MITSUBISHI ELECTRIC

AIR CONDITIONER

Changes for the Better

2015

R410A

Service Handbook

Model

CMB-WP108V-GA1

CMB-WP1016V-GA1

CMB-WP108V-GB1

CMB-WP1016V-GB1

Safety Precautions

- Before installing the unit, thoroughly read the following safety precautions.
- Observe these safety precautions for your safety.

⚠ WARNING

This symbol is intended to alert the user to the presence of important instructions that must be followed to avoid the risk of serious injury or death.

⚠ CAUTION

This symbol is intended to alert the user to the presence of important instructions that must be followed to avoid the risk of serious injury or damage to the unit.

- After reading this manual, give it to the user to retain for future reference.
- Keep this manual for easy reference. When the unit is moved or repaired, give this manual to those who provide these services.
  When the user changes, make sure that the new user receives this manual.

⚠ 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.

Ask your dealer or a qualified technician to install the unit.

Improper installation by the user may result in water leakage, electric shock, smoke, and/or fire.

Properly install the unit on a surface that can withstand the weight of the unit.

Unit installed on an unstable surface may fall and cause injury.

Only use specified cables. Securely connect each cable so that the terminals do not carry the weight of the cable.

Improperly connected or fixed cables may produce heat and start a fire.

Take appropriate safety measures against strong winds and earthquakes to prevent the unit from falling.

If the unit is not installed properly, the unit may fall and cause serious injury to the person or damage to the unit.

Do not make any modifications or alterations to the unit. Consult your dealer for repair.

Improper repair may result in water leakage, electric shock, smoke, and/or fire.

Do not touch the heat exchanger fins.

The fins are sharp and dangerous.

In the event of a refrigerant leak, thoroughly ventilate the room.

If refrigerant gas leaks and comes in contact with an open flame, poisonous gases will be produced.

Properly install the unit according to the instructions in the installation manual.

Improper installation may result in water leakage, electric shock, smoke, and/or fire.

Have all electrical work performed by an authorized electrician according to the local regulations and instructions in this manual, and a dedicated circuit must be used.

Insufficient capacity of the power supply circuit or improper installation may result in malfunctions of the unit, electric shock, smoke, and/or fire.

⚠ WARNING

Securely attach the terminal block cover (panel) to the unit.

If the terminal block cover (panel) is not installed properly, dust and/or water may infiltrate and pose a risk of electric shock, smoke, and/or fire.

Only use the type of refrigerant that is indicated on the unit when installing or reinstalling the unit.

Infiltration of any other type of refrigerant or air into the unit may adversely affect the refrigerant cycle and may cause the pipes to burst or explode.

When installing the unit in a small room, exercise caution and take measures against leaked refrigerant reaching the limiting concentration.

Consult your dealer with any questions regarding limiting concentrations and for precautionary measures before installing the unit. Leaked refrigerant gas exceeding the limiting concentration causes oxygen deficiency.

Consult your dealer or a specialist when moving or reinstalling the unit.

Improper installation may result in water leakage, electric shock, and/or fire.

After completing the service work, check for a gas leak.

If leaked refrigerant is exposed to a heat source, such as a fan heater, stove, or electric grill, poisonous gases may be produced.

Do not try to defeat the safety features of the unit.

Forced operation of the pressure switch or the temperature switch by defeating the safety features of these devices, or the use of accessories other than the ones that are recommended by MITSUBISHI may result in smoke, fire, and/or explosion.

Only use accessories recommended by MITSUBISHI.

Ask a qualified technician to install the unit. Improper installation by the user may result in water leakage, electric shock, smoke, and/or fire.

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 between FT-P and FT-N on INV Board has dropped to DC20V or less. (It takes about 10 minutes to discharge electricity after the power supply is turned off.)

Precautions for handling units for use with R410A

⚠ CAUTION

Do not use the existing refrigerant piping.

- A large amount of chlorine that may be contained in the residual refrigerant and refrigerating machine oil in the existing piping may cause the refrigerating machine oil in the new unit to deteriorate.
- R410A is a high-pressure refrigerant and can cause the existing pipes to burst.

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.

Store the pipes to be installed indoors, and keep both ends of the pipes sealed until immediately before brazing. (Keep elbows and other joints wrapped in plastic.)

Infiltration of dust, dirt, or water into the refrigerant system may cause the refrigerating machine oil to deteriorate or cause the unit to malfunction.

Use a small amount of ester oil, ether oil, or alkylbenzene to coat flares and flanges.

Infiltration of a large amount of mineral oil may cause the refrigerating machine oil to deteriorate.

Charge liquid refrigerant (as opposed to gaseous refrigerant) into the system.

If gaseous refrigerant is charged into the system, the composition of the refrigerant in the cylinder will change and may result in performance loss.

Use a vacuum pump with a reverse-flow check valve.

If a vacuum pump that is not equipped with a reverse-flow check valve is used, the vacuum pump oil may flow into the refrigerant cycle and cause the refrigerating machine oil to deteriorate.

Prepare tools for exclusive use with R410A. Do not use the following tools if they have been used with the conventional refrigerant (gauge manifold, charging hose, gas leak detector, reverse-flow check valve, refrigerant charge base, vacuum gauge, and refrigerant recovery equipment.).

- If the refrigerant or the refrigerating machine oil left on these tools are mixed in with R410A, it may cause the refrigerating machine oil to deteriorate.
- Infiltration of water may cause the refrigerating machine oil to deteriorate.
- Gas leak detectors for conventional refrigerants will not detect an R410A leak because R410A is free of chlorine.

Do not use a charging cylinder.

If a charging cylinder is used, the composition of the refrigerant will change, and the unit may experience power loss.

Exercise special care when handling the tools for use with R410A.

Infiltration of dust, dirt, or water into the refrigerant system may cause the refrigerating machine oil to deteriorate.

Before installing the unit

⚠ WARNING

Do not install the unit where a gas leak may occur.

If gaseous refrigerant leaks and piles up around the unit, it may be ignited.

Do not use the unit to keep food items, animals, plants, artifacts, or for other special purposes.

The unit is not designed to preserve food products.

Do not use the unit in an unusual environment.

- Do not install the unit where a large amount of oil or steam is present or where acidic or alkaline solutions or chemical sprays are used frequently. Doing so may lead to a remarkable drop in performance, electric shock, malfunctions, smoke, and/or fire.
- The presence of organic solvents or corrosive gas (i.e. ammonia, sulfur compounds, and acid) may cause gas leakage or water leakage.

When installing the unit in a hospital, take appropriate measures to reduce noise interference.

High-frequency medical equipment may interfere with the normal operation of the air conditioner or vice versa.

Do not install the unit on or over things that cannot get wet.

When the humidity level exceeds 80% or if the drainage system is clogged, the indoor unit may drip water. Drain water is also discharged from the outdoor unit. Install a centralized drainage system if necessary.

Before installing the unit (moving and reinstalling the unit) and performing electrical work

⚠ CAUTION

Properly ground the unit.

Do not connect the grounding wire to a gas pipe, water pipe, lightning rod, or grounding wire from a telephone pole. Improper grounding may result in electric shock, smoke, fire, and/or malfunction due to noise interference.

Do not put tension on the power supply wires.

If tension is put on the wires, they may break and result in excessive heat, smoke, and/or fire.

Install an earth leakage breaker to avoid the risk of electric shock.

Failure to install an earth leakage breaker may result in electric shock, smoke, and/or fire.

Use the kind of power supply wires that are specified in the installation manual.

The use of wrong kind of power supply wires may result in current leak, electric shock, and/or fire.

Use breakers and fuses (current breaker, remote switch <switch + Type-B fuse>, moulded case circuit breaker) with the proper current capacity.

The use of wrong capacity fuses, steel wires, or copper wires may result in malfunctions, smoke, and/or fire.

Do not spray water on the air conditioner or immerse the air conditioner in water.

Otherwise, electric shock and/or fire may result.

When handling units, always wear protective gloves to protect your hands from metal parts and high-temperature parts.

Periodically check the installation base for damage.

If the unit is left on a damaged platform, it may fall and cause injury.

Properly install the drain pipes according to the instructions in the installation manual. Keep them insulated to avoid dew condensation.

Improper plumbing work may result in water leakage and damage to the furnishings.

Exercise caution when transporting products.

- Products weighing more than 20 kg should not be carried alone.
- Do not carry the product by the PP bands that are used on some products.
- Do not touch the heat exchanger fins. They are sharp and dangerous.
- When lifting the unit with a crane, secure all four corners to prevent the unit from falling.

Properly dispose of the packing materials.

- Nails and wood pieces in the package may pose a risk of injury.
- Plastic bags may pose a risk of choking hazard to children. Tear plastic bags into pieces before disposing of them.

Before the test run

⚠ CAUTION

Turn on the unit at least 12 hours before the test run.

Keep the unit turned on throughout the season. If the unit is turned off in the middle of a season, it may result in malfunctions.

To avoid the risk of electric shock or malfunction of the unit, do not operate switches with wet hands.

Do not touch the refrigerant pipes with bare hands during and immediately after operation.

During or immediately after operation, certain parts of the unit such as pipes and compressor may be either very cold or hot, depending on the state of the refrigerant in the unit at the time. To reduce the risk of frost bites and burns, do not touch these parts with bare hands.

Do not operate the unit without panels and safety guards.

Rotating, high-temperature, or high-voltage parts on the unit pose a risk of burns and/or electric shock.

Do not turn off the power immediately after stopping the operation.

Keep the unit on for at least five minutes before turning off the power to prevent water leakage or malfunction.

Do not operate the unit without the air filter.

Dust particles may build up in the system and cause malfunctions.

Use circulation and makeup water that meet the water-quality standards.

Degradation of water quality can result in water leakage.

In areas where temperature drops to freezing during the periods of non-use, blow the water out of the pipes or fill the pipes with anti-freeze solution.

Not doing so may cause the water to freeze, resulting in burst pipes and damage to the unit or the furnishings.

CONTENTS

Ⅰ Read Before Servicing

[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 R2 YLM series: R410A

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.**
   Refer to "Necessary Tools and Materials" for information on the use of tools.(page 4)

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. **If there is a leak of gaseous refrigerant and the remaining refrigerant is exposed to an open flame, a poisonous gas hydrofluoric acid may form. Keep workplace well ventilated.**

> ⚠ **CAUTION**
> - 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.

[2] Necessary Tools and Materials

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

Tools for use with R410A (Adaptability of tools that are for use with R22 or R407C)

1. To be used exclusively with R410A (not to be used if used with R22 or R407C)

Tools/Materials	Use	Notes
Gauge Manifold	Evacuation and refrigerant charging	Higher than 5.09MPa[738psi] on the high-pressure side
Charging Hose	Evacuation and refrigerant charging	The hose diameter is larger than the conventional model.
Refrigerant Recovery Cylinder	Refrigerant recovery	
Refrigerant Cylinder	Refrigerant charging	The refrigerant type is indicated. The cylinder is pink.
Charging Port on the Refrigerant Cylinder	Refrigerant charging	The charge port diameter is larger than that of the current port.
Flare Nut	Connection of the unit with the pipes	Use Type-2 Flare nuts.

2. Tools and materials that may be used with R410A with some restrictions

Tools/Materials	Use	Notes
Gas Leak Detector	Gas leak detection	The ones for use with HFC refrigerant may be used.
Vacuum Pump	Vacuum drying	May be used if a check valve adapter is attached.
Flare Tool	Flare processing	Flare processing dimensions for the piping in the system using the new refrigerant differ from those of R22. Refer to I [3] Piping Materials.
Refrigerant Recovery Equipment	Refrigerant recovery	May be used if compatible with R410A.

3. Tools and materials that are used with R22 or R407C that may also be used with R410A

Tools/Materials	Use	Notes
Vacuum Pump with a Check Valve	Vacuum drying	
Bender	Bending pipes	
Torque Wrench	Tightening flare nuts	Only the flare processing dimensions for pipes that have a diameter of ø12.7 (1/2") and ø15.88 (5/8") have been changed.
Pipe Cutter	Cutting pipes	
Welder and Nitrogen Cylinder	Welding pipes	
Refrigerant Charging Meter	Refrigerant charging	
Vacuum Gauge	Vacuum level check	

4. Tools and materials that must not be used with R410A

Tools/Materials	Use	Notes
Charging Cylinder	Refrigerant charging	Prohibited to use

Tools for R410A must be handled with special care to keep moisture and dust from infiltrating the cycle.

[3] Piping Materials

Do not use the existing piping!

1. Copper pipe materials

O-material (Soft Annealed)	Soft copper pipes (annealed copper pipes). They can easily be bent with hands.
1/2H-material (Light Annealed)	Hard copper pipes (straight pipes). They are stronger than the O-material (Soft Annealed) at the same radial thickness.

- The distinction between O-materials (Soft Annealed) and 1/2H-materials (Light Annealed) is made based on the strength of the pipes themselves.

2. Types of copper pipes

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

3. Piping materials/Radial thickness

Use refrigerant pipes made of phosphorus deoxidized copper.
The operation pressure of the units that use R410A is higher than that of the units that use R22.
Use pipes that have at least the radial thickness specified in the chart below.
(Pipes with a radial thickness of 0.7 mm or less may not be used.)

Pipe size (mm[in])		Radial thickness (mm)	Type
ø6.35	[1/4"]	0.8t	O-material (Soft Annealed)
ø9.52	[3/8"]	0.8t	
ø12.7	[1/2"]	0.8t	
ø15.88	[5/8"]	1.0t	
ø19.05	[3/4"]	1.0t	1/2H-material, H-material (Light Annealed, Skin Hard)
ø22.2	[7/8"]	1.0t	
ø25.4	[1"]	1.0t	
ø28.58	[1-1/8"]	1.0t	
ø31.75	[1-1/4"]	1.1t	
ø34.93	[1-3/8"]	1.2t	
ø41.28	[1-5/8"]	1.4t	

- For the models for use with R410A, pipes made with O-material (soft annealed) cannot be used unless they have a diameter of at least ø19.05 (3/4") and a radial thickness of 1.2 t. Use pipes made with 1/2H-material (light annealed).
- The figures in the radial thickness column are based on the Japanese standards and provided only as a reference. Use pipes that meet the local standards.

4. Thickness and refrigerant type indicated on the piping materials

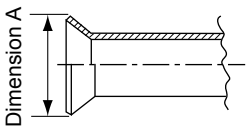
Ask the pipe manufacturer for the symbols indicated on the piping material for new refrigerant.

5. Flare processing (O-material (Soft Annealed) and OL-material only)

The flare processing dimensions for the pipes that are used in the R410A system are larger than those in the R22 system.

Flare processing dimensions (mm[in])

Pipe size (mm[in])		A dimension (mm)	
		R410A	R22, R407C
ø6.35	[1/4"]	9.1	9.0
ø9.52	[3/8"]	13.2	13.0
ø12.7	[1/2"]	16.6	16.2
ø15.88	[5/8"]	19.7	19.4
ø19.05	[3/4"]	24.0	23.3



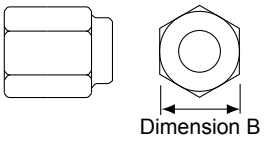
(ø19.05 pipes should have a radial thickness of 1.2 t and be made of annealed materials.)
If a clutch-type flare tool is used to flare the pipes in the system using R410A, the length of the pipes must be between 1.0 and 1.5 mm. For margin adjustment, a copper pipe gauge is necessary.

6. Flare nut

The flare nut type has been changed to increase the strength. The size of some of the flare nuts have also been changed.

Flare nut dimensions (mm[in])

Pipe size (mm[in])		B dimension (mm)	
		R410A	R22, R407C
ø6.35	[1/4"]	17.0	17.0
ø9.52	[3/8"]	22.0	22.0
ø12.7	[1/2"]	26.0	24.0
ø15.88	[5/8"]	29.0	27.0
ø19.05	[3/4"]	36.0	36.0



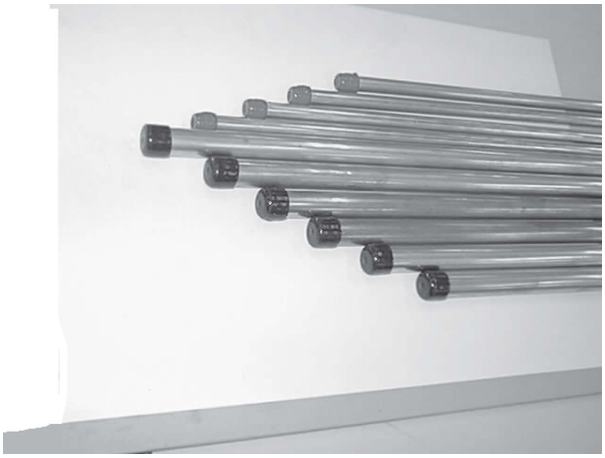
The figures in the radial thickness column are based on the Japanese standards and provided only as a reference. Use pipes that meet the local standards.

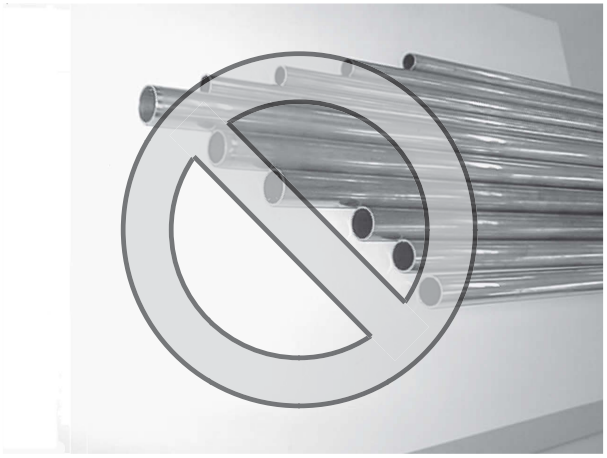
[4] Storage of Piping

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.

The new refrigerator oil is 10 times as hygroscopic as the conventional refrigerating machine oil (such as Suniso) and, if not handled with care, could easily introduce moisture into the system. Keep moisture out of the pipes, for it will cause the oil to deteriorate and cause a compressor failure.

[5] Pipe Processing

Use a small amount of ester oil, ether oil, or alkylbenzene to coat flares and flanges.

Note

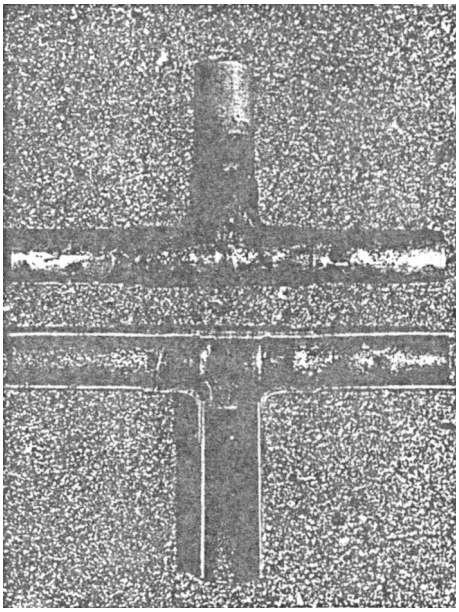
- Use a minimum amount of oil.
- Use only ester oil, ether oil, and alkylbenzene.

[6] Brazing

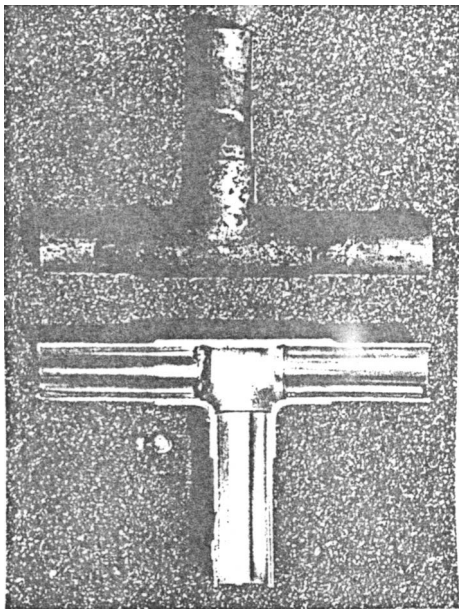
No changes have been made in the brazing procedures. Perform brazing with special care to keep foreign objects (such as oxide scale, water, and dust) out of the refrigerant system.

Example: Inside the brazed connection

Use of oxidized solder for brazing



Use of non-oxidized solder for brazing



1. Items to be strictly observed

- Do not conduct refrigerant piping work outdoors if raining.
- Use non-oxidized solder.
- 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

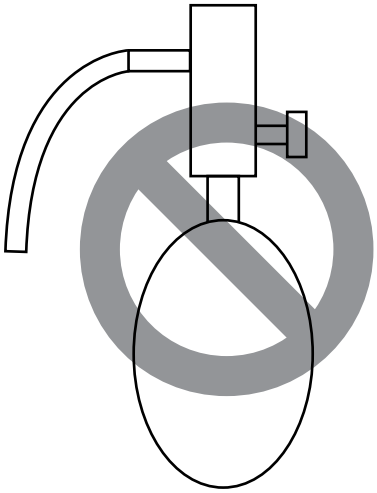
- The new refrigerating machine oil is 10 times as hygroscopic as the conventional oil and is more likely to cause unit failure if water infiltrates into the system.
- Flux generally contains chloride. Residual flux in the refrigerant circuit will cause sludge to form.

3. Notes

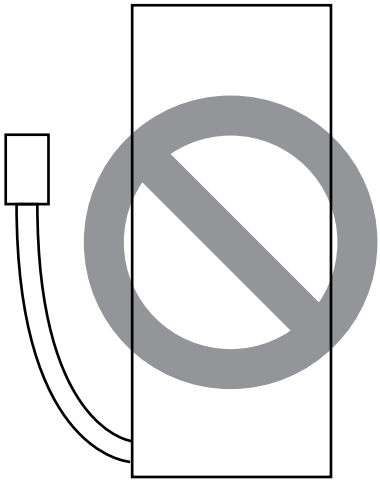
Do not use commercially available antioxidants because they may cause the pipes to corrode or refrigerating machine oil to deteriorate.

[7] Air Tightness Test (Refrigerant Circuit)

No changes have been made in the detection method. Note that a refrigerant leak detector for R22 will not detect an R410A leak.



Halide torch



R22 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.
- Refrigerant R410A must be charged in its liquid state (vs. gaseous state).

2. Reasons

- Oxygen, if used for an air tightness test, poses a risk of explosion. (Only use nitrogen to check air tightness.)
- Refrigerant R410A must be charged in its liquid state. If gaseous refrigerant in the cylinder is drawn out first, the composition of the remaining refrigerant in the cylinder will change and become unsuitable for use.

3. Notes

Procure a leak detector that is specifically designed to detect an HFC leak. A leak detector for R22 will not detect an HFC(R410A) leak.

[8] Vacuum Drying (Evacuation) (Refrigerant Circuit)

(Photo1) 15010H

(Photo2) 14010

Recommended vacuum gauge:
ROBINAIR 14010 Thermistor 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 (Photo 2)

Use a vacuum pump that attains 0.5Torr(65Pa) 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

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

4. Evacuation time

- After the degree of vacuum has reached 5Torr(650Pa), evacuate for an additional 1 hour. (A thorough vacuum drying removes moisture in the pipes.)
- Verify that the vacuum degree has not risen by more than 1Torr(130Pa) 1hour after evacuation. A rise by less than 1Torr(130Pa) is acceptable.
- If the vacuum is lost by more than 1Torr(130Pa), 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 5Torr(650Pa) 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 0.5kgf/cm^{2}G(0.05MPa) and evacuate again. Repeat this cycle of pressurizing and evacuation either until the degree of vacuum below 5Torr(650Pa) 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. Notes

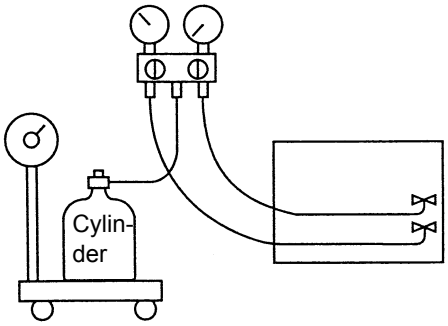
♦To evacuate air from the entire system
Applying a vacuum through the check joints at the refrigerant service valve on the high and low pressure sides (BV1 and 2) is not enough to attain the desired vacuum pressure.
Be sure to apply a vacuum through the check joints at the refrigerant service valve on 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 (CJ1, and 2).

♦Open the valves in the HBC controller, and switch on the power to the outdoor units, HBC controllers, and indoor units before performing evacuation so that all refrigerant circuits will be open. (By switching on the power to the indoor units, normal M-NET communication will be maintained.)

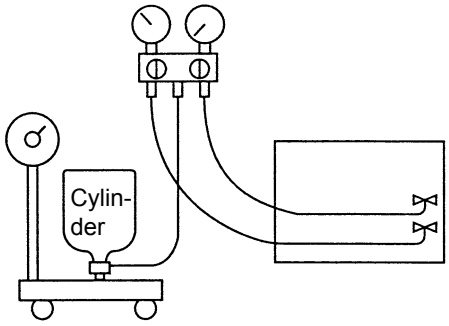
[9] Refrigerant Charging

Cylinder with a siphon

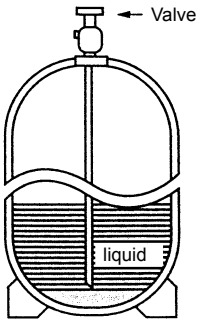


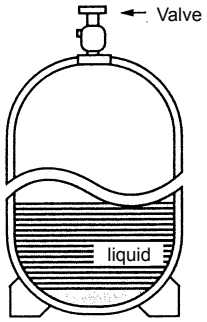
Cylinder color R410A is pink.

Cylinder without a siphon



Refrigerant charging in the liquid state





1. Reasons

R410A is a pseudo-azeotropic HFC blend (boiling point R32=-52°C[-62°F], R125=-49°C[-52°F]) and can almost be handled the same way as a single refrigerant, such as R22. To be safe, however, draw out the refrigerant from the cylinder in the liquid phase. If the refrigerant in the gaseous phase is drawn out, the composition of the remaining refrigerant will change and become unsuitable for use.

2. 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.

[10] Remedies to be taken in case of a Refrigerant Leak

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 "VIII [5] Refrigerant Leak."(page 176)

[11] Characteristics of the Conventional and the New Refrigerants

1. Chemical property

As with R22, the new refrigerant (R410A) is low in toxicity and chemically stable nonflammable refrigerant.
However, because the specific gravity of vapor refrigerant is greater than that of air, leaked refrigerant in a closed room will accumulate at the bottom of the room and may cause hypoxia.
If exposed to an open flame, refrigerant will generate poisonous gases. Do not perform installation or service work in a confined area.

	New Refrigerant (HFC type)		Conventional Refrigerant (HCFC type)
	R410A	R407C	R22
	R32/R125	R32/R125/R134a	R22
Composition (wt%)	(50/50)	(23/25/52)	(100)
Type of Refrigerant	Pseudo-azeotropic Refrigerant	Non-azeotropic Refrigerant	Single Refrigerant
Chloride	Not included	Not included	Included
Safety Class	A1/A1	A1/A1	A1
Molecular Weight	72.6	86.2	86.5
Boiling Point (°C/°F)	-51.4/-60.5	-43.6/-46.4	-40.8/-41.4
Steam Pressure (25°C,MPa/77°F,psi) (gauge)	1.557/226	0.9177/133	0.94/136
Saturated Steam Density (25°C,kg/m^3/77°F,psi)	64.0	42.5	44.4
Flammability	Nonflammable	Nonflammable	Nonflammable
Ozone Depletion Coefficient (ODP)*1	0	0	0.055
Global Warming Coefficient (GWP)*2	2090	1770	1810
Refrigerant Charging Method	Refrigerant charging in the liquid state	Refrigerant charging in the liquid state	Refrigerant charging in the gaseous state
Replenishment of Refrigerant after a Refrigerant Leak	Available	Available	Available

*1 When CFC11 is used as a reference
*2 When CO_2 is used as a reference

2. Refrigerant composition

R410A is a pseudo-azeotropic HFC blend and can almost be handled the same way as a single refrigerant, such as R22. To be safe, however, draw out the refrigerant from the cylinder in the liquid phase. If the refrigerant in the gaseous phase is drawn out, the composition of the remaining refrigerant will change and become unsuitable for use.
If the refrigerant leaks out, it may be replenished. The entire refrigerant does not need to be replaced.

3. Pressure characteristics

The pressure in the system using R410A is 1.6 times as great as that in the system using R22.

Temperature (°C/°F)	Pressure (gauge)		
	R410A	R407C	R22
	MPa/psi	MPa/psi	MPa/psi
-20/-4	0.30/44	0.18/26	0.14/20
0/32	0.70/102	0.47/68	0.40/58
20/68	1.34/194	0.94/136	0.81/117
40/104	2.31/335	1.44/209	1.44/209
60/140	3.73/541	2.44/354	2.33/338
65/149	4.17/605	2.75/399	2.60/377

[12] Notes on Refrigerating Machine Oil

1. Refrigerating machine oil in the HFC refrigerant system

HFC type refrigerants use a refrigerating machine oil different from that used in the R22 system.
Note that the ester oil used in the system has properties that are different from commercially available ester oil.

Refrigerant	Refrigerating machine oil
R22	Mineral oil
R407C	Ester oil
R410A	Ester oil

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.

<table>
<tr><th colspan="2">Cause</th><th colspan="2">Symptoms</th><th>Effects on the refrigerant cycle</th></tr>
<tr><td colspan="2" rowspan="2">Water infiltration</td><td></td><td>Frozen expansion valve and capillary tubes</td><td rowspan="3">Clogged expansion valve and capillary tubes
Poor cooling performance
Compressor overheat
Motor insulation failure
Burnt motor
Coppering of the orbiting scroll
Lock
Burn-in on the orbiting scroll</td></tr>
<tr><td>Hydrolysis</td><td rowspan="2">Sludge formation and adhesion
Acid generation
Oxidization
Oil degradation</td></tr>
<tr><td colspan="2">Air infiltration</td><td>Oxidization</td></tr>
<tr><td rowspan="4">Infiltration of contaminants</td><td rowspan="2">Dust, dirt</td><td colspan="2">Adhesion to expansion valve and capillary tubes</td><td>Clogged expansion valve, capillary tubes, and drier
Poor cooling performance
Compressor overheat</td></tr>
<tr><td colspan="2">Infiltration of contaminants into the compressor</td><td>Burn-in on the orbiting scroll</td></tr>
<tr><td rowspan="2">Mineral oil etc.</td><td colspan="2">Sludge formation and adhesion</td><td>Clogged expansion valve and capillary tubes
Poor cooling performance
Compressor overheat</td></tr>
<tr><td colspan="2">Oil degradation</td><td>Burn-in on the orbiting scroll</td></tr>
</table>

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

[13] Water piping

1. Precautions for water piping

Consider the following when installing a water piping system.

(1) Design pressure of the water piping

Use a water pipe that can withstand pressure of at least 1.0 MPa.

(2) Water pipe type

Use of plastic pipe is recommended.Do not use chloride plastic pipes.
When using copper pipes, be sure to braze the pipes under a nitrogen purge. (Oxidation during may shorten the life of the pump.)

(3) Expansion tank

Install an expansion tank to accommodate expanded water.

(4) Drain piping

Install the drain pipe with a downward inclination of between 1/100 and 1/200. To prevent drain water from freezing in winter, install the drain pipe as steep an angle as practically possible and minimize the straight line. For cold climate installation, take an appropriate measure (e.g., drain heater) to prevent the drain water from freezing.

(5) Insulation

Cover the water pipe with insulating materials with the specified thickness or more to prevent thermal loss or condensation from collecting.

(6) Air vent valve

Install air vent valves to the highest places where air can accumulate.

(7) Maintenance valve

It is recommended to install valves on the inlet/outlet for each HBC controller branch for maintenance.

(8) Water pressure gauge

Install a water pressure gauge to check the charged pressure.

(9) Water pipe connection

When connecting to water pipe, be sure to make the connection in accordance with the relevant local laws and regulations.

2. Notes on corrosion

(1) Water quality

It is important to check the water quality beforehand. See table below (Circulating water/Makeup Water Quality Standards).

Items			Lower mid-range temperature water system		Tendency	
			Recirculating water [20<T<60°C] [68<T<140°F]	Make-up water	Corrosive	Scale-forming
Standard items	pH (25°C[77°F])		7.0 ~ 8.0	7.0 ~ 8.0	○	○
	Electric conductivity	(mS/m) (25°C[77°F]) (μS/cm) (25°C[77°F])	30 or less [300 or less]	30 or less [300 or less]	○	○
	Chloride ion	(mg Cl^-/ ℓ)	50 or less	50 or less	○	
	Sulfate ion	(mg SO_4^{2-}/ ℓ)	50 or less	50 or less	○	
	Acid consumption (pH4.8)	(mg $CaCO_3$/ ℓ)	50 or less	50 or less		○
	Total hardness	(mg $CaCO_3$/ ℓ)	70 or less	70 or less		○
	Calcium hardness	(mg $CaCO_3$/ ℓ)	50 or less	50 or less		○
	Ionic silica	(mg SiO_2/ ℓ)	30 or less	30 or less		○
Reference items	Iron	(mg Fe/ ℓ)	1.0 or less	0.3 or less	○	○
	Copper	(mg Cu/ ℓ)	1.0 or less	0.1 or less	○	
	Sulfide ion	(mg S^{2-}/ ℓ)	not to be detected	not to be detected	○	
	Ammonium ion	(mg NH_4^+/ ℓ)	0.3 or less	0.1 or less	○	
	Residual chlorine	(mg Cl/ ℓ)	0.25 or less	0.3 or less	○	
	Free carbon dioxide	(mg CO_2/ ℓ)	0.4 or less	4.0 or less	○	
	Ryzner stability index		–	–	○	○

Reference : Guideline of Water Quality for Refrigeration and Air Conditioning Equipment. (JRA GL02E-1994)

(2) Debris in the water

Sand, pebbles, suspended solids, and corrosion products in water can damage the metal pipe and heat exchanger on the HBC controller and may cause corrosion. When installing, prevent debris from entering the water. If there is debris in the water, perform debris removal operation after test run by cleaning the strainers inside the HBC controller. (Refer to other sections for how to perform a test run.)

(3) Connecting pipes made of different materials

Connecting pipes used for HBC controller and indoor unit are copper alloy pipes. If steel pipes are connected tothe pipes, the contact surface will corrode. Do not use steel pipes to avoid corrosion.

(4) Residual air

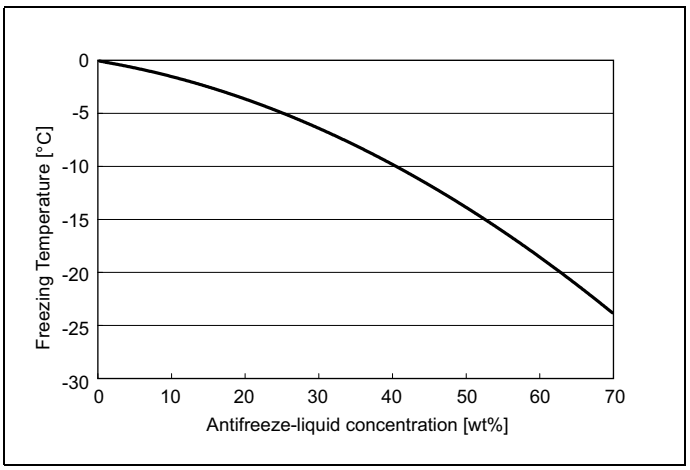
Residual air in the pipe results in water pump malfunction, noise, or water pipe corrosion in the water circuit. Ensure air is purged before use. (Refer to other sections for how to perform air vent operation.)

