Panasonic

Order No. SBPAC2011011CE

SERVICE MANUAL & TEST RUN SERVICE MANUAL

Mini VRF SYSTEM

R32

Model No.

Outdoor Units		HP = horsepower	
Type	Outdoor Unit Type	Rated Capacity	
		8 HP	10 HP
LZ2	mini VRF System	U-8LZ2E8	U-10LZ2E8

REFERENCE NO. **SM830289-01**

Model No.

• To be connecting Indoor Unit

Indoor Units								
Type	Indoor Unit Type	Rated Capacity						
		15	22	28	36	45	56	60
U2	4-Way Cassette		S-22MU2E5B	S-28MU2E5B	S-36MU2E5B	S-45MU2E5B	S-56MU2E5B	S-60MU2E5B
Y2	4-Way Cassette 60 × 60	S-15MY2E5B	S-22MY2E5B	S-28MY2E5B	S-36MY2E5B	S-45MY2E5B	S-56MY2E5B	
K2	Wall-Mounted	S-15MK2E5B	S-22MK2E5B	S-28MK2E5B	S-36MK2E5B	S-45MK2E5B	S-56MK2E5B	
M1	Slim Low Static Ducted	S-15MM1E5B	S-22MM1E5B	S-28MM1E5B	S-36MM1E5B	S-45MM1E5B	S-56MM1E5B	

Type	Indoor Unit Type	Rated Capacity				
		73	90	106	140	160
U2	4-Way Cassette	S-73MU2E5B	S-90MU2E5B	S-106MU2E5B	S-140MU2E5B	S-160MU2E5B
K2	Wall-Mounted	S-73MK2E5B		S-106MK2E5B		

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.
- That compliance with national gas regulations shall be observed.
- This product is intended for professional use. Permission from the power supplier is required when installing the U-8LZ2E8 outdoor unit that is 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 supply with a short-circuit power Ssc greater than or equal to the values in the table.

	U-10LZ2E8
Ssc	1,800 kVA

- The product meets the technical requirements of EN/IEC 61000-3-3.
- Pay close attention to all warning and caution notices given in this manual.
- An RCD suitable for use with inverters, resistant to high frequency noise, is most suitable. RCD's intended for protection to include high frequency currents are unnecessary and should be avoided, as potentially causing nuisance tripping, in this application.
- If capacity of power supply circuit and enforcement are not enough, it can cause the electric shock and a fire.

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

CAUTION 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.

WARNING

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- The following checks shall be applied to installations using flammable refrigerants.

  Appliance shall be installed, operated and stored in a room with a floor area larger than [Amin] m^2.

  As for [Amin], see Section "Check of Density Limit".

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-8LZ2E8	U-10LZ2E8
Circuit breaker	25 A	30 A

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation by 3 mm 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.
- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.

When Transporting

- It may need two or more people to carry out the installation work.
- 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 Storing…

WARNING

- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- The appliance shall be stored in a room without continuously operating open flames (for example: an operating gas appliance) and ignition sources (for example: an operating electric heater).

- The appliance shall be stored so as to prevent mechanical damage from occurring.

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 cases that require mechanical ventilation, ventilation openings shall be kept clear of obstruction.
- An unventilated area where the appliance using flammable refrigerants is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

…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.

⚠ WARNING

- If the air conditioner is installed in a small room, take measures to prevent the refrigerant concentration from exceeding the safety limit in the event of refrigerant leakage.

  Consult the sales dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded.

  If the refrigerant comes in contact with a flame, it produces a toxic gas and a fire.

  If the refrigerant leaks and the allowable concentration is exceeded, hazards due to a lack of oxygen in the room will result.
- When air flow decrease is detected of a circulation fan beside the indoor unit installed, the system must be powered off within 10 seconds from the detection.

⚠ CAUTION 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

Pay particular attention to refrigerant leakages.

⚠ WARNING

- When performing piping work, do not mix air except for specified refrigerant in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.
- If the refrigerant comes in contact with a flame, it produces a toxic gas and a fire.
- Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury, etc.

- Ventilate the room immediately in the event of a refrigerant gas leakage during installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of toxic gas and fire.
- Keep all tubing runs as short as possible.
- 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.
- Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.

- A halide torch (or any other detector using a naked flame) shall not be used.
- Electronic leak detectors may be used to detect refrigerant leaks but, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- Leak detection equipment shall be set at a percentage of the lower flammable limit (LFL) of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed.
- Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- If a leak is suspected, all naked flames shall be removed/extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.
- If refrigerant R32 is used and R32 refrigerant leakage detection sensor is connected to the indoor unit, do not turn off the ELCB of the indoor unit except when there is a symptom of abnormality or failure, or when performing short-term maintenance. (When the ELCB is turned off, R32 refrigerant leakage detection sensor cannot detect the refrigerant leakage when the refrigerant leaks, and it may lead to cause the generation of toxic gas and fire.)

When Servicing

- Contact the sales dealer or service dealer for a repair.
- Ventilate the room by opening windows before servicing if there is a possibility of a refrigerant leakage.
- Be sure to turn off the power before servicing.
- Turn the power OFF at the main power box (mains), wait at least 5 minutes until it is discharged, then open 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.

⚠ WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- 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 the sales dealer or service dealer for a repair and disposal.

⚠ CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Leaked 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 toxic gas and fire.

Others

When disposal of the product, do follow the precautions in “Recovery” and comply with national regulations.

⚠ WARNING

- Do not sit or step on the unit. You may fall down accidentally.

⚠ CAUTION

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

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

- Do not touch the fan because it automatically rotates when it detects a refrigerant leak. You may be injured.

SERVICING

⚠ CAUTION

- Any qualified person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
- Servicing shall be performed only as recommended by the manufacturer.
- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, (2) to (6) shall be completed prior to conducting work on the system.

(1) Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

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

(3) The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

(4) If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

(5) No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

(6) Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

(7) Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.
- The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

(8) Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:
- That capacitors are discharged. This shall be done in a safe manner to avoid possibility of sparking.
- That no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity of earth bonding.

- During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc.

- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
- Ensure that apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres.
- Replacement parts shall be in accordance with the manufacturer's specifications.

  NOTE:
  The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
- Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere.
- The test apparatus shall be at the correct rating.
- Replace components only with parts specified by the manufacturer. Unspecified parts by manufacturer may result ignition of refrigerant in the atmosphere from a leak.

REMOVAL AND EVACUATION

⚠ CAUTION

- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used.
  However, it is important that best practice is followed since flammability is a consideration.
  The following procedure shall be adhered to:
  - Remove refrigerant.
  - Purge the circuit with inert gas.
  - Evacuate.
  - Purge again with inert gas.
  - Open the circuit by cutting or brazing.
- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The system shall be "flushed" with Oxygen free nitrogen (OFN) to render the unit safe.
- This process may need to be repeated several times.
- Compressed air or oxygen shall not be used for this task.
- Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- This process shall be repeated until no refrigerant is within the system.
- When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
- This operation is absolutely vital if brazing operations on the pipe work are to take place.
- Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and there is ventilation available.

CHARGING PROCEDURES

⚠ CAUTION

- In addition to conventional charging procedures, the following requirements shall be followed.
  - Ensure that contamination of different refrigerants does not occur when using charging equipment.
  - Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
  - Cylinders shall be kept upright.
  - Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas.
- The system shall be leak-tested on completion of charging but prior to commissioning.
- A follow up leak test shall be carried out prior to leaving the site.
- Electrostatic charge may accumulate and create a hazardous condition when charging or discharging the refrigerant.

  To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before charging / discharging.

DECOMMISSIONING

⚠ CAUTION

- Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details.
- It is recommended good practice that all refrigerants are recovered safely.
- Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant.
- It is essential that electrical power is available before the task is commenced.

  a) Become familiar with the equipment and its operation.

  b) Isolate system electrically.

  c) Before attempting the procedure ensure that:
    - Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
    - All personal protective equipment is available and being used correctly.
    - The recovery process is supervised at all times by a competent person.
    - Recovery equipment and cylinders conform to the appropriate standards.

  d) Pump down refrigerant system, if possible.

  e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

  f) Make sure that cylinder is situated on the scales before recovery takes place.

  g) Start the recovery machine and operate in accordance with instructions.

  h) Do not overfill cylinders. (No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

- Electrostatic charge may accumulate and create a hazardous condition when charging or discharging the refrigerant.

  To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before charging / discharging.
- Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant.
- The label shall be dated and signed.
- Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

RECOVERY

⚠ CAUTION

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.
- Ensure that the correct number of cylinders for holding the total system charge are available.
- All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).
- Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order.
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants.
- In addition, a set of calibrated weighing scales shall be available and in good working order.
- Hoses shall be complete with leak-free disconnect couplings and in good condition.
- Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.

  Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged.
- Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.

- The evacuation process shall be carried out prior to returning the compressor to the suppliers.
- Only electric heating to the compressor body shall be employed to accelerate this process.
- When oil is drained from a system, it shall be carried out safely.

Check of Density Limit

Check the amount of refrigerant in the system and floor space of the room according to the legislation on refrigerant drainage. If there is no applicable legislation, follow the standards described below.

The refrigerant (R32), which is used in the air conditioner, is a flammable refrigerant. So the requirements for the maximum refrigerant charge amount [m_{max}] used in the appliance are determined according to installation space of the appliance.

Installation conditions

Procedure of preliminary calculation

1. Determine the room space in accordance with the requirements of installation.
2. Calculate the maximum refrigerant charge amount [m_{max}].
   When connecting the refrigerant tubes and installing the indoor unit in each partitioned room, it is necessary to calculate the allowable refrigerant charge amount in each room.
   For all indoor units shown in Fig. 1, calculate the allowable refrigerant charge amount that can be used in each room [m_{IN_1}, m_{IN_2},---, m_{IN_n}].
   Calculate the maximum refrigerant charge for each indoor unit from Fig. 2 by referring to the following items.
   - Floor area of the room
   - Indoor units type
   - Capacity of indoor unit
   - Installation height of Indoor Unit
   - Use or nonuse of R32 refrigerant leakage detection sensor

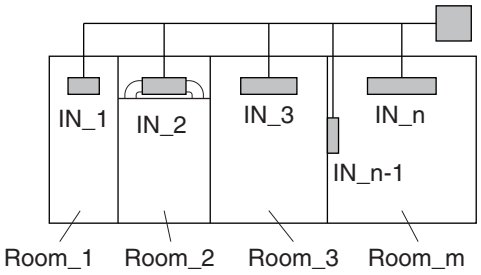

Fig. 1

Room No.	No. of indoor units	Indoor units type	Capacity of indoor unit	Installation height of Indoor Unit: h_{inst} (m)	R32 refrigerant leakage detection sensor	Floor area of the room (m^2)	Refrigerant charge amount that can be used for each indoor unit (kg)
Room_1	IN_1	4-Way Cassette 60 × 60	15	$h_{inst} \geq 2.2$	Use	10	m_{IN_1}
Room_2	IN_2	Slim Low Static Ducted	56	$h_{inst} \geq 2.2$	Nonuse	15	m_{IN_2}
Room_3	IN_3	4-Way Cassette	56	$h_{inst} \geq 2.2$	Use	20	m_{IN_3}
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Room_m	IN_n-1	Wall-Mounted	45	$h_{inst} \geq 1.8$	Nonuse	30	m_{IN_n-1}
Room_m	IN_n	4-Way Cassette	140	$h_{inst} \geq 2.2$	Use	30	m_{IN_n}

$$[m_{max}] = \text{Min}\ (m_{IN\_1}, m_{IN\_2}, m_{IN\_3}, ---, m_{IN\_n-1}, m_{IN\_n})$$

The minimum value of the allowable refrigerant charge amount in each room is the maximum value of the maximum refrigerant charge amount [m_{max}] that can be used in the system.

3. Calculate the maximum refrigerant charge amount [m_c]* by following details of piping installation.

   * $[m_c] \leq 15.9$ (Maximum refrigerant charge amount)

   As a reference, refer to Technical Data.

4. Determine from two values [m_{max}] in Step 2 and [m_c] in Step 3.
   $[m_c] \leq [m_{max}]$: Can be installed.
   $[m_c] > [m_{max}]$: Return to Steps 1 to 3 and change the indoor unit type, capacity and pipe length.

< Whether or not to use R32 refrigerant leakage detection sensor >

- According to the type of diagrams shown in Fig. 2, it is necessary to install R32 refrigerant leakage detection sensor if the installation space is within the range of using R32 refrigerant leakage detection sensor.
- As to installation method of R32 refrigerant leakage detection sensor, refer to Technical Data.
- When connecting R32 refrigerant leakage detection sensor, group connection with a remote controller is not possible. Be sure to prepare a remote controller for each indoor unit.

The refrigerant charge amount compared with the floor area of the room is roughly as follows:

NOTE

In the case of connecting R32 refrigerant leakage detection sensor :

- For systems using R32 refrigerant, this unit is equipped with a refrigerant leak detector for safety. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

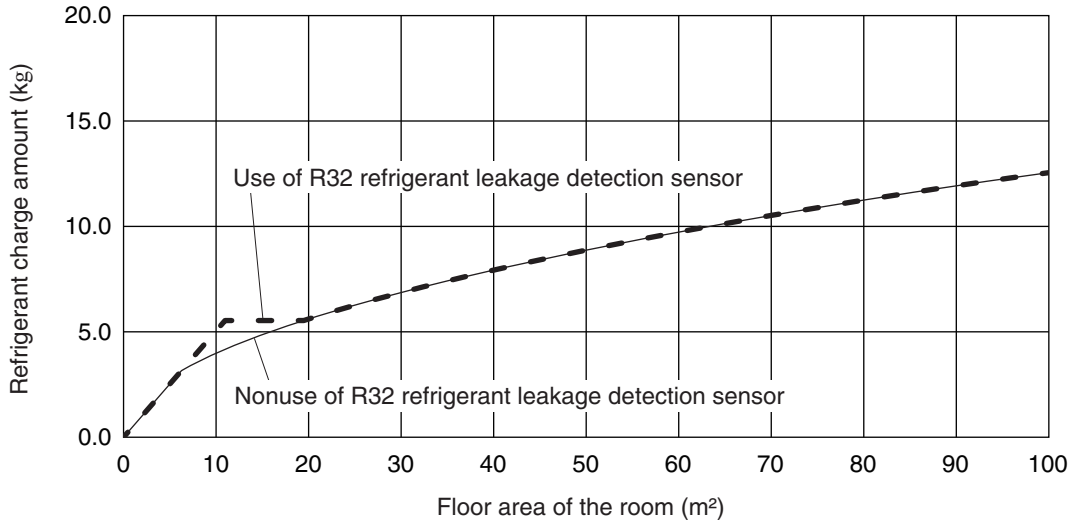
Here is one of an example shown below. The following diagram is subject to change according to the type of the connected indoor units. Refer to each indoor unit Service Manual.

Example:

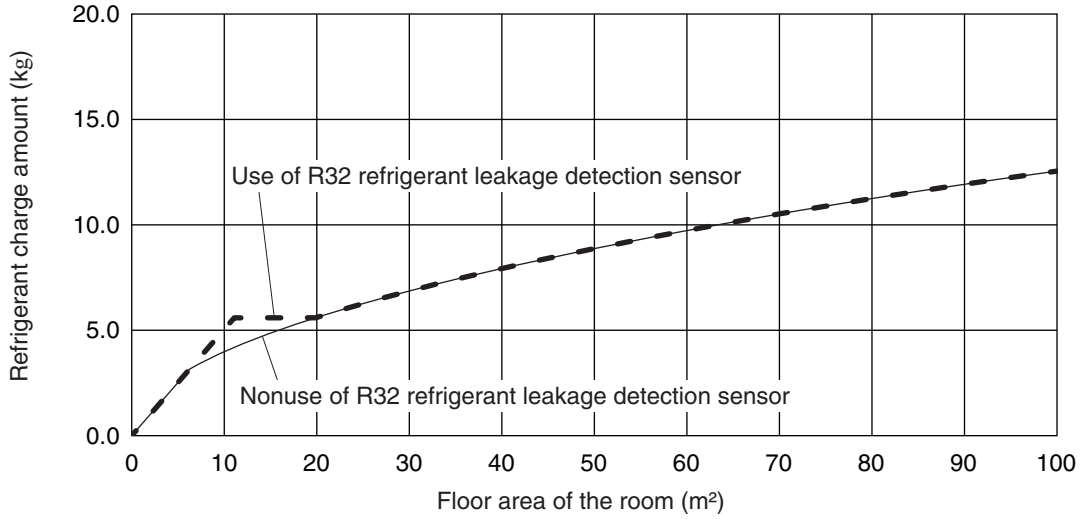
Fig. 2

4-Way Cassette 60 × 60

Type 15



Type 22



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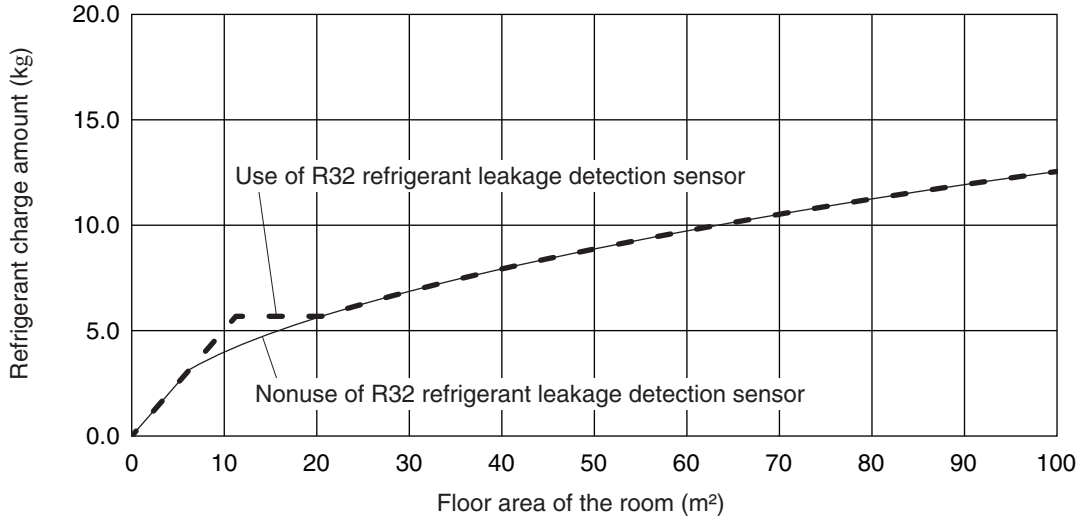
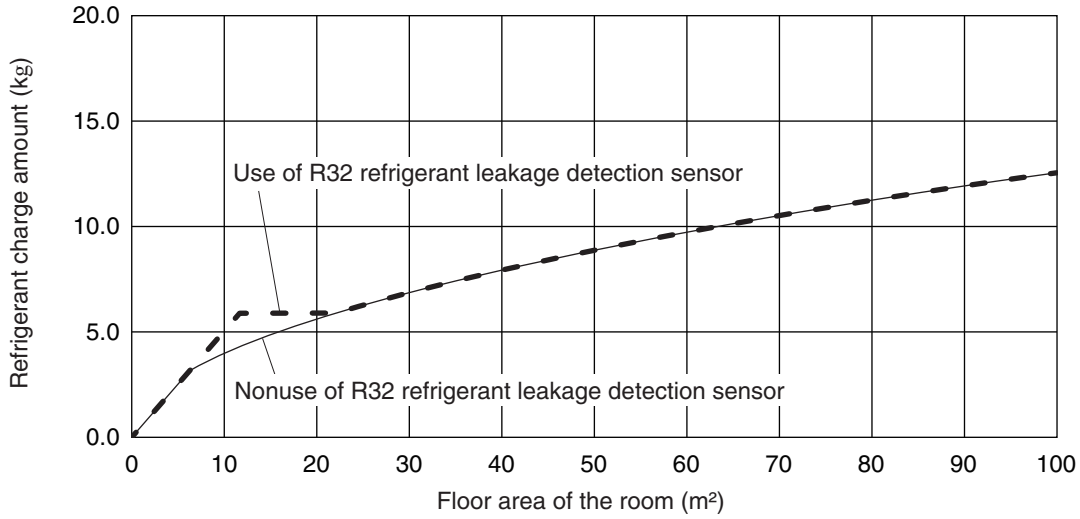
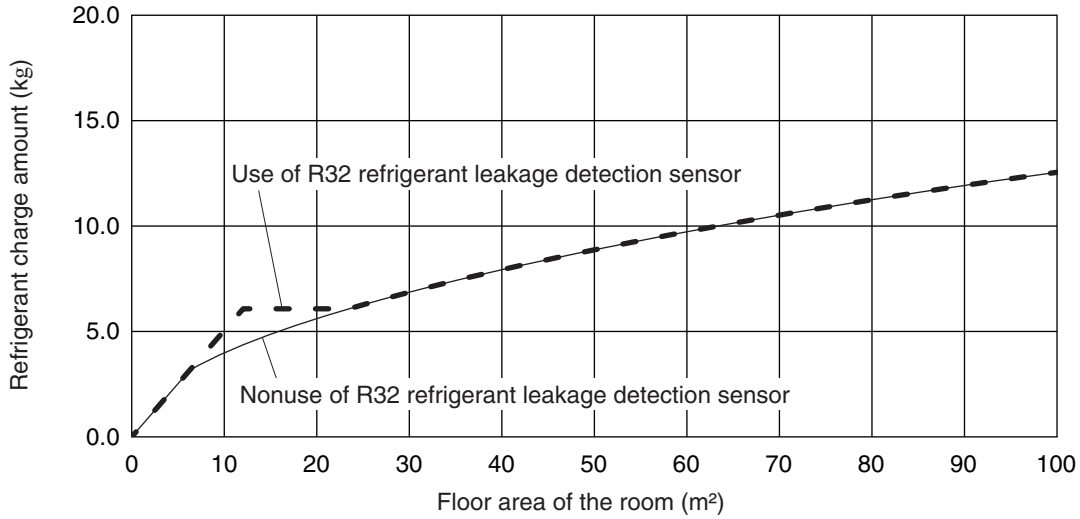


Type 36



Type 45
Type 56



4-Way Cassette 60 × 60							
	Use or nonuse of R32 refrigerant leakage detection sensor	Nonuse	Use				
	Capacity of indoor unit	15~56	15	22	28	36	45~56
		Refrigerant charge amount (kg)					
Floor area of the room (m^2)	0	0.0	0.0	0.0	0.0	0.0	0.0
	2	1.0	1.0	1.0	1.0	1.0	1.0
	4	2.0	2.0	2.0	2.0	2.0	2.0
	6	3.0	3.0	3.0	3.0	3.0	3.0
	8	3.5	4.0	4.0	4.0	4.0	4.0
	10	3.9	5.0	5.0	5.0	5.0	5.0
	12	4.3	5.5	5.6	5.7	5.8	6.0
	14	4.7	5.5	5.6	5.7	5.8	6.0
	16	5.0	5.5	5.6	5.7	5.8	6.0
	18	5.3	5.5	5.6	5.7	5.8	6.0
	20	5.6	5.6	5.6	5.7	5.8	6.0
	22	5.8	5.8	5.8	5.8	5.8	6.0
	24	6.1	6.1	6.1	6.1	6.1	6.1
	26	6.4	6.4	6.4	6.4	6.4	6.4
	28	6.6	6.6	6.6	6.6	6.6	6.6
	30	6.8	6.8	6.8	6.8	6.8	6.8
	32	7.1	7.1	7.1	7.1	7.1	7.1
	34	7.3	7.3	7.3	7.3	7.3	7.3
	36	7.5	7.5	7.5	7.5	7.5	7.5
	38	7.7	7.7	7.7	7.7	7.7	7.7
	40	7.9	7.9	7.9	7.9	7.9	7.9
	42	8.1	8.1	8.1	8.1	8.1	8.1
	44	8.3	8.3	8.3	8.3	8.3	8.3
	46	8.5	8.5	8.5	8.5	8.5	8.5
	48	8.7	8.7	8.7	8.7	8.7	8.7
	50	8.8	8.8	8.8	8.8	8.8	8.8
	52	9.0	9.0	9.0	9.0	9.0	9.0
	54	9.2	9.2	9.2	9.2	9.2	9.2
	56	9.4	9.4	9.4	9.4	9.4	9.4
	58	9.5	9.5	9.5	9.5	9.5	9.5
	60	9.7	9.7	9.7	9.7	9.7	9.7
	62	9.8	9.8	9.8	9.8	9.8	9.8
	64	10.0	10.0	10.0	10.0	10.0	10.0
	66	10.2	10.2	10.2	10.2	10.2	10.2
	68	10.3	10.3	10.3	10.3	10.3	10.3
	70	10.5	10.5	10.5	10.5	10.5	10.5
	72	10.6	10.6	10.6	10.6	10.6	10.6
	74	10.8	10.8	10.8	10.8	10.8	10.8
	76	10.9	10.9	10.9	10.9	10.9	10.9
	78	11.1	11.1	11.1	11.1	11.1	11.1
	80	11.2	11.2	11.2	11.2	11.2	11.2

4-Way Cassette 60 × 60							
	Use or nonuse of R32 refrigerant leakage detection sensor	Nonuse	Use				
	Capacity of indoor unit	15~56	15	22	28	36	45~56
		Refrigerant charge amount (kg)					
Floor area of the room (m^2)	82	11.3	11.3	11.3	11.3	11.3	11.3
	84	11.5	11.5	11.5	11.5	11.5	11.5
	86	11.6	11.6	11.6	11.6	11.6	11.6
	88	11.7	11.7	11.7	11.7	11.7	11.7
	90	11.9	11.9	11.9	11.9	11.9	11.9
	92	12.0	12.0	12.0	12.0	12.0	12.0
	94	12.1	12.1	12.1	12.1	12.1	12.1
	96	12.3	12.3	12.3	12.3	12.3	12.3
	98	12.4	12.4	12.4	12.4	12.4	12.4
	100	12.5	12.5	12.5	12.5	12.5	12.5

Precautions for Installation Using New Refrigerant

1. Care regarding tubing

1-1. Process tubing

- Material: Use seamless phosphorous deoxidized copper tube for refrigeration. Wall thickness shall comply with the applicable legislation. The minimal wall thickness must be in accordance with the table below.
- **Tubing size: Be sure to use the sizes indicated in the table below.**
- Use a tube cutter when cutting the tubing, and be sure to remove any flash. This also applies to distribution joints (optional).
- When bending tubing, use a bending radius that is 4 times the outer diameter of the tubing or larger.

⚠ **CAUTION** **Use sufficient care in handling the tubing. Seal the tubing ends with caps or tape to prevent dirt, moisture, or other foreign substances from entering. These substances can result in system malfunction.**

Unit: mm

Material		Temper - O (Soft copper tube)				
Copper tube	Outer diameter	6.35	9.52	12.7	15.88	19.05
	Wall thickness	0.8	0.8	0.8	1.0	1.2

Unit: mm

Material		Temper - 1/2 H, H (Hard copper tube)	
Copper tube	Outer diameter	22.22	25.4
	Wall thickness	1.0	1.0

1-2. Prevent impurities including water, dust and oxide from entering the tubing. Impurities can cause R32 refrigerant deterioration and compressor defects. Due to the features of the refrigerant and refrigerating machine oil, the prevention of water and other impurities becomes more important than ever.

2. Be sure to recharge the refrigerant only in liquid form.

2-1. Since refrigerant composition changes and performance decreases when gas leaks, collect the remaining refrigerant and recharge the required total amount of new refrigerant after fixing the leak.

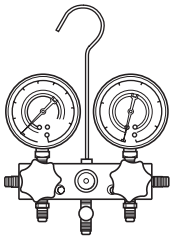
3. Different tools required

3-1. Tool specifications have been changed due to the characteristics of R32.
Some tools for R22- and R407C-type refrigerant systems cannot be used.

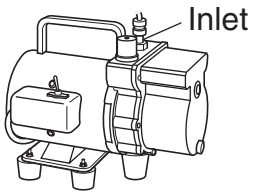
Item	Different tools? (From R22 and R407C)	R410A tools compatible with R32?	Remarks
Manifold gauge	Yes	Yes	Types of refrigerant, refrigerating machine oil, and pressure gauge are different.
Charge hose	Yes	Yes	To resist higher pressure, material must be changed.
Vacuum pump	Yes	Yes	Use a conventional vacuum pump if it is equipped with a check valve. If it has no check valve, purchase and attach a vacuum pump adapter.
Leak detector	Yes	Yes	Leak detectors for CFC and HCFC that react to chlorine do not function because R32 and R410A contains no chlorine. Leak detectors for HFC can be used for R32 and R410A.
Flaring oil	Yes	Yes	For systems that use R22, apply mineral oil (Suniso oil) to the flare nuts on the tubing to prevent refrigerant leakage. For machines that use R32 or R410A, apply synthetic oil (ether oil) to the flare nuts.

* Using tools for R22, R407C, R410A and R32 together can cause defects.

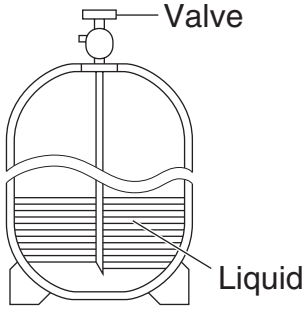
Manifold gauge



Vacuum pump



Single-outlet valve
(with siphon tube)
Liquid refrigerant should be recharged with the cylinder standing on end as shown.



Important Information Regarding The Refrigerant Used

This product contains fluorinated greenhouse gases. Do not vent gases into the atmosphere.

Refrigerant type: R32

GWP[(1)] value: 675

[(1)]GWP = global warming potential

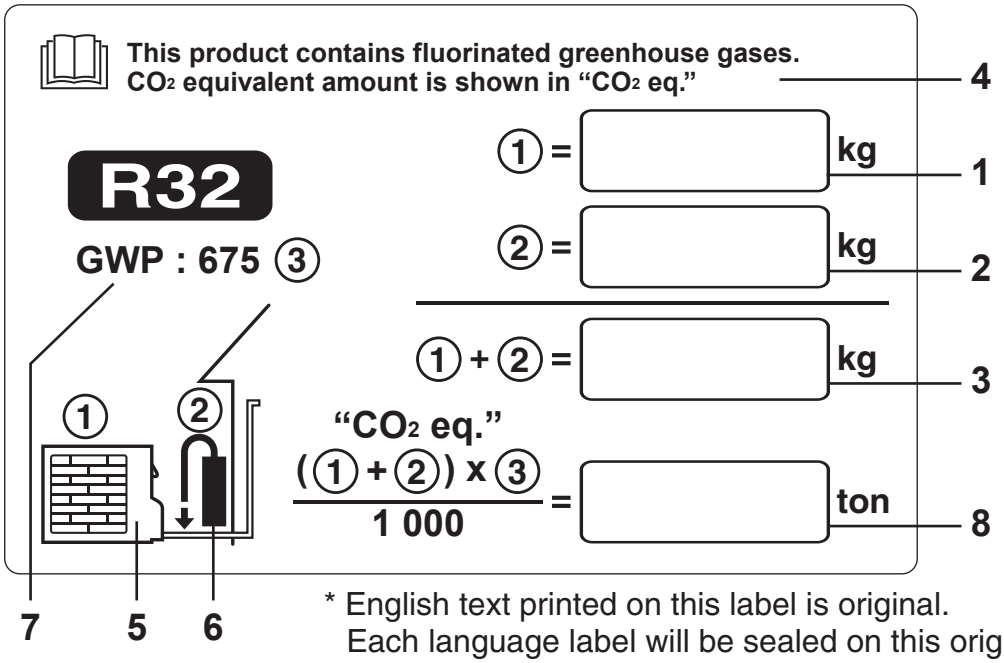
Periodical inspections for refrigerant leaks may be required depending on European or local legislation.
Please contact your local dealer for more information.

Please fill in with indelible ink,

- ①: the factory refrigerant charge of the product
- ②: the additional refrigerant amount charged in the field
- ① + ②: the total refrigerant charge
- (① + ②) x ③/1000: CO_2 equivalent in tons; multiply the total refrigerant charge by GWP value, then divided by 1000.

on the refrigerant charge label supplied with the product.

The filled out label must be adhered in the proximity of the product charging port (e.g. onto the inside of the service cover).



* English text printed on this label is original.
Each language label will be sealed on this original text.

1. Factory refrigerant charge of the product: see unit name plate
2. Additional refrigerant amount charged in the field*
3. Total refrigerant charge
4. Contains fluorinated greenhouse gases
5. Outdoor unit
6. Refrigerant cylinder and manifold for charging
7. GWP(global warming potential) of the refrigerant used in this product
8. CO_2 equivalent of fluorinated greenhouse gases contained in this product

CONTENTS

– MEMO –

1. CONTROL FUNCTIONS - 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

Setting item	At shipment from factory	Settable range
System address	1	System 1 – 30
No. of indoor units	1	1 – 16 units

Table 1-2

	8 HP	10 HP
Maximum number of connected indoor units	16	16

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% – 150% (130%*).
* In case of 1.5 kW indoor units connection.

(1) Compressors Mounted in the Outdoor Units

Type of outdoor unit		8HP	10HP
Compressor 1	Inverter compressor (High pressure rotary)	●	●

* The inverter compressor is operated according to the load and does not operate beyond outdoor unit capacity.

(2) Operating Frequency Range of Inverter Compressor

The inverter compressor can operate within the range in the table below.

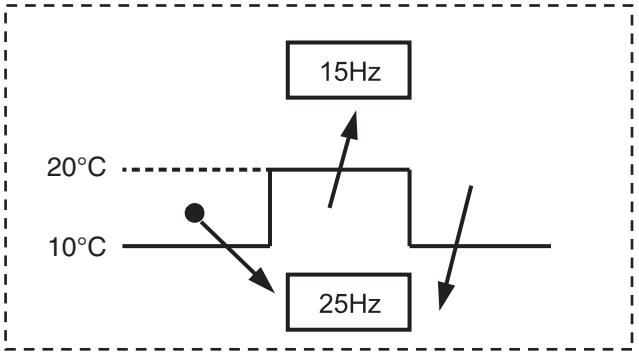
① When the high pressure is over 3.3MPa, the upper limit frequency is restricted.

② If the low pressure is over 1.7MPa during operation of the inverter compressor, the system is stopped. (P27: Pre-trip)

Type of outdoor unit	8HP	10HP
Minimum frequency (Hz) *1	15	15
Maximum frequency (Hz) *2	77.2	95.0

* The frequency range in the table above is subject to change without notice.

*1 The minimum Hz changes according to the outdoor air temperature during cooling operation.



・When operation started under the temperature of 10°C＜ outdoor air temperature, the minimum Hz becomes 15Hz.

*2

・The upper limit frequency is sometimes restricted to 50Hz or less until the compressor gets warmer.

・During special control (4-way valve adjustment control, system oil recovery control or defrost control) the maximum frequency is limited.

(3) Forced Stopping of Compressor

Once a compressor stops, it will not start for a period of 3 minutes (3-minute forced OFF).
However, this is not applied when the compressor was forced to stop as the result of a special control operation. (Start control, Defrost control, Refrigerant oil recovery control, etc.)

(4) Horsepower Control (Roadmap Control)

① Horsepower control (start & stop of compressor and increase & decrease of inverter frequency) are controlled according to the numerical value of the pressure sensor installed at the outdoor unit and the temperature sensor installed at the indoor unit heat exchanger.

* The pressure detected by the pressure sensor is converted to the saturated temperature.
There are two types of controls; one is the pressure detected by the pressure sensor and the other is detected by the saturated temperature.

- High pressure saturated temperature is converted from values detected by the high pressure sensor.
- Low pressure saturated temperature is converted from values detected by the low pressure sensor.

② This control is performed every 30 seconds.

③ When cooling operation, evaporation temperature (= antifreeze control) and condensation temperature (= high pressure prevention control) are applied.
When heating operation, condensation temperature (= high pressure prevention control) is applied.

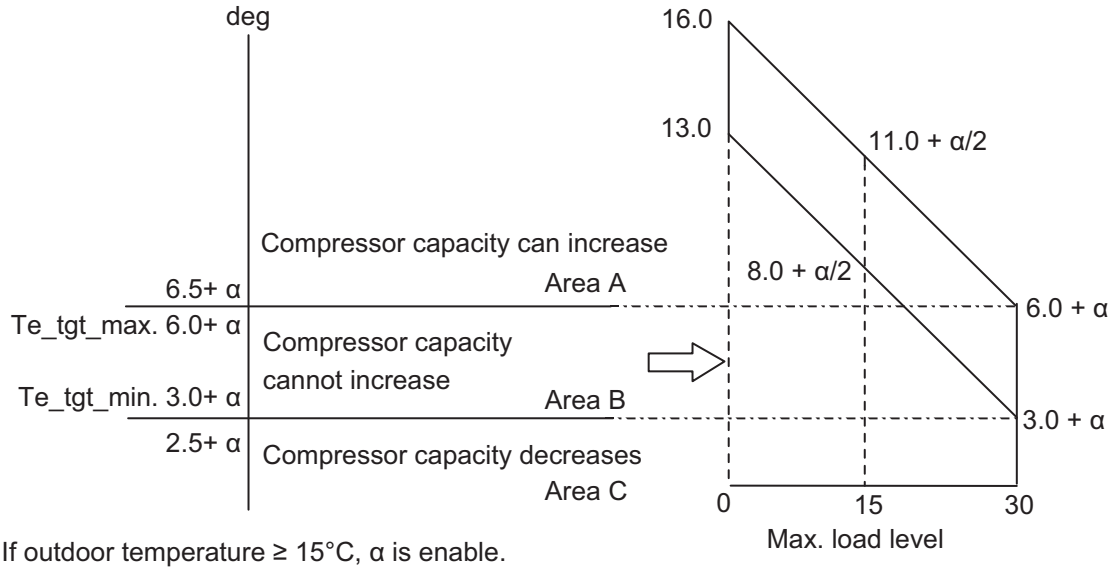
- Definition of evaporation temperature (Te)
  Lowest temperature of all indoor units' evaporation temperature (E1, E3) in the system including the stopped indoor units
- Definition of condensation temperature (Tc)
  Outdoor units' high pressure saturated temperature
- Load level varies from a minimum of 0 to a maximum of 30 on 1 to 1 basis up to 31 levels.
  When the indoor unit stops (including thermostat OFF), the level shows "0".
  In the case of test run mode, the actual level implies "30" even if a PC monitor indicates "31".
  * In the case that the compressor is stopped from such as special controls, load level does not turn to "0" even if the indoor unit is most likely to be in stopped state.
- The indoor unit demand level varies according to the following 2 conditions.
  - Intake temperature difference:
    Difference between indoor unit remote control set temperature and intake temperature (TA)
  - Discharge temperature difference:
    Difference between preset discharge setting temperature according to the type of indoor unit and actual discharge temperature (TF)
- Load level increases when the differential temperature noted above indicates plus (+) value and decreases when it indicates minus (-) value.
  However, the types of units which are set to control the discharge temperature vary according to the lowest value from the intake temperature difference and discharge temperature difference.
- Horsepower is controlled by the maximum value of all indoor units load level.

4-1. Evaporation temperature (= Te) control

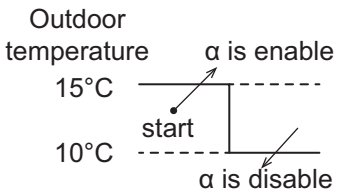
The cooling capacity is adjusted with this control. It prevents freezing of the indoor unit heat exchanger and the dew to the outside panel of the indoor unit. The capacity is adjusted according to the following figure.

Evaporation temperature area

unit: °C



- If outdoor temperature ≥ 15°C, α is enable.
  Minimum α is enable in all indoor units.
- If outdoor temperature < 10°C, α is disable.



α : Correction Value of Te

	α	Indoor unit type
Gr 1	2	Type D1, L1
Gr 2	5	Type P1, R1
Gr 3	3	Indoor units inapplicable to Gr 1, Gr 2

- The evaporation temperature area changes depending on the maximum load level in each indoor unit as shown on previous page.
- The Area C is regarded as Area B for 6 minutes after compressor starts.
- When the system operates in a minimum capacity, the system will continue operating for at least 6 minutes if the evaporation temperature area is Area C.
- During special controls such as defrosting or oil recovering between the systems, the compressor capacity will not be controlled by the evaporation temperature control area.
- If the outdoor unit is stopped while the evaporation temperature is in Area C, the system may operate from the lower compressor capacity when starting next time.
- Test run mode
  Test run mode in cooling operation is used when the room temperature is low and the indoor unit thermostat is not turn ON. This mode is used for operation check when the outdoor unit is fully operated or additional refrigerant charge without stopping the system.
  * If the test run is continued for a long time, the mist may occur but it is not abnormal.
  - If more than 1 indoor unit is in test run mode, the evaporation temperature control is not applicable.
  - Once the indoor unit is selected for the test run, the thermostat will not be turned OFF.
  - After the last indoor unit is operated in the test run mode, the test run is automatically cancelled after 1 hour.

1

4-2. Condensation Temperature Control

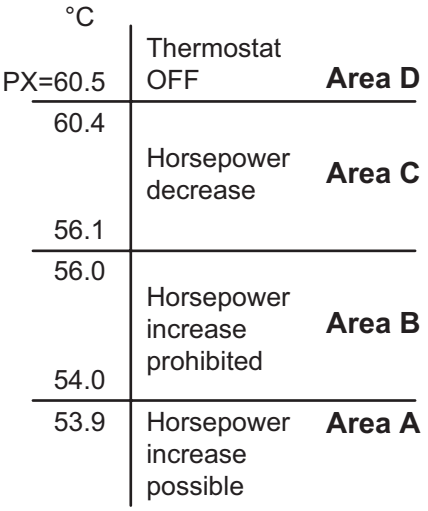
Target temperature of the Area B is different between cooling and heating operation.

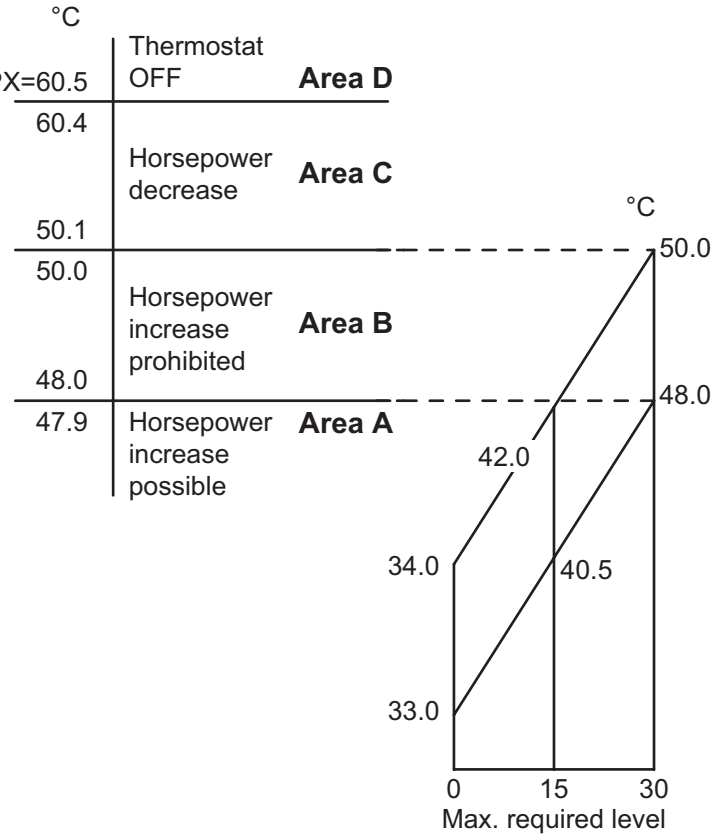
① In Cooling Mode

The purpose of this control at cooling is to prevent abnormal high-pressure.

② In Heating Mode

Heating capacity is adjusted with this control.
It also prevents abnormal high-pressure simultaneously.
The capacity is controlled in the following diagram.

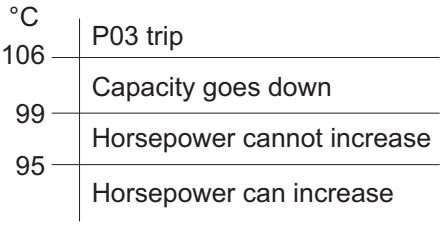




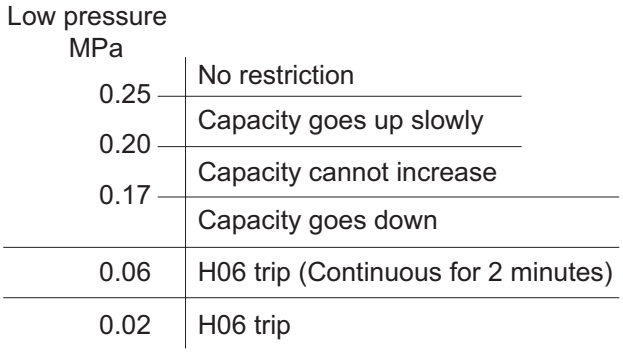
- When the temperature falls in the Area D (over PX temperature), the operation stops within 0 to 30 seconds at the interval of the roadmap control.
- After Tc falls in the Area D and the thermostat is turned OFF, the system may resume operating from the lower compressor capacity.
- When the system operates in a minimum capacity, the system will continue operating for at least 6 minutes if the condensation temperature area is the Area C.
  If it maintains in the Area C, the thermostat may turn OFF.
- Test Run
  Test run mode in heating operation is used when the room temperature is high and the indoor unit thermostat is not turned ON. This mode is used for operation check when the outdoor unit is fully operated or additional refrigerant charge without stopping the system.
  - Once the indoor unit is selected for the test run, the thermostat will not be turned OFF. However, condensation temperature control is performed in order to prevent the high load according to the figure shown on previous page.
  - After the last indoor unit is operated in the test run mode, the test run is automatically cancelled after 1 hour.

4-3. Protection Control

① Compressor discharge temperature protection
The compressor capacity is controlled according to the figure below.
* Discharge temperature that is used for this control is the highest temperature among all compressors.



② Low pressure protection control
In order to prevent the excessive decrease of low pressure, the compressor capacity is controlled according to the figure below.



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③ Current protection
This restriction protects the compressor and controls the compressor electric current simultaneously.
The current limitation value changes to “normal status” and “overload status” according to the outdoor temperature.
The primary and secondary current values of the inverter compressors are measured.

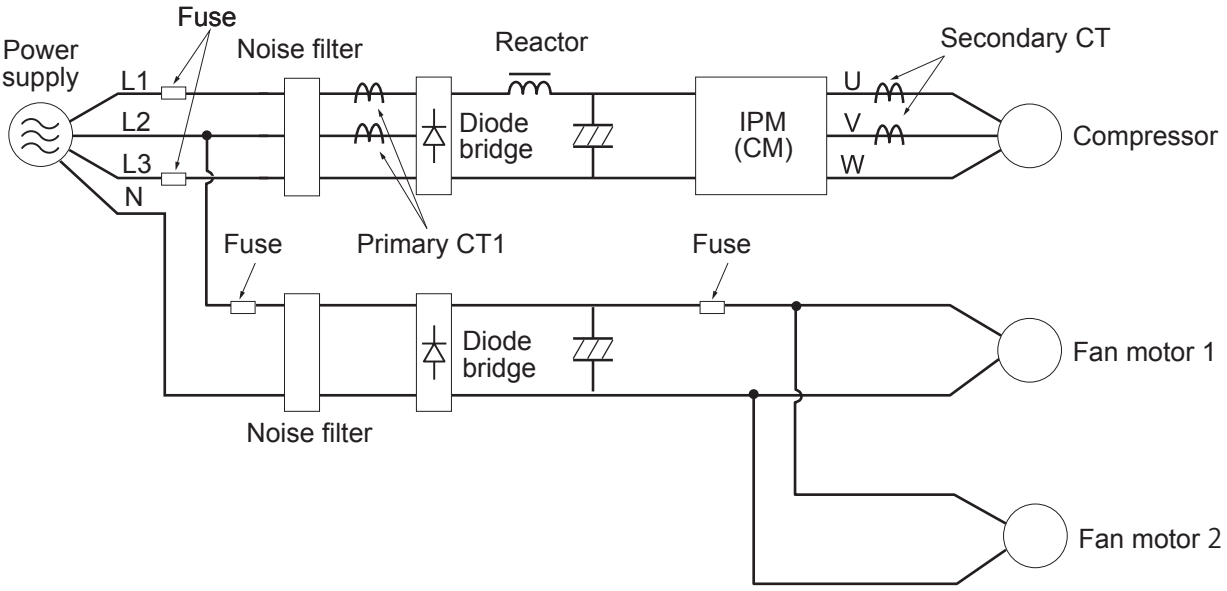
unit: Ampere

Type of outdoor unit		8HP	10HP
Primary	Limit current 1	23.0	23.0
	Maximum current 1 H	12.7	18.5
	Maximum current 1 L	11.7	17.5

Type of outdoor unit		8HP	10HP
Secondary	Limit current 2	24.3	24.3
	Maximum current 2 H	20.5	20.5
	Maximum current 2 L	19.5	19.5

	Stop If this current is detected at regular intervals, alarm appears.
Limit current 1, 2	Frequency of inverter compressor goes down.
Max. current 1H, 2H	Frequency of inverter compressor cannot increase.
Max. current 1L, 2L	Frequency of inverter compressor can increase.

