MITSUBISHI ELECTRIC

*Changes for the Better*

AIR CONDITIONER

2025

**R32**

# Service Handbook

**Model**

**PURY-EM72, EM96, EM120, EM144, EM168, EM192T(Y)XU-A**
**PURY-EM264, EM288, EM312, EM336, EM360, EM384T(Y)SXU-A**

**PURY-HM72, HM96, HM120T(Y)XU-A**
**PURY-HM144, HM192, HM240T(Y)SXU-A**

# Safety Precautions

- Please read the following safety precautions carefully before installing the unit to ensure safety.

| | |
|---|---|
| ⚠ **WARNING** | **Indicates a risk of death or serious injury.** |
| ⚠ **CAUTION** | **Indicates a risk of serious injury or structural damage.** |

- Make sure that this manual is passed on to the end user to retain for future reference.
- Retain this manual for future reference. When the unit is reinstalled or repaired, have this manual available to those who provide these services. Make sure that this manual is passed on to any future users.

**All electric work must be performed by qualified personnel.**

**Air tightness test must be performed by qualified personnel.**

## General Precautions

### ⚠WARNING

**Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate. Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit. It may also be in violation of applicable laws. MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.**

**Do not install the unit in a place where large amounts of oil, steam, organic solvents, or corrosive gases, such as sulfuric gas, are present or where acidic/alkaline solutions or sprays containing sulfur are used frequently. These substances can compromise the performance of the unit or cause certain components of the unit to corrode, which can result in refrigerant leakage, water leakage, injury, electric shock, malfunctions, smoke, or fire.**

**Do not try to defeat the safety features of the unit or make unauthorized setting changes. Forcing the unit to operate the unit by defeating the safety features of the devices such as the pressure switch or the temperature switch, making unauthorized changes to the switch settings, or using accessories other than the ones recommended by Mitsubishi Electric may result in smoke, fire, or explosion.**

**To reduce the risk of shorting, current leakage, electric shock, malfunctions, smoke, or fire, do not splash water on electric parts.**

**To reduce the risk of electric shock, malfunctions, smoke or fire, do not operate the switches/buttons or touch other electrical parts with wet hands.**

**To reduce the risk of pipe burst and explosion, do not allow gas refrigerant and refrigerant oil to be trapped in the refrigerant circuit.**

**To reduce the risk of burns or frost bites, do not touch the refrigerant pipes or refrigerant circuit components with bare hands during and immediately after operation.**

**To reduce the risk of burns, do not touch any electrical parts with bare hands during or immediately after stopping operation.**

**To reduce the risk of injury from falling tools, keep children away while installing, inspecting, or repairing the unit.**

**Keep the space well ventilated. Refrigerant can displace air and cause oxygen starvation. If leaked refrigerant comes in contact with a heat source, toxic gas may be generated.**

**Always replace a fuse with one with the correct current rating. The use of improperly rated fuses or a substitution of fuses with steel or copper wire may result in bursting, fire or explosion.**

**To reduce the risk of electric shock, smoke, and fire due to infiltration of dust and water, properly install all required covers.**

**To reduce the risk of electric shock, smoke, and fire due to infiltration of dust and water, properly install all required terminal block covers and insulation sheets.**

**To reduce the risk of electric shock, smoke, and fire due to infiltration of dust and water, properly install all required covers and panels on the terminal box and control box.**

**To reduce the risk of injury from units falling or falling over, periodically check the installation base for damage.**

**Consult an authorized agency for the proper disposal of the unit. Refrigerant oil and refrigerant that may be left in the unit pose a risk of fire, explosion, or environmental pollution.**

**Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.**

**The unit 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 unit shall be properly stored to prevent mechanical damage.**

**Before inspecting the inside of the control box, turn off the power, keep the unit off for at least 10 minutes.**

**Refrigerant R32 is flammable. Do not use a naked-flame type detector.**

**Refrigerant leak detection sensor shall be set at a percentage of the 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 also 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 pipework.**

**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.**

**When installing an indoor unit or a BC controller, if the floor area of the unit installation site falls below the minimum area (Amin) defined in Equation 1, please take appropriate safety measures in accordance with UL standards.**

-Amin = mc/(0.5 × 0.306 × Hr) …Equation 1

mc: Refrigerange in the system

Hr: Height ft charrom the floor to the unit

Table 1

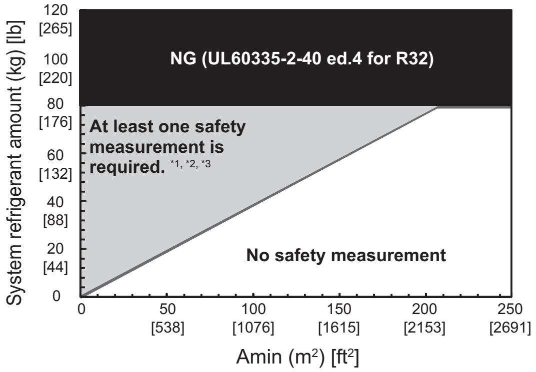
Refrigerant concentration and required safety measure
(height of ceiling = 2.5 m [8-3/16 ft])

| Amin | | mc | | | Amin | | mc | | |
|---|---|---|---|---|---|---|---|---|---|
| $m^2$ | $ft^2$ | kg | lb | oz | $m^2$ | $ft^2$ | kg | lb | oz |
| 5 | 53.9 | 1.9 | 4 | 3 | 110 | 1184.1 | 42.0 | 92 | 9 |
| 10 | 107.7 | 3.8 | 8 | 6 | 120 | 1291.7 | 45.9 | 101 | 3 |
| 20 | 215.3 | 7.6 | 16 | 12 | 130 | 1399.4 | 49.7 | 109 | 9 |
| 30 | 323.0 | 11.4 | 25 | 2 | 140 | 1507.0 | 53.5 | 117 | 15 |
| 40 | 430.6 | 15.3 | 33 | 11 | 150 | 1614.6 | 57.3 | 126 | 5 |
| 50 | 538.2 | 19.1 | 42 | 1 | 160 | 1722.3 | 61.2 | 134 | 14 |
| 60 | 645.9 | 22.9 | 50 | 7 | 170 | 1829.9 | 65.0 | 143 | 4 |
| 70 | 753.5 | 26.7 | 58 | 13 | 180 | 1937.6 | 68.8 | 151 | 10 |
| 80 | 861.2 | 30.6 | 67 | 7 | 190 | 2045.2 | 72.6 | 160 | 0 |
| 90 | 968.8 | 34.4 | 75 | 13 | 200 | 2152.8 | 76.5 | 168 | 10 |
| 100 | 1076.4 | 38.2 | 84 | 3 | 210 | 2260.5 | 79.5 | 175 | 4 |

* If the values of Table 1 are different from the values calculated by Equation 1, use the results calculated by the New Design Tool software of Mitsubishi Electric Corporation or the Diamond System Builder software of Mitsubishi Electric Trane HVAC US.

Fig. 1

Refrigerant concentration and required safety measure
(height of ceiling space = 2.5 m [8-3/16 ft])



*1 Please be aware that this product does not have built-in safety measures for installation.

*2 The system is UL-Listed for the ETRS (Enhanced Tightness Refrigerant System).Therefore, please note that the installation requirements indicated in Fig. 1 are mitigated compared to ASHRAE 15 or local building codes.

*3 For safety reasons, do not install a shut off valve kit of other manufacturers in the refrigerant circuit to prevent equipment failure.

**Prior to beginning work on systems, safety checks are necessary to ensure that the risk of ignition is minimised.**

**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.**

**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 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.**

**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.**

**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.**

**The following checks shall be applied.**

- 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.

**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.**

**Sealed electrical components shall be replaced.**

**Intrinsically safe components must be replaced.**

**Only qualified personnel must decommissioning. The following checks shall be applied.**

- All personal protective equipment is available and being used correctly;
- Recovery equipment and cylinders conform to the appropriate standards.
- Do not overfill cylinders (no more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- 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.
- Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

**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.**

# ⚠CAUTION

**To reduce the risk of fire or explosion, do not place flammable materials or use flammable sprays around the unit.**

**To reduce the risk of being caught in rotating parts, electric shock, and burns, do not operate the unit without all required panels and guards being installed.**

**To reduce the risk of injury, do not sit, stand, or place objects on the unit.**

The unit described in this manual is not intended for use with food, animals, plants, precision instruments, or art work.

To reduce the risk of water leakage and malfunctions, do not turn off the power immediately after stopping operation. Leave the unit turned on for at least 5 minutes before turning off the power.

Do not install the unit over things that are vulnerable to water damage from condensation dripping.

To reduce the risk of injury, electric shock, and malfunctions, do not touch or allow cables to come in contact with the edges of components.

To reduce the risk of injury, do not touch the heat exchanger fins or sharp edges of components with bare hands.

Always wear protective gears when touching electrical components on the unit. Several minutes after the power is switched off, residual voltage may still cause electric shock.

To reduce the risk of electric shock and burns, always wear protective gear when working on units.

To reduce the risk of injury, do not insert fingers or foreign objects into air inlet/outlet grills. If the unit is left on a damaged base, it may fall and cause injury.

To reduce the risk of injury, always wear protective gear when working on units.

Do not release refrigerant into the atmosphere. Collect and reuse the refrigerant, or have it properly disposed of by an authorized agency. Refrigerant poses environmental hazards if released into the air.

## Transportation and Installation

### ⚠WARNING

Lift the unit by placing the slings at designated locations. Support the outdoor unit securely at four points to keep it from slipping and sliding. If the unit is not properly supported, it may fall and cause personal injury.

### ⚠CAUTION

To reduce the risk of injury, do not carry the product by the PP bands that are used on some packages.

To reduce the risk of injury, products weighing 20 kg (44 lbs) or more should be carried by two or more people.

## Installation

### ⚠WARNING

Do not install the unit where there is a risk of leaking flammable gas.
If flammable gas accumulates around the unit, it may ignite and cause a fire or explosion.

To reduce the risk of injury from coming in contact with units, install units where they are not accessible to people other than maintenance personnel.

To reduce the risk of injury, properly dispose of the packing materials so that children will not play with them.

Properly dispose of the packing materials. Plastic bags pose suffocation hazard to children.

All drainage work should be performed by the dealer or qualified personnel according to the instructions detailed in the Installation Manual. Improper drainage work may cause water leakage and resultant damage to the furnishings.

**Remove packing materials from the unit before operating the unit. Note that some accessories may be taped to the unit. Properly install all accessories that are required. Failing to remove the packing materials or failing to install required accessories may result in refrigerant leakage, oxygen deprivation, smoke, or fire.**

**Install the following safety devices according to system refrigerant amount, volume of installation space or residential space, and installation position.**

- Safety shut off valve and mechanical ventilation device

**Any additional parts must be installed by the dealer or qualified personnel. Only use the parts specified by Mitsubishi Electric. Installation by unauthorized personnel or use of unauthorized parts or accessories may result in water leakage, electric shock, or fire.**

**Take appropriate safety measures against wind gusts and earthquakes to prevent the unit from toppling over and causing injury.**

**To reduce the risk of injury from units falling or falling over, install the unit on a surface that is strong enough to support its weight.**

**To reduce the risk of injury from units falling or falling over, periodically check the installation base for damage.**

## ⚠CAUTION

**Do not install the unit over things that are vulnerable to water damage. Provide an adequate collective drainage system for the drain water from unit as necessary.**

**Do not install the unit over things that are vulnerable to water damage. When the indoor humidity exceeds 80% or if the drain water outlet becomes clogged, condensation may drip from the indoor unit onto the ceiling or floor.**

**To reduce the risk of damage to the unit and resultant electric leak and electric shock, keep small animals, snow, and rain water from entering the unit by closing the gap in the pipe and wire access holes.**

**To reduce the risk of rain water or drain water from entering the room and damaging the interior, drainage work must be performed by your dealer or qualified personnel according to the instructions detailed in the Installation Manual.**

**To reduce the risk of drain water overflow, install the unit horizontally, using a level.**

## Piping Work

## ⚠WARNING

**To reduce the risk of injury, including frost bites, that may result from being blasted with refrigerant, use caution when operating the refrigerant service valve. If refrigerant comes into contact with an open flame, toxic gases, ignition, or fire may result.**

**To reduce the risk of refrigerant catching fire and causing burns, remove the refrigerant gas and the residual refrigerant oil in the pipes before heating them.**

**To reduce the risk of pipe damage, refrigerant leakage, and oxygen deprivation, use pipes that meet the pipe thickness specifications, which vary by the type of refrigerant used, pipe diameter, and pipe material.**

**To reduce the risk of pipe burst or explosion, evacuate the refrigerant circuit using a vacuum pump, and do not purge the system with refrigerant.**

**To reduce the risk of explosion and deterioration of refrigerant oil caused by chloride, do not use oxygen, flammable gas, or refrigerant that contains chloride as a pressurizing gas.**

**To prevent explosion, do not heat the unit with refrigerant gas in the refrigerant circuit.**

**Check for refrigerant leaks. If refrigerant leaks, oxygen deprivation may result. If refrigerant comes into contact with an open flame, toxic gases, ignition, or fire may result.**

**Insulate pipe connections after completing the air tightness test. Performing an air tightness test with the pipe being insulated may lead to failure to detect refrigerant leakage and cause oxygen deprivation.**

**To reduce the risk of pipe damage and resultant refrigerant leakage and oxygen deprivation, keep the field-installed pipes out of contact with the edges of components.**

**Pipe-work including piping material, pipe routing, and installation shall be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52.**

**After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements;**

-The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

**Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the MAXIMUM ALLOWABLE PRESSURE. No leak shall be detected.**

**When breaking into the refrigerant circuit to make repairs or for any other purpose, the following procedure shall be adhered to.**

-safely remove refrigerant following local and national regulations;

-continuously flush or purge with inert gas when using flame to open circuit;

-open the circuit.

**The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. The system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.**

**The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.**

**Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.**

**Cylinders shall be kept in an appropriate position according to the instructions.**

**Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.**

**Indicate the refrigerant charge on the label when charging is complete.**

**Extreme care shall be taken not to overfill the REFRIGERATING 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.**

**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 is 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 the flammable refrigerant. If in doubt, the manufacturer should be consulted. 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.**

**The recovered refrigerant shall be processed according to local legislation 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 compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

## ⚠CAUTION

To reduce the risk of pipe bursting and explosion due to abnormal pressure rise, do not allow any substances other than R32 (such as air) to enter the refrigerant circuit.

To reduce the risk of water leakage and resultant damage to the furnishings, drain piping work must be performed by your dealer or qualified personnel according to the instructions detailed in the Installation Manual.

To keep the ceiling and floor from getting wet due to condensation, properly insulate the pipes.

## Wiring Work

### ⚠WARNING

To reduce the risk of wire breakage, overheating, smoke, and fire, keep undue force from being applied to the wires.

To reduce the risk of wire breakage, overheating, smoke, or fire, properly secure the cables in place and provide adequate slack in the cables so as not to stress the terminals.

To reduce the risk of injury or electric shock, switch off the main power before performing electrical work.

All electric work must be performed by a qualified electrician according to the local regulations, standards, and the instructions detailed in the Installation Manual. Capacity shortage to the power supply circuit or improper installation may result in malfunction, electric shock, smoke, or fire.

To reduce the risk of electric shock, smoke, or fire, install an earth leakage breaker on the power supply to each unit.

To reduce the risk of electric shock, smoke, or fire, install an earth leakage breaker on the power supply to each unit. (Applicable to inverter units only)

Use properly rated breakers and fuses (earth leakage breaker, local switch <switch + fuse>, no-fuse breaker). The use of a breaker with a breaking capacity greater than the specified capacity may cause electric shock, malfunctions, smoke, or fire.

Use properly rated breakers and fuses (earth leakage breaker, local switch <switch + fuse>, no-fuse breaker). The use of a breaker with a breaking capacity greater than the specified capacity may cause electric shock, malfunctions, smoke, or fire. (Applicable to inverter units only)

To reduce the risk of current leakage, overheating, smoke, or fire, use properly rated cables with adequate current carrying capacity.

Proper grounding must be provided by a licensed electrician.
Do not connect the grounding wire to a gas pipe, water pipe, lightning rod, or telephone wire. Improper grounding may result in electric shock, smoke, fire, or malfunction due to electrical noise interference.

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.

### ⚠CAUTION

To reduce the risk of current leakage, wire breakage, smoke, or fire, keep the wiring out of contact with the refrigerant pipes and other parts, especially sharp edges.

Have all electric work done by a licensed electrician according to “Electric Facility Engineering Standard” and “Interior Wire Regulations” and the instructions given in this manual and always use a dedicated power supply.

## Relocation and Repairs

### ⚠WARNING

To reduce the risk of refrigerant leakage, water leakage, injury, electric shock, and fire, units should only be moved or repaired by your dealer or qualified personnel.

To reduce the risk of wire shorting, electric leak, electric shock, smoke, or fire, do not perform maintenance work in the rain.

To reduce the risk of injury, electric shock, and fire, properly reinstall all removed components after completing repair work.

### ⚠CAUTION

To reduce the risk of wire shorting, electric shock, malfunctions, or fire, keep circuit boards dust free, and do not touch them with your hands or tools.

To reduce the risk of refrigerant and water leakage, check the pipe supports and insulation for damage during inspection or repair, and replace or repair the ones that are found to be deteriorated.

## Additional Precautions

To avoid damage to the unit, use appropriate tools to install, inspect, or repair the unit.

To reduce the risk or malfunction, turn on the power at least 12 hours before starting operation, and leave the power turned on throughout the operating season.

Recover all refrigerant in the units, and dispose of it properly according to any applicable laws and regulations.

To reduce the risk of deterioration of refrigerant oil and compressor malfunctions caused by the use of refrigerant other than R32, only use R32.

Provide a maintenance access to allow for the inspection of pipes above the ceiling or the buried pipes.

Take appropriate measures against electrical noise interference when installing the air conditioners in hospitals or facilities with radio communication capabilities. Inverter, high-frequency medical, or wireless communication equipment as well as power generators may cause the air conditioning system to malfunction. Air conditioning system may also adversely affect the operation of these types of equipment by creating electrical noise.

To reduce the risk of damage to the unit, leave the valves on the unit closed until refrigerant charging is completed.

Place a wet towel on the refrigerant service valve before brazing the pipes to keep its temperature from rising above 120ºC and damaging the surrounding equipment.

**Direct the blazing torch flame away from the adjacent cables and sheet metal to keep them from being overheated and damaged.**

**Prepare tools for exclusive use with R32. Do not use the following tools if they have been used with the conventional refrigerant (R410A): refrigerant recovery cylinder, refrigerant cylinder. Use a leak detector that is compatible with R32. Infiltration of the residual refrigerant, refrigerant oil, or water on these tools may cause the refrigerant oil in the new system to deteriorate or damage the compressor.**

**To reduce the risk of the vacuum pump oil backflowing into the refrigerant cycle and causing the refrigerant oil to deteriorate, use a vacuum pump with a check valve.**

**Have a set of tools for exclusive use with R32. Consult your nearest Mitsubishi Electric Dealer.**

**Keep dust, dirt, and water off charging hose. Infiltration of dust, dirt, or water into the refrigerant circuit may cause the refrigerant oil to deteriorate or damage the compressor.**

**Use refrigerant piping and couplings that meet the applicable standards. For refrigerant pipes, use pipes made of phosphorus deoxidized copper. Keep the inner and outer surfaces of pipes and couplings clean and free of such contaminants as sulfur, oxides, dust, dirt, shaving particles, oil, and moisture. Failure to follow these directions may result in the deterioration of refrigerant oil or compressor damage.**

**Store the piping materials indoors, and keep both ends of the pipes sealed until immediately before brazing. Keep elbows and other joints in plastic bags. Infiltration of dust, dirt, or water into the refrigerant circuit may cause the refrigerant oil to deteriorate or damage the compressor.**

**To reduce the risk of oxidized film from entering the refrigerant pipe and causing the refrigerant oil to deteriorate or damaging the compressor, braze pipes under nitrogen purge.**

**Do not use the existing refrigerant piping. A large amount of chloride that is contained in the residual refrigerant and refrigerant oil in the existing piping may cause the refrigerant oil in the new unit to deteriorate or damage the compressor.**

**Charge the system with an appropriate amount of refrigerant in the liquid phase. Refer to the relevant sections in the manuals to calculate the appropriate amount of refrigerant to be charged. Refrigerant overcharge or undercharge may result in performance drop, abnormal stop of operation, or compressor failure.**

**To reduce the risk of power capacity shortage, always use a dedicated power supply circuit.**

**To reduce the risk of both the breaker on the product side and the upstream breaker from tripping and causing problems, split the power supply system or provide protection coordination between the earth leakage breaker and no-fuse breaker.**

**Have a backup system, if failure of the unit has a potential for causing significant problems or damages.**

# CONTENTS

## Chapter 1 Check Before Servicing

## Chapter 2 Restrictions

## Chapter 3 Major Components, Their Functions and Refrigerant Circuits

## Chapter 4 Electrical Components and Wiring Diagrams

## Chapter 5 Control

## Chapter 6 Test Run

## Chapter 7 Troubleshooting Using Error Codes

## Chapter 8 Troubleshooting Based on Observed Symptoms

## Chapter 9 USB Function

## Chapter 10 LED Status Indicators

## Chapter 11 Safety for Leak

# Chapter 1 Check Before Servicing

# 1-1 Preparation for Piping Work

## 1-1-1 Read before Servicing

1. **Check the type of refrigerant used in the system to be serviced.**
   **Refrigerant Type**
   Multi air conditioner for building application CITY MULTI:R32

2. **Check the symptoms exhibited by the unit to be serviced.**
   Refer to this service handbook for symptoms relating to the refrigerant cycle.

3. **Thoroughly read the safety precautions at the beginning of this manual.**

4. **Preparing necessary tools: Prepare a set of tools to be used exclusively with each type of refrigerant.**
   For information about the correct use of tools, refer to the following page(s). [1-1-2 Tool Preparation]

5. **Verification of the connecting pipes: Verify the type of refrigerant used for the unit to be moved or replaced.**
   - Use refrigerant pipes made of phosphorus deoxidized copper. Keep the inner and outer surfaces of the pipes clean and free of such contaminants as sulfur, oxides, dust, dirt, shaving particles, oil, and water.
   - These types of contaminants inside the refrigerant pipes may cause the refrigerant oil to deteriorate.

6. **Leaked refrigerant that comes into contact with fire or a heated area may generate poisonous gas, posing a fire risk. Ensure the work area is well ventilated.**

> Note
> - Install new pipes immediately after removing old ones to keep moisture out of the refrigerant circuit.
> - The use of refrigerant that contains chloride, such as R22, will cause the refrigerating machine oil to deteriorate.

7. **Specifications and system requirements may differ for products manufactured at different times. Refer to the relevant chapters for specification details. Production periods can be found from the serial number as follows.**

**5XW**○○○···

1~9: Jan to Sept.
X~Z: Oct to Dec. (Production month)

5: April 2025 to March 2026 (Production year)

| | | | |
|---|---|---|---|
| ex) | 5ZW | December | 2025 |
| | 51W | January | 2026 |
| | 52W | February | 2026 |
| | 53W | March | 2026 |
| | 64W | April | 2026 |

## 1-1-2 Tool Preparation

Prepare the following tools and materials necessary for installing and servicing the unit.

### Tools for R32 (Availability of tools for R22, R407C, and R410A models)

◎ : Tools that can be shared with older models (R22, R407C, and R410A)

○ : Tools or materials that can be shared with older models (R22, R407C, and R410A) under certain conditions

△ : Tools or materials that cannot be shared with older models (R22, R407C, and R410A) (New tools or materials need to be prepared.)

× : Tools that are prohibited for use

| Tools/Materials | Availability | | | Use | Notes |
|---|---|---|---|---|---|
| | R22 | R407C | R410A | | |
| Gauge manifold | △ | △ | ◎*1 | Evacuation and refrigerant charging | Pressure on the high-pressure side is 5.09 MPa [738 psi]  or higher. |
| Charging hose | △ | △ | ◎*1 | Evacuation and refrigerant charging | The hose diameter is larger than the conventional model. |
| Charging port on the Refrigerant cylinder | △ | △ | ◎*1 | Refrigerant charging | The charge port diameter is larger than that of the current port. |
| Refrigerant recovery cylinder | △ | △ | △ | Refrigerant charging | |
| Refrigerant cylinder | △ | △ | △ | Refrigerant charging | The refrigerant type is indicated. The top of the cylinder is light blue. |
| Gas Leak detector | ○ | ○ | ○ | Gas leak detection | Can be used if compatible with R32 refrigerant. (Combustion type cannot be used.) |
| Vacuum pump | ○ | ○ | ○ | Vacuum drying | Can be used with a check valve adapter installed (if R32-compatible). |
| Refrigerant recovery equipment | ○ | ○ | ○ | Refrigerant recovery | Can be used if compatible with R32 refrigerant. |
| Vacuum pump with a check valve | ○ | ○ | ○ | Vacuum drying | Can be used if compatible with R32 refrigerant. |
| Bender | ◎ | ◎ | ◎ | Bending pipes | |
| Torque wrench | ◎ | ◎ | ◎ | Tightening flare nuts | The flare processing dimensions for pipes that have a diameter of ø12.7 (1/2") or ø15.88 (5/8") have been increased. |
| Pipe cutter | ◎ | ◎ | ◎ | Cutting pipes | |
| Welder and nitrogen cylinder | ◎ | ◎ | ◎ | Welding pipes | |
| Refrigerant charging meter | ◎ | ◎ | ◎ | Refrigerant charging | |
| Vacuum gauge | ◎ | ◎ | ◎ | Vacuum level check | |
| Charging cylinder | × | × | × | Refrigerant charging | Prohibited to use. |
| Tools containing abrasive materials | × | × | × | Cutting pipes | Prohibited to use. |

*1 When sharing tools between R32 and R410A models, perform a nitrogen blow to remove refrigerant oil and other deposits before each use.
Nitrogen blow:
Set the nitrogen pressure to 1.0 MPa and blow nitrogen for 10 seconds. Cover the port on the opposite side of the nitrogen blow instrument with a cloth.

**Extreme caution must be taken to ensure that no water or dust enters the tools.**

# 1-2 Handling and Characteristics of Piping Materials, Refrigerant, and Refrigerant Oil

## 1-2-1 Piping Materials

Do not use the existing piping!

### 1. Copper pipe materials

| | |
|---|---|
| Annealed | Soft copper pipes (annealed copper pipes). They can easily be bent with hands. |
| Drawn | Hard copper pipes (straight pipes). They are stronger than the Annealed at the same radial thickness. |

- The distinction between Annealed and Drawn is made based on the strength of the pipes themselves.
- Annealed can easily be bent with hands.
- Drawn are considerably stronger than Annealed at the same thickness.

### 2. Types of copper pipes

| Maximum working pressure | Refrigerant type |
|---|---|
| 3.45 MPa [500psi] | R22, R407C etc. |
| 4.30 MPa [624psi] | R32, R410A etc. |

### 3. Piping materials/Radial thickness

Select piping materials that meet the requirements set forth in ASTM B280.

### 4. Thickness and refrigerant type indicated on the piping materials

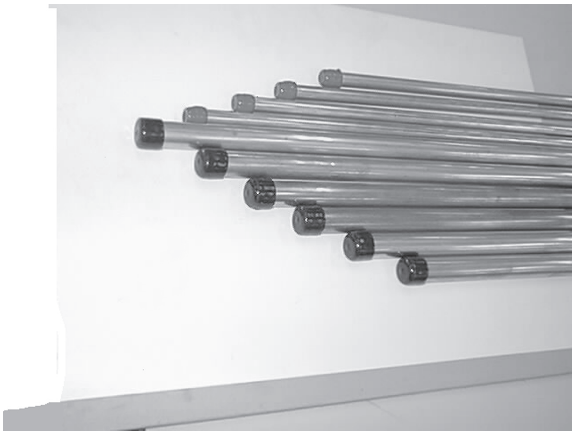
Ask the pipe manufacturer for the symbols indicated on the piping material for refrigerant R32.

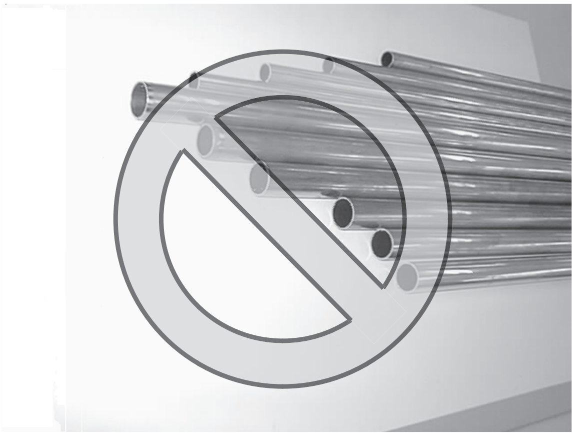
## 1-2-2 Storage of Piping Materials

### 1. Storage location

Store the pipes to be used indoors. (Warehouse at site or owner's warehouse)
If they are left outdoors, dust, dirt, or moisture may infiltrate and contaminate the pipe.

### 2. Sealing the pipe ends





Both ends of the pipes should be sealed until just before brazing.
Keep elbow pipes and T-joints in plastic bags.

Refrigerant oil is highly hygroscopic and is likely to degrade and cause compressor failure if moisture infiltrates into the system. Storage of piping materials requires stringent management.

## 1-2-3 Pipe Processing

Prevent the particles that are generated during pipe cutting or cut edge treatment from entering the pipes. If abrasive materials contained in sandpaper or cutting tools enter the refrigerant circuit, they may cause the compressor, valves, or other refrigerant circuit components to fail.

**Note**

- To deburr pipes, use a reamer or other deburring tools, not sandpaper.
- To cut pipes, use a pipe cutter, not a grinder or other tools that use abrasive materials.
- When cutting or deburring pipes, do not allow cutting chips or other foreign matters to enter the pipes.
- If cutting chips or other foreign matters enter pipes, wipe them off the inside of the pipes.

## 1-2-4 Differences in Refrigerant Properties

### 1. Chemical characteristics

R32, one of the two components of R410A, is a less toxic and chemically stable hydrofluorocarbon. Because R32 has an atmospheric lifespan of just 4.9 years, it has little impact on global warming. However, since R32 has a high percentage of hydrogen, it is slightly flammable.

<Comparison table of R32, R410A, R407C, and R22 characteristics>

| | HFC | | | HCFC |
|---|---|---|---|---|
| Refrigerant | R32 | R410A | R407C | R22 |
| Component | HFC32 | HFC32/HFC125 | HFC32/HFC125/ HFC134a | HCFC22 |
| Composition (%) | 100 | 50/50 | 23/25/52 | 100 |
| Type | Single refrigerant | Near-azeotropic refrigerant mixture | Non-azeotropic refrigerant | Single refrigerant |
| Chlorine | Not contained | Not contained | Not contained | Contained |
| Safety class | A2L | A1/A1 | A1/A1/A1 | A1 |
| Pressure (physical property) [MPa (abs)] *1 | 3.14 | 3.07 | 2.11 | 1.94 |
| Pressure (physical property) [psi (abs)] *1 | 455 | 445 | 306 | 281 |
| Boiling point [°C] | -51.7 | -51.4 | -43.6 | -40.8 |
| Boiling point [°F] | -61.06 | -60.52 | -46.48 | -41.44 |
| Vapor pressure (25°C) [MPaG] | 1.588 | 1.557 | 0.9177 | 0.94 |
| Vapor pressure [psiG] | 230 | 226 | 133 | 136 |
| Ozone Depletion Potential (ODP) *2 | 0 | 0 | 0 | 0.055 |
| Global Warming Potential (GWP) *3 | 675 | 2090 | 1770 | 1810 |
| Charging | Liquid and gas charging | Liquid charging | Liquid charging | Gas charging |
| Additional charging when refrigerant leaks | Allowed | Allowed | Non allowed | Allowed |

*1 Physical property at 50°C

*2 Relative to CFC11

*3 GWP = Global Warming Potential (Each value is based on the IPCC Forth Assessment Report.)

### 2. Pressure characteristics

As shown in the table below, the vapor pressure of R32 is almost as high as that of R410A at the same temperatures.
As with R410A, perform installation and servicing with high-pressure resistant tools and materials.

<Comparison table of saturated vapor pressure>

| Temperature | Refrigerant | | | |
|---|---|---|---|---|
| | R32 | R410A | R407C | R22 |
| -20°C (-4°F) | 0.30 MPa (44 psi) | 0.30 MPa (44 psi) | 0.11 MPa (16 psi) | 0.14 MPa (20 psi) |
| 0°C (32°F) | 0.71 MPa (103 psi) | 0.70 MPa (102 psi) | 0.36 MPa (52 psi) | 0.40 MPa (58 psi) |
| 20°C (68°F) | 1.37 MPa (199 psi) | 1.34 MPa (194 psi) | 0.78 MPa (113 psi) | 0.81 MPa (117 psi) |
| 40°C (104°F) | 2.38 MPa (345 psi) | 2.32 MPa (336 psi) | 1.44 MPa (209 psi) | 1.43 MPa (207 psi) |
| 60°C (140°F) | 3.84 MPa (557 psi) | 3.73 MPa (541 psi) | 2.43 MPa (352 psi) | 2.33 MPa (338 psi) |
| 65°C (149°F) | 4.29 MPa (622 psi) | 4.17 MPa (605 psi) | 2.74 MPa (397 psi) | 2.60 MPa (377 psi) |

* The figures are calculated using NIST REFPROP V8.0.

## 3. Flammability

R32 may burn slightly if the following conditions (gas concentration and ignition energy) are met.

### (1) Flammable gas concentration (when mixed with air)

R32 may burn if within the following flammable range when an ignition source is near. However, in comparison with propane, for example, R32 may not burn unless its concentration is higher than that of propane. Although the flammable concentration range of R32 could lead to oxygen deficiency (oxygen level of less than 18%), this is not typical in normal working environments.

<Flammable range> Unit (vol%)

| | R32 | (Reference) R290 (propane) |
|---|---|---|
| Upper limit | 29.3 | 9.5 |
| Lower limit (source: ASHRAE 34-2024) | 14.4 | 2.1 |

### (2) Energy required for ignition

R32 requires a large amount of energy for ignition and will not be ignited by static electricity from the human body or sparks from an electronic lighter (energy: a few mJ). Therefore, it can be said that R32 is harder to ignite than propane.

<Minimum ignition energy> Unit (mJ)

| | R32 | (Reference) R290 (propane) |
|---|---|---|
| Minimum ignition energy | 15 | 0.246 |

### (3) Combustion speed

Since the combustion speed of R32 is slow, it does not burn explosively like propane.

<Combustion speed> Unit (cm/s)

| | R32 | (Reference) R290 (propane) |
|---|---|---|
| Combustion speed | 6.7 | 38.7 |

As noted above, R32 will not ignite under normal air conditioning or working conditions. However, in the event of ignition, be careful of spreading flames.

## 1-2-5 Refrigerant Oil

### 1. Refrigerant oil for R32 systems

Unlike the mineral oil used in R22 systems, R32 systems use synthetic oil, which is also used in R410A systems. However, the properties of synthetic oil may vary by manufacturer, so use the refrigerant oil specified by Mitsubishi Electric.

### 2. Effects of contaminants[*1]

Refrigerating machine oil used in the HFC system must be handled with special care to keep contaminants out.
The table below shows the effect of contaminants in the refrigerating machine oil on the refrigeration cycle.

### 3. The effects of contaminants in the refrigerating machine oil on the refrigeration cycle.

| Cause | | Symptoms | | Effects on the refrigerant cycle |
|---|---|---|---|---|
| Water infiltration | | Frozen expansion valve and capillary tubes | | Clogged expansion valve and capillary tubes<br>Poor cooling performance<br>Compressor overheat<br>Motor insulation failure<br>Burnt motor<br>Coppering of the orbiting parts<br>Lock<br>Burn-in on the orbiting parts |
| | | Hydrolysis | Sludge formation and adhesion<br>Acid generation<br>Oxidization<br>Oil degradation | |
| Air infiltration | | Oxidization | | |
| Infiltration of contaminants | Dust, dirt | Adhesion to expansion valve and capillary tubes | | Clogged expansion valve, capillary tubes, and drier<br>Poor cooling performance<br>Compressor overheat |
| | | Infiltration of contaminants into the compressor | | Burn-in on the orbiting parts |
| | Mineral oil etc. | Sludge formation and adhesion | | Clogged expansion valve and capillary tubes<br>Poor cooling performance<br>Compressor overheat |
| | | Oil degradation | | Burn-in on the orbiting parts |

---

[*1] Contaminants is defined as moisture, air, processing oil, dust/dirt, wrong types of refrigerant, and refrigerating machine oil.

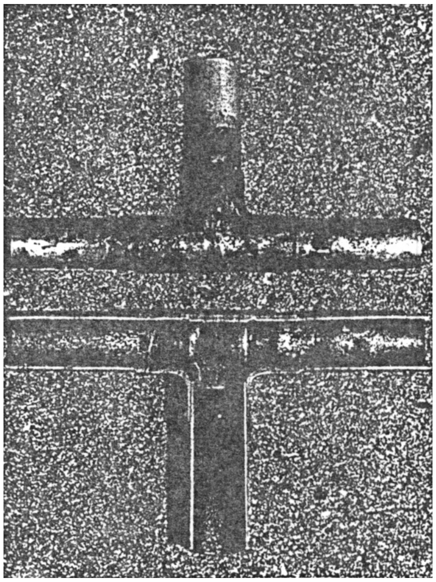
# 1-3 Working with Refrigerant Piping

## 1-3-1 Pipe Brazing

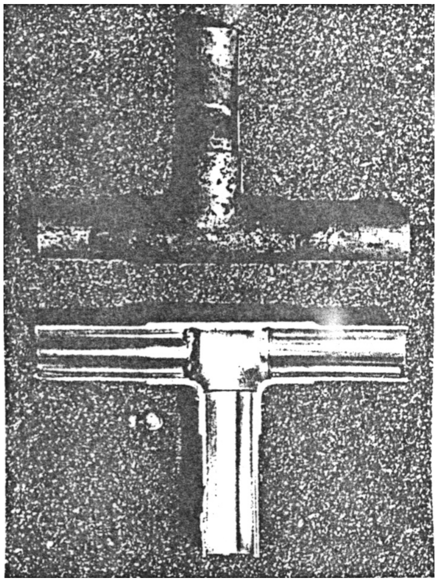
Perform brazing with special care to keep foreign objects (such as oxide scale, copper powder, water, and dust) out of the refrigerant system.

Example: Inside the brazed connection

Use of no inert gas during brazing



Use of inert gas during brazing



### 1. Items to be strictly observed

- Do not conduct refrigerant piping work outdoors if raining.
- Use inert gas during brazing.
- Use a brazing material (BCuP-3) that requires no flux when brazing between copper pipes or between a copper pipe and copper coupling.
- If installed refrigerant pipes are not immediately connected to the equipment, then braze and seal both ends.

### 2. Reasons

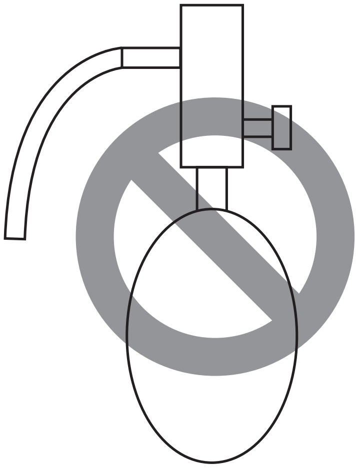
- The new refrigerant oil has over 10 times the water absorption capacity of the older types, and is more likely to cause unit failure if water enters the system.
- Flux typically contains chlorine, and any residual flux within the refrigerant circuit may form sludge.

### 3. Notes

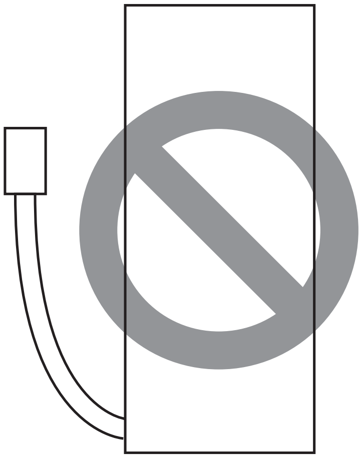
Do not use commercially available antioxidants because they may cause the pipes to corrode or refrigerating machine oil to deteriorate.

## 1-3-2 Air Tightness Test

Note that the refrigerant leak detectors for R22 and R410A cannot detect R32 refrigerant leaks.



Halide torch



R22 and R410A leakage detector

### 1. Items to be strictly observed

- Pressurize the equipment with nitrogen up to the design pressure (4.15MPa[601psi]), and then judge the equipment's air tightness, taking temperature variations into account.

### 2. Reasons

- Oxygen, if used for an air tightness test, poses a risk of explosion. (Only use nitrogen to check air tightness.)

### 3. Notes

The refrigerant leak detectors for R22 and R410A cannot detect R32 refrigerant leaks. Purchase a commercial refrigerant leak detector for HFC (R32) if needed.

## 1-3-3 Vacuum Drying

(Photo1) 15010H

(Photo2) Recommended vacuum gauge

### 1. Vacuum pump with a reverse-flow check valve (Photo1)

To prevent the vacuum pump oil from flowing into the refrigerant circuit during power OFF or power failure, use a vacuum pump with a reverse-flow check valve.
A reverse-flow check valve may also be added to the vacuum pump currently in use.

### 2. Standard of vacuum degree (Photo1 and 2)

Use a vacuum pump that attains 0.5 Torr (65 Pa) or lower degree of vacuum after 5 minutes of operation, and connect it directly to the vacuum gauge. Use a pump well-maintained with an appropriate lubricant. A poorly maintained vacuum pump may not be able to attain the desired degree of vacuum.

### 3. Required precision of vacuum gauge (Photo2)

Use a vacuum gauge that registers a vacuum degree of 5 Torr (650 Pa) and measures at intervals of 1 Torr (130 Pa).
(A recommended vacuum gauge is shown in Photo2.)
Do not use a commonly used gauge manifold because it cannot register a vacuum degree of 5 Torr (650 Pa).

### 4. Evacuation time

- After the degree of vacuum has reached 5 Torr (650 Pa), evacuate for an additional 1 hour. (A thorough vacuum drying removes moisture in the pipes.) When the outside temperature drops below 1°C (or when the saturation pressure drops below 656 Pa), continue vacuum drying for another 1 hour after the vacuum degree has reached the saturated vapor pressure of the water (ice) at the outside temperature. When performing vacuum drying at a low outside temperature, use a vacuum gauge appropriate for the temperature range.

Degree of vacuum (reference)

| Outdoor temp. | -20°C (-4°F) | -15°C (5°F) | -10°C (14°F) | -5°C (23°F) | 0°C (32°F) |
|---|---|---|---|---|---|
| Degree of vacuum | 0.77 Torr (103 Pa) | 1.24 Torr (165 Pa) | 1.95 Torr (260 Pa) | 3.01 Torr (402 Pa) | 4.58 Torr (611 Pa) |

* Degrees of vacuum shown above are obtained based on the saturated vapor pressure of ice.
* In a system using water heat exchangers, circulate water to prevent the water in the heat exchangers from freezing during vacuum drying.

- Verify that the vacuum degree has not risen by more than 1 Torr (130 Pa) 1hour after evacuation. A rise by less than 1 Torr (130 Pa) is acceptable.
- If the vacuum is lost by more than 1 Torr (130 Pa), conduct evacuation, following the instructions in section 6. Special vacuum drying.

### 5. Procedures for stopping vacuum pump

To prevent the reverse flow of vacuum pump oil, open the relief valve on the vacuum pump side, or draw in air by loosening the charge hose, and then stop the operation.
The same procedures should be followed when stopping a vacuum pump with a reverse-flow check valve.

### 6. Special vacuum drying

- When 5 Torr (650 Pa) or lower degree of vacuum cannot be attained after 3 hours of evacuation, it is likely that water has penetrated the system or that there is a leak.
- If water infiltrates the system, break the vacuum with nitrogen. Pressurize the system with nitrogen gas to 0.5 kgf/cm$^2$G (0.05 MPa) and evacuate again. Repeat this cycle of pressurizing and evacuation either until the degree of vacuum below 5 Torr (650 Pa) is attained or until the pressure stops rising.
- Only use nitrogen gas for vacuum breaking. (The use of oxygen may result in an explosion.)

## 7. Triple Evacuation

The method below can also be used to evacuate the system.

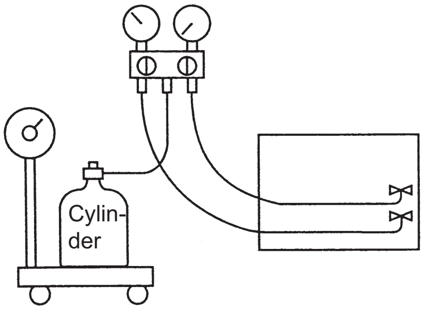
- Evacuate the system to 4 Torr (520 Pa) from both service valves. System manifold gauges must not be used to measure vacuum. A micron gauge must be used at all times. Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 Torr (0 Pa).
- Evacuate the system to 1.5 Torr (195 Pa) from the suction service valve. Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 Torr (0 Pa).
- Evacuate the system to 0.5 Torr (65 Pa). System must hold the vacuum at 0.5 Torr (65 Pa) for a minimum of 1 hour.
- Conduct a rise test for a minimum of 30 minutes

## 8. Notes

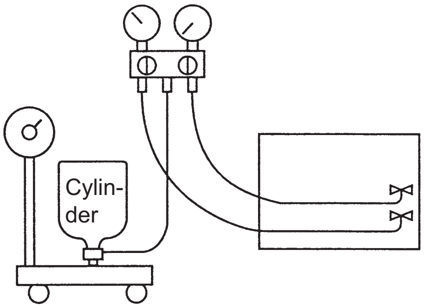
- **To evacuate air from the entire system**
  **Applying a vacuum through the check joints at the refrigerant service valve on the high and low pressure sides (BV1 and 2) is not enough to attain the desired vacuum pressure.**
  **Be sure to apply a vacuum through the check joints at the refrigerant service valve on the high and low pressure sides (BV1 and 2) and also through the check joints on the high and low pressure sides (CJ1 and 2).**
- **To evacuate air only from the outdoor units**
  **Apply a vacuum through the check joints on the high and low pressure sides (CJ2 and 6).**
- **To evacuate air from the indoor units and extension pipes**
  **Apply a vacuum through the check joints at the refrigerant service valve on the high and low pressure sides (BV1 and 2).**

## 1-3-4 Refrigerant Charging

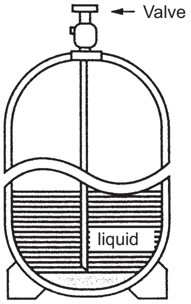
Cylinder with a siphon

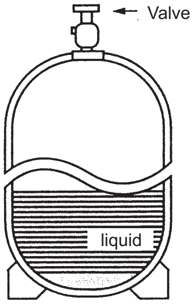


Cylinder without a siphon



Cylinder color R32 is light blue.





### 1. Notes

When using a cylinder with a siphon, refrigerant is charged in the liquid state without the need for turning it upside down. Check the type of the cylinder on the label before use.

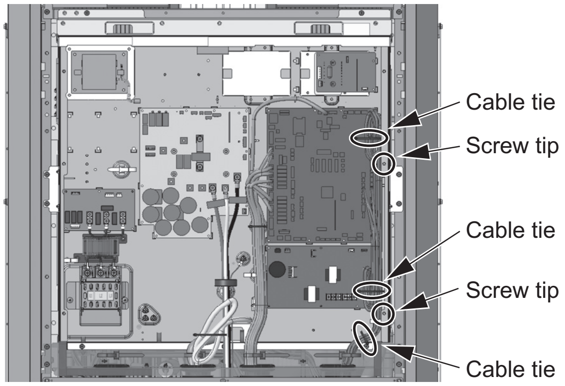
If the refrigerant leaks out, it may be replenished. The entire refrigerant does not need to be replaced. (Charge refrigerant in the liquid state.)
Refer to the following page(s). [8-11 Measures for Refrigerant Leakage]

Since R32 is a single-component refrigerant with a stable composition, it can be charged in both liquid and gas forms. However, charging the refrigerant from the low-pressure side too quickly can cause compressor failure. To avoid compressor failure, use a tool designed for use between the cylinder and the unit, or charge the refrigerant slowly.

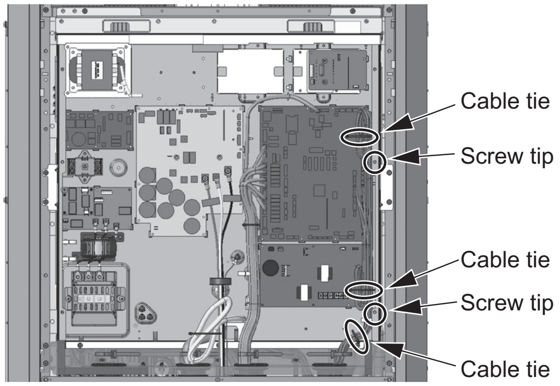
# 1-4 Precautions for Wiring

- Control boxes house high-voltage and high-temperature electrical parts.
- They may still remain energized or hot after the power is turned off.
- When opening the front panel of the control box for inspection, turn off the unit's power at least 10 minutes in advance and ensure that the voltage at the electrolytic capacitor (main inverter circuit) is 20 VDC or lower. (It takes about 10 minutes for the capacitor to discharge.)
- Before servicing, disconnect the CNINV connector on the outdoor unit fan circuit board, as well as the CNFA1 or CNFA2 connector on the inverter circuit board.
  (When connecting or disconnecting the connectors, ensure that the outdoor unit fan is not rotating and that the voltage at the main circuit capacitor is 20 VDC or lower. For details, refer to the wiring nameplate on the back of the control box front panel.)
  Do not touch the sub-circuit boards mounted upright on each circuit board. Applying excessive force to the sub-circuit boards may damage the mounted electronic components.
  After servicing, reconnect all disconnected connectors.
- When turning the unit's power on, the compressor will be energized even if it is not operating. Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, measure the insulation resistance, and check for ground faults.
  If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor. Then, turn on the outdoor unit and energize the compressor for at least the designated number of hours. For details, refer to the specified page. [6-1 Read before Test Run]
  (Energizing the compressor will help evaporate the liquid refrigerant accumulated inside, which will increase the insulation resistance.)
- When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
- If the system controller is connected to TB7 on the outdoor unit, it is recommended to connect a power supply unit for the transmission cable to TB7.
  Disconnecting the power supply switch connector from CN41 and connecting it to CN40 will allow the system controller to receive power from the outdoor unit. Note that even when the outdoor unit is turned OFF, power may still be supplied to TB7, causing the system controller to detect an error and issue an alarm.
  Up to three system controllers can be connected to TB3.
- If the system controller is connected to the centralized control transmission cable and supplied with power from the outdoor unit (by connecting the power supply switch connector to CN40 on the outdoor unit), even when the outdoor unit is turned OFF, the outdoor fan, if rotated by a strong wind or other factors, may cause the power to be supplied from the outdoor unit to the centralized control transmission cable, resulting in error detection or alarm issuance by the system controller.
- If the cable ties inside the control box are removed, ensure that the tips of the screws on the control box cover do not come into contact with the cables.

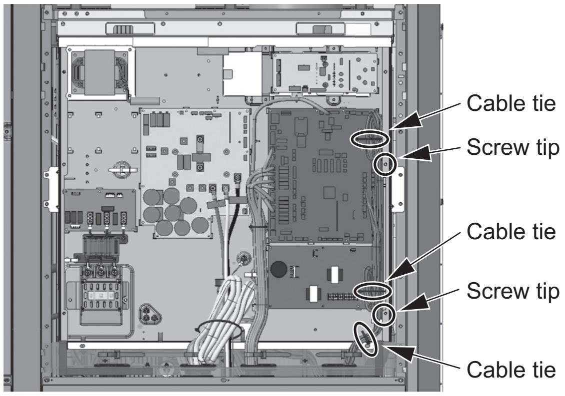
**EM72, EM96, EM120TXU, HM72TXU**



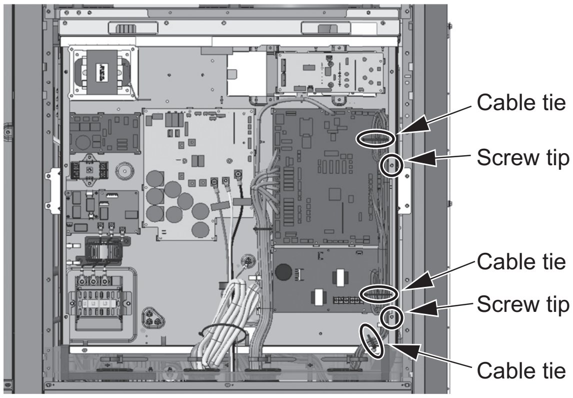
**EM72, EM96, EM120YXU, HM72YXU**



**EM144, EM168, EM192TXU, HM96, HM120TXU**



**EM144, EM168, EM192YXU, HM96, HM120YXU**



- When replacing the internal electrical components of the control box, tighten the screws to the recommended tightening torque as specified below.

Recommended tightening torque for the internal electrical components of the control box

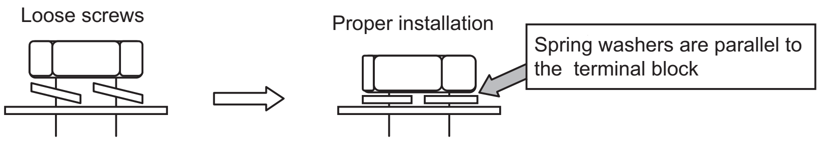
| Screw | Recommended tightening torque (N·m [lbf·ft]) |
|---|---|
| M3 | 0.69 [0.51] |
| M3.5 | 0.82 - 1.0 [0.60 - 0.74] |
| M4 | 1.47 [1.08] |
| M5 | 2.55 [1.88] *1 *3 |
| M6 | 2.75 [2.03] |
| M8 | 6.20 [4.57] |

∗1 Please replace according to the replacement instructions included with the substrate.
∗2 Deviating from the recommended tightening torque may cause damage to the unit or its parts.
∗3 The recommended torque for the screws that secure the DCL (DC reactor) is 4.00 (N·m).

Take the following steps to ensure that the screws are properly tightened.

1) Ensure that the spring washers are parallel to the terminal block.

Even if the tightening torque is observed, if the washers are not parallel to the terminal block, then the semiconductor module (e.g., INV board, fan board) is not installed properly.



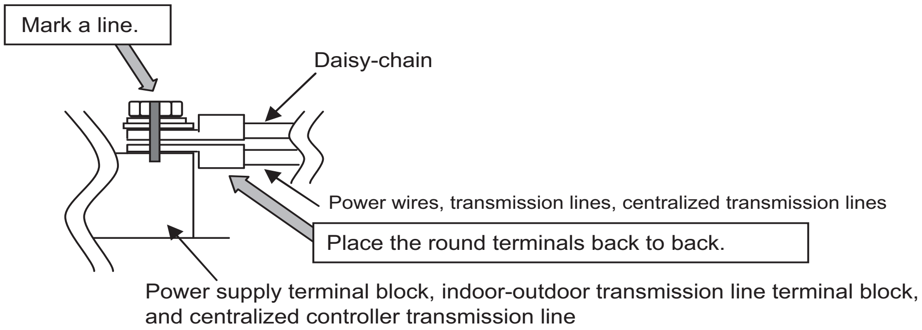
2) Check the wires are securely fastened to the screw terminals.

- **Screw the screws straight down so as not to damage the screw threads.**

Hold the two round terminals back to back to ensure that the screw will screw down straight.

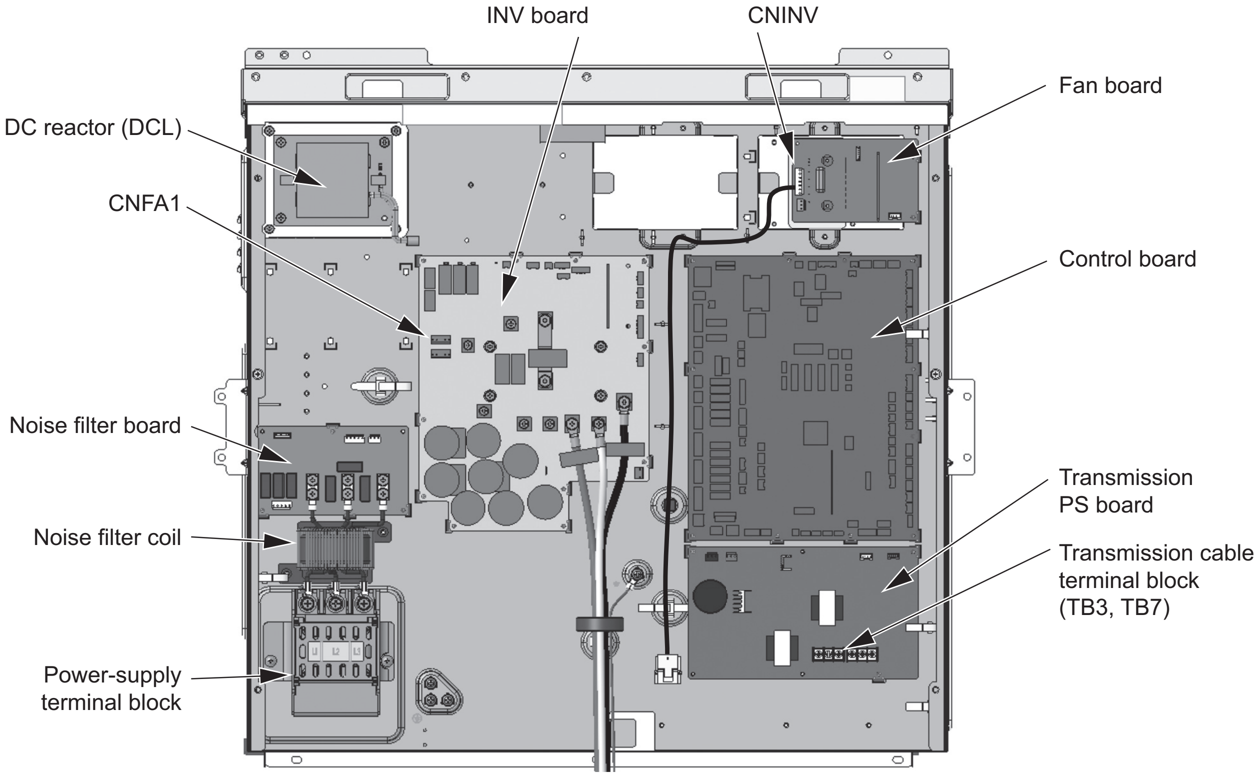
- **After tightening the screw, mark a line through the screw head, washer, and terminals with a permanent marker.**

Example

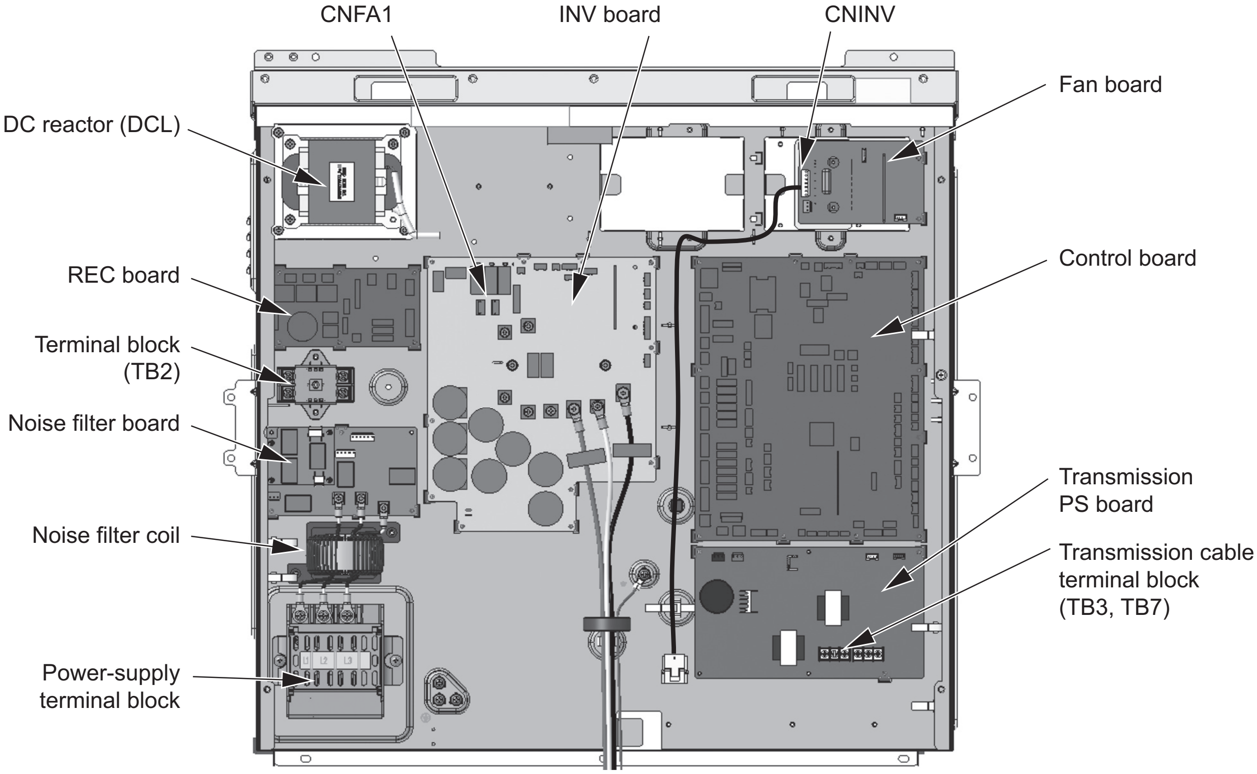


Poor contact caused by loose screws may result in overheating and fire.
Continued use of the damaged circuit board may cause overheating and fire.

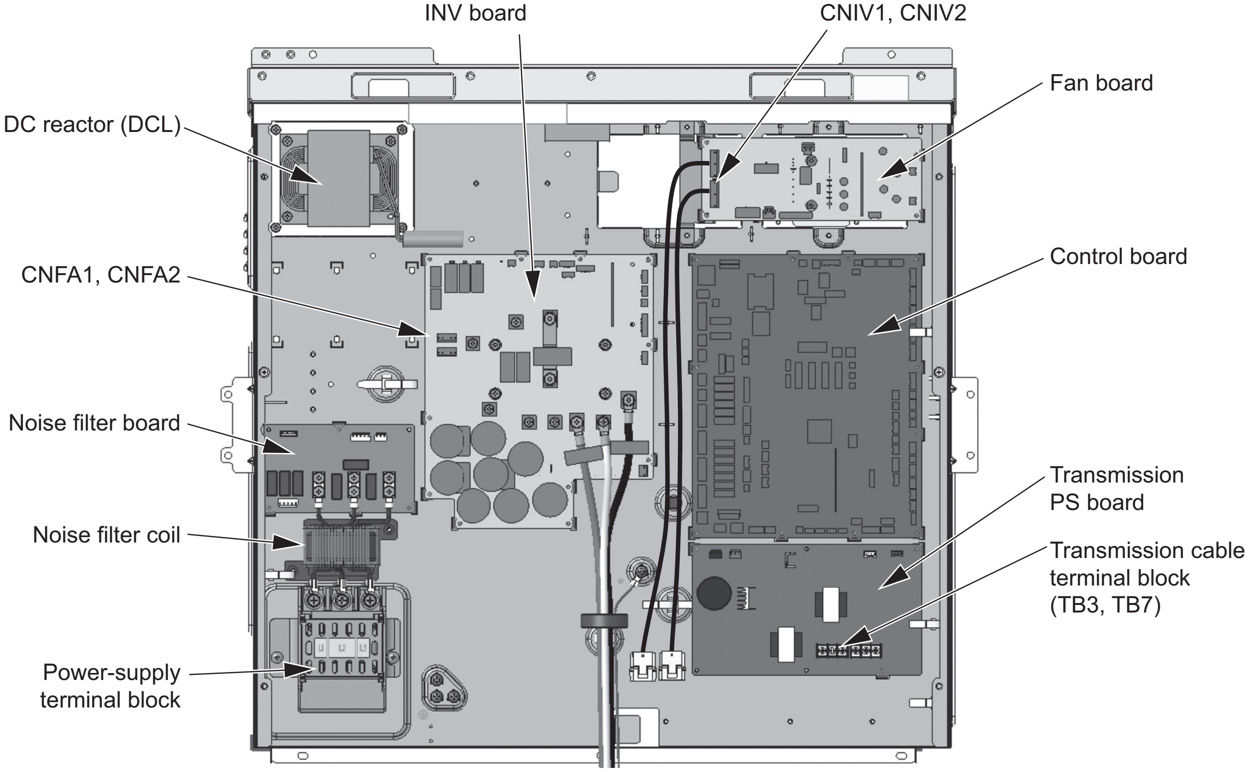
**EM72, EM96, EM120TXU, HM72TXU**



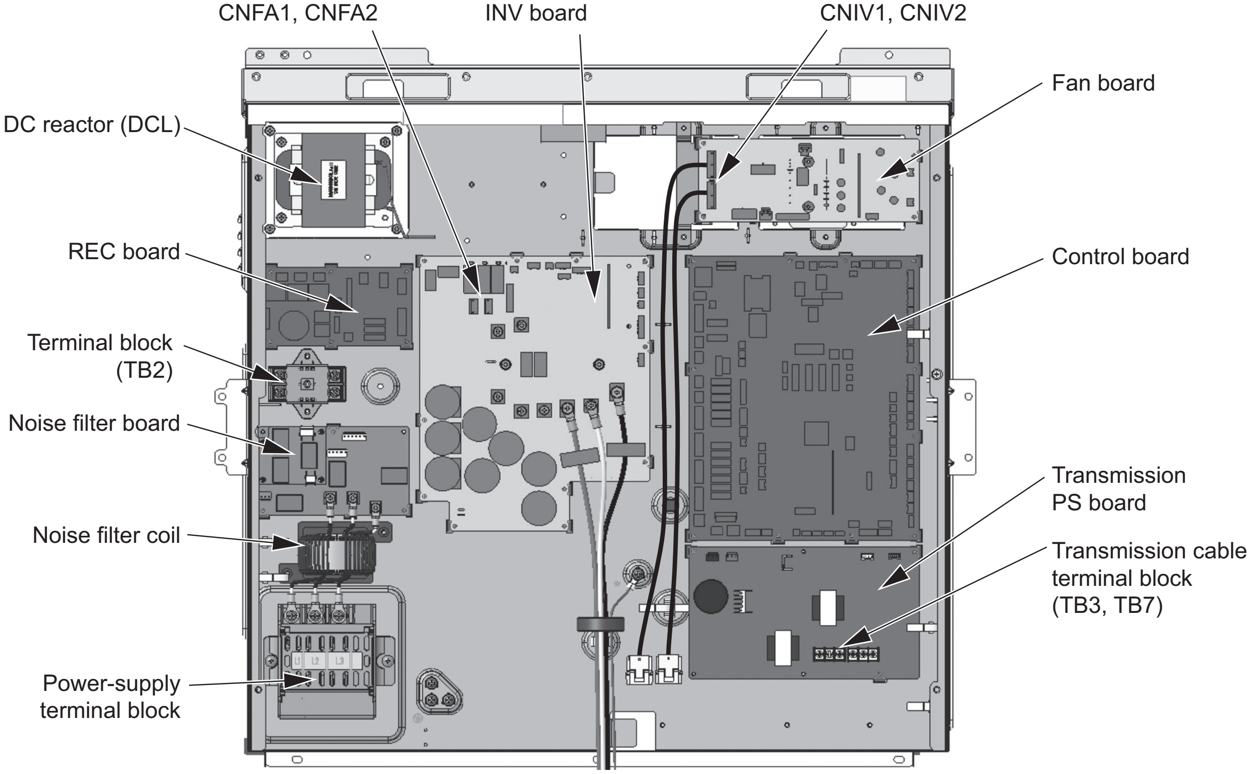
**EM72, EM96, EM120YXU, HM72YXU**



**EM144, EM168, EM192TXU, HM96, HM120TXU**



**EM144, EM168, EM192YXU, HM96, HM120YXU**



# 1-5 Cautionary notes on installation environment and maintenance

### Please note the following when installing and maintaining outdoor units in marine atmosphere.

1) Install the unit out of direct exposure to sea breeze, and minimize the exposure to salt water mist.
2) Avoid installing a sun shade over the outdoor unit, so that rain will wash away salt deposits off the unit.
3) Install the unit horizontally to ensure proper water drainage from the base of the unit. Accumulation of water in the base of the outdoor unit will significantly accelerate corrosion.
4) Periodically wash salt deposits off the unit, especially when the unit is installed in a coastal area.
5) Repair all noticeable scratches after installation and during maintenance.
6) Periodically check the unit, and apply anti-rust agent and replace corroded parts as necessary.

# 1-6 Inspection and maintenance

## 1-6-1 Guideline for preventive maintenance

The following maintenance intervals indicate the estimated intervals of parts replacement and repair to be required as a result of periodic inspections. They do not necessarily mean that replacement is required at the maintenance intervals.
**The maintenance intervals do not indicate the warranty period.**

| Parts | Inspection interval | Maintenance interval | Daily inspection | Maintenance inspection | Remarks |
|---|---|---|---|---|---|
| Compressor | 1 year | 20,000 hours |  | O |  |
| Fan motor |  |  |  | O |  |
| Electronic expansion valve |  |  |  | O |  |
| Valve |  |  |  | O |  |
| Heat exchanger |  | 5 years |  | O |  |
| Sensor |  | 20,000 hours |  | O |  |
| Electric board |  | 25,000 hours |  | O |  |
| Smoothing capacitor (Mounted on the inverter board) |  |  |  | O | Wide fluctuations in voltage may accelerate the deterioration of the unit. |

## 1-6-2 Recommended parts inspection interval

| Parts | Inspection interval | Inspection items | Criteria | Measures |
|---|---|---|---|---|
| Compressor | 1 year | ⬩Auditory check of operating sounds<br>⬩Measurement of insulation resistance<br>⬩Visual check for loose terminals | ⬩No abnormal sounds<br>⬩Insulation resistance must be 1 MΩ or above.<br>⬩No loose terminals | Replace the compressor if an insulation problem is found when the refrigerant is not stagnating. Retighten loose terminals. |
| Fan motor (for air-cooled outdoor unit) | | ⬩Auditory check of operating sounds<br>⬩Measurement of insulation resistance | ⬩No abnormal sounds<br>⬩Insulation resistance must be 1 MΩ or above. | Replace the fan motor if an insulation problem is found. |
| Electronic expansion valve | | ⬩Operation check using operation data<br>⬩Tactile and auditory operation check | ⬩Temperature must change in proportion to the valve position. (Check the temperature variation with the centralized controller.)<br>⬩Changes in refrigerant circulation must be noticed as a result of the valve operation.<br>⬩Operating sounds and temperature changes must be noticed. | Replace the valve if the operation data show an operation failure due to valve problems. |
| Valve | | ⬩Operation check using operation data | Temperature must change according to the valve position.(Check the temperature variation when the operation mode is switched between cooling and heating.) | Replace the valve if the operation data show an operation failure due to valve problems. |
| Heat exchanger | | ⬩Check for clogging, contamination, and damage | Clogging, contamination, and damage | Perform cleaning. |
| Sensor | | ⬩Check for breakage and deterioration of the cables, and for disconnection of the connectors.<br>⬩Measurement of insulation resistance | ⬩No breakage or deterioration of the cables or disconnected connectors.<br>⬩Insulation resistance must be 1 MΩ or above. | Replace the sensor if the cable is broken, short-circuited, or severely deteriorated, or an insulation problem is found. |
| Electric board | | ⬩Check the appearance. | ⬩No sedimentary remains | Clean with a brush if deposits are attached. |
| Smoothing capacitor (Mounted on the inverter board) | | ⬩Check the appearance of electrolytic capacitors. | ⬩No liquid leakage, deformation, or sleeve (outer film) shrinkage | Replace the INV board if any leakage, deformation, or shrinkage of the sleeve (outer film) is found. |

- The inspection intervals depend on the usage and environment.
  **The inspection intervals do not indicate the warranty period.**
- The maintenance and inspection items may differ depending on maintenance providers. Please check with your maintenance provider when concluding a maintenance contract.
- Repairs outside the warranty period will be charged, even if periodic inspections have been performed at the recommended intervals.

# Chapter 2 Restrictions

# 2-1 System Configurations

## 1. Table of compatible indoor units

The table below summarizes the types of indoor units that are compatible with different types of outdoor units.
The ones not listed are incompatible with this series of outdoor units. The PURY-EM***TXU-A, PURY-EM***YXU-A, PURY-HM***TXU-A, and PURY-HM***YXU-A outdoor units cannot be used in combination across the series.

### (1) High efficiency combinations

| Outdoor units | Composing units | | Maximum total capacity of connectable indoor units | Maximum number of connectable indoor units | Types of connectable indoor units |
|---|---|---|---|---|---|
| EM72T/YXU-A | - | - | 36 - 108 | 14 | M04 - M96 models<br>R32 series indoor units |
| EM96T/YXU-A | - | - | 48 - 144 | 19 | |
| EM120T/YXU-A | - | - | 60 - 180 | 24 | |
| EM144T/YXU-A | - | - | 72 - 216 | 29 | |
| EM168T/YXU-A | - | - | 84 - 252 | 34 | |
| EM192T/YXU-A | - | - | 96 - 288 | 39 | |
| EM264T/YSXU-A | EM144T/YXU-A | EM120T/YXU-A | 132 - 396 | 50 | |
| EM288T/YSXU-A | EM144T/YXU-A | EM144T/YXU-A | 144 - 432 | | |
| EM312T/YSXU-A | EM168T/YXU-A | EM144T/YXU-A | 156 - 468 | | |
| EM336T/YSXU-A | EM168T/YXU-A | EM168T/YXU-A | 168 - 504 | | |
| EM360T/YSXU-A | EM192T/YXU-A | EM168T/YXU-A | 180 - 540 | | |
| EM384T/YSXU-A | EM192T/YXU-A | EM192T/YXU-A | 192 - 576 | | |

### (2) Hyper Heating Inverter combinations

| Outdoor units | Composing units | | Maximum total capacity of connectable indoor units | Maximum number of connectable indoor units | Types of connectable indoor units |
|---|---|---|---|---|---|
| HM72T/YXU-A | - | - | 36 - 108 | 14 | M04 - M96 models<br>R32 series indoor units |
| HM96T/YXU-A | - | - | 48 - 144 | 19 | |
| HM120T/YXU-A | - | - | 60 - 180 | 24 | |
| HM144T/YSXU-A | HM72T/YXU-A | HM72T/YXU-A | 72 - 216 | 29 | |
| HM192T/YSXU-A | HM96T/YXU-A | HM96T/YXU-A | 96 - 298 | 39 | |
| HM240T/YSXU-A | HM120T/YXU-A | HM120T/YXU-A | 120 - 360 | 49 | |

**Note**

1) "Maximum total capacity of connectable indoor units" refers to the sum of the numeric values in the indoor unit model names.
2) If the total capacity of the indoor units that are connected to a given outdoor unit exceeds the capacity of the outdoor unit, the indoor units will not be able to perform at the rated capacity when they are operated simultaneously. Select a combination of units so that the total capacity of the connected indoor units is at or below the capacity of the outdoor unit whenever possible.
3) High efficiency units and hyper heating inverter units cannot be used in combination.

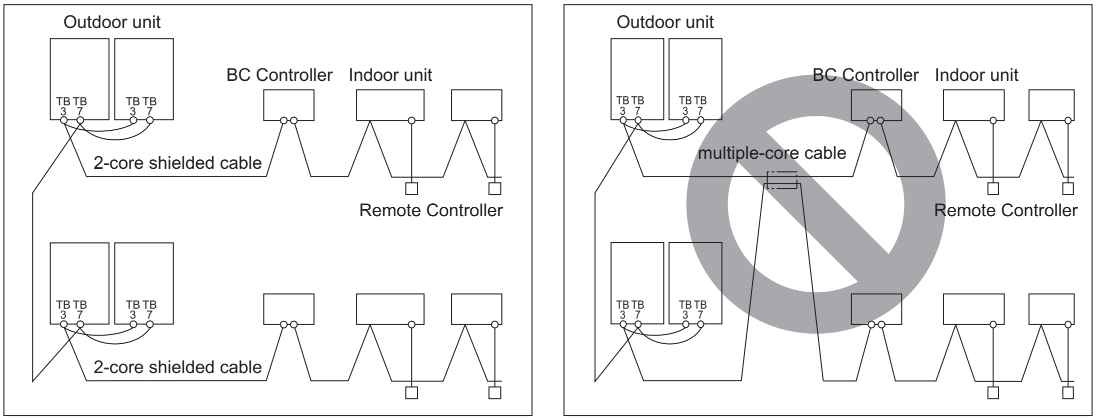
# 2-2 Types and Maximum Allowable Length of Cables

## 1. Wiring work

### (1) Notes

1) Have all electrical work performed by an authorized electrician according to the local regulations and instructions in this manual.
2) Install external transmission cables at least 5cm [1-31/32"] away from the power supply cable to avoid noise interference. (Do not put the control cable and power supply cable in the same conduit tube.)
3) Provide grounding for the outdoor unit as required.
4) Run the cable from the electric box of the indoor or outdoor unit in such way that the box is accessible for servicing.
5) Do not connect power supply wiring to the terminal block for transmission line. Doing so will damage the electronic components on the terminal block.
6) Use 2-core shielded cables as transmission cables.

   Do not use a single multiple-core cable to connect indoor units that belong to different refrigerant systems. Doing so may result in signal transmission errors and malfunctions.



TB3: Terminal block for indoor-outdoor transmission line   TB7: Terminal block for centralized control

7) When extending the transmission cable, be sure to extend the shield wire.
8) When opening and closing the front panel of the control box, do not touch the internal parts. When inspecting the inside of the control box, be sure to turn off the power of the unit at least 10 minutes beforehand and check that the voltage (across pins 1 and 5 of connector RYPN) has decreased to 20 V DC or less. (It takes about 10 minutes for the electricity to discharge after the power is turned off.)
9) The control box (inside and rear) contains high-temperature parts. Be careful even after shutting down the power.
10) Before servicing, ensure that the fan is not rotating, and then disconnect the CNINV connector on the fan board and the CNFA1 connector on the INV board. When connecting or disconnecting the connectors, ensure that the outdoor unit fan is not rotating. The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock. For details, refer to the wiring nameplate. After servicing, reconnect all disconnected connectors CNINV and CNFA1.
11) When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
12) When the power is on, the heater is energized even when the compressor is stopped. Before turning on the power, disconnect the power wires from the terminal block of the compressor and measure the insulation resistance of the compressor. Check that the compressor does not have a ground fault. If the insulation resistance is 1 MΩ or less, connect the power wires of the compressor and turn on the power of the outdoor unit. (The liquid refrigerant in the compressor will evaporate by energizing the heater.)
13) When connecting a system controller to the TB7 side of the outdoor unit, we recommend connecting a power supply unit for transmission to the TB7 side.

    If a system controller is connected to the TB3 side, up to three units can be connected.

    A system controller can be connected to the TB7 side if the power supply switch connector is disconnected from CN41 and then connected to CN40, but power will be supplied to the TB7 side even when the power of the outdoor unit is off so the system controller may log an error and generate a warning.
14) When tightening the screws, take care that the screws are not loose or overtightened. A contact fault resulting from screw looseness may cause the generation of heat and fire. Refer to the following page(s). [1-4 Precautions for Wiring]

## (2) Control wiring

Different types of control wiring are used for different systems. Before performing wiring work, refer to the following page(s).
[2-7 Example System with an MA Remote Controller]

**Types and maximum allowable length of cables**

Control lines are categorized into 2 types: transmission line and remote controller line.

Use the appropriate type of cables and observe the maximum allowable length specified for a given system. If a given system has a long transmission line or if a noise source is located near the unit, place the unit away from the noise source to reduce noise interference.

1) M-NET transmission line

| | |
|---|---|
| Type | 2-core shielded cable CVVS, CPEVS, or MVVS |
| Size | 1.25 mm$^2$ [AWG 16], or ø1.2 mm or above |
| Length | Max. 200 m [656 ft] |
| Remarks | The maximum allowable length of transmission cables via outdoor units (both centralized control transmission cables and indoor-outdoor transmission cables) is 500 m [1640 ft]*1.<br>The maximum allowable length of transmission cables from the power supply unit to each outdoor unit or to the system controller is 200 m [656 ft]. |

* Do not use a single multiple-core cable to connect indoor units that belong to different refrigerant systems. The use of a multiple-core cable may result in signal transmission errors and malfunctions.

* Ensure shield continuity when extending the transmission cable.

*1 When extending the length of the transmission cables to 1000 m [3280 ft], consult your dealer.

2) Remote controller wiring

| | MA remote controller |
|---|---|
| Type | 2-core cable VCTF, VCTFK, CVV, VVR, VVF, or VCT |
| Size | 0.3 to 1.25 mm$^2$ [AWG 22 to 16] *1 *3 |
| Length | Max. 200 m [656 ft] *2 |

*1 The use of cables that are smaller than 0.75 mm$^2$ [AWG 18] is recommended for easy handling.

*2 Max. 70 m [229 ft] for PAR-CT01MA series

*3 To wire PAR-CT01MA series, PAR-4"x"MA series, PAR-3"x"MA series ("x" represents 0 or later), or Simple MA remote controller, use a cable with a size of 0.3 mm$^2$ [AWG 22].

# 2-3 Switch Settings

## 1. Switch setting

The necessary switch settings depend on system configuration. Before performing wiring work, refer to the following page(s).
[2-7 Example System with an MA Remote Controller]
If the switch settings are changed while the unit is being powered, those changes will not take effect, and the unit will not function properly.

| Units on which to set the switches | | Symbol | Units to which the power must be shut off |
|---|---|---|---|
| CITY MULTI indoor unit | Main/sub unit | IC | Outdoor units [*3] [*4] and Indoor units |
| LOSSNAY, OA processing unit [*1] | | LC | Outdoor units [*3] [*4] and LOSSNAY |
| MA remote controller | Main/sub remote controller | MA | Indoor units |
| CITY MULTI outdoor unit[*2] | | OC,OS | Outdoor units [*3] [*4] |
| BC controller | Main | BC | Outdoor units [*3] [*4] and BC controller |
| | Sub1 - 11 | BS1 - 11 | Outdoor units [*3] [*4] and BC controller |

*1. Applicable when LOSSNAY units are connected to the indoor-outdoor transmission line.
*2. The outdoor units in the same refrigerant circuit are automatically designated as OC and OS in the order of capacity from large to small (if two or more units have the same capacity, in the order of address from small to large).
*3. Turn off the power to all the outdoor units in the same refrigerant circuit.
*4. When setting the switch SW4 of the control board, set it with the outdoor unit power on. Refer to the following page(s).
[5-1-1 Outdoor Unit Switch Functions and Factory Settings]

# 2-4 M-NET Address Settings

## 2-4-1 Address Settings List

### 1. M-NET Address settings

### (1) Address settings table

The need for address settings and the range of address setting depend on the configuration of the system.

| Unit or controller | | Sym-bol | Address setting range | Setting method | Factory address setting |
|---|---|---|---|---|---|
| CITY MULTI indoor unit | Main/sub unit | IC | 01 to 50[*1]<br>[*3] [*5] | ♦Assign the smallest address to the main indoor unit in the group, and assign sequential address numbers to the rest of the indoor units in the same group.<br>♦In an R2 system with a sub BC controller, make the settings for the indoor units in the following order.<br>(i) Indoor unit to be connected to the main BC controller<br>(ii) Indoor unit to be connected to sub BC controller 1<br>(iii) Indoor unit to be connected to sub BC controller 2<br>Make the settings for the indoor units in the way that the formula "(i) < (ii) < (iii)" is true. | 00 |
| M-NET adapter | | | | | |
| M-NET control interface | | | | | |
| Free Plan adapter | | | | | |
| LOSSNAY, OA processing unit | | LC | 01 to 50[*1]<br>[*3] [*5] | Assign an arbitrary but unique address to each of these units after assigning an address to all indoor units. | 00 |
| MA remote controller | | MA | No address settings required. (The main/sub setting must be made if 2 remote controllers are connected to the system.)[*8] | | Main |
| CITY MULTI outdoor unit | | OC<br>OS | 51 to 100[*1]<br>[*2] [*4] [*5] | ♦Assign an address that equals the lowest address of the indoor units in the same refrigerant circuit plus 50.<br>♦Assign sequential addresses to the outdoor units in the same refrigerant circuit. The outdoor units in the same refrigerant circuit are automatically designated as OC and OS. [*5] | 00 |
| Auxiliary outdoor unit | BC controller (main) | BC | 51 to 100[*1]<br>[*2] [*5] | The BC controller address should generally be set to 1 + the address of the outdoor unit and Heat source unit. However, if this would result in it having the same address as another outdoor unit and Heat source unit, set the address between 51 and 100, making sure that it is different from the address of other controllers.<br>* The address automatically becomes “100” if it is set as “01 - 50”. | 00 |
| | BC controller (sub) | BS1<br>BS2<br>BS3<br>.<br>.<br>BS11 | 51 to 100[*2] | | |
| System controller | Central controller<br>AE-C400A<br>EW-C50A | TR<br>SC | 000, 201 to 250 | Assign an arbitrary but unique address within the range listed on the left to each unit. | 000 |

*1. If a given address overlaps any of the addresses that are assigned to other units, use a different, unused address within the setting range.

*2. To set the outdoor unit address or the auxiliary outdoor unit address to "100," set the rotary switches to "50."

*3. Some models of indoor units have two or three control boards.
Assign an address to the No.1, No. 2, and No. 3 control boards so that the No. 2 control board address equals the No. 1 control board address plus 1, and that the No. 3 control board address equals the No. 1 control board address plus 2.

*4. The outdoor units in the same refrigerant circuit are automatically designated as OC, and OS. They are designated as OC, and OS in the descending order of capacity (ascending order of address if the capacities are the same).

*5. No address settings are required for units in a system with a single outdoor unit (with some exceptions).
Address setting is required if a sub BC controller is connected.

## 2-4-2 Outdoor Unit Power Jumper Connector Connection

There are limitations on the total number of units that are connectable to each refrigerant system. Refer to the DATABOOK for details.

| System configuration | Connection to the system controller | Power supply unit for transmission lines | Group operation of units in a system with multiple outdoor units | Power supply switch connector connection |
|---|---|---|---|---|
| System with one outdoor unit | – | – | – | CN41 (Factory setting) |
| System with multiple outdoor units | Not connected | – | Not grouped | |
| | | Not required | Grouped | Disconnect the male connector from the female power supply switch connector (CN41) and connect it to the female power supply switch connector (CN40) on only one of the outdoor units.[2]<br>*Connect the S (shielded) terminal on the terminal block (TB7) on the outdoor unit whose CN41 was replaced with CN40 to the ground terminal (⏚) on the electric box. |
| | With connection to the indoor unit system | Not required | Grouped/not grouped | |
| | With connection to the centralized control system | Not required[1] (Powered from the outdoor unit) | Grouped/not grouped | |
| | | Required [1] | Grouped/not grouped | CN41 (Factory setting) |

[1] The need for a power supply unit for transmission lines depends on the system configuration. Some controllers, such as GB-50ADA, have a function to supply power to the transmission lines.

[2] The replacement of the power jumper connector from CN41 to CN40 must be performed on only one outdoor unit in the system.

## 2-4-3 Outdoor Unit Centralized Controller Switch Setting

| System configuration | Centralized control switch (SW5-1) settings [1] |
|---|---|
| Connection to the system controller Not connected | OFF (Factory setting) |
| Connection to the system controller Connected | ON |

[1] Set SW5-1 on all outdoor units in the same refrigerant circuit to the same setting.

## 2-4-4 Room Temperature Detection Position Selection

To stop the fan during heating Thermo-OFF (SW1-7 and 1-8 on the indoor units to be set to ON), use the built-in thermistor on the remote controller or an optional thermistor.

1) To use the built-in sensor on the remote controller, set the SW1-1 to ON.
(Factory setting: SW1-1 set to "OFF".)

⬩Some models of remote controllers are not equipped with a built-in temperature sensor.
Use the built-in temperature sensor on the indoor unit instead.

⬩When using the built-in sensor on the remote controller, install the remote controller where room temperature can be detected.
(Note) Factory setting for SW1-1 on the indoor unit of the All-Fresh Models is ON.

2) When an optional temperature sensor is used, set SW1-1 to OFF, and set SW3-8 to ON.

⬩When using an optional temperature sensor, install it where room temperature can be detected.

## 2-4-5 Start/Stop Control of Indoor Units

Each indoor unit (or group of indoor units) can be controlled individually by setting SW 1-9 and 1-10.

| Function | Operation of the indoor unit when the operation is resumed after the unit was stopped | Setting (SW1)[*4 *5] | |
|---|---|---|---|
| | | 9 | 10 |
| Power ON/OFF by the plug[*1,*2,*3] | Indoor unit will go into operation regardless of its operation status before power off (power failure). (In approx. 5 minutes) | OFF | ON |
| Automatic restoration after power failure | Indoor unit will go into operation if it was in operation when the power was turned off (or cut off due to power failure). (In approx. 5 minutes) | ON | OFF |
| | Indoor unit will remain stopped regardless of its operation status before power off (power failure). | OFF | OFF |

*1. Do not shut off power to the outdoor units. Doing so will cut off the power supply to the compressors and the heater on the outdoor units and may result in compressor malfunction when operation is restored after a power failure.
*2. Not applicable to units with a built-in drain pump and humidifier.
*3. Models with a built-in drain pump cannot be turned on/off by the plug individually. All the units in the same refrigerant circuits will be turned on or off by the plug.
*4. Requires that the dipswitch settings for all the units in the group be made.
*5. To control the external input to and output from the air conditioners with the PLC software for general equipment via the AE-C400, set SW1-9 and SW1-10 to ON. With these settings made, the power start-stop function becomes disabled. To use the auto recovery function after power failure while these settings are made, set SW1-5 to ON.

## 2-4-6 Miscellaneous Settings

Cooling-only setting for the indoor unit: Cooling only model (Factory setting: SW3-1 "OFF.")
When using indoor unit as a cooling-only unit, set SW3-1 to ON.

## 2-4-7 Various Control Methods Using the Signal Input/Output Connector on Outdoor Unit

### (1) Various connection options

| Type | Usage | Function | Terminal to be used[*1] | Option |
|---|---|---|---|---|
| Input | Prohibiting cooling/heating operation (thermo OFF) by an external input to the outdoor unit.<br>*It can be used as the DEMAND control device for each system. | DEMAND (level) | CN3D[*2] | Adapter for external input (PAC-SC36NA-E) |
| | Performs a low level noise operation of the outdoor unit by an external input to the outdoor unit.<br>* It can be used as the silent operation device for each refrigerant system. | Low-noise mode (level) [*3*4] | | |
| | Forces the outdoor unit to perform a fan operation by receiving signals from the snow sensor.[*5*7] | Snow sensor signal input (level) | CN3S | |
| | Cooling/heating operation can be changed by an external input to the outdoor unit. | Auto-changeover | CN3N | |
| | The operation mode of the unit can be changed from normal cooling operation (performance priority) to energy-saving cooling mode by an external signal input. The unit will automatically slide the evaporating temperature depending on the ΔT °C. (Control activate: ΔT is 1°C or lower.) | Energy-saving mode[*9]<br>(Shifts evaporating temp. depending on the load) | CN3K | |
| Output | How to extract signals from the outdoor unit<br>*It can be used as an operation status display device.<br>*It can be used for an interlock operation with external devices. | Operation status of the compressor[*5] | CN51 | Adapter for external output (PAC-SC37SA-E) |
| | | Error status[*6*8] | | |

*1 For details, refer to section (2) Example of wiring connection.

*2 For details, refer to section (2) Example of wiring connection and other relevant sections in the manual. [2-5 Demand Control Overview]

*3 Low-noise mode is valid when Dip SW6-8 on the outdoor unit is set to OFF. When DIP SW6-8 is set to ON, 4 levels of on-DEMAND are possible, using different configurations of low-noise mode input and DEMAND input settings.When 2 or more outdoor units exist in one refrigerant circuit system, 8 levels of on-DEMAND are possible.

*4 By setting Dip SW6-7, the Low-noise mode can be switched between the Capacity priority mode and the Low-noise priority mode.
When SW6-7 is set to ON: The low-noise mode always remains effective.
When SW6-7 is set to OFF: The low noise mode is cancelled when certain outside temperature or pressure criteria are met, and the unit goes into normal operation (capacity priority mode).

| Low-noise mod is effective. | | Capacity priority mode becomes effective. | |
|---|---|---|---|
| Cooling | Heating | Cooling | Heating |
| TH7<30°C[86°F] and 63HS1<3.13 MPa[454 psi] | TH7>3°C[37°F] and 63LS>0.45 MPa[65 psi] | TH7>35°C[95°F] or 63HS1>3.43 MPa[497 psi] | TH7<0°C[32°F] or 63LS<0.38 MPa[55 psi] |

*5 If multiple outdoor units are connected to the same refrigerant circuit, signal input/output settings need to be made for each outdoor unit.

*6 Take out signals from the outdoor unit that is designated as OC if multiple outdoor units in the same system.

*7 If the formula TH7>5°C[41°F] holds true, the fan will not go into operation when the contact receives signal input.

*8 When using a base heater, change the setting using SW4. When using a base heater, error output will not be available.

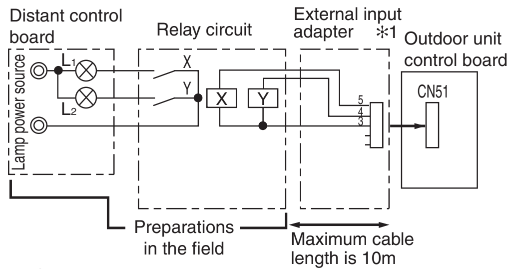
*9 This control can be enabled also from the system controller. For the procedure, refer to the manual of the system controller.

## (2) Example of wiring connection

### ⚠ CAUTION

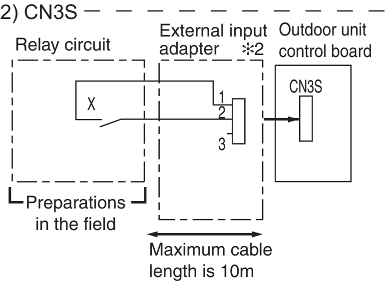
1) Wiring should be covered by insulation tube with supplementary insulation.
2) Use relays or switches with IEC or equivalent standard.
3) The electric strength between accessible parts and control circuit should have 2750V or more.

(1) CN51



L1 : Outdoor unit error display lamp✻3
L2 : Compressor operation lamp (compressor running state)
X, Y : Relay (coil =<0.9W : DC12V)
✻1. Optional part : PAC-SC37SA-E or field supply.
✻3. When using a base heater, error output will not be available.

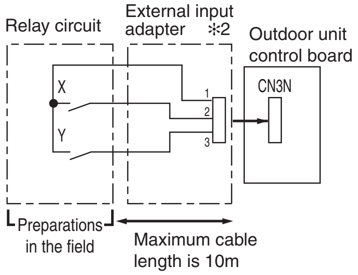
(2) CN3S



X : Relay Contact rating voltage >= DC15V
Contact rating current >= 0.1A
Minimum applicable load =< 1mA at DC

Snow sensor : The outdoor fan runs when X is closed in stop mode or thermostat mode.
✻2. Optional part : PAC-SC36NA-E or field supply.

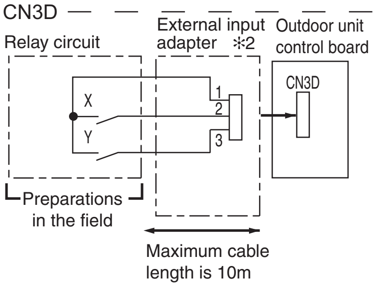
(3) CN3N



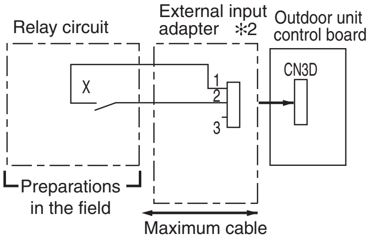
| | | | |
|---|---|---|---|
| | | X | |
| | | OFF | ON |
| Y | OFF | Normal | |
| | ON | Cooling | Heating |

X : Cooling / Heating
Y : Validity / Invalidity of X
X,Y : Relay Contact rating voltage >= DC15V
Contact rating current >= 0.1A
Minimum applicable load =< 1mA at DC
✻2. Optional part : PAC-SC36NA-E or field supply.

(4) CN3D

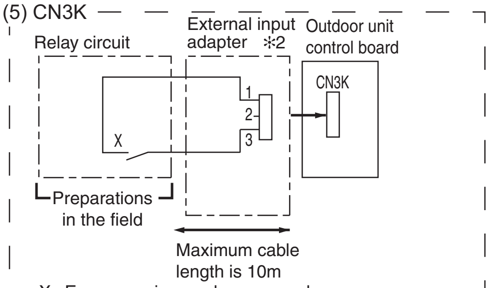


X : Low-noise mode
Y : Compressor ON/OFF
X,Y : Relay Contact rating voltage >= DC15V
Contact rating current >= 0.1A
Minimum applicable load =< 1mA at DC
✻2. Optional part : PAC-SC36NA-E or field supply.



X : Low-noise mode
X : Relay Contact rating voltage >= DC15V
Contact rating current >= 0.1A
Minimum applicable load =< 1mA at DC
✻2. Optional part : PAC-SC36NA-E or field supply.
Low-noise mode : The noise level is reduced by controlling the maximum fan frequency and maximum compressor frequency.

(5) CN3K



X : Energy-saving mode command

X : Relay Contact rating voltage >= DC15V
Contact rating current >= 0.1A
Minimum applicable load =< 1mA at DC

✻2. Optional part : PAC-SC36NA-E or field supply.

# 2-5 Demand Control Overview

## (1) General outline of control

Demand control is performed by using the external signal input to the 1-2 and 1-3 pins of CN3D on the outdoor units (OC and OS). Between 2 and 8 steps of demand control is possible by setting Dip SW6-8 on the outdoor units (OC and OS).

| No | Demand control switch | Dip SW6-8 | | Input to CN3D*2 |
|---|---|---|---|---|
| | | OC | OS | |
| 1 | 2 steps (0-100%) | OFF | OFF | OC |
| 2 | 4 steps (0-50-75-100%) | ON | OFF | OC |
| 3 | | OFF | ON | OS |
| 4 | 8 steps<br>(0-25-38-50-63-75-88-100%) | ON | ON | OC and OS |

*1 Available demand functions
EM72-EM192T/YXU-A, HM72-HM120T/YXU-A models (single-outdoor-unit system) : 2 and 4 steps shown in the rows 1 and 2 in the table above only.
EM264-EM384T/YSXU-A, HM144-HM240T/SXU-A models (two-outdoor-unit system OC+OS) : 2-8 steps shown in the rows 1, 2, 3, and 4 in the table above only.

*2 Signal is input to CN3D on the outdoor unit whose SW6-8 is set to ON. When SW6-8 is set to OFF on all outdoor units, the signal is input to the CN3D on the OC.
Outdoor units whose SW6-8 is set to ON are selectable in a single refrigerant system.

*3 If wrong sequence of steps are taken, the units may go into the Thermo-OFF (compressor stop) mode.
Ex) When switching from 100% to 50%
(Incorrect) 100%→0%→50% The units may go into the Thermo-OFF mode.
(Correct) 100%→75%→50%

*4 The percentage of the demand listed in the table above is an approximate value based on the compressor volume and does not necessarily correspond with the actual capacity.

*5 Notes on using demand control in combination with the low-noise mode
To enable the low-noise mode, it is necessary to short-circuit 1-2 pin of CN3D on the outdoor unit whose SW6-8 is set to OFF.
When SW6-8 is set to ON on all outdoor units, the following operations cannot be performed.
- Performing 4-step demand in combination with the low-noise operation in a single-outdoor-unit system.
- Performing 8-step demand in combination with the low-noise operation in a two-outdoor-unit system.

1) Contact input and control content

**2-step demand control**

The same control as the Thermo-OFF is performed by closing 1-3 pin of CN3D.

| CN3D | - |
|---|---|
| 1-3 | |
| Open | 100% |
| Close | 0% |

**4-step demand control (When SW6-8 is set to ON on an outdoor unit)**

Demand capacity is shown below.

| CN3D | 1-2P | |
|---|---|---|
| 1-3P | Open | Close |
| Open | 100% | 75% |
| Close | 0% | 50% |

**8-step demand control (When SW6-8 is set to ON on two outdoor units)**

Demand capacity is shown below.

| 8-step demand | | | No.2 CN3D | | | |
|---|---|---|---|---|---|---|
| | | 1-2P | Open | | Close | |
| No.1 CN3D | 1-2P | 1-3P | Open | Close | Open | Close |
| | Open | Open | 100% | 50% | 88% | 75% |
| | | Close | 50% | 0% | 38% | 25% |
| | Close | Open | 88% | 38% | 75% | 63% |
| | | Close | 75% | 25% | 63% | 50% |

*1. The outdoor units whose SW6-8 is set to ON are designated as No. 1 and No. 2 in the order of address from small to large.
Ex) When outdoor units whose SW6-8 is set to ON are designated as OC and OS, OC = No. 1 and OS = No. 2.

# 2-6 System Connection Example

Examples of typical system connection are shown below.
Refer to the Installation Manual that came with each device or controller for details.

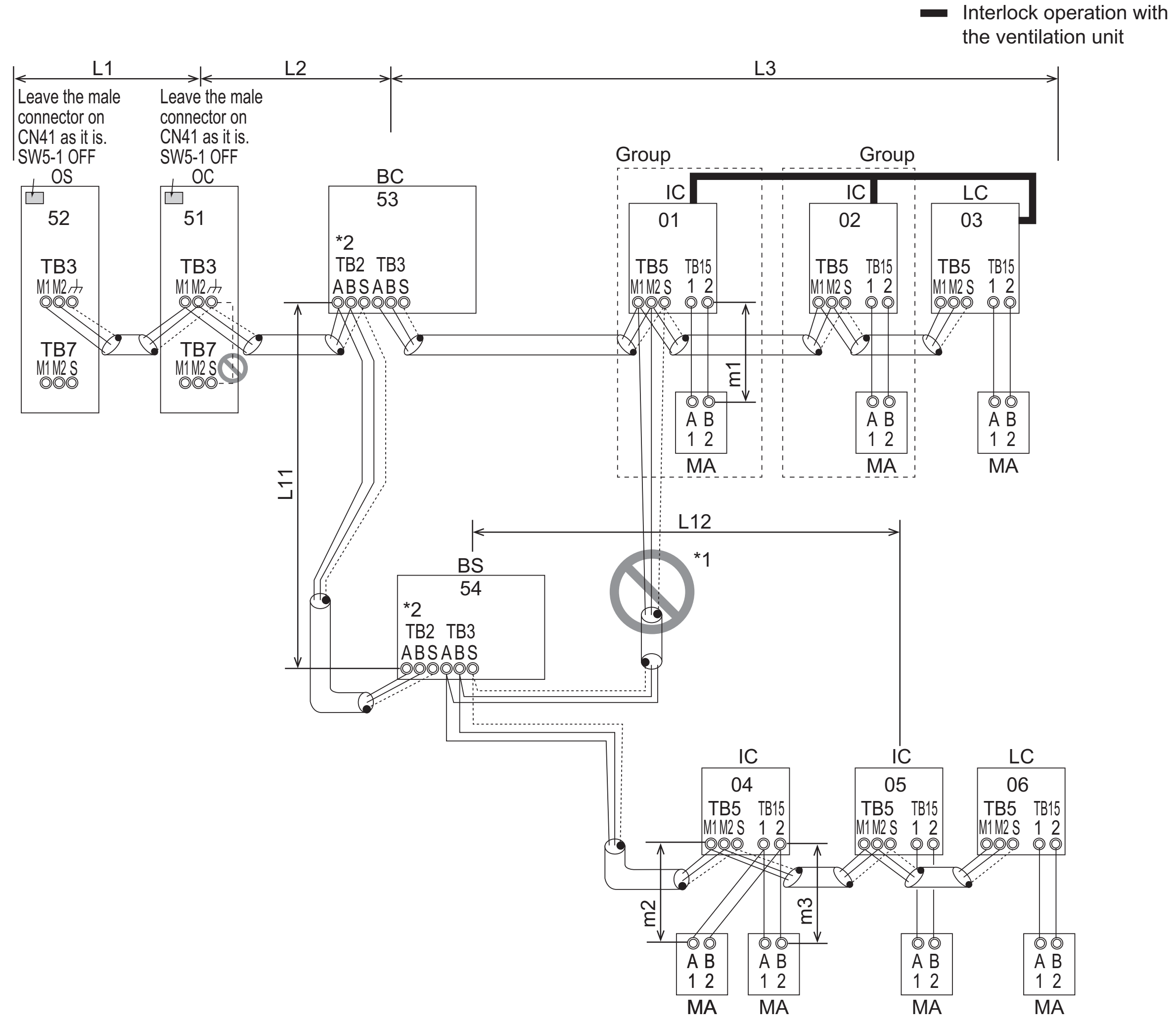
## (1) An example of a system to which an MA remote controller is connected

| | System configuration | Connection to the system controller | Address start up for indoor and outdoor units | Notes |
|---|---|---|---|---|
| 1 | Single refrigerant system | NO | Manual address setup | Connection of multiple LOSSNAY units |
| 2 | Multiple refrigerant systems | With connection to transmission line for centralized control | Manual address setup | - |
| 3 | Multiple refrigerant systems | With connection to indoor-outdoor transmission line | Manual address setup | - |

# 2-7 Example System with an MA Remote Controller

## 2-7-1 Single Refrigerant System with Two or More LOSSNAY Units

### (1) Sample control wiring



### (2) Cautions

1) Do not connect the indoor unit transmission cable terminal block TB3 on the BC controller to any indoor units that are not controlled by this BC controller.
2) Up to two cables can be connected to the transmission cable terminal block TB2 (outdoor unit/indoor unit/BC controller) on the BC controller, and one cable can be connected to the transmission cable terminal block TB3 (indoor unit).
3) When the PAR-4"x"MA series ("x" represents 3 or later) is connected to a group, no other MA remote controllers can be connected to the same group.
4) For information on the maximum number of connectable indoor units or other devices, connection requirements, or the need for a transmission booster, refer to the MELANS Centralized Controller Technical Manual or Data Book.

### (3) Maximum allowable length

1) Indoor/outdoor transmission line
   Maximum distance (1.25 mm$^2$ [AWG16] or larger)
   L1 + L2 + L3 $\leq$ 200 m [656 ft]
   L1 + L2 + L11 + L12 $\leq$ 200 m [656 ft]
   *If the power-supply distance exceeds the distance limit of 200 m, a transmission booster (PAC-SF46EPA-G) is required.
2) Transmission line for centralized control
   No connection is required.
3) MA remote controller wiring
   Maximum overall line length
   (0.3 to 1.25 mm$^2$ [AWG22 to 16])
   m1 $\leq$ 200 m [656 ft]
   m2 + m3 $\leq$ 100 m [328 ft] *1
   *1 Max. 70 m [229 ft] for PAR-CT01MA series
   ⬩When connecting PAR-CT01MA, PAR-4“x”MA, PAR-3“x”MA (“x” represents 0 or later), use sheathed cables with a minimum thickness of 0.3 mm$^2$.

## (4) Wiring method

1) Indoor/outdoor transmission line
   Daisy-chain the following terminals: the M1 and M2 terminals of the indoor-outdoor transmission cable terminal block TB3 on the outdoor units (OC and OS), and the M1 and M2 terminals of the indoor-outdoor transmission cable terminal block TB2 (outdoor unit/indoor unit/BC controller) on each BC controller (main: BC, sub: BS). (Non-polarized two-wire)

**Note**

The outdoor units in the same refrigerant circuit are automatically designated as OC and OS. They are designated as OC and OS in the descending order of capacity (ascending order of address if the capacities are the same).

**Grounding shielded cables**

To ground the shielded cable, daisy-chain the following terminals: the ground terminals of the OC and OS, and the S terminals of the transmission cable terminal blocks TB2 (outdoor unit/indoor unit/BC controller) on each BC controller (main: BC, sub: BS).

2) Indoor unit transmission line
   Daisy-chain the following terminals: the M1 and M2 terminals of the indoor-outdoor transmission cable terminal block TB5 on each indoor unit (IC) in which the refrigerant flow is to be shut off, and the M1 and M2 terminals of the transmission cable terminal block TB3 (indoor unit) on the BC controller (main: BC, sub: BS) that controls these indoor units. (Non-polarized two-wire)

   Processing shielded cables

   To ground the shielded cable, daisy-chain the following terminals: the S terminal of the indoor-outdoor transmission cable terminal block TB5 on each indoor unit (IC) in which the refrigerant flow is to be shut off, and the S terminal of the transmission cable terminal block TB3 (indoor unit) on the BC controller (main: BC, sub: BS) that controls these indoor units.

   Shielded cable connection

   To ground the shielded cable, daisy-chain the following terminals: the S terminal of the indoor-outdoor transmission cable terminal block TB5 on each indoor unit (IC) at which the BC controller and the refrigerant pipe are connected, and the S terminal of the transmission cable terminal block TB3 on the above-mentioned BC controller (BC).

3) Transmission line for centralized control
   No connection is required.

4) MA remote controller wiring
   Connect terminals 1 and 2 on the terminal block TB15 for MA remote controller on the indoor unit (IC) to the terminal block on the MA remote controller (MA).
   (Non-polarized two-wire)

   **When two remote controllers are connected to the system**

   When two remote controllers are connected to the system, connect terminals 1 and 2 of the terminal block TB15 on the indoor unit (IC) to the terminal block on the two MA remote controllers.

   - Set one of the MA remote controllers as a sub controller. (Refer to the Instruction Manual for the MA remote controller for the setting method.)
   - The remote controllers with alarms can be set as a main remote controller or supervisor remote controller using the main/sub setting.

5) LOSSNAY connection
   Connect the M1 and M2 terminals on the terminal block TB5 on the indoor unit (IC) to the appropriate terminals on the terminal block TB5 on LOSSNAY (LC). (Non-polarized two-wire) *This is a typical connection example.

   - Ensure that the interlock control between the indoor unit and the LOSSNAY unit is set by the remote controller. (For the setting procedure, refer to the Installation Manual for the remote controller.)
   - For additional information on the LOSSNAY unit connection, refer to the technical documents for the LOSSNAY unit.

6) Switch setting
   Address setting is required as follows.

## (5) Address setting method

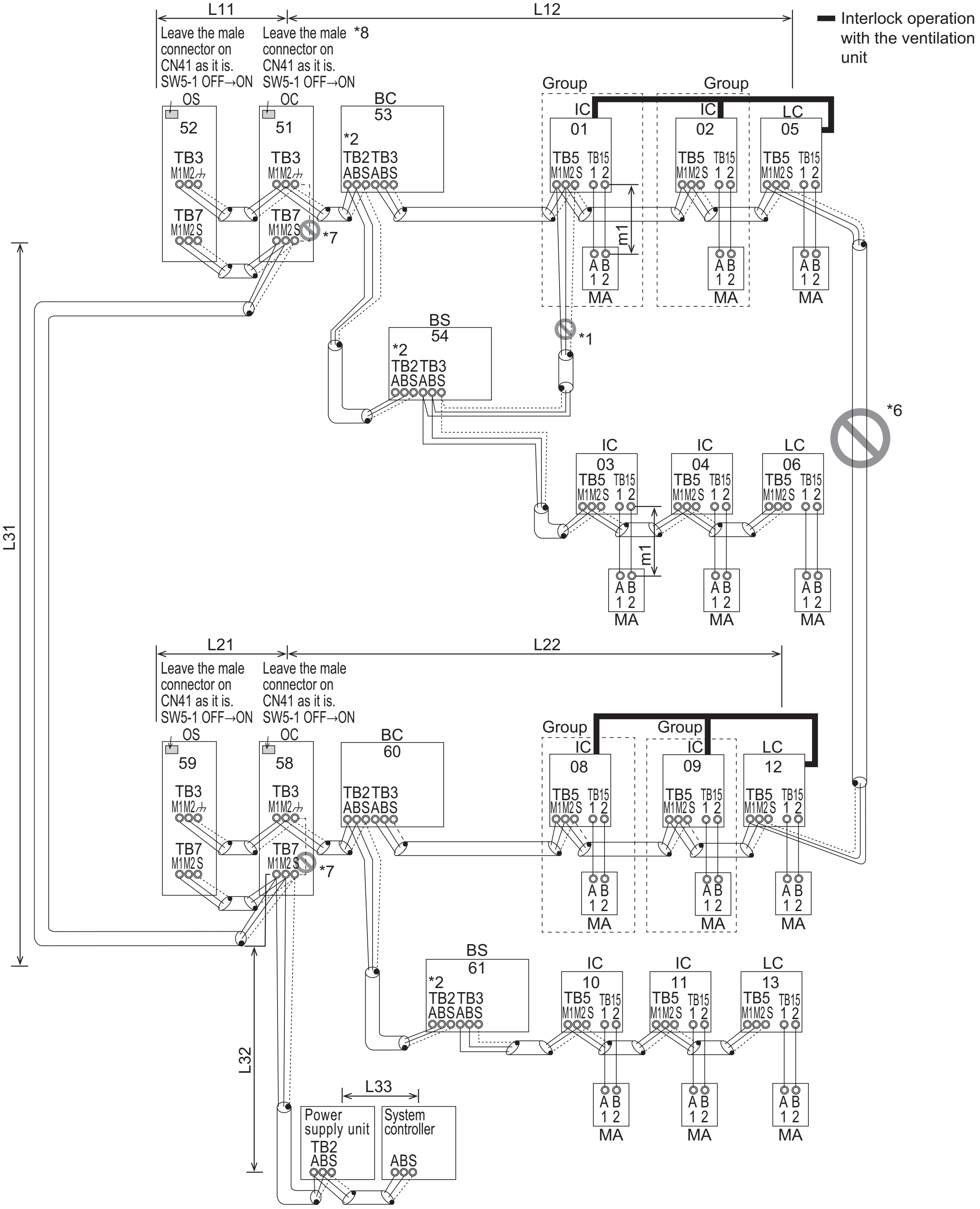
| Procedures | Unit or controller | | | Address setting range | Setting method | Notes | Factory setting |
|---|---|---|---|---|---|---|---|
| 1 | Indoor unit | Main unit | IC | 01 to 50 | Assign the smallest address to the main unit in the group. | Setting the port number is required.<br>If indoor units with different functions operate in the same group, set the unit with the most functions as the main unit. | 00 |
| 2 | LOSSNAY | | LC | 01 to 50 | After setting all indoor unit addresses, assign an address to the LOSSNAY unit. | Ensure that the address of the LOSSNAY unit does not overlap with those of indoor units. | 00 |
| 3 | MA remote controller | Main remote controller | MA | No settings required. | - | | Main |
| | | Supervisor remote controller | MA | Supervisor remote controller | Settings to be made with the Sub/Main switch | | |
| 4 | Outdoor unit | | OC<br>OS | 51 to 100 | ⬩Assign sequential address to the outdoor units in the same refrigerant circuit.<br>⬩The outdoor units are automatically designated as OC and OS.(Note 1) | ⬩To set the address to 100, set the rotary switches to 50.<br>⬩If the addresses that is assigned to the main BC controller overlaps any of the addresses that are assigned to the outdoor units or to the sub BC controller, use a different, unused address within the setting range.<br>⬩The use of a sub BC controller requires the connection of a main BC controller. | 00 |
| 5 | BC controller (Main) | | BC | 51 to 100 | The BC controller address should generally be set to 1 + the address of the outdoor unit and Heat source unit. However, if this would result in it having the same address as another outdoor unit and Heat source unit, set the address between 51 and 100, making sure that it is different from the address of other controllers.<br>* The address automatically becomes "100" if it is set as "01 - 50". | | |
| | BC controller (Sub) | | BS | | | | |

**Note**

1) The outdoor units in the same refrigerant circuit are automatically designated as OC and OS.
They are designated as OC and OS in the descending order of capacity (ascending order of address if the capacities are the same).

## 2-7-2 System with a Connection of System Controller to Centralized Control Transmission Line for Supplying Power from Power Supply Unit

### (1) Sample control wiring



### (2) Cautions

1) Do not connect the indoor unit transmission cable terminal block TB3 on the BC controller to any indoor units that are not controlled by this BC controller.
2) Up to two cables can be connected to the transmission cable terminal block TB2 (outdoor unit/indoor unit/BC controller) on the BC controller, and one cable can be connected to the transmission cable terminal block TB3 (indoor unit).
3) When the PAR-4"x"MA series ("x" represents 3 or later) is connected to a group, no other MA remote controllers can be connected to the same group.
4) For information on the maximum number of connectable

indoor units or other devices, connection requirements, or the need for a transmission booster, refer to the MELANS Centralized Controller Technical Manual or Data Book.

5) Indoor units in a large space configuration can be controlled as a group. However, controlling indoor units in groups across different refrigerant systems or BC controllers is not allowed.
6) Do not connect TB5 terminal blocks of indoor units connected to different outdoor units.
7) If a power supply unit is connected, do not connect the ground terminal (⏚) to the shield terminal S on the TB7 terminal block for the centralized control transmission cable.
8) If a power supply unit is connected to the centralized control transmission cable, keep the power supply switch connector connected to CN41 (factory default).

## (3) Maximum allowable length

1) Indoor/outdoor transmission line
   Maximum distance (1.25 $mm^2$ [AWG16] or larger)
   L11 + L12 ≤ 200 m [656 ft]
   L21 + L22 ≤ 200 m [656 ft]
2) Transmission line for centralized control
   L33 ≤200 m [656 ft]
   L32 + L21 ≤ 200 m [656 ft]
   L32 + L31 + L11≤ 200 m [656 ft]
3) MA remote controller wiring
   Same as 2-7-1
4) Maximum line distance via outdoor unit
   (1.25 $mm^2$ [AWG16] or larger)
   L33 + L32 + L31 + L12 (L11) ≤ 1000 m [3280 ft]
   L33 + L32 + L22 (L21) ≤ 1000 m [3280 ft]
   L12 (L11) + L31 + L22 (L21) ≤ 1000 m [3280 ft]

## (4) Wiring method

1) Indoor/outdoor transmission line
   Same as 2-7-1

   **Grounding shielded cables**
   Same as 2-7-1
2) Indoor unit transmission line
   Same as 2-7-1

   Shielded cable connection
   Same as 2-7-1
3) Transmission line for centralized control
   The A and B daisy-chain terminals on the system controller, the M1 and M2 terminals on the terminal block for transmission line for centralized control TB7 on the outdoor units (OC) in different refrigerant circuits and on the outdoor units (OC and OS) (Note a) in the same refrigerant circuit.
   If a system controller exists in the system, turn on the centralized control switch SW5-1 on the control circuit boards of all outdoor units.

**Note**

a) The outdoor units in the same refrigerant circuit are automatically designated as OC and OS. They are designated as OC and OS in the descending order of capacity (ascending order of address if the capacities are the same).
b) If TB7's on the outdoor units in the same refrigerant circuit are not daisy-chained, connect the transmission line for the central control system to TB7 of the OC. (Note a).To maintain the central control even during an OC failure or a power failure, connect TB7 on OC and OS together.
c) When connecting TB7, only commence after checking that the voltage is below 20 VDC.

- Only use shielded cables.

**Grounding shielded cables**
Daisy-chain the S terminal of the terminal block TB7 on the system controller, OC, and OS with the shield of the shielded cable.

4) MA remote controller wiring
   Same as 2-7-1

   **When two remote controllers are connected to the system**
   Same as 2-7-1
5) LOSSNAY connection
   Connect the M1 and M2 terminals on the terminal block TB5 on the indoor unit (IC) to the appropriate terminals on the terminal block TB5 on LOSSNAY (LC). (Non-polarized two-wire) *This is a typical connection example.
   - Ensure that the interlock control between the indoor unit and the LOSSNAY unit is set by the system controller. (For the setting procedure, refer to the Instruction Manual for the system controller.) However, if only an ON/OFF remote controller connected, use the remote controller to set the interlock control.)
   - For additional information on the LOSSNAY unit connection, refer to the technical documents for the LOSSNAY unit.
6) Switch setting
   Address setting is required as follows.

## (5) Address setting method

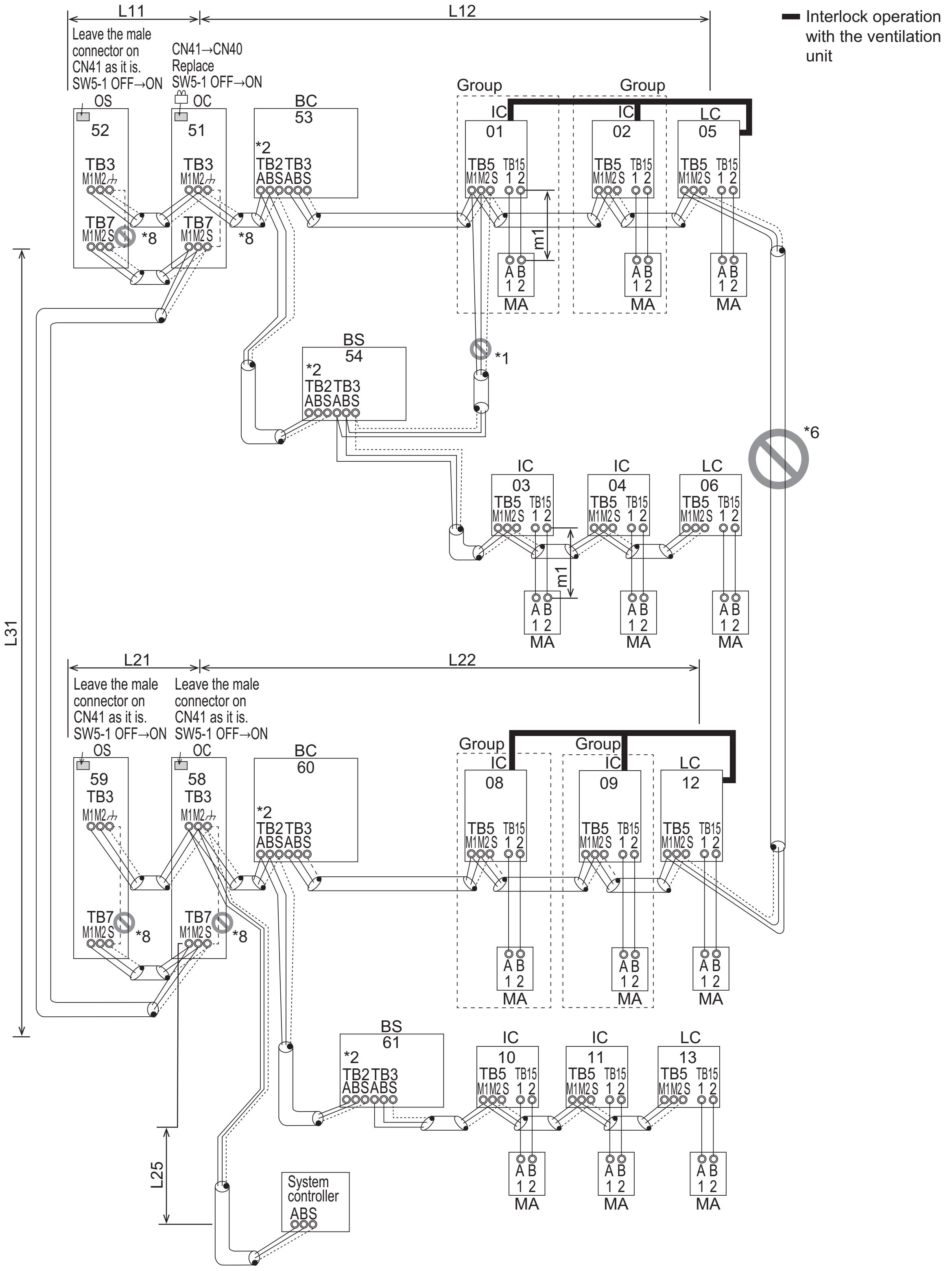
| Procedures | Unit or controller | | | Address setting range | Setting method | Notes | Factory setting |
|---|---|---|---|---|---|---|---|
| 1 | Indoor unit | Main unit | IC | 01 to 50 | Assign the smallest address to the main unit in the group. | Setting the port number is required.<br>If indoor units with different functions operate in the same group, set the unit with the most functions as the main unit. | 00 |
| 2 | LOSSNAY | | LC | 01 to 50 | After setting all indoor unit addresses, assign an address to the LOSSNAY unit. | Ensure that the address of the LOSSNAY unit does not overlap with those of indoor units. | 00 |
| 3 | MA remote controller | Main remote controller | MA | No settings required. | - | Apply the indoor unit group settings made by the MA remote controller to the system controller as an initial setting. | Main |
| | | Supervisor remote controller | MA | Supervisor remote controller | Settings to be made with the Sub/ Main switch | | |
| 4 | Outdoor unit | | OC<br>OS | 51 to 100 | ♦Assign sequential address to the outdoor units in the same refrigerant circuit.<br>♦The outdoor units are automatically designated as OC and OS.(Note 1) | ♦To set the address to 100, set the rotary switches to 50.<br>♦If the addresses that is assigned to the main BC controller overlaps any of the addresses that are assigned to the outdoor units or to the sub BC controller, use a different, unused address within the setting range.<br>♦The use of a sub BC controller requires the connection of a main BC controller. | 00 |
| 5 | BC controller (Main) | | BC | 51 to 100 | The BC controller address should generally be set to 1 + the address of the outdoor unit and Heat source unit. However, if this would result in it having the same address as another outdoor unit and Heat source unit, set the address between 51 and 100, making sure that it is different from the address of other controllers.<br>* The address automatically becomes "100" if it is set as "01 - 50". | | |
| | BC controller (Sub) | | BS | | | | |

**Note**

1) The outdoor units in the same refrigerant circuit are automatically designated as OC and OS.
They are designated as OC and OS in the descending order of capacity (ascending order of address if the capacities are the same).

## 2-7-3 System with a Connection of System Controller to Indoor-Outdoor Transmission Line

### (1) Sample control wiring



### (2) Cautions

1) Do not connect the indoor unit transmission cable terminal block TB3 on the BC controller to any indoor units that are not controlled by this BC controller.

2) Up to two cables can be connected to the transmission cable terminal block TB2 (outdoor unit/indoor unit/BC controller) on the BC controller, and one cable can be connected to the transmission cable terminal block TB3 (indoor unit).

3) When the PAR-4"x"MA series ("x" represents 3 or later) is connected to a group, no other MA remote controllers can be connected to the same group.
4) For information on the maximum number of connectable indoor units or other devices, connection requirements, or the need for a transmission booster, refer to the MELANS Centralized Controller Technical Manual or Data Book.
5) Indoor units in a large space configuration can be controlled as a group. However, controlling indoor units in groups across different refrigerant systems or BC controllers is not allowed.
6) Do not connect the terminal blocks TB5 on the indoor units that are connected to different outdoor units with each other.
7) Replacement of male power jumper connector CN41 must be performed only on one of the outdoor units.
8) Provide grounding to S terminal on the terminal block for transmission line for centralized control TB7 on only one of the outdoor units.

## (3) Maximum allowable length

1) Indoor/outdoor transmission line
Maximum distance (1.25 mm$^2$ [AWG16] or larger)
L11 + L12 $\leq$ 200 m [656 ft]
L21 + L22 $\leq$ 200 m [656 ft]
L25 $\leq$ 200 m [656 ft]
2) Transmission line for centralized control
L31 + L21 $\leq$ 200 m [656 ft]
3) MA remote controller wiring
Same as 2-7-1
4) Maximum line distance via outdoor unit
(1.25 mm$^2$ [AWG16] or larger)
L25 + L31 + L12 (L11) $\leq$ 1000 m [3280 ft]
L12 (L11) + L31 + L22 (L21) $\leq$ 1000 m [3280 ft]

## (4) Wiring method

1) Indoor/outdoor transmission line
Daisy-chain the following terminals: the M1 and M2 terminals of the indoor-outdoor transmission cable terminal block TB3 on the outdoor units (OC and OS) (Note), the M1 and M2 terminals of the indoor-outdoor transmission cable terminal block TB5 on each indoor unit (IC), and the S terminal on the system controller. (Non-polarized two-wire)

♦Only use shielded cables.

**Note**

The outdoor units in the same refrigerant circuit are automatically designated as OC and OS. They are designated as OC and OS in the descending order of capacity (ascending order of address if the capacities are the same).

**Grounding shielded cables**

To ground the shielded cable, daisy-chain the following terminals: the ground terminals (⏚) of the OC and OS, the S terminal of the terminal block TB5 on the IC, and the S terminal on the system controller.

2) Indoor unit transmission line
Same as 2-7-1

Shielded cable connection
Same as 2-7-1
3) Transmission line for centralized control
Daisy-chain terminals M1 and M2 on the terminal block for transmission line for centralized control TB7 on the outdoor units (OC) in different refrigerant circuits and on the OC and OS (Note a) in the same refrigerant circuit.
If a power supply unit is not connected to the transmission line for centralized control, replace the power jumper connector on the control board from CN41 to CN40 on only one of the outdoor units.
If a system controller exists in the system, turn on the centralized control switch SW5-1 on the control circuit boards of all outdoor units.

**Note**

a) The outdoor units in the same refrigerant circuit are automatically designated as OC and OS in the order of capacity from large to small (if two or more units have the same capacity, in the order of address from small to large).
b) If TB7's on the outdoor units in the same refrigerant circuit are not daisy-chained, connect the transmission line for the central control system to TB7 of the OC. (Note a). To maintain the central control even during an OC failure or a power failure, connect TB7 on OC and OS together. (If there is a problem with the outdoor unit whose power jumper was moved from CN41 to CN40, central control is not possible, even if TB7's are daisy-chained.)
c) When connecting TB7, only commence after checking that the voltage is below 20 VDC.

♦Only use shielded cables.

**Grounding shielded cables**

Daisy-chain the S terminal of the terminal block TB7 on the system controller, OC, and OS with the shield of the shielded cable. Short-circuit the ground terminal (⏚) and the S terminal on the terminal block TB7 on the outdoor unit whose power jumper connector is mated with CN40.

4) MA remote controller wiring
Same as 2-7-1

**When two remote controllers are connected to the system**

Same as 2-7-1
5) LOSSNAY connection
Connect terminals M1 and M2 on the terminal block (TB5) on the indoor unit (IC) to the appropriate terminals on the terminal block (TB5) on LOSSNAY (LC). (Non-polarized two-wire) *This is a typical connection example.

♦Ensure that the interlock control between the indoor unit and the LOSSNAY unit is set by the system controller. (For the setting procedure, refer to the Instruction Manual for the system controller.) However, if only an ON/OFF remote controller is connected, use the remote controller to set the interlock control.

♦For additional information on the LOSSNAY unit connection, refer to the technical documents for the LOSSNAY unit.

6) Switch setting
Address setting is required as follows.

## (5) Address setting method

| Procedures | Unit or controller | | | Address setting range | Setting method | Notes | Factory setting |
|---|---|---|---|---|---|---|---|
| 1 | Indoor unit | Main unit | IC | 01 to 50 | Assign the smallest address to the main unit in the group. | Setting the port number is required.<br>If indoor units with different functions operate in the same group, set the unit with the most functions as the main unit. | 00 |
| 2 | LOSSNAY | | LC | 01 to 50 | After setting all indoor unit addresses, assign an address to the LOSSNAY unit. | Ensure that the address of the LOSSNAY unit does not overlap with those of indoor units. | 00 |
| 3 | MA remote controller | Main remote controller | MA | No settings required. | - | Make the same indoor unit group settings with the system controller as the ones that were made with the MA remote controller. | Main |
| | | Supervisor remote controller | MA | Supervisor remote controller | Settings to be made with the Sub/Main switch | | |
| 4 | Outdoor unit | | OC<br>OS | 51 to 100 | ⬩Assign sequential address to the outdoor units in the same refrigerant circuit.<br>⬩The outdoor units are automatically designated as OC and OS.(Note 1) | ⬩To set the address to 100, set the rotary switches to 50.<br>⬩If the addresses that is assigned to the main BC controller overlaps any of the addresses that are assigned to the outdoor units or to the sub BC controller, use a different, unused address within the setting range.<br>⬩The use of a sub BC controller requires the connection of a main BC controller. | 00 |
| 5 | BC controller (Main) | | BC | 51 to 100 | The BC controller address should generally be set to 1 + the address of the outdoor unit and Heat source unit. However, if this would result in it having the same address as another outdoor unit and Heat source unit, set the address between 51 and 100, making sure that it is different from the address of other controllers.<br>* The address automatically becomes "100" if it is set as "01 - 50". | | |
| | BC controller (Sub) | | BS | | | | |

**Note**

1) The outdoor units in the same refrigerant circuit are automatically designated as OC and OS.
They are designated as OC and OS in the descending order of capacity (ascending order of address if the capacities are the same).

# 2-8 Restrictions on Refrigerant Pipes

## 2-8-1 Restrictions on Refrigerant Pipe Length and Refrigerant Pipe Size

### (1) If 12 ports or less are in use, i.e., if only one BC controller is in use with no sub BC controller

Note1. No Header usable on PURY system.
Note2. Indoor unit sized M72-M96 should be connected to BC controller via Y shape joint CMY-R170M-E.
Note3. Indoor unit sized M72-M96 does NOT share BC controller ports with other Indoor units;
Note4. As bents cause pressure loss on transportation of refrigerant, fewer bents design is better; Piping length needs to consider the actual length and equivalent length which bents are counted. Equivalent piping length (m) = Actual piping length + "M" × Number of bent.
Note5. Set DIP-SW 1-1 to ON of BC controller, in case of connected Indoor unit sized M31-M54 with 2 ports.
Note6. Do not connect multiple indoor units to the same port when operating each of them in different mode (cooling, heating, stop, and thermo-off). In case of connecting multiple indoor units to the same port, connecting all indoor units to one remote controller and switching SW1-1 ON in the all connected indoor units (switch to thermostat built in the remote controller) are recommended.
Note7. Indoor capactiy is described as its model size. For example, PEFY-M24NMAU, its capacity is M24.
Note8. Total down-stream Indoor capacity is the summary of the model size of Indoors down-stream. For example, PEFY-M24NMAU + PEFY-M06NMAU: Total Indoor capacity = M24 + M06 = M30.
Note9. To connect the BC controller to the main pipe, use the reducer (CMY-R304S-G1).
Note10. Install the pipes correctly referring to the DATA BOOK.

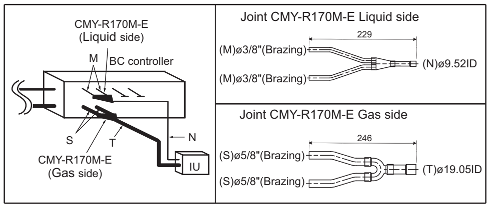


Fig. A

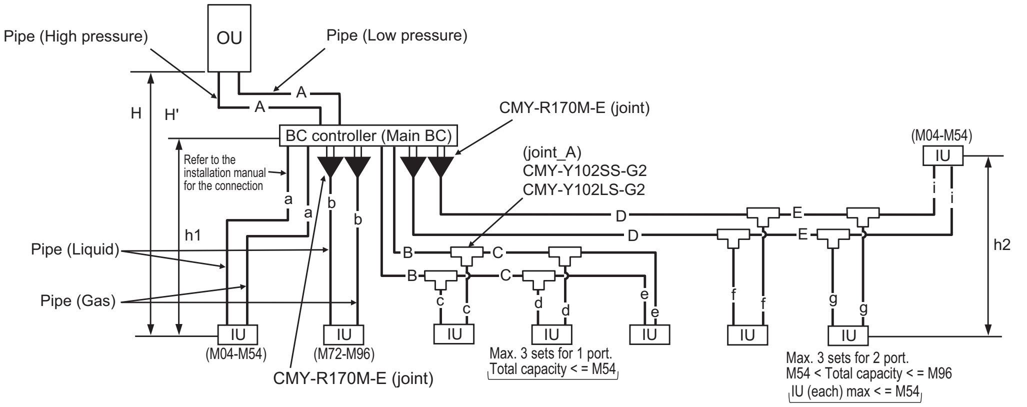


Fig. Piping scheme

OU: Outdoor unit, IU: Indoor unit

**Piping length limitation *8** (m [ft.])

| Item | Piping in the figure | Max. length | Max. equivalent length |
|---|---|---|---|
| Total piping length (Total length of high pressure and liquid pipes) | A+B+C+D+E+a+b+c+d+e+f+g+i | *1 | - |
| Farthest IU from OU | A+D+E+i | 165 [541] | 190 [623] |
| Distance between OU and BC | A | 110 [360] *1 | 110 [360] *1 |
| Farthest IU from BC controller | D+E+i | 60 [197] *2*3 | 60 [197] *2*3 |
| Height between OU and IU (OU above IU) | H | 50 [164] *6 | - |
| Height between OU and IU (OU under IU) | H' | 40 [131] *7 | - |
| Height between IU and BC | h1 | 15 [49] (10 [32]) *4 | - |
| Height between IU and IU | h2 | 30 [98] (20 [65]) *5 | - |

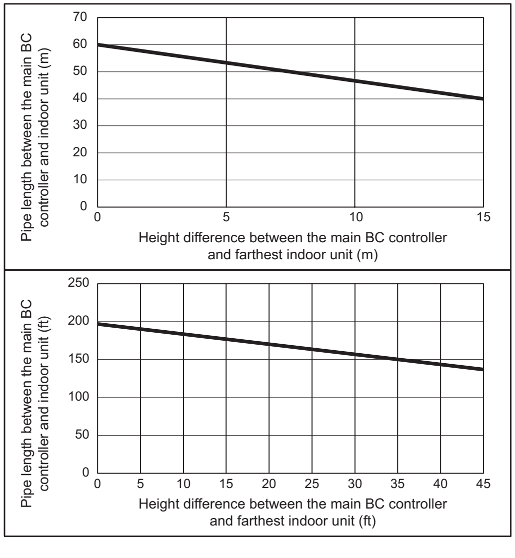
**Bent equivalent length**

| Outdoor Model | M (m/bent [ft./bent]) |
|---|---|
| EM72T/YXU | 0.35 [1.15] |
| EM96T/YXU | 0.42 [1.38] |
| EM120T/YXU | 0.50 [1.65] |
| EM144T/YXU | 0.50 [1.65] |
| EM168T/YXU | 0.50 [1.65] |
| EM192T/YXU | 0.50 [1.65] |
| HM72T/YXU | 0.35 [1.15] |
| HM96T/YXU | 0.42 [1.38] |
| HM120T/YXU | 0.50 [1.65] |

OU: Outdoor Unit; IU: Indoor Unit; BC: BC controller

*1. Refer to "Total piping length restrictions (m)" / "Total piping length restrictions (ft.)" section.
*2. Details refer to Fig. 1.
*3. When the M72 or M96 model of indoor units are connected to the system, the maximum distance from the BC controller to the farthest indoor unit (indicated as "D + E + i" in the figure is 40 m [131 ft].)
*4. Distance of Indoor sized M72, M96 from BC must be less than 10 m [32 ft], if any.
*5. Distance of Indoor sized M72, M96 from IU must be less than 20 m [65 ft], if any.
*6. 113 m [370 ft] is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
*7. 60 m [197 ft] is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
*8. Total length of high-pressure pipes and liquid pipes
*9. The piping length between the BC controller and the indoor unit is subject to restrictions depending on the installation location and the capacity of the indoor unit. For details, refer to the New Design Tool software of Mitsubishi Electric Corporation/the Diamond System Builder software of Mitsubishi Electric Trane HVAC US.

Fig. 1 Piping length and height between IU and BC controller



**Piping "A"size selection rule** **(mm [in.])**

| Outdoor Model | Pipe(High pressure) | Pipe(Low pressure) |
|---|---|---|
| EM72T/YXU | ø15.88 [5/8] | ø19.05 [3/4] |
| EM96T/YXU | ø19.05 [3/4] | ø22.20 [7/8] |
| EM120T/YXU | ø19.05 [3/4] | ø28.58 [1-1/8] |
| EM144T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| EM168T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| EM192T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| HM72T/YXU | ø15.88 [5/8] | ø19.05 [3/4] |
| HM96T/YXU | ø19.05 [3/4] | ø22.20 [7/8] |
| HM120T/YXU | ø19.05 [3/4] | ø28.58 [1-1/8] |

**Piping "B", "C", "D", "E" size seleciton rule** **(mm [in.])**

| Total down-stream Indoor capacity | Pipe(Liquid) | Pipe(Gas) |
|---|---|---|
| M54 or less | ø9.52 [3/8] | ø15.88 [5/8] |
| M55-M72 | ø9.52 [3/8] | ø19.05 [3/4] |
| M73-M96 | ø9.52 [3/8] | ø22.20 [7/8] |

**Piping "a", "b", "c", "d", "e", "f", "g", "i" size selection rule** **(mm [in.])**

| Indoor Unit size | Pipe(Liquid) | Pipe(Gas) |
|---|---|---|
| M04-M18 | ø6.35 [1/4] | ø12.70 [1/2] |
| M24-M54 | ø9.52 [3/8] | ø15.88 [5/8] |
| M72 | ø9.52 [3/8] | ø19.05 [3/4] |
| M96 | ø9.52 [3/8] | ø22.20 [7/8] |

**Selection criteria for joints_A**

| Total down-stream Indoor capacity | Joint |
|---|---|
| -M72 | CMY-Y102SS-G2 |
| M73-M96 | CMY-Y102LS-G2 |

## (2) If more than 12 ports are in use, or if there is more than one BC controller in use for one outdoor unit

Note1. No Header usable on PURY system.
Note2. Indoor unit sized M72-M96 should be connected to BC controller via Y shape joint CMY-R170M-E.
Note3. Indoor unit sized M72-M96 does NOT share BC controller ports with other Indoor units;
Note4. As bents cause pressure loss on transportation of refrigerant, fewer bents design is better; Piping length needs to consider the actual length and equivalent length which bents are counted. Equivalent piping length (m) = Actual piping length + "M" × Number of bent.
Note5. Set DIP-SW 1-1 to ON of BC controller, in case of connected Indoor unit sized M31-M54 with 2 ports.
Note6. Do not connect multiple indoor units to the same port when operating each of them in different mode (cooling, heating, stop, and thermo-off). In case of connecting multiple indoor units to the same port, connecting all indoor units to one remote controller and switching SW1-1 ON in the all connected indoor units (switch to thermostat built in the remote controller) are recommended.
Note7. The maximum total capacity of indoor units that can be connected to each sub BC controller CMB-M•NV-MB-SV is 126.
Note8. Indoor capactiy is described as its model size. For example, PEFY-M24NMAU, its capacity is M24.
Note9. Total down-stream Indoor capacity is the summary of the model size of Indoors down-stream. For example, PEFY-M24NMAU + PEFY-M06NMAU: Total Indoor capacity = M24 + M06 = M30.
Note10. To connect the BC controller to the main pipe, use the reducer (CMY-R304S-G1).
Note11. To connect the sub BC controller to the main BC controller, use the reducer (CMY-R303S-G1 or CMY-R306S-G).
Note12. Install the pipes correctly referring to the DATA BOOK.
Note13. Up to 11 sub BC controllers can be connected.

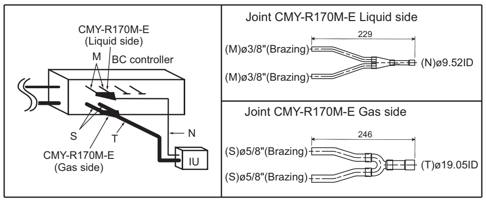


Fig. A

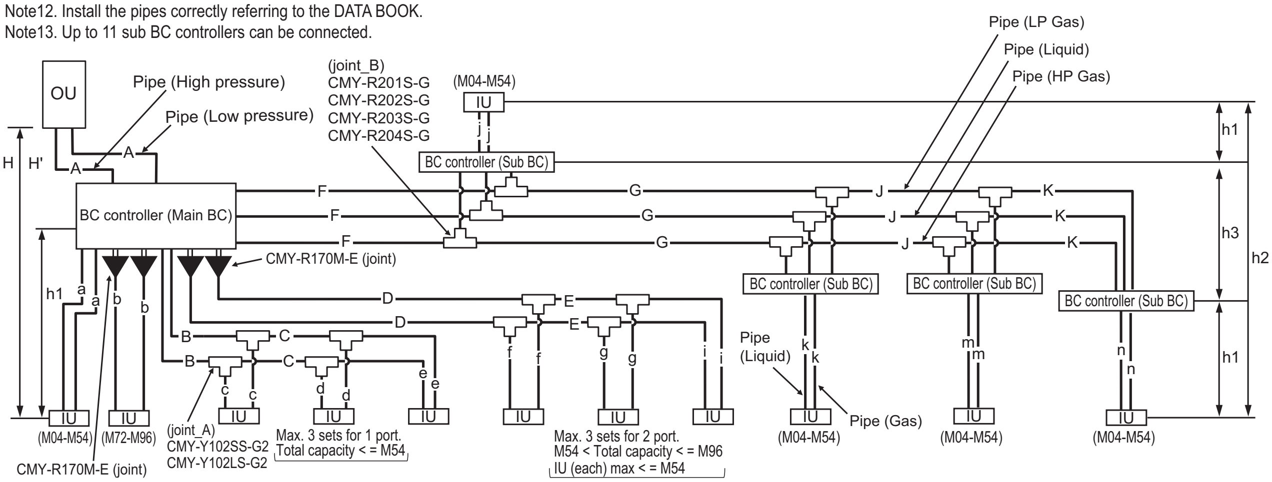


Fig. Piping scheme

OU: Outdoor unit, IU: Indoor unit

**Piping length limitation *10** **(m [ft.])**

| Item | Piping in the figure | Max. length | Max. equivalent length |
|---|---|---|---|
| Total piping length (Total length of high pressure and liquid pipes) | A+B+C+D+E+F+G+J+K+a+b+c+d+e+f+g+i+j+k+m+n | *1 | - |
| Farthest IU from OU | A+F+G+J+K+n | 165 [541] | 190 [623] |
| Distance between OU and BC | A | 110 [360] *1 | 110 [360] *1 |
| Farthest IU from BC controller | D+E+i | 60 [197] *2*3 | 60 [197] *2*3 |
| Farthest IU from BC controller via Sub BC controller | F+G+J+K+n | 90 [295] *9 | 90 [295] *9 |
| Height between OU and IU (OU above IU) | H | 50 [164] *7 | - |
| Height between OU and IU (OU under IU) | H' | 40 [131] *8 | - |
| Height between IU and BC | h1 | 15 [49] (10 [32]) *4 | - |
| Height between IU and IU | h2 | 30 [98] (20 [65]) *5 | - |
| Height between BC(Main or Sub) and BC(Sub) | h3 | 15 [49] (10 [32]) *6 | - |

OU: Outdoor Unit; IU: Indoor Unit; BC: BC controller

**Bent equivalent length**

| Outdoor Model | M(m/bent [ft./bent]) |
|---|---|
| EM72T/YXU | 0.35 [1.15] |
| EM96T/YXU | 0.42 [1.38] |
| EM120T/YXU | 0.50 [1.65] |
| EM144T/YXU | 0.50 [1.65] |
| EM168T/YXU | 0.50 [1.65] |
| EM192T/YXU | 0.50 [1.65] |
| HM72T/YXU | 0.35 [1.15] |
| HM96T/YXU | 0.42 [1.38] |
| HM120T/YXU | 0.50 [1.65] |

*1. Refer to "Total piping length restrictions (m)" / "Total piping length restrictions (ft.)" section.
*2. Details refer to Fig. 2.
*3. When the M72 or M96 model of indoor units are connected to the system, the maximum distance from the BC controller to the farthest indoor unit (indicated as "D + E + i" in the figure is 40 m [131 ft].)
*4. Distance of Indoor sized M72, M96 from BC must be less than 10 m [32 ft], if any.
*5. Distance of Indoor sized M72, M96 from IU must be less than 20 m [65 ft], if any.
*6. When using 2 or more Sub BC controllers, max. height "h3" should be considered.
*7. 113 m [370 ft] is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
*8. 60 m [197 ft] is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
*9. When the piping length or the vertical separation exceeds the limit specified in Fig. 2, connect a sub BC to the system. The restriction for a system with a sub BC connection is shown in Fig. 3. When a given system configuration falls within the shaded area in Fig. 3, increase the size of the high-pressure pipe and the liquid pipe between the main BC and sub BC by one size. When using M12, M15, M18, M36, or M48 model of indoor units, increase the size of the liquid branch pipe between the sub BC and indoor unit by one size.
When using indoor models M54 or larger, the restrictions shown in Fig. 2 cannot be exceeded.
*10. Total length of high-pressure pipes and liquid pipes
*11. The piping length between the BC controller and the indoor unit is subject to restrictions depending on the installation location and the capacity of the indoor unit. For details, refer to the New Design Tool software of Mitsubishi Electric Corporation/the Diamond System Builder software of Mitsubishi Electric Trane HVAC US.

Piping length and height between IU and BC controller

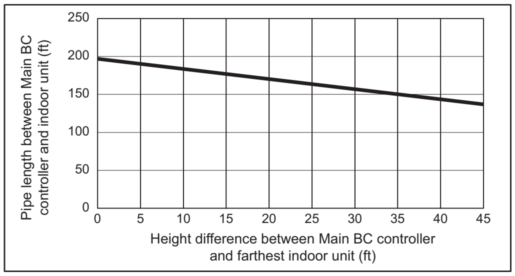


Fig. 2

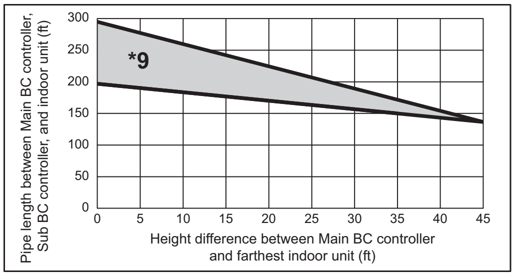
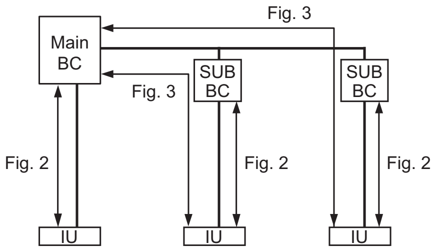


Fig. 3



*9. When the piping length or the vertical separation exceeds the limit specified in Fig. 2, connect a sub BC to the system.
The restriction for a system with a sub BC connection is shown in Fig. 3.
When a given system configuration falls within the shaded area in Fig. 3, increase the size of the high-pressure pipe and the liquid pipe between the main BC and sub BC by one size.
The maximum liquid branch pipe diameter is ø19.05. If a given system already has a ø19.05-pipe between the main BC and sub BC, there is no need to increase the pipe size.
When using M12, M15, M18, M36, or M48 model of indoor units, increase the size of the liquid branch pipe between the sub BC and indoor unit by one size.
When using indoor models M54 or larger, the restrictions shown in Fig. 2 cannot be exceeded.

**Piping "A"size selection rule** **(mm [in.])**

| Outdoor Model | Pipe(High pressure) | Pipe(Low pressure) |
|---|---|---|
| EM72T/YXU | ø15.88 [5/8] | ø19.05 [3/4] |
| EM96T/YXU | ø19.05 [3/4] | ø22.20 [7/8] |
| EM120T/YXU | ø19.05 [3/4] | ø28.58 [1-1/8] |
| EM144T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| EM168T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| EM192T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| HM72T/YXU | ø15.88 [5/8] | ø19.05 [3/4] |
| HM96T/YXU | ø19.05 [3/4] | ø22.20 [7/8] |
| HM120T/YXU | ø19.05 [3/4] | ø28.58 [1-1/8] |

**Selection criteria for joints_A**

| Total down-stream Indoor capacity | Joint |
|---|---|
| -M72 | CMY-Y102SS-G2 |
| M73-M96 | CMY-Y102LS-G2 |

**Selection criteria for joints_B**

| Total down-stream Indoor capacity | Joint |
|---|---|
| -M126 | CMY-R201S-G |
| M127-M216 | CMY-R202S-G |
| M217-M234 | CMY-R203S-G |
| M235- | CMY-R204S-G |

**Piping "B", "C", "D", "E" size seleciton rule** **(mm [in.])**

| Total down-stream Indoor capacity | Pipe(Liquid) | Pipe(Gas) |
|---|---|---|
| M54 or less | ø9.52 [3/8] | ø15.88 [5/8] |
| M55-M72 | ø9.52 [3/8] | ø19.05 [3/4] |
| M73-M96 | ø9.52 [3/8] | ø22.20 [7/8] |

**Piping "a", "b", "c", "d", "e", "f", "g", "i", "j", "k", "m", "n" size selection rule** **(mm [in.])**

| Indoor Unit size | Pipe(Liquid) | Pipe(Gas) |
|---|---|---|
| M04-M18 | ø6.35 [1/4] | ø12.70 [1/2] |
| M24-M54 | ø9.52 [3/8] | ø15.88 [5/8] |
| M72 | ø9.52 [3/8] | ø19.05 [3/4] |
| M96 | ø9.52 [3/8] | ø22.20 [7/8] |

**Piping "F", "G", "J", "K" size selection rule** **(mm [in.])**

| Total down-stream Indoor capacity | Pipe(Liquid) | Pipe(HP Gas) | Pipe(LP Gas) |
|---|---|---|---|
| M72 or less | ø9.52 [3/8] | ø15.88 [5/8] | ø19.05 [3/4] |
| M73 to M108 | ø9.52 [3/8] | ø19.05 [3/4] | ø22.20 [7/8] |
| M109 to M126 | ø12.70 [1/2] | ø19.05 [3/4] | ø28.58 [1-1/8] |
| M127 to M144 | ø12.70 [1/2] | ø22.20 [7/8] | ø28.58 [1-1/8] |
| M145 to M216 | ø15.88 [5/8] | ø22.20 [7/8] | ø28.58 [1-1/8] |
| M217 to M234 | ø15.88 [5/8] | ø28.58 [1-1/8] | ø28.58 [1-1/8] |
| M235 to M288 | ø19.05 [3/4] | ø28.58 [1-1/8] | ø34.93 [1-3/8] |
| M289 or above | ø19.05 [3/4] | ø28.58 [1-1/8] | ø41.28 [1-5/8] |

HP: High pressure, LP: Low pressure

## (3) If more than 12 ports are in use, or if there is more than one BC controller in use for two outdoor units

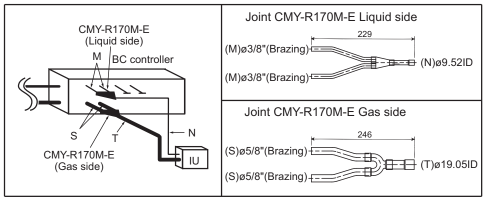


Fig. A

Note1. No Header usable on PURY system.
Note2. Indoor unit sized M72-M96 should be connected to BC controller via Y shape joint CMY-R170M-E.
Note3. Indoor unit sized M72-M96 does NOT share BC controller ports with other Indoor units;
Note4. As bents cause pressure loss on transportation of refrigerant, fewer bents design is better;
Piping length needs to consider the actual length and equivalent length which bents are counted.
Equivalent piping length (m) = Actual piping length + "M" × Number of bent.
Note5. Set DIP-SW 1-1 to ON of BC controller, in case of connected Indoor unit sized M31-M54 with 2 ports.
Note6. Do not connect multiple indoor units to the same port when operating each of them in different mode (cooling, heating, stop, and thermo-off). In case of connecting multiple indoor units to the same port, connecting all indoor units to one remote controller and switching SW1-1 ON in the all connected indoor units (switch to thermostat built in the remote controller) are recommended.
Note7. The maximum total capacity of indoor units that can be connected to each sub BC controller CMB-M•NV-MB-SV is 126.
Note8. Indoor capactiy is described as its model size. For example, PEFY-M24NMAU, its capacity is M24.
Note9. Total down-stream Indoor capacity is the summary of the model size of Indoors down-stream. For example,
PEFY-M24NMAU + PEFY-M06NMAU: Total Indoor capacity = M24 + M06 = M30.
Note10. To connect the BC controller to the main pipe, use the reducer (CMY-R304S-G1).
Note11. To connect the sub BC controller to the main BC controller, use the reducer (CMY-R303S-G1 or CMY-R306S-G).
Note12. Install the pipes correctly referring to the DATA BOOK.
Note13. Up to 11 sub BC controllers can be connected.

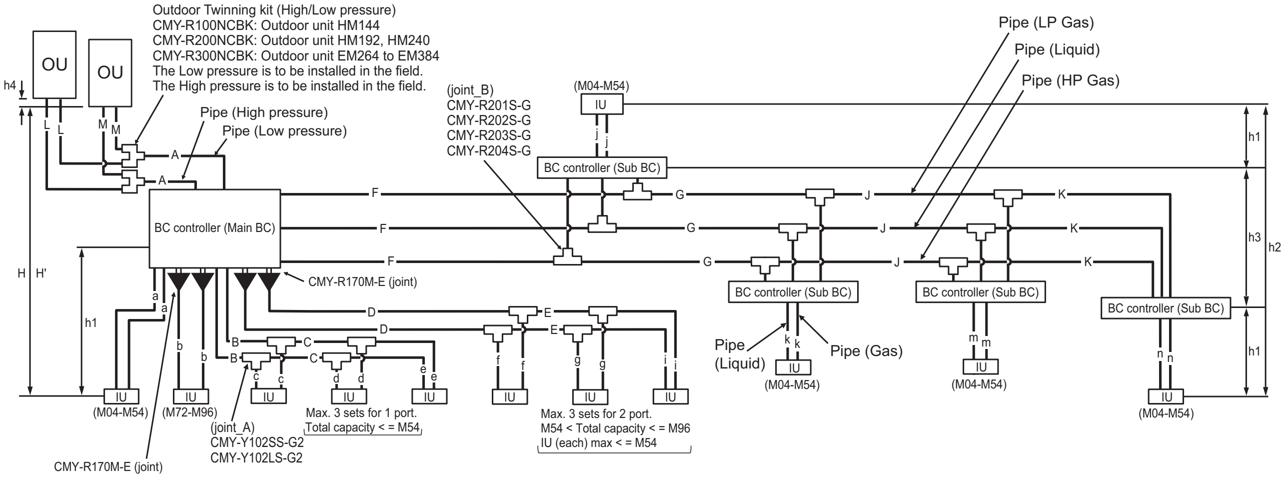


Fig. Piping scheme

OU: Outdoor unit, IU: Indoor unit

### Piping length limitation *10

(m [ft.])

| Item | Piping in the figure | Max. length | Max. equivalent length |
|---|---|---|---|
| Total piping length (Total length of high pressure and liquid pipes) | L+M+A+B+C+D+E+F+G+J+K+a+b+c+d+e+f+g+i+j+k+m+n | *1 | - |
| Farthest IU from OU | L(M)+A+F+G+J+K+n | 165 [541] | 190 [623] |
| Distance between OU and BC | L(M)+A | 110 [360] *1 | 110 [360] *1 |
| Farthest IU from BC controller | D+E+i | 60 [197] *2 *3 | 60 [197] *2*3 |
| Farthest IU from BC controller via Sub BC controller | F+G+J+K+n | 90 [295] *9 | 90 [295] *9 |
| Height between OU and IU (OU above IU) | H | 50 [164] *7 | - |
| Height between OU and IU (OU under IU) | H' | 40 [131] *8 | - |
| Height between IU and BC | h1 | 15 [49] (10 [32]) *4 | - |
| Height between IU and IU | h2 | 30 [98] (20 [65]) *5 | - |
| Height between BC(Main or Sub) and BC(Sub) | h3 | 15 [49] (10 [32]) *6 | - |
| Distance between Main unit and Sub unit | L+M | 5 [16] | - |
| Height between Main unit and Sub unit | h4 | 0.1 [0.3] | - |

OU: Outdoor Unit; IU: Indoor Unit; BC: BC controller

### Bent equivalent length

| Outdoor Model | M(m/bent [ft./bent]) |
|---|---|
| EM264T/YSXU | 0.70 [2.30] |
| EM288T/YSXU | 0.70 [2.30] |
| EM312T/YSXU | 0.80 [2.63] |
| EM336T/YSXU | 0.80 [2.63] |
| EM360T/YSXU | 0.80 [2.63] |
| EM384T/YSXU | 0.80 [2.63] |
| HM144T/YSXU | 0.50 [1.65] |
| HM192T/YSXU | 0.50 [1.65] |
| HM240T/YSXU | 0.70 [2.30] |

*1. Refer to "Total piping length restrictions (m)" / "Total piping length restrictions (ft.)" section.
*2. Details refer to Fig. 2.
*3. When the M72 or M96 model of indoor units are connected to the system, the maximum distance from the BC controller to the farthest indoor unit (indicated as "D + E + i" in the figure is 40 m [131 ft].)
*4. Distance of Indoor sized M72, M96 from BC must be less than 10 m [32 ft], if any.
*5. Distance of Indoor sized M72, M96 from IU must be less than 20 m [65 ft], if any.
*6. When using 2 or more Sub BC controllers, max. height "h3" should be considered.
*7. 113 m [370 ft] is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
*8. 60 m [197 ft] is available depending on the model and installation conditions. For more detailed information, contact your local distributor.
*9. When the piping length or the vertical separation exceeds the limit specified in Fig. 2, connect a sub BC to the system.
The restriction for a system with a sub BC connection is shown in Fig. 3.
When a given system configuration falls within the shaded area in Fig. 3, increase the size of the high-pressure pipe and the liquid pipe between the main BC and sub BC by one size.
When using M12, M15, M18, M36, or M48 model of indoor units, increase the size of the liquid branch pipe between the sub BC and indoor unit by one size.
When using indoor models M54 or larger, the restrictions shown in Fig. 2 cannot be exceeded.
*10. Total length of high-pressure pipes and liquid pipes
*11. The piping length between the BC controller and the indoor unit is subject to restrictions depending on the installation location and the capacity of the indoor unit.
For details, refer to the New Design Tool software of Mitsubishi Electric Corporation/the Diamond System Builder software of Mitsubishi Electric Trane HVAC US.
*12. When the high pressure piping length is 65 m or less, use ø22.2 (ø7/8) pipe.
When the high pressure piping length exceeds 65 m, use ø22.2 (ø7/8) pipe until 65 m, use ø28.58 (ø1-1/8) pipe for the part that exceeds 65 m.

Piping length and height between IU and BC controller

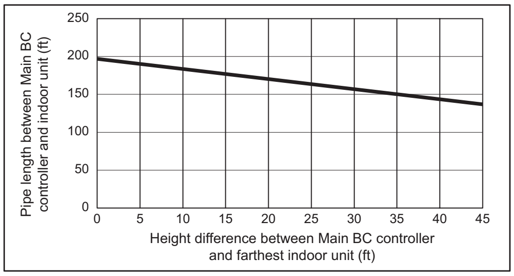


Fig. 2

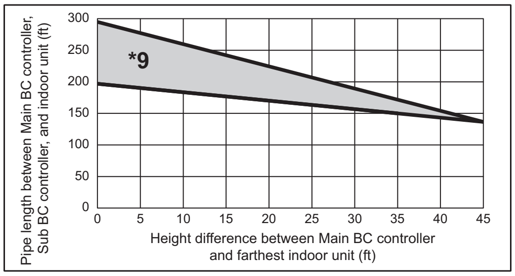
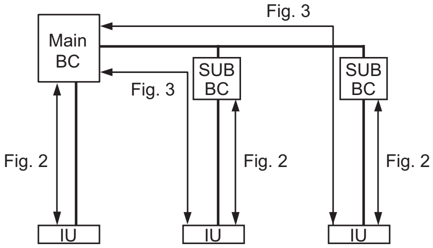


Fig. 3



*9. When the piping length or the vertical separation exceeds the limit specified in Fig. 2, connect a sub BC to the system.
The restriction for a system with a sub BC connection is shown in Fig. 3.
When a given system configuration falls within the shaded area in Fig. 3, increase the size of the high-pressure pipe and the liquid pipe between the main BC and sub BC by one size.
The maximum liquid branch pipe diameter is ø19.05. If a given system already has a ø19.05-pipe between the main BC and sub BC, there is no need to increase the pipe size.
When using M12, M15, M18, M36, or M48 model of indoor units, increase the size of the liquid branch pipe between the sub BC and indoor unit by one size.
When using indoor models M54 or larger, the restrictions shown in Fig. 2 cannot be exceeded.

