DAIKIN

SiMX042215E

R-32

Service Manual

Inverter Pair
Wall Mounted Type FTKM-U Series

[Applied Models]
- Inverter Pair : Cooling Only

Introduction

1. Safety Cautions

Be sure to read the following safety cautions before conducting repair work.
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.

	This manual is for the person in charge of maintenance and inspection.		This appliance is filled with R-32.

Caution Items

The caution items are classified into ⚠**Warning** and ⚠**Caution**. The ⚠**Warning** items are especially important since death or serious injury can result 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.

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

1.1 Warnings and Cautions Regarding Safety of Workers

⚠ Warning	
Do not store equipment in a room with fire sources (e.g., naked flames, gas appliances, electric heaters).	
Be sure to disconnect the power cable from the socket before disassembling equipment for repair. Working on equipment that is connected to the power supply may cause an electrical shock. If it is necessary to supply power to the equipment to conduct the repair or inspect the circuits, do not touch any electrically charged sections of the equipment.	
If refrigerant gas is discharged during repair work, do not touch the discharged refrigerant gas. Refrigerant gas may cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, evacuate the refrigerant gas completely at a well-ventilated place first. If there is gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it may cause injury.	
If refrigerant gas leaks during repair work, ventilate the area. Refrigerant gas may generate toxic gases when it contacts flames.	
Be sure to discharge the capacitor completely before conducting repair work. The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. A charged capacitor may cause an electrical shock.	

Warning	
Do not turn the air conditioner on or off by plugging in or unplugging the power cable. Plugging in or unplugging the power cable to operate the equipment may cause an electrical shock or fire.	
Be sure to wear a safety helmet, gloves, and a safety belt when working in a high place (more than 2 m). Insufficient safety measures may cause a fall.	
In case of R-32 / R-410A refrigerant models, be sure to use pipes, flare nuts and tools intended for the exclusive use with the R-32 / R-410A refrigerant. The use of materials for R-22 refrigerant models may cause a serious accident, such as a damage of refrigerant cycle or equipment failure.	
Do not mix air or gas other than the specified refrigerant (R-32 / R-410A / R-22) in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, causing equipment damage and injury.	

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

■ **Checking the area**
Before beginning work, conduct safety checks to minimise the risk of ignition. When repairing the refrigerating system, take the following precautions before work.

■ **Work procedure**
Work shall be conducted under a controlled procedure so as to minimise the risk of working in the presence of R-32 or vapour.

■ **General working area**
All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
Work in confined spaces shall be avoided.
The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable materials.

■ **Checking for presence of refrigerant**
The working area shall be checked with an appropriate refrigerant detector before and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with R-32, i.e. non-sparking, adequately sealed or intrinsically safe.

■ **Fire extinguishing equipment**
If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be made available at hand. Prepare a dry powder or CO_2 fire extinguisher adjacent to the working area.

■ **No ignition sources**
During work on a refrigeration system which involves exposing any piping work that contains or has contained R-32, any sources of ignition shall not be used in a manner that may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept at a safe distance from the site of installation, repairing, or removing space. Before starting work, the area around the equipment shall be examined to make sure that there are no flammable hazard or ignition risks. No Smoking signs shall be displayed.

■ **Ventilated area**
Ensure that the working area is open or that it is adequately ventilated before work. Adequate ventilation shall be maintained during the entire period of work.
The ventilation should disperse any released refrigerant and preferably discharge it into the external atmosphere.

■ **Checking the refrigeration equipment**
Where electrical components are to be changed, the new components shall be fit for the purpose and have the correct specifications.
The manufacturer's maintenance and service guidelines shall be followed at all times. If there are any unclear points, consult the manufacturer's technical department for assistance.
The following checks shall be applied to any installation work involving R-32:
- The amount of charge is in accordance with the size of the room where the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking on the equipment is visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigeration pipes or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, or the refrigerant containing components are constructed of materials which are inherently resistant to corrosion or are suitably protected against corrosion.

- **Checking electrical devices**
  Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. In case there is any fault that could endanger safety, no electrical supply shall be connected to the circuit until the fault is satisfactorily dealt with.
  Initial safety checks shall include:
  - that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
  - that no live electrical components and wiring are exposed while charging, recovering or purging the system;
  - that the equipment is earthed at all times.

- **Repairs to sealed components**
  During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon before the removal of any sealed covers, etc. If it is absolutely necessary to have power supplied to equipment during servicing, continuously operating leak detection shall be installed at the most dangerous point of the system in order to warn of a potentially hazardous situation.
  Particular attention shall be paid to the following: ensure that working on electrical components does not alter the casing in such a way that affects the level of protection including damage to cables, excessive number of connections, terminals different from the original specification, damage to seals, incorrect fitting of glands, etc.
  Ensure that the equipment is mounted securely.
  Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingression of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.
  The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated before working on them.

- **Repair to intrinsically safe components**
  Do not apply any permanent inductive or capacitance load to the circuit without ensuring that this will not exceed the permissible voltage and current for the equipment in use.
  Only intrinsically safe components can be worked on in the presence of a flammable atmosphere.
  The test apparatus shall be of correct rating.
  Replace components only with parts specified by the manufacturer. Using other parts may result in ignition of the refrigerant leaked into the atmosphere.

- **Wiring**
  Check that wiring is not subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of ageing or continuous vibration from sources such as compressors or fans.

- **Detecting of R-32**
  Under no circumstances shall potential sources of ignition be used in the search for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

■ **Leak detection methods**

The following leak detection methods can be applied for systems containing R-32. Electronic leak detectors shall be used to detect R-32, but the sensitivity may not be adequate or may need re-calibration (detection equipment shall be calibrated in a refrigerant-free area). Ensure that the detector is not a potential source of ignition and that it is suitable for the refrigerant used. Leak detection equipment shall be set to the percentage of the lower flammability limit (LFL) of the refrigerant and calibrated to fit the refrigerant employed. The appropriate percentage of gas (maximum 25%) shall be confirmed.

Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper piping work.
If a leak is suspected, all naked flames shall be removed or extinguished.
If a refrigerant leakage which requires brazing is found, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the point of the leakage. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

■ **Removal and evacuation**

When breaking the refrigerant circuit to make repairs or any other purpose, conventional procedures may be used. However, flammability must be taken into consideration. The following procedure shall be adhered to:

- Remove refrigerant;
- Purge the circuit with inert gas;
- Evacuate the inert gas;
- Purge again with inert gas;
- Carry out cutting or brazing of the circuit.

The refrigerant shall be recovered into the correct recovery cylinders. The system shall be cleaned with OFN to render the unit safe. (= Flushing) This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.
Flushing shall be achieved through breaking the vacuum by filling the system with OFN until the working pressure is achieved, then venting the OFN into the atmosphere, and finally pulling the system down to vacuum again. This process shall be repeated until no refrigerant remains within the system. After the last OFN charge is finished, the system shall be vented down to atmospheric pressure to enable work. This operation is especially important if brazing operations on the piping work are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and that there is ventilation available.

■ **Charging procedures**

In addition to conventional charging procedures, the following requirements shall be met.
Ensure that the charging equipment to be used is not contaminated by different refrigerants.
Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.

- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed before charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.

Before recharging, the system shall be tested for leakage with OFN. On completion of charging, the system shall be tested before commissioning. Follow up leakage test shall be carried out before leaving the site.

■ **Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended to train technicians so that all of the refrigerant is recovered safely. In case analysis is required before re-using the reclaimed refrigerant, an oil and refrigerant sample shall be taken before proceeding with decommissioning. It is essential that electrical power is available before work.

(1) Comprehend the equipment and its operation.
(2) Isolate the system electrically.
(3) Before starting work, ensure that:
- mechanical handling equipment is available if required, for handling refrigerant cylinders;
- protective equipment can be used in compliance with specifications;
- the recovery process is supervised by a competent person at all times;
- recovery equipment and cylinders conform to the appropriate standards.

(4) Pump down the refrigerant system, if possible.
(5) If vacuum cannot be ensured, apply a manifold so that refrigerant can be removed from various parts of the system.
(6) Make sure that the cylinder is situated on the scale before recovery takes place.
(7) Start the refrigerant recovery device and operate it in accordance with the manufacturer's instructions.
(8) Do not overfill cylinders. (Do not exceed 80% liquid charge volume).
(9) Do not exceed the maximum working pressure of the cylinder, even temporarily.
(10) When the cylinders have been filled correctly and the process is completed, make sure that the cylinders and the equipment are removed from site promptly and all valves on the equipment are closed.
(11) Recovered refrigerant shall not be charged into another refrigeration system before it has been cleaned and checked.

■ **Labelling**

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains R-32.

■ **Refrigerant recovery**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended to conduct training so that all refrigerants can be removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are used.

Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used must be designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be equipped with a pressure relief valve and associated shut-off valves in good working order. If possible, empty recovery cylinders shall be cooled in a separate place before recovery is conducted.

The recovery equipment shall be in good working order with instructions concerning the equipment at hand, and shall be suitable for the recovery of R-32. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be equipped with leak-free disconnect couplings and in good condition. Before using the recovery device, check that it has undergone proper maintenance, that it is in satisfactory working order, and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant leakage. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, with the relevant Waste Transfer Note attached. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oil are to be removed, ensure that the refrigerant melted into the oil has been evacuated to an acceptable level to make certain that R-32 does not remain within the oil. The evacuation process shall be carried out before returning the compressor to the supplier. Only electric heating to the compressor body shall be employed to accelerate this process. Oil drained from the system shall be treated safely.

1.2 Warnings and Cautions Regarding Safety of Users

Warning	
Do not store the equipment in a room with fire sources (e.g., naked flames, gas appliances, electric heaters).	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools may cause an electrical shock, excessive heat generation or fire.	
If the power cable and lead wires are scratched or have deteriorated, be sure to replace them. Damaged cable and wires may cause an electrical shock, excessive heat generation or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it may cause an electrical shock, excessive heat generation or fire.	
Be sure to use an exclusive power circuit for the equipment, and follow the local technical standards related to the electrical equipment, the internal wiring regulations, and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work may cause an electrical shock or fire.	
Be sure to use the specified cable for wiring between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections may cause excessive heat generation or fire.	
When wiring between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section may cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cables may cause an electrical shock or fire. Placing heavy items on the power cable, or heating or pulling the power cable may damage it.	
Do not mix air or gas other than the specified refrigerant (R-32 / R-410A / R-22) in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leaking point and repair it before charging the refrigerant. After charging the refrigerant, make sure that there is no leak. If the leaking point cannot be located and the repair work must be stopped, be sure to pump-down, and close the service valve, to prevent refrigerant gas from leaking into the room. Refrigerant gas itself is harmless, but it may generate toxic gases when it contacts flames, such as those from fan type and other heaters, stoves and ranges.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength or the installation work is not conducted securely, the equipment may fall and cause injury.	

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet securely. If the plug is dusty or has a loose connection, it may cause an electrical shock or fire.	
When replacing the coin battery in the remote controller, be sure to dispose 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 combustible gas leaks and remains around the unit, it may cause a fire.	
Check to see if parts and wires are mounted and connected properly, and if connections at the soldered or crimped terminals are secure. Improper installation and connections may cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. A corroded installation platform or frame may cause the unit to fall, resulting in injury.	
Check the earth / grounding, and repair it if the equipment is not properly earthed / grounded. Improper earth / grounding may cause an electrical shock.	
Be sure to measure insulation resistance after the repair, and make sure that the resistance is 1 MΩ or higher. Faulty insulation may cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage may cause water to enter the room and wet the furniture and floor.	
Do not tilt the unit when removing it. The water inside the unit may spill and wet the furniture and floor.	

2. Icons Used

The following icons are used to attract the attention of the reader to specific information.

Icon	Type of Information	Description
 Warning	Warning	**Warning** is used when there is danger of personal injury.
 Caution	Caution	**Caution** is used when there is danger that the reader, through incorrect manipulation, may damage equipment, lose data, get an unexpected result or have to restart (part of) a procedure.
 Note	Note	**Note** provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
 Reference	Reference	**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.

3. Revision History

Month/Year	Version	Revised contents
07 / 2022	SiMX042215E	First edition

Part 1
General Information

1. Applicable Models

Indoor Unit	Outdoor Unit
FTKM12UVLWZ	RKMG12UVLWZ
FTKM18UVLVZ	RKMG18UVLVZ
FTKM24UVLUZ	RKMG24UVLUZ

2. Functions

Category	Functions	12/18 class	24 class
Technology	Inverter (with inverter power control)	●	●
	Operation limit	Refer to page 114	
	PAM control	—	●
	Indoor fan motor	DC	DC
	Outdoor fan motor	DC	DC
Compressor	Swing compressor	●	●
	Reluctance DC motor	●	●
Operation Mode	Cooling mode	●	●
	Heating mode	—	—
	Dry mode	●	●
	Fan operation	●	●
	Powerful mode	●	●
	Econo mode	●	●
	INTELLIGENT EYE (infrared sensing technology)	—	—
	Indoor unit quiet operation	●	●
	Outdoor unit quiet operation (manual)	—	—
Comfortable Airflow	Fan speed	5 steps	5 steps
	Auto fan speed	●	●
	Power-airflow flap	—	—
	Power-airflow dual flaps	●	●
	Wide-angle louvers	●	●
	Auto-swing (up and down)	●	●
	Auto-swing (left and right)	●	●
	3-D airflow	●	●
	COANDA operation (comfort airflow mode)	●	●
Health and Cleanliness	Titanium apatite deodorizing filter	●	●
	Ag-ion filter	●	●
	PM2.5 filter	—	—
	PM2.5 filter for streamer	●	●
	Mold proof air filter (pre-filter)	●	●
	Wipe-clean flat panel (washable)	●	●
	DEW CLEAN operation	●	●
	FLASH STREAMER AIR PURIFYING operation (patented)	●	●
	SMELL PROOF operation	●★	●★
Timers	24-hour ON/OFF TIMER	—	—
	Count up-down ON/OFF TIMER	—	—
	12-hour ON TIMER	●	●
	GOOD SLEEP OFF TIMER	●	●
Worry Free (Reliability & Durability)	Auto-restart after power failure	●	●
	Self-diagnosis	●	●
	Stabilizer inside	●	●
	Copper tube and aluminum heat exchanger	●	●
	Anti-corrosion treatment of outdoor heat exchanger	●	●
	Indoor/outdoor unit heat exchanger with enhanced anti-corrosion property (BTA oil)	●	●
Flexibility	Chargeless	10 m	10 m
	Either side drain (left or right)	●	●
	Installation kit	●	●
Remote Control	Wireless remote controller with LCD backlight	●	●
	Wireless remote controller with luminous button	●	●
	Remote controller LCD back light OFF	●	●
	Indoor unit ON/OFF switch	●	●
	Signal reception indicator	●	●
	Wireless LAN connection	—	—
	Child lock	●	●

● : Available
— : Not available
★ Activated only when the airflow rate is set to automatic in dry or cooling operation.

Part 2
Specifications

1. Specifications

Model	Indoor Unit		FTKM12UVLWZ	FTKM18UVLVZ
	Outdoor Unit		RKMG12UVLWZ	RKMG18UVLVZ
Power Supply			1 ϕ, 60 Hz, 220 V	1 ϕ, 60 Hz, 220 V
Capacity Rated (Min. ~ Max.)		kW	3.52 (1.09 ~ 4.0)	5.0 (1.75 ~ 5.4)
		Btu/h	12,000 (3,720 ~ 13,650)	17,100 (6,000 ~ 18,400)
		kcal/h	3,030 (940 ~ 3,440)	4,300 (1,500 ~ 4,640)
Moisture Removal		L/h	1.0	1.8
Running Current (Rated)		A	4.50	6.77
Power Consumption Rated (Min. ~ Max.)		W	940.00 (196 ~ 1,150)	1,415 (375 ~ 1,650)
Annual Power Consumption (Rated)		kWh	523.54	824.08
Power Factor (Rated)		%	95.0	98
SEER (Rated)		Btu/Wh	22.00	21.00
Piping Connections	Liquid	mm	ϕ 6.4	ϕ 6.4
	Gas	mm	ϕ 9.5	ϕ 12.7
	Drain	mm	ϕ 18	ϕ 18
Heat Insulation			Both Liquid and Gas Pipes	Both Liquid and Gas Pipes
Max. Interunit Piping Length		m	15	20
Max. Interunit Height Difference		m	12	16
Chargeless		m	10	10
Amount of Additional Charge of Refrigerant		g/m	20	20
Indoor Unit			**FTKM12UVLWZ**	**FTKM18UVLVZ**
Front Panel Color			White	White
Airflow Rate	H	m³/min (cfm)	11.1 (392)	14.9 (526)
	M		9.3 (328)	13.2 (466)
	L		6.8 (240)	10.5 (371)
	SL		5.6 (198)	9.4 (332)
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output	W	39	38
	Speed	Steps	5 Steps, Quiet, Auto	5 Steps, Quiet, Auto
Air Direction Control			Right, Left, Horizontal, Downwards	Right, Left, Horizontal, Downwards
Air Filter			Removable, Washable, Mildew Proof	Removable, Washable, Mildew Proof
Running Current (Rated)		A	0.21	0.29
Power Consumption (Rated)		W	20.2	64
Power Factor (Rated)		%	41.6	99.1
Temperature Control			Microcomputer Control	Microcomputer Control
Dimensions (H × W × D)		mm	298 × 800 × 229	298 × 885 × 229
Packaged Dimensions (H × W × D)		mm	375 × 895 × 325	390 × 1,010 × 355
Weight (Mass)		kg	9.5	10.5
Gross Weight (Gross Mass)		kg	12.5	13.5
Sound Pressure Level	H / M / L / SL	dB(A)	41 / 36 / 29 / 26	45 / 40 / 35 / 33
Outdoor Unit			**RKMG12UVLWZ**	**RKMG18UVLVZ**
Casing Color			Ivory White	Ivory White
Heat Exchanger	Fin / Spec. Tube		Waffle Fin (PE) / ϕ 7 Hi-XD Tube	Waffle Fin (PE) / ϕ 7 Hi-XD Tube
Compressor	Type		Hermetically Sealed Swing Type	Hermetically Sealed Swing Type
	Model		1YC20HXD	1Y097BKAX1N
	Motor Output	W	650	920
Refrigerant Oil	Type		FW50DA	FW50DA
	Charge	L	0.275	0.350
Refrigerant	Type		R-32	R-32
	Charge	kg	0.68	0.850
Airflow Rate	H	m³/min (cfm)	33.3 (1,176)	46 (1,624)
	SL		—	—
Fan	Type		Propeller	Propeller
	Motor Output	W	28	68
Running Current (Rated)		A	4.29	6.48
Power Consumption (Rated)		W	919.8	1,351
Power Factor (Rated)		%	98	95
Starting Current		A	4.3	6.77
Dimensions (H × W × D)		mm	550 × 675 × 284	595 × 845 × 300
Packaged Dimensions (H × W × D)		mm	620 × 825 × 400	680 × 1,035 × 410
Weight (Mass)		kg	24	31.5
Gross Weight (Gross Mass)		kg	30	38.5
Sound Pressure Level	H	dB(A)	51	54
Conditions Based on			Indoor ; 27°CDB / 19°CWB, Outdoor ; 35°CDB, Piping Length: 5 m	
Note(s)			Airflow rate (m³/min) during fan operation: H: 11.9, M: 10.0, L: 7.2, SL: 6.0	Airflow rate (m³/min) during fan operation: H: 16.2, M: 15.0, L: 11.9, SL: 10.6
Drawing No.			3D141454A	3D141456B

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

Model	Indoor Unit		FTKM24UVLUZ
	Outdoor Unit		RKMG24UVLUZ
Power Supply			1 ϕ, 60 Hz, 220 V
Capacity Rated (Min. ~ Max.)		kW	6.6 (1.75 ~ 7.0)
		Btu/h	22,500 (6,000 ~ 23,900)
		kcal/h	5,680 (1,500 ~ 6,020)
Moisture Removal		L/h	3.2
Running Current (Rated)		A	10.45
Power Consumption Rated (Min. ~ Max.)		W	2,185 (210 ~ 2,250)
Annual Power Consumption (Rated)		kWh	957
Power Factor (Rated)		%	97
SEER (Rated)		Btu/Wh	21.00
Piping Connections	Liquid	mm	ϕ 6.4
	Gas	mm	ϕ 12.7
	Drain	mm	ϕ 18
Heat Insulation			Both Liquid and Gas Pipes
Max. Interunit Piping Length		m	30
Max. Interunit Height Difference		m	20
Chargeless		m	10
Amount of Additional Charge of Refrigerant		g/m	20
Indoor Unit			**FTKM24UVLUZ**
Front Panel Color			White
Airflow Rate	H	m³/min (cfm)	15.3 (540)
	M		11.9 (420)
	L		9.2 (325)
	SL		6.0 (212)
Fan	Type		Cross Flow Fan
	Motor Output	W	38
	Speed	Steps	5 Steps, Quiet, Auto
Air Direction Control			Right, Left, Horizontal, Downwards
Air Filter			Removable, Washable, Mildew Proof
Running Current (Rated)		A	0.38
Power Consumption (Rated)		W	83
Power Factor (Rated)		%	99.2
Temperature Control			Microcomputer Control
Dimensions (H × W × D)		mm	298 × 885 × 229
Packaged Dimensions (H × W × D)		mm	390 × 1,010 × 355
Weight (Mass)		kg	11.5
Gross Weight (Gross Mass)		kg	14.5
Sound Pressure Level	H / M / L / SL	dB(A)	49 / 43 / 39 / 35
Outdoor Unit			**RKMG24UVLUZ**
Casing Color			Ivory White
Heat Exchanger	Fin / Spec. Tube		Waffle Fin (PE) / ϕ 7 Hi-XD Tube
Compressor	Type		Hermetically Sealed Swing Type
	Model		2YC40AXD
	Motor Output	W	1,300
Refrigerant Oil	Type		FW68DA
	Charge	L	0.395
Refrigerant	Type		R-32
	Charge	kg	1.04
Airflow Rate	H	m³/min (cfm)	41.4 (1,461)
	SL		39.9 (1,408)
Fan	Type		Propeller
	Motor Output	W	68
Running Current (Rated)		A	10.07
Power Consumption (Rated)		W	2,102
Power Factor (Rated)		%	94.9
Starting Current		A	7.46
Dimensions (H × W × D)		mm	595 × 845 × 300
Packaged Dimensions (H × W × D)		mm	680 × 1,035 × 410
Weight (Mass)		kg	35.5
Gross Weight (Gross Mass)		kg	42.5
Sound Pressure Level	H	dB(A)	56
Conditions Based on			Indoor ; 27°CDB / 19°CWB, Outdoor ; 35°CDB, Piping Length: 5 m
Note(s)			Airflow rate (m³/min) during fan operation: H: 16.8, M: 15.8, L: 12.4, SL: 7.2
Drawing No.			3D141461

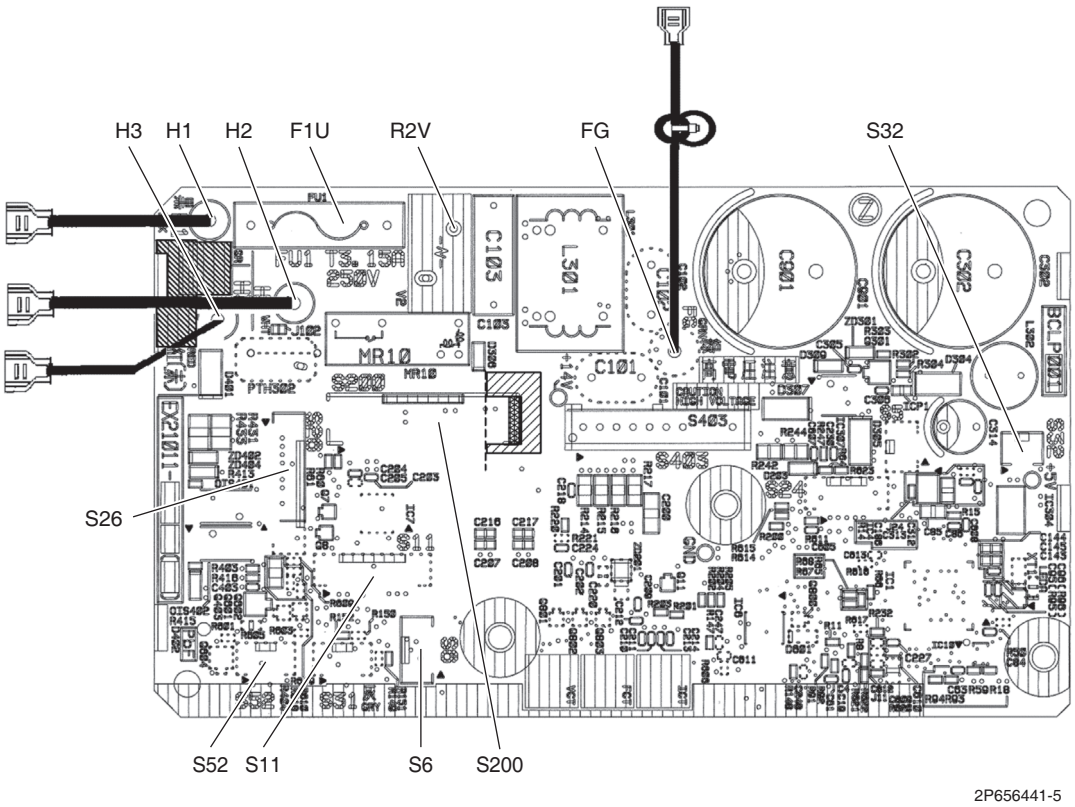
Conversion Formulae
kcal/h = kW × 860 Btu/h = kW × 3412 cfm = m³/min × 35.3

Part 3 Printed Circuit Board Connector Wiring Diagram

1. Indoor Unit

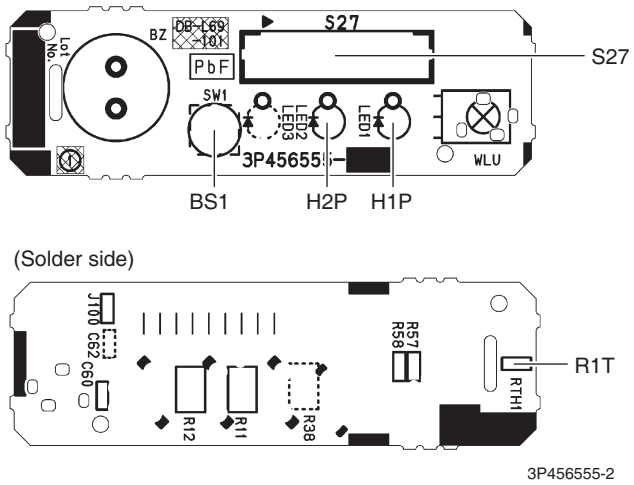
Control PCB (A1P)

1)	S6	Connector for swing motor (horizontal blade)
2)	S11	Connector for swing motor (vertical blade)
3)	S26	Connector for display/signal receiver PCB (A2P)
4)	S32	Connector for indoor heat exchanger thermistor (R2T)
5)	S52	Connector for high voltage power supply PCB (streamer unit)
6)	S200	Connector for DC fan motor
7)	H1, H2, H3, FG	Wire harness for terminal strip
8)	F1U	Fuse (3.15 A, 250 V)
9)	R2V	Varistor



Display/Signal Receiver PCB (A2P)

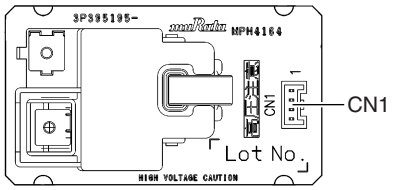
1)	S27	Connector for control PCB (A1P)
2)	BS1	Indoor unit **ON/OFF** switch (Forced cooling operation **ON/OFF** switch) Refer to page 103 for details of forced cooling operation.
3)	H1P	LED for operation (green)
4)	H2P	LED for timer (yellow)
5)	R1T	Room temperature thermistor



3P456555-2

High Voltage Power Supply PCB (Streamer Unit)

1)	CN1	Connector for control PCB (A1P)



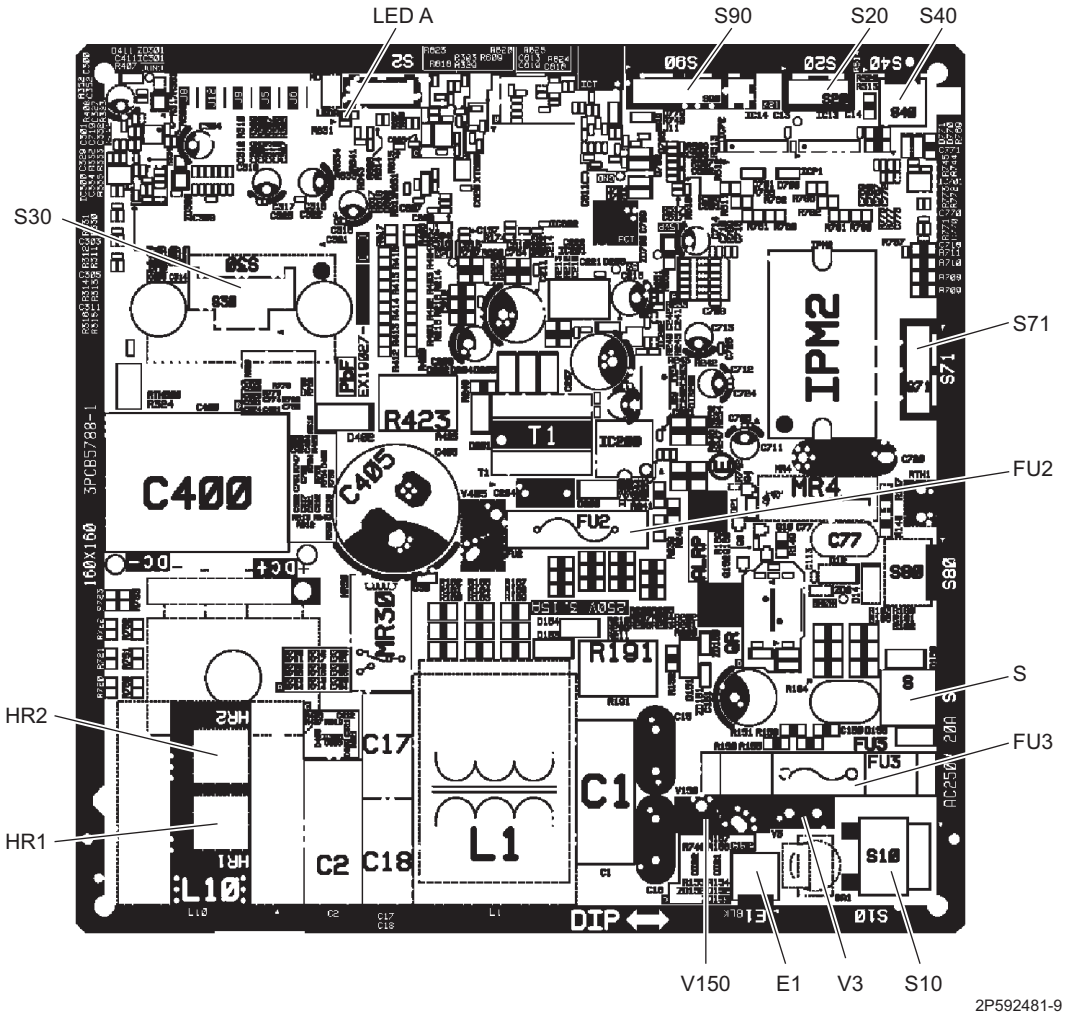
3P395195-2

2. Outdoor Unit

2.1 12 Class

Main PCB (PCB1)