Inverter layout



Items	Remarks	Indication on PCB
Solenoid valve	4-way valve	20S
	Oil recovery valve	ORVR
Motor Operated Valve	MOV for heat exchanger	MOV1
	MOV for Sub cooler	MOV4
Crankcase heater	Crankcase heater	CH

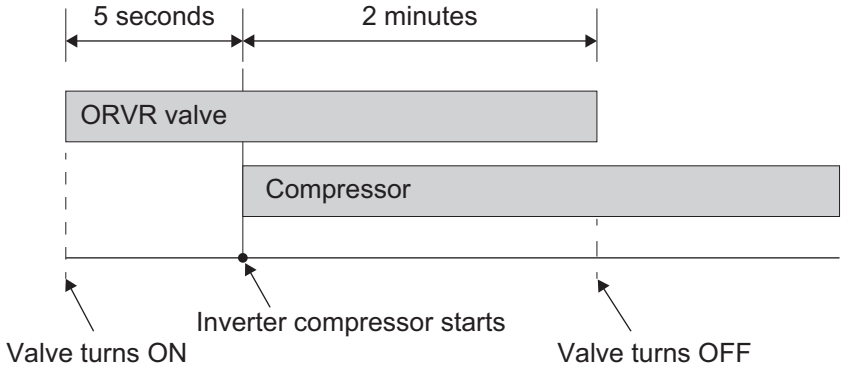
(1) 4-way Valve [20S]

- This valve turns OFF at cooling mode, and turns ON at heating mode.
- Regarding the operation in defrost mode, see Section “8. Defrost Control”.
- When the outdoor unit stops, the 4-way valve maintains in the same state as before.

(2) Oil Recovery Valve [ORVR]

The purpose of this valve is to recover oil from the oil separator to the compressor and is to adjust the capacity and pressure.

- This valve is always OFF when outdoor unit is stopped.
- This valve turns ON for 5 seconds before the inverter compressor starts. After the inverter compressor starts, the valve is ON for 2 minutes. After that, it turns OFF.



- This valve turns ON for 30 seconds after the outdoor unit stops. After that, it turns OFF.
- This valve turns ON when the high pressure is too high.
  This valve turns OFF when the high pressure goes down.
- This valve turns ON when the high pressure switch is activated.
  This valve stays ON for 10 seconds after the high pressure switch returns in normal.
  After that, it turns OFF.
- This valve might turn ON when the system capacity is excessive although the inverter compressor operates at minimum frequency.
- This valve turns ON while the discharge temperature of the compressor is low.
- This valve turns ON during the operation of 4-way valve control.

(3) Electronic Control Valves [MOV1, MOV4]

3-1. Type of Electronic control valves

MOV1 is for adjusting refrigerant flow amount of outdoor heat exchanger.
MOV4 is for adjusting refrigerant flow amount of Sub cooler.

3-2. Power Initialization

If no indoor units have started (even once) after the power supply to the outdoor unit, the MOV holds the fully open.

Fully open	Pulse
MOV1	3000
MOV4	480

* When the indoor unit receives the signal for operation request from the control equipment, the pulse turns other than the fully open (regardless of the thermostat ON/OFF or operating ON/OFF).
It is necessary to switch ON the power supply again if the fully open are required.

3-3. Control of Electronic control valves

Electronic control valves for heat exchanger control according to the operation mode.

Mode of system	Stop	Cooling		Heating	
Compressor	Stop	Stop	Operation	Stop	Operation
MOV1 (pulse)	0	0*1	Full open	0	0 ~ Full*3
MOV4 (pulse)	0	0	0 ~ Full	0*2	0 ~ Full

*1 However, 100 pulses remain for 2 minutes after unit stopped.
*2 When the outdoor unit stops and low pressure ≤ 0.16 MPa, 60 pulses remain for 30 seconds.
*3 If any one compressor in the outdoor unit is operating in heating mode, electronic control valves perform SH control.

(4) Crankcase Heater Control [CH]

When the compressor stops, the crankcase heater is turned ON / OFF.

● Internal Calculated

4. Outdoor Unit Fan Control

(1) Number of Fan Motor

Type of outdoor unit	8·10HP
Number of fan motor	2

(2) Fan Step

These outdoor units utilize a DC fan motor that can be controlled in 0～15 steps.
The fan rotating numbers will be changed according to the fan steps.

(3) Minimum Fan Step and Maximam Fan Step

These outdoor units utilize a DC fan motor that can be controlled in a maximum of 14 steps.

	Status of heat exchanger	8HP	10HP
Maximum value	Condenser	14	14
	Evaporator	14	14
Minimum value		0	0

(4) Fixed Initial Fan Step

For the first 30 seconds after operation starts, the spep is fixed at the initial mode which was calculated from the relationship between the outdoor air temperature and the outdoor unit horsepower.
If the outdoor unit horsepower (compressor capacity) changes dramatically, the initial mode may be recalculated and may be again fixed for 30 seconds.

(5) Operation after Fixed Initial Fan Step

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

5-1. Cooling operation

- Fan step is increased when the detected high pressure saturated temperature is high, and is decreased when the high pressure saturated temperature is low.
  * The fan step is always increased when the detected high pressure sensor temperature is 46°C or higher.
- The fan step may be decreased when the system detects refrigerant shortage at an indoor unit.
- During cooling operation, if the fan step becomes “0” and this condition maintains for 3 minutes, the fan step is changed to “1”.

5-2. Heating operation

- If the pressure sensor temperature is low, the fan step is increased at regular intervals.
- If the pressure sensor temperature is high, the fan step is decreased in order to prevent excessive loads.
- The fan step may be increased when the liquid temperature of outdoor unit heat exchanger drops to 1 degrees Celsius or below.

(6) Silent Mode

Selecting the silent mode results in operation that gives priority to reducing noise at the outdoor unit.
When the setting is in silent mode, the outdoor fan step and the maximum frequency is limited.
So the capacity will be decreased. However, the frequency is not limited during the special controls.

- Maximum fan step & maximum frequency in silent mode

Type of outdoor unit		8HP		10HP	
Silent effect		Cooling	Heating	Cooling	Heating
50dB mode	Fan step	5	5	5	5
	Compressor frequency (Hz)	34.4	34.4	34.4	34.4
-3dB mode	Fan step	11	12	12	12
	Compressor frequency (Hz)	60.2	62.0	60.2	68.3
-5dB mode	Fan step	10	11	11	11
	Compressor frequency (Hz)	60.2	62.0	54.9	68.3
-7dB mode	Fan step	9	10	10	10
	Compressor frequency (Hz)	60.2	62.0	44.2	68.3

The system entirely becomes to the silent mode by setting in the main outdoor unit.

EEPROM setting in main outdoor unit

CODE : 05

Setting No.	Mode	External input to PCB	Silent effect
0	Invalidity (Factory preset mode)	———	———
1	Capacity is given priority	Necessary	50dB
2	Capacity is given priority	Necessary	-3dB
3	Capacity is given priority	Necessary	-5dB
4	Capacity is given priority	Necessary	-7dB
5	Capacity is given priority	Unnecessary	50dB
6	Capacity is given priority	Unnecessary	-3dB
7	Capacity is given priority	Unnecessary	-5dB
8	Capacity is given priority	Unnecessary	-7dB
9	Silent is given priority	Necessary	50dB
10	Silent is given priority	Necessary	-3dB
11	Silent is given priority	Necessary	-5dB
12	Silent is given priority	Necessary	-7dB
13	Silent is given priority	Unnecessary	50dB
14	Silent is given priority	Unnecessary	-3dB
15	Silent is given priority	Unnecessary	-5dB
16	Silent is given priority	Unnecessary	-7dB

NOTE

- When the setting is “external input necessary”, this function works in either of the following way
  ① short circuiting "SILENT” plug on the PCB.
  ②-1 Change setting the outdoor unit EEPROM CODE: 78 to “01”.

  CODE: 78

Setting No.	Input by indoor unit remote controller
0	Invalid (Factory preset mode)
1	Valid

  ②-2 When setting in Quiet operation by the indoor unit address 1 remote controller (CZ-RTC5B):
  *Regarding the method of setting Quiet operation, see the Operating Instructions provided with the remote controller.
- When the setting is “external input to PCB unnecessary”, this function always works.
- When the setting is “Capacity is given priority”, this function is interrupted in the following conditions.
  Cooling operation: Ambient temperature ≥ 38°C
  Heating operation: Ambient temperature < 2°C
- In case of selecting silent priority mode (more than “9” setting) in high load situation, the system has possibility to stop to prevent high pressure cut.

Some actuators of indoor unit are controlled by CCU.

(1) MOV of Indoor Unit

1-1. Indoor unit without RAP valve kit

unit : pulse

Operating mode of indoor unit	Operating mode of outdoor unit	Operating mode of compressor	Thermostat ON/OFF	MOV pulse of indoor unit
Stop	Cooling	Stop	—	20
		Operation	—	20
	Heating	Stop	—	85
		Operation	—	65 ~ 80 (prevent remaining refrigerant)
Fan (only)	Cooling	Stop	—	20
		Operation	—	20
	Heating	Stop	—	85
		Operation	—	65 ~ 80 (prevent remaining refrigerant)
Cooling	Cooling	Stop	—	20
		Operation	OFF	20
			ON	60 ~ 480 (SH control*1)
Heating	Heating	Stop	—	85
		Operation	OFF	55 ~ 80 (prevent remaining refrigerant, suction temperature control*2)
			ON	65 - 480 pulses (SC control*3)

*1 SH control adjusts the difference between the liquid temperature and gas temperature in indoor unit.
SH = gas temperature (E3) - liquid temperature (E1)
Target SH is 3 degrees Celsius when the load level of indoor unit is “30” or “31 (test run)”.
Target SH will be increased up to 17.5 degrees Celsius when the load level of indoor unit is low.
- When the refrigerant amount in the system is adjusted, it is necessary to select test run mode that the required level becomes “31”.

*2 MOV pulse changes to 55 for 1 minute when the MOV pulse continues to be 55 or more for 10 minutes.
The purpose of this control is to decrease the flow volume of the refrigerant so that room temperature can be detected with less influence of heat from the refrigerant.

*3 SC control adjusts the difference in temperature between the liquid temperature in indoor unit and high-pressure saturated temperature in outdoor unit.
SC = high-pressure sensor temperature (HPT) - liquid temperature (E1)
Target SC is 5 - 15 degrees Celsius according to the operating condition.

1-2. Indoor unit with RAP valve kit

unit : pulse

Operating mode of indoor unit	Operating mode of outdoor unit	Operating mode of compressor	Thermostat ON/OFF	MOV pulse of indoor unit
Stop	Cooling	Stop	—	20
		Operation	—	20
	Heating	Stop	—	20
		Operation	—	20
Fan (only)	Cooling	Stop	—	20
		Operation	—	20
	Heating	Stop	—	20
		Operation	—	20
Cooling	Cooling	Stop	—	20
		Operation	OFF	20
			ON	60 ~ 480 (SH control*1)
Heating	Heating	Stop	—	20
		Operation	OFF	20
			ON	65 - 480 pulses (SC control*3)

Go to previous page and see the comments with asterisks *1 and *3.
In the case of special controls, the MOV performs a special operation.
For details, see Section “3. Output of PCB” under this section.

(2) RAP Valve Kit

Operating mode of indoor unit	Operating mode of outdoor unit	Operating mode of Compressor	Thermostat ON/OFF	RAP valve kit ON/OFF
Stop	Cooling	Stop	—	OFF
		Operation	—	OFF
	Heating	Stop	—	OFF
		Operation	—	OFF
Fan (only)	Cooling	Stop	—	OFF
		Operation	—	OFF
	Heating	Stop	—	OFF
		Operation	—	OFF
Cooling	Cooling	Stop	—	OFF
		Operation	OFF	OFF
			ON	OFF
Heating	Heating	Stop	—	OFF
		Operation	OFF	OFF
			ON	ON

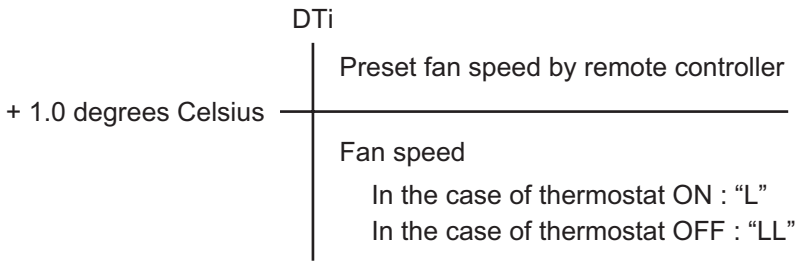
- RAP valve kit state (ON/OFF) is displayed on “D” in DSBE column when the Checker software is used.
  0 : OFF
  1 : ON
- In the case of special controls, the MOV performs a special operation.
  For details, see Section “3. Output of PCB” under this section.

(3) Indoor Fan Speed Control

The CCU intervenes in fan control of the indoor unit according to the status of the operating mode.
The priority order of fan control by the CCU is higher than that of indoor units.

3-1. Dry mode

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



* DTi = (Air intake temperature of indoor unit) - (Preset temperature by remote controller)

3-2. Heating mode

The indoor unit fan in heating mode is stopped from the CCU in the following condition.

- Discharge air temperature of indoor unit ≤ 20°C
- High pressure saturated temperature (HPT) in outdoor unit ≤ 25°C
- Liquid temperature (E1) in indoor unit ≤ 20°C

(4) Drain Pump Control

The 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 the CCU control at the following condition.

- DP counter ≥ 5

* The DP counter counts each oil recovery control, and 4-way Valve Adjustment Control in cooling operation.

- Liquid temperature (E1) in the indoor unit which selected cooling mode < 0°C

* Regardless of operating / stopped mode

* To activate this function, it is necessary to set EEPROM on the main outdoor unit PCB.

EEPROM setting in main outdoor unit
CODE: 0C

Setting No.	Movement of drain pump	Indoor unit operation mode
0 (Factory preset mode)	Invalid	All mode
1	DP operates for 20 minutes and stops for 2 hours	
2	DP operates for 20 minutes and stops for 20 minutes	
3	DP always operates	Cooling mode Dry mode Heating mode
4	DP operates for XX minutes when indoor unit's operation changes; from thermostat ON → thermostat OFF or operation stopped.	
5	DP operates for XX minutes when indoor unit's operation changes; from thermostat ON or thermostat OFF → operation stopped.	
6	Both Setting No. 4 and 5 functions.	
7	DP operates for XX minutes when indoor unit's operation changes from thermostat ON or thermostat OFF → operation stopped.	Cooling mode Dry mode

* When any of setting Nos. 4 – 7 is selected, this function works only for the type of F2, M1, E2.

* Operating time “XX” under Section “(4) Drain Pump Control” described on previous page 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 the CCU.

(5) Discharge Air Temperature Control

For some indoor units, discharge air temperature is controlled from the CCU to prevent dew condensation on duct surface in cooling operation.
The CCU monitors and adjusts ΔTo of indoor unit.
The adjustment is made by compressor capacity and MOV operation in the indoor unit.

ΔTo : Cooling (Discharge air temperature) - (Preset discharge air temperature)
Heating (Preset discharge air temperature) - (Discharge air temperature)

Situation in which indoor unit thermostat OFF by discharge air temperature control

ΔTo ≤ - 3.5 degrees Celsius, and this condition continues for 7 minutes
ΔTo < - 2.0 degrees Celsius, and this condition continues for (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 (minutes)
-19	-19 (minutes)
-18	-18 (minutes)
...	...
0	0 (minutes) (factory preset mode)
...	...
10	10 (minutes)

* Regarding the preset discharge air temperature that is set in the indoor unit is able to change, see Section “5. REMOTE CONTROLLER FUNCTIONS”.

(1) Self-separator Oil Recovery Control

Oil is recovered from the oil separator to the compressor through the ORVR.

(2) System Oil Recovery Control

All indoor units MOV are opened for recovering oil from indoor side to compressor.

2-1. Start of system oil recovery control

Amount of oil in the compressor is presumed from operation condition. If presumed oil shortage, system oil recovery control start.
This control is performed every 30 minutes - 5 hours.

2-2. Simplified flow of system oil recovery control

The system oil recovery control shall be performed as the flow mentioned below.
Normal operation → System oil recovery control → Normal operation

- In the case of cooling mode

Control time		For 3 minutes
Outdoor units		Operate for 90 seconds at 15Hz + for 90 seconds at 15 ~ 90Hz.
Indoor units	MOV	MOV at all indoor units operate at a fixed pulse according to the indoor unit capacity or SH control.
	RAP valve kit	All indoor units operate in Cooling mode (OFF status).
	Fan	Fan rotates at the set fan speed depending on the indoor unit operation mode or at fan speed “LL”.

- In the case of heating mode

Control time		For max 3 minutes
Outdoor units		Operate for 90 seconds at 15Hz + for 90 seconds at 15 ~ 90Hz.
Indoor units	MOV	MOV at all indoor units operate at 250 pulses.
	RAP valve kit	All indoor units operate in Heating mode (ON status.)
	Fan	Fan rotates at the set fan speed depending on the indoor unit operation mode or at fan speed “LL”.

(3) Indoor Unit Self Oil Recovery Control

This control is carried out regularly when the system is in cooling mode.

- During stopped, fan mode setting or thermostat OFF condition at the indoor unit, MOV of the indoor unit is opened regularly for 1 minute (at the interval of approximately 40 minutes).
- During the thermostat ON, MOV of the indoor unit is opened 20 pulses from the current status.

Type of indoor unit	Operating mode of indoor unit	Thermostat ON/OFF	Pulse of MOV	EEPROM setting in main outdoor unit CODE: 24			
				Setting No. 0		Setting No. 1	
				Fan speed	Flap	Fan speed	Flap
For K2	Stop	——	80 – 160	Stop	——	LL	Open
	Fan	——	80 - 160	LL	——	LL	Open
	Cooling*	OFF	80 – 160	Set speed	——	Set speed	——
		ON	Present pulse+20	L	——	L	——
Except K2	Stop	——	80 – 160	Stop	——	Stop	——
	Fan	——	80 – 160	Stop	——	Stop	——
	Cooling*	OFF	80 – 160	Set speed	——	Set speed	——
		ON	Present pulse+20	L	——	L	——

* MOV pulse might be different from the table listed above depending on the use conditions.

7. 4-Way Valve Adjustment Control

The purpose of this control is to change over the 4-way valve appropriately with big pressure difference.
This control is performed at the following conditions.

- The first operation after turning on power supply to outdoor unit.
- The first operation after all outdoor units stopped for 60 minutes.
- The mode of the system changes.

- Cooling operation

Control time		For 60 seconds
Outdoor units		Outdoor units operate at 40 ~ 90Hz.
Indoor units	MOV	MOV at all indoor units operate at a fixed pulse according to the indoor unit capacity.
	RAP valve kit	All indoor units operate in Cooling mode (OFF status).
	Fan	Fan rotates at the set fan speed depending on the indoor unit operation mode or at fan speed “LL”.

* When the above operation is finished, normal operation starts at the horsepower determined by the indoor units where thermostats are ON.

- Heating operation

Control time		Minimum 1 min - Maximum 20 min Termination condition for control must be satisfied with the following three performances. ・Control has been for 20 minutes. ・Detected HPT ≥ 35°C ・Detected HPT ≥ 25°C and continuously for about 60 seconds
Outdoor units		Outdoor units operate at 40 ~ 90Hz.
Indoor units	MOV	MOV at all indoor units initially operates 250 pulses and then runs in SC control mode.
	RAP valve kit	All indoor units operate in heating mode (ON status).
	Fan	Fan rotates at the set fan speed depending on the indoor unit operation mode or at “LL” fan speed, or stops.

* When the above operation is finished, normal operation starts at the horsepower determined by the indoor units where thermostats are ON.

(1) Type of Defrost Control

This system uses the reverse cycle defrost.

(2) Forced Conditions

- Defrost does not begin again for 35 minutes of operation after defrost was once completed.
- If the outdoor unit is stopped while defrosting due to protection control or another reason, then defrost control will not start for a minimum of 10 minutes after restart occurs.
- Even if all indoor units are stopped while defrosting, defrost control continues until it ends.

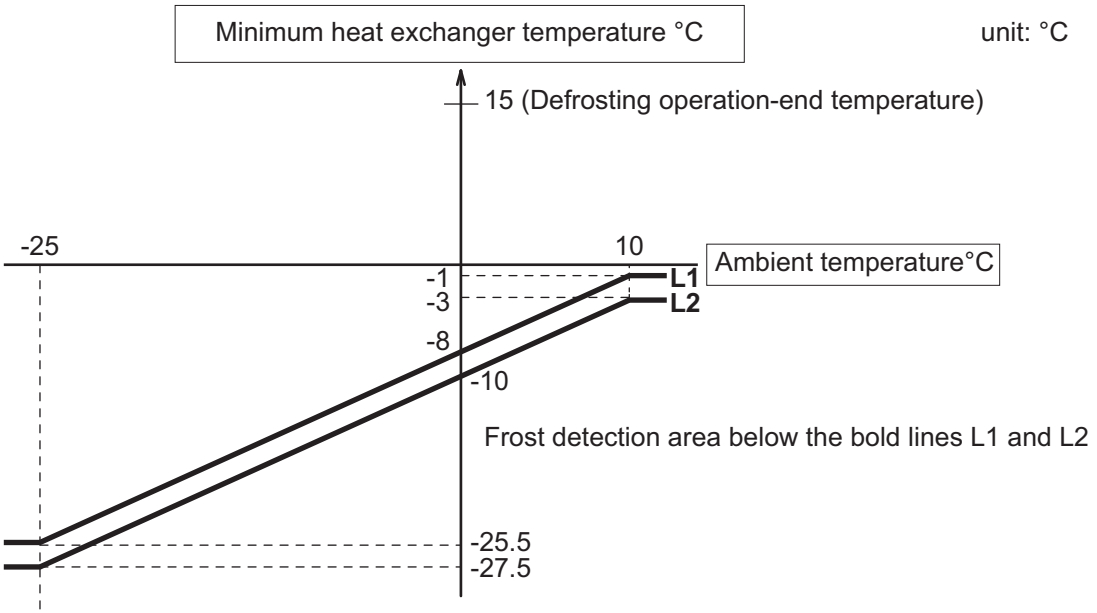
(3) Frost Detection

- Frost detection does not occur for 5 minutes after operation starts.
- Frost is detected when minimum heat exchanger temperature meets any one of the condition 1 - 3 below.

  Condition 1: Minimum heat exchanger temperature drops below L2 line shown in the figure below and detects twice for 4 minutes without interruption while the compressor is operating.

  Condition 2: Minimum heat exchanger temperature drops below L1 line shown in the figure below and detects for a total of 60 minutes while the compressor is operating.

  Condition 3: Minimum heat exchanger temperature drops below -3°C and detects for a total of 90 minutes while the compressor is operating.



(4) Heating Operation Set Time (Defrosting Operation Prohibiting Time)

When the heating operation time at system has exceeded “XX” minutes (35 minutes at initial setting), and at least one unit satisfies the decision of defrosting, the defrosting operation is effective.

* XX is able to set in EEPROM of main outdoor unit.

EEPROM setting in main outdoor unit
CODE: A3

Setting No.	XX
0	0 (minutes)
1	1 (minutes)
...	...
35	35 (minutes) (factory preset code)
...	...
60	60 (minutes)

* Defrost control is also performed at outdoor units where the outdoor unit heat exchanger is not functioning as an evaporator (such as stopped outdoor units).

(5) Defrost End Judgment Conditions

Defrost ends when either of the below defrost end judgment conditions is met.

Condition 1: The temperatures are 15°C or higher at all heat exchanger sensors installed on the outdoor unit.

Condition 2: One minute has elapsed under the condition that the temperatures are 10°C or higher at all heat exchanger sensors installed in the outdoor unit.

Condition 3: 15 minutes have elapsed.

(6) Reverse Cycle Defrost

• Defrost flow E: Evaporator operation
C: Condenser operation
E → C: Switching evaporator operation to condenser operation
C → E: Switching condenser operation to evaporator operation

			Defrost preparation	Defrost in progress		Defrost end
Outdoor unit status			E → C	C	Defrost end judgment	C → E
Compressor			Operating	Operating		Operating
4-way valve			ON→OFF	OFF		OFF→ON
Indoor unit	Stopped		C→E	E		E → C
	Fan (only)		C→E	E		E → C
	Cooling mode	Thermostat ON	C→E	E		E → C
		Thermostat OFF	C→E	E		E → C
	Heating mode	Thermostat ON	C→E	E		E → C
		Thermostat OFF	C→E	E		E → C
Time			40 seconds	Maximum 15 minutes		40 seconds

(1) Demand Control

Demand control is performed to suppress the horsepower not to make the primary current exceed the setting value.
The standard value of the limit current is shown in the table below.
Demand control is performed based on this current value.

Type of outdoor unit	8HP	10HP
Cooling mode	9.7	13.2
Heating mode	9.8	10.5

unit:Amp.

HP=Horsepower

(2) Energy Saving Button (CZ-RTC5B)

When the Energy Saving button of the indoor unit remote controller is pressed, demand control is performed according to EEPROM : 1A values.
Setting of Energy Saving button: Outdoor unit EEPROM Setting item DN18, DN19
Energy saving operation when the Energy Saving button is pressed provides 3 patterns of control.
Patterns:

A. Demand control is performed under the current limitation values set at the outdoor unit EEPROM setting (DN1A). In addition, the indoor unit controls the limitation of discharge temperature.
B. Demand control is performed under the current limitation values set at the outdoor unit EEPROM setting (DN1A).
C. Discharge temperature limitation control is performed set at the indoor unit EEPROM setting.

Outdoor unit EEPROM setting (DN18) :
The marking " ○ " indicated in the following table is applicable to the function of control.

Setting No.	Discharge temperature control	Demand control	Remarks
0	×	×	No controls
1	○	×	Pattern "C" only discharge temperature
2	×	○	Pattern "B" only demand control
3 (Factory preset mode)	○	○	Pattern "A" demand control + discharge temp. control

Outdoor unit EEPROM setting (DN19):
Setting of control validity range when pressing the Energy Saving button

Setting No.	Control range
0 (Factory preset mode)	Energy saving activates where Energy Saving button is pressed as a unit of indoor unit (group).
1	Energy saving activates where Energy Saving button is pressed as a unit of indoor unit including all refrigerant system.

* When the pattern "A" and "B" are selected, energy saving control becomes valid in the same range as the setting "1" although the Setting No. is set to "0".

NOTE

Since the pattern “A” and “B” perform the outdoor unit current demand control (compressor’s suppressive drive), it is easy to grasp energy saving amount.
However, it may cause the reduction of capacity in all indoor units of the same refrigerant system.
In order to make the indoor unit (group) only valid as the energy saving function where the Energy Saving button is pressed and not to influence to other indoor units, be sure to set the outdoor unit EEPROM setting DN18 to “1” and DN19 to “0”.

(3) Serial-parallel I/O

Serial-parallel I/O must be connected in order to perform demand control.
The below input is received by serial-parallel I/O, and demand control is performed.

The demand values can be set as needed with serial-parallel I/O.

Upper current limitation setting		Control
Contact 1	Contact 2	
×	×	No control (Operates to maximum capacity)
○	×	Operates to XX% of the upper limit for the rated current.
×	○	Operates to YY% of the upper limit for the rated current.
○	○	Forced thermostat OFF setting

○ : Input present × : Input not present

* The rated current indicates the current value that is listed in the catalog or similar material.
* XX and YY are able to set in EEPROM of main outdoor unit.

EEPROM setting in main outdoor unit

CODE: 1A

Setting No.	XX
0	0
40	40
45	45
⋮	Interval of “5”
100	100 (factory preset mode)
⋮	⋮
140	140
-1	No control

CODE: 1B

Setting No.	YY
0	0
40	40
45	45
⋮	Interval of “5”
70	70 (factory preset mode)
⋮	⋮
140	140
-1	No control

It is able to display the present condition on the remote controller.

EEPROM setting in main outdoor unit

CODE: 1E

Setting No.	
0	No display
1	Information is displayed when input of demand control is set (factory preset mode).
2	Information is displayed only when the capacity is restricted by demand control.

1

(4) When Using Demand Terminal Block

Demand terminal block must be connected in order to perform the demand control.
(It is also possible to connect the optional Seri-Para I/O unit (optional CZ-CAPDC2) and setup the system.)
The current limitation values can be set by changing either contact.

Demand terminal block	Seri-Para I/O unit		Control	Demand meaning
COM short circuit	Contact 1	Contact 2		
Non	✕	✕	No control	Operates to the maximum capacity.
LV1	○	✕	Operates to XX% of the upper limit for the rated current.	Current is limited to the set values.
LV2	✕	○	Operates to YY% of the upper limit for the rated current.	Current is limited to the set values.
LV3	○	○	Forced thermostat OFF setting	——

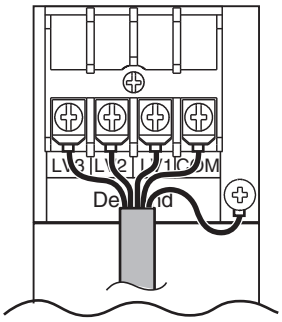
○ : Input present ✕ : Input not present

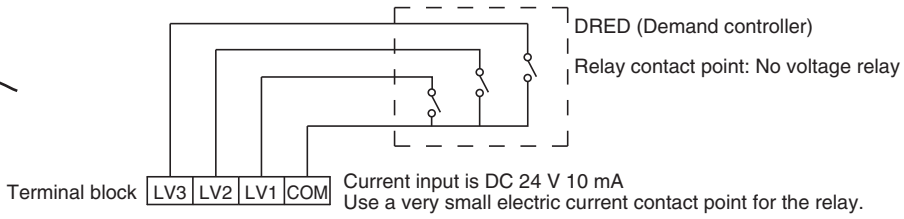
* The rated current indicates the current value that is listed in the catalog or service manual.

* In respect of connection method for demand terminal block and Seri-Para I/O unit, refer to the installation instructions supplied with the unit.

* During setting in LV1 - LV3, [CZ-RTC4] [CZ-RTC5B] [CZ-RTC6*] (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.

* XX and YY are able to set in EEPROM of main outdoor unit.
Check “(3) Serial-parallel I/O” section.





(1) Auto Cooling/Heating Function

It is possible to select auto cooling/heating mode in each remote controller even in 2WAY VRF system.
The system changes to cooling or heating operation according to number of thermostat ON mode.
The system selects the mode that has more number of units with thermostat ON.
(It is impossible to perform the simultaneous cooling/heating operation.)

While the system is operating, the system judges whether to switch the mode in XX minutes intervals.
While the system is stopped, change the mode immediately.

Case 1

Number of thermostat ON indoor units in cooling mode > Number of thermostat ON indoor units in heating mode
→ system selects cooling mode
The heating indoor units will be forced to thermostat OFF.

Case 2

Number of thermostat ON indoor units in cooling mode < Number of thermostat ON indoor units in heating mode
→ system selects heating mode
The cooling indoor units will be forced to thermostat OFF.

* "XX" is able to be set in EEPROM on the outdoor unit's PCB.

EEPROM setting in main outdoor unit
CODE: 27

Setting No.	XX
0	Invalid (factory preset mode)
30	30
40	40
50	50
60	60
90	90
120	120
180	180
240	240

(2) Setting when at Thermostat OFF in Cooling Mode

When decreasing the indoor airflow volume at the cooling thermostat OFF or dry thermostat OFF, follow the setting procedure below.

EEPROM setting in outdoor unit
CODE: ED

Setting No.	Indoor fan mode	Indoor unit expansion valve	Louver
0 (factory preset mode)	w/o force	w/o force	w/o force
1	STOP *3	20	w/o force
2	LL	20	w/o force
3	Interval mode *4	20	w/o force
4	Never use	-	-

*1 If setting at thermostat ON, the system will return to the normal indoor fan control or solenoid valve kit mode.
*2 Whenever changing thermostat ON and OFF, solenoid valve kit sounds ON and OFF.
*3 When setting at Stop mode, be sure to set the room sensor to the remote control thermostat.

EEPROM setting in outdoor unit
CODE: 32

Setting No.	
0	Indoor unit sensor (factory preset mode)
1	Remote control sensor

*4 Operation when in the intermittent airflow setting
• When in the thermostat OFF, LL airflow and stop mode repeats alternately and the mechanical valve and solenoid valve kit remain in the forced condition.
• Interval intermittent operation can be changed by EEPROM setting.

EEPROM setting in indoor unit
CODE: 51

Setting No.	Indoor unit fan operating time [sec]
30	30
60 (factory preset mode)	60
90	90
⋮	⋮
210	210
240	240

CODE: 52

Setting No.	Indoor unit fan stopped time [min]
5 (factory preset mode)	5
10	10
15	15
20	20
25	25
30	30

11. Detailed Settings in EEPROM of Outdoor Unit

Never use the DN code unlisted in the following table. (P) : Factory preset mode

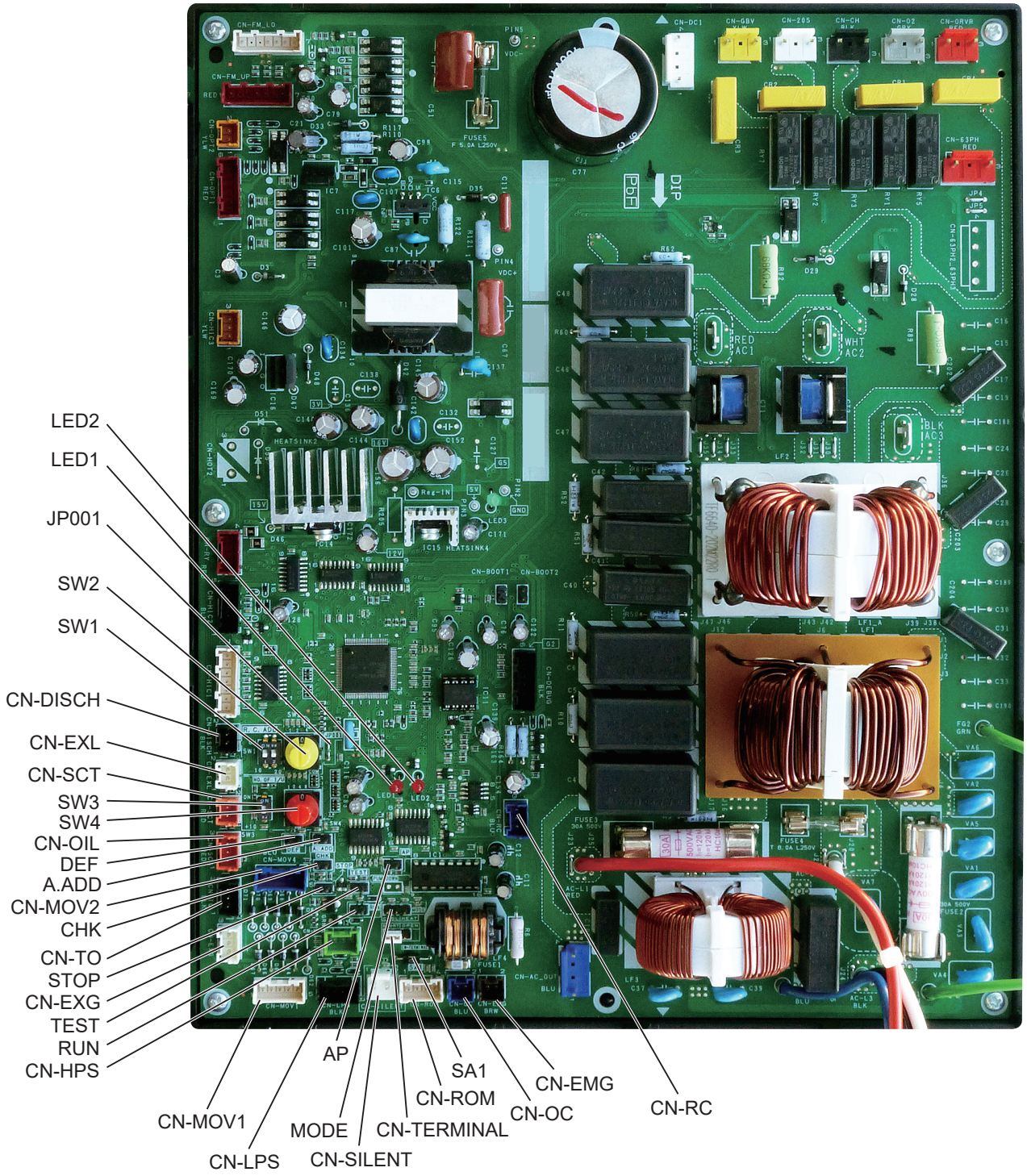
DN	Item	Setting No.
05	Outdoor fan silent mode	0=Invalid (P) 1=Silent mode 1 2=Silent mode 2,,,,, 15=Silent mode 15 (For details, see Section "4. Outdoor Unit Fan Control (6)")
06	Defrost fan speed select	0=Invalid (P) , 1=LL fan speed
0C	Indoor unit drain pump forced operation	0=Invalid (P) 1=stop for 2 hours and drive for 20 minutes constantly 2=stop for 20 minutes and drive for 20 minutes constantly 3=Drive constantly 4-6=delay drive when thermostat OFF 7=delay drive when thermostat OFF (For details, see Section "5. Outdoor Unit CCU Control (4)")
0D	Measures against smell when indoor unit cooling thermostat OFF	0=Invalid (P) 1=Measures against smell
19	Setting of control validity range when pressing the Energy saving button	0=for group (P) 1=for refrigerant system (For details, see Section “9. Demand Control (2)”)
1A	Demand 1 current (%)	0=0% 40=40% 45=45%,,,,, 100=100% (P) ,,,,, 130=130% -1=No control (For details, see Section "9. Demand Control")
1B	Demand 2 current (%)	0=0% 40=40% 45=45%,,,,, 70=70% (P) ,,,,, 130=130% -1=No control (For details, see Section "9. Demand Control")
1E	Demand remote controller display	0=No demand display 1=When demand ON, “demand - actived” display (P) 2=When forced thermostat OFF with demand ON, “demand - actived” display (For details, see Section "9. Demand Control")
24	Indoor unit self oil recovery control	0=fan stop (P) 1=fan operate & Te +5°C shift (For Type D, K) (For details, see Section “6. Oil Control (5)”)
27	Auto Cooling / Heating Functions mode change mask time	0=Invalid (P) 30=30 minutes 40=40 minutes ,,,,, 240=240 minutes (For details, see Section "10. Other Functions (1)")
2A	Dew condensation prevention control of indoor unit	0=Invalid (P) 1=30 minutes 2=40 minutes 3=50 minutes 4=60 minutes
2B	DP operation time for slime measures	20=20 minutes 30=30 minutes (P) 40=40 minutes 50=50 minutes 60=60 minutes (For details, see Section "5. Outdoor Unit CCU Control (4)")
2C	Indoor unit fan stop temperature shift	-10=-10°C,,,,, 0=+0°C (P) ,,,,,20=20°C
35	Condensation temperature adjustment Lower temperature of B area (Tc_B) for heating mode	-7=-7°C -6=-6°C,,,,, 0=0°C (P) ,,,,, 7=7°C
36	Condensation temperature adjustment Upper temperature of B area (Tc_B) for heating mode	-7=-7°C -6=-6°C,,,,, 0=0°C (P) ,,,,, 7=7°C
3E	PSccutgt delay-start setting	0=8 second delay-start (P) 1=(system address x1x8) second delay-start 2=(system address x2x8) second delay-start 3=(system address x3x8) second delay-start
3F	Evaporating temperature control lower limit shift	-5=-5°C,,,,,0=0°C (P), 1=1°C,,,,,11=11°C
40	Evaporating temperature control upper limit shift	-5=-5°C,,,,,0=0°C (P), 1=1°C,,,,,11=11°C
51	Indoor unit fan's intermittent operation and operating time when in cooling thermostat OFF	30=30 seconds , 60=60 seconds (P) ,,,, 240=240 seconds
52	Indoor unit fan's intermittent operation and stopped time when in cooling thermostat OFF	5=5 minutes (P), 10=10 minutes, 15=15 minutes, 20=20 minutes, 25=25 minutes, 30=30 minutes

11. Detailed Settings in EEPROM of Outdoor Unit

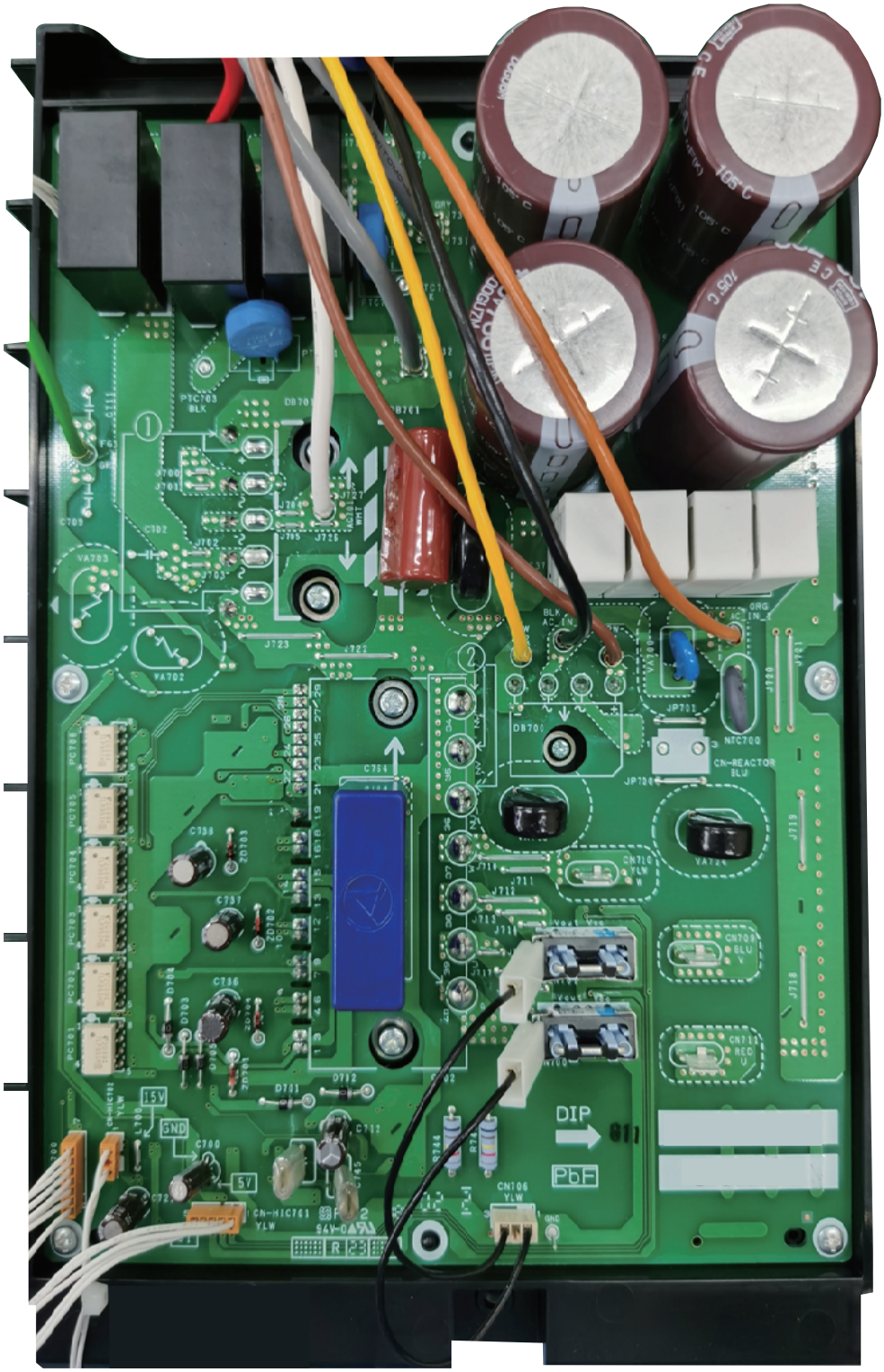
Never use the DN code unlisted in the following table. (P) : Factory preset mode

DN	Item	Setting No.
78	Outdoor silent mode as input setting "Valid" or "Invalid" from the indoor unit remote controller	0=Invalid (P) 1=Valid (For details, see Section "4. Outdoor Unit Fan Control (6)")
81	Outdoor unit capacity (Setting when the data is not stored in the EEPROM. Do not change under normal conditions.)	0=Invalid 21=224 23=280
A3	The minimum operating time 1 until defrosting	20=20 minutes 21=21 minutes ,,,,, 35=35 minutes (P) ,,,,, 40=40 minutes 41 - 90=Never use (For details, see Section "8. Defrost Control (4)")
A8	The minimum operating time 3 until defrosting	0=0 minute , 10=10 minutes ,,,,, 90=90 minutes (P) ,,,,, 120=120 minutes -1=Invalid (For details, see Section "8. Defrost Control (3)")
CA	The defrost detection temperature 3 setting	-3=-3°C (P) , -6=-6°C , -9=-9°C ,,,,, -30=-30°C (For details, see Section "8. Defrost Control (3)")
E1	Discharge air temperature control with thermostat OFF additional time	-20=-20 minutes -19=-19 minutes ,,,,, 0=0 minute (P) ,,,,, 10=10 minutes (For details, see Section "5. Outdoor Unit CCU Control (5)")
EF	Indoor unit auto restart setting	0=No control (P) 1=capable of auto restart 2=incapable of auto restart

1-1. Outdoor Unit Control PCB



(2) Outdoor Unit HIC PCB



(3) Functions

A. ADD pin (2P, Black)	Auto address setting pin • Short-circuit this pin for 1 second or longer to automatically set the addresses at the indoor units that are connected to that outdoor unit and are within the same system. • The system address is “1” at the time of shipment. Auto address setting is necessary even for communications lines in a single system where the inter-unit control wiring does not cross to any other systems. • While auto address setting is in progress, the 2 LEDs (LED1, 2: Red) on the outdoor unit control PCB blink alternately. (Short-circuiting this pin while auto address setting is in progress will stop the auto address setting operation.)
SW1 DIP switch (2P, Black)	Switches for setting system address 10s digit and 20s digit • If 10 systems or more are set, the setting is made by a combination of this DIP switch and S002. • If 10 - 19 systems are set, set switch 1 (10s digit) to ON. • If 20 - 29 systems are set, set switch 2 (20s digit) to ON, and set switch 1 (10s digit) to OFF. • If 30 systems are set, set both switch 1 (10s digit) and switch 2 (20s digit) to ON. (For details, see Table 1.)
SW2 Rotary switch (10 positions, Yellow)	Outdoor system address setting switch • The setting is “1” at the time of shipment. It is not necessary to change the setting if wiring is connected only to an outdoor unit and indoor units in a single system and the inter-unit control wiring does not cross multiple systems. • If wiring links the inter-unit control wiring for multiple systems to the same communications lines, then a different address must be set for each refrigerant tubing system. • If wiring links multiple systems, a maximum of 30 systems (up to 64 indoor units) can be connected. This setting can be set up to “39”, however control will be for 30 systems even if the setting is set to higher than 30. An alarm will be displayed if system addresses are duplicated. (For details, see Table 1.)
SW3 DIP switch (2P, Black)	Switches for setting the 10s and 20s digit for the number of connected indoor units • If 10 systems or more are set, the setting is made by a combination of this DIP switch and SW4. • If 10 - 15 units are set, set only switch 1 (10s digit) to ON. • Switch 2 is not used. (For details, see Table 2.)
SW4 Rotary switch (10 positions, Red)	Switch for setting the number of connected indoor units. In order to allow the outdoor unit to manage indoor units in the same refrigerant system, set the number of connected indoor units. (For details, see Table 2.)

