

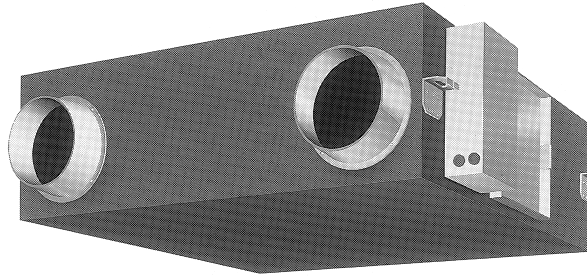


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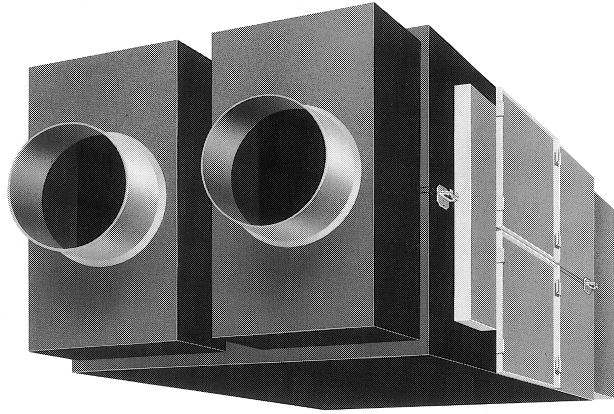


Heat Recovery Ventilation

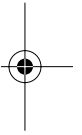
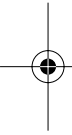
VAM 500EJ
VAM 800EJ
VAM1000EJ
VAM2000EJ

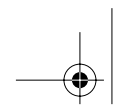


VAM500~1000EJ



VAM2000EJ





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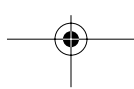
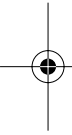
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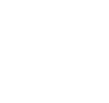
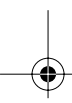
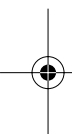
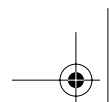
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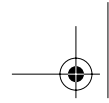
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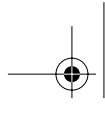
1. Introduction

1.1 Safety Cautions

Cautions and Warnings

- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into “ **Warning**” and “ **Caution**”. The “ **Warning**” items are especially important since they can lead to death or serious injury if they are not followed closely. The “ **Caution**” items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.
- About the pictograms
 -  This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.
 -  This symbol indicates a prohibited action.
The prohibited item or action is shown inside or near the symbol.
 -  This symbol indicates an action that must be taken, or an instruction.
The instruction is shown inside or near the symbol.
- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer






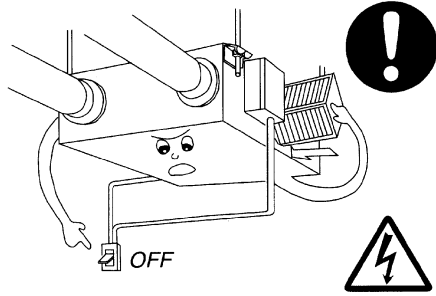
1.1.1 Cautions in Repair

Warning

WARNING

Never inspect or service the unit by yourself.
Ask a qualified service person to perform this work.
(The qualified service person)

WARNING: Before obtaining access to terminal devices() , all power supply circuit must be interrupted.

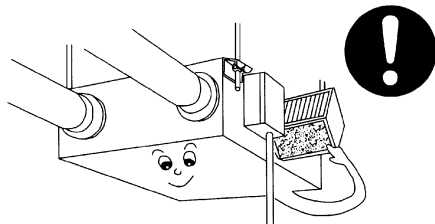


Electric shock may result. Before servicing the unit, always shut off power.



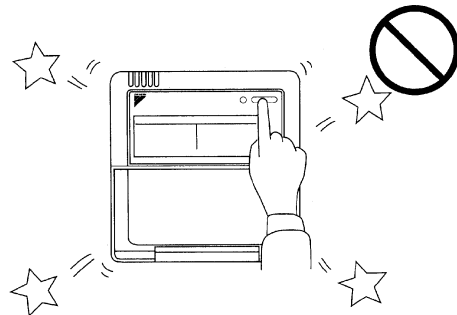
WARNING

Always use the air filter.
If the air filter is not used, heat exchange elements will be clogged, possibly causing poor performance and subsequent failure.



WARNING

Do not change operations suddenly. It can result not only in malfunction but also failure of switches or relays in the body.



(HL001)

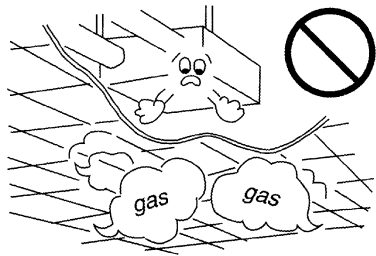




▲ WARNING Do not use a HRV or an air suction/discharge grille in the following places.

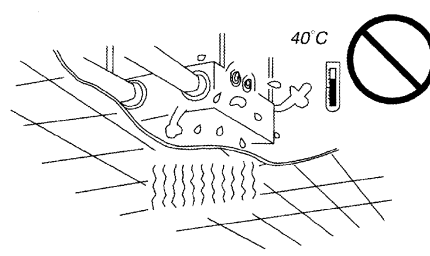
● **Place such as machinery plant and chemical plant where gas, which contains noxious gas or corrosive components of materials such as acid, alkali, organic solvent and paint, is generated. Place where combustible gas leakage is likely.**

Such gas can cause fire.



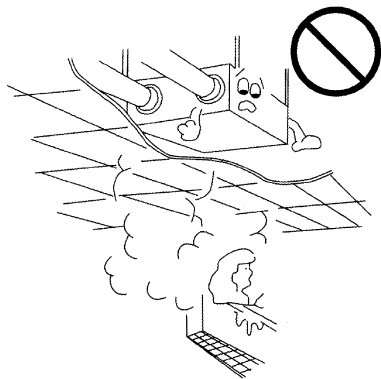
● **Place subjected to high temperature or direct flame.**

Avoid a place where the temperature near the HRV unit and the air suction/discharge air grille exceeds 40°C. If the unit is used at high temperature, deformed air filter and heat exchange element or burned motor result.



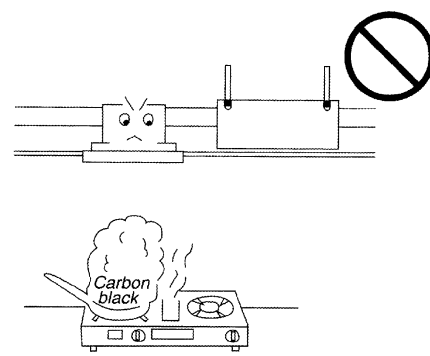
● **Place such as bathroom subjected to moisture.**

Electric leak or electric shock and other failure can be caused.

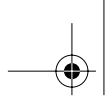


● **Place subjected to much carbon black.**

Carbon black attaches to air filter and heat exchange element, making them unable to use.







(HL002)



1.1.2 Using Icons

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

1.1.3 Using Icons List

Icon	Type of Information	Description
 Note:	Note	A "note" provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
 Caution	Caution	A "caution" is used when there is danger that the reader, through incorrect manipulation, may damage equipment, lose data, get an unexpected result or has to restart (part of) a procedure.
 Warning	Warning	A "warning" is used when there is danger of personal injury.
	Reference	A "reference" guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic.

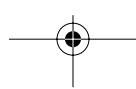
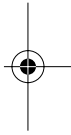


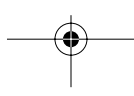
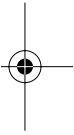
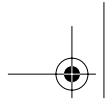


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Part 1 General Constructions

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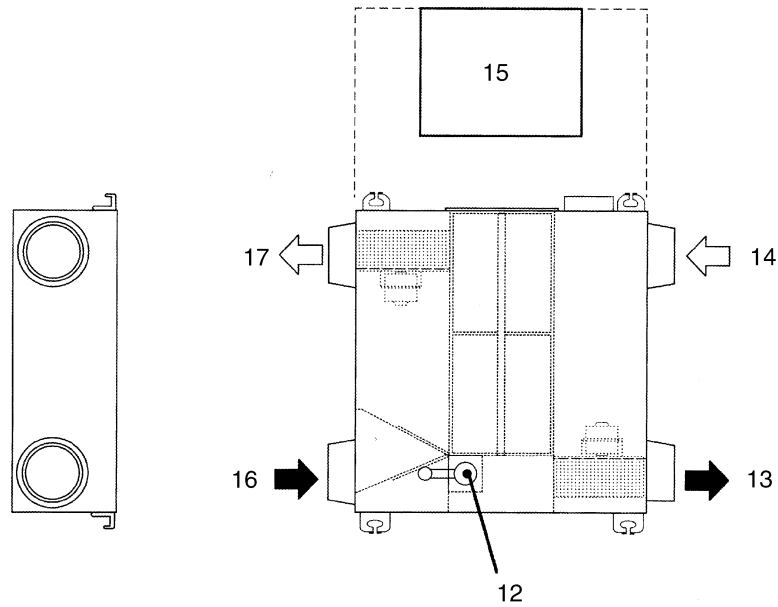
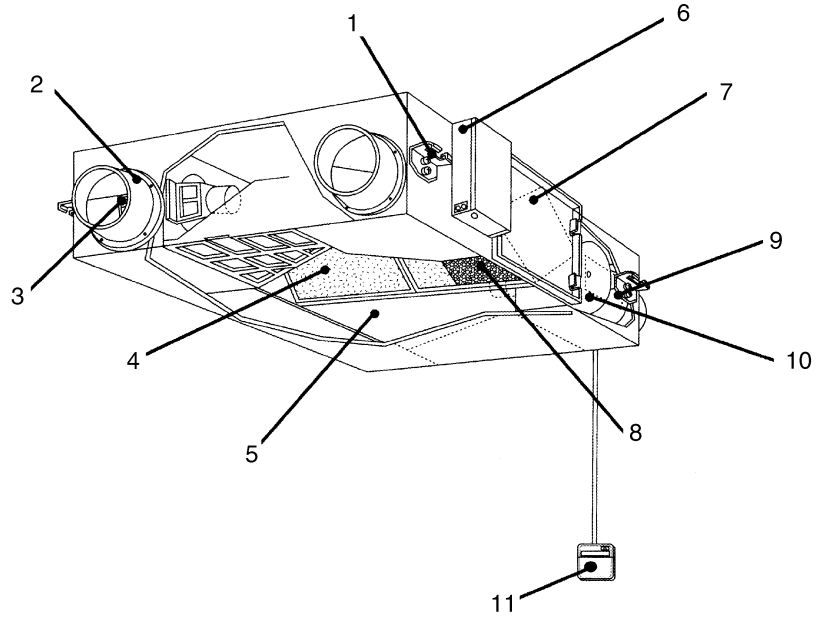




1. General Constructions

1.1 Explanation

VAM500EJVE /
VAM800EJVE /
VAM1000EJVE



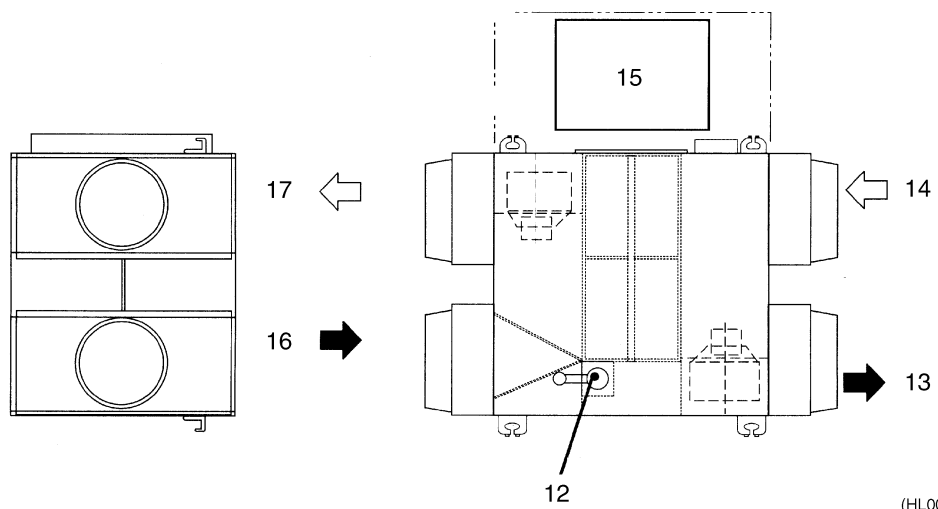
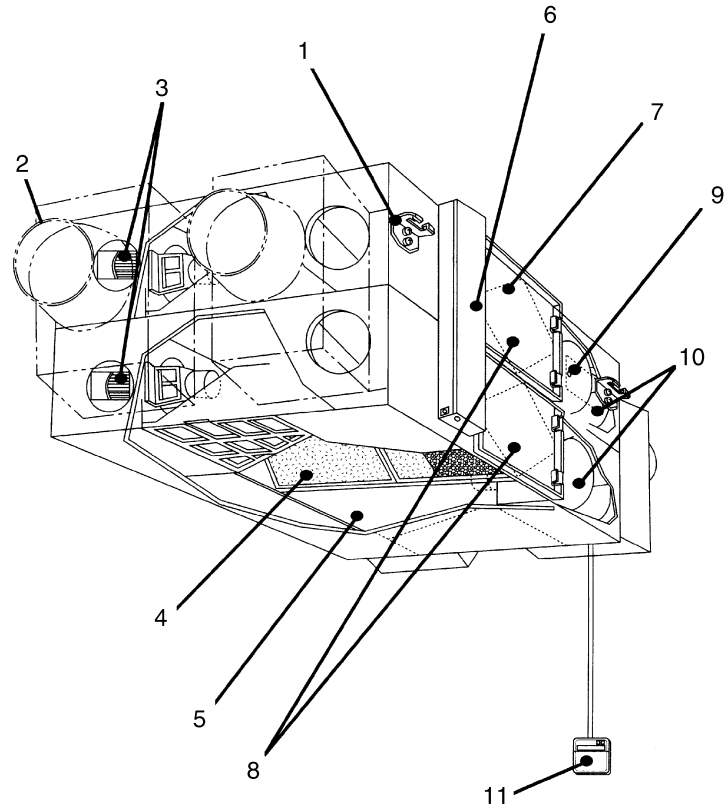
(HL003)

1	Metal Suspension Bracket	2	Duct Connection Flange
3	Exhaust Fan	4	Air Filter (Long Life Filter)
5	Damper	6	Switch Box
7	Maintenance Cover	8	Heat Exchange Elements
9	Name Plate	10	Air Supply Fan
11	Remote Controller (Option Parts)	12	Damper Motor
13	EA (Exhaust Air) [Exhaust Air to Outdoor]	14	OA (Outdoor Air) [Fresh Air from Outdoor]
15	Maintenance Space for The Air Filters Heat Exchange Elements and Switch Box	16	RA (Return Air) [Exhaust Air from Room]
17	SA (Supply Air) [Feed Air to Room]		



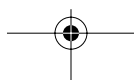


VAM2000EJVE



(HL004)

1	Metal Suspension Bracket	2	Duct Connection Flange
3	Exhaust Fan	4	Air Filter (Long Life Filter)
5	Damper	6	Switch Box
7	Maintenance Cover	8	Heat Exchange Elements
9	Name Plate	10	Air Supply Fan
11	Remote Controller (Option Parts)	12	Damper Motor
13	EA (Exhaust Air) [Exhaust Air to Outdoor]	14	OA (Outdoor Air) [Fresh Air from Outdoor]
15	Maintenance Space for The Air Filters Heat Exchange Elements and Switch Box	16	RA (Return Air) [Exhaust Air from Room]
17	SA (Supply Air) [Feed Air to Room]		



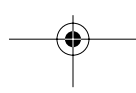


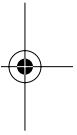
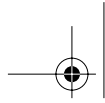
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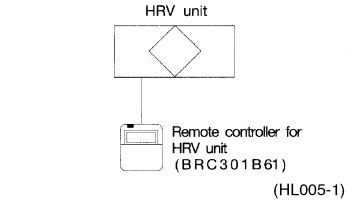
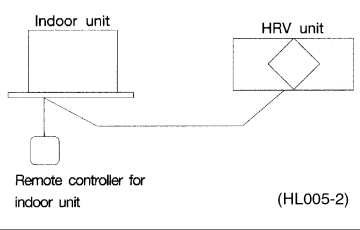
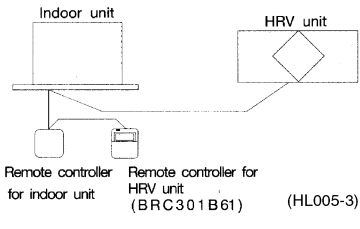
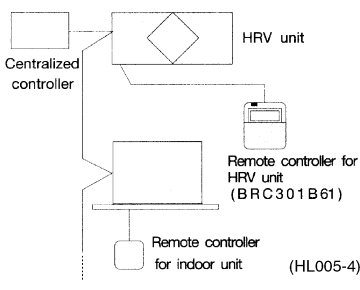
1. Operation

1.1 Explanation for Systems

This product is operated differently depending on the system configuration.

For the operation of the remote controller for indoor unit and centralized controller, refer to the instruction manual provided with each unit.