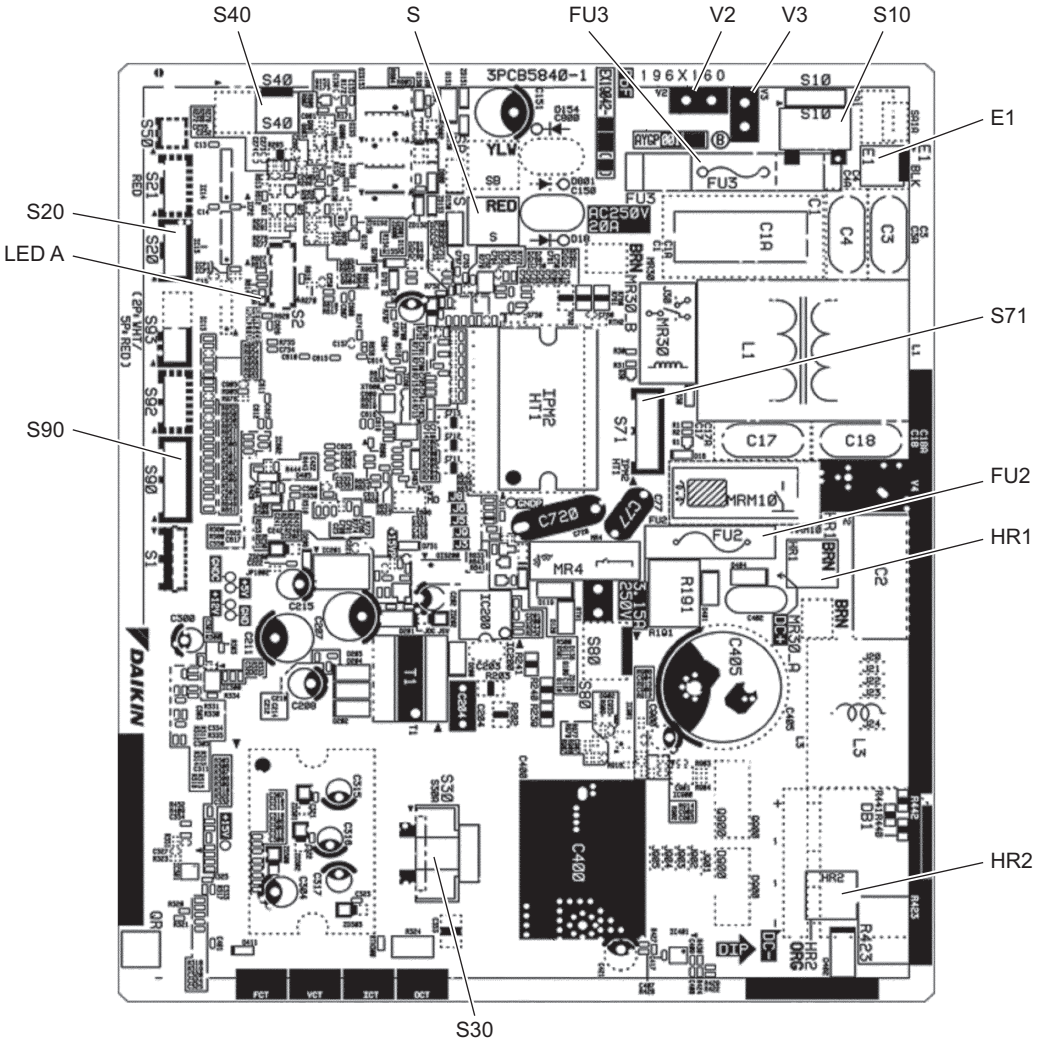
1)	S10, S	Wire harness for terminal strip
2)	S20	Connector for electronic expansion valve coil
3)	S30	Connector for compressor
4)	S40	Connector for overload protector
5)	S71	Connector for DC fan motor
6)	S90	Connector for thermistors (outdoor temperature, outdoor heat exchanger, discharge pipe)
7)	E1	Wire harness for earth wire
8)	HR1, HR2	Connector for reactor
9)	FU2	Fuse (3.15 A, 250 V)
10)	FU3	Fuse (20 A, 250 V)
11)	LED A	LED for service monitor (green)
12)	V3, V150	Varistor



2.2 18 Class

Main PCB (PCB1)

1)	S10, S	Connector for terminal strip
2)	S20	Connector for electronic expansion valve coil
3)	S30	Connector for compressor
4)	S40	Connector for overload protector
5)	S71	Connector for DC fan motor
6)	S90	Connector for thermistors (outdoor temperature, outdoor heat exchanger, discharge pipe)
7)	E1	Connector for earth wire
8)	HR1, HR2	Connector for reactor
9)	FU2	Fuse (3.15 A, 250 V)
10)	FU3	Fuse (20 A, 250 V)
11)	LED A	LED for service monitor (green)
12)	V2, V3	Varistor

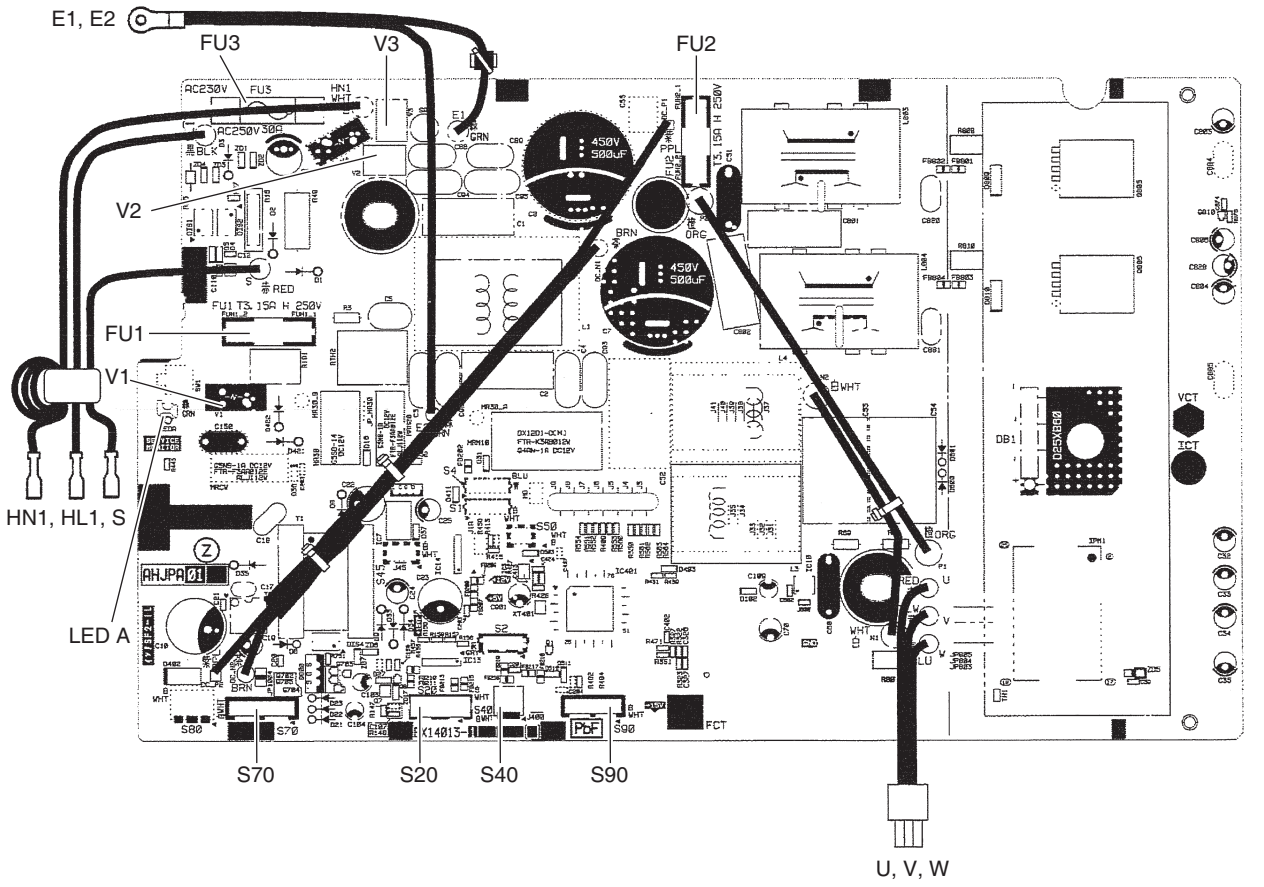


2P584516-12

2.3 24 Class

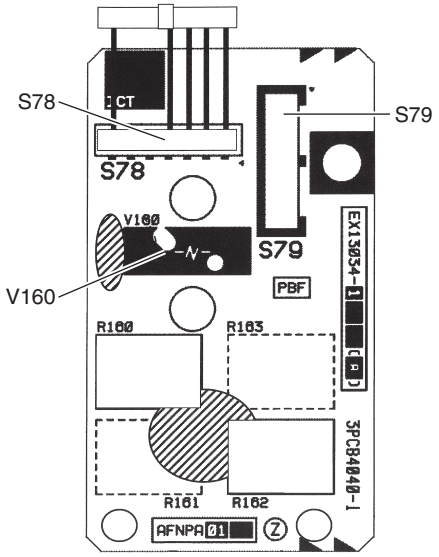
Main PCB (PCB1)

1)	S20	Connector for electronic expansion valve coil
2)	S40	Connector for overload protector
3)	S70	Connector for clamp PCB (PCB2)
4)	S90	Connector for thermistors (outdoor temperature, outdoor heat exchanger, discharge pipe)
5)	HL1, HN1, S	Wire harness for terminal block
6)	E1, E2	Wire harness for earth wire
7)	U, V, W	Wire harness for compressor
8)	FU1, FU2	Fuse (3.15 A, 250 V)
9)	FU3	Fuse (30 A, 250 V)
10)	LED A	LED for service monitor (green)
11)	V1, V2, V3	Varistor



Clamp PCB (PCB2)

1)	S78	Connector for main PCB (PCB1)
2)	S79	Connector for DC fan motor
3)	V160	Varistor



Part 4
Functions and Control

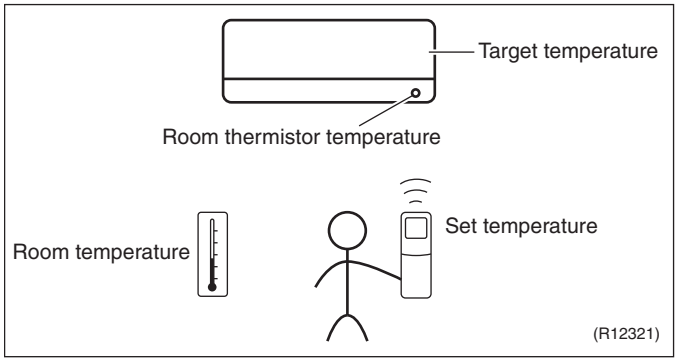
1. Main Functions

1.1 Temperature Control

Definitions of Temperatures

The definitions of temperatures are classified as following.

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



Temperature Control

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

1.2 Frequency Principle

Control Parameters

The frequency of the compressor is controlled by the following 2 parameters:

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

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

- Frequency restrictions
- Initial settings
- Forced cooling operation

Inverter Principle

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

Phase 1

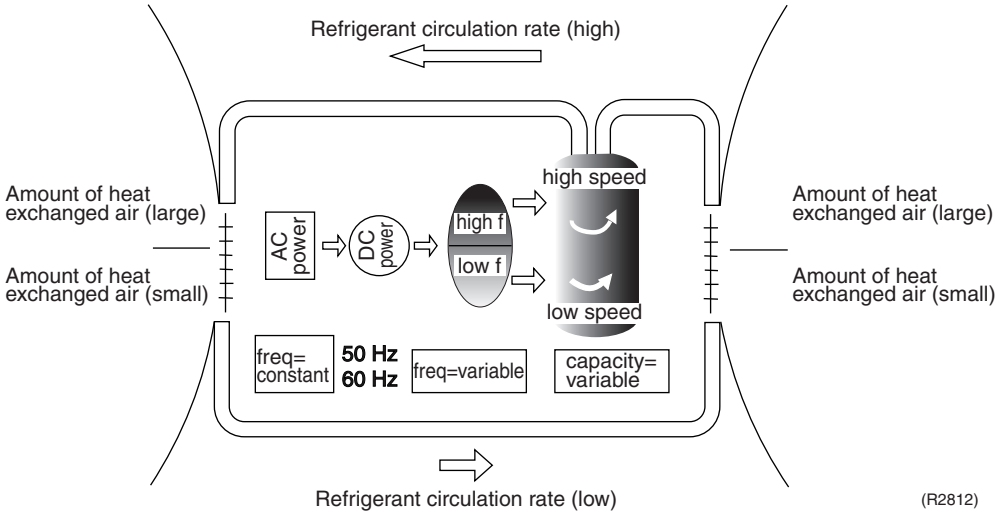
The supplied AC power source is converted into the DC power source for the present.

Phase 2

The DC power source is reconverted into the three phase AC power source with variable frequency.

- When the frequency increases, the rotation speed of the compressor increases resulting in an increase of refrigerant circulation. This leads to a larger amount of heat exchange per unit.
- When the frequency decreases, the rotation speed of the compressor decreases resulting in a decrease of refrigerant circulation. This leads to a smaller amount of heat exchange per unit.

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



Inverter Features

The inverter provides the following features:

- The regulating capacity can be changed according to the changes in the outdoor temperature and cooling load.
- Quick cooling
  The rotation speed of the compressor is increased when starting the cooling.
  This enables to reach the set temperature quickly.
- Comfortable air conditioning
  A fine adjustment is integrated to keep the room temperature constant.
- Energy saving cooling
  Once the set temperature is reached, the energy saving operation enables to maintain the room temperature at low power.

Frequency Limits

The following functions regulate the maximum frequency:

- Compressor protection function. Refer to page 39.
- Discharge pipe temperature control. Refer to page 39.
- Input current control. Refer to page 40.
- Freeze-up protection control. Refer to page 41.

Forced Cooling Operation

Refer to page 103 for details.

1.3 Airflow Direction Control

Power-Airflow Dual Flaps

The large flap sends a large volume of air downward to the floor and provides an optimum control in cooling and dry operation.

Cooling/Dry

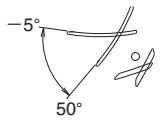
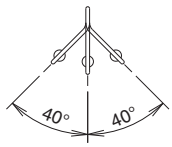
During cooling or dry operation, the flap retracts into the indoor unit. Then, cool air can be blown far and distributed all over the room.

Wide-Angle Louvers

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

Auto-swing

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

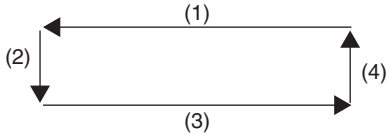
Flap (up and down)	Louver (right and left)
 (R24729)	 (R23416)

3-D Airflow

Alternative repetition of vertical and horizontal swing motions enables uniform air-conditioning of the entire room.

When the horizontal swing and vertical swing are both set to automatic operation, the airflow becomes 3-D airflow. The horizontal and vertical swing motions are alternated and the airflow direction changes in the order shown in the following diagram.

(1) The vertical blades (louvers) move from the right to the left.
(2) The horizontal blades (flaps) move downward.
(3) The vertical blades (louvers) move from the left to the right.
(4) The horizontal blades (flaps) move upward.



(R13554)

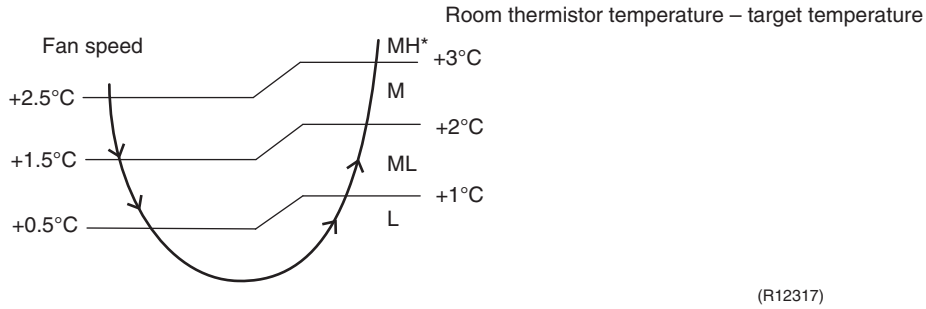
1.4 Fan Speed Control for Indoor Unit

Outline

Phase control and fan speed control contains 7 steps: SL, L, ML, M, MH, H, and HH (POWERFUL).
The airflow rate can be automatically controlled depending on the difference between the room thermistor temperature and the target temperature.

Automatic Fan Speed Control

Cooling
The airflow rate is automatically controlled within the range L tap ~ MH tap when **FAN** setting button is set to automatic.



∗ The upper limit is M tap for 30 minutes from the operation start.

1.5 COANDA Operation

Outline

- The horizontal flap is controlled not to blow the air directly at the people in the room.
- If you press **SWING** button during COANDA operation, COANDA operation will be canceled.
- The airflow rate can be set to any level. However, a low airflow rate may cause cold air to go down and blow on people.

Details

- When POWERFUL operation is started during COANDA operation, the flap turns downward, allowing the air to blow directly onto people. The combination of COANDA and POWERFUL operations provides sufficient cooling (heating) performance to quickly cool down (warm up) the room. After POWERFUL operation is finished, the system automatically returns to COANDA operation.

- When COANDA operation is started during POWERFUL operation, the system prevents the air from blowing directly onto people while keeping POWERFUL operation.

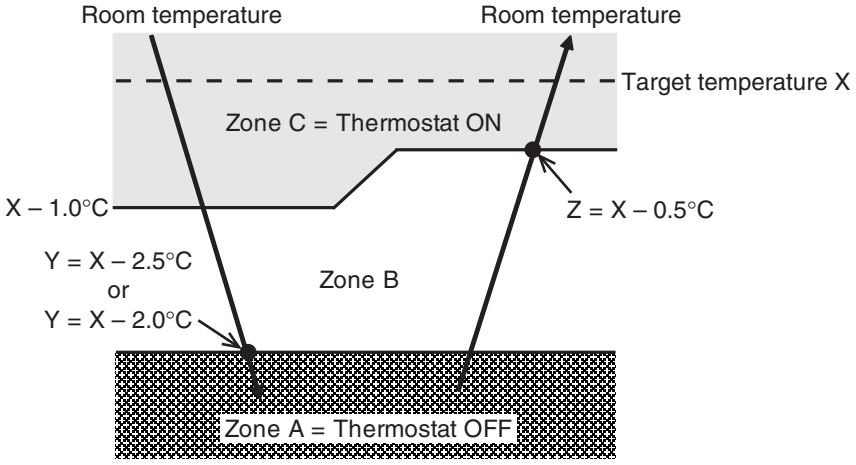
1.6 Program Dry Operation

Outline

Program dry operation removes humidity while preventing the room temperature from lowering. Since the microcomputer controls both the temperature and airflow rate, the temperature adjustment and **FAN** setting buttons are inoperable.

Details

The microcomputer automatically sets the temperature and airflow rate. The difference between the room thermistor temperature at start-up and the target temperature is divided into two zones. Then, the unit operates in an appropriate capacity for each zone to maintain the temperature and humidity at a comfortable level.



(R22443)

Room thermistor temperature at start-up	Target temperature X	Thermostat OFF point Y	Thermostat ON point Z ★
24°C or more	Room thermistor temperature at start-up	X – 2.5°C	X – 0.5°C
18 ~ 23.5°C		X – 2.0°C	X – 0.5°C
17.5°C or less	18°C	X – 2.0°C = 16°C	X – 0.5°C = 17.5°C

★ Thermostat turns on also when the room temperature is in the zone B for 10 minutes.

1.7 Thermostat Control

Outline

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

Details

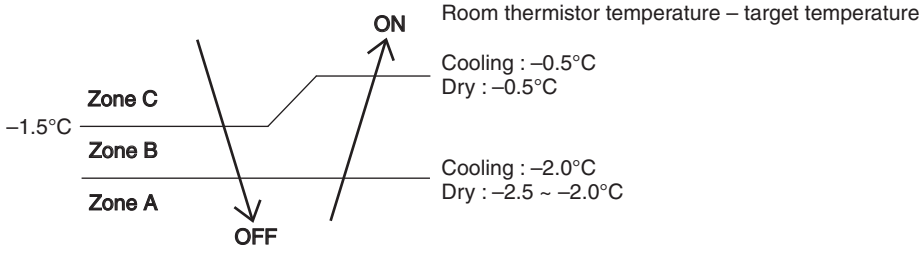
Thermostat OFF Condition

- The temperature difference is in the zone A.

Thermostat ON Conditions

- The temperature difference returns to the zone C after being in the zone A.
- The operation turns on in any zones except A.
- The temperature difference remains in zone B for the determined monitoring time. (Cooling/Dry : 10 minutes)

Cooling/Dry

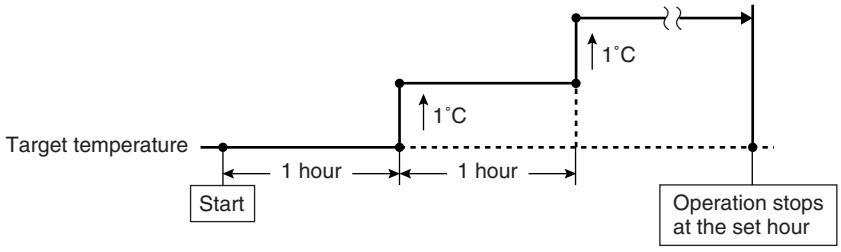


R4003615

Reference Refer to Temperature Control on page 26 for details.

1.8 GOOD SLEEP OFF TIMER

Once GOOD SLEEP OFF TIMER operation starts, the target temperature will increase gradually by 2°C in the next 2 hours to prevent excessive cooling for your pleasant sleep.



(R24016)

Note(s) Not available in dry operation.

1.9 SMELL PROOF Operation

The smell proof operation can be activated as mentioned below:

- To use SMELL PROOF operation

1. Before starting the operation, press **FAN** button to set to Auto.
2. Press **MODE** button to select the DRY or COOL operation.
3. Press **ON/OFF** button.
   - Air starts circulating about 1 minute after the operation is started. However, if the POWERFUL operation is started, air starts circulating immediately.

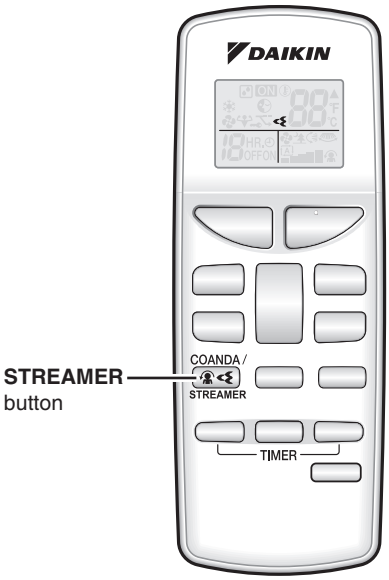
Note(s) SMELL PROOF operation can prevent some odors, but not all.

1.10 Flash Streamer Air Purifying Operation

Outline

The absorption power of the accessory filter and the decomposition power of the streamer discharge combine to reduce unpleasant odors and viruses, cleaning the air in the room.

Operation



R4003865

To start the operation:

- Press **STREAMER** button for more than 5 seconds.
  The icon appears on the display. The flash streamer operation lamp lights up.
  The air in the room is being cleaned.

To stop the operation:

- Press **STREAMER** button for more than 5 seconds again.
  The icon disappears from the display.
  The streamer will stop operating.

Note(s)

- This is a type of plasma discharge comprising high-speed electrons with oxidative capacity that is released within the unit. It decomposes odors and harmful gases.
  (The high-speed electrons which are generated and adsorbed inside of the unit ensure the safety.)
- The streamer discharge may generate a hissing sound, however, this does not indicate a defect.
- When airflow is weak during operation, the streamer discharge may stop temporarily to prevent the emission of trace amounts of ozone from the air outlet.

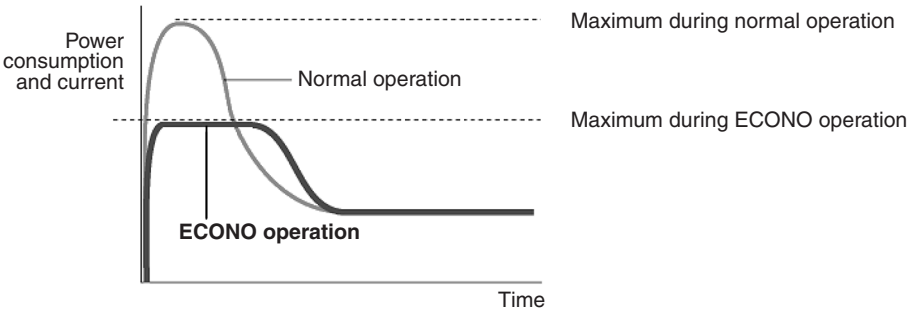
1.11 ECONO Operation

Outline

ECONO operation reduces the maximum operating current and the power consumption. This operation is particularly convenient for energy-saving. It is also a major bonus when breaker capacity does not allow the use of multiple electrical devices and air conditioners. It can be easily activated by pressing **ECONO** button on the wireless remote controller.

Details

- When this function is activated, the maximum capacity also decreases.
- The remote controller can send the ECONO command when the unit is in cooling or dry operation. This function can only be set when the unit is running. To cancel the ECONO operation, press **ECONO** button several times until the ECONO symbol disappears.
- This function and POWERFUL operation cannot be used at the same time. The latest command has the priority.



(R22012)

1.12 POWERFUL Operation

Outline

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

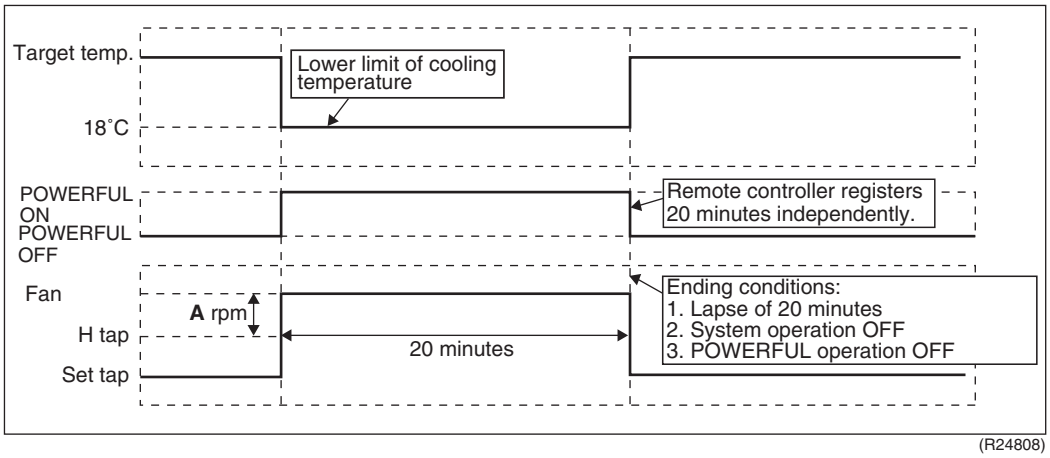
Details

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

Operation mode	Fan speed	Target temperature
COOL	H tap + **A** rpm	18°C
DRY	Dry rotating speed + **A** rpm	Lowered by 2.5°C
FAN	H tap + **A** rpm	—

A = 50 rpm (12/18 class), 110 ~ 150 rpm (24 class)

Ex: POWERFUL operation in cooling



(R24808)

Note

POWERFUL operation cannot be used together with ECONO operation. Priority is given to the function of whichever button is pressed last.

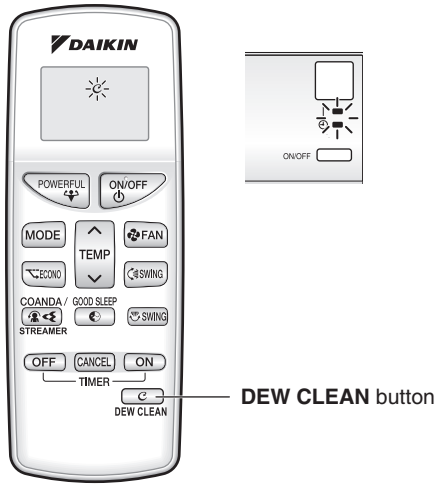
1.13 Dew Clean Operation

Outline

This function helps to clean accumulation of dust and stain on indoor heat exchanger.
The dew clean operation is available in both cooling and dry operation.
For better cooling performance, recommended to run once in a month.

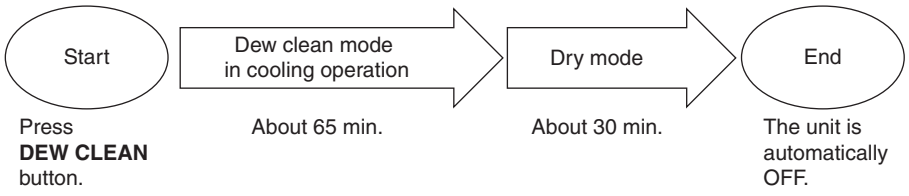
Details

- When the operation is ON, press **DEW CLEAN** button for more than 2 seconds, then dew clean icon blinks 4 times on the remote controller display and disappears.
  Dew clean operation starts.
  During the dew clean operation, the indoor unit LED indicator lamps will blink.



R4003884

- The operation will stop automatically in the following process.
  To cancel dew clean operation, turn off the unit by pressing **ON/OFF** button on remote controller.



R4003858

Note(s)

- During dew clean operation, other functions of remote controller except streamer function are not available, such as temperature control, airflow control and so on.
- When the power failure occurs, the dew clean operation will stop.
- The dew clean operation is recommended to operate in the condition of more than 24°C
  If the room temperature is lower than available set temperature ranges of remote controller, the dew clean operation will not work.
- If the indoor unit LED is set OFF during the dew clean operation, it is hard to know the operation progress. Make sure the LED is ON via brightness setting before starting the dew clean operation.