CN-TERMINAL pin (3P, Black)	For communications circuit impedance matching • A connecting socket (3P, Black) is attached to the terminal plug at the time of shipment from the factory. • In the case of link wiring which combines the inter-unit control wiring for multiple systems into a single communications circuit, When using, refer to the item “4. Auto Address Setting” under Section “7. TEST RUN”.
LED1, 2 (2P, Red)	• LED 1 and 2 blink alternately while auto address setting is in progress. • Display the alarm contents for alarms which were detected by the outdoor unit.
RUN pin (2P, Black)	Start pin Short-circuit this pin and apply a pulse signal to start all indoor units in that refrigerant system.
STOP pin (2P, Black)	Stop pin Short-circuit this pin and apply a pulse signal to stop all indoor units in that refrigerant system.
AP pin (2P, Black)	Vacuuming pin • To perform vacuuming of the outdoor unit, short-circuit this pin and then turn the power ON. All solenoid valves turn ON and vacuuming begins smoothly. (Do not perform auto address setting at this time.) • Release the short-circuit to return the unit to normal status.
MODE pin (3P, Black)	Indoor unit Heating/Cooling mode change pin • During the summer season, short-circuit this pin in the cooling mode. Then, perform auto address setting. When auto address setting is completed, release the short-circuit to return the unit to normal status. • When cooling mode is short-circuited, only cooling operation can be used. • When heating mode is short-circuited, only heating operation can be used.
TEST pin (2P, Black)	• This pin is used to test the PCB at the factory. • When the power is turned ON after this pin has been short-circuited, all output signals will be output in sequence. (Sequential output does not occur if this pin is short-circuited when the power is already ON.) Releasing this pin returns the unit to normal control.
CHK pin (2P, Black)	When short circuited, test run begins. (If the remote controller is connected in test run mode, it is automatically cancelled after 1 hour.) Also, if short-circuit is cancelled, test run mode is cancelled.
DEF pin (2P, Black)	When the pin of the main unit is short-circuit in heating mode, defrosting operation is started. Even if short circuited, defrosting will not be activated immediately.
SILENT plug (2P, White)	Can be used when setting the outdoor unit fan in sound absorbing mode.
SA1 (Surge absorber)	If “TO INDOOR UNIT” accidently connected to high voltage, use the following method. 1. Replace the wire CN-OC with the wire CN-EMG. 2. Cut off SA1.

Table 1

● **Examples of refrigerant circuit (R.C.) address settings (required when link wiring is used) (SW1, SW2)**

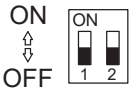
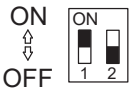
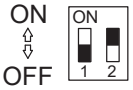
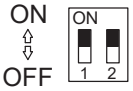
System address No.	System address (SW1) (2P DIP switch) 10 20	System address (SW2) (Rotary switch)
System 1 (factory setting)	Both OFF 	 Set to 1
System 11	1 ON 	 Set to 1
System 21	2 ON 	 Set to 1
System 30	Both ON 	 Set to 0

Table 2

● **The number of indoor units settings (SW3, SW4)**

Number of indoor units	Indoor unit setting (SW3) (1P DIP switch) 10	Indoor unit setting (SW4) (Rotary switch)
1 - 9 unit (factory setting : 1 unit)	OFF 	 Set to 1 - 9
10 - 16 unit	ON 	 Set to 0 - 6

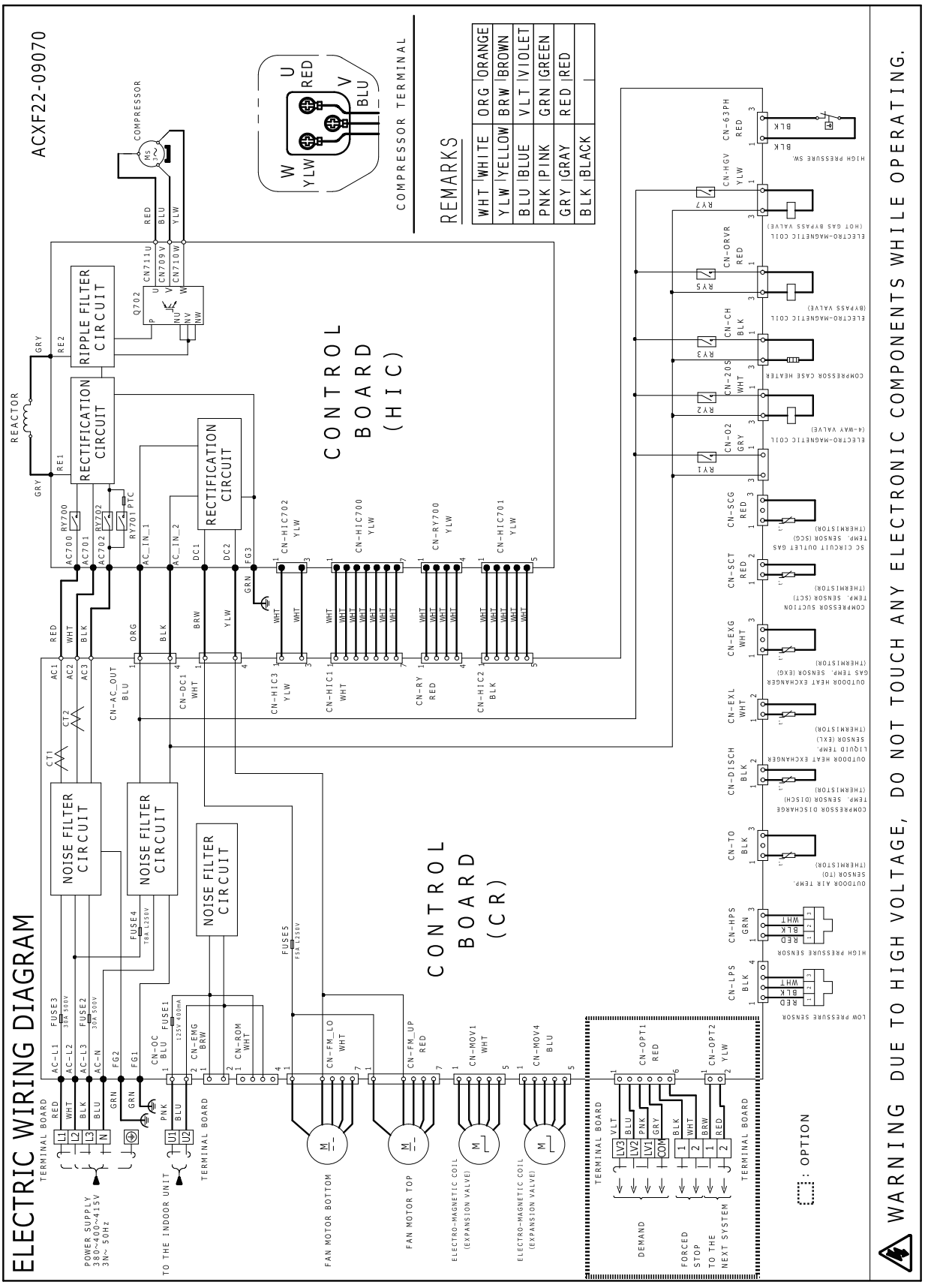
DO NOT exceed the maximum number of indoor units when making connections.

The indoor unit address setting should also be set less than “16”.

In the event of setting more than “17”, the communication cannot be made between the outdoor and indoor units.

1

(1) Electric Wiring Diagram U-8LZ2E8, U-10LZ2E8



2. CONTROL FUNCTIONS - Indoor Unit

*** Refer to the Service Manual of Indoor Unit.**

3. OUTDOOR UNIT REPAIR PROCEDURES

1. Removing Panels

CAUTION **Be sure to turn off the power before maintenance. When the power is turned off, wait for 5 minutes without any work. Then start working.**

(1) Front panel removal

• Remove the front panel (remove 2 screws).

(2) Cover A removal

• Remove the cover A (remove 1 screw).

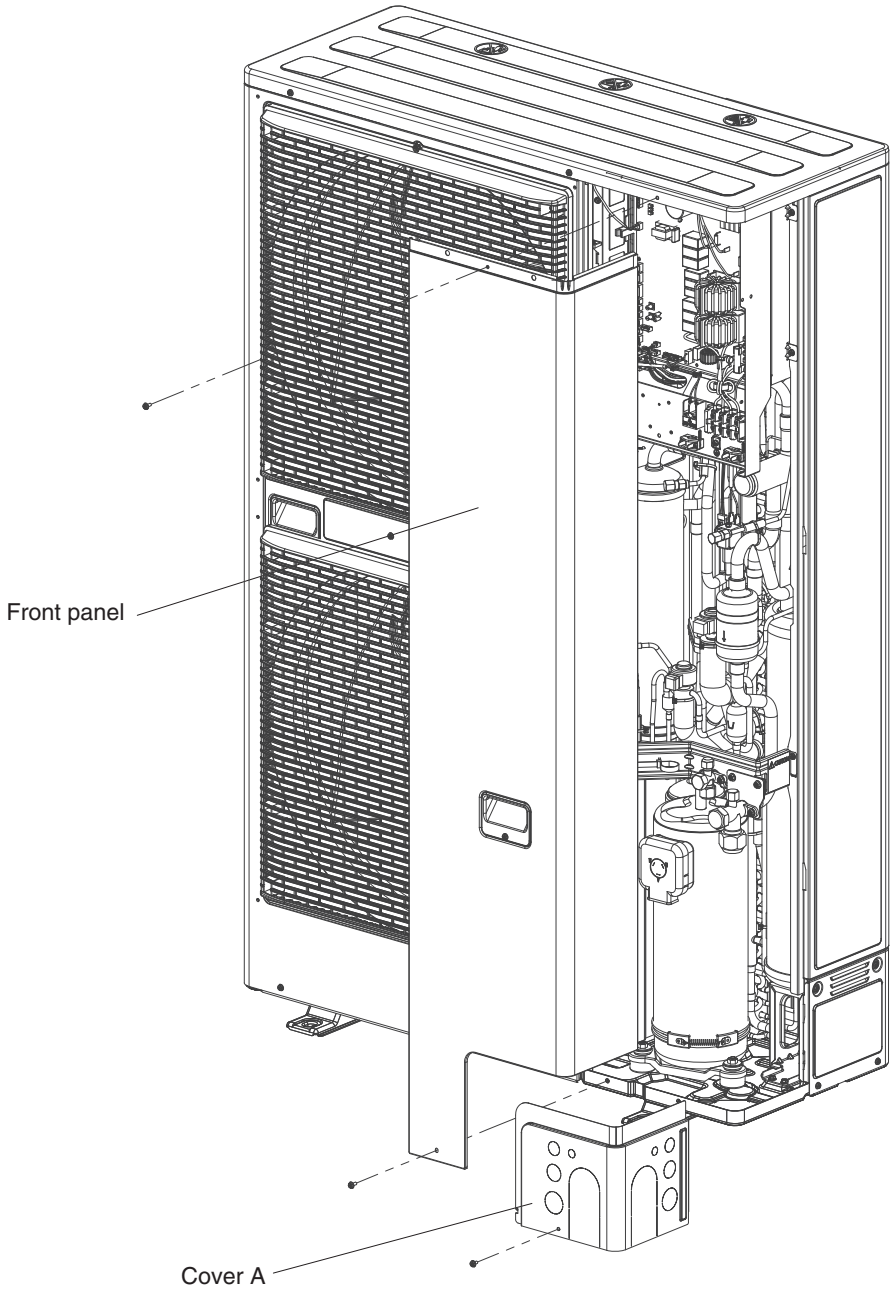


Fig. 1

2-1. 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. See Section “8. Compressor” for detailed procedures.

2-2. Checking the Oil

Acceptance/rejection criteria for the oil

Condition of refrigeration cycle	Condition of oil		Judgment criteria for changing oil*	
	Color	Odor	Total acid value	Hue
Normal	Light chestnut	None	0.02 or less	3.5 or less
Abnormal overheat-operation	Brownish	Smells somewhat (not as strong as below)	over 0.06	over 4.0
			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.

The following equipment and tools are required:
Jumper wire with clips, adjustable wrench, set of manifold gauge valves specially designed for refrigerant R32 only, vacuum pump, refrigerant recovery unit, pre-purged refrigerant cylinder for recovery, flathead screwdriver, and outdoor unit maintenance remote controller.

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 liquid tube and gas tube 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)

CAUTION **The remaining refrigerant in the faulty 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 push-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. (Fig. 2)

CAUTION **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 pin on the control PCB in the faulty outdoor unit and short them using the clips of the jumper wire. Then restore electrical power to the outdoor unit.

CAUTION **By short-circuiting the AP pin, each solenoid 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.

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

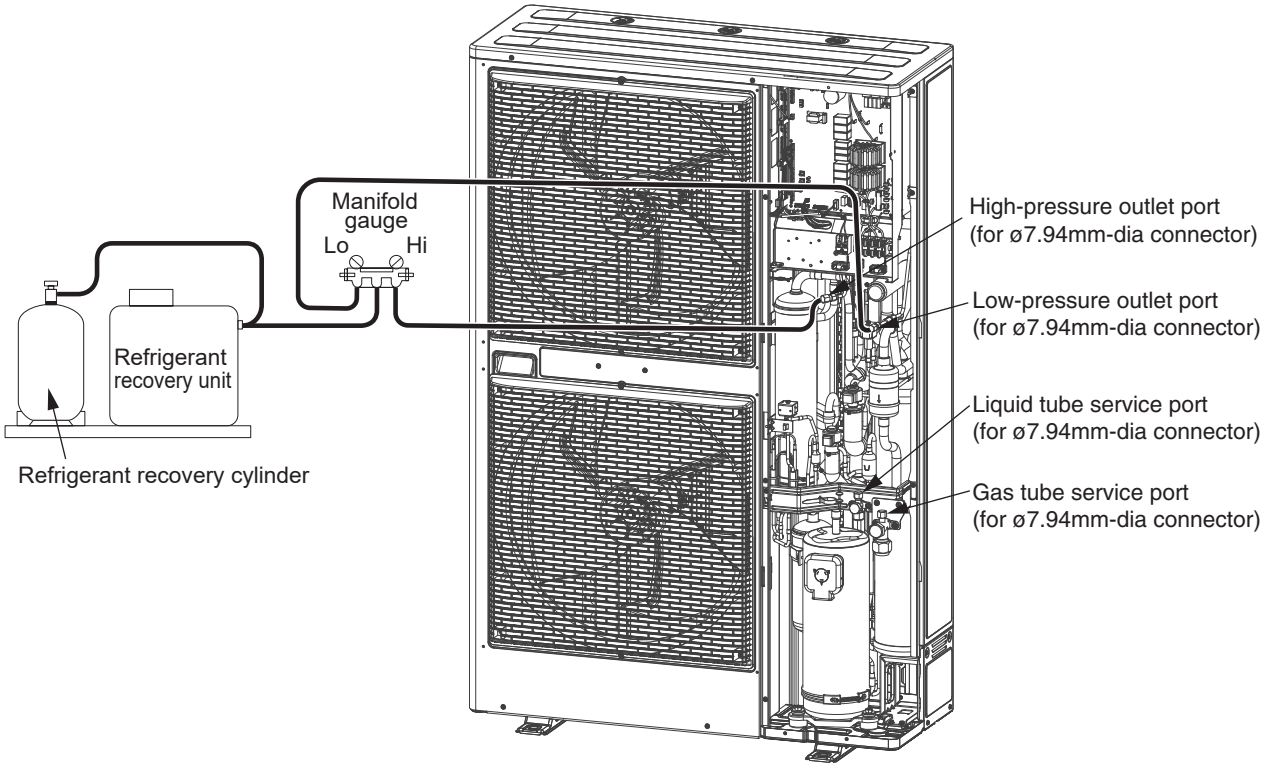
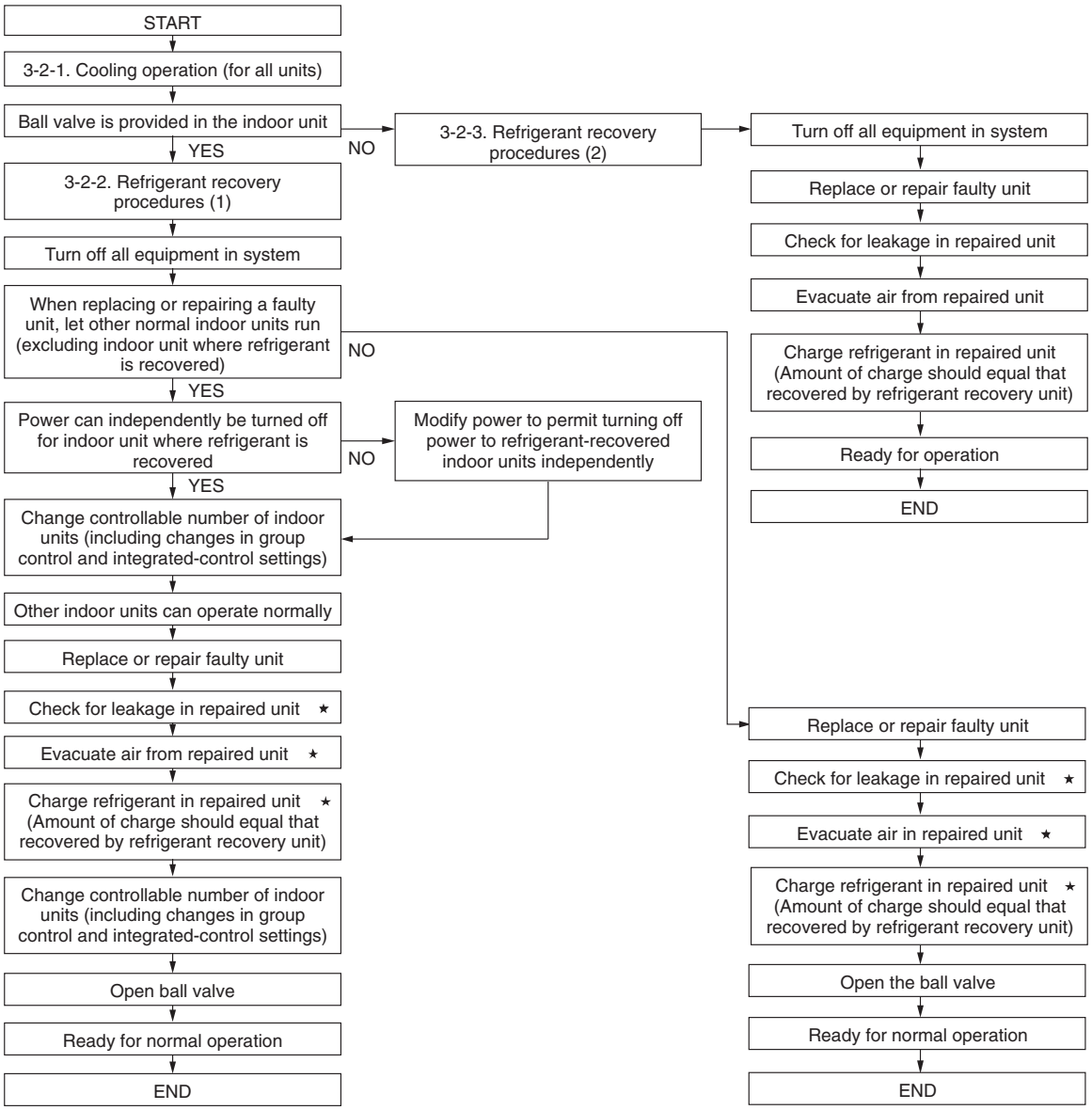


Fig. 2

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 (narrow tube) side and the gas (wide 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) If the remote controller is used for maintenance of the outdoor unit

① Connect the outdoor unit maintenance remote controller to the RC connector on the outdoor unit control PCBs. Then start a test run of all units. (Press and hold the (CHECK) button for 4 seconds or longer.)

② Press the (MODE) button and change to cooling operation and ensure that the cooling is performed.

See Section 4 for the detail of the outdoor maintenance remote controller operation. It may be possible to determine whether operation is cooling or heating by touching the gas tubing.

Cooling : low temperature (20℃ or lower)

Heating: high temperature (60℃ or higher)

CAUTION **The gas tubing becomes hot (60°C or higher) in heating mode. Be careful so as not to be burnt when touching the tubing.**

(2) If the remote controller is not available for maintenance of the outdoor unit
① Short-circuit the MODE pin (“COOL” side) on the outdoor unit control PCB.
② Short-circuit the CHK pin on the PCB to start test run operation.

3-2-2. Refrigerant recovery procedures (1) (using indoor unit ball valve)

(1) If a ball valve with a service port has been provided in the indoor unit as shown in Fig. 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 (2).”
(2) After running the unit in Cooling mode for about 5 minutes as described in “3-2-1. Cooling operation (for all units),” fully close the liquid tube ball valve.
(3) Run the unit in Cooling mode for 10 to 20 minutes more.
(4) Fully close the gas tube ball valve, and stop the operation of all units.
(5) Use hoses to connect the manifold gauge valves, refrigerant recovery unit, and refrigerant recovery cylinder with each other. (Fig. 3) Do each connection quickly to prevent air from entering the tubing.

CAUTION **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.

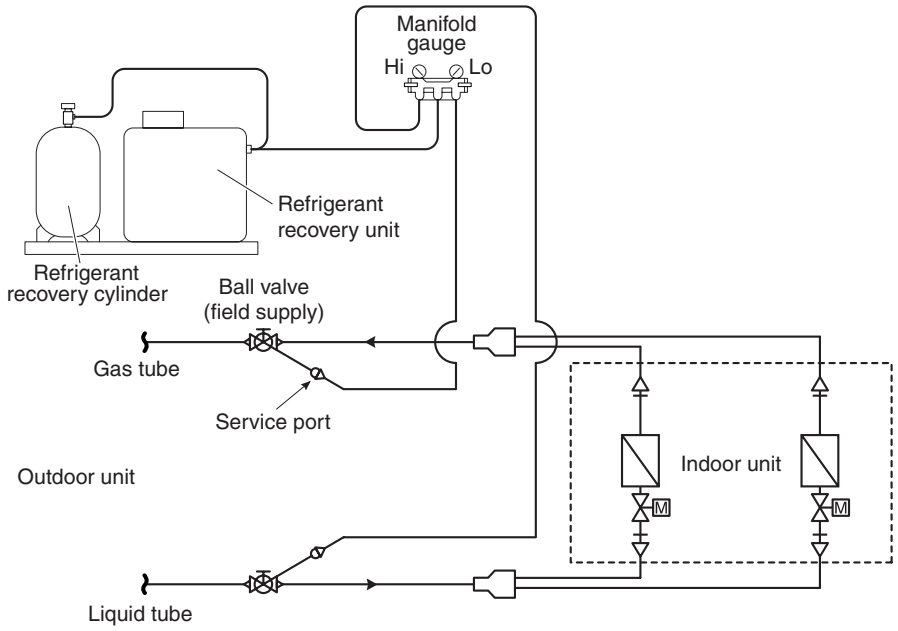


Fig. 3

3-2-3. Refrigerant recovery procedures (2): Indoor unit with no ball valve equipped

Refrigerant in all indoor units and the refrigerant tubing circuit can be pumped into the outdoor unit. The maximum refrigerant storage capacity per a single outdoor unit is approx. 2.7 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.

Perform work correctly, according to the work procedures given below.

① Connect the manifold gauge to the high- and low-pressure outlet ports on the outdoor unit where pump down will be performed. Be sure that no air enters the tubing at this time.

② Follow the instructions in "3-2-1. Cooling operation (for all units)" and operate all units in Cooling mode for approximately 10 minutes. Then fully close the liquid tube valve on the outdoor unit where pump down will be performed.

③ When the high-pressure gauge reaches 2.8 MPa or higher, or the low-pressure gauge reaches 0.5 MPa or below, at the outdoor unit where pump down is being performed, press the ON/OFF button on the outdoor unit maintenance remote controller to stop operation at all units. Then immediately fully close the gas tube valve on the outdoor unit where pump down is being performed.

* If the outdoor unit maintenance remote controller is unavailable, short-circuit the STOP pin.

④ Using hoses with Schrader-type push-to-release valves, connect the manifold gauge valves to the gas tube service port, the liquid tube service port to undergo pump down. (Fig. 4)

CAUTION **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.**

⑤ 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.

⑥ Recover remaining refrigerant from the inter-unit tubing and indoor units using the refrigerant recovery unit.

NOTE

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

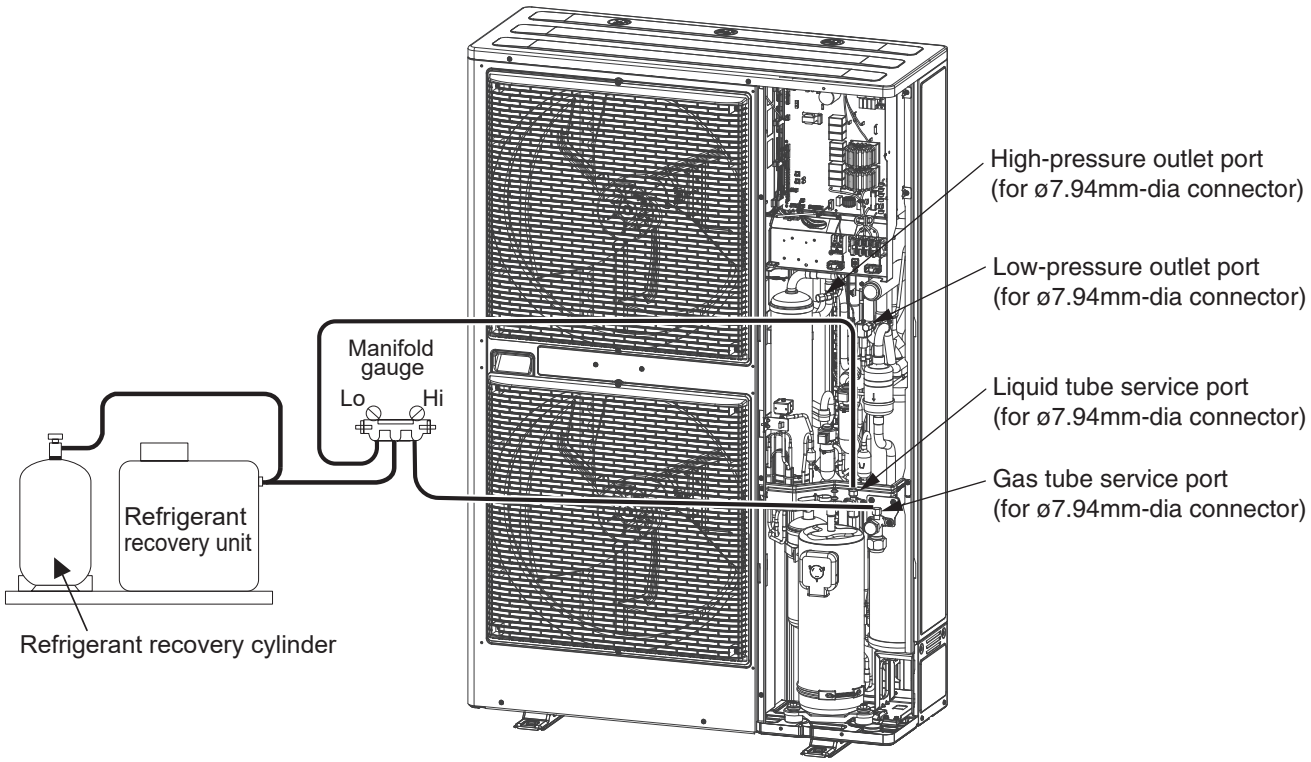


Fig. 4

3-3. Refrigerant recovery from Entire System

(1) Turn off power to the outdoor unit.
(2) Short-circuit the AP pin on the outdoor control PCB, then supply power to the outdoor unit.
* By short-circuiting the AP pin and supplying power to the outdoor unit, the solenoid valve is forcibly opened and all remaining refrigerant can be recovered.
(3) Connect the manifold gauge to the high- and low-pressure outlet ports (Schrader-type valves) on the outdoor unit. (Fig. 4)

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

(4) Connect the manifold gauge valves, refrigerant recovery unit, and refrigerant recovery cylinder. Quickly connect each part to prevent air from entering the tubing.
(5) Check that each service valve of the gas tube and liquid tube for the outdoor unit has opened, then perform refrigerant recovery.

NOTE

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

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 tube and liquid tube in the repaired outdoor unit (units necessary to carry out the pressurized leak check) are fully closed.

(2) Connect the manifold gauge valves to the high- and low-pressure outlet ports of the outdoor unit.

(3) Feed nitrogen gas into the circuit until 4.15 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 pin 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 brazed 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 pin. Again feed nitrogen gas to obtain a system pressure of 4.15 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.

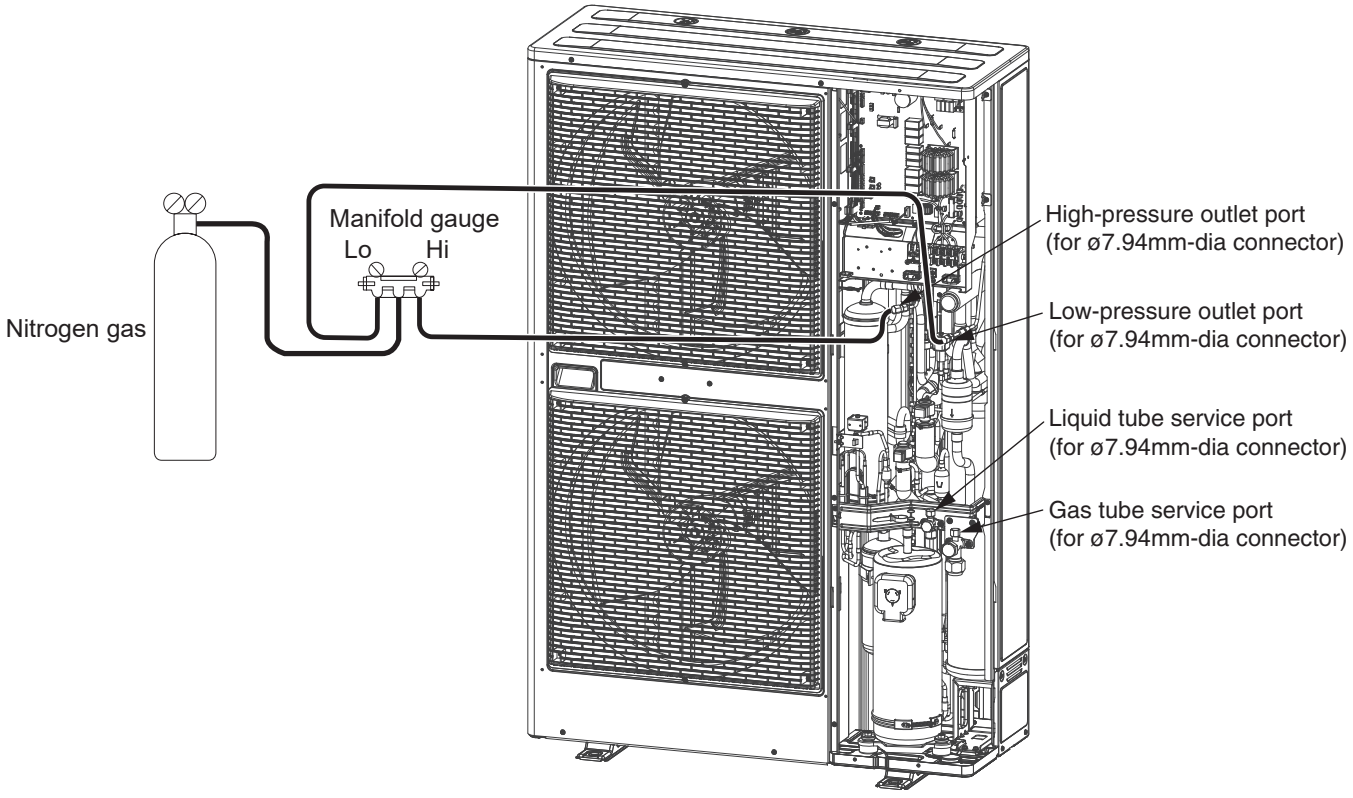


Fig. 5

4-2. Checking for Leakage in Refrigerant Tubing Between Indoor and Outdoor Units

Refer to the “Installation Instructions” that came with the outdoor unit.

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 tube and liquid tube in the outdoor unit are fully closed.
(2) Connect the manifold gauge valves to the high-pressure and low-pressure sensor outlets of the outdoor unit. (Fig. 6)
(3) Connect the manifold gauge valves to the vacuum pump.
* If the AP pin on the outdoor control PCB has already been short-circuited, step (4) is not necessary.
(4) Turn off power to the repaired outdoor unit and short-circuit the AP pin on the outdoor control PCB.

⚠ CAUTION **By short-circuiting the AP pin and turning on power to the outdoor unit, all electronic 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.**

(5) Turn the power ON at the outdoor unit where vacuum will be applied. Then run the vacuum pump and continue evacuation until the vacuum condition falls to less than –101kPa {–755 mmHg, 5 Torr}.

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

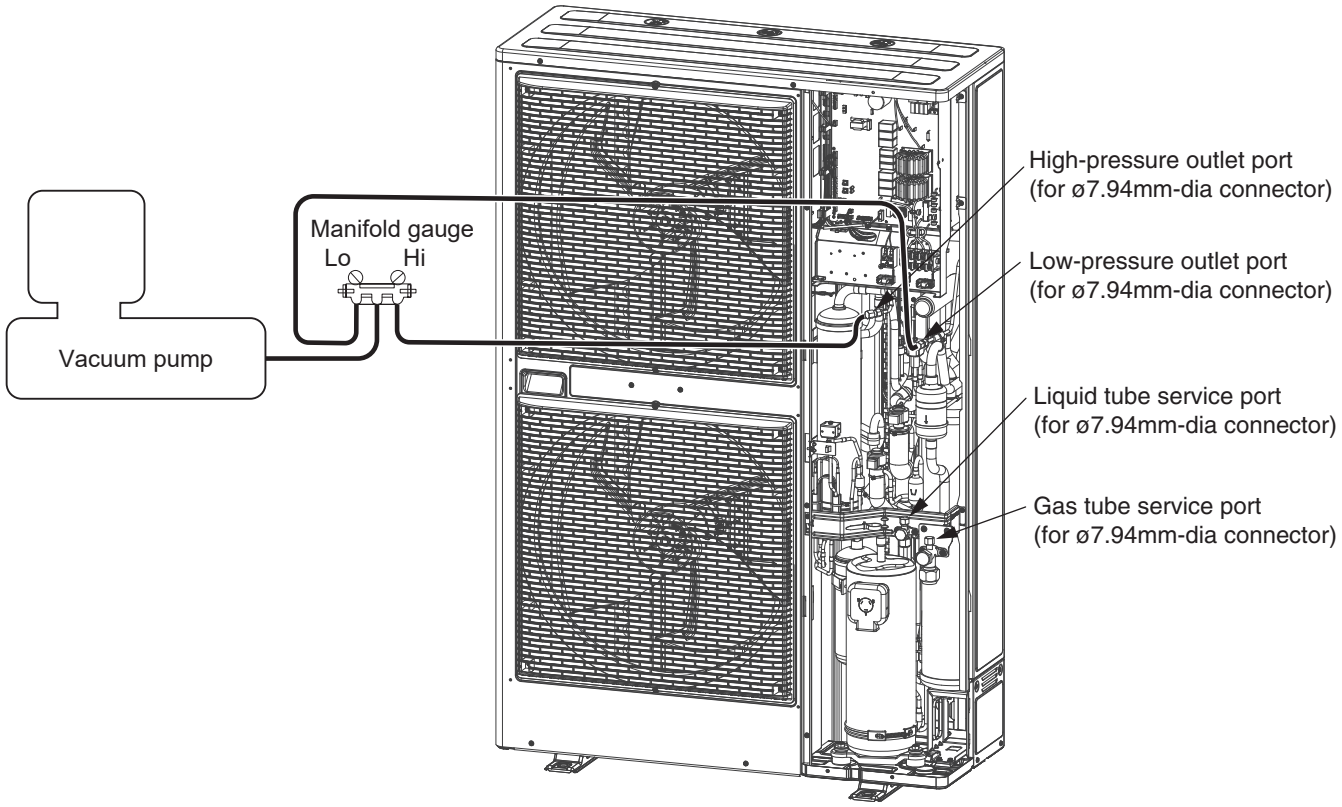


Fig. 6

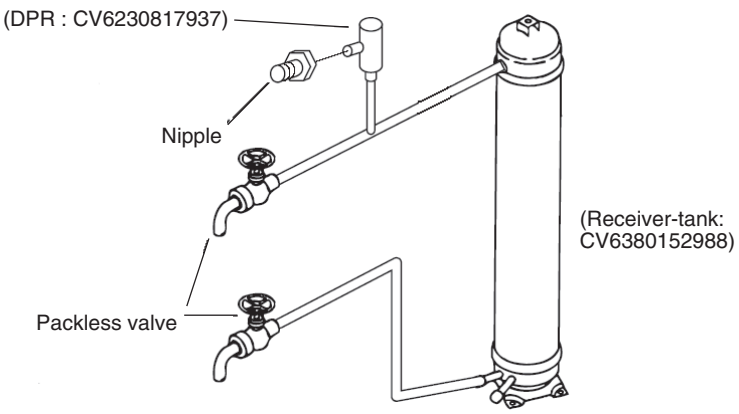
5-2. Evacuating Refrigerant Tubing Between Indoor and Outdoor Units

For details, refer to the “Installation Instructions” that came with the outdoor unit.

6-1. If Refrigerant Has Already Been Charged to Outdoor Unit

Be sure to use an exclusive oil-charging tank for charging compressor oil. Prior to charging, carry out vacuum drying inside the tank and take care that no air (in the form of bubbles) is permitted to enter the tank.
The oil charging procedures are given below.
*The receiver tank used for maintenance may be used as an exclusive oil-charging tank.

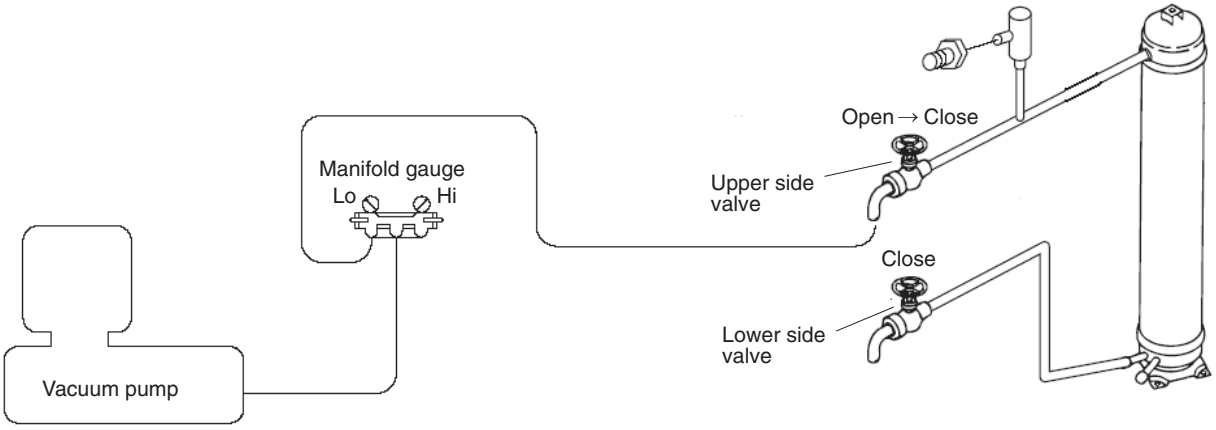
When installing the oil-charging tank to the refrigerant system to serve as a safety bypass circuit for refrigerant, connect it to the gas tube service port carefully to avoid releasing refrigerant into the atmosphere.



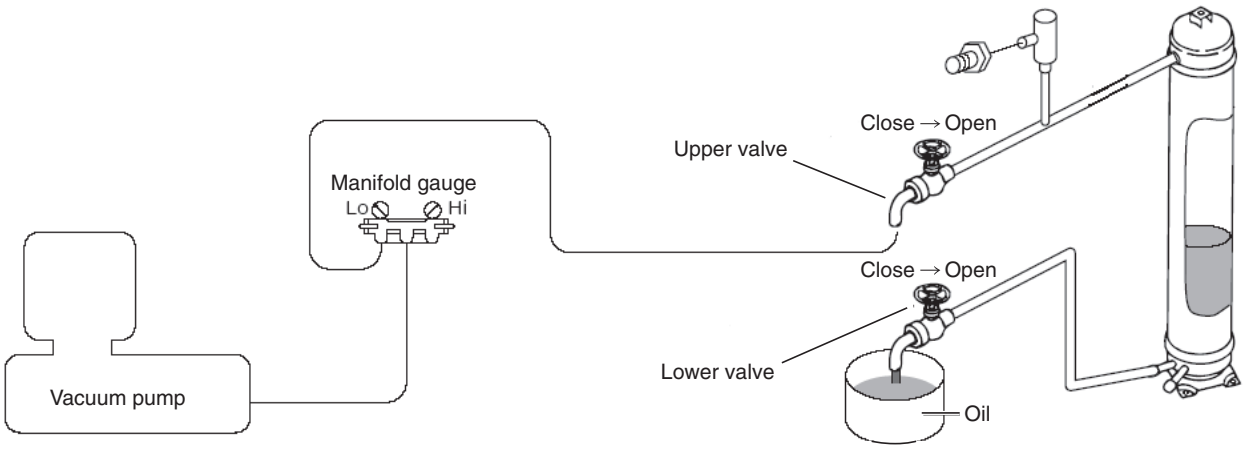
CAUTION **Perform oil charging work carefully so that no liquid refrigerant enters the charging tank.**

(1) Evacuation drying in oil-charging tank
With the lower side valve fully closed, open the upper side valve and connect it to the vacuum pump via the manifold gauge valves as shown below. Run the vacuum pump and evacuate the tank until the pressure falls to below –101kPa {–755mmHg, 5 Torr} for the evacuation drying. After the evacuation drying is finished, fully close the upper valve. Next, fully close the manifold gauge valves and stop the vacuum pump.

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



(2) Charging compressor oil into oil-charging tank
Connect a piece of pipe to the lower valve and then insert the other end deeply into the bottom of the oil container. Make sure you avoid letting any air be sucked into the tube. Next, run the vacuum pump and open the manifold gauge valves, then open the upper and lower valves to begin charging oil into the charging tank.



When the predetermined amount of oil has been charged into the oil-charging tank, immediately close the lower valve. Next, run the vacuum pump until the system pressure reaches lower than -101kPa {-755mmHg, 5 Torr}. Close the upper valve and then, stop the vacuum pump.

CAUTION **Do this operation quickly because compressor oil easily absorbs moisture from the air.**

3

(3) Charging compressor oil into outdoor unit

Connect the lower valve to the low-pressure outlet (with Schrader-type push-to-release valve) in the outdoor unit to be oil-charged, and then connect the high-pressure outlet (with push-to-release valve) to the upper valve via the manifold gauge valves (at Hi-pressure gauge side). In addition, connect the gas tube service port (with push-to-release valve) to the DPR (Discharge Pressure Regulator). Carry out the connection work quickly to avoid letting air enter the tube.

CAUTION

- **The hoses may be subject to internal pressure from the refrigerant inside the outdoor unit. A Schrader-type push-to-release valve is provided at each connection port.**
- **Since the DPR valve opens at pressures of 2.5 MPa and above, be sure to connect the DPR to the gas tube service port (low-pressure side).**

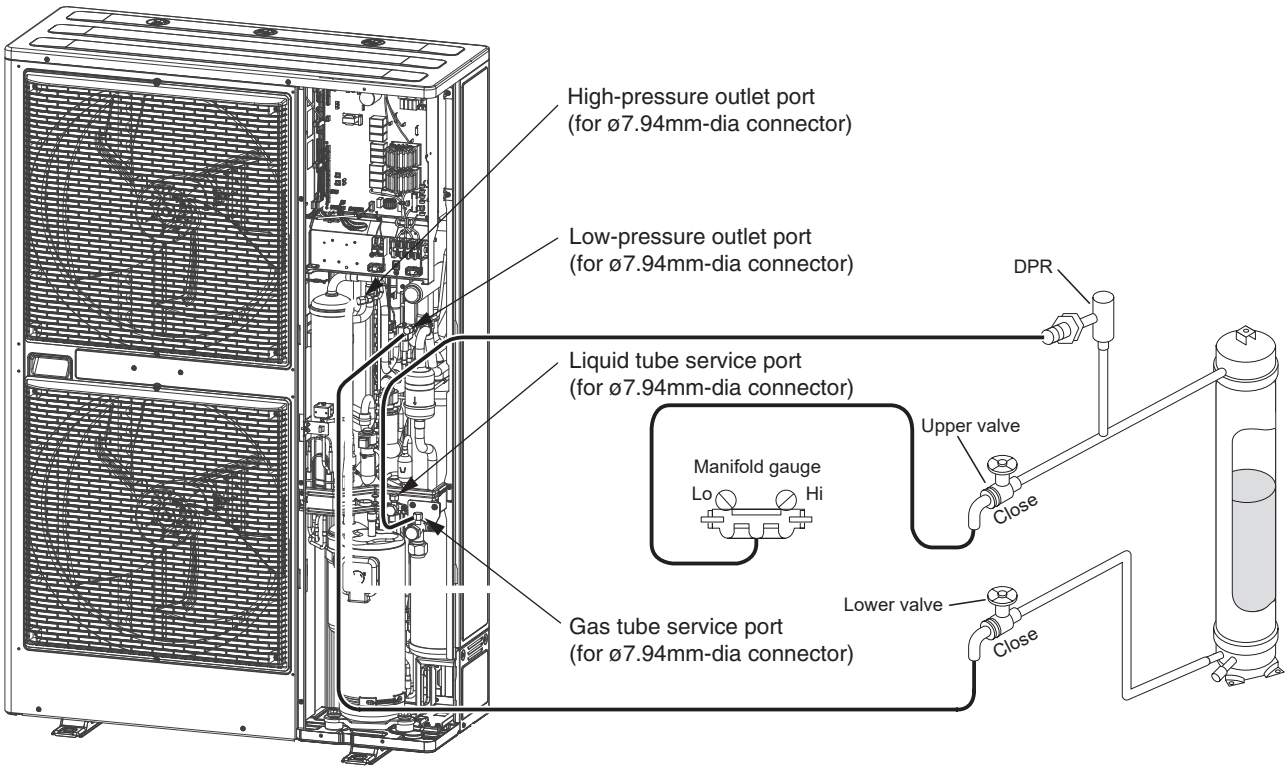


Fig. 7

6. Charging Compressor Oil

Next, follow the instructions in “3-2-1. Cooling operation (for all units)” at the outdoor unit where oil will be charged, and start cooling operation at all units. After the operating conditions were stabilized, open each valve (Hi-side manifold gauge, upper valve and lower valve) in sequence as follows.

(1) Open the valve on the high-pressure side of the manifold gauge.