3. Correction by antifreeze-liquid concentration

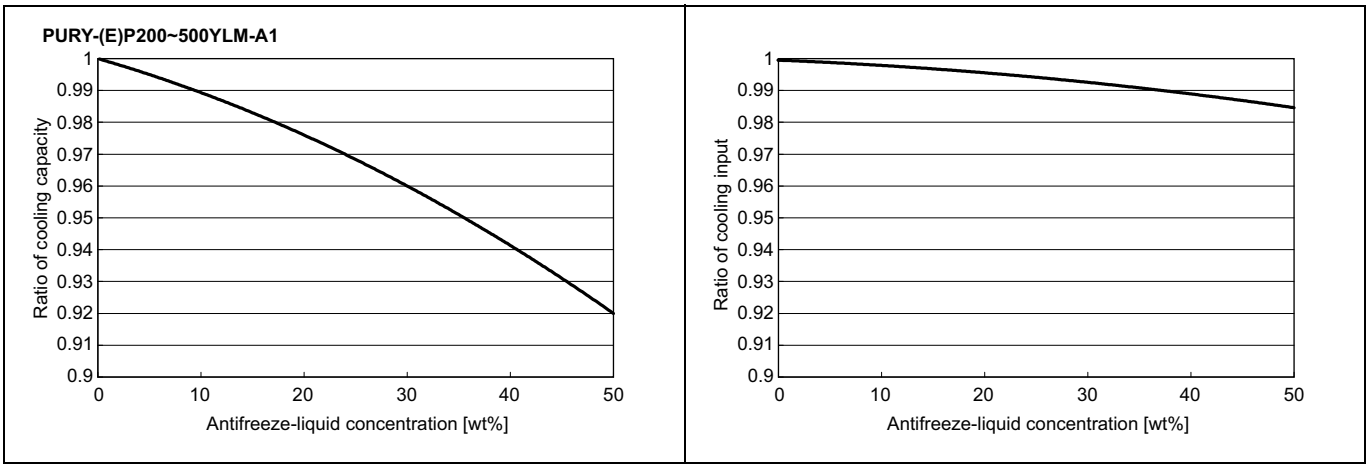
In HYBRID CITY MULTI system, antifreeze-liquid should be used to prevent the system from freezing. Refer to the following graphs for the capacity correction by antifreeze-liquid. Refer to (1) for antifreeze-liquid concentration, (2) and (3) for capacity correction by antifreeze-liquid concentration.
When adding antifreeze-liquid, be sure to perform the process in accordance with the relevant local laws and regulations.

(1) Antifreeze-liquid concentration

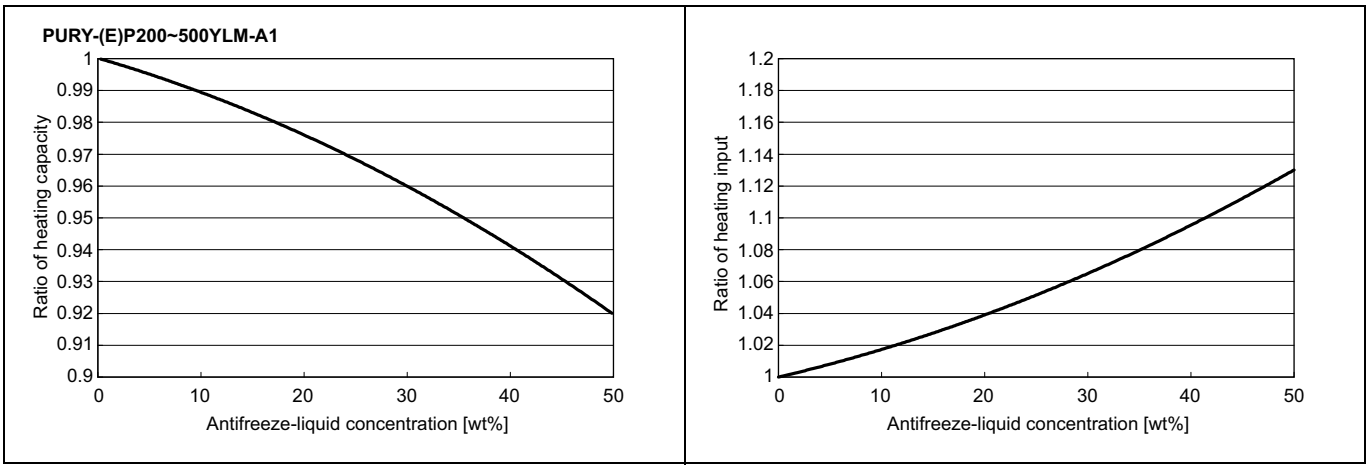
Use propylene glycol solution for antifreeze.
Refer to the following graph to estimate the antifreeze-liquid concentration required for freeze protection.



(2) Capacity correction by brine concentration (cooling)



(3) Capacity correction by brine concentration (heating)



II Restrictions

[1] System configuration

1. Table of compatible indoor units

The table below summarizes the types of indoor units that are compatible with different types of outdoor units.

(1) Standard combinations

Outdoor units	HBC controller Sub-HBC	Maximum total capacity of connectable indoor units	Maximum number of connectable indoor units	Types of connectable indoor units
(E)P200	CMB-WP108V-GA1, CMB-WP1016V-GA1 CMB-WP108V-GB1, CMB-WP1016V-GB1	100 - 300	50	WP15- WP50 models Indoor units for use with HBC controller
(E)P250		125 - 375	50	
(E)P300		150 - 450	50	
(E)P350		175 - 525	50	
(E)P400		200 - 600	50	
(E)P450		225 - 675	50	
(E)P500		250 - 750	50	

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.

[2] Switch Settings and Address Settings

1. Switch setting

Refer to section "[3] An Example of a System to which an MA Remote Controller is connected - [5] An Example of a System to which both MA Remote Controller and ME Remote Controller are connected" before performing wiring work.
Set the switches while the power is turned off.
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 *1 and Indoor units
ATW	Booster Unit	BU	Outdoor units and Booster Unit
	Water Hex Unit	AU	Outdoor units and Water Hex Unit
ME remote controller	Main/sub remote controller	RC	Outdoor units *1
MA remote controller	Main/sub remote controller	MA	Indoor units
CITY MULTI outdoor unit		OC	Outdoor units *1
HBC controller, Sub-HBC		HB, HS	Outdoor units *1 , HBC controller, and Sub-HBC

*1. Turn off the power to all the outdoor units in the same refrigerant circuit.

2. 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.

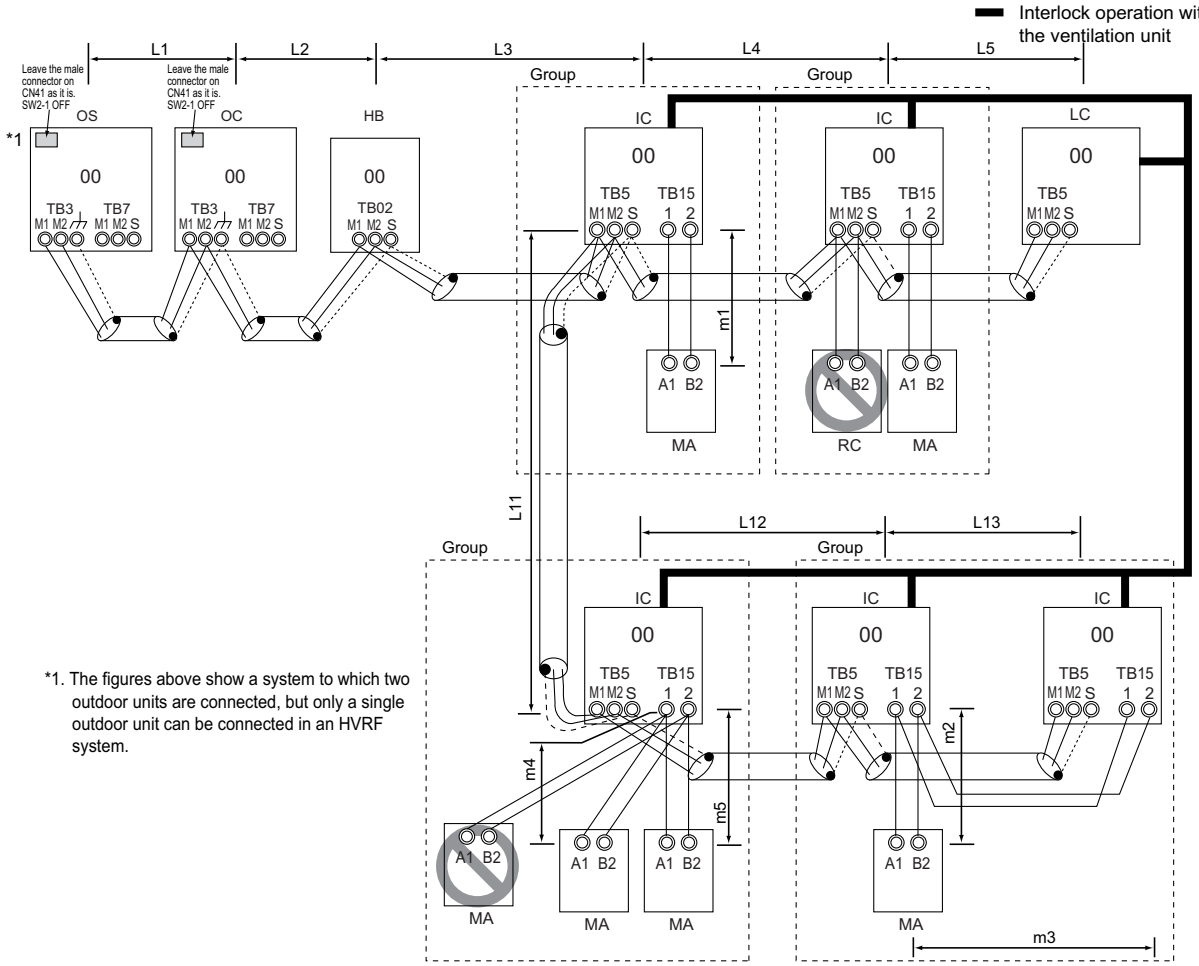
Unit or controller		Symbol	Address setting range	Setting method	Factory address setting
CITY MULTI indoor unit	Main/sub unit	IC	0, 01 to 50*1 *4 *6*7	Assign the smallest address to the main indoor unit in the group, and assign sequential address numbers to the rest of the indoor units in the same group.	00
M-NET adapter					
M-NET control interface					
Free Plan adapter					
LOSSNAY, OA processing unit		LC	0, 01 to 50*1 *4 *6*7	Assign an arbitrary but unique address to each of these units after assigning an address to all indoor units.	00
ATW	Booster Unit	BU			
	Water Hex Unit	AU			
ME remote controller	Main remote controller	RC	101 to 150	Add 100 to the smallest address of all the indoor units in the same group.	101
	Sub remote controller	RC	151 to 200*3	Add 150 to the smallest address of all the indoor units in the same group.	
MA remote controller		MA	No address settings required. (The main/sub setting must be made if 2 remote controllers are connected to the system.)		Main
CITY MULTI outdoor unit		OC OS	0, 51 to 100*1 *2 *6*7	♦Assign an address that equals the lowest address of the indoor units in the same refrigerant circuit plus 50. ♦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	HBC controller Sub-HBC	HB HS	0, 51 to 100*1 *2 *6	♦Assign an address that equals the lowest address of the indoor units to be connected to the HBC controller or Sub-HBC plus 50. ♦If a given address overlaps any of the addresses that are assigned to the other units, use a different, unused address within the setting range.	00
System controller	Group remote controller	GR SC	201 to 250	Assign an address that equals the sum of the smallest group number of the group to be controlled and 200.	201
	System remote controller	SR SC		Assign an arbitrary but unique address within the range listed on the left to each unit.	
	ON/OFF remotecontroller	AN SC		Assign an address that equals the sum of the smallest group number of the group to be controlled and 200.	
	Schedule timer (compatible with M-NET)	ST SC		Assign an arbitrary but unique address within the range listed on the left to each unit.	202
	Central controller AG-150A GB-50ADA G(B)-50A	TR SC	0, 201 to 250	Assign an arbitrary but unique address within the range listed on the left to each unit. The address must be set to "0" to control the K-control unit.	000
	LM adapter	SC	201 to 250	Assign an arbitrary but unique address within the range listed on the left to each unit.	247

*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. To set the ME remote controller address to "200," set the rotary switches to "00."
*4. 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.
*5. 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).
*6. 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.
*7. If a given address overlaps any of the addresses that are assigned to other units, use a different, unused address within the setting range.

[3] An Example of a System to which an MA Remote Controller is connected

1. System with one outdoor unit (automatic address setup for both indoor and outdoor units)

(1) Sample control wiring



*1. The figures above show a system to which two outdoor units are connected, but only a single outdoor unit can be connected in an HVRF system.

(2) Cautions

1) ME remote controller and MA remote controller cannot both be connected to the same group of indoor units.
2) No more than 2 MA remote controllers can be connected to a group of indoor units.
3) When the number of the connected indoor units is as shown in the table below, one or more transmission boosters (sold separately) are required.
   To connect two transmission boosters, connect them in parallel. (Observe the maximum number of connectable indoor units that are listed in the specifications for each outdoor unit.)

	Number of transmission booster (sold separately) required	
	1 unit	2 units
When the P200 and P250 models are not included in the connected indoor units	27 - 50 units	-
When the P200 and P250 models are included in the connected indoor units	21 - 39 units	40 - 50 units

4) Automatic address setup is not available if start-stop input(CN32, CN51, CN41) is used for a group operation of indoor units.
5) No more than 2 HBC controllers can be connected. Sub-HBC cannot be connected.

(3) Maximum allowable length

1) Indoor/outdoor transmission line
   Maximum distance (1.25mm^2 [AWG16] or larger)
   L1 +L2+L3+L4+L5≦200m[656ft]
   L1 +L2+L3+L11+L12+L13≦200m[656ft]
2) Transmission line for centralized control
   No connection is required.
3) MA remote controller wiring
   Maximum overall line length
   (0.3 to 1.25mm^2 [AWG22 to 16])
   m1≦200m [656ft]
   m2+m3≦200m [656ft]
   m4+m5≦200m [656ft]

(4) Wiring method

1) Indoor/outdoor transmission line

Daisy-chain terminals M1 and M2 of the terminal block for indoor-outdoor transmission line (TB3) on the outdoor units (OC and OS), of the terminal block for indoor-outdoor transmission line (TB02) on the HBC controller (HB), and of the terminal block for indoor-outdoor transmission line (TB5) on each indoor unit (IC). (Non-polarized two-wire)

- Only use shielded cables.

Note

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).

Shielded cable connection

Daisy-chain the ground terminal (⏚) on the outdoor units (OC and OS), the S terminal of the terminal block (TB02) on the HBC controller (HB), and the S terminal of the terminal block (TB5) on the indoor unit (IC) with the shield of the shielded cable.

2) Transmission line for centralized control

No connection is required.

3) MA remote controller wiring

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

When 2 remote controllers are connected to the system

When 2 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.)

Group operation of indoor units

To perform a group operation of indoor units (IC), daisy-chain terminals 1 and 2 on the terminal block (TB15) on all indoor units (IC) in the same group, and then connect terminals 1 and 2 on the terminal block (TB15) on the indoor unit on one end to the terminal block on the MA remotecontroller. (Non-polarized two-wire)

- When performing a group operation of indoor units that have different functions, "Automatic indoor/outdoor addresssetup" is not available.

4) Switch setting

No address settings required.

(5) Address setting method

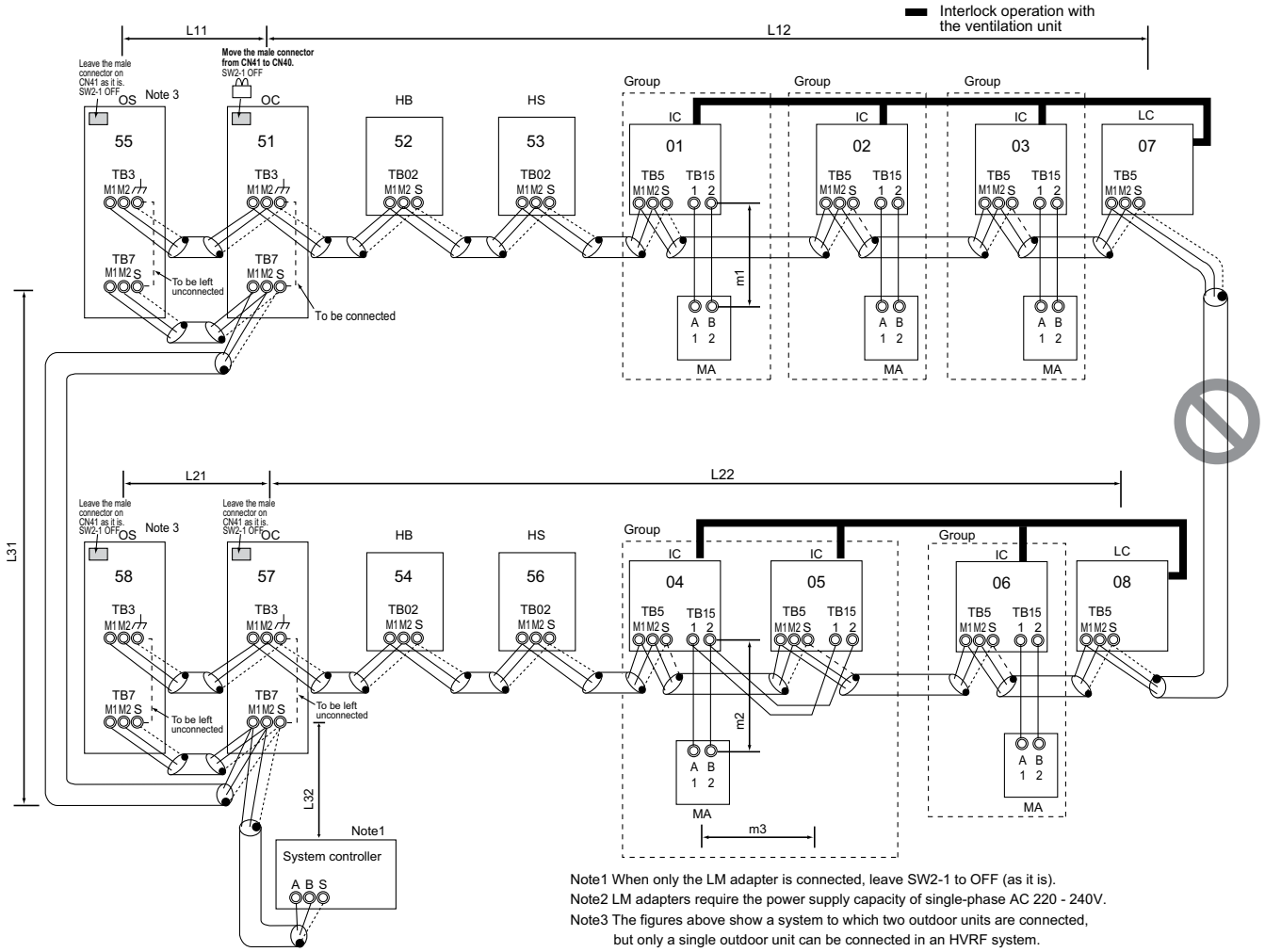
Procedures	Unit or controller			Address setting range	Setting method	Notes	Factory setting
1	Indoor unit	Main unit	IC	No settings required.	-	Port number setting is required To perform a group operation of indoor units that feature different functions, the automatic IC/OC address setup function is not available.	00
		Sub unit	IC				
2	LOSSNAY		LC	No settings required.	-		00
3	MA remote controller	Main remote controller	MA	No settings required.	-		Main
		Sub remote controller	MA	Sub remote controller	Settings to be made with the Sub/Main switch		
4	Outdoor unit		OC OS	No settings required.	-		00
5	Auxiliary outdoor unit	HBC controller	HB	No settings required.	-		00

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).

2. A system in which a system controller is connected to the transmission line for centralized control and which is powered from an outdoor unit

(1) Sample control wiring



Note1 When only the LM adapter is connected, leave SW2-1 to OFF (as it is).
Note2 LM adapters require the power supply capacity of single-phase AC 220 - 240V.
Note3 The figures above show a system to which two outdoor units are connected, but only a single outdoor unit can be connected in an HVRF system.

(2) Cautions

1) ME remote controller and MA remote controller cannot both be connected to the same group of indoor units.
2) No more than 2 MA remote controllers can be connected to a group of indoor units.
3) Do not connect the terminal blocks (TB5) on the indoor units that are connected to different outdoor units with each other.
4) Replacement of male power jumper connector (CN41) must be performed only on one of the outdoor units.
   (not required if power to the transmission line for centralized control is supplied from a controller with a power-supply function, such as GB-50ADA)
5) Short-circuit the shield terminal (S terminal) and the earth terminal (⏚) on the terminal block for transmission line for centralized control (TB7) on the outdoor unit whose power jumper connector is mated with CN40.
6) When the number of the connected indoor units is as shown in the table below, one or more transmission boosters (sold separately) are required.
   To connect two transmission boosters, connect them in parallel.
   (Observe the maximum number of connectable indoor units that are listed in the specifications for each outdoor unit.)

	Number of transmission booster (sold separately) required	
	1 unit	2 units
When the P200 and P250 models are not included in the connected indoor units	27 - 50 units	-
When the P200 and P250 models are included in the connected indoor units	21 - 39 units	40 - 50 units

7) When a power supply unit is connected to the transmission line for centralized control, leave the power jumper connector on CN41 as it is (factory setting).

(3) Maximum allowable length

1) Indoor/outdoor transmission line
   Maximum distance (1.25mm^2 [AWG16] or larger)
   L11+L12≦200m [656ft]
   L21+L22≦200m [656ft]
2) Transmission line for centralized control
   L31+L32(L21) ≦200m [656ft]
3) MA remote controller wiring
   Same as [3] 1.
4) Maximum line distance via outdoor unit
   (1.25mm^2 [AWG16] or larger)
   L32+L31+L12(L11) ≦500m [1640ft]
   L32+L22(L21) ≦500m [1640ft]
   L12(L11)+L31+L22(L21) ≦500m[1640ft]

(4) Wiring method

1) Indoor/outdoor transmission line

Daisy-chain terminals M1 and M2 of the terminal block for indoor-outdoor transmission line (TB3) on the outdoor units (OC and OS), of the terminal block for indoor-outdoor transmission line (TB02) on the HBC controller (HB), and of the terminal block for indoor-outdoor transmission line (TB5) on each indoor unit (IC). (Non-polarized two-wire)

- Only use shielded cables.

Note

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).

Shielded cable connection

Daisy-chain the ground terminal (⏚) on the outdoor units (OC and OS), the S terminal of the terminal block (TB02) on HB, and the S terminal of the terminal block (TB5) on the indoor unit (IC) with the shield of the shielded cable.

2) Transmission line for centralized control

Daisy-chain terminals A and B on the system controller, 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 outdoor units (OC and OS) (Note a) in the same refrigerant circuit. (Note b)
When both of the following conditions are met, move the power jumper connector on the control board from CN41 to CN40 on only one of the outdoor units: (1) No power supply units are connected to the transmission line for centralized control AND (2) No controllers with a power-supply function are connected to the system.
If a system controller is connected, set the central control switch (SW2-1) on the control board of all outdoor units to "ON."

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.)

- Only use shielded cables.

Shielded cable connection

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 earth terminal (⏚) and the S terminal on the terminal block (TB7) on the outdoor unit whose power jumper connector is mated with CN40.

3) MA remote controller wiring

Same as [3] 1.

When 2 remote controllers are connected to the system

Same as [3] 1.

Group operation of indoor units

Same as [3] 1.

4) 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 for indoor-outdoor transmission line (TB5) on LOSSNAY (LC). (Non-polarized two-wire)

- Indoor units must be interlocked with the LOSSNAY unit using the system controller. (Refer to the operation manual for the system controller for the setting method.) Interlock setting from the remote controller is required if the ON/OFF remote controller alone or the LM adapter alone is connected.

(5) Address setting method

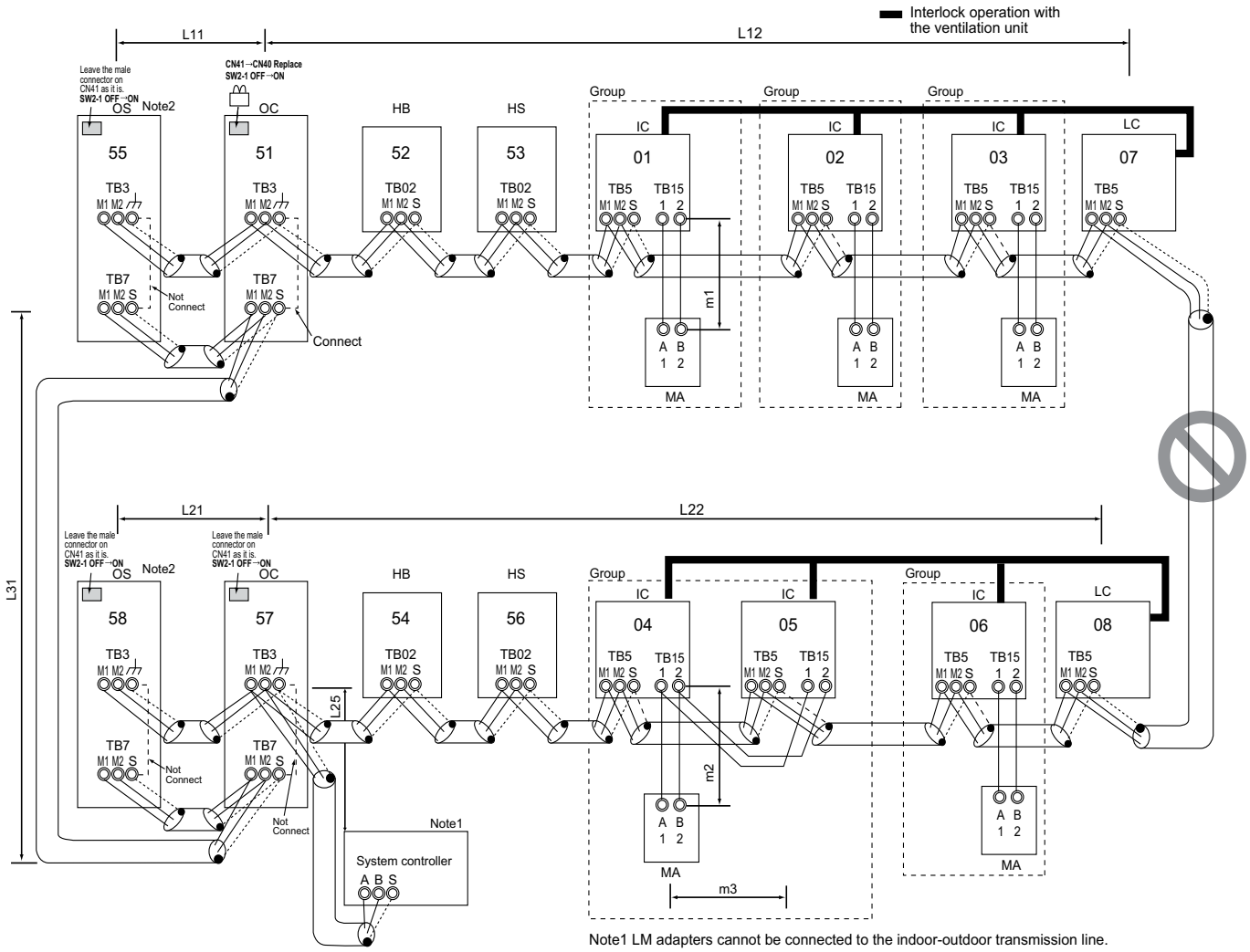
Procedures	Unit or controller			Address setting range	Setting method	Notes	Factory setting
1	Indoor unit	Main unit	IC	01 to 50	• Assign the smallest address to the main unit in the group.	• Port number setting is required • To perform a group operation of indoor units that feature different functions, designate the indoor unit in the group with the greatest number of functions as the main unit.	00
		Sub unit			Assign sequential numbers starting with the address of the main unit in the same group +1. (Main unit address +1, main unit address +2, main unit address +3, etc.)		
2	LOSSNAY		LC	01 to 50	Assign an arbitrary but unique address to each of these units after assigning an address to all indoor units.	None of these addresses may overlap any of the indoor unit addresses.	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
		Sub remote controller	MA	Sub remote controller	Settings to be made with the Sub/ Main switch		
4	Outdoor unit (Note)		OC OS	51 to 100	• Assign sequential address to the outdoor units in the same refrigerant circuit. • The outdoor units are automatically designated as OC and OS.(Note)	• To set the address to 100, set the rotary switches to 50. • If the address that is assigned to the HBC controller and Sub-HBC overlaps any of the addresses that are assigned to the other units, use a different, unused address within the setting range.	00
5	Auxiliary outdoor unit	HBC controller Sub-HBC	HB HS	51 to 100	Assign an address that equals the lowest address of the indoor units to be connected to the HBC controller or Sub-HBC plus 50.		

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).

3. An example of a system in which a system controller is connected to the indoor-outdoor transmission line (except LM adapter)

(1) Sample control wiring



Note1 LM adapters cannot be connected to the indoor-outdoor transmission line.

Note2 The figures above show a system to which two outdoor units are connected, but only a single outdoor unit can be connected in an HVRF system.

(2) Cautions

1) ME remote controller and MA remote controller cannot both be connected to the same group of indoor units.
2) No more than 2 MA remote controllers can be connected to a group of indoor units.
3) Do not connect the terminal blocks (TB5) on the indoor units that are connected to different outdoor units with each other.
4) Replacement of male power jumper connector (CN41) must be performed only on one of the outdoor units.
   (not required if power to the transmission line for centralized control is supplied from a controller with a power-supply function, such as GB-50ADA)
5) Provide grounding to S terminal on the terminal block for transmission line for centralized control (TB7) on only one of the outdoor units.
6) A maximum of 3 system controllers can be connected to the indoor-outdoor transmission line, with the exception that only one G(B)-50A may be connected.
7) When the total number of indoor units exceeds 20 (12 if one or more indoor units of the 200 model or above is connected), it may not be possible to connect a system controller to the indoor-outdoor transmission line.
8) When the number of the connected indoor units is as shown in the table below, one or more transmission boosters (sold separately) are required.
   To connect two transmission boosters, connect them in parallel. (Observe the maximum number of connectable indoor units that are listed in the specifications for each outdoor unit.)

	Number of transmission booster (sold separately) required	
	1 unit	2 units
When the P200 and P250 models are not included in the connected indoor units	27 - 50 units	-
When the P200 and P250 models are included in the connected indoor units	21 - 39 units	40 - 50 units

(3) Maximum allowable length

1) Indoor/outdoor transmission line
   Maximum distance (1.25mm^2 [AWG16] or larger)
   L11+L12≦200m [656ft]
   L21+L22≦200m [656ft]
   L25≦200m [656ft]
2) Transmission line for centralized control
   L31+L21≦200m [656ft]
3) MA remote controller wiring
   Same as [3] 1.
4) Maximum line distance via outdoor unit (1.25mm^2 [AWG16] or larger)
   L25+L31+L12(L11)≦500m [1640ft]
   L12(L11)+L31+L22(L21)≦500m [1640ft]

(4) Wiring method

1) Indoor/outdoor transmission line

Daisy-chain terminals M1 and M2 of the terminal block for indoor-outdoor transmission line (TB3) on the outdoor units (OC and OS) (Note a), of the terminal block for indoor-outdoor transmission line (TB02) on the main and sub BC controllers (BC and BS), of the terminal block for indoor-outdoor transmission line (TB5) on each indoor unit (IC), and the S terminal of the system controller.(Non-polarized two-wire)

- Only use shielded cables.

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).

Shielded cable connection

Daisy-chain the ground terminal (⏚) on the outdoor units (OC and OS), the S terminal of the terminal block (TB02) on the BC and BS, and the S terminal of the terminal block (TB5) on the indoor unit (IC) with the shield of the shielded cable.

2) 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 in the same refrigerant circuit.(Note b)
When both of the following conditions are met, move the power jumper connector on the control board from CN41 to CN40 on only one of the outdoor units: (1) No power supply units are connected to the transmission line for centralized control AND (2) No controllers with a power-supply function are connected to the system.
Set the central control switch (SW2-1) on the control board of all outdoor units to "ON."

Note

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.)

- Only use shielded cables.

Shielded cable connection

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

3) MA remote controller wiring

Same as [3] 1.

When 2 remote controllers are connected to the system

Same as [3] 1.

Group operation of indoor units

Same as [3] 1.

4) LOSSNAY connection

Connect terminals M1 and M2 on the terminal block (TB5) on the indoor units (IC) to the appropriate terminals on the terminal block for indoor-outdoor transmission line (TB5) on LOSSNAY (LC). (Non-polarized two-wire)

- Indoor units must be interlocked with the LOSSNAY unit using the system controller. (Refer to the operation manual for the system controller for the setting method.) Interlock setting from the remote controller is required if the ON/OFF remote controller alone is connected.

5) Switch setting

Address setting is required as follows.

(5) Address setting method

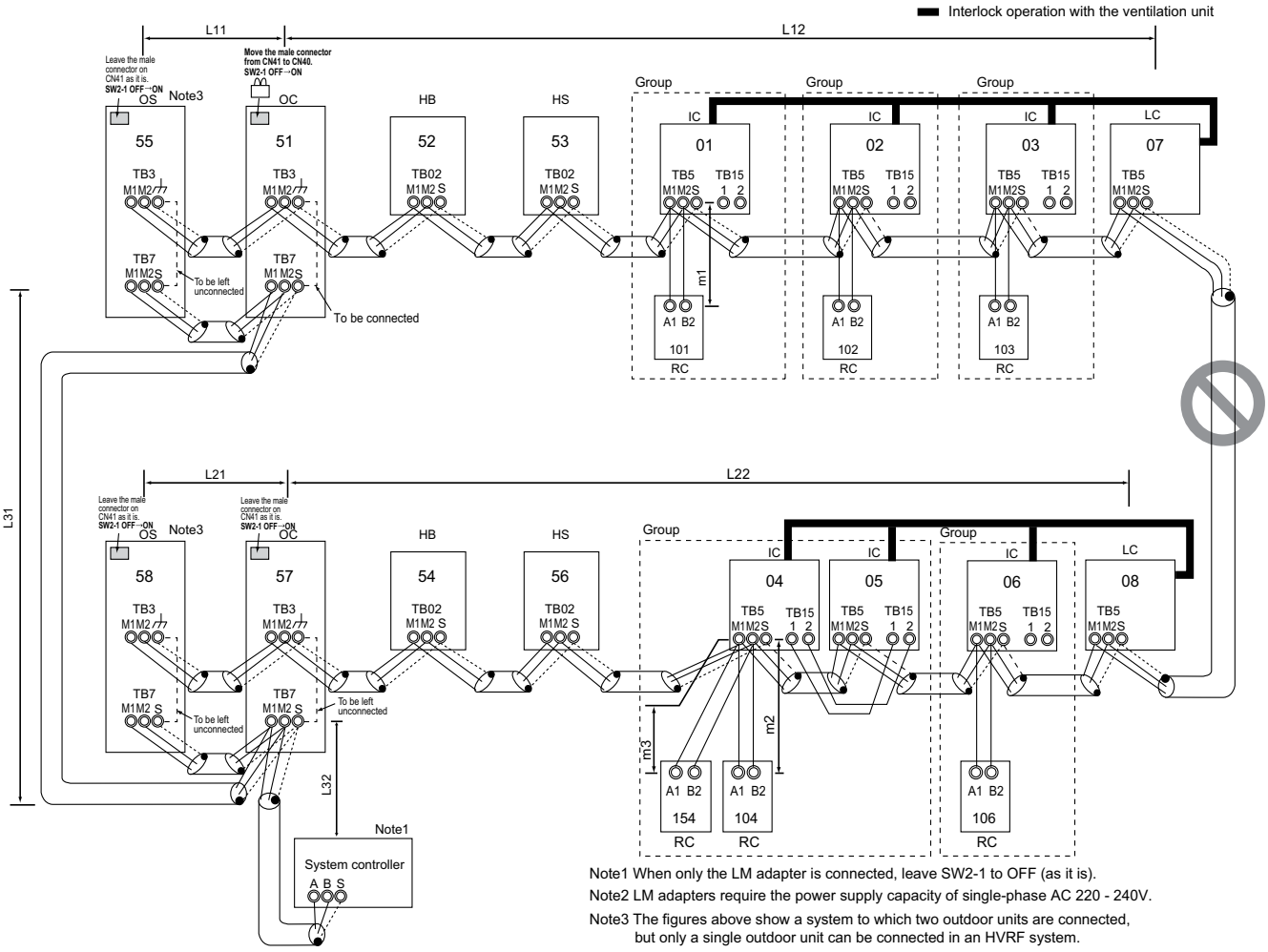
Procedures	Unit or controller			Address setting range	Setting method	Notes	Factory setting
1	Indoor unit	Main unit	IC	01 to 50	• Assign the smallest address to the main unit in the group.	• Port number setting is required • To perform a group operation of indoor units that feature different functions, designate the indoor unit in the group with the greatest number of functions as the main unit.	00
		Sub unit			Assign sequential numbers starting with the address of the main unit in the same group +1. (Main unit address +1, main unit address +2, main unit address +3, etc.)		
2	LOSSNAY		LC	01 to 50	Assign an arbitrary but unique address to each of these units after assigning an address to all indoor units.	None of these addresses may overlap any of the indoor unit addresses.	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
		Sub remote controller	MA	Sub remote controller	Settings to be made with the Sub/Main switch		
4	Outdoor unit		OC OS	51 to 100	• Assign sequential address to the outdoor units in the same refrigerant circuit. • The outdoor units are automatically designated as OC and OS.(Note)	• To set the address to 100, set the rotary switches to 50. • If the address that is assigned to the HBC controller and Sub-HBC overlaps any of the addresses that are assigned to the other units, use a different, unused address within the setting range.	00
5	Auxiliary outdoor unit	HBC controller Sub-HBC	HB HS	51 to 100	Assign an address that equals the lowest address of the indoor units to be connected to the HBC controller or Sub-HBC plus 50.		