### Piping "A"size selection rule (mm [in.])

| Outdoor Model | Pipe(High pressure) | Pipe(Low pressure) |
|---|---|---|
| EM264T/YSXU | ø28.58 [1-1/8] | ø34.93 [1-3/8] |
| EM288T/YSXU | ø28.58 [1-1/8] | ø34.93 [1-3/8] |
| EM312T/YSXU | ø28.58 [1-1/8] | ø41.28 [1-5/8] |
| EM336T/YSXU | ø28.58 [1-1/8] | ø41.28 [1-5/8] |
| EM360T/YSXU | ø28.58 [1-1/8] | ø41.28 [1-5/8] |
| EM384T/YSXU | ø28.58 [1-1/8] | ø41.28 [1-5/8] |
| HM144T/YSXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| HM192T/YSXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| HM240T/YSXU | ø22.20 [7/8] *12 | ø34.93 [1-3/8] |

### Piping "L", "M" size selection rule (mm [in.])

| Outdoor Model | Pipe(High pressure) | Pipe(Low pressure) |
|---|---|---|
| EM120T/YXU | ø19.05 [3/4] | ø28.58 [1-1/8] |
| EM144T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| EM168T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| EM192T/YXU | ø22.20 [7/8] | ø28.58 [1-1/8] |
| HM72T/YXU | ø15.88 [5/8] | ø19.05 [3/4] |
| HM96T/YXU | ø19.05 [3/4] | ø22.20 [7/8] |
| HM120T/YXU | ø19.05 [3/4] | ø28.58 [1-1/8] |

### Piping "B", "C", "D", "E" size seleciton rule (mm [in.])

| Total down-stream Indoor capacity | Pipe(Liquid) | Pipe(Gas) |
|---|---|---|
| M54 or less | ø9.52 [3/8] | ø15.88 [5/8] |
| M55-M72 | ø9.52 [3/8] | ø19.05 [3/4] |
| M73-M96 | ø9.52 [3/8] | ø22.20 [7/8] |

### Selection criteria for joints_A

| Total down-stream Indoor capacity | Joint |
|---|---|
| -M72 | CMY-Y102SS-G2 |
| M73-M96 | CMY-Y102LS-G2 |

### Selection criteria for joints_B

| Total down-stream Indoor capacity | Joint |
|---|---|
| -M126 | CMY-R201S-G |
| M127-M216 | CMY-R202S-G |
| M217-M234 | CMY-R203S-G |
| M235- | CMY-R204S-G |

### Piping "a", "b", "c", "d", "e", "f", "g", "i", "j", "k", "m", "n" size selection rule (mm [in.])

| Indoor Unit size | Pipe(Liquid) | Pipe(Gas) |
|---|---|---|
| M04-M18 | ø6.35 [1/4] | ø12.70 [1/2] |
| M24-M54 | ø9.52 [3/8] | ø15.88 [5/8] |
| M72 | ø9.52 [3/8] | ø19.05 [3/4] |
| M96 | ø9.52 [3/8] | ø22.20 [7/8] |

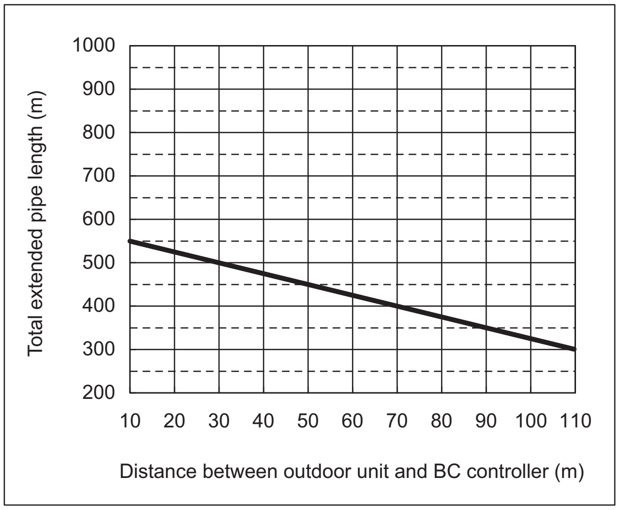
### Piping "F", "G", "J", "K" size selection rule (mm [in.])

| Total down-stream Indoor capacity | Pipe(Liquid) | Pipe(HP Gas) | Pipe(LP Gas) |
|---|---|---|---|
| M72 or less | ø9.52 [3/8] | ø15.88 [5/8] | ø19.05 [3/4] |
| M73 to M108 | ø9.52 [3/8] | ø19.05 [3/4] | ø22.20 [7/8] |
| M109 to M126 | ø12.70 [1/2] | ø19.05 [3/4] | ø28.58 [1-1/8] |
| M127 to M144 | ø12.70 [1/2] | ø22.20 [7/8] | ø28.58 [1-1/8] |
| M145 to M216 | ø15.88 [5/8] | ø22.20 [7/8] | ø28.58 [1-1/8] |
| M217 to M234 | ø15.88 [5/8] | ø28.58 [1-1/8] | ø28.58 [1-1/8] |
| M235 to M288 | ø19.05 [3/4] | ø28.58 [1-1/8] | ø34.93 [1-3/8] |
| M289 or above | ø19.05 [3/4] | ø28.58 [1-1/8] | ø41.28 [1-5/8] |

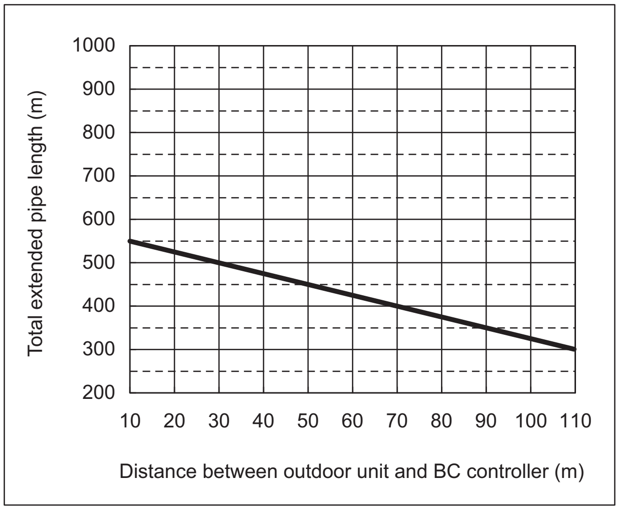
HP: High pressure, LP: Low pressure

## Total piping length restrictions (m)

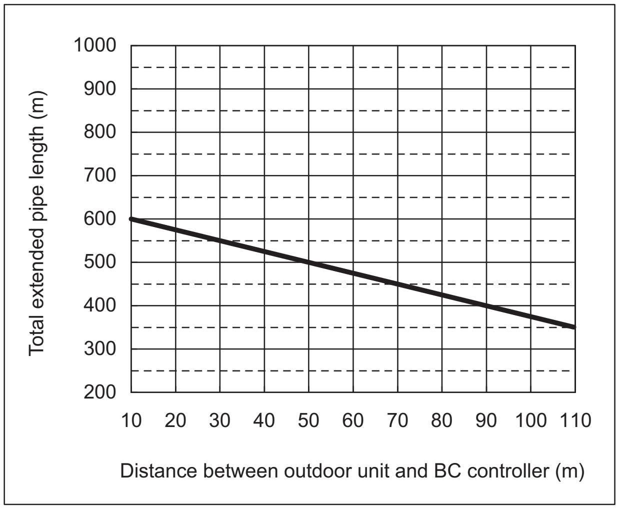
[PURY-EM72, 96, 120TXU/YXU]



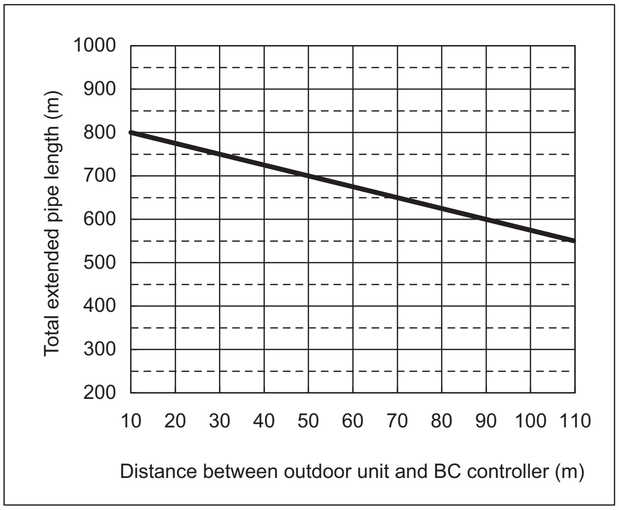
[PURY-HM72, 96, 120TXU/YXU]



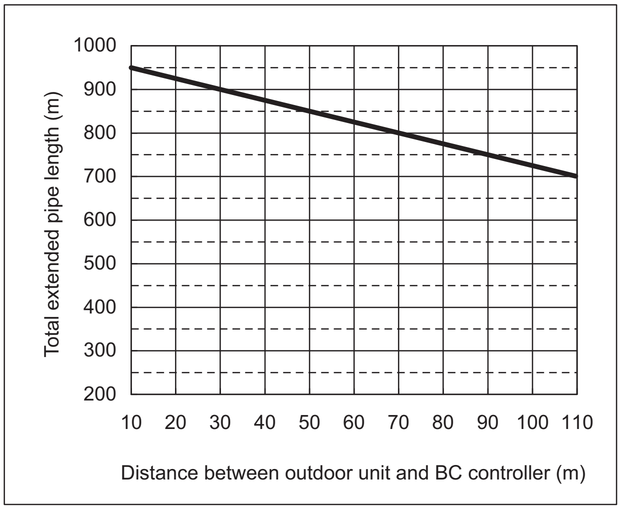
[PURY-EM144, 168, 192TXU/YXU]



[PURY-HM144, 192, 240TSXU/YSXU]

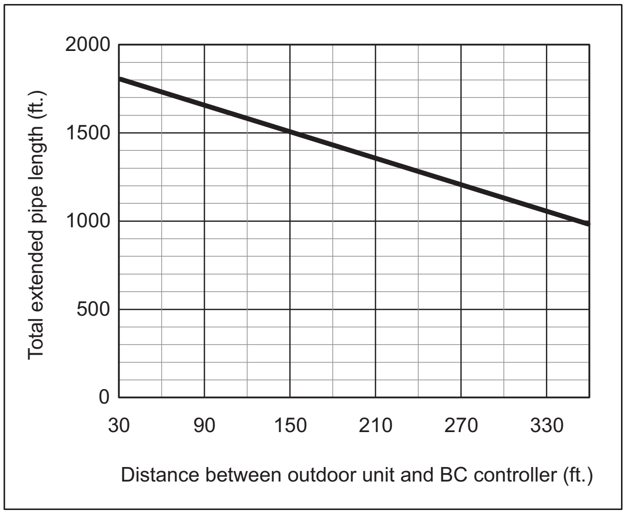


[PURY-EM264, 288, 312, 336, 360, 384TSXU/YSXU]

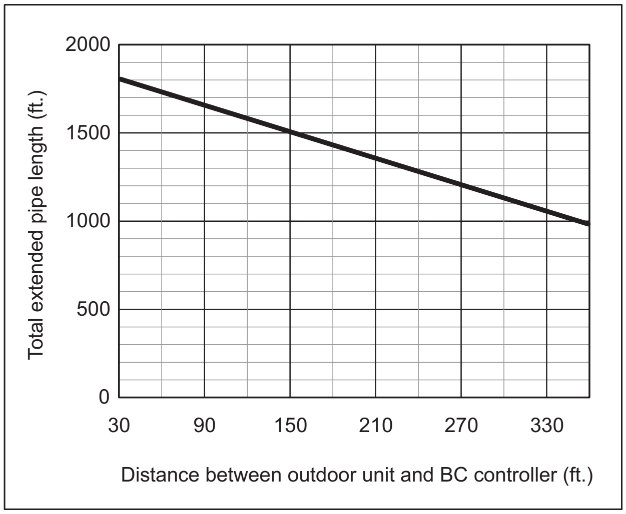


## Total piping length restrictions (ft.)

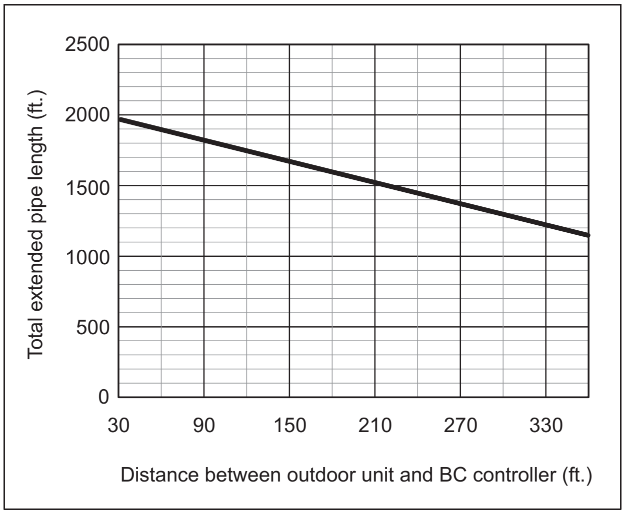
[PURY-EM72, 96, 120TXU/YXU]



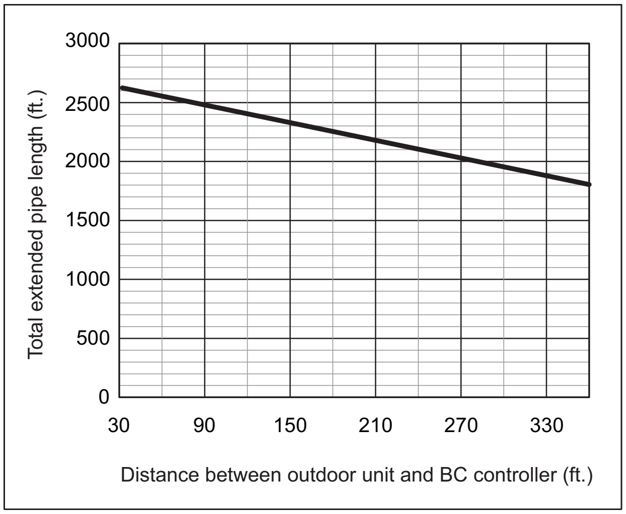
[PURY-HM72, 96, 120TXU/YXU]



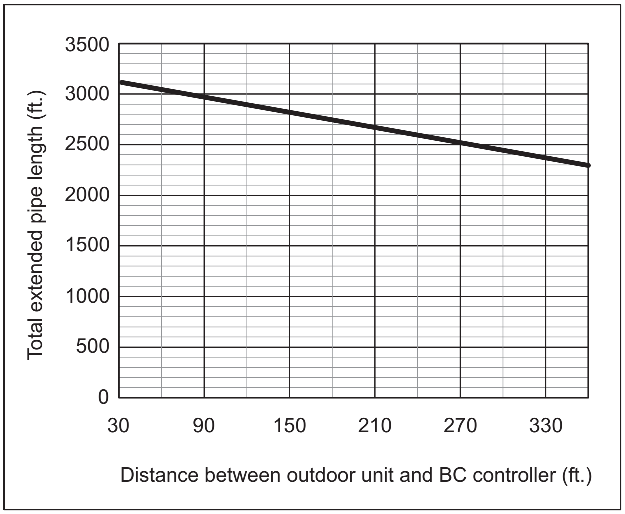
[PURY-EM144, 168, 192TXU/YXU]



[PURY-HM144, 192, 240TSXU/YSXU]



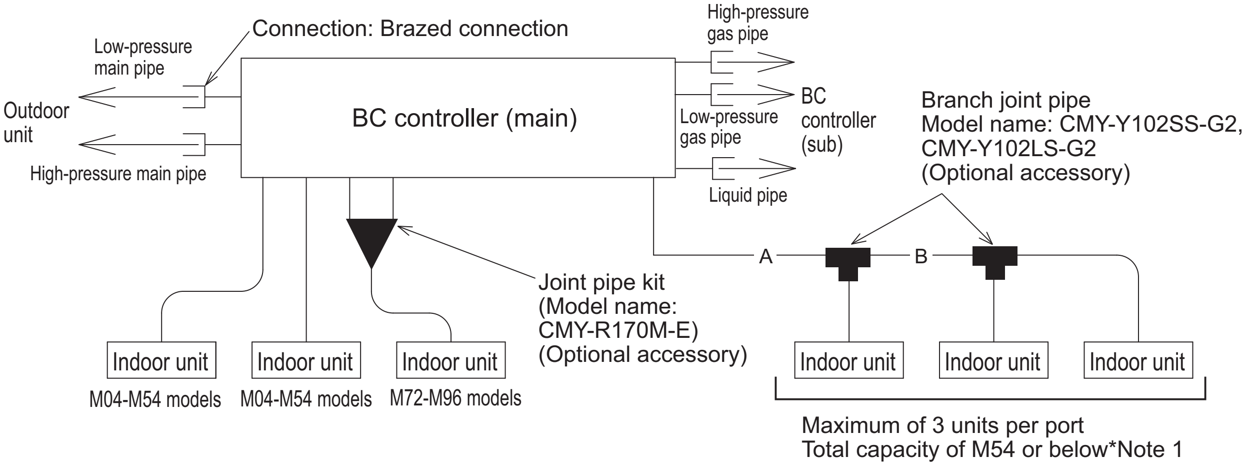
[PURY-EM264, 288, 312, 336, 360, 384TSXU/YSXU]



## 2-8-2 BC Controller Connection Method

### (1) Size of the pipe that fits the main BC controller ports

72 - 384 models

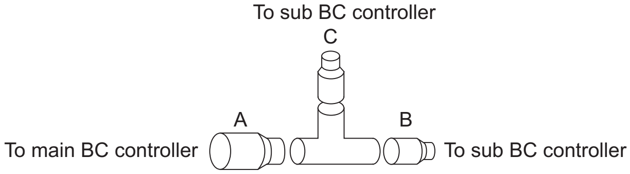


*Note 1 Do not connect multiple indoor units to the same port when operating each of them in different mode (cooling, heating, stop, and thermo-off).
The indoor units connected to the same port must be set to operate in the same mode. Set them in the same group to make them run/stop in the same mode all together. For other options, enable the thermo setting on the remote controller, or set the common thermostat (optional) to run/stop the units in the same mode based on a representative temperature.

*Note 2 Use the branch joint (CMY-Y102SS-G2) if the total capacity of the downstream indoor units is 72 or less.
Use the branch joint (CMY-Y102LS-G2) if the total capacity of the downstream indoor units is between 73 and 96.
Use two branch ports to connect to the optional Junction Pipe Kit (CMY-R170M-E) if the total capacity of the downstream indoor units exceeds 54.

1. Connect the liquid and gas pipes of each indoor unit to the same (correct) end connection numbers as indicated on the indoor unit connection section of each BC controller. If connected to wrong end connection numbers, there will be no normal operation.
2. List indoor unit model names in the name plate on the BC controller control box (for identification purposes), and BC controller end connection numbers and address numbers in the name plate on the indoor unit side.
3. Connect sealing pipes to the unused branch ports. (The optional part PAC-KA01PS-E is recommended.)
4. When using indoor unit of total capacity of 55 to 96, use the joint pipe kit (model name: CMY-R170M-E) to connect the units.
5. When using the branch joint between BC and indoor units, or between Main BC and Sub BC controllers, connect it horizontally.

6. Restriction on installing the branch joint between Main BC and Sub BC on the high-pressure piping, low pressure piping, and liquid piping.



- Regarding the 2-Branch Joint Pipe on the high-pressure/low-pressure/liquid piping, A and B must be installed horizontally, and C must be installed upward higher than the horizontal plane of A and B.

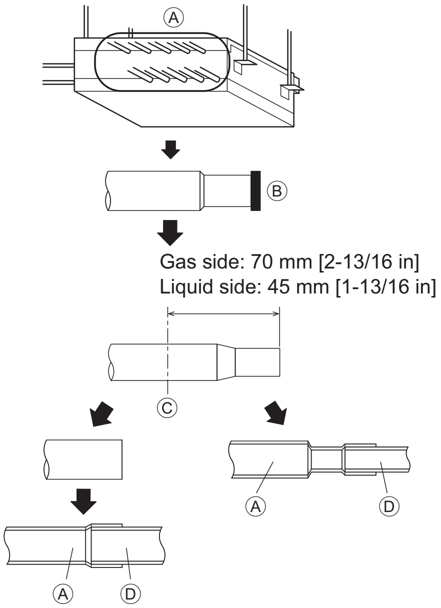
7. Be sure to have pipe expansion of indoor unit connecting port by cutting the piping at the cutting point which depends on the indoor unit capacity.
8. Be sure to use non-oxidative brazing where necessary. If you do not use non-oxidative brazing, it may clog the pipes.
   While under a nitrogen purge, braze the indoor unit connecting port before brazing the outdoor unit connecting port of BC controller.
   When brazing the indoor unit connecting port, supply a nitrogen gas into the outdoor unit connecting port of BC controller.
   When brazing the outdoor unit connecting port of BC controller, supply a nitrogen gas into the pipe between the outdoor unit and BC controller.
9. After completing pipe connection, support the pipes to ensure that load is not imparted to the BC controller's end connections (particularly to the gas pipes of indoor units).
10. Support the on-site pipes near the BC controller at 0.5-meter intervals or less, and at 2-meter intervals or less in other areas. Support the pipes so that the bending part is securely fixed in place.
11. Refrigerant pipes may expand or shrink due to temperature fluctuations of the refrigerant inside the pipes. When installing long straight pipes, provide expansion loops or offsets to absorb the expansion of the pipes.

The ports of the BC controller accommodates the pipes on M24 - M54 models of indoor units. To connect other types of indoor units, follow the procedure below.

1)

**Note:**
**Remove burr after cutting the piping to prevent entering the piping.**
**Check that there is no crack at the pipe expansion part.**

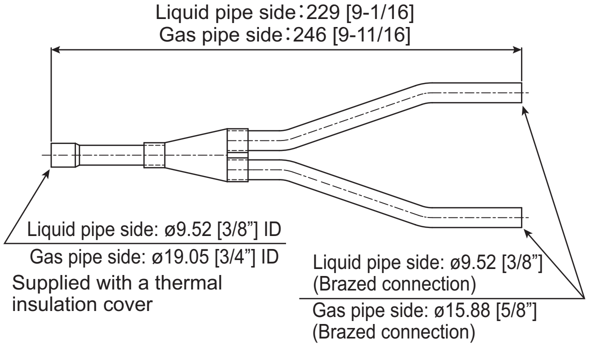
**[Fig. 5.2.1]**



Ⓐ Indoor unit connecting port
Ⓑ Rubber stopper
Ⓒ Cutting point (Indoor unit model: bigger than 18)
Ⓓ Field pipe

Connect the field piping as follows.
① Cut the connecting port. (Liquid side, Gas side)
② Connect the field piping to the liquid side connecting ports.
③ Connect the field piping to the gas side connecting ports.

2) To connect M72 - M96 models of indoor units (or when the total capacity of indoor units exceeds M55), use a junction pipe kit and merge the two nozzles.



3) To connect multiple indoor units to a port (or to a junction pipe)
- ⬩Maximum total capacity of connected indoor units: M54 or below (in a system with a junction pipe: M96 or below)
- ⬩Maximum number of connectable indoor units: 3 units
- ⬩Branch joint: Use CMY-Y102SS-G2, CMY-Y102LS-G2 (optional accessory).
- ⬩(1) Size of the pipe that fits the main BC controller ports (A, B): Select the proper size pipes based on the total capacity of the downstream indoor units, using the table below as a reference.

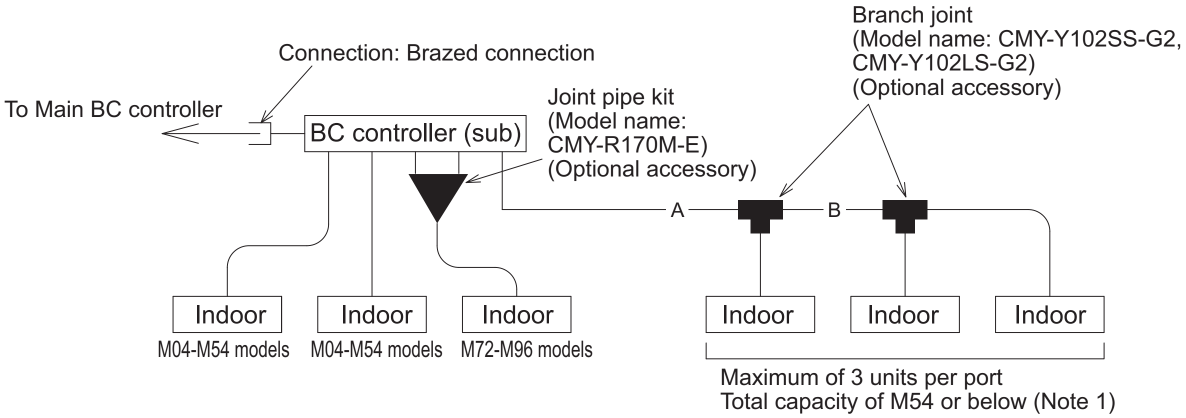
Unit : mm [inch]

| Total capacity of indoor units | Liquid pipe | Gas pipe |
|---|---|---|
| 54 or below | ø9.52 [3/8"] | ø15.88 [5/8"] |
| 55 - 72 | ø9.52 [3/8"] | ø19.05 [3/4"] |
| 73 - 96 | ø9.52 [3/8"] | ø22.2 [7/8"] |

Unit : mm [inch]

| Outdoor | | High-pressure pipe | Low-pressure pipe |
|---|---|---|---|
| Outdoor unit side | EM72 | ø15.88 [5/8"] (Brazed connection) | ø19.05 [3/4"] (Brazed connection) |
| | EM96 | ø19.05 [3/4"] (Brazed connection) | ø22.2 [7/8"] (Brazed connection) |
| | EM120 | | ø28.58 [1-1/8"] (Brazed connection) |
| | EM144 | ø22.2 [7/8"] (Brazed connection) | |
| | EM168 | | |
| | EM192 | | |
| | EM264 | ø28.58 [1-1/8"] (Brazed connection) | ø34.93 [1-3/8"] (Brazed connection) |
| | EM288 | | |
| | EM312 | | ø41.28 [1-5/8"] (Brazed connection) |
| | EM336 | | |
| | EM360 | | |
| | EM384 | | |
| | HM72 | ø15.88 [5/8"] (Brazed connection) | ø19.05 [3/4"] (Brazed connection) |
| | HM96 | ø19.05 [3/4"] (Brazed connection) | ø22.2 [7/8"] (Brazed connection) |
| | HM120 | | ø28.58 [1-1/8"] (Brazed connection) |
| | HM144 | ø22.2 [7/8"] (Brazed connection) | |
| | HM192 | | |
| | HM240 | ø22.2 [7/8"] (Brazed connection) | ø34.93 [1-3/8"] (Brazed connection) |
| Indoor unit side | | ø9.52 [3/8"] (Brazed connection) | ø15.88 [5/8"] (Brazed connection) |

## (2) Size of the pipe that fits the sub BC controller ports



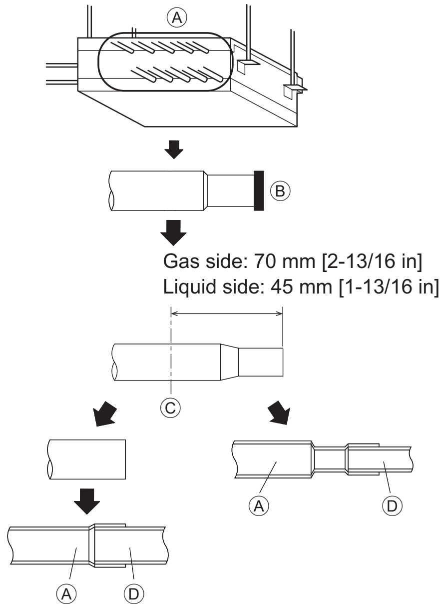
Note 1 Do not connect multiple indoor units to the same port when operating each of them in different mode (cooling, heating, stop, and thermo-off).
The indoor units connected to the same port must be set to operate in the same mode. Set them in the same group to make them run/stop in the same mode all together. For other options, enable the thermo setting on the remote controller, or set the common thermostat (optional) to run/stop the units in the same mode based on a representative temperature.

The ports of the BC controller accommodates the pipes on M24-M54 models of indoor units. To connect other types of indoor units, follow the procedure below.

1)

**Note:**
**Remove burr after cutting the piping to prevent entering the piping.**
**Check that there is no crack at the pipe expansion part.**

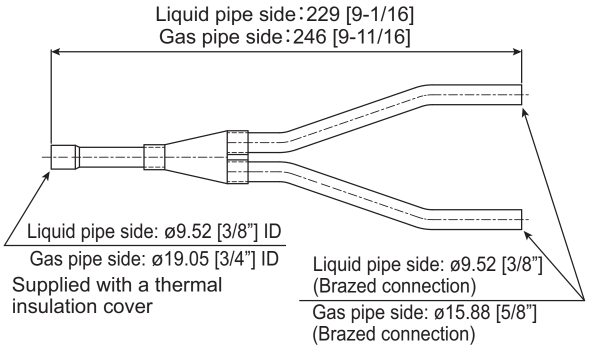
**[Fig. 5.2.1]**



Ⓐ Indoor unit connecting port
Ⓑ Rubber stopper
Ⓒ Cutting point (Indoor unit model: bigger than 18)
Ⓓ Field pipe

Connect the field piping as follows.
① Cut the connecting port. (Liquid side, Gas side)
② Connect the field piping to the liquid side connecting ports.
③ Connect the field piping to the gas side connecting ports.

2) To connect M72 - M96 models of indoor units (or when the total capacity of indoor units exceeds M55), use a junction pipe kit and merge the two nozzles.



3) To connect multiple indoor units to a port (or to a junction pipe)
- Maximum total capacity of connected indoor units: M54 or below (in a system with a junction pipe: M96 or below)
- Maximum number of connectable indoor units: 3 units
- Branch joint: Use CMY-Y102SS-G2, CMY-Y102LS-G2 (optional accessory).
- (2) Size of the pipe that fits the main BC controller ports (A, B): Select the proper size pipes based on the total capacity of the downstream indoor units, using the table below as a reference.

Unit : mm [inch]

| Total capacity of indoor units | Liquid pipe | Gas pipe |
|---|---|---|
| 54 or below | ø9.52 [3/8"] | ø15.88 [5/8"] |
| 55 - 72 | ø9.52 [3/8"] | ø19.05 [3/4"] |
| 73 - 96 | ø9.52 [3/8"] | ø22.2 [7/8"] |

Unit : mm [inch]

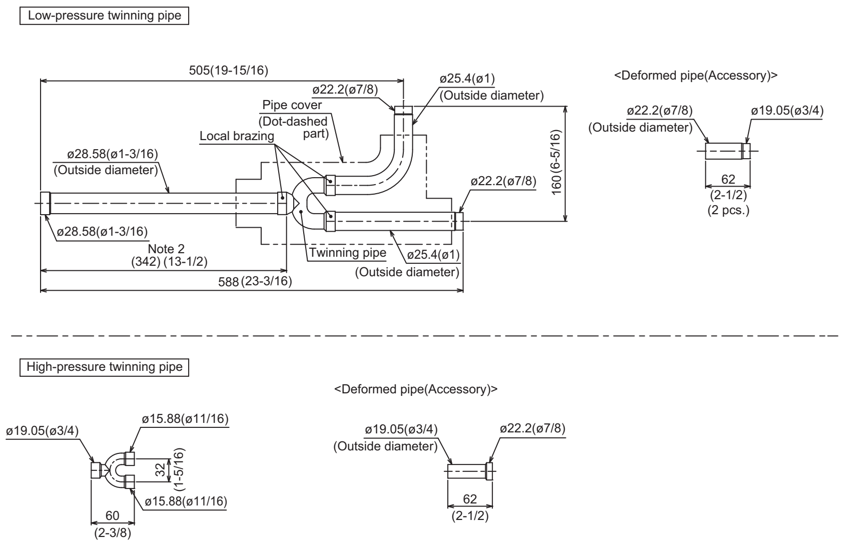
| Operation | | Pipe sections | | |
|---|---|---|---|---|
| | Total capacity of indoor units connected to down-stream BC controller | High-pressure side (gas) | Low-pressure side (gas) | Liquid pipe side |
| Main BC controller side | - 72 | ø15.88 [5/8"] (Brazed connection) | ø19.05 [3/4"] (Brazed connection) | ø9.52 [3/8"] (Brazed connection) |
| | 73 - 108 | ø19.05 [3/4"] (Brazed connection) | ø22.2 [7/8"] (Brazed connection) | |
| | 109 - 126 | | ø28.58 [1-1/8"] (Brazed connection) | ø12.7 [1/2"] (Brazed connection) |
| | 127 - 144 | ø22.2 [7/8"] (Brazed connection) | | |
| | 145 - 216 | | | ø15.88 [5/8"] (Brazed connection) |
| | 217 - 234 | ø28.58 [1-1/8"] (Brazed connection) | | |
| | 235 - 288 | | ø34.93 [1-3/8"] (Brazed connection) | ø19.05 [3/4"] (Brazed connection) |
| | 289 - | | ø41.28 [1-5/8"] (Brazed connection) | |

## 2-8-3 Outdoor Twinning Kit

The following optional Outdoor Twinning Kit is needed to use to combine multiple refrigerant pipes. Refer to section "Piping Design" of the DATA BOOK for the details of selecting a proper twinning kit.

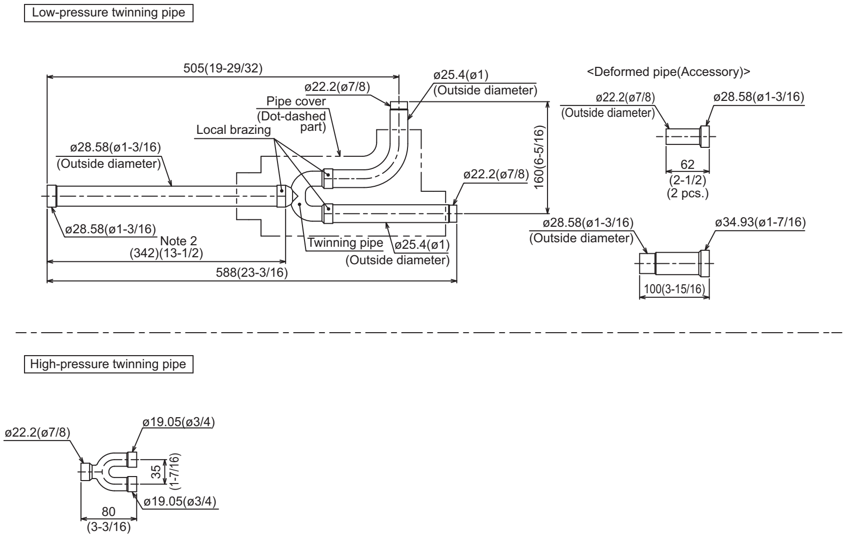
CMY-R100NCBK

Unit: mm (in.)



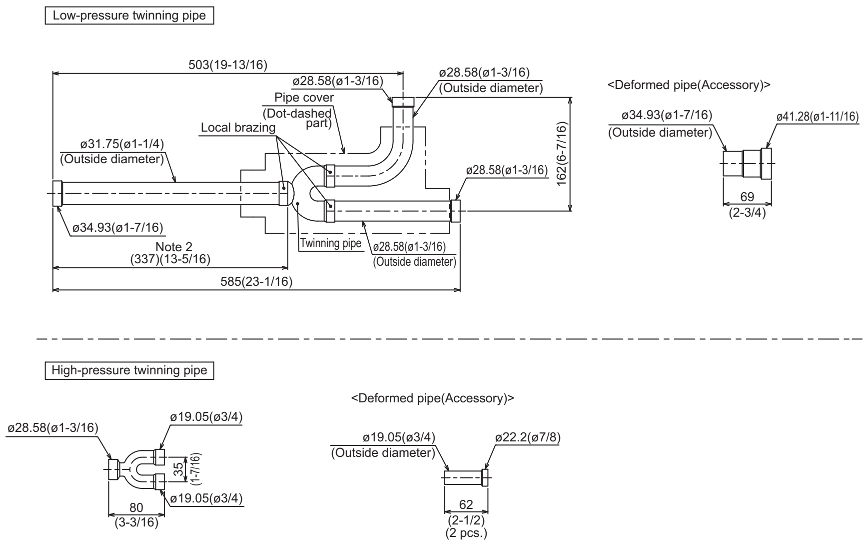
CMY-R200NCBK

Unit: mm (in.)

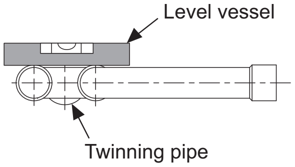


CMY-R300NCBK

Unit: mm (in.)



Note 1. Refer to the figure below for the installation position of the twinning pipe.
The Twinning pipe must be installed horizontally using a level vessel to avoid unit damage.



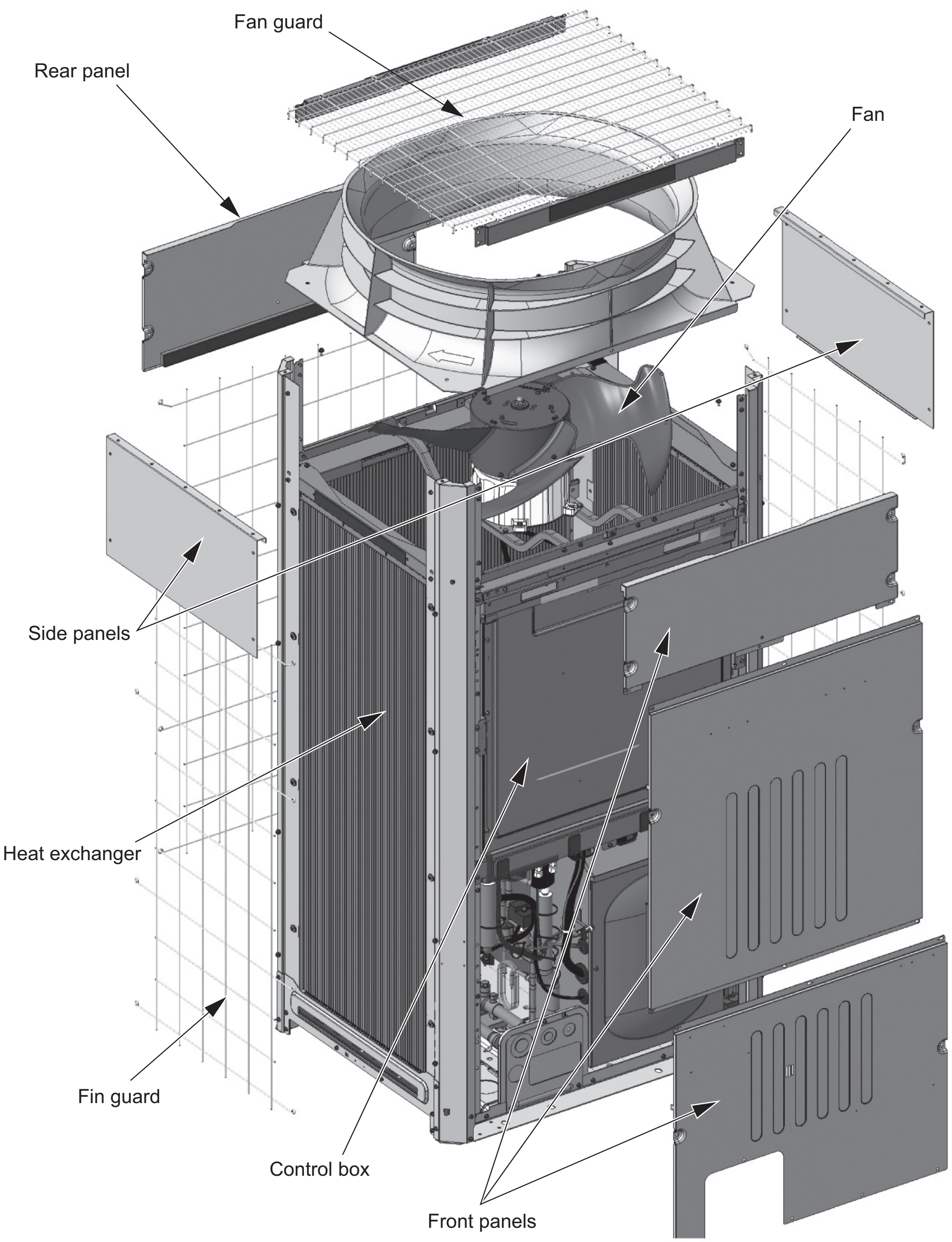
2. Use the attached pipe to braze the port-opening of the twinning pipe.
3. Pipe diameter is indicated by inside diameter.
4. Only use the twinning pipe by Mitsubishi (optional parts).

# Chapter 3 Major Components, Their Functions and Refrigerant Circuits

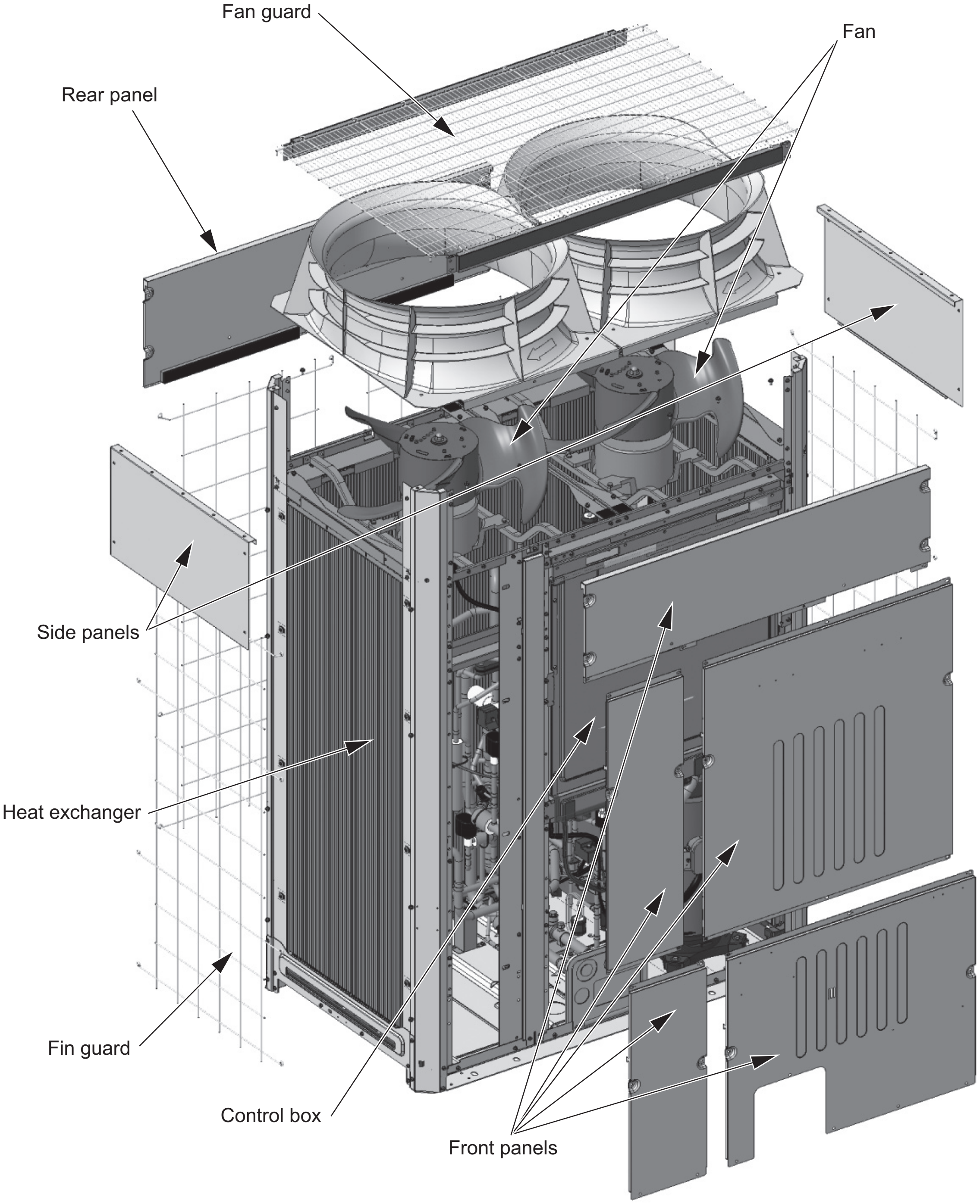
# 3-1 External Appearance and Refrigerant Circuit Components of Outdoor Unit

## 3-1-1 External Appearance of Outdoor Unit

### (1) PURY-EM72, 96, 120T(Y)XU-A
### PURY-HM72T(Y)XU-A

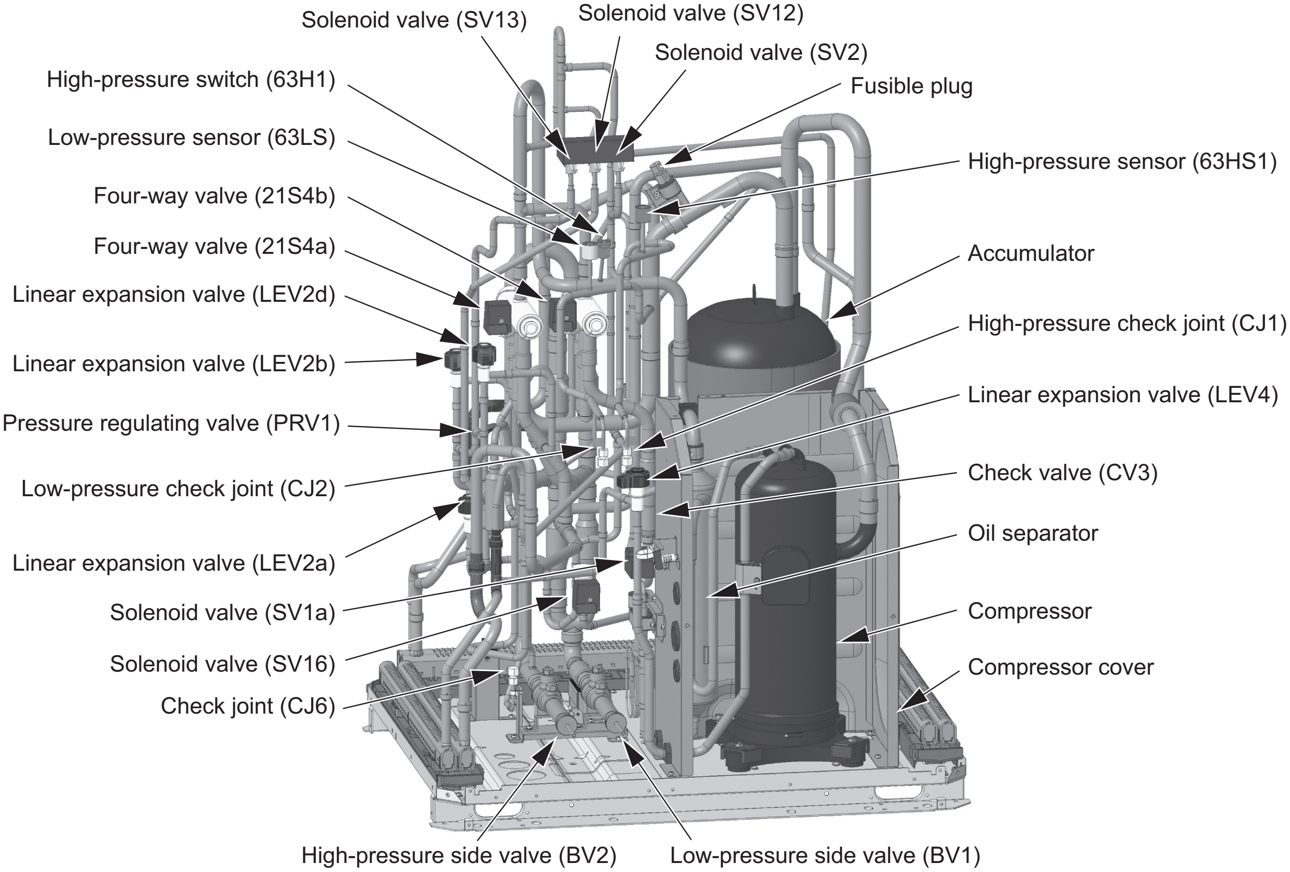


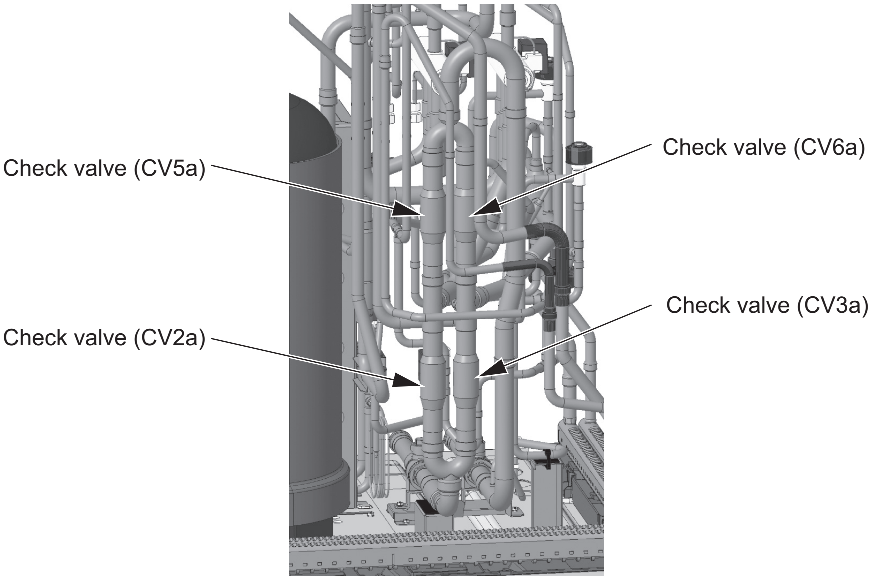
## (2) PURY-EM144, 168, 192T(Y)XU-A
## PURY-HM96, HM120T(Y)XU-A



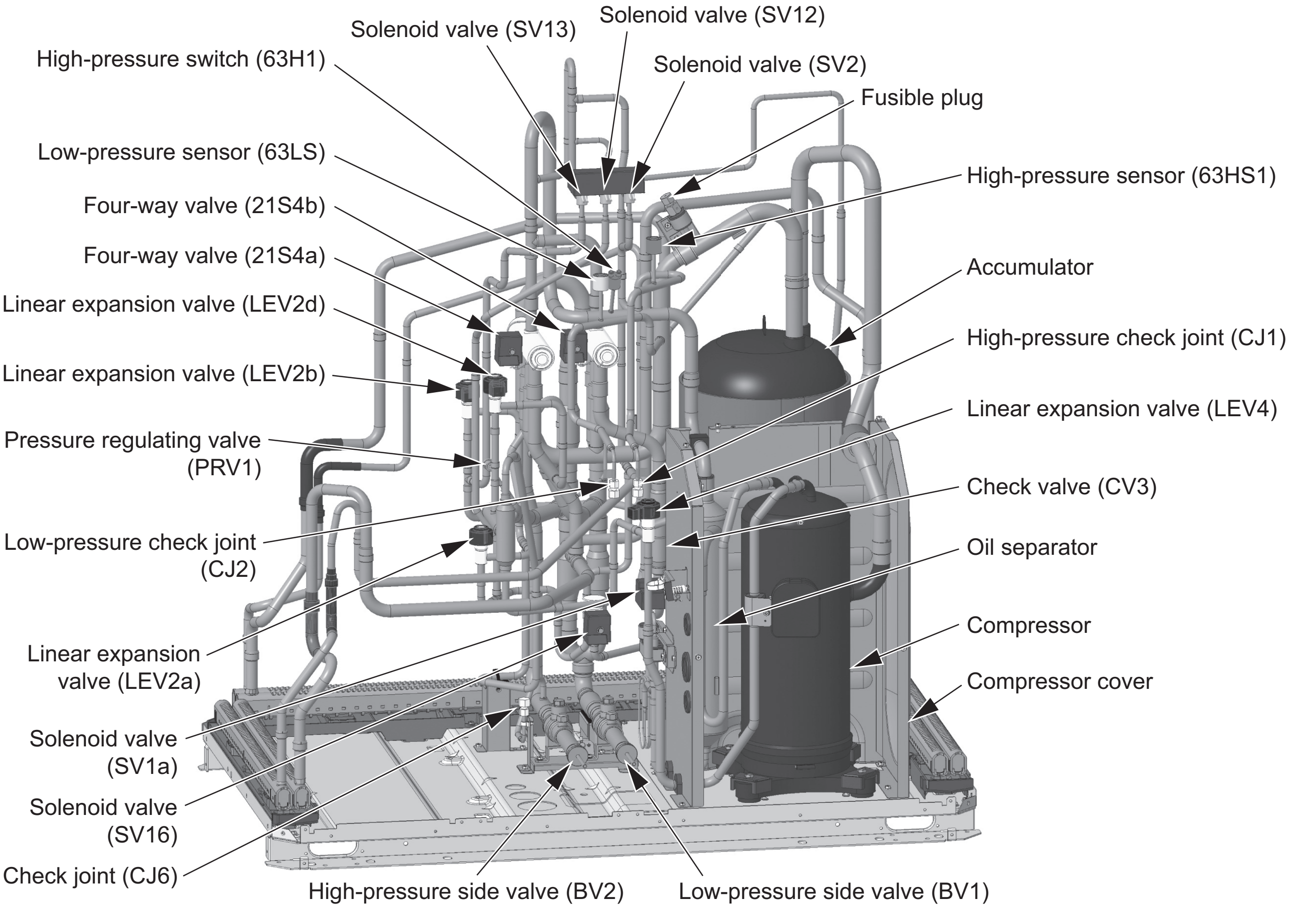
## 3-1-2 Outdoor Unit Refrigerant Circuits

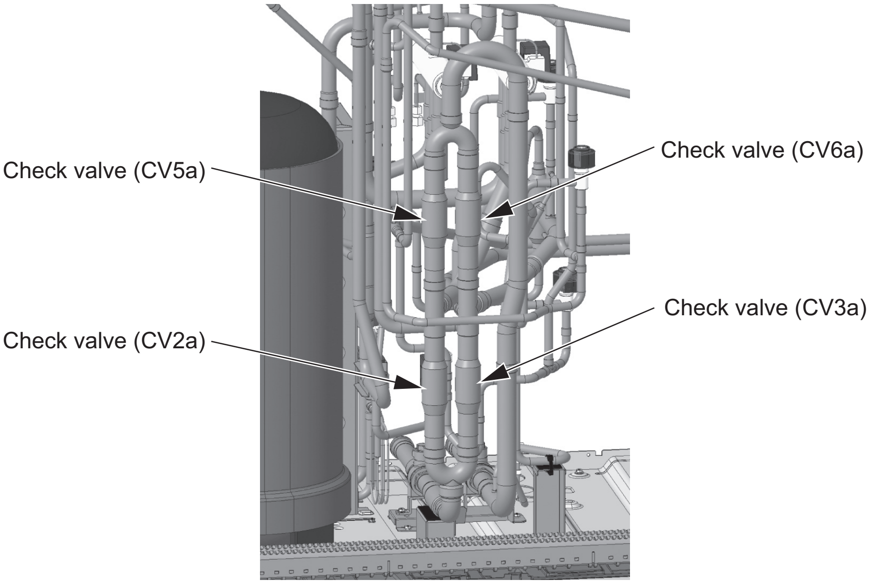
### (1) PURY-EM72, 96, 120T(Y)XU-A
### PURY-HM72T(Y)XU-A





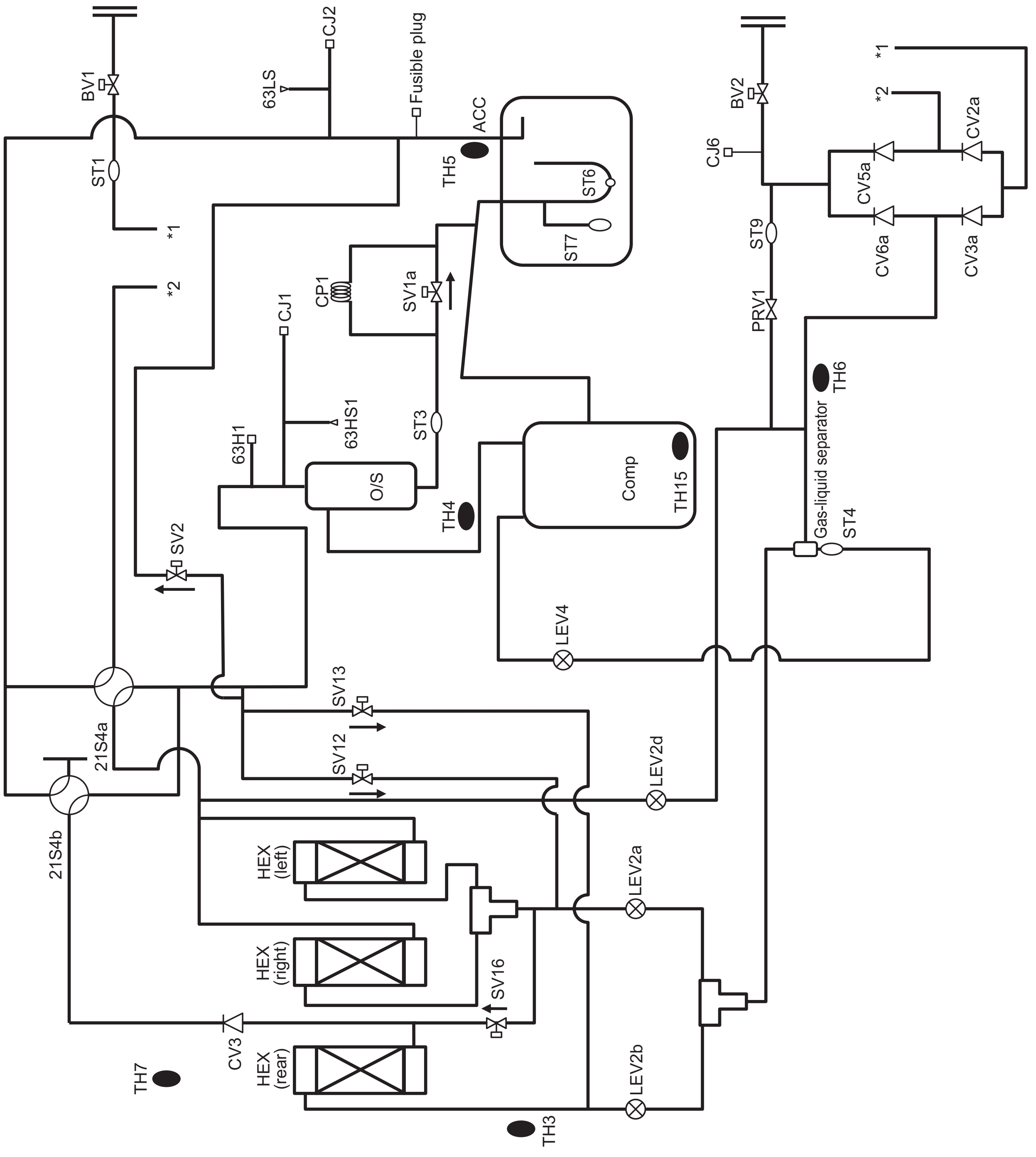
## (2) PURY-EM144, 168, 192T(Y)XU-A
## PURY-HM96, HM120T(Y)XU-A



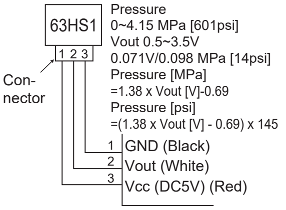
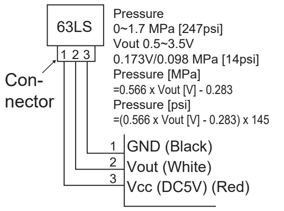


# 3-2 Outdoor Unit Refrigerant Circuit Diagrams

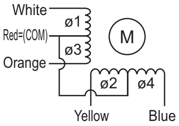
### (1) PURY-EM72 - 192T/YXU-A
### PURY-HM72 - 120T/YXU-A



# 3-3 Functions of the Major Components of Outdoor Unit

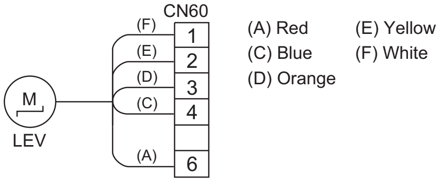
| Part name | Symbols (functions) | Notes | Usage | Specifications | Check method |
|---|---|---|---|---|---|
| Compressor | MC1<br>(Comp1) | | Adjusts the amount of circulating refrigerant by adjusting the operating frequency based on the operating pressure data | EM72, 96, 120 models<br>HM72 model<br>Low-pressure shell scroll compressor<br>wirewound resistance<br>20°C [68°F]: 0.431Ω (YXU), 0.124Ω (TXU)<br>EM144, 168, 192 models<br>HM96, 120 models<br>Low-pressure shell scroll compressor<br>wirewound resistance<br>20°C [68°F]: 0.212Ω (YXU), 0.079Ω (TXU) | |
| High pressure sensor | 63HS1 | | 1) Detects high pressure<br>2) Regulates frequency and provides high-pressure protection | Pressure<br>0~4.15 MPa [601psi]<br>Vout 0.5~3.5V<br>0.071V/0.098 MPa [14psi]<br>Pressure [MPa]<br>=1.38 x Vout [V]-0.69<br>Pressure [psi]<br>=(1.38 x Vout [V] - 0.69) x 145<br> | |
| Low pressure sensor | 63LS | | 1) Detects low pressure<br>2) Provides low-pressure protection | Pressure<br>0~1.7 MPa [247psi]<br>Vout 0.5~3.5V<br>0.173V/0.098 MPa [14psi]<br>Pressure [MPa]<br>=0.566 x Vout [V] - 0.283<br>Pressure [psi]<br>=(0.566 x Vout [V] - 0.283) x 145<br> | |
| Pressure switch | 63H1 | | 1) Detects high pressure<br>2) Provides high-pressure protection | 4.15MPa [601psi] OFF setting | |
| Power supply transformer | Transformer | YXU only | Decreases the power supply voltage (460 V) supplied to the circuit board | Primary rated voltage: 460 V, 50/60 Hz<br>Secondary rated voltage: 229 V<br>(No-load voltage) | |

| Part name | Symbols (functions) | Notes | Usage | Specifications | Check method |
|---|---|---|---|---|---|
| Thermistor | TH4<br>(Discharge temperature) | | 1) Detects discharge air temperature<br>2) Provides high-pressure protection | Degrees Celsius<br>$R_{120} = 7.465k\Omega$<br>$R_{25/120} = 4057$<br>$R_t =$<br>$7.465\exp\{4057(\frac{1}{273+t} - \frac{1}{393})\}$ | Resistance check |
| | | | 0°C[32°F] : 645 kΩ<br>10°C[50°F] : 396 kΩ<br>20°C[68°F] : 250 kΩ<br>30°C[86°F] : 161 kΩ<br>40°C[104°F] : 107 kΩ<br>50°C[122°F] : 72 kΩ<br>60°C[140°F] : 50 kΩ<br>70°C[158°F] : 35 kΩ<br>80°C[176°F] : 25 kΩ<br>90°C[194°F] : 18.0 kΩ<br>100°C[212°F] : 13.6 kΩ<br>110°C[230°F] : 9.9 kΩ | | |
| | TH3<br>(Pipe temperature) | | 1) Controls frequency<br>2) Controls defrosting during heating operation | Degrees Celsius<br>$R_0 = 15k\Omega$<br>$R_{0/80} = 3460$<br>$R_t = 15\exp\{3460 (\frac{1}{273+t} - \frac{1}{273})\}$<br>0°C[32°F] :15 kΩ<br>10°C[50°F] :9.7 kΩ<br>20°C[68°F] :6.4 kΩ<br>25°C[77°F] :5.3 kΩ<br>30°C[86°F] :4.3 kΩ<br>40°C[104°F] :3.1 kΩ | |
| | TH6<br>(Pipe temperature) | | Used to control the refrigerant flow in combination units during heating operation | | |
| | TH7<br>(Outdoor temperature) | | 1) Detects outdoor air temperature<br>2) Controls fan operation | | |
| | TH5<br>(Pipe temperature) | | Used to control the refrigerant flow in combination units during heating operation | | |
| | TH15<br>(Compressor shell bottom temperature) | | Detects liquid backflow to protect the compressor | | |
| | THHS<br>Inverter heat sink temperature | | Inverter overheating protection | Degrees Celsius<br>$R_{50} = 17k\Omega$<br>$R_{25/120} = 4016$<br>$R_t = 17\exp\{4016 (\frac{1}{273+t} - \frac{1}{323})\}$<br>0°C[32°F] :161 kΩ<br>10°C[50°F] :97 kΩ<br>20°C[68°F] :60 kΩ<br>25°C[77°F] :48 kΩ<br>30°C[86°F] :39 kΩ<br>40°C[104°F] :25 kΩ | |

| Part name | Symbols (functions) | Notes | Usage | Specifications | Check method |
|---|---|---|---|---|---|
| Solenoid valve | SV1a<br>Discharge-suction bypass | | 1) High/low pressure bypass at start-up and stopping, and capacity control during low-load operation<br>2) High-pressure-rise prevention | 208 - 230 VAC<br>Open while being powered/ closed while not being powered | Continuity check with a tester |
| | SV2 | | Prevention of low-pressure drop<br>Refrigerant equalization control | 208 - 230 VAC<br>Open while being powered/ closed while not being powered | |
| | SV12 | | Used for defrosting during heating operation. | 208 - 230 VAC<br>Open while being powered/ closed while not being powered | |
| | SV13 | | 1) Controls capacity during low-load heating operation.<br>2) Used for defrosting during heating operation. | 208 - 230 VAC<br>Open while being powered/ closed while not being powered | |
| | SV16 | | Controls the heat exchanger capacity of the outdoor unit. | 208 - 230 VAC<br>Open while being powered/ closed while not being powered | |
| LEV | LEV2a, 2b | | 1) Controls the heat exchanger capacity of the outdoor unit.<br>2) Adjusts the refrigerant flow during heating operation. | 12 VDC<br>Opening of stepping motor driving valve 0-3000 pulses | Continuity Test with a Tester. Continuity between white and orange.Continuity between yellow, brown, and blue<br><br> |
| | LEV2d | | Heat exchanger capacity control | | |
| | LEV4 | | Injection amount control | 12 VDC<br>Opening of stepping motor driving valve 0-480 pulses (direct driven type) | |
| 4-way valve | 21S4a | | Changeover between heating and cooling | 208 - 230 VAC<br>Dead: cooling cycle<br>Live: heating cycle | Continuity check with a tester |
| | 21S4b | | 1) Changeovers between cooling and heating.<br>2) Controls the heat exchanger capacity of the outdoor unit. | 208 - 230 VAC<br>Dead: cooling cycle, 100% of exchanger capacity of outdoor unit<br>Live: 50% of heat exchanger capacity of outdoor unit, or heating cycle | |
| Fan motor | FAN motor 1,2 | FAN motor 2 is on the EM144-192, HM96-120 models. | Regulates the heat exchanger capacity by adjusting the operating frequency and operating the propeller fan based on the operating pressure. | (TXU)<br>EM72, EM96, EM120, HM72<br>200-230 VAC, 920 W<br>EM144, EM168, EM192, HM96, HM120<br>200-230 VAC, 460 W<br>(YXU)<br>EM72, EM96, EM120, HM72<br>380-460 VAC, 920 W<br>EM144, EM168, EM192, HM96, HM120<br>380-460 VAC, 460 W | |
| Crankcase heater | CH11 | | Heat the compressor shell to make liquid refrigerant in the compressor evaporate. | EM72, EM96, EM120, HM72<br>240 VAC, 45W<br>EM144, EM168, EM192, HM96, HM120<br>240 VAC, 48W | Continuity check with a tester |

| Part name | Symbols (functions) | Notes | Usage | Specifications | Check method |
|---|---|---|---|---|---|
| Fusible plug | Fusible plug | | Discharges the internal gas into the air when the temperature rises above the specified level. | Melting Point: 90±2°C<br>Hole: ø3.1mm | |

# 3-4 Functions of the Major Components of Indoor Unit

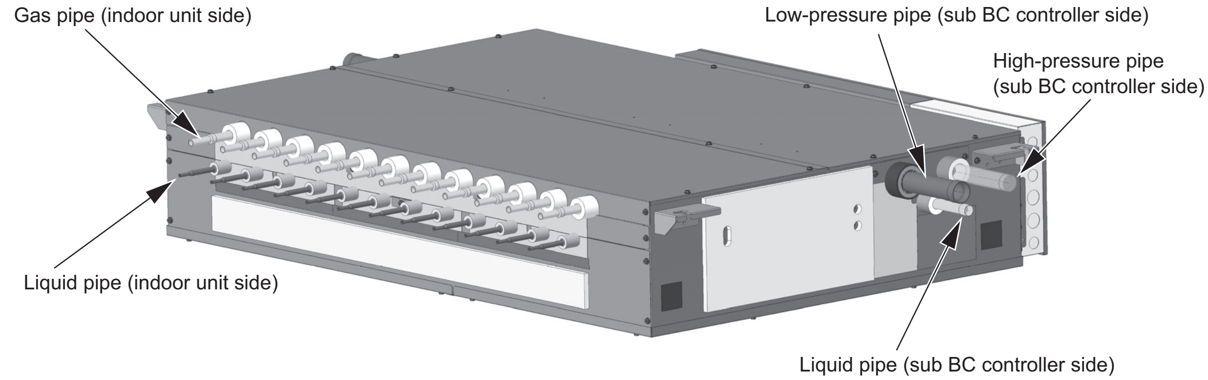
<table>
<tr><th>Part Name</th><th>Symbol (functions)</th><th>Notes</th><th>Usage</th><th>Specification</th><th>Check method</th></tr>
<tr><td rowspan="2">Linear expansion valve</td><td rowspan="2">LEV</td><td rowspan="2"></td><td rowspan="2">1) Adjusts superheat at the indoor heat exchanger outlet during cooling<br>2) Adjusts subcool at the indoor unit heat exchanger outlet during heating</td><td>DC12V<br>Opening of stepping motor driving valve 0-(1800) pulses</td><td>Disconnect the connector, and measure the resistance between terminals with a tester.<br>For details, refer to the Service Handbook for the indoor unit.</td></tr>
<tr><td colspan="2"><table>
<tr><th colspan="4">Normal</th><th>Abnormal</th></tr>
<tr><td>1-6<br>White-Red</td><td>2-6<br>Yellow-Red</td><td>3-6<br>Orange-Red</td><td>4-6<br>Blue-Red</td><td rowspan="2">Open or short</td></tr>
<tr><td colspan="4">(150Ω) ±10%</td></tr>
</table>

</td></tr>
<tr><td rowspan="5">Thermistor</td><td>TH1<br>(Suction air temperature)</td><td></td><td>Indoor unit control (Thermo)</td><td rowspan="5">$R_0=15k\Omega$<br>$R_{0/80}=3460$<br>$R_t = 15\exp\{3460(\frac{1}{273+t}-\frac{1}{273})\}$<br>0°C [32°F]:15 kΩ<br>10°C [50°F] :9.7 kΩ<br>20°C [68°F]:6.4 kΩ<br>25°C [77°F] :5.3 kΩ<br>30°C [86°F] :4.3 kΩ<br>40°C [104°F] :3.1 kΩ</td><td rowspan="5">Resistance check</td></tr>
<tr><td>TH2<br>(Pipe temperature)</td><td></td><td>1) Indoor unit control (Frost prevention, Hot adjust)<br>2) LEV control during heating operation (subcool detection).</td></tr>
<tr><td>TH3<br>(Gas pipe temperature)</td><td></td><td>LEV control during cooling operation (superheat detection)</td></tr>
<tr><td>TH4<br>(Outdoor air temperature)*1</td><td></td><td>Indoor unit control (Thermo)</td></tr>
<tr><td>Temperature sensor (Indoor air temperature)</td><td></td><td>Indoor unit control (Thermo)</td></tr>
</table>

*1. Indicates gas pipe temperature on the PKFY-NKMU model.

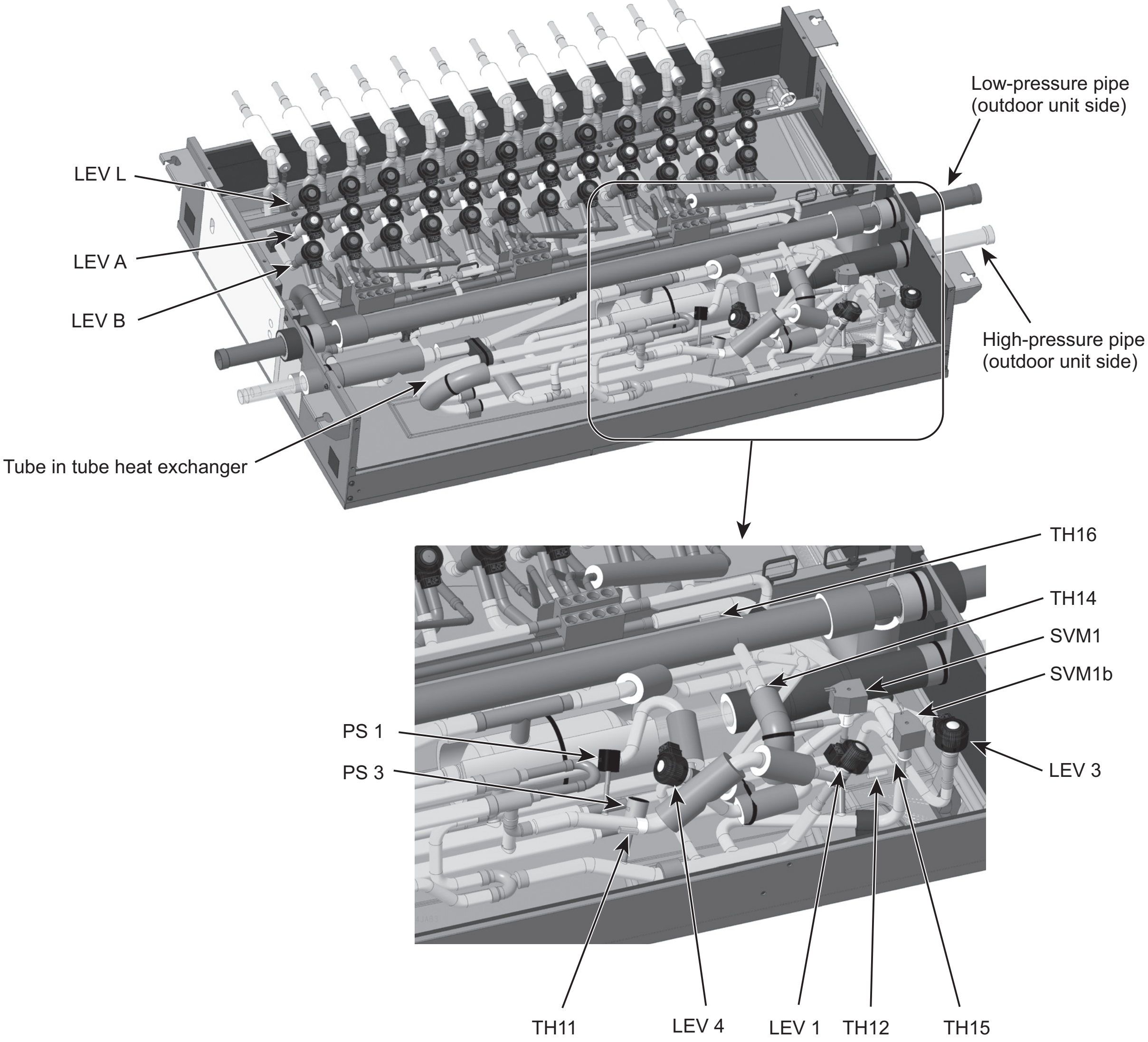
# 3-5 External Appearance and Refrigerant Circuit Components of BC Controller

## 1. CMB-M_NU-MA-SV

### (1) Front view

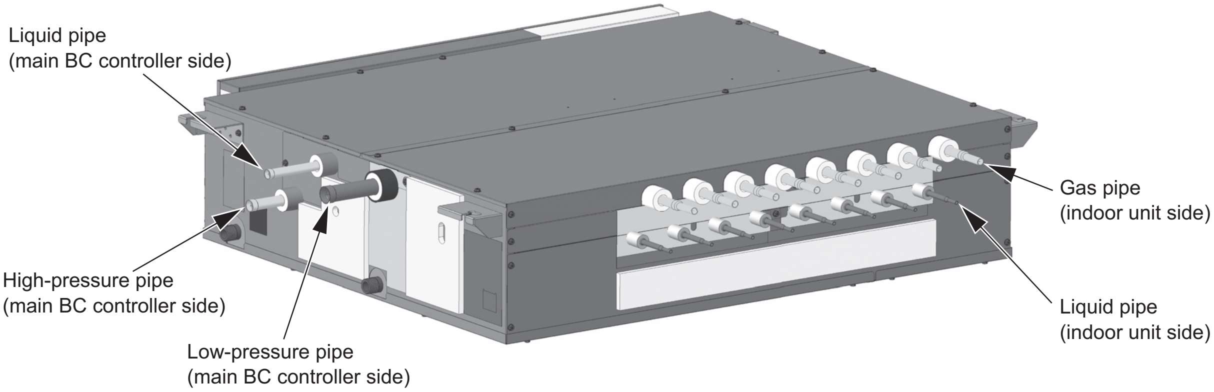


### (2) Rear view

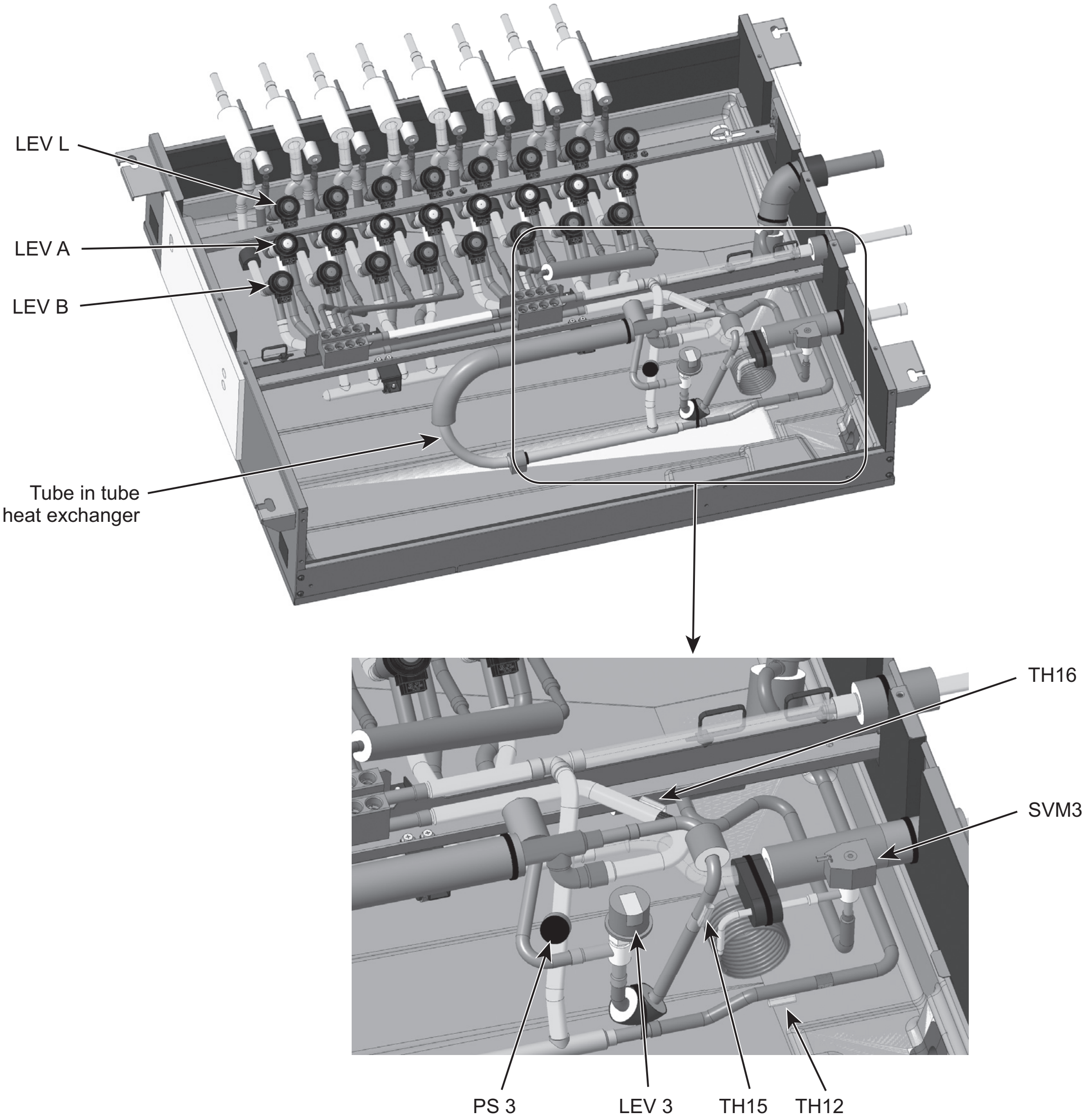


## 2. CMB-M_NU-MB-SV

### (1) Front view

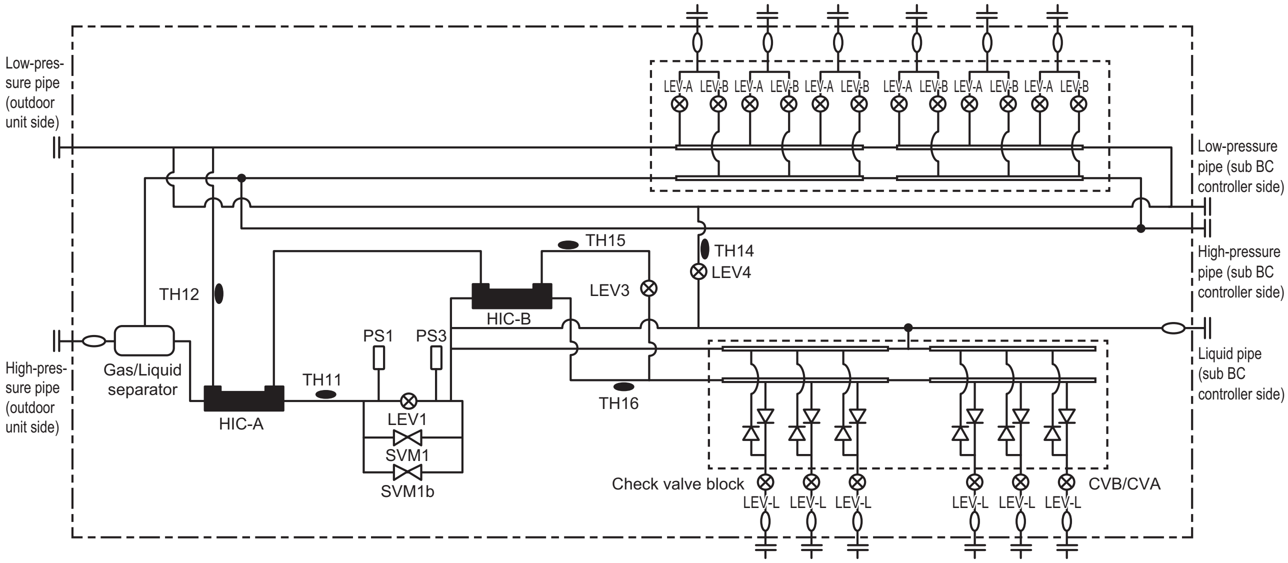


### (2) Rear view

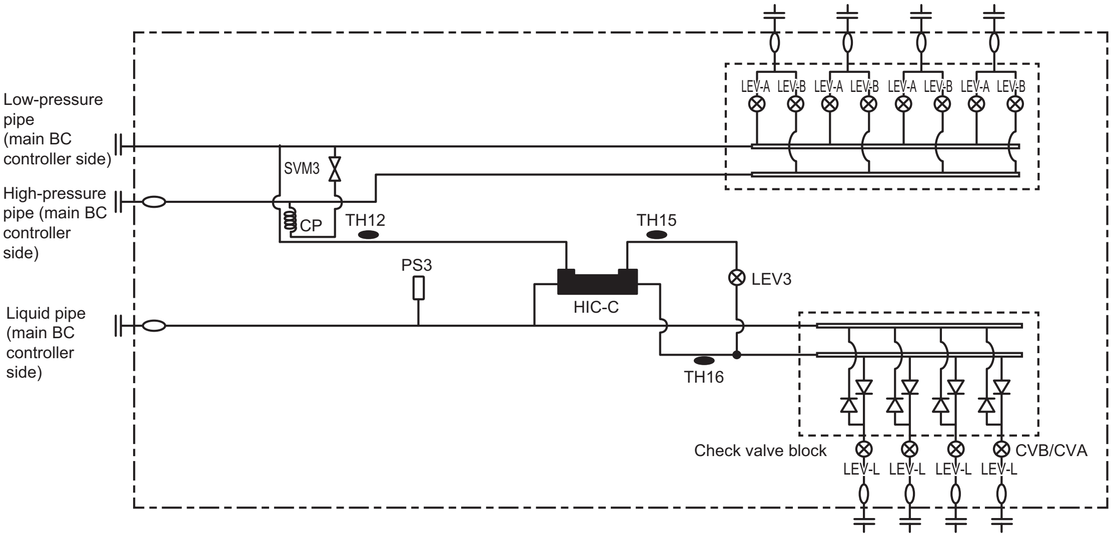


# 3-6 BC Controller Refrigerant Circuit Diagrams

## (1) CMB-M104, 106, 108, 1012NU-MA-SV (main)

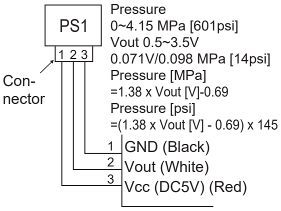


## (2) CMB-M104, 108NU-MB-SV (sub)

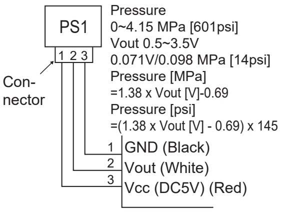


## 3-7 Functions of the Major Components of BC Controller

### (1) MA type

| Part name | Symbols (function) | Notes | Usage | Specifications | Inspection |
|---|---|---|---|---|---|
| Pressure sensor | PS1<br>(high pressure side) | | 1) Detects high pressure<br>2) Controls LEV |  | |
| | PS3<br>(intermediate pressure) | | 1) Detects intermediate pressure<br>2) Controls LEV | | |
| Thermistor | TH11<br>(liquid inlet temperature) | | Controls LEV (liquid level) | $R_0 = 15k\Omega$<br>$R_{0/80} = 3460$<br>$R_t = 15\exp\{3460\ (\frac{1}{273+t} - \frac{1}{273})\}$<br>0°C[32°F] : 15 kΩ<br>10°C[50°F] :9.7 kΩ<br>20°C[68°F] :6.4 kΩ<br>25°C[77°F] :5.3 kΩ<br>30°C[86°F] :4.3 kΩ<br>40°C[104°F] :3.1 kΩ | |
| | TH12<br>(bypass outlet temperature) | | Controls LEV (superheat) | | |
| | TH14<br>(bypass temperature) | | Detects LEV failure | | |
| | TH15<br>(bypass inlet temperature) | | Controls LEV (superheat) | | |
| | TH16<br>(liquid temperature) | | Controls LEV (subcooling) | | |
| Solenoid valve | SVM1 | | Opens during cooling or defrosting | 208-230 VAC<br>Opens when energized<br>Closes when not energized | Continuity check with a tester |
| | SVM1b | | Opens during cooling or defrosting | | |
| LEV | LEV1 | | 1) Controls liquid level<br>2) Controls differential pressure<br>3) Controls subcooling | 12-VDC stepping motor<br>Opening of stepping motor driving valve:<br>41 to 3,000 pulses | Same as indoor LEV |
| | LEV3 | | | | |
| | LEV4 | | | | |
| | LEVA | | Supplies refrigerant to the indoor units during cooling operation / serves as a shut off valve for gas refrigerant | 12-VDC stepping motor<br>Opening of stepping motor driving valve:<br>20 to 6,000 pulses | Continuity Test with a Tester. Continuity between white, red and orange. Continuity between yellow, red, and blue. |
| | LEVB | | Supplies refrigerant to the indoor units during heating operation / serves as a shut off valve for gas refrigerant | | |
| | LEVL | | Serves as a shut off valve for liquid refrigerant | | |

## (2) MB type

| Part name | Symbols (function) | Notes | Usage | Specifications | Inspection |
|---|---|---|---|---|---|
| Pressure sensor | PS3 (intermediate pressure) |  | 1) Detects intermediate pressure<br>2) Controls LEV |  |  |
| Thermistor | TH12 (bypass outlet temperature) |  | Controls LEV (superheat) | $R_0 = 15k\Omega$<br>$R_{0/80} = 3460$<br>$R_t = 15\exp\{3460(\frac{1}{273+t} - \frac{1}{273})\}$<br>0°C[32°F] : 15 kΩ<br>10°C[50°F] :9.7 kΩ<br>20°C[68°F] :6.4 kΩ<br>25°C[77°F] :5.3 kΩ<br>30°C[86°F] :4.3 kΩ<br>40°C[104°F] :3.1 kΩ |  |
|  | TH15 (bypass inlet temperature) |  | Controls LEV (superheat) |  |  |
|  | TH16 (liquid temperature) |  | Controls LEV (subcooling) |  |  |
| Solenoid valve | SVM3 |  | Opens when refrigerant returns | 208-230 VAC<br>Opens when energized<br>Closes when not energized | Continuity check with a tester |
| LEV | LEV3 |  | Controls differential pressure | 12-VDC<br>stepping motor<br>Opening of stepping motor driving valve:<br>60 to 2,000 pulses | Same as indoor LEV |
|  | LEVA |  | Supplies refrigerant to the indoor units during cooling operation / serves as a shut off valve for gas refrigerant | 12-VDC<br>stepping motor<br>Opening of stepping motor driving valve:<br>20 to 6,000 pulses | Continuity Test with a Tester. Continuity between white, red and orange. Continuity between yellow, red, and blue. |
|  | LEVB |  | Supplies refrigerant to the indoor units during heating operation / serves as a shut off valve for gas refrigerant |  |  |
|  | LEVL |  | Serves as a shut off valve for liquid refrigerant |  |  |

# Chapter 4 Electrical Components and Wiring Diagrams

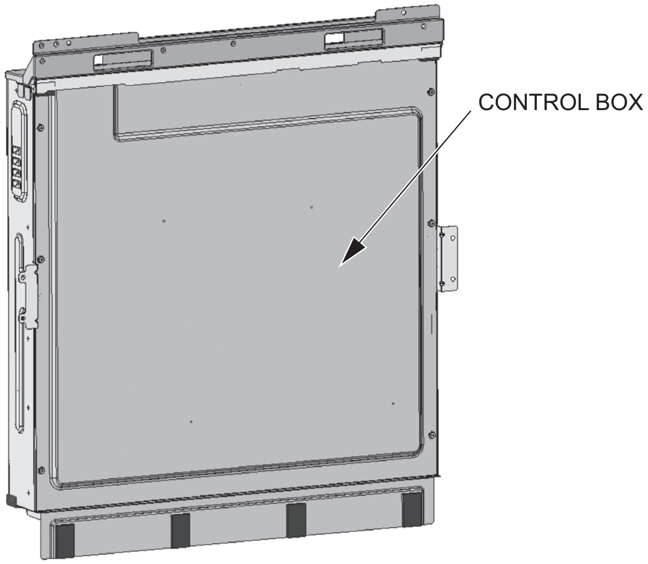
# 4-1 Outdoor Unit Circuit Board Arrangement

## 4-1-1 Outdoor Unit Control Box

<HIGH VOLTAGE WARNING>

- Control box houses high-voltage parts.
- When opening or closing the front panel of the control box, do not let it come into contact with any of the internal components.
- Before inspecting the inside of the control box, turn off the power, keep the unit off for at least 10 minutes, and confirm that the voltage of the capacitor in the main circuit has dropped to 20 VDC or less.

### (1) PURY-EM72-192T/YXU-A
### PURY-HM72-120T/YXU-A

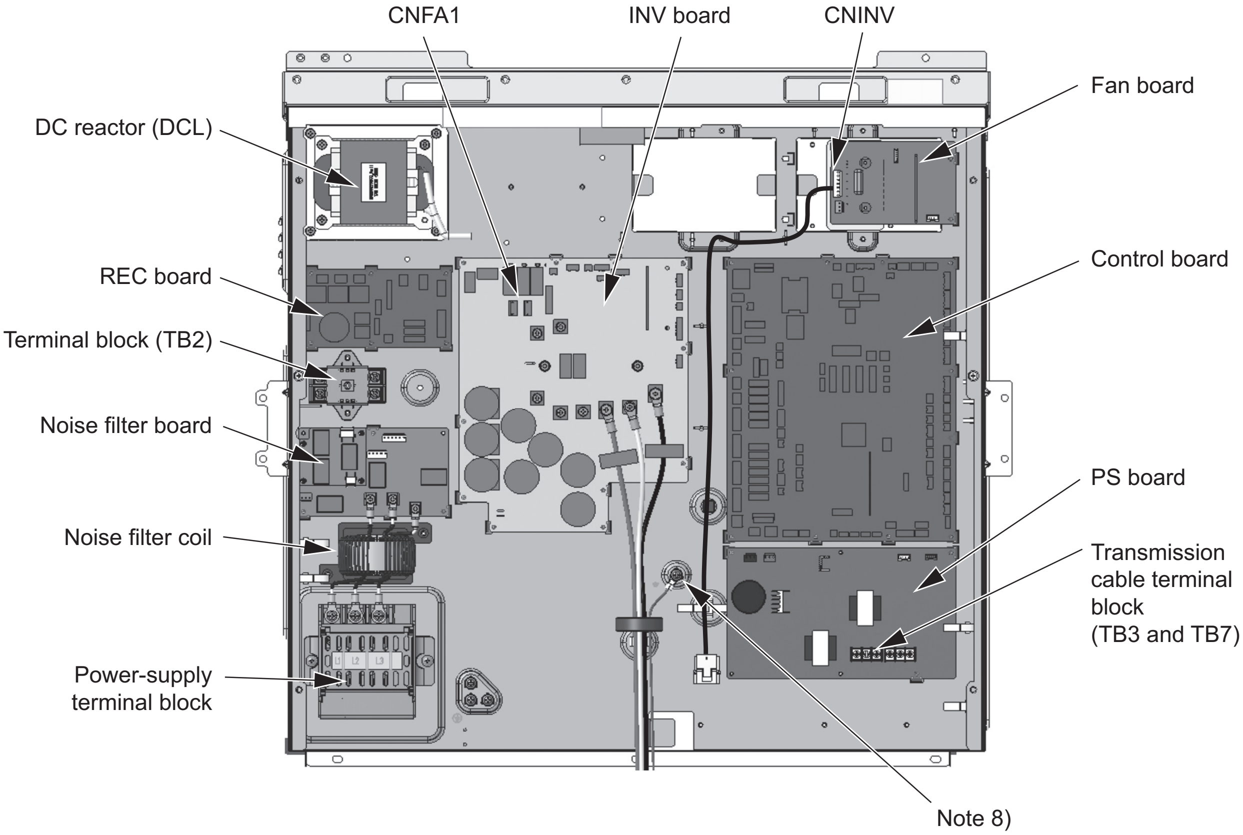


**Note**

1) Exercise caution not to damage the front panel of the control box. Damage to this part affect the waterproof and dust proof properties of the control box and may result in damage to its internal components.
2) Faston terminals have a locking function. Make sure the cable heads are securely locked in place. Press the tab on the terminals to remove them.
3) Before servicing, ensure that the fan is not rotating, and then disconnect the CNINV connector on the fan board and the CN-FA1 connector on the INV board.
   When connecting or disconnecting the connectors, ensure the outdoor unit fan is not rotating.
   The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock.
   See the wiring diagram nameplate for details.
4) The rear surface and inside of the control box have many hot areas. Be careful of those areas even after shutting off the power.
5) When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
6) After servicing, reconnect the disconnected connectors (CNINV and CNFA1).
7) When turning the unit's power on, the heater will be energized even if the compressor is not operating.
   Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, and measure the insulation resistance.
   Ensure that the compressor does not have a ground fault.
   If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor and turn on the outdoor unit.
   Energizing the heater will help evaporate the liquid refrigerant accumulated inside the compressor.
8) Do not remove the ground wire even during servicing.

## (2) PURY-EM72, 96, 120
## PURY-HM72

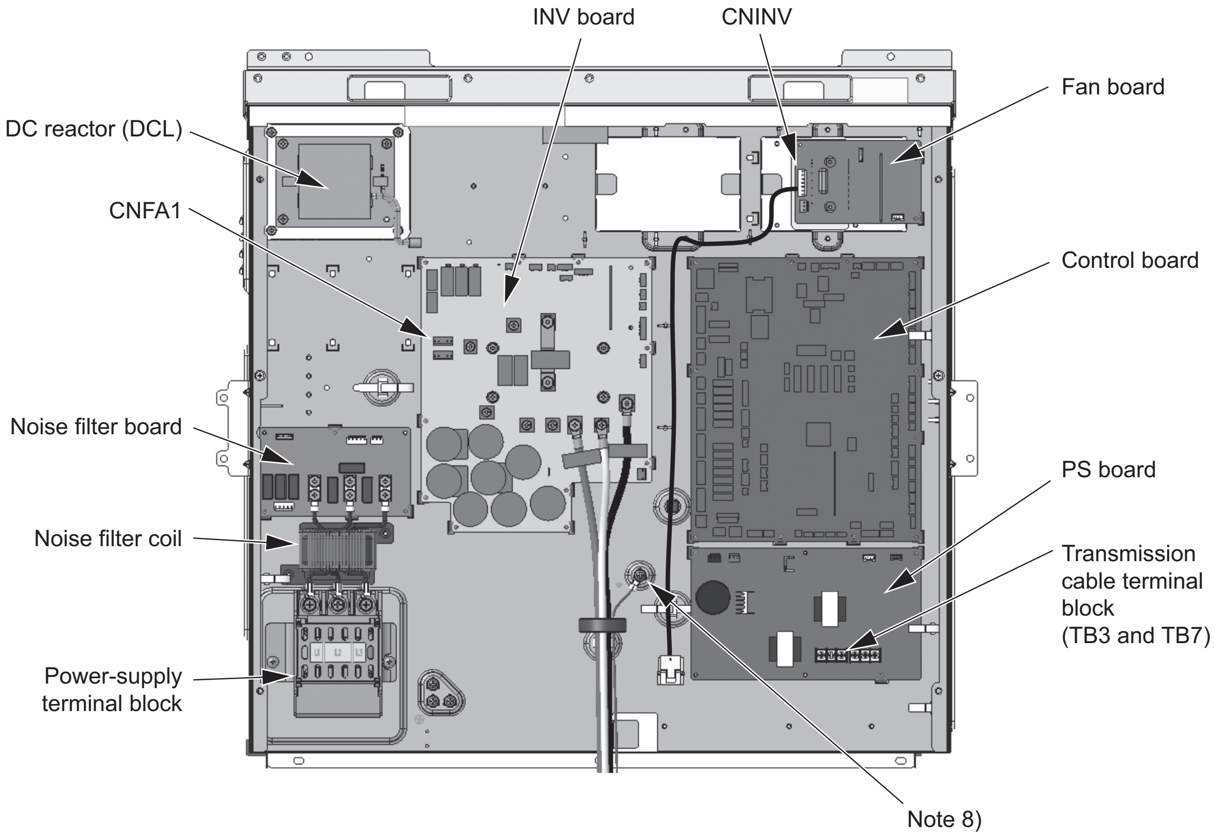
(YXU)



**Note**

1) Exercise caution not to damage the front panel of the control box. Damage to this part affect the waterproof and dust proof properties of the control box and may result in damage to its internal components.
2) The control box contains several high voltage charging components. Before servicing, ensure that the unit is turned off for at least 10 minutes to allow the voltage across the tab terminals FTP and FTN on the INV board to drop to 20 VDC or lower.
3) Before servicing, ensure that the fan is not rotating, and then disconnect the CNINV connector on the fan board and the CN-FA1 connector on the INV board.
   When connecting or disconnecting the connectors, ensure the outdoor unit fan is not rotating.
   The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock.
   See the wiring diagram nameplate for details.
4) The rear surface and inside of the control box have many hot areas. Be careful of those areas even after shutting off the power.
5) When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
6) After servicing, reconnect the disconnected connectors (CNINV and CNFA1).
7) When turning the unit's power on, the heater will be energized even if the compressor is not operating.
   Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, and measure the insulation resistance.
   Ensure that the compressor does not have a ground fault.
   If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor and turn on the outdoor unit.
   Energizing the heater will help evaporate the liquid refrigerant accumulated inside the compressor.
8) Do not remove the ground wire even during servicing.

(TXU)

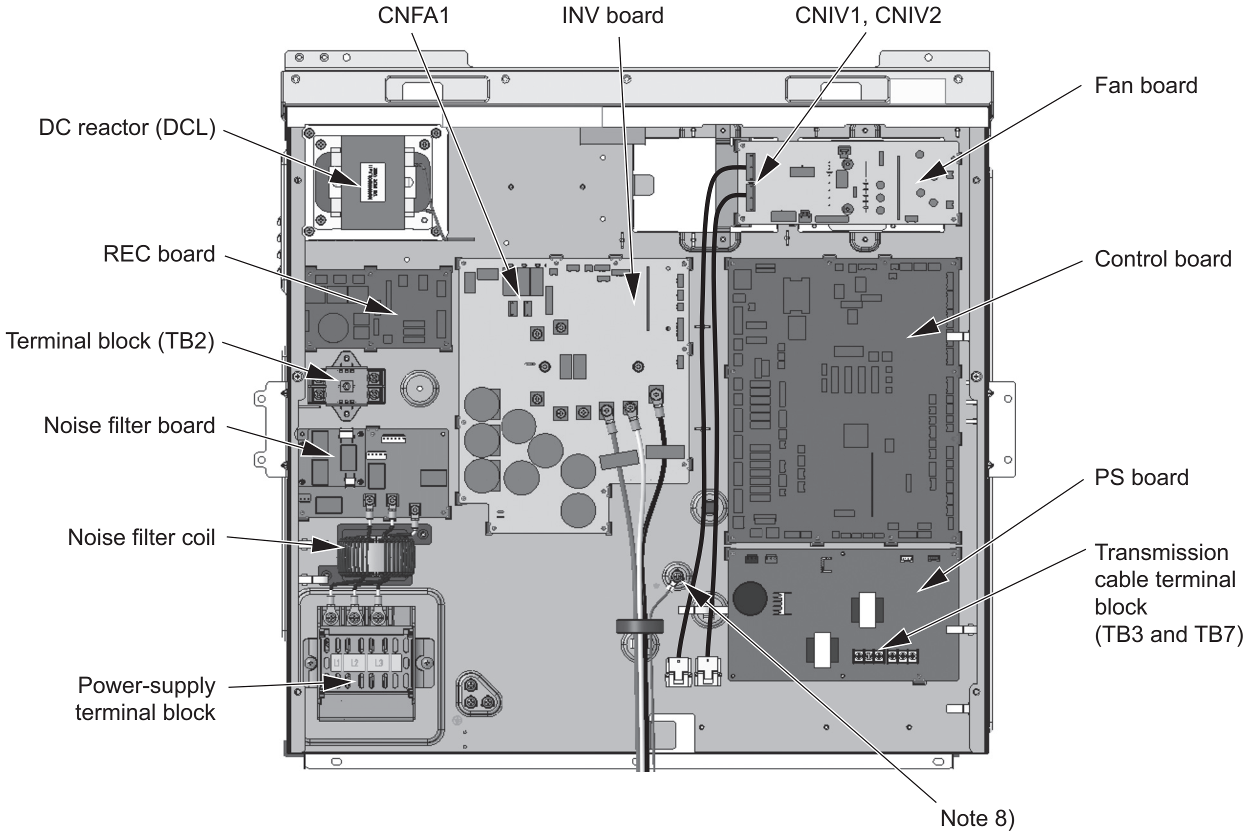


**Note**

1) Exercise caution not to damage the front panel of the control box. Damage to this part affect the waterproof and dust proof properties of the control box and may result in damage to its internal components.
2) The control box contains several high voltage charging components. Before servicing, ensure that the unit is turned off for at least 10 minutes to allow the voltage across the tab terminals FTP and FTN on the INV board to drop to 20 VDC or lower.
3) Before servicing, ensure that the fan is not rotating, and then disconnect the CNINV connector on the fan board and the CNFA1 connector on the INV board.
   When connecting or disconnecting the connectors, ensure the outdoor unit fan is not rotating.
   The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock.
   See the wiring diagram nameplate for details.
4) The rear surface and inside of the control box have many hot areas. Be careful of those areas even after shutting off the power.
5) When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
6) After servicing, reconnect the disconnected connectors (CNINV and CNFA1).
7) When turning the unit's power on, the heater will be energized even if the compressor is not operating.
   Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, and measure the insulation resistance.
   Ensure that the compressor does not have a ground fault.
   If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor and turn on the outdoor unit.
   Energizing the heater will help evaporate the liquid refrigerant accumulated inside the compressor.
8) Do not remove the ground wire even during servicing.

## (3) PURY-EM144, 168, 192
## PURY-HM96, 120

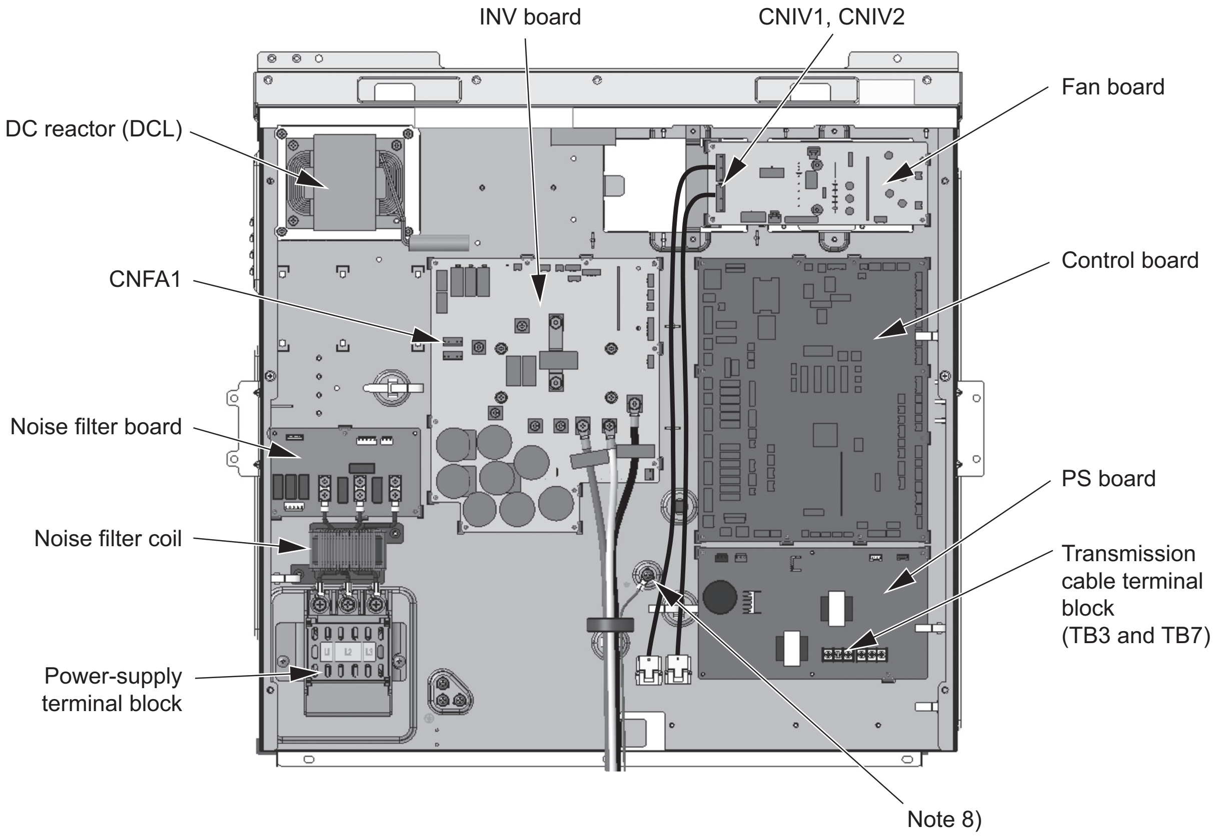
(YXU)



**Note**

1) Exercise caution not to damage the front panel of the control box. Damage to this part affect the waterproof and dust proof properties of the control box and may result in damage to its internal components.
2) The control box contains several high voltage charging components. Before servicing, ensure that the unit is turned off for at least 10 minutes to allow the voltage across the tab terminals FTP and FTN on the INV board to drop to 20 VDC or lower.
3) Before servicing, ensure that the fan is not rotating, and then disconnect the CNIV1 and CNIV2 connectors on the fan board and the CNFA1 connector on the INV board.
   When connecting or disconnecting the connectors, ensure the outdoor unit fan is not rotating.
   The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock.
   See the wiring diagram nameplate for details.
4) The rear surface and inside of the control box have many hot areas. Be careful of those areas even after shutting off the power.
5) When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
6) After servicing, reconnect the disconnected connectors (CNIV1, CNIV2, and CNFA1).
7) When turning the unit's power on, the heater will be energized even if the compressor is not operating.
   Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, and measure the insulation resistance.
   Ensure that the compressor does not have a ground fault.
   If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor and turn on the outdoor unit.
   Energizing the heater will help evaporate the liquid refrigerant accumulated inside the compressor.
8) Do not remove the ground wire even during servicing.

(TXU)

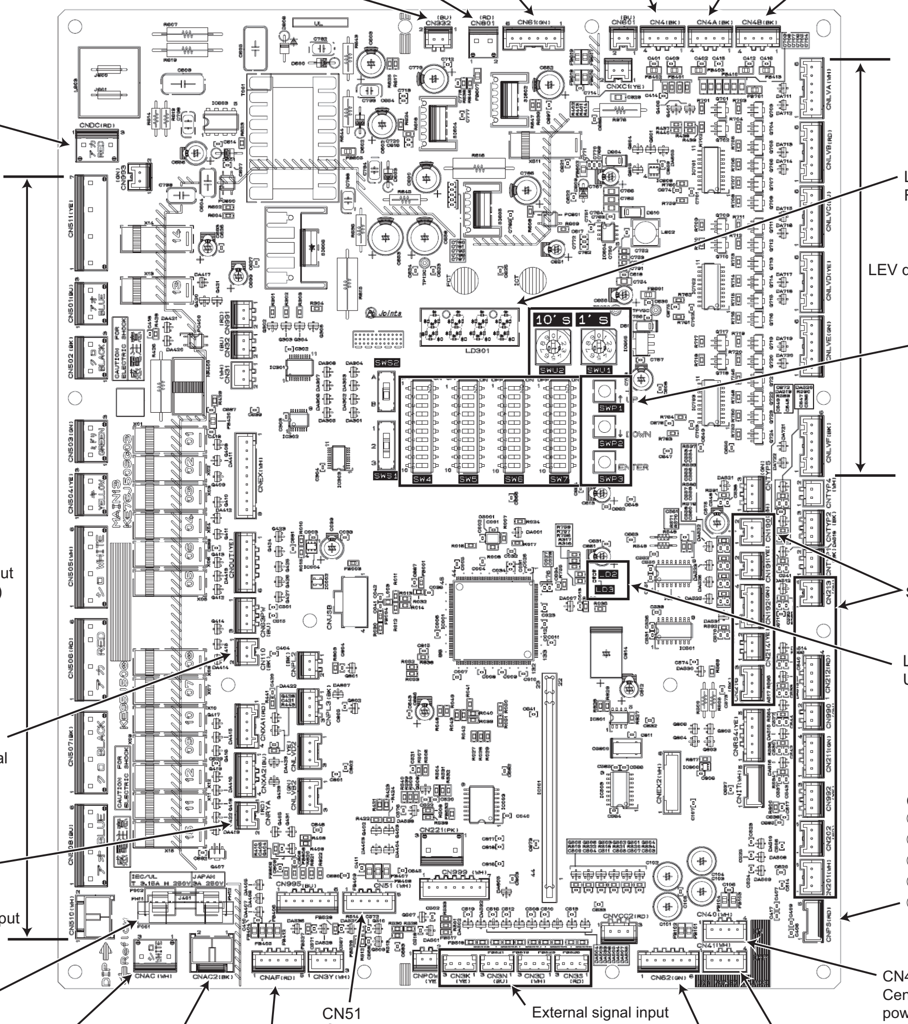


**Note**

1) Exercise caution not to damage the front panel of the control box. Damage to this part affect the waterproof and dust proof properties of the control box and may result in damage to its internal components.
2) The control box contains several high voltage charging components. Before servicing, ensure that the unit is turned off for at least 10 minutes to allow the voltage across the tab terminals FTP and FTN on the INV board to drop to 20 VDC or lower.
3) Before servicing, ensure that the fan is not rotating, and then disconnect the CNIV1 and CNIV2 connectors on the fan board and the CNFA1 connector on the INV board.
   When connecting or disconnecting the connectors, ensure the outdoor unit fan is not rotating.
   The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock.
   See the wiring diagram nameplate for details.
4) The rear surface and inside of the control box have many hot areas. Be careful of those areas even after shutting off the power.
5) When connecting a cable to TB7, ensure the voltage is 20 VDC or lower.
6) After servicing, reconnect the disconnected connectors (CNIV1, CNIV2, and CNFA1).
7) When turning the unit's power on, the heater will be energized even if the compressor is not operating.
   Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, and measure the insulation resistance.
   Ensure that the compressor does not have a ground fault.
   If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor and turn on the outdoor unit.
   Energizing the heater will help evaporate the liquid refrigerant accumulated inside the compressor.
8) Do not remove the ground wire even during servicing.

# 4-2 Outdoor Unit Circuit Board Components

## 4-2-1 Control Board



CN4 (INV board)
① Serial communication signal output
② GND
③ Serial communication signal input
④ GND

CN4A (Fan board)
① Serial communication signal output
② GND
③ Serial communication signal input
④ GND

CN61
① 18 VDC output (Fan board)
② GND (Fan board)
⑤ 17 VDC output (INV board)
⑥ GND (INV board)

CN332 (Fan board)
① 18 VDC output
② GND

CN801
Pressure switch connection

CN4B (Fan board)
① Serial communication signal output
② GND
③ Serial communication signal input
④ GND

CNDC
Bus voltage input
(280 VDC)
① P
② N

LD301
Function setting/Maintenance LED

LEV drive signal output

SWU1, 2 (rotary switch)
Address switch

SW4, 5, 6, 7 (DIP switch)
Function setting

SWP1, 2, 3 (push switch)
Function setting

Actuator
Drive output
(200 VAC)

Sensor input

LD2, 3
Unit status display

CN110
① Power supply detection signal input
② GND

CNPS
① 12 VDC output
② GND
③ 5 VDC output
④ Power-supply detection input
⑤ Power-supply ON/OFF signal output

CNRYA
① 12 VDC output
② CN72C drive output

CN40
Centralized control system power-supply ON

CN41
Centralized control system power-supply OFF

F001 fuse
250 VAC
3.15 A

CNAC
200 VAC input
① L1 phase
③ L2 phase

CNAC2
200 VAC input
① L1 phase
③ L2 phase

CN51
③ 12 VDC output
④ Compressor ON/OFF signal output
⑤ Error signal output

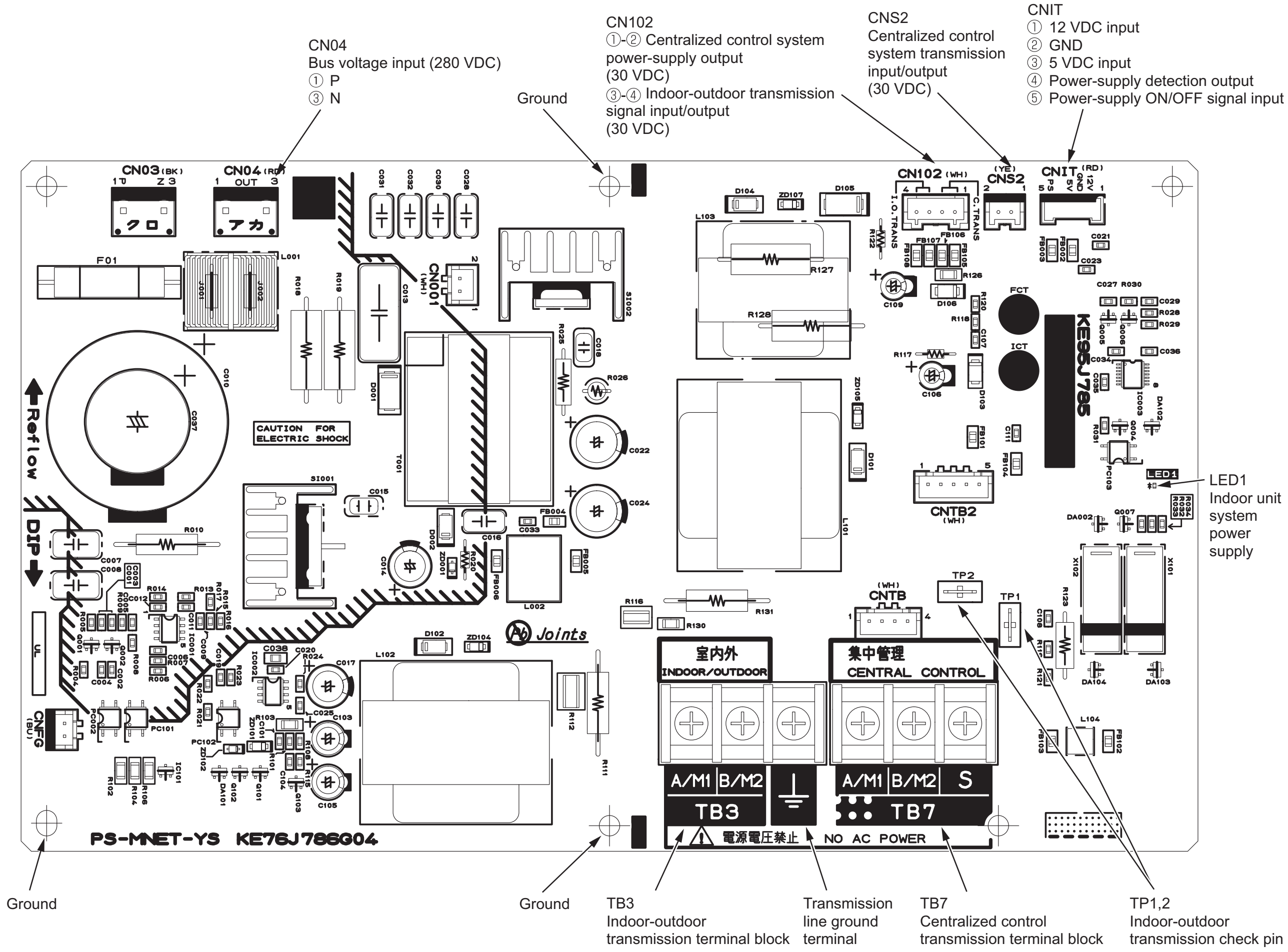
External signal input
(contact input)

CNAF
① 12 VDC output
② Active filter connection detection input
③ Active filter operation status input
④ 12 VDC output
⑤ Active filter operation command output

CN62
①-② Centralized control system transmission input/output
③-④ Centralized control system power-supply input
⑤-⑥ Indoor-outdoor transmission input/output

*For information about the display of SW4 function settings, refer to the following page(s). [5-1-1 Outdoor Unit Switch Functions and Factory Settings]

## 4-2-2 Power-supply board (PS Board)



CN04
Bus voltage input (280 VDC)
① P
③ N

Ground

CN102
①-② Centralized control system power-supply output (30 VDC)
③-④ Indoor-outdoor transmission signal input/output (30 VDC)

CNS2
Centralized control system transmission input/output (30 VDC)

CNIT
① 12 VDC input
② GND
③ 5 VDC input
④ Power-supply detection output
⑤ Power-supply ON/OFF signal input

LED1
Indoor unit system power supply

Ground

Ground

TB3
Indoor-outdoor transmission terminal block

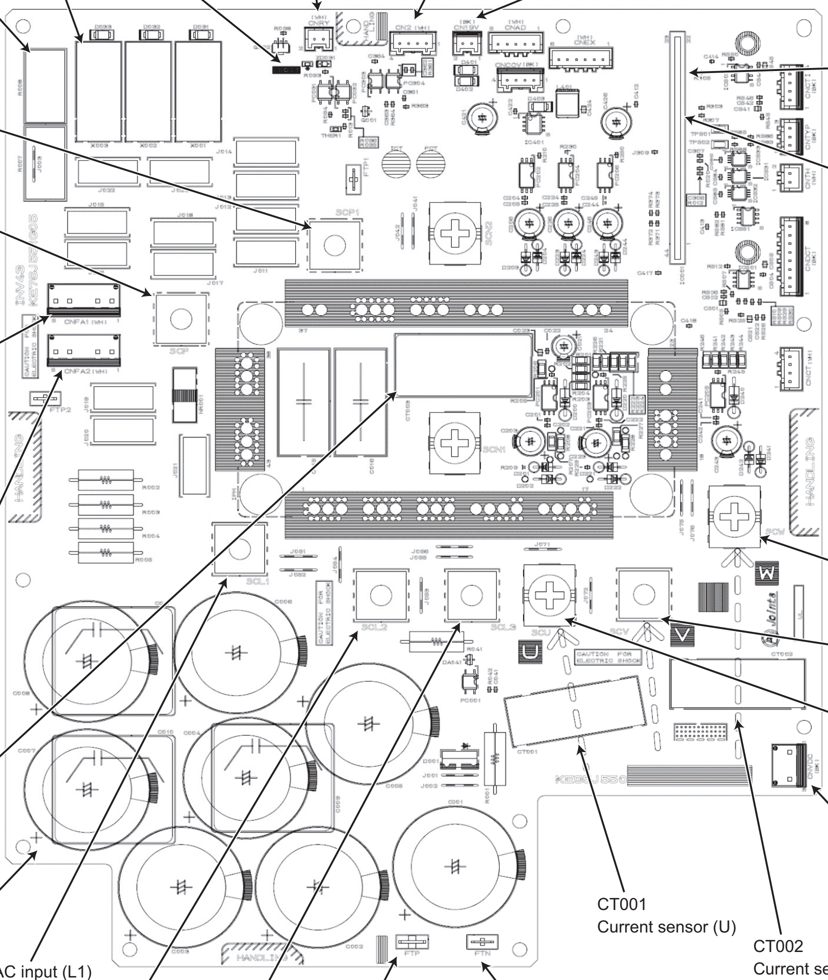
Transmission line ground terminal

TB7
Centralized control transmission terminal block

TP1,2
Indoor-outdoor transmission check pin

## 4-2-3 Inverter Board (INV Board)

### (1) PURY-EM72/96/120/144/168/192TXU-A
### PURY-HM72/96/120TXU-A



R007 and R008
Inrush current resistor

X001 to X003
Electromagnetic relay (72C)

LED01
Electromagnetic relay
(72C) energized

CNRY
① 12 VDC input
② GND (control board)

CN2
① Serial communication signal input
② GND (control board)
③ Serial communication signal output
④ GND (control board)

CN19V
① 18 VDC input
② GND

LED1 (mounted on SUB
circuit board IC001)
Lit: Inverter operation
Blinking: Inverter error

LED4 (mounted on SUB
circuit board IC001)
Microcomputer in operation

SCP1
Bus voltage input (P)

SCP
Diode rectifier output (P)

CNFA1
Bus voltage output
① N
② N
④ P
⑤ P

CNFA2
Bus voltage output
① N
② N
④ P
⑤ P

CT003
DCCT for overcurrent
detection

C001 to C008
Smoothing capacitor

SCL1
200 VAC input (L1)

SCL2
200 VAC input (L2)

SCL3
200 VAC input (L3)

FTP
Voltage check terminal (P)

FTN
Voltage check terminal (N)

CT001
Current sensor (U)

CT002
Current sensor (W)

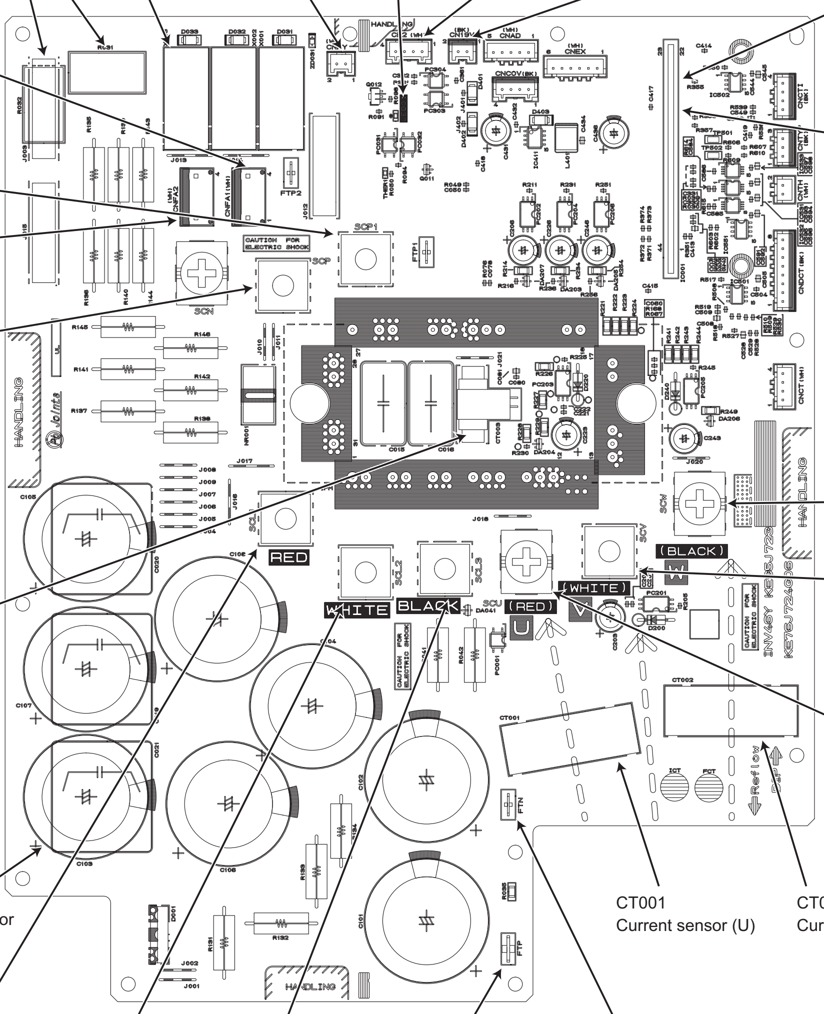
CNVDC
Bus voltage output
① P
③ N

SCU
Inverter output (U)

SCV
Inverter output (V)

SCW
Inverter output (W)

## (2) PURY-EM72/96/120/144/168/192YXU-A
## PURY-HM72/96/120YXU-A



R031 and R032
Inrush current resistor

CNRY
① 12 VDC input
② GND (control board)

X001 to X003
Electromagnetic relay
(72C)

LED01
Electromagnetic relay
(72C) energized

CN2
① Serial communication signal input
② GND (control board)
③ Serial communication signal output
④ GND (control board)

CN19V
① 18 VDC input
② GND

CNFA1
Bus voltage output
① N
④ P

LED1 (mounted on SUB
circuit board IC001)
Lit: Inverter operation
Blinking: Inverter error

LED4 (mounted on SUB
circuit board IC001)
Microcomputer in operation

SCP1
Bus voltage input (P)

CNFA2
Bus voltage output
① N
④ P

SCP
Diode rectifier output (P)

SCW
Inverter output (W)

SCV
Inverter output (V)

CT003
DCCT for overcurrent
detection

SCU
Inverter output (U)

C101 to C108
Smoothing capacitor

CT001
Current sensor (U)

CT002
Current sensor (W)

FTN
Voltage check terminal (N)

SCL1
400 VAC input (L1)

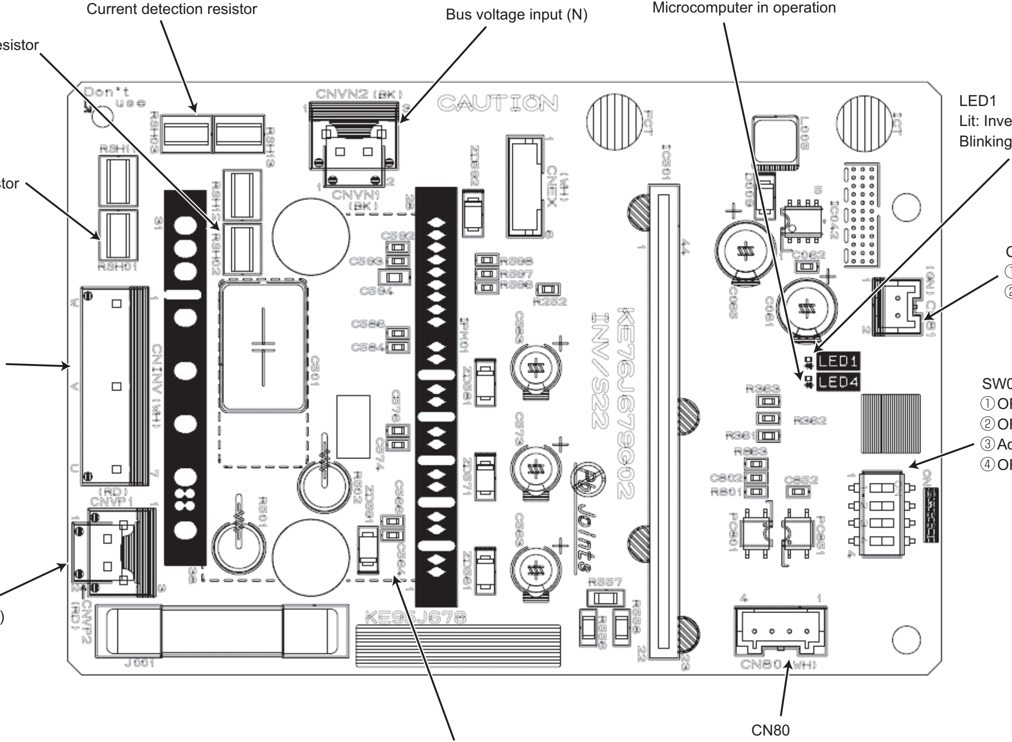
SCL2
400 VAC input (L2)

SCL3
400 VAC input (L3)

FTP
Voltage check terminal (P)

## 4-2-4 Fan board

### (1) PURY-EM72/96/120TXU-A
### PURY-HM72TXU-A



RSH02 to RSH12
Current detection resistor

RSH03 to RSH13
Current detection resistor

CNVN1
Bus voltage input (N)

LED4
Microcomputer in operation

LED1
Lit: Inverter operation
Blinking: Inverter error

RSH01 to RSH11
Current detection resistor

CN81
①17 VDC input
②GND

CNINV
Inverter output
①W
④V
⑦U

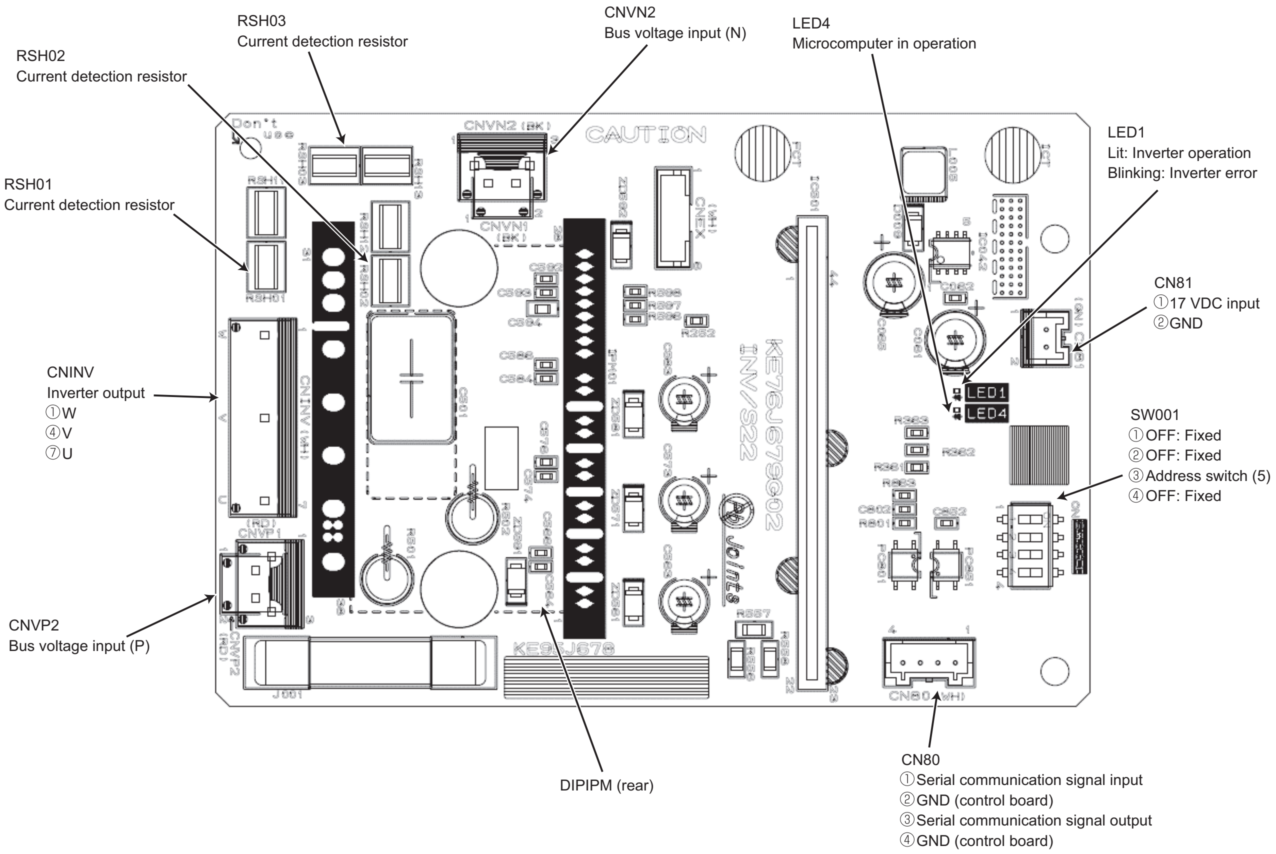
SW001
①OFF: Fixed
②OFF: Fixed
③Address switch (5)
④OFF: Fixed

CNVP1
Bus voltage input (P)

DIPIPM (rear)

CN80
①Serial communication signal input
②GND (control board)
③Serial communication signal output
④GND (control board)

## (2) PURY-EM72/96/120YXU-A
PURY-HM72YXU-A



RSH03
Current detection resistor

CNVN2
Bus voltage input (N)

LED4
Microcomputer in operation

RSH02
Current detection resistor

LED1
Lit: Inverter operation
Blinking: Inverter error

RSH01
Current detection resistor

CN81
①17 VDC input
②GND

CNINV
Inverter output
①W
④V
⑦U

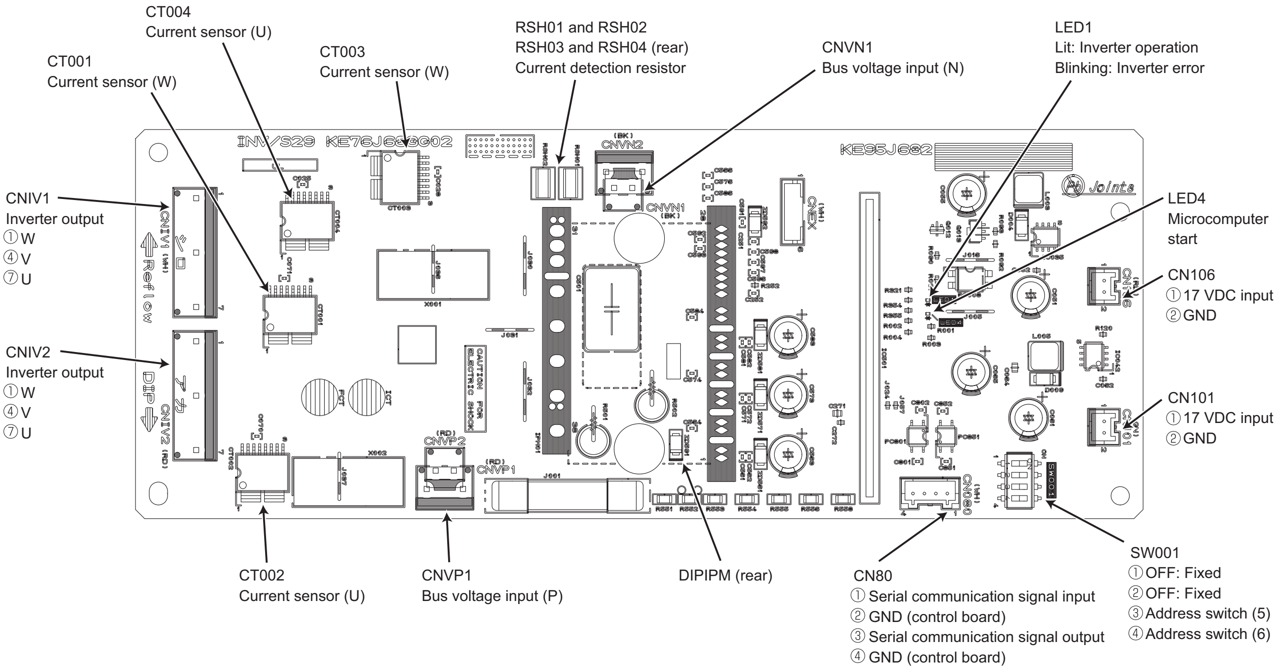
SW001
①OFF: Fixed
②OFF: Fixed
③Address switch (5)
④OFF: Fixed

CNVP2
Bus voltage input (P)

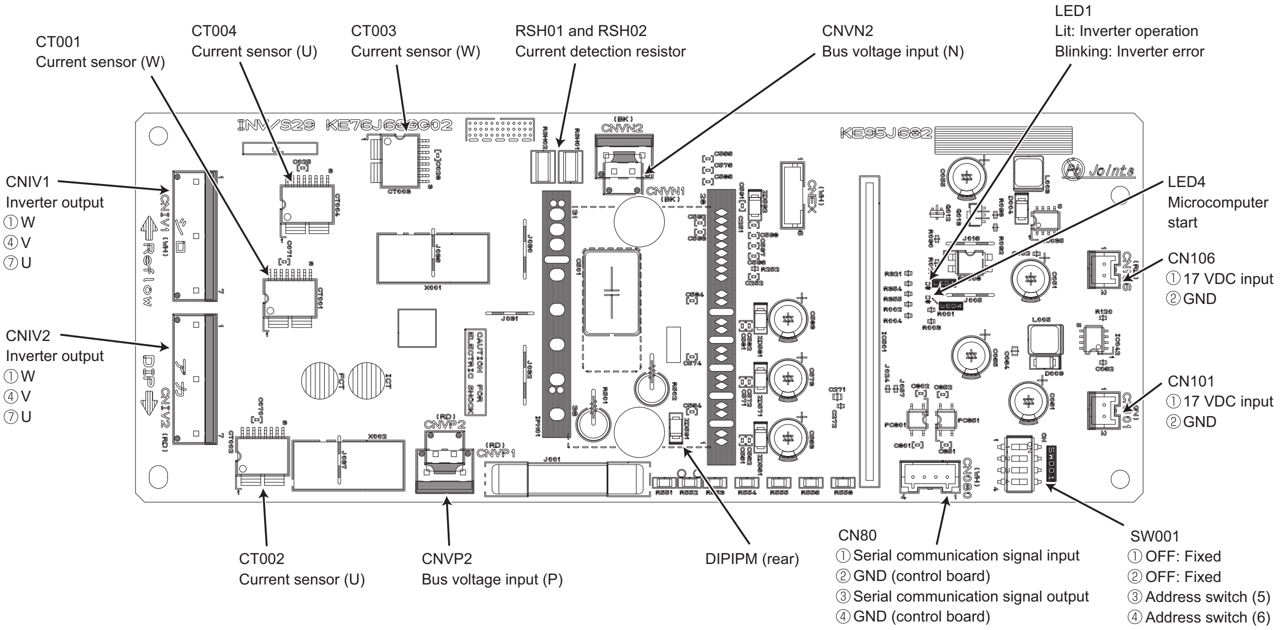
DIPIPM (rear)

CN80
①Serial communication signal input
②GND (control board)
③Serial communication signal output
④GND (control board)

## (3) PURY-EM144/168/192TXU-A
## PURY-HM96/120TXU-A



## (4) PURY-EM144/168/192YXU-A
## PURY-HM96/120YXU-A



CT001
Current sensor (W)

CT004
Current sensor (U)

CT003
Current sensor (W)

RSH01 and RSH02
Current detection resistor

CNVN2
Bus voltage input (N)

LED1
Lit: Inverter operation
Blinking: Inverter error

CNIV1
Inverter output
①W
④V
⑦U

LED4
Microcomputer
start

CN106
①17 VDC input
②GND

CNIV2
Inverter output
①W
④V
⑦U

CN101
①17 VDC input
②GND

CT002
Current sensor (U)

CNVP2
Bus voltage input (P)

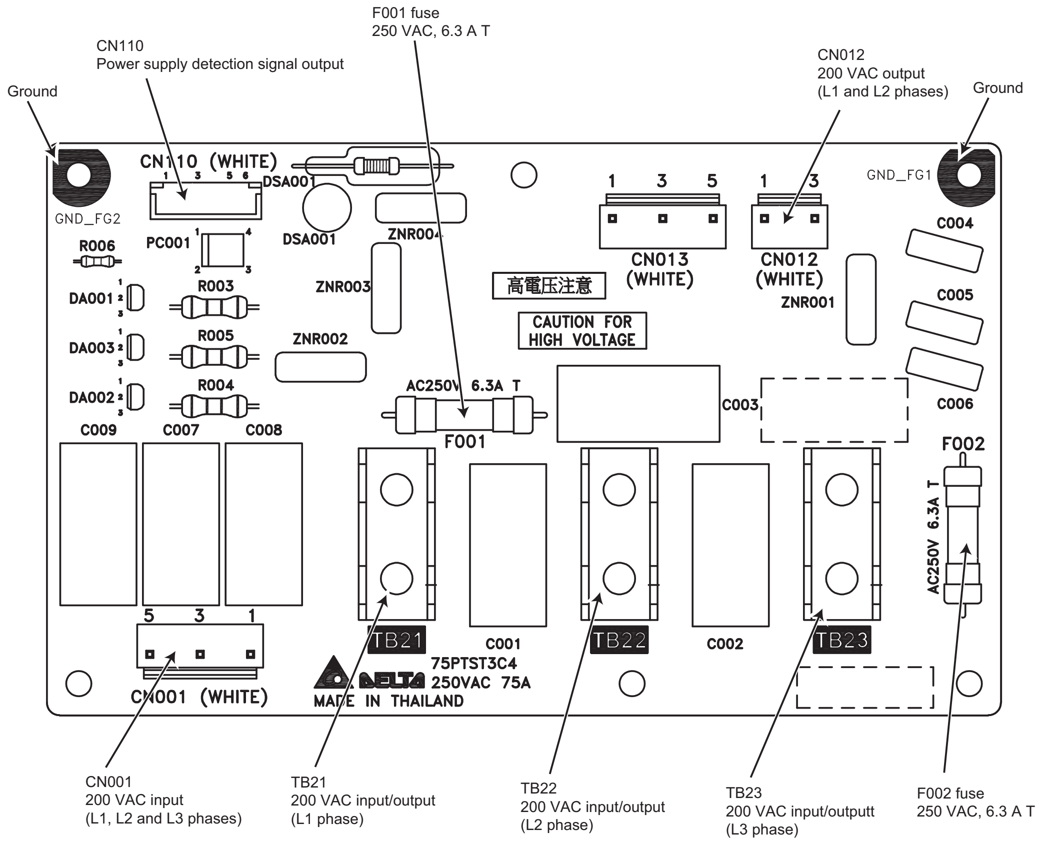
DIPIPM (rear)

CN80
①Serial communication signal input
②GND (control board)
③Serial communication signal output
④GND (control board)

SW001
①OFF: Fixed
②OFF: Fixed
③Address switch (5)
④Address switch (6)

## 4-2-5 Noise Filter

### (1) PURY-EM72/96/120/144/168/192TXU-A
### PURY-HM72/96/120TXU-A



F001 fuse
250 VAC, 6.3 A T

CN110
Power supply detection signal output

CN012
200 VAC output
(L1 and L2 phases)

Ground

Ground

CN001
200 VAC input
(L1, L2 and L3 phases)

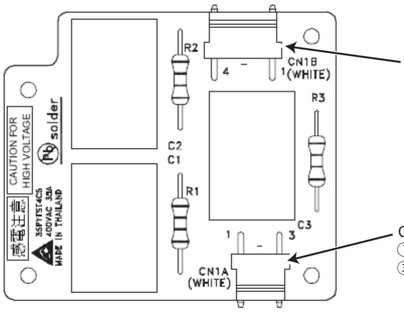
TB21
200 VAC input/output
(L1 phase)

TB22
200 VAC input/output
(L2 phase)

TB23
200 VAC input/outputt
(L3 phase)

F002 fuse
250 VAC, 6.3 A T

## (2) PURY-EM72/96/120/144/168/192YXU-A
## PURY-HM72/96/120YXU-A



CN1B
① L3
④ L2

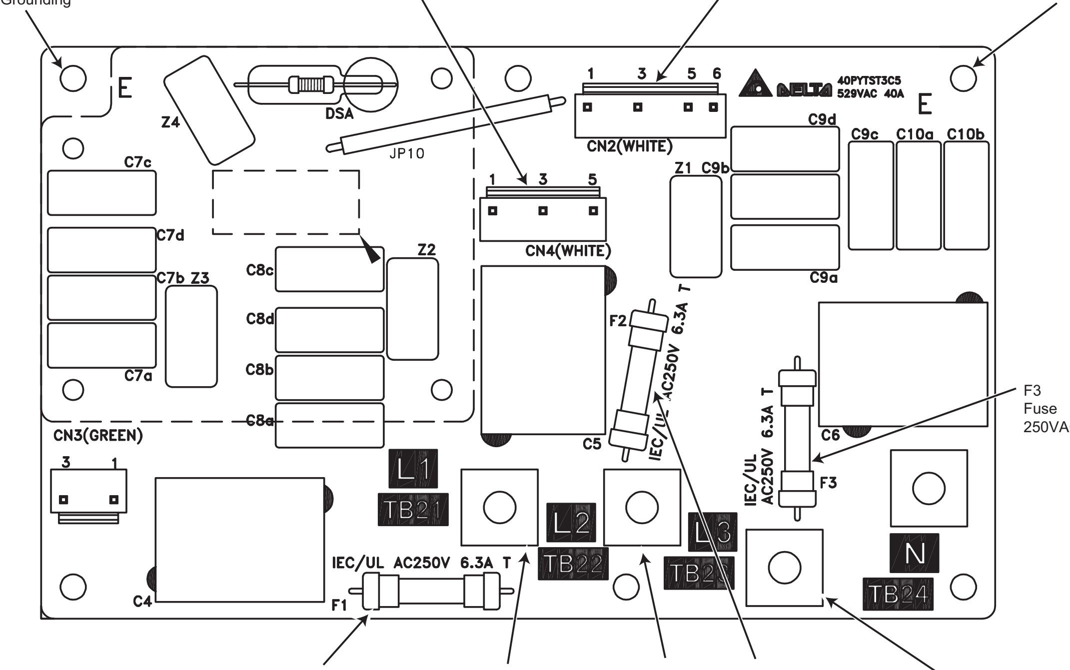
CN1A
① N
③ L1

CN4
① L2
③ N
⑤ L3

CN2
① Surge absorber circuit
③ Surge absorber circuit
⑤ short circuit
⑥ short circuit

Grounding

Grounding



F3
Fuse
250VAC 6.3V

F1
Fuse
250VAC 6.3A T

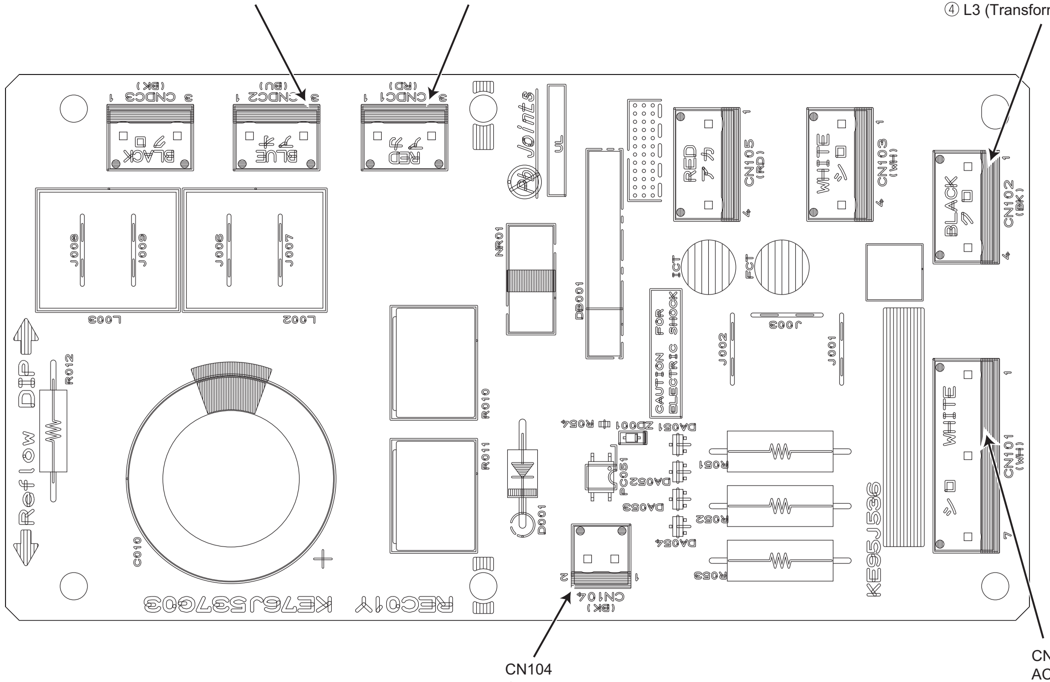
TB21
Input/output
L1

TB22
Input/output
L2

F2
Fuse
250VAC 6.3A T

TB23
Input/output
L3

## 4-2-6 REC board



CNDC2
Bus voltage output to
Control board

CNDC1
Bus voltage output to
Transmission power board

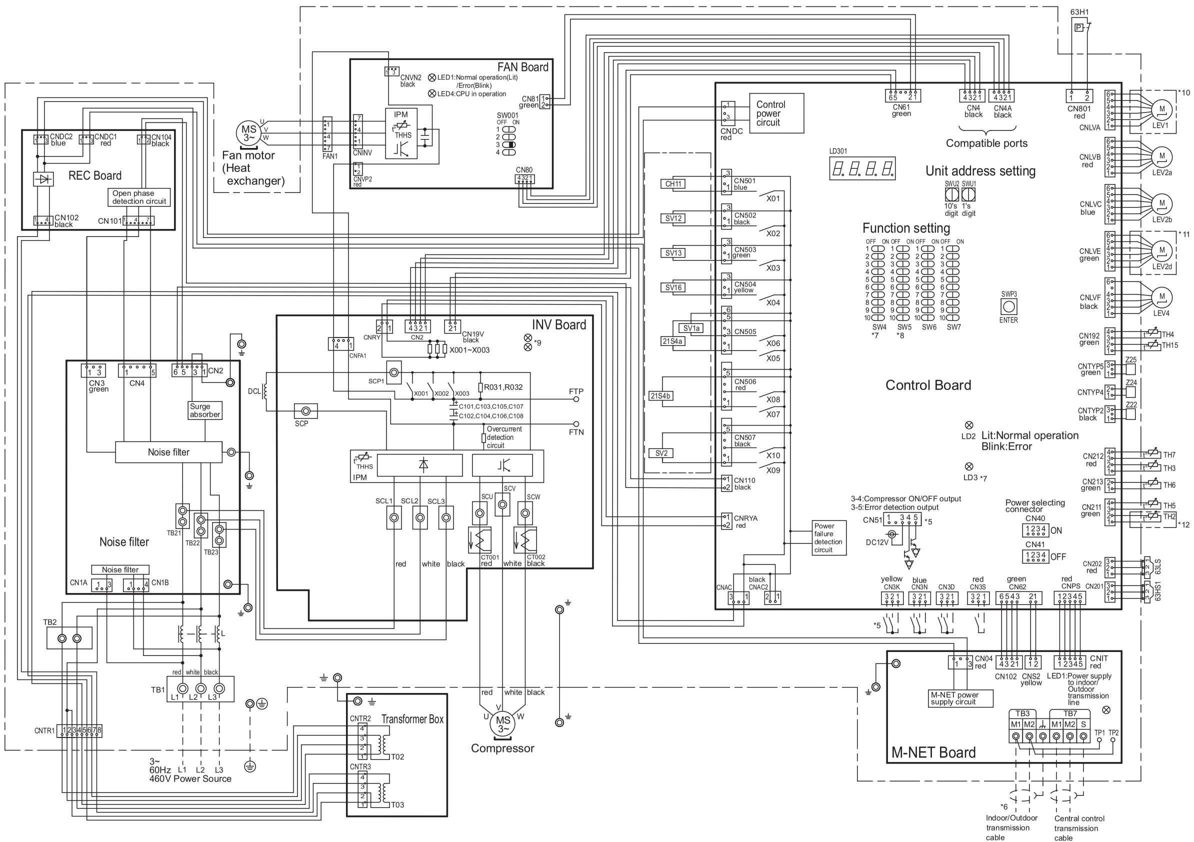
CN102
AC input(230V)
① L2 (Transformer out put)
④ L3 (Transformer out put)

CN104
Open-phase detection circuit

CN101
AC input (460V)
① L2
④ L1
⑦ L3

# 4-3 Outdoor Unit Electrical Wiring Diagrams

## (1) PURY-EM72, 96, 120YXU-A / PURY-HM72YXU-A



*1.Dot-dash lines indicate wiring not supplied with unit.

*2.Single-dotted lines indicate the control box boundaries.

*3.Control box houses high-voltage parts. Before inspecting the inside of the control box, turn off the power, keep the unit off for at least 10 minutes, and confirm that the voltage between the FTP and FTN terminals on the INV board has dropped to DC20V or less.

*4.There are many high-temperature parts inside and on the back of the control box, so exercise caution even after turning off the power.

*5.Refer to the Data book for connecting input/output signal connectors.

*6.Refer to the Data book for outdoor units in the same refrigerant system.

*7.SW4:In the case of All OFF

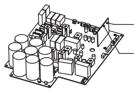
•LD3 Lit:Operation
Blink:Turning on
Unlit:Turn off

Refer to the Data book and Service Handbook for other switch setting and monitoring items.

*8.Setting the Central control switch(SW5-1).

| System configuration | SW5-1 |
|---|---|
| No connection system with the system controller | OFF |
| Connection system with the system controller | ON |

*9.Refer to the following for the LED on the INV board.



*10.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *10 exist |
| PURY/TURY | *10 do not exist |

*11.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *11 do not exist |
| PURY/TURY | *11 exist |

*12.Difference of appliance

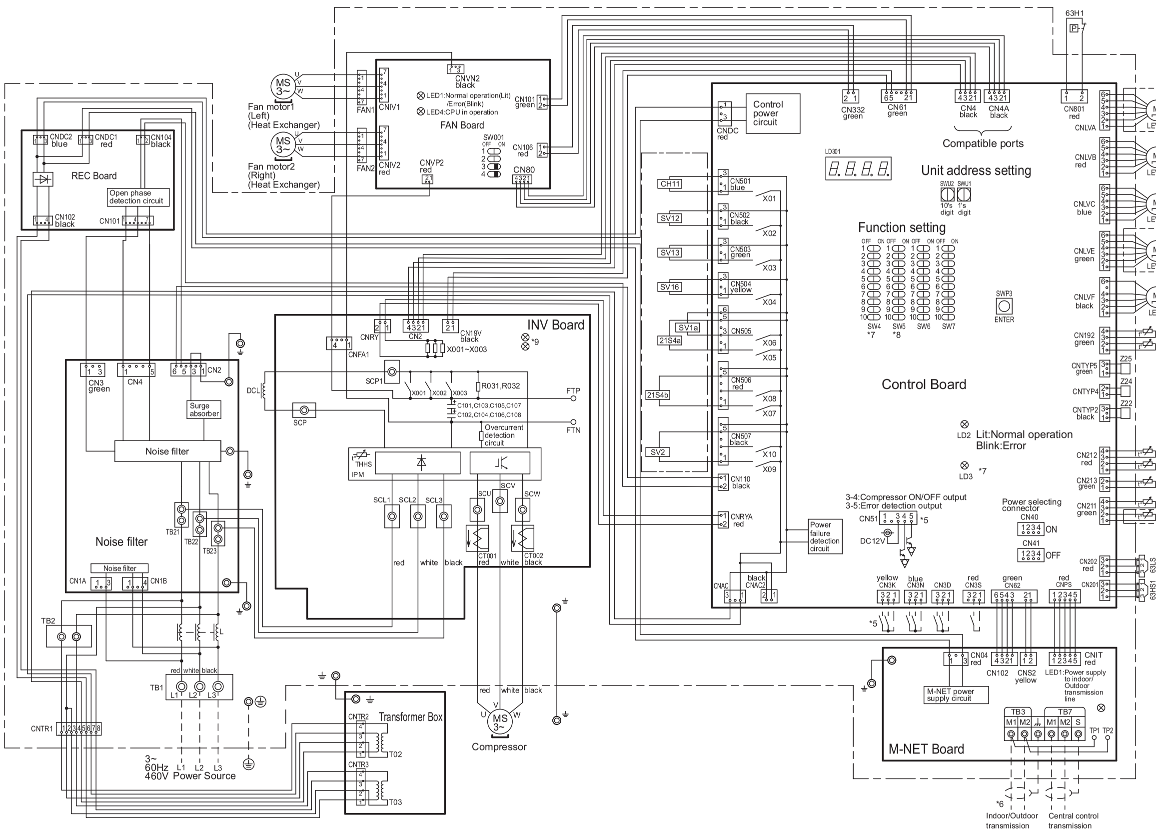
| Model name | Appliance |
|---|---|
| PUHY/TUHY | *12 exist |
| PURY/TURY | *12 do not exist |

<Symbol explanation>

| Symbol | Explanation | | |
|---|---|---|---|
| 21S4a | 4-way valve | Cooling/Heating switching | |
| 21S4b | | HEX capacity switching | |
| 63H1 | Pressure switch(High pressure protection) | | |
| 63HS1 | Pressure sensor | Discharge pressure | |
| 63LS | | Low pressure | |
| X001~X003 | Magnetic relay(inverter main circuit)72C | | |
| C001~C007 | Capacitor(inverter main circuit) | | |
| CH11 | Crankcase heater (for heating the compressor) | | |
| CT001,002 | Current sensor | | |
| DCL | DC reactor(For power factor enhancement) | | |
| L | Choke coil(For high-frequency noise reduction) | | |
| LEV1 | Linear expansion valve | Pressure control,<br>Refrigerant flow late control. | |
| LEV2a | | Pressure control,<br>Refrigerant flow late control. | |
| LEV2b | | Pressure control,Refrigerant flow late control. | |
| LEV2d | | Pressure control,Refrigerant flow late control. | |
| LEV4 | | For opening/closing the injection circuit | |
| R007,008 | Resistor | Inrush current prevention | |

| Symbol | Explanation | |
|---|---|---|
| SV1a | Solenoid valve | For opening/closing the bypass circuit under the O/S |
| SV2 | | For opening/closing the high and low pressure the bypass circuit |
| SV12 | | For on defrost switching |
| SV13 | | For on defrost switching |
| SV16 | | For opening/closing the variable pass circuit |
| TB1 | Terminal block | Power supply |
| TB3 | | Indoor/Outdoor transmission cable |
| TB7 | | Central control transmission cable |
| TH2 | Thermistor | Subcool bypass outlet temperature |
| TH3 | | Pipe temperature |
| TH4 | | Discharge pipe temperature |
| TH5 | | ACC inlet pipe temperature |
| TH6 | | Subcooled liquid refrigerant temperature |
| TH7 | | OA temperature |
| TH15 | | Detection of compressor lower shell temperature |
| THHS | | IPM temperature |
| Z22,Z24,Z25 | Function setting connector | |

## (2) PURY-EM144, 168, 192YXU-A / PURY-HM96, 120YXU-A



*1.Dot-dash lines indicate wiring not supplied with unit.

*2.Single-dotted lines indicate the control box boundaries.

*3.Control box houses high-voltage parts. Before inspecting the inside of the control box, turn off the power, keep the unit off for at least 10 minutes, and confirm that the voltage between the FTP and FTN terminals on the INV board has dropped to DC20V or less.

*4.There are many high-temperature parts inside and on the back of the control box, so exercise caution even after turning off the power.

*5.Refer to the Data book for connecting input/output signal connectors.

*6.Refer to the Data book for outdoor units in the same refrigerant system.

*7.SW4:In the case of All OFF

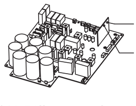
•LD3 Lit:Operation
Blink:Turning on
Unlit:Turn off

Refer to the Data book and Service Handbook for other switch setting and monitoring items.

*8.Setting the Central control switch(SW5-1).

| System configuration | SW5-1 |
|---|---|
| No connection system with the system controller | OFF |
| Connection system with the system controller | ON |

*9.Refer to the following for the LED on the INV board.



*10.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *10 exist |
| PURY/TURY | *10 do not exist |

*11.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *11 do not exist |
| PURY/TURY | *11 exist |

*12.Difference of appliance

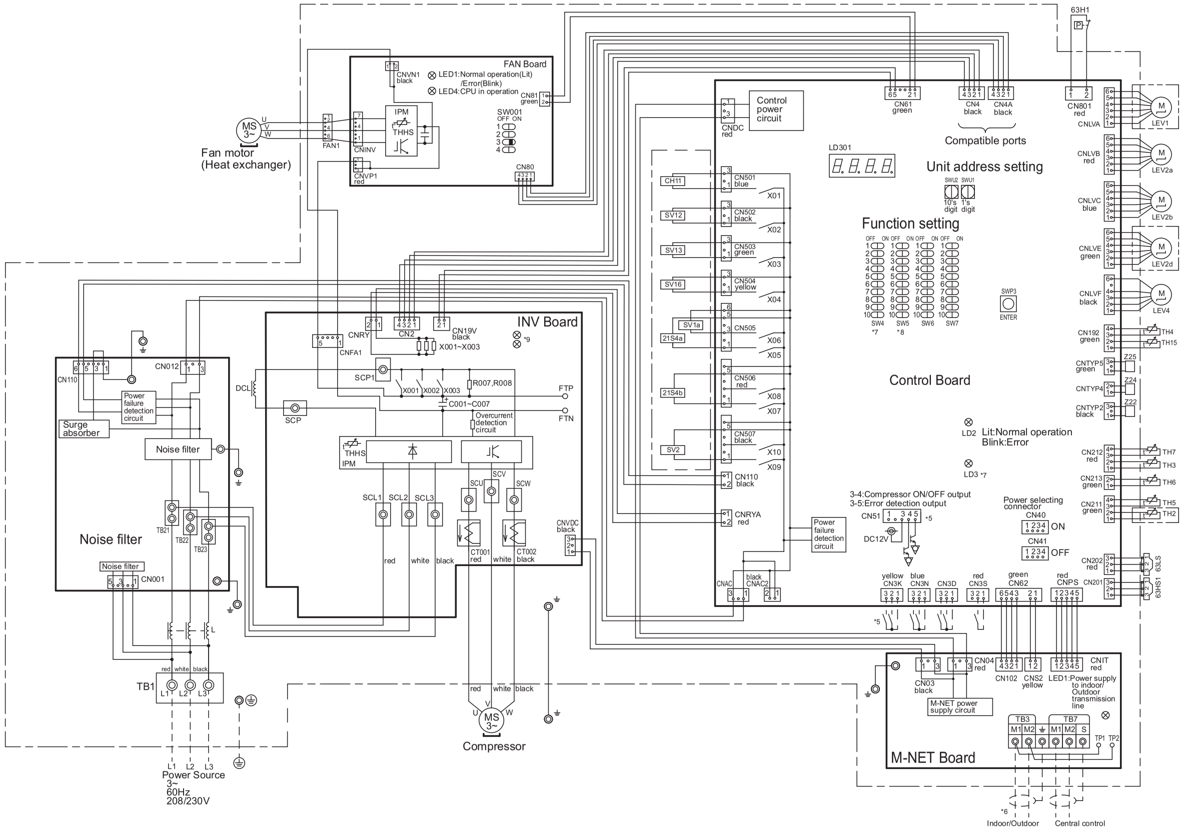
| Model name | Appliance |
|---|---|
| PUHY/TUHY | *12 exist |
| PURY/TURY | *12 do not exist |

<Symbol explanation>

| Symbol | Explanation | |
|---|---|---|
| 21S4a | 4-way valve | Cooling/Heating switching |
| 21S4b | | HEX capacity switching |
| 63H1 | Pressure switch(High pressure protection) | |
| 63HS1 | Pressure sensor | Discharge pressure |
| 63LS | | Low pressure |
| X001~X003 | Magnetic relay(inverter main circuit)72C | |
| C001~C007 | Capacitor(inverter main circuit) | |
| CH11 | Crankcase heater (for heating the compressor) | |
| CT001,002 | Current sensor | |
| DCL | DC reactor(For power factor enhancement) | |
| L | Choke coil(For high-frequency noise reduction) | |
| LEV1 | Linear expansion valve | Pressure control, Refrigerant flow late control. |
| LEV2a | | Pressure control, Refrigerant flow late control. |
| LEV2b | | Pressure control,Refrigerant flow late control. |
| LEV2d | | Pressure control,Refrigerant flow late control. |
| LEV4 | | For opening/closing the injection circuit |
| R007,008 | Resistor | Inrush current prevention |

| Symbol | Explanation | |
|---|---|---|
| SV1a | Solenoid valve | For opening/closing the bypass circuit under the O/S |
| SV2 | | For opening/closing the high and low pressure the bypass circuit |
| SV12 | | For on defrost switching |
| SV13 | | For on defrost switching |
| SV16 | | For opening/closing the variable pass circuit |
| TB1 | Terminal block | Power supply |
| TB3 | | Indoor/Outdoor transmission cable |
| TB7 | | Central control transmission cable |
| TH2 | Thermistor | Subcool bypass outlet temperature |
| TH3 | | Pipe temperature |
| TH4 | | Discharge pipe temperature |
| TH5 | | ACC inlet pipe temperature |
| TH6 | | Subcooled liquid refrigerant temperature |
| TH7 | | OA temperature |
| TH15 | | Detection of compressor lower shell temperature |
| THHS | | IPM temperature |
| Z22,Z24,Z25 | Function setting connector | |

## (3) PURY-EM72, 96, 120TXU-A / PURY-HM72TXU-A



*1.Dot-dash lines indicate wiring not supplied with unit.