(2) Open the upper valve.

(3) Open the lower valve.

When this is done, the refrigerant pressure from operation forces the oil out of the oil charge tank, and oil is charged into the outdoor unit from the low-pressure outlet port. Occasionally close the upper valve on the top of the oil charge tank (only this valve) and shake the tank to check the amount of remaining oil.

Process	Operating valve			
	Hi-side manifold gauge	Lo-side manifold gauge	Upper valve	Lower valve
Oil charging	Open	Close (No connection)	Open	Open
Oil charge completed	Close*	Close (No connection)	Open	Close after approx. 60 seconds
Refrigerant recovery (oil-charging tank inside)	Close	Open (Connect to refrigerant recovery tank)	Open	Close

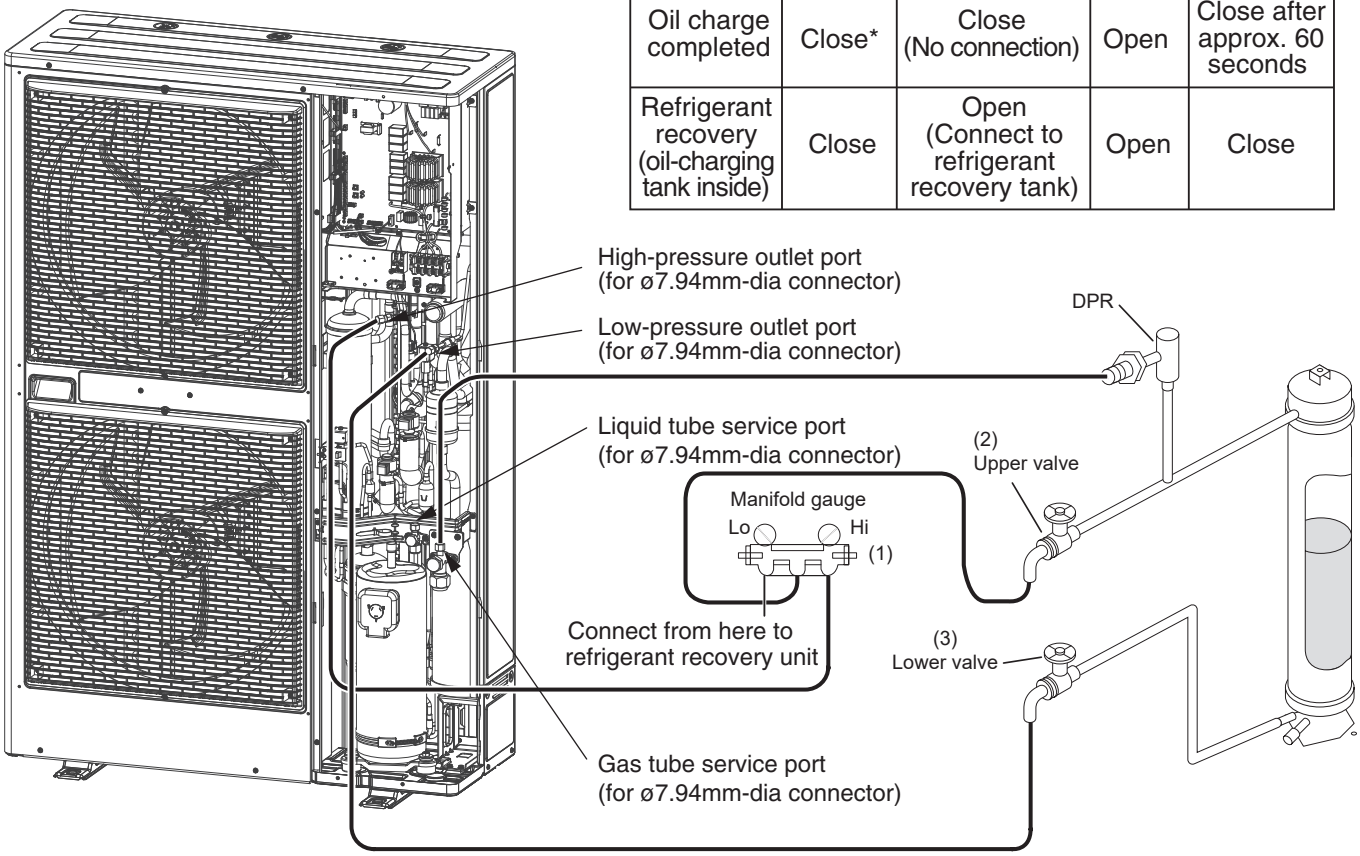


Fig. 8

Completing oil-charging

To terminate the oil charging work, do as follows:
To end the charge process, first close the valve on the Hi-side manifold gauge. Then wait approximately 60 seconds in order to vaporize the refrigerant in the charge tank. Then fully close the lower valve.

Refrigerant recovery (oil-charging tank inside)

Finally, connect the refrigerant recovery unit to the Lo-side manifold gauge, shut down all indoor and outdoor units, and then recover the remaining refrigerant in the oil-charging tank. Perform these procedures quickly and securely so that no air can enter them. Then, charge the necessary amount of new refrigerant by referring to the “Installation Instructions” that came with the outdoor unit.

NOTE

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

6-2. If Outdoor Unit Has Not Been Charged with Refrigerant

When a compressor has been replaced or in any other case where the outdoor unit has not been charged with refrigerant, first charge with refrigerant then follow the instructions in "6-1. If Refrigerant Has Already Been Charged to Outdoor Unit" and charge with oil.

Or, alternatively, follow the procedure below.

(1) Connect a tube to the oil outlet port on the outdoor unit to be charged with oil. Insert the other end of the tube into the oil container.

(2) Follow the instructions in "5. Evacuating System," and apply vacuum to the outdoor unit to be charged with oil. When this is done, oil is charged into the outdoor unit through the oil outlet port.

(3) When the unit has been charged with the designated amount of oil, stop the vacuum pump.

CAUTION **The oil absorbs moisture readily. This work must be completed quickly.**

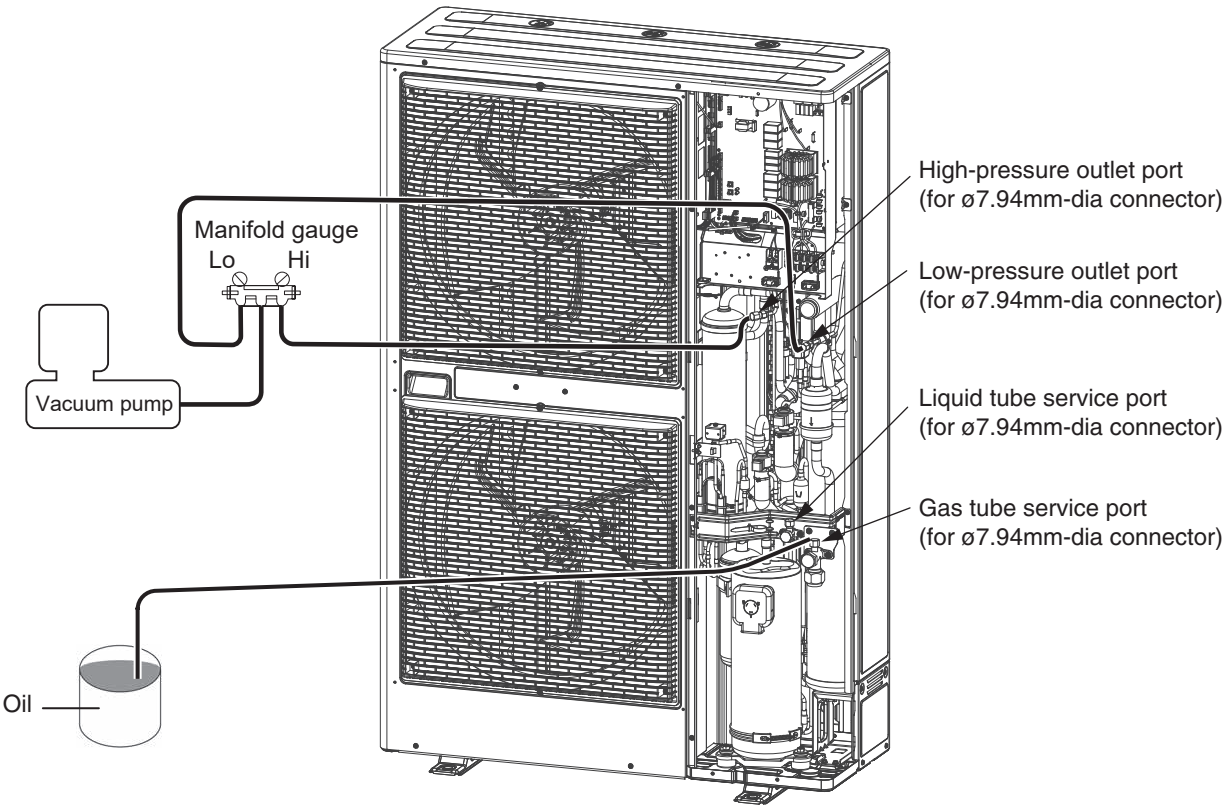


Fig. 9

6-3. Charging Additional Compressor Oil (after replacing compressor)

The rated amount of compressors as given below:

Rated Capacity	Compressor model	Q'ty	Weight (OIL IN) [kg]
8HP	9VD650XAA21	1	23.2
10HP	9VD650XAA21	1	23.2

When replacing a faulty compressor, be sure to first measure the weight of the compressor.
If the surplus oil is removed along with the compressor, add the same amount of new oil.

For example:
Additional oil to be charged: 23.4 kg (removed compressor weight) – 23.2 kg (new compressor weight) = 0.2 kg ≒ 0.2 L

* If the result is a negative weight (removed compressor weight is less than the rated weight), it is not necessary to discharge the extra oil from the system.

For the method used for additional oil charging after compressor replacement, see Section “6-1. If Refrigerant Has Already Been Charged to Outdoor Unit.”

Required equipment and tools: Jumper wire with clips, adjustable wrench, set of manifold gauge valves for the refrigerant R32, refrigerant recovery unit, pre-purged refrigerant cylinder for recovery, flathead screwdriver, and outdoor unit maintenance remote controller.

This work is performed in order to collect the refrigerant from an outdoor unit where repairs (other than compressor replacement) will be performed into other outdoor units and indoor units, and the refrigerant tubing.

7-1. If Remote Controller is Used for Maintenance of Outdoor Unit

(1) Connect the manifold gauge valves at the Lo side to the low-pressure outlet port of the outdoor unit. Also connect the refrigerant recovery cylinder at the liquid tube service port (Schrader-type push-to-release valve). Perform the connection work quickly so that no air is allowed to enter them. (Fig. 10)

* Connecting the refrigerant recovery cylinder is done to prevent pressure from rising excessively during 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.)

CAUTION **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) Connect the outdoor unit maintenance remote controller to the CN-RC connector (3P) (BLU) on the outdoor unit control PCB. Then start a test run of all units. (Press and hold the (CHECK) button for 4 seconds or longer.)

(3) Use the outdoor unit maintenance remote controller to check the operating status of the indoor units. Check that all units are operating in Heating mode. For details concerning operation of the outdoor unit maintenance remote controller, see Section “Outdoor unit maintenance remote controller”. It is also possible to check the operating conditions either in cooling or heating mode by touching the gas tube.

Cooling mode: low temperature (20℃ or lower)

Heating mode: high temperature (60℃ or higher)

CAUTION **The gas tubing becomes hot (60°C or higher) in heating. Be careful so as not to be burnt when touching the tubing.**

(4) Then slowly close the liquid tube service valve.

(5) When the low pressure at the outdoor unit to be repaired reaches 0.5 MPa or below, press the ON/OFF button on the outdoor unit maintenance remote controller to stop all the units. Then immediately fully close the gas tube valve on that outdoor unit.

CAUTION **While closing the valves, the rise in discharge temperature or another factor may cause a protective device to activate, stopping the operation of the outdoor unit. If this occurs, immediately fully close the gas tube valve on the outdoor unit to be repaired.**

(6) Connect the high-pressure gauge side of the manifold gauge to the high-pressure outlet port on the outdoor unit, and connect the manifold gauge to the refrigerant recovery device. Be sure that no air enters the tubing at this time.

(7) Short-circuit the AP pin on the outdoor unit control PCB. Then turn ON the outdoor unit power.

CAUTION

When the AP pin is short-circuited and the power is turned ON, all solenoid valves in the outdoor unit are forced open, allowing the refrigerant to be recovered from all tubes which are separated by solenoid valves. If this work is not performed, it will not be possible to recover all of the refrigerant at the refrigerant recovery device. Be sure to perform this step.

(8) Open both Hi- and Lo-side valves on the manifold gauge valves, and recover the refrigerant remaining in the outdoor unit. Then measure the amount of recovered refrigerant.

NOTE

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

7-2. If Remote Controller is Not Available for Maintenance of Outdoor Unit

(1) Connect the manifold gauge valves at the Lo-side to the low-pressure outlet port of the outdoor unit. Also connect the refrigerant recovery cylinder at the liquid tube service port (Schrader-type push-to-release valve). Perform the connection work quickly so that no air is allowed to enter them. (Fig. 10)

* Connecting the refrigerant recovery cylinder is done to prevent pressure from rising excessively during the 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.)

CAUTION

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 MODE pin (“HEAT” side) on the outdoor unit control PCB.

(3) Short-circuit the CHK pin to start operation, leave the unit running for a while. Touch the gas tubing with fingers to determine whether the unit is running in heating.

(4) Then slowly close the liquid tube service valve.
* When the low pressure at the outdoor unit to be repaired reaches 0.5 MPa or below, pull out the SCT connector from the outdoor unit control PCB of that outdoor unit. Then immediately fully close the gas tube valve on that outdoor unit.
* Pulling out the SCT connector immediately stops all of the outdoor units.

CAUTION

While closing the valves, the rise in discharge temperature or another factor may cause a protective device to activate, stopping the operation of the outdoor unit. If this occurs, immediately fully close the gas tube valve on the outdoor unit to be repaired.

(5) Connect the high-pressure gauge side of the manifold gauge to the high-pressure outlet port on the outdoor unit, and connect the manifold gauge to the refrigerant recovery device. Be sure that no air enters the tubing at this time.
(6) Short-circuit the AP pin on the outdoor unit control PCB. Then turn ON the outdoor unit power.

CAUTION

When the AP pin is short-circuited and the power is turned ON, all solenoid valves in the outdoor unit are forced open, allowing the refrigerant to be recovered from all tubes which are separated by solenoid valves. If this work is not performed, it will not be possible to recover all of the refrigerant at the refrigerant recovery device. Be sure to perform this step.

(7) 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.

NOTE

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

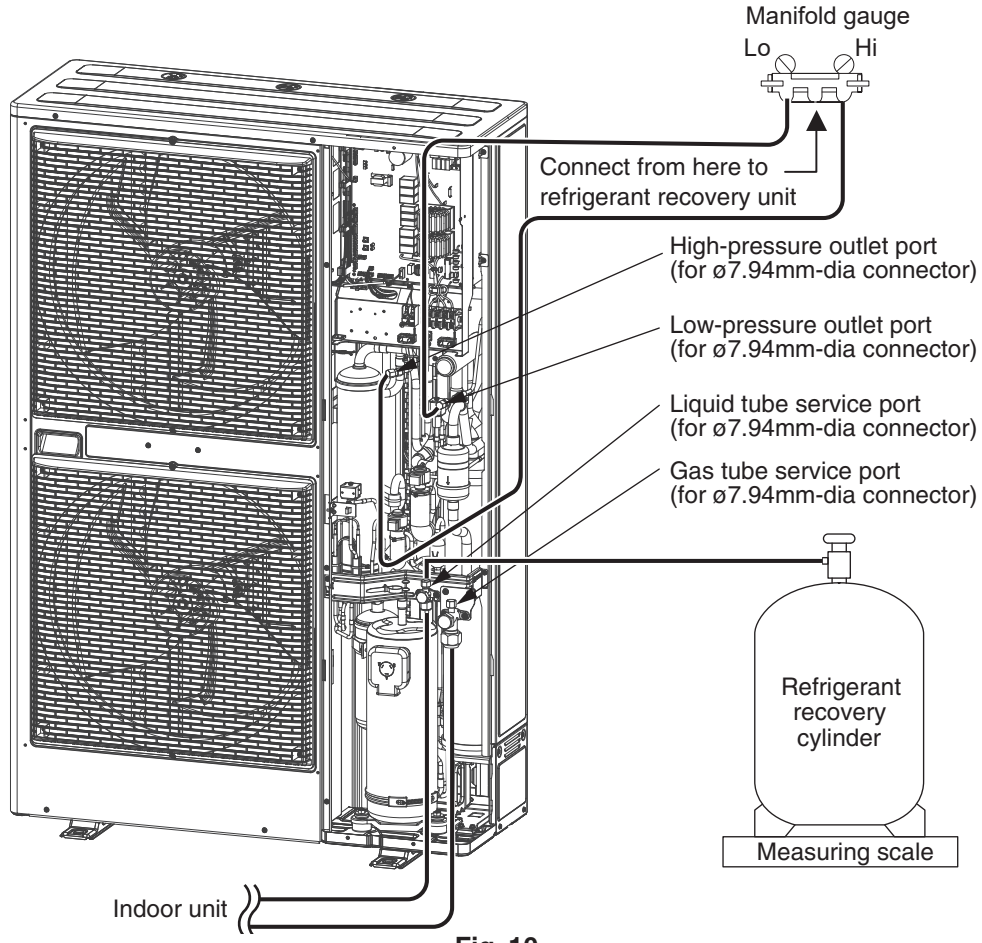


Fig. 10

8-1. Compressor Trouble Diagnosis and Check Methods

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

(1) Mechanical trouble → (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 → (A) Coil burning
(B) Open circuit
(C) Insulation failure
(D) Short circuit

Trouble diagnosis is based on the following remote controller displays:

Display	Compressor
[P16], [P29]	Compressor 1 (INV compressor)

A judgment is made based on factors that include the following:

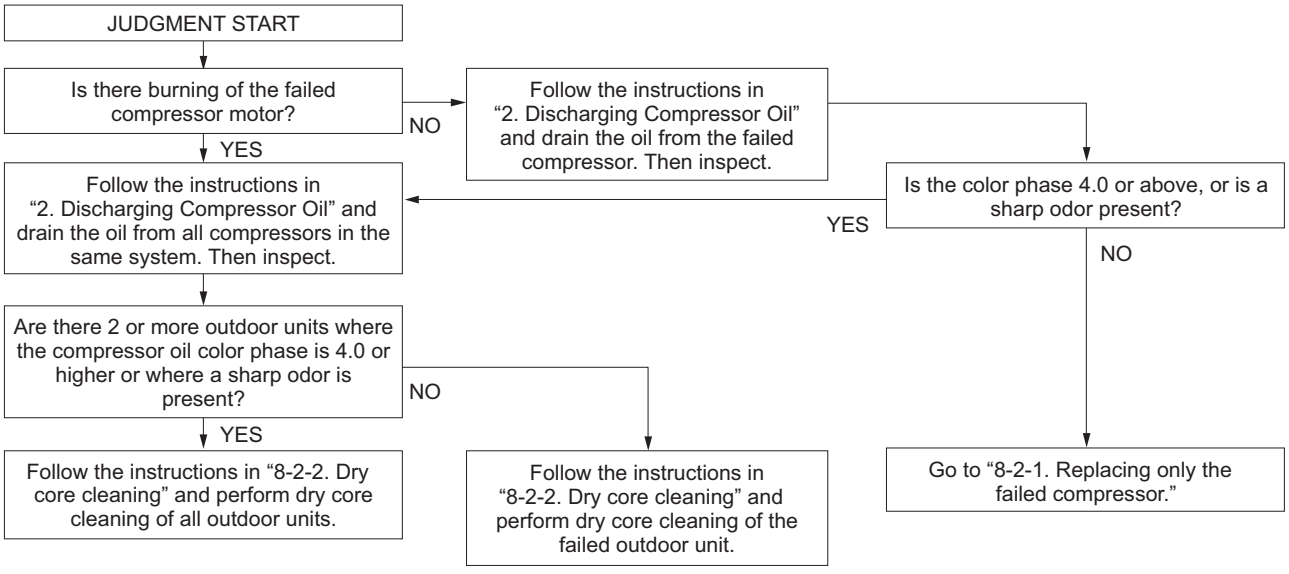
Coil resistance (varies depending on the compressor), insulation resistance, current, leakage breaker operation, oil and refrigerant fouling, odor, pressure, and noise

Reference:

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

(a) Motor → Min. 300 MΩ
(b) Compressor → Min. 100 MΩ (servicing part)
(c) Unit → Min. 10 MΩ (This is due to the presence of refrigerant, which decreases the insulation resistance.)

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



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

8-2. Replacing the Compressor(s)

8-2-1. Replacing compressor

(1) Follow the instructions in “8-3. Removing Compressors” and replace the failed compressor.
(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 vacuum pump. Connect the manifold gauge to the cylinder where the refrigerant was recovered. At this time, be careful that air does not enter the tubing.
(4) Open the valve on the refrigerant recovery cylinder and the high-pressure gauge valve on the manifold gauge to charge with refrigerant. At this time, the low-pressure gauge valve on the manifold gauge remains fully closed.

CAUTION **If the recovered refrigerant becomes mixed with another refrigerant or another gas (such as nitrogen or air), do not use the recovered refrigerant for charging. Charge with the designated amount of new refrigerant.**

(5) When charging has been completed with an amount of new refrigerant equal to the amount of recovered refrigerant, or when charging with the same amount of new refrigerant has not been completed but no more refrigerant will enter the unit, fully close the high-pressure gauge valve on the manifold gauge. Next, turn the power OFF at the repaired outdoor unit, then remove the short circuit at the AP pin. Finally, fully open all valves on the gas tube and liquid tube.
(6) If charging with an amount of new refrigerant equal to 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 “3-2-1. Cooling operation (for all units)”, open the low-pressure gauge valve on the manifold gauge and charge with the designated amount of refrigerant.

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

(7) If necessary, follow the instructions in “6. Charging Compressor Oil,” and charge with oil.
(8) Remove the manifold gauge.

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

8-2-2. Dry core cleaning

If burning or other failures occur repeatedly at compressors, 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.
And use the bidirectional dry core for refrigerant R32.

(A) If a ball valve is installed on the outdoor unit

(1) All units are operated in either Cooling or Heating mode.
For Cooling operation, see Section 3-2-1. For Heating operation, see Section 7-1 and 7-2.

(2) If all units are operated in Cooling mode, close the liquid tube service valve then the ball valve.
If all units are operated in Heating mode, close the ball valve then the liquid tube service valve.
* This step is performed in order to expel refrigerant from the tubing between the liquid tube service valve and the ball valve. Approximately 4 – 5 seconds is a sufficient interval between closing each of the 2 valves.

(3) Press the **ON/OFF** button on the outdoor unit maintenance remote controller to stop the operation of all units.
* If the outdoor unit maintenance remote controller is not available, use the following method to stop the operation of all units:
Pull out the SCT connector from the outdoor unit control PCB. When the SCT connector is pulled out, alarm F12 (sensor trouble) immediately occurs and all outdoor units stop operating. Be sure that you do NOT grasp the lead wire when pulling out the connector. Removing any other connector may not cause the units to stop. Therefore be sure to pull out only the SCT connector.

(4) Connect a refrigerant recovery device to the liquid tube service port (Schrader-type valve) of outdoor unit where dry cores will be attached, then recover the refrigerant from the tubing. Be sure that no air enters the tubing at this time.

CAUTION **When the hose is connected, internal pressure is applied by the remaining refrigerant in the inter-unit tubing. The connection port employs a Schrader-type valve. To determine when refrigerant recovery is complete, follow the instructions in the instruction manual of the refrigerant recovery device.**

(5) As shown in Fig. 11, disconnect the tube that runs from the liquid tube valve to the ball valve on outdoor unit where dry cores will be attached. Then attach the dry cores.

(6) At outdoor unit where dry cores are attached, pressurize with 3.8 MPa of nitrogen from the liquid tube service port and check for leaks.

(7) After evacuating all nitrogen gas from the tubing, apply vacuum from the liquid tube service port to outdoor unit where dry cores are attached until the pressure is –101kPa {–755 mm Hg, 5 Torr} or less.

(8) Fully open the liquid tube valve and ball valve on all outdoor units where dry cores are attached.

(9) Operate all units for approximately 3 hours (in either Heating or Cooling mode).

(10) Follow the above procedure, and replace dry cores with new dry cores.

(11) Operate all units for approximately 20 minutes (in either Heating or Cooling mode).

(12) Follow the instructions in “2. Discharging Compressor Oil” and drain a small amount of the oil from the oil separators of outdoor unit where dry cores are attached. Check the color phase, odor, and other characteristics.

(13) If the results show that dry core cleaning is still necessary (for example, a color phase of 4.0 or higher)*, return to Step 11 and repeat until the results return to normal (including a color phase of 3.5 or less)*.
* Color sample sheet for degree of stain

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

(14) Perform steps (1) – (4), and remove all dry cores. Then connect the tubing between the liquid tube valves and the ball valves.

(15) At outdoor unit where dry cores were removed, pressurize with 3.8 MPa of nitrogen from the liquid tube service port and check for leaks.

(16) After evacuating all nitrogen gas from the tubing, apply vacuum to outdoor unit where dry cores were removed until the pressure is –101kPa {–755 mm Hg, 5 Torr} or less.
(17) Refer to the Installation Instructions for further information. Charge with an amount of refrigerant equal to the amount that was recovered.

(B) If a ball valve is not installed on the outdoor unit

(1) See Section “3-2-3. Refrigerant recovery procedures (2) : Indoor unit with no ball valve equipped”. 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. 11.
(3) For the next steps, see the steps (6) – (17) in **(A)** on the previous page.

Cleaning dry core

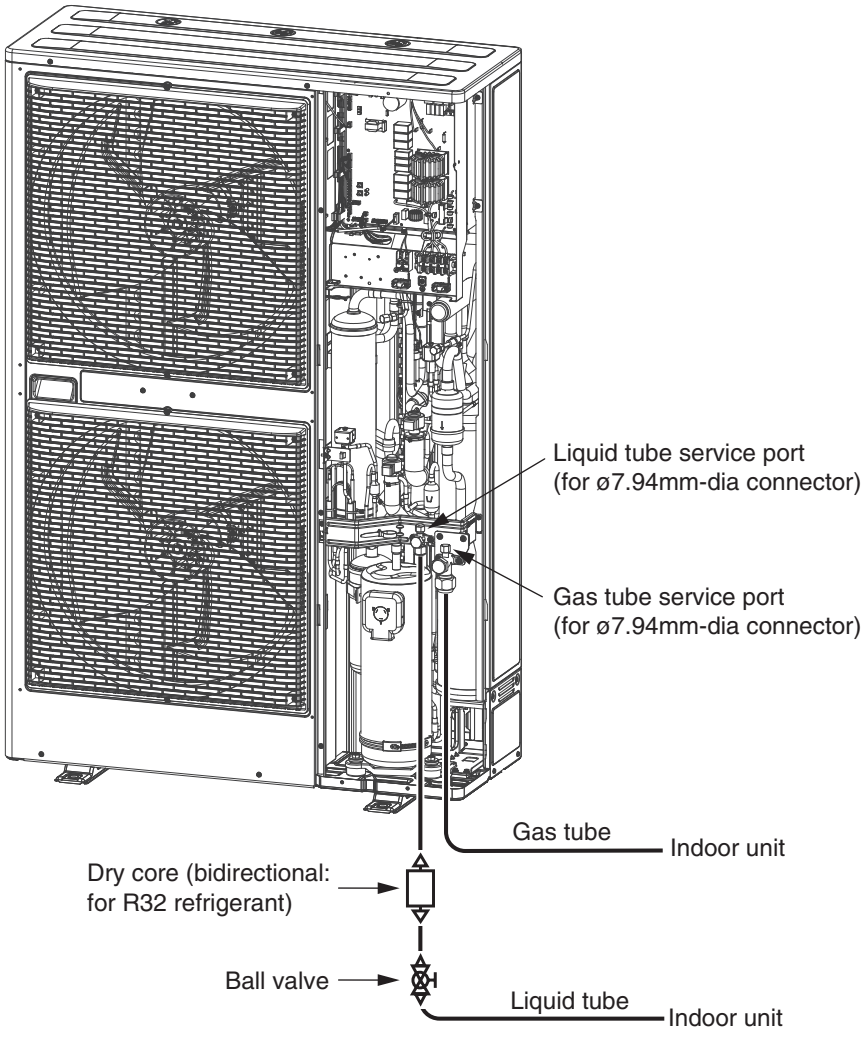


Fig. 11

8-3. Removing Compressors

Use caution to prevent water or foreign particles from invading the refrigerant tube while removing and installing the compressor.

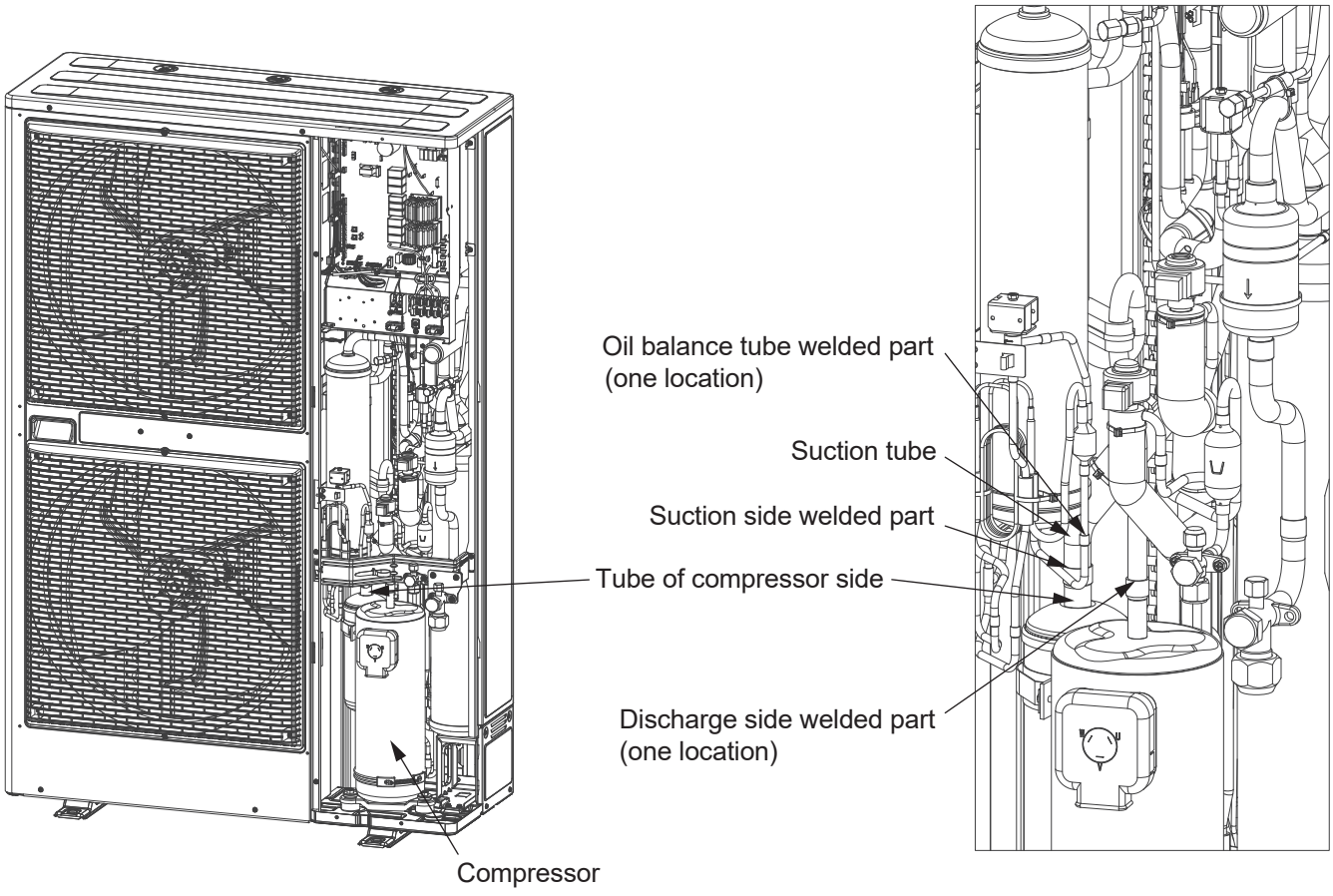
8-3-1. Removing Compressors

(1) After recovering refrigerant in the system, replace the nitrogen gas through the service valve port.
(2) Remove the insulator containing the compressor and heat insulating material surrounding the oil balance tube.
(3) Remove the compressor terminal cap and then take out the supply terminal.
(4) Remove the crankcase heater.
(5) Remove the hexagonal nuts with washer from three locations.
(6) Cut out the tube on the compressor side because the suction tube showing in the figure is rigid and unmovable.
(7) Remove each welded part on the discharge side (one location) and on the oil balance tube (one location) showing in the figure.

NOTE

Protect the sensor part, sheet-metal area, lubber, lead wire, clamper, etc.

(8) Pull the compressor toward you.
(9) Remove the welded part on the suction side of the cut-out tube of the compressor side attached to the suction tube.



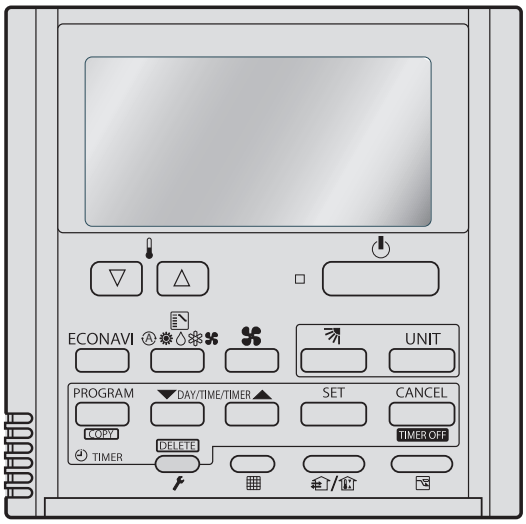
4. OUTDOOR UNIT MAINTENANCE REMOTE CONTROLLER

OUTDOOR UNIT MAINTENANCE REMOTE CONTROLLER (CZ-RTC4) for 2WAY VRF

■ 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.).

[Service Checker Section]

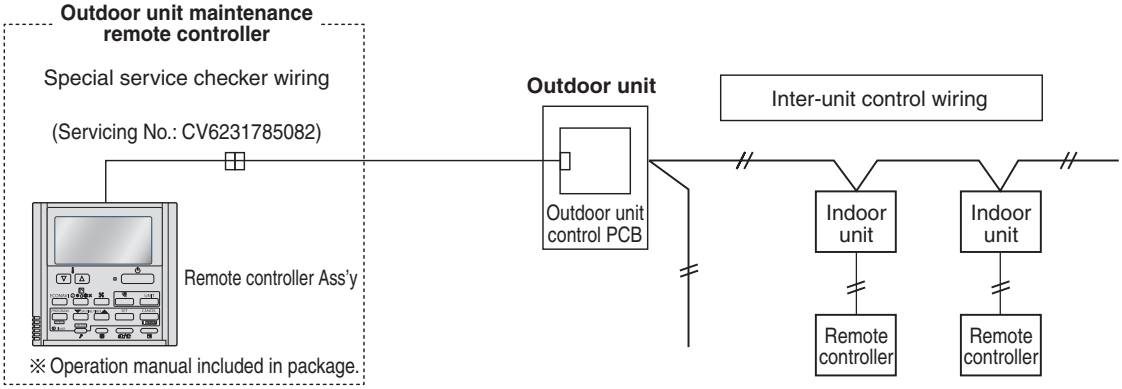


CZ-RTC4

NOTE

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



- 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.

■ **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
- Double-speed operation of indoor units (Do not use for actual operation. Doing so may damage the devices.)

(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.

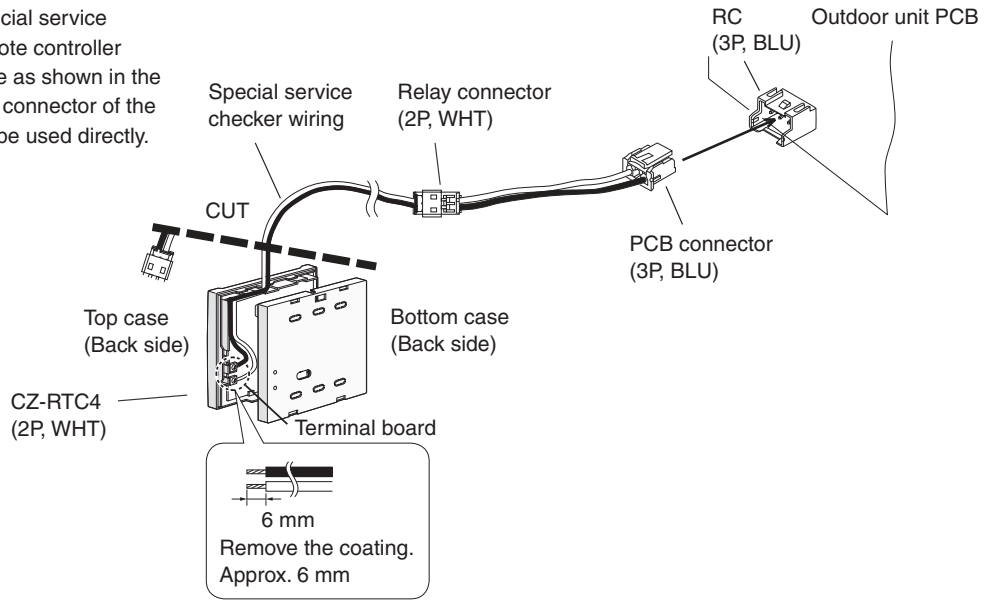
■ **Outdoor unit alarm history monitor**
- Displays the outdoor unit alarm history.

■ **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.

When connecting the special service checker wiring to the remote controller CZ-RTC4, cut out the wire as shown in the figure below because the connector of the remote controller cannot be used directly.



- 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, auto 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.

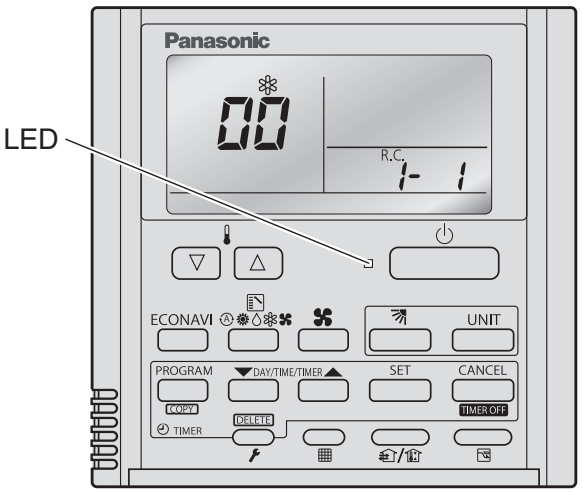
4

- **All units start/stop**

<Operation>

The (Start/Stop 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**

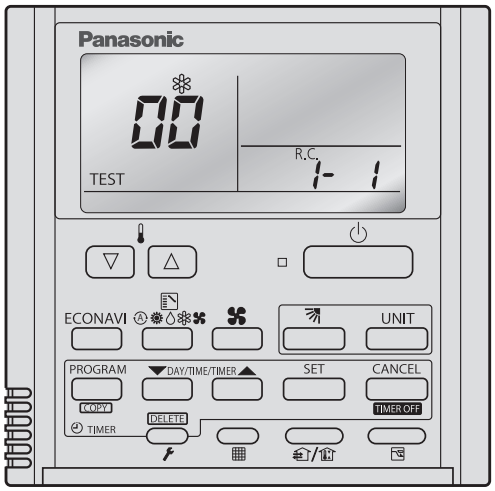
NOTE

Cooling and heating mode changes are only available when all indoor units are stopped.

<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**

<Operation>

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

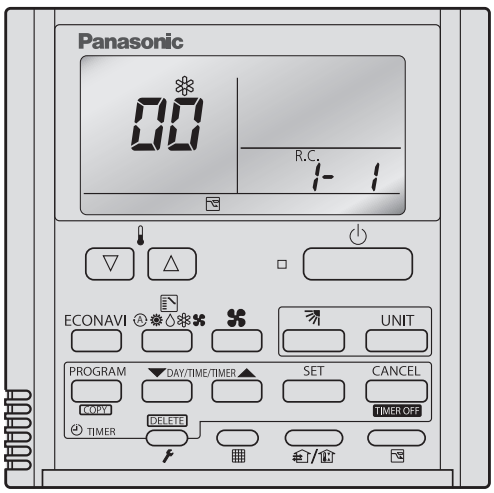
- Press and hold for 4 seconds to turn ON. During the test run "TEST" is displayed.
- The status of test runs performed from the indoor unit remote controller is not displayed on the outdoor unit maintenance remote controller.

- **Double-speed**
  - Do not use for actual operation. (Doing so may damage the devices.)

<Operation>

The timer button can be used to change between double-speed and normal operation.

- During double-speed operation, the Sleeping Mode mark is displayed.



4

■ **Display (functions)**

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

① Item code	② Item	Remarks
00	Outdoor unit alarm	Alarm code display
01	No. of connected indoor units	Quantity
02	Unit Nos. of connected indoor unit	7-segment display
03	Operating status of indoor unit	7-segment display
04	Thermostat ON status of indoor unit	7-segment display
05	No. of connected outdoor units	1 – 4
06	Unit Nos. of connected outdoor units	7-segment display
07	Operating status of outdoor unit compressor	7-segment display
08		
09		
10	Compressor 1 operating time	0 – 99999999 hours
13	Compressor 1 oil level	0 = Empty 1 = Insufficient 2 = Sufficient
16	Outdoor unit power ON time	0 – 99999999 hours
17	Compressor 1 operation count	0 – 65535 times
F0	Alarm history 1 (most recent)	Display only. Alarm code and unit No. of unit where alarm occurred are displayed alternately. 0 = CCU 1 – 4 = Outdoor unit
F1	Alarm history 2	
F2	Alarm history 3	
F3	Alarm history 4	
F4	Alarm history 5	
F5	Alarm history 6	
F6	Alarm history 7	
F7	Alarm history 8 (oldest)	
FE	Firmware version	Display the version No. × 100.
FF	Program version	Display the version No. × 100.

① and ② correspond to Fig. 1 on the next page.

③ XX-YY R.C.
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 – 8)
"1" appears when there is only 1 outdoor unit.

Locations where ①, ②, and ③ are displayed as shown in Fig. 1.

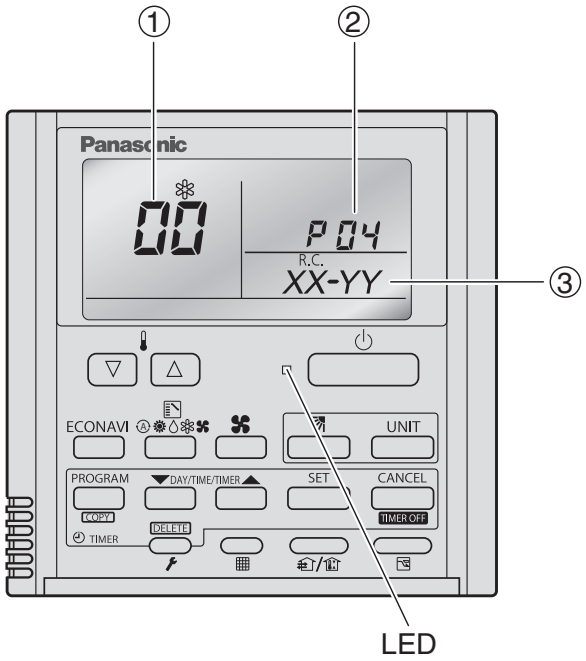
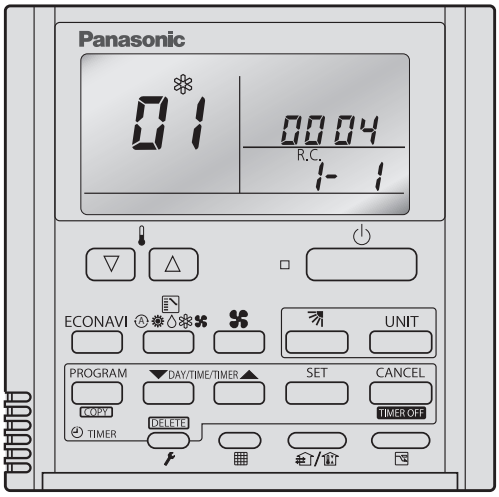
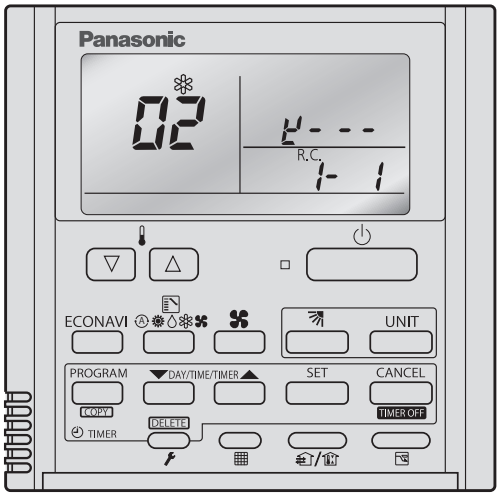


Fig. 1

<Sample displays>



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



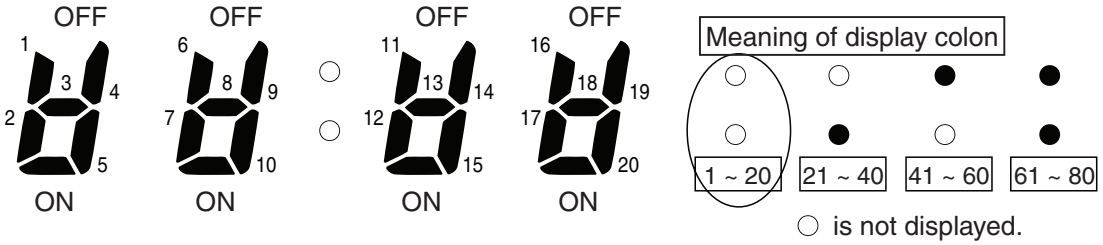
02: <Unit Nos. 1, 2, 3 and 4 are connected>

4

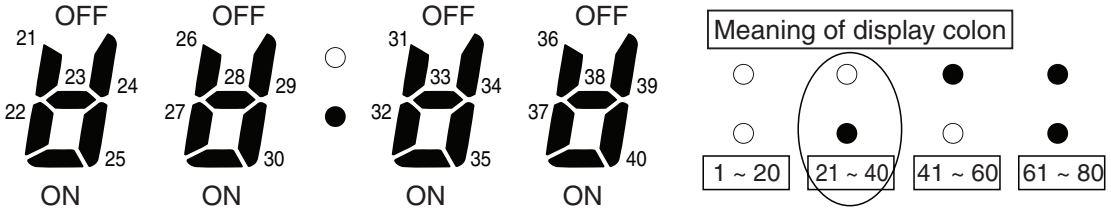
■ **Concerning the 7-segment, 4-digit display remote controller timer display**

The unit Nos. of connected units are indicated by four 7-segment digits (88:88) and a colon.

- **Display of unit Nos. 1 – 20**



- **Display of unit Nos. 21 – 40**



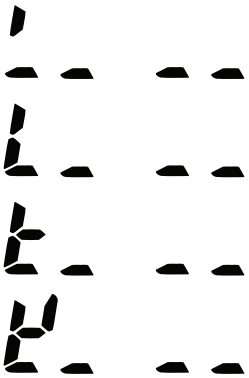
- The meaning of the colon changes in the same way to indicate unit Nos. up to 80.
- Sample displays of the connected indoor unit Nos.:

  • 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

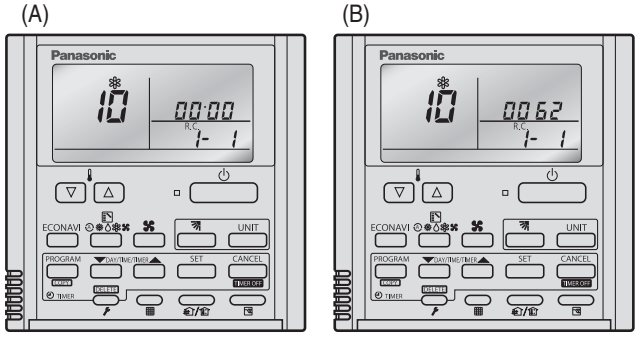


NOTE

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 top 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.

