thermistor or related abnormality		185
CA	Discharge thermistor or related abnormality		185
∗	Faulty indoor unit PCB		186
			187
∗ or U4	Faulty power supply or indoor unit PCB		188
U4	Signal transmission error (between indoor and outdoor units)		192

CDX25~60H Series

☼: ON, ●: OFF, ◑: Blinks

Green: Flashes when in normal condition
Red: OFF in normal condition
- : Not used for troubleshooting
∗ : Varies depending on the cases.

Indoor Unit LED Indication		Indication on the remote controller	Description of the Fault		Details of fault (Refer to the indicated page.)
Green					
A	B				
◑	◑	00 or ∗	Indoor unit in normal condition (Conduct a diagnosis of the outdoor unit.)		—
◑	◑				
◑	◑	A5	Operation halt due to the freeze protection function or high pressure control (heat pump model only)		182
◑	◑				
◑	◑	A6	Faulty fan motor (AC motor stop)	AC motor	184
◑	◑				
◑	◑	C4 or C5	Heat exchanger temperature thermistor or related abnormality		185
◑	◑				
◑	◑	C9	Suction thermistor or related abnormality		185
◑	◑	CA	Discharge thermistor or related abnormality		185
☼	∗	∗	Faulty indoor unit PCB		186
◑	☼				187
●	∗	∗ or U4	Faulty power supply or indoor unit PCB		188, 189 190, 191
◑	●	U4	Signal transmission error (between indoor and outdoor units)		192
◑	●	U5	Signal transmission error (between indoor unit and remote controller)		193

1.5 Troubleshooting Detail

1.5.1 Faulty PCB

Remote Controller Display

A1

Indoor Unit LED Display

Method of Malfunction Detection

Evaluation of zero-cross detection of power supply by indoor unit.

Malfunction Decision Conditions

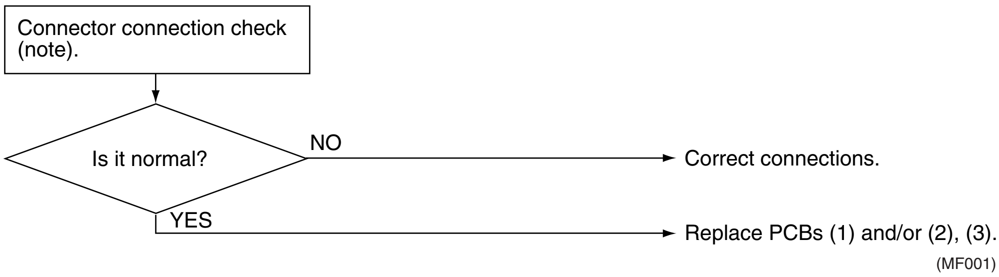
When there is no zero-cross detection in approximately 10 continuous seconds.

Supposed Causes

- Faulty indoor unit PCB
- Faulty connector connection

Troubleshooting

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



Note: Connector Nos. vary depending on models.
Control connector......S35 and S26

1.5.2 Operation Halt Due to the Freeze Protection Function

Remote Controller Display

A5

Indoor Unit LED Display

A ◐ B ◐

Note: No LED Display on FTK(X)25/35J Series.

Method of Malfunction Detection

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

Malfunction Decision Conditions

- High pressure control
  During heating operations, the temperature detected by the indoor heat exchanger thermistor is above 67˚C
- Freeze protection

When the indoor unit heat exchanger temperature is below 0˚C during cooling operation.

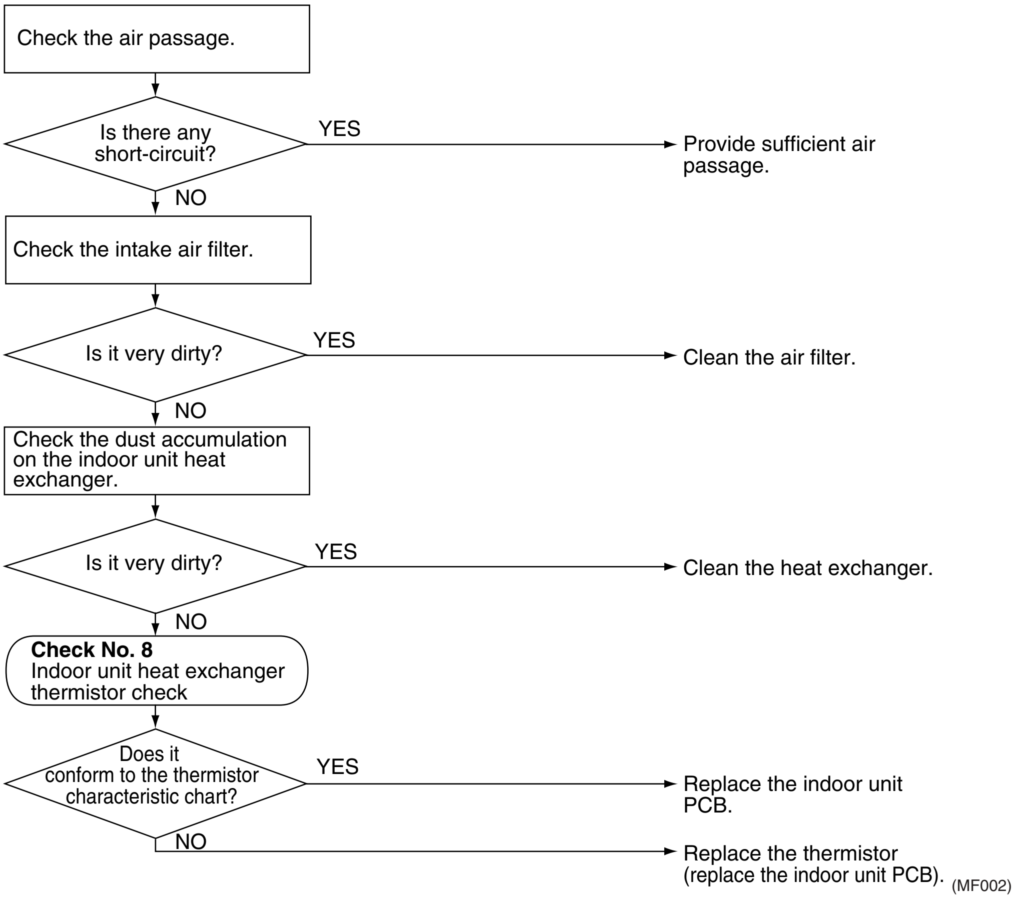
Supposed Causes

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

Troubleshooting

Check No.8
Refer to P.254

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



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

Remote Controller Display

A6

Indoor Unit LED Display

A B

Note: No LED Display on FTK(X)25/35J Series.

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

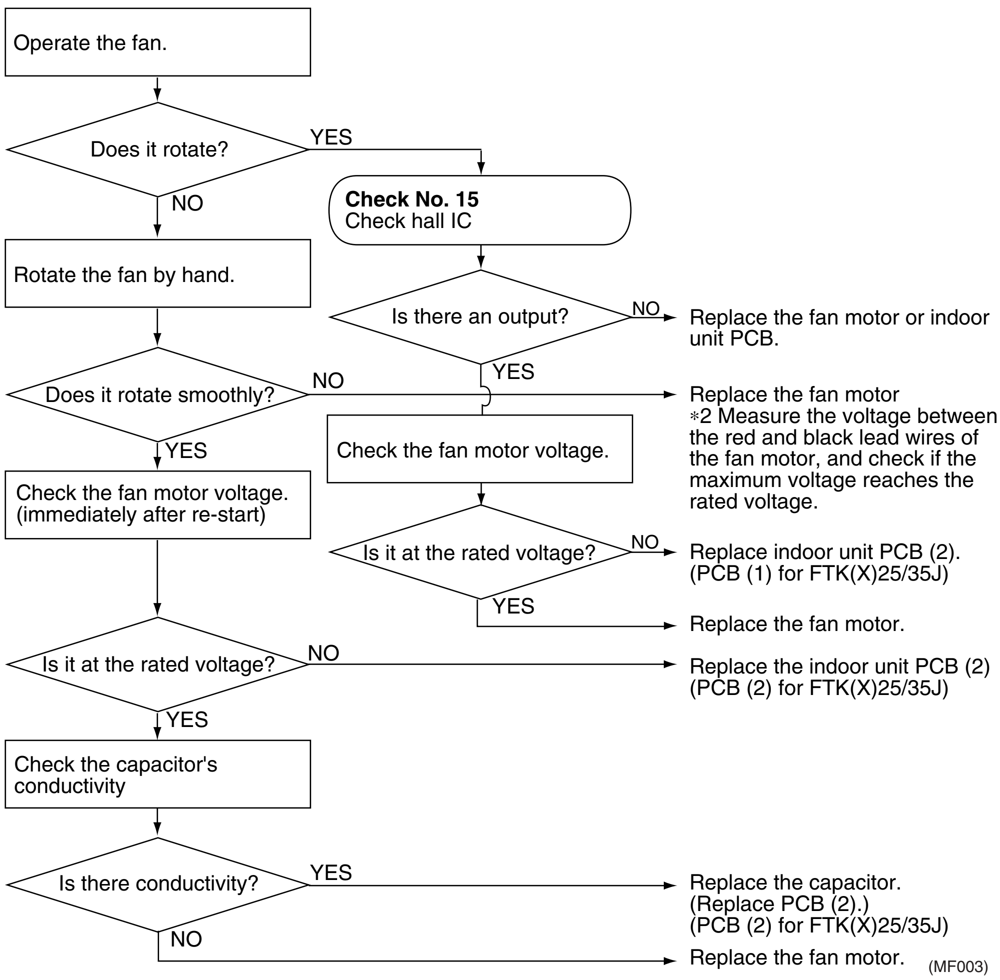
Supposed Causes

- Operation halt due to short circuit inside the fan motor winding.
- Operation halt due to breaking of wire inside the fan motor.
- Operation halt due to breaking of the fan motor lead wires.
- Operation halt due to faulty capacitor of the fan motor.
- Detection error due to faulty indoor unit PCB (1).
- Detection error due to faulty indoor unit PCB (2).

Troubleshooting

Check No.15
Refer to P.258

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



1.5.4 Operation Halt Due to Detection of Thermistor or Related Abnormality

Remote Controller Display

C4, C5, C9, CA

Indoor Unit LED Display

A ◐ B ◐

Note: No LED Display on FTK(X)25/35J Series.

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

Note: The values vary slightly in some models.

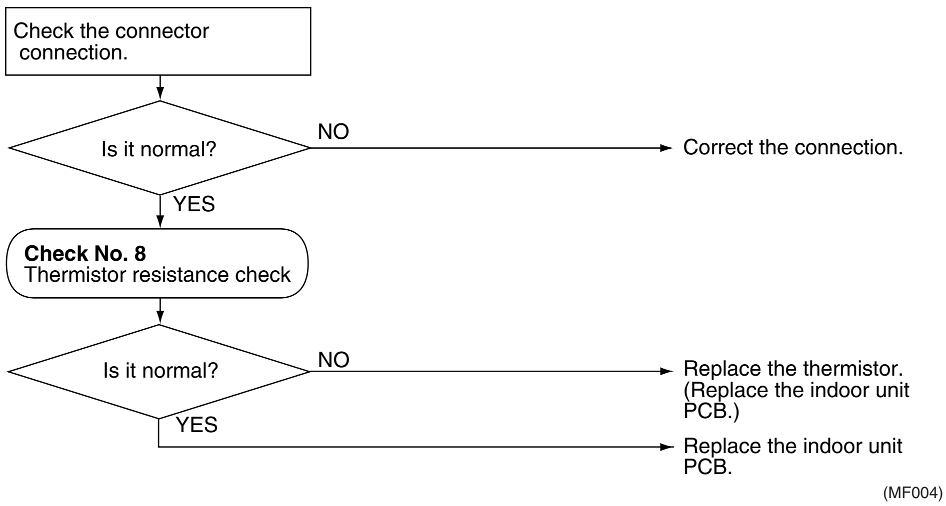
Supposed Causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

Troubleshooting

Check No.8
Refer to P.254

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



C4 : Heat exchanger temperature thermistor
C5 : Heat exchanger temperature thermistor
C9 : Suction air thermistor
CA : Discharge air thermister

1.5.5 Faulty Indoor Unit PCB

Remote Controller Display

✻

Indoor Unit LED Display

A ☼ B ∗

Note: No LED Display on FTK(X)25/35J Series.

Method of Malfunction Detection

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

Malfunction Decision Conditions

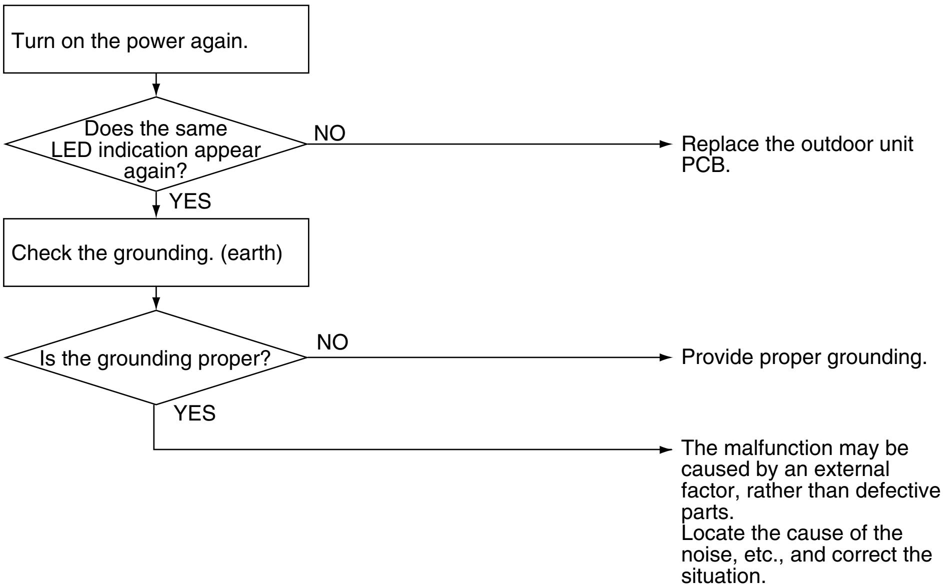
When the microcomputer program does not function properly.

Supposed Causes

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

Troubleshooting

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



(MF005)

1.5.6 Faulty Indoor Unit PCB

Remote Controller Display	*
Indoor Unit LED Display	A ◑ B ☼
Note:	No LED Display on FTK(X)25/35J Series.
Method of Malfunction Detection	The condition of the transmission circuit for indoor-outdoor signal transmission is detected.
Malfunction Decision Conditions	When the transmission circuit remains ON.
Supposed Causes	■ Faulty indoor unit PCB
Troubleshooting	Replace the indoor unit PCB.

1.5.7 Faulty Power Supply or Indoor Unit PCB (For FTK(X)25/35J)

Remote Controller Display

∗ or U4

Indoor Unit LED Display

Method of Malfunction Detection

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

Malfunction Decision Conditions

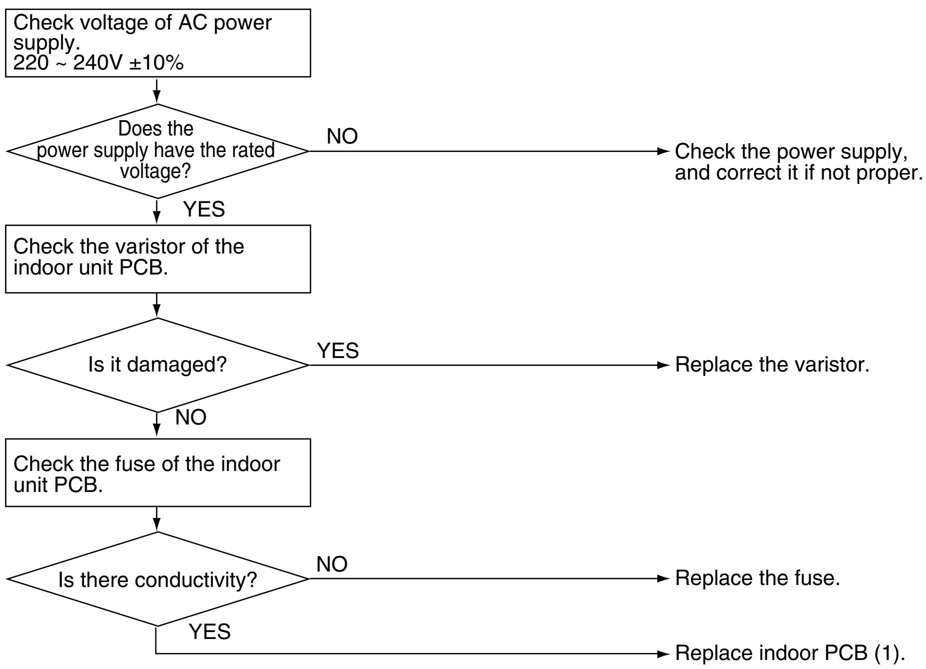
1. When the microcomputer program does not function properly.
2. When the indoor unit determines that the indoor unit does not properly receive signals transmitted by the outdoor unit in indoor-outdoor signal communications.

Supposed Causes

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

Troubleshooting

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



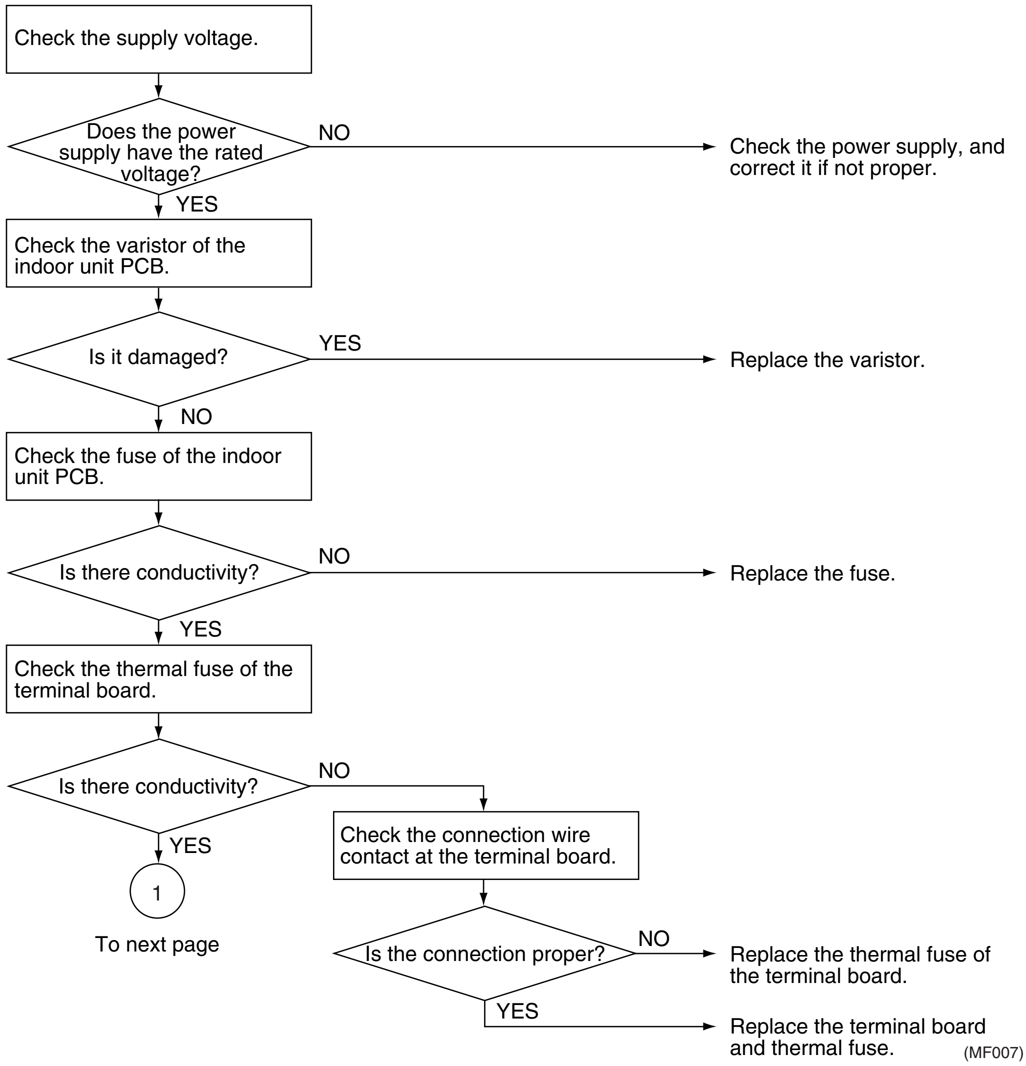
(MF006)

1.5.8 Faulty Power Supply or Indoor Unit PCB (For FTK(X)50/60H, CDK(X)25~60H)

Remote Controller Display	∗ or U4
Indoor Unit LED Display	A ● B ∗
Note:	No LED Display on FTK(X)25/35J Series.
Method of Malfunction Detection	The proper program operation of the microcomputer is checked by the program.
Malfunction Decision Conditions	When the microcomputer program does not function properly.
Supposed Causes	■ Display disabled by fault power supply. ■ Microcomputer program is in abnormal condition due to an external factor. ∗Noise. ∗Momentary voltage drop. ∗Momentary power failure, etc. ■ Faulty indoor unit PCBs (1) and (2).

Troubleshooting

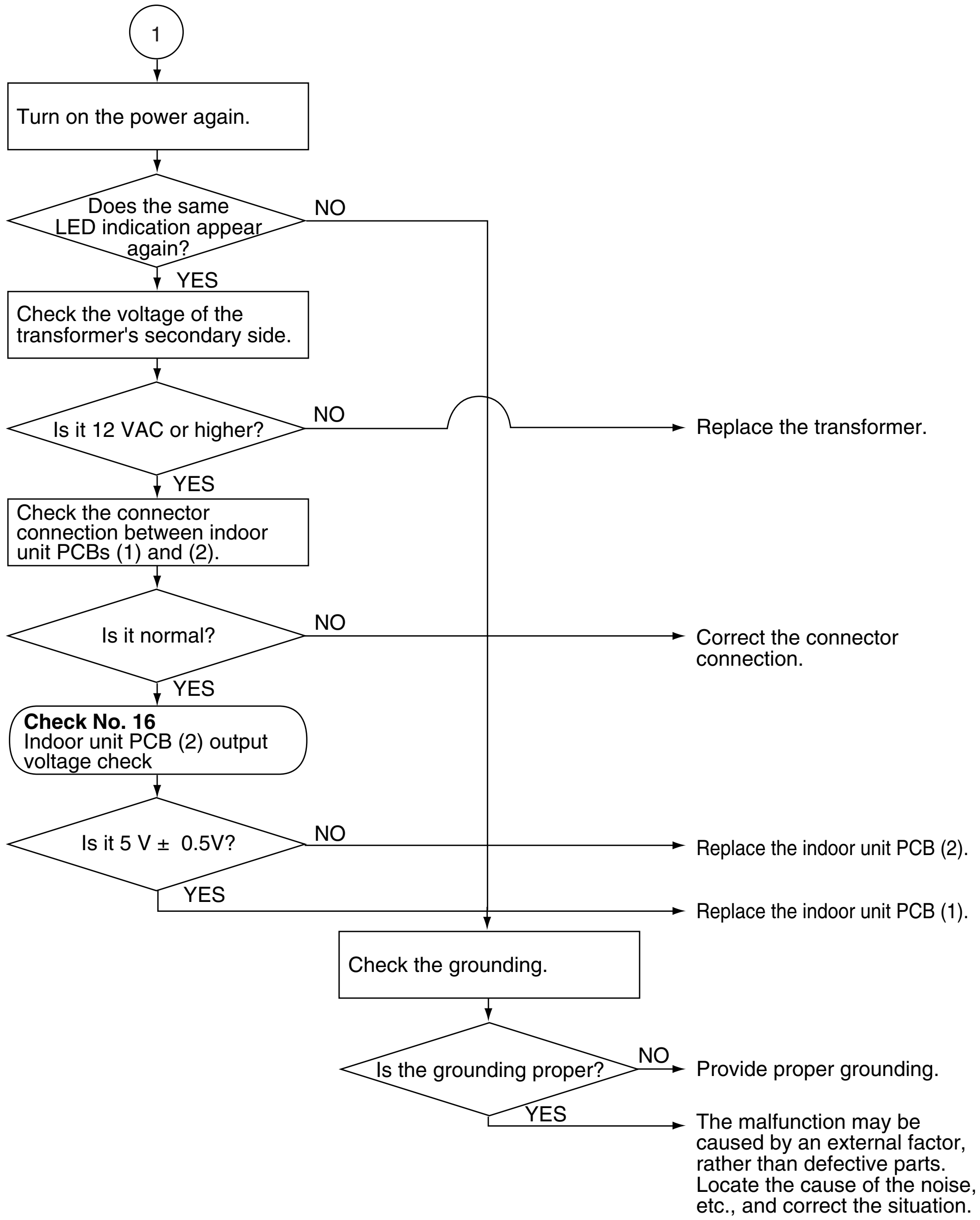
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Troubleshooting

Check No.16
Refer to P.258

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



(MF008)

1.5.9 Signal Transmission Error (Between Indoor and Outdoor Units)

Remote Controller Display

U4

Indoor Unit LED Display

A ◐ B ●

Note: No LED Display on FTK(X)25/35J Series.

Method of Malfunction Detection

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

Malfunction Decision Conditions

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

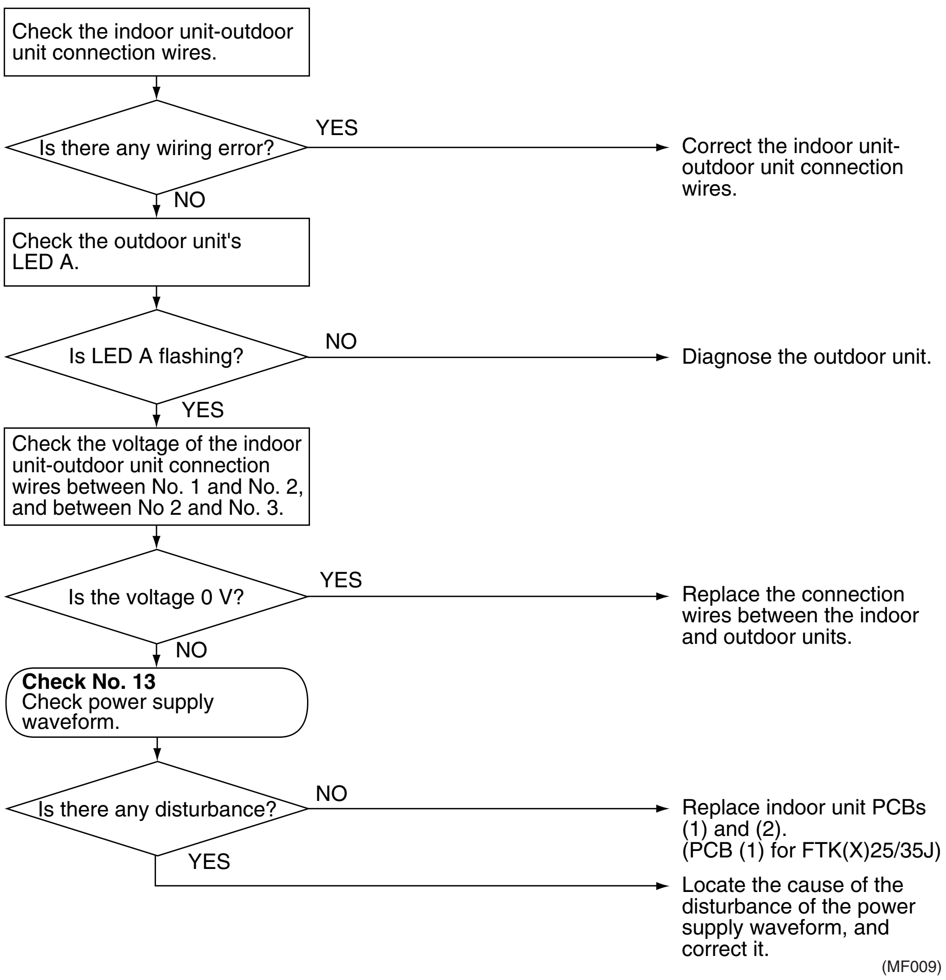
Supposed Causes

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

Troubleshooting

Check No.13
Refer to P.257

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



1.5.10 Signal Transmission Error (Between Indoor Unit and Remote Controller)

Remote Controller Display

U5

Indoor Unit LED Display

A ◐ B ●

Note: No LED Display on FTK(X)25/35 J Series.

Method of Malfunction Detection

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

Malfunction Decision Conditions

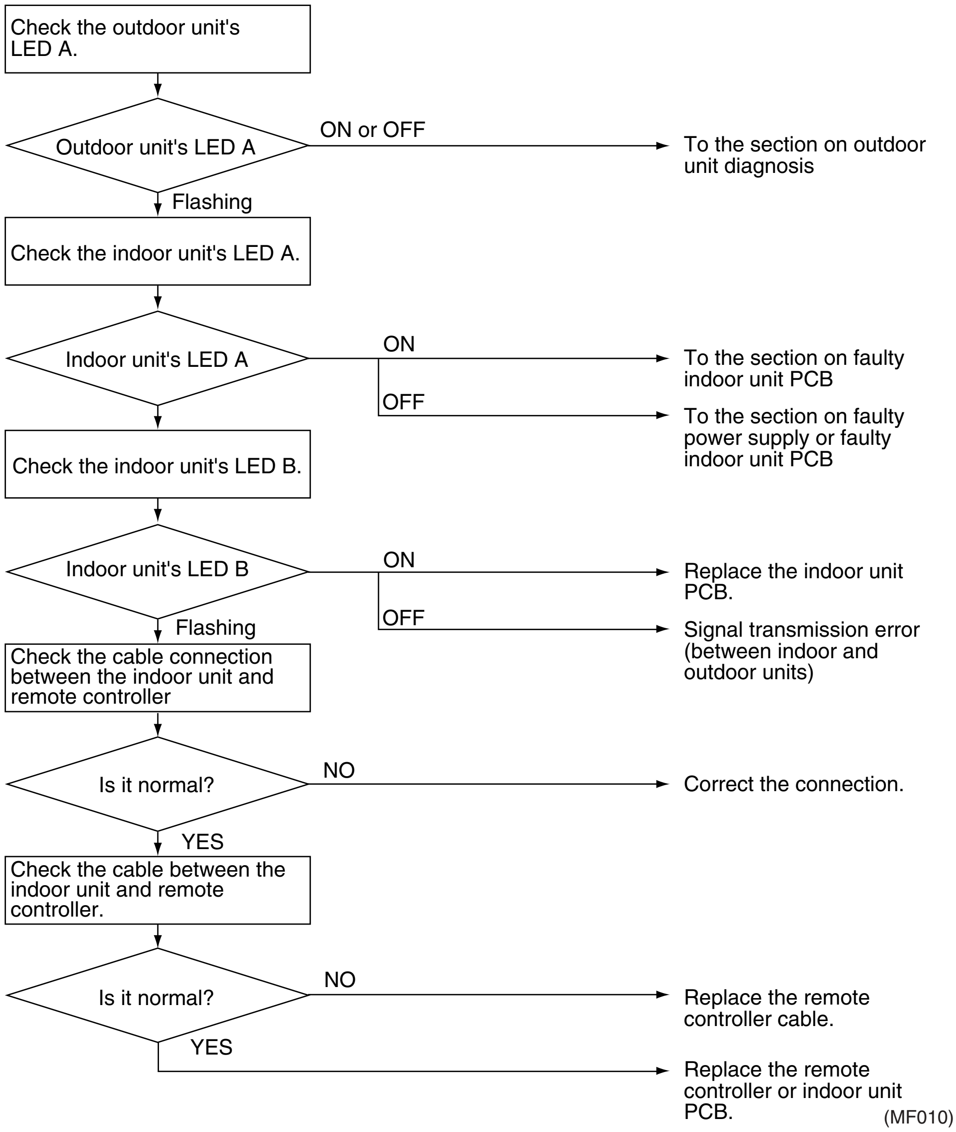
When the data sent from the outdoor unit cannot be received normally, or when the content of the data is abnormal.

Supposed Causes

- Faulty outdoor unit PCB.
- Faulty indoor unit PCB.
- Faulty remote controller cable.
- Faulty remote controller.

Troubleshooting

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



2. Troubleshooting - SkyAir Indoor Unit

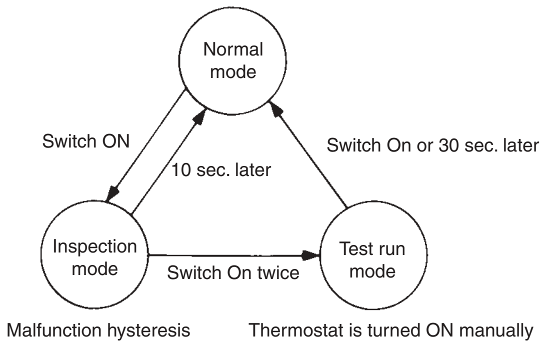
2.1 The INSPECTION/TEST Button

Explanation

By turning the remote controller's inspection /test button ON, you can change the mode as shown in the figure on the right.

- When in the inspection mode, malfunction contents can be cleared by continuing to press the ON/OFF button for 5 seconds.
  (Let you know completion timing by blinking.)
- To carry out a test run, follow the procedure below.

1. Open the gas side stop valve all the way
2. Open the liquid side stop valve all the way.
3. Energize the crank case heater for 6 hours.
4. Enter the test run mode.
5. Continue to operate by the operation switch for 3 minutes.
6. Enter the normal mode.
7. Check the functions according to the operation manual.

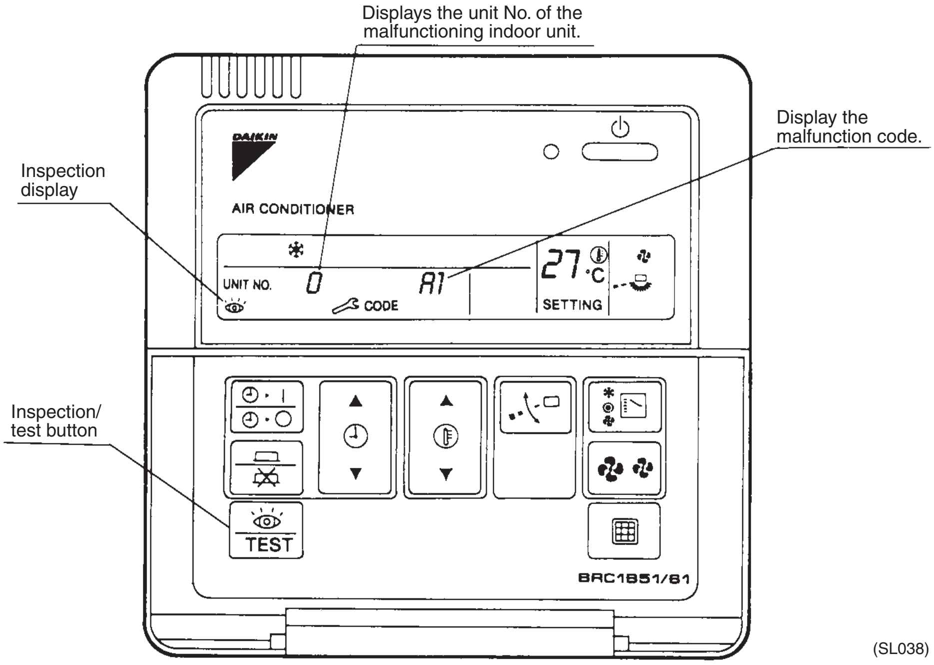


(SL037)

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 200 for malfunction code and malfunction contents.



(SL038)

2.3 Fault 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.

⇨ " UP " button ⬅ " DOWN " button

(SE015)

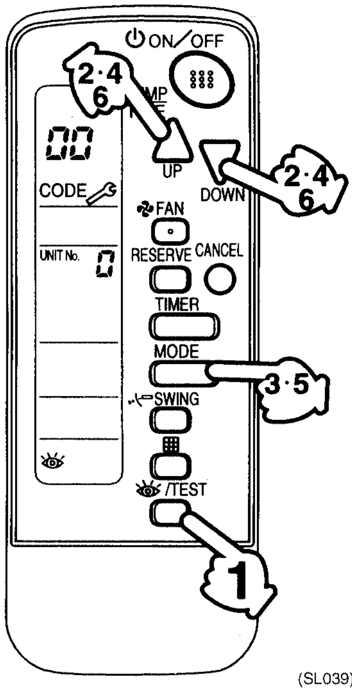
∗2 Number of beeps
Continuous beep : Both upper and lower digits matched.(Malfunction code confirmed)
2 short beeps: Upper digit matched.
1 short beep : Lower digit matched.

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.

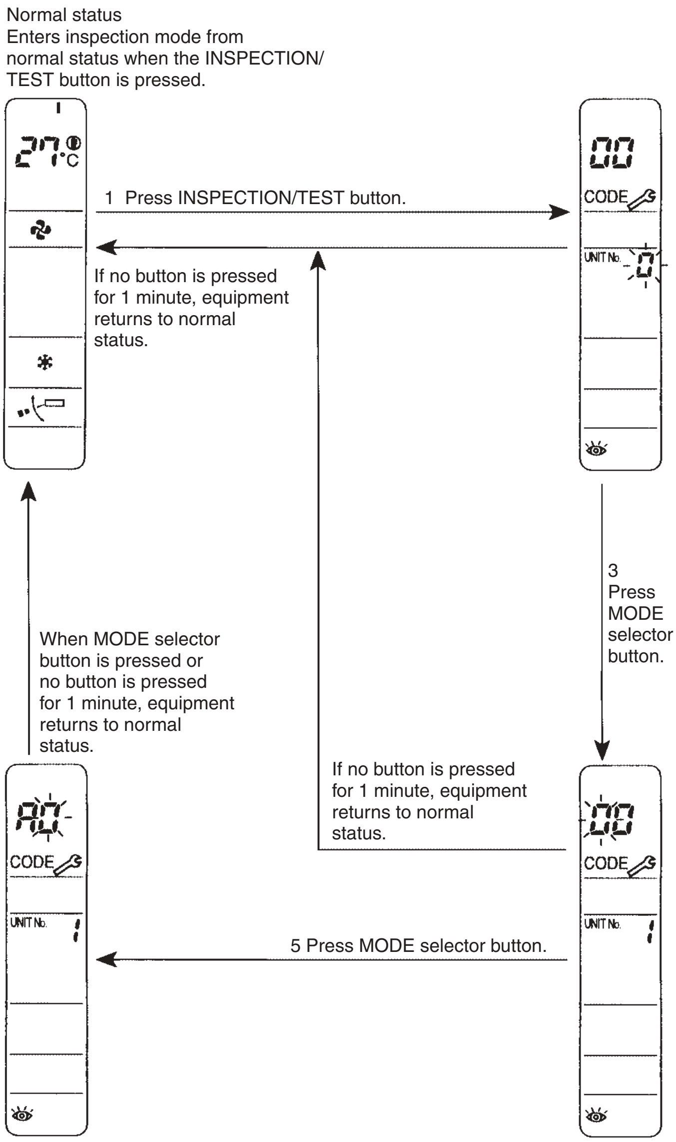
■ The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.

⇨ " UP " button ⬅ " DOWN " button

(SE016)


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

(SL039)


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, equipment 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.

(SL040)

2.4 Troubleshooting by LED on the Indoor Unit's

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	Transmission Normal Monitor	Contents/Processing
H1P (LED-A)	H2P (LED-B)	
◐	◐	Normal → Outdoor unit
◐	☼	Failure of indoor unit PC board ass'y
	●	If outdoor unit's LED-A blinks, failure of indoor unit PC board ass'y (Note 1)
☼	—	Failure of indoor unit PC board ass'y (Note 2)
●		Malfunction of power supply or failure of PC board ass'y (Note 2)

Note:

1. If LED-B is off, the transmission wiring between indoor and outdoor unit may be incorrect or disconnected. Before performing the previously described troubleshooting, check the transmission wiring.
2. Troubleshoot by turning off the power supply for a minimum of 5 seconds, turning it back on, and then rechecking the LED display.

General Precautions when Performing Maintenance

1. When disconnecting the fasten terminal from the PC board, hold down the PC board with your finger and do not apply excessive force. Also, do not hold the neck of the fasten terminal and pull the lead wire.
2. Do not use a mega tester on the secondary side (transformer secondary side) of the electronic circuitry.
3. Even when not energized, beware of static electricity when touching parts or pattern. (If handling PC board when dry [winter], be sure to discharge the electrostatic charge by grounding. Do not touch any other grounded metal parts with your fingers.)

2.5 Troubleshooting by Remote Controller Display / LED Display

2.5.1 Explanation for 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)

2.5.2 Malfunction Code and LED Display Table

Indoor Unit

Indoor Unit Malfunctions	Indoor Unit LED Display Note 2		Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
	H1P	H2P		Other than PC Board	PC Board: Outdoor Unit	PC Board: Indoor Unit	PC Board: Remote Controller		
	◐	◐	*Note 1	—	—	—	—	Normal → to outdoor unit	—
	◐	☼	A1	—	—	○	—	Failure of indoor unit PC board (For troubleshooting by LED, refer to p.199.)	201
	◐	●							
	☼	—							
	●	—							
	◐	◐	A3	◎	—	—	—	Malfunction of drain water level system	202
	◐	◐	A6	◎	—	□	—	Indoor unit fan motor overload/ overcurrent/ lock	204
	◐	◐	A7	◎	—	□	—	Swing flap motor malfunction / lock	205
	◐	◐	AJ	◎	—	○	—	Failure of capacity setting	206
	◐	◐	C4	◎	—	□	—	Malfunction of heat exchanger temperature sensor system	207
	◐	◐	C9	◎	—	□	—	Malfunction of suction air temperature sensor system	208

Note:
1. The asterisk (*) indicates variety of circumstances.
2. No H2P for dedicated cooling only model 35 ~ 60 class.

2.6 Troubleshooting Detail

2.6.1 Failure of Indoor Unit PC Board

Remote Controller Display

A1

Indoor Unit LED Display

Refer to p.200

Applicable Models

All indoor unit models

Method of Malfunction Detection

Check data from E^2PROM.

Malfunction Decision Conditions

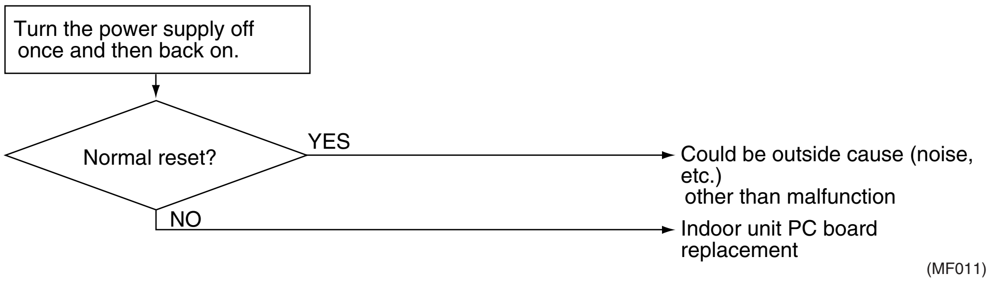
When data could not be correctly received from the E^2PROM
E^2PROM : Type of nonvolatile memory. Maintains memory contents even when the power supply is turned off.

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.



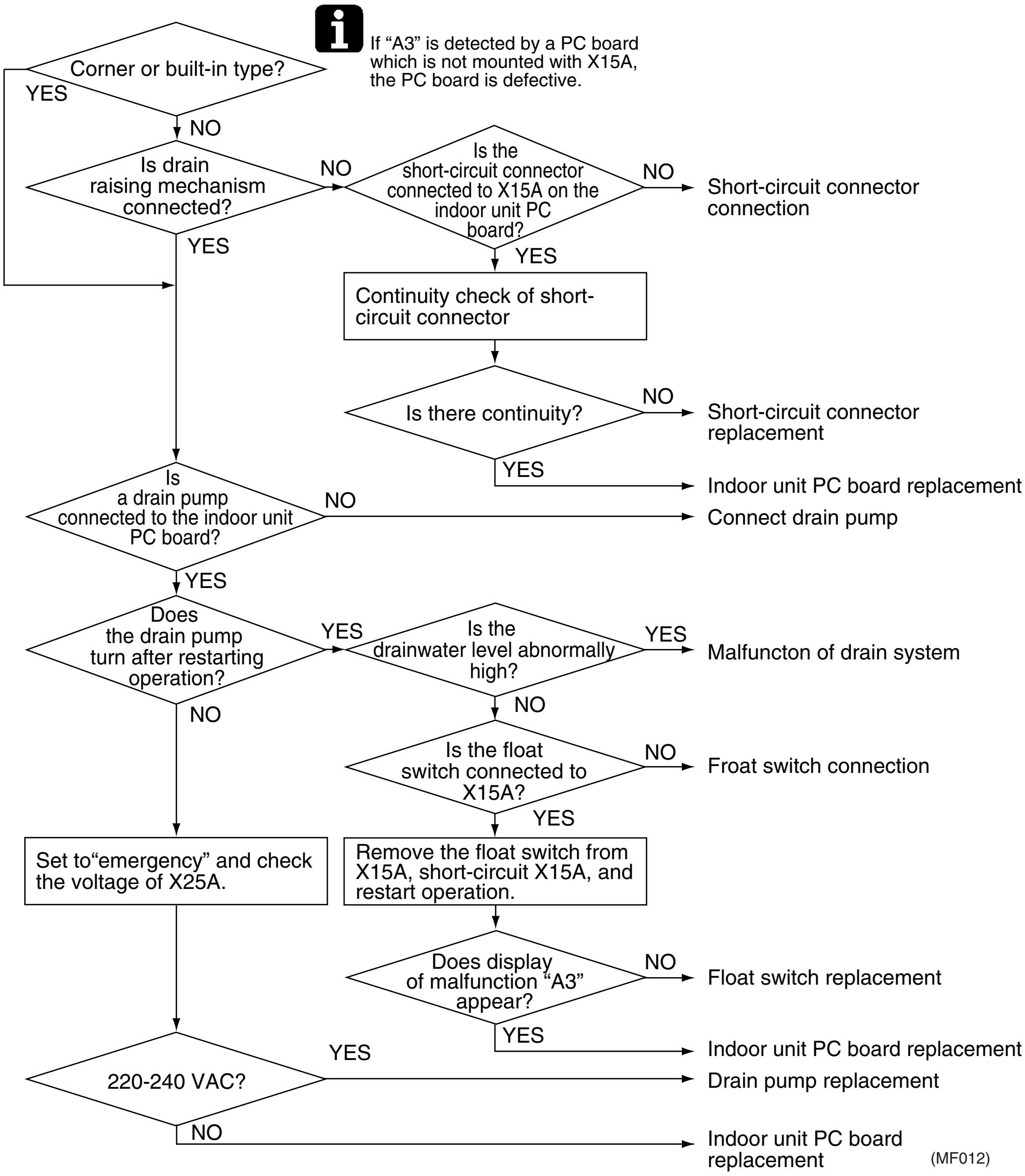
2.6.2 Malfunction of Drain Water Level System (Float Type)

Remote Controller Display	A3
Applicable Models	FHYC
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.



2.6.3 Indoor Unit Fan Motor Lock

Remote Controller Display

A6

Applicable Models

FHYC

Method of Malfunction Detection

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

Malfunction Decision Conditions

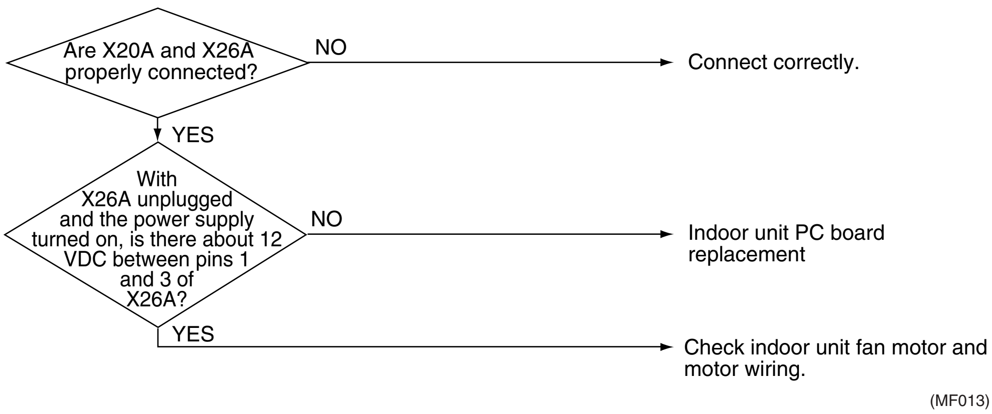
When number of turns can't be detected even when output voltage to the fan is maximum

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.

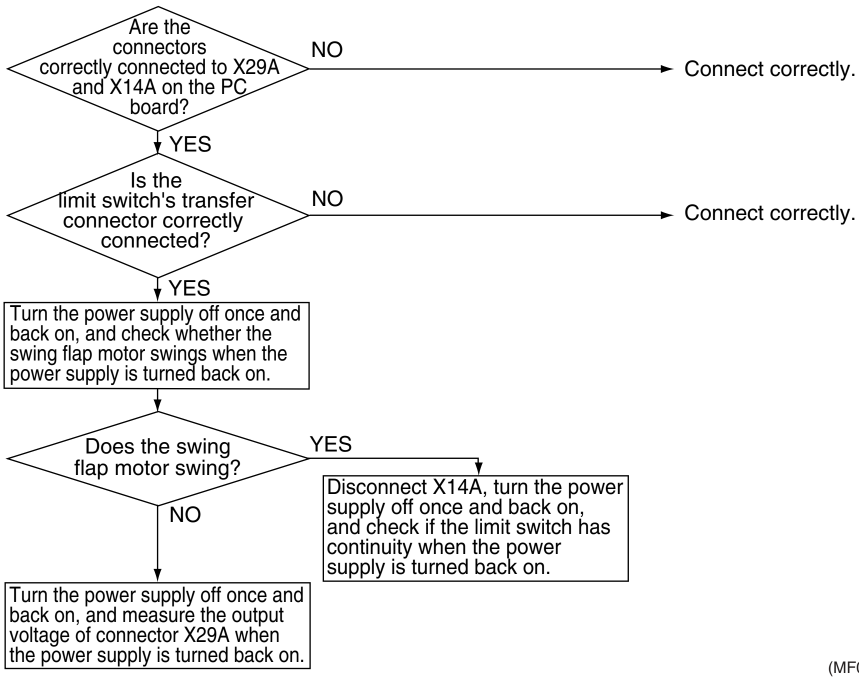


2.6.4 Swing Flap Motor Malfunction / Lock

Remote Controller Display	A7
Applicable Models	FHYC
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.