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).

[4] An Example of a System to which an ME Remote Controller is connected

(1) Sample control wiring



Note1 When only the LM adapter is connected, leave SW2-1 to OFF (as it is).

Note2 LM adapters require the power supply capacity of single-phase AC 220 - 240V.

Note3 The figures above show a system to which two outdoor units are connected, but only a single outdoor unit can be connected in an HVRF system.

(2) Cautions

1) ME remote controller and MA remote controller cannot both be connected to the same group of indoor units.
2) No more than 2 ME remote controllers can be connected to a group of indoor units.
3) Do not connect the terminal blocks (TB5) on the indoor units that are connected to different outdoor units with each other.
4) Replace the power jumper connector of the control board from CN41 to CN40 on only one of the outdoor units.
   (not required if power to the transmission line for centralized control is supplied from a controller with a power-supply function, such as GB-50ADA)
5) Provide an electrical path to ground for the S terminal on the terminal block for centralized control on only one of the outdoor units.
6) When the number of the connected indoor units is as shown in the table below, one or more transmission boosters (sold separately) are required.
   To connect two transmission boosters, connect them in parallel. (Observe the maximum number of connectable indoor units that are listed in the specifications for each outdoor unit.)

	Number of transmission booster (sold separately) required		
	1 unit	2 units	3 units
When the P200 and P250 models are not included in the connected indoor units	15 - 34 units	35 - 50 units	-
When the P200 and P250 models are included in the connected indoor units	11 - 26 units	27 - 42 units	43 - 50 units

7) When a power supply unit is connected to the transmission line for centralized control, leave the power jumper connector on CN41 as it is (factory setting).

(3) Maximum allowable length

1) Indoor/outdoor transmission line
   Maximum distance (1.25mm^2 [AWG16] or larger)
   L11+L12≦200m [656ft]
   L21+L22≦200m [656ft]
2) Transmission line for centralized control
   Same as [3] 2.
3) ME remote controller wiring
   Maximum overall line length
   (0.3 to 1.25mm^2 [AWG22 to 16])
   m1≦10m [32ft]
   m2+m3≦10m [32ft]
   If the standard-supplied cable must be extended, use a cable with a diameter of 1.25mm^2 [AWG16]. The section of the cable that exceeds 10m [32ft] must be included in the maximum indoor-outdoor transmission line distance described in (1).
   When connected to the terminal block on the Simple remote controller, use cables that meet the following cable size specifications: 0.75 - 1.25 mm^2 [AWG18-16].
4) Maximum line distance via outdoor unit
   (1.25 mm^2 [AWG16] or large)
   Same as [3] 2.

(4) Wiring method

1) Indoor/outdoor transmission line

Same as [3] 2.

Shielded cable connection

Same as [3] 2.

2) Transmission line for centralized control

Same as [3] 2.

Shielded cable connection

Same as [3] 2.

3) ME remote controller wiring

ME remote controller is connectable anywhere on the indoor-outdoor transmission line.

When 2 remote controllers are connected to the system

Refer to the section on Switch Setting.

Performing a group operation (including the group operation of units in different refrigerant circuits).

Refer to the section on Switch Setting.

4) LOSSNAY connection

Same as [3] 2.

5) Switch setting

Address setting is required as follows.

(5) Address setting method

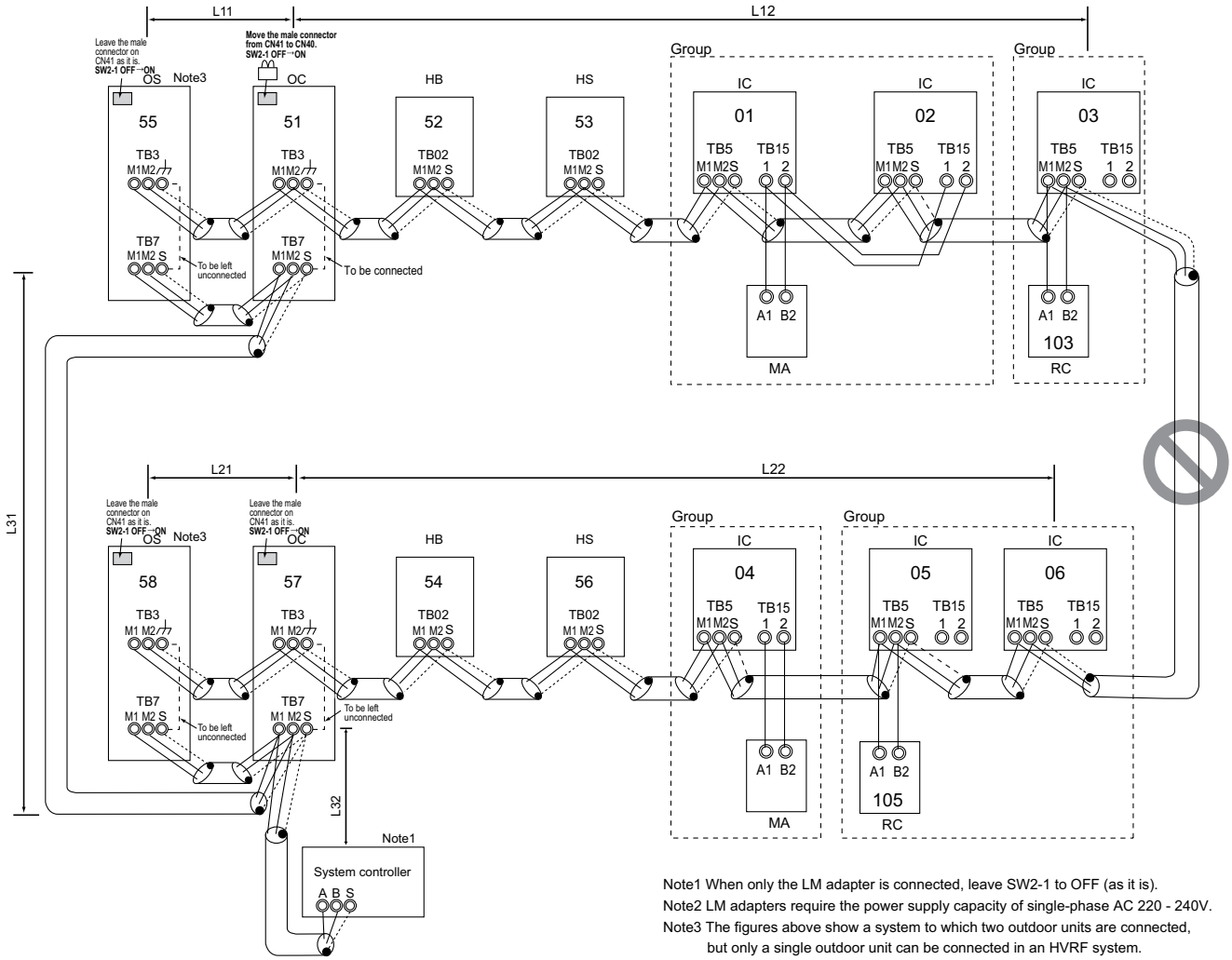
Procedures	Unit or controller			Address setting range	Setting method	Notes	Factory setting
1	Indoor unit	Main unit	IC	01 to 50	♦Assign the smallest address to the main unit in the group.	♦Port number setting is required ♦To perform a group operation of indoor units that have different functions, set the indoor unit in the group with the greatest number of functions as the main unit.	00
		Sub unit			Assign sequential numbers starting with the address of the main unit in the same group +1. (Main unit address +1, main unit address +2, main unit address +3, etc.)		
2	LOSSNAY		LC	01 to 50	Assign an arbitrary but unique address to each of these units after assigning an address to all indoor units.	None of these addresses may overlap any of the indoor unit addresses.	00
3	ME remote controller	Main remote controller	RC	101 to 150	Add 100 to the main unit address in the group	♦It is not necessary to set the 100s digit. ♦To set the address to 200, set the rotary switches to 00.	101
		Sub remote controller	RC	151 to 200	Add 150 to the main unit address in the group		
4	Outdoor unit		OC OS	51 to 100	♦Assign sequential address to the outdoor units in the same refrigerant circuit. ♦The outdoor units are automatically designated as OC and OS.(Note)	♦To set the address to 100, set the rotary switches to 50. ♦If the address that is assigned to the HBC controller and Sub-HBC overlaps any of the addresses that are assigned to the other units, use a different, unused address within the setting range.	00
5	Auxiliary outdoor unit	HBC controller Sub-HBC	HB HS	51 to 100	Assign an address that equals the lowest address of the indoor units to be connected to the HBC controller or Sub-HBC plus 50.		

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).

[5] An Example of a System to which both MA Remote Controller and ME Remote Controller are connected

(1) Sample control wiring



Note1 When only the LM adapter is connected, leave SW2-1 to OFF (as it is).
Note2 LM adapters require the power supply capacity of single-phase AC 220 - 240V.
Note3 The figures above show a system to which two outdoor units are connected, but only a single outdoor unit can be connected in an HVRF system.

(2) Cautions

1) Be sure to connect a system controller.
2) ME remote controller and MA remote controller cannot both be connected to the same group of indoor units.
3) Assign to the indoor units connected to the MA remote controller addresses that are smaller than those of the indoor units that are connected to the ME remote controller.
4) No more than 2 ME remote controllers can be connected to a group of indoor units.
5) No more than 2 MA remote controllers can be connected to a group of indoor units.
6) Do not connect the terminal blocks (TB5) on the indoor units that are connected to different outdoor units with each other.
7) Replace the power jumper connector of the control board from CN41 to CN40 on only one of the outdoor units.
   (not required if power to the transmission line for centralized control is supplied from a controller with a power-supply function, such as GB-50ADA)
8) Provide an electrical path to ground for the S terminal on the terminal block for centralized control on only one of the outdoor units.
9) When the number of the connected indoor units is as shown in the table below, one or more transmission boosters (sold separately) are required.
   To connect two transmission boosters, connect them in parallel.
   (Observe the maximum number of connectable indoor units that are listed in the specifications for each outdoor unit.)

	Number of transmission booster (sold separately) required		
	1 unit	2 units	3 units
When the P200 and P250 models are not included in the connected indoor units	15 - 34 units	35 - 50 units	-
When the P200and P250 models are included in the connected indoor units	11 - 26 units	27 - 42 units	43 - 50 units

10) When a power supply unit is connected to the transmission line for centralized control, leave the power jumper connector on CN41 as it is (factory setting).

(3) Maximum allowable length

1) Indoor/outdoor transmission line
   Same as [3] 2.
2) Transmission line for centralized control
   Same as [3] 2.
3) MA remote controller wiring
   Same as [3] 1.
4) ME remote controller wiring
   Same as [4]
5) Maximum line distance via outdoor unit (1.25 mm^2 or larger)
   Same as [3] 2.

(4) Wiring method

1) Indoor/outdoor transmission line
   Same as [3] 2.
   Shielded cable connection
   Same as [3] 2.
2) Transmission line for centralized control
   Same as [3] 2.
   Shielded cable connection
   Same as [3] 2.
3) MA remote controller wiring
   (When 2 remote controllers are connected to the system
   Group operation of indoor units)
   Same as [3] 1.
4) ME remote controller wiring
   (When 2 remote controllers are connected to the system
   Group operation of indoor units)
   Same as [4]
5) LOSSNAY connection
   Same as [3] 2.
6) Switch setting
   Address setting is required as follows.

(5) Address setting method

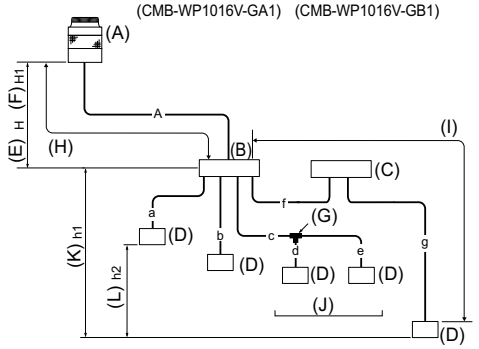
Procedures	Unit or controller				Address setting range	Setting method	Notes	Factory setting
1	Operation with the MA remote controller	Indoor unit	Main unit	IC	01 to 50	⬧Assign the smallest address to the main unit in the group.	⬧Assign an address smaller than that of the indoor unit that is connected to the ME remote controller. ⬧Enter the same indoor unit group settings on the system controller as the ones that were entered on the MA remote controller. ⬧To perform a group operation of indoor units that have different functions, designate the indoor unit in the group with the greatest number of functions as the main unit. ⬧Port number setting is required.	00
			Sub unit	IC	01 to 50	Assign sequential numbers starting with the address of the main unit in the same group +1. (Main unit address +1, main unit address +2, main unit address +3, etc.)		
		MA remote controller	Main remote controller	MA	No settings required.	-		Main
			Sub remote controller	MA	Sub remote controller	Settings to be made according to the remote controller function selection		
2	Operation with the ME remote controller	Indoor unit	Main unit	IC	01 to 50	Assign the smallest address to the main unit in the group.	⬧Assign an address higher than those of the indoor units that are connected to the MA remote controller. ⬧Make the initial settings for the indoor unit group settings via the system controller. ⬧To perform a group operation of indoor units that have different functions, designate the indoor unit in the group with the greatest number of functions as the main unit. ⬧Port number setting is required. ⬧Addresses that are assigned to the indoor units that are connected to the sub BC controller should be higher than the addresses that are assigned to the indoor units that are connected to the main BC controller.	00
			Sub unit	IC	01 to 50	Assign sequential numbers starting with the address of the main unit in the same group +1. (Main unit address +1, main unit address +2, main unit address +3, etc.)		
		ME remote controller	Main remote controller	RC	101 to 150	Add 100 to the main unit address in the group.	⬧It is not necessary to set the 100s digit. ⬧To set the address to 200, set it to 00.	101
			Sub remote controller	RC	151 to 200	Add 150 to the main unit address in the group.		
3	LOSSNAY			LC	01 to 50	Assign an arbitrary but unique address to each of these units after assigning an address to all indoor units.	None of these addresses may overlap any of the indoor unit addresses.	00
4	Outdoor unit			OC OS	51 to 100	⬧Assign sequential address to the outdoor units in the same refrigerant circuit. ⬧The outdoor units are automatically designated as OC and OS.(Note)	⬧To set the address to 100, set it to 50. ⬧If the address that is assigned to the HBC controller and Sub-HBC overlaps any of the addresses that are assigned to the other units, use a different, unused address within the setting range.	00
5	Auxiliary outdoor unit	HBC controller Sub-HBC		HB HS	51 to 100	Assign an address that equals the lowest address of the indoor units to be connected to the HBC controller or Sub-HBC plus 50.		

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).

[6] Restrictions on Pipe Length

CMB-WP108V-GA1 + CMB-WP108V-GB1
(CMB-WP1016V-GA1) (CMB-WP1016V-GB1)



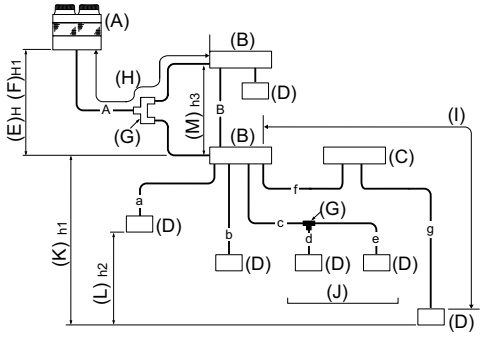
(A) Outdoor unit (B) Main-HBC controller
(C) Sub-HBC controller (D) Indoor unit
(E) Less than H=50 m (when the outdoor unit is higher than HBC)
(F) Less than H1=40 m (when the outdoor unit is lower than HBC)
(G) Twinning pipe (field supply)
(H) Less than 110 m (I) Less than 60 m
(J) Up to three units for 1 branch port
Total capacity: less than 80 (but in same mode, cooling/heating)
(K) Less than 15 m (L) Less than 15 m

Notes:
***1 Indoor units that are connected to the same branch joint cannot be simultaneously operated in different operation modes.**

(Unit: m)

	Item		Piping portion	Allowable value
Pipe Lengths	Between outdoor unit and HBC controller (refrigerant pipework)		A	110 or less
	Water pipework between indoor units and HBC controller		f + g	60 or less
Difference of elevation	Between indoor and outdoor units	Above outdoor unit	H	50 or less
		Below outdoor unit	H1	40 or less
	Between indoor units and HBC controller		h1	15 or less
	Between indoor units		h2	15 or less

CMB-WP108V-GA1 + CMB-WP108V-GB1
(CMB-WP1016V-GA1) (CMB-WP1016V-GB1)



(A) Outdoor unit (B) Main-HBC controller
(C) Sub-HBC controller (D) Indoor unit
(E) Less than H=50 m (when the outdoor unit is higher than the indoor unit)
(F) Less than H1=40 m (when the outdoor unit is lower than the indoor unit)
(G) Twinning pipe (field supply)
(H) Less than 110 m (I) Less than 60 m
(J) Up to three units for 1 branch port
Total capacity: less than 80 (but in same mode, cooling/heating)
(K) Less than 15 m (L) Less than 15 m
(M) Less than 15 m

(Unit: m)

	Item		Piping portion	Allowable value
Pipe Lengths	Between outdoor unit and HBC controller (refrigerant pipework)		A	110 or less
	Water pipework between indoor units and HBC controller		f + g	60 or less
	Between HBC controllers		B	40 or less
Difference of elevation	Between indoor and outdoor units	Above outdoor unit	H	50 or less
		Below outdoor unit	H1	40 or less
	Between indoor units and HBC controller		h1	15 or less
	Between indoor units		h2	15 or less
	Between HBC controllers		h3	15 or less

1. Refrigerant and water pipe size

(1) Refrigerant pipe between outdoor unit and HBC controller (Part A)

		HBC CONTROLLER		
Unit model		Model name	High pressure side	Low pressure side
Outdoor unit side	PURY-(E)P200	(HBC CONTROLLER) CMB-WP108V-GA1 CMB-WP1016V-GA1 *1	ø15.88 (Brazing)	ø19.05 (Brazing)
	PURY-(E)P250		ø19.05 (Brazing)	ø22.2 (Brazing)
	PURY-(E)P300		ø19.05 (Brazing)	ø22.2 (Brazing)
	PURY-(E)P350		ø19.05 (Brazing)	ø28.58 (Brazing)
	PURY-(E)P400		ø15.88 (Brazing) for each HBC	ø19.05 (Brazing) for each HBC
	PURY-(E)P450		ø15.88 (Brazing) for each HBC	ø22.2 (Brazing) for each HBC
	PURY-(E)P500		ø19.05 (Brazing) for each HBC	ø22.2 (Brazing) for each HBC

***1. PURY-(E)P-400YLM model or larger requires a connection of two main-HBC controllers in parallel.**

(2) Water pipe between HBC controller and indoor units (Sections a, b, c, d, e, and g)

Unit : mm [inch]

Indoor unit	Inlet pipe size	Outlet pipe size
P15 - P50	20A [I.D. 13/16"]	20A [I.D. 13/16"]

(3) Water pipe between HBC controller and Sub-HBC

Unit : mm [inch]

	Inlet pipe size	Outlet pipe size
Cold-water side	20A [I.D. 13/16"]	20A [I.D. 13/16"]
Hot-water side	20A [I.D. 13/16"]	20A [I.D. 13/16"]

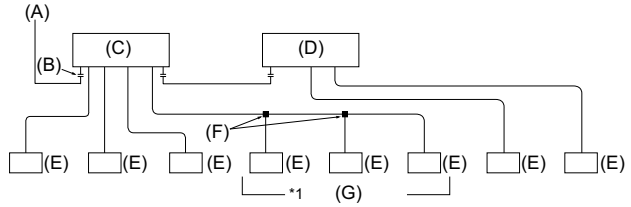
(4) Water pipe between HBC controller and HBC controller

Unit : mm [inch]

ø15.88 [5/8"] (Brazed connection)

2. Connecting the HBC controller

(1) Size of the pipe that fits the standard HBC controller ports



(A) To outdoor unit
(B) End connection (brazing)
(C) Main-HBC controller
(D) Sub-HBC controller
(E) Indoor unit
(F) Twinning pipe (field supply)
(G) Up to three units for 1 branch hole; totalcapacity: below 80 (but same in cooling/heating mode)

Note

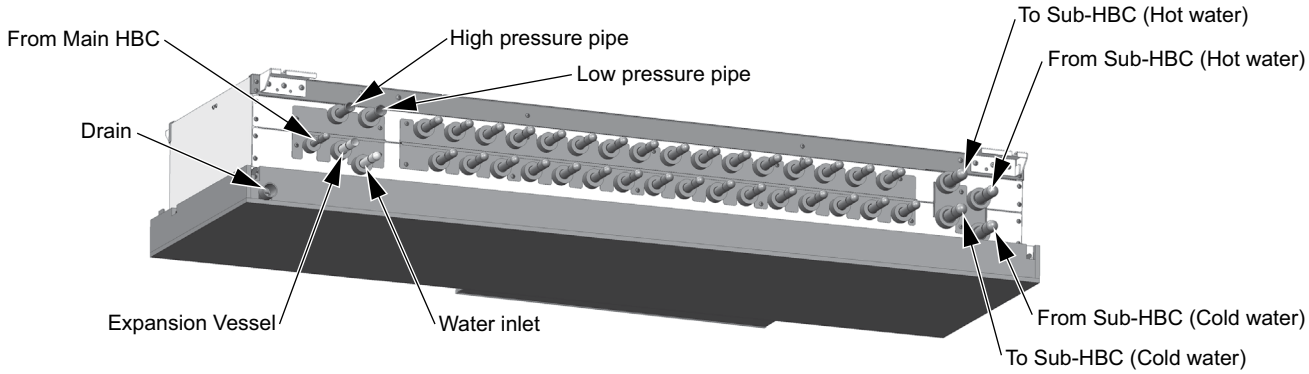
1) To connect multiple indoor units to a port
- Maximum total capacity of connected indoor units: P80 or below
- Maximum number of connectable indoor units: 3 units
- Branch joints are field-supplied.
- All the indoor units that are connected to the same port must be in the same group and Thermo-ON/OFF operation simultaneously. For all the indoor units in the group, the room temperature needs to be monitored via the connected remote controller.

