

SERVICE MANUAL

Mini VRF System





Model No.

Outdoor Unit			
Class	4HP	5HP	6HP
Model Name	U-4LE1E5 U-4LE1E8	U-5LE1E5 U-5LE1E8	U-6LE1E5 U-6LE1E8

HP = horsepower

Indoor Unit

	Class	22	28	36	45	56	73	90	106	140	160
U1	4-Way Cassette	S-22MU1E5	S-28MU1E5	S-36MU1E5	S-45MU1E5	S-56MU1E5	S-73MU1E5		S-106MU1E5	S-140MU1E5	S-160MU1E5
Y1	4-Way Cassette 60×60	S-22MY1E5	S-28MY1E5	S-36MY1E5	S-45MY1E5	S-56MY1E5					
L1	2-Way Cassette	S-22ML1E5	S-28ML1E5	S-36ML1E5	S-45ML1E5	S-56ML1E5	S-73ML1E5				
D1	1-Way Cassette		S-28MD1E5	S-36MD1E5	S-45MD1E5	S-56MD1E5	S-73MD1E5				
F1	Low Silhouette Ducted	S-22MF1E5	S-28MF1E5	S-36MF1E5	S-45MF1E5	S-56MF1E5	S-73MF1E5	S-90MF1E5	S-106MF1E5	S-140MF1E5	S-160MF1E5
M1	Slim Low Static Ducted	S-22MM1E5	S-28MM1E5	S-36MM1E5	S-45MM1E5	S-56MM1E5					
T1	Ceiling			S-36MT1E5	S-45MT1E5	S-56MT1E5	S-73MT1E5		S-106MT1E5	S-140MT1E5	
K1	Wall Mounted	S-22MK1E5	S-28MK1E5	S-36MK1E5	S-45MK1E5	S-56MK1E5	S-73MK1E5		S-106MK1E5		
R1	Concealed Floor Standing	S-22MR1E5	S-28MR1E5	S-36MR1E5	S-45MR1E5	S-56MR1E5	S-71MR1E5				
P1	Floor Standing	S-22MP1E5	S-28MP1E5	S-36MP1E5	S-45MP1E5	S-56MP1E5	S-71MP1E5				
E1	High Static Pressure Ducted						S-73ME1E5		S-106ME1E5	S-140ME1E5	

IMPORTANT! Please Read Before Starting

This air conditioner must be installed by the sales dealer or installer.

This information is provided for use only by authorized persons.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This air conditioner shall be installed in accordance with National Wiring Regulations.
- This product is intended for professional use. Permission from the power supplier is required when installing the U-4LE1E8, U-5LE1E8, U-6LE1E8, outdoor units that are connected to a 16 A distribution network.
- This equipment complies with EN/IEC 61000-3-12 provided that the short-circuit power Ssc is greater than or equal to the following table at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power Ssc greater than or equal to the value in the table.

	U-4LE1E5	U-5LE1E5	U-6LE1E5
Ssc	350 kVA	400 kVA	550 kVA

• This equipment complies with EN/IEC 61000-3-11 provided that the system impedance Zmax is less than or equal to the values corresponding to each model as shown in the table below at the interface point between the user's supply and the public system. Consult with the supply authority for the system impedance Zmax.

	U-4LE1E5	U-5LE1E5	U-6LE1E5
Zmax	0.298 Ω	0.298 Ω	0.298 Ω

 Pay close attention to all warning and caution notices given in this manual.



This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

WARNING When Wiring



ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system.

Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death.**

- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Provide a power outlet to be used exclusively for each unit.
- ELCB must be incorporated in the fixed wiring. Circuit breaker must be incorporated in the fixed wiring in accordance with the wiring regulations.

	U-4LE1E5	U-5LE1E5	U-6LE1E5
Circuit breaker	30 A	40 A	40 A
	U-4LE1E8	U-5LE1E8	U-6LE1E8
Circuit breaker	20 A	20 A	20 A

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.



Keep the fire alarm and the air outlet at least 1.5 m away from the unit.

... In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems) Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing



- When performing piping work do not mix air except for specified refrigerant (R410A) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.
- Refrigerant gas leakage may cause fire.
- Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury etc.
- Ventilate the room well, in the event that is refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of poisonous gas.
- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.
- Do not leak refrigerant while piping work for an installation or re-installation, and while repairing refrigeration parts.

Handle liquid refrigerant carefully as it may cause frostbite.

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.



- Do not clean inside the indoor and outdoor units by users. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact to the sales dealer or service dealer for a repair.



Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.

- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

Others



- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Do not sit or step on the unit, you may fall down accidentally.

 Do not stick any object into the FAN CASE.
 You may be injured and the unit may be damaged.

Check of Density Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its density will not exceed a set limit.

The refrigerant (R410A), which is used in the air conditioner, is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws imposed to protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of refrigerant is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power, etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared to conventional individual air conditioners. If a single unit of the multi air conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its density does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

In a room where the density may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device. The density is as given below.

Total amount of refrigerant (kg)

Min. volume of the indoor unit installed room (m^3) \leq Density limit (kg/m^3)

The density limit of refrigerant which is used in multi air conditioners is 0.3 $\mbox{kg/m}^3$ (ISO 5149).

NOTE

1. If there are 2 or more refrigerating systems in a single refrigerating device, the amount of refrigerant should be as charged in each independent device.

For the amount of charge in this example:



The possible amount of leaked refrigerant gas in rooms A, B and C is 10 kg.

The possible amount of leaked refrigerant gas in rooms D, E and F is 15 kg.



- 2. The standards for minimum room volume are as follows.
- (1) No partition (shaded portion)



(2) When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).



(3) If an indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest room of course becomes the object. But when mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.



Mechanical ventilation device - Gas leak detector

 The minimum indoor floor space compared with the amount of refrigerant is roughly as follows: (When the ceiling is 2.7 m high)



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1. CONTROL FUNCTIONS

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1. Introduction

OUTDOOR UNIT

Mini VRF SYSTEM is a multi system that is connected to a single outdoor unit. The outdoor unit contains an inverter compressor.

To operate this system, the below settings must be made at the time of the test run.

Table 1-1

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Setting item	At shipment from factory	Settable range
System address	1	System 1 – 30
No. of indoor units	1	1 – (9) units*

* Up to a maximum of 9 indoor units can be set, however the maximum number of units which can be connected is shown below for each outdoor unit capacity.

Table 1-2

	4HP	5HP	6HP
Maximum number of connected indoor units	6	8	9

Be sure to connect indoor units so that the resulting indoor-outdoor capacity ratio (total capacity of all indoor units compared with the outdoor unit capacity) is within the range of 50% - 130%.

2-1. Compressors Mounted on Outdoor Units

Capacity	Туре	4HP	5HP	6HP
Compressors mounted	Rotary		DC Inverter	

2-2. Compressor Stop Rules

After a compressor stops, it will not start again for a period of 3 minutes (3 minutes forced OFF). However, this does not apply to the Special Control described later, when operation of the compressor is forcibly stopped as part of a control operation.

2-3. Roadmap Control

- (1) The controls listed below are performed according to the pressure sensor attached to the outdoor unit and temperature thermistor attached to the indoor / outdoor unit heat exchanger.
 - * With roadmap control, the pressure detected by the pressure sensor is converted to saturation temperature before it is used. The temperature that has been converted to the saturation temperature is called the pressure sensor temperature.
- (2) This control is performed every 30 seconds.
- (3) In the evaporation temperature control and condensation temperature control shown in Figs. 1 and 2, the temperatures used to judge each area (A, AB, B, and C) may vary depending on the relationships among factors including the difference between the room temperature setting and the indoor unit air intake temperature (= air intake temperature difference) and the difference between the air discharge temperature setting and the air discharge temperature (= air discharge temperature (= air discharge temperature difference).
- (4) Definitions of the evaporation temperature and condensation temperature

Evaporation temperature (=Te)	:	Lowest temperature of the heat exchangers (E1, E3) in all indoor units.
Condensation temperature (=Tc)):	The value used for judgment in Cooling mode and Heating mode is different depending on the mode.
Cooling mode	:	The outdoor unit pressure sensor temperature or the outdoor unit heat exchanger liquid temperature, whichever temperature is higher.
Heating mode	:	The outdoor unit pressure sensor temperature or the indoor unit heat exchanger temperature (E1) when the heating thermostat is ON, whichever temperature is higher.

* The E3 temperature may indicate the temperature of superheated gas. Therefore it is not included for detection of the condensation temperature (=Tc).

2-3-1. Roadmap control in cooling mode

With this control, the below evaporation temperature control and condensation temperature control are both used. Control is performed according to the following order of priority:

Control order of priority Area C > Area B > Area A

Example: When Evaporation temperature control = Area A, and Condensation temperature control = Area C, then based on the above order or priority, the result is "Area C = Reduce horsepower."

Evaporation temperature (=Te) control



Fig. 1-1

(1) For indoor units that are operating in Cooling mode, if one unit is selected for a test run, then the air intake temperature difference (difference between the room temperature setting and indoor unit air intake temperature) is ignored, and areas B and C are considered to be area A for control purposes. (This is used for additional refrigerant charging, test run checks, etc.)

For this reason, vapor may be discharged if the test run continues for a long period of time, however this does not indicate a problem. In addition, the test run is canceled automatically after 1 hour.

- (2) Even within the same area, the compressor capacity varies depending on the refrigerant temperature.
- (3) For 6 minutes after the compressors start, area C is considered to be area B for control purposes.
- (4) During special control, control of the compressor capacity according to Te is not performed.

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- (5) If the thermostat turns OFF while Te is within area C, the next time the compressor starts it may restart from a lower capacity.
- (6) When the area changes to area C, area C is considered to be area B for control purposes for the first 6 minutes, even if the horsepower is the minimum value within the range where capacity control is possible (operation with inverter frequency of 25 Hz only). Subsequently if C area continues, the thermostat turns OFF.

Condensation temperature (=Tc) control

57.5°C	Thermostat OFF	(Area D)
57.4°C		
	Horsepower decrease	(Area C)
54.6°C		
54.5°C		
	Horsepower increase prohibited	(Area B)
53.5°C		
53.4°C	Horsepower increase permitted	(Area A)

Fig. 1-2

2-3-2. Roadmap control in heating mode

Roadmap control is performed using the below condensation temperature control.

Condensation temperature (=Tc) control



Fig. 1-3

- (1) For indoor units that are operating in Heating mode, if one unit is selected for a test run, the air intake temperature difference is ignored;however, Tc control is performed according to Fig.1-3 in order to prevent excessive load.(This is used for test run checks, etc.)
- (2) Even within the same area, the compressor capacity varies depending on the refrigerant temperature.
- (3) If the condensation temperature (Tc) enters area D and the thermostat turns OFF, the next time the compressor starts it may restart from a lower capacity.
- (4) When the area changes to area C, area C is considered to be area B for control purposes for the first 6 minutes, even if the horsepower is the minimum value within the range where capacity control is possible (operation with inverter frequency of 25 Hz only).Subsequently if C area continues, the thermostat turns OFF.

2-3-3. Protection control

Protection control consists of 2 types of protection:compressor air discharge temperature protection and current protection. The limit values from this protection control are incorporated into the output compressor capacity increase/decrease values that were calculated from roadmap control.

- * In some cases, the control shown below may stop the compressor, issue an alarm, or reduce the compressor capacity.
- (1) Air discharge temperature protection

The compressor capacity is limited by using the air discharge temperature of the operating compressor (as shown in the tables below).

(Air discharge temperature level: Highest level among the air discharge temperature levels of all compressors)

Air discharge temperature level	Horsepower (hp) limits
105	+2 hp down
104	+1 hp down
102	+0.5 hp down
99 – Less than 102	Hp increase prohibited
96 – Less than 99	Hp increase permitted (slowly)
Less than 96	No restriction

The values shown in the table above are reduced to the values calculated by roadmap control.

(2) Primary Current Protection

The primary current protection value is divided into the cooling and heating mode. Also, the cooling of single-phase outdoor unit can be divided into two tables according to the outdoor air temperature. 3-phase outdoor unit has no distinction for outdoor air temperature.

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Concept view of outdoor air temperature

<Cooling>

Single-phase Model

When outdoor air temperature increases :

Outdoor air temperature: 43.0°C	7	Section of outdoor air temp. Cooling at Table 2
	7	Cooling at Table 1

Table 1

Table 1	unit :	Amp. hp:	horse power
	4 hp	5 hp	6 hp
Stop*1	22.0~	25.0~	28.0~
Down*2	20.0~22.0	23.0~25.0	26.0~28.0
Not up*3	19.0~20.0	22.0~23.0	25.0~26.0
Followed by normal control	~19.0	~22.0	~25.0

3-phase Model	unit :	Amp. hp:	horse power
	4 hp	5 hp	6 hp
Stop*1	10.5~	12.0~	14.0~
Down*2	8.5~10.5	10.0~12.0	12.0~14.0
Not up*3	7.5~8.5	9.0~10.0	11.0~12.0
Followed by normal control	~7.5	~9.0	~11.0

When outdoor air temperature decreases :



Table 2

unit : Amp.	hp : horse power
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	4 hp	5 hp	6 hp
Stop*1	22.0~	25.0~	28.0~
Down*2	20.0~22.0	23.0~25.0	24.0~28.0
Not up*3	19.0~20.0	22.0~23.0	23.0~24.0
Followed by normal control	~19.0	~22.0	~23.0

<Heating>

Regardless of the outdoor air temperature, the value of the primary current protection is controlled by the contents of the table listed below.

unit : Amn hn : horao nowor

hn : haraa nawa

Single-phase Model

	unit.	Amp. np. i	ioise power
	4 hp	5 hp	6 hp
Stop*1	23.0~	26.5~	30.0~
Down*2	21.0~23.0	24.5~26.5	28.0~30.0
Not up*3	20.0~21.0	23.5~24.5	27.0~28.0
Followed by normal control	~20.0	~23.5	~27.0

3-phase Model

	unit.	Amp. np. i	loise power
	4 hp	5 hp	6 hp
Stop*1	10.5~	12.0~	14.0~
Down*2	8.5~10.5	10.0~12.0	12.0~14.0
Not up*3	7.5~8.5	9.0~10.0	11.0~12.0
Followed by normal control	~7.5	~9.0	~11.0

NOTE

- Each value shown in the table indicates the detected value.
- When the detected value is detected as shown in the table :
- *1 Stop the compressor.
- *2 Decrease the frequency that the compressor is controlled.
- *3 Do not increase the frequency that the compressor is controlled.

(3) Secondary Current Protection (Common to cooling & heating mode)

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Single-phase Model unit : Amp. hp : horse power

	Common to 4/5/6 hp
Stop*1	24.0~
Down*2	21.0~24.0
Not up*3	20.0~21.0
Followed by normal control	~20.0

3-phase Model unit : Amp. hp : horse power

	Common to 4/5/6 hp
Stop*1	18.0~
Down*2	15.0~18.0
Not up*3	14.0~15.0
Followed by normal control	~14.0

NOTE

- · Each value shown in the table indicates the detected value.
- · When the detected value is detected as shown in the table : *1 Stop the compressor.
 - *2 Decrease the frequency that the compressor is controlled.
 - *3 Do not increase the frequency that the compressor is controlled.

3. Special Controls

In addition to ordinary heating and cooling operation, this system also includes the following 4 types of special controls for control of the system as a whole:

- 3-1. Oil discharge prevention device control
- 3-2. Reverse cycle start control
- 3-3. Inter systems refrigerant oil recovery control
- 3-4. Reverse cycle defrost control

3-1. Oil discharge prevention device control

Perform an oil discharge prevention control when starting from the stop mode.

- When starting the operation after a long hour-stop mode under a low outdoor air temperature, control the oil discharge prevention without rapidly increasing the compressor's frequency to avoid draining the condensed refrigerant together with oil until the overheating inside the compressor is decreased.
- In order to judge as to whether the compressor is to be started when in a high temperature state, a starting pattern will be changed according to the discharge temperature.
- (1) Control in the Cooling Mode

(1-1) Discharge temperature: less than 30°C

Control hour		Min. 1 minute 30 seconds to Max. 12 minutes. (Discharge degree-of-overheating: Td* ¹ - HPT* ² ≥10K* ³)
Outdoor unit	Compressor	Frequency 44Hz (Max. 3 minutes) -> 54Hz
Indoor unit	Fan	Preset wind speed or fixture setting to "Lo" by indoor unit control system
	Elec. cont. valve*4	All indoor units' elec. cont. valve are fixed to a certain pulse according to the capacity.

Control hour		Min. 1 minute to Max. 5 minutes (Discharge degree-of-overheating: Td-HPT≥10K)
Outdoor unit	Compressor	Frequency 22Hz
Indoor unit	Fan	Preset wind speed or fixture setting to "Lo" by indoor unit control system
Elec. cont. valve* ⁴		All indoor units' elec. cont. valve are fixed to a certain pulse according to the capacity.

(1-2) Discharge temperature: over 30°C

NOTE

- *1 Td: Discharge temperature
- *2 HPT: High pressure saturated temperature
- *3 K: Difference in temperature (1K=1°C)
- *4 Elec. cont. valve: Electronic control valve

(2) Control in the Heating Mode

(2-1) Discharge temperature: less than 30°C

Control hour		Min. 2 minutes 30 seconds to Max. 23 minutes (Discharge degree-of-overheating: Td* ¹ - HPT* ² ≥12 K* ³)
Outdoor unit	Compressor	Frequency 54Hz
	Elec. cont. valve*4	250pulse (Max. 3 minutes)> 480pulse (Max. 17 minutes)> 300pulse (Max. 3 minutes)
Indoor unit	Fan	Preset wind speed or fixture setting to "Stop" by indoor unit control system
	Elec. cont. valve*4	480pulse

(2-2) Discharge temperature: over 30°C

Control hour		Min. 1 minute to Max. 6 minutes (Discharge degree-of-overheating: Td-HPT≥12 K)	
Outdoor unit	Compressor	Frequency 22Hz	
	Elec. cont. valve*4	A certain pulse calculated by the outdoor air temperature and total load of indoor unit	
Indoor unit	Fan	Preset wind speed or fixture setting to "Stop" by indoor unit control system	
	Elec. cont. valve*4	80pulse	

NOTE

- *1 Td: Discharge temperature
- *2 HPT: High pressure saturated temperature
- *3 K: Difference in temperature (1K=1°C)
- *4 Elec. cont. valve: Electronic control valve

3-2. Reverse Cycle Start Control

Reverse cycle start control is performed under the following conditions:

- The outdoor unit starts in Heating mode after microcomputer initialization when the power was turned ON.
- The outdoor unit starts in Heating mode after it was stopped for 1 hour or longer.

When the outdoor unit starts in Heating mode after having been stopped for a long period of time, this control first operates the unit in Cooling mode to return refrigerant from the outdoor unit heat exchanger to the liquid tubing. This prevents back-flow of the refrigerant liquid which had accumulated in the outdoor unit heat exchanger.

Control time		1 minute	
Outdoor units		Operates at a compressor frequency of 46 Hz.	
Indoor	Electronic control valve	All indoor units operate at a fixed pulse according to the indoor unit capacity.	
units	Fan	The fan operates at the set fan speed, is stopped, or operates at "Lo" fan speed, according to the operation mode of the indoor unit.	

3-3. Inter Systems Refrigerant Oil Recovery Control

3-3-1. Inter systems refrigerant oil recovery cycle

In both indoor unit Cooling mode and Heating mode, this control is performed in the cooling cycle after a certain amount of time has passed.

3-3-2. Start of inter systems refrigerant oil recovery control

This control is performed periodically after the total compressor operating time exceeds 150 minutes.

3-3-3. Flow of inter systems refrigerant oil recovery control

(1) Simplified flow of inter systems refrigerant oil recovery control

Inter systems refrigerant oil recovery control follows this flow process:

Normal operation	ightarrow 1-minute stop	$ \rightarrow \begin{array}{c} \text{Inter systems refrigerant oil} \\ \text{recovery control (3-minute)} \end{array} \rightarrow \begin{array}{c} \text{1-minute} \\ \text{stop} \end{array} \rightarrow \begin{array}{c} \text{Normal} \\ \text{operation} \end{array} $		
Control time		3 minutes (stops once before and after control)		
Outdoor units		Operates at a compressor frequency of 65 Hz. However depending on the operating conditions, the frequency may be lower than this value.		
Indoor	Electronic control valve	All indoor units operate at a fixed pulse according to the indoor unit capacity.		
units	Fan	The fan operates at the set fan speed, is stopped, or operates at "Lo" fan speed, according to the operation mode of the indoor unit.		

3-4. Reverse cycle Defrost Control

3-4-1. Defrost control method

Defrost with this system is done by reverse cycle defrost.

3-4-2. Conditions for start of defrost

Defrost control is started when the "frost detection" conditions are met, and the "defrost mask time" has elapsed.

1

3-4-3. Frost detection

- (a) Frost is not detected at the outdoor unit heat exchanger for 5 minutes after operation starts.
- (b) Frost is detected when either Condition 1 or 2 below is met.



3-4-4.Defrost mask time

The next defrost operation will not start until the defrost mask time (= 35 minutes) has elapsed following the previous defrost operation.

* While defrost control is in effect, if all indoor units stop, or if the outdoor unit is restarted after it was stopped for protective control or a similar reason, then defrost control may start again after a minimum of 10 minutes.

3-4-5.General flow of reverse cycle defrost

(1) General flow of reverse cycle defrost control

Reverse cycle defrost control follows this flow process:

Normal operation	ightarrow 1 minute stop	$ \rightarrow \begin{array}{c} \text{Reverse cycle defrost} \\ \text{control (Max. 12 minutes)} \end{array} \rightarrow \begin{array}{c} 1 \text{ minute} \\ \text{stop} \end{array} \rightarrow \begin{array}{c} \text{Normal} \\ \text{operation} \end{array} $		
Control time		Max. 12 minutes (stops once before and after control)		
Outdoor units		Operates at a compressor frequency of 75 Hz. The outdoor fan stops.		
Indoor	Electronic control valve	All indoor units operate at a fixed pulse according to the indoor unit capacity.		
units	Fan	The fan stops.		

3-4-6.Defrost end judgment conditions

Defrost ends when the below defrost end conditions are met.

- Condition 1: Defrost end judgment occurs when the temperature at the temperature sensor installed on the outdoor heat exchanger is 10°C or higher (or has been 6°C or higher continuously for 1 minute).
- Condition 2: When the maximum defrost time shown in the table above has elapsed, defrost end judgment occurs.

4. Other Control

5. Operation of Solenoid Valves

6. Outdoor Unit Electronic Control Valve (Motor Valve) control [MOV1]

4. Other Control

4-1. Indoor Unit Self-Separator Oil Recovery Control

Refer to the indoor unit special control item.

5. Operation of Solenoid Valves

5-1. 4-way Valve Control

- (1) OFF conditions
 - At Cooling mode
 - Special control (reverse cycle start control, inter systems refrigerant oil recovery control, reverse cycle defrost control) is in effect.
- (2) ON conditions
 - At Heating mode

6. Outdoor Unit Electronic Control Valve (Motor Valve) Control [MOV1]

6-1. Power Initialization

The valve position is 480 pulses if the indoor unit has not started once after the power was turned ON.