*2.Single-dotted lines indicate the control box boundaries.

*3.Control box houses high-voltage parts. Before inspecting the inside of the control box, turn off the power, keep the unit off for at least 10 minutes, and confirm that the voltage between the FTP and FTN terminals on the INV board has dropped to DC20V or less.

*4.There are many high-temperature parts inside and on the back of the control box, so exercise caution even after turning off the power.

*5.Refer to the Data book for connecting input/output signal connectors.

*6.Refer to the Data book for outdoor units in the same refrigerant system.

*7.SW4:In the case of All OFF

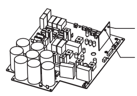
•LD3 Lit:Operation
Blink:Turning on
Unlit:Turn off

Refer to the Data book and Service Handbook for other switch setting and monitoring items.

*8.Setting the Central control switch(SW5-1).

| System configuration | SW5-1 |
|---|---|
| No connection system with the system controller | OFF |
| Connection system with the system controller | ON |

*9.Refer to the following for the LED on the INV board.


LED4:Microcomputer operation

LED1:Normal operation(Lit)
/Error(Blink)

*10.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *10 exist |
| PURY/TURY | *10 do not exist |

*11.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *11 do not exist |
| PURY/TURY | *11 exist |

*12.Difference of appliance

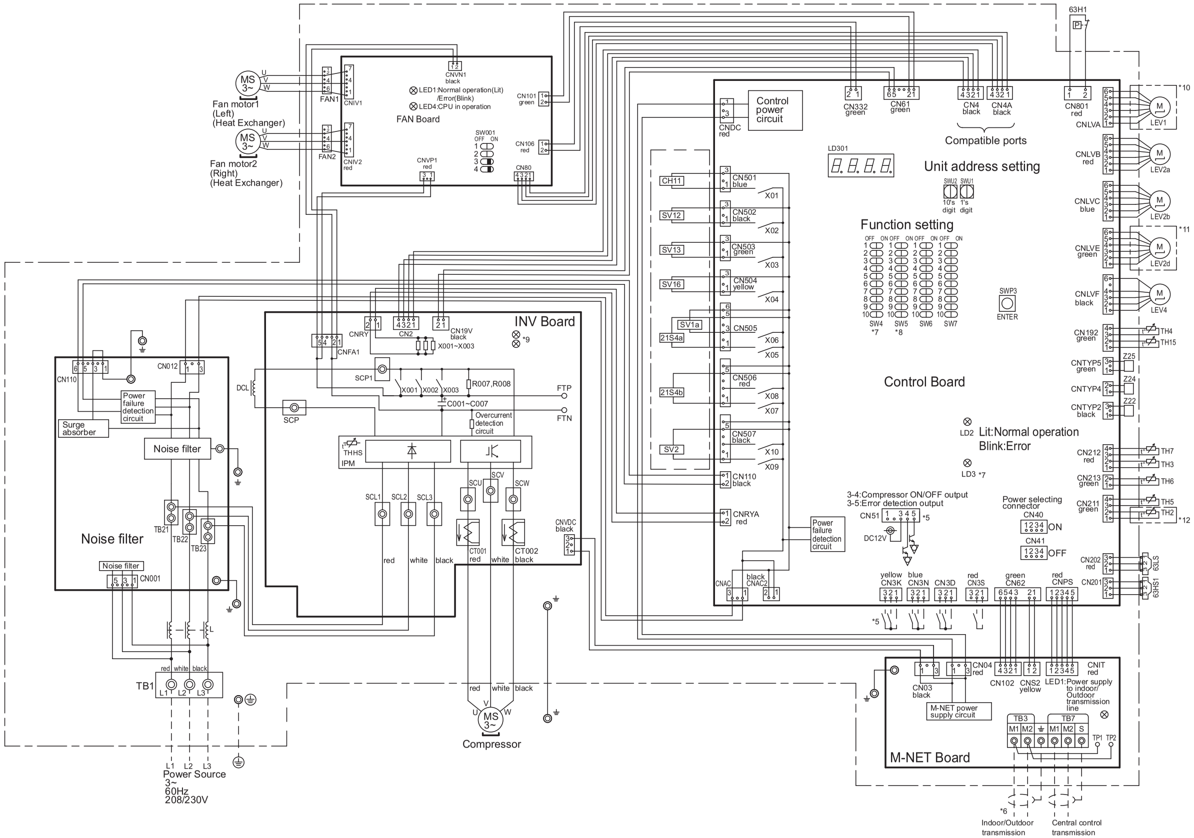
| Model name | Appliance |
|---|---|
| PUHY/TUHY | *12 exist |
| PURY/TURY | *12 do not exist |

<Symbol explanation>

| Symbol | Explanation | |
|---|---|---|
| 21S4a | 4-way valve | Cooling/Heating switching |
| 21S4b | | HEX capacity switching |
| 63H1 | Pressure switch(High pressure protection) | |
| 63HS1 | Pressure sensor | Discharge pressure |
| 63LS | | Low pressure |
| X001~X003 | Magnetic relay(inverter main circuit)72C | |
| C001~C007 | Capacitor(inverter main circuit) | |
| CH11 | Crankcase heater (for heating the compressor) | |
| CT001,002 | Current sensor | |
| DCL | DC reactor(For power factor enhancement) | |
| L | Choke coil(For high-frequency noise reduction) | |
| LEV1 | Linear expansion valve | Pressure control, Refrigerant flow late control. |
| LEV2a | | Pressure control, Refrigerant flow late control. |
| LEV2b | | Pressure control,Refrigerant flow late control. |
| LEV2d | | Pressure control,Refrigerant flow late control. |
| LEV4 | | For opening/closing the injection circuit |
| R007,008 | Resistor | Inrush current prevention |

| Symbol | Explanation | |
|---|---|---|
| SV1a | Solenoid valve | For opening/closing the bypass circuit under the O/S |
| SV2 | | For opening/closing the high and low pressure the bypass circuit |
| SV12 | | For on defrost switching |
| SV13 | | For on defrost switching |
| SV16 | | For opening/closing the variable pass circuit |
| TB1 | Terminal block | Power supply |
| TB3 | | Indoor/Outdoor transmission cable |
| TB7 | | Central control transmission cable |
| TH2 | Thermistor | Subcool bypass outlet temperature |
| TH3 | | Pipe temperature |
| TH4 | | Discharge pipe temperature |
| TH5 | | ACC inlet pipe temperature |
| TH6 | | Subcooled liquid refrigerant temperature |
| TH7 | | OA temperature |
| TH15 | | Detection of compressor lower shell temperature |
| THHS | | IPM temperature |
| Z22,Z24,Z25 | Function setting connector | |

## (4) PURY-EM144, 168, 192TXU-A / PURY-HM96, 120TXU-A



*1.Dot-dash lines indicate wiring not supplied with unit.

*2.Single-dotted lines indicate the control box boundaries.

*3.Control box houses high-voltage parts. Before inspecting the inside of the control box, turn off the power, keep the unit off for at least 10 minutes, and confirm that the voltage between the FTP and FTN terminals on the INV board has dropped to DC20V or less.

*4.There are many high-temperature parts inside and on the back of the control box, so exercise caution even after turning off the power.

*5.Refer to the Data book for connecting input/output signal connectors.

*6.Refer to the Data book for outdoor units in the same refrigerant system.

*7.SW4:In the case of All OFF

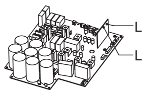
•LD3 Lit:Operation
Blink:Turning on
Unlit:Turn off

Refer to the Data book and Service Handbook for other switch setting and monitoring items.

*8.Setting the Central control switch(SW5-1).

| System configuration | SW5-1 |
|---|---|
| No connection system with the system controller | OFF |
| Connection system with the system controller | ON |

*9.Refer to the following for the LED on the INV board.



*10.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *10 exist |
| PURY/TURY | *10 do not exist |

*11.Difference of appliance

| Model name | Appliance |
|---|---|
| PUHY/TUHY | *11 do not exist |
| PURY/TURY | *11 exist |

*12.Difference of appliance

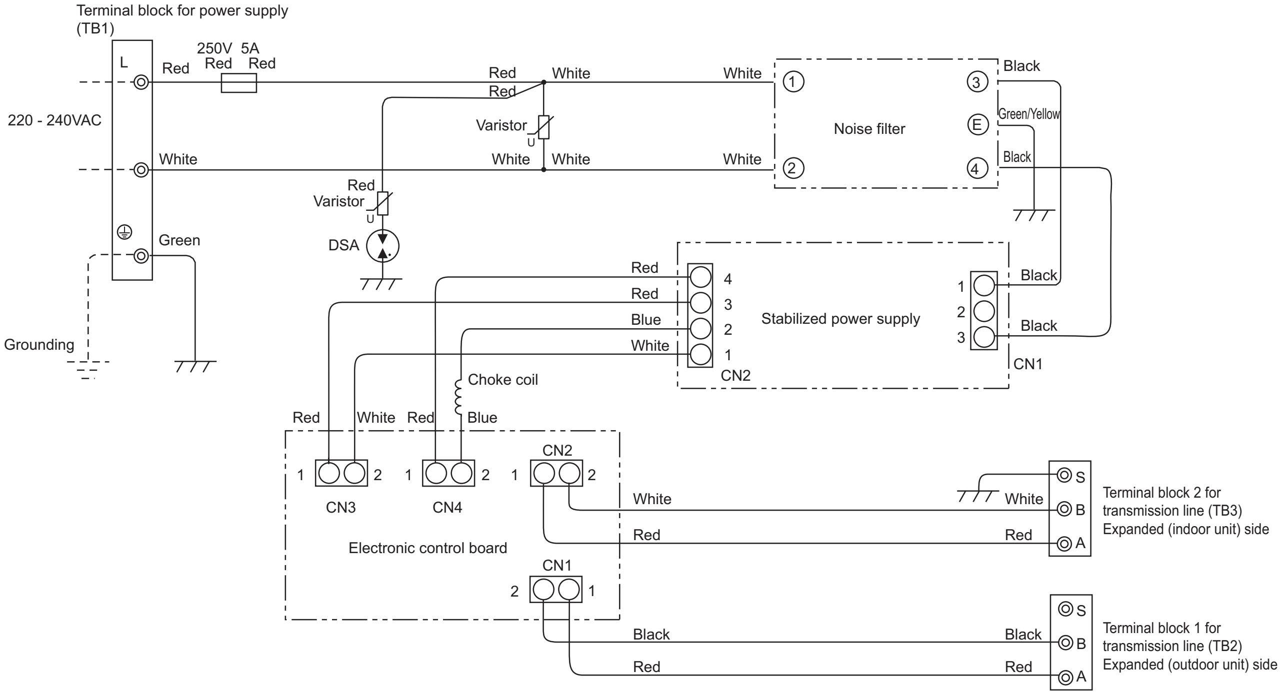
| Model name | Appliance |
|---|---|
| PUHY/TUHY | *12 exist |
| PURY/TURY | *12 do not exist |

<Symbol explanation>

| Symbol | Explanation | |
|---|---|---|
| 21S4a | 4-way valve | Cooling/Heating switching |
| 21S4b | | HEX capacity switching |
| 63H1 | Pressure switch(High pressure protection) | |
| 63HS1 | Pressure sensor | Discharge pressure |
| 63LS | | Low pressure |
| X001~X003 | Magnetic relay(inverter main circuit)72C | |
| C001~C007 | Capacitor(inverter main circuit) | |
| CH11 | Crankcase heater (for heating the compressor) | |
| CT001,002 | Current sensor | |
| DCL | DC reactor(For power factor enhancement) | |
| L | Choke coil(For high-frequency noise reduction) | |
| LEV1 | Linear expansion valve | Pressure control,<br>Refrigerant flow late control. |
| LEV2a | | Pressure control,<br>Refrigerant flow late control. |
| LEV2b | | Pressure control,Refrigerant flow late control. |
| LEV2d | | Pressure control,Refrigerant flow late control. |
| LEV4 | | For opening/closing the injection circuit |
| R007,008 | Resistor | Inrush current prevention |

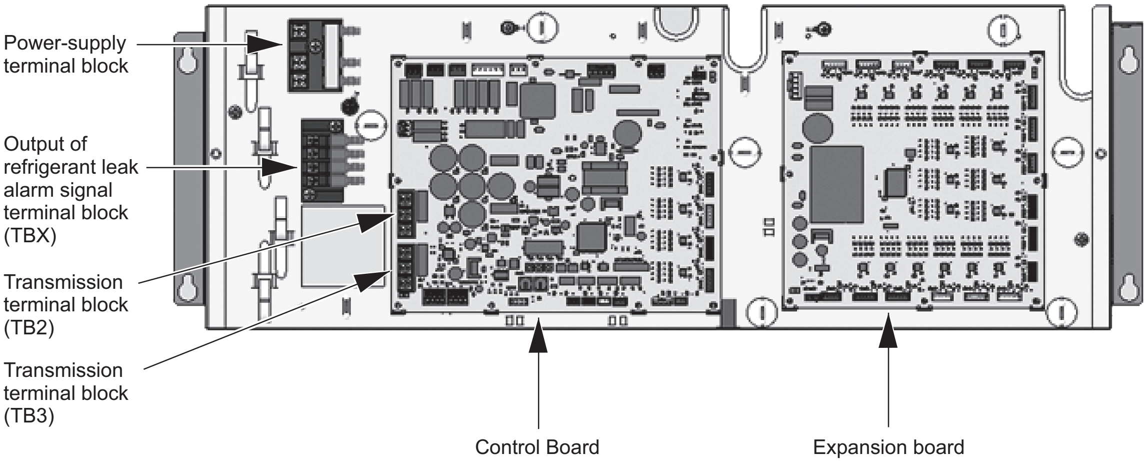
| Symbol | Explanation | |
|---|---|---|
| SV1a | Solenoid valve | For opening/closing the bypass circuit under the O/S |
| SV2 | | For opening/closing the high and low pressure the bypass circuit |
| SV12 | | For on defrost switching |
| SV13 | | For on defrost switching |
| SV16 | | For opening/closing the variable pass circuit |
| TB1 | Terminal block | Power supply |
| TB3 | | Indoor/Outdoor transmission cable |
| TB7 | | Central control transmission cable |
| TH2 | Thermistor | Subcool bypass outlet temperature |
| TH3 | | Pipe temperature |
| TH4 | | Discharge pipe temperature |
| TH5 | | ACC inlet pipe temperature |
| TH6 | | Subcooled liquid refrigerant temperature |
| TH7 | | OA temperature |
| TH15 | | Detection of compressor lower shell temperature |
| THHS | | IPM temperature |
| Z22,Z24,Z25 | Function setting connector | |

# 4-4 Transmission Booster Electrical Wiring Diagrams

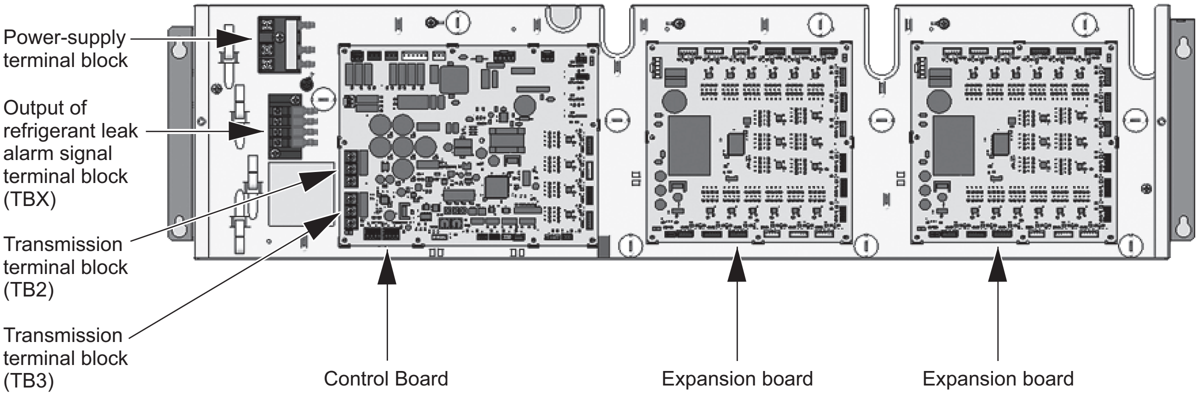


# 4-5 BC Controller Circuit Board Arrangement

## 1. CMB-M104, 106NU-MA-SV, M104NU-MB-SV



## 2. CMB-M108, 1012NU-MA-SV, M108NU-MB-SV



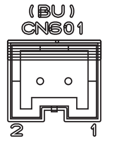
# 4-6 BC Controller Circuit Board Components

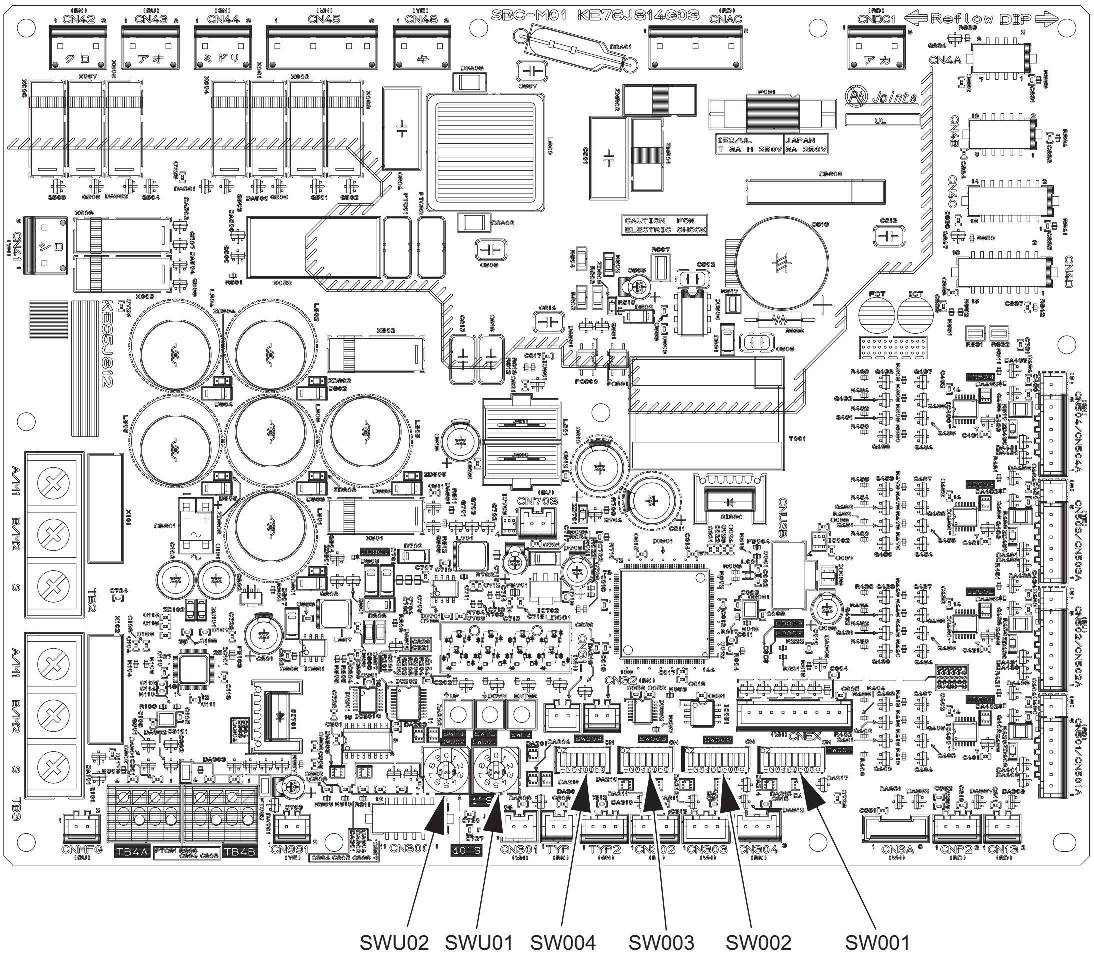
## 4-6-1 Control Board

Abbreviated name of connector color

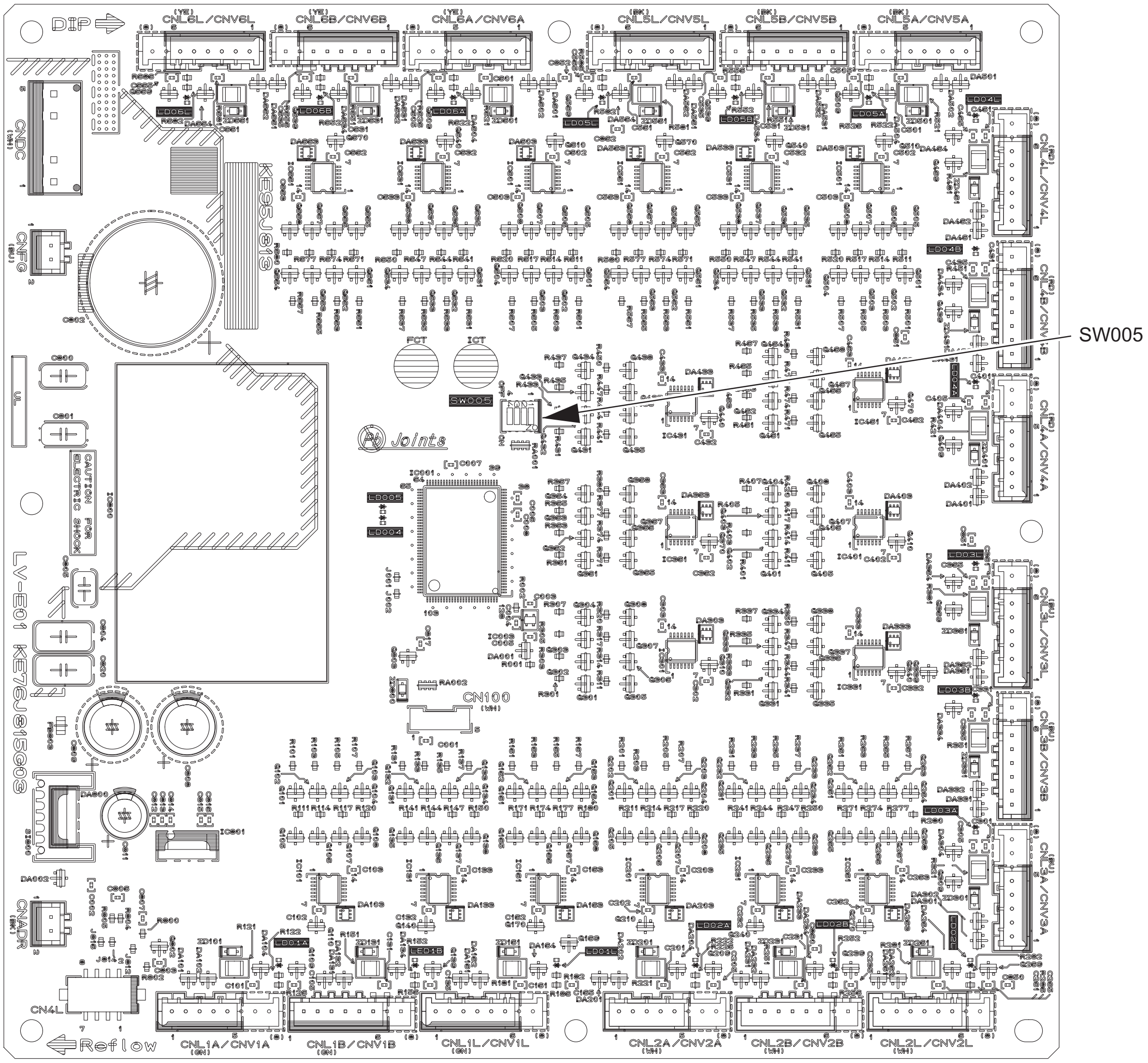
Examples
- BU : BLUE
- BK : BLACK
- GN : GREEN
- YE : YELLOW
- WH : WHITE
- RD : RED

Example: (BU) above CN601 indicates that the connector is blue.



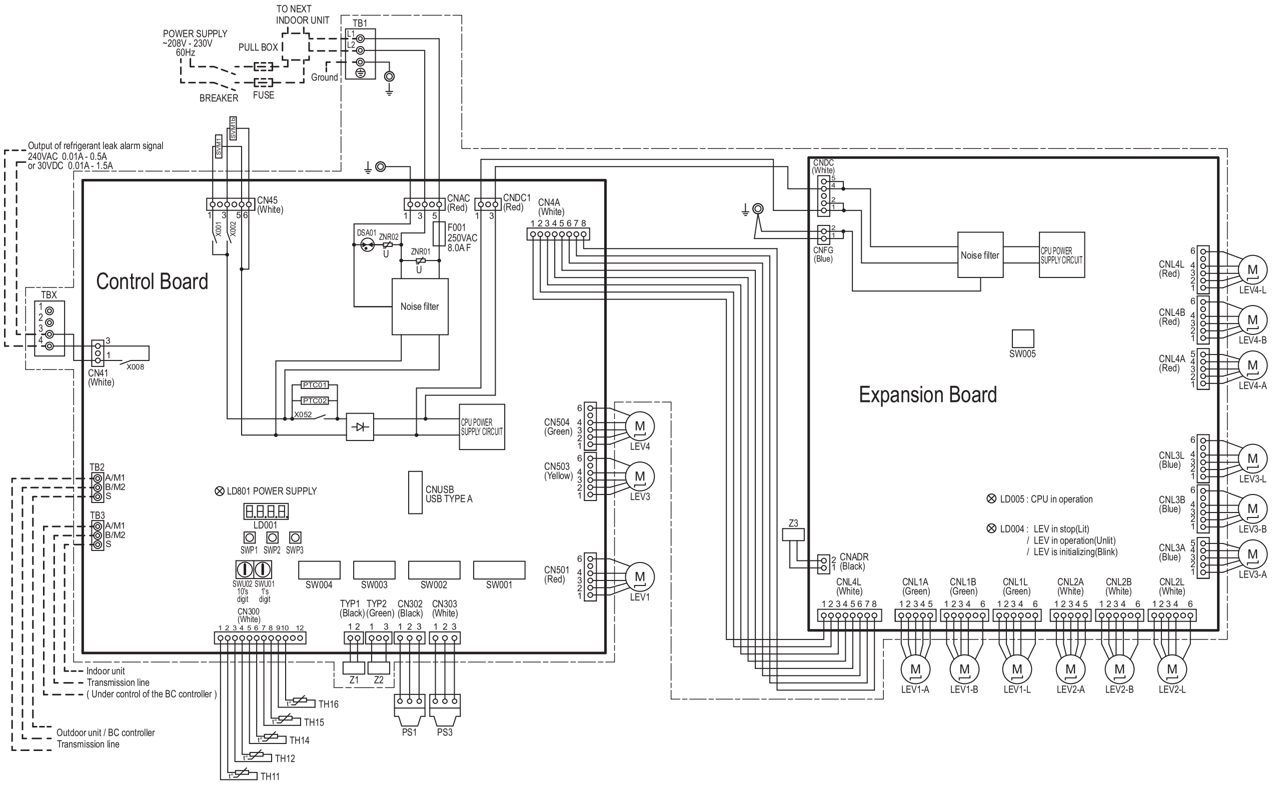


## 4-6-2 Expansion Board

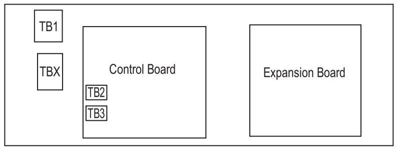


# 4-7 BC Controller Electrical Wiring Diagrams

## (1) CMB-M104NU-MA-SV



[ Box Internal layout ]



[ Symbol explanation ]

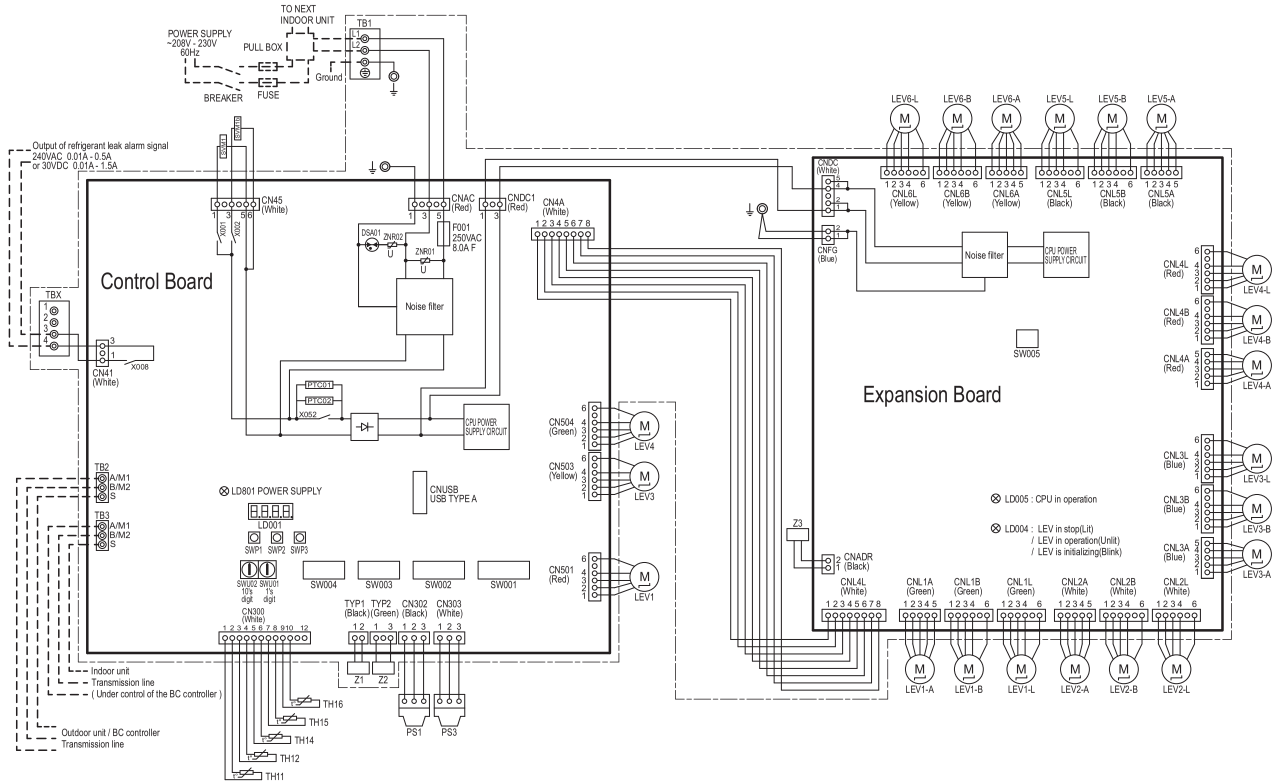
| Symbol | Name |
|---|---|
| TH11,12,14,15,16 | Thermistor sensor |
| LEV1,3,4 | Expansion valve |
| PS1,3 | Pressure sensor |
| LEV1 to 4 A, B, L | Expansion valve |
| SVM1, SVM1b | Solenoid valve |
| Z1 to Z3 | Function setting connector |
| F001 | Fuse 250VAC 8.0A F |

| Symbol | Name |
|---|---|
| TB1 | Terminal block<br>( for power source ) |
| TB2 , 3 | Terminal block<br>( Transmission ) |
| TBX | Terminal block<br>(Output of refrigerant leak alarm signal ) |

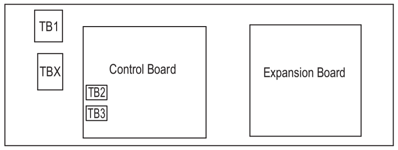
Note:

1. TB2 and TB3 are transmission terminal block.
   Never connect power line to it.
2. The initial set values of switch on
   Control Board are as follows.
   SWU01:0
   SWU02:0
3. The wirings to TB1, TB2, TB3, and TBX shown in dotted lines are carried out on site.
4. Refer to the Installation Manual to carry out wirings to TB2, TB3, and TBX on site properly.
5. Dot-dash lines indicate the control box boundaries.
6. If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant charging is necessary with the power off, turn off the power to the outdoor unit or heat source unit first, and then turn off the power to the BC controller and the power to the indoor units.
   When turning on the power, start the BC controller and indoor units first, and then start the outdoor unit or heat source unit.

## (2) CMB-M106NU-MA-SV



[ Box Internal layout ]



Note:

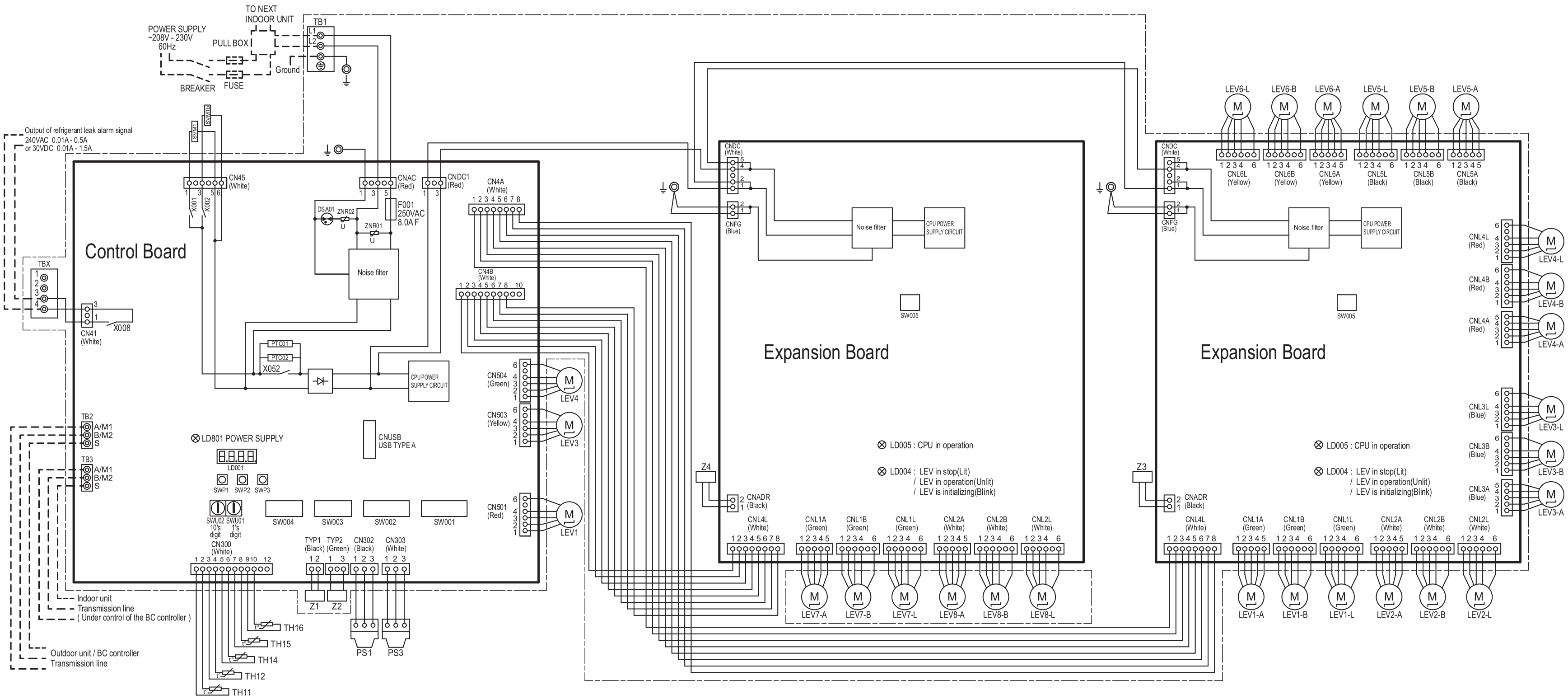
1. TB2 and TB3 are transmission terminal block.
   Never connect power line to it.
2. The initial set values of switch on
   Control Board are as follows.
   SWU01:0
   SWU02:0
3. The wirings to TB1, TB2, TB3, and TBX shown in dotted lines are carried out on site.
4. Refer to the Installation Manual to carry out wirings to TB2, TB3, and TBX on site properly.
5. Dot-dash lines indicate the control box boundaries.
6. If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant charging is necessary with the power off, turn off the power to the outdoor unit or heat source unit first, and then turn off the power to the BC controller and the power to the indoor units.
   When turning on the power, start the BC controller and indoor units first, and then start the outdoor unit or heat source unit.

[ Symbol explanation ]

| Symbol | Name |
|---|---|
| TH11,12,14,15,16 | Thermistor sensor |
| LEV1,3,4 | Expansion valve |
| PS1,3 | Pressure sensor |
| LEV1 to 6 A, B, L | Expansion valve |
| SVM1, SVM1b | Solenoid valve |
| Z1 to Z3 | Function setting connector |
| F001 | Fuse 250VAC 8.0A F |

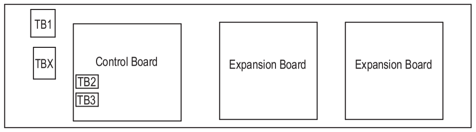
| Symbol | Name |
|---|---|
| TB1 | Terminal block<br>( for power source ) |
| TB2 , 3 | Terminal block<br>( Transmission ) |
| TBX | Terminal block<br>(Output of refrigerant leak alarm signal ) |

## (3) CMB-M108NU-MA-SV



Note:
1. TB2 and TB3 are transmission terminal block.
   Never connect power line to it.
2. The initial set values of switch on
   Control Board are as follows.
   SWU01:0
   SWU02:0
3. The wirings to TB1, TB2, TB3, and TBX shown in
   dotted lines are carried out on site.
4. Refer to the Installation Manual to carry out wirings
   to TB2, TB3, and TBX on site properly.
5. Dot-dash lines indicate the control box boundaries.
6. If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant
   charging is necessary with the power off, turn off the power to the outdoor unit
   or heat source unit first, and then turn off the power to the BC controller and
   the power to the indoor units.
   When turning on the power, start the BC controller and indoor units first, and
   then start the outdoor unit or heat source unit.

[ Box Internal layout ]



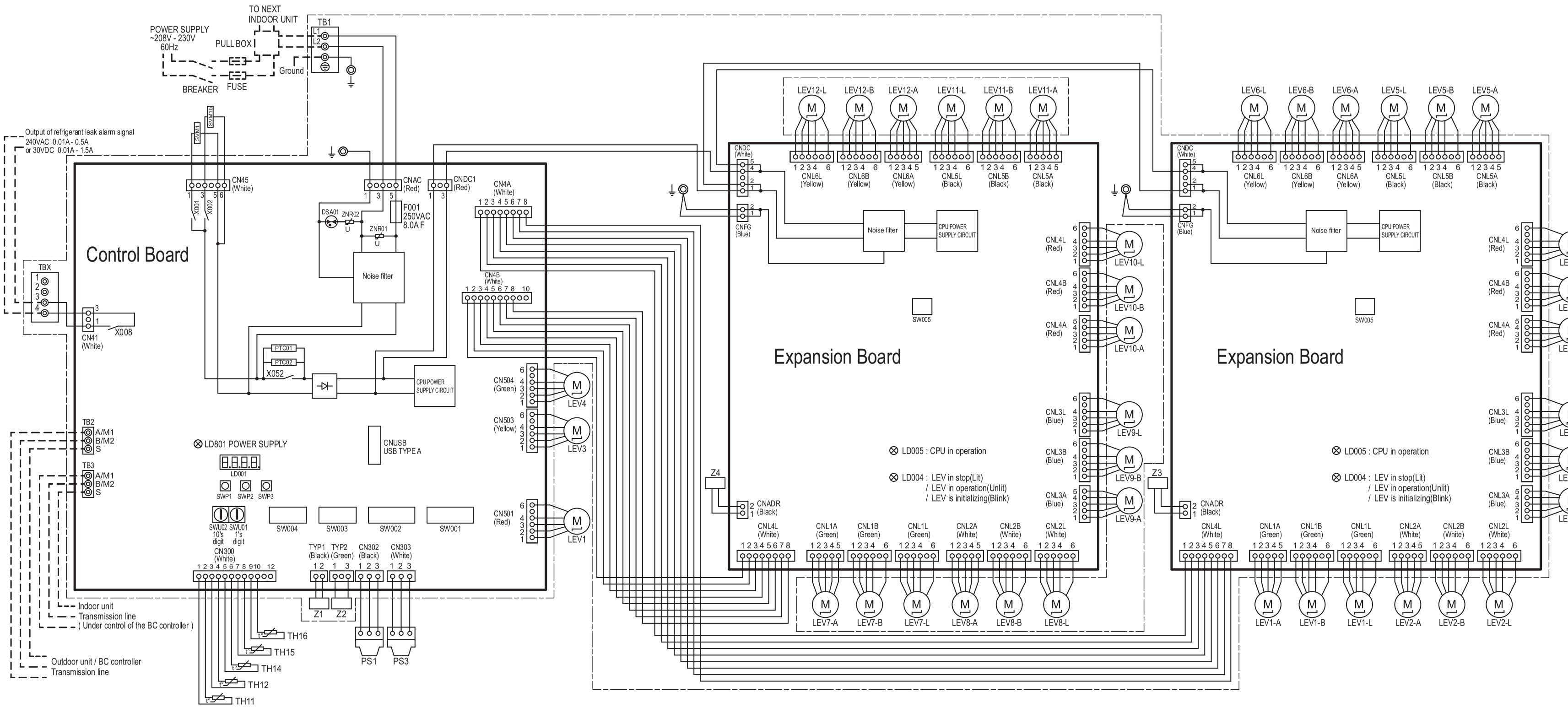
[ Symbol explanation ]

| Symbol | Name |
|---|---|
| TH11,12,14,15,16 | Thermistor sensor |
| LEV1,3,4 | Expansion valve |
| PS1,3 | Pressure sensor |
| LEV1 to 8 A, B, L | Expansion valve |
| SVM1, SVM1b | Solenoid valve |
| Z1 to Z4 | Function setting connector |
| F001 | Fuse 250VAC 8.0A F |

| Symbol | Name |
|---|---|
| TB1 | Terminal block<br>( for power source ) |
| TB2 , 3 | Terminal block<br>( Transmission ) |
| TBX | Terminal block<br>(Output of refrigerant leak alarm signal ) |

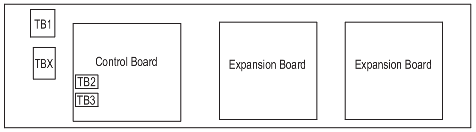
4 Electrical Components and Wiring Diagrams

## (4) CMB-M1012NU-MA-SV



Note:
1. TB2 and TB3 are transmission terminal block.
   Never connect power line to it.
2. The initial set values of switch on
   Control Board are as follows.
   SWU01:0
   SWU02:0
3. The wirings to TB1, TB2, TB3, and TBX shown in dotted lines are carried out on site.
4. Refer to the Installation Manual to carry out wirings to TB2, TB3, and TBX on site properly.
5. Dot-dash lines indicate the control box boundaries.
6. If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant charging is necessary with the power off, turn off the power to the outdoor unit or heat source unit first, and then turn off the power to the BC controller and the power to the indoor units.
   When turning on the power, start the BC controller and indoor units first, and then start the outdoor unit or heat source unit.

[ Box Internal layout ]

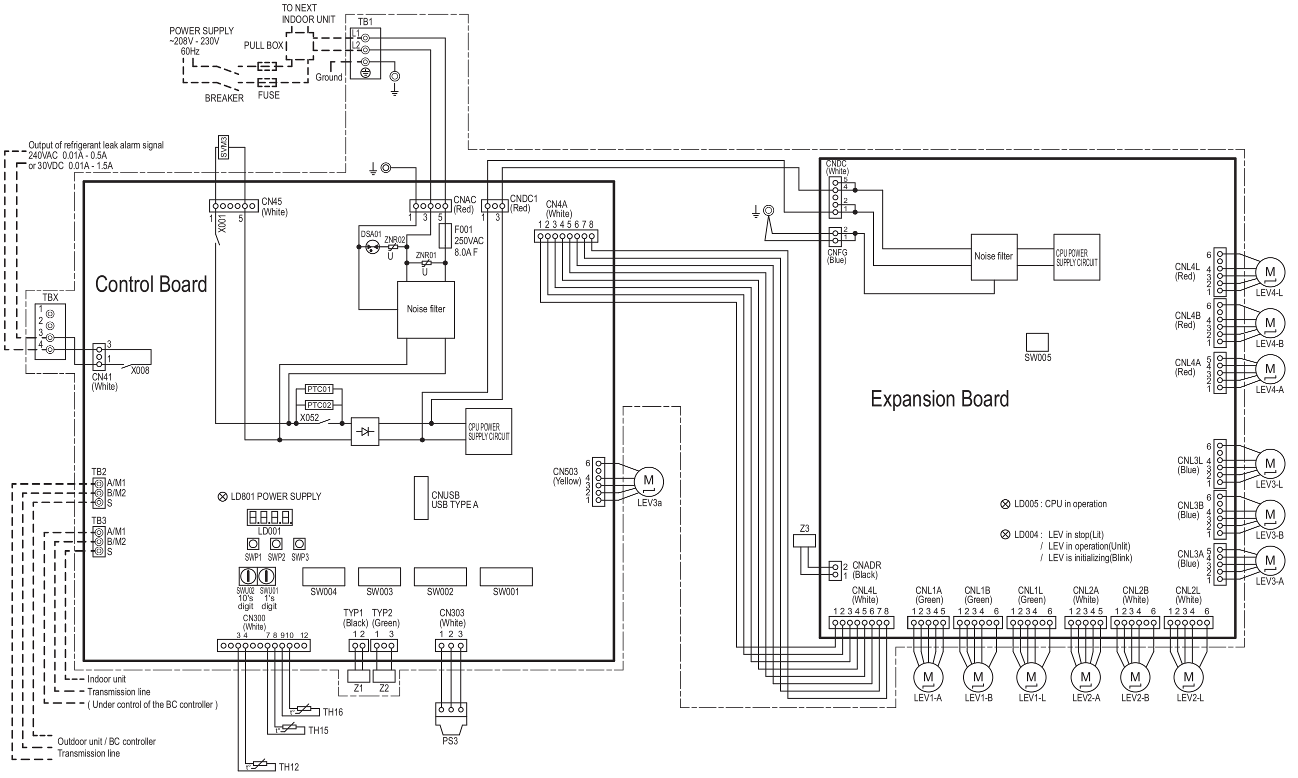


[ Symbol explanation ]

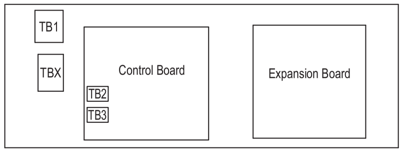
| Symbol | Name |
|---|---|
| TH11,12,14,15,16 | Thermistor sensor |
| LEV1,3,4 | Expansion valve |
| PS1,3 | Pressure sensor |
| LEV1 to 12 A,B,L | Expansion valve |
| SVM1, SVM1b | Solenoid valve |
| Z1 to Z4 | Function setting connector |
| F001 | Fuse 250VAC 8.0A F |

| Symbol | Name |
|---|---|
| TB1 | Terminal block<br>( for power source ) |
| TB2 , 3 | Terminal block<br>( Transmission ) |
| TBX | Terminal block<br>(Output of refrigerant leak alarm signal ) |

## (5) CMB-M104NU-MB-SV



[ Box Internal layout ]



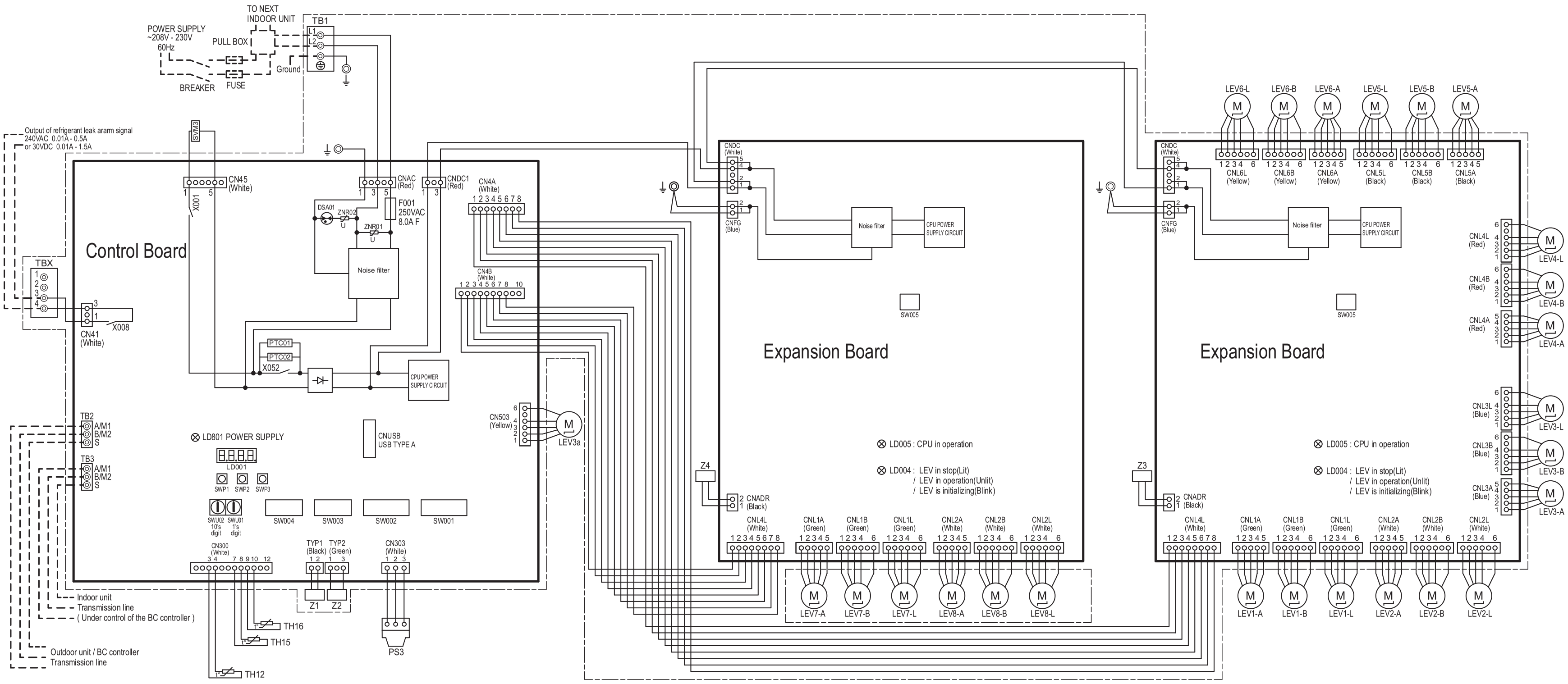
Note:
1. TB2 and TB3 are transmission terminal block.
Never connect power line to it.
2. The initial set values of switch on
Control Board are as follows.
SWU01:0
SWU02:0
3. The wirings to TB1, TB2, TB3, and TBX shown in dotted lines are carried out on site.
4. Refer to the Installation Manual to carry out wirings to TB2, TB3, and TBX on site properly.
5. Dot-dash lines indicate the control box boundaries.
6. If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant charging is necessary with the power off, turn off the power to the outdoor unit or heat source unit first, and then turn off the power to the BC controller and the power to the indoor units.
When turning on the power, start the BC controller and indoor units first, and then start the outdoor unit or heat source unit.

[ Symbol explanation ]

| Symbol | Name |
|---|---|
| TH12,15,16 | Thermistor sensor |
| LEV3a | Expansion valve |
| PS3 | Pressure sensor |
| LEV1 to 4 A, B, L | Expansion valve |
| SVM3 | Solenoid valve |
| Z1 to Z3 | Function setting connector |
| F001 | Fuse 250VAC 8.0A F |

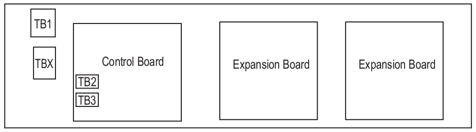
| Symbol | Name |
|---|---|
| TB1 | Terminal block<br>( for power source ) |
| TB2 , 3 | Terminal block<br>( Transmission ) |
| TBX | Terminal block<br>(Output of refrigerant leak alarm signal ) |

## (6) CMB-M108NU-MB-SV



Note:
1. TB2 and TB3 are transmission terminal block.
   Never connect power line to it.
2. The initial set values of switch on
   Control Board are as follows.
   SWU01:0
   SWU02:0
3. The wirings to TB1, TB2, TB3, and TBX shown in dotted lines are carried out on site.
4. Refer to the Installation Manual to carry out wirings to TB2, TB3, and TBX on site properly.
5. Dot-dash lines indicate the control box boundaries.
6. If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant charging is necessary with the power off, turn off the power to the outdoor unit or heat source unit first, and then turn off the power to the BC controller and the power to the indoor units.
   When turning on the power, start the BC controller and indoor units first, and then start the outdoor unit or heat source unit.

[ Box Internal layout ]



[ Symbol explanation ]

| Symbol | Name |
|---|---|
| TH12,15,16 | Thermistor sensor |
| LEV3a | Expansion valve |
| PS3 | Pressure sensor |
| LEV1 to 8 A, B, L | Expansion valve |
| SVM3 | Solenoid valve |
| Z1 to Z4 | Function setting connector |
| F001 | Fuse 250VAC 8.0A F |

| Symbol | Name |
|---|---|
| TB1 | Terminal block<br>( for power source ) |
| TB2 , 3 | Terminal block<br>( Transmission ) |
| TBX | Terminal block<br>(Output of refrigerant leak alarm signal ) |

# Chapter 5 Control

# 5-1 Dipswitch Functions and Factory Settings

## 5-1-1 Outdoor Unit Switch Functions and Factory Settings

### (1) Control board

| Switch | | Function | Function according to switch setting | | Switch setting timing | Units that require switch setting (Note 2) |
|---|---|---|---|---|---|---|
| | | | OFF | ON | | |
| SWU | 1-2 | Unit address setting | Set to 00 or 51-100 with the dial switch | | Before power on | C |
| SW5 | 1 | Centralized control switch | Without connection to the centralized controller | With connection to the centralized controller | Before power on | B |
| | 2 | Deletion of connection information | Normal control | Deletion | Before power on | A |
| | 3 | - | Preset before shipment | | | - |
| | 4 | - | | | | - |
| | 5 | - | | | | - |
| | 6 | - | | | | - |
| | 7 | - | | | | - |
| | 8 | - | | | | - |
| SW6 | 4 | Model setting (outdoor unit/high static pressure setting) | High static pressure (Note 5) | | Before power on | C |
| | 5 | Model setting (outdoor unit/high static pressure setting) | | | Before power on | C |
| | 7 | Performance-priority/ low-noise mode setting | Performance-priority mode (Note 3) | Quiet-priority mode | Anytime after power on | A |
| | 8 | Low-noise mode/step demand switching | Low-noise mode (Note 4) | Step demand mode | Before power on | C |
| | 9 | Self-diagnosis monitor display / SW4 function setting mode switching | Self-diagnosis monitor display | SW4 function setting mode | Anytime after power on | C |
| | 10 | | | | | |

| Switch | | Function | Function according to switch setting | | Switch setting timing | Units that require switch setting (Note 2) |
|---|---|---|---|---|---|---|
| | | | OFF | ON | | |
| SW7 | 1 | Enables or disables the detection of the following types of inverter compressor errors<br>ACCT, DCCT sensor error(5301 Detail code 115, 116)<br>ACCT, DCCT sensor circuit error(5301 Detail code 117, 118)<br>IPM open-phase/ CNCT2 connection error(5301 Detail code 119)<br>Wiring connection error(5301 Detail code 120) | Error detection enabled | Error detection disabled (no-load operation allowed) | Any time after power on | C |
| | 2 | Enables or disables no-load operation of the left fan inverter<br>The unit continues no-load operation for 30 seconds and comes to an error stop. See the relevant pages for details: [8-9-1(2)[7] Fan inverter damage check (no load)] | No-load operation disabled | No-load operation enabled | Any time after power on | C |
| | 3 | - | - | - | - | - |
| | 4 | Enables or disables no-load operation of the right fan inverter<br>The unit continues no-load operation for 30 seconds and comes to an error stop. See the relevant pages for details: [8-9-1(2)[7] Fan inverter damage check (no load)] | No-load operation disabled | No-load operation enabled | Any time after power on | C |
| | 5 | - | - | - | - | - |
| | 6 | - | - | - | - | - |
| | 7 | - | - | - | - | - |
| | 8 | - | - | - | - | - |
| | 9 | Switches between the normal startup mode and the USB writer rewrite mode | Normal startup mode | USB writer rewrite mode | Before power on | C |

**Note**

1) Unless otherwise specified, leave the switch to OFF where indicated by "-" or where the cells are blank, which may be set to OFF for a reason.
2) A: Only the switch on OC needs to be set for the setting to be effective.
   B: The switches on both the OC and OS need to be set to the same setting for the setting to be effective.
   C: The switches on both the OC and OS need to be set.
3) When set to the performance-priority mode, the low-noise mode will be terminated, and the units will operate in the normal mode.
   Cooling: Ambient temperature or the high pressure is high.
   Heating: When the outside air temperature is low or when the low pressure is low. Refer to the following page(s). [2-4-7 Various Control Methods Using the Signal Input/Output Connector on Outdoor Unit]
4) Operation noise is reduced by controlling the compressor frequencies and the rotation speed of the outdoor unit fans.
   CN3D needs to be set. Refer to the following page(s). [2-4-7 Various Control Methods Using the Signal Input/Output Connector on Outdoor Unit]
5) Selectable with the function switches SW6-4 and SW6-5.

| | | SW6-5 | |
|---|---|---|---|
| | | ON | OFF |
| SW6-4 | ON | 80 Pa*1, *2 | 60 Pa*1 |
| | OFF | 30 Pa*1 | 0 Pa |

   *1 The setting is only available for cooling and heating in models EM72 to EM144 and EM264 to EM288, and for cooling in models EM168 and EM312 to EM336.
   *2 The setting is only available in models HM72 and HM144.
6) Keep SW7-1, -2, and -4 set to OFF during normal operation. Leaving these switches to ON will disable the error-detection function and can lead to equipment damage.
7) Shaded areas ( ▨ ) indicate factory settings.

## (2) Additional dipswitch settings at time of shipment

| Switch | | | Function | | Function according to switch setting | | Switch setting timing | Units that require switch setting (Note 2) |
|---|---|---|---|---|---|---|---|---|
| | | | | | OFF (LED3 Unlit) | ON (LED3 Lit) | | |
| SW4<br>SW6-10: OFF | 1-10<br>1:ON, 0:OFF | | Self-diagnosis/operation monitor | | Refer to the following page(s). [10 LED Status Indicators] | | Anytime after power on | C |
| SW4<br>1-10<br>[0:OFF, 1:ON]<br>(Note 1)<br>SW6-10:ON | No.1 | 1000000000 | Test run mode: ON/OFF | | Stops all ICs | Sends a test-run signal to all IC | Anytime after power on | A |
| | No.3 | 1100000000 | Refrigerant amount adjustment | | Normal control | Refrigerant amount adjust mode | Anytime after power on (except during initial startup/becomes ineffective 90 minutes after compressor started up.) | A |
| | No.4 | 0010000000 | Clearance of error history SW | OC | Retained (IC/OC) | Deleted (IC/OC) | Anytime after power on (OFF→ON) | C |
| | | | | OS | Retained (OS) | Deleted (OS) | | |
| | No.8 | 0001000000 | Cumulative compressor operation time deletion | | Retained | Cleared | Anytime after power on (OFF→ON) | C |
| | No.16 | 0000100000 | Forced defrost (Note 3) | | Normal control | Forced defrost starts | 10 minutes after the completion of defrost operation (OFF→ON) or 10 minutes after compressor start-up (OFF→ON) | D |
| | No.17 | 1000100000 | Pump down function | | Normal control | Pump down operation | After being energized and while the compressor is stopped | A |
| | No.20 | 0010100000 | Clear the history of completing initial control | | Retained | Cleared | After being energized and while the compressor is stopped<br>* Effective only OFF to ON | C |
| | No.24 | 0001100000 | Automatic address initialization switch | | Disabled | Initialization and reset | After being energized and while the operation is stopped | B |
| | No.768 | 0000000011 | System response | | Disabled | Enabled | Anytime after power on | B |
| | No.771 | 1100000011 | Liquid back less Defrost function | | Disabled | Enabled | After being energized and while the operation is stopped | B |
| | No.791 | 1110100011 | Switch for maintaining indoor unit fan speed during Thermo-OFF | | Disabled | Enabled | After being energized and while the compressor is stopped | A |
| | No.817 | 1000110011 | Starts up drive recorder | | Enabled | Disabled | Anytime after power on | A |
| | No.818 | 0100110011 | Data collection during an error | | Disabled | Enabled | Anytime after power on | A |
| | No.852 | 0010101011 | Shifts evaporating temp. depending on the load. | | Depends on the setting combination with No. 853 (Note 5)<br>(Factory setting: OFF) | | Anytime after power on | A |
| | No.853 | 1010101011 | Shifts evaporating temp. depending on the load. | | Depends on the setting combination with No. 852 (Note 5)<br>(Factory setting: OFF) | | Anytime after power on | A |
| | No.885 | 1010111011 | Fan speed setting at low-outside temperature heating | | Depends on the setting combination with No.885 (Note 11) (Factory setting: OFF) | | After being energized and while the compressor is stopped | B |
| | No.886 | 0110111011 | Fan speed setting at low-outside temperature heating | | Depends on the setting combination with No.886 (Note 11) (Factory setting: ON) | | After being energized and while the compressor is stopped | B |
| | No.891 | 1101111011 | Smooth auto-shift start up mode | | Disabled | Enabled | After being energized and while the compressor is stopped | A |
| | No.897 | 1000000111 | High sensible heat operation setting | | Depends on the combined setting with No. 900 (Note 8) | | Anytime after power on | A |
| | No.900 | 0010000111 | High sensible heat operation setting | | Depends on the combined setting with No. 897 (Note 8) | | Anytime after power on | A |
| | No.915 | 1100100111 | Defrost start temperature (Note 3) | | EM72-120, HM72: -13°C [9°F]<br>EM144-192, HM96: -120 -11°C [12°F] | -8°C [18°F] | Anytime after power on | B |
| | No.916 | 0010100111 | Defrost end temperature (Note 3) | | Refer to Note 3). | | Anytime after power on | B |
| | No.918 | 0110100111 | Changes the defrost timer setting (Note 3) | | 50 minutes | 90 minutes | Anytime after power on (OFF→ON) | B |
| | No.921 | 1001100111 | Temperature/pressure unit selection | | °C/kgf/cm$^2$ | °F/psi | Anytime after power on | C |
| | No.932 | 0010010111 | Heating backup | | Disabled | Enabled | Anytime after power on | A |
| | No.933 | 1010010111 | Snow sensor setting | | Effective only when TH7 ≤ 5°C [41°F] is true or the snow sensor contact input is on. | Effective when TH7 ≤ 5°C [41°F] is true | Anytime after power on | C |
| | No.934 | 0110010111 | Snow sensor setting | | Continuous fan operation (FAN=50%) | Intermittent fan operation (100% for 5 minutes ↔ 0% for 30 minutes) | Anytime after power on | C |
| | No.935 | 1110010111 | COP priority setting (at low ambient temperature) | | COP priority mode | Heating capacity priority control mode | Anytime after power on | A |
| | No.959 | 1111110111 | Cool toughness mode | | Disabled | Enabled | After being energized and while the operation is stopped | A |

| Switch | | | Function | Function according to switch setting | | Switch setting timing | Units that require switch setting (Note 2) |
|---|---|---|---|---|---|---|---|
| | | | | OFF (LED3 Unlit) | ON (LED3 Lit) | | |
| SW4<br>1-10<br>[0:OFF, 1:ON]<br>(Note 1)<br>SW6-10:ON | No.982 | 0110101111 | Target evaporation temperature setting | Refer to Note 4). | | Anytime after power on | A |
| | No.997 | 1010011111 | Multiple-stage low-noise setting | See note 9 below.<br>(Factory setting: OFF) | | After power on and while the compressor is stopped | A |
| | No.1006 | 0111011111 | | | | | |

**Note**

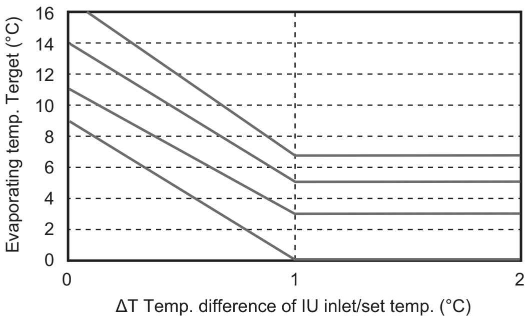
1) To change the settings, set SW6-10 to ON, set SW4, and press and hold SWP3 for 2 seconds or longer (OFF↔ON).
LED3 will light up when the switch setting is ON, and lights off when OFF.
Use the LED3 display to confirm that the settings are properly made.
The settings will need to be set again when the control board is replaced. Write down the settings on the electrical wiring drawing label.
2) A: Only the switch on OC needs to be set for the setting to be effective.
B: The switches on both the OC and OS need to be set to the same setting for the setting to be effective.
C: The switches on both the OC and OS need to be set.
D: The switch on either the OC or OS needs to be set.
3) For details, refer to the following page(s).[5-2-7 Defrost Operation Control]
4) The table below shows how the target evaporation temperature is set with SW4 (982).

| | |
|---|---|
| SW4(982) | OFF → ON → OFF → ON → OFF → ON |
| Target evaporating temperature | 0℃ [32℉] → -2℃ [28℉] → 0℃ [32℉] → -4℃ [25℉] → 0℃ [32℉] → -6℃ [21℉] |

*SW4 (982) setting will not automatically be restored after the control board is replaced. (The function of SW4 is explained in Note 7.) When using the function of SW4, write down the SW4 (982) setting on the control board panel, and manually reset the setting after the control board is replaced.

5) The table below shows the combination of the settings for items No.852 and No.853 and the target evaporating temperature (target ET) setting that corresponds to each combination when energy-saving mode is activated. Refer to the following page(s). [2-4-7 Various Control Methods Using the Signal Input/Output Connector on Outdoor Unit]

| | | | | |
|---|---|---|---|---|
| Switch No.852 | OFF | ON | OFF | ON |
| Switch No.853 | OFF | OFF | ON | ON |
| Target ET max | 9°C [48°F] | 11°C [52°F] | 14°C [57°F] | 17°C [63°F] |
| Target ET min | 0°C [32°F] | 3°C [37°F] | 5°C [41°F] | 6°C [43°F] |



6) Unless otherwise specified, leave the switch to OFF where indicated by "-" or where the cells are blank, which may be set to OFF for a reason.
7) The function settings No. 768 through 1023 that are configured with SW4 (SW6-10: ON) will automatically be stored on the indoor units that support the new function*. The stored settings will automatically be restored when the outdoor unit control board is replaced.
Not applicable to SW4 (982).
If none of the connected indoor units supports the new function, no configuration information will be saved. If this is the case, manually record the settings configuration on the control box panel.
8) The table below shows the combinations of the settings for items No. 897 and No. 900 and the target evaporating temperature setting that corresponds to each combination.

| Switch | | No.900 | |
|---|---|---|---|
| | | OFF | ON |
| No.897 | OFF | 0°C [32°F] | 9°C [48°F] |
| | ON | 6°C [43°F] | 14°C [57°F] |

9) The multiple-stage low-noise function controls the fan by targeting the capacities shown in the table below.

| Switch | | No.1006 | |
|---|---|---|---|
| | | OFF | ON |
| No.997 | OFF | 50% | 60% |
| | ON | 85% | 70% |

10) Shaded areas ( ▨ ) indicate factory settings.

11) The table below shows the combinations of the settings for items No. 885 and No. 886 and the ratio of outdoor unit fan speed at low outside temperature heating setting that corresponds to each combination.

| Switch | | No.886 | |
|---|---|---|---|
| | | OFF | ON |
| No.885 | OFF | Max | Middle |
| | ON | High | Low |

## (3) Fan board

| Switch | | Function | Function according to switch setting | | Switch setting timing |
|---|---|---|---|---|---|
| | | | OFF | ON | |
| SW1 | 1 | Enabling/Disabling no-load operation<br>No-load operation will continue for approximately 30 seconds, and then the unit will come to an abnormal stop. For details, refer to the following page(s). [8-9-1(2)[7] Fan inverter damage check (no load)] | No-load operation disabled | No-load operation enabled | Anytime after power on |
| | 2 | - | - | - | - |
| | 3 | Address setting.<br>See the notes below. | 0 | 5 | Before power on |
| | 4 | Address setting.<br>See the notes below. | 0 | 6 | Before power on |

**Note**

- Only the addresses are preset before shipment (All other switches are set to OFF.) Unless otherwise specified, leave the switch to OFF where indicated by "-," which may be set to OFF for a reason.
- To set the address of the models equipped with a single fan, set only SW1-3 to ON (= address 5). For the models equipped with two fans, set SW1-3 to ON (= address 5) on the fan board on the right when seen from the front of the control box, and set SW1-4 to ON (= address 6) on the fan board on the left.
- Leave SW1-1 to OFF during normal operation. Setting this switch to ON will disable the error detection function and may result in equipment damage.

## 5-1-2 Indoor Unit Switch Functions and Factory Settings

### (1) Dipswitches

1) SW1,3

| Switch | | Function | Function according to switch setting | | Switch setting timing | Notes |
|---|---|---|---|---|---|---|
| | | | OFF | ON | | |
| SW1 | 1 | Room temperature detection position | Indoor unit inlet | Built-in sensor on the remote controller | While the unit is stopped (Remote controller OFF) | |
| | 2 | Clogged filter detection | Not available | Available | | |
| | 3 | Filter check reminder time setting | 100h | 2500h | | |
| | 4 | Outside air intake | Disabled | Enabled | | |
| | 5 | Remote display option | Fan output | Thermo-ON signal | | |
| | 6 | Humidifier control | During heating operation | Always on while in the heating mode | | |
| | 7 | Fan speed setting for Heating Thermo-OFF | Very Low | Low | | |
| | | Forced heating operation at OA temp of 5°C or below | Not available | Available | | |
| | 8 | Fan speed setting for Heating Thermo-OFF | According to the SW1-7 setting | Preset speed | | |
| | 9 | Self-recovery after power failure | Disabled | Enabled | | |
| | 10 | Power source start-stop | Disabled | Enabled | | |
| SW3 | 1 | Unit model selection | Heat pump | Cooling only | | |
| | 2 | Louver | Not available | Available | | |
| | 3 | Vane | Not available | Available | | |
| | 4 | Vane swing function | Not available | Available | | |
| | 5 | - | - | - | | |
| | 6 | Vane angle limit setting for cooling operation | Downblow B,C | Horizontal | | |
| | | Initial vane position | Enabled | Disabled | | |
| | 7 | Automatic LEV value conversion function | Not available | Available | | |
| | 8 | Heating 4°C [7.2°F] up | Enabled | Disabled | | |
| | 9 | SHm setting | 2°C [3.6°F] | 5°C [9°F] | | The setting depends on the model and type. |
| | 10 | SCm setting | 10°C [18°F] | 15°C [27°F] | | The setting depends on the model and type. |

Note 1. Settings in the shaded areas are factory settings.

Note 2. If both SW1-7 and SW1-8 are set to ON, the fan remains stopped during heating Thermo-OFF.
To prevent incorrect temperature detection due to a build-up of warm air around the indoor unit, use the built-in temperature sensor on the remote controller (SW1-1) instead of the one on the indoor unit inlet thermistor.

Note 3. By setting SW3-1, SW1-7, and SW1-8 to a certain configuration, the fan can be set to remain stopped during cooling Thermo-OFF. See the table below for details.

| Switch setting | | | Fan speed during Thermo-OFF | | Cooling-only/heat pump |
|---|---|---|---|---|---|
| SW3-1 | SW1-7 | SW1-8 | Heating | Cooling | |
| OFF | OFF | OFF | Very Low | Preset speed | Heat pump |
| | ON | | Low | | |
| | OFF | ON | Preset speed | | |
| | ON | | Stop | | |
| ON | OFF | OFF | - | Preset speed | Cooling-only |
| | ON | | - | | |
| | OFF | ON | - | Stop | |
| | ON | | Stop | Stop | Heat pump |

Note 4. Switch settings vary with indoor units models. Refer to the Service Handbook for indoor units for details.

**Note**

The setting timing for SW2 is before power is turned on.
Switch settings vary with different types of indoor units. Refer to the service handbooks of relevant indoor units for details.

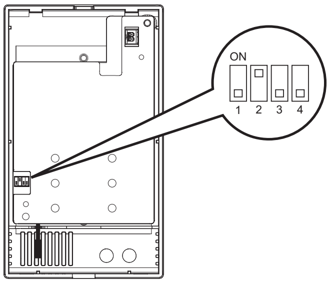
## (2) Address switch

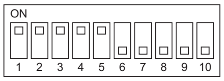
Actual indoor unit address setting varies in different systems. Refer to the installation manual for the outdoor unit for details on how to make the address setting.
Each address is set with a combination of the settings for the 10's digit and 1's digit.
(Example)
When setting the address to "3", set the 1's digit to 3, and the 10's digit to 0.
When setting the address to "25", set the 1's digit to 5, and the 10's digit to 2.

## 5-1-3 Remote Controller Switch Functions and Factory Settings

### (1) MA simple remote controller (PAC-YT53CRAU)

There are switches on the back of the top case. Remote controller Main/Sub and other function settings are performed using these switches. Ordinarily, only change the Main/Sub setting of SW1. (The factory settings are ON for SW2, and OFF for SW1, 3, and 4.)





The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

| SW No. | SW contents Main | ON | OFF | Comment | Switch setting timing |
|---|---|---|---|---|---|
| 1 | Remote controller Main/Sub setting | Main | Sub | Set one of the two remote controllers at one group to “ON”. | Before power on |
| 2 | Temperature display units setting | Celsius | Fahrenheit | When the temperature is displayed in [Fahrenheit], set to “OFF”. | Before power on |
| 3 | Cooling/heating display in AUTO mode | Yes | No | When you do not want to display “Cooling” and “Heating” in the AUTO mode, set to “OFF”. | Before power on |
| 4 | Indoor temperature display | Yes | No | When you want to display the indoor temperature, set to “ON”. | Before power on |

**Note**

The MA remote controllers (PAR-CT01MA series, PAR-FS01MA series, PAR-4"x"MA series, or PAR-3"x"MA series ("x" represents 0 or later)) do not have the switches listed above. Refer to the installation manual for the function setting.

## 5-1-4 BC Controller Switch Settings

| Switch | | Function | Function according to switch setting | | Switch setting timing |
|---|---|---|---|---|---|
| | | | OFF | ON | |
| SWU | 1 - 2 | Unit address setting | Set to 00 or 51 - 100 with the dial switch. | | Before power on |
| SW001 | 1 | - | - | - | - |
| | 2 | Number of ports setting | 1 | 2 | Before power on |
| | 3 | - | - | - | - |
| | 4 | - | - | - | - |
| | 5 | - | - | - | - |
| | 6 | - | - | - | - |
| | 7 | - | - | - | - |
| | 8 | - | - | - | - |
| | 9 | - | - | - | - |
| | 10 | USB writer rewrite mode switch | Normal startup mode | USB writer rewrite mode | Before power on |
| SW002 | 1 | - | - | - | - |
| | 2 | - | - | - | - |
| | 3 | - | - | - | - |
| | 4 | - | - | - | - |
| | 5 | - | - | - | - |
| | 6 | - | - | - | - |
| | 7 | - | - | - | - |
| | 8 | - | - | - | - |
| | 9 | - | - | - | - |
| | 10 | - | - | - | - |
| SW003 | 1 | - | - | - | - |
| | 2 | - | - | - | - |
| | 3 | - | - | - | - |
| | 4 | - | - | - | - |
| | 5 | - | - | - | - |
| | 6 | - | - | - | - |
| | 7 | - | - | - | - |
| | 8 | - | - | - | - |
| SW004 | 1 | - | - | - | - |
| | 2 | - | - | - | - |
| | 3 | - | - | - | - |
| | 4 | - | - | - | - |
| | 5 | - | - | - | - |
| | 6 | - | - | - | - |
| | 7 | - | - | - | - |
| | 8 | - | - | - | - |

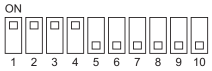
**Note**

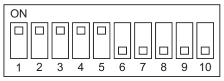
Shaded areas (▨) indicate factory settings.

# 5-2 Outdoor Unit Control

## 5-2-1 Overview

- The outdoor units are designated as OC and OS in the order of capacity from large to small (if two or more units have the same capacity, in the order of address from small to large).
- The setting of outdoor unit can be verified by using the self-diagnosis switch (SW4).

| SW4 (SW6-10:OFF) | Display |
|---|---|
|  | ⬩The unit is designated as the OC: "OC" appears on the display.<br>⬩The unit is designated as the OS: "OS" appears on the display. |

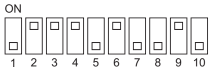


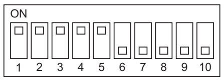
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

- The OC determines the operation mode and the control mode, and it also communicates with the indoor units.
- The OS exercises autonomous distributed control (over defrost, error detection, and actuator control etc.) according to the operation/control mode signals that are sent from the OC.

## 5-2-2 Rotation Control

- At the initial startup, outdoor units start up in the order of "OC and OS." When the cumulative operation time of the OC reaches two hours, the OS will start up before the OC at the next start up.
- Startup sequence rotation is performed while all the indoor units are stopped. (Even after two hours of operation, startup sequence rotation is not performed while the compressor is in operation.)
  In a system with multiple outdoor units (OC and OS), when the integrated operation time of the unit in operation (either OC or OS) reaches one hour during a cooling operation at low outside temperature, that unit will stop and the other unit will go into operation.
- Two-outdoor-unit combination models will start rotation control when either of the outdoor units operates for four hours in total.
- For information about rotation control at initial startup, refer to the following page(s). [5-2-12 Control at Initial Startup]
- Performing startup sequence rotation does not change the basic operation of OC and OS. Only startup sequence is changed.
- Startup sequence of the outdoor units can be checked with the self-diagnosis switch (SW4) on the OC.

| SW4 (SW6-10:OFF) | Display |
|---|---|
|  | ⬩OC→OS: "OC" and the "OC" address appear alternately on the display.<br>⬩OS→OC: "OS" and the "OS" address appear alternately on the display. |



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

## 5-2-3 Initial Control

- When the power is turned on, the initial processing of the microcomputer is given top priority.
- During the initial processing, control processing of the operation signal is suspended. (The control processing is resumed after the initial processing is completed. Initial processing involves data processing in the microcomputer and initial setting of each of the LEV opening. This process will take up to 5 minutes.)
- During the initial processing, the LED monitor on the outdoor unit's control board displays S/W version → refrigerant type → Model and capacity → and communication address in turn every second.

## 5-2-4 Startup Control

- The upper limit of frequency during the first 3 minutes of the operation is 50 Hz.
- When the power is turned on, normal operation will start after the initial start-up mode (to be described later) has been completed (with a restriction on the frequency).
- In the Heating-Only or Heating-Main operation, the unit will not start when TH7 > 25°C [77°F]. In the test run mode, the unit will start when TH7 > 25°C [77°F].

## 5-2-5 Refrigerant Bypass Control

Bypass solenoid valves, which bypass the high- and low- pressure sides, perform the following functions.

### (1) Bypass solenoid valve (SV1a) (ON [energized] = Open)

| Operation | SV1a | |
|---|---|---|
| | ON | OFF |
| When starting-up the compressor of each outdoor unit | ON for 4 minutes. | |
| After the restoration of thermo or 3 minutes after restart | ON for 4 minutes. | |
| During cooling or heating operation with the compressor stopped | ON for 3 minutes.<br>Exception: OFF when 63HS1-63LS is 0.2MPa [29psi] or less<br>Always ON for cooling/heating mixed operation. | |
| After the operation has stopped | ON for 3 minutes.<br>Exception: OFF when 63HS1-63LS is 0.2MPa [29psi] or less | |
| While the compressor is operating at the minimum frequency and when the low pressure (63LS) drops (3 or more minutes after compressor startup) | When the low pressure (63LS) drops below 0.23 Mpa [33 psi] during cooling-only or cooling-main operation. | When the low pressure (63LS) is above 0.38 Mpa [55 psi] during cooling-only or cooling-main operation. |
| The following conditions are met during the heating mode: Compressor frequency after power on is greater than 0.<br>The low pressure (63LS) drops (One or more minutes after compressor startup if the cumulative compressor operation time is one hour or less; three or more minutes if the cumulative compressor operation time is one hour or more) | When the low pressure (63LS) drops below 0.07 MPa [10 psi] | When the low pressure (63LS) rises above 0.16 MPa [23 psi] |
| When high pressure (63HS1) rises | When the high pressure (63HS1) reaches 3.62 MPa [525 psi] or higher during cooling-only or cooling-main operation<br>When the high pressure (63HS1) reaches 3.43 MPa [497 psi] or higher during heating-only or heating-main operation | When the high pressure (63HS1) drops to 3.43 MPa [497 psi] or lower during cooling-only or cooling-main operation<br>When the high pressure (63HS1) drops to 2.64 MPa [383 psi] or lower during heating-only or heating-main operation |

### (2) Bypass solenoid valve (SV2) (ON [energized] = Open)

| Operation | SV2 | |
|---|---|---|
| | ON | OFF |
| When returning to normal operation after completion of the defrost cycle | ON for a few minutes | After a few minutes have passed |
| When high pressure (63HS1) rises during heating operation | When the high pressure (63HS1) reaches 3.62 MPa [525 psi] or higher at the minimum frequency during heating-only or heating-main operation | When 63HS is 2.84 MPa [412 psi] or below |
| When low pressure (63LS) drops during heating operation | When 63HS is below 1.47 MPa [213 psi] and 63LS is below 0.25 MPa [36 psi] | When 63HS is above 1.72 MPa [249 psi] or 63LS is above 0.39 MPa [56 psi] |
| Others | Always OFF (Closed) | |

- ⬩On the module system, SV2 may open to balance the liquid refrigerant level depending on the TdSH values of both outdoor units. SV2 closes when TdSH is larger, and opens when TdSH is smaller. SV2 opens for maximum 1 minute and then closes.
- ⬩TdSH = TH4 - Tc
- ⬩At low ambient temperatures, SV2 may open (turn ON) according to the compressor shell bottom temperature SH (TH15-Te) during compressor startup and defrost recovery.
- ⬩SV2 remains open (ON) for up to 15 minutes and closes (OFF) afterward.

### (3) Bypass solenoid valve (SV13) (ON [energized] = Open)

| Operation | SV13 | |
|---|---|---|
| | ON | OFF |
| When high pressure (63HS1) rises during heating operation | When the high pressure (63HS1) reaches 3.62 MPa [525 psi] or higher at the minimum frequency during heating-only or heating-main operation | When the high pressure (63HS1) drops to 2.84 MPa [412 psi] or lower after 60 seconds |

## 5-2-6 Frequency Control

- Depending on the capacity required, the frequency of the compressor is controlled to keep constant evaporation temperature during cooling operation, and condensing temperature during heating operation.
- The table below summarizes the operating frequency ranges of the inverter compressor during normal operation.
- The compressor frequency is divided into two types: preliminary frequency that is used as a control signal, and actual frequency that is obtained by converting the frequency reading of each type of unit.
- The OS in the multiple-outdoor-unit system operates at the actual compressor frequency value that is calculated by the OS based on the preliminary compressor frequency value that the OC determines.

| Model | Preliminary frequency/cooling | | Preliminary frequency/heating | |
|---|---|---|---|---|
| | Max | Min | Max | Min |
| EM72 | 52 Hz | 22 Hz | 58 Hz | 22 Hz |
| EM96 | 65 Hz | 22 Hz | 74 Hz | 22 Hz |
| EM120 | 74 Hz | 22 Hz | 93 Hz | 22 Hz |
| EM144 | 97 Hz | 27 Hz | 114 Hz | 27 Hz |
| EM168 | 111 Hz | 27 Hz | 130 Hz | 27 Hz |
| EM192 | 130 Hz | 27 Hz | 132 Hz | 27 Hz |
| HM72 | 52 Hz | 22 Hz | 58 Hz | 22 Hz |
| HM96 | 65 Hz | 27 Hz | 75 Hz | 27 Hz |
| HM120 | 74 Hz | 27 Hz | 95 Hz | 27 Hz |

**Note**

The maximum frequency during heating operation depends on the outside air temperature and the dipswitch settings. Temporarily, the frequency may be higher than the values shown above (during defrosting, etc.).

### (1) Pressure limit

The upper limit of high pressure (63HS1) is preset, and when it exceeds the upper limit, the frequency is decreased every 15 seconds.

- The actuation pressure is when the high-pressure reading on 63HS1 is 3.58MPa [519psi].

### (2) Discharge temperature limit

Discharge temperature (TH4) of the compressor in operation is monitored, and when it exceeds the upper limit, the frequency is decreased every 30 seconds.

- Operating temperature is 110°C [230°F].

### (3) Periodic frequency control

Frequency control other than the ones performed at start-up, upon status change, and for protection is called periodic frequency control (convergent control) and is performed in the following manner.

**Periodic control cycle**

Periodic control is performed after the following time has passed

- 30 seconds after either compressor start-up or the completion of defrost operation
- 30 seconds after frequency control based on discharge temperature or pressure limit

**The amount of frequency change**

The amount of frequency change is controlled to approximate the target value based on the evaporation temperature (Te) and condensing temperature (Tc).

## 5-2-7 Defrost Operation Control

### (1) Starting the defrost operation

- The defrost cycle will start when all of the three conditions (outside temperature, cumulative compressor operation time, and pipe temperature) under <Condition 1>, <Condition 2>, or <Condition 3> are met.

| | Condition 1 | Condition 2 | Condition 3 |
|---|---|---|---|
| Outside temperature (TH7) | -5ºC [23ºF] or above | -5ºC [23ºF] or below | |
| Cumulative compressor operation time | 50 minutes or more<br>90 minutes or more if the defrost prohibit timer is set to 90. | | 250 minutes or more |
| Evaporation temperature (Te) | The evaporation temperature remains equal to or lower than the values shown in the table below (Note 1) continuously for three minutes. | When TH7 is lower than -27°C [-17°F], Te remains at -37°C [-35°F] or lower continuously for three minutes, or when TH7 is -27°C [-17°F] or higher, Te remains at 1.1×TH7-7.5 or lower continuously for three minutes. | The evaporation temperature remains equal to or lower than the values shown in the table below (Note 1) continuously for three minutes. |

**Note**

1) Evaporation temperature (Te)

| | EM72 | EM96 | EM120 | EM144 | EM168 | EM192 |
|---|---|---|---|---|---|---|
| SW4 (915) OFF | -13ºC [9°F] | -13ºC [9°F] | -13ºC [9°F] | -11ºC [12°F] | -11ºC [12°F] | -11ºC [12°F] |
| SW4 (915) ON | -8ºC [18°F] | -8ºC [18°F] | -8ºC [18°F] | -8ºC [18°F] | -8ºC [18°F] | -8ºC [18°F] |

| | HM72 | HM96 | HM120 |
|---|---|---|---|
| SW4 (915) OFF | -13ºC [9°F] | -11ºC [12°F] | -11ºC [12°F] |
| SW4 (915) ON | -8ºC [18°F] | -8ºC [18°F] | -8ºC [18°F] |

- The defrost cycle will not start if other outdoor units are in the defrost cycle or until a minimum of 10 minutes have passed since the completion of the last defrost cycle.
- If 10 minutes have passed since compressor startup or since the completion of a defrost cycle, a forced defrost cycle can be started by setting DIP SW4 (16) to ON.
- Even if the defrost-prohibit timer is set to 90 minutes, the actual defrost-prohibit time for the next defrost cycle is 50 minutes if the last defrost cycle took 12 minutes.
- All units in the heating mode will simultaneously go into the defrost cycle in a system with multiple units. The units that are not in operation may or may not go into the defrost cycle, depending on the cumulative operation time of their compressors.
- Depending on the type of the connected indoor unit, etc., the next defrosting prohibition time may be 30 or 40 minutes.

## (2) Defrost operation

Reverse defrost cycle: SW4 (771) is OFF, or SW4 (771) is ON, and TH7 is 0°C [32°F] or lower.

| Outdoor unit | Compressor frequency | Model | Compressor frequency |
|---|---|---|---|
| | | EM72, EM96, EM120 models<br>HM72 model | 129 Hz |
| | | EM144, EM168, EM192 models<br>HM96, HM120 models | 155 Hz [*1] |
| | Outdoor unit fan | Stops | |
| | 21S4a, 21S4b | OFF | |
| | SV1a | ON (open) | |
| | LEV2a | 41 | |
| | LEV2b | 3,000 | |
| | LEV2d | 41 | |
| | LEV4 | 41 to 300 | |
| | SV2 | OFF (close), ON (open) | |
| | SV12 | OFF (close) | |
| | SV13 | OFF (close) | |
| | SV16 | ON (open) | |
| BC controller | LEV1 | 3,000 | |
| | LEV3(a) | MA type: 3,000<br>MB type: 60 | |
| | LEV4 | 3,000 | |
| | SVM1 | ON (open) | |
| | SVM1b | ON (open) | |
| | SVM3 (MB type only) | OFF (close) | |
| | LEV-A[*2] | Ports that be connected to the indoor units during cooling Thermo-ON: 6,000<br>Other ports: 20 | |
| | LEV-B | 20 | |
| | LEV-L | 6,000 | |

* On the module system, both outdoor units start in the defrost mode regardless of the operation mode before the defrost operation.

* The compressor frequency is fixed at 60Hz for 90 seconds.

* The compressor frequency is fixed at 60Hz when the compressor bottom SH (TH15 - Te) ≤ 10ºC [18ºF].

*1 When TH7 is below -20°C [-4°F], the compressor frequency is 175 Hz.

*2 When TH7 is below -20°C [-4°F], ports that be connected to the indoor units during stop or heating Thermo-ON, OFF: 6,000
And open the indoor unit's LEV: 2000.

Liquid back less defrost cycle: SW4 (771) is ON and TH7 is above 0°C [32°F].

| Outdoor unit | Compressor frequency | Model | Compressor frequency |
|---|---|---|---|
| | | EM72, EM96, EM120 models<br>HM72 model | 129 Hz |
| | | EM144, EM168, EM192 models<br>HM96, HM120 models | 155 Hz |
| | Outdoor unit fan | Stops | |
| | 21S4a, 21S4b | ON | |
| | SV1a | OFF (close) | |
| | LEV2a | 41 | |
| | LEV2b | 41 | |
| | LEV2d | 41 | |
| | LEV4 | 41 | |
| | SV2 | OFF (close) | |
| | SV12 | ON (open) | |
| | SV13 | ON (open) | |
| | SV16 | OFF (close) | |
| BC controller | LEV1 | 41 | |
| | LEV3(a) | MA type: 3,000<br>MB type: 60 | |
| | LEV4 | 3,000 | |
| | SVM1 | OFF (close) | |
| | SVM1b | OFF (close) | |
| | SVM3 (MB type only) | OFF (close) | |
| | LEV-A | 20 | |
| | LEV-B | 20 | |
| | LEV-L | 6,000 | |

* In the multiple-outdoor-unit system, defrost control occurs simultaneously for both units during the heating operation. In units that are not in operation, defrost control may occur depending on the compressor's operating time.

## (3) Stopping the defrost operation

**Reverse defrost cycle**

- The defrost cycle ends under the following conditions:
  - 12 minutes[*1] have passed[*2] since the defrost cycle started.
  - The piping temperature (TH3) is detected to remain at 0°C [32°F] or higher for four minutes (when SW4 (916) is OFF).
  - The piping temperature (TH3) is detected to remain at 5°C [41°F] or higher continuously for two minutes and the defrost cycle for four minutes.
- The defrost cycle will last for at least four minutes once it has started. However, the defrost cycle ends under the following conditions after at least four minutes:
  - The piping temperature (TH3) exceeds 15°C [59°F] after four minutes (when SW4 (916) is OFF).
  - The piping temperature (TH3) exceeds α[*3] = 25°C + TH7°C [77°F + TH7°F] (when SW4 (916) is ON).
- In the multiple-outdoor-unit system, the defrost cycle stops simultaneously for all units.

*1 If TH7 is below -20°C [-4°F], the defrost cycle may last for up to 20 minutes.
*2 If the superheat at the bottom shell of the compressor (TH15 - Te) drops to 10°C [18°F] or lower the compressor frequency is fixed at 60 Hz. In this case, the defrost cycle may continue even after 12 minutes have passed since it started.
*3 5°C [41°F] ≤ α ≤ 25°C [77°F].

**Liquid back less defrost cycle**

- The defrost cycle ends under the following conditions:
  - 15 minutes have passed since the defrost cycle started.
  - The piping temperature (TH5) and low pressure (63LS) have reached the values specified in the table below.
- The defrost cycle will last for at least four minutes once it has started.
- In the multiple-outdoor-unit system, the defrost cycle stops simultaneously for all units.

The defrost cycle ends when any one of the following conditions is met.

| Model | SW4 (916): OFF | SW4 (916): ON |
|---|---|---|
| Condition 1 | TH5 is 5°C [41°F] or higher, and 63LS exceeds 0.71 MPa [104 psi] continuously for two minutes. | TH5 is 23°C [73°F] or higher, and 63LS exceeds 0.71 MPa [104 psi] continuously for two minutes. |
| Condition 2 | The piping temperature (TH5) is 70°C [158°F]. | |
| Condition 3 | The low pressure (63LS) is 0.78 MPa [114 psi]. | |

## (4) Problems during defrost operation

- If a problem is detected during defrost operation, the operation will be stopped, and the defrost prohibition time based on the integrated compressor operation time will be set to 20 minutes.
- The unit will stop after the defrost operation when the total time of “compressor bottom SH (TH15 – Te) ≤ 10ºC [18ºF]” reaches 3 minutes.

## (5) Change in the number of operating indoor units during defrost operation

- Even when there is a change in the number of operating indoor units during defrost operation, the operation will continue, and an adjustment will be made after the completion of the defrost operation.
- Defrost operation will be continued, even if the indoor units stop or under the Thermo-OFF conditions until it has run its course.

## 5-2-8 Refrigerant Recovery Control

Refrigerant recovery is performed for each BC port during heating operation to prevent the refrigerant from accumulating inside the units that are stopped (in the fan mode), in the cooling mode, or in the heating Thermo-OFF mode.
It is also performed during cooling operation to prevent an excessive amount of refrigerant from accumulating in the outdoor heat exchanger.

**Starting criteria for the refrigerant recovery cycle (during Cooling-only, Cooling-main, Heating-only, or Heating-main mode)**

The refrigerant recovery mode starts when all of the following conditions are met:

1) When 5 minutes have passed in the Heating-only or Heating-main mode or 45 seconds have passed in the Cooling-only or Cooling-main mode since the completion of the previous refrigerant recovery cycle AND the when following conditions are met.
TH4 > 105°C [221°F]
2) When the port is not in the 4-minute restart delay mode

**Starting criteria for the refrigerant recovery cycle (during Cooling-only, Cooling-main, Heating-only, or Heating-main mode)**

1) The opening of LEV1 and LEV3 is increased.

## 5-2-9 Outdoor Unit Fan Control

### (1) Control method

- Depending on the capacity required, the rotation speed of the outdoor fan is controlled by the inverter to keep a constant condensing temperature (outside temperature + 10°C [18°F]) during cooling operation and a constant evaporation temperature (0°C [32°F] = 0.71 MPa [103 psi]) during heating operation.
- The OS in the multiple-outdoor-unit system operates at the actual outdoor unit fan control value that is calculated by the OS based on the preliminary outdoor unit fan control value that the OC determines.

### (2) Control

- Outdoor unit fan stops while the compressor is stopped (except in the presence of input from snow sensor).
- The fan operates at full speed for 5 seconds after start-up.(Only when TH7<0°C [32°F])
- The outdoor unit fan stops during defrost operation.
- Both fans operate on the EM144, EM168, EM192, HM96, and HM120 models of outdoor units.

### (3) Outdoor heat exchanger capacity control pattern

- Outdoor fan rotation control is supported.
- As the operation pattern number increases, the refrigerant bypassing the outdoor heat exchanger increases. As the operation pattern number increases, the capacity difference becomes smaller between cooling operation and heating operation.
- In each mode, the four-way valve and the expansion valve operate as shown in the table on the next page. The expansion valve may open or close during the refrigerant equalization control or the evaporation temperature control. See [5-2-10 Expansion valve control (LEV2a, LEV2b, and LEV2d)]

| Model | Operating mode | Operation pattern | Four-way valve | | LEV | | | Solenoid valve | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 21S4a | 21S4b | LEV2a | LEV2b | LEV2d | SV12 | SV13 | SV16 |
| EM72, EM96, EM120, HM72 models | Cooling-only Cooling-main | 1 | OFF | OFF | 41 | 3,000 | 41 | OFF | OFF | ON |
| | | 2 | OFF | ON | 3,000 | 41 | 41 | OFF | OFF | OFF |
| | | 3[*1] | OFF | ON | 3,000 | 41 | 420 | OFF | OFF | OFF |
| | | 4[*1] | OFF | ON | 1,000 | 41 | 1,673 | OFF | OFF | OFF |
| | Heating-only, Heating-main | 1 | ON | ON | 3,000[*2] | 600[*2] | 41 | OFF | OFF | OFF |
| | | 2 | ON | ON | 3,000[*2] | 600[*2] | 2,670[*3] | OFF | OFF | OFF |
| | Reverse defrost | 1 | OFF | OFF | 41 | 3,000 | 41 | OFF | OFF | ON |
| | Liquid back less defrost cycle | 1 | ON | ON | 41 | 41 | 41 | ON | ON | OFF |
| EM144, EM168, EM192, HM96, HM120 models | Cooling-only Cooling-main | 1 | OFF | OFF | 41 | 3,000 | 41 | OFF | OFF | ON |
| | | 2 | OFF | ON | 3,000 | 41 | 41 | OFF | OFF | OFF |
| | | 3[*1] | OFF | ON | 3,000 | 41 | 808 | OFF | OFF | OFF |
| | | 4[*1] | OFF | ON | 1,000 | 41 | 1,673 | OFF | OFF | OFF |
| | Heating-only, Heating-main | 1 | ON | ON | 3,000[*2] | 1,600[*2] | 41 | OFF | OFF | OFF |
| | | 2 | ON | ON | 3,000[*2] | 1,600[*2] | 1,673[*3] | OFF | OFF | OFF |
| | Reverse defrost | 1 | OFF | OFF | 41 | 3,000 | 41 | OFF | OFF | ON |
| | Liquid back less defrost cycle | 1 | ON | ON | 41 | 41 | 41 | ON | ON | OFF |

*1 Operation patterns 3 and 4 occur only in the cooling-main mode.

*2 In the heating-only and heating-main modes, the openings of LEV2a and LEV2b change according to the outside temperature.

*3 In a system with combined models, the opening of LEV2d may differ from the values shown in the table above, while keeping its opening ratio to LEV2a constant during the liquid balance operation.

## 5-2-10 Expansion valve control (LEV2a, LEV2b, and LEV2d)

The default opening levels of the expansion valves LEV2a and LEV2b are shown in Section [5-2-9 Outdoor Unit Fan Control]. When the following control (1) is performed during heating-only or heating-main operation, the valves open or close.

### (1) Refrigerant equalization control

- On the combination models, to equalize the refrigerant amount between OC and OS, the opening levels of LEV2a and LEV2b are controlled depending on the difference of TdSH between OC and OS. During the refrigerant equalization control, the opening levels of LEV2a and LEV2b change on each unit. The LEV opening levels of the unit having smaller TdSH is lower than those of the unit with larger TdSH. Therefore, the opening levels of LEV2a and LEV2b are sometimes smaller than the default opening levels.
- TdSH = TH4-Tc

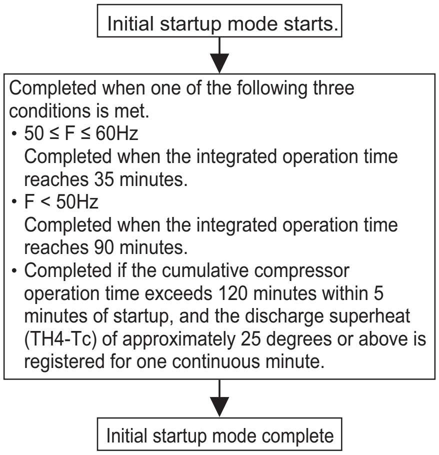
## 5-2-11 Injection Control (Linear Expansion Valve <LEV4>)

- LEV4 opening is adjusted every 30 seconds to keep the discharge temperature (TH4) within the predetermined range.

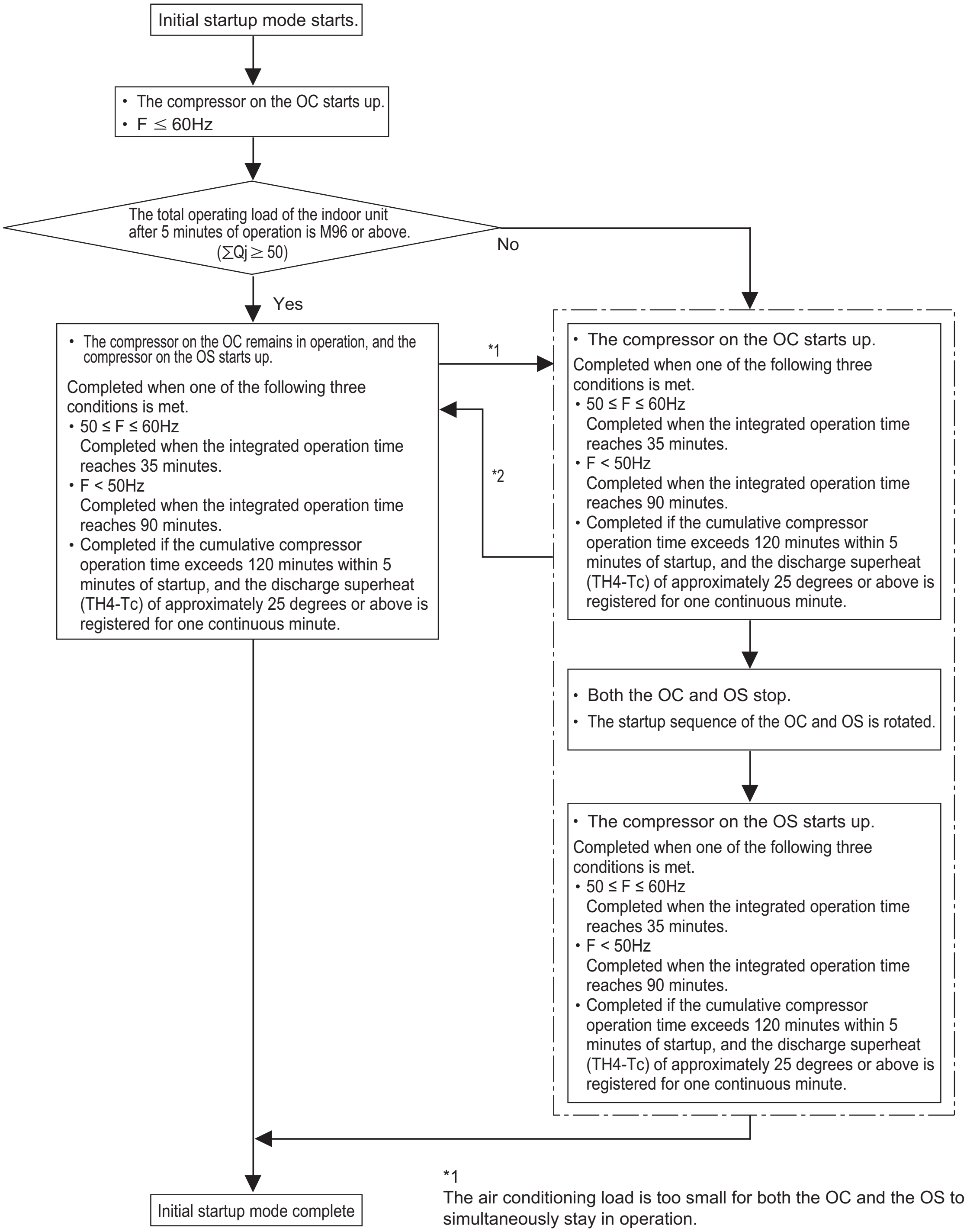
## 5-2-12 Control at Initial Startup

- When started up for the first time after power on, the unit goes into the initial startup mode.
- At the completion of the initial operation mode on the OC and OS, they will go into the normal control mode.

### (1) Single-outdoor-unit system



## (2) Two-outdoor-unit system



*1
The air conditioning load is too small for both the OC and the OS to simultaneously stay in operation.
*2
The air conditioning load is high enough for both OC and OS to simultaneously stay in operation.

## 5-2-13 Emergency Operation Mode

### 1. Problems with the outdoor unit

- Systems with two outdoor units have a mode that allows one of the outdoor units to perform a backup operation when the other outdoor unit in the system malfunctions.
- This mode can be started by performing an error reset via the remote controller.

### (1) Starting the emergency operation

1) When an error occurs, the error source and the error code will be displayed on the display on the remote controller.
2) The error is reset using the remote controller.
3) If an error code appears that permits an emergency operation in step 1) above, (See the table below.), the retry operation starts.
4) If the same error is detected during the retry operation (step 3) above), an emergency operation can be started by resetting the error via the remote controller.

Error codes that permit an emergency operation (Applicable to both OC and OS)

| Trouble source | | Error codes that permit an emergency operation | Error code description |
|---|---|---|---|
| Compressor<br>Fan motor<br>Inverter | | 0403 | Serial communication error |
| | | 1550 | Liquid back error (detected by current sensor) |
| | | 4220,4225,4226 | Bus voltage drop |
| | | 4230,4235 | Heatsink overheat protection |
| | | 4240,4245 | Overload protection |
| | | 4250,4255,4256 | Overcurrent relay trip |
| | | 5110 | Heatsink temperature sensor failure (THHS) |
| | | 5301 | Current sensor/circuit failure |
| | | 5305,5306 | Position error |
| Thermistor | TH3 | 5103 | Pipe temperature sensor failure |
| | TH4 | 5104 | Discharge temperature sensor failure |
| | TH6 | 5106 | Piping temperature sensor failure |
| | TH7 | 5107 | Outside air temperature sensor failure |
| | TH15 | 5115 | Compressor shell bottom temperature sensor fault |
| Power | | 4102 | Open phase |
| | | 4115 | Power supply sync signal abnormality |

* In the event of Accumulator inlet temperature sensor failure (TH5 5105 error), the emergency operation mode cannot be activated to protect the fusible plug. Replace the sensor.

Emergency operation pattern (2 outdoor units)

| | | OC failure pattern | OS failure pattern |
|---|---|---|---|
| OC | | Trouble | Normal |
| OS | | Normal | Trouble |
| Emergency operation | Cooling | Permitted | Permitted |
| | Heating | Permitted | Permitted |
| Maximum total capacity of indoor units (Note 1) | | 60% | |

**Note**

1) If an attempt is made to put into operation a group of indoor units whose total capacity exceeds the maximum allowable capacity, some of the indoor units will go into the same condition as Thermo-OFF.

### (2) Ending the emergency operation

1) End conditions

When one of the following conditions is met, emergency operation stops, and the unit makes an error stop.

- When the integrated operation time of compressor in cooling mode has reached four hours.
- When the integrated operation time of compressor in heating mode has reached two hours.
- When an error is detected that does not permit the unit to perform an emergency operation.

2) Control at or after the completion of emergency operation

- At or after the completion of emergency operation, the compressor stops, and the error code reappears on the remote controller.
- If another error reset is performed at the completion of an emergency mode, the unit repeats the procedures in section (1) above.
- To stop the emergency mode and perform a current-carrying operation after correcting the error, perform a power reset.

## 2. Communication circuit failure or when some of the outdoor units are turned off

This is a temporary operation mode in which the outdoor unit that is not in trouble operates when communication circuit failure occurs or when some of the outdoor units are turned off.

### (1) Starting the emergency operation (When the OC is in trouble)

1) When an error occurs, the error source and the error code appear on the display on the remote controller.
2) Reset the error via the remote controller to start an emergency operation.

**Precautions before servicing the unit**

- When the OC is in trouble, the OS temporarily takes over the OC's function and performs an emergency operation. When this happens, the indoor unit connection information are changed.
- In a system that has a billing function, a message indicating that the billing system information has an error may appear on the TG-2000A. Even if this message appears, do not change (or set) the refrigerant system information on the TG-2000A. After the completion of an emergency operation, the correct connection information will be restored.

### (2) Starting the emergency operation (When the OS is in trouble)

1) A communication error occurs. → An emergency operation starts in approximately six minutes.

Error codes that permit an emergency operation (Applicable to both OC and OS)

| Trouble source | Error codes that permit an emergency operation | Error code description |
|---|---|---|
| Circuit board failure or the power to the outdoor units is off | 6607 | No acknowledgement error |
| | 6608 | No response error |

Emergency operation pattern (2 outdoor units)

| | | OC failure pattern | OS failure pattern |
|---|---|---|---|
| OC | | Trouble | Normal |
| OS | | Normal | Trouble |
| Emergency operation | Cooling | Permitted | Permitted |
| | Heating | Permitted | Permitted |
| Maximum total capacity of indoor units (Note 1) | | Capacity that matches the total capacity of the operable outdoor units | |

**Note**

1) If an attempt is made to put into operation a group of indoor units whose total capacity exceeds the maximum allowable capacity, some of the indoor units will go into the same condition as Thermo-OFF.

### (3) Ending the emergency operation

When communication is restored, the emergency mode is cancelled, and the units go into the normal operation mode.

## 5-2-14 Operation Mode

### (1) Indoor unit operation mode

The operation mode can be selected from the following 6 modes using the remote controller.

| | |
|---|---|
| 1 | Cooling mode |
| 2 | Heating mode |
| 3 | Dry mode |
| 4 | Automatic cooling/heating mode |
| 5 | Fan mode |
| 6 | Stopping mode |

### (2) Outdoor unit operation mode

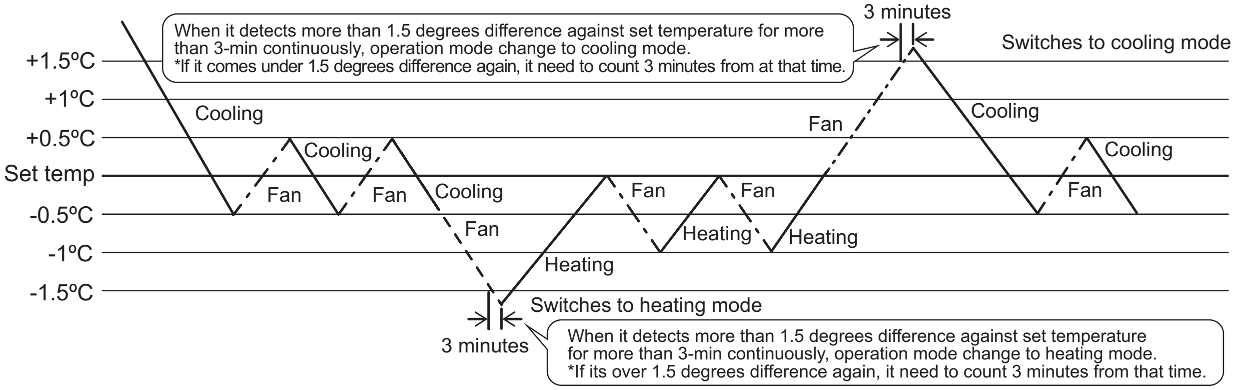
| | | |
|---|---|---|
| 1 | Cooling only mode | All indoor units in operation are in cooling mode. |
| 2 | Heating only mode | All indoor units in operation are in heating mode. |
| 3 | Cooling main mode | Coexistence of units in cooling and heating modes. |
| 4 | Heating main mode | Coexistence of units in cooling and heating modes. |
| 5 | Stopping mode | All indoor units are in fan mode or stopping mode. |

**Note**

When units in cooing and heating coexist, the operation mode (cooling main mode or heating main mode) will be determined, based on the refrigerant pressure in the R2 refrigerant circuit and speed variation data.

### (3) Operation pattern for automatic cooling/heating mode

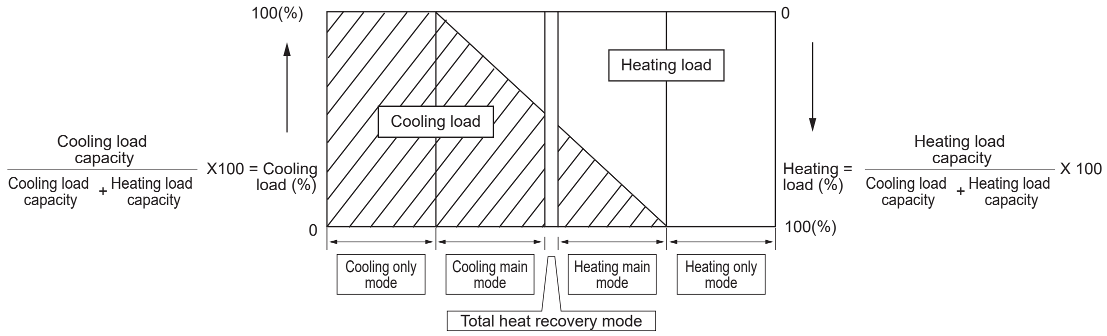
When the automatic cooling/heating mode is selected from remote controller functions, the indoor temperature will be detected in pattern as shown in the figure below, and the operation mode (cooling or heating) will automatically be selected.



When it detects more than 1.5 degrees difference against set temperature for more than 3-min continuously, operation mode change to cooling mode.
*If it comes under 1.5 degrees difference again, it need to count 3 minutes from at that time.

When it detects more than 1.5 degrees difference against set temperature for more than 3-min continuously, operation mode change to heating mode.
*If its over 1.5 degrees difference again, it need to count 3 minutes from that time.

### (4) Relationship between the operation mode and the load capacity (kW) (within a system)



## 5-2-15 Demand Control

Cooling/heating operation can be prohibited (Thermo-OFF) by an external input to the indoor units.

**Note**

When DIP SW6-8 is set to ON, the 4-step DEMAND control is enabled.
Eight-step demand control is possible in the system with two outdoor units.

For details, refer to the following page(s). [2-4-7 Various Control Methods Using the Signal Input/Output Connector on Outdoor Unit]

## 5-2-16 Control of Crankcase Heater

A crankcase heater is used to heat the compressor motor on the stopped outdoor unit to make liquid refrigerant in the compressor evaporate or to keep liquid refrigerant from flooding the compressor.

- Initial power on after power is turned on: Stays on for 16 hours, and then transitions to the operation that is performed while the compressor is stopped
- When the compressor is stopped: Stays on for 30 minutes after the compressor stopped, and then repeats the off-on cycle at 30-minute intervals

# 5-3 BC Controller Control

## 1. Control of LEV-A, LEV-B, and LEV-L

Depending on the operation mode of the branch port, the openings (sj) of LEV-A, LEV-B, and LEV-L change as shown below.

| | | Mode | | | |
|---|---|---|---|---|---|
| | | Cooling | Heating | Stop | Defrost*1 |
| Branch port | LEV-A | 6,000 | 20 | 160 | 20 |
| | LEV-B | 20 | 6,000 | 20 | 20 |
| | LEV-L | 6,000 | 6,000 | 6,000 | 6,000 |

*1 The operation of LEV-A, LEV-B, and LEV-L may vary depending on the defrosting method or operational status.
*2 When a refrigerant leak is detected, the openings of LEV-A, LEV-B, and LEV-L corresponding to the relevant branch port become 20 pulses.

## 2. Control of SVM1, SVM1b, and SVM3

| | Operation mode | Cooling only | Cooling main | Heating only | Heating main | Defrost*2 | Stop |
|---|---|---|---|---|---|---|---|
| MA type | SVM1, SVM1b | ON | Pressure differential control*1 | OFF | OFF | OFF | OFF |
| MB type | SVM3 | OFF*3 | OFF*3 | OFF*3 | OFF*3 | OFF | OFF |

*1 Pressure differential control: The detected differential pressure (dPHM = PS1 - PS3) is monitored and adjusted every minute to maintain it within a specific range.
*2 The operation of SVM1, SVM1b, and SVM3 may vary depending on the defrosting method and operational status.
*3 The SVM1, SVM1b, and SVM3 may be turned ON to prevent the refrigerant from stagnating excessively inside the BC controller.

## 3. Control of LEV

LEV opening (sj) is controlled as follows depending on the operation mode.

| | Operation mode | Cooling only | Cooling main | Heating only | Heating main | Defrost*5 | Stop |
|---|---|---|---|---|---|---|---|
| MA type | LEV1 | 3000 | Liquid level control*1<br>Pressure differential control*2 | 120*3 | 120*3 | 3,000 | 900 |
| | LEV3 | Superheat control*4 | | Pressure differential control*2 | Pressure differential control*2 | 3,000 | 41 |
| | LEV4 | 41 | 41 | Pressure differential control*2 | Pressure differential control*2 | 3,000 | 41 |
| MB type | LEV3 | Liquid level control*6<br>Superheat control*4 | Liquid level control*6<br>Superheat control*4 | Pressure differential control*2 | Pressure differential control*2 | 60 | 60 |

*1. Liquid level control: The liquid level detected by the liquid inlet temperature (TH11 sensor) is controlled so as to be within a certain range.

*2. Pressure differential control: The detected differential pressure (PS1 and PS3) is controlled every minute so as to be within a certain range.

*3. Can be 120 or more due to pressure rise on the liquid side (PS1).

*4. Superheat control: The amount of superheat that is calculated on the bypass inlet and outlet temperature (TH12, TH15) is controlled every minute so as to be within a certain range.

*5 The operation of the LEV may vary depending on the defrosting method and operational status.
*6 Liquid level control: The liquid level detected by the MA and MB types is controlled so as to be within the same range.

# Chapter 6 Test Run

# 6-1 Read before Test Run

### (1) Check for refrigerant leak and loose cables and connectors.

### (2) When opening or closing the front panel of the control box, do not let it come into contact with any of the internal components.

**Note**

- The control box contains several high voltage charging components. Before inspecting the control box, ensure that the unit is turned off and that the voltage between the tab terminals FTP and FTN on the INV board has dropped sufficiently (to 20 VDC or lower).
- Disconnect the relay connectors (FAN 1 and FAN 2) on the outdoor unit fan before performing maintenance work. (Before connecting or disconnecting the connector, check that the outdoor unit fan is stopped and that the voltage across pins 1 and 5 of connector RYPN has dropped to 20 VDC or less. If the outdoor unit fan is turned by strong winds, the main circuit capacitor will be energized and poses an electric shock hazard. Refer to the wiring diagram name plate for details.
- To connect wiring to TB7, check that the voltage is 20 VDC or below.
- Reconnect the relay connectors (FAN 1 and FAN 2) on the outdoor unit fan after completion of maintenance work.

### (3) Measure the insulation resistance between the power supply terminal block and the ground with a 500V megger and make sure it reads at least 1.0Mohm.

**Note**

- Do not operate the unit if the insulation resistance is below 1.0Mohm.
- Do not apply megger voltage to the terminal block for transmission line. Doing so will damage the controller board.
- The insulation resistance between the power supply terminal block and the ground could go down to close to 1Mohm immediately after installation or when the power is kept off for an extended period of time because of the accumulation of refrigerant in the compressor.
- If insulation resistance reads at least 1 MΩ, by turning on the main power and keeping it on for at least 16 hours, the refrigerant in the compressor will evaporate and the insulation resistance will go up. (Refer to section (8) for details.)
- Do not measure the insulation resistance of the terminal block for transmission line for the unit remote controller.

### (4) When the power is turned on, the heater is energized even while the compressor is not operating.

**Note**

- Before turning on the power, disconnect all power supply wires from the compressor terminal block, and measure the insulation resistance of the compressor.
- Check the compressor for a ground fault. If the insulation resistance is 1.0 MΩ or below, connect all power supply wires to the compressor and turn on the power to the outdoor unit. (The liquid refrigerant in the compressor will evaporate by energizing the heater.)

### (5) Make sure the valves on both the high-pressure and low-pressure sides are fully open.

**Note**

Securely tighten the cap.

### (6) Check the phase sequence and the voltage of the power supply.

When the voltage is out of the ±10% range, or when the phase voltage difference is more than 2%, please discuss the countermeasure with the customer.

### (7) [When a transmission booster is connected]
### Turn on the transmission booster before turning on the outdoor units.

**Note**

- If the outdoor units are turned on first, the connection information for the refrigerant circuit may not be properly recognized.
- In case the outdoor units are turned on before the transmission booster is turned on, perform a power reset on the outdoor units after turning on the power booster.

### (8) Before starting operation, leave the power on for the time periods shown in the table below.

Time to leave the power on before starting operation

| Minimum outside temperature | Time |
|---|---|
| Minimum outside temperature < 0 ºC [32 ºF] | 16 hours |
| 0 ºC [32 ºF] ≤ Minimum outside temperature < 15 ºC [59 ºF] | 12 hours |
| 15 ºC [59 ºF] ≤ Minimum outside temperature < 30 ºC [86 ºF] | 10 hours |
| 30 ºC [86 ºF] ≤ Minimum outside temperature | 8 hours |

Keep the power on while the units are operating. Keep the air conditioning units on even during periods when they are not in use, except for maintenance or installation. Failure to do so may disable safety devices.

- If the BC controllers are connected, turn on the indoor units, BC controllers, and transmission boosters before turning on the outdoor unit.

### (9) When a power supply unit is connected to the transmission line for centralized control(*), perform a test run with the power supply unit being energized. Leave the power jumper connector on CN41 as it is (factory setting).

*Includes the cases where power is supplied to the transmission line from a system controller with a power-supply function

### (10) After a test run.

System response setting No. 768 can be disabled before a test run is started other than at the time of initial installation. To enable the System response setting No. 768, make the setting after a test run is completed.This allows the system to respond (close the shut off valve) to communication errors or sensor failures.
Refer to (2) in [5-1-1 Outdoor Unit Switch Functions and Factory Settings] for the settings of No. 768.
After enabling No. 768, turn off all bits of SW4 and the bits of SW6 to SW10, then check that the FLAG 4 on the Control Board LED display is lit.

# 6-2 Operation Characteristics and Refrigerant Charge

It is important to have a clear understanding of the characteristics of refrigerant and the operating characteristics of air conditioners before attempting to adjust the refrigerant amount in a given system.

The following shows items of particular importance.

1) During cooling operation, the amount of refrigerant in the accumulator is the smallest when all indoor units are in operation.
2) During heating operation, the amount of refrigerant in the accumulator is the largest when a small number of indoor units are in operation.
3) General tendency of discharge temperature
    - Discharge temperature tends to rise when the system is short on refrigerant.
    - Changing the amount of refrigerant in the system while there is refrigerant in the accumulator has little effect on the discharge temperature.
    - The higher the pressure, the more likely it is for the discharge temperature to rise.
    - The lower the pressure, the more likely it is for the discharge temperature to rise.
4) When the amount of refrigerant in the system is adequate, the compressor shell temperature is 10 to 60°C [18 to 108°F] higher than the low pressure saturation temperature (Te).

   → If the temperature difference between the compressor shell temperature and low pressure saturation temperature (Te) is smaller than 5°C [9°F], an overcharging of refrigerant is suspected.

# 6-3 Evaluating and Adjusting Refrigerant Charge

## 6-3-1 Refrigerant Overcharge and undercharge

Overcharging or undercharging of refrigerant can cause the following symptoms:
Before attempting to adjust the amount of refrigerant in the system, thoroughly check the operating conditions of the system. Then, adjust the refrigerant amount by running the unit in the refrigerant amount adjust mode.

| | |
|---|---|
| The system comes to an abnormal stop, displaying 1500/1550 (liquid back) on the controller. | Overcharged refrigerant |
| The operating frequency does not reach the set frequency, and there is a problem with performance. | Insufficient refrigerant amount |
| The system comes to an abnormal stop, displaying 1102 (abnormal discharge temperature) on the controller. | |

## 6-3-2 Checking the Refrigerant Charge during Operation

Operate all indoor units in either cooling-only or heating-only mode, and check such items as discharge temperature, subcooling, low pressure, suction temperature, and shell bottom temperature to estimate the amount of refrigerant in the system.

| Symptoms | Conclusion |
|---|---|
| Discharge temperature is high. (Normal discharge temperature is below 105°C [221°F].) * | Slightly undercharged refrigerant |
| Low pressure is unusually low. | |
| Suction superheat is large. (Normal suction superheat is less than 20°C [36°F].) | |
| Compressor shell bottom temperature is high. (The difference between the compressor shell bottom temperature and low pressure saturation temperature (Te) is greater than 60°C [108°F].) | |
| Discharge superheat is small. (Normal discharge superheat is greater than 10°C [18°F].) | Slightly overcharged refrigerant |
| Compressor shell bottom temperature is low. (The difference between the compressor shell bottom temperature and low pressure saturation temperature (Te) is less than 5°C [9°F].) | |

*Evaluate the refrigerant amount using other criteria during the injection control.

## 6-3-3 Maximum refrigerant charge

There is a limit to the amount of refrigerant that can be charged into a unit. Observe the maximum refrigerant charge in the table below.

⬧EM72-192Y(T)XU-A

| Unit model | | EM72 | EM96 | EM120 | EM144 | EM168 | EM192 |
|---|---|---|---|---|---|---|---|
| Maximum refrigerant charge | Factory charged | 5.3 kg | 5.3 kg | 5.3 kg | 6.3 kg | 6.3 kg | 6.3 kg |
| | Charged on site | 32.3 kg | 32.7 kg | 33.2 kg | 34.7 kg | 34.7 kg | 35.8 kg |
| | Total for system | 37.6 kg | 38.0 kg | 38.5 kg | 41.0 kg | 41.0 kg | 42.1 kg |
| | Factory charged | 187 oz | 187 oz | 187 oz | 223 oz | 223 oz | 223 oz |
| | Charged on site | 1140 oz | 1154 oz | 1172 oz | 1225 oz | 1225 oz | 1263 oz |
| | Total for system | 1327 oz | 1341 oz | 1359 oz | 1447 oz | 1447 oz | 1486 oz |

⬧EM264-384Y(T)SXU-A

| Unit model | | EM264 | EM288 | EM312 | EM336 | EM360 | EM384 |
|---|---|---|---|---|---|---|---|
| Maximum refrigerant charge | Factory charged | 11.6 kg | 12.6 kg | 12.6 kg | 12.6 kg | 12.6 kg | 12.6 kg |
| | Charged on site | 62.3 kg | 61.3 kg | 61.6 kg | 62.5 kg | 63.0 kg | 63.0 kg |
| | Total for system | 73.9 kg | 73.9 kg | 74.2 kg | 75.1 kg | 75.6 kg | 75.6 kg |
| | Factory charged | 410 oz | 445 oz | 445 oz | 445 oz | 445 oz | 445 oz |
| | Charged on site | 2198 oz | 2163 oz | 2173 oz | 2205 oz | 2223 oz | 2223 oz |
| | Total for system | 2607 oz | 2607 oz | 2618 oz | 2650 oz | 2667 oz | 2667 oz |

⬧HM72-120Y(T)XU-A

| Unit model | | HM72 | HM96 | HM120 |
|---|---|---|---|---|
| Maximum refrigerant charge | Factory charged | 5.3 kg | 6.3 kg | 6.3 kg |
| | Charged on site | 32.3 kg | 32.1 kg | 32.7 kg |
| | Total for system | 37.6 kg | 38.4 kg | 39.0 kg |
| | Factory charged | 187 oz | 223 oz | 223 oz |
| | Charged on site | 1140 oz | 1133 oz | 1154 oz |
| | Total for system | 1327 oz | 1355 oz | 1376 oz |

⬧HM144-240Y(T)SXU-A

| Unit model | | HM144 | HM192 | HM240 |
|---|---|---|---|---|
| Maximum refrigerant charge | Factory charged | 10.6 kg | 12.6 kg | 12.6 kg |
| | Charged on site | 54.8 kg | 56.2 kg | 59.6 kg |
| | Total for system | 65.4 kg | 68.8 kg | 72.2 kg |
| | Factory charged | 374 oz | 445 oz | 445 oz |
| | Charged on site | 1934 oz | 1983 oz | 2103 oz |
| | Total for system | 2307 oz | 2427 oz | 2547 oz |

## 6-3-4 Refrigerant Charge Adjustment Mode

Follow the procedures below to add or extract refrigerant as necessary depending on the operation mode.

When the function switch (SW4 (3)) on the main board on the outdoor unit (OC only) is turned to ON, the unit goes into the refrigerant amount adjust mode, and operation <A> below is followed.

**Note**

The unit will not go into the refrigerant amount adjust mode when the switch on the OS is set to ON.

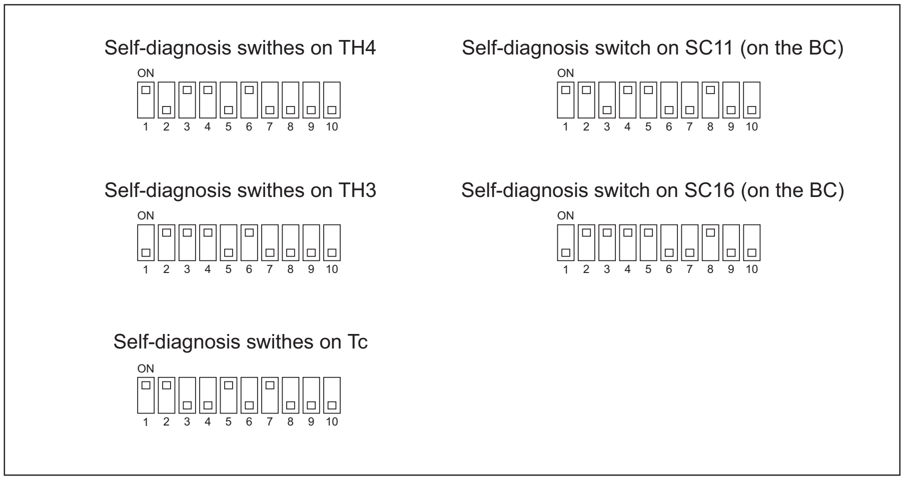
**Operation <A>**
**When the unit is in the refrigerant amount adjust mode, the LEV on the indoor unit does not open as fully as it normally does during cooling operation to secure subcooling.**

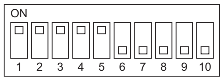
**Note**

1) Adjust the refrigerant amount using TH4, TH3, Tc, SC11 (on the BC), and SC16 (on the BC) according to the flowchart on the next page.
Check the TH4, TH3, Tc, SC11 (on the BC), and SC16 (on the BC) values according to the flowchart. The TH4, TH3, Tc, SC11 (on the BC), and SC16 (on the BC) values can be displayed by setting the self-diagnosis switch (SW4 (SW6-10): OFF)) on the control board of the OC or OS.
2) There may be cases when the refrigerant amount may seem adequate for a short while after starting the unit in the refrigerant amount adjust mode but turn out to be inadequate later on (when the refrigerant system stabilizes).

**When the amount of refrigerant is truly adequate.**
All the following formulas are true:
3°C [5.4°F] ≤ SC11 (on the BC) on the outdoor unit ≤ 10°C [18°F]
10°C [18°F] ≤ SC16 (on the BC) on the outdoor unit
5°C [9°F] ≤ SH on the indoor unit ≤ 15°C [27°F]
**The refrigerant amount may seem adequate at the moment, but may turn out to be inadequate later on.**
Any of the following formulas is true:
SC11 (on the BC) on the outdoor unit < 3°C [5.4°F]
SC11 (on the BC) on the outdoor unit > 10°C [18°F]
SC16 (on the BC) on the outdoor unit < 10°C [18°F]
SH on the indoor unit < 5°C [9°F]
In this case, check the refrigerant amount after all the following formulas become true:
3°C [5.4°F] ≤ SC11 (on the BC) on the outdoor unit ≤ 10°C [18°F]
10°C [18°F] ≤ SC16 (on the BC) on the outdoor unit
5°C [9°F] ≤ SH on the indoor unit ≤ 15°C [27°F]

3) If the high pressure is not at least 2.0 MPa [290 psi], a correct judgment will not be possible for refrigerant adjustment. Perform the adjustment when the outdoor air temperature is at least 20°C.
4) Refrigerant amount adjust mode automatically ends 90 minutes after beginning. When this happens, by turning off the SW4 (3) and turning them back on, the unit will go back into the refrigerant amount adjust mode.


Self-diagnosis swithes on TH4
Self-diagnosis switch on SC11 (on the BC)
Self-diagnosis swithes on TH3
Self-diagnosis switch on SC16 (on the BC)
Self-diagnosis swithes on Tc



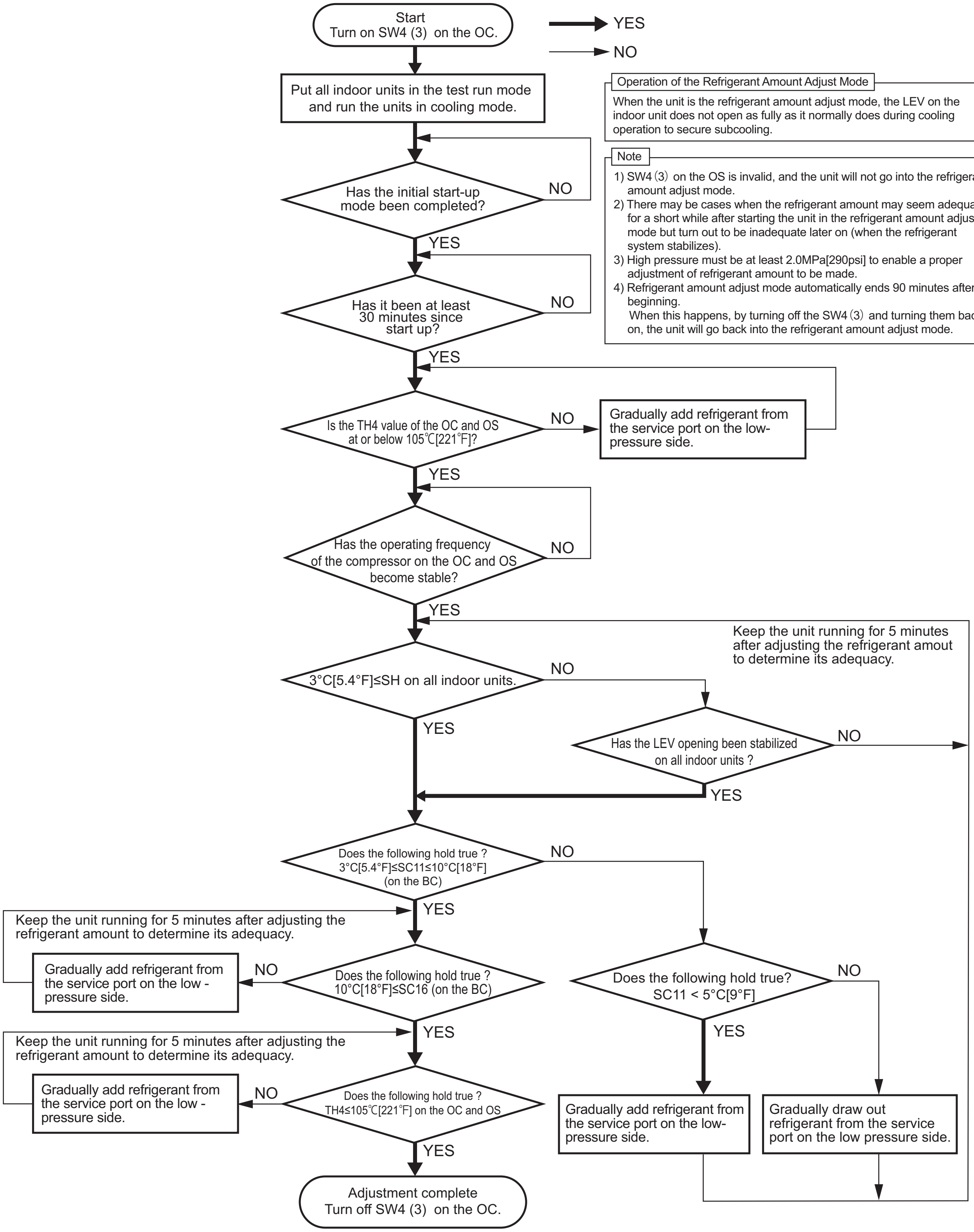
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

**Operation of the Refrigerant Amount Adjust Mode**

When the unit is the refrigerant amount adjust mode, the LEV on the indoor unit does not open as fully as it normally does during cooling operation to secure subcooling.

**Note**

1) SW4 (3) on the OS is invalid, and the unit will not go into the refrigerant amount adjust mode.
2) There may be cases when the refrigerant amount may seem adequate for a short while after starting the unit in the refrigerant amount adjust mode but turn out to be inadequate later on (when the refrigerant system stabilizes).
3) High pressure must be at least 2.0MPa[290psi] to enable a proper adjustment of refrigerant amount to be made.
4) Refrigerant amount adjust mode automatically ends 90 minutes after beginning.
When this happens, by turning off the SW4 (3) and turning them back on, the unit will go back into the refrigerant amount adjust mode.



**⚠ CAUTION**

Do not release the extracted refrigerant into the air.

# 6-4 The Following Symptoms Are Normal

| Symptoms | Remote controller display | Cause |
|---|---|---|
| The indoor unit does not start after starting cooling (heating) operation. | "Cooling (heating)" icon blinks on the display. | The unit cannot perform a heating (cooling) operation when other indoor units on the same refrigerant system, are performing a cooling (heating) operation. |
| The auto vane adjusts its position by itself. | Normal display | After an hour of cooling operation with the auto vane in the vertical position, the vane may automatically move into the horizontal position.<br>Louver blades will automatically move into the horizontal position while the unit is in the defrost mode, pre-heating stand-by mode, or when the thermostat triggers unit off. |
| The fan speed changes during heating. | Normal display | Very Low fan speed when "Thermo-OFF.' Changes from Very Low to preset fan speed when "Thermo-ON" depending on pipe temperature. |
| The fan stops during heating operation. | Defrost | The fan remains stopped during defrost operation. |
| The fan keeps running after the unit has stopped. | Unlit | When the auxiliary heater is turned on, the fan operates for one minute after stopping to dissipate heat. |
| The fan speed does not reach the set speed when operation switch is turned on. | STAND BY | The fan operates at extra low speed for 5 minutes after it is turned on or until the pipe temperature reaches 35°C[95°F], then it operates at low speed for 2 minutes, and finally it operates at the set speed.<br>(Pre-heating stand-by) |
| When the main power is turned on, the display shown on the right appears on the indoor unit remote controller for 5 minutes. | "HO" or "PLEASE WAIT" icons blink on the display. | The system is starting up. Wait until the blinking display of "HO" or "PLEASE WAIT" go off. |
| The drain pump keeps running after the unit has stopped. | Unlit | The drain pump stays in operation for three minutes after the unit in the cooling mode is stopped. |
| The drain pump is running while the unit is stopped. | Unlit | When drain water is detected, the drain pump goes into operation even while the unit is stopped. |
| Indoor unit makes noise during cooling/heating changeover. | Normal display | This noise is made when the refrigerant circuit is reversed and is normal. |
| Sound of the refrigerant flow is heard from the indoor unit immediately after starting operation. | Normal display | This is caused by the transient instability of the refrigerant flow and is normal. |
| Warm air sometimes comes out of the indoor units that are not in the heating mode. | Normal display | This is due to the fact that the LEVs on some of the indoor units are kept slightly open to prevent the refrigerant in the indoor units that are not operating in the heating mode from liquefying and accumulating in the compressor. It is part of a normal operation. |
| In a short while after the outdoor unit stops, the unit makes a clicking sound. | No display | After the unit stops and before the unit performs pressure equalization, the pressure difference temporarily becomes small and the check valve may vibrate and make a sound. This is temporary and does not imply a problem. |

# Chapter 7 Troubleshooting Using Error Codes

# 7-1 Error Code and Preliminary Error Code Lists

| Error Code | Preliminary error code | Error (preliminary) detail code | Error code definition | Searched unit | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Outdoor unit | Indoor unit | BC controller | LOSSNAY | Remote controller | |
| 0403 | 4300<br>4305<br>4306 | 1<br>5<br>6<br>(Note) | Serial communication error/Panel communication error | O | O | | | | (page 7) |
| | - | XY<br>(X=0-5, Y=1,2) | | | | O | | | |
| 0404 | - | - | Indoor unit EEPROM abnormality | | O | | | | (page 8) |
| 0910 | - | - | Circuit check (detected unit) | | O | O | | | (page 8) |
| 0911 | - | - | Circuit check (other units) | | O | O | | | (page 9) |
| 1102 | 1202 | - | Discharge temperature fault | O | | | | | (page 10) |
| 1301 | - | - | Low pressure fault | O | | | | | (page 11) |
| 1302 | 1402 | - | High pressure fault | O | | | | | (page 12) |
| 1500 | 1600 | - | Liquid back error (detected by refrigerant temperature) | O | | | | | (page 14) |
| - | 1605 | - | Preliminary suction pressure fault | O | | | | | |
| 1521 | - | - | Refrigerant leak error (self detection of the unit) | | O | | | | (page 15) |
| 1522 | - | - | Refrigerant leak error (other units) | | O | O | | | (page 15) |
| - | 1625 | - | Refrigerant sensor maintenance (indoor unit) | | O | | | | (page 18) |
| 1550 | 1650 | 001 | Liquid back error<br>(Instantaneous overcurrent detected by current sensor) | O | | | | | (page 16) |
| | | 002 | Liquid back error<br>(Overcurrent effective value shut off error detected by current sensor) | O | | | | | (page 16) |
| | | 003 | Liquid back error<br>(ACCT overcurrent error detected by current sensor) | O | | | | | (page 16) |
| 2500 | - | - | Drain sensor submergence | | O | | | | (page 19) |
| 2502 | - | - | Drain pump fault | | O | | | | (page 20) |
| 2600 | - | - | Water leakage | | | | O | | (page 21) |
| 2601 | - | - | Water supply cutoff | | | | O | | (page 21) |
| 3121 | - | - | Out-of-range outside air temperature | O | | | | | (page 22) |
| 4102 | 4152 | - | Open phase | O | | | | | (page 23) |
| 4106 | - | - | Transmission power supply fault | O | | | | | (page 24) |
| 4109 | - | - | Indoor unit fan operation error | | O | | | | (page 24) |
| 4114 | - | - | Indoor unit fan motor error | | O | | | | (page 25) |
| 4115 | - | - | Power supply sync signal abnormality | O | | | | | (page 25) |
| 4116 | - | - | RPM error/Motor error | | O | | O | | (page 26) |
| 4121 | 4171 | − | Function setting error | O | | | | | (page 26) |

| Error Code | Preliminary error code | Error (preliminary) detail code | Error code definition | | Searched unit | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Outdoor unit | Indoor unit | BC controller | LOSSNAY | Remote controller | |
| 4124 | - | – | Electric system not operate due to damper abnormality | | | O | | | | (page 27) |
| 4136 | - | XXY (XX= 01-18, Y=1,2) | Safety shut off valve circuit error | | | | O | | | (page 28) |
| 4220<br>4225<br>4226<br>(Note) | 4320<br>4325<br>4326<br>(Note) | [0] | Backup operation | | O | | | | | |
| | | [108] | Abnormal bus voltage drop | | O | | | | | (page 29) |
| | | [109] | Abnormal bus voltage rise | | O | | | | | (page 31) |
| | | [110] | VDC error | | O | | | | | (page 31) |
| | | [111] | Logic error | | O | | | | | (page 32) |
| | | [129] | Control power-supply fault | | O | | | | | (page 32) |
| | | [131] | Low bus voltage at startup | | O | | | | | (page 33) |
| 4230<br>4235<br>4236 | 4330<br>4335<br>4336 | [125] | Heatsink overheat protection | | O | | | | | (page 34) |
| 4240<br>4245<br>4246 | 4340<br>4345<br>4346 | - | Overload protection | | O | | | | | (page 35) |
| 4250<br>4255<br>4256<br>(Note) | 4350<br>4355<br>4356<br>(Note) | [0] | Backup operation | | O | | | | | |
| | | [101] | IPM error | | O | | | | | (page 37) |
| | | [104] | Short-circuited IPM/Ground fault | | O | | | | | (page 38) |
| | | [105] | Overcurrent error due to short-circuited motor | | O | | | | | (page 39) |
| | | [106] | Instantaneous overcurrent (S/W detection) | | O | | | | | (page 39) |
| | | [107] | Overcurrent (effective value)(S/W detection) | | O | | | | | (page 39) |
| 4255<br>4256 | 4355<br>4356 | [137] | Step-out fault | | O | | | | | (page 40) |
| 4260 | - | - | Heatsink overheat protection at startup | | O | | | | | (page 41) |
| 5101 | 1202 | - | Temperature sensor fault | Return air temperature (TH21) | | O | | | | (page 42) |
| | | | | OA processing unit inlet temperature (TH4) | | | | O | | (page 42) |
| 5102 | 1217 | - | Temperature sensor fault | Indoor unit pipe temperature (TH22) | | O | | | | (page 42) |
| | | | | OA processing unit pipe temperature (TH2) | | | | O | | (page 42) |
| 5103 | 1205 | 00 | Temperature sensor fault | Indoor unit gas-side pipe temperature (TH23) | | O | | | | (page 42) |
| | | | | OA processing unit gas-side pipe temperature (TH3) | | | | O | | (page 42) |
| | | | | Pipe temperature at heat exchanger outlet (TH3) | O | | | | | (page 43) |

| Error Code | Preliminary error code | Error (preliminary) detail code | Error code definition | | Searched unit | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Outdoor unit | Indoor unit | BC controller | LOSSNAY | Remote controller | |
| 5104 | 1202 | - | Temperature sensor fault | OA processing unit intake air temperature (TH1) | | | | O | | (page 42) |
| | | | | Outside temperature (TH24) | | O | | | | (page 42) Detectable only by the All-Fresh type indoor units |
| | | | | Outdoor unit discharge temperature (TH4) | O | | | | | (page 43) |
| 5105 | 1204 | - | Temperature sensor fault | Accumulator inlet temperature (TH5) | O | | | | | (page 43) |
| 5106 | 1216 | - | Temperature sensor fault | Piping temperature (TH6) | O | | | | | (page 43) |
| 5107 | 1221 | - | Temperature sensor fault | Outside temperature (TH7) | O | | | | | (page 43) |
| 5110 | 1214 | [0] | Backup operation | | O | | | | | |
| | | 01, 05, 06 | Temperature sensor fault | Heatsink temperature (THHS) | O | | | | | (page 44) |
| 5111 | - | - | Temperature sensor fault | Liquid inlet temperature (TH11) | | | O | | | (page 45) |
| 5112 | - | - | Temperature sensor fault | Bypass outlet temperature (TH12) | | | O | | | (page 45) |
| 5114 | - | - | | LEV4 outlet temperature (TH14) | | | O | | | (page 45) |
| 5115 | 1203 | - | | Compressor shell bottom temperature (TH15) | O | | | | | (page 43) |
| | - | - | | LEV3 outlet temperature (TH15) | | | O | | | (page 45) |
| 5116 | - | - | | LEV3 inlet temperature (TH16) | | | O | | | (page 45) |
| 5201 | 1402 | - | High-pressure sensor fault (63HS1) | | O | | | | | (page 46) |
| | - | - | High-pressure sensor fault (BC controller PS1) | | | | O | | | (page 46) |
| 5203 | - | - | Intermediate pressure sensor fault (BC controller PS3) | | | | O | | | (page 46) |
| 5301<br>5305<br>5306 | 4300<br>4305<br>4306 | [0] | Backup operation | | O | | | | | |
| | | [115] | ACCT sensor fault | | O | | | | | (page 47) |
| | | [117] | ACCT sensor circuit fault | | O | | | | | (page 48) |
| | | [119] | Open-circuited IPM/Loose ACCT connector | | O | | | | | (page 48) |
| | | [120] | Faulty ACCT wiring | | O | | | | | (page 49) |
| | | [135] | Current sensor fault | | O | | | | | (page 49) |
| | | [136] | Current sensor/circuit fault | | O | | | | | (page 50) |
| 5558 | - | - | Refrigerant sensor error/CFC gas alarm device error | | | O | | | | (page 50) |
| 5701 | - | - | Loose float switch connector | | | O | | | | (page 51) |

| Error Code | Prelimi-nary error code | Error (prelim-inary) detail code | Error code definition | Searched unit | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Outdoor unit | Indoor unit | BC controller | LOSSNAY | Remote controller | |
| 6201 | - | - | Remote controller board fault (nonvolatile memory error) | | | | | O | (page 52) |
| 6202 | - | - | Remote controller board fault (clock IC error) | | | | | O | (page 52) |
| 6600 | - | [001] | Detection of overlapped address in centralized control system | O | O | O | O | O | (page 52) |
| | | [002] | Detection of overlapped address in indoor unit system | O | O | O | O | O | (page 52) |
| 6601 | - | [001] | Detection of polarity setting error in centralized control system | | | O | O | O | (page 53) |
| | | [002] | Detection of polarity setting error in indoor unit system | | | O | O | O | (page 53) |
| 6602 | - | [001] | Transmission processor hardware error in centralized control system | O | O | O | O | O | (page 54) |
| | | [002] | Transmission processor hardware error in indoor unit system | O | O | O | O | O | (page 54) |
| 6603 | - | [001] | Transmission Bus-Busy error in centralized control system | O | O | O | O | O | (page 55) |
| | | [002] | Transmission Bus-Busy error in indoor unit system | O | O | O | O | O | (page 55) |
| 6606 | - | [003] | Communication error between device processor on circuit board and M-NET processor | O | O | O | O | O | (page 55) |
| 6607 | - | - | No ACK error | O | O | O | O | O | (page 56) |
| 6608 | - | - | No response error | O | O | O | O | O | (page 63) |
| 6815 | - | - | Supervisor remote controller communication error | | O | | | O | (page 64) |
| 6831 | - | - | MA controller signal reception error (No signal reception) | | O | | | O | (page 65) |
| 6832 | - | - | MA remote controller signal transmission error (Synchronization error) | | O | | | O | (page 66) |
| 6833 | - | - | MA remote controller signal transmission error (H/W error) | | O | | | O | (page 67) |
| 6834 | - | - | MA controller signal reception error (Start bit detection error) | | O | | | O | (page 68) |
| 6840 | - | - | A control communication reception error | | O | | | | (page 69) |
| 6841 | - | - | A control communication synchronism not recover | | O | | | | (page 69) |
| 6842 | - | - | A control communication transmission/reception hardware trouble | | O | | | | (page 70) |
| 6843 | - | - | A control communication start bit detection error | | O | | | | (page 71) |
| 6846 | - | - | Start-up time over | | O | | | | (page 72) |
| 7100 | - | - | Total capacity error | O | | | | | (page 73) |
| 7101 | - | - | Capacity code setting error | O | O | | O | | (page 74) |
| 7102 | - | - | Wrong number of connected units | O | | O | | | (page 75) |
| 7105 | - | - | Address setting error | O | | | | | (page 76) |
| 7106 | - | - | Attribute setting error | | | | O | | (page 76) |
| 7107 | - | [001] - [012] | Port setting error | | | O | | | (page 77) |

| Error Code | Prelimi-nary error code | Error (prelim-inary) detail code | Error code definition | Searched unit | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Outdoor unit | Indoor unit | BC controller | LOSSNAY | Remote controller | |
| 7110 | - | - | Connection information signal transmission/reception error | O | | | | | (page 78) |
| 7111 | - | - | Remote controller sensor fault | | O | | O | | (page 78) |
| 7113 | - | - | Function setting error (improper connection of CN-TYP) | O | | O | | | (page 79) |
| 7117 | - | - | Model setting error | O | | O | | | (page 81) |
| 7119 | - | - | M-NET wiring connection error (detected unit) | | O | | | | (page 83) |
| 7120 | - | - | M-NET wiring connection error (other units) | | O | | | | (page 83) |
| 7121 | - | - | Power-off detection | | O | | | | (page 84) |
| 7130 | - | - | Incompatible unit combination | O | | O | | | (page 84) |
| 7134 | - | - | Abnormal stop due to other causes | | | O | | | (page 85) |

* If an error not listed in the error code list occurs, check the switch settings and connector connections, and then contact AC&R Systems Works.

**Note**

- The error codes and preliminary error codes can be checked on the service LED (LD301) by setting the SW on the outdoor unit control board.
  For how to read the SW settings, refer to the following page(s). [10-1 LED Status Indicators]
- There are the inverter system and fan inverter system. See the last digit of the error codes from 4000 to 5999 to determine each error code and corresponding detail code are intended for the compressor or fan.

Example) 4225 (detail 108) code → Abnormal bus voltage drop: Fan inverter system
4230 code → Heatsink overheat protection: Inverter system

| Last digit | Target unit |
|---|---|
| 0 or 1 | Inverter system |
| 5 or 6[*1] | Fan inverter system |

[*1] When there are two fan motors, the fan motor on the left in the control box is "5" and that on the right is "6."

| Series name | Model name | Inverter system | | | | | Fan inverter system | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Overload protection Imax (Arms) | Current effective value error (Arms) | Current peak value error (Apeak) | Tem-perature protec-tion TOL (°C [°F]) | Compres-sor winding resistance (standard) (Ω: 20°C [68°F]) | Overload protection Imax (Arms) | Current peak value error (Apeak) | Fan motor winding resistance (standard) (Ω: 20°C [68°F]) |
| Highly-efficient series | PURY-EM72TXU-A | 35 | 42 | 91 | 95 [203] | 0.12 | 6 | 13 | 1.7 |
| | PURY-EM96TXU-A | 35 | 42 | 91 | 95 [203] | 0.12 | 6 | 13 | 1.7 |
| | PURY-EM120TXU-A | 45 | 54 | 91 | 95 [203] | 0.12 | 6 | 13 | 1.7 |
| | PURY-EM144TXU-A | 53 | 64 | 108 | 95 [203] | 0.08 | 5.3 | 12 | 2.7 |
| | PURY-EM168TXU-A | 53 | 64 | 108 | 95 [203] | 0.08 | 5.3 | 12 | 2.7 |
| | PURY-EM192TXU-A | 53 | 64 | 108 | 95 [203] | 0.08 | 5.3 | 12 | 2.7 |
| | PURY-EM72YXU-A | 19 | 23 | 49 | 95 [203] | 0.43 | 3.2 | 7 | 4.7 |
| | PURY-EM96YXU-A | 19 | 23 | 49 | 95 [203] | 0.43 | 3.2 | 7 | 4.7 |
| | PURY-EM120YXU-A | 24 | 29 | 49 | 95 [203] | 0.43 | 3.2 | 7 | 4.7 |
| | PURY-EM144YXU-A | 27 | 33 | 56 | 95 [203] | 0.21 | 3.2 | 9 | 5.5 |
| | PURY-EM168YXU-A | 27 | 33 | 56 | 95 [203] | 0.21 | 3.2 | 9 | 5.5 |
| | PURY-EM192YXU-A | 27 | 33 | 56 | 95 [203] | 0.21 | 3.2 | 9 | 5.5 |
| Hyper-heating series | PURY-HM72TXU-A | 45 | 54 | 91 | 95 [203] | 0.12 | 6 | 13 | 1.7 |
| | PURY-HM96TXU-A | 53 | 64 | 108 | 95 [203] | 0.08 | 5.3 | 12 | 2.7 |
| | PURY-HM120TXU-A | 53 | 64 | 108 | 95 [203] | 0.08 | 5.3 | 12 | 2.7 |
| | PURY-HM72YXU-A | 24 | 29 | 49 | 95 [203] | 0.43 | 3.2 | 7 | 4.7 |
| | PURY-HM96YXU-A | 27 | 33 | 56 | 95 [203] | 0.21 | 3.2 | 9 | 5.5 |
| | PURY-HM120YXU-A | 27 | 33 | 56 | 95 [203] | 0.21 | 3.2 | 9 | 5.5 |

# 7-2 Error Code Definitions and Solutions: Codes [0 - 999]

## 7-2-1 Error Code [0403]

### 1. Error code definition

**Serial communication error**

### 2. Error definition and error detection method

**[Outdoor unit]**

Serial communication error between the control board and the INV board on the compressor, and between the control board and the Fan board
Detail code 1: Between the control board and the INV board
Detail code 5, 6: Between the control board and the Fan board

**[BC controller]**

Serial communication error between the control board and the expansion board
Detail code X1: Between the control board and the expansion board (on the right)
Detail code X2: Between the control board and the expansion board (on the left[*1])
-X = 0-5

*1 For 8, 12-branch models only.

### 3. Cause, check method and remedy

**[Outdoor unit]**

### (1) Faulty wiring

Check the following wiring connections.

1) Between Control board and Fan board

| Control board | Fan board |
|---|---|
| CN4A | CN80 |

2) Between control board and INV board

| Control board | INV board |
|---|---|
| CN4 | CN2 |

3) Between control board and INV board

| Power-supply board | INV board |
|---|---|
| CN61 | CN19V |

4) Between control board and Fan board

| Power-supply board | Fan board |
|---|---|
| CN61 | CN81 (CN101[*2]) |

*2 CN101 for when there are two fan motors.

### (2) INV board failure, Fan board failure and Control board failure

If the problem persists after a power reset, replace the INV board, Fan board, or control board.

**[BC controller]**

Check the following wiring connections.

### (1) Faulty wiring

First, check the communication address of the detected unit to identify which of the units (the BC controller and sub BC controllers 1 to 11) is causing the problem.
Then, check the connectors between the control board and expansion board in the identified unit.

| Control board side | Expansion board side | |
|---|---|---|
| | Connector | Board position |
| CN4A | CN4L | Right |
| CN4B | | Left |

### (2) Expansion board failure, control board failure

If the problem persists after the power to the BC controller is reset, replace the expansion board or control board.

### (3) Incorrect address setting for the expansion board

Check the CNADR connector on the expansion board on the right or left.
(The connector may be disconnected, short-circuited, or has a contact failure.)

## 7-2-2 Error Code [0404]

### 1. Error code definition

**Indoor unit control-related errors**

### 2. Error definition and error detection method

Indoor controller board
Abnormal if data cannot be read normally from the nonvolatile memory of the indoor controller board.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| Defective indoor controller board | Replace indoor controller board. |

Note: Refer also to the Service Handbook for the indoor units.

## 7-2-3 Error Code [0910]

### 1. Error code definition

**Circuit check (detected unit)**

### 2. Error definition and error detection method

This error code is displayed by the circuit check target indoor unit to inform that the circuit check is under way.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Circuit check | This is not abnormal.<br>After the circuit check, cancel the error. |

## 7-2-4 Error Code [0911]

### 1. Error code definition

**Circuit check (other units)**

### 2. Error definition and error detection method

1) This error code is displayed by indoor units that belong to the same shut off space as the circuit check target indoor unit to inform that the circuit check is under way.
2) This is a maintenance error code displayed by the indoor units connected to the same outdoor unit that does not belong to the same shut off space as the circuit check target indoor unit to inform that the circuit check is under way.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Circuit check | This is not abnormal.<br>After the circuit check, cancel the error. |

# 7-3 Error Code Definitions and Solutions: Codes [1000 - 1999]

## 7-3-1 Error Code [1102]

### 1. Error code definition

**Discharge temperature fault**

### 2. Error definition and error detection method

1) If the discharge temperature of 120 °C [248°F] or more is detected during the operation (the first detection), the outdoor unit stops once, turns to anti-restart mode for 3 minutes, and restarts after 3 minutes automatically.
2) If the discharge temperature of 120° C [248°F] or more is detected again (the second detection) within 5 minutes after the second stop of the outdoor unit described, the mode will be changed to 3 - minute restart mode, then the outdoor unit will restart in 3 minutes.
3) If the discharge temperature of 120°C [248°F] or more is detected (the third detection) within 5 minutes after the stop of the outdoor unit described (regardless of the first or the second stop), the outdoor unit will make an error stop, and the error code "1102" will be displayed.
4) If the discharge temperature of 120°C [248°F] or more is detected more than 5 minutes after the previous stop of the outdoor unit, the detection is regarded as the first detection, and the operation described in step 1) above will start.
5) For 5 minutes after the stop (the first stop or the second stop) of the outdoor unit, preliminary errors will be displayed on the LED display.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Gas leak, gas shortage | Refer to the following page(s). [6-3 Evaluating and Adjusting Refrigerant Charge] |
| (2) Overload operation | Check operating conditions and operation status of indoor/ outdoor units. |
| (3) LEV failure on the indoor unit<br>(4) BC controller LEV malfunction<br>Cooling only : LEV3<br>Cooling main : LEV1,3<br>Heating only or heating main : LEV3, 4<br>Defrost : LEV3, 4<br>(5) BC controller SVM1 and 1b malfunction<br>→ Cooling only or defrost<br>(6) BC controller LEV-A malfunction<br>→ Cooling only or cooling main<br>(7) BC controller LEV-B malfunction<br>→ Heating only or heating main<br>(8) Actuation failure in the four-way valve (21S4a or 21S4b) or the expansion valve (LEV2a or LEV2b)<br>→heating only, heating main | Perform a heating operation and check the operation.<br>Cooling: LEV on the indoor unit<br>BC controller LEV1,3<br>SVM1,1b<br>LEV-A<br>Heating: LEV on the indoor unit<br>BC controller LEV3, 4<br>LEV-B<br>Refer to the following page(s). [8-7 Troubleshooting LEV Problems] |
| (9) Port address setting error. | Confirm the port address of the indoor unit. |
| (10) Closed ball valve | Confirm that the ball valve is fully open. |
| (11) Outdoor fan (including fan parts) failure, motor failure, or fan controller malfunction<br>Rise in discharge temp. by low pressure drawing for (3) - (11). | Check the fan on the outdoor unit.<br>Refer to the following page(s). [8-6 Troubleshooting Outdoor Unit Fan Problems] |
| (12) Gas leak between low and high pressures (4-way valve failure, Compressor failure, Solenoid valve (SV1a) failure) | Perform a cooling or heating operation and check the operation. |
| (13) Thermistor failure<br>(TH4) | Refer to the following page(s). [7-7-2 Error Code [5103,5104,5105,5106,5107,5115]] |
| (14) Input circuit failure on the controller board thermistor | Check the inlet air temperature on the LED monitor. |

## 7-3-2 Error Code [1301]

### 1. Error code definition

**Low pressure fault**

### 2. Error definition and error detection method

When starting the compressor from Stop Mode for the first time if low pressure reads 0.098MPa [14psi] immediately before start-up, the operation immediately stops.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Inner pressure drop due to a leakage.<br>(2) Low pressure sensor failure<br>(3) Short-circuited pressure sensor cable due to torn outer rubber<br>(4) A pin on the male connector is missing.<br>(5) Disconnected wire<br>(6) Failure of the low pressure input circuit on the controller board | Refer to the following page(s). [8-4-3 Comparing the Low-Pressure Sensor Measurement and Gauge Pressure] |

**Note**

When a shut off valve is installed as a safety measure, closing of the valve may cause this error.