(MF014)

2.6.5 Failure of Capacity Setting

Remote Controller Display

AJ

Applicable Models

FHYC

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

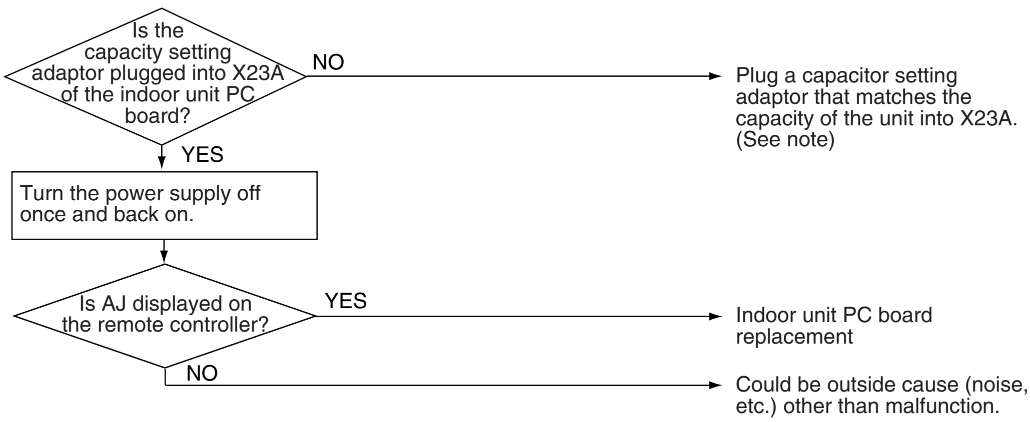
Operation and:
(1)When the capacity code is not contained in the PC board’s memory, and the capacity setting adaptor is not connected.
(2)When a capacity that doesn’t exist for that unit is set.

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.



(MF015)

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)

2.6.6 Malfunction of Heat Exchange Temperature Sensor System

Remote Controller Display

C4

Applicable Models

All indoor unit models

Method of Malfunction Detection

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

Malfunction Decision Conditions

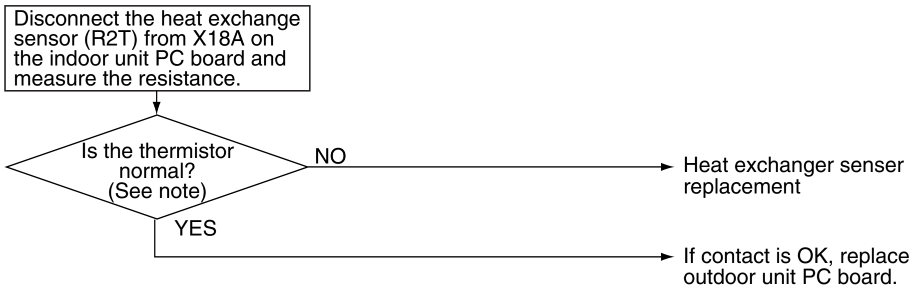
When the heat exchanger thermistor becomes disconnected or short-circuited while the unit is running.

Supposed Causes

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

Troubleshooting

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



(MF016)

Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table.

Thermistor temperature and resistance conversion table.

Temperature	Suction, heat exchanger(indoor) outdoor air, outdoor unit suction pipe sensor (kΩ)	Temperature	Suction, heat exchanger(indoor) outdoor air, outdoor unit suction pipe sensor (kΩ)
-6.0	90.8	28.0	17.6
-4.0	81.7	30.0	16.2
-2.0	73.5	32.0	14.8
0.0	66.3	34.0	13.6
2.0	59.8	36.0	12.5
4.0	54.1	38.0	11.5
6.0	48.9	40.0	10.6
8.0	44.3	42.0	9.8
10.0	40.2	44.0	9.1
12.0	36.5	46.0	8.4
14.0	33.2	48.0	7.8
16.0	30.2	50.0	7.2
18.0	27.5	52.0	6.9
20.0	25.1	54.0	6.2
22.0	23.0	56.0	5.7
24.0	21.0	58.0	5.3
26.0	19.2		

2.6.7 Malfunction of Suction Air Temperature Sensor System

Remote Controller Display

C9

Applicable Models

All indoor unit models

Method of Malfunction Detection

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

Malfunction Decision Conditions

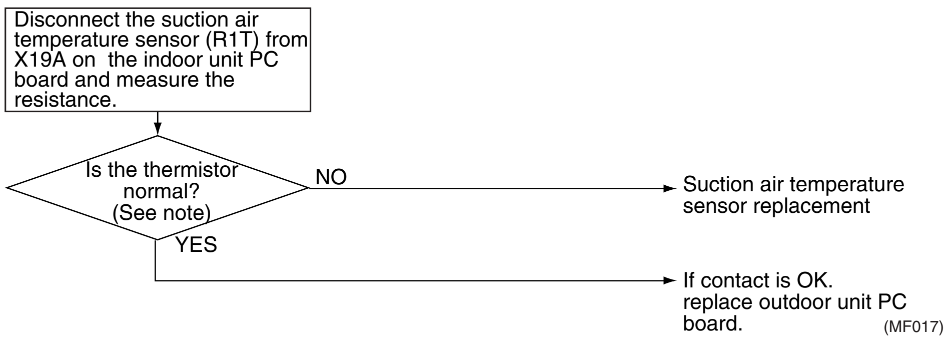
When the suction air temperature sensor's thermistor becomes disconnected or short-circuited while the unit is running.

Supposed Causes

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

Troubleshooting

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



Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table.

Thermistor temperature and resistance conversion table.

Temperature	Suction, heat exchanger(indoor) outdoor air, outdoor unit suction pipe sensor (kΩ)	Temperature	Suction, heat exchanger(indoor) outdoor air, outdoor unit suction pipe sensor (kΩ)
-6.0	90.8	28.0	17.6
-4.0	81.7	30.0	16.2
-2.0	73.5	32.0	14.8
0.0	66.3	34.0	13.6
2.0	59.8	36.0	12.5
4.0	54.1	38.0	11.5
6.0	48.9	40.0	10.6
8.0	44.3	42.0	9.8
10.0	40.2	44.0	9.1
12.0	36.5	46.0	8.4
14.0	33.2	48.0	7.8
16.0	30.2	50.0	7.2
18.0	27.5	52.0	6.9
20.0	25.1	54.0	6.2
22.0	23.0	56.0	5.7
24.0	21.0	58.0	5.3
26.0	19.2		

3. Troubleshooting - Outdoor Unit Related

3.1 The Unit Runs but Doesn't Cool (Heat) the Room

Supposed Causes

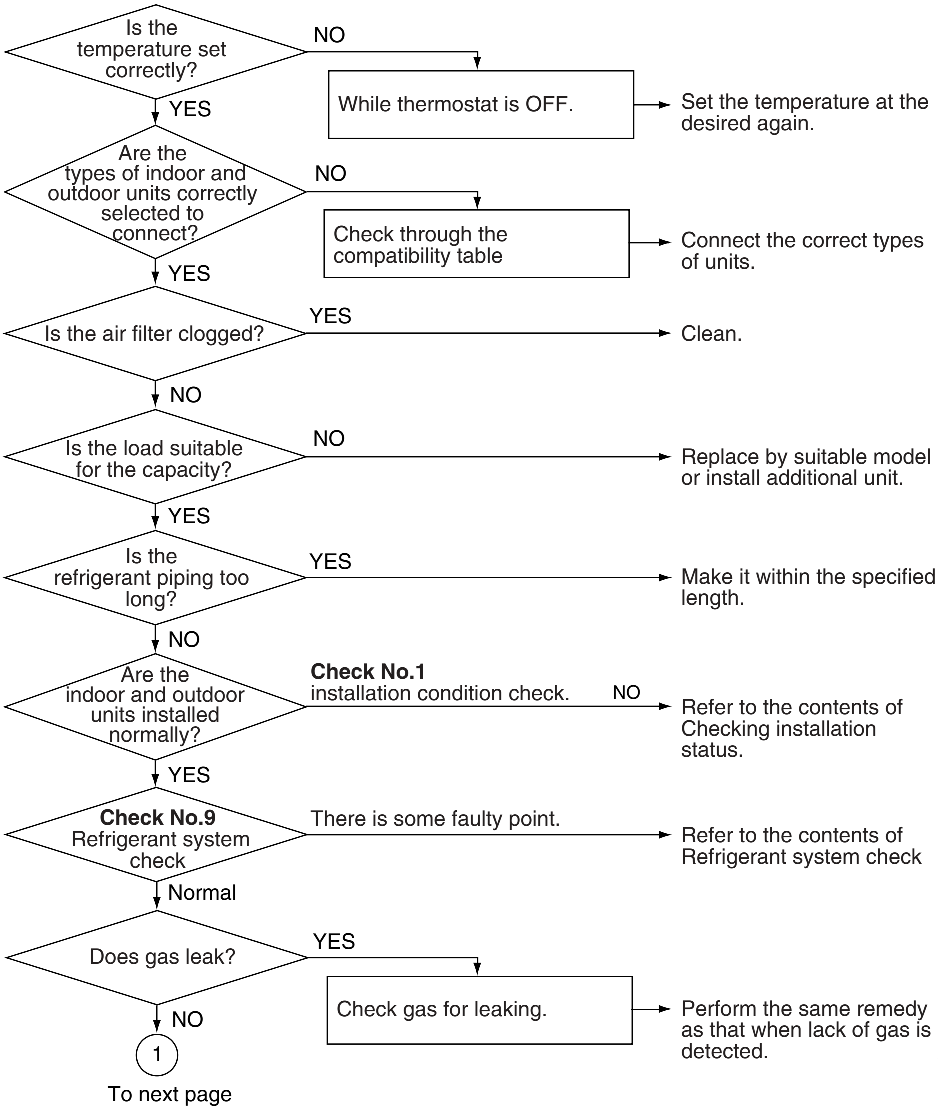
- Incorrect temperature setting
- Unconnectable models
- Clogged air filter
- Improper load for the capacity
- Excessively long refrigerant pipe
- Faulty installation of indoor unit / outdoor unit
- Clogged refrigerant circuit, etc.
- Gas shortage
- Stop valve closed
- EVn malfunction
- EVH malfunction
- EVP malfunction

Troubleshooting

Check No.1
Refer to P.249

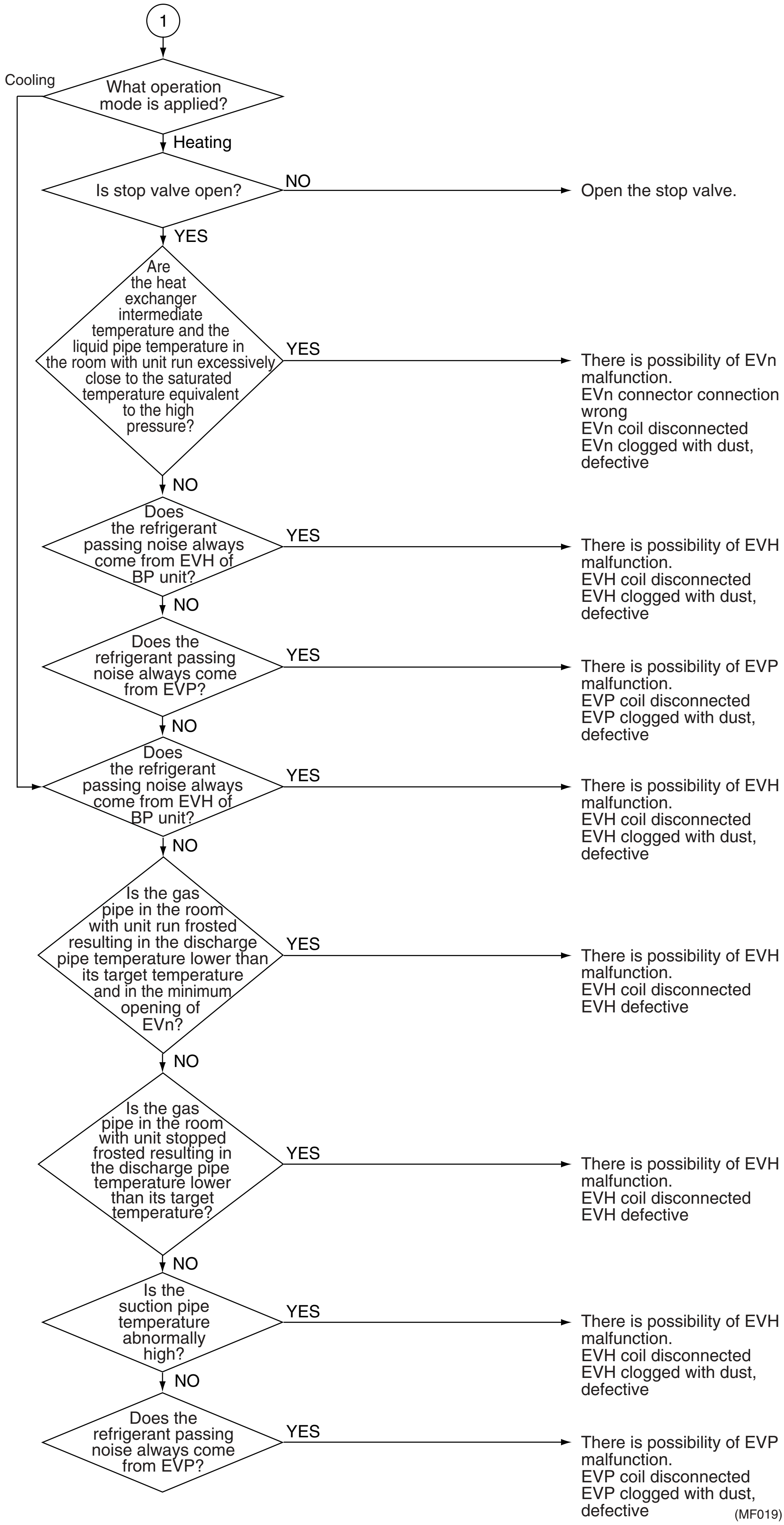
Check No.9
Refer to P.255

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

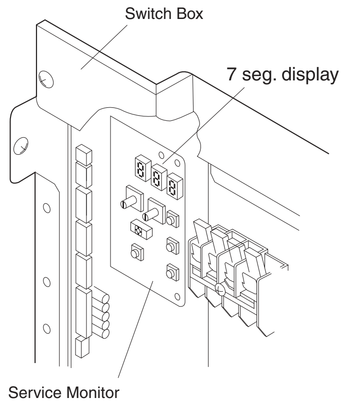


(MF018)

Troubleshooting



3.2 7 Seg. Display on the Outdoor P.C. Board



TROUBLE DAIGNOSIS

<LED ON OUTDOOR UNIT PCB >

[GREEN]		LED DISPLAY: [Blinking slowly]	LED DISPLAY: [ON] OR [OFF] OR [Blinking quickly]
PCB4	LED (A)H1P	NORMAL	ABNORMAL (Malfunction of control unit)
PCB1	LED H2P		
PCB3	LED H3P		
	LED H4P		

<DIGITAL DISPLAY >

Rotary SW position : Set SW1 to 0, Set SW2 to 0.

DIGITAL DISPLAY	DIAGNOSIS
A5	**INDOOR UNNIT** : High pressure protector worked, or freeze-up in operating unit (Stop due to peak cut, freeze)
A9	**BP UNIT** : Malfunction of moving part of electoric expansion valve (Y1E ~ Y4E)
E3	**OUTDOOR UNIT** : Actuation of high pressure switch
E6	**OUTDOOR UNIT** : Compressor lock
E7	**OUTDOOR UNIT** : Fan motor lock or OCP (Output Over current Protect)
E8	**OUTDOOR UNIT** : Inverter input over current protect
E9	**OUTDOOR UNIT** : Malfunction of moving part of electoric expansion valve (Y1E ~ Y3E)
F3	**OUTDOOR UNIT** : Abnormal discharge pipe temperature
FC	**OUTDOOR UNIT** : Low pressure drop error
H3	**OUTDOOR UNIT** : High pressure switch failure
H6	**OUTDOOR UNIT** : Compressor motor position detection sensor error
H7	**OUTDOOR UNIT** : Fan motor position detection sensor error
H8	**OUTDOOR UNIT** : AC current sensor error
H9	**OUTDOOR UNIT** : Malfunction of thermistor for outdoor air
J3	**OUTDOOR UNIT** : Discharge pipe thermistor or related abnormaly
J5	**OUTDOOR UNIT** : Malfunction of suction pipe thermistor
J6	**OUTDOOR UNIT** : Malfunction of heat exchanger thermistor
J7	**OUTDOOR UNIT** : Malfunction of heat exchanger liquid thermistor
J8	**BP UNIT** : Malfunction of liquid pipe thermistor
J9	**BP UNIT** : Malfunction of gas pipe thermistor
JC	**OUTDOOR UNIT** : Malfunction of suction pipe pressure sensor
L3	**OUTDOOR UNIT** : Electoric component box over temperature
L4	**OUTDOOR UNIT** : Radiation fin over temperature
L5	**OUTDOOR UNIT** : Compressor motor insulation defect, short circuit, power unit short circuit
L7	**OUTDOOR UNIT** : Total input over current
L8	**OUTDOOR UNIT** : Compressor overload, compressor motor wire cut
L9	**OUTDOOR UNIT** : Compressor start up error
LC	**OUTDOOR UNIT** : Malfunction of transmission between inverter and outdoor control unit
P3	**OUTDOOR UNIT** : Malfunction of electoric component box sensor
P4	**OUTDOOR UNIT** : Malfunction of power unit temperature sensor
U0	**OUTDOOR UNIT** : Refrigerant shortage
U2	**OUTDOOR UNIT** : Power supply insurfficient or instantaneous failure
U4	Malfunction of transmission between BP unit and outdoor unit
U6	Malfunction of transmission between indoor unit and BP unit
U7	Malfunction of transmission between fan control unit and outdoor control unit
UA	**BP UNIT** : Failure of field setting
UH	**OUTDOOR UNIT** : Malfunction of outdoor control unit

<CAUTION>

It is possible to check if the outdoor unit, or a BP unit, is malfunctioning.
Rotary SW position : Set SW1 to 0, Set SW2 to 1.
(Digital display is as follows.)

Outdoor unit malfunction :

BP unit malfunction : , , (UPPER) (LOWER)

DC fan malfunction :

Return SW to original position. : "SW1 to 0, SW2 to 0"

2P060527

3.3 Troubleshooting Detail

3.3.1 High Pressure Malfunction

Outdoor Unit Indication

E3

Method of Malfunction Detection

Continuity of the high pressure switch is detected by the safety device circuitry.

Malfunction Decision Conditions

When HPS malfunction is generated 4 times, the system shuts down.

(The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

Supposed Causes

- Faulty high pressure switch
- Disconnection of high pressure switch's harness
- Faulty connectors connection of high pressure switch
- Dirty indoor unit heat exchanger
- Faulty outdoor unit fan
- Over-charged with refrigerant
- Motorized valve clogged

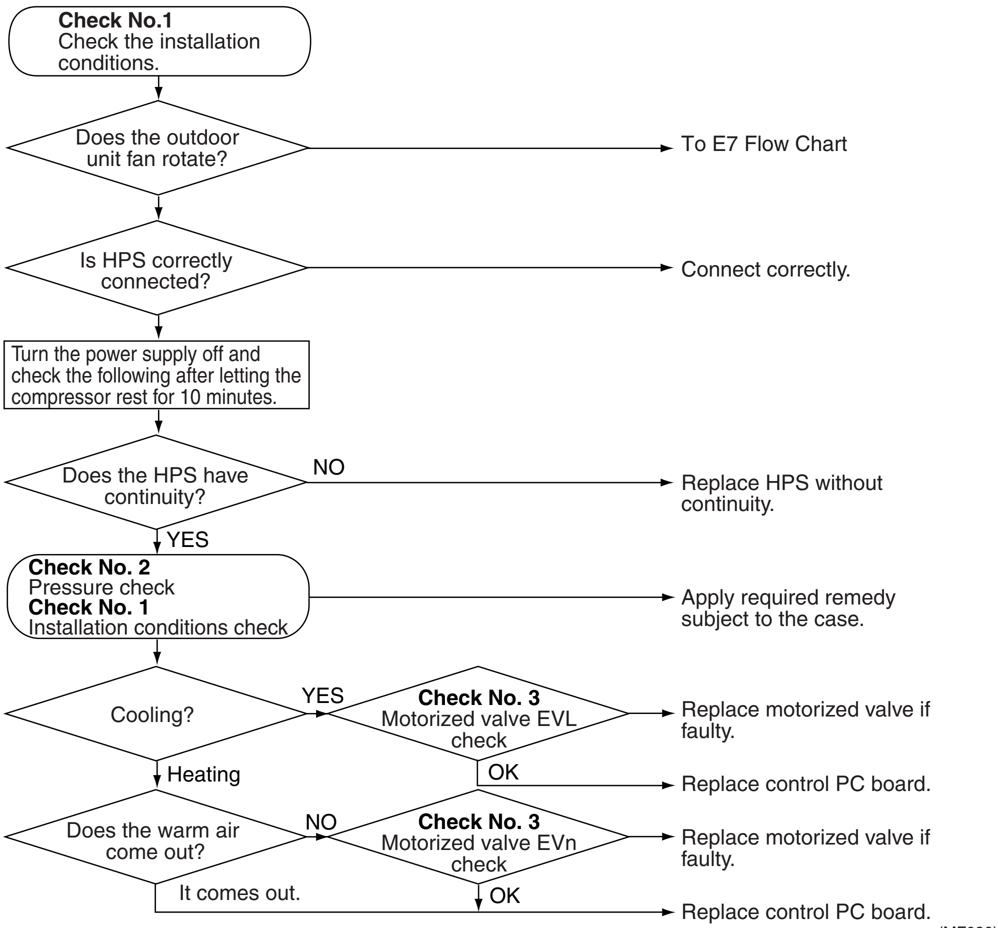
Troubleshooting

Check No.1
Refer to P.249

Check No.2
Refer to P.249

Check No.3
Refer to P.250

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



(MF020)

3.3.2 Compressor Lock

Outdoor Unit Indication

E6

Method of Malfunction Detection

Detection by the position signal waveform when starting the compressor.

Malfunction Decision Conditions

When the position detected signal coincides with the lock pattern at time of starting the compressor.

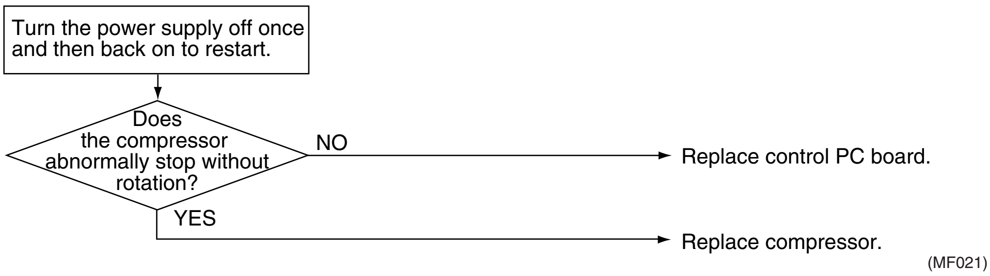
- When a compressor lock is generated 4 times, the system shuts down.
  (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

Supposed Causes

- Faulty compressor

Troubleshooting

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



3.3.3 Fan Lock / Overcurrent

Outdoor Unit Indication

E7

Method of Malfunction Detection

Fan lock is detected using the voltage signal given to the fan and number of turns of the fan motor.

Overcurrent is detected by the signal from driver.

Malfunction Decision Conditions

When the fan ran with 30rpm or less continuously for 6 seconds in the waveform output

When OCP signal was sent from the fan driver

- When a fan lock / overcurrent is generated 4 times, the system shuts down. (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

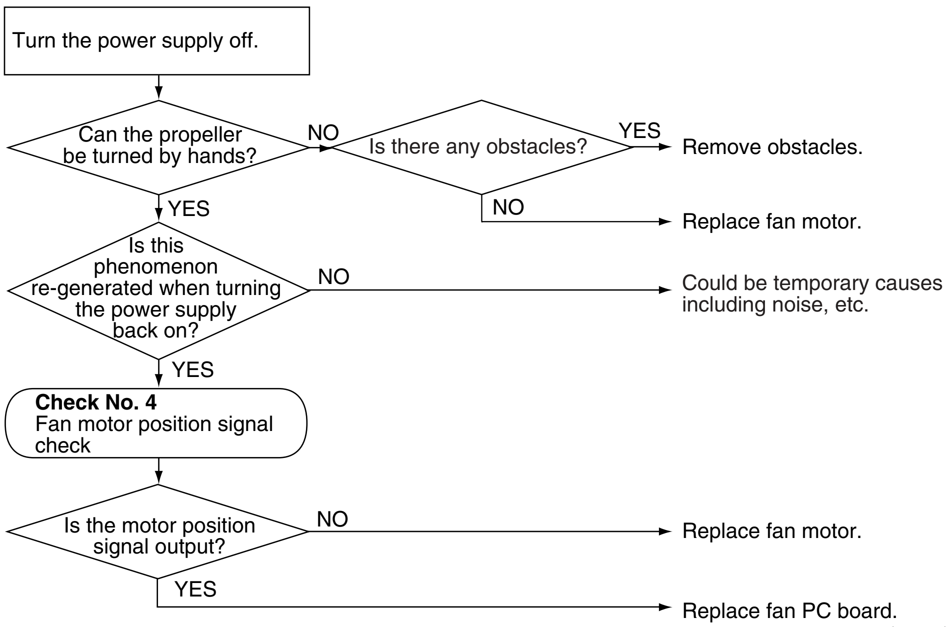
Supposed Causes

- Interference by foreign matters with propeller
- Faulty fan PC board
- Faulty fan motor

Troubleshooting

Check No.4
Refer to P.250

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



(MF022)

3.3.4 Operation Halt Due to Detection of INV Input Current Error

Outdoor Unit Indication

E8

Method of Malfunction Detection

INV input current error is detected using INV input current detected by CT.

Malfunction Decision Conditions

When the inverter input current of 28A or more continued for 2.5 seconds.

- When an INV input current error is generated 4 times, the system shuts down.
  (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

Supposed Causes

- Faulty wiring connection of filter PC board and control PC board
- Faulty compressor
- Overcurrent due to faulty PC board
- Incorrect detection due to faulty PC board
- Short-circuit

Troubleshooting

Check No.5
Refer to P.251

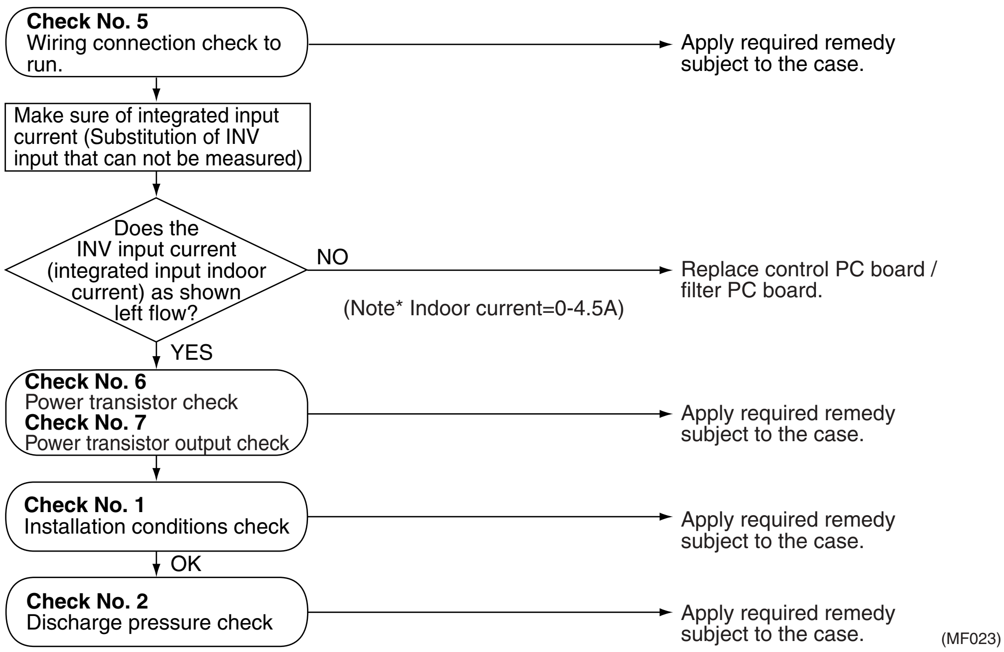
Check No.6
Refer to P.252

Check No.7
Refer to P.253

Check No.1
Refer to P.249

Check No.2
Refer to P.249

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



3.3.5 Malfunction of Electronic Expansion Valve

Outdoor Unit Indication

E9

Method of Malfunction Detection

Detection by checking continuity and lack of connector.

Malfunction Decision Conditions

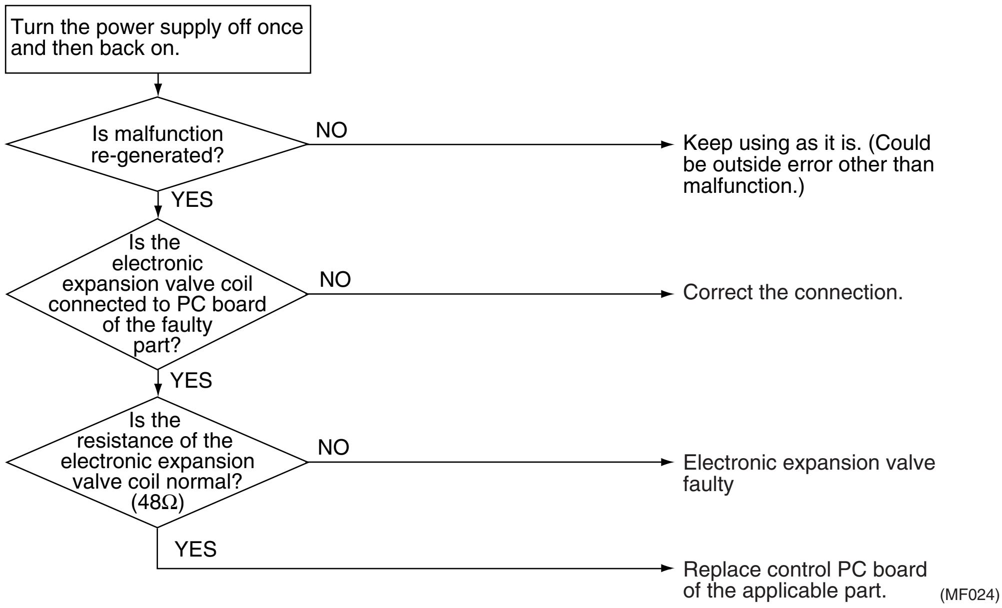
Malfunction is determined by no common voltage applied when turning the power supply on.

Supposed Causes

- Faulty electronic expansion valve
- Faulty harness of electronic expansion valve
- Incorrect connectors connection of electronic expansion valve
- Outside cause (noise, etc.)

Troubleshooting

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



Note: The applicable part of motorized valve is displayed via rotary switch [01].

3.3.6 Operation Halt Due to Discharge Pipe Temperature Control

Outdoor Unit Indication

F3

Method of Malfunction Detection

Discharge pipe temperature control (halt, frequency deviation, etc.) is carried out using temperature detected by the discharge pipe thermistor.

Malfunction Decision Conditions

- Case where the compressor halts operation when the temperature detected by the discharge pipe thermistor rose to 115˚C or higher. (reset when the temperature falls to 85˚C or lower.)
- When this is generated 4 times, the system shuts down.
- The error counter resets itself when no compressor abnormality occurs within 60-minute cumulative time after the error generation.
  (including operation halt due to other errors)

Supposed Causes

- Insufficient refrigerant
- Malfunction of 4-way valve
- Faulty discharge pipe thermistor
- Faulty outdoor unit PC board
- Water mixed in the piping at site
- Faulty motorized valve
- Faulty stop valve
- Faulty indoor unit solenoid valve

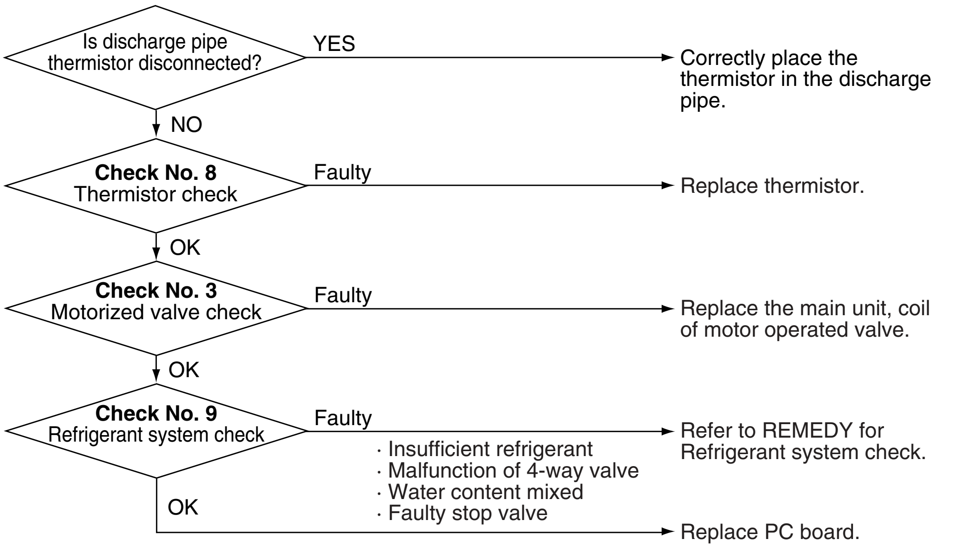
Troubleshooting

Check No.8
Refer to P.254

Check No.3
Refer to P.250

Check No.9
Refer to P.255

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



(MF025)

3.3.7 LP Drop Error

Outdoor Unit Indication

FC

Method of Malfunction Detection

When the value of LP sensor was kept at lower level for a certain time range after the certain time range passed since the compressor started.

Malfunction Decision Conditions

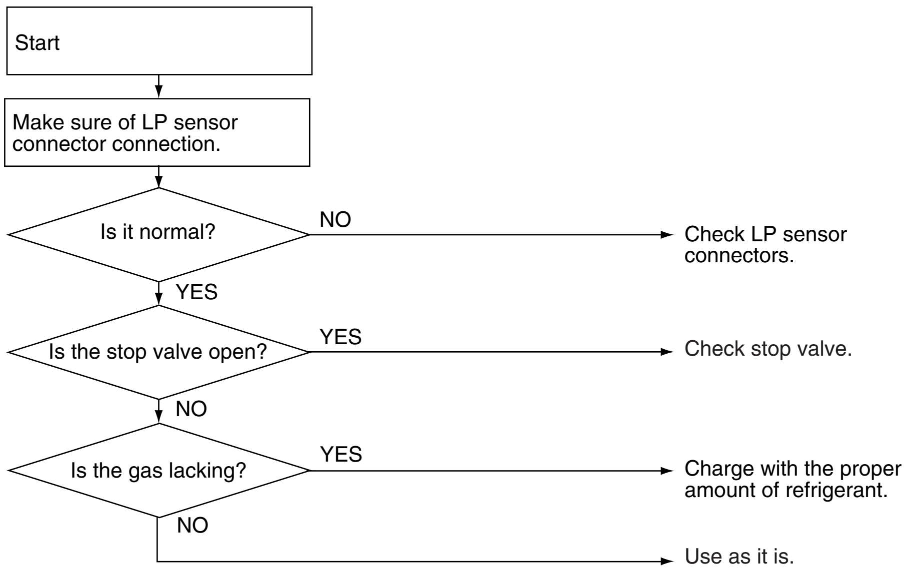
When the value of LP sensor was kept at 0kg/cm² · G or less for a certain time range after TLPGD period
(15 seconds when cooling, 150 seconds when heating) passed since the compressor started.

Supposed Causes

- Malfunction of LP sensor
- Faulty contact of LP sensor connector
- Gas shortage
- Heating operation under low outside air temperature beyond the operative area

Troubleshooting

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



(MF026)

3.3.8 Malfunction of High Pressure Switch System

Outdoor Unit Indication

H3

Method of Malfunction Detection

Continuity of high pressure switch is detected by the safety device circuitry.

Malfunction Decision Conditions

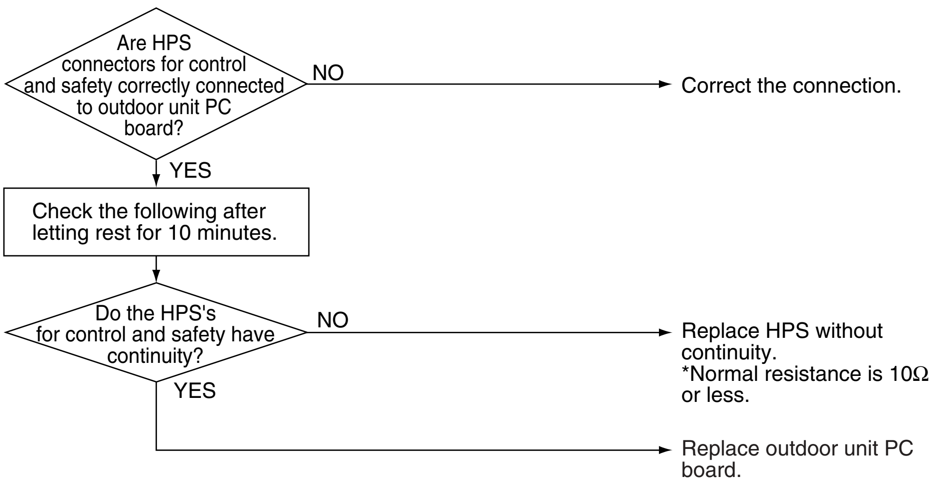
When the compressor is off, and the high pressure switch doesn't have continuity.

Supposed Causes

- Faulty high pressure switch
- Disconnection of high pressure switch harness
- Faulty connectors connection of high pressure switch

Troubleshooting

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



(MF027)

3.3.9 Operation Halt Due to Faulty Position Detection Sensor

Outdoor Unit Indication

H6

Method of Malfunction Detection

Faulty start of the compressor is detected by checking the turning information of the compressor via position detector of electrical parts.

Malfunction Decision Conditions

When the compressor did not turn in approximately 15 seconds after starting operation.
Frequency: 4 times
Clear condition: 60-minute continuous run (normal)

Supposed Causes

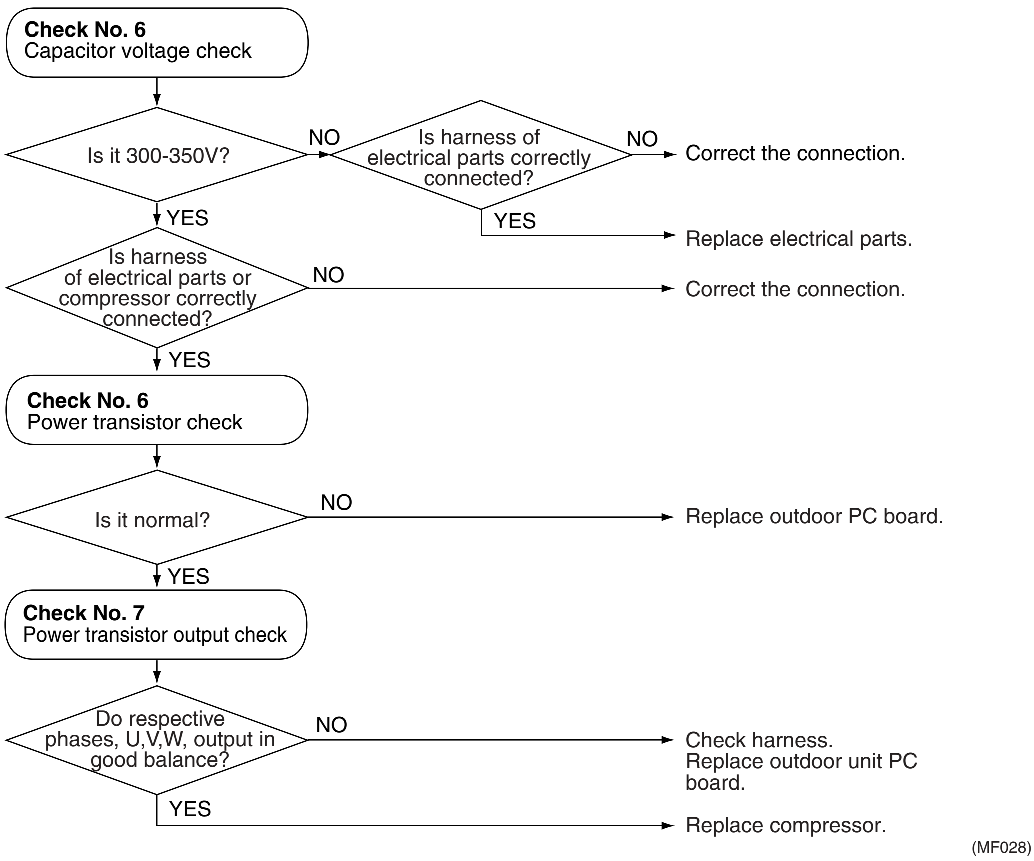
- Incorrect detection due to disconnected relay of compressor
- Malfunction to start due to faulty compressor
- Malfunction to start due to faulty outdoor unit PC board
- Malfunction to start due to stop valve "closed"
- Incorrect detection due to faulty outdoor unit PC board
- Input voltage error

Troubleshooting

Check No.6
Refer to P.252

Check No.7
Refer to P.253

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



3.3.10 Fan Position Detection Error

Outdoor Unit Indication

H7

Method of Malfunction Detection

Fan malfunction is detected by checking 3 numbers motor position detection signal.

Malfunction Decision Conditions

When the same state with 3 numbers motor position detection signal was kept for 5 seconds.

- When a fan malfunction is generated 4 times, the system shuts down.
  (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the malfunction generation.)

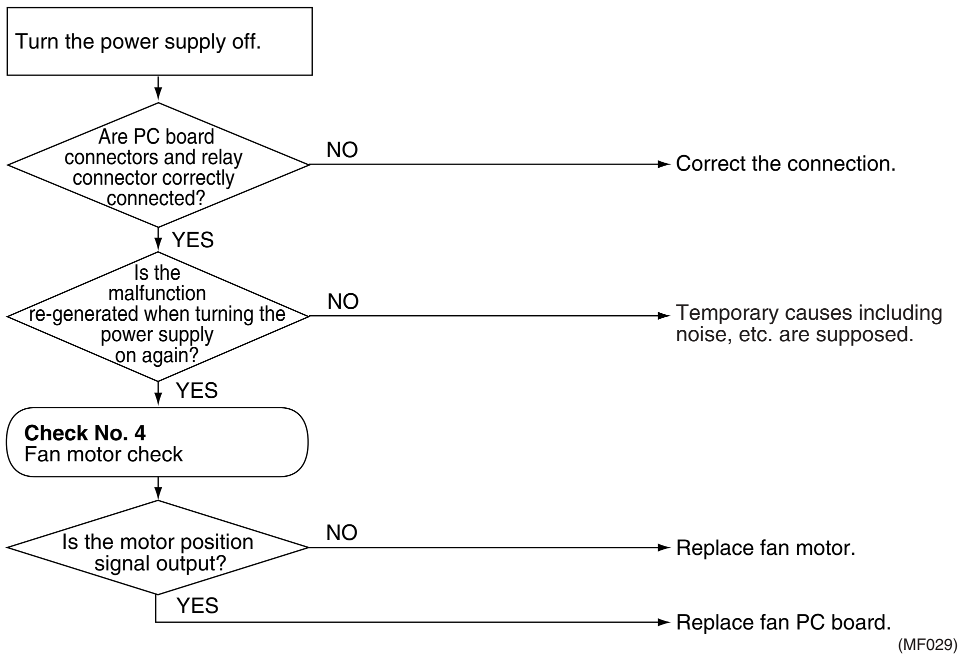
Supposed Causes

- Incorrect connectors connection
- Faulty fan PC board
- Faulty fan motor

Troubleshooting

Check No.4
Refer to P.250

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



3.3.11 Operation Halt Due to Detection of CT Error

Outdoor Unit Indication

H8

Method of Malfunction Detection

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

Malfunction Decision Conditions

When the compressor's rotating speed is 64rps or more and the CT input is 2 A or less.

- When a CT error is generated 4 times, the system shuts down.
  (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60 minutes (cumulative time) after the error generation.)

Supposed Causes

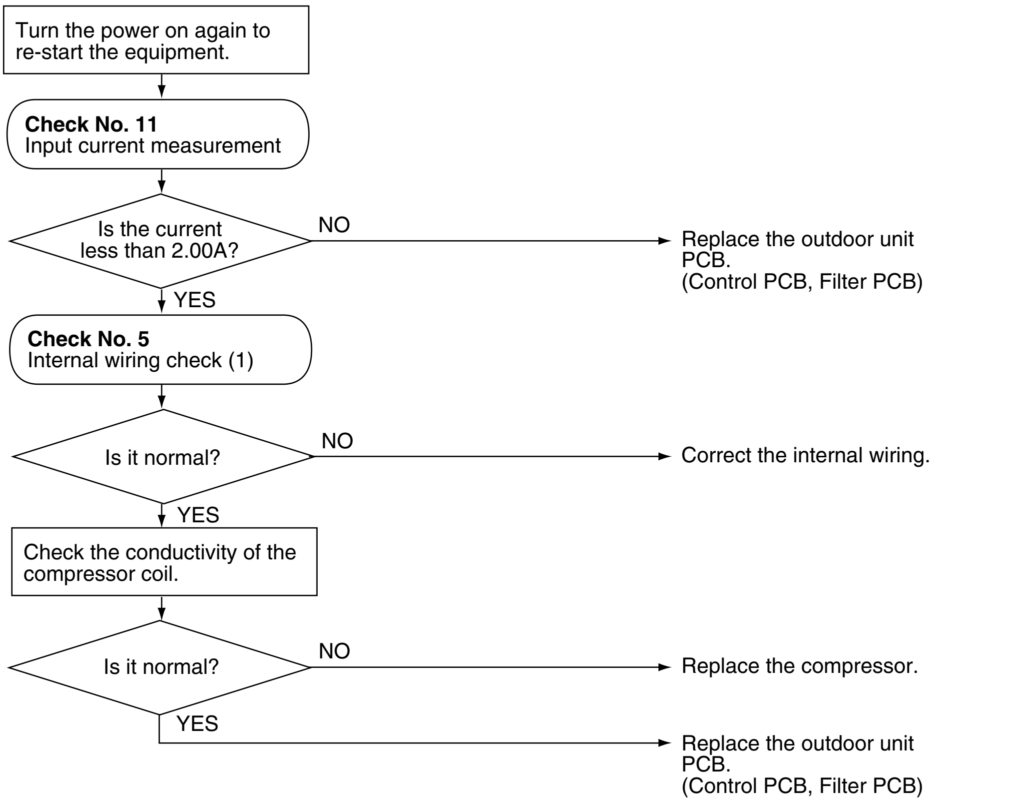
- Incorrect connectors connection
- Faulty thermistor
- Faulty power transistor
- Breaking of wire or faulty connection of internal wiring
- Faulty reactor
- Faulty PCB

Troubleshooting

Check No.11
Refer to P.256

Check No.5
Refer to P.251

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



(MF030)

3.3.12 Faulty Outside Air Thermistor

Outdoor Unit Indication

H9

Method of Malfunction Detection

Malfunction Decision Conditions

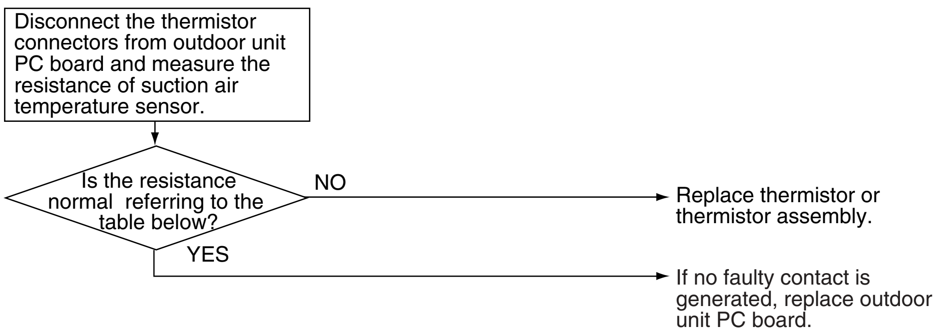
When the outside air temperature sensor became short-circuited or open.

Supposed Causes

- Faulty outside air temperature sensor
- Faulty connectors connection of outside air temperature sensor

Troubleshooting

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



(MF031)

	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.13 Faulty Discharge Thermistor

Outdoor Unit Indication

J3

Method of Malfunction Detection

Malfunction Decision Conditions

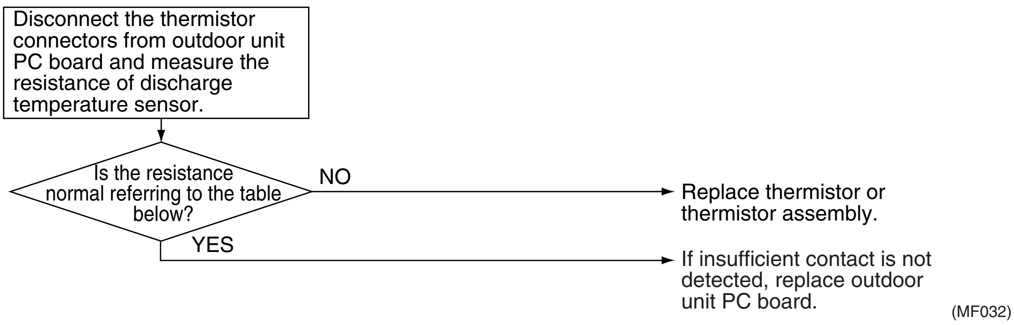
When the discharge temperature sensor became short-circuited or open.