Operation of the electronic control valve during normal unit operation

Indoor Unit	Heat exchanger status	MOV1 position (pulses)	Remarks
Cooling	Condenser	480	Maximum flow control
operation	Stop	480	-
Heating operation	Evaporator	65 – Less than 480	SH (super heat) control
	Stop	0	_

* SH control controls the difference between outdoor heat exchanger liquid temperature and suction temperature to $1 - 5^{\circ}$ C.

7-1. Outdoor Fan (Min.Fan Mode and Max.Fan Mode)

These outdoor units utilize a DC fan motor that can be controlled using a maximum of 15 increments (15 fan modes).

Outdoor unit	Min. fan mode	Max. fan mode	
Cooling operation	Outdoor air temp. > 36°C: 3 Outdoor air temp. ≤ 36°C: 1	4 hp 14	5, 6 hp 14
Heating operation	1	13	14

7-2. Fixed Initial Fan Mode

For the first 30 seconds after operation starts, the mode is fixed at the initial mode that was calculated based on the relationship between the outdoor air temperature and the outdoor unit horsepower.

If the outdoor unit horsepower changes dramatically, the initial mode may be recalculated and may be again fixed for 30 seconds.

7-3. Operation after initial fan mode is fixed

After the fixed initial fan mode, the fan mode is increased or decreased according to the operating conditions.

- (1) Indoor cooling operation
 - (a) The fan mode is increased when the pressure sensor temperature is high, and is decreased when the pressure sensor temperature is low.
 - * The fan mode is always increased when the pressure sensor temperature is 50°C or higher.
 - (b) The fan mode may be decreased when symptoms of insufficient gas are detected at an indoor unit.
- (2) Indoor heating operation
 - (a) If the condensation temperature is low, the fan mode is increased at regular intervals.
 - (b) If the condensation temperature is high, the fan mode is decreased in order to prevent excessive load.
 - (c) The fan mode may be increased when the outdoor liquid temperature drops to 7°C or below.

7-4. When Compressor Magnet Switch Seizing Alarm Occurs

Because the high pressure may increase, operation occurs at the maximum fan mode.

Quiet mode operation

For the setting procedure, refer to the separate instructions. When Quiet mode is activated, the maximum fan mode is reduced compared to maximum fan mode during normal operation.

Outdoor unit	Max. fan mode		
Cooling operation	4 hp	5, 6 hp	
cooling operation	11	12 (*14)	
Heating operation	10	11	

* However, during cooling operation if the outdoor air temperature is 30°C or higher, the maximum fan mode is 14.

INDOOR UNIT

8-1. During Normal Control

(1) During Cooling mode operation

		MOV position (pulses)			
		Outdoor unit operating	Outdoor unit stopped		
Stop		20 pulses	20 pulses		
Fan		20 pulses	20 pulses		
Cooling	Thermostat OFF	20 pulses	20 pulses		
	Thermostat ON	60 – 480 pulses Performs SH control	_		

* The target value for SH control is 2 – 6°C for the temperature difference between E3 and E1, depending on the operating conditions.

However, the SH target value may increase if the required level decreases. In this case, because the electronic control valve position moves toward the closed side, you should not assume that there is insufficient gas.

(2) During Heating mode operation

		MOV position (pulses)			
		Outdoor unit operating		Outdoor unit stopped	
Stop		65 – 80 pulses	Control to prevent refrigerant accumulation	85 pulses	
Fan		65 – 80 pulses	Control to prevent refrigerant accumulation	85 pulses	
Heat	Thermostat OFF	65 – 80 pulses	Control to prevent refrigerant accumulation	85 pulses	
	Thermostat ON	60 – 480 pulses	Performs SC distribution control	_	

* The target value for SC control is 5 – 20°C for the temperature difference between the pressure sensor temperature and E1, depending on the operating conditions.

8-2. During Special Control

Control type	Operating mode	Target indoor units		Electronic control valve position (pulses)
4-way valve	Cooling	All indoor units		Fixed pulses for cooling, corresponding to the indoor unit capacity
switching control	Heating	All indoor units		480
		OFF		Fixed pulses, corresponding to the indoor unit capacity
Reverse cycle	Heating	Fan		Fixed pulses, corresponding to the indoor unit capacity
start control	Heating	Heating	Thermostat ON	Fixed pulses, corresponding to the indoor unit capacity
			Thermostat OFF	Fixed pulses, corresponding to the indoor unit capacity
Inter systems refigerant oil recovery control	Cooling / Heating	All indoor units		Fixed pulses, corresponding to the indoor unit capacity
		OFF		Fixed pulses, corresponding to the indoor unit capacity
Reverse cycle defrost control	Leating	Fan		Fixed pulses, corresponding to the indoor unit capacity
	Heating	Heating	Thermostat ON	Fixed pulses, corresponding to the indoor unit capacity
		rieating	Thermostat OFF	Fixed pulses, corresponding to the indoor unit capacity

9. Indoor Special Control

9-1. Indoor Unit Thermostat ON/OFF Delay Timer

- When an indoor unit thermostat turns ON, the thermostat cannot be turned OFF by the room temperature thermostat discharge temperature thermostat for 3 minutes. However, if the condensation temperature (refrigerant temperature detected at the condenser) reaches PX temperature or higher, the thermostat may turn OFF in order to prevent excessive loads.
- (2) When an indoor unit thermostat turns OFF, it will not turn ON again for a minimum of 3 minutes.

9-2. Indoor Unit Refrigerant Oil Self-recovery Control

* This control is performed constantly during Cooling mode operation only.

- (1) The electronic control valve at indoor units that are stopped, or are in Fan mode or in Cooling mode with thermostat OFF, opens for 1 − 2 minutes.
- (2) At indoor units that are in Cooling mode with thermostat ON, the electronic control valve opens from its current position by approximately 20 pulses.

9-3. Indoor Fan Speed Control

CCU intervenes in fan control of the indoor unit according to the state at the operating mode below. The priority order of fan control by CCU is higher than that of indoor unit's.

9-3-1. Dry mode

Indoor unit fan operated in the dry mode is controlled from CCU as shown in the below figure.

DTi Fan speed set by remote controller +1 Fan speed is "L" when thermostat ON Fan speed is "LL" when thermostat OFF

DTi = (Intake temperature of indoor unit) - (Preset temperature in remote controller)

9-3-2. Heating mode

Indoor unit fan operated in the heating mode is stopped from CCU at the following condition.

- Discharge air temperature of indoor unit \leq 20°C+XX
- High pressure sensor temperature (HPS) in outdoor unit \leq 25°C+XX
- Liquid temperature (E1) in indoor unit \leq 20°C+XX
- * "XX" is able to be set in EEPROM on the outdoor unit's PCB.

EEPROM setting in main outdoor uni^r CODE: 2C

0 N.	201
Setting No	XX
-10	-10
-9	-9
-8	-8
	Interval of "1"
0	0
	(factory preset mode)
:	-
20	20

9-4. Drain Pump control

CCU intervenes in drain pump control of the indoor unit according to the setting in EEPROM in the outdoor unit. The drain pump operates from CCU control at the following condition.

- DP counter ≥ 5
- * The DP counter counts each oil recovery control.
- Liquid temperature (E1) in the indoor unit which selected cooling mode < 0 °C
- * Regardless of operating / stopped.
- Low Silhouette Ducted type indoor unit
 In Low Silhouette Ducted types, dirt might be accumulated when water collects in the drain pan for a long term. Therefore, the drain pump works longer to drain water surely.
- * To activate this function, it is necessary to set it to EEPROM on the main outdoor PCB.

EEPROM setting of drain pump in main outdoor unit

CODE: 0C

Setting No	Description	Indoor unit under this control
0	Invalid	All units
1	DP operates for 20 minutes and stops for 2 hours	(Mode, Operation / Stop
2	DP operates for 20 minutes and stops for 20 minutes	Thermostat ON / OFF
3	DP always operates	doesn't concern)
4	DP operates for XX minutes when indoor unit's operation changes; from thermostat ON \rightarrow thermostat OFF or operation stopped.	Cooling mode
5	DP operates for XX minutes when indoor unit's operation changes; from thermostat ON or thermostat OFF \rightarrow operation stopped.	Dry mode Heating mode
6	Both Setting No. 4 and 5 functions.	
7	DP operates for XX minutes when indoor unit's operation	
(Factory	changes	Cooling mode
preset mode)	from thermostat ON or thermostat OFF \rightarrow operation stopped.	Dry mode

*When setting No. 4 - 7 is selected, this function works only for below indoor unit types.

Types : F1, M1, E1

*Operating time mentioned "XX" above is able to set in EEPROM of the main outdoor unit

EEPROM setting in main outdoor unit

CODE: 2B

Setting No	XX
20	20 minutes
30	30 minutes (factory preset mode)
40	40 minutes
50	50 minutes
60	60 minutes

* The drain pump always operates when the indoor unit is thermostat ON in cooling operation.

* Once the drain pump operates, it keeps operating for 20 minutes.

In the above 2 cases, the drain pump operates by the signal of indoor PCB, not by CCU.

9-5. Discharge air temperature control

For Type F1, M1, E1 indoor units, discharge air temperature is controlled from the CCU to prevent condensation on duct surface in cooling operation. The CCU monitors and adjusts Δ To of indoor unit. The adjustment is made by compressor capacity and MOV operation in the indoor unit.

* *A*To: Cooling (Discharge air temperature) - (Preset discharge air temperature) Heating (Preset discharge air temperature) - (Discharge air temperature)

Situation in which indoor unit stops by discharge air temperature control

- - \angle To \leq -3.5deg, and this condition continues 7 minutes
- - \angle To \leq -2.0deg, and this condition continues (20 + XX) minutes

*The above mentioned "XX" is able to set in EEPROM of the main outdoor unit

EEPROM setting in main outdoor unit

CODE: E1

Setting No	XX
-20	-20
-19	-19
-18	-18
	Interval of "1"
0	0 (factory preset mode)
10	10

*In heating operation, this function virtually does not work because preset discharge air temperature is 50 °C and this is sufficiently higher than actual discharge temperature.

For preset discharge air temperature that is set in the indoor unit is able to change, refer to manual for indoor unit.

9-6. Indoor Unit Auto Restart Setting

Detail setting items of indoor unit (28 : auto restart setting) can be changed instantly from the outdoor unit. Settings at factory shipping of indoor unit is set to "00" (incapable of auto restart setting).

Setting No	Control operation
0	Non (at factory shipment)
1	Indoor unit EEPROM code : Set "28" to "01"(capable of auto restart setting)
2	Indoor unit EEPROM code : Set "28" to "00"(incapable of auto restart setting)

Outdoor unit EEPROM code : Set "EF" as shown in the following table.

NOTE

This setting change for communication should only be performed at the initial communication setting. CCU recognizes the number of indoor units at the time of initial setting's communication and stores in memory at outdoor EEPROM code "EE".

When changing code "EF" after indoor communication setup, set "EE" (number of indoor units' connection) to the setting at shipment "0" in order to initialize the recognition of the number of indoor units.

10-1. Discharge Gas Temperature Protection

Alarm

The compressor upper-limit discharge temperature is 106°C. If the discharge temperature reaches 106°C, then the compressor stops. If the discharge temperature reaches 106°C 4 times repeatedly after restart, an alarm occurs. After the compressor stops, if the discharge temperature at the stopped compressor is at or above 101°C, the compressor start restriction temperature, then this compressor does not operate until the temperature drops.

List of discharge temperature protections

Compressor model	Compressor type	Stop temperature (°C)	Compressor start restriction temperature (°C)	Alarm display
Compressor 1	Inverter	106	103	P03

10-2. Control For Detection of Discharge Sensor Failures

- If the temperature is at or above sensor failure temperature (80°C) (value in parentheses) 60 minutes after the compressor stopped, an alarm occurs.
- If the discharge gas temperature remains at or above sensor failure temperature (101°C) for 20 minutes after the system is stopped, an alarm occurs.
- * In this case, in addition to sensor failure, compressor overheating caused by insufficient refrigerant is also a possibility.

List of discharge sensor failures

Compressor model	Compressor type	Stop temperature (°C)
Compressor 1	Inverter	F04

11. Current Protection

11-1. Fan Motor

Alarm	Description	
P22	Occurs when the fan motor detects overcurrent, or when the fan motor is locked and does not turn.	

11. Current Protection

12. Pressure Sensor Failure

13. 4-Way Valve Failure [L18]

11-2. Inverter Compressor

Alarm	Description
P16	Occurs when overcurrent (32.5 A) is detected during normal operation.
P29	Occurs when a missing phase or overcurrent (48 A) is detected when the inverter compressor starts.
H31	Occurs when the HIC detects overcurrent (75 A), and when an abnormal temperature (150°C) is reached.

The inverter current values include primary current and secondary current. Alarm judgment uses both of these current values. However, in general the secondary current is higher than the primary current.

11-3. CT Circuit Detection Failure

	Alarm	Description
Compressor 1 (inverter compressor)	H03	Occurs when an open circuit is detected in the inverter compressor CT circuit.

If the operating frequency of the inverter compressor is low, the current value is also low. As a result, this alarm is detected only when the compressor is stopped.

12. Pressure Sensor Failure

This system includes a high-pressure sensor.

12-1. High-Pressure Sensor Failure

Connector disconnection or displacement failure is judged according to the relationship between the high-pressure sensor temperature, which is detected by the high-pressure sensor, and the various temperature thermistors. However, if the pressure rises suddenly, a high-pressure sensor failure warning may be judged before the high-pressure sensor activates. Therefore check the following before determining that a pressure sensor failure has occurred:

- Has the service valve been left open?
- Is there a blocked circuit?
- Is there leakage of refrigerant into stopped outdoor units?

Also check the difference between the high-pressure pressure as measured by a manifold gauge and the pressure as detected by the pressure sensor.

Alarm	Description
F16	High-pressure sensor failure

13. 4-Way Valve Failure [L18]

When a 4-way valve coil failure, coil disconnection or similar failure occurs, a judgment is made automatically from the operating conditions, and an alarm is output.

14. Servicing and Maintenance Functions

The below functions are available, and are selected by the outdoor unit EEPROM settings.

14-1. Outdoor Unit Noise Countermeasures (outdoor Quiet mode function)

This function reduces the operating noise to lessen the noise produced by the outdoor unit. When this mode is selected, noise reduction is given priority during operation, and the outdoor fan mode and compressor operating frequency are restricted (to approximately 80% of capacity).

The following two operations are required in order to engage this mode. (This mode cannot be engaged when neither (1) nor (2) below has been completed.)

(1) Outdoor unit EEPROM settings

Outdoor unit EEPROM 05 can be set from 0 to 1.

EEPROM setting	Max. fan mode	Effect	Capacity ratio
0	14	Normal operation (setting at time of factory shipment)	100%
1	12	5 and 6 hp units. Noise reduced by approx. 3 dB from the catalog value.	Approx 80%
1	11	Only 4 hp unit. Noise reduced by approx. 3 dB from the catalog value.	Applox. 60 /8

(2) Short-circuit the "SILENT"2P pin on the outdoor unit PCB.

Noise reduction mode is engaged constantly when this pin is short-circuited. To operate in noise reduction mode only at night, or for similar control at other times, use an external timer (field supply).

14-2. Slime Countermeasure: EEPROM 0C (set only on the main unit)

This setting controls the operation of the drain pump.

EEPROM setting	Details of operation
0	Normal operation (setting at time of factory shipment)
1	Drain pump operates for 20 minutes at 2-hour intervals
2	Drain pump operates for 20 minutes, at intervals of 20 minutes
3	Drain pump operates continuously

14-3. Delayed Start for Each System:Outdoor EEPROM 3E

The operation start time can be delayed according to the set system addresses.

This setting reduces voltage drops by preventing multiple systems from starting at the same time when operation is restarted after recovery when multiple operating systems were stopped due to a power outage or other cause.

EEPROM setting	Effect
0	Delayed start is not performed (setting at time of factory shipment)
1	System address: Delay in seconds before start
2	Start after System address × 2 seconds
3	Start after System address × 3 seconds

<Reference> Indoor unit discharge temperature control

Operating mode	Cooling	Heating
Discharge temperature control value	12	50
Change method	Enter shift value for indoor EEPROM setting "1C."	Enter shift value for indoor EEPROM setting "1D."

The method is the same as ordinary indoor unit discharge temperature shift.

15-1. Demand Control

Demand terminal block (optional CZ-CAPDC3) or Seri-Para I/O unit (optional CZ-CAPDC2) must be connected in order to perform demand control.

The current limitation values can be set by changing either contact.

Demand terminal block	Seri-Para I/O unit		Control	Demendencering	
COM short circuit	Contact 1	Contact 2	Control	Demand meaning	
Non	×	×	No control	Operates to the maximum capacity.	
LV1	0	×	Operates to XX% [EEPROM:1A] of the upper limit for the rated current	Current is limited to the set values.	
LV2	×	0	Operates to XX% [EEPROM:1B] of the upper limit for the rated current	Current is limited to the set values.	
LV3	0	0	Forced thermostat OFF setting	-	

 \bigcirc : Input present \times : Input not present

- * The rated current indicates the current value that is listed in the catalog or service manual.
- * In respect of connection method for demand terminal block and Seri-Para I/O unit, refer to the installation instructions supplied with the units.
- * XX% is possible to change among 40 to 100% (5% interval scale) by the indoor unit EPROM. [1A]:100% at shipment / [1B]:70% at shipment
- * During setting in LV1-LV3, (i) (demand-activated) displays on the remote controller of the indoor unit. It is also possible to make setting that the display (symbol of demand-activated) is concealed as shown in the following table.

15-2. Demand Display Selection Function EEPROM : 1E

Outdoor Unit EEPROM Setting : The display mark for demand function is selectable by changing 1E as shown below.

EEPROM Setting	ting Description	
0	No mark is displayed even in demand-activated mode.	
1	When demand input is ON, demand-activated mark is displayed. (At factory shipment)	
2	When demand is set to LV3 (forced thermostat OFF), demand-activated mark is display.	

– MEMO –

2. OUTDOOR UNIT REPAIR PROCEDURES

La	yout Diagram: Sensors and solenoid valves	. 2 -2
1.	Removing Panels	. 2- 3
2.	Discharging Oil in Compressor	. 2 -4
3.	Recovering Refrigerant	. 2- 5
4.	Checking for Leakage After Repair	2 -10
5.	Evacuating System	2 -11
6.	Pumping Out Refrigerant from Outdoor Unit	2- 12
7.	Compressor	2-1 4
8.	High Pressure Sensor	2 -17

Layout Diagram: Sensors and solenoid valves



(condenser 1 thermistor)

2 - 2

1. Removing Panels

- (1) Front panel removal (Fig. 2-1)
 - Remove the front panel (remove 3 screws).
- (2) Cover A removal (Fig. 2-1)
 - Remove the cover A (remove 1 screw).



Fig. 2-1

2. Discharging Oil in Compressor

Recover the refrigerant in the outdoor unit following the procedures in "3. Recovering Refrigerant." Remove the compressor and discharge the oil in it. Refer to "8. Compressor" for detailed procedures.

2-1. Checking the Oil

Acceptance/rejection criteria for the oil

Condition of	Condition of oil		Judgment criteria for changing oil*	
refrigeration cycle	Color	Odor	Total acid value	Hue
Normal	Yellowish	None	0.02 or less	3.5 or less
Abnormal overheat	verheat- on Brownish	Smells some what (not as strong as below)	0.06 or over	4.0 or over
operation			Changing the oil and system cleaning with dry-cores are necessary.	
Motor burnout	Brownish / blackish	Pungent / burnt odor	Changing the oil and system cleaning with dry-cores are necessary.	

* It is difficult to measure the total acid value in the field, therefore oil hue and odor are the rule of thumb. Checking for carbon deposits and abrasive metal powder can additionally be used to assess the system condition.

2

The following equipment and tools are required:

Jumper wire with clips, adjustable wrench, set of manifold gauge valves specially designed for refrigerant R410A only, vacuum pump, refrigerant recovery unit, pre-purged refrigerant cylinder for recovery (air already evacuated), and hex wrench (4 mm for liquid tube and 5 mm for gas tube).

3-1. Refrigerant Recovery Procedures (From Outdoor Unit)

- (1) Turn off the power of the outdoor unit beforehand (at power mains).
- (2) Fully close each service valve on the gas line and liquid line of the outdoor unit.
- (3) Connect the outdoor unit's high-pressure and low-pressure outlet ports with the Hi and Lo sides of the manifold gauge valves using hoses. (Fig. 2-2)



The remaining refrigerant in the outdoor unit may create internal pressure. Before connecting hoses, be sure to confirm that each of the manifold gauge valves is tightly closed. Note that the connection ports employ Schrader-type, press-to-release valves.

(4) Connect the manifold gauge valves, refrigerant recovery unit, and recovery cylinder using hoses. To avoid the entry of air into the refrigerant tubing, carry out this connection work carefully.



For detailed procedures such as connecting the refrigerant recovery unit with the recovery cylinder and methods used for recovery, follow the specific instructions that came with the refrigerant recovery unit.

(5) Locate the AP pins on the control PCB in the outdoor unit and short them using the clips of the jumper wire. Then restore electrical power to the outdoor unit.



By short-circuiting the AP pins, each electronic expansion valve in the outdoor unit is forcibly opened as soon as power comes on, which releases all remaining refrigerant into the recovery cylinder. Since neglecting this procedure may leave some refrigerant in the system, it is important that you carry out this step.

(6) Carry out refrigerant recovery.



To determine the completion of refrigerant recovery, follow the instructions that came with the refrigerant recovery unit.



Fig. 2-2

3-2. Refrigerant Recovery Procedures (Indoor Unit)

The flowchart below shows the refrigerant recovery procedures you must follow when replacing or repairing the indoor unit due to trouble in the refrigerant circuit.



* Service work performed on indoor units is done simultaneously using the service ports at the liquid tube side and the gas tube side ball valves. Refer to each section in the "Installation Instructions" on refrigerant charging, leak checking, and evacuation procedures.

3-2-1. Cooling operation (for all units)

- (1) Short-circuit the TEST pin (CN-TEST) on the outdoor control PCB.
- (2) Let the unit operate for a while, then check if it is running in Cooling mode or Heating mode by touching the gas line with your finger. If it is running in Heating mode, follow the instructions given in (3) through (5).

Cooling mode : low temperature (lower than 20°C)

Heating mode : high temperature (higher than 60°C)



Be careful when touching the gas line since the tubing may be very hot (about 60°C) during Heating mode.

- (3) If the unit is in Heating mode, release the short-circuit across the test run pins on the outdoor control PCB of the main unit. Then short-circuit the STOP pin (CN-STOP) to stop operation of the unit.
- (4) Short-circuit the MODE pin (CN-MODE) on the outdoor control PCB.
 - * The 4-way valve will not change at this moment; rather, it changes just before start of operation. (It is difficult to confirm the change by listening for the sound.)
- (5) Short-circuit the TEST pin (CN-TEST) on the outdoor control PCB. Let the unit operate for a while, then check if it is in Cooling mode by carefully touching the gas line.