## 7-3-3 Error Code [1302] (during operation)

### 1. Error code definition

**High pressure fault 1 (Outdoor unit)**

### 2. Error definition and error detection method

1) If the pressure of 3.78MPa [548psi] or higher is detected by the pressure sensor during operation (the first detection), the outdoor stops once, turns to antirestart mode for 3 minutes, and restarts after 3 minutes automatically.
2) If the pressure of 3.78MPa [548psi] or higher is detected by the pressure sensor again (the second detection) within 30 minutes after the first stop of the outdoor unit, the outdoor unit stops once, turns to anti-restart mode for 3 minutes, and restarts after 3 minutes automatically.
3) If the pressure of 3.87MPa [561psi] or higher is detected by the pressure sensor (the third detection) within 30 minutes of the second stop of the outdoor unit, the outdoor unit will make an error stop, and the error code "1302" will be displayed.
4) If the pressure of 3.78MPa [548psi] or higher is detected more than 30 minutes after the stop of the outdoor unit, the detection is regarded as the first detection, and the operation described in step 1) above will start.
5) For 30 minutes after the stop of the outdoor unit, preliminary errors will be displayed on the LED display.
6) The outdoor unit makes an error stop immediately when not only the pressure sensor but also the pressure switch detects $4.15^{+0,-0.15}$ MPa [$601^{+0,-22}$ psi]

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Indoor unit LEV actuation failure<br>(2) BC controller LEV malfunction<br>Heating only or heating main: Indoor LEV 3, 4<br>Defrost: LEV3, 4<br>(3) BC controller SVM1 and 1b malfunction<br>→Cooling only or defrost<br>(4) BC controller LEV-A malfunction<br>→Cooling only or cooling main<br>(5) BC controller LEV-B malfunction →Heating only or heating main<br>(6) Actuation failure in the four-way valve (21S4a or 21S4b) or the expansion valve (LEV2a or LEV2b) →Cooling-only or cooling-main | Perform a heating operation and check the operation.<br>Cooling: Four-way valves<br>(21S4a and 21S4b) on the outdoor unit<br>Expansion valves (LEV2a, 2b, and 2d)<br>LEV on the indoor unit<br>BC controller LEV1,3,<br>SVM1,1b, LEV-A<br>Heating: LEV on the indoor unit<br>BC controller LEV3<br>Refer to the following page(s). [8-7 Troubleshooting LEV Problems] |
| (7) Port address setting error. | Confirm the port address of the indoor unit. |
| (8) Refrigerant service valve actuation failure | Confirm that the refrigerant service valve is fully open. |
| (9) Short cycle on the indoor unit side<br>(10) Clogged filter on the indoor unit<br>(11) Reduced air flow due to dirty fan on the indoor unit fan<br>(12) Dirty heat exchanger of the indoor unit<br>(13) Indoor fan (including fan parts) failure or motor failure<br>Items (7) through (12) above reduce the condensing capability of the unit, resulting in high-pressure rise during heating operation. | Check the indoor units for problems and correct them, if any. |
| (14) Short cycle on the outdoor unit<br>(15) Dirty heat exchanger of the outdoor unit | Check the outdoor units for problems and correct them, if any. |
| (16) Outdoor fan (including fan parts) failure, motor failure, or fan controller malfunction<br>Items (13) through (15) above reduce the condensing capability of the unit, resulting in high-pressure rise during cooling operation. | Check the fan on the outdoor unit.<br>Refer to the following page(s). [8-6 Troubleshooting Outdoor Unit Fan Problems] |
| (17) Solenoid valve (SV1a) malfunction<br>The by-pass valve (SV1a) can not control rise in high pressure. | Refer to the following page(s). [8-5 Troubleshooting Solenoid Valve Problems] |
| (18) Thermistor failure (TH3, TH7) | Refer to the following page(s). [7-7-2 Error Code [5103,5104,5105,5106,5107,5115]] |

| | | |
|---|---|---|
| (19) | Pressure sensor failure | Refer to the following page(s). [8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure] |
| (20) | Failure of the thermistor input circuit and pressure sensor input circuit on the controller board | Check the sensor temperature/pressure on the LED monitor. |
| (21) | Thermistor mounting problem (TH3, TH7) | Check the sensor temperature/pressure on the LED monitor. |
| (22) | Disconnected male connector on the pressure switch (63H1) or disconnected wire | |
| (23) | Open phase in the power-supply due to improper power-supply wiring | Refer to item (6) in section [6-1 Read before Test Run]. |

## 7-3-4 Error Code [1302] (at startup)

### 1. Error code definition

**High pressure fault 2 (Outdoor unit)**

### 2. Error definition and error detection method

If the pressure of 0.098MPa [14psi] or lower is registered on the pressure sensor immediately before start-up, it will trigger an abnormal stop, and error code "1302" will be displayed.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Inner pressure drop due to a leakage. | Refer to the following page(s). [8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure] |
| (2) | Pressure sensor failure | |
| (3) | Shorted-circuited pressure sensor cable due to torn outer rubber | |
| (4) | A pin on the male connector on the pressure sensor is missing or contact failure | |
| (5) | Disconnected pressure sensor cable | |
| (6) | Failure of the pressure sensor input circuit on the controller board | |
| (7) | Open phase in the power-supply due to improper power-supply wiring | Refer to item (6) in section [6-1 Read before Test Run]. |

## 7-3-5 Error Code [1500]

### 1. Error code definition

**Liquid back error (detected by refrigerant temperature)**

### 2. Error definition and error detection method

An error can be detected by the shell bottom superheat (TH15 - Te).

1) If the formula "compressor bottom SH (TH15 - Te) ≤ 10ºC [18ºF]" is satisfied during operation (first detection), the outdoor unit stops, goes into the 3-minute restart mode, and starts up in three minutes.
2) If the formula "compressor bottom SH (TH15 - Te) ≤ 10ºC [18ºF]" is satisfied again within 40 minutes of the first stoppage of the outdoor unit (second detection), the unit comes to an abnormal stop, and the error code "1500" appears.
3) If the formula "compressor bottom SH (TH15 - Te) ≤ 10ºC [18ºF]" is satisfied 40 minutes or more after the first stoppage of the outdoor unit, the same sequence as Item 1) above (first detection) is followed.
4) For 40 minutes after the stop of the outdoor unit, preliminary errors will be displayed on the LED display.
5) If the formula "compressor bottom SH (TH15 - Te) ≤ 10ºC [18ºF]" is satisfied during the defrost operation and if the formula "compressor bottom SH (TH15 - Te) ≤ 10ºC [18ºF]" is also satisfied after the defrost operation, the same sequence as Item 1) above (first detection) is followed.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Overcharged refrigerant | Refer to the following page(s). [6-3 Evaluating and Adjusting Refrigerant Charge] |
| (2) | Thermistor input circuit failure on the control board | Check the temperature and pressure readings on the sensor that are displayed on the LED monitor. |
| (3) | Faulty mounting of thermistor (TH4, TH15) | Check the temperature and pressure readings on the thermistor that are displayed on the LED monitor. |
| (4) | Malfunction of outdoor LEV2a and 2b → Heating<br>Malfunction of outdoor LEV4 → Cooling, heating | Refer to the following page(s). [8-7 Troubleshooting LEV Problems] |
| (5) | Distribution failure in the outdoor distributor → Heating | Use a level to check if the distributor is installed horizontally.<br>Check if the length of the straight pipe before the distributor is 500 mm or more. |

## 7-3-6 Error Code [1521]

**Note**

Error codes related to refrigerant leak are displayed with higher priority than other error codes. Take actions according to [11-7-3 Flowchart for Refrigerant Leak].

### 1. Error code definition

**Refrigerant leak error (self detection of the unit)**

### 2. Error definition and error detection method

If the indoor unit with the built-in refrigerant sensor detects a refrigerant leak.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Refrigerant leak | The refrigerant gas may have leaked in the room.<br>Take the remedies according to [11-7-3 Flowchart for Refrigerant Leak]. |

## 7-3-7 Error Code [1522]

**Note**

Error codes related to refrigerant leak are displayed with higher priority than other error codes. Take actions according to [11-7-3 Flowchart for Refrigerant Leak].

### 1. Error code definition

**Refrigerant leak error (other units)**

### 2. Error definition and error detection method

1) An error detected by indoor units that belong to the same shut off space as the unit that detected a refrigerant leak
2) A maintenance error code detected by indoor units that belong to a different shut off space from that for the unit that detected a refrigerant leak and are connected to the same outdoor unit

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Refrigerant leak | Identify the unit that has issued the error code (1521) and take the remedies.<br>Take the remedies according to [11-7-3 Flowchart for Refrigerant Leak]. |

## 7-3-8 Error Code [1550]

### 1. Error code definition

**Liquid back error (detected by current sensor)**
**Instantaneous overcurrent (detail code 001)**
**Overcurrent (effective value) shut off error (detail code 002)**
**ACCT overcurrent error (detail code 003)**

### 2. Error definition and error detection method

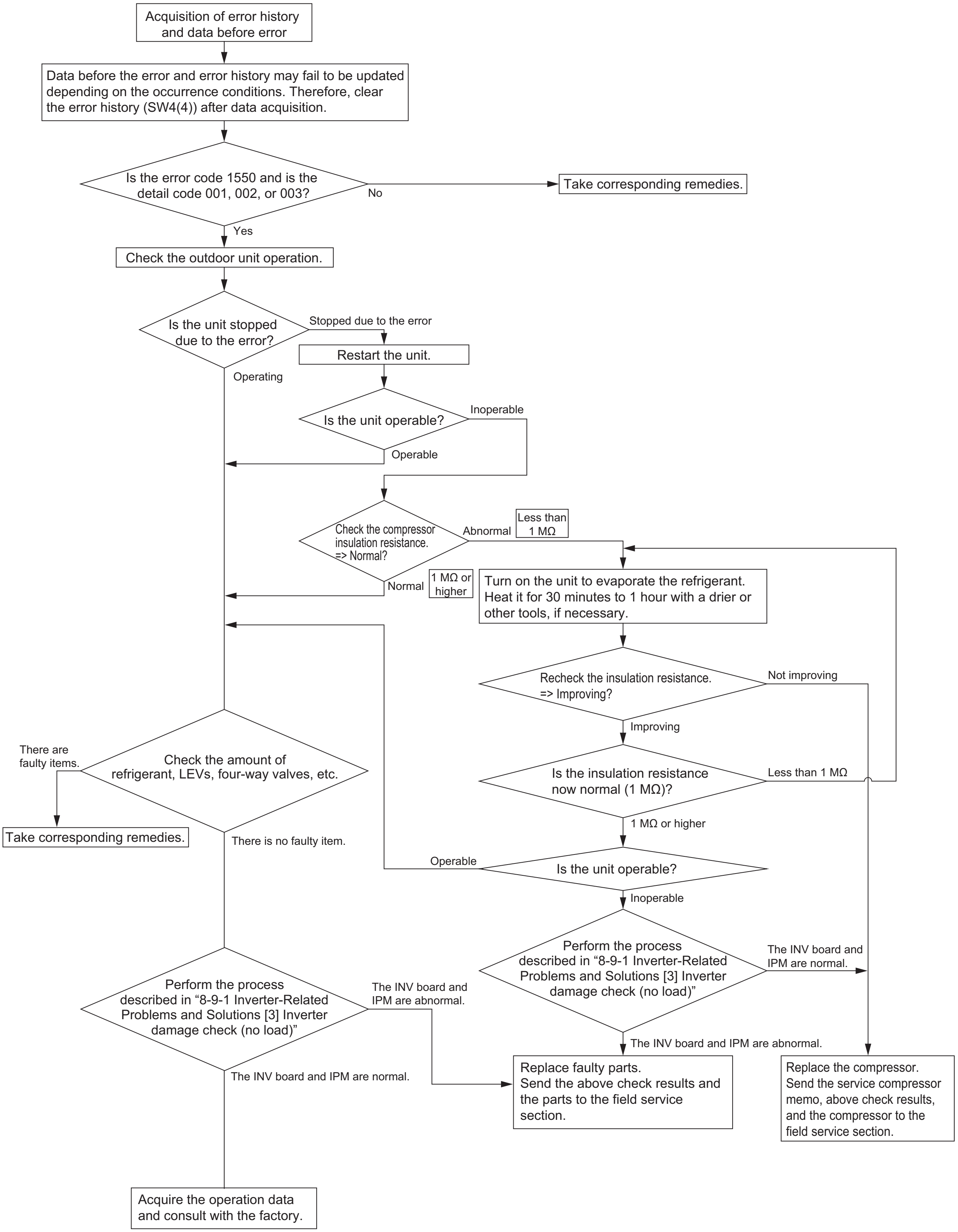
If the current sensor detects an overcurrent that is equal to or greater than the specified value after the start of operation.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Liquid back | Refer to the action flow for 1550 shown on the next page (refrigerant overcharge, malfunctions of outdoor LEVs, distributors, and compressors). |
| (2) Inverter output-related problems | Refer to the following page(s). [8-9-1 Inverter-Related Problems and Solutions] |
| (3) The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

### Action flow for the error 1550

Handle the error 1550 according to the following flowchart.



## 7-3-9 Error Code [1625]

### 1. Error code definition

**Refrigerant sensor maintenance (indoor unit)**

### 2. Error definition and error detection method

Time to replace the built-in refrigerant sensor in the indoor unit

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Time to replace the refrigerant sensor | Replace the built-in refrigerant sensor in the indoor unit. |

# 7-4 Error Code Definitions and Solutions: Codes [2000 - 2999]

## 7-4-1 Error Code [2500] (Models with a float switch)

### 1. Error code definition

**Drain sensor submergence**

### 2. Error definition and error detection method

1) If an immersion of the float switch in the water is detected while the unit is in any mode other than the Cool/Dry mode and when the drain pump goes from OFF to ON, this condition is considered preliminary water leakage. While this error is being detected, humidifier output cannot be turned on.
2) If the drain pump turns on within one hour after preliminary water leakage is detected and the above-mentioned condition is detected two consecutive times, water leakage error water leakage is detected, and "2500" appears on the monitor.
3) Detection of water leakage is also performed while the unit is stopped.
4) Preliminary water leakage is cancelled when the following conditions are met:

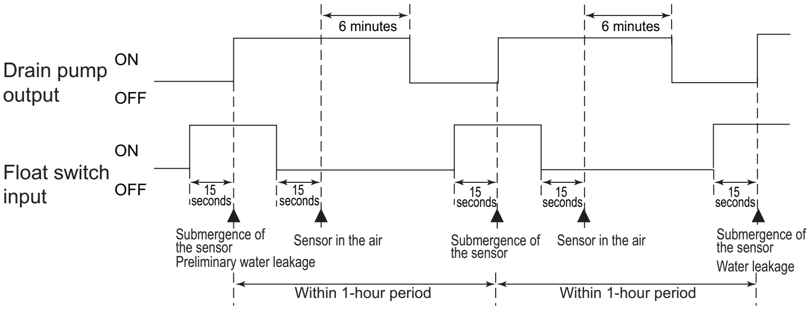
- One hour after the preliminary water leakage was detected, it is not detected that the drain pump goes from OFF to ON.
- The operation mode is changed to Cool/Dry.
- The liquid pipe temperature minus the inlet temperature is - 10°C [-18°F] or less.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Drain water drainage problem<br>•Clogged drain pump<br>•Clogged drain piping<br>•Backflow of drain water from other units | Check for proper drainage. |
| (2) | Stuck float switch<br>Check for slime in the moving parts of the float switch. | Check for normal operation of the float switch. |
| (3) | Float switch failure | Check the resistance with the float switch turned on and turned off. |

<Reference>

Drain pump operation triggered by a submergence of the liquid level sensor
(except during the Cooing/Dry mode)



## 7-4-2 Error Code [2502] (Models with a float switch)

### 1. Error code definition

**Drain pump fault**

### 2. Error definition and error detection method

1) The immersion of sensor tip in water is detected by the ON/OFF signal from the float switch.

   ∗Submergence of the sensor
   When it is detected that the float switch has been ON for 15 seconds, it is interpreted that the sensor tip is immersed in water.
   ∗Sensor in the air
   When it is detected that the float switch has been OFF for 15 seconds, it is interpreted that the sensor tip is not immersed in water.
2) If it is detected that the float switch has been ON for 3 minutes after the immersion of the sensor tip was detected, this is considered a drain pump failure, and "2502" appears on the monitor.

   ∗The total time it takes for this error to be detected is 3 minutes and 15 seconds, including the time it takes for the first immersion of the sensor tip to be detected.
3) Detection of drain pump failure is performed while the unit is stopped.
4) The following criteria are met when the criteria for the forced stoppage of outdoor unit (system stoppage) are met.

   ∗"Liquid pipe temperature-inlet temperature ≤ -10°C [-18°F]" has been detected for 30 minutes.
   ∗It is detected by the float switch that the sensor tip has been immersed in water for 15 minutes or more.
   ∗The conditions that are listed under items 1) through 3) above are always met before the criteria for the forced stoppage of the outdoor unit.
5) The indoor unit that detected the conditions that are listed in item 4) above brings the outdoor unit in the same refrigerant circuit to an error stop (compressor operation prohibited), and the outdoor unit brings all the indoor units in the same refrigerant circuit that are in any mode other than Fan or Stop to an error stop. "2502" appears on the monitor of the units that came to an error stop.
6) Forced stoppage of the outdoor unit
   Detection timing: The error is detected whether the unit is in operation or stopped.
7) Ending criteria for the forced stoppage of outdoor unit
   Power reset the indoor unit that was identified as the error source and the outdoor unit that is connected to the same refrigerant circuit.
   Forced stoppage of the outdoor unit cannot be cancelled by stopping the unit via the remote controller.
   (Note) Items 1) - 3) and 4) - 7) are detected independently from each other.

**Note**

**The address and attribute that appear on the remote controller are those of the indoor unit (or OA processing unit) that caused the error.**

### 3. Cause, check method and remedy

| | Cause | Check method and remedy |
|---|---|---|
| (1) | Drain pump failure | Check for proper functioning of the drain pump mechanism |
| (2) | Drain water drainage problem<br>⬩Clogged drain pump<br>⬩Clogged drain piping | Check for proper drainage. |
| (3) | Stuck float switch<br>Check for slime in the moving parts of the float switch. | Check for normal operation of the float switch. |
| (4) | Float switch failure | Check the resistance with the float switch turned on and turned off. |
| (5) | Indoor unit control board failure<br>⬩Drain pump drive circuit failure<br>⬩Float switch input circuit failure | Replace indoor unit control board. |
| (6) | Wrong dipswitch setting on the indoor unit controller board<br>⬩Dipswitch for the new indoor unit controller board was wrongly set to "unit model without drain pump" instead of "unit model with drain pump" when the board was replaced. | Check for proper dipswitch model setting on the indoor unit controller board. |

## 7-4-3 Error Code [2600]

### 1. Error code definition

**Water leakage**

### 2. Cause, check method and remedy

Check that water does not leak from the pipes in such as the humidifier.

## 7-4-4 Error Code [2601]

### 1. Error code definition

**Water supply cutoff**

### 2. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | The water tank of the humidifier is empty. | Check the amount of supply water.<br>Check for the solenoid valve and for the connection. |
| (2) | The solenoid valve for humidification is OFF. | Check the connector. |
| (3) | Disconnected float switch | Check the connecting part. |
| (4) | Poor operation of float switch | Check for the float switch. |
| (5) | Frozen water tank | Turn off the power source of the water tank to defrost, and turn it on again. |

# 7-5 Error Code Definitions and Solutions: Codes [3000 - 3999]

## 7-5-1 Error Code [3121]

### 1. Error code definition

**Out-of-range outside air temperature**

### 2. Error definition and error detection method

- When the thermistor temperature of -33°C[-27°F] or below has continuously been detected for 3 minutes during heating operation (during compressor operation), the unit makes an error stop and "3121" appears on the display. (Use the OC thermistor temperature to determine when two outdoor units are in operation.)
- The compressor restarts when the thermistor temperature is -31°C[-24°F] or above (both OC and OS) during error stop. (The error display needs to be canceled by setting the remote controller.)
- Outdoor temperature error is canceled if the units stop during error stop. (The error display needs to be canceled by setting the remote controller.)

### 3. Cause, check method and remedy

Check the following factors if an error is detected, without drop in the outdoor temperature.

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Thermistor failure | Check thermistor resistance. |
| (2) | Pinched lead wire | Check for pinched lead wire. |
| (3) | Torn wire coating | Check for wire coating. |
| (4) | A pin on the male connector is missing or contact failure | Check connector. |
| (5) | Disconnected wire | Check for wire. |
| (6) | Thermistor input circuit failure on the control board | Check the intake temperature of the sensor with the LED monitor.<br>When the temperature is far different from the actual temperature, replace the control board. |

<Reference>

| | Short detection | Open detection |
|---|---|---|
| TH7 | 110 ℃ [230 ˚F ] and above (0.4 kΩ) | -40 ℃ [ -40 ˚F ] and below (130 kΩ) |

# 7-6 Error Code Definitions and Solutions: Codes [4000 - 4999]

## 7-6-1 Error Code [4102]

### 1. Error code definition

**Open phase**

### 2. Error definition and error detection method

- An open phase of the power supply was detected at power on.

**Note**

The open phase of the power supply may not always be detected if a power voltage from another circuit is applied.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Power supply problem<br>• Open phase voltage of the power supply<br>• Power supply voltage drop | • Check the input voltage to the power supply terminal block TB1.<br>• Possible open phase in the power-supply due to improper power-supply wiring. (Refer to item (6) in section [6-1 Read before Test Run].) |
| (2) Terminal block TB1/TB2 failure | Check the continuity between the primary and secondary sides of each phase on the terminal block. |
| (3) Noise filter problem<br>• Coil (L) problem<br>• Circuit board failure | • Check the coil connections.<br>• Check for coil burnout. |
| (4) Wiring failure | [TXU models]<br>Check the wiring between CN012 on the noise filter and CNAC on the control board.<br>Check the wiring between CN110 on the noise filter and CN110 on the control board.<br>[YXU models]<br>Confirm that the voltage at the control board connector CNAC is 190 V or above.<br>• If the voltage is below 190, check the wiring between each of the following.<br>CN2 on the noise filter – REC board – CN104 – CNAC on the control board<br>TB21/TB22/TB23 on the noise filter – TB2 on the terminal block – CNTR1 |
| (5) Blown fuse | [TXU models]<br>Check that F001 on the control board is not blown.<br>→ If a blown fuse is found, check for a short-circuiting or ground fault of the actuator.<br>Check noise filter fuses F001 and F002.<br>→ If a blown fuse is found, check for a short-circuiting or ground fault of the actuator.<br>[YXU models]<br>Check the fuse F001 on the control board and the continuity between the primary and secondary sides of TB2.<br>→ If the fuse F001 is blown or there is not continuity between the primary and secondary sides of TB2, check for a short-circuiting or ground fault of the actuator. |
| (6) Control board failure | Replace the control board if none of the above is causing the problem. |

## 7-6-2 Error Code [4106]

### 1. Error code definition

**<Transmission power supply fault Error detail code FF (Outdoor unit)>**

### 2. Error definition and error detection method

Transmission power output failure

### 3. Cause

1) Wiring failure
2) Transmission power supply cannot output voltage because overcurrent was detected.
3) Voltage cannot be output due to transmission power supply problem.
4) Transmission voltage detection circuit failure

### 4. Check method and remedy

Check the transmission power supply circuit on all outdoor units in a given refrigerant circuit for problems. [8-10-2 Troubleshooting Problems with Outdoor Unit Transmission Power Supply Circuit]

### 1. Error code definition

**<Transmission power supply fault other than error detail code FF (Outdoor unit)>**

**2.Error definition and error detection method**

Transmission power reception failure

**3.Cause**

One of the outdoor units stopped supplying power, but no other outdoor units start supplying power.

**4.Check method and remedy**

Check the transmission power supply circuit on all outdoor units in a given refrigerant circuit for problems. [8-10-2 Troubleshooting Problems with Outdoor Unit Transmission Power Supply Circuit]

## 7-6-3 Error Code [4109]

### 1. Error code definition

**Indoor unit fan operation error**

### 2. Error definition and error detection method

1) Connector CN28 has remained open-circuited for 100 consecutive secondsduring operation.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Auxiliary relay fault | The coil or the wiring of the auxiliary relay connected to CN28 is faulty. |
| (2) Connector (CN28) is disconnected. | Check the connector for proper connection. |
| (3) Blown fuse | Check the fuse on the control circuit board. |
| (4) Motor error (thermistor error inside the motor) | Check the unit fan for proper operation in the test run mode.<br>If no problems are found with items 1 through 3 above and the fan does not operate, replace the motor. |

## 7-6-4 Error Code [4114]

### 1. Error code definition

**Indoor unit fan motor error**

### 2. Error definition and error detection method

When the fan motor output from the indoor unit circuit board is ON and when the rotation speed input from the fan motor cannot be detected for 30 seconds or more

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Fan motor connector contact failure | Check the fan motor connector CNMF for proper connection. |
| (2) Contact failure of the relay connector for the fan motor | Check the relay connector for the fan motor for proper connection. |
| (3) Indoor unit circuit board failure | Remove the fan motor connector CNMF and check the voltage at the indoor unit circuit board.<br>Testing point 1. 280 VDC (Between CNMF1 (+) and CNMF4 (-))<br>2. 15 VDC (Between CNMF5 (+) and CNMF4 (-))<br>Replace the indoor unit circuit board if the voltage is abnormal.<br>If the 4114 error persists after the indoor unit circuit board is replaced, replace the fan motor as well. |
| (4) Fan motor fault | Replace the fan motor if the voltage is normal in step (3) above.<br>If the 4114 error persists after the fan motor is replaced, replace the indoor unit circuit board as well. |

## 7-6-5 Error Code [4115]

### 1. Error code definition

**Power supply sync signal abnormality**

### 2. Error definition and error detection method

The power supply frequency cannot be judged at the power-on.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Power supply problem | Check the voltage at the power supply terminal block TB1. |
| (2) Terminal block failure | Check the continuity between the primary and secondary sides of each phase on the terminal block. |
| (3) Noise filter problem<br>⬩Coil problem<br>⬩Circuit board failure | ⬩Check the coil connections.<br>⬩Check for coil burnout.<br>⬩Confirm that the voltage at the CN012 connector is 180 V or above. |
| (4) Blown fuse | Check fuses F001 and F002 on the noise filter board and fuse F001 on the control board. |
| (5) Wiring failure<br>Between CN012 on the noise filter and CNAC on the control board | Confirm that the voltage at the control board connector CNAC is 180 V or above. |
| (6) Control board failure | Replace the control board if all of the above are normal and the problem persists after the power-on. |

## 7-6-6 Error Code [4116]

### 1. Error code definition

**RPM error/Motor error**

### 2. Error definition and error detection method

♦LOSSNAY

∗The motor keep running even if the power is OFF.
∗The thermal overload relay is ON. (Only for the three-phase model)

♦Indoor unit

If detected less than 180rpm or more than 2000rpm, the indoor unit will restart and keep running for 3 minutes.If detected again, the display will appear.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Board failure | Replace the board. |
| (2) | Motor malfunction | Check for the motor and the solenoid switch. |
| (3) | Solenoid switch malfunction | |

## 7-6-7 Error Code [4121]

### 1. Error code definition

**Function setting error**

### 2. Error source, cause, check method and remedy

| Error source | Cause | | Check method and remedy |
|---|---|---|---|
| Outdoor unit | (1) | Dip switch setting error on the control board | Check the SW6-1 setting on the control board |
| | (2) | Connector connection error on the control board | Check that nothing is connected to the connector CNAF on the control board. |
| | (3) | Control board failure | Replace the control board if no problems are found with the two items above. |

## 7-6-8 Error Code [4124]

### 1. Error code definition

**Electric system not operate due to damper abnormality**

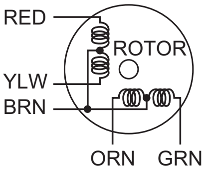
### 2. Error definition and error detection method

When the damper is not located at the designated position.

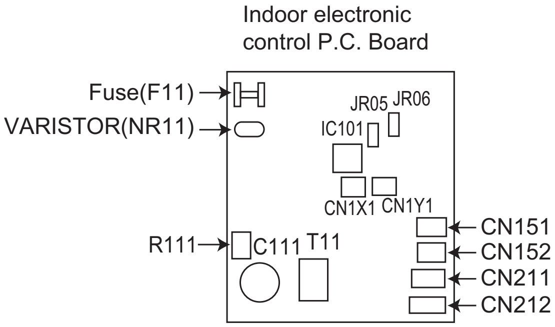
### 3. Cause, check method and remedy

When the damper is not located at the designated position.

1) Check there is something that interferes the opening or closing movement of the damper.
2) If damper does not open or close, turn OFF the power supply and measure the resistance of the damper lock motors (ML1, ML2) and the damper motor (MV2).
   The resistance value is normal each. →Replace the indoor electronic control P.C. board.
   The resistance value is not normal each. →Replace the motor that indicates the abnormal value.

<table>
<tr><th>Part name</th><th>Check method and criteria</th><th>Figure</th></tr>
<tr><td>Damper lock motor Right(ML1)</td><td rowspan="2">Measure the resistance between the terminals with a tester.<br>(Part temperature: 10°C ~ 30°C)<table><tr><th>Color of the lead wire</th><th>Normal</th></tr><tr><td>BRN-other one</td><td>235Ω~255Ω</td></tr></table></td><td rowspan="3"> </td></tr>
<tr><td>Damper lock motor Left(ML2)</td></tr>
<tr><td>Damper motor (MV2)</td><td>Measure the resistance between the terminals with a tester.<br>(Part temperature: 10°C ~ 30°C)<table><tr><th>Color of the lead wire</th><th>Normal</th></tr><tr><td>BRN-other one</td><td>282Ω~306Ω</td></tr></table></td></tr>
</table>

3) If damper opens or closes, measure the voltage between CN1X1 (+) and (-) and the voltage between CN1Y1 (+) and (-) during the damper open by pressing VANE CONTROL button.
   There is not 0V DC between CN1X1 (+) and (-). →Replace the damper limit switch (open)
   There is not 5V DC between CN1X1 (+) and (-). →Replace the damper limit switch (close)
4) If damper opens or closes and voltages in 3) are normal, measure the voltage between CN1X1 (+) and (-) and the voltage between CN1Y1 (+) and (-) during the damper close by pressing VANE CONTROL button.
   There is not 5V DC between CN1X1 (+) and (-). →Replace the damper limit switch (open)
   There is not 0V DC between CN1X1 (+) and (-). →Replace the damper limit switch (close)
   There is 5V DC between CN1X1 (+) and (-) and 0V DC between CN1X1 (+) and (-). →Replace the indoor electronic control P.C. board.



Note: Refer also to the Service Handbook for the indoor units.

## 7-6-9 Error Code [4136]

### 1. Error code definition

**Safety shut off valve circuit error**

### 2. Error definition and error detection method

If the BC controller detects an abnormal control signal from the safety shut off valve.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Connection failure | ⬩Check the communication address of the detected unit to identify which of the units (the BC controller and sub BC controllers 1 to 11) is causing the problem.<br>⬩Check the connectors (CNL1 to 6A), (CNL1 to 6B), or (CNL1 to 6L) on the expansion board of the BC controller.<br>Refer to "Detail No. and corresponding connector" below to identify the faulty connector. |
| (2) Circuit board failure | Replace the expansion board or control board of the BC controller. |

Detail No. and corresponding connector

| Detail No. *1 | | Connector |
|---|---|---|
| 011 | 012 | CNL1A |
| 021 | 022 | CNL1B |
| 031 | 032 | CNL1L |
| 041 | 042 | CNL2A |
| 051 | 052 | CNL2B |
| 061 | 062 | CNL2L |
| 071 | 072 | CNL3A |
| 081 | 082 | CNL3B |
| 091 | 092 | CNL3L |
| 101 | 102 | CNL4A |
| 111 | 112 | CNL4B |
| 121 | 122 | CNL4L |
| 131 | 132 | CNL5A |
| 141 | 142 | CNL5B |
| 151 | 152 | CNL5L |
| 161 | 162 | CNL6A |
| 171 | 172 | CNL6B |
| 181 | 182 | CNL6L |

*1 Check the expansion board on the right if the last digit of the detail No. is 1 and that on the left if the last digit is 2.

## 7-6-10 Error Code [4220, 4225, 4226] Detail Code 108

### 1. Error code definition

**Abnormal bus voltage drop (Detail code 108) (YXU)**

### 2. Error definition and error detection method

If Vdc 350 V or less is detected during inverter operation. (S/W detection)

### 3. Cause, check method and remedy

### (1) Power supply environment

Check the power-supply wiring for an open phase. Refer to item (6) in section [6-1 Read before Test Run].
Find out if there was a (momentary) power failure.
Check whether the power voltage (Between L1 and L2, L2 and L3, and L1 and L3) is 414 V or less across all phases.

### (2) Voltage drop detected

**4220**

- Check the voltage between the tab terminals FTP and FTN on the INV board while the inverter is stopped.

If the voltage is 420 V or above, check the following items.

1) Check the LED monitor to see if the bus voltage is above 350 V, and replace the inverter board if it is 350 V or below.
2) Check the coil (L) connections and for broken wiring.
3) Check the wiring connections.
   Between the noise filter board and INV board, INV board and DCL
   Replace the INV board if no problems are found.

If the voltage is below 420 V, check the following items.

1) Check the coil (L) connections and for broken wiring.
2) Check the wiring connections between noise filter board and INV board.
3) Check if the inrush current resistors (R031 and R032) on the inverter board are open.
4) If the problem persists after reboot, replace the INV board.

**4225, 4226**

- Check the voltage between CNVP2 and CNVN2 on the fan board while the inverter is stopped.

If the voltage is 420 V or above, check the following items.

1) Check for proper connections of the coil (L) and DC reactor, and for broken wiring.
2) Check the wiring connections.
   Between the noise filter board and INV board, INV board and fan board
   Replace the fan board if no problems are found.
   If the problem persists in operation after the fan board is replaced, replace the INV board.

If the voltage is below 420 V, check the following items.

1) Check the wiring connections.
   Between the noise filter board and INV board, INV board and fan board
   Replace the fan board if no problems are found.
   If the problem persists in operation after the fan board is replaced, replace the INV board.

### (3) Control board failure

Check if LED01 on the INV board is lit while the inverter is operating. If it is not lit, check the following wiring connections.
Between control board CNRYA and INV board CNRY
Replace the control board if no problem is found in the wiring.

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-11 Error Code [4220, 4225, 4226] Detail Code 108

### 1. Error code definition

**Abnormal bus voltage drop (Detail code 108) (TXU)**

### 2. Error definition and error detection method

If Vdc 180 V or less is detected during inverter operation. (S/W detection)

### 3. Cause, check method and remedy

### (1) Power supply environment

Check the power-supply wiring for an open phase. Refer to item (6) in section [6-1 Read before Test Run].
Find out if there was a (momentary) power failure.
Check whether the power voltage (Between L1 and L2, L2 and L3, and L1 and L3) is 180 V or less across all phases.

### (2) Voltage drop detected

**4220**

⬩Check the voltage between the tab terminals FTP and FTN on the INV board while the inverter is stopped.

If the voltage is 220 V or above, check the following items.

1) Check the LED monitor to see if the bus voltage is above 180 V, and replace the inverter board if it is 180 V or below.
2) Check the coil (L) connections and for broken wiring.
3) Check the wiring connections.
   Between the noise filter board and INV board, INV board and DCL
   Replace the INV board if no problems are found.

If the voltage is below 220 V, check the following items.

1) Check the coil (L) connections and for broken wiring.
2) Check the wiring connections between noise filter board and INV board.
3) Check if the inrush current resistors (R007 and R008) on the inverter board are open.
4) If the problem persists after reboot, replace the INV board.

**4225, 4226**

⬩Check the voltage between CNVP1 and CNVN1 on the fan board while the inverter is stopped.

If the voltage is 220 V or above, check the following items.

1) Check for proper connections of the coil (L) and DC reactor, and for broken wiring.
2) Check the wiring connections.
   Between the noise filter board and INV board, INV board and fan board
   Replace the fan board if no problems are found.
   If the problem persists in operation after the fan board is replaced, replace the INV board.

If the voltage is below 220 V, check the following items.

1) Check the wiring connections.
   Between the noise filter board and INV board, INV board and fan board
   Replace the fan board if no problems are found.
   If the problem persists in operation after the fan board is replaced, replace the INV board.

### (3) Control board failure

Check if LED01 on the INV board is lit while the inverter is operating. If it is not lit, check the following wiring connections.
Between control board CNRYA and INV board CNRY
Replace the control board if no problem is found in the wiring.

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-12 Error Code [4220, 4225, 4226] Detail Code 109

### 1. Error code definition

**Abnormal bus voltage rise (Detail code 109)**

### 2. Error definition and error detection method

**4220**

If Vdc ≥ 830 V is detected by the INV board during inverter operation. (YXU)
If Vdc ≥ 400 V is detected by the INV board during inverter operation. (TXU)

**4225, 4226**

If Vdc ≥ 830 V is detected by the fan board during inverter operation. (YXU)
If Vdc ≥ 407 V is detected by the fan board during inverter operation. (TXU)

### 3. Cause, check method and remedy

### (1) Different voltage connection

Check the power supply voltage on the power supply terminal block (TB1).

### (2) INV board failure

If no problem is found in the power supply voltage but the problem recurs after restarting the inverter, replace the INV board or fan board.
In the case of 4220: INV board
In the case of 4225 and 4226: Fan board

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-13 Error Code [4220] Detail Code 110

### 1. Error code definition

**VDC error (Detail code 110)**

### 2. Error definition and error detection method

BUS voltage error When Vdc is equal to or greater than 814 volts (hardware detection) (YXU)

BUS voltage error When Vdc is equal to or greater than 407 volts (hardware detection) (TXU)

### 3. Cause, check method and remedy

Details of 4220 error: See No. 108 and 109.

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-14 Error Code [4220, 4225, 4226] Detail Code 111

### 1. Error code definition

**Logic error (Detail code 111)**

### 2. Error definition and error detection method

An electronic circuit error on the INV board or fan board
An error detected when the output was stopped with a specific abnormal state not detected by the INV board or fan board electronic circuit

### 3. Cause, Check method and remedy

**In the case of 4220**

| Cause | Check method and remedy |
|---|---|
| (1) External noise | Refer to the following page(s). [8-9-1(2)[1] INV board error detection circuit check] |
| (2) INV board failure | |

**In the case of 4225 and 4226**

| Cause | Check method and remedy |
|---|---|
| (1) External noise | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |
| (2) Fan board failure | |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-15 Error Code [4220] Detail Code 129

### 1. Error code definition

**Control power supply error (Detail code 129)(outdoor unit)**

### 2. Error definition and error detection method

If insufficient drive voltage for relays (X001, X002, X003) on INV board is detected.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Faulty wiring | Check the wiring between the control board and INV board. |
| (2) Connector contact failure | Check the connectors CNRY on INV board and CNRYA on control board for proper connections. |
| (3) Control power supply drop | Disconnect the connector CNRYA from the control board and check the voltage at the connector CNRYA pins on the control board. If the voltage is 10 V or less, replace the control board. |
| (4) INV board failure | If the problem persists after reboot, replace the INV board. |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-16 Error Code [4220, 4225, 4226] Detail Code 131

### 1. Error code definition

**Low bus voltage at startup (Detail code 131) (YXU)**

### 2. Error definition and error detection method

When Vdc ≦350 V is detected just before the inverter operation. (YXU)

### 3. Cause, check method and remedy

### (1) Inverter main circuit failure

Same as detail code 108 of 4220, 4225, 4226 error

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-17 Error Code [4220, 4225, 4226] Detail Code 131

### 1. Error code definition

**Low bus voltage at startup (Detail code 131) (TXU)**

### 2. Error definition and error detection method

When Vdc ≦180 V is detected just before the inverter operation. (TXU)

### 3. Cause, check method and remedy

### (1) Inverter main circuit failure

Same as detail code 108 of 4220, 4225, 4226 error

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-18 Error Code [4230, 4235, 4236] Detail Code 125

### 1. Error code definition

**Heatsink overheat protection (Detail code 125)**

### 2. Error definition and error detection method

When the heat sink temperature (THHS) remains at or above TOH is detected.

| models | TOH |
|---|---|
| INV board | 100°C [212°F] |
| Fan board | 100°C [212°F] |

### 3. Cause, check method and remedy

| Cause | | Check method and remedy | |
|---|---|---|---|
| (1) | Fan board failure | | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |
| (2) | Outdoor fan failure | | Check the outdoor fan for proper operation.<br>Check the fan motor if problems are found with the operation of the fan. |
| (3) | Air passage blockage | | Check that the heat sink cooling air passage is not blocked. |
| (4) | THHS failure | 1) | Check the power modules and heatsink for proper mounting.<br>(Remove the inverter and check the status of the heat dissipation grease for the power module or the heat dissipation sheet.)<br>When heat dissipation grease is used, check for any missing application of the grease.<br>When heat dissipation sheet is used, check for the presence of the sheet and for damage or breakage of the sheet. |
| | | 2) | Check the THHS sensor reading on the LED monitor.<br>→ If the THHS value is abnormal, replace the INV board or the fan board that has the abnormal THHS value. |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-19 Error Code [4240, 4245, 4246]

### 1. Error code definition

**Overload protection (YXU)**

### 2. Error definition and error detection method

**In the case of 4240**

If the output current of "(Iac) >Imax (Arms)" or "THHS > TOL" is continuously detected for 10 minutes during inverter operation.

**In the case of 4245 and 4246**

If the output current of "(Iac) >Imax (Arms)" is continuously detected for 10 minutes during inverter operation.

For details of the model names and specified values, refer to the following page(s). The note of [7-1 Error Code and Preliminary Error Code Lists].

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) The control board SW7-1 (control board SW7-2 or fan board SW1-1 for 4245 and 4246) is on with the inverter output wiring connected. | Check the status of the control board SW7-1 (control board SW7-2 and fan board SW1-1 for 4245 and 4246). |
| (2) Power module contact failure | Check the power modules and heatsink for proper mounting.<br>(Remove the inverter and check the status of the heat dissipation grease for the power module or the heat dissipation sheet.)<br>When heat dissipation grease is used, check for any missing application of the grease.<br>When heat dissipation sheet is used, check for the presence of the sheet and for damage or breakage of the sheet. |
| (3) Air passage blockage | Check that the heat sink cooling air passage is not blocked. |
| (4) Power supply environment | Power supply voltage is 414 V or above. |
| (5) Inverter failure | Refer to the following page(s). [8-9 Troubleshooting Inverter Problems] |
| (6) Compressor failure (for 4240) | Check that the compressor has not overheated during operation.<br>→ Check the refrigerant circuit (oil return section).<br>Refer to the following page(s). [8-9-1(2)[2] Compressor ground fault and winding error check] |
| (7) Fan motor failure (for 4245 and 4246) | Check if the fan is locked. |
| (8) The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-20 Error Code [4240, 4245, 4246]

### 1. Error code definition

**Overload protection (TXU)**

### 2. Error definition and error detection method

**In the case of 4240**

If the output current of "(Iac) >Imax (Arms)" or "THHS > TOL" is continuously detected for 10 minutes during inverter operation.

**In the case of 4245 and 4246**

If the output current of "(Iac) >Imax (Arms)" is continuously detected for 10 minutes during inverter operation.

For details of the model names and specified values, refer to the following page(s). The note of [7-1 Error Code and Preliminary Error Code Lists].

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) The control board SW7-1 (control board SW7-2 or fan board SW1-1 for 4245 and 4246) is on with the inverter output wiring connected. | Check the status of the control board SW7-1 (control board SW7-2 and fan board SW1-1 for 4245 and 4246). |
| (2) Power module contact failure | Check the power modules and heatsink for proper mounting.<br>(Remove the inverter and check the status of the heat dissipation grease for the power module or the heat dissipation sheet.)<br>When heat dissipation grease is used, check for any missing application of the grease.<br>When heat dissipation sheet is used, check for the presence of the sheet and for damage or breakage of the sheet. |
| (3) Air passage blockage | Check that the heat sink cooling air passage is not blocked. |
| (4) Power supply environment | Power supply voltage is 188 V or above. |
| (5) Inverter failure | Refer to the following page(s). [8-9 Troubleshooting Inverter Problems] |
| (6) Compressor failure (for 4240) | Check that the compressor has not overheated during operation.<br>→ Check the refrigerant circuit (oil return section).<br>Refer to the following page(s). [8-9-1(2)[2] Compressor ground fault and winding error check] |
| (7) Fan motor failure (for 4245 and 4246) | Check if the fan is locked. |
| (8) The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-21 Error Code [4250, 4255, 4256] Detail Code 101

### 1. Error code definition

**IPM error (Detail code 101)**

### 2. Error definition and error detection method

**In the case of 4250**

If an overcurrent is detected by the overcurrent detection circuit on the INV board.

**In the case of 4255 and 4256**

If an error signal is detected from IPM on the fan board.

### 3. Cause, check method and remedy

**In the case of 4250**

| Cause | Check method and remedy |
|---|---|
| (1) Inverter output related | Refer to the following page(s).<br>[8-9-1(2)[1] INV board error detection circuit check]<br>[8-9-1(2)[2] Compressor ground fault and winding error check]<br>[8-9-1(2)[3] Inverter damage check (no load)]<br>[8-9-1(2)[4] Inverter damage check (during compressor operation)]<br>[8-9-2 Checking the Installation Conditions]<br>Check the IGBT module resistance value of the INV board, if no problems are found.<br>[8-9-6 Troubleshooting Problems with IGBT Module] |
| (2) The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |
| (3) Open phase in the power-supply due to improper power-supply wiring. | Refer to item (6) in section [6-1 Read before Test Run]. |

**In the case of 4255 and 4256**

| Cause | Check method and remedy |
|---|---|
| (1) Fan motor abnormality | Refer to the following page(s). [8-9-1(2)[5] Fan motor ground fault and winding error check] |
| (2) Fan board failure | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |
| (3) The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-22 Error Code [4250, 4255, 4256] Detail Code 104

### 1. Error code definition

**Short-circuited IPM/Ground fault (Detail code 104)**

### 2. Error definition and error detection method

When IPM/IGBT short damage or grounding on the load side is detected just before starting the inverter.

### 3. Cause, check method and remedy

**In the case of 4250**

| Cause | Check method and remedy |
|---|---|
| (1) Grounding fault compressor | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |
| (2) Inverter output related | Refer to the following page(s).<br>[8-9-1(2)[1] INV board error detection circuit check]<br>[8-9-1(2)[3] Inverter damage check (no load)]<br>[8-9-1(2)[4] Inverter damage check (during compressor operation)]<br>[8-9-2 Checking the Installation Conditions] |
| (3) Open phase in the power-supply due to improper power-supply wiring | Refer to item (6) in section [6-1 Read before Test Run] |

**In the case of 4255 and 4256**

| Cause | Check method and remedy |
|---|---|
| (1) Grounding fault of fan motor | Refer to the following page(s).<br>[8-9-1(2)[5] Fan motor ground fault and winding error check] |
| (2) Fan board failure | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-23 Error Code [4250, 4255, 4256] Detail Code 105

### 1. Error code definition

**Overcurrent error due to short-circuited motor (Detail code 105)**

### 2. Error definition and error detection method

If a short is detected in the compressor or fan motor just before starting the inverter operation.

### 3. Cause, Check method and remedy

**In the case of 4250**

| Cause | Check method and remedy |
|---|---|
| (1) Short-circuited compressor winding | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |
| (2) Inverter output wiring | Check for a short circuit. |

**In the case of 4255 and 4256**

| Cause | Check method and remedy |
|---|---|
| (1) Short-circuited fan motor winding | Refer to the following page(s).<br>[8-9-1(2)[5] Fan motor ground fault and winding error check] |
| (2) Fan inverter output wiring | Check for a short circuit. |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-24 Error Code [4250] Detail Code 106 and 107

### 1. Error code definition

**Instantaneous overcurrent (Detail code 106)**
**Overcurrent (effective value) (Detail code 107)**

### 2. Error definition and error detection method

When a current above the specified value is detected by the electric current sensor.

Refer to the following page(s). [7-1 Error Code and Preliminary Error Code Lists] for the details of model names and the specified values.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Inverter output related | Refer to the following page(s).<br>[8-9-1(2)[1] INV board error detection circuit check]<br>[8-9-1(2)[3] Inverter damage check (no load)]<br>[8-9-1(2)[4] Inverter damage check (during compressor operation)]<br>[8-9-2 Checking the Installation Conditions]<br>Check the IGBT module resistance value of the INV board, if no problems are found.<br>[8-9-6 Troubleshooting Problems with IGBT Module] |
| (2) The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-25 Error Code [4255, 4256] Detail Code 106

### 1. Error code definition

**Instantaneous overcurrent (Detail code 106)**

### 2. Error definition and error detection method

If the current sensor detects an overcurrent other than the specified value.

* For details of the model names and specified values, refer to the following page(s). The note of [7-1 Error Code and Preliminary Error Code Lists]

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Open phase of the fan board output | Check the connection of the fan board output line. |
| (2) | Air passage blockage | Check that the heat sink cooling air passage, such as heat exchangers, is not blocked. |
| (3) | Strong wind such as a gust | Check if there is strong wind such as a gust. |
| (4) | Fan motor failure | Check if the fan is locked. |
| (5) | Fan board failure | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |
| (6) | The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8). For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-26 Error Code [4255, 4256] Detail Code 137

### 1. Error code definition

**Motor synchronization loss (Detail code 137)**

### 2. Error definition and error detection method

If fan motor locking is detected during operation.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Fan motor locking | Check the fan blades for objects obstructing fan rotation. |
| (2) | Open phase of the fan board output | Check the connection of the fan board output wiring. |
| (3) | Fan motor failure | Refer to the following page(s).<br>[8-9-1(2)[5] Fan motor ground fault and winding error check] |
| (4) | Strong wind such as a gust | Check if there is strong wind such as a gust. |
| (5) | Fan board failure | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |
| (6) | The setting for the outdoor unit model selection switch is incorrect (control boards SW5-3 to 5-8). | Check the outdoor unit model selection switch (control boards SW5-3 to 5-8).<br>For details of the switch settings, refer to the following page(s). [5-1 Dipswitch Functions and Factory Settings] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-6-27 Error Code [4260]

### 1. Error code definition

**Heatsink overheat protection at startup**

### 2. Error definition and error detection method

When heatsink temperature (THHS) remains at or above 100°C [212°F] for 10 minutes or longer after inverter startup

### 3. Cause, check method and remedy

Same as 4230 error

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

# 7-7 Error Code Definitions and Solutions: Codes [5000 - 5999]

## 7-7-1 Error Code [5101, 5102, 5103, 5104]

### 1. Error code definition

**5101**
**Return air temperature sensor (TH21) fault (Indoor unit)**
**Return air temperature sensor (TH4) fault (OA processing unit)**

**5102**
**Pipe temperature sensor (TH22) fault (Indoor unit)**
**Pipe temperature sensor (TH2) fault (OA processing unit)**

**5103**
**Gas-side pipe temperature sensor (TH23) fault (Indoor unit)**
**Gas-side pipe temperature sensor (TH3) fault (OA processing unit)**

**5104**
**Intake air temperature sensor (TH1) fault (OA processing unit)**
**Intake air temperature sensor (TH24) fault (All-fresh (100% outdoor air) type indoor unit)**

### 2. Error definition and error detection method

- If a short or an open is detected during thermostat ON, the outdoor unit turns to anti-restart mode for 3 minutes. When the error is not restored after 3 minutes (if restored, the outdoor unit runs normally), the outdoor unit makes an error stop.
  Short: detectable at 90°C [194°F] or higher
  Open: detectable at -40°C [-40°F] or lower
- Sensor error at gas-side cannot be detected under the following conditions.
  - *During heating operation
  - *During cooling operation for 3 minutes after the compressor turns on.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Thermistor failure | Check the thermistor resistor.<br>0°C [32°F]: 15 kΩ<br>10°C [50°F]: 9.7 kΩ<br>20°C [68°F] : 6.4 kΩ<br>30°C [86°F] : 4.3 kΩ<br>40°C [104°F] : 3.1 kΩ |
| (2) | Connector contact failure | |
| (3) | Disconnected wire or partial disconnected thermistor wire | |
| (4) | Unattached thermistor or contact failure | |
| (5) | Indoor board (detection circuit) failure | Check the connector contact.<br>When no fault is found, the indoor board is a failure. |

## 7-7-2 Error Code [5103,5104,5105,5106,5107,5115]

### 1. Error code definition

**5103**
**Heat exchanger outlet temperature sensor (TH3) fault (Outdoor unit)**

**5104**
**Discharge temperature sensor (TH4) fault (Outdoor unit)**

**5105**
**Accumulator inlet temperature sensor (TH5) fault (Outdoor unit)**

**5106**
**Piping temperature sensor (TH6) fault (Outdoor unit)**

**5107**
**Outside temperature sensor (TH7) fault (Outdoor unit)**

**5115**
**Compressor shell bottom temperature sensor (TH15) fault (Outdoor unit)**

### 2. Error definition and error detection method

- When a short (high temperature intake) or an open (low temperature intake) of the thermistor is detected (the first detection), the outdoor unit stops, turns to anti-restart mode for 3 minutes, and restarts when the detected temperature of the thermistor.
- When a short or an open is detected again (the second detection) after the first restart of the outdoor unit, the outdoor unit stops, turns to anti-restart mode for 3 minutes, and restarts in 3 minutes when the detected temperature is within the normal range.
- When a short or an open is detected again (the third detection) after the previous restart of the outdoor unit, the outdoor unit makes an error stop.
- When a short or an open of the thermistor is detected just before the restart of the outdoor unit, the outdoor unit makes an error stop, and the error code "5102", "5103", "5104", "5105", "5106", "5107" or "5115" will appear.
- During 3-minute antirestart mode, preliminary errors will be displayed on the LED display.
- A short or an open described above is not detected for 10 minutes after the compressor start, during defrost mode, or for 3 minutes after defrost mode.
- Error code 5105 (Accumulator inlet temperature sensor (TH5) fault) is issued when the TH5 temperature exceeds 80°C to protect the fusible plug. Check if the fusible plug has melted when this error is issued.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Thermistor failure | Check thermistor resistance. |
| (2) | Pinched lead wire | Check for pinched lead wire. |
| (3) | Torn wire coating | Check for wire coating. |
| (4) | A pin on the male connector is missing or contact failure | Check connector. |
| (5) | Disconnected wire | Check for wire. |
| (6) | Thermistor input circuit failure on the control board | Check the intake temperature of the sensor with the LED monitor.<br>When the temperature is far different from the actual temperature, replace the control board. |

<Reference>

| | Short detection | Open detection |
|---|---|---|
| TH3 | 110°C [230°F] and above (0.4 kΩ and below) | -50°C [-58°F] and below (230 kΩ and above) |
| TH4 | 240°C [464°F] and above (0.57 kΩ and below) | -20°C [-4°F] and below (1880 kΩ and above) |
| TH5 | 80°C [176°F] and above (0.84 kΩ and below) | -50°C [-58°F] and below (230 kΩ and above) |
| TH6 | 110°C [230°F] and above (0.4 kΩ and below) | -50°C [-58°F] and below (230 kΩ and above) |
| TH7 | 110°C [230°F] and above (0.4 kΩ and below) | -50°C [-58°F] and below (230 kΩ and above) |
| TH15 | 110°C [230°F] and above (0.4 kΩ and below) | -50°C [-58°F] and below (230 kΩ and above) |

## 7-7-3 Error Code [5110]

### 1. Error code definition

**Heatsink temperature sensor (THHS) fault (Detail code 01, 05, 06)**

### 2. Error definition and error detection method

If a short or an open of THHS is detected just before or during the inverter operation.

### 3. Cause, check method and remedy

Detail code 01

| Cause | Check method and remedy |
|---|---|
| (1) INV board failure | If the problem recurs when the unit is put into operation, replace the INV board. |

Detail code 05, 06

| Cause | Check method and remedy |
|---|---|
| (1) Fan board failure | If the problem recurs when the unit is put into operation, replace the fan board. |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-4 Error Code [5111,5112,5114,5115,5116]

### 1. Error code definition

**5111**
**Liquid inlet temperature sensor (TH11) fault (BC controller)**

**5112**
**Bypass outlet temperature sensor (TH12) fault (BC controller)**

**5114**
**LEV4 outlet temperature sensor (TH14) fault (BC controller)**

**5115**
**LEV3(a) outlet temperature sensor (TH15) fault (BC controller)**

**5116**
**LEV3(a) inlet temperature sensor (TH16) fault (BC controller)**

### 2. Error definition and error detection method

- If a shorted (high temperature intake) or open (low temperature intake) thermistor (TH11, TH12, TH14, TH15, or TH16) is detected during operation, and an error code "5111," "5112," "5114," "5115," or "5116" will appear. The unit will continue its operation by using other sensors as a backup.
- Detection of a short- or open-circuit as described above is suspended during the defrost cycle and for 3 minutes after the operation mode is changed.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Thermistor failure | Check thermistor resistance. |
| (2) | Pinched lead wire | Check for pinched lead wire. |
| (3) | Torn wire coating | Check for wire coating. |
| (4) | A pin on the male connector is missing or contact failure | Check connector. |
| (5) | Disconnected wire | Check for wire. |
| (6) | Thermistor input circuit failure on the control board | Check the intake temperature of the sensor with the LED monitor. When the temperature is far different from the actual temperature, replace the control board. |

<Reference>

| | Short detection | Open detection |
|---|---|---|
| TH11 | 110°C [230°F ] and above (0.57 kΩ) | -40°C [ -40°F ] and below (130 kΩ) |
| TH12 | 110°C [230°F ] and above (0.57 kΩ) | -40°C [ -40°F ] and below (130 kΩ) |
| TH14 | 110°C [230°F ] and above (0.57 kΩ) | -40°C [ -40°F ] and below (130 kΩ) |
| TH15 | 110°C [230°F ] and above (0.57 kΩ) | -40°C [ -40°F ] and below (130 kΩ) |
| TH16 | 110°C [230°F ] and above (0.57 kΩ) | -40°C [ -40°F ] and below (130 kΩ) |

## 7-7-5 Error Code [5201]

### 1. Error code definition

**High-pressure sensor fault (63HS1)**

### 2. Error definition and error detection method

- If the high pressure sensor detects 0.098MPa [14psi] or less during the operation, the outdoor unit stops once, turns to anti-restart mode for 3 minutes, and restarts after 3 minutes when the detected high pressure sensor is 0.098MPa [14psi] or more.
- If the high pressure sensor detects 0.098MPa [14psi] or less just before the restart, the outdoor unit makes an error stop, and the error code "5201" will appear.
- During 3-minute antirestart mode, preliminary errors will be displayed on the LED display.
- A error is not detected for 3 minutes after the compressor start, during defrost operation, or 3 minutes after defrost operation.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | High pressure sensor failure | Refer to the following page(s). [8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure] |
| (2) | Pressure drop due to refrigerant leak | Check for refrigerant leakage |
| (3) | Torn wire coating | Check for damaged wire coating |
| (4) | A pin on the male connector is missing or contact failure | Check whether a connector pin is missing |
| (5) | Disconnected wire | Check for disconnected or broken wire |
| (6) | High pressure sensor input circuit failure on the control board | Check the temperature detected by the sensor from the LED monitor. If the tempera-tureis significantly different from the actual temperature, replace the control board. |

## 7-7-6 Error Code [5201, 5203]

### 1. Error code definition

**5201**
**High-pressure sensor fault (BC controller PS1)**

**5203**
**Intermediate pressure sensor fault (BC controller PS3)**

### 2. Error definition and error detection method

When a pressure sensor reading of 4.06 MPa [589 psi] or above OR 0.098Mpa[142psi] or below is detected, error codes "5201" OR "5203" will appear.
The unit will continue its operation by using other sensors as a backup.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | High pressure sensor failure | Refer to the following page(s). [8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure] |
| (2) | Torn wire coating | Check for damaged wire coating |
| (3) | A pin on the male connector is missing or contact failure | Check whether a connector pin is missing |
| (4) | Disconnected wire | Check for disconnected or broken wire |
| (5) | High pressure sensor input circuit failure on the control board | Check the temperature detected by the sensor from the LED monitor. If the temperature is significantly different from the actual temperature, replace the control board. |

## 7-7-7 Error Code [5301] Detail Code 115

### 1. Error code definition

**ACCT sensor fault (Detail code 115) (YXU)**

### 2. Error definition and error detection method

When the formula "output current < 1.0 Arms" remains satisfied for 10 seconds while the inverter is in operation.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) INV output phase loss | Check the output wire for proper connection. |
| (2) Compressor failure | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |
| (3) INV board failure | Replace the INV board if the problem persists after the operation is resumed. |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-8 Error Code [5301] Detail Code 115

### 1. Error code definition

**ACCT sensor fault (Detail code 115) (TXU)**

### 2. Error definition and error detection method

When the formula "output current < 1.8 Arms" remains satisfied for 10 seconds while the inverter is in operation.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) INV output phase loss | Check the output wire for proper connection. |
| (2) Compressor failure | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |
| (3) INV board failure | Replace the INV board if the problem persists after the operation is resumed. |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-9 Error Code [5301] Detail Code 117

### 1. Error code definition

**ACCT sensor circuit fault (Detail code 117)**

### 2. Error definition and error detection method

When an error value is detected with the ACCT detection circuit just before the inverter starts

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) INV board failure | Refer to the following page(s).<br>[8-9-1(2)[1] INV board error detection circuit check]<br>[8-9-1(2)[3] Inverter damage check (no load)]<br>[8-9-1(2)[4] Inverter damage check (during compressor operation)] |
| (2) Compressor failure | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-10 Error Code [5301] Detail Code 119

### 1. Error code definition

**Open-circuited IPM/Loose ACCT connector (Detail code 119)**

### 2. Error definition and error detection method

Presence of enough current cannot be detected during the self-diagnostic operation immediately before inverter startup.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Inverter output wiring failure | Check the output wiring connections.<br>Check if the U- and W-phase output wires penetrate through CT001 and CT002 on the INV board. |
| (2) Inverter failure | Refer to the following page(s).<br>[8-9-1(2)[3] Inverter damage check (no load)]<br>[8-9-1(2)[4] Inverter damage check (during compressor operation)] |
| (3) Compressor failure | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-11 Error Code [5301] Detail Code 120

### 1. Error code definition

**Faulty ACCT wiring (Detail code 120)**

### 2. Error definition and error detection method

Presence of target current cannot be detected during the self-diagnostic operation immediately before startup.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Inverter output wiring failure | Check the output wiring connections.<br>Check if the U- and W-phase output wires penetrate through CT001 and CT002 on the INV board. |
| (2) Inverter failure | Refer to the following page(s).<br>[8-9-1(2)[3] Inverter damage check (no load)]<br>[8-9-1(2)[4] Inverter damage check (during compressor operation)] |
| (3) Compressor failure | Refer to the following page(s).<br>[8-9-1(2)[2] Compressor ground fault and winding error check] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-12 Error Code [5305, 5306] Detail Code 135

### 1. Error code definition

**Current sensor fault (Detail code 135)**

### 2. Error definition and error detection method

Detection of output current below 0.2 Arms(*) for 10 continuous seconds while fan motor is in operation.
*For TXU models with two motors, the threshold is 0.3 Arms.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Open output phase of fan board | Check the output wiring from the fan board for proper connection. |
| (2) Fan motor error | Refer to the following page(s).<br>[8-9-1(2)[5] Fan motor ground fault and winding error check] |
| (3) Fan board failure | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-13 Error Code [5305, 5306] Detail Code 136

### 1. Error code definition

**Current sensor circuit fault (Detail code 136)**

### 2. Error definition and error detection method

Detection of abnormal value by the current detection circuit on the fan board before the startup of fan motor

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Fan board fault | Refer to the following page(s).<br>[8-9-1(2)[6] Fan board error detection circuit check (no load)]<br>[8-9-1(2)[7] Fan inverter damage check (no load)]<br>[8-9-1(2)[8] Fan inverter damage check (with load)] |

**Note**

For inverter-related error codes, refer to the following page(s). [8-9 Troubleshooting Inverter Problems]

## 7-7-14 Error Code [5558]

### 1. Error code definition

**Refrigerant sensor error**

### 2. Error definition and error detection method

If the indoor unit refrigerant sensor has an error.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Refrigerant sensor failure | Replace the refrigerant sensor. |
| (2) Wiring failure | Check the wiring of the refrigerant sensor. |
| (3) A disconnected connector of the built-in refrigerant sensor in the indoor unit | Check the connector status (CNSA) on the indoor unit board. |
| (4) If the refrigerant sensor is removed. | ⬩Install the refrigerant sensor.<br>⬩When removing the refrigerant sensor, refer to the following page(s). [11-9-2 Checking and Changing the System Configuration] |

## 7-7-15 Error Code [5701]

### 1. Error code definition

**Loose float switch connector**

### 2. Error definition and error detection method

Detection of the disconnected float switch (open-phase condition) during operation

### 3. Cause, check method and remedy

### (1) CN4F disconnection or contact failure

Check for disconnection of the connector (CN4F) on the indoor unit control board.

# 7-8 Error Code Definitions and Solutions: Codes [6000 - 6999]

## 7-8-1 Error Code [6201]

### 1. Error code definition

**Remote controller board fault (nonvolatile memory error)**

### 2. Error definition and error detection method

This error is detected when the data cannot be read out from the built-in nonvolatile memory on the remote controller.

### 3. Cause, check method and remedy

### (1) Remote controller failure

Replace the remote controller.

## 7-8-2 Error Code [6202]

### 1. Error code definition

**Remote controller board fault (clock IC error)**

### 2. Error definition and error detection method

This error is detected when the built-in clock on the remote controller is not properly functioning.

### 3. Cause, check method and remedy

### (1) Remote controller failure

Replace the remote controller.

## 7-8-3 Error Code [6600]

### 1. Error code definition

**Address overlaps**

### 2. Error definition and error detection method

An error in which signals from more than one indoor units with the same address are received
Detail code 001: Detection of overlapped address in centralized control system
Detail code 002: Detection of overlapped address in indoor unit system

Note

**The address and attribute that appear on the remote controller indicate the controller that detected the error.**

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Two or more of the following have the same address: Outdoor units, BC controllers, indoor units, LOSSNAY units, controllers such as ME remote controllers.<br><Example><br>6600 "01" appears on the remote controller<br>Unit #01 detected the error.<br>Two or more units in the system have 01 as their address.<br>(2) Signals are distorted by the noise on the transmission line. | ⬩Find the unit that has the same address as that of the error source.<br>**Once the unit is found, correct the address. Then, turn off the outdoor units, indoor units, BC controllers, and LOSSNAY units, keep them all turned off for at least five minutes, and turn them back on.**<br>⬩When air conditioning units are operating normally despite the address overlap error<br>Check the transmission wave shape and noise on the transmission line.<br>Refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference] |

## 7-8-4 Error Code [6601]

### 1. Error code definition

**Polarity setting error**

### 2. Error definition and error detection method

The error detected when transmission processor cannot distinguish the polarities of the M-NET transmission line.

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) No voltage is applied to the M-NET transmission line that AE-C/EW-C are connected to.<br>(2) M-NET transmission line to which AE-C/EW-C are connected is short-circuited.<br>(3) When two or more power supplies are connected to the M-NET | Check if power is supplied to the M-NET transmission line of the AE-C/EW-C, and correct any problem found. |

## 7-8-5 Error Code [6602]

### 1. Error code definition

**Transmission processor hardware error**

### 2. Error definition and error detection method

Although "0" was surely transmitted by the transmission processor, "1" is displayed on the transmission line.
Detail code 001: Transmission processor hardware error in centralized control system
Detail code 002: Transmission processor hardware error in indoor unit system

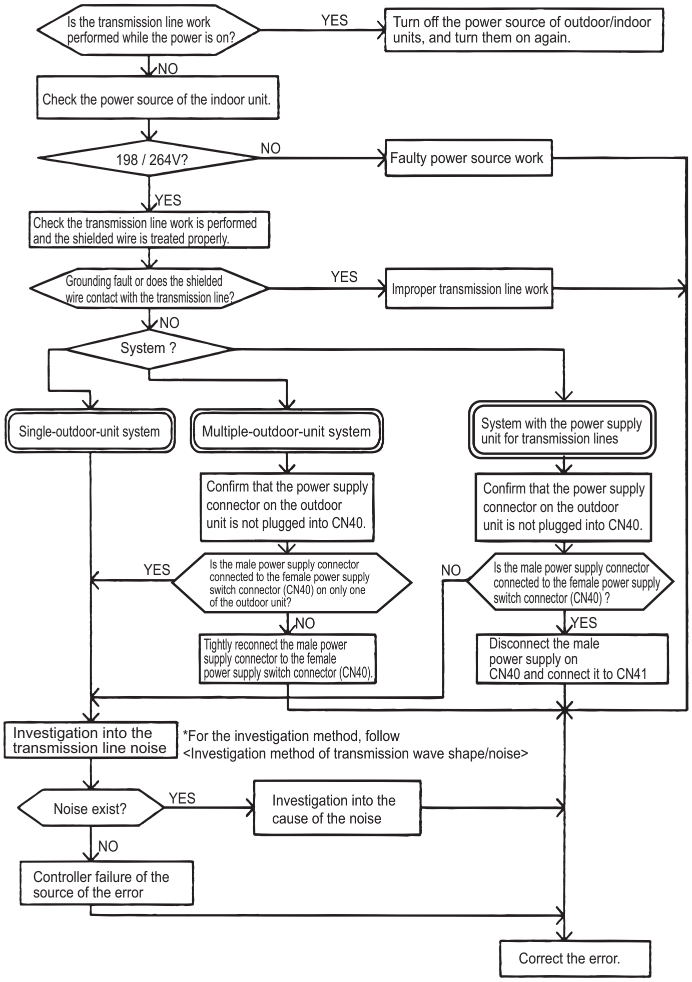
**Note**

**The address/attribute appeared on the display on the remote controller indicates the controller where an error occurred.**

### 3. Cause

1) When the wiring work of or the polarity of either the indoor or outdoor transmission line is performed or is changed while the power is on, the transmitted data will collide, the wave shape will be changed, and an error will be detected.
2) Grounding fault of the transmission line
3) When grouping the indoor units that are connected to different outdoor units, the male power supply connectors on the multiple outdoor units are connected to the female power supply switch connector (CN40).
4) When the power supply unit for transmission lines is used in the system connected with MELANS, the male power supply connector is connected to the female power supply switch connector (CN40) on the outdoor unit.
5) Controller failure of the source of the error
6) When the transmission data is changed due to the noise on the transmission line
7) Voltage is not applied on the transmission line for centralized control (in case of grouped indoor units connected to different outdoor units or in case of the system connected with MELANS)

### 4. Check method and remedy



## 7-8-6 Error Code [6603]

### 1. Error code definition

**Transmission line bus busy error**

### 2. Error definition and error detection method

- Generated error when the command cannot be transmitted for 4-10 minutes in a row due to bus-busy
- Generated error when the command cannot be transmitted to the transmission line for 4-10 minutes in a row due to noise

Detail code 001: Transmission Bus-Busy error in centralized control system
Detail code 002: Transmission Bus-Busy error in indoor unit system

**Note**

**The address/attribute appeared on the display on the remote controller indicates the controller where an error occurred.**

### 3. Cause, check method and remedy

| | Cause | Check method and remedy |
|---|---|---|
| (1) | The transmission processor cannot be transmitted as the short-wavelength voltage like noise exists consecutively on the transmission line. | Check the transmission wave shape and noise on the transmission line.<br>Refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference]<br>→ No noise indicates that the error source controller is a failure.<br>→ If noise exists, investigate the noise. |
| (2) | Error source controller failure | |

## 7-8-7 Error Code [6606]

### 1. Error code definition

**Communication error between device processor and transmission processor or M-NET processor**

### 2. Error definition and error detection method

Communication error between device processor on circuit board and transmission processor or M-NET processor
Detail code 003: Communication error between device processor on circuit board and M-NET processor

**Note**

**The address/attribute appeared on the display on the remote controller indicates the controller where an error occurred.**

### 3. Cause, check method and remedy

| | Cause | Check method and remedy |
|---|---|---|
| (1) | Data is not properly transmitted due to accidental erroneous operation of the controller of the error source. | Turn off the power source of the outdoor and the indoor units.(When the power source is turned off separately, the microcomputer will not be reset, and the error will not be corrected.)<br>→ If the same error occurs, the error source controller is a failure. |
| (2) | Error source controller failure | |

## 7-8-8 Error Code [6607] Error Source Address = Outdoor Unit (OC)

### 1. Error code definition

**No ACK error**

### 2. Error definition and error detection method

The error is detected when no acknowledgement (ACK signal) is received after the transmission. (eg. When the data is transmitted six times in a row with 30 seconds interval, the error is detected on the transmission side.)

**Note**

**The address/attribute appeared on the display on the remote controller indicates the controller which did not provide the response (ACK).**

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Incidental cause | 1) Check whether Error Code [Er91] is displayed on the service LED on the outdoor unit. |
| (2) Contact failure of transmission line of OC or IC | 2) If the code is not displayed, turn off the power to the outdoor unit, and then turn it back on. |
| (3) Decrease of transmission line voltage/signal by exceeding acceptable range of transmission wiring.<br>Farthest: 200 m [656ft] or less<br>Remote controller wiring:<br>10m [32ft] or less | 3) If the error is accidental, it will run normally. If not, check the causes (2) - (5).<br>* Skip check item 1) on the outdoor unit whose firmware does not need to be updated. |
| (4) Erroneous sizing of transmission line (Not within the range below).<br>Wire diameter:<br>1.25mm$^2$ [AWG16] or more | |
| (5) Outdoor unit control board failure | |
| (6) Firmware update error on the outdoor unit | |

## 7-8-9 Error Code [6607] Error Source Address = BC controller (BC)

### 1. Error code definition

**No ACK error**

### 2. Error definition and error detection method

The error is detected when no acknowledgement (ACK signal) is received after the transmission. (eg. When the data is transmitted six times in a row with 30 seconds interval, the error is detected on the transmission side.)

Note

**The address/attribute appeared on the display on the remote controller indicates the controller which did not provide the response (ACK).**

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Incidental cause | 1) Turn off the power to the outdoor unit and the BC controller, leave them turned off for at least 5 minutes, and then turn them back on. |
| (2) When BC controller address is changed or modified during operation. | 2) If the error is accidental, it will run normally. If not, check the causes (2) - (4). |
| (3) Faulty or disconnected transmission wiring of BC controller | |
| (4) Faulty control board of BC controller | |

## 7-8-10 Error Code [6607] Error Source Address = Indoor Unit (IC)

### 1. Error code definition

**No ACK error**

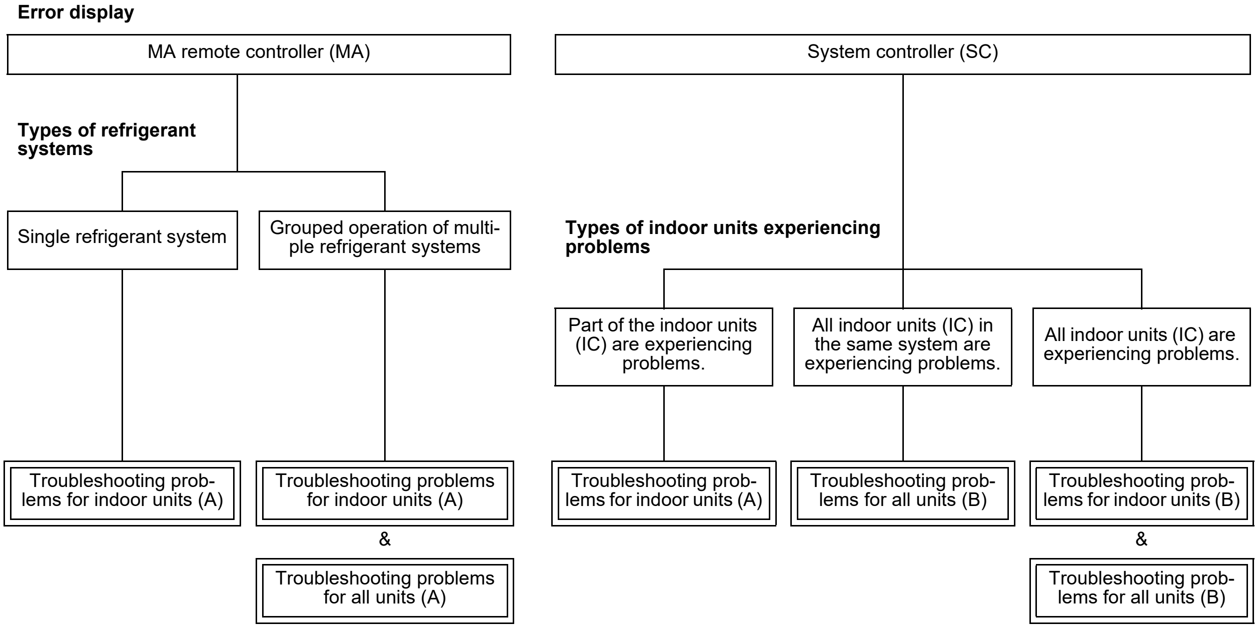
### 2. Error definition and error detection method

The error is detected when no acknowledgement (ACK signal) is received after the transmission. (eg. When the data is transmitted six times in a row with 30 seconds interval, the error is detected on the transmission side.)

Note

**The address/attribute appeared on the display on the remote controller indicates the controller which did not provide the response (ACK).**

### 3. Cause, check method and remedy



### (1) Troubleshooting problems for indoor units (A)

| Cause | Check method and remedy |
|---|---|
| (1) Incidental cause<br>(2) When IC unit address is changed or modified during operation.<br>(3) Faulty or disconnected IC transmission wiring<br>(4) Disconnected IC connector (CN2M)<br>(5) Indoor unit controller failure | 1) Turn off the outdoor/indoor units for 5 or more minutes, and turn them on again.<br>2) If the error is accidental, it will run normally. If not, check the causes (2) - (5). |

## (2) Troubleshooting problems for indoor units (B)

| Cause | Check method and remedy |
|---|---|
| (1) When the power supply unit for transmission lines is used and the male power supply connector is connected to the female power supply switch connector (CN40) for the transmission line for centralized control<br>(2) Disconnection or shutdown of the power source of the power supply unit for transmission line | 1) Check voltage of the transmission line for centralized control.<br>♦20 V or more: Check (1) on the left.<br>♦Less than 20 V: Check (2) on the left. |
| (3) System controller (MELANS) malfunction | 2) Check the causes of the error indicated by the error codes listed in items (1) through (3) in the "Cause" column. |

## 7-8-11 Error Code [6607] Error Source Address = LOSSNAY (LC)

### 1. Error code definition

**No ACK error**

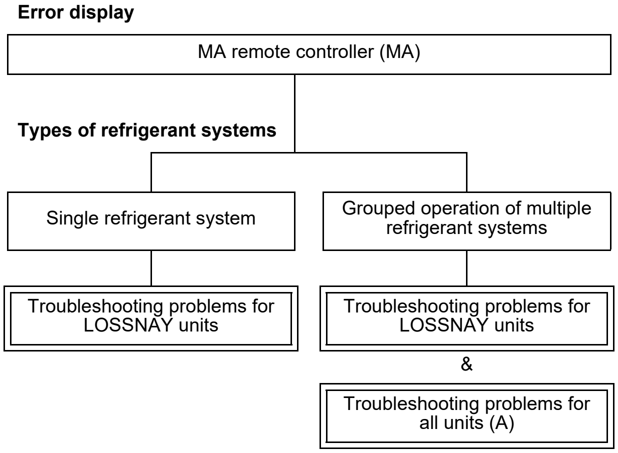
### 2. Error definition and error detection method

The error is detected when no acknowledgement (ACK signal) is received after the transmission. (eg. When the data is transmitted six times in a row with 30 seconds interval, the error is detected on the transmission side.)

Note

**The address/attribute appeared on the display on the remote controller indicates the controller which did not provide the response (ACK).**

### 3. Cause, check method and remedy



### (1) Troubleshooting problems for LOSSNAY units

| Cause | Check method and remedy |
|---|---|
| (1) Incidental cause | 1) Turn off the power source of LOSSNAY and turn it on again. |
| (2) The power source of LOSSNAY has been shut off. | 2) If the error is accidental, it will run normally.<br>If not, check the causes (2) - (6). |
| (3) When the address of LOSSNAY is changed in the middle of the operation | |
| (4) Faulty or disconnected transmission wiring of LOSSNAY | |
| (5) Disconnected connector (CN1) on LOSSNAY | |
| (6) Controller failure of LOSSNAY | |

## 7-8-12 Error Code [6607] Error Source Address = System Controller

### 1. Error code definition

**No ACK error**

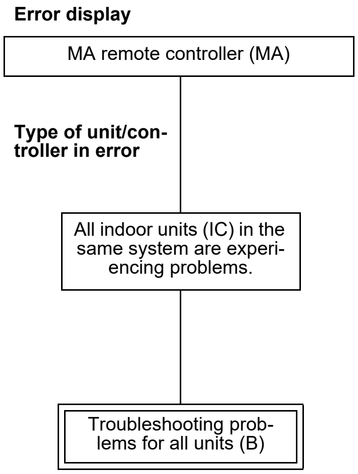
### 2. Error definition and error detection method

The error is detected when no acknowledgement (ACK signal) is received after the transmission. (eg. When the data is transmitted six times in a row with 30 seconds interval, the error is detected on the transmission side.)

**Note**

**The address/attribute appeared on the display on the remote controller indicates the controller which did not provide the response (ACK).**

### 3. Cause, check method and remedy



## 7-8-13 Error Code [6607] All Error Source Addresses

### 1. Error code definition

**No ACK error**

### 2. Error definition and error detection method

The error is detected when no acknowledgement (ACK signal) is received after the transmission. (eg. When the data is transmitted six times in a row with 30 seconds interval, the error is detected on the transmission side.)

**Note**

**The address/attribute appeared on the display on the remote controller indicates the controller which did not provide the response (ACK).**

### 3. Cause, check method and remedy

### (1) Troubleshooting problems for all units (A)

| Cause | Check method and remedy |
|---|---|
| (1) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7) | 1) Check the causes of (1) - (4). If the cause is found, correct it. If no cause is found, check 2). |
| (2) When multiple outdoor units are connected and the power source of one of the outdoor units has been shut off. | 2) Check the LED displays for troubleshooting on other remote controllers whether an error occurs.<br>⬩When an error is present<br>Check the causes of the error indicated by the error codes listed in item (4) in the "Cause" column.<br>⬩When no errors are present<br>Indoor unit circuit board failure |
| (3) The male power supply connector of the outdoor unit is not connected to the female power supply switch connector (CN40). | |
| (4) The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for centralized control.<br>If an error occurs, after the unit runs normally once, the following causes may be considered.<br>⬩Total capacity error (7100)<br>⬩Capacity code error (7101)<br>⬩Error in the number of connected units (7102)<br>⬩Address setting error (7105) | |

### (2) Troubleshooting problems for all units (B)

| Cause | Check method and remedy |
|---|---|
| (1) Total capacity error (7100) | 1) Check the LED display for troubleshooting on the outdoor unit.<br>⬩When an error is present<br>Check the causes of the error indicated by the error codes listed in items (1) through (4) in the "Cause" column.<br>⬩When no errors are present<br>Check the causes of the error indicated by the error codes listed in items (5) through (7) in the "Cause" column. |
| (2) Capacity code error (7101) | |
| (3) Error in the number of connected units (7102) | |
| (4) Address setting error (7105) | |
| (5) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7) | |
| (6) Turn off the power source of the outdoor unit | |
| (7) Malfunction of electrical system for the outdoor unit | |

## 7-8-14 Error Code [6608]

### 1. Error code definition

**No response error**

### 2. Error definition and error detection method

- When no response command is returned although acknowledgement (ACK) is received after transmission, an error is detected.
- When the data is transmitted 10 times in a row with 3 seconds interval, an error is detected on the transmission side.

Note

**The address/attribute appeared on the display on the remote controller indicates the controller where an error occurred.**

### 3. Cause

1) The transmission line work is performed while the power is on, the transmitted data will collide, and the wave shape will be changed.
2) The transmission is sent and received repeatedly due to noise.
3) Decrease of transmission line voltage/signal by exceeding acceptable range of transmission wiring.

   Farthest:200m [656ft] or less
   Remote controller wiring:12m [39ft] or less
4) The transmission line voltage/signal is decreased due to erroneous sizing of transmission line.

   Wire diameter: 1.25mm$^2$[AWG16] or more

### 4. Check method and remedy

1) When an error occurs during commissioning, turn off the power sources for the outdoor unit, indoor unit, BC controller, and LOSSNAY for 5 or more minutes, and then turn them on again.
   - When they return to normal operation, the cause of the error is the transmission line work performed with the power on.
   - If an error occurs again, check the cause 2).
2) Check 3) and 4) above.
   - If the cause is found, correct it.
   - If no cause is found, check 3).
3) Check the transmission waveform, and check the transmission line for electrical noise. For details, refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference]

   **Noise is the most possible cause of the error "6608".**

## 7-8-15 Error Code [6815]

### 1. Error code definition

**Supervisor remote controller communication error**

### 2. Error definition and error detection method

If an error is detected in communication with the MA remote controller set as the supervisor remote controller.

### 3. Cause

1) Cable contact failure of the MA remote controller set as the supervisor remote controller or the MA remote controller for the indoor unit
2) The wiring specifications are not met.
   - Cable length
   - Cable width
   - The number of remote controllers
   - The number of indoor units
3) A connected MA remote controller was removed without turning off the power.
4) Noise in the MA remote controller signal transmission line
5) Failure of the circuit that receives signals from the MA remote controller, which is on the indoor unit board
6) Sending/receiving circuit failure of the MA remote controller

### 4. Check method and remedy

1) Check for a disconnected or loose transmission line of the MA remote controller for the indoor unit or that set as the supervisor remote controller.
2) Check the main power and power supply to the remote controller.
3) Check if the MA remote controller cable exceeds the allowable ranges.
4) Check if the MA remote controllers have been set as the main or supervisor remote controller. Set one of them as the supervisor remote controller.
5) Perform the remote controller diagnosis. (Refer to the Installation Manual for the remote controller.)
   [OK]: No problem with the remote controller (Check the wiring specifications.)
   [NG]: Replace the remote controller.
   [6832, 6833, ERC]: Noise is causing the problem. Go to 6).
6) Investigate the waveforms and noise of the signals transmitted in the MA remote controller cable.
   For the investigation method, refer to the Service Handbook for the outdoor unit.
7) When there is no problem in 1) to 6) above, replace the indoor unit board or the MA remote controller set as the supervisor remote controller.

- The main power to the indoor unit is on when the LED 1 is lit.
- The power is supplied to the MA remote controller cable when the LED 2 is lit.

## 7-8-16 Error Code [6831]

### 1. Error code definition

**MA remote controller signal reception error (No signal reception)**

### 2. Error definition and error detection method

- Communication between the MA remote controller and the indoor unit is not done properly.
- No proper data has been received for 3 minutes.

### 3. Cause

1) Contact failure of the remote controller lines of MA remote controller or the indoor unit.
2) All the remote controllers are set to SUB.
3) Failure to meet wiring regulations
    - Wire length
    - Wire size
    - Number of remote controllers
    - Number of indoor units
4) The remote controller is removed after the installation without turning the power source off.
5) Noise interference on the remote controller transmission lines
6) Faulty circuit that is on the indoor board and performs transmission/ reception of the signal from the remote controller
7) Problems with the circuit on the remote controller that sends or receives the signals from the remote controller

### 4. Check method and remedy

1) Check for disconnected or loose transmission lines for the indoor units or MA remote controllers.
2) Confirm that the power is supplied to the main power source and the remote controller line.
3) Confirm that MA remote controller's capacity limit is not exceeded.
4) Check the sub/main setting of the MA remote controllers.One of them must be set to MAIN.
5) Diagnose the remote controller (described in the remote controller installation manual).
    [OK]: no problems with the remote controller (check the wiring regulations)
    [NG]: Replace the MA remote controller.
    [6832, 6833, ERC]: Due to noise interference <Go to 6)>
6) Check the transmission waveform, and check the MA remote controller line for electrical noise. For details, refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference]
7) When no problems are found with items 1) through 6), replace the indoor unit board or the MA remote controller.
    The following status can be confirmed on LED1 and 2 on the indoor unit board.
    - If LED1 is lit, the main power source of the indoor unit is turned on.
    - If LED2 is lit, the MA remote controller line is being powered.

## 7-8-17 Error Code [6832]

### 1. Error code definition

**MA remote controller signal transmission error (Synchronization error)**

### 2. Error definition and error detection method

- ⬩MA remote controller and the indoor unit is not done properly.
- ⬩Failure to detect opening in the transmission path and unable to send signals
  - ∗Indoor unit: 3 minutes
  - ∗Remote controller: 6 seconds

### 3. Cause

1) Contact failure of the remote controller lines of MA remote controller or the indoor unit
2) 2 or more remote controllers are set to MAIN
3) Overlapped indoor unit address
4) Noise interference on the remote controller lines
5) Failure to meet wiring regulations
   - ⬩Wire length
   - ⬩Wire size
   - ⬩Number of remote controllers
   - ⬩Number of indoor units
6) Problems with the circuit on the remote controller that sends or receives the signals from the remote controller

### 4. Check method and remedy

1) Check for disconnected or loose transmission lines for the indoor units or MA remote controllers.
2) Confirm that the power is supplied to the main power source and the remote controller line.
3) Confirm that MA remote controller's capacity limit is not exceeded.
4) Check the sub/main setting of the MA remote controllers.One of them must be set to MAIN.
5) Diagnose the remote controller (described in the remote controller installation manual).
   [OK]: no problems with the remote controller (check the wiring regulations)
   [NG]: Replace the MA remote controller.
   [6832, 6833, ERC]: Due to noise interference <Go to 6)>
6) Check the transmission waveform, and check the MA remote controller line for electrical noise. For details, refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference]
7) When no problems are found with items 1) through 6), replace the indoor unit board or the MA remote controller.
   The following status can be confirmed on LED1 and 2 on the indoor unit board.
   - ⬩If LED1 is lit, the main power source of the indoor unit is turned on.
   - ⬩If LED2 is lit, the MA remote controller line is being powered.

## 7-8-18 Error Code [6833]

### 1. Error code definition

**MA remote controller signal transmission error (Hardware error)**

### 2. Error definition and error detection method

- Communication between the MA remote controller and the indoor unit is not done properly.
- An error occurs when the transmitted data and the received data differ for 30 times in a row.

### 3. Cause

1) Contact failure of the remote controller lines of MA remote controller or the indoor unit
2) 2 or more remote controllers are set to MAIN
3) Overlapped indoor unit address
4) Noise interference on the remote controller lines
5) Failure to meet wiring regulations
    - Wire length
    - Wire size
    - Number of remote controllers
    - Number of indoor units
6) Problems with the circuit on the remote controller that sends or receives the signals from the remote controller

### 4. Check method and remedy

1) Check for disconnected or loose transmission lines for the indoor units or MA remote controllers.
2) Confirm that the power is supplied to the main power source and the remote controller line.
3) Confirm that MA remote controller's capacity limit is not exceeded.
4) Check the sub/main setting of the MA remote controllers.One of them must be set to MAIN.
5) Diagnose the remote controller (described in the remote controller installation manual).
    [OK]: no problems with the remote controller (check the wiring regulations)
    [NG]: Replace the MA remote controller.
    [6832, 6833, ERC]: Due to noise interference <Go to 6)>
6) Check the transmission waveform, and check the MA remote controller line for electrical noise. For details, refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference]
7) When no problems are found with items 1) through 6), replace the indoor unit board or the MA remote controller.
    The following status can be confirmed on LED1 and 2 on the indoor unit board.
    - If LED1 is lit, the main power source of the indoor unit is turned on.
    - If LED2 is lit, the MA remote controller line is being powered.

## 7-8-19 Error Code [6834]

### 1. Error code definition

**MA remote controller signal reception error (Start bit detection error)**

### 2. Error definition and error detection method

- Communication between the MA remote controller and the indoor unit is not done properly.
- No proper data has been received for 2 minutes.

### 3. Cause

1) Contact failure of the remote controller lines of MA remote controller or the indoor unit.
2) All the remote controllers are set to SUB.
3) Failure to meet wiring regulations
    - Wire length
    - Wire size
    - Number of remote controllers
    - Number of indoor units
4) The remote controller is removed after the installation without turning the power source off.
5) Noise interference on the remote controller transmission lines
6) Faulty circuit that is on the indoor board and performs transmission/ reception of the signal from the remote controller
7) Problems with the circuit on the remote controller that sends or receives the signals from the remote controller

### 4. Check method and remedy

1) Check for disconnected or loose transmission lines for the indoor units or MA remote controllers.
2) Confirm that the power is supplied to the main power source and the remote controller line.
3) Confirm that MA remote controller's capacity limit is not exceeded.
4) Check the sub/main setting of the MA remote controllers.One of them must be set to MAIN.
5) Diagnose the remote controller (described in the remote controller installation manual).
    [OK]: no problems with the remote controller (check the wiring regulations)
    [NG]: Replace the MA remote controller.
    [6832, 6833, ERC]: Due to noise interference <Go to 6)>
6) Check the transmission waveform, and check the MA remote controller line for electrical noise. For details, refer to the following page(s). [8-3 Checking Transmission Waveform and for Electrical Noise Interference]
7) When no problems are found with items 1) through 6), replace the indoor unit board or the MA remote controller.
    The following status can be confirmed on LED1 and 2 on the indoor unit board.
    - If LED1 is lit, the main power source of the indoor unit is turned on
    - If LED2 is lit, the MA remote controller line is being powered.

## 7-8-20 Error Code [6840]

### 1. Error code definition

**Indoor-outdoor communication: Reception error**

### 2. Error definition and error detection method

- Abnormal if indoor controller board could not receive any signal normally for 6 minutes after turning the power on
- Abnormal if indoor controller board could not receive any signal normally for 3 minutes.
- Consider the unit as abnormal under the following condition. When 2 or more indoor units are connected to an outdoor unit, indoor controller board could not receive a signal for 3 minutes from outdoor controller circuit board, a signal which allows outdoor controller circuit board to transmit signals.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Contact failure, short circuit or miswiring (converse wiring) of indoor/outdoor unit connecting wire. | Check disconnecting or looseness of indoor /outdoor unit connecting wire of indoor unit or outdoor unit. Check all the units in case of twin/triple/quadruple indoor unit system. |
| (2) | Defective transmitting receiving circuit of outdoor controller circuit board. | Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board or outdoor controller circuit board. |
| (3) | Defective transmitting receiving circuit of indoor controller board. | |
| (4) | Noise has entered into indoor/outdoor unit connecting wire. | |
| (5) | Defective fan motor | Turn the power off, and detach fan motor from connector (CNF1, 2). Then turn the power on again. If abnormality is not displayed, replace fan motor. If abnormality is displayed, replace outdoor controller circuit board. |
| (6) | Defective rush current resistor of outdoor power circuit board | Check the rush current resistor on outdoor power circuit board with tester. If open is detected, replace the power circuit board. |

Note: Refer also to the Service Handbook for the indoor units.

## 7-8-21 Error Code [6841]

### 1. Error code definition

**A control communication synchronism not recover**

### 2. Error definition and error detection method

Indoor/outdoor unit communication error (Outdoor unit)

- Abnormal if "0" receiving is detected 30 times continuously though outdoor controller circuit board has transmitted "1".
- Abnormal if outdoor controller circuit board could not find blank of transmission path for 3 minutes.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Indoor/outdoor unit connecting wire has contact failure. | Check disconnection or looseness of indoor/ outdoor unit connecting wire. |
| (2) | Defective communication circuit of outdoor controller circuit board. | Turn the power off, and on again to check. Replace outdoor controller circuit board if abnormality is displayed again. |
| (3) | Noise has entered power supply. | |
| (4) | Noise has entered indoor/outdoor unit connecting wire. | |

Note: Refer also to the Service Handbook for the indoor units.

## 7-8-22 Error Code [6842]

### 1. Error code definition

**Indoor-outdoor communication: Transmission error**

### 2. Error definition and error detection method

Indoor/outdoor unit communication error (Transmitting error)
Abnormal if "1" receiving is detected 30 times continuously though indoor controller board has transmitted "0".

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Defective transmitting receiving circuit of indoor controller board | Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board. |
| (2) | Noise has entered into power supply. | |
| (3) | Noise has entered into outdoor control wire. | |

Note: Refer also to the Service Handbook for the indoor units.

## 7-8-23 Error Code [6843]

### 1. Error code definition

**A control communication start bit detection error**

### 2. Error definition and error detection method

Indoor/outdoor unit communication error

- ♦Abnormal if indoor controller board could not receive any signal normally for 6 minutes after turning the power on.
- ♦Abnormal if indoor controller board could not receive any signal normally for 3 minutes.
- ♦Consider the unit as abnormal under the following condition. When 2 or more indoor units are connected to an outdoor unit, indoor controller board could not receive a signal for 3 minutes from outdoor controller circuit board, a signal which allows outdoor controller circuit board to transmit signals.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Contact failure, short circuit or miswiring (converse wiring) of indoor/outdoor unit connecting wire | Check disconnecting or looseness of indoor /outdoor unit connecting wire of all indoor units or outdoor units. |
| (2) | Defective transmitting receiving circuit of outdoor controller circuit board. | Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board or outdoor controller circuit board.<br>Note: other indoor controller board may have defect. |
| (3) | Defective transmitting receiving circuit of indoor controller board. | |
| (4) | Noise has entered into indoor/outdoor unit connecting wire. | |
| (5) | Defective fan motor | Turn the power off, and detach fan motor from connector (CNF1, 2). Then turn the power on again. If abnormality is not displayed, replace fan motor. If abnormality is displayed, replace outdoor controller circuit board. |
| (6) | Defective rush current resistor of outdoor power circuit board | Check the rush current resistor on outdoor power circuit board with tester. If open is detected, replace the power circuit board. |

---

### 1. Error code definition

**A control communication start bit detection error**

### 2. Error definition and error detection method

Indoor/outdoor unit communication error (Outdoor unit)
Abnormal if outdoor controller circuit board could not receive anything normally for 3 minutes.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Contact failure of indoor/outdoor unit connecting wire | Check disconnection or looseness of indoor/outdoor unit connecting wire of indoor or outdoor units. |
| (2) | Defective communication circuit of outdoor controller circuit board | Turn the power off, and on again to check. Replace indoor controller board or outdoor controller circuit board if abnormality is displayed again. |
| (3) | Defective communication circuit of indoor controller board | |
| (4) | Noise has entered into indoor/outdoor unit connecting wire. | |

Note: Refer also to the Service Handbook for the indoor units.

## 7-8-24 Error Code [6846]

### 1. Error code definition

**Start-up time over**

### 2. Error definition and error detection method

Start-up time over The unit cannot finish start-up process within 4 minutes after power on.

### 3. Cause, check method and remedy

| Cause | | Check method and remedy |
|---|---|---|
| (1) | Contact failure of indoor/outdoor unit connecting wire | Check disconnection or looseness or polarity of indoor/outdoor unit connecting wire of indoor and outdoor units. |
| (2) | Diameter or length of indoor/outdoor unit connecting wire is out of specified capacity. | Check the following: Diameter of the cables used for indoor-outdoor lines; maximum line distance between indoor and outdoor units (max. 50 m); maximum line distance between indoor units (daisy-changed cables) (max. 30 m); and if flat cables such as VVF is used, make sure they are connected in the order of S1, S2, and S3. |
| (3) | 2 or more outdoor units have refrigerant address "0". (In case of group control) | When units are controlled as groups, check the refrigerant address (SW1 (3-6) on the outdoor unit control board settings) for duplicates. |
| (4) | Noise has entered into power supply or indoor/outdoor unit connecting wire. | Check the transmission lines for problems. |

Note: Refer also to the Service Handbook for the indoor units.

# 7-9 Error Code Definitions and Solutions: Codes [7000 - 7999]

## 7-9-1 Error Code [7100]

### 1. Error code definition

**Total capacity error**

### 2. Error definition and error detection method

The model total of indoor units in the system with one outdoor unit exceeds limitations.

### 3. Error source, cause, check method and remedy,

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

<table>
<tr><th>Error source</th><th>Cause</th><th>Check method and remedy</th></tr>
<tr><td rowspan="3">Outdoor unit</td><td>(1) The Qj total of indoor units in the system with one outdoor unit exceeds the following table.<br>
<table>
<tr><th>Model</th><th>Capacity total</th></tr>
<tr><td>72 model</td><td>108</td></tr>
<tr><td>96 model</td><td>144</td></tr>
<tr><td>120 model</td><td>180</td></tr>
<tr><td>144 model</td><td>216</td></tr>
<tr><td>168 model</td><td>252</td></tr>
<tr><td>192 model</td><td>288</td></tr>
<tr><td>240 model</td><td>360</td></tr>
<tr><td>264 model</td><td>396</td></tr>
<tr><td>288 model</td><td>432</td></tr>
<tr><td>312 model</td><td>468</td></tr>
<tr><td>336 model</td><td>504</td></tr>
<tr><td>360 model</td><td>540</td></tr>
<tr><td>384 model</td><td>576</td></tr>
</table>
</td><td>1) Check the Qj total (capacity code total) of indoor units connected.<br>2) Check the Qj setting (capacity code) of the connected indoor unit set by the switch (SW2 on indoor unit board).<br>When the model name set by the switch is different from that of the unit connected, turn off the power source of the outdoor and the indoor units, and change the setting of the Qj (capacity code).</td></tr>
<tr><td>(2) The model selection switches (SW5-3 - 5-8) on the outdoor unit are set incorrectly.<br>
<table>
<tr><th rowspan="2">Model</th><th colspan="6">SW5</th></tr>
<tr><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th></tr>
<tr><td>72 model</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td rowspan="6">*1</td></tr>
<tr><td>96 model</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>120 model</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>144 model</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>168 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>192 model</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
</table>
*1 ON: EM model; OFF: HM model</td><td>Check the setting for the model selection switch on the outdoor unit (Dipswitches SW5-3 - 5-8 on the outdoor unit control board).</td></tr>
<tr><td>(3) The outdoor unit and the auxiliary unit (OS) that is connected to the same system are not properly connected.</td><td>Confirm that the TB3 on the OC and OS are properly connected.</td></tr>
</table>

## 7-9-2 Error Code [7101]

### 1. Error code definition

**Capacity code setting error**

### 2. Error definition and error detection method

Connection of incompatible (wrong capacity code) indoor unit or outdoor unit

### 3. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

<table>
<tr><th>Error source</th><th>Cause</th><th>Check method and remedy</th></tr>
<tr><td>Outdoor unit<br>Indoor unit</td><td>(1) The model name (capacity code) set by the switch (SW2) is wrong.<br>*The capacity of the indoor unit can be confirmed by the self-diagnosis function (SW1 operation) of the outdoor unit.</td><td>1) Check the model name (capacity code) of the indoor unit which has the error source address set by the switch (SW2 on indoor unit board).<br>When the model name set by the switch is different from that of the unit connected, turn off the power source of the outdoor and the indoor units, and change the setting of the capacity code.</td></tr>
<tr><td>Outdoor unit</td><td>(2) The model selection switches (SW5-3 - 5-8) on the outdoor unit are set incorrectly.
<table>
<tr><th rowspan="2">Model</th><th colspan="6">SW5</th></tr>
<tr><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th></tr>
<tr><td>72 model</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td rowspan="6">*1</td></tr>
<tr><td>96 model</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>120 model</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>144 model</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>168 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>192 model</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
</table>
*1 ON: EM model; OFF: HM model</td><td>Check the setting for the model selection switch on the outdoor unit (Dipswitches SW5-3 - 5-8 on the outdoor unit control board).</td></tr>
</table>

## 7-9-3 Error Code [7102]

### 1. Error code definition

**Wrong number of connected units**

### 2. Error definition and error detection method

The number of connected indoor units is "0" or exceeds the allowable value.

### 3. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

<table>
<tr><th>Error source</th><th>Cause</th><th>Check method and remedy</th></tr>
<tr><td>Outdoor unit</td><td>(1) Number of indoor units connected to the outdoor terminal block (TB3) for indoor/ outdoor transmission lines exceeds limitations described below.
<table>
<tr><th>Number of units</th><th>Restriction on the number of units</th></tr>
<tr><td>Total number of indoor units</td><td>14 : 72 model<br>19 : 96 model<br>24 : 120 model<br>29 : 144 model<br>34 : 168 model<br>39 : 192 model<br>49 : 240 model<br>50 : 264 - 384 models</td></tr>
<tr><td>Number of Main BC controllers</td><td>0 or 1</td></tr>
<tr><td>Number of Sub BC controllers</td><td>0 - 11</td></tr>
<tr><td>Total number of LOSSNAY units (During auto address start-up only)</td><td>0 or 1</td></tr>
<tr><td>Total number of outdoor units</td><td>1 : EM72-EM192, HM72-HM120 models<br>2 : EM264-EM384, HM144-HM240 models</td></tr>
</table>
<br>(2) Disconnected transmission line from the outdoor unit or BC controller<br>(3) Short-circuited transmission line<br>When (2) and (3) apply, the following display will appear.<br>⬩MA remote controller<br>"HO" or "PLEASE WAIT" blinks.<br>(4) The model selection switch (SW5-7) on the outdoor unit is set to OFF. (Normally set to ON)<br>(5) Outdoor unit or BC controller address setting error<br>The outdoor units in the same refrigerant circuit do not have sequential address numbers.</td><td>1) Check whether the number of units connected to the outdoor terminal block (TB3) for indoor/ outdoor transmission lines does not exceed the limitation. (See (1) and (2) on the left.)<br>2) Check (2) - (3) on the left.<br>3) Check whether the transmission line for the terminal block for centralized control (TB7) is not connected to the terminal block for the indoor/outdoor transmission line (TB3).<br>4) Check the setting for the model selection switch on the outdoor unit (Dipswitches SW5-7 on the outdoor unit control board).</td></tr>
<tr><td>BC controller</td><td>(1) The outdoor unit is not R32-compatible.</td><td>1) Check the model of the outdoor unit to see if it is R32-compatible.</td></tr>
</table>

## 7-9-4 Error Code [7105]

### 1. Error code definition

**Address setting error**

### 2. Error definition and error detection method

Erroneous setting of OC unit address
Erroneous setting of BC controller address

### 3. Error source, cause, check method and remedy

| Error source | Cause | Check method and remedy |
|---|---|---|
| Outdoor unit<br>BC controller | Erroneous setting of OC unit address<br>The address of outdoor unit is not being set to 51 - 100.<br>The address of BC controller is not set to 51 - 100. | Check that the outdoor unit and BC controller addresses are set to 00 or a number between 51 and 100.<br>If the outdoor unit address is out of the valid range, reset the address with the power to the outdoor unit turned off.<br>If the BC controller address is out of the valid range, reset the address with the power to both the outdoor unit and BC controller turned off. |

## 7-9-5 Error Code [7106]

### 1. Error code definition

**Attribute setting error**

### 2. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

<table>
<tr><th>Error source</th><th>Cause</th><th>Check method and remedy</th></tr>
<tr><td>-</td><td>A remote controller for use with indoor units, such as the MA remote controller, is connected to the OA processing unit whose attribute is FU.</td><td>To operate the OA processing unit directly via a remote controller for use with indoor units, such as the MA remote controller, set the DIP SW 3-1 on the OA processing unit to ON.
<table>
<tr><th>Operation Method</th><th>SW3-1</th></tr>
<tr><td>Interlocked operation with the indoor unit</td><td>OFF</td></tr>
<tr><td>Direct operation via the MA remote controller</td><td>ON</td></tr>
</table>
</td></tr>
</table>

## 7-9-6 Error Code [7107]

### 1. Error code definition

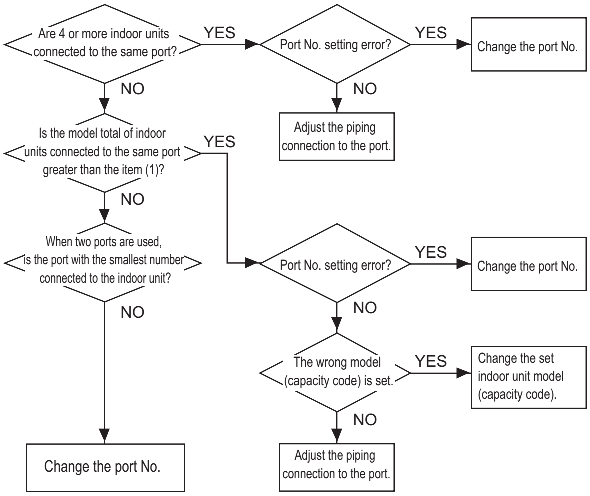
**Port setting error**

### 2. Error definition and error detection method

The port with wrong number is connected to the indoor unit.The model total connected to the port is greater than the specification. Detail code indicates the port number where the error was detected.

### 3. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

<table>
<tr><th>Error source</th><th>Cause</th><th>Check method and remedy</th></tr>
<tr><td rowspan="2">BC controller</td><td>(1) Model total of indoor units per each port or per each port merge is greater than the specification.<br>
<table>
<tr><th>Total port number</th><th>Model total</th></tr>
<tr><td>Single branching</td><td>54</td></tr>
<tr><td>Two branches merge</td><td>96</td></tr>
</table>
(2) 4 or more indoor units are connected to the same port.<br>(3) When two ports are used, the port with the smaller number is not connected to the indoor unit.<br>(4) For the address of the BC controller (Sub 1 - 11), 50 is not added to the smallest indoor unit address, which is connected to the BC controller (Sub 1 - 11).</td><td><b>Before resetting the port number using the port number setting switch or the model using the model (capacity code) setting switch, turn off the power of the outdoor unit, the BC controller and the indoor unit.</b></td></tr>
<tr><td colspan="2">
</td></tr>
</table>

## 7-9-7 Error Code [7110]

### 1. Error code definition

**Connection information signal transmission/reception error**

### 2. Error definition and error detection method

The given indoor unit is inoperable because it is not properly connected to the outdoor unit in the same system.

### 3. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

| Error source | Cause | Check method and remedy |
|---|---|---|
| Outdoor unit | (1) Power to the transmission booster is cut off. | 1) Confirm that the power to the transmission booster is not cut off by the booster being connected to the switch on the indoor unit. (The unit will not function properly unless the transmission booster is turned on.) |
| | (2) Power resetting of the transmission booster and outdoor unit. | →Reset the power to the outdoor unit. |
| | (3) Wiring failure between OC and OS | 2) Confirm that the TB3 on the OC and OS are properly connected. |
| | (4) Broken wire between OC and OS.<br>(5) The model selection switch (SW5-7) on the outdoor unit is set to OFF. (Normally set to ON) | 3) Check the model selection switch on the outdoor unit (Dipswitch SW5-7 on the control board.). |

## 7-9-8 Error Code [7111]

### 1. Error code definition

**Remote controller sensor fault**

### 2. Error definition and error detection method

This error occurs when the temperature data is not sent although the remote controller sensor is specified.

### 3. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

| Error source | Cause | Check method and remedy |
|---|---|---|
| Indoor unit<br>OA processing unit | The remote controller without the temperature sensor (the wireless remote controller or the ME compact remote controller (mounted type)) is used and the remote controller sensor for the indoor unit is specified. (SW1-1 is ON.) | Replace the remote controller with the one with built-in temperature sensor. |

## 7-9-9 Error Code [7113]

### 1. Error code definition

**Function setting error (improper connection of CNTYP)**

### 2. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

| Error source | Cause | Check method and remedy |
|---|---|---|
| Outdoor unit | (1) Wiring fault<br>(2) Loose connectors, short-circuit, contact failure<br>(3) Incompatible control board and INV board (replacement with a wrong circuit board)<br>(4) DIP SW setting error on the control board | (Detail code 15)<br>1) Check the connector CNTYP5 on the control board for proper connection.<br>2) Check the connector CNTYP4 on the control board for proper connection. |
| | | (Detail code 14)<br>1) Check the settings of SW5-3 through SW5-6 on the control board.<br>2) Check the connector CNTYP4 on the control board for proper connection. |
| | | (Detail code 12)<br>1) Check the settings of SW5-3 through SW5-6 on the control board.<br>2) Check the connector CNTYP2 on the control board for proper connection.<br>3) Check the connector CNTYP5 on the control board for proper connection.<br>4) Check the connector CNTYP on the INV board for proper connection. |
| | | (Detail code 16)<br>1) Check the settings of SW5-3 through SW5-6 on the control board.<br>2) Check the connector CNTYP5 on the control board for proper connection.<br>3) Check the connector CNTYP2 on the control board for proper connection.<br>4) Check the wiring between the control board and INV board. Refer to the following page(s). [7-2-1 Error Code [0403]]<br>5) Check the connector CNTYP on the INV board for proper connection. |
| | | (Detail codes 56, 66)<br>1) Check the settings of SW5-3 through SW5-6 on the control board.<br>2) Check the wiring between the control board and the Fan board. Refer to the following page(s). [7-2-1 Error Code [0403]]<br>3) Make sure the Fan board has been properly replaced. |
| | | (Detail code 0, 1, 5, 6)<br>1) Check the wiring between the control board and INV board. Refer to the following page(s). [7-2-1 Error Code [0403]]<br>2) Check the settings of SW5-3 through SW5-6 on the control board.<br>3) Check the connector CNTYP5 on the control board for proper connection. |
| | | (Detail code Miscellaneous)<br>*If a set-model-name identification error occurs, check the detail code on the unit on which the error occurred. The detail code that appears on other units will be different from the ones shown above. |

| Error source | Cause | Check method and remedy |
|---|---|---|
| BC controller | (1) Wiring fault<br>(2) Loose connectors, short-circuit, contact failure | (Detail code 1)<br>1) Check the connector TYP1 on the control board for proper connection.<br>(Detail code 12, 32)<br>1) Check the connector TYP2 on the control board for proper connection. |

## 7-9-10 Error Code [7117]

### 1. Error code definition

**Model setting error**

### 2. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

| Error source | Cause | Check method and remedy |
|---|---|---|
| Outdoor unit | (1) Wiring fault<br>(2) Loose connectors, short-circuit, contact failure | (Detail code 15)<br>1) Check the connector CNTYP5 on the control board for proper connection. |
| | | (Detail code 14)<br>1) Check the connector CNTYP4 on the control board for proper connection. |
| | | (Detail code 12)<br>1) Check the connector CNTYP2 on the control board for proper connection.<br>2) Check the connector CNTYP5 on the control board for proper connection.<br>3) Check the connector CNTYP on the INV board for proper connection. |
| | | (Detail code 16)<br>1) Check the connector CNTYP5 on the control board for proper connection.<br>2) Check the connector CNTYP2 on the control board for proper connection.<br>3) Check the wiring between the control board and INV board. Refer to the following page(s). [7-2-1 Error Code [0403]]<br>4) Check the connector CNTYP on the INV board for proper connection. |
| | | (Detail codes 56, 66)<br>1) Check the wiring between the control board and the Fan board. Refer to the following page(s). [7-2-1 Error Code [0403]]<br>2) Make sure the Fan board has been properly replaced. |
| | | (Detail code 0, 1, 5, 6)<br>1) Check the wiring between the control board and INV board. Refer to the following page(s). [7-2-1 Error Code [0403]]<br>2) Check the settings of SW5-3 through SW5-6 on the control board.<br>3) Check the connector CNTYP5 on the control board for proper connection. |
| | | (Detail code Miscellaneous)<br>*If a set-model-name identification error occurs, check the detail code on the unit on which the error occurred. The detail code that appears on other units will be different from the ones shown above. |

| Error source | Cause | Check method and remedy |
|---|---|---|
| BC controller | (1) Wiring fault<br>(2) Loose connectors, short-circuit, contact failure. | (Detail code 1)<br>1) Check the connector TYP1 on the control board for proper connection.<br>(Detail code 2)<br>1) Check the connector TYP2 on the control board for proper connection. |

## 7-9-11 Error Code [7119,7120]

### 1. Error code definition

**7119**
**M-NET wiring connection error (detected unit)**

**7120**
**M-NET wiring connection error (other units)**

### 2. Error definition and error detection method

Check the M-NET wiring connection path to search the indoor unit connected to the shut off valve kit or BC controller TB3 terminal to understand the refrigerant shut off area of the shut off valve kit or BC controller. The following errors are detected when there is an error in the M-NET wiring connection path.

1) The error detected when the indoor units or shut off valve kit with the same address are connected to multiple shut off valve kit or BC controllers
2) The error detected when multiple shut off valve kit or BC controllers are connected to a single indoor unit
3) The error detected when no indoor unit is connected to the shut off valve kit or BC controller TB3 terminal
4) The error detected when the shut off valve kit or BC controller is connected to the TB3 terminal of another shut off valve kit or BC controller
5) The error detected when the outdoor unit is connected to the shut off valve kit or BC controller TB3 terminal

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) Duplicate M-NET address for the indoor units or shut off valve kit | ⬩ If the indoor unit address is 00, wait for 10 minutes and check that the error is no longer displayed.<br>⬩ The error code (7119) is displayed on multiple remote controllers. Change the address and turn the outdoor unit back on. |
| (2) Incorrect M-NET wiring | Check the M-NET wiring of the indoor unit connected to the remote controller displaying the error code (7119) and remove the following causes. Then, turn the outdoor unit back on.<br>⬩ The M-NET line connects the indoor unit TB5 terminal to two or more BC controller or shut off valve kit TB3 terminals.<br>⬩ The shut off valve kit TB3 terminal is connected to another shut off valve kit TB2 terminal.<br>⬩ The shut off valve kit TB3 terminal and TB2 terminal are connected oppositely. |
| (3) The shut off valve kit or BC controller TB3 terminal is not connected to the indoor unit | If the remote controller does not display the error code (7119) and all other remote controllers display the error code (7120), the indoor unit may not be connected to the shut off valve kit or BC controller TB3 terminal. Connect the indoor unit to be protected from refrigerant leak to the shut off valve kit or BC controller TB3 terminal before turning the outdoor unit back on. |

## 7-9-12 Error Code [7121]

### 1. Error code definition

**Power-off detection**

### 2. Error definition and error detection method

If the power-off of the indoor units and shut off valve kit or BC controllers are detected

### 3. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| (1) The indoor units, shut off valve kit or BC controllers are off | Turn on all indoor units and shut off valve kit or BC controllers in the refrigerant system before turning the outdoor unit back on.<br>If the remedy above does not reset the error, turn off the power of the BC controller and leave it off for at least one minute, and then perform the remedy above again. |

## 7-9-13 Error Code [7130]

### 1. Error code definition

**Incompatible unit combination**

### 2. Error definition and error detection method

The check code will appear when the indoor units with different refrigerant systems are connected or when the combination of the outdoor units is not as per [2-1 System Configurations].

### 3. Error source, cause, check method and remedy

After troubleshooting the error using the check methods and remedies shown below, turn the power back on.

| Error source | Cause | Check method and remedy |
|---|---|---|
| Outdoor unit | (1) Indoor units for use with different refrigerant systems<br>The connected indoor unit is for use with R410A, R22 or R407C. Incorrect type of indoor units are connected.<br>The M-NET connection adapter is connected to the indoor unit system in a system in which the Slim Model (A control) of units are connected to the M-NET.<br>The refrigerant leak sensor built in the indoor unit does not support the type of the refrigerant used. | Check the connected indoor unit model.<br>Check whether the connecting adapter for M-NET is not connected to the indoor unit. (Connect the connecting adapter for M-NET to the outdoor unit.) |
| | (2) Combination of outdoor units<br>The combination of the outdoor units is not as per [2-1 System Configurations].<br>In addition, the connected outdoor units cannot mix old and new model names. | Check the model name of the outdoor units (OC) and (OS).<br>Check whether the combination of the outdoor units is as per [2-1 System Configurations]. |
| | (3) Combination of BC controllers<br>Wrong models of BC controllers are connected. | Check the model names of the BC controllers.<br>Check if the combination of the BC controllers conforms to the combination specified in [2-1 System Configurations]. |
| BC controller | (1) The BC controller is connected to outdoor units (TNU-A/YNU-A or earlier models) that do not support the refrigerant leak detection system. | Connect the outdoor units (TXU-A/YXU-A or later models) that support the refrigerant leak detection system. |

## 7-9-14 Error Code [7134]

### 1. Error code definition

**Error due to other causes**

### 2. Error definition and error detection method

An error code is displayed when this unit cannot be operated due to an error in other units or other causes.

### 3. Error source, cause, check method and remedy

| Error source | Cause | Check method and remedy |
|---|---|---|
| BC controller | An error is occurring in other unit. | An error code other than 7134 is occurring in other unit. Identify the unit and eliminate the causes of the error. |

# Chapter 8 Troubleshooting Based on Observed Symptoms

# 8-1 MA Remote Controller Problems

## 8-1-1 The LCD Does Not Light Up.

### 1. Phenomena

Even if the operation button on the remote controller is pressed, the display remains unlit and the unit does not start running. (Power indicator ( ◎) is unlit and no lines appear on the remote controller.)

### 2. Cause

1) The power is not supplied to the indoor unit.
    - The main power of the indoor unit is not on.
    - The connector on the indoor unit board has come off.
    - The fuse on the indoor unit board has melted.
    - Transformer failure and disconnected wire of the indoor unit.
2) Incorrect wiring for the MA remote controller
    - Disconnected wire for the MA remote controller or disconnected line to the terminal block.
    - Short-circuited MA remote controller wiring
    - Incorrect wiring of the MA remote controller cables
    - Incorrect connection of the MA remote wiring to the terminal block for transmission line (TB5) on the indoor unit
    - Wiring mixup between the MA remote controller cable and 220-240 VAC power supply cable
    - Reversed connection of the wire for the MA remote controller and the M-NET transmission line on the indoor unit
3) The number of the MA remote controllers that are connected to an indoor unit exceeds the allowable range (2 units).
4) The length or the diameter of the wire for the MA remote controller are out of specification.
5) Short circuit of the wire for the remote display output of the outdoor unit or reversed polarity connection of the relay.
6) The indoor unit board failure
7) MA remote controller failure

### 3. Check method and remedy

1) Check the voltage at the MA remote controller terminals.
    - If the voltage is between DC 9 and 12V, the remote controller is a failure.
    - If no voltage is applied, check the causes 1) and 3) and if the cause is found, correct it.
    If no cause is found, refer to 2).
2) Disconnect the remote controller cable from TB15 (MA remote controller terminal) on the indoor unit, and check the voltage across the terminals on TB15.
    - If the voltage is between DC 9 and 12 V, check the causes 2) and 4) and if the cause is found, correct it.
    - If no voltage is applied, check the cause 1) and if the cause is found, correct it.
    If no cause is found, check the wire for the remote display output (relay polarity).
    If no further cause is found, replace the indoor unit board.

## 8-1-2 The LCD Momentarily Lights Up and Then Goes Off.

### 1. Phenomena

When the remote controller operation SW is turned on, the operation status briefly appears on the display, then it goes off, and the display lights out immediately, and the unit stops.

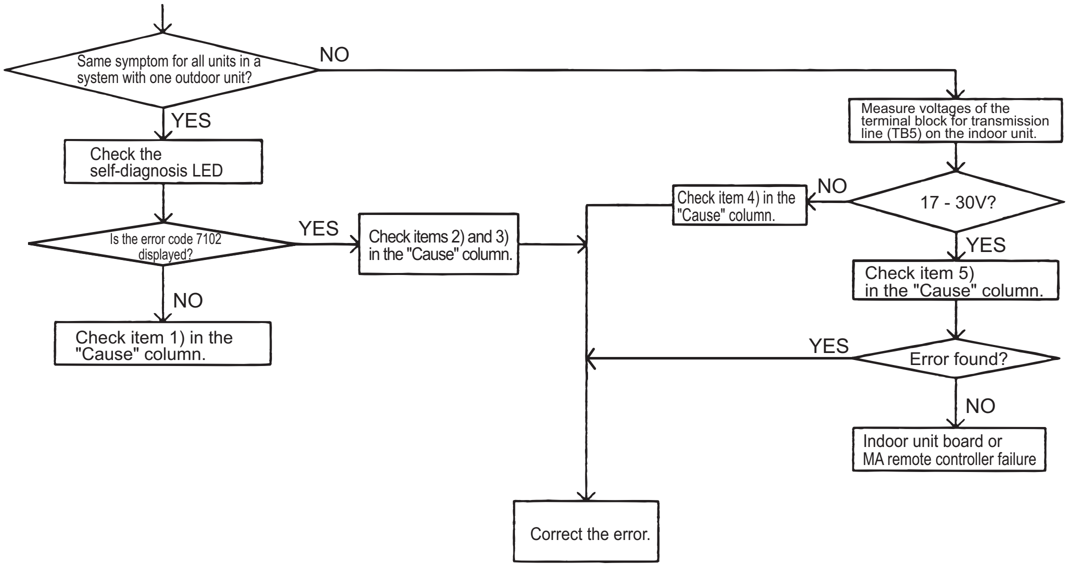
### 2. Cause

1) The power for the M-NET transmission line is not supplied from the outdoor unit. For details, refer to the following page(s).[8-10-2 Troubleshooting Problems with Outdoor Unit Transmission Power Supply Circuit]
2) Short circuit of the transmission line.
3) Incorrect wiring of the M-NET transmission line on the outdoor unit.
   - Disconnected wire for the MA remote controller or disconnected line to the terminal block.
   - The indoor transmission line is connected incorrectly to the transmission terminal block for centralized controller (TB7).
   - The male power supply connectors on the multiple outdoor units are connected to the female power supply switch connector (CN40).

   In the system to which the power supply unit for transmission lines is connected, the male power supply connector is connected to the female power supply switch connector (CN40) on the outdoor unit.
4) Disconnected M-NET transmission line on the indoor unit side.
5) Disconnected wire between the terminal block for M-NET line (TB5) of the indoor unit and the indoor unit board (CN2M) or disconnected connector.

### 3. Check method and remedy

**When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**



## 8-1-3 "HO" and "PLEASE WAIT" Do Not Go Off the Screen.

### 1. Phenomena

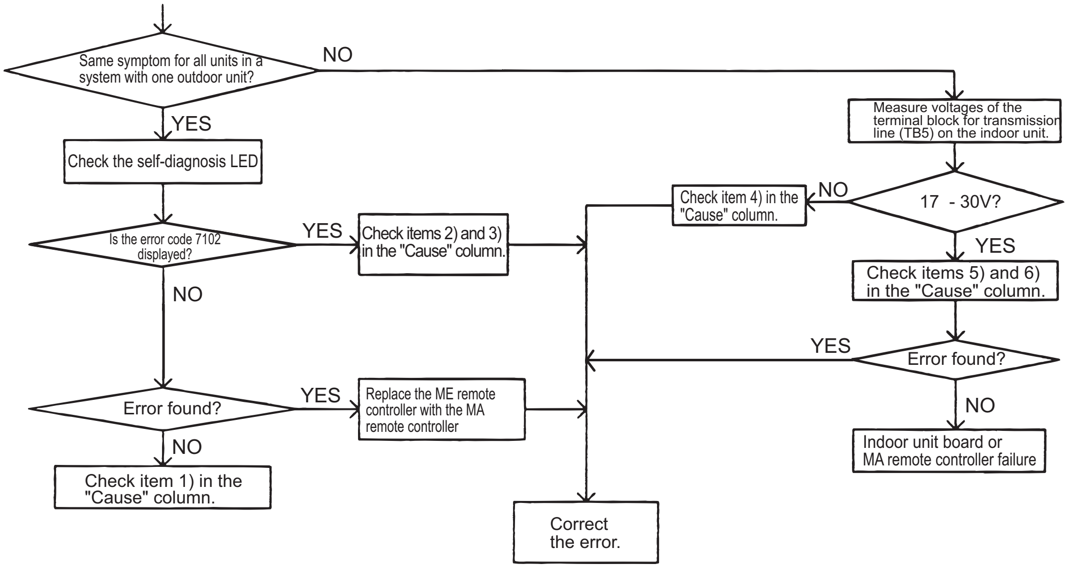
"HO" or "PLEASE WAIT" display on the remote controller does not disappear, and no operation is performed even if the button is pressed. ("HO" or "PLEASE WAIT" display will normally turn off 5 minutes later after the power on.)

### 2. Cause

1) The power for the M-NET transmission line is not supplied from the outdoor unit. For details, refer to the following page(s). [8-10-2 Troubleshooting Problems with Outdoor Unit Transmission Power Supply Circuit]
2) Short-circuited transmission line
3) Incorrect wiring of the M-NET transmission line on the outdoor unit.
   - Disconnected wire for the MA remote controller or disconnected line to the terminal block.
   - The indoor transmission line is connected incorrectly to the transmission terminal block for centralized controller (TB7).
   - The male power supply connectors on the multiple outdoor units are connected to the female power supply switch connector (CN40).
     In the system to which the power supply unit for transmission lines is connected, the male power supply connector is connected to the female power supply switch connector (CN40) on the outdoor unit
4) Disconnected M-NET transmission line on the indoor unit.
5) Disconnected wire between the terminal block for M-NET line (TB5) of the indoor unit and the indoor unit board (CN2M) or disconnected connector.
6) Incorrect wiring for the MA remote controller
   - Short-circuited wire for the MA remote controller
   - Disconnected wire for the MA remote controller (No.2) and disconnected line to the terminal block.
   - Reversed daisy-chain connection between groups
   - Incorrect wiring for the MA remote controller to the terminal block for transmission line connection (TB5) on the indoor unit
   - The M-NET transmission line is connected incorrectly to the terminal block (TB15) for the MA remote controller.
7) The sub/main setting of the MA remote controller is set to sub.
8) 2 or more main MA remote controllers are connected.
9) Indoor unit board failure (MA remote controller communication circuit)
10) Remote controller failure
11) Outdoor unit failure (Refer to the following page(s). [8-14 Troubleshooting Problems Using the LED Status Indicators on the Outdoor Unit])

### 3. Check method and remedy

**When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**

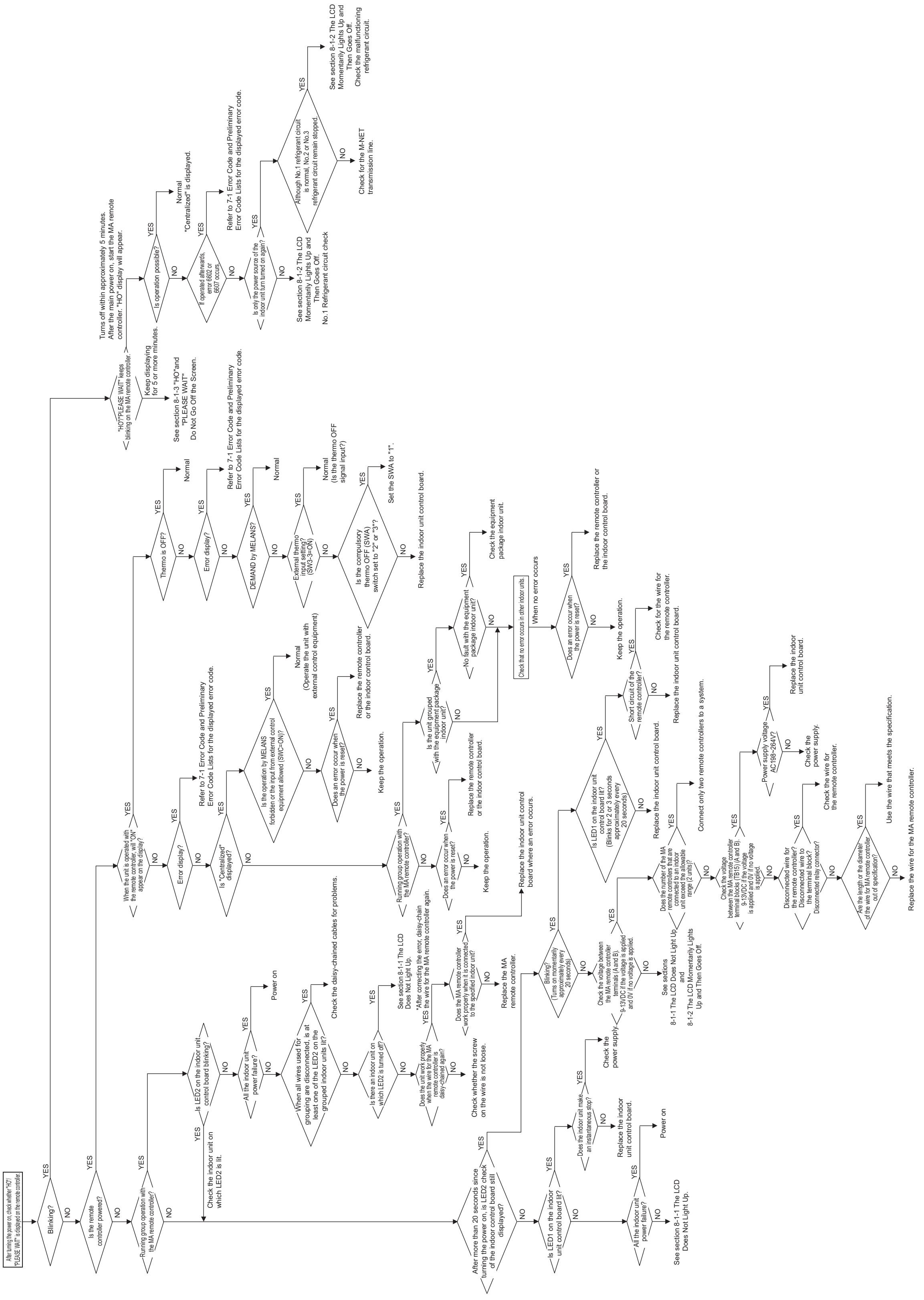


## 8-1-4 Air Conditioning Units Do Not Operate When the ON Button Is Pressed.

### 1. Phenomena

Even if the operation button on the remote controller is pressed, the indoor and the outdoor units do not start running.

### 2. Check method and remedy



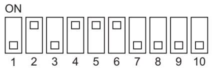
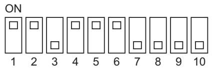
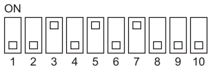
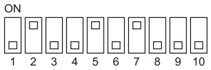
# 8-2 Refrigerant Control Problems

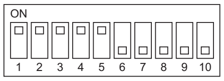
## 8-2-1 Units in the Cooling Mode Do Not Operate at Expected Capacity.

### 1. Phenomena

Although cooling operation starts with the normal remote controller display, the capacity is not enough.

### 2. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| 1. Compressor frequency does not rise sufficiently.<br>⬩Faulty detection of pressure sensor.<br>⬩Protection works and compressor frequency does not rise due to high discharge temperature<br>⬩Protection works and compressor frequency does not rise due to high pressure<br>⬩Pressure drops excessively. | (1) Check pressure difference between the detected pressure by the pressure sensor and the actual pressure with self-diagnosis LED.<br>→ If the accurate pressure is not detected, check the pressure sensor.<br>Refer to the following page(s). [8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure]<br>Note: Lower inlet pressure by the low pressure sensor than the actual pressure causes insufficient capacity.<br>SW4 setting (SW6-10: OFF)<br>High pressure sensor SW4<br><br> <br>Low pressure sensor SW4<br><br> <br>(2) Check temperature difference between the evaporating temperature (Te) and the target evaporating temperature (Tem) with self-diagnosis LED.<br>Note: Higher Te than Tem causes insufficient capacity.<br>SW4 setting (SW6-10: OFF)<br>Evaporating temperature Te SW4<br><br> <br>Target evaporating temperature Tem SW4<br><br> <br>Note: Protection works and compressor frequency does not rise even at higher Te than Tem due to high discharge temperature and high pressure.<br>At high discharge temperature:<br>Refer to the following page(s). [7-3-1 Error Code [1102]]<br>At high pressure:<br>Refer to the following page(s). [7-3-3 Error Code [1302] (during operation)] |
| 2. Indoor unit LEV malfunction<br>⬩Insufficient refrigerant flows due to LEV malfunction (not enough opening) or protection works and compressor frequency does not rise due to pressure drop.<br>⬩Refrigerant leak from LEV on the stopping unit causes refrigerant shortage on the running unit. | Refer to the following page(s).[8-7 Troubleshooting LEV Problems] |



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

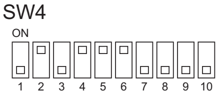
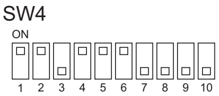
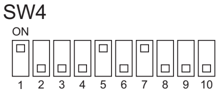
| Cause | Check method and remedy |
|---|---|
| 3. RPM error of the outdoor unit FAN<br>•Motor failure or board failure, or airflow rate decrease due to clogging of the heat exchanger<br>•The fan is not properly controlled as the outdoor temperature cannot be precisely detected by the temperature sensor.<br>•The fan is not properly controlled as the pressure cannot be precisely detected by the pressure sensor. | Refer to the following page(s).<br>[8-6 Troubleshooting Outdoor Unit Fan Problems]<br>[7-3-3 Error Code [1302] (during operation)] |
| 4. Long piping length<br>The cooling capacity varies greatly depending on the pressure loss. (When the pressure loss is large, the cooling capacity drops.) | Check the piping length to determine if it is contributing to performance loss.<br>Piping pressure loss can be estimated from the temperature difference between the indoor unit heat exchanger outlet temperature and the saturation temperature (Te) of 63LS. →Correct the piping. |
| 5. Piping size is not proper (thin) | |
| 6. Insufficient refrigerant amount<br>Protection works and compressor frequency does not rise due to high discharge temperature. | Refer to item 1 (Compressor frequency does not rise sufficiently.) on the previous page.<br>Refer to the following page(s). [6-3 Evaluating and Adjusting Refrigerant Charge] |
| 7. Clogging by foreign object | Check the temperature difference between in front of and behind the place where the foreign object is clogging the pipe (upstream side and downstream side).<br>When the temperature drops significantly, the foreign object may clog the pipe.<br>→ Remove the foreign object inside the pipe. |
| 8. The indoor unit inlet temperature is excessively low. (Less than 15°C [59°F] WB) | Check the inlet air temperature and for short cycling.<br>Change the environment where the indoor unit is used. |
| 9. Compressor failure<br>The amount of circulating refrigerant decreases due to refrigerant leak in the compressor. | Check the discharge temperature to determine if the refrigerant leaks, as it rises if there is a leak. |
| 10. BC controller LEV 3 actuation failure<br>Sufficient liquid refrigerant is not be supplied to the indoor unit as sufficient sub cool cannot be secured due to LEV3 malfunction. | Refer to the following page(s).[8-7 Troubleshooting LEV Problems]<br>It most likely happens when there is little difference or no difference between TH12 and TH15. |
| 11. BC controller LEV4 operation failure<br>LEV4 fails to close, preventing BC controller from ensuring sufficient subcool. As a result, the indoor unit is not supplied with a sufficient amount of liquid refrigerant. | Refer to the following page(s).[8-7 Troubleshooting LEV Problems]<br>This problem may occur when SC16 and SH2 are small and when the difference between TH5 of the outdoor unit and the evaporation temperature (Te) is small. |
| 12. TH12, TH15 and 63HS1 sensor failure or faulty wiring<br>LEV3 is not controlled normally. | •Check the thermistor.<br>•Check wiring. |
| 13. The restrictions on pipe lengths have not been observed | Refer to the following page(s). [2-8 Restrictions on Refrigerant Pipes] |
| 14. Open phase in the power-supply due to improper power-supply wiring | Make sure that the power-supply wiring is properly connected. (Refer to item (6) in section [6-1 Read before Test Run].)<br>Possible open phase. |

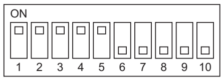
## 8-2-2 Units in the Heating Mode Do Not Operate at Expected Capacity.

### 1. Phenomena

Although heating operation starts with the normal remote controller display, the capacity is not enough.

### 2. Cause, check method and remedy

| Cause | Check method and remedy |
|---|---|
| 1. Compressor frequency does not rise sufficiently.<br>•Faulty detection of pressure sensor.<br>•Protection works and compressor frequency does not rise due to high discharge temperature<br>•Protection works and compressor frequency does not rise due to high pressure. | (1) Check pressure difference between the detected pressure by the pressure sensor and the actual pressure with self-diagnosis LED.<br>→ If the accurate pressure is not detected, check the pressure sensor. Refer to the following page(s). [8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure]<br>Note: Higher inlet pressure by the high pressure sensor than the actual pressure causes insufficient capacity.<br>SW4 setting (SW6-10: OFF)<br>High pressure sensor  <br>Low pressure sensor  <br>(2) Check the difference between the condensing temperature (Tc) and the target condensing temperature (Tcm) with self-diagnosis LED.<br>Note: Higher Tc than Tcm causes insufficient capacity.<br>SW4 setting (SW6-10: OFF)<br>Condensing temperature Tc  <br>Target condensing temperature Tcm  <br>Note: Protection works and compressor frequency does not rise even at lower Tc than Tcm due to high discharge temperature and high pressure.<br>At high discharge temperature:<br>Refer to the following page(s). [7-3-1 Error Code [1102]]<br>At high pressure:<br>Refer to the following page(s). [7-3-3 Error Code [1302] (during operation)] |



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

| Cause | | Check method and remedy |
|---|---|---|
| 2. | Indoor unit LEV malfunction<br>Insufficient refrigerant flows due to LEV malfunction (not enough opening). | Refer to the following page(s).[8-7 Troubleshooting LEV Problems] |
| 3. | Temperature reading error on the indoor unit piping temperature sensor<br>If the temperature reading on the sensor is higher than the actual temperature, it makes the subcool seem smaller than it is, and the LEV opening decreases too much. | Check the thermistor. |
| 4 | RPM error of the outdoor unit FAN<br>⬩Motor failure or board failure, or airflow rate decrease, pressure drop due to clogging of the heat exchanger leading to high discharge temperature<br>⬩The fan is not properly controlled as the temperature cannot be precisely detected with the piping sensor. | Refer to the following page(s).<br>[8-6 Troubleshooting Outdoor Unit Fan Problems] |
| 5. | Insulation failure of the refrigerant piping | |
| 6. | Long piping length<br>Excessively long piping on the high pressure side causes pressure loss leading to increase in the high pressure. | Confirm that the characteristic of capacity drop due to piping length.<br>→ Change the pipe |
| 7. | Piping size is not proper (thin) | |
| 8. | Clogging by foreign object | Check the temperature difference between the upstream and the downstream of the pipe section that is blocked. Since blockage in the extended section is difficult to locate, operate the unit in the cooling cycle, and follow the same procedures that are used to locate the blockage of pipe during cooling operation.<br>→ Remove the blockage in the pipe. |
| 9. | The indoor unit inlet temperature is excessively high.(exceeding 28°C [82°F]) | Check the inlet air temperature and for short cycling. Change the environment where the indoor unit is used. |
| 10. | Insufficient refrigerant amount<br>Protection works and compressor frequency does not rise due to low discharge temperature<br>Refrigerant recovery operation is likely to start. | Refer to item 1 (Compressor frequency does not rise sufficiently.) on the previous page.<br>Refer to the following page(s). [6-3 Evaluating and Adjusting Refrigerant Charge] |
| 11. | Compressor failure (same as in case of cooling) | Check the discharge temperature. |
| 12. | BC controller LEV3 or LEV4 actuation failure<br>A drop in the low pressure that is caused either by a blockage of liquid pipe or by a pressure loss and the resultant slowing of refrigerant flow causes a tendency for the discharge temperature to rise. | Refer to the following page(s). [8-7 Troubleshooting LEV Problems] |
| 13. | Open phase in the power-supply due to improper power-supply wiring | Make sure that the power-supply wiring is properly connected. (Refer to item (6) in section [6-1 Read before Test Run].)<br>Possible open phase. |

## 8-2-3 Outdoor Units Stop at Irregular Times.

### 1. Phenomena

Outdoor unit stops at times during operation.

### 2. Cause, check method and remedy

| Cause | | Check method and remedy | |
|---|---|---|---|
| | The first stop is not considered as an error, as the unit turns to anti-restart mode for 3 minutes as a preliminary error. | (1) | Check the mode operated in the past by displaying preliminary error history on LED display with SW4. |
| | **Error mode** | | |
| 1. | Abnormal high pressure | (2) | Reoperate the unit to find the mode that stops the unit by displaying preliminary error history on LED display with SW4. |
| 2. | Abnormal discharge air temperature | | |
| 3. | Heatsink thermistor failure | | → Refer to the reference page for each error mode. |
| 4. | Thermistor failure | | *Display the indoor piping temperature with SW4 to check whether the freeze proof operation runs properly, and check the temperature. |
| 5. | Pressure sensor failure | | Refer to the following page(s). [10 LED Status Indicators] |
| 6. | Over-current break | | |
| 7. | Refrigerant overcharge | | |
| Note1: | Frost prevention tripping only under cooling mode may be considered in addition to the above. (Freeze protection is detected by one or all indoor units.) | | |
| Note2: | Even the second stop is not considered as an error when some specified errors occur. (eg. The third stop is considered as an error when the thermistor error occurs.) | | |

# 8-3 Checking Transmission Waveform and for Electrical Noise Interference

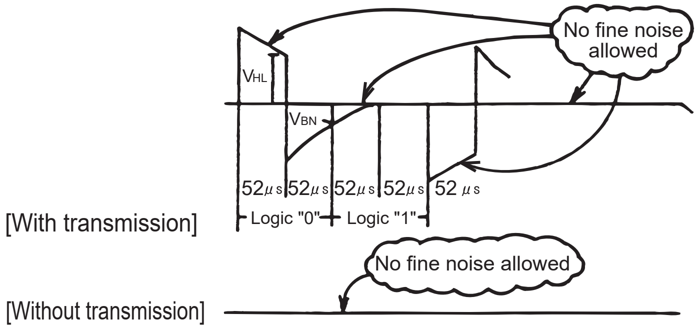
## 8-3-1 M-NET

Control is performed by exchanging signals between the outdoor unit and the indoor unit through M-NET transmission. Noise interference on the transmission line will interrupt the normal transmission, leading to erroneous operation.

### (1) Symptoms caused by noise interference on the transmission line

| Cause | Erroneous operation | Error code | Error code definition |
|---|---|---|---|
| Noise interference on the transmission line | Signal is transformed and will be misjudged as the signal of another address. | 6600 | Address overlap |
| | Transmission wave pattern is transformed due to the noise creating a new signal | 6602 | Transmission processor hardware error |
| | Transmission wave pattern is transformed due to the noise, and will not be received normally leading to no acknowledgement (ACK). | 6607 | No ACK error |
| | Transmission cannot be performed due to the fine noise. | 6603 | Transmission line bus busy error |
| | Transmission is successful; however, the acknowledgement (ACK) or the response cannot be received normally due to the noise. | 6607<br>6608 | No ACK error<br>No response error |

### (2) Wave shape check



**Wave shape check**

Check the wave pattern of the transmission line with an oscilloscope. The following conditions must be met.

1) Small wave pattern (noise) must not exist on the transmission signal. (Minute noise (approximately 1V) can be generated by DC-DC converter or the inverter operation; however, such noise is not a problem when the shield of the transmission line is grounded.)
2) The sectional voltage level of transmission signal should be as follows.

| Logic | Voltage level of the transmission line |
|---|---|
| 0 | $V_{HL}$ = 2.5V or higher |
| 1 | $V_{BN}$ = 1.3V or below |

## (3) Check method and remedy

1) Measures against noise
Check the followings when noise exists on the wave or the errors described in (1) occur.

| | Error code definition | Remedy |
|---|---|---|
| Check that the wiring work is performed according to wiring specifications. | 1. The transmission line and the power line are not wired too closely. | Isolate the transmission line from the power line (5cm [1-31/32"] or more). Do not insert them in the same conduit. |
| | 2. The transmission line is not bundled with that for another systems. | The transmission line must be isolated from another transmission line.<br>When they are bundled, erroneous operation may be caused. |
| | 3. The specified wire is used for the transmission line. | Use the specified transmission line.<br>Type: Shielded wire CVVS/CPEVS/MVVS<br>Diameter: 1.25mm$^2$ [AWG16] or more<br>(Remote controller wire: 0.3 - 1.25mm$^2$ [AWG22-16]) |
| | 4. When the transmission line is daisy-chained on the indoor unit terminals, are the shields daisy-chained on the terminals, too? | The transmission is two-wire daisy-chained. The shielded wire must be also daisy-chained.<br>When the shielded cable is not daisy-chained, the noise cannot be reduced enough. |
| Check that the grounding work is performed according to grounding specifications. | 5. Is the shield of the indoor-outdoor transmission cable grounded to the earth terminal on the outdoor unit? | Connect the shield of the indoor-outdoor transmission cable to the earth terminal (⏚) on the outdoor unit.<br>If no grounding is provided, the noise on the transmission line cannot escape leading to change of the transmission signal. |
| | 6. Check the treatment method of the shield of the transmission line (for centralized control). | The transmission cable for centralized control is less subject to noise interference if it is grounded to the outdoor unit whose power jumper cable was moved from CN41 to CN40 or to the power supply unit.<br>The environment against noise varies depending on the distance of the transmission lines, the number of the connected units, the type of the controllers to be connected, or the environment of the installation site. Therefore, the transmission line work for centralized control must be performed as follows.<br>(1) When no grounding is provided: Ground the shield of the transmission cable by connecting to the outdoor unit whose power jumper connector was moved from CN41 to CN40 or to the power supply unit.<br>(2) When an error occurs even though one point grounding is provided: Ground the shield on all outdoor units. |

2) Check the followings when the error "6607" occurs, or "HO" appears on the display on the remote controller.

| Error code definition | Remedy |
|---|---|
| 7. The farthest distance of transmission line is 200m [656ft] or longer. | Check that the farthest distance from the outdoor unit to the indoor unit and to the remote controller is within 200m [656ft]. |
| 8. The types of transmission lines are different. | Use the specified transmission line.<br>Type: Shielded wire CVVS/CPEVS/MVVS<br>Diameter: 1.25mm$^2$ [AWG16] or more<br>(Remote controller wire: 0.3-1.25mm$^2$ [AWG22-16]) |
| 9. Outdoor unit circuit board failure | Replace the outdoor unit control board or the power supply board for the transmission line. |
| 10. Indoor unit circuit board failure or remote controller failure | Replace the indoor unit circuit board or the remote controller. |
| 11. The MA remote controller is connected to the M-NET transmission line. | Connect the MA remote controller to the terminal block for MA remote controller (TB15). |

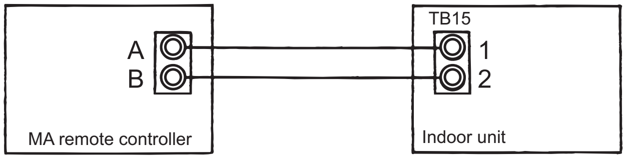
## 8-3-2 MA Remote Controller

The communication between the MA remote controller and the indoor unit is performed with current tone burst.

### (1) Symptoms caused by noise interference on the transmission line

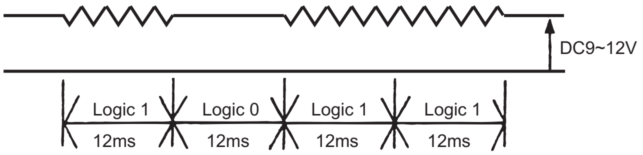
If noise is generated on the transmission line, and the communication between the MA remote controller and the indoor unit is interrupted for 3 minutes in a row, MA transmission error (6831) will occur.

### (2) Confirmation of transmission specifications and wave pattern



A, B : No polarity
Across terminal No. 1-2
: Power supply (9V to 12VDC)

Transmission waveform (Across terminal No.1 - 2)



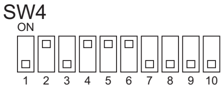
① Satisfies the formula
12 ms/bit ±5%

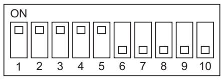
② Voltage among terminals must
be between DC9 and 12 V.

# 8-4 Pressure Sensor Circuit Configuration and Troubleshooting Pressure Sensor Problems

## 8-4-1 Comparing the High-Pressure Sensor Measurement and Gauge Pressure

By configuring the digital display setting switch (SW4 (when SW6-10 is set to OFF)) as shown in the figure below, the pressure as measured by the high-pressure sensor appears on the LED1 on the control board.





The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

### (1) While the sensor is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1.

1) When the gauge pressure is between 0 and 0.098MPa [14psi], internal pressure is caused due to gas leak.
2) When the pressure displayed on self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the connector may be defective or be disconnected. Check the connector and go to (4).
3) When the pressure displayed on self-diagnosis LED1 exceeds 4.15MPa [601psi], go to (3).
4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

### (2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1 while the sensor is running. (Compare them by MPa [psi] unit.)

1) When the difference between both pressures is within 0.098MPa [14psi], both the high pressure sensor and the control board are normal.
2) When the difference between both pressures exceeds 0.098MPa [14psi], the high pressure sensor has a problem. (performance deterioration)
3) When the pressure displayed on self-diagnosis LED1 does not change, the high pressure sensor has a problem.

### (3) Remove the high pressure sensor from the control board to check the pressure on the self-diagnosis LED1.

1) When the pressure displayed on self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the high pressure sensor has a problem.
2) When the pressure displayed on self-diagnosis LED1 is approximately 4.15MPa [601psi], the control board has a problem.

### (4) Remove the high pressure sensor from the control board, and short-circuit between the No.2 and 3 connectors (63HS1, PS1, PS3) to check the pressure with self-diagnosis LED1.

1) When the pressure displayed on the self-diagnosis LED1 exceeds 4.15MPa [601psi], the high pressure sensor has a problem.
2) If other than 1), the control board has a problem.

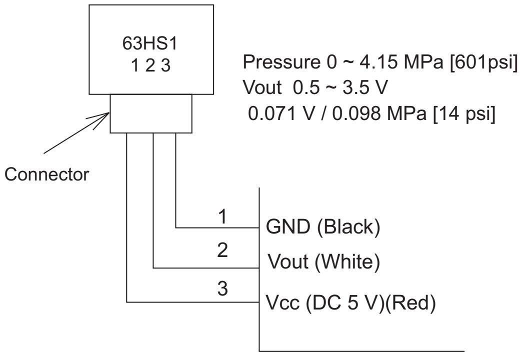
## 8-4-2 High-Pressure Sensor Configuration (63HS1, PS1, PS3)

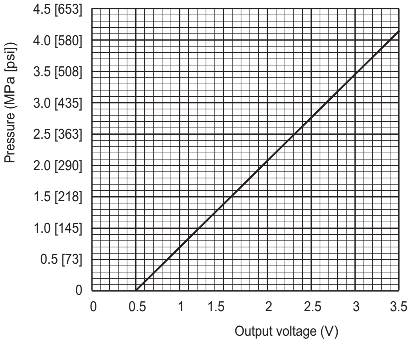
The high pressure sensor consists of the circuit shown in the figure below. If DC 5V is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microcomputer. The output voltage is 0.071V per 0.098MPa [14psi].

**Note**

The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

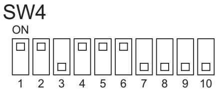
| | Body side | Control board side |
|---|---|---|
| Vcc | Pin 1 | Pin 3 |
| Vout | Pin 2 | Pin 2 |
| GND | Pin 3 | Pin 1 |

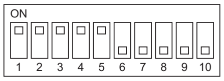




## 8-4-3 Comparing the Low-Pressure Sensor Measurement and Gauge Pressure

By configuring the digital display setting switch (SW4 (when SW6-10 is set to OFF)) as shown in the figure below, the pressure as measured by the low-pressure sensor appears on the LED1 on the control board.





The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

### (1) While the sensor is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1.

1) When the gauge pressure is between 0 and 0.098MPa [14psi], internal pressure is caused due to gas leak.
2) When the pressure displayed on self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the connector may be defective or be disconnected. Check the connector and go to (4).
3) When the pressure displayed on self-diagnosis LED1 exceeds 1.7MPa [247psi], go to (3).
4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

### (2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1 while the sensor is running. (Compare them by MPa [psi] unit.)

1) When the difference between both pressures is within 0.03MPa [4psi], both the low pressure sensor and the control board are normal.
2) When the difference between both pressures exceeds 0.03MPa [4psi], the low pressure sensor has a problem. (performance deterioration)
3) When the pressure displayed on the self-diagnosis LED1 does not change, the low pressure sensor has a problem.

### (3) Remove the low pressure sensor from the control board to check the pressure with the self-diagnosis LED1 display.

1) When the pressure displayed on the self-diagnosis LED1 is between 0 and 0.098MPa [14psi], the low pressure sensor has a problem.
2) When the pressure displayed on self-diagnosis LED1 is approximately 1.7MPa [247psi], the control board has a problem.
   - When the outdoor temperature is 30°C [86°F] or less, the control board has a problem.
   - When the outdoor temperature exceeds 30°C [86°F], go to (5).

### (4) Remove the low pressure sensor from the control board, and short-circuit between the No.2 and 3 connectors (63LS:CN202) to check the pressure with the self-diagnosis LED1.

1) When the pressure displayed on the self-diagnosis LED1 exceeds 1.7MPa [247psi], the low pressure sensor has a problem.
2) If other than 1), the control board has a problem.

### (5) Remove the high pressure sensor (63HS1) from the control board, and insert it into the connector for the low pressure sensor (63LS) to check the pressure with the self-diagnosis LED1.

1) When the pressure displayed on the self-diagnosis LED1 exceeds 1.7MPa [247psi], the control board has a problem.
2) If other than 1), the low-pressure sensor has a problem.

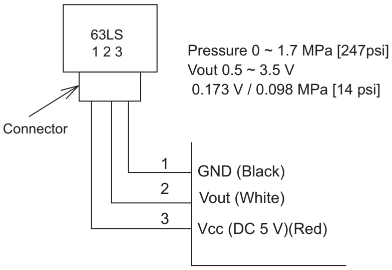
## 8-4-4 Low-Pressure Sensor Configuration (63LS)

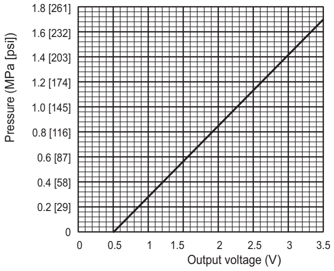
The low pressure sensor consists of the circuit shown in the figure below. If DC5V is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microcomputer. The output voltage is 0.173V per 0.098MPa [14psi].

**Note**

The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

| | Body side | Control board side |
|---|---|---|
| Vcc | Pin 1 | Pin 3 |
| Vout | Pin 2 | Pin 2 |
| GND | Pin 3 | Pin 1 |



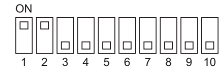
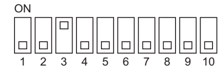


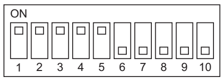
# 8-5 Troubleshooting Solenoid Valve Problems

Check whether the output signal from the control board and the operation of the solenoid valve match.
Setting the self-diagnosis switch (SW4) as shown in the figure below causes the ON signal of each relay to be output to the LED's. Each LED shows whether the relays for the following parts are ON or OFF. LEDs light up when relays are on.

**Note**

The circuits on some parts are closed when the relays are ON. Refer to the following instructions.

<table>
<tr><th colspan="2" rowspan="2">SW4 (SW6-10:OFF)</th><th colspan="8">Display</th></tr>
<tr><th>LD1</th><th>LD2</th><th>LD3</th><th>LD4</th><th>LD5</th><th>LD6</th><th>LD7</th><th>LD8</th></tr>
<tr><td rowspan="2">SW4<br> </td><td>Upper</td><td>21S4a</td><td></td><td>CH11</td><td>SV12</td><td>SV1(a)</td><td></td><td>SV2</td><td></td></tr>
<tr><td>Lower</td><td></td><td></td><td>21S4b</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">SW4<br> </td><td>Upper</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Power supply</td></tr>
<tr><td>Lower</td><td></td><td></td><td></td><td></td><td></td><td>SV13</td><td>SV16</td><td></td></tr>
</table>



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

- When a valve malfunctions, check if the wrong solenoid valve coil is not attached the lead wire of the coil is not disconnected, the connector on the board is not inserted wrongly, or the wire for the connector is not disconnected.

## (1) In case of 21S4a, 21S4b (4-way switching valve)

About this 4-way valve
When not powered:
Conducts refrigerant between the oil separator outlet and heat exchanger AND the gas ball valve (BV1) and the accumulator to complete the circuit for the cooling cycle.
When powered:
The refrigerant runs between the oil separator and the gas ball valve, and between the heat exchanger and the accumulator. This circulation is for heating.

Check the LED display and the intake and the discharge temperature for the 4-way valve to check whether the valve has no faults and the refrigerant runs between where and where.Do not touch the pipe when checking the temperature, as the pipe on the oil separator side will be hot. (Before checking the inlet and outlet temperatures, check that LEV2a and LEV2b are open. Refer to [8-7 Troubleshooting LEV Problems].)

**Note**

Do not give an impact from outside, as the outer hull will be deformed leading to the malfunction of the inner valve.

## (2) In case of SV1a (Bypass valve)

This solenoid valve opens when powered (Relay ON).

1) At compressor start-up, the SV1a turns on for 4 minutes, and the operation can be checked by the self-diagnosis LED display and the closing sound.
2) To check whether the valve is open or closed, check the change of the SV1a downstream piping temperature while the valve is being powered.Even when the valve is closed, high-temperature refrigerant flows inside the capillary next to the valve. (Therefore, temperature of the downstream piping will not be low with the valve closed.)

## (3) In the case of SV2 (Bypass valve)

This solenoid valve opens when powered (Relay ON).

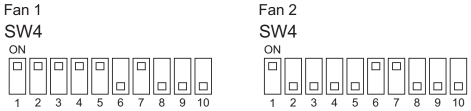
The relay turns on in the following cases:

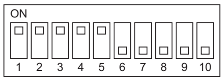
- 63HS1 is above 3.62 MPa (525 psi) even when the compressor operates at the minimum frequency in the heating-only or heating-main mode.
- 63LS is below 0.25 MPa (36 psi) and 63HS is below 1.47 MPa (213 psi) after the recovery from defrosting in the heating-only or heating-main mode, or after the start of the compressor. To see whether the valve is open or closed, check the change in the SV2 downstream piping temperature while the valve is being powered. Do not touch the pipe to check the valve status because hot gas flows while the valve is open.

# 8-6 Troubleshooting Outdoor Unit Fan Problems

## (1) Fan motor (common items)

- The number of revolutions of the outdoor fan is controlled by inverter. Check the number of revolutions of the fan while monitoring the inverter output indicated by the self-diagnosis LED.
- When starting the fan, the fan runs at full speed for 5 seconds.
- When setting the DIP SW4 (when SW6-10 is set to OFF) as shown in the figure below, the inverter output [%] will appear. 100% indicates the full speed and 0% indicates the stopping. (Fan 2 is only on the EM144 - EM192, HM96 - HM120 models.)





The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

- As the revolution of the fan changes under control, at the interphase or when the indoor unit operation capacity is low, the revolution of the fan may change.
- If the fan does not move or it vibrates, Fan board problem or fan motor problem is suspected. When checking the fan motor for problems by shutting down the power, be sure to disconnect the motor wire from the fan board. If a short-circuited fan board malfunctions, it will keep the fan motor from rotating smoothly. For details, refer to the following page(s).

[8-9-1(2)[5] Fan motor ground fault and winding error check]
[8-9-1(2)[6] Fan board error detection circuit check (no load)]
[8-9-1(2)[7] Fan inverter damage check (no load)]
[8-9-1(2)[8] Fan inverter damage check (with load)]

# 8-7 Troubleshooting LEV Problems

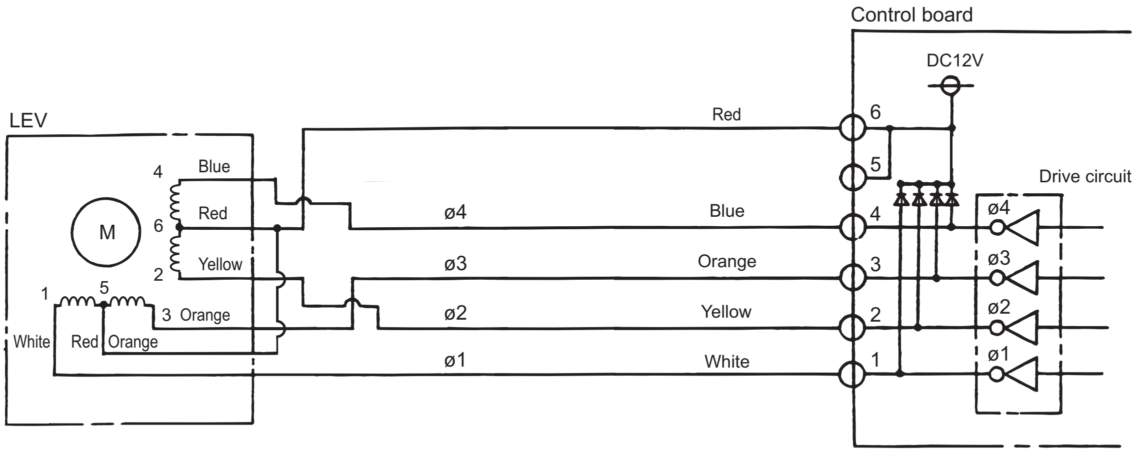
## 8-7-1 General Overview on LEV Operation

**LEV operation**

LEV are stepping-motor-driven valves that operate by receiving the pulse signals from the indoor and outdoor unit control boards.

### (1) Outdoor LEV (LEV2a, 2b, 2d, and LEV4), Indoor LEV and BC controller LEV

The valve opening changes according to the number of pulses.