III HBC Controller Components

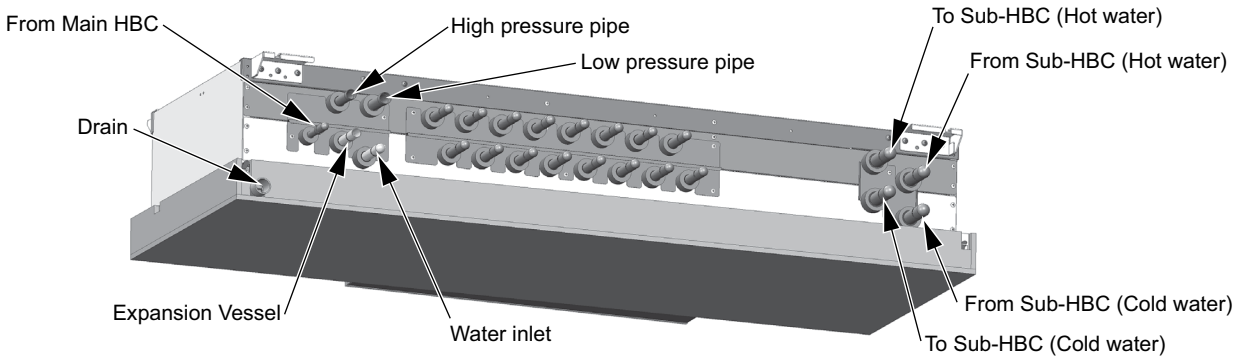
[1] HBC Controller Components

1. Front

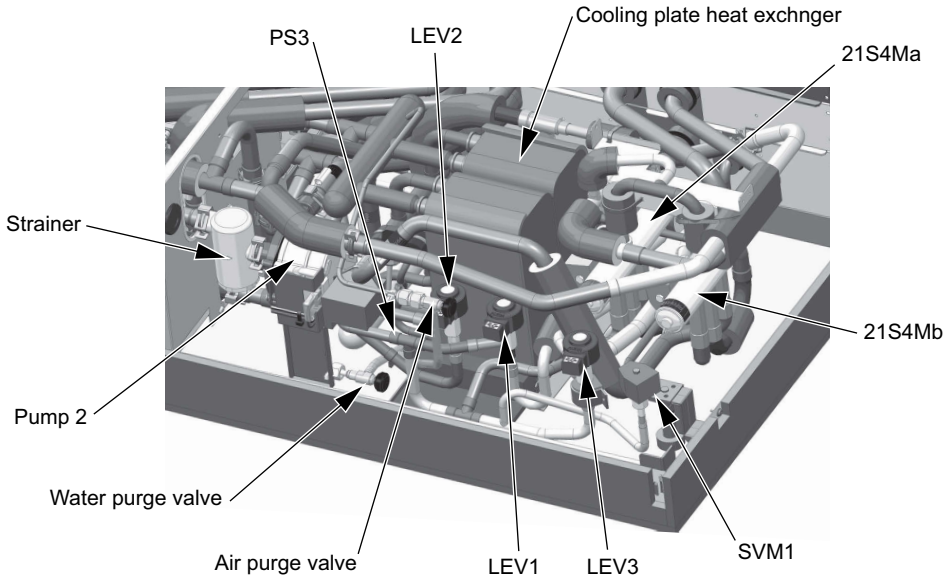
(1) CMB-WP1016V-GA1



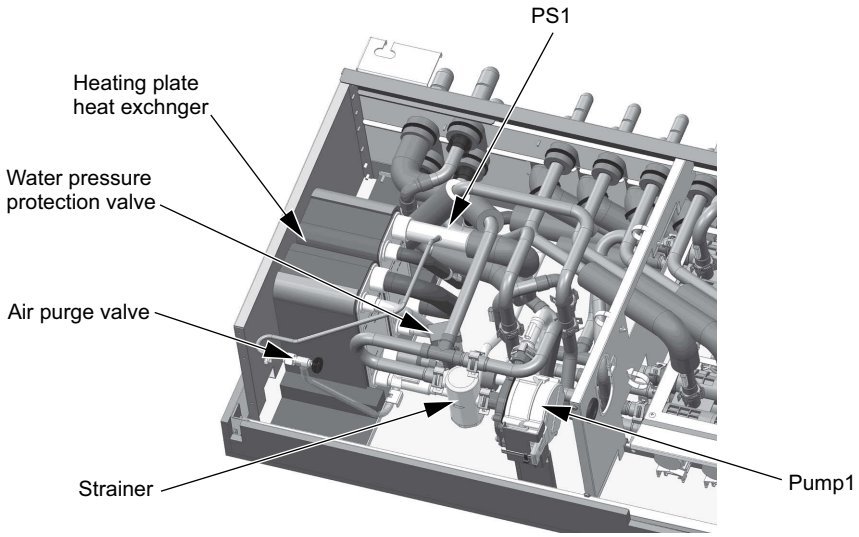
(2) CMB-WP108V-GA1



2. Rear right side (cooling)

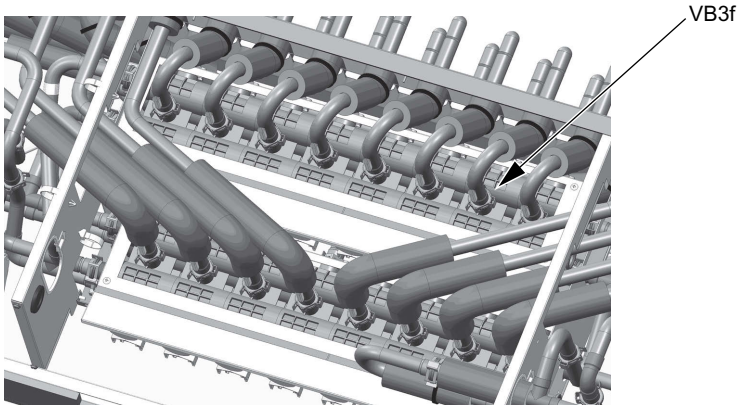


3. Rear left side (heating)

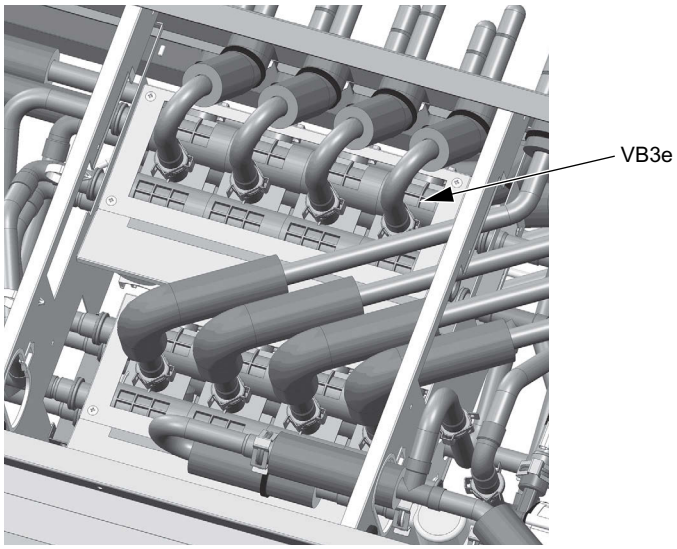


4. Top side

(1) CMB-WP1016V-GA1



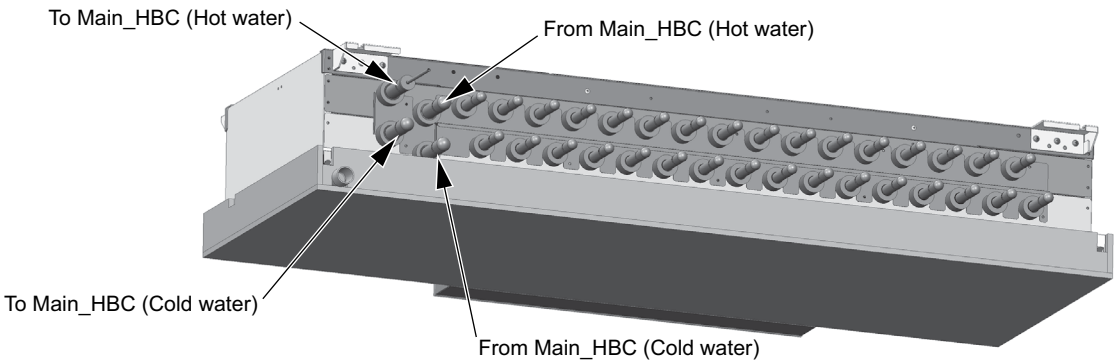
(2) CMB-WP108V-GA1



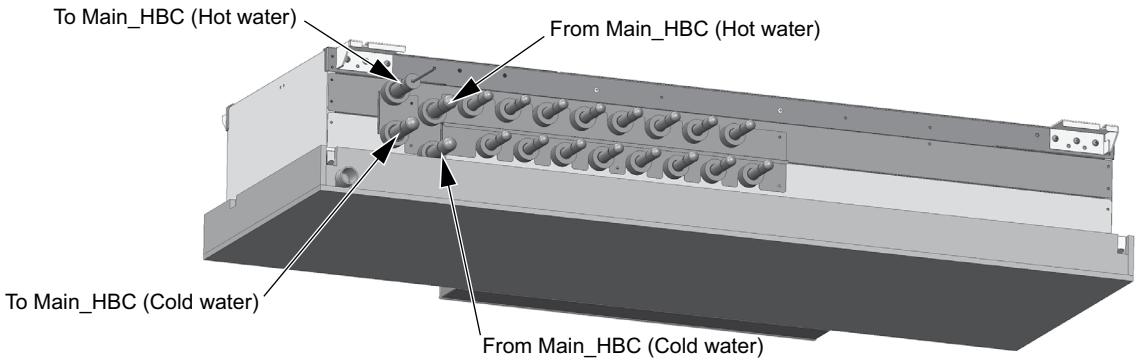
[2] Sub-HBC Components

1. Front

(1) CMB-WP1016V-GB1

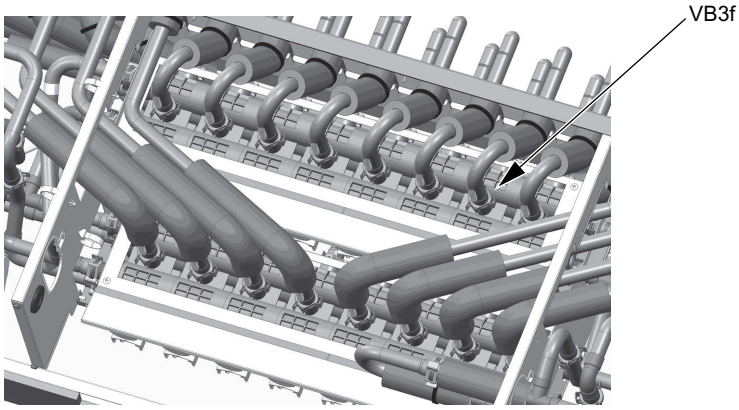


(2) CMB-WP108V-GB1

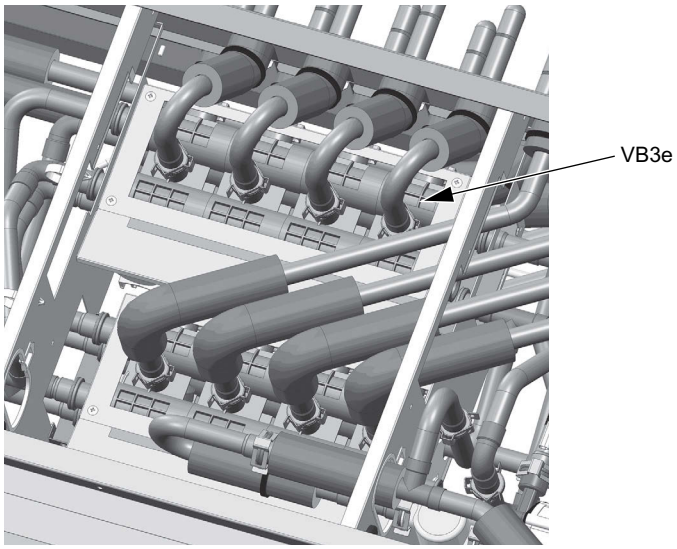


2. Top side

(1) CMB-WP1016V-GB1

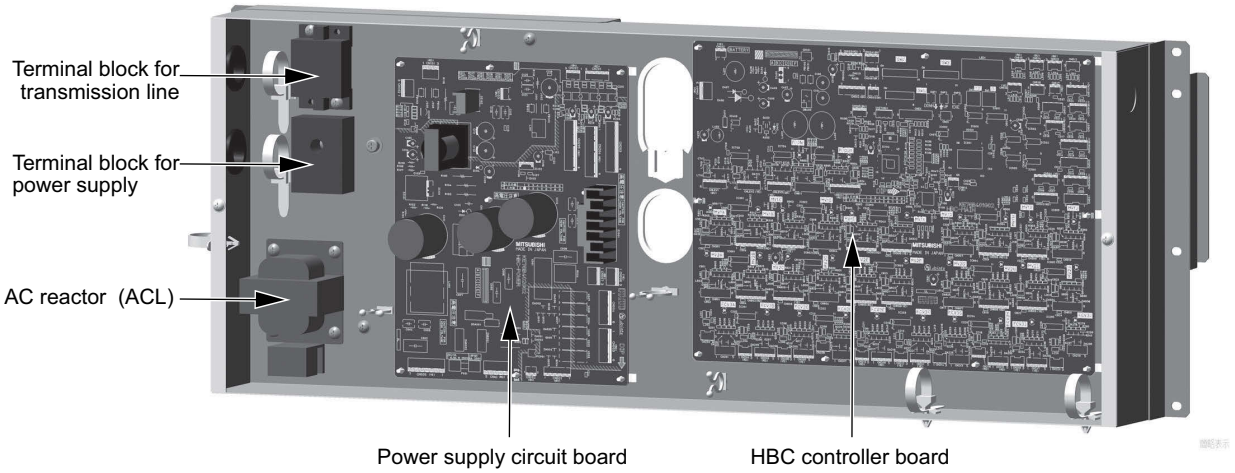


(2) CMB-WP108V-GB1



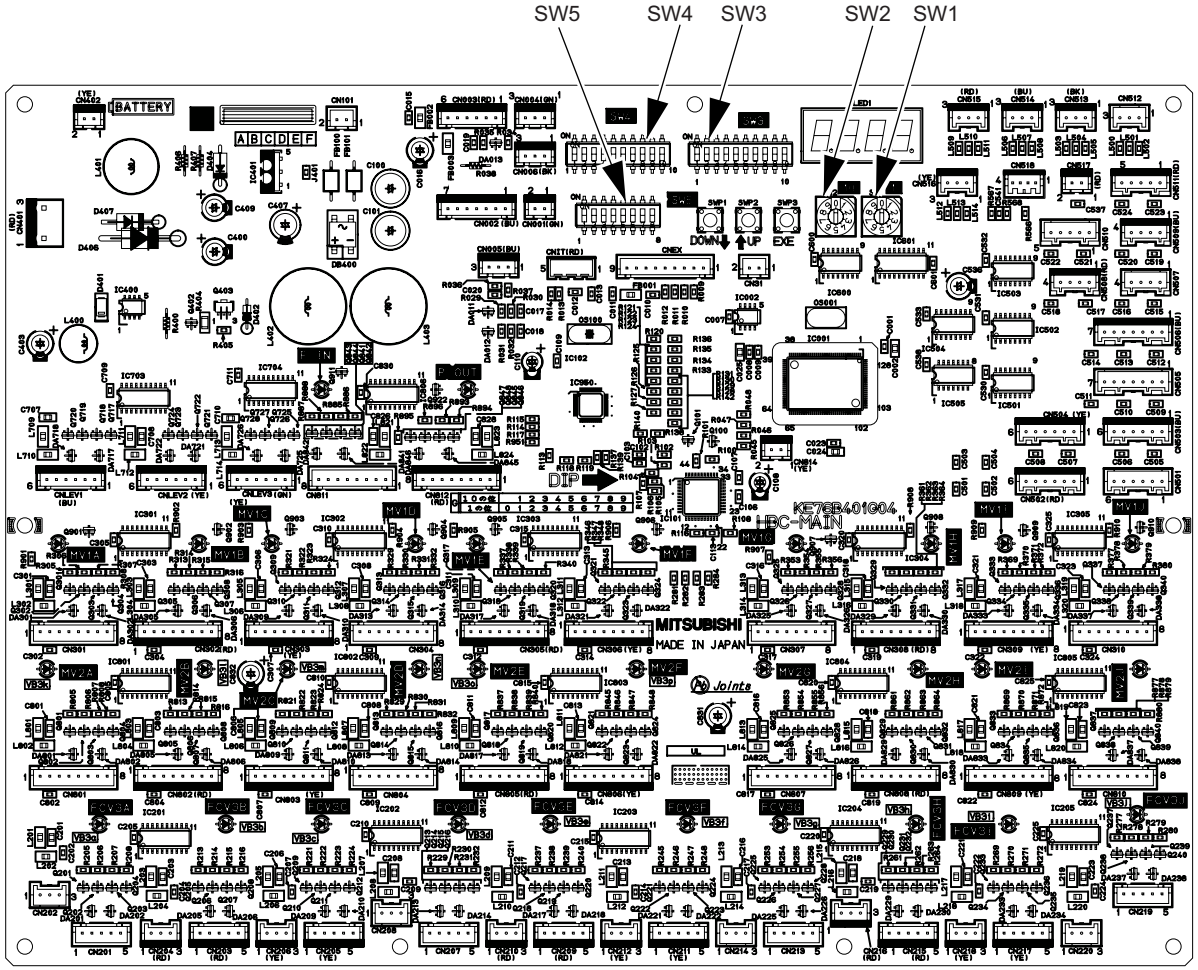
[3] Control Box of the HBC Controller and Sub-HBC

1. CMB-WP108V, WP1016V-GA1, CMB-WP108, WP1016V-GB1

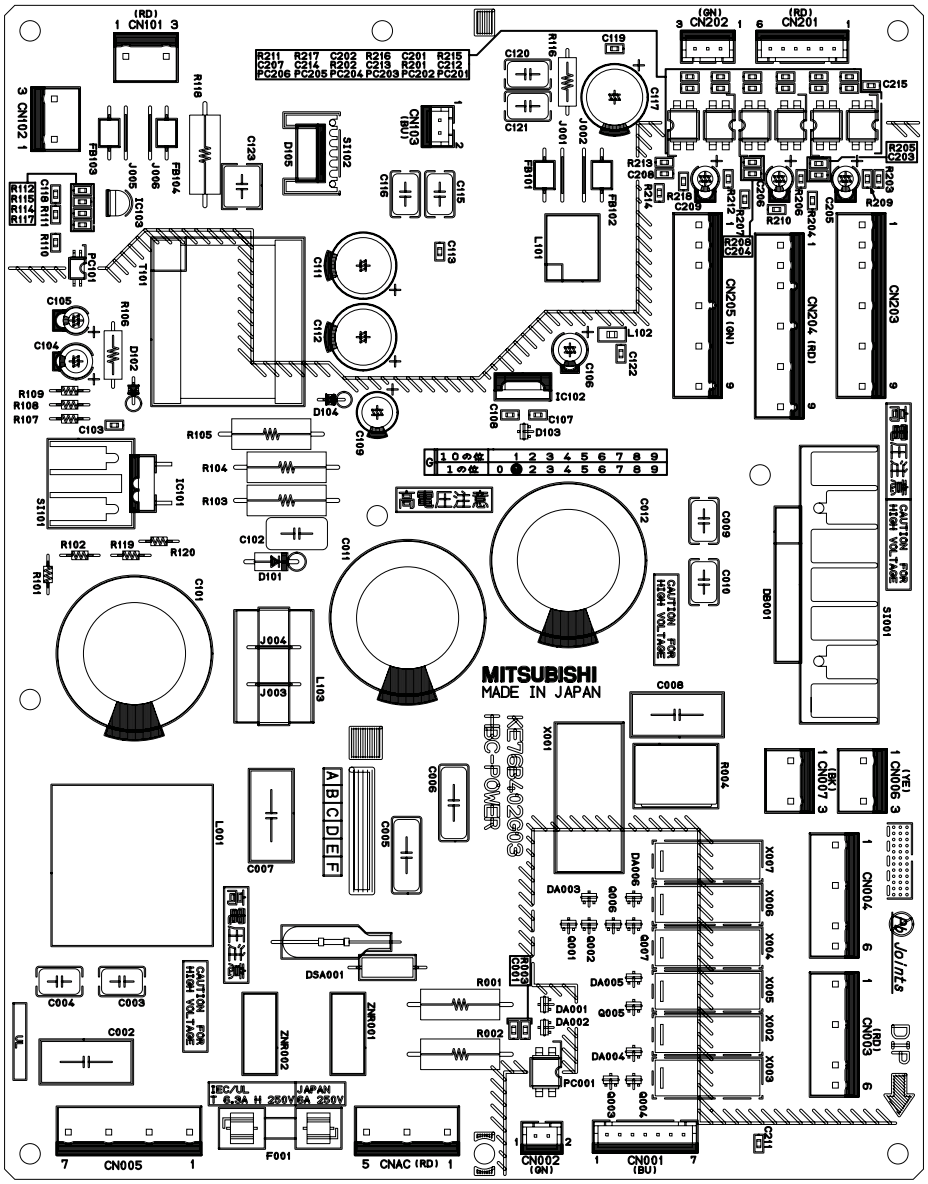


[4] HBC Controller and Sub-HBC Circuit Board

1. HBC controller and Sub-HBC circuit board



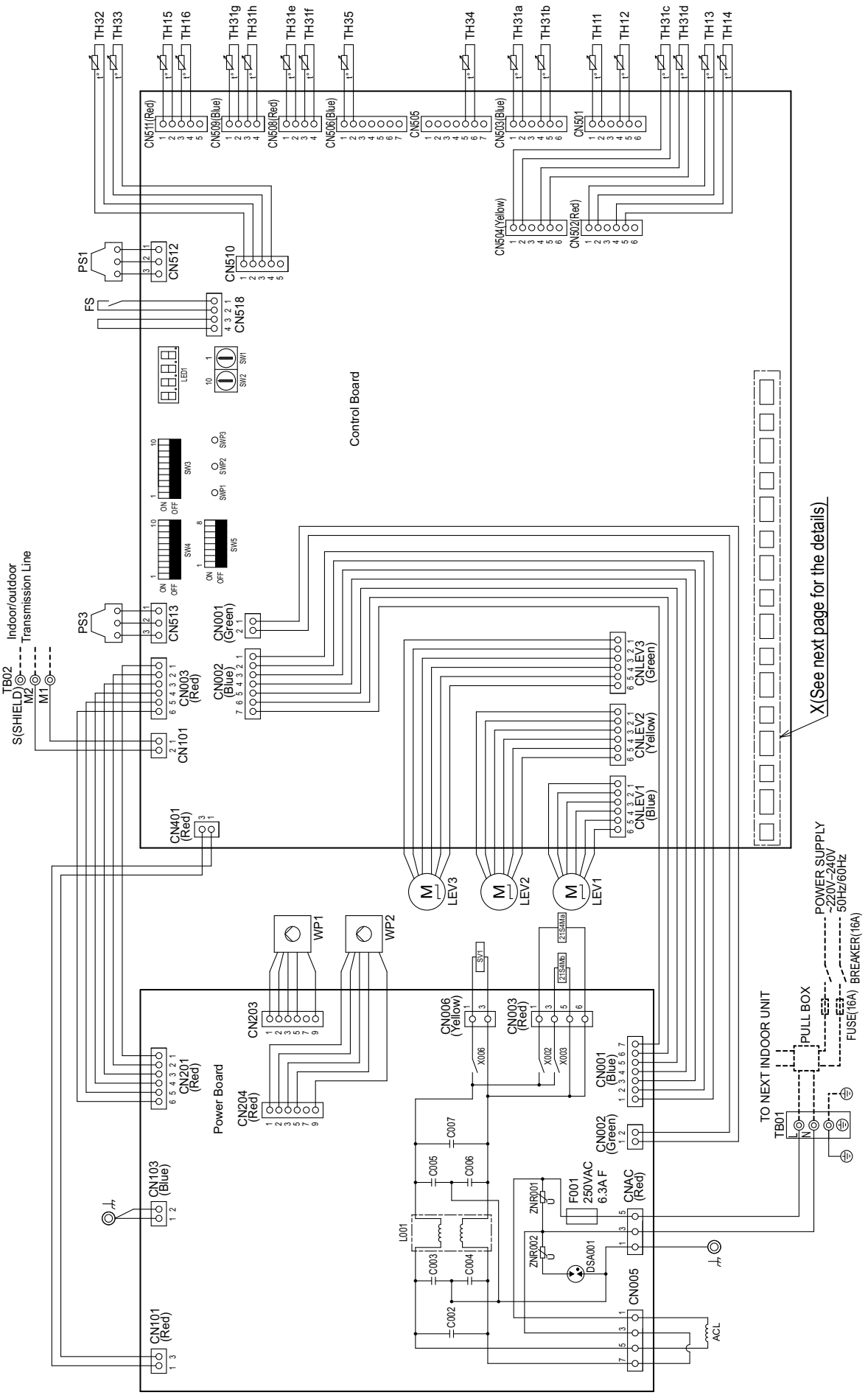
2. Power supply circuit board



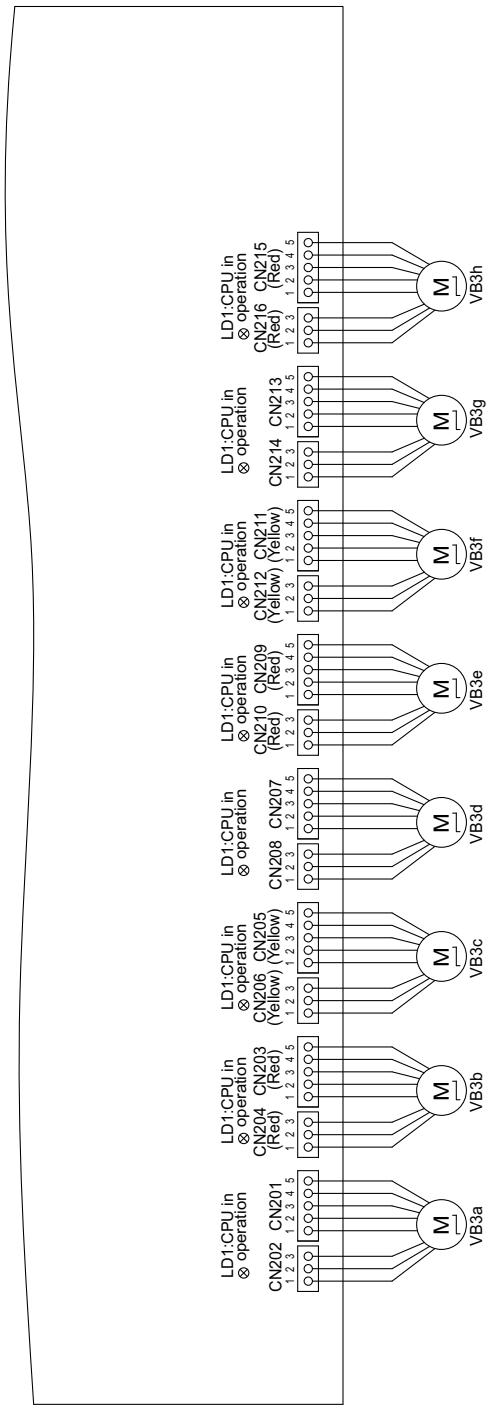
Ⅳ Electrical Wiring Diagram

[1] Electrical Wiring Diagram of the HBC Controller and Sub-HBC

(1) CMB-WP108V-GA1



(2) CMB-WP108V-GA1 (Detail of X section)

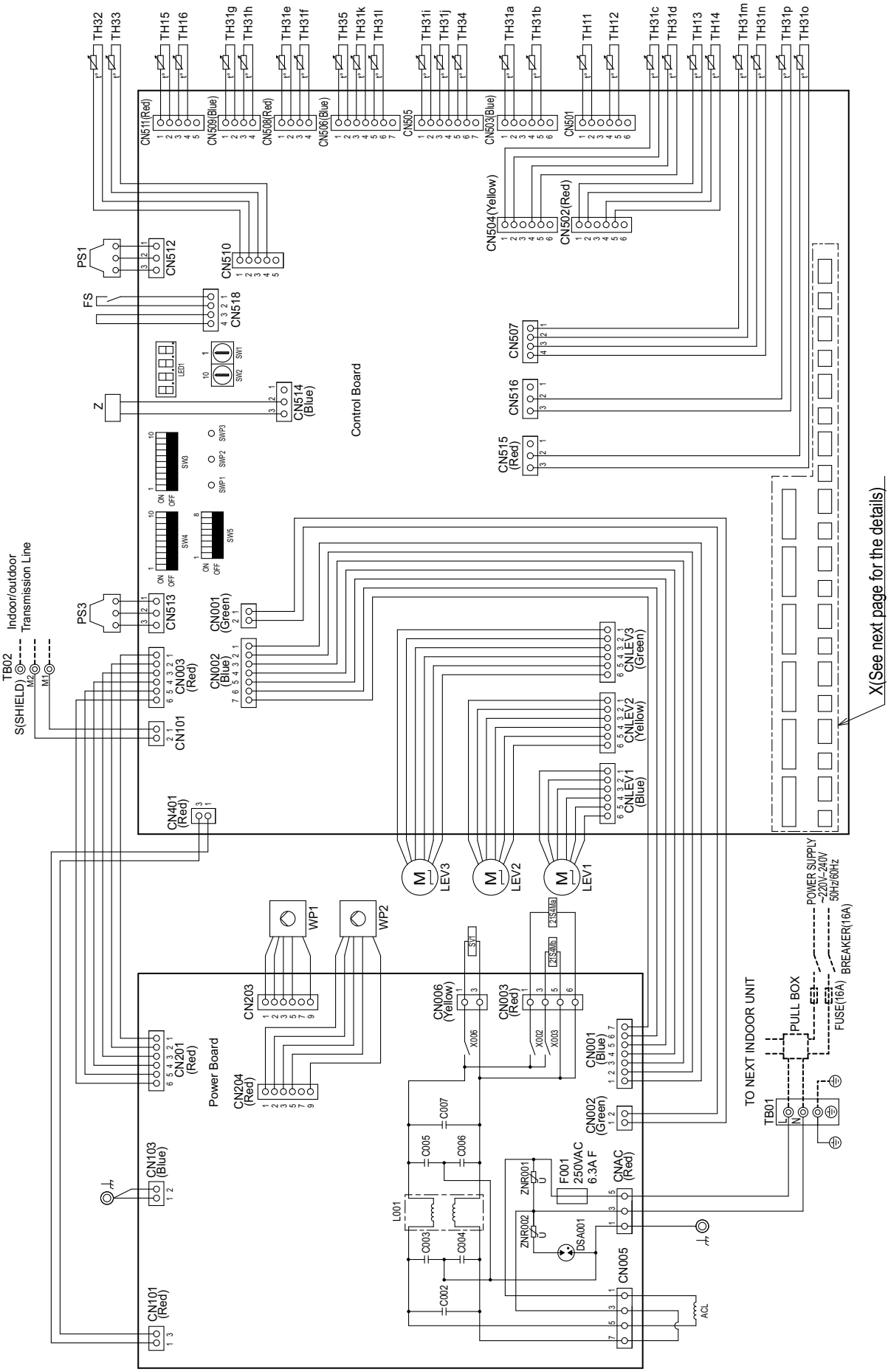


NOTE:1.TB02 is transmission terminal block.
Never connect power line to it.
2.The initial set values of switch on Control Board are as follows.
SW1:0
SW2:0

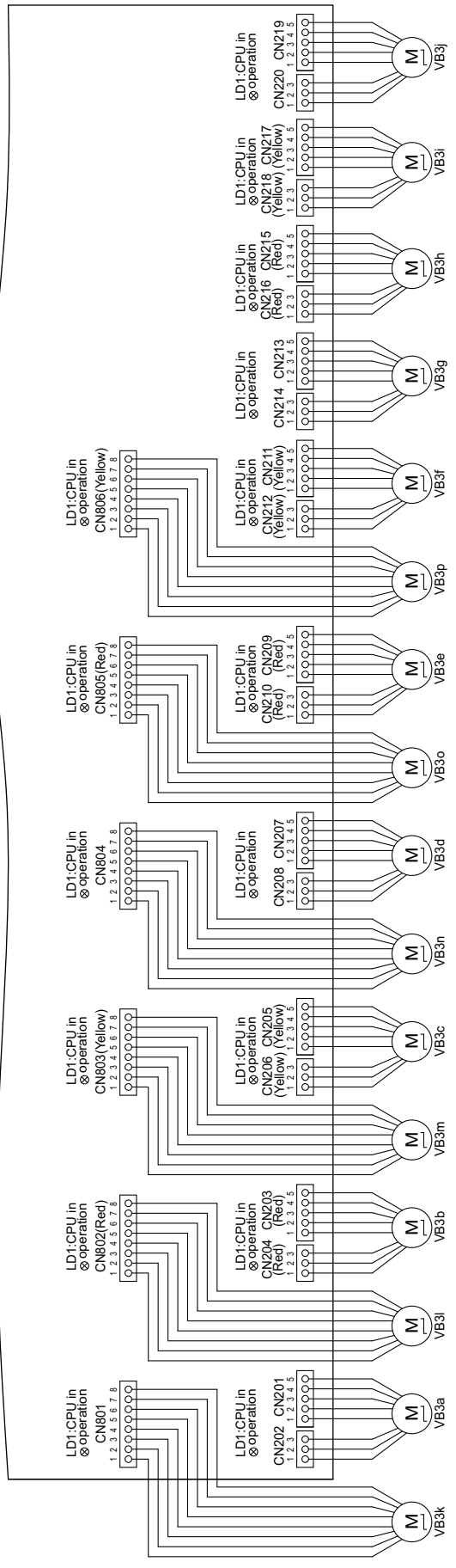
(Symbol explanation)

Symbol	Name	Symbol	Name
ACL	AC reactor	SV1	Solenoid valve
TH11~16,TH32~35, TH31a~h	Thermister sensor	F001	Fuse AC250V 6.3A F
		21S4Ma,21S4Mb	4 way valve
LEV1~3	Expansion valve	WP1,WP2	Pump
PS1,PS3	Pressure sensor	VB3a~h	Valve block
TB01	Terminal block (for power source)	FS	Float switch
TB02	Terminal block (for Transmission)		

(3) CMB-WP1016V-GA1



(4) CMB-WP1016V-GA1 (Detail of X section)

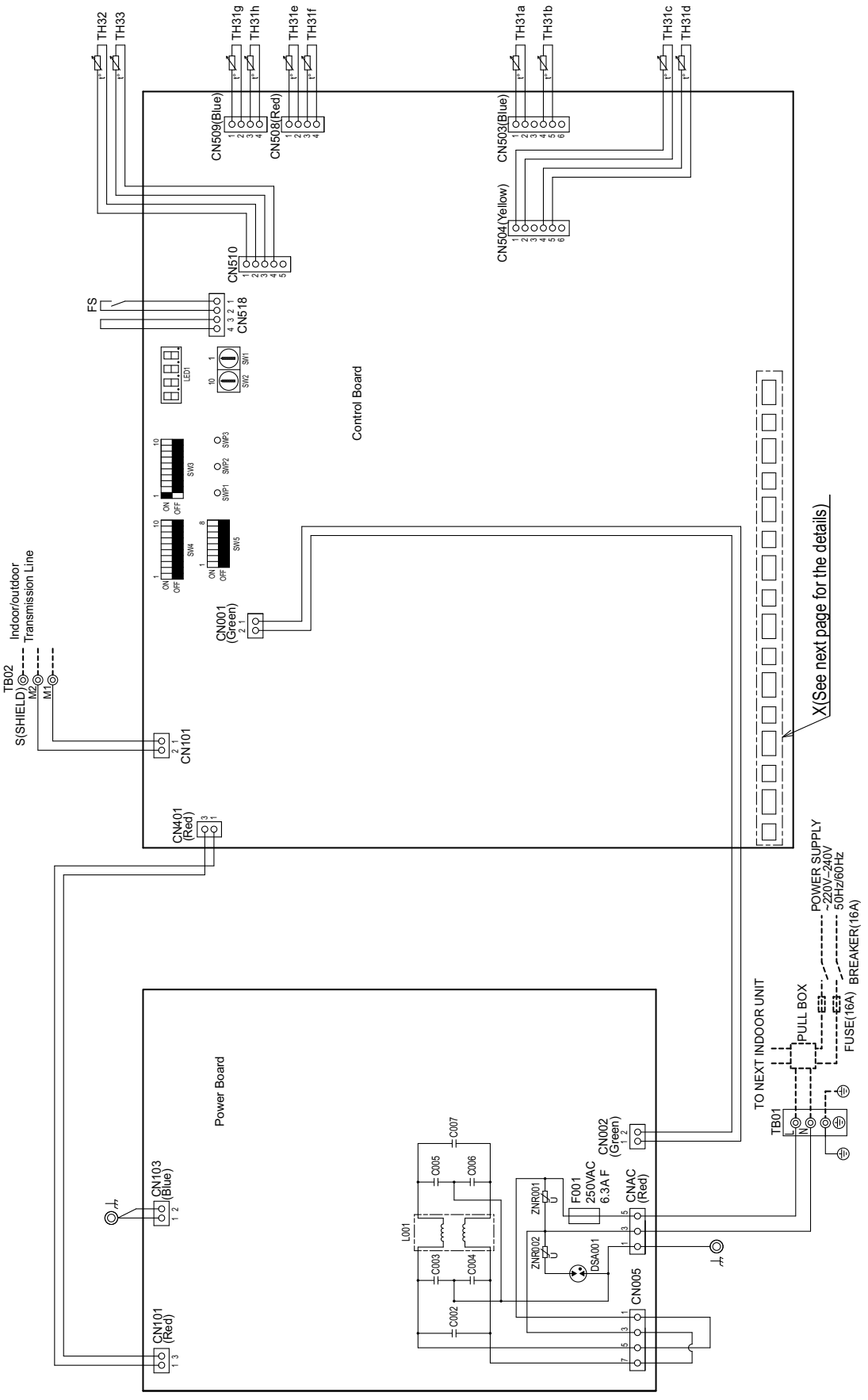


NOTE:1.TB02 is transmission terminal block.
Never connect power line to it.
2.The initial set values of switch on
Control Board are as follows.
SW1:0
SW2:0

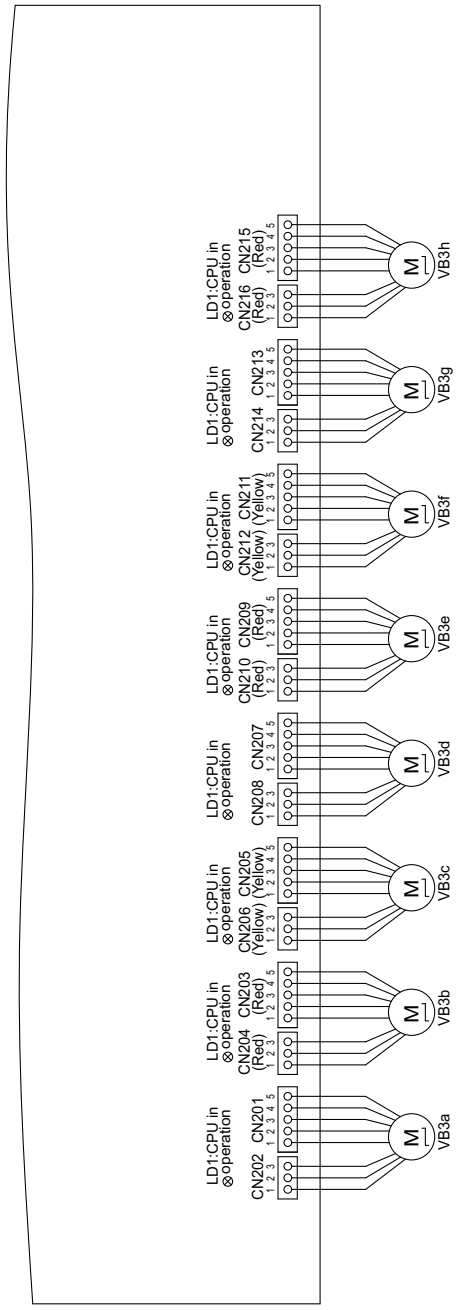
(Symbol explanation)

Symbol	Name	Symbol	Name
ACL	AC reactor	SV1	Solenoid valve
TH11~16,TH32~35, TH31a~p	Thermister sensor	F001	Fuse AC250V 6.3A F
		21S4Ma,21S4Mb	4 way valve
LEV1~3	Expansion valve	WP1,WP2	Pump
PS1,PS3	Pressure sensor	VB3a~p	Valve block
TB01	Terminal block (for power source)	FS	Float switch
		Z	Function setting connector
TB02	Terminal block (for Transmission)		

(5) CMB-WP108V-GB1



(6) CMB-WP108V-GB1 (Detail of X section)

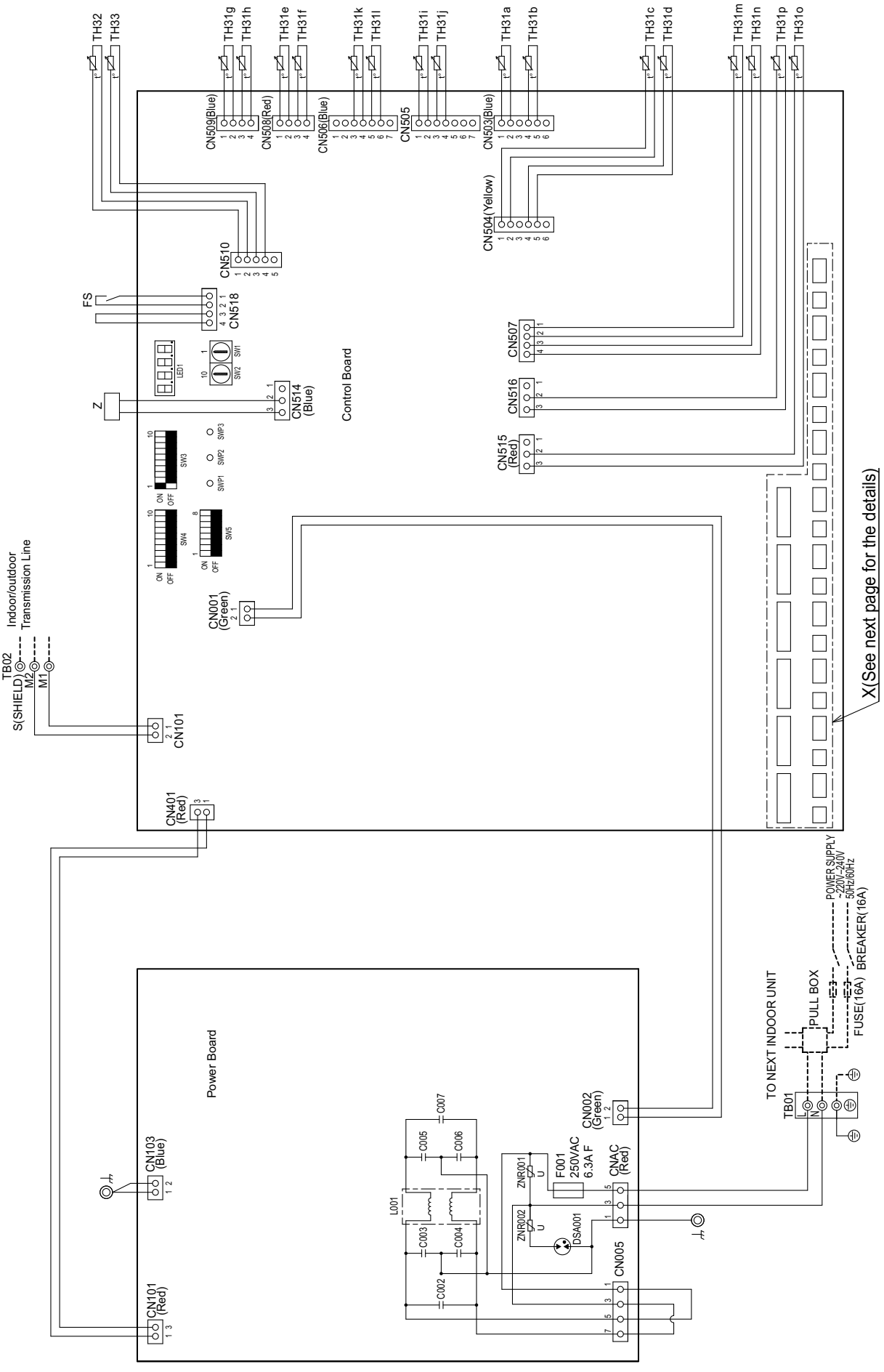


NOTE:1.TB02 is transmission terminal block.
Never connect power line to it.
2.The initial set values of switch on
Control Board are as follows.
SW1:0
SW2:0

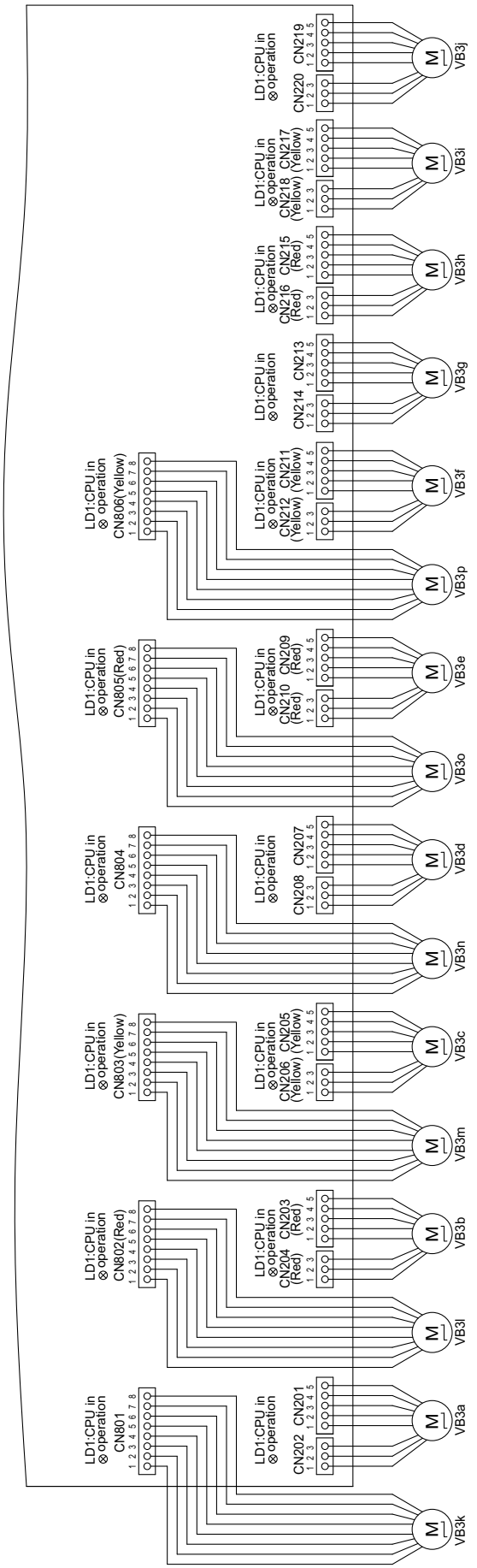
(Symbol explanation)

Symbol	Name
TH31a~h,TH32,TH33	Thermister sensor
VB3a~h	Valve block
FS	Float switch
TB01	Terminal block (for power source)
TB02	Terminal block (for Transmission)
F001	Fuse AC250V 6.3A F

(7) CMB-WP1016V-GB1



(8) CMB-WP1016V-GB1 (Detail of X section)