3-2-2. Refrigerant recovery procedures (A) (using ball valve near the indoor unit)



- (1) If a ball valve with a service port has been provided near the indoor unit as shown in Fig. 2-3, follow the instructions given in (2) through (6) below. If the service port is instead located in the outdoor side, follow the instructions in "3-2-3. Refrigerant recovery procedures (B)."
- (2) After running the unit in Cooling mode for about 5 minutes, fully close the liquid line ball valve.
- (3) Run the unit in Cooling mode for 10 to 20 minutes more.
- (4) Fully close the gas line service valve.
- (5) Use hoses to connect the manifold gauge valves, refrigerant recovery unit, and refrigerant recovery cylinder with each other. (Fig. 2-4) Do each connection quickly to prevent air from entering the tubing.



Remaining refrigerant may create internal pressure, therefore care should be taken when connecting the hoses.

(6) Recover the remaining refrigerant from the indoor unit using the refrigerant recovery unit.

NOTE

To determine completion of refrigerant recovery, follow the instructions that came with the refrigerant recovery unit.




3-2-3. Refrigerant recovery procedures (B): for indoor unit with no ball valve

Refrigerant in all indoor units and the refrigerant tubing circuit must be pumped into the outdoor unit (referred to as "pump down"). The maximum refrigerant storage capacity per a single outdoor unit is approx. 3.5 kg. Thus, in order to collect all refrigerant from the system, a separate refrigerant recovery unit is necessary. Follow these procedures to correctly perform pump down.

- (1) Using hoses, connect the manifold gauge valves to both the high-pressure and low-pressure outlet ports of the outdoor unit to be pumped down. Quickly connect each part to prevent air from entering the tubing.
- (2) After running the unit in Cooling mode for about 5 minutes, fully close the liquid line valve of the outdoor unit to be pumped down.
- (3) When the high-pressure gauge reading shows 3.80 MPa or more (or the low-pressure gauge reading falls to 0.5 MPa or less), pull out the EXL2 connector (3P) (YEL) (CN-RC) on the control PCB of the outdoor unit, then immediately close the gas line service valve.
 - * As soon as the EXL2 connector is pulled out, F24 alarm (abnormal sensor) immediately turns on and the outdoor unit stops.



When pulling out the EXL2 connector, be sure to grasp the connector securely with your fingers and never pull it directly by its wires. When any other connector except the EXL2 is disconnected, the outdoor unit will not stop. Be sure to pull out only the EXL2 connector as described.

- (4) Turn off power to all equipment in the system. Then pull out the RC1 connector (4P) (BLU) (CN006) on the outdoor control PCB in the outdoor unit for which pump down has been completed.
- (5) Turn on power for all equipment in the system and let the outdoor unit run in Cooling mode.
 - * Because the test run pins on the outdoor control PCB of the unit have been short-circuited, all units start Cooling mode operation 3 minutes after power ON.
- (6) Using hoses with Schrader-type, push-to-release valves, connect the manifold gauge valves to the gas line service port and the liquid line service port in the outdoor unit to undergo pump-down. (Fig. 2-5)



Remaining refrigerant in the system may cause internal pressure. Check that each valve on the manifold gauge is tightly closed. A Schrader-type, push-to-release valve is provided for each connection port.

- (7) Use hoses to connect the manifold gauge valves, refrigerant recovery unit, and refrigerant recovery cylinder. Quickly connect each part to prevent air from entering the tubing.
- (8) Recover remaining refrigerant from the inter-unit tubing and indoor units using the refrigerant recovery unit.

Low-pressure outlet port (For ø7.94 mm connector)



4. Checking for Leakage After Repair

4-1. Pressure Check for Leakage of Outdoor Unit

After completing repair of the outdoor unit, carry out the following leakage check.

- (1) Check that all service valves for gas line, and liquid line in the repaired outdoor unit are fully closed.
- (2) Connect the manifold gauge valves to the high- and low-pressure sensor outlets of the outdoor unit.
- (3) Feed nitrogen gas into the circuit until 3.80 MPa pressure is reached. If it is apparent that the nitrogen gas is not entering the repaired section, interrupt the feeding. Short-circuit the AP pins (CN-AP) on the outdoor unit control PCB, turn on power to run the outdoor unit, then resume feeding nitrogen.
- (4) Apply soapy water to the repaired part (such as a newly welded part), and briefly inspect for any leakage. If there are any leaks, bubbles will show on the tubing surface.
 - * To continue the air-tight check after the brief leak inspection, turn on power while short-circuiting the AP pins. Again feed in nitrogen gas to obtain a system pressure of 3.80 MPa. Then measure both the outdoor ambient temperature and the pressure in the system. Leave the system in this state for 1 full day and night, and again measure the outdoor ambient temperature and pressure (to determine any reduced values). During the inspection, it is recommended that an awning or cover be used to shield the unit in case of rain. If no problem is found, purge all nitrogen from the system.





4-2. Checking for Leakage in Refrigerant Tubing Between Indoor and Outdoor Units Refer to the "Installation Instructions" that came with the outdoor unit.

5. Evacuating System

This procedure is carried out to ensure there is no remaining refrigerant or other gases (nitrogen, etc.) in the repaired outdoor unit and tubing.

5-1. Evacuating Repaired Outdoor Unit

- (1) Check that each service valve of the gas line, and the liquid line in the outdoor unit are fully closed.
 * If the AP pins (CN-AP) on the outdoor control PCB have already been short-circuited, steps (2) and (5) are not necessary.
- (2) Turn off power to the outdoor unit to be evacuated.
- (3) Connect the manifold gauge valves to the high- and low-pressure sensor outlets of the outdoor unit.
- (4) Connect the manifold gauge valves to the vacuum pump.
- (5) Short-circuit the AP pins on the outdoor control PCB and turn on power to the repaired outdoor unit.



By short-circuiting the AP pins and turning on power to the outdoor unit, all electronic expansion valves in the outdoor unit are forcibly opened and any remaining nitrogen gas can be recovered. Failure to perform this procedure may result in nitrogen gas remaining in the refrigerant circuit and causing operating problems. Therefore, never skip this step.

(6) Run the vacuum pump and continue evacuation until the vacuum condition falls to less than -101 kPa (-755 mmHg, 5 Torr).



To ensure proper evacuation, refer to the operating instructions that came with the vacuum pump.



Fig. 2-7

5-2. Evacuating Refrigerant Tubing Between Indoor and Outdoor Units

Refer to the "Installation Instructions" that came with the outdoor unit.

6. Pumping Out Refrigerant from Outdoor Unit

Required equipment and tools: Jumper wire with clips, adjustable wrench, set of manifold gauge valves, vacuum pump, refrigerant recovery unit, pre-purged refrigerant cylinder for recovery, and hex wrench (4 mm for liquid tube and 5 mm for gas tube).

This procedure is used to move refrigerant of the faulty outdoor unit (except compressor) into indoor units, and refrigerant tubing.

- (1) Connect the manifold gauge valves at the Lo-side to the low-pressure sensor outlet of the outdoor unit to be repaired. Also connect the refrigerant recovery cylinder to any one of the normal outdoor units at the liquid line service port (Schrader type, with push-to-release valve). Perform the connection work quickly so that no air is allowed to enter.
 - * Connecting the refrigerant recovery cylinder is done to prevent pressure from rising excessively during the backup operation by recovering the refrigerant from the outdoor unit to be repaired.

(Measure the weight of the refrigerant and cylinder itself beforehand and provide sufficient safety measures, such as installing a high-pressure cutout in the circuit.)



The hoses may be subject to internal pressure from the refrigerant inside the outdoor unit. Check that the manifold gauge valves are fully closed beforehand. A Schrader-type, push-to-release valve is provided at each connection port.

- (2) Short-circuit the TEST pin (CN-TEST) on the outdoor control PCB of the main unit.
- (3) After operating the unit for a while, judge whether it is running in Cooling or Heating mode by touching the gas line cautiously with your fingers. If it is running in Cooling mode, follow the instructions given in (4) through (6).
 - * The gas line reaches a low temperature (under 20°C) during cooling operation, and a high temperature (over 60°C) during heating operation.



Be careful when testing the temperature of the gas line with your fingers, because the tubing becomes very hot (about 60°C) when Heating mode is used.

- (4) If the unit is in Cooling mode, temporarily release the short-circuit across the test run pins on the outdoor control PCB of the unit. Then, short-circuit the STOP pin (CN-STOP) to stop operation of the unit.
- (5) Short-circuit the MODE pin (CN-MODE) on the outdoor control PCB of the main unit.
 - * The 4-way valve will not change at this moment; rather, it changes just before start of operation. (It is difficult to confirm the change by listening for the sound.)
- (6) Short-circuit the TEST pin (CN-TEST) on the outdoor control PCB of the unit. Let the unit operate for a while, then check if it is in Heating mode by cautiously touching the gas line.
- (7) Slowly close the liquid line service valve of the outdoor unit to be repaired.
- (8) When the low-pressure gauge reading shows 0.5 MPa or less, pull out the EXL2 connector (3P) (YEL) (CN-RC) on the control PCB of the outdoor unit to be repaired and then fully close the gas line service valve immediately.
 - * By pulling out the EXL2 connector, all outdoor units stop immediately.



While closing the valve, the outdoor unit may suddenly stop. This is because a protective function, such as for discharge temperature, is working. In this case also, fully close the gas line service valve immediately.

- (9) Connect the high-pressure sensor outlet of the outdoor unit to be repaired to the manifold gauge valves at the Hi-side. Also connect the manifold gauge valves to the refrigerant recovery unit. Perform the connection work quickly so that no air is allowed to enter.
- (10) Open both Hi- and Lo-side valves on the manifold gauge valves, and recover the refrigerant remaining in the outdoor unit. After that, measure the amount of recovered refrigerant.

6. Pumping Out Refrigerant from Outdoor Unit

NOTE

To determine the completion of refrigerant recovery, follow the instructions that came with the refrigerant recovery unit.



Fig. 2-8

7. Compressor

7-1. Compressor Trouble Diagnosis and Check Methods

Generally, compressor failures can be classified into the following categories.

- (1) Mechanical trouble \rightarrow (A) Locking (intrusion of foreign objects, galling, etc.)
 - (B) Pressure rise failure (damaged valve, seal, bearing, or other component)
 - (C) Noise (damaged stator, rotor, valve, or other component)

(2) Electrical trouble \rightarrow (A) Coil burning

- (B) Open circuit
 - (C) Insulation failure
 - (D) Short circuit
- Failure diagnosis is based on the following remote controller displays: [H01], [H02], [H03] (Compressor : right side when viewed from front). A judgment is made based on factors that include the following: coil resistance (varies depending on the compressor), insulation resistance, current, leakage breaker operation, oil and refrigerant fouling, odor, pressure, and noise.

Reference: Insulation resistance (Use a DC 500 V insulation resistance meter and measure the insulation resistance between the electrified and non-electrified parts.)

- (a) Compressor \rightarrow Min. 50 M Ω (servicing part)
- (b) Unit \rightarrow Min. 10 M Ω (This is due to the presence of refrigerant, which decreases the insulation resistance.)

* Minimum insulation resistance as required by generally accepted requirements is 1 M Ω .

Reference: Symptoms of motor burning

- 1. Ground fault results in breaker operation.
- 2. Short circuit results in different coil resistance at different phases.
- 3. Open circuit

7-2. Compressor Replacement

- (1) Follow the instructions in "7-4. Replacing the Compressor" and replace compressor in the failed unit.
- (2) Fully close the high- and low-pressure gauge valves on the manifold gauge, then stop the vacuum pump.
- (3) Disconnect the manifold gauge from the vacuum pump. Connect the manifold gauge to the refrigerant cylinder. At this time, be careful that air does not enter the refrigerant tubing.



Do not use the recovered refrigerant. Use a refrigerant cylinder that contains new refrigerant.

- (4) Open the valve on the refrigerant cylinder. When charging with the amount of recovered refrigerant is completed, or when charging with the amount of recovered refrigerant is not completed but no more refrigerant will enter the unit, first turn the power OFF at the repaired outdoor unit, then remove the short circuit at the AP pin (CN-AP). Then fully open all valves on the gas tube, and liquid tube.
- (5) If charging with the amount of recovered refrigerant was not possible, fully close the high-pressure gauge valve on the manifold gauge. Then, while the unit is operating in Cooling mode, open the low-pressure gauge valve on the manifold gauge and charge with the designated amount of refrigerant.



When charging with liquid refrigerant, add refrigerant a little at a time in order to prevent liquid back-flow.

(6) Remove the manifold gauge.



The connecting port includes a Schrader-type, push-to-release valve. When disconnecting the hose, pressure will be applied from the refrigerant in the outdoor unit.

(7) Follow the instructions in "7-3. Dry Core Cleaning" and perform dry core cleaning of the outdoor unit that failed.

7-3. Dry Core Cleaning

If burning or other failures occur repeatedly at compressor, in many cases the cause is acid, sludge, carbon, or other substances that remain in the refrigeration cycle as the result of insufficient cleaning.

If, when the oil is inspected, there is an outdoor unit where the oil color phase is 4.0 or higher, or where a sharp odor is present, carry out all steps below to perform dry core cleaning.

- * The operating pressure is approximately 1.5 times higher than with R22 or R407C. Therefore use R410A dry cores.
- (1) Refer to "Refrigerant recovery procedures (B): for indoor unit with no ball valve" under "3-2. Refrigerant Recovery Procedures (Indoor Unit)." Perform pump-down of the refrigerant from all indoor units and inter-unit tubing to the outdoor unit side.
- (2) Cut the liquid tube at all outdoor units where dry cores will be attached, then attach the dry cores and ball valves as shown in Fig. 2-9.
- (3) Operate outdoor unit (in either Heating or Cooling mode).
- (4) Fully close the liquid tube valve and ball valve at the outdoor unit where dry cores will be attached.
- (5) Stop operation of outdoor unit.
- (6) Connect a refrigerant recovery device to the liquid tube service port (Schrader-type valve) on the outdoor unit where dry cores will be attached. Recover the refrigerant that is in the tubing. At this time, be careful that air does not enter the tubing.



The connecting port includes a Schrader-type, push-to-release valve. When connecting the hose, internal pressure will be applied from the remaining refrigerant in the inter-unit tubing. To determine when refrigerant recovery has been completed, follow the instructions that came with the refrigerant recovery device.

- (7) As shown in Fig. 2-9, disconnect the tube that runs from the liquid tube valve to the ball valve on the outdoor unit where dry cores will be attached. Then attach the dry cores.
- (8) At all outdoor units where dry cores are attached, pressurize with 3.80 MPa of nitrogen from the liquid tube service port and check for leaks.
- (9) After draining all nitrogen from the tubing, apply vacuum from the liquid tube service port to the outdoor unit where dry cores are attached until the pressure is -101 kPa (-755 mm Hg, 5 Torr) or less.
- (10) Fully open the liquid tube valve and ball valve on the outdoor unit where dry cores are attached.
- (11) Operate the outdoor unit for approximately 3 hours (in either Heating or Cooling mode).
- (12) Follow the above procedure, and replace all dry cores with new dry cores.
- (13) Operate all outdoor units for approximately 20 minutes (in either Heating or Cooling mode).
- (14) Follow the instructions in "2. Discharging Oil in Compressor" and drain a small amount of the oil from the oil separators of all outdoor units where dry cores are attached. Check the color phase, odor, and other characteristics.
- (15) If the results show that dry core cleaning is still necessary (for example, a color phase of 4.0 or higher), return to Step 13 and repeat until the results are normal (including a color phase of 3.5 or less).



Perform another dry core replacement after approximately 30 hours of system operation.

- (16) Fully close the liquid tube valve and ball valve on the outdoor unit where dry cores are attached.
- (17) Connect a refrigerant recovery device to the liquid tube service port (Schrader-type valve) on the outdoor unit where dry cores are attached. Recover the refrigerant that is in the tubing. At this time, be careful that air does not enter the tubing.

7. Compressor

- (18) Remove dry cores. Connect the tube that runs from the liquid tube valve to the ball valve.
- (19) At the outdoor unit where dry cores were removed, pressurize with 3.80 MPa of nitrogen from the liquid tube service port and check for leaks.
- (20) After draining all nitrogen from the tubing, apply vacuum to the outdoor unit where dry cores were removed until the pressure is -101 kPa (-755 mm Hg, 5 Torr) or less using the liquid tube service port.
- (21) Refer to the "Charging additional refrigerant" items. Charge with an amount of refrigerant equal to the amount that was recovered.

7-4. Replacing the Compressor

When removing and installing compressors, use sufficient caution to ensure that water or other substances do not enter the refrigerant tubing system.

7-4-1. Replacing the compressor

(A) Replacing the inverter compressor (Compressor 1 on remote controller alarm display)

Removal

- Connect a manifold gauge to the high- and lowpressure outlet ports at the outdoor unit where the compressor will be replaced. Connect the manifold gauge to a nitrogen cylinder and perform nitrogen replacement.
- (2) Follow the procedure for removing panels, and remove the front panel, the right lower panel, and the electrical component box cover. (Fig. 2-10)
- (3) Follow the refrigerant work procedure and recover the refrigerant.
- (4) Remove the acoustic material that surrounds the compressor (3 layers).
- (5) Remove the cap from the compressor terminal plate. Disconnect the power terminal and internal terminal.
- (6) Remove the crankcase heater. Remove the 3 flange washers that are attached to the compressor legs as shown in Fig. 2-11.
- (7) Prepare to disconnect the 2 welded locations shown in Fig. 2-11. Protect the sensors and the surrounding plates, rubber, lead wires, clamps, and other items.
- (8) Disconnect the 2 welded locations shown in Fig. 2-11.
- (9) Tilt the compressor toward you slightly. Lift it off of the bolt at the rear of the compressor, then pull the compressor toward you.







Fig. 2-10

Welding locations to disconnect (2)





2 - 16

7. Compressor

8. High Pressure Sensor

Installation

- (1) Prepare for installation.
 - Remove the rubber stopper and tube cap (welded) from the new compressor.
- (2) Install the crankcase heater onto the compressor.
- (3) Place the cushioning rubber in the designated positions on the compressor. (There are 3 pieces for an inverter compressor.)
- (4) Set the new compressor into the unit.
- (5) Shape the tubes and insert them at the 2 welding locations.
- (6) Use nitrogen to replace the air inside the compressor. Perform brazing at all parts.
- (7) Increase the pressure to the nitrogen airtightness test pressure of 3.80 MPa. Check that no leakage occurs.
- (8) Re-install all components that were removed. Re-install the electrical component box in the original position as it was before.
- (9) After the airtightness test is completed, apply vacuum until a pressure of -101 kPa (-775 mm Hg, 5 Torr) or less is reached at the indoor and outdoor units and in the tubing.
- (10) After applying vacuum, charge with refrigerant.
 For the refrigerant charging methods, refer to "Installation Instructions."
 Charge with the total of the "refrigerant amount at time of shipment" plus the "additional charge amount." (Listed on the nameplate and description label.)
 - Be sure to perform refrigerant charge using liquid refrigerant.
- (11) Never use any refrigerant other than R410A.



Fig. 2-12

8. High Pressure Sensor

The high pressure sensor connection port on the outdoor unit includes a Schrader-type, push-to-release valve. It is not necessary to recover the refrigerant when removing and installing the sensor.

8-1. Removing the High Pressure Sensor

- (1) Refer to "1. Removing Panels" and remove the front panel.
- (2) Disconnect the high pressure sensor connector (3P BLK) from terminal CN-HPS on the outdoor unit control PCB of the outdoor unit where the high pressure sensor will be removed.
- (3) Use 2 adjustable wrenches in combination to remove the high pressure sensor.



The high pressure sensor connection port on the outdoor unit includes a Schrader-type valve. When removing the high pressure sensor, internal pressure will be applied from the refrigerant in the outdoor unit.

8-2. Installing the High Pressure Sensor

(1) Use 2 adjustable wrenches in combination to install the high pressure sensor.

– MEMO –

3. OUTDOOR UNIT MAINTENANCE REMOTE CONTROLLER

1.	Overview
2.	Functions
3.	Ordinary Display Controls and Functions
4.	Monitoring Operations
5.	Outdoor Unit Alarm History Monitor
6.	Mode Settings

OUTDOOR UNIT MAINTENANCE REMOTE CONTROLLER (CZ-RTC2) for MINI VRF SYSTEM

■ About the outdoor unit maintenance remote controller

The outdoor unit utilizes nonvolatile memory (EEPROM) on its PCB. This allows EEPROM data to replace the setting switches that were present on previous PCBs. The outdoor unit maintenance remote controller is used to set and change these EEPROM data.

In addition to setting and checking the outdoor unit EEPROM data, this remote controller can also be used to monitor the outdoor unit alarm history, monitor the various indoor and outdoor temperatures, and check the indoor unit connection status (number of units, operating mode, etc.).

NOTE

3

Outdoor unit maintenance remote controller does not function as an ordinary remote controller. It is therefore only used for test runs and during servicing.

System diagram	Outdoor unit maintenance remote controller			
	Special service checker wiring	Outdoor unit	Inter-unit control w	/iring
	(Servicing No.: CV6231785082)		<u> </u>	#
		Outdoor unit control PCB	Indoor unit	Indoor unit
	Kemote controller Ass y Ass y Ass y Ass y Ass y		Remote	Remote controller

- The special service checker wiring is required in order to connect the outdoor unit maintenance remote controller to the outdoor unit PCB.
- Ordinary remote controllers or other controller are still required for the indoor units, even when the outdoor unit maintenance remote controller is connected.

[Service Checker Section]



CZ-RTC2

2. Functions

Functions on the ordinary display

(1) Functions: Button operations can be used to perform the following functions.

- Start/stop of all indoor units
- Switching between cooling and heating
- Test run of all indoor units

(2) Display: The following can be displayed.

- Alarm details display
- No. of indoor/outdoor units
- Unit Nos. of connected indoor/outdoor units
- Indoor/outdoor unit operating status (blinks when an alarm occurs)
- Indoor unit thermostat ON
- Display of individual outdoor unit alarms
- Total operating time of outdoor unit compressors
- Oil level of the outdoor unit oil sensor
- Total outdoor unit power ON time
- Outdoor unit microcomputer version, other information

Temperature monitor

• Displays the indoor/outdoor unit sensor temperatures.

Outdoor unit alarm history monitor

• Displays the outdoor unit alarm history.

Mode settings

• Setting mode 1 and setting mode 2 are used to make the outdoor EEPROM setting.

- Functions on the ordinary display
- Connect the special service checker wiring to the outdoor unit PCB. The connection is shown in the figure below.



- If the communications line in the inter-unit control wiring is connected, it can be left as-is.
- In case of an independent outdoor unit (1 maintenance remote controller connected to 1 outdoor unit, automatic address setting for indoor units not completed), both setting mode 1 and setting mode 2 can be used.
- The overall system status for that refrigerant system is displayed.

• All units start/stop (Fig. 3-1)

<Operation>

The :: U (ON/OFF operation) button can be used to start and stop all the indoor units.

- The LED illuminates if any indoor units is operating.
- The LED blinks if an alarm at any of the operating indoor units occurs.

• Cooling/heating change (Fig. 3-1)

<Operation>

The (MODE) button can be used to change between heating and cooling operation.