Supposed Causes

- Faulty discharge temperature sensor
- Faulty connectors connection of discharge temperature sensor

Troubleshooting

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



	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.14 Faulty of Suction Thermistor

Outdoor Unit Indication

J5

Method of Malfunction Detection

Malfunction Decision Conditions

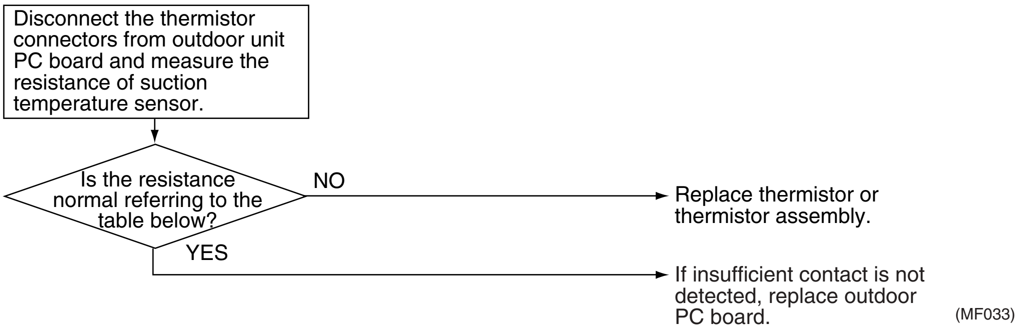
When the suction temperature sensor became short-circuited or open.

Supposed Causes

- Faulty suction temperature sensor
- Faulty connectors connection of suction temperature sensor

Troubleshooting

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



	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.15 Faulty heat exchanger thermistor

Outdoor Unit Indication

J6

Method of Malfunction Detection

Malfunction Decision Conditions

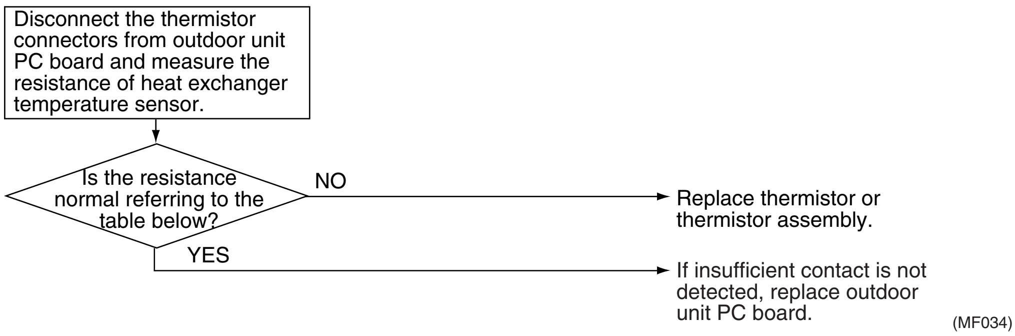
When the heat exchanger temperature sensor became short-circuited or open.

Supposed Causes

- Faulty heat exchanger temperature sensor
- Faulty connectors connection of heat exchanger temperature sensor

Troubleshooting

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



	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.16 Faulty of Liquid Pipe Thermistor

Outdoor Unit Indication

J7

Method of Malfunction Detection

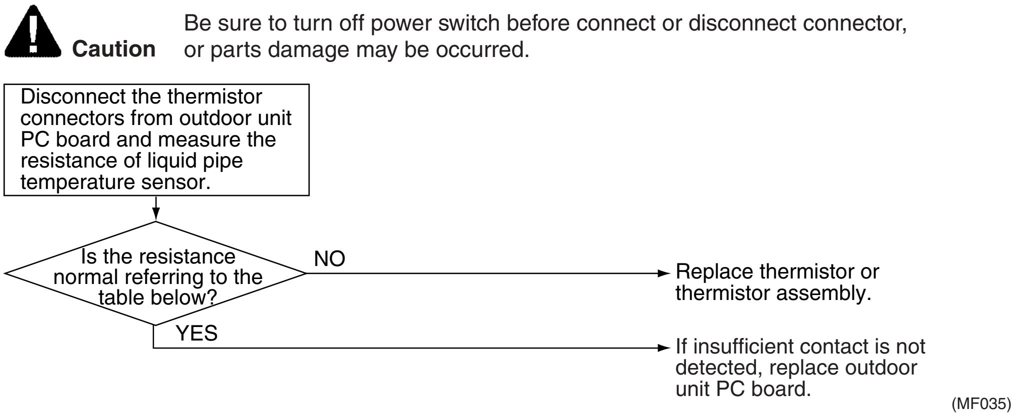
Malfunction Decision Conditions

When the liquid pipe temperature sensor became short-circuited or open.

Supposed Causes

- Faulty liquid pipe temperature sensor
- Faulty connectors connection of liquid pipe temperature sensor

Troubleshooting



	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.17 Faulty BP Liquid Pipe Thermistor

Outdoor Unit Indication

J8

Method of Malfunction Detection

Malfunction Decision Conditions

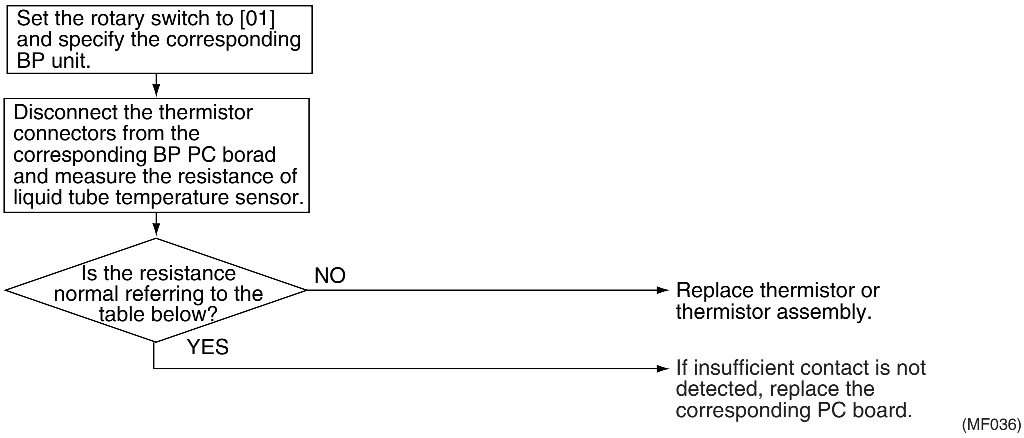
When the BP liquid pipe temperature sensor became short-circuited or open.

Supposed Causes

- Faulty BP liquid pipe temperature sensor
- Faulty connectors connection of BP liquid pipe temperature sensor

Troubleshooting

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



	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.18 Faulty BP Gas Pipe Thermistor

Outdoor Unit Indication

J9

Method of Malfunction Detection

Malfunction Decision Conditions

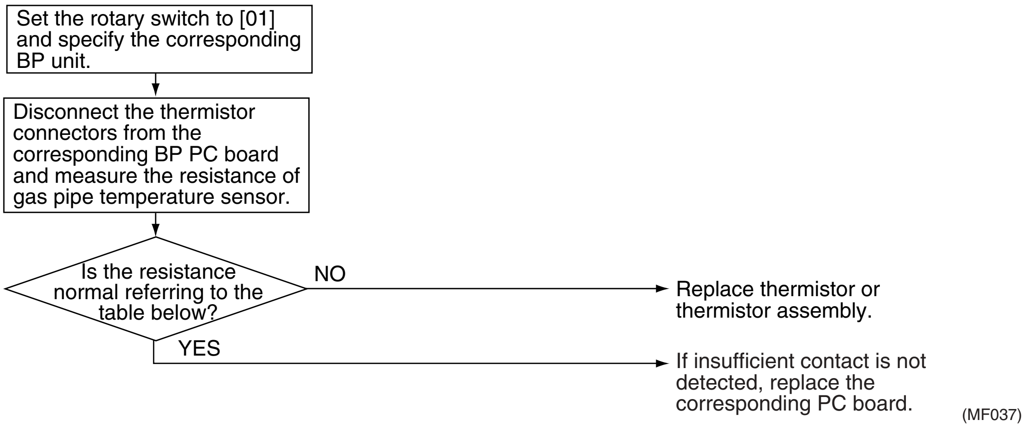
When the BP gas pipe temperature sensor became short-circuited or open.

Supposed Causes

- Faulty BP gas pipe temperature sensor
- Faulty connectors connection of BP gas pipe temperature sensor

Troubleshooting

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



	A	B
1	-10˚C	117kΩ
2	0˚C	67kΩ
3	10˚C	40kΩ
4	20˚C	25kΩ
5	30˚C	16kΩ
6	40˚C	10kΩ
7	50˚C	7kΩ
8	60˚C	5kΩ
9	70˚C	3kΩ

3.3.19 Abnormal LP Error

Outdoor Unit Indication

JC

Method of Malfunction Detection

1. Error is determined by the LP sensor value when the compressor is off.
2. Error is determined by the LP sensor value in normal operation when the compressor is on.
3. Error is determined by the LP sensor value when a certain time range passed after standby operation at time of starting.

Malfunction Decision Conditions

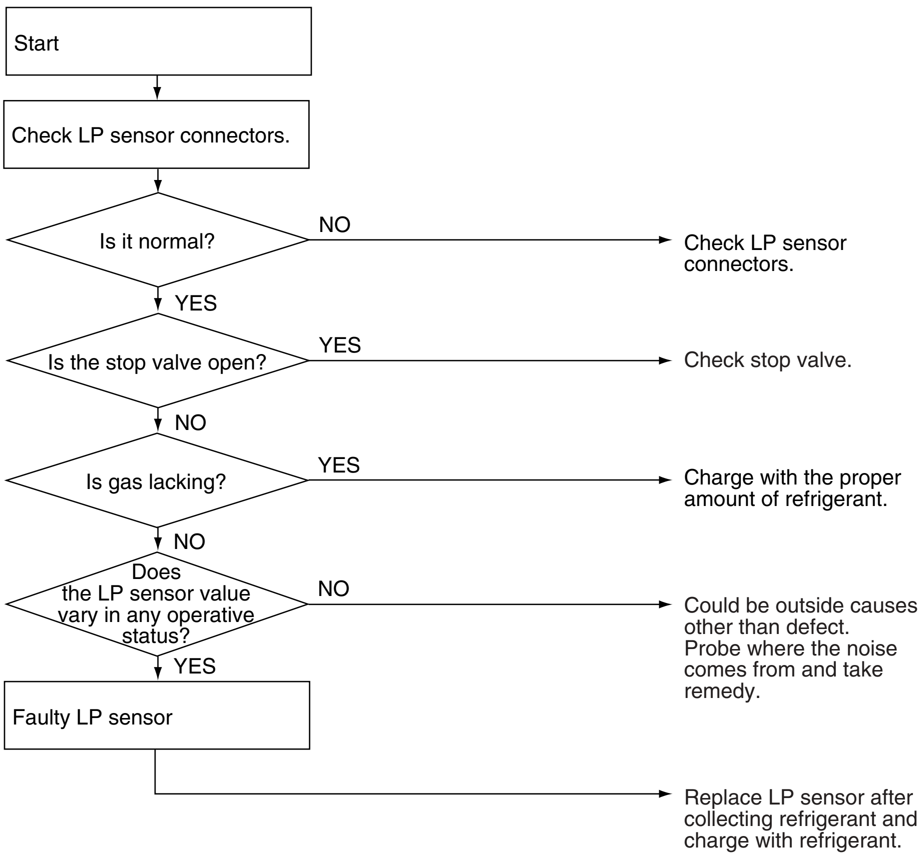
When either of 1-3 conditions mentioned above was satisfied.

Supposed Causes

- Defective LP sensor
- Faulty connectors connection of LP sensor
- Possibility of gas shortage
- When cooling: Refrigerant amount 0-20%
- When heating: Refrigerant amount 0-5%

Troubleshooting

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



(MF038)

3.3.20 Rise in BOX Temperature

Outdoor Unit Indication

L3

Method of Malfunction Detection

Detection of abnormal rise in BOX temperature is carried out by the temperature detected by thermistor.

Malfunction Decision Conditions

When the detected BOX temperature came to 85˚C or higher

- When an abnormal rise in BOX temperature is generated 4 times, the system shuts down. (The 4-time counter resets itself when no outdoor unit abnormality occurs within cumulative 60-minute after the abnormal temperature rise generation.)

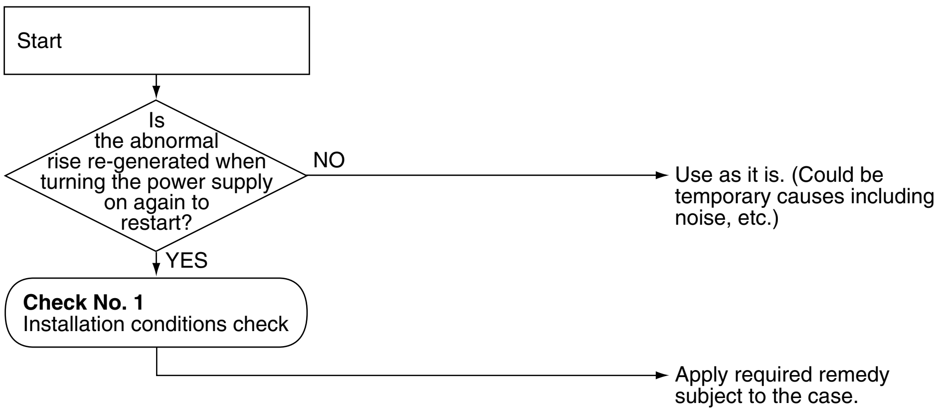
Supposed Causes

- Incorrect installation
- Abnormally high ambient temperature of electrical parts
- Outside causes other than noise, etc.

Troubleshooting

Check No.1
Refer to P.249

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



(MF039)

3.3.21 Abnormal Rise in Fin Temperature

Outdoor Unit Indication

L4

Method of Malfunction Detection

Detection of abnormal rise in fin temperature is carried out by the detected value of fin temperature.

Malfunction Decision Conditions

When fin temperature came to 92˚C or higher

(The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the abnormal rise generation.)

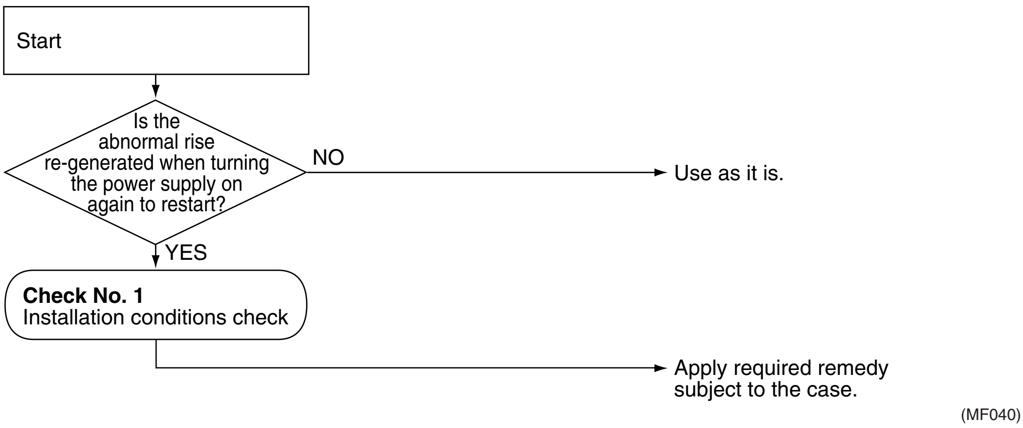
Supposed Causes

- Incorrect installation including short-circuit, etc.

Troubleshooting

Check No.1
Refer to P.249

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



3.3.22 Operation Halt Due to Detection of Output Overcurrent

Outdoor Unit Indication	L5
Method of Malfunction Detection	The output overcurrent is detected using amperage that flows through the DC unit of inverter.
Malfunction Decision Conditions	■ When the output overcurrent was input into microcomputer from the output overcurrent detection circuitry.
Supposed Causes	■ Overcurrent due to faulty power transistor ■ Overcurrent due to faulty connection of internal wiring ■ Overcurrent due to power supply voltage error ■ Overcurrent due to faulty PC board ■ Incorrect detection due to faulty PC board ■ Overcurrent due to [CLOSED] stop valve ■ Overcurrent due to faulty compressor ■ Overcurrent due to incorrect site installation ■ Faulty indoor unit solenoid valve

Troubleshooting

Check No.1
Refer to P.249

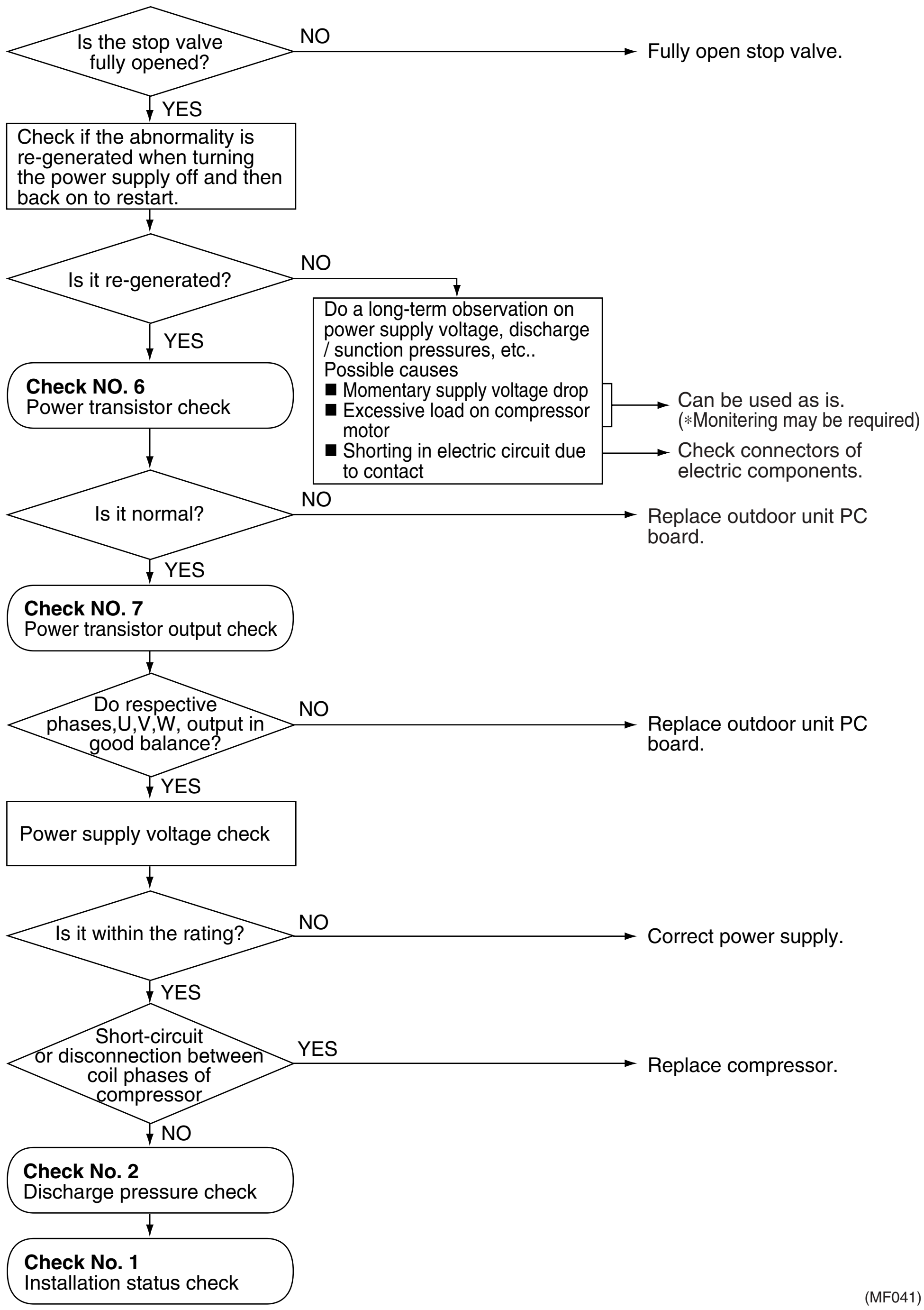
Check No.2
Refer to P.249

Check No.6
Refer to P.252

Check No.7
Refer to P.253

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

*Output overcurrent will be generated due to incorrect connection of internal wiring. When the operation is halted due to output overcurrent after connecting/disconnecting the wiring for replacement of parts, etc., check the wiring again.



(MF041)

3.3.23 Integrated Input Current Stop

Outdoor Unit Indication

L7

Method of Malfunction Detection

Abnormality of integrated input current is detected using integrated input current detected by the CT.

Malfunction Decision Conditions

When the integrated input current of 31A. continued for 2.5 seconds

- When an integrated input error is generated 4 times, the system shuts down.
  (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

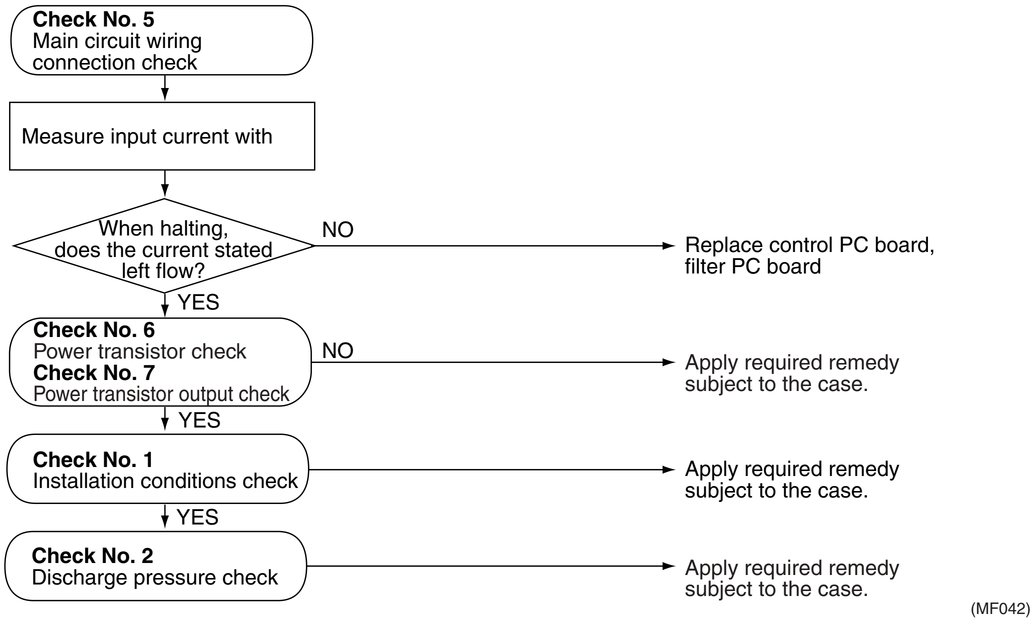
Supposed Causes

- Faulty compressor
- Overcurrent due to faulty PC board
- Incorrect detection due to faulty PC board
- Short-circuit

Troubleshooting

Check No.5
Refer to P.251
Check No.6
Refer to P.252
Check No.7
Refer to P.253
Check No.1
Refer to P.249
Check No.2
Refer to P.249

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



3.3.24 Electronic Thermal

Outdoor Unit Indication

L8

Method of Malfunction Detection

Electronic thermal is detected using output amperage and operating status.

Malfunction Decision Conditions

When the compressor output current of 40A or higher continued for 260 seconds
When the compressor output current of 50A or higher continued for 5 seconds

- When an electronic thermal error is generated 4 times, the system shuts down.
  (The 4-time counter resets itself when no outdoor unit abnormality occurs for 60-minute cumulative time after the error generation.)

Supposed Causes

- Incorrect connectors connection
- Faulty thermistor
- Faulty power transistor
- Disconnection·Faulty connection of internal wiring
- Faulty reactor
- Faulty compressor
- Faulty PC board

Troubleshooting

Check No.5
Refer to P.251

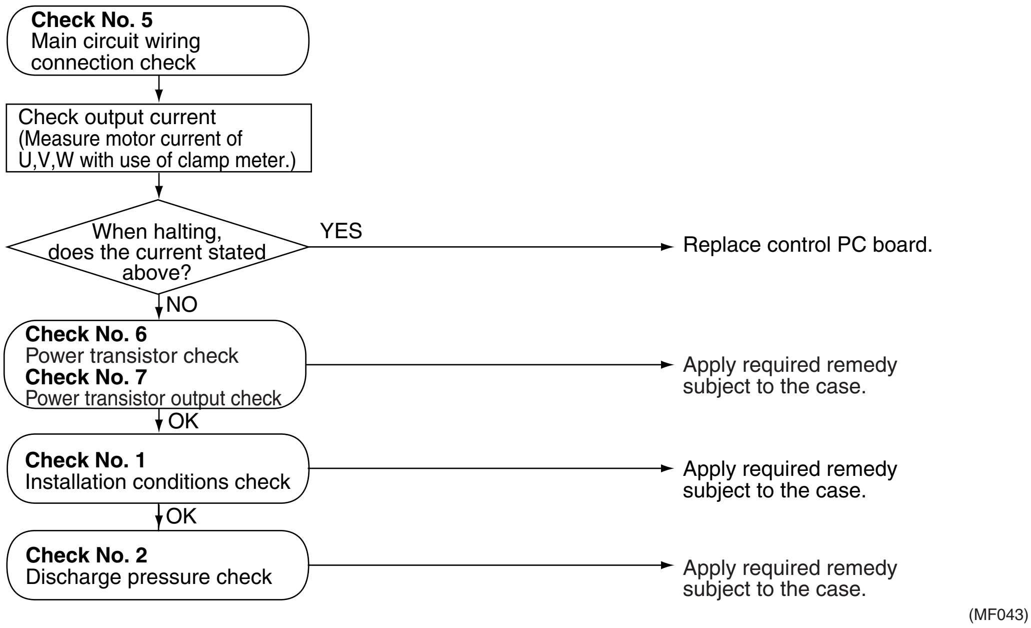
Check No.6
Refer to P.252

Check No.7
Refer to P.253

Check No.1
Refer to P.249

Check No.2
Refer to P.249

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



3.3.25 Stall Prevention

Outdoor Unit Indication

L9

Method of Malfunction Detection

Stall prevention system error is detected using the compressor's output current.

Malfunction Decision Conditions

◆ When the compressor's output current of 33A or higher continued for 0.3 seconds and peak current reached to 65A or higher
◆ When the compressor's output current of 33A or higher continued for 5 seconds
◆ When failing to changeover the position detecting function

■ When a stall prevention error is generated 4 times, the system shuts down.
(The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

Supposed Causes

■ Faulty compressor
■ Overcurrent due to faulty PC board
■ Incorrect detection due to faulty PC board
■ Overload due to incorrect installation
■ Overload at time of starting including high differential pressure start, etc.

Troubleshooting

Check No.5
Refer to P.251

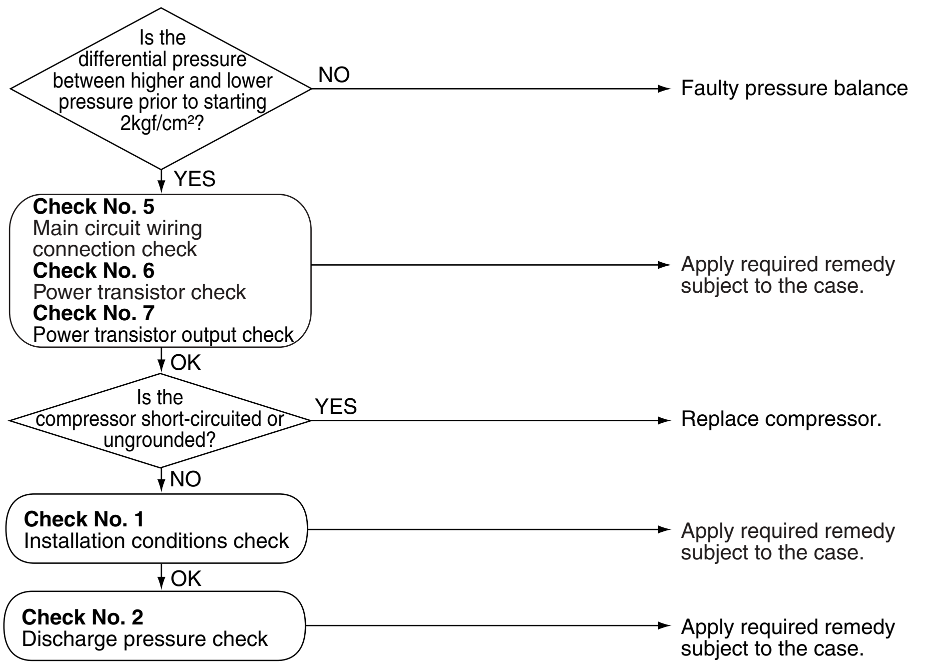
Check No.6
Refer to P.252

Check No.7
Refer to P.253

Check No.1
Refer to P.249

Check No.2
Refer to P.249

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



(MF044)

3.3.26 Transmission Error between Microcomputers

Outdoor Unit Indication

LC

Method of Malfunction Detection

Malfunction Decision Conditions

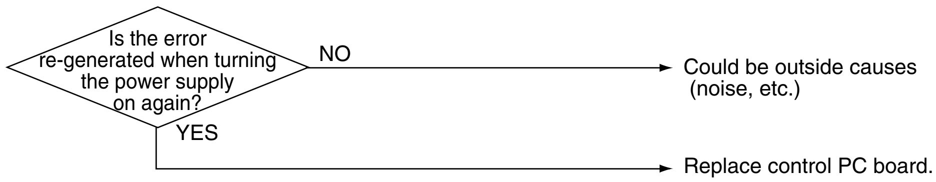
When the transmission error with INV fan microcomputer continues for 60 seconds

Supposed Causes

- Faulty fan PC board
- Outside causes (noise, etc.)

Troubleshooting

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



Note: If the error should be caused by wiring connection, etc., fan transmission error (U7) is generated, immediately replace the control PC board.

(MF045)

3.3.27 Overvoltage, Low Voltage

Outdoor Unit Indication

U2

Method of Malfunction Detection

Power supply system error is detected using the voltage of inverter DC unit.

Malfunction Decision Conditions

When, after starting the compressor, the voltage reached to below 210V over 450V before it exceeded 320V, or to below 260V or over 450V after it exceeded 320V once.

- When a power supply system error is generated 4 times, the system shuts down. (The 4-time counter resets itself when no outdoor unit abnormality occurs within 60-minute cumulative time after the error generation.)

Supposed Causes

- Electrolytic capacitor malfunction
- PAM module malfunction
- Faulty power transistor
- Disconnection·Faulty connection of internal wiring
- Faulty reactor
- Faulty PC board

- Instantaneous power failure
- Mismatching with power supply of feedback control system

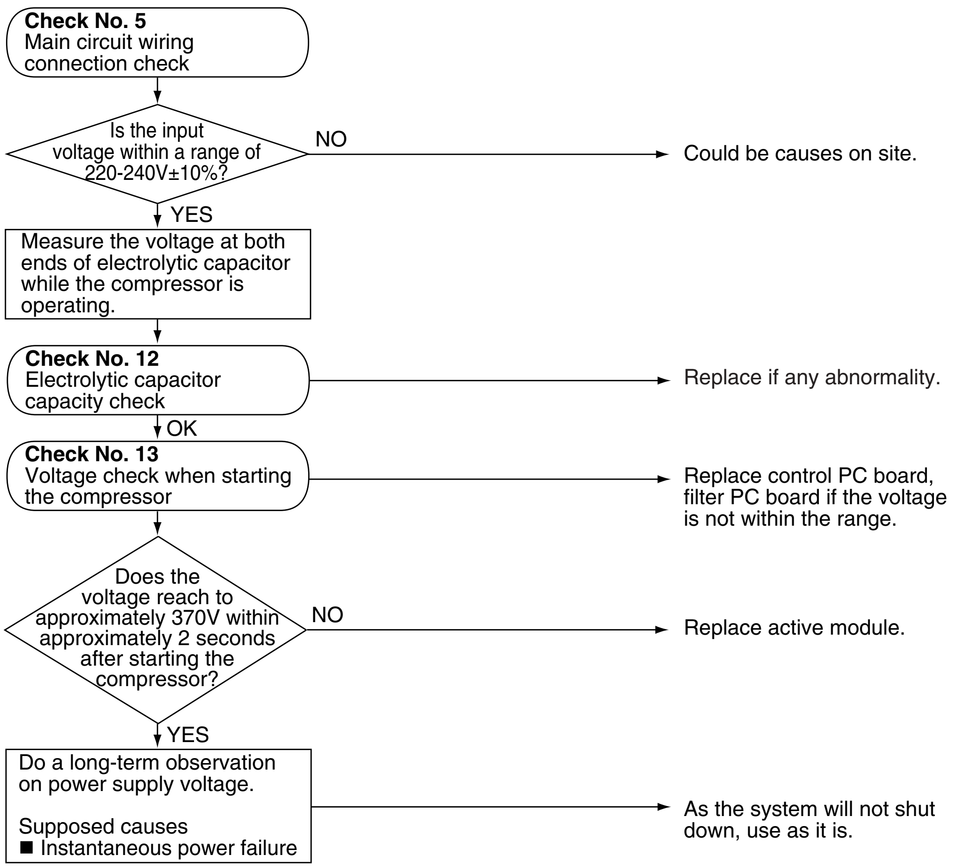
Troubleshooting

Check No.5
Refer to P.251

Check No.12
Refer to P.256

Check No.13
Refer to P.257

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



(MF046)

3.3.28 Transmission Error between Outdoor Unit and BP Unit

Outdoor Unit Indication

U4

Method of Malfunction Detection

Transmission error is detected when the data from BP unit could not be correctly received.

Malfunction Decision Conditions

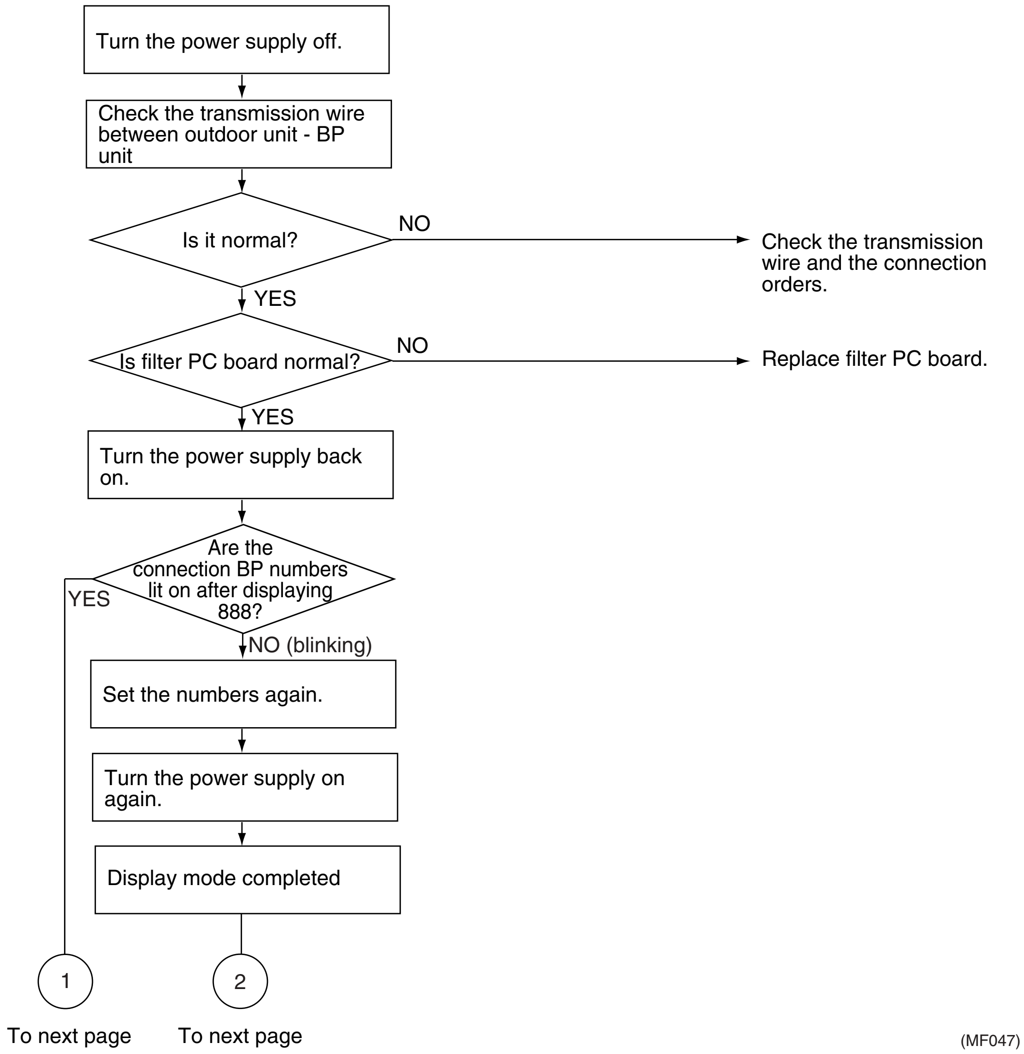
When the data from BP unit could not be correctly received continuously for 15 seconds

Supposed Causes

- Incorrect connection of transmission wire
- Connection from Side-A of BP is not carried out.
- BP determined numbers are different from actual BP numbers.
- Distortion of power supply wave

Troubleshooting

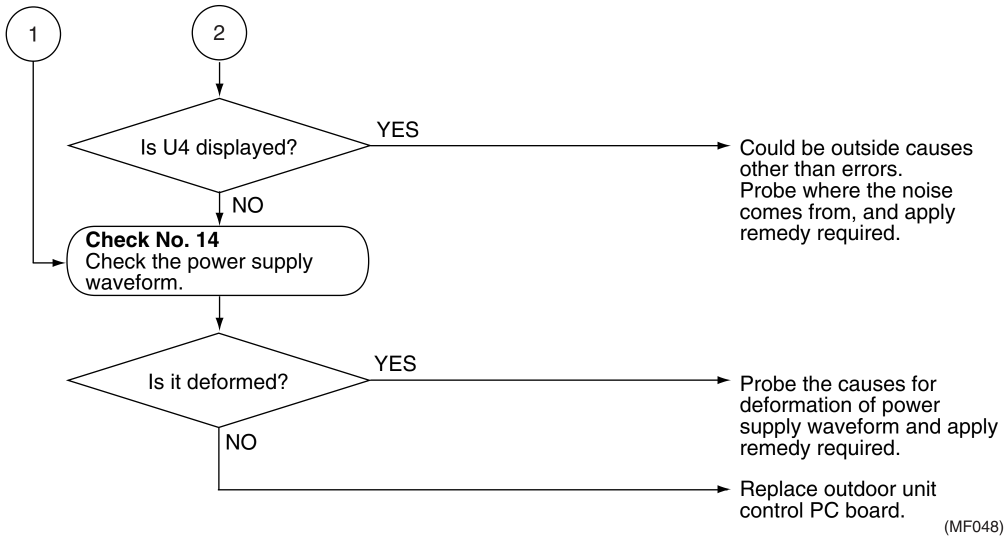
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(MF047)

Troubleshooting

Check No.14
Refer to P.257



3.3.29 Transmission Error between Indoor Unit and BP Unit

Outdoor Unit Indication

U6

Method of Malfunction Detection

Transmission error is detected when BP unit could not correctly receive the data from BP unit to transmit the data incorrectly to outdoor unit.

Malfunction Decision Conditions

When BP unit could not correctly receive the data from indoor unit continuously for 15 seconds and transmitted the data incorrectly to outdoor unit.

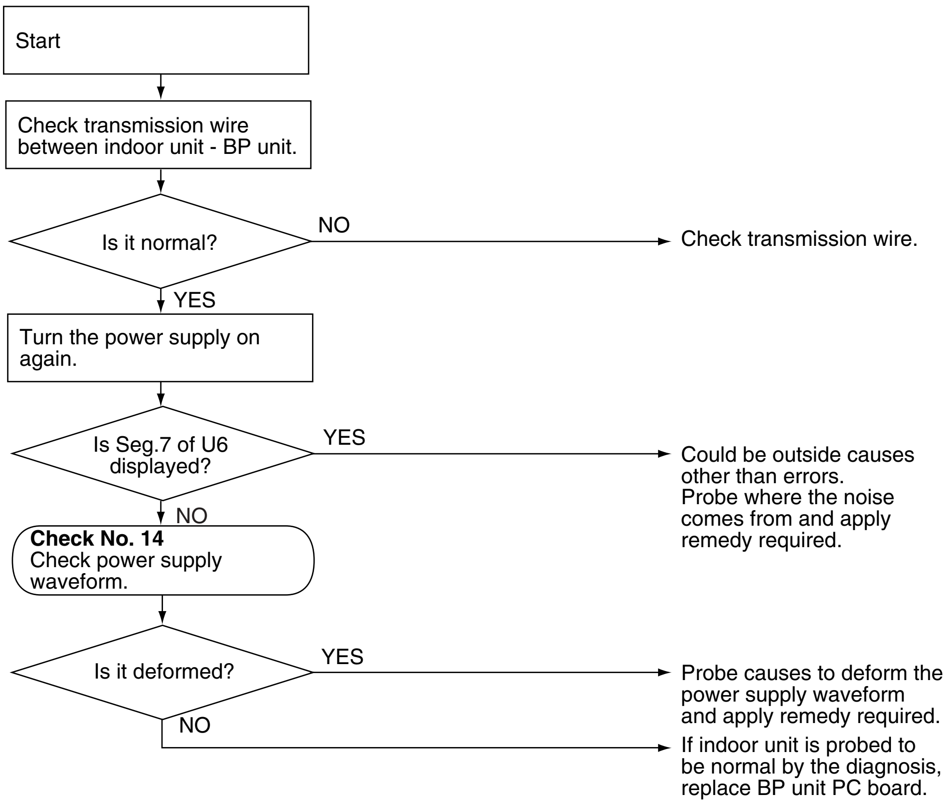
Supposed Causes

- Incorrect connection of transmission wire
- Distortion of power supply waveform

Troubleshooting

Check No.14
Refer to P.257

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



(MF049)

3.3.30 Transmission Error of DC Fan

Outdoor Unit Indication

U7

Method of Malfunction Detection

Malfunction Decision Conditions

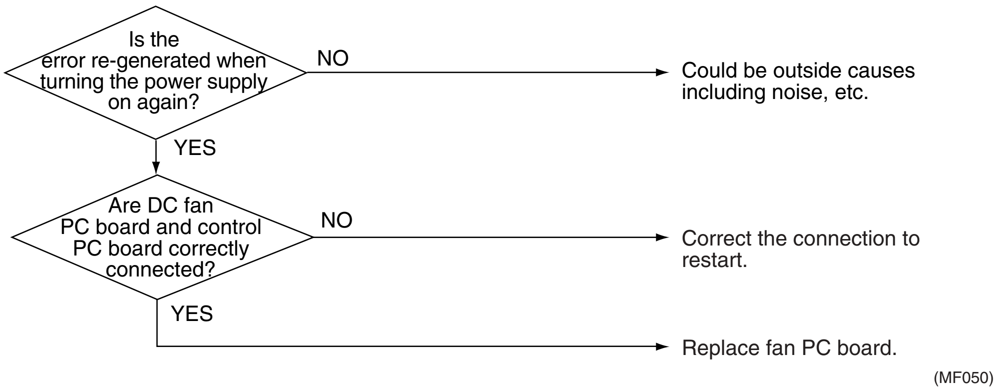
When transmission error with DC fan microcomputer continued for 60 seconds

Supposed Causes

- Incorrect connectors connection
- DC fan microcomputer malfunction
- Outside causes (noise, etc.)
- Malfunction of control PC board receiving circuit

Troubleshooting

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



3.3.31 Operation Halt Due to Detection of Gas Shortage

Outdoor Unit Indication

U0

Method of Malfunction Detection

Detection Method 1
Lack of gas is detected using the input current detected by the CT and the compressor's operating frequency.

Detection Method 2
Lack of gas is detected using the discharge pipe temperature and the motorized valve opening.

Malfunction Decision Conditions

Detection Method 1
Input current < 0.09 ° Compressor's operating frequency -3.5
However, when the above state continued for 7 minutes with the operating frequency > 55(Hz)

Detection Method 2
discharge pipe temperature >Target discharge pipe temperature +20˚C, that should be continued for 80 seconds or longer with motorized valve full opening.

Note: The target discharge pipe temperature is calculated with the microcomputer.

Supposed Causes

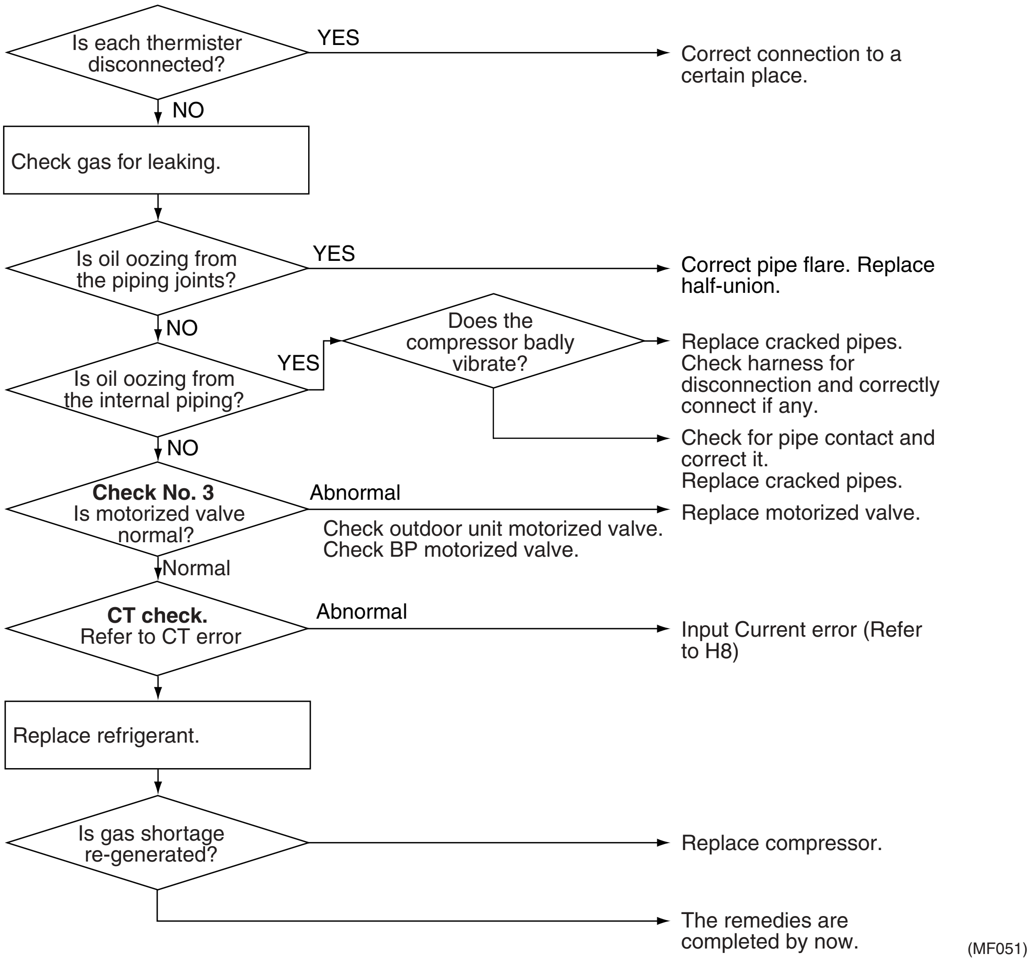
- Gas shortage due to refrigerant leak
- Faulty gas shortage sensor
- Input current drop due to faulty compression of the compressor
  - ∗ Disconnection of thermistor (all thermistors)
  - ∗ Faulty CT
- Faulty, Disconnected motorized valve
- Incorrect wiring, piping

Troubleshooting

Check No.3
Refer to P.250

CT Check
Refer to P.222

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



3.3.32 System Malfunction

Outdoor Unit Indication

UH

Method of Malfunction Detection

Case where other BP or indoor unit connected with other BP malfunctioned

This malfunction means that displayed only on indoor unit connected with normal BP.

- Outdoor unit displays malfunction code of faulty BP.

Malfunction Decision Conditions

When the system shut down due to malfunction of BP of other systems.

Supposed Causes

- Outdoor unit is not malfunctioning.
- Transmission error by other system's BP and outdoor unit
- Malfunction of other system's thermistor
- Other system's BP malfunction including faulty motorized valve of other system's BP, etc.

Troubleshooting

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

(MF052)

3.3.33 Faulty BOX Thermistor Malfunction

Outdoor Unit Indication

P3

Method of Malfunction Detection

Malfunction of BOX temperature thermistor is detected using the temperature detected by the thermistor.

Malfunction Decision Conditions

When the detected temperature came to 92˚C or higher, or to -30˚C or lower

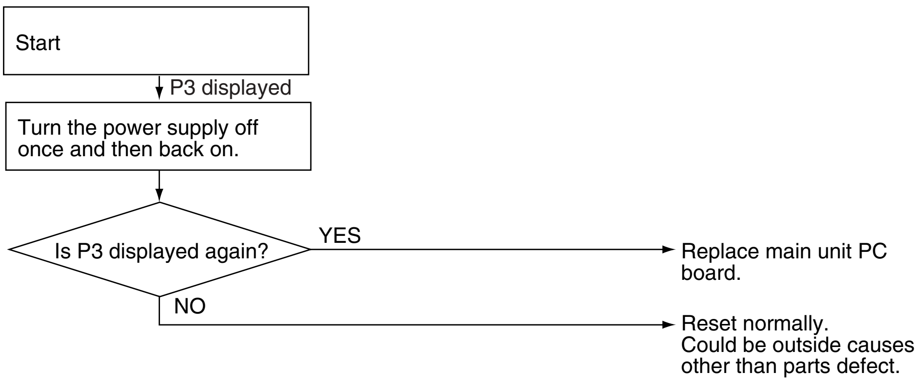
- When BOX thermistor malfunction is detected once, the system shuts down.
  (The 1-time counter automatically resets itself when cause of malfunction is resolved.)

Supposed Causes

- Faulty main unit PC board

Troubleshooting

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



(MF053)

3.3.34 Faulty Fin Thermistor

Outdoor Unit Indication

P4

Method of Malfunction Detection

Faulty fin thermistor is detected using the temperature detected by the fin.