1.14 Default Set Temperature Setting

Outline

As per BEE regulation, whenever the air conditioner will be switched **ON** from the remote controller, the default set temperature will be set as follows:

Previously switched **OFF**	After switched **ON** again
If set temperature < 24˚C	Set temperature will be 24˚C.
If set temperature >= 24˚C	Set temperature will be kept as previous setting.
If in dry operation	Cooling operation with previously set temperature.

For example,
If switched **OFF** with 20 ˚C set, the unit will be restarted with 24 ˚C cooling mode.
If switched **OFF** with 26 ˚C set, the unit will be restarted with 26 ˚C cooling mode.

In the case of switched **OFF** with dry operation, the unit will be switched **ON** with cooling mode. To keep dry operation when restarted, select dry operation mode again from the remote controller.

1.15 Other Functions

1.15.1 Signal Receiving Sign

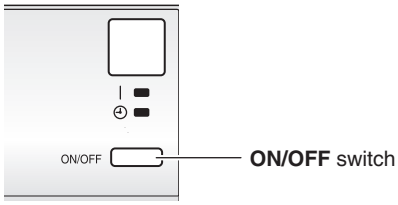
When the indoor unit receives a signal from the remote controller, the unit emits a signal receiving sound.

1.15.2 Indoor Unit ON/OFF Switch

Indoor unit **ON/OFF** switch is provided on the display of the unit.

- Press **ON/OFF** switch once to start operation. Press once again to stop it.
- **ON/OFF** switch is useful when the remote controller is missing or the battery has run out.
- The operation mode refers to the following table.

Operation mode	Temperature setting	Airflow rate
COOL	22°C	Automatic



R4003873

Forced Cooling Operation

Forced cooling operation can be started by pressing **ON/OFF** switch for 5 ~ 9 seconds while the unit is not operating.
Refer to page 103 for details.

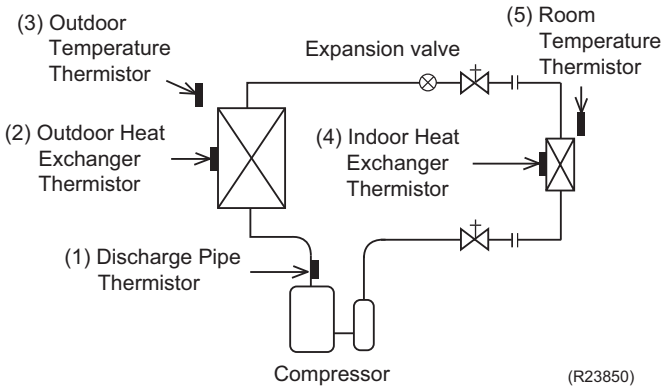
Note Forced cooling operation will not be started if the **ON/OFF** switch is pressed for 10 seconds or more.

1.15.3 Auto-restart Function

If a power failure (even a momentary one) occurs during the operation, the operation restarts automatically in the same conditions as before when the power supply is restored to the conditions prior to the power failure.

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

2. Thermistor Functions



(1) Discharge Pipe Thermistor

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

(2) Outdoor Heat Exchanger Thermistor

- The outdoor heat exchanger thermistor is used for controlling the target discharge pipe temperature. The system sets the target discharge pipe temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge pipe temperature can be obtained.
- In cooling operation, the outdoor heat exchanger thermistor is used for detecting the disconnection of the discharge pipe thermistor. When the discharge pipe temperature drops below the outdoor heat exchanger temperature by more than a certain value, the discharge pipe thermistor is judged as disconnected.
- In cooling operation, the outdoor heat exchanger thermistor is used for high pressure protection.

(3) Outdoor Temperature Thermistor

- The outdoor temperature thermistor detects the outdoor air temperature and is used for refrigerant shortage detection, input current control, outdoor fan control, liquid compression protection function, and so on.

(4) Indoor Heat Exchanger Thermistor

- The indoor heat exchanger thermistor is used for controlling the target discharge pipe temperature. The system sets the target discharge pipe temperature according to the outdoor and indoor heat exchanger temperature, and controls the electronic expansion valve opening so that the target discharge pipe temperature can be obtained.
- In cooling operation, the indoor heat exchanger thermistor is used for freeze-up protection control. If the indoor heat exchanger temperature drops abnormally, the operating frequency becomes lower or the operation halts.

(5) Room Temperature Thermistor

- The room temperature thermistor detects the room air temperature and is used for controlling the room air temperature.

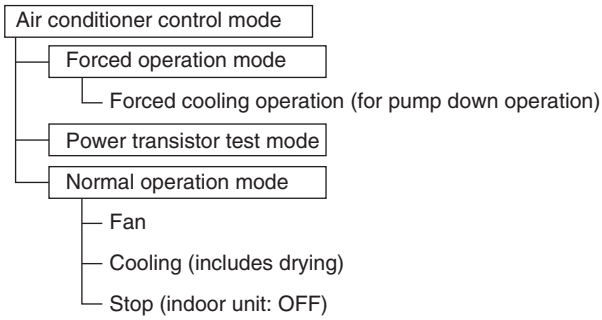
3. Control Specification

3.1 Mode Hierarchy

Outline

The air conditioner control has normal operation mode, forced operation mode, and power transistor test mode for installation and servicing.

Details



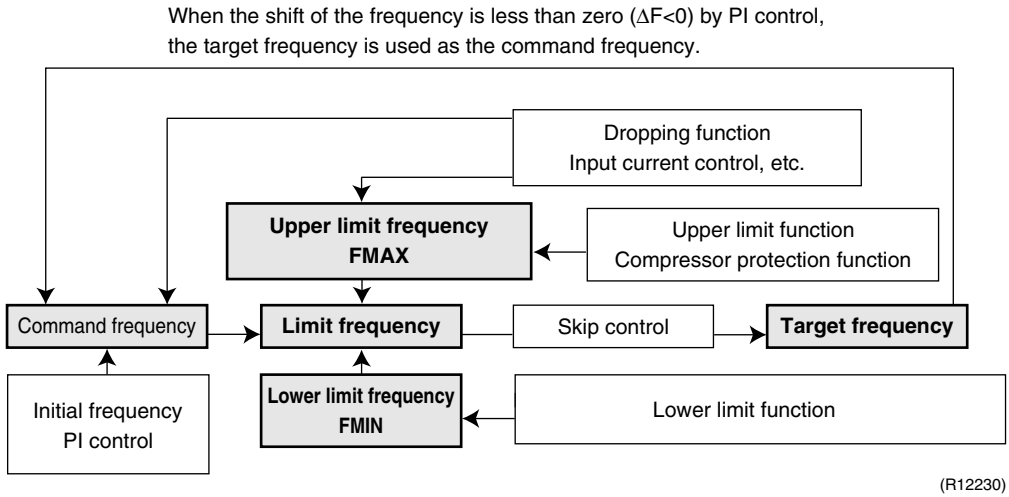
(R20475)

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

3.2 Frequency Control

Outline

The compressor frequency is determined according to the difference between the room thermistor temperature and the target temperature.



(R12230)

Details

1. **Determine command frequency**
   Command frequency is determined in the following order of priority.
   (1) Forced cooling
   (2) Indoor frequency command

2. **Determine upper limit frequency**
   The minimum value is set as the upper limit frequency among the frequency upper limits of the following functions:
   Compressor protection, input current, discharge pipe temperature, freeze-up protection.

3. **Determine lower limit frequency**
   The maximum value is set as the lower limit frequency among the frequency lower limits of the following function:
   Pressure difference upkeep.

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

Initial Frequency

When starting the compressor, the frequency is initialized according to the ΔD value of the indoor unit.

ΔD signal: Indoor frequency command
The difference between the room thermistor temperature and the target temperature is taken as the ΔD value and is used for ΔD signal of frequency command.

Temperature difference	ΔD signal	Temperature difference	ΔD signal	Temperature difference	ΔD signal	Temperature difference	ΔD signal
–2.0	∗OFF	0	4	2.0	8	4.0	12
–1.5	1	0.5	5	2.5	9	4.5	13
–1.0	2	1.0	6	3.0	10	5.0	14
–0.5	3	1.5	7	3.5	11	5.5	15

∗ OFF = Thermostat OFF

PI Control

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

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

3. **Frequency control when other controls are functioning**
   - When frequency is dropping:
     Frequency control is carried out only when the frequency drops.
   - For controlling lower limit:
     Frequency control is carried out only when the frequency rises.

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

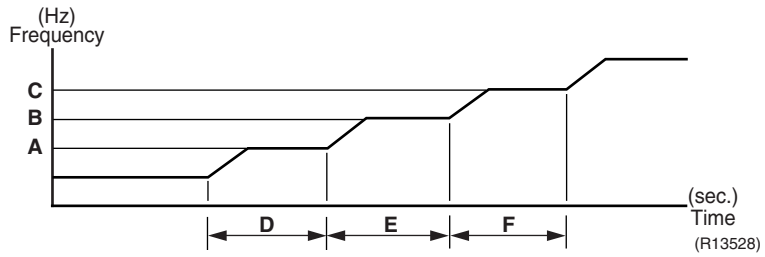
3.3 Controls at Mode Changing/Start-up

3.3.1 3-Minute Standby

Turning on the compressor is prohibited for 3 minutes after turning off.

3.3.2 Compressor Protection Function

When turning the compressor from OFF to ON, the upper limit of frequency is set as follows.



	12 class	18 class	24 class
A (Hz)	44	40	24
B (Hz)	80	60	52
C (Hz)	110	79	68
D (seconds)	120	120	20
E (seconds)	60	120	100
F (seconds)	60	180	120

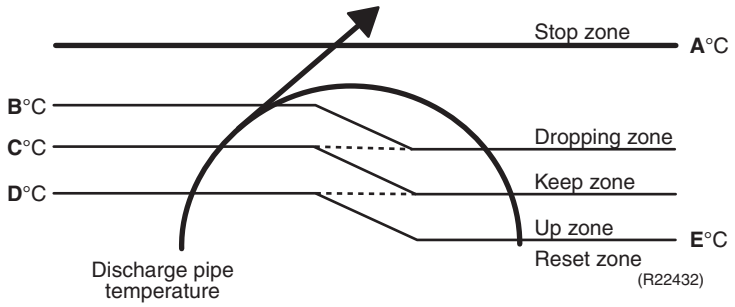
3.4 Discharge Pipe Temperature Control

Outline

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

Details

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



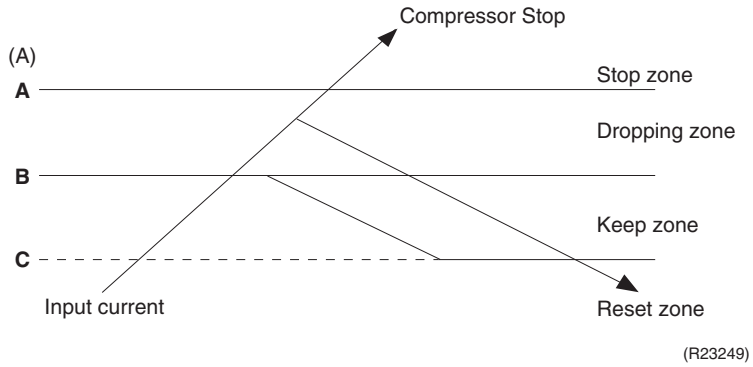
	A (°C)	**B** (°C)	**C** (°C)	**D** (°C)	**E** (°C)
12 class	116	110	104	98	88
18 class	116	110	104	101	85
24 class	115	105	100	95	85

3.5 Input Current Control

Outline

The microcomputer calculates the input current while the compressor is running, and sets the frequency upper limit based on the input current.

Details



Frequency control in each zone

Stop zone

- After the input current remains in the stop zone for 2.5 seconds, the compressor is stopped.

Dropping zone

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

Keep zone

- The present maximum frequency goes on.

Reset zone

- Limit of the frequency is canceled.

	12 class	18 class	24 class
A (A)	10	10	11.5
B (A)	5.7	7.7	10
C (A)	3.7	5.7	9

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

- The current drops when outdoor temperature becomes higher than a certain level.

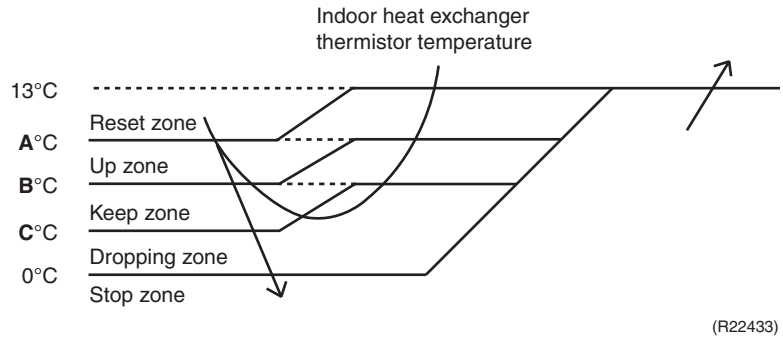
3.6 Freeze-up Protection Control

Outline

During cooling operation, the signals sent from the indoor unit control the operating frequency limitation and prevent freezing of the indoor heat exchanger. The signal from the indoor unit is divided into zones.

Details

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



A (°C)	**B** (°C)	**C** (°C)
7	5	3

3.7 Outdoor Fan Control

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

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

3. **Fan speed control for pressure difference upkeep**
   The rotation speed of the outdoor fan is controlled for keeping the pressure difference during cooling operation with low outdoor temperature.
   - When the pressure difference is low, the rotation speed of the outdoor fan is reduced.
   - When the pressure difference is high, the rotation speed of the outdoor fan is controlled as well as normal operation.

4. **Fan speed control during forced cooling operation**
   The outdoor fan is controlled as well as normal operation during forced cooling operation.

5. **Fan speed control during POWERFUL operation**
   The rotation speed of the outdoor fan is increased during POWERFUL operation.

6. **Fan speed control during indoor unit quiet operation**
   The rotation speed of the outdoor fan is reduced by the command of the indoor unit quiet operation.

7. **Fan ON/OFF control when operation (cooling, dry) starts/stops**
   The outdoor fan is turned ON when the operation starts. The outdoor fan is turned OFF when the operation stops.

3.8 Liquid Compression Protection Function

Outline

In order to increase the dependability of the compressor, the compressor is stopped according to the outdoor temperature.

Details

Operation stops depending on the outdoor temperature.
The compressor turns off under the conditions that the system is in cooling operation and outdoor temperature is below **A**°C.

	A (°C)
12/18 class	18
24 class	0

3.9 Electronic Expansion Valve Control

Outline

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

Electronic expansion valve is fully closed

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

Open Control

1. Electronic expansion valve control when starting operation
2. Electronic expansion valve control when the frequency changes
3. Electronic expansion valve control when the discharge pipe temperature is abnormally high
4. Electronic expansion valve control when the discharge pipe thermistor is disconnected

Feedback Control

Target discharge pipe temperature control

Details

Following are the examples of the electronic expansion valve control for each operation mode.

Control \ Status	Power on ; Compressor stop	Operation start	Frequency change under starting control	During target discharge pipe temperature control	Frequency change under target discharge pipe temperature control	Discharge pipe thermistor disconnection	Frequency change under discharge pipe thermistor disconnection control
Starting operation control	—	●	—	—	—	—	—
Control when the frequency changes	—	—	●	—	●	—	—
Target discharge pipe temperature control	—	—	—	●	—	—	—
Discharge pipe thermistor disconnection control	—	—	—	—	—	●	●
High discharge pipe temperature control	—	●	●	●	●	—	—
Pressure equalizing control	●	—	—	—	—	—	—
Opening limit control	—	●	●	●	●	●	●

● : Available
— : Not available

(R2833)

3.9.1 Initialization as Power Supply On

The electronic expansion valve is initialized (fully closed) when the power is turned on. Then, the valve opening position is set and the pressure is equalized.

3.9.2 Pressure Equalizing Control

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

3.9.3 Opening Limit Control

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

	Maximum opening (pulse)	Minimum opening (pulse)
12/18 class	470	45
24 class	500	52

The electronic expansion valve is fully closed when cooling operation stops.

3.9.4 Starting Operation Control

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

3.9.5 Control when the Frequency Changes

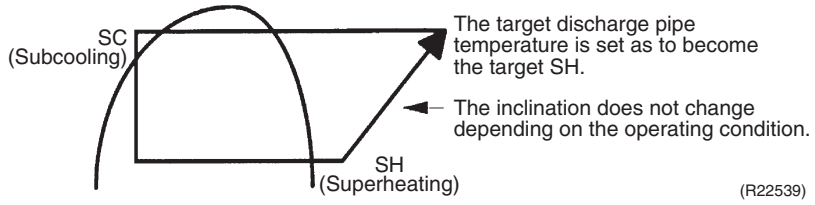
When the target discharge pipe temperature control is active, if the target frequency changes to a specified value in a certain period of time, the target discharge pipe temperature control is canceled and the target opening of the electronic expansion valve is changed according to the frequency shift.

3.9.6 High Discharge Pipe Temperature Control

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

3.9.7 Target Discharge Pipe Temperature Control

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



The electronic expansion valve opening and the target discharge pipe temperature are adjusted every 20 seconds. The opening degree of the electronic expansion valve is adjusted by the following.

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

3.9.8 Discharge Pipe Thermistor Disconnection Control

Outline

The disconnection of the discharge pipe thermistor is detected by comparing the discharge pipe temperature with the condensing temperature. If the discharge pipe thermistor is disconnected, operates for a specified time, and then stops.
After 3 minutes, the operation restarts and checks if the discharge pipe thermistor is disconnected. If the discharge pipe thermistor is disconnected, the system stops after operating for a specified time.
If the disconnection is detected repeatedly, the system is shut down. When the compressor runs for 60 minutes without any error, the error counter is reset.

Details

Determining thermistor disconnection
When the starting control finishes, the detection timer for disconnection of the discharge pipe thermistor (**A** seconds) starts. When the timer is over, the following adjustment is made.
When the following condition is fulfilled, the discharge pipe thermistor disconnection is ascertained.

Discharge pipe temperature + **B**°C < outdoor heat exchanger temperature

A (seconds)	720
B (°C)	6

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

3.10 Malfunctions

3.10.1 Sensor Malfunction Detection

Sensor malfunction can be detected in the following thermistors.

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

3.10.2 Detection of Overcurrent and Overload

Outline

In order to protect the inverter, an excessive output current is detected and the OL temperature is observed to protect the compressor.

Details

- If the inverter current exceeds **A** A, the system shuts down the compressor.
- If the OL (compressor head) temperature exceeds **B**°C, the compressor stops.

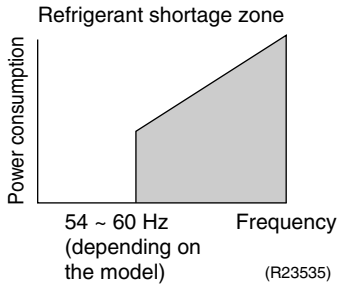
A (A)	10 ~ 11.5
B (°C)	120

3.10.3 Refrigerant Shortage Detection

I: Detection by power consumption

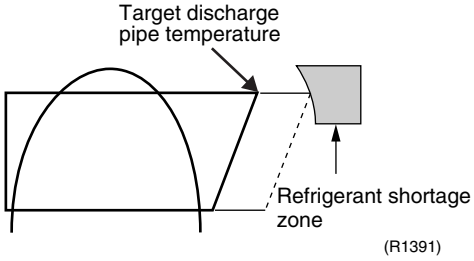
Refrigerant shortage is detected if the power consumption is below the specified value and the frequency is higher than the specified frequency.

When refrigerant is insufficient, the power consumption is lower than normal operation. Hence refrigerant shortage is detected by checking power consumption.



II: Detection by discharge pipe temperature

Refrigerant shortage is detected if the discharge pipe temperature is higher than the target discharge pipe temperature, and the electronic expansion valve is fully open for more than the specified time.



III: Detection by the difference of temperature

Refrigerant shortage is detected if the difference between suction and discharge temperature is lower than the specified value.

Reference Refer to page 62 for details.

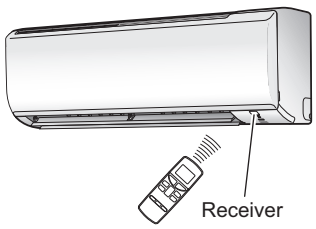
Part 5
Remote Controller

1. Applicable Remote Controller

Model Name	Remote Controller	Reference Page
FTKM12UVLWZ	ARC484B41	48
FTKM18UVLVZ		
FTKM24UVLUZ		

2. ARC484B41

Signal transmitter



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

POWERFUL*1 button

- Starts POWERFUL operation.

MODE button

- Selects the operation mode.

DRY → COOL → FAN

ECONO*2 button

- Starts ECONO operation.

COANDA*3/STREAMER*4 button

- Starts COANDA operation or STREAMER operation.

GOOD SLEEP*5 button

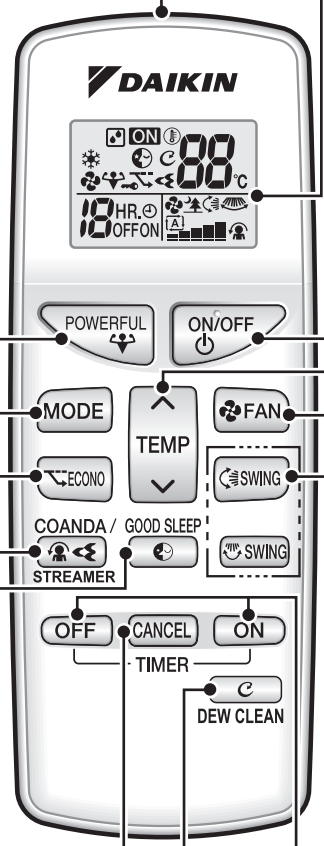
- Starts GOOD SLEEP operation.

TIMER CANCEL button

- Cancels the timer setting.

DEW CLEAN*6 button

- To start dew clean operation, press **DEW CLEAN** button for 2 seconds.
- To cancel dew clean operation, press **ON/OFF** button on remote controller.



Display (LCD)

- Displays the current settings. (In this illustration, each section is shown with all its displays on for the purpose of explanation.)

ON/OFF button

- Press this button once to start operation.
  Press once again to stop it.

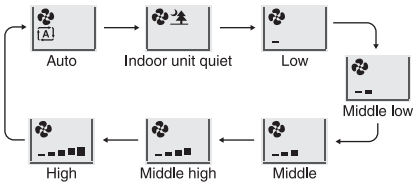
TEMPERATURE adjustment button

- Changes the temperature setting.

: DRY	Not available
: COOL	20 ~ 32 °C
: FAN	Not available

FAN*7 setting button

- Selects the airflow rate setting every time you press this button.



- When the airflow is set to " ", indoor unit quiet operation will start and the noise from the unit will become quieter.
- In indoor unit quiet operation, operation sound becomes weak. (The airflow rate also decreases.)
- In DRY operation, the airflow rate setting is not available.

ON/OFF TIMER button

- Each pressing of this button advances the time setting by 1 hour.
- The time can be set between 1 to 12 hours.

SWING*8 button

- Adjusts the airflow direction.
- When you press **SWING** button, the flap moves up and down, or (and) the louver moves right and left. The flap (louver) stops when you press **SWING** button again.

Child lock

- When you press **ECONO** button and **POWERFUL** button at the same time for 5 seconds or more, "" will be displayed on the remote controller LCD and all buttons on the remote controller will be disabled. To cancel the Child lock, press **ECONO** button and **POWERFUL** button at the same time for 5 seconds or more again.

R5000391

Reference Refer to the following pages for details.

★1 POWERFUL Operation	P.33	★5 GOOD SLEEP Operation	P.31
★2 ECONO Operation	P.33	★6 DEW CLEAN Operation	P.34
★3 COANDA Operation	P.29	★7 Fan Speed Control for Indoor Unit	P.29
★4 Flash Streamer Air Purifying Operation	P.32	★8 Auto-swing	P.28

Part 6
Service Diagnosis

1. General Problem Symptoms and Check Items

Symptom	Check Item	Details	Reference Page
The unit does not operate.	Check the power supply.	Check if the rated voltage is supplied.	—
	Check the type of the indoor unit.	Check if the indoor unit type is compatible with the outdoor unit.	—
	Check the outdoor temperature.	Cooling operation is not available when the outdoor temperature is out of the operation limit. Check the reference page for the operation limit.	114
	Diagnose with remote controller indication.	—	56
	Check the remote controller addresses.	Check if address settings for the remote controller and indoor unit are correct.	105
Operation sometimes stops.	Check the power supply.	A power failure of 2 to 10 cycles can stop air conditioner operation. (Operation lamp OFF)	—
	Check the outdoor temperature.	Cooling operation is not available when the outdoor temperature is out of the operation limit. Check the reference page for the operation limit.	114
	Diagnose with remote controller indication.	—	56
The unit operates but does not cool.	Check for wiring and piping errors in the connection between the indoor and outdoor units.	—	—
	Check for thermistor detection errors.	Check if the thermistor is mounted securely.	—
	Diagnose with remote controller indication.	—	56
	Diagnose by service port pressure and operating current.	Check for refrigerant shortage.	62
Large operating noise and vibrations	Check the resistance between the terminals of the power module.	—	99
	Check the power module.	—	—
	Check the installation condition.	Check if the required spaces for installation (specified in the installation manual) are provided.	—

2. Troubleshooting with LED

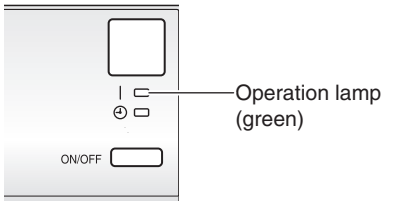
2.1 Indoor Unit

Operation Lamp

The operation lamp blinks when any of the following errors is detected.

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

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



(R25231)

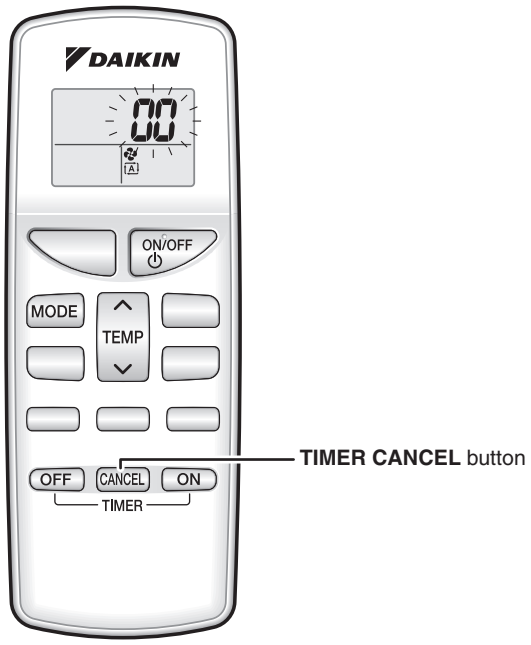
2.2 Outdoor Unit

The outdoor unit has a green LED (LED A) on the PCB.
When the microcomputer works in order, the LED A blinks.
Refer to pages 21, 22, 23 for the location of LED A.

3. Service Diagnosis

3.1 Method 1

1. When **TIMER CANCEL** button is held down for 5 seconds, **00** is displayed on the temperature display screen.
2. Press **TIMER CANCEL** button repeatedly until a long beep sounds.



<ARC484 Series>

R6000601

Note(s)

1. A short beep or two consecutive beeps indicate non-corresponding codes.
2. To return to the normal mode, hold **TIMER CANCEL** button down for 5 seconds. When the remote controller is left untouched for 60 seconds, it also returns to the normal mode.
3. Not all the error codes are displayed. When you cannot find the error code, try method 2. Refer to page 54.

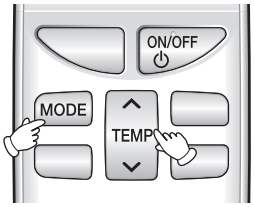
■ The code indication changes in the sequence shown below.

ARC484B41

No.	Code	No.	Code	No.	Code
1	**00**	14	**U0**	27	**UA**
2	**A5**	15	**C7**	28	**U4**
3	**E7**	16	**A3**	29	**P4**
4	**F3**	17	**H8**	30	**H7**
5	**F6**	18	**H9**	31	**U2**
6	**L3**	19	**C9**	32	**EA**
7	**L4**	20	**C4**	33	**AH**
8	**L5**	21	**C5**	34	**FA**
9	**U4**	22	**J3**	35	**H1**
10	**E6**	23	**J6**	36	**P9**
11	**H6**	24	**E5**	37	**E8**
12	**H0**	25	**A1**	—	—
13	**A6**	26	**E1**	—	—

3.2 Method 2

1. Press the **TEMP up** or **TEMP down** button and **MODE** button at the same time to enter the service check mode.

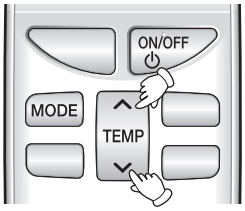


(R14572)

The left-side number blinks.

(R25244)

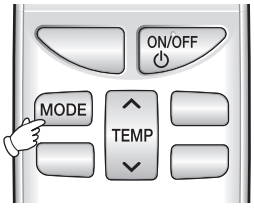
2. Press **TEMP up** or **TEMP down** button and change the number until you hear the two consecutive beeps or the long beep.



(R14573)

3. Diagnose by the sound.
   - Beep: The left-side number does not correspond with the error code.
   - Two consecutive beeps: The left-side number corresponds with the error code but the right-side number does not.
   - Long beep: Both the left-side and right-side numbers correspond with the error code. The numbers indicated when you hear the long beep are the error code.
     Refer to page 56.

4. Press **MODE** button.

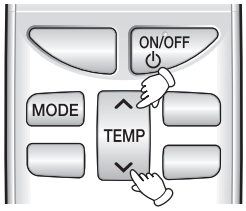


(R14574)

The right-side number blinks.

(R25245)

5. Press **TEMP up** or **TEMP down** button and change the number until you hear the long beep.

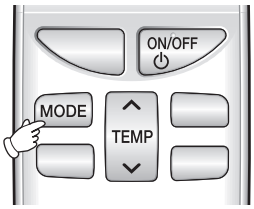


(R14573)

6. Diagnose by the sound.
   - Beep: The left-side number does not correspond with the error code.
   - Two consecutive beeps: The left-side number corresponds with the error code but the right-side number does not.
   - Long beep: Both the left-side and right-side numbers correspond with the error code.

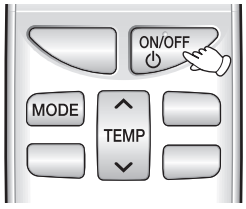
7. Determine the error code.
   The numbers indicated when you hear the long beep are the error code.
   Refer to page 56.