• The display indicates the operating mode of the indoor unit with the lowest unit No.

• All units test run (Fig. 3-2)

<Operation>

The (CHECK) button can be used to start and stop a test run for all indoor units.

- Press and hold for 4 seconds to turn ON. During the test run "TEST" is displayed.
- The status of test runs performed from the indoor unit remote controller is not displayed on the outdoor unit maintenance remote controller.



Fig. 3-1



Fig. 3-2

Display (functions)

• Use the temperature setting and value buttons to change the item code.

Item code	Item	Remarks
[][] 1	Outdoor unit alarm @	Alarm code display
01	No. of connected indoor units	Quantity
50	Unit Nos. of connected indoor unit	7-segment display
03	Operating status of indoor unit	7-segment display
ūy	Thermostat ON status of indoor unit	7-segment display
05		
06		
07	Operating status of outdoor unit compressor	7-segment display
08		
09		
10	Compressor 1 operating time	0 – 99999999 hrs
11		
12		
13		
14		
15		
15	Outdoor unit power ON time	0 – 99999999 hrs
17	Compressor 1 operation count	0 – 65535 times
18		
19		
FÜ	Alarm history 1 (most recent)	
F	Alarm history 2	
F2	Alarm history 3	
F3	Alarm history 4	
FY	Alarm history 5	
F5	Alarm history 6	
F 5	Alarm history 7	
F7	Alarm history 8 (oldest)	
FE	Firmware version	Display the version No. \times 100.
FF	Program version	Display the version No. \times 100.

■ XX-YY R.C. (Fig. 3-3)

Displays the outdoor unit sub-bus address which is currently selected.

XX = Outdoor system address on main bus line (1 - 30)

- YY = Outdoor unit sub-bus address.
- "1" appears when there is only 1 outdoor unit.





<Sample displays>



01: <No. of connected indoor units> 4 units connected





02: <Unit Nos. 1, 2, 3, and 4 are connected>

Fig. 3-5

- Concerning the 7-segment, 4-digit display remote controller timer display The unit Nos. of connected units are indicated by four 7-segment digits (
 - Display of unit Nos. 1 20



- The meaning of the colon changes in the same way to indicate unit Nos. up to 80.
- Sample displays of the connected indoor unit Nos.:
 - Display of unit No. 1
 Display of unit Nos. 1 and 2
 Display of unit Nos. 1, 2, and 3
 Display of unit Nos. 1, 2, 3, and 4

NOTE

The change of the colon display (between unit Nos. 1-20 to unit Nos. 21-40) occurs automatically every 10 seconds. (However the display does not change if there are no higher-number units connected.) To change the display to the higher-number units before 10 seconds have passed, press the **FLAP**) button.

- The total compressor operating time is displayed (in 1-hour units) using 8 digits.
 - When the first 4 digits are displayed, the bottom dot of the colon is illuminated. (Figure (A))
 - When the last 4 digits are displayed, the colon dot is OFF. (Figure (B))
 - The display of the first 4 digits and last 4 digits changes automatically after 10 seconds. The display can also be changed by pressing the (FLAP) button.



10: <Compressor's total operating time>
(A) and (B) are displayed alternately.
(The example here (0000, 0062) indicates 62 hours.)

NOTE

With the outdoor unit maintenance remote controller (when connected to the outdoor unit), the unit remote controller check functions will not operate.

4. Monitoring Operations

Display the indoor unit and outdoor unit sensor temperatures.

<Operating procedure>

① Press and hold the 🗡 (CHECK) button and 🔛 buttons simultaneously for 4 seconds or longer to engage temperature monitor mode.

During temperature monitoring, $[\mathbf{F}]$ is illuminates.

(The display and operations are the same as for monitor mode using the indoor unit remote controller.)

- ② Press the UNIT button and select the indoor unit to monitor.
- ③ Press the temperature setting and buttons and select the item code of the temperature to monitor.

The unit No. of the selected indoor unit, and the temperature data, are displayed.

(4) To end monitoring, press the \checkmark (CHECK) button. The display returns to the normal display.



NOTE The display does not blink.



4. Monitoring Operations

Display of unit No. 1 (main unit)

DN	Description		Remarks
82	Indoor unit intake temp.	°C	
<i>[</i>]3	Indoor unit heat exchanger temp. (E1)	°C	
<u>[</u>]4	Not used	°C	
85	Indoor unit heat exchanger temp. (E3)	°C	> Indoor unit
86	Discharge air temp.	°C	
<i>[</i>]7	Discharge air temp. setting	°C	
88	Indoor unit MOV position	STEP)
<u>[</u>]R	Discharge temp. (TD)	°C	
EE	High-pressure sensor temp.	°C	
ūd	Suction temp. (TS)	°C	
<u>EIE</u>	Heat exchanger liquid temp. (C1)	°C	
11	Outdoor air temp. (TO)	°C	> Outdoor unit
12	Not used		
E	Inverter primary current	A	
15	MOV position		
19	Actual operating frequency	Hz	J

5. Outdoor Unit Alarm History Monitor

- Displays outdoor unit alarms only.
- Check the indoor unit alarm histories separately using the indoor unit remote controllers or other control device.

<Operating procedure>

 Press and hold the (CHECK) button and ET button simultaneously for 4 seconds or longer to engage outdoor unit alarm history mode.

During temperature monitoring, 🗲 illuminates.

The display and operations are the same as for the alarm history monitor performed from the indoor unit remote controller. However the "unit No." display shows the outdoor unit address.

② Press the temperature setting and buttons and select the item code for the alarm history.

The select outdoor unit address, the item code, and the alarm history (alarm data) are displayed.

The outdoor unit address is displayed as R.C. XX-YY. System XX = Outdoor unit system address R.C. XX = Outdoor unit system address YY = Outdoor unit sub-bus address

Item codes 01-08 are displayed. 01 indicates the most recent alarm.

The alarm history displays the alarm code. (If no alarm are present, then -- -- is displayed.)

- ③ To clear the alarm history, press the End button. (The outdoor unit alarm history will be cleared.)
- ④ To exit, press the (CHECK) button. The display returns to the normal display.



6. Mode Settings

Setting mode 1

<Operating procedure>

- Press and hold the (CHECK) button and
 (VENTILATION) button simultaneously for 4 seconds or longer.
- ② Press the temperature setting and buttons to change the item code. The item codes and setting data are shown in the table below.
- ③ Press the timer time and buttons to change the setting data.

To confirm the changed setting data, press the SET button.

(At this time, "**SETTING**" stops blinking and remains lit.)

 During this mode, "SETTING" is displayed, blinking. The outdoor unit address display section displays "ALL," the item code number (DN value in the table), and the setting data (8 digits).

(The setting data is displayed in 8 digits. The display changes between the first 4 digits (Fig. B) and the last 4 digits (Fig. B). When the first 4 digits are displayed, the bottom dot of the colon is illuminated.)

(5) To exit the setting mode, press the (CHECK) button.

A Display of first 4 digits



B Display of last 4 digits



(A) and (B) are displayed alternately. (Example shows display of 0000 0001.)

DN	Parameter	Description
05	Outdoor unit fan Quiet mode	0 = Disabled 1 = Quiet mode
18	Energy saving mode	0 = None 1 = Discharge temp. control only (Mode 3) 2 = Demand only (Mode 2) 3 = Discharge temp. control + Demand (Mode 1)
19	Energy saving operation plug	0 = Independent 1 = All indoor units linked
IR .	Demand 1 current	40 = 40%, 45 = 45%, 95 = 95% 100 = 100%, -1 = (no limit)
Њ	Demand 2 current	40 = 40%, 45 = 45%, 95 = 95% 100 = 100%, -1 = (no limit)
EE	Indoor unit connecting Nos.	0 = Setting at shipment (Indoor unit connecting Nos. shows after installation's communication.)
FF Auto restart setting		 0 = None 1 = Indoor EEPROM code : Set 28 to 01 (When power failure is recovered, the system restores automatically.) 2 = Indoor EEPROM code : Set 28 to 00 (When power failure is recovered, the system does not restore automatically.) (When EF changed, set to EE for setting at shipment : Set to 0)

6. Mode Settings

Setting mode 2

<Operating procedure>

- Press and hold the (CHECK) button, SET button, and button simultaneously for 4 seconds or longer.
- ② Press the temperature setting and buttons to change the item code. The item codes and setting data are shown in the table below.
- ③ Press the timer time and buttons to change the setting data. To confirm the changed setting data, press the SET button.

(At this time, "SETTING" stops blinking and remains lit.)

④ During this mode, "STINC" is displayed, blinking. The display shows the set outdoor unit address "System XX-YY" (System XX = System address, YY = Address at outdoor unit sub-bus), item code number (DN value in the table below), and the setting data (8 digits).



Fig. 3-6

(The setting data is displayed in 8 digits. The display changes between the first 4 digits (Fig. B) and the last 4 digits (Fig. B). When the first 4 digits are displayed, the bottom dot of the colon is lit.)

(5) To exit setting mode, press the 🗡 (CHECK) button. Returns to the normal display mode.



(B) Display of last 4 digits



B: <Refrigerant type> (A) and (B) are displayed alternately. (Example shows 0000 0410 (R410A).)

List of Item Codes

DN	Parameter	Description
81	Outdoor unit capacity	112 = 4 hp 140 = 5 hp 160 = 6 hp

hp = horse power

– MEMO –

4. REMOTE CONTROLLER FUNCTIONS

1.	Simple Settings Function	4 -2
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1. Simple Settings Function

 This allows the filter lifetime, operating mode priority change, central control address, and other settings to be made for an individual or groupcontrol indoor unit to which the remote controller used for simple settings is connected.

When simple settings mode is engaged, operation stops at the individual or group-control indoor unit to which the remote controller for simple settings is connected.

<Procedure>

- Press and hold the And buttons simultaneously for 4 seconds or longer.
- ② "SET DATA," unit No. " : {" (or " RLL" in the case of group control), item code " U i," and settings data " U XX" are displayed blinking on the remote controller LCD display (Fig. 4-1). At this time, the indoor unit fan (or all indoor unit fans in the case of group control) begins operating.
- ③ If group control is in effect, press the UNIT button and select the address (unit No.) of the indoor unit to set. At this time, the fan at the indoor unit begins operating.
 - * If unit No. " **#L L** " is displayed, the same setting will be made for all indoor units.
- ④ Press the temperature setting /
 buttons to select the item code to change.
- (5) Press the timer time / buttons to select the desired setting data.
 - * For item codes and setting data, refer to the following page.
- 6 Press the SET button. (The display stops blinking and remains lit, and setting is completed.)
- ⑦ Press the button to return to normal remote controller display.

[Remote Controller Functions Section]



Fig. 4-1

4 - 2

List of Simple Setting Items

Itom codo	Itom	Setting data						
item code	nem	No.	D	escription				
		0000	Not displayed					
		0001	150 hours					
n	Filter sign ON time	0002	2,500 hours					
_ LI I	(fitIter life time)	0003	5,000 hours					
		0004	10,000 hours					
		0005	Use the filter clogging sensor.					
		0000	Standard (setting at time of shipping	g)				
	Degree of filter fouling	0001	Highly fouled					
		0001	(Filter sign ON time is reduced to o	ne-half the set time.)				
		0001	Central control address 1					
		0002	Central control address 2					
		0003	Central control address 3					
03	Central control address	2	2					
		0064	Central control address 64					
		0099	No central control address set (sett	ing at time of shipping)				
្រាប	Operating mode	0000	Normal (setting at time of shipping)					
<u> </u>	priority change	0001	Priority					
	Fan speed when heating thermostat is OFF		Compressor ON	Compressor OFF				
		0000	Lo 1 min., LL 3 min.	LL				
		0001	Lo	LL				
25		0002						
		0004	Lo 1 min., LL 3 min.	Lo				
		0005	Lo	Lo				
		0006		Lo				
			INO SNIT					
		0001	Shifts intake temperature 1°C down.					
ne	Heating intake	0002	Shifts intake temperature 2°C down.					
116	temperature shift	0003	Shifts intake temperature 3°C down.					
		0004	Shifts intake temperature 4°C down.					
		0005	Shifts intake temperature 5°C down.					
		0006	Shifts intake temperature 6°C dowr	l.				
רח	Electric heater	0000	No heater					
	Installation	0001	Heater installed					
nn	Humidifying when	0000	No (setting at time of shipping)					
	neater thermostat is OFF	0001	Yes					
ן הם	Permit/prohibit	0000	Permit					
	heating/cooling	0001	Prohibit					
חַכ	Cool-only	0000	Normal					
ן ייש	Cooronny	0001	Cool only (Set "1" for item code OD	.)				

NOTE

- In order to avoid water leakage and damage to the fan, do not set for humidifying when the thermostat is OFF unless a vaporizing humidifier is used.
- Consider the device purpose and type when changing the settings. Incorrect settings may result in malfunction.
- Do not change any setting data that does not appear in this list.

Simple setting items

Item code	ltem	Description
01	Filter sign ON time setting (filter lifetime)	Changes the indoor unit filter lifetime when a high-performance filter or other optional product is installed.
02	Degree of filter fouling	Reduces the filter sign ON time to 1/2 of the standard time (setting at the time of shipping) for cases when filter fouling is more severe than normal.

Filter sign ON times for each model

		Filter sign ON time										
Model	Model	Standard		Long-life		Super long-life		High performance 65		High performance 90		Pressure
data		Standard	High fouling	St _{andard}	High fouling	St _{andard}	High fouling	St _{andard}	High fouling	St _{andard}	High fouling	differential switch
0001	4-Way cassette (U1, Y1)	×	×	2500	1250	5000	2500	2500	1250	×	×	×
0002	2-Way cassette (L1)	×	×	2500	1250	10000	5000	2500	1250	2500	1250	×
0003	1-Way cassette (D1)	×	×	2500	1250	×	×	×	×	×	×	×
0005	Low Silhouette Ducted (F1) Slim Low Static Ducted (M1)	×	×	×	1250	5000	2500	2500	1250	5000	2500	×
0006	High Static Pressure Ducted (E1)	×	×	×	1250	×	×	2500	1250	5000	2500	×
0007	Ceiling (T1)	×	×	2500	1250	×	×	2500	1250	×	×	×
0008	Wall Mounted (K1)	150	75	×	×	×	×	×	×	×	×	×
0010	Floor Standing (P1)	150	75	×	×	×	×	×	×	×	×	×
0011	Concealed Floor Standing (R1)	150	75	×	×	×	×	×	×	×	×	×

Unit: hour

NOTE

- X indicates that there is no corresponding filter.
- 150 indicates the filter sign ON time that is set at shipment.
- High fouling: Set when $\square\square\square$; is selected for the degree of filter fouling (item code \square).

4

Item code	Item	Description
03	Central control address	Set when using a central control device. Used when setting the central control address manually from the remote controller.
04	Operating mode priority change	Note (1)

NOTE

(1) Explanation of operation mode priority change

Enabled only in Mini VRF System heat-pump models.

<Function>

With indoor units that are installed in combination with an outdoor unit model where either heating or cooling operation can be selected, the operating mode of the indoor unit that starts first takes priority. The first indoor unit to operate can select any operating mode. When any mode other than fan mode is selected, then the operating modes that cannot be selected are not displayed on all remote controllers that are subsequently operated. "Operation change control in progress" is displayed, indicating that there are restrictions on the operating modes that can be selected.

· Controlling the operating mode from a specific remote controller

- When there are multiple remote controllers in the same refrigerant system, it is possible to set one remote controller as the priority remote controller (the remote controller which is given priority for selecting the operating mode). (If 2 or more remote controllers are set as priority remote controllers, an alarm will occur at the remote controllers, and operation will not be possible.)
- When the priority remote controller is set to the operating mode for control, then all other remote controllers can select only the permitted operating mode, regardless of whether the priority remote controller is operating or stopped.
- When a controlled remote controller is operated, "Operation change control in progress" is displayed.

Set mode at priority remote controller	Modes that can be selected at other remote controllers
Cooling or dry	Cooling, dry, fan
Heating	Heating, fan
Fan	Whichever mode (heating/cooling) is selected first

NOTE

There are other methods to avoid control in which the mode selected first takes priority.

Methods of remotely controlling the operating mode

- (1) Use the central functions of a central control device.
- (2) Use a remote control relay PCB at the outdoor unit.

1. Simple Settings Function

When the operating mode at the priority remote controller is changed, the operating modes of other remote controllers change as shown below.

Mode change at pri	iority remote controller	Operating modes at other remote controllers						
Current mode New mode		Current mode	New mode					
Cooling or dry	Llasting	Cooling or dry	Heating					
	пеашу	Fan	Fan (not changed)					
Leating	Cooling	Heating	Cooling					
nealing	Cooling	Fan	Fan (not changed)					
Cooling	Day	Cooling	Cooling (not changed)					
Cooling	Dry	Dry	Dry (not changed)					
Heating	Day	Heating	Cooling					
	Dry	Fan	Fan (not changed)					
		Cooling	Cooling (not changed)					
Cooling or dry	Fan	Dry	Dry (not changed)					
		Fan	Fan (not changed)					
Heating	For	Heating	Heating (not changed)					
neating	ran	Fan	Fan (not changed)					

Item code	Item	Description
05	Fan speed setting when heating thermostat is OFF	Changes the fan speed setting when the heating thermostat is OFF.
06	Heating intake temperature shift	Shifts the intake temperature during heating. Can be set when the body thermostat is used.
07	Electric heater installation	Set when cost distribution is performed using an AMY central control system or similar system, and when an optional electric heater is installed. (This is unrelated to control of the electric heater.)
08	Humidifying when heater thermostat is OFF	Normally humidifying does not occur when the thermostat is OFF during heating operation. However, this setting can be changed in order to increase the amount of humidifying. Caution: In order to avoid water leakage and damage to the fan, do not use this setting unless a vaporizing humidifier is used.
0D	Permit/prohibit automatic heating/cooling	This setting can be used to prevent the automatic heating/cooling display on the remote control if the unit configuration permits automatic heating/cooling operation.
0F	Cooling-only	This setting allows a heat pump indoor unit to be operated as a cooling-only unit.

 This allows the system address, indoor unit address, and other settings to be made for the individual or group-control indoor unit to which the remote controller used for detailed settings is connected.

When detailed settings mode is engaged, operation stops at the individual or group-control indoor unit where the remote controller used for detailed settings is connected. Simple settings items can also be set at this time.

<Procedure>

- Press and hold the , SET and EN buttons simultaneously for 4 seconds or longer.
- ② "SET DATA," unit No. " : (or " ALL" in the case of group control), item code " []," and settings data " []] XX" are displayed blinking on the remote controller LCD display (Fig. 4-2).

At this time, the indoor unit fan (or all indoor unit fans in the case of group control) begins operating.

- ③ If group control is in effect, press the UNIT button and select the address (unit No.) of the indoor unit to set. At this time, the fan at the indoor unit begins operating.
- ④ Press the temperature setting / v buttons to select the item code to change.
- (5) Press the timer time / buttons to select the desired setting data.
 - * For item codes and setting data, refer to the following page.
- 6 Press the SET button. (The display stops blinking and remains lit, and setting is completed.)
- ⑦ Press the button to return to normal remote controller display.



Fig. 4-2

- Setting the Flap Separately (When setting the CZ-RTC2)
 - 1) The 4-air outlet flap can be adjusted separately during operation. When not adjusted separately, all flaps operate in the same manner.



(adjustment for up-down airflow direction)

<Procedure>

Stop the system before performing these steps.

- ② If group control is in effect, press the UNIT button and select the address (unit No.) of the indoor unit to set. At this time, the fan at the indoor unit begins operating.
- (3) " SETTING," unit No. " :- : : (or " Fill i " in the case of group control), item code " XX," and settings data " YYYY " are displayed blinking on the remote controller LCD display.
- Designate the item code "XX " by adjusting the Temperature Setting
 /
 buttons.



 ⑤ Press the timer time ▲ / ▼ buttons to select the desired setting data.



* Setting data "YYYY" (refer to Fig. 4-3)

Setting data	Flap position during operation
00 00	Without separate setting
0001	Swing
00 02	Move to position 1 and stay
00 03	Move to position 2 and stay
00 04	Move to position 3 and stay
00 05	Move to position 4 and stay
00.06	Move to position 5 and stay

When the flap position is set to $\boxed{4}$ or $\boxed{5}$ and the unit is in the cooling or dry mode, the flap position is moved to $\boxed{3}$ and the operation is started. (refer to Fig. 4-3)

NOTE

The flap swings during the operation under "Setting the Flap Separately".

At this time, the unselected flaps are moved to the position 1. (refer to Fig. 4-3)

6 Press the SET button.

(The display stops blinking and remains lit, and setting is completed.)

If you wish to change the selected indoor unit, follow the step 2 .

Press the button to return to normal remote controller display.



List of Detailed Setting Items

ltow orde	ltana	Setting data											
item code	No. Description No. Description	No.	Description										
	0001	4-Way Casstte (60×60) (U1, Y1)	0002	2-WAY Cassette (L1)	0003	1-Way Cassette (D1)							
10	Туре	0005	Low Silhouette Ducted (F1) Slim Low Static Ducted (M1)	0006	High Static Pressure Ducted (E1)	0007	Ceiling (T1)						
		0008	Wall mounted (K1)	Setting data lescription No. Description No. Casstte (60x60) (U1, Y1) 0002 2-WAY Cassette (L1) 0003 1-W ouelte Ducted (F1) 0006 High Static Pressure Ducted (E1) 0007 0007 rounted (K1) 0010 Floor Standing (P1) 0011 C 2 (Type 22) 0003 28 (Type 28) 0005 0011 2 (Type 45) 0009 56 (Type 56) 0011 For S-71 80 (Type 73) 0018 160 (Type 160) 0021 22 0 (Type 140) 0018 160 (Type 160) 0021 22 3	Concealed Floor Standing (R1)								
		0001	22 (Type 22)	0003	28 (Type 28)	0005	36 (Type 36)						
	Indoor unit capacity	0007	45 (Type 45)	0009	56 (Type 56)	0011	71 (Type 73) For S-71MP1E5 and S-71MR1E5						
		0012	80 (Type 73) (Except S-71MP1E5, S-71MR1E5)	0013	90 (Type 90)	0015	112 (Type 106)						
		0017	140 (Type 140)	0018	160 (Type 160)	0021	224 (Type 224)						
		0023	280 (Type 280)										
		0001	Unit No. 1										
		0002	Unit No. 2										
	System	0003	Unit No. 3										
12'	address	2	2										
		0030	Unit No. 30										
		0099	Not set										
		0001	Unit No. 1	nit No. 1									
		0002	Unit No. 2										
,	Indoor unit	0003	Jnit No. 3										
i I	address	2	ζ										
		0064	Init No. 64										
		0099	Not set										
		0000	ndividual (1:1 = Indoor unit with no group wiring)										
111	Group control	0001	Main unit (One of the group-control indoor units)										
1	address	Iress 0002	Sub unit (All group-control indoor units except for main unit)										
		0099	Not set										
	-010 Shifts intake temperature by -10°C.												
		-009	Shifts intake temperature by -9°C.										
		2	2										
	Cooling	-001	Shifts intake temperature I	Shifts intake temperature by -1°C.									
	Intake temperature	0000	No intake temperature shift										
	shift	0001	Shifts intake temperature I	oy +1°C).								
		2	ζ										
		0009	Shifts intake temperature I	oy +9°C).								
		0010	Shifts intake temperature I	oy +10°	°C.								
	Automatic	0000	Function disabled										
	stop time	0001	Stops automatically 5 minu	utes aft	er operation starts.								
	operation	0002	Stops automatically 10 min	nutes a	fter operation starts.								
18	start	2											
	*Can be set	0123	Stops automatically 615 m	ninutes	after operation starts.								
	in 5-minute	0124	Stops automatically 620 minutes after operation starts.										
	units.	0125	Stops automatically 625 minutes after operation starts.										