■ Operation for Each System

System Example	Operation Method
<p>Independent System</p> 	<p>The remote controller turns on and off the air conditioner and HRV unit.</p>
<p>Combined Operation System with VRV Systems and Skyair Series</p> 	<p>The remote controller for VRV turns on and off the air conditioner and HRV unit. If only the HRV unit is used without operating the air conditioner, set the unit in the "VENTILATION mode".</p>
	<p>The ON/OFF and timer operation can not be performed using the HRV remote controllers. (The indication of centralized control " " appears on the display.) Other operations can be performed using the HRV remote controllers. Starting and stopping operations of the indoor unit and the HRV unit can be performed using the indoor remote controllers.</p>
<p>Centralized System</p> 	<p>When the HRV remote controllers is not connected, the Centralized controller controls the operation of the HRV unit.</p> <p>When the HRV remote controllers is connected, operation can be started and stopped using the Centralized controller or the indoor and the HRV remote controllers. During the indication of centralized control " " appears on the display, the ON/OFF and timer operation may not be possible with the HRV remote controllers. Other operations can be performed using the HRV remote controllers.</p>

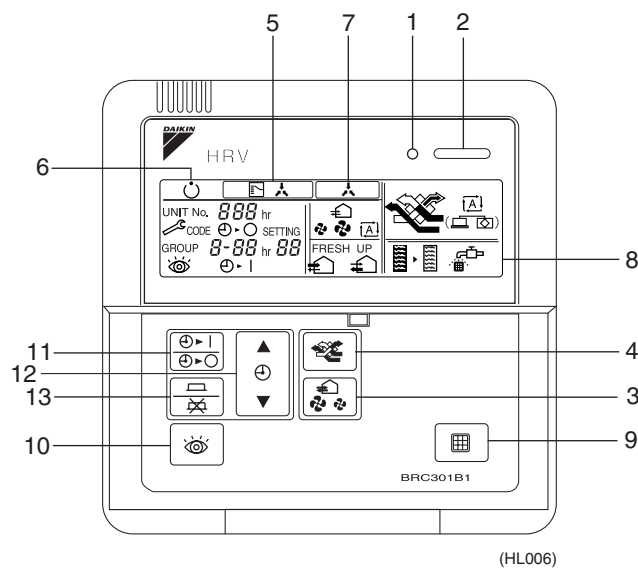
1.2 Operation with The Remote Control for Air Conditioning Operation HRV Units. (BRC301B61)

For non-independent systems, starting/stopping operation and timer operation may not be possible. Use the air conditioner remote control or the Centralized controller in such cases.

Operation for INDIVIDUAL SYSTEM

1. Operation lamp
This pilot lamp (red) light up while the unit is in Operation.
2. Operation/Stop button
When pushed once, the unit starts operating.
When pushed twice, the unit stops.
3. Air flow rate changeover button
Air flow rate can be changed over to " [Low] mode or " [High] mode, " FRESH UP" [Low FRESH UP] mode, " FRESH UP" [High FRESH UP] mode.

Remote Controller for HRV BRC301B61



(HL006)

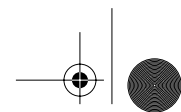





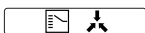
For "Freshup" operation


When this indication does not show: The volume of outdoor air supplied into the room and that of the room air exhausted outdoors is equivalent.

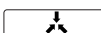
For "Freshup" operation,

- If it is set to "Fresh up air supply": The volume of outdoor air supplied into the room is larger than that of room air exhausted outdoors.
(This operation prevents the odor and moisture from kitchens and toilets from flowing into the rooms.)
- If it is set to "Fresh up air exhaust": The volume of room air exhausted outdoors is larger than that of outdoor air supplied into the room.
(This operation prevents the hospital odor and floating bacteria from flowing out to the corridors.)




4. Ventilation mode changeover: button
 - “” (Automatic) mode The temperature sensor of the unit automatically changes the ventilation of the unit in [Bypass] mode and [Heat Exchange] mode.
 - “” (Heat Exchange) mode In this mode, the air passes through the heat exchange element to effect [Total Heat Exchanging] ventilation.
 - “” (Bypass) mode In this mode, the air does not pass through the heat exchange element but bypasses it to effect [Bypass] ventilation.
5. Indication of operation control method: 

When the operation of HRVs are linked with the air conditioners, this indication may be shown. While the indication is shown, the ON/OFF of HRVs cannot be operated by the HRV remote controller.
6. Indication of operation standby: 




It indicates the precooling/preheating operation. This unit is at stop and will start operation after the precooling/preheating operation is over.
 Precooling/preheating operation means the operation of HRVs is delayed during the startup operation of linked air conditioners such as before the office hours. During this period the cooling or heating load is reduced to bring the room temperature to the set temperature in a short time.
7. Indication of centralized control: 

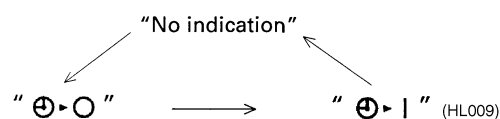
When a remote controller for air conditioners or devices for centralized control are connected to the HRVs, this indication may show.
 During this indication appears on the display, the ON/OFF and timer operation may not be possible with the HRV remote controllers.
8. Indication of air filter cleaning








When the indication “” appears on the display, clean the filter.
9. Filter signal reset button
10. Inspection button

This button is to be used only for service. It is not to be used normally.

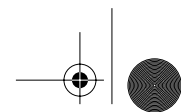
HOW TO OPERATE WITH TIMER

11. Push the button “” and select either one of “▶○” or “▶|”.
 Each time the button is pushed, the indication changes as shown below.



12. Push the button “” and set the time.
 - Each time when “” is pushed, the time advances one hour.
 - Each time when “” is pushed, the time goes back one hour.
13. Push the button “”.
 Then, the reservation is finished.
 Either “▶○” or “▶|” changes from flashing to lighting.
 After the reservation is finished, the remaining time is indicated in the display.
 For cancelling the timer operation, push the button “” once again.
 The indication disappears.



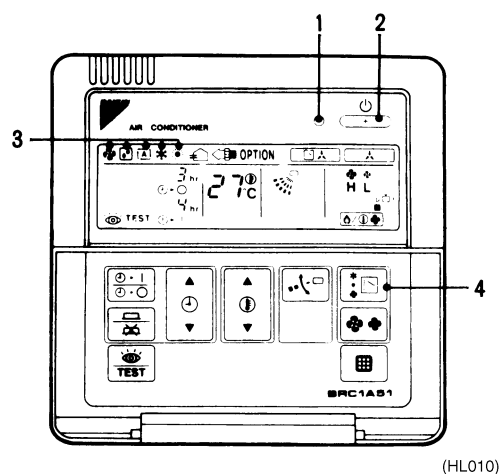


Operating The HRV Unit Using The Remote Controller of The VRV. System Air Conditioner

When the VRV-system air conditioner is connected with the HRV unit with a direct duct, the remote controller of the air conditioner cannot be used to select the VENTILATION mode. To use the HRV unit without operating the air conditioner, set the air conditioner in the FAN VENTILATION mode and select the low fan speed.

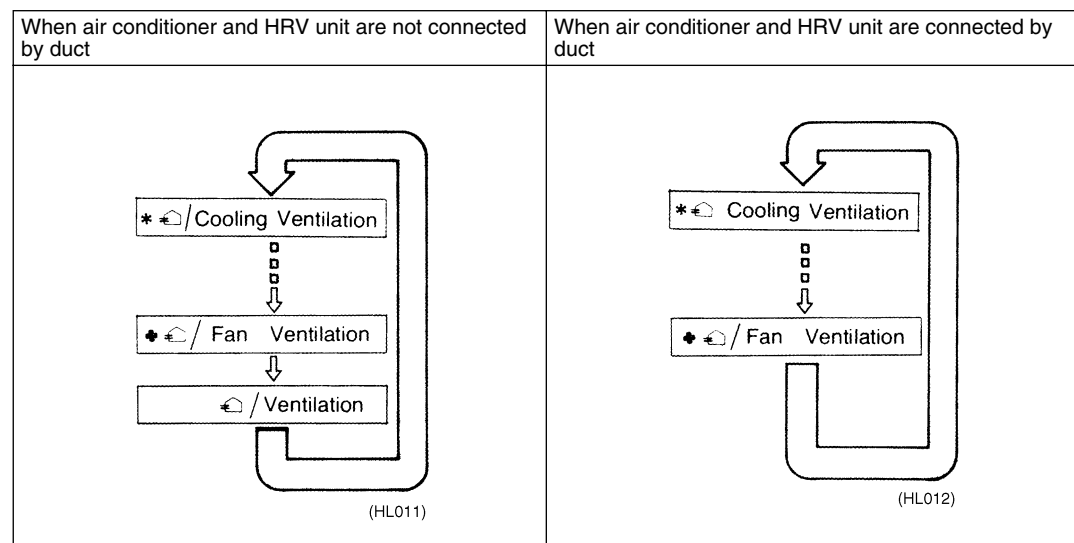
1. Operation lamp
2. Operation/stop button
3. Operation mode display
4. Operation mode selector

Remote Controller for VRV BRC1A61-62



■ Every time the operation mode selector is pressed, the operation mode display changes as shown below.

(example)



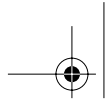
■ When the "FILTER" indication appears on the display, clean the filter of the HRV unit.

Independent Operation of The HRV Unit Using The Centralized Controller (DCS302B61)

■ After selecting the zone where the only the HRV unit operation is desired, press the operation mode selector and select " " VENTILATION. The HRV unit can then be operated independently from the air conditioner.

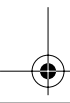
■ When the "FILTER" indication appears on the display, clean the filter of the HRV unit.

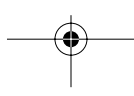
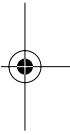




Part 3 Maintenance

1. Maintenance.....	13
1.1 Maintenance for The Air Filter	13
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1. Maintenance

1.1 Maintenance for The Air Filter



Caution During operation, never check or clean the HRV. It may cause electrical shock and it is very dangerous to touch the rotating part. Be sure to turn off the OPERATION switch and disconnect the power.

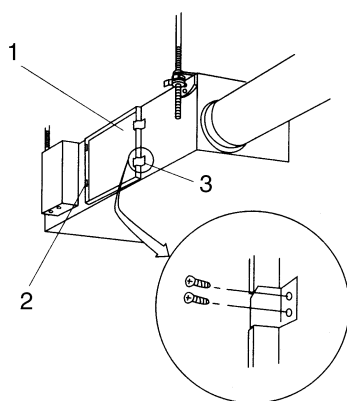
■ **CLEANING FREQUENCY**

AT LEAST ONCE EVERY TWO YEARS (FOR GENERAL OFFICE USE)

(CLEAN THE ELEMENT MORE FREQUENTLY IF NECESSARY.)

1. Go into ceiling through the inspection hole, remove the hanging metals of maintenance cover and take it off.

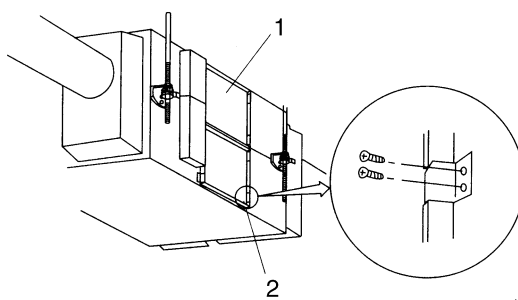
VAM500~1000EJVE



(HL013)

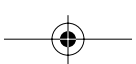
1	Maintenance Cover	2	Binding Metal
3	Hanging Metal		

VAM2000EJVE



(HL014)

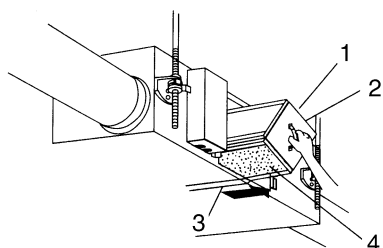
1	Maintenance Cover	2	Hanging Metal
---	-------------------	---	---------------





2. Take out the heat exchange elements from the unit body.

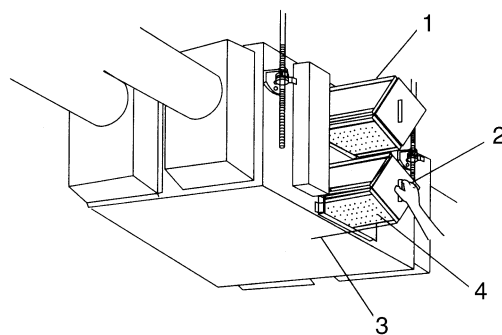
VAM500~1000EJVE



(HL015)

1	Heat Exchange Element (X2)	2	Handle
3	Rail	4	Filter

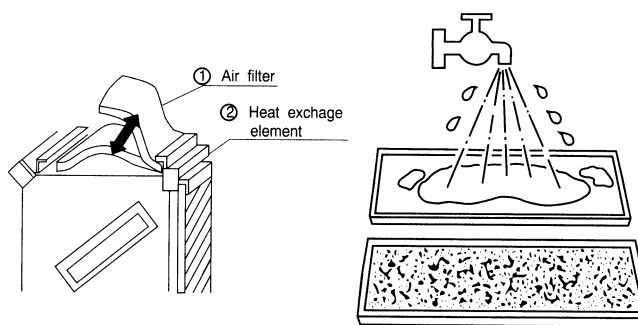
VAM2000EJVE



(HL016)

1	Heat Exchange Element (X4)	2	Handle
3	Rail	4	Filter

3. Take out the air filter
4. To clean the air filter, lightly pat it with hand or remove dust with a vacuum cleaner. If excessively dirty, wash it in water.



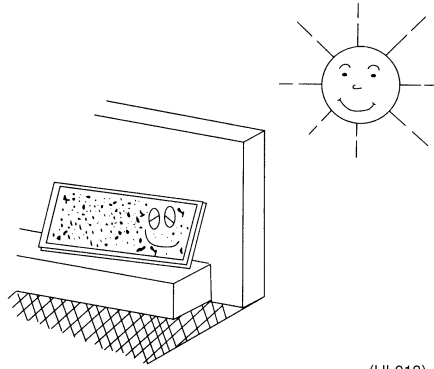
(HL017)

5. If the air filter is washed, remove water completely and allow to dry Air filter for 20 to 30 minutes in the shade. When dried completely, install the air filter back in place.
(Direct the indication "INSIDE" of the air filter toward the heat exchange element.)



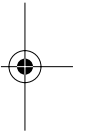
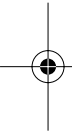


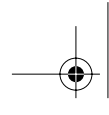
6. Install the maintenance cover securely in place.



Caution

1. Do not wash the air filter in hot water.
 2. Do not dry the air filter over a fire.
 3. Do not subject the air filter to direct sunlight.
 4. Do not use organic solvent such as gasoline and thinner on the air filter.
 5. Be sure to install the air filter after servicing.
- (Missing air filter causes clogged heat exchange element.)
The air filter is an optional item and the replacement is available.



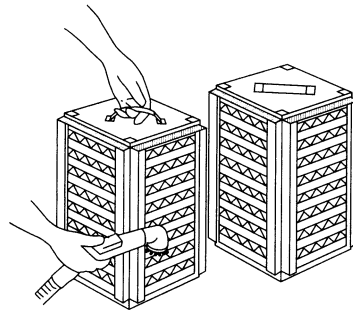


1.2 Maintenance for The Heat Exchange Element

■ CLEANING FREQUENCY

AT LEAST ONCE EVERY TWO YEARS (FOR GENERAL OFFICE USE)
(CLEAN THE ELEMENT MORE FREQUENTLY IF NECESSARY.)

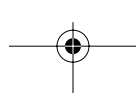
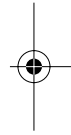
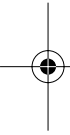
1. Use a vacuum cleaner to remove dust and foreign objects on the surface of the heat exchange element.
 - Use the vacuum cleaner equipped with a brush on the tip of the suction nozzle.
 - Lightly contact the brush on the surface of the heat exchanging element when cleaning. (Do not crush the heat exchange element while cleaning.)
2. Install the air filter securely in place.
3. Put the heat exchange element on the rail and insert it securely in place.
4. Install the maintenance cover securely in place.

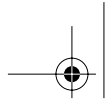


(HL019)



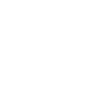
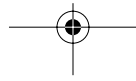
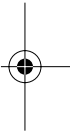
Caution Never wash the heat exchanger element with water.

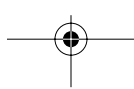
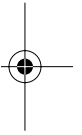
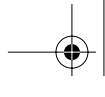




Part 4 Control Functions

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1.2 Explanation of Individual Functions	20





1. Control Functions

1.1 List of Control Functions

Classification	Function name	Outline of function
1. Basic functions (functions related to basic performance)	1.1 Ventilation operation control function	Controls supply air fan motor, exhaust air fan motor and damper motor.
	1.2 Abnormality control function	Detects abnormalities in thermistor, damper motor and data transmission to prevent errors.
2. Additional functions	2.1 Ventilation mode changeover function	Operates equipment in selected ventilation mode (total heat exchange, normal, automatic).
	2.2 Automatic ventilation operation function	Selects the most suitable ventilation mode by controlling damper motor according to temperature controller mode, temperature setting and thermistor data.
	2.3 Ventilation capacity changeover function	Operates equipment at set airflow rate.
	2.4 Humidifier operation control function	Controls humidifier output based on temperature controller judgment. Note 1
	2.5 Pre-cool/pre-heat function	Prevents equipment operation for a preset time (set time) after air conditioner is turned on.
	2.6 Freshup function	Sets motor tap so that supply air fan airflow rate is larger than exhaust air fan airflow rate.
	2.7 Filter sign function	Stores cumulative operation hour data and turns on air filter cleaning indicator.
3. System control functions	3.1 Remote controller function	Operates equipment according to instructions from remote controller.
	3.2 Group function	Operates two or more units based on instructions from single remote controller.
	3.3 Air conditioner link function	Follows air conditioner ON/OFF instructions.
	3.4 Power ON operation function	Operates equipment when power is turned on.
	3.5 External link operation function	Turns equipment on and off according to external link terminal signal (no-voltage contact a).
	3.6 Centralized control function	Allows remote control operation by centralized control equipment.
	3.7 Timer function	Turns equipment on and off at set time.
4. Other support functions	4.1 Troubleshooting function	Displays error codes to indicate locations of error.
	4.2 Field setting function	Allows initial setting from LCD remote controller.


Note:
Note 1

Requires optional humidifier and optional printed circuit board (KRP50-2 : Wiring adapter for remote contact).