8. Press **MODE** button to exit from the service check mode.



(R14574)

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



(R14575)

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

4. Troubleshooting

4.1 Error Codes and Description

	Error Codes	Description	Reference Page
System	**00**	Normal	—
	U0★	Refrigerant shortage	62
	U2	Low-voltage detection or over-voltage detection	64
	U4	Signal transmission error (between indoor unit and outdoor unit)	66
	UA	Unspecified voltage (between indoor unit and outdoor unit)	68
Indoor Unit	**A1**	Indoor unit PCB abnormality	57
	A5	Freeze-up protection control	58
	A6	Indoor fan motor (DC Motor) or related abnormality	59
	C4	Indoor heat exchanger thermistor or related abnormality	61
	C9	Room temperature thermistor or related abnormality	61
Outdoor Unit	**E1**	Outdoor unit PCB abnormality	69
	E5★	OL activation (compressor overload)	70
	E6★	Compressor lock	72
	E7★	DC fan lock	73
	E8	Input overcurrent detection	74
	F3	Discharge pipe temperature control	75
	F6	High pressure control in cooling	77
	F8	System shutdown due to temperature abnormality in compressor	79
	H0	Compressor system sensor abnormality	80
	H6	Position sensor abnormality	81
	H8	DC voltage/current sensor abnormality	83
	H9	Outdoor temperature thermistor or related abnormality	84
	J3★	Discharge pipe thermistor or related abnormality	84
	J6	Outdoor heat exchanger thermistor or related abnormality	84
	L3	Electrical box temperature rise	85
	L4	Radiation fin temperature rise	86
	L5★	Output overcurrent detection	87
	P4	Radiation fin thermistor or related abnormality	84
—	**None**	Unknown	89

★: Displayed only when system down occurs.

4.2 Indoor Unit PCB Abnormality

Error Code **A1**

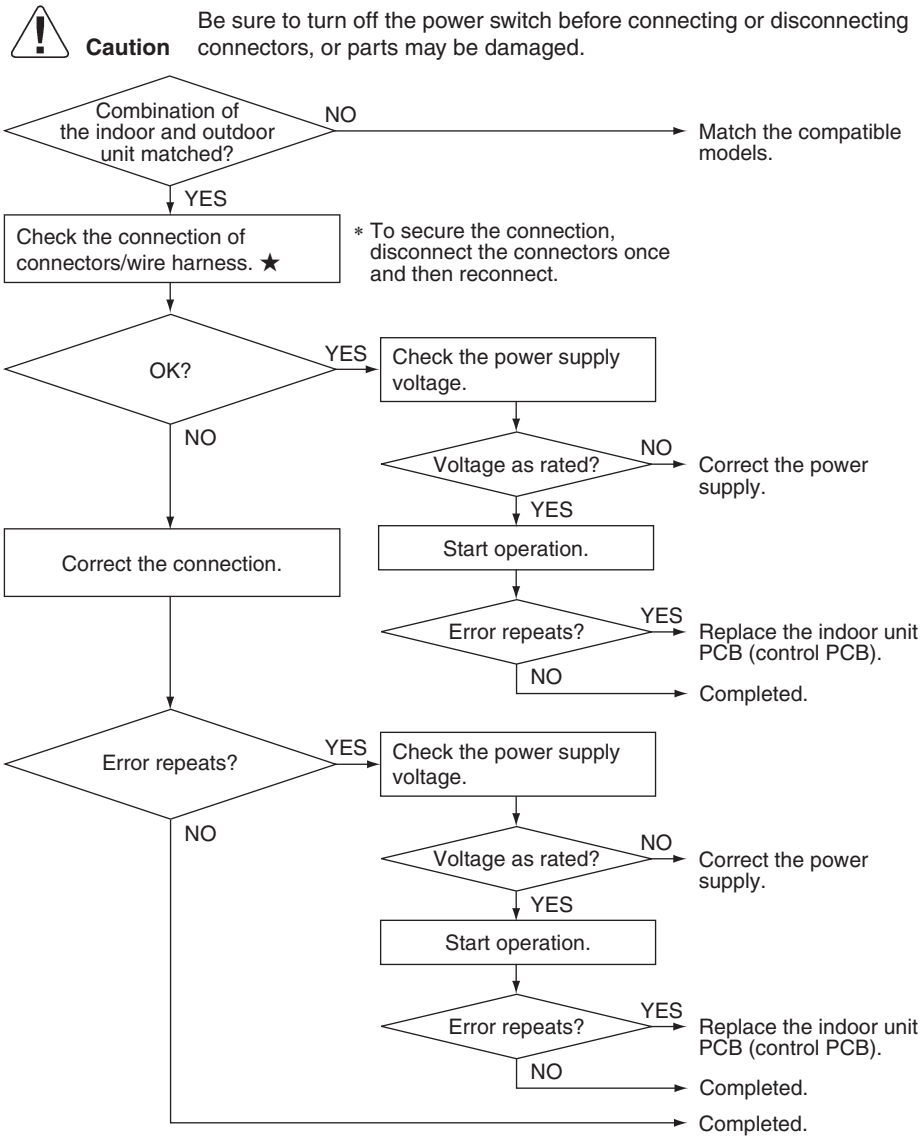
Method of Error Detection The system checks if the circuit works properly within the microcomputer of the indoor unit.

Error Decision Conditions The system cannot set the internal settings.

Supposed Causes

- Wrong models interconnected
- Defective indoor unit PCB
- Disconnection of connector
- Reduction of power supply voltage

Troubleshooting



R6000615

Note ★ Wire harness (Connector): Terminal strip ~ Control PCB (H1, H2, H3)

4.3 Freeze-up Protection Control

Error Code **A5**

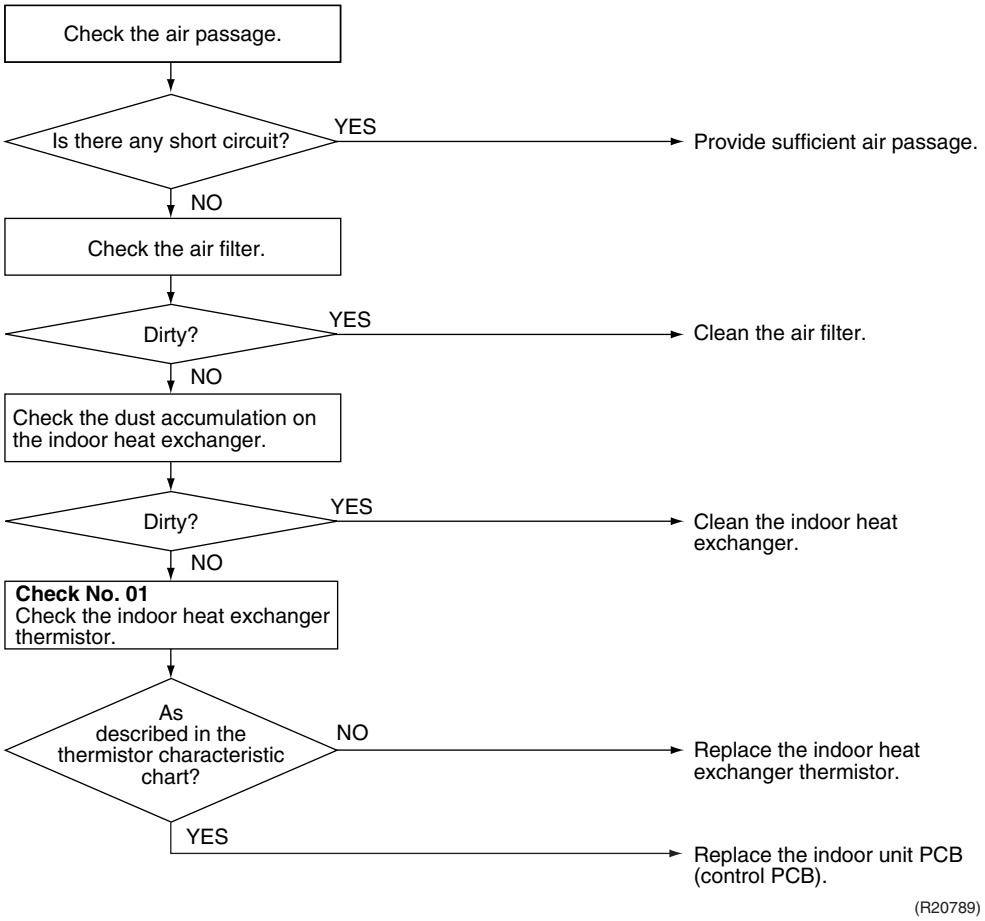
Method of Error Detection
During cooling operation, the freeze-up protection control (operation halt) is activated according to the temperature detected by the indoor heat exchanger thermistor.

Error Decision Conditions
During cooling operation, the indoor heat exchanger temperature is below 0°C.

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

Troubleshooting

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



Reference **Check No.01** Refer to P.90

4.4 Indoor Fan Motor (DC Motor) or Related Abnormality

Error Code

A6

Method of Error Detection

- The rotation speed detected by the microcomputer during fan motor operation is used to determine abnormal fan motor operation.
- The fan motor stops its rotation within 5 seconds after the operation starts.

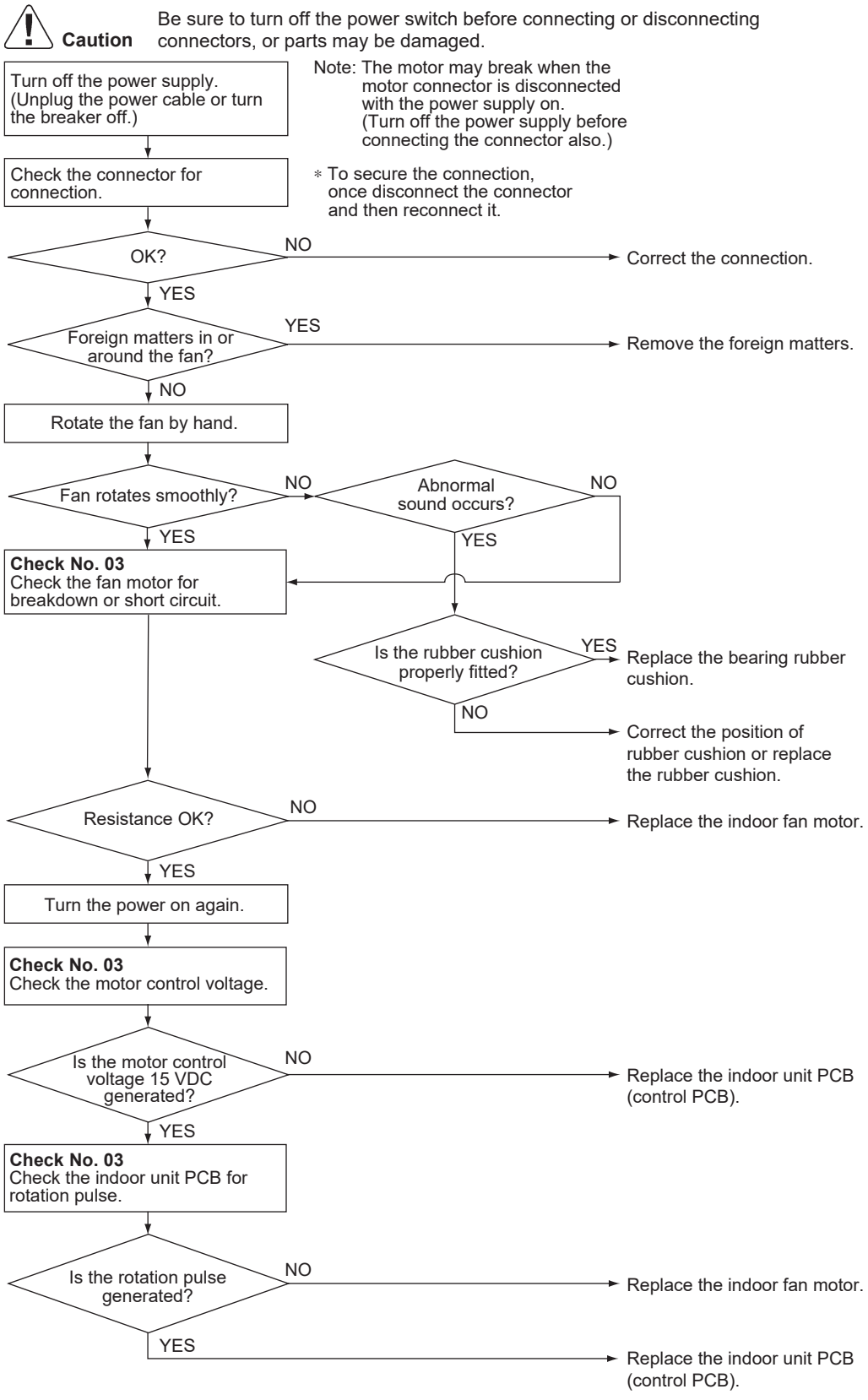
Error Decision Conditions

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

Supposed Causes

- Remarkable decrease in power supply voltage
- Layer short inside the fan motor winding
- Breaking of wire inside the fan motor
- Breaking of the fan motor lead wires
- Defective indoor unit PCB

Troubleshooting



R6000288

Reference **Check No.03** Refer to P.91

Note(s) The rotation pulse is the feedback signal from the indoor fan motor.

4.5 Thermistor or Related Abnormality (Indoor Unit)

Error Code

C4, C9

Method of Error Detection

The temperatures detected by the thermistors determine thermistor errors.

Error Decision Conditions

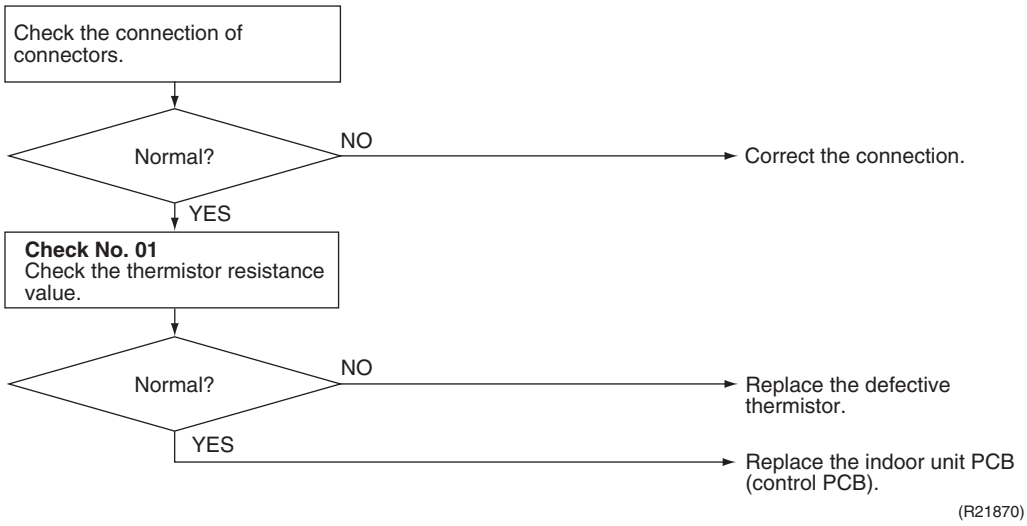
The voltage between the both ends of the thermistor is either 4.96 V or more, or 0.04 V or less with the power on.

Supposed Causes

- Disconnection of connector
- Defective thermistor(s)
- Defective indoor unit PCB

Troubleshooting

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



C4: Indoor heat exchanger thermistor
C9: Room temperature thermistor

Reference **Check No.01** Refer to P.90

4.6 Refrigerant Shortage

Error Code **U0**

Method of Error Detection

Refrigerant shortage detection I:
Refrigerant shortage is detected by checking the input current value and the compressor running frequency. If there is insufficient refrigerant, the input current tends to be lower than the normal value.

Refrigerant shortage detection II: (electronic expansion valve type model only)
Refrigerant shortage is detected by checking the discharge pipe temperature and the opening of the electronic expansion valve. If there is insufficient refrigerant, the discharge pipe temperature tends to rise.

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

Error Decision Conditions

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

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

	A (coefficient)	**B** (W)	**C** (Hz)
12 class	2048/256	–120	40
18 class	3015/256	–230	50
24 class	1002/256	40	54

Refrigerant shortage detection II: (electronic expansion valve type model only)
The following conditions continue for 80 seconds.

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

	D (pulse)	**E** (coefficient)	**F** (°C)
12 class	470	128/128	6
18 class	470	128/128	21
24 class	510	128/128	20

Refrigerant shortage detection III:
Refrigerant shortage is detected when the difference of the temperature is smaller than **G**°C

	G (°C)		
	12 class	18 class	24 class
Room thermistor temperature – indoor heat exchanger thermistor	3.5	N/A	4.0
Outdoor heat exchanger temperature – outdoor temperature	3.5	N/A	4.0

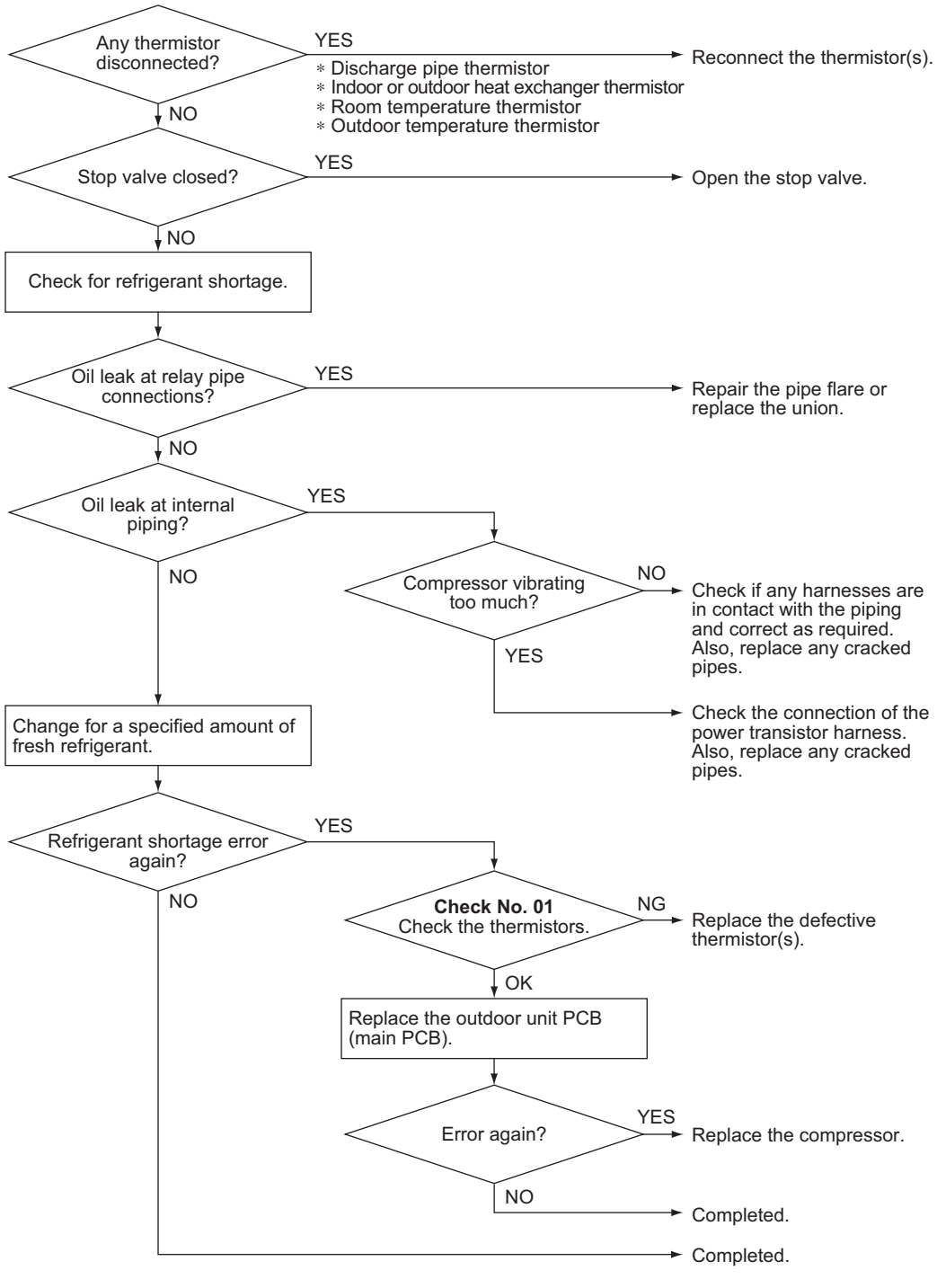
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

Supposed Causes

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

Troubleshooting

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



(R24716)

Reference **Check No.01** Refer to P.90

4.7 Low-voltage Detection or Over-voltage Detection

Error Code

U2

Method of Error Detection

■ **Indoor Unit**

The zero-cross detection of the power supply is evaluated by the indoor unit PCB.

■ **Outdoor Unit**

Low-voltage detection:

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

Over-voltage detection:

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

Error Decision Conditions

■ **Indoor Unit**

There is no zero-cross detection in approximately 10 seconds.

■ **Outdoor Unit**

Low-voltage detection:

- The voltage detected by the DC voltage detection circuit is below 150 ~ 200 V (12/18 class) or 180 ~ 196 V (24 class)
- The compressor stops if the error occurs, and restarts automatically after 3-minute standby.

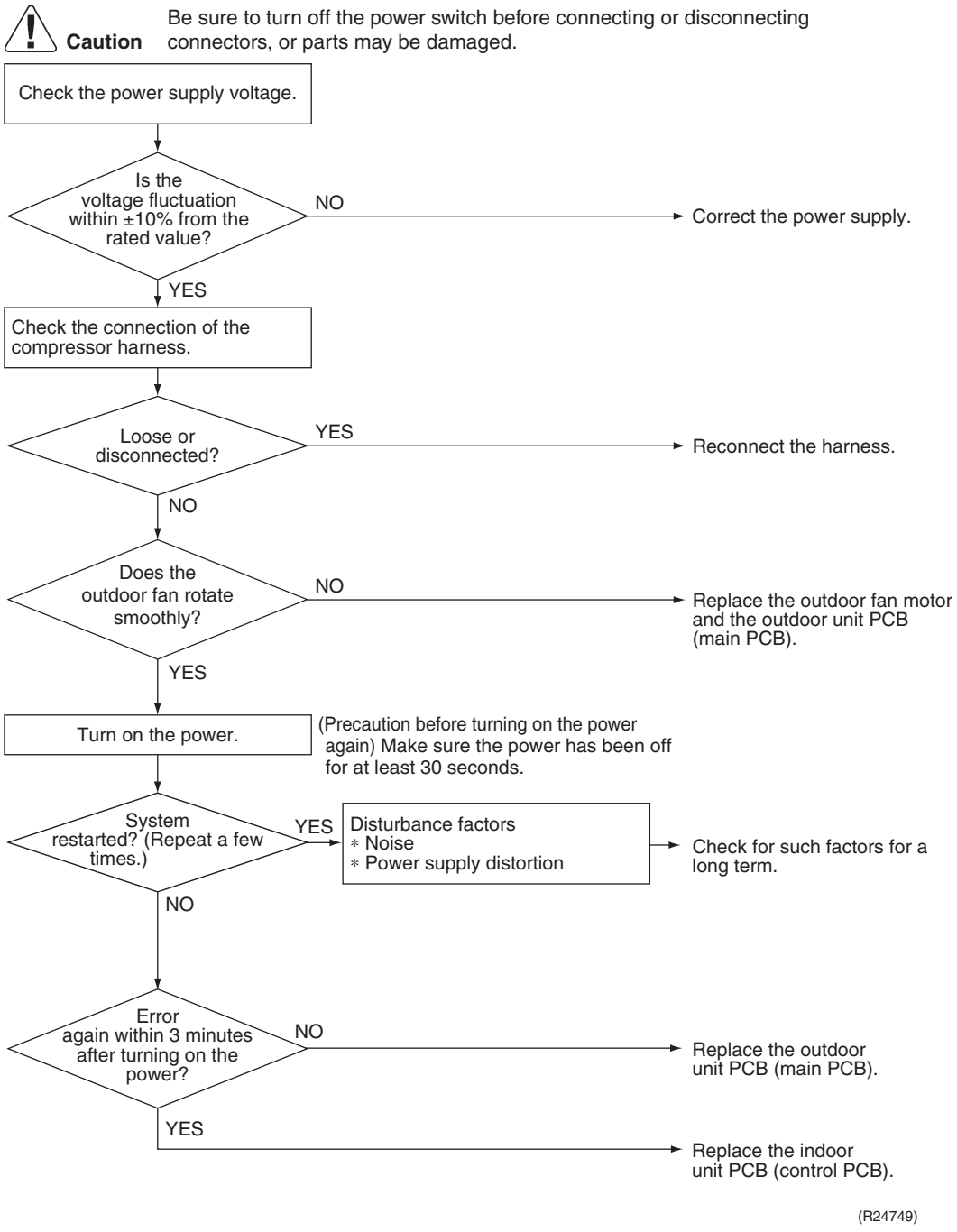
Over-voltage detection:

- An over-voltage signal is fed from the over-voltage detection circuit to the microcomputer (over 458 ~ 500 V, depending on the model).
- The compressor stops if the error occurs, and restarts automatically after 3-minute standby.

Supposed Causes

- Power supply voltage out of specification
- Defective DC voltage detection circuit
- Defective over-voltage detection circuit
- Defective PAM control part
- Disconnection of compressor harness
- Short circuit inside the fan motor winding
- Noise
- Momentary drop of voltage
- Momentary power failure
- Defective outdoor unit PCB
- Defective indoor unit PCB

Troubleshooting

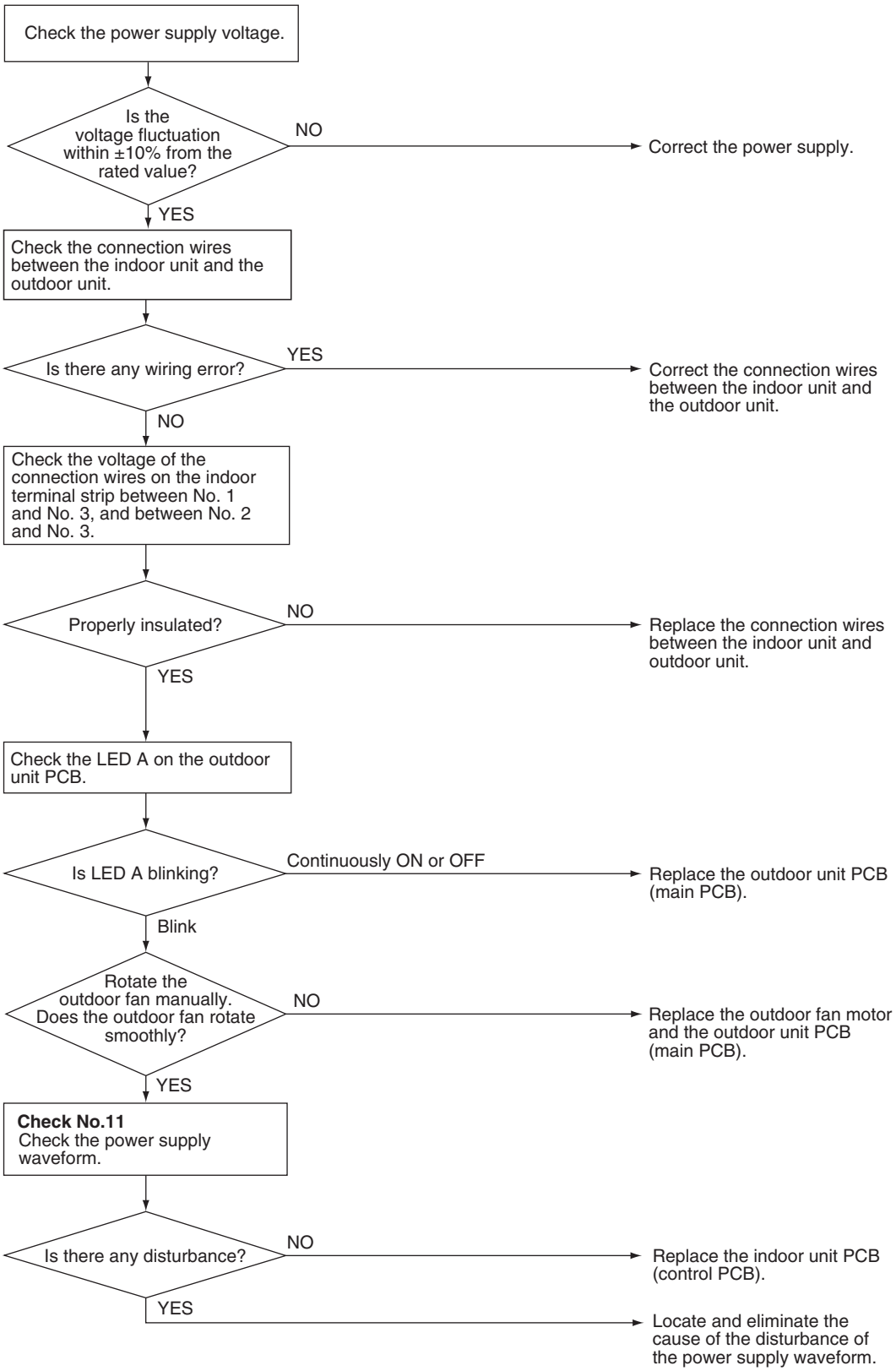


4.8 Signal Transmission Error (Between Indoor Unit and Outdoor Unit)

Error Code	**U4**
Method of Error Detection	The signal transmission data received from the outdoor unit is checked whether it is normal.
Error Decision Conditions	The data sent from the outdoor unit cannot be received normally, or the content of the data is abnormal.
Supposed Causes	■ Power supply voltage out of specification ■ Reduction of power supply voltage ■ Wiring error ■ Breaking of the connecting wires between the indoor and outdoor units (wire No.3) ■ Defective outdoor unit PCB ■ Short circuit inside the fan motor winding ■ Defective indoor unit PCB ■ Disturbed power supply waveform

Troubleshooting

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



(R24742)

Reference **Check No.11** Refer to P.92

4.9 Unspecified Voltage (Between Indoor Unit and Outdoor Unit)

Error Code

UA

Method of Error Detection

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

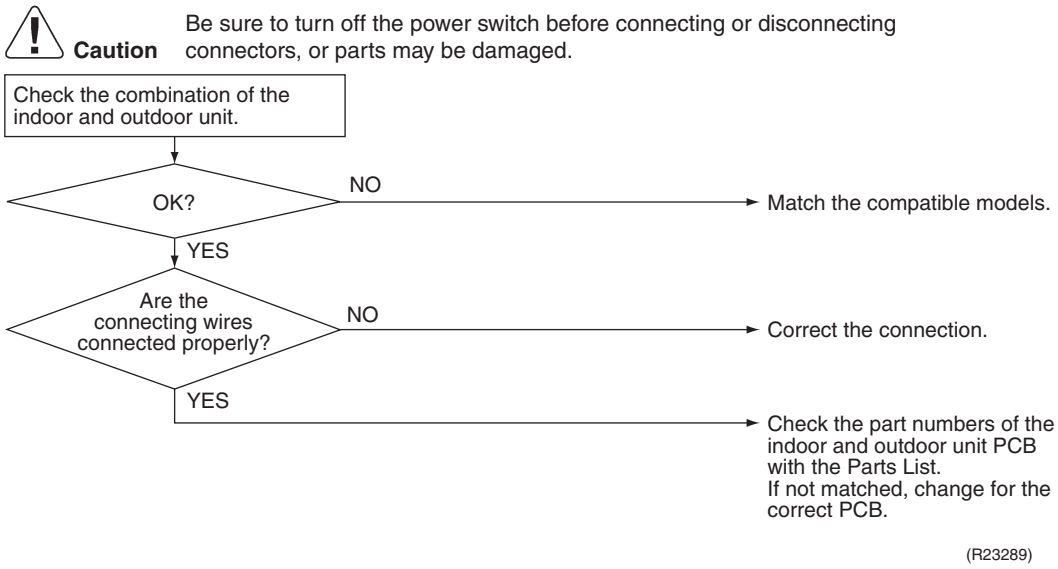
Error Decision Conditions

The pair type and multi type are interconnected.