Item code	ltem -		Setting data			
			No.	Description		
1. (1P)	Forced thermostat ON time		0000	5 minutes		
		a ume	0001	4 minutes		
			-010	–10°C		
			-009	_9°C		
11	Cooling discharge temperature shift		-008	-8°C		
1))		
			((
			0010	10°C		
	Heating discharge		_010	–10°C		
			-009	-9°C		
!_!			-008	-8°C		
	temperature shift	temperature shift				
			((
			0010	10°C		
			0001	±1°C		
	Temperature shift f	or	0002	±2°C		
<i>!</i> F	cooling/heating chance	ge in	0003	±3°C		
1	auto heat/cool mod	de)	\rangle		
			0007			
			0007	10° C (Lower limit at chipment)		
<i> </i> F						
(Upper limit)		ng	0019			
		ilo	2			
20		ပိ	0029	29°C		
(Lower limit)			0030	30°C (Upper limit at shipment)		
			0016	16° C (Lower limit at shipment)		
<i>c'</i> i		_	0017			
(Upper limit)		ing)			
		eat	(
		Т	0029	29°C		
(Lower limit)	Change to remote		0030	30°C (Upper limit at shipment)		
	control temperature		0018	18°C (Lower limit at shipment)		
C I	setting range		0010	10°C		
(Upper limit)		ing)			
		- Suc	((
64			0029	29°C		
(Lower limit)			0030	30°C (Upper limit at shipment)		
717	1	eat/cool	0017	17°C (Lower limit at shipment)		
63			0018	18°C		
(Upper limit)))		
20		he	((
		utc	0026	26°C		
(Lower limit)		∢	0027	27°C (Upper limit at shipment)		
, , , , , , , , , , , , , , , , , , , ,	Auto restart settin	a	0000	Incapable of auto restart setting		
		3	0001	Capable of auto restart setting (at factory shipment)		
	Humidifier operatio	n	0000	Normal		
			0001	Ignore heat exchanger temperature conditions.		
			0000	Filter input (differential pressure switch input)		
20	Filter (CN70) inpu	t	0001	Alarm input (for trouble input about air cleaner or similar device)		
"	switching		0002	Humidifier input (Operates linked with drain pump when humidifier is		
				ON.)		
27	Indoor unit electron	nic	0000	Present (Setting at shipment)		
	control valve		0002	None		
			0000	Normal (Used as optional relay PCB or JEMA standard HA terminal.)		
28	T10 terminal switching		0001	Used for OFF reminder		
			0002	Fire prevention input		
L				· · ·		

Itom codo	Itom	Setting data				
item code	nem	No.	Description			
25		0000	No forced operation			
	Automatic drain nump	0001	Forced operation for 1 minute			
	operation	2	2			
		0060	Continuous operation			
71	Ventilation fan operation	0000	None			
1	ventilation lan operation	0001	Ventilation fan operated by remote controller.			
22	Wired remote controller	0000	Not used. (Body sensor is used.)			
]]]	sensor	0001	Remote control sensor is used.			
שע	"Operation change control in progress"	0000	Normal (displayed)			
	display	0001	Not displayed			
20	Discharge temperature	0000	Discharge temperature control OFF			
	control	0001	Discharge temperature control ON			
	Heat exchanger	0013	Control temperature 13°C			
	temperature for cold air	0014	Control temperature 14°C			
JE	(Heat exchanger control point for control to prevent cold air)	2	2			
		0025	Control temperature 25°C			
		0026	Control temperature 26°C			
רב	Fan output switching	0000	Output linked with fan. (ON when indoor unit fan is operating.)			
		0001	Fan mode operation output			
	Drain pump delayed start time	0000	No delayed start			
		0001	1 sec. delayed start			
		0002	2 sec. delayed start			
38		2	2			
		0058	58 sec. delayed start			
		0059	59 sec. delayed start			
		0060	60 sec. delayed start			
		0000	Humidifier output OFF. Drain pump stopped.			
40		0001	Humidifier output ON. Drain pump operates.			
	Humidifier setting	0002	Humidifier output ON. Drain pump operates for 1 minute when total humidifier			
			operating time reaches 60 minutes.			
		0003	Humiditier output ON. Drain pump stopped.			
45	Flap operation mode	0000				
' -'		0001	Draft reduction mode (Flap lower-limit position is shifted upwards.)			
	<u> </u>	0000	Smudging reduction mode (Flap swing upper-limit position is shifted downwards.)			
46	Flap swing mode	0001				
		0002	IDratt reduction mode (Flap swind lower-limit position is upwards)			

			Setting data					
Item code	Item	No.	Description					
			DC fan tap ope mode	erating		Purpose		
		0000	Standard		Standard (setting at ship	oment)		
			High ceiling use	Э	High ceiling setting 1 (w	ith standard panel)		
		0001	For low	<i>c</i>	Ultra long-life filter, oil gu	uard panel, ammonia deodorizing		
	Fan tap setting		static-pressure	filter	filter, optical regenerativ	e deodorizing filter		
F 1	(Fan tap change in order to prevent drop in air		High ceiling use	<u>ə</u>	High ceiling setting 2 (W	Ith standard panel)		
20	discharge caused by	0003	For low static-pressure filter		(Antibacterial) high-performance filter (55%)			
	filter installation)				Air-cleaning unit, air-cleaning unit + optical regenerative			
					deodorizing filter, deodo	rant (activated charcoal) filter		
			For air-blocking		an disabarga duat is connected			
			material		For 3-way discharge, when discharge duct is connected			
		0006	For air-blocking For 2-way discharge					
		0000	Mo humidifier output					
		0000		uipui				
		0002	2 sec.					
CC	ON time per 60)	<u>> > - ></u>					
בן	seconds)	((
		0058	58 Sec.					
		0059	Continuously ON					
		0000	Function disabled					
55	Repeat timer switching	0001	Function enabled					
	Timer function change	0000	Function disabl	led				
bü	prohibit	0001	Function enable	ed				
52	Smudging control	0000	No smudging c	ontrol				
	Setting the Flap Separately *Only for 4-way Cassette type	0000	Air discharge		Flap 1 XX =9	0 Flap position		
		0001	port	ÉN	(Motor No. 4)	component (1)		
50		0002		<u>Iltref</u>		box		
		0002	Flan		Flap 2	Flap 4		
		0003	(adjustment for		(Motor No. 2)	$(Motor No. 3) \bullet 4 \Box$		
		0004	up-down					
	Setting the Flap Separately *Only for 4-way Cassette type	0005			Flap 3 XX =9	2		
91		0006			(Motor No. 1)			
		0006	Setting data	Flap po	osition during operation	When the flap position is set to		
			00 00	Withou	t separate setting	4 or 5 and the unit is in the		
92	Setting the Flap Separately *Only for 4-way Cassette type		0001	Swing		position is moved to 3 and the		
			50.00	Move t	o position 1 and stay	operation is started.		
			0003	Move t	o position 2 and stav	NOTE		
			0000	Move t	o position 3 and stav	The flap swings during the		
	Setting the Flap Separately		000	Movet	o position 4 and stav	Flap Separately".		
23	*Only for 4-way			Movet	o position E and star	At this time, the unselected flaps		
	Cassette type					are moved to the position 1.		
2. Detailed Settings Function

Item code	Item	Description		
10	Unit type	Sat when the indeer unit EEPPOM memory is replaced during convising		
11	Indoor unit capacity	Set when the industrum EEP Now memory is replaced during servicing.		
12	System (outdoor unit) address	These are not set at the time of shipping from the factory. These must be set after installation if automatic address setting is not performed		
13	Indoor unit address			
14	Group address			
17	Cooling intake temperature shift	Shifts the intake temperature during cooling and dry operation. (Enabled only when the body thermostat is used.) Increase this value when it is difficult to turn the thermostat ON.		
18	Automatic stop time after operation start	The time at which an indoor unit is automatically stopped after operation starts can be set in increments of 5 minutes.		
1E	Temperature shift for cooling/heating change in "auto heat/cool" mode	"Auto heat/cool" selects the operating mode automatically based on the difference between the room temperature and the temperature set on the remote controller. This setting establishes a shift temperature for the heating/ cooling temperature setting relative to the remote controller temperature setting.		



Item code	Item		Description		
1F (Upper limit) 20 (Lower limit)		Cooling			
21 (Upper limit) 22 (Lower limit)	Change to the remote	Heating	This setting changes the temperature range (upper limit and lower limit) which is set from the remote controller or central control device.		
23 (Upper limit) 24 (Lower limit)	setting range	Drying	If the temperature setting is to be a single point, set the upper limit and lower limit to the same temperature.		
25 (Upper limit) 26 (Lower limit)		Auto heat/cool			
28	Auto restart setting		When indoor unit is shutdown due to power failure, auto restart setting can restore the previous operating system.		
29	Humidifier operation which ignores the heat exchanger temperature		During heating operation, the humidifier operates when the heat exchanger temperature is suitable for humidifying. This setting is used to ignore this condition for humidifier operation and operate the humidifier more.		
2A	Filter input switching		This setting switches the filter input according to the purpose of use.		
2C	Indoor unit electronic control valve		This setting indicates whether or not an indoor unit electronic control valve is present. At the time of shipping, this setting is set according to the conditions of the indoor unit.		
2E	T10 terminal input switching		Ordinarily, the T10 terminal is used as the HA terminal at the time of shipping. However, this setting is used when the T10 terminal is used for OFF reminder or for fire prevention input.		
31	Ventilation fan operation from remote controller		It is possible to install a total heat exchanger and ventilation fan in the system, which can be started and stopped by the wired remote controller. The ventilation fan can operate linked with the start and stop of the indoor unit, or can be operated even when the indoor unit is stopped. Use a ventilation fan that can accept the no-voltage A contact as the external input signal. In the case of group control, the fans are operated together. They cannot be operated individually.		
32	Switching to remote controller sensor		This setting is used to switch from the body sensor to the remote controller sensor. Check that "remote controller sensor" is displayed. Do not use this setting with models that do not include a remote controller sensor. Do not use this setting if both the body sensor and remote sensor are used.		
34	ON/OFF of "Operation change control in progress" display		In a MULTI system with multiple remote controllers, switching between heating and cooling is restricted, and "Operation change control in progress" is displayed. This setting is used to prevent this display from appearing. Refer to the item concerned with operating mode priorities.		

(Continued)

4

2. Detailed Settings Function

(Continued from previous page)

Item code	Item	Description
ЗC	Heat exchanger temperature for cold air discharge	The heat exchanger temperature control point for prevention of cold air discharge during heating operation can be changed.
3d	Fan output switching	The indoor unit PCB optional output for the fan can be switched according to the purpose of use.
3E	Drain pump delayed start time	The drain pump starts after the set time delay after cooling operation stops.
40	Humidifier drain pump setting	This specifies the humidifier and drain pump setting.
45	DC flap operation mode	Changes flap operation to draft reduction mode.
46	DC flap swing mode	Selects the swing operation mode for the flap.
5d	DC fan tap setting	Sets the DC fan tap according to the purpose of use. Change the settings data at the same time.
5E	Humidifier ON time	Sets the humidifier output ON time for when the humidifier is operating. ON/OFF control is performed during humidifier operation. This setting therefore sets the ON time per 60-second interval.
5F	Stop at time set for OFF timer after operation starts	This setting enables a function that stops operation when the amount of time set for the OFF timer has passed after remote controller operation was started.
60	Timer function change prohibit	This function prohibits changes from being made to the remote controller time setting.
62	Smudging control	Smudging control is disabled when 0000 is set.

Selecting the DC fan motor tap (when setting from the PCB)

• 4-Way Cassette type

<Procedure> Stop the system before performing these steps.

- 1 Open the electrical component box cover, then check the indoor unit control PCB.
- ⁽²⁾ Connect the jumper connector (2P: yellow) which was supplied with the accessory to the correct connector pin on the indoor unit control PCB according to the setting number which was confirmed in " List of Detailed Setting Items " (Item code 5d).

Setting No. (3) :

Then connect the jumper connector to the connector pin TP3 (2P: yellow) on the indoor unit control PCB. Setting No. (6) :

Then connect the jumper connector to the connector pin TP6 (2P: white) on the indoor unit control PCB.



Fig. 4-4

• Ceiling type

<Procedure> Stop the system before performing these steps.

- ① Open the electrical component box cover, then check the indoor unit control PCB. (Fig. 4-5)
- ⁽²⁾ Connect the jumper connector (2P: yellow) which was supplied with the accessory to the correct connector pin on the indoor unit control PCB according to the setting number which was confirmed in "List of Detailed Setting Items" (Item code 5d).
 - If the setting No. is (1), then connect the jumper connector to the connector pin TP1 (2P: red) on the indoor unit control PCB.
 - If the setting No. is (3), then connect the jumper connector to the connector pin TP3 (2P: yellow) on the indoor unit control PCB.

1-Way Cassette type

<Procedure> Be sure to turn OFF the main power source before performing the steps below.

- ① Open the electrical component box cover, then check the indoor unit control PCB. (Fig. 4-5)
- ② Connect the jumper connector (2P: yellow) which was supplied with the accessory to the correct connector pin on the indoor unit control PCB according to the setting number which was confirmed in "List of Detailed Setting Items" (Item code 5d).
 - When using with the high ceiling settings Connect the jumper connector to the connector pin TP1 (2P: red) on the indoor unit control PCB.
 - When using with the discharge grille (purchased separately) attached (2-way lowered ceiling system) Connect the jumper connector to the connector pin TP3 (2P: yellow) on the indoor unit control PCB.



1

• The remote controller includes a number of servicing functions. Use these as needed for test runs and inspections.

List of Servicing Functions

Functions	Description	Button operation	Reset operation	Unit status
Test run	Operation with forced thermostat ON	Press and hold the <i>S</i> button for 4 seconds or longer.		
Sensor temperature display	Temperature display from each sensor	Press and hold the f and E buttons for 4 seconds or longer.		Current operation is maintained.
Servicing check display	Alarm history display	Press and hold the And SET buttons for 4 seconds or longer.	Press the 🗲	
Simple settings	Filter life time, operating mode priority, central control address, and other settings	Press and hold the 🖍 and from buttons for 4 seconds or longer.	button.	When settings are made from a remote controller,
Detailed settings	System address, indoor unit address, central control address, and other settings	Press and hold the \nearrow , CAN and SET buttons for 4 seconds or longer.		remote controller is connected stops.
Automatic address	Automatic address setting based on command from the wired remote controller	Press and hold the 🖍 and the timer operation 🍙 buttons for 4 seconds or longer.	Automatic reset	Entire system stops.
Address change	Change of indoor unit address	Press and hold the And the timer operation buttons for 4 seconds or longer.	Press the 🗡 button.	

Test Run Function

Operates the unit with the thermostat forced ON.

<Procedure>

- Press and hold the button for 4 seconds or longer.
- ② "Test" appears on the remote controller LCD display (Fig. 4-6).
- ③ Start operation.
- ④ Press the button to return to normal remote controller display.



Fig. 4-6

Sensor temperature display function (displayed both when unit is running and stopped)

• Use the following check procedure to display the sensor temperatures from the remote controller, indoor unit, and outdoor unit sensors on the remote controller display.

<Check procedure>

- Press and hold the (CHECK) button and button simultaneously for 4 seconds or longer.
- ② The following appears on the remote controller LCD display: unit No. X – X (main unit No.), item code XX (sensor address), and service monitor 00XX (sensor temperature).

(See figure at right. 2)

- ③ Press the temperature setting _____ and
 _____ buttons to change the item code to the sensor address of the sensor you wish to monitor.
 (For the relationship between the sensor address and sensor type, refer to the sensor temperature relationship table on next page.)
- ④ If group control is in effect, press the UNIT button to change to the unit you wish to monitor.
- ⑤ Press the (CHECK) button to return to normal remote controller operation.

<Note> The temperature display for units that are not connected appears as "- - - -."

 If monitor mode is engaged during ordinary operation, the only parts of the LCD display that change are those shown in ② in the figure. The other parts remain unchanged during normal operation.



F ↓ ∶ Unit No. *IH* ∶ Item code (sensor address) *IIXX* ∶ Discharge temp. (TD)

Location where sensor is installed	Sensor address	Sensor type	Sensor address	Sensor type
	00	Room temp. *1	05	Indoor unit heat exchanger temp. (E3)
	01	Remote controller temp.	06	Discharge air temp.
Indoor unit	02	Indoor unit intake temp.	07	Discharge air temp. setting
	03	Indoor unit heat exchanger temp. (E1)	08	Indoor unit MOV position
	04	—	09	_
	0R	Discharge temp. (TD)	12	_
	0C	High-pressure sensor temp.	13	Inverter primary current
Outdoor unit	Ūď	Suction temp. (TS)	15	MOV1 position
	0E	Outdoor unit heat exchanger temperature (C1)	18	_
	11	Outside air temperature	19	Actual operating Frequency

Sensor Temperature Relationship Table

*1 Main unit only in case of group control.

5. TROUBLE DIAGNOSIS

1.	Contents of Remote Controller Switch Alarm Display	. 5 -2
2.	Outdoor Unit Control Panel LED Display	. 5 -4
3.	Mini VRF System Alarm Codes	. 5- 5
4.	Inspection of Parts (Outdoor Unit)	5 -51
5.	Symptom: Thermostat in OFF continues or cycles OFF & ON too frequently	5 -52

1. Contents of Remote Controller Switch Alarm Display

ON: ○ Blinking: -☆- OFF: ●

	_		Wired remote control display	Wireless remote controller receiver display		
	Poss	ible cause of malfunction		Operation Timer Standby for heating		
Serial communication errors	Remote controller is detecting error signal from indoor unit.	Error in receiving serial communication signal (Signal from main indoor unit in case of group control) Ex: Auto address is not completed.	<e01></e01>	Operating lamp blinking		
Missetting		Error in transmitting serial communication signal	<e02></e02>			
	Indoor unit is detecting error sig	gnal from remote controller (and system controller).	< <e03>></e03>			
	Indoor unit is detecting error signal from outdoor unit.	Error in receiving serial communication signal When turning on the power supply, the number of connected indoor units does not correspond to the number set. (Except R.C. address is "0.")	E04	Heating ready lamp blinking		
		Error of the outdoor unit in receiving serial communication signal from the indoor unit	<e06></e06>			
	Improper setting of indoor unit	Indoor unit address setting is duplicated.	E08	Operating lamp		
	or remote controller.	Remote controller address connector (RCU. ADR) is duplicated. (Duplication of main remote controller)	< <e09>></e09>	blinking		
	During auto address setting, number of connected units does not correspond to number set.	Starting auto address setting is prohibited. This alarm message shows that the auto address connector CN-A.ADD is shorted while other RC line is executing auto address operation.	E12 🌣 •			
	Indoor unit communication error of group control wiring	Error of main indoor unit in receiving serial communication signal from sub indoor units	E18			
	When turning on the power supply, number of connected units does not correspond to number set. (Except R.C. address is "0.")	Error in auto address setting (Number of connected indoor units is less than the number set.)	E15	Heating ready		
		Error in auto address setting (Number of connected indoor units is more than the number set.)	E16			
		No indoor unit is connected during auto address setting.	E20			
		Main outdoor unit is detecting error signal from sub outdoor unit.	E24			
		Error of outdoor unit address setting	E25			
		The number of connected main and sub outdoor units do not correspond to the number set at main outdoor unit PCB.	E26			
		Error of sub outdoor unit in receiving serial communication signal from main outdoor unit	E29			
		Outdoor unit serial communications failure.	E30			
	Improper setting	This alarm message shows when the indoor unit for multiple-use is not connected to the outdoor unit.	L02	Operating and		
		Duplication of main indoor unit address setting in group control	<l03></l03>	lamps blinking		
		There are 2 or more indoor units controllers which have operation	L05	simultaneously		
		mode priority in 1 refrigerant circuit. Non-priority set remote controller	L06	☆ ● ☆		
		Group control wiring is connected to individual control indoor unit.	L07			
		Indoor unit address is not set.	L08			
		Capacity code of indoor unit is not set.	< <l09>></l09>			
		4-way valve operation failure	L18	Operating and		
		Duplication of outdoor R.C. address setting	L04	heating ready lamps blinking simultaneously		
		Capacity code of outdoor unit is not set.	L10	☆ ○ ☆		
Activation of	Protective device in indoor	Thermal protector in indoor unit fan motor is activated.	< <p01>></p01>			
protective	unit is activated.	Improper wiring connections of ceiling panel	< <p09>></p09>	Timer and heat		
uevice		Float switch is activated.	< <p10>></p10>	blinking		
		Operation of protective function of fan inverter	< <p12>></p12>	altemately ● ☆ ☆		
		Uperation of U2 sensor	F14			

Continued

Mini VRF SYSTEM Trouble Diagnosis

1. Contents of Remote Controller Switch Alarm Display

ON: ○ Blinking: -☆ OFF: ●

	Wired remote control display	Wireless remote controller receiver display				
		Operation	Timer	Standby for heating		
Activation of	Protective device in outdoor	Incorrect discharge temperature (Comp.)	P03			
protective	unit is activated.	High-pressure switch	P04			1
device		Power supply circuit failure, missing-phase detection	P05		1	
		There is a trouble with the outdoor unit when the liquid valve and the gas valve are closed.	P13	Opera heatir	ating a ng reac blinkin	nd dy ia
		Outdoor unit fan motor is unusual.	P22	altem	ately	9
		Compressor running failure resulting from missing phase in the compressor wiring, etc. (Start failure not caused by IPM or no gas.)	P16	*	•	☆
		Missing-phase/reverse-phase in the compressor wiring, Compressor start-up failure (Overcurrent at time of INV compressor starts up, etc.)	P29			
		IPM trip (IPM current or temperature)	H31	Timer	lamp b	linking
Thermistor Indoor thermistor is either		Indoor coil temp. sensor (E1)	< <f01>></f01>	Operating an		nd
fault	open or damaged.	Indoor coil temp. sensor (E3)	< <f03>></f03>	timer blinkir	lamps na alter	nately
		Indoor suction air (room) temp. sensor (TA)	< <f10>></f10>			-
		Indoor discharge air temp. sensor (BL)	< <f11>></f11>	<u>-</u> \$	<u>-</u> ₽	•
	Outdoor thermistor is either	Comp. discharge gas temp. sensor (TD)	F04	Opera	ting an	nd
	open or damaged.	Outdoor coil liquid temp. sensor (C1)	F07	timer	lamps	natoly
		Outdoor air temp. sensor (TO)	F08		iy alter	latery
		Compressor intake port temperature sensor (TS)	F12	↓ ☆	\#	0
		High pressure sensor	F16			i
EEPROM on indoor unit PCB failure					ating ar lamp bl aneous	nd linking sly
Protective device for compressor is activated	Protective device for compressor is activated.	EEPROM on the outdoor unit PCB has failed.	F31	Opera timer simult	ating ar lamp bl aneous	inking sly
		Overcurrent of power supply current (CT) sensor	H01	Timer	lamp b	linking
	PAM failure		H02		*	
Power supply current (CT) sensor failure (Current is not detected at time of compressor ON.)		Power supply current (CT) sensor failure (Current is not detected at time of compressor ON.)	H03		뀻	•

2. Outdoor Unit Control Panel LED Display

UFF)			
ica-			
After power is turned ON (and automatic address setting is not in progress), 1 or more indoor units are confirmed in that system; however, the number of indoor units does not match the			
and regular communications are occurring.)			
Automatic address setting is in progress.			
nat			
LED 1 blinks M times, then LED 2 blinks N times. The cycle then repeats.			