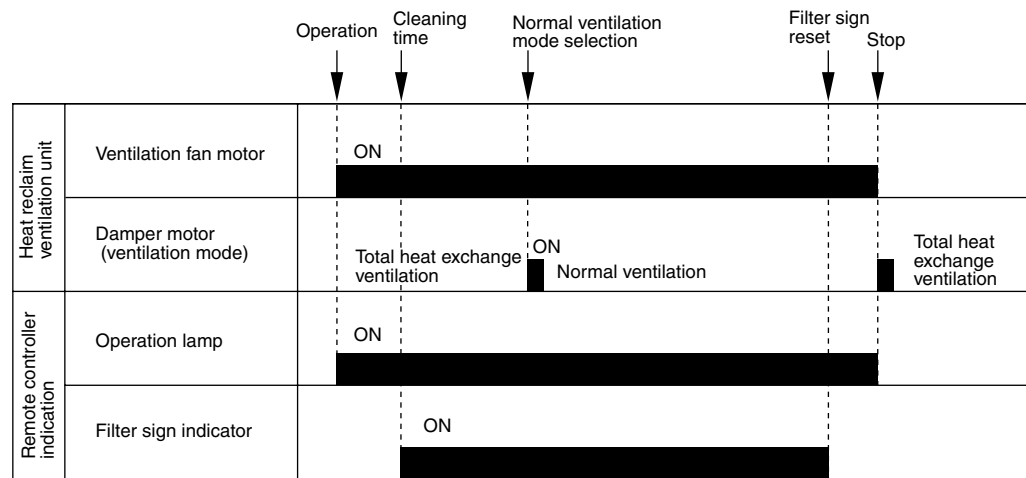
1.2 Explanation of Individual Functions

1.2.1 Ventilation Operation Control

Controls ventilation fan motors (supply and exhaust air fans) and damper motor.

1) Normal operation

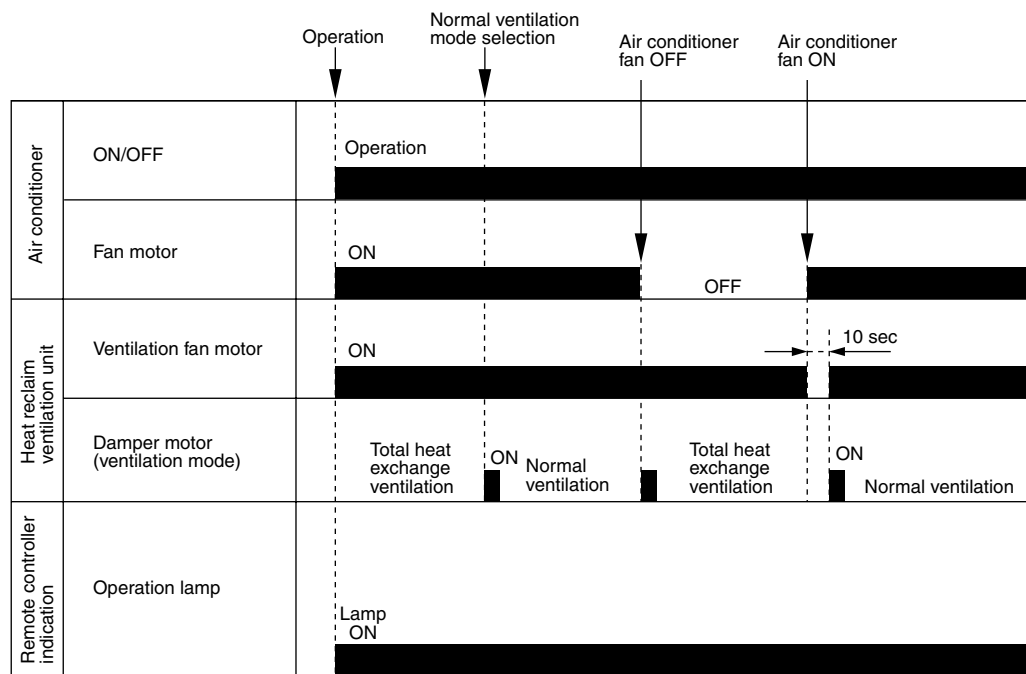
Operation chart



(HL020)

2) Direct duct connection with air conditioner

Operation chart



(HL021)



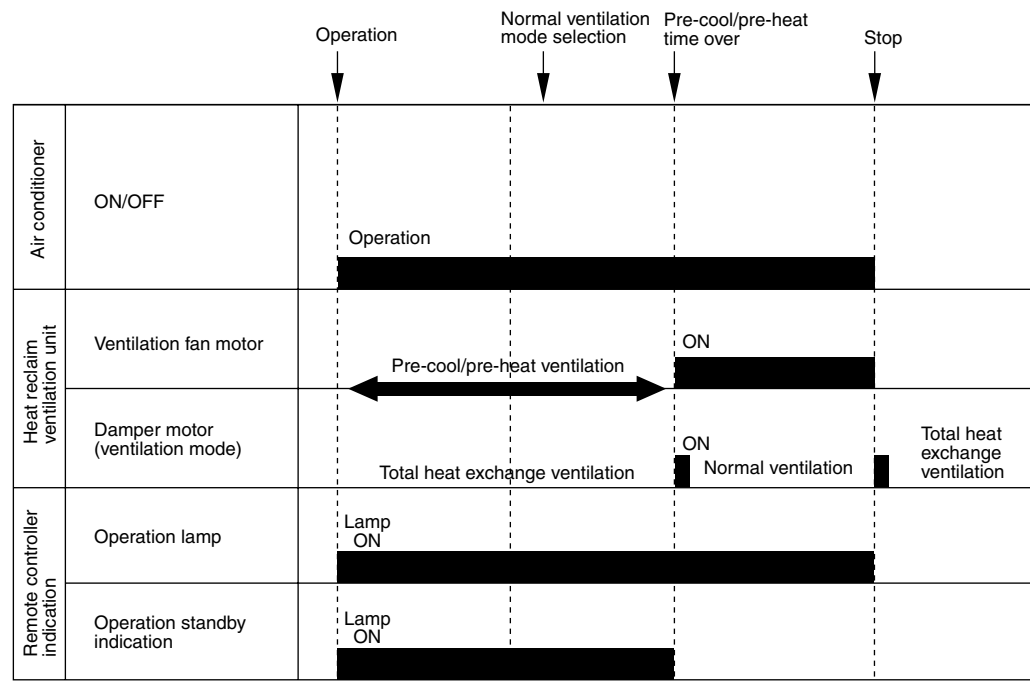
Note: Direct duct connection setting can be made in VRV system or using field setting mode of HRV LCD remote controller.



1.2.2 Pre-cool/Pre-heat

Pre-cool/pre-heat operations require the following conditions.

1. System
Pre-heat operation is possible only in air conditioner linked system (1 group, 2-group link). Check the system first.
2. Heat reclaim ventilation setting
Set Preheat ON/OFF to ON.
Pre-cool/pre-heat On/OFF setting can be made in air conditioner or using field setting mode of LCD remote controller of heat reclaim ventilation unit. (Pre-cool time can be set between 30 and 60 min, and pre-heat time can be set between 30 and 150 min.)
3. Others
 - a) Heat reclaim ventilation unit must be in non-operating condition for two consecutive hours or more prior to pre-cool/pre-heat operation.
 - b) Temperature control mode of the air conditioner must be set to Cool, Heat or Dry.



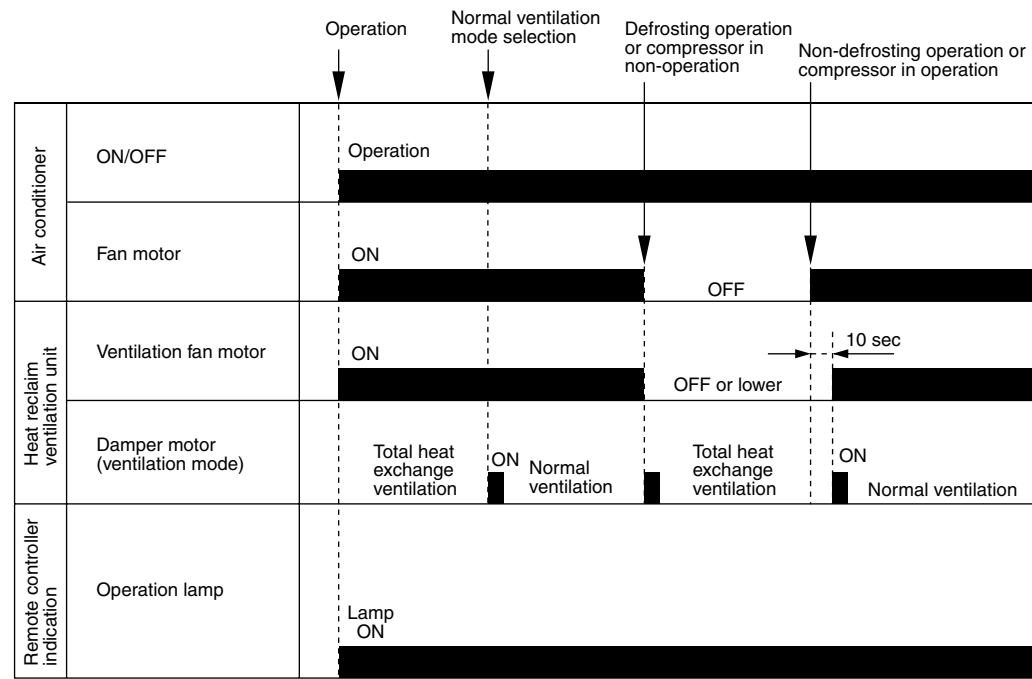
(HL022)

i Note: Operation standby indication is displayed only on LCD remote controller of heat reclaim ventilation unit.

1.2.3 Cold Area Mode

Stops or lowers ventilation airflow during defrosting operation and compressor non-operating condition when equipment in heating mode, thus reducing heating load and cold air draft.

Operation chart (in heating operation only)



(HL023)

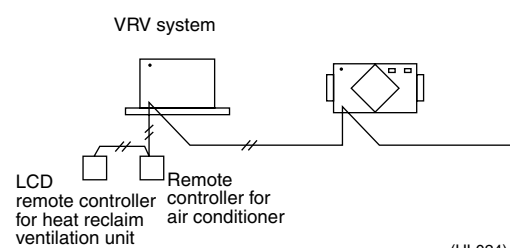
Note: Cold area mode can set using remote controller for air conditioner or field setting mode of LCD remote controller of heat reclaim ventilation unit.

1.2.4 Air Conditioner Link Operation

Link system enables simultaneous ON/OFF operation of heat reclaim ventilation unit and air conditioner (VRV system, Skyair).

1) 1 group link control

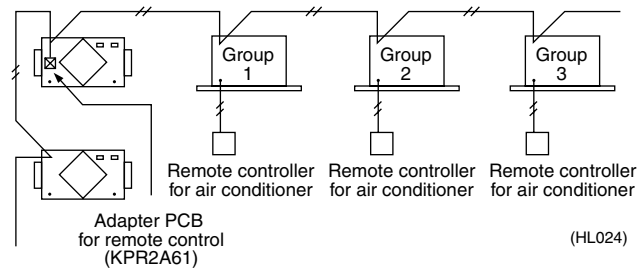
- Allows simultaneous ON/OFF from remote controller for air conditioner.
- Allows independent operation of heat reclaim ventilation unit from VRV-system remote controller during interim periods (not possible when direct duct connection is used).
- ON/OFF operation is not possible from LCD remote controller of heat reclaim ventilation unit.



(HL024)

2) Link control of 2 or more groups (zone link)

- Heat reclaim ventilation unit can be operated when one or more air conditioners are operating.
- Allows independent operation of heat reclaim ventilation unit from VRV-system remote controller during interim periods (direct duct connection is not allowed in this system).
- ON/OFF operation is not possible from LCD remote controller of heat reclaim ventilation unit.



i Note: With Super Wiring, units of different outdoor systems can be linked in operation.

1.2.5 Field Setting, Service Mode





1. Field setting
Used for initial setting of heat reclaim ventilation unit.
2. Service mode
Used for confirmation of unit Nos. in the group and reallocation of unit Nos.

List of Field Setting and Service Mode

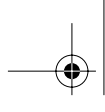
Details of setting	Mode	Setting mode	Setting switch No.	Setting position						Operation method
				01	02	03	04	05	06	
Group No. setting for centralized controller (individual)	Field setting	00(30)								Refer to P-54
Filter cleaning time setting		17(27)	0	2500 hr.	1250 hr.	No integration	—	—	—	Refer to P-53
Pre-cool/pre-heat On/Off setting			2	Off	On	—	—	—	—	
Pre-cool/pre-heat time (min.) setting			3	30 min.	45 min.	60 min.	—	—	—	
Fan speed initial setting			4	Normal	Ultra-High	—	—	—	—	
Setting for cold area (Fan operation selection for heater thermostat OFF)			5	No duct	Normal	Cold area function (Fan switch selection when heating thermostat Off)				
					With duct	Normal		With duct		
					Fan Off	Fan Off	Fan L	Fan Off	Fan L	
Centralized/individual setting			7	Invalid	Valid	—	—	—	—	
Centralized zone interlock setting			8	Off	Individual setting when zone interlock On				—	
		No			ventilation only	Cleaning only	Ventilation +Cleaning	—		
Pre-heat time extension setting		9	0	30 min.	90 min.	60 min.	—	—		
External signal setting		18(28)	0	Last command	Priority on external input	—	—	—	—	
Setting for direct power-on			1	Off	On	—	—	—	—	
Auto restart setting	2		Off	On	—	—	—	—		
Humidifying operation setting	3		Only for heating mode	For all mode	—	—	—	—		

Control Functions

SI-93

Details of setting	Mode	Setting mode	Setting switch No.	Setting position						Operation method
				01	02	03	04	05	06	
Ventilation mode indication ON/OFF	Field setting	18(28)	4	ON	OFF	—	—	—	—	 Refer to P-53
Freshup indication ON/OFF			6	OFF	ON	—	—	—	—	
Freshup supply air/exhaust air			7	Supply Air	Exhaust Air	—	—	—	—	
External input terminal function selection			8	Fresh up	Overall alarm	Overall malfunction	Forced Off	Fanforced Off	Air flow increase	
KRP50 output changeover selection			9	Humidifying output	Malfunction output	—	—	—	—	
Air flow setting		19(29)	0	Low	Low	Low	Low	High	High	
Ventilation mode setting			2	Automatic	Total heat exchange	Normal	—	—	—	
Fresh up operation			3	Off	On	—	—	—	—	
Humidifying On/Off setting			5	On	Off	—	—	—	—	
Error record display	Service	40							 Refer to operation manual for remote controller of air conditioner	
Forced ventilation fan On		43							 Refer to P-55	
Unit No. allocation		45							 Refer to P-56	

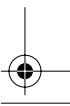
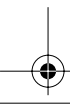
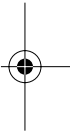
- Note:**
- All the setting can be made by the remote controller for VRV and HRV unit. The setting of mode No. 19 (29) and 40 can be made only by the remote controller for VRV unit. The mode No. 30 is used for the individual setting such as the calculation of power bill, etc.
 - The mode No. in () is used for making individual setting of each unit.
 - Factory setting

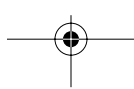
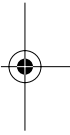
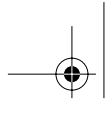


Part 5

Circuit Operations

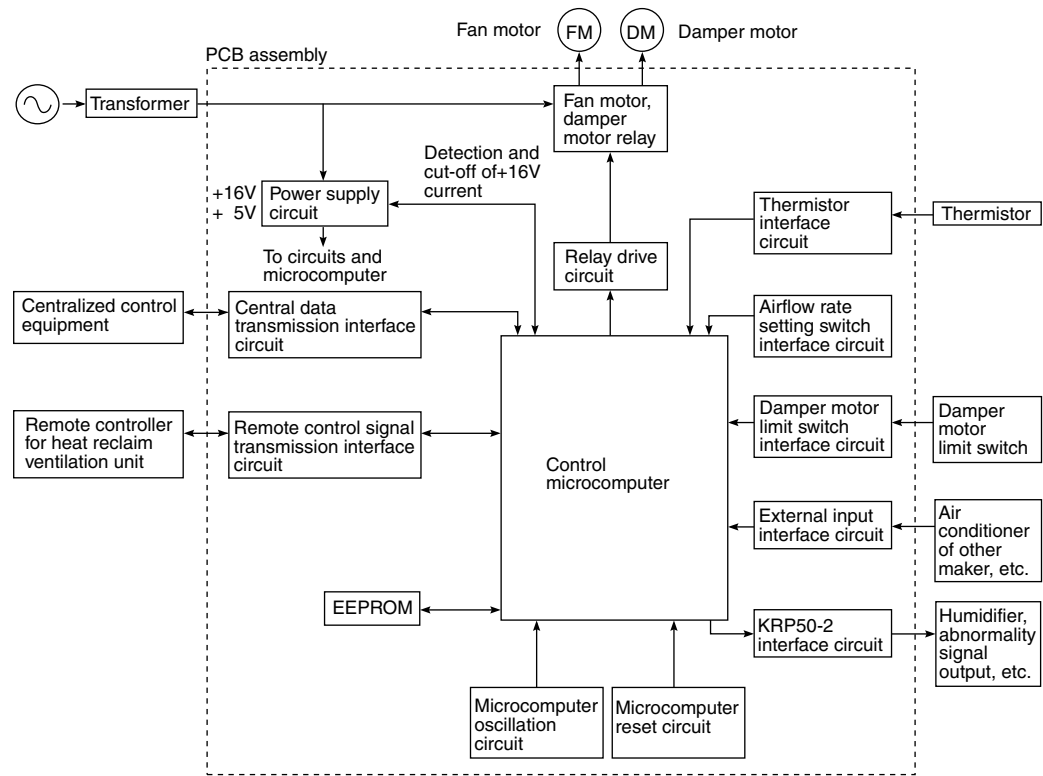
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1. Circuit Operations

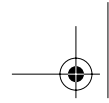
1.1 Circuit Configuration



(HL026)

1.2 Circuit Functions

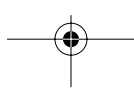
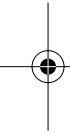
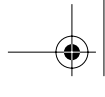
Classification	Circuit	Function
Input/output	Central data transmission interface	Used by centralized control equipment for operation control. Allows control of up to 64 groups of air conditioners and heat reclaim ventilation units. Use of KRP2A61 allows zone link operation.
	Remote control data transmission interface	Use of dedicated LCD remote controller allows control of up to 16 heat reclaim ventilation units. Also used for linked operation of air conditioners of 2 groups.
	Air conditioner link operation	Connects to remote control line of air conditioner for linked operation.
Output	KRP50-2 interface	Can be used to output signals of operating condition and abnormalities to external equipment or to connect humidifier via KRP50-2.
	Relay drive circuit	Supplies drive voltage to relay coils.
	Fan motor, damper motor relay	Power supply relay for fan motor and damper motor.
Input	Thermistor interface	Uses thermistor (temperature sensor) to detect inside and outside temperatures.
	Airflow rate setting switch interface	Used to set airflow rate of main unit when dedicated remote controller is not used.
	External input interface	Used to control main unit with external contact point. (Freshup, external link operation, etc.)
	Damper limit switch interface	Sends signal of limit switch condition to microcomputer for damper motor cam positioning.
Peripheral Parts	Control microcomputer	Controls entire equipment by varying output according to input condition.
	EEPROM	Stores operating condition and address data.
Microcomputer	Microcomputer reset circuit	Resets microcomputer when power is turned on.
	Microcomputer oscillation circuit	Generates clock frequency for microcomputer operation.
Power Supply	Power transformer	Produces power supply of approx. 26 VAC from 220-240 VAC.
	Power supply circuit	Supplies direct currents (16 VDC, 5 VDC) to control circuits.