1) Pulse signal output and valve operation

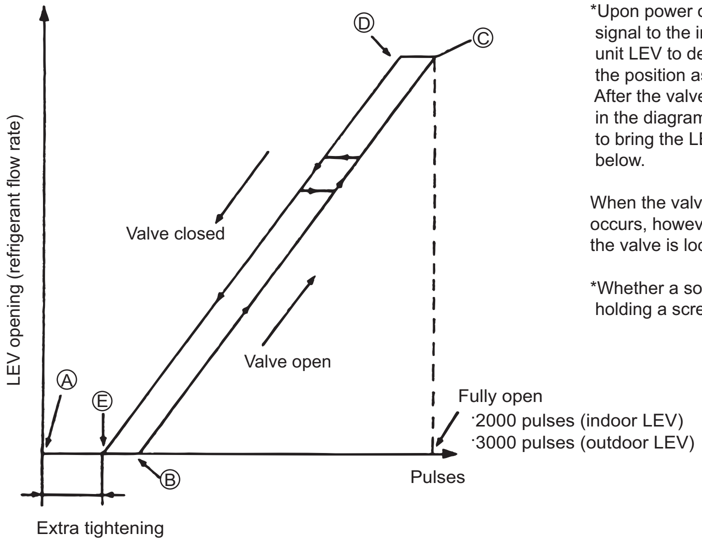
| Output (phase) number | Output state | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| ϕ1 | ON | OFF | OFF | ON |
| ϕ2 | ON | ON | OFF | OFF |
| ϕ3 | OFF | ON | ON | OFF |
| ϕ4 | OFF | OFF | ON | ON |

Output pulses change in the following orders when the
Valve is closed; 1 → 2 → 3 → 4 → 1
Valve is open; 4 → 3 → 2 → 1 → 4

*1. When the LEV opening angle does not change, all the output phases will be off.

*2. When the output is open phase or remains ON, the motor cannot run smoothly, and rattles and vibrates.

### 2) LEV closing and opening operation

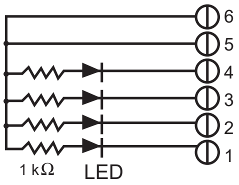
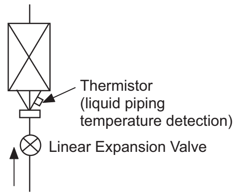


*Upon power on, the indoor unit circuit board sends a 2200 pulse closing signal to the indoor unit LEV and a 3200 pulse closing signal to the outdoor unit LEV to determine the valve position and always brings the valve to the position as indicated by "Ⓐ" in the diagram.
After the valve position has been adjusted to the position as indicated by Ⓐ in the diagram below, the indoor unit circuit board sends a 41-pulse signal to bring the LEV opening to the position as indicated by Ⓑ in the diagram below.

When the valve operates smoothly, no sound from LEV or no vibration occurs, however, when the pulses change from Ⓔ to Ⓐ in the chart or the valve is locked, a big sound occurs.

*Whether a sound is generated or not can be determined by holding a screwdriver against it, then placing your ear against the handle.

## 8-7-2 Possible Problems and Solutions

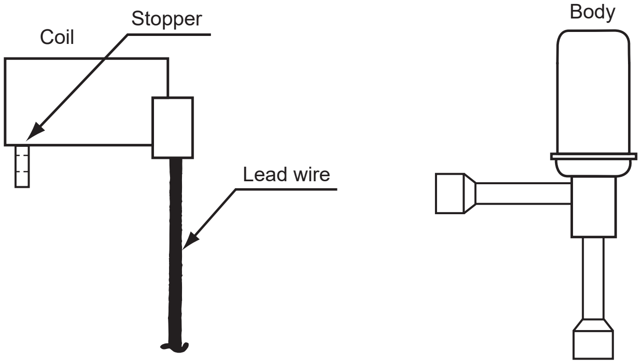
| Malfunction mode | Judgment method | Remedy | LEV |
|---|---|---|---|
| Microcomputer driver circuit failure | Disconnect the control board connector and connect the check LED as shown in the figure below.<br><br> <br>resistance : 0.25W 1kΩ<br>LED : DC15V 20mA or more<br>When the main power is turned on, the indoor unit circuit board outputs pulse signals to the indoor unit LEV for 10 seconds.<br>If any of the LED remains lit or unlit, the drive circuit is faulty. | When the drive circuit has a problem, replace the control board. | Indoor unit, Outdoor unit and BC controller |
| LEV mechanism is locked | If the LEV is locked, the drive motor runs idle, and makes a small clicking sound.<br>When the valve makes a closing and opening sound, the valve has a problem. | Replace the LEV. | Indoor unit, Outdoor unit and BC controller |
| Disconnected or short-circuited LEV motor coil | Measure resistance between the coils (red - white, red -orange, red - yellow, red - blue) using a tester. They are normal if resistance is 100Ω ± 10%. | Replace the LEV coils. | Outdoor unit (LEV2a, LEV2b, LEV2d) and BC controller |
| | Measure resistance between the coils (red - white, red -orange, brown - yellow, brown - blue) using a tester. They are normal if resistance is 150Ω ± 3%. | Replace the LEV coils. | Indoor unit |
| | Measure the resistance between coils (red - white, red - orange, brown - yellow, brown - blue) with a tester. When the resistance is in the range of 46Ω ± 3%, the LEV is normal. | Replace the LEV coils. | Outdoor (LEV4) |
| Incomple sealing<br>(leak from the valve) | When checking the refrigerant leak from the indoor LEV, run the target indoor unit in the fan mode, and the other indoor units in the cooling mode. Then, check the liquid temperature (TH22) with the self-diagnosis LED. When the unit is running in the fan mode, the LEV is fully closed, and the temperature detected by the thermistor is not low. If there is a leak, however, the temperature will be low. If the temperature is extremely low compared with the inlet temperature displayed on the remote controller, the LEV is not properly sealed, however, if there is a little leak, it is not necessary to replace the LEV when there are no effects to other parts.<br><br> | If there is a large amount of leakage, replace the LEV. | Indoor unit |
| Faulty wire connections in the connector or faulty contact | 1. Check for loose pins on the connector and check the colors of the lead wires visually<br>2. Disconnect the control board's connector and conduct a continuity check using a tester. | Check the continuity at the points where an error occurs. | Indoor unit, Outdoor unit and BC controller |

## 8-7-3 Coil Removal Instructions

### (1) Outdoor unit LEV (LEV2a, 2b, 2d, and LEV4)

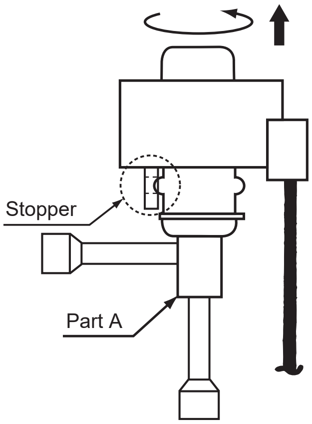
1) Components

The outdoor unit LEV consists of a coil and a valve body that can be separated from each other.



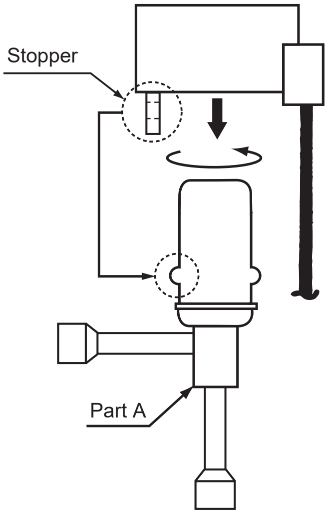
2) Removing the coil

Securely hold the LEV at the bottom (Part A in the figure), and turn the coil. After checking that the stopper is removed, pull up and out the coil.
When removing the coil, hold the LEV body securely to prevent undue force from being placed on the pipe and bending the pipe.



3) Installing the coil

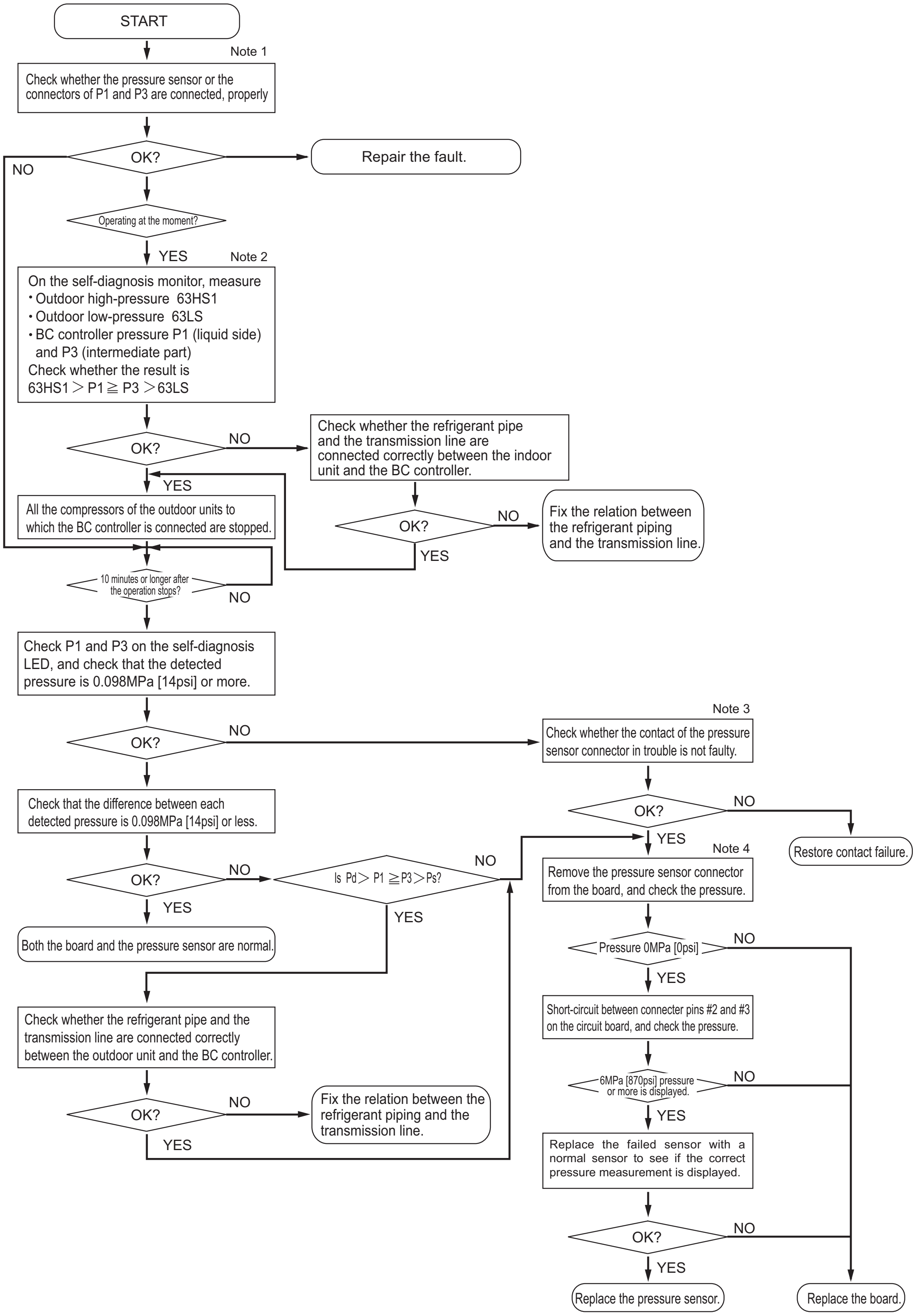
Securely hold the bottom of the LEV (Part A in the figure), insert the coil from above, and turn the coil until the coil stopper is properly installed on the LEV body.
When removing the coil, hold the LEV body securely to prevent undue force from being placed on the pipe and bending the pipe.



# 8-8 Troubleshooting Problems with Major Components on BC Controller

## 8-8-1 Pressure Sensor

Troubleshooting flow chart for pressure sensor



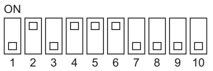
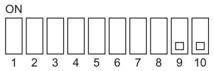
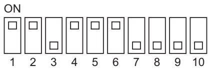
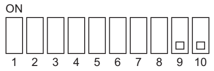
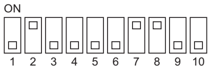
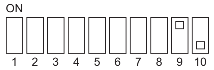
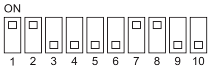
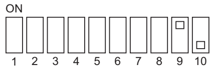
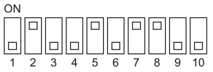
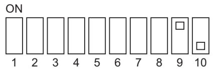
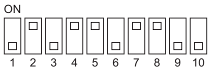
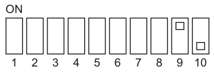
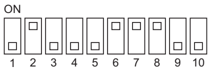
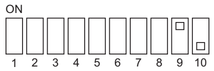
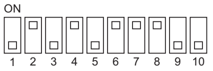
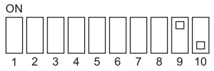
**Note**

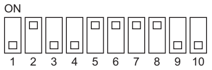
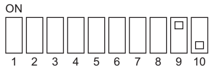
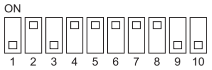
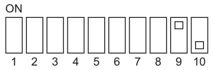
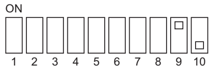
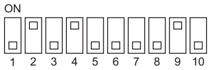
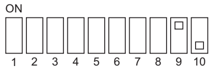
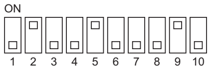
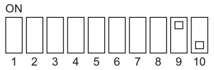
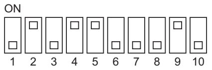
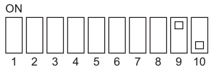
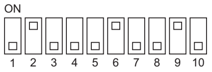
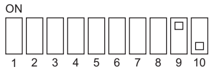
1) BC controller: Phenomena when the pressure sensor is connected wrongly (reverse connection of P1 and P3) to the board.

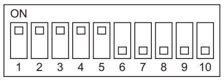
| Symptoms | | | | | | |
|---|---|---|---|---|---|---|
| Cooling-only | Cooling-main | | Heating only | | Heating main | |
| Normal | Non-cooling | SC11 large<br>SC16 small<br>△PHM large | Indoor heating SC small<br>Heating indoor Thermo ON<br>Especially noise is large. | SC11 large<br>SC16 small<br>△PHM large | Non-cooling<br>Indoor heating SC small<br>Heating indoor Thermo ON<br>Especially noise is large. | SC11 large<br>SC16 small<br>△PHM large |

**Note**

2) Check the self-diagnosis switch (Outdoor control board SW4 and SW6).

| Measurement data | Symbol | SW4 setting value | SW6 setting value |
|---|---|---|---|
| Outdoor high pressure | 63HS1 |  |  |
| Outdoor low pressure | 63LS |  |  |
| BC controller pressure (liquid side) | PS1 |  |  |
| BC controller pressure (intermediate part) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 1) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 2) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 3) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 4) | PS3 |  |  |

| Measurement data | Symbol | SW4 setting value | SW6 setting value |
|---|---|---|---|
| Sub BC controller pressure (intermediate part) (Sub 5) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 6) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 7) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 8) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 9) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 10) | PS3 |  |  |
| Sub BC controller pressure (intermediate part) (Sub 11) | PS3 |  |  |



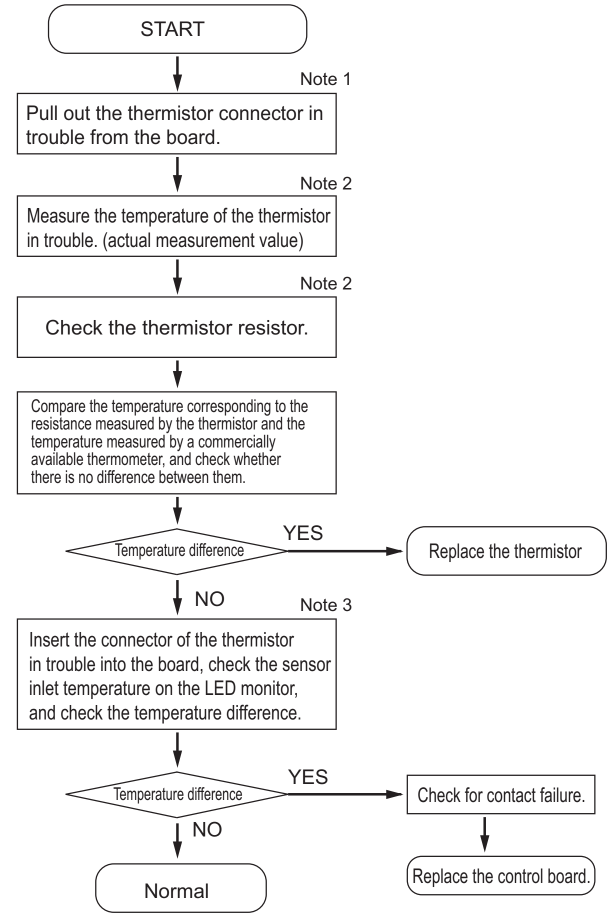
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

**Note**

3) Check whether CN302 (liquid side) connector on the BC controller control board and the connector CN303 (intermediate part) are not disconnected or not loose.
4) Check the pressure value on the self-diagnosis switch (same as note 2) with the connector of the applied pressure sensor is disconnected from the board.

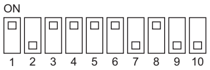
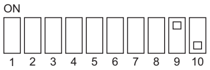
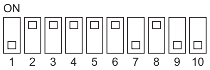
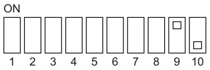
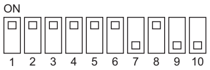
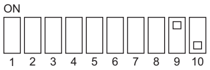
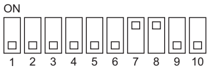
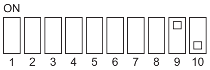
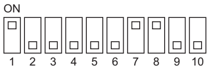
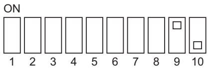
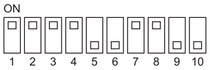
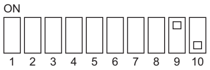
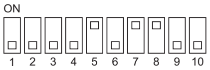
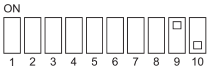
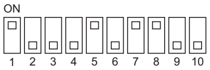
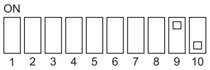
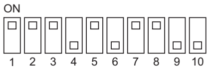
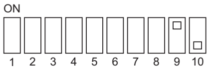
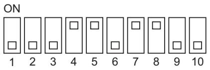
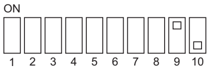
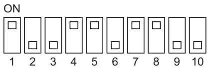
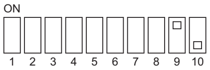
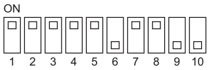
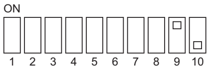
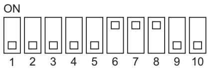
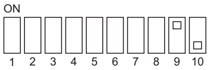
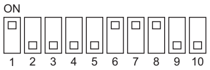
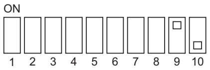
## 8-8-2 Temperature Sensor

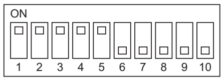
**Troubleshooting instructions for thermistor**



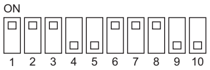
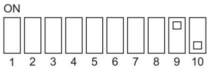
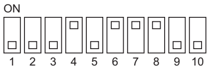
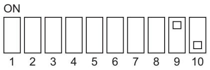
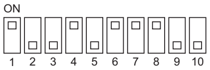
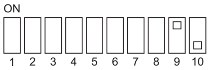
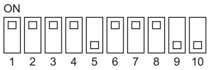
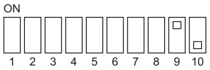
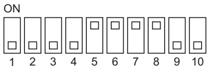
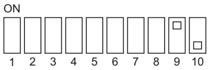
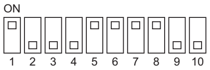
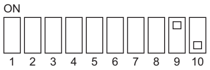
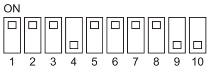
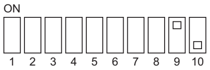
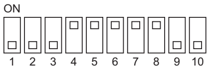
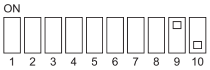
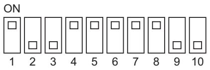
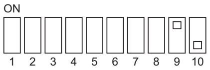
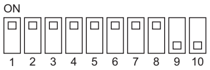
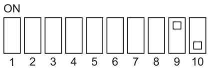
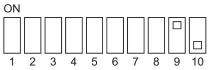
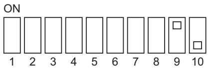
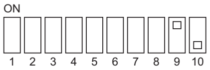
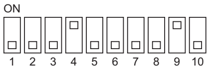
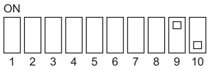
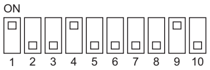
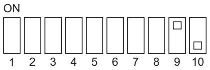
**Note**

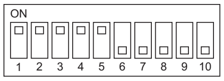
1) For the connectors on the board, TH11 through TH16 are connected to CN300. Disconnect the connector in trouble, and check the sensor of each number.
2)
   - Pull out the sensor connector from the I/O board, Do not pull the sensor by holding the lead wire.
   - Measure the resistance with such as a tester.
   - Compare the measured value with that shown in the table below. When the result is ±10%, it is normal.
3) Check the self-diagnosis switch (Outdoor control board SW4 and SW6).

| | Measurement data | Symbol | SW4 setting value | SW6 setting value |
|---|---|---|---|---|
| MA<br>(Standard / main) | Liquid inlet temperature | TH11 |  |  |
| | Bypass outlet temperature | TH12 |  |  |
| | LEV4 outlet temperature | TH14 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 1) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 2) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 3) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |

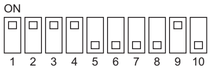
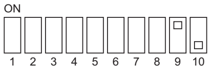
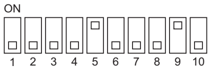
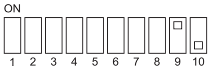
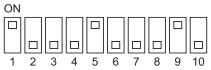
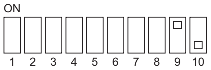
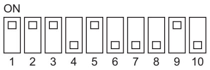
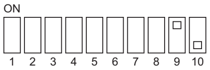
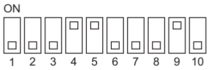
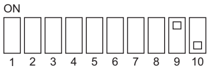
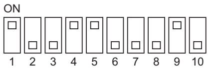
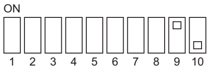
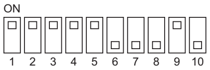
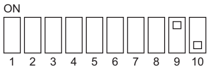
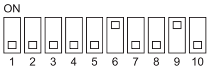
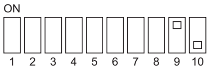
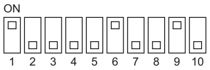
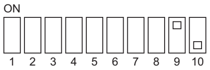


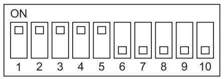
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

| | Measurement data | Symbol | SW4 setting value | SW6 setting value |
|---|---|---|---|---|
| MB<br>(Sub 4) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 5) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 6) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 7) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 8) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |



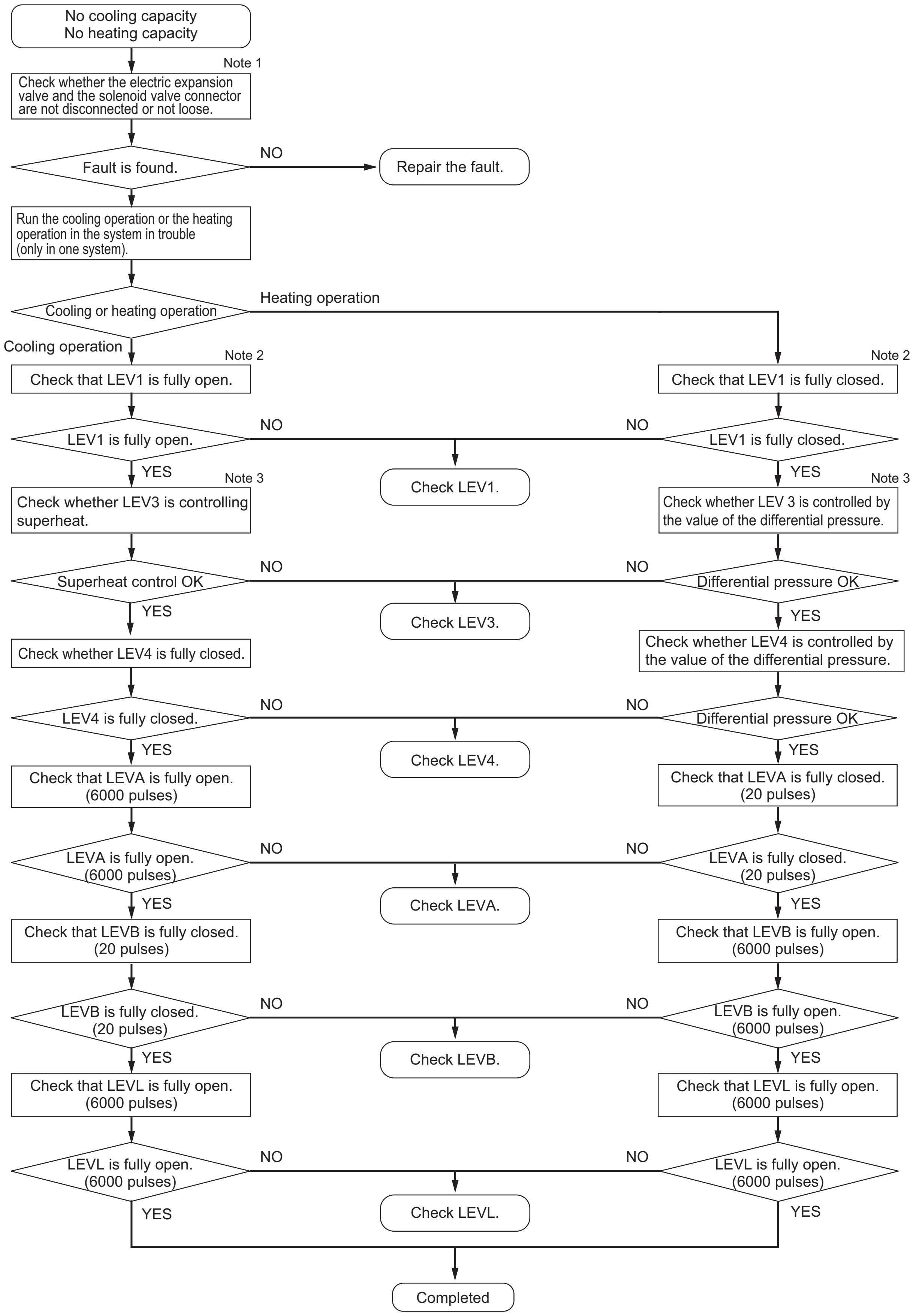
The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

| | Measurement data | Symbol | SW4 setting value | SW6 setting value |
|---|---|---|---|---|
| MB<br>(Sub 9) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 10) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |
| MB<br>(Sub 11) | Bypass outlet temperature | TH12 |  |  |
| | LEV3(a) outlet temperature | TH15 |  |  |
| | LEV3(a) inlet temperature | TH16 |  |  |



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

## 8-8-3 Troubleshooting Flowchart for LEVs



**Note**

1) BC controller: Phenomena when LEV is connected wrongly (reverse connection of LEV1 and LEV3 or LEV4) to the board.

| Phenomena | | | |
|---|---|---|---|
| Cooling-only | Cooling-main | Heating only | Heating main |
| Non-cooling<br>SH12 small, SC11 small<br>SC16 small, branch pipe SC small<br>BC controller sound | Non-cooling and non-heating<br>SH12 small, SC11 small<br>SC16 large, but branch pipe SC small<br>BC controller sound△PHM large | Indoor heating SC small<br>△PHM large | Non-cooling<br>Indoor heating SC small<br>△PHM large |

2) BC controller: Phenomena when LEV is connected wrongly (reverse connection of LEV3 and LEV4) to the board

| Phenomena | | | |
|---|---|---|---|
| Cooling-only | Cooling-main | Heating only | Heating main |
| Non-cooling<br>SH12 large, SC11 small<br>SC16 small, branch pipe SC small | Non-cooling<br>SH12 large, SC11 small<br>SC16 small, branch pipe SC small | SH12 large | Non-cooling<br>SH12 large, SC16 small |

3) BC controller: Phenomena when LEV is connected wrongly (reverse connection of LEVA, LEVB, and LEVL) to the board

This fails to control refrigerant to the indoor units with applicable branches, disabling cooling and heating.
LEVA, LEVB, and LEVL fully open (6,000 pulses) or fully close (20 pulses) according to the indoor unit operation mode. Measure the temperature at the upstream and downstream pipes of the check branch LEV during cooling and heating to check that LEV behaves as specified with no wrong wiring.

When fully open: There is no temperature difference between the upstream and downstream pipes.
When fully closed: There is a temperature difference between the upstream and downstream pipes (with no refrigerant flowing sound).

| | | Mode | | | |
|---|---|---|---|---|---|
| | | Cooling | Heating | Stop | Defrosting[*1] |
| Branch inlet | LEVA | Fully open (6,000) | Fully closed (20) | Slightly open (160) | Fully closed (20) |
| | LEVB | Fully closed (20) | Fully open (6,000) | Fully closed (20) | Fully closed (20) |
| | LEVL | Fully open (6,000) | Fully open (6,000) | Fully open (6,000) | Fully open (6,000) |

*1 Behavior may differ according to the defrosting method and operation conditions.
*2 When refrigerant leak is detected, LEVA, LEVB, and LEVL at related branch inlets fully close (20 pulses).

4) Check method of fully open state or fully closed state of LEV

- Check LEV opening (pulse) on the self-diagnosis LED (Outdoor control board SW1).

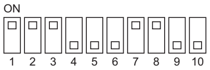
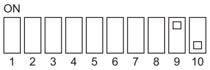
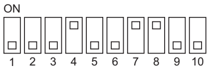
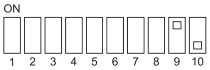
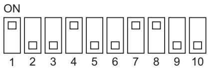
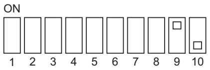
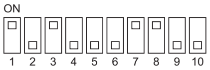
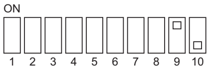
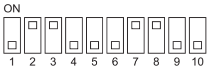
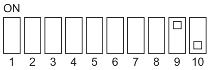
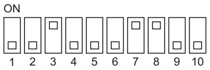
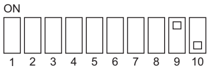
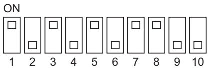
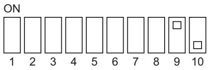
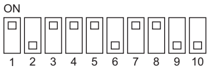
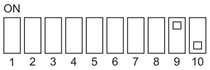
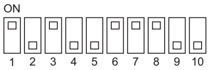
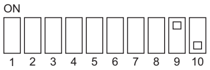
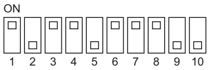
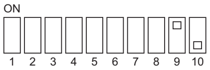
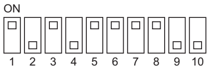
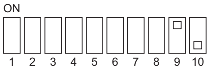
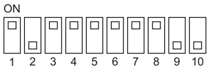
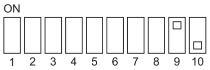
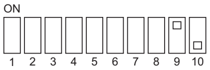
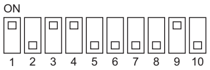
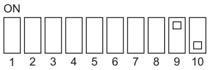
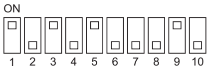
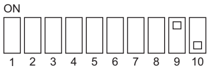
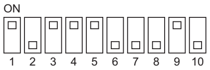
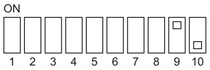
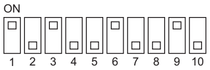
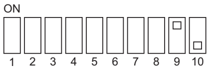
LEV1, 3, 4
  Full open: 3000 pulses
  Fully closed: 41 pulses (In the case of heating-only mode, however, the pulse may become 41 or more.)
LEVA, B, L
  Full open: 6000 pulses
  Fully closed: 20 pulses

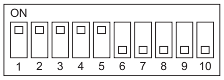
- When LEV is fully open, measure the temperature at the upstream and downstream pipes of LEV, and make sure that there is no temperature difference.
- When LEV is fully closed, check that there is no refrigerant flowing sound.

5) Refer to the chart below to judge LEV opening controlled by the values of the differential pressure and of the superheat. (BC controller LEV basic operation characteristic)

| | Part | Malfunction mode | Operation mode | Content | Standards of judgment on unit stable operation |
|---|---|---|---|---|---|
| MA type | LEV1 | Inclined to close | Heating only<br>Heating-main<br>Cooling-main | Difference between high pressure (P1) and intermediate pressure (P3) is large. | 0.3 to 0.4MPa [44 to 58psi] |
| | | Inclined to open | | Difference between high pressure (P1) and intermediate pressure (P3) is small. | |
| | LEV3 | Inclined to close | Cooling-only<br>Cooling-main | SH12 is large. | SH12 < 20°C [36°F] |
| | | | Heating only<br>Heating-main | Difference between high pressure (P1) and intermediate pressure (P3) is small. | 0.3 to 0.4MPa [44 to 58psi] |
| | | Inclined to open | Cooling-only<br>Cooling-main | SC16 and SH12 are small. | SC16 > 3°C [5.4°F]<br>SH12 > 3°C [5.4°F] |
| | | | Heating only<br>Heating-main | Difference between high pressure (P1) and intermediate pressure (P3) is large. | 0.3 to 0.4MPa [44 to 58psi] |
| | LEV4 | Inclined to close | Heating-only<br>Heating-main | Difference between high pressure (P1) and intermediate pressure (P3) is small. | 0.3 to 0.4MPa [44 to 58 psi] |
| | | Inclined to open | Cooling-only<br>Cooling-main<br>Heating-only<br>Heating-main | SC16 is small. | SC16 > 3°C [5.4°F] |
| | | | | Difference between high pressure (P1) and intermediate pressure (P3) is large. | 0.3 to 0.4MPa [44 to 58 psi] |
| MB type | LEV3 | Inclined to close | Cooling-only<br>Cooling-main | SH12 is large. | SH12 < 20°C [36°F] |
| | | Inclined to open | Cooling-only<br>Cooling-main | SH12 is small. | SH12 > 3°C [5.4°F] |

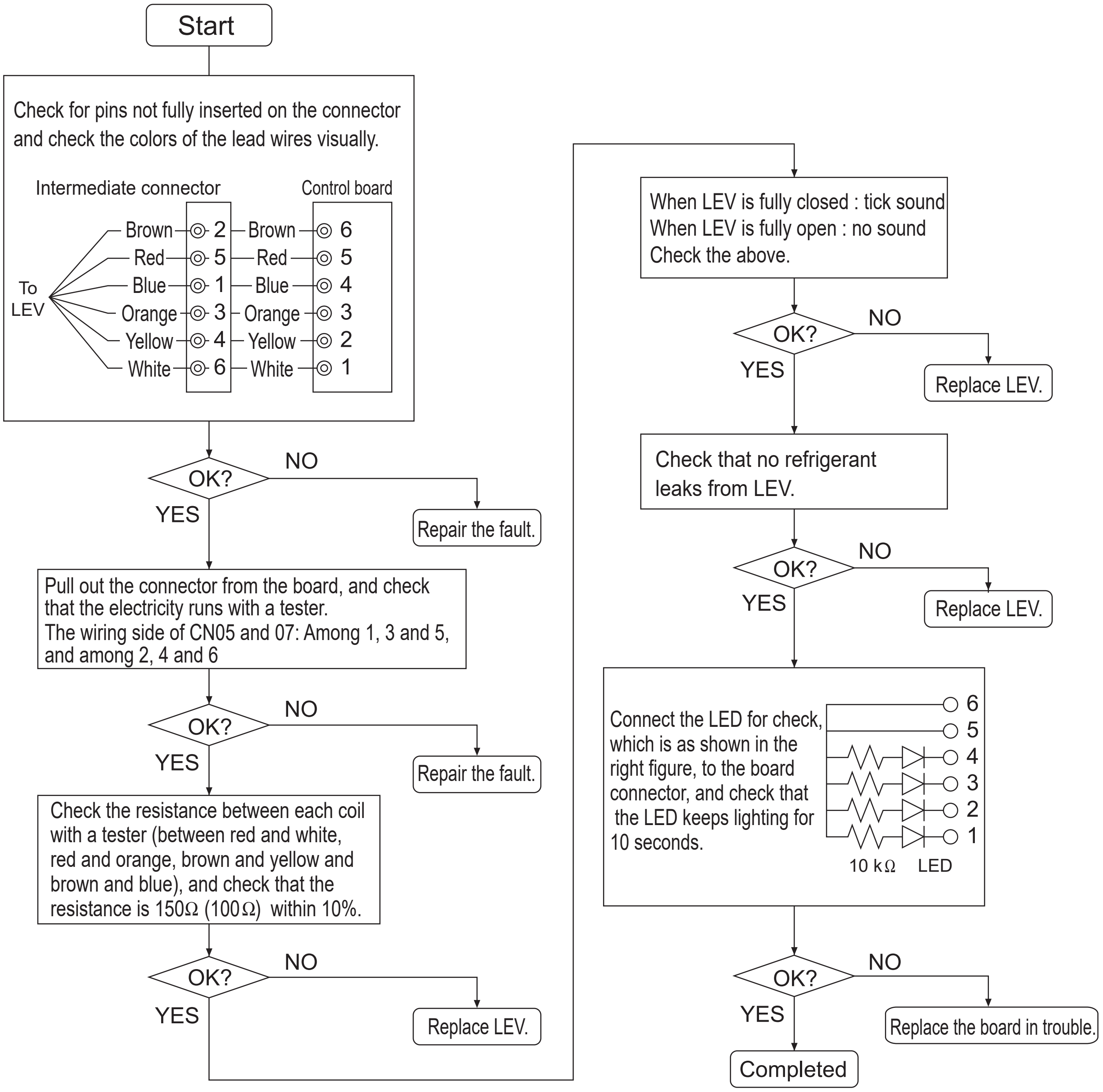
### Self-diagnosis LED

| | Measurement data | Symbol | SW4 setting value | SW6 setting value |
|---|---|---|---|---|
| MA<br>(Standard / main) | LEV1 opening | - |  |  |
| | LEV3 opening | - |  |  |
| | LEV4 opening | - |  |  |
| | BC controller bypass outlet superheat | SH12 |  |  |
| | BC controller intermediate part subcool | SC16 |  |  |
| | BC controller liquid-side subcool | SC11 |  |  |
| MB<br>(Sub 1) | LEV3 opening | - |  |  |
| MB<br>(Sub 2) | LEV3 opening | - |  |  |
| MB<br>(Sub 3) | LEV3 opening | - |  |  |
| MB<br>(Sub 4) | LEV3 opening | - |  |  |
| MB<br>(Sub 5) | LEV3 opening | - |  |  |
| MB<br>(Sub 6) | LEV3 opening | - |  |  |
| MB<br>(Sub 7) | LEV3 opening | - |  |  |
| MB<br>(Sub 8) | LEV3 opening | - |  |  |
| MB<br>(Sub 9) | LEV3 opening | - |  |  |
| MB<br>(Sub 10) | LEV3 opening | - |  |  |
| MB<br>(Sub 11) | LEV3 opening | - |  |  |



The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

Troubleshooting Flowchart for LEV



Check for pins not fully inserted on the connector and check the colors of the lead wires visually.

Pull out the connector from the board, and check that the electricity runs with a tester.
The wiring side of CN05 and 07: Among 1, 3 and 5, and among 2, 4 and 6

Check the resistance between each coil with a tester (between red and white, red and orange, brown and yellow and brown and blue), and check that the resistance is 150Ω (100Ω) within 10%.

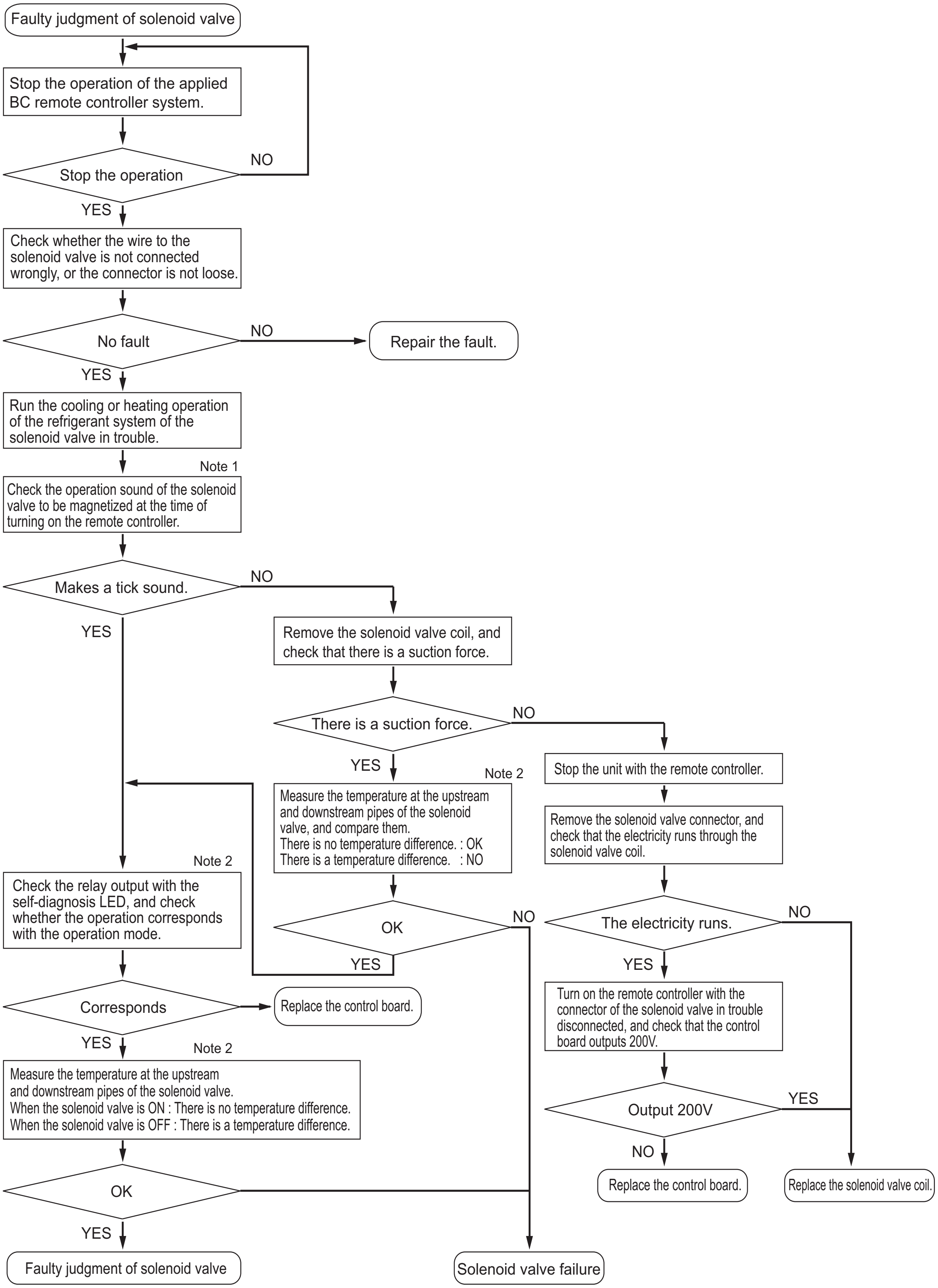
When LEV is fully closed : tick sound
When LEV is fully open : no sound
Check the above.

Check that no refrigerant leaks from LEV.

Connect the LED for check, which is as shown in the right figure, to the board connector, and check that the LED keeps lighting for 10 seconds.

## 8-8-4 Troubleshooting Flowchart for Solenoid Valves

### (1) Solenoid valve



Check whether the BC board output signal corresponds with the solenoid valve operation correspond.

**Note**

1) SVM1, SVM1b

SVM1 and SVM1b turn on or off according to the indoor unit operation mode.

| Operation mode | Cooling only | Cooling main | Heating only | Heating main | Defrost | Stopped |
|---|---|---|---|---|---|---|
| SVM1, SVM1b | ON | Pressure differential control OFF or ON | OFF | OFF | ON | OFF |

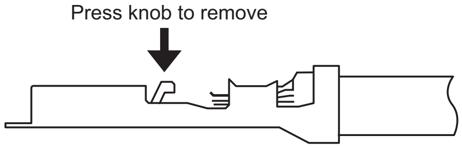
# 8-9 Troubleshooting Inverter Problems

## 8-9-1 Inverter-Related Problems and Solutions

- If only the compressor has failed, replace only the compressor. (If the compressor fails, an overcurrent flows to the INV board. However, the INV board detects the overcurrent and shuts down to prevent itself from being damaged. Make sure that the outdoor unit model selection switch (SW5-3 to SW5-8 of the DIP switch on the outdoor control board) is set correctly. For the switch settings, refer to the following page(s). [7-9-2 Error Code [7101]]
- If only the fan motor has failed, replace only the fan motor. (If the fan motor fails, an overcurrent flows to the fan board. However, the fan board will not be damaged.)
- If the INV board or fan board has failed, replace the INV board or fan board as necessary.
- If both the compressor and INV board have failed, replace both the compressor and INV board.
- If both the fan motor and fan board have failed, replace both the fan motor and fan board.

### (1) Inverter-related failure diagnosis and remedies

1) Because the inverter is equipped with a large electrolytic capacitor, voltage remains even after the main power is turned off, posing a dangerous risk of electric shock. As such, turn off the power to the unit at least 10 minutes before inspecting inside the control box, and ensure that the voltage across the electrolytic capacitor in the main circuit (across tab terminals FTP and FTN) is no more than 20 VDC.
(It takes about 10 minutes to discharge the voltage after the power has been turned off.)
2) Before servicing, ensure that the fan is not rotating, and then disconnect the connectors CNINV, CNIV1, and CNIV2 on the fan board and the connectors CNFA1 and CNFA2 on the INV board. When connecting or disconnecting the connectors, ensure that the outdoor unit fan is not rotating and that the voltage across electrolytic capacitor (across tab terminals FTP and FTN) in the main circuit is 20 VDC or lower. The outdoor unit fan, when rotated by a strong wind, may charge the main circuit capacitor, posing a risk of electrical shock. For details, refer to the wiring nameplate.
3) When connecting a cable to TB7, ensure that the voltage across the electrolytic capacitor in the main circuit (across tab terminals FTP and FTN) is no more than 20 VDC.
4) After servicing, reconnect all disconnected connectors.
5) The inverter can be damaged if the wiring screws are not tightened properly or if the connectors are not inserted properly. If a problem occurs after replacing a board or an electrical component, check if the wiring, screws, connectors, tab terminals, and other components are inserted correctly, as problems are often caused by incorrect wiring.
6) Do not disconnect or connect any inverter-related connectors while the main power is turned on. Doing so may damage the board.
7) Tab terminals are terminals with locks. Press and hold the knob in the center of the terminal to release the lock. After engaging the lock, ensure the lock is securely fastened.



8) When using heat-dissipating grease during replacement of boards or electrical components, apply the grease supplied with the service parts thinly and evenly to the applicable components. Grease on the wiring terminals may cause poor contact, so be sure to wipe off any excess grease.
9) If the output wiring to the compressor is connected incorrectly, the compressor could be damaged. Be very careful to note the phase order before starting the work.
10) When turning the unit's power on, the compressor or heater will be energized even if it is not operating. Before turning the power on, disconnect the electrical wiring from the compressor's terminal box, measure the insulation resistance, and check for ground faults. If the insulation resistance is 1 MΩ or lower, reconnect the electrical wiring to the compressor and turn on the outdoor unit. Energizing the compressor or heater will help evaporate the liquid refrigerant accumulated inside the compressor.

| | Error display / Symptom | Remedy / Inspection item |
|---|---|---|
| [1] | Inverter-related error<br>0403, 1550, 4220, 4225, 4226, 4230, 4235, 4236, 4240, 4245, 4246, 4250, 4255, 4256, 4260, 5110, 5301, 5305, 5306 | Check the details of the inverter error in the error history as specified under [10 LED Status Indicators].<br>Perform the necessary actions as specified in [7-2 Error Code Definitions and Solutions: Codes [0 - 999]] for the error code and error details. |
| [2] | The main power breaker was tripped.<br>Check for breaker failure (e.g., contacts welded together) before attempting to resolve or inspect the problem. | <1> Check the breaker capacity. |
| | | <2> Check for short-circuits and ground faults in electrical systems other than the inverter. |
| | | <3> If no problems are found in checks <1> and <2>, see [8-9-3 Solutions for the Main Breaker Trip]. |
| [3] | The main power earth leakage breaker was tripped.<br>Check for earth leakage breaker failure (e.g., contacts welded together) before attempting to resolve or inspect the problem. | <1> Check the earth leakage breaker capacity and sensitivity current. |
| | | <2> Check for insulation faults in electrical systems other than the inverter. |
| | | <3> If no problems are found in checks <1> and <2>, see [8-9-4 Solutions for the Main Earth Leakage Breaker Trip]. |
| [4] | The compressor is inoperable. | Check the inverter frequency on the LED monitor. If it is displayed as operating, see (2) - [4] under [8-9-1 Inverter-Related Problems and Solutions]. |
| [5] | The compressor vibrates constantly or makes abnormal noise. | See (2) - [4] under [8-9-1 Inverter-Related Problems and Solutions]. |
| [6] | The compressor speed does not increase to the specified speed. | <1> Check for compressor current or heatsink temperature problems, taking note of the information in [7-1 Error Code and Preliminary Error Code Lists].<br><2> Check for power supply voltage imbalance problems. (Standard: 2% or less) |
| [7] | The fan motor is inoperable. | Check the inverter frequency on the LED monitor. If it is displayed as operating, see (2) - [6], [7], and [8] under [8-9-1 Inverter-Related Problems and Solutions]. |
| [8] | The fan motor vibrates constantly or makes abnormal noise. | Check the inverter frequency on the LED monitor. If it is displayed as operating, go to (2) - [6], [7], and [8] under [8-9-1 Inverter-Related Problems and Solutions]. |
| [9] | Noise is present in peripheral equipment. | <1> Check for any peripheral equipment power source wiring, etc. close to the outdoor unit power source wiring. |
| | | <2> Check for any power source wiring or transmission wiring close to the inverter output wiring. |
| | | <3> Check that the transmission line is properly shielded if necessary, and properly grounded. |
| | | <4> Check for insulation faults in electrical systems other than the inverter. |
| | | <5> Add a ferrite core to the inverter output wiring. (Service parts are available. Consult a Mitsubishi Electric factory for more information.) |
| | | <6> Switch to an alternate power supply line. |
| | | <7> If noise occurs suddenly, the inverter output may have a ground fault. Go to (2) -[4] under [8-9-1 Inverter-Related Problems and Solutions]. |
| | | * Consult a Mitsubishi Electric factory for situations other than the above. |
| [10] | A sudden malfunction (due to external noise) occurs. | <1> Check for improper grounding. |
| | | <2> Check that the transmission line is properly shielded if necessary, and properly grounded. |
| | | <3> Check for any transmission lines or external connection wiring that is close to other power supply lines, etc., or in the same conduit. |
| | | * Consult a Mitsubishi Electric factory for situations other than the above. |

## (2) Troubleshooting for inverter output-related problems

| | Check item | Symptom | Remedy |
|---|---|---|---|
| [1]<br>INV board error detection circuit check | (1) Disconnect the inverter output wiring from the INV board terminals (SCU, SCV, SCW).<br>(2) Operate the outdoor unit. | 1) An overcurrent shut-off error occurs.<br>Error code: 1550<br>Detail code: 001, 002, 003 | See the action flow for the error 1550 in [7-3-8 Error Code [1550]]. |
| | | 2) An IPM/overcurrent shut-off error occurs.<br>Error code: 4250<br>Detail code: 101, 104, 105 | Replace the INV board. |
| | | 3) A logic error occurs.<br>Error code: 4220<br>Detail code: 111 | Replace the INV board. |
| | | 4) A sensor system circuit error occurs.<br>Error code: 5301<br>Detail code: 117 | Replace the INV board. |
| | | 5) An IPM open error occurs.<br>Error code: 5301<br>Detail code: 119 | Normal |
| [2] Compressor ground fault and winding error check | Disconnect the compressor wiring and check for compressor insulation faults and winding resistance faults. | 1) A compressor insulation fault occurs.<br>An error occurs at less than 1MΩ.<br>2) A compressor winding resistance fault occurs.<br>For details on the standard compressor winding resistance values, refer to the specified page. See the notes in [7-1 Error Code and Preliminary Error Code Lists]. | See the action flow for the error 1550 in [7-3-8 Error Code [1550]]. |
| [3] Inverter damage check<br>(no load) | (1) Disconnect the inverter output wiring from the INV board terminals (SCU, SCV, SCW). | 1) An inverter system error is detected. | Turn off SW7-1 on the control board and go to [1]. |
| | | 2) No inverter voltage is output. | Replace the INV board. |
| | (2) Turn on SW7-1 on the control board. | 3) The following imbalance exists in the voltage between each line.<br>5% or more or 5 V or more (whichever is greater)*1 | Replace the INV board. |
| | (3) Operate the outdoor unit.<br>Check the inverter output voltage after the inverter output frequency has stabilized. | 4) No imbalance exists in the voltage between each line. | Normal<br>* After checking, turn off SW7-1 on the control board.<br>If the inverter output wiring is connected while SW7-1 on the control board is on, overload protection is activated during operation.<br>Error code: 4240 |
| [4] Inverter damage check (during compressor operation) | Operate the outdoor unit.<br>Check the inverter output voltage after the inverter output frequency has stabilized. | 1) An overcurrent error occurs immediately after the start of compressor or during operation.<br>Error code: 1550<br>Detail code: 001, 002, 003<br>Error code: 4250<br>Detail code: 101 | a. Confirm that there is no problem in the check items of [1] to [3].<br>b. Check if the high pressure and low pressure are balanced.<br>c. Check for liquified refrigerant stagnation and liquid backflow in the compressor.<br>→ If the problem persists after rebooting a few times, check "d."<br>d. Check if there is a difference between the high pressure and low pressure after the startup.<br>→ Check if the high pressure changes on the LED monitor.<br>If there is no differential pressure, replace the compressor. (The compressor may have been locked.) |
| | | 2) After the inverter output voltage has stabilized, the following imbalance exists in the voltage between each line.<br>5% or more or 5 V or more (whichever is greater) | If the imbalance exists, replace the INV board. |

*1 Measure the voltage while the outdoor unit is operating. (Note that the inverter voltage can be imbalanced even on a normal board if measured while the outdoor unit is stopped.)

| | Check item | Symptom | Remedy |
|---|---|---|---|
| [5] Fan motor ground fault and winding error check | Disconnect the fan motor wiring and check for fan motor insulation faults and winding resistance faults. | 1) A fan motor insulation fault occurs.<br>An error occurs at less than 1 MΩ. | Replace the fan motor. |
| | | 2) Broken wiring of the fan motor<br>For details on the standard fan motor winding resistance values, refer to the specified page. See the notes in [7-1 Error Code and Preliminary Error Code Lists]. | Replace the fan motor. |
| [6] Fan board error detection circuit check (no load) | (1) Turn off the breaker.<br>* Make sure to turn off the power. | 1) An overcurrent error occurs.<br>Error code: 4255, 4256<br>Detail code: 101, 104 | Replace the fan board. |
| | (2) Remove the CNINV connector (CNIV1 connector and CNIV2 connector when two fan motors are mounted) from the fan board. | 2) A logic error occurs.<br>Error code: 4225, 4256<br>Detail code: 111 | Replace the fan board. |
| | (3) Turn on the breaker. | 3) A sensor system circuit error occurs.<br>Error code: 5305, 5306<br>Detail code: 136 | Replace the fan board. |
| | (4) Operate the unit. | 4) A step-out error or current sensor error occurs.<br>Error code: 4255, 4256<br>Detail code: 137<br>Error code: 5305, 5306<br>Detail code: 135 | Normal<br>* After checking, reconnect the CNINV connector (CNIV1 connector and CNIV2 connector when two fan motors are mounted) to the fan board. |
| [7] Fan inverter damage check (no load) | (1) Turn off the breaker.<br>* Make sure to turn off the power. | 1) After operation, any error is detected. | Replace the fan board. |
| | (2) Remove the CNINV connector (CNIV1 connector and CNIV2 connector when two fan motors are mounted) from the fan board. | 2) The following imbalance exists in the voltage between each line.<br>5 V or more | Replace the fan board. |
| | (3) Turn on SW7-2 on the control board.<br>(4) Turn on the breaker.<br>(5) Operate the unit.<br>The unit operates with no load, outputting a constant voltage.<br>During operation with no load, a constant voltage of 100 V or higher is output between each line. | 3) No imbalance exists in the voltage between each line. | Normal<br>* After checking, reconnect the CNINV connector (CNIV1 connector and CNIV2 connector when two fan motors are mounted) and turn off the SW on the board.<br>If the connector is reconnected while SW7-2 on the control board is on, overload protection is activated during operation.<br>Error code: 4245, 4246 |

| | Check item | Symptom | Remedy |
|---|---|---|---|
| [8]<br>Fan inverter damage check (with load) | (1) Operate the unit. | 1) The operation stops within approximately 10 seconds after the startup and a step-out error or overcurrent error occurs.<br>Error code: 4255, 4256<br>Detail code: 137, 101, 106 | Check if the fan motor is locked.<br>→ Replace the fan motor if it is locked.<br>If the problem persists after the replacement, replace the fan board.<br>→ If it is not locked, check the remedies for 2). |
| | | 2) An overcurrent error occurs during operation.<br>Error code: 4255, 4256<br>Detail code: 101, 106 | a. Check if there is strong wind such as a gust.<br>b. If the error occurs with no abnormal wind outside, check [5].<br>c. If no problems are found in [5], replace the fan board.<br>d. If the problem persists after the replacement of the fan board, replace the fan motor. |
| | | 3) An overvoltage error occurs during operation.<br>Error code: 4225, 4226<br>Detail code: 109 | a. Check if there is strong wind such as a gust.<br>b. If the error occurs with no abnormal wind outside, replace the fan board. |
| | | 4) A load short circuit error occurs.<br>Error code: 4255, 4256<br>Detail code: 105 | a. If no problems are found in the check of [6] and [7], check for a short circuit in the motor wiring.<br>b. If no problems are found in a., replace the fan motor.<br>c. If the same error is detected after the replacement of the fan motor, replace the fan board. |
| | | 5) After the rotation rate has stabilized, the following imbalance exists in the voltage between each line.<br>5% or more or 5 V or more (whichever is greater) | a. If the voltage imbalance exists, check [5].<br>b. If no problems are found in [5], replace the fan board.<br>c. If the problem persists after the replacement of the fan board, replace the fan motor. |
| [9]<br>On-site installation condition check | (1) Check the charged refrigerant amount. | The amount of charged refrigerant exceeds the specified amount. | Reduce it to the specified amount. |
| | (2) Check the installation conditions of the outdoor unit branch pipe. | The approach distance before the branch is less than 500 mm. | Ensure at least 500 mm of the approach distance between the branches. |
| | | The branch pipe is inclined more than ±15° from the horizontal. | Install the branch pipe horizontally (within ±15°). |

## 8-9-2 Checking the Installation Conditions

| Items to be checked | Phenomena | Remedy |
|---|---|---|
| (1) Check refrigerant charge. | Overcharge of refrigerant | Return to correct refrigerant charge. |
| (2) Check outdoor unit branch installation. | The branch approach <500 mm. | Make branch approach >500mm |
| | Is the branch angle < ±15° to horizontal? | Make branch angle < ±15° |

## 8-9-3 Solutions for the Main Breaker Trip

**Note**

Measure the secondary voltage of the main power breaker before checking because the main power breaker may have been broken.

| | Items to be checked | Phenomena | Remedy |
|---|---|---|---|
| [1] | Check the breaker capacity. | Use of a non-specified breaker | Replace it with a specified breaker. |
| [2] | Perform Meg check between theterminals on the power terminalblock TB1.<br>Check the continuity between the primary and secondary sides of each phase on TB1. | Zero to several ohm, or Meg-failure<br>No continuity between the primary and secondary sides of each phase on TB1 | Check each part and wiring.<br>Refer to the following page(s). [8-9-5 Simple Check on Inverter Circuit Components]<br>⬩IGBT module<br>⬩Rush current protection resistor<br>⬩Electromagnetic relay<br>⬩DC reactor<br>If there is not continuity between the primary and secondary sides of each phase on TB1, replace the TB1 terminal block. To identify the cause of the trip, inspect the above parts and check the wiring for signs of shorts and abrasion of the sheaths. |
| [3] | Turn on the power again and check again. | 1) Main power breaker trip | |
| | | 2) No remote control display | |
| [4] | Turn on the outdoor unit and check that it operates normally. | 1) Operates normally without tripping the main breaker. | a) The wiring may have been short-circuited. Search for the wire that short-circuited, and repair it.<br>b) If item a) above is not the cause of the problem, the compressor may be faulty. Check the compressor for ground fault and coil failure according to 8-9-1 (2) [2].<br>c) If item b) above is not the cause of the problem, the fan motor may be faulty. Check the fan motor for ground fault and coil failure according to 8-9-1 (2) [5]. |
| | | 2) Main power breaker trip | |

## 8-9-4 Solutions for the Main Earth Leakage Breaker Trip

**Note**

Measure the secondary voltage of the main power earth leakage breaker before checking because the main power earth leakage breaker may have been broken.

| | Items to be checked | Phenomena | Remedy |
|---|---|---|---|
| [1] | Check the earth leakage breaker capacity and the sensitivity current. | Use of a non-specified earth leakage breaker | Replace with a regulation earth leakage breaker. |
| [2] | Check the resistance at the power supply terminal block TB1 with a megger. | Failure resistance value | Check the INV board, fan board.<br>Refer to the following page(s).<br>[8-9-5 Simple Check on Inverter Circuit Components]<br>[8-9-6 Troubleshooting Problems with IGBT Module] |
| [3] | Disconnect the compressor wirings and check the resistance of the compressor with a megger. | Failure compressor if the insulating resistance value is not in specified range.<br>Failure when the insulating resistance value is 1 MΩ or less. | Check that there is no liquid refrigerant in the compressor. If there is none, replace the compressor. |
| [4] | Disconnect the fan motor wirings and check the resistance of the fan motor with a megger. | Failure fan motor if the insulating resistance value is not in specified range.<br>Failure when the insulating resistance value is 1 MΩ or less. | Replace the fan motor. |

**Earth leakage current measurement method**

- For easy on-site measurement of the earth leakage current, enable the filter with a measurement instrument that has filter functions as below, clamp all the power supply wires, and measure.
  Recommended measurement instrument: CLAMP ON LEAK HiTESTER 3283 made by HIOKI E.E. CORPORATION
- When measuring one device alone, measure near the device's power supply terminal block.

## 8-9-5 Simple Check on Inverter Circuit Components

**Note**

Before checking, turn off the power to the unit and wait for at least 10 minutes. After checking that the voltage across the electrolytic capacitor in the main circuit (across the tab terminals FTP and FTN) is 20 VDC or less, remove the target component from the control box.

| Part name | Judgment method |
|---|---|
| DC reactor (DCL) | Measure the resistance between terminals: 1Ω or lower (almost 0 Ω)<br>Measure the resistance between terminals and the chassis: ∞ |

## 8-9-6 Troubleshooting Problems with IGBT Module

Measure the resistance across each pair of terminals on the INV board and fan board with a tester, and use the results for troubleshooting.

1) Notes on measurement
- Check the polarity before measuring. (On the tester, black normally indicates plus.)
- Check that the resistance is not open (∞ Ω) or not shorted (to 0 Ω).
- The values are for reference, and the margin of errors is allowed.
- The result that is more than double or half of the result that is measured at the same measurement point is not allowed.
- Disconnect all the wiring connected to the target board before measurement.

2) Tester restriction
- Use the tester whose internal electrical power source is 1.5V or greater
- Use the dry-battery-powered tester.

**Note**

(The accurate diode-specific resistance cannot be measured with the button-battery-powered card tester, as the applied voltage is low.)

- Use a low-range tester if possible. A more accurate resistance can be measured.

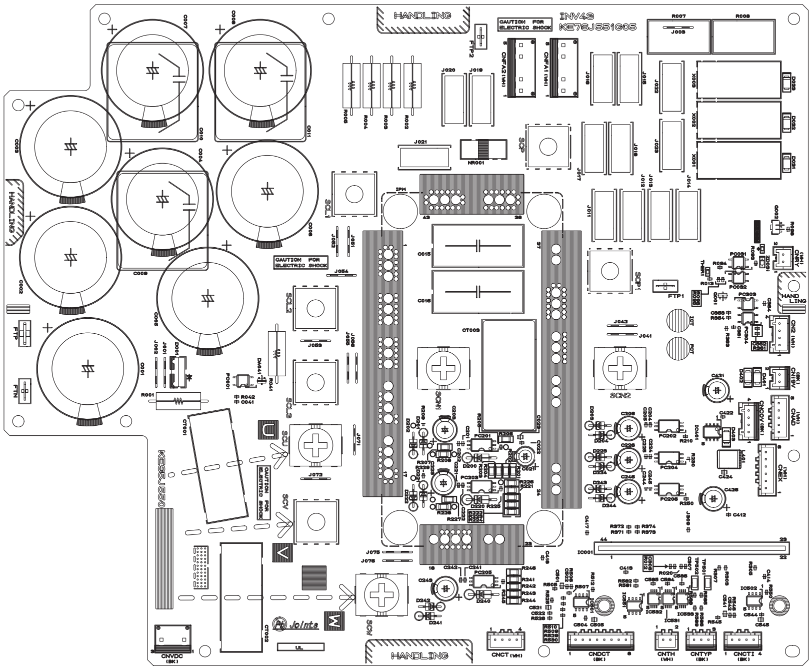
<INV43>

Reference resistance value

| | | Black (+) | | | | |
|---|---|---|---|---|---|---|
| | | SCP | FTN | SCL1 | SCL2 | SCL3 |
| Red (-) | SCP | - | - | 5-200 Ω | 5-200 Ω | 5-200 Ω |
| | FTN | - | - | ∞ | ∞ | ∞ |
| | SCL1 | ∞ | 5-200 Ω | - | - | - |
| | SCL2 | ∞ | 5-200 Ω | - | - | - |
| | SCL3 | ∞ | 5-200 Ω | - | - | - |

| | | Black (+) | | | | |
|---|---|---|---|---|---|---|
| | | SCP1 | FTN | SCU | SCV | SCW |
| Red (-) | SCP1 | - | - | 5-200 Ω | 5-200 Ω | 5-200 Ω |
| | FTN | - | - | ∞ | ∞ | ∞ |
| | SCU | ∞ | 5-200 Ω | - | - | - |
| | SCV | ∞ | 5-200 Ω | - | - | - |
| | SCW | ∞ | 5-200 Ω | - | - | - |
| | chassis | ∞ | ∞ | - | - | - |

INV board outline drawing



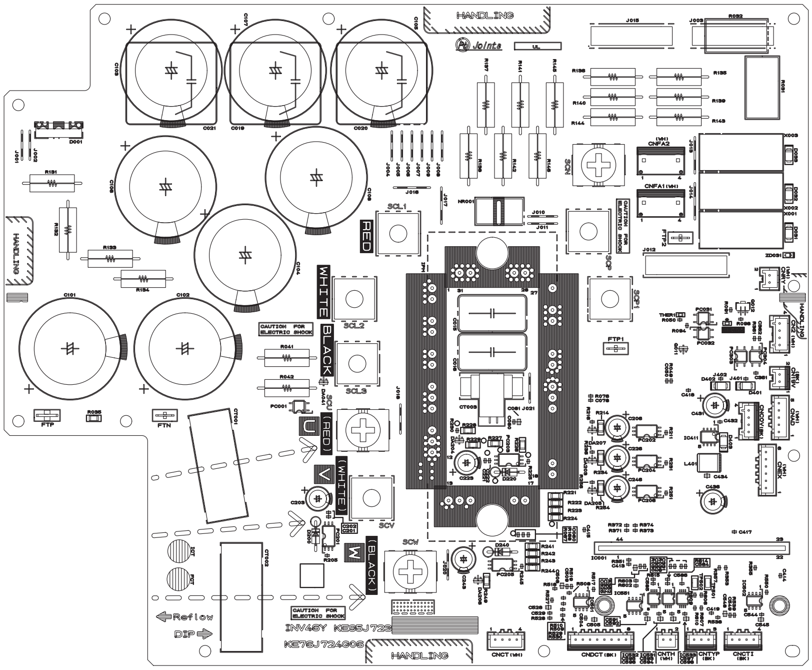
<INV46Y>

Reference resistance value

| | | Black (+) | | | | |
|---|---|---|---|---|---|---|
| | | SCP | FTN | SCL1 | SCL2 | SCL3 |
| Red (-) | SCP | - | - | 5-200 Ω | 5-200 Ω | 5-200 Ω |
| | FTN | - | - | ∞ | ∞ | ∞ |
| | SCL1 | ∞ | 5-200 Ω | - | - | - |
| | SCL2 | ∞ | 5-200 Ω | - | - | - |
| | SCL3 | ∞ | 5-200 Ω | - | - | - |

| | | Black (+) | | | | |
|---|---|---|---|---|---|---|
| | | SCP1 | FTN | SCU | SCV | SCW |
| Red (-) | SCP1 | - | - | 5-200 Ω | 5-200 Ω | 5-200 Ω |
| | FTN | - | - | ∞ | ∞ | ∞ |
| | SCU | ∞ | 5-200 Ω | - | - | - |
| | SCV | ∞ | 5-200 Ω | - | - | - |
| | SCW | ∞ | 5-200 Ω | - | - | - |
| | chassis | ∞ | ∞ | - | - | - |

INV board outline drawing

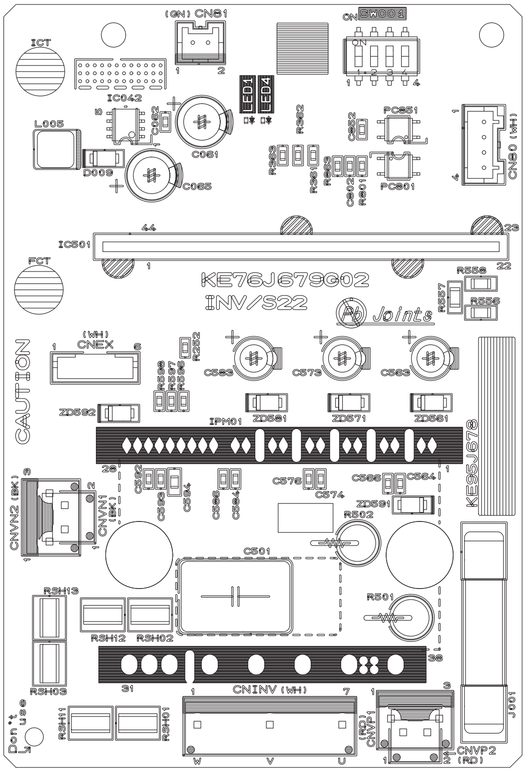


<INV/S22>

Reference resistance value

| | | Black (+) | | | | |
|---|---|---|---|---|---|---|
| | | CNVP1 (CNVP2) | CNVN1 (CNVN2) | CNINV 1 pin | CNINV 4 pin | CNINV 7 pin |
| Red (-) | CNVP1 (CNVP2) | - | - | 5-200 Ω | 5-200 Ω | 5-200 Ω |
| | CNVN1 (CNVN2) | - | - | ∞ | ∞ | ∞ |
| | CNINV 1 pin | ∞ | 5-200 Ω | - | - | - |
| | CNINV 4 pin | ∞ | 5-200 Ω | - | - | - |
| | CNINV 7 pin | ∞ | 5-200 Ω | - | - | - |
| | chassis | ∞ | ∞ | - | - | - |

INV board outline drawing

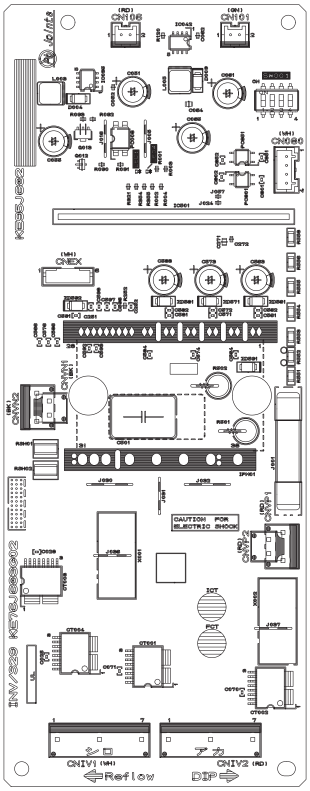


<INV/S29>

Reference resistance value

| | | Black (+) | | | | |
|---|---|---|---|---|---|---|
| | | CNVP1<br>(CNVP2) | CNVN1<br>(CNVN2) | CNIV1<br>1 pin | CNIV1<br>4 pin | CNIV1<br>7 pin |
| Red (-) | CNVP1<br>(CNVP2) | - | - | 5-200 Ω | 5-200 Ω | 5-200 Ω |
| | CNVN1<br>(CNVN2) | - | - | ∞ | ∞ | ∞ |
| | CNIV1<br>1 pin | ∞ | 5-200 Ω | - | - | - |
| | CNIV1<br>4 pin | ∞ | 5-200 Ω | - | - | - |
| | CNIV1<br>7 pin | ∞ | 5-200 Ω | - | - | - |
| | chassis | ∞ | ∞ | - | - | - |

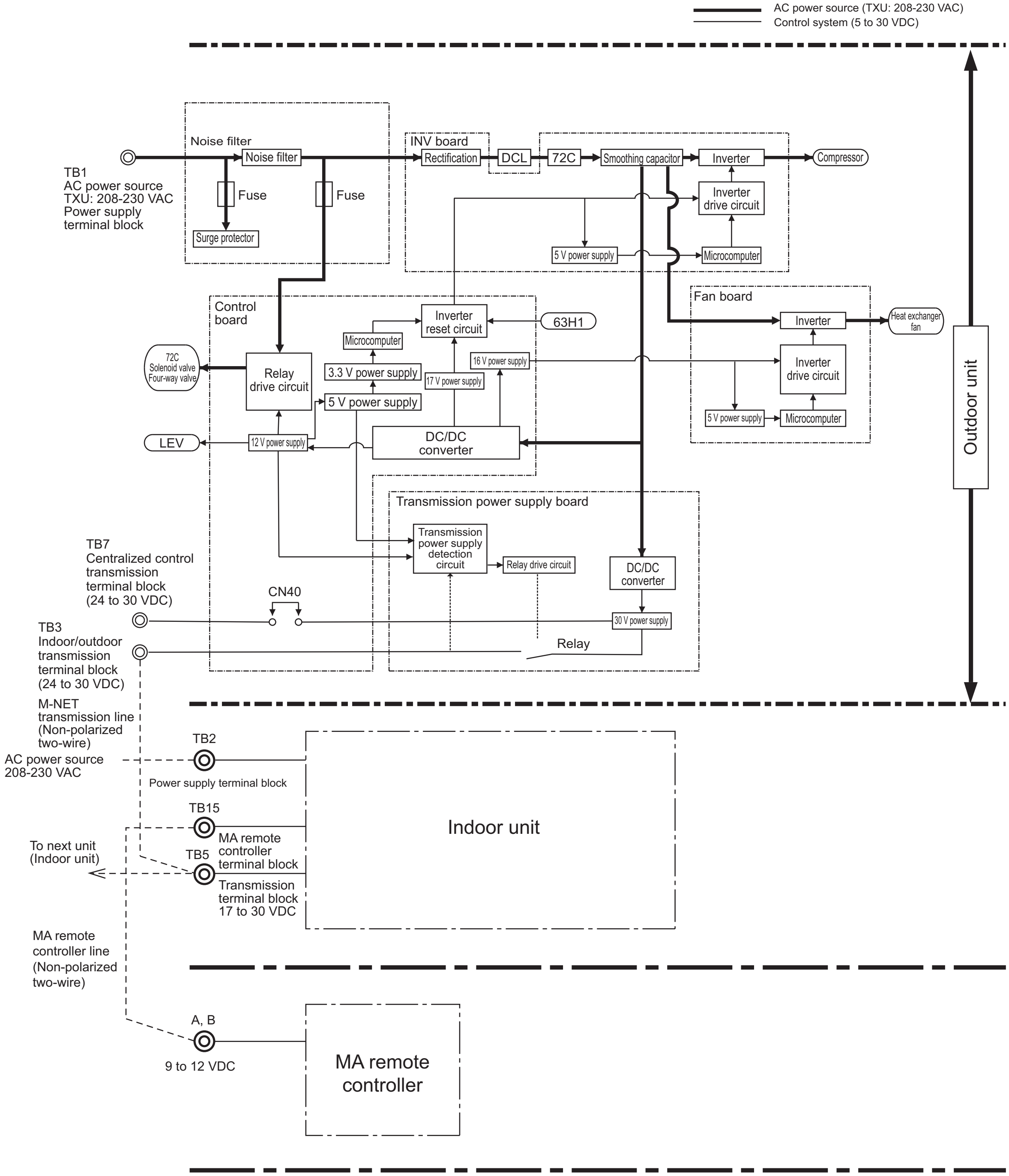
INV board outline drawing



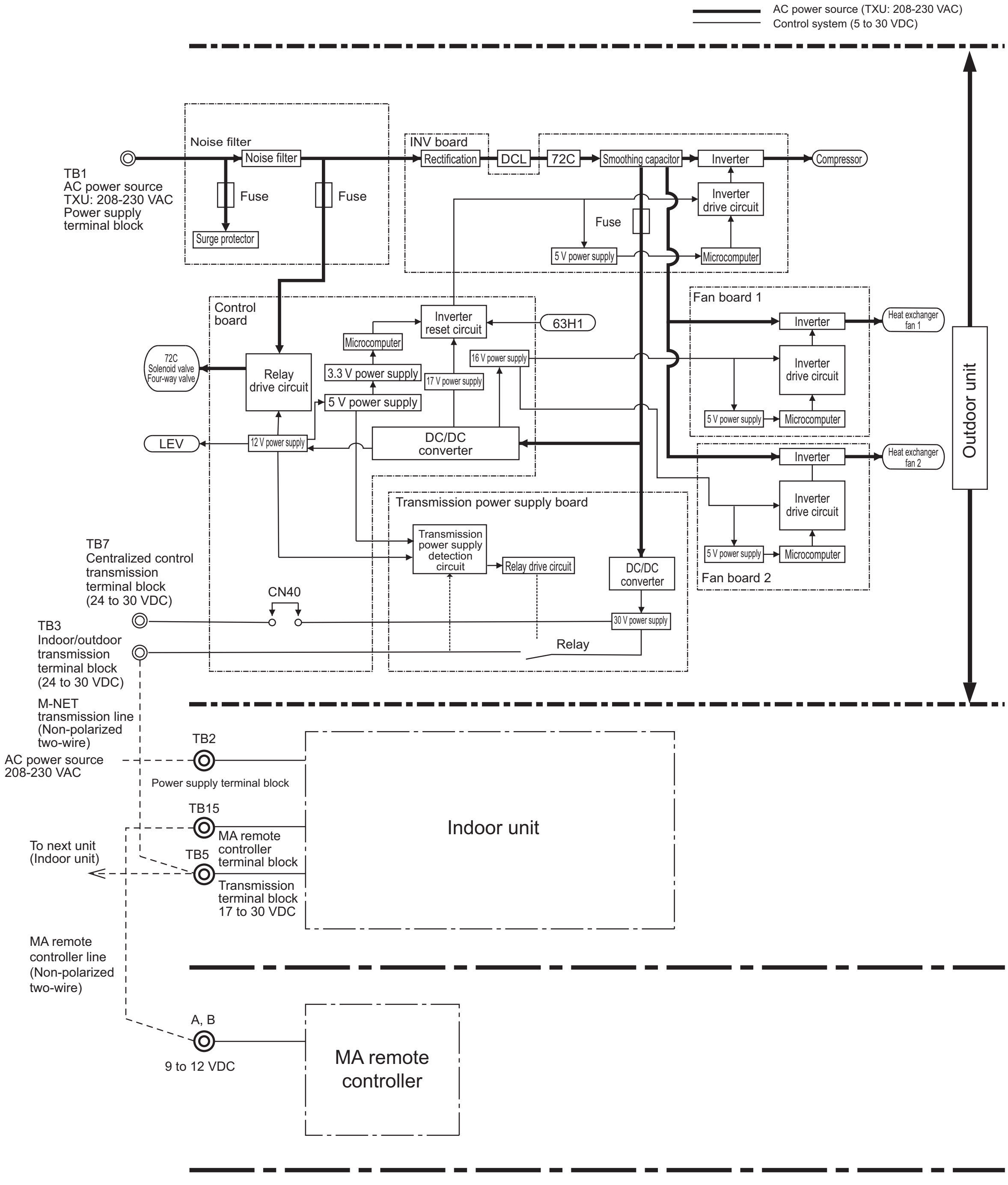
# 8-10 Control Circuit

## 8-10-1 Control Power Supply Function Block

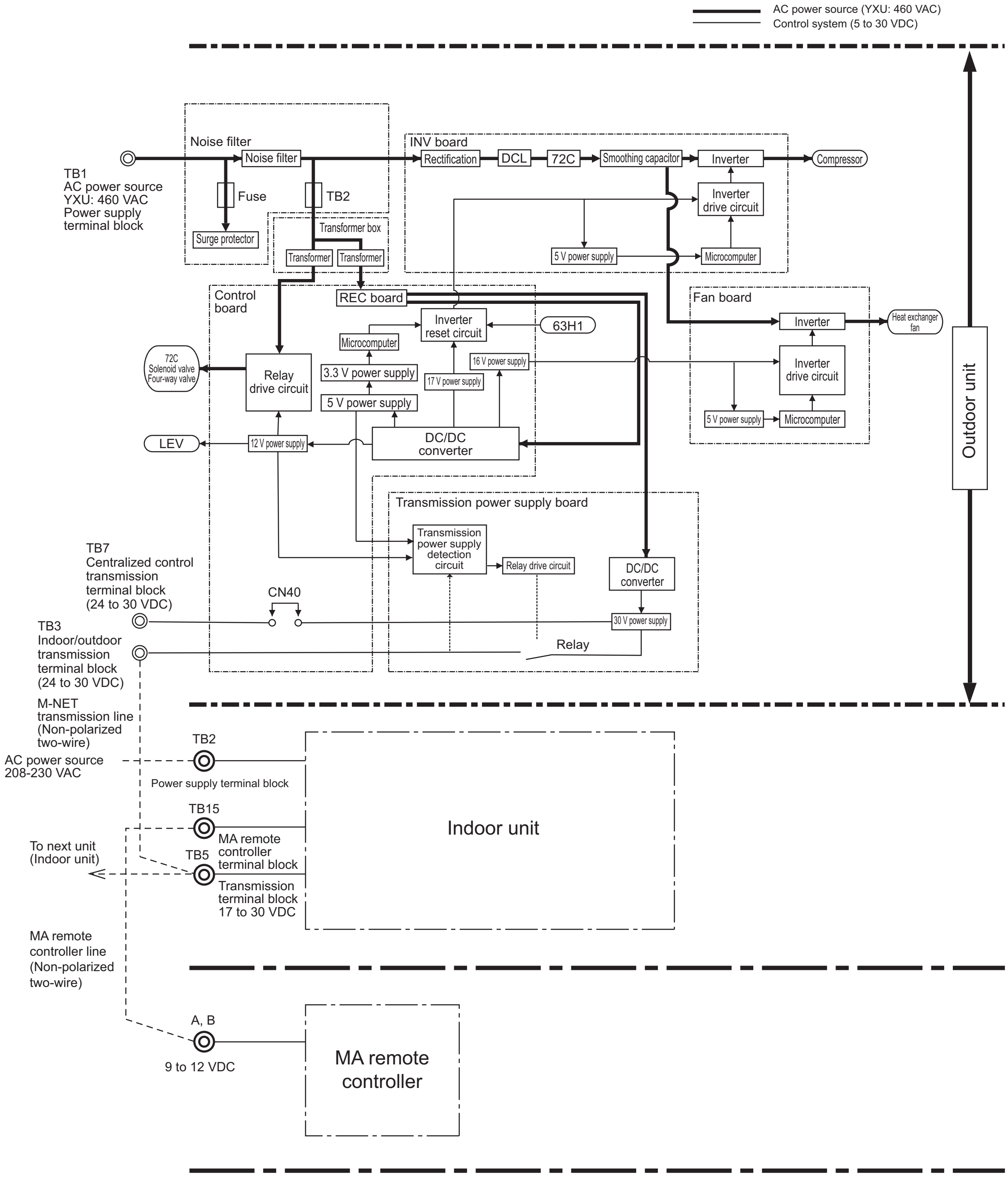
1) PURY-EM72, 96, 120TXU-A
PURY-HM72TXU-A



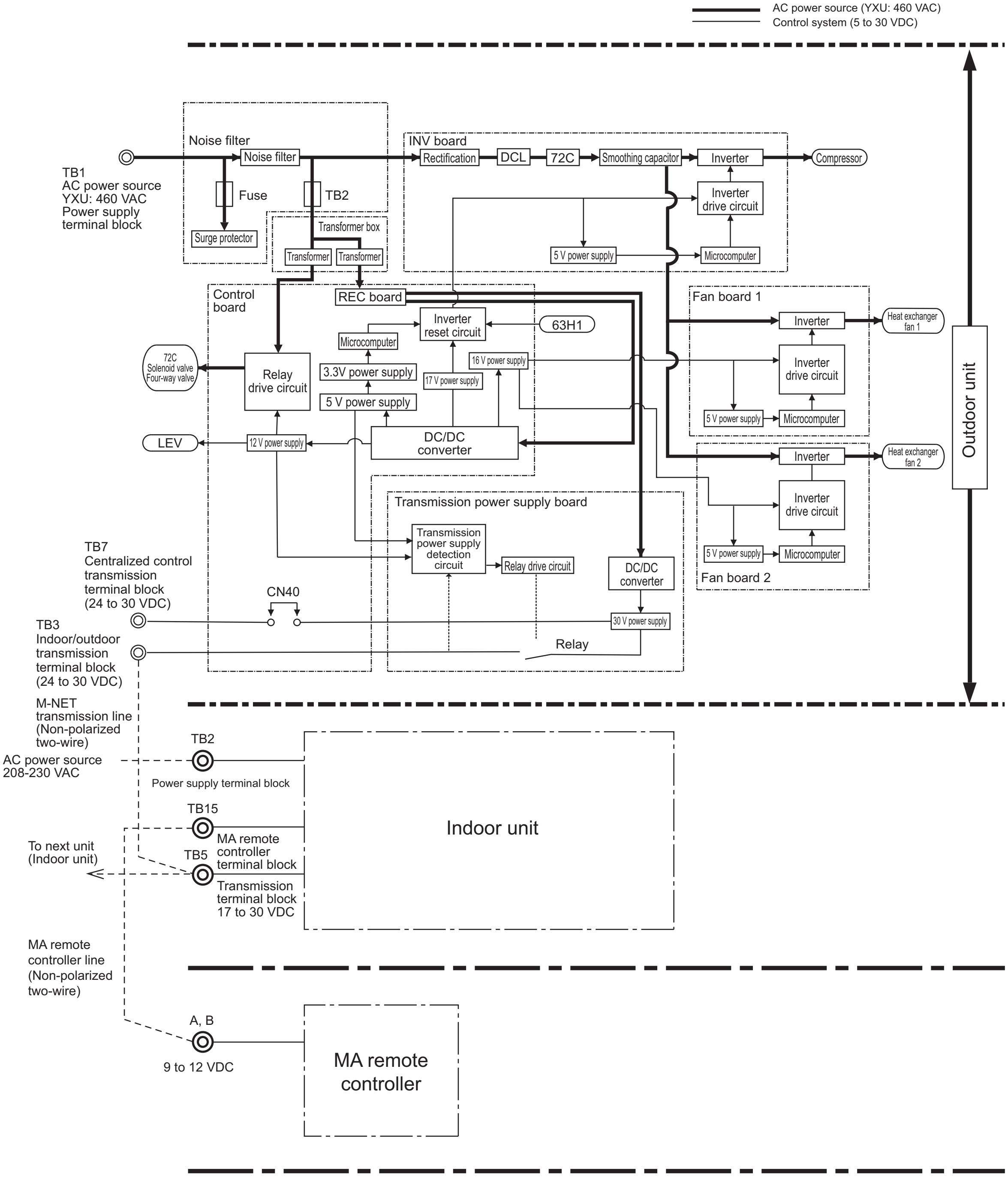
2) PURY-EM144, 168, 192TXU-A
PURY-HM96, 120TXU-A



## 3) PURY-EM72, 96, 120YXU-A
PURY-HM72YXU-A

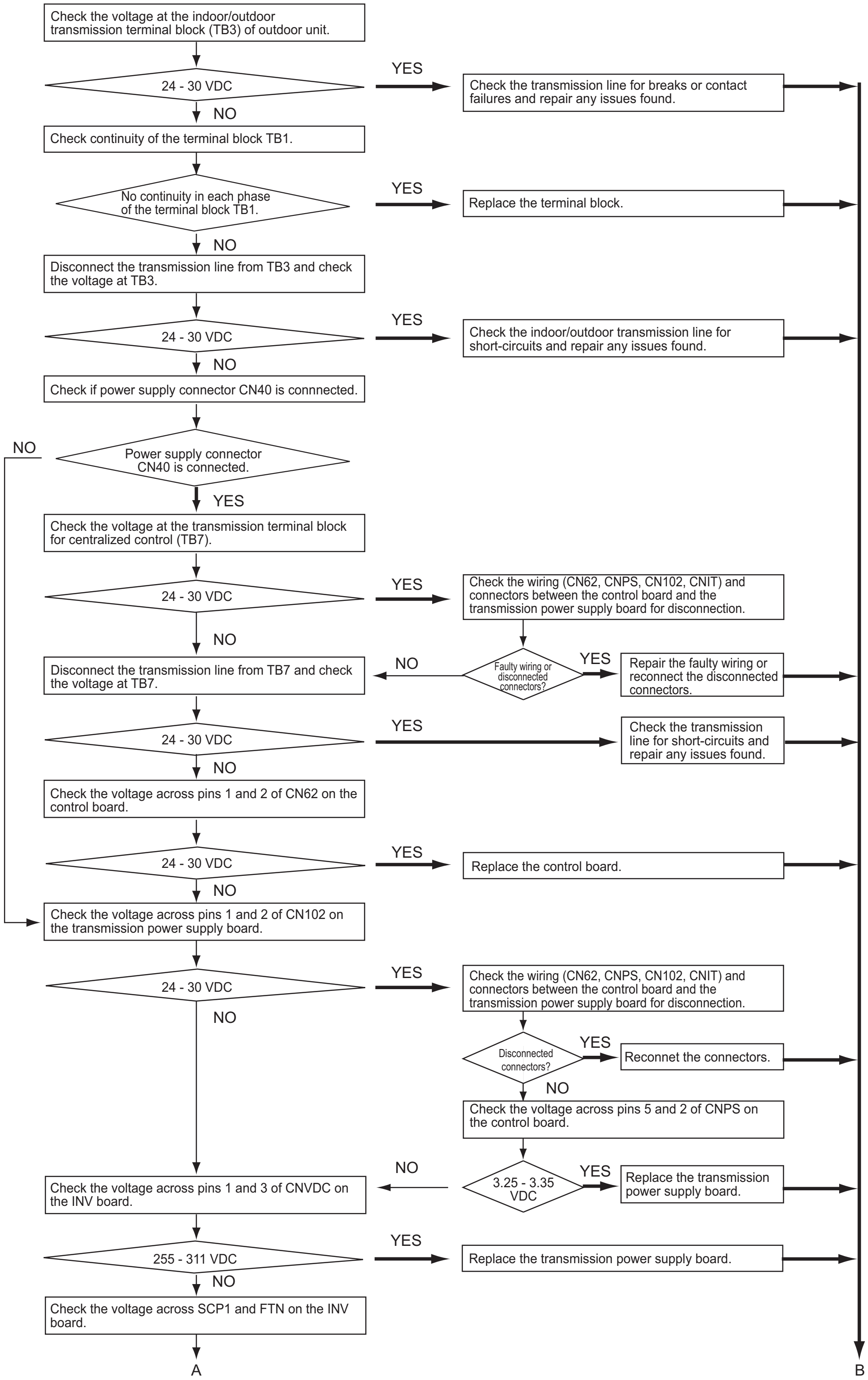


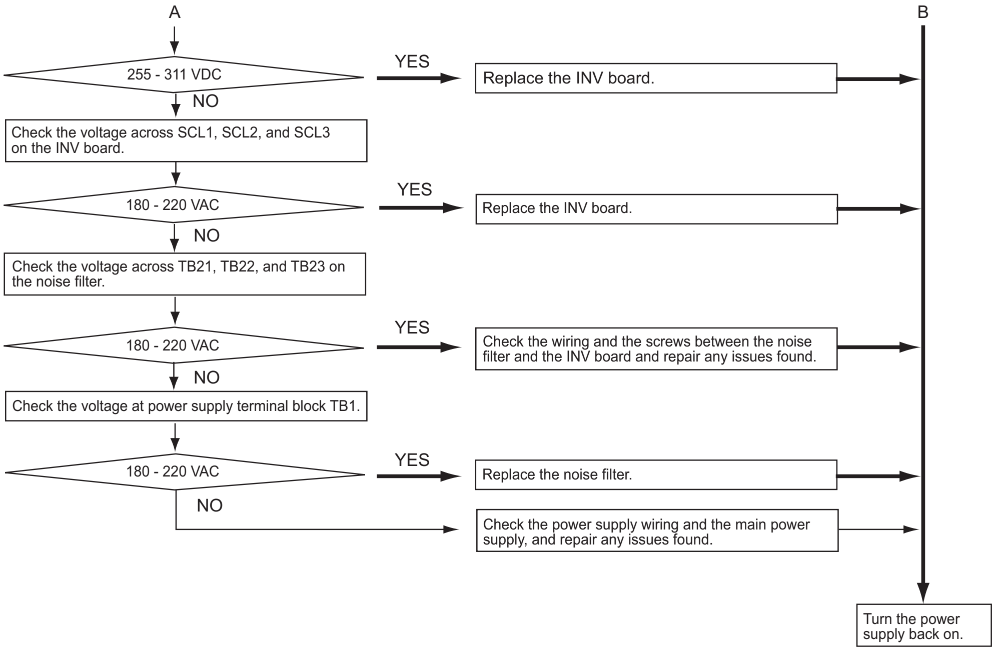
### 4) PURY-EM144, 168, 192YXU-A
### PURY-HM96, 120YXU-A



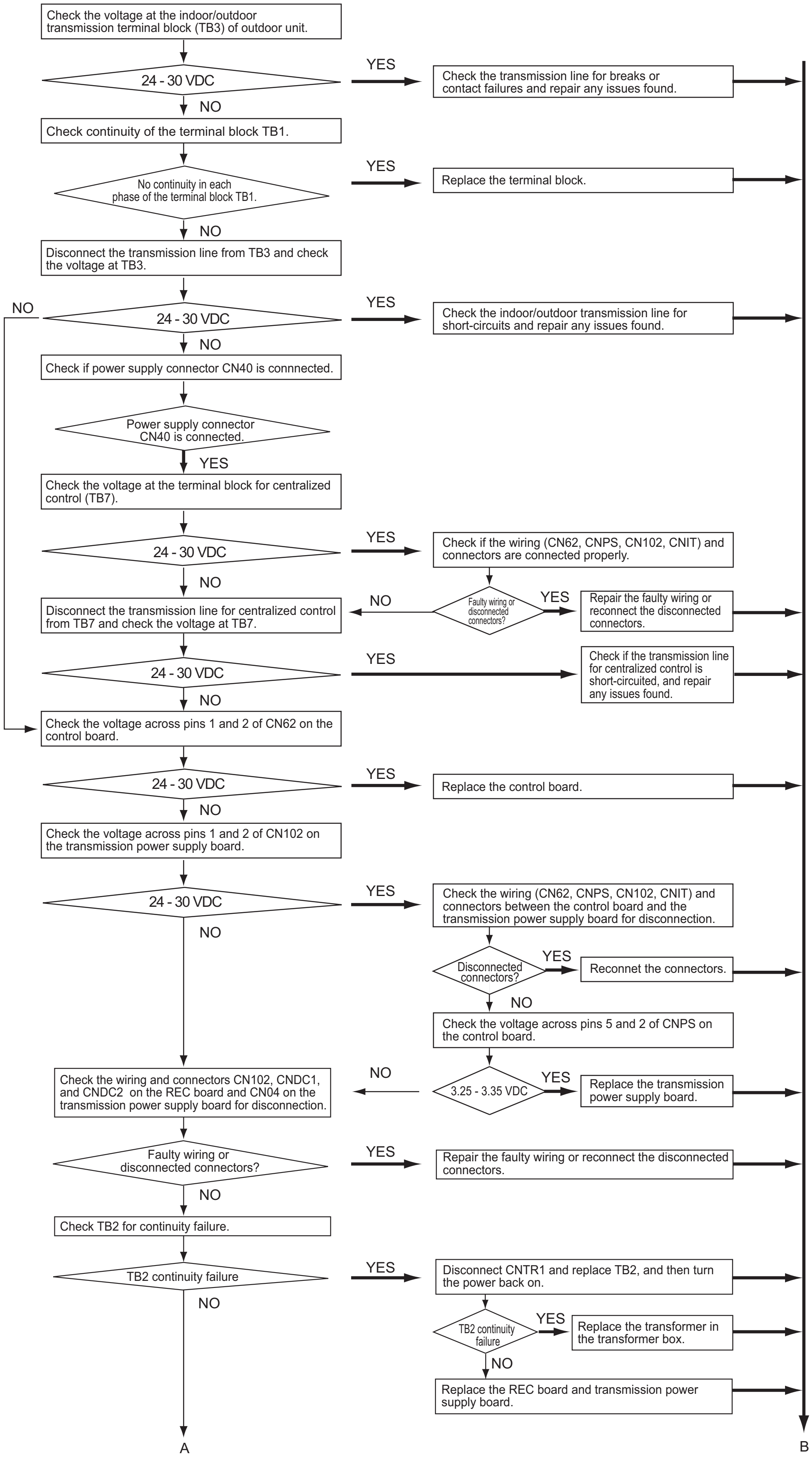
## 8-10-2 Troubleshooting Problems with Outdoor Unit Transmission Power Supply Circuit

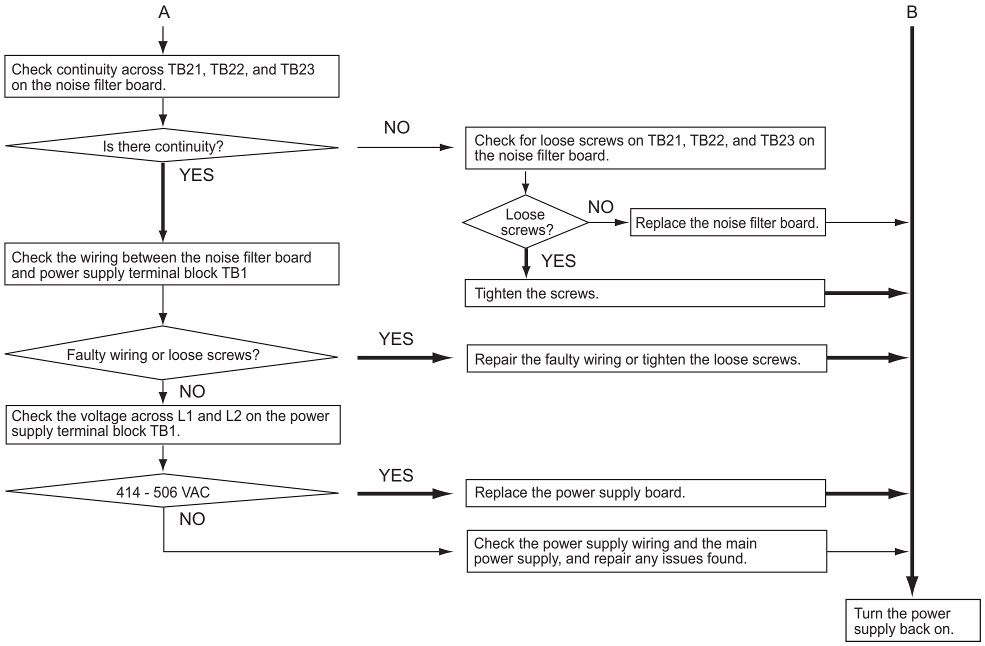
1) PURY-EM72, 96, 120, 144, 168, 192TXU-A
PURY-HM72, 96, 120TXU-A




A
B
255 - 311 VDC
YES
Replace the INV board.
NO
Check the voltage across SCL1, SCL2, and SCL3 on the INV board.
180 - 220 VAC
YES
Replace the INV board.
NO
Check the voltage across TB21, TB22, and TB23 on the noise filter.
180 - 220 VAC
YES
Check the wiring and the screws between the noise filter and the INV board and repair any issues found.
NO
Check the voltage at power supply terminal block TB1.
180 - 220 VAC
YES
Replace the noise filter.
NO
Check the power supply wiring and the main power supply, and repair any issues found.
Turn the power supply back on.

## 2) PURY-EM72, 96, 120, 144, 168, 192YXU-A
## PURY-HM72, 96, 120YXU-A

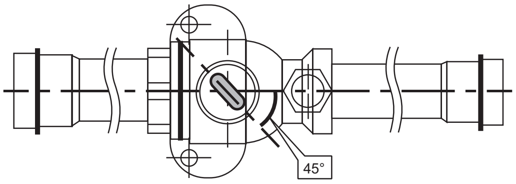



A
B
Check continuity across TB21, TB22, and TB23 on the noise filter board.
Is there continuity?
NO
Check for loose screws on TB21, TB22, and TB23 on the noise filter board.
YES
Loose screws?
NO
Replace the noise filter board.
YES
Check the wiring between the noise filter board and power supply terminal block TB1
Tighten the screws.
Faulty wiring or loose screws?
YES
Repair the faulty wiring or tighten the loose screws.
NO
Check the voltage across L1 and L2 on the power supply terminal block TB1.
414 - 506 VAC
YES
Replace the power supply board.
NO
Check the power supply wiring and the main power supply, and repair any issues found.
Turn the power supply back on.

# 8-11 Measures for Refrigerant Leakage

## 1. Leak spot: In the case of extension pipe for indoor unit (Cooling season)

1) Mount a pressure gauge on the service check joint (CJ2) on the low-pressure side.
2) Connect the service port on the high-pressure gas service valve (BV2) to that on the low-pressure gas service valve (BV1) using a charge hose.
3) Stop all the indoor units. While the compressor is being stopped, turn the high-pressure gas service valve (BV2) on the outdoor unit 45 degrees in the close direction as shown below, and fully open the low-pressure gas service valve (BV1). (Do not close BV2 completely. Closing BV2 will cause the unit to stop in step 4.)
   *Pump down operation can be performed with BV1 and BV2 open. It will take less to collect refrigerant when BV2 is closed 45 degrees.



4) Stop all the indoor units; turn on SW4 (17) on the outdoor unit control board while the compressor is being stopped. (Pump down mode will start, and all the indoor units will run in cooling test run mode.)
5) In the pump down mode (SW4 (17)), all the indoor units and compressors will automatically stop when the low pressure (63LS) reaches 0.383MPa [55psi] or less or 15 minutes have passed after the pump mode started. Stop all the indoor units and compressors when the pressure indicated by the pressure gauge, which is on the check joint (CJ2) for low-pressure service, reaches 0.383MPa [55psi] or 20 minutes pass after the pump down operation is started.
6) Close the service ball valve (BV1) on the low-pressure pipe and the service ball valve (BV2) on the high-pressure pipe on the outdoor unit.
7) Collect the refrigerant that remains in the extended pipe for the indoor unit. Do not discharge refrigerant into the atmosphere when it is collected.
8) Repair the leak.
9) After repairing the leak, vacuum*1the extension pipe and the indoor unit.
10) To adjust refrigerant amount, open the ball valves (BV1 and BV2) inside the outdoor unit, and turn off SW4 (17).

## 2. Leak spot: In the case of outdoor unit (Cooling season)

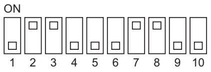
### (1) Run all the indoor units in the cooling test run mode.

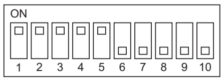
1) To run the indoor unit in test run mode, turn SW4 (1) on the outdoor unit control board to ON.
2) Change the setting of the remote controller for all the indoor units to the cooling mode.
3) Check that all the indoor units are performing a cooling operation.

### (2) Check the SC16 value. (This value can be displayed on the LED by setting the self-diagnosis switch SW4 (SW6-10: OFF) on the outdoor unit control board.)

1) When SC16 is 10°C [18°F] or above: Go to the next item (3).
2) When the SC16 value is below 10°C [18°F]: After the compressor has stopped, extract the refrigerant in the system, repair the leak, evacuate the air from the system *1, and charge the system with refrigerant. (If the leak is in the outdoor unit, follow the same procedure as listed under "heating season.")

SC16 self-diagnosis switch





The figure at left shows that the switches 1 through 5 are set to ON and 6 through 10 are set to OFF.

### (3) Stop all the indoor units, and stop the compressor.

1) To stop all the indoor units and the compressors, turn SW4 (1) on the outdoor control board from ON to OFF.
2) Check that all the indoor units are being stopped.

---

*1. For details, refer to the following page(s). [1-3-3 Vacuum Drying]

**(4) Close the ball valves (BV1 and BV2).**

**(5) Collect the refrigerant that remains inside the outdoor unit. Do not discharge refrigerant into air into the atmosphere when it is collected.**

**(6) Repair the leak.**

**(7) After repairing the leak, replace the dryer with the new one, and perform evacuation[*1] inside the outdoor unit.**
**Use CJ6 when evacuating the outdoor unit with the refrigerant service valve closed.**
**Connect CJ6 (high-pressure side) and CJ2 (low-pressure side) before evacuating the outdoor unit.**

**(8) To adjust refrigerant amount, open the ball valves (BV1 and BV2) inside the outdoor unit.**

### 3. Leak spot: In the case of extension pipe for indoor unit (Heating season)

#### (1) Run all the indoor units in heating test run mode.

1) To run the indoor unit in test run mode, set SW4 (1) on the outdoor unit control board to ON.
2) Change the setting of the remote controller for all the indoor units to the heating mode.
3) Check that all the indoor units are performing a heating operation.

#### (2) Stop all the indoor units, and stop the compressor.

1) To stop all the indoor units and the compressors, turn SW4 (1) on the outdoor control board from ON to OFF.
2) Check that all the indoor units are stopped.

**(3) Close the ball valves (BV1 and BV2).**

**(4) Collect the refrigerant that remains inside the indoor unit. Do not discharge refrigerant into air into the atmosphere when it is collected.**

**(5) Repair the leak.**

**(6) After repairing the leak, perform evacuation of the extension pipe[*1]for the indoor unit, and open the ball valves (BV1 and BV2) to adjust refrigerant.**

### 4. Leak spot: In the case of outdoor unit (Heating season)

1) Collect the refrigerant in the entire system (outdoor unit, extended pipe and indoor unit). Do not discharge refrigerant into the atmosphere when it is collected.
2) Repair the leak.
3) Repair the leak, and evacuate the air from the entire system [*1]. Then, calculate the proper amount of refrigerant to be added (outdoor unit + extension pipe + indoor unit), and charge the system with that amount. For details, refer to the following page(s). [6-3-3 Maximum refrigerant charge]

### 5. Actions to take when the refrigerant sensor detects a leak

For actions to take when the refrigerant sensor detects a leak, refer to the specified page(s).

---

*1. For details, refer to the following page(s). [1-3-3 Vacuum Drying]

# 8-12 Parts Replacement Instructions

## 8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)

### 1. S, L-module

To ensure a clear workspace for servicing, follow the steps below.

(1) Remove the front panels of the casing. (15 screws on S module, 21 screws on L module: Fig. 1)
The following steps apply to both S and L modules.

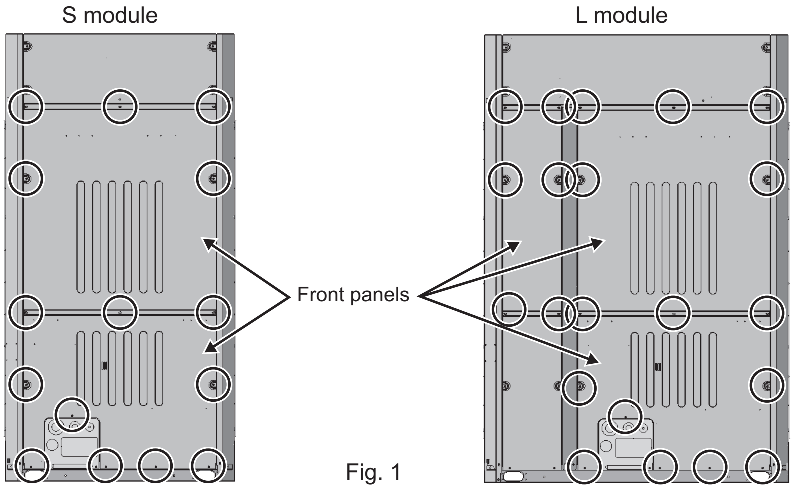


Fig. 1

(2) Remove the control box cover and the wiring connected to the unit from the control box. (Six screws: Fig. 2)
(3) Remove the control box. (Nine screws: Fig. 3)

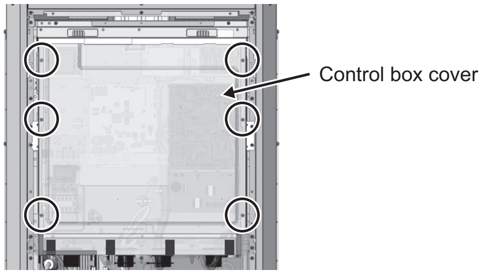


Fig. 2

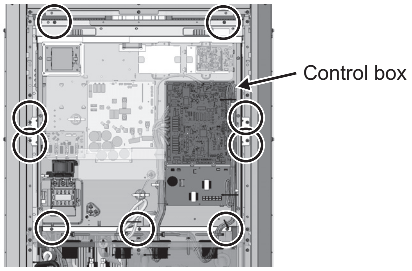


Fig. 3

(4) Remove the plastic clips and the wiring from the frame, and then remove the frame. (Four screws: Fig. 4)

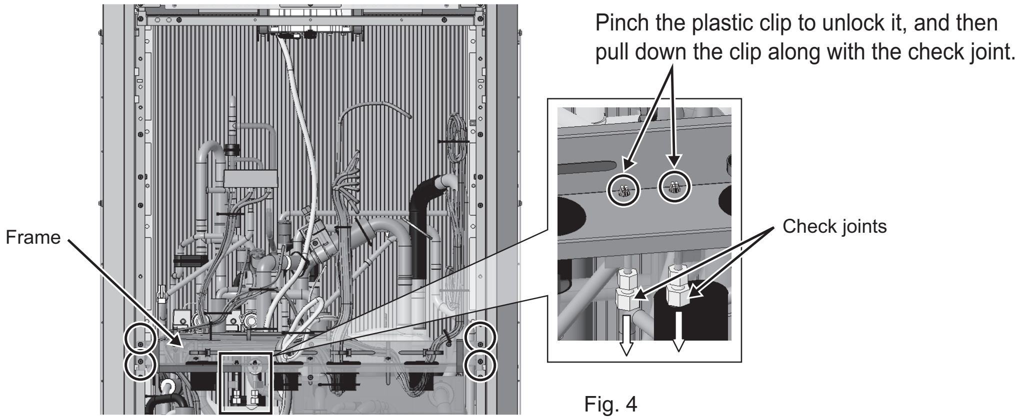


Fig. 4

## 8-12-2 Compressor Replacement Procedure

### 1. S, L-module

[WARNING]
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

The steps for replacing the compressor are as follows. Before replacing the compressor, ensure a sufficient maintenance space and prepare the refrigerant circuit parts for servicing. For details, refer to Section [8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)]

(1) Remove the front and top covers of the compressor. (Six screws: Fig. 1)

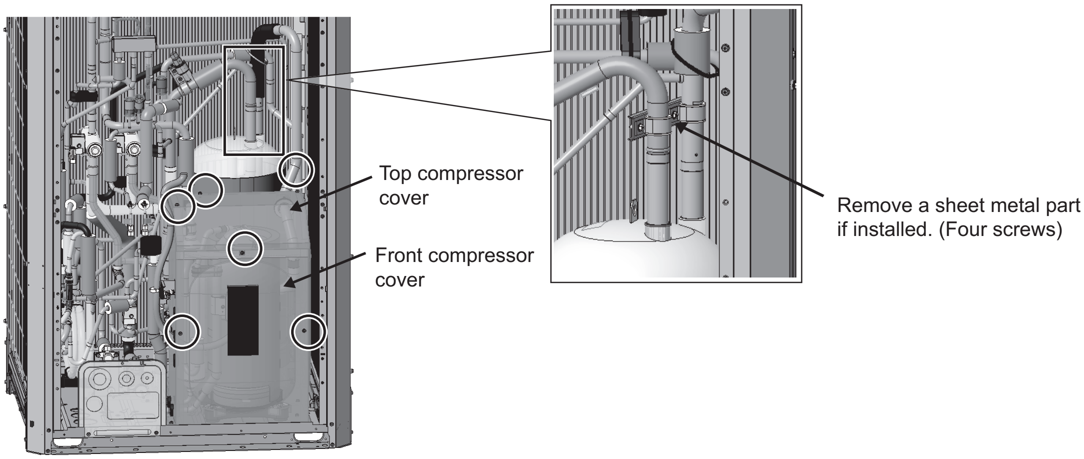


Fig. 1

(2) Remove the compressor cable, TH15, right compressor cover, saddles, pipe cover, rubber spacer, soundproofing material, and bands. (One screw on the compressor cover and three saddles: Fig. 2)
Remove the saddles following the procedure shown in Fig. 3.
*The cover will be reused when the compressor is restored.

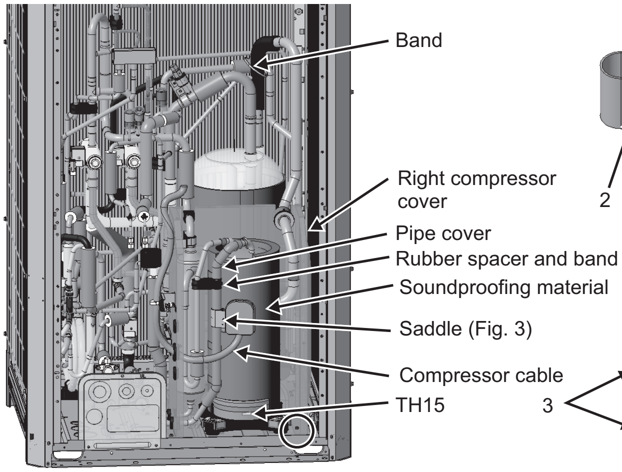


Fig. 2

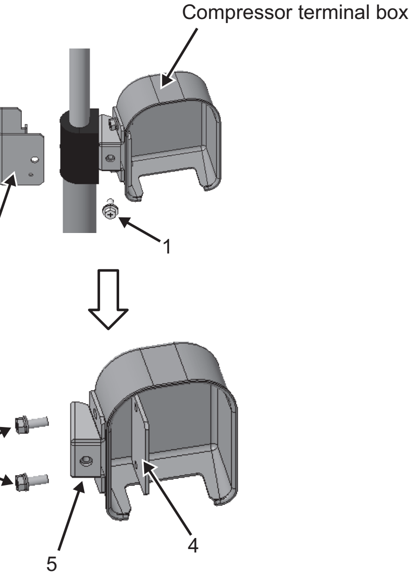


Fig. 3

Cautions for replacing a compressor
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the heat exchanger is protected from spatter during brazing.

(3) Before removing the brazing from the pipes, protect the sealing material on the suction pipe of the compressor and heat exchanger from burning by using a wet felt cloth, such as the recommended felt. (Five areas to remove brazing: Fig. 4)
(4) Remove the compressor securing bolts. (Four bolts: Fig. 5)
(5) Seal the pipes to prevent oil from leaking when the compressor is tilted.
(6) After replacing the compressor, protect the sealing material on the suction pipe of the compressor and the heat exchanger by using a wet felt cloth in the same manner as removal of the brazing, and then braze the pipes. (Five areas to braze: Fig. 4)

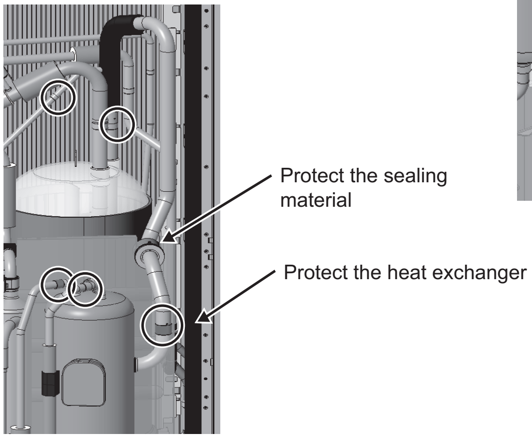


Fig. 4

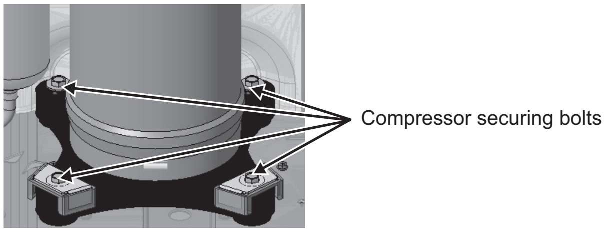


Fig. 5

(7) Tighten the compressor securing bolts using a torque-setting tool. Recommended tightening torque is 3.0 N·m.
(8) Install the compressor covers in the reverse order of removal.
*Ensure that the pipe and damper, and the pipe covers above the accumulator, are tied with bands. (Fig. 6)
*The recommended torque for the screws on the power terminal block in the compressor terminal box is 2.2 to 2.6 N·m. (Fig. 7)

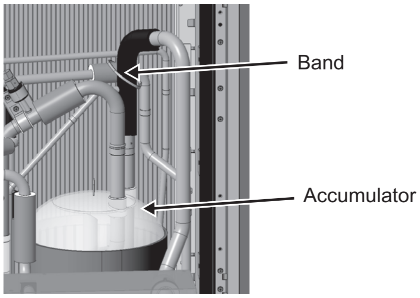


Fig. 6

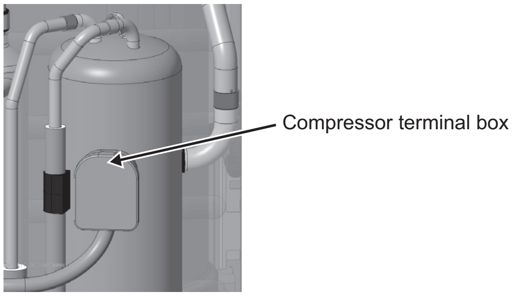


Fig. 7

## 8-12-3 Accumulator Replacement Procedure

### 1. S, L-module

[WARNING]
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

The steps for replacing the accumulator are as follows.
Before replacing the accumulator, ensure a sufficient maintenance space and prepare the refrigerant circuit parts for servicing.
For details, refer to Section [8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)]

(1) Remove the front panels. (Five screws on S module, six screws on L module: Fig. 1)

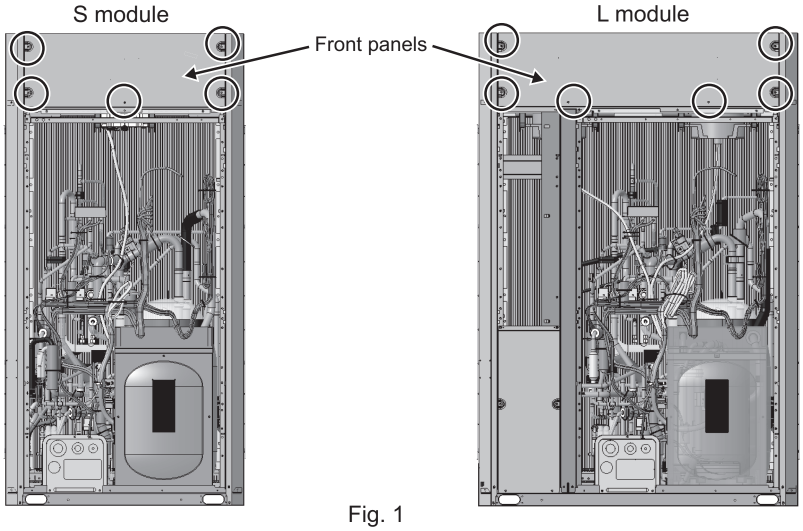


Fig. 1

(2) Remove the remaining panels (right, left, and rear), fan guards, bell mouths, fans, and motors.
Refer to Section [8-12-7 Maintenance Procedures for the Heat Exchanger] for details. (Fig. 2)

(3) Remove the frames. (Four screws on S module: Fig. 2, six screws on L module: Fig. 3)

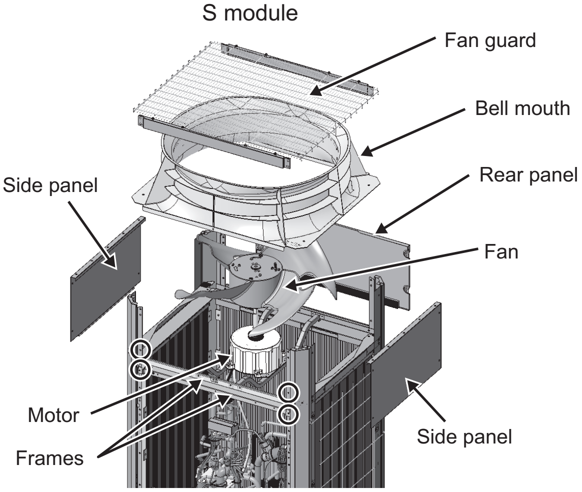


Fig. 2

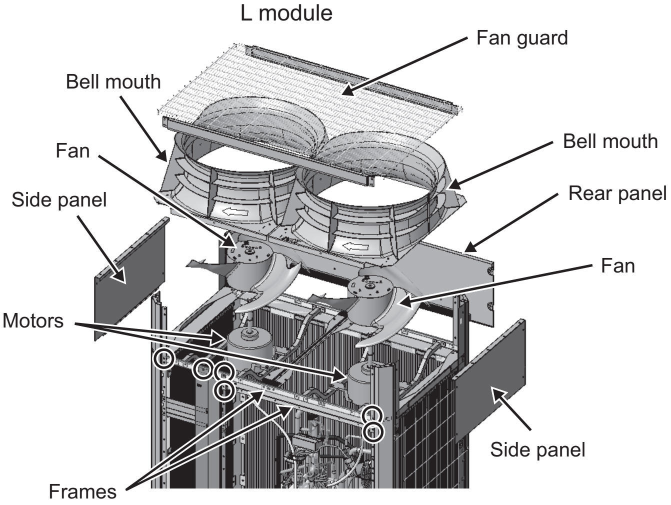


Fig. 3

(4) Remove the front and top covers of the compressor. (Six screws: Fig. 4)

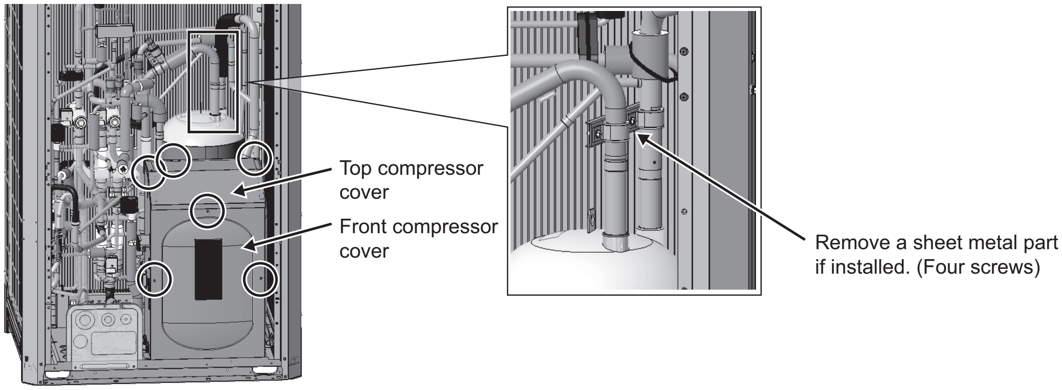


Fig. 4

(5) Remove the right compressor cover, SV1 coil, pipe cover, soundproofing material, and bands.
(One screw on the compressor cover, one on the SV1 coil: Fig. 5)
*The pipe cover will be reused when the accumulator is restored.

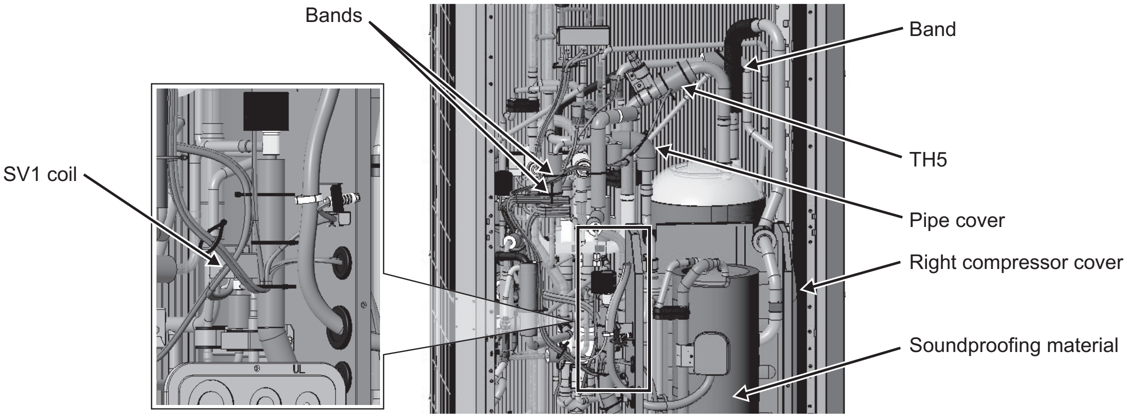
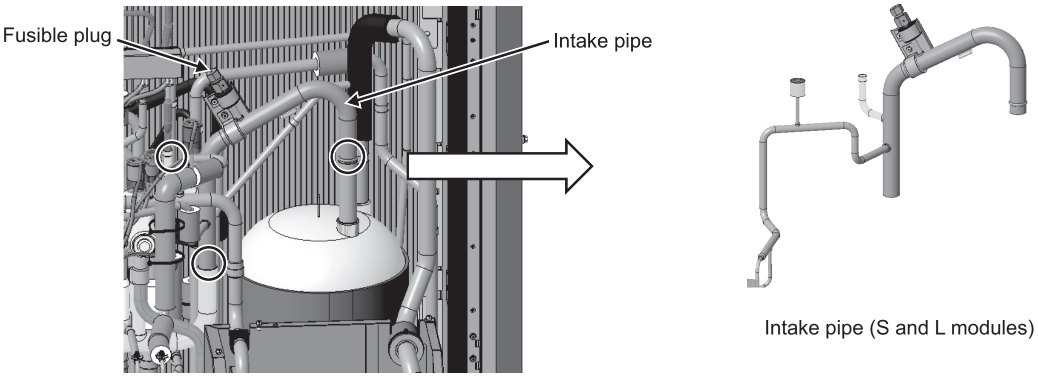


Fig. 5

(6) Remove the brazing from the intake pipe of the accumulator. (Three areas: Fig. 6)

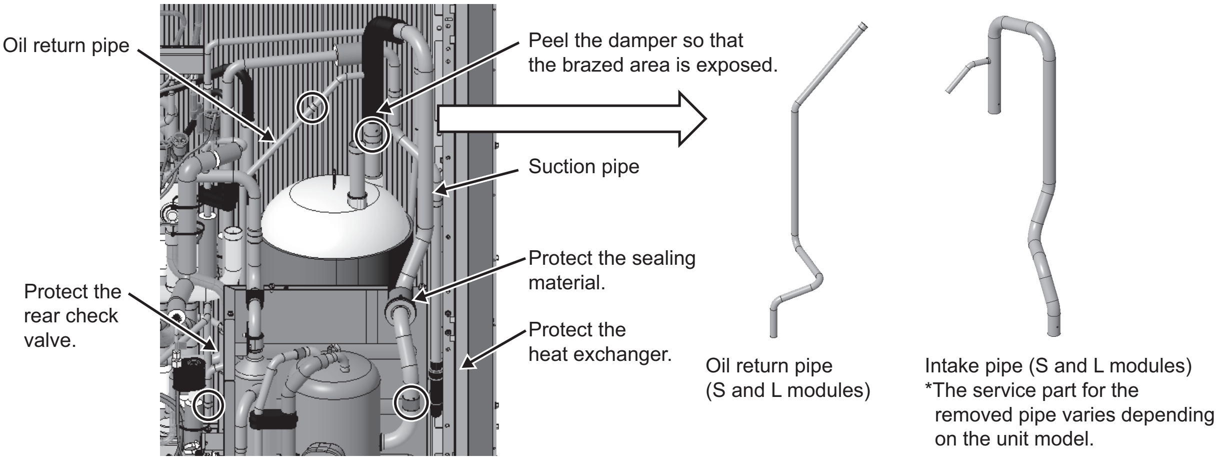
Cautions for replacing a refrigerant circuit component (accumulator)
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F] and the fusible plug temperature below 88°C [190°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the heat exchanger is protected from spatter during brazing.



Intake pipe (S and L modules)

Fig. 6

(7) Remove the brazing from the suction pipe. (Four areas: Fig. 7)



Oil return pipe (S and L modules)

Intake pipe (S and L modules)
*The service part for the removed pipe varies depending on the unit model.

Fig. 7

(8) Remove the brazing from the heat exchange gas pipe. (Two areas: Fig. 8)

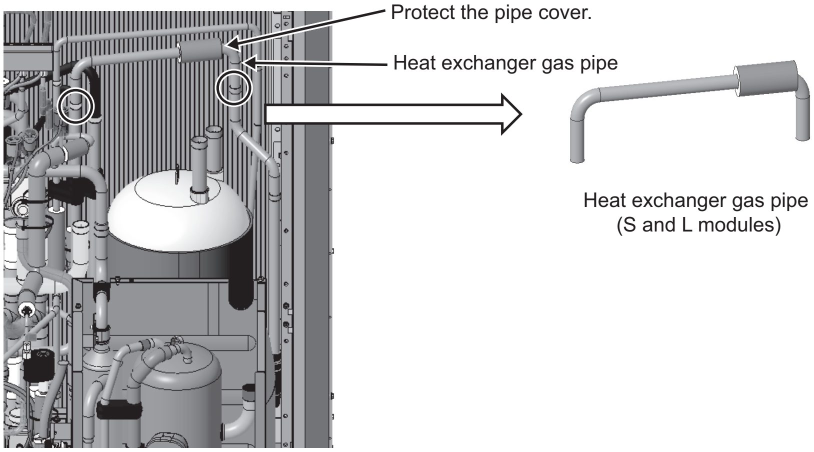


Fig. 8

(9) Remove the brazing from the heat exchange liquid pipe. (Two areas: Fig. 9)

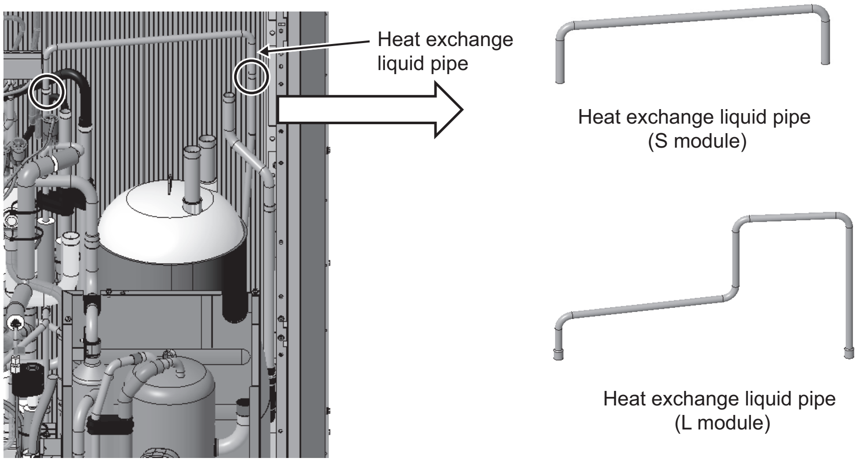


Fig. 9

(10) Remove the screws securing the accumulator at the bottom. (Six screws: Fig. 10)

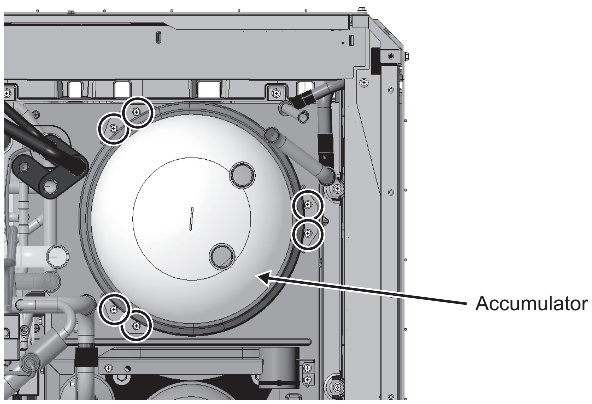


Fig. 10

(11) After replacing the accumulator, reinstall the accumulator in the reverse order.
Reinstall the components that were removed in each step back into their original positions.

## 8-12-4 Four-way Valve Replacement Procedure

### 1. S, L-module (Applicable to four-way valves 21S4a and 21S4b)

[WARNING]
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

The steps for replacing the four-way valves 21S4a (left side when viewed from the front) and 21S4b (right side when viewed from the front) are as follows. Before replacing the four-way valves, ensure a sufficient maintenance space and prepare the refrigerant circuit parts for servicing. For details, refer to Section [8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)]

(1) Remove the four-way valve coils, LEV coils, coil covers, coil caps, pipe covers, rubber spacers, and bands. (Fig. 1)
*These pipe covers will be reused when the four-way valves are restored.

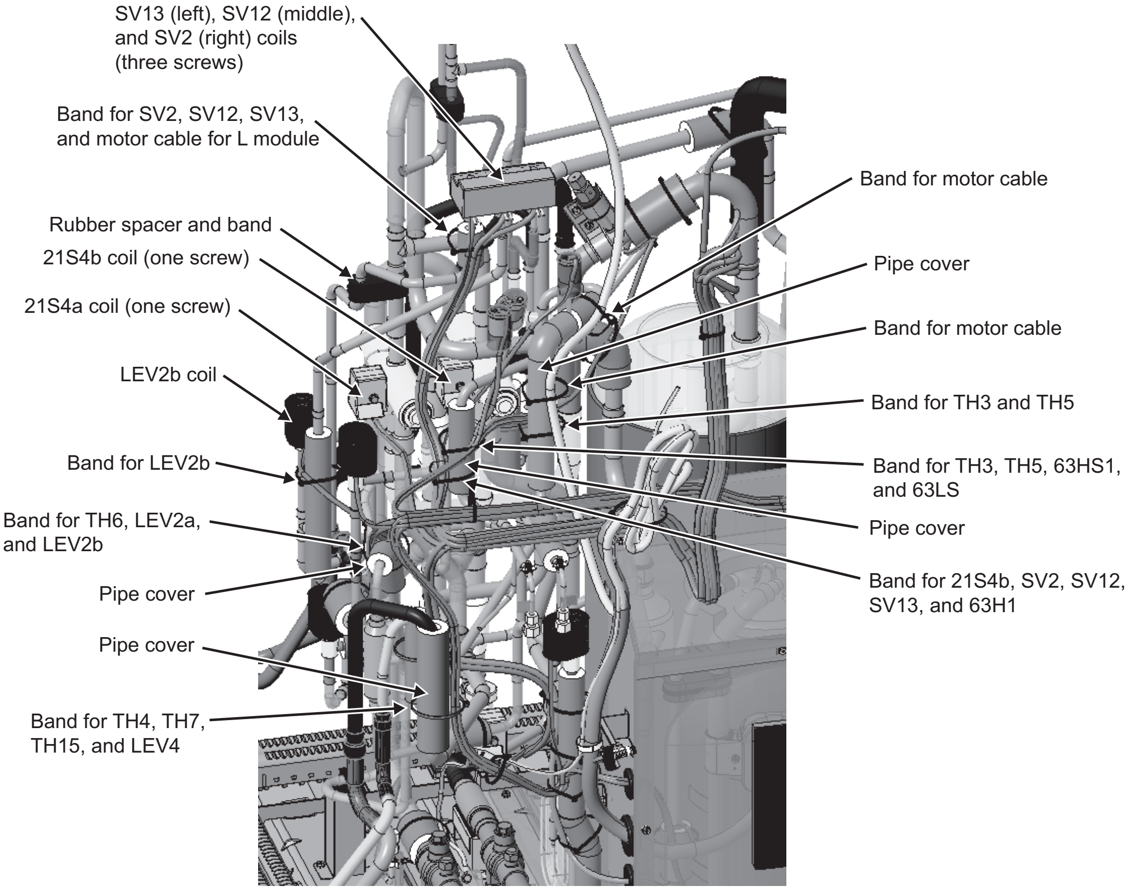


Fig. 1

(2) When brazing the four-way valves or removing the brazing, protect the surrounding pipe covers and cables. (Fig. 2)

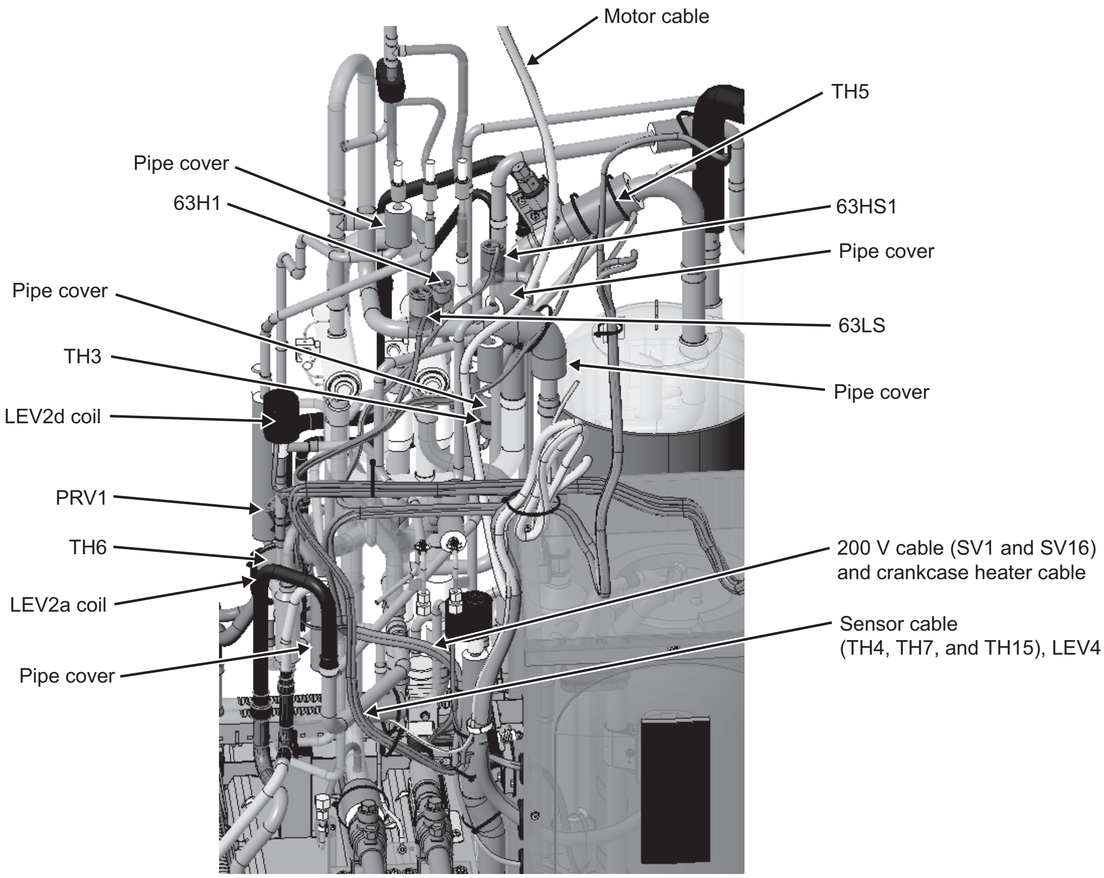
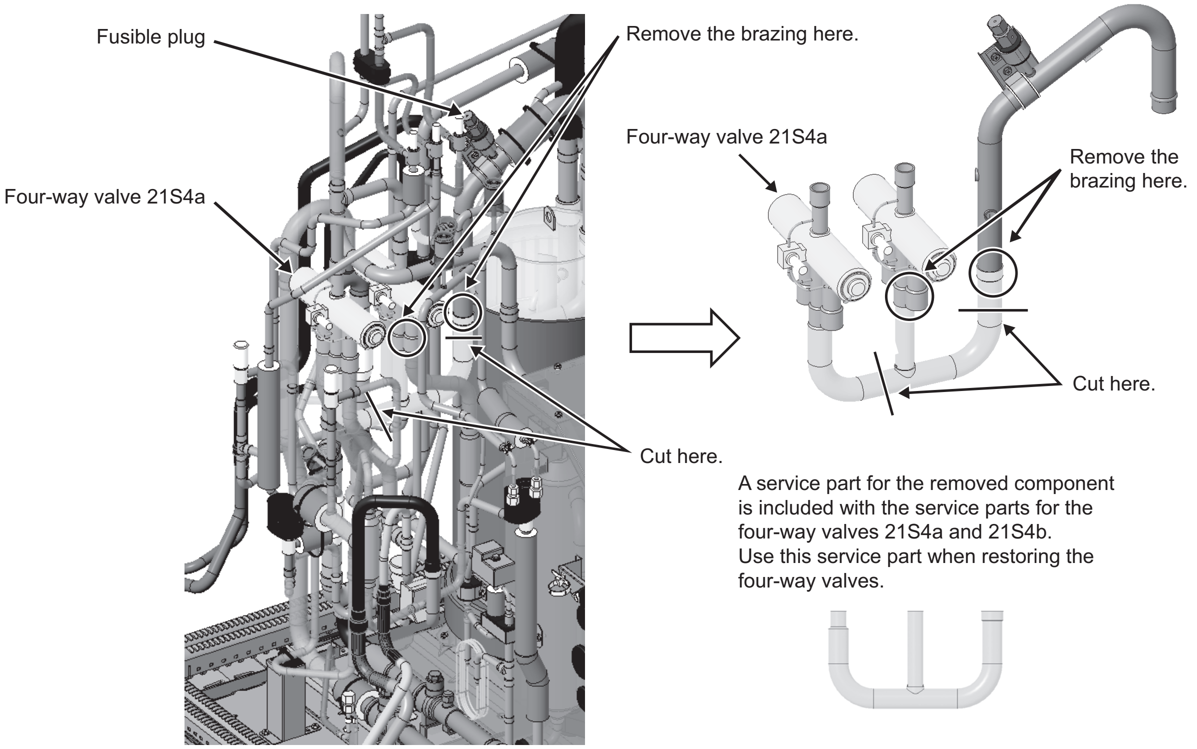


Fig. 2

Cautions for replacing refrigerant circuit components (four-way valve, solenoid valve, and LEV)
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F] and the fusible plug temperature below 88°C [190°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the heat exchanger is protected from spatter during brazing.

Replacing the four-way valve 21S4a

(3A) Cut the pipe connected to the bottom center port of the four-way valve 21S4a using a pipe cutter or a similar tool at the points shown in the figure below.
After cutting the pipe, remove the brazing from the pipe. (Two points to cut and two areas to remove brazing: Fig. 3)



A service part for the removed component is included with the service parts for the four-way valves 21S4a and 21S4b.
Use this service part when restoring the four-way valves.

Fig. 3

(4A) Remove the brazing from the pipe connected to the bottom front port of the four-way valve 21S4a. (Two areas: Fig. 4)

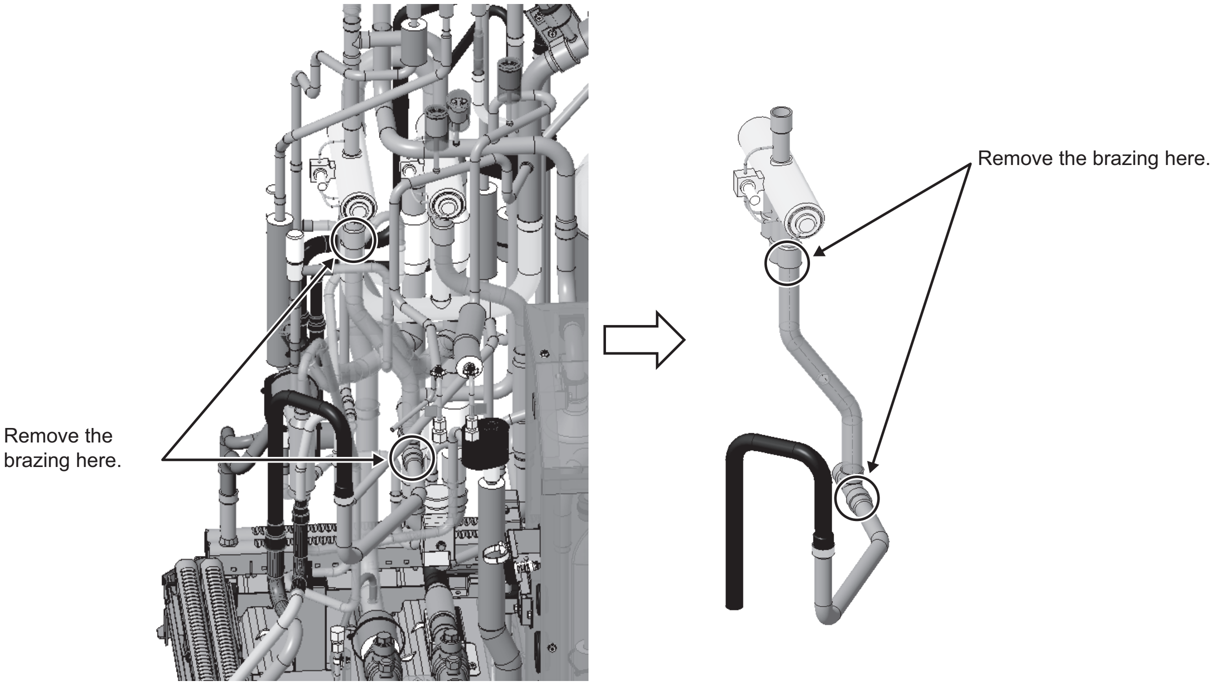


Fig. 4

(5A) Cut the pipe extending from the top port of the four-way valve 21S4a using a pipe cutter or a similar tool at the point shown in the figure. (One point to cut: Fig. 5)

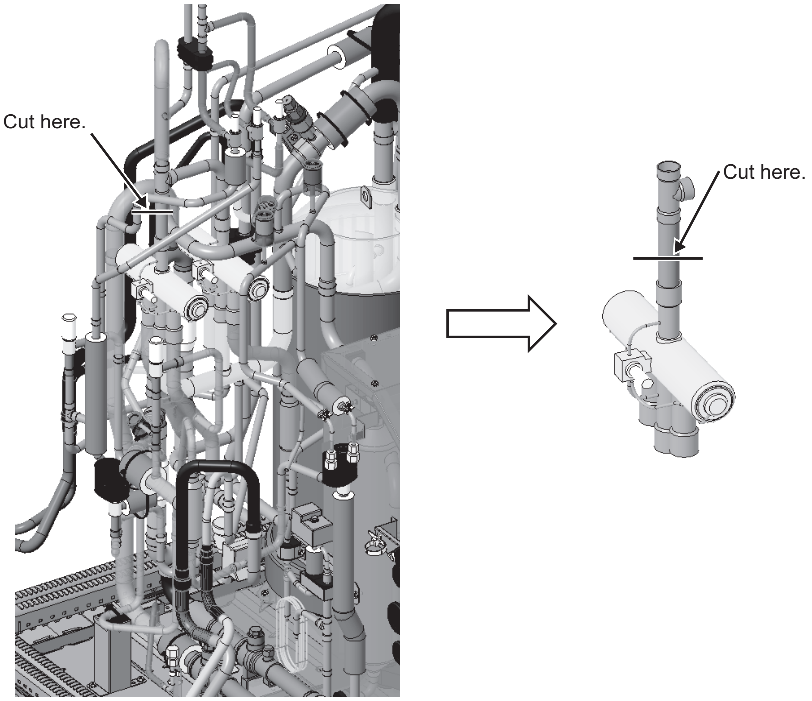
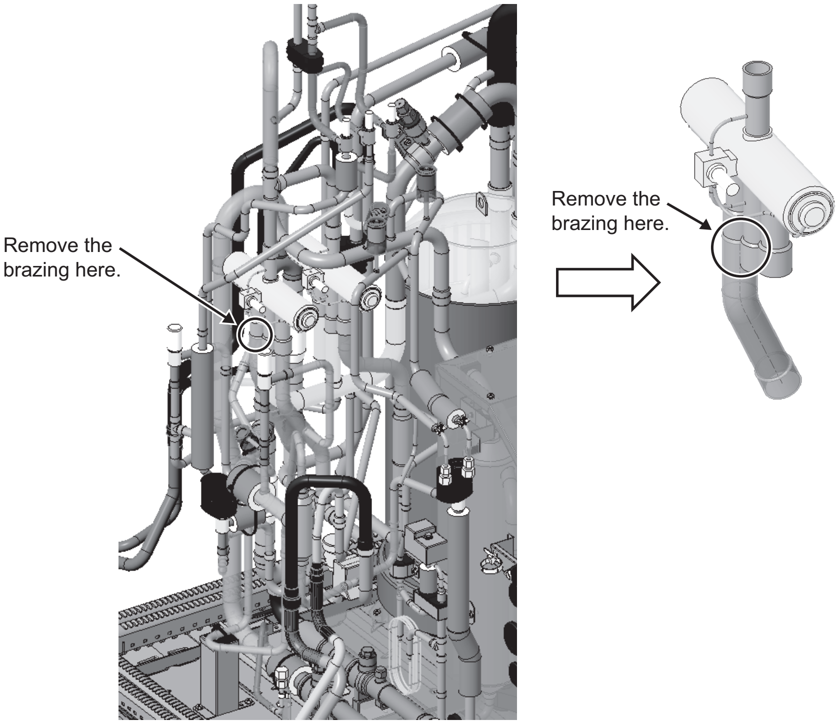


Fig. 5

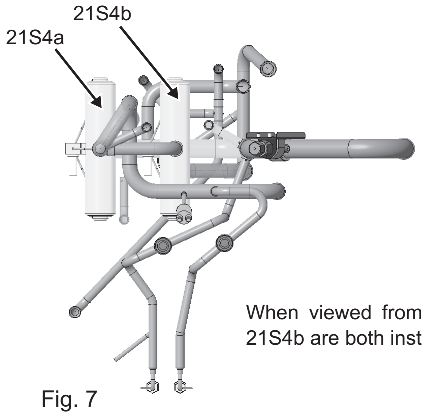
(6A) Remove the brazing from the pipe connected to the bottom rear port of the four-way valve 21S4a. (One area: Fig. 6)


Remove the brazing here.

Remove the brazing here.

Fig. 6

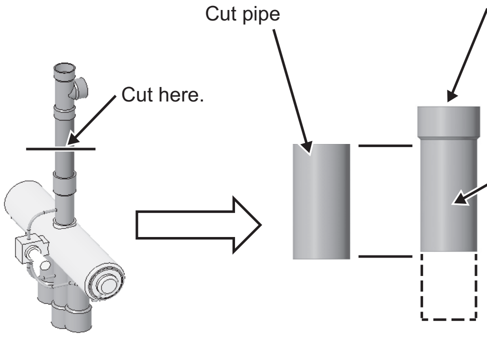
(7A) Install the new four-way valve 21S4a. Fig. 7 shows the positions of the four-way valves for reference.



When viewed from the top, the four-way valves 21S4a and 21S4b are both installed perpendicularly.

Fig. 7

(8A) Before installing the new four-way valve 21S4a, cut the supplied pipe, of which one end is expanded, to the length of the cut pipe connected to the top port of the four-way valve. (Fig. 8)



Pipe diameter ø19.05
ID of expanded end ø19.05

Ensure that the length of the supplied pipe (for 21S4a), excluding the expanded section, is equal to the length of the cut pipe.

*The length of the supplied pipe, including the expanded section, is 100 mm. Cut it to the appropriate length.

Fig. 8

(9A) Braze the pipe to the bottom rear port of the four-way valve 21S4a.
Braze three areas in total, including the pipe joint in step (8A) and the area shown in Fig. 9. (Three areas: Fig. 9)

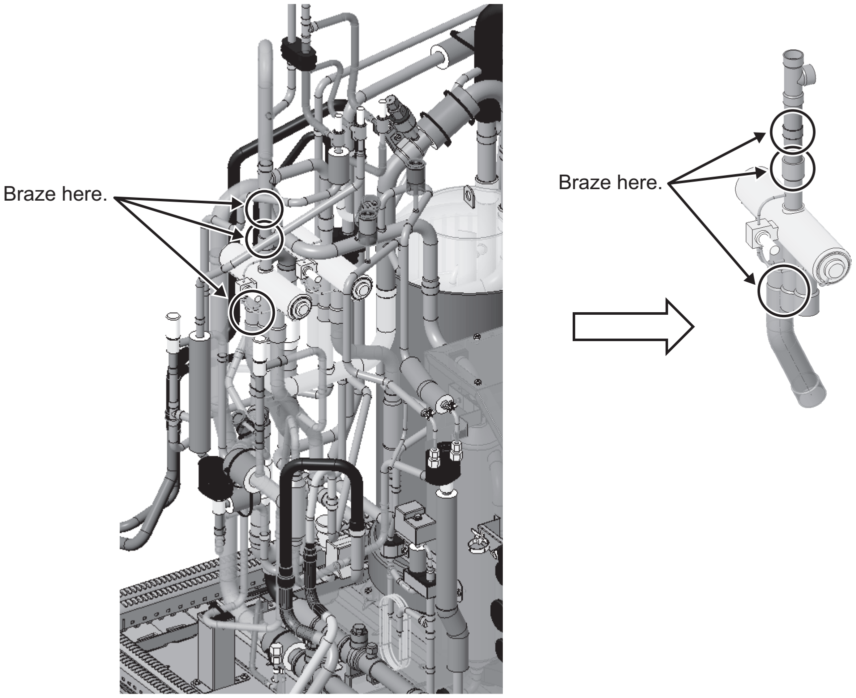
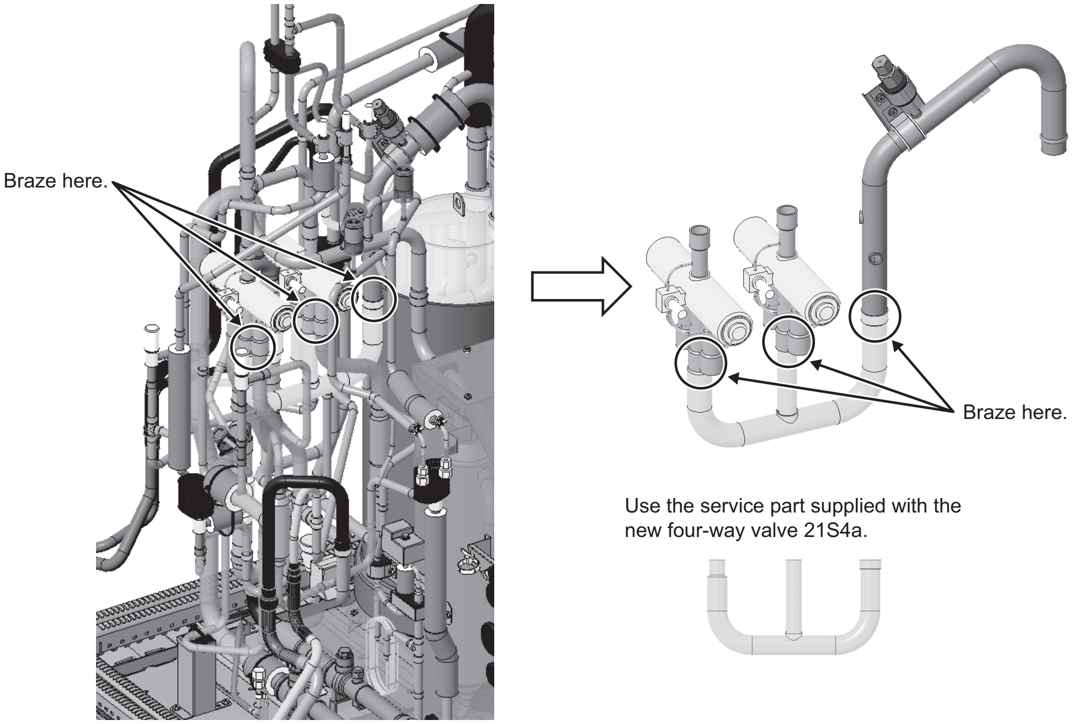


Fig. 9

(10A) Braze the pipe to the bottom center port of the four-way valve 21S4a. (Three areas: Fig. 10)



Use the service part supplied with the new four-way valve 21S4a.

Fig. 10

(11A) Braze the pipe to the bottom front port of the four-way valve 21S4a. (Two areas: Fig. 11)

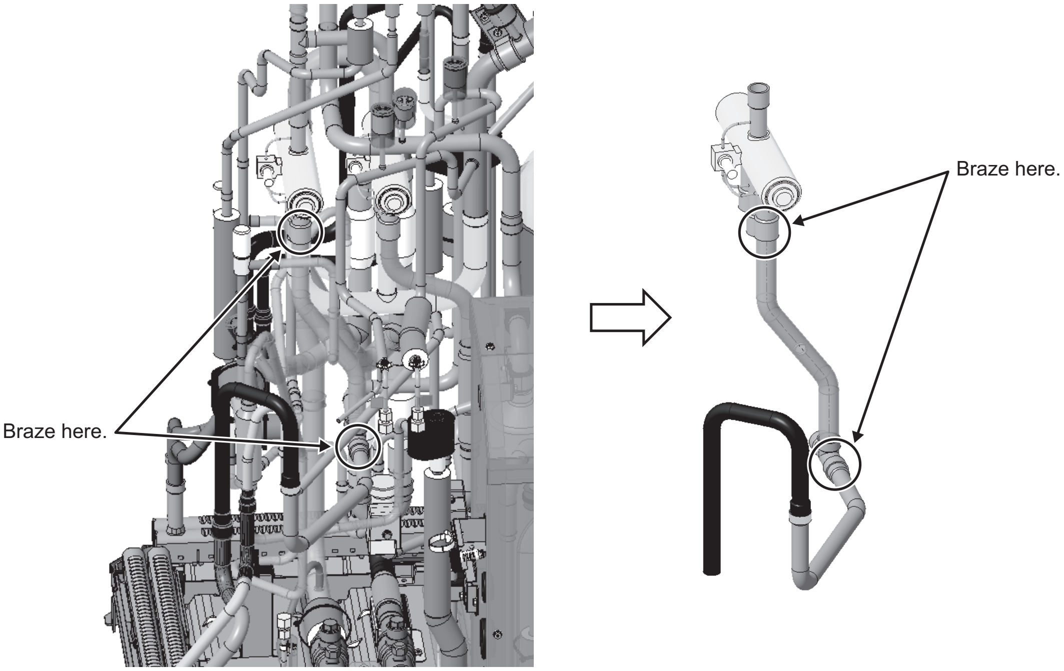
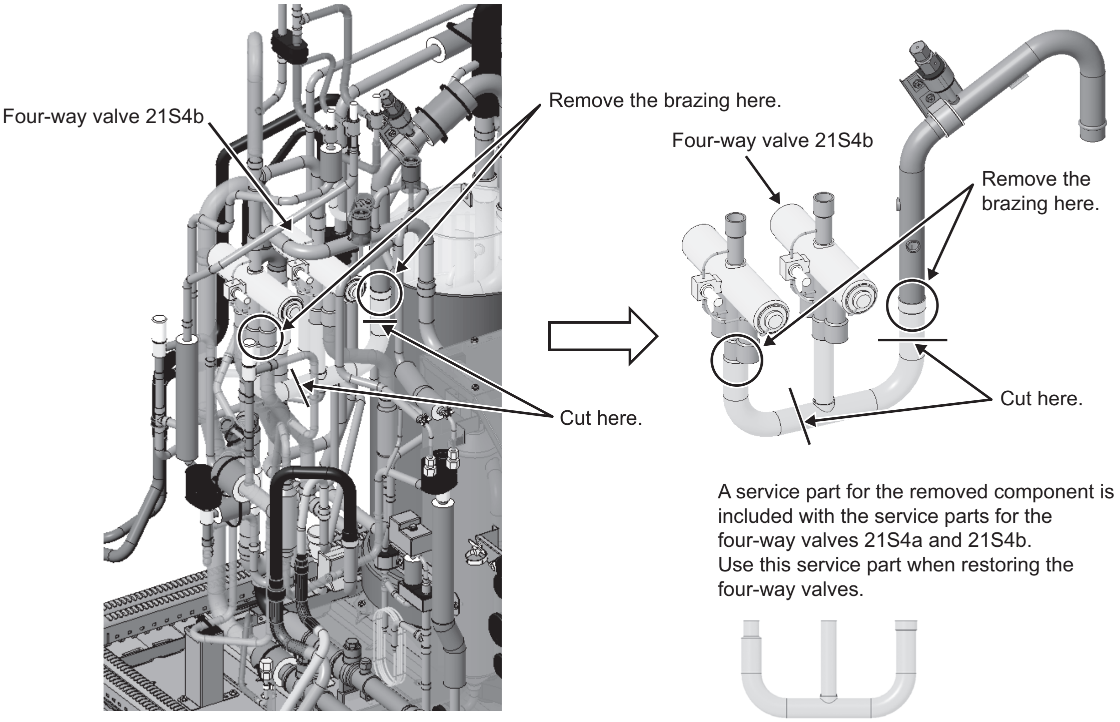


Fig. 11

The replacement of the four-way valve 21S4a is completed here.
Reinstall the components that were removed in each step back into their original positions.

Replacing the four-way valve 21S4b

(12B) Cut the pipe connected to the bottom center port of the four-way valve 21S4b using a pipe cutter or a similar tool at the points shown in the figure. After cutting the pipe, remove the brazing from the pipe. (Two points to cut and two areas to remove brazing: Fig. 12)



A service part for the removed component is included with the service parts for the four-way valves 21S4a and 21S4b.
Use this service part when restoring the four-way valves.