Supposed Causes

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

Troubleshooting



4.10 Outdoor Unit PCB Abnormality

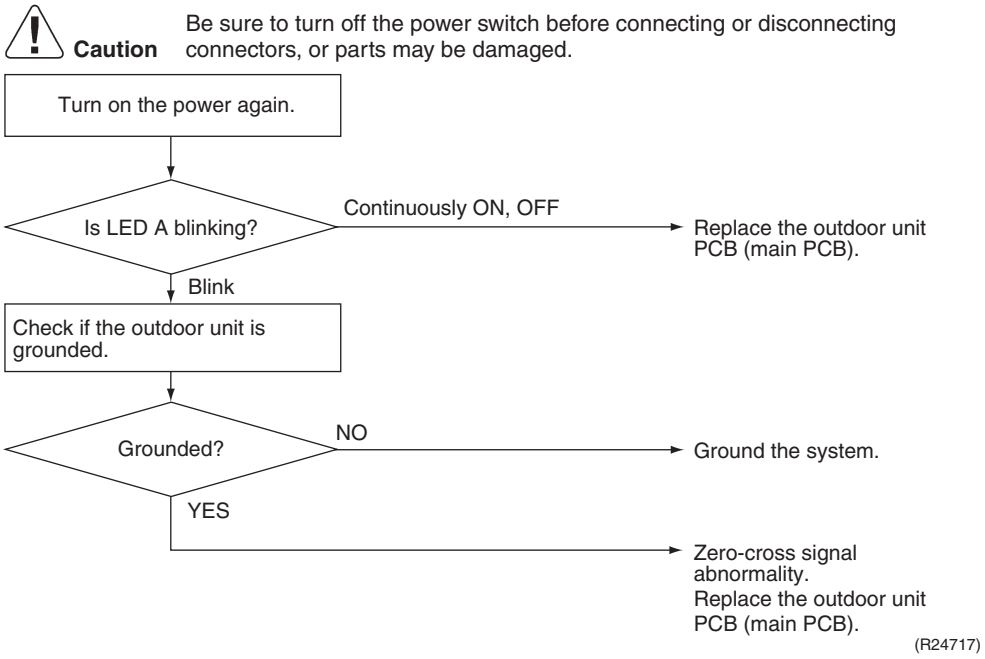
Error Code **E1**

Method of Error Detection
- The system checks if the microcomputer is working in order.
- The system checks if the zero-cross signal comes in properly.

Error Decision Conditions
- The microcomputer program runs out of control.
- The zero-cross signal is not detected.

Supposed Causes
- Defective outdoor unit PCB
- Noise
- Momentary drop of voltage
- Momentary power failure

Troubleshooting



4.11 OL Activation (Compressor Overload)

Error Code

E5

Method of Error Detection

A compressor overload is detected through compressor OL.

Error Decision Conditions

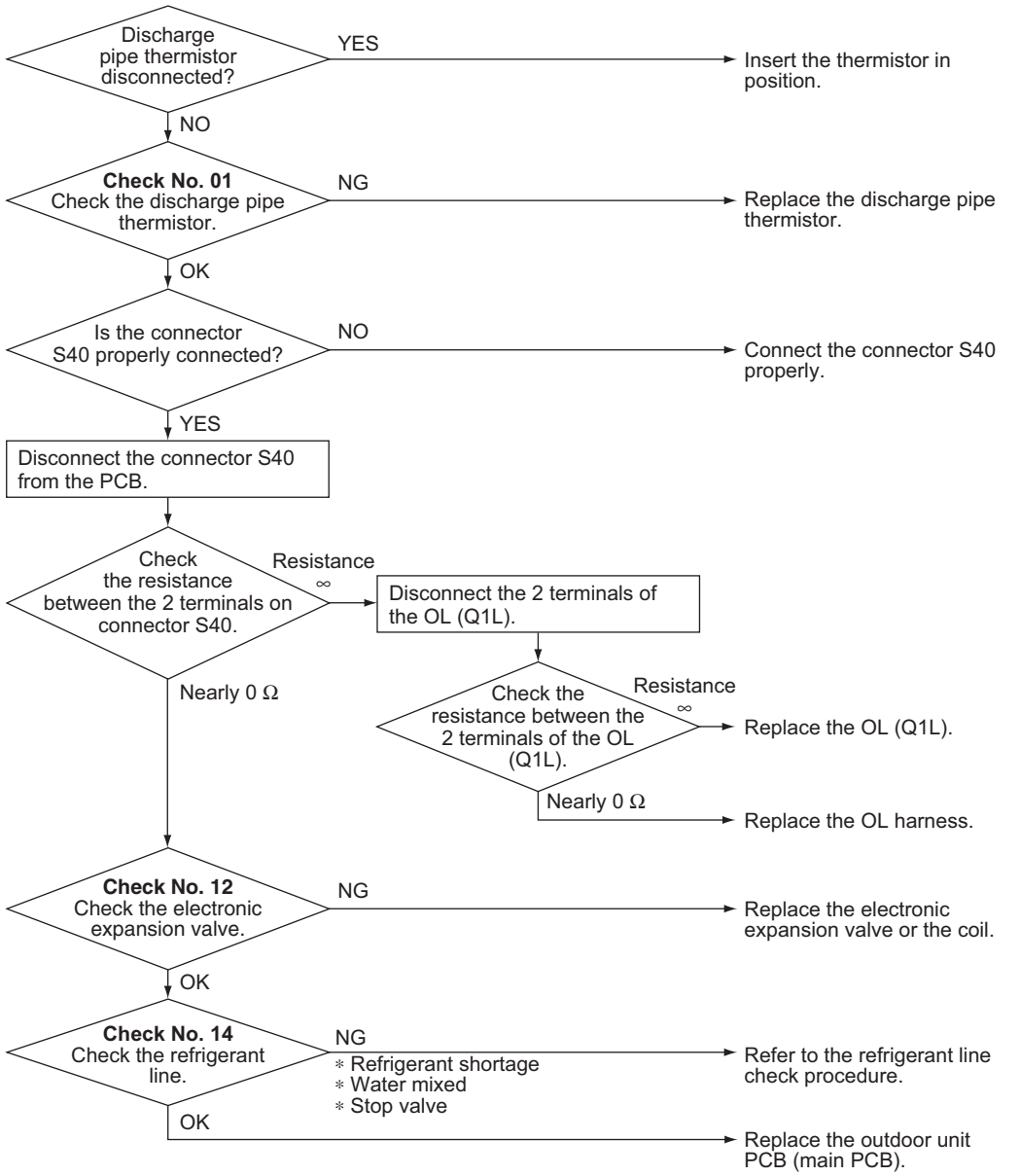
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

Supposed Causes

- Disconnection of discharge pipe thermistor
- Defective discharge pipe thermistor
- Disconnection of connector S40
- Disconnection of 2 terminals of OL (Q1L)
- Defective OL (Q1L)
- Broken OL harness
- Defective electronic expansion valve or coil
- Defective outdoor unit PCB
- Refrigerant shortage
- Water mixed in refrigerant
- Defective stop valve

Troubleshooting

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



R6000651

OL (Q1L) activating temperature: 120°C
OL (Q1L) recovery temperature: 95°C

Reference **Check No.01** Refer to P.90

Reference **Check No.12** Refer to P.92

Reference **Check No.14** Refer to P.93

4.12 Compressor Lock

Error Code **E6**

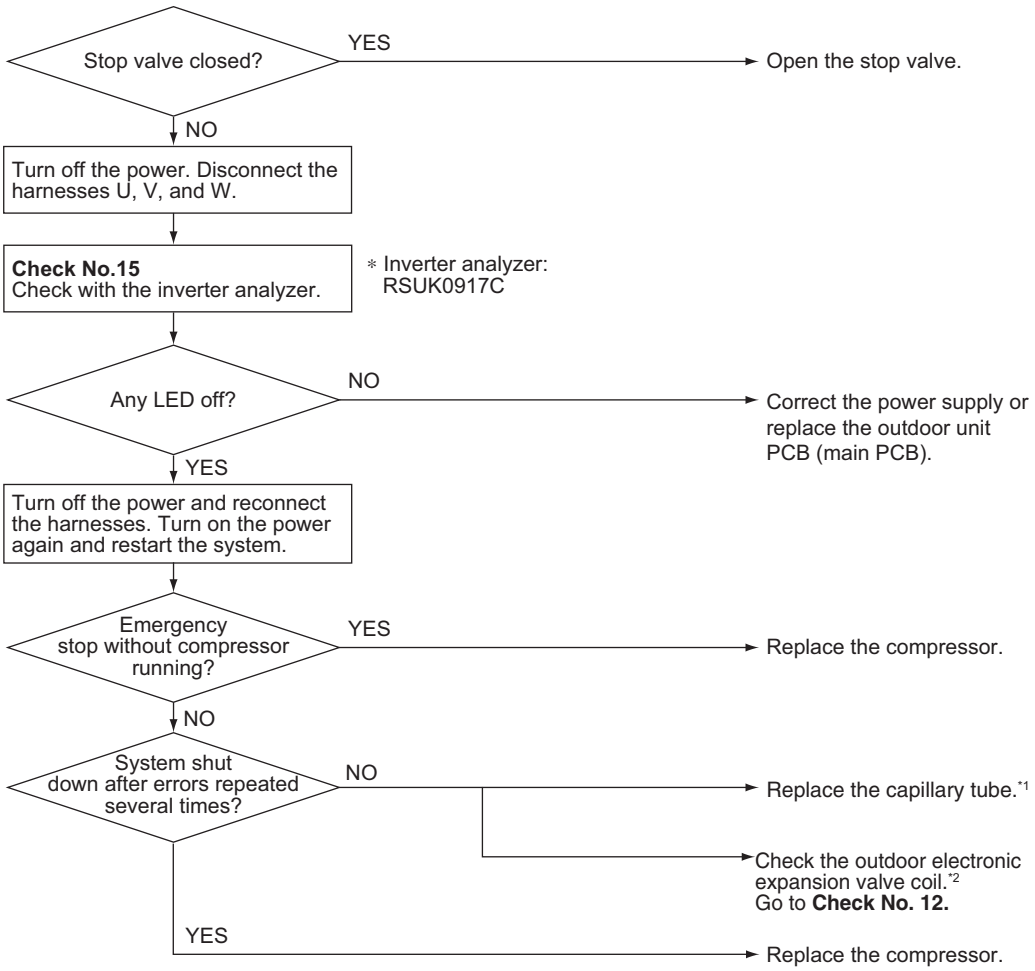
Method of Error Detection
A compressor lock is detected by the current waveform generated when applying high-frequency voltage to the motor.

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

Supposed Causes
- Closed stop valve
- Compressor locked
- Disconnection of compressor harness
- Defective electronic expansion valve or coil

Troubleshooting

Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.
(Precaution before turning on the power again)
Make sure the power has been off for at least 30 seconds.



*1 Capillary tube type model only
*2 Electronic expansion valve type model only

Reference **Check No.12** Refer to P.92

Reference **Check No.15** Refer to P.93

4.13 DC Fan Lock

Error Code

E7

Method of Error Detection

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

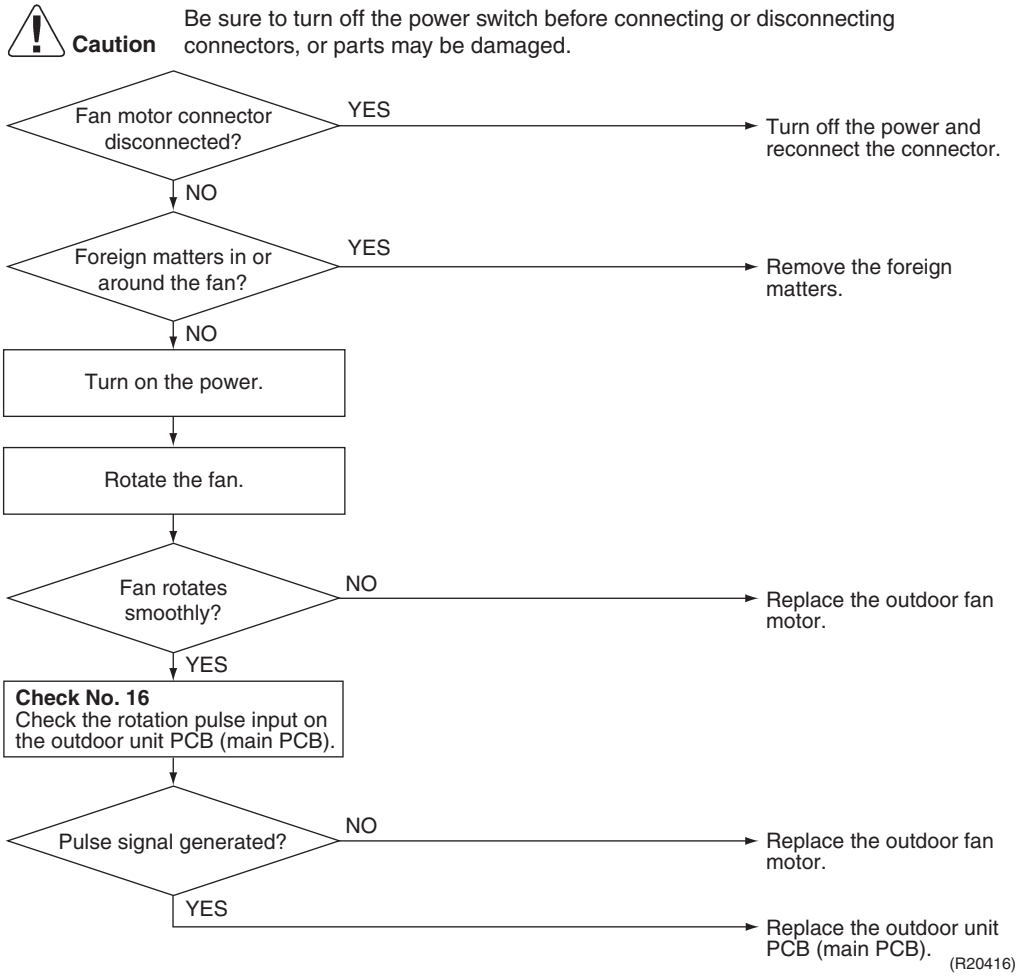
Error Decision Conditions

- The fan does not start in about 15 ~ 60 seconds (depending on the model) even when the fan motor is running.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 5 ~ 11 minutes without any other error

Supposed Causes

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

Troubleshooting



Reference **Check No.16** Refer to P.95

4.14 Input Overcurrent Detection

Error Code

E8

Method of Error Detection

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

Error Decision Conditions

The current exceeds 7 ~ 10 A (depending on the model) for 2.5 seconds with the compressor running.
The upper limit of the current decreases when the outdoor temperature exceeds a certain level.

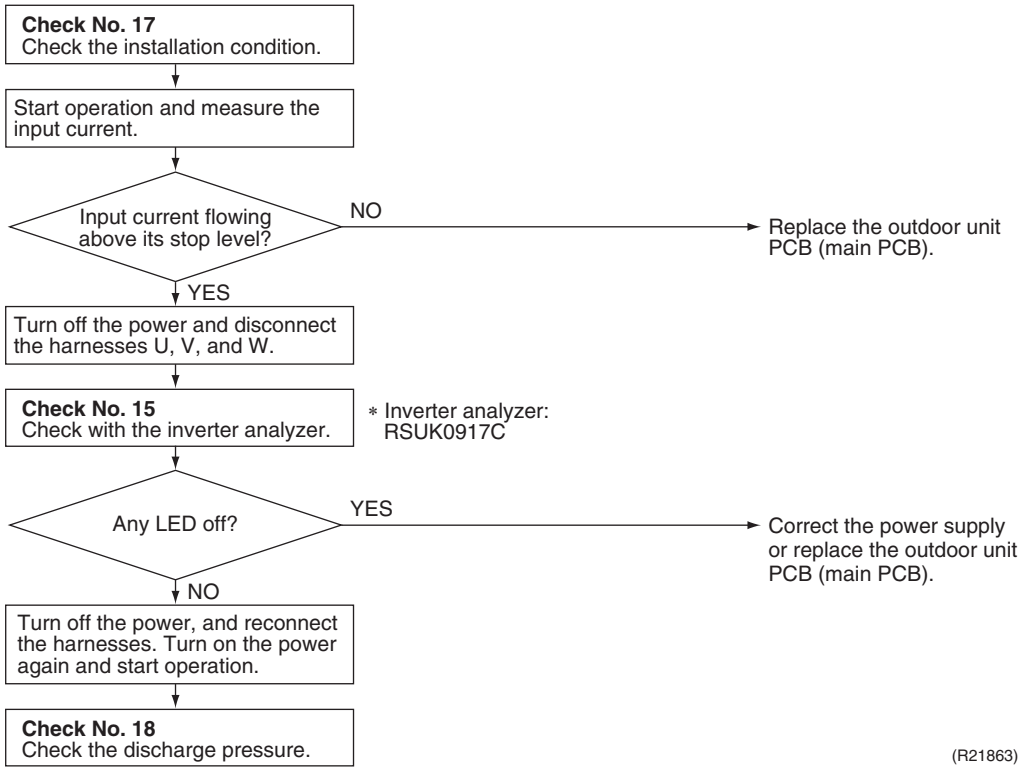
Supposed Causes

- Outdoor temperature out of operation range
- Defective compressor
- Defective power module
- Defective outdoor unit PCB
- Short circuit

Troubleshooting

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

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



Reference **Check No.15** Refer to P.93

Reference **Check No.17** Refer to P.96

Reference **Check No.18** Refer to P.96

4.15 Discharge Pipe Temperature Control

Error Code

F3

Method of Error Detection

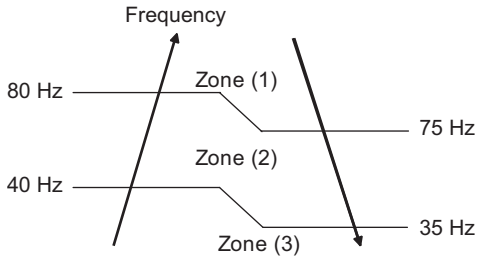
An error is determined with the temperature detected by the discharge pipe thermistor.

Error Decision Conditions

- If the temperature detected by the discharge pipe thermistor rises above **A**°C, the compressor stops.
- The error is cleared when the discharge pipe temperature has dropped below **B**°C.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 60 minutes without any other error

■ **12 class**

	A (°C)	**B** (°C)
(1) Above 80 Hz (rising), above 75 Hz (dropping)	116	104
(2) 40 ~ 80 Hz (rising), 35 ~ 75 Hz (dropping)	110	98
(3) Below 40 Hz (rising), below 35 Hz (dropping)	110	88



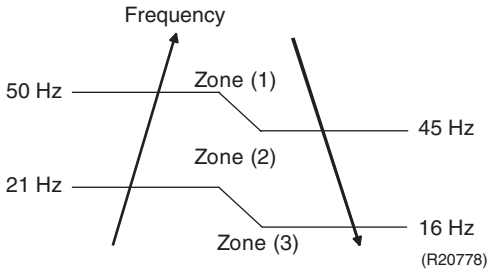
R6000880

■ **18 class**

A (°C)	**B** (°C)
116	85

■ **24 class**

	A (°C)	**B** (°C)
(1) Above 50 Hz (rising), above 45 Hz (dropping)	115	85
(2) 21 ~ 50 Hz (rising), 16 ~ 45 Hz (dropping)	103	73
(3) Below 21 Hz (rising), below 16 Hz (dropping)	95	65



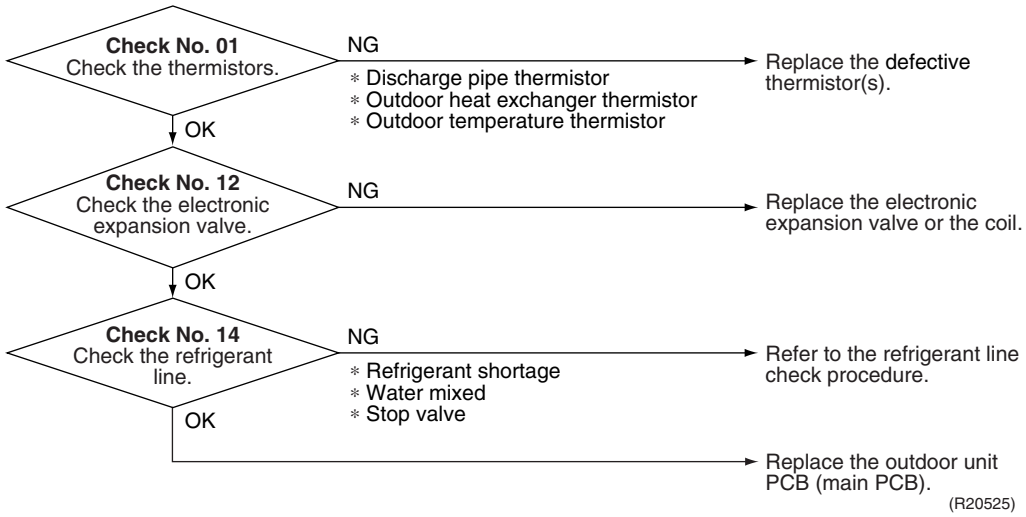
(R20778)

Supposed Causes

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

Troubleshooting

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



(R20525)

Reference **Check No.01** Refer to P.90

Reference **Check No.12** Refer to P.92

Reference **Check No.14** Refer to P.93

4.16 High Pressure Control in Cooling

Error Code

F6

Method of Error Detection

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

Error Decision Conditions

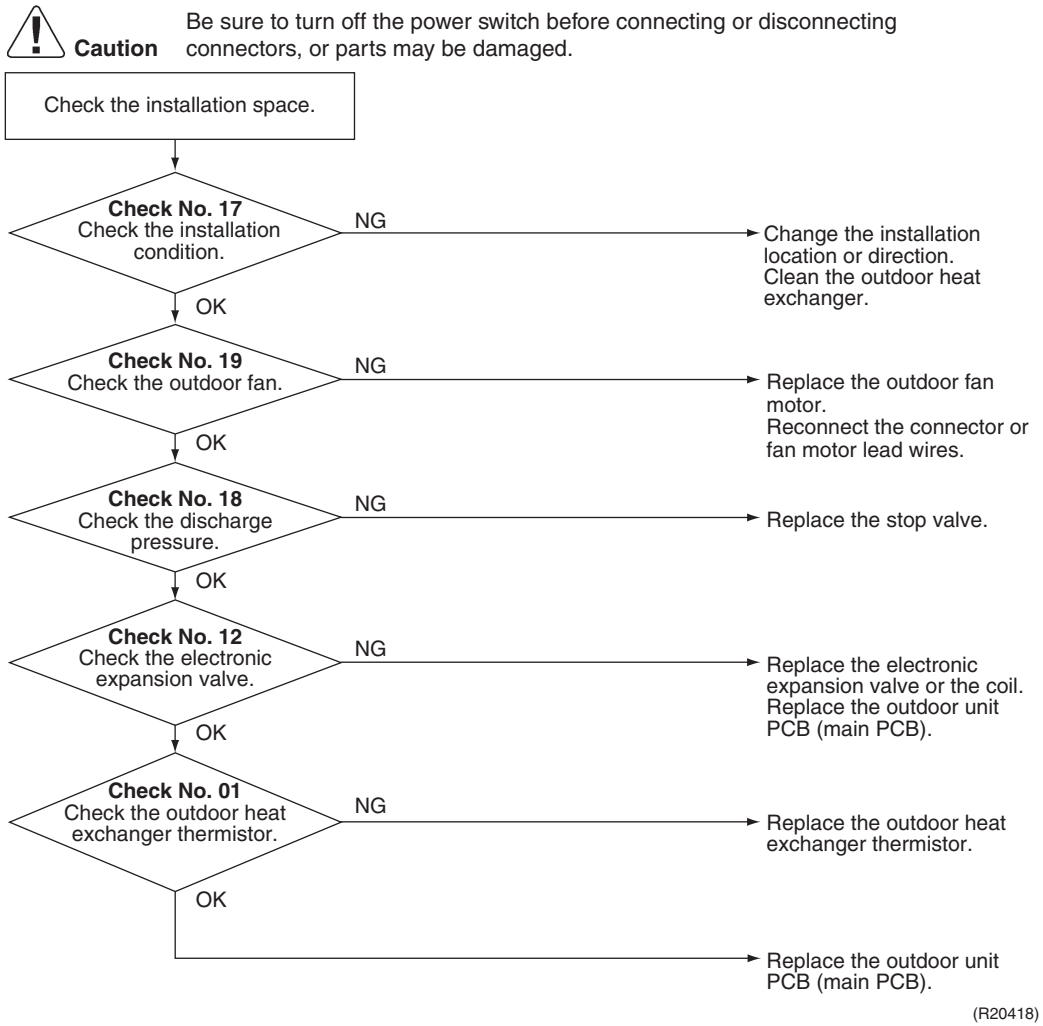
- The temperature sensed by the outdoor heat exchanger thermistor rises above **A**°C.
- The error is cleared when the temperature drops below **B**°C.

	A (°C)	**B** (°C)
12 class	62.5	55.5
18 class	63	55.5
24 class	60	55

Supposed Causes

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

Troubleshooting



Reference **Check No.01** Refer to P.90

 **Reference** **Check No.12** Refer to P.92

 **Reference** **Check No.17** Refer to P.96

 **Reference** **Check No.18** Refer to P.96

 **Reference** **Check No.19** Refer to P.97

4.17 System Shutdown due to Temperature Abnormality in Compressor

Error Code

F8

Method of Error Detection

Operation is halted when the temperature detected by the discharge pipe thermistor exceeds the determined limit.

Error Decision Conditions

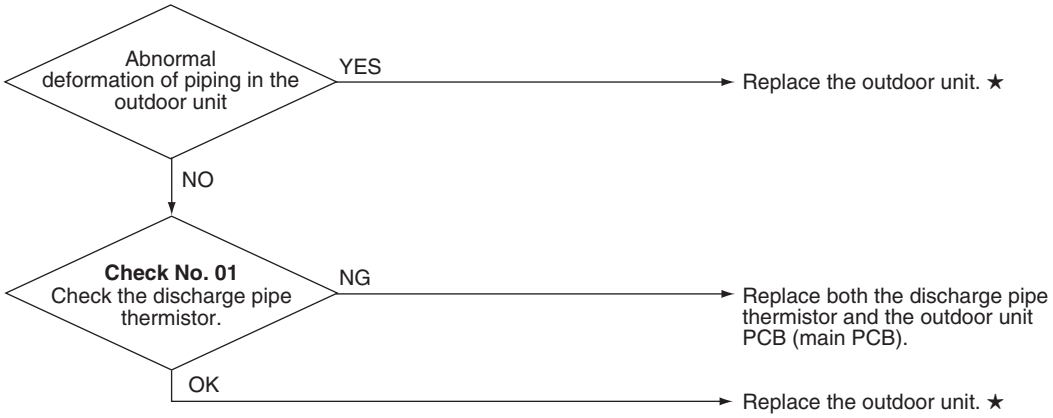
Temperature exceeds the detection threshold of 127.5°C during forced cooling operation.

Supposed Causes

- Abnormal operation due to air intrusion
- Defective discharge pipe thermistor

Troubleshooting

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



★ Replace the unit as directed in the installation manual, making sure that air does not intrude into the refrigerant piping.

(R23655)

Reference **Check No.01** Refer to P.90

4.18 Compressor System Sensor Abnormality

Error Code

H0

Method of Error Detection

The system checks the DC current before the compressor starts.

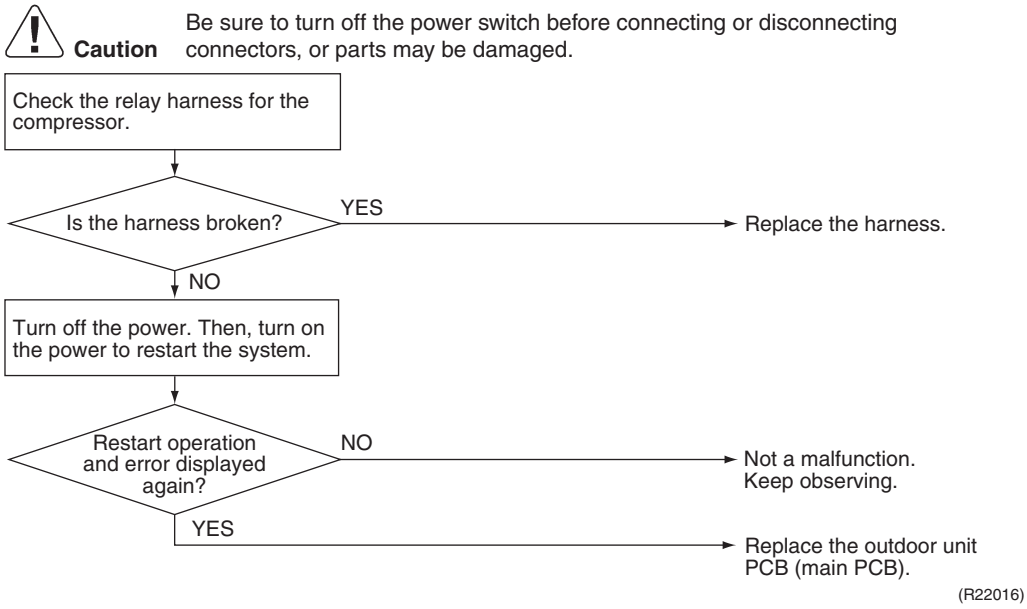
Error Decision Conditions

- The voltage converted from the DC current before compressor start-up is out of the range 0.5 ~ 4.5 V.
- The DC voltage before compressor start-up is below 50 V.