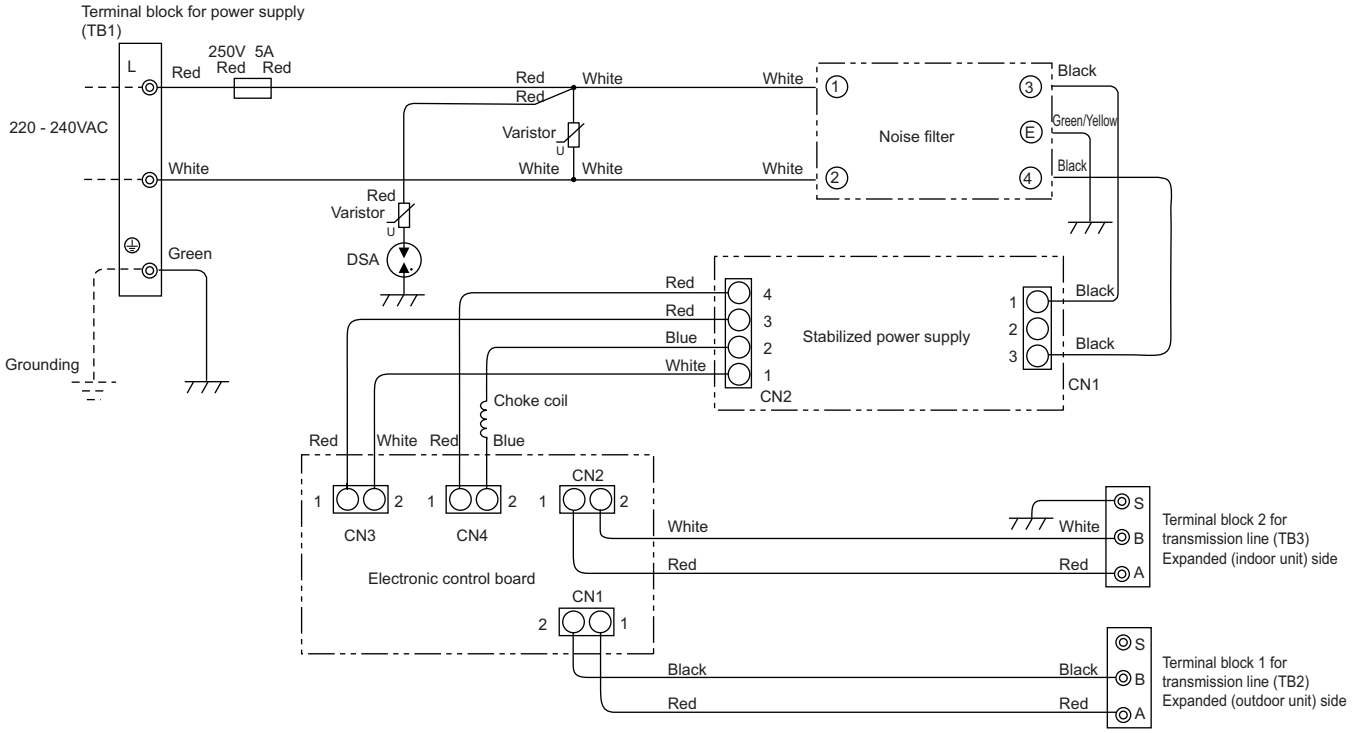


NOTE:1.TB02 is transmission terminal block.
Never connect power line to it.
2.The initial set values of switch on Control Board are as follows.
SW1:0
SW2:0

(Symbol explanation)

Symbol	Name
TH31a~p,TH32,TH33	Thermister sensor
VB3a~p	Valve block
FS	Float switch
Z	Function setting connector
TB01	Terminal block (for power source)
TB02	Terminal block (for Transmission)
F001	Fuse AC250V 6.3A F

[2] Electrical Wiring Diagram of Transmission Booster

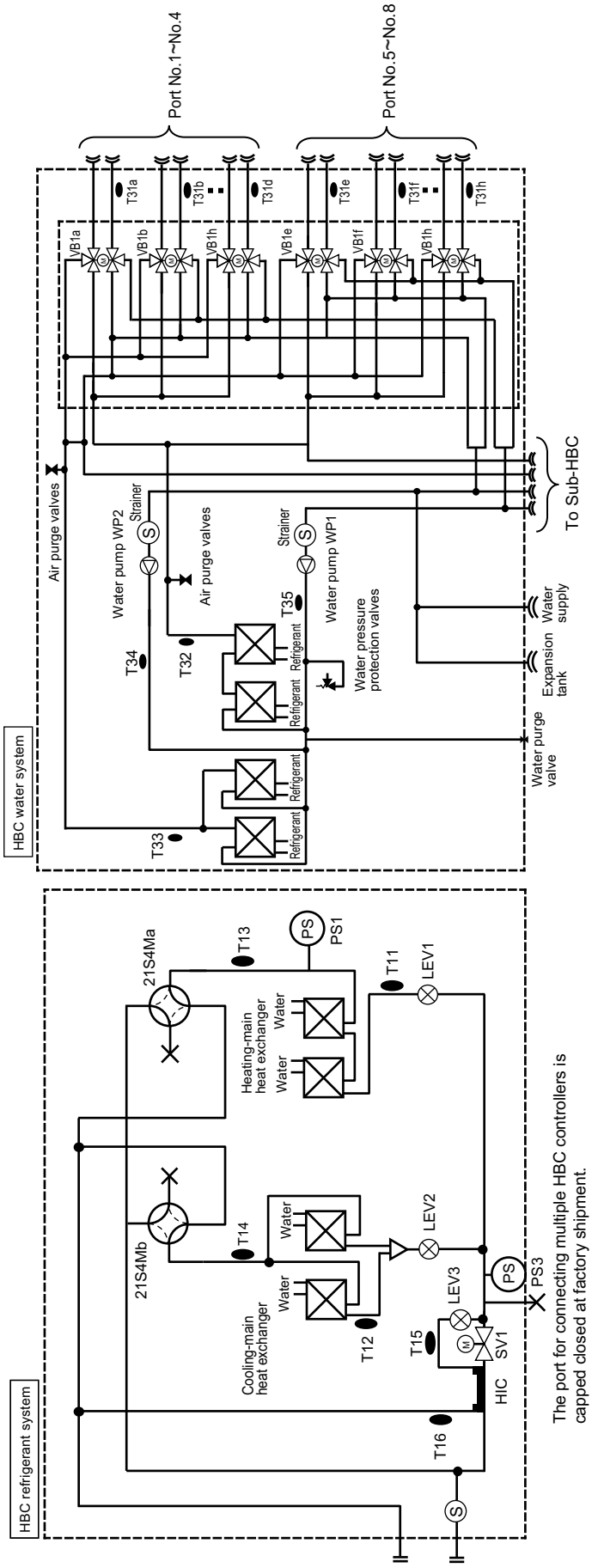


Ⅴ Refrigerant Circuit

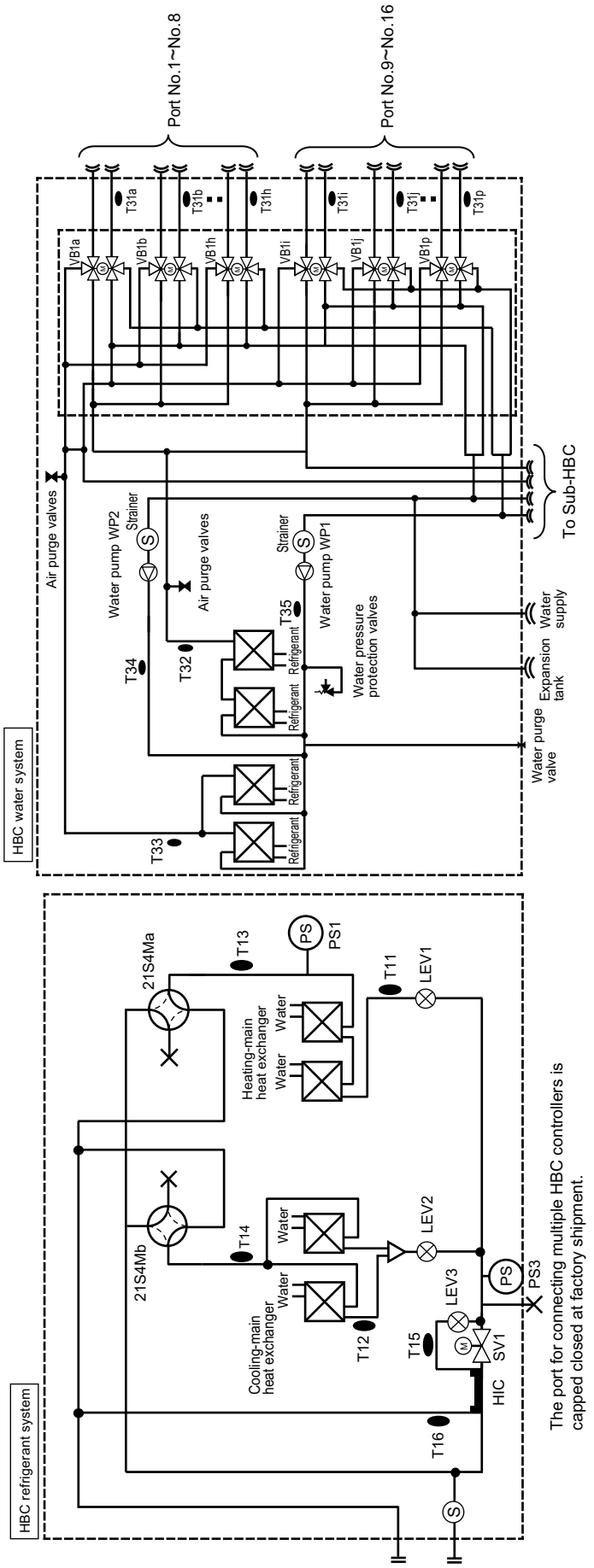
[1] Refrigerant Circuit Diagram

1. HBC controller

(1) CMB-WP108V-GA1

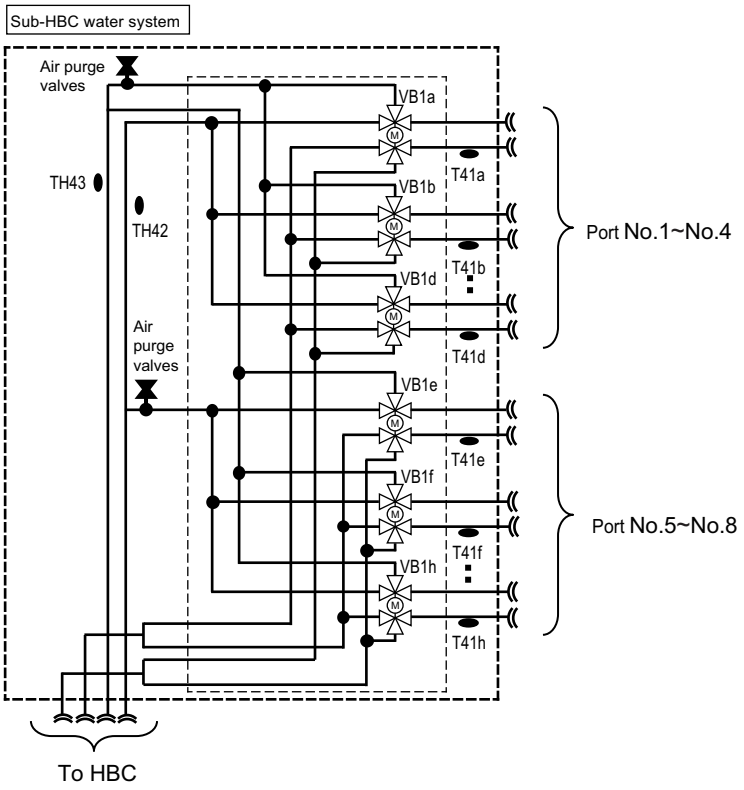


(2) CMB-WP1016V-GA1

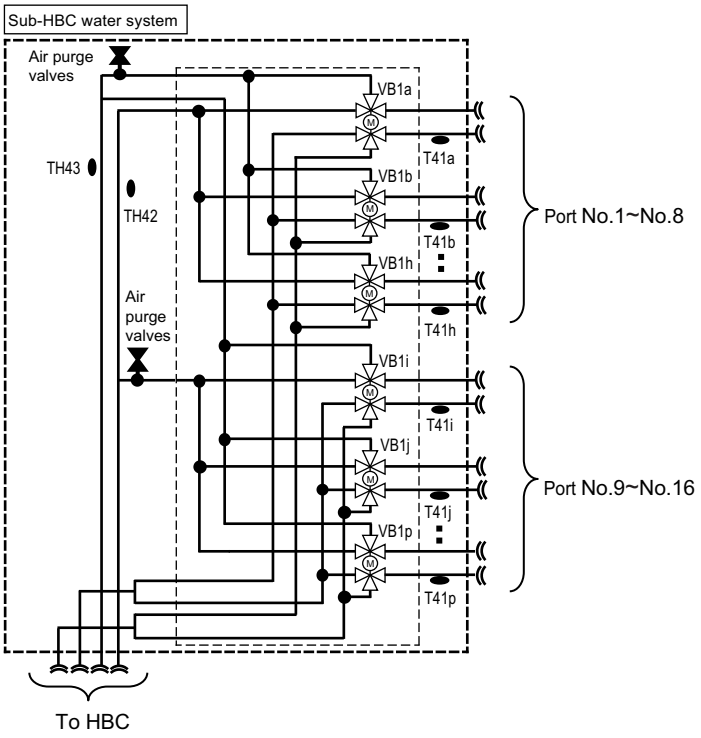


2. Sub-HBC

(1) CMB-WP108V-GB1

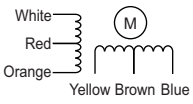
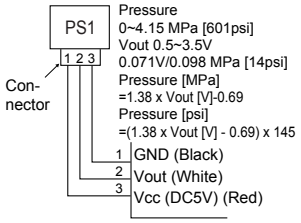


(2) CMB-WP1016V-GB1



[2] Principal Parts and Functions

1. HBC controller

Part name	Symbols	Notes	Usage	Specifications	Check method
Solenoid valve	SVM1	Refrigerant side	Opens during the cooling mode and defrost cycle	AC220-240V Open when energized/ closed when de-energized	Continuity check with a tester
4-way valve	21S4Ma,b	Refrigerant side	Switches between heating and cooling	AC220-240V Open when energized/ closed when de-energized	Continuity check with a tester
LEV	LEV1	Refrigerant side	Supplies refrigerant to HEX1a and HEX1b	DC12V Opening of a valve driven by a stepping motor 0~3000 pulses	Refer to the section "Continuity Test with aTester". Continuity between white, red, and orange. Continuity between yellow, brown, and blue. 
	LEV2	Refrigerant side	Supplies refrigerant to HEX2a and HEX2b		
	LEV3	Refrigerant side	Subcool control		
Thermistor	TH11,12, T13,14	Refrigerant side	Compressor frequency control LEV opening adjustment	R_0 = 15kΩ $R_{0/80}$ = 3460 $R_t = 15\exp\{3460\ (\frac{1}{273+t} - \frac{1}{273})\}$ 0°C[32°F] : 15kohm 10°C[50°F] :9.7kohm 20°C[68°F] :6.4kohm 25°C[77°F] :5.3kohm 30°C[86°F] :4.3kohm 40°C[104°F] :3.1kohm	
	TH15,16		Bypass superheat amount adjustment		
	TH31a~p	Water side	Indoor unit circulating water control		
	TH32,33		Indoor unit circulating water control		
	TH34,35		Water pump error detection		
	TH36,37		Water pump suction water temperature detection		
Pressure sensor	PS1 (high pressure side)	Refrigerant side	1) Detects high pressure 2) LEV control		
	PS3 (medium pressure side)		1) Detects medium pressure 2) LEV control		
Valve block	VB3a~p*1	Water side	1) Switches the water flow path depending on the operation mode 2) Temperature difference control Controls the water flow to each indoor unit	DC12V Opening of a valve driven by a stepping motor*2	
Pump	PUMP1,2	Water side	Temperature difference control Controls the water flow to each indoor unit	Rated voltage DC268V Specified voltage DC0-6V	
Water pressure protection valve	CPV1	Water side	Trips when the internal pressure in the water circuit rises	Operating pressure: 560 kPa	

*1. The names of port "a" through "p" are corresponding to port 1 through 16.

*2. For the degree of valve opening, "0" or "1600" indicates fully open and "800" indicates fully closed.

2. Sub-HBC

Part name	Symbols	Notes	Usage	Specifications	Check method
Thermistor	TH31a~p[*1], TH32, 33	Water side	Indoor unit circulating water control	Same as the table above	
Valve block	VB3a~p [*1]	Water side	1) Switches the water flow path depending on the operation mode 2) Temperature difference control Controls the water flow to each indoor unit	DC12V Opening of a valve driven by a stepping motor[*2]	

*1. The names of port "a" through "p" are corresponding to port 1 through 16.

*2. For the degree of valve opening, "0" or "1600" indicates fully open and "800" indicates fully closed.

VI Control

[1] Functions and Factory Settings of the Dipswitches

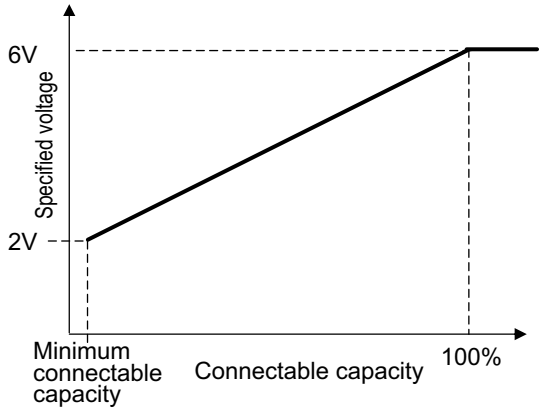
1. Switch functions <HBC controller> (Control board)

Switch		Function	Function according to switch setting		Switch setting timing
			OFF	ON	
SW3	1 - 3	Model setting	R410A	-	Always leave this switch to OFF.
	4	-	-	-	-
	5	SVM1 ON fixed control	Not available	Available	Any time after being energized
	6 - 7	Pressure sensor backup	Error codes are not sent to outdoor units	Error codes are sent to outdoor units.	Any time after being energized
	8	-	-	-	-
	9	-	-	-	-
	10	Heat recovery defrost	Available	Not available	Before being energized
SW4	1	Debris removal run mode	Not available	Available	Any time after being energized
	2	-	-	-	-
	3	Test run air vent mode after strainer processing	Not available	Available	Any time after being energized
	4	Forced termination of a test run	Not available	Available	Any time after being energized
	5	Water tightness check	Not available (When the switch is set from ON to OFF, set the VB3 to the specified opening for stoppage.)	Available Two water pumps ON (output 30%) one minute after setting VB3 to 0 or 1600.	Any time after being energized (only when the control mode is stopped)
	6	Operation function 1 of the valve block	Not available	VB3=800	Any time after being energized
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-
	10	-	-	-	-
SW5	1	Water supply SW	Not available	Available: VB=0 or 1600	Any time after being energized
	2	Air vent SW	Not available	Available	Any time after being energized
	3	-	-	-	-
	4	Compatible with antifreeze-liquid 1	Refer to the Databook.		
	5	Compatible with antifreeze-liquid 2			
	6	-	-	-	-
	7	-	-	-	-
	8	-	-	-	-

[2] Controlling HBC Controller

-1- Water pump control

Depending on the capacity required, temperature difference on the indoor units is controlled so as to be within a certain range. During normal operation, the changes in specified voltage of the water pump corresponding to the capacity of connectable indoor units are shown in the graph below.



Note

The specified voltage changes with the load on the indoor unit side. (A sample is shown in the graph above.)

(1) Periodic specified voltage control

1) Periodic control cycle

Specified voltage control is performed after the following times have elapsed.

- Thirty seconds after either compressor startup or the completion of the defrost cycle

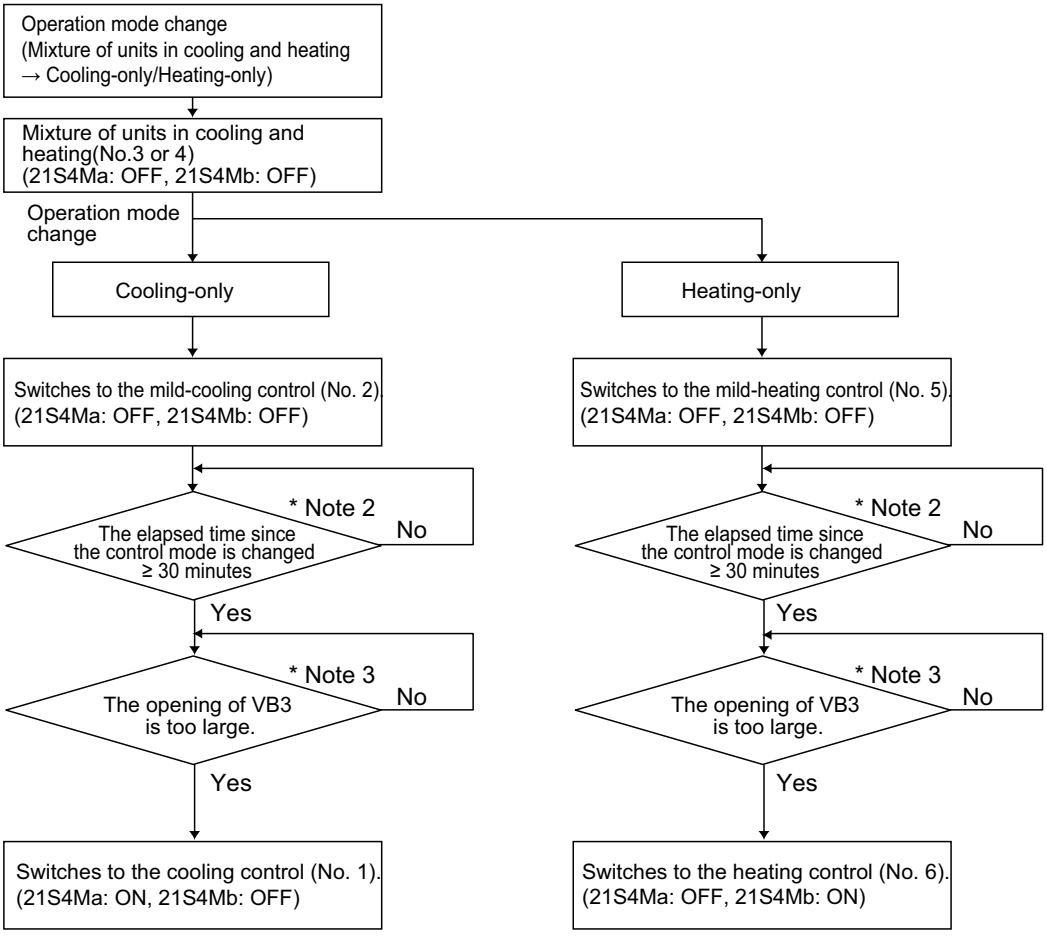
2) The amount of frequency change

The amount of specified voltage change is controlled to approximate the target value based on the target temperature difference.

-2- 4-way valve control

4-way valves (21S4M (a, b)) turn on or off according to the operation mode.
For 21S4Ma, ON indicates switching to the cooling side and OFF indicates switching to the heating side. For 21S4Mb, ON indicates switching to the heating side and OFF indicates switching to the cooling side. For 21S4Ma, ON indicates switching to the cooling side and OFF indicates switching to the heating side. For 21S4Mb, ON indicates switching to the heating side and OFF indicates switching to the cooling side. When energized: ON; When de-energized: OFF

No.	Operation mode	4-way valve control mode	4-way valve	
			21S4Ma	21S4Mb
1	Cooling-only	Cooling	ON	OFF
2		Cooling (Half HEX)	OFF	OFF
3	Cooling-main	Cooling-main	OFF	OFF
4	Heating-main	Heating-main	OFF	OFF
5	Heating-only	Warm heating	OFF	OFF
6		Heating	OFF	ON
7	Defrost	Defrost	The status before defrosting maintained	The status before defrosting maintained
8	Stopped	Stopped	OFF	OFF



Note

1) Select the installation site carefully, as some noise may be produced when the 4-way valve is switched.
   Install the unit in a place where the noise from the unit will not be problem.
   (Install the indoor units and HBC controller at least 5m [16-6/16ft] away from each other when installing in a space with low background noise, e.g., hotel rooms.)
   Install the unit in the ceiling of an area that are not always occupied by people, e.g., hallway, office kitchen, restrooms. (Do not install the unit in the middle of a room.)
2) The elapsed time is used to reduce the switching frequency of the control modes between No. 1 or No. 6 AND No. 3 or No. 4.
3) Capacity control is determined depending on the opening of VB3 that adjusts the water flow rate.

-3- Valve block (VB3) water flow rate adjustment

♦Depending on the capacity required, periodic control is performed every one minute to keep the temperature difference between the heat exchanger outlet pipe temperature and indoor unit port pipe temperature within 4.0ºC for cooling and 4.5ºC for heating, and the opening is controlled in the range between 85 and 700 or 900 and 1600 pulses.

For the degree of valve opening, C800 or H800 indicate fully open and 0 indicates fully closed.

-4- Valve block (VB3) water flow path switching control

♦The following table shows the control pattern of the 3-way valve in different operation modes to switch the water flow.

(1) Cooling-only Thermo-ON, Cooling-only Thermo-OFF, Cooling-only test run, Heating-only Thermo ON, and Heating-only Thermo OFF

Outdoor unit operation mode	Connected indoor unit operation mode	VB3 command value for opening
Cooling-only Thermo-ON Heating-only Thermo ON	Stop	1
	Fan	1
	Thermo-ON	2 or 3
	Thermo-OFF	1
Cooling-only Thermo-OFF Heating-only Thermo OFF	Stop	1
	Fan	1
	Thermo-OFF	1
Cooling-only test run	Stop	1
	Fan	1
	Thermo-ON	2 or 3
	Thermo-OFF	1

(2) Heating-main Thermo-ON, Heating-main Thermo-OFF, Cooling-main Thermo-ON, and Cooling-main Thermo-OFF

Outdoor unit operation mode	Connected indoor unit operation mode	VB3 command value for opening
Heating-main Thermo-ON Cooling-main Thermo-ON	Stop	1
	Fan	1
	Cooling Thermo-ON	2
	Cooling Thermo-OFF	1
	Heating Thermo-ON	3
	Heating Thermo-OFF	1
Heating-main Thermo-OFF Cooling-main Thermo-OFF	Stop	1
	Fan	1
	Cooling Thermo-OFF	1
	Heating Thermo-OFF	1

<Designated degree of valve opening>

- 1: 800 pulse
- 2: 85~700 pulses
- 3: 900~1600 pulses

-5- Bypass Control

Solenoid valves have two types: (SVM1) that bypass the high- and low- pressure sides; LEV (LEV3). They perform the following functions.

(1) Bypass solenoid valve (SVM1) (ON: open)

Operation mode	SVM1	
	ON	OFF
Cooling-only Thermo-ON	Always ON	
Cooling-main Thermo-ON	Always OFF	
Heating-only Thermo-ON	Always OFF	
Heating-main Thermo-ON	Always OFF	
Defrost	Always ON during heat recovery defrost	OFF except to perform heat recovery defrost
Stop	Always OFF	
Cooling-only Thermo-OFF	Always ON	
Thermo-OFF (Heating-only, Mixture of units in cooling and heating)	Always OFF	
Cooling-only test run	Always ON	
Test run for stop	Always ON	

-6- Plate heat exchanger control

(1) Cooling-only Thermo-ON and Cooling-only test run

- When three minutes have passed after the LEV operates with initial opening, the LEV opening is adjusted every 1 minute to keep the amount of superheat before and after the plate heat exchanger constant.

(2) Heating-only Thermo-ON

- When three minutes have passed after the LEV operates with initial opening, the LEV opening is adjusted every 1 minute to keep the amount of subcool before and after the plate heat exchanger constant.

(3) Cooling-main/Heating-main Thermo-ON and Cooling-main/Heating-main refrigerant recovery

1) Periodic control for LEV1

   The LEV opening is adjusted the same way as described in (2) Heating-only Thermo-ON and Heating-only refrigerant recovery.

2) Periodic control for LEV2

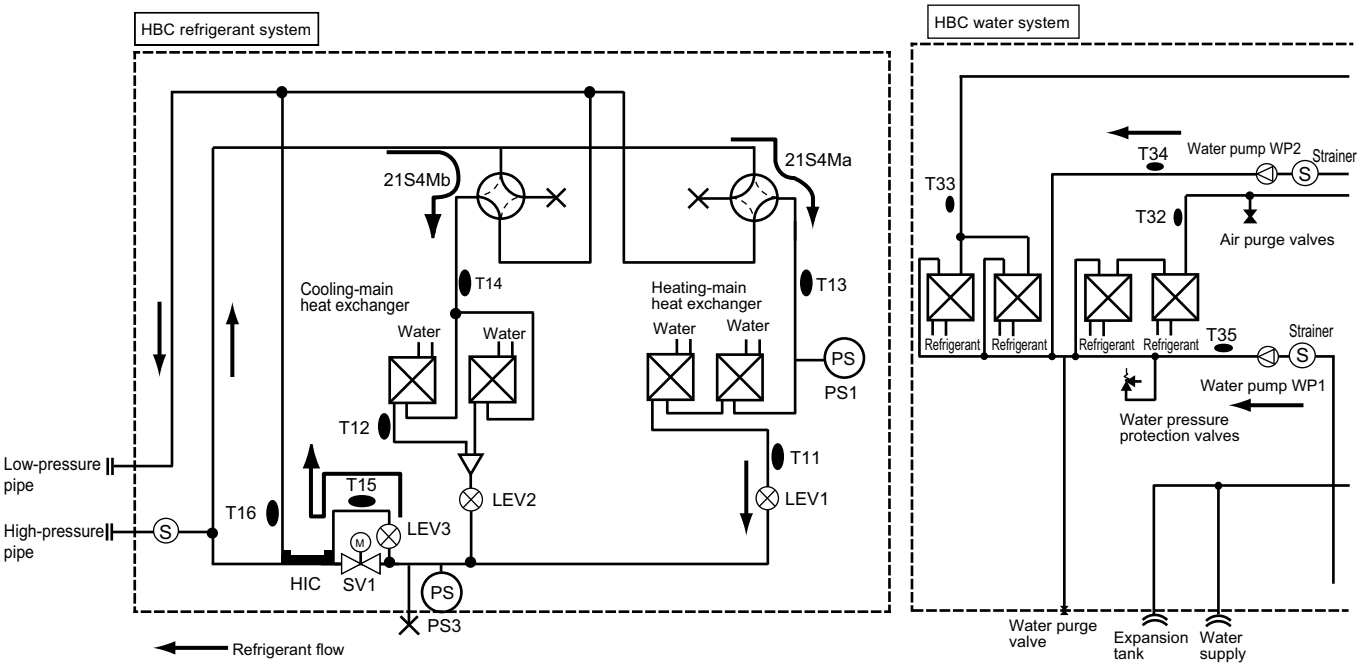
   To be fully open (3000)

-7- Defrost Operation Control

(1) Defrost cycle type

- The defrost cycle has following two types: Bypass defrost that is the same method as that used in a CITY MULTI series system and heat recovery defrost (default) that the heat is collected from the water circuit and the defrost cycle ends early.

The following figure shows the refrigerant flow for the bypass defrost. In the bypass defrost method, LEV1 and 2 are closed and the heat is not exchanged between the refrigerant and water. In the heat recovery defrost method, the defrost cycle ends early because the heat is caught from the water.
The basic defrost method is the heat recovery defrost with the dip switch 3-10 on the HBC turned OFF (default). The bypass defrost may be performed depending on the water temperature. Setting the dip switch 3-10 to ON performs the bypass defrost.



(2) 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 90 minutes or more if the defrost prohibit timer is set to 90.		250 minutes or more
Pipe temperature (TH6)	The pipe temperature has stayed below the temperatures in the table below (Note1) for three minutes.	The pipe temperature (TH6) has stayed at or below the value obtained from the formula "Outside temperature (TH7) - 10ºC [18ºF]" for three minutes. or the 63LS reading has stayed below the value obtained from the formula "1.5 + 0.02 x (20+TH7)" for three minutes.	The pipe temperature has stayed below the temperatures in the table below (Note1) for three minutes

Note

1) Outdoor unit pipe temperature (TH6)

SW3-3 OFF	-8ºC
SW3-3 ON	-5ºC

- 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 SW2-7 to ON.
- Even if the defrost-prohibit timer is set to 90 minutes (or 150 minutes for "Condition 3" to be met), the actual defrost-prohibit time for the next defrost cycle is 50 minutes if the last defrost cycle took 12 minutes.

(3) Defrost cycle

		Bypass defrost		Heat recovery defrost	
Outdoor Unit	Dip switch setting	SW3-10 ON		SW3-10 OFF	
	Operation mode	Heating-only	Heating-main	Heating-only	Heating-main
	Outdoor unit frequency	103Hz			
	Outdoor unit fan	Stop			
	SV1a	ON (open)			
	SV5b	ON (open)			
	21S4a, 21S4b	OFF			
	SV9	OFF (closed)			
HBC controller (other than 3-way valve and water flow rate control valve)	LEV1	41		3000	
	LEV2	41		3000	41
	LEV3	3000			
	SVM1	ON		OFF	
	21S4Ma	OFF			
	21S4Mb	ON		ON	OFF
	PUMP1	Scheduled control		Command value 100%	
	PUMP2	Scheduled control		Command value 100%	Scheduled control

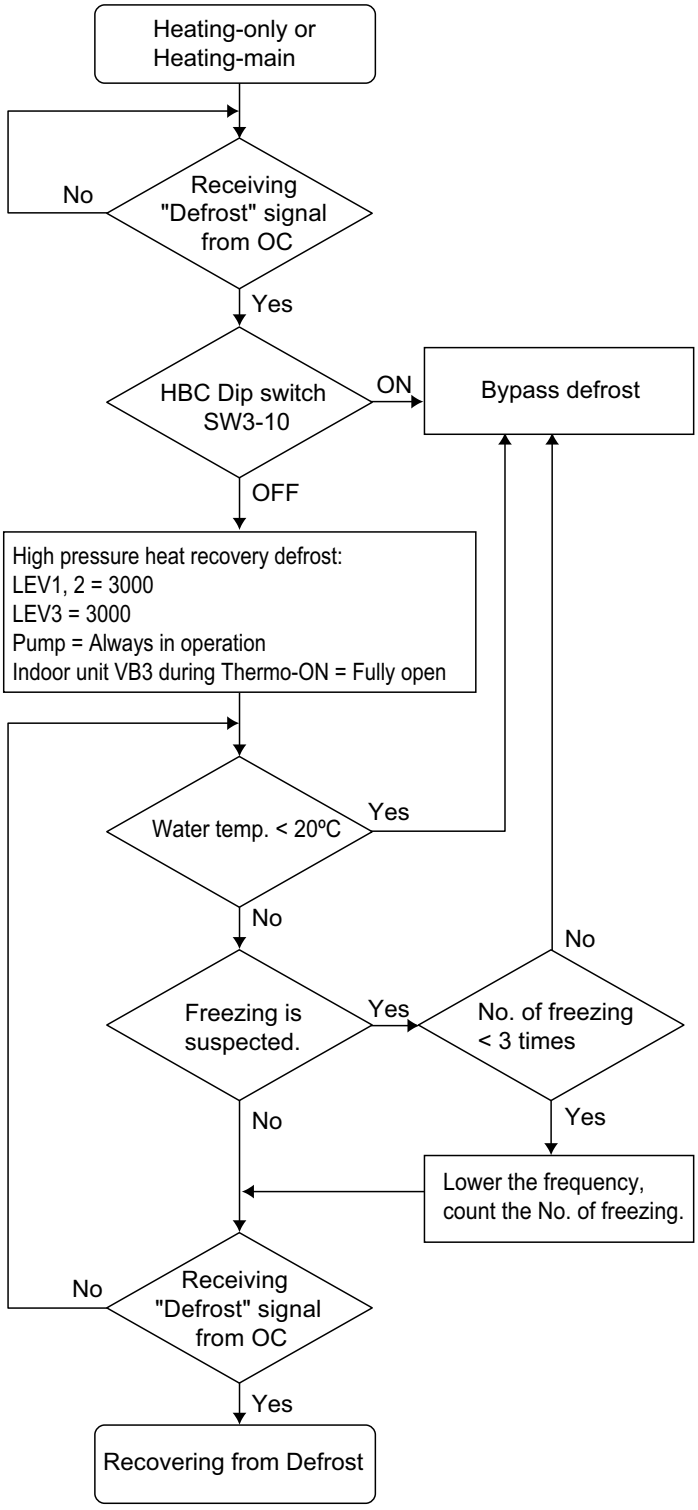
HBC controller (3-way valve and water flow rate control valve)	Dip switch setting	SW3-10 ON			
	Indoor unit mode	Heating Thermo-ON	Heating Thermo-OFF	Cooling Thermo-ON	Cooling Thermo-OFF
	VB3a~p	Scheduled control	Scheduled control	Scheduled control	C800 or H800

HBC controller (3-way valve and water flow rate control valve)	Dip switch setting	SW3-10 OFF			
	Indoor unit mode	Heating Thermo-ON	Heating Thermo-OFF	Cooling Thermo-ON	Cooling Thermo-OFF
	VB3a~p	C800 or H800	C800 or H800	Scheduled control	C800 or H800

*The indoor unit fan will stop during defrost.