Fig. 12

(13B) Cut the pipe extending from the top port of the four-way valve 21S4b using a pipe cutter or a similar tool at the point. (One point to cut: Fig. 13)

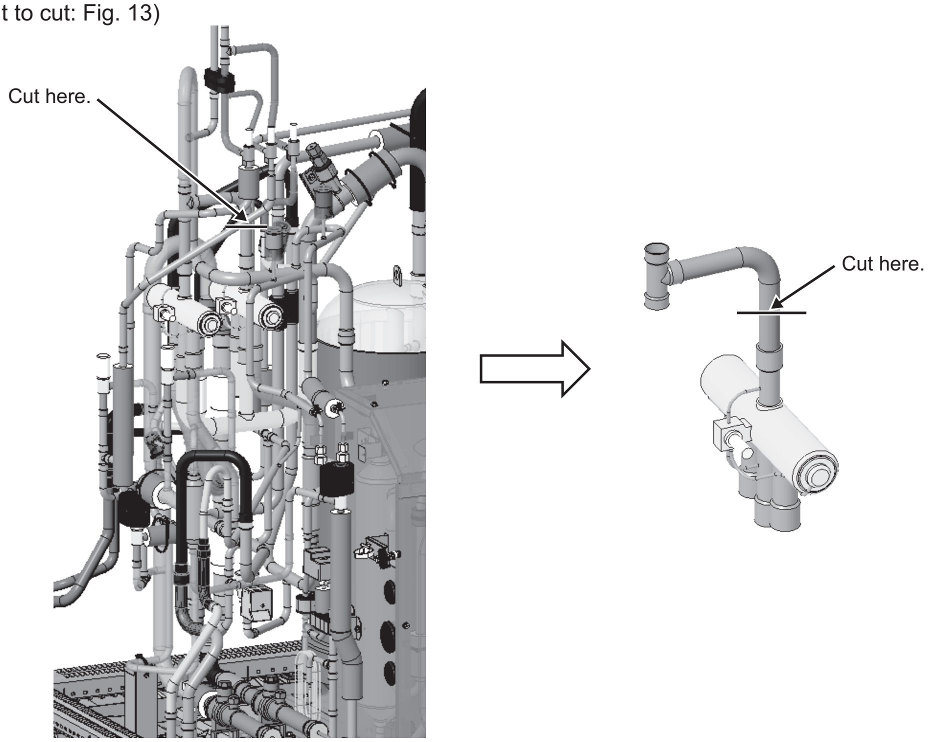
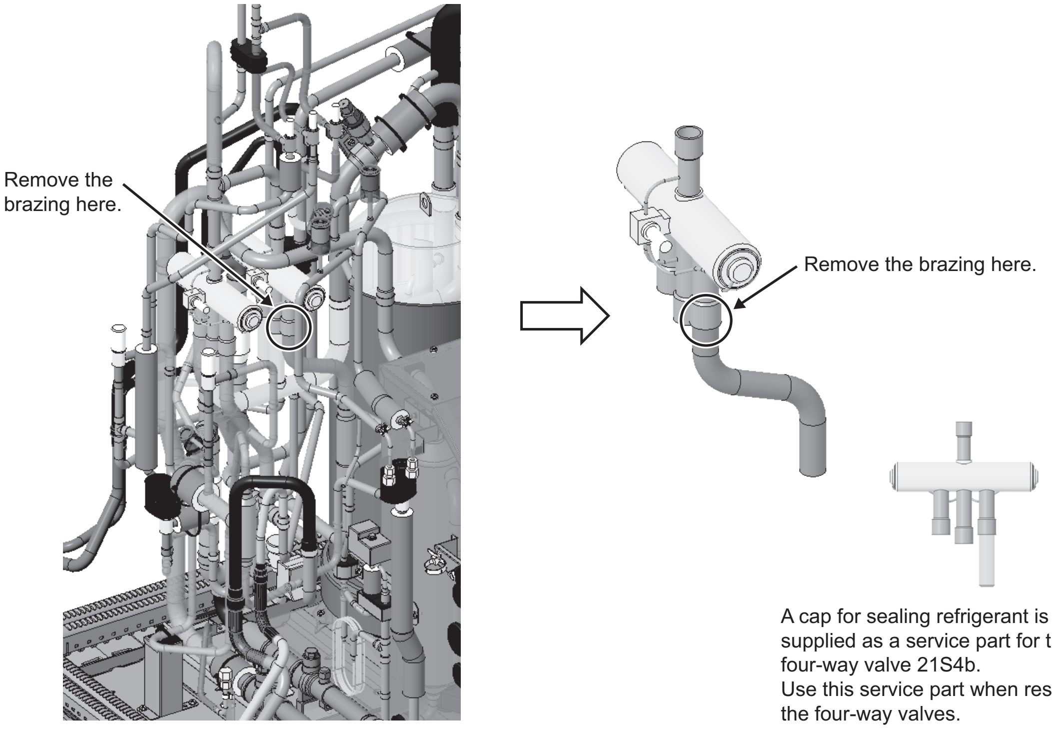


Fig. 13

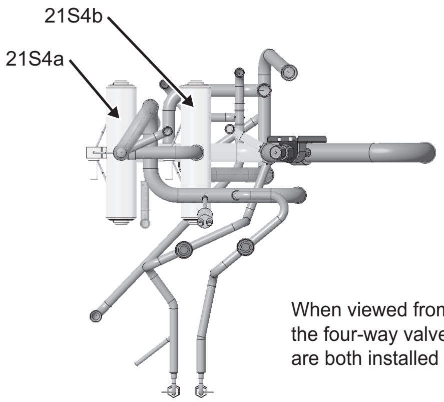
(14B) Remove the brazing from the pipe connected to the bottom front port of the four-way valve 21S4b. (One area: Fig. 14)



A cap for sealing refrigerant is supplied as a service part for the four-way valve 21S4b.
Use this service part when restoring the four-way valves.

Fig. 14

(15B) Install the new four-way valve 21S4b. Fig. 15 shows the positions of the four-way valves for reference.



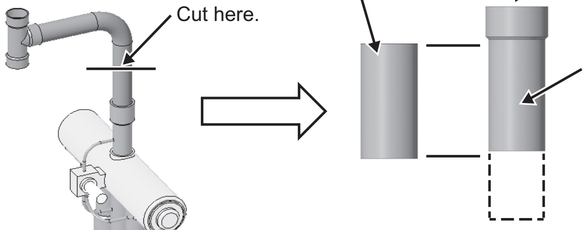
When viewed from the top,
the four-way valves 21S4a and 21S4b
are both installed perpendicularly.

Fig. 15

(16B) Before installing the new four-way valve 21S4b, cut the supplied pipe, of which one end is expanded, to the length of the cut pipe connected to the top port of the four-way valve. (Fig. 16)

Cut pipe

Pipe diameter Φ19.05
ID of expanded end Φ19.05



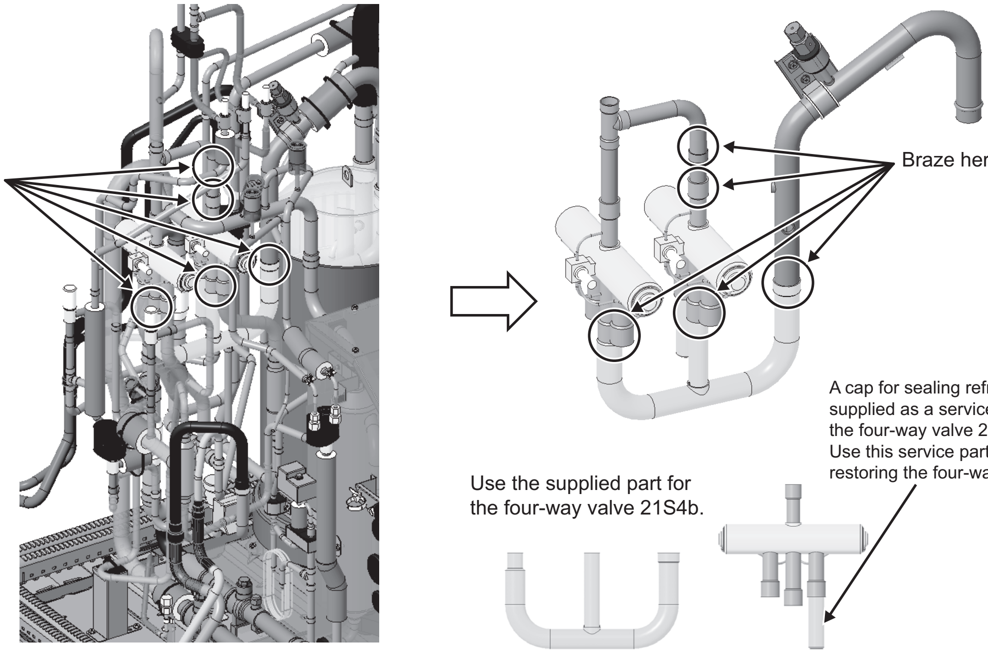
Ensure that the length of the supplied pipe (for 21S4b), excluding the expanded section, is equal to the length of the cut pipe.

*The length of the supplied pipe, including the expanded section, is 100 mm.
Cut it to the appropriate length.

Fig. 16

(17B) Braze the pipe to the center bottom port of the four-way valve 21S4b.
Braze five areas in total, including the pipe joint in step (16B) and the areas shown in Fig. 17. (Five areas: Fig. 17)

Braze here.



A cap for sealing refrigerant is supplied as a service part for the four-way valve 21S4b. Use this service part when restoring the four-way valves.

Use the supplied part for the four-way valve 21S4b.

Fig. 17

(18B) Braze the pipe to the bottom front port of the four-way valve 21S4b. (One area: Fig. 18)

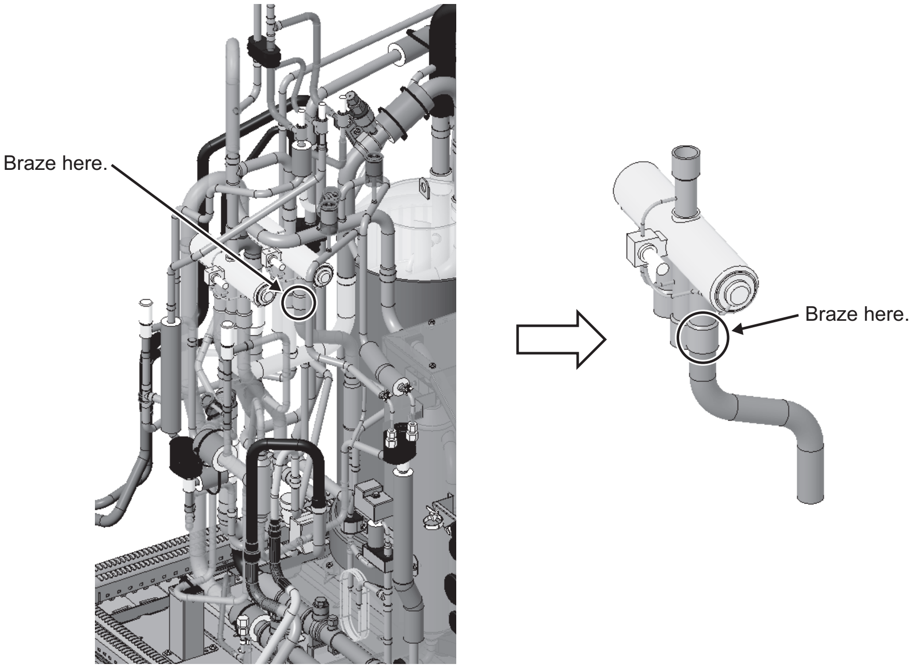


Fig. 18

The replacement of the four-way valve 21S4b is completed here. Reinstall the components that were removed in each step back into their original positions.

## 8-12-5 Replacement Procedure for the Check Valve Assembly

### 1. S, L-module

[WARNING]
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

The steps for replacing the check valve assembly (CV2a, CV3a, CV5a, and CV6a) are as follows. Before replacing the check valve assembly, ensure a sufficient maintenance space and prepare the refrigerant circuit parts for servicing. For details, refer to Section [8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)]

(1) Remove the four-way valve coils, LEV coils, coil covers, coil caps, pipe covers, rubber spacers, and bands. (Fig. 1)
*These pipe covers will be reused when the check valve assembly is restored.

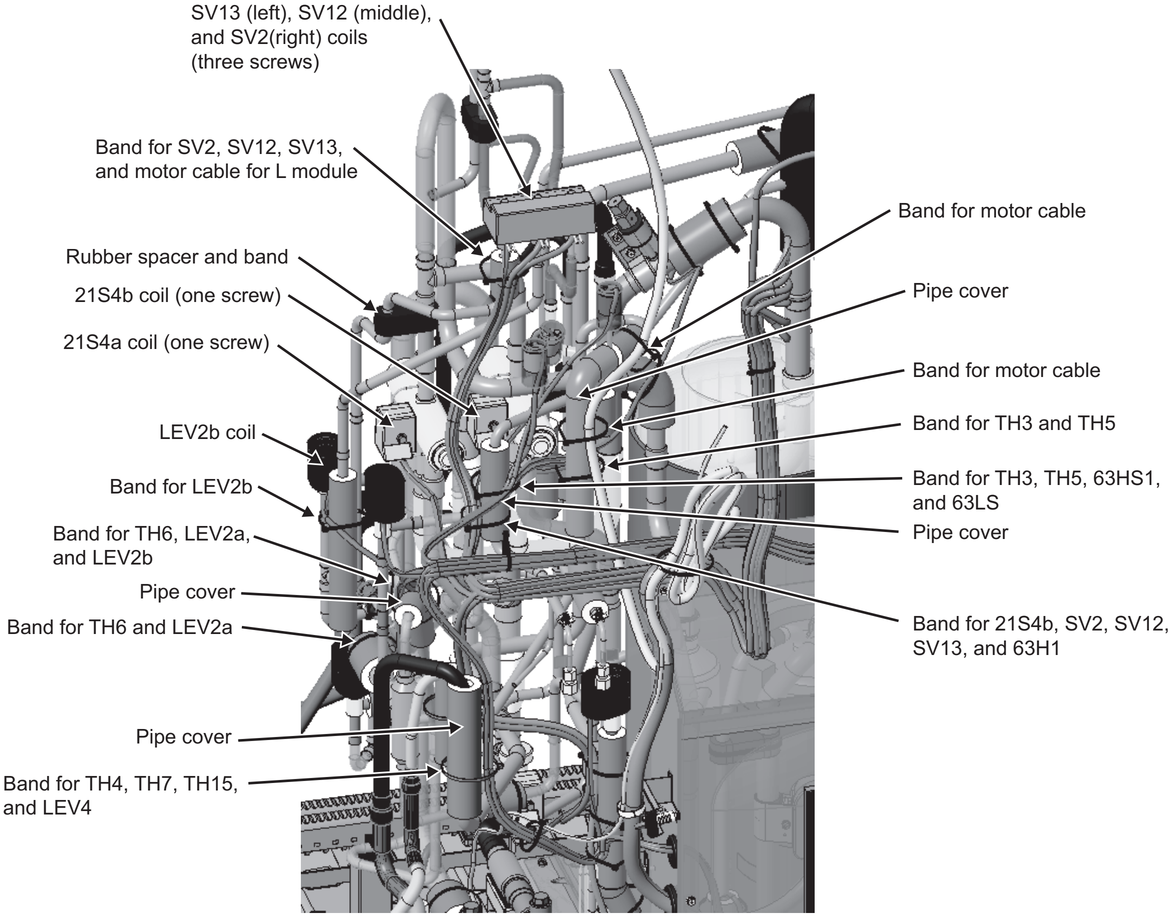


Fig. 1

(2) When brazing or removing the braze from the check valve assembly, protect the surrounding pipe covers and cables. (Fig. 2)

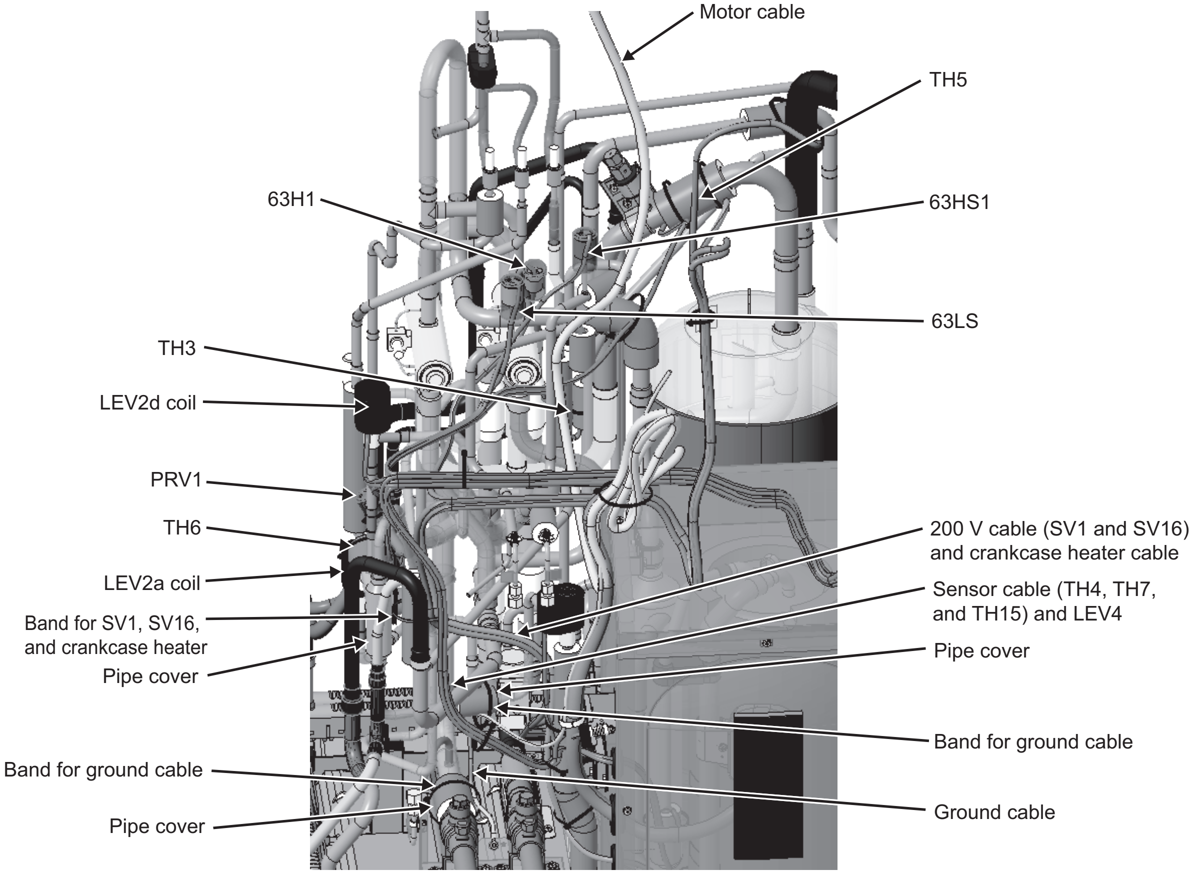


Fig. 2

Cautions for replacing refrigerant circuit components (check valve assembly, four-way valve, solenoid valve, and LEV)
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the heat exchanger is protected from spatter during brazing.

Replacing the check valve assembly

(3) Cut the pipes located before the check valve assembly joints using a pipe cutter or a similar tool, as shown in the figure below. After cutting the pipe, remove the brazing from the pipe. (Two points to cut and one area to remove brazing: Fig. 3)

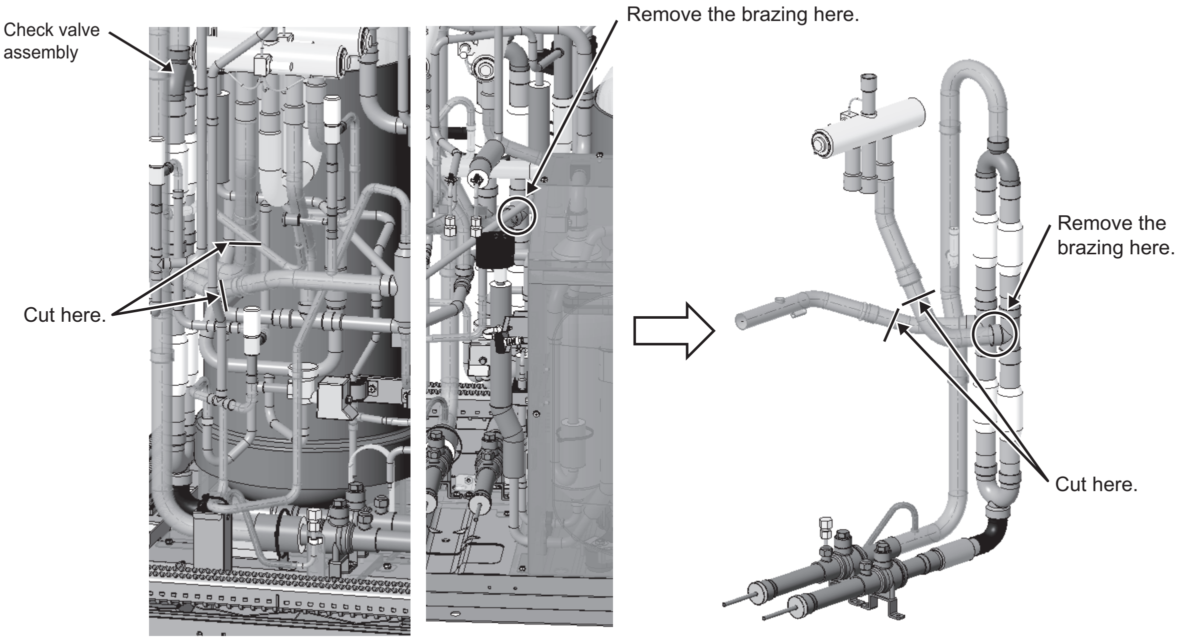


Fig. 3

(4) Cut the upper pipe of the check valve assembly using a pipe cutter or similar tool, as shown in the figure below. After cutting the pipe, remove the brazing from the pipe. (One point to cut and one area to remove brazing: Fig. 4)

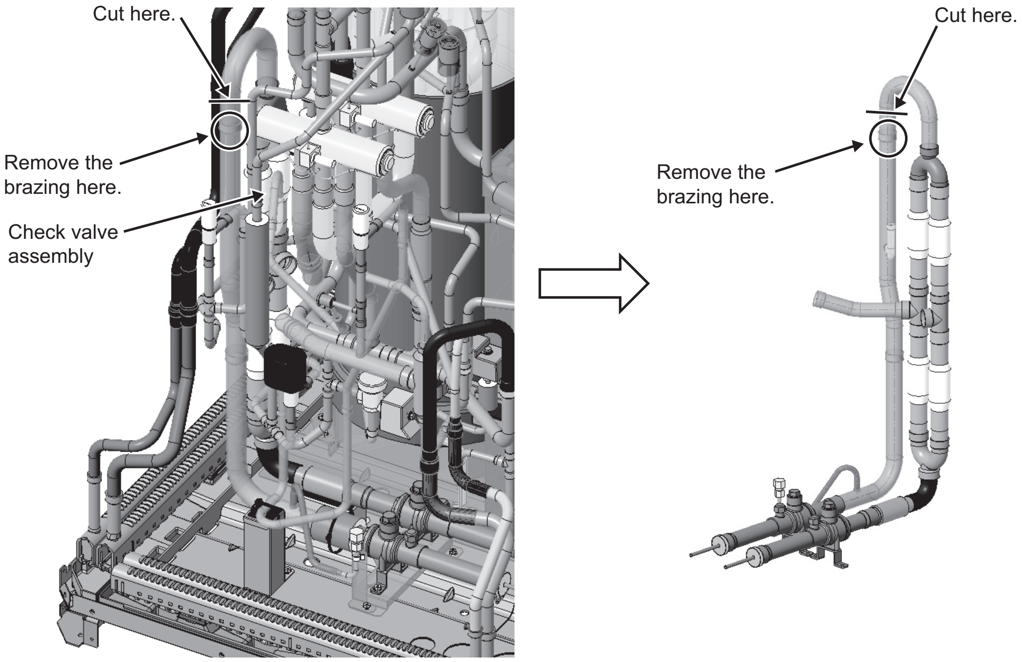
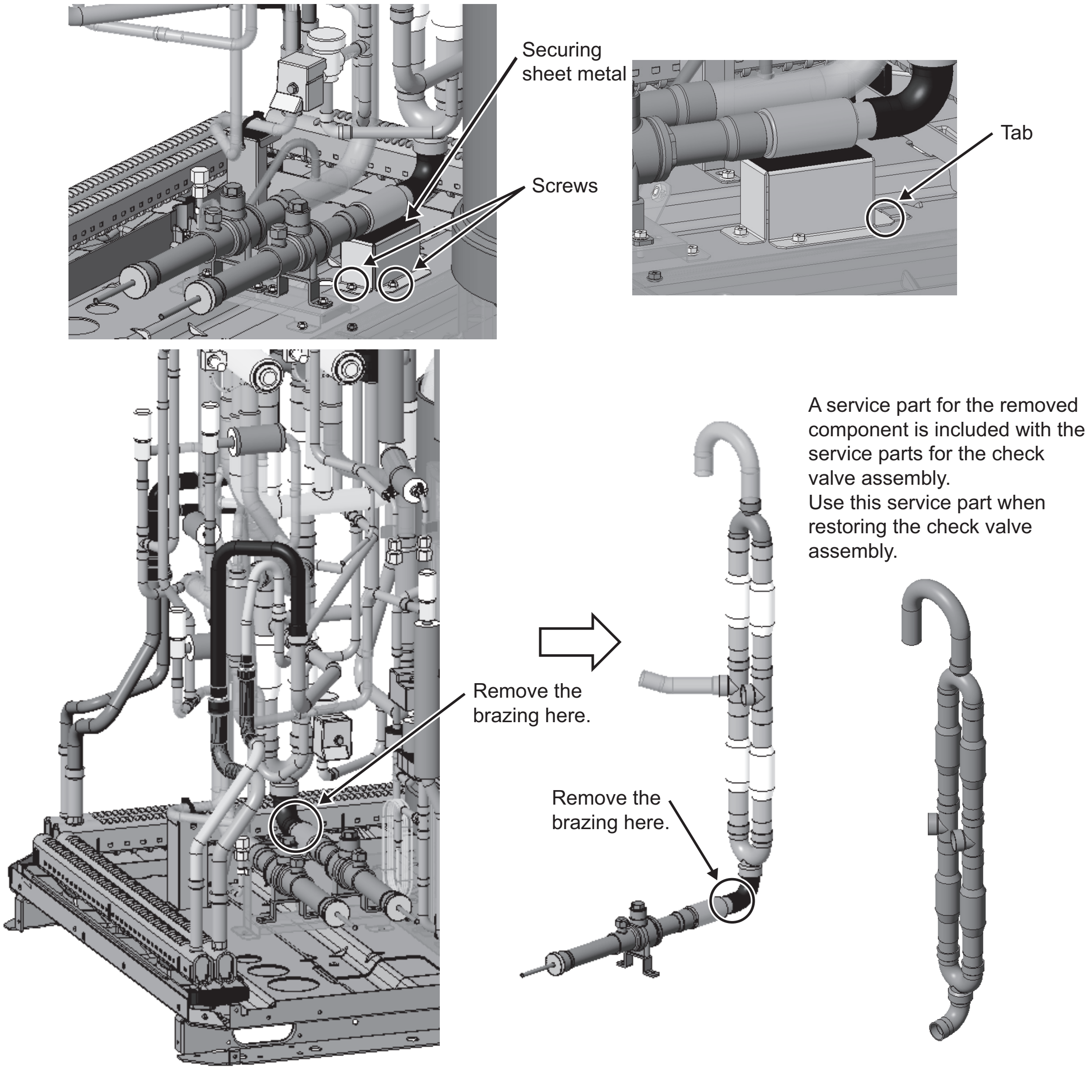


Fig. 4

(5) Remove the screws from the securing metal sheet, pull the tab toward you, and then remove the metal sheet.
After removing the metal sheet, remove the brazing from the lower pipe of the check valve assembly, and then lift the assembly to remove it. (Two screws and one area to remove brazing: Fig. 5)



A service part for the removed component is included with the service parts for the check valve assembly.
Use this service part when restoring the check valve assembly.

Fig. 5

(6) After removing the check valve assembly, remove the brazing from the pipe that was cut in step (3). (Two areas: Fig. 6)

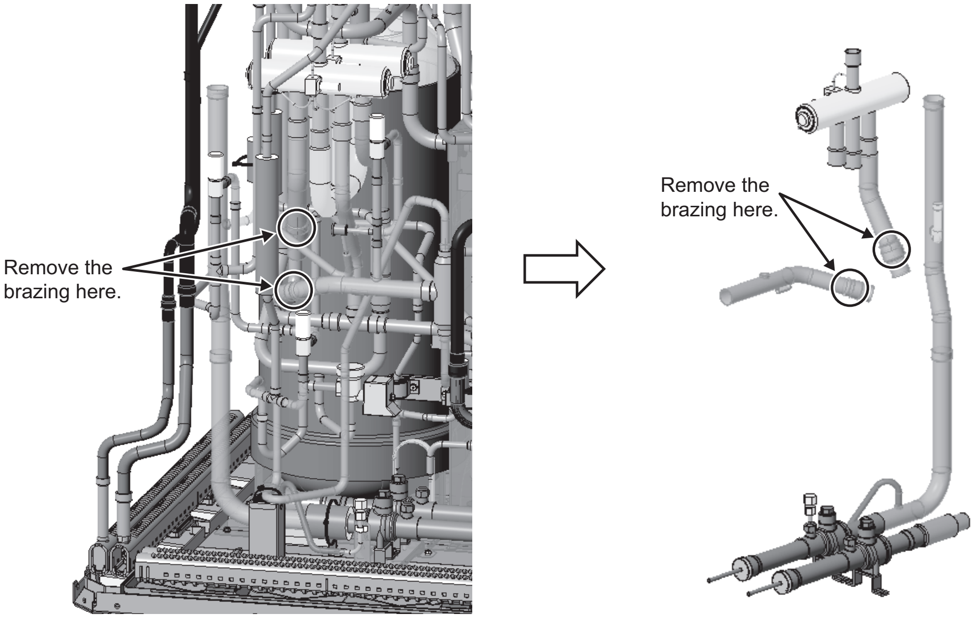


Fig. 6

(7) Install the new check valve assembly. Place the new check valve assembly and connect the supplied pipes to it as shown below.

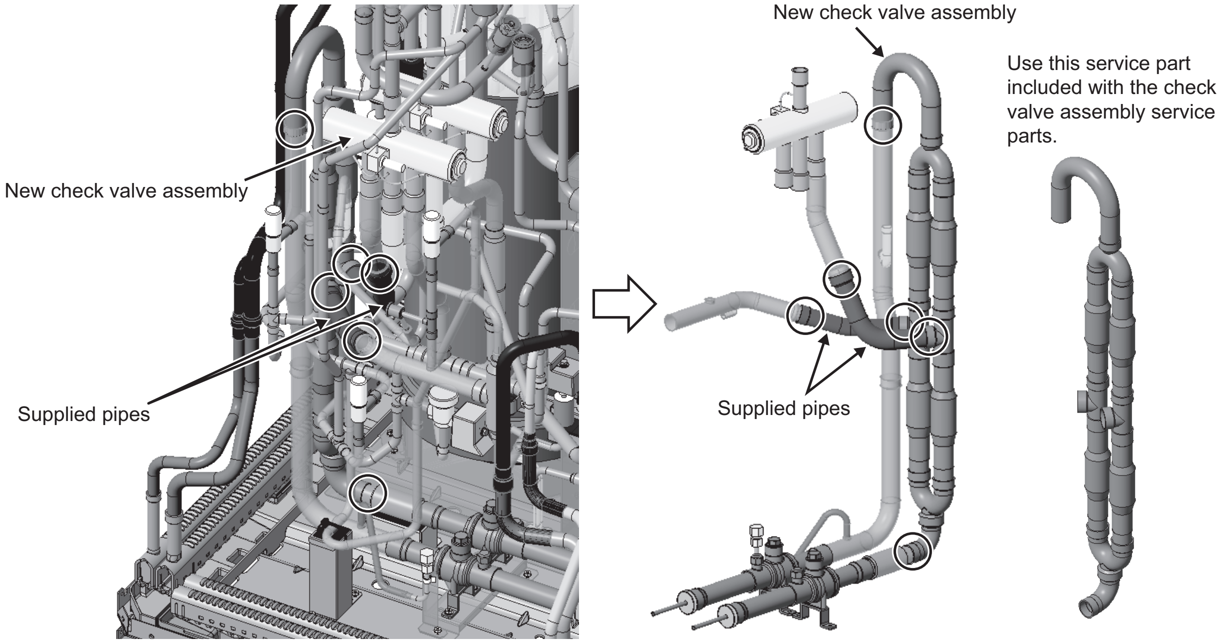


Fig. 7

(8) Braze the area shown in the figure below. (One area: Fig. 8)

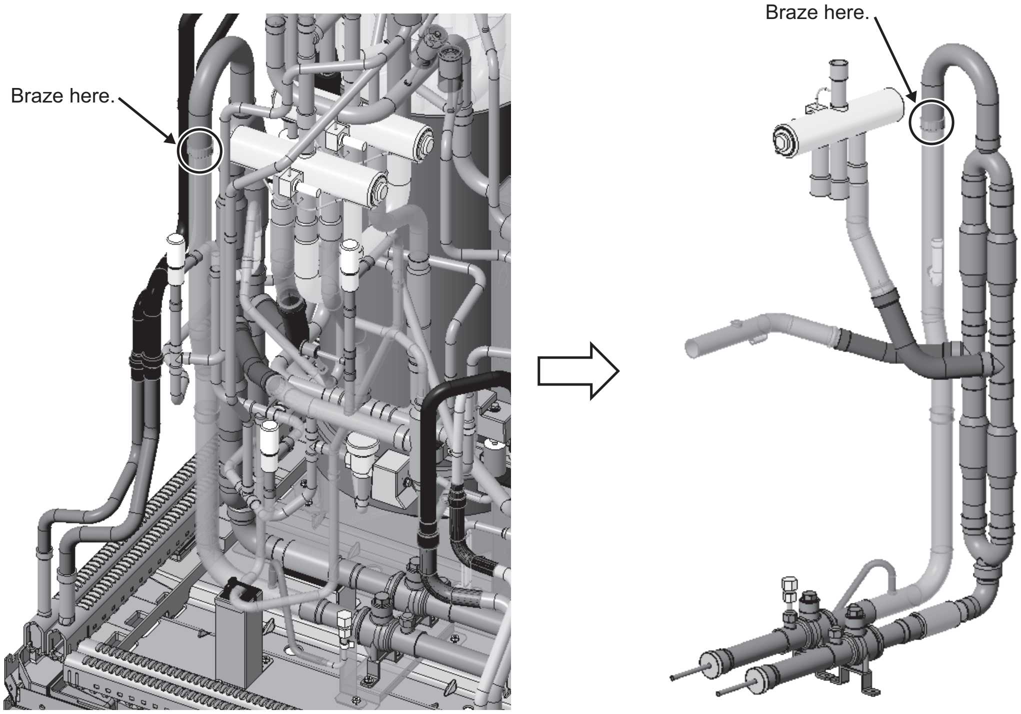


Fig. 8

(9) Braze the area shown in the figure below. After brazing, install the securing sheet metal removed in step (5) in reverse order. (One area to braze and two screws: Fig. 9)

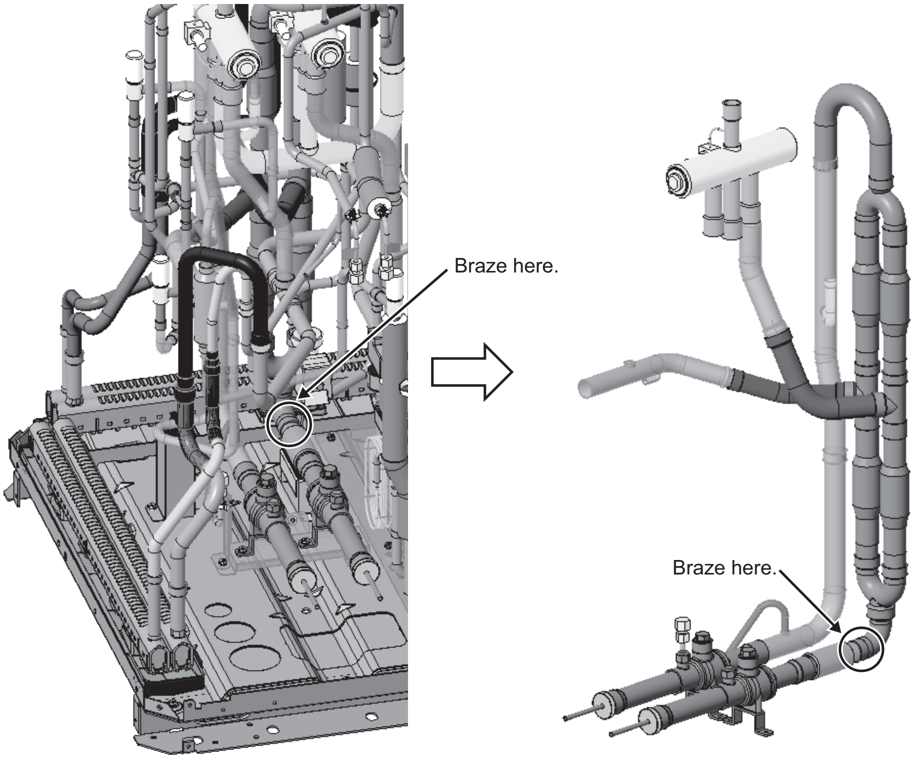


Fig. 9

(10) Braze the new check valve assembly, supplied pipes, and connecting pipes. (Four areas to braze: Fig. 10)

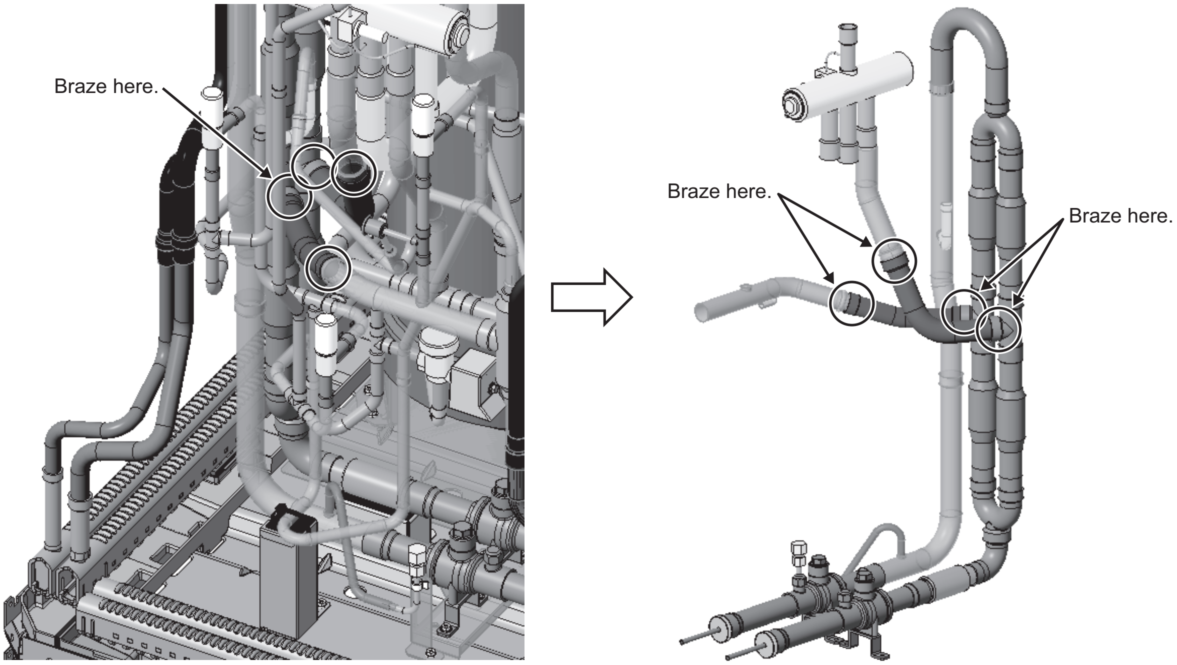


Fig. 10

The replacement of the check valve assembly is completed here. Reinstall the components that were removed in each step back into their original positions.

## 8-12-6 Capillary Assembly Replacement Procedure

### 1. S, L-module

[WARNING]
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

The steps for replacing the capillary assembly are as follows. Before replacing the capillary assembly, ensure a sufficient maintenance space and prepare the refrigerant circuit parts for servicing. For details, refer to Section [8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)]

Cautions for replacing a capillary assembly
- Ensure a non-oxidizing brazing is performed.
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the heat exchanger is protected from spatter during brazing.

(1) Remove the brazing from the capillary assembly. (Two areas: Fig. 1)
(2) When heating the piping, wrap wet towels around the capillary assembly to prevent the brazing from melting. (Two wet towels: Fig. 2)
(3) Connect the pipes of the capillary assembly. (Two areas to braze: Fig. 2)

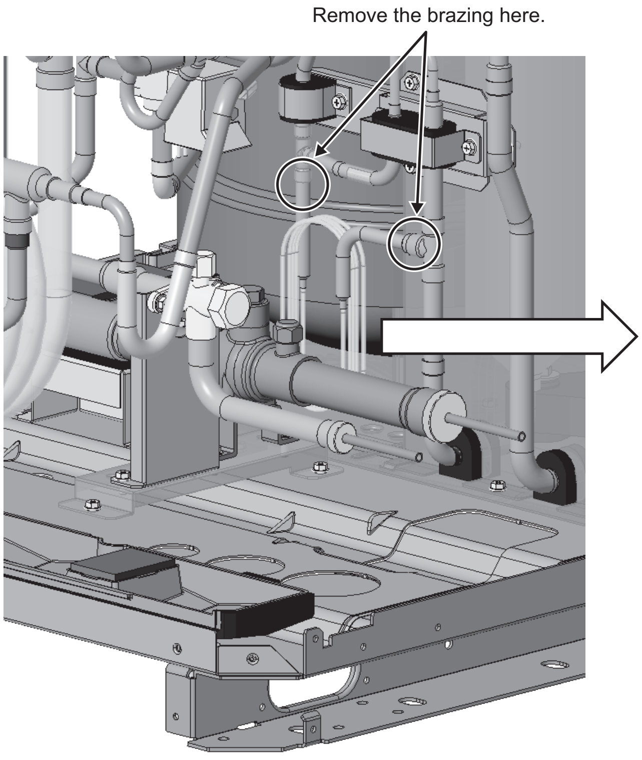


Fig. 1

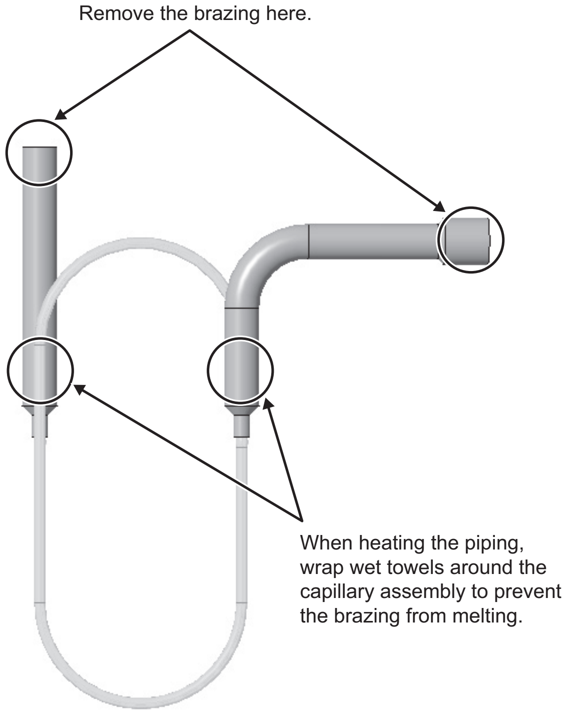


Fig. 2

The replacement of the capillary assembly is completed here.
Install the removed components back into their original positions.

## 8-12-7 Maintenance Procedures for the Heat Exchanger

### 1. For the S-module

[Precautions]
·Do not touch fin surfaces of the heat exchanger and the sharp edges of components.
·Operate with protective equipment.
·Two persons shall operate when carrying the heat exchanger.
·When brazing piping, be careful not to burn the wiring and sheet metal in the unit.
·Use a wet towel to moisten the rubber tube near the brazing area before brazing.
·When connecting piping, be sure to perform non-oxidation brazing with nitrogen substitution.
Do not use commercially available antioxidants as they may cause pipe corrosion and degradation of the refrigeration oil. Otherwise, the compressor may be damaged.
·Heat exchanger is provided with cushioning material so that the aluminum pipe does not come into contact with the ground, and a clearance is secured between the aluminum pipe and the ground when it is placed on the ground.
·When holding the heat exchanger, do not use gloves that have touched corrosive components (copper, iron, sulfur, etc.) so that the aluminum pipes do not corrode.

[Warning]
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

1-1. Advance preparation for service heat exchanger replacement operation.
Remove various parts before removing the heat exchanger.

(1) Remove the panel from the unit. (20 screws: Fig. 1)

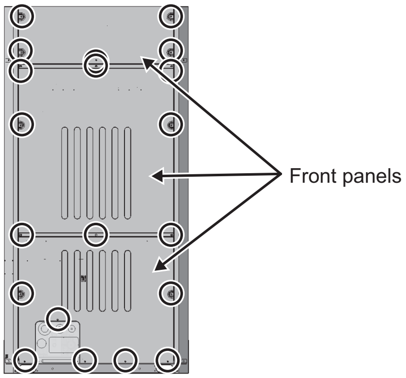


Fig. 1

(2) Remove the control box cover and remove the wiring connected to the unit from the control box.
(Six screws: Fig. 2)

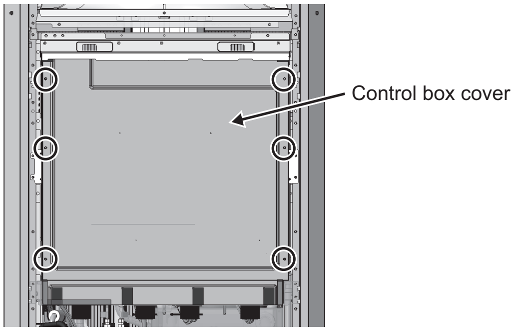


Fig. 2

(3) Remove the control box. (Nine screws: Fig. 3)

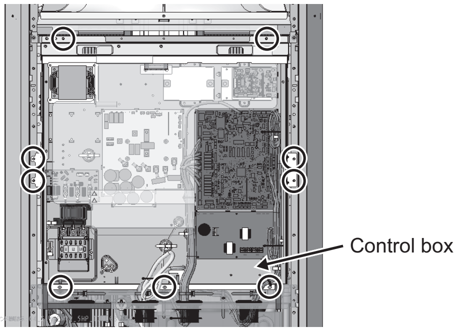


Fig. 3

(4) Remove the wires that are secured to frame B and remove frames A and B. (Six screws: Fig. 4)

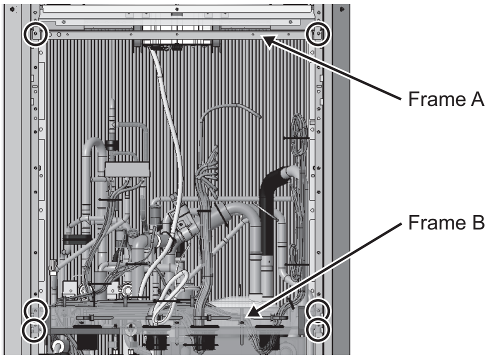


Fig. 4

(5) Remove the top panel except the front panel. (Four screws on the left and right each, and five screws on the rear: Fig. 5)

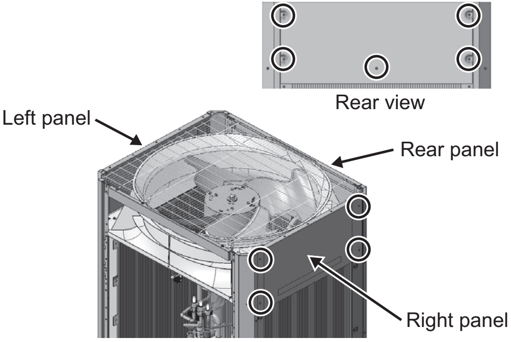


Fig. 5

(6) Remove the fan guard and the upper frames. (Four screws: Fig. 6)

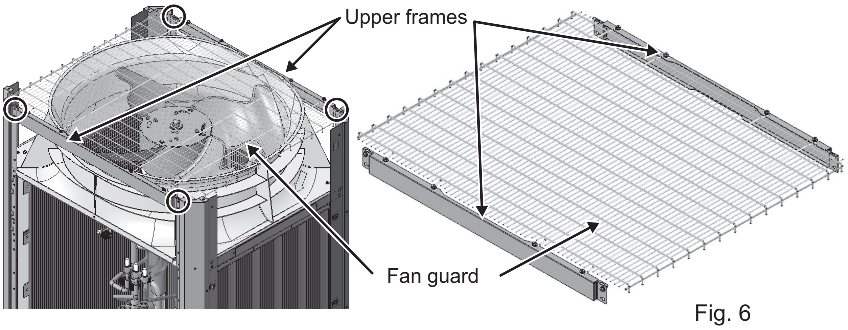


Fig. 6

(7) Remove the fan. (One nut: Fig. 7)

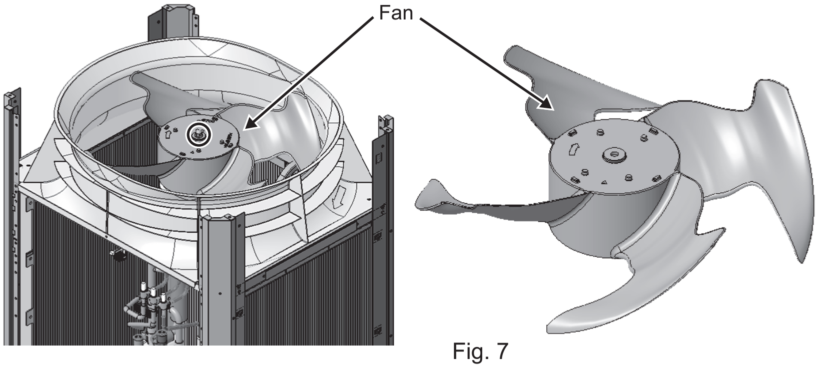


Fig. 7

(8) Remove the bell mouth. (Four screws: Fig. 8)

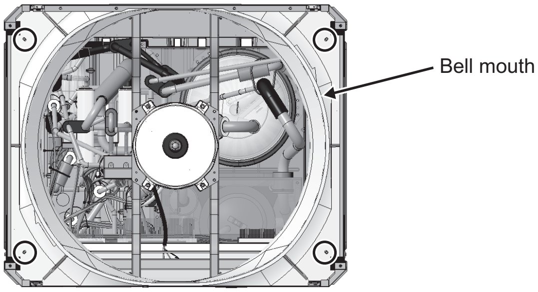


Fig. 8

(9) Remove the motor. (Eight screws: Fig. 9)

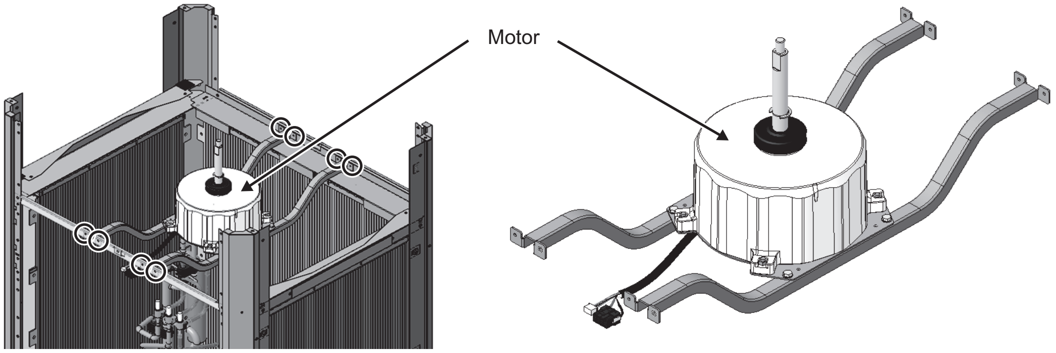


Fig. 9

(10) Remove each frame on the top of the unit.
At this time, remove the screws from all frames before removing the frames.
(Two screws on each of the front, rear, left, and right: Fig. 10)

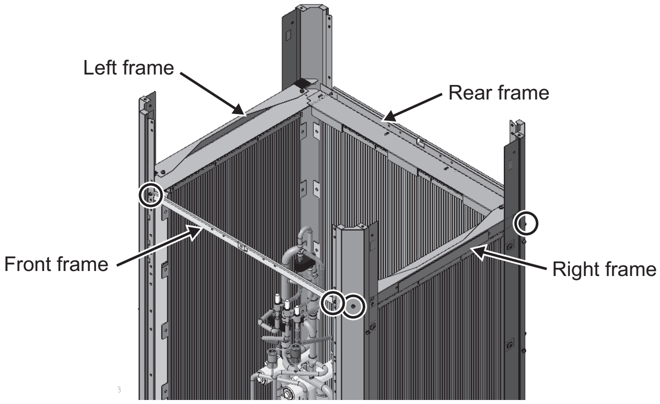


Fig. 10

(11) If the unit comes with fin guards, remove them.
(Eight screws on the left and right each: Fig. 11)

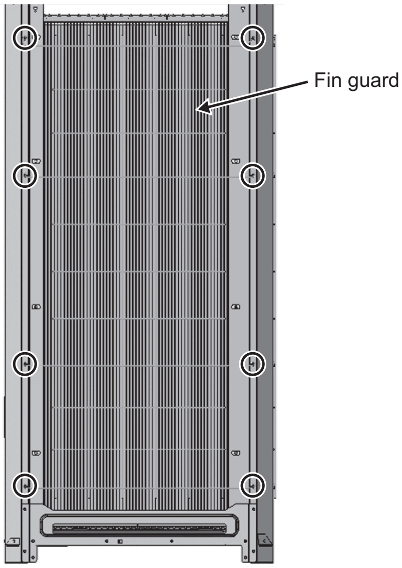


Fig. 11

That's all for removing the various parts.

1-2. When performing services from the front of the unit

(1) When removing the heat exchanger, use the recommended wet felt to avoid burning the aluminum heat exchanger and pipe cover, etc.
Remove the brazed part. (Six areas to braze: Fig. 12, Fig. 13, and Fig. 14)
*It is no problem to cut the piping of the heat exchanger to be replaced and remove the brazing.

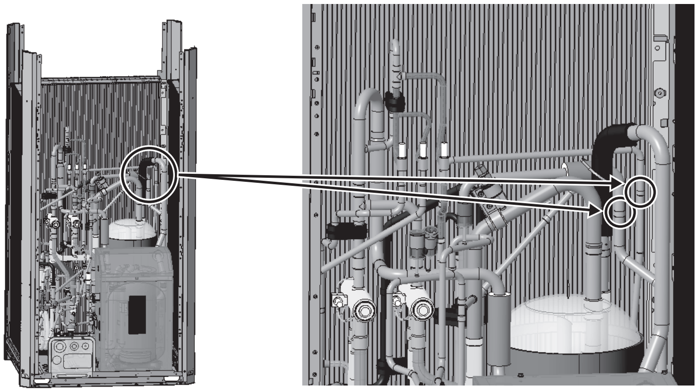


Fig. 12 Brazing point of the right heat exchanger piping

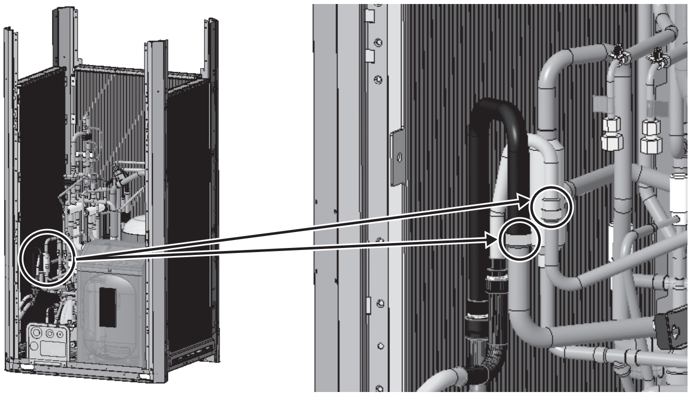


Fig. 13 Brazing point of the left heat exchanger piping

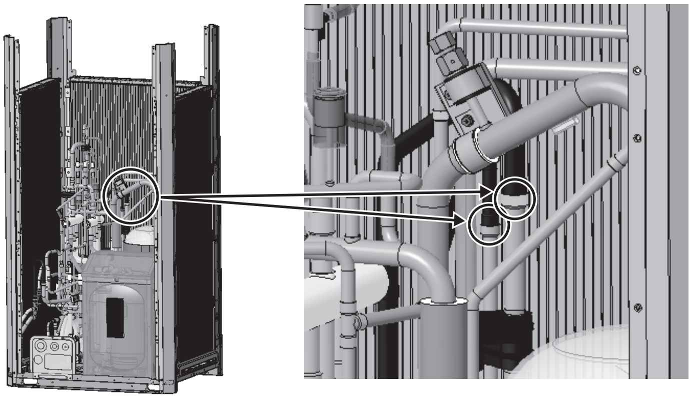


Fig. 14 Brazing point of the rear heat exchanger piping

(2) Remove the right pillar on the front side and the screws that hold the heat exchanger. (Four screws: Fig. 16)
*The left and right sides are symmetrical, so please handle the left pillar in the same way.

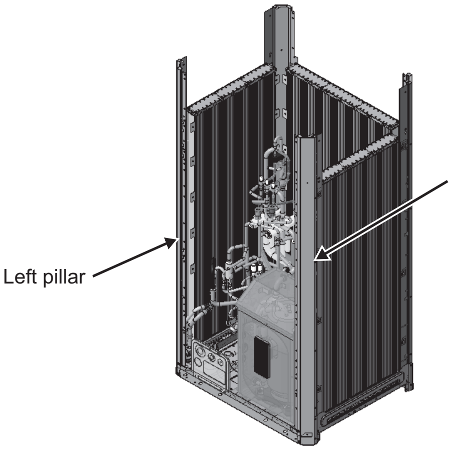


Fig. 15

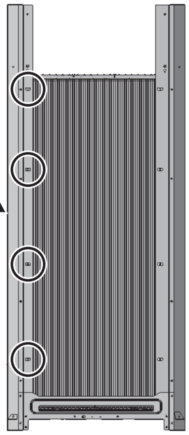


Fig. 16 Right

(3) Remove the screws that secure the right pillar on the front side and remove the pillar. (Six screws: Fig. 17)
*The left and right sides are symmetrical, so please handle the left pillar in the same way.

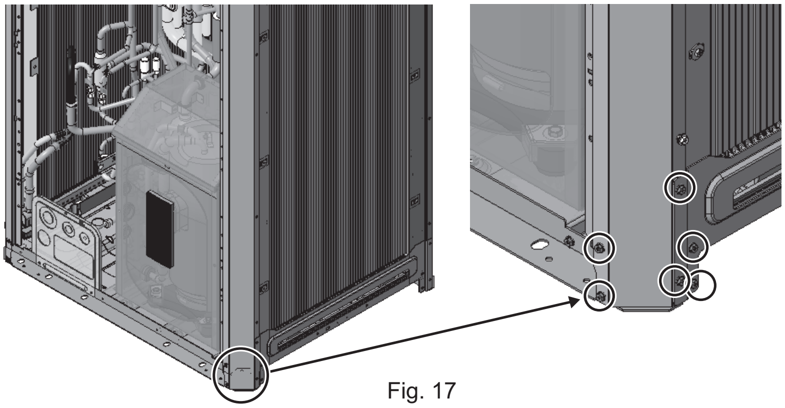


Fig. 17

(4) Access through the front space and remove the screws that secure the right heat exchanger and rear pillars. (Four screws: Fig. 19)
*Be careful not to hit the piping when moving the heat exchanger. The left and right sides are symmetrical, so please handle the left pillar in the same way.
When holding the heat exchanger, hold the side plates (sheet metal) on both sides. (Fig. 20)

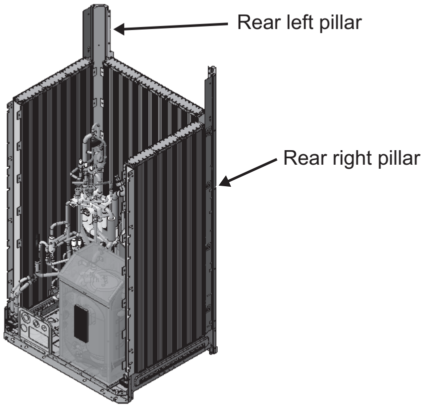


Fig. 18

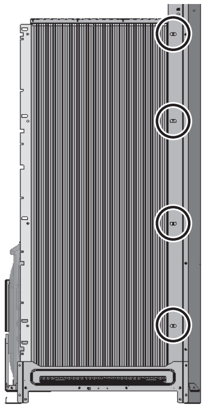


Fig. 19 Right

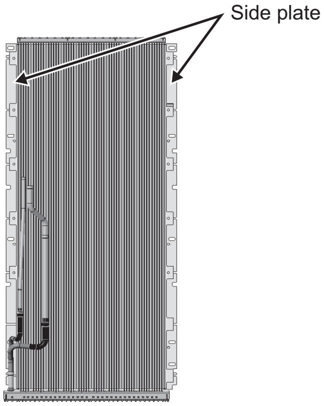


Fig. 20

(5) Remove the rear heat exchanger and the screws that hold the pillars, and remove the heat exchanger.
(Eight screws: Fig. 22)

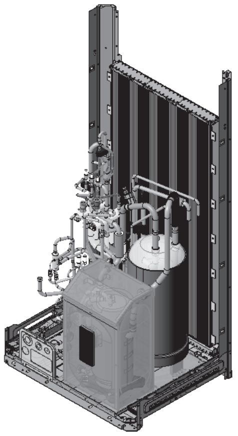


Fig. 21

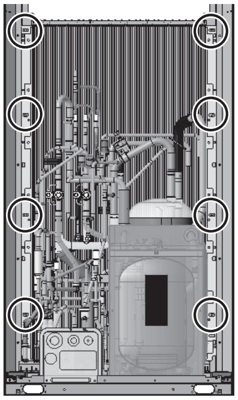


Fig. 22

1-3. When servicing from the rear of the unit, only the rear heat exchanger can be replaced.
(1) Remove the brazing from the piping. (Two areas to remove brazing: Fig. 23)

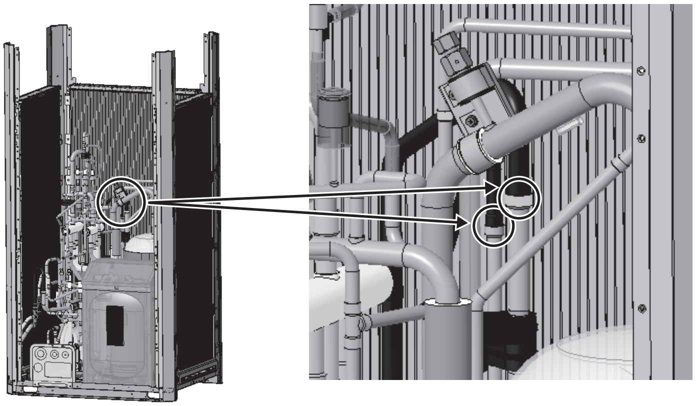


Fig. 23 Brazing point of the rear heat exchanger piping

(2) Remove the rear guard. (Two screws: Fig. 25)

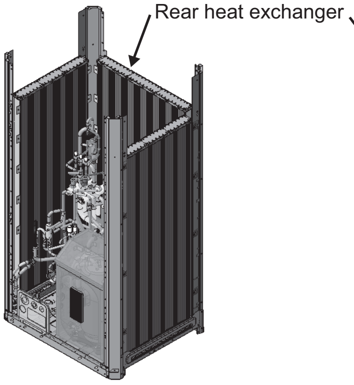


Fig. 24

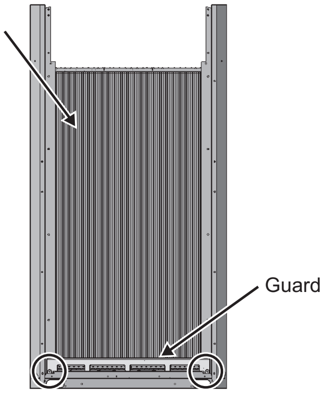


Fig. 25 Rear

(3) Remove the screws that secure the rear and right pillars. (10 screws: Fig. 26 and Fig. 27)
*Be careful not to hit the piping when moving the heat exchanger.
The left and right sides are symmetrical, so please handle the left pillar in the same way.

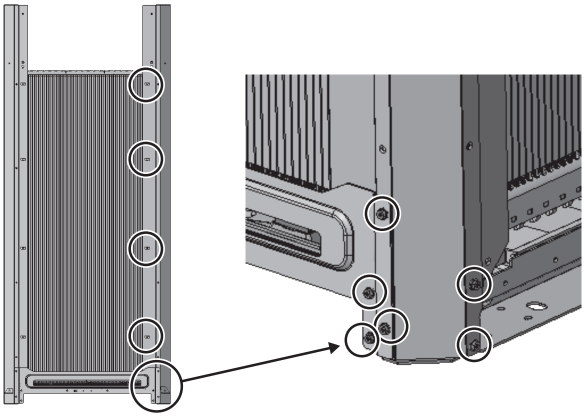
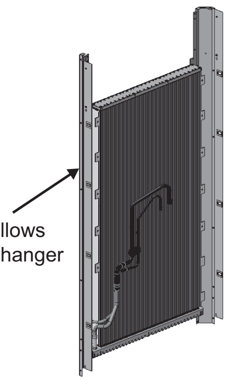


Fig. 26 Right



This procedure allows the rear heat exchanger to be removed.

Fig. 27 Rear heat exchanger unit drawing

·When replacing the heat exchanger, use threadlocker-coated screws (service parts). The orange thread-locking agent is applied to the tip of the screw. (Fig. 28)
*Do not reuse the removed screws.

·The tightening torque of the screws when installing the heat exchanger should be 2.7±0.1 N-m.

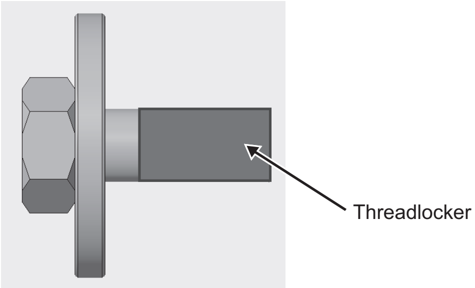


Fig. 28 Threadlocker application range

·After replacing all the heat exchangers, return the parts removed in each process to their original condition.

·In addition, the screw fixing part between the heat exchanger and each pillar is made to have a long hole in consideration of variation.
If it is difficult to fit the fixing holes, installing the upper frame first will make it easier to fix since the pillars are arranged vertically.

Cautions for replacing refrigerant circuit components (heat exchanger)
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved

## 2. For the L-module

[Precautions]

·Do not touch fin surfaces of the heat exchanger and the sharp edges of components.

·Operate with protective equipment.

·Two persons shall operate when carrying the heat exchanger.

·When brazing piping, be careful not to burn the wiring and sheet metal in the unit.

·Use a wet towel to moisten the rubber tube near the brazing area before brazing.

·When connecting piping, be sure to perform non-oxidation brazing with nitrogen substitution.
Do not use commercially available antioxidants as they may cause pipe corrosion and degradation of the refrigeration oil.
Otherwise, the compressor may be damaged.

·Heat exchanger is provided with cushioning material so that the aluminum pipe does not come into contact with the ground, and a clearance is secured between the aluminum pipe and the ground when it is placed on the ground.

·When holding the heat exchanger, do not use gloves that have touched corrosive components (copper, iron, sulfur, etc.)so that the aluminum pipes do not corrode.

[Warning]

Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

2-1. Advance preparation for service heat exchanger replacement operation.
Remove various parts before removing the heat exchanger.

(1) Remove the panels from the unit. (31 screws: Fig. 29)

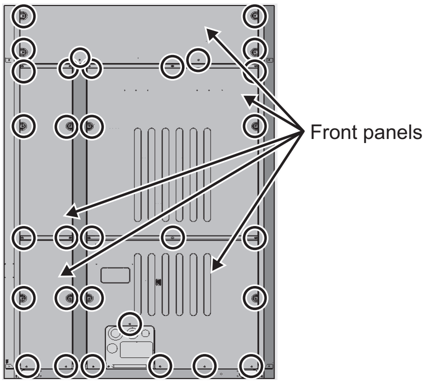


Fig. 29

(2) Remove the control box cover and remove the wiring connected to the unit from the control box.
(Six screws: Fig. 30)

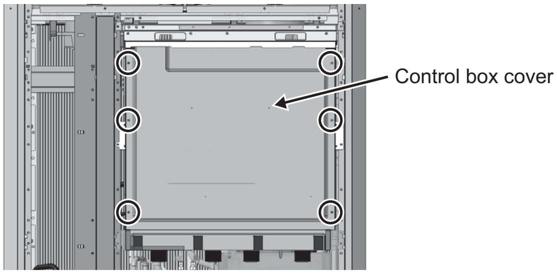


Fig. 30

(3) Remove the control box. (Nine screws: Fig. 31)

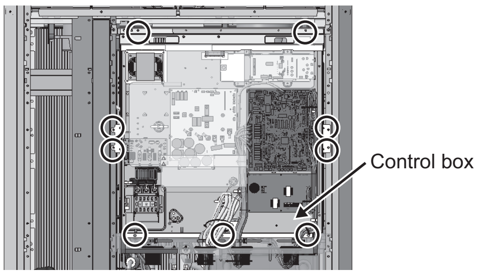


Fig. 31

(4) Remove the wires that are secured to frame B and remove frames A and B. (Six screws: Fig. 32)

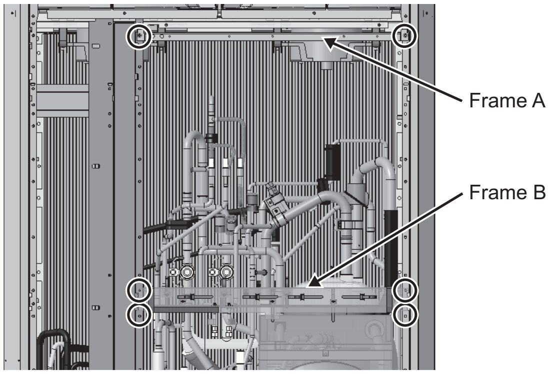


Fig. 32

(5) Remove the top panel except the front panel. (Four screws on the left and right each, and six screws on the rear: Fig. 33)

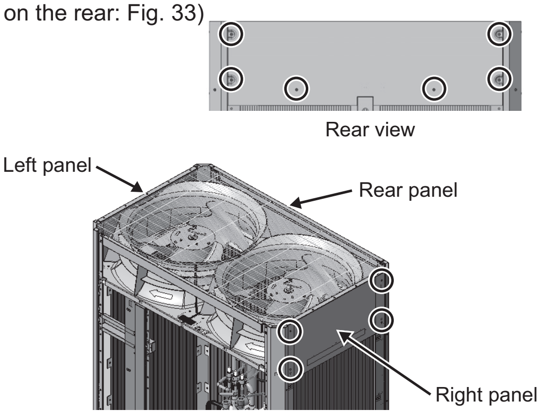


Fig. 33

(6) Remove the fan guard and the upper frames. (Four screws: Fig. 34)

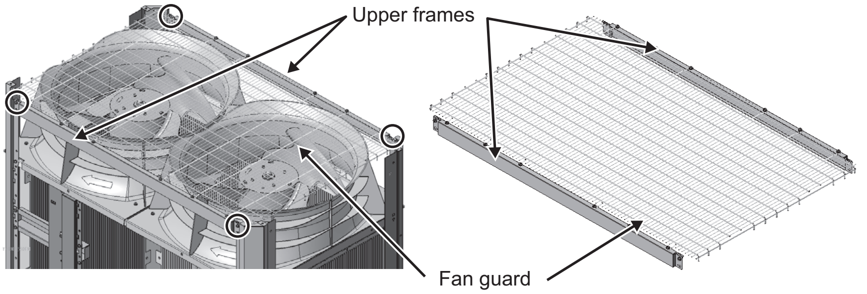


Fig. 34

(7) Remove the fan. (Two nuts: Fig. 35)

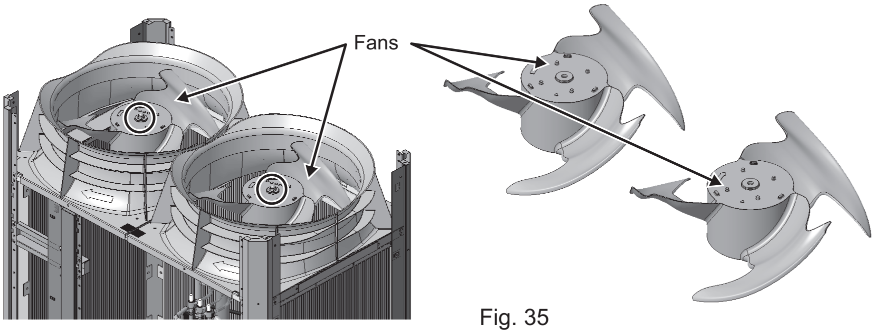


Fig. 35

(8) Remove the bell mouth. (Eight screws: Fig. 36)

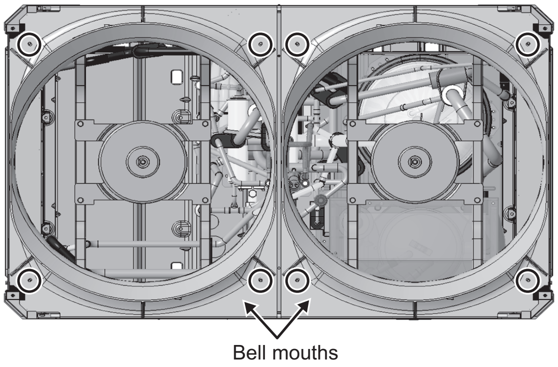


Fig. 36

(9) Remove the motors. (16 screws: Fig. 37)

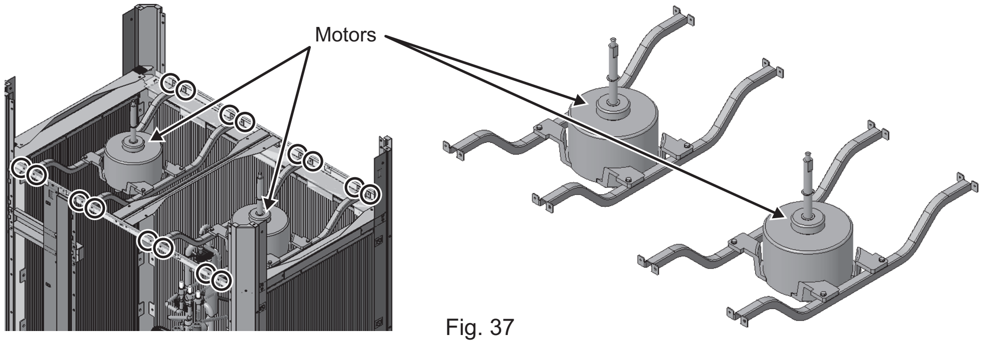


Fig. 37

(10) Remove the center pillar on the front of the unit and the fixing attachment.
(Eight screws on the pillar, and two screws on the attachment: Fig. 38)

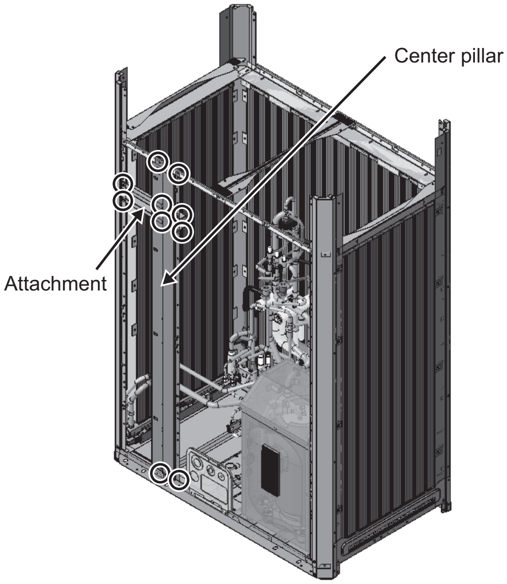


Fig. 38

(11) Remove each frame on the top of the unit.
At this time, remove the screws from all frames before removing the frames.
(Two screws on each of the front, rear, right, and left frames, and six screws on the center frame: Fig. 39)

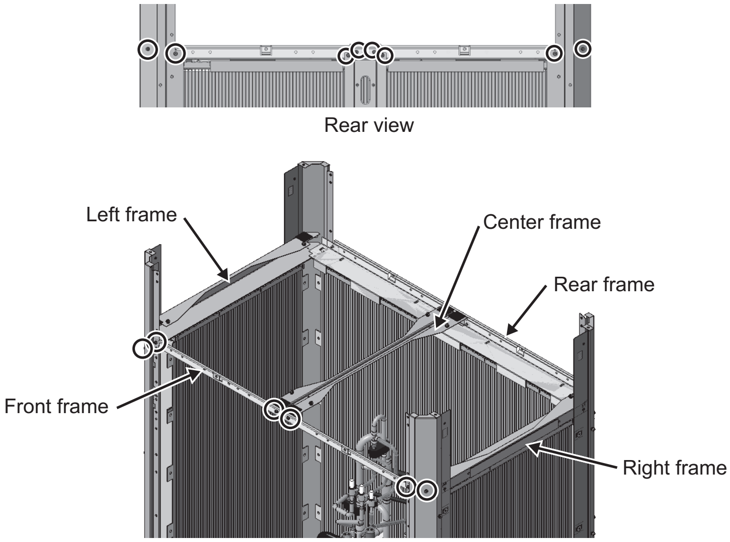


Fig. 39

(12) If the unit comes with fin guards, remove them.
(Eight screws on the left and right: Fig. 40)

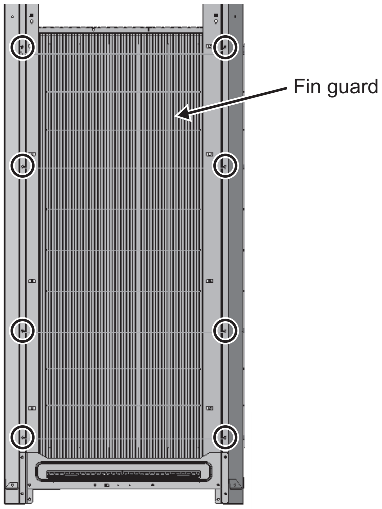


Fig. 40

That's all for removing the various parts.

2-2. When performing services from the front of the unit

(1) When removing the heat exchanger, use the recommended wet felt to avoid burning the aluminum heat exchanger and pipe cover, etc.
Remove the brazed part. (Six areas to remove brazing: Fig. 41, Fig. 42, and Fig. 43)
*It is no problem to cut the piping of the heat exchanger to be replaced and remove the brazing.

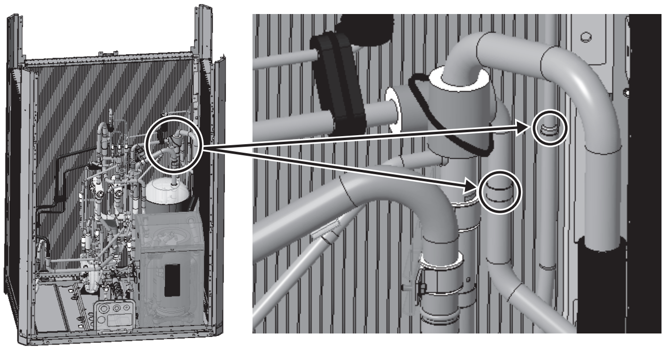


Fig. 41 Brazing point of the right heat exchanger piping

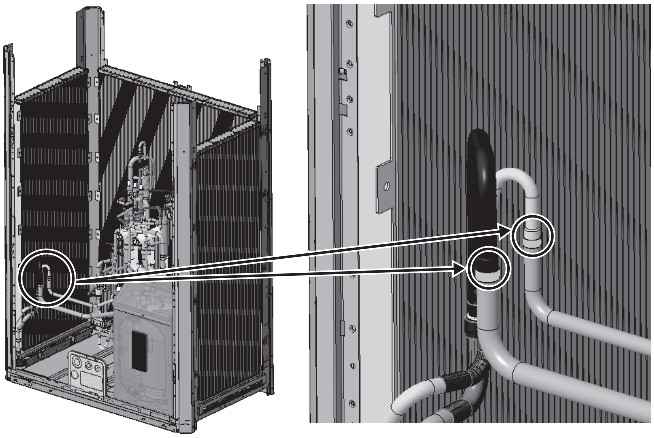


Fig. 42 Brazing point of the left heat exchanger piping

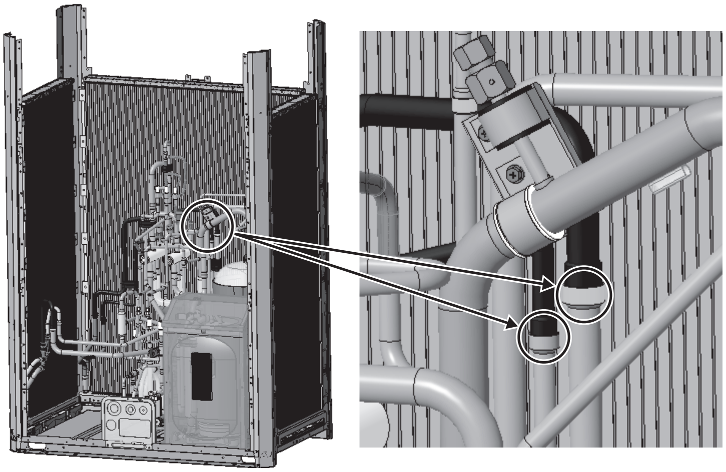


Fig. 43 Brazing point of the rear heat exchanger piping

(2) Remove the right pillar on the front side and the screws that hold the heat exchanger. (Four screws: Fig. 45)
*The left and right sides are symmetrical, so please handle the left pillar in the same way.

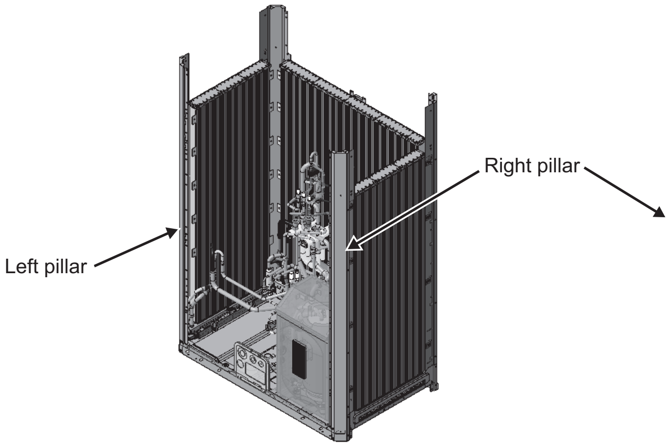


Fig. 44

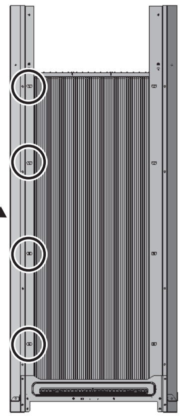


Fig. 45 Right

(3) Remove the screws that secure the right pillar on the front side and remove the pillar. (Six screws: Fig. 46)
*The left and right sides are symmetrical, so please handle the left pillar in the same way.

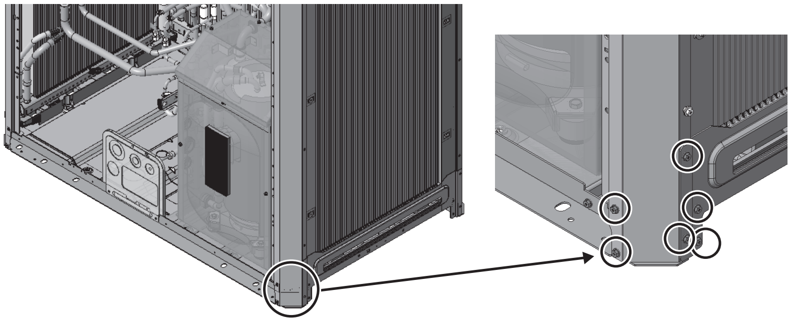


Fig. 46

(4) Access through the front space and remove the screws that secure the right heat exchanger and rear pillars. (Four screws: Fig. 48)
*Be careful not to hit the piping when moving the heat exchanger. The left and right sides are symmetrical, so please handle the left pillar in the same way.
When holding the heat exchanger, hold the side plates (sheet metal) on both sides. (Fig. 49)

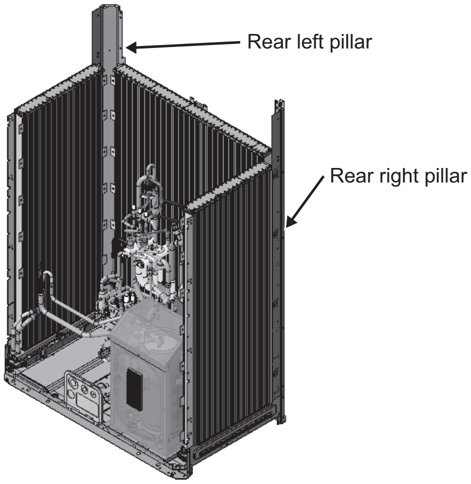


Fig. 47

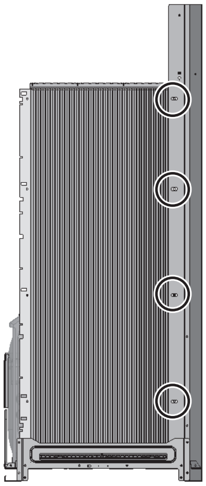


Fig. 48 Right

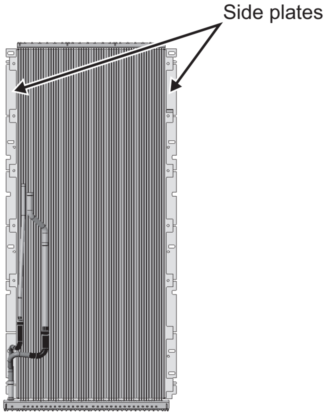


Fig. 49

(5) Remove the rear heat exchanger and the screws that hold the pillars, and remove the heat exchanger.
(Eight screws: Fig. 51)

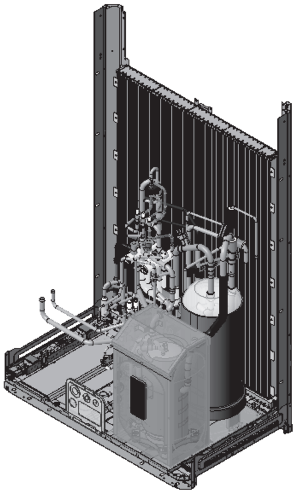


Fig. 50

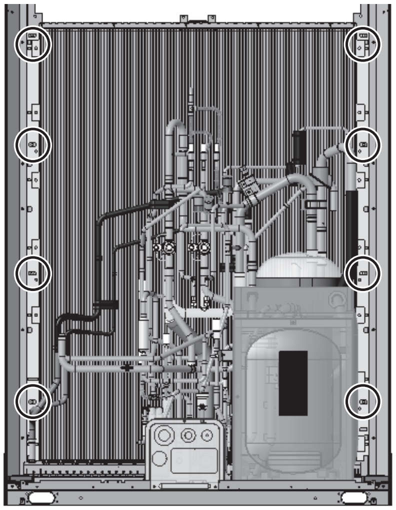


Fig. 51

2-3. When servicing from the rear of the unit, only the rear heat exchanger can be replaced.
(1) Remove the brazing from the piping. (Two areas to remove brazing: Fig. 52)

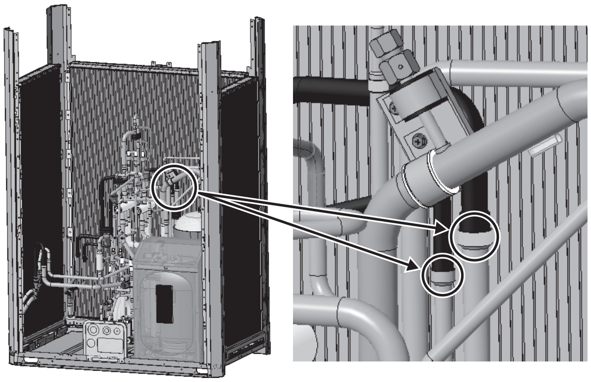


Fig. 52 Brazing point of the rear heat exchanger piping

(2) Remove the rear guard and, if the unit comes with fin guards, remove them.
(Four screws on the guards, and 16 screws on fin guards: Fig. 54)

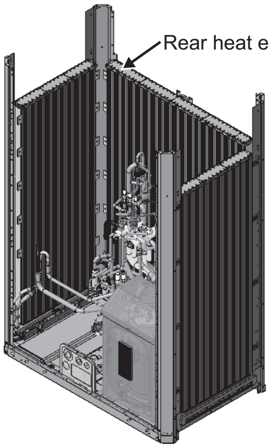


Fig. 53

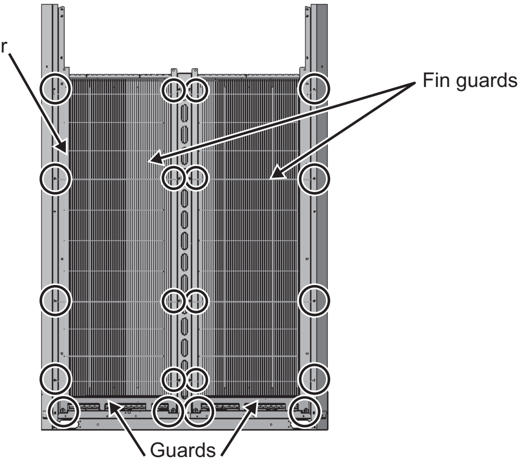


Fig. 54 Rear

(3) Remove the center pillar. (Two screws: Fig. 55)

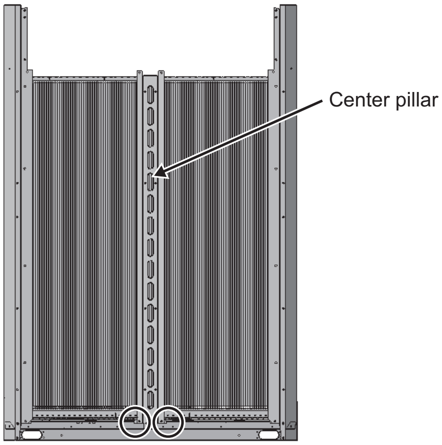


Fig. 55 Rear

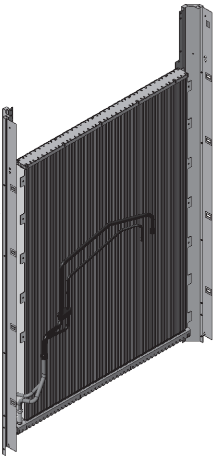


Fig. 57 Rear heat exchanger unit drawing

(4) Remove the screws that secure the rear and right pillars. (10 screws: Fig. 56 and Fig. 57)
*Be careful not to hit the piping when moving the heat exchanger.
The left and right sides are symmetrical, so please handle the left pillar in the same way.

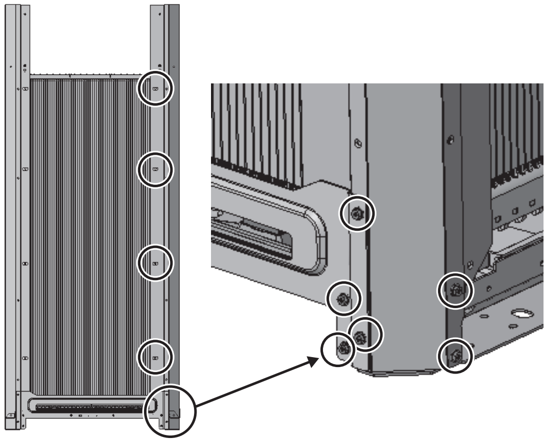


Fig. 56 Right

·When replacing the heat exchanger, use threadlocker-coated screws (service parts). The orange thread-locking agent is applied to the tip of the screw. (Fig. 58)
*Do not reuse the removed screws.

·The tightening torque of the screws when installing the heat exchanger should be 2.7±0.1 N-m.

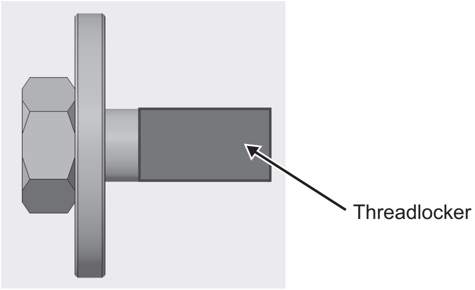


Fig. 58 Threadlocker application range

·After replacing all the heat exchangers, return the parts removed in each process to their original condition.
·In addition, the screw fixing part between the heat exchanger and each pillar is made to have a long hole in consideration of variation.
If it is difficult to fit the fixing holes, installing the upper frame first will make it easier to fix since the pillars are arranged vertically.

Cautions for replacing refrigerant circuit components (heat exchanger)
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit.
- To protect the heat exchanger, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved

## 8-12-8 Transformer box replacement instructions

### 1. S, L-module (YXU models only)

The steps for replacing the transformer box are as follows.
Before replacing the transformer box, ensure a sufficient maintenance space and prepare the refrigerant circuit parts for servicing. For details, refer to Section [8-12-1 Ensuring Maintenance Space (Preparation for the Maintenance of Refrigerant Circuit Parts)]

(1) Remove the band securing the transformer box wiring. (One band: Fig. 1)
(2) Remove the screws from the transformer box. (Four screws: Fig. 1)

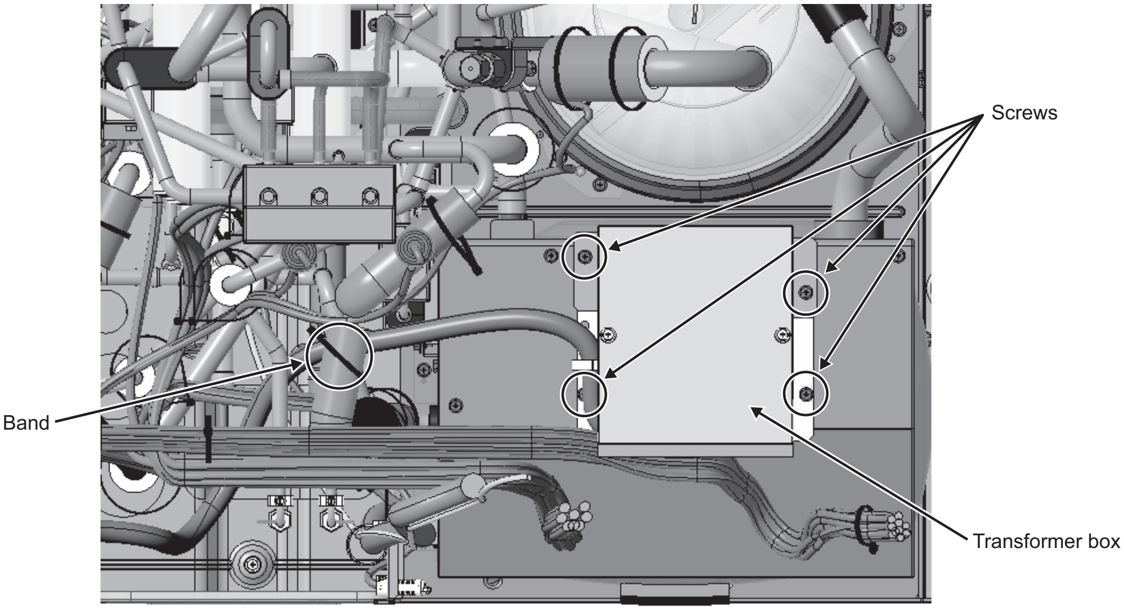


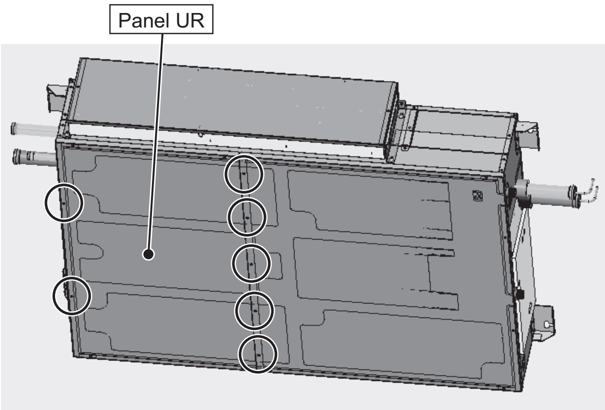
Fig. 1

(3) Remove the transformer box.
(4) The replacement of the transformer box is completed here.
Install the components that were removed in each step back into their original positions.

# 8-13 BC Controller Maintenance Instructions

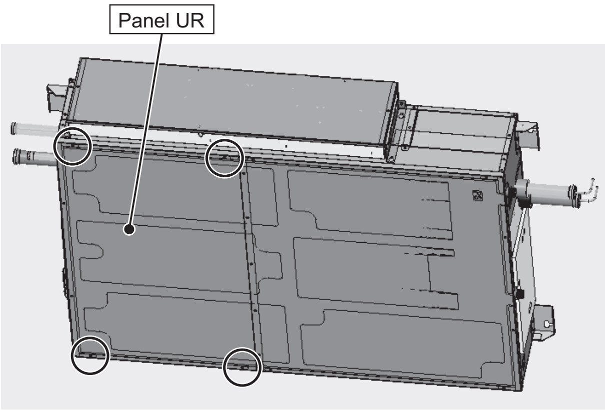
## 1. Drain pan replacement

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove Panel UR.</b></td></tr>
<tr><td>1) Remove the seven screws other than the keyhole screws.</td><td>

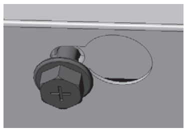


○ : Screws to remove

</td></tr>
<tr><td>2) Loosen the four keyhole screws.<br>*Do not remove the screws to prevent the panel from falling.</td><td>

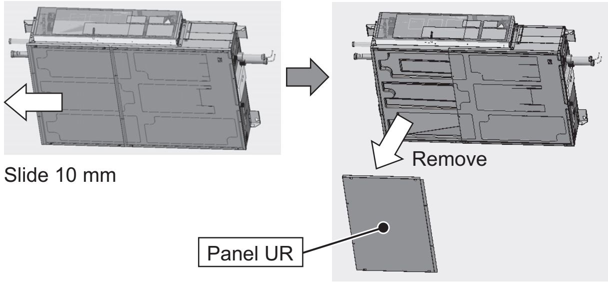


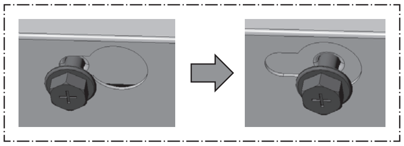
○ : Screws to loosen



Shape of keyhole

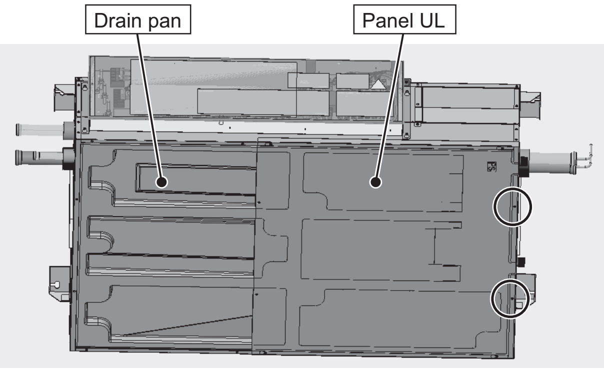
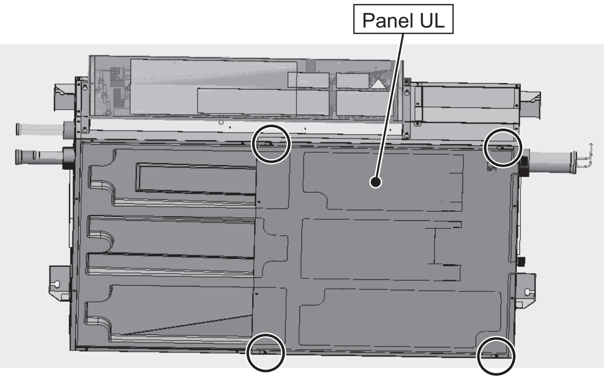
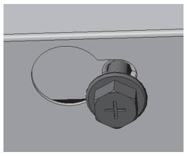
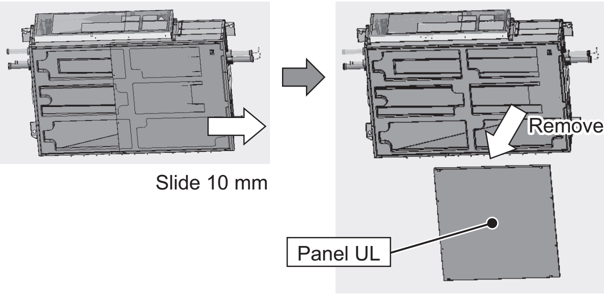
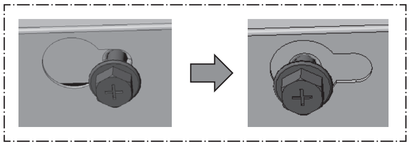
</td></tr>
<tr><td>3) Slide Panel UR 10 mm away from the unit to remove it.</td><td>

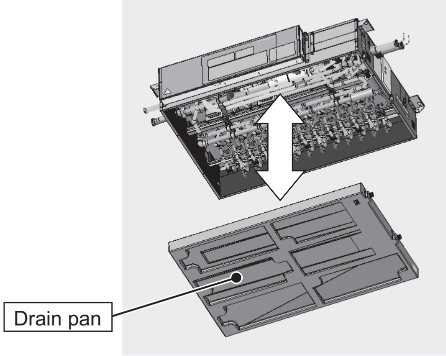




Shape of keyhole after sliding 10 mm

</td></tr>
</table>

| Procedure | Illustration |
|---|---|
| **(2) Remove Panel UL.** | |
| 1) Remove the two screws other than the keyhole screws. |  <br>○ : Screws to remove |
| 2) Loosen the four keyhole screws.<br>*Do not remove the screws to prevent the panel from falling. |  <br><br>Shape of keyhole<br>○ : Screws to loosen |
| 3) Slide Panel UL 10 mm away from the unit to remove it. |  <br><br>Shape of keyhole after sliding 10 mm |

| Procedure | Illustration |
|---|---|
| **(3) Replace the drain pan.** | |
| Lower the drain pan and replace it. |  |
| **(4) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

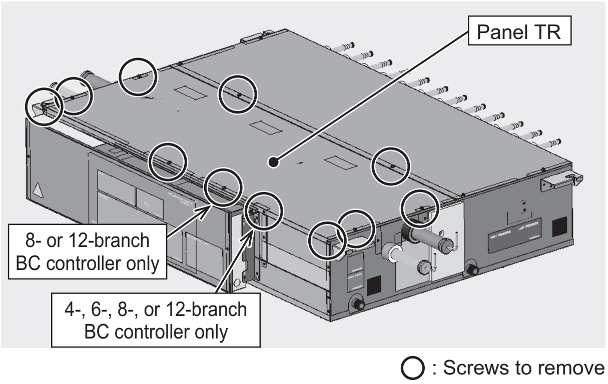
## 2. Panel UR replacement

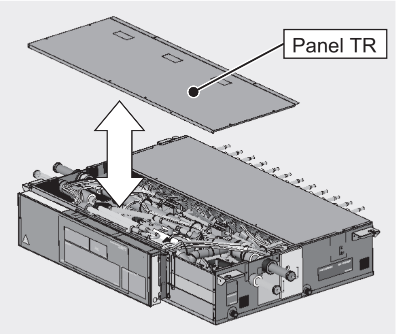
| Procedure |
|---|
| **(1) Replace Panel UR.** |
| Follow step (1) in 1. Drain pan replacement to replace Panel UR. |
| **(2) Reassemble the components.** |
| Reassemble the components in the reverse order. |

## 3. Panel UL replacement

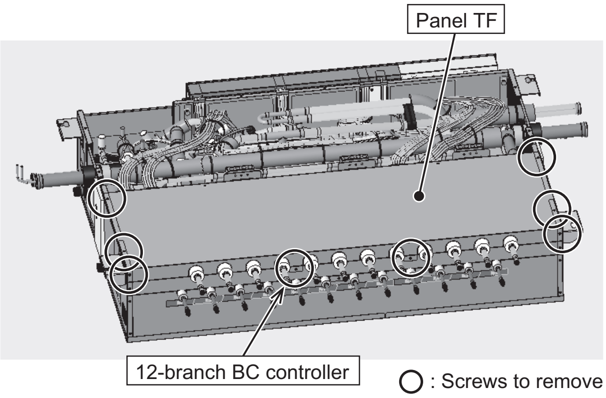
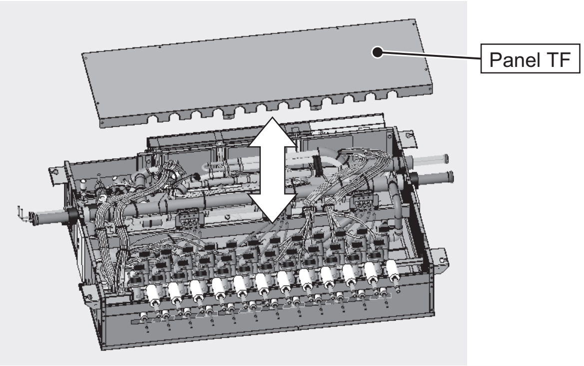
| Procedure |
|---|
| **(1) Replace Panel UL.** |
| Follow step (1) and (2) in 1. Drain pan replacement to replace Panel UL. |
| **(2) Reassemble the components.** |
| Reassemble the components in the reverse order. |

## 4. Panel TR replacement

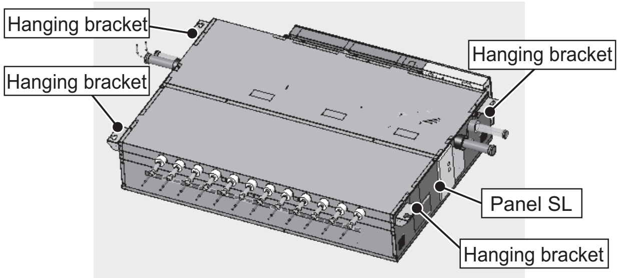
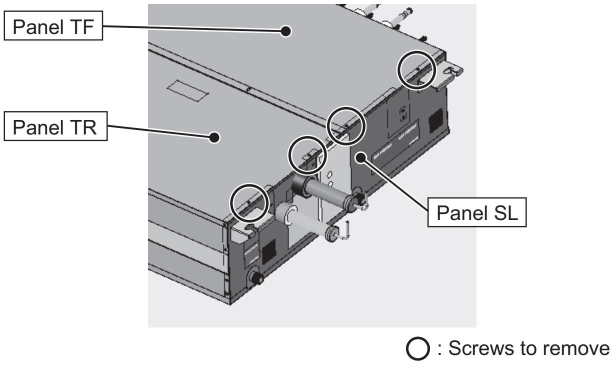
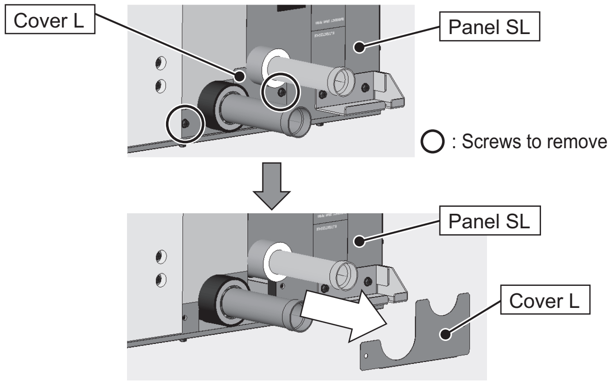
| Procedure | Illustration |
|---|---|
| **(1) Replace Panel TR.** | |
| 1) Remove the screws.<br>[Number of screws to remove]<br>•12-branch BC controller: 11 screws<br>•Other controllers: 10 screws |  |

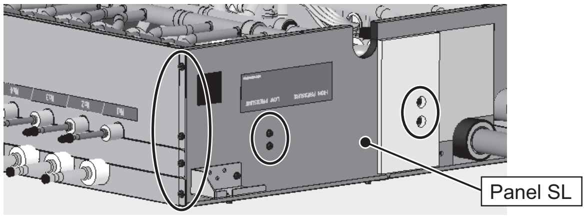
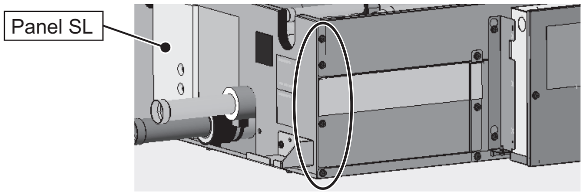
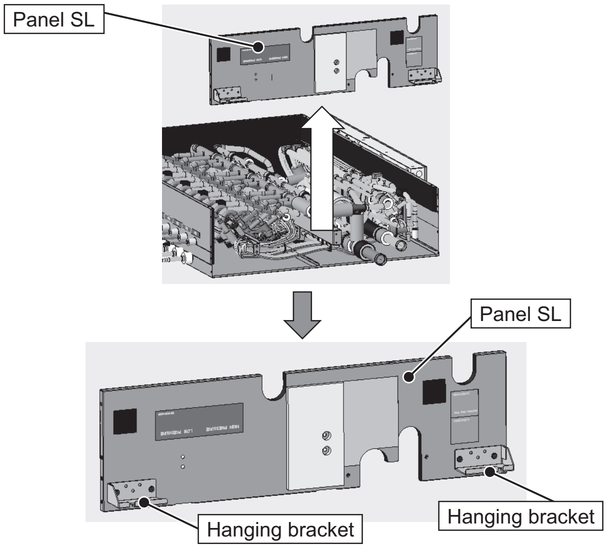
| Procedure | Illustration |
|---|---|
| 2) Replace Panel TR. |  |
| **(2) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

## 5. Panel TF replacement

| Procedure | Illustration |
|---|---|
| **(1) Remove Panel TR.** | |
| Follow the procedure in 4. Panel TR replacement to remove Panel TR. | |
| **(2) Replace Panel TF.** | |
| 1) Remove the screws.<br>[Number of screws to remove]<br>⬩12-branch BC controller: 8 screws<br>⬩Other controllers: 7 screws |  <br>○ : Screws to remove |
| 2) Replace Panel TF. |  |
| **(3) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

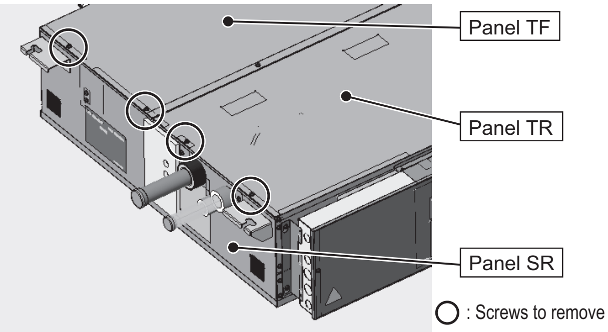
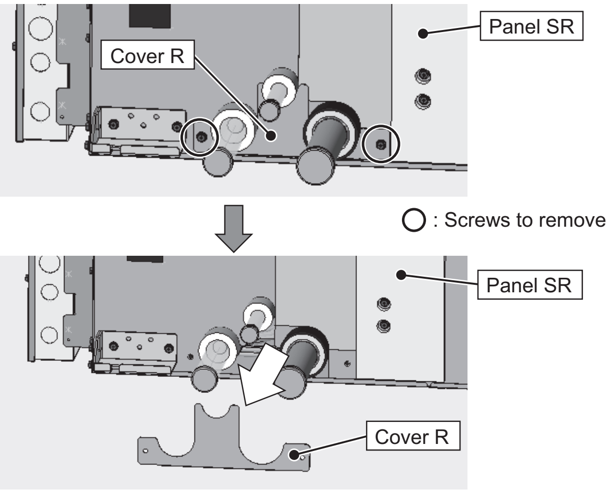
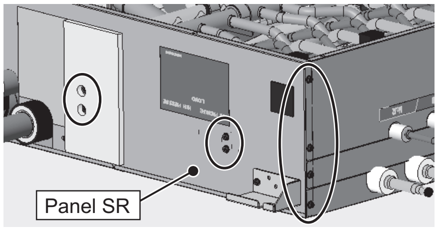
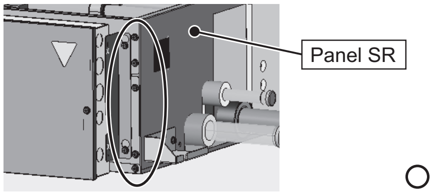
## 6. Panel SL replacement

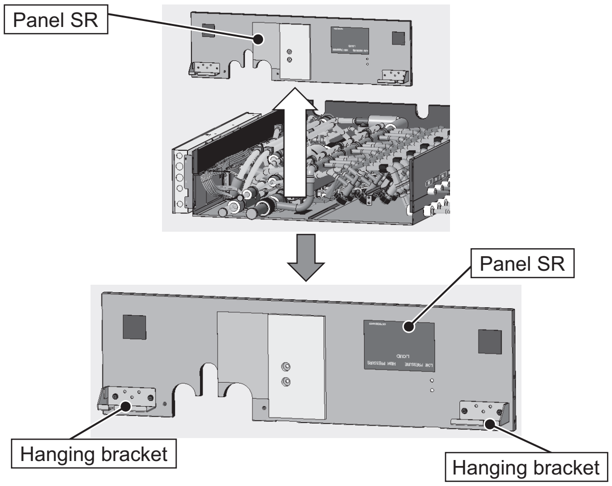
<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Recover the refrigerant.</b></td></tr>
<tr><td colspan="2"><b>(2) Lower the unit from the ceiling.</b></td></tr>
<tr><td>Panel SL is directly connected to the hanging brackets, so the unit must be lowered from the ceiling.</td><td>
</td></tr>
<tr><td colspan="2"><b>(3) Remove the Panel TR and Panel TF screws.</b></td></tr>
<tr><td>Remove the four screws.</td><td>
</td></tr>
<tr><td colspan="2"><b>(4) Turn the unit over.</b></td></tr>
<tr><td colspan="2">Turn the unit over so that Panel UR and Panel UL face up.</td></tr>
<tr><td colspan="2"><b>(5) Remove Panel UR, Panel UL, and the drain pan.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 1. Drain pan replacement to remove Panel UR, Panel UL, and the drain pan.</td></tr>
<tr><td colspan="2"><b>(6) Remove Cover L.</b></td></tr>
<tr><td>Remove the two screws to remove Cover L.</td><td>
</td></tr>
</table>

| Procedure | Illustration |
|---|---|
| **(7) Remove the screws from Panel SL.** | |
| Remove the 12 screws. | Viewed from indoor unit connection piping side<br><br> <br>Viewed from control box side<br><br> <br>○ : Screws to remove |
| **(8) Replace Panel SL.** | |
| Slide Panel SL upward and remove the hanging brackets to replace Panel SL. | <br> |
| **(9) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

## 7. Panel SR replacement

| Procedure | Illustration |
|---|---|
| **(1) Recover the refrigerant.** | |
| **(2) Lower the unit from the ceiling.** | |
| Panel SR is directly connected to the hanging brackets, so the unit must be lowered from the ceiling. | |

| Procedure | Illustration |
|---|---|
| **(3) Remove the Panel TR and Panel TF screws.** | |
| Remove the four screws. |  |
| **(4) Turn the unit over.** | |
| Turn the unit over so that Panel UR and Panel UL face up. | |
| **(5) Remove Panel UR, Panel UL, and the drain pan.** | |
| Follow the procedure in 1. Drain pan replacement to remove Panel UR, Panel UL, and the drain pan. | |
| **(6) Remove Cover R. (Main unit only)** | |
| Remove the two screws to remove Cover R. |  |
| **(7) Remove the screws from Panel SR.** | |
| Remove the 13 screws. | Viewed from indoor unit connection piping side<br> <br>Viewed from control box side<br> |

| Procedure | Illustration |
|---|---|
| **(8) Replace Panel SR.** | |
| Slide Panel SR upward and remove the hanging brackets to replace Panel SR. |  |
| **(9) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

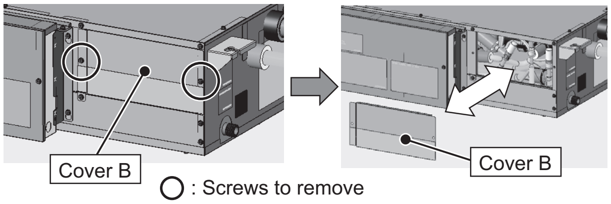
## 8. Cover L replacement

| Procedure |
|---|
| **(1) Replace Cover L.** |
| Follow step (6) in 6. Panel SL replacement to replace Cover L. |
| **(2) Reassemble the components.** |
| Reassemble the components in the reverse order. |

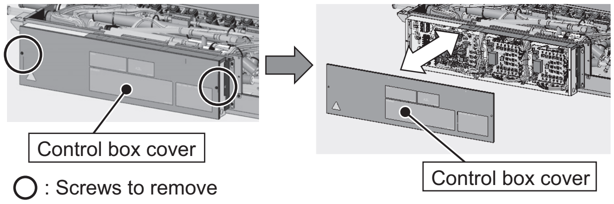
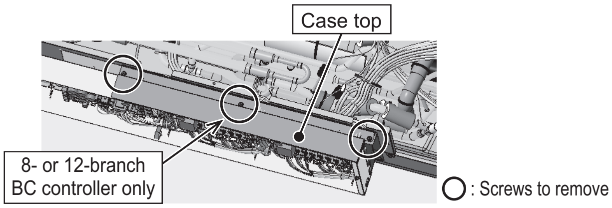
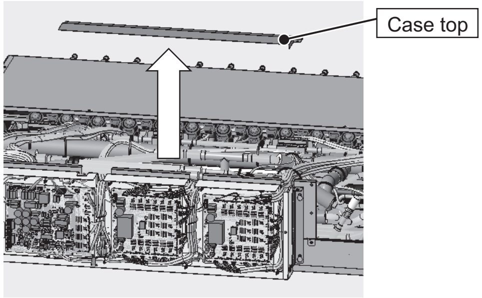
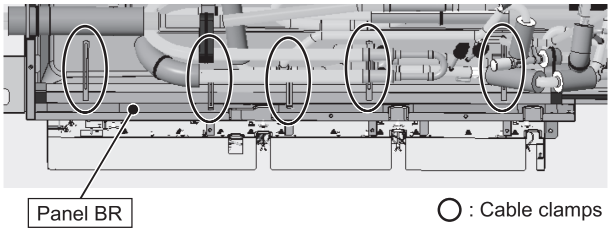
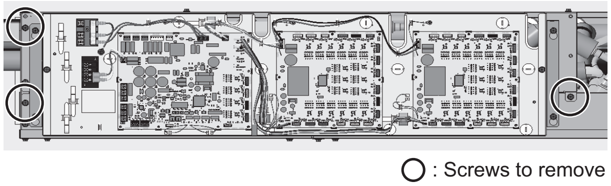
## 9. Cover R replacement (Main unit only)

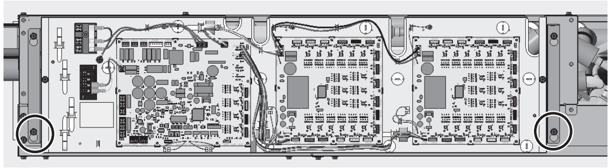
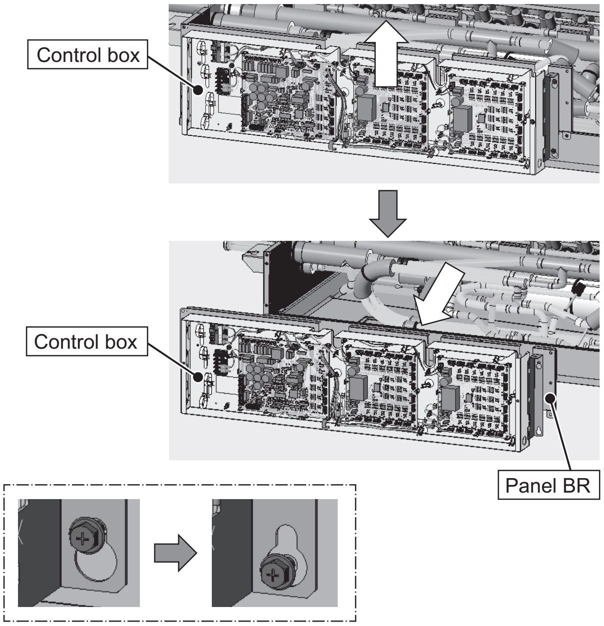
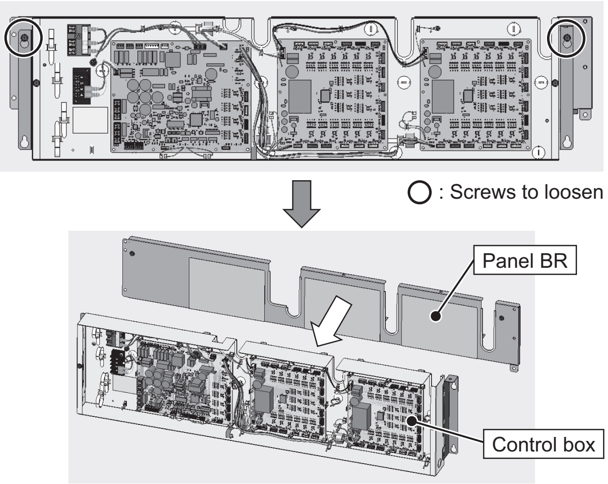
| Procedure |
|---|
| **(1) Replace Cover R.** |
| Follow step (6) in 7. Panel SR replacement to replace Cover R. |
| **(2) Reassemble the components.** |
| Reassemble the components in the reverse order. |

## 10. Cover B replacement (4-, 6-, or 12-branch BC controller only)

| Procedure | Illustration |
|---|---|
| **(1) Replace Cover B.** | |
| Remove the two screws to replace Cover B. |  |
| **(2) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

## 11. Panel BR replacement

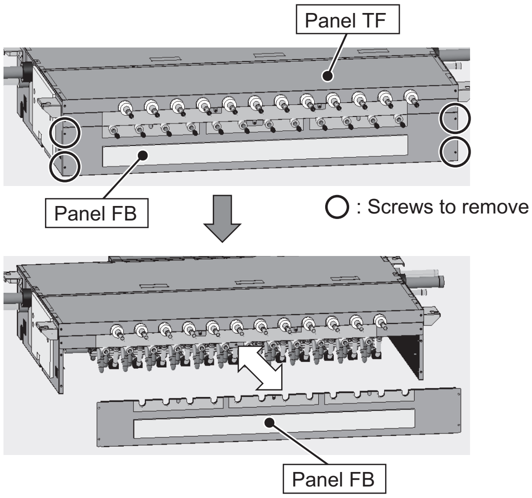
<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove Panel TR.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 4. Panel TR replacement to remove Panel TR.</td></tr>
<tr><td colspan="2"><b>(2) Remove Cover B. (4-, 6-, or 12-branch BC connectors only)</b></td></tr>
<tr><td colspan="2">Follow the procedure in 10. Cover B replacement to remove Cover B.</td></tr>
<tr><td colspan="2"><b>(3) Remove the control box cover.</b></td></tr>
<tr><td>Remove the two screws to remove the control box cover.</td><td>
</td></tr>
<tr><td colspan="2"><b>(4) Remove the case top.</b></td></tr>
<tr><td>1) Remove the screws.<br>[Number of screws to remove]<br>♦4- or 6-branch BC controller: 2 screws<br>♦8- or 12-branch BC controller: 3 screws</td><td>
</td></tr>
<tr><td>2) Remove the case top.</td><td>
</td></tr>
<tr><td colspan="2"><b>(5) Remove the wiring from the cable clamps in the Panel BR unit.</b></td></tr>
<tr><td>Remove all wiring secured by cable clamps.</td><td>
</td></tr>
<tr><td colspan="2"><b>(6) Remove Panel BR and the control box.</b></td></tr>
<tr><td>1) Remove the three screws other than the keyhole screws.</td><td>
</td></tr>
</table>

| Procedure | Illustration |
|---|---|
| 2) Loosen the two keyhole screws. | <br>○ : Screws to loosen |
| 3) Lift the control box up 10 mm and remove it together with Panel BR. |  <br>Shape of keyhole after lifting 10 mm |
| 4) Loosen the two keyhole screws, and then remove and replace Panel BR. |  <br>○ : Screws to loosen |

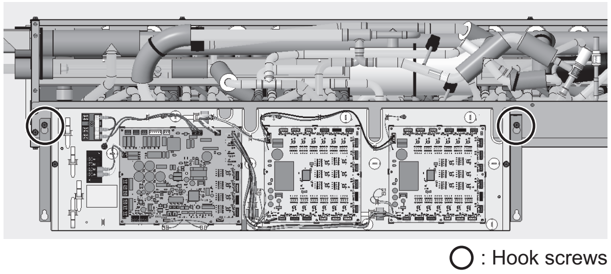
### (7) Reassemble the components.

Reassemble the components in the reverse order.

## 12. Panel FB replacement

| Procedure | Illustration |
|---|---|
| **(1) Remove Panel UL, Panel UR, and the drain pan.** | |
| Follow the procedure in 1. Drain pan replacement to remove Panel UL, Panel UR, and the drain pan. | |
| **(2) Replace Panel FB.** | |
| Remove the screws to replace Panel FB. |  |

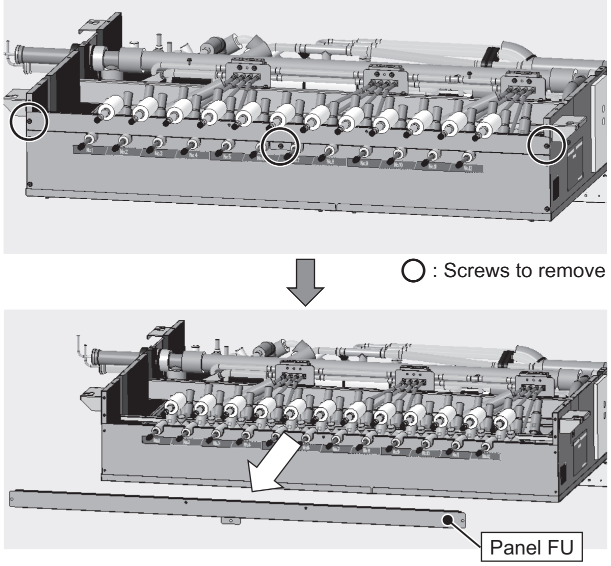
## 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement

| Procedure | Illustration |
|---|---|
| **(1) Remove Panel TR, Cover B, and Panel BR.** | |
| Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR. | |
| **(2) Temporarily place the control box.** | |
| Temporarily place the control box by hooking it on the screws loosened in 11. Panel BR replacement. |  |
| **(3) Remove Panel TF.** | |
| Follow the procedure in 5. Panel TF replacement to remove Panel TF. | |

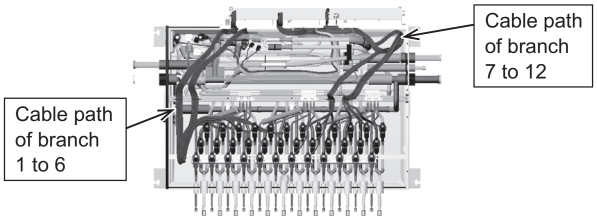
Procedure | Illustration

## (4) Remove Panel FU.

Remove the three screws to remove Panel FU.

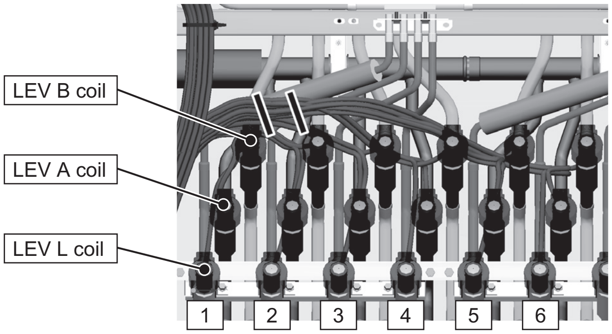


**LEV A/B/L coil cable path**



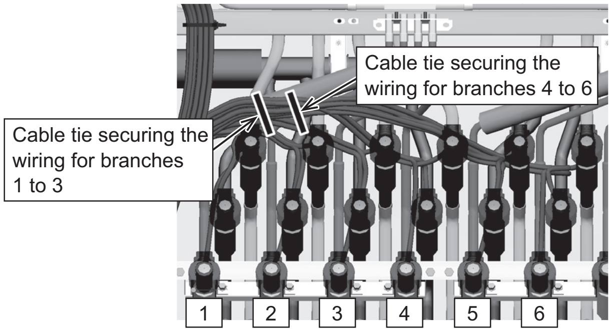
## (5) Remove the LEV A/B/L coils to be replaced.

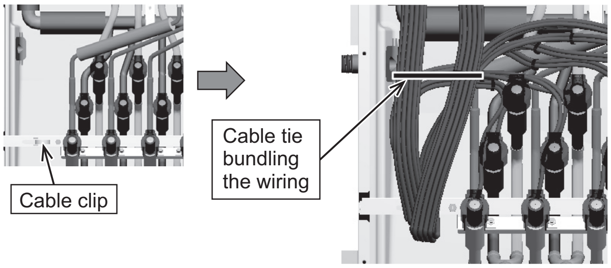
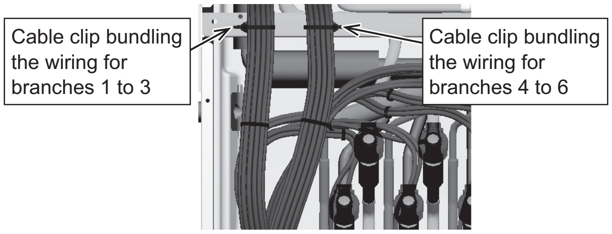
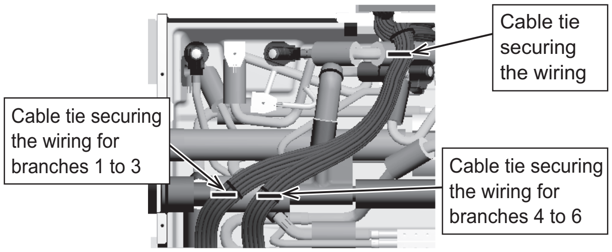
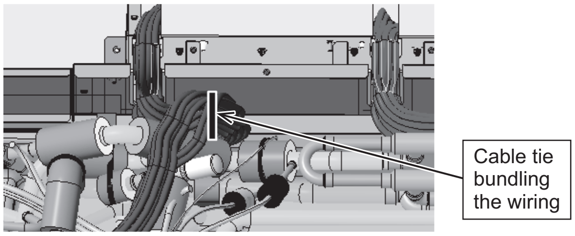
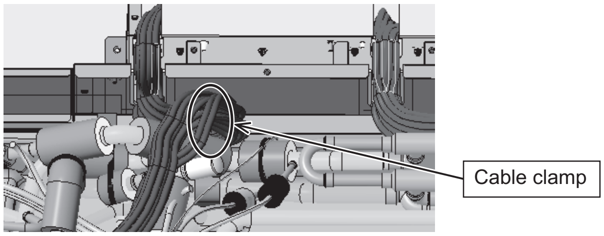
Remove the LEV A/B/L coils collectively.



## (6) Remove the cable ties and clips securing the wiring.

1) Cut and remove the cable ties securing the wiring.

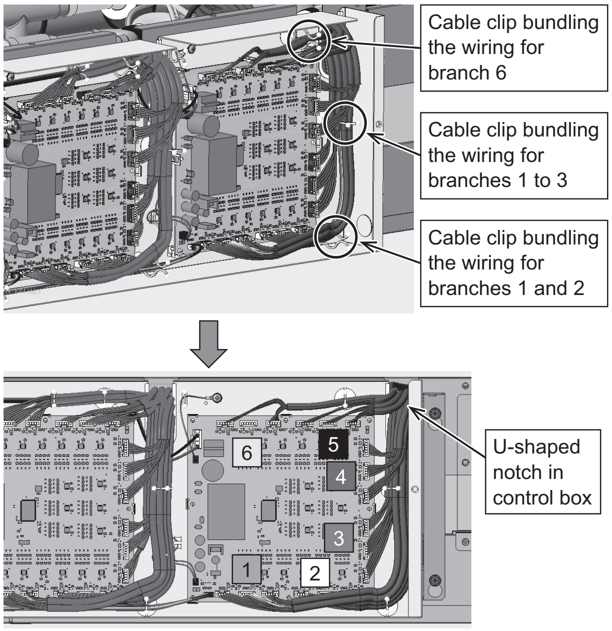


| Procedure | Illustration |
|---|---|
| 2) Remove the wiring from the cable clip and cut the cable tie bundling the wiring. |  |
| 3) Cut the cable clips and remove the wiring.<br>Remove the cut cable clips from the sheet metal. (Cable clips are supplied.) |  |
| 4) Cut and remove the cable ties securing the wiring. |  |
| 5) Cut and remove the cable tie bundling the wiring. |  |
| 6) Remove the wiring from the cable clamp. |  |

| Procedure | Illustration |
|---|---|

## (7) Replace the LEV A/B/L coils.

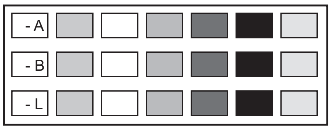
1) Remove the appropriate connectors to remove the LEV A/B/L coils.



Connecter locations

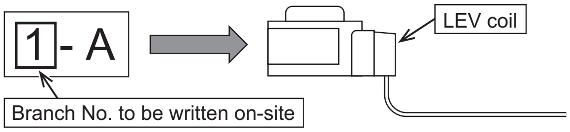
2) Write the branch number on the label and attach it to the coil. Then, attach the colored label corresponding to the branch number to the wire near the connector.

Supplied label sheet

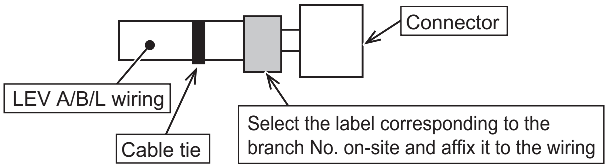


| Branch No. | | Connector color |
|---|---|---|
| 1 | 7 | Green |
| 2 | 8 | White |
| 3 | 9 | Blue |
| 4 | 10 | Red |
| 5 | 11 | Black |
| 6 | 12 | Yellow |

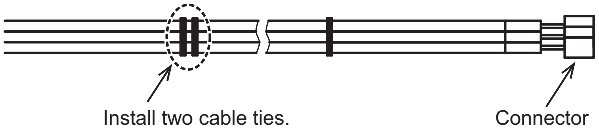
Affix the branch No. label to the coil



Attach the colored label to the wiring



3) Install two cable ties on the wiring as positioning markers.



| Branch No. | Dimension A [mm (in.)] | Branch No. | Dimension A [mm (in.)] |
|---|---|---|---|
| 1 | 550 (21-11/16) | 7 | 500 (19-11/16) |
| 2 | 500 (19-11/16) | 8 | 470 (18-9/16) |
| 3 | 400 (15-3/4) | 9 | 370 (14-5/8) |
| 4 | 350 (13-13/16) | 10 | 320 (12-5/8) |
| 5 | 350 (13-13/16) | 11 | 320 (12-5/8) |
| 6 | 400 (15-3/4) | 12 | 320 (12-5/8) |

## (8) Reassemble the components.

Reassemble the components in the reverse order.

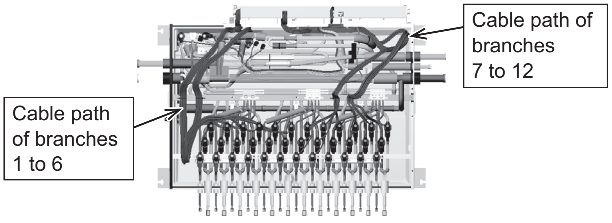
## 13-1-2. Main 12-branch BC controller LEV A/B/L coil (branches 7 to 12) replacement

| Procedure | Illustration |
|---|---|

### (1) Remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and then temporarily place the control box.

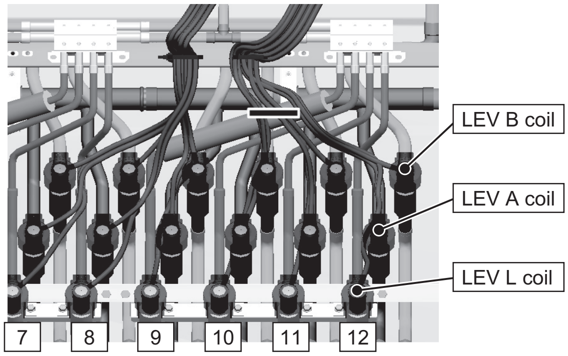
Follow steps (1) to (4) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and then temporarily place the control box.

**LEV A/B/L coil cable path**



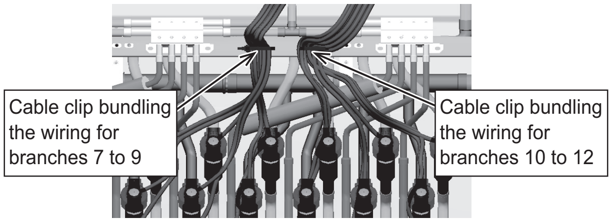
### (2) Remove the LEV A/B/L coils to be replaced.

Remove the LEV A/B/L coils to be replaced collectively.

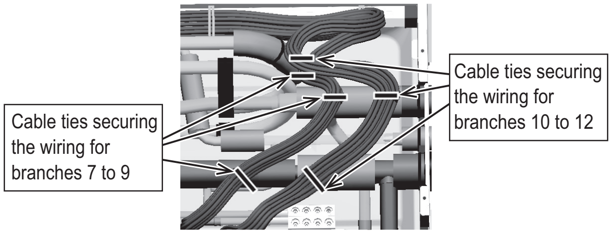


### (3) Remove the cable ties and clips securing the wiring.

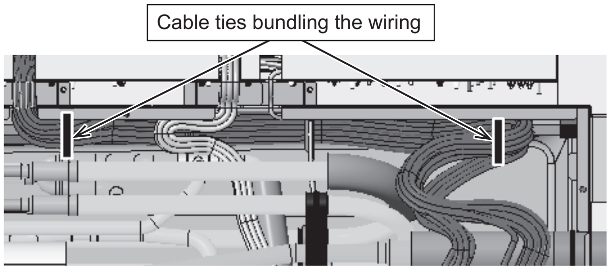
1) Cut the cable clips and remove the wiring.
   Remove the cut cable clips from the sheet metal. (Cable clips are supplied.)

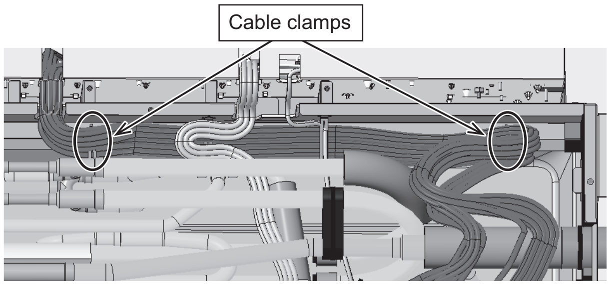
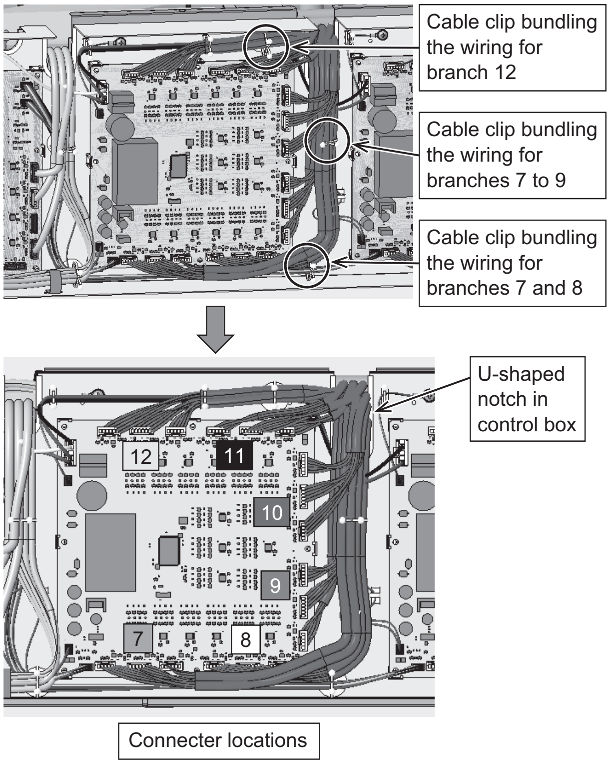


2) Cut and remove the cable ties securing the wiring.



3) Cut and remove the cable ties bundling the wiring.



<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td>4) Remove the wiring from the cable clamps.</td><td> </td></tr>
<tr><td colspan="2"><b>(4) Replace the LEV A/B/L coils.</b></td></tr>
<tr><td>1) Remove the appropriate connectors to replace the LEV A/B/L coils.</td><td> </td></tr>
<tr><td colspan="2">2) Follow the procedure in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to attach the supplied labels to the coils and replace the coils.</td></tr>
<tr><td colspan="2"><b>(5) Reassemble the components.</b></td></tr>
<tr><td colspan="2">Reassemble the components in the reverse order.</td></tr>
</table>

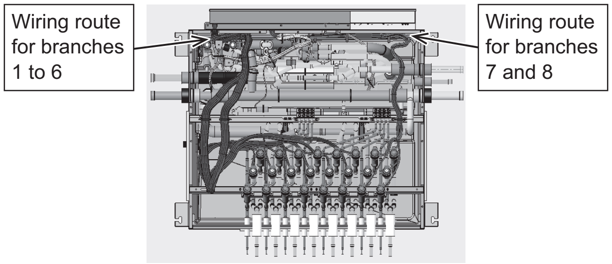
## 13-2-1. Main 4 to 8-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement

Procedure | Illustration

### (1) Remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and place the control box temporarily.

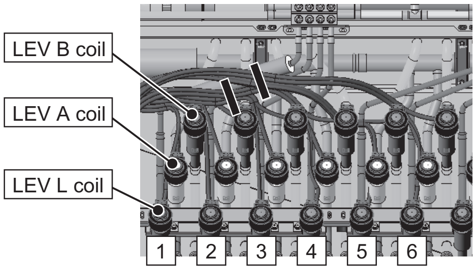
Follow steps (1) to (4) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and then place the control box temporarily.

**Wiring route for LEV A, B, L coils**



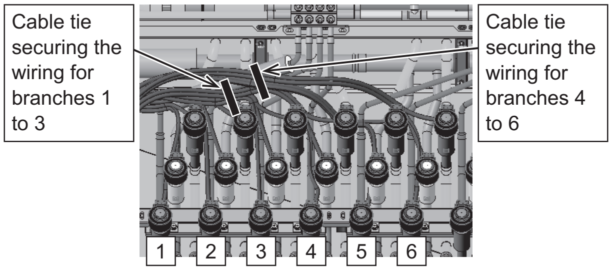
### (2) Remove the LEV A, B, L coils to be replaced.

Remove the LEV A, B, L coils to be replaced all together.

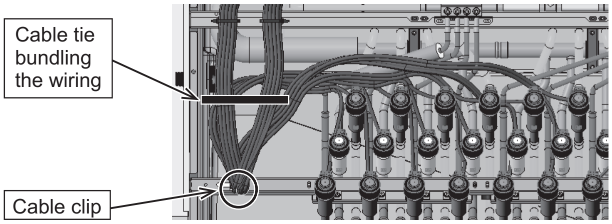


### (3) Remove the cable ties and clips securing the wiring.

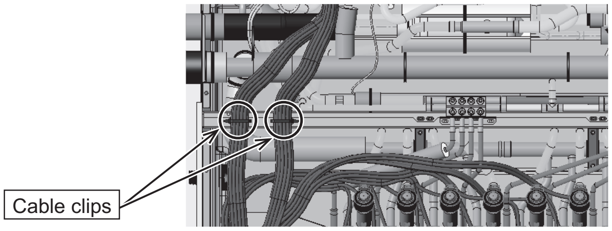
1) Cut and remove the cable ties securing the wiring.



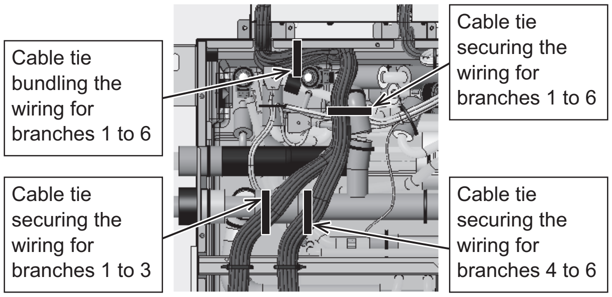
2) Cut the cable tie securing the wiring and remove it from the cable clip.



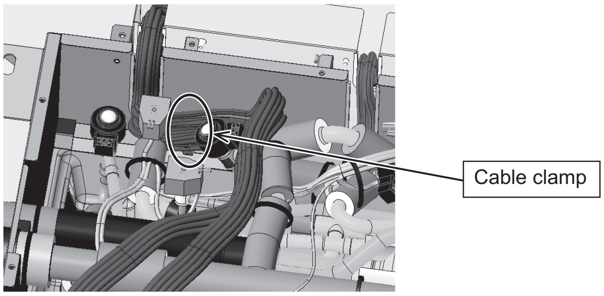
3) Cut the cable clips and remove the wiring.
The wiring ASSY and the cable clips are bundled as a service part, so remove the cut cable clips from the sheet metal.



<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td>4) Cut and remove the cable ties securing the wiring.</td><td>



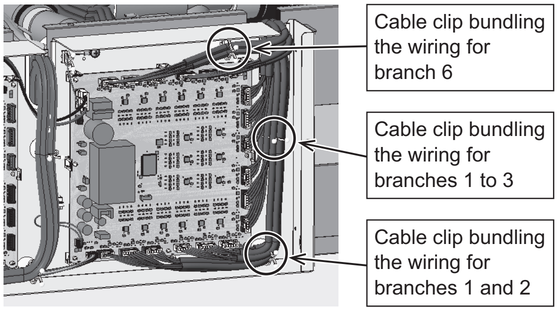
</td></tr>
<tr><td>5) Remove the wiring from the cable clamp.</td><td>

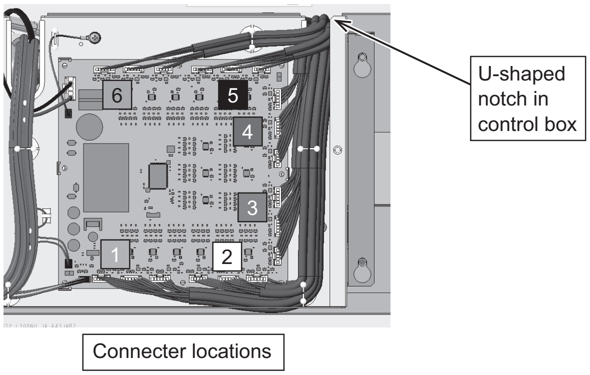


</td></tr>
<tr><td colspan="2">

### (4) Replace the LEV A, B, L coils.

</td></tr>
<tr><td>1) Remove the wiring from the cable clips and replace the LEV A, B, L coils.</td><td>



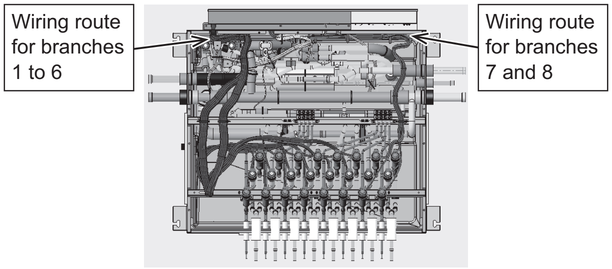
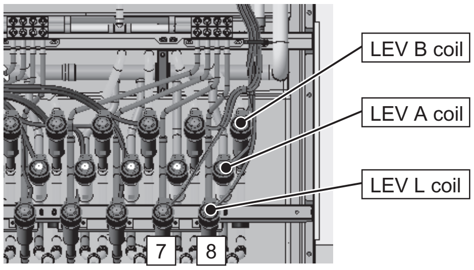
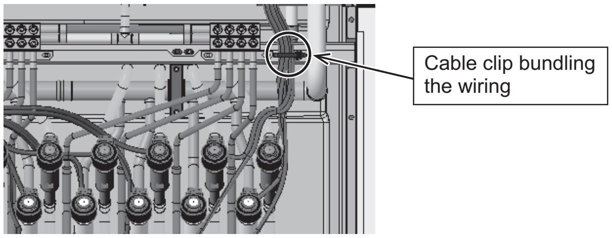
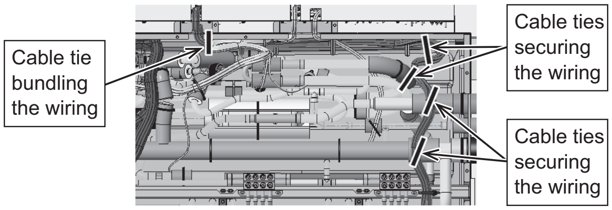
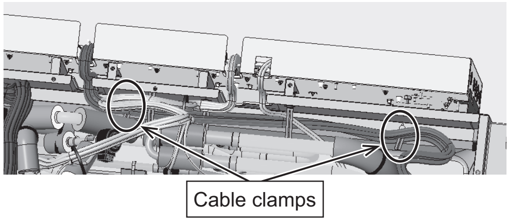


</td></tr>
<tr><td colspan="2">2) Follow the procedure in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to attach the supplied labels to the coils and replace the coils.</td></tr>
<tr><td colspan="2">

### (5) Reassemble the components.

</td></tr>
<tr><td colspan="2">Reassemble the components in the reverse order.</td></tr>
</table>

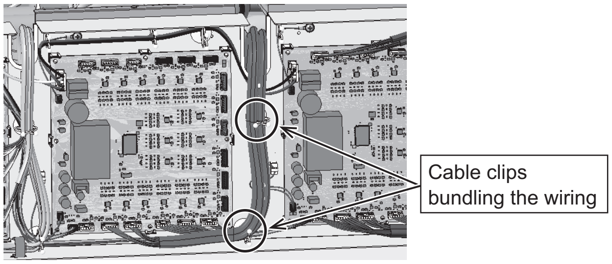
## 13-2-2. Main 8-branch BC controller LEV A/B/L coil (branches 7 and 8) replacement

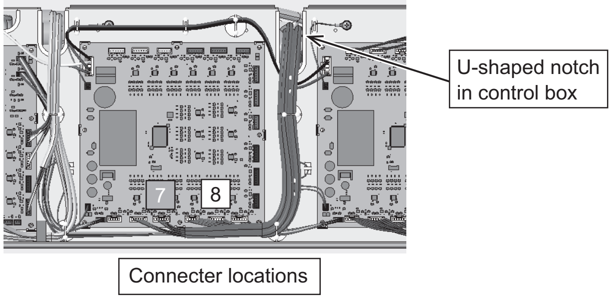
| Procedure | Illustration |
|---|---|
| **(1) Remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and place the control box temporarily.** | |
| Follow steps (1) to (4) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and then place the control box temporarily. | |
| **Wiring route for LEV A, B, L coils** | |
| |  |
| **(2) Remove the LEV A, B, L coils to be replaced.** | |
| Remove the LEV A, B, L coils to be replaced all together. |  |
| **(3) Remove the cable ties and clip securing the wiring.** | |
| 1) Cut the cable clip and remove the wiring.<br>The wiring ASSY and the cable clips are bundled as a service part, so remove the cut cable clip from the sheet metal. |  |
| 2) Cut and remove the cable ties securing or bundling the wiring. |  |
| 3) Remove the wiring from the cable clamps. |  |

Procedure | Illustration

### (4) Replace the LEV A, B, L coils.

1) Remove the wiring from the cable clips and replace the LEV A, B, L coils.





2) Follow the procedure in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to attach the supplied labels to the coils and replace the coils.

### (5) Reassemble the components.

Reassemble the components in the reverse order.

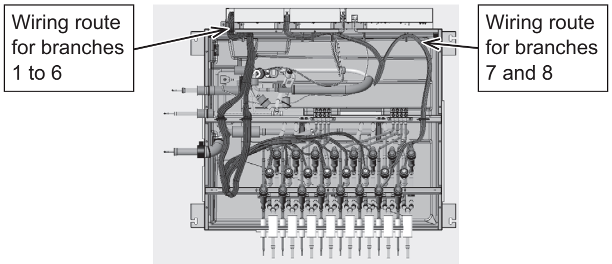
## 13-3-1. Sub 4 and 8-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement

Procedure | Illustration

### (1) Remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and place the control box temporarily.

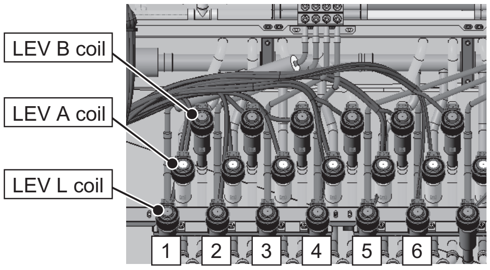
Follow steps (1) to (4) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and then place the control box temporarily.

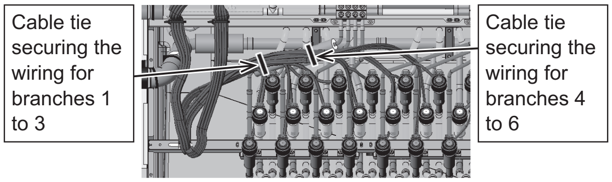
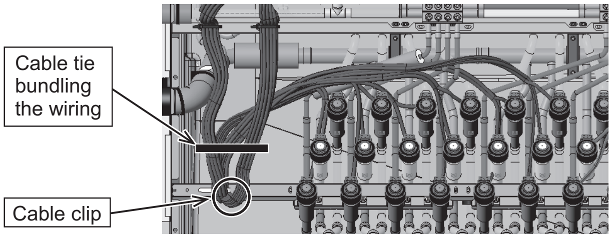
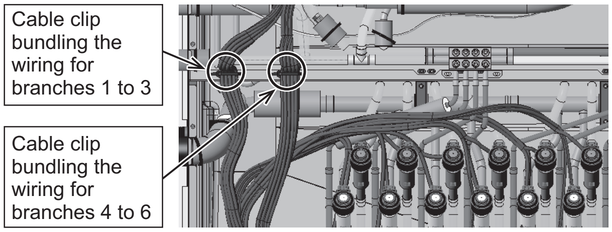
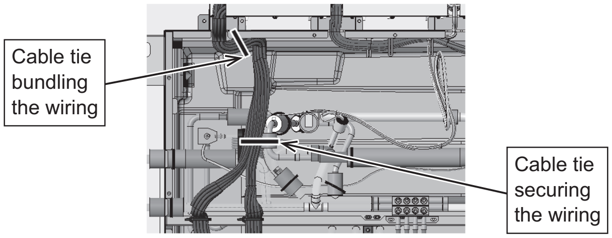
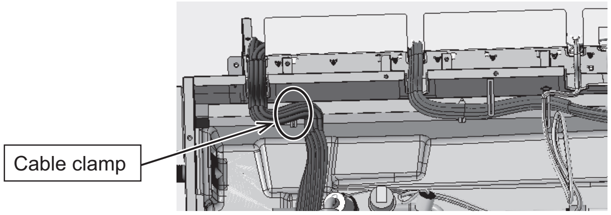
**Wiring route for LEV A, B, L coils**



### (2) Remove the LEV A, B, L coils to be replaced.

Remove the LEV A, B, L coils to be replaced all together.

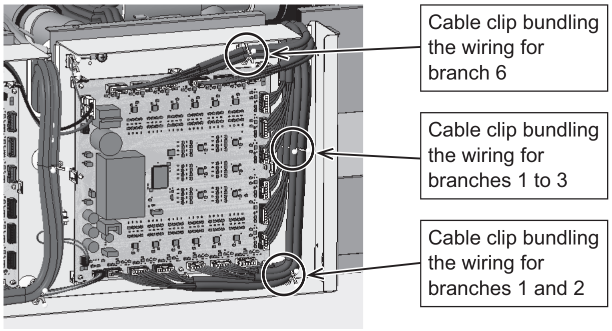


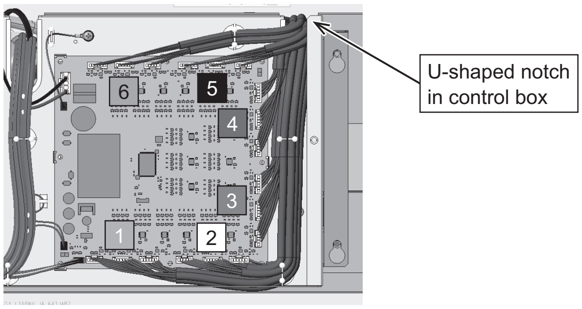
<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(3) Remove the cable ties and clip securing the wiring.</b></td></tr>
<tr><td>1) Cut and remove the cable ties securing the wiring.</td><td>
</td></tr>
<tr><td>2) Cut the cable tie bundling the wiring and remove it from the cable clip.</td><td>
</td></tr>
<tr><td>3) Cut the cable clips and remove the wiring.<br>The wiring ASSY and the cable clips are bundled as a service part, so remove the cut cable clips from the sheet metal.</td><td>
</td></tr>
<tr><td>4) Cut and remove the cable ties securing or bundling the wiring.</td><td>
</td></tr>
<tr><td>5) Remove the wiring from the cable clamp.</td><td>
</td></tr>
</table>

| Procedure | Illustration |
|---|---|

### (4) Replace the LEV A, B, L coils.

1) Remove the wiring from the cable clips and replace the LEV A, B, L coils.





Connecter locations

2) Follow the procedure in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to attach the supplied labels to the coils and replace the coils.

### (5) Reassemble the components.

Reassemble the components in the reverse order.

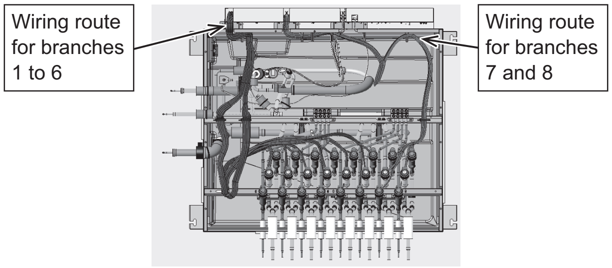
## 13-3-2. Sub 8-branch BC controller LEV A/B/L coil (branches 7 and 8) replacement

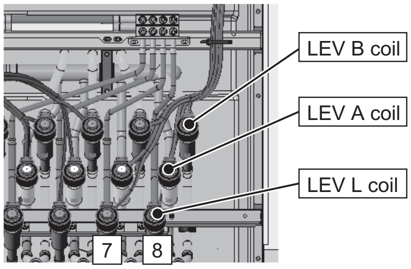
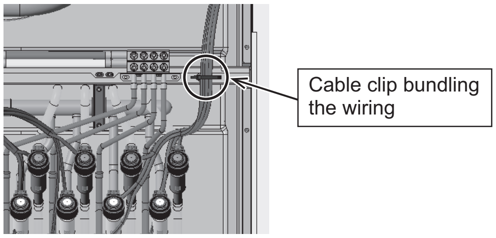
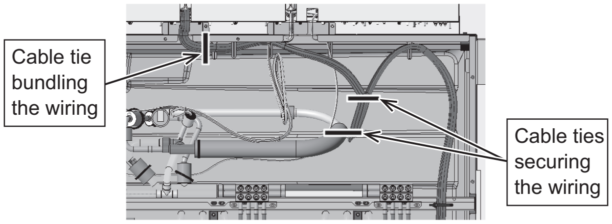
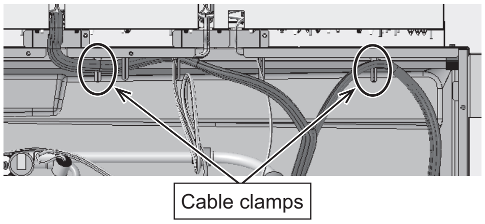
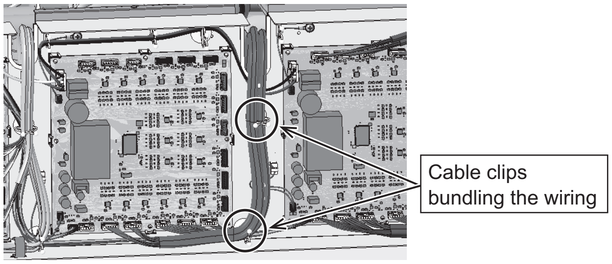
| Procedure | Illustration |
|---|---|

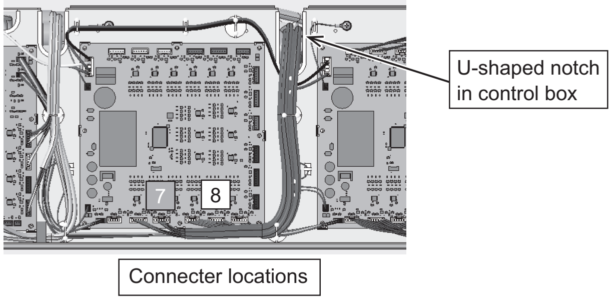
### (1) Remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and place the control box temporarily.

Follow steps (1) to (4) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to remove Panel TR, Cover B, Panel BR, Panel TF, and Panel FU, and then place the control box temporarily.