Supposed Causes

- Broken or disconnected harness
- Defective outdoor unit PCB

Troubleshooting



4.19 Position Sensor Abnormality

Error Code **H6**

Method of Error Detection

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

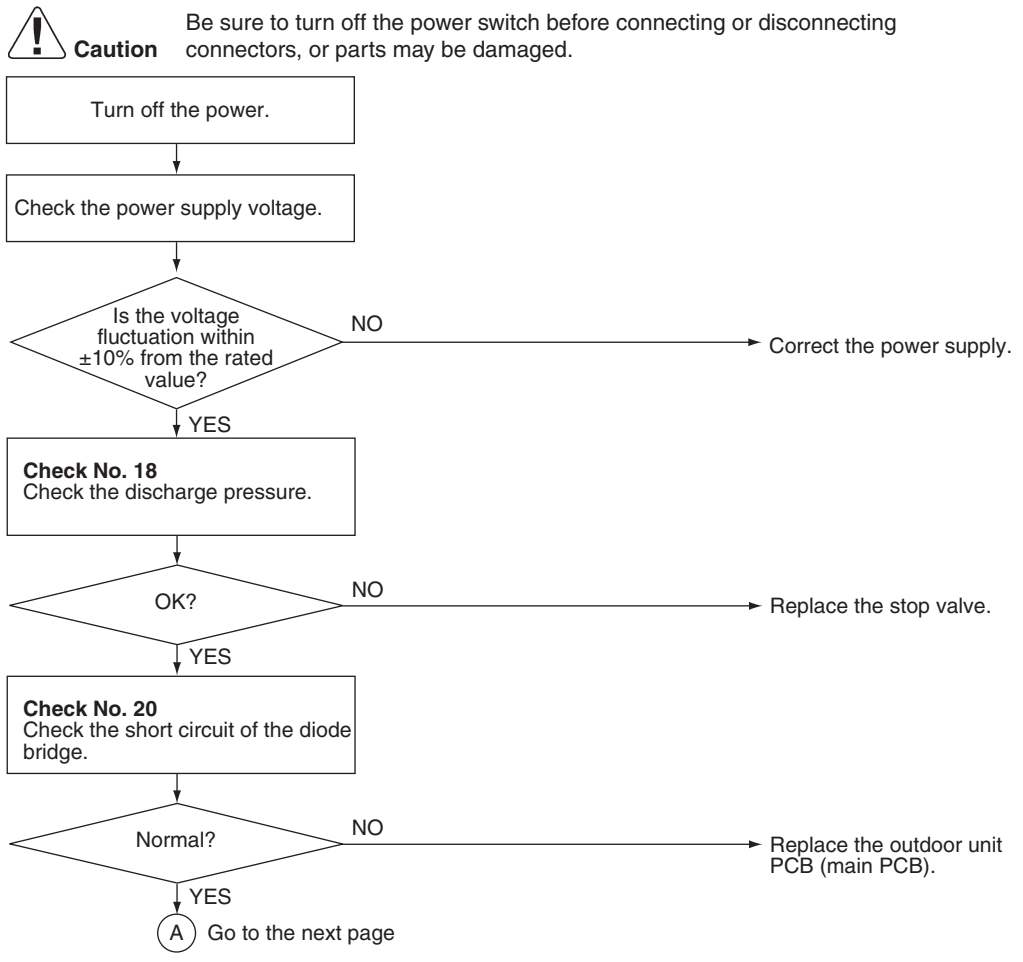
Error Decision Conditions

- The compressor fails to start in about 15 seconds after the compressor run command signal is sent.
- If the error repeats, the system is shut down.
- Reset condition: Continuous run for about 11 minutes without any other error

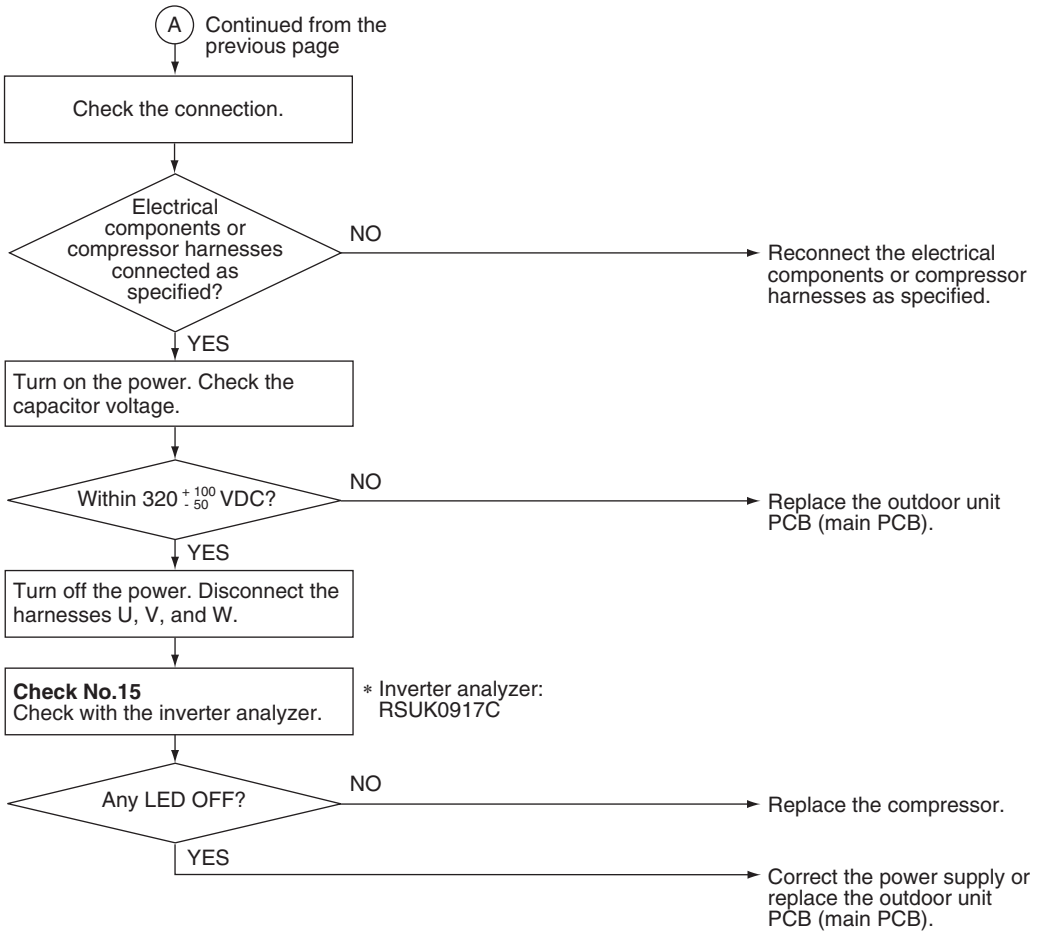
Supposed Causes

- Power supply voltage out of specification
- Disconnection of the compressor harness
- Defective compressor
- Defective outdoor unit PCB
- Start-up failure caused by the closed stop valve
- Input voltage out of specified range

Troubleshooting



(R24909)



Reference **Check No.15** Refer to P.93

Reference **Check No.18** Refer to P.96

Reference **Check No.20** Refer to P.97

4.20 DC Voltage/Current Sensor Abnormality

Error Code

H8

Method of Error Detection

DC voltage or DC current sensor abnormality is identified based on the compressor running frequency and the input current.

Error Decision Conditions

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

Supposed Causes

- Defective outdoor unit PCB

Troubleshooting

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

Replace the outdoor unit PCB (main PCB).

4.21 Thermistor or Related Abnormality (Outdoor Unit)

Error Code

H9, J3, J6, P4

Method of Error Detection

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

Error Decision Conditions

- The voltage between both ends of the thermistor is either 4.96 V or more, or 0.04 V or less with the power on.
- **J3** error is judged if the discharge pipe temperature is lower than the heat exchanger temperature.

Supposed Causes

- Disconnection of the connector for the thermistor
- Defective thermistor(s)
- Defective outdoor heat exchanger thermistor in the case of **J3** error
- Defective outdoor unit PCB

Troubleshooting

In case of P4

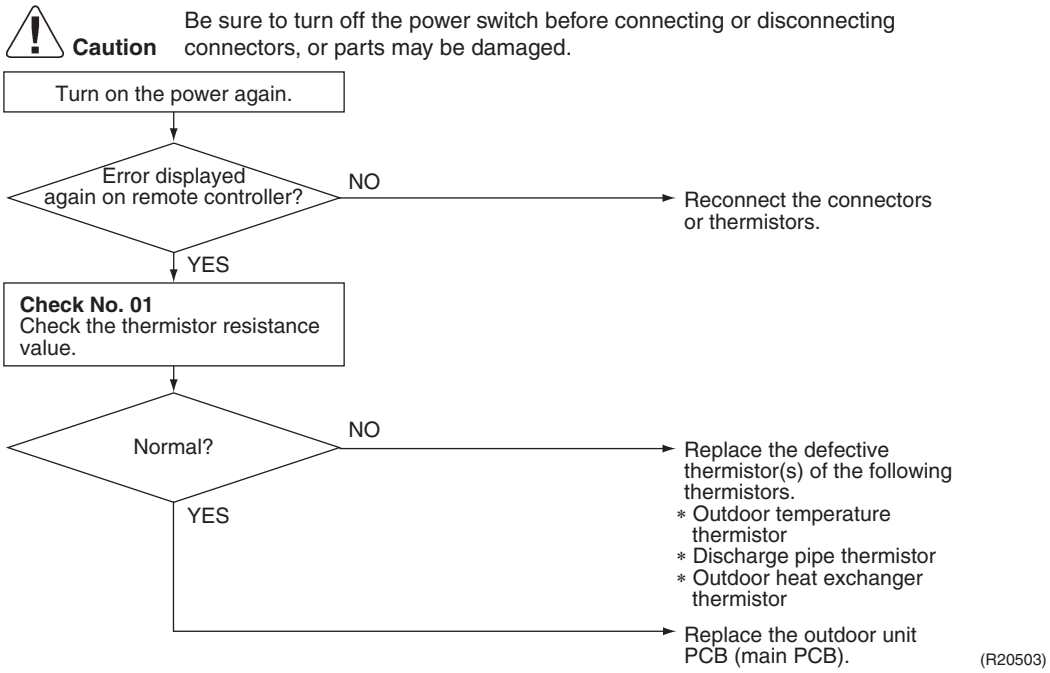
Caution Be sure to turn off the power switch before connecting or disconnecting connectors, or parts may be damaged.

Replace the outdoor unit PCB (main PCB).

P4 : Radiation fin thermistor

Troubleshooting

In case of H9, J3, J6



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

Reference **Check No.01** Refer to P.90

4.22 Electrical Box Temperature Rise

Error Code

L3

Method of Error Detection

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

Error Decision Conditions

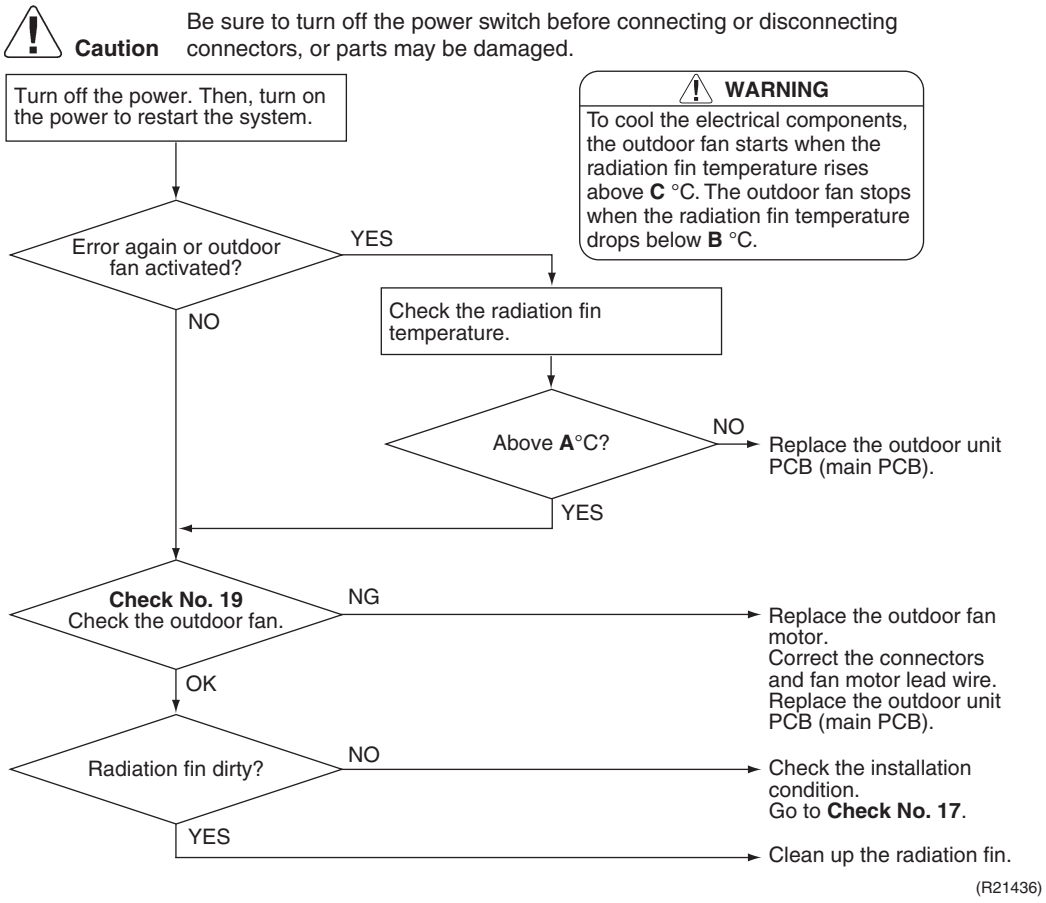
- With the compressor off, the radiation fin temperature is above **A** °C.
- The error is cleared when the radiation fin temperature drops below **B** °C.
- To cool the electrical components, the outdoor fan starts when the radiation fin temperature rises above **C** °C and stops when the radiation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

	A (°C)	**B** (°C)	**C** (°C)
12 class	94	82	87
18 class	95.5	80	85
24 class	100	64	91

Supposed Causes

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

Troubleshooting



Reference **Check No.17** Refer to P.96

Reference **Check No.19** Refer to P.97

4.23 Radiation Fin Temperature Rise

Error Code

L4

Method of Error Detection

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

Error Decision Conditions

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

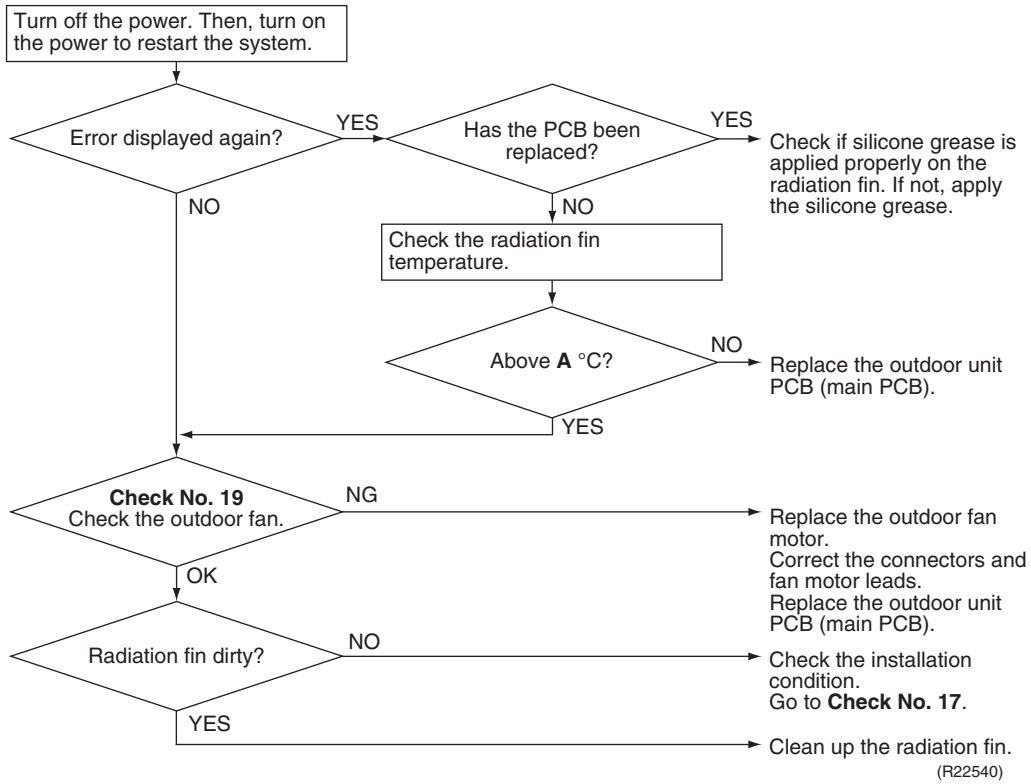
	12 class	18 class	24 class
A (°C)	94	95.5	73.5
B (°C)	82	80	57

Supposed Causes

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

Troubleshooting

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



Note Refer to Silicone Grease on Power Transistor/Diode Bridge on page 106 for details.

Reference **Check No.17** Refer to P.96

Reference **Check No.19** Refer to P.97

4.24 Output Overcurrent Detection

Error Code

L5

Method of Error Detection

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

Error Decision Conditions

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

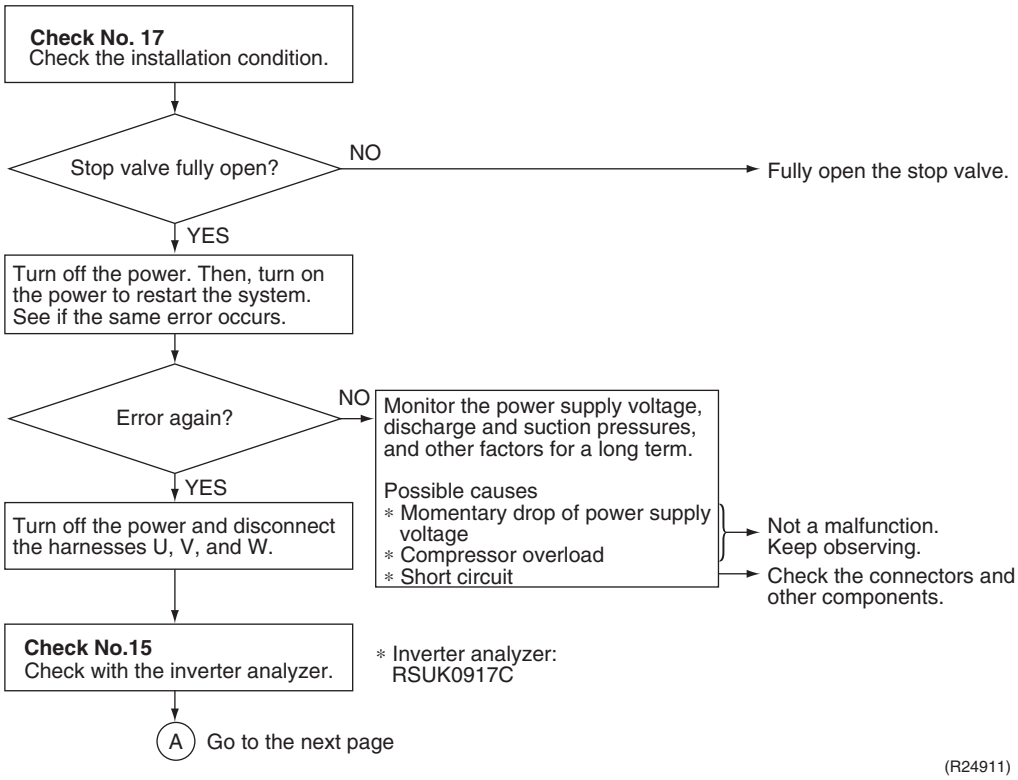
Supposed Causes

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

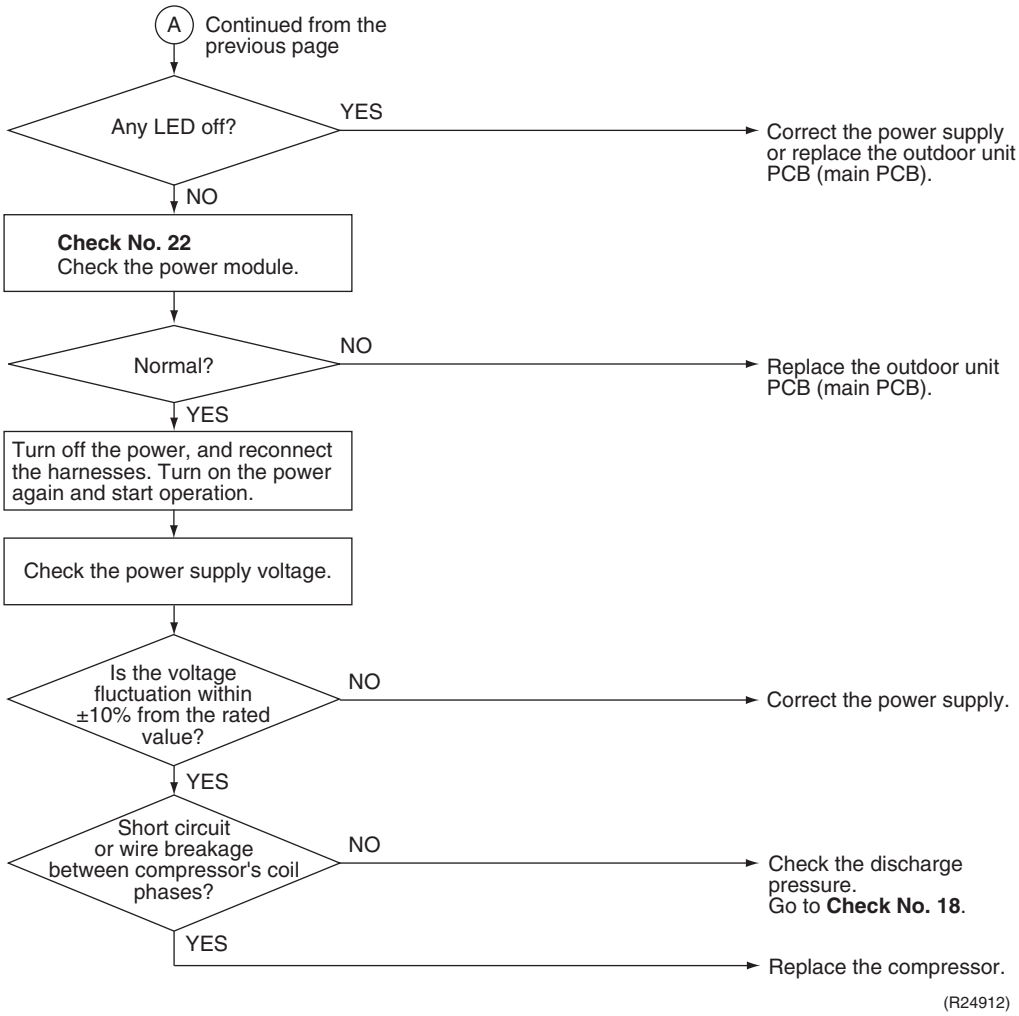
Troubleshooting

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

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



(R24911)



Reference **Check No.15** Refer to P.93

Reference **Check No.17** Refer to P.96

Reference **Check No.18** Refer to P.96

Reference **Check No.22** Refer to P.99

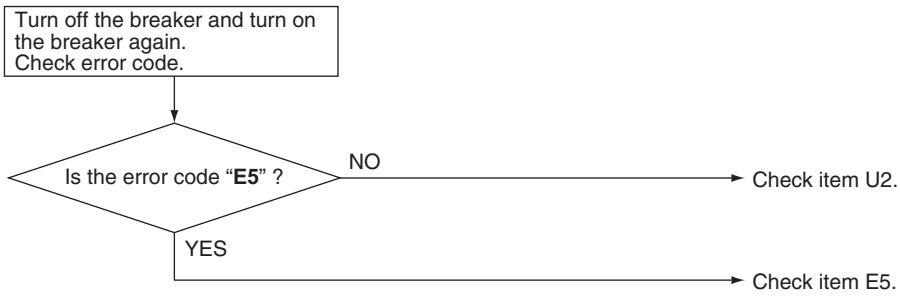
4.25 Error Codes None

Error Code None

Possible error detection
- Over-voltage detection
- OL Activation (compressor overload)

Troubleshooting

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



Reference Refer to U2 on P.64

Reference Refer to E5 on P.70

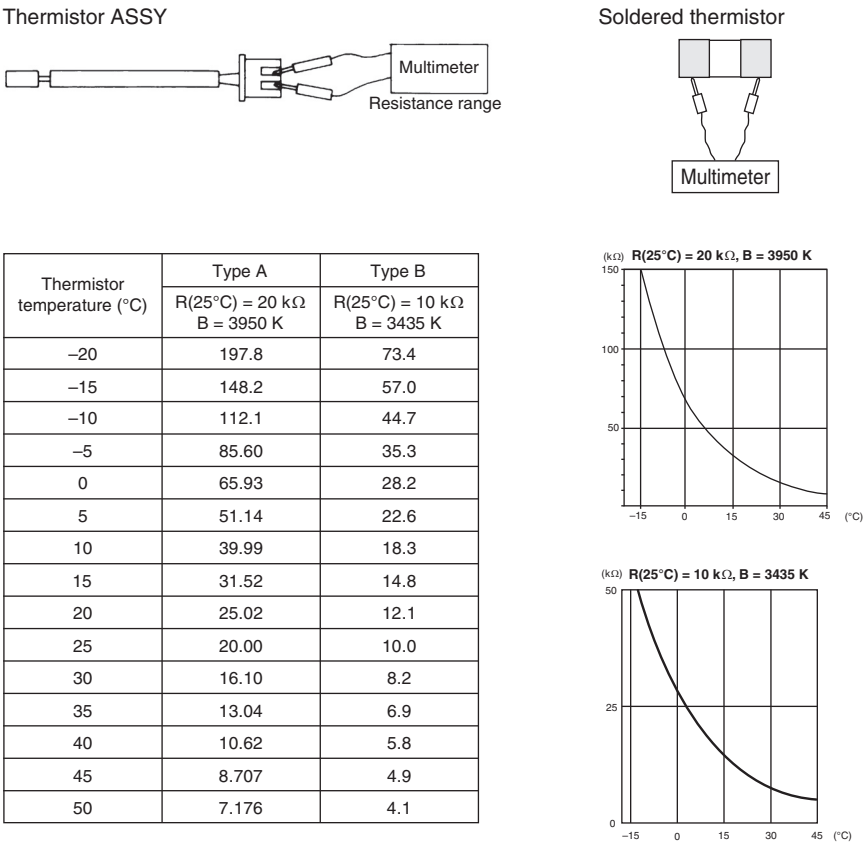
5. Check

5.1 Thermistor Resistance Check

Check No.01

Measure the resistance of each thermistor using multimeter.
The resistance values are defined by below table.
If the measured resistance value does not match the listed value, the thermistor must be replaced.

- Disconnect the connector of thermistor ASSY from the PCB to measure the resistance between the pins using multimeter.
- To check the thermistor soldered on a PCB, disconnect the PCB from other PCB/parts, and measure the resistance between the both ends of soldered thermistor.



Thermistor temperature (°C)	Type A R(25°C) = 20 kΩ B = 3950 K	Type B R(25°C) = 10 kΩ B = 3435 K
–20	197.8	73.4
–15	148.2	57.0
–10	112.1	44.7
–5	85.60	35.3
0	65.93	28.2
5	51.14	22.6
10	39.99	18.3
15	31.52	14.8
20	25.02	12.1
25	20.00	10.0
30	16.10	8.2
35	13.04	6.9
40	10.62	5.8
45	8.707	4.9
50	7.176	4.1

R6000664

Thermistor			Resistance Type	B value	R(25°C)
Indoor Unit	R1T	Room temperature thermistor	B	3435 K	10 kΩ
	R2T	Indoor heat exchanger thermistor	A	3950 K	20 kΩ
Outdoor Unit	R1T	Outdoor temperature thermistor	A	3950 K	20 kΩ
	R2T	Outdoor heat exchanger thermistor	A	3950 K	20 kΩ
	R3T	Discharge pipe thermistor	A	3950 K	20 kΩ

Note

When replacing the defective thermistor(s), replace the thermistor as ASSY.

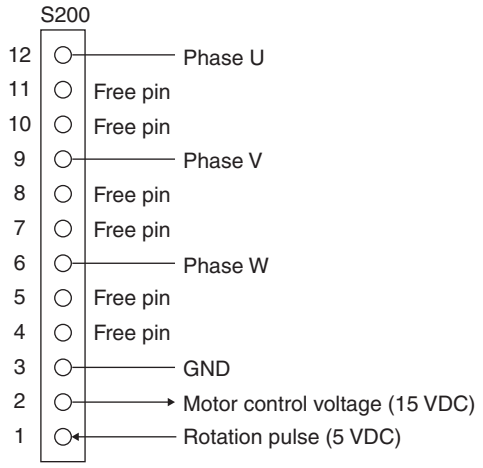
5.2 Indoor Fan Motor Connector Check

Check No.03

- Fan motor wire breakdown/short circuit check
  (1) Check the connector for connection.
  (2) Turn the power off.
  (3) Check if each resistance at the phases U - V and V - W is within specified range in the table below.

- Motor control voltage check
  (1) Check the connector for connection.
  (2) Check the motor control voltage is generated (between the pins 2 - 3).

- Rotation pulse check
  (1) Check the connector for connection.
  (2) Turn the power on and stop the operation.
  (3) Check if the Hall IC generates the rotation pulse 4 times when the fan motor is manually rotated once (between the pins 1 - 3).



R6000090

U-V-W Resistance (Ω)
90 ~ 100

Note

A measurement error might occur in the resistance value depending on the measurement conditions and the method.

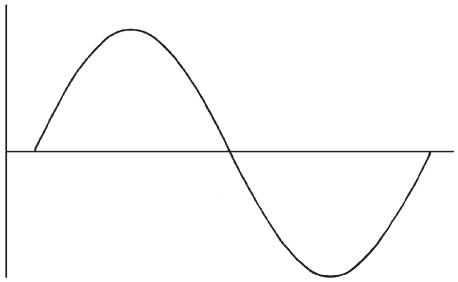
5.3 Power Supply Waveform Check

Check No.11

Measure the power supply waveform between No. 1 and No. 2 on the terminal strip, and check the waveform disturbance.

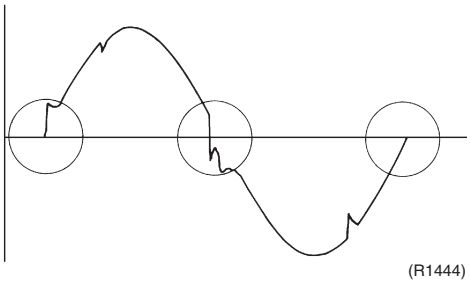
- Check if the power supply waveform is a sine wave (Fig.1).
- Check if there is waveform disturbance near the zero-cross (sections circled in Fig.2).