(4) Recovering from Defrost

♦The setting of the dip switch 3-10 determines the defrost method (bypass defrost or heat recovery defrost).
As shown in the following flow chart, the bypass defrost may be performed during the heat recovery defrost depending on the operation status.



-8- Refrigerant Recovery Control

The refrigerant recovery control function controls the refrigerant flow at the HBC controller during heating operation to keep the refrigerant from collecting inside the HBC controller.
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 30 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.
   Outdoor unit 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)

The opening of LEV1 and LEV2 on the HBC is increased.

-9- Backup control

The following backup control is started on the HBC as necessary.

(1) Backup mode for plate heat exchanger protection

- The following control is performed depending on the outlet pipe temperature of the plate heat exchanger for freeze-up protection.

[Cooling-main/Heating-main operation]

1) Outdoor unit

Cooling-main operation: Continued; Heating-main operation: Continued

2) HBC controller

		Control mode	
		Cooling-main/Heating-main	Cooling-only
Outdoor unit	Operation mode	Continues the current operation	Cooling-only Thermo-OFF
HBC controller	21S4Ma	Heating side: open (de-energized)	Cooling side: open (energized)
	21S4Mb	Cooling side: open (de-energized)	Cooling side: open (de-energized)
	LEV1	Maintains the opening that was used in the previous operation mode	Opening during Cooling-only Thermo-OFF
	LEV2	41 pulses: fully closed	Opening during Cooling-only Thermo-OFF
	LEV3	3000 pulses: fully open	Opening during Cooling-only Thermo-OFF
	SVM1	Closed	Open
	PUMP1	Continues the heating operation	Continues the cooling-only operation
	PUMP2	Continues the cooling operation	Continues the cooling-only operation
	VB3a~p	The opening depending on the indoor unit operation mode	The opening depending on the indoor unit operation mode

(2) Heating water temperature backup mode

- When the heating operation can be continued without receiving heat from the refrigerant due to water temperature rise during heating operation (the outlet pipe temperature of the plate heat exchanger is 50ºC or above), the outdoor unit goes into the Thermo-OFF mode, and the heating operation is performed only by circulating the hot water by the water pump. When the water temperature decreases to a certain level (the outlet temperature of the plate heat exchanger is 45ºC or below), the outdoor unit starts up.

-10- Water pump protection control

When the circuit is clogged or air enters the water circuit, the protection control starts on the HBC controller to protect the water pump and the system is stopped depending on the situation.

(1) When the internal temperature of the water pump increases

- When the detection temperature of the water pump outlet pipe is above a certain level, the water pump is stopped to protect it from the heat.

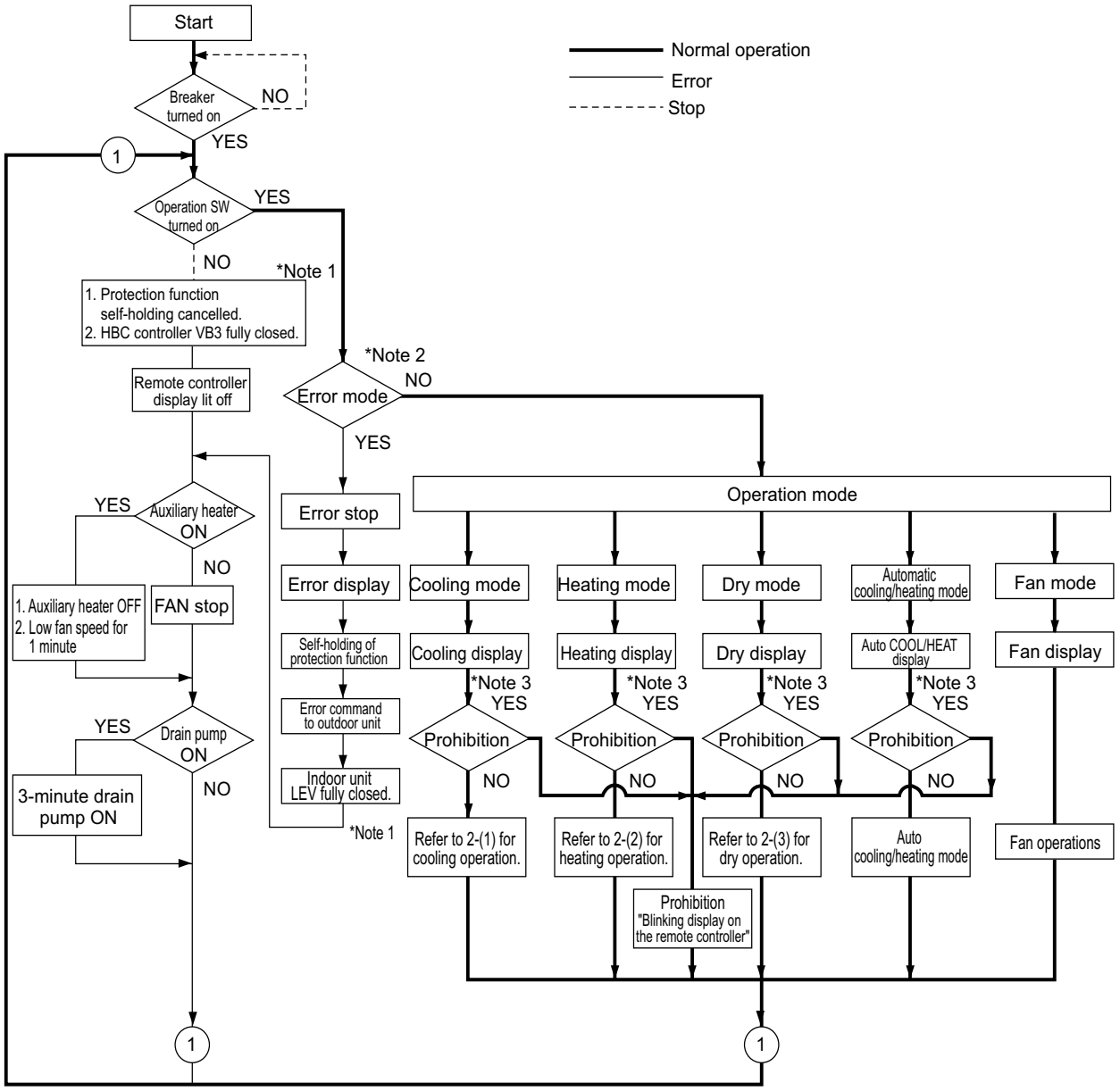
(2) When the revolutions of the water pump increases

- When the revolutions of the water pump is above a certain level (The value changes depending on the specified voltage.), the water pump is stopped to reduce the risk of air infiltration and water leaks.

[3] Operation Flow Chart

1. Mode determination flowchart

(1) Indoor unit (cooling, heating, dry, fan mode)

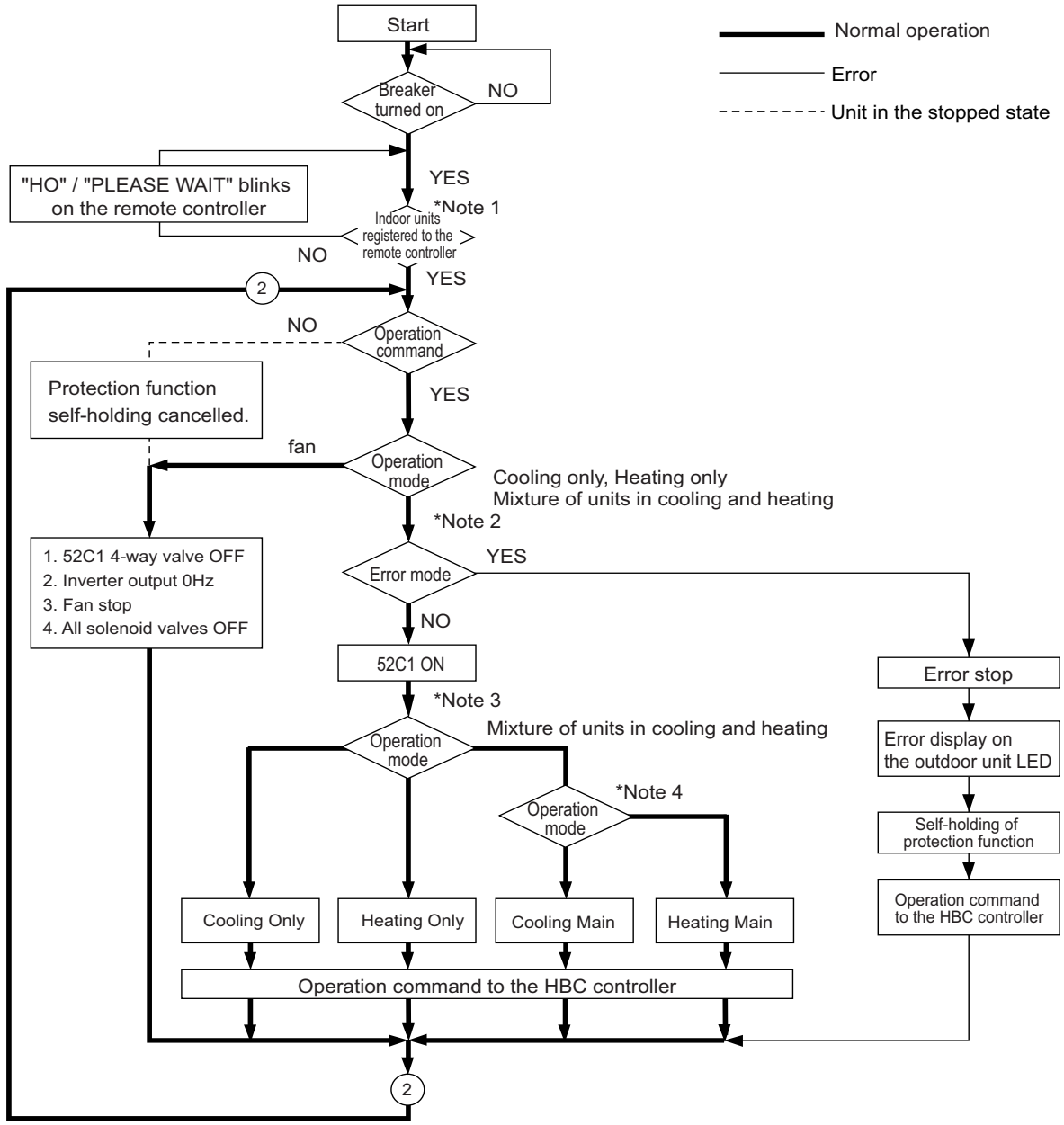


*Note 1. HBC controller VB3 fully closed : Opening 0.

*Note 2. The system may go into the error mode on either the indoor unit side or the HBC controller or outdoor unit side. If some of the indoor units are experiencing a problem, only those indoor units that are experiencing the problem will stop. If the HBC controller or the outdoor unit is experiencing a problem, all the connected units will stop.

*Note 3. If multiple indoor units are connected to a port and there is a discrepancy in the operation mode between the indoor unit and the port, the operation will be prohibited. (Operation mode blinks on the remote controller, the Fan stops, HBC controller VB3 becomes fully closed.)

(2) Outdoor unit (cooling only, heating only, cooling main and heating main modes)



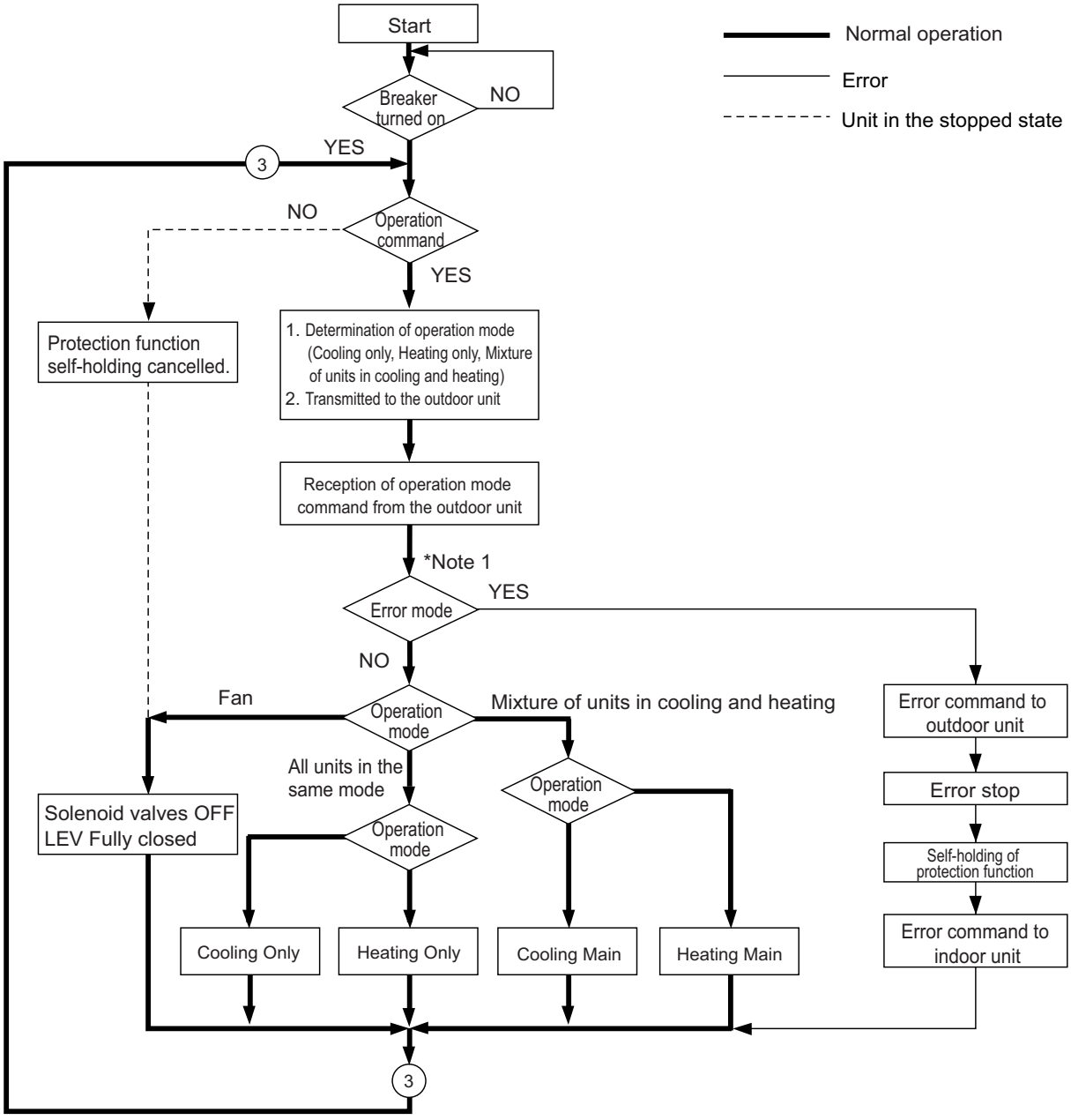
*Note 1. For approximately three minutes after power on, a search for the outdoor unit address, HBC controller address, indoor unit address, and remote controller address, and group information is performed. While this process is performed, "HO" and "PLEASE WAIT" blink on the display. If the indoor units have not been grouped with the remote controller, "HO" and "PLEASE WAIT" will keep blinking on the display, even after three minutes after power on.

*Note 2. The system may go into the error mode on the indoor unit, HBC controller, or the outdoor unit side. The outdoor units will stop only when all the indoor units are experiencing a problem. If at least one of the indoor units is in normal operation, the outdoor unit will continue in operation, displaying an error code on the LED.

*Note 3. The units will follow the operation mode commands from the HBC controller

*Note 4. When the operation mode commands from the HBC controllers are mixed (both cooling and heating), the actual operation mode is determined by the outdoor unit.

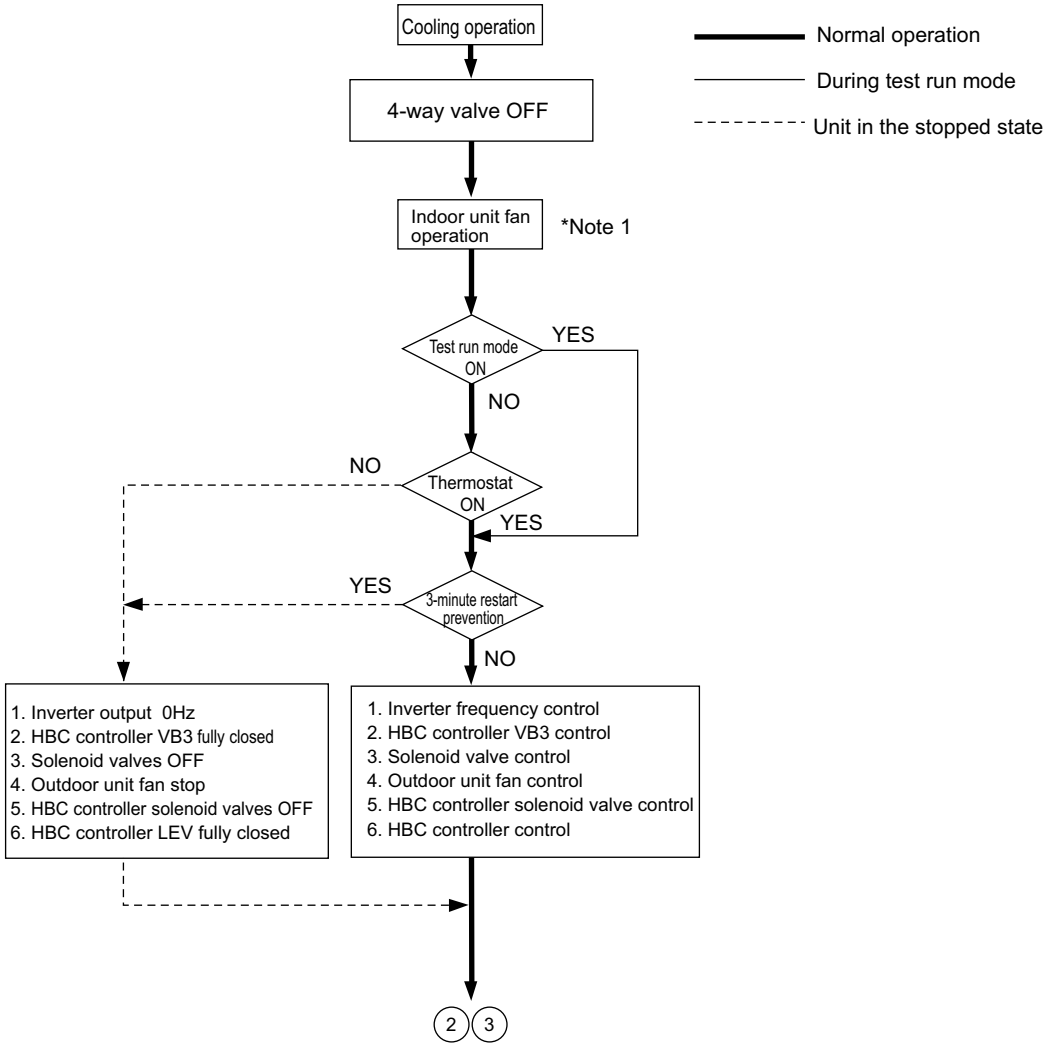
(3) HBC controller (cooling only, heating only, cooling main and heating main modes)



Note 1. The system may go into the error mode on either the indoor unit side or the HBC controller or outdoor unit side. If some of the indoor units are experiencing a problem, only those indoor units that are experiencing the problem will stop. If the HBC controller or the outdoor unit is experiencing a problem, all the connected units will stop.

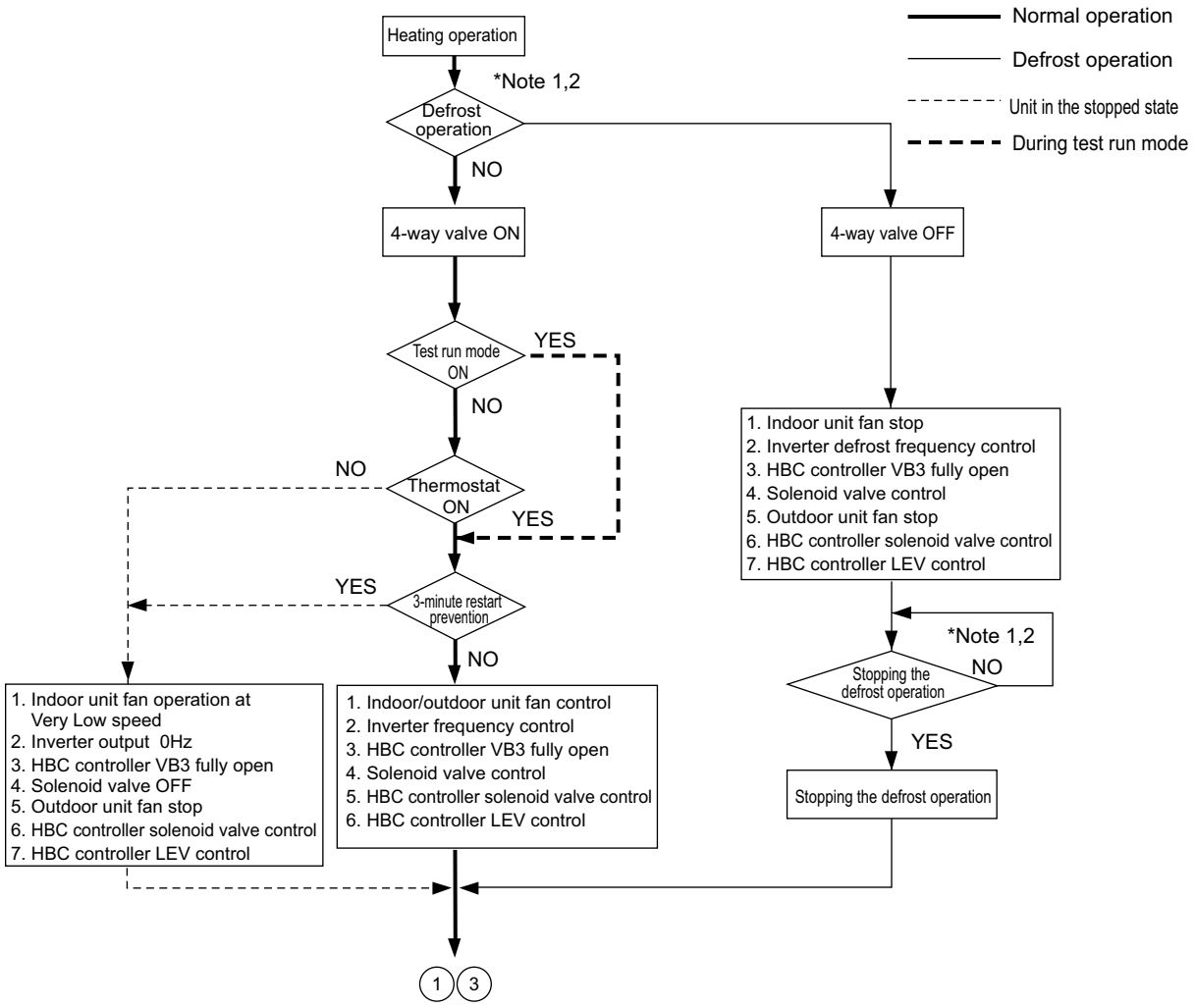
2. Operations in each mode

(1) Cooling operation



*Note 1. The indoor fan operates at the set notch under cooling mode regardless of the ON/OFF state of the thermostat.

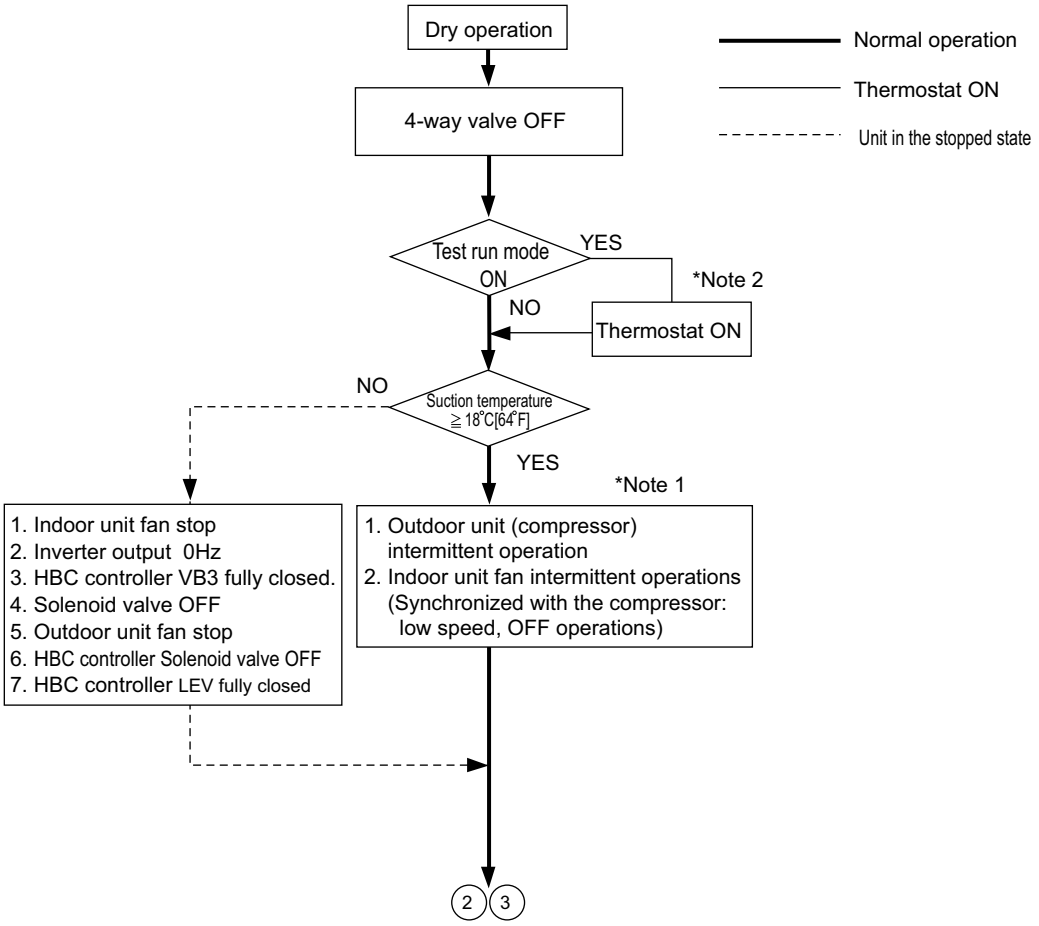
(2) Heating operation



*Note 1. When the outdoor unit goes into the defrost mode, defrost command is sent to the HBC controller and indoor units. Upon reception of the command, the indoor units will go into the defrost mode. When defrosting is completed and upon receiving the signal that indicates the completion of defrosting, indoor units will resume the heating operation.

*Note 2. Defrost end condition: 10 or more minutes must pass after defrost operation.
or Outdoor unit piping temperature : refer to "-7- Defrost operation control" of [2] Controlling HBC Controller (page 74)

(3) Dry operation



*Note 1.When the return air temperature reaches 18ºC [64ºF] or above, the outdoor unit (compressor) and the indoor unit fan will start a simultaneous intermittent operation. The operations of the outdoor unit, HBC controller, outdoor unit LEVs and solenoid valves that are performed when the compressor turns on are the same with the cooling operation.

*Note 2.Thermostat is always kept on during test run mode, and indoor and outdoor unit intermittent operation (ON) time is a little longer than that of normal operation.

VII Test Run Mode

[1] Items to be checked before a Test Run

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

(2) 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 1Mohm, by turning on the main power and powering the belt heater for at least 12 hours, the refrigerant in the compressor will evaporate and the insulation resistance will go up.
- Do not measure the insulation resistance of the terminal block for transmission line for the unit remote controller.

(3) Make sure the valves on both the high-pressure and low-pressure sides are fully open.

Note

Securely tighten the cap.

(4) Check the phase sequence and the voltage of the power supply.

(5) [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.

(6) Turn on the main power to the unit at least 12 hours before test run to power the belt heater.

Note

Insufficient powering time may result in compressor damage.

(7) 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).

[2] Operating Characteristic and Refrigerant Amount

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.

1. Operating characteristic and refrigerant amount

The following table 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 all 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.

[3] Adjusting the Refrigerant Amount

1. Symptoms

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 (overcharged refrigerant) 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.	

2. Amount of refrigerant

(1) To be checked 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 95°C [203°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].)	

3. Amount of refrigerant to be added

The amount of refrigerant that is shown in the table below is factory-charged to the outdoor units.
The amount necessary for extended pipe (field piping) is not included and must be added on site.

Outdoor unit model	Amount of pre-charged refrigerant in the outdoor unit (kg)	Outdoor unit model	Amount of pre-charged refrigerant in the outdoor unit (kg)
P200YLM	9.5	P400YLM	10.3
P250YLM	9.5	P450YLM	11.8
P300YLM	10.3	P500YLM	11.8
P350YLM	10.3		

Outdoor unit model	Amount of pre-charged refrigerant in the outdoor unit (kg)
EP200YLM	6.0
EP250YLM	6.0
EP300YLM	8.0
EP350YLM	8.0
EP400YLM	10.5
EP450YLM	11.8
EP500YLM	11.8

(1) Calculation formula

The amount of refrigerant to be added depends on the size and the length of field piping. (unit in m[ft])

1) When the distance between HBC and outdoor unit is longer than 30.5m:
   Amount of added refrigerant (kg) = $(0.21 \times L_1)+(0.14 \times L_2)+(0.1 \times L_3)+\alpha_1$
2) When the distance between HBC and outdoor unit is 30.5m or shorter:
   Amount of added refrigerant (kg) = $(0.23 \times L_1)+(0.16 \times L_2)+(0.11 \times L_3)+\alpha_1$

L_1 :Length of Φ22.2 [7/8"] high pressure pipe (m)
L_2 :Length of Φ19.05 [3/4"] high pressure pipe (m)
L_3 :Length of Φ15.88 [5/8"] high pressure pip (m)
α_1 :Refer to the table below.

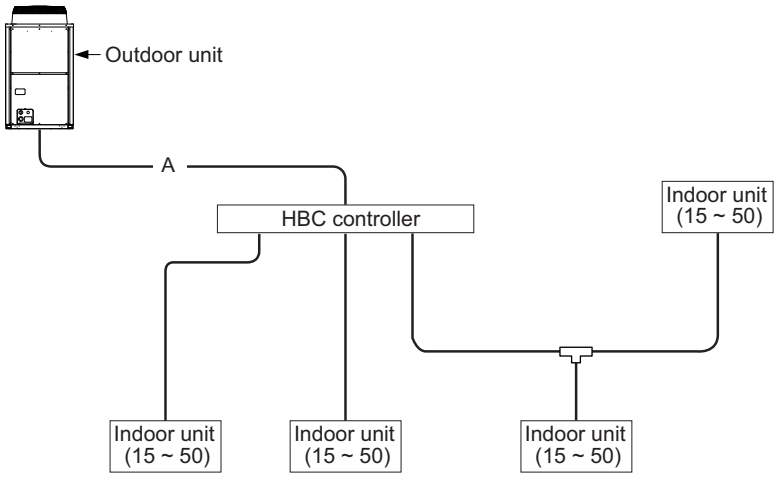
Outdoor unit index	Diameter of high-pressure pipe
(E)P200	ø15.88
(E)P250	ø19.05
(E)P300	ø19.05
(E)P350	ø19.05
(E)P400	ø15.88
(E)P450	ø15.88
(E)P500	ø19.05

Amount for the HBC controller
α_1(kg)
3.0

Round up the calculation result to the nearest 0.1kg. (Example: 18.04kg to 18.1kg)

(2) Example

[P200, P300, P350YLM]



(3) Sample calculation

Indoor	1: 50	A: ø19.05	42 m
	2: 50		
	3: 50		
	4: 40		
Outdoor	P250		

At the conditions below:

The total length of each liquid line is as follows:
ø19.05: A = 42 m, α_1=3.0
Therefore,
<Calculation example>
Additional refrigerant charge
= 42 × 0.16+3.0
= 9.72 kg
* All pipe work except A is water pipe work.

[4] Refrigerant Amount Adjust Mode

On the model of unit described in this document, the refrigerant charge cannot be adjusted.

[5] The following symptoms are normal.

Symptoms	Remote controller display	Cause
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. 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 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. (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.		When drain water is detected, the drain pump goes into operation even while the unit is stopped.
Indoor unit and HBC controller make 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.
The HBC controller makes refrigerant flow noise during defrost.	During defrost	This noise is produced by the high-pressure liquid refrigerant migrating into the HBC and evaporating. (This noise is normal.)