Malfunction Decision Conditions

When the detected temperature came to 120˚C or higher, or to -30˚C or lower

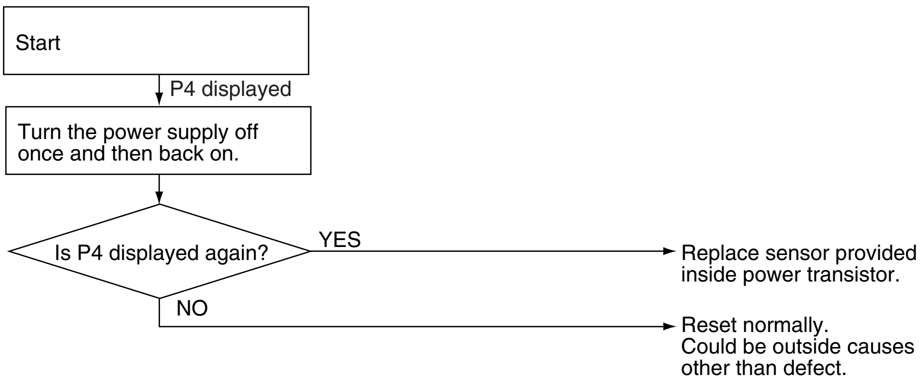
■ When faulty fin thermistor is detected once, the system shuts down.
(The 1-time counter automatically resets itself when cause of malfunction is resolved.)

Supposed Causes

■ Faulty sensor provided inside power transistor.

Troubleshooting

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

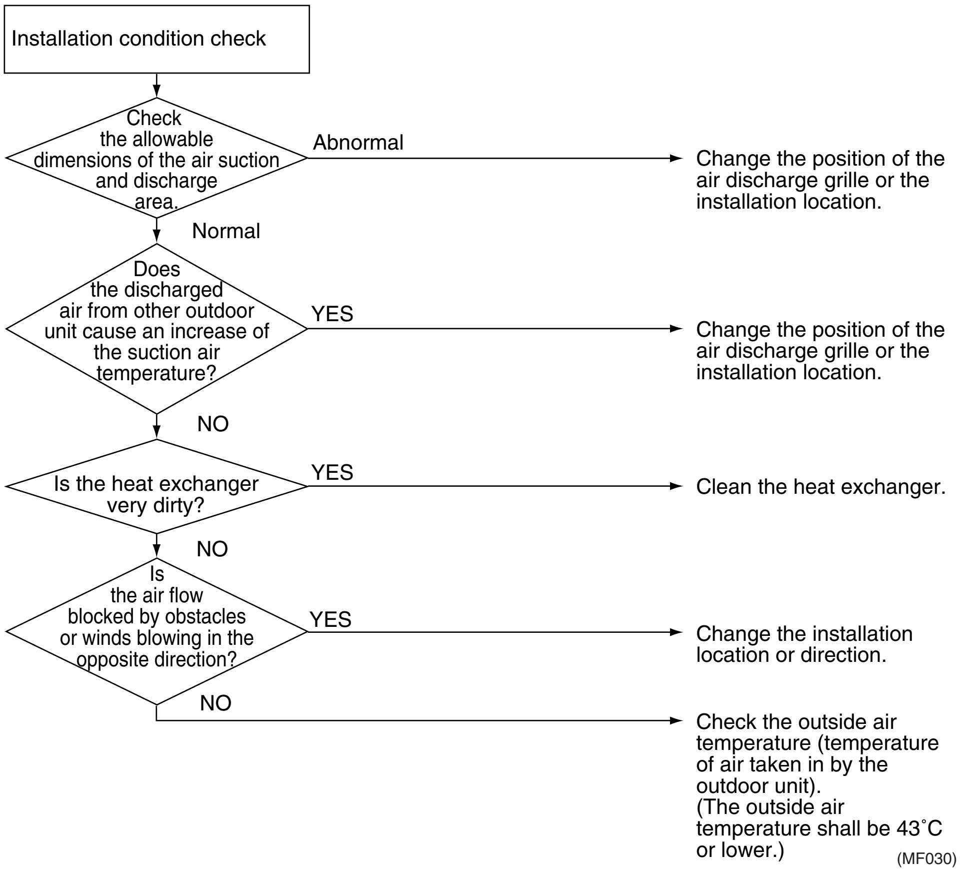


(MF054)

3.4 How to Check

3.4.1 Installation Condition Check

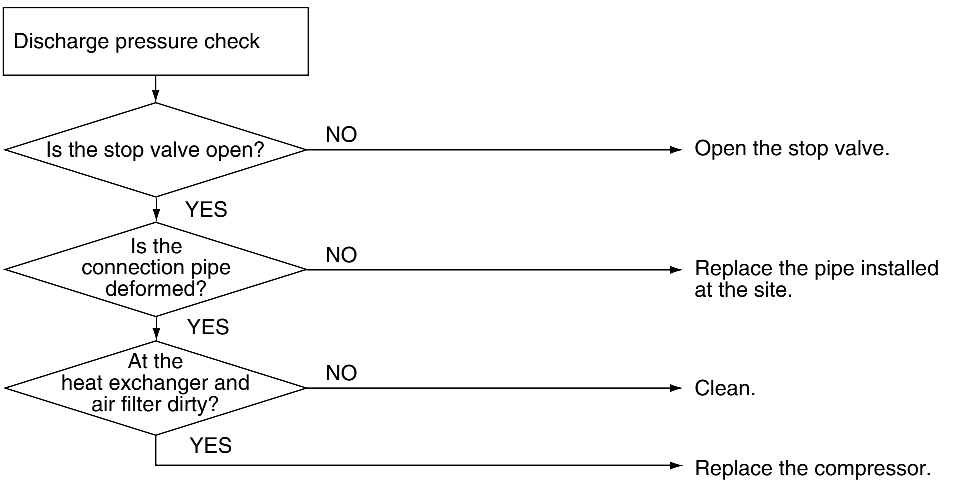
Check No.1



(MF030)

3.4.2 Discharge Pressure Check

Check No.2



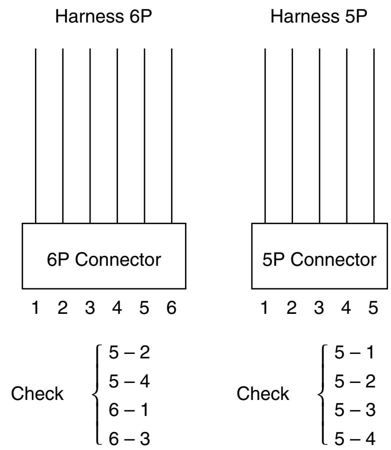
(MF031)

3.4.3 Electronic Expansion Valve Check

Check No.3

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.

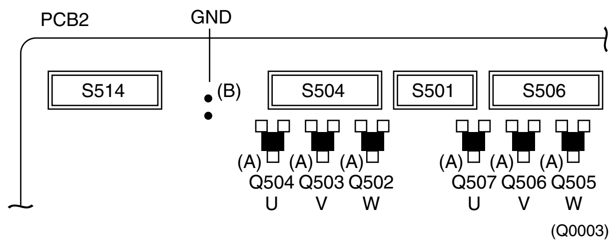


4. If no EV generates latching sound in the above step 2, the outdoor unit PCB is faulty.
5. If the conductivity is confirmed in the above step 2, mount a good coil (which generated latching sound) in the EV unit that did not generate latching sound, and check to see if that EV generates latching sound.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

3.4.4 Fan Motor Position Signal Check

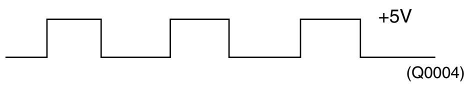
Check No.4



Locations for measurement (Upper/Lower fans + U-,V-,W-Phase)
Multiple-meter, + side (A)
- side (B)

Measurement method

1. Turn the power supply on.
2. Check the voltage of U-,V-,W-Phase of the above upper and lower fans with fan rotating.
3. The waveform measured will be as shown below.

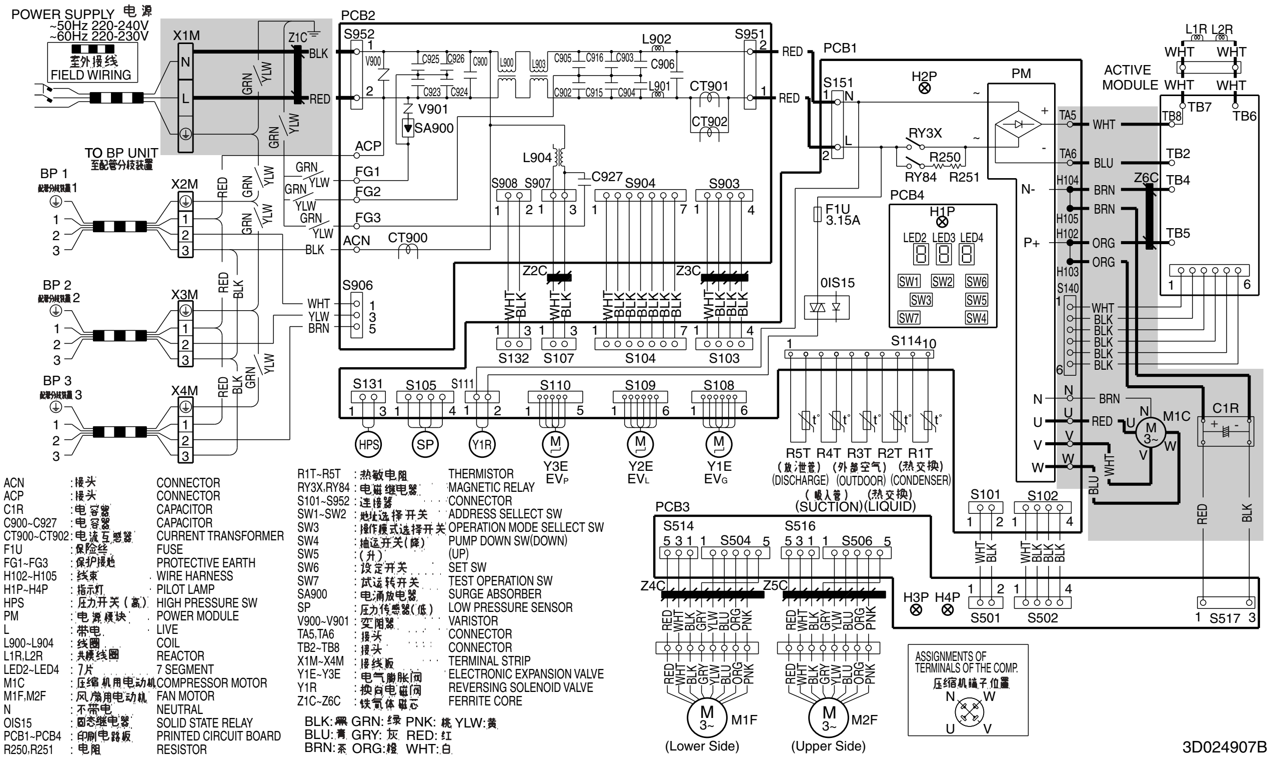


4. It is OK if , as shown above 3, approximately 5V voltage is turned on and off.

3.4.5 Internal Wiring Check (1)

Check No.5

Check the wiring at the sections marked by the boxes ▭ in the diagram.
Check for breaking of wire and wiring errors.
In the case of RMX140JVMC



3.4.6 Power Transistor Check (Capacitor Voltage Check)

Check No.6

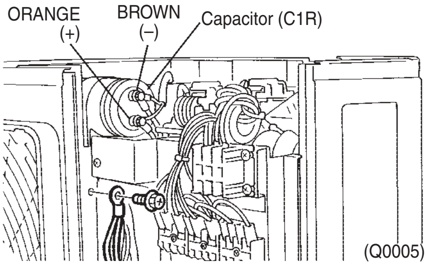
Power Transistor Check

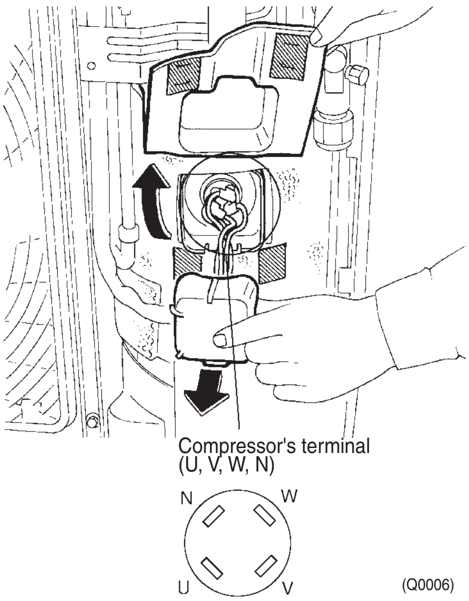
- Do not touch the charging unit for 10 minutes after turning the breaker off.
- Even when touching the charging unit after 10 minutes, use a multiple meter to ensure that the power supply voltage of power transistor is 50V or less.
- Measure U,V,W either on terminals of control PC board on the substrate side or on the compressor terminals.
- Measure (+),(–) of the power transistor on (+) / (–) section of capacitor as shown in the figure below.

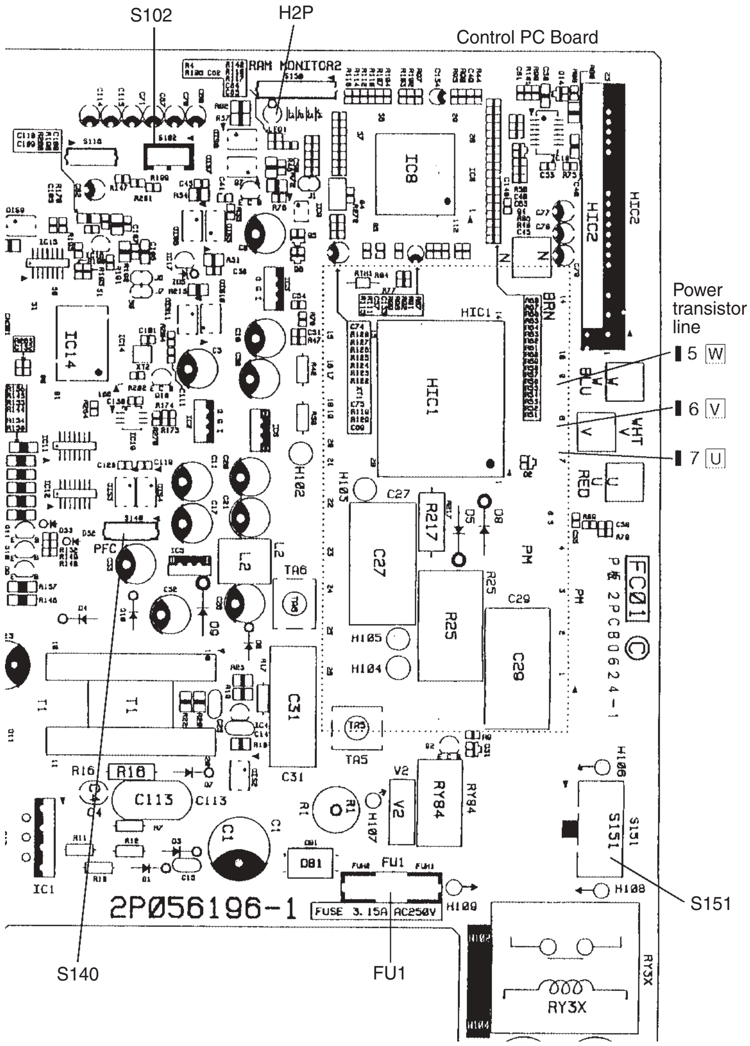
∗ If the resistance value is not normal, replace the control PC board.

Capacitor Voltage Check

- Follow the below figure to measure the capacitor voltage with breaker kept ON, while take enough care not to touch the charging unit .







Negative (–) terminal of tester (positive (+) terminal for digital type)	(+) of power transistor	UVW	(–) of power transistor	UVW
Positive (+ terminal of tester (negative (–) terminal for digital type)	UVW	(+) of power transistor	UVW	(–) of power transistor
Normal resistance	∞	Several KΩ to several MΩ	Several KΩ to several MΩ	∞
Resistance for NG	0	0 to several Ω	0 to several Ω	0

3.4.7 Power Transistor Output Check

Check No.7

Measure the output current and voltage of the power transistor.

Output Current Measurement

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

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

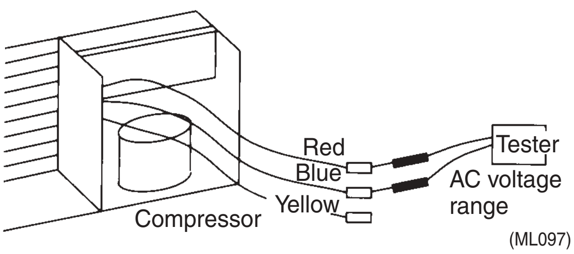
Output Voltage Measurement

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

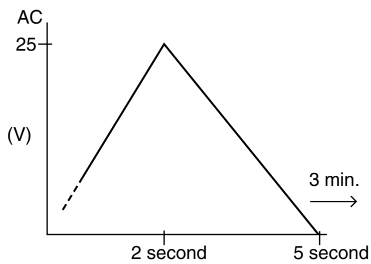
1. Conduct forced cooling operation with the equipment in the condition shown in Fig.1.
2. Measure the voltage between the operation start (when the outdoor unit fan starts rotating) to operation halt caused by an stall prevention (about 5 seconds).
3. Reset the power, and repeat steps (1) to (3) for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

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

[Fig.1]



[Fig.2]



Note:

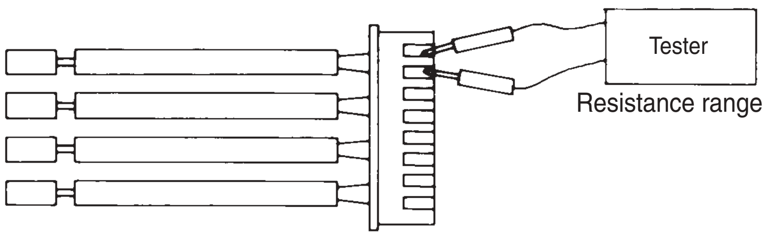
1. Do not touch the terminals of the red, yellow and blue wires when the power is supplied. (Touching them is very dangerous since a voltage of over 100V is applied.)
2. Do not short-circuit the terminals of the red, yellow, and blue wires.

3.4.8 Thermistor Resistance Check

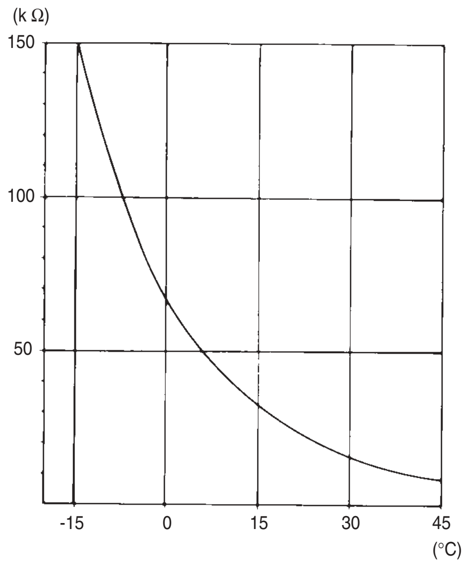
Check No.8

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

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



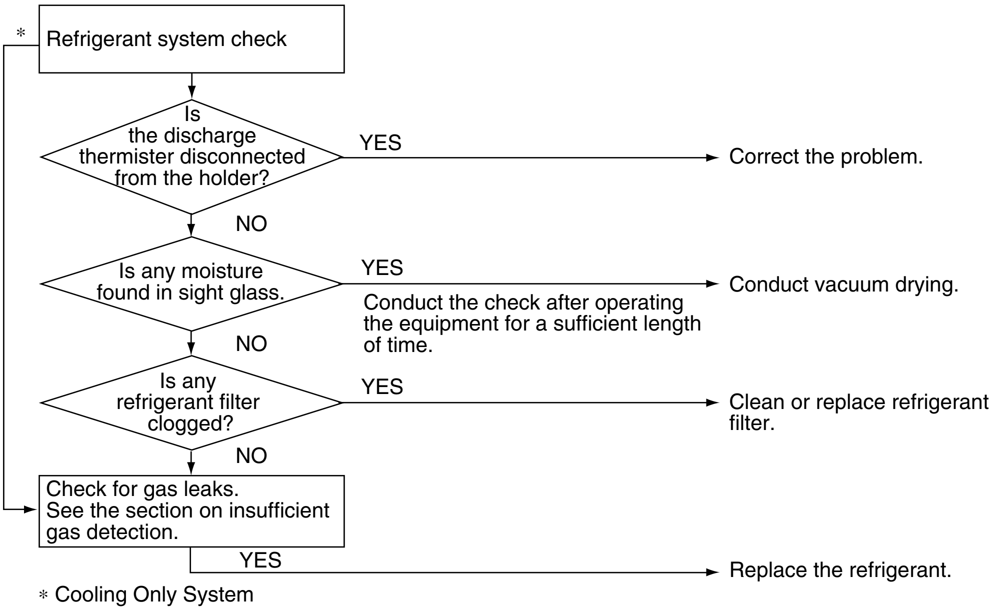
(R25=20kΩ, B=3950)



(ML099)

3.4.9 Inverter Units Refrigerant System Check

Check No.9

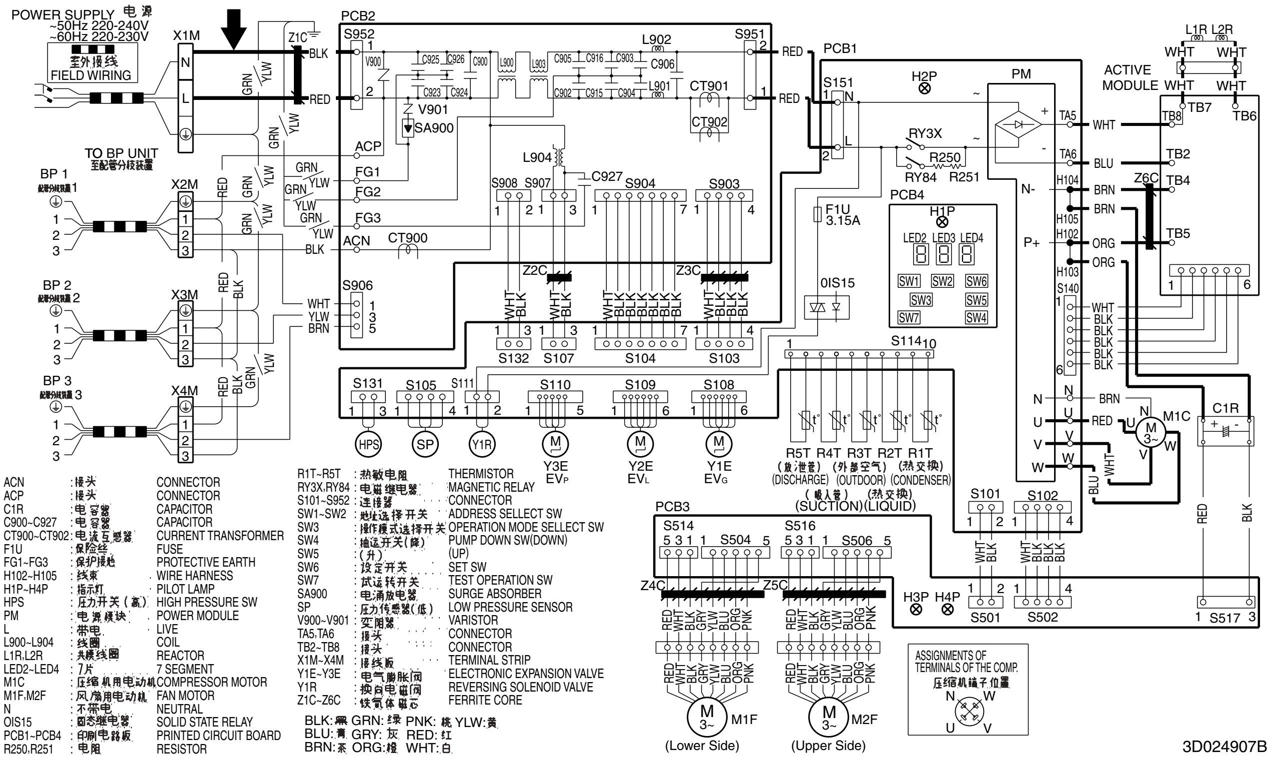


(MF032)

3.4.10 Inverter Units Input Current Measurement

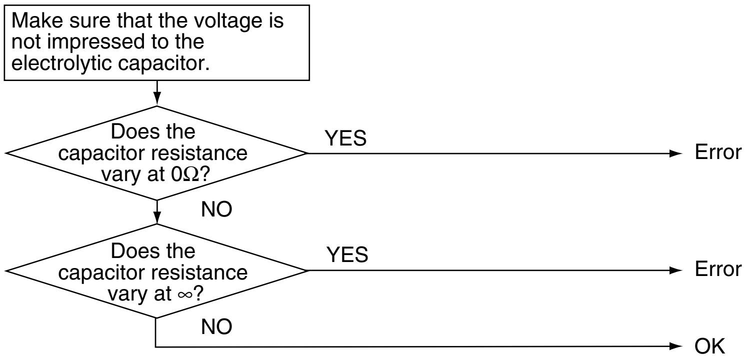
Check No.10 Mount a clamp meter to the red harness indicated by the arrow (➔), and conduct forced cooling operation.

In the case of RMX140JVMC



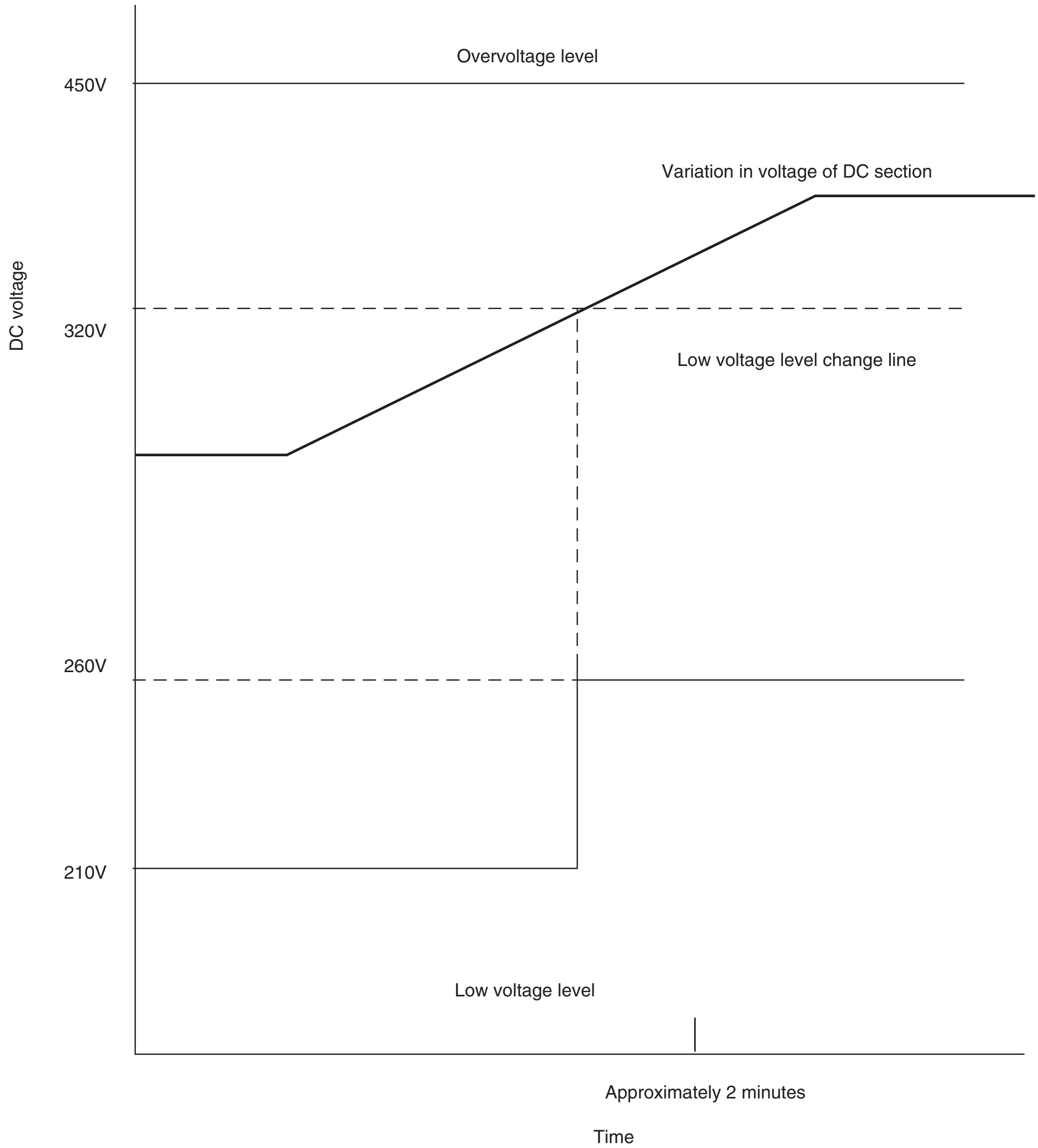
3.4.11 Electrolytic Capacitor Capacity Check

Check No.11



3.4.12 Voltage Check when Starting the Compressor

Check No.12



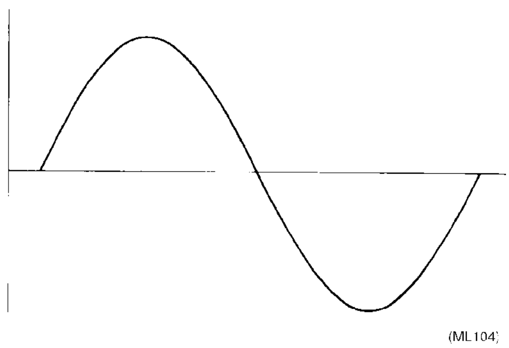
3.4.13 Power Supply Waveforms Check

Check No.13

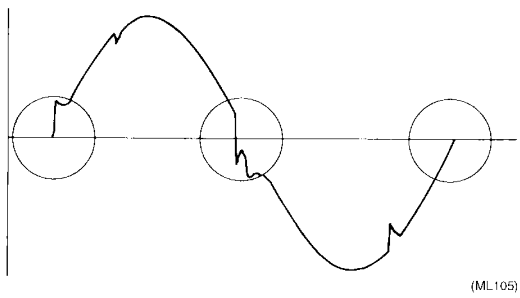
Measure the power supply waveform between pins 1 and 3 on the terminal board, and check the waveform disturbance.

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

[Fig.1]

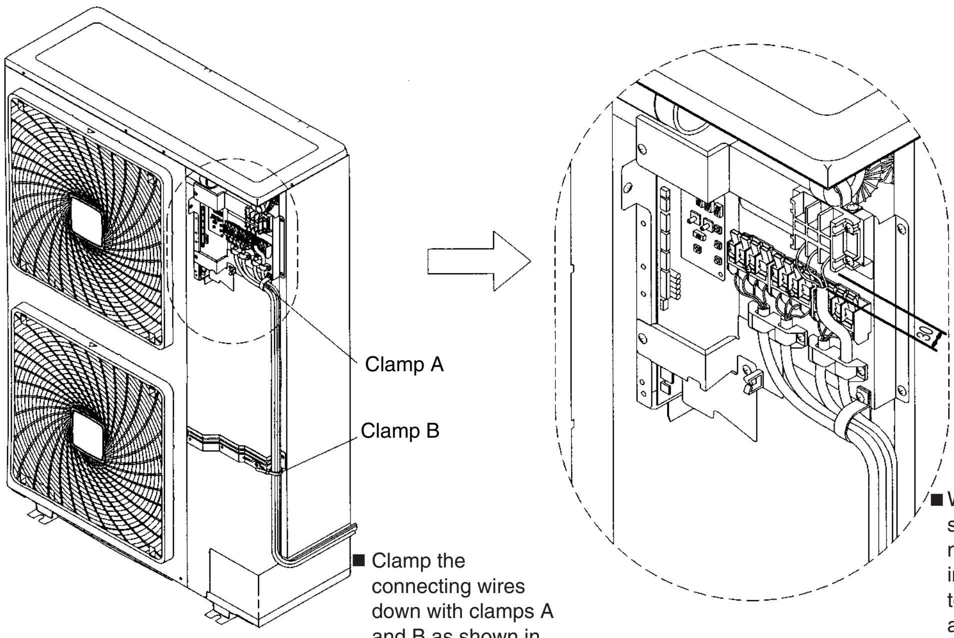


[Fig.2]



3.4.14 Total Operating Current Check

Check No.14



- Clamp the connecting wires down with clamps A and B as shown in the diagram.
- When connecting the power supply cord, do not peel back more than 30mm of the cable insulation from the power supply terminal board, in order to be able to pull the connecting terminal board around.

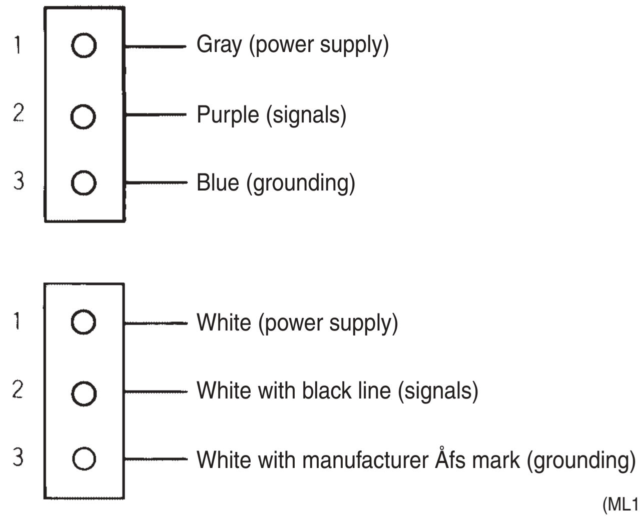
3.4.15 Inverter Units Hall IC Check

Check No.15

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

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.

The connector has 3 pins, and there are three patterns of lead wire colors.



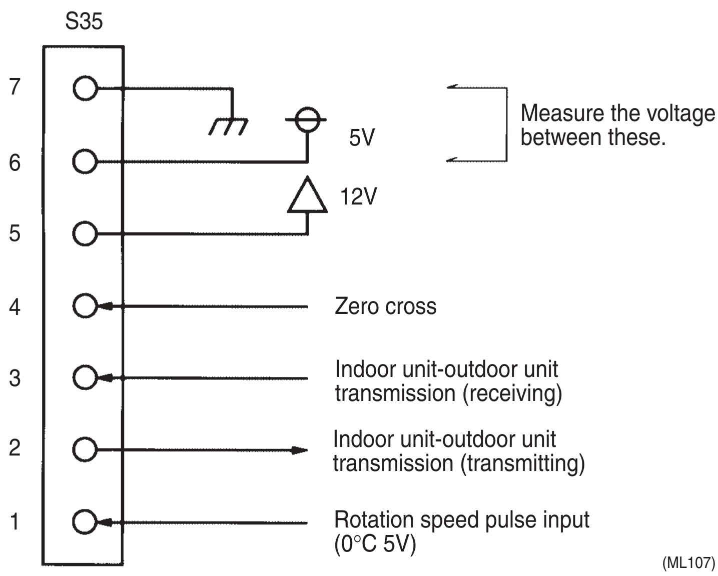
(ML106)

3.4.16 Inverter Units Indoor Unit PCB (2) Output Voltage Check

Check No.16

1. Check the connector connection (breaking of wire check).
2. With the power On and Off, check the following.

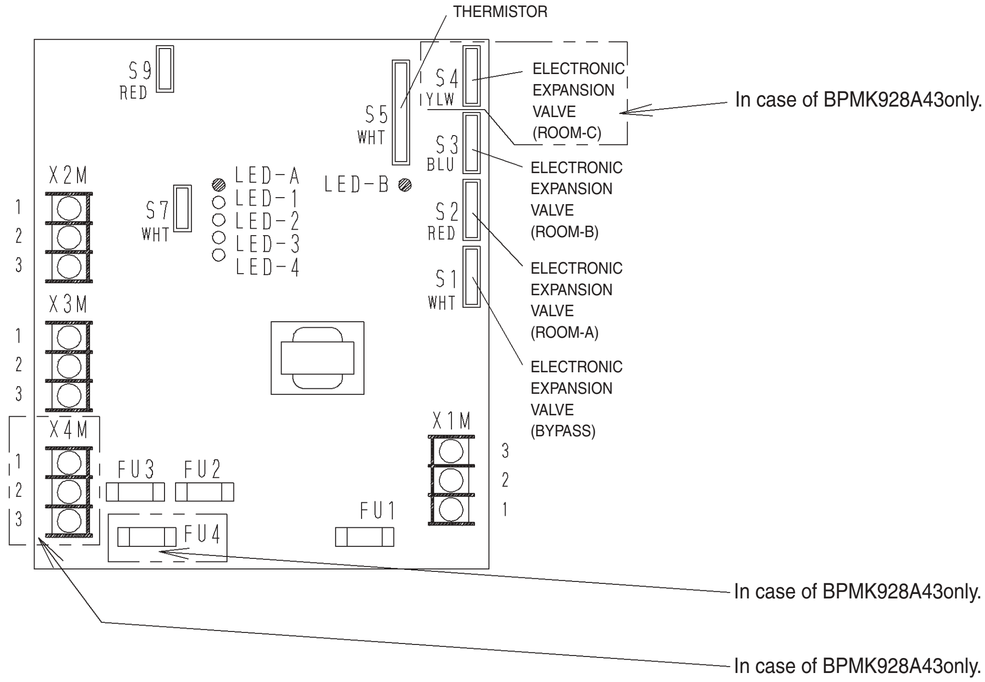
■ Output voltage of about 5 VDC between pins 6 and 7.



(ML107)

4. BP Unit Trouble Diagnosis

4.1 PCB Parts Layout



3P058760B

4.2 LED On Branch Provider Unit (Diagnosis LEDs)

LED–B GREEN INTERCOMMUNICATION TD OUTDOOR UNIT : NORMAL	DIAGNOSIS
◐	NORMAL
☼	ABNORMALITY → CHECK INTER-UNIT WIRING
●	ABNORMALITY → CHECK INTER-UNIT WIRING

GREEN	NORMALLY FLASHING
RED	NORMALLY OFF
☼	ON
◐	FLASH
●	OFF
–	IRRELEVANT

GREEN	RED				DIAGNOSIS
MICROCOMPUTER : NORMAL	MALFUNCTION DETECTION				
LED-A	LED-1	LED-2	LED-3	LED-4	
◐	●	●	●	●	NORMAL → CHECK INDOOR OR OUTDOOR UNIT
◐	☼	☼	●	●	THERMISTOR ABNORMALITY
◐	☼	●	☼	☼	HIGH PRESSURE PROTECTOR WORKED, OR FREEZE-UP IN OPERATING UNIT OR STAND-BY UNIT
◐	☼	●	●	●	ELECTRONIC EXPANSION VALVE ABNORMALITY
☼	—	—	—	—	[NOTE 1]
●	—	—	—	—	POWER SUPPLY FAULT OF [NOTE 2]

NOTES
1. TURN THE POWER OFF THEN ON AGAIN, IF THE LED DISPLAY RECURS, THE BRANCH PROVIDER UNIT PCB IS FAULTY.
2. TURN THE POWER OFF AND THEN ON AGAIN, IF THE LED DISPLAY RECURS, TURN THE POWER OFF AND DICONNECT LINE 2 OF INTER-UNIT WIRING FOR ALL UNITS, THEN TURN THE POWER ON AGAIN.

< IF LED-A IS OFF: >
THE BRANCH PROVIDER UNIT PCB IS FAULTY.

< IF LED-A IS FLASHING: >
THE INDOOR UNIT PCB IS FAULTY.
TURN THE RECONNECT LINE 2 OF ALL INTER UNITY WIRING AND CHECK THE DIAGNOSIS BY LEDS ON INDOOR UNIT PCB.

3P058760B

Part 10
Removal Procedure

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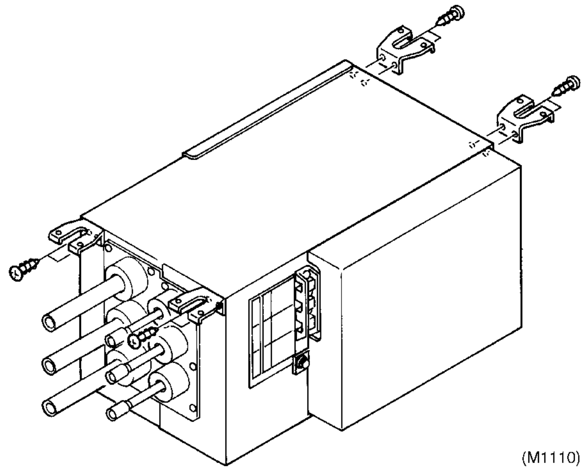
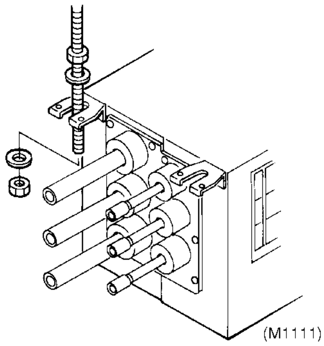
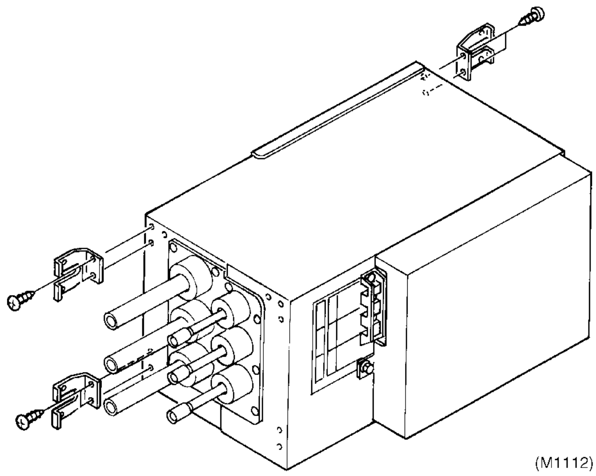
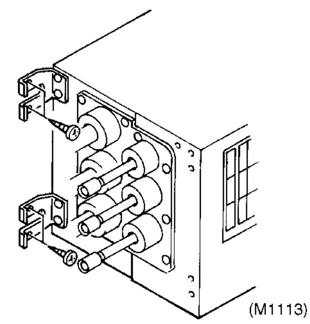
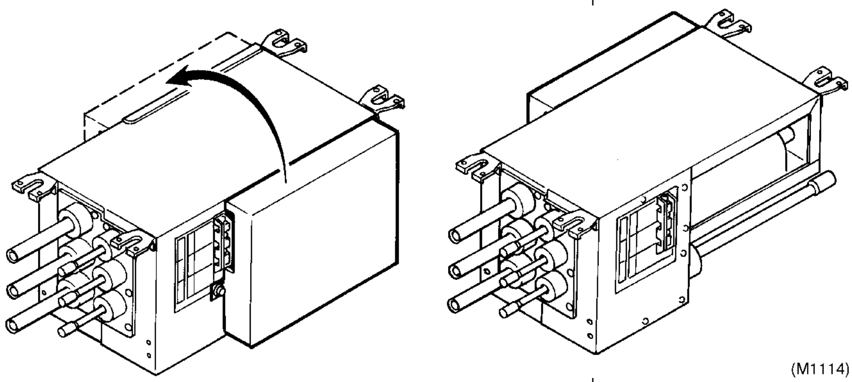
1. For BPMK928B42 · 43

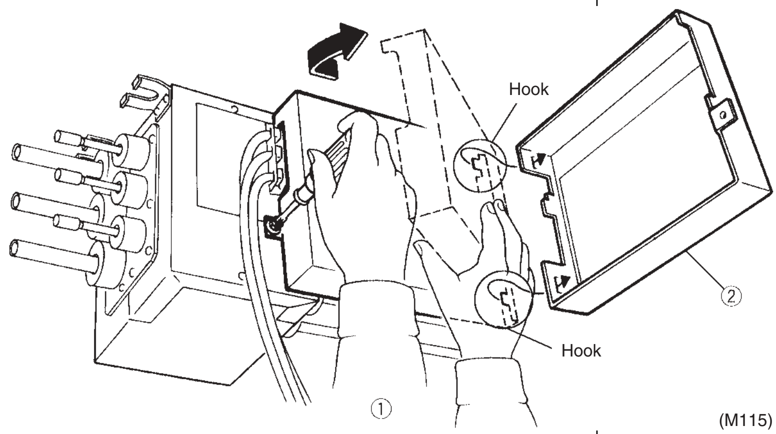
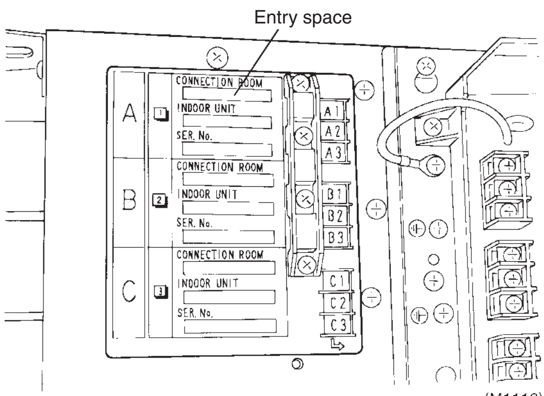
1.1 Installation of Indoor Unit

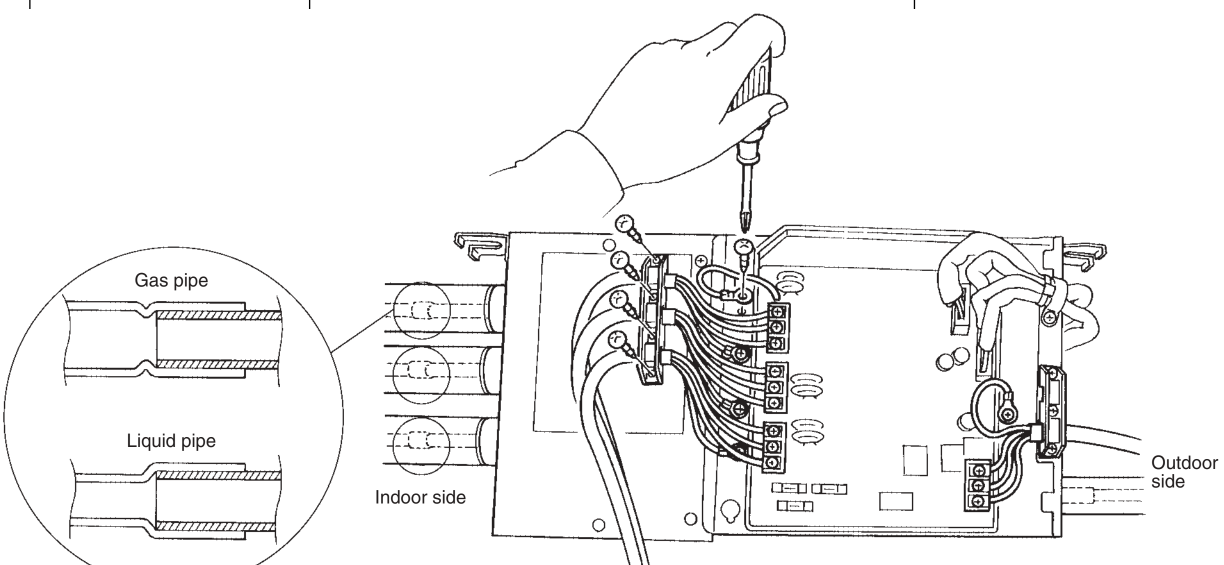
Procedure ⚠ **Warning** **Be sure to turn off all power supplies before disassembling work.**

Step		Procedure	Points
1. For ceiling mounting		 (M1110)	■ This unit is of drain-free type.  (M1111)
1	Screw down the accompanying four fixtures in position.		
2. For wall mounting		 (M1112)	 (M1113)
1	Screw down the accompanying three fixtures in position.		
3. Attaching the electrical box		 (M1114)	
1	The electrical box can be attached on either side of the unit depending on the piping route.		■ When attaching the electrical box, be sure to seal up the original screw holes (using aluminium tape or the like.)

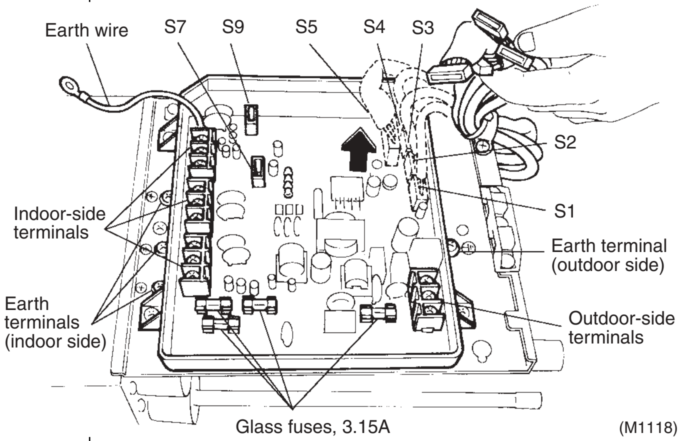
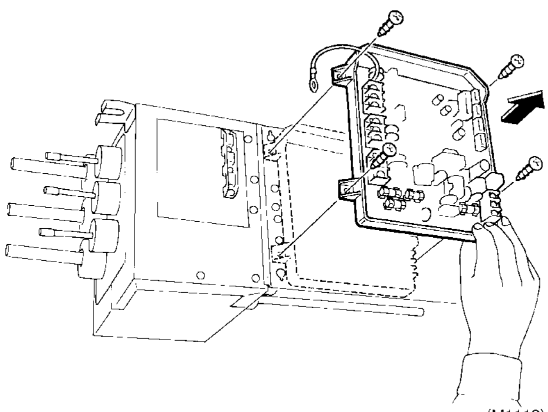
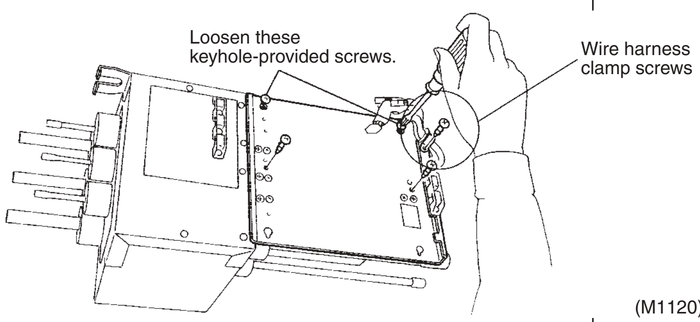
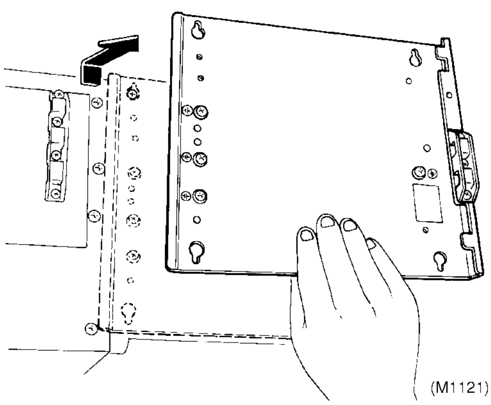
1.2 Opening of Electrical Box Cover and Removal of PCB Mount

Procedure ⚠ **Warning** **Be sure to turn off all power supplies before disassembling work.**

Step		Procedure	Points
1. Opening the electrical box cover			
1	Remove the M5 screw from the electrical box cover.	 (M115)	
2	Open and slide the electrical box cover to the left, and take it out.	 (M1116)	■ The section C is not provided for the two-room type. ■ The sections A, B and C are located from top down whether the electrical box is attached on the left or right side. ■ Write down a room number in the entry space for easy setup and servicing.
3	Disconnect the relay wire harness connectors as well as the earth wire from the PCB.		