Part 6 Troubleshooting

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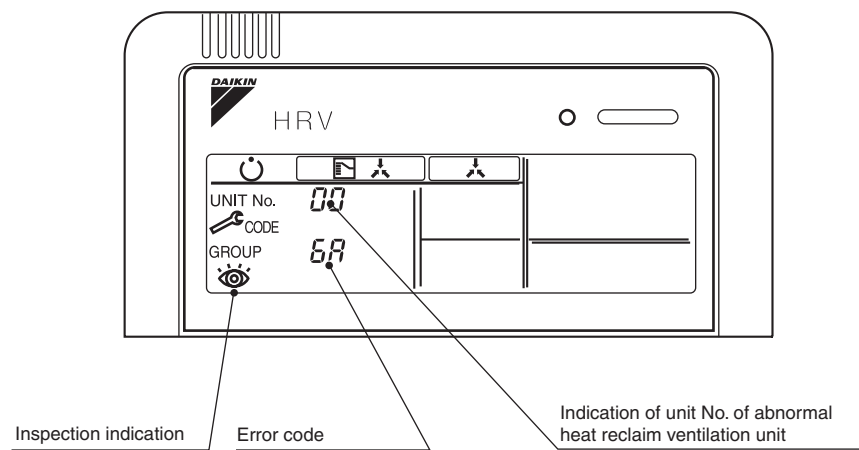




1. Troubleshooting

1.1 Error Code Indication

When an abnormality is generated, take necessary measures by referring to displayed error code.
After the cause of abnormality is removed, operate equipment and check proper functioning.






(HL027)

List of malfunction codes displayed by LCD remote controller

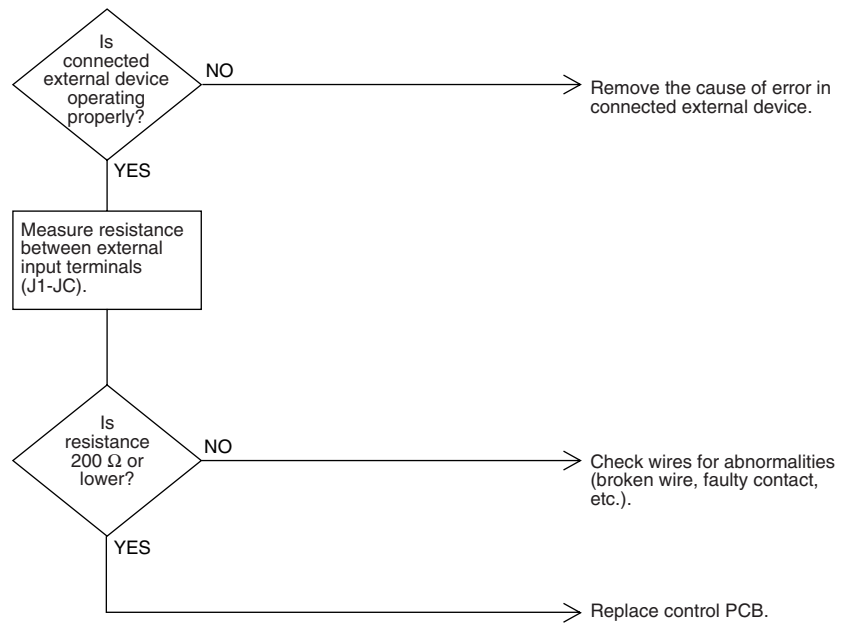
LCD Remote Controller Display				Description of Abnormality	Page
Error Code	Operation Lamp	Inspection Indication	Unit No.		
60	ON	OFF	Flashing	Overall alarm	P32
	Flashing	Flashing		Overall malfunction	P33
64	ON	OFF	Flashing	Inside air thermistor error	P34
65	ON	OFF	Flashing	Outside air thermistor error	P35
6A	ON	OFF	Flashing	Damper system alarm	P36
6B	Flashing	Flashing	Flashing	Damper system + thermistor error	P37
U5	Flashing	Flashing	Flashing	Data transmission error between LCD remote controller and main unit	P39
U5	OFF	Flashing	OFF	LCD remote controller connection error	P40
UB	OFF	Flashing	OFF	Data transmission error between master-slave LCD remote controllers	P41
UA	OFF	Flashing	OFF	LCD remote controller connection error (no remote controller for air conditioner in air conditioner group)	P42
UC	ON	ON	ON	Overlapping central control address	P43
UE	Blinking	Blinking	Blinking	Transmission error between the unit and centralized controller	—

In case of the malfunction with the shaded error code, the unit still operates. However, be sure to have it inspected and repaired and as soon as possible.

1.2 Overall Alarm

Remote Controller LCD Display	Error Code 60 Inspection — Unit No. 
LED Indication	Remote Controller  Main Unit 
Error Detection Method	Abnormalities are detected based on open circuit in external input terminals (J1-JC).
Error Generating Conditions	When external input terminal (J1-JC) is shorted during operation ("Overall Alarm" must be set in field setting mode).
Possible Causes	<ul style="list-style-type: none"> ■ Faulty external device ■ Broken wire ■ Faulty control PCB

Troubleshooting

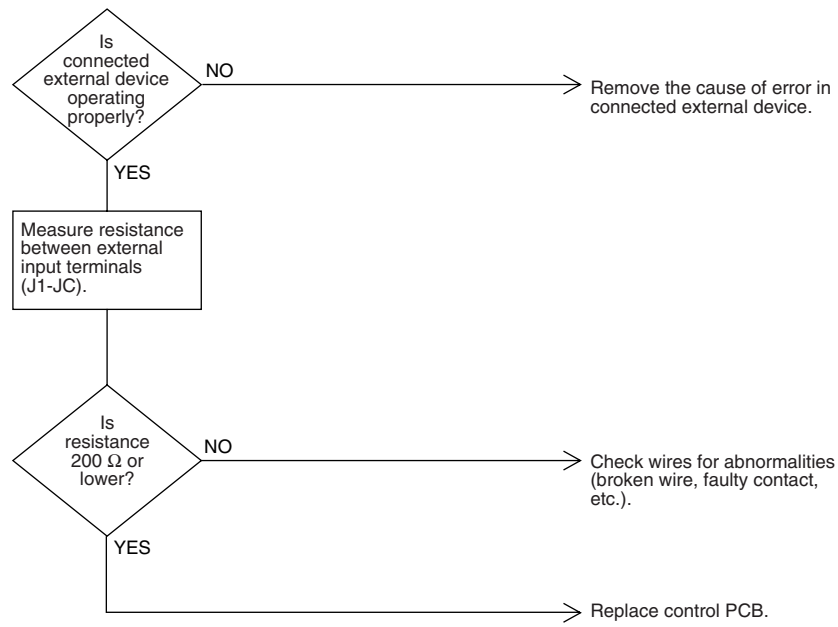


(HF001)

1.3 Overall Malfunction

Remote Controller LCD Display	Error Code 60 Inspection Unit No.
LED Indication	Remote Controller Main Unit
Error Detection Method	Errors are detected based on open circuit in external input terminals (J1-JC).
Error Generating Conditions	When external input terminal (J1-JC) is shorted during operation ("Overall Alarm" must be set in field setting mode).
Possible Causes	<ul style="list-style-type: none"> ■ Faulty external device ■ Broken wire ■ Faulty control PCB

Troubleshooting

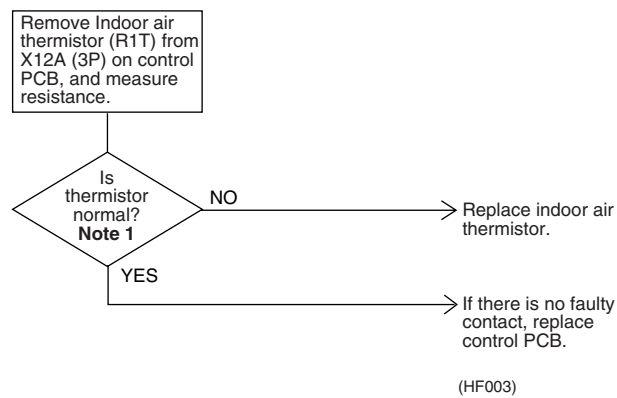


(HF002)

1.4 Indoor Air Thermistor Error

Remote Controller LCD Display	Error Code 64 Inspection — Unit No.
LED Indication	Remote Controller Main Unit
Error Detection Method	Temperature detected by inside air temperature sensor is used to detect errors.
Error Generating Conditions	When value detected by inside air temperature sensor is -40°C or below (open circuit) or 70°C or higher (shorting).
Possible Causes	<ul style="list-style-type: none"> ■ Faulty sensor ■ Broken wire ■ Faulty control PCB ■ Faulty contact in connector

Troubleshooting



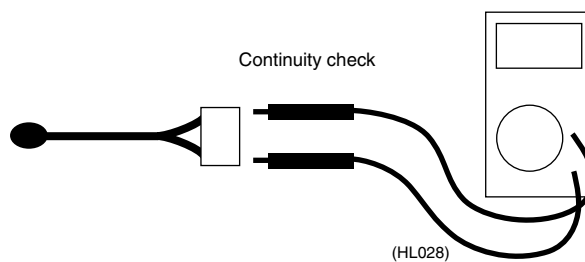
Note: **Note 1:** Refer to the thermistor temperature - resistance conversion table when measuring resistance.

Thermistor temperature - resistance conversion table

Thermistor temperature	Sensor resistance	Thermistor temperature	Sensor resistance
-10°C or less	108k Ω or more	22°C	Approx. 23k Ω
-5°C	Approx. 85k Ω	24°C	Approx. 21k Ω
0°C	Approx. 66k Ω	26°C	Approx. 19k Ω
5°C	Approx. 51k Ω	28°C	Approx. 18k Ω
10°C	Approx. 40k Ω	30°C	Approx. 16k Ω
14°C	Approx. 33k Ω	35°C	Approx. 13k Ω
16°C	Approx. 30k Ω	40°C	Approx. 11k Ω
18°C	Approx. 27k Ω	50°C or more	7k Ω or less
20°C	Approx. 25k Ω		

If measured value deviates significantly from above values, thermistor is faulty.

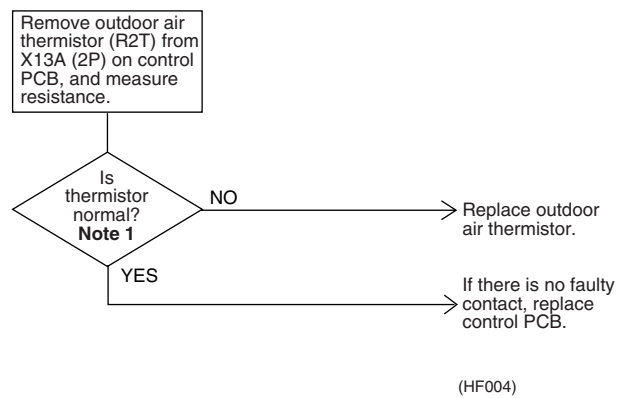
Use tester to check resistance



1.5 Outdoor Air Thermistor Error

Remote Controller LCD Display	Error Code 65 Inspection — Unit No.
LED Indication	Remote Controller Main Unit
Error Detection Method	Temperature detected by outside air temperature sensor is used to detect errors.
Error Generating Conditions	When value detected by outside air temperature sensor is -40°C or below (open circuit) or 70°C or higher (shorting).
Possible Causes	<ul style="list-style-type: none"> ■ Faulty sensor ■ Broken wire ■ Faulty control PCB ■ Faulty contact in connector

Troubleshooting



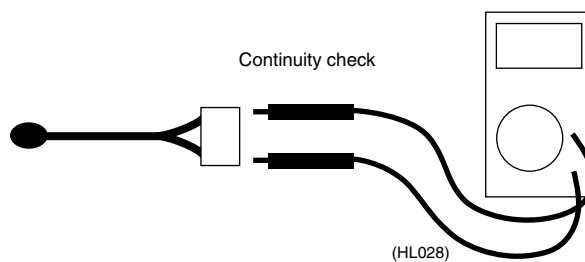
Note: **Note 1:** Refer to the thermistor temperature - resistance conversion table when measuring resistance.

Thermistor temperature - resistance conversion table

Thermistor temperature	Sensor resistance	Thermistor temperature	Sensor resistance
-10°C or less	108k Ω or more	22 $^{\circ}\text{C}$	Approx. 23k Ω
-5°C	Approx. 85k Ω	24 $^{\circ}\text{C}$	Approx. 21k Ω
0 $^{\circ}\text{C}$	Approx. 66k Ω	26 $^{\circ}\text{C}$	Approx. 19k Ω
5 $^{\circ}\text{C}$	Approx. 51k Ω	28 $^{\circ}\text{C}$	Approx. 18k Ω
10 $^{\circ}\text{C}$	Approx. 40k Ω	30 $^{\circ}\text{C}$	Approx. 16k Ω
14 $^{\circ}\text{C}$	Approx. 33k Ω	35 $^{\circ}\text{C}$	Approx. 13k Ω
16 $^{\circ}\text{C}$	Approx. 30k Ω	40 $^{\circ}\text{C}$	Approx. 11k Ω
18 $^{\circ}\text{C}$	Approx. 27k Ω	50 $^{\circ}\text{C}$ or more	7k Ω or less
20 $^{\circ}\text{C}$	Approx. 25k Ω		

If measured value deviates significantly from above values, thermistor is faulty.

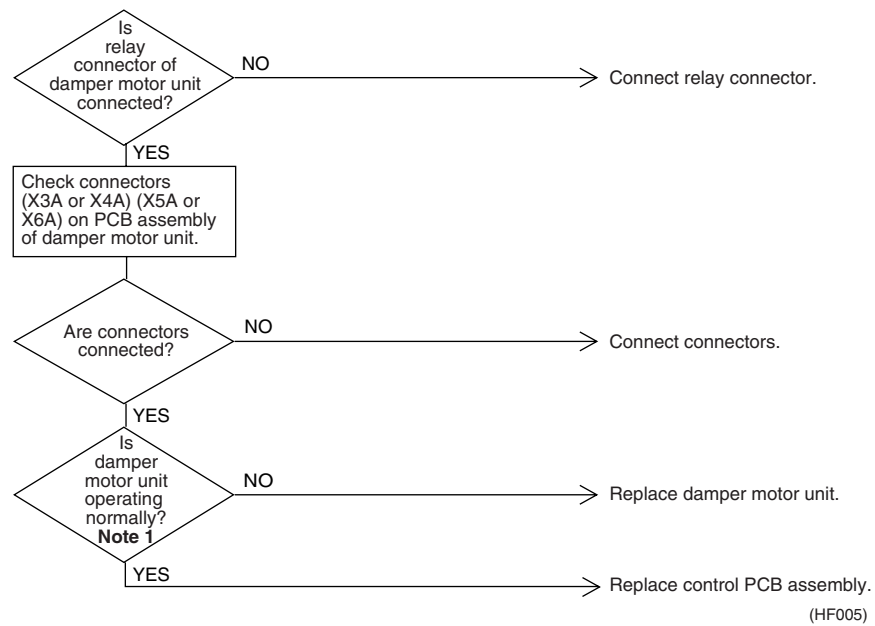
Use tester to check resistance



1.6 Damper System Error (Alarm)

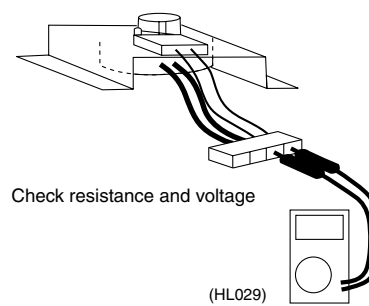
Remote Controller LCD Display	Error Code 6A Inspection — Unit No.
LED Indication	Remote Controller Main Unit
Error Detection Method	Measurement of damper motor limit ON/OFF time.
Error Generating Conditions	<ul style="list-style-type: none"> ■ When damper motor limit switch 1 (or 2) remains ON (or OFF) for more than a certain time duration after ventilation mode is changed. ■ When damper motor limit switch 1 (or 2) repeats ON/OFF operations after damper motor 1 (or 2) stops.
Possible Causes	<ul style="list-style-type: none"> ■ Faulty damper motor or limit switch ■ Broken wire in cable ■ Faulty contact in connector (including relay connector) ■ Faulty control PCB assembly

Troubleshooting



Note: **Note 1:**

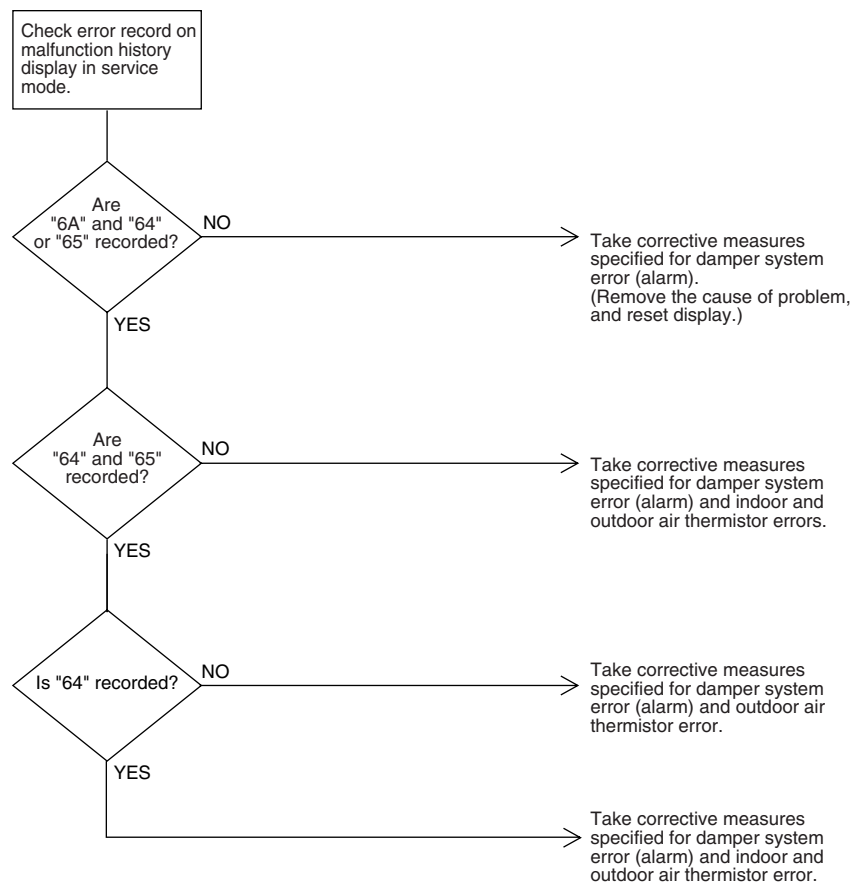
- Place tester probes on connectors of limit switch. Move switch by hand and check continuity. If tester indicates 0Ω when limit switch turns on, and infinity when it turns off, limit switch is normal.
- Place tester probes on connectors of damper motor and check resistance. If tester indicates approx. 17 kΩ in 200-V model, damper motor is normal.