[6] Standard Operation Data (Reference Data)

(1) Cooling only operation

Operation				Outdoor unit model	
				PURY-P200YLM-A1	PURY-P250YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]	35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	5	6
		No. of units in operation		5	6
		Model	-	40/40/40/40/40	40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		12.5 [42]	15.0 [50]
	Amount of refrigerant		kg [lbs]	13.1 [29]	13.3 [30]
Outdoor unit	Electric current		A	11.2	15.9
	Voltage		V	400	400
	Compressor frequency		Hz	63	86
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	300	300
		LEV2		300	300
		LEV3		80	80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.83/ 0.97 [411/ 141]	3.04/ 0.93 [441/ 135]
	HBC controller PS1			1.03 [150]	1 [146]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	77 [171]	86 [187]
		Heat exchanger outlet TH3		43 [110]	46 [115]
		Accumulator inlet TH5		16 [61]	15 [59]
		Accumulator outlet		16 [61]	14 [58]
		Compressor inlet		17 [63]	15 [59]
		Compressor shell bottom		28 [83]	36 [97]
	HBC controller	LEV1/LEV2 inlet		40 [104]	43 [110]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		15 [59]	15 [59]
	Indoor unit	Inlet		15 [59]	15 [59]
		Outlet		20 [68]	20 [68]

Operation				Outdoor unit model	
				PURY-P300YLM-A1	PURY-P350YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]	35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	7	9
		No. of units in operation		7	9
		Model	-	40/40/40/40/40/50/50	40/40/40/40/40/40/40/40/40
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		17.5 [58]	22.5 [74]
	Amount of refrigerant		kg [lbs]	14.1 [32]	14.1 [32]
Outdoor unit	Electric current		A	21.3	28.7
	Voltage		V	400	400
	Compressor frequency		Hz	79	100
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	337	468
		LEV2		337	468
		LEV3		80	80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.95/ 0.87 [428/ 126]	3.15/ 0.83 [457/ 120]
	HBC controller PS1			0.96 [140]	0.94 [137]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	87 [189]	95 [203]
		Heat exchanger outlet TH3		44 [112]	46 [115]
		Accumulator inlet TH5		13 [56]	12 [54]
		Accumulator outlet		12 [54]	11 [52]
		Compressor inlet		13 [56]	12 [54]
		Compressor shell bottom		35 [95]	34 [94]
	HBC controller	LEV1/LEV2 inlet		40 [104]	39 [103]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		14 [58]	14 [58]
	Indoor unit	Inlet		14 [58]	14 [58]
		Outlet		20 [68]	21 [70]

Operation				Outdoor unit model	
				PURY-P400YLM-A1	PURY-P450YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				2	2
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]	35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	10	11
		No. of units in operation		10	11
		Model	-	40/40/40/40/40/40/40/40/40/40	40/40/40/40/40/40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		25.0 [83]	27.5 [91]
	Amount of refrigerant		kg [lbs]	17.5 [39]	19.0 [42]
Outdoor unit	Electric current		A	26.7	28.7
	Voltage		V	400	400
	Compressor frequency		Hz	103	107
HBC controller unit	Electric current		A	5.78	5.78
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	300	300
		LEV2		300	300
		LEV3		80	80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	3.34/ 0.96 [485/ 140]	3.02/ 0.95 [439/ 139]
	HBC controller PS1			1.05 [153]	1.02 [148]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	93 [200]	87 [189]
		Heat exchanger outlet TH3		48 [119]	45 [113]
		Accumulator inlet TH5		16 [61]	16 [61]
		Accumulator outlet		14 [58]	15 [59]
		Compressor inlet		15 [59]	16 [61]
		Compressor shell bottom		37 [99]	38 [101]
	HBC controller	LEV1/LEV2 inlet		45 [113]	42 [108]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		16 [61]	15 [59]
	Indoor unit	Inlet		16 [61]	15 [59]
		Outlet		20 [68]	20 [68]

Operation				Outdoor unit model
				PURY-P500YLM-A1
Model name of HBC controller				CMB-WP108V-GA1
No. of HBC controllers required				2
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	13
		No. of units in operation		13
		Model	-	40/40/40/40/40/40/40/40/ 40/40/40/40/40
		Fan speed		Hi
	Piping	Main pipe	m [ft]	5 [17]
		Branch pipe		2.5 [9]
		Total water pipe length		32.5 [107]
	Amount of refrigerant		kg [lbs]	19.0 [42]
Outdoor unit	Electric current		A	36.3
	Voltage		V	400
	Compressor frequency		Hz	120
HBC controller unit	Electric current		A	5.78
	Voltage		V	230
	Water pump command value [two units]		%	100
LEV opening	HBC controller	LEV1	Pulse	300
		LEV2		300
		LEV3		80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	3.04/ 0.94 [441/ /137]
	HBC controller PS1			1.02 [148]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	91 [196]
		Heat exchanger outlet TH3		45 [113]
		Accumulator inlet TH5		15 [59]
		Accumulator outlet		14 [58]
		Compressor inlet		15 [59]
		Compressor shell bottom		37 [99]
	HBC controller	LEV1/LEV2 inlet		42 [108]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		15 [59]
	Indoor unit	Inlet		15 [59]
		Outlet		21 [70]

Operation				Outdoor unit model	
				PURY-EP200YLM-A1	PURY-EP250YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]	35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	5	6
		No. of units in operation		5	6
		Model	-	40/40/40/40/40	40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		12.5 [42]	15.0 [50]
	Amount of refrigerant		kg [lbs]	9.6 [22]	9.8 [22]
Outdoor unit	Electric current		A	10.0	14.0
	Voltage		V	400	400
	Compressor frequency		Hz	61	82
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	300	300
		LEV2		300	300
		LEV3		80	80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.68/ 0.98 [389/ 143]	2.83/ 0.94 [411/ 137]
	HBC controller PS1			1.03 [150]	1.00 [146]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	73 [164]	80 [176]
		Heat exchanger outlet TH3		41 [106]	43 [110]
		Accumulator inlet TH5		16 [61]	15 [59]
		Accumulator outlet		15 [59]	14 [58]
		Compressor inlet		17 [63]	15 [59]
		Compressor shell bottom		28 [83]	36 [97]
	HBC controller	LEV1/LEV2 inlet		38 [101]	40 [104]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		15 [59]	15 [59]
	Indoor unit	Inlet		15 [59]	15 [59]
		Outlet		20 [68]	20 [68]

Operation				Outdoor unit model	
				PURY-EP300YLM-A1	PURY-EP350YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]	35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	7	9
		No. of units in operation		7	9
		Model	-	40/40/40/40/40/50/50	40/40/40/40/40/40/40/40/40
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		17.5 [58]	22.5 [74]
	Amount of refrigerant		kg [lbs]	11.8 [27]	11.8 [27]
Outdoor unit	Electric current		A	19.3	27.5
	Voltage		V	400	400
	Compressor frequency		Hz	75	100
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	347	506
		LEV2		347	506
		LEV3		80	80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.77/ 0.88 [402/ 128]	2.94/ 0.82 [427/ 119]
	HBC controller PS1			0.96 [140]	0.93 [135]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	81 [178]	90 [194]
		Heat exchanger outlet TH3		41 [106]	43 [110]
		Accumulator inlet TH5		13 [56]	11 [52]
		Accumulator outlet		12 [54]	10 [50]
		Compressor inlet		13 [56]	11 [52]
		Compressor shell bottom		35 [95]	33 [92]
	HBC controller	LEV1/LEV2 inlet		38 [101]	36 [97]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		14 [58]	14 [58]
	Indoor unit	Inlet		14 [58]	14 [58]
		Outlet		20 [68]	21 [70]

Operation				Outdoor unit model	
				PURY-EP400YLM-A1	PURY-EP450YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				2	2
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]	35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	10	11
		No. of units in operation		10	11
		Model	-	40/40/40/40/40/40/40/40/40/40	40/40/40/40/40/40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		25.0 [83]	27.5 [91]
	Amount of refrigerant		kg [lbs]	17.7 [40]	19.0 [42]
Outdoor unit	Electric current		A	22.2	26.9
	Voltage		V	400	400
	Compressor frequency		Hz	88	102
HBC controller unit	Electric current		A	5.78	5.78
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	300	300
		LEV2		300	300
		LEV3		80	80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.77/ 0.99 [402/ 144]	2.86/ 0.96 [415/ 140]
	HBC controller PS1			1.04 [151]	1.02 [148]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	78 [173]	82 [180]
		Heat exchanger outlet TH3		42 [108]	43 [110]
		Accumulator inlet TH5		16 [61]	16 [61]
		Accumulator outlet		16 [61]	15 [59]
		Compressor inlet		16 [61]	15 [59]
		Compressor shell bottom		38 [101]	37 [99]
	HBC controller	LEV1/LEV2 inlet		39 [103]	40 [104]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		16 [61]	15 [59]
	Indoor unit	Inlet		16 [61]	15 [59]
		Outlet		20 [68]	20 [68]

Operation				Outdoor unit model
				PURY-EP500YLM-A1
Model name of HBC controller				CMB-WP108V-GA1
No. of HBC controllers required				2
Operating conditions	Ambient temperature	Indoor	DB/WB	27°C/ 19°C [81°F/ 66°F]
		Outdoor		35°C/ - [95°F/ -]
	Indoor unit	No. of connected units	Unit	13
		No. of units in operation		13
		Model	-	40/40/40/40/40/40/40/40/ 40/40/40/40/40
		Fan speed		Hi
	Piping	Main pipe	m [ft]	5 [17]
		Branch pipe		2.5 [9]
		Total water pipe length		32.5 [107]
	Amount of refrigerant		kg [lbs]	19.0 [42]
Outdoor unit	Electric current		A	34.0
	Voltage		V	400
	Compressor frequency		Hz	120
HBC controller unit	Electric current		A	5.78
	Voltage		V	230
	Water pump command value [two units]		%	100
LEV opening	HBC controller	LEV1	Pulse	300
		LEV2		300
		LEV3		80
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.88/ 0.94 [418/ 137]
	HBC controller PS1			1.02 [148]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	87 [189]
		Heat exchanger outlet TH3		43 [110]
		Accumulator inlet TH5		15 [59]
		Accumulator outlet		14 [58]
		Compressor inlet		15 [59]
		Compressor shell bottom		37 [99]
	HBC controller	LEV1/LEV2 inlet		40 [104]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		15 [59]
	Indoor unit	Inlet		15 [59]
		Outlet		21 [70]

(2) Heating only operation

Operation				Outdoor unit model	
				PURY-P200YLM-A1	PURY-P250YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]	7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	5	6
		No. of units in operation		5	6
		Model	-	40/40/40/40/40	40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		12.5 [42]	15.0 [50]
	Amount of refrigerant		kg [lbs]	13.1 [29]	13.3 [30]
Outdoor unit	Electric current		A	11.3	16.1
	Voltage		V	400	400
	Compressor frequency		Hz	71	94
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	193	226
		LEV2		193	226
		LEV3		3000	3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.55/ 0.68 [370/ 99]	2.66/ 0.64 [386/ 93]
	HBC controller PS1			2.47 [359]	2.57 [373]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	71 [160]	79 [175]
		Heat exchanger inlet TH6		2 [36]	2 [36]
		Accumulator inlet TH5		-1 [31]	-3 [27]
		Accumulator outlet		-1 [31]	-3 [27]
		Compressor inlet		-1 [31]	-3 [27]
		Compressor shell bottom		38 [101]	40 [104]
	HBC controller	LEV1/LEV2 inlet		33 [92]	35 [95]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		35 [95]	37 [99]
	Indoor unit	Inlet		35 [95]	37 [99]
		Outlet		30 [86]	31 [88]

Operation				Outdoor unit model	
				PURY-P300YLM-A1	PURY-P350YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]	7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	7	9
		No. of units in operation		7	9
		Model	-	40/40/40/40/40/50/50	40/40/40/40/40/40/40/40/40
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		17.5 [58]	22.5 [74]
	Amount of refrigerant		kg [lbs]	14.1 [32]	14.1 [32]
Outdoor unit	Electric current		A	20.3	24.8
	Voltage		V	400	400
	Compressor frequency		Hz	72	100
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	243	294
		LEV2		243	294
		LEV3		3000	3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.61/ 0.65 [379/ 95]	2.75/ 0.59 [399/ 86]
	HBC controller PS1			2.53 [367]	2.64 [383]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	76 [169]	90 [194]
		Heat exchanger inlet TH6		2 [36]	1 [34]
		Accumulator inlet TH5		-2 [29]	-5 [23]
		Accumulator outlet		-3 [27]	-6 [22]
		Compressor inlet		-3 [27]	-4 [25]
		Compressor shell bottom		38 [101]	37 [99]
	HBC controller	LEV1/LEV2 inlet		34 [94]	36 [97]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		36 [97]	37 [99]
	Indoor unit	Inlet		36 [97]	37 [99]
		Outlet		30 [86]	29 [85]

Operation				Outdoor unit model	
				PURY-P400YLM-A1	PURY-P450YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				2	2
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]	7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	10	11
		No. of units in operation		10	11
		Model	-	40/40/40/40/40/40/40/40/40/40	40/40/40/40/40/40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		25.0 [83]	27.5 [91]
	Amount of refrigerant		kg [lbs]	17.5 [39]	19.0 [42]
Outdoor unit	Electric current		A	21.4	27.8
	Voltage		V	400	400
	Compressor frequency		Hz	104	111
HBC controller unit	Electric current		A	5.78	5.78
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	180	204
		LEV2		180	204
		LEV3		3000	3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.47/ 0.57 [359/ 83]	2.62/ 0.68 [381/ 99]
	HBC controller PS1			2.41 [350]	2.54 [369]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	79 [175]	78 [173]
		Heat exchanger inlet TH6		1 [34]	2 [36]
		Accumulator inlet TH5		-6 [22]	-1 [31]
		Accumulator outlet		-7 [20]	-1 [31]
		Compressor inlet		-6 [22]	-1 [31]
		Compressor shell bottom		35 [95]	40 [104]
	HBC controller	LEV1/LEV2 inlet		32 [90]	34 [94]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		34 [94]	36 [97]
	Indoor unit	Inlet		34 [94]	36 [97]
		Outlet		30 [86]	31 [88]

Operation				Outdoor unit model
				PURY-P500YLM-A1
Model name of HBC controller				CMB-WP108V-GA1
No. of HBC controllers required				2
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	13
		No. of units in operation		13
		Model	-	40/40/40/40/40/40/40/40/ 40/40/40/40/40
		Fan speed		Hi
	Piping	Main pipe	m [ft]	5 [17]
		Branch pipe		2.5 [9]
		Total water pipe length		32.5 [107]
	Amount of refrigerant		kg [lbs]	19.0 [42]
Outdoor unit	Electric current		A	28.1
	Voltage		V	400
	Compressor frequency		Hz	111
HBC controller unit	Electric current		A	5.78
	Voltage		V	230
	Water pump command value [two units]		%	100
LEV opening	HBC controller	LEV1	Pulse	217
		LEV2		217
		LEV3		3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.53/ 0.71 [367/ 103]
	HBC controller PS1			2.44 [354]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	73 [164]
		Heat exchanger inlet TH6		3 [38]
		Accumulator inlet TH5		1 [34]
		Accumulator outlet		1 [34]
		Compressor inlet		-1 [31]
		Compressor shell bottom		40 [104]
	HBC controller	LEV1/LEV2 inlet		33 [92]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		35 [95]
	Indoor unit	Inlet		35 [95]
		Outlet		29 [85]

Operation				Outdoor unit model	
				PURY-EP200YLM-A1	PURY-EP250YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]	7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	5	6
		No. of units in operation		5	6
		Model	-	40/40/40/40/40	40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		12.5 [42]	15.0 [50]
	Amount of refrigerant		kg [lbs]	9.6 [22]	9.8 [22]
Outdoor unit	Electric current		A	11.0	15.7
	Voltage		V	400	400
	Compressor frequency		Hz	71	94
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	193	227
		LEV2		193	227
		LEV3		3000	3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.55/ 0.69 [370/ 101]	2.66/ 0.64 [386/ 93]
	HBC controller PS1			2.47 [359]	2.57 [373]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	71 [160]	79 [175]
		Heat exchanger inlet TH6		3 [38]	2 [36]
		Accumulator inlet TH5		-1 [31]	-3 [27]
		Accumulator outlet		-1 [31]	-3 [27]
		Compressor inlet		-1 [31]	-3 [27]
		Compressor shell bottom		38 [101]	40 [104]
	HBC controller	LEV1/LEV2 inlet		33 [92]	35 [95]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		35 [95]	37 [99]
	Indoor unit	Inlet		35 [95]	37 [99]
		Outlet		30 [86]	31 [88]

Operation				Outdoor unit model	
				PURY-EP300YLM-A1	PURY-EP350YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				1	1
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]	7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	7	9
		No. of units in operation		7	9
		Model	-	40/40/40/40/40/50/50	40/40/40/40/40/40/40/40/40
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		17.5 [58]	22.5 [74]
	Amount of refrigerant		kg [lbs]	11.8 [27]	11.8 [27]
Outdoor unit	Electric current		A	18.7	24.6
	Voltage		V	400	400
	Compressor frequency		Hz	69	98
HBC controller unit	Electric current		A	2.89	2.89
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	246	305
		LEV2		246	305
		LEV3		3000	3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.61/ 0.69 [379/ 101]	2.78/ 0.62 [404/ 90]
	HBC controller PS1			2.53 [367]	2.67 [388]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	74 [166]	88 [191]
		Heat exchanger inlet TH6		3 [38]	3 [38]
		Accumulator inlet TH5		-1 [31]	-4 [25]
		Accumulator outlet		-1 [31]	-4 [25]
		Compressor inlet		-1 [31]	-3 [27]
		Compressor shell bottom		40 [104]	38 [101]
	HBC controller	LEV1/LEV2 inlet		34 [94]	36 [97]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		36 [97]	38 [101]
	Indoor unit	Inlet		36 [97]	38 [101]
		Outlet		30 [86]	29 [85]

Operation				Outdoor unit model	
				PURY-EP400YLM-A1	PURY-EP450YLM-A1
Model name of HBC controller				CMB-WP108V-GA1	
No. of HBC controllers required				2	2
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]	7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	10	11
		No. of units in operation		10	11
		Model	-	40/40/40/40/40/40/40/40/40/40	40/40/40/40/40/40/40/40/40/40/50
		Fan speed		Hi	Hi
	Piping	Main pipe	m [ft]	5 [17]	5 [17]
		Branch pipe		2.5 [9]	2.5 [9]
		Total water pipe length		25.0 [83]	27.5 [91]
	Amount of refrigerant		kg [lbs]	17.7 [40]	19.0 [42]
Outdoor unit	Electric current		A	22.6	27.0
	Voltage		V	400	400
	Compressor frequency		Hz	99	112
HBC controller unit	Electric current		A	5.78	5.78
	Voltage		V	230	230
	Water pump command value [two units]		%	100	100
LEV opening	HBC controller	LEV1	Pulse	188	203
		LEV2		188	203
		LEV3		3000	3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.57/ 0.69 [373/ 101]	2.62/ 0.67 [381/ 98]
	HBC controller PS1			2.51 [365]	2.54 [369]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	74 [166]	78 [173]
		Heat exchanger inlet TH6		2 [36]	2 [36]
		Accumulator inlet TH5		-1 [31]	-2 [29]
		Accumulator outlet		-1 [31]	-2 [29]
		Compressor inlet		-1 [31]	-2 [29]
		Compressor shell bottom		40 [104]	39 [103]
	HBC controller	LEV1/LEV2 inlet		34 [94]	34 [94]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		36 [97]	36 [97]
	Indoor unit	Inlet		36 [97]	36 [97]
		Outlet		31 [88]	31 [88]

Operation				Outdoor unit model
				PURY-EP500YLM-A1
Model name of HBC controller				CMB-WP108V-GA1
No. of HBC controllers required				2
Operating conditions	Ambient temperature	Indoor	DB/WB	20°C/ - [68°F/ -]
		Outdoor		7°C/ 6°C [45°F/ 43°F]
	Indoor unit	No. of connected units	Unit	13
		No. of units in operation		13
		Model	-	40/40/40/40/40/40/40/40/40/40/40/40/40
		Fan speed		Hi
	Piping	Main pipe	m [ft]	5 [17]
		Branch pipe		2.5 [9]
		Total water pipe length		32.5 [107]
	Amount of refrigerant		kg [lbs]	19.0 [42]
Outdoor unit	Electric current		A	34.7
	Voltage		V	400
	Compressor frequency		Hz	120
HBC controller unit	Electric current		A	5.78
	Voltage		V	230
	Water pump command value [two units]		%	100
LEV opening	HBC controller	LEV1	Pulse	226
		LEV2		226
		LEV3		3000
Pressure on the refrigerant side	High pressure(63HS1)/ Low pressure(63LS)		MPa [psi]	2.59/ 0.69 [376/ 101]
	HBC controller PS1			2.50 [363]
Temp. on the refrigerant side	Outdoor unit	Discharge TH4	°C [°F]	76 [169]
		Heat exchanger inlet TH6		3 [38]
		Accumulator inlet TH5		-1 [31]
		Accumulator outlet		-1 [31]
		Compressor inlet		-2 [29]
		Compressor shell bottom		39 [103]
	HBC controller	LEV1/LEV2 inlet		33 [92]
Temp. on the water side	HBC controller	Water heat exchanger outlet TH32/TH33		36 [97]
	Indoor unit	Inlet		36 [97]
		Outlet		30 [86]

VIII Troubleshooting

[1] Error Code Lists

Error Code	Preliminary error code	Error (preliminary) detail code	Error code definition		Searched unit					Notes
					Outdoor unit	Indoor unit	HBC controller	LOSSNAY	Remote controller	
2500	-	-	Drain sensor submergence			O				
2501	-	-	Water pump error				O			
2502	-	-	Drain pump fault (float switch)			O	O			
			Untightened manual air vent valve			O				
2503	-	-	Drain sensor (Thd) fault			O		O		
2512	-	-	3-way valve/Water flow rate control valve fault				O			
4102	4152	-	Open phase		O					
4106	-	-	Transmission power supply fault		O					
4115	-	-	Power supply signal sync error		O					
5111	-	-	Temperature sensor fault (HBC controller)	Liquid-side refrigerant temp. of Heating-main heat exchanger (TH11)			O			
5112	-	-		Liquid-side refrigerant temp. of Cooling-main heat exchanger (TH12)			O			
5113	-	-		Gas-side refrigerant temp. of Heating-main heat exchanger (TH13)			O			
5114	-	-		Gas-side refrigerant temp. of Cooling-main heat exchanger (TH14)			O			
5115	-	-		Bypass inlet temperature (TH15)			O			
5116	-	-		Bypass outlet temperature (TH16)			O			
5132	–	–	Temperature sensor fault (HBC controller)	Water-side outlet temp. of Heating-main heat exchanger (TH32)			O			
5133	–	–		Water-side outlet temp. of Cooling-main heat exchanger (TH33)			O			
5134	–	–		Water pump WP2 outlet temperature (TH34)			O			
5135	–	–		Water pump WP1 outlet temperature (TH35)			O			

Error Code	Prelimi-nary error code	Error (prelim-inary) detail code	Error code definition		Searched unit					Notes
					Outdoor unit	Indoor unit	HBC controller	LOSSNAY	Remote controller	
5141	–	–	Temperature sensor fault (HBC controller)	1st port returned water temp. (TH31a)			O			
5142	–	–		2nd port returned water temp. (TH31b)			O			
5143	–	–		3rd port returned water temp. (TH31c)			O			
5144	–	–		4th port returned water temp. (TH31d)			O			
5145	–	–		5th port returned water temp. (TH31e)			O			
5146	–	–		6th port returned water temp. (TH31f)			O			
5147	–	–		7th port returned water temp. (TH31g)			O			
5148	–	–		8th port returned water temp. (TH31h)			O			
5149	-	-		9th port returned water temp. (TH31i)			O			
5150	-	-		10th port returned water temp. (TH31j)			O			
5151	-	-		11th port returned water temp. (TH31k)			O			
5152	-	-		12th port returned water temp. (TH31l)			O			
5153	-	-		13th port returned water temp. (TH31m)			O			
5154	-	-		14th port returned water temp. (TH31n)			O			
5155	-	-		15th port returned water temp. (TH31o)			O			
5156	-	-		16th port returned water temp. (TH31p)			O			

Error Code	Prelimi-nary error code	Error (prelim-inary) detail code	Error code definition		Searched unit					Notes
					Outdoor unit	Indoor unit	HBC controller	LOSSNAY	Remote controller	
5161	-	-	Temperature sensor fault (Sub-HBC)	1st port returned water temp. (TH41a)			O			
5162	-	-		2nd port returned water temp. (TH41b)			O			
5163	-	-		3rd port returned water temp. (TH41c)			O			
5164	-	-		4th port returned water temp. (TH41d)			O			
5165	-	-		5th port returned water temp. (TH41e)			O			
5166	-	-		6th port returned water temp. (TH41f)			O			
5167	-	-		7th port returned water temp. (TH41g)			O			
5168	-	-		8th port returned water temp. (TH41h)			O			
5169	-	-		9th port returned water temp. (TH41i)			O			
5170	-	-		10th port returned water temp. (TH41j)			O			
5171	-	-		11th port returned water temp. (TH41k)			O			
5172	-	-		12th port returned water temp. (TH41l)			O			
5173	-	-		13th port returned water temp. (TH41m)			O			
5174	-	-		14th port returned water temp. (TH41n)			O			
5175	-	-		15th port returned water temp. (TH41o)			O			
5176	-	-		16th port returned water temp. (TH41p)			O			
5177	-	-		Water-side outlet temp. of Heating-main heat ex-changer (TH42)			O			
5178	-	-		Water-side outlet temp. of Cooling-main heat ex-changer (TH43)			O			
5201	1402	-	High-pressure sensor fault (Outdoor unit HPS/HBC controller PS1)		O		O			
5301	4300	[115]	ACCT sensor fault		O					
		[117]	ACCT sensor circuit fault		O					
		[119]	Open-circuited IPM/Loose ACCT connector		O					
		[120]	Faulty ACCT wiring		O					
5701	-	-	Loose float switch connector			O				
6600	-	-	Address overlaps		O	O	O	O	O	

Error Code	Preliminary error code	Error (preliminary) detail code	Error code definition	Searched unit					Notes
				Outdoor unit	Indoor unit	HBC controller	LOSSNAY	Remote controller	
6601	-	-	Polarity setting error					O	
6602	-	-	Transmission processor hardware error	O	O	O	O	O	
6603	-	-	Transmission line bus busy error	O	O	O	O	O	
6606	-	-	Communication error between device and transmission processors	O	O	O	O	O	
6607	-	-	No ACK error	O	O	O	O	O	
6608	-	-	No response error	O	O	O	O	O	
7100	-	-	Total capacity error	O					
7101	-	-	Capacity code setting error	O	O		O		
7102	-	-	Wrong number of connected units	O		O			
7105	-	-	Address setting error	O					
7106	-	-	Attribute setting error				O		
7107	-	-	Port setting error			O			
7110	-	-	Connection information signal transmission/reception error	O					
7113	-	-	Function setting error	O					
7117	-	-	Model setting error	O					
7130	-	-	Incompatible unit combination	O					

[2] Responding to Error Display on the Remote Controller

1. Error Code

2500

Drain sensor submergence (Models with a drain sensor)

2. Error definition and error detection method

1) If an immersion of the drain sensor 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 immersion of the sensor in the water is detected four consecutive times at an hour interval, this is considered water leakage, 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 • Clogged drain pump • Clogged drain piping • Backflow of drain water from other units	Check for proper drainage.
(2) Adhesion of water drops to the drain sensor • Trickling of water along the lead wire • Rippling of drain water caused by filter clogging	1) Check for proper lead wire installation. 2) Check for clogged filter.
(3) Failure of the relay circuit for the solenoid valve	Replace the relay.
(4) Indoor unit control board failure • Drain sensor circuit failure	If the above item checks out OK, replace the indoor unit control board.

1. Error Code

2500

Drain sensor submergence (Models with a float switch)

2. Error definition and error detection method

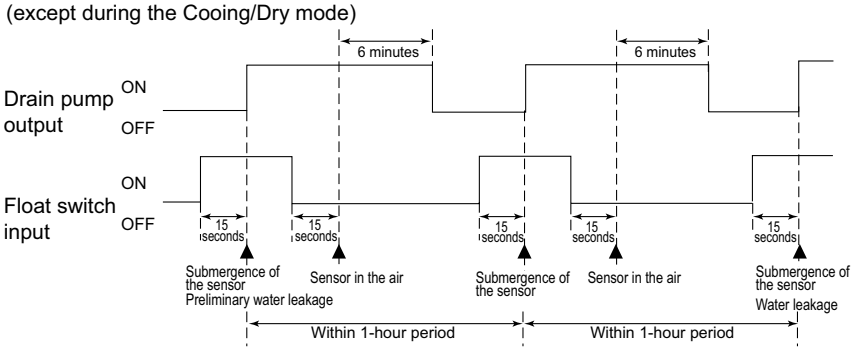
1) If an immersion of the float switch in the water is detected while the unit is in any mode other than the Cool/Dry mode and when the drain pump goes from OFF to ON, this condition is considered preliminary water leakage. While this error is being detected, humidifier output cannot be turned on.
2) 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 ♦Clogged drain pump ♦Clogged drain piping ♦Backflow of drain water from other units	Check for proper drainage.
(2) Stuck float switch 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)



1. Error Code

2501

Water pump fault

2. Error definition and error detection method

- When clogged water circuit or water leaks from the water circuit is detected, the water pump is stopped for protection.
- When the following statuses are detected, the pump will be stopped.
  - The revolutions of the water pump exceeds the specific range.
  - Pump discharge port: TH34, TH35 > 53ºC [127ºF]

3. Cause, check method and remedy

Cause	Check method and remedy
(1) Water circuit is clogged.	1) Check for tightened water flow rate control valves or field-installed valves.
(2) Water leaks from the water circuit	2) Check the pump for proper sound. If there is air in the circuit, it makes a noise.
(3) Air infiltration through the air vent valve	3) Check that any air vent valves are not installed in the water circuit on the suction side water pump. If an air vent valve is installed in the water circuit on the suction side water pump, it will cause the air infiltration.
(4) Broken or semi-broken thermistor wire	4) Check for a broken thermistor wire.
(5) Thermistor failure	5) Check the resistance of the thermistor. 0°C [32°F] : 6.0kΩ 10°C [50°F] : 3.9kΩ 20°C [68°F]: 2.6kΩ 30°C [86°F] : 1.8kΩ 40°C [104°F] : 1.3kΩ
(6) Semi-broken pump wire	6) Check for semi-broken pump wires.

- If a sudden water leak occurs, replace the water pressure protection valves because they may be the cause.

1. Error Code

2502

Drain pump fault (Models with a drain sensor)

2. Error definition and error detection method

1) Make the drain sensor thermistor self-heat. If the temperature rise is small, it is interpreted that the sensor is immersed in water. This condition is considered to be a preliminary error, and the unit goes into the 3-minute restart delay mode.
2) If another episode of the above condition is detected during the preliminary error, this is considered a drain pump error, and "2502" appears on the monitor.
3) This error is always detected while the drain pump is in operation.
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.
   ∗The immersion of drain sensor is detected 10 consecutive times.
   ∗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.
(2) Drain water drainage problem ♦Clogged drain pump ♦Clogged drain piping	Check for proper drainage.
(3) Adhesion of water drops to the drain sensor ♦Trickling of water along the lead wire ♦Rippling of drain water caused by filter clogging	1) Check for proper lead wire installation. 2) Check for clogged filter.
(4) Indoor unit control board failure ♦Drain pump drive circuit failure ♦Drain heater output circuit failure	If the above item checks out OK, replace the indoor unit control board.
(5) Items (1) through (4) above and an indoor unit electronic valve closure failure (leaky valve) occurred simultaneously.	Check the solenoid valves on the indoor unit for leaks.

1. Error Code

2502

Drain pump fault (Models with a float switch)

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 and HBC controller that detected the conditions that are listed in item 4) above brings the outdoor unit in the same refrigerant system to an abnormal stop (compressor operation prohibited), and the outdoor unit brings all the indoor units and HBC controller in the same refrigerant system that are in any mode other than Fan or Stop to an abnormal stop. "2502" appears on the monitor of the units that came to an abnormal stop.
6) Forced stoppage of the outdoor unit
   Detection timing: The error is detected whether the unit is in operation or stopped.
   This 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 ♦Clogged drain pump ♦Clogged drain piping	Check for proper drainage.
(3)	Stuck float switch 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/HBC controller control board fault ♦Drain pump drive circuit failure ♦Float switch input circuit failure	Replace indoor unit control board.
(6)	Items (1) through (5) above and an indoor unit electronic valve closure failure (leaky valve) occurred simultaneously.	Check the solenoid valves on the indoor unit for leaks.
(7)	Untightened manual air vent valve	Visual/Manual inspection

♦If a sudden water leak occurs, replace the water pressure protection valves because they may be the cause.
♦During water supply or air vent operation, set the Dip SW 5-2 from OFF to ON. (This error is ignored for nine hours.)

1. Error Code

2503

Drain sensor (Thd) fault

2. Error definition and error detection method

- If the open or short circuit of the thermistor has been detected for 30 seconds, this condition is considered to be a preliminary error, and the unit goes into the 3-minute restart delay mode.
- If another episode of the above condition is detected during the preliminary error, this is considered a drain sensor error.(If the short or open circuit of the thermistor is no longer detected, normal operation will be restored in 3 minutes.)
- This error is detected when one of the following conditions are met.
  - During Cool/Dry operation
  - Liquid pipe temperature minus inlet temperature is equal to or smaller than - 10°C [-18°F] (except during the defrost cycle)
  - When the liquid temperature thermistor or suction temperature thermistor or short or open circuited.
  - Drain pump is in operation.
  - One hour has elapsed since the drain sensor went off.

  Short: 90°C [194 °F] or above
  Open: - 20°C [-4 °F] or below

3. Cause, check method and remedy

Cause		Check method and remedy	
(1)	Faulty connector (CN31) insertion.	1)	Check for connector connection failure. Reinsert the connector, restart the operation, and check for proper operation.
(2)	Broken or semi-broken thermistor wire	2)	Check for a broken thermistor wire.
(3)	Thermistor failure	3)	Check the resistance of the thermistor. 0°C[32 °F]:6.0kΩ 10°C[50 °F]:3.9kΩ 20°C[68°F]:2.6kΩ 30°C[86°F]:1.8kΩ 40°C[104 °F]:1.3kΩ
(4)	Indoor unit control board (error detection circuit) failure	4)	Replace the indoor unit control board if the problem recurs when the unit is operated with the No.-1 and No.-2 pins on the drain sensor connector (CN31) being short-circuited. If the above item checks out OK, there are no problems with the drain sensor. Turn off the power and turn it back on.

1. Error Code

2512

Valve block fault

2. Error definition and error detection method

♦Limit signal that is output from valve block is not detected or is not reset after it is detected.

3. Cause, check method and remedy

Cause	Check method and remedy
(1) Loose connectors, wiring fault (2) Valve block fault	When the LEDs on the control board (VB3a-VB3p) are lit, check the valve block whose LED is lit for loose connectors, wiring fault, and proper operation. When the LEDs described above are not lit, check all the valve block for proper operation.
(3) Control board fault	If no problems are found with the above items, replace the control board.

1. Error Code

4102

Open phase

2. Error definition and error detection method

- An open phase of the power supply (L1 phase, N phase) was detected at power on.
- The L3 phase current is outside of the specified range.

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 •Open phase voltage of the power supply •Power supply voltage drop	Check the input voltage to the power supply terminal block TB1.
(2) Noise filter problem •Coil problem •Circuit board failure	•Check the coil connections. •Check for coil burnout. •Confirm that the voltage at the CN3 connector is 198 V or above.
(3) Wiring failure	Confirm that the voltage at the control board connector CNAC is 198 V or above. If the voltage is below 198V, check the wiring connection between the noise filter board CN3, noise filter board CN2 and control board CNAC. Confirm that the wiring between noise filter TB23 and INV board SC-L3 is put through CT3.
(4) Blown fuse	Check for a blown fuse (F01) on the control board. ->If a blown fuse is found, check for a short-circuiting or earth fault of the actuator.
(5) CT3 failure	Replace the inverter if this problem is detected after the compressor has gone into operation.
(6) Control board failure	Replace the control board if none of the above is causing the problem.

1. Error Code

4106

<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 items in VIII [4] -3- (2) Troubleshooting transmission power circuit of outdoor unit on all outdoor units in the same refrigerant circuit.(page 175)

<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 items in VIII [4] -3- (2) Troubleshooting transmission power circuit of outdoor unit on all outdoor units in the same refrigerant circuit.(page 175)

1. Error Code

4115

Power supply signal sync error

2. Error definition and error detection method

The frequency cannot be determined when the power is switched on.

3. Cause, check method and remedy

Cause	Check method and remedy
(1) Power supply error	Check the voltage of the power supply terminal block (TB1).
(2) Noise filter problem •Coil problem •Circuit board failure	•Check the coil connections. •Check for coil burnout. •Confirm that the voltage at the CN3 connector is 198 V or above.
(3) Faulty wiring	Check fuse F01 on the control board.
(4) Wiring failure Between noise filter CN3 and noise filter CN2 and control board CNAC	Confirm that the voltage at the control board connector CNAC is 198 V or above.
(5) Control board failure	If none of the items described above is applicable, and if the trouble reappears even after the power is switched on again, replace the control board.