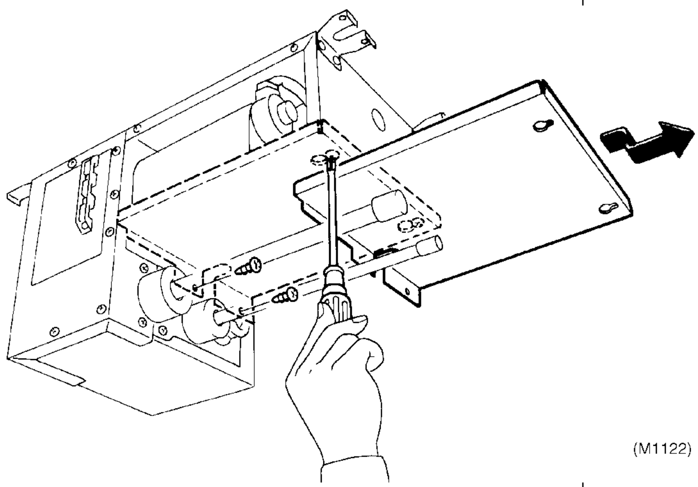
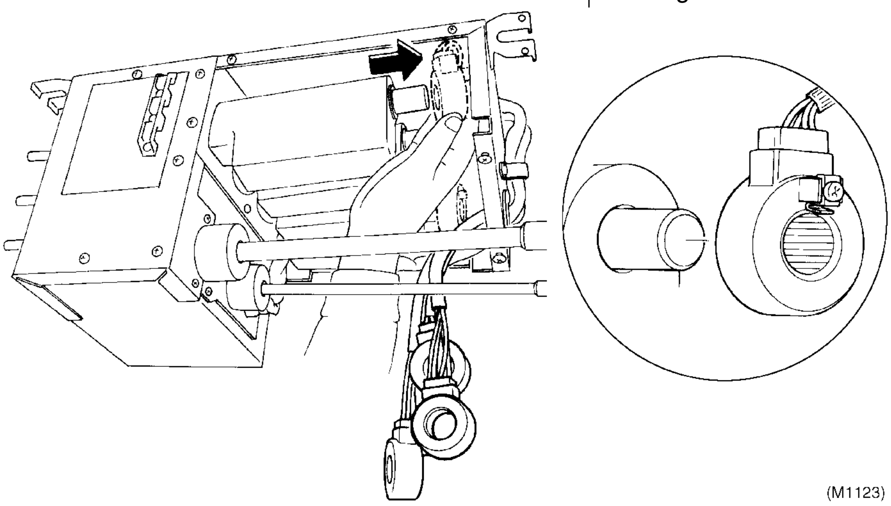
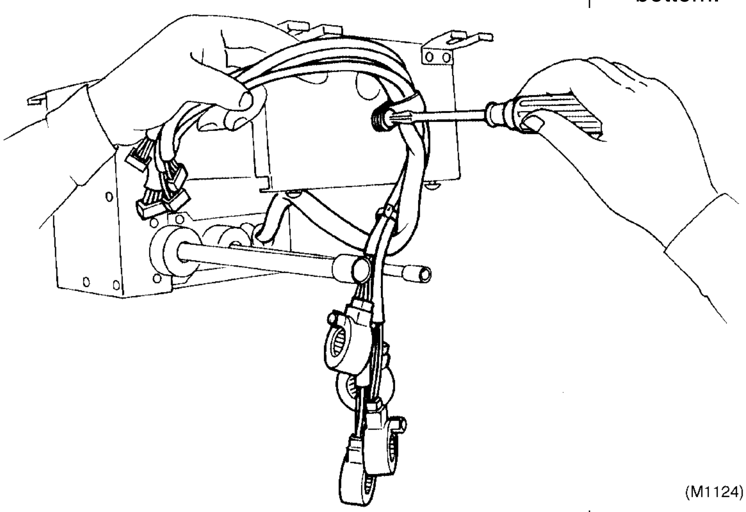


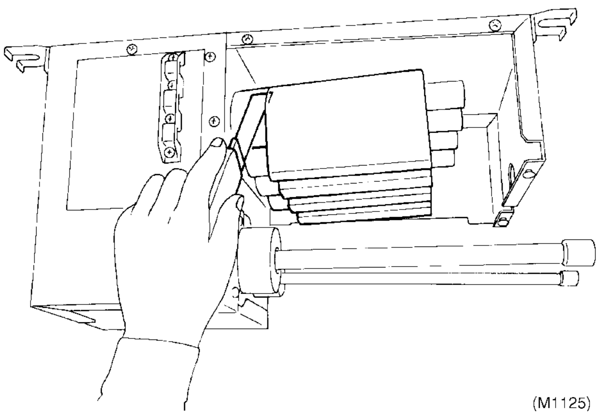
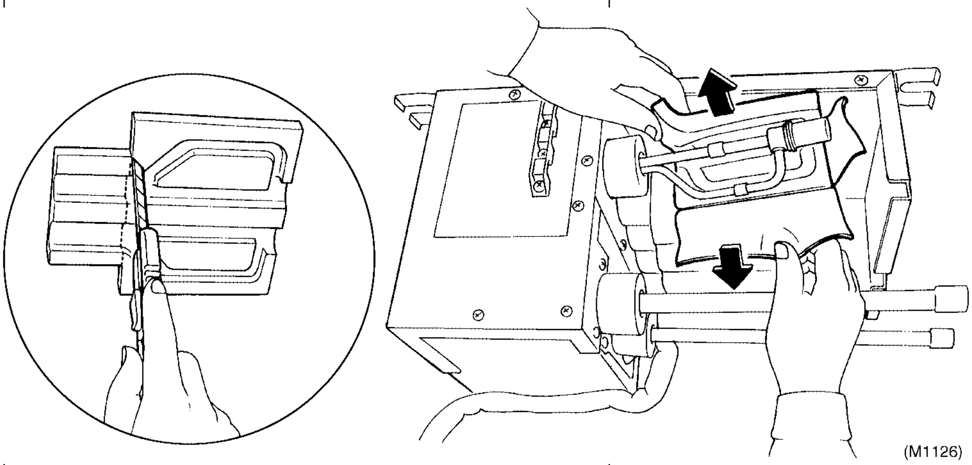
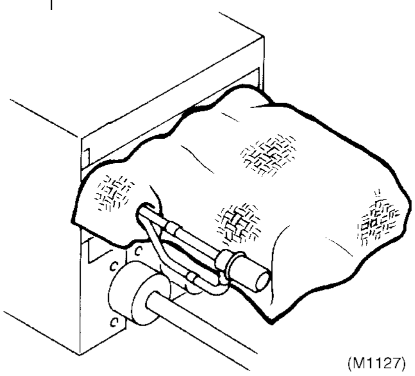
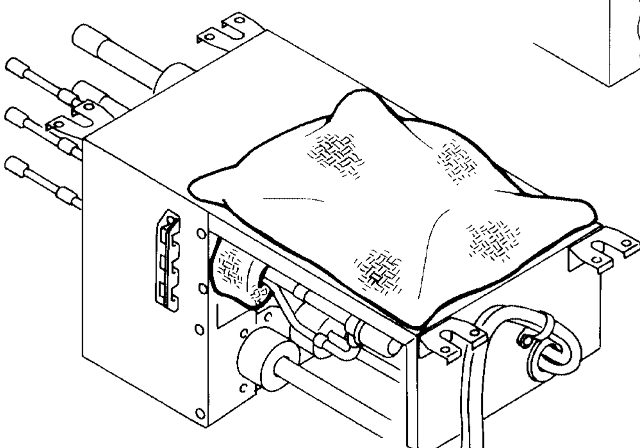
(M1117)

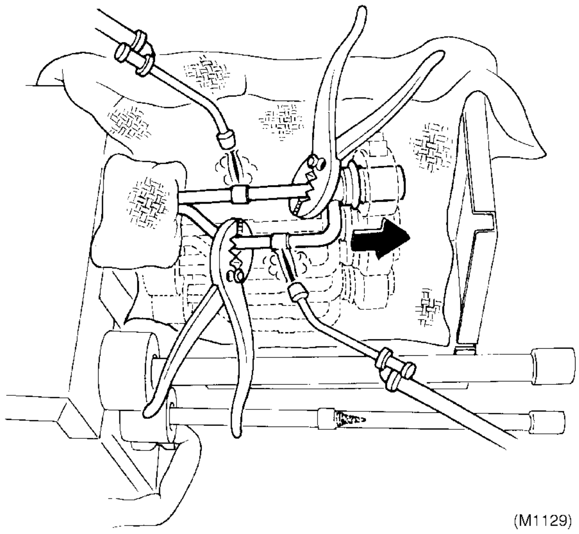
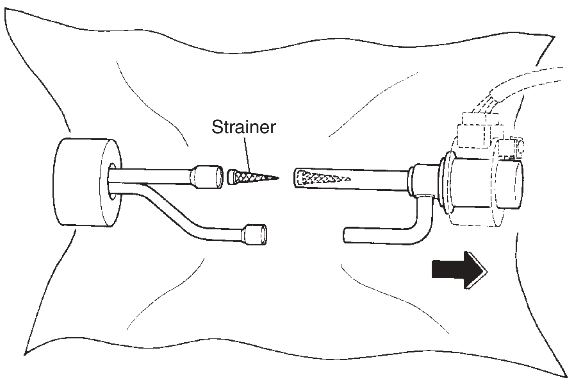
Step		Procedure	Points
2. Removing the PCB			■ The PCB is treated for moisture resistance. Replace the PCB and its mount together, if required. ■ The LED (green) lights up while the microcomputer functions. ■ Self-diagnostic LEDs LED-A (green) LED-1 (red) LED-2 (red) LED-3 (red) LED-4 (red) S4: Motorized valve coil (yellow) S3: Motorized valve coil (blue) S2: Motorized valve coil (red) S1: Motorized valve coil (white)
1	The codes of the connectors on the PCB are as shown at right.	 (M1118)	
2	Remove the four screws from the PCB.	 (M1119)	
3	Loosen the two keyhole-provided screws and remove the two other screws from the PCB mount.	 (M1120)  (M1121)	

1.3 Removal of Motorized Valve

Procedure ⚠ **Warning** **Be sure to turn off all power supplies before disassembling work.**

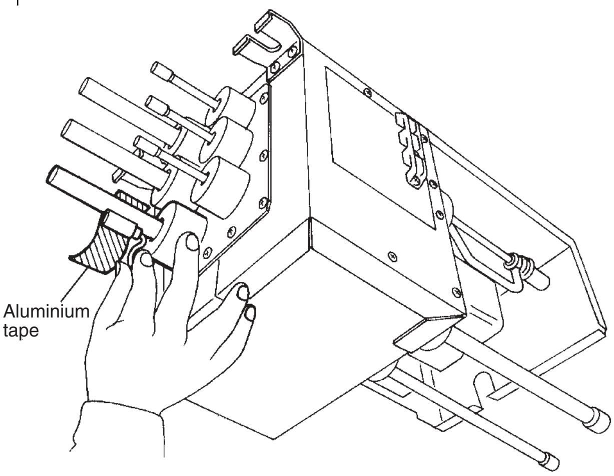
Step	Procedure		Points
1. Detaching the bottom panel		 (M1122)	
1	Loosen the two keyhole-provided screws and remove the two other screws from the electrical mounting plate.		
2. Removing the motorized valve coil		 (M1123)	■ When reassembling, make sure the motorized valve coil spring clicks and feels caught.
1	Slide the motorized valve coil to the right and take it out.		
3. Undoing the clamp		 (M1124)	■ The plain, red, blue and yellow markings are provided from the front bottom.
1	Remove the harness clamp from the side.		

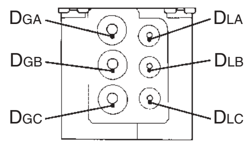
Step		Procedure	Points
4. Dismounting the motorized valve ■ Before taking this procedure, make sure there is no refrigerant gas left in the refrigerant pipes.			**Caution** Be careful not to get yourself burnt with the motorized valve, pipes and other parts that are heated by the gas welding rod ■ When reassembling, place the thermal insulators back into position. Using finishing tape, be sure to join together the cut-off parts.
1	Cut off the thermal insulator.	 (M1125)	
2	Remove the tape and open the thermal insulator.	 (M1126)	
3	Be careful not to allow flames of a gas welding rod to affect the parts around the motorized valve. To do this, wrap all the thermal insulators with water-wet cloths and place welding protective sheets or iron plates around. Place wet-water cloth over the top of the product too.	 (M1127)  (M1128)	

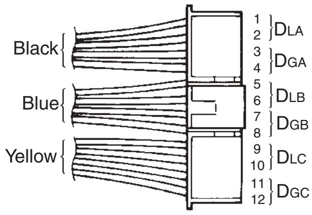
Step	Procedure		Points
4	Heat up the brazed sections of the motorized valve. Using pliers or the like, disconnect the valve.	 (M1129)  (M1130)	**Reassembling precautions** 1. Use non-oxidizing brazing method. If nitrogen gas is not available, braze the parts speedily. 2. Avoid deterioration of the packings due to carbonization of oil inside the motorized valve or thermal influence. For this purpose, wrap the motorized valve with wet cloth and splash water over the cloth against becoming too hot (keep it below 120˚C). ■ In pulling the pipes, be careful not to overtighten them with pliers. The pipes may get deformed. ■ The strainer is located inside each motorized valve. When replacing the motorized valve, be sure to change its strainer too. (Otherwise the strainer will get burnt and out of function.) ■ Using the outdoor liquid gas shut-off valve, open the indoor line. If the gas welding machine fails to remove the motorized valve, take the steps below. 1. Disconnect the brazed pipe sections that are readily easy to separate and join together later. 2. With a small copper tube cutter, cut off the internal pipes to easily take out the motorized valve. **Note:** Never use a hack saw. Cuttings may come into the pipes.

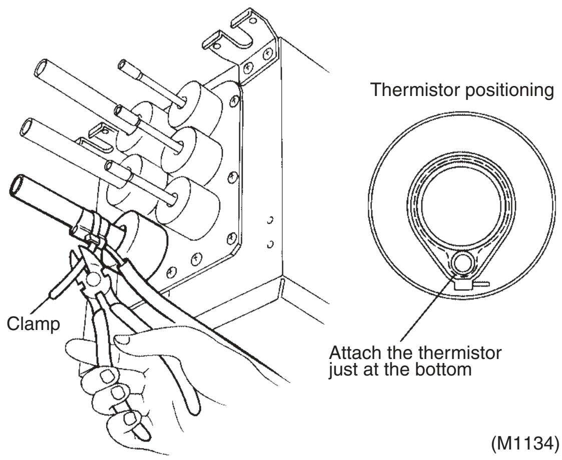
1.4 Removal of Thermistor

Procedure **Warning** **Be sure to turn off all power supplies before disassembling work.**

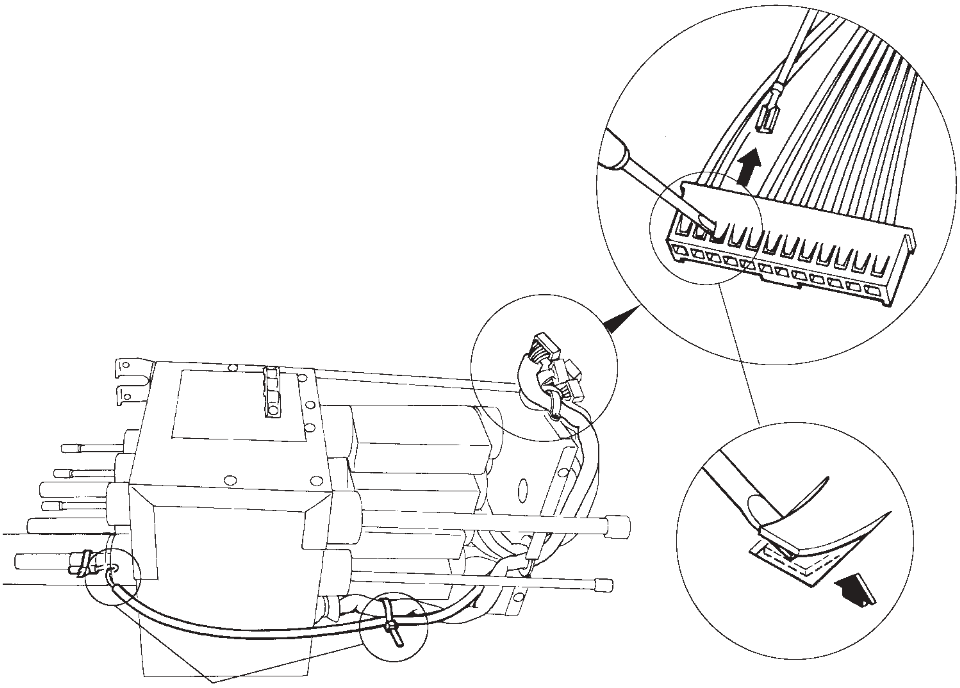
<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td colspan="2">■ Disconnect the thermistor harness connector from the PCB.</td><td rowspan="2">

(M1131)</td><td rowspan="3">■ The factory-installed thermistors cannot be replaced.
■ Thermistor positions and connector pins


(M1132)
Thermistor positions


(M1133)
Thermistor connector pins</td></tr>
<tr><td>1</td><td>Secure a replacement thermistor onto the pipe with aluminium tape.
■ Provide thermal insulation from above.</td></tr>
<tr><td>2</td><td>Tighten the tie-wrap to secure the above tape.</td><td>

(M1134)</td></tr>
</table>

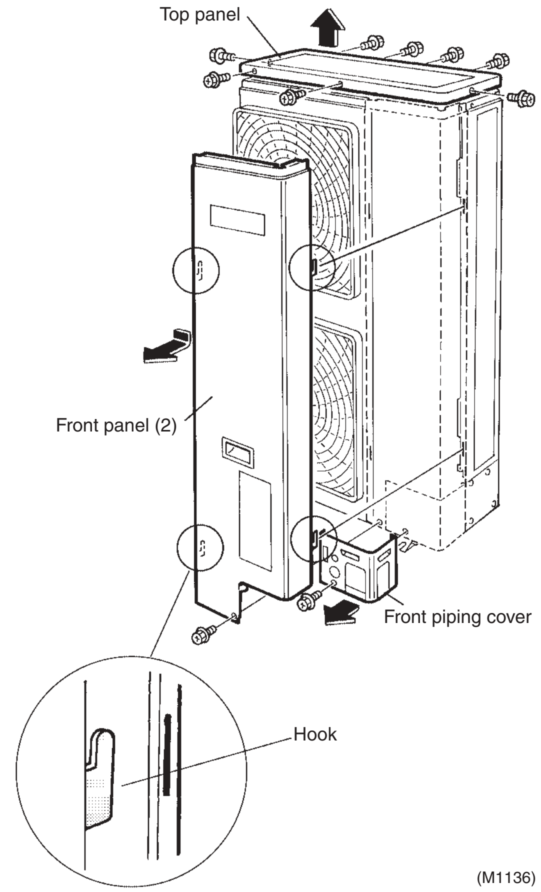
Step	Procedure		Points
3	Insert the new thermistor terminal to the thermistor connector. ■ Align the thermistor terminal with its hole of the connector. ■ Provide thermal insulation from above.	 	■ Pulling the thermistor terminal Carefully work on the connector without breaking the hook. (Just raise the hook.)

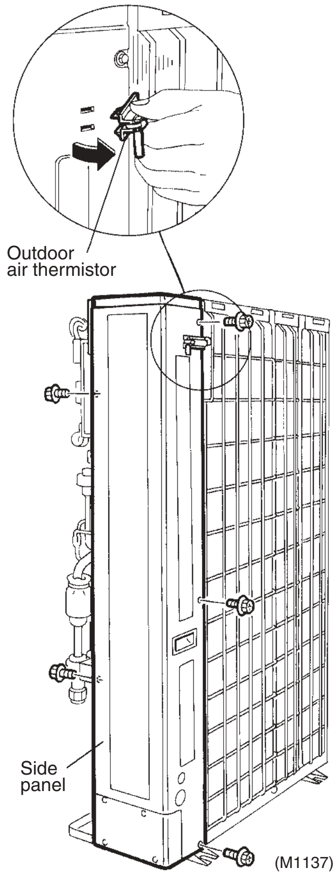
2. Outdoor Unit

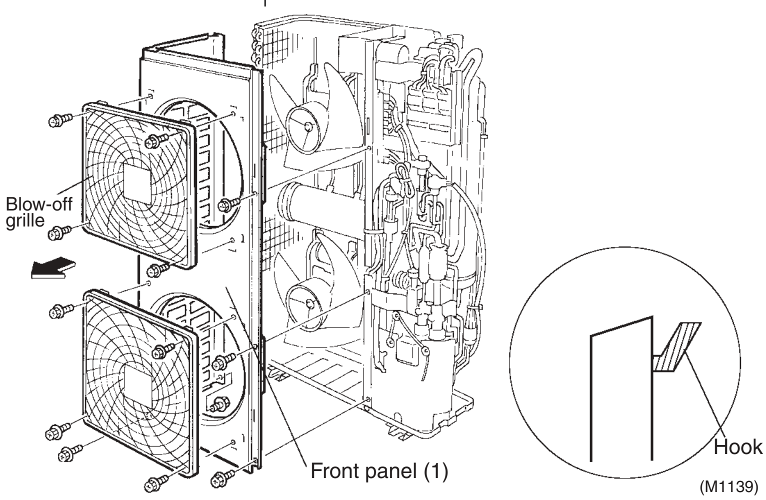
2.1 Removal of Outer Panels

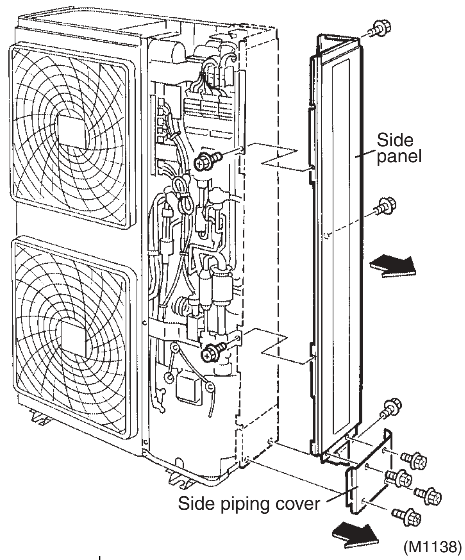
Procedure ⚠ **Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

Step	Procedure	Points
1	Remove the eight screws from the top panel.	■ The front panel can be detached without removing the top panel.
2	Remove the screw from the front panel. Push down the panel unhooked and detached.	
3	Remove the screw from the front piping cover.	
4	Remove the four screws from the side piping cover.	
5	Remove the outdoor air thermistor first and then the five screws from the side panel.	
6	Remove the four screws from the blow-off grille and release the grille from the four top and bottom hooks.	
7	Remove the five screws from the front panel (1). Push up the panel out of position.	





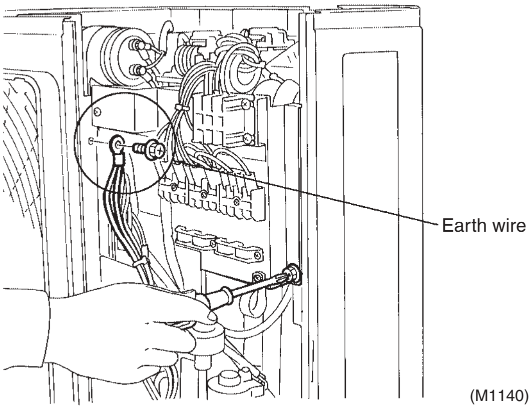
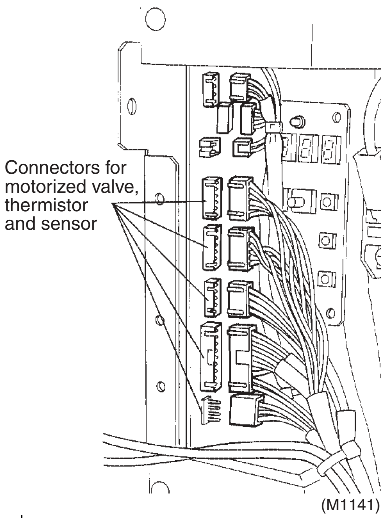
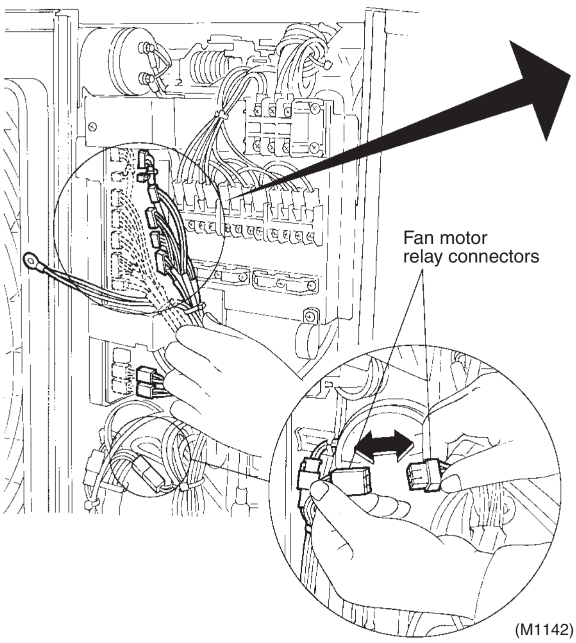
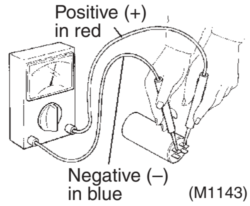
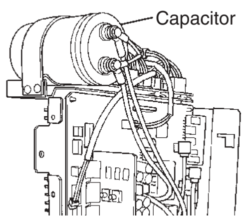


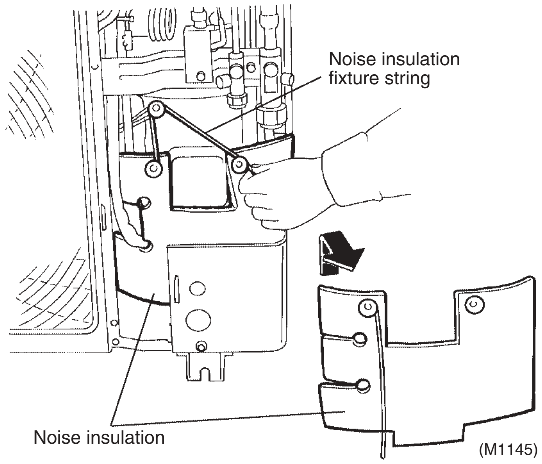
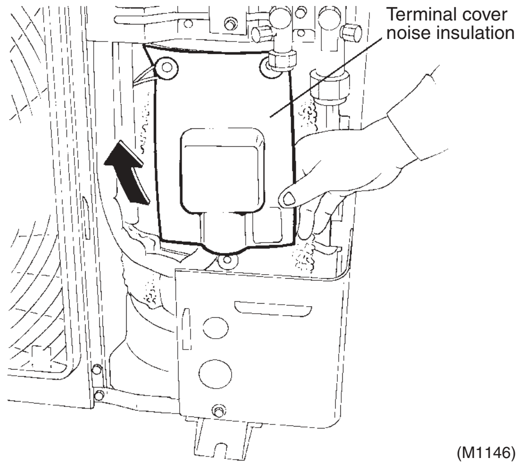
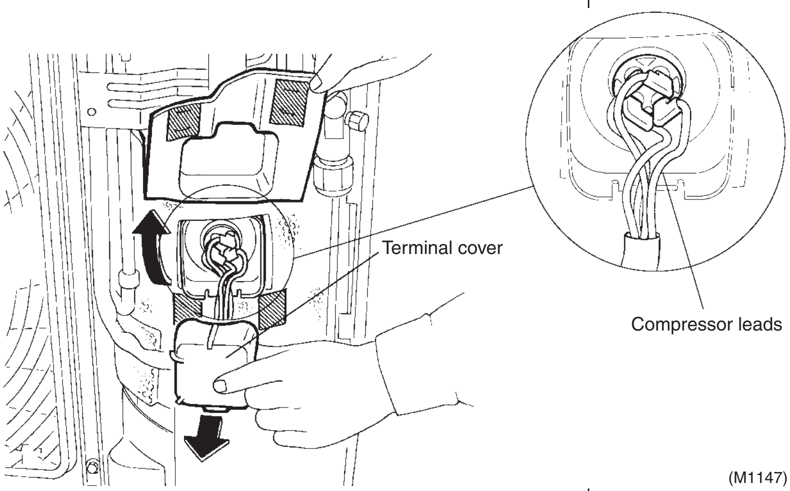


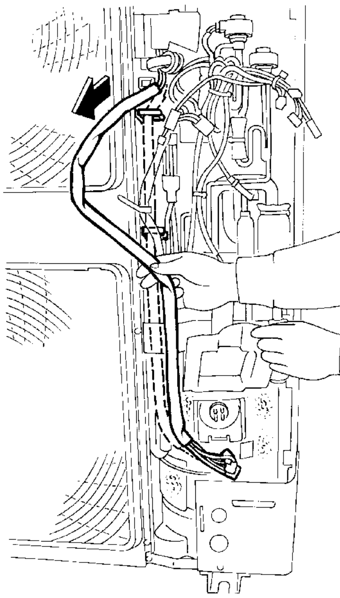
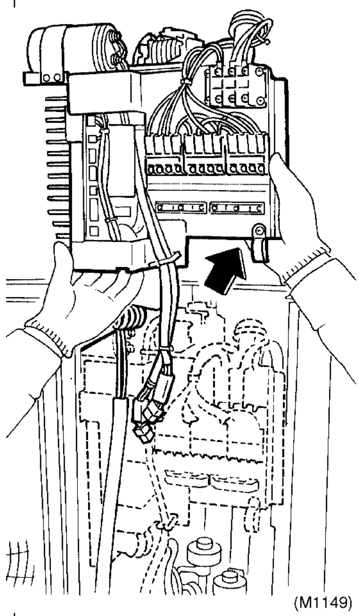
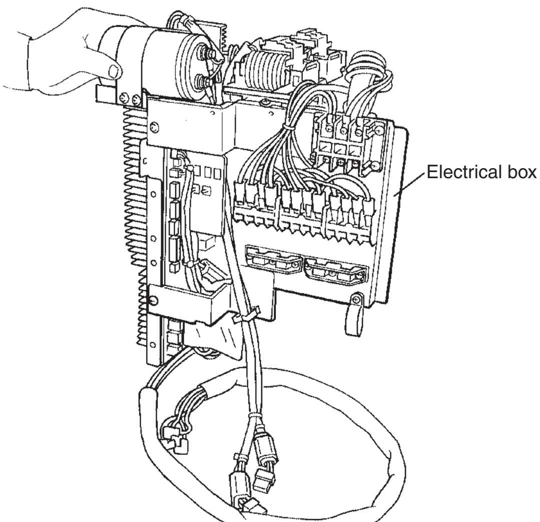
2.2 Removal of PCB and Electrical Box

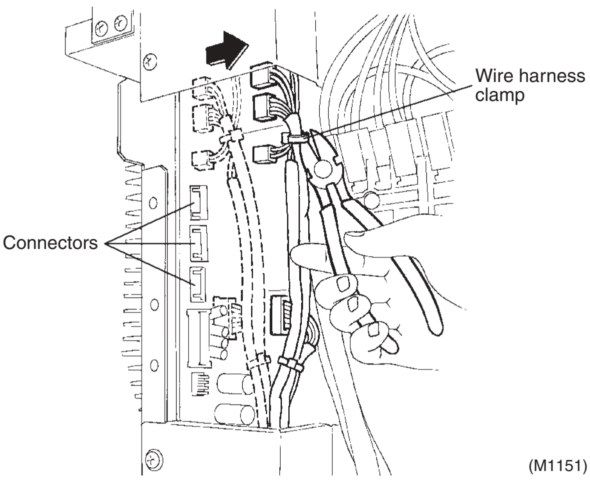
Procedure

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

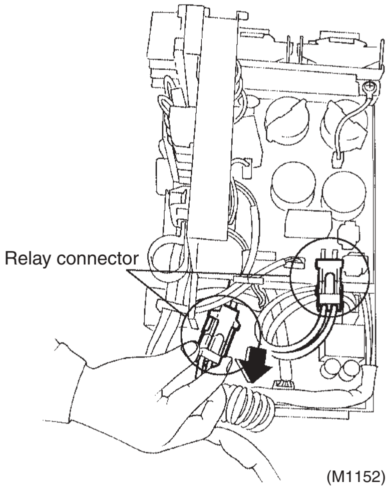
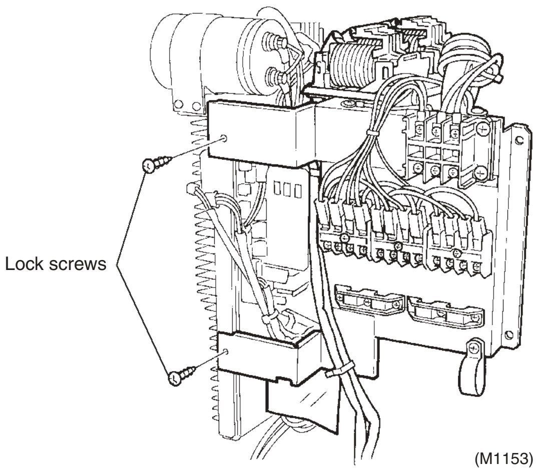
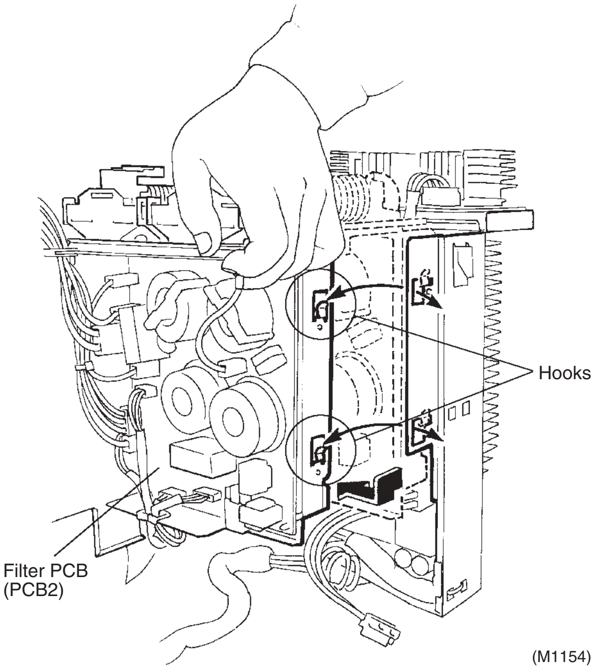
Step		Procedure	Points
■	Detach the top, front and side panels, referring to the instructions in "Removal of Outer Panels".		
1.	Disconnecting the earth wire	(M1140)	(M1141)
1	Disconnect all the relay wires.		
2	Remove the screw from the earth wire. Remove the screw from the electrical box itself.		
2.	Disconnecting the connectors	(M1142)	⚠ **Warning** ⚡ **Electric Shock** 1 Be sure to turn off the power before servicing. 2 Do not touch any live parts (high-voltage) for 15 minutes after turning off the power. 3 Before handling these parts, make sure the main circuit capacitor (C1) voltage is below DC 50 V and disconnect the fan connectors (CN3, CN4). 4 Pay attention to the hot parts Keep in mind that some parts inside the electrical box are hot.
1	Disconnect the following connectors. S108: EVG gas pipe motorized valve (Blue) S109: EVL liquid pipe motorized valve (White) S110: EVP discharge/ suction bypass motorized valve (Red) S114: Thermistor harness S105: LP low-pressure sensor		
3.	Disconnecting the relay connectors		(M1143)
1	Disconnect the two fan moter relay connectors.		

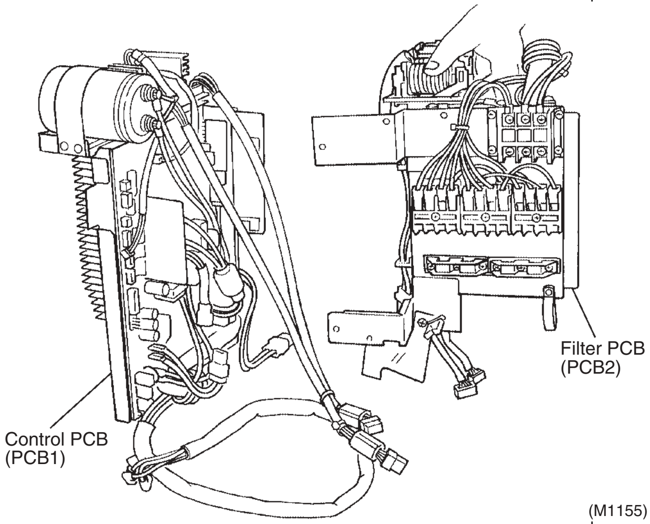
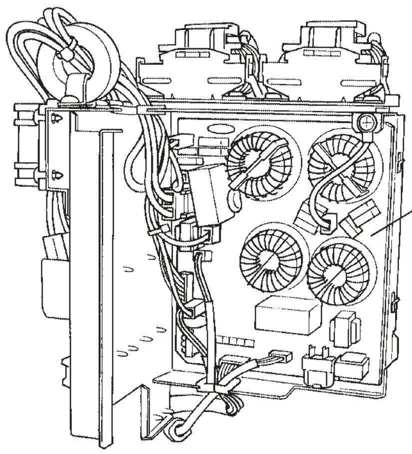
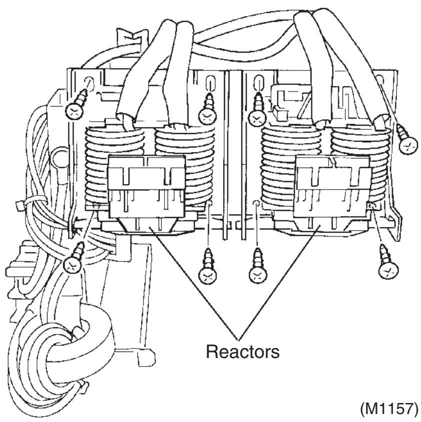
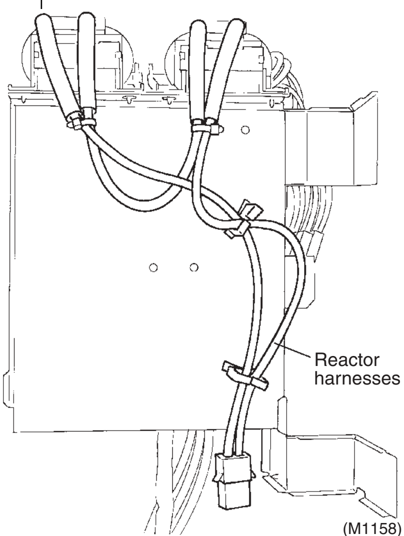
Step	Procedure		Points
4.	Disconnecting the compressor leads		
1	Undo the noise insulation fixture string.		■ Handle the sound insulation with enough care. It may damage the pipes around.
2	Pull up the noise insulation.		
3	Open up the terminal cover noise insulation.		
4	Detach the terminal cover.		
5	Disconnect the compressor leads from their terminals.		

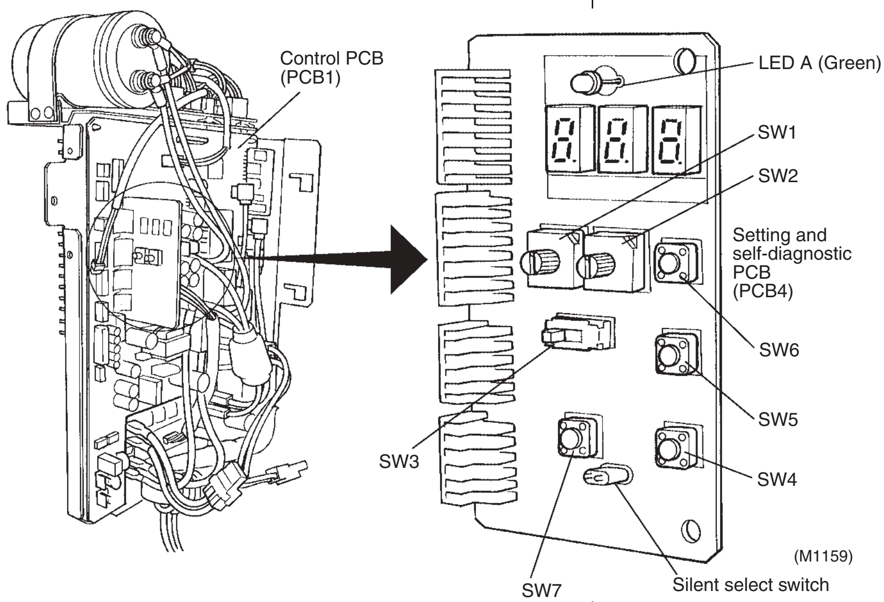
<table>
<tr><th colspan="2">Step</th><th>Procedure</th><th>Points</th></tr>
<tr><td colspan="2">5. Detaching the electrical box</td><td rowspan="3">
(M1148)

(M1149)


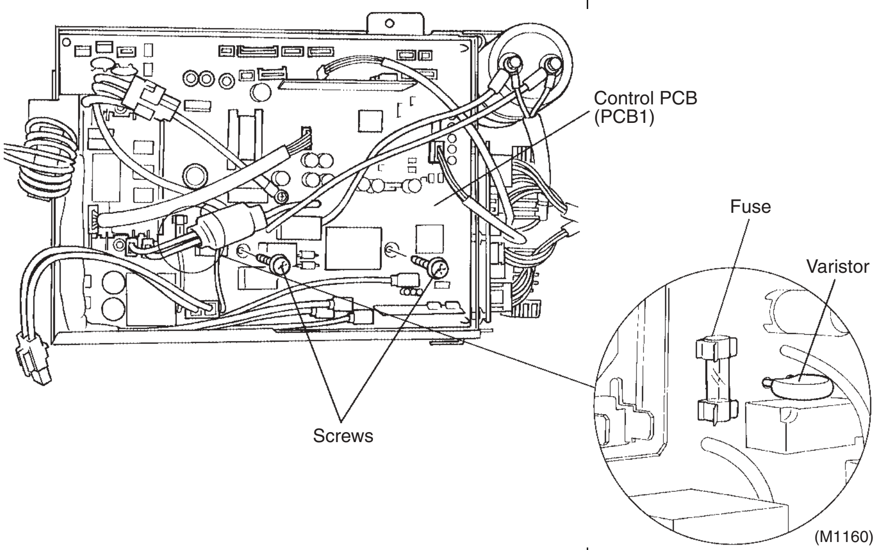
(M1150)</td><td rowspan="3"></td></tr>
<tr><td>1</td><td>Remove the screws from the electrical box.</td></tr>
<tr><td>2</td><td>Lift the electrical box off the hook at the back, and draw out the box.</td></tr>
<tr><td colspan="2">6. Disassembling the electrical box</td><td rowspan="3">

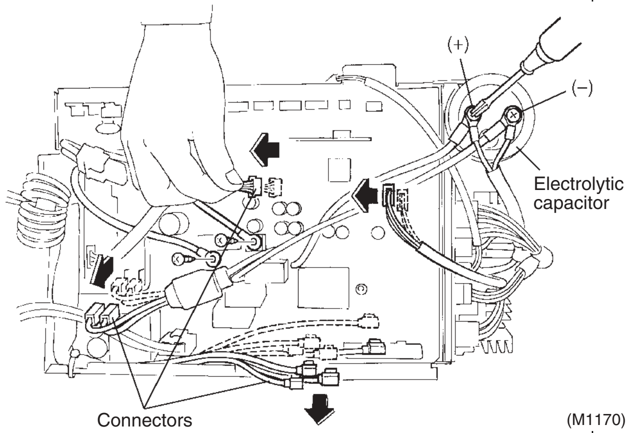
(M1151)</td><td rowspan="3">■ Make sure to clamp all wire harness after repair work is completed.</td></tr>
<tr><td>1</td><td>Disconnect all the connectors.</td></tr>
<tr><td>2</td><td>Cut off the clamp at the wire harness.</td></tr>
</table>

Step	Procedure		Points
3	Disconnect the two relay connectors on the side.		
4	Remove the two lock screws from the front section.		
5	Slide the front section to the right and release it off the two hooks at the back.		

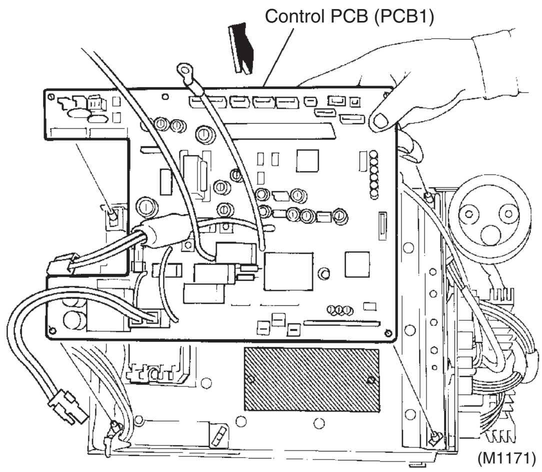
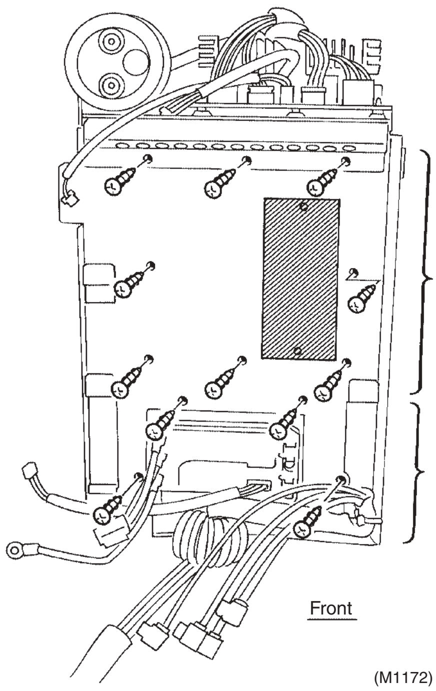
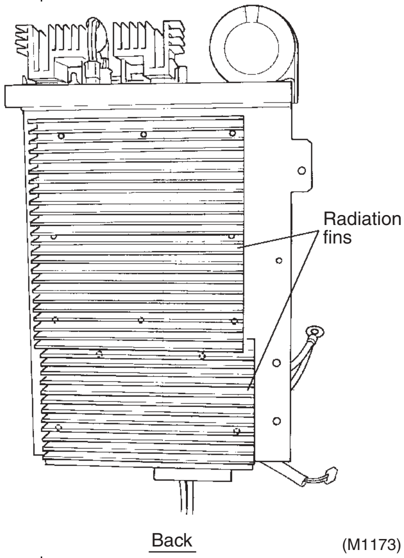
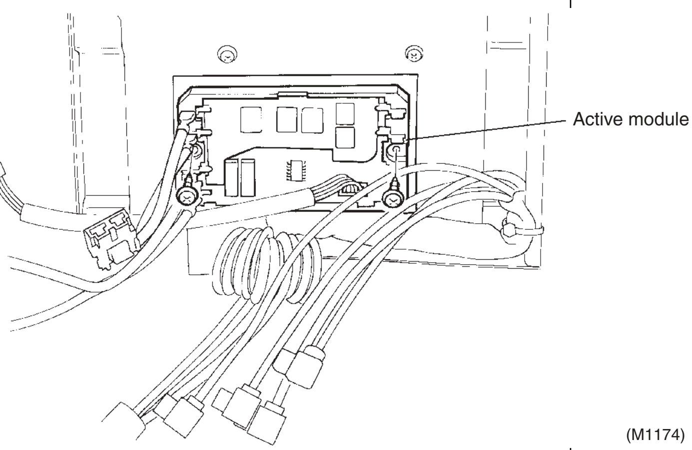
Step	Procedure		Points
		 (M1155)	
7. Detaching the filter PCB			
1	The filter PCB is located as shown at right.	 (M1156)	
2	Disconnect all the connectors and remove the four locking guard spacers. Take out the filter PCB.		
3	Remove the four screws and take out the reactors.	 (M1157)	 (M1158)
4	Lay and dress the reactor harnesses.		