[Fig.1]



(R1736)

[Fig.2]



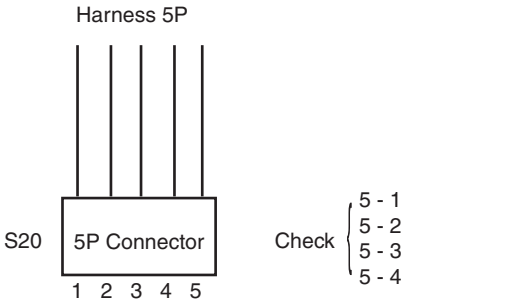
(R1444)

5.4 Electronic Expansion Valve Check

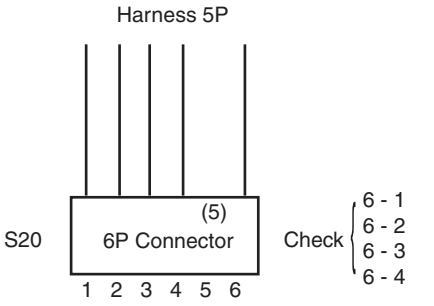
Check No.12

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

1. Check if the EV connector is correctly connected to the PCB.
2. Turn the power off and on again, and check if the EV generates a latching sound.
3. If the EV does not generate a latching sound in the step 2 above, disconnect the connector and check the continuity using a multimeter.
4. Check the continuity between the pins 5 - 1, 5 - 2, 5 - 3, 5 - 4 (for 5P connectors) and 6 - 1, 6 - 2, 6 - 3, 6 - 4 (for 6P connectors). If there is no continuity between the pins, the EV coil is faulty.
5. If the continuity is confirmed in step 3, the outdoor unit PCB (main PCB) is faulty.



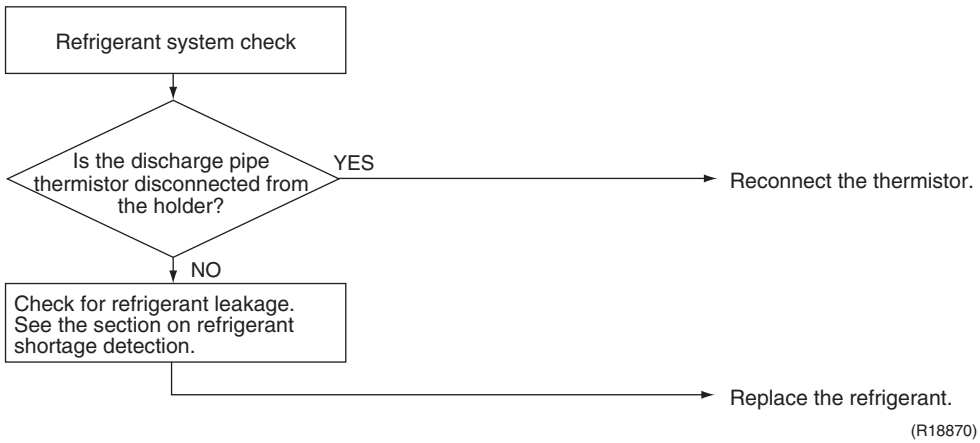
(R23840)



(R23593)

5.5 Inverter Unit Refrigerant System Check

Check No.14



5.6 Inverter Analyzer Check

Check No.15

■ **Characteristics**

Inverter analyzer: RSUK0917C

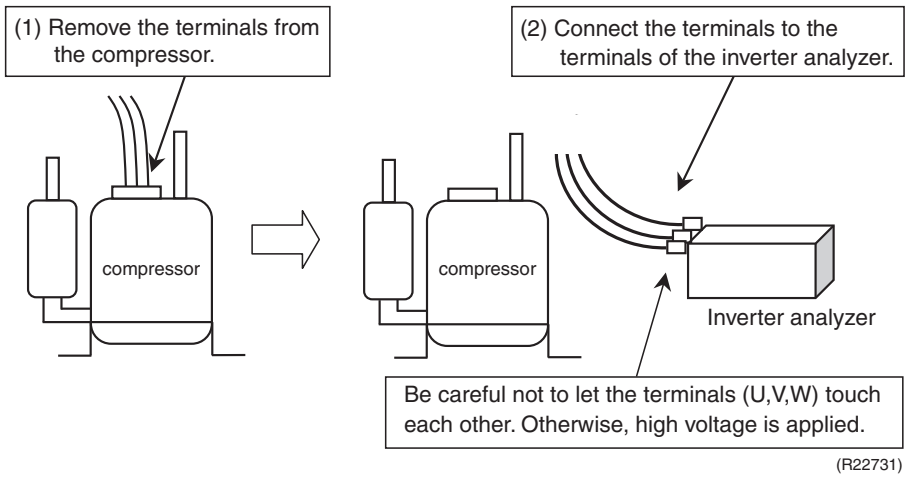
If an abnormal stop occurs due to compressor startup failure or overcurrent output when using an inverter unit, it is difficult to judge whether the stop is caused by the compressor failure or some other failure (main PCB, power module, etc.). The inverter analyzer makes it possible to judge the cause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

■ **Operation Method**

Step 1
Be sure to turn the power off.

Step 2
Install an inverter analyzer instead of a compressor.

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



Reference:
If the terminals of the compressor are not FASTON terminals (difficult to remove the wire on the

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

Step 3

Activate power transistor test operation from the indoor unit.

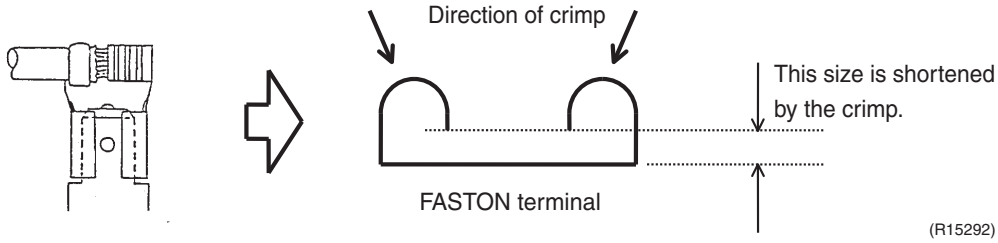
1. Turn the power on.
2. Select FAN operation with **MODE** button on the remote controller.
3. Press the center of **TEMP** button and **MODE** button at the same time.
4. Select **T** with **TEMP** up or **TEMP** down button.
5. Press **MODE** button to start the power transistor test operation.

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

1. If all the LEDs are lit uniformly, the compressor is defective.
   Replace the compressor.
2. If the LEDs are not lit uniformly, check the power module.
   Refer to **Check No.22**.
3. If NG in **Check No.22**, replace the power module.
   (Replace the main PCB. The power module is united with the main PCB.)
   If OK in **Check No.22**, check if there is any solder cracking on the PCB.
4. If any solder cracking is found, replace the PCB or repair the soldered section.
   If there is no solder cracking, replace the PCB.

Caution

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

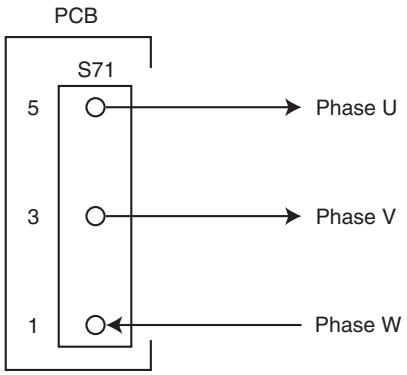


5.7 Outdoor Fan Motor Check

Check No.16

■ **12/18 class**

Check if the sinusoidal voltage is generated between pins 1 - 3 and 3 - 5 when the fan motor is manually rotated once.



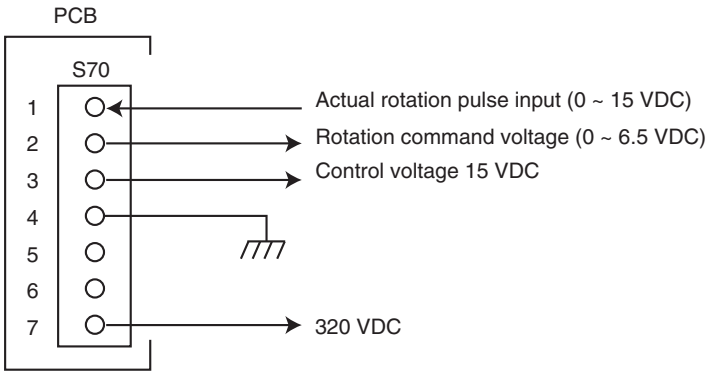
R6000709

■ **24 class**

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

1. Set operation OFF and power OFF. Disconnect the connector S70.
2. Check that the voltage between the pins 4 - 7 is 320 VDC.
3. Check that the control voltage between the pins 4 - 3 is 15 VDC.
4. Check that the rotation command voltage between the pins 4 - 2 is 0 ~ 6.5 VDC.
5. Keep operation OFF and power OFF. Connect the connector S70.
6. Check whether 4 rotation pulses (0 ~ 15 VDC) are input at the pins 4 - 1 when the fan motor is rotated 1 turn by hand.

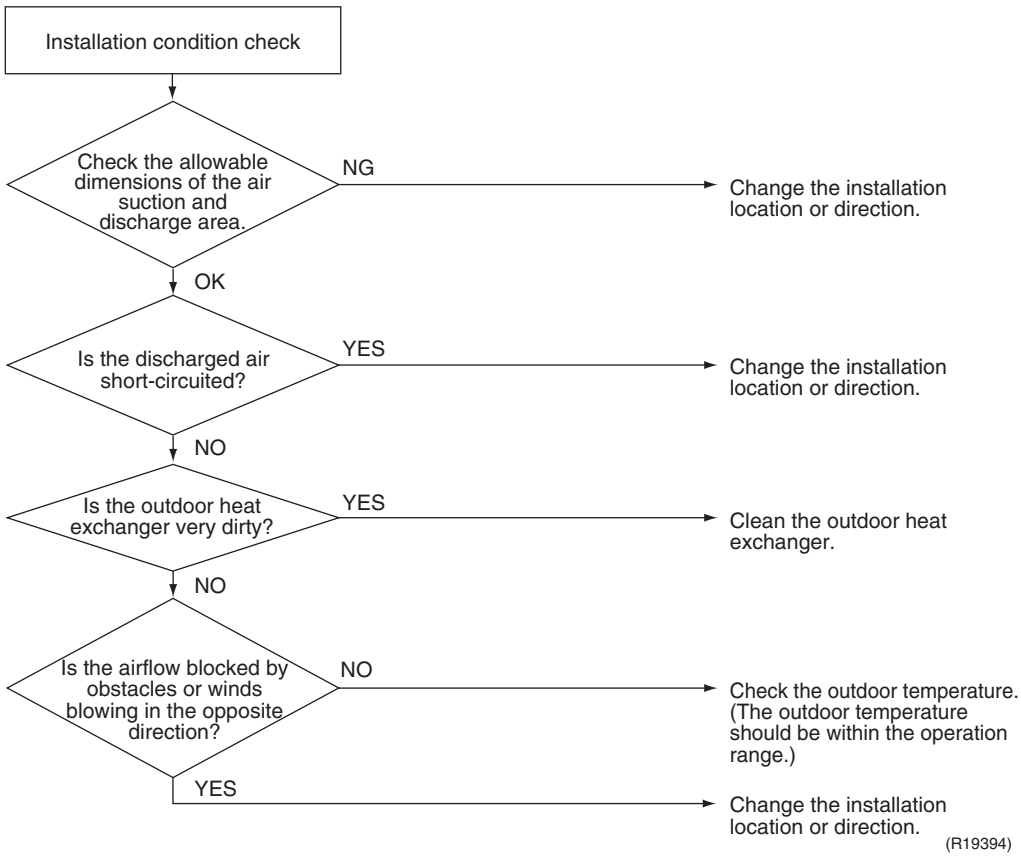
When the fuse is melted, check the outdoor fan motor for proper function.
If NG in step 2 → Defective PCB → Replace the outdoor unit PCB (main PCB).
If NG in step 4 → Defective Hall IC → Replace the outdoor fan motor.
If OK in both steps 2 and 4 → Replace the outdoor unit PCB (main PCB).



(R25288)

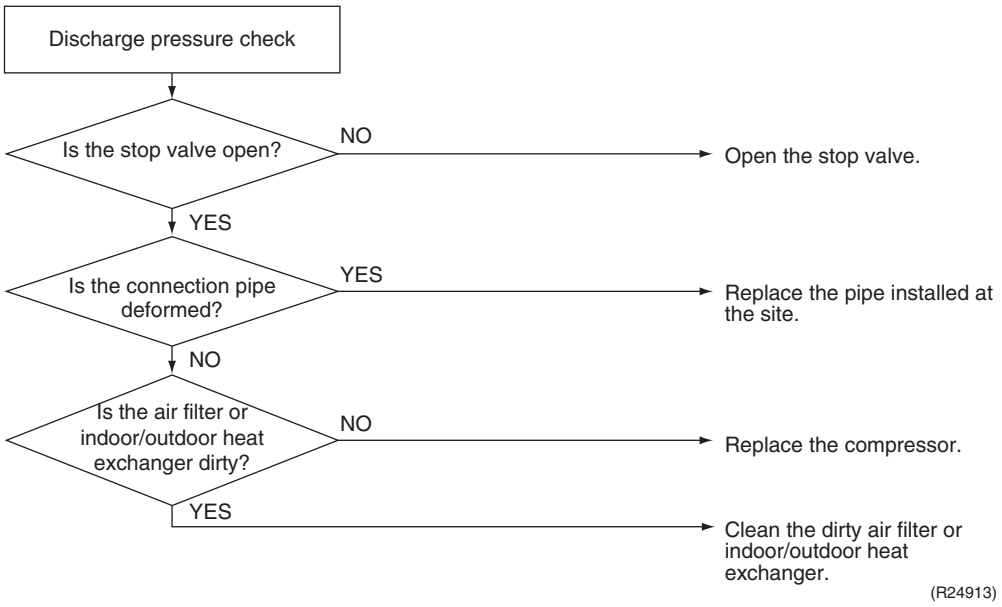
5.8 Installation Condition Check

Check No.17



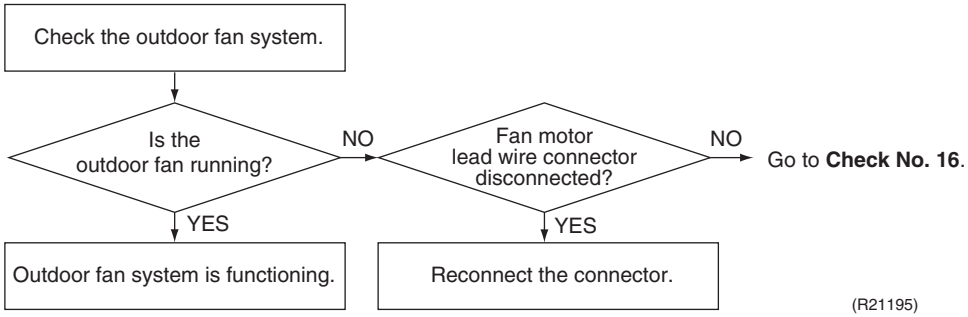
5.9 Discharge Pressure Check

Check No.18



5.10 Outdoor Fan System Check

Check No.19 **DC motor**



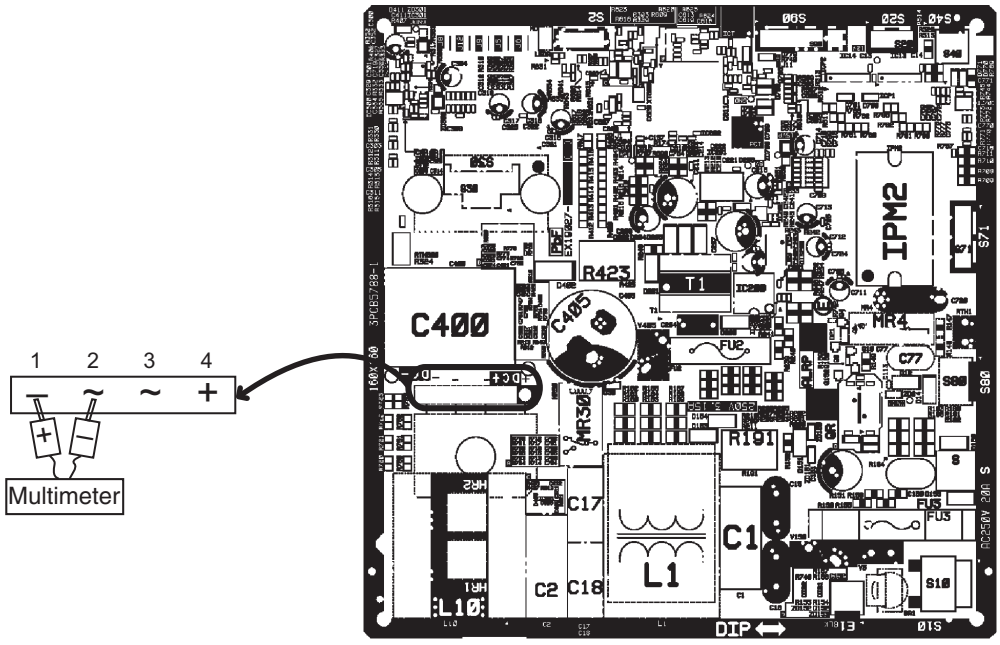
5.11 Main Circuit Short Check

Check No.20 Check to make sure that the voltage between (+) and (–) of the diode bridge (DB1) is about 0 V before checking.

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

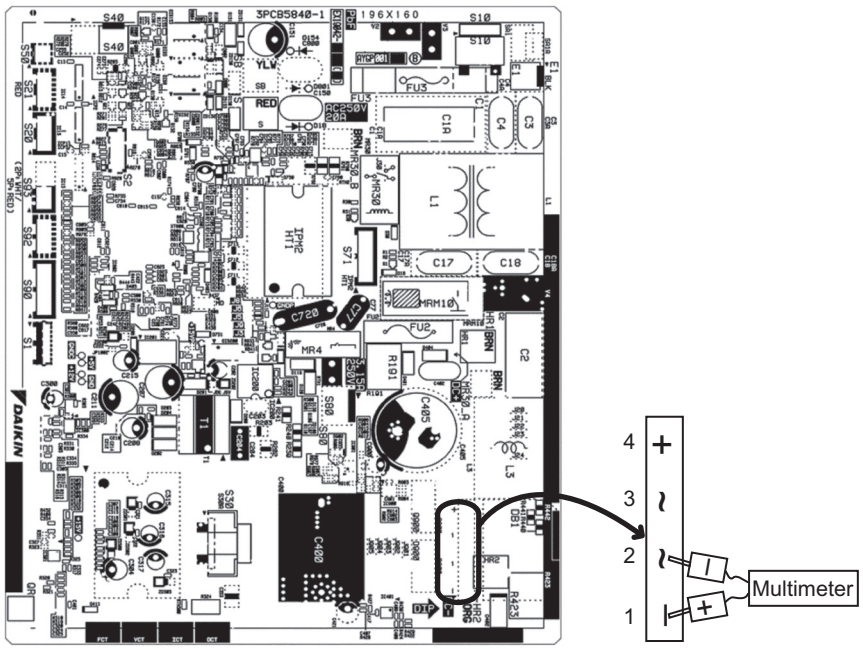
Positive terminal (+) of digital multimeter	~ (2, 3)	+ (4)	~ (2, 3)	– (1)
Negative terminal (–) of digital multimeter	+ (4)	~ (2, 3)	– (1)	~ (2, 3)
Resistance is OK.	several kΩ ~ several MΩ			
Resistance is NG.	0 Ω or ∞			

- **12 class**



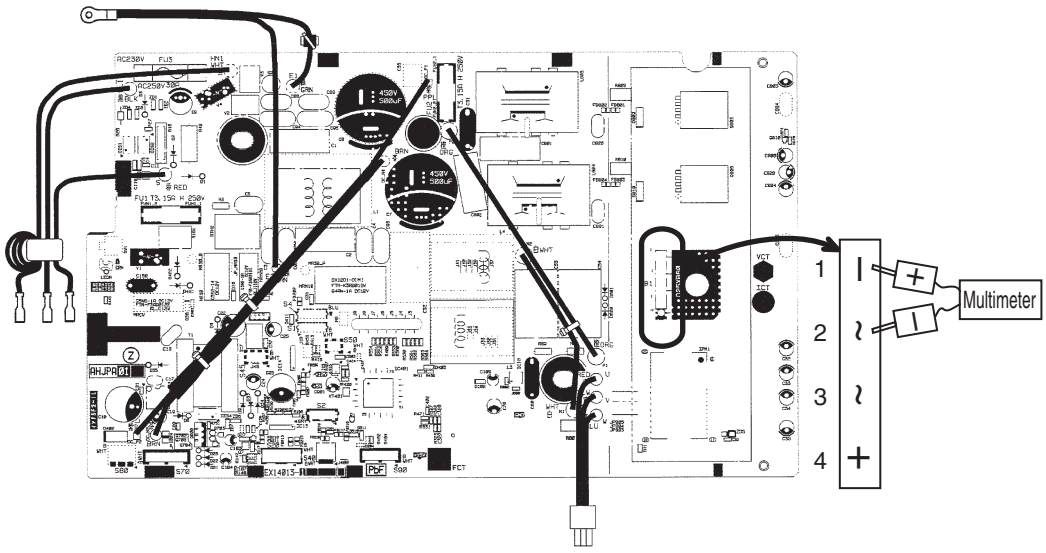
R6000751

■ **18 class**



R6000724

■ **24 class**



(R23458)

5.12 Power Module Check

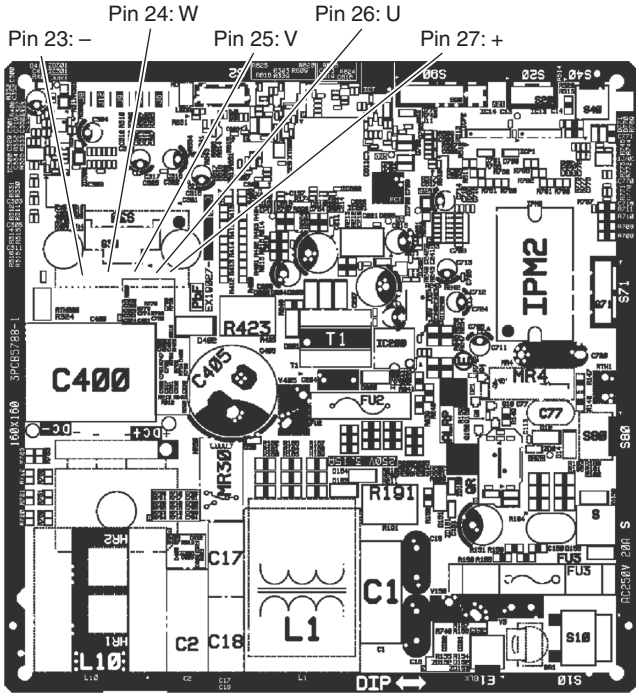
Check No.22

Check to make sure that the voltage between (+) and (–) of the power module is about 0 V before checking.

- Disconnect the compressor harness connector from the outdoor unit PCB. To disengage the connector, press the protrusion on the connector.
- Follow the procedure below to measure resistance between the (+) or (–) terminal of the power module and the U, V, or W terminal of the compressor with a multimeter. Evaluate the measurement results referring to the following table.

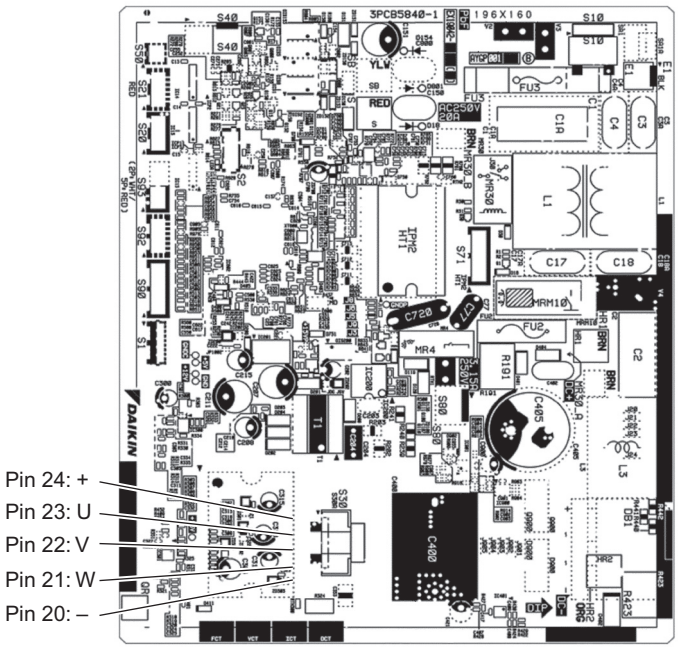
Positive terminal (+) of digital multimeter	Power module (+)	UVW	Power module (–)	UVW
Negative terminal (–) of digital multimeter	UVW	Power module (+)	UVW	Power module (–)
Resistance is OK.	several kΩ ~ several MΩ			
Resistance is NG.	0 Ω or ∞			

- **12 class**



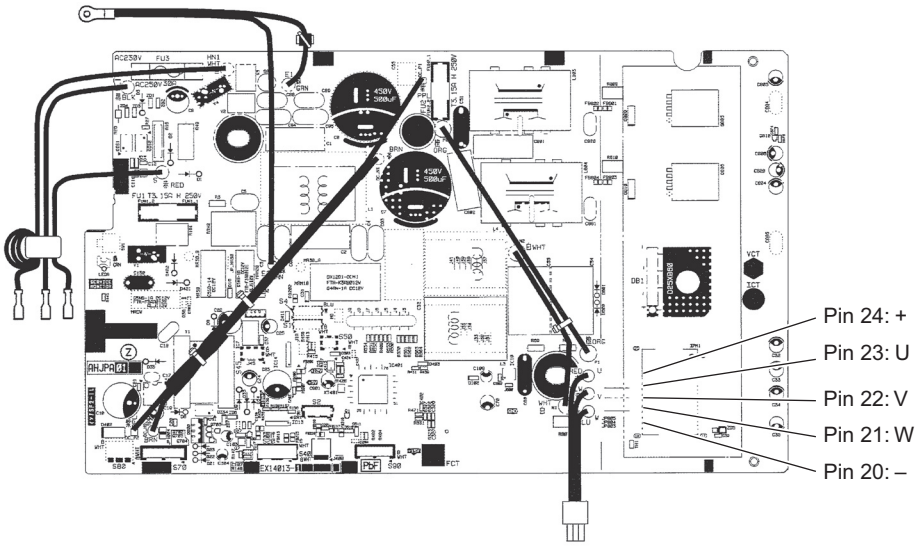
R6000752

■ **18 class**



R6000725

■ **24 class**



R6000303

Part 7
Trial Operation and Field Settings

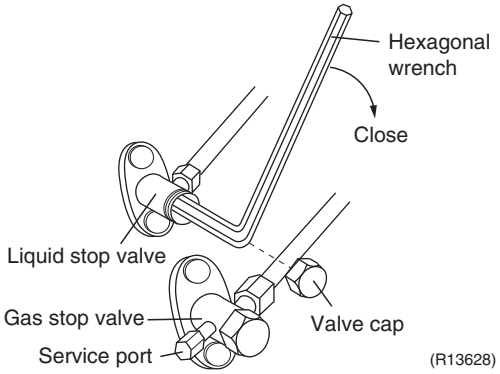
1. Pump Down Operation

Outline

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

Details

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



Reference Refer to page 103 for forced cooling operation.

2. Forced Cooling Operation

Outline

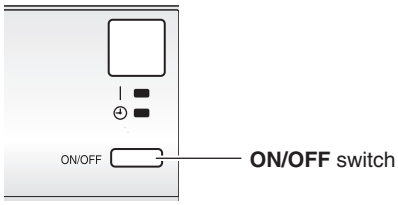
The forced cooling operation is allowed when both the following conditions are met.
1. The outdoor unit is not abnormal and not in the 3-minute standby mode.
2. The outdoor unit is not operating.

Protection functions have priority over all other functions during forced cooling operation.

Details

■ **With indoor unit ON/OFF switch**

Press indoor unit **ON/OFF** switch for at least 5 seconds. The operation will start.
Forced cooling operation will stop automatically after about 15 minutes.
To stop the operation, press indoor unit **ON/OFF** switch.



R4003873

3. Trial Operation

Outline

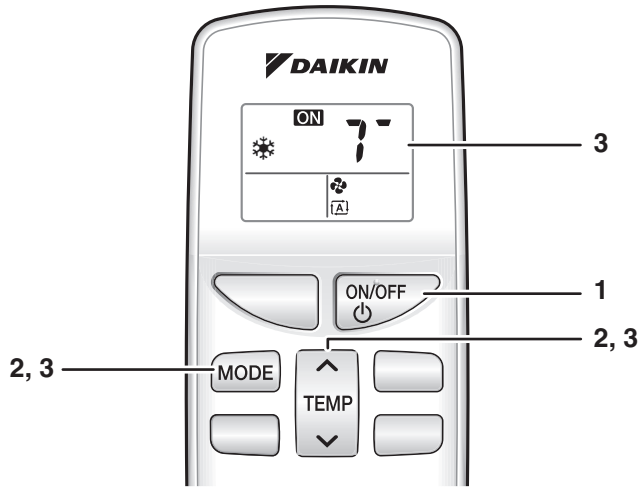
- Check that the inter-unit wire is correctly connected.
- Trial operation should be carried out in COOL operation

1. Measure the supply voltage and make sure that it is within the specified range.
2. Select the lowest programmable temperature.
3. Carry out the trial operation following the instructions in the operation manual to ensure that all functions and parts, such as the movement of the flaps, are working properly.
   - To protect the air conditioner, restart operation is disabled for 3 minutes after the system has been turned off.
4. After trial operation is complete, set the temperature to a normal level (26°C to 28°C).

Procedure

With remote controller

1. Press **ON/OFF** button to turn on the system.
2. Press both of **TEMP** button and **MODE** button at the same time.
3. Press **TEMP** button, select **T** and press **MODE** button for confirmation.
   - Trial operation will stop automatically after about 30 minutes. To stop the operation, press **ON/OFF** button.
   - Some of the functions cannot be used in the trial operation mode.