**Wiring route for LEV A, B, L coils**

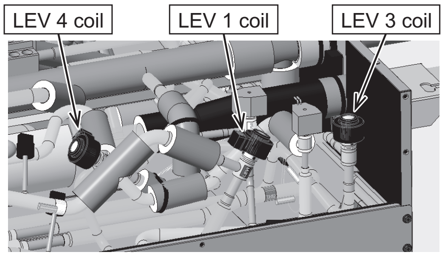
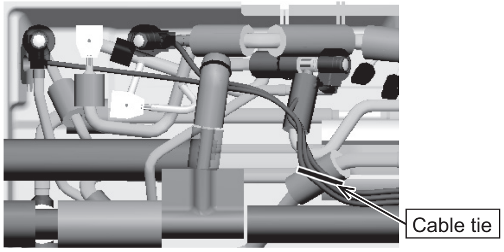
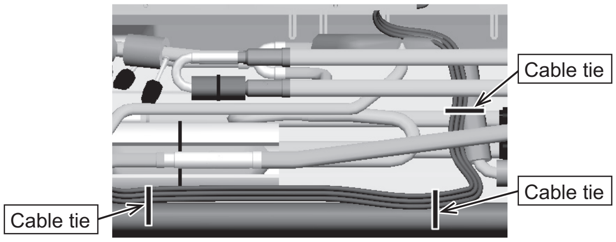
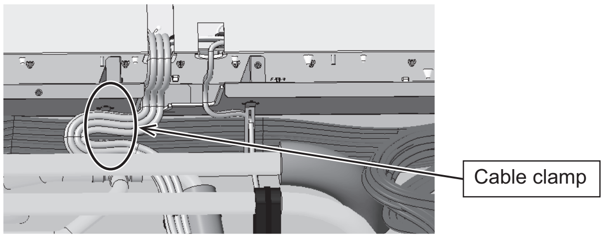


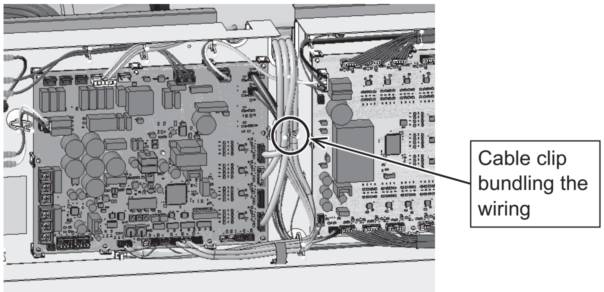
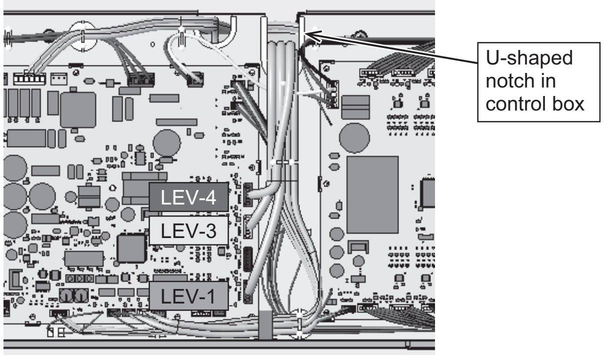
<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(2) Remove the LEV A, B, L coils to be replaced.</b></td></tr>
<tr><td>Remove the LEV A, B, L coils to be replaced all together.</td><td>
</td></tr>
<tr><td colspan="2"><b>(3) Remove the cable ties and clip securing the wiring.</b></td></tr>
<tr><td>1) Cut the cable clip and remove the wiring.<br>The wiring ASSY and the cable clips are bundled as a service part, so remove the cut cable clip from the sheet metal.</td><td>
</td></tr>
<tr><td>2) Cut and remove the cable tie securing or bundling the wiring.</td><td>
</td></tr>
<tr><td>3) Remove the wiring from the cable clamps.</td><td>
</td></tr>
<tr><td colspan="2"><b>(4) Replace the LEV A, B, L coils.</b></td></tr>
<tr><td>1) Remove the wiring from the cable clips and replace the LEV A, B, L coils.</td><td>


</td></tr>
</table>

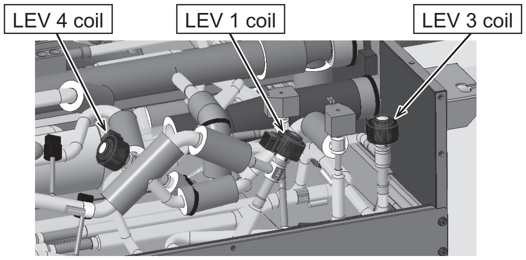
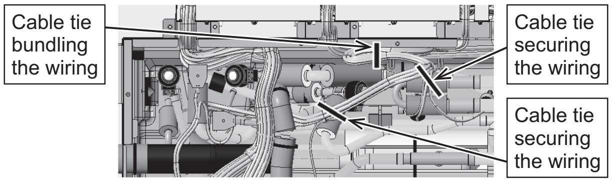
| Procedure | Illustration |
|---|---|
| 2) Follow the procedure in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to attach the supplied labels to the coils and replace the coils. | |
| **(5) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

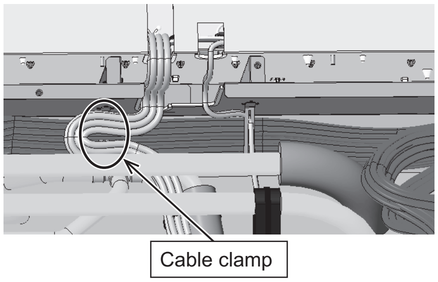
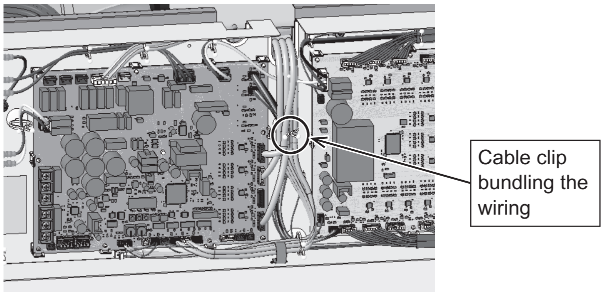
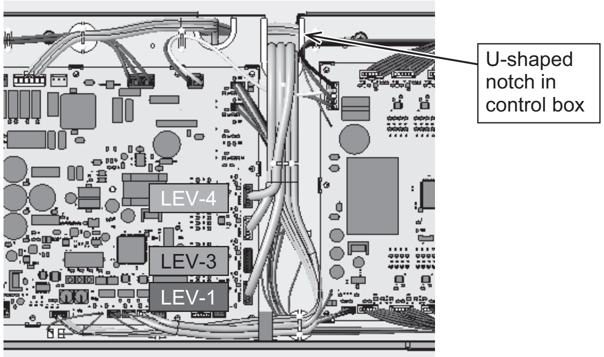
## 14-1. Main 12-branch BC controller LEV 1/3/4 coil replacement

| Procedure | Illustration |
|---|---|
| **(1) Remove Panel TR, Cover B, and Panel BR.** | |
| Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR. | |
| **(2) Temporarily place the control box.** | |
| Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box. | |
| **(3) Remove the LEV 1/3/4 coils.** | |
| Remove the LEV coils to be replaced. |  |
| **(4) Remove the cable ties and cable clamp securing the wiring.** | |
| 1) Cut and remove the cable ties securing the wiring. |  |
| 2) Cut and remove the cable ties securing the wiring. |  |
| 3) Remove the wiring from the cable clamp. |  |

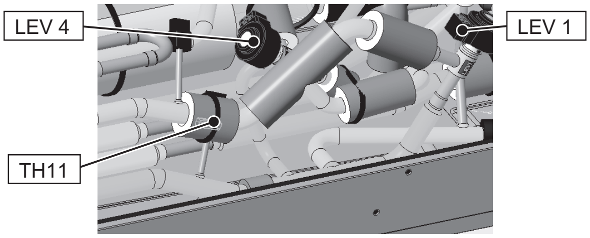
| Procedure | Illustration |
|---|---|
| **(5) Replace the LEV 1/3/4 coils.** | |
| Remove the appropriate connectors to replace the LEV coils. |  <br>  <br> Connecter locations |
| **(6) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

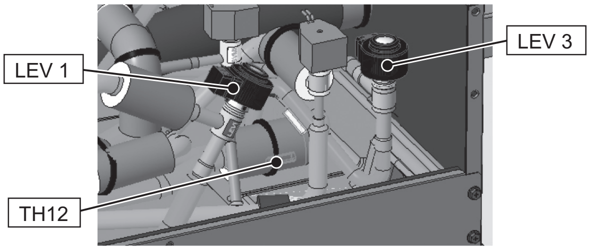
## 14-2. Main 4 to 8-branch BC controller LEV 1/3/4 coil replacement

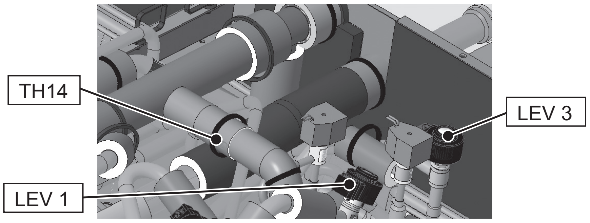
| Procedure | Illustration |
|---|---|
| **(1) Remove Panel TR, Cover B, and Panel BR.** | |
| Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR. | |
| **(2) Place the control box temporarily.** | |
| Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box. | |
| **(3) Remove the LEV 1, 3, 4 coils.** | |
| Remove the LEV coils to be replaced. |  |
| **(4) Remove the cable ties and cable clamp securing the wiring.** | |
| 1) Cut and remove the cable ties securing or bundling the wiring. |  |

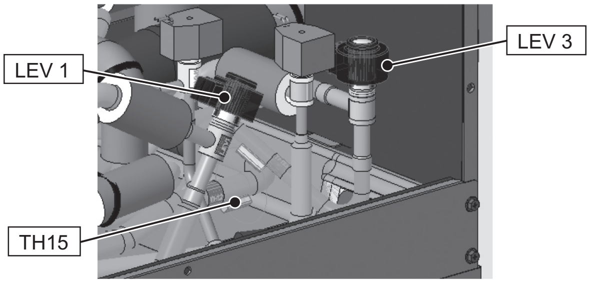
<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td>2) Remove the wiring from the cable clamp.</td><td> </td></tr>
<tr><td colspan="2"><b>(5) Replace the LEV 1/3/4 coils.</b></td></tr>
<tr><td>1) Remove the wiring from the cable clip and replace the LEV coils.</td><td>  Connecter locations</td></tr>
<tr><td colspan="2"><b>(6) Reassemble the components.</b></td></tr>
<tr><td colspan="2">Reassemble the components in the reverse order.</td></tr>
</table>

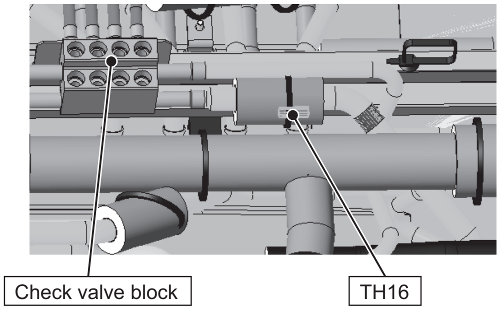
## 15-1. Main 12-branch BC controller thermistor replacement

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove Panel TR, Cover B, and Panel BR.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR.</td></tr>
<tr><td colspan="2"><b>(2) Place the control box temporarily.</b></td></tr>
<tr><td colspan="2">Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box.</td></tr>
<tr><td colspan="2"><b>Thermistor location</b></td></tr>
<tr><td></td><td>


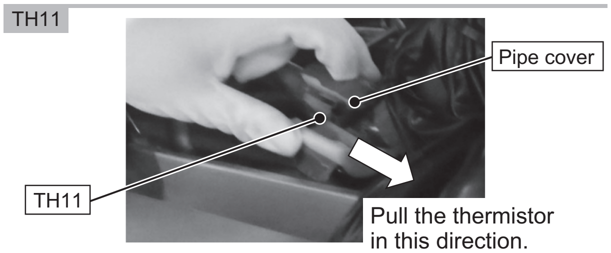
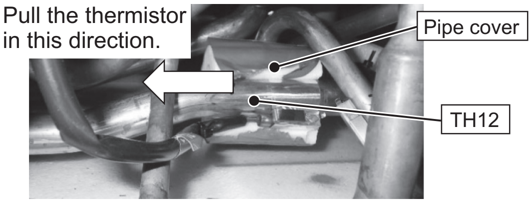
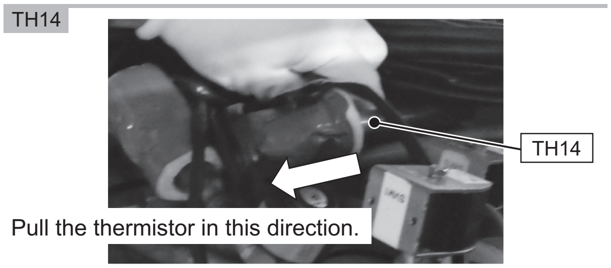
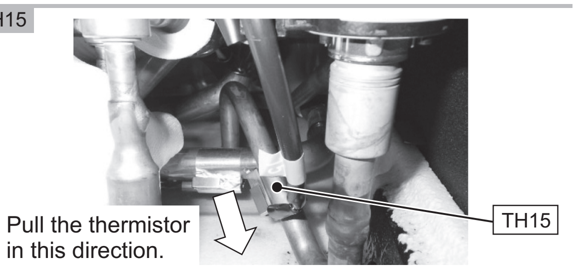
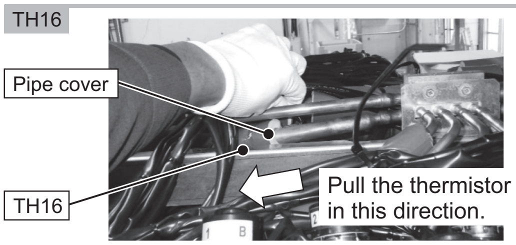
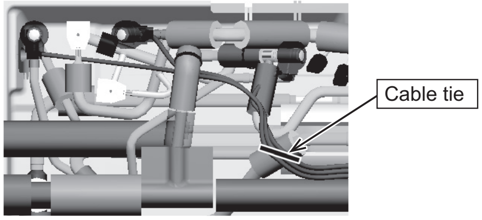


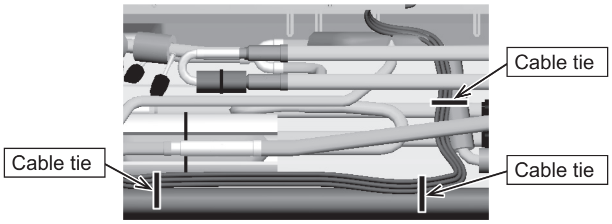
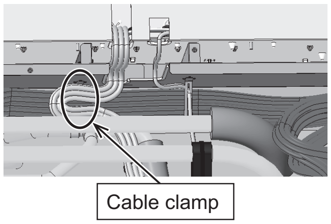




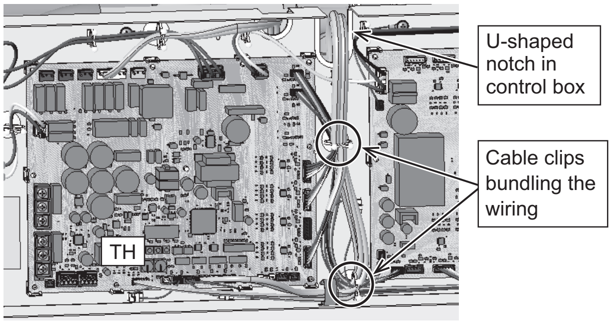


</td></tr>
</table>

| Procedure | Illustration |
|---|---|
| **(3) Remove the thermistor.** | |
| Cut the pipe cover and the attached cable tie, and then remove the thermistor. | TH11<br><br> <br>Pull the thermistor in this direction.<br>TH12<br><br>Pull the thermistor in this direction.<br> <br>TH14<br><br> <br>Pull the thermistor in this direction.<br>TH15<br><br>Pull the thermistor in this direction.<br> <br>TH16<br><br> <br>Pull the thermistor in this direction. |
| **(4) Remove the cable ties and cable clamp securing the wiring.** | |
| 1) Cut and remove the cable tie securing the wiring. | <br> |

| Procedure | Illustration |
|---|---|
| 2) Cut and remove the cable ties securing the wiring. |  |
| 3) Remove the wiring from the cable clamp. |  |

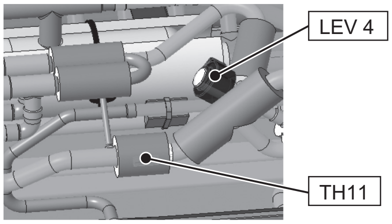
### (5) Replace the thermistor.

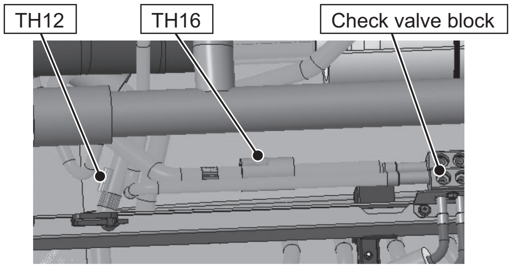
| | |
|---|---|
| Disconnect the wiring inside the control box and connect the new thermistor. |  |

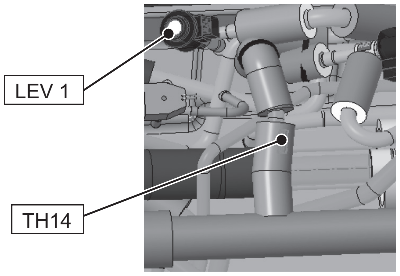
### (6) Reassemble the components.

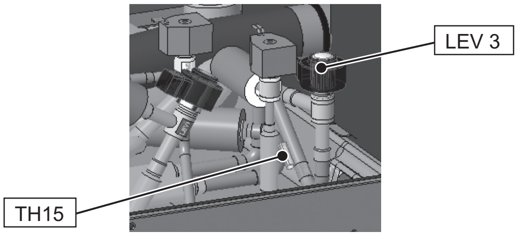
Reassemble the components in the reverse order.

## 15-2. Main 4 to 8-branch BC controller thermistor replacement

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove Panel TR, Cover B, and Panel BR.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR.</td></tr>
<tr><td colspan="2"><b>(2) Place the control box temporarily.</b></td></tr>
<tr><td colspan="2">Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box.</td></tr>
<tr><td colspan="2"><b>Thermistor location</b></td></tr>
<tr><td></td><td>


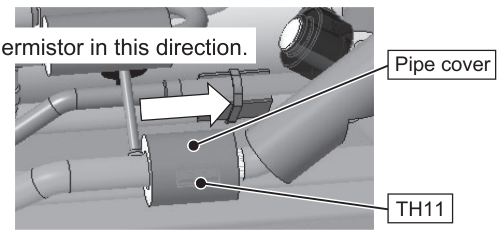




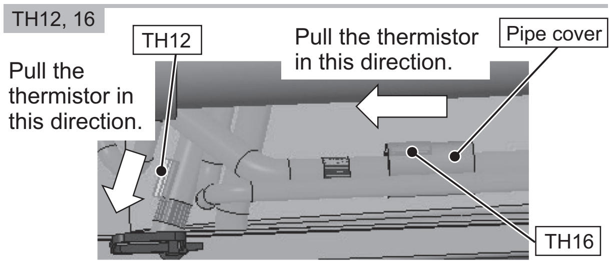


</td></tr>
</table>

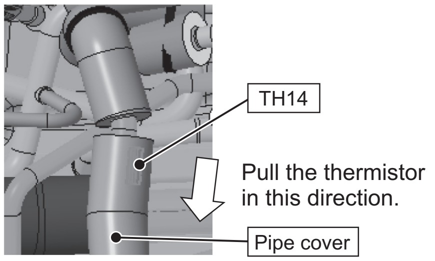
<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(3) Remove the thermistor.</b></td></tr>
<tr><td>Cut the pipe cover and the attached cable tie, and then remove the thermistor.</td><td>
TH11



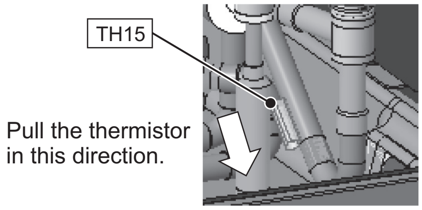
TH12, 16

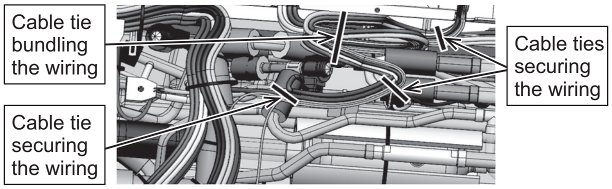


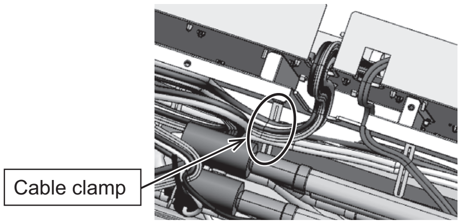
TH14



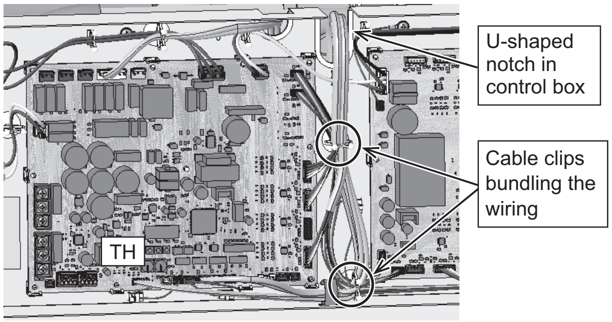
TH15



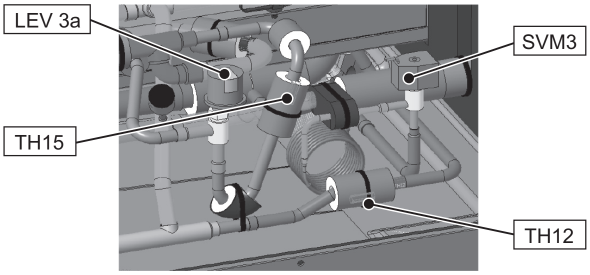
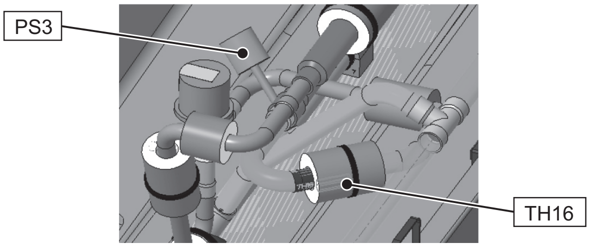
</td></tr>
<tr><td colspan="2"><b>(4) Remove the cable ties and cable clamp securing the wiring.</b></td></tr>
<tr><td>1) Cut and remove the cable ties securing or bundling the wiring.</td><td>


</td></tr>
<tr><td>2) Remove the wiring from the cable clamp.</td><td>


</td></tr>
</table>

| Procedure | Illustration |
|---|---|
| **(5) Replace the thermistor.** | |
| Disconnect the wiring inside the control box and connect the new thermistor. |  |
| **(6) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

### 15-3. Sub BC controller thermistor replacement

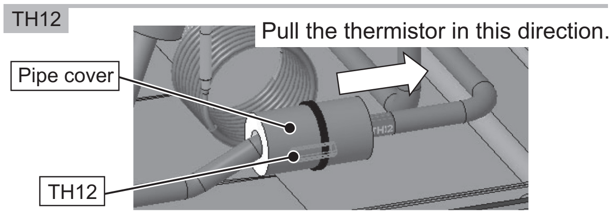
| Procedure | Illustration |
|---|---|
| **(1) Remove Panel TR, Cover B, and Panel BR.** | |
| Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR. | |
| **(2) Place the control box temporarily.** | |
| Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box. | |
| **Thermistor location** | |
| |  <br> |

Procedure | Illustration

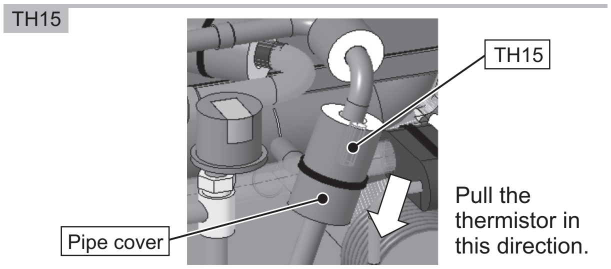
## (3) Remove the thermistor.

Cut the pipe cover and the attached cable tie, and then remove the thermistor.

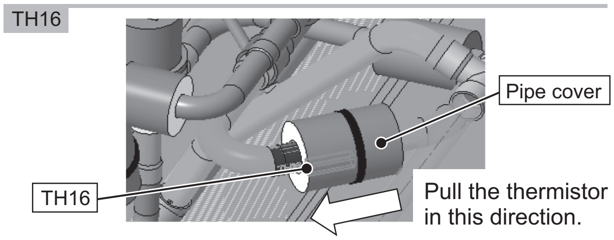
TH12



TH15

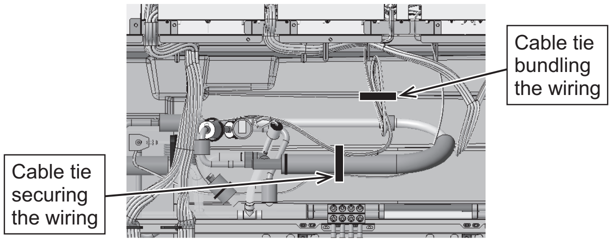


TH16

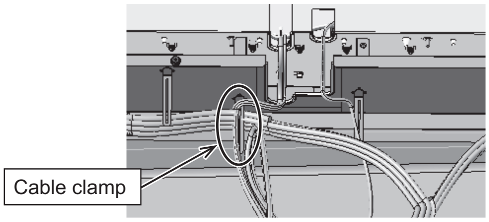


## (4) Remove the cable ties and cable clamp securing the wiring.

1) Cut and remove the cable ties securing or bundling the wiring.

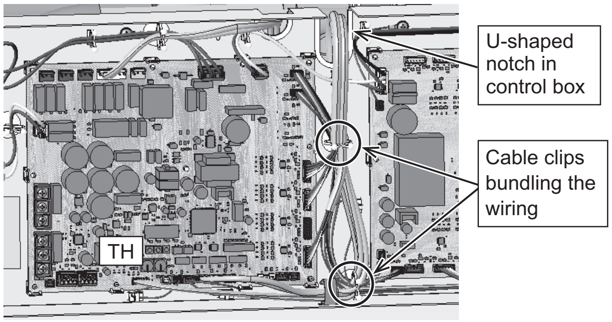


2) Remove the wiring from the cable clamp.



## (5) Replace the thermistor.

Disconnect the wiring inside the control box and connect the new thermistor.



| Procedure | Illustration |
|---|---|
| **(6) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

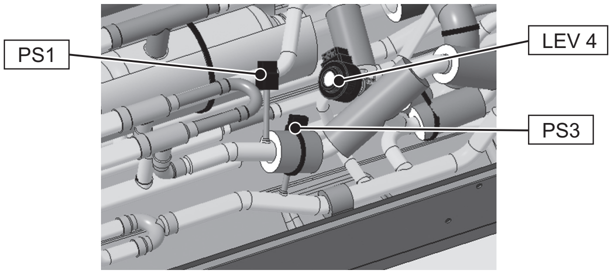
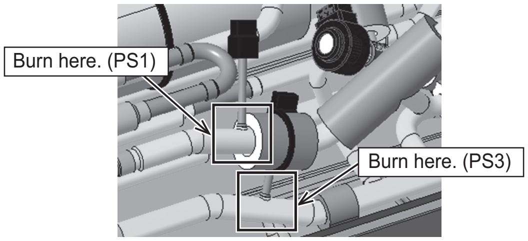
## 16-1. Main BC controller PS1 and PS3 replacement

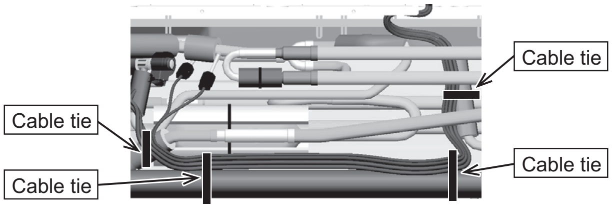
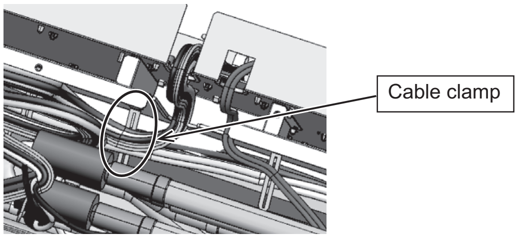
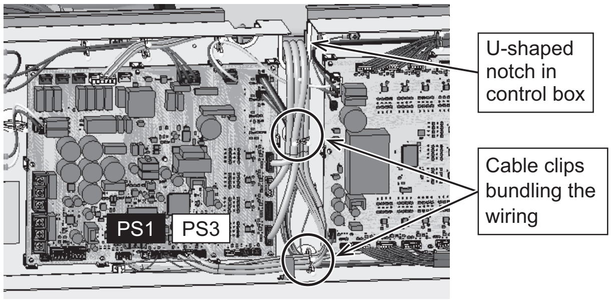
**⚠ WARNING**

Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components

- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit parts except the pressure sensor to keep their temperature below 120°C [248° F]. Do not allow the temperature of the pressure sensor to rise above 80°C [176°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

| Procedure | Illustration |
|---|---|
| **(1) Recover the refrigerant.** | |
| **(2) Lower the unit from the ceiling.** | |
| Lower the unit from the ceiling for brazing work. | |
| **(3) Remove Panel TR, Cover B, and Panel BR.** | |
| Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR. | |
| **PS1 and PS3 location** | |
| |  |
| **(4) Remove the components around PS1 and PS3.** | |
| Remove the pipe covers and wiring around PS1 and PS3. | |
| **(5) Protect the functional components.** | |
| Protect the functional components, insulation material, and drain pan around PS1 and PS3. | |
| **(6) Remove PS1 and PS3.** | |
| Remove PS1 and PS3. |  |

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2">(7) Remove the cable ties securing the wiring.</td></tr>
<tr><td>1) Cut and remove the cable ties securing the wiring.<br>The cable path and cable tie location are the same as for LEV 1/3/4.</td><td>
</td></tr>
<tr><td>2) Remove the wiring from the cable clamp.</td><td>
</td></tr>
<tr><td colspan="2">(8) Replace PS1 and PS3.</td></tr>
<tr><td>Remove the relevant connectors and replace PS1 and PS3.</td><td>
</td></tr>
<tr><td colspan="2">(9) Reassemble the components.</td></tr>
<tr><td colspan="2">Reassemble the components in the reverse order.</td></tr>
</table>

## 16-2. Sub BC controller PS3 replacement

⚠ **WARNING**

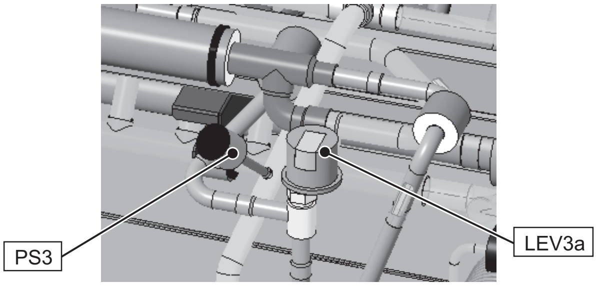
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

| |
|---|
| Cautions for replacing refrigerant circuit components<br>⬩Ensure a non-oxidizing brazing is performed.<br>⬩When heating the piping, wrap a wet towel around the refrigerant circuit parts except the pressure sensor to keep their temperature below 120°C [248° F]. Do not allow the temperature of the pressure sensor to rise above 80°C [176°F].<br>⬩After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.<br>⬩Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area. Use the felt recommended below or equivalent.<br>Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)<br>Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved<br>⬩Ensure the drain pan is protected from spatter during brazing. |

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2">(1) Recover the refrigerant.</td></tr>
<tr><td colspan="2">(2) Bring the unit down from the ceiling.</td></tr>
<tr><td colspan="2">Bring the unit down from the ceiling for brazing work.</td></tr>
<tr><td colspan="2">(3) Remove Panel TR, Cover B, and Panel BR.</td></tr>
<tr><td colspan="2">Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR.</td></tr>
</table>

| Procedure | Illustration |
|---|---|

**PS3 location**



## (4) Remove the components around PS3.

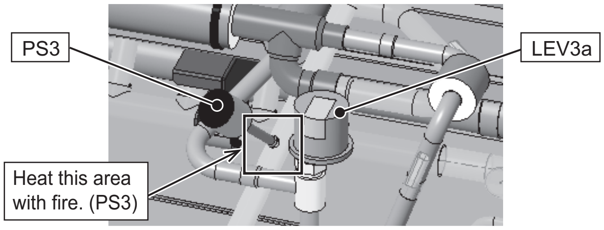
Remove the pipe cover and wiring around PS3.

## (5) Protect the functional components.

Protect the functional components, insulation material, and drain pan around PS3.

## (6) Remove PS3.

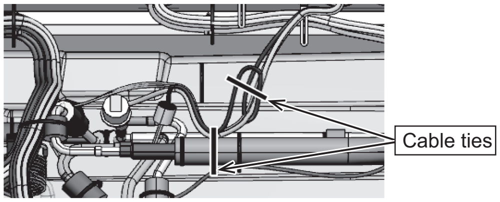
Remove PS3.



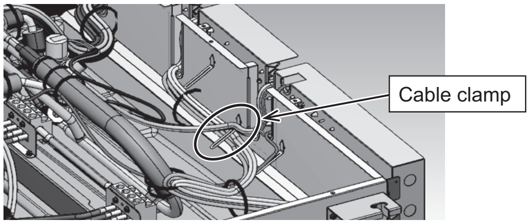
Heat this area with fire. (PS3)

## (7) Remove the cable tie securing the wiring.

1) Cut and remove the cable ties securing the wiring.

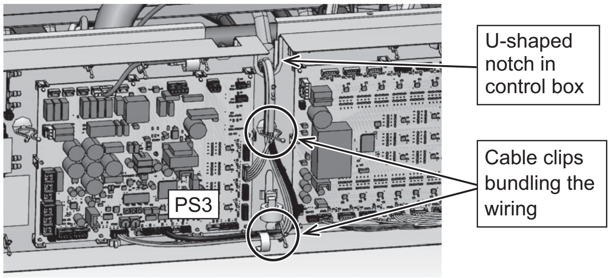


2) Remove the wiring from the cable clamp.



## (8) Replace PS3.

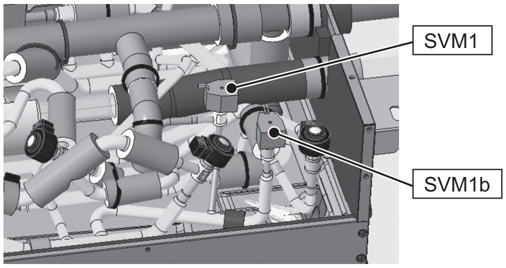
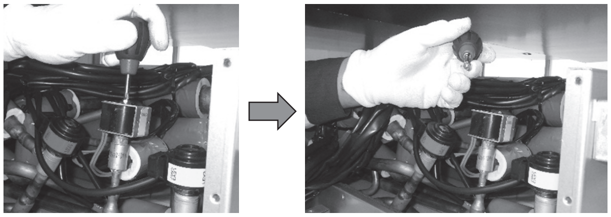
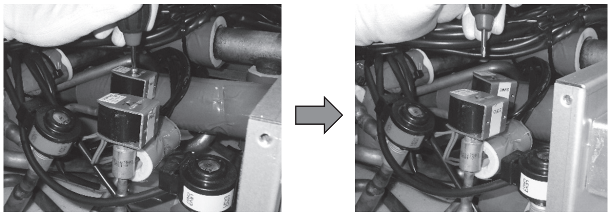
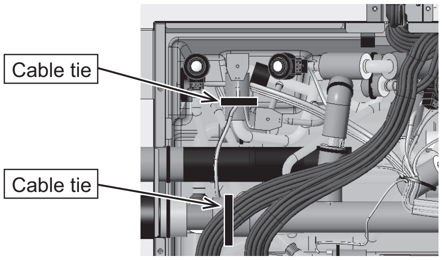
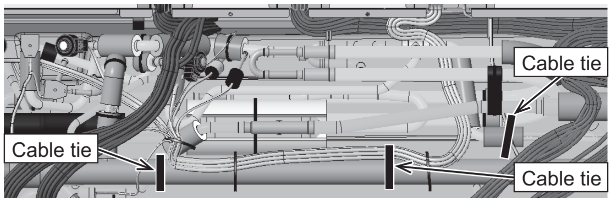
Remove the wiring from the cable clips and replace PS3.

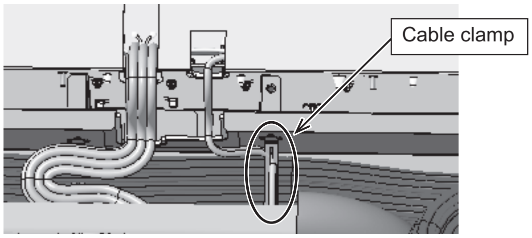
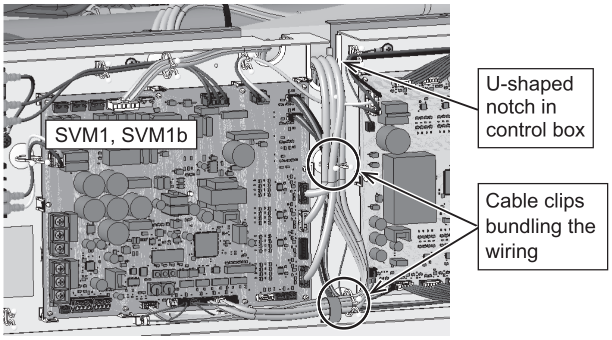


## (9) Reassemble the components.

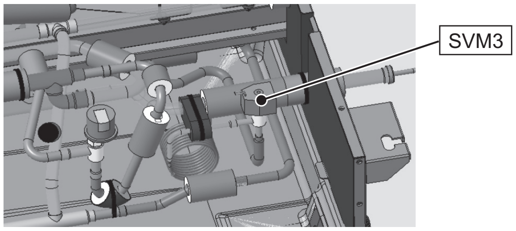
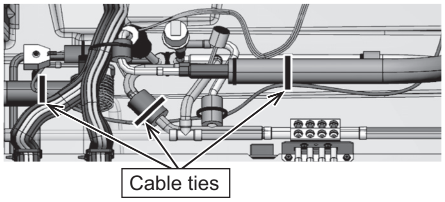
Reassemble the components in the reverse order.

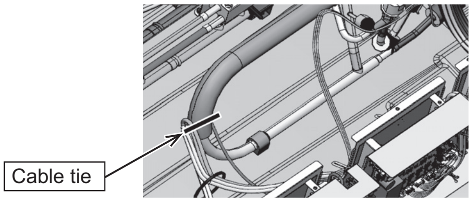
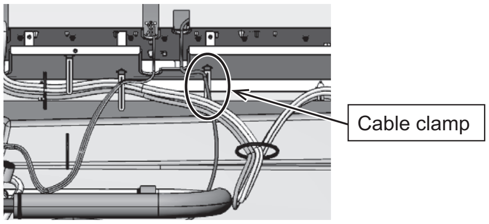
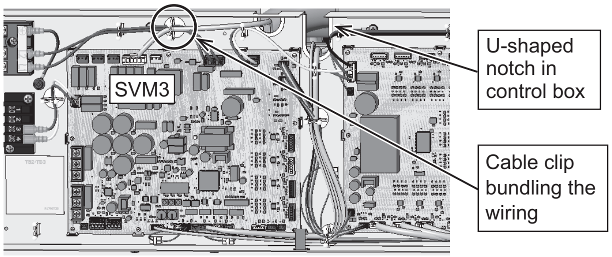
## 17-1. SVM1 and SVM1b coil replacement (only for main BC controller)

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove Panel TR, Cover B, and Panel BR.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR.</td></tr>
<tr><td colspan="2"><b>(2) Temporarily place the control box.</b></td></tr>
<tr><td colspan="2">Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box.</td></tr>
<tr><td colspan="2"><b>SVM1 and SVM1b coil location</b></td></tr>
<tr><td></td><td>
</td></tr>
<tr><td colspan="2"><b>(3) Remove the SVM1 and SVM1b coils.</b></td></tr>
<tr><td>Remove the screws to remove the coils.</td><td>Removing the screw (SVM1b)<br><br>Removing the screw (SVM1)<br></td></tr>
<tr><td colspan="2"><b>(4) Remove the cable ties securing the wiring.</b></td></tr>
<tr><td>1) Cut and remove the cable ties securing the wiring.</td><td>
</td></tr>
<tr><td>2) Cut and remove the cable ties securing the wiring.</td><td>
</td></tr>
</table>

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td>3) Remove the wiring from the cable clamp.</td><td>
</td></tr>
<tr><td colspan="2"><b>(5) Replace the SVM1 and SVM1b coils.</b></td></tr>
<tr><td>Remove the relevant connectors and replace SVM1 and SVM1b.</td><td>
</td></tr>
<tr><td colspan="2"><b>(6) Reassemble the components.</b></td></tr>
<tr><td colspan="2">Reassemble the components in the reverse order.</td></tr>
</table>

## 17-2. SVM3 coil replacement (only for sub BC controller)

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove Panel TR, Cover B, and Panel BR.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR.</td></tr>
<tr><td colspan="2"><b>(2) Place the control box temporarily.</b></td></tr>
<tr><td colspan="2">Follow step (2) in 13-1-1. Main 12-branch BC controller LEV A/B/L coil (branches 1 to 6) replacement to temporarily place the control box.</td></tr>
<tr><td colspan="2"><b>SVM3 coil location</b></td></tr>
<tr><td></td><td>
</td></tr>
<tr><td colspan="2"><b>(3) Remove the SVM3 coil.</b></td></tr>
<tr><td>Remove the screws to remove the coil.</td><td></td></tr>
<tr><td colspan="2"><b>(4) Remove the cable ties securing the wiring.</b></td></tr>
<tr><td>1) Cut and remove the cable ties securing the wiring.</td><td>
</td></tr>
</table>

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td>2) Cut and remove the cable tie securing the wiring.</td><td> </td></tr>
<tr><td>3) Remove the wiring from the cable clamp.</td><td> </td></tr>
<tr><td colspan="2"><b>(5) Replace SVM3.</b></td></tr>
<tr><td>Remove the wiring from the cable clip and replace SVM3.</td><td> </td></tr>
<tr><td colspan="2"><b>(6) Reassemble the components.</b></td></tr>
<tr><td colspan="2">Reassemble the components in the reverse order.</td></tr>
</table>

## 18-1. Main 12-branch BC controller LEV 1/3/4 valve replacement

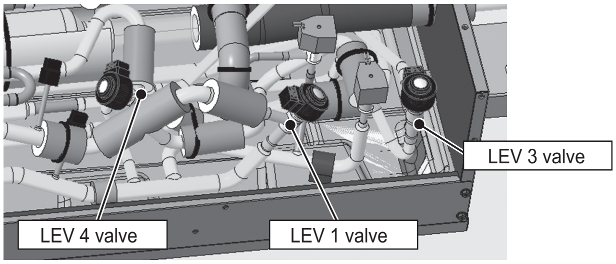
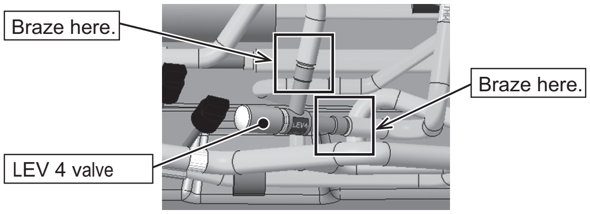
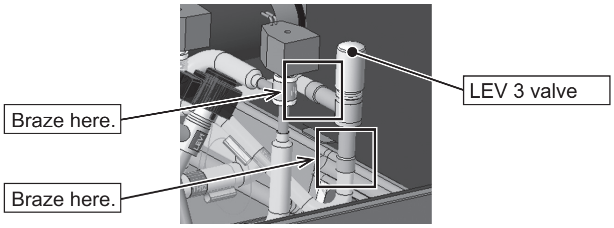
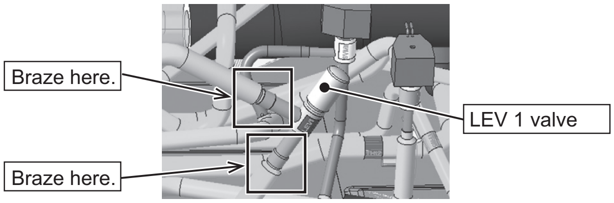
**⚠ WARNING**

Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components

- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit parts except the pressure sensor to keep their temperature below 120°C [248° F]. Do not allow the temperature of the pressure sensor to rise above 80°C [176°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Recover the refrigerant.</b></td></tr>
<tr><td colspan="2"><b>(2) Lower the unit from the ceiling.</b></td></tr>
<tr><td colspan="2">Lower the unit from the ceiling for brazing work.</td></tr>
<tr><td colspan="2"><b>(3) Remove Panel TR, Cover B, and Panel BR.</b></td></tr>
<tr><td colspan="2">Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR.</td></tr>
</table>

| Procedure | Illustration |
|---|---|
| **LEV 1/3/4 valve location** | |
| |  |
| **(4) Remove the components around the valves.** | |
| Remove the pipe covers and wiring around the valves. | |
| **(5) Protect the functional components.** | |
| Protect the functional components, insulation material, and drain pan around the valve. | |
| **(6) Replace the valves.** | |
| Remove and replace the LEV 1/3/4 valves. | LEV 4<br> <br>LEV 3<br> <br>LEV 1<br> |
| **(7) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

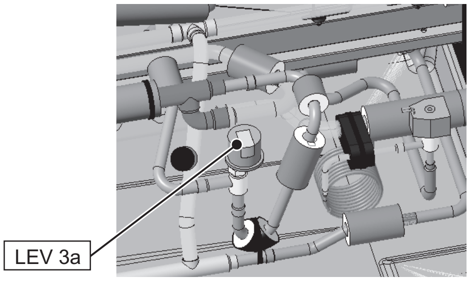
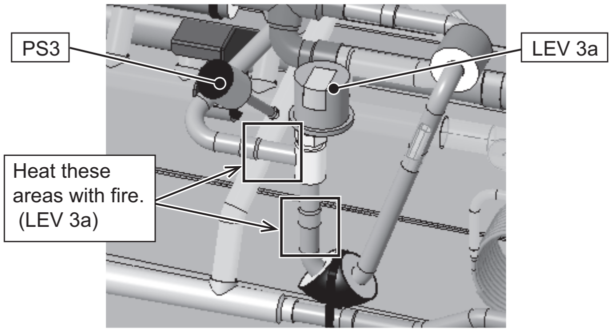
## 18-2. LEV 3a replacement (only for sub BC controller)

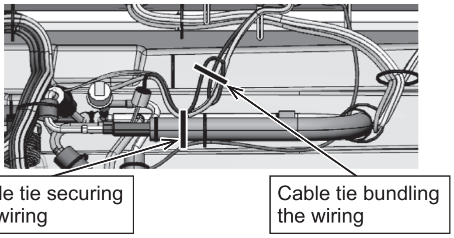
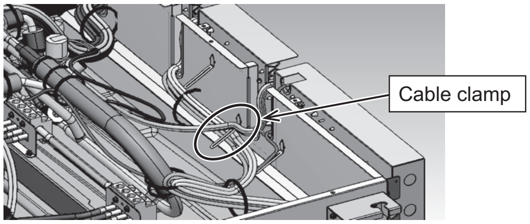
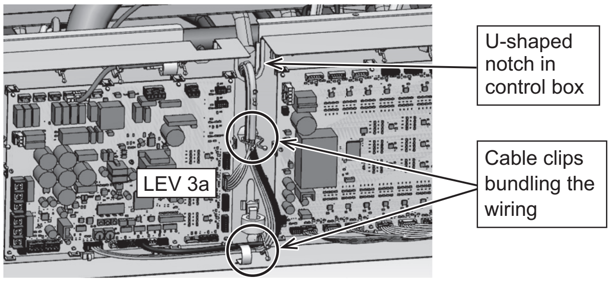
**⚠ WARNING**

Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components

- ⬩Ensure a non-oxidizing brazing is performed.
- ⬩When heating the piping, wrap a wet towel around the refrigerant circuit parts except the pressure sensor to keep their temperature below 120°C [248° F]. Do not allow the temperature of the pressure sensor to rise above 80°C [176°F].
- ⬩After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- ⬩Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- ⬩Ensure the drain pan is protected from spatter during brazing.

| Procedure | Illustration |
|---|---|
| **(1) Recover the refrigerant.** | |
| **(2) Bring the unit down from the ceiling.** | |
| Bring the unit down from the ceiling for brazing work. | |
| **(3) Remove Panel TR, Cover B, and Panel BR.** | |
| Follow the procedure in 11. Panel BR replacement to remove Panel TR, Cover B, and Panel BR. | |
| **LEV 3a location** | |
| |  |
| **(4) Remove the components around LEV 3a.** | |
| Remove the pipe covers and wiring around LEV 3a. | |
| **(5) Protect the functional components.** | |
| Protect the functional components, insulation material, and drain pan around LEV 3a. | |
| **(6) Remove LEV 3a.** | |
| Remove LEV 3a. |  |

| Procedure | Illustration |
|---|---|
| **(7) Remove the cable ties securing the wiring.** | |
| 1) Cut and remove the cable ties securing or bundling the wiring. |  |
| 2) Remove the wiring from the cable clamp. |  |
| **(8) Replace LEV 3a.** | |
| Remove the wiring from the cable clips and replace LEV 3a. |  |
| **(9) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

## 19-1. Main 12-branch BC controller LEV A/B valve replacement

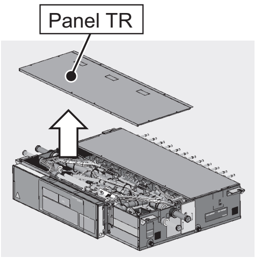
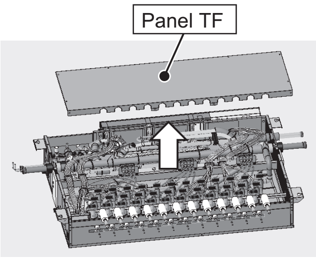
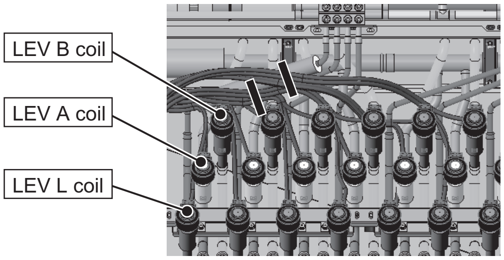
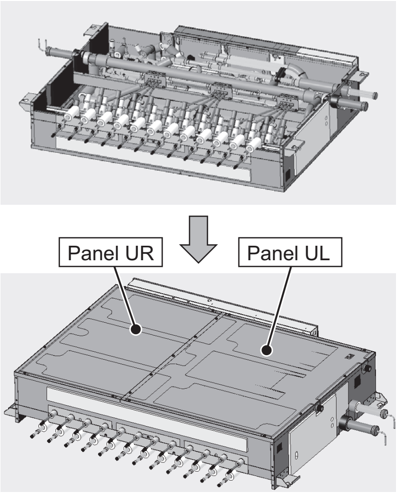
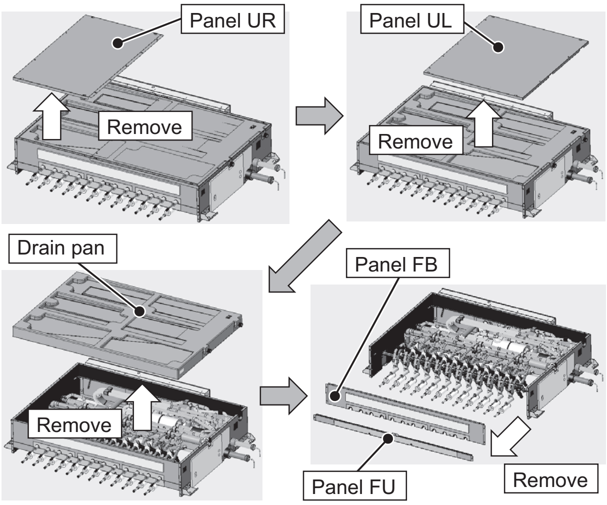
**⚠ WARNING**

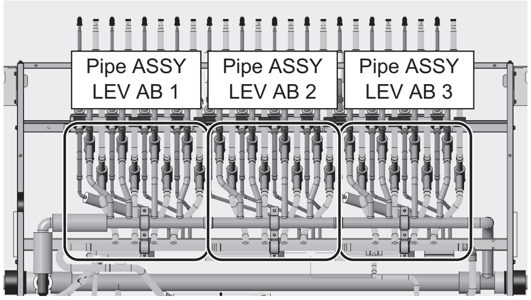
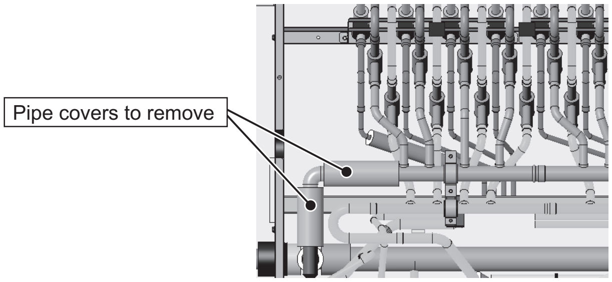
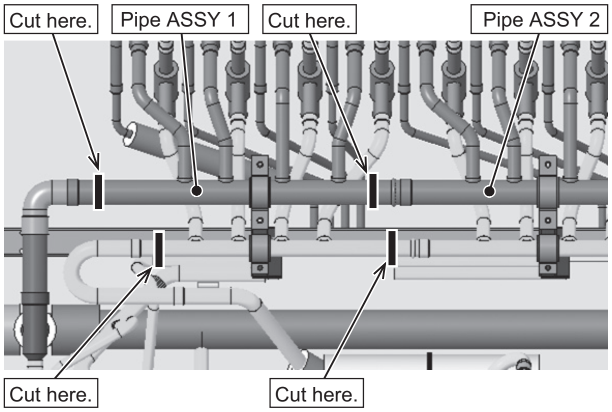
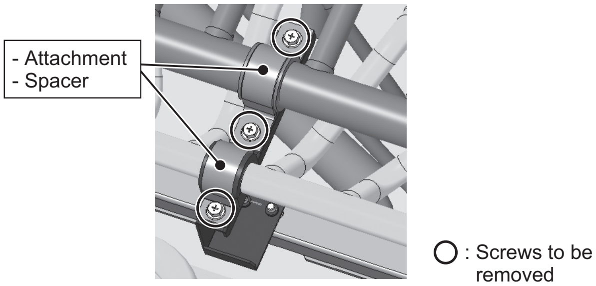
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

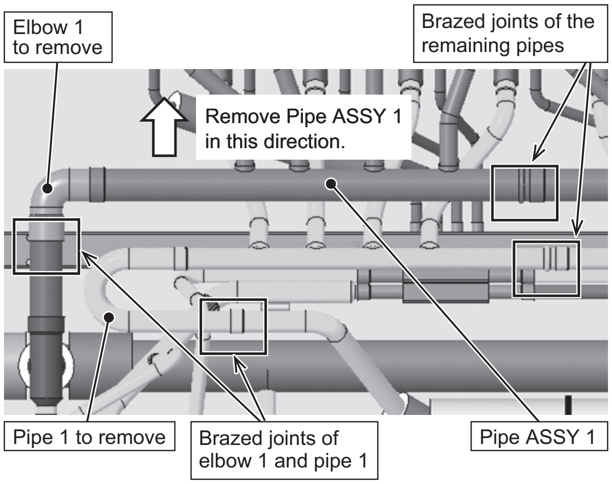
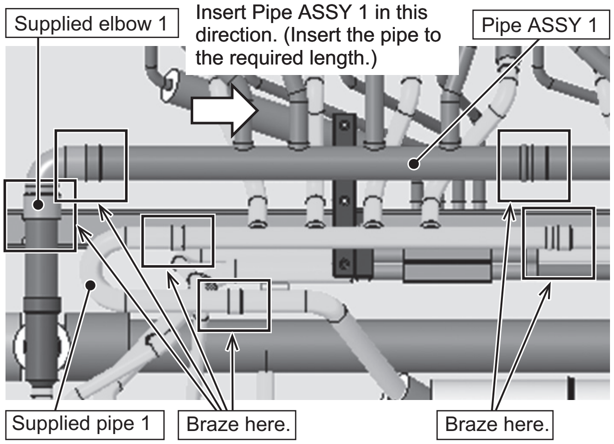
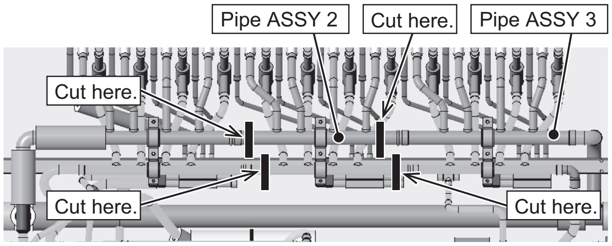
Cautions for replacing refrigerant circuit components

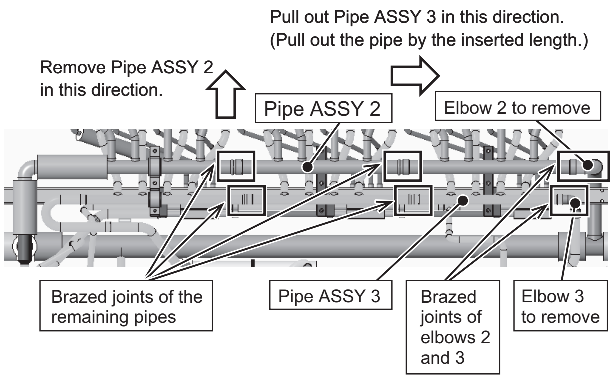
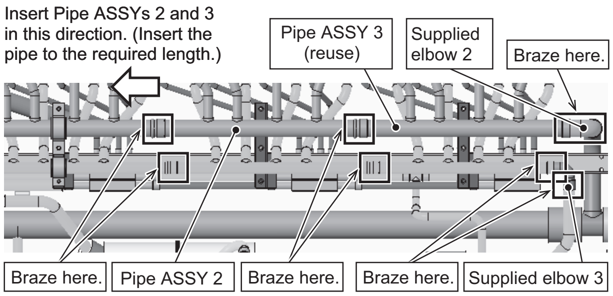
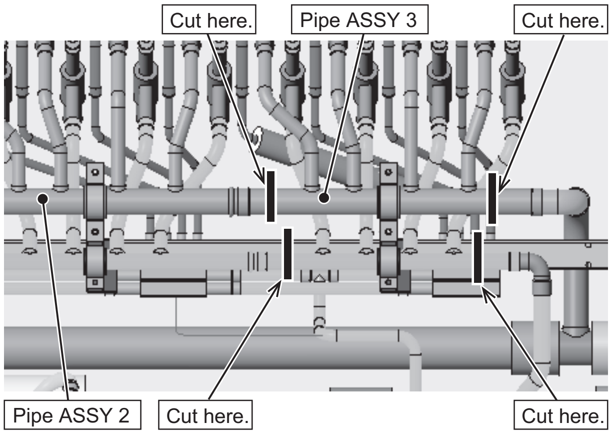
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

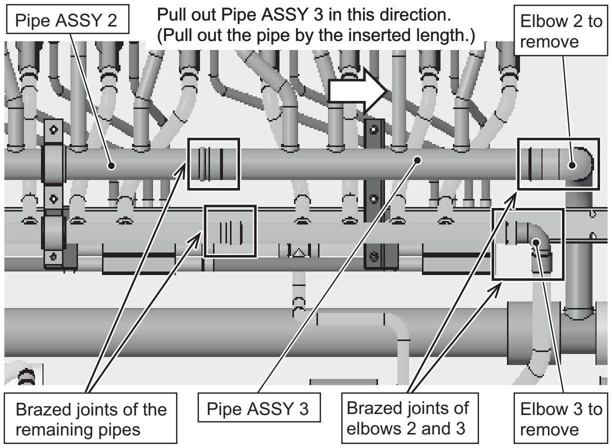
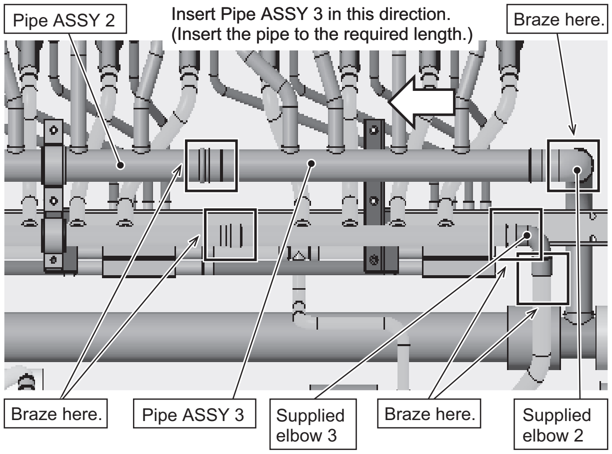
| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |

| No. | Procedure | Illustration |
|---|---|---|
| 3 | Remove Panel TR, and then Panel TF. |   |
| 4 | Remove the LEV A, B, and L coils from the Pipe ASSY that needs to be replaced, and set them aside in a location where they are not exposed to fire during brazing. |  |
| 5 | Turn the unit upside down so that Panel UR and Panel UL face up. |  |
| 6 | Remove Panel UR, Panel UL, the drain pan, Panel FB, and Panel FU in that order. |  |

| No. | Procedure | Illustration |
|---|---|---|
| Locations of the Pipe ASSYs on the main BC controller (12 branches) | |  |
| No. 7: To replace Pipe ASSY LEV AB 1 on the main BC controller (12 branches), follow the steps below. | | |
| 7-(1) | Remove the pipe covers. |  |
| 7-(2) | Remove the insulation material and cables around Pipe ASSY 1 to prevent them from being exposed to fire during brazing. | |
| 7-(3) | Cut the pipes using a pipe cutter. |  |
| 7-(4) | Remove the attachment and spacer that secure Pipe ASSY 1. |  |

| No. | Procedure | Illustration |
|---|---|---|
| 7-(5) | Remove Pipe ASSY 1, as well as elbow 1, pipe 1, and the remaining pipes from the brazed joints. |  |
| 7-(6) | Replace the old elbow 1 and pipe 1 with elbow 1 and pipe 1 that are supplied with Pipe ASSY 1.<br>**Note**<br>•Be sure to use brazing to connect the pipes. |  |
| 7-(7) | The replacement of Pipe ASSY LEV AB 1 is completed here.<br>Install the removed parts in reverse order. | |
| | No. 8: To replace Pipe ASSY LEV AB 2 on the main BC controller, follow the steps below. | |
| 8-(1) | Remove the insulation material and cables around Pipe ASSY 2 to prevent them from being exposed to fire during brazing. | |
| 8-(2) | Cut the pipes using a pipe cutter. |  |
| 8-(3) | Remove the attachments and spacers that secure Pipe ASSYs 2 and 3, referring to step No. 7-(4) on previous page. | |

<table>
<tr><th>No.</th><th>Procedure</th><th>Illustration</th></tr>
<tr><td>8-(4)</td><td>Remove Pipe ASSY 2, as well as Pipe ASSY 3, elbows 2 and 3, and the remaining pipes from the brazed joints.</td><td> </td></tr>
<tr><td>8-(5)</td><td>Reuse the removed Pipe ASSY 3, and replace the old elbows 2 and 3 with elbow 2 and elbow 3 that are supplied with Pipe ASSY 2.<br>Note<br>•Be sure to use brazing to connect the pipes.<br>•Dispose of pipe 2 and pipe 3 as they will not be used.</td><td> </td></tr>
<tr><td>8-(6)</td><td colspan="2">The replacement of Pipe ASSY LEV AB 2 is completed here.<br>Install the removed parts in reverse order.</td></tr>
<tr><td colspan="3">No. 9: To replace Pipe ASSY LEV AB 3 on the main BC controller (12 branches), follow the steps below.</td></tr>
<tr><td>9-(1)</td><td colspan="2">Remove the insulation material and cables around Pipe ASSY 3 to prevent them from being exposed to fire during brazing.</td></tr>
<tr><td>9-(2)</td><td>Cut the pipes using a pipe cutter.</td><td> </td></tr>
<tr><td>9-(3)</td><td colspan="2">Remove the attachment and spacer that secure Pipe ASSY 3, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement.</td></tr>
</table>

| No. | Procedure | Illustration |
|---|---|---|
| 9-(4) | Remove Pipe ASSY 3, as well as elbows 2 and 3, and the remaining pipes from the brazed joints. |  |
| 9-(5) | Replace the old elbow 2 and elbow 3 with elbow 2 and elbow 3 that are supplied with Pipe ASSY 3.<br>**Note**<br>⬩Be sure to use brazing to connect the pipes. |  |
| 9-(6) | The replacement of Pipe ASSY LEV AB 3 is completed here.<br>Install the removed parts in reverse order. | |

## 19-2. Main 8-branch BC controller LEV A/B valve replacement

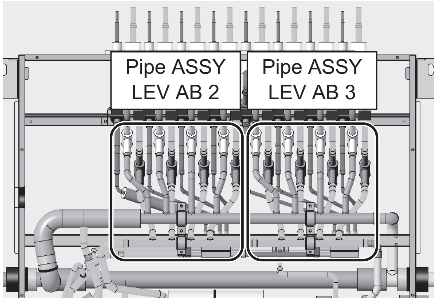
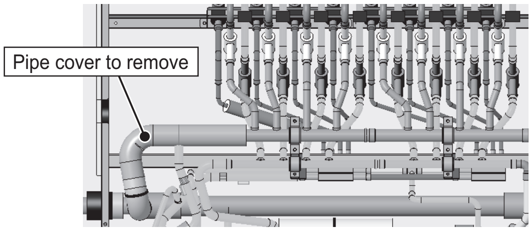
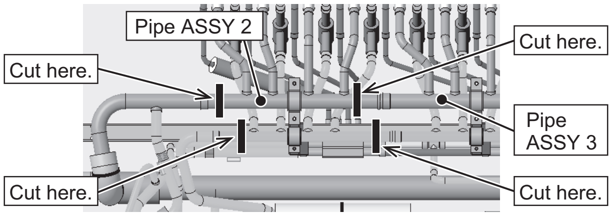
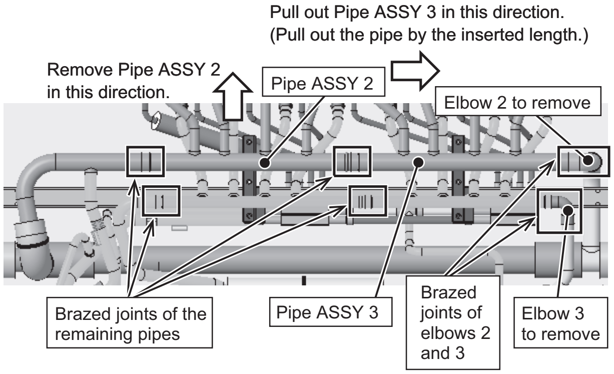
**⚠ WARNING**

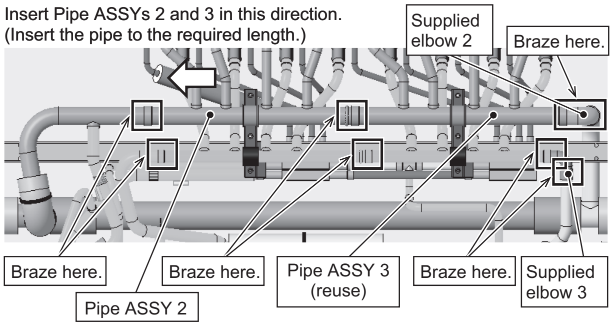
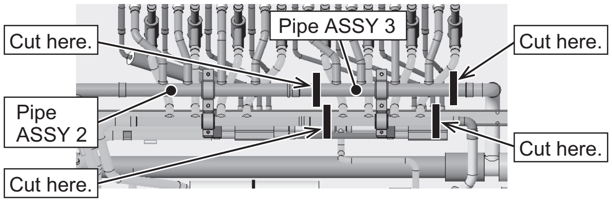
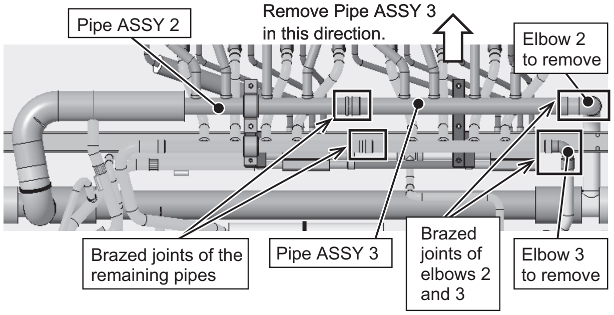
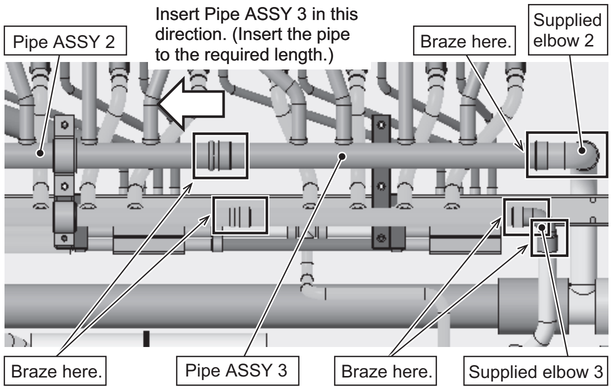
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components

- ⬩Ensure a non-oxidizing brazing is performed.
- ⬩When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- ⬩After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- ⬩Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- ⬩Ensure the drain pan is protected from spatter during brazing.

| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |
| 3 | Remove Panel TR and Panel TF, referring to step No. 3 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 4 | Remove the LEV A, B, and L coils from the Pipe ASSY that needs to be replaced, referring to step No. 4 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |

| No. | Procedure | Illustration |
|---|---|---|
| 5 | Turn the unit upside down, referring to step No. 5 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 6 | Remove Panel UR, Panel UL, the drain pan, Panel FB, and Panel FU, referring to step No. 6 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| Locations of the Pipe ASSYs on the main BC controller (8 branches) | |  |
| | No. 7: To replace Pipe ASSY LEV AB 2 on the main BC controller (8 branches), follow the steps below. | |
| 7-(1) | Remove the pipe cover. |  |
| 7-(2) | Remove the insulation material and cables around Pipe ASSY 2 to prevent them from being exposed to fire during brazing. | |
| 7-(3) | Cut the pipes using a pipe cutter. |  |
| 7-(4) | Remove the attachments and spacers that secure Pipe ASSYs 2 and 3, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 7-(5) | Remove Pipe ASSY 2, as well as Pipe ASSY 3, elbows 2 and 3, and the remaining pipes from the brazed joints. |  |

| No. | Procedure | Illustration |
|---|---|---|
| 7-(6) | Reuse the removed Pipe ASSY 3, and replace the old elbows 2 and 3 with elbow 2 and elbow 3 that are supplied with Pipe ASSY 2.<br>**Note**<br>◆Be sure to use brazing to connect the pipes.<br>◆Dispose of pipe 2 and pipe 3 as they will not be used. | <br>Insert Pipe ASSYs 2 and 3 in this direction.<br>(Insert the pipe to the required length.)<br> |
| 7-(7) | The replacement of Pipe ASSY LEV AB 2 is completed here.<br>Install the removed parts in reverse order. | |
| | No. 8: To replace Pipe ASSY LEV AB 3 on the main BC controller (8 branches), follow the steps below. | |
| 8-(1) | Remove the insulation material and cables around Pipe ASSY 3 to prevent them from being exposed to fire during brazing. | |
| 8-(2) | Cut the pipes using a pipe cutter. | <br> |
| 8-(3) | Remove the attachment and spacer that secure Pipe ASSY 3, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 8-(4) | Remove Pipe ASSY 3, as well as elbows 2 and 3, and the remaining pipes from the brazed joints. | <br>Remove Pipe ASSY 3<br>in this direction.<br> |
| 8-(5) | Replace the old elbow 2 and elbow 3 with elbow 2 and elbow 3 that are supplied with Pipe ASSY 3.<br>**Note**<br>◆Be sure to use brazing to connect the pipes. | <br>Insert Pipe ASSY 3 in this direction. (Insert the pipe to the required length.)<br> |
| 8-(6) | The replacement of Pipe ASSY LEV AB 3 is completed here.<br>Install the removed parts in reverse order. | |

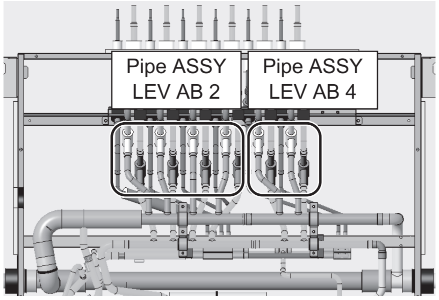
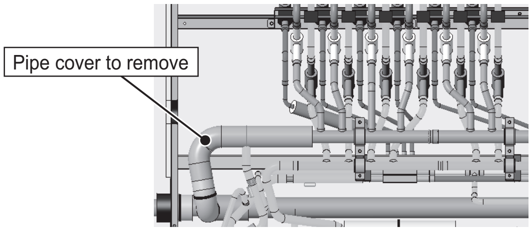
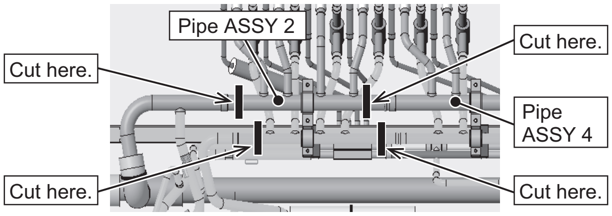
## 19-3. Main 6-branch BC controller LEV A/B valve replacement

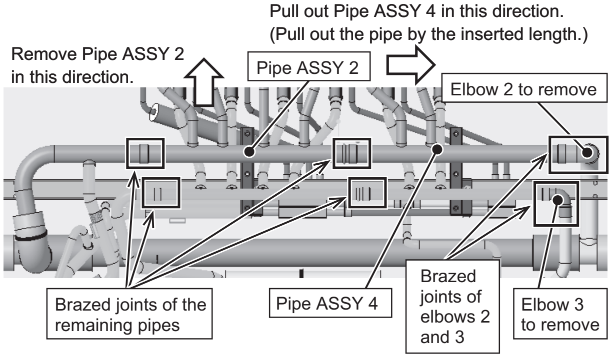
### ⚠ WARNING

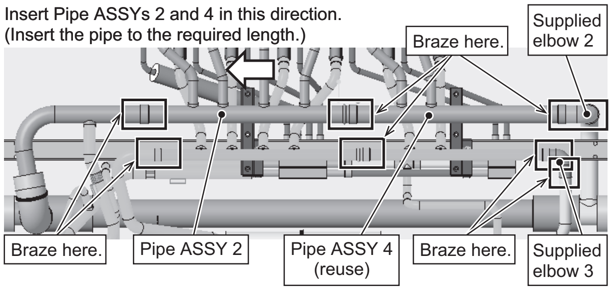
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

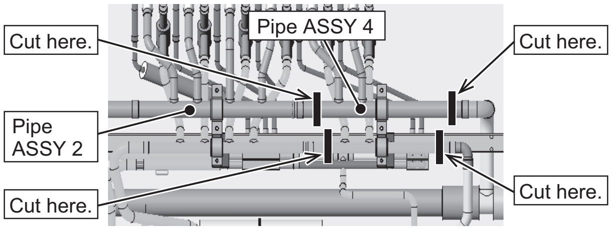
Cautions for replacing refrigerant circuit components

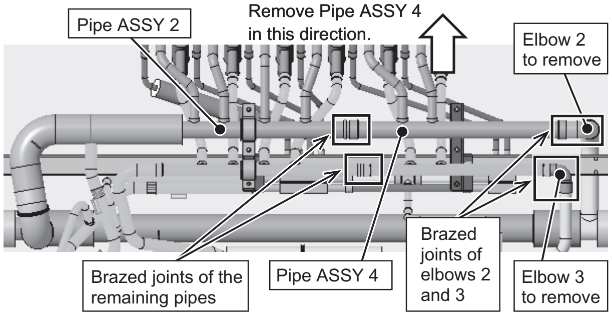
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |
| 3 | Remove Panel TR and Panel TF, referring to step No. 3 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 4 | Remove the LEV A, B, and L coils from the Pipe ASSY that needs to be replaced, referring to step No. 4 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 5 | Turn the unit upside down, referring to step No. 5 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 6 | Remove Panel UR, Panel UL, the drain pan, Panel FB, and Panel FU, referring to step No. 6 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| Locations of the Pipe ASSYs on the main BC controller (6 branches) | |  |
| No. 7: To replace Pipe ASSY LEV AB 2 on the main BC controller (6 branches), follow the steps below. | | |
| 7-(1) | Remove the pipe cover. |  |
| 7-(2) | Remove the insulation material and cables around Pipe ASSY 2 to prevent them from being exposed to fire during brazing. | |
| 7-(3) | Cut the pipes using a pipe cutter. |  |

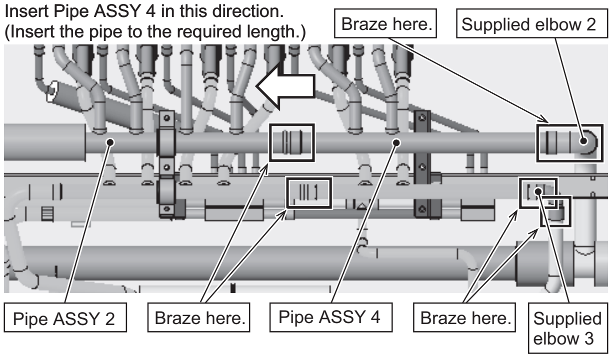
<table>
<tr><th>No.</th><th>Procedure</th><th>Illustration</th></tr>
<tr><td>7-(4)</td><td colspan="2">Remove the attachments and spacers that secure Pipe ASSYs 2 and 4, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement.</td></tr>
<tr><td>7-(5)</td><td>Remove Pipe ASSY 2, as well as Pipe ASSY 4, elbows 2 and 3, and the remaining pipes from the brazed joints.</td><td>


</td></tr>
<tr><td>7-(6)</td><td>Reuse the removed Pipe ASSY 4, and replace the old elbows 2 and 3 with elbow 2 and elbow 3 that are supplied with Pipe ASSY 2.<br><br>Note<br>♦Be sure to use brazing to connect the pipes.<br>♦Dispose of pipe 2 and pipe 3 as they will not be used.</td><td>


</td></tr>
<tr><td>7-(7)</td><td colspan="2">The replacement of Pipe ASSY LEV AB 2 is completed here.<br>Install the removed parts in reverse order.</td></tr>
<tr><td colspan="3">No. 8: To replace Pipe ASSY LEV AB 4 on the main BC controller (6 branches), follow the steps below.</td></tr>
<tr><td>8-(1)</td><td colspan="2">Remove the insulation material and cables around Pipe ASSY 4 to prevent them from being exposed to fire during brazing.</td></tr>
<tr><td>8-(2)</td><td>Cut the pipes using a pipe cutter.</td><td>


</td></tr>
<tr><td>8-(3)</td><td colspan="2">Remove the attachment and spacer that secure Pipe ASSY 4, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement.</td></tr>
<tr><td>8-(4)</td><td>Remove Pipe ASSY 4, as well as elbows 2 and 3, and the remaining pipes from the brazed joints.</td><td>


</td></tr>
</table>

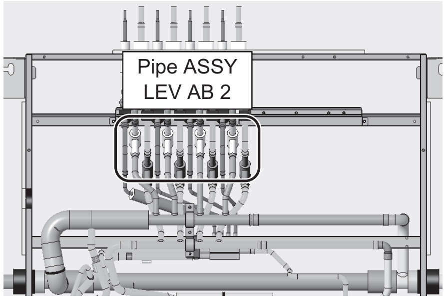
| No. | Procedure | Illustration |
|---|---|---|
| 8-(5) | Replace the old elbow 2 and elbow 3 with elbow 2 and elbow 3 that are supplied with Pipe ASSY 4.<br>**Note**<br>⬩Be sure to use brazing to connect the pipes. | Insert Pipe ASSY 4 in this direction.<br>(Insert the pipe to the required length.)<br> |
| 8-(6) | The replacement of Pipe ASSY LEV AB 4 is completed here.<br>Install the removed parts in reverse order. | |

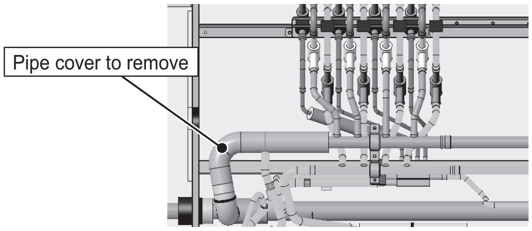
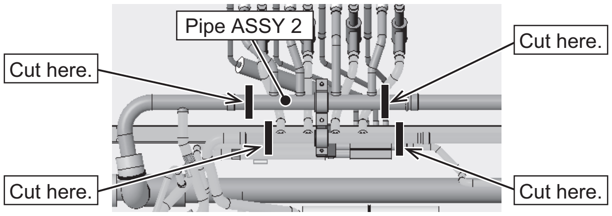
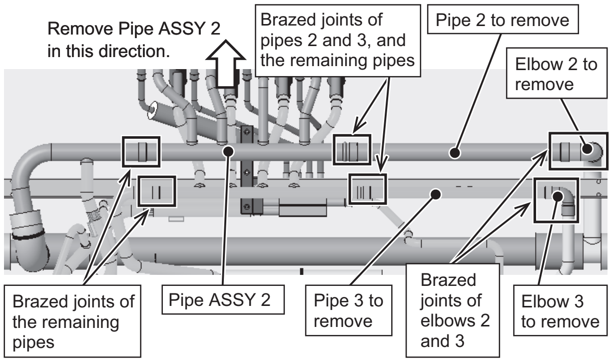
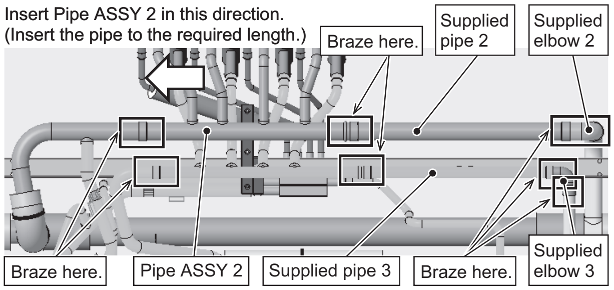
## 19-4. Main 4-branch BC controller LEV A/B valve replacement

**⚠ WARNING**

Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components
- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |
| 3 | Remove Panel TR and Panel TF, referring to step No. 3 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 4 | Remove the LEV A, B, and L coils from the Pipe ASSY that needs to be replaced, referring to step No. 4 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 5 | Turn the unit upside down, referring to step No. 5 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 6 | Remove Panel UR, Panel UL, the drain pan, Panel FB, and Panel FU, referring to step No. 6 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| Locations of the Pipe ASSYs on the main BC controller<br>(4 branches) | |  |

| No. | Procedure | Illustration |
|---|---|---|
| 7 | Remove the pipe cover. |  |
| 8 | Remove the insulation material and cables around Pipe ASSY 2 to prevent them from being exposed to fire during brazing. | |
| 9 | Cut the pipes using a pipe cutter. |  |
| 10 | Remove the attachment and spacer that secure Pipe ASSY 2, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 11 | Remove Pipe ASSY 2, as well as pipes 2 and 3, elbows 2 and 3, and the remaining pipes from the brazed joints. |  |
| 12 | Replace the old pipe 2, pipe 3, elbow 2, and elbow 3 with pipe 2, pipe 3, elbow 2, and elbow 3 that are supplied with Pipe ASSY 2.<br>**Note**<br>♦Be sure to use brazing to connect the pipes. |  |
| 13 | The replacement of Pipe ASSY LEV AB 2 is completed here.<br>Install the removed parts in reverse order. | |

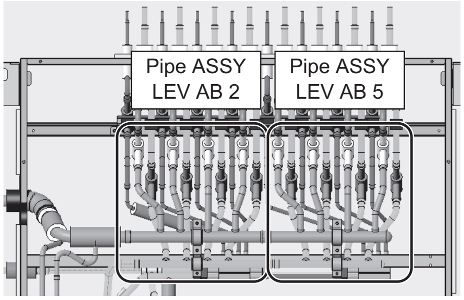
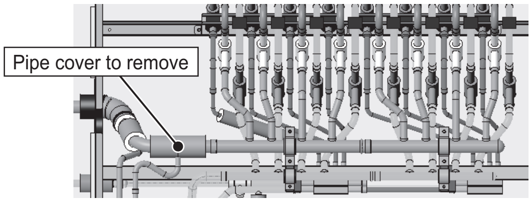
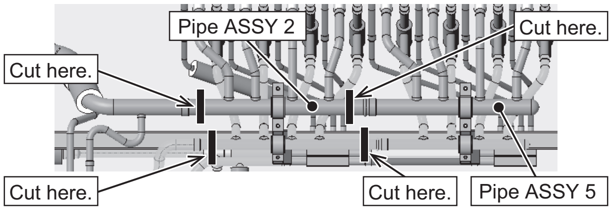
## 19-5. Sub 8-branch BC controller LEV A/B valve replacement

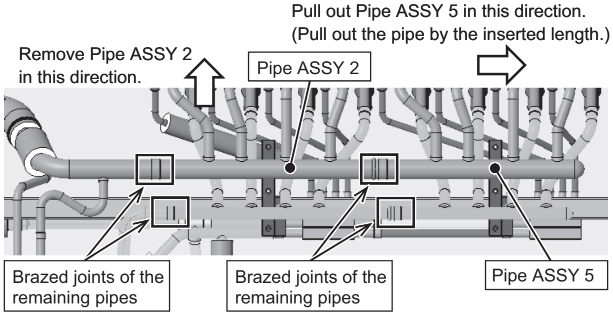
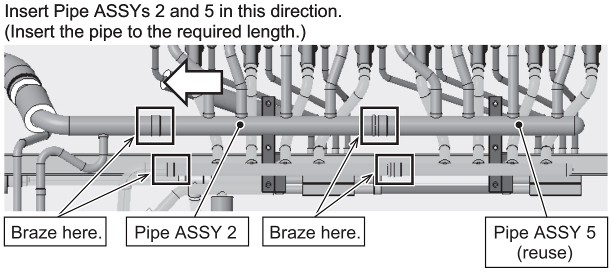
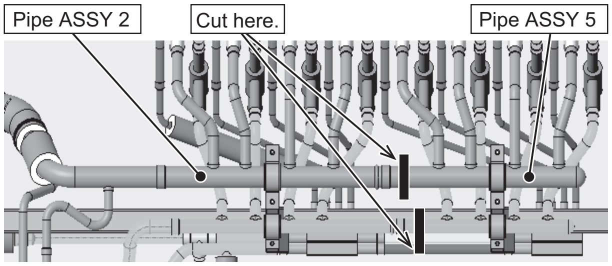
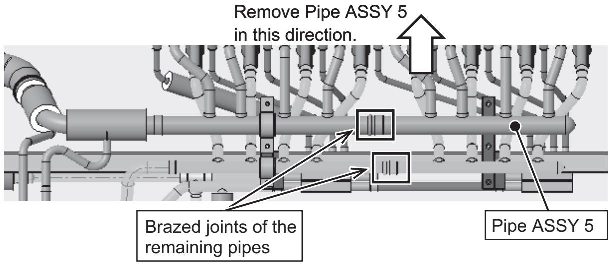
**⚠ WARNING**

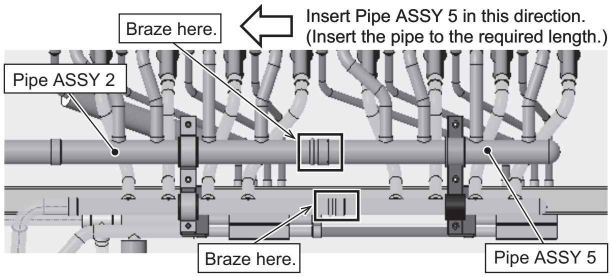
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components

- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |
| 3 | Remove Panel TR and Panel TF, referring to step No. 3 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 4 | Remove the LEV A, B, and L coils from the Pipe ASSY that needs to be replaced, referring to step No. 4 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 5 | Turn the unit upside down, referring to step No. 5 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 6 | Remove Panel UR, Panel UL, the drain pan, Panel FB, and Panel FU, referring to step No. 6 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| Locations of the Pipe ASSYs on the main BC controller (8 branches) | |  |
| No. 7: To replace Pipe ASSY LEV AB 2 on the sub BC controller (8 branches), follow the steps below. | | |
| 7-(1) | Remove the pipe cover. |  |
| 7-(2) | Remove the insulation material and cables around Pipe ASSY 2 to prevent them from being exposed to fire during brazing. | |
| 7-(3) | Cut the pipes using a pipe cutter. |  |

| No. | Procedure | Illustration |
|---|---|---|
| 7-(4) | Remove the attachments and spacers that secure Pipe ASSYs 2 and 5, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 7-(5) | Remove Pipe ASSY 2, as well as Pipe ASSY 5, and the remaining pipes from the brazed joints. |  |
| 7-(6) | Reuse the removed Pipe ASSY 5, and replace the old Pipe ASSY 2 with Pipe ASSY 2.<br>**Note**<br>⬩Be sure to use brazing to connect the pipes.<br>⬩Dispose of pipe 2, pipe 3, elbow 2, and elbow 3 as they will not be used. |  |
| 7-(7) | The replacement of Pipe ASSY LEV AB 2 is completed here.<br>Install the removed parts in reverse order. | |
| | No. 8: To replace Pipe ASSY LEV AB 5 on the sub BC controller (8 branches), follow the steps below. | |
| 8-(1) | Remove the insulation material and cables around Pipe ASSY 5 to prevent them from being exposed to fire during brazing. | |
| 8-(2) | Cut the pipes using a pipe cutter. |  |
| 8-(3) | Remove the attachment and spacer that secure Pipe ASSY 5, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 8-(4) | Remove Pipe ASSY 5 and the remaining pipes from the brazed joints. |  |

| No. | Procedure | Illustration |
|---|---|---|
| 8-(5) | Replace the old Pipe ASSY 5 with Pipe ASSY 5.<br>**Note**<br>⬩Be sure to use brazing to connect the pipes. |  |
| 8-(6) | The replacement of Pipe ASSY LEV AB 5 is completed here.<br>Install the removed parts in reverse order. | |

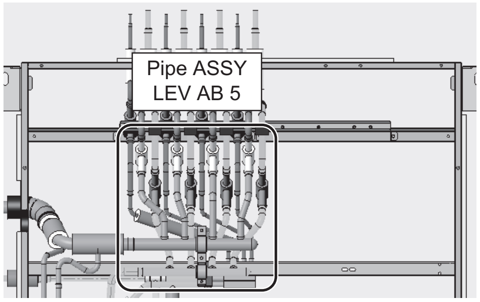
## 19-6. Sub 4-branch BC controller LEV A/B valve replacement

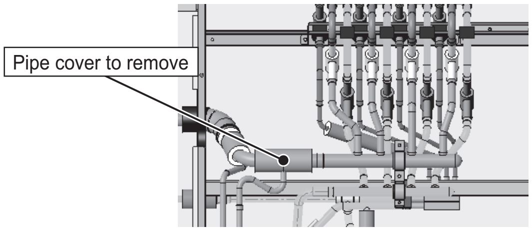
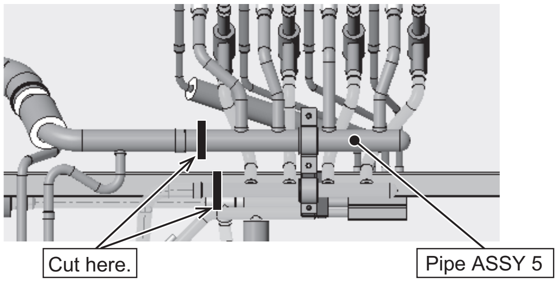
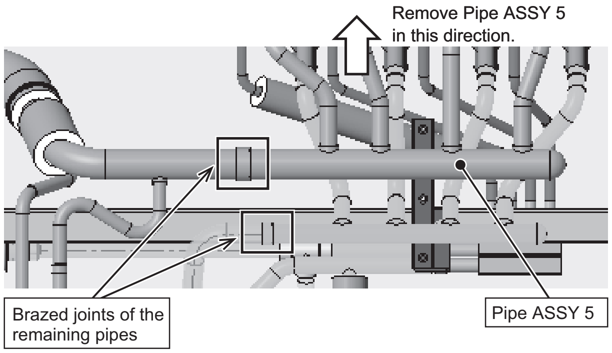
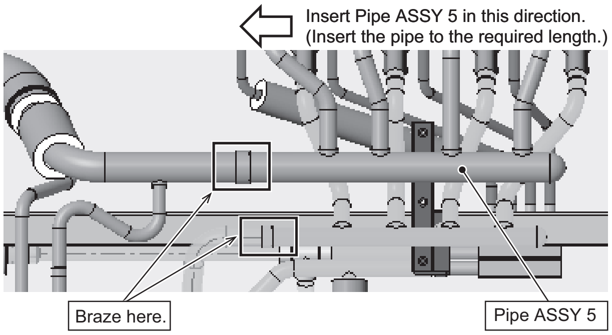
**⚠ WARNING**

Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

Cautions for replacing refrigerant circuit components

- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |
| 3 | Remove Panel TR and Panel TF, referring to step No. 3 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 4 | Remove the LEV A, B, and L coils from the Pipe ASSY that needs to be replaced, referring to step No. 4 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 5 | Turn the unit upside down, referring to step No. 5 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 6 | Remove Panel UR, Panel UL, the drain pan, Panel FB, and Panel FU, referring to step No. 6 in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| Locations of the Pipe ASSYs on the main BC controller<br>(4 branches) | |  |

| No. | Procedure | Illustration |
|---|---|---|
| 7 | Remove the pipe cover. |  |
| 8 | Remove the insulation material and cables around Pipe ASSY 5 to prevent them from being exposed to fire during brazing. | |
| 9 | Cut the pipes using a pipe cutter. |  |
| 10 | Remove the attachment and spacer that secure Pipe ASSY 5, referring to step No. 7-(4) in 19-1. Main 12-branch BC controller LEV A/B valve replacement. | |
| 11 | Remove Pipe ASSY 5 and the remaining pipes from the brazed joints. |  |
| 12 | Replace the old Pipe ASSY 5 with Pipe ASSY 5.<br>**Note**<br>♦Be sure to use brazing to connect the pipes. |  |
| 13 | The replacement of Pipe ASSY LEV AB 5 is completed here.<br>Install the removed parts in reverse order. | |

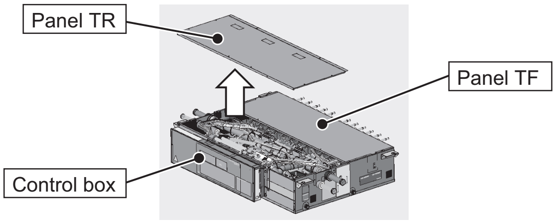
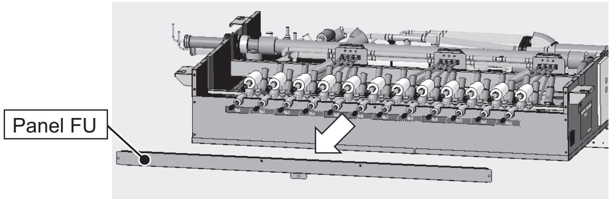
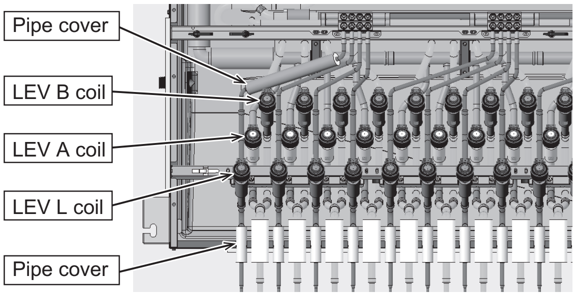
## 20. LEV L valve replacement

### ⚠ WARNING

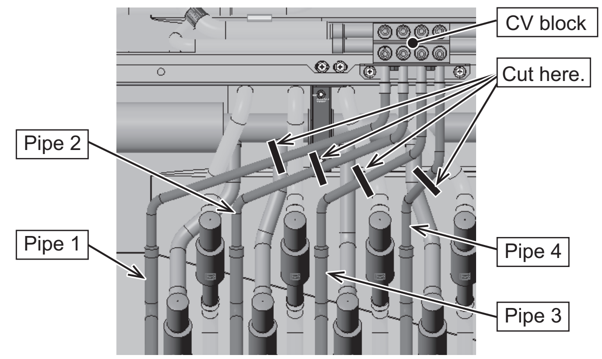
Refrigerant, when coming into direct contact with flame, can produce poisonous gases, so perform work in a well-ventilated place where the refrigerant does not stagnate.

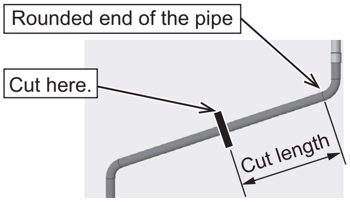
Cautions for replacing refrigerant circuit components.

- Ensure a non-oxidizing brazing is performed.
- When heating the piping, wrap a wet towel around the refrigerant circuit components to keep their temperature below 120°C [248°F].
- After brazing, check the area around the brazing joint for any leaks before performing vacuum drying.
- Beware of the flame direction during brazing, as it may burn the wiring or sheet metal parts inside the unit. To protect the drain pan, unit piping, and pipe covers from the flame during brazing, place a wet felt around the brazed area.
  Use the felt recommended below or equivalent.
  Recommended felt: TRUSCO NAKAYAMA Spatter Felt 50CF-11 (5t × 1 m × 1 m)
  Flame retardant testing method for spark droplets from welding and gas cutting on fabric sheets in construction works (JIS A 1323) Type A approved
- Ensure the drain pan is protected from spatter during brazing.

| No. | Procedure | Illustration |
|---|---|---|
| 1 | Recover the refrigerant. | |
| 2 | Bring the unit down from the ceiling for brazing work. | |
| 3 | Remove Panel TR, and then Panel TF. |  |
| 4 | Remove Panel FU. |  |
| 5 | (1) Remove all the LEV L coils.<br>(2) Remove LEV A/B coils around LEV L that needs to be replaced.<br>(3) Remove the pipe cover of LEV L that needs to be replaced. |  |

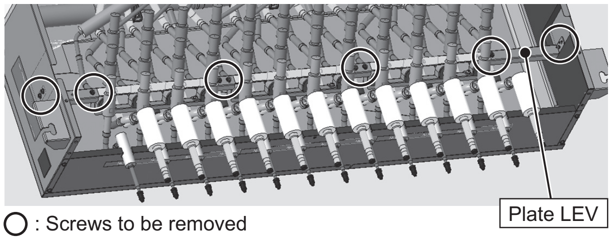
<table>
<tr><th>No.</th><th>Procedure</th><th>Illustration</th></tr>
<tr><td>6</td><td>Cut the pipe of the LEV L that needs to be replaced at the location shown in Table 1 using a pipe cutter.<br><b>Note</b><br>⬩Remove burrs from the cut section of the pipe.</td><td>



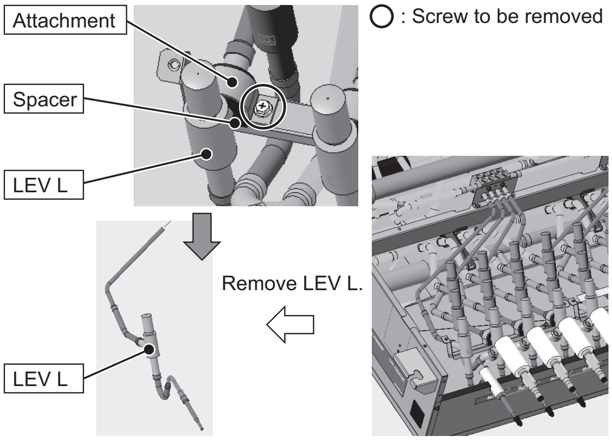


<table>
<tr><th>Item</th><th>Cut length mm (in.)</th></tr>
<tr><td>Pipe 1</td><td>100 (3-15/16)</td></tr>
<tr><td>Pipe 2</td><td>80 (3-3/16)</td></tr>
<tr><td>Pipe 3</td><td>50 (2)</td></tr>
<tr><td>Pipe 4</td><td>40 (1-5/8)</td></tr>
</table>

Table 1. Pipe cut length
</td></tr>
<tr><td>7</td><td>Remove the Plate LEV.</td><td>



</td></tr>
<tr><td>8</td><td>Remove the attachment and spacer that are securing LEV L, and then remove LEV L.</td><td>



</td></tr>
<tr><td>9</td><td>(1) Select the pipe to be replaced from Table 2.<br>(2) Cut the end of the selected pipe on the unprocessed side, and then expand its diameter (INSIDE 9.52 mm [3/8 in.]). (See Fig. 1.)<br>Refer to Table 1 and select the cut length that corresponds to the actual pipe.<br><b>Note</b><br>⬩Consider the margin needed for inserting the pipe when cutting.<br>⬩Remove burrs from the cut section of the pipe.<br>⬩Dispose of the pipes that are not selected as they will not be used.</td><td>

<table>
<tr><th>Branch No.</th><th>Supplied pipe</th></tr>
<tr><td>1, 5, 9</td><td>Pipe 1</td></tr>
<tr><td>2, 6, 10</td><td>Pipe 2</td></tr>
<tr><td>3, 7, 11</td><td>Pipe 3</td></tr>
<tr><td>4, 8, 12</td><td>Pipe 4</td></tr>
</table>

Table 2. Pipe selection

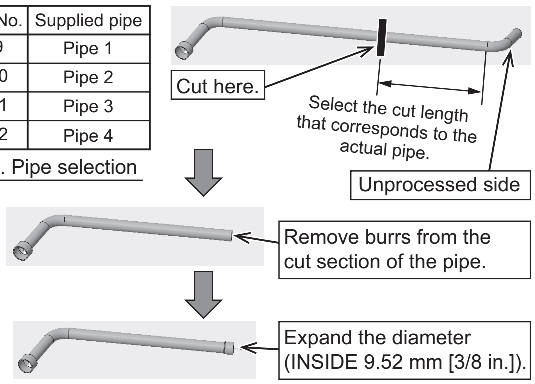
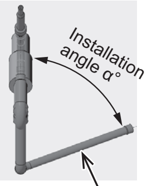
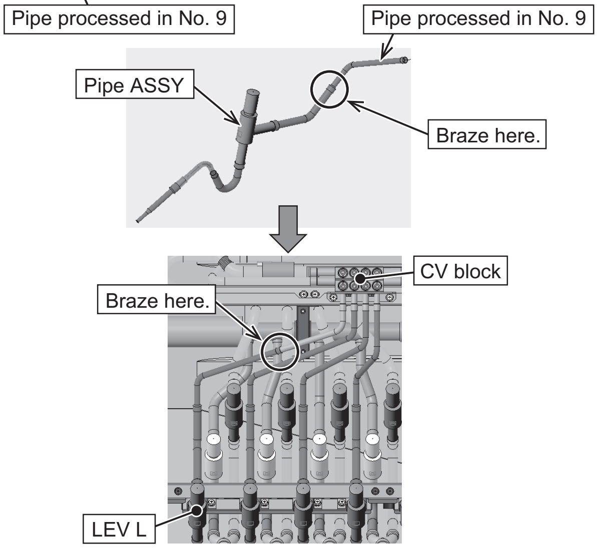


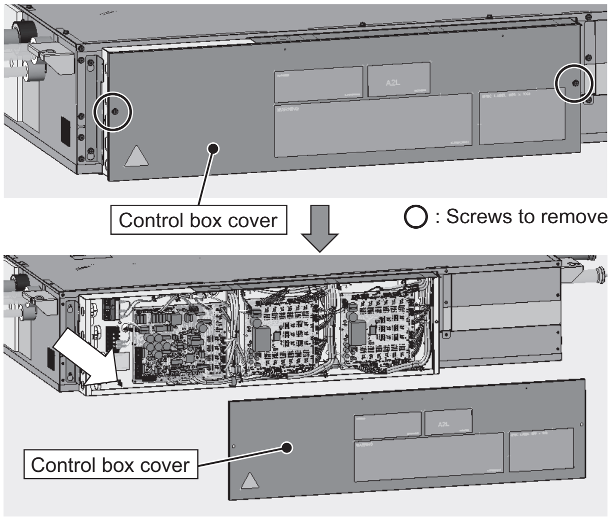
Fig. 1. Pipe processing procedure

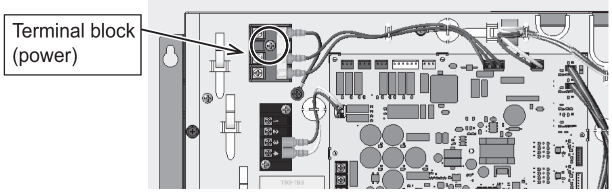
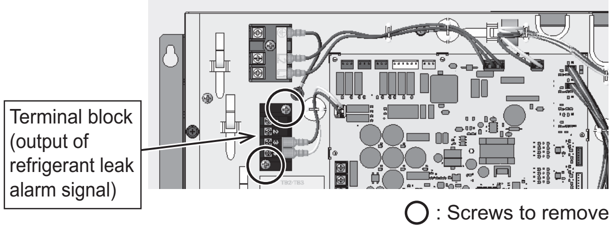
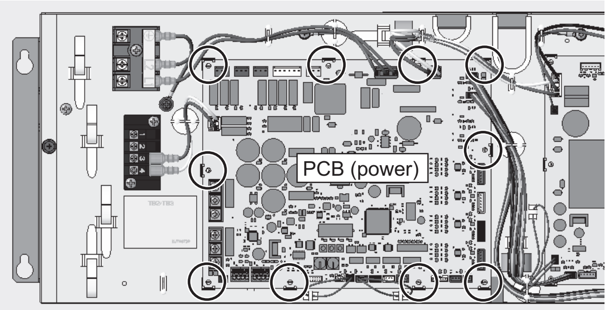
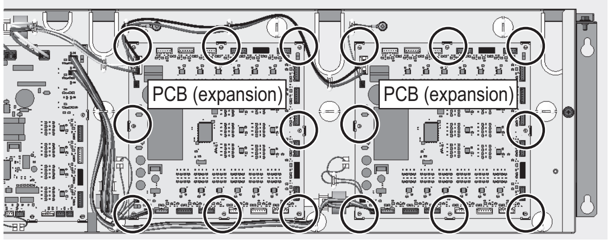
Shown above is the procedure for processing Pipe 1.
This procedure applies to other pipes.
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Procedure</th><th>Illustration</th></tr>
<tr><td>10</td><td>Braze the Pipe ASSY and the pipe processed in No. 9 above, and then braze them to the unit.<br>Refer to Table 3 for the installation angles of the pipes connected to the Pipe ASSY.<br><b>Note</b><br>•Be sure to use brazing to connect the pipes.<br>•Before brazing to the unit, protect the insulation material, pipe covers, cables, and other components from burning.</td><td><br>
<table>
<tr><th>Pipe to connect</th><th>Installation angle α°</th></tr>
<tr><td>Pipe 1 (Item No. S-3)</td><td>70°</td></tr>
<tr><td>Pipe 2 (Item No. S-4)</td><td>60°</td></tr>
<tr><td>Pipe 3 (Item No. S-5)</td><td>45°</td></tr>
<tr><td>Pipe 4 (Item No. S-6)</td><td>20°</td></tr>
</table>
Table 3. Pipe installation angle<br><br> <br>Shown above is the procedure for brazing Pipe 1 (Item No. S-3).<br>This procedure applies to other pipes (Item Nos. S-4 to S-6).</td></tr>
</table>

*The replacement of LEV L is completed here.
Reverse the order above to reinstall the removed components to their original positions.

## 21. Terminal block and board replacement

<table>
<tr><th>Procedure</th><th>Illustration</th></tr>
<tr><td colspan="2"><b>(1) Remove the control box cover.</b></td></tr>
<tr><td>Remove the two screws to remove the control box cover.</td><td><br> </td></tr>
</table>

| Procedure | Illustration |
|---|---|
| **(2) Replace the terminal block (power).** | |
| Remove the screw to replace the terminal block (power). |  <br>○ : Screws to remove |
| **(3) Replace the terminal block (output of refrigerant leak alarm signal).** | |
| Remove the two screws to replace the terminal block (output of refrigerant leak alarm signal). |  <br>○ : Screws to remove |
| **(4) Replace the PCB (main).** | |
| Remove the 10 clips to replace the PCB (main). |  <br>○ : Clips to remove |
| **(5) Replace the PCB (expansion).** | |
| Remove the eight clips to replace the PCB (expansion). |  <br>○ : Clips to remove |
| **(6) Reassemble the components.** | |
| Reassemble the components in the reverse order. | |

# 8-14 Troubleshooting Problems Using the LED Status Indicators on the Outdoor Unit

If the LED error display appear as follows while all the SW4 switches and SW6-10 are set to OFF, check the items under the applicable item numbers below.

## 1. Error code appears on the LED display.

Refer to the following page(s). [7-1 Error Code and Preliminary Error Code Lists]

## 2. LED is blank.

Take the following troubleshooting steps.

**(1) Refer to the section on troubleshooting the transmission power supply circuit, if the voltage across pins 1 through 3 of CNDC on the control panel is outside the range between 220 VDC and 380 VDC. [8-10-2 Troubleshooting Problems with Outdoor Unit Transmission Power Supply Circuit]**

**(2) If the LED error display becomes lit when the power is turned on with all the connectors on the control board except CNDC disconnected, there is a problem with the wiring to those connectors or with the connectors themselves.**

**(3) If nothing appears on the display under item (2) above AND the voltage between pins 1 and 3 of CNDC is within the range between 220 VDC and 380 VDC, control board failure is suspected.**

## 3. Only the software version appears on the LED display.

**(1) Only the software version appears while the transmission cables to TB3 and TB7 are disconnected.**

1) Wiring failure between the control board and PS board. (CN62, CNPS, CNIT, CNS2, CN102)
2) If item 1) checks out OK, the transmission line power supply board failure is suspected.
3) If items 1) and 2) check out OK, control board failure is suspected.

**(2) If the LED shows the same display as the initial display upon disconnection of transmission lines (TB3, TB7), there is a problem with the transmission lines or with the connected devices. [10-1-2 Initial LED Display]**

# Chapter 9 USB Function

# 9-1 Service Overview

## 9-1-1 Function Overview

The control board has a USB port that allows the use of the following two functions.
Use the USB port only for the following functions.

### 1. Collection and storage of operation data (Outdoor unit)

Operation information from indoor units, outdoor units, and other equipment and devices in the system are collected andstored in the flash memory in the control board of the outdoor unit (OC).
The data can be transferred and stored in a USB memory stick.

- Operation data in the multiple-outdoor-unit system will be saved on the OC unit.
- Attempting to collect the operation data from the OS unit will result in an error.

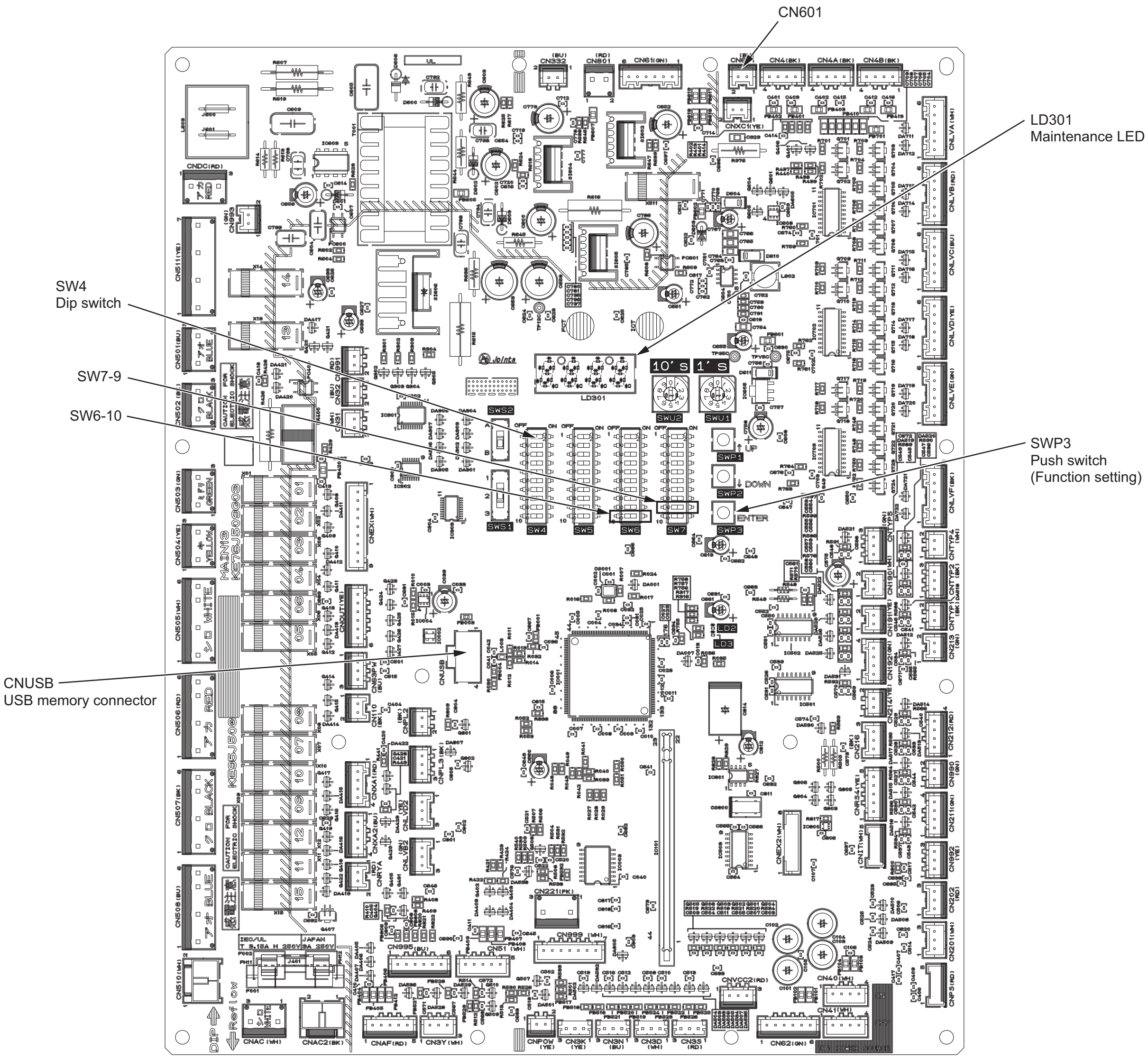
### 2. Software rewrite function (Outdoor unit, BC controller)

The software on outdoor units can be rewritten using a USB memory stick.

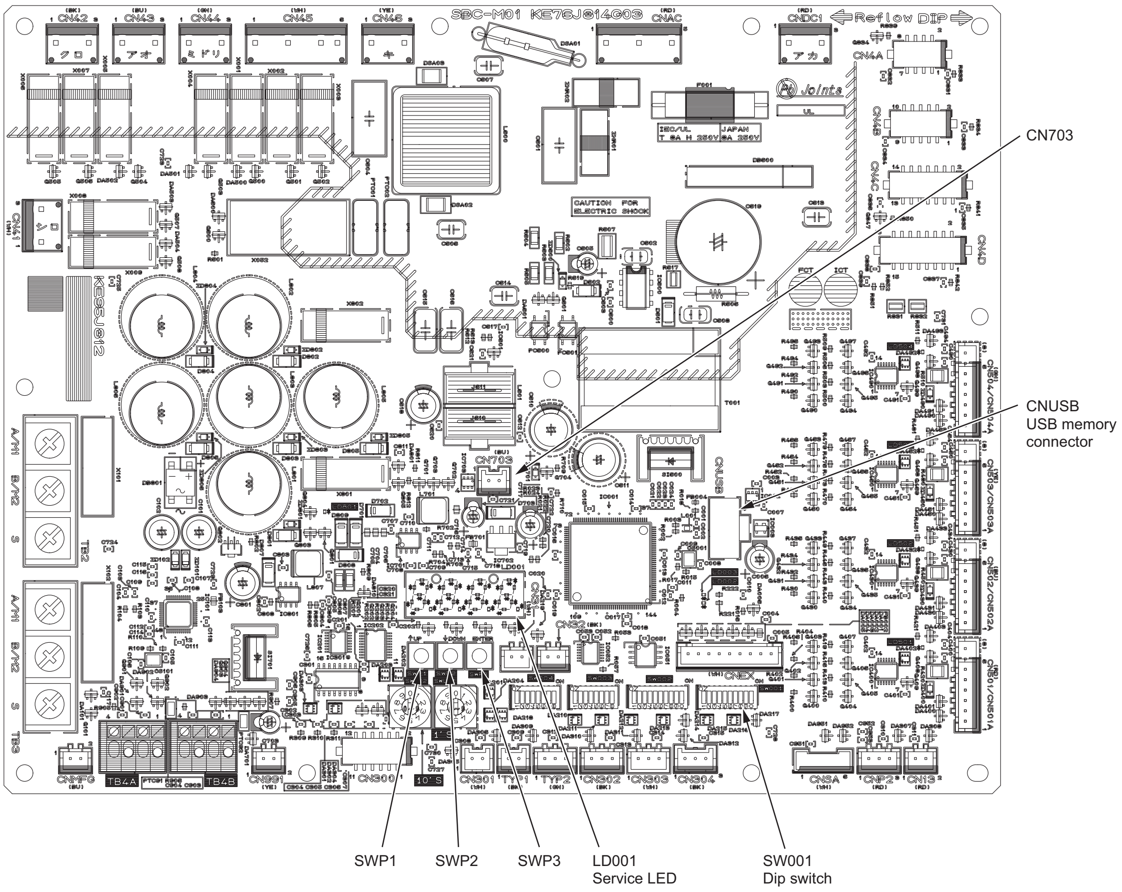
For detailed information about each function, refer to Section [9-2 Operation Data Collection and Storage Functions (Outdoor unit)] and Section [9-3 Software Rewrite Function on the USB (Outdoor unit, BC Controller)].
For information regarding the maintenance LED display content and regarding troubleshooting, refer to Section [9-4 Maintenance LED Display and Troubleshooting].

## 9-1-2 System Structure

### (1) Control board on the outdoor unit



## (2) Control board on the BC controller



## 9-1-3 Necessary Materials

The use of the USB function requires a USB memory stick and a portable battery charger.
See below for the types of USB memory stick and portable charger that can be used.

### (1) USB memory stick

Use a USB memory stick that meets the following specifications.

- ♦USB 2.0 compatible
- ♦Formatted in FAT 32
- ♦Without a security function

### (2) Portable battery charger

Use a portable battery charger that meets the following specifications for rewriting the software.

- ♦USB 2.0 compatible
- ♦Voltage and amperage rating of 5 V and 2.1 A (MAX)
- ♦Supports the low current mode
  A battery charger not compatible with the low current mode may turn off while the data are being collected or while the S/W is being re-written, and these actions may not be completed successfully.

A LEAD WIRE ASSY USB is required to connect the control board and the portable charger.
Use a cable that meets the following specifications.

- ♦[Type A male] - [Male XA connector for the PCB] USB cable. For details of “LEAD WIRE ASSY USB”, please contact the sales office.

The connector on the control board side is a female XA connector for the PCB.

# 9-2 Operation Data Collection and Storage Functions (Outdoor unit)

Operation data of the units collected on the outdoor unit can be recorded in the flash memory of the control board. These data can also be exported to and recorded in a USB memory stick.
See Section [9-2-2 Storing Data on a USB Memory Stick] for information on storing data on a USB memory stick.
See Section [9-2-3 Collecting Operation Data] for information on the collection of operation data.

## 9-2-1 Preparation

A USB memory stick and a portable battery charger are required to store data on a USB memory stick (not supplied).
Prepare a USB memory stick and a portable battery charger as described in Section [9-1-3 Necessary Materials].

## 9-2-2 Storing Data on a USB Memory Stick

Store operation data recorded in the flash memory on the control board in a USB memory stick.
The content of the stored file can be confirmed using the maintenance tool.
Operation data should be stored in a dedicated mode (Store Mode).

### 1. Procedure

### (1) Preparation of a USB memory stick

1) Since the size of the saved file containing operation data is 50 MB, prepare a USB memory stick with 50 MB or more available memory. A USB memory stick which has other data in it may also be used. However, it is recommended to clear the remaining data in advance to prevent any malfunctions.The saved file is named "MNTXXX.MT." XXX represents a serial number from 000 to 100. Since files named "MNT101.MT" or more cannot be created, unnecessary folders and files should be deleted.

### (2) Storing data on a USB memory stick

Data can be stored to a USB memory stick either with the main power to the outdoor unit turned on (Method 2) or off (Method 1). For safety reasons, it is recommended to store the data on a USB memory stick with the main power to the outdoor unit turned off (Method 1). If turning off the power is not feasible, take appropriate measures to ensure safety.

**[Method 1 (recommended)] Storing data on a USB memory stick with the main power to the outdoor unit turned off**

**<Starting up the unit in the data storage mode>**

- Turn off the main power to the outdoor unit.
- Connect a USB memory stick to the USB port (CNUSB) on the control board. Wait for five seconds until the USB memory stick is recognized.
- With SWP3 (ENTER) being held down, connect the portable battery charger to the XA connector (CN601) for the PCB, and supply power to the control board.
- [USB] will appear on the monitoring LED301. If "USB" does not appear, refer to Section 1.(1) in [9-4-2 Troubleshooting].

- When [USB] has appeared on the LED, lift the finger off SWP3 (ENTER).
  The unit is now in the data storage mode.

**<Storing data>**

- Press SWP3 (ENTER). If the data storage process has properly started, the progress (0-99) will be shown on the monitoring LED 301.
- [End] on the LED indicates successful completion of the data storage process.
  *It takes approximately five minutes for the data storage process to be completed.

**<Ending the data storage mode>**

- When done storing data, disconnect the portable battery charger from the control board.
- Then disconnect the USB memory stick from the control board.
- Turn the main power to the outdoor unit back on.

- If the data collection process needs to be started, check the operation data collection status by following the procedures explained in [9-2-3 Collecting Operation Data] and making the necessary settings.

### [Method 2] Storing data on a USB memory stick with the main power to the outdoor unit turned on

**<Starting up the unit in the data storage mode>**

- Stop the operation of all indoor units.
  *Although operation data can be collected without stopping all indoor units, doing so may be detected as a communication error.
- Connect a USB memory stick to the USB port (CNUSB) on the control board. Wait for five seconds until the USB memory stick is recognized.
- Press and hold SWP3 (ENTER) for approximately 10 seconds until [USB] appears on the monitoring LED 301.

- When [USB] has appeared on the LED, lift the finger off SWP3 (ENTER).
  The unit is now in the data storage mode.

**<Storing data>**

- Press SWP3 (ENTER). If the data storage process has properly started, the progress (0-99) will be shown on the monitoring LED 301.
- [End] on the LED indicates successful completion of the data storage process.
  *It takes approximately five minutes for the data storage process to be completed.

**<Ending the data storage mode>**

- When done storing data, disconnect the USB memory stick from the control board.
- Press and hold SWP3 (ENTER) for approximately 10 seconds until [End] disappears from the monitoring LED 301.
- Restart the indoor and outdoor units that were stopped to perform data storage.
- If the data collection process needs to be started, check the operation data collection status by following the procedures explained in [9-2-3 Collecting Operation Data] and making the necessary settings.

## (3) Confirmation of stored file

Confirm that the operation data is stored in the USB memory stick. Insert the USB memory stick into a computer, and check the contents in the memory stick.

Check that there is the following file in the memory stick.
File: MNTXXX.MT
“XXX” represents serial numbers from “000” to “100.”

## 9-2-3 Collecting Operation Data

This function is used to collect the operation data of the outdoor and indoor units via M-NET, and record the data in the flash memory on the control board. When the memory is full, it is overwritten from the first segment.
The settings for checking the status of operation data collection, for starting/ending data collection, and for continuing/stopping error-data collection are made, using the switches on the control board. The items to be set are shown in the table below.
The data collection setting is enabled by default, and the setting for error data collection during an error is disabled by default.

| Switch | | | Function | Operation set by the switch | | Timing for switch operation | Unit for setting |
|---|---|---|---|---|---|---|---|
| SW6-10 | SW4 (0: OFF, 1: ON) | | | OFF (LED3 OFF) | ON (LED3 ON) | | |
| OFF | NO.28 | 0011100000 | Data being collected | - | - | Anytime after power-on | OC setting necessary |
| ON | NO.817 | 1000110011 | Data collection enabled | Enabled | Disabled | Anytime after power-on | OC setting necessary |
| ON | NO.818 | 0100110011 | Data collection during an error | Disabled | Enabled | Anytime after power-on | OC setting necessary |

*When setting the switch SW4 on the control board, make sure the outdoor unit is energized.
Also use Section [5-1 Dipswitch Functions and Factory Settings] as a reference.

The procedure for making the operation data settings is shown below.

### 1. Operation procedure

### (1) Status Confirmation

1) Confirm the current status of operation data collection by setting the switches on the control board following the table shown above.
Switch setting: SW6-10: OFF
SW4: 28
Check the status on the maintenance LED display (LED301).
* For details, refer to Section [9-4-1 Maintenance LED Display Content List]

♦When “ON” or “OFF” is displayed, go to step (2) and the later steps.
♦When “Err” is displayed, go to step (3) and the later steps.
♦When “F-Er” is displayed, it indicates an error in the flash memory on the control board.
Refer to Section [9-4-2 Troubleshooting]

### (2) Setting Start and End of data collection

1) Set the switches on the control board by following the table shown above.
Switch setting: SW6-10: ON
SW4: 817
2) Press SWP3 (ENTER).With each switch operation, the setting can be alternately switched ON and OFF.
3) After conducting step (1), check that the operating condition is stable.
Data collection start: OFF (Enabled)
Data collection end: ON (Disabled)
Setting procedure is now complete.

### (3) Settings for error-data collection during an error

Stops or continues error-data collection when an error occurs.
1) Referring to the table above, set the control switches.
Switch setting: SW6-10: ON
SW4: 818
Stop collecting error-data when an error occurs: OFF
Continue collecting error-data when an error occurs: ON
2) To set the switches, press SWP3 (ENTER). Each pressing of SWP3 (ENTER) toggles between ON and OFF. Error data in the 6000's and the 7000's will be collected, regardless of the SW4 (818) settings.

### (4) Restarting data collection

1) If “Err” is shown, it indicates that data collection is being suspended for some reason, even though data collection is enabled. To restart, it is necessary to set the switches on the control board. Referring to (2)-1) and (2)-2), set the switches on the control board from OFF (original setting) to ON, and then to OFF again, and make sure the switches settings are indicated as being ON, following the instructions in (1)-1).

## 9-2-4 Precautions

For dealing with display on the maintenance LED and other problems, refer to Section [9-4 Maintenance LED Display and Troubleshooting].

### 1. Storage of data in a USB memory stick

- Take extra care regarding electric shock during the work on the control board, such as the insertion of the USB memory stick.
- Before starting in Normal Mode, remove the USB memory stick from the control board.
- Storing data in the USB memory stick may take a long time resulting in OS and communication errors. These errors affect neither storing process nor unit operation. If an error occurs, refer to [9-4-2 Troubleshooting].
- After normal startup, set the operation status of the air-conditioning units to the original status.
- USB memory sticks may become unusable due to unexpected damage or memory shortage. It is recommended to take extra USB memory sticks to the site.
- If only the OS is operated due to problems with the OC, collect data also from the OS by following the same operation procedure as for OC. Refer to Section [9-2-2 Storing Data on a USB Memory Stick].

### 2. Collection of operation data

- The collection of operation data does not start immediately after power-on, but does after ten minutes.
- When the operation data are being collected from AE-C400/EW-C50 or the Maintenance Tool, the function to collect outdoor unit (OC) data with a USB memory stick will not be available for use.

# 9-3 Software Rewrite Function on the USB (Outdoor unit, BC Controller)

The USB memory stick may be used to rewrite the software of the outdoor unit or the BC controller in the same way as using a ROM writer.

## 9-3-1 Preparation

- Prepare a USB memory stick and a portable battery charger.
  A LEAD WIRE ASSY USB for connecting the control board and the charger is also necessary.
  Make sure the portable battery charger is sufficiently charged.
- Prepare a countermeasure program file "******.mot" for the intended model.
- Copy the software rewrite program file "******.mot" onto the root folder of the USB memory stick.
  Install only one program and only in the root folder of the USB memory stick.

## 9-3-2 Rewriting Software

The procedure is shown below.

### 1. Operation procedure

### (1) Starting software rewrite mode

**[Outdoor unit]**

1) Shut down the power for the outdoor unit. Make sure the power for the outdoor unit control board is off.
   This is done by confirming LED2 is off.
2) Turn on switches SW7-9 of the outdoor unit control board.
3) Insert the USB memory stick into the USB port (CNUSB) on the control board. Wait for five seconds until the USB memory stick is recognized.
4) Connect the portable battery charger to the outdoor unit control board (CN601).
   The power of the outdoor unit control board will turn on.
5) Make sure the display “Pro” is shown on the maintenance LED (LED301).
   This shows that Software Rewrite Mode has been started.

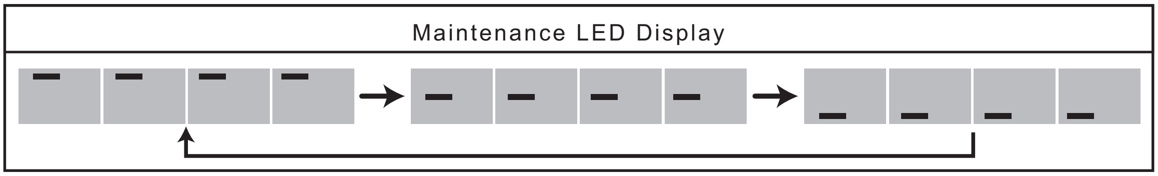
**[BC controller]**

1) Shut down the power for the outdoor unit and the BC controller. Make sure the power for the BC controller control board is off by checking that the maintenance LED (LD001) does not light up when pressing SWP1.
2) Turn on switches SW001-10 of the BC controller control board.
3) Insert the USB memory stick into the USB port (CNUSB) on the BC controller control board.
4) Connect the portable battery charger to the BC controller control board (CN703).
   The power of the BC controller control board will turn on.
5) Make sure the display “Pro” is shown on the maintenance LED (LD001).
   This shows that Software Rewrite Mode has been started.

### (2) Performing software rewriting

**[Outdoor unit, BC controller]**

1) Wait for 5 seconds after “Pro” appeared on the LED, and press SWP3 (ENTER) to start software rewrite.
   When the rewrite process is in progress, progress bars move as shown below.



2) If "End" is displayed on the LED, the rewrite process has been completed correctly. * Generally, this process takes about five minutes.

### (3) Confirmation of operation

**[Outdoor unit]**

1) Disconnect the portable battery charger from the outdoor unit control board (CN601). The control board will be turned off.
2) Remove the USB memory stick from the USB port (CNUSB) on the control board.
3) Turn off the switches SW7-9 on the control board.
4) Turn on the outdoor unit, and check that the versions of the outdoor unit and the software are the same.
   The version of the software may be found using the maintenance tool or other means.
   Perform a test run, and check for normal operation.

**[BC controller]**

1) Disconnect the portable battery charger from the BC controller control board (CN703). The BC controller control board will be turned off.
2) Remove the USB memory stick from the USB port (CNUSB) on the BC controller control board.
3) Turn off the switches SW001-10 of the BC controller control board.
4) Turn on the BC controller, and check that the versions of the BC controller and the software are the same.
   The version of the software may be found using the maintenance tool or other means.
   Perform a test run, and check for normal operation.

## 9-3-3 Precautions

For dealing with the displays shown on the maintenance LED and other problems, refer to Section [9-4 Maintenance LED Display and Troubleshooting]

- Take care to choose the correct countermeasure program for the intended model and version.
  Store only one software rewrite program on the USB memory stick.
  If this requirement is not met, software rewrite may not start.
- Be cautious of electric shock when connecting an USB memory stick or a portable battery charger to the control board.
- Connect the portable battery charger to the LEAD WIRE ASSY USB and then to the control board.
- Use a portable charger that supports the low current mode.
- Make sure the portable battery charger is sufficiently charged. Rewrite error may occur if battery charge is insufficient.
- Take care not to forget to remove the USB memory stick in step (3) - 2) or forget to turn off the switch in step (3) - 3). [9-3-2 Rewriting Software] If these precautions are not taken, the system may not start normally.
- When rewriting ended unsuccessfully, redo the procedure from step (1) - 3). [9-3-2 Rewriting Software] When rewriting ended unsuccessfully, the system may be started in Software Rewrite Mode instead of using the switches on the control board. Also refer to Section [9-4-2 Troubleshooting].
- If software cannot be successfully rewritten using an USB memory stick, use a ROM writer to rewrite the software.
- A battery charger not compatible with the low current mode may turn off while the data are being collected or while the S/W is being re-written, and these actions may not be completed successfully.

# 9-4 Maintenance LED Display and Troubleshooting

## 9-4-1 Maintenance LED Display Content List

The following table shows the maintenance LED displays for each function.
When dealing with the errors shown on the display, refer to Section [9-4-2 Troubleshooting]

### 1. Storing data on a USB memory stick (Outdoor unit)

| No. | Switch | Meaning | Maintenance LED Display | Description |
|---|---|---|---|---|
| 1 | Not applicable | Storage Mode activated |  | “USB” Storage Mode to USB memory stick is active. Storage is enabled. See Section [9-4-2 Troubleshooting]1-(1) and 1- (2). |
| 2 | | Storage in progress |  | 0 to 99 is displayed. Status of the data storage to the USB memory stick is shown by the progress rate. |
| 3 | | Storage completed |  | “END” The storage process has been completed successfully. |
| 4 | | Error (USB memory side) |  | “Er01” The storage process cannot be started due to failure of the USB memory stick. See Section [9-4-2 Troubleshooting]1- (3). |
| | | |  | “Er02” The storage process was stopped due to failure of the USB memory stick during processing. See Section [9-4-2 Troubleshooting]1- (4). |
| 5 | | Error (control board side) |  | “Er10” The storage process cannot be started due to failure of the control board. See Section [9-4-2 Troubleshooting]1- (5). |

## 2. Collecting operation data (Outdoor unit)

| No. | Switch | Meaning | Maintenance LED Display | Description |
|---|---|---|---|---|
| 6 | SW6-10: OFF<br>SW4: No.28 | Collection in progress |  | “ON” OC is collecting operation data. A blinking display indicates that data collection is temporarily suspended. No switch setting is necessary. Data collection will be resumed automatically. See Section [9-4-2 Troubleshooting]2-(1). |
| 7 | | Collection suspended |  | “OFF” Collection of operation data is suspended. |
| 8 | | Flash memory error |  | “F-Er” Collection of operation data is suspended due to failure in the flash memory used to store operation data. It may be necessary to change the board. See Section [9-4-2 Troubleshooting]2-(2). |
| 9 | | Error |  | “Err” Error was found due to the failure in units. After addressing the cause, data collection needs to be restated. See Section [9-4-2 Troubleshooting]2- (3). |

- Collect data from both OC and OS from multiple-outdoor unit systems.
  System operation data are stored on OC, and compressor operation time of OS and switch settings are stored on OS.
- When importing the OS data to the Maintenance Tool, an import error may appear. This error indicates that no data are available for import and does not indicate equipment failure.

## 3. Rewriting software (Outdoor unit, BC controller)

| No. | Switch | Meaning | Maintenance LED Display | Description |
|---|---|---|---|---|
| 10 | [Outdoor unit]<br>SW7-9: ON<br>[BC controller]<br>SW001-10: ON | Rewrite Mode activated |  | “PRO” Software rewrite mode is active. Software rewrite is enabled. See Section [9-4-2 Troubleshooting]3-(1), 3-(2) and 3- (3). |
| 11 |  | Rewrite in progress |  | Software rewrite is in progress. Bars are displayed in turn. |
|  |  |  |  |  |
|  |  |  |  |  |
| 12 |  | Software rewrite has been completed. |  | “END” Software rewrite has been completed successfully. |
| 13 |  | Error (USB memory side) |  | “Er01” Software rewrite process cannot be started due to failure of the USB memory stick. See Section [9-4-2 Troubleshooting]3- (4). |
|  |  |  |  | “Er02” Software rewrite was stopped due to failure of the USB memory stick during the software rewrite process. See Section [9-4-2 Troubleshooting]3- (5). |
| 14 |  | Error (control board side) |  | “Er10” Software rewrite was not completed due to failure in deleting the existing software. See Section [9-4-2 Troubleshooting]3- (6). |
|  |  |  |  | “Er11” Software rewrite has not been completed due to failure in writing new software. See Section [9-4-2 Troubleshooting]3- (6). |

## 9-4-2 Troubleshooting

Troubleshooting of USB functions are shown below.
The displays on the maintenance LED described in Section [9-4-1 Maintenance LED Display Content List]may also be used as a reference.

### 1. Storing on a USB memory stick (Outdoor unit)

### (1) Maintenance LED does not display "USB."

(Meaning or Cause)

The system was not started in Storage Mode.
The USB memory stick is not connected. Or, switch SWP3 may not be pressed deeply enough.

(Solution)

Check the connection of the USB memory stick, and try again using Section [9-2-2 Storing Data on a USB Memory Stick] as a reference.
Hold down the switch SWP3 until "USB" is displayed on the maintenance LED.
If the problem persists, there may be a problem with the USB memory stick.
Check if the USB memory stick meets the specification described in Section [9-1-3 Necessary Materials] (1) USB memory stick.
If compliance is confirmed, the USB memory stick may be broken. Replace it with a new one.

### (2) Pressing the switch SWP3 does not start data storage, and the maintenance LED continues to display "USB."

(Meaning or Cause)

There may be a problem with the USB memory stick.

(Solution)

Check the connection of the USB memory stick.
If no problem is found, the USB memory stick may be at fault.
Check that the USB memory stick meets the specification described in Section [9-1-3 Necessary Materials] (1) USB memory stick.
If compliance is confirmed, the USB memory stick may be broken. Replace it with a new one.

### (3) Maintenance LED displays "Er01."

(Meaning or Cause)

- Because there was a problem regarding the USB memory before the start of data storage, data storage has not been completed.
- Error Er01 occurs when SWP3 on the control board is pressed to rewrite the software immediately after power is supplied to the USB-connected control board.
(When the software rewriting is started before the control board recognizes the USB memory stick.)

(Solution)

Check the connection of the USB memory stick.
If no problem is found, the USB memory stick may be at fault.
Check the following four items.

- After supplying power to the USB-connected control board, wait at least five seconds before pressing SWP3 on the control board to rewrite software because it takes approximately five seconds for the control board to recognize the USB memory stick.
- Compliance of the USB memory stick to the specification described in Section [9-1-3 Necessary Materials] (1) USB memory stick.
- Available free space of the USB memory stick exceeding 50 MB.
- The maximum number of folders or files is not exceeded. When files are created in the USB memory stick, the upper limit of files is 101, including those files from "MNT000.MT" to "MNT100.MT."
Delete unnecessary folders or files.

When there is no problem in the four items above, the USB memory stick may be broken. Replace it with a new one.

### (4) Maintenance LED displays "Er02."

(Meaning or Cause)

Because there was a problem regarding the USB memory during data storage, data storage is unfinished.
For example, if the USB memory stick is disconnected during data storage, this display appears on the maintenance LED.

(Solution)

Check the connection of the USB memory stick.
If no problem was found, remove the USB memory stick from the control board and insert it again. Then conduct data storage referring to Section [9-2-2 Storing Data on a USB Memory Stick].

### (5) Maintenance LED displays "Er10."

(Meaning or Cause)

Because there was a problem regarding the control board during data storage, data storage is unfinished.

(Solution)

Perform data storage again.
Remove the USB memory stick from the control board and insert it again. Then conduct data storage using Section [9-2-2 Storing Data on a USB Memory Stick] as a reference.

If this still does not correct the problem, there may be a problem with the control board.

### (6) System does not start in Normal Mode.

(Meaning or Cause)

The USB memory stick may be left connected.

(Solution)

Remove the USB memory stick from the control board by referring to <Ending the data storage mode> under Section [9-2-2 Storing Data on a USB Memory Stick]. Then press SWP3 (ENTER). If the problem is not resolved, turn off the power to the outdoor unit, and restart the unit.

### (7) Unit cannot be started in the data storage mode.

(Meaning or Cause)

There may be problems with the control board.

(Solution)

Take the two measures 1 and 2 explained in (2) Storing data on a USB memory stick in 1 Procedure under [9-2-2 Storing Data on a USB Memory Stick].
If the unit cannot be started up in the data storage mode by following either of the two methods 1 or 2, the control board may be malfunctioning.

## 2. Collecting operation data (Outdoor unit)

### (1) Maintenance LED displays blinking "ON."

(Meaning or Cause)

Despite data collection function being enabled, it is not started yet.
There may be two causes.
Firstly, the initialization process immediately after the system startup may have inhibited the start of data collection.
Secondly, M-NET communication may be underway to enable maintenance tools or collect AE-C400/EW-C50 logs.

(Solution)

After a certain time, the problem will resolve itself, requiring no corrective actions.

### (2) Maintenance LED displays "F-Er."

(Meaning or Cause)

Because there was a problem with the flash memory used to store operation data, the collection of operation data is unfinished.

(Solution)

Restart the outdoor unit, check the status of data collection.
If the LED displays "F-Er," the flash memory may be broken.
Depending on the local conditions, replace the control board.
When the flash memory is not working correctly, data collection and storage to a memory stick cannot be performed, but the outdoor unit itself functions normally.

### (3) Maintenance LED displays blinking "Err."

(Meaning or Cause)

An error occurred in the unit, suspending data collection.

(Solution)

After resolving the error, resume data collection, referring to 1. Operation procedure (4) Restarting data collection under Section [9-2-3 Collecting Operation Data].

## 3. Rewriting software (Outdoor unit, BC controller)

### (1) Maintenance LED does not display "Pro."

(Meaning or Cause)

The system is not started in Software Rewrite Mode.
Switches SW7-9 (Outdoor unit) and SW001-10 (BC controller) on the control board may not be in the ON position, or the portable charger may not be charged sufficiently.
The power-supply units (Outdoor unit/transmission booster) may not be turned off.

(Solution)

Make sure switches SW7-9 are ON using Section [9-3-2 Rewriting Software] as a reference.
Restart using a fully charged portable charger or a different charger.

Check that the power-supply units (Outdoor units/transmission booster) are turned off.

### (2) Pressing the switch SWP3 for rewriting software process does not start the process, and Maintenance LED continues to display "Pro."

(Meaning or Cause)

There may be a problem with the USB memory stick.

(Solution)

Check the connection of the USB memory stick.
If no problem is found, the USB memory stick may be at fault.
Check if the USB memory stick meets the specification described in Section [9-1-3 Necessary Materials] (1) USB memory stick.
If compliance is confirmed, the USB memory stick may be broken. Replace it with a new one.

### (3) At the time of the system start after "END" was displayed, Maintenance LED displays "Pro."

(Meaning or Cause)

The system was started in Software Rewrite Mode.
Switches SW7-9 (Outdoor unit) and SW001-10 (BC controller) on the control board may not be in the OFF position.
If the switches are in the OFF position, it means the software rewrite process has failed.

(Solution)

After turning off control board switches, turn on the system again.
If the control board switches are in the OFF position, it means the software rewrite process has failed.
Try rewriting the software again by following the procedure detailed in 1 (1) Starting software rewrite mode under Section [9-3-2 Rewriting Software]. If the problem persists, rewrite the software, using a ROM writer.

### (4) Maintenance LED displays "Er01."

(Meaning or Cause)

- Because an error occurred in the USB memory stick before the start of software rewrite, software rewrite has not been completed.
- Error Er01 occurs when SWP3 on the control board is pressed to rewrite the software immediately after power is supplied to the USB-connected control board.
  (When the software rewriting is started before the control board recognizes the USB memory stick.)

(Solution)

Check the connection of the USB memory stick.
If no problem is found, the USB memory stick may be at fault.
Check the following five items.

- After supplying power to the USB-connected control board, wait at least five seconds before pressing SWP3 on the control board to rewrite software because it takes approximately five seconds for the control board to recognize the USB memory stick.
- Compliance of the USB memory stick to the specification of Section [9-1-3 Necessary Materials] (1) USB memory stick.
- The countermeasure program file "******.mot” for the intended model is used.
  The countermeasure program is not for a different model or version.
- The countermeasure program file "******.mot” is stored in the root folder. It is not stored in another folder.
- Make sure that the program file "******.mot” is stored in the root folder of the USB memory and not in any folder created on the USB memory stick.

When there is no problem in the five items above, the USB memory stick may be broken. Replace it with a new one. After the check is completed, follow the procedure starting with the step explained in 1. Operation procedure (1) Starting software rewrite mode under [9-3-2 Rewriting Software].

### (5) Maintenance LED displays "Er02."

(Meaning or Cause)

Software rewrite is suspended due to a problem with the USB memory stick during the software rewrite process.
For example, if the USB memory stick is disconnected during data storage, this display appears on the maintenance LED.

(Solution)

Check the connection of the USB memory stick.
If no problems are found, follow the procedure starting with the step explained in 1. Operation procedure (1) Starting software rewrite mode under [9-3-2 Rewriting Software].

### (6) Maintenance LED displays "Er10” or "Er11.”

(Meaning or Cause)

Because there was a problem in the control board during the software rewrite process, software rewrite has not been completed.

(Solution)

Try rewriting the software again by following the procedure detailed in 1. Operation procedure (1) Starting software rewrite mode under Section [9-3-2 Rewriting Software]. If the problem persists, rewrite the software, using a ROM writer.

### (7) Service monitor LED lights off while the S/W is being re-written, and the process cannot be completed.

(Meaning or Cause)

The re-writing process may not have been completed due to a power-supply interruption from the battery charger.

(Solution)

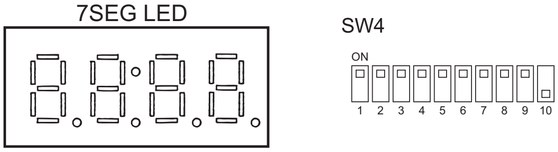
- Make sure the battery charger is compatible with the low-current mode.
- If a battery charger that is compatible with the low-current mode is not available, re-write the S/W using a ROM writer.

# Chapter 10 LED Status Indicators

# 10-1 LED Status Indicators (Outdoor unit)

## 10-1-1 How to Read the LED

By setting the DIP SW 4-1 through 4-10 and SW6-9 (Set SW6-10 to OFF.)(Switch number 10 is represented by 0), the operating condition of the unit can be monitored on the service monitor. (Refer to the table on the following pages for DIP SW settings.)
The service monitor uses 4-digit 7-segment LED to display numerical values and other types of information.



⬩In the example above, 1 through 9 are set to ON, and 10 is set to OFF.

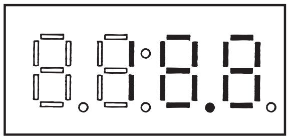
Pressure and temperature are examples of numerical values, and operating conditions and the on-off status of solenoid valve are examples of flag display.

1) Display of numerical values

Example: When the pressure data sensor reads 18.8kg/cm$^2$ (Item No. 58)

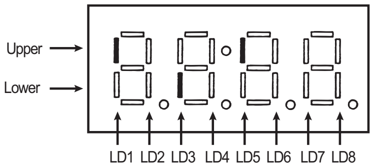
⬩The unit of pressure is in kg/cm$^2$

⬩ Use the following conversion formula to convert the displayed value into a value in SI unit.
Value in SI unit (MPa) = Displayed value (kg/cm$^2$) x 0.098

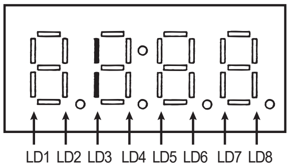


2) Flag display

Example: When 21S4a, 21S4b, SV1a are ON. (Item No. 3)

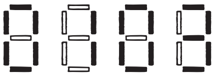
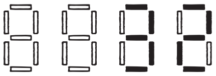
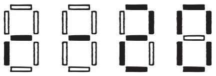
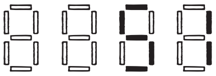


Example: 3-minutes restart mode (Item No. 14)



## 10-1-2 Initial LED Display

From power on until the completion of initial settings, the following information will be displayed on the monitor screen. (Displays No. 1 through No. 4 in order repeatedly.)

| No | Item | Display | Remarks |
|---|---|---|---|
| 1 | Software version |  | [0103] : Version 1.03 |
| 2 | Refrigerant type |  | [   32] : R32 |
| 3 | Model and capacity |  | [r-20] : Cooling/Heating 20 HP<br>For the first few minutes after power on, the capacity of each outdoor unit is displayed. Thereafter, the combined capacity is displayed. |
| 4 | Communication address |  | [   51] : Address 51 |

After the initial settings have been completed, the information on these items can be checked by making the switch setting that corresponds to No. 517 in the LED display table.

**Note**

Only item No. 1 "Software Version" appears on the display if there is a wiring failure between the control board and the transmission line power supply board or if the circuit board has failed. LED may not light up at all.

- How to convert HP capacity to Model name

HP capacity is the capacity of outdoor unit that is shown on LED display at initial setting.
Please refer to the following table to covert from HP capacity to Model name.

| HP | Model | HP | Model |
|---|---|---|---|
| 8 | 72 | 32 | 312 |
| 10 | 96 | 34 | 336 |
| 12 | 120 | 36 | 360 |
| 14 | - | 38 | - |
| 16 | 144 | 40 | 384 |
| 18 | 168 | 42 | - |
| 20 | 192 | 44 | - |
| 22 | 216 | 46 | - |
| 24 | 240 | 48 | - |
| 26 | - | 50 | - |
| 28 | 264 | 52 | - |
| 30 | 288 | 54 | - |

## 10-1-3 Clock Memory Function

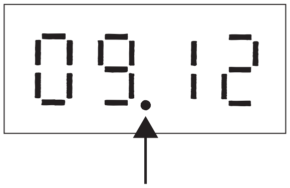
The outdoor unit has a simple clock function that enables the unit to calculate the current time with an internal timer by receiving the time set by the system controller, such as AE-C400.
If an error (including a preliminary error) occurs, the error history data and the error detection time are stored into the service memory.
The error detection time stored in the service memory and the current time can be seen on the service LED.

**Note**

1) Use the time displayed on the service LED as a reference.
2) The date and the time are set to "00" by default. If a system controller that sets the time, such as AE-C400 is not connected, the elapsed time and days since the first power on will be displayed.
   If the time set on a system controller is received, the count will start from the set date and the time.
3) The time is not updated while the power of the indoor unit is turned off. When the power is turned off and then on again, the count will resume from the time before the power was turned off. Thus, the time that differs the actual time will be displayed. (This also applies when a power failure occurs.)
   The system controller, such as AE-C400, adjusts the time once a day. When the system controller is connected, the time will be automatically updated to the correct current time after the time set by the system controller is received. (The data stored into the memory before the set time is received will not be updated.)

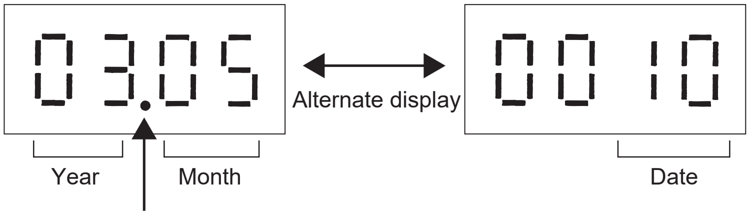
### (1) Reading the time data:

1) Time display
   Example: 12 past 9



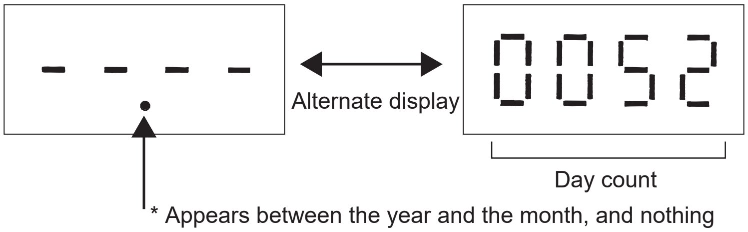
* Disappears if the time data is deviated due to a power failure, or if a system controller that sets the time is not connected.

2) Date display
   - When the main controller that can set the time is connected
   Example: May 10, 2003



* Appears between the year and the month, and nothing appears when the date is displayed.

   - When the main controller that can set the time is not connected
   Example: 52 days after power was turned on



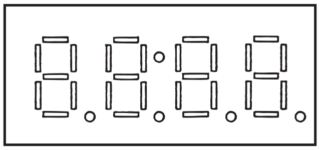
* Appears between the year and the month, and nothing appears when the date is displayed.

# 10-2 LED Status Indicators (BC controller)

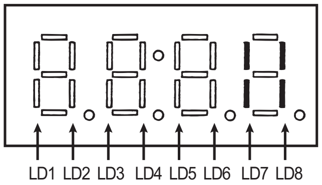
## 10-2-1 How to Read the LED

The operation status of the unit can be monitored on the service monitor.
The service monitor uses 4-digit 7-segment LED to display flags.
There are no check items using dipswitch settings.

7SEG LED

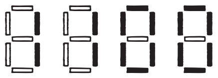
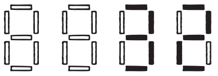
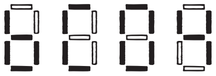
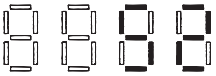


LD5: 52C
LD7: BC
LD8: Microcomputer in operation



## 10-2-2 Initial LED Display

From power on until the completion of initial settings, the following information will be displayed on the monitor screen. (Displays No. 1 through No. 4 in order repeatedly.)

| No | Item | Display | Remarks |
|---|---|---|---|
| 1 | Software version |  | [1100] : Version |
| 2 | Refrigerant type |  | [ 32] : R32 |
| 3 | Model and capacity |  | [bC04] : M104NU-MA<br>[bC06] : M106NU-MA [bS04] : M104NU-MB<br>[bC08] : M108NU-MA [bS08] : M108NU-MB<br>[bC12] : M1012NU-MA |
| 4 | Communication address |  | [ 52] : Address 52 |

**Note**

Only item No. 1 "Software Version" appears on the display if there is a wiring failure between the control board and the transmission line power supply board or if the circuit board has failed. LED may not light up at all.