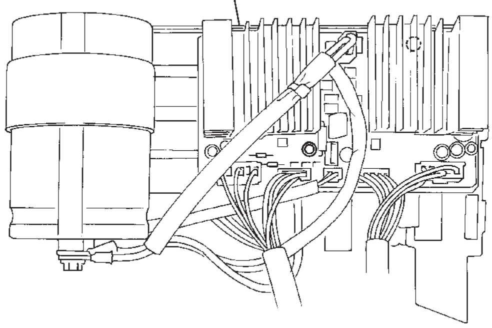
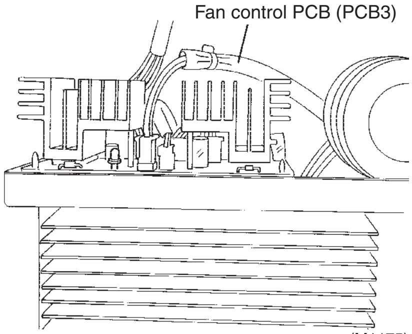
<table>
<tr><th colspan="2">Step</th><th>Procedure</th><th>Points</th></tr>
<tr><td colspan="2">8. Detaching the control PCB</td><td rowspan="5">






</td><td rowspan="5"></td></tr>
<tr><td>1</td><td>The control PCB is located as shown at right.</td></tr>
<tr><td>2</td><td>The setting and self-diagnostic PCB is located also as shown at right.
■ The PCB1 and PCB4 are integrally constructed.</td></tr>
<tr><td>3</td><td>Disconnect all the connectors.
Remove the two screws from the control PCB.</td></tr>
<tr><td>4</td><td>Remove the two screws from the electrolytic capacitor.</td></tr>
</table>

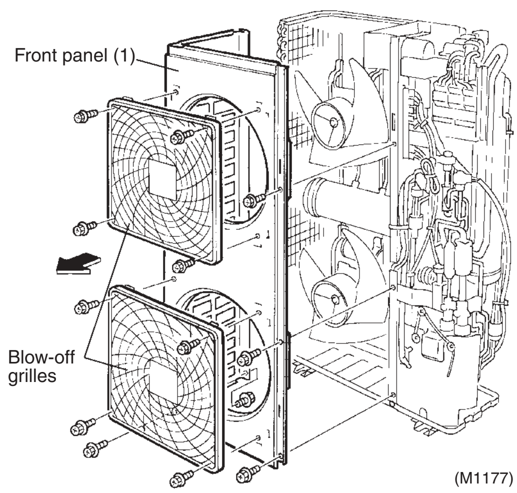
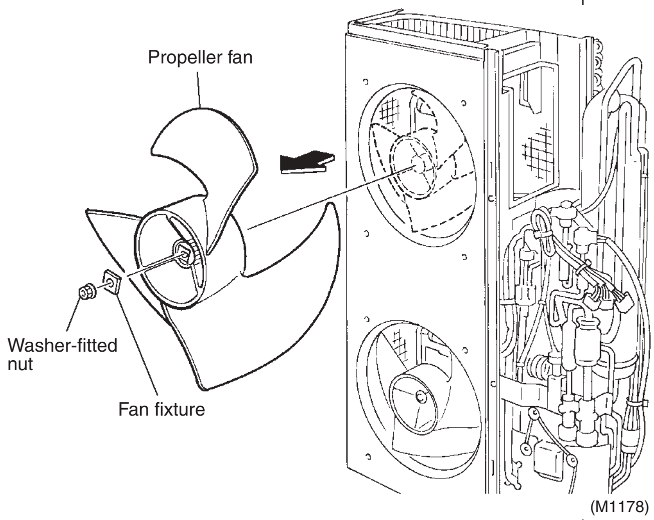
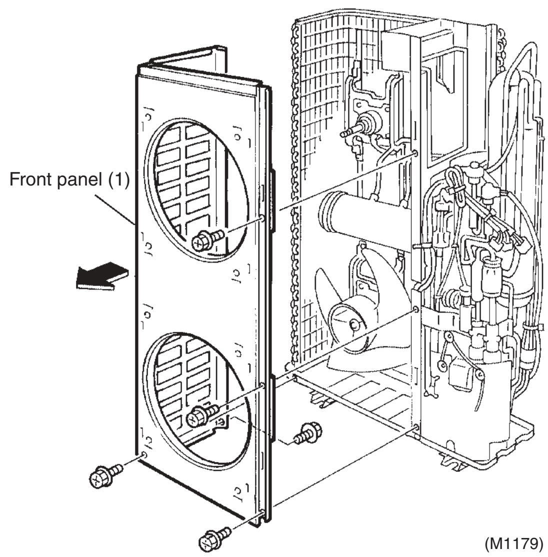
Step	Procedure		Points
5	Remove the five locking card spacers and detach the control PCB.	(M1171)	■ The back of the PCB has silicone compound applied. Give a slight force in detaching the PCB. ■ Be sure to apply fresh silicone compound before attaching the PCB back in place.
9. Detaching the radiation fins		(M1172)	(M1173)
1	The radiation fins are provided in two blocks. Remove the eight screws from the upper block and the four screws from the lower one.		
10. Detaching the active module		(M1174)	
1	Remove the two screws from the active module.		

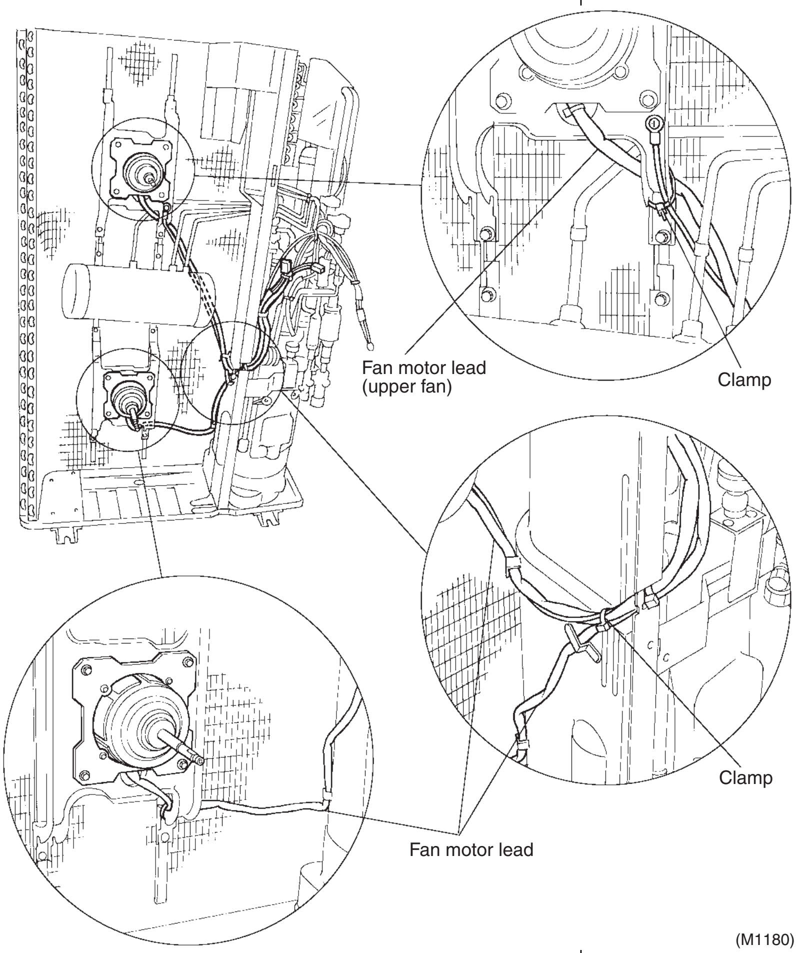
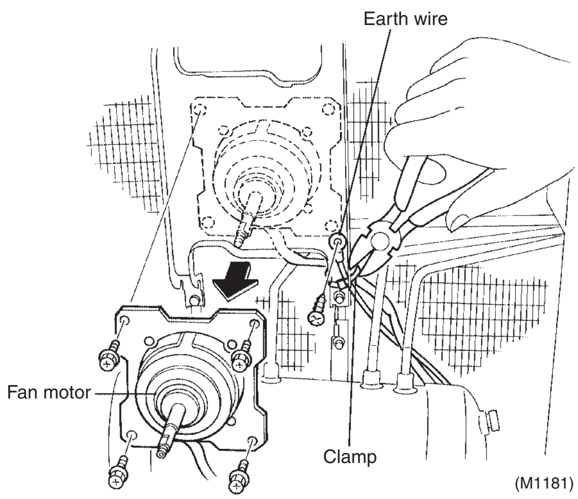
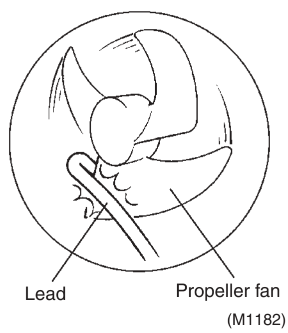
Step		Procedure	Points
11. Detaching the fan control PCB		(M1176)	(M1175)
1	The fan control PCB is located as shown at right. Remove the four locking card spacers and detach the PCB.		

2.3 Removal of Propeller Fans and Fan Motors

Procedure

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

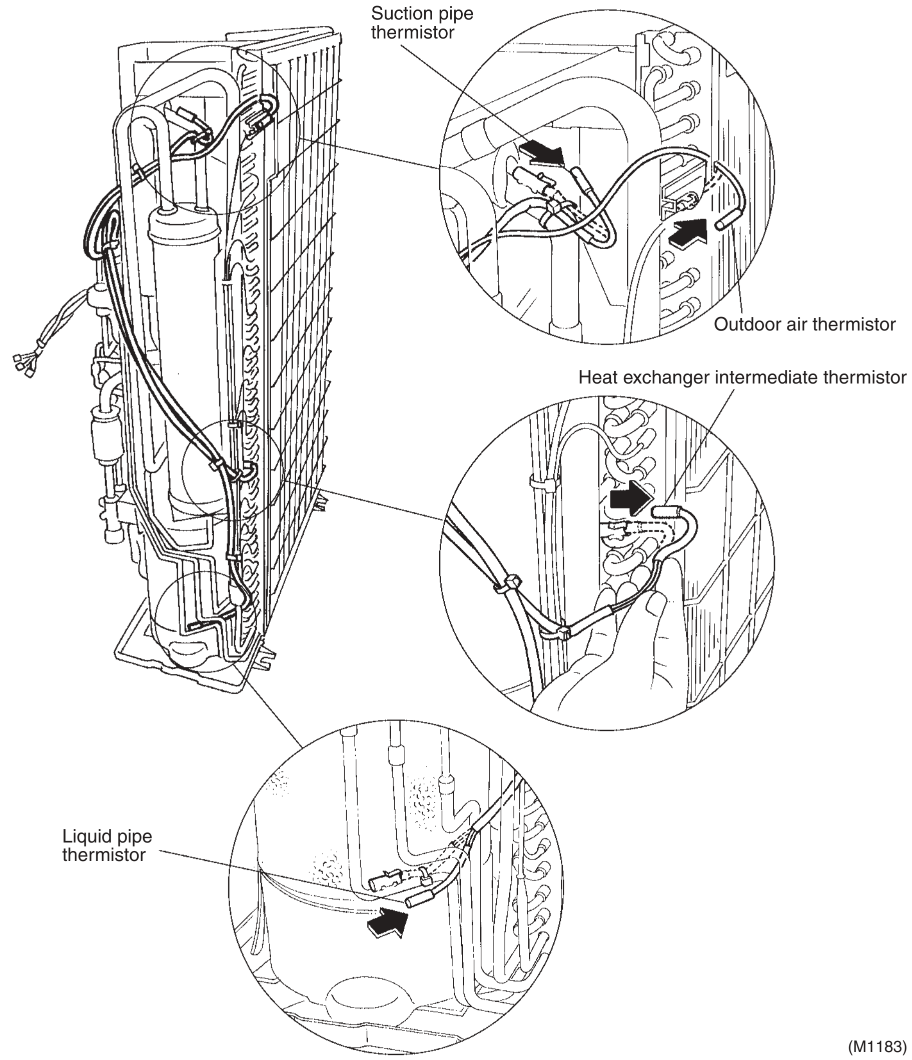
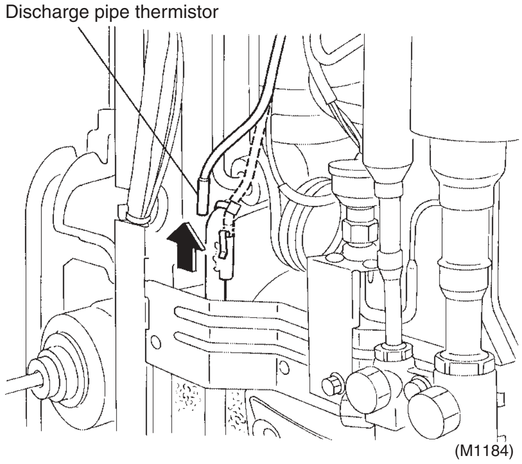
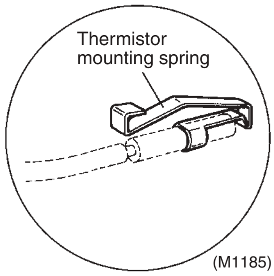
Step		Procedure	Points
■ Detach the front panel, front piping cover, etc., referring to the instructions in "Removal of Outer Panels".		 	
1. Detaching the propeller fans			
1	Remove the four blow-off grille lock screws. Undo the four top and bottom hooks to take out the blow-off grilles.		
2	Remove the washer-fitted nuts and fixtures from the propeller fans.	 	
3	Remove the five screws from the front panel (1). Push up the panel out of position.	 	■ To disconnect the fan motor leads, detach the front panel (1) first.

Step		Procedure	Points
2. Dismounting the fan motors			
1	Disconnect the two fan motor relay connectors from the PCB in the electrical box.		■ In disconnecting the connectors, do not pull the leads, but hold the connectors and press the hooks.
2	The fan motor leads are hooked in some locations: one hook for the upper fan and two for the lower fan.		
3	Undo the lead tie-wraps first and then the lead clamp off the partition board.		
4	Disconnect the earth wire from the upper-motor mount.		
5	Undo the clamp.		■ Precaution in mounting the motors: Be sure to secure the motor leads with the clamps. Otherwise the leads may get caught by the fans.  ■ In setting up the fan, put the partition board piece between the tie-wraps A and B and secure the lead.
6	Remove the four screws from the fan motor. Then dismount the fan motor.		

2.4 Removal of Thermistor

Procedure

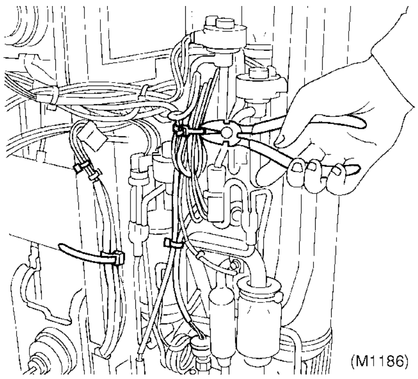
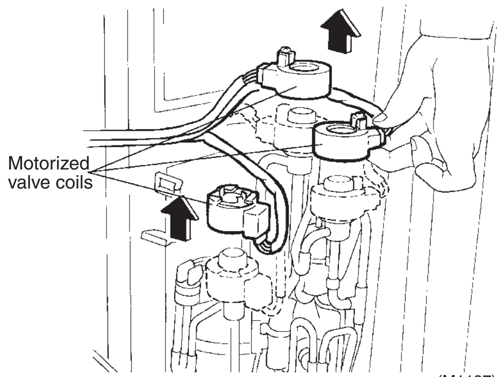
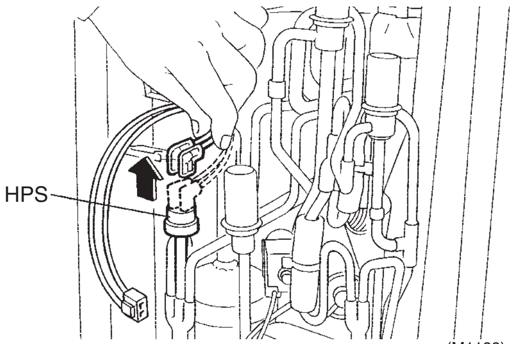
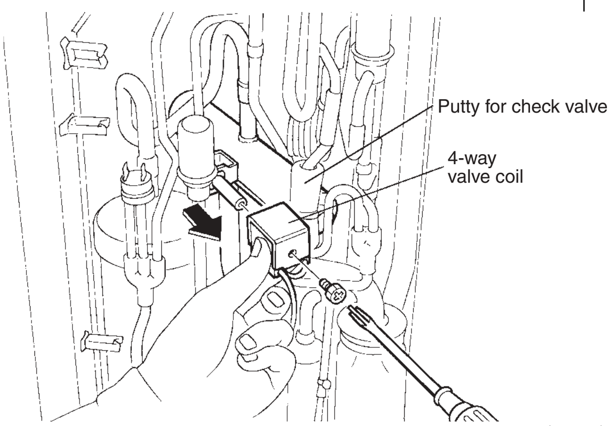
⚠ **Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

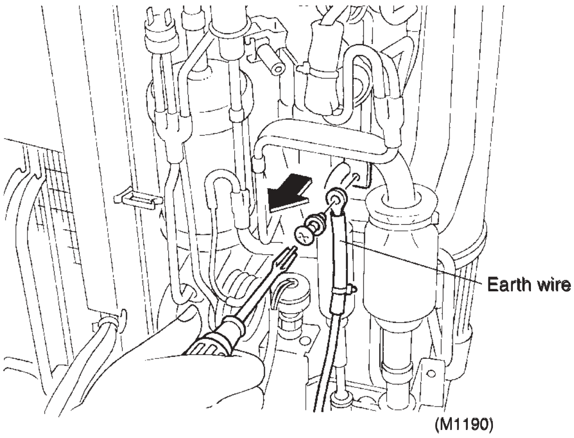
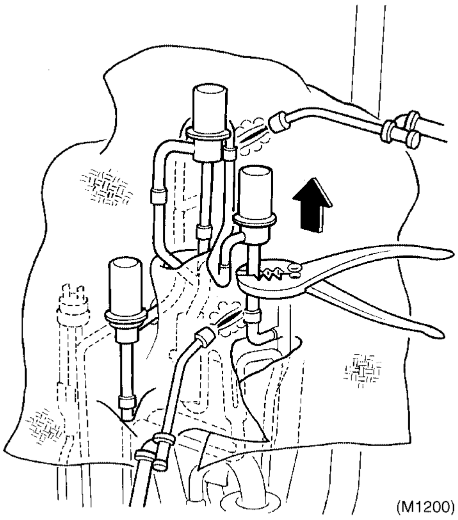
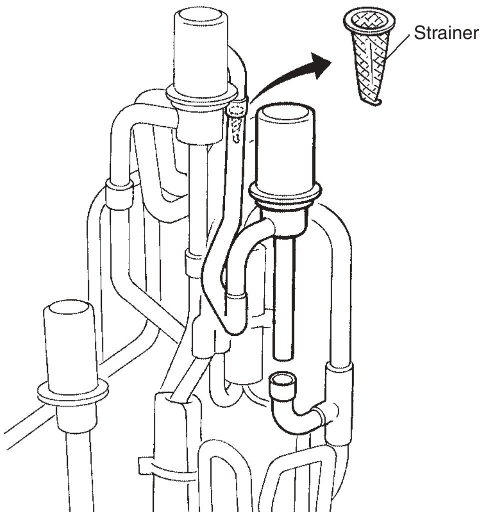
Step	Procedure		Points
■ Detach the top, front panel (2) and side panel, referring to the instructions in "Removal of Outer Panels". ■ Take out the electrical box.		 (M1183)	
1	Disconnect the thermistors from the holders, and pass them out of the through opening of the piping plate.		
2	Undo the two tie-wraps and disconnect the suction pipe thermistor.		
■ In reconnecting the suction pipe thermistor, bend the harness back into its original route and apply the tie-wraps.			
3	Disconnect the heat exchanger intermediate thermistor.		
4	Disconnect the liquid pipe thermistor.		
5	Disconnect the discharge pipe thermistor.	 (M1184)	■ In reconnecting the thermistors, be sure to fit their mounting springs into position.  (M1185)

2.5 Removal of Motorized Valve

Procedure

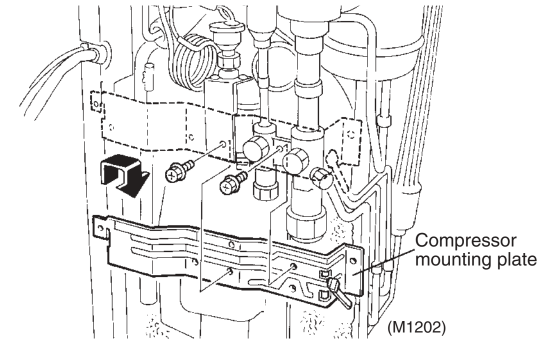
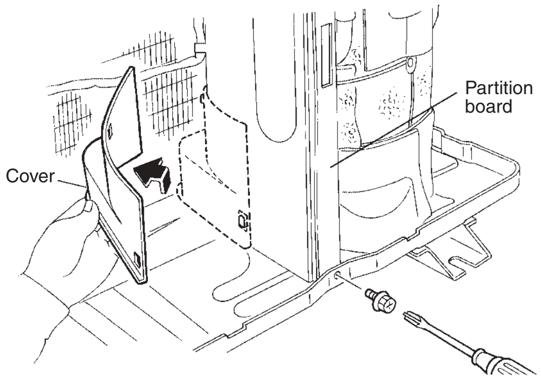
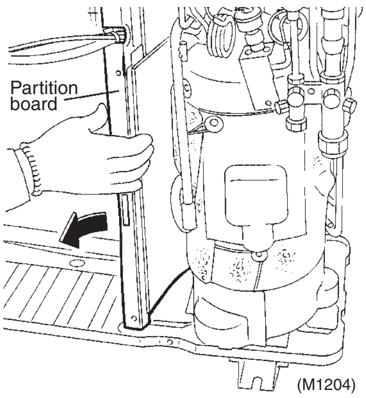
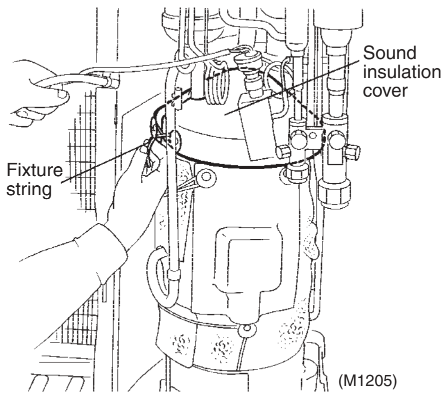
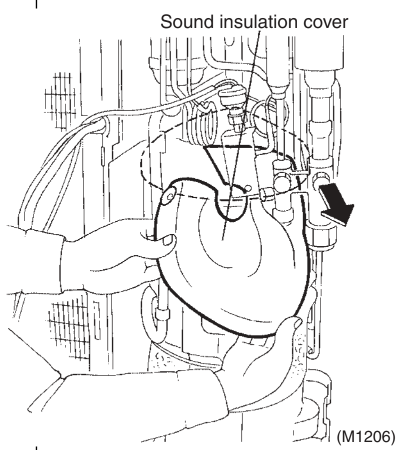
⚠ **Warning Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.**

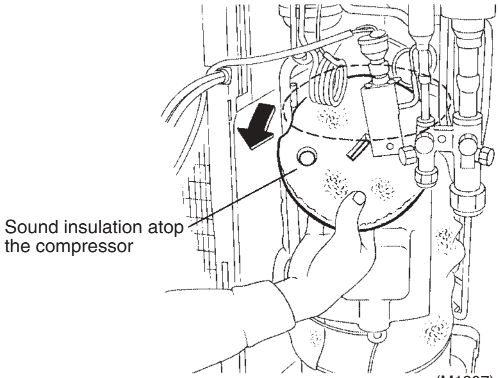
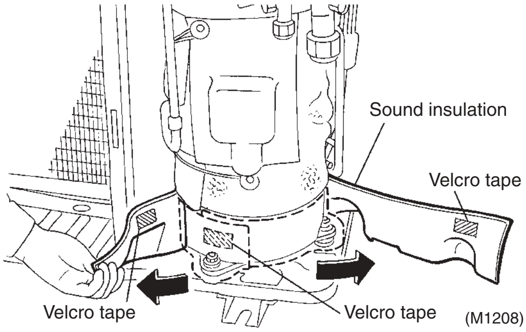
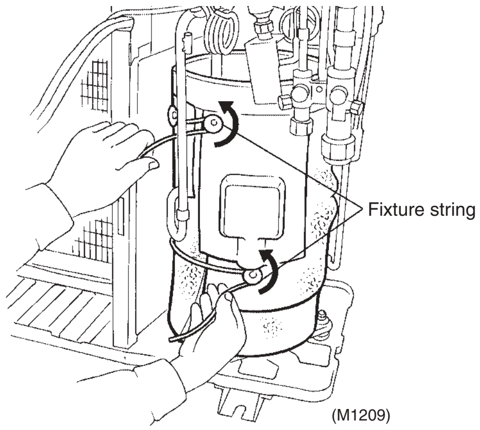
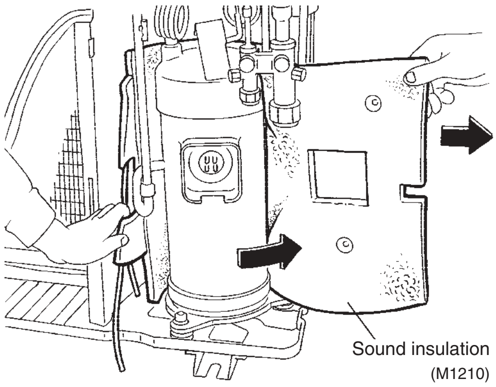
Step		Procedure	Points
■ Before taking this procedure, make sure there is no refrigerant gas left in the refrigerant pipes. ■ Cut off the wire harness clamp.		 (M1186)	**Reassembling precautions** 1 Use non-oxidizing brazing method. If nitrogen gas is not available, braze the parts speedily. 2 Wrap the motorized valve itself with wet cloth. Splash water over the cloth against becoming too hot (keep it below 120˚C). ■ In pulling the pipes, be careful not to overtighten them with pliers. The pipes may get deformed. If the gas welding machine fails to remove the motorized valve, take the steps below. 1. Disconnect the brazed pipe sections that are readily easy to separate and join together later. 2. With a small copper tube cutter, cut off the internal pipes to easily take out the motorized valve. **Note:** Never use a hack saw. Cuttings may come into the pipes.
1. Removing the motorized valve coils		 (M1187)	
1	Pull out the three motorized valve coils.		
■ In remounting the motorized valve coils, pay attention to their directions. Orient them so that the harness connections be at the horizontally coming pipes.			
2. Disconnecting the peripheral components		 (M1188)	
1	Disconnect the HPS lead.		
2	To protect the 4-way valve coil, detach it out of position.	 (M1189)	
3	Remove the check valve putty at two locations.		

Step	Procedure		Points
4	Disconnect the earth wire.	 (M1190)	**Warning** If refrigerant gas leaks during the job, ventilate the room. (Bear in mind that if the refrigerant gas is exposed to open flames, noxious gas may be generated.) **Caution** Be careful not to get yourself burnt with the motorized valve, pipes and other parts that are heated by the gas welding rod
5	Disconnect the brazed section of the motorized valve.	 (M1200)	**Caution** Do not allow flames of a gas welding rod to affect the parts around the motorized valve. Place welding protective sheets or iron plates around
■ When replacing the motorized valve, change its strainer too. ■ The strainer is located in the brazed section of the pipe.		 (M1201)	

2.6 Removal of Sound Insulation

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

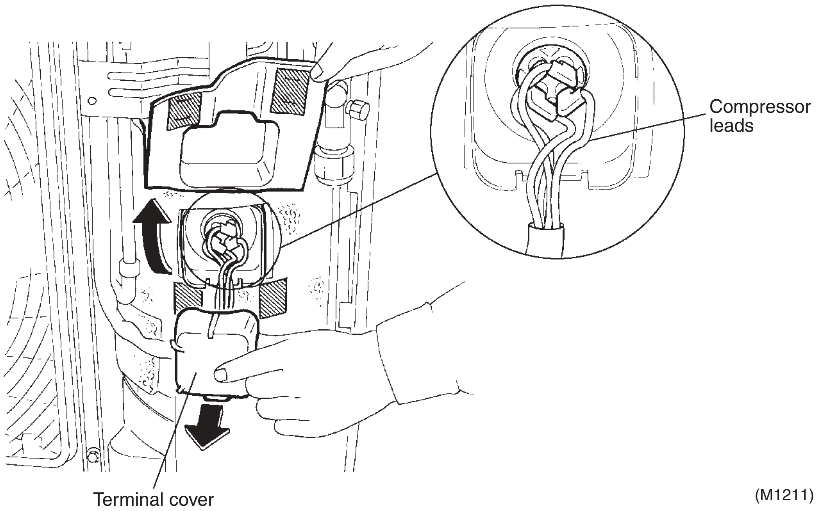
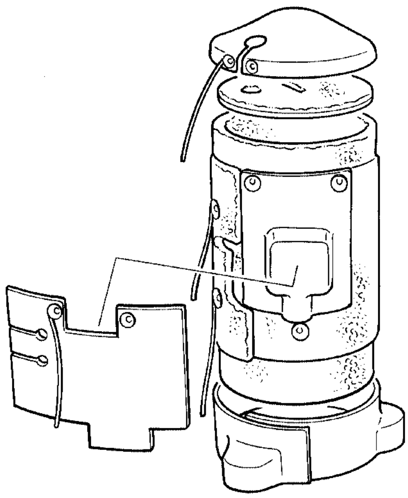
Step		Procedure	Points
■ Remove the terminal cover and disconnect the compressor leads, referring to the instructions in "Removal of PCB".		 (M1202)	
1. Disconnecting the peripheral components			
1	Detach the compressor mounting plate.		
2	Slide up the cover at the back of the partition board. Release the cover off the two hooks.	 (M1203)	■ The partition board cannot be detached.
3	Remove the screw from the partition board.		
4	Open the partition board to the left to easily access the sound insulation.	 (M1204)	
2. Detaching the sound insulation		 (M1205)	 (M1206)
1	Undo the sound insulation fixture string.		
2	Draw out the sound insulation cover and sound insulation from the top of the compressor.		

Step	Procedure		Points
			
3	Draw out the sound insulation cover from the bottom of the compressor.		
4	Undo the two points of the sound insulation fixture string.		
5	Open the sound insulation and draw it out.		

2.7 Removal of Compressor

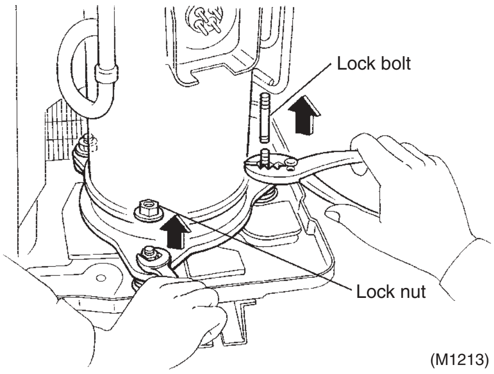
Procedure

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

Step	Procedure	Points
■ Detach the outer panels, electrical box and noise insulation, referring to the instructions in "Removal of Outer Panels" and other procedures.		
1. Dismounting the compressor		
1 Detach the terminal cover. 2 Disconnect the compressor leads from their terminals.		The sound insulation is in the shape as shown at right. 

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>3

4</td><td>Remove the three lock nuts from the compressor.

Remove the three lock bolts from the compressor.
■ This is to easily pull out the heavy compressor</td><td>
</td><td rowspan="2">

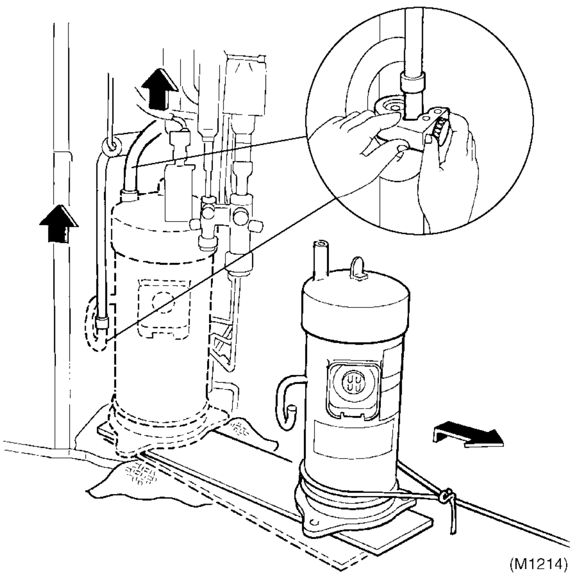
■ Reattach the noise insulation with no gap using the fixture string.

Warning
The compressor's refrigerating machine oil may catch fire. Have wet cloth at hand for quickly putting out the fire.

Warning
If refrigerant gas leaks during the job, ventilate the room. (Bear in mind that if the refrigerant gas is exposed to open flames, noxious gas may be generated.)

Caution
Be careful not to get yourself burnt with the pipes and other parts that are heated by the gas welding rod.</td></tr>
<tr><td>5

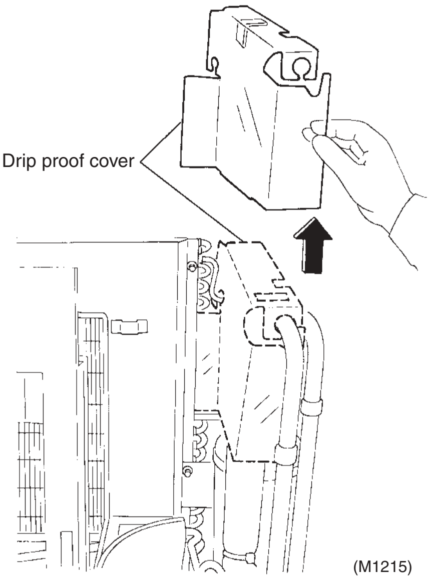
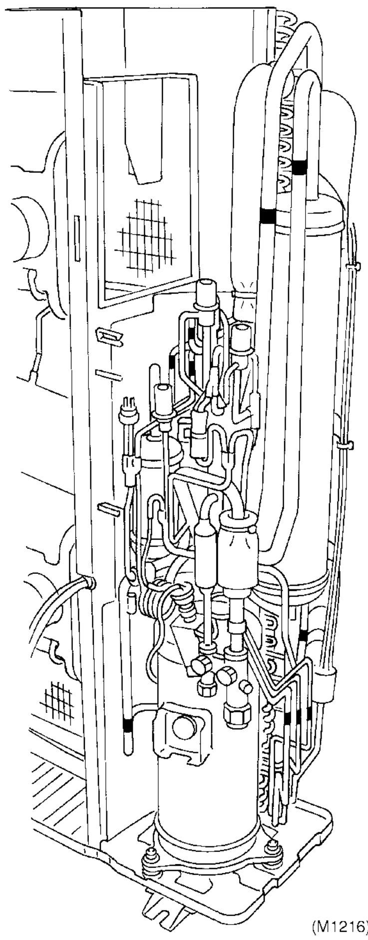
6</td><td>Using a pipe cutter, cut off the two points of the compressor suction and discharge pipes.
■ The cut-off points are nearer the compressor than the brazed sections.
■ There is no crankcase heater.

Before installing a new compressor, disconnect the brazed sections of the cut-off pipes, using a gas welding rod.</td><td>
</td></tr>
</table>

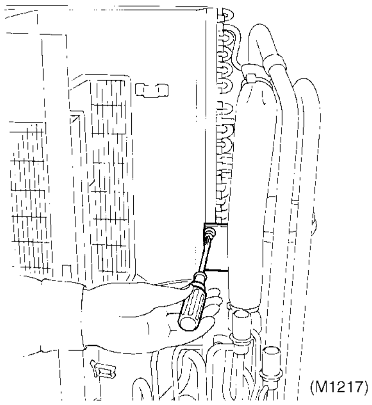
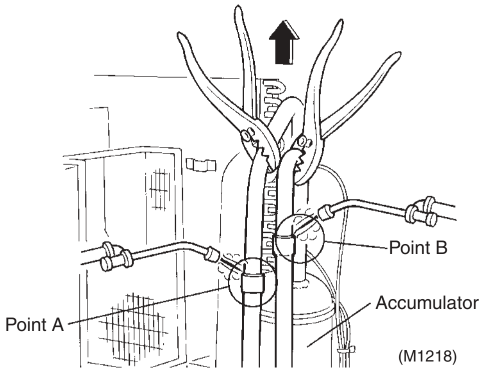
2.8 Removal of 4-way Valve

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></th><th>Procedure</th><th>Points</th></tr>
<tr><td colspan="2">■ Before taking this procedure, make sure there is no refrigerant gas left in the refrigerant pipes.
■ Detach the outer panels, electrical box, 4-way valve coil, etc., referring to the instructions in "Removal of Outer Panels" and other procedures.</td><td rowspan="4">
(M1215)

(M1216)</td><td rowspan="4">**Warning**
If refrigerant gas leaks during the job, ventilate the room. (Bear in mind that if the refrigerant gas is exposed to open flames, noxious gas may be generated.)

Caution
Be careful not to get yourself burnt with the 4-way valve, pipes and other parts that are heated by the gas welding rod.</td></tr>
<tr><td colspan="2">1. Detaching the drip proof cover</td></tr>
<tr><td>1</td><td>Remove the drip proof cover.</td></tr>
<tr><td>2</td><td>See at right for the refrigerant piping assembly.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Procedure</th><th>Points</th></tr>
<tr><td>3</td><td>Remove the lock screw from the piping assembly.</td><td>
</td><td></td></tr>
<tr><td>4</td><td>Disconnect the pipes form the accumulator (at points A and B) using a welding machine.</td><td>
</td><td rowspan="3">

Warning

The compressor's refrigerating machine oil may catch fire. Have wet cloth at hand for quickly putting out the fire.

Warning

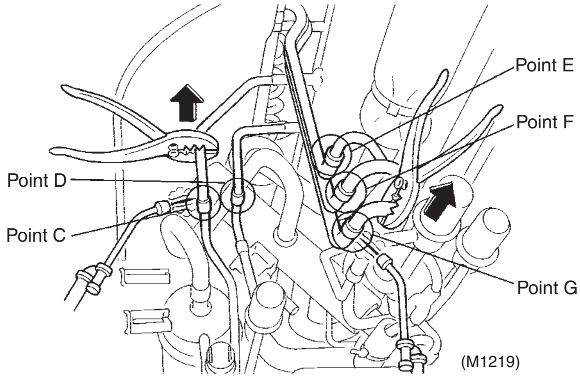
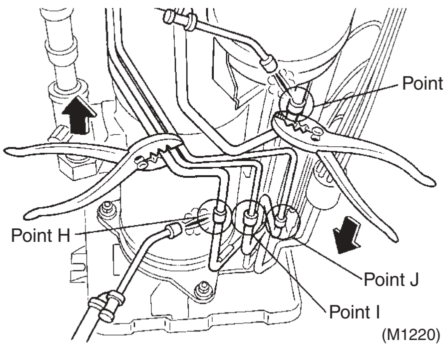
If refrigerant gas leaks during the job, ventilate the room. (Bear in mind that if the refrigerant gas is exposed to open flames, noxious gas may be generated.)

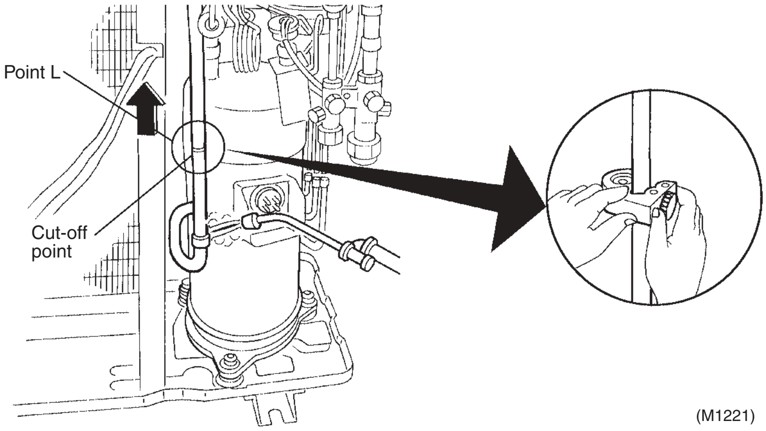
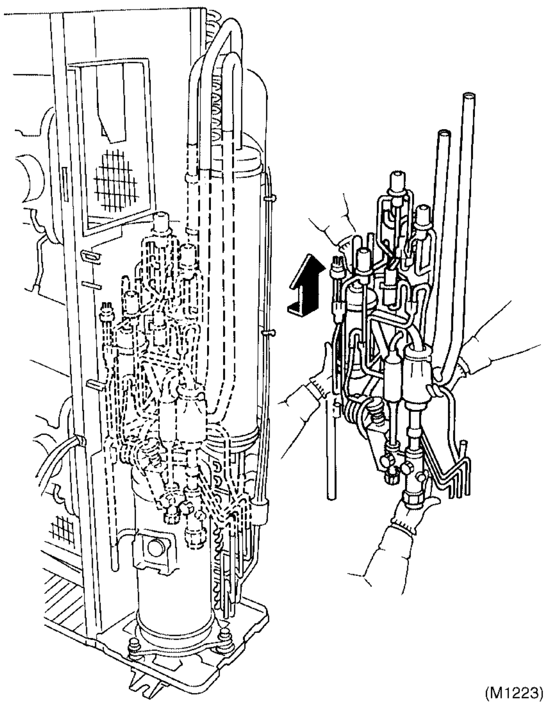
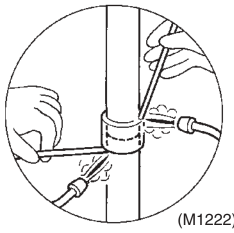
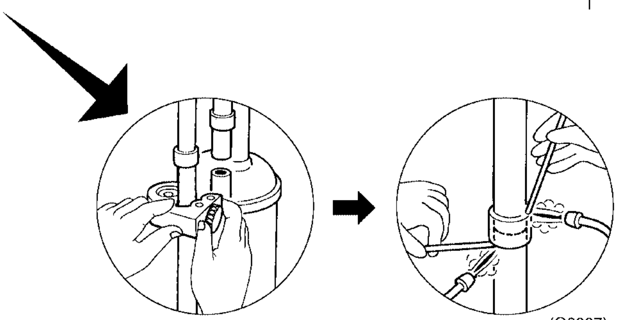
Caution

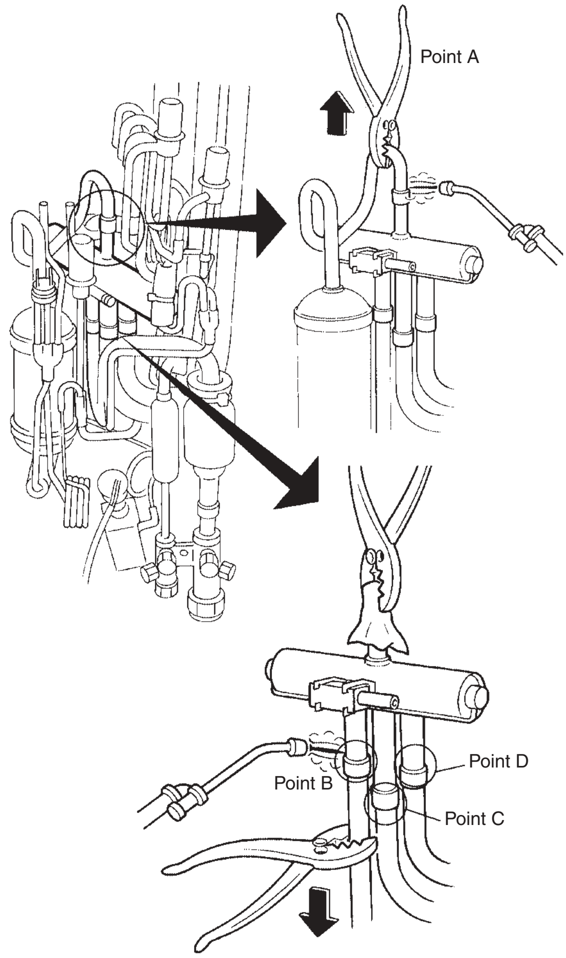
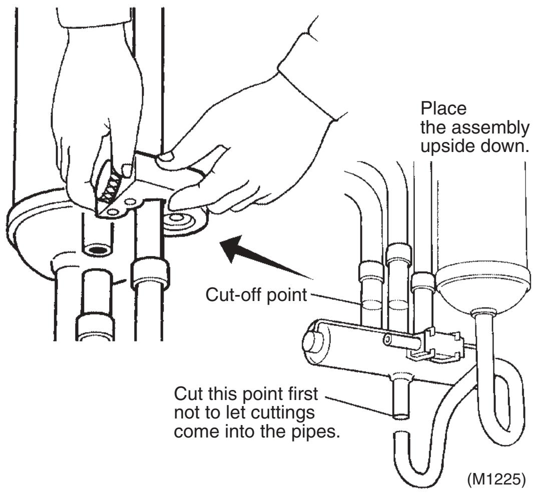
Be careful not to get yourself burnt with the pipes and other parts that are heated by the gas welding rod.

Caution

Do not allow flames of a gas welding rod to affect the parts around the motorized valve. Place welding protective sheets or iron plates around

</td></tr>
<tr><td>5</td><td>Disconnect the pipes at points C, D, E, F and G using the welding machine.</td><td>
</td></tr>
<tr><td>6</td><td>Also disconnect the pipes at points H, I, J and K using the welding machine.</td><td>
</td></tr>
</table>

Step	Procedure		Points
7	Cut off the compressor's discharge pipe (at point L) with the pipe cutter.	 (M1221)	
8	Disconnect the 4-way valve assembly.	 (M1223)	■ In reconnecting the 4-way valve assembly, braze the cut-off point together with a copper tube union (Local supply).  (M1222)
	■ It may be difficult to disconnect the pipes (at points A and B) of the accumulator (discussed in Step (4) above). In such case, use the pipe cutter. When reconnecting the 4-way valve assembly, braze the cut-off point together with a copper tube union.	 (Q0007)	

Step		Procedure	Points
2. Disconnecting the 4-way valve			
1	Remove the screw.		
2	Get rid of the brazing at points A, B, C and D. Disconnect the 4-way valve assembly.		**Reassembling precautions** 1 Use non-oxidizing brazing method. If nitrogen gas is not available, braze the parts speedily. 2 Avoid deterioration of the packings due to carbonization of oil inside the 4-way valve or thermal influence. For this purpose, wrap the 4-way valve with wet cloth. Splash water over the cloth against becoming too hot (keep it below 120˚C). ■ In pulling the pipes, be careful not to overtighten them with pliers. The pipes may get deformed.
When cutting with the small pipe cutter:			If the gas welding machine fails to remove the 4-way valve, take the steps below. 1. Disconnect the brazed pipe sections that are readily easy to separate and join together later. 2. With a small copper tube cutter, cut off the internal pipes to easily take out the 4-way valve. **Note:** Never use a hack saw. Cuttings may come into the pipes. ■ Be careful not to lose or damage the drip proof cover. Fit it back into position.
1	Place the refrigerant piping assembly upside down to prevent cuttings from coming into the pipes		

3. Indoor Unit

3.1 Refer following table for indoor unit removal procedure

Model Number	Service Manual	Page
FTX25 / 35J, FTXD25 / 35K, FVX25 / 35K	Si12-001	P.176~192
FTXD50 / 60 / 71J	Si12-001	P.193~214
FLX25~60H, FLX50 / 60J	Si05-003 * Similer model FL(E)-H	P.50~65
CDX25~60HA, CDX25~60J	Si12-001 * Similer model CDK(X)25~60H	P.215~219
FHYC35~71FK	—	—
FHYB35~71B	ESIE 02-01	—

Part 11
Cautions before Operation

1. Installation 294
   1.1 Outdoor Unit 294
   1.2 BP Unit 296
2. Wiring 298
   2.1 Outdoor Unit 298
   2.2 BP Unit 300
   2.3 Outdoor Unit Rotary Switch Setting 302
3. Others 304
   3.1 Explanation for FTX25/35J Series 304
   3.2 Explanation for CDK(X)25~60H Series 307

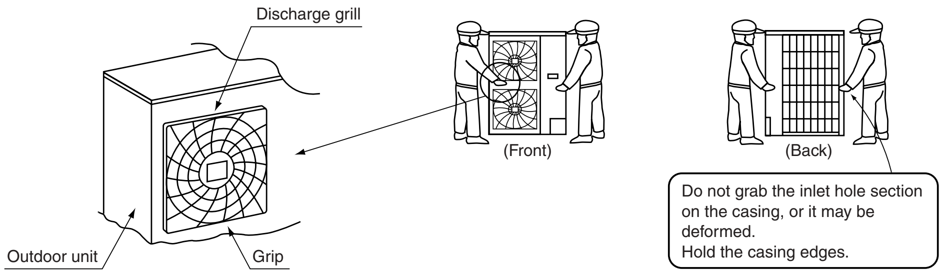
1. Installation

1.1 Outdoor Unit

1 INSTALLATION PROCEDURE

1. Carrying-in

- Take care not to let your hands and other objects touch the rear fins. ⚠ **WARNING**
  1. Carry in the equipment slowly, using the grips provided on the sides.



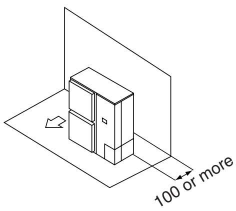
- Always use accessory parts or those of designated specification as parts required for installation.

2. Installation service space

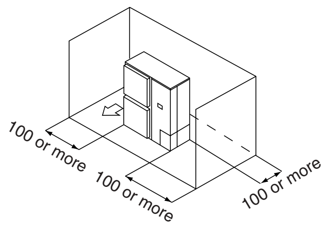
*** The horizontal coupling and stacking are not allowed.**

(A) Where there is an obstacle on the suction side:

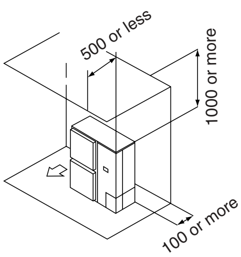
- No obstacle above
  - · Obstacle on the suction side only



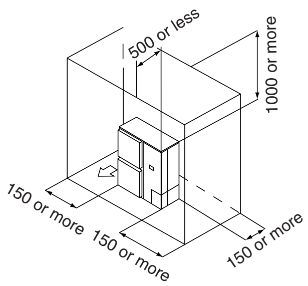
  - · Obstacle on both sides



- Obstacle above, too
  - · Obstacle on the suction side, too

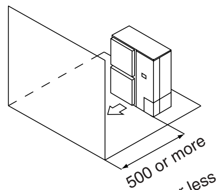


  - · Obstacle on the sunction side, and both sides

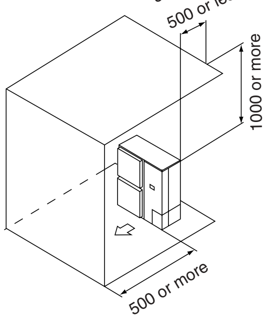


(B) Where there is an obstacle on the discharge side:

- No obstacle above



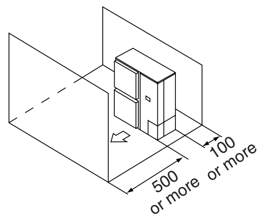
- Obstacle above, too



(C) Where there are obstacles on both suction and discharge sides:

Pattern 1 Where the obstacles on the discharge side is higher than the unit:

- No obstacle above

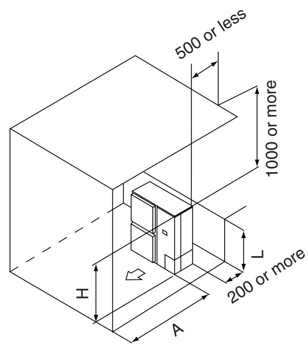


- Obstacle above, too

The relations between H, A and L are as follows:

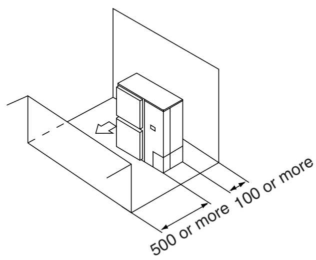
	L	A
L ≤ H	0 < L ≤ 1/2H	750
	1/2H < L	1000
H < L	Set the stand as: L ≤ H	

Close the bottom of the installation frame to prevent the discharged air from being bypassed.