Display the indoor unit and outdoor unit sensor temperatures.

<Operating procedure>

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

During temperature monitoring, is illuminates.

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

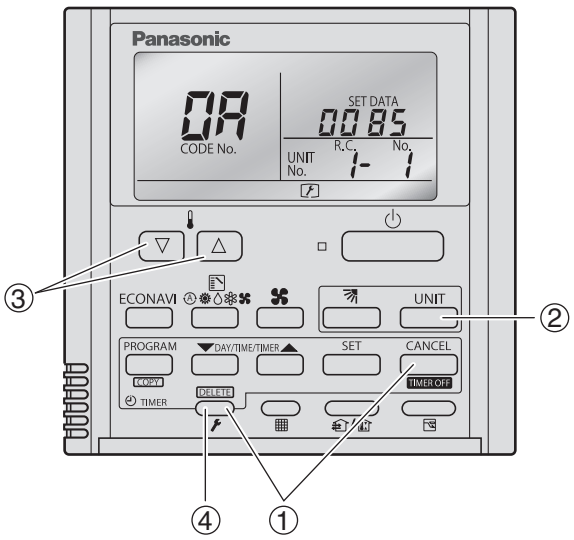
② Press the UNIT button and select the indoor unit to monitor.

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 (Check) button. The display returns to the normal display.

NOTE The display does not blink.



■ **Display of unit No. 1 (main unit)**

DN	Description	Remarks	
02	Indoor unit intake temp. (TA)	°C	
03	Indoor unit heat exchanger temp. E1 (E1)	°C	
04	—		
05	Indoor unit heat exchanger temp. E3 (E3)	°C	**Indoor unit**
06	Discharge air temp. (BL)	°C	
07	Discharge air temp. setting	°C	
08	Indoor unit MOV pulse (MOV)	STEP	
0A	Discharge temp. (DISCH)	°C	
0C	High-pressure sensor temp.	°C	
0d	Heat exchanger gas (EXG)	°C	
0E	Heat exchanger liquid (EXL)	°C	
11	Outdoor air temp. (TO)	°C	
12	Inverter secondary current	A (Ten times value)	
13	Inverter primary current (L2 phase)	A	
15	MOV pulse 1 (MOV1)	STEP	**Outdoor unit**
16	—		
17	—		
19	Inverter actual operating frequency	Hz	
1A	Sub cooler (MOV4)	STEP	
1b	Inverter primary current (L1 phase)	A	
1d	Low-pressure sensor temp.	°C	
1E	Suction temp. (SCT)	°C	
1F	Detected oil temp. (OIL)	°C	
21	Inverter primary current (L3 phase)	A	
24	Temp. sensor at refrigerant gas outlet of dual-tube temp. (SCG)	°C	

NOTE

0A and subsequent items are outdoor unit data.
It takes about 10-second long until outdoor unit data appears or changes on the display.

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>

① Press and hold the (Check) button and SET 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 UNIT button and select the outdoor unit for which to monitor the alarm history.

③ 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.

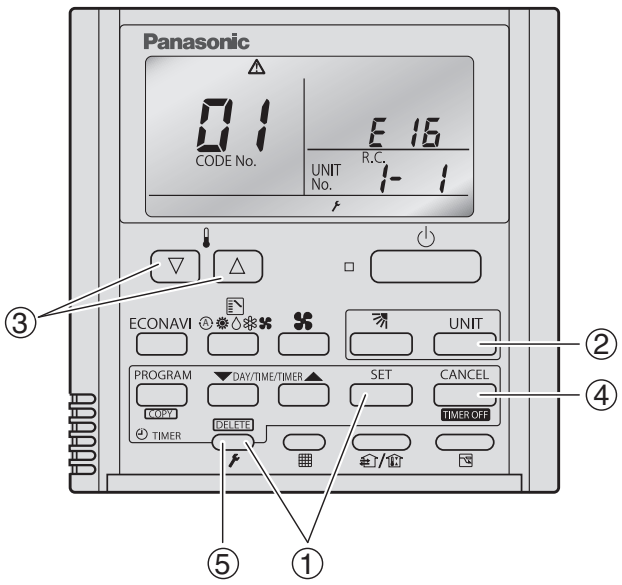
The outdoor unit address is displayed as R.C. XX-YY.
System XX = Outdoor unit system address
R.C. XX = Outdoor unit system address
YY = Outdoor unit sub-bus address

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.)

④ To clear the alarm history, press the CANCEL button. (The outdoor unit alarm history will be cleared.)

⑤ To exit, press the (Check) button. The display returns to the normal display.



4

■ Setting mode 1

<Operating procedure>

① 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 DAY and TIMER buttons to change the setting data.

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

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

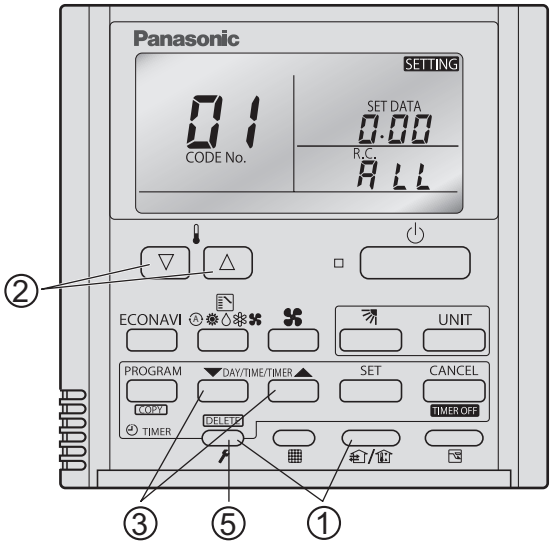
④ During this mode, " SETTING " is displayed, blinking. The outdoor unit address display section displays "ALL," the item code and number (DN value in the table), and the setting data (6 digits).

(The setting data is displayed in 6 digits. The display changes between the first 3 digits (Fig.Ⓐ) and the last 3 digits (Fig.Ⓑ).

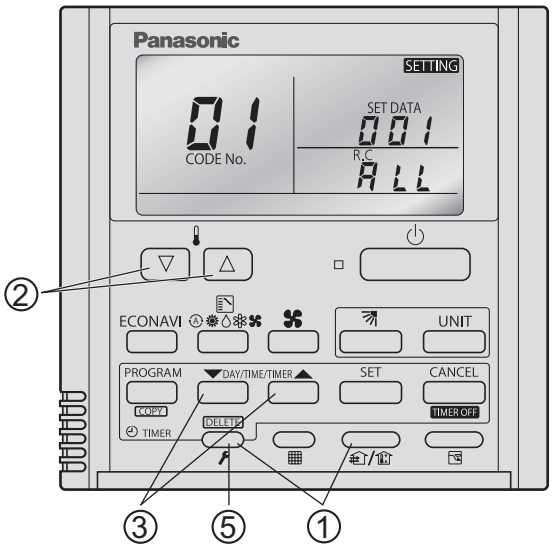
When the first 3 digits are displayed, the bottom dot of the colon is illuminated.)

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

Ⓐ **Display of first 3 digits**



Ⓑ **Display of last 3 digits**



Ⓐ and Ⓑ are displayed alternately.
(Example shows display of 000 001.)

Regarding the parameter setting, see the item "11. Detailed Settings in EEPROM of Outdoor Unit" under Section 1.

4

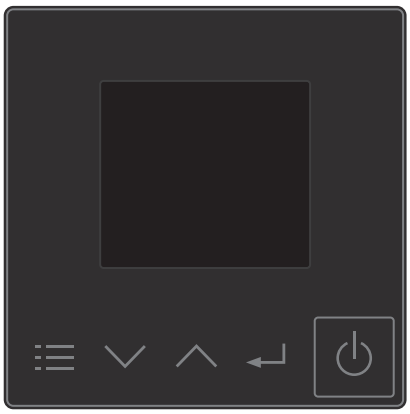
5. REMOTE CONTROLLER FUNCTIONS

Simple Settings Function

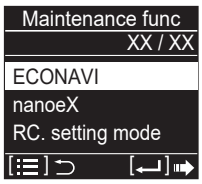
This allows the filter lifetime, operating mode priority change, central control address, and other settings to be made for an individual or group-control indoor unit to which the remote controller used for simple settings is connected. When simple settings mode is engaged, operation stops at the individual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

<Procedure of CZ-RTC6 series>

Stop the system before performing these steps.

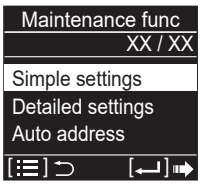


(1) Keep pressing the ☰, ∧ and ↵ buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



(2) Press the ∨ or ∧ button to see each menu.
Select “Simple settings” on the LCD display and press the ↵ button.

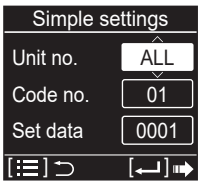
The “Simple settings” screen appears on the LCD display.



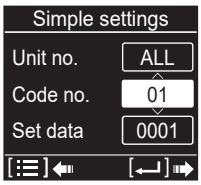
(3) Select the “Unit no.” by pressing the ∨ or ∧ button.
After selecting “Unit no.”, press the ↵ button and proceed to Step (4).

NOTE

If the ☰ button is pressed, proceed to Step (6).

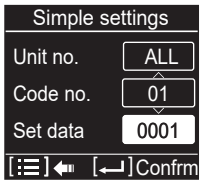


(4) Select the “Code no.” by pressing the ∨ or ∧ button.
After selecting “Code no.”, press the ↵ button and proceed to Step (5).

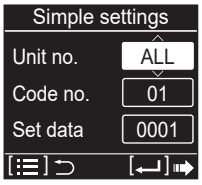


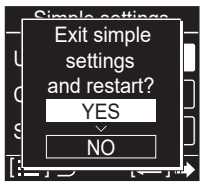
(5) Select the “Set data” by pressing the ∨ or ∧ button.
After selecting “Set data”, press the ↵ button.

The “Simple settings” screen appears on the LCD display (proceed to Step (6)).



(6) If the ☰ button is pressed under the display, the following display (Simple setting-end screen) appears.
Then select “YES” by pressing the ∨ or ∧ button and press the ↵ button. (Return to normal remote controller display.)

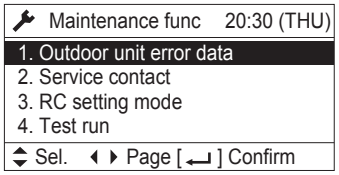




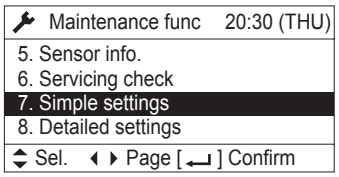
5

<Procedure of CZ-RTC5B>

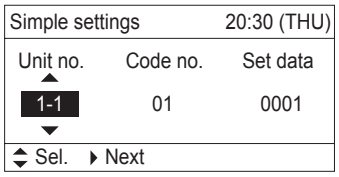
(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



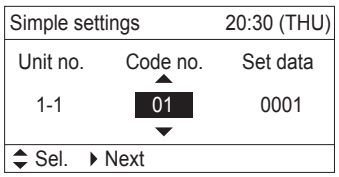
(2) Press the [▼] or [▲] button to see each menu.
If you wish to see the next screen instantly, press the [◀] or [▶] button.
Select “7. Simple settings” on the LCD display and press the [↵] button.

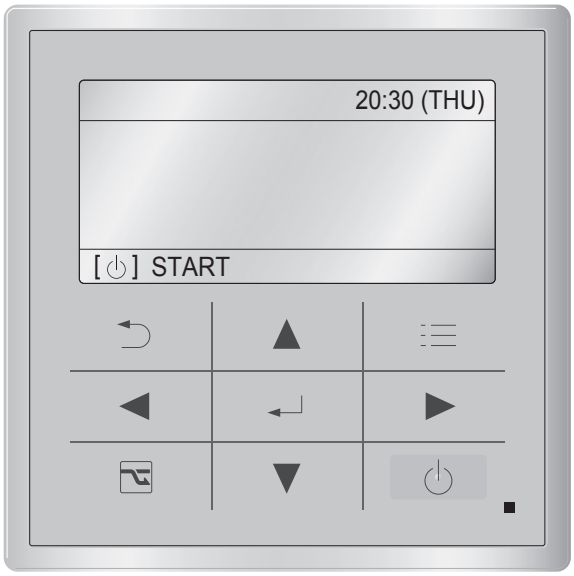


The “Simple settings” screen appears on the LCD display.
Select the “Unit no.” by pressing the [▼] or [▲] button for changes.

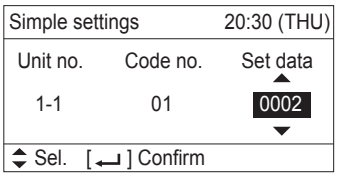


(3) Select the “Code no.” by pressing the [◀] or [▶] button.
Change the “Code no.” by pressing the [▼] or [▲] button.

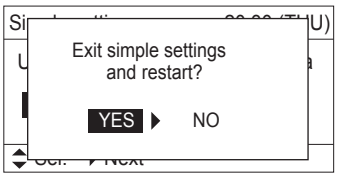




(4) Select the “Set data” by pressing the [◀] or [▶] button.
Select one of the “Set data” by pressing the [▼] or [▲] button.
Then press the [↵] button.



(5) Select the “Unit no.” by pressing the [◀] or [▶] button and press the [↩] button.
The “Exit simple settings and restart?” (Simple setting-end) screen appears on the LCD display.
Select “YES” and press the [↵] button.



5

<Procedure of CZ-RTC4>

(1) Press and hold the [ ] and [ ] buttons simultaneously for 4 seconds or longer.

(2) "SETTING", unit No. "1- 1" (or "ALL" in the case of group control), item code "01", and settings data "00XX" are displayed blinking on the remote controller LCD display. 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. "ALL" is displayed, the same setting will be made for all indoor units.

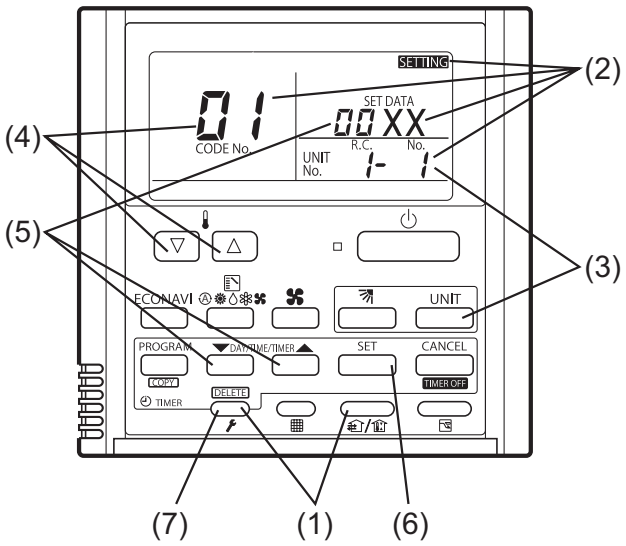
(4) Press the temperature setting [▽] / [△] buttons to select the item code to change.

(5) Press the timer time DAY/ / TIMER▲ buttons to select the desired setting data.

* For item codes and setting data, see 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.



5

List of Simple Setting Items

Item code	Item	Setting data		
		No.	Description	
01	Filter sign ON time (filter life time)	0000	Not displayed	
		0001	150 hours	
		0002	2,500 hours	
		0003	5,000 hours	
		0004	10,000 hours	
		0005	Use the filter clogging sensor.	
02	Degree of filter fouling	0000	Standard (setting at time of shipping)	
		0001	Highly fouled (Filter sign ON time is reduced to one-half the set time.)	
03	Central control address	0001	Central control address 1	
		0002	Central control address 2	
		0003	Central control address 3	
		≀	≀	
		0064	Central control address 64	
		0099	No central control address set (setting at time of shipping)	
04	Operating mode priority change	0000	Normal (setting at time of shipping)	
		0001	Priority	
05	Fan speed when heating thermostat is OFF		Compressor ON	Compressor OFF
		0000	L 1 min., LL 3 min.	LL
		0001	L	LL
		0002	LL	LL
		0004	L 1 min., LL 3 min.	L
		0005	L	L
		0006	LL	L
06	Heating intake temperature shift	0000	No shift	
		0001	Shifts intake temperature 1°C down.	
		0002	Shifts intake temperature 2°C down.	
		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 down.	
07	Electric heater installation	0000	No heater	
		0001	Heater installed	
08	Humidifying when heater thermostat is OFF	0000	No (setting at time of shipping)	
		0001	Yes	
0A	Change to remote controller sensor thermostat differential	0000	Thermostat OFF differential: – 1°C (setting at time of shipping)	
		0001	Thermostat OFF differential: – 0.5°C	
0b (0B)	Function of EXCT plug short-circuit	0000	Indoor unit does thermostat OFF (factory preset mode)	
		0001	Indoor unit gives “P14” alarm and transmits the refrigerant leakage signal.	
0d (0D)	Permit/prohibit automatic heating/cooling	0000	Permit	
		0001	Prohibit	
0F	Cool-only	0000	Normal	
		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	Item	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

Model data	Model	Filter sign ON time			
		Standard		Long-life	
		Standard	High fouling	Standard	High fouling
0001	4-Way cassette (U2) 4-Way cassette 60×60 (Y2)	×	×	**2500**	**1250**
0008	Wall Mounted (K2)	**150**	**75**	×	×

Unit: hour

NOTE

- × indicates that there is no corresponding filter.
- 150 indicates the filter sign ON time that is set at shipment.
- High fouling: Set when 0001 is selected for the degree of filter fouling (item code 02).

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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.

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

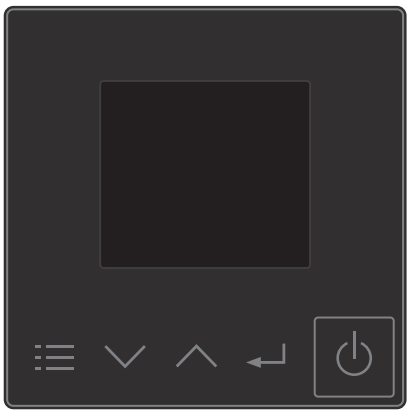
Mode change at priority remote controller		Operating modes at other remote controllers	
Current mode	**New mode**	**Current mode**	**New mode**
Cooling or dry	Heating	Cooling or dry	Heating
		Fan	Fan (not changed)
Heating	Cooling	Heating	Cooling
		Fan	Fan (not changed)
Cooling	Dry	Cooling	Cooling (not changed)
		Dry	Dry (not changed)
Heating	Dry	Heating	Cooling
		Fan	Fan (not changed)
Cooling or dry	Fan	Cooling	Cooling (not changed)
		Dry	Dry (not changed)
		Fan	Fan (not changed)
Heating	Fan	Heating	Heating (not changed)
		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.

Detailed Settings Function

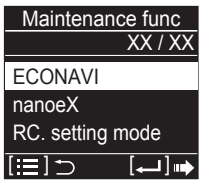
This allows the system address, indoor unit address, and other settings to be made for the individual or group-control indoor unit to which the remote controller used for detailed settings is connected.
When detailed settings mode is engaged, operation stops at the individual or group-control indoor unit where the remote controller used for detailed settings is connected. Simple settings items can also be set at this time.

<Procedure of CZ-RTC6 series>



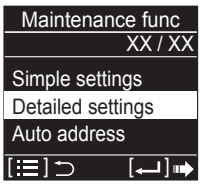
Stop the system before performing these steps.

(1) Keep pressing the ☰, ∧ and ↵ buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



(2) Press the ∨ or ∧ button to see each menu.
Select “Detailed settings” on the LCD display and press the ↵ button.

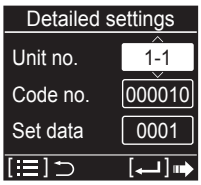
The “Detailed settings” screen appears on the LCD display.



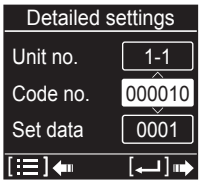
(3) Select the “Unit no.” by pressing the ∨ or ∧ button.
After selecting “Unit no.”, press the ↵ button and proceed to Step (4).

NOTE

If the ☰ button is pressed, proceed to Step (6).

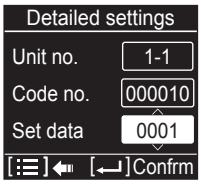


(4) Select the “Code no.” by pressing the ∨ or ∧ button.
After selecting “Code no.”, press the ↵ button and proceed to Step (5).

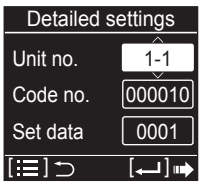


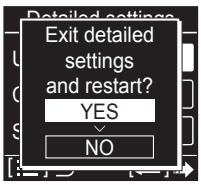
(5) Select the “Set data” by pressing the ∨ or ∧ button.
After selecting “Set data”, press the ↵ button.

The “Detailed settings” screen appears on the LCD display (proceed to Step (6)).



(6) If the ☰ button is pressed under the display, the following display (Detailed setting-end screen) appears.
Then select “YES” by pressing the ∨ or ∧ button and press the ↵ button. (Return to normal remote controller display.)





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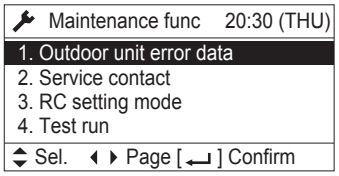
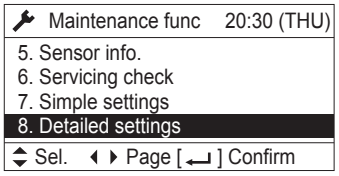
<Procedure of CZ-RTC5B>

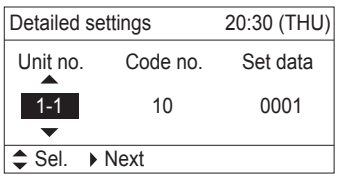
(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



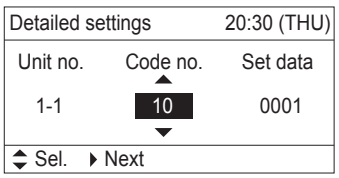
(2) Press the [▼] or [▲] button to see each menu.
If you wish to see the next screen instantly, press the [◀] or [▶] button.
Select “8. Detailed settings” on the LCD display and press the [↵] button.

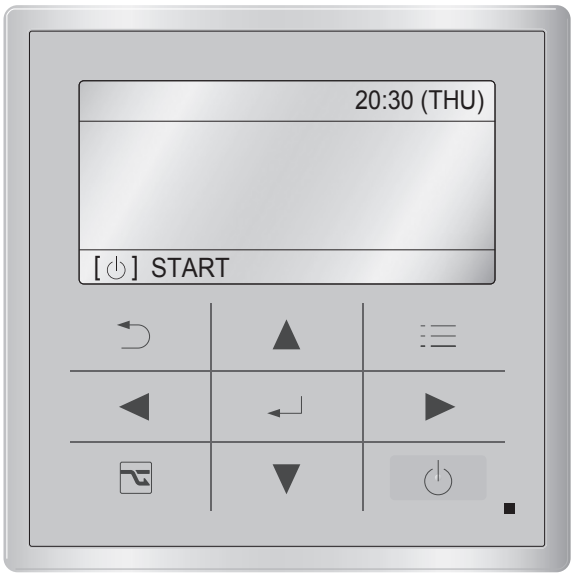


The “Detailed settings” screen appears on the LCD display.
Select the “Unit no.” by pressing the [▼] or [▲] button for changes.

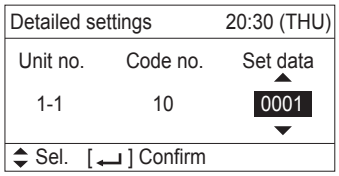


(3) Select the “Code no.” by pressing the [◀] or [▶] button.
Change the “Code no.” by pressing the [▼] or [▲] button (or keeping it pressed).

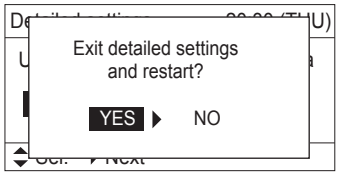




(4) Select the “Set data” by pressing the [◀] or [▶] button.
Select one of the “Set data” by pressing the [▼] or [▲] button.
Then press the [↵] button.



(5) Select the “Unit no.” by pressing the [◀] or [▶] button and press the [↩] button.
The “Exit detailed settings and restart?” (Detailed setting-end) screen appears on the LCD display.
Select “YES” and press the [↵] button.



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<Procedure of CZ-RTC4>

(1) Press and hold the , CANCEL and SET buttons simultaneously for 4 seconds or longer.

(2) " SETTING ", unit No. " 1- 1 ", item code " 10 ", and settings data " 00 XX " are displayed blinking on the remote controller LCD display. At this time, the indoor unit fan 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. " ALL " is displayed, the same setting will be made for all indoor units.

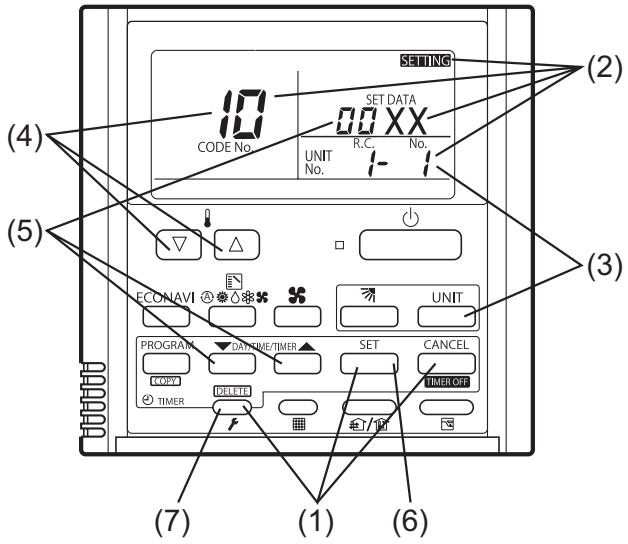
(4) Press the temperature setting ▽ / △ buttons to select the item code to change.

(5) Press the timer time DAY/ / /TIMER buttons to select the desired setting data.

* For item codes and setting data, see 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.



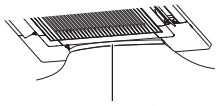
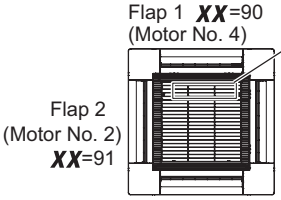
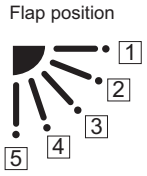
5

List of Detailed Setting Items

Item code	Item	Setting data					
		No.	Description	No.	Description	No.	Description
10	Type	0001	4-Way Cassette (60×60) (U2, Y2)	0005	Slim Low Static Ducted (M1)	0008	Wall Mounted (K2)
11	Indoor unit capacity	0038	15 (Type 15)	0001	22 (Type 22)	0003	28 (Type 28)
		0005	36 (Type 36)	0007	45 (Type 45)	0009	56 (Type 56)
		0010	63 (Type 60)	0012	80 (Type 73)	0013	90 (Type 90)
		0015	112 (Type 106)	0017	140 (Type 140)	0018	160 (Type 160)
12	System address	0001	Unit No. 1				
		0002	Unit No. 2				
		0003	Unit No. 3				
		〉	〉				
		0030	Unit No. 30				
		0099	Not set				
13	Indoor unit address	0001	Unit No. 1				
		0002	Unit No. 2				
		0003	Unit No. 3				
		〉	〉				
		0064	Unit No. 64				
		0099	Not set				
14	Group control address	0000	Individual (1:1 = Indoor unit with no group wiring)				
		0001	Main unit (One of the group-control indoor units)				
		0002	Sub unit (All group-control indoor units except for main unit)				
		0099	Not set				
17	Cooling intake temperature shift	−010	Shifts intake temperature 10°C down.				
		−009	Shifts intake temperature 9°C down.				
		〉	〉				
		−001	Shifts intake temperature 1°C down.				
		0000	No intake temperature shift				
		0001	Shifts intake temperature 1°C up.				
		〉	〉				
		0009	Shifts intake temperature 9°C up.				
		0010	Shifts intake temperature 10°C up.				
18	Automatic stop time after operation start *Can be set in 5-minute units.	0000	Function disabled				
		0001	Stops automatically 5 minutes after operation starts.				
		0002	Stops automatically 10 minutes after operation starts.				
		〉	〉				
		0123	Stops automatically 615 minutes after operation starts.				
		0124	Stops automatically 620 minutes after operation starts.				
		0125	Stops automatically 625 minutes after operation starts.				

Item code	Item		Setting data	
			No.	Description
1b (1B)	Forced thermostat ON time		0000	5 minutes
			0001	4 minutes
1C	Cooling discharge temperature shift		–010	Shifts discharge temperature setting 10°C down
			–009	Shifts discharge temperature setting 9°C down
			–008	Shifts discharge temperature setting 8°C down
			〜	〜
			0010	Shifts discharge temperature setting 10°C up
1d (1D)	Heating discharge temperature shift		–010	Shifts discharge temperature setting 10°C down
			–009	Shifts discharge temperature setting 9°C down
			–008	Shifts discharge temperature setting 8°C down
			〜	〜
			0010	Shifts discharge temperature setting 10°C up
1E	Temperature shift for cooling/heating change in auto heat/cool mode		0001	±1°C
			0002	±2°C
			0003	±3°C
			〜	〜
			0007	±7°C
1F (Upper limit) 20 (Lower limit)	Change to remote control temperature setting range	Cooling	0018	18°C (Lower limit at shipment)
			0019	19°C
			〜	〜
			0029	29°C
			0030	30°C (Upper limit at shipment)
21 (Upper limit) 22 (Lower limit)		Heating	0016	16°C (Lower limit at shipment)
			0017	17°C
			〜	〜
			0029	29°C
			0030	30°C (Upper limit at shipment)
23 (Upper limit) 24 (Lower limit)		Drying	0018	18°C (Lower limit at shipment)
			0019	19°C
			〜	〜
			0029	29°C
			0030	30°C (Upper limit at shipment)
25 (Upper limit) 26 (Lower limit)		Auto heat/cool	0017	17°C (Lower limit at shipment)
			0018	18°C
			〜	〜
			0026	26°C
			0027	27°C (Upper limit at shipment)
29	Humidifier operation		0000	Normal
			0001	Ignore heat exchanger temperature conditions.
2A	Filter (CN70) input switching		0000	Filter input (differential pressure switch input)
			0001	Alarm input (for trouble input about air cleaner or similar device)
			0002	Humidifier input (Operates linked with drain pump when humidifier is ON.)
2C	Indoor unit electronic control valve		0000	Present (Setting at shipment)
			0002	None
2E	T10 terminal switching		0000	Normal (Used as optional relay PCB or JEMA standard HA terminal.)
			0001	Used for OFF reminder
			0002	Fire prevention input

Item code	Item	Setting data	
		No.	Description
2F	Automatic drain pump operation	0000	No forced operation
		0001	Forced operation for 1 minute
		)	)
		0060	Continuous operation
31	Ventilation fan operation	0000	None
		0001	Ventilation fan operated by remote controller.
32	Wired remote controller sensor	0000	Not used. (Body sensor is used.)
		0001	Remote control sensor is used.
34	"Operation change control in progress" display	0000	Normal (displayed)
		0001	Not displayed
35	OFF reminder function for when weekly timer is used	0000	None
		0001	Only stop time setting is enabled.
3A	Discharge temperature control	0000	Discharge temperature control OFF
		0001	Discharge temperature control ON
3C	Heat exchanger temperature for cold air discharge (Heat exchanger control point for control to prevent cold air)	0013	Control temperature 13°C
		0014	Control temperature 14°C
		)	)
		0025	Control temperature 25°C
		0026	Control temperature 26°C
3d	Fan output switching	0000	Output linked with fan. (ON when indoor unit fan is operating.)
		0001	Fan mode operation output
3E	Drain pump delayed stop time	0000	No delayed start
		0001	1 minute delayed stop
		0002	2 minutes delayed stop
		)	)
		0058	58 minutes delayed stop
		0059	59 minutes delayed stop
		0060	60 minutes delayed stop
40	Humidifier setting	0000	Humidifier output OFF. Drain pump stopped.
		0001	Humidifier output ON. Drain pump operates.
		0002	Humidifier output ON. Drain pump operates for 1 minute when total humidifier operating time reaches 60 minutes.
		0003	Humidifier output ON. Drain pump stopped.
45	Flap operation mode	0000	Standard setting
		0001	Draft reduction mode (Flap lower-limit position is shifted upwards.)
46	Flap swing mode	0000	Smudging reduction mode (Flap swing upper-limit position is shifted downwards.)
		0001	Normal mode
		0002	Draft reduction mode (Flap swing lower-limit position is upwards.)

Item code	Item	Setting data	
		No.	Description
5d	Fan tap setting (Fan tap change in order to prevent drop in air discharge caused by filter installation)		Purpose
		0000	Standard (setting at shipment)
		0001	High ceiling setting 1 (Type U2)
			Air-flow blocking kit (when a duct is connected : Type U2)
			Air-flow blocking kit (for 3-way airflow : Type U2)
		0003	High ceiling setting 2 (Type U2)
		0006	Air-flow blocking kit (for 2-way airflow : Type U2)
5E	Humidifier ON time (ON time per 60 seconds)	0000	No humidifier output
		0001	1 second
		0002	2 seconds
		≀	≀
		0058	58 seconds
		0059	59 seconds
		0060	Continuously ON
60	Timer function change prohibit	0000	Function disabled
		0001	Function enabled
62	Smudging control	0000	No smudging control
8F	Waiting time for dew condensation prevention control	0000	Without dew condensation prevention control
		0001	Dew condensation prevention control after 10 minutes
		0002	Dew condensation prevention control after 20 minutes
		≀	≀
		0010	Dew condensation prevention control after 100 minutes
		0011	Dew condensation prevention control after 110 minutes
		0012	Dew condensation prevention control after 120 minutes
90	Setting the Flap Separately *Only for 4-Way Cassette type	0000 0001 0002 0003 0004 0005 0006	 Air outlet flap (adjustment for up-down airflow direction)   When the flap position is set to 4 or 5 and the unit is in the cooling or dry mode, the flap position is moved to 3 and the operation is started. **NOTE** The flap swings during the operation under "Setting the Flap Separately". At this time, the unselected flaps are moved to the position 1.
91	Setting the Flap Separately *Only for 4-Way Cassette type		
92	Setting the Flap Separately *Only for 4-Way Cassette type		
93	Setting the Flap Separately *Only for 4-Way Cassette type		

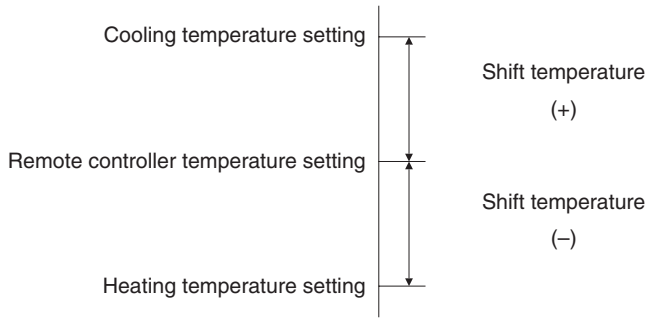
Setting data	Flap position during operation
0000	Without separate setting
0001	Swing
0002	Move to position 1 and stay
0003	Move to position 2 and stay
0004	Move to position 3 and stay
0005	Move to position 4 and stay
0006	Move to position 5 and stay

5

Item code	Item	Setting data	
		No.	Description
97	Refrigerant leak sensor life notification and refrigerant leak alarm reset	0000	Normal (Life of refrigerant leak sensor hasn't expired)
		0001	Life of refrigerant leak sensor has expired
		0002	Reset the life notification of refrigerant leak sensor in indoor unit (J04, J06)
		0003	Reset the refrigerant leak alarm (P08)
9F	Operation setting for nanoe™ X, Internal cleaning and internal drying (Type U2, K2, Y2)	0000	nanoe™ X OFF. Internal cleaning with nanoe™ X OFF Internal drying OFF.
		0001	nanoe™ X ON. Internal cleaning with nanoe™ X ON Internal drying OFF. (Not operational if R/C adaptable to the nanoe™ X not connected)
		0002	nanoe™ X ON. Internal cleaning with nanoe™ X ON Internal drying OFF. (Operational even if R/C adaptable to the nanoe™ X not connected)
		0004	nanoe™ X ON. Internal cleaning with nanoe™ X OFF Internal drying ON. (Operational even if R/C adaptable to the nanoe™ X not connected)
		0005	nanoe™ X ON. Internal cleaning with nanoe™ X OFF Internal drying OFF. (Operational even if R/C adaptable to the nanoe™ X not connected)
		0006	nanoe™ X OFF. Internal cleaning with nanoe™ X OFF Internal drying ON. (Operational even if R/C adaptable to the nanoe™ X not connected)
F8	Internal cleaning dry times (when humidity is over 70%) (Type U2, K2*)	0000	Without fan operation
		0001	1 minute
		0002	2 minute
		≀	≀
		0118	118 minute
		0119	119 minute
		0120	120 minute
F9	Internal cleaning dry times (when humidity is less than 70%) (Type U2, K2*)	0000	Without fan operation
		0001	1 minute
		0002	2 minute
		≀	≀
		0118	118 minute
		0119	119 minute
		0120	120 minute
Fb (FB)	R32 refrigerant leakage detection sensor	0000	Not connected (Setting at shipment)
		0001	Connected (Automatically set by connecting to R32 refrigerant leakage detection sensor)

* Type 45, 56, 73, 106

Item code	Item	Description
10	Unit type	Set when the indoor unit EEPROM memory is replaced during servicing.
11	Indoor unit capacity	
12	System (outdoor unit) address	These are not set at the time of shipping from the factory. These must be set after installation if auto 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)	Change to the remote control temperature setting range	Cooling	This setting changes the temperature range (upper limit and lower limit) which is set from the remote controller or central control device. The set upper limit must be greater than or equal to the lower limit. If the temperature setting is to be a single point, set the upper limit and lower limit to the same temperature.
21 (Upper limit) **22** (Lower limit)		Heating	
23 (Upper limit) **24** (Lower limit)		Drying	
25 (Upper limit) **26** (Lower limit)		Auto heat/cool	
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. See the item concerned with operating mode priorities.
35	OFF reminder function for weekly timer		This setting switches the operation when the weekly timer is connected to the remote controller. This can be used to prevent cases in which the unit is accidentally left ON. There is no change when this setting is ON, however it is necessary to set the weekly timer ON time.

(Continued)

(Continued from previous page)

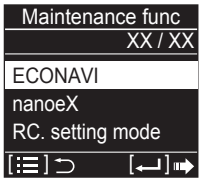
Item code	Item	Description
3C	Heat exchanger temperature for cold air discharge	The heat exchanger temperature control point for prevention of cold air discharge during heating operation can be changed.
3d	Fan output switching	The indoor unit PCB optional output for the fan can be switched according to the purpose of use.
3E	Drain pump delayed stop time	The drain pump stops 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.

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

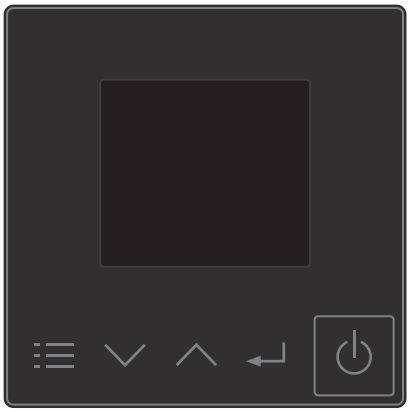
<Function of CZ-RTC6 series>

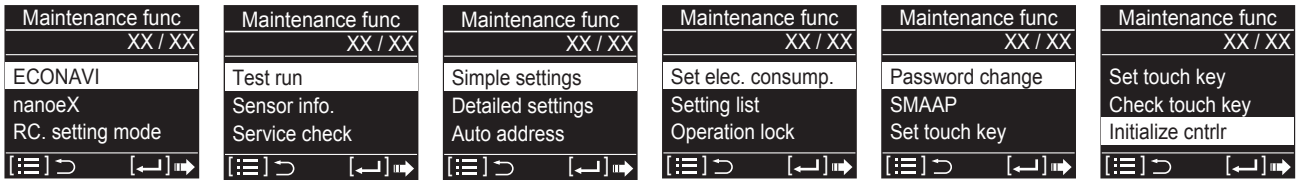
Stop the system before performing these steps.

(1) Keep pressing the ☰ , ∧ and ↵ buttons simultaneously for 4 or more seconds.



(2) Press the ∨ or ∧ button to see each menu.





Maintenance function screen

List of Servicing Functions

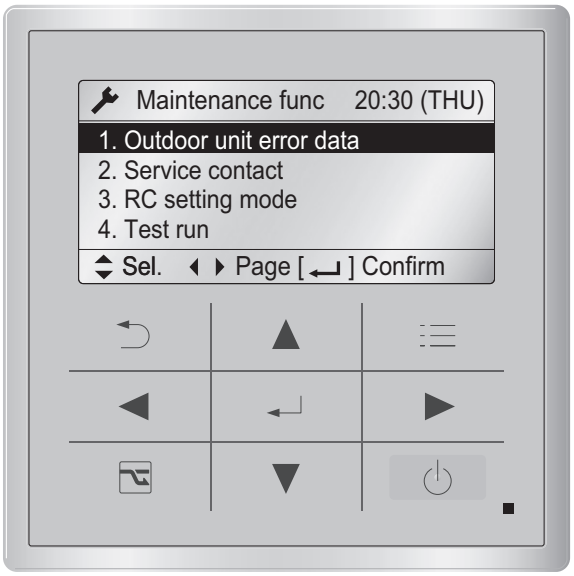
Functions	Description	Menu selection	Reset operation	Unit status
ECONAVI ・CZ-KPU3A ・CZ-CENSC1	Display from each sensor	ECONAVI	Press the ☰ button.	
Test run	Operation with forced thermostat ON	Test run		
Sensor temperature display	Temperature display from each sensor	Sensor info		
Servicing check display	Alarm history display	Service check		
Simple settings	Filter lifetime, operating mode priority, central control address, and other settings	Simple settings	Press the ☰ button. (Restart)	When settings are made from a remote controller, the indoor unit where that remote controller is connected stops.
Detailed settings	System address, indoor unit address, central control address, and other settings	Detailed settings		
Auto address	Auto address setting based on command from the wired remote controller	Auto address	Automatic reset	Entire system stops.
nanoe™ X	Display status of nanoe™ X	nanoeX	Press the ☰ button.	

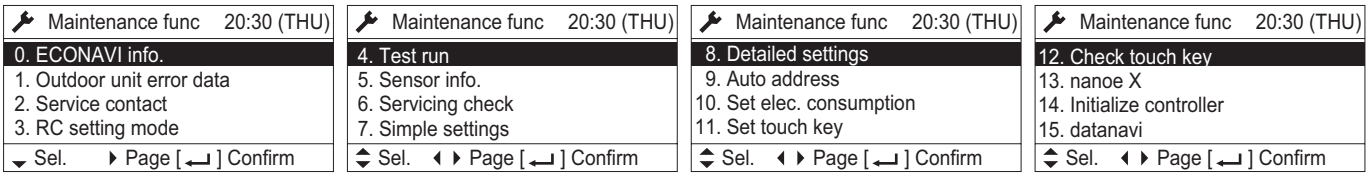
<Function of CZ-RTC5B>

Display of “maintenance function” screen

(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds. The “Maintenance func” screen appears on the LCD display.

(2) Press the [▼] or [▲] button to see each menu.
If you wish to see the next screen instantly, press the [◀] or [▶] button.





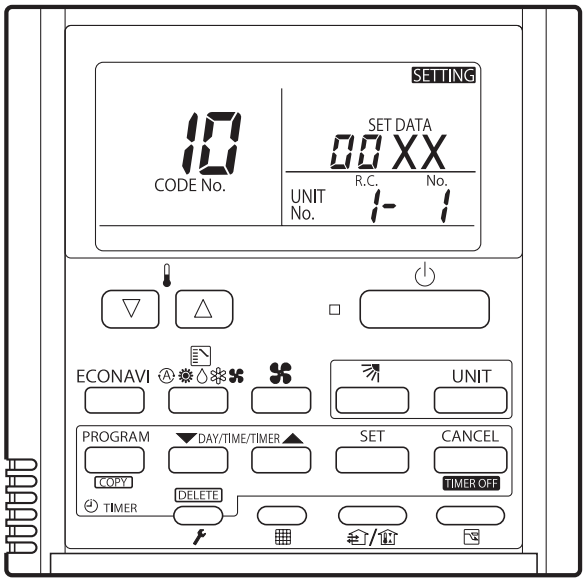
Maintenance function screen

List of Servicing Functions

Functions	Description	Menu selection	Reset operation	Unit status
ECONAVI ・CZ-KPU3A ・CZ-CENSC1	Display from each sensor	0. ECONAVI info.	Press the [↩] button.	
Test run	Operation with forced thermostat ON	4. Test run		
Sensor temperature display	Temperature display from each sensor	5. Sensor info		
Servicing check display	Alarm history display	6. Service check		
Simple settings	Filter lifetime, operating mode priority, central control address, and other settings	7. Simple settings	Press the [↩] button. (Restart)	When settings are made from a remote controller, the indoor unit where that remote controller is connected stops.
Detailed settings	System address, indoor unit address, central control address, and other settings	8. Detailed settings		
Auto address	Auto address setting based on command from the wired remote controller	9. Auto address	Automatic reset	Entire system stops.
nanoe™ X	Display status of nanoe™ X	13. nanoe X	Press the [↩] button.	

5

<Function of CZ-RTC4>



List of Servicing Functions

Functions	Description	Button operation	Reset operation	Unit status
Test run	Operation with forced thermostat ON	Press and hold the button for 4 seconds or longer.	Press the button.	Current operation is maintained.
Sensor temperature display	Temperature display from each sensor	Press and hold the and CANCEL buttons for 4 seconds or longer.		
Servicing check display	Alarm history display	Press and hold the and SET buttons for 4 seconds or longer.		
Simple settings	Filter lifetime, operating mode priority, central control address, and other settings	Press and hold the and buttons for 4 seconds or longer.		When settings are made from a remote controller, the indoor unit where that remote controller is connected stops.
Detailed settings	System address, indoor unit address, central control address, and other settings	Press and hold the , CANCEL and SET buttons for 4 seconds or longer.		
Auto address	Auto address setting based on command from the wired remote controller	Press and hold the and the timer operation TIMER 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 DAY/ buttons for 4 seconds or longer.	Press the button.	

5

■ ECONAVI Display

When the ⚠ECONAVI appears on the LCD display, the state of the sensor unit can be checked in the following method.

<Procedure of CZ-RTC5B>

(1) Keep pressing the ⮌ , ↵ and ▶ buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.

(2) Select “0. ECONAVI info.” on the LCD display and press the ↵ button.