# 10-3 LED Status Indicators Table

**Current data**

| No. | SW4 (SW6 - 9: OFF, SW6-10: OFF) | Item | | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 0 | 0000000000 | Relay output display 1 | | Comp in operation | | | System response setting enabled | 72C | | OC | CPU in operation | A | A | |
| | | Check (error) display 1 OC/OS error | | 0000 to 9999 (Address and error codes highlighted) | | | | | | | | B | B | |
| 1 | 1000000000 | Check (error) display 2 OC/OS error | | 0000 to 9999 (Address and error codes highlighted) | | | | | | | | A | A | Display of the latest preliminary error<br>If no preliminary errors are detected, "----" appears on the display. |
| 2 | 0100000000 | Check (error) display 3 (Including IC and BC) | | 0000 to 9999 (Address and error codes highlighted) | | | | | | | | B | | If no errors are detected, "----" appears on the display. |
| 3 | 1100000000 | Relay output display 2 | Top | 21S4a | | CH11 | SV12 | SV1a | | SV2 | | A | A | |
| | | | Bottom | | | 21S4b | | | | | | | | |
| 4 | 0010000000 | Relay output display 3 | Top | | | | | | | | Supply power | A | A | |
| | | | Bottom | | | | | | SV13 | SV16 | | | | |
| 5 | 1010000000 | Relay output display 4 | Top | Optional 200 V output | | CH21 | | | | | | A | A | |
| | | | Bottom | | | | | | | | | | | |
| 7 | 1110000000 | Special control | | Retry operation | Emergency operation | | | | | Communication error between the OC and OS | Communication error<br>3-minute restart delay mode | B | B | |
| 9 | 1001000000 | Communication demand capacity | | 0000 to 9999 | | | | | | | | B | B | If not demanded controlled, "----" [ % ] appears on the display. |
| 10 | 0101000000 | Contact point demand capacity | | 0000 to 9999 | | | | | | | | B | | If not demanded controlled, "----" [ % ] appears on the display. |
| 11 | 1101000000 | External signal (Open input contact point) | | Contact point demand | Low-noise mode (Capacity priority ) | Snow sensor | Cooling-heating changeover (Cooling) | Cooling-heating changeover (Heating) | | | | A | A | |
| 12 | 0011000000 | External signal (Open input contact point) | | | | | | | | | Low-noise mode (Quiet priority) | A | A | |
| 13 | 1011000000 | | | | | | | | | | | | | |
| 14 | 0111000000 | Outdoor unit operation status | | BC operation signal | Warm-up mode | 3-minutes restart mode | Compressor in operation | Preliminary error | Error | 3-minutes restart after instantaneous power failure | Preliminary low pressure error | A | A | |
| 15 | 1111000000 | OC/OS identification | | OC/OS | | | | | | | | A | A | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Current data**

| No. | SW4 (SW6 - 9: OFF, SW6-10: OFF) | Item | | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 16 | 0000100000 | Indoor unit check | Top | Unit No. 1 | Unit No. 2 | Unit No. 3 | Unit No. 4 | Unit No. 5 | Unit No. 6 | Unit No. 7 | Unit No. 8 | B | | The lamp that corresponds to the unit that came to an abnormal stop lights.<br>The lamp goes off when the error is reset.<br>Each unit that comes to an abnormal unit will be given a sequential number in ascending order starting with 1. |
| | | | Bottom | Unit No. 9 | Unit No. 10 | Unit No. 11 | Unit No. 12 | Unit No. 13 | Unit No. 14 | Unit No. 15 | Unit No. 16 | | | |
| 17 | 1000100000 | | Top | Unit No. 17 | Unit No. 18 | Unit No. 19 | Unit No. 20 | Unit No. 21 | Unit No. 22 | Unit No. 23 | Unit No. 24 | | | |
| | | | Bottom | Unit No. 25 | Unit No. 26 | Unit No. 27 | Unit No. 28 | Unit No. 29 | Unit No. 30 | Unit No. 31 | Unit No. 32 | | | |
| 18 | 0100100000 | | Top | Unit No. 33 | Unit No. 34 | Unit No. 35 | Unit No. 36 | Unit No. 37 | Unit No. 38 | Unit No. 39 | Unit No. 40 | | | |
| | | | Bottom | Unit No. 41 | Unit No. 42 | Unit No.43 | Unit No. 44 | Unit No. 45 | Unit No. 46 | Unit No. 47 | Unit No. 48 | | | |
| 19 | 1100100000 | | Top | Unit No. 49 | Unit No. 50 | | | | | | | | | |
| | | | Bottom | | | | | | | | | | | |
| 20 | 0010100000 | Indoor unit Operation mode | Top | Unit No. 1 | Unit No. 2 | Unit No. 3 | Unit No. 4 | Unit No. 5 | Unit No. 6 | Unit No. 7 | Unit No. 8 | B | | Lit during cooling<br>Blinking during heating<br>Unlit while the unit is stopped or in the fan mode |
| | | | Bottom | Unit No. 9 | Unit No. 10 | Unit No. 11 | Unit No. 12 | Unit No. 13 | Unit No. 14 | Unit No. 15 | Unit No. 16 | | | |
| 21 | 1010100000 | | Top | Unit No. 17 | Unit No. 18 | Unit No. 19 | Unit No. 20 | Unit No. 21 | Unit No. 22 | Unit No. 23 | Unit No. 24 | | | |
| | | | Bottom | Unit No. 25 | Unit No. 26 | Unit No. 27 | Unit No. 28 | Unit No. 29 | Unit No. 30 | Unit No. 31 | Unit No. 32 | | | |
| 22 | 0110100000 | | Top | Unit No. 33 | Unit No. 34 | Unit No. 35 | Unit No. 36 | Unit No. 37 | Unit No. 38 | Unit No. 39 | Unit No. 40 | | | |
| | | | Bottom | Unit No. 41 | Unit No. 42 | Unit No.43 | Unit No. 44 | Unit No. 45 | Unit No. 46 | Unit No. 47 | Unit No. 48 | | | |
| 23 | 1110100000 | | Top | Unit No. 49 | Unit No. 50 | | | | | | | | | |
| | | | Bottom | | | | | | | | | | | |
| 24 | 0001100000 | Indoor unit thermostat | Top | Unit No. 1 | Unit No. 2 | Unit No. 3 | Unit No. 4 | Unit No. 5 | Unit No. 6 | Unit No. 7 | Unit No. 8 | B | | Lit when thermostat is on<br>Unlit when thermostat is off |
| | | | Bottom | Unit No. 9 | Unit No. 10 | Unit No. 11 | Unit No. 12 | Unit No. 13 | Unit No. 14 | Unit No. 15 | Unit No. 16 | | | |
| 25 | 1001100000 | | Top | Unit No. 17 | Unit No. 18 | Unit No. 19 | Unit No. 20 | Unit No. 21 | Unit No. 22 | Unit No. 23 | Unit No. 24 | | | |
| | | | Bottom | Unit No. 25 | Unit No. 26 | Unit No. 27 | Unit No. 28 | Unit No. 29 | Unit No. 30 | Unit No. 31 | Unit No. 32 | | | |
| 26 | 0101100000 | | Top | Unit No. 33 | Unit No. 34 | Unit No. 35 | Unit No. 36 | Unit No. 37 | Unit No. 38 | Unit No. 39 | Unit No. 40 | | | |
| | | | Bottom | Unit No. 41 | Unit No. 42 | Unit No.43 | Unit No. 44 | Unit No. 45 | Unit No. 46 | Unit No. 47 | Unit No. 48 | | | |
| 27 | 1101100000 | | Top | Unit No. 49 | Unit No. 50 | | | | | | | | | |
| | | | Bottom | | | | | | | | | | | |
| 28 | 0011100000 | Drive recorder status | | Drive recorder is stopped (OFF).: "OFF"<br>Drive recorder is in operation (ON).: "ON"<br>Drive recorder is in operation, but unable to start for a certain reason. *1: "ON" flashes.<br>On-board flash error *2: "F-Er"<br>Drive recorder has automatically stopped due to a serious error in the system. "Err" | | | | | | | | B | | |
| 37 | 1010010000 | BC operation mode | | Cooling-only ON | Cooling-only OFF | Heating-only ON | Heating-only OFF | Mixed-mode ON | Mixed-mode OFF | Fan | Stop | B | | |
| 39 | 1110010000 | Outdoor unit Operation mode | | Permissible stop | Standby | Cooling | Cooling-main | Heating | Heating-main | | | A | A | |
| 42 | 0101010000 | Outdoor unit control mode | | Stop | Thermo OFF | Abnormal stop | Scheduled control | Initial start up | Defrost | Oil balance | Low frequency oil recovery | A | A | |
| 43 | 1101010000 | | | Warm-up mode | Refrigerant recovery | | | | | | | A | A | |
| 45 | 1011010000 | TH4 | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |
| 46 | 0111010000 | TH3 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 47 | 1111010000 | TH7 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 48 | 0000110000 | TH6 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 50 | 0100110000 | TH5 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 56 | 0001110000 | THHS1 | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |
| 58 | 0101110000 | High-pressure sensor data | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [$kgf/cm^2$] |
| 59 | 1101110000 | Low-pressure sensor data | | -99.9 to 999.9 | | | | | | | | A | A | |
| 62 | 0111110000 | TH15 | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## 10 LED Status Indicators

### Current data

| No. | SW4 (SW6 - 9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 78 | 0111001000 | ∑ Qj | 0000 to 9999 | | | | | | | | B | B | |
| 79 | 1111001000 | ∑ Qjc | 0000 to 9999 | | | | | | | | B | B | |
| 80 | 0000101000 | ∑ Qjh | 0000 to 9999 | | | | | | | | B | B | |
| 81 | 1000101000 | Target Tc | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 82 | 0100101000 | Target Te | -99.9 to 999.9 | | | | | | | | B | | |
| 83 | 1100101000 | Tc | -99.9 to 999.9 | | | | | | | | A | A | |
| 84 | 0010101000 | Te | -99.9 to 999.9 | | | | | | | | A | A | |
| 86 | 0110101000 | Total frequencies (OC+OS) | 0000 to 9999 | | | | | | | | B | | Control data [ Hz ] |
| 87 | 1110101000 | Total frequency of each unit | 0000 to 9999 | | | | | | | | A | A | |
| 88 | 0001101000 | COMP frequency | 0000 to 9999 | | | | | | | | A | A | |
| 89 | 1001101000 | THHS (FAN1) | -99.9 to 999.9 | | | | | | | | A | A | |
| 90 | 0101101000 | THHS (FAN2) | -99.9 to 999.9 | | | | | | | | A | A | |
| 91 | 1101101000 | COMP operating frequency | 0000 to 9999 | | | | | | | | A | A | The unit is [rps]<br>Output frequency of the inverter depends on the type of compressor and equals the integer multiples (x1, x2 etc.) of the operating frequency of the compressor. |
| 92 | 0011101000 | Number of times error occurred during crankcase heating by compressor motor | 0000 to 9999 | | | | | | | | A | A | Number of times INV error occurred during IH crankcase heating by compressor motor |
| 93 | 1011101000 | All AK (OC+OS) | 0000 to 9999 | | | | | | | | B | | |
| 94 | 0111101000 | AK | 0000 to 9999 | | | | | | | | A | A | |
| 95 | 1111101000 | FAN1 | 0000 to 9999 | | | | | | | | A | A | Fan output [ % ] |
| 96 | 0000011000 | Fan inverter output rpm (FAN1) | 0000 to 9999 | | | | | | | | A | A | [rpm] |
| 97 | 1000011000 | FAN2 | 0000 to 9999 | | | | | | | | A | A | Fan output [ % ] |
| 98 | 0100011000 | Fan inverter output rpm (FAN2) | 0000 to 9999 | | | | | | | | A | A | [rpm] |
| 104 | 0001011000 | LEV2 | 0000 to 9999 | | | | | | | | A | A | |
| 105 | 1001011000 | LEV4 | 0000 to 9999 | | | | | | | | A | A | |
| 108 | 0011011000 | COMP operating current (DC) | 00.0 to 999.9 | | | | | | | | A | A | Peak value[A] |
| 109 | 1011011000 | LEV2b | 0000 to 9999 | | | | | | | | A | A | |
| 111 | 1111011000 | COMP bus voltage | 00.0 to 999.9 | | | | | | | | A | A | The unit is [ V ] |
| 112 | 0000111000 | LEV2d | 0000 to 9999 | | | | | | | | A | A | |
| 114 | 0100111000 | ALh | 0: -, 1: Low, 2: Mid, 3: High | | | | | | | | A | A | |
| 116 | 0010111000 | Number of times the unit went into the mode to remedy wet vapor suction | 0000 to 9999 | | | | | | | | B | | |
| 117 | 1010111000 | COMP Operation time Upper 4 digits | 0000 to 9999 | | | | | | | | A | A | The unit is [ h ] |
| 118 | 0110111000 | COMP Operation time Lower 4 digits | 0000 to 9999 | | | | | | | | A | A | |
| 121 | 1001111000 | Backup mode | Abnormal pressure rise | High-pressure drop | Low-pressure drop | Abnormal Td rise | High-pressure during defrost cycle | Control box temperature rise | | | A | A | Stays lit for 90 seconds after the completion of backup control |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Current data**

| No. | SW4 (SW6 - 9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 123 | 1101111000 | COMP number of start-stop events<br>Upper 4 digits | 0000 to 9999 | | | | | | | | A | A | Count-up at start-up<br>The unit is [Time] |
| 124 | 0011111000 | COMP number of start-stop events<br>Lower 4 digits | 0000 to 9999 | | | | | | | | A | A | |
| 129 | 1000000100 | Integrated operation time of compressor (for rotation purpose) | 0000 to 9999 | | | | | | | | B | | The unit is [ h ] |
| 178 | 0100110100 | Error history 1 | 0000 to 9999 | | | | | | | | B | B | Address and error codes highlighted<br>If no errors are detected, "---- " appears on the display.<br>Preliminary error information of the OS does not appear on the OC.<br>Neither preliminary error information of the OC nor error information of the IC appears on the OS. |
| 179 | 1100110100 | Error history 1: detail codes | Error history 1: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 180 | 0010110100 | Error history 2 | 0000 to 9999 | | | | | | | | B | B | |
| 181 | 1010110100 | Error history 2: detail codes | Error history 2: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 182 | 0110110100 | Error history 3 | 0000 to 9999 | | | | | | | | B | B | |
| 183 | 1110110100 | Error history 3: detail codes | Error history 3: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 184 | 0001110100 | Error history 4 | 0000 to 9999 | | | | | | | | B | B | |
| 185 | 1001110100 | Error history 4: detail codes | Error history 4: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 186 | 0101110100 | Error history 5 | 0000 to 9999 | | | | | | | | B | B | |
| 187 | 1101110100 | Error history 5: detail codes | Error history 5: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 188 | 0011110100 | Error history 6 | 0000 to 9999 | | | | | | | | B | B | |
| 189 | 1011110100 | Error history 6: detail codes | Error history 6: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 190 | 0111110100 | Error history 7 | 0000 to 9999 | | | | | | | | B | B | |
| 191 | 1111110100 | Error history 7: detail codes | Error history 7: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 192 | 0000001100 | Error history 8 | 0000 to 9999 | | | | | | | | B | B | |
| 193 | 1000001100 | Error history 8: detail codes | Error history 8: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 194 | 0100001100 | Error history 9 | 0000 to 9999 | | | | | | | | B | B | |
| 195 | 1100001100 | Error history 9: detail codes | Error history 9: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 196 | 0010001100 | Error history 10 | 0000 to 9999 | | | | | | | | B | B | |
| 197 | 1010001100 | Error history 10: detail codes | Error history 10: detail codes (0001 to 0120) | | | | | | | | A | A | |
| 198 | 0110001100 | Error history of inverter<br>(At the time of last data backup before error) | 0000 to 9999 | | | | | | | | B | B | |
| 199 | 1110001100 | Error history (data saved before error): detail codes | Error history (data saved before error): detail codes (0001 to 0120) | | | | | | | | A | A | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Data before error**

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 201 | 1001001100 | Outdoor unit operation status | | BC operation signal | Warm-up mode | 3-minutes restart mode | Compressor in operation | Preliminary error | Error | 3-minutes restart after instantaneous power failure | Preliminary low pressure error | A | A | |
| 202 | 0101001100 | OC/OS identification | | OC/OS | | | | | | | | A | A | |
| 203 | 1101001100 | BC operation mode | | Cooling-only ON | Cooling-only OFF | Heating-only ON | Heating-only OFF | Mixed-mode ON | Mixed-mode OFF | Fan | Stop | A | A | |
| 205 | 1011001100 | Outdoor unit Operation mode | | Permissible stop | Standby | Cooling | Cooling-main | Heating | Heating-main | | | A | A | |
| 208 | 0000101100 | Outdoor unit control mode | | Stop | Thermo OFF | Abnormal stop | Scheduled control | Initial start up | Defrost | Oil balance | Low frequency oil recovery | A | A | |
| 209 | 1000101100 | Outdoor unit control mode | | | Refrigerant recovery | | | | | | | A | A | |
| 211 | 1100101100 | Relay output display 1 | | Comp in operation | | | | 72C | | OC | Always lit | A | A | |
| 212 | 0010101100 | Relay output display 2 | Top | 21S4a | | CH11 | SV12 | SV1a | | SV2 | | A | A | |
| | | | Bottom | | | 21S4b | | | | | | | | |
| 213 | 1010101100 | Relay output display 3 | Top | | | | | | | | Lit while power to the indoor units is being supplied | A | A | |
| | | | Bottom | | | | | | SV13 | SV16 | | | | |
| 214 | 0110101100 | Relay output display 4 | Top | Optional 200 V output | | CH21 | | | | | | A | A | |
| | | | Bottom | | | | | | | | | | | |
| 216 | 0001101100 | TH4 | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |
| 217 | 1001101100 | TH3 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 218 | 0101101100 | TH7 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 219 | 1101101100 | TH6 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 221 | 1011101100 | TH5 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 227 | 1100011100 | THHS1 | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |
| 229 | 1010011100 | High-pressure sensor data | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [kgf/cm$^2$] |
| 230 | 0110011100 | Low-pressure sensor data | | -99.9 to 999.9 | | | | | | | | A | A | |
| 233 | 0101011100 | TH15 | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |
| 234 | 0101011100 | TH11 | | -99.9 to 999.9 | | | | | | | | A | A | |
| 238 | 0111011100 | ALh | | 0: -, 1: Low, 2: Mid, 3: High | | | | | | | | A | A | |
| 249 | 1001111100 | ∑ Qj | | 0000 to 9999 | | | | | | | | B | B | |
| 250 | 0101111100 | ∑ Qjc | | 0000 to 9999 | | | | | | | | B | B | |
| 251 | 1101111100 | ∑ Qjh | | 0000 to 9999 | | | | | | | | B | B | |
| 252 | 0011111100 | Target Tc | | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 253 | 1011111100 | Target Te | | -99.9 to 999.9 | | | | | | | | B | | |
| 254 | 0111111100 | Tc | | -99.9 to 999.9 | | | | | | | | A | A | The unit is [°C] |
| 255 | 1111111100 | Te | | -99.9 to 999.9 | | | | | | | | A | A | |
| 257 | 1000000010 | Total frequencies (OC+OS) | | 0000 to 9999 | | | | | | | | B | | Control data<br>[ Hz ] |
| 258 | 0100000010 | Total frequency of each unit | | 0000 to 9999 | | | | | | | | A | A | |
| 259 | 1100000010 | COMP frequency | | 0000 to 9999 | | | | | | | | A | A | |
| 260 | 0010000010 | THHS (FAN1) | | -99.9 to 999.9 | | | | | | | | A | A | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

### Data before error

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 261 | 1010000010 | THHS (FAN2) | -99.9 to 999.9 | | | | | | | | A | A | |
| 262 | 0110000010 | COMP output frequency | 0000 to 9999 | | | | | | | | A | A | |
| 264 | 0001000010 | All AK (OC+OS) | 0000 to 9999 | | | | | | | | B | | |
| 265 | 1001000010 | AK | 0000 to 9999 | | | | | | | | A | A | |
| 266 | 0101000010 | FAN1 | 0000 to 9999 | | | | | | | | A | A | Fan inverter output [ % ] |
| 267 | 1101000010 | Fan inverter output rpm (FAN1) | 0000 to 9999 | | | | | | | | A | A | [rpm] |
| 268 | 0011000010 | FAN2 | 0000 to 9999 | | | | | | | | A | A | Fan inverter output [ % ] |
| 269 | 1011000010 | Fan inverter output rpm (FAN2) | 0000 to 9999 | | | | | | | | A | A | [rpm] |
| 275 | 1100100010 | LEV2 | 0000 to 9999 | | | | | | | | A | A | |
| 276 | 0010100010 | LEV4 | 0000 to 9999 | | | | | | | | A | A | |
| 279 | 1110100010 | COMP operating current (DC) | 00.0 to 999.9 | | | | | | | | A | A | Peak value[A] |
| 282 | 0101100010 | COMP bus voltage | 00.0 to 999.9 | | | | | | | | A | A | The unit is [ V ] |
| 283 | 1101100010 | LEV2b | 0000 to 9999 | | | | | | | | A | A | |
| 285 | 1011100010 | LEV2d | 0000 to 9999 | | | | | | | | A | A | |
| 288 | 0000010010 | COMP Operation time Upper 4 digits | 0000 to 9999 | | | | | | | | A | A | The unit is [ h ] |
| 289 | 1000010010 | COMP Operation time Lower 4 digits | 0000 to 9999 | | | | | | | | A | A | |
| 294 | 0110010010 | COMP number of start-stop events<br>Upper 4 digits | 0000 to 9999 | | | | | | | | A | A | Count-up at start-up<br>The unit is [Time] |
| 295 | 1110010010 | COMP number of start-stop events<br>Lower 4 digits | 0000 to 9999 | | | | | | | | A | A | |
| 300 | 0011010010 | Integrated operation time of compressor (for rotation purpose) | 0000 to 9999 | | | | | | | | B | | The unit is [ h ] |
| 301 | 1011010010 | Power supply unit | OC/OS ↔ Address | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Setting data**

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 512 | 0000000001 | Self-address | Alternate display of self address and unit model | | | | | | | | A | A | |
| 513 | 1000000001 | IC/FU address | Count-up display of number of connected units | | | | | | | | B | | |
| 514 | 0100000001 | RC address | Count-up display of number of connected units | | | | | | | | B | | |
| 516 | 0010000001 | OS address | Count-up display of number of connected units | | | | | | | | B | | |
| 517 | 1010000001 | Version/Capacity | S/W version → Refrigerant type → Model and capacity → Communication address | | | | | | | | A | A | |
| 518 | 0110000001 | OC address | OC address display | | | | | | | | | B | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## Data on indoor unit system

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 523 | 1101000001 | IC1 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 524 | 0011000001 | IC2 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 525 | 1011000001 | IC3 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 526 | 0111000001 | IC4 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 527 | 1111000001 | IC5 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 528 | 0000100001 | IC6 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 529 | 1000100001 | IC7 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 530 | 0100100001 | IC8 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 531 | 1100100001 | IC9 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 532 | 0010100001 | IC10 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 533 | 1010100001 | IC11 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 534 | 0110100001 | IC12 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 535 | 1110100001 | IC13 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 536 | 0001100001 | IC14 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 537 | 1001100001 | IC15 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 538 | 0101100001 | IC16 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 539 | 1101100001 | IC17 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 540 | 0011100001 | IC18 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 541 | 1011100001 | IC19 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 542 | 0111100001 | IC20 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 543 | 1111100001 | IC21 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 544 | 0000010001 | IC22 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 545 | 1000010001 | IC23 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 546 | 0100010001 | IC24 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 547 | 1100010001 | IC25 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 548 | 0010010001 | IC26 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 549 | 1010010001 | IC27 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 550 | 0110010001 | IC28Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 551 | 1110010001 | IC29 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 552 | 0001010001 | IC30 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 553 | 1001010001 | IC31 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 554 | 0101010001 | IC32 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 555 | 1101010001 | IC33 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 556 | 0011010001 | IC34 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 557 | 1011010001 | IC35 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 558 | 0111010001 | IC36 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 559 | 1111010001 | IC37 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 560 | 0000110001 | IC38 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 561 | 1000110001 | IC39 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 562 | 0100110001 | IC40 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 563 | 1100110001 | IC41 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 564 | 0010110001 | IC42 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

# 10 LED Status Indicators

## Data on indoor unit system

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 565 | 1010110001 | IC43 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 566 | 0110110001 | IC44 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 567 | 1110110001 | IC45 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 568 | 0001110001 | IC46 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 569 | 1001110001 | IC47 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 570 | 0101110001 | IC48 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 571 | 1101110001 | IC49 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 572 | 0011110001 | IC50 Gas pipe temperature | -99.9 to 999.9 | | | | | | | | | | |
| 573 | 1011110001 | IC1SH | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 574 | 0111110001 | IC2SH | -99.9 to 999.9 | | | | | | | | | | |
| 575 | 1111110001 | IC3SH | -99.9 to 999.9 | | | | | | | | | | |
| 576 | 0000001001 | IC4SH | -99.9 to 999.9 | | | | | | | | | | |
| 577 | 1000001001 | IC5SH | -99.9 to 999.9 | | | | | | | | | | |
| 578 | 0100001001 | IC6SH | -99.9 to 999.9 | | | | | | | | | | |
| 579 | 1100001001 | IC7SH | -99.9 to 999.9 | | | | | | | | | | |
| 580 | 0010001001 | IC8SH | -99.9 to 999.9 | | | | | | | | | | |
| 581 | 1010001001 | IC9SH | -99.9 to 999.9 | | | | | | | | | | |
| 582 | 0110001001 | IC10SH | -99.9 to 999.9 | | | | | | | | | | |
| 583 | 1110001001 | IC11SH | -99.9 to 999.9 | | | | | | | | | | |
| 584 | 0001001001 | IC12SH | -99.9 to 999.9 | | | | | | | | | | |
| 585 | 1001001001 | IC13SH | -99.9 to 999.9 | | | | | | | | | | |
| 586 | 0101001001 | IC14SH | -99.9 to 999.9 | | | | | | | | | | |
| 587 | 1101001001 | IC15SH | -99.9 to 999.9 | | | | | | | | | | |
| 588 | 0011001001 | IC16SH | -99.9 to 999.9 | | | | | | | | | | |
| 589 | 1011001001 | IC17SH | -99.9 to 999.9 | | | | | | | | | | |
| 590 | 0111001001 | IC18SH | -99.9 to 999.9 | | | | | | | | | | |
| 591 | 1111001001 | IC19SH | -99.9 to 999.9 | | | | | | | | | | |
| 592 | 0000101001 | IC20SH | -99.9 to 999.9 | | | | | | | | | | |
| 593 | 1000101001 | IC21SH | -99.9 to 999.9 | | | | | | | | | | |
| 594 | 0100101001 | IC22SH | -99.9 to 999.9 | | | | | | | | | | |
| 595 | 1100101001 | IC23SH | -99.9 to 999.9 | | | | | | | | | | |
| 596 | 0010101001 | IC24SH | -99.9 to 999.9 | | | | | | | | | | |
| 597 | 1010101001 | IC25SH | -99.9 to 999.9 | | | | | | | | | | |
| 598 | 0110101001 | IC26SH | -99.9 to 999.9 | | | | | | | | | | |
| 599 | 1110101001 | IC27SH | -99.9 to 999.9 | | | | | | | | | | |
| 600 | 0001101001 | IC28SH | -99.9 to 999.9 | | | | | | | | | | |
| 601 | 1001101001 | IC29SH | -99.9 to 999.9 | | | | | | | | | | |
| 602 | 0101101001 | IC30SH | -99.9 to 999.9 | | | | | | | | | | |
| 603 | 1101101001 | IC31SH | -99.9 to 999.9 | | | | | | | | | | |
| 604 | 0011101001 | IC32SH | -99.9 to 999.9 | | | | | | | | | | |
| 605 | 1011101001 | IC33SH | -99.9 to 999.9 | | | | | | | | | | |
| 606 | 0111101001 | IC34SH | -99.9 to 999.9 | | | | | | | | | | |
| 607 | 1111101001 | IC35SH | -99.9 to 999.9 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

### Data on indoor unit system

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 608 | 0000011001 | IC36SH | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 609 | 1000011001 | IC37SH | -99.9 to 999.9 | | | | | | | | | | |
| 610 | 0100011001 | IC38SH | -99.9 to 999.9 | | | | | | | | | | |
| 611 | 1100011001 | IC39SH | -99.9 to 999.9 | | | | | | | | | | |
| 612 | 0010011001 | IC40SH | -99.9 to 999.9 | | | | | | | | | | |
| 613 | 1010011001 | IC41SH | -99.9 to 999.9 | | | | | | | | | | |
| 614 | 0110011001 | IC42SH | -99.9 to 999.9 | | | | | | | | | | |
| 615 | 1110011001 | IC43SH | -99.9 to 999.9 | | | | | | | | | | |
| 616 | 0001011001 | IC44SH | -99.9 to 999.9 | | | | | | | | | | |
| 617 | 1001011001 | IC45SH | -99.9 to 999.9 | | | | | | | | | | |
| 618 | 0101011001 | IC46SH | -99.9 to 999.9 | | | | | | | | | | |
| 619 | 1101011001 | IC47SH | -99.9 to 999.9 | | | | | | | | | | |
| 620 | 0011011001 | IC48SH | -99.9 to 999.9 | | | | | | | | | | |
| 621 | 1011011001 | IC49SH | -99.9 to 999.9 | | | | | | | | | | |
| 622 | 0111011001 | IC50SH | -99.9 to 999.9 | | | | | | | | | | |
| 623 | 1111011001 | IC1SC | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 624 | 0000111001 | IC2SC | -99.9 to 999.9 | | | | | | | | | | |
| 625 | 1000111001 | IC3SC | -99.9 to 999.9 | | | | | | | | | | |
| 626 | 0100111001 | IC4SC | -99.9 to 999.9 | | | | | | | | | | |
| 627 | 1100111001 | IC5SC | -99.9 to 999.9 | | | | | | | | | | |
| 628 | 0010111001 | IC6SC | -99.9 to 999.9 | | | | | | | | | | |
| 629 | 1010111001 | IC7SC | -99.9 to 999.9 | | | | | | | | | | |
| 630 | 0110111001 | IC8SC | -99.9 to 999.9 | | | | | | | | | | |
| 631 | 1110111001 | IC9SC | -99.9 to 999.9 | | | | | | | | | | |
| 632 | 0001111001 | IC10SC | -99.9 to 999.9 | | | | | | | | | | |
| 633 | 1001111001 | IC11SC | -99.9 to 999.9 | | | | | | | | | | |
| 634 | 0101111001 | IC12SC | -99.9 to 999.9 | | | | | | | | | | |
| 635 | 1101111001 | IC13SC | -99.9 to 999.9 | | | | | | | | | | |
| 636 | 0011111001 | IC14SC | -99.9 to 999.9 | | | | | | | | | | |
| 637 | 1011111001 | IC15SC | -99.9 to 999.9 | | | | | | | | | | |
| 638 | 0111111001 | IC16SC | -99.9 to 999.9 | | | | | | | | | | |
| 639 | 1111111001 | IC17SC | -99.9 to 999.9 | | | | | | | | | | |
| 640 | 0000000101 | IC18SC | -99.9 to 999.9 | | | | | | | | | | |
| 641 | 1000000101 | IC19SC | -99.9 to 999.9 | | | | | | | | | | |
| 642 | 0100000101 | IC20SC | -99.9 to 999.9 | | | | | | | | | | |
| 643 | 1100000101 | IC21SC | -99.9 to 999.9 | | | | | | | | | | |
| 644 | 0010000101 | IC22SC | -99.9 to 999.9 | | | | | | | | | | |
| 645 | 1010000101 | IC23SC | -99.9 to 999.9 | | | | | | | | | | |
| 646 | 0110000101 | IC24SC | -99.9 to 999.9 | | | | | | | | | | |
| 647 | 1110000101 | IC25SC | -99.9 to 999.9 | | | | | | | | | | |
| 648 | 0001000101 | IC26SC | -99.9 to 999.9 | | | | | | | | | | |
| 649 | 1001000101 | IC27SC | -99.9 to 999.9 | | | | | | | | | | |
| 650 | 0101000101 | IC28SC | -99.9 to 999.9 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Data on indoor unit system**

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 651 | 1101000101 | IC29SC | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 652 | 0011000101 | IC30SC | -99.9 to 999.9 | | | | | | | | | | |
| 653 | 1011000101 | IC31SC | -99.9 to 999.9 | | | | | | | | | | |
| 654 | 0111000101 | IC32SC | -99.9 to 999.9 | | | | | | | | | | |
| 655 | 1111000101 | IC33SC | -99.9 to 999.9 | | | | | | | | | | |
| 656 | 0000100101 | IC34SC | -99.9 to 999.9 | | | | | | | | | | |
| 657 | 1000100101 | IC35SC | -99.9 to 999.9 | | | | | | | | | | |
| 658 | 0100100101 | IC36SC | -99.9 to 999.9 | | | | | | | | | | |
| 659 | 1100100101 | IC37SC | -99.9 to 999.9 | | | | | | | | | | |
| 660 | 0010100101 | IC38SC | -99.9 to 999.9 | | | | | | | | | | |
| 661 | 1010100101 | IC39SC | -99.9 to 999.9 | | | | | | | | | | |
| 662 | 0110100101 | IC40SC | -99.9 to 999.9 | | | | | | | | | | |
| 663 | 1110100101 | IC41SC | -99.9 to 999.9 | | | | | | | | | | |
| 664 | 0001100101 | IC42SC | -99.9 to 999.9 | | | | | | | | | | |
| 665 | 1001100101 | IC43SC | -99.9 to 999.9 | | | | | | | | | | |
| 666 | 0101100101 | IC44SC | -99.9 to 999.9 | | | | | | | | | | |
| 667 | 1101100101 | IC45SC | -99.9 to 999.9 | | | | | | | | | | |
| 668 | 0011100101 | IC46SC | -99.9 to 999.9 | | | | | | | | | | |
| 669 | 1011100101 | IC47SC | -99.9 to 999.9 | | | | | | | | | | |
| 670 | 0111100101 | IC48SC | -99.9 to 999.9 | | | | | | | | | | |
| 671 | 1111100101 | IC49SC | -99.9 to 999.9 | | | | | | | | | | |
| 672 | 0000010101 | IC50SC | -99.9 to 999.9 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

### Setting data

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 676 | 0010010101 | INV board S/W version | 0.00 to 99.99 | | | | | | | | A | A | |
| 679 | 1110010101 | Fan board (address 5) S/W version | 0.00 to 99.99 | | | | | | | | A | A | |
| 680 | 0001010101 | Fan board (address 6) S/W version | 0.00 to 99.99 | | | | | | | | A | A | |
| 688 | 0000110101 | Current time | 00:00 to 23:59 | | | | | | | | A | A | Hour: minute |
| 689 | 1000110101 | Current time -2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 690 | 0100110101 | Time of error detection 1 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 691 | 1100110101 | Time of error detection 1-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 692 | 0010110101 | Time of error detection 2 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 693 | 1010110101 | Time of error detection 2-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 694 | 0110110101 | Time of error detection 3 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 695 | 1110110101 | Time of error detection 3-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 696 | 0001110101 | Time of error detection 4 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 697 | 1001110101 | Time of error detection 4-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 698 | 0101110101 | Time of error detection 5 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 699 | 1101110101 | Time of error detection 5-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 700 | 0011110101 | Time of error detection 6 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 701 | 1011110101 | Time of error detection 6-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 702 | 0111110101 | Time of error detection 7 | 00:00 to 23:59 | | | | | | | | A | A | Hour: minute |
| 703 | 1111110101 | Time of error detection 7-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 704 | 0000001101 | Time of error detection 8 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 705 | 1000001101 | Time of error detection 8-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 706 | 0100001101 | Time of error detection 9 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 707 | 1100001101 | Time of error detection 9-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 708 | 0010001101 | Time of error detection 10 | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 709 | 1010001101 | Time of error detection 10-2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |
| 710 | 0110001101 | Time of last data backup before error | 00:00 to 23:59 | | | | | | | | | | Hour: minute |
| 711 | 1110001101 | Time of last data backup before error -2 | 00.00 to 99.12/1 to 31 | | | | | | | | | | Year and month, and date alternate display |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Data on indoor unit system**

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 714 | 0101001101 | IC1 LEV opening | 0000 to 9999 | | | | | | | | B | | Fully open: 2000 |
| 715 | 1101001101 | IC2 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 716 | 0011001101 | IC3 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 717 | 1011001101 | IC4 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 718 | 0111001101 | IC5 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 719 | 1111001101 | IC6 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 720 | 0000101101 | IC7 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 721 | 1000101101 | IC8 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 722 | 0100101101 | IC9 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 723 | 1100101101 | IC10 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 724 | 0010101101 | IC11 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 725 | 1010101101 | IC12 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 726 | 0110101101 | IC13 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 727 | 1110101101 | IC14 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 728 | 0001101101 | IC15 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 729 | 1001101101 | IC16 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 730 | 0101101101 | IC17 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 731 | 1101101101 | IC18 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 732 | 0011101101 | IC19 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 733 | 1011101101 | IC20 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 734 | 0111101101 | IC21 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 735 | 1111101101 | IC22 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 736 | 0000011101 | IC23 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 737 | 1000011101 | IC24 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 738 | 0100011101 | IC25 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 739 | 1100011101 | IC26 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 740 | 0010011101 | IC27 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 741 | 1010011101 | IC28 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 742 | 0110011101 | IC29 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 743 | 1110011101 | IC30 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 744 | 0001011101 | IC31 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 745 | 1001011101 | IC32 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 746 | 0101011101 | IC33 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 747 | 1101011101 | IC34 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 748 | 0011011101 | IC35 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 749 | 1011011101 | IC36 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 750 | 0111011101 | IC37 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 751 | 1111011101 | IC38 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 752 | 0000111101 | IC39 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 753 | 1000111101 | IC40 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 754 | 0100111101 | IC41 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 755 | 1100111101 | IC42 LEV opening | 0000 to 9999 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

### Data on indoor unit system

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 756 | 0010111101 | IC43 LEV opening | 0000 to 9999 | | | | | | | | B | | Fully open: 2000 |
| 757 | 1010111101 | IC44 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 758 | 0110111101 | IC45 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 759 | 1110111101 | IC46 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 760 | 0001111101 | IC47 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 761 | 1001111101 | IC48 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 762 | 0101111101 | IC49 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 763 | 1101111101 | IC50 LEV opening | 0000 to 9999 | | | | | | | | | | |
| 764 | 0011111101 | IC1 Operation mode | 0000: Stop 0001: Ventilation 0002: Cooling 0003: Heating 0004: Dry | | | | | | | | B | | |
| 765 | 1011111101 | IC2 Operation mode | | | | | | | | | | | |
| 766 | 0111111101 | IC3 Operation mode | | | | | | | | | | | |
| 767 | 1111111101 | IC4 Operation mode | | | | | | | | | | | |
| 768 | 0000000011 | IC5 Operation mode | | | | | | | | | | | |
| 769 | 1000000011 | IC6 Operation mode | | | | | | | | | | | |
| 770 | 0100000011 | IC7 Operation mode | | | | | | | | | | | |
| 771 | 1100000011 | IC8 Operation mode | | | | | | | | | | | |
| 772 | 0010000011 | IC9 Operation mode | | | | | | | | | | | |
| 773 | 1010000011 | IC10 Operation mode | | | | | | | | | | | |
| 774 | 0110000011 | IC11 Operation mode | | | | | | | | | | | |
| 775 | 1110000011 | IC12 Operation mode | | | | | | | | | | | |
| 776 | 0001000011 | IC13 Operation mode | | | | | | | | | | | |
| 777 | 1001000011 | IC14 Operation mode | | | | | | | | | | | |
| 778 | 0101000011 | IC15 Operation mode | | | | | | | | | | | |
| 779 | 1101000011 | IC16 Operation mode | | | | | | | | | | | |
| 780 | 0011000011 | IC17 Operation mode | | | | | | | | | | | |
| 781 | 1011000011 | IC18 Operation mode | | | | | | | | | | | |
| 782 | 0111000011 | IC19 Operation mode | | | | | | | | | | | |
| 783 | 1111000011 | IC20 Operation mode | | | | | | | | | | | |
| 784 | 0000100011 | IC21 Operation mode | | | | | | | | | | | |
| 785 | 1000100011 | IC22 Operation mode | | | | | | | | | | | |
| 786 | 0100100011 | IC23 Operation mode | | | | | | | | | | | |
| 787 | 1100100011 | IC24 Operation mode | | | | | | | | | | | |
| 788 | 0010100011 | IC25 Operation mode | | | | | | | | | | | |
| 789 | 1010100011 | IC26 Operation mode | | | | | | | | | | | |
| 790 | 0110100011 | IC27 Operation mode | | | | | | | | | | | |
| 791 | 1110100011 | IC28 Operation mode | | | | | | | | | | | |
| 792 | 0001100011 | IC29 Operation mode | | | | | | | | | | | |
| 793 | 1001100011 | IC30 Operation mode | | | | | | | | | | | |
| 794 | 0101100011 | IC31 Operation mode | | | | | | | | | | | |
| 795 | 1101100011 | IC32 Operation mode | | | | | | | | | | | |
| 796 | 0011100011 | IC33 Operation mode | | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

### Data on indoor unit system

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B)$^{*1}$ | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 797 | 1011100011 | IC34 Operation mode | 0000: Stop 0001: Ventilation 0002: Cooling 0003: Heating 0004: Dry | | | | | | | | B | | |
| 798 | 0111100011 | IC35 Operation mode | | | | | | | | | | | |
| 799 | 1111100011 | IC36 Operation mode | | | | | | | | | | | |
| 800 | 0000010011 | IC37 Operation mode | | | | | | | | | | | |
| 801 | 1000010011 | IC38 Operation mode | | | | | | | | | | | |
| 802 | 0100010011 | IC39 Operation mode | | | | | | | | | | | |
| 803 | 1100010011 | IC40 Operation mode | | | | | | | | | | | |
| 804 | 0010010011 | IC41 Operation mode | | | | | | | | | | | |
| 805 | 1010010011 | IC42 Operation mode | | | | | | | | | | | |
| 806 | 0110010011 | IC43 Operation mode | | | | | | | | | | | |
| 807 | 1110010011 | IC44 Operation mode | | | | | | | | | | | |
| 808 | 0001010011 | IC45 Operation mode | | | | | | | | | | | |
| 809 | 1001010011 | IC46 Operation mode | | | | | | | | | | | |
| 810 | 0101010011 | IC47 Operation mode | | | | | | | | | | | |
| 811 | 1101010011 | IC48 Operation mode | | | | | | | | | | | |
| 812 | 0011010011 | IC49 Operation mode | | | | | | | | | | | |
| 813 | 1011010011 | IC50 Operation mode | | | | | | | | | | | |
| 814 | 0111010011 | IC1 filter | 0000 to 9999 | | | | | | | | B | | Hours since last maintenance [ h ] |
| 815 | 1111010011 | IC2 filter | 0000 to 9999 | | | | | | | | | | |
| 816 | 0000110011 | IC3 filter | 0000 to 9999 | | | | | | | | | | |
| 817 | 1000110011 | IC4 filter | 0000 to 9999 | | | | | | | | | | |
| 818 | 0100110011 | IC5 filter | 0000 to 9999 | | | | | | | | | | |
| 819 | 1100110011 | IC6 filter | 0000 to 9999 | | | | | | | | | | |
| 820 | 0010110011 | IC7 filter | 0000 to 9999 | | | | | | | | | | |
| 821 | 1010110011 | IC8 filter | 0000 to 9999 | | | | | | | | | | |
| 822 | 0110110011 | IC9 filter | 0000 to 9999 | | | | | | | | | | |
| 823 | 1110110011 | IC10 filter | 0000 to 9999 | | | | | | | | | | |
| 824 | 0001110011 | IC11 filter | 0000 to 9999 | | | | | | | | | | |
| 825 | 1001110011 | IC12 filter | 0000 to 9999 | | | | | | | | | | |
| 826 | 0101110011 | IC13 filter | 0000 to 9999 | | | | | | | | | | |
| 827 | 1101110011 | IC14 filter | 0000 to 9999 | | | | | | | | | | |
| 828 | 0011110011 | IC15 filter | 0000 to 9999 | | | | | | | | | | |
| 829 | 1011110011 | IC16 filter | 0000 to 9999 | | | | | | | | | | |
| 830 | 0111110011 | IC17 filter | 0000 to 9999 | | | | | | | | | | |
| 831 | 1111110011 | IC18 filter | 0000 to 9999 | | | | | | | | | | |
| 832 | 0000001011 | IC19 filter | 0000 to 9999 | | | | | | | | | | |
| 833 | 1000001011 | IC20 filter | 0000 to 9999 | | | | | | | | | | |
| 834 | 0100001011 | IC21 filter | 0000 to 9999 | | | | | | | | | | |
| 835 | 1100001011 | IC22 filter | 0000 to 9999 | | | | | | | | | | |
| 836 | 0010001011 | IC23 filter | 0000 to 9999 | | | | | | | | | | |
| 837 | 1010001011 | IC24 filter | 0000 to 9999 | | | | | | | | | | |
| 838 | 0110001011 | IC25 filter | 0000 to 9999 | | | | | | | | | | |
| 839 | 1110001011 | IC26 filter | 0000 to 9999 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## Data on indoor unit system

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 840 | 0001001011 | IC27 filter | 0000 to 9999 | | | | | | | | B | | Hours since last maintenance<br>[ h ] |
| 841 | 1001001011 | IC28 filter | 0000 to 9999 | | | | | | | | | | |
| 842 | 0101001011 | IC29 filter | 0000 to 9999 | | | | | | | | | | |
| 843 | 1101001011 | IC30 filter | 0000 to 9999 | | | | | | | | | | |
| 844 | 0011001011 | IC31 filter | 0000 to 9999 | | | | | | | | | | |
| 845 | 1011001011 | IC32 filter | 0000 to 9999 | | | | | | | | | | |
| 846 | 0111001001 | IC33 filter | 0000 to 9999 | | | | | | | | | | |
| 847 | 1111001011 | IC34 filter | 0000 to 9999 | | | | | | | | | | |
| 848 | 0000101011 | IC35 filter | 0000 to 9999 | | | | | | | | | | |
| 849 | 1000101011 | IC36 filter | 0000 to 9999 | | | | | | | | | | |
| 850 | 0100101011 | IC37 filter | 0000 to 9999 | | | | | | | | | | |
| 851 | 1100101011 | IC38 filter | 0000 to 9999 | | | | | | | | | | |
| 852 | 0010101011 | IC39 filter | 0000 to 9999 | | | | | | | | | | |
| 853 | 1010101011 | IC40 filter | 0000 to 9999 | | | | | | | | | | |
| 854 | 0110101011 | IC41 filter | 0000 to 9999 | | | | | | | | | | |
| 855 | 1110101011 | IC42 filter | 0000 to 9999 | | | | | | | | | | |
| 856 | 0001101011 | IC43 filter | 0000 to 9999 | | | | | | | | | | |
| 857 | 1001101011 | IC44 filter | 0000 to 9999 | | | | | | | | | | |
| 858 | 0101101011 | IC45 filter | 0000 to 9999 | | | | | | | | | | |
| 859 | 1101101011 | IC46 filter | 0000 to 9999 | | | | | | | | | | |
| 860 | 0011101011 | IC47 filter | 0000 to 9999 | | | | | | | | | | |
| 861 | 1011101011 | IC48 filter | 0000 to 9999 | | | | | | | | | | |
| 862 | 0111101011 | IC49 filter | 0000 to 9999 | | | | | | | | | | |
| 863 | 1111101011 | IC50 filter | 0000 to 9999 | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Other types of data**

| No. | SW4 (SW6-9: OFF, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 871 | 1110011011 | U-phase current effective value 1 | -99.9 to 999.9 | | | | | | | | A | A | The unit is [ A ] |
| 872 | 0001011011 | W-phase current effective value 1 | -99.9 to 999.9 | | | | | | | | A | A | |
| 873 | 1001011011 | Power factor phase angle 1 | -99.9 to 999.9 | | | | | | | | A | A | The unit is [ deg ] |
| 881 | 1000111011 | INV board<br>Reset counter | 0 to 254 | | | | | | | | A | A | The unit is [ time ] |
| 884 | 0010111011 | Fan board (address 5) reset counter | 0 to 254 | | | | | | | | A | A | The unit is [ time ] |
| 885 | 1010111011 | Fan board (address 6) reset counter | 0 to 254 | | | | | | | | A | A | |
| 980 | 0010101111 | M-NET processor S/W version | 0.00 to 99.99 | | | | | | | | A | A | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## Current data

| No. | SW4 (SW6-9:ON, SW6-10:OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1152 | 0000000100 | Relay output display BC (Main) | SVM1 | SVM2 | SVM1b | SVM2b | 21S4a | | | | B | | The 21S4a value will be displayed only when a WCB is connected to the system. |
| | | | | | | | | | | | | | |
| 1153 | 1000000100 | LEV output display BC (Main) | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1154 | 0100000100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1155 | 1100000100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1158 | 0110000100 | Relay output display BC (Sub1) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1159 | 1110000100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1160 | 0001000100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1161 | 1001000100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1163 | 1101000100 | Relay output display BC (Sub2) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1164 | 0011000100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1165 | 1011000100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1166 | 0111000100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1168 | 0000100100 | Relay output display BC (Sub3) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1169 | 1000100100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1170 | 0100100100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1171 | 1100100100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1173 | 1010100100 | Relay output display BC (Sub4) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1174 | 0110100100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1175 | 1110100100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1176 | 0001100100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1178 | 0101100100 | Relay output display BC (Sub5) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Current data**

| No. | SW4 (SW6-9:ON, SW6-10:OFF) | Item | Display | | | | | | | | Unit (A, B)[*1] | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1179 | 1101100100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1180 | 0011100100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1181 | 1011100100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1183 | 1111100100 | Relay output display BC (Sub6) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1184 | 0000010100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1185 | 1000010100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1186 | 0100010100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1188 | 0010010100 | Relay output display BC (Sub7) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1189 | 1010010100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1190 | 0110010100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1191 | 1110010100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1193 | 1001010100 | Relay output display BC (Sub8) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1194 | 0101010100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1195 | 1101010100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1196 | 0011010100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1198 | 0111010100 | Relay output display BC (Sub9) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1199 | 1111010100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1200 | 0000110100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1201 | 1000110100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1203 | 1100110100 | Relay output display BC (Sub10) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1204 | 0010110100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |

[*1] A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Current data**

| No. | SW4 (SW6-9:ON, SW6-10:OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1205 | 1010110100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1206 | 0110110100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1208 | 0001110100 | Relay output display BC (Sub11) | SVM3 | | | | | | | | B | | |
| | | | | | | | | | | | | | |
| 1209 | 1001110100 | | LEV-A1 | LEV-A2 | LEV-A3 | LEV-A4 | LEV-A5 | LEV-A6 | LEV-A7 | LEV-A8 | B | | |
| | | | LEV-B1 | LEV-B2 | LEV-B3 | LEV-B4 | LEV-B5 | LEV-B6 | LEV-B7 | LEV-B8 | | | |
| 1210 | 0101110100 | | LEV-L1 | LEV-L2 | LEV-L3 | LEV-L4 | LEV-L5 | LEV-L6 | LEV-L7 | LEV-L8 | B | | |
| | | | LEV-A9 | LEV-A10 | LEV-A11 | LEV-A12 | LEV-A13 | LEV-A14 | LEV-A15 | LEV-A16 | | | |
| 1211 | 1101110100 | | LEV-B9 | LEV-B10 | LEV-B11 | LEV-B12 | LEV-B13 | LEV-B14 | LEV-B15 | LEV-B16 | B | | |
| | | | LEV-L9 | LEV-L10 | LEV-L11 | LEV-L12 | LEV-L13 | LEV-L14 | LEV-L15 | LEV-L16 | | | |
| 1213 | 1011110100 | BC (Main) TH11 | | | | | | | | | B | | |
| 1214 | 0111110100 | BC (Main) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1215 | 1111110100 | BC (Main) TH14 | -99.9 to 999.9 | | | | | | | | B | | |
| 1216 | 0000001100 | BC (Main) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1217 | 1000001100 | BC (Main) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1218 | 0100001100 | BC (Main) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1219 | 1100001100 | BC (Main) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1220 | 0010001100 | BC (Main) SC11 (WCB SC14) | -99.9 to 999.9 | | | | | | | | B | | The SC14 value will be displayed when a WCB is connected to the system. |
| 1221 | 1010001100 | BC (Main) SH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1222 | 0110001100 | BC (Main) SC6 | -99.9 to 999.9 | | | | | | | | B | | |
| 1223 | 1110001100 | BC (Main) LEV1 | 0000 to 9999 | | | | | | | | B | | |
| 1224 | 0001001100 | BC (Main) LEV3 | 0000 to 9999 | | | | | | | | B | | LEV1 opening |
| 1225 | 1001001100 | BC (Main) LEV4 | 0000 to 9999 | | | | | | | | B | | LEV2 opening |
| 1231 | 1111001100 | BC (Sub1) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1232 | 0000101100 | BC (Sub1) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1233 | 1000101100 | BC (Sub1) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1234 | 0100101100 | BC (Sub1) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1235 | 1100101100 | BC (Sub1) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1237 | 1010101100 | BC (Sub1) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1239 | 1110101100 | BC (Sub2) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1240 | 0001101100 | BC (Sub2) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1241 | 1001101100 | BC (Sub2) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1242 | 0101101100 | BC (Sub2) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1245 | 1011101100 | BC (Sub2) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1247 | 1111101100 | BC (Sub3) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1248 | 0000011100 | BC (Sub3) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1249 | 1000011100 | BC (Sub3) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1250 | 0100011100 | BC (Sub3) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1253 | 1010011100 | BC (Sub3) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1255 | 1110011100 | BC (Sub4) TH12 | -99.9 to 999.9 | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## Current data

| No. | SW4 (SW6-9:ON, SW6-10:OFF) | Item | Display | | | | | | | | Unit (A, B)*1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1256 | 0001011100 | BC (Sub4) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1257 | 1001011100 | BC (Sub4) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1258 | 0101011100 | BC (Sub4) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1261 | 1011011100 | BC (Sub4) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1263 | 1111011100 | BC (Sub5) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1264 | 0000111100 | BC (Sub5) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1265 | 1000111100 | BC (Sub5) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1266 | 0100111100 | BC (Sub5) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1269 | 1010111100 | BC (Sub5) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1271 | 1110111100 | BC (Sub6) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1272 | 0001111100 | BC (Sub6) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1273 | 1001111100 | BC (Sub6) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1274 | 0101111100 | BC (Sub6) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1277 | 1011111100 | BC (Sub6) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1279 | 1111111100 | BC (Sub7) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1280 | 0000000010 | BC (Sub7) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1281 | 1000000010 | BC (Sub7) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1282 | 0100000010 | BC (Sub7) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1285 | 1010000010 | BC (Sub7) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1287 | 1110000010 | BC (Sub8) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1288 | 0001000010 | BC (Sub8) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1289 | 1001000010 | BC (Sub8) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1290 | 0101000010 | BC (Sub8) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1293 | 1011000010 | BC (Sub8) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1295 | 1111000010 | BC (Sub9) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1296 | 0000100010 | BC (Sub9) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1297 | 1000100010 | BC (Sub9) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1298 | 0100100010 | BC (Sub9) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1301 | 1010100010 | BC (Sub9) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1303 | 1110100010 | BC (Sub10) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1304 | 0001100010 | BC (Sub10) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1305 | 1001100010 | BC (Sub10) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1306 | 0101100010 | BC (Sub10) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1309 | 1011100010 | BC (Sub10) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1311 | 1111100010 | BC (Sub11) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1312 | 0000010010 | BC (Sub11) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1313 | 1000010010 | BC (Sub11) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1314 | 0100010010 | BC (Sub11) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1317 | 1010010010 | BC (Sub11) LEV3a | 0000 to 9999 | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Data before error**

| No. | SW4 (SW6 - 9: ON, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1550 | 0111000001 | BC (Main) TH11 | -99.9 to 999.9 | | | | | | | | B | | |
| 1551 | 1111000001 | BC (Main) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1552 | 0000100001 | BC (Main) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1553 | 1000100001 | BC (Main) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1554 | 0100100001 | BC (Main) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1555 | 1100100001 | BC (Main) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1556 | 0010100001 | BC (Main) TH14 | -99.9 to 999.9 | | | | | | | | B | | |
| 1560 | 0001100001 | BC (Main) LEV1 | 0000 to 9999 | | | | | | | | B | | LEV1 opening |
| 1562 | 0101100001 | BC (Main) LEV3 | 0000 to 9999 | | | | | | | | B | | LEV3 opening |
| 1563 | 1101100001 | BC (Main) LEV4 | 0000 to 9999 | | | | | | | | B | | LEV4 opening |
| 1567 | 1111100001 | BC (Sub1) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1568 | 0000010001 | BC (Sub1) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1569 | 1000010001 | BC (Sub1) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1570 | 0100010001 | BC (Sub1) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1571 | 1100010001 | BC (Sub1) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1572 | 0010010001 | BC (Sub1) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1575 | 1110010001 | BC (Sub2) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1576 | 0001010001 | BC (Sub2) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1577 | 1001010001 | BC (Sub2) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1578 | 0101010001 | BC (Sub2) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1579 | 1101010001 | BC (Sub2) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1580 | 0011010001 | BC (Sub2) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1583 | 1111010001 | BC (Sub3) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1584 | 0000110001 | BC (Sub3) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1585 | 1000110001 | BC (Sub3) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1586 | 0100110001 | BC (Sub3) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1587 | 1100110001 | BC (Sub3) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1588 | 0010110001 | BC (Sub3) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1591 | 1110110001 | BC (Sub4) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1592 | 0001110001 | BC (Sub4) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1593 | 1001110001 | BC (Sub4) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1594 | 0101110001 | BC (Sub4) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1595 | 1101110001 | BC (Sub4) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1596 | 0011110001 | BC (Sub4) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1599 | 1111110001 | BC (Sub5) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1600 | 0000001001 | BC (Sub5) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1601 | 1000001001 | BC (Sub5) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1602 | 0100001001 | BC (Sub5) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1603 | 1100001001 | BC (Sub5) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1604 | 0010001001 | BC (Sub5) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1607 | 1110001001 | BC (Sub6) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1608 | 0001001001 | BC (Sub6) TH15 | -99.9 to 999.9 | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

# 10 LED Status Indicators

## Data before error

| No. | SW4 (SW6 - 9: ON, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1609 | 1001001001 | BC (Sub6) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1610 | 0101001001 | BC (Sub6) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1611 | 1101001001 | BC (Sub6) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1612 | 0011001001 | BC (Sub6) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1615 | 1111001001 | BC (Sub7) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1616 | 0000101001 | BC (Sub7) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1617 | 1000101001 | BC (Sub7) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1618 | 0100101001 | BC (Sub7) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1619 | 1100101001 | BC (Sub7) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1620 | 0010101001 | BC (Sub7) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1623 | 1110101001 | BC (Sub8) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1624 | 0001101001 | BC (Sub8) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1625 | 1001101001 | BC (Sub8) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1626 | 0101101001 | BC (Sub8) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1627 | 1101101001 | BC (Sub8) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1628 | 0011101001 | BC (Sub8) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1631 | 1111101001 | BC (Sub9) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1632 | 0000011001 | BC (Sub9) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1633 | 1000011001 | BC (Sub9) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1634 | 0100011001 | BC (Sub9) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1635 | 1100011001 | BC (Sub9) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1636 | 0010011001 | BC (Sub9) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1639 | 1110011001 | BC (Sub10) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1640 | 0001011001 | BC (Sub10) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1641 | 1001011001 | BC (Sub10) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1642 | 0101011001 | BC (Sub10) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1643 | 1101011001 | BC (Sub10) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1644 | 0011011001 | BC (Sub10) LEV3a | 0000 to 9999 | | | | | | | | B | | |
| 1647 | 1111011001 | BC (Sub11) TH12 | -99.9 to 999.9 | | | | | | | | B | | |
| 1648 | 0000111001 | BC (Sub11) TH15 | -99.9 to 999.9 | | | | | | | | B | | |
| 1649 | 1000111001 | BC (Sub11) TH16 | -99.9 to 999.9 | | | | | | | | B | | |
| 1650 | 0100111001 | BC (Sub11) PS1 | -99.9 to 999.9 | | | | | | | | B | | |
| 1651 | 1100111001 | BC (Sub11) PS3 | -99.9 to 999.9 | | | | | | | | B | | |
| 1652 | 0010111001 | BC (Sub11) LEV3a | 0000 to 9999 | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## Data on indoor unit system

| No. | SW4 (SW6 - 9: ON, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1851 | 1101110011 | IC1 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | Displayed alternately every 5 seconds |
| 1852 | 0011110011 | IC2 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1853 | 1011110011 | IC3 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1854 | 0111110011 | IC4 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1855 | 1111110011 | IC5 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1856 | 0000001011 | IC6 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1857 | 1000001011 | IC7 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1858 | 0100001011 | IC8 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1859 | 1100001011 | IC9 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1860 | 0010001011 | IC10 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1861 | 1010001011 | IC11 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 1862 | 0110001011 | IC12 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1863 | 1110001011 | IC13 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1864 | 0001001011 | IC14 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1865 | 1001001011 | IC15 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1866 | 0101001011 | IC16 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1867 | 1101001011 | IC17 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1868 | 0011001011 | IC18 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1869 | 1011001011 | IC19 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1870 | 0111001011 | IC20 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1871 | 1111001011 | IC21 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1872 | 0000101011 | IC22 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1873 | 1000101011 | IC23 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1874 | 0100101011 | IC24 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1875 | 1100101011 | IC25 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1876 | 0010101011 | IC26 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1877 | 1010101011 | IC27 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1878 | 0110101011 | IC28 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1879 | 1110101011 | IC29 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1880 | 0001101011 | IC30 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1881 | 1001101011 | IC31 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1882 | 0101101011 | IC32 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1883 | 1101101011 | IC33 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1884 | 0011101011 | IC34 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1885 | 1011101011 | IC35 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1886 | 0111101011 | IC36 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1887 | 1111101011 | IC37 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1888 | 0000011011 | IC38 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1889 | 1000011011 | IC39 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1890 | 0100011011 | IC40 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1891 | 1100011011 | IC41 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

## Data on indoor unit system

| No. | SW4 (SW6 - 9: ON, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1892 | 0010011011 | IC42 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1893 | 1010011011 | IC43 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1894 | 0110011011 | IC44 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1895 | 1110011011 | IC45 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1896 | 0001011011 | IC46 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1897 | 1001011011 | IC47 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1898 | 0101011011 | IC48 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1899 | 1101011011 | IC49 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1900 | 0011011011 | IC50 intake-air temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1901 | 1011011011 | IC1 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | The unit is [°C] |
| 1902 | 0111011011 | IC2 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1903 | 1111011011 | IC3 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1904 | 0000111011 | IC4 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1905 | 1000111011 | IC5 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1906 | 0100111011 | IC6 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1907 | 1100111011 | IC7 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1908 | 0010111011 | IC8 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1909 | 1010111011 | IC9 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1910 | 0110111011 | IC10 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1911 | 1110111011 | IC11 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1912 | 0001111011 | IC12 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1913 | 1001111011 | IC13 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1914 | 0101111011 | IC14 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1915 | 1101111011 | IC15 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1916 | 0011111011 | IC16 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1917 | 1011111011 | IC17 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1918 | 0111111011 | IC18 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1919 | 1111111011 | IC19 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1920 | 0000000111 | IC20 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1921 | 1000000111 | IC21 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1922 | 0100000111 | IC22 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1923 | 1100000111 | IC23 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1924 | 0010000111 | IC24 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1925 | 1010000111 | IC25 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1926 | 0110000111 | IC26 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1927 | 1110000111 | IC27 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1928 | 0001000111 | IC28 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1929 | 1001000111 | IC29 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1930 | 0101000111 | IC30 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1931 | 1101000111 | IC31 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1932 | 0011000111 | IC32 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1933 | 1011000111 | IC33 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1934 | 0111000111 | IC34 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

### Data on indoor unit system

| No. | SW4 (SW6 - 9: ON, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1935 | 1111000111 | IC35 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1936 | 0000100111 | IC36 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1937 | 1000100111 | IC37 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1938 | 0100100111 | IC38 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1939 | 1100100111 | IC39 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1940 | 0010100111 | IC40 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1941 | 1010100111 | IC41 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1942 | 0110100111 | IC42 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1943 | 1110100111 | IC43 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1944 | 0001100111 | IC44 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1945 | 1001100111 | IC45 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1946 | 0101100111 | IC46 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1947 | 1101100111 | IC47 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1948 | 0011100111 | IC48 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1949 | 1011100111 | IC49 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1950 | 0111100111 | IC50 liquid pipe temperature | -99.9 to 999.9 | | | | | | | | B | | |
| 1951 | 1111100111 | IC1 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | Displayed alternately every 5 seconds |
| 1952 | 0000010111 | IC2 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1953 | 1000010111 | IC3 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1954 | 0100010111 | IC4 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1955 | 1100010111 | IC5 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1956 | 0010010111 | IC6 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1957 | 1010010111 | IC7 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1958 | 0110010111 | IC8 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1959 | 1110010111 | IC9 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1960 | 0001010111 | IC10 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1961 | 1001010111 | IC11 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1962 | 0101010111 | IC12 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1963 | 1101010111 | IC13 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1964 | 0011010111 | IC14 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1965 | 1011010111 | IC15 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1966 | 0111010111 | IC16 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1967 | 1111010111 | IC17 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1968 | 0000110111 | IC18 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1969 | 1000110111 | IC19 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1970 | 0100110111 | IC20 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1971 | 1100110111 | IC21 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1972 | 0010110111 | IC22 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1973 | 1010110111 | IC23 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1974 | 0110110111 | IC24 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1975 | 1110110111 | IC25 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1976 | 0001110111 | IC26 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1977 | 1001110111 | IC27 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

**Data on indoor unit system**

| No. | SW4 (SW6 - 9: ON, SW6-10: OFF) | Item | Display | | | | | | | | Unit (A, B) *1 | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1234567890 | | LD1 | LD2 | LD3 | LD4 | LD5 | LD6 | LD7 | LD8 | OC | OS | |
| 1978 | 0101110111 | IC28 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1979 | 1101110111 | IC29 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1980 | 0011110111 | IC30 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1981 | 1011110111 | IC31 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1982 | 0111110111 | IC32 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1983 | 1111110111 | IC33 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1984 | 0000001111 | IC34 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1985 | 1000001111 | IC35 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1986 | 0100001111 | IC36 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1987 | 1100001111 | IC37 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1988 | 0010001111 | IC38 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1989 | 1010001111 | IC39 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1990 | 0110001111 | IC40 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1991 | 1110001111 | IC41 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1992 | 0001001111 | IC42 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1993 | 1001001111 | IC43 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1994 | 0101001111 | IC44 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1995 | 1101001111 | IC45 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1996 | 0011001111 | IC46 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1997 | 1011001111 | IC47 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1998 | 0111001111 | IC48 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 1999 | 1111001111 | IC49 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |
| 2000 | 0000101111 | IC50 address/capacity code | 0000 to 9999 | | | | 0000 to 9999 | | | | B | | |

*1 A: The condition of either OC or OS is displayed individually. B: The condition of the entire refrigerant system is displayed.

# Chapter 11 Safety for Leak

# 11-1 Introduction

This chapter is for the following models that use R32 refrigerant.
*For the latest applicable models, check with local distributors.

Outdoor unit

| Category | Model |
|---|---|
| Heat Recovery R2-Series (High efficiency) | PURY-EM_TXU-A |
| | PURY-EM_YXU-A |
| Hyper Heating Inverter R2-Series | PURY-HM_TXU-A |
| | PURY-HM_YXU-A |
| Heat Pump Y-Series (High efficiency) | PUHY-EM_TXU-A |
| | PUHY-EM_YXU-A |
| Hyper Heating Inverter Y-Series | PUHY-HM_TXU-A |
| | PUHY-HM_YXU-A |

BC Controller

| Category | Model |
|---|---|
| Main BC Controller | CMB-M_NU-MA-SV |
| Sub BC Controller | CMB-M_NU-MB-SV |

Indoor unit

| Category | Model |
|---|---|
| Ceiling cassette (4-way flow type) | PLFY-M_NFMU-A |
| | PLFY-EM_NEMU-A |
| Ceiling concealed (Low static pressure type) | PEFY-M_NMSU-A |
| Ceiling concealed (Medium static pressure type) | PEFY-M_NMAU-A |
| Vertical-concealed | PVFY-M_NAMU-A |
| Ceiling suspended | PCFY-M_NKMU-A |
| Wall mounted | PKFY-M_NLMU-A |
| | PKFY-M_NKMU-A |

## 11-2 Refrigerant Emission Reduction

Dispose of recovered refrigerant according to local regulations such as the Code of Federal Regulations.

# 11-3 Safety for Servicing

Follow the precautions listed below when handling R32-type refrigerant even more strictly than when handling conventional types of refrigerant (R410A, R407C, and R22).

- Safety measures that comply with UL60335-2-40 ed.4 are required when the maximum refrigerant leak concentration exceeds LFL × 1/2.
  *LFL: Lower Flammability Limit (kg/$m^3$)
- Never use other types of refrigerant than R32 for the packaged air conditioners using R32.
- As with other refrigerant, R32 is heavier than air, so it tends to stagnate at the bottom (near the floor). R32 stagnated in the bottom area of room may reach the burning concentration. Maintain the safe work environment to avoid burning by appropriately ventilating the room. Be sure to prevent refrigerant stagnation especially when working in basements, closed rooms, or outdoor environments that easily cause refrigerant stagnation, by carrying a mobile gas leak detector in operation, operating local exhaust systems, or taking other measures.
  When a refrigerant leak is found in a room or place with no adequate ventilation, avoid using fire and do not operate work until the work environment improves with appropriate ventilation.
- Appropriate ventilation is also required for brazing work to avoid refrigerant burning. Additionally, make sure that there is no hazardous materials or flammable materials nearby and take fire prevention measures.
  If refrigerant leaks during brazing work, put out the fire, such as that of torches, immediately.
- Ventilate workplaces when refrigerant leaks during work.
- Keep ignition sources, such as gas burning appliances and electric heaters, sufficiently away from workplaces where installation, repair, or relocation is conducted.
- Do not mix R32 with other materials, such as air, in the refrigerant circuit when installing, repairing, or relocating the air conditioner. If it is mixed with other materials, such as air, the pressure inside the refrigeration circuit becomes abnormally high, causing bursting or injuries.
- Make sure that the refrigerant gas is not leaking after the installation work. The refrigerant gas leaking in a room may generate toxic gases or cause fire when coming into contact with fire from heating equipment, such as fan heaters and stoves.
- Make sure that installation work, repair, relocation, and other work are correctly conducted by specialists who can safely handle slightly flammable refrigerant according to the Installation Manual. Any failure may result in abnormal refrigeration cycles, water leak, electric shock, fire, or other dangerous accidents.
- When recovering refrigerant, be sure to connect the refrigerant hose correctly to prevent a refrigerant leak from joints. After refrigerant recovery, check if the residual pressure increases again. If it does, perform refrigerant recovery again.
- Never modify the air conditioner.

# 11-4 Installation Requirements for R32 Refrigerant

## 11-4-1 Safety measures against refrigerant leaks specified in UL60335-1 and UL60335-2-40

Since R32 refrigerant is slightly flammable, refrigerant charge limits or installation of safety devices as shown below, are required to avoid the risk of fire in the room if the refrigerant leaks.
The installation of safety devices is required if the refrigerant concentration exceeds LFL × 1/2 in the room in case of a refrigerant leak (in ENHANCED TIGHTNESS REFRIGERATING SYSTEMS).

Refrigerant gas charge limit

$$m \leqq \frac{G}{2} \times A \times h_r$$

$m$ : Refrigerant gas amount (kg)
$G$ : LFL: Lower Flammability Limit (kg/m$^3$)
$A$ : Floor area (m$^2$)
$h_r$ : Leakage height (m)

**or**

Implementing safety measures

**Shut off device** **or** **Circulation airflow system** **or** **Ventilation system** **or** **Natural ventilation**

* LFL: Lower Flammability Limit (kg/m$^3$)
refers to the minimum concentration of refrigerant that can propagate a flame when uniformly mixed with air.
R32: 0.306(kg/m$^3$)
LFL×1/2(R32): 0.153(kg/m$^3$)

**Note**

What is UL60335-1/UL60335-2-40?
→Safety Standard for Household and Similar Electrical Appliances
- UL60335-1: General requirements of Safety Standard for Household and Similar Electrical Appliances
- UL60335-2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers of Safety Standard for Household and Similar Electrical Appliances

## 11-4-2 Compliance of Mitsubishi City Multi air conditioning systems with UL60335-1/ UL60335-2-40

To comply with UL60335-1/UL60335-2-40, Mitsubishi R32-compatible City Multi air conditioning systems have optional safety devices listed below. The following shut off devices comply with the requirements for ENHANCED TIGHTNESS REFRIGERATING SYSTEMS.

Shut off device

- Shut off valve kit (CMR-M100KT-NA) *For Y-Series
- BC controller (CMB-M***NU-MA/MB-SV) *For R2-Series

Detector/Alarm

- Alarm: MA remote controller (PAR-43MAAUB and later)
- Detector: The indoor units are equipped with a built-in refrigerant sensor. (For applicable models, refer to the catalogs.)

For your reference, the following shows the selection flow of R32-compatible City Multi air conditioning systems and safety equipment, as well as installation illustrations of the safety devices against refrigerant leaks into the room.

**Note**

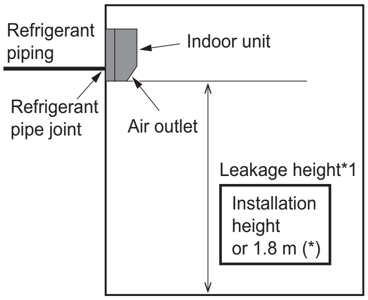
Check the following when selecting or installing safety devices.
- The M-NET remote controller (ME remote controller) cannot be connected to R32 air conditioning systems.
- Reassess the safety measures if you change the room layout.
- Check whether each indoor unit is used in large space or with a safety device.
- Shut off devices used as safety devices differ between the City Multi Y-Series and R2-Series.

Leakage height refers to the distance from the floor to a potential refrigerant leak point, and is defined as the lesser of either the installation height of the indoor unit or the installation height of the refrigerant piping joint (excluding brazed joints) connected to the indoor unit. For details, see the illustrations below. The installation height of the indoor unit is the distance from the floor to the bottom of the air outlet.

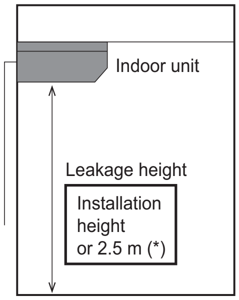
*Ensure that the leakage height is 1.8 m or higher from the floor before installation. (For the installation height requirements for each indoor unit model, refer to the Installation Manual.)

*When installing a duct for ceiling concealed models, the leakage height is defined as the lowest among the installation height of the duct air outlet, the ceiling, and the indoor unit.

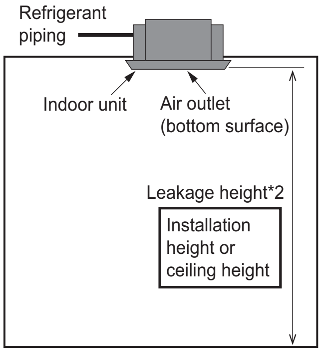
(1) Leakage height for wall-mounted indoor unit



(2) Leakage height for ceiling suspended indoor unit



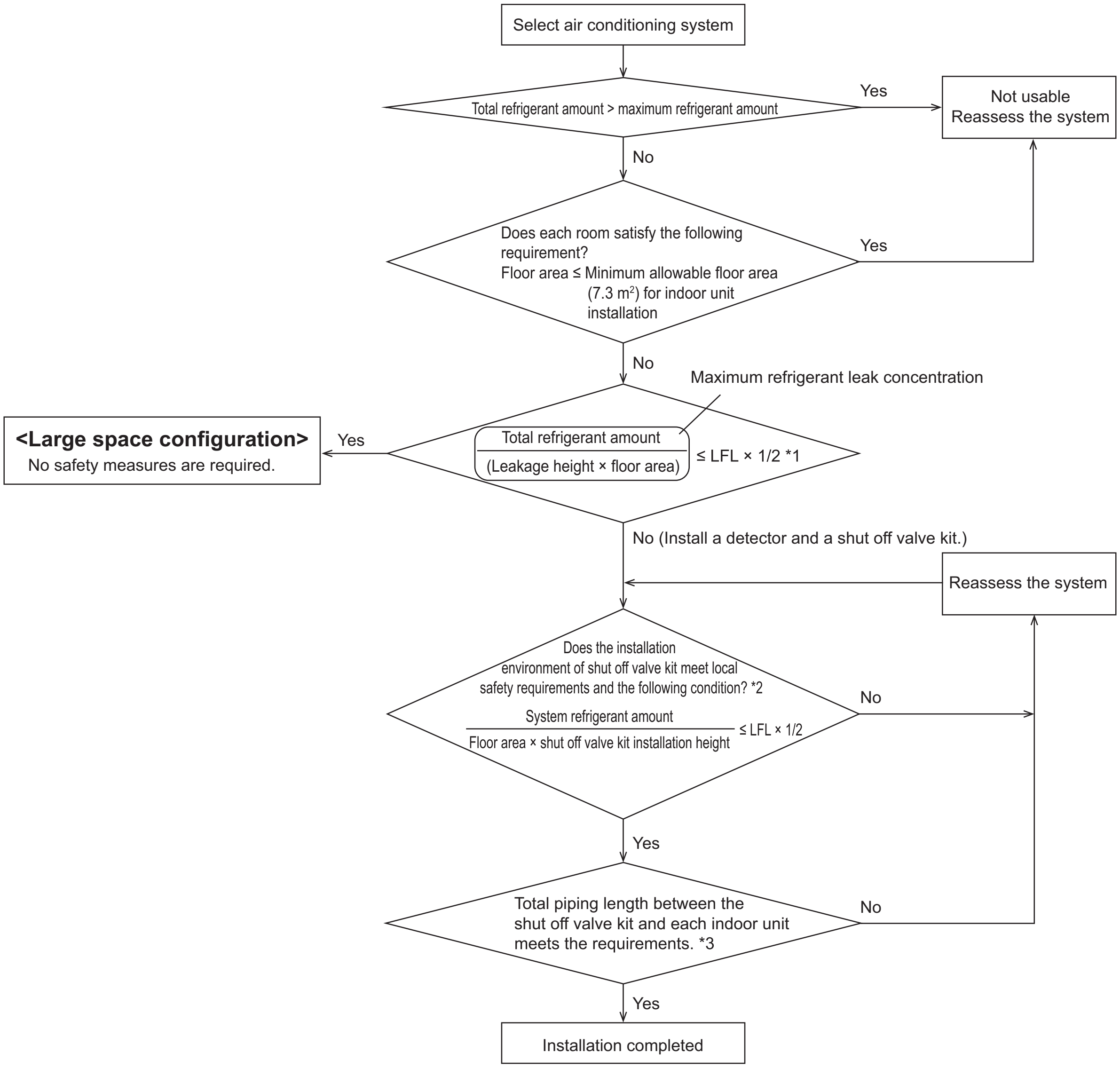
(3) Leakage height for ceiling cassette indoor unit



*1 If the installation height is unknown, the value marked with (*) in the above illustration is considered as the leakage height.
If the actual installation height is lower than the value marked with (*) in the above illustration, the actual installation height is considered as the leakage height.

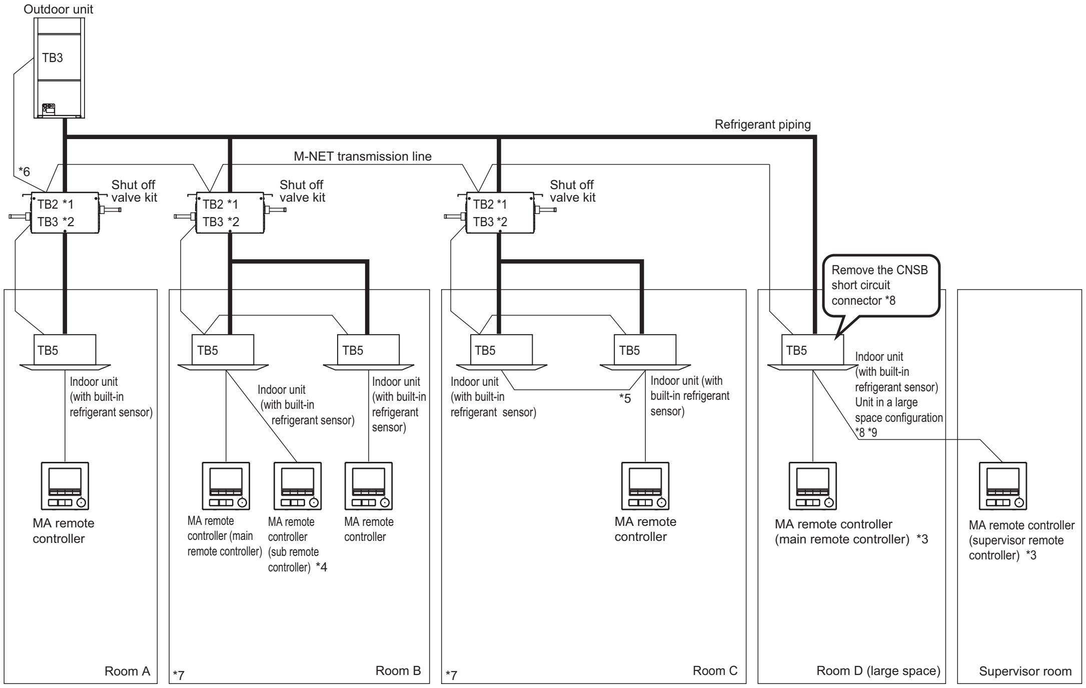
*2 The installation height or the ceiling height, whichever is lower, is considered as the leakage height.

■City Multi Y-Series
<Safety measure selection flow>



*1 For details, refer to **11-4-4 1. "[1] Determining the necessity of the shut off valve kit"**.
*2 For details, refer to **11-4-4 1. "[2] Shut off valve kit installation requirements"**.
*3 For details, refer to **11-4-4 1. "[3] Shut off valve kit installation requirements (for piping length)"**.
* Regardless of whether an air conditioning system is installed in the lowest basement or not, ensure that the total refrigerant amount of the air conditioning system with the highest refrigerant amount in the building, when divided by the volume of the lowest basement, does not exceed the LFL. For details, refer to **11-4-3. "Refrigerant leakage prevention for the lowest basement"**.
* Installation requirements may be defined by the New Design Tool Software of Mitsubishi Electric Corporation or the Diamond System Builder Software of Mitsubishi Electric Trane HVAC US.

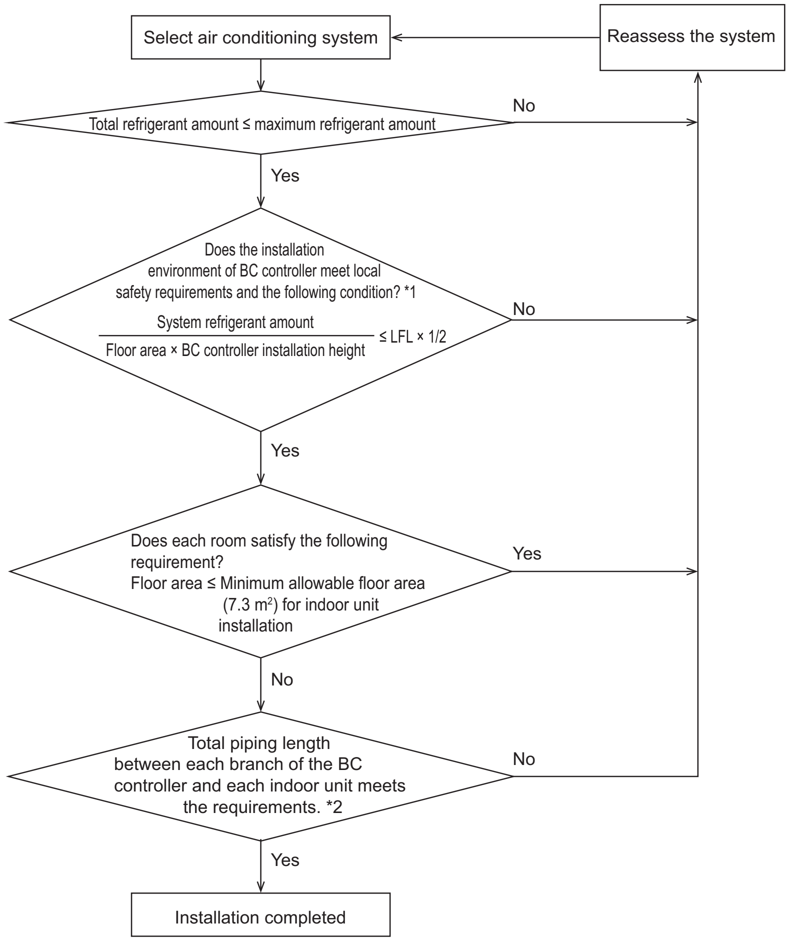
<System diagram>
When using shut off device



Room A: A shut off valve kit is connected to one indoor unit.
Room B: A shut off valve kit is connected to multiple indoor units (the diagram illustrates two indoor units).
Room C: A shut off valve kit is connected to multiple indoor units (the diagram illustrates two indoor units).
Room D: For use in large space.
→ No safety devices are required.

*1 Connect the outdoor unit, indoor unit, and shut off valve kit to TB2 on the shut off valve kit.
*2 Up to 8 indoor units can be connected to TB3 on the shut off valve kit.
*3 When using a supervisor remote controller, connect two MA remote controllers (PAR-43MAAUB or later), and set one as the main controller and the other as the supervisor remote controller using the Main/Sub setting.
The main controller cannot be used as a supervisor remote controller.
A supervisor remote controller can be connected to any indoor unit.
*4 For requirements for pairing MA remote controllers, refer to **11-4-6. "Precautions for installing alarm device (MA remote controller, model name: PAR-43MAAUB or later)"**.
*5 For requirements for grouping indoor units, refer to **11-4-6. "Precautions for installing alarm device (MA remote controller, model name: PAR-43MAAUB or later)"**.
*6 The quantity of connectible shut off valve kits depends on the equivalent power supply of the connected outdoor unit.
Calculate the number of the shut off valve kit by referring to the Data Book for the outdoor unit or MELANS Centralized Controller Technical Manual.
*7 One shut off valve kit can be connected to indoor units installed in multiple rooms.
*8 For large space configuration, remove the CNSB short circuit connector on the indoor unit circuit board to disable the built-in refrigerant sensor in the indoor unit.
For ceiling concealed models, however, do not use large space configuration.
For the conditions for removal of the CNSB short circuit connector, refer to **11-4-5. "[2] Enable/disable settings for refrigerant sensor (CNSB short circuit connector)"**.
*9 If disabled, the built-in refrigerant sensor in the indoor unit does not issue refrigerant leak alarm.

■City Multi R2-Series
<Safety measure selection flow>



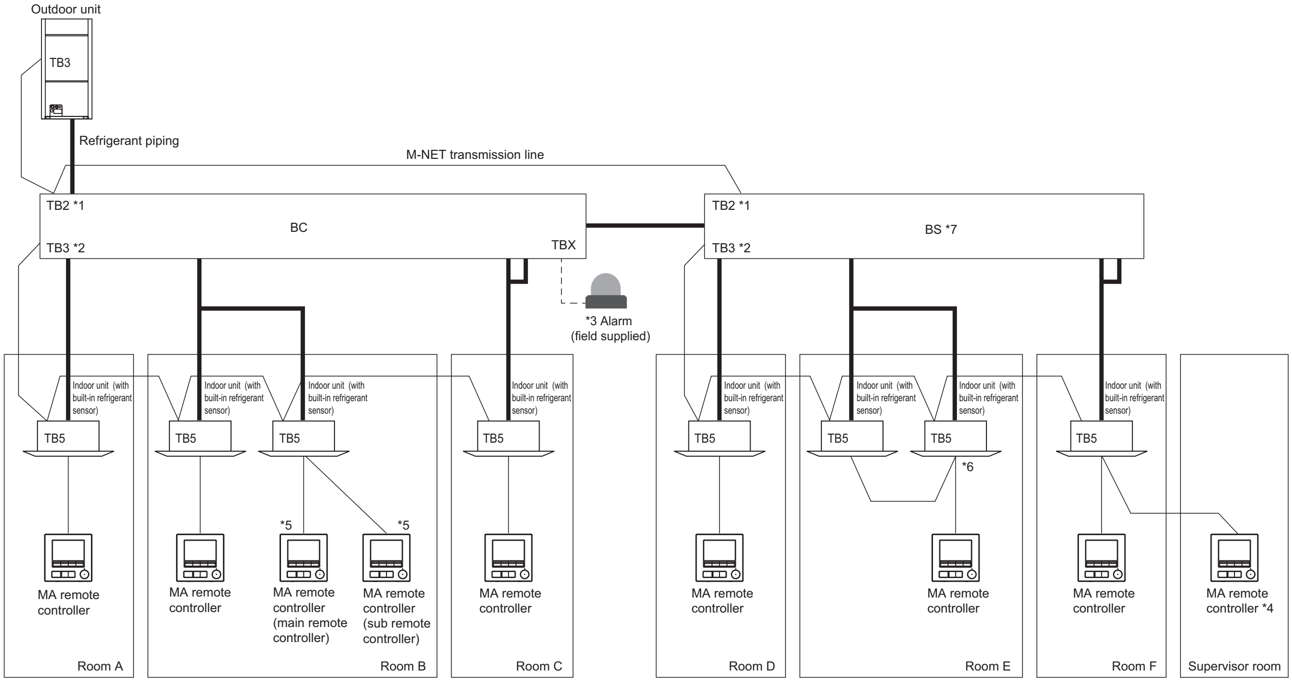
*1 For details, refer to **11-4-4 2. "[1] BC controller installation requirements"**.

*2 For details, refer to **11-4-4 2. "[2] Branch piping length requirements for indoor units controlled by BC controller with a built-in shut off valve"**.

* Regardless of whether an air conditioning system is installed in the lowest basement or not, ensure that the total refrigerant amount of the air conditioning system with the highest refrigerant amount in the building, when divided by the volume of the lowest basement, does not exceed the LFL. For details, refer to **11-4-3. "Refrigerant leakage prevention for the lowest basement"**.

* Installation requirements may be defined by the New Design Tool Software of Mitsubishi Electric Corporation or the Diamond System Builder Software of Mitsubishi Electric Trane HVAC US.

<System diagram>



Room A: One indoor unit is connected to one branch port of the BC controller.
Room B: Two or more indoor units are connected to one branch port of the BC controller.
Room C: One indoor unit is connected to two branch ports of the BC controller.
(If the total capacity of downstream indoor units is 55 or above, two branch ports must be used. For details, refer to the Installation Manual of BC controller.)
Room D-F: Indoor units are connected to the sub BC controllers. (Connection restrictions are the same as when connected to the main BC controller.)

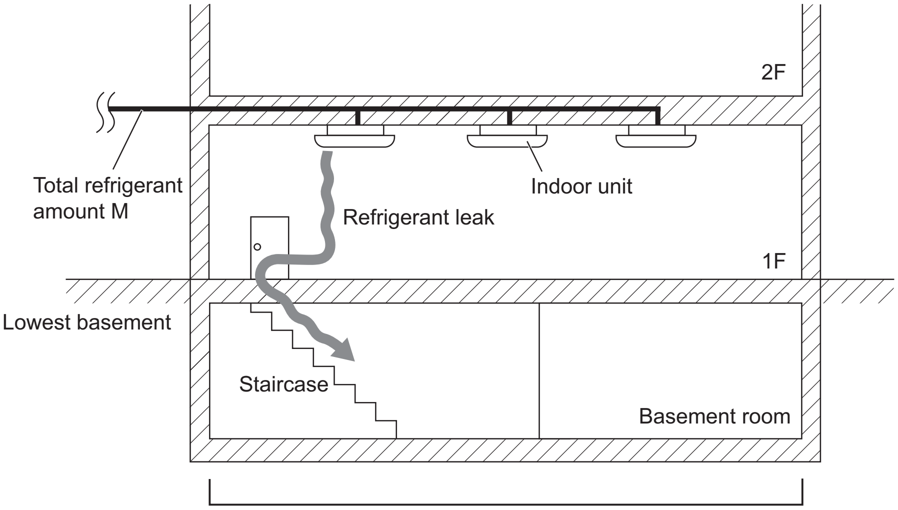
*1 Connect an outdoor unit or another BC controller to TB2 of the BC controller.
*2 Connect an indoor unit controlled by the BC controller to TB3 of the same BC controller.
*3 A field-supplied building-wide alarm can be installed in case an indoor unit detects a refrigerant leak. For the setup, refer to the Installation Manual for the BC controller.
*4 When using a supervisor remote controller, connect two MA remote controllers (PAR-43MAAUB or later), and set one as the main controller and the other as the supervisor remote controller using the main/sub setting.
The main remote controller cannot be used as an a supervisor remote controller.
A supervisor remote controller can be connected to any indoor unit.
*5 For requirements for pairing MA remote controllers, refer to **11-4-6. "Precautions for installing alarm device (MA remote controller, model name: PAR-43MAAUB or later)"**.
*6 For requirements for grouping indoor units, refer to **11-4-6. "Precautions for installing alarm device (MA remote controller, model name: PAR-43MAAUB or later)"**.
*7 Up to 11 sub BC controllers can be connected.

## 11-4-3 Refrigerant leakage prevention for the lowest basement

Regardless of whether an air conditioning system is installed in the lowest basement or not, ensure that the total refrigerant amount of the air conditioning system with the highest refrigerant amount in the building, when divided by the volume of the lowest basement, does not exceed the LFL.

$$\frac{M}{A \times h} \leqq LFL$$

$M$ : Total refrigerant amount (kg)
$A$ : Total floor area of the lowest basement ($m^2$)
$h$ : Ceiling height of the lowest basement (m)
$LFL$ : Lower Flammability Limit ($kg/m^3$), 0.306 ($kg/m^3$) for R32



Total floor area of the lowest basement A
Ceiling height of the lowest basement h

*If the calculated result exceeds the LFL, additional safety measures should be implemented according to the local building code.

## 11-4-4 Precautions for shut off devices (Shut off valve kit [CMR-M100K-NA] and BC controller [CMB-M-NU-MA/MB-SV])

Installation of shut off devices is required if the concentration of leaked refrigerant in the room exceeds 1/2 of the LFL. Read through the following and consider the necessity and installation location of the shut off valve kit, installation location of the BC controller, and length of branch piping.

### 1. Shut off device for Y-series (Shut off valve kit)

**[1] Determining the necessity of the shut off valve kit**

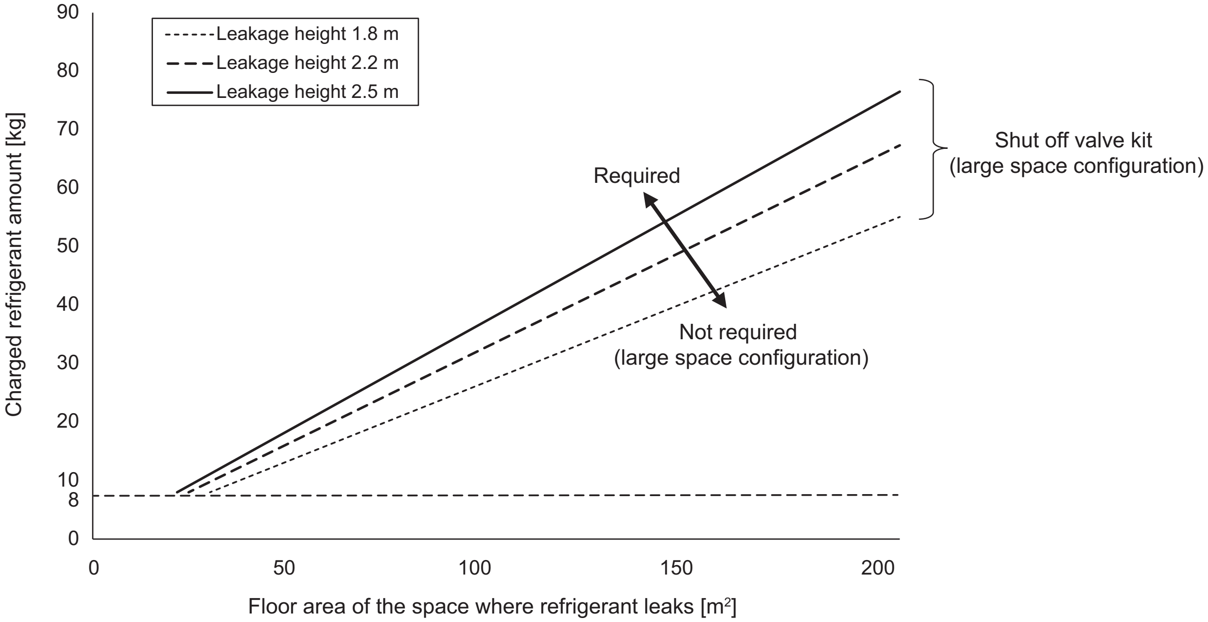
Determine whether the shut off valve kit is required in each room using the formula below.

**Necessity of the shut off valve kit (in large space)**

Installation of the shut off valve kit is not required if the following formula is satisfied.

$$R_f = \frac{m}{A \times h_r} \leqq LFL \times \frac{1}{2}$$

$R_f$ : Maximum refrigerant leak concentration (kg/m$^3$)
$m$ : Charged refrigerant amount (total refrigerant amount) (kg)
$A$ : Floor area (m$^2$)
$h_r$ : Leakage height (m)
$LFL$ : Lower Flammability Limit (kg/m$^3$), 0.306 (kg/m$^3$) for R32



### [2] Shut off valve kit installation requirements

**⚠WARNING**

(When R32 refrigerant is used)

- When installing the unit in the ceiling space, the floor area of the room under the unit is referenced.
- The unit shall be installed, operated and stored in a room with a floor area according to the following figure.
- When installing the shut off valve kit, if the floor area of the installation site falls below the minimum area (Amin) defined in Equation 1, change the system or location of the kit.
- If the installation height of the shut off valve kit is not 2.5 m, install the shut off valve kit according to Equation 1.
- If the minimum area (Amin) is over 250 $m^2$, review the safety measures and the installation location.

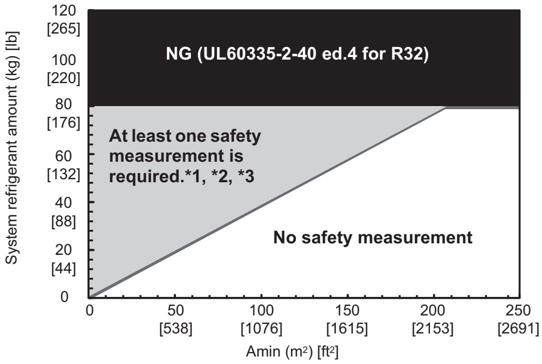
Amin = mc/(0.5 × 0.306 × Hr) …Equation 1
mc: Refrigerant charge in the system
Hr: Height from the floor to the shut off valve kit

Table1
Refrigerant concentration and required safety measure
(height of ceiling = 2.5 m [8-3/16 ft])

| Amin | | mc | | | Amin | | mc | | |
|---|---|---|---|---|---|---|---|---|---|
| $m^2$ | $ft^2$ | kg | lb | oz | $m^2$ | $ft^2$ | kg | lb | oz |
| 5 | 53.9 | 1.9 | 4 | 3 | 110 | 1184.1 | 42.0 | 92 | 9 |
| 10 | 107.7 | 3.8 | 8 | 6 | 120 | 1291.7 | 45.9 | 101 | 3 |
| 20 | 215.3 | 7.6 | 16 | 12 | 130 | 1399.4 | 49.7 | 109 | 9 |
| 30 | 323.0 | 11.4 | 25 | 2 | 140 | 1507.0 | 53.5 | 117 | 15 |
| 40 | 430.6 | 15.3 | 33 | 11 | 150 | 1614.6 | 57.3 | 126 | 5 |
| 50 | 538.2 | 19.1 | 42 | 1 | 160 | 1722.3 | 61.2 | 134 | 14 |
| 60 | 645.9 | 22.9 | 50 | 7 | 170 | 1829.9 | 65.0 | 143 | 4 |
| 70 | 753.5 | 26.7 | 58 | 13 | 180 | 1937.6 | 68.8 | 151 | 10 |
| 80 | 861.2 | 30.6 | 67 | 7 | 190 | 2045.2 | 72.6 | 160 | 0 |
| 90 | 968.8 | 34.4 | 75 | 13 | 200 | 2152.8 | 76.5 | 168 | 10 |
| 100 | 1076.4 | 38.2 | 84 | 3 | 210 | 2260.5 | 79.5 | 175 | 4 |

* If the values of Table1 are different from the values calculated by Equation 1, use the results calculated by the New Design Tool software of Mitsubishi Electric Corporation or the Diamond System Builder software of Mitsubishi Electric Trane HVAC US.

Fig. 1
Refrigerant concentration and required safety measure (height of ceiling space = 2.5 m [8-3/16 ft])



*1 Please be aware that this product does not have built-in safety measures for installation.
*2 The system is UL-Listed for the ETRS (ENHANCED TIGHTNESS REFRIGERATING SYSTEM). Therefore, please note that the installation requirements indicated in Fig. 1 are mitigated compared to ASHRAE 15 or local building codes.
*3 For safety reasons, do not install a shut off valve kit of other manufacturers in the refrigerant circuit to prevent equipment failure.

**Note**

For the amount of additional charge of R32 and its maximum amount within the system, refer to the Data Book.

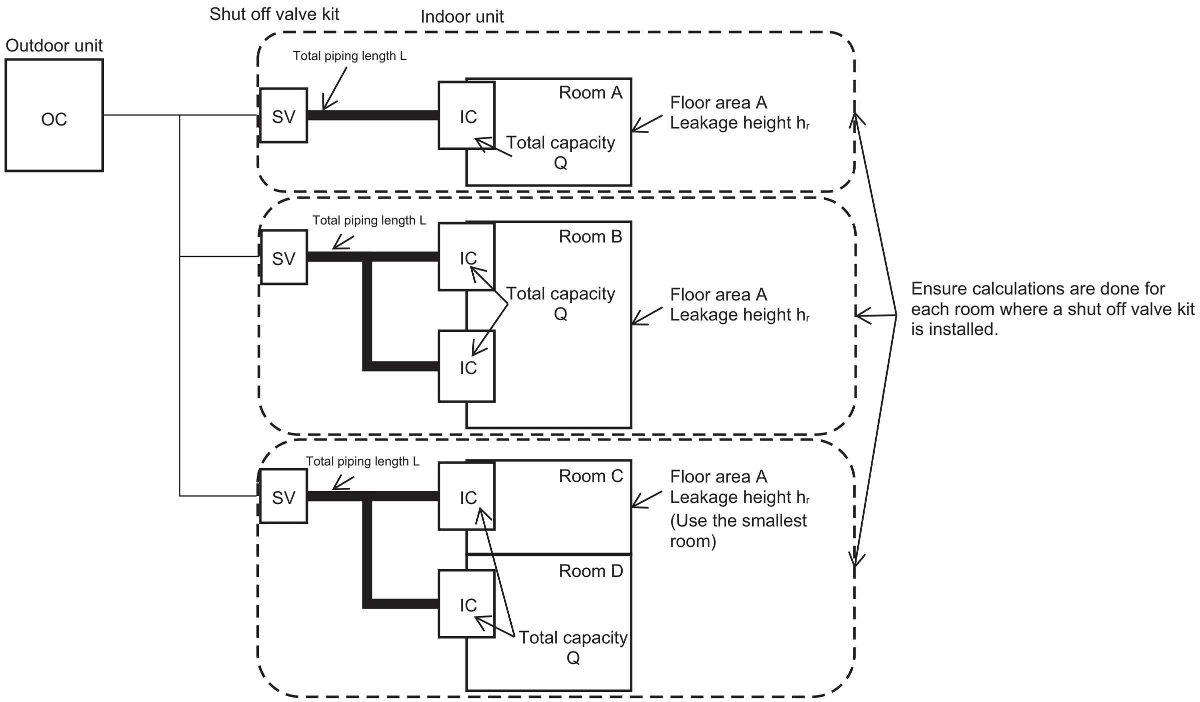
### [3] Shut off valve kit installation requirements (for piping length)

If the maximum concentration of leaked refrigerant exceeds 1/2 of the LFL, the shut off valve kit must be installed in a location where the concentration of the refrigerant after shut off does not exceed 1/2 of the LFL. Therefore, install the shut off valve kit within the total piping length L as shown in the illustrations below.

*For the selection of indoor or outdoor units and requirements on the total piping length and furthest piping length for the systems, refer to the Data Book.

*Installation requirements are defined by the New Design Tool Software of Mitsubishi Electric Corporation or the Diamond System Builder Software of Mitsubishi Electric Trane HVAC US.

<System diagram>



L : Total piping length (m)
→ Total piping length between the shut off valve kit and each indoor unit

Q : Total capacity
→ The total capacity and quantity of indoor units connected to a shut off valve kit are as follows: the total maximum capacity is 96, and the total quantity is 8.

A : Floor area ($m^2$)
→ In the actual calculation, use the room, of which volume obtained by multiplying the floor area by the leakage height is the smallest.

$h_r$ : Leakage height (m)

### [4] Equivalent piping length of shut off valve kit

When shut off valve kit is used in a system, the equivalent piping length of the shut off valve kit should be added to the equivalent piping length calculation. For details, refer to section "Piping Design" of the Data Book.

## 2. Shut off device for R2-series (BC controller)

### [1] BC controller installation requirements

Check that the difference of elevation between indoor and outdoor units and the length of refrigerant piping are within the limitations provided by Data Book.

**⚠WARNING**

- If the minimum area (Amin) is over 250 m$^2$, review the safety measures and the installation location.
- If the BC controller is installed above the ceiling, and the boundary with the living space is unclear, use the floor area of the room directly below the BC controller and the height from the floor of that room to the ceiling for the calculation. Refer to the Data Book for the details.
- If the BC controller is installed at a height of 1.8 m or less from the floor, install a device equipped with air circulation equipment in accordance with local regulations.
- The unit shall be installed, operated and stored in a room with a floor area according to the following figure.
- Table 1 and Fig. 1 show the floor area of the BC controller installation site and system refrigerant amount when the height from the floor to the BC controller is 2.5 m [8-3/16 ft]. However, if the height is not 2.5 m, please keep the minimum area (Amin) calculated by Equation 1.
- When installing a BC controller, if the floor area of the BC controller installation site falls below the minimum area (Amin) defined in Equation 1, please take appropriate safety measures in accordance with UL standards.

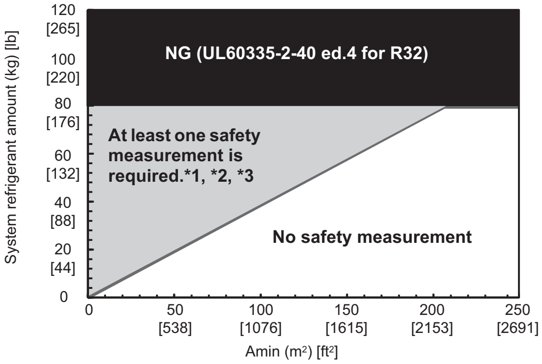
Amin = mc/(0.5 × 0.306 × Hr) …Equation 1
mc: Refrigerant charge in the system
Hr: Height from the floor to the BC controller

Table1
Refrigerant concentration and required safety measure
(height of ceiling = 2.5 m [8-3/16 ft])

| Amin | | mc | | | Amin | | mc | | |
|---|---|---|---|---|---|---|---|---|---|
| m$^2$ | ft$^2$ | kg | lb | oz | m$^2$ | ft$^2$ | kg | lb | oz |
| 5 | 53.9 | 1.9 | 4 | 3 | 110 | 1184.1 | 42.0 | 92 | 9 |
| 10 | 107.7 | 3.8 | 8 | 6 | 120 | 1291.7 | 45.9 | 101 | 3 |
| 20 | 215.3 | 7.6 | 16 | 12 | 130 | 1399.4 | 49.7 | 109 | 9 |
| 30 | 323.0 | 11.4 | 25 | 2 | 140 | 1507.0 | 53.5 | 117 | 15 |
| 40 | 430.6 | 15.3 | 33 | 11 | 150 | 1614.6 | 57.3 | 126 | 5 |
| 50 | 538.2 | 19.1 | 42 | 1 | 160 | 1722.3 | 61.2 | 134 | 14 |
| 60 | 645.9 | 22.9 | 50 | 7 | 170 | 1829.9 | 65.0 | 143 | 4 |
| 70 | 753.5 | 26.7 | 58 | 13 | 180 | 1937.6 | 68.8 | 151 | 10 |
| 80 | 861.2 | 30.6 | 67 | 7 | 190 | 2045.2 | 72.6 | 160 | 0 |
| 90 | 968.8 | 34.4 | 75 | 13 | 200 | 2152.8 | 76.5 | 168 | 10 |
| 100 | 1076.4 | 38.2 | 84 | 3 | 210 | 2260.5 | 79.5 | 175 | 4 |

* If the values of Table 1 are different from the values calculated by Equation 1, use the results calculated by the New Design Tool software of Mitsubishi Electric Corporation or the Diamond System Builder software of Mitsubishi Electric Trane HVAC US.

Fig. 1
Refrigerant concentration and required safety measure (height of ceiling space = 2.5 m [8-3/16 ft])



*1 Please be aware that this product does not have built-in safety measures for installation.
*2 The system is UL-Listed for the ETRS (Enhanced Tightness Refrigerating System). Therefore, please note that the installation requirements indicated in Fig. 1 are mitigated compared to ASHRAE 15 or local building codes.
*3 For safety reasons, do not install a shut off valve kit of other manufacturers in the refrigerant circuit to prevent equipment failure.

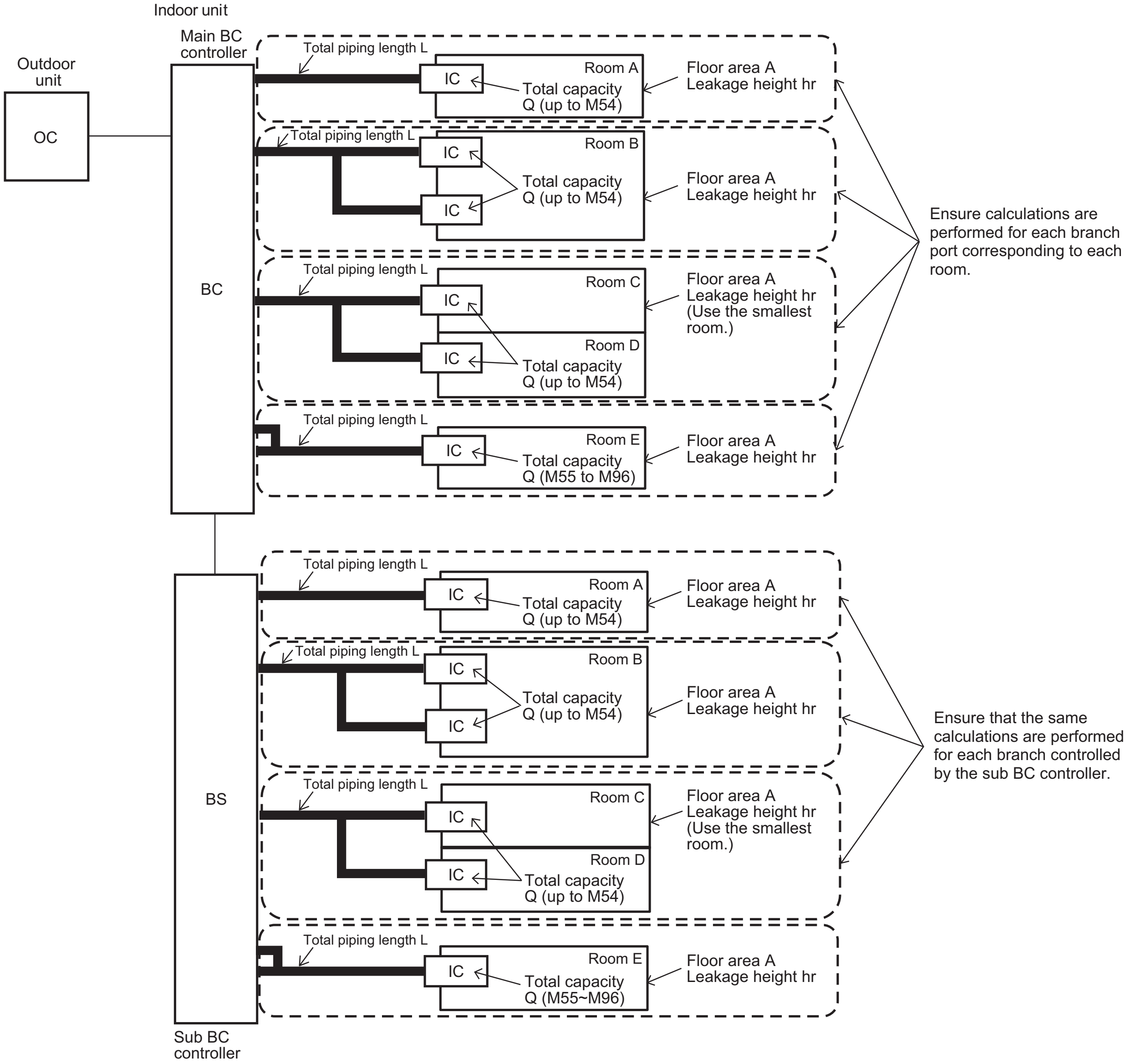
### [2] Branch piping length requirements for indoor units controlled by BC controller with a built-in shut off valve

The BC controller with a built-in shut off valve is equipped with an internal shut off valve. The length of the branch pipe running from the shut off valve must meet the requirements to ensure that the maximum refrigerant concentration after shut off does not exceed 1/2 of the LFL.

*For the selection of indoor or outdoor units and requirements on the total piping length and furthest piping length for the systems, refer to the Data Book.

*Installation requirements are defined by the New Design Tool Software of Mitsubishi Electric Corporation or the Diamond System Builder Software of Mitsubishi Electric Trane HVAC US.

<System diagram>



L : Total piping length (m)
→ Total piping length between each branch of the BC controller and each indoor unit

Q : Total capacity
→ The total capacity and quantity of the indoor units connected to each branch of the BC controller are as follows: the total maximum capacity is 54(*), and the total quantity is 3.

A : Floor area ($m^2$)
→ In the actual calculation, use the room, of which volume obtained by multiplying the floor area by the leakage height is the smallest.

$h_r$ : Leakage height (m)

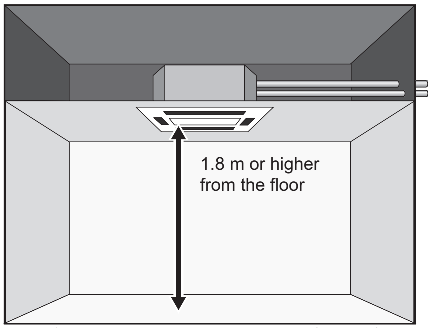
* When using indoor units with M55 to M96 capacity, connect them to two branch ports.

## 11-4-5 Precautions for installing indoor units

### [1] Indoor unit installation location

- Do not use gas appliances or spray products near the unit.
  The refrigerant sensor may be triggered by propane, butane, and fluorinated gases contained in spray products, acetone and ethanol in drug or antiseptic solutions, dichloromethane in paint, and smoke from charcoal. In such cases, the sensor may need to be replaced.
- Install the indoor unit at a height of 1.8 m or higher from the floor, as shown in the figure on the right. (This height requirement applies to ceiling cassette, ceiling suspended, and wall-mounted types.)
  For duct installation, the requirements below must be satisfied.
  *Ceiling height must comply with building codes.

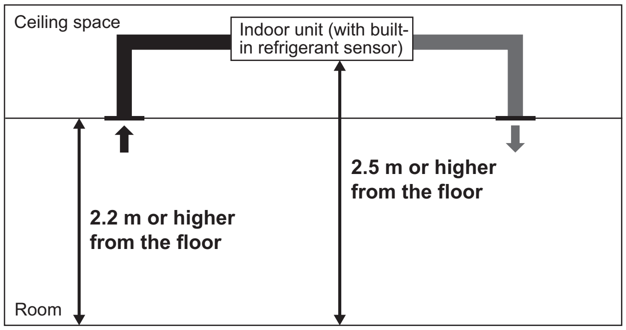
  For details, refer to the Installation Manual for the indoor unit.



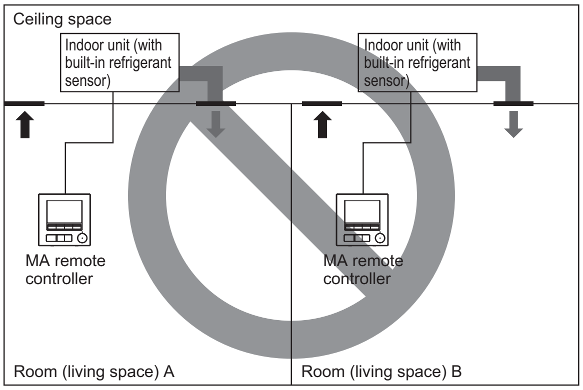
Ceiling cassette indoor unit installation (example)

**■Duct installation requirements for ceiling concealed model**

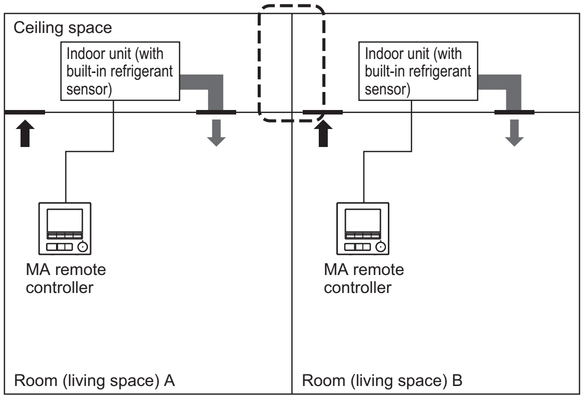
- Install the indoor unit at a height of 2.5 m or higher.
- Ensure the ceiling height (duct opening) is 2.2 m or higher.



- If two different rooms share the same space above the ceiling from which the indoor unit draws air, install a partition above the ceiling.

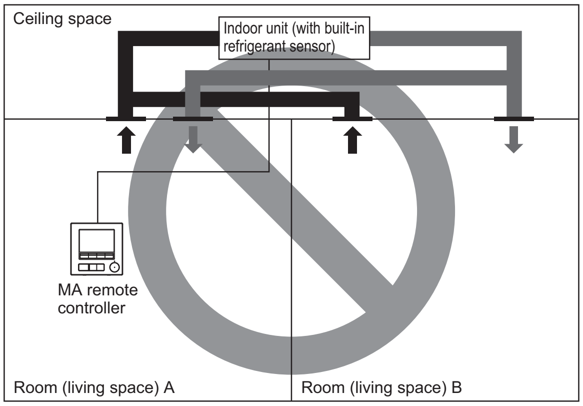


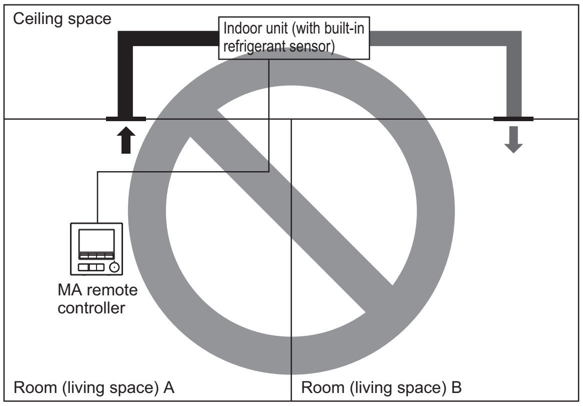
**Partition the ceiling space into two for Rooms A and B.**



*Install the partition in accordance with building codes.

- Do not use a duct to draw in or blow out air from/to multiple rooms.





- Operation when ducted indoor units connected to the BC controller or shut off valve kit are installed in the same room as other indoor units (including ductless units)

If the indoor units are installed as follows, change function setting No. 174 from “1” to “2” for the ducted indoor units.

(1) Indoor units (including ductless indoor units) connected to different ports on the same BC controller are installed in the same room.
Note that if those indoor units are connected to the same ports, there is no need to change the setting.

(2) Indoor units (including ductless indoor units) connected to different shut off valve kits are installed in the same room.

**Note**

If the refrigerant sensors in any of the indoor units detect a refrigerant leak or if the refrigerant sensors fail, the fans on all ducted indoor units to which this setting is applied will start.

### [2] Enable/disable settings for refrigerant sensor (CNSB short circuit connector)

If the following condition is met, remove the CNSB short circuit connector from the indoor unit to disable the built-in refrigerant sensor. (Models that are not equipped with a built-in refrigerant sensor do not have the CNSB short circuit connector.)

Conditions for removal of the CNSB short circuit connector

| Condition | Indoor unit |
|---|---|
| Safety device is not required (in large space). | Remove the CNSB short circuit connector *1 |
| (For reference)<br>Built-in refrigerant sensor on the indoor unit is used. | Do not remove the CNSB short circuit connector. |

*1 Removing the CNSB short circuit connector will disable the built-in refrigerant sensor on the indoor unit.

## 11-4-6 Precautions for installing alarm device (MA remote controller, model name: PAR-43MAAUB or later)

### [1] Installation location

Install the MA remote controller as an alarm device in a location where a facility manager works, such as a supervisor room or any room that requires safety devices. (This is not mandatory.)

*If the MA remote controller is used in a supervisor room, set the remote controller as a supervisor remote controller using the Main/Sub setting. For details, refer to the MA remote controller Installation Manual.

### [2] Behavior of alarm device

Once the MA remote controller detects a refrigerant leak, it will issue an alarm and sound, and the operation lamp and backlight will blink.

### [3] Connection of alarm device

Connect one MA remote controller (PAR-43MAAUB or later) to one indoor unit.
A table below shows the requirements for grouping of indoor units and connecting of multiple remote controllers to a group.

<MA remote controller (PAR-43MAAUB or later)>

| Applicable system | Grouping of indoor units | Connection of multiple remote controllers to a group |
|---|---|---|
| R32 indoor units equipped with built-in refrigerant sensors | Allowed (*1) (*2) (*3) | Allowed<br>*Do not use a sub remote controller as an alarm device.<br>*Up to two remote controllers can be connected. |
| R32 indoor units set for large spaces | Allowed (*1) | |

*1 Grouping connections between different refrigerant systems or between different system configurations are not allowed.

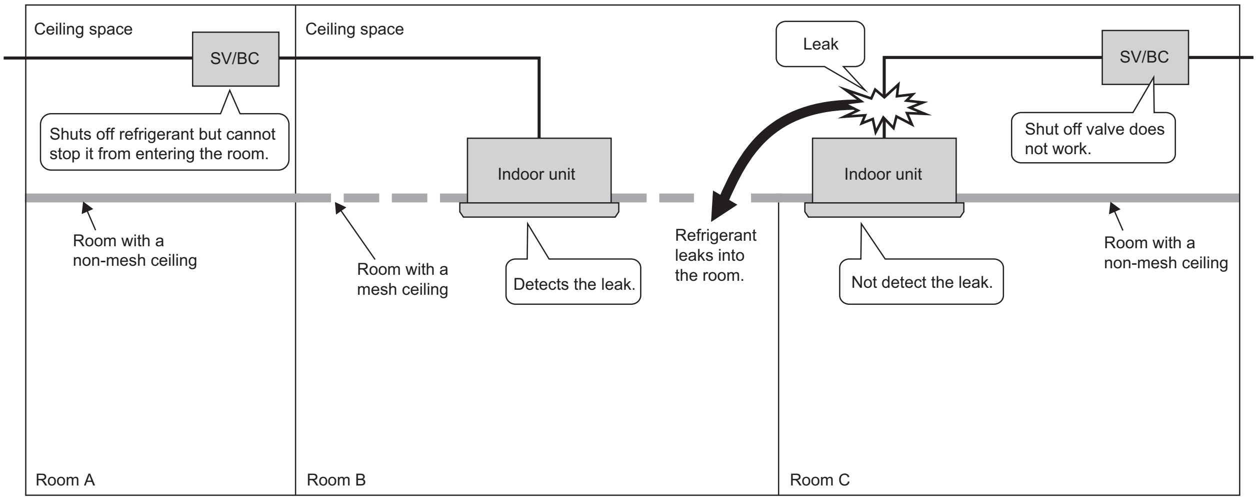
*2 Grouping connections across rooms are not allowed.

*3 The supervisor remote controller cannot be connected to grouped indoor units.

## 11-4-7 Precautions for mesh ceiling

For rooms with a mesh ceiling, note the following points for unit selection and determination of pipe locations.

- If refrigerant leaks from the unit or pipe above the ceiling, it may enter the room through the mesh ceiling.
- In the case shown below, if refrigerant leaks, the leak may be detected in a room with the mesh ceiling, but the shut off valve kit cannot stop the refrigerant leak.



## 11-4-8 Restrictions on installation environment of outdoor units

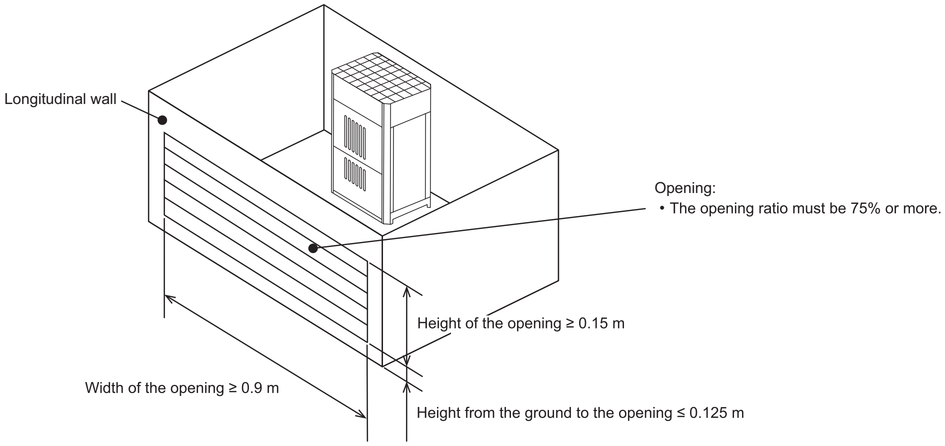
If the outdoor unit is installed in a place where the refrigerant easily stagnates, the refrigerant may burn in the case of refrigerant leakage. Be sure to follow the installation restrictions below.
When installing the outdoor units in such places, do not install combustion appliances such as boilers together. Leaked refrigerant may catch fire.

### 1. Restrictions when installing outdoor units in a machine room

If the outdoor unit is installed in a machine room, refer to the latest ANSI/ASHRAE 15 or CSA B52 standards and install the unit in accordance with UL60335-2-40 (Fourth Edition) GG.5DV.

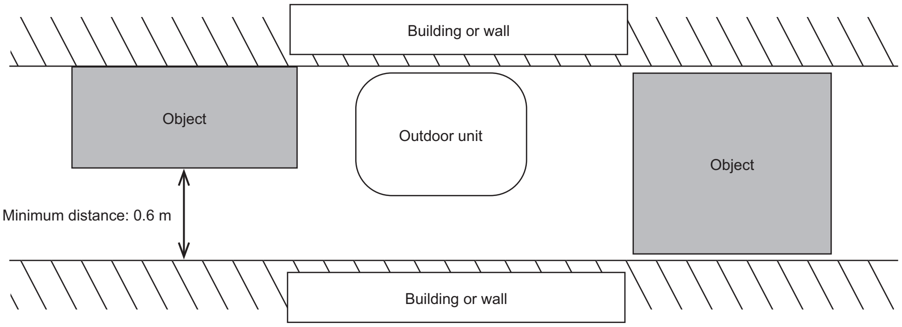
### 2. Restrictions when installing outdoor units in louvered space

When installing the outdoor unit in louvered space as shown in the figure below, follow the conditions for the openings described in the figure.



### 3. Restrictions when installing outdoor units in a confined space

When installing the outdoor unit in a confined space as shown in the figure below, be sure to leave a clearance of at least 0.6 m to prevent the stagnating refrigerant from reaching a high concentration and becoming flammable.
Refer to the Installation Manual or the Data Book of the outdoor unit for details on the required surrounding space for the outdoor unit.

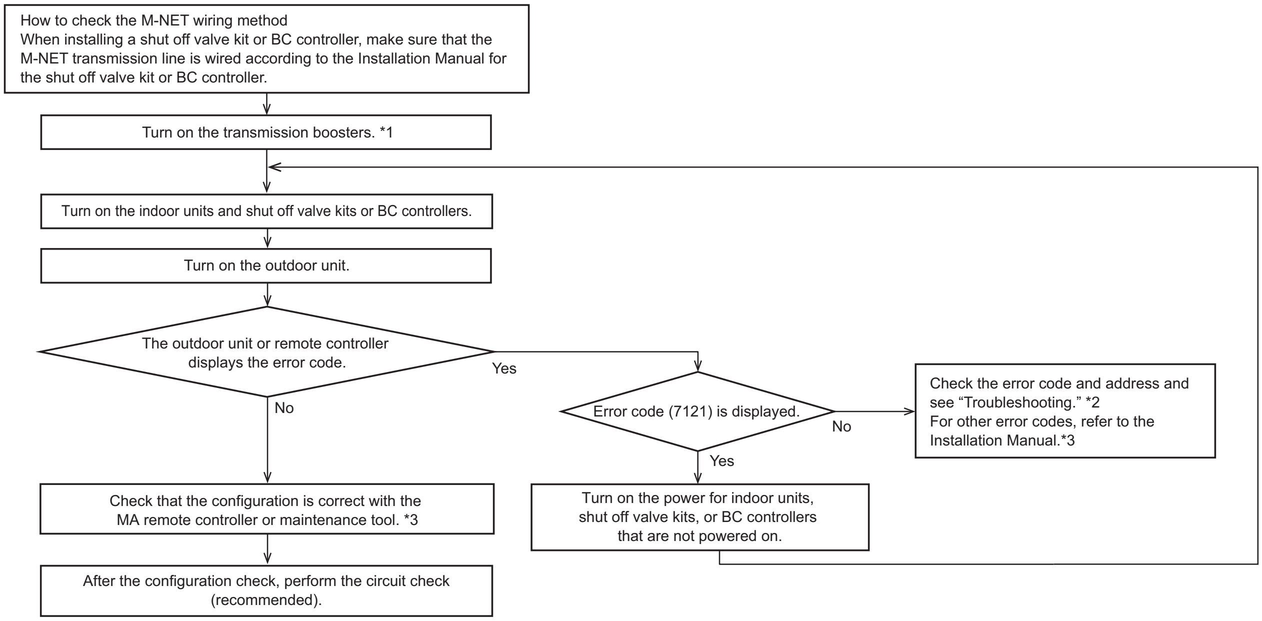


# 11-5 Precautions for Test Run

**[Note]**

- Turn on the outdoor units **after turning on the indoor units, shut off valve kits or BC controllers, and transmission boosters.**
- After turning on the system power, perform the circuit check (recommended) and test run.
  The system power refers to the power to all units in the same refrigerant circuit system (outdoor units, indoor units, shut off valve kits or BC controllers, and transmission boosters).
- Check the M-NET wiring according to the check flowchart before the circuit check and test run.
- The device managers are required to inform air conditioner users of necessary information by explaining it, posting it, or other means, so that they can handle a refrigerant leak according to [11-7 Actions to Take When Refrigerant Leaks]

<Check flowchart>



*1 Do this only when a transmission booster is used.
*2 For details, refer to the specified page. [11-9 Troubleshooting]
*3 For details, refer to the specified page. [11-9-2 Checking and Changing the System Configuration]

# 11-6 Precautions for Servicing

## 11-6-1 Check before Servicing

- In a service call, check the type of device refrigerant.
  Type of refrigerant charged in the product: R32
- In a service call, check the device symptoms.
  If you will perform the service for refrigeration cycle systems, be sure to check the symptoms with the issued Data Book and Service Handbook.
- Check of required tools: Tools to be used need to be selected according to the type of refrigerant. For details, refer to the specified page. [1-1-2 Tool Preparation]
- Check of piping to connect: Check the type of refrigerant used in the device to be relocated or replaced.
- If the refrigerant gas leaks during servicing and the residual gas comes into contact with a flame, toxic gases, ignition, and fire may result. Ventilate workplaces sufficiently during work.
- Check with the contractor if an insufficient amount of refrigerant has been charged to the specified amount during installation.
- Ensure safety in brazing work space by ventilating the space and carrying a potable refrigerant leak detector before starting the work.

## 11-6-2 Refrigerant Charging during Servicing

- When a part or compressor in the refrigerant circuit is replaced
  Recover the existing refrigerant in the system completely to the outside of the system. After replacing a part or compressor, check for leakage and perform vacuum drying and then recharge the refrigerant to the specified amount.

**Key points for work**

After removing a part, immediately attach a replacement part to the piping.
When cooling parts or piping, do not allow water or moisture to enter the refrigerant circuit.

## 11-6-3 Circuit Check

The following two points can be checked with the circuit check.
It is recommended to perform the circuit check in a test run.

- Whether the alarm is activated with the leak detection signal
- Whether the shut off valve is activated when the refrigerant leaks

## 11-6-4 How to Perform the Circuit Check

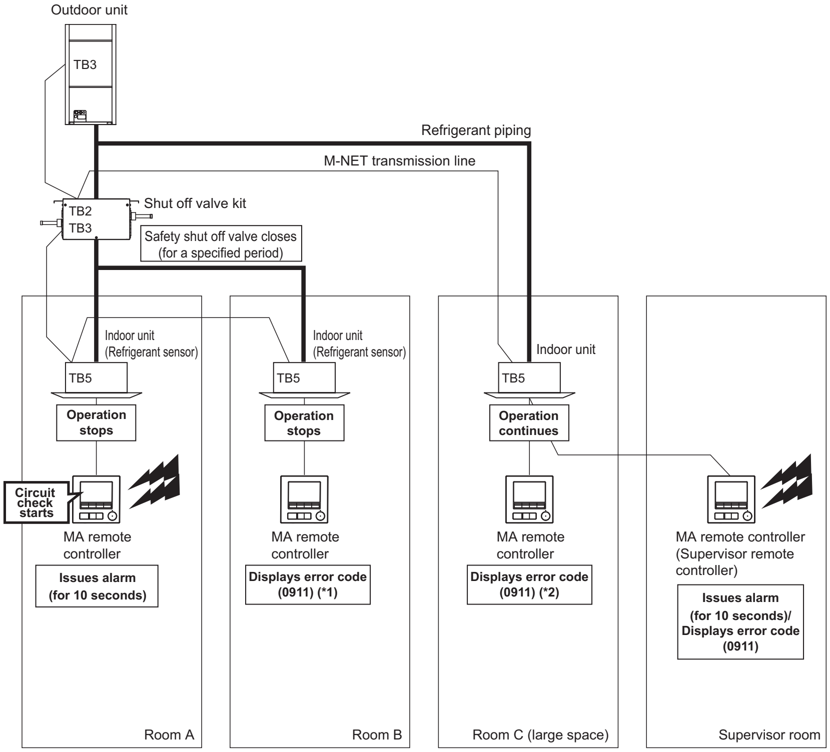
**[Note]**

- Note that the check method differs according to the system configuration.
- If the supervisor remote controller is installed, check if the alarm of the supervisor remote controller is functioning to ensure that the safety device is appropriately operating. After checking, turn on and off the start/stop button of the main remote controller to cancel the error code (0911) and perform the following circuit check.
- Do not perform the circuit check simultaneously from multiple devices. Additionally, do not operate other devices during the circuit check.

**[For Y series]**

The following diagrams show the systems during the circuit check.
The circuit check is performed on the MA remote controllers of Rooms A and B.

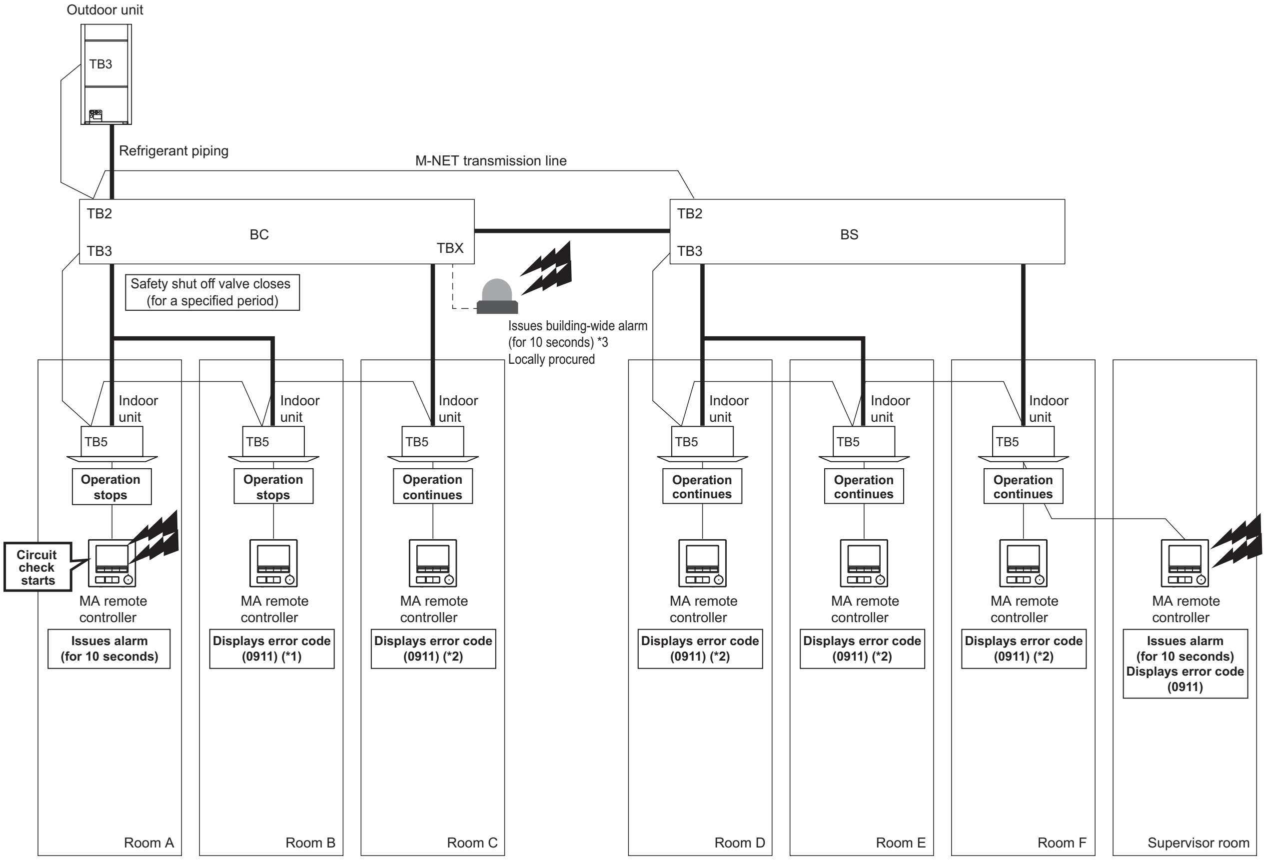
### [Circuit check with the configuration using the built-in refrigerant sensor of the indoor unit (diagram of the circuit check of Room A)]



*1 While the indoor unit is stopped, the error code (0911) may not be displayed depending on the check start timing.

*2 While the indoor unit is in operation, the error code (0911) is displayed at the upper left of the remote controller screen.
While the indoor unit is stopped, the error code (0911) is not displayed.

## [For R2 series]



*1 While the indoor unit is stopped, the error code (0911) may not be displayed depending on the check start timing.

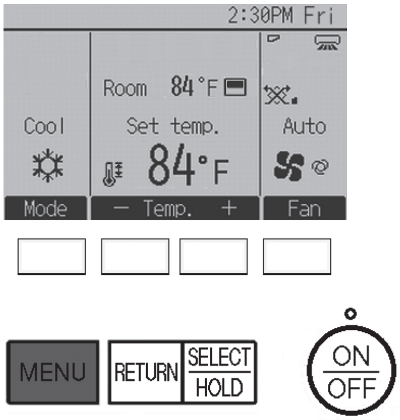
*2 While the indoor unit is in operation, the error code (0911) is displayed at the upper left of the remote controller screen. While the indoor unit is stopped, the error code (0911) is not displayed.

*3 A field-supplied building-wide alarm can be installed in case an indoor unit detects a refrigerant leak. For the setup, refer to the Installation Manual for the BC controller.

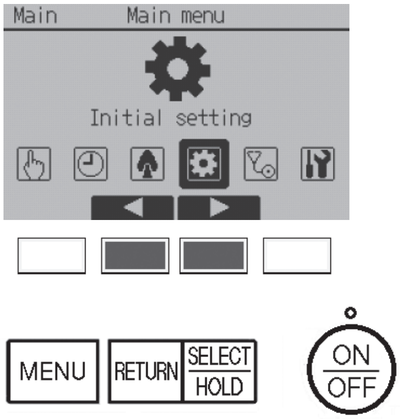
## 1. When the circuit check is performed from the MA remote controller (PAR-43MAAUB)

**[Procedure]**

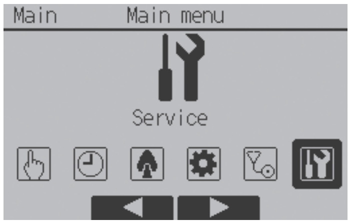
1) Press the **MENU** button on the main screen.
   The main menu screen appears.



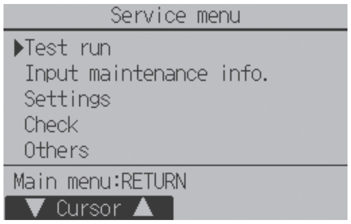
2) Press the **F2** or **F3** button to select the item.
   Pressing the **F2** button moves the cursor to the left.
   Pressing the **F3** button moves the cursor to the right.



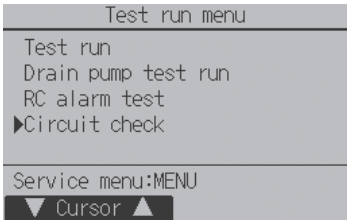
3) Select the service menu icon with the cursor and press the **SELECT/HOLD** button.
   Each menu item is displayed.



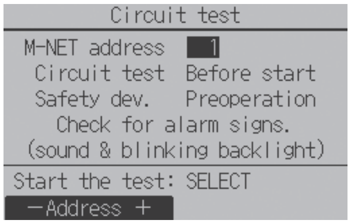
4) Select “Test run” with the cursor and press the **SELECT/HOLD** button.



5) Select “Circuit check” with the cursor and press the **SELECT/HOLD** button.

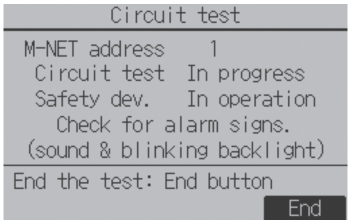


6) Check the circuit check start screen and press the **SELECT/HOLD** button.
The circuit check starts.



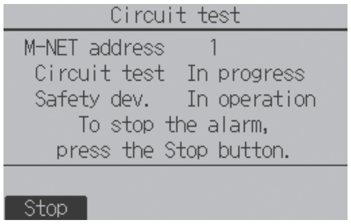
Circuit test
M-NET address 1
Circuit test Before start
Safety dev. Preoperation
Check for alarm signs.
(sound & blinking backlight)
Start the test: SELECT

- The MA remote controller will issue an alarm and sound, and the operation lamp and backlight will blink. (For approximately 10 seconds)
  - * The operation duration of the safety shut off valve differs according to the system. (Approximately 10 seconds to 2 minutes)
  - * If the supervisor remote controller is connected, it will also issue an alarm and sound, and the operation lamp and backlight will blink. (For approximately 10 seconds)



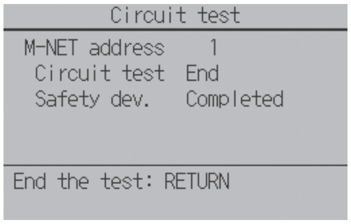
Circuit test
M-NET address 1
Circuit test In progress
Safety dev. In operation
Check for alarm signs.
(sound & blinking backlight)
End the test: End button

- Press the **[Stop]** button to stop the alarm.
  After the stop button is pressed, the stop confirmation screen appears.
- Select [Stop].
  The alarm stops.



Circuit test
M-NET address 1
Circuit test In progress
Safety dev. In operation
To stop the alarm,
press the Stop button.

7) After the safety shut off valve operation completion is displayed, press the **RETURN** button.
The circuit check is complete.



Circuit test
M-NET address 1
Circuit test End
Safety dev. Completed
End the test: RETURN

**[Troubleshooting]**

- **When the circuit check is stopped**
  - The circuit check is stopped and the check is incomplete.
  - If the error of the error code (0911) has occurred in the units other than the circuit check target units, cancel the error. For details of the error code, refer to the specified page. [7 Troubleshooting Using Error Codes]
  - If the supervisor remote controller is installed, turn on and off the start/stop button of the main remote controller to cancel the error of the error code (0911).
- **When the circuit check result is abnormal**
  There may be an abnormality detection or power failure. Check the unit statuses.
- **If an alarm is not issued or the operation lamp and backlight fail to blink**
  The remote controller may be malfunctioning. Stop using it and contact your dealer (installer, service shop).
- **How to delete the error display on the supervisor remote controller**
  Turn on and off the start/stop button of the main remote controller.
  * The error display will disappear in five minutes after the circuit check ends.
- **If “Cannot start circuit check” is displayed**
  If the system configuration does not need safety measures, the circuit check cannot be performed.

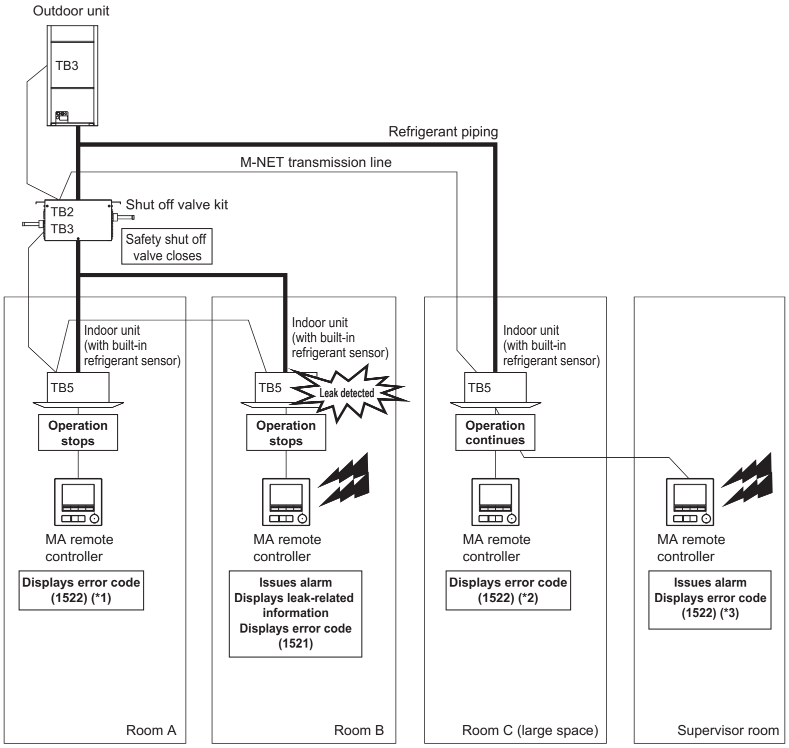
# 11-7 Actions to Take When Refrigerant Leaks

**[Note]**

⬩When refrigerant leaks, ventilate the place sufficiently by opening the windows and doors or other means. Then, immediately report the alarm issuance to the device manager.

The following diagrams show the systems when refrigerant leaks.

**[For Y series]**

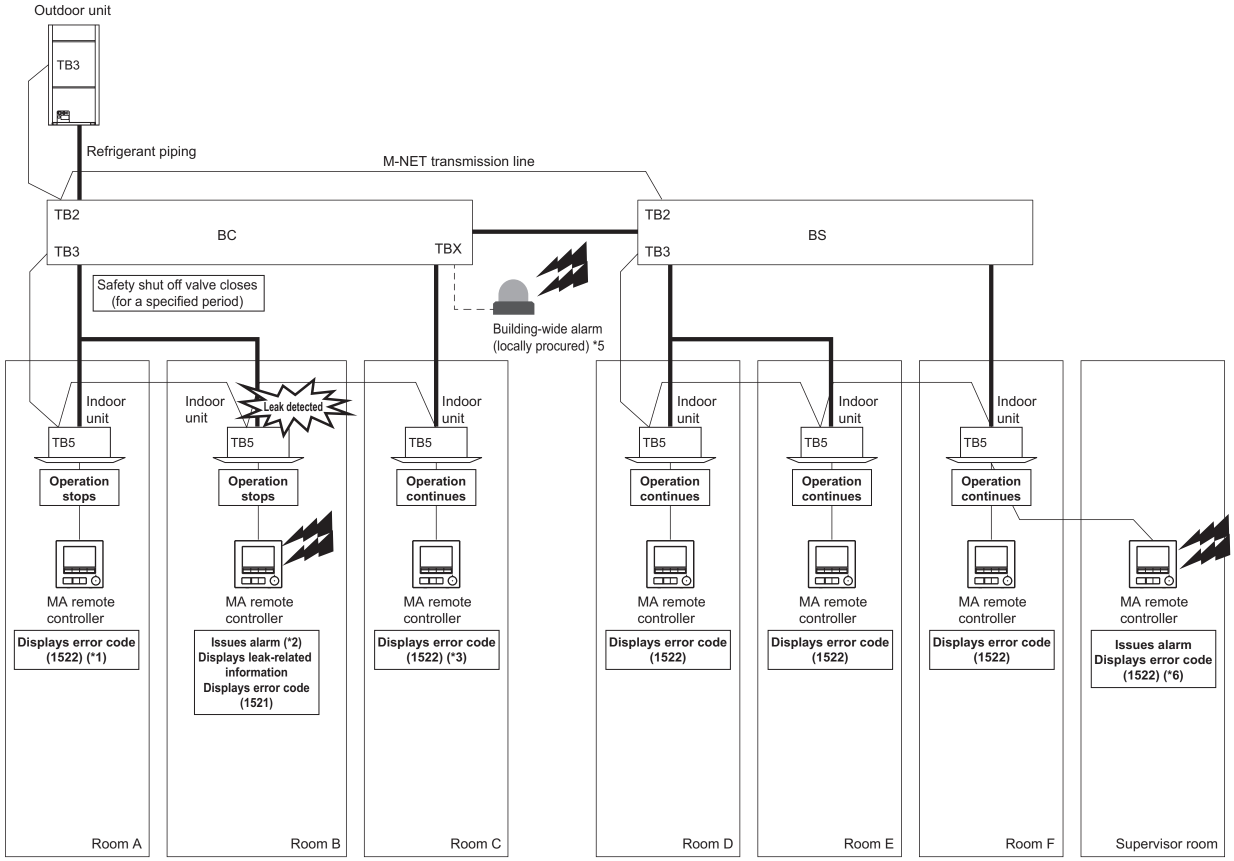


*1 While the indoor unit is stopped, the error code (1522) may not be displayed depending on the leak detection timing.

*2 While the indoor unit is in operation, the error code (1522) is displayed at the upper left of the remote controller screen. While the indoor unit is stopped, the error code (1522) is not displayed.

*3 Since the error codes (1521/1524/ 5558) are prioritized, the error code (1522) may not be displayed.

**[For R2 series]**

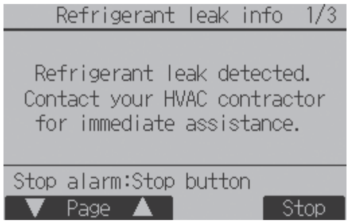


*1 While the indoor unit is stopped, the error code (1522) may not be displayed depending on the leak detection timing.
*2 While the indoor unit is in operation, the error code (1522) is displayed at the upper left of the remote controller screen. While the indoor unit is stopped, the error code (1522) is not displayed.
*3 Alarm issuance can be disabled. For how to disable the alarm issuance, refer to the Installation Manual for the MA remote controller.
*4 Indoor units not connected to the branch that is connected to the indoor unit that has detected the leak can continue to operate.
*5 A field-supplied building-wide alarm can be installed in case an indoor unit detects a refrigerant leak. For the setup, refer to the Installation Manual for the BC controller.
*6 Since the error codes (1521/1524/ 5558) are prioritized, the error code (1522) may not be displayed.

## 11-7-1 In Case of the Alarm in a Room

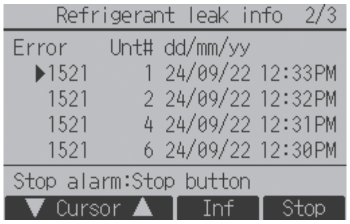
**If the MA remote controller is used**

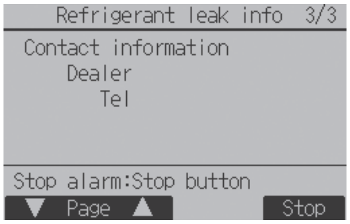
- The remote controller of the detected indoor unit sounds an alarm, the operation lamp and backlight blink, and the following screen appears.


```
    Refrigerant leak info  1/3

  Refrigerant leak detected.
 Contact your HVAC contractor
  for immediate assistance.

Stop alarm:Stop button
 ▼ Page ▲              Stop
```


```
    Refrigerant leak info  2/3
Error    Unt# dd/mm/yy
  ▶1521     1 24/09/22 12:33PM
   1521     2 24/09/22 12:32PM
   1521     4 24/09/22 12:31PM
   1521     6 24/09/22 12:30PM
Stop alarm:Stop button
 ▼ Cursor ▲    Inf    Stop
```

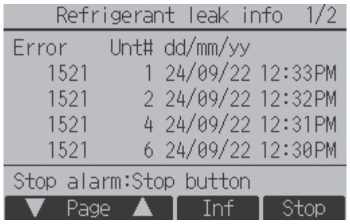

```
    Refrigerant leak info  3/3
 Contact information
     Dealer
        Tel


Stop alarm:Stop button
 ▼ Page ▲              Stop
```

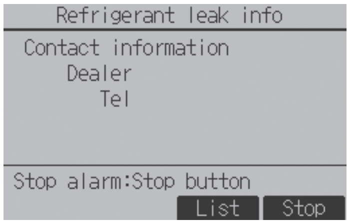
- Ventilate the room sufficiently by opening the windows and doors or other means and immediately report the alarm issuance to the device manager.
- Follow the on-screen instructions to stop the alarm.
  * This stops the alarm but does not cancel the error.
- After the alarm stops, the error can be canceled. However, if the error is canceled with the causes unremoved, the remote controller will detect the error again and sound an alarm.
- Check the refrigerant leak according to [11-7-3 Flowchart for Refrigerant Leak].

## 11-7-2 In Case of the Alarm in the Supervisor Room

- The remote controller sounds an alarm, the operation lamp and backlight blink, and the following screen appears.



```
   Refrigerant leak info  1/2
Error   Unt# dd/mm/yy
   1521     1 24/09/22 12:33PM
   1521     2 24/09/22 12:32PM
   1521     4 24/09/22 12:31PM
   1521     6 24/09/22 12:30PM
Stop alarm:Stop button
 ▼  Page  ▲   Inf    Stop
```



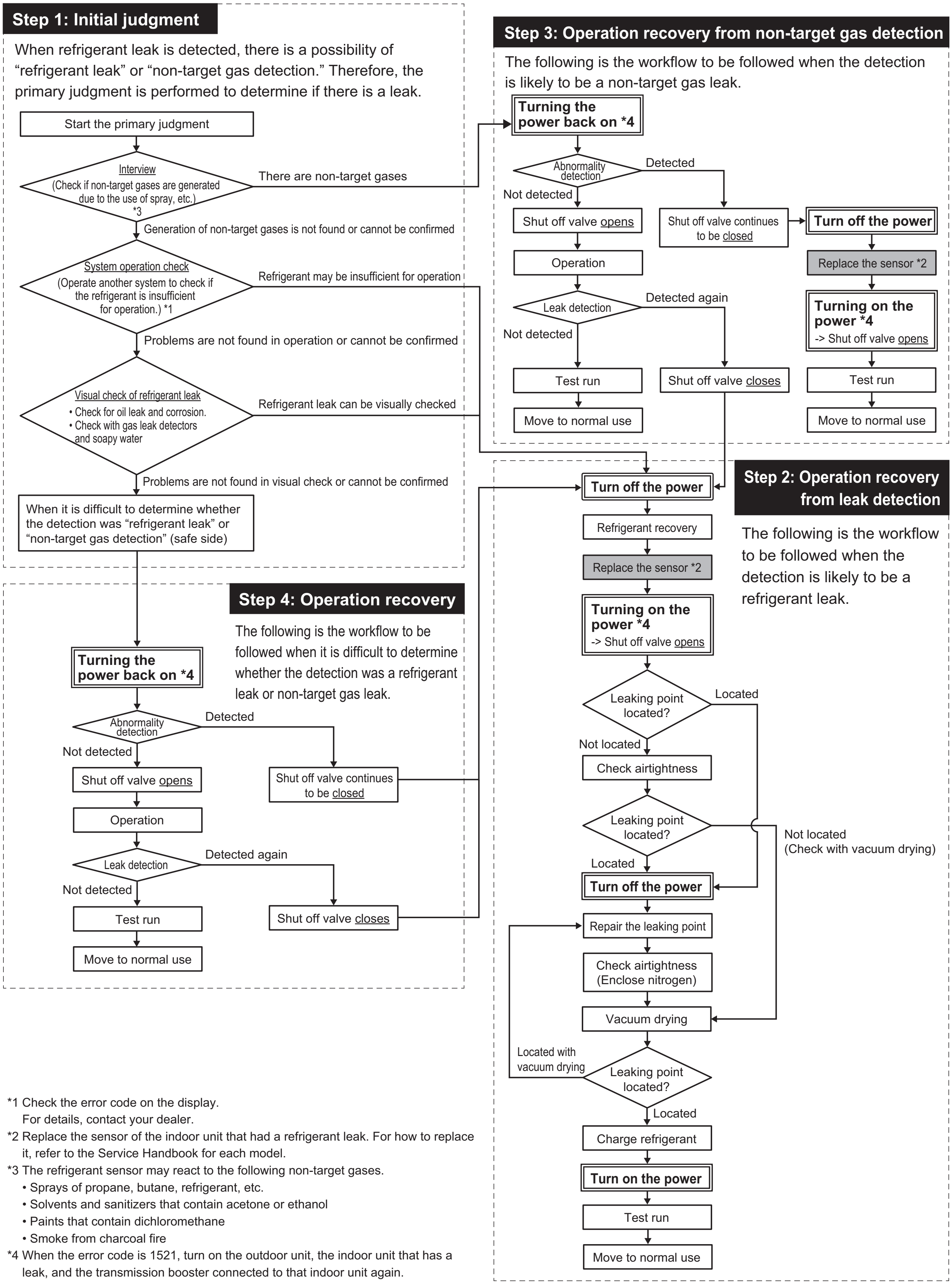
```
   Refrigerant leak info
 Contact information
     Dealer
        Tel

Stop alarm:Stop button
                  List   Stop
```

- Check the detected indoor unit and ventilate the room sufficiently by opening the windows and doors or other means.
- Follow the on-screen instructions to stop the alarm.
 * This stops the alarm but does not cancel the error.
- Check the refrigerant leak according to [11-7-3 Flowchart for Refrigerant Leak].

## 11-7-3 Flowchart for Refrigerant Leak

**[For Y series]**



**Step 1: Initial judgment**

When refrigerant leak is detected, there is a possibility of “refrigerant leak” or “non-target gas detection.” Therefore, the primary judgment is performed to determine if there is a leak.

**Step 3: Operation recovery from non-target gas detection**

The following is the workflow to be followed when the detection is likely to be a non-target gas leak.

**Step 2: Operation recovery from leak detection**

The following is the workflow to be followed when the detection is likely to be a refrigerant leak.

**Step 4: Operation recovery**

The following is the workflow to be followed when it is difficult to determine whether the detection was a refrigerant leak or non-target gas leak.

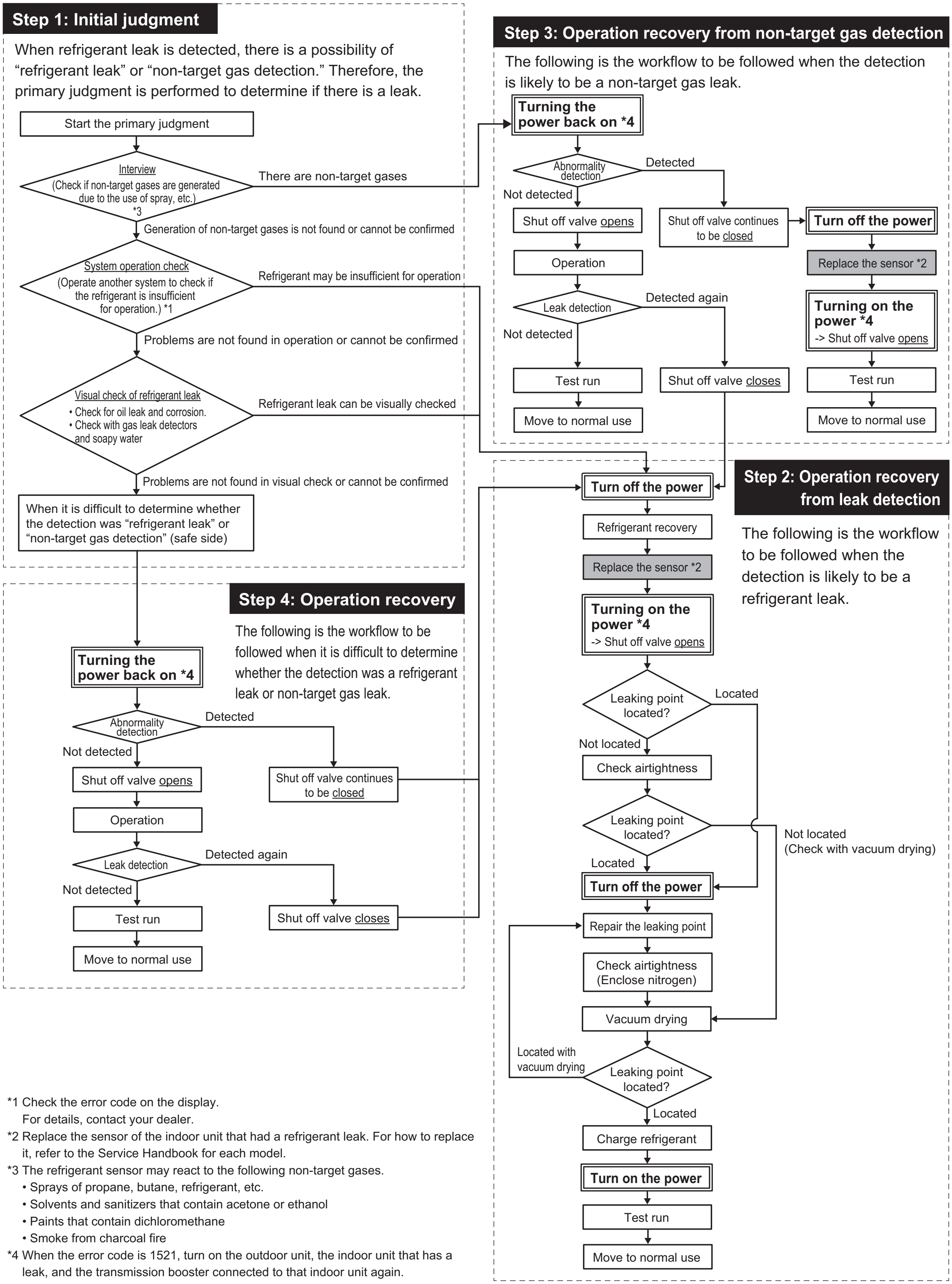
*1 Check the error code on the display.
For details, contact your dealer.

*2 Replace the sensor of the indoor unit that had a refrigerant leak. For how to replace it, refer to the Service Handbook for each model.

*3 The refrigerant sensor may react to the following non-target gases.
- Sprays of propane, butane, refrigerant, etc.
- Solvents and sanitizers that contain acetone or ethanol
- Paints that contain dichloromethane
- Smoke from charcoal fire

*4 When the error code is 1521, turn on the outdoor unit, the indoor unit that has a leak, and the transmission booster connected to that indoor unit again.

### [For R2 series]



**Step 1: Initial judgment**

When refrigerant leak is detected, there is a possibility of "refrigerant leak" or "non-target gas detection." Therefore, the primary judgment is performed to determine if there is a leak.

**Step 3: Operation recovery from non-target gas detection**

The following is the workflow to be followed when the detection is likely to be a non-target gas leak.

**Step 2: Operation recovery from leak detection**

The following is the workflow to be followed when the detection is likely to be a refrigerant leak.

**Step 4: Operation recovery**

The following is the workflow to be followed when it is difficult to determine whether the detection was a refrigerant leak or non-target gas leak.

*1 Check the error code on the display.
For details, contact your dealer.

*2 Replace the sensor of the indoor unit that had a refrigerant leak. For how to replace it, refer to the Service Handbook for each model.

*3 The refrigerant sensor may react to the following non-target gases.
- Sprays of propane, butane, refrigerant, etc.
- Solvents and sanitizers that contain acetone or ethanol
- Paints that contain dichloromethane
- Smoke from charcoal fire

*4 When the error code is 1521, turn on the outdoor unit, the indoor unit that has a leak, and the transmission booster connected to that indoor unit again.

# 11-8 Other Services

## 1. List of services

Check the contents of servicing and maintenance and perform work with safety in mind.

| Contents | Procedures |
|---|---|
| (1) Replacement of indoor unit boards (with manual address setting) | This page below |
| (2) Replacement of indoor unit refrigerant sensors | This page below |
| (3) Replacement of MA remote controllers | This page below |

### (1) Replacement of indoor unit boards (with manual address setting)

**[Procedure]**

1) Turn off the target indoor unit.
2) Remove the control box cover.
3) Replace the board.
   Set the same address as the removed board for the indoor unit after replacement.
4) Turn on the indoor unit.

* Be sure to replace the boards one by one.
* For details of the replacement procedure, refer to the Service Handbook for the indoor unit.

### (2) Replacement of indoor unit refrigerant sensors

**[Procedure]**

1) Turn off the target indoor unit.
2) Replace the refrigerant sensor.
3) Turn on the indoor unit.

* For details of the replacement procedure, refer to the Service Handbook for the indoor unit.
* In case of refrigerant leak, proceed with the replacement work according to [11-7-3 Flowchart for Refrigerant Leak].

### (3) Replacement of MA remote controllers

**[Procedure]**

1) Turn off the target indoor unit.
2) Replace the remote controller.
3) Turn on the indoor unit.

* For servicing, refer to the Installation Manual (Installation) for the remote controller.

# 11-9 Troubleshooting

**[Memo]**

The system power refers to the power to all units in the same refrigerant circuit system (outdoor units, indoor units, shut off valve kits, BC controllers, and transmission boosters).

## 11-9-1 Troubleshooting List

| Item | Symptom | Remedy |
|---|---|---|
| When the first power-on was performed in an incorrect order | | |
| When the outdoor unit was tuned on before the indoor units and shut off valve kits/BC controllers were turned on | The seven-segment LED display of the outdoor unit and the remote controller show the error code (7121). | Turn the power back on in the following order. (After turning on the indoor units and the shut off valve kits/BC controllers, turn on the outdoor unit.) |
| When the power was shut off by mistake (including power failures) | | |
| When the power to the entire system was shut off | - | Turn the power back on in the following order. (After turning on the indoor units and the shut off valve kits, turn on the outdoor unit/BC controllers.) |
| When the power to the outdoor unit was shut off | The remote controller displays the error code (6607). | Turn the power back on. |
| When the power to the shut off valve kit was shut off | ♦The safety shut off valve closes.<br>♦The indoor unit turns off the thermostat, disabling cooling and heating. | Turn the power back on. |
| When the power to the BC controller was shut off | ♦The built-in shut off valve closes.<br>♦The indoor units in the system turn off the thermostats. | Turn the power back on. |
| When the power to the indoor unit was shut off | No operation takes place. | Turn the power back on. |
| When the power to the indoor unit and shut off valve kit was shut off | ♦The safety shut off valve closes.<br>♦No operation takes place. | Turn the power back on. |
| When the connection configuration, including partitioning, was changed | | |
| When the number of indoor units was changed | - | For details, refer to the specified page. [11-9-2 Checking and Changing the System Configuration] |
| When the number of shut off valve kits was changed | - | |
| When the M-NET wiring connections were changed without changing the numbers of indoor units and shut off valve kits | - | |
| When an air tightness test and vacuum drying are required (When the shut off valve needs to be opened)<br>When the power to the shut off valve kit/BC controller is shut off, the safety shut off valve closes, making it impossible to perform air tightness tests and vacuum drying. | - | [When the power is on]<br>After shutting off the power to the outdoor unit, shut off the power to the shut off valve kit/BC controller and indoor unit.<br>[When the power is off]<br>Turn on the shut off valve kit/BC controller and the indoor unit connected to that shut off valve kit/BC controller.<br>* The product is shipped with the safety shut off valves of the shut off valve kit and BC controller opened. If the power has never been turned on after shipment, air tightness tests and vacuum drying can be performed without the power-on procedure. |
| The alarm was activated due to the use of sprays, etc. | The system responds in the same way as it detects a leak. | For details, refer to the specified page. [11-7 Actions to Take When Refrigerant Leaks] |

| Item | Symptom | Remedy |
|---|---|---|
| When the remote controller installed in the supervisor room has not been set as the supervisor remote controller | The remote controller may fail to sound an alarm when the system detects a leak and during the circuit check. | Refer to the Installation Manual (Settings) for the MA remote controllers to set the remote controller as the supervisor remote controller. |
| When the refrigerant is recovered | - | For details, refer to the specified page. [11-10 Other Precautions] |

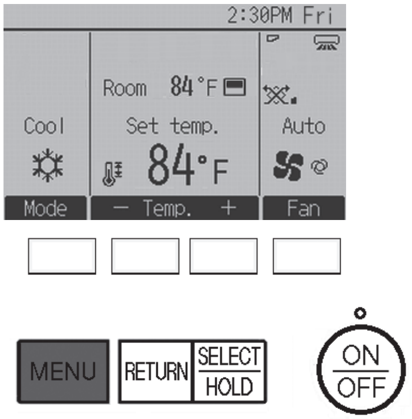
## 11-9-2 Checking and Changing the System Configuration

### 1. Checking the system configuration

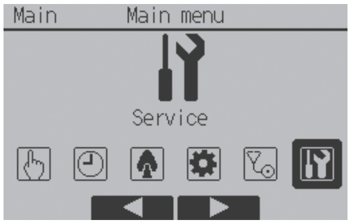
The system configuration can be checked by operating the MA remote controller (PAR-43MAAUB or later) after the interlock inspection.
Check it in the following procedure.

**[Procedure]**

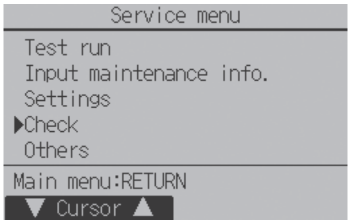
1) Press the **MENU** button on the main screen.
The main menu screen appears.



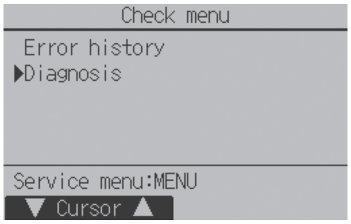
2) Select the service menu icon with the cursor and press the **SELECT/HOLD** button.
Each menu item is displayed.



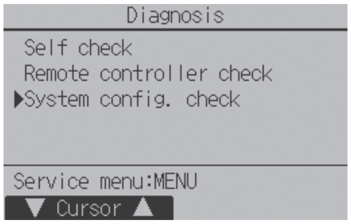
3) Select “Check” with the cursor and press the **SELECT/HOLD** button.
The check menu is displayed.



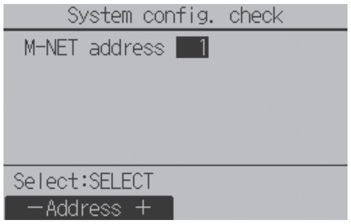
4) Select “Diagnosis” with the cursor and press the **SELECT/HOLD** button.
The diagnosis menu is displayed.



5) Select “System config. check” with the cursor and press the **SELECT/HOLD** button.

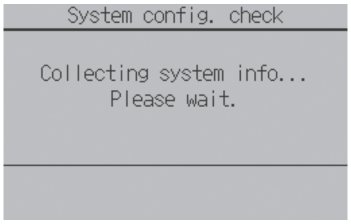


6) Check the system configuration check screen and press the **SELECT/HOLD** button.
Check the indoor unit address.



System config. check
M-NET address 1
Select:SELECT

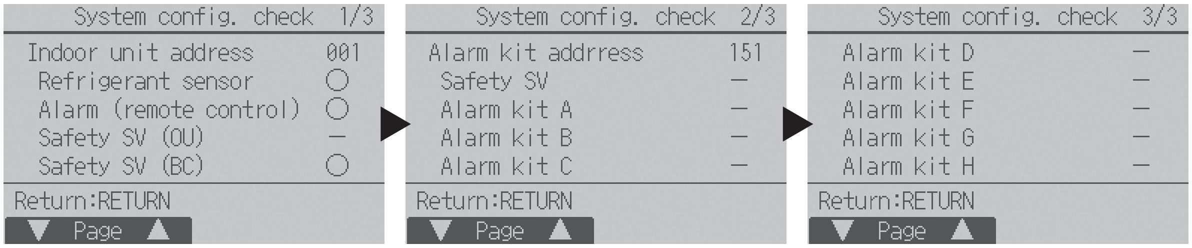
7) The system configuration information collection starts.



System config. check
Collecting system info...
Please wait.

8) When the information collection ends, the following system configuration check screens are displayed.
Note that the screens to be displayed differ according to the system configuration.
"○" represents the enabled status and "–" represents the disabled status.

[Configuration with the built-in refrigerant sensor of the indoor unit]

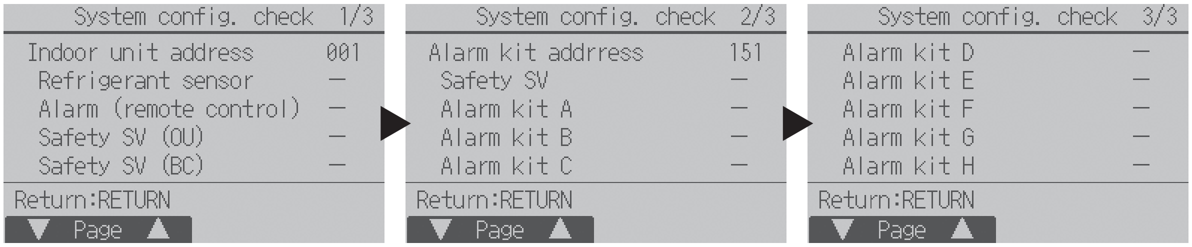


System config. check 1/3
Indoor unit address 001
Refrigerant sensor ○
Alarm (remote control) ○
Safety SV (OU) –
Safety SV (BC) ○
Return:RETURN

System config. check 2/3
Alarm kit addrress 151
Safety SV –
Alarm kit A –
Alarm kit B –
Alarm kit C –
Return:RETURN

System config. check 3/3
Alarm kit D –
Alarm kit E –
Alarm kit F –
Alarm kit G –
Alarm kit H –
Return:RETURN

[Configuration that needs no safety measure (use with large space configuration)]



System config. check 1/3
Indoor unit address 001
Refrigerant sensor –
Alarm (remote control) –
Safety SV (OU) –
Safety SV (BC) –
Return:RETURN

System config. check 2/3
Alarm kit addrress 151
Safety SV –
Alarm kit A –
Alarm kit B –
Alarm kit C –
Return:RETURN

System config. check 3/3
Alarm kit D –
Alarm kit E –
Alarm kit F –
Alarm kit G –
Alarm kit H –
Return:RETURN

* When safety measures are not required, the refrigerant sensor and alarm (remote controller) functions are disabled.

## 1. Changing the system configuration

**[Memo]**

The system power refers to the power to all units in the same refrigerant circuit system (outdoor units, indoor units, shut off valve kits, BC controllers, and transmission boosters).

**[Note]**

This section summarizes the procedures. For details of the work, such as plumbing, refer to the corresponding pages of each Installation Manual and this Manual.

| Item | Procedure |
|---|---|
| When the unit is removed<br>* Before shutting off the system power, recover the refrigerant. For details, refer to the specified page. [11-10 Other Precautions] | ■ When the indoor unit and shut off valve kit are removed<br>1. Shut off the system power.<br>2. Remove the target units.<br>3. Turn the system power back on. Turn on the outdoor unit last. |
| When a unit is added<br>* Before shutting off the system power, recover the refrigerant. For details, refer to the specified page. [11-10 Other Precautions] | For Y series<br>■ When an indoor unit that needs no safety device is added<br>1. Shut off the system power.<br>2. Install a new indoor unit.<br>3. Turn the system power back on. Turn on the outdoor unit last.<br>■ When an indoor unit to be connected to the shut off valve kit is added<br>1. Shut off the system power.<br>2. Install a new indoor unit.<br>3. Turn the system power back on. Turn on the outdoor unit last.<br>■ When a shut off valve kit and an indoor unit to be connected to that shut off valve kit are added together<br>1. Shut off the system power.<br>2. Install a new shut off valve kit and indoor unit.<br>3. Turn the system power back on. Turn on the outdoor unit last.<br>For R2 series<br>■ When an indoor unit to be connected to the BC controller (BC/BS) is added<br>1. Shut off the system power.<br>2. Install a new indoor unit.<br>3. Turn the system power back on. Turn on the outdoor unit last. |
| When the M-NET wiring is changed without changing the number of units | For Y series<br>■ When the terminal connected to the M-NET wiring of the indoor unit is changed from the TB3 terminal of one shut off valve kit to that of another shut off valve kit<br>■ When the terminal connected to the M-NET wiring of the indoor unit is changed from the TB3 terminal of the outdoor unit to that of the shut off valve kit<br>■ When the terminal connected to the M-NET wiring of the indoor unit is changed from the TB3 terminal of the shut off valve kit to that of the outdoor unit<br>* If the error code 7102, 7119, 7120, or 7121 is displayed, steps 3 to 6 are not required.<br>1. Shut off the system power.<br>2. Change the terminal connected to the M-NET wiring of the indoor unit.<br>3. Turn on the DIP switch (SW 5-2) on the outdoor unit control board.<br>4. Turn on the outdoor unit and wait for five minutes.<br>5. Shut off the power to the outdoor unit and wait for five minutes.<br>6. Turn off the DIP switch (SW 5-2) on the outdoor unit control board.<br>7. Turn the system power back on. Turn on the outdoor unit last. |

# 11-10 Other Precautions

## 11-10-1 Precautions for Refrigerant Recovery, Vacuum Drying, and Air Tightness Test

Recover the refrigerant without shutting off the system power.

If an airtightness test, vacuum drying, refrigerant recovery, or refrigerant charging is necessary with the power off, turn off the power to the outdoor unit or heat source unit first, and then turn off the power to the BC controller/the shut off valve kit and the power to the indoor units. When turning on the power, start the BC controller/the shut off valve kit and indoor units first, and then start the outdoor unit or heat source unit. (If the BC controller/the shut off valve kit or indoor unit is turned off first, the shut off valve may close, resulting in inadequate refrigerant recovery and potential injuries from a refrigerant burst or similar incidents while removing the unit.)

## 11-10-2 Precautions That Must Be Taken for Maintenance

Device managers must make sure that the environment of installed safety measures is maintained.

Strictly follow [11-3 Safety for Servicing] when performing maintenance work.

## 11-10-3 Precautions That Must Be Taken for Removal and Disposal

You must be careful about the stagnation of leaked refrigerant depending on the installation conditions. Follow the instructions below.

- When removing the indoor unit, be sure to perform refrigerant recovery or pump down before dismounting the piping to ensure there is no residual refrigerant in the circuit. Never use heat or fire when removing the indoor unit. If you must use fire, ensure there is no residual refrigerant in the circuit.
- When removing the outdoor unit, be sure to perform refrigerant recovery or pump down before dismounting the piping to ensure there is no residual refrigerant in the circuit. Never use heat or fire when removing the outdoor unit. If you must use fire, ensure there is no residual refrigerant in the circuit.
- Strictly follow [11-3 Safety for Servicing] when removing and discarding units.

# Service Handbook

**Model**

**PURY-EM72, EM96, EM120, EM144, EM168, EM192T(Y)XU-A**
**PURY-EM264, EM288, EM312, EM336, EM360, EM384T(Y)SXU-A**

**PURY-HM72, HM96, HM120T(Y)XU-A**
**PURY-HM144, HM192, HM240T(Y)SXU-A**

**MITSUBISHI ELECTRIC CORPORATION**

**www.MitsubishiElectric.com**

HWE24150

New publication effective Nov. 2025
Specifications subject to change without notice