3. Mini VRF System Alarm Codes

Alarms for outdoor units

Alarm Code	Alarm Meaning
E01	Remote Controller Reception Error
E02	Remote Controller Transmission Error
E03	Error in Indoor Unit Receiving Signal from Remote Controller (central)
E04	Error in Indoor Unit Receiving Signal from the Outdoor unit
E05	Error in Indoor Unit Transmitting Signal to the Outdoor Unit
E06	Error in the Outdoor Unit Receiving Signal from the Indoor Unit
E07	Error in Outdoor Unit Transmitting Signal to the Indoor Unit
E08	Duplicate Indoor Unit Address Settings Error
E09	More Than One Remote Controller Set to Main Error
E12	Start of Auto Address Setting Prohibited Due to Auto Address Setting Being in Progress
E13	Error in Indoor Unit Transmitting Signal to Remote Controller
E15	Auto-Address Alarm (not enough units)
E16	Auto-Address Alarm (too many units)
E18	Faulty Communication in Group Control Wiring
E20	No Indoor Units Error
E30	Outdoor Unit Serial Transmission Error
F 04	
F04	Compressor Discharge Temperature Sensor Error
F07	Heat Exchanger Inlet Temperature Sensor (C1) Error
F08	Outdoor Air Temperature Sensor (TO) Error
	Link Descent Concern Server
F10	Augh Pressure Sensor Error
F31	
H01	Primary Current (Input) Detect of Overcurrent
H02	PAM Error
H03	Compressor CT Sensor (Current Sensor) Unplugged
H31	HIC Error
L04	Duplicated Setting of Outdoor System Address Error
L10	Outdoor Unit Capacity Not Yet Setup Error
L18	4-way valve operation failure
P03	Compressor Discharge Temperature Error
P04	Actuation of High Pressure Switch
P05	Power Supply Error
P13	Forgot-to-open Valve Alarm
P14	O2 Sensor
P16	Overcurrent of Inverter Compressor
P22	Outdoor Fan Motor Error
P29	INV Compressor Start-up Failed (including lock) Due to INV Compressor Wiring Open Phase, Faulty DCCT, etc.

Checks Prior to Auto Address Setting

X If an outdoor unit displays an alarm, conduct this process after diagnosing the problem.

1 Auto	1-1	Is the power of the indoor unit(s) and outdoor unit(s) on?	Yes	2-1	
Audress			No	Power on	
2 Indoor/	2_1	Has the wiring of the indoor/outdoor control line been completed?YIs it all connected?It		2-2	
outdoor	2-1			Connect the wiring	
control line	2-2	Has high voltage (over AC200V) been applied to the control line circuit? Has the fuse on the control PC board blown?	Yes	2-3	
		(Check each board of the indoor unit(s) and outdoor unit(s).)	No	3-1	
	2-3	The power line and indoor/outdoor control line are miswired. Turn off the power, check & correct the miswiring and then make connections of the indoor/outdoor control lines to the emergency side of all the control PC boards and controllers.			
3 Installation	3-1	Check the setting of the number of indoor units on the outdoor control		3-2	
related		are actually connected?	No	Correct the setting	
	3-2	Is the indoor/outdoor control line connected to more than one		3-3	
		outdoor unit? (Network wired?)	No	3-6	
	3-3	Is the Terminal resistor select switch on the outdoor control PC board set to just one unit?	Yes	3-4	
			No	Correct the setting	
	3.1	Are other outdoor units using a duplicate setting?		3-5	
	5-4			3-6	
	3-5	When units are networked, first set the system address for each outdo 1-2-3 and then run auto address setting.	nit in the order		
	3-6	Run the auto address setting.			

E01 Remote Controller Reception Error (When indoor unit(s) are connected)

1. Error Detection Method

It is judged an error if no self-addressed communication is sent to the remote controller in a 3-minute period.

- When a remote controller is set to sub remote controller.
- When there are nine or more indoor units in a remote control group's wiring.
- When the CHK (check pin) and/or TEST (test pin) on the indoor unit control PC board are short circuited.
- The nonvolatile memory (EEPROM) is not installed or faulty when turning on the power.
- Indoor unit control PC board error
- Remote controller check mode
- · Malfunctions of the remote controller itself (reception circuit error)

2. Error Diagnosis

1 Auto Address	1_1	Is auto address setting complete?	Yes	1-2		
	1-1			1-3		
	1_2	Is there an auto address setting error (Is the outdoor unit showing		1-3		
	1-2	an alarm)?	No	2-1		
	1-3	Conduct checks prior to auto address setting.				
2 Group	2_1	Is that indoor unit under group control?		2-2		
Control	2-1		No	3-1		
vuring	2.2	Are there any indoor units with their power off in the remote	Yes	Power on		
	2-2	control group's wiring?	No	2-3		
	2.3	Are nine or more indoor units connected in one remote control	Yes	Correct the wiring		
	2-5	group's wiring?	No	2-4		
	2-4	Was the remote control group's wiring changed after auto address	Yes	2-5		
	2 7	in the remote control detailed settings mode?		3-1		
	2-5	No main unit in the remote control group's wiring? Re-execute auto ad	dres	s setting.		
3 Installation	3-1	Are the CHK pin and/or TEST pin on the indoor unit control board short-circuited?	Yes	Remove the short		
or setting			No	3-2		
related	3-2	Is the wireless remote controller and/or optional control PC board		3-3		
		connected to on the indoor unit's control PC board?	No	3-5		
	3-3	Disconnect the connector mentioned above on the PC board of the indoor unit control PC board, and see whether the E01 goes off after several minutes. (When doing so, if two remote controllers are	Yes	3-4		
		being used and the wireless remote controller is the main remote controller, set the other remote controller as the main.)	No	3-5		
	3-4	Replace all optional control PC board and/or wireless remote control parts including wiring.				
	3_5	Is the LED blinking on the indoor unit's control PC board?	Yes	3-6		
	00		No	3-7		
	3-6	The nonvolatile memory (EEPROM) on the indoor unit's control PC board is either no installed, improperly installed or the nonvolatile memory is faulty. Correct this or after replacing the nonvolatile memory, write model data to it in the remote control detailed settings mode.		s either not nis or after ol detailed		
		le there a short miswiring disconnection wrong contact or	Yes	Correct the wiring		
	3-7	grounding in the remote control's wiring?	No	Replace the indoor unit's control board.		

• The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.

• There is no TEST pin on the AC motor's indoor unit board.

[•] Regarding the remote controller check, refer to the Reference Materials.

[•] For information on the procedures for replacing the nonvolatile memory (EEPROM) of the indoor unit and/or replacing the indoor unit's control board, refer to the manual that is packaged with the indoor unit service board.

3. Mini VRF System Alarm Codes



DC Motor Model Indoor Unit Control Board



AC Motor Model Indoor Unit Control Board

E02 Remote Controller Transmission Error

1. Error Detection Method

When the remote controller itself cannot transmit. Or when it cannot receive the signal it transmitted itself, or when they are different and judged an error.

• Malfunction of the remote controller itself (transmit circuit error)

2. Error Diagnosis

1 Remote	1_1	Is the indeer unit under aroun control?	Yes	1-2
Control	1-1		No	2-1
Group	1 2	Are the wires 1 (white) & 2 (black) to the remote control group shorted or opened?	Yes	Correct the wiring
vunng	1-2		No	2-1
2 Group	2.1	Is the wireless remote controller and/or optional control PC board	Yes	2-2
Control	2-1	connected to on the indoor unit's control PC board?	No	2-4
vviring	2-2	Disconnect the connector mentioned above on the board of the indoor unit control PC board, and see whether the E02 goes off after several minutes. (When doing so, if two remote controllers are being used and the wireless remote controller is the main remote controller, set the other remote controller as the main.)	Yes	2-3
			No	2-4
	2-3	Replace all optional control PC board and/or wireless remote control p	arts	including wiring.
	2-4	Is there a short, miswiring, open, wrong contact or grounding in the remote control's wiring?	Yes	Correct the wiring
			No	Replace the indoor unit's control PC board

• The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.

• There is no TEST pin on the AC motor's indoor unit board.

• Regarding the remote controller check, refer to the Reference Materials.

• For information on the procedures for replacing the nonvolatile memory (EEPROM) of the indoor unit and/or replacing the indoor unit's control board, refer to the manual that is packaged with the indoor unit service board.



OPTION DC Motor Model Indoor unit Control Board

OPTION AC Motor Model Indoor unit Control Board

E03 Error in Indoor Unit Receiving Signal from Remote Controller (central)

(When indoor unit(s) are connected)

1. Error Detection Method

It is judged an error when there is no communication from any remote controller (collectively) in a 3-minute period or if there is no communication from the central device in a 15-minute period.

- · When there was once communication, but during use the remote control wiring is opened or miswired.
- The line to the central control unit for indoor/outdoor operations is opened.
- Settings are made only for sub remote controller.
- The power to the central control unit is not on and remote controllers are not being used (or the indoor/outdoor operations line to the central control unit is opened).
- · When remote controller are not being used, only the sub remote controller is set up.

2. Error Diagnosis

1 Central	1 1	Is the central control unit connected?	Yes	1-2
control unit	1-1	is the central control unit connected?	No	2-1
	1 2	le the control control unit's newcrod off?	Yes	Power on
	1-2		No	1-3
	1 2	Are all the Main/Sub switches on the connected central control unit	Yes	1-4
	1-5	set to Sub?	No	1-5
	1-4	Of the central control units that are connected, set only the uppermost Main and the others to Sub. The order from top to bottom is intelligent \rightarrow system controller \rightarrow ON/OFF controller.	cent t con	ral control unit to troller
	1 5	Is the indoor/outdoor operations line connected to the central	Yes	Correct the setting
	I-5	control unit opened?	No	2-1
2 Remote controller 2-	0 1	-1 Is the indoor unit under group control?	Yes	2-2
	2-1		No	3-1
	2-2	Are the wires 1 (white) & 2 (black) to the remote control group opened, have wrong contact or grounded?	Yes	Correct the setting
			No	3-1
3 Indoor	3-1	Is the wireless remote controller and/or optional control PC board	Yes	3-2
unit	0-1	connected to on the indoor unit's control PC board?	No	3-4
PC board	3-2	Disconnect the connector mentioned above on the control PC board of the indoor unit control PC board, and see whether the E03 goes off after several minutes. (When doing so, if two remote controllers are	Yes	3-3
	0-2	being used and the wireless remote controller is the main remote controller, set the other remote controller as the main.)	No	3-4
	3-3	Replace all optional control PC board and/or wireless remote control p	arts	including wiring.
			Yes	Correct the wiring
	3-4	in the remote control's wiring?	No	Replace the indoor unit control board

• The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.

There is no TEST pin on the AC motor's indoor unit board.

· Regarding the remote controller check, refer to the Reference Materials.

• For information on the procedures for replacing the nonvolatile memory (EEPROM) of the indoor unit and/or replacing the indoor unit's control board, refer to the manual that is packaged with the indoor unit service board.



3. Mini VRF System Alarm Codes



DC Motor Model Indoor unit Control PC Board



AC Motor Model Indoor unit Control PC Board

E04 Error in Indoor Unit Receiving Signal from the Outdoor unit

1. Error Detection Method

When there is no communication within a 3-minute period from the outdoor unit. Or, judged an error when no reply comes from the outdoor unit.

- The outdoor unit is not turned on.
- When the network of indoor/outdoor operation line was wired, the (SHORT) setting of the terminal resistor switch on the outdoor control PC board was set on multiple units (four or more).
- When the power was turned on after auto address setting was completed, the number of indoor units had been changed.
- Forgot to turn on the indoor unit.
- The CHK pin and/or TEST pin on the indoor unit's control PC board are shorted.
- Forgot to install the nonvolatile memory (EEPROM) when replacing the indoor unit control PC board.
- Mistakenly set the indoor unit address to Not Set in the remote control's detailed setting mode.
- · When indoor unit addresses are duplicated.
- There is a short, open, wrong contact or grounding of the indoor/outdoor operation line.
- There is an error in the receiving circuit on the signal output PC board (optional control PC board).
- · Malfunctions of the outdoor unit
- High voltage was applied (over AC200V) in the indoor/outdoor operations line circuit.
- The thermistor inside the indoor unit is grounded.

1 Power Source	1-1	Is/was the power to the outdoor unit cut off?	Yes	After turning the power on, wait three minutes			
			No	1-2			
	4.0		1	Yes	Power on		
	1-2	is the indoor unit powered off?		No	2-1		
2 Indoor/	2.1	Is the indoor/outdoor operation line shorted, opened, grounde	ed	Yes	Correct the wiring		
outdoor	2-1	or has a wrong contact?		No	2-2		
Control line		When the network of indoor/outdoor operation line was wired,	d, Yes	Nor	mally the (SHORT)		
	2-2	was the (SHORT) setting of the terminal resistor switch on th		sett	ing is just one unit.		
		outdoor control PC board set on multiple units (four or more))? No	2-3			
	2-3	Was a high voltage (over AC200V) applied in the indoor/outd	door	Yes	3-2		
		operations line circuit?		No	3-1		
3 No. of	3-1	Was the number of indoor units increased or decreased after	r	Yes	3-2		
Units	<u> </u>	auto address setting was complete?		No	3-3		
Onito	3-2	Conduct checks prior to auto address setting.					
	3-3	Check the indoor unit addresses from the remote control's		Yes	3-2		
		detailed settings mode. Is it Not Set (99), or is the indoor unit's address duplicated?		No	4-1		
4 Indoor	4-1	Are the CHK pin and/or TEST pin on the indoor unit control PC		Yes	Remove the short		
unit		board short-circuited?			4-2		
PC board	4-2	Is the wireless remote controller and/or optional control PC board connected to on the indoor unit's control PC board?		Yes	4-3		
1 O board				No	4-5		
	4-3	Disconnect the connector mentioned above on the control PC of the indoor unit control PC board, and see whether the E04 after several minutes. (When doing so, if two remote controlle	C board 4 goes off ers are	Yes	4-4		
	+ 0	being used and the wireless remote controller is the main ren controller, set the other remote controller as the main.)	mote	No	4-5		
	4-4	Replace all optional control PC board and/or wireless remote	e control p	arts	including wiring.		
	4-5	Is the LED on the indoor unit control PC board blinking?		Yes	4-6		
				No	4-7		
	4-6	The nonvolatile memory (EEPROM) on the indoor unit's contr improperly installed or the nonvolatile memory is faulty. Corre nonvolatile memory, write model data to it in the remote contr	rol PC bo ect this or rol detaile	ard is after d set	s either not installed, replacing the tings mode.		
	4_7	Are all the remote controllers of the other indoor Yes Repla	lace the o	utdo	or unit control board		
	4-1	units connected to that outdoor unit displaying E04? No Repla	lace the ir	ndoor	unit control board		

3. Mini VRF System Alarm Codes

- The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.
- There is no TEST pin on the AC motor's indoor unit board.
- Regarding the remote controller check, refer to the Reference Materials.
- For information on the procedures for replacing the nonvolatile memory (EEPROM) of the indoor unit and/or replacing the indoor unit's control board, refer to the manual that is packaged with the indoor unit service board.

(for single-phase outdoor unit PCB)

(for 3-phase outdoor unit PCB)



TERMINAL



TERMINAL



DC Motor Model Indoor unit Control Board



AC Motor Model Indoor unit control Board

E05 Error in Indoor Unit Transmitting Signal to the Outdoor Unit

1. Error Detection Method

It is judged an error when a unit itself cannot receive a signal that it has sent.

- · Indoor unit control PC board error
- The setting of the terminal resistor select switch on the outdoor unit main PC board is set incorrectly.

2. Error Diagnosis

1 Indoor	1_1	Is the indoor/outdoor operation line connected to more than one	Yes	1-2
unit	1-1	outdoor unit? (Network wired?)	No	1-3
PC board			Yes	1-4
r o board	1-2	main PC board set to one unit, and the others are OPEN?	No	Set the SHORT to one unit only
	1-3	Is the terminal resistor select switch on the outdoor main PC board set to OPEN?	Yes	Make the SHORT setting
			No	1-4
	4.4	In the indeer/outdoor energian line energy or shorted?	Yes	Correct the wiring
	1-4			1-5
	1-5	Replace the indoor unit control PC board.		

• For information on the procedures for replacing the indoor unit's control PC board, refer to the manual that is packaged with the indoor unit service board.

(for single-phase outdoor unit PC board)



(for 3-phase outdoor unit PC board)



TERMINAL

E06 Error in the Outdoor Unit Receiving Signal from the Indoor Unit

(When indoor unit(s) are connected)

1. Error Detection Method

It is judged an error when there is no transmission (reply) from the indoor unit to the outdoor unit for a period of three minutes.

- The indoor unit is not turned on.
- The DISP pin of the indoor unit is shorted.
- There is a short, open, wrong contact or grounding of the indoor/outdoor operation line.
- The signal output control PC board (optional control PC board) inside the indoor unit has failed.
- The thermistor inside the indoor unit is grounded.

2. Error Diagnosis

1 Indoor unit	1_1	Is the indeer unit newered off?	Yes	Power on
power	1-1		No	2-1
2 Indoor/ outdoor	2_1	Is the indoor/outdoor operation line shorted, opened,	Yes	Correct the wiring
operation line	2-1	grounded or has a wrong contact?	No	3-1
3 Indoor	2 1	Are the DISP pin and/or CHK pin on the indoor unit control PC board Short-circuited?	Yes	Remove the short
units	3-1		No	3-2
PC board	3-2	Is the wireless remote controller and/or optional control PC board connected to on the indoor unit's control PC board?	Yes	3-3
			No	3-5
		Disconnect the connector mentioned above on the control PC board of the indoor unit control PC board, and see whether the E06 goes off after soveral minutes. (When doing so, if two remote controllers are	Yes	3-4
		being used and the wireless remote controller is the main remote controller, set the other remote controller as the main.)	No	3-5
	3-4	Replace all optional control PC board and/or wireless remote control p	arts	including wiring.
	3-5	Indoor unit control PC board failure \rightarrow Replace board.		

• The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.

• There is no TEST pin on the AC motor's indoor unit board.

• For information on the procedures for replacing the indoor unit's control board, refer to the manual that is packaged with the indoor unit control PCB.



DC Motor Model Indoor unit Control PC Board



AC Motor Model Indoor unit Control PC Board

E07 Error in Outdoor Unit Transmitting Signal to the Indoor Unit

1. Error Detection Method

It is judged an error when a unit itself cannot receive (discrepancy) a signal within a 3-minute period that it had sent.

- Outdoor main PC board error
- The setting of the terminal resistor select switch on the outdoor main PC board is set incorrectly.

2. Error Diagnosis

1 Outdoor	1_1	Is the indoor/outdoor operation line connected to more than one	Yes	1-2
unit	1-1	outdoor unit? (Network wired?)	No	1-3
PC board			Yes	1-4
i o board	1-2	PC board set to one unit, and the others are OPEN?	No	Set the SHORT to one unit only
	1-3	Is the terminal resistor select switch on the outdoor main PC board set to OPEN?	Yes	Make the SHORT setting
			No	1-4
	1 /	Is the indeer/outdoor operation line opened or shorted?	Yes	Correct the wiring
	1-4		No	1-5
	1-5	Replace the outdoor unit main PC board.		

• For information on the procedures for replacing the outdoor main PC board, refer to the manual that is packaged with the service board.

(for single-phase outdoor unit PC board)

TERMINAL

(for 3-phase outdoor unit PC board)



TERMINAL

E08 Duplicate Indoor Unit Address Settings Error

1. Error Detection Method

- It is judged an error if the addresses of indoor units are duplicated.
- The indoor unit address settings are duplicated in the remote control detailed settings mode.
- The multiple unit DISP pin is shorted across the indoor unit whose address is Not Set.

1 Indoor unit	or	1-1	Is the DISP pip on the indeer unit control DC board aborted?	Yes	Remove the short
	al		is the DISP pin on the indoor unit control PC board shorted?	No	1-2
PC bc	oard		Conduct checks prior to auto address setting.	Yes	1-3
		1-2	Does E08 fail to go off even after running auto address setting again?	No	1-4
		1-3	The nonvolatile memory (EEPROM) on the indoor unit board has failed ↓ Replace the EEPROM.	d.	
		1-4	Do not make changes to indoor unit addresses with the detailed settin controller. Make them in the remote control address change mode.	gs of	the remote

- The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.
- For information on the procedures for replacing the nonvolatile memory (EEPROM) of the indoor unit, refer to the manual that is packaged with the indoor unit service board.



DISP Pin EEPROM DC Motor Model Indoor Unit Control PC Board



EEPROM DISP Pin AC Motor Model Indoor Unit Control PC Board

E09 More Than One Remote Controller Set to Main Error

1. Error Detection Method

It is judged an error when more than one remote controller in a remote control group is set as the main remote controller.

- Forgot to set one remote controller to sub in a 2-remote control group.
- When using one wireless and one wired remote controller in a control group, forgot to set one of them to sub.

2. Error Diagnosis

1 Remote		
controller	1-1	Set one of t

1-1 Set one of the 2 remote controllers to sub.

- Method for setting a remote controller to sub (CZ-RTC2)
- 1. Press and hold both I + SET buttons for 4 seconds or longer.
- 2. This will display SETTING , the item "01" and the setting data "0001" or the like on the remote controller's display.
- 3. Press Timer 🔺 / 🔻 buttons to switch the setting data to "0000". (0000:SUB 0001:Main)
- 4. Press (SET) button (Once the display changes from flashing to steady, the setting is complete).
- 5. Once you press *p* button, the remote controller returns to its normal display.

Wireless remote controller





CZ-RWSC2



CZ-RWSL2

CZ-RWST2



E12 Start of Auto Address Setting Prohibited Due to Auto Address Setting Being in Progress

1. Error Detection Method

- It is judged an error if a command to start auto address setting comes from another controller during auto address setting.
- This occurs in a system that has more than one outdoor unit and operating lines among the indoor/outdoor units (networked wiring), when an instruction to start auto address setting is given from another controller during the auto address setting process.