1.7 Damper System Error (Alarm)

Remote Controller LCD Display	Error Code 6A Inspection Unit No.
LED Indication	Remote Controller Main Unit
Error Detection Method	Measurement of damper motor limit switch ON/OFF time and temperatures detected by outdoor and indoor air thermistor.
Error Generating Conditions	<ul style="list-style-type: none"> ■ When damper system error (alarm) and indoor (or outdoor) thermistor error are generated at the same time. ■ When damper system error (alarm) occurs and values of indoor and outdoor air thermistor meet frost conditions.
Possible Causes	<ul style="list-style-type: none"> ■ Faulty damper motor or limit switch ■ Faulty indoor air thermistor ■ Faulty outdoor air thermistor ■ Frosting ■ Broken wire in cable ■ Faulty contact in connector (including relay connector) ■ Faulty control PCB assembly

Troubleshooting



(HF006)

1.8 Dedicated LCD Remote Controller

When "88" remains on remote controller display.

Error Detection Method

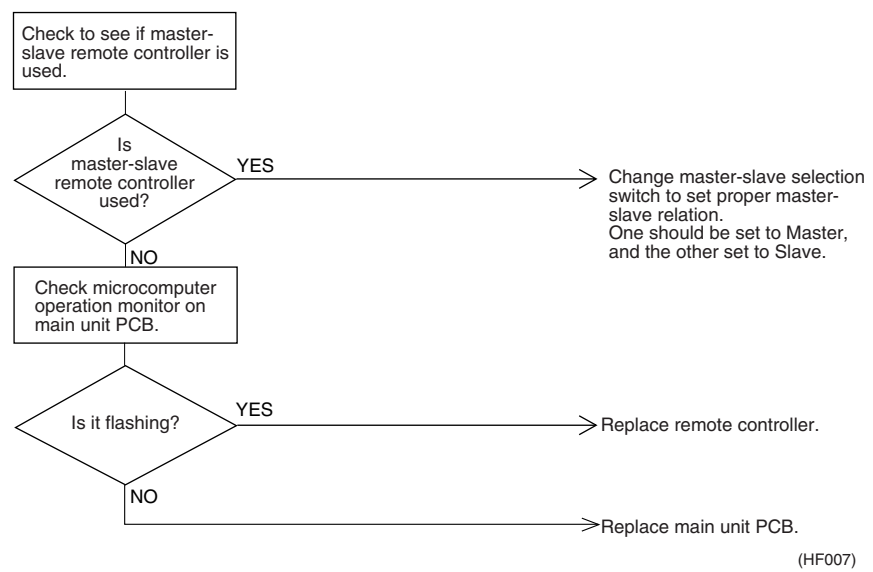
When "88" remains on remote controller display.

Error Generating Conditions

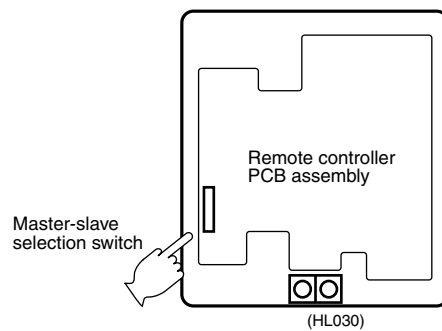
Possible Causes

Master-slave setting of remote controller
 Remote controller PCB assembly error
 Main unit PCB assembly error

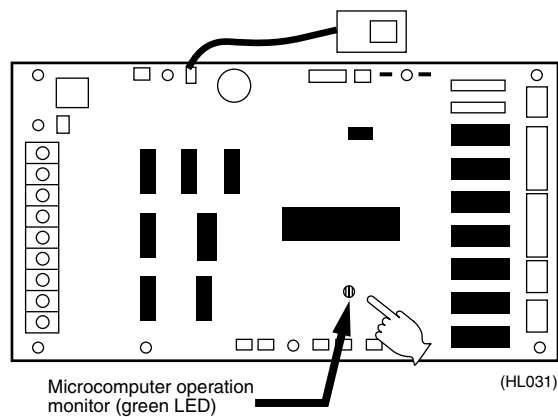
Troubleshooting



Dedicated Remote Controller



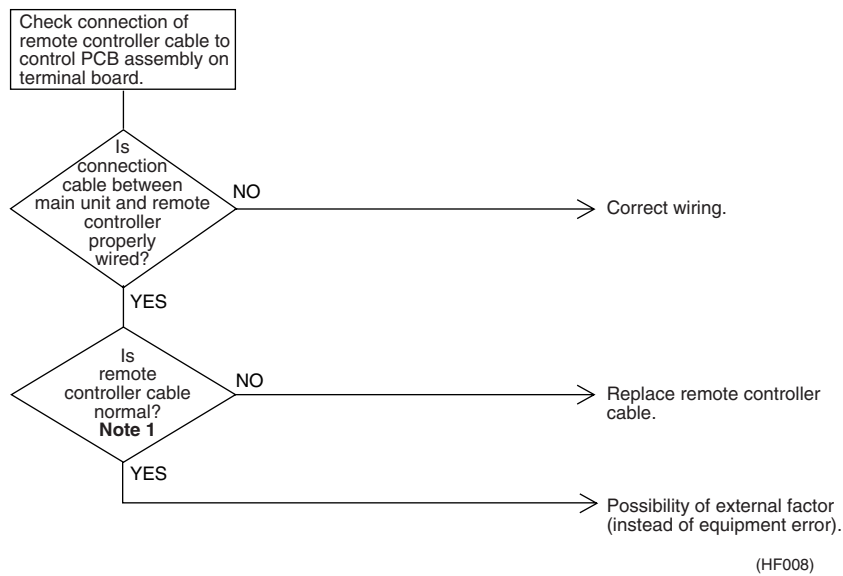
Main Unit PCB



1.9 Data Transmission Error (Between LCD Remote Controller and Main Unit)

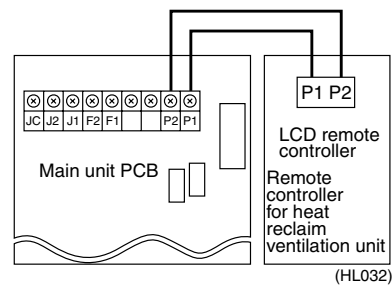
Remote Controller LCD Display	Error Code US Inspection Unit No.
LED Indication	Remote Controller Main Unit
Error Detection Method	Microcomputer checks if data is transmitted properly between main unit and remote controller.
Error Generating Conditions	When data transmission is not performed correctly for a certain time period.
Possible Causes	<ul style="list-style-type: none"> ■ Faulty connection of remote controller cable ■ Faulty remote controller cable ■ External factor (noise, etc.)

Troubleshooting






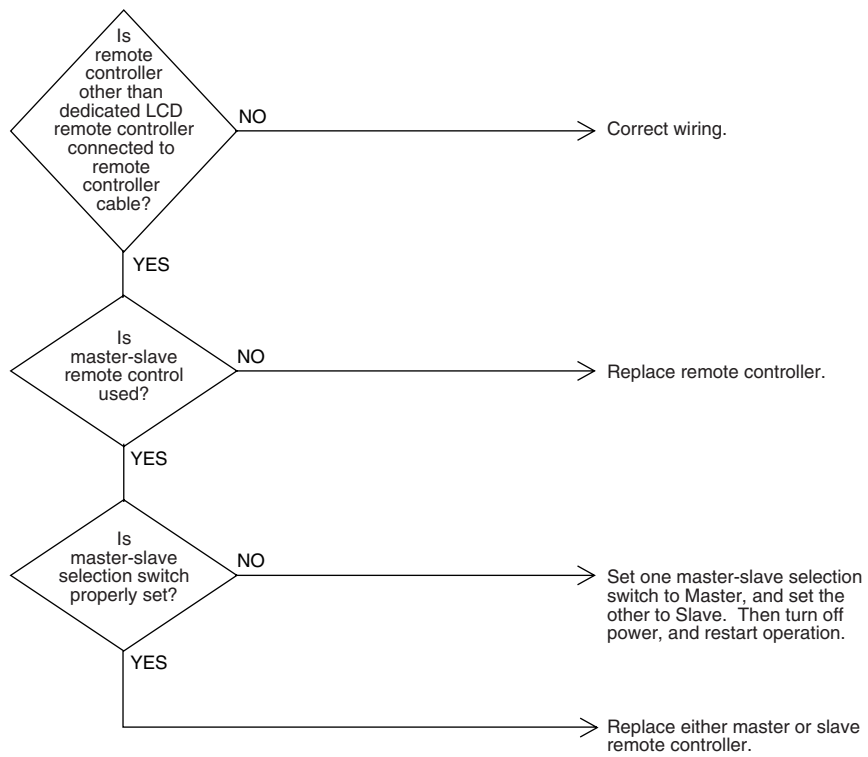
Note: **Note 1:**

1. Use tester to check continuity of remote controller cable.
 - Disconnect cable from main unit terminal board and remote controller terminal board. Measure resistance between wires in cable. Resistance should be $\infty M\Omega$ (infinity).
2. Use tester to check voltage at terminal board.
 - Check with power turned on.
 - With remote controller cable disconnected, voltage between P1 and P2 on terminal board should be approx. 16 VDC. If measured value is not approx. 16 VDC, PCB assembly is faulty.
 - Connect remote controller cable and disconnect remote controller. Voltage at the end of remote controller cable should be approx. 16 VDC. If measured value is not 16 VDC, remote controller cable is faulty.
 - Connect remote controller cable and remote controller. Voltage between P1 and P2 on remote controller terminal should be approx. 16 VDC. If measured value is not 16 VDC, remote controller is faulty.



1.10 Data Transmission Error (LCD Remote Controller)

Remote Controller LCD Display	Error Code U5 Inspection  Unit No. ●
LED Indication	Remote Controller  Main Unit 
Error Detection Method	Microcomputer checks if data is transmitted properly between main unit and remote controller.
Error Generating Conditions	When data transmission is not performed correctly for a certain time period.
Possible Causes	<ul style="list-style-type: none"> ■ Erroneous connection ■ Faulty remote controller setting ■ Faulty remote controller
Troubleshooting	

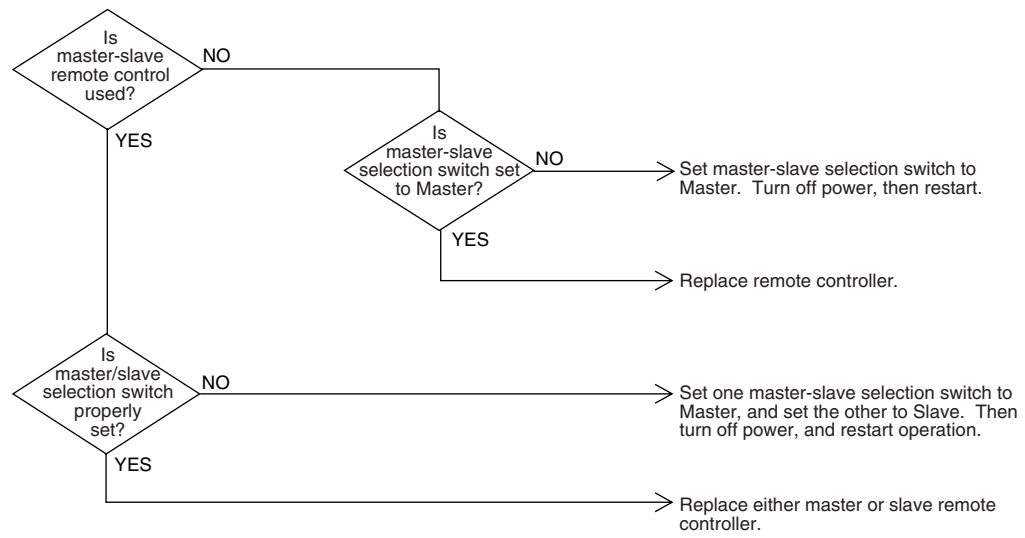


(HF009)

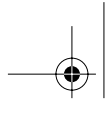
1.11 Data Transmission Error (Between LCD Master Remote Controller and Slave Remote Controller)

Remote Controller LCD Display	Error Code UB Inspection Unit No. ●
LED Indication	Remote Controller ● Main Unit
Error Detection Method	Microcomputer checks if data is transmitted properly between master-slave remote controller.
Error Generating Conditions	When data transmission is not performed correctly for a certain time period.
Possible Causes	<ul style="list-style-type: none"> ■ Faulty remote controller setting ■ Faulty remote controller

Troubleshooting



(HF010)



1.12 Field Setting Error

Remote Controller LCD Display

Error Code **UR** Inspection Unit No. ●

LED Indication

Remote Controller ● Main Unit

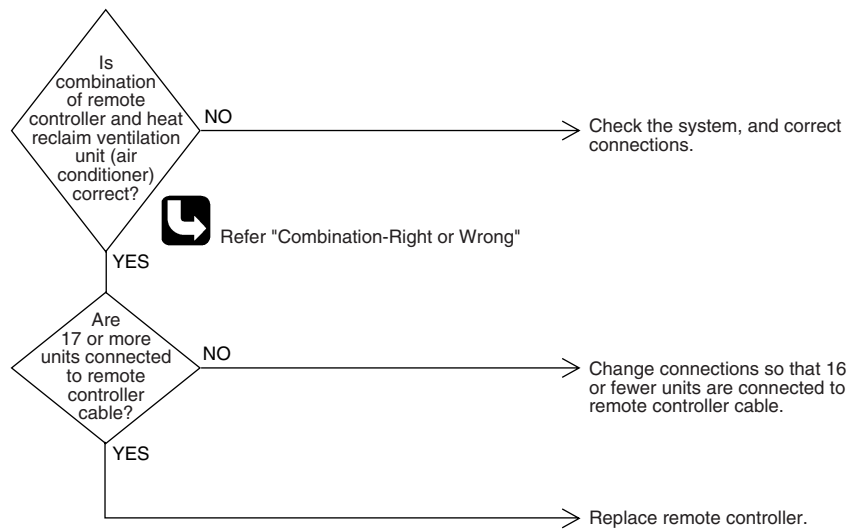
Error Detection Method

Error Generating Conditions

Possible Causes

- Faulty combination of remote controller
- More than 16 units connected to remote controller cable.
- Faulty remote controller

Troubleshooting

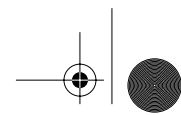


(HF011)

<Combination-Right or Wrong>

Main body	Remote controller	Right/Wrong
Heat reclaim ventilation unit only	Heat reclaim ventilation unit	Right
Heat reclaim ventilation unit only	Heat reclaim ventilation unit + air-conditioner	Wrong
Heat reclaim ventilation unit only	Air conditioner	Right
Heat reclaim ventilation unit + air-conditioner	Heat reclaim ventilation unit	Wrong
Heat reclaim ventilation unit + air-conditioner	Heat reclaim ventilation unit + air-conditioner	Right
Heat reclaim ventilation unit + air-conditioner	Air-conditioner	Right

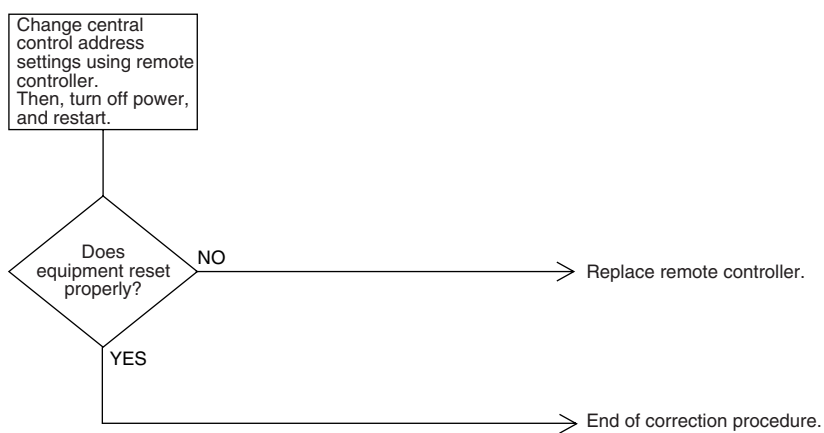




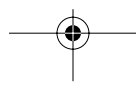
1.13 Overlapping Central Control Address

Remote Controller LCD Display	Error Code UC Inspection ☼ Unit No. ☼
LED Indication	Remote Controller ☼ Main Unit ☾
Error Detection Method	Remote controller microcomputer checks for double-setting of addresses.
Error Generating Conditions	When same address is set to two or more units.
Possible Causes	<ul style="list-style-type: none"> ■ Overlapping of central control address ■ Faulty remote control