Pattern 2 Where the obstacle on the discharge side is lower than the unit:

- No obstacle above

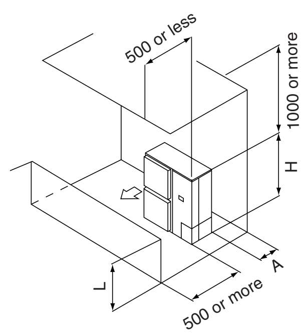


- Obstacle above, too

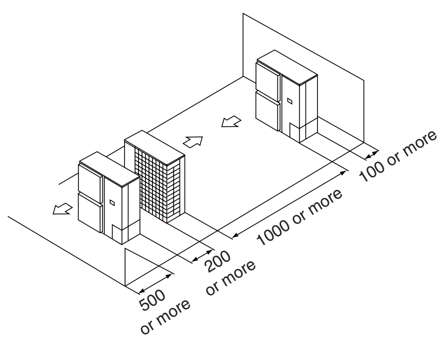
The relations between H, A and L are as follows:

	L	A
L ≤ H	0 < L ≤ 1/2H	100
	1/2H < L	200
H < L	Set the stand as: L ≤ H	

Close the bottom of the installation frame to prevent the discharged air from being bypassed.



(D) Multiple rows of series installation (on the rooftop, etc.)

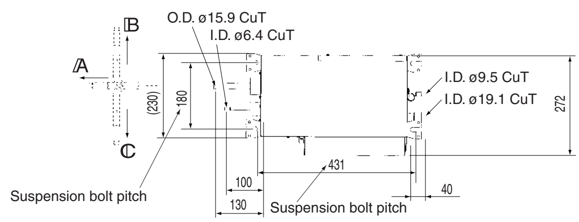


1.2 BP Unit

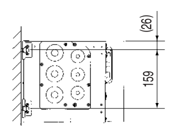
1 INSTALLATION

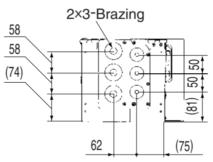
- This unit may be installed suspended from the ceiling or mounted on the wall.
- **This unit may only be installed vertically, as shown in the diagram below.** (Side D is facing up.) However, it may be freely installed in any direction forward or back, and to the sides.
- Be sure to leave a **600mm square** opening for service and inspection as shown in the diagram below, for both ceiling-suspended installation and wall-mounted installation.
- This unit **"does not require drain treatment"** as it uses internal foam treatment as low-pressure piping insulation.
- This unit may be installed with sides F or R facing forward (servicing direction).
- The piping for the indoor unit may be freely led around in directions A , B, or C.
- The inclination of side D must be within ±5˚C degrees forward or back or to the sides.

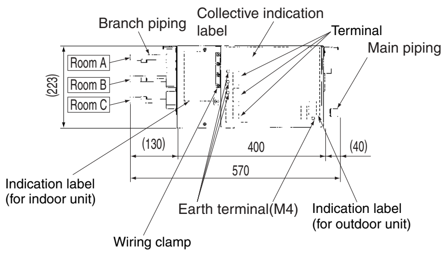
Three-sided view
(product dimensions and attachment bolt pitch)

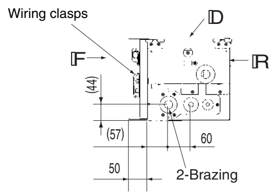


Wall-mounted

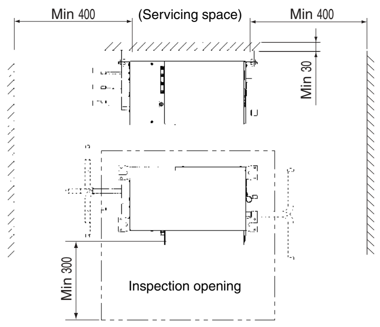






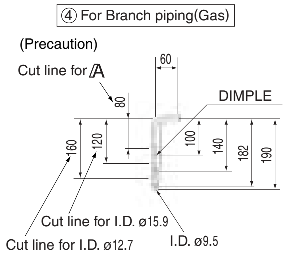


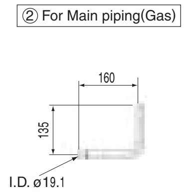
Installation restrictions
(installation and service space)

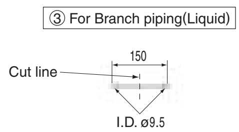


Be sure to leave a 600mm square opening for service and maintenance.

Standard accessories





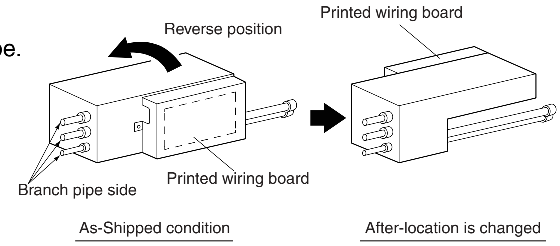


(Precaution) Cut the piping on the standard accessories to match the indoor unit's piping diameter.

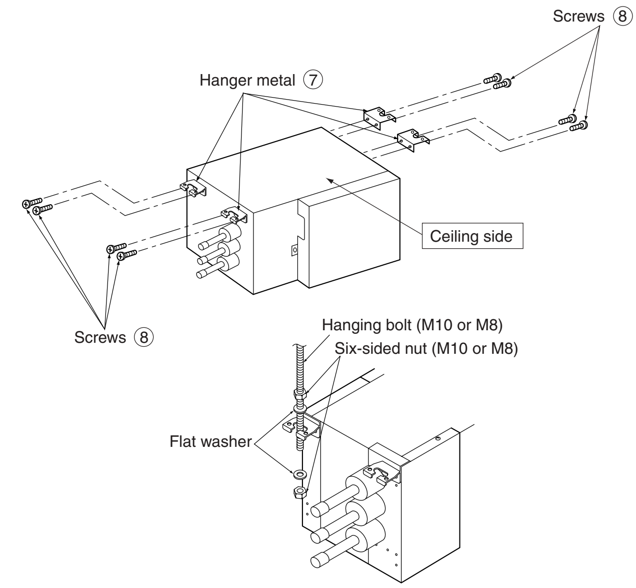
2 INSTALLATION OF THE MAIN UNIT

NOTES:

- This unit has two different installation types: (1) ceiling-suspended type and (2) wall-mounted type.
- Choose the proper installation pattern according to the location of installation.
- The installation location for printed wiring board can be changed. Follow the procedure specified in the "CONNECTING THE WIRING" section to change the location. (Refer to ★ mark)

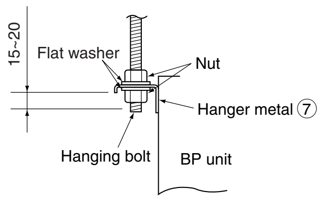


(1) Ceiling-suspended type

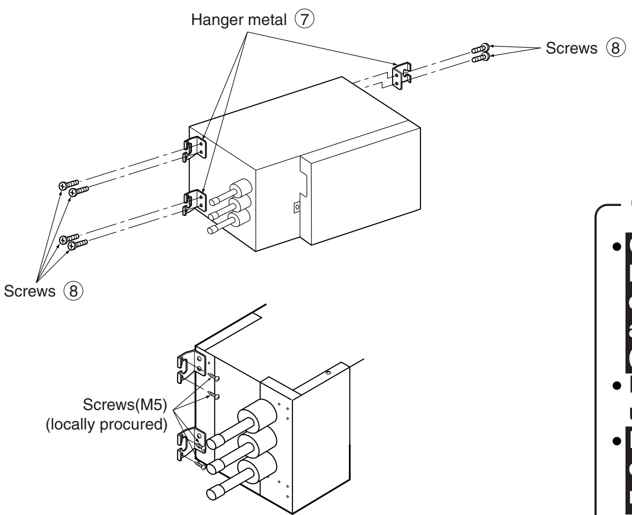


Procedure

(1) Fix the furnished hanger metal ⑦ with two screws ⑧. (4 locations in total)
(2) Using an insert-hole-in-anchor, hang the hanging bolt.
(3) Install a hexagon nut and a flat washer (locally-procured) to the hanging bolt as shown in the figure in the left, and lift the main unit to hang on the hanger metal.
(4) After checking with a level that the unit is level, tighten the hexagon nut.
*The tilt of the unit should be within ±5° in front/back and left/right.



(2) Wall-mounted type



Procedure

(1) Fix the furnished hanger metal ⑦ with two screws ⑧. (3 locations in total)
(2) After checking with a level that the unit is level, fix the unit with the furnished wood screws ⑦.
*The tilt of the unit should be within ±5° in front/back and left/right.

CAUTIONS:

- **Once a screw-hole on the main unit has had a screw hammered in, make sure to either hammer it again or cover it with aluminum tape. (This is to prevent condensation.)**
- Be sure to install the unit with the ceiling-side up.
- **Do not install near bedrooms. The sound of refrigerant flowing through the piping may sometimes be audible.**

2. Wiring

2.1 Outdoor Unit

1 ELECTRIC WIRING CONNECTION

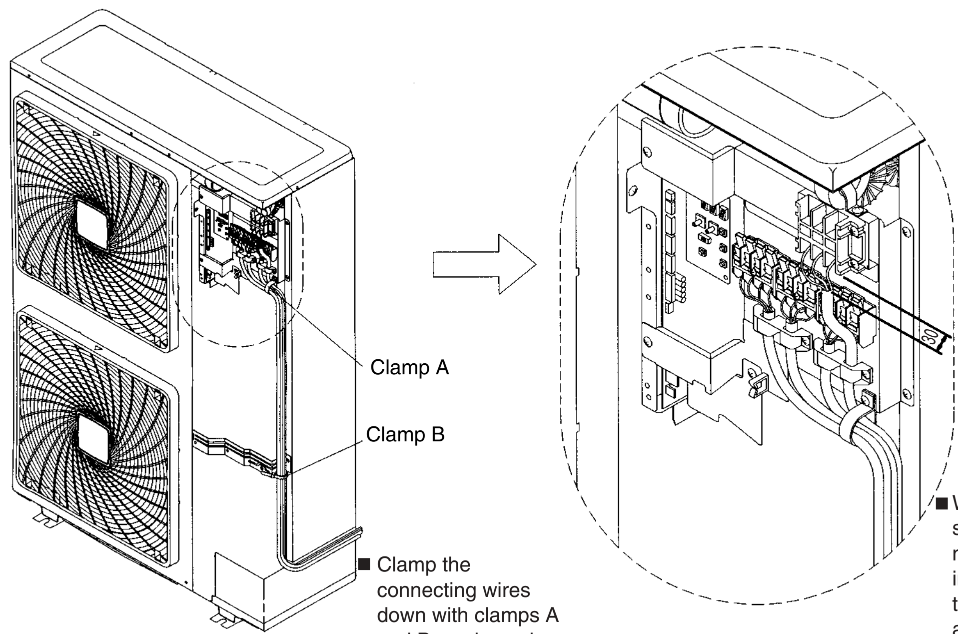
1. Connection electric wire treatment (⚠CAUTION)

Following are the precautions for inter-unit wiring and power supply wiring.
Be sure to install an earth leakage breaker and safety breaker.

- Do not turn ON the safety breaker for the outdoor power supply before all the work is completed.
- Make sure that the wiring and the piping for each room have the same alphabetical code. (BP1, BP2, BP3)
- In double-outdoor-unit installation, be sure that the wirings are connected in the same outdoor-units as pipings are connected.
- On the inter-unit wiring, terminals of each line at the BP side and the outdoor side must have the same number.
- Tighten the terminal screws on the power supply terminal block securely.
- For power supply, be sure to use a dedicated power circuit.
- Fix wires securely over the sheathes with the clamp.
- Connect an earth wire to the earth screw.
  For earthing, follow applicable local standards for electrical installations.
- For inter-unit wiring, do not use a cut wire joined to another on the way. Use wires long enough to cover the entire length.

WARNING

Do not use tapped wires, stand wires, extensioncords, or starbust connections, as they may cause overheating, electrical shock, or fire.

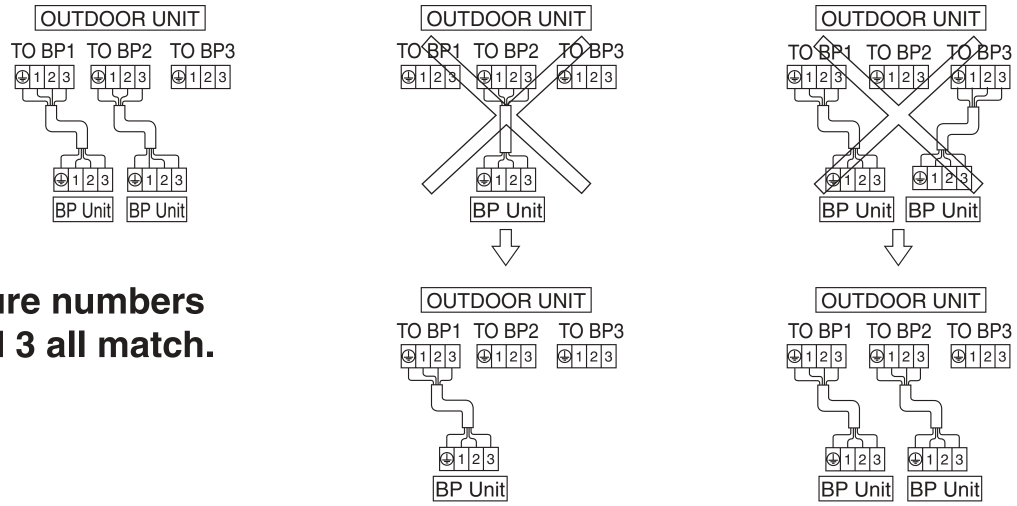


■ Clamp the connecting wires down with clamps A and B as shown in the diagram.

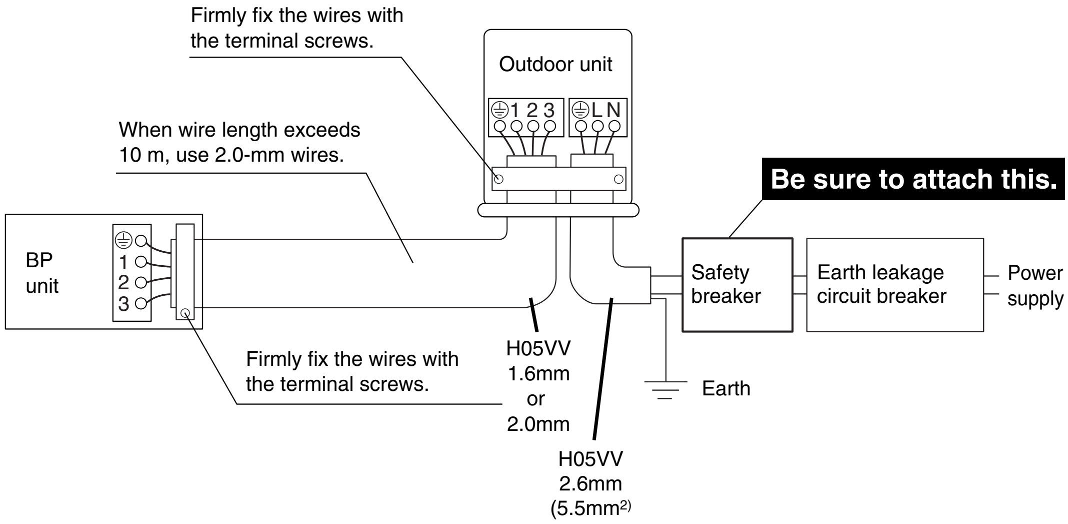
■ When connecting the power supply cord, do not peel back more than 30mm of the cable insulation from the power supply terminal board, in order to be able to pull the connecting terminal board around.

2. BP unit connection priority

When connecting to the BP unit, always start the connection with BP1 of the terminal board (at outdoor unit side) in the sequential order.
Improper connection will cause a transmission failure, preventing the operation.



Make sure numbers 1, 2, and 3 all match.

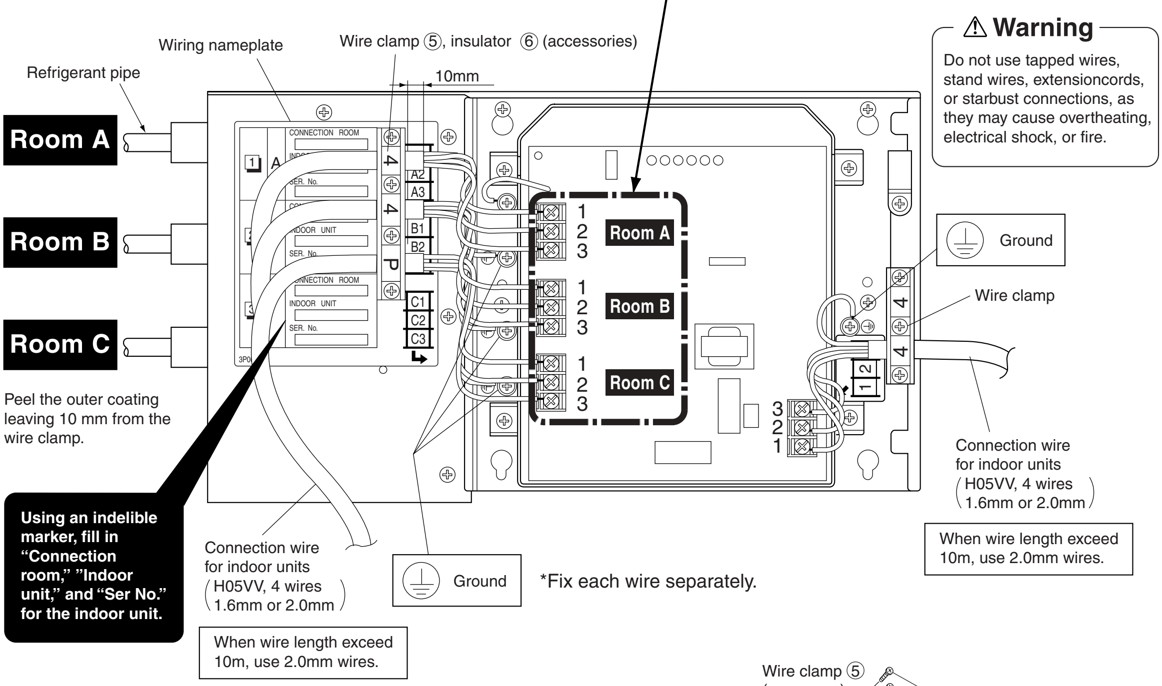


2.2 BP Unit

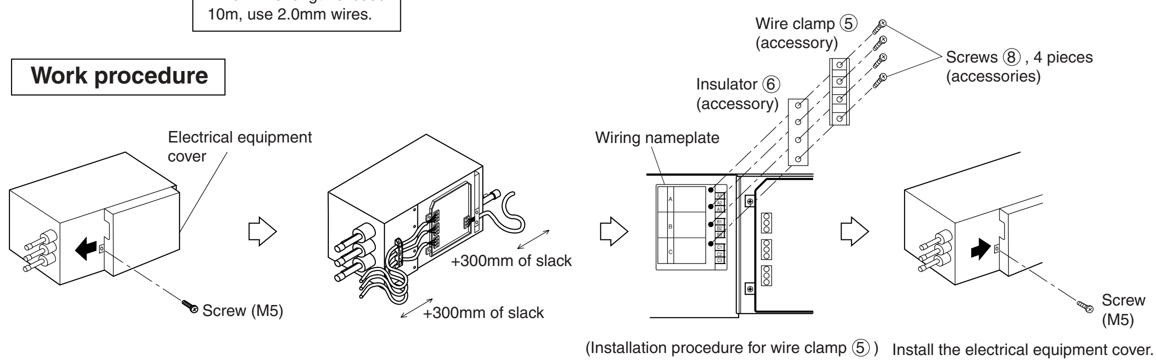
1 CONNECTING THE WIRING

- Connect refrigerant pipes and connection wires to the appropriate ports marked with matching alphabets (A, B, and C) on this unit .
- Follow the instructions on the wiring nameplate to connect the connection wires of indoor/outdoor units to terminal board numbers. (1,2 and 3) Always fix each ground wire separately with a ground screw. (See the figure below.)
- After completing the wiring, fix the outer coating of wires securely with wire clamps. The wire clamp on indoor unit side is furnished. Follow the procedure below to install.

NOTE:
The terminal board numbers are arranged from top to bottom in order of 1, 2, and 3.



Work procedure



(1) Remove the electrical cover. Loosen one of the screws, and slide the cover in the direction of the arrow.

(2) Perform wiring. Allow 300 mm for the pulling-out section of harness.

(3) After checking the wiring, fill in "Connection room," "Indoor unit," and "Ser No." of the indoor unit on the wiring nameplate.

(4) Fix the wires completely with wire clamps (2 locations).

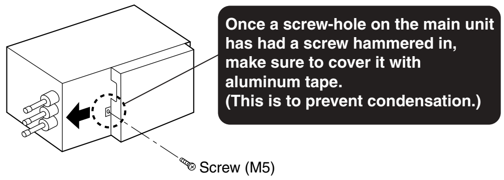
(5) In reverse procedure of (1), slide the electrical equipment cover, and fix it with the screw.

★ Procedure for changing the installation location of printed wiring board

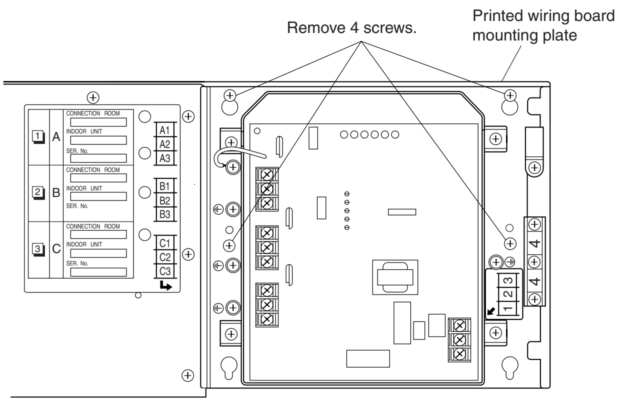
If the installation location of printed wiring board needs to be changed because of the installation conditions, perform the following:

CAUTIONS:
- Do not turn ON the power until relocation and wiring is completed.
- When supplying power, it will automatically recognize the vertical orientation of the printed wiring board and change the terminal board for the indoor unit in order starting with A, B, and then C from above.

(1) Remove the electrical equipment cover.
Loosen the screw, and slide the cover in the direction indicated by the arrow.

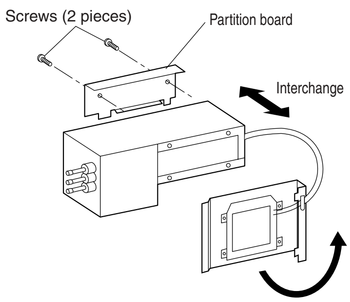


(2) Loosen 4 screws shown in the figure on the below, remove the mounting plate of the printed wiring board.



(3) Loosen and remove 2 screws fixed on the partition board in the opposite side.

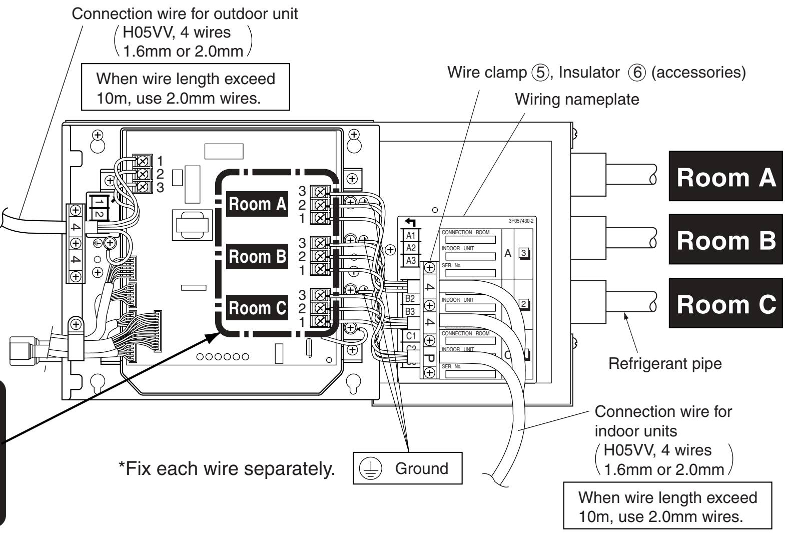
(4) Interchange the positions of the printed wiring board and partition board, and then fix them with screws.



(5) Follow the instruction on the wiring nameplate to connect the connection wires for indoor/outdoor units in accordance with the terminal board numbers.

⚠ Warning

Do not use tapped wires, stand wires, extensioncords, or starburst connections, as they may cause overtheating, electrical shock, or fire.



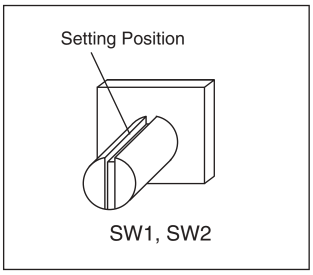
NOTE:
The terminal board numbers are arranged from top to bottom in order of 3, 2, and 1.

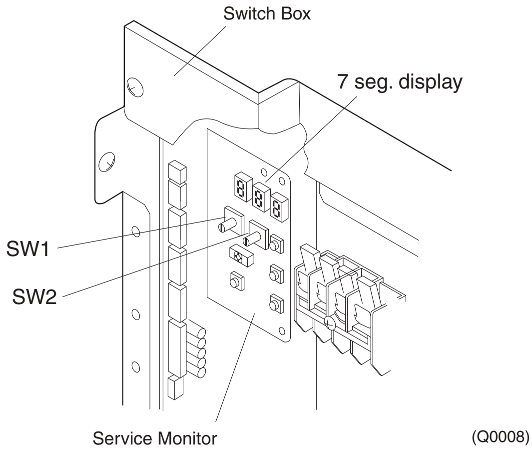
Operating Test

Follow the "operating test" as described in the manual for installation that comes with outdoor unit.

1P058455B

2.3 Outdoor Unit Rotary Switch Setting





* RAM View Monitor

RSW1	RSW2	Remarks	Unit
0	0	Latest (status) error code	Error code
0	1	Latest (status) error spot	Standard
0	2	Current run mode	Status
0	3	Current 4-way valve	Status
0	4	Current operating frequency (Hz)	Frequency
0	5	Current EVP	EV openness
0	6	Current EVG	EV openness
0	7	Current EVL	EV openness
0	8	Current fan (upper)	Fan rpm
0	9	Current fan (lower)	Fan rpm
1	0	Current input current	Ampere
1	1	Current total input current	Ampere
1	2	Current high pressure (calculated)	Pressure
1	3	Current suction pressure	Pressure
1	4	Current outdoor temperature	Temp. offset 40h
1	5	Current discharge temperature	Temperature
1	6	Current suction temperature	Temp. offset 40h
1	7	Current outdoor heat exchange temperature	Temp. offset 40h
1	8	Current outdoor fluid pipe temperature	Temp. offset 40h
1	9	Current fin temperature	Temperature
2	0	Current box temperature	Temp. offset 40h
2	1	Current BP 1 Room-A motorized valve openness	EV openness
2	2	Current BP 1 Room-B motorized valve openness	EV openness
2	3	Current BP 1 Room-C motorized valve openness	EV openness
2	4	Current BP 2 Room-A motorized valve openness	EV openness
2	5	Current BP 2 Room-B motorized valve openness	EV openness
2	6	Current BP 2 Room-C motorized valve openness	EV openness
2	7	Current BP 3 Room-A motorized valve openness	EV openness
2	8	Current BP 3 Room-B motorized valve openness	EV openness
2	9	Current BP 3 Room-C motorized valve openness	EV openness
3	0		
3	1	Current BP 1 Room-A fluid pipe temperature	Temp. offset 40h
3	2	Current BP 1 Room-B fluid pipe temperature	Temp. offset 40h
3	3	Current BP 1 Room-C fluid pipe temperature	Temp. offset 40h
3	4	Current BP 2 Room-A fluid pipe temperature	Temp. offset 40h
3	5	Current BP 2 Room-B fluid pipe temperature	Temp. offset 40h
3	6	Current BP 2 Room-C fluid pipe temperature	Temp. offset 40h
3	7	Current BP 3 Room-A fluid pipe temperature	Temp. offset 40h
3	8	Current BP 3 Room-B fluid pipe temperature	Temp. offset 40h
3	9	Current BP 3 Room-C fluid pipe temperature	Temp. offset 40h

RSW1	RSW2	Remarks	Unit
4	1	Current BP 1 Room-A gas pipe temperature	Temp. offset 40h
4	2	Current BP 1 Room-B gas pipe temperature	Temp. offset 40h
4	3	Current BP 1 Room-C gas pipe temperature	Temp. offset 40h
4	4	Current BP 2 Room-A gas pipe temperature	Temp. offset 40h
4	5	Current BP 2 Room-B gas pipe temperature	Temp. offset 40h
4	6	Current BP 2 Room-C gas pipe temperature	Temp. offset 40h
4	7	Current BP 3 Room-A gas pipe temperature	Temp. offset 40h
4	8	Current BP 3 Room-B gas pipe temperature	Temp. offset 40h
4	9	Current BP 3 Room-C gas pipe temperature	Temp. offset 40h
5	0		
5	1	Current BP 1 Room-A indoor temperature	Temp. offset 40h
5	2	Current BP 1 Room-B indoor temperature	Temp. offset 40h
5	3	Current BP 1 Room-C indoor temperature	Temp. offset 40h
5	4	Current BP 2 Room-A indoor temperature	Temp. offset 40h
5	5	Current BP 2 Room-B indoor temperature	Temp. offset 40h
5	6	Current BP 2 Room-C indoor temperature	Temp. offset 40h
5	7	Current BP 3 Room-A indoor temperature	Temp. offset 40h
5	8	Current BP 3 Room-B indoor temperature	Temp. offset 40h
5	9	Current BP 3 Room-C indoor temperature	Temp. offset 40h
6	0		
6	1	Current BP 1 Room-A heat exchange temperature	Temp. offset 40h
6	2	Current BP 1 Room-B heat exchange temperature	Temp. offset 40h
6	3	Current BP 1 Room-C heat exchange temperature	Temp. offset 40h
6	4	Current BP 2 Room-A heat exchange temperature	Temp. offset 40h
6	5	Current BP 2 Room-B heat exchange temperature	Temp. offset 40h
6	6	Current BP 2 Room-C heat exchange temperature	Temp. offset 40h
6	7	Current BP 3 Room-A heat exchange temperature	Temp. offset 40h
6	8	Current BP 3 Room-B heat exchange temperature	Temp. offset 40h
6	9	Current BP 3 Room-C heat exchange temperature	Temp. offset 40h
7	0		
7	1	Current BP 1 Room-A ∆D signal	∆D signal
7	2	Current BP 1 Room-B ∆D signal	∆D signal
7	3	Current BP 1 Room-C ∆D signal	∆D signal
7	4	Current BP 2 Room-A ∆D signal	∆D signal
7	5	Current BP 2 Room-B ∆D signal	∆D signal
7	6	Current BP 2 Room-C ∆D signal	∆D signal
7	7	Current BP 3 Room-A ∆D signal	∆D signal
7	8	Current BP 3 Room-B ∆D signal	∆D signal
7	9	Current BP 3 Room-C ∆D signal	∆D signal
8	0		
8	1	Gas short error counter (NGAS)	Counter
8	2	Discharge pipe temperature error counter (NOT)	Counter
8	3	HPS action counter (NHPS)	Counter
8	4	Upper fan lock error counter (NF1LOCK)	Counter
8	5	Upper fan OCP error counter (NF1OCP)	Counter
8	6	Lower fan lock error counter (NF2LOCK)	Counter
8	7	Lower fan OCP error counter (NF2OCP)	Counter
8	8	Supply voltage line error counter (NDC)	Counter
8	9	Output current line electronic thermal anti-stall counter (NTH)	Counter
9	0	Electronic thermal anti-stall counter with position detection waveform (NST)	Counter
9	1	Box temperature rise counter (NBOX)	Counter
9	2	Radiation fin temperature rise counter (NFIN)	Counter
9	3	Compressor lock counter (NCOMP)	Counter
9	4	AC current sensor line error counter (NCT)	Counter
9	5	Total input over-current error counter (NIINT)	Counter
9	6	INV input over-current error counter (NIINV)	Counter
9	7	Anti-freeze action counter (NTOU)	Counter
9	8	Peak cut action counter (NPC)	Counter
9	9	BP indoor anti-freeze error counter (NCOLD HU)	Counter

3. Others

3.1 Explanation for FTX25/35J Series

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

Trial Operation and Testing

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

For Heat pump

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

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

For Cooling operation in case of low ambient temperature

Select the lowest programmable temperature.

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

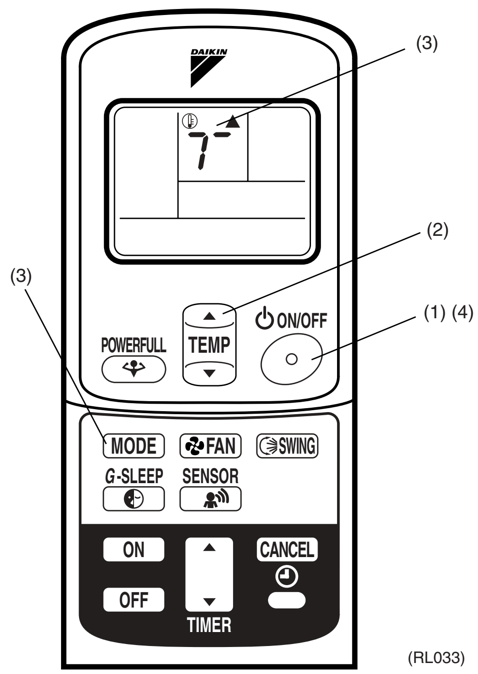
Trial operation from Remote Controller

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

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

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

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



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

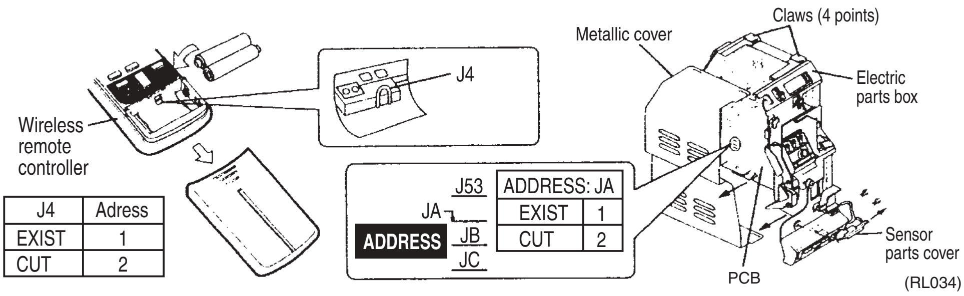
- **How to set the different addresses.**
- When two indoor units are installed in one room, the two wireless remote controllers can be set for different addresses.

PCB in the indoor unit

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

Wireless remote controller

- Cut the jumper J4.



(RL034)

3.1.3 Centralized Control (For KRC72, KRP413A1S)

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

Cut jumper JC on the indoor PC Bord.

(ML112)

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

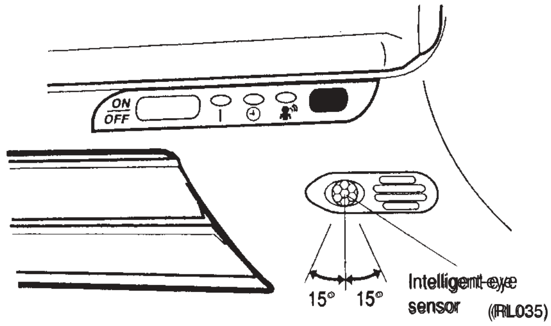
- If the unit was running when a power failure occurred, it may not resume operation after recovering from a power failure.

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

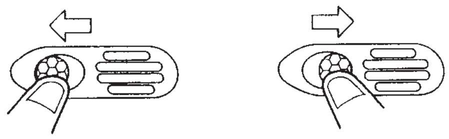
Jumper (On indoor PC Board)	Function	When connected (factory set)	When cut
JC	Power failure recovery function	Auto start	Unit does not resume operation after recovering from a power failure. Timer ON-OFF settings are cleared.
JB	Fan speed setting when compressor is OFF on thermostat.	Fan speed setting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

3.1.5 Adjusting the Angle of the Intelligent-eye Sensor

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



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



Moving the sensor to the left Moving the sensor to the right
(RL036)

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

Caution

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

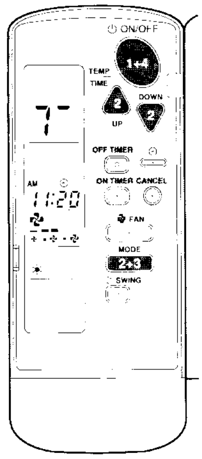
3.2 Explanation for CDK(X)25~60H Series

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

This program is to test the air conditioner independent from the room temperature and the temperature setting (i.e. as the thermostat of the indoor unit is bridged).
Carry out the test operation in accordance with the operation manual to ensure that all functions and parts, such as louvre movement, are working properly.

Using the remote controller for trial operation
1. Press the ON/OFF button to turn on the system.
2. Simultaneously press DOWN, UP and MODE buttons.
3. Press the MODE button twice. ("7" appears on the display to indicate that the trial operation mode is selected.)
4. Trial run mode terminates in approximately 30 minutes and switches into normal mode. To quit a trial operation, press the ON/OFF button.

Note: The air conditioner requires a small amount of power in stand-by mode. If the system is not to be used for some time after installation, shut off the circuit breaker to eliminate unnecessary power consumption.

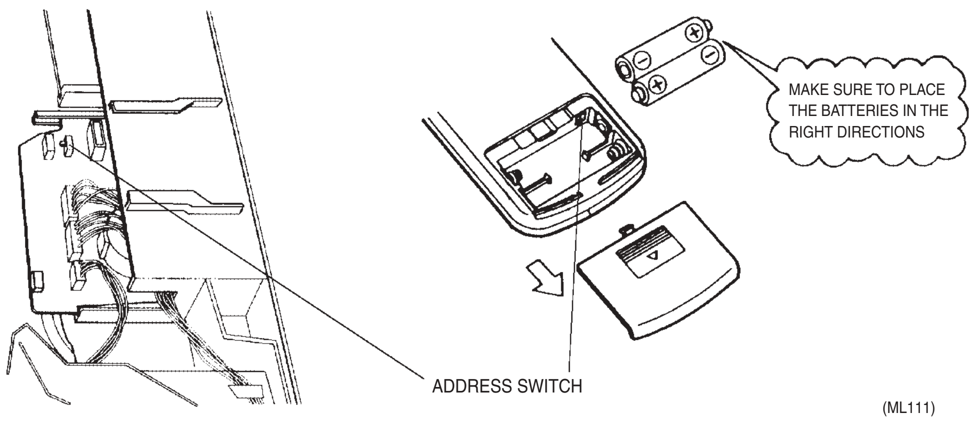


(ML110)

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

Either of the units (including wireless remote controller) needs to be set as follows.

Setting of address switch on wireless remote controller	[1] → [2] [1] : Before delivery
Address switch in door PCB1	[1] → [2]



(ML111)

3.2.3 Centralized Control (For KRC72, KRP411A1S and KRP410A11S)

For an explanation on usage, see the option handbook. However, do the following when using the KRP410A11S (Contact connection centralized control PC board).

Cut jumper JC on the indoor PC Bord.

(ML112)

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

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

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

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

Part 12
Appendix

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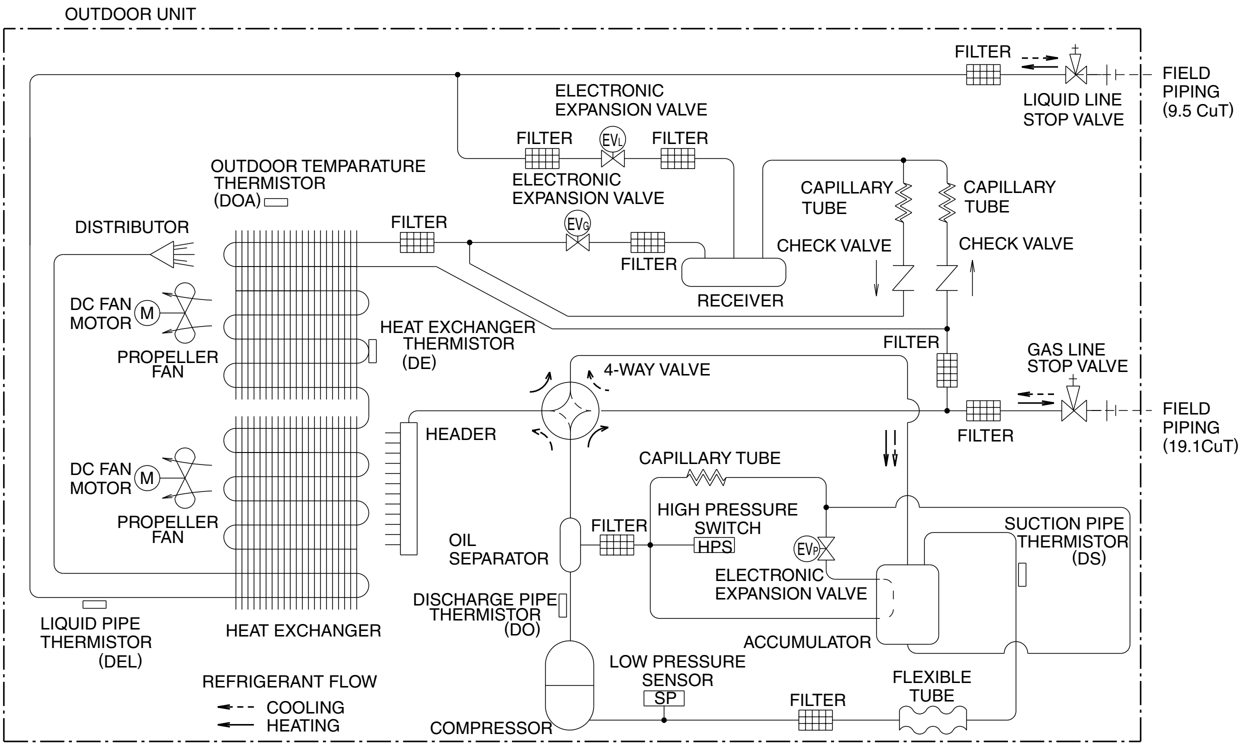
1. Piping Diagrams

1.1 Outdoor Units

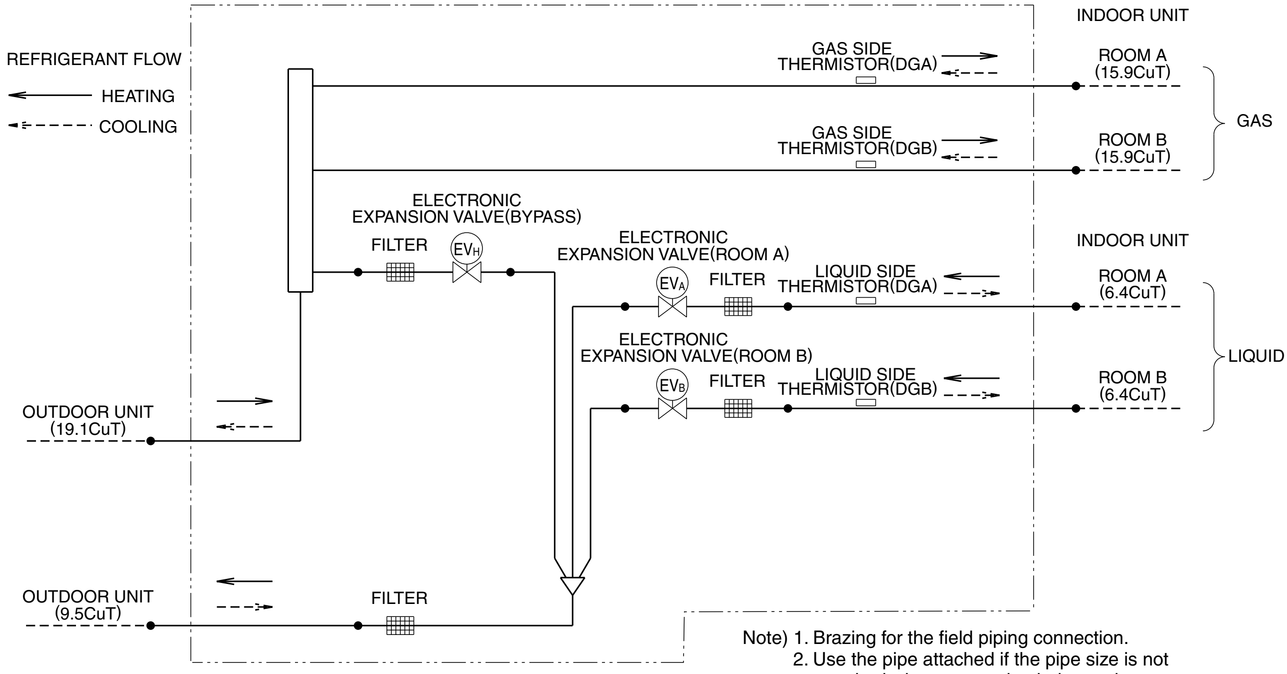
RMX140JVMB / RMX140JZVMB



3D024920C

1.2 BP Units

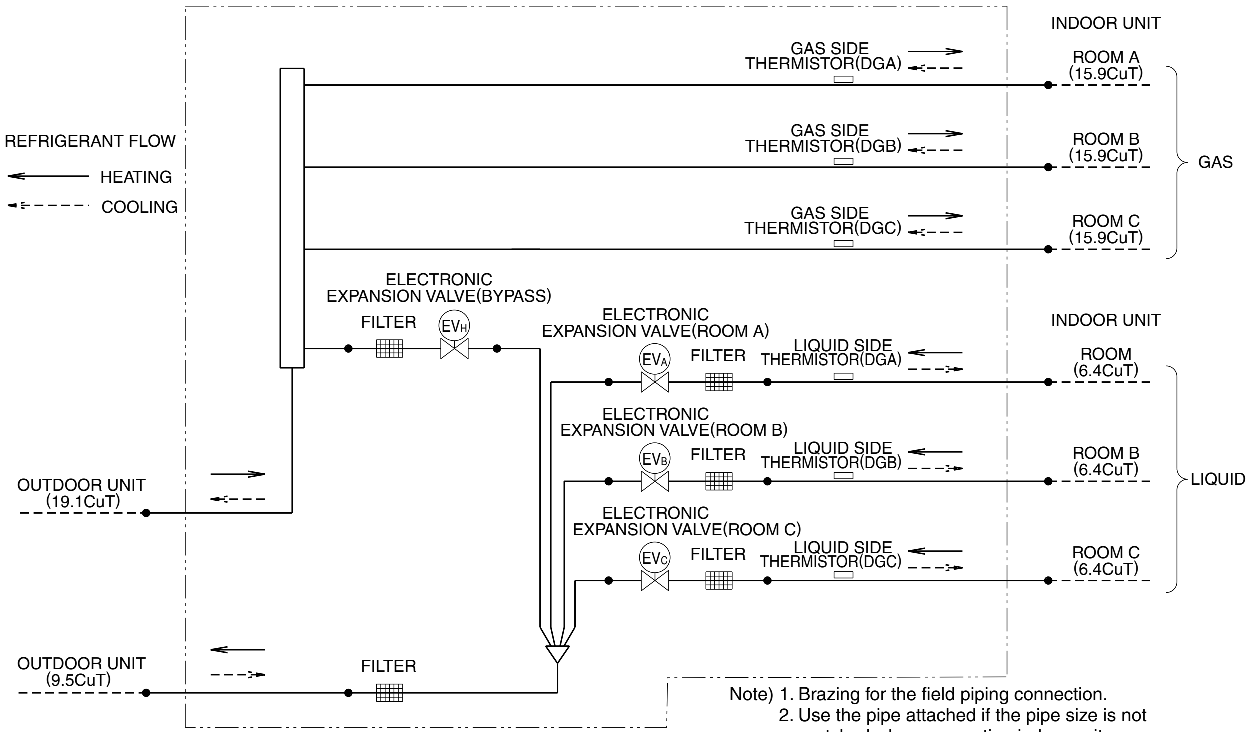
BPMK928B42



Note) 1. Brazing for the field piping connection.
2. Use the pipe attached if the pipe size is not matched when connecting indoor unit.
* Adjustable for the connecting direction.