Maintenance func 20:30 (THU)
0. ECONAVI info.
1. Outdoor unit error data
2. Service contact
3. RC setting mode
Sel. Page [↵] Confirm

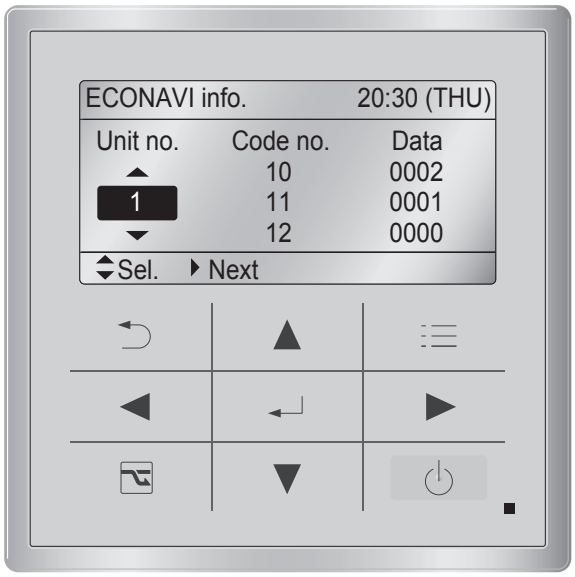
(3) Press the ▼ or ▲ button to see each menu.
Select “Sensor unit info.” on the LCD display and press the ↵ button.

ECONAVI info. 20:30 (THU)
Setting info.
Sensor unit info.
System settings
Status info.
Sel. [↵] Check

Select the “Unit no.” by pressing the ▼ or ▲ button for changes.

ECONAVI info. 20:30 (THU)		
Unit no.	Code no.	Data
▲	10	0002
1	11	0001
▼	12	0000
Sel. Next		

Then press the ▶ button.
Display sensor information of the unit.
Refer to the information by pressing the ▼ or ▲ button.



5

Code no.		Description
ECONAVI sensor	**ECONAVI panel**	
11	**21**	Data shows the status of the ECONAVI sensor. 0000: The sensor is not connected. 0001: The sensor can detect human motion. 0002: The sensor is initializing. (The sensor cannot detect human motion.) The initial setting is completed after about 90 seconds when switched on. 0003: Multiple sensor units are connected. Only one sensor unit per indoor group is connectable. 0004: The sensor is broken down. 0005: The floor temperature sensor is broken down. Data is automatically updated every 30 seconds.
12	**22**	In 30 seconds, data shows the number of times human motion was detected. Data is automatically updated every 30 seconds.
-	**24**	Data shows the floor temperature measured by the sensor. Data is automatically updated every 30 seconds.

How to Check Human Detection Sensor

Step 1 Check that Code no.11 or 21 is showing “0001”.

Step 2 Make the sensor that can detect a person.
Move back and forth and around for about 10 seconds under sensor activation.

Step 3 Check that Code no.12 or 22 can show “1” or more within 30 seconds after Step 2 is performed.

Step 4 Make the sensor that cannot detect a person.
Exclude the persons or animals (an object to be detected) from the detection area.
If the remote controller is placed within the detection area of the ECONAVI sensor, an inspector must check motionless the display of the remote controller.

Step 5 After a while, check that Code no.12 or 22 can show “0”. (For about 30 seconds to 2 minutes)

How to Check Floor Temperature Sensor

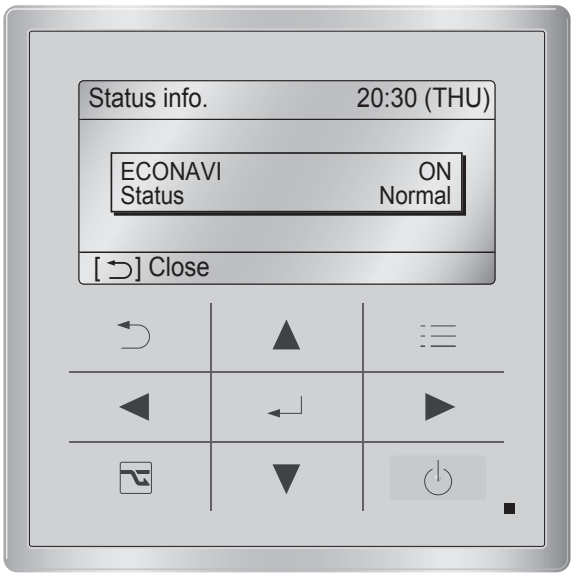
Code no. 24: There is no problem if data is within the range of -20 to 60.
If data shows -35, the floor temperature is broken down.

Check of ECONAVI Operational Status

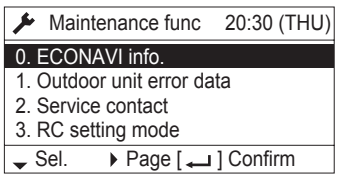
The status of ECONAVI operation can be checked instantly.
It is available to check the operation when installing the indoor unit.

<Procedure of CZ-RTC5B>

(1) Keep pressing the [⮌] , [↵] and [▶] buttons simultaneously for 4 or more seconds. The “Maintenance func” screen appears on the LCD display.

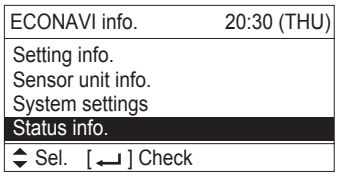


(2) Select “0. ECONAVI info.” on the LCD display and press the [↵] button.



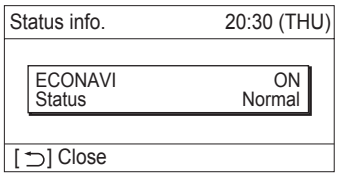
(3) Press the [▼] or [▲] button to see each menu.

Select “Status info.” on the LCD display and press the [↵] button.



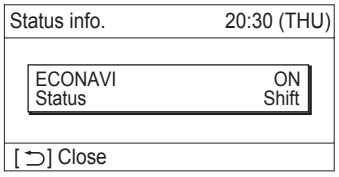
(4) There are four patterns of operational status display as shown below.

(4)-1 Under normal operation



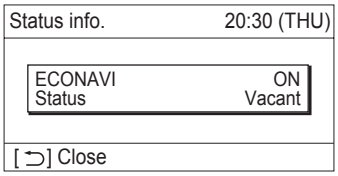
State of no energy-saving operation

(4)-2 Under temperature shift



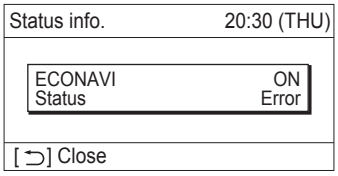
State of energy-saving (temperature shift) operation

(4)-3 Under suspension with absentee



State of energy-saving (suspended) operation
*Shows that air conditioner operation was suspended because no person was detected for a certain period.
This state remains until operation is restarted.

(4)-4 Under sensor communication error



Shows that the connected ECONAVI sensor is in error state.

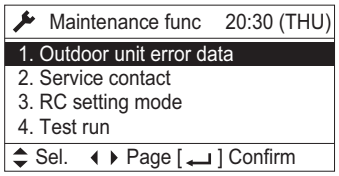
5

Test Run Function

Operates the unit with the thermostat forced ON.

<Procedure of CZ-RTC5B>

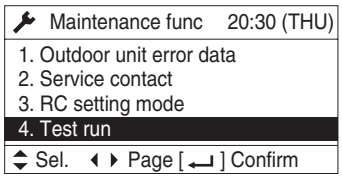
(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds. The “Maintenance func” screen appears on the LCD display.



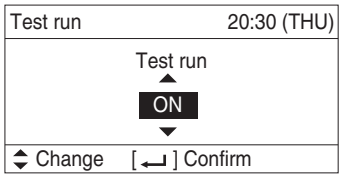
(2) Press the [▼] or [▲] button to see each menu.

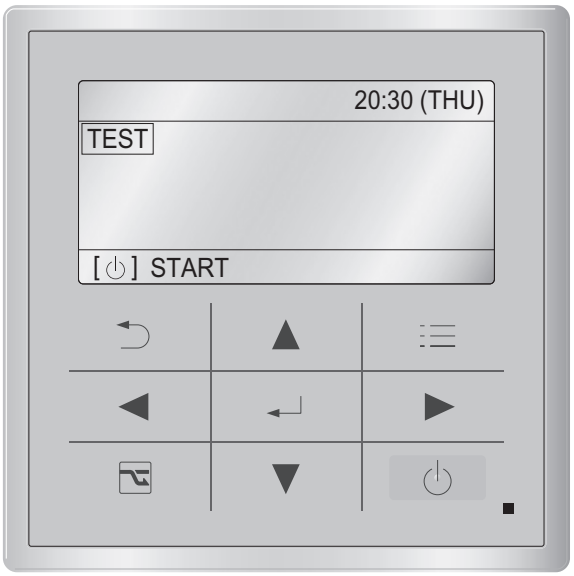
If you wish to see the next screen instantly, press the [◀] or [▶] button.

Select “4. Test run” on the LCD display and press the [↵] button.

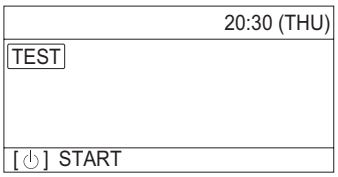


Change the display from OFF to ON by pressing the [▼] or [▲] button. Then press the [↵] button.

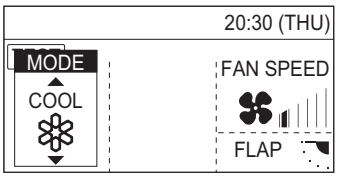




(3) Press the [↩] button. “TEST” will be displayed on the LCD display.



(4) Press the [⏻] button. Test run will be started. Test run setting mode screen appears on the LCD display.

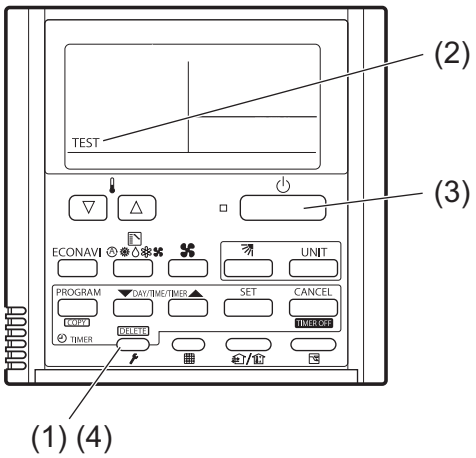


<Procedure of CZ-RTC4>

(1) Press and hold the button for 4 seconds or longer.

(2) " TEST " appears on the remote controller LCD display.

(3) Press the button to start the test run.



- The temperature cannot be adjusted in Test Run mode. (This mode places a heavy load on the machines. Therefore use it only when performing the test run.)
- The test run can be performed using the HEAT, COOL, or FAN operation modes.

NOTE The outdoor unit will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.

- If correct operation is not possible, an error code is displayed on the remote controller LCD display.

(4) Press the button to return to normal remote controller display.

- To prevent continuous test runs, this remote controller includes a timer function that cancels the test run after 60 minutes.
- The operation is possible even if the cassette-type ceiling panel has not been installed. ("P09" display does not occur.)

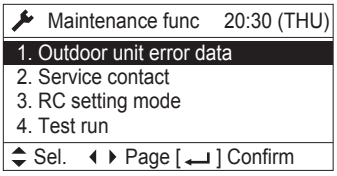
5

■ Sensor Temperature Display Function (displayed regardless of whether unit is operating or stopped)

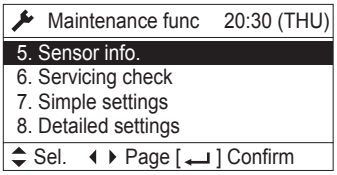
The procedure below displays the sensor temperatures from the remote controller, indoor unit, and outdoor unit on the remote controller.

<Procedure of CZ-RTC5B>

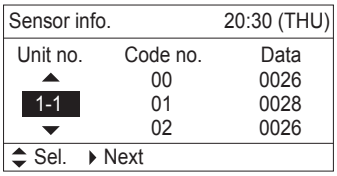
(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds. The "Maintenance func" screen appears on the LCD display.



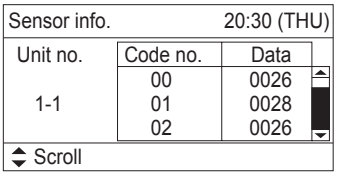
(2) Press the [▼] or [▲] button to see each menu.
If you wish to see the next screen instantly, press the [◀] or [▶] button.
Select "5. Sensor info." on the LCD display and press the [↵] button.



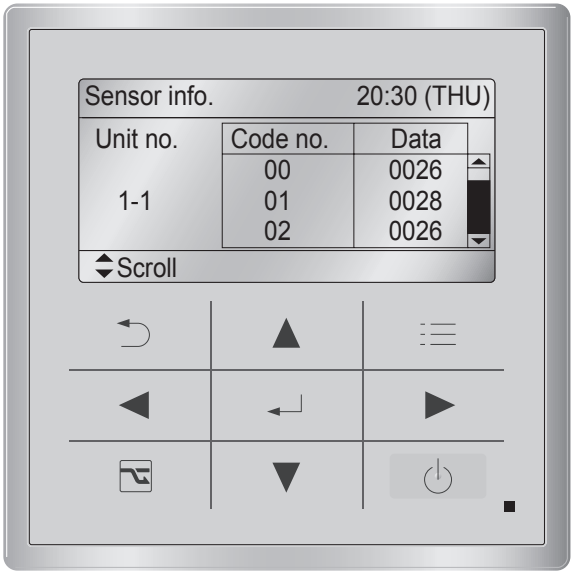
Select the "Unit no." by pressing the [▼] or [▲] button for changes.



Then press the [▶] button.
Display sensor information of the unit.



See the information by pressing the [▼] or [▲] button.



5

<Procedure of CZ-RTC4>

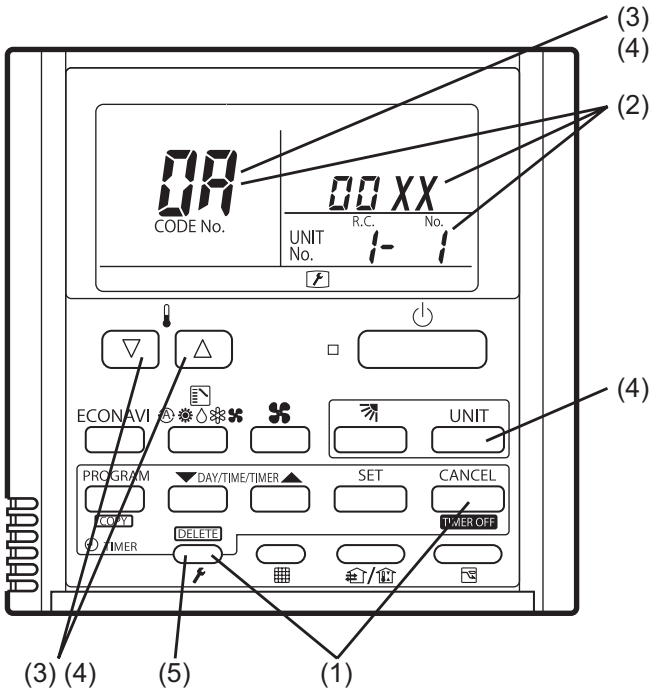
(1) Press and hold the and CANCEL buttons simultaneously for 4 seconds or longer.

(2) The unit No. "X-X" (main unit No.), item code " XX " (sensor address), and servicing monitor " 00 XX " (sensor temperature) are displayed on the remote controller LCD display.

(3) Press the temperature setting ▽ / △ buttons and select the item code to the address of the sensor to monitor.

(4) If group control is in effect, press the UNIT button to select the unit to monitor.
Press the temperature setting buttons to select the item code to change.

(5) Press the button to return to normal remote controller display.



* Display shows a discharge temperature of 00XX at unit No. 1-1.

NOTE

The temperature display appears as "- - - -" for unit that are not connected.

* If monitor mode is engaged while normal operation is in progress, only the parts of the LCD display shown in the figure will change. Other parts continue to display the same information as during normal operation.

Indoor unit sensors	
00	Room temp. controlled*
01	Remote controller temp.
02	Indoor unit intake temp. (TA)
03	Indoor unit heat exchanger temp. E1 (E1)
04	—
05	Indoor unit heat exchanger temp. E3 (E3)
06	Discharge air temp. (BL)
07	Discharge air temp. setting
08	Indoor unit MOV pulse (MOV)

Outdoor unit sensors	
Unit No.1	
0A	Discharge temp. (DISCH)
0C	High-pressure sensor temp.
0D	Heat exchanger gas (EXG)
0E	Heat exchanger liquid (EXL)
11	Outdoor air temp. (TO)
12	Inverter secondary current
13	Inverter primary current (L2 phase) (Three phase only)
15	MOV pulse 1 (MOV1)
19	Inverter actual operating frequency
1A	Sub cooler (MOV4)
1B	Inverter primary current (L1 phase)
1D	Low-pressure sensor temp.
1E	Suction temp. (SCT)
21	Inverter primary current (L3 phase) (Three phase only)
24	Temp. sensor at refrigerant gas outlet of dual-tube temp. (SCG)
26	High-pressure
27	Low-pressure

*Room temp. controlled: = Controlled room temperature

•When body thermostat controlled:
Controlled room temperature = Indoor unit intake temp. (TA) – Intake temperature shift (*1)

•Remote control thermostat controlled:
Controlled room temperature = Remote controller temp.

*1 Intake temperature shift: This is the shift value considered the temperature difference between the upper area and lower area of the room in heating mode.
It is the value of the code "06" in the indoor unit's EEPROM setting.
Cooling mode: = 0

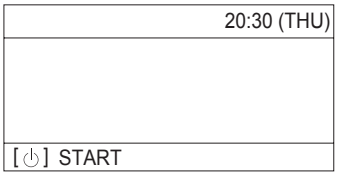
■ nanoe™ X Display

When the ⚠nanoeX appears on the remote controller (CZ-RTC5B), the status of the nanoe™ X can be checked in the following way.

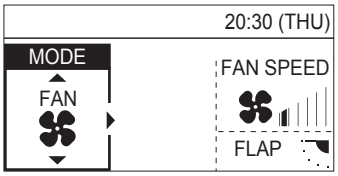
<Procedure of CZ-RTC5B>

(1) Switch On the earth leakage circuit breaker.

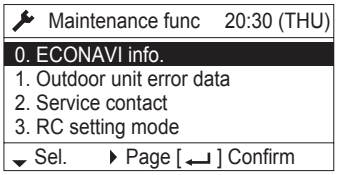
(2) Wait until the remote control display returns to normal.



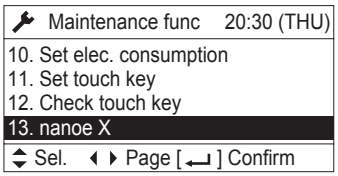
(3) Operate the unit in FAN mode.

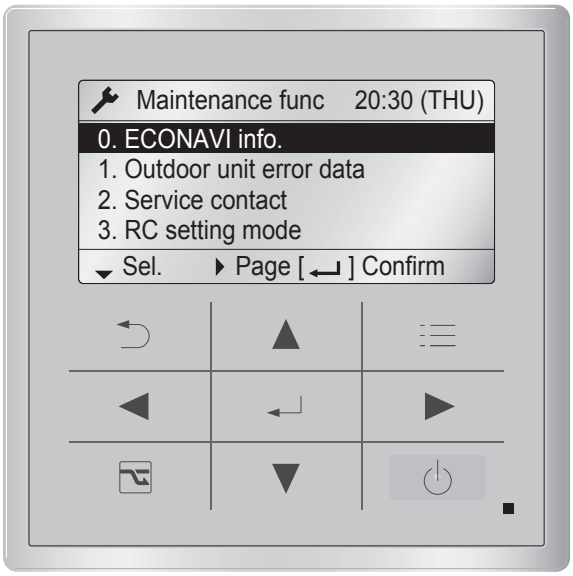


(4) While operating in FAN mode (more than 5 minutes have elapsed), press the ⮌ , ↵ and ▶ buttons simultaneously for 4 or more seconds. The “Maintenance func” screen appears on the LCD display.

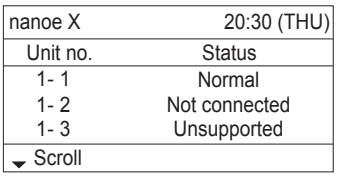


(5) Press the ▼ or ▲ button to see each menu. Select “13. nanoe X” on the LCD display and press the ↵ button.





(6) Check that the nanoe™ X module status is “Normal”. The indoor unit on the display can be scrolled up or down using ▼ / ▲ buttons.



The nanoe™ X module status of all indoor units will be displayed.
Normal : The nanoe™ X module is operating normally.
Unsupported : The indoor unit is not available to the nanoe™ X function.
*1-1 and 1-2 represent the unit number.
*In the case of “Unsupported”, select “8. Detailed settings” and check the setting data of the Code no. 9.
*If the setting data is “0000”, the nanoe™ X module is not recognized. Check the status of the connection.
If the display other than “Normal” or “Unsupported” appears, check the Step (7) next page.

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(7) In the case of the nanoe™ X module status other than “Normal” or “Unsupported”

If the menu “13. nanoe X” is not displayed or the module status becomes other than “Normal” or “Unsupported” even though the nanoe™ X module is connected, there is a probability that the following symptoms happen.

Display	Symptom	Countermeasure
Discharge error	The probability of occurrence of nanoe™ X is deviated from the room temperature and humidity conditions. Outside the range of temperature: Below 5°C or over 35°C Outside the range of humidity: Over 86%	There is no abnormality in the nanoe™ X module. Use in the range of appropriate temperature and humidity.
Humidity error	Humidity sensor not connected or sensor failure	Check if connected to the indoor unit PCB of the humidity sensor or replace the sensor.
Faulty connection	The wiring between the indoor unit and nanoe™ X module is not connected.	Specialize the target indoor unit and check the connection to the indoor unit PCB of the nanoe™ X module.
Not connected	There is no abnormality in the nanoe™ X module. Use in the range of appropriate room temperature and humidity.	

*Specialization of the indoor unit can be checked by the operation of the airflow.

Checking method:

1. Stop the maintenance function.
   Press the  button to show the maintenance func display. Then press the  button.
2. Operate the airflow.
   Select the Unit no. under the  “2. Airflow setting”. Make the airflow setting.
   The unit which is corresponded to the preset flap operation will become the target unit.

When the unit is specialized, switch off the earth leakage circuit breaker and unplug the connector of the nanoe™ X module wiring from the PCB. Then plug it in again. Switch on the earth leakage circuit breaker and once again check the Steps 1 to 3. Then check the status by selecting the menu “13. nanoe X”. If “Disconnection failure” or “Not connected” appears on the display, it is necessary to replace the nanoe™ X module with a new one.

6. TROUBLE DIAGNOSIS

ON: ○ Blinking: ☼ OFF: ●

Possible cause of malfunction			Wired remote control display	Wireless remote controller receiver display
				Operation / Timer / Standby for heating
Serial communication errors Miss-setting	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) Outdoor system address, indoor unit address, or indoor unit address independent/main/sub unit setting has not been made. (Auto address is not completed.)	<E01>	Operating lamp blinking ☼ ● ●
		Error in transmitting serial communication signal.	<E02>	
	Indoor unit is detecting error signal from remote controller and system controller.		<<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.") • Group wiring failure of indoor units in the refrigerant system (occurring when remote controller is operated immediately after auto address setting)	E04	Heating ready lamp blinking ● ● ☼
	Outdoor unit is detecting error signal from indoor unit.	• Error in receiving serial communication signal. • There is an indoor unit which does not send signals when the power is ON.	<E06>	
	Improper setting	• Indoor unit address setting is duplicated.	E08	Operating lamp blinking ☼ ● ●
		• Duplicated remote controller "main" setting.	<<E09>>	
	Improper setting	Auto address setting start is prohibited. AP pin was short-circuited at time when auto address setting was started.	E12	
	Indoor unit communication error of group control wiring.	Error of main indoor unit in receiving serial communication signal from sub indoor units.	E18	
	During auto. address setting, number of connected units does not correspond to number set.	Number of connected indoor units is less than the number set.	E15	Heating ready lamp blinking ● ● ☼
		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	
		Duplicated outdoor unit address.	E25	
		Mismatch in "No. of outdoor units" setting.	E26	
		Error of sub outdoor unit in receiving serial communication signal from main outdoor unit.	E29	
		Outdoor unit serial communications failure.	E30	
	Improper setting	Connected indoor unit is not a multi unit.	<<L02>>	Operating and heating ready lamps blinking simultaneously ☼ ● ☼
		Duplication of main indoor unit address setting in group control.	<L03>	
		Duplicated indoor unit priority (priority indoor unit).	L05	
		Duplicated indoor unit priority (non-priority indoor unit) and outdoor unit.	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>>	
		Duplication of outdoor R.C. address setting.	L04	Operating and heating ready lamps blinking simultaneously ☼ ○ ☼
		Capacity code of outdoor unit is not set.	L10	
		Indoor unit model does not match with outdoor unit.	L13	
		4-way valve operation failure	L18	
Thermistor fault	Indoor unit	Indoor coil temp. sensor (E1)	<<F01>>	Operating and timer lamps blinking alternately ☼ ☼ ●
		Indoor coil temp. sensor (E3)	<<F03>>	
		Indoor suction air (room) temp. sensor (TA)	<<F10>>	
		Indoor discharge air temp. sensor (BL)	<<F11>>	
Thermistor fault	Outdoor unit	Compressor discharge gas temp. sensor (DISCH)	F04	Operating and timer lamps blinking alternately ☼ ☼ ○
		Outdoor coil gas temp. sensor (EXG)	F06	
		Outdoor coil liquid temp. sensor (EXL)	F07	
		Outdoor air temp. sensor (TO)	F08	

Continued

ON: ○ Blinking: ☼ OFF: ●

Possible cause of malfunction			Wired remote control display	Wireless remote controller receiver display: Operation / Timer / Standby for heating
Thermistor fault	Outdoor thermistor is either open or damaged.	Compressor intake temp. sensor (SCT)	F12	Operating and timer lamps blinking alternately ☼ ☼ ○
		High pressure sensor failure. High pressure trouble.	F16	
		Low-pressure sensor failure	F17	
Activation of protective device	Protective device in indoor unit is activated.	Thermal protector in indoor unit fan motor is activated.	<<P01>>	Timer and heat ready lamp blinking alternately ● ☼ ☼
		Improper wiring connections of ceiling panel.	<<P09>>	
		Float switch is activated.	<<P10>>	
		Faulty drain pump. Drain pump locked.	<<P11>>	
		Operation of protective function of fan inverter.	<<P12>>	
	Protective device in outdoor unit is activated.	Compressor discharge temperature error.	P03	Operating and heat ready lamp blinking alternately ☼ ● ☼
		High pressure switch is activated.	P04	
		AC power supply has abnormal.	P05	
		Compressor secondary current is overcurrent.	P16	
		High load alarm (Forgot to open valves)	P20	
		Outdoor unit fan motor has failure.	P22	
		Compressor start failure. Compressor is missing phase or reverse phase.	P29	
	Indoor unit communication error of group control wiring.	When alarm message in other indoor units occurs in case of group control, unalarmed state of indoor units are inoperative.	<P31>	
	R32 refrigerant leakage detection	Refrigerant leakage detection of indoor unit connected with the remote controller displaying this alarm.	P08	
		Refrigerant leakage detection of one of the indoor units connected to the outdoor unit.	P14	Timer and heat ready lamp blinking alternately ● ☼ ☼
		R32 refrigerant leakage detection sensor has failure.	<<J01>>	Timer and heat ready lamp blinking simultaneously ● ☼ ☼
		Life of refrigerant leak sensor in R32 refrigerant leakage detection sensor has expired.	<<J02>>	
		Indoor unit refrigerant leak sensor 1 has failure.(GAS1)	<<J03>>	
		Life of indoor unit refrigerant leak sensor 1 has expired. (GAS1)	<<J04>>	
		Indoor unit refrigerant leak sensor 2 has failure.(GAS2)	<<J05>>	
		Life of indoor unit refrigerant leak sensors 1 and 2 has expired.(GAS1 and GAS2)	<<J06>>	
EEPROM on indoor unit PCB failure			F29	Operating and timer lamp blinking simultaneously ☼ ☼ ●
EEPROM on the main or sub outdoor unit PCB has failed.			F31	Operating and timer lamp blinking simultaneously ☼ ☼ ○
Protective device for compressor is activated	Protective device for compressor is activated.	Compressor primary current is overcurrent.	H01	Timer lamp blinking ● ☼ ●
		Compressor current sensor is disconnected or shorted.	H03	
		Compressor discharge temp. sensor disconnected	H05	
	Abnormal decrease of low-pressure		H06	
	Low oil alarm		H07	
	Oil sensor fault. (Disconnection, etc.)	Compressor oil sensor	H08	
	Abnormal device function	Compressor HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.	H31	

<< >> alarm indication: Does not affect the operation of other indoor units.

< > alarm indication: In some cases may affect the operation of other indoor units.

6

(○ : ON ☼ : Blinking ● : OFF)

LED (RED)		Display meaning
1	2	
○	○	After the power is turned ON (and auto address setting is not in progress), no communication with the indoor units in that system is possible.
(Both ON)		
●	○	After power is turned ON (and auto address setting is not in progress), one or more indoor units are confirmed in that system; however, the number of indoor units does not match the number that was set. This status remains even if the indoor unit address (indoor EEPROM item code : 13) is set more than 17 indoor units. In this case, be sure to set the indoor unit address less than 16.
(OFF)	(ON)	
●	●	Auto address setting was completed successfully. (After the power is turned ON, and auto address setting is not in progress, the number of detected indoor units connected to that system matches the number that was set, and regular communications are occurring.)
(Both OFF)		
☼	☼	Auto address setting is in progress.
(Blinking alternately)		
☼	☼	At time of auto address setting, the number of indoor units did not match the number that was set.
(Both blinking)		
☼	☼	Alarm display LED 1 blinks M times, then LED 2 blinks N times. The cycle then repeats. M = 2: P alarm 3: H alarm 4: E alarm 5: F alarm 6: L alarm N = Alarm No. Example: LED 1 blinks 2 times, then LED 2 blinks 17 times. The cycle then repeats. Alarm is "P17."
(Blinking alternately)		

6

Alarm code	Alarm meaning	Page
E06	Some indoor units do not respond to outdoor unit.	**6**-6
E12	Auto Address failed to start.	**6**-6
E15	Fewer indoor units are found in Auto Addressing than the setting on outdoor PCB.	**6**-6
E16	More indoor units are found in Auto Addressing than the setting on outdoor PCB.	**6**-7
E20	No indoor unit responded in Auto Addressing.	**6**-7
F04	Compressor discharge temperature sensor has failure. (DISCH)	**6**-8
F06	Outdoor unit heat exchanger gas temperature sensor has failure. (EXG)	**6**-9
F07	Outdoor unit heat exchanger liquid temperature sensor has failure. (EXL)	**6**-9
F08	Outdoor temperature sensor has failure. (TO)	**6**-9
F12	Compressor inlet temperature sensor has failure. (SCT)	**6**-9
F16	High pressure sensor has failure. (HPS)	**6**-10
F17	Low pressure sensor has failure. (LPS)	**6**-11
F31	EEPROM on outdoor unit PCB has failure.	**6**-11
H01	Compressor primary current is overcurrent.	**6**-11
H03	Compressor current sensor is disconnected or shorted.	**6**-12
H05	Compressor discharge temperature sensor is disconnected, shorted or misplaced. (DISCH)	**6**-12
H06	Low pressure sensor value is too low.	**6**-13
H31	Compressor HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.	**6**-14
L04	Duplicate system address setting on outdoor units.	**6**-15
L10	Capacity setting of outdoor unit is not correct.	**6**-15
L13	Indoor unit model does not match with outdoor unit.	**6**-15
L18	4-way valve has failure.	**6**-15
P03	Compressor discharge temperature is too high.	**6**-16
P04	High pressure switch is activated.	**6**-17
P05	AC power supply has abnormal.	**6**-18
P08	Refrigerant sensor of the indoor unit or R32 refrigerant leakage detection sensor detected R32 refrigerant.	**6**-19
P14	Refrigerant leakage detection of one of the indoor units connected to the outdoor unit.	**6**-20
P16	Compressor secondary current is overcurrent.	**6**-21
P20	Too high load in refrigerant circuit.	**6**-21
P22	Outdoor unit fan motor has failure.	**6**-22
P29	Compressor start failure. Compressor is missing phase or reverse phase.	**6**-22
J01	R32 refrigerant leakage detection sensor has failure.	-*
J02	Life of refrigerant leak sensor in R32 refrigerant leakage detection sensor has expired.	

*Refer to the Service Manual of indoor Unit.

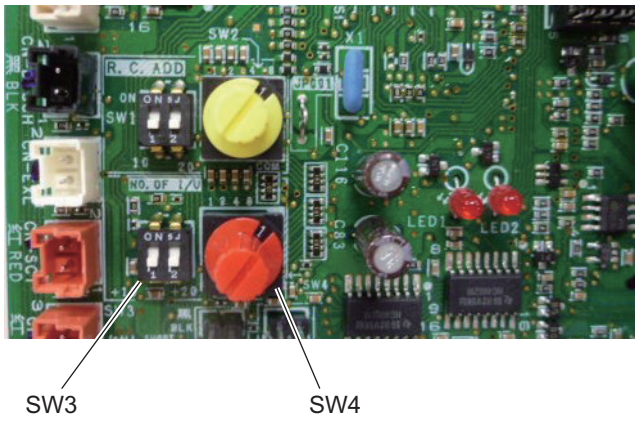
E06 Alarm

Alarm code	E06
Alarm meaning	Outdoor unit failed to receive serial communication signals from indoor unit.
Alarm conditions	Outdoor unit failed to receive serial communication signals from indoor unit.
Probable cause	(1) The indoor unit power was cut OFF after initial communications were completed. (2) An open circuit or short-circuit occurred in the inter-unit control wiring after initial communications were completed.
Check	Check the power at the indoor and outdoor units, and check the inter-unit control wiring.
Correction	—
Example	—
Notes	This alarm is detected after initial communications are completed. Therefore, it does not occur in cases of “disconnected serial connector,” “no terminal unit set,” or other trouble that occurs before initial communications are completed. If initial communications have not been completed, alarm E04 occurs.

E12 Alarm

Alarm code	E12
Alarm meaning	Auto address setting start is prohibited.
Alarm conditions	Auto address setting was started when auto address setting was in progress at another outdoor unit in the same link.
Probable cause	Auto address setting is in progress at another outdoor unit.
Check	This alarm is not displayed on the remote controller. Therefore check the blinking on the Outdoor Unit Control PCB.
Correction	Wait for auto address setting to be completed at the outdoor unit where it is currently in progress. Then start auto address setting again.
Example	—
Notes	—

E15 Alarm

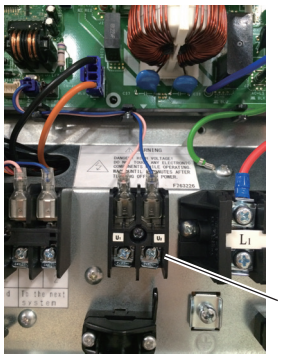
Alarm code	E15
Alarm meaning	Auto address setting alarm (too few units)
Alarm conditions	The number of indoor units was too few when auto address setting was performed.
Probable cause	(1) The number of indoor units set at the indoor unit quantity setting SW (SW3, SW4) on the Outdoor Unit Control PCB is too many. (2) The inter-unit control wiring between indoor units has been cut.
Check	(1) See the section "7. TEST RUN" and check the indoor unit quantity setting SW (SW3, SW4). (2) Check the inter-unit control wiring at the indoor and outdoor units.
Correction	After correcting the indoor unit quantity setting or the inter-unit control wiring, perform auto address setting again.
Example	—
Notes	Switch position 

6

E16 Alarm

Alarm code	**E16**
Alarm meaning	Auto address setting alarm (too many units)
Alarm conditions	• The number of indoor units was too many when auto address setting was performed. • After initial communications were completed, an unrecognized unit was detected.
Probable cause	(1) The number of indoor units set at the indoor unit quantity setting SW (SW3, SW4) on the Outdoor Unit Control PCB is less than the number set. (2) The inter-unit control wiring is wired incorrectly.
Check	(1) See the section "7. TEST RUN" and check the number of indoor units that is set. (2) Check the inter-unit control wiring at the indoor and outdoor units.
Correction	After correcting the indoor unit quantity setting or the inter-unit control wiring, perform auto address setting again.
Example	—
Notes	—

E20 Alarm

Alarm code	**E20**
Alarm meaning	No indoor units at auto address setting.
Alarm conditions	When auto address setting was performed, no indoor units were recognized.
Probable cause	(1) The inter-unit control wiring from the outdoor unit to the indoor units has been cut. (2) Serial wire is disconnected at the outdoor unit. (3) The power is OFF at all indoor units in the system.
Check	(1) Check whether the inter-unit control wiring from the outdoor unit to the indoor units is cut. (2) Check whether serial wire is disconnected at the terminal base. (3) Check the power at the indoor units.
Correction	(1) Reconnect the inter-unit control wire from the outdoor unit to the indoor unit.
Example	—
Notes	Position of serial terminal base 

F04 Alarm

Alarm code	**F04**
Alarm meaning	Compressor discharge temperature sensor has failure. (DISCH)
Alarm conditions	(1) Discharge temp. of 100°C or higher was detected 30 minutes or more after that compressor stopped operating. (2) Discharge temp. of 80°C or higher was detected after all compressors had been stopped for 60 minutes or longer. (3) A/D step is 10 steps or less (short circuit).
Probable cause	(1) Sensor malfunction • Sensor element malfunction • Sensor wiring is partially disconnected, resulting in increased electrical resistance. ☆This alarm does not occur when the wiring is disconnected or when the connector is not connected to the Outdoor Unit Control PCB. (2) Outdoor Unit Control PCB failure (3) The check valve on the discharge tube for that compressor is wet. (4) An air short blockage in the area around the outdoor unit has increased the outdoor unit ambient temperature, reducing the cooling effects after the compressor stops. (5) There is a cause that results in P03 alarm. (6) Electrical noise
Check	(1) Sensor malfunction and Outdoor Unit Control PCB failure Trouble: • Constantly indicates a high temperature. • When monitoring software or other means are used for monitoring, the discharge temperature at times fluctuates suddenly and wildly. • In some cases, the precise temperature may not be known, even when monitoring software is used. Check: • Wiggle the sensor and check whether the trouble continues. • Check whether the connector is partially disconnected from the Outdoor Unit Control PCB. ☆An F04 alarm will not result if the connector is completely disconnected (circuit is open). • If the cause is still uncertain, check the following to determine whether a sensor or Outdoor Unit Control PCB failure has occurred. Step 1: Connect a discharge sensor where the F04 alarm has not occurred, to the connector for this compressor on the Outdoor Unit Control PCB. Measure the temperature at the same point (a location where temperature fluctuations are small), and check whether there is a temperature difference. Difference → Outdoor Unit Control PCB or sensor failure is possible. No difference → Outdoor Unit Control PCB and sensor are normal. Step 2: If an abnormality was found at Step 1, connect the problem compressor sensor to the Outdoor Unit Control PCB connector of a device where the F04 alarm has not occurred. Measure the temperature at the same point (a location where temperature fluctuations are small), and check whether there is a temperature difference. Difference → Sensor failure. No difference → Outdoor Unit Control PCB failure. ☆ It is convenient at this time to have a discharge temperature sensor on hand. (2) The ambient temperature around the outdoor unit when it is stopped is 46 °C or higher. (3) If the cause is still unknown after checking the above, then it is possible that electrical noise is the cause of the trouble. It is necessary to provide a line filter or carry out other noise countermeasures.
Correction	(1) Replace the sensor. (2) Replace the Outdoor Unit Control PCB. (3) Carry out noise countermeasures. (4) Repair the refrigerant tubing. (5) Adjust the amount of refrigerant. (6) Correct the trouble.
Example	(1) Sensor wiring is partially cut.
Notes	This alarm does not indicate that the sensor is disconnected. In order to prevent overheating during operation, the outdoor units in this system will not allow a compressor to start if the discharge temperature does not decrease while the compressor is stopped. If a sensor malfunction results in continuous detection of a high discharge temperature, then the compressor may stop for no apparent reason. The purpose of this alarm is to facilitate identification of the problem in this case.

F06 Alarm

Alarm code	F06
Alarm meaning	Gas temperature sensor trouble at outdoor heat exchanger
Alarm conditions	(1) Short circuit (A/D step is 10 steps or less) (2) Open circuit (A/D step is 1014 steps or more)
Probable cause	(1) Sensor malfunction (including connector) (2) The Outdoor Unit Control PCB malfunction
Check	(1) Measure the sensor resistance. Check that the sensor is operating normally. (2) Use a remote controller monitor or PC monitor to check the temperature that is recognized by the microcomputer.
Correction	—
Example	—
Notes	—

F07 Alarm

Alarm code	F07
Alarm meaning	Liquid temperature sensor trouble at outdoor heat exchanger
Alarm conditions	(1) Short circuit (A/D step is 10 steps or less) (2) Open circuit (A/D step is 1014 steps or more)
Probable cause	(1) Sensor malfunction (including connector) (2) The Outdoor Unit Control PCB malfunction
Check	(1) Measure the sensor resistance. Check that the sensor is operating normally. (2) Use a remote controller monitor or PC monitor to check the temperature that is recognized by the microcomputer.
Correction	—
Example	—
Notes	—

F08 Alarm

Alarm code	F08
Alarm meaning	Outdoor air temperature sensor trouble
Alarm conditions	(1) Short circuit (A/D step is 10 steps or less) (2) Open circuit (A/D step is 1014 steps or more)
Probable cause	(1) Sensor malfunction (including connector) (2) The Outdoor Unit Control PCB malfunction
Check	(1) Measure the sensor resistance. Check that the sensor is operating normally. (2) Use a remote controller monitor or PC monitor to check the temperature that is recognized by the microcomputer.
Correction	—
Example	—
Notes	—

F12 Alarm

Alarm code	F12
Alarm meaning	Compressor intake temperature sensor trouble
Alarm conditions	(1) Short circuit (A/D step is 10 steps or less) (2) Open circuit (A/D step is 1014 steps or more)
Probable cause	(1) Sensor malfunction (including connector) (2) The Outdoor Unit Control PCB malfunction
Check	(1) Measure the sensor resistance. Check that the sensor is operating normally. (2) Use a remote controller monitor or PC monitor to check the temperature that is recognized by the microcomputer.
Correction	—
Example	—
Notes	—

F16 Alarm

Alarm code	**F16**
Alarm meaning	High-pressure sensor malfunction
Alarm conditions	• High-pressure sensor disconnected or open circuit • High-pressure sensor detected over 3.9MPa (In case of renewal setting : 3.15MPa) continuously for 30 minutes while outdoor units stopped. • High-pressure sensor detected over 3.9MPa (In case of renewal setting : 3.15MPa) while outdoor units were operating. (In some cases, start and stop may sometimes repeat due to pre-trip mode.)
Probable cause	(1) High-pressure sensor failure (2) Failure to connect the connector to the Outdoor Unit Control PCB (3) Failure to open the service valve of the outdoor unit (4) Clogged refrigerant circuit (5) Refrigerant over-charging (6) Outdoor Unit Control PCB failure
Check	(1) High-pressure sensor failure • Check the sensor resistance value. (Use a tester and measure the resistance between sensor No. 1 and No. 3) Resistance of less than 95kΩ indicates a short circuit or other trouble. Resistance of 95kΩ - 105kΩ (high pressure sensor pin 1-3) is normal. Resistance of more than 105kΩ indicates an open circuit or other trouble. • Connect a gauge to the high-pressure outlet and check for changes in the value displayed by the monitoring software, and for large deviation of the gauge pressure. • During heating, check whether the temperature is lower than the highest indoor-unit E1 temperature. *The pressure detected by the high-pressure sensor is the highest pressure in the system. Therefore during heating the converted saturation temperature will never be lower than any indoor-unit E1 temperature. During cooling this temperature will never be lower than the outdoor unit liquid temperature. (2) Failure to connect the connector to the Outdoor Unit Control PCB Check the connector connected to the Outdoor Unit Control PCB (3) Failure to open the service valve Check the open/closed status of the service valve. (4) Check for clogging of the refrigerant circuit. (5) Check for refrigerant over-charging. When clogging or over-charging occurs, refrigerant is likely to accumulate in the outdoor unit (cooling) and indoor unit (heating). Sudden rise in pressure at start may sometimes occur. (6) Outdoor Unit Control PCB failure • The check items are the same as for a high-pressure sensor malfunction. A normal PCB is needed to determine whether the problem is a PCB failure or a pressure sensor malfunction. If an abnormality was found at the check items for a high-pressure sensor malfunction, first try replacing the PCB and check again. Trouble is corrected: Outdoor Unit Control PCB failure Trouble is not corrected: High-pressure sensor malfunction
Correction	(1) Replacement of high-pressure sensor When replacing a high-pressure sensor, carry out after refrigerant recovering of outdoor unit. (2) Replacing the Outdoor Unit Control PCB (3) Correct malfunction of refrigerant cycle. • Open valve of outdoor unit. • Correct clogging. • In the case of refrigerant over-charging, recover appropriate amount of refrigerant. ∗ Standards of over-charging Install the pressure gauge at the high-pressure removal port of outdoor units and check for it. During cooling: Not available in case of low outdoor temperature or adjusting the outdoor fan. While both the compressors are operating under 12-step or 13-step in the fan mode, high-pressure's saturation temperature indicates the outdoor temperature + around 15°C. If the temperature is 5°C higher than the said temperature, over-charging might be expected. During heating: There is an indoor unit where refrigerant flow is poor (E1 temperature and discharge temperature are low), and the mechanical valve of that unit is opened to 300 pulses or more, and the E1 temperature is close to room temperature. However be aware that this kind of data results often when there is a height difference between indoor units. Reducing the amount of refrigerant will improve the refrigerant flow, however reducing it too much will increase the likelihood of alarms related to low oil level (scroll-side), the low pressure switch, and discharge temperature. Use caution.
Example	Malfunction had occurred when the liquid, suction and discharge tubes were clogged together.