2. Error Diagnosis

1 Auto		When one controller in a networked system is running auto address setting, it is not possible
Address	1-1	to start auto address setting from another controller.
		Wait until the auto address setting in progress finishes.

E13 Error in Indoor Unit Transmitting Signal to Remote Controller

1. Error Detection Method

It is judged an error when an indoor unit cannot itself receive a signal that it sent to its remote controller(s).

- Indoor unit control PC board faulty
- The remote control's wires 1(white) and 2(black) are shorted or opened.

2. Error Diagnosis

1 Indoor unit control	1 1	Are the remote control's wires 1(white) and 2(black) are shorted or	Yes	Correct the wiring
	1-1	opened?	No	1-2
PCB	1-2	Replace the indoor unit control PC board.		

• For information on the procedures for replacing the Indoor unit control PC board, refer to the manual that is packaged with the indoor unit service board.

E15 Auto-Address Alarm (not enough units) (When indoor unit(s) are connected)

1. Error Detection Method

It is judged an error not enough indoor units reply to communications and this is determined from the number of indoor units specified with the outdoor unit. (This is detected even when auto address setting is not used.)

- The actual number of indoor units is fewer than that specified at the outdoor unit.
- Some indoor unit(s) are connected but power is not turned on.
- The CHK pin and/or TEST pin of the indoor unit was shorted when its power was turned on.
- High voltage was applied (over AC200V) in the indoor/outdoor operations line circuit.

2. Error Diagnosis

1 Power	1_1	Is the indoor unit powered off?	Yes	Power on
Source	1-1		No	2-1
2 Indoor/	2 1	le the indeer/outdeer centrel line apared or charted?	Yes	Correct the wiring
outdoor	2-1		No	2-2
control line	~ ~	Was a high voltage (over AC200V) applied in the indoor/outdoor	Yes	3-2
	2-2	operations line circuit?	No	3-1
3 No. of Indoor	3-1	Was the number of indoor units changed after auto address setting finished? Or was the setting for the number of indoor units changed	Yes	3-2
Units		on the control PC board of the outdoor unit?	No	4-1
	3-2	Conduct checks prior to auto address setting.		·
4 Indoor	11	Are the CHK pin and/or TEST pin on the indoor unit control board	Yes	Remove the short
unit ² control –	4-1	short-circuited?	No	4-2
	4-2	Is the wireless remote controller and/or optional control PC board	Yes	4-3
1 O Doard		connected to on the indoor unit's control PC board?	No	4-5
	4-3	connect the connector mentioned above on the control PC board ne indoor unit control PC board and see whether the E15 goes off r several minutes. (When doing so, if two remote controllers are	Yes	4-4
		being used and the wireless remote controller is the main remote controller, set the other remote controller as the main.)	No	4-5
	4-4	Replace all optional control PC board or wireless remote control parts	ding wiring.	
	1-5	Is the LED blinking on the indoor unit's control PC board?	Yes	4-6
	4-0		No	5-1
	4-6	The nonvolatile memory (EEPROM) on the indoor unit's control board is either not installed improperly installed or the nonvolatile memory is faulty. Correct this or after replacing the nonvolatile memory, write model data to it in the remote control detailed settings mode.		
5 Outdoor unit control PC board	5-1	 Set the number of the indoor unit setting at No.10 on the outdoor unit's control PC board. And compare the status of the indoor unit's connection setting at No.9 (indoor unit check). Then, make a detailed examination of any absent indoor units. 		

• The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.

- There is no TEST pin on the AC motor model's indoor unit board.
- For information on the procedures for replacing the nonvolatile memory (EEPROM) of the indoor unit, refer to the manual that is packaged with the indoor unit service board.
- · For information on the remote control's detailed settings, refer to the Reference Materials.



OPTION CHK Pin TEST Pin LED EEPROM RC DC Motor Model Indoor Unit Control PC Board



LED EEPROM OPTION CHK Pin RC AC Motor Model Indoor Unit Control PC Board

E16 Auto-Address Alarm (too many units)

1. Error Detection Method

It is judged an error when there are too many indoor units that reply to communications and this is determined from the number of indoor units specified with the outdoor unit. (This is detected even when auto address setting is not used.)

· The actual number of indoor units is more than that specified at the outdoor unit.

1 Auto Address	1-1	Conduct checks prior to auto address setting.

E18 Faulty Communication in Group Control Wiring

1. Error Detection Method

When the main remote controller cannot communicate with a sub remote controller in the remote control group. It is judged an error if a sub remote controller in a remote control group fails to communicate with the main remote controller for a period of three minutes.

- An indoor unit within the control group does not have its power on.
- The CHK pin and/or TEXT pin on the indoor unit in the control group are shorted.
- The DISP pin of an indoor unit sub remote controller in the control group is shorted.
- Remote control group wiring is opened.
- More than one indoor unit in the control group is set to Main.
- An indoor unit in the control group is set to Separate.

2. Error Diagnosis

1 Indoor Unit	1-1	Is the indoor unit powered off?	Yes	Power on			
			No	1-2			
	1-2	Are the CHK pin, TEST pin and/or DISP pin on the indoor unit control PC board short-circuited?	Yes	Remove the short			
			No	2-1			
2 Substitute	2.1	Is the remote control group's wiring opened?	Yes	Correct the wiring			
Sub	2-1		No	2-2			
Controller	2-2	Check the group settings (Item Code 14) from the remote control's detailed settings mode. Is the main remote controller (1) set to more	Yes	2-3			
	2-2	than one remote controller or to separate (0)?	No	3-1			
	2-3	Is the wiring of the remote control group wired according to the wiring diagram?	Yes	2-4			
			No	2-5			
	2-4	Run the auto address setting again.					
	2-5	Run the auto address setting again after correcting the wiring of the remote control group.					
3 Indoor	3-1	Is the wireless remote controller and/or optional control PC board connected to on the indoor unit's control PC board?	Yes	3-2			
unit			No	3-4			
PCB	3-2	Disconnect the connector mentioned above on the control PC board of the indoor unit control PC board, and see whether the E18 goes off after several minutes. (When doing so, if two remote controllers are being used and the wireless remote controller is the main remote controller, set the other remote controller as the main.)	Yes	3-3			
			No	3-4			
	3-3	Replace all optional control PC board and/or wireless remote control parts including wiring.					
	3-4	Replace the indoor unit control PC board.					

• The '/' in the table indicates the DC motor's indoor unit board/AC motor's indoor unit board.

• There is no TEST pin on the AC motor model's indoor unit board.

• For information on the remote control's detailed settings, refer to the Reference Materials.

• For information on the procedures for replacing the Indoor unit control PCB, refer to the manual that is packaged with the indoor unit service board.



DC Motor Model Indoor Unit Control PC Board



AC Motor Model Indoor Unit Control PC Board

E20 No Indoor Units Error

1. Error Detection Method

It is judged an error if an indoor unit cannot be recognized at the start of auto address setting or when the outdoor unit is turned on.

- The address(es) of indoor unit(s) are not assigned correctly.
- The indoor unit is not turned on.

1 Indoor Unit	1_1	Are the address(es) of indoor unit(s) assigned correctly?	Yes	1-2			
	1-1		No	Set its address			
	1-2	Are the indoor units turned on?	Yes	1-3			
			No	Power on			
	1-3	The indoor/outdoor control line may be disconnected somewhere between the indoor unit(s) and the outdoor unit. Check and make sure the indoor/outdoor control line is connected.					

E30 Outdoor Unit Serial Transmission Error

(Transmission from an outdoor unit faulty.)

1. Error Detection Method

Outdoor unit unable to read and confirm its own transmission data with the board of the outdoor unit.

- The power to the control PC board of the outdoor unit is not turned on.
- The circuit on the control PC board of the outdoor unit faulty.

1 Power, wiring	1-1	Is the power to the control PC board of the outdoor unit on? Check the LED.	Yes	1-2 (Turn the power back on)
			No	Power on
	1-2	Replace the control PC board of the outdoor unit.		

F04 Compressor Discharge Temperature Sensor Error

1. Error Detection Method

It is judged an error based on the criteria listed below.

- Open circuit or Short circuit
- When compressor stopped temporally, even after 20 minutes passed, over 103°C of discharge temperature is detected.
- Compressor stopped and remained over 60 minutes but over 93°C of discharge temperature is detected.

1 Sensor	1 1	Senser connector is connected to PC beard properly	Yes	-2
	1-1	Sensor connector is connected to PC board property.	No	Reconnect and check
		Sensor is correctly installed at holder side	Yes	Replace sensor
	1-2		No	Correct and see what
	hap	happens.		
				1-3
	1.3	Abnormal temperature exists even after replacing sensor.	Yes	2-1
	1-3		No	See what happens.
2 PC board	2-1	Resistance between connector pins on PC board is less than 1 k ohm	Yes	Replace PC board
			No	2-2
	2-2	Abnormal temperature exists even after replacing PC board.	Yes	3-1
			No	See what happens.
3 Operating status	3-1	Peripheral temperature of outdoor unit is over 46°C.	Yes	Correct
			No	3-2
	3-2	Tends to have insufficient refrigerant charge in the system.	Yes	Adjust the amount of refrigerant
			No	3-3
	3-3	Check noise.		

F07 Heat Exchanger Inlet Temperature Sensor (C1) Error

1. Error Detection Method

It is judged an error when open circuit or short circuit.

1 Sensor	1_1	Sensor connector is connected to PC board properly.	Yes	1-2
	1-1		No	Reconnect and check
	1-2	Resistance between sockets is infinity or 0 ohm.	Yes	Replace sensor
			No	2-1
2 PC board	2-1	Replace PC board because of outdoor control PC board failure.		

F08 Outdoor Air Temperature Sensor (TO) Error

1. Error Detection Method

It is judged an error when open circuit or short circuit.

1 Sensor	1 1	Sansar connector is connected to PC beard properly	Yes	1-2
	1-1	Sensor connector is connected to r o board property.	No	Reconnect and check
	1-2	Resistance between sockets is infinity or 0 ohm.	Yes	Replace sensor
			No	2-1
2 PC board	2-1	Replace PC board because of outdoor control PC board failure.		

F12 Compressor Intake Temperature Sensor (TS) Error

1. Error Detection Method

It is judged an error when open circuit or short circuit.

1 Sensor 1-1 Sensor connector is connector 1-2 Resistance between socked	1 1	Sensor connector is connected to PC beard properly	Yes	1-2
	Sensor connector is connected to P & board property.	No	Reconnect and check	
	1-2	Resistance between sockets is infinity or 0 ohm.	Yes	Replace sensor
			No	2-1
2 Outdoor control PC board	2-1	Replace PC board because of outdoor control PC board failure.		
F16 High Pressure Sensor Error

1. Error Detection Method

It is judged an error based on the criteria listed below.

- Cooling: Status of lower 5°C saturated temperature under the detect pressure compared to the outdoor heat exchanger liquid temperature (C1 temp.) was continuosly detected for 30 minutes.
- Heating: Status of lower 5°C saturated temperature under the detect pressure compared to the highest E1 temperature in the indoor unit was continuously detected for 30 minutes.
- Open circuit or Short circuit

1 Sensor	1_1	Sensor connector is connected to control PC board properly		Yes	1-2		
	1-1	Sensor connector is connected to com	lior PC board property.	No	Reconnect and check		
		Is sensor resistance value in normal?		Yes	2-1		
	1-2	Disconnect the connector and measur between each wire of sensor. Correct reference values: between 1-2: 8.5 k ohm, 1-3: 1.0 k c	e the resistance value hm, 2-3: 8.5 k ohm	No	Replace sensor		
2 Operating	2_1	Forgot to open the service valve		Yes	Correct		
status	2-1	Torgot to open the service valve		No	2-2		
	2-2	Tends to have insufficient refrigerant of	harge in the system.	Yes	Adjust the amount of refrigerant		
					2-2		
	22	Are the tubes clogged?		Yes	Avoid clogging		
	2-5	Are the tubes clogged?		No	3-1		
3 Control PC board		The difference between the value of a that of detect pressure will roughly ind	ctual high pressure and icate as shown below.				
	2.1			Judgement criteria		Yes	Replace sensor
			At time of outdoor temperature lower than 20°C	Difference of roughly over 0.2MPa			
		At time of outdoor	Difference of roughly				
	5-1	temperature higher than 20°C	over 0.4MPa				
		 When measuring the value of actual the measuring gauge to the high promeasure it. The detect pressure value is the pressure the monitoring software display. 	I high pressure, connect essure outlet port and essure value indicated	No	Replace control PC board		

F31 Outdoor Unit Nonvolatile Memory (EEPROM) Error

1. Error Detection Method

It is judged an error based on the criteria listed below.

- When power initially turned ON for the first time, nonvolatile memory (EEPROM) is not installed.
- Read values after writing onto nonvolatile memory (EEPROM) is inconsisntent.

1 PC board	1_1	1 Does EEPROM exist on the control PC board?	Yes	1-2
	1-1		No	Install EEPROM
	1-2	Is EEPROM installed properly?		1-3
		(Check: Bent IC pin or incorrect installation, etc.)	No	Correct
	1-3	Incorrect EEPROM Replace with correct EEPROM.		

H01 Primary Current (Input) Detect of Overcurrent

1. Error Detection Method

• Primary current effective value detected overcurrent (trip current value).

Trip current value	hp = ho	rse power	Trip current value	hp = horse power			
Single-phase model	4 hp	5 hp	6 hp	3-phase model	4 hp	5 hp	6 hp
Heating	23.0A	26.5A	30.0A	Heating	10.5A	12.0A	14.0A
Cooling	22.0A	25.0A	28.0A	Cooling	10.5A	12.0A	14.0A

2. Error Diagnosis

1 Power	1_1	Not satisfied with ±10% rated supply voltage		Check power supply
supply*	1-1	Not satisfied with _10% rated supply voltage	No	1-2
	1 2	Extrama valtaga fluatuationa	Yes	Check power supply
	1-2		No	1-3
	1 2	Extrama distortion of voltage waveform	Yes	Check power supply
	1-3	Extreme distortion of voltage wavelorm	No	1-4
	1 1	Instantancous blackout mov comptimes acour	Yes	Check power supply
	1-4	Instantaneous blackout may sometimes occur.	No	2-1
2 PC board	2.4	Has FUSE 1 blown?		2-3
wiring	2-1	Check the electrical conduction with tester.	No	2-2
	2.2		Yes	Correct wiring
	2-2	Loose electrical wire connection	No	2-3
	2-3	Replace CR board.		·

* Check not only in the outdoor unit stop mode but in the drive mode.

(for single-phase outdoor unit PC board)

(for 3-phase outdoor unit PC board)



FUSE 1



FUSE 1

H02 PAM Error

1. Error Detection Method

• Error is detected by over-voltage and overcurrent of DC side.

2. Error Diagnosis

1 Power	4 4	Not satisfied with ±10% rated supply voltage		Check power supply
supply*	1-1			1-2
	1.0	Extreme voltage fluctuations	Yes	Check power supply
	1-2	Extreme voltage nucluations	No	1-3
	1 0	Extreme distortion of voltage waveform	Yes	Check power supply
	1-3	Extreme distortion of voltage waveform	No	2-1
2 PC board	0.1	2-1 Loose electrical wire connection	Yes	Correct connection
wiring	2-1		No	2-2
	2-2	Is HIC PC board connector (CN-PAM) poorly connected or	Yes	Correct connection or wiring
			No	2-3
	2-3	Replace HIC PC board.		

* Check not only in the outdoor unit stop mode but in the drive mode.

H03 Compressor CT Sensor (Current Sensor) Unplugged

1. Error Detection Method

It is judged an error based on the criteria listed below.

- If 18A or greater is detected when the compressor is stopped (alarm triggered even if the connector is unplugged).
- If no current is detected even though a compressor is running.

1 Check the	1 1	Turn the power on again and run the outdoor unit.	Yes	Replace CR board.
PC board	1-1	Is alarm occurred after operation?	No	See what happens.

H31 HIC Error

1. Error Detection Method

It is judged an error if the computer detects an error signal from the HIC. An error signal is issued by the HIC if abnormal heat occurs inside the HIC or if there is an overcurrent.

However, it is judged an error in the same way if the signal line from the HIC is not connected properly or opened.

- · HIC overcurrent due to HIC fault
- · HIC abnormal heat caused by defective HIC or HIC radiation error
- · Signal line is not connected properly or opened between the HIC and the outdoor CR board.

2. Error Diagnosis

1 Wiring		The wiring (power cord and signal line) between the HIC		1-2	1-2	
between	and the outdoor CR board is connected properly.		No	Corr	ect wiring (connector)	
outdoor control	1-2	Everything is normal in the wiring (power cord & signal line) between the HIC and the outdoor CR board. Check the wiring one by one with a tester if there is one and			3-1 : Single-phase model 2-1 : 3-phase model	
		grounding.	No	Rep	lace wiring	
2 Check the outdoor	The connector CN-PRY1 on the CR PC board is connected		Yes	3-1		
unit CR PC board	2-1	properly (locked).		Correct wiring (connector)		
3 HIC poor radiation	3-1	The heat dissipating surface on the back of the HIC is in good contact with the heat sink (heat dissipating fins) of the electric			3-2	
		box. Check for looseness in the fastening screws and the condition of the heat-conducting putty.		No	Tighten screw(s), add putty	
	2 2	A good flow of cooling air passes through the heat sink		i 4-1		
	Check for debris blocking the fins.		No	Remove foreign matter		
4 HIC	1_1	The results of the pass/fail tests for the following HIC board	Yes	Replace the HIC PC board		
	4-1	conforming part.		4-2		
	1-2	The inverter compressor was stopped/started more than 10 times and it triggered H31 at a high rate. If alarm code P16 occurs at times, refer to the alarm code P16.		Rep	lace the HIC PC board	
	+- ~			Refer to alarm code P16		

• HIC board IPM Pass/Fail Tests

• Measure with an analog tester. (Set to the k ohm range)

- · Measure the board by itself. (Remove wires connected from other parts.)
- · Measure using IPM terminals.

★ Conforming part resistance value (measure with an analog tester)

Tester terminals								
+		Р			NU			
-	U	V	W	NU	U	V	W	Р
Resistance value (ohm)	1 k to 5 k	1 k to 5 k	1 k to 5 k	5 k to 10 k	100 k to ∞			
			·					
Tester terminals								
Tester terminals -		F)				NU	
Tester terminals - +	U	F	> W		U	V	NU W	

• Excepting the parts of "100 k to ∞", it is acceptable if a small resistance value appears as a reference value unless the value is "0 = short-circuit".

3. Mini VRF System Alarm Codes



(for Single-phase outdoor unit HIC PC board)



(for 3-phase outdoor unit HIC PC board)



CN-PRY1 (for 3-phase outdoor unit CR PC board)

L04 Duplicated Setting of Outdoor System Address Error

1. Error Detection Method

It is judged an error when the identical self-address communication on the indoor and outdoor wirings is received over 5 times within 3 minutes.

1 System	1_1	Are other outdoor units using a duplicate setting?		2-1
address	1-1	Are other outdoor units using a duplicate setting:	No	2-2
2 Installation or setting	2-1	When units are networked, first set the system address for each outdo 1-2-3 and then run auto address setting.	or ur	nit in the order
related	2-2	Run the auto address setting.		

L10 Outdoor Unit Capacity Not Yet Setup Error

1. Error Detection Method

It is judged an error when outdoor unit capacity not yet setup or systematically unauthorized setting.

2. Error Diagnosis

1 Check the	1 1	Was EEPPOM replaced when PC board was replaced?		2-1
PC board	1-1	was EERKOW replaced when PC board was replaced?	No	Replace EEPROM
2 Installation or setting related	2-1	Set an applicable capacity value on the item code 81 display of mair controller.	ntena	nce remote

 Check : Connect the outdoor maintenance remote controller and check whether item code 81 outdoor capacity value shows "0" or unauthorized capacity is set on the detailed setting mode display of the outdoor EEPROM. If the capacity value of the item code 81 with the outdoor maintenance remote controller is incorrect, recorrect and set it again.

* After setting the capacity value, be sure to reset the power supply switches of both indoor and outdoor units.

L18 4-way valve operation failure

1. Error Detection Method

It is judged an error when during heating operation (Comp. ON), the highest detected temperature at an outdoor unit heat exchanger (C1) was 20°C or more above the outdoor air temperature (Air Temp.) continuously for 5 minutes or longer, or the detected suction temperature (SCT) was 20°C or more above the outdoor air temperature continuously for 5 minutes or longer.

1 PC board		Is the connector wired from the 4-WAY valve plugged in the CN-20S		1-2
wiring	1-1	connector on the HIC PC board properly?		Correct connector
	1 2	Here the 4 way value wiring become append?	Yes	Correct wiring
	1-2	has the 4-way valve withing become opened?	No	1-3
	4.0	Is the wire from the coil for controlling the 4-way valve firmly	Yes	2-1
1-	1-3	connected to the 4-way valve?	No	Correct connector
2 4-way valve	2-1	During heating mode (Comp. ON), insert and remove the connector wired from the 4-WAY valve into or from CN-20S connector on the		2-2
		HIC PC board. At the same time, does the ON & OFF sounds occur from the 4-way valve?	No	Replace HIC PC board
		During heating mode (Comp. ON), does the alarm code L18 reproduce for 5 minutes or longer after insertion and removal of	Yes	2-3
	2-2	CN-20S connector wired from the 4-way valve connector on the HIC PC board ?		See what happens
	2-3	The parts inside the 4-way valve might have fixed at the cooling side. Replace the 4-way valve		

P03 Compressor Discharge Temperature Error

1. Error Detection Method

• When the discharge temperature is over 106°C.

1 Adjustment to	1-1	Not additional refrigerant charged	Yes	Additional refrigerant charge
refrigerant			No	2-2
cnarge	1-2	Tends to have insufficient refrigerant charge in the system.	Yes	Adjust the refrigerant amount
			No	Replace CR board
2 Blockage in	0.1	Convice value incide the outdoor unit closed		Open service valve
refrigerant	2-1		No	2-2
Circuit	<u> </u>	Are the tubes cleared?	Yes	Avoid clogging
	2-2	Are the tubes clogged?	No	2-3
		Is the outdoor unit's electronic control valve operating correctly? (Check for debris clogging the electronic control valve, a problem with the electronical coil and/or the control PC board.)	Yes	2-4
	2-3		No	Replace the electronic control valve
	24	Is it observable difference in status of the dew or frost between		Replace the strainer
	2-4	the strainer's primary and secondary sides?	No	Replace CR board

P04 Actuation of High Pressure Switch

1. Error Detection Method

It is judged an error if the internal circuit of the high pressure switch is dead.

The electronic circuitry of the high pressure switch is cut off if the pressure at the pressure sensor port of the high pressure switch reaches 3.80 MPa. Once it is cut off, it remains cut off until the pressure drops to 3.15 MPa.