R7000249

Test Items

Test Items	Symptom
Indoor and outdoor units are installed properly on solid bases.	Fall, vibration, noise
No refrigerant gas leaks.	Incomplete cooling function
Refrigerant gas and liquid pipes and indoor drain hose extension are thermally insulated.	Water leakage
Draining line is properly installed.	Water leakage
System is properly earthed.	Electrical leakage
The specified wires are used for inter-unit connections.	Inoperative or burn damage
Indoor or outdoor unit's air intake or exhaust has clear path of air.	Incomplete cooling function
Stop valves are opened.	Incomplete cooling function
Indoor unit properly receives remote controller commands.	Inoperative

4. Field Settings

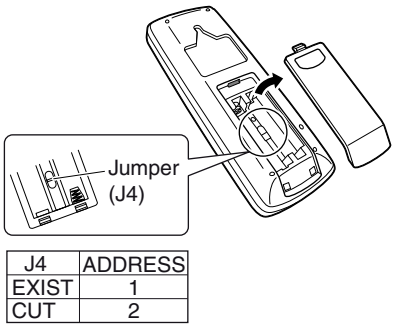
4.1 When 2 Units are Installed in 1 Room

Outline

When 2 indoor units are installed in 1 room, 1 of the 2 indoor units and the corresponding wireless remote controller can be set for different address.

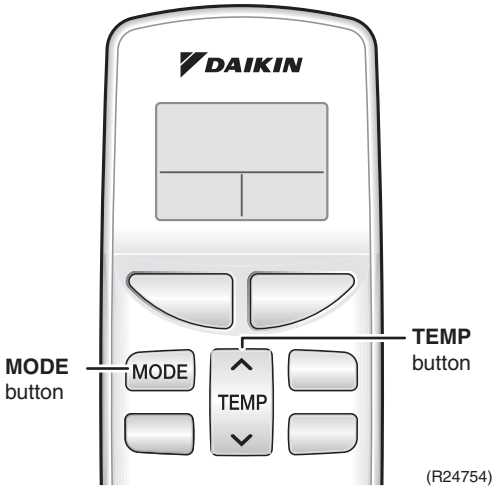
Procedure

1. Remove the battery cover of the remote controller.
2. Cut the address jumper (J4).
3. Press the center of **TEMP** button and **MODE** button on the remote controller at the same time.
4. Select **A** (address setting) with **TEMP** up or **TEMP** down button.
5. Press **MODE** button to enter the address setting mode.
   - The indoor unit operation lamp blinks for 1 minute.
6. Press the indoor unit **ON/OFF** switch while the operation lamp is blinking.
7. Press **MODE** button on the remote controller for 5 seconds to return to the normal mode.

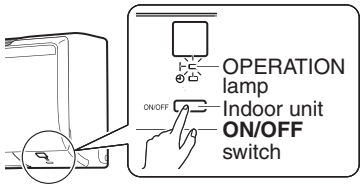


J4	ADDRESS
EXIST	1
CUT	2

(R24753)



(R24754)



R7000108

Caution

Replace the remote controller if you cut a jumper unintentionally.
Jumpers are necessary for electronic circuit. Improper operation may occur if you cut any of them.

5. Silicone Grease on Power Transistor/Diode Bridge

Outline

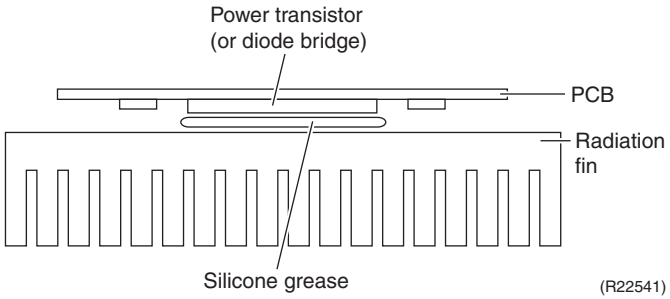
Apply the specified silicone grease to the heat generation part of a power transistor/diode bridge when you replace an outdoor unit PCB. The silicone grease encourages the heat dissipation of a power transistor/diode bridge.

Details

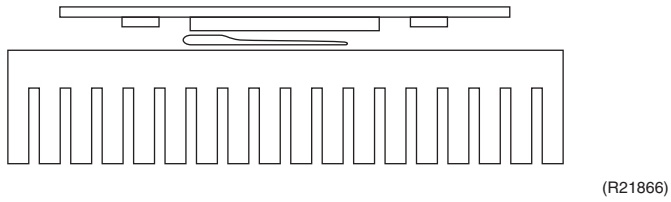
1. Wipe off the old silicone grease completely.
2. Apply the silicone grease evenly. See the illustrations below for examples of application.
3. Tighten the screws of the power transistor/diode bridge.
4. Make sure that the heat generation parts are firmly contacted to the radiation fin.

Note: Smoke emission may be caused by bad heat radiation when the silicone grease is not appropriately applied.

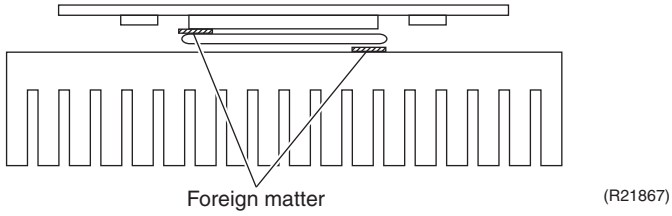
- OK: Evenly applied



- NG: Not evenly applied



- NG: Foreign matter is stuck.

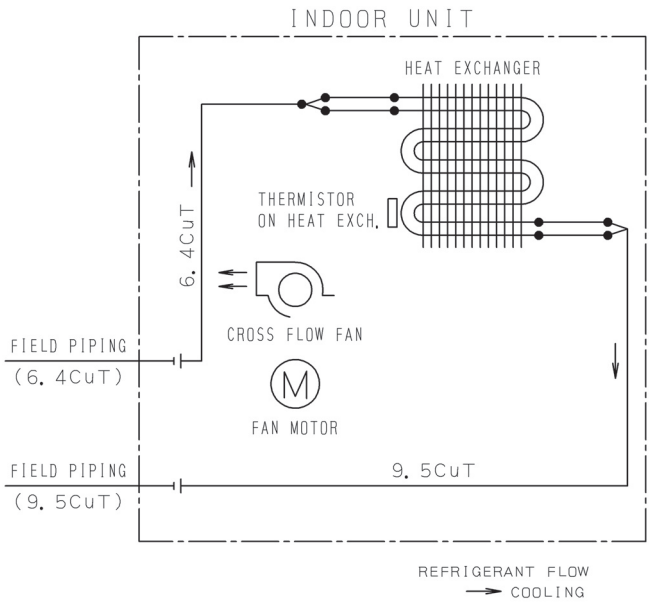


Part 8
Appendix

1. Piping Diagrams

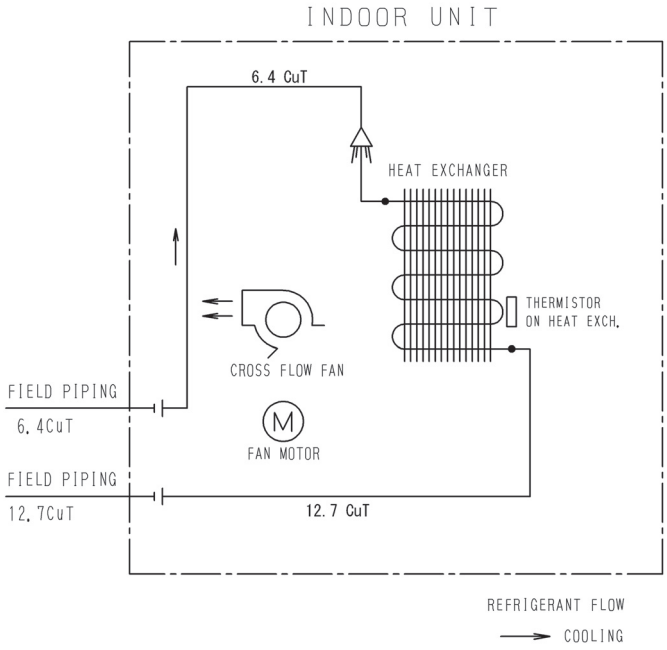
1.1 Indoor Unit

FTKM12UVLWZ



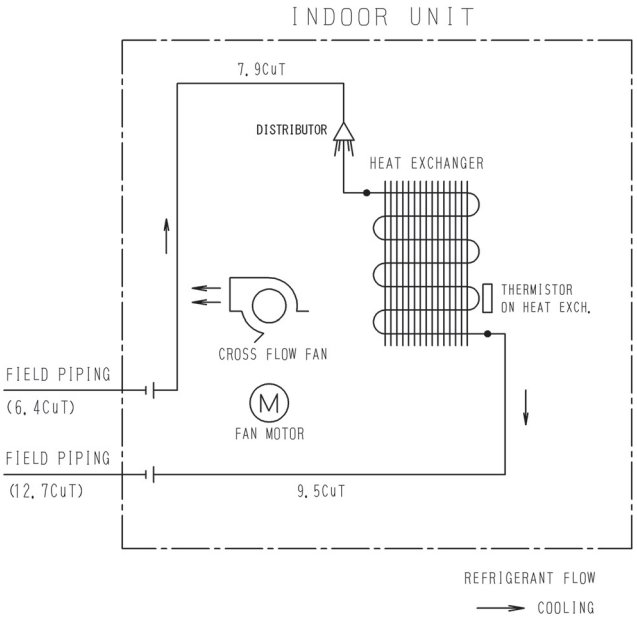
4D086364T

FTKM18UVLVZ



4D113909J

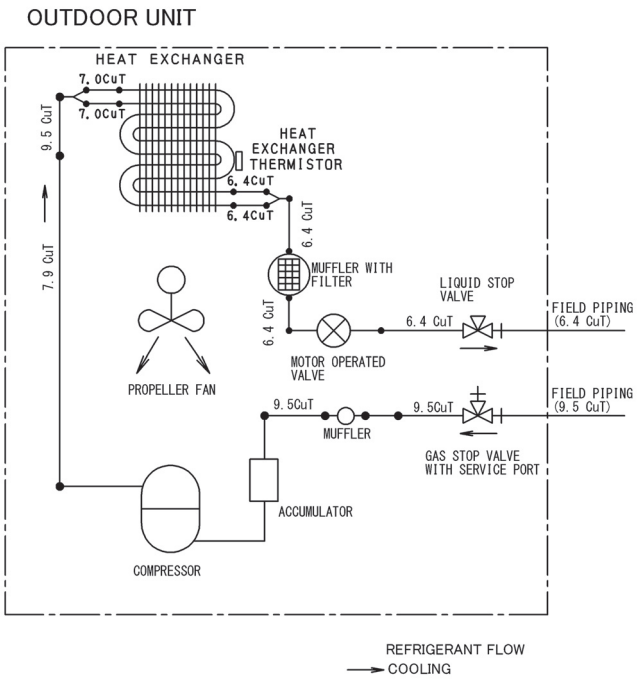
FTKM24UVLUZ



4D108592N

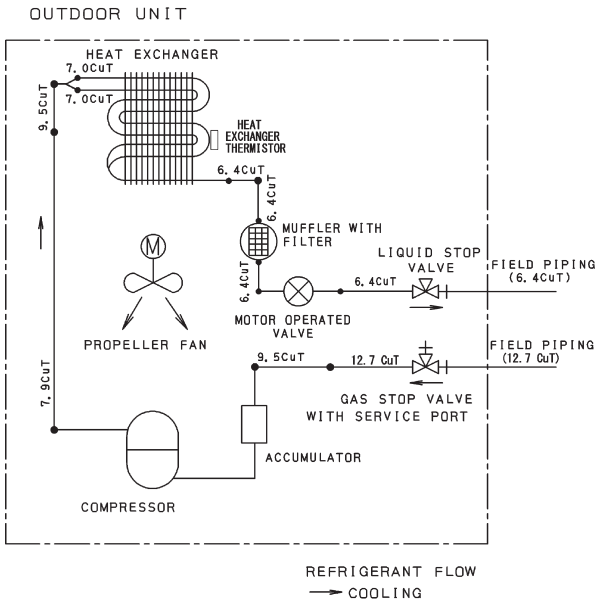
1.2 Outdoor Unit

RKMG12UVLWZ



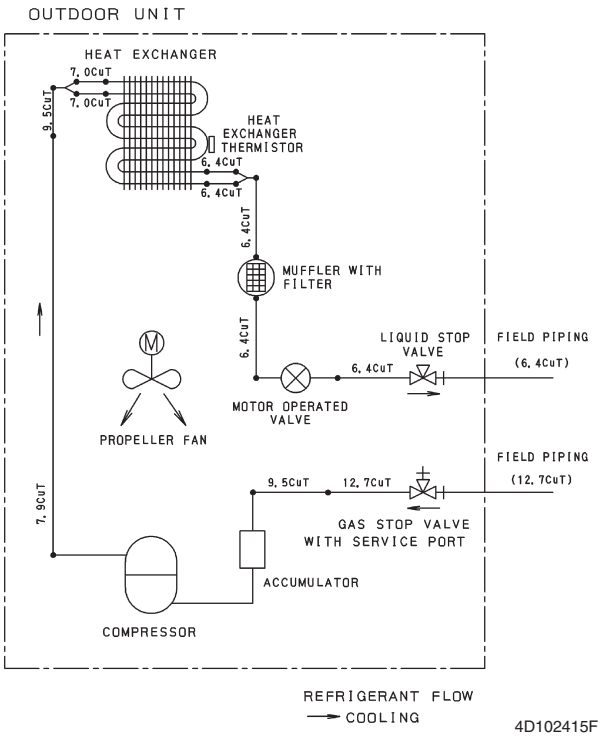
4D137518

RKMG18UVLVZ



4D113913D

RKMG24UVLUZ

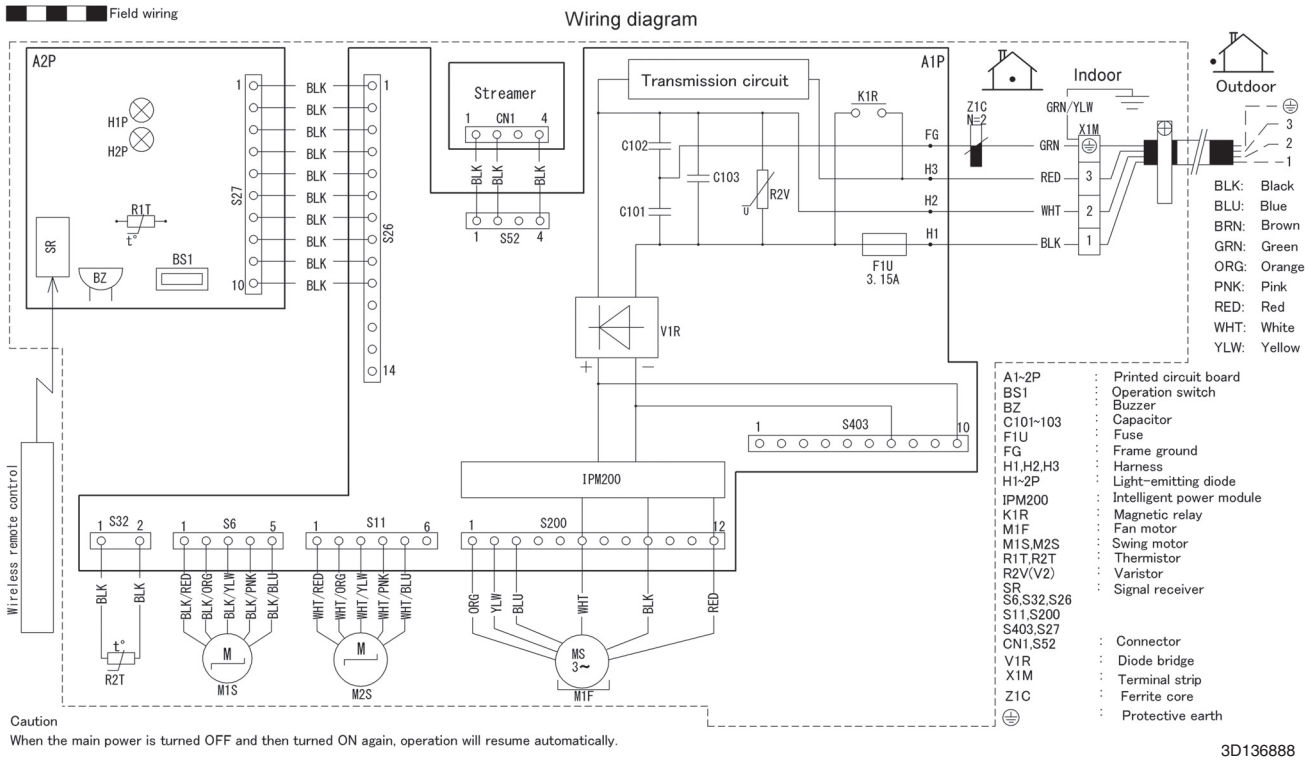


4D102415F

2. Wiring Diagrams

2.1 Indoor Unit

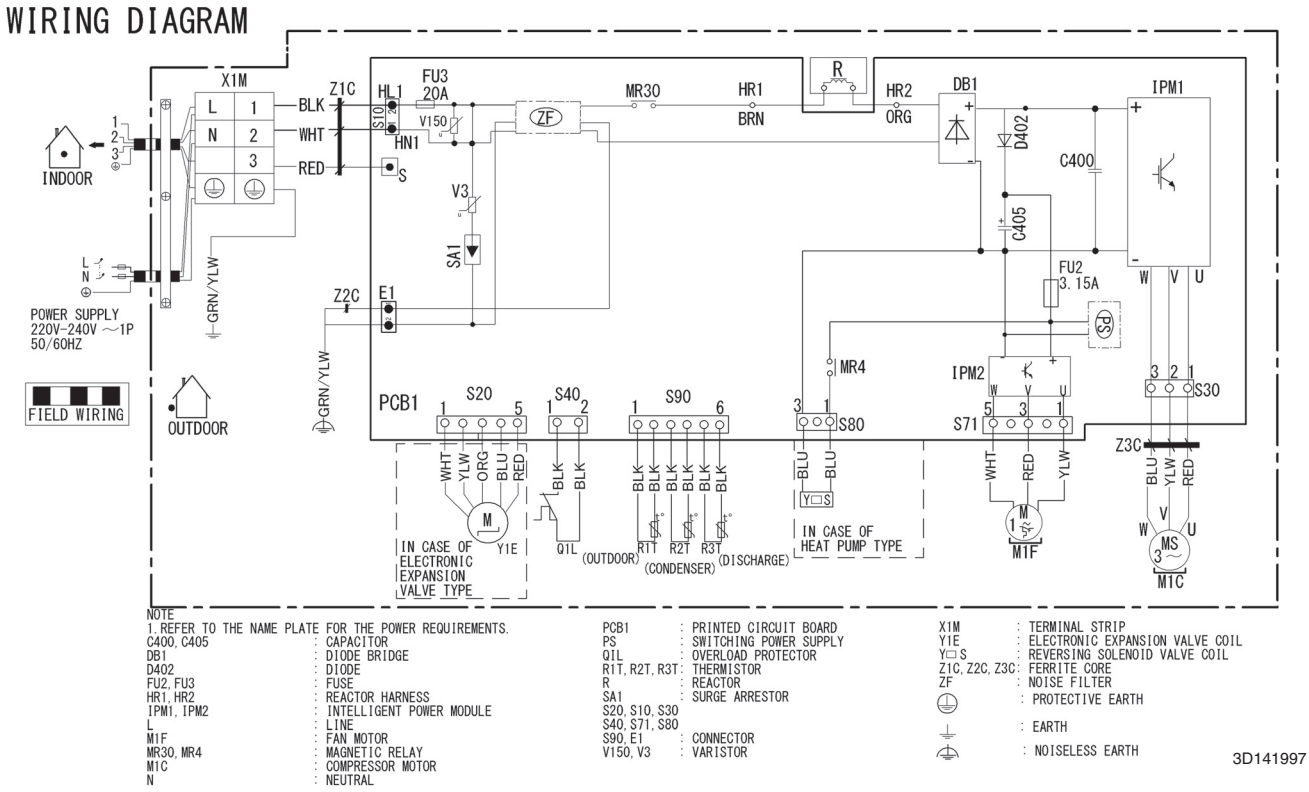
FTKM12UVLWZ, FTKM18UVLVZ, FTKM24UVLUZ



Note A1P: Control PCB
A2P: Display/signal receiver PCB
Refer to page 19 for Printed Circuit Board Connector Wiring Diagram.

2.2 Outdoor Unit

RKMG12UVLWZ



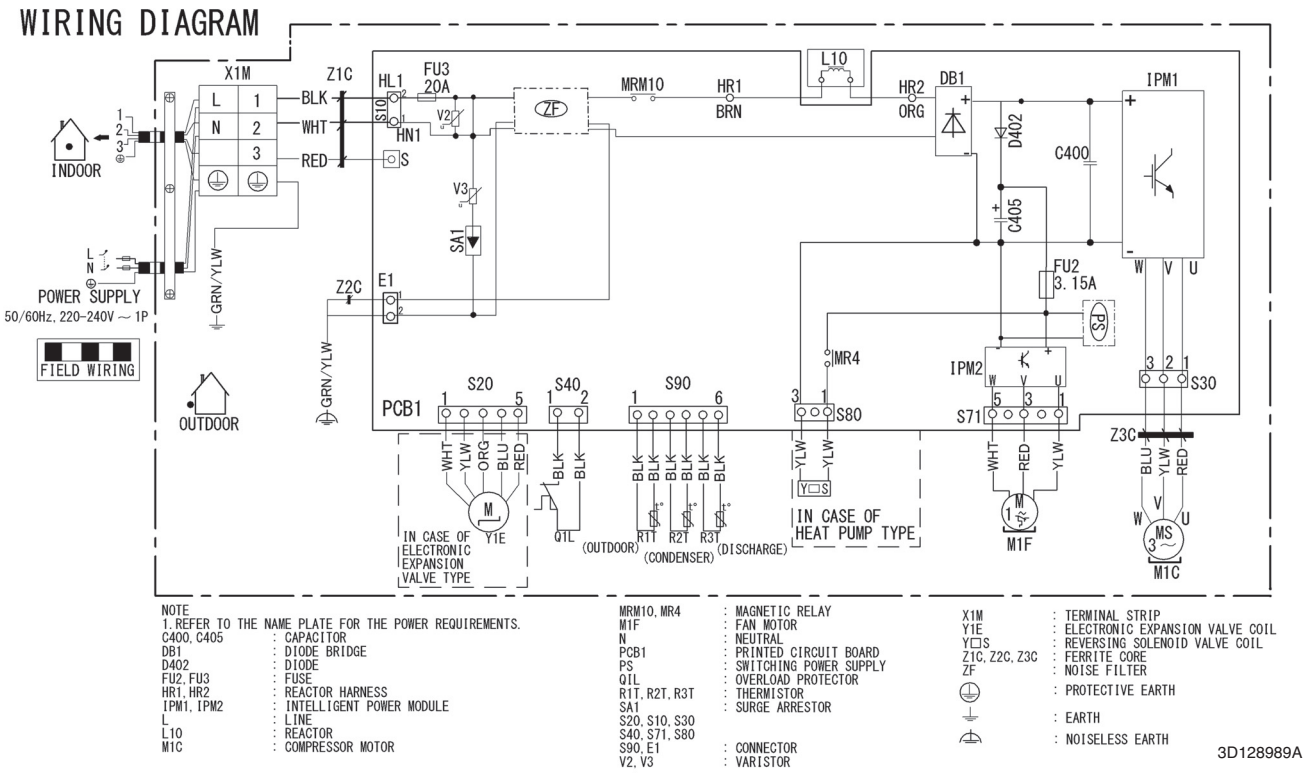
NOTE
1. REFER TO THE NAME PLATE FOR THE POWER REQUIREMENTS.

C400, C405	: CAPACITOR	PCB1	: PRINTED CIRCUIT BOARD	X1M	: TERMINAL STRIP
DB1	: DIODE BRIDGE	PS	: SWITCHING POWER SUPPLY	Y1E	: ELECTRONIC EXPANSION VALVE COIL
D402	: DIODE	Q1L	: OVERLOAD PROTECTOR	Y□S	: REVERSING SOLENOID VALVE COIL
FU2, FU3	: FUSE	R1T, R2T, R3T	: THERMISTOR	Z1C, Z2C, Z3C	: FERRITE CORE
HR1, HR2	: REACTOR HARNESS	R	: REACTOR	ZF	: NOISE FILTER
IPM1, IPM2	: INTELLIGENT POWER MODULE	SA1	: SURGE ARRESTOR	⏚	: PROTECTIVE EARTH
L	: LINE	S20, S10, S30		⏚	: EARTH
M1F	: FAN MOTOR	S40, S71, S80		⏚	: NOISELESS EARTH
MR30, MR4	: MAGNETIC RELAY	S90, E1	: CONNECTOR		
M1C	: COMPRESSOR MOTOR	V150, V3	: VARISTOR		
N	: NEUTRAL				

Note(s) PCB 1: Main PCB

Refer to page 21 for Printed Circuit Board Connector Wiring Diagram.

RKMG18UVLVZ



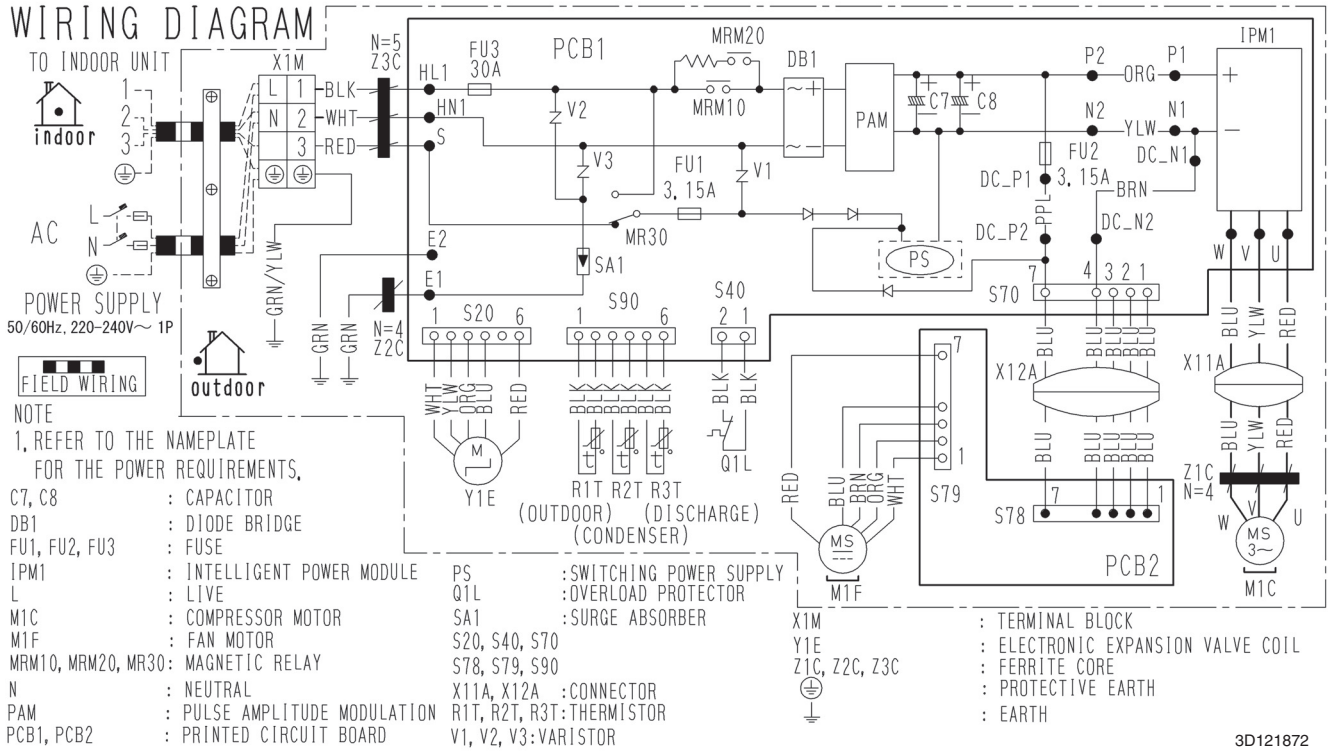
NOTE
1. REFER TO THE NAME PLATE FOR THE POWER REQUIREMENTS.

C400, C405	: CAPACITOR	MRM10, MR4	: MAGNETIC RELAY	X1M	: TERMINAL STRIP
DB1	: DIODE BRIDGE	M1F	: FAN MOTOR	Y1E	: ELECTRONIC EXPANSION VALVE COIL
D402	: DIODE	N	: NEUTRAL	Y□S	: REVERSING SOLENOID VALVE COIL
FU2, FU3	: FUSE	PCB1	: PRINTED CIRCUIT BOARD	Z1C, Z2C, Z3C	: FERRITE CORE
HR1, HR2	: REACTOR HARNESS	PS	: SWITCHING POWER SUPPLY	ZF	: NOISE FILTER
IPM1, IPM2	: INTELLIGENT POWER MODULE	QTL	: OVERLOAD PROTECTOR	⏚	: PROTECTIVE EARTH
L	: LINE	R1T, R2T, R3T	: THERMISTOR		: EARTH
L10	: REACTOR	SA1	: SURGE ARRESTOR		: NOISELESS EARTH
M1C	: COMPRESSOR MOTOR	S20, S10, S30			
		S40, S71, S80			
		S90, E1	: CONNECTOR		
		V2, V3	: VARISTOR		

Note(s) PCB 1: Main PCB

Refer to page 22 for Printed Circuit Board Connector Wiring Diagram.

RKMG24UVLUZ

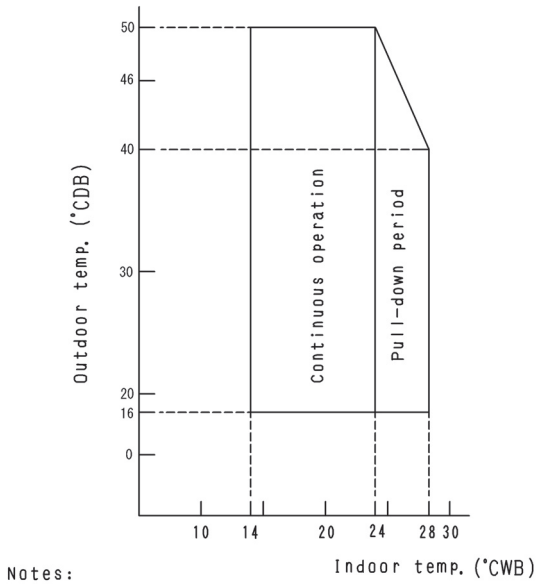


Note(s)

PCB 1: Main PCB
PCB 2: Clamp PCB
Refer to page 23 for Printed Circuit Board Connector Wiring Diagram.

3. Operation Limit

RKMG12UVLWZ, RKMG18UVLVZ, RKMG24UVLUZ



Notes:

The graph is based on the following conditions.

- Equivalent piping length 5m
- Level difference 0m
- Air flow rate High

4D142785

Warning

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

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

Cautions on product corrosion

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

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