F17 Alarm

Alarm code	**F17**
Alarm meaning	Low-pressure sensor trouble
Alarm conditions	(1) Sensor short circuit (2) Sensor open circuit
Probable cause	(1) Sensor malfunction (including connector) (2) The Outdoor Unit Control PCB malfunction
Check	(1) Measure the sensor resistance. Check that the sensor is operating normally. (2) Use a remote monitor or a PC monitor to check the temperature that is recognized by the microcomputer.
Correction	—
Example	—
Notes	—

F31 Alarm

Alarm code	**F31**
Alarm meaning	Outdoor unit non-volatile memory (EEPROM) trouble
Alarm conditions	(1) Non-volatile memory is not present when power initialization occurs. (2) Read values do not match after writing to non-volatile memory is complete.
Probable cause	(1) Memory was not inserted after the Outdoor Unit Control PCB was replaced. (2) The lifetime of the non-volatile memory has been reached. (3) Non-volatile memory is installed incorrectly (wrong direction, bent pins, etc.).
Check	(1) Check the non-volatile memory on the Outdoor Unit Control PCB.
Correction	—
Example	—
Notes	—

H01 Alarm

Alarm code	**H01**
Alarm meaning	Compressor primary current is overcurrent.
Alarm conditions	Compressor (INV) primary current detected overcurrent higher than the values (overcurrent) listed in the table below. Horsepower of unit: 8HP: 10HP Current (A): 23.0: 23.0
Probable cause	(1) Wiring failure (2) Power supply voltage malfunction (sudden-voltage-drop) (3)The Outdoor Unit Control PCB or the HIC PCB failure.
Check	(1) Wiring failure Forgot to connect the wires L1, L2, L3. Check whether the terminals are connected correctly. (2) Check the power supply voltage.
Correction	(1) Wiring failure Correct the disconnection and wiring failure. (2) Correct the power supply voltage. (3)Replace the Outdoor Unit Control PCB or the HIC PCB.
Example	—
Notes	—

H03 Alarm

Alarm code	**H03**
Alarm meaning	Compressor current sensor is disconnected or shorted.
Alarm conditions	• When the frequency of compressor (INV) is over 35Hz and the secondary current is over 9.8A, the primary current detected lower than 0.7A. • When the frequency of compressor (INV) is limited by current protection (primary), the primary current detected lower than 0.7A. * No current is detected even though the compressors are operating.
Probable cause	(1) CT failure (2) HIC PCB failure (3) Power supply and voltage malfunction
Check	Check the power supply and voltage. Check whether the voltage between each of the phases is correct while the compressor is running. (It is necessary to check the compressor while running because the voltage may decrease if the compressor starts running.)
Correction	(1) Correct the power supply voltage. Replace the Outdoor Unit Control PCB or the HIC PCB.
Example	—
Notes	—

H05 Alarm

Alarm code	**H05**
Alarm meaning	Compressor discharge temperature sensor disconnected
Alarm conditions	• This alarm occurs when the discharge sensor temperature detector is not inserted into the tube's sensor holder, or when the sensor itself has suffered some kind of malfunction other than a cut wire. • When outdoor air temperature is -10°C or higher: Alarm occurs if the temperature detected by the discharge sensor has changed by less than 2°C when the compressor has operated for 10 minutes immediately after start. • When outdoor air temperature is below -10°C: Alarm occurs if the temperature detected by the discharge sensor has changed by less than 2°C when the compressor has operated for 30 minutes immediately after start.
Probable cause	(1) Discharge sensor temperature detector is not inserted into the tube's sensor holder. (2) Discharge sensor itself has suffered some kind of malfunction other than a cut wire.
Check	(1) Check that the discharge temperature sensor is inserted into the sensor holder. (2) Check that sufficient heat-conducting putty is applied. (3) Remove the discharge sensor from the sensor holder and expose the sensor to the outside air for approximately 5 minutes. Check that the temperature detected by the sensor changes to match the outside air temperature. (However the sensor cannot detect temperatures at or below 0 °C.)
Correction	(1) Install the sensor into the holder, and apply sufficient heat-conducting putty. (2) If the sensor is malfunctioning, replace it.
Example	—

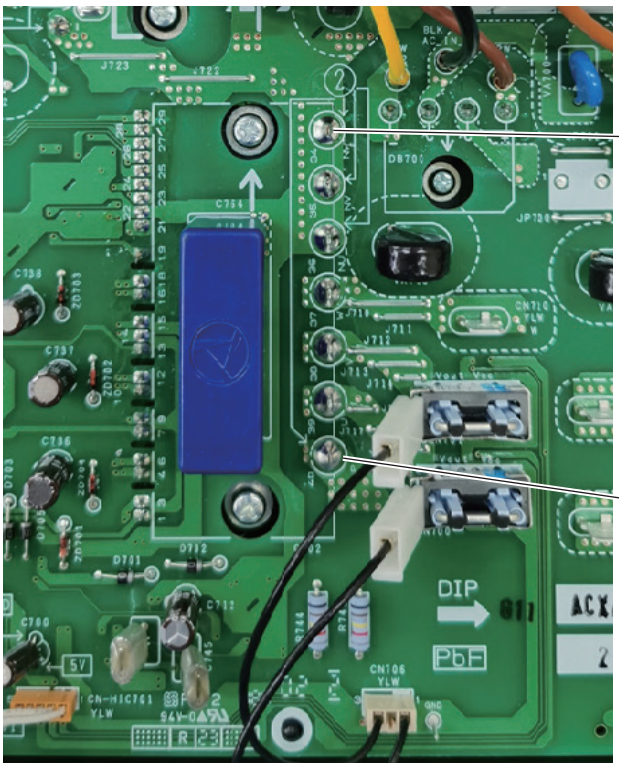
H06 Alarm

Alarm code	**H06**
Alarm meaning	Abnormal decrease of low-pressure
Alarm conditions	• Low-pressure sensor detects lower than 0.06MPa continuously for 2 minutes or lower than 0.02MPa for just a moment.
Probable cause	(1) Low-pressure sensor failure (2) Failure to open the service valve of the outdoor unit (3) Clogged refrigerant circuit (4) Insufficiency of refrigerant gas amount
Check	(1) Low-pressure sensor failure • Remove the socket of low-pressure sensor from the Outdoor Unit Control PCB and measure the resistance of each wire (×3) and between the outdoor unit and earth. If this resistance is more than 1MΩ, it indicates normal. If not, replace the sensor. • Connect a gauge to the low-pressure outlet and check for changes in the value displayed by the monitoring software, and for large deviation of the gauge pressure. (2) Failure to open the service valve of the outdoor unit Check the open/closed status of the service valve. (3) Check for clogging of the refrigerant circuit. When clogging in the refrigerant circuit occurs, refrigerant does not return to the compressor. As a result, low-pressure may occasionally decrease abnormally. Then check the following points: Solenoid valve, expansion valve, fleezing caused by contaminated water inside the circuit, etc. (4) Insufficiency of refrigerant gas When insufficiency of refrigerant charge amount or of refrigerant amount in the system caused by gas leakage occurs, low-pressure may occasionally decrease abnormally.
Correction	(1) Replacement of low-pressure sensor When replacing a low-pressure sensor, carry out after refrigerant recovering of outdoor unit. (2) Correct malfunction of refrigerant cycle. • Open valve of outdoor unit. • Correct clogging. • Dissolve insufficiency of refrigerant gas (Correction of gas leakage area, additional refrigerant, etc.) * When charging additionally because of refrigerant insufficiency, add each 500g of refrigerant little by little.
Example	• The alarm had occurred because of refrigerant insufficiency due to gas leak. • The alarm had occurred when the liquid, suction and discharge tubes were clogged together.

H08 Alarm

Alarm code	H08
Alarm meaning	Compressor oil sensor (connection) trouble
Alarm conditions	This alarm occurs when a connector connection (pins 1 and 3 for compressor) is open.
Probable cause	Disconnected connector
Check	Check that the connector is securely connected.
Correction	(1) Connect the connector.
Example	—
Notes	

H31 Alarm

Alarm code	**H31**
Alarm meaning	Compressor HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.
Alarm conditions	This alarm occurs when the microcomputer identifies a trouble signal (indicating abnormal HIC temperature or other trouble) from the HIC. The HIC judges the current and temperature, and outputs the trouble signal. In general this indicates trouble with the HIC itself.
Probable cause	(1) Power supply voltage malfunction (2) Overcurrent HIC caused the HIC failure by abnormal temperature.
Check	(1) Check the power supply and voltage. Check whether the voltage between each of the phases is correct while the compressor is running. (It is necessary to check the compressor while running because the voltage may decrease when the compressor starts running.) (2) Right or wrong decision of HIC PCB IPM Carry out the judgement of HIC PCB IPM in the following method. If the result of measurement shows the resistance value of the fault diagnosis, replace the HIC PCB. ■ Right or wrong decision of HIC PCB IPM Measure the resistance value between the + side (P) and - side (NW) of the HIC PCB. • Use the analogue tester when measuring. Measure by the kΩ-range. • Measure as single item PCB. (Remove the wires, etc.) • Measure as terminal part. (See the figure.) Resistance value of fault diagnosis: Less than 1kΩ (3) Radiation failure of HIC. Check the follows. • Confirm that radiation surface of the rear HIC PCB and the radiation plate of the electrical component box contact properly. Putty of thermal conductivity is properly adhered. • No screws loose. • Cooling air flows properly through the rear radiation plate of the electrical component box (fin part). (Clogged in the airflow, etc.) HIC PCB 
Correction	(1) Correct the power supply voltage. (2) HIC failure and PCB replacement (3) Improve the HIC radiation failure. Additional description is required in the manual. (4) Replace the Outdoor Unit Control PCB.
Example	—
Notes	Disconnect the power supply.

L04 Alarm

Alarm code	**L04**
Alarm meaning	Outdoor system address duplication
Alarm conditions	Communication by inter-unit control wiring was received that contained the same address as that unit 5 times or more within 3 minutes.
Probable cause	Incorrect outdoor system address settings
Check	Check the system address settings again.
Correction	Correct the system address settings.
Example	—
Notes	Recovery from this alarm occurs automatically (when communication that contains the same address as that unit is not received for 3 minutes after detection).

L10 Alarm

Alarm code	**L10**
Alarm meaning	Outdoor unit capacity not set
Alarm conditions	The outdoor unit capacity has not been set, or the setting is not allowed by the system.
Probable cause	This alarm occurs because the capacity has not been set.
Check	Connect the outdoor unit maintenance remote controller. On the outdoor unit EEPROM detailed setting mode screen, check the value for the outdoor unit capacity (item code 81). Check that it is not set to “0” or to a capacity that is not allowed.
Correction	If item code 81 is incorrect, use the outdoor unit maintenance remote controller and set it correctly. * After changing the setting, be sure to reset both the indoor and outdoor power.
Example	—
Notes	The outdoor unit maintenance remote controller is required in order to set the capacity in the outdoor unit EEPROM.

L13 Alarm

Alarm code	**L13**
Alarm meaning	Indoor unit model mismatch.
Alarm conditions	Indoor unit other than R32 refrigerant models is connected.
Probable cause	A Indoor unit that uses R410A, R407C, or R22 refrigerant was connected by mistake.
Check	Check the refrigerant type at the connected Indoor unit.
Correction	Replace the indoor unit with the R32 type indoor unit.
Example	—
Notes	—

L18 Alarm

Alarm code	**L18**
Alarm meaning	4-way valve operation failure
Alarm conditions	During heating operation (Comp. ON), the detected temperature at an outdoor unit heat exchanger (EXL) was 20°C or more above the outdoor air temperature (Air Temp.) continuously for 15 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.
Probable cause	(1) The 4-way valve connector (20S) has become disconnected from the Outdoor Unit Control PCB. (2) The 4-way valve circuit is locked (malfunctioning).
Check	(1) Check the 4-way valve connector (20S). (2) If the connector is normal, check the 4-way valve wiring and the Outdoor Unit Control PCB circuit.
Correction	If the connector is normal, correct or replace the problem locations.
Example	—
Notes	—

P03 Alarm

Alarm code	**P03**
Alarm meaning	Compressor discharge temperature trouble
Alarm conditions	Compressor : Pre-trip stops when the temperature exceeds 106°C. * The alarm occurs when pre-trip stop occurs more than once. However, the pre-trip counter is cleared if the compressor operates continuously for a specified length of time (more than 2.5 minutes).
Probable cause	(1) Insufficient amount of refrigerant (including trouble resulting from an insufficient initial charge and from gas leakage) (2) Blocking of low-pressure parts caused by intrusion of foreign objects (moisture, scale, etc.) (3) Malfunction of expansion valves (MOV1, MOV2) (4) Compressor discharge sensor failure (5) Outdoor Unit Control PCB failure (6) Failure to open the service valve of the outdoor unit (7) Electrical noise
Check	(1) Insufficient refrigerant Trouble: Liquid effectiveness is poor. Check: Check whether or not the superheating temperature is declining if the expansion valves (MOV1, MOV2) are opened to 300 pulses or more (after checking for foreign object intrusion). (2) Sensor failure Check: • This alarm is likely to occur when wiring is partially cut. (It is difficult to identify, even when continuity is checked.) The detected discharge temperature is high. • Replace the sensor with another discharge sensor and compare the temperature conditions. (3) Failure to open the service valve of the outdoor unit Check open/closed status of the outdoor unit service valve. (4) If the cause is still unknown after checking the above, there is possibility that electrical noise is the cause of the trouble.
Correction	(1) Replace the sensor. (2) Replace the Outdoor Unit Control PCB. (3) Correct the problem locations.
Example	All of the probable causes

P04 Alarm

Alarm code	**P04**
Alarm meaning	High-pressure switch activated.
Alarm conditions	The operation of the electronic circuit in the high-pressure switch may short-circuit the terminal depending on the pressure. A pressure of 4.15 MPa or above will short-circuit the terminal. Once the terminal is short-circuited, it will remain in that state until the pressure goes below 3.05 MPa.
Probable cause	(1) High-pressure switch failure or wiring connection failure (2) Failure to open the service valve of the outdoor unit (3) Difference of characteristics of high-pressure sensor (4) Clogging of the outdoor heat exchanger during cooling (5) Air short circuit occurs during cooling. (6) Failure of the outdoor fan during cooling (7) Clogging of the air filter in the indoor unit during heating (8) Air short circuit occurs during heating. (9) Failure of the indoor fan during heating (10) Clogging of the refrigerant circuit (11) Failure of the expansion valve (12) Failure of the solenoid valve kit (13) Too much refrigerant has been charged. (14) The wiring from the solenoid valve kit is actually connected to the different indoor unit. (15) The system is that the multiple indoor units are connected at only one solenoid valve kit and also multiple remote controllers are connected. "Installation of the common use solenoid valve kit" from a PC has not been made.
Check	(1) High-pressure switch failure or wiring connection failure • Check under the section 6. "Inspection and Characteristics of Parts (1) High-pressure switch". • Check whether the socket of the high-pressure switch is surely inserted into the Outdoor Unit Control PCB. (2) Failure to open the service valve of the outdoor unit. • Check open/closed status of the outdoor unit service valve. (3) Difference of characteristics of high-pressure sensor • Connect a gauge to the high-pressure outlet and check for changes in the value displayed by the monitoring software, and for large deviation of the gauge pressure. (4) During cooling, check whether the outdoor unit heat exchanger is clogged. Remove any foreign material that prevents ventilation. (5) During cooling, check whether an air short blockage has occurred in the outdoor unit. The system is operating normally unless the temperature around the outdoor unit is excessively high. (6) During cooling, check for outdoor fan failure. Check whether the screws securing the fan are loose and whether the fan connector in the outdoor unit PCB is properly connected. (7) During heating, check whether the air filters in the indoor unit are clogged. If clogged, clean the filters. (8) During heating, check whether an air short blockage has occurred in the indoor unit. The system operates normally unless the temperature around the indoor unit is excessively high. (9) During heating, check for indoor fan failure. (10) Check whether the refrigerant circuit is clogged. Check that all service valves are closed. Check whether welded locations are clogged. (11) Check for expansion valve failure. Check whether the expansion valves make a clattering sound when the power is reset. Since the expansion valve in the indoor unit is in a location that makes aural inspection difficult, use an electric means to check. Check that the connector pin of the expansion valve on the PCB outputs 4 V. In addition, check that the coil resistance of the expansion valve is several tens of Ohm (Ω). (12) Check for solenoid valve kit failure. Removing a coil that is on will result in a clicking sound. Also, removing a coil that is off will not produce such a sound. (13) Check whether too much refrigerant has been charged. Too much refrigerant has been charged if the sub-cool temperature of the condenser is 15°C or more. (14) Check whether the wiring from the solenoid valve kit is actually connected to the different indoor unit. (15) The system is that the multiple indoor units are connected at only one solenoid valve kit and also multiple remote controllers are connected. Check whether "installation of the common use solenoid valve kit" from a PC has been made. (Confirmation from the address setting software of a PC)
Correction	Replace damaged components and correct the amount of charged refrigerant.

P05 Alarm

Alarm code	**P05**
Alarm meaning	AC power supply has abnormal.
Alarm conditions	AC power supply trouble.
Probable cause	(1) Instantaneous blackout (2) Zero-cross (waveform input of power supply) error (3) DC voltage charge failure
Check	(1) Check the power supply and power wiring. (2) Check the wiring. Check whether each wiring is missing or connector is damaged.
Correction	(1) Correct the power supply and power wiring. (2) Correct the wiring failure. (3) Replace the Outdoor Unit Control PCB or the HIC PCB.
Example	Miswiring occurred when replacing the compressor or HIC PCB.
Notes	—

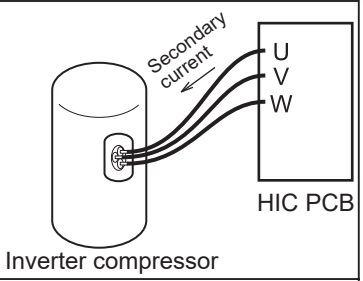
P08 Alarm

Alarm code	P08
Alarm meaning	R32 refrigerant leak detection
Alarm conditions	Refrigerant sensor of the indoor unit or R32 refrigerant leakage detection sensor detected R32 refrigerant.
Probable cause	(1) Connection failure on "Refrigerant tube connection part", or refrigerant leakage caused by crack on "Indoor unit's inside tube" or "Refrigerant tube between indoor and outdoor units" (2) Using gases may cause false detection.
Check	(1) Check "Refrigerant tube connection part", "Indoor unit's inside tube" or "Refrigerant tube between indoor and outdoor units". (2) Check if one of the following items is in use that causes false detection. •Gas appliances with combustible gas (propane, methane) •Insecticide or hair spray with combustible gas (LPG, etc.) •Spray contained siloxane, medicines, drugs, lacquer, etc. ■ If the alarm P08 occurs, the indoor unit fan starts driving in order to prevent refrigerant retention and will not stop despite pressing the Start/Stop button. In the event of stopping the fan for sake of the investigation of the causes and repairing the refrigerant leak area, turn off the power after ventilating the room sufficiently.
Correction	(1) Ventilate the room sufficiently and repair the refrigerant leak area. (2) Stop using the items that are suspected to cause false detection and remove them with the ventilation system. When the refrigerant leak problem is solved, carry out the following procedures. ■ Replace the present refrigerant sensor with a new one in the following steps. (If the refrigerant sensor detects the refrigerant leak once, detection performance decreases.) ◇ In the case of R32 refrigerant leakage detection sensor: •Replace the refrigerant sensor in the refrigerant leakage detection sensor with a new one. •Reset the refrigerant sensor accumulated energization timer by pressing the switch of R32 refrigerant leakage detection sensor. As to the procedure for refrigerant sensor replacement and resetting the accumulated energization timer, refer to the Service Manual of indoor Unit. ◇In the case of indoor unit with a built-in refrigerant sensor: •Replace the refrigerant sensor in the indoor unit with a new one. (The unit with 2 refrigerant sensors must be replaced with both of them.) •Change Detailed Setting Code 97 to "2" with the remote controller. → Reset the refrigerant sensor accumulated energization time. (After resetting, Code 97 automatically returns "0".) As to the procedure for refrigerant sensor replacement, refer to the Service Manual of indoor Unit. ■ Cancel the alarm P08 in the following steps. (The alarm P08 cannot be cancelled despite switching the power ON/OFF of the indoor unit.) •Change Detailed Setting Code 97 to "3" with the remote controller. → Cancel the alarm. (After alarm cancellation, the code automatically returns to the original number.) * At first, replace the refrigerant sensor with a new one without fail. Then, cancel the alarm. ■ Check the following points whether the refrigerant sensor functions properly. •Ensure that the inspection mark and alarm code do not appear on the remote controller. •As to R32 refrigerant leakage detection sensor, the LED lights up in a normal mode. (Operation LED only lights up.)
Example	—
Notes	■ R32 refrigerant leakage detection sensor •In normal operation mode Operation LED (Green) : Light up, Alarm LED (Red) : Light off •When refrigerant leak detected Operation LED (Green) : Light off, Alarm LED (Red) : Blinking, Alarm buzzer : ON * When the refrigerant concentration decreases, the LED of external sensor unit returns to normal and the alarm buzzer stops. However, the alarm P08 of the indoor unit cannot be cancelled.

P14 Alarm

Alarm code	P14
Alarm meaning	R32 refrigerant leak detection
Alarm conditions	One of the indoor units connected to the outdoor unit has detected R32 refrigerant leak.
Probable cause	(1) Connection failure on "Refrigerant tube connection part", or refrigerant leakage caused by crack on "Indoor unit's inside tube" or "Refrigerant tube between indoor and outdoor units" (2) Using gases may cause false detection.
Check	(1) Identify the indoor unit that detected the refrigerant leak and issues the P08 alarm. (2) Check "Refrigerant tube connection part", "Indoor unit's inside tube" or "Refrigerant tube between indoor and outdoor units". (3) Check if one of the following items is in use that causes false detection. •Gas appliances with combustible gas (propane, methane) •Insecticide or hair spray with combustible gas (LPG, etc.) •Spray contained siloxane, medicines, drugs, lacquer, etc. ■ If the alarm P08 occurs, the indoor unit fan starts driving in order to prevent refrigerant retention and will not stop despite pressing the Start/Stop button. In the event of stopping the fan for sake of the investigation of the causes and repairing the refrigerant leak area, turn off the power after ventilating the room sufficiently.
Correction	(1) Ventilate the room sufficiently and repair the refrigerant leak area. (2) Stop using the items that are suspected to cause false detection and remove them with the ventilation system. When the refrigerant leak problem is solved, carry out the following procedures. ■ Replace the present refrigerant sensor with a new one in the following steps. (If the refrigerant sensor detects the refrigerant leak once, detection performance decreases.) ◇ In the case of R32 refrigerant leakage detection sensor: •Replace the refrigerant sensor in the refrigerant leakage detection sensor with a new one. •Reset the refrigerant sensor accumulated energization timer by pressing the switch of R32 refrigerant leakage detection sensor. As to the procedure for refrigerant sensor replacement and resetting the accumulated energization timer, refer to the Service Manual of indoor Unit. ◇In the case of indoor unit with a built-in refrigerant sensor: •Replace the refrigerant sensor in the indoor unit with a new one. (The unit with 2 refrigerant sensors must be replaced with both of them.) •Change Detailed Setting Code 97 to "2" with the remote controller. ⟶ Reset the refrigerant sensor accumulated energization time. (After resetting, Code 97 automatically returns "0".) As to the procedure for refrigerant sensor replacement, refer to the Service Manual of indoor Unit. ■ Cancel the alarm P08 in the following steps. (The alarm P08 cannot be cancelled despite switching the power ON/OFF of the indoor unit.) •Change Detailed Setting Code 97 to "3" with the remote controller. ⟶ Cancel the alarm. (After alarm cancellation, the code automatically returns to the original number.) * At first, replace the refrigerant sensor with a new one without fail. Then, cancel the alarm. ■ Check the following points whether the refrigerant sensor functions properly. •Ensure that the inspection mark and alarm code do not appear on the remote controller. •As to R32 refrigerant leakage detection sensor, the LED lights up in a normal mode. (Operation LED only lights up.) Turn the outdoor unit power off and on.
Example	—
Notes	When P08 alarm occurs at the indoor unit, P14 alarm occurs at the outdoor unit.

P16 Alarm

Alarm code	**P16**
Alarm meaning	Compressor secondary current is overcurrent.
Alarm conditions	This alarm occurs when current trouble or current detection trouble occur (when trouble judgement current is detected in the secondary current). * Changed to output error by current regardless of the inverter frequency. When more than the current values shown in the table are instantly detected in the secondary current. Secondary current Capacity of unit: 8HP: 10HP Current (A): 24.3: 24.3 
Probable cause	(1) Power supply voltage malfunction (2) Wiring failure (connection failure, miswiring) * Wiring between HIC PCB and compressor
Check	(1) Check the power supply voltage. Check whether the voltage between each of the phases is correct while the compressor is running. (It is necessary to check the compressor while running because the voltage may decrease when the compressor starts running.) (2) Check the wiring. Check whether the following wiring is missing, connection failure or miswiring (position of U, V, W is properly placed). • Wiring between HIC PCB and compressor • HIC PCB side • Compressor side
Correction	(1) Correct the power supply voltage. (2) Correct the wiring. (3) Replace the compressor or the HIC PCB.
Example	—
Notes	—

P20 Alarm

Alarm code	**P20**
Alarm meaning	High load alarm
Alarm conditions	The high pressure increase is not rapid but the alarm occurs when the horsepower down does not meet the anticipated time.
Probable cause	(1) Forgot to open the valve. (2) Operation failure of mechanical valve (3) Idle away of outdoor fan
Check	Check the valve, mechanical valve and outdoor fan.
Correction	—
Example	—
Notes	—

P22 Alarm

Alarm code	**P22**
Alarm meaning	Outdoor unit fan motor has failure.
Alarm conditions	Fan motor start failure, fan motor Hall IC input failure
Probable cause	(1) Wiring failure (2) Outdoor Unit Control PCB failure (3) Fan failure (4) Fan motor failure
Check	(1) Wiring check 1-1 Are the connectors "CN-FM_UP" and "CN-FM_LO" firmly connected to the Outdoor Unit Control PCB (lock engaged)? If “Yes”, see “2-1”. If “No”, correct the connector connections. (2) Outdoor fan motor check 2-1 Disconnect the connectors "CN-FM_UP" and "CN-FM_LO" from the Outdoor Unit Control PCB and rotate the outdoor fan by hand ; does it rotate freely? (Check the outdoor fan motor lock) If “Yes”, see “3-1”. If “No”, replace the outdoor fan motor. (3) Outdoor control PC board check 3-1 Turn the power on and run the unit again; is P22 triggered again? Or can you see or hear anything that is obviously wrong in its rotation? If “Yes”, see “3-2”. If “No”, see “3-3”. 3-2 Replace the Outdoor Unit Control PCB. 3-3 If there is nothing particularly out of the ordinary, see what happens.
Correction	(1) Correct the wiring. (2) Remove the obstacles attached to the fan. (3) Replace the fan motor. (4) Replace the Outdoor Unit Control PCB.
Example	—
Notes	Turn OFF the power, and check the continuity of “+” and “–” on the Outdoor Unit Control PCB.

P29 Alarm

Alarm code	P29
Alarm meaning	Compressor start failure. Compressor is missing phase or reverse phase.
Alarm conditions	This alarm may occur at start, and occurs when open phase or lock alarm is detected or the compressor is in reversed-phase, and when a DCCT failure occurs.
Probable cause	(1) Power supply voltage malfunction (2) Wiring failure (missing, connection failure, miswiring, reversed-phase) * Wiring between the HIC PCB and compressor
Check	(1) Check the power supply and voltage. Check whether the voltage between each of the phases is correct while the compressor is running. (It is necessary to check the compressor while running because the voltage may decrease when the compressor starts running.) (2) Check the wiring. Check whether the following wiring is missing, connection failure or miswiring (position of U, V, W is properly placed). •Wiring between the HIC PCB and compressor •HIC PCB side •Compressor side
Correction	(1) Correct the power supply voltage. (2) Correct the wiring. (3) Replace the HIC PCB. (4) Replace the compressor.
Example	—

(1) High-Pressure Switch (63PH)

63PH	Disconnect the CN-63PH connector (3P, red) from the outdoor unit control panel. Measure the resistance between socket pins 1 and 3. The resistance is OK if the result is 0 Ω.

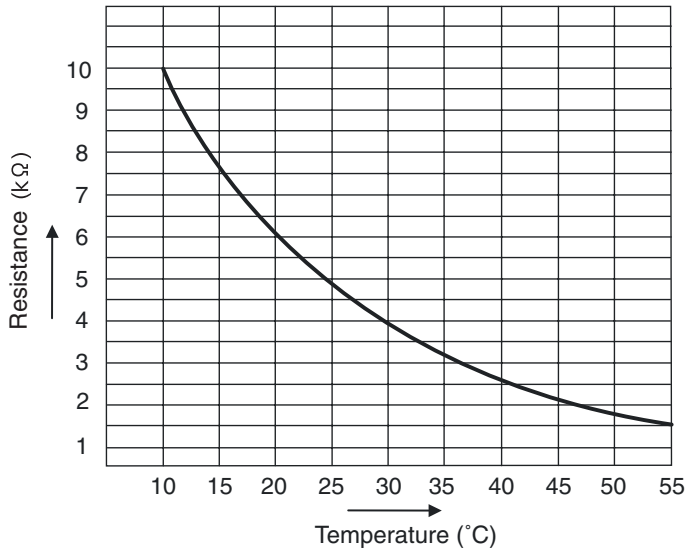
(2) Electronic Control Valve (MOV1, MOV4)
After removing the connector from the PCB, use the following methods to check the valves.

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.) When the voltage is normal, measure the resistance between each pair of pins on the electronic control valve connector. The connector is normal if all results (pin 5 – pin 1, pin 5 – pin 2, pin 5 – pin 3, pin 5 – pin 4) are approximately 46Ω. (If the results are 0Ω or ∞, replace the coil.)
MOV4	Measure the voltage between plug pin 5 and pins 1 through 4 at the CN-MOV4 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.) When the voltage is normal, measure the resistance between each pair of pins on the electronic control valve connector. The connector is normal if all results (pin 5 – pin 1, pin 5 – pin 2, pin 5 – pin 3, pin 5 – pin 4) are approximately 46Ω. (If the results are 0Ω or ∞, replace the coil.)

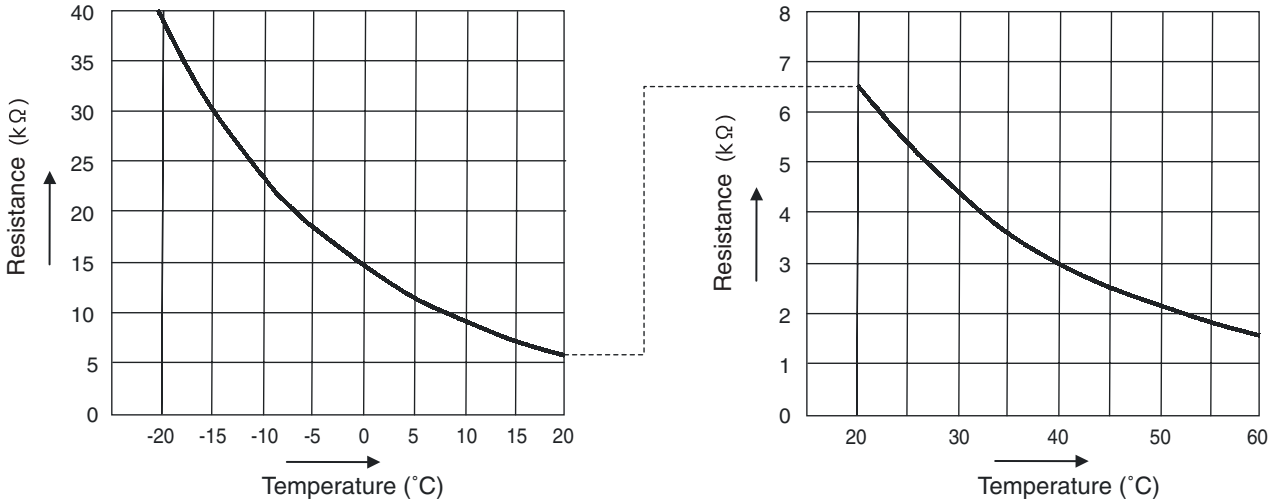
(3) Crankcase Heater

- Check the resistance of crankcase heater using a tester.
  Under the value under the temperature 20°C, the result shows 1729 ± 7% Ω.

(4) Indoor suction air (room) temp. sensor (TA)
Indoor discharge air temp. sensor (BL)



(5) Indoor coil temp. sensor (E1, E3)



6

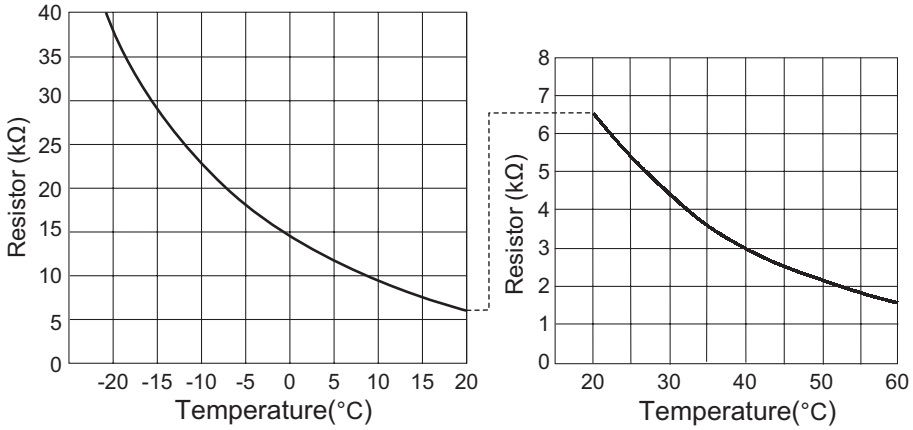
(6) Coil Resistance of Compressor Motor

unit : ohm

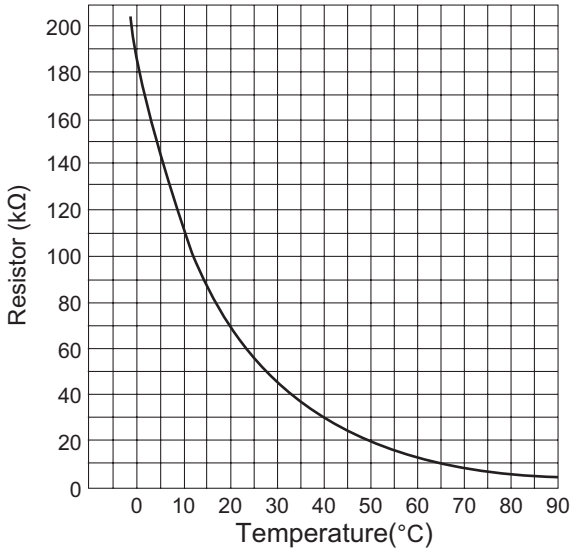
Compressor Type	9VD650XAA21	
Resistance (at 20°C)	U - V	0.735
	U - W	0.715
	V - W	0.715

(7) Characteristics of Sensor

- Outdoor air temp. sensor (TO)
- Compressor intake temp. sensor (SCT)
- Outdoor coil liquid temp. sensor (EXL)
- Outdoor coil gas temp. sensor (EXG)
- Temp. sensor at refrigerant gas outlet of dual-tube (SCG)



- Compressor discharge gas temp. sensor (DISCH)



6

When the test pin on the outdoor unit control PCB is short-circuited, each part can be operated individually.

- After turning OFF the main unit power, short-circuit the test pin (black), then turn the power back ON. Output is performed in the sequence shown in the table below, for 0.5 seconds each.

	Output	Operation		Output	Operation
1	Relay RY2	4-way valve (20s)	3	Relay RY3	Crankcase heater (CH)
2	Relay RY5	Oil recovery valve (ORVR)	4	Relay RY1	O_2 (OPTION)

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.	Yes	Adjust setting temperature
			No	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 (E3) in brown, air outlet (BL) in green	Yes	Connect correctly
			No	1-3
	1-3	DISP (display mode) is applied.	Yes	Turn OFF(OPEN)
			No	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.)	Yes	Choose one of 0 to 6
			No	1-5
	1-5	EXCT(demand control) is applied.	Yes	Turn OFF(OPEN)
			No	2-1
2 Outdoor control PC board	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.)	Yes	See operational status
			No	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.)	Yes	Replace discharge temperature sensor
			No	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.)	Yes	Increase values (over 70)
			No	2-4
	2-4	DEMAND or EXCT(demand control) is applied.	Yes	Turn OFF(OPEN)
			No	3-1
3 Control equipment	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
			No	4-1
4 System	4-1	When operating in cooling (including auto cooling & heating) and dry mode, lowest temp. of indoor E1 and E3 sensor is less than 2°C (under anti-freeze control).	Yes	Wait until more than 2°C reaches
			No	4-2
	4-2	During defrosting operation	Yes	Wait for a few minutes to 10 minutes or so
			No	4-3
	4-3	Outdoor unit PC board failure → Replacement		

- According to the type of models, the indoor sensors will not be supplied in some cases.
- According to the type of models, 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.

7. TEST RUN

1. Preparing for Test Run

- **Before attempting to start the air conditioner, check the following.**

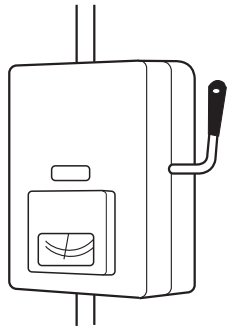
(1) All loose matter is removed from the cabinet especially steel filings, bits of wire, and clips.

(2) The control wiring is correctly connected and all electrical connections are tight.

(3) The protective spacers for the compressor used for transportation have been removed. If not, remove them now.

(4) The transportation pads for the indoor fan have been removed. If not, remove them now.

(5) The power has been connected to the unit for at least 5 hours before starting the compressor. The bottom of the compressor should be warm to the touch and the crankcase heater around the feet of the compressor should be hot to the touch.

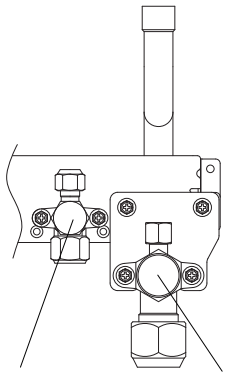


ON

(Power must be turned ON at least 5 hours before attempting test run)

Power mains switch

(6) Both the gas and liquid tube service valves are open. If not, open them now.



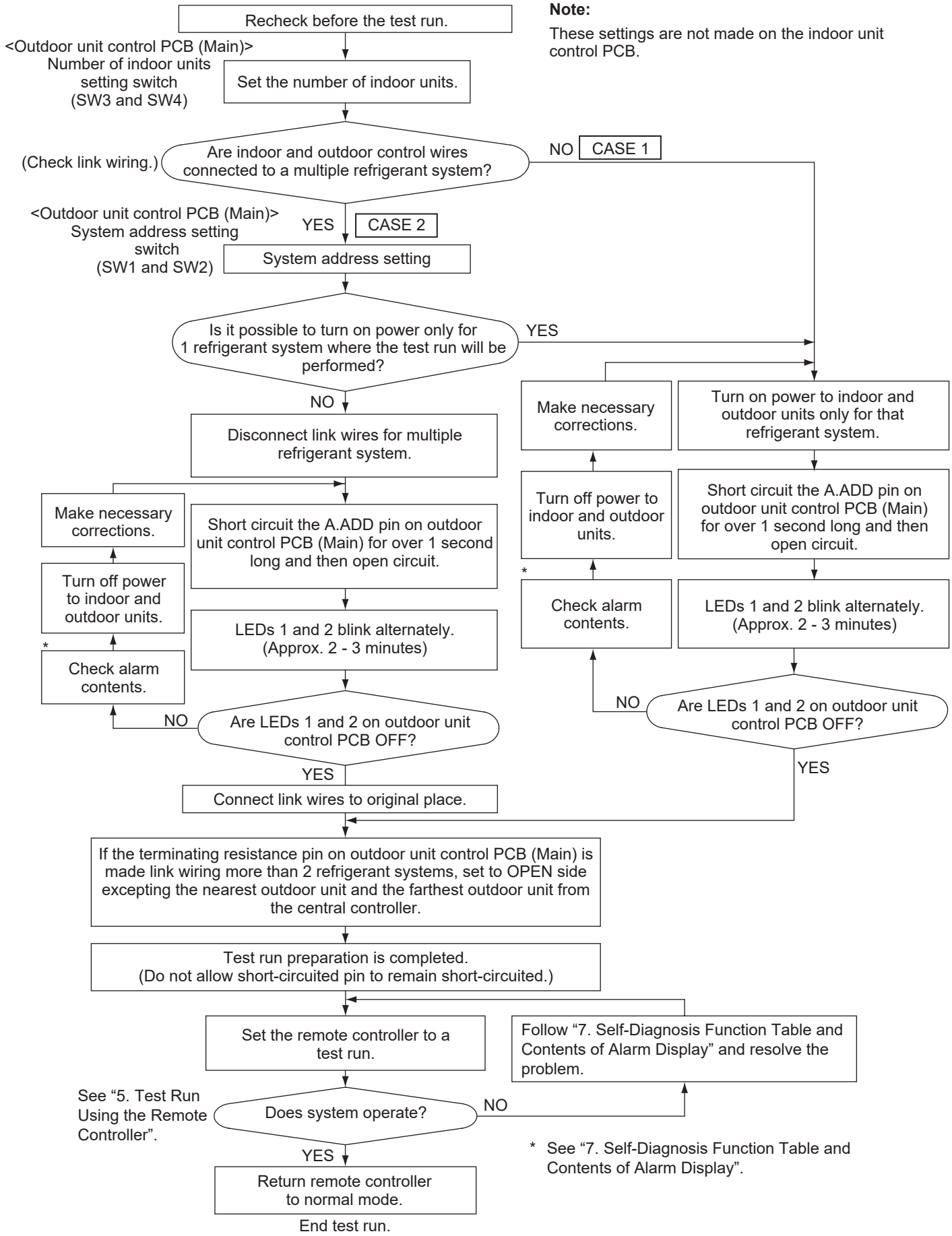
Liquid tube Gas tube

(7) Request that the customer be present for the test run. Explain the contents of the operating instructions, then have the customer actually operate the system.

(8) Be sure to give the operating instructions and installation instructions to the customer.

(9) When replacing the outdoor unit control PCB, be sure to make all the same settings on the new outdoor unit control PCB as were in use before replacement.
The existing EEPROM is not changed, and is connected to the new outdoor unit control PCB.

2. Test Run Procedure



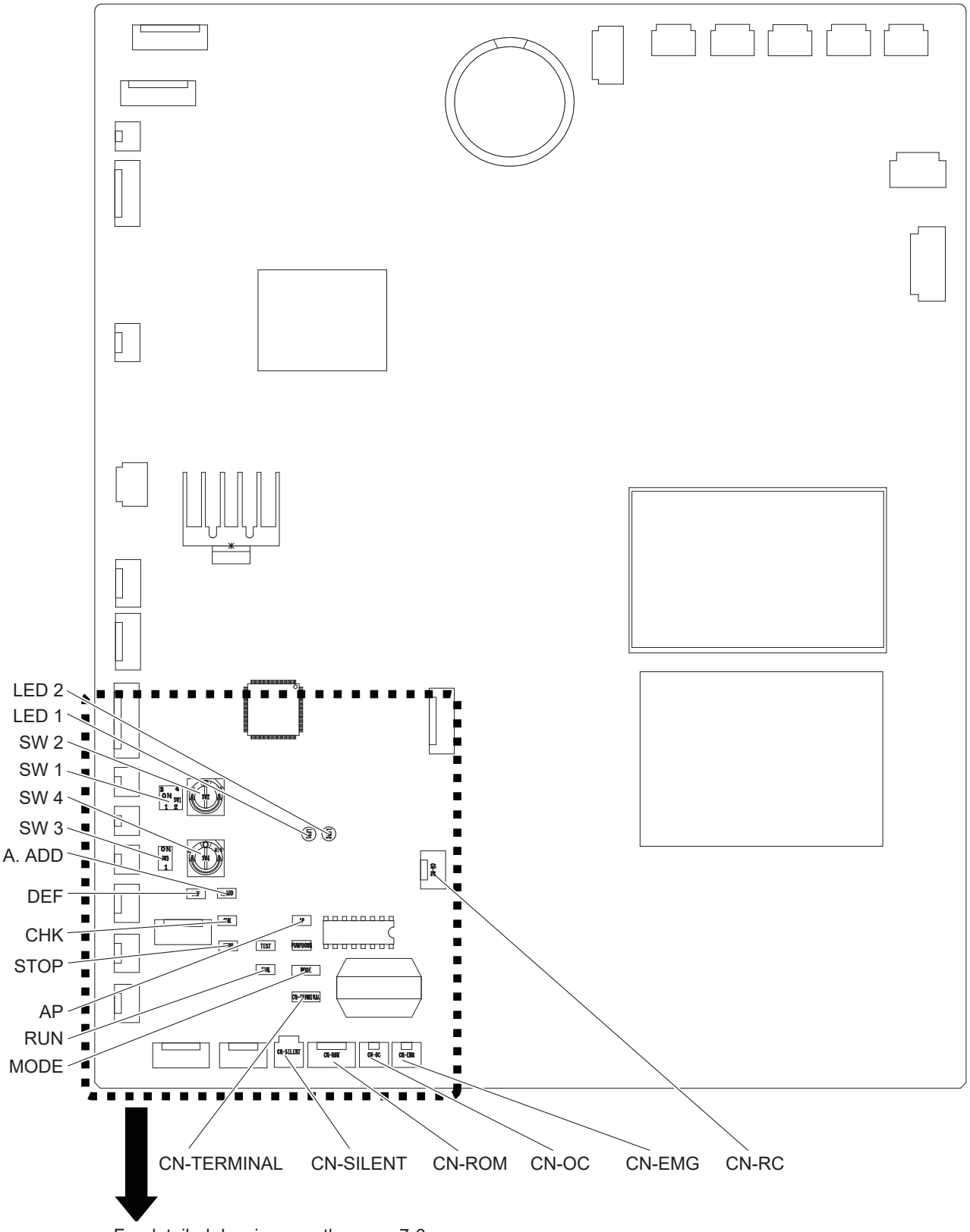
Note:

These settings are not made on the indoor unit control PCB.

* See “7. Self-Diagnosis Function Table and Contents of Alarm Display”.

7

3. Outdoor Unit Control PCB Setting



For detailed drawing, see the page 7-6.

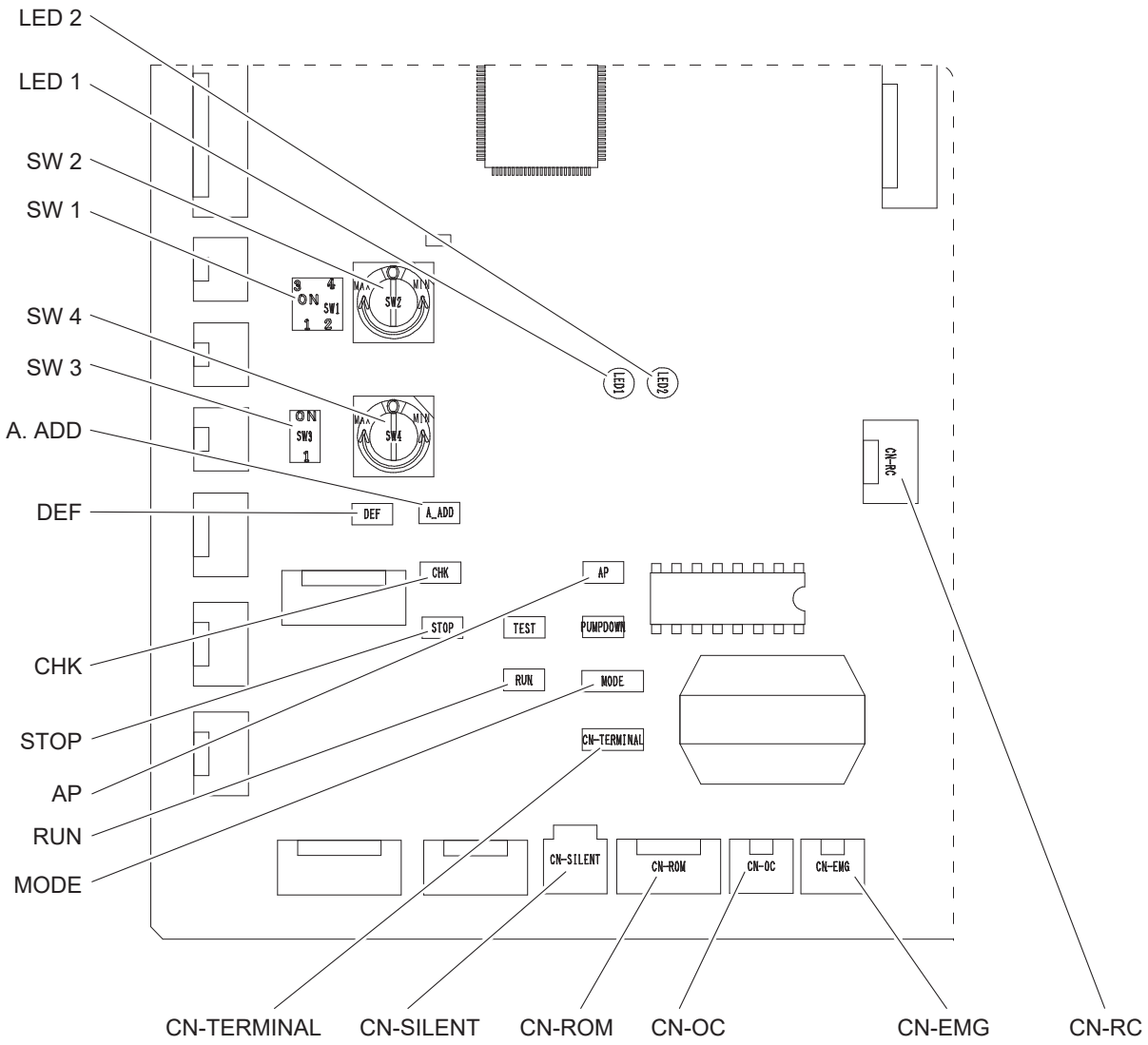
● **Examples of the number of indoor units settings (SW3, SW4)**

Number of indoor units	Indoor unit setting (SW3) (1P DIP switch) 10	Indoor unit setting (SW4) (Rotary switch)
1 - 9 unit (factory setting : 1 unit)	OFF ⇕ ON 	 Set to 1 - 9
10 - 16 unit	ON ⇕ ON 	 Set to 0 - 6

DO NOT exceed the maximum number of indoor units when making connections.
The indoor unit address setting should also be set less than “16”.
In the event of setting more than “17”, the communication cannot be made between the outdoor and indoor units.