- The high pressure switch is malfunctioning.
- · Service valve inside the outdoor unit closed
- There is a short air circuit through the outdoor unit's heat exchanger. (when cooling)
- The outdoor unit's fan is broken. (when cooling)
- The outdoor unit's heat exchanger is clogged. (when cooling)
- · There is a short air circuit at the indoor unit. (when heating)
- The filter of the indoor unit is clogged. (when heating)
- The fan of the indoor unit is broken or the fan motor is malfunctioning. (when heating)
- The refrigerant circuit is closed and the high pressure is increasing abnormally high. (solenoid valve or expansion valve not activated, a stuck check valve, etc.)
- Refrigerant overcharged.
- · Nitrogen or air contaminated in the refrigerant system

1 High	The socket of the high pressure switch is securely inse		Yes	1-2
pressure switch	1-1	PC board. The wiring is not opened.	No	Correct connection and/or wiring
	1-2	Even if parts near the high pressure switch are shaken quite a lot, the high pressure cutoff will be activated. Even if the covering is in good condition, in several cases vibration	Yes	Replace the high pressure switch (wiring)
		has caused wiring inside to open.	No	2-1
2 Service valve	2-1	Service valve inside the outdoor unit closed	Yes	Open the service valve
			No	2-2
	2.2	There is an extreme difference in temperature in/out of the service	Yes	2-3
	2-2	valve.	No	3-1
	2-3	Check the flare connection, someone may have forgotten to remove If there is a problem within the service valve, replace the valve.	the b	onnet.
3 Problem	2.1	1 While eacling is operating on clarm is eacured		3-2
around the	3-1		No	3-5
heat exchanger	3-2	The intake temperature (ambient temperature) of the outdoor unit's	Yes Prevent air short circuit	
			No	3-3
	3-3	The outdoor unit's heat exchanger is clogged.	Yes	Clean the heat exchanger
			No	3-4
		Check whether the outdoor unit fan is normal ar if the sockets are	Yes	4-1
3-4		 3-4 firmly pressed onto the plugs on the outdoor PC board, as well as if any wiring is opened. Are these checking finished without fail? 		Replace the outdoor unit fan. Correct connection and/or wiring
	3 5	While heating is operating an alarm is occurred	Yes	3-6
	5-5		No	4-1

3. Mini VRF System Alarm Codes

3 Problem around the	3-6	The intake temperature (ambient temperature) of the indoor unit is	Yes	Prevent air short circuit
heat		above 36°C.	No	3-7
exchanger	0.7		Yes	Clean the filter
	3-7	I ne filter of the indoor unit is clogged.	No	3-8
	3-8	The fan of the indoor unit is broken or the fan motor is faulty.	Yes	Replace the indoor fan (motor)
			No	4-1
Blockage		In the outdoor unit's electropic control valve operating correctly?	Yes	4-3
in the refrigerant circuit	4-1	(Check for debris clogging the electronic control valve operating correctly? with the electronical coil and/or the control PC board.)	No	Repair the electronic control valve of the outdoor unit
		The indeer write every relation we have in expression entry	Yes	4-3
	4-2	(check for debris clogging the valve, a problem with the electronical coil and/or the control PC board)	No	Repair the expansion valve of the indoor unit
		If an alarm is assurred with the high pressure helow 2.90 MDs	Yes	4-4
	4-3	with the pressure measured as displayed by the manifold gauge, check the check valve in the compressor discharge line. Are these checking finished without fail?	No	Replace the check valve in the compressor discharge line
	4-4	The electronic control valve is faulty. In systems where the solenoid valve kits and the ice thermal storage tank are connected, check these solenoid valves.	Yes	Replace the electronic control valve and/or solenoid valve.
			No	5-1
5 Overcharg-			Yes	5-3
ing	5-1	Error occurs when the system is operating in cooling mode.	No	5-2
			Yes	5-4
	5-2	Error occurs when the system is operating in heating mode.	No	5-5
	53	An alarm is occurred with the high pressure at 3.80 MPa, with the pressure measured either as displayed by the monitoring software		5-5
	5-5	the outdoor unit's heat exchanger is detected to be at the temperature of the outside air.	No	Contact the service representative
		An alarm is occurred with the high pressure at 3.80 MPa, with the pressure measured either as displayed by the monitoring software	Yes	5-5
	5-4	or with a manifold gauge, at which time the temperature of liquid in the indoor heat exchanger is detected to be at room temperature (intake temperature).	No	Contact the service representative
	5-5	The system may be overcharged. Check how much refrigerant was a When a system is inspected for airtightness, it is seldom that enough expelled, so some remains in the circuit. In this case, it is necessary to collect the refrigerant and then recharge	addeo n nitro ge the	d during installation. ogen has been e system.

P05 Power Supply Error

1. Error Detection Method

- · Instantaneous blackout
- ٠ Zero-cross (waveform input of power supply) error
- · DC voltage charge failure

2. Error Diagnosis

Note : The work involved in diagnosing each of the items is extremely dangerous, so turn the power off at the breaker before performing the tests.

1 Check the power	1 1	Is the voltage on each of the terminal boards within ±10%		Yes 1-4 : Single-phase model 1-2 : 3-phase model				
supply & the wiring	1-1	of the rated voltage?	No	Check for open circuit an if a problem is found, fix i	and the voltage at the breaker. fix it and check again.			
	1_2	Power wiring N phase is connect						
	1-2		eu.		No	1-3		
	1 2	Dower wiring L 2 and N are reverse connected				Correct wiring		
	1-5	Fower winnig L2 and N are revers	ver wiring L2 and N are reverse connected.					
	1-4	Furn the power back on and check again.				3-1 : Single-phase model 2-1 : 3-phase model		
		Is the alarm triggered again?			No	4-1		
2 Check the outdoor	0.1	The connector CN-PRY2 on the outdoor CR PC board is				3-1		
unit CR PC board	2-1	connected properly (locked).	nected properly (locked).					
3 Check the	2.4	Are the wires (DE1_DE2) from the		ator firmly installed?	Yes	3-2		
outdoor	3-1	Are the wires (RET, REZ) from the	e rea	ctor infinity installed?	No	Correct wiring		
PC board	3-2	Turn the power back on and chec	k aga	ain.	Yes	Replace the outdoor unit HIC PC board.		
		is the alarm triggered again?			No	4-1		
4 Final check	4-1	There may be a instantaneous bla If there is nothing abnormal, see v	ackou what	ut failure. happens.				

Single-phase outdoor unit HIC PC board



* Common in RE1 and RE2 4hp, 5hp: Plug-in type 6hp: Fastening screw type RE2*

3-phase outdoor unit HIC PC board



(for 3-phase outdoor unit CR PC board)



CN-PRY2

P13 Forgot-to-open Valve Alarm

1. Error Detection Method

Detection is performed only in the test run. When once detected or the test run finished without any error, the second detection will not be done.

In case of forgetting to open a valve, P04 (high-pressure switch operational alarm) is occasionally preceded due to the following conditions.

- The status of small temperature change of the oprating indoor unit continues for 3 minutes even after 5-minute to 15-minute since the cooling test run has started.
- The status of small temperature change of the oprating indoor unit continues for 3minutes even after 7-minute to 15-minute since the heating test run has started.

1 Service valve	1-1	Service valve inside the outdoor unit closed		Open the service valve
			No	2-1
2 Adjustment to	2-1	Not additional refrigerant charged	Yes	Additional refrigerant charge
refrigerant change	2 .		No	3-1
3 Blockage	2 1	Are the tubes cleared?		Avoid clogging
in	5-1	Are the tubes clogged?	No	3-2
circuit		le the outdoor unit's electronic control valve energting correctly?	Yes	3-3
3-2		(Check for debris clogging the electronic control valve operating correctly? with the electronical coil and/or the control PC board.)		Replace the electronic control valve
	3-3	As the second detection is not done, restart and see what happens i	f ther	e is no error.

P14 O₂ Sensor

1. Error Detection Method

- It is judged an error whenever the outdoor unit receives the signal "O2 Alarm Occurred" from the indoor unit.
- With the indoor unit's EEPROM setting (item code 0B) set to 0001, the EXCT input was shorted.

1 System	1_1	Is an Ω^2 sensor being used?	Yes	3-1
configuration	1-1		No	2-1
2 Indoor unit's EEPROM	2-1	Is the indoor EEPROM setting, item code 0B, on the indoor unit's control PC board set to 00012	Yes	After correcting the setting, 3-1
setting				4-1
3 Indoor EXCT	2.1	In the indeer EVCT assest (wire) shorted?	Yes	Correct wiring
wiring	3-1	Is the indoor EACT socket (wire) shorted?	No	4-1
4 Indoor unit's	1 1	Is the alarm triggered if the indoor EXCT socket (wire) is	Yes	4-3
control	4-1	disconnected, and the power is reset?	No	4-2
PC board	4-2	Since there is no error, see what happens.		
	4-3	Indoor unit control PC board error \rightarrow replace PC board.		

P16 Overcurrent of Inverter Compressor

1. Meaning of Alarm

- Secondary current effective value detected the overcurrent (trip current value).
 Single-phase model : Trip current = 24.0 A
 3-phase model : Trip current = 18.0 A
- Secondary current instantly detected over xx A. Single-phase model : xx A = 45.0 A

3-phase model : xx A = 36.0 A

2. Check of content

0 Multiple	0 1	Replaced the compressor (added oil, if it was necessary)	Yes	7-1
factors	0-1	but it occurred again immediately.	No	-
	0-2	Replaced the board, but it occurred again immediately.	Yes	Replace compressor along with adding oil, then recheck from 1-1
			No	-
1 Power	1-1	Power cord connections are loose.	Yes	Correct the wiring
Source			No	1-2
	1-2	Rated power voltage is not within + 10%	Yes	Test the power supply
			No	1-3
	1-3	Extreme fluctuations in voltage.	Yes	Test the power supply
			No	1-4
	1-4	An open phase state is observed.	Yes	Test the power supply
			No	2-1
wiring	2-1	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections on the CR board and/or in the	Yes	Correct
		connections of components that are connected by wiring from the CR board.	No	2-2
	2-2	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections of outdoor board(s) that are	Yes	Correct
		connected by wiring from the CR board.	No	2-3
	2-3	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections of outdoor board(s) that are	Yes	Correct
	2.0	connected by wiring from the HIC board.	No	2-4
	2-4	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections of HIC boards connected by	Yes	Correct
		wiring from the CR board.	No	2-5
	2.5	Disconnected parts, miswiring and/or poor connections (loose)	Yes	Correct
	2-5	connected by wiring from the outdoor board.	No	2-6
	2-6	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections of HIC board(s) that are	Yes	Correct
		connected by wiring to a compressor.	No	3-1
3	3_1	Disconnections and/or miswiring are observed in the	Yes	Correct
Compressor	5-1	connecting location of the compressor terminals.	No	3-2
winng	3-2	Conditions such as burned terminal covers and/or discolored terminals are observed in the connecting location of the compressor terminals.	Yes	Eliminate looseness by changing the terminals, or crimping the terminals again.
			No	4-1

3. Mini VRF System Alarm Codes

4 Check the	1_1	Outdoor air intake temperature is high	Yes	Take measures
situation	4-1		No	4-2
	12	May be caused by poor outdoor unit air flow	Yes	Correct
	4-2	(dirty or clogged heat exchanger, blocked discharge port, etc.)	No	4-3
	4.0	Air short circuit has occurred. This is a phenomenon when	Yes	Prevent air short
	4-3	into the suction vent.	No	4-4
			Yes	Take measures
	4-4	Indoor air intake temperature is high.	No	4-5
			Yes	Clean the filter
	4-5	The filter of the indoor unit is clogged.	No	4-6
		Air short circuit has occurred. This is a phenomenon when	Ves	Prevent air short
	4-6	discharged air (exhaust heat) from the indoor unit is drawn back	103	circuit
E Chaoli		into the suction vent.	No	5-1
operation	5-1	Possible to operate.	Yes	5-2
operation			NO	6-1
	5-2	Operating pressure is affected by pressure overload.	Yes	5-3
			No	5-4
	5-3	Tends to have an overcharge of refrigerant in the system.	Yes	Adjust the amount of refrigerant
			No	5-4
	5-4	Tends to operate for a long time turning gas back into liquid.	Yes	Check the operation of functional parts
			No	5-5
	5-5	Tends to have insufficient refrigerant charge in the system.	Yes	Adjust the amount of refrigerant
			No	5-6
	5-6	Even though the high pressure saturation temperature is 43°C or less, the secondary current of the inverter is high.	Yes	Replace the compressor
		(The frequency (Hz) ends up dropping due to the current.)	No	See what happens.
6 Check	6.1	Dividing the outdoor EEPROM INV operation time by the number	Yes	6-2
history	0-1	of times oil was supplied to the system yields 3 hours or less.	No	6-2
	6-2	There is a history of H31 in the pre-trip counter of the outdoor EEPROM alarm history.	Yes	Replace the compressor and add oil. However if 6-1 was "no," it is not necessary to add oil.
			No	7-1
7 Check the	7-1	The results of HIC board IPM Pass/Fail Tests show the outside the	Yes	Replace HIC board
		range of the resistance of a conforming part listed in the next page.	No	8-1
8 Check the compressor	8-1	The compressor is causing a failure in the insulation.	Yes	Replace the compressor
			No	8-2
		The winding resistance of the compressor is abnormal. Standard winding resistance	Yes	Replace the compressor
	8-2	Single-phase model 3-phase model R-S: 0.490 ohm R-S: 0.903 ohm R-T: 0.495 ohm R-T: 0.918 ohm S-T: 0.483 ohm S-T: 0.892 ohm	No	9-1

9 Check the HIC PC	0_1	Replace the HIC PC board and operate the unit. (Apply putty and		See what happens.
boards	9-1	screws must not be loose) Does it operate normally?	No	10-1
10 Check the outdoor unit main PC board	10-1	Replace the control PC board and operate the unit.	See	what happens.

(Check content of 7) The test check of the HIC board is only a check on the output level, so the input stage may not be working.
With the filter board broken, alarm P16 may not be triggered.

• HIC board IPM Pass/Fail Tests

- Measure with an analog tester. (Set to the k ohm range.)
- Measure the board by itself. (Remove wires connected from other parts.)
- Measure using IPM terminals.

★ Conforming part resistance value (measure with an analog tester)

Tester terminals								
+	Р				NU			
-	U V		W	NU	U	V	W	Р
Resistance value (ohm)	1 k to 5 k	1 k to 5 k	1 k to 5 k	5 k to 10 k	100 k to ∞			
Tester terminals								
Tester terminals		F)				NU	
Tester terminals - +	U	F	o W		U	V	NU W	

• Excepting the parts of "100 k to ∞", it is acceptable if a small resistance value appears as a reference value unless the value is "0 = short-circuit".

Single-phase outdoor unit HIC board

3-phase outdoor unit HIC board





P22 Outdoor Fan Motor Error

1. Error Detection Method

• It is judged an error when the outdoor fan motor's rotating signal cannot be detected normally.

1 Wiring	1_1	Are the connectors "CN-FMA", "CN-FMB", "CN-FM1", and	Yes	2-1
	1-1	"CN-FM2" firmly connected to the outdoor control PC board (lock engaged)?	No	Correct the connector connections
2 Outdoor fan motor	2-1	Disconnect the connectors "CN-FMA", "CN-FMB", "CN-FM1", and "CN-FM2" from the outdoor control PC board and rotate	Yes	3-1
		the outdoor fan by hand; does it rotate freely? (Check the outdoor fan motor lock)	No	Replace the outdoor fan motor
3 Outdoor	3_1	Turn the power on and run the unit again; is P22 triggered		3-2
PC board	0-1	wrong in its rotation?	No	3-3
	3-2	Replace the outdoor control PC board. (If it fails to operate normathe outdoor control PC board, replace the outdoor fan motor.)	ally e	ven after replacing
	3-3	If there is nothing particularly out of the ordinary, see what happe	ns.	

P29 INV Compressor Start-up Failed (including lock) Due to INV Compressor Wiring Open Phase, Faulty DCCT, etc.

1. Error Detection Method

- Abnormal current is detected at DCCT before start-up.
- · Start-up failed during overcurrent and/or step-out detected.
- · Open-wire of compressor and/or backspin detected.
- · Secondary current is not detected during INV compressor is running.

2. Error Diagnosis

1 Wiring	1-1	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections of HIC PC board(s) that are connected by wiring to a compressor. *1		Correct wiring connections
				1-2
	1-2	Disconnected parts, miswiring and/or poor connections (loose) are observed in the connections of outdoor board(s) that are	Yes	Correct wiring connections
	connected by wiring from the HIC PC board. *1		No	2-1
2	Disconnections and/or miswiring is observed in the connection		Yes	Correct
Compressor	2-1	of the compressor terminals. *1	No	2-2
wiring 2-2		Conditions such as burned terminal covers and/or discolored terminals are observed at the connectors of the compressor terminals. *1	Yes	Eliminate looseness by changing the terminals, or crimping the terminals again.
			No	3-1
3 Check the	3_1	The results of the pass/fail tests for the following HIC PC board		Replace the HIC board
boards	5-1	conforming part.	No	3-2
	3.2	Replace the HIC PC board and operate the unit. (Apply putty		See what happens.
	5-2	and screws must not be loose) Does it operate normally?	No	4-1
4 Check the outdoor control PC board	4-1	Replace the control PC board and operate the unit.	See	what happens.

*1 Checking for looseness of compressor terminals by wiggling them has the adverse effect of loosening them, so do not do it. Evaluate them by discoloration of wire insulation near the terminal.

• HIC board IPM Pass/Fail Tests

- Measure with an analog tester. (Set to the k ohm range)
- Measure the board by itself. (Remove wires connected from other parts.)
- Measure using IPM terminals.

★ Conforming part resistance value (measure with an analog tester)

Tester terminals									
+	Р				NU				
-	U	V	W	NU	U	V	W	Р	
Resistance value (ohm)	1 k to 5 k	1 k to 5 k	1 k to 5 k	5 k to 10 k	100 k to ∞				
Tester terminals									
Tester terminals		F)				NU		
Tester terminals - +	U	F	W		U	V	NU W		

• Excepting the parts of "100 k to ∞", it is acceptable if a small resistance value appears as a reference value unless the value is "0 = short-circuit".



Single-phase outdoor unit HIC board

3-phase outdoor unit HIC board





- (1) Electronic control valve (MOV1)
 - MOV1: Measure the voltage between plug pin 5 and pins 1 through 4 at the CN-MOV1 connector (5P, white) on the outdoor unit control PCB. (Because of the pulse output, a simplified measurement method is used. Set the tester to the 12 V range; if the value displayed is approximately 4 V, then the voltage is normal.) If the voltage is normal, measure the resistance between connector pin 5 and pins 1 through 4. Resistance between pin 5 and pins 1 through 4 should be approximately 46 Ω for all. (If the result is 0 Ω or, ∞ then replace the coil.)
- (2) Crankcase heater
 - Connect a clamp meter to 1 of the 2 crankcase heater wires and measure the current. The current is normal if the result is 0.15 A or higher.
 (As a guide, the current should be 0.14 A (180 V) 0.17 A (220 V).)

Test Pin

When the test pin on the outdoor unit main control PCB is short-circuited, each part can be operated individually. After turning OFF the outdoor unit power, short circuit the test pin (CN-TEST, black), then turn the power back ON. The following operations will start after turning ON the outdoor unit power when the test pin (CN-TEST, black) is short-circuited.

- (1) Set DC fan motor at W5 (FM1 : 340 360 rpm, FM2 : 360 380 rpm).
- (2) 20S turns ON for 0.5 sec.
- (3) Check Inter-unit control wiring circuit. If normal state, go to the next step. If not, it stops after LED1 starts blinking at 0.5 sec intervals and LED2 turns off.
- (4) Connector CH1 turns ON for 0.5 sec.
- (5) Do the test to read / write EEPROM. If normal state, go to the next step. If not, it stops after LED1 starts blinking at 0.5 sec intervals and LED2 lights.
- (6) Connector O₂ turns ON for 0.5 sec.
- (7) Check inter-outdoor unit control wiring circuit to outdoor unit maintenance remote controller. If normal state, go to the next step. If not, it stops after LED1 turns off and LED2 starts blinking at 0.5 sec intervals.
- (8) LED1 turns ON for 0.5 sec.
- (9) Do the test(1) of circuit for writing micro-computing software. If normal state, go to the next step. If not, it stops after LED1 starts blinking and LED2 starts blinking at 0.5 sec intervals.
- (10) LED2 turns ON for 0.5 sec.
- (11) Do the test(2) of circuit for writing micro-computing software. If normal state, go to the next step. If not, it stops after LED1 starts blinking and LED2 starts blinking at 0.5 sec intervals.
- (12) Outputs listed below turn ON for 0.5 sec.

No.	Contents of output			
1	MOV1 – A			
2	MOV1 – B			
3	MOV1 – / A			
4	MOV1 – / B			
5				

1. How to detect abnormality

• Abnormality does not occur. Protective function can be checked when the outdoor maintenance remote controller is connected.

2. Error Diagnosis

1 Indoor control PC board	1-1	Setting temperature reaches the level set ON thermostat. Setting temperature is too low in heating mode and too high in cooling and dry mode.		Adjust setting temperature
				1-2
	1-2	Check if the sensors are connected correctly. Are all connection made properly? Room temp. (TA) in yellow, heat exchanger (E1) in red, heat exchanger (E2) in black, heat exchanger (E3) in brown, air outlet (BL) in green		Connect correctly
				1-3
	1-3		Yes	Turn OFF(OPEN)
		DISP (display mode) is applied.		1-4
	1-4	With a thermostat OFF in heating mode, wind speed (item code 05) is out of range 0 - 6. (Use Simple Setting Function on standard timer remote controller.)		Choose one of 0 to 6
				1-5
	1-5		Yes	Turn OFF(OPEN)
				2-1
2 Outdoor control	2-1	Outdoor unit and protective function of a system are operating. (Connect outdoor maintenance remote controller to RC socket on outdoor unit main control PC board and check alarm messages.)		See operational status
PC board				2-2
	2-2	Discharge temperature is over 80°C in stop mode and does not decrease. (Connect outdoor maintenance remote controller to RC socket on outdoor unit main control PC board and check alarm messages.)		Replace discharge temperature sensor
				2-3
	2-3	Demand value always stays low. (The value is lower than 70. Excluding -1 (unlimited))(Connect outdoor maintenance remote controller to RC socket on outdoor unit main control PC board and check alarm messages.)		Increase values (over 70)
				2-4
	2-4	DEMAND or EXCT(demand control) is applied		Turn OFF(OPEN)
			No	3-1
3 Control	3_1	Demand setting is made by control units (P-AIMS, Seri-Para I/O unit for outdoor unit, Seri-Para I/O each indoor unit.)	Yes	Turn OFF
equipment	5-1		No	4-1
4 System	4-1	When operating in cooling (including auto cooling & heating) and dry mode, lowest temp. of indoor E1, E2 and E3 sensor is	Yes	Wait until more than 2°C reaches
		less than 2°C (under anti-freeze control).		4-2
	4-2	During defrosting operation		Wait for a few minutes to 10 minutes or so
				4-3
	4-3	Outdoor unit PC board failure \rightarrow Replacement		

• According to a type of model, the indoor sensors will not be supplied in some cases.

• According to a type of model, the outdoor DEMAND or EXCT will not be supplied in some cases.

• When LINE Checker is used, the temperature sensors can be observed (display, record) simultaneously.

• According to some areas, some of the models are unreleased.