C : 3D024825A

BPMK928B43

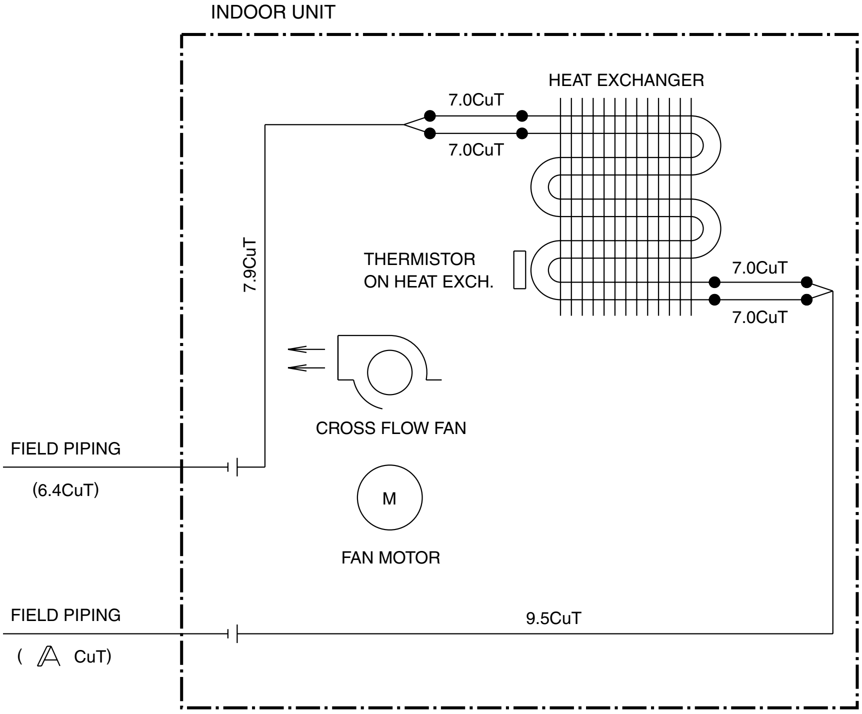


Note) 1. Brazing for the field piping connection.
2. Use the pipe attached if the pipe size is not matched when connecting indoor unit.
* Adjustable for the connecting direction.

C : 3D024824A

1.3 Indoor Units

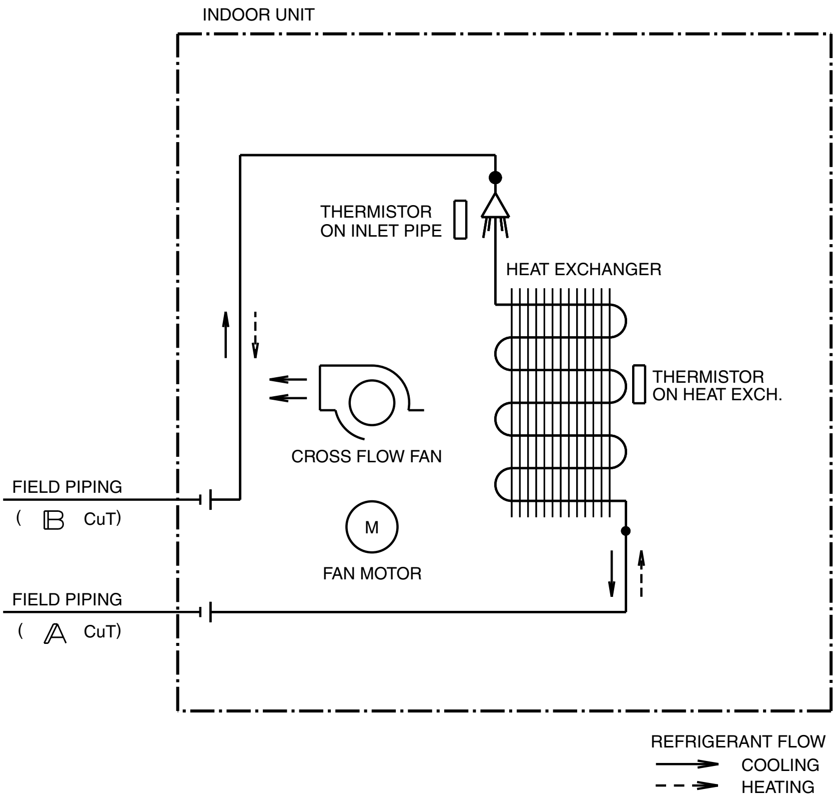
FTX25 / 35JAV1NB



	A
FTK25- FTX25-	9.5
FTK35- FTX35-	12.7

4D019960D

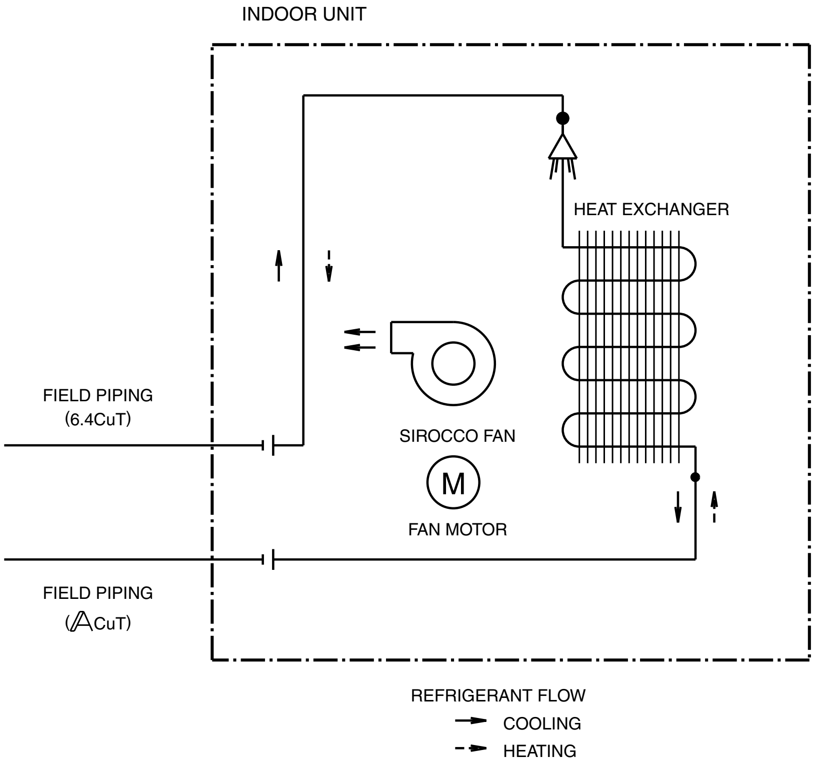
FTXD50 / 60 / 71JV1B



	A	B
FTXD50-	12.7	6.4
FTXD60-	15.9	6.4
FTXD71-	15.9	9.5

4D024820A

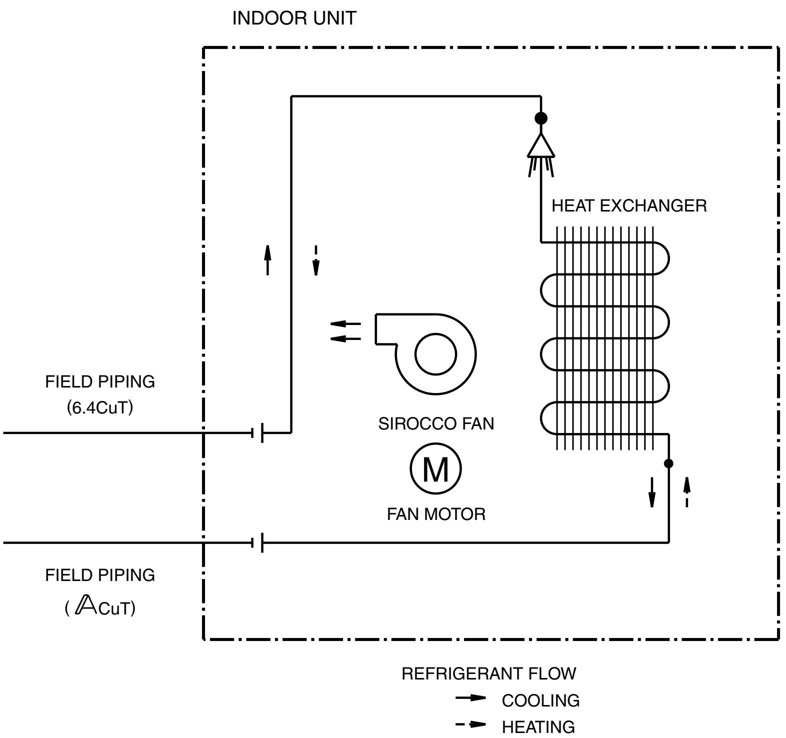
CDX25 / 35 / 50 / 60HAV1NB, CDX25 / 35 / 50 / 60JV1NB



	A
CDX25-	9.5
CDX35,50-	12.7
CDX60-	15.9

4D024749

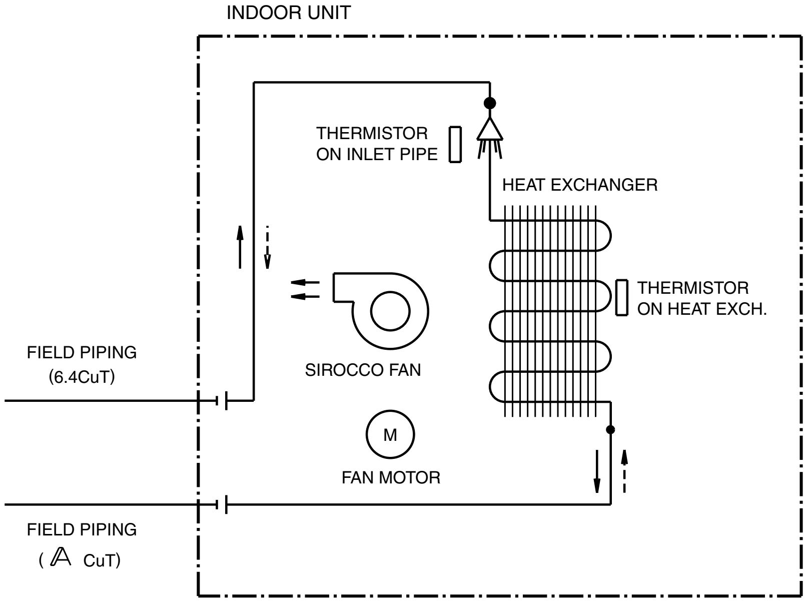
FLX25 / 35HV1NB



	A
FLX25-	9.5
FLX35,50-	12.7
FLX60-	15.9

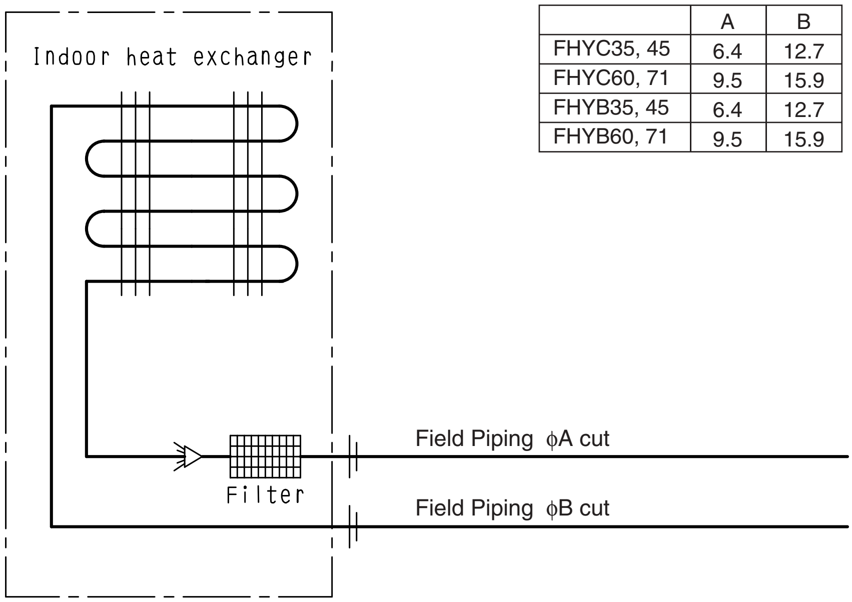
4D024775

FLX50 / 60JV1B



	A
FLX50-	12.7
FLX60-	15.9

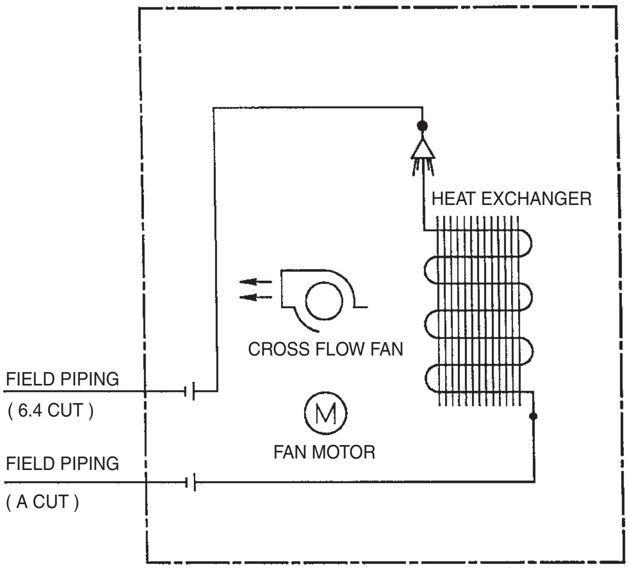
FHYB35 / 45 / 60 / 71FK7V1, FHYC35 / 45 / 60 / 71B7V1



	A	B
FHYC35, 45	6.4	12.7
FHYC60, 71	9.5	15.9
FHYB35, 45	6.4	12.7
FHYB60, 71	9.5	15.9

DU427-6109A

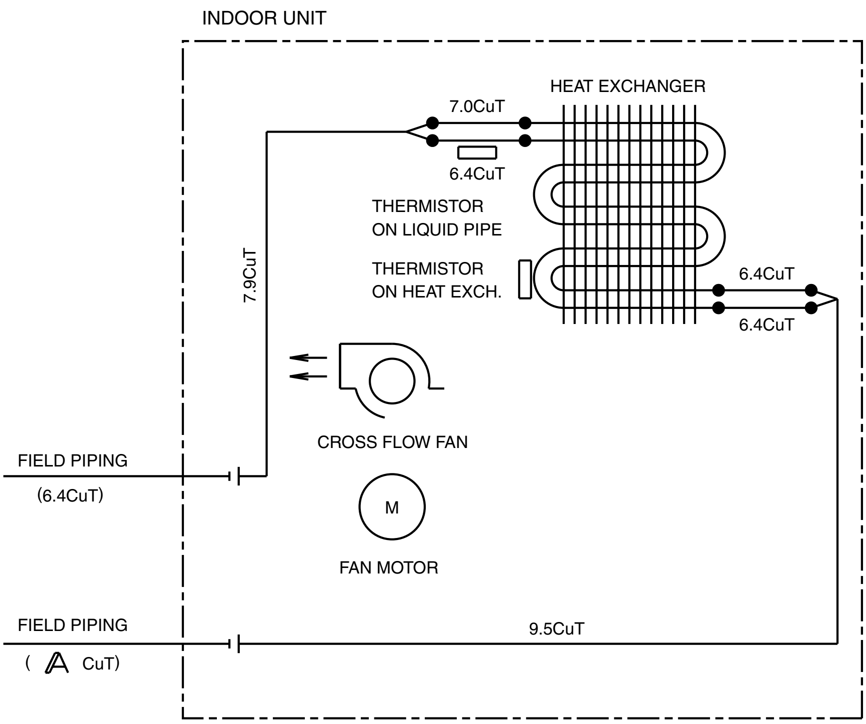
FTK50 / 60HVEC, FTX50 / 60HVEC



	A
FTK50-	12.7
FTK60-	15.9

4D013572

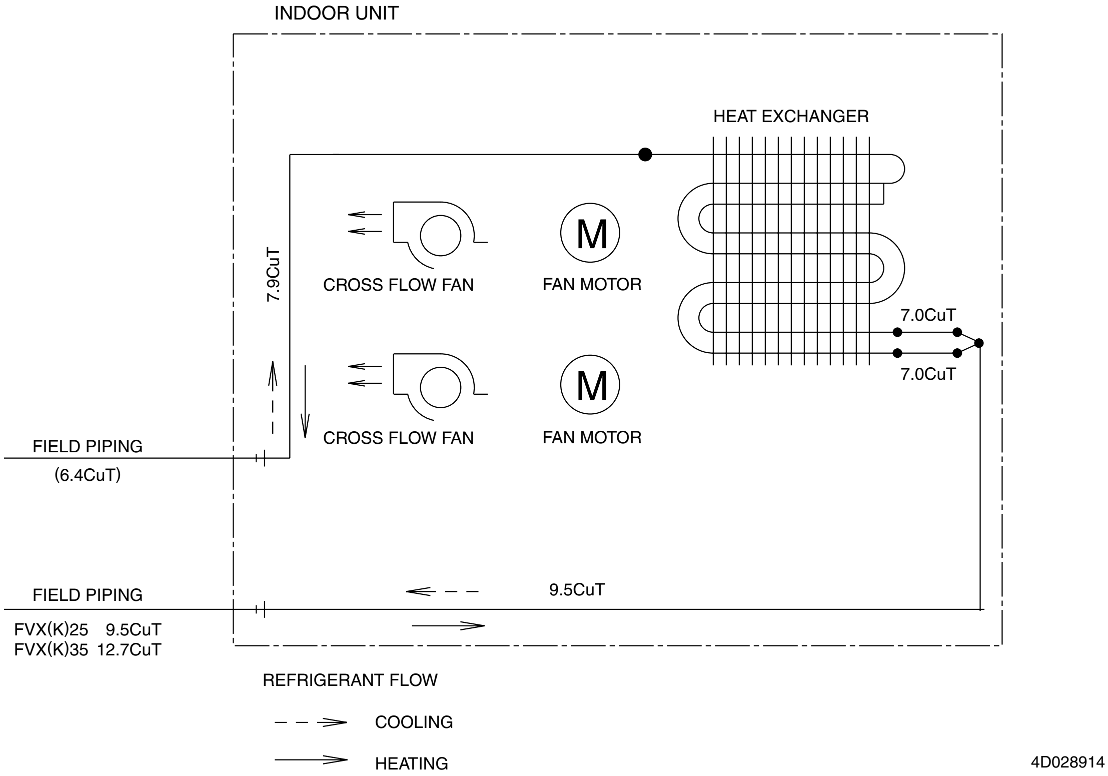
FTXD25 / 35KZV1B



	A
FTXD25KZV1B FTKD25KZV1B	9.5
FTXD35KZV1B FTKD35KZV1B	12.7

4D029145

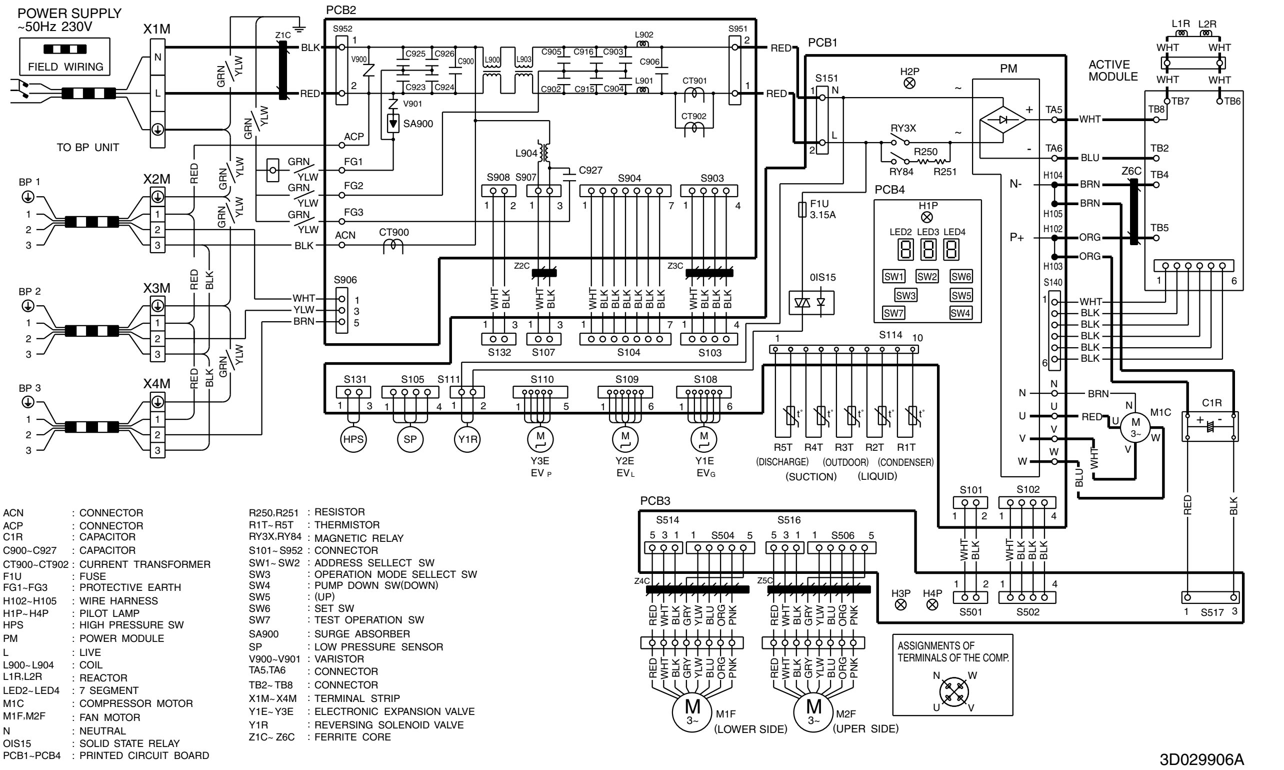
FVX25 / 35KZV1B



2. Wiring Diagrams

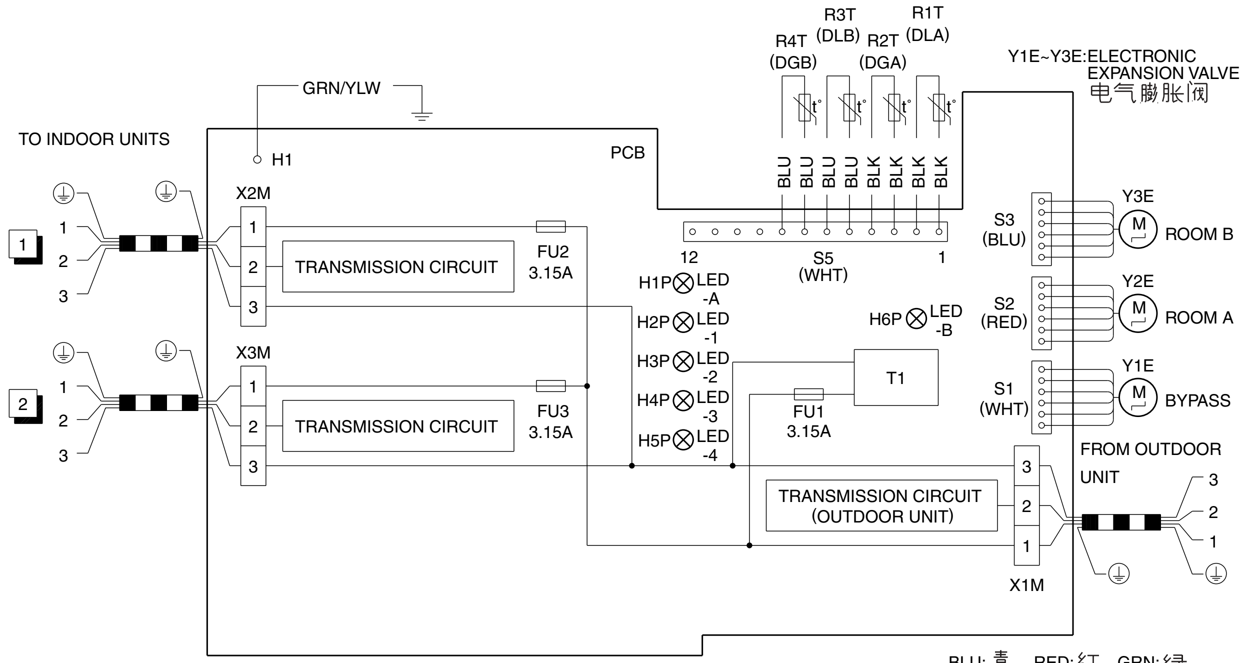
2.1 Outdoor Units

RMX140JVMB, RMX140JZVMB



2.2 BP Units

BPMK928B42



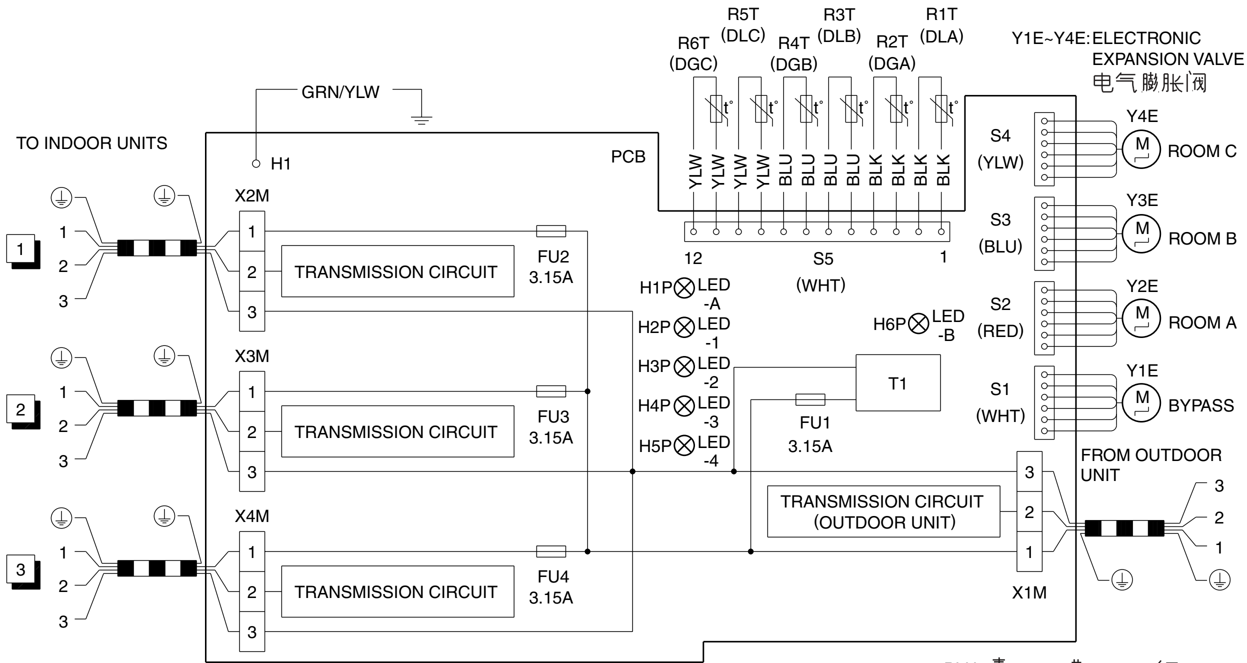
PCB :PRINTED CIRCUIT BOARD 印刷电路板
FU1~3 :FUSE 保险丝
H1P~H6P :PILOT LAMP 指示灯
R1T~R4T :THERMISTOR 热敏电阻

S1~S3,S5 :CONNECTOR 连接器
T1 :TRANSFORMAR 变压器
X1M~X3M :TERMINAL STRIP 接线板

BLU: 青 RED: 红 GRN: 绿
WHT: 白 BLK: 黑

3D024655B

BPMK928B43



PCB :PRINTED CIRCUIT BOARD 印刷电路板
FU1~4 :FUSE 保险丝
H1P~H6P :PILOT LAMP 指示灯
R1T~R6T :THERMISTOR 热敏电阻

S1~S5 :CONNECTOR 连接器
T1 :TRANSFORMAR 变压器
X1M~X4M :TERMINAL STRIP 接线板

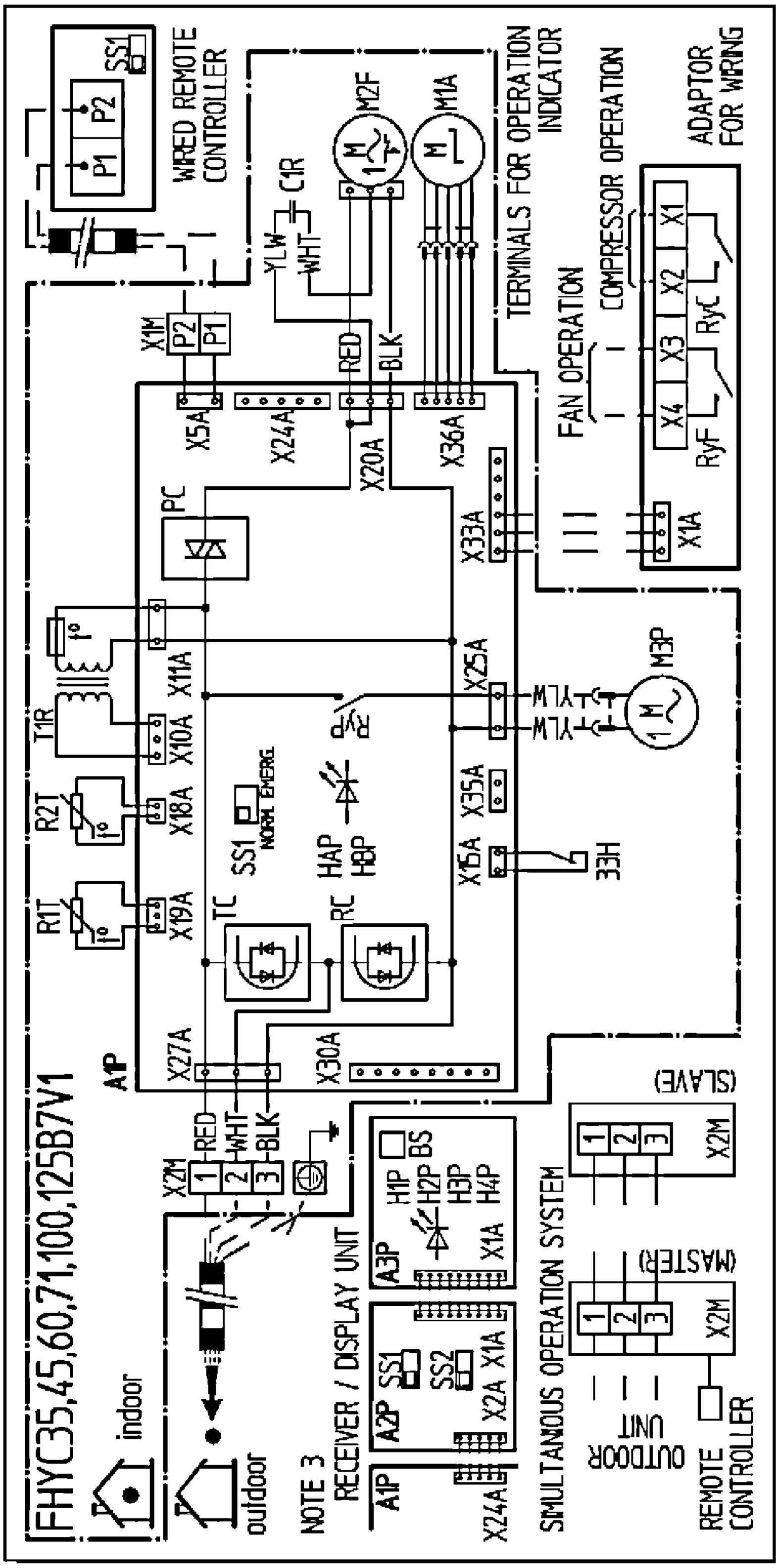
BLU: 青 YLW: 黄 RED: 红
WHT: 白 BLK: 黑 GRN: 绿

3D024654B

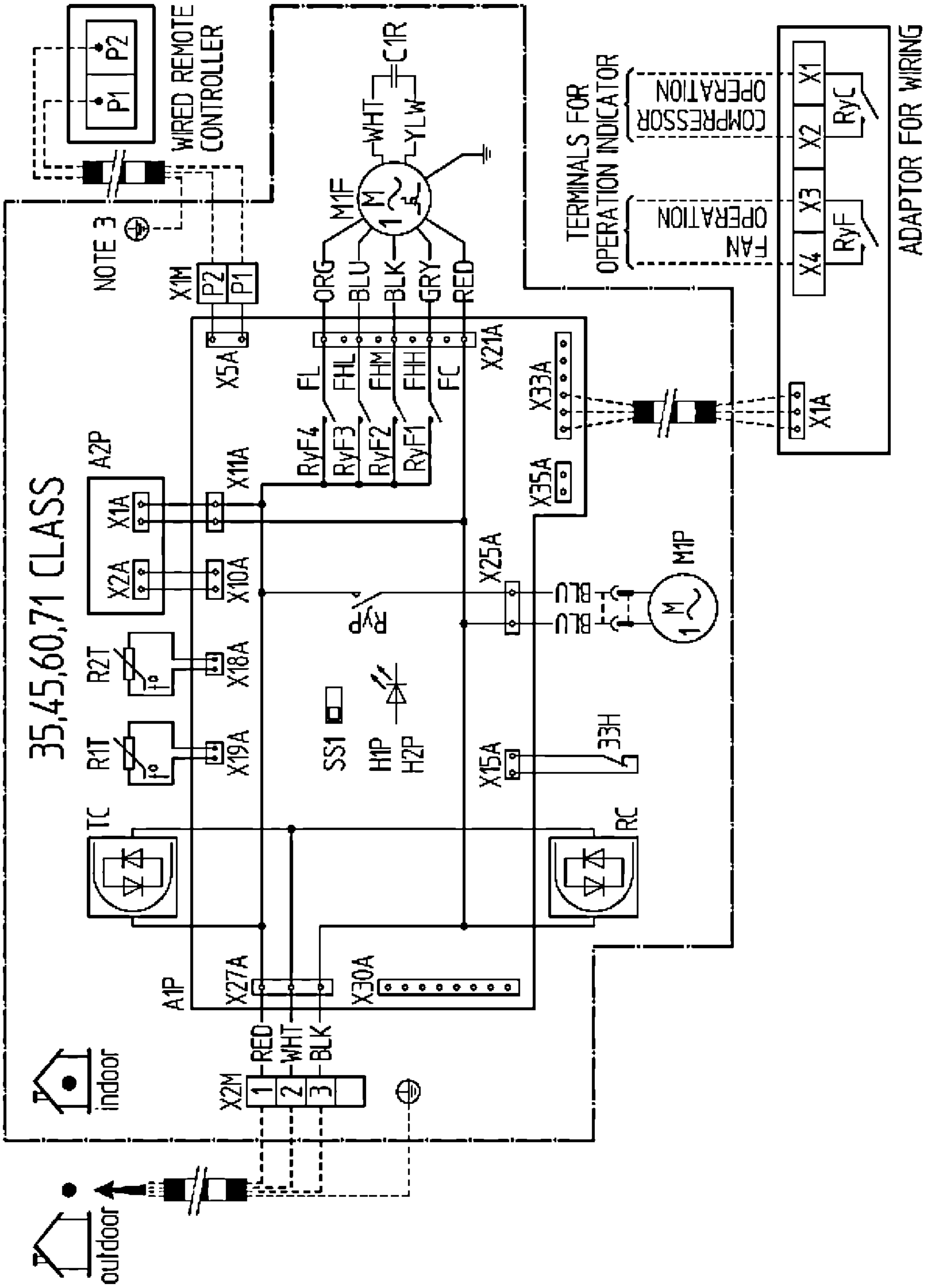
2.3 Indoor Units

2.3.1 Cooling Only

FHYC35 / 45 / 60 / 71B7V1

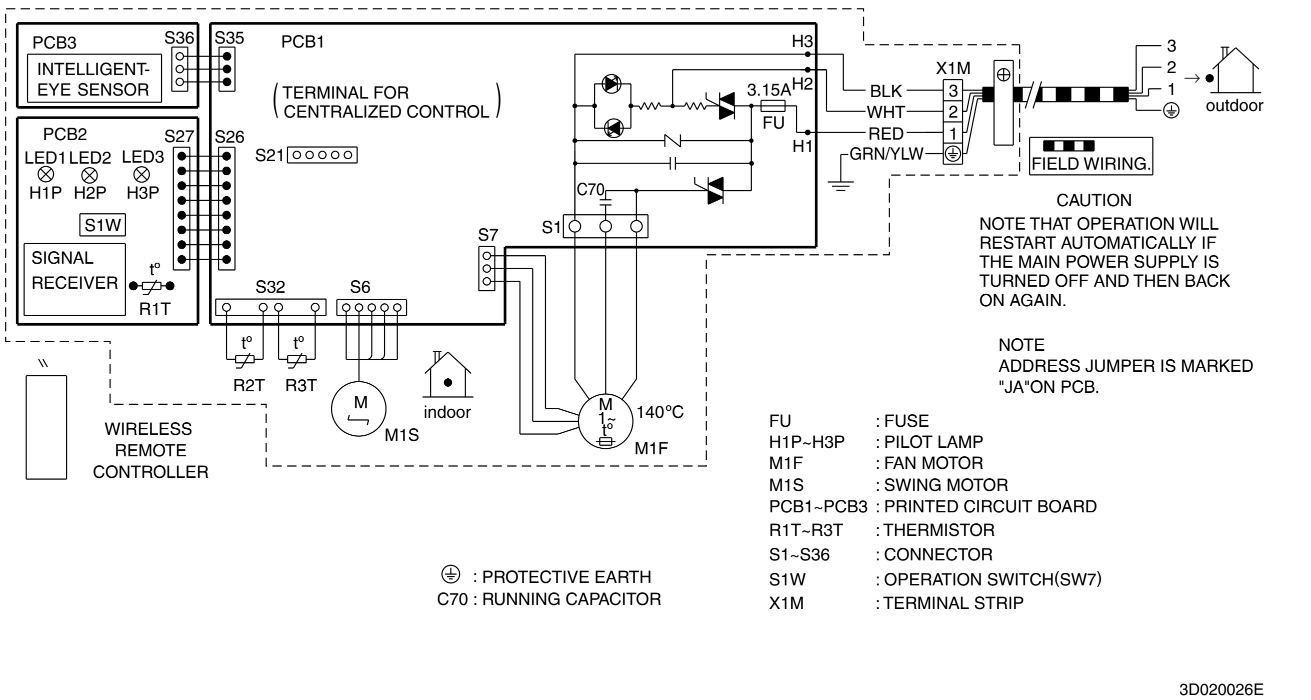


FHYB35 / 45 / 60 / 71FK7V1

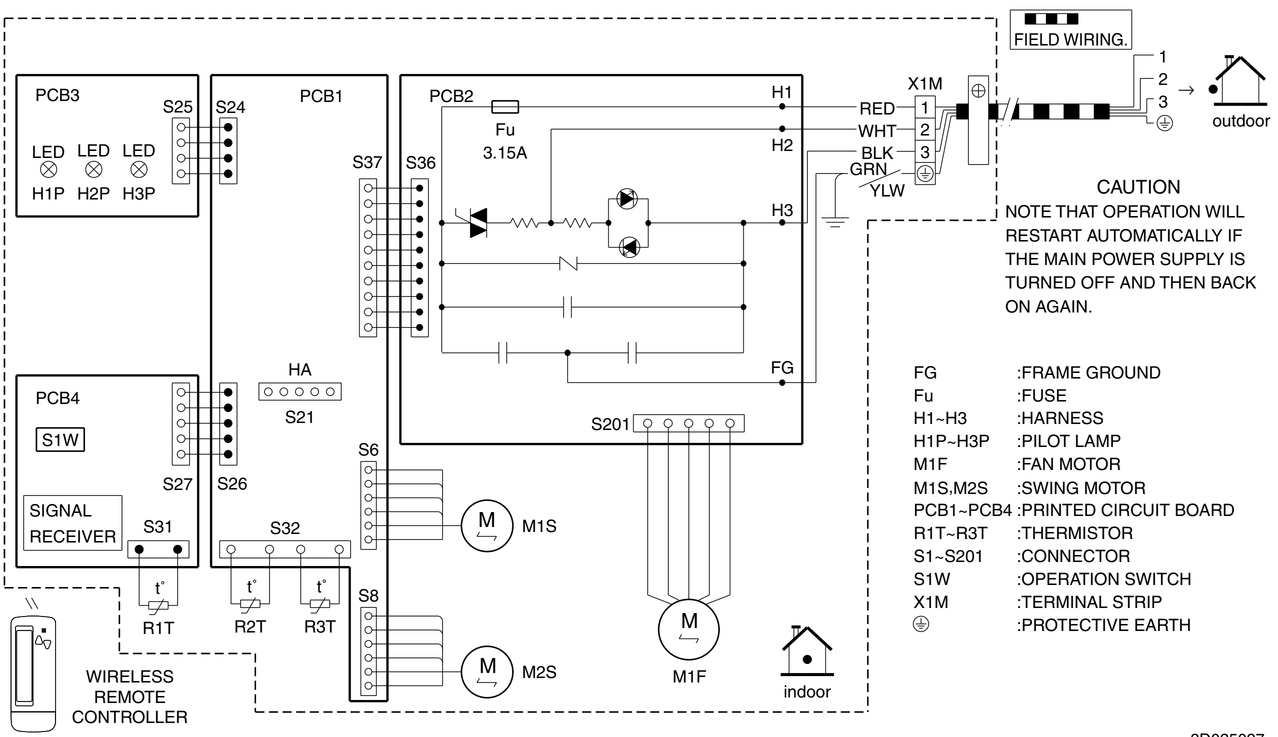


2.3.2 Heat Pump

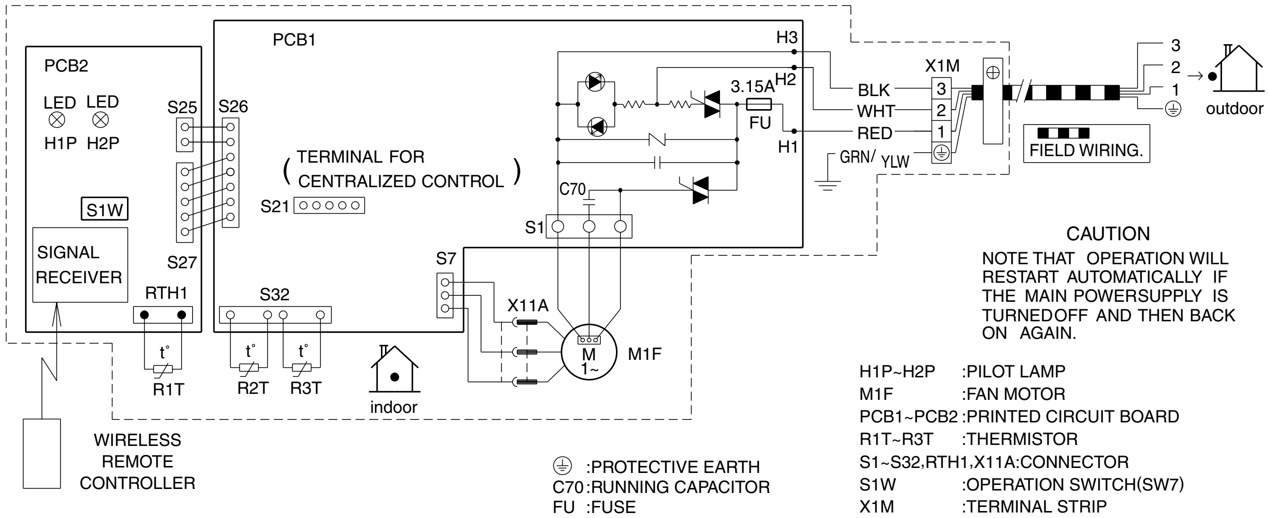
FTX25 / 35JAV1NB, FTXD25 / 35KZV1B



FTXD50 / 60 / 71JV1B

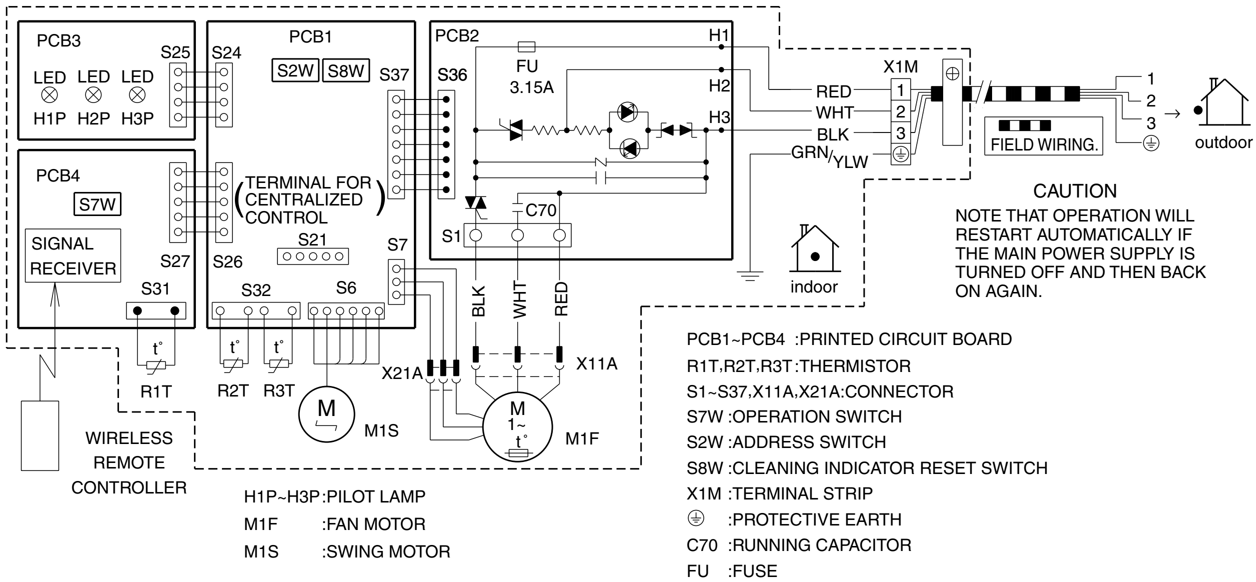


CDX25 / 35 / 50 / 60HAV1NB, CDX25 / 35 / 50 / 60JV1NB



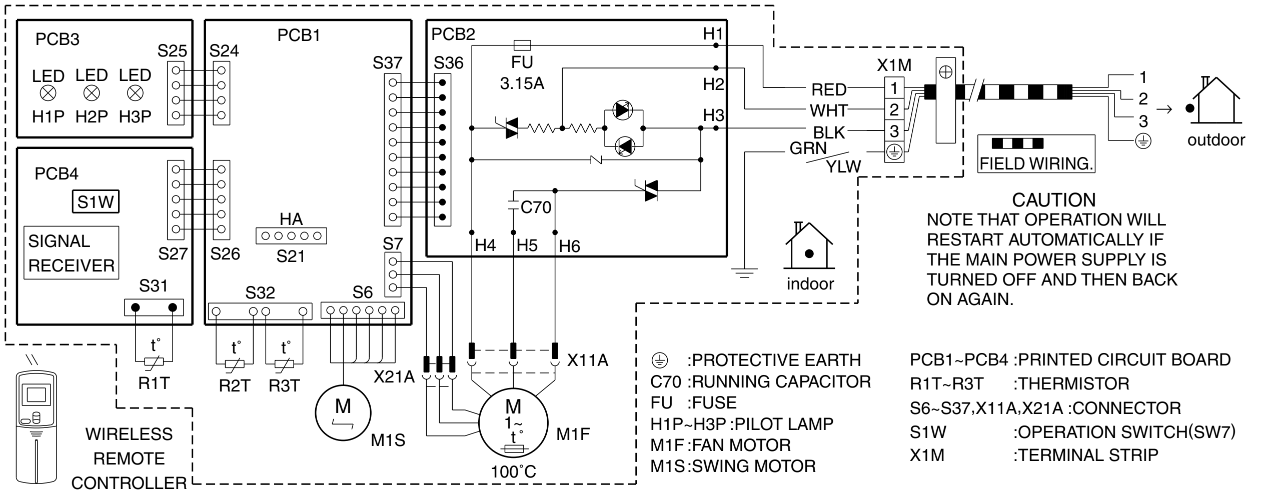
3D024411

FLX25 / 35HV1NB



3D024310

FLX50 / 60JV1B



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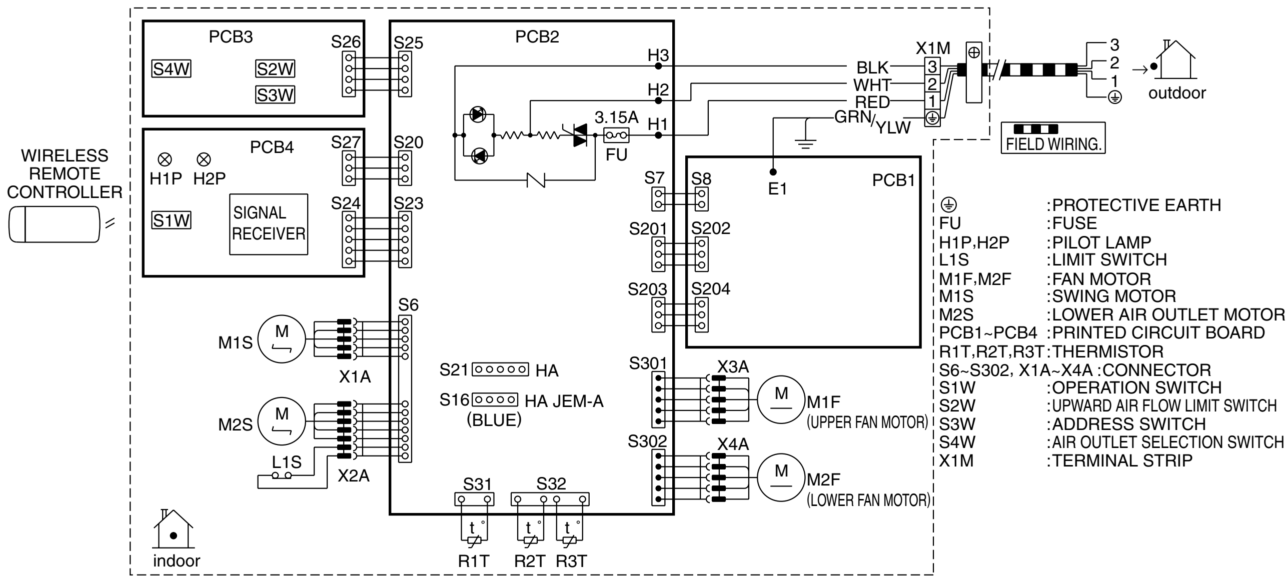
FVX25 / 35KZV1B



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SiE18-201 • 05/2003
Prepared in Belgium by Vanmelle