● **Examples of refrigerant circuit address settings (required when link wiring is used) (SW1, SW2)**

System address No.	System address (SW1) (2P DIP switch) 10 20	System address (SW2) (Rotary switch)
System 1 (factory setting)	Both OFF ⇕ ON 	 Set to 1
System 11	1 ON ⇕ ON 	 Set to 1
System 21	2 ON ⇕ ON 	 Set to 1
System 30	Both ON ⇕ ON 	 Set to 0


LED 2
LED 1
SW 2
SW 1
SW 4
SW 3
A. ADD
DEF
CHK
STOP
AP
RUN
MODE
CN-TERMINAL
CN-SILENT
CN-ROM
CN-OC
CN-EMG
CN-RC
LED1
LED2
SW1
SW2
SW3
SW4
DEF
A_ADD
CHK
STOP
TEST
AP
PUMPDOWN
RUN
MODE
CN-TERMINAL
CN-SILENT
CN-ROM
CN-OC
CN-EMG
CN-RC

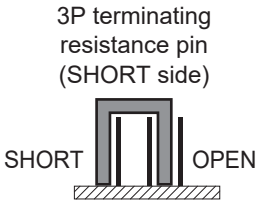
● **Name and Function of Each Switch on Outdoor Unit Control PCB**

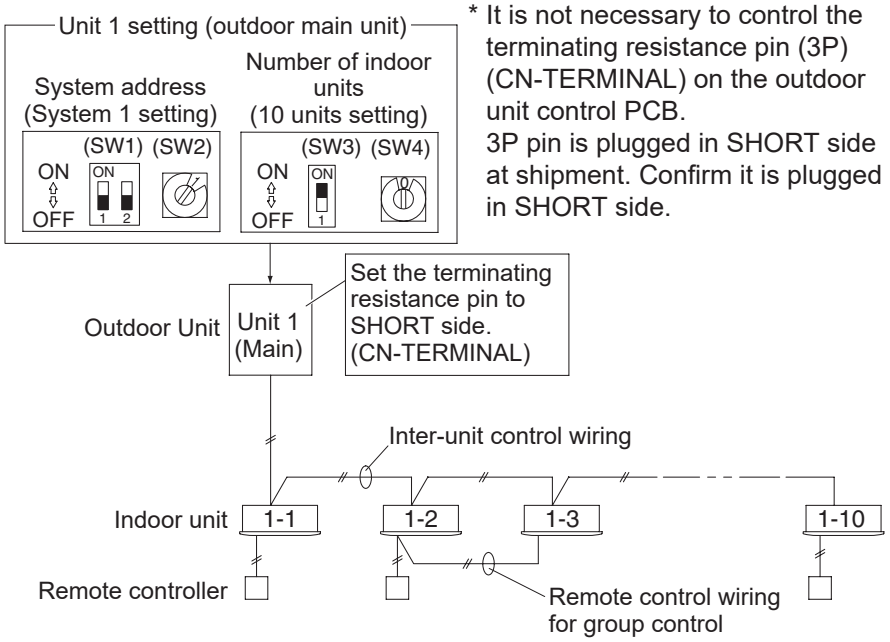
Function Switch	Remarks
MODE pin (3P, BLK)	Changes to cooling/heating mode. When in normal operation: When short circuited the COOL side, indoor unit operation in the same refrigerant system changes to all cooling mode. When short circuited the HEAT side, indoor unit operation in the same refrigerant system changes to all heating mode. When in auto address setting: Changes to heating mode with open-circuit.
A.ADD pin (2P, BLK)	Short circuited for over 1 second long → Auto address setting starts with open-circuit. If short circuit lasts for over 1 second long during auto address setting, the setting is interrupted.
CHK pin (2P, BLK)	When short circuited, test run begins. (If the remote controller is connected in test run mode, it is automatically cancelled after 1 hour.) Also, if short-circuit is cancelled, test run mode is cancelled.
RC plug (3P, BLU)	Connects to outdoor unit maintenance remote controller and content of alarm message will be checked.
RUN pin (2P, BLK)	When short circuited and pulse signal is given, all indoor units operate in the same refrigerant system.
STOP pin (2P, BLK)	When short circuited and pulse signal is given, all indoor units stop in the same refrigerant system. (When short circuited, operation cannot be performed by the indoor unit's remote controller.)
DEF pin (2P, BLK)	When the pin of the main unit is short-circuit in heating mode, defrosting operation is started. Even if short circuited, defrosting will not be activated immediately.
AP pin (2P, BLK)	Can be used when vacuuming the outdoor unit.
SILENT plug (2P, WHT)	Can be used when setting the outdoor unit fan in sound absorbing mode.

4. Auto Address Setting

Example: Basic Wiring Diagram (1)

- **Case of no link wiring**
  (Inter-unit control wiring is not connected to a multiple system.)
  Indoor unit address setting is possible without starting the compressor.





* It is not necessary to control the terminating resistance pin (3P) (CN-TERMINAL) on the outdoor unit control PCB.
3P pin is plugged in SHORT side at shipment. Confirm it is plugged in SHORT side.

Case 1

Auto Address Control from Outdoor Unit

1. Check the refrigerant system's Address Setting Rotary switch (SW2) on outdoor unit control PCB (Main) to "1" and the Dip switch (SW1) to "0" (at shipment). 

2. Regarding the setting of the number of indoor units connected to the outdoor unit, set the Dip switch (SW3) for setting the number of indoor units on outdoor unit control PCB (Main) connected to the outdoor unit to "1" 

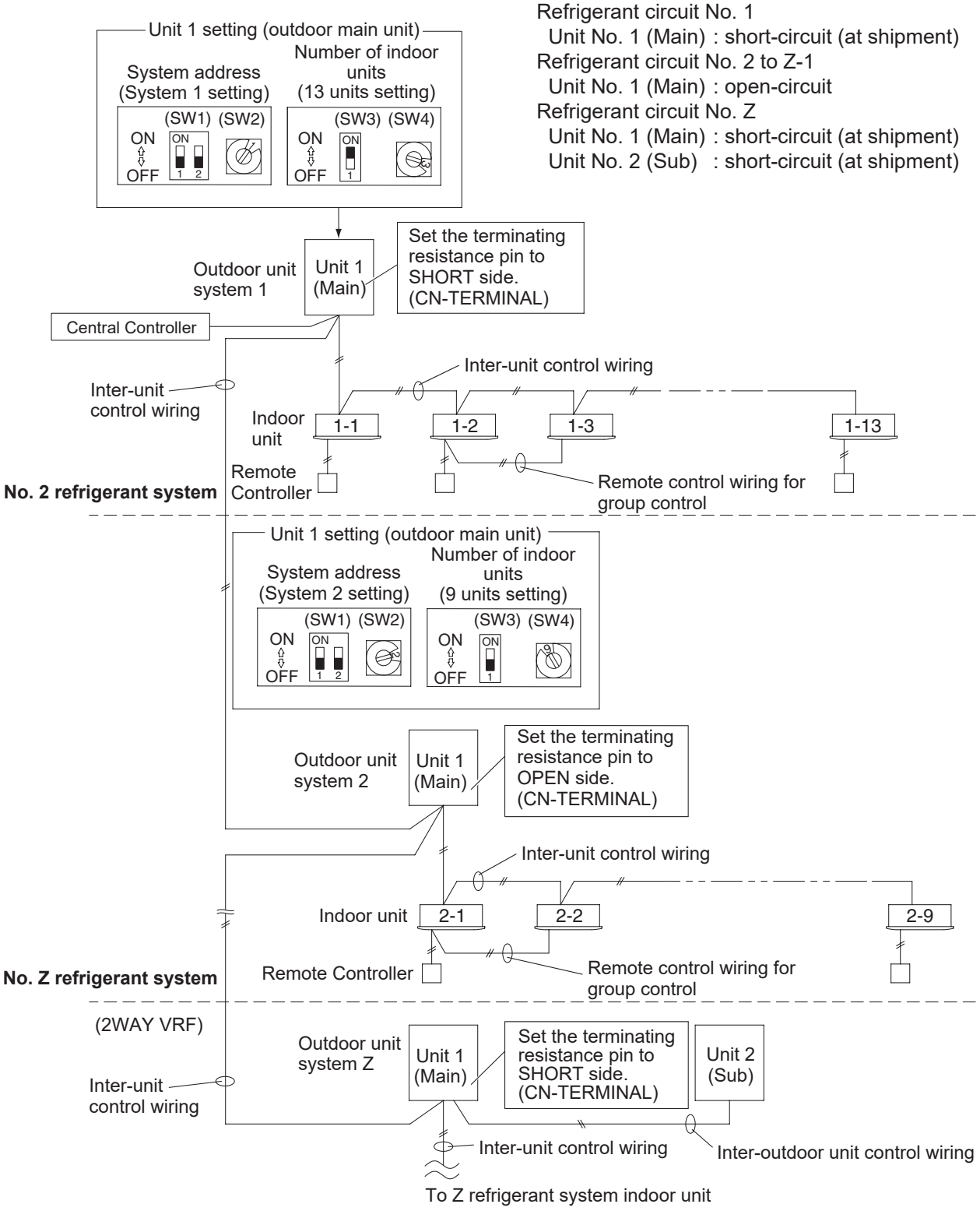
and set the Rotary switch (SW4) to "0".
3. Turn on power to indoor and outdoor units.
4. Short circuit the A.ADD pin on outdoor unit control PCB (Main) for over 1 second long and open circuit.
   Communication for auto address setting begins.
   * To cancel, short circuit the A.ADD pin again for over 1 second long and then open circuit. The LED that indicates auto address setting goes out and the process is stopped.
   Be sure to perform auto address setting again.
   ⇩
   Auto address setting is completed when LEDs 1 and 2 on outdoor unit control PCB (Main) go out.
   ⇩
5. Remote control operation is now available.
   * When auto address setting is controlled by the remote controller, perform auto address setting by the remote controller after step 3 described above.

Example: Basic Wiring Diagram (2)

- **Case of link wiring** * See “ATTENTION!”.

No. 1 refrigerant system

Setting of terminal pin (CN-TERMINAL)
Refrigerant circuit No. 1
Unit No. 1 (Main) : short-circuit (at shipment)
Refrigerant circuit No. 2 to Z-1
Unit No. 1 (Main) : open-circuit
Refrigerant circuit No. Z
Unit No. 1 (Main) : short-circuit (at shipment)
Unit No. 2 (Sub) : short-circuit (at shipment)



7

● **Final check before operation**

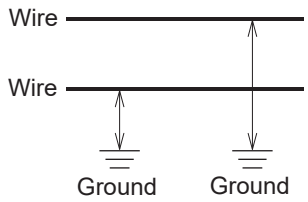
Final check must be done under the conditions of inter-outdoor unit control wiring connected to the centralized control system and the resistor between conductors must be measured by a tester. Check if it is showing between 30Ω and 120Ω.

If the resistance value is out of range, check adjustment of the termination resistor again. Even if it is out of range, the problem is caused by wiring.

- Is the wiring connection properly completed?
- Are there any scratches or deterioration on the coverage?
- Measure between conductors and also between wiring and ground by 500 V mega-tester (insulation resistance meter).
  Make sure the mega-tester is showing more than 100MΩ.
  When measuring, remove both ends of the wiring from the terminal board.
  If not removed, it will be damaged.
  If it is less than 100MΩ, a new wiring connection should be made.

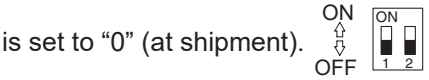
Between conductors

Between wiring and ground



Case 2 **Auto Address Control for Multiple Linked Refrigerant System**

How to Control Auto Address Setting from Outdoor Unit

1. Check that the refrigerant system address Rotary switch (SW2) on outdoor unit control PCB (Main) in 1 refrigerant system is set to “1” and the Dip switch (SW1) is set to “0” (at shipment). ON ⇕ OFF 

2. Regarding the number of indoor units connected to the outdoor unit, set the Dip switch (SW3) for setting the number of indoor units on outdoor unit control PCB (Main) to “0” ON ⇕ OFF 

and set the Rotary switch (SW4) to “9”.
   Total of 9 units installation is made.
3. Turn on power to all indoor and outdoor units only for one refrigerant system or disconnect link wires for multiple refrigerant system.
4. Short circuit the A.ADD pin of outdoor main unit for over 1 second long and then open circuit.
   Communication for auto address setting begins.

   ⇩

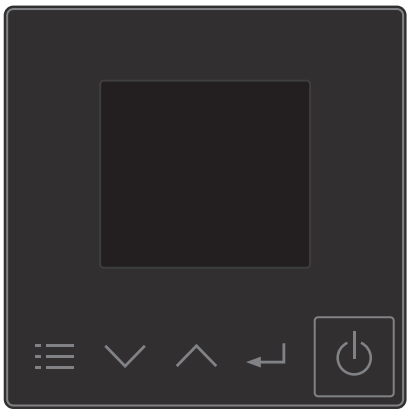
   * To cancel, again short circuit the A.ADD pin for over 1 second long and then open circuit.
     LEDs 1 and 2 that indicate auto address setting is in progress go out and that process is stopped.
     Be sure to perform auto address setting again.

   Auto address setting is completed when the compressor stops and LEDs 1 and 2 on outdoor unit control PCB (Main) go out.

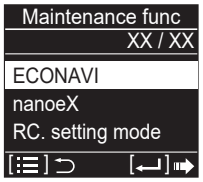
   ⇩
5. Remote control operation is now available.
   * When performing auto address setting by the remote controller, perform auto address setting by the remote controller after step 3.

● See “Auto Address Setting from the Remote Controller”.

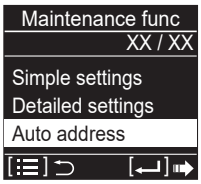
Auto Address Setting from the Remote Controller
Auto Address Setting from the Wired Remote Controller (CZ-RTC6 series)



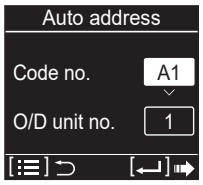
(1) Keep pressing the ☰, ∧ and ↵ buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



(2) Press the ∨ or ∧ button to see each menu.
Select “Auto address” on the LCD display and press the ↵ button.

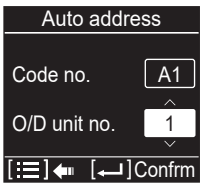


(3) The “Auto address” screen appears on the LCD display.
Select the “Code no.” to “A1” by pressing the ∨ or ∧ button.



After selecting “Code no.”, press the ↵ button and proceed to Step (4).
If the ☰ button is pressed, proceed to Step (5).

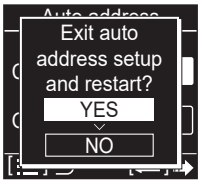
(4) Select one of the “O/D unit no.” for auto address by pressing the ∨ or ∧ button.



After selecting “O/D unit no.”, press the ↵ button.

Approximately 10 minutes are required.
When auto address setting is completed, the units return to normal stopped status.

(5) If the ☰ button is pressed under the display Step (3), the following display (Auto address-end screen) appears.
Then select “YES” by pressing the ∨ or ∧ button and press the ↵ button.



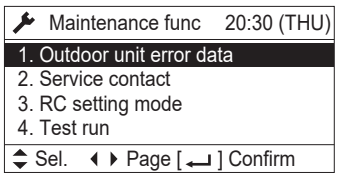
7

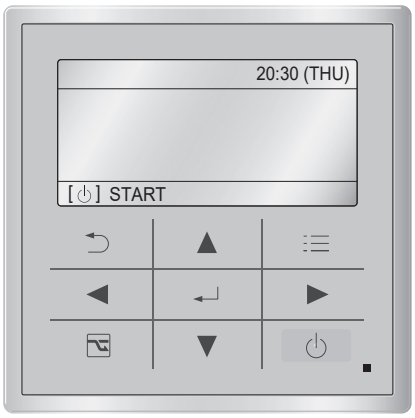
4. Auto Address Setting

Auto Address Setting from the High-spec Wired Remote Controller (CZ-RTC5B)

(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds.

The “Maintenance func” screen appears on the LCD display.

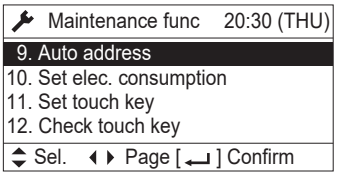




(2) Press the [▼] or [▲] button to see each menu.

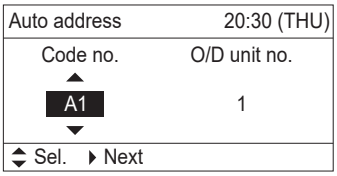
If you wish to see the next screen instantly, press the [◀] or [▶] button.

Select “9. Auto address” on the LCD display and press the [↵] button.



(3) The “Auto address” screen appears on the LCD display.

Change the “Code no.” to “A1” by pressing the [▼] or [▲] button.



(4) Select the “O/D unit no.” by pressing the [◀] or [▶] button.

Select one of the “O/D unit no.” by pressing the [▼] or [▲] button and press the [↵] button for auto address setting.

Approximately 10 minutes are required.

When auto address setting is completed, the units return to normal stopped status.

7

4. Auto Address Setting

Auto Address Setting* from the Remote Controller (CZ-RTC4)

* Auto address setting in Cooling mode cannot be done from the remote controller.

NOTE

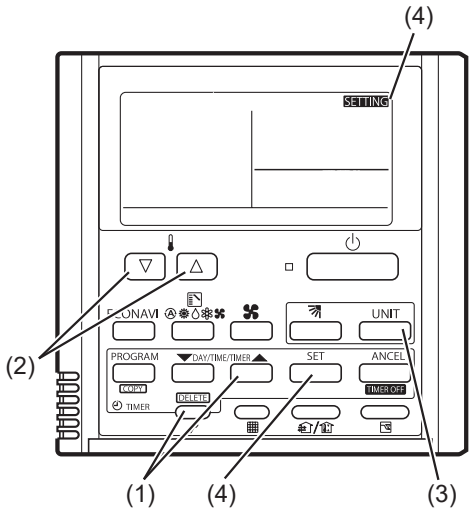
- Selecting each refrigerant system individually for auto address setting
- Auto address setting for each system: Item code “A1”

(1) Press the remote controller timer time /TIMER button and button at the same time.
(Press and hold for 4 seconds or longer.)

(2) Next, press either the temperature setting ▽/△ button. (Check that the item code is “A1”.)

(3) Use either the UNIT button to set the system No. to perform auto address setting.

(4) Then press the SET button.
(Auto address setting for one refrigerant system begins.) (When auto address setting for one system is completed, the system returns to normal stopped status.)
<Approximately 10 minutes are required.>
(During auto address setting, “ SETTING ” is displayed on the remote controller.
This message disappears when auto address setting is completed.)



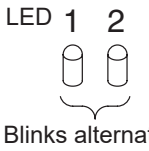
(5) Repeat the same steps to perform auto address setting for each successive system.

7

4. Auto Address Setting

Display During Auto Address Setting

- On the surface of outdoor unit control PCB



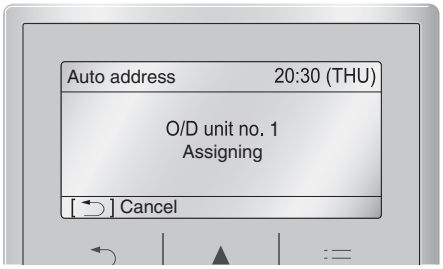
* Do not short circuit the A.ADD pin again during auto address setting.
LEDs 1 and 2 go out and address setting is interrupted.
* When auto address setting is normally completed, both LEDs 1 and 2 go out.
In other cases, correct settings by referring to the following table and perform auto address setting again.

- Contents of LEDs 1 and 2 on outdoor unit control PCB
  ☼ : Illuminating
  ✷ : Blinking
  ● : Go out

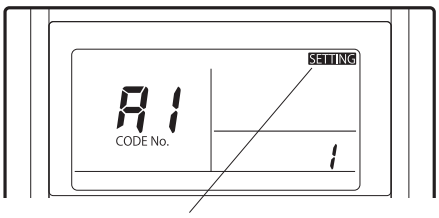
LED 1	LED 2	Contents of display
☼	☼	After turned on power (not during auto address setting), it is entirely impossible to communicate with the indoor unit in the system.
●	☼	After power is turned on (and auto address setting is not in progress), one or more indoor units are confirmed in that system; however, the number of indoor units does not match the number that was set. This status remains even if the indoor unit address (indoor EEPROM item code : 13) is set more than 13 indoor units. In this case, be sure to set the indoor unit address less than 12.
✷ Alternately	✷ Alternately	Under auto address setting
●	●	Auto address setting completed
✷ Simultaneously	✷ Simultaneously	There are inconsistencies between the number of indoor units and setting number of indoor units. (at the time of auto address setting)
✷ Alternately	✷ Alternately	See “7. Self-Diagnosis Function Table and Contents of Alarm Display”.

- Display of remote controller

CZ-RTC5B



CZ-RTC4



Blinking “ SETTING ” indicator

CZ-RTC6 series

Request concerning recording the indoor/outdoor unit combination Nos.

After auto address setting has been completed, be sure to record them for future reference.

List the outdoor main unit system address and the addresses of the indoor units in that system in an easily visible location (next to the nameplate), using a permanent marking pen or similar means that cannot be abraded easily.

Example: (Outdoor) 1 - (Indoor) 1-1, 1-2, 1-3… (Outdoor) 2 - (Indoor) 2-1, 2-2, 2-3…

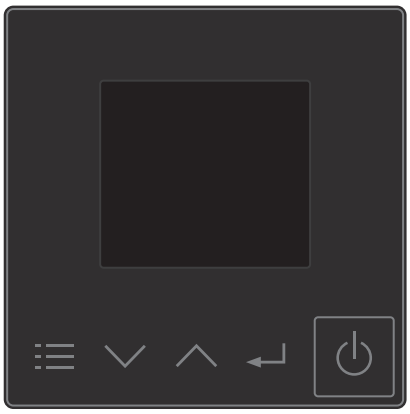
These numbers are necessary for later maintenance. Please be sure to indicate them.

4. Auto Address Setting

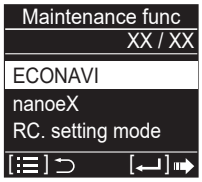
Checking the indoor unit addresses

Use the remote controller to check the indoor unit address.

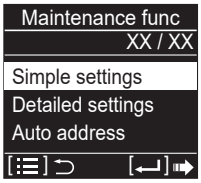
CZ-RTC6 series (Wired Remote Controller)



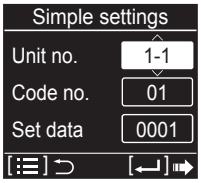
(1) Keep pressing the ☰, ∧ and ↵ buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



(2) Press the ∨ or ∧ button to see each menu.
Select “Simple settings” on the LCD display and press the ↵ button.

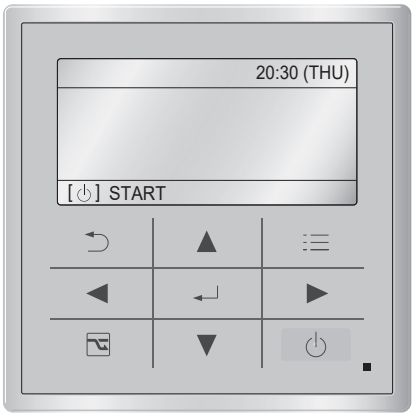


(3) The “Simple settings” screen appears on the LCD display.
Select the “Unit no.” by pressing the ∨ or ∧ button for changes.
The indoor unit fan operates only at the selected indoor unit.



(4) Press the ☰ button and select “YES” to restart.

CZ-RTC5B (High-spec wired remote controller)



(1) Keep pressing the [↩], [↵] and [▶] buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.

Maintenance func 20:30 (THU)
1. Outdoor unit error data
2. Service contact
3. RC setting mode
4. Test run
↕ Sel. ◀ ▶ Page [↵] Confirm

(2) Press the [▼] or [▲] button to see each menu.
If you wish to see the next screen instantly, press the [◀] or [▶] button.
Select “7. Simple settings” on the LCD display and press the [↵] button.

Maintenance func 20:30 (THU)
5. Sensor info.
6. Servicing check
7. Simple settings
8. Detailed settings
↕ Sel. ◀ ▶ Page [↵] Confirm

(3) The “Simple settings” screen appears on the LCD display.
Select the “Unit no.” by pressing the [▼] or [▲] button for changes.
The indoor unit fan operates only at the selected indoor unit.

Simple settings		20:30 (THU)
Unit no.	Code no.	Set data
1-1	01	0001
↕ Sel. ▶ Next		

(4) Press the [↩] button when “Unit no.” is selected, and then select “YES” and press [↵] button to return to normal remote controller mode.

CZ-RTC4 (Timer remote controller)

(1) Press and hold the button and button for 4 seconds or longer (simple settings mode).

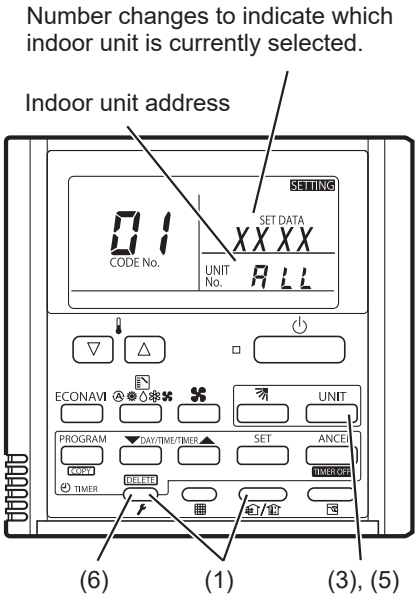
(2) “ALL” is displayed on the remote controller.

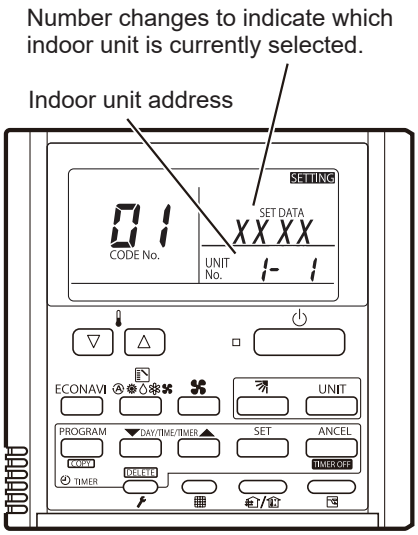
(3) Next, press the UNIT button.

(4) The address is displayed for 1 of the indoor units which is connected to the remote controller. Check that the fan of that indoor unit starts and that air is discharged.

(5) Press the UNIT button again and check the address of each indoor unit in sequence.

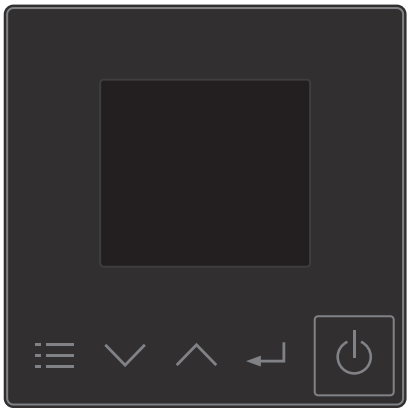
(6) Press the button again to return to normal remote controller mode.





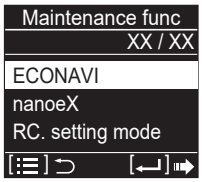
5. Test Run Using the Remote Controller

CZ-RTC6 series (Wired Remote Controller)

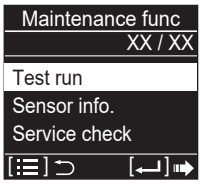


This mode places a heavy load on the machines. Therefore use it only when performing the test run.

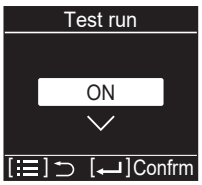
(1) Keep pressing the ☰, ∧ and ↵ buttons simultaneously for 4 or more seconds.
The “Maintenance func” screen appears on the LCD display.



(2) Press the ∨ or ∧ button to see each menu.
Select “Test run” on the LCD display and press the ↵ button.

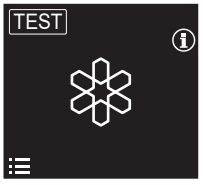


Change the display from “OFF” to “ON” by pressing the ∨ or ∧ button.
Then press the ↵ button.



(3) Press the ☰ button.
“TEST” will be displayed on the LCD display.

(4) Press the ⏻ button. Test run will be started.
Test run setting mode screen appears on the LCD display.



- The test run can be performed using the HEAT, COOL, or FAN operation mode.
- The temperature cannot be adjusted when in test run mode.
- If correct operation is not possible, a code is displayed on the remote controller LCD display. (See “7. Self-Diagnosis Function Table and Contents of Alarm Display” and correct the problem.)

(5) After the test run is completed, proceed from Step (1) and change to “OFF” at Step (2).

- To prevent continuous test run, this remote controller includes a timer function that cancels the test run after 60 minutes.

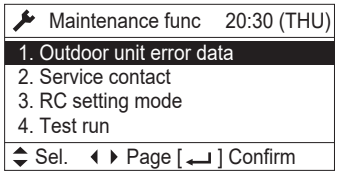
NOTE

- The outdoor units will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.

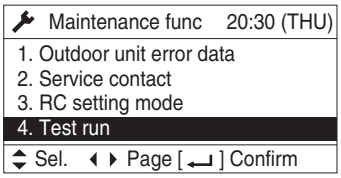
CZ-RTC5B (High-spec wired remote controller)

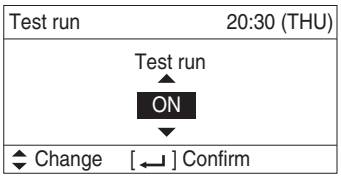
This mode places a heavy load on the machines. Therefore use it only when performing the test run.

(1) Keep pressing the [↩], [↵] and [►] buttons simultaneously for 4 or more seconds.
The "Maintenance func" screen appears on the LCD display.

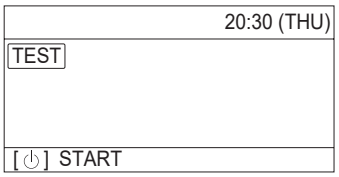


(2) Press the [▼] or [▲] button to see each menu.
If you wish to see the next screen instantly, press the [◄] or [►] button.
Select "4. Test run" on the LCD display and press the [↵] button.
Change the display from "OFF" to "ON" by pressing the [▼] or [▲] button. Then press the [↵] button.

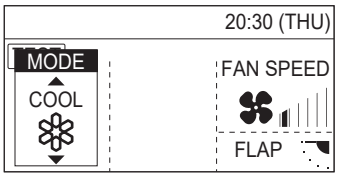




(3) Press the [↩] button. "TEST" will be displayed on the LCD display.



(4) Press the [⏻] button. Test run will be started.
Test run setting mode screen appears on the LCD display.



- The test run can be performed using the HEAT, COOL, or FAN operation mode.
- The temperature cannot be adjusted when in test run mode.
- If correct operation is not possible, a code is displayed on the remote controller LCD display. (See "7. Self-Diagnosis Function Table and Contents of Alarm Display" and correct the problem.)

(5) After the test run is completed, proceed from Step (1) and change to "OFF" at Step (2).

- To prevent continuous test run, this remote controller includes a timer function that cancels the test run after 60 minutes.

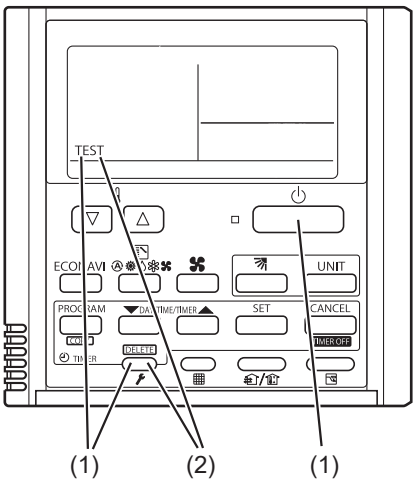
NOTE

- The outdoor units will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.

5. Test Run Using the Remote Controller

CZ-RTC4 (Timer remote controller)

This mode places a heavy load on the machines. Therefore use it only when performing the test run.



(1) Press the remote controller button for 4 seconds or longer.

Then press the button.

" TEST " appears on the LCD display while the test run is in progress.

- The test run can be performed using the HEAT, COOL, or FAN operation mode.
- The temperature cannot be adjusted when in test run mode.
- If correct operation is not possible, a code is displayed on the remote controller LCD display. (See "7. Self-Diagnosis Function Table and Contents of Alarm Display" and correct the problem.)

(2) After the test run is completed, press the button again.
Check that " TEST " disappears from the LCD display.

- To prevent continuous test run, this remote controller includes a timer function that cancels the test run after 60 minutes.

NOTE

- The outdoor units will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.

6. Caution for Pump Down

Pump down means refrigerant gas in the system is returned to the outdoor unit.
Pump down is used when the unit is to be moved, or before servicing the refrigerant circuit.

⚠ CAUTION

- **This outdoor unit cannot collect more than the rated refrigerant amount as shown by the nameplate on the back.**
- **If the amount of refrigerant is more than that recommended, do not conduct pump down.**
  In this case use another refrigerant collecting system.

7. Self-Diagnosis Function Table and Contents of Alarm Display

How to know LEDs 1 and 2 alarm display on outdoor unit control PCB

<table>
<tr><th>LED 1</th><th>LED 2</th><th>Contents of Alarm Display</th></tr>
<tr><td>☀</td><td>☀</td><td rowspan="2">Alarm display
After LED1 blinks M times, LED2 blinks N times.
This will be repeated.

<table>
<tr><th></th><th>Number of blinks</th><th>Type of alarm</th></tr>
<tr><td rowspan="5">M</td><td>2</td><td>Alarm P</td></tr>
<tr><td>3</td><td>Alarm H</td></tr>
<tr><td>4</td><td>Alarm E</td></tr>
<tr><td>5</td><td>Alarm F</td></tr>
<tr><td>6</td><td>Alarm L</td></tr>
</table>
N = number of alarm No.

For example: After LED1 blinks twice, LED2 blinks 17 times. This will be repeated.
The alarm shows “P17”.</td></tr>
<tr><td colspan="2">Alternately</td></tr>
</table>

(☀ : Blink) Connect the outdoor unit maintenance remote controller to the RC plug (3P, BLU) on outdoor unit control PCB (Main) and make confirmation.

■ Self-Diagnosis Function Table

- Cause and countermeasure against the symptom of auto address failure

Symptom	Cause and countermeasure
• When turning on power to the outdoor main unit, LEDs 1 and 2 illuminate or blink excluding going out. Auto address setting is not available.	See “Contents of Alarm Display” and make corrections.
• When auto address setting by the remote controller begins, the alarm display appears immediately.	
• When auto address setting by the remote controller begins, no display appears.	Are remote control wiring and inter-unit control wiring connected properly? Is indoor unit turned on power?

- Auto address setting begins but finishes improperly.

Symptom	Cause and countermeasure
• Soon after a few seconds or after a few minutes, the alarm content is displayed on the remote controller.	See “Contents of Alarm Display” and make a correction.
• After a few minutes when auto address setting begins, the compressor may occasionally start and stop several times. LEDs 1 and 2 on outdoor unit control PCB show the display of auto address setting with blinking alternately but LEDs 1 and 2 do not indicate the completion of auto address setting (go out).	Are remote control wiring and inter-unit control wiring connected properly? Is indoor unit turned on power?

- If the alarm display “E15”, “E16” and “E20” appear after auto address setting began, check the following items.

Alarm display	Alarm contents
E15	Recognized number of indoor units at the time of auto address setting are fewer than that of indoor units set by SW3 and SW4 on outdoor unit control PCB (Main).
E16	Recognized number of indoor units at the time of auto address setting are more than that of indoor units set by SW3 and SW4 on outdoor unit control PCB (Main).
E20	Outdoor unit could not entirely receive serial communication signal from the indoor unit within 90 seconds after auto address setting began.

Check	E15	E16	E20
Have you forgotten to turn on power to indoor unit?	○		○
Are indoor and outdoor control wiring connected properly? (Check for incorrect wiring to open & short-circuit, terminal pin and remote control terminal.)	○	○	○
Are the number of the connecting indoor units set by SW3 and SW4 of outdoor unit control PCB (Main) connected properly?	○	○	
Is additional appropriate amount of refrigerant charge? (Compressor ON at the time of auto address setting)	○		
Is the refrigerant tubing connected properly? (Compressor ON at the time of auto address setting)	○	○	
Are E1 and E3 sensors of indoor unit normal? (Compressor ON at the time of auto address setting)	○		
Are there any wrong system address installed in indoor units caused by manual or incorrect auto address control?		○	

1) When auto address setting from outdoor unit control PCB (Main) or remote controller begins, “Under Setting” appears on the remote controller as for normal indoor units under the inter-unit control wirings and remote control wirings.
   LEDs 1 and 2 indicators on outdoor unit control PCB (Main) blink alternately.
2) If there is an error at the inter-unit control wiring of the remote controller when in the indoor unit group control, address setting may not occasionally be made although “under setting” is displayed.
3) Although the alarm “E15” and “E16” are displayed, addresses will be installed in the recognized indoor units. The installed addresses can be checked by the remote controller. See “Checking the indoor unit addresses”.

- When operating the remote controller after auto address setting completed (LEDs 1 and 2 indicators on outdoor unit control PCB (Main) go out), correct the symptom if the following alarms appear on the remote controller.

Remote control display	Cause
No display	Remote controller is not connected properly. (Power failure) When auto address setting was completed, the power of indoor unit was turned off.
E01	Remote controller is not connected properly. (Receiving failure from remote control) Indoor unit address was mistakenly controlled by undesired indoor unit remote controller. (Impossible to communicate with outdoor unit)
E02	Remote controller is not connected properly. (Impossible to communicate with indoor unit by remote controller)
P09	Connector of indoor unit ceiling panel is not connected properly.

If any other alarm appears on the display, see Section 6.

7. Self-Diagnosis Function Table and Contents of Alarm Display

- Alarm display can be checked by the outdoor maintenance remote controller. When operating, see Section 6. Alarm display can also be checked by number of blinking of LEDs 1 and 2 on outdoor unit control PCB. (See “How to know LEDs 1 and 2 alarm display on outdoor unit control PCB” under “7. Self-Diagnosis Function Table and Contents of Alarm Display”.)

Remote control display	Alarm contents
C17	Indoor unit does not respond to central control equipment.
E01	Indoor unit does not respond to remote controller.
E02	Remote controller is having error in sending serial communication signal.
E03	Remote controller does not respond to indoor unit.
E04	Outdoor unit does not respond to indoor unit.
E06	Some indoor units do not respond to outdoor unit.
E08	Indoor unit address is duplicating.
E09	Two or more remote controllers are set as main on R1-R2 link.
E12	Auto Address failed to start.
E14	Two or more indoor units are set as main, in the group controlled indoor units.
E15	Fewer indoor units are found in Auto Addressing than the setting on outdoor unit control PCB.
E16	More indoor units are found in Auto Addressing than the setting on outdoor unit control PCB.
E18	No response from sub indoor to the main indoor unit in group control wiring.
E20	No indoor unit responded in Auto Addressing.
E31	Error in communication inside outdoor unit control box.
F01	Indoor unit heat exchanger liquid temperature sensor has failure. (E1)
F02	Indoor unit heat exchanger temperature sensor has failure. (E2)
F03	Indoor unit heat exchanger gas temperature sensor has failure. (E3)
F04	Compressor discharge temperature sensor has failure. (DISCH)
F06	Outdoor unit heat exchanger gas temperature sensor has failure. (EXG)
F07	Outdoor unit heat exchanger liquid temperature sensor has failure. (EXL)
F08	Outdoor temperature sensor has failure. (TO)
F10	Indoor suction air (room) temperature sensor has failure. (TA)
F11	Indoor discharge air temperature sensor has failure. (BL)
F12	Compressor inlet temperature sensor has failure. (SCT)
F14	Subcooling heat exchanger temperature sensor has failure. (SCG)
F16	High pressure sensor has failure. (HPS)
F17	Low pressure sensor has failure. (LPS)
F29	EEPROM on indoor unit control PCB has failure.
F31	EEPROM on outdoor unit control PCB has failure.
H01	Compressor primary current is overcurrent.
H02	PFC is overcurrent or VDC is overvoltage. (Single phase only)
H03	Compressor current sensor is disconnected or shorted.
H05	Compressor discharge temperature sensor is disconnected, shorted or misplaced. (DISCH)
H06	Low pressure sensor value is too low.
H31	Compressor HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.
J01	R32 refrigerant leakage detection sensor has failure.
J02	Life of refrigerant leak sensor in R32 refrigerant leakage detection sensor has expired.
J03	Indoor unit refrigerant leak sensor 1 has failure. (GAS1)
J04	Life of Indoor unit refrigerant leak sensor 1 has expired. (GAS1)
J05	Indoor unit refrigerant leak sensor 2 has failure. (GAS2)
J06	Life of indoor unit refrigerant leak sensors 1 and 2 has expired. (GAS1 and GAS2)
L01	Indoor unit address setting has error. (No main indoor unit in group control.)
L02	Indoor unit model does not match with the outdoor unit model. (Multi-split/mini-split)
L03	Two or more indoor units are set as main in group control.
L04	Duplicate system address setting on outdoor units.
L05	Two or more indoor units are set as priority indoor unit (priority indoor unit).
L06	Two or more indoor units are set as priority indoor unit (non-priority indoor unit).
L07	Group control wiring is detected for indoor unit set as individual control.

Remote control display	Alarm contents
L08	Indoor unit address is not set.
L09	Capacity setting of indoor unit is not correct.
L10	Capacity setting of outdoor unit is not correct.
L13	Indoor unit model does not match with outdoor unit.
L17	Model mismatch between outdoor units.
L18	4-way valve has failure.
P01	Thermal protector for Indoor unit fan motor is activated.
P03	Compressor discharge temperature is too high.
P04	High pressure switch is activated.
P05	AC power supply has abnormal.
P08	Refrigerant leakage detection of indoor unit connected with the remote controller displaying this alarm.
P09	Connection to the panel of indoor unit is not good.
P10	Float switch of drain pan safety is activated.
P11	Drain pump failure or locked rotor.
P12	Indoor unit fan inverter protection control is activated.
P14	Refrigerant leakage detection of one of the indoor units connected to the outdoor unit.
P16	Compressor secondary current is overcurrent.
P20	Too high load in refrigerant circuit.
P22	Outdoor unit fan motor has failure.
P29	Compressor start failure. Compressor is missing phase or reverse phase.
P31	Other indoor unit in group control has an alarm.

- Contents of alarm display on remote controller
  For the remote controller, there are other alarm contents listed on the following table besides the alarm display on outdoor unit control PCB (Main).

Wired remote control display	Detected contents	
<E01>	Remote controller is detecting error signal from indoor unit.	Indoor unit does not respond to remote controller.
<E02>		Remote controller is having error in sending serial communication signal.
<<E03>>	Remote controller does not respond to indoor unit.	
E04	Remote controller is detecting error signal from outdoor unit.	Outdoor unit does not respond to indoor unit.
E08	Improper setting	Indoor unit address is duplicating.
<<E09>>		Two or more remote controllers are set as main on R1-R2 link.
E18	Indoor unit communication error in group control wiring	No response from sub indoor to the main indoor unit in group control wiring.
<<L02>>	Improper setting	Indoor unit model does not match with the outdoor unit model. (Multi-split/mini-split)
<L03>		Two or more indoor units are set as main in group control.
L07		Group control wiring is detected for indoor unit set as individual control.
L08		Indoor unit address is not set.
<<L09>>		Capacity setting of indoor unit is not correct.

Wired remote control display	Detected contents	
<<F01>>	Indoor unit sensor has failure	Indoor unit heat exchanger liquid temperature sensor has failure. (E1)
<<F03>>		Indoor unit heat exchanger gas temperature sensor has failure. (E3)
<<F10>>		Indoor suction air (room) temperature sensor has failure. (TA)
<<F11>>		Indoor discharge air temperature sensor has failure. (BL)
<<P09>>	Connection to the panel of indoor unit is not good.	
<<P01>>	Activation of protective device for Indoor unit	Thermal protector for Indoor unit fan motor is activated.
<<P10>>		Float switch of drain pan safety is activated.
<<P11>>		Drain pump failure or locked rotor.
<<P12>>		Indoor unit fan inverter protection control is activated.
F29	EEPROM on indoor unit control PCB has failure.	

- The parentheses of << >> used in the table of alarm display does not affect anything the operation of other indoor units.
- The parentheses of < > used in the table of alarm display implies that there are two cases : according to the content of the symptom, some affect the operation of other indoor units and others do not affect anything.

Alarm messages displayed on system controller			
Serial communication errors Mis-setting	Error in transmitting serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller.	C05
	Error in receiving serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller. CN1 is not connected properly.	C06
Activation of protective device	Protective device of sub indoor unit in group control is activated.	When using wireless remote controller or system controller, in order to check the alarm message in detail, connect wired remote controller to indoor unit temporarily.	P30

NOTE

1. Alarm messages in << >> do not affect other indoor unit operations.
2. Alarm messages in < > sometimes affect other indoor unit operations depending on the fault.

ATTENTION!

Adjustment of terminating resistance (pin) is necessary.

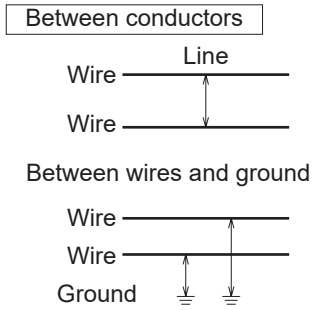
Communication failure will occur unless adjustment is made correctly.

- Terminating resistance (pin) is mounted on outdoor unit control PCB.
- When connecting central controller, interface or peripheral equipment, adjustment of terminating resistance (pin) is necessary. Although the connection is not made, confirmation is necessary for VRF systems.
- In the case of a refrigerant system, the terminating resistance (pin) for this inter-unit control wiring (S-LINK wiring) is one location (See “4. Auto Address Setting”).
  For 2 or more refrigerant systems, 2 locations should be valid (SHORT for VRF systems at shipment). See “4. Auto Address Setting”.
  In order to make 2 locations valid, let the terminating resistance (pin) of the nearest outdoor unit and the farthest outdoor unit be valid (SHORT side) from the location of central controller.
  In other refrigerant systems excepting 2 locations described above, make them invalid (OPEN side).
  It is prohibited making more than 3 locations of terminating resistance valid.
- Since the use of linking the sub outdoor units of VRF systems is not connected to the inter-unit control wiring, it is not necessary to make the terminating resistance invalid OPEN side.

Make final confirmation regarding the central controller or interface & inter-unit control wiring (S-LINK wiring) connected to the peripheral equipment.
Measure the line resistance with a tester and check whether the values are in the range of 30Ω - 120Ω.

If the resistance values are out of range, check again the terminating resistance.
Nevertheless, if the values are out of range, the problem comes from wiring.

- Is the connection properly made?
- Are there any scratches or damages on the coated surface?
- Measure the line, between wires and ground with the 500 V mega-tester (insulation resistance meter) and check the values are over 100MΩ.
- When measuring, be sure to remove both edges of the wire from the terminal board. If not removed, it will be damaged.
- If the line resistance is within 100MΩ, newly carry out the wiring work.



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