Troubleshooting



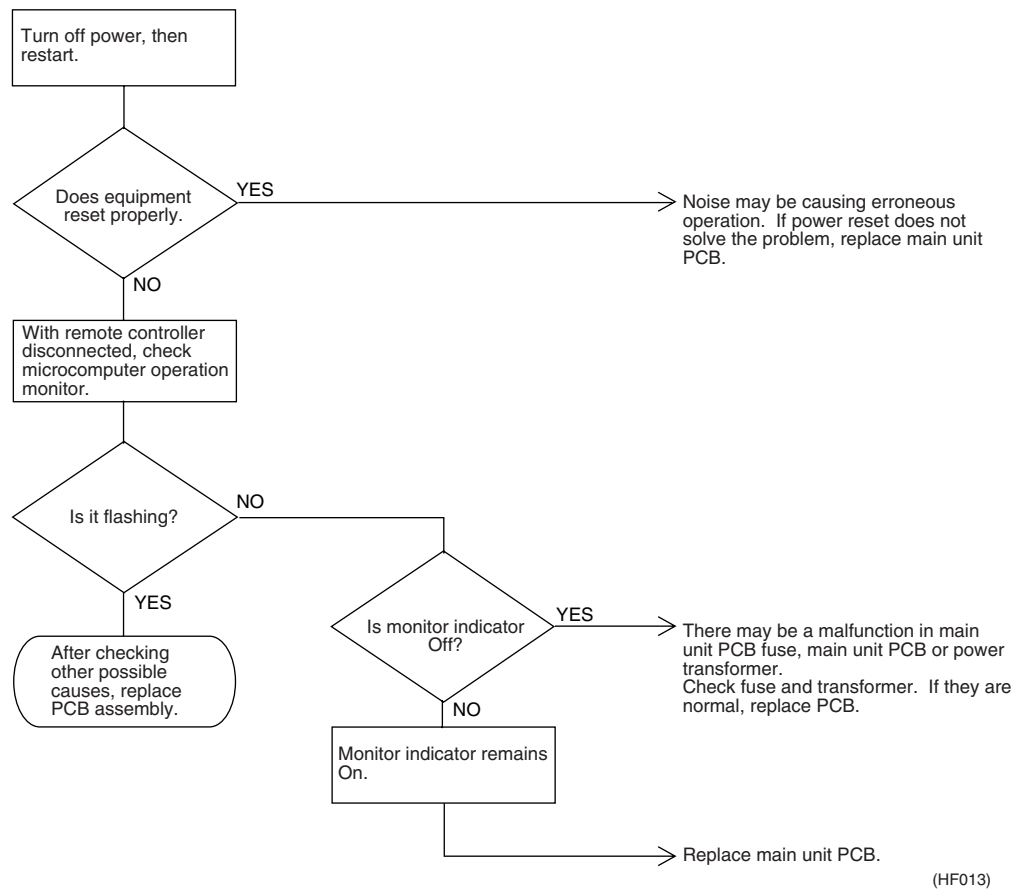
(HF012)



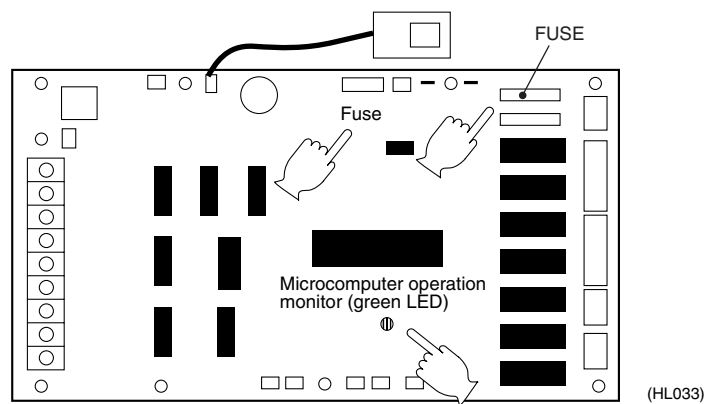
1.14 Main Unit PCB Assembly

Error Detection Method	Check microcomputer operation monitor.
Error Generating Conditions	When main unit PCB assembly does not operate. When communication circuit errors.
Possible Causes	Fuse (excess current) Power transformer Noise Main unit PCB

Troubleshooting



Main unit PCB





1.15 Dedicated LCD Remote Controller

When no indication is displayed on remote controller

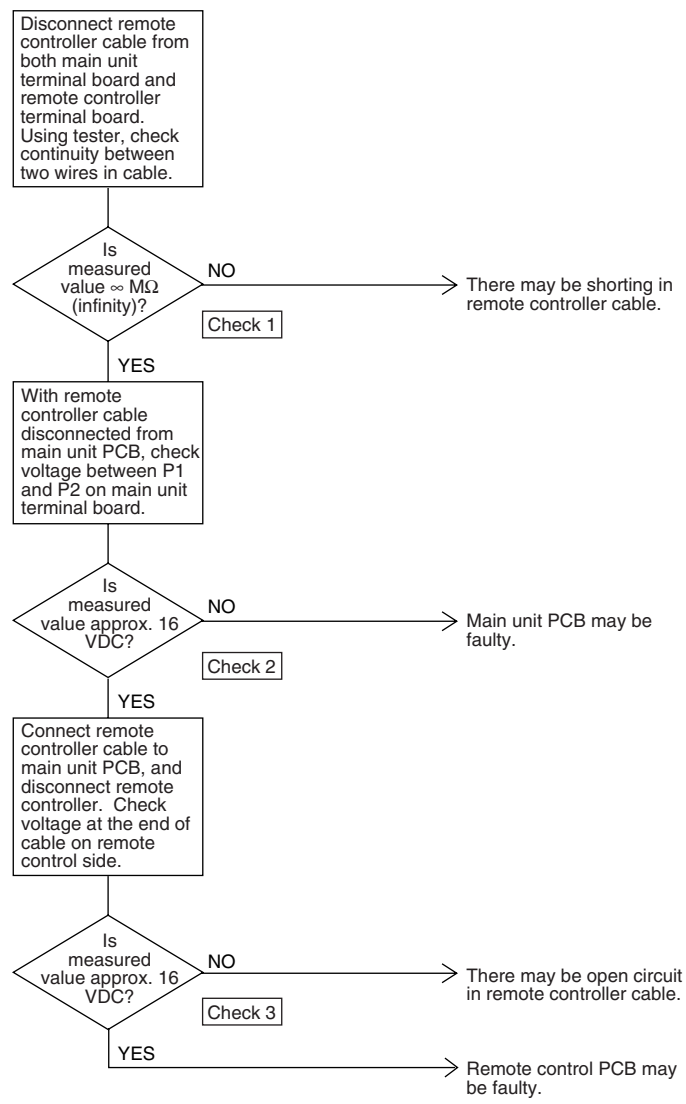
Error Detection Method

Check to see if remote controller displays indication.

Error Generating Conditions

Possible Causes

Troubleshooting



(HF014)



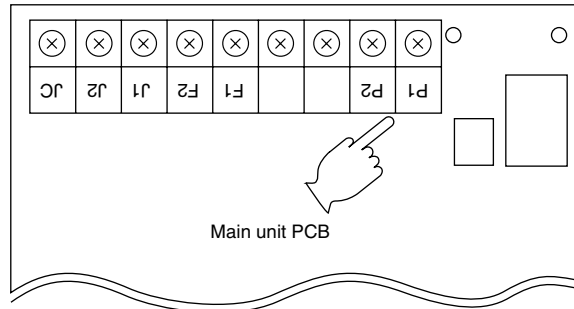
Check 1, 2, 3 : Refer to page 46





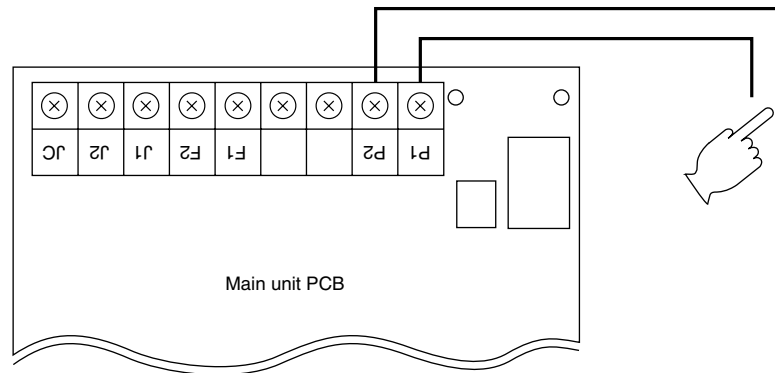
1.16 How to Check

Check 1 Dedicated LCD remote controller (Option)



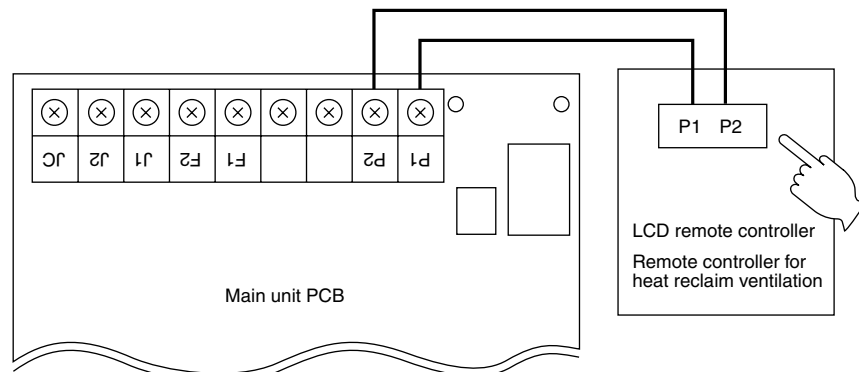
(HL034)

Check 2 Dedicated LCD remote controller (Option)



(HL035)

Check 3 Dedicated LCD remote controller (Option)



(HL036)



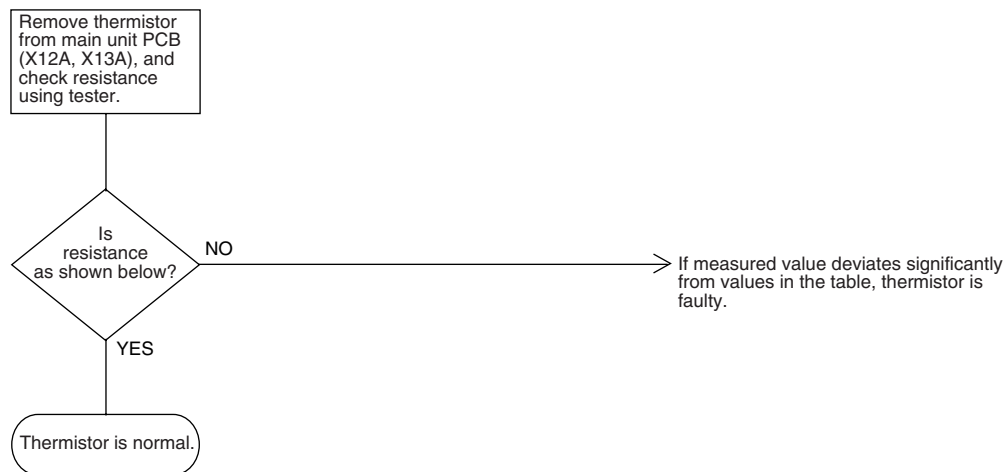
1.17 Thermistor

Error Detection Method Remove thermistor and check resistance with tester.

Error Generating Conditions

- Possible Causes**
- Faulty thermistor
 - Broken wire
 - Faulty control PCB
 - Faulty contact in connector

Troubleshooting



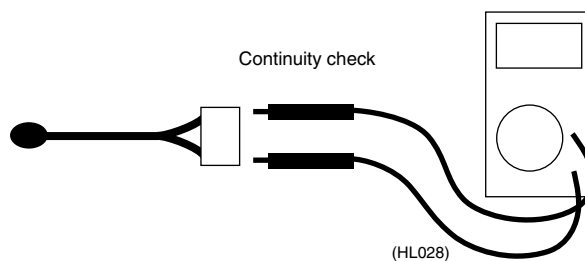
(HF015)

Note: Refer to the thermistor temperature - resistance conversion table when measuring resistance.

Thermistor temperature - resistance conversion table

Thermistor temperature	Sensor resistance	Thermistor temperature	Sensor resistance
-10°C or less	108kΩ or more	22°C	Approx. 23kΩ
-5°C	Approx. 85kΩ	24°C	Approx. 21kΩ
0°C	Approx. 66kΩ	26°C	Approx. 19kΩ
5°C	Approx. 51kΩ	28°C	Approx. 18kΩ
10°C	Approx. 40kΩ	30°C	Approx. 16kΩ
14°C	Approx. 33kΩ	35°C	Approx. 13kΩ
16°C	Approx. 30kΩ	40°C	Approx. 11kΩ
18°C	Approx. 27kΩ	50°C or more	7kΩ or less
20°C	Approx. 25kΩ		

If measured value deviates significantly from above values, thermistor is faulty.
Use tester to check resistance



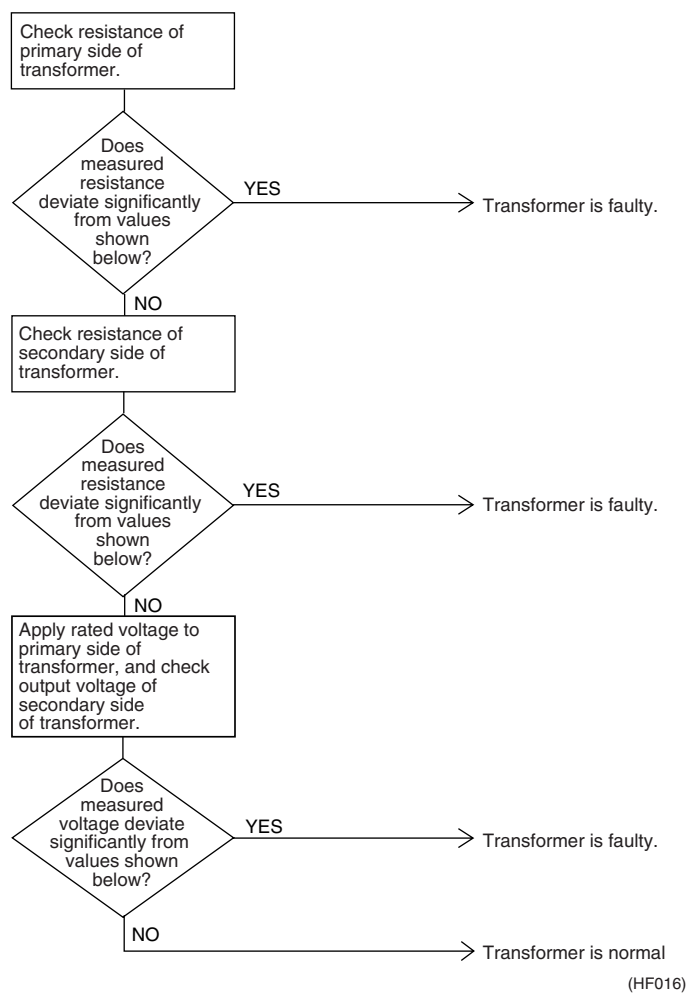
1.18 Power Transformer

Error Detection Method Check resistance and voltage with tester, and insulation resistance with megger.

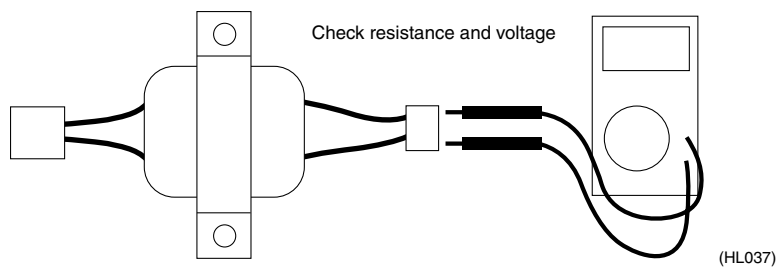
Error Generating Conditions

Possible Causes

Troubleshooting



- Resistance of primary side of transformer: approx. 140Ω
- Resistance of secondary side of transformer: approx. 1.9Ω
- Voltage at secondary side of transformer when rated voltage is applied to primary side: approx. 26 VAC
- Insulation resistance between primary side of transformer and case: 100 MΩ or higher
- Insulation resistance between secondary side of transformer and case: 100 MΩ or higher
- Insulation resistance between primary side and secondary side of transformer: 100 MΩ or higher



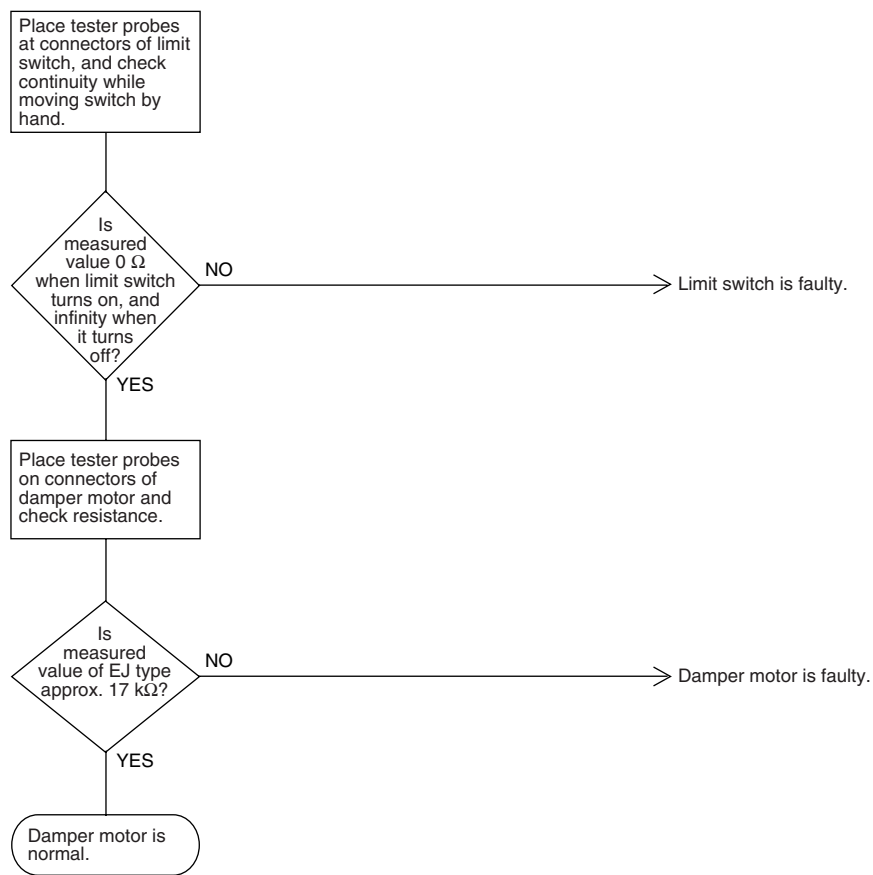
1.19 Damper Motor

Error Detection Method Check damper motor and limit switch when damper motor does not operate.

Error Generating Conditions

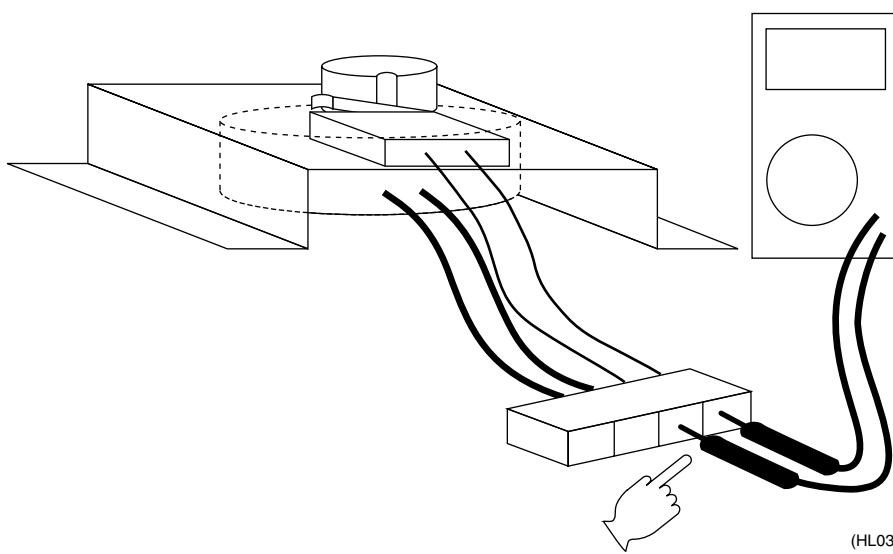
Possible Causes

Troubleshooting

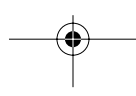
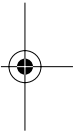
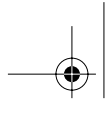


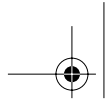
(HF017)

Check resistance and voltage — DAMPER MOTOR



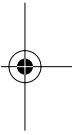
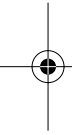
(HL038)

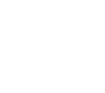
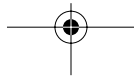
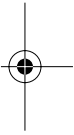
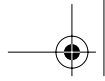




Part 7 Supplementary Explanation

1. Supplementary Explanation	53
1.1 Field Setting, Service Mode Operation.....	53



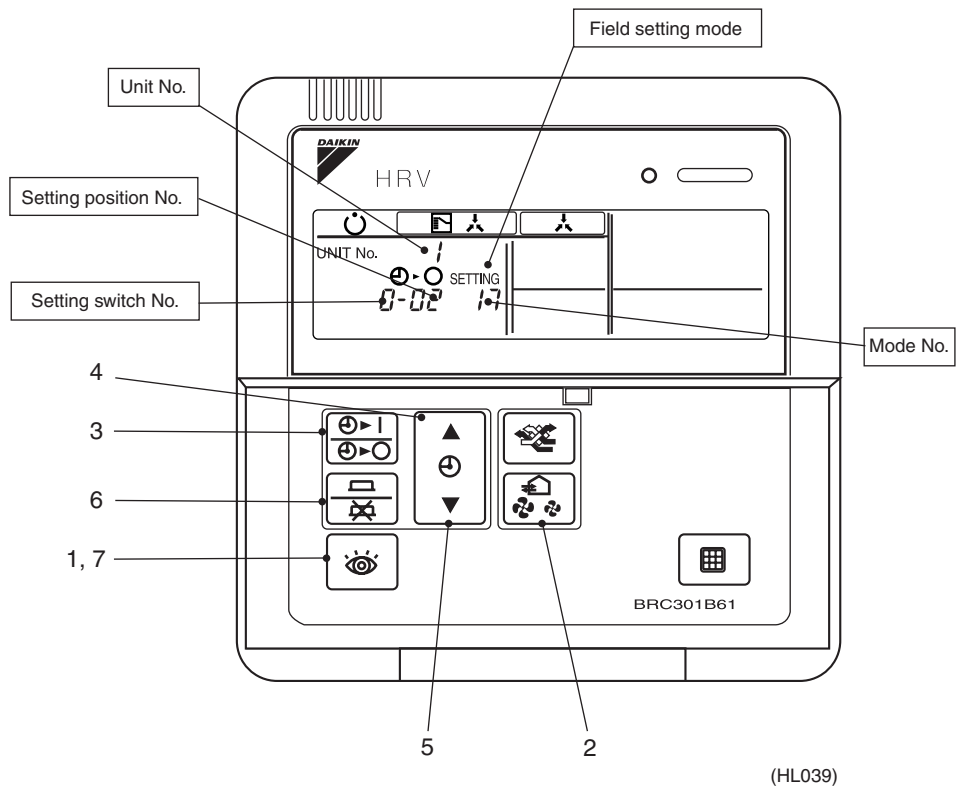


1. Supplementary Explanation









1.1 Field Setting, Service Mode Operation

1.1.1 Field Setting

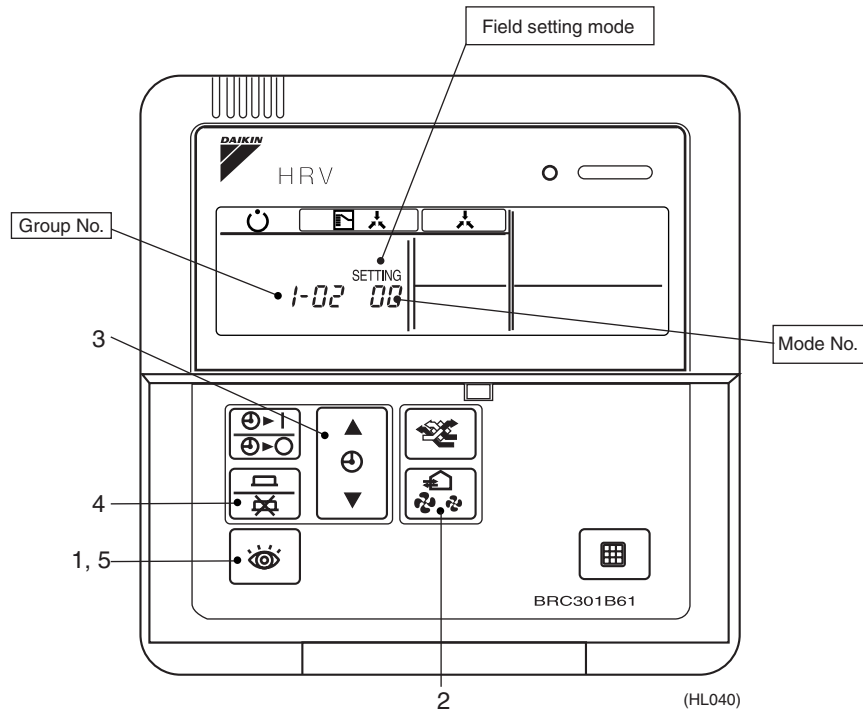
Initial setting (mode Nos. 17, 27, 18, 28)



(HL039)

Step 1	With equipment in normal mode, press the  button for more than 4 seconds to enter field setting mode.
Step 2	 Mode No.: UP ↔  Mode No.: DOWN Use [MODE] and [AIR VOLUME] to select desired mode No.
Step 3	To setting heat reclaim ventilation units by group, press  button and select desired unit No.
Step 4	Press  button to select desired setting switch No.
Step 5	Press  button to select desired setting position No.
Step 6	Press  button to enter settings.
Step 7	Press  button to return to normal mode.

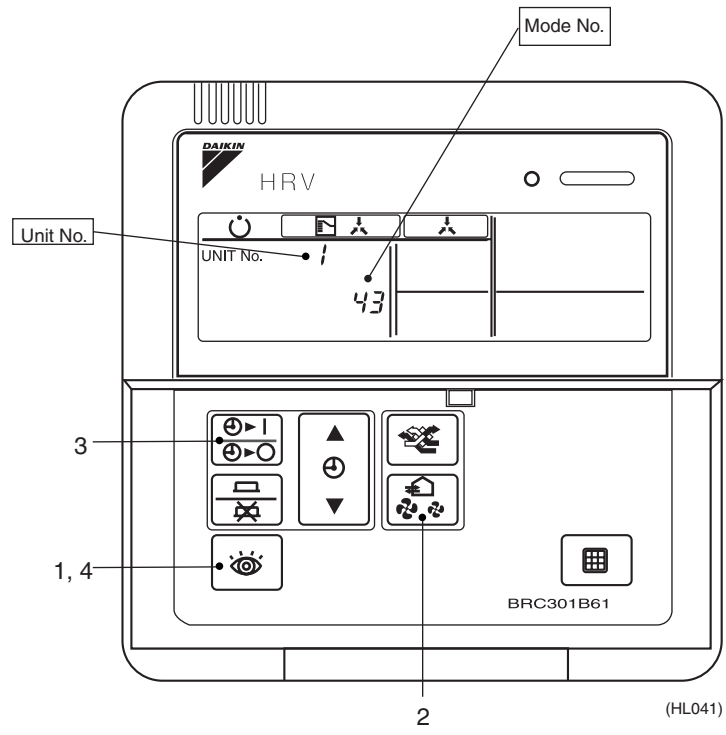
**Centralized control
group No. setting
(Mode No. 00)
Setting of
Individual No.
(Mode No. 30)**



Step 1	With equipment in normal mode, press the button for more than 4 seconds to enter field setting mode.
Step 2	Mode No.: UP \leftrightarrow Mode No.: DOWN Use [MODE] and [AIR VOLUME] to select mode No.00 (30).
Step 3	Press or button to select Group No.
Step 4	Press button once to enter settings.
Step 5	Press button to return to normal mode.

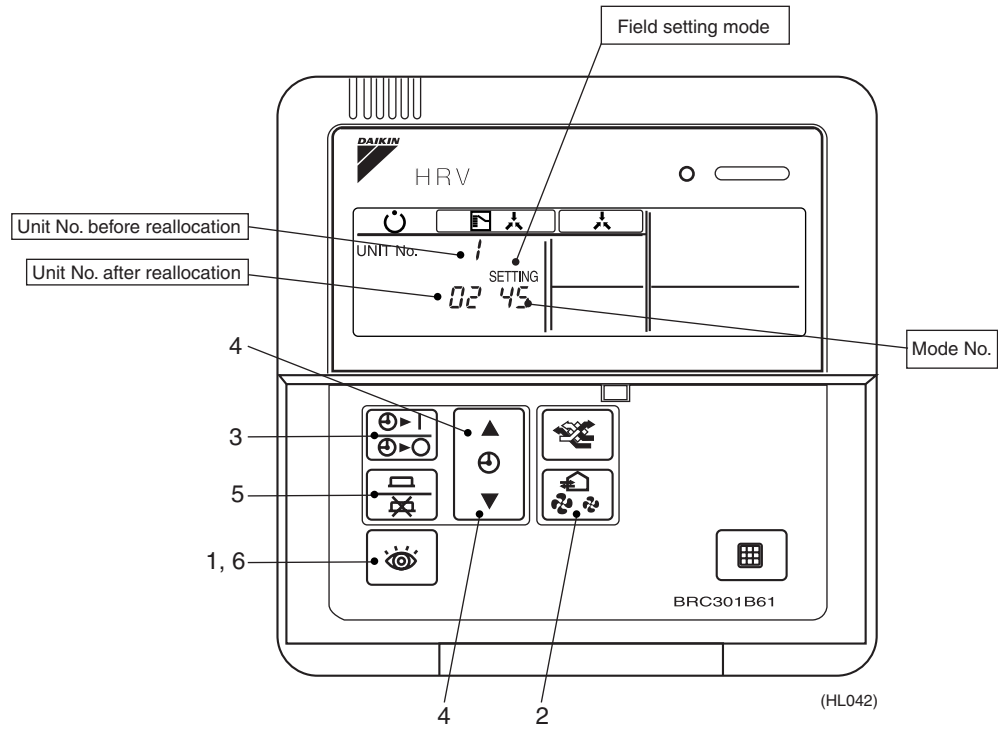
1.1.2 Service Mode Operation

Turn on the forced fan (Mode No.43)



Step 1	With equipment in field setting mode, press the button for more than 4 seconds to enter service mode.
Step 2	Mode No.: UP \leftrightarrow Mode No.: DOWN Use [MODE] and [AIR VOLUME] to select mode No.43.
Step 3	Use to select desired Unit No.
Step 4	Press button to return to normal mode.

**Unit No.
reallocation (Mode
No.45)**

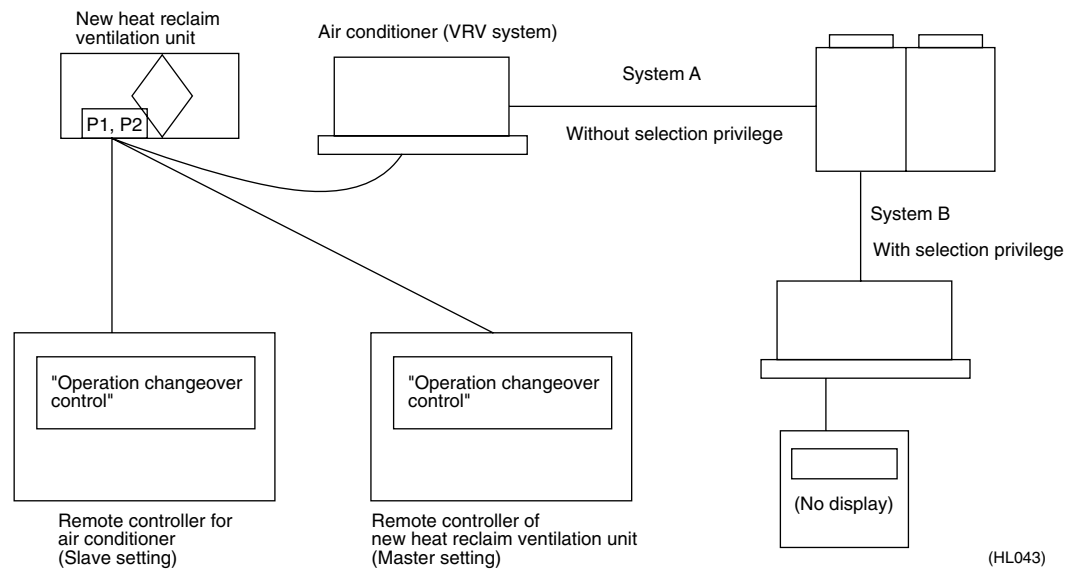


Step 1	With equipment in field setting mode, press the button for more than 4 seconds to enter service mode.
Step 2	Mode No.: UP \leftrightarrow Mode No.: DOWN Use [MODE] and [AIR VOLUME] to select mode No.45.
Step 3	Use to select setting Unit No.
Step 4	Press or button to select Unit No. after reallocation.
Step 5	Press button once to enter settings.
Step 6	Press button to return to normal mode.

1.1.3 Operation Changeover Control

For group control of systems containing heat reclaim ventilation units and air conditioners (VRV system), remote controllers of air conditioners are connected with remote controllers of new heat reclaim ventilation units. In such system, both remote controllers display "Operation changeover control" according to the ON/OFF of cooling/heating selection privilege.
The following diagram shows the display ON/OFF condition determined by the unit combination.

Example of "Operation changeover control" display



Display ON/OFF condition by connection type and cooling/heating selection privilege

Connection type	"Operation changeover control" display	
Heat reclaim ventilation unit only	No display	
Heat reclaim ventilation unit + Air conditioner (VRV system)	Cooling/heating selection privilege not set	Flashing (Note 1)
	Cooling/heating selection privilege ON	No display
	Cooling/heating selection privilege OFF	Display



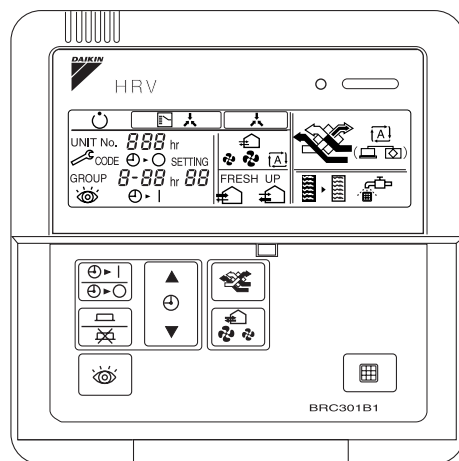
Note:

Note 1:

Only master remote controller can display flashing "Operation changeover control" when cooling/heating selection privilege is not set.

1.1.4 Field Setting

The following shows the procedure for field setting using remote controller of new heat reclaim ventilation unit.



(HL044)

List of field setting mode Nos.

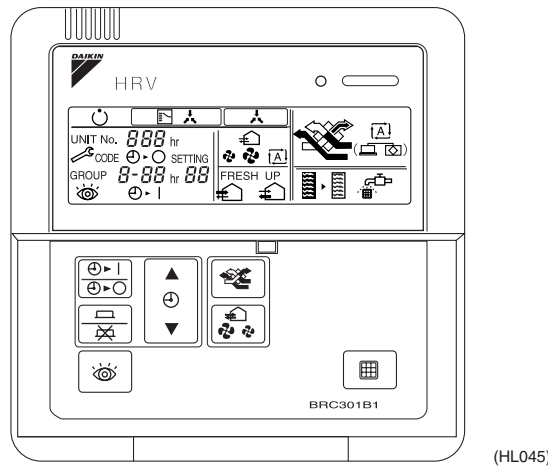
Centralized control group No. setting	00
General setting	10-29
Centralized control group No. setting (group)	30
Error recode display	40
Sensor data	41
Forced fan ON	43
Individual setting	44
Unit No. reallocation	45

Step 1	To field setting mode	Press for more than 4 sec.
Step 2	Mode No. selection 1	[Mode (00-30)] → [Mode (40-49)] → [Mode (50-59)] (Press for more than 4 sec.) (Press for more than 4 sec.)
Step 3	Mode No. selection 2	Mode No.: UP ↔ Mode No.: DOWN
Step 4	Switch No. selection	(▲) Switch No. selection
Step 5	Position selection	(▼) Position selection
Step 6	Position enter	Enters currently selected position.
Step 7	To normal mode	Exits field setting mode and enters normal mode.

In group control, use to select unit No.

1.1.5 LCD and Operation Panel (Reference Information)

The following shows the operation panel and LCD of remote controller of new heat reclaim ventilation unit.



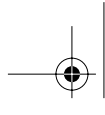
(HL045)

LCD

LCD is equipped with a new function that graphically displays currently selected ventilation mode, as shown below.

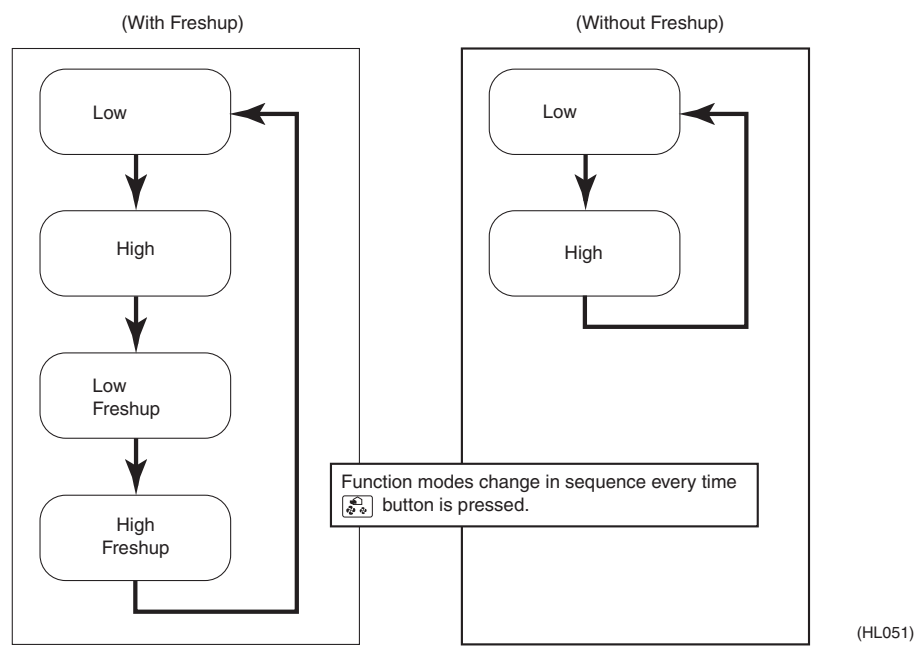
(Ventilation mode: Auto)	Total heat exchange ventilation mode	(HL046)
	Normal ventilation mode	(HL047)
	Display OFF in automatic ventilation mode	(HL048)
(Ventilation mode: Total heat exchange)		(HL049)
(Ventilation mode: Normal)	Normal ventilation mode	(HL050)

Display can be turned off using field setting 19 (29) - 7.



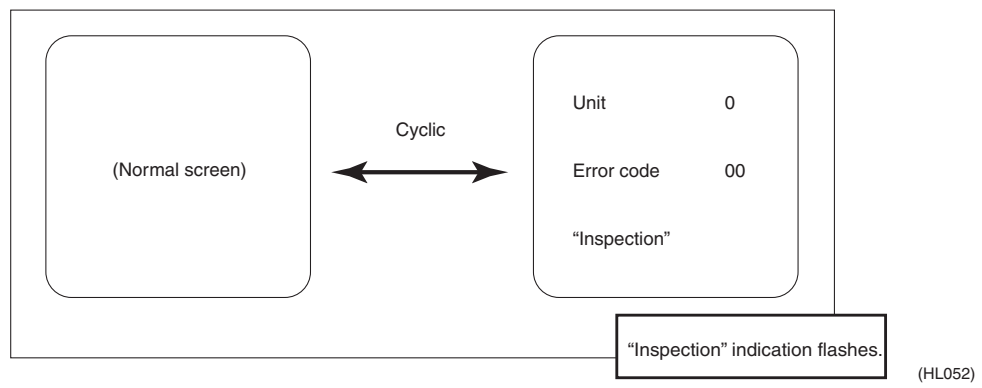
1.1.6 Ventilation Volume (Freshup)

Ventilation volume (Freshup) setting changes as follows.



Inspection








Inspection operation is shown below.



1.1.7 Field Setting



(Example of setting operation)

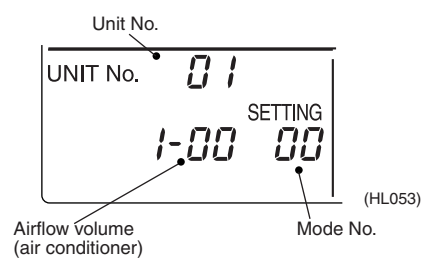
Centralized control group No. setting (mode No.: 00)

1. Press  for more than 4 seconds.
2. Set mode No. to "00" using  or .
3. Set centralized control group No. using  [▲] or  [▼].
4. Enter displayed group No. by pressing .
5. Press  to return to normal operation mode.

Centralized control group No. setting (mode No.: 30)

For group control, the following step must be performed.

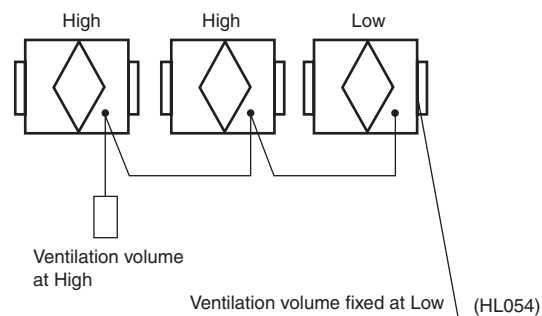
- (*) Set unit No. using  .











Procedure for entering individual settings (mode No.: 44)

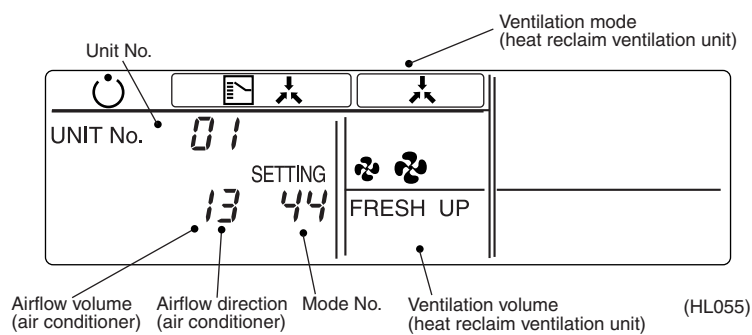
- The setting is generally the same for all units in the same group control system. However, the setting of selected units can be fixed by the following method.

< Example >



This setting method can be used when a group control system is connected with units having a different airflow capacity from other units in the system.

1. Press  for more than 4 seconds.
2. Set mode No. to "44" using  or .
3. Set unit No. using  .
4. Set airflow volume (ventilation mode) using  [▲].
5. Set airflow direction (ventilation volume) using  [▼].
6. Enter settings by pressing .



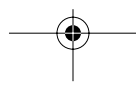
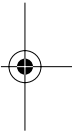
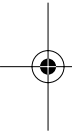


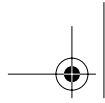
Supplementary Explanation

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Individual Settings

Heat Reclaim Ventilation Unit		Air Conditioner			
Ventilation Volume	Ventilation Mode	Airflow Volume		Airflow Direction	
As indicated by LCD	As indicated by LCD	Low	1	P0	0
				~	~
		High	3	P4	4
				Swing	5

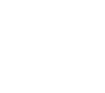
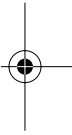


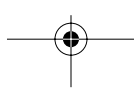
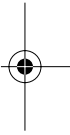
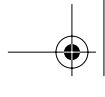


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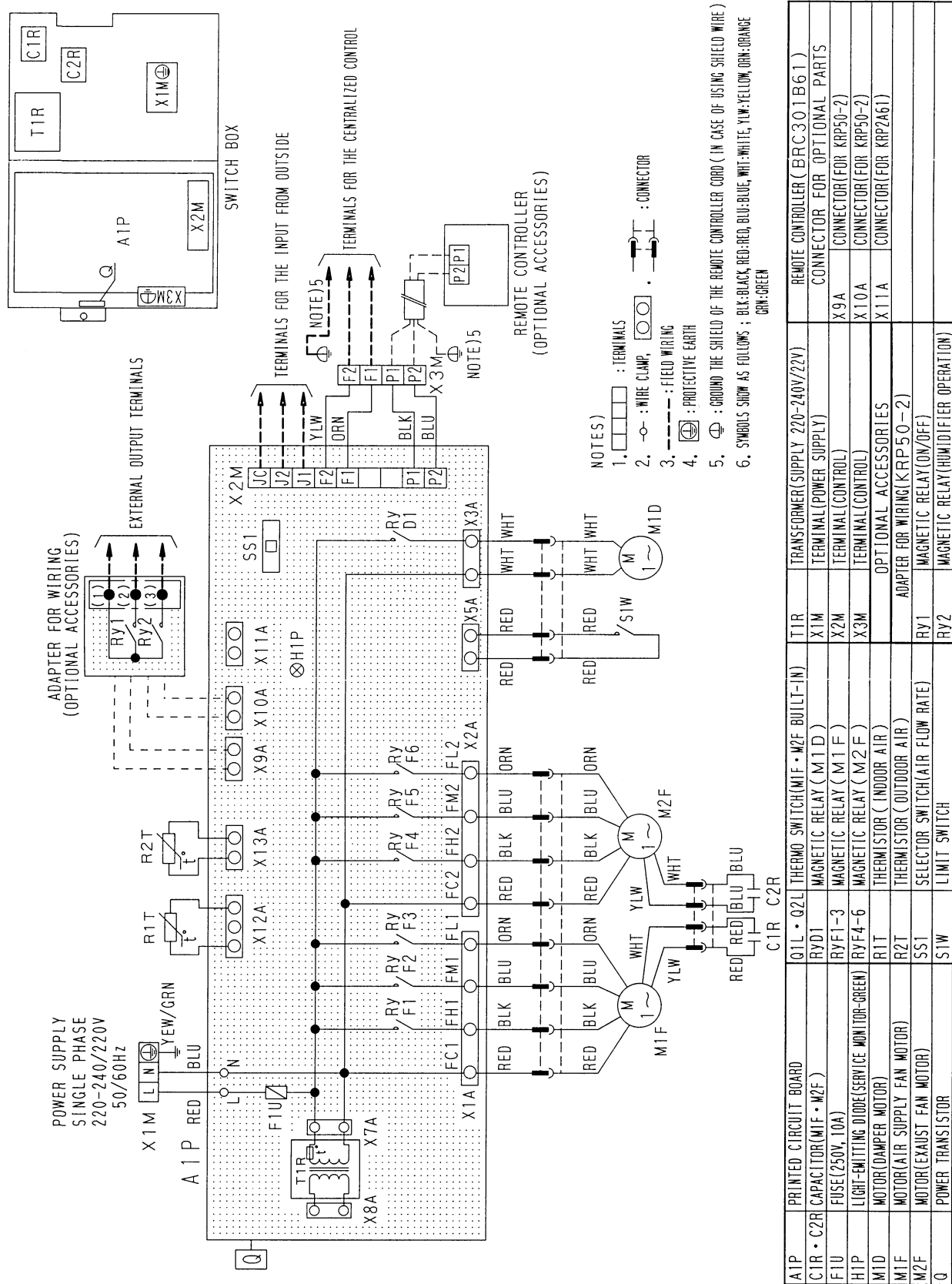




1. Appendix

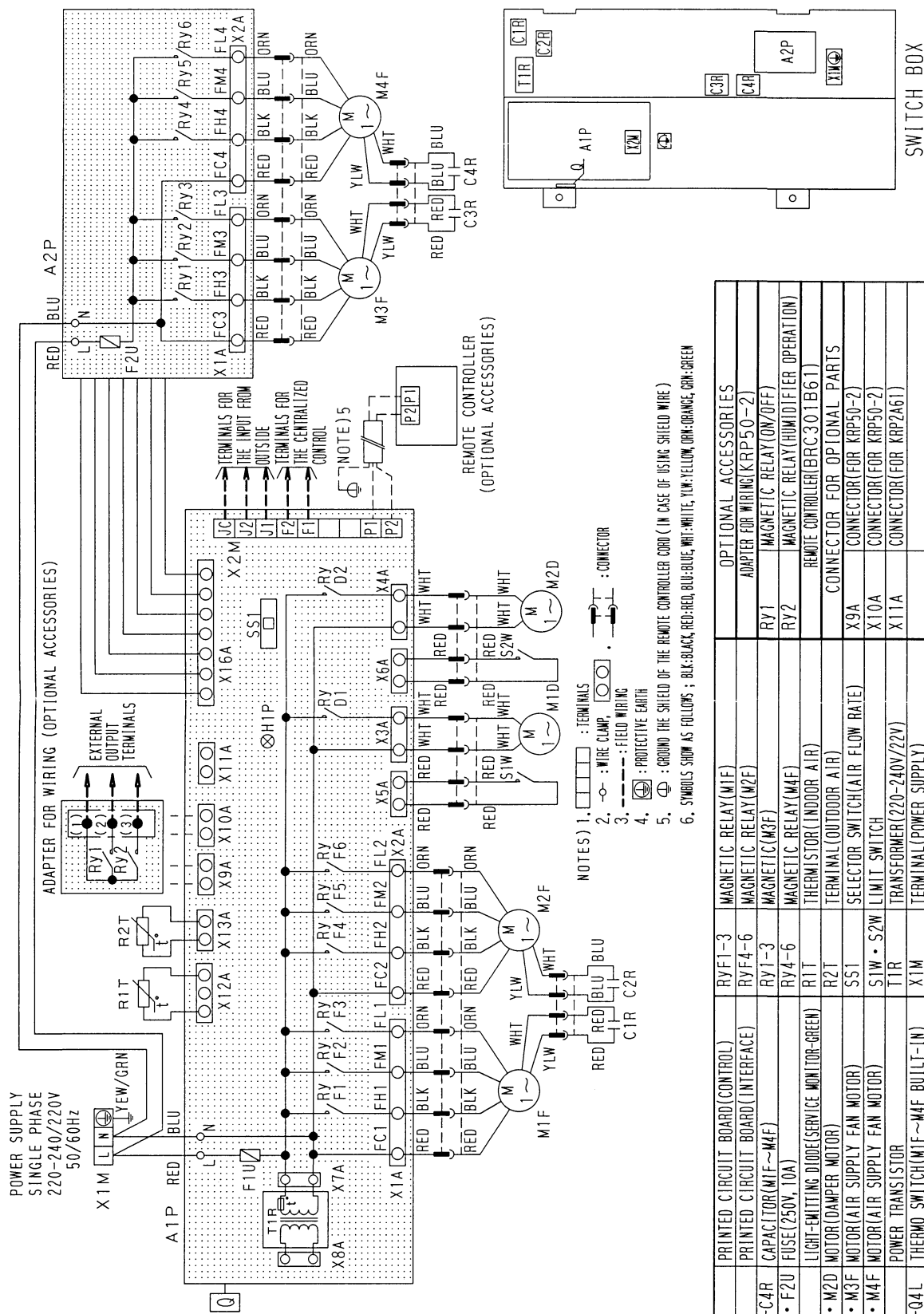
1.1 Wiring Diagram

VAM500EJVE / VAM800EJVE / VAM1000EJVE



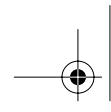
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VAM2000EJVE



Component	Symbol	Component	Symbol
A1P	PRINTED CIRCUIT BOARD (CONTROL)	RVF1-3	MAGNETIC RELAY (M1F)
A2P	PRINTED CIRCUIT BOARD (INTERFACE)	RVF4-6	MAGNETIC RELAY (M2F)
C1R-C4R	CAPACITOR (M1F~M4F)	RV1-3	MAGNETIC RELAY (ON/OFF)
F1U • F2U	FUSE (250V, 10A)	RV4-6	MAGNETIC RELAY (HUMIDIFIER OPERATION)
H1P	LIGHT-EMITTING DIODE (SERVICE MONITOR-GREEN)	R1T	THERMISTOR (INDOOR AIR)
M1F • M2D	MOTOR (DAMPER MOTOR)	R2T	THERMISTOR (OUTDOOR AIR)
M1F • M3F	MOTOR (AIR SUPPLY FAN MOTOR)	SS1	SELECTOR SWITCH (AIR FLOW RATE)
M2F • M4F	MOTOR (AIR SUPPLY FAN MOTOR)	S1W • S2W	LIMIT SWITCH
Q	POWER TRANSISTOR	T1R	TRANSFORMER (220-240V/22V)
Q1L-Q4L	THERMO SWITCH (M1F~M4F BUILT-IN)	X1M	TERMINAL (POWER SUPPLY)
RYD1	MAGNETIC RELAY (M1D)	X2M	TERMINAL (CONTROL)
RYD2	MAGNETIC RELAY (M2D)		

3D012423



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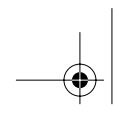
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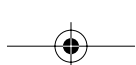
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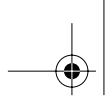
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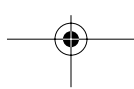
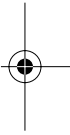
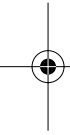


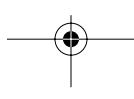
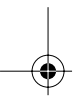
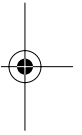
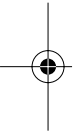
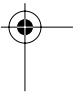
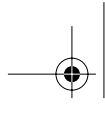
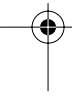
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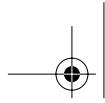
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