1. Error Code

5111 - **5116**

Temperature sensor fault (HBC controller) (TH11~TH16)

5132 - **5135**

Temperature sensor fault (HBC controller) (TH32~TH35)

5141 - **5156**

Temperature sensor fault (HBC controller) (TH31a~TH31p)

5161 - **5176**

Temperature sensor fault (Sub-HBC) (TH41a~TH41p)

5177 - **5178**

Temperature sensor fault (Sub-HBC) (TH42~TH43)

2. Error definition and error detection method

- If a shorted (high temperature intake) or open (low temperature intake) thermistor (TH11 through TH16, TH32 through TH35, TH31a through TH31p, TH41a through TH41p, TH42, or TH43) is detected during operation, the unit comes to an abnormal stop, and an error code “5111” through “5116,” “5132” through “5135,” “5141” through “5156,” “5161” through “5176,” or “5177” through “5178” appears on the display.
- 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 (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH12	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH13	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH14	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH15	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH16	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH32~TH35	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH31a~TH31p	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH41a~TH41p	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)
TH42~TH43	110°C [230°F] and above (0.4kΩ)	-40°C [-40°F] and below (130kΩ)

1. Error Code

5201

High-pressure sensor fault (Outdoor unit 63HS1/HBC controller PS)

2. Error definition and error detection method

When a pressure sensor reading of 4.06 MPa [589 psi] or above is detected, error codes "5201" and "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 page on the troubleshooting of the high pressure sensor in outdoor unit service handbook.
(2)	Pressure drop due to refrigerant leak	
(3)	Torn wire coating	
(4)	A pin on the male connector is missing or contact failure	
(5)	Disconnected wire	
(6)	High pressure sensor input circuit failure on the control board	

1. Error Code

5301

ACCT sensor fault (Detail code 115)

2. Error definition and error detection method

When the formula "output current < 1.5 Arms" remains satisfied for 10 seconds while the inverter is in operation.

3. Cause, check method and remedy

Cause	Check method and remedy
(1) Inverter open output phase	Check the output wiring connections.
(2) Compressor failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook
(3) INV board failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook

Note

Refer to the page on troubleshooting of inverter in outdoor unit service handbook.

1. Error Code

5301

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 page on troubleshooting of inverter in outdoor unit service handbook
(2) Compressor failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook

Note

Refer to the page on troubleshooting of inverter in outdoor unit service handbook.

1. Error Code

5301

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 problem	Check output wiring connections. Confirm that the U- and W-phase output cables are put through CT12 and CT22 on the INV board respectively.
(2) Inverter failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook
(3) Compressor failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook

Note

Refer to the page on troubleshooting of inverter in outdoor unit service handbook.

1. Error Code

5301

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. (Detection of improperly mounted ACCT sensor)

3. Cause, check method and remedy

Cause	Check method and remedy
(1) Inverter output wiring problem	Check output wiring connections. Confirm that the U- and W-phase output cables are put through CT12 and CT22 on the INV board respectively.
(2) Inverter failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook
(3) Compressor failure	Refer to the page on troubleshooting of inverter in outdoor unit service handbook

Note

Refer to the page on troubleshooting of inverter in outdoor unit service handbook.

1. Error Code

5701

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.

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1. Error Code

6600

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

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, HBC controllers, indoor units, LOSSNAY units, controllers such as ME remote controllers. <Example> 6600 "01" appears on the remote controller Unit #01 detected the error. Two or more units in the system have 01 as their address. (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. **Once the unit is found, correct the address. Then, turn off the outdoor units, indoor units, and LOSSNAY units, keep them all turned off for at least five minutes, and turn them back on.** ♦When air conditioning units are operating normally despite the address overlap error Check the transmission wave shape and noise on the transmission line. See the section "Investigation of Transmission Wave Shape/Noise."

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1. Error Code

6601

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 AG-150A/GB-50ADA/PAC-YG50ECA/BAC-HD150 are connected to. (2) M-NET transmission line to which AG-150A/GB-50ADA/PAC-YG50ECA/BAC-HD150 are connected is short-circuited.	Check if power is supplied to the M-NET transmission line of the AG-150A/GB-50ADA/PAC-YG50ECA/BAC-HD150, and correct any problem found.

1. Error Code

6602

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.

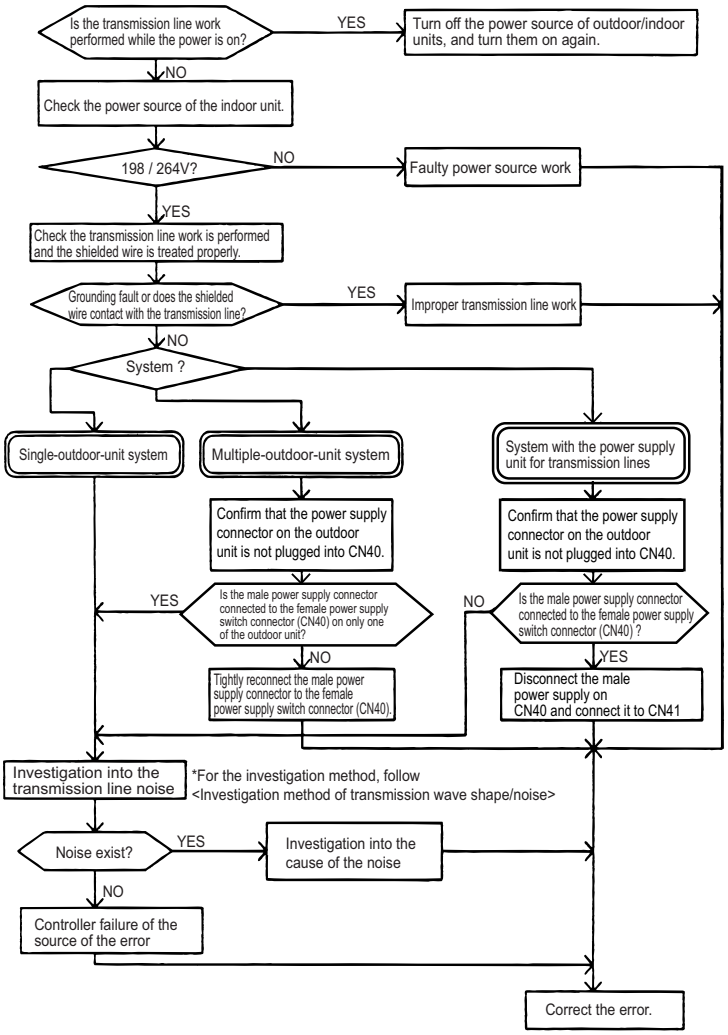
Note

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



1. Error Code

6603

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

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. See the section "Investigation of Transmission Wave Shape/Noise." -> No noise indicates that the error source controller is a failure. -> If noise exists, investigate the noise.
(2)	Error source controller failure	

1. Error Code

6606

Communication error between device and transmission processors

2. Error definition and error detection method

Communication error between the main microcomputer on the indoor unit board and the microcomputer for transmission

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.) -> If the same error occurs, the error source controller is a failure.
(2)	Error source controller failure	

1. Error Code

6607

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. System configuration

(1) System with one outdoor unit

Error source address	Error display	Detection method	Cause	Check method and remedy
Outdoor unit (OC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to OC	(1) Contact failure of transmission line of OC or IC (2) Decrease of transmission line voltage/signal by exceeding acceptable range of transmission wiring. Farthest:200 m [656ft] or less Remote controller wiring: 10m [32ft] or less (3) Erroneous sizing of transmission line (Not within the range below). Wire diameter: 1.25mm^2 [AWG16] or more (4) Indoor unit control board failure	Turn off the power source of the outdoor unit, and turn it on again. If the error is accidental, it will run normally. If not, check the causes (1) - (4).
HBC controller (HB)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to HB	(1) When HBC controller address is changed or modified during operation. (2) Faulty or disconnected transmission wiring of HBC controller (3) Disconnected connector of HBC controller (CN02) (4) Faulty control board of HBC controller	Turn off the outdoor/indoor units for 5 or more minutes, and turn them on again. If the error is accidental, they will run normally. If not, check the causes (1) - (4).
Indoor unit (IC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at RC transmission to IC	(1) When IC unit address is changed or modified during operation. (2) Faulty or disconnected IC transmission wiring (3) Disconnected IC connector (CN2M) (4) Indoor unit controller failure (5) ME remote controller failure	Turn off the outdoor/indoor units for 5 or more minutes, and turn them on again. If the error is accidental, they will run normally. If not, check the causes (1) - (5).
LOSSNAY (LC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to LC	(1) The power source of LOSSNAY has been shut off. (2) When the address of LOSSNAY is changed in the middle of the operation (3) Faulty or disconnected transmission wiring of LOSSNAY (4) Disconnected connector (CN1) on LOSSNAY (5) Controller failure of LOSSNAY	Turn off the power source of LOSSNAY and turn it on again. If the error is accidental, it will run normally. If not, check the causes (1) - (5).
ME remote controller (RC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to RC	(1) Faulty transmission wiring at IC unit side. (2) Faulty wiring of the transmission line for ME remote controller (3) When the address of ME remote controller is changed in the middle of the operation (4) ME remote controller failure	Turn off the power source of the outdoor unit for 5 minutes or more, and turn it on again. If the error is accidental, it will run normally. If not, check the causes (1) - (4).

1. Error Code

6607

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. System configuration

(2) Grouping of units in a system with multiple outdoor units

Error source address	Error display	Detection method	Cause	Check method and remedy
Outdoor unit (OC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to OC	Same cause as that for system with one outdoor unit	Same remedy as that for system with one outdoor unit
HBC controller (HB)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to HB	Same cause as that for system with one outdoor unit	Same remedy as that for system with one outdoor unit
Indoor unit (IC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at RC transmission to IC	(1) Same causes as (1) - (5) for system with one outdoor unit (2) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7) (3) When multiple outdoor units are connected and the power source of one of the outdoor units has been shut off. (4) The male power supply connector of the outdoor unit is not connected to the female power supply switch connector (CN40). (5) The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for centralized control. If an error occurs, after the unit runs normally once, the following causes may be considered. ♦Total capacity error (7100) ♦Capacity code error (7101) ♦Error in the number of connected units (7102) ♦Address setting error (7105)	1) Turn off the power sources of the outdoor and indoor units for 5 or more minutes, and turn them on again. If the error is accidental, the will run normally.If not, check the cause 2). 2) Check the causes of (1) - (5). If the cause is found, correct it. If no cause is found, check 3). 3) Check the LED displays for troubleshooting on other remote controllers whether an error occurs. If an error is found, -> If an error is found, check the check code definition, and correct the error. If no error is found, -> Indoor unit board failure

1. Error Code

6607

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. System configuration

(2) Grouping of units in a system with multiple outdoor units

Error source address	Error display	Detection method	Cause	Check method and remedy
LOSSNAY (LC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to LC	(1) Factors (1) through (5) in the "Factors in system with one outdoor unit" (When performing an interlocked operation of the LOSSNAY unit and the indoor units that are connected to different outdoor units.) (2) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7) (3) When multiple outdoor units are connected and the power source of one of the outdoor units has been shut off. (4) The male power supply connector of the outdoor unit is not connected to the female power supply switch connector (CN40). (5) The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for centralized control. If an error occurs, after the unit runs normally once, the following causes may be considered. ♦Total capacity error (7100) ♦Capacity code error (7101) ♦Error in the number of connected units (7102) ♦Address setting error (7105)	1) Turn off the power source of LOSSNAY for 5 or more minutes, and turn it on again. If the error is accidental, it will run normally.If not, check the cause 2). 2) Check the causes of (1) - (5). If the cause is found, correct it. If no cause is found, check 3). 3) Same cause as that for indoor unit described in 3)

1. Error Code

6607

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. System configuration

(2) Grouping of units in a system with multiple outdoor units

Error source address	Error display	Detection method	Cause	Check method and remedy
ME remote controller (RC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to RC	(1) Same causes as (1) - (4) for system with one outdoor unit	1) Turn off the power source of LOSSNAY for 5 or more minutes, and turn it on again. If the error is accidental, it will run normally.If not, check the cause 2).
			(2) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7)	2) Check the causes of (1) - (5). If the cause is found, correct it. If no cause is found, check 3).
			(3) When multiple outdoor units are connected and the power source of one of the outdoor units has been shut off.	3) Same cause as that for indoor unit described in 3)
			(4) The male power supply connector of the outdoor unit is not connected to the female power supply switch connector (CN40).	
			(5) The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for centralized control. If the problem recurs after normal operation is restored, the problem is caused by one of the following factors: ♦Total capacity error (7100) ♦Capacity code setting error (7101) ♦Error in the number of connected units (7102) ♦Address setting error (7105)	

1. Error Code

6607

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. System configuration

(3) System connected to the system controllers (MELANS)

Error source address	Error display	Detection method	Cause	Check method and remedy
Outdoor unit (OC)	ME remote controller (RC) System controller (SC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to OC	Same cause as that for system with one outdoor unit	Same remedy as that for system with one outdoor unit
HBC controller (HB)	ME remote controller (RC) system controller (SC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to HB	Same cause as that for system with one outdoor unit	Same remedy as that for system with one outdoor unit

1. Error Code

6607

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. System configuration

(3) System connected to the system controllers (MELANS)

Error source address	Error display	Detection method	Cause	Check method and remedy
Indoor unit (IC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at RC transmission to IC	Same as grouping of units in a system with multiple outdoor units	Same remedy as that for grouping of units in a system with multiple outdoor units
	System controller (SC)	No acknowledgement (ACK) at SC transmission to IC	1. Error occurrence on some IC (1) Same cause as that for system with one outdoor unit	Same remedy as that for system with one outdoor unit
			2. Error occurrence on all IC in the system with one outdoor unit (1) Total capacity error (7100) (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	1) Check the LED display for troubleshooting on the outdoor unit. ♦If an error is found, check the check code definition, and correct the error. ♦If no error is found, check 2). 2) Check (5) - (7) on the left.
			3. Error occurrence on all IC (1) Same causes as (1) - (7) described in 2. (2) The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for the transmission line for centralized control. (3) Disconnection or shutdown of the power source of the power supply unit for transmission line (4) System controller (MELANS) malfunction	Check voltage of the transmission line for centralized control. ♦20V or more: Check (1) and (2) on the left. ♦Less than 20V: Check (3) on the left.

1. Error Code

6607

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. System configuration

(3) System connected to the system controllers (MELANS)

Error source address	Error display	Detection method	Cause	Check method and remedy
ME remote controller (RC)	ME remote controller (RC) System controller (SC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to RC	Same as grouping of units in a system with multiple outdoor units	Same remedy as that for grouping of units in a system with multiple outdoor units
	System controller (SC)	No acknowledgement (ACK) at MELANS transmission to RC	1. Error occurrence on some IC (1) Same cause as that for system with one outdoor unit	Same remedy as that for system with one outdoor unit
			2. Error occurrence on all IC in the system with one outdoor unit (1) An error is found by the outdoor unit. Total capacity error (7100) Capacity code error (7101) Error in the number of connected units (7102) Address setting error (7105) (2) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7) (3) Turn off the power source of the outdoor unit (4) Malfunction of electrical system for the outdoor unit	1) Check the LED display for troubleshooting on the outdoor unit. • If an error is found, check the check code definition, and correct the error. • If no error is found, check the cause 2). 2) Check (2) - (4) on the left.
			3. Error occurrence on all IC (1) Same causes as (1) - (4) described in 2. (2) 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 (3) Disconnection or shutdown of the power source of the power supply unit for transmission line (4) System controller (MELANS) malfunction	Check (1) - (4) on the left.

1. Error Code

6607

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. System configuration

(3) System connected to the system controllers (MELANS)

Error source address	Error display	Detection method	Cause	Check method and remedy
System controller (SC)	ME remote controller (RC) MA remote controller (MA)	No acknowledgement (ACK) at IC transmission to SC	1. Error display on some displays on ME remote controllers (1) Faulty wiring of the transmission line for ME remote controller (2) Disconnection or contact failure of the transmission connector for ME remote controller (3) ME remote controller failure	Check (1) - (3) on the left.
			2. Error occurrence on all IC in the system with one outdoor unit (1) An error is found by the outdoor unit. Total capacity error (7100) Capacity code error (7101) Error in the number of connected units (7102) Address setting error (7105) (2) Disconnection or short circuit of the transmission line for the outdoor unit on the terminal block for centralized control line connection (TB7) (3) Turn off the power source of the outdoor unit (4) Malfunction of electrical system for the outdoor unit	1) Check the LED display for troubleshooting on the outdoor unit. • If an error is found, check the check code definition, and correct the error. • If no error is found, check the cause 2) 2) Check (2) - (4) on the left.
			3. Error display on all displays on ME remote controllers (1) Same causes as (1) - (4) described in 2. (2) 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 (3) Disconnection or shutdown of the power source of the power supply unit for transmission line (4) System controller (MELANS) malfunction	Check (1) - (4) on the left

1. Error Code

6607

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. System configuration

(4) Errors that are not limited to a particular system

Error source address	Error display	Detection method	Cause	Check method and remedy
Address which should not be existed	-	-	(1) Although the address of ME remote controller has been changed after the group is set using ME remote controller, the indoor unit is keeping the memory of the previous address. The same symptom will appear for the registration with SC.	Delete unnecessary information of non-existing address which some indoor units have. Use either of the following two methods for deletion.
			(2) Although the address of LOSSNAY has been changed after the interlock registration of LOSSNAY is made using ME remote controller, the indoor unit is keeping the memory of the previous address.	1) Address deletion by ME remote controller Delete unnecessary address information using the manual setting function of ME remote controller. 2) Deletion of connection information of the outdoor unit by the deleting switch **Note that the above method will delete all the group settings set via the ME remote controller and all the interlock settings between LOSSNAY units and indoor units.** • Turn off the power source of the outdoor unit, and wait for 5 minutes. • Turn on the dip switch (SW2-2) on the outdoor unit control board. • Turn on the power source of the outdoor unit, and wait for 5 minutes. • Turn off the power source of the outdoor unit, and wait for 5 minutes. • Turn off the dip switch (SW2-2) on the outdoor unit control board. • Turn on the power source of the outdoor unit.

1. Error Code

6608

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 transmission wave shape/ noise on trans-mission line by following "VIII [3] Investigation of Transmission Wave Shape/ Noise" (page 163).
   Noise is the most possible cause of the error "6608".

1. Error Code

7100

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,

<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 model total of indoor units in the system with one outdoor unit exceeds the following table.

<table>
<tr><th>Model</th><th>Qj Total</th></tr>
<tr><td>(E)P200 model</td><td>300</td></tr>
<tr><td>(E)P250 model</td><td>375</td></tr>
<tr><td>(E)P300 model</td><td>450</td></tr>
<tr><td>(E)P350 model</td><td>525</td></tr>
<tr><td>(E)P400 model</td><td>600</td></tr>
<tr><td>(E)P450 model</td><td>675</td></tr>
<tr><td>(E)P500 model</td><td>750</td></tr>
</table></td><td>1) Check the Qj total (capacity code total) of indoor units connected.

2) Check the Qj setting (capacity code) of the connected indoor unit set by the switch (SW2 on indoor unit board).

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).

3) Indoor unit Qj table

<table>
<tr><th>Model</th><th>Qj</th></tr>
<tr><td>15</td><td>3</td></tr>
<tr><td>20</td><td>4</td></tr>
<tr><td>25</td><td>5</td></tr>
<tr><td>32</td><td>6</td></tr>
<tr><td>40</td><td>8</td></tr>
<tr><td>50</td><td>10</td></tr>
</table></td></tr>
<tr><td>(2) The model selection switches (SW5-1 - 5-4) 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>P200 model</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P250 model</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P300 model</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P350 model</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P400 model</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P450 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>P500 model</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>EP200 model</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP250 model</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP300 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP350 model</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP400 model</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP450 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr>
<tr><td>EP500 model</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr>
</table></td><td>Check the setting for the model selection switch on the outdoor unit (Dipswitches SW5-1 - 5-4 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>

1. Error Code

7101

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

<table>
<tr><th>Error source</th><th>Cause</th><th>Check method and remedy</th></tr>
<tr><td>Outdoor unit
Indoor unit</td><td>(1) The model name (capacity code) set by the switch (SW2) is wrong.
*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).
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 (SW5-1 - 5-4) 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>P200 model</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P250 model</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P300 model</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P350 model</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P400 model</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>P450 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>P500 model</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>EP200 model</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP250 model</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP300 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP350 model</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP400 model</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>EP450 model</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr>
<tr><td>EP500 model</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td></tr>
</table></td><td>Check the setting for the model selection switch on the outdoor unit (Dipswitches SW5-1 - 5-4 on the outdoor unit control board).</td></tr>
</table>

1. Error Code

7102

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

<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>1 - 50: (E)P200 model
1 - 50: (E)P250 model
1 - 50: (E)P300 model
1 - 50: (E)P350 model
1 - 50: (E)P400 model
1 - 50: (E)P450 model
1 - 50: (E)P500 model</td></tr>
<tr><td>Number of HBC controllers</td><td>1 - 2 *1</td></tr>
<tr><td>Total number of outdoor units</td><td>1</td></tr>
</table>
*1 2 units in the case of P300 or later model
(2) Disconnected transmission line from the outdoor unit or BC controller
(3) Short-circuited transmission line
When (2) and (3) apply, the following display will appear.
♦ME remote controller
Nothing appears on the remote controller because it is not powered.
♦MA remote controller
"HO" or "PLEASE WAIT" blinks.
(4) The model selection switch (SW5-7) on the outdoor unit is set to OFF. (Normally set to ON)
(5) Outdoor unit address setting error
The outdoor units in the same refrigerant circuit do not have sequential address numbers.
(6) The units other than HBC controller and indoor units for exclusive use with HBC controller are connected.</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.)
2) Check (2) - (3) on the left.
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).
4) Check the setting for the model selection switch on the outdoor unit (Dipswitches SW5-7 on the outdoor unit control board).</td></tr>
</table>

1. Error Code

7105

Address setting error

2. Error definition and error detection method

Erroneous setting of OC unit address
Erroneous setting of BC controller address

3. Cause, check method and remedy

Error source	Cause	Check method and remedy
Outdoor unit BC controller	Erroneous setting of OC unit address The address of outdoor unit is not being set to 51 - 100. The address of HBC controller is not set to 51 - 100.	Check that the outdoor unit and HBC controller addresses are set to 00 or a number between 51 and 100. If the outdoor unit address is out of the valid range, reset the address with the power to the outdoor unit turned off. If the HBC controller address is out of the valid range, reset the address with the power to both the outdoor unit and HBC controller turned off.

1. Error Code

7106

Attribute setting error

2. Error definition and error detection method

Error source	Cause	Check method and remedy
-	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.	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. Operation Method / SW3-1 Interlocked operation with the indoor unit / OFF Direct operation via the MA remote controller / ON

1. Error Code

7107

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.

3. Cause, check method and remedy

Error source	Cause	Check method and remedy
HBC controller	(1) Model total of indoor units per each port or per each port merge is greater than the specification. Total port number: Single branching Model total: 80 (2) 4 or more indoor units are connected to the same port. (3) When two ports are used, the port with the smaller number is not connected to the indoor unit. (4) The address of the HBC controller is not set to an address that equals the address of the lowest address of the connected indoor unit plus 50.	**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 HBC controller and the indoor unit.**

1. Error Code

7110

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

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.	3) Check the model selection switch on the outdoor unit (Dipswitch SW5-7 on the control board.).
	(5) The model selection switch (SW5-7) on the outdoor unit is set to OFF. (Normally set to ON)	

1. Error Code

7113

Function setting error (incorrect resistor connection)

2. Error source, cause, check method and remedy

Error source	Cause	Check method and remedy
Outdoor unit	(1) Wiring fault (2) Loose connectors, short-circuit, contact failure	(Detail code 15) 1) Check the connector CNTYP5 on the control board for proper connection.
	(3) Incompatible control board and INV board (replacement with a wrong circuit board) (4) DIP SW setting error on the control board	(Detail code 14) 1) Check the connector CNTYP4 on the control board for proper connection. 2) Check the connector CNTYP5 on the control board for proper connection. 3) Check the settings of SW5-1 through SW5-4 on the control board.
		(Detail code 12) 1) Check the connector CNTYP2 on the control board for proper connection. 2) Check the connector CNTYP5 on the control board for proper connection. 3) Check the connector CNTYP4 on the control board for proper connection. 4) Check the settings of SW5-1 through SW5-4 on the control board.
		(Detail code 16) 1) Check the connector CNTYP on the INV board for proper connection. 2) Check the connector CNTYP5 on the control board for proper connection. 3) Check the connector CNTYP4 on the control board for proper connection. 4) Check the settings of SW5-1 through SW5-4 on the control board. 5) Check the wiring between the control board and INV board.
		(Detail code 00, 01, 05) 1) Check the wiring between the control board and INV board. 2) Check the settings of SW5-1 through SW5-4 on the control board. 3) Check the connector CNTYP5 on the control board for proper connection. 4) Check the connector CNTYP4 on the control board for proper connection.
		(Detail code Miscellaneous) *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.

1. Error Code

7117

Model setting error

2. Error source, cause, check method and remedy

Error source	Cause	Check method and remedy
Outdoor unit	(1) Wiring fault (2) Loose connectors, short-circuit, contact failure	(Detail code 15) 1) Check the connector CNTYP5 on the control board for proper connection.
		(Detail code 14) 1) Check the connector CNTYP4 on the control board for proper connection.
		(Detail code 12) 1) Check the connector CNTYP2 on the control board for proper connection. 2) Check the connector CNTYP5 on the control board for proper connection.
		(Detail code 16) 1) Check the connector CNTYP on the INV board for proper connection. 2) Check the connector CNTYP5 on the control board for proper connection. 3) Check the connector CNTYP4 on the control board for proper connection. 4) Check the wiring between the control board and INV board.
		(Detail code 00, 01, 05) 1) Check the wiring between the control board and INV board. 2) Check the settings of SW5-1 through SW5-4 on the control board. 3) Check the connector CNTYP5 on the control board for proper connection. 4) Check the connector CNTYP4 on the control board for proper connection.
		(Detail code Miscellaneous) *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.

1. Error Code

7130

Incompatible unit combination

2. Error source, cause, check method and remedy

Refer to 7130 in outdoor unit service handbook.

-1- Troubleshooting according to the remote controller malfunction or the external input error

In the case of MA remote controller

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 ◎ does not appear on the screen.)

(1) 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

(2) Check method and remedy

1) Measure voltages of the MA remote controller terminal (among 1 to 3).
   - 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) Remove the wire for the remote controller from the terminal block (TB15) on the MA remote controller for the indoor unit, and check voltage among 1 to 3.
   - 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.

In the case of MA remote controller

2. 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.

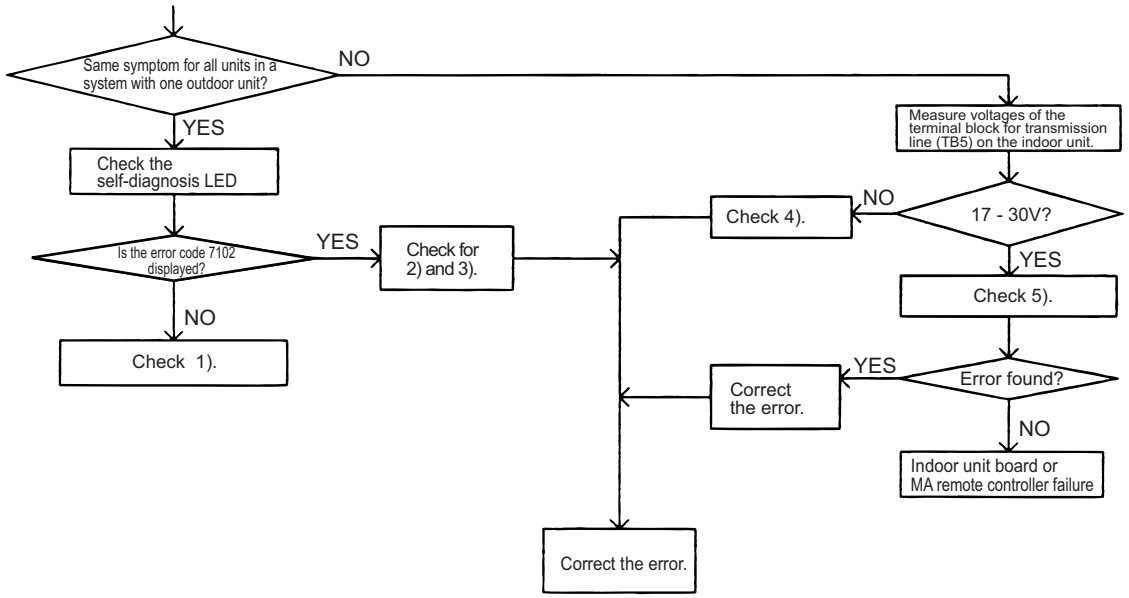
(1) Cause

1) The power for the M-NET transmission line is not supplied from the outdoor unit.
2) Short circuit of the transmission line.
3) Incorrect wiring of the M-NETtransmission line on the outdoorunit.
   - 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.

(2) Check method and remedy

1) **When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**



Refer to VIII [4] -3- (2) "Troubleshooting transmission power circuit of outdoor unit" for how to check item 1 in the flow chart above.(page 175)

In the case of MA remote controller

3. Phenomena

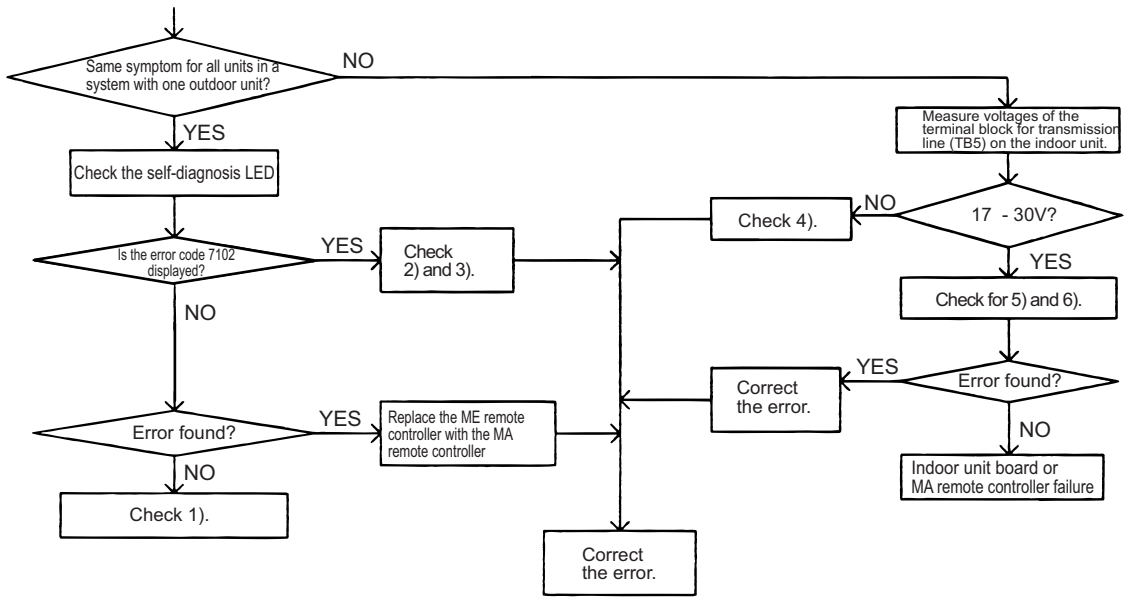
"HO" or "PLEASE WAIT" display on the remote controller does not disappear, and no operation is performed even if the button is pressed. ("HO" or "PLEASE WAIT" display will normally turn off 5 minutes later after the power on.)

(1) Cause

1) The power for the M-NET transmission line is not supplied from the outdoor unit.
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

(2) Check method and remedy

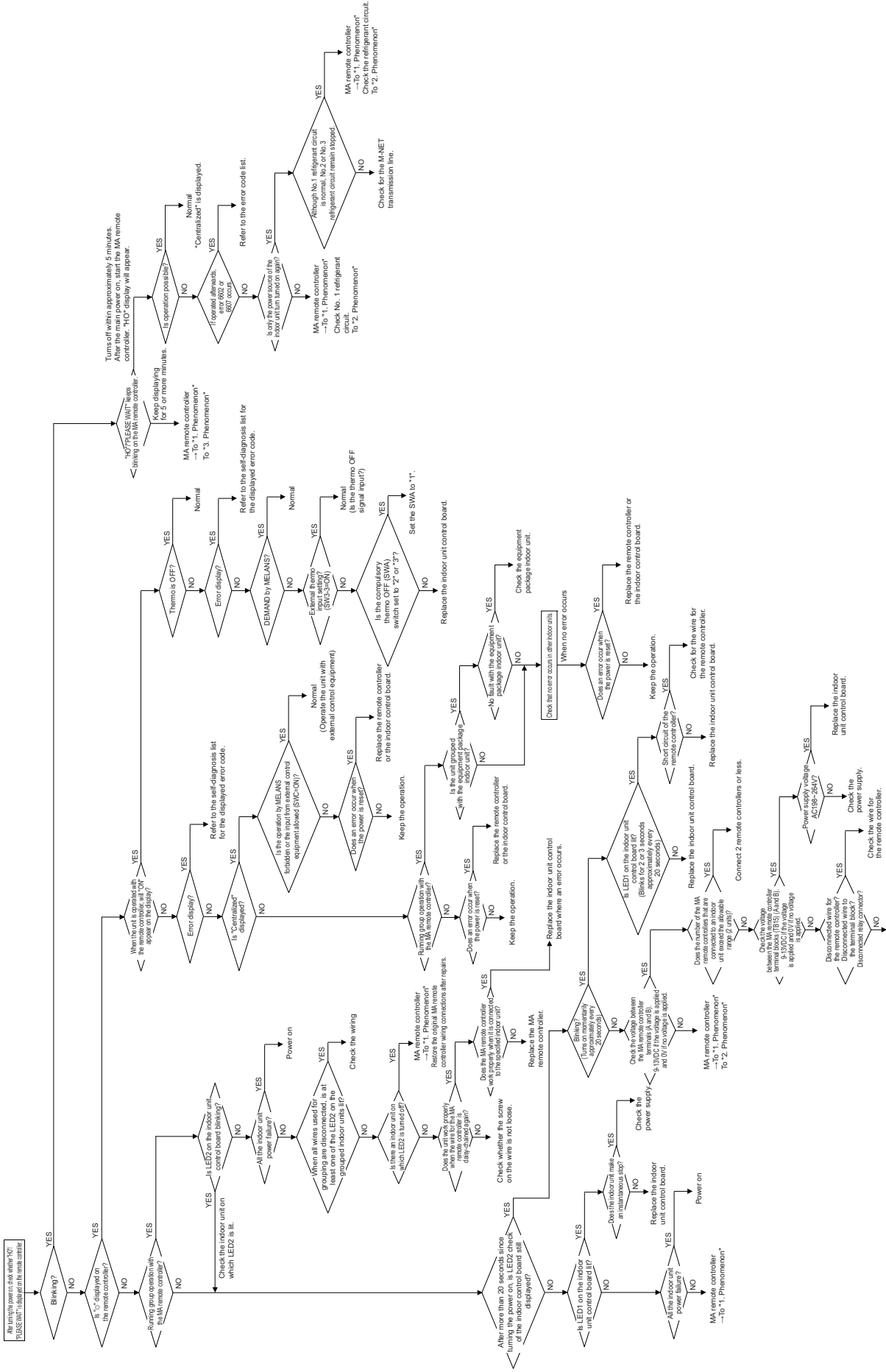
1) **When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**



Refer to VIII [4] -3- (2) "Troubleshooting transmission power circuit of outdoor unit" for how to check item 1 in the flow chart above.(page 175)

Flow chart

Even if the operation button on the remote controller is pressed, the indoor and the outdoor units do not start running.



In case of ME remote controller

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 ◎ does not appear on the screen.)

(1) Cause

1) The power for the M-NET transmission line is not supplied from the indoor unit.
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).
4) Disconnected transmission line on the remote controller.
5) Remote controller failure
6) Outdoor unit failure

(2) Check method and remedy

1) Check voltage of the transmission terminal block for of the ME remote controller.
   - If voltage between is 17V and 30V -> ME remote controller failure
   - When voltage is 17V or less -> Refer to VIII [4] -3- (2) "Troubleshooting transmission power curcuit of outdoor unit".(page 175)
2) **When 2) and 3) above apply, check code 7102 will be displayed on the self-diagnosis LED.**

In case of ME remote controller

2. Phenomena

When the remote controller operation SW is turned on, a temporary operation display is indicated, and the display lights out immediately.

(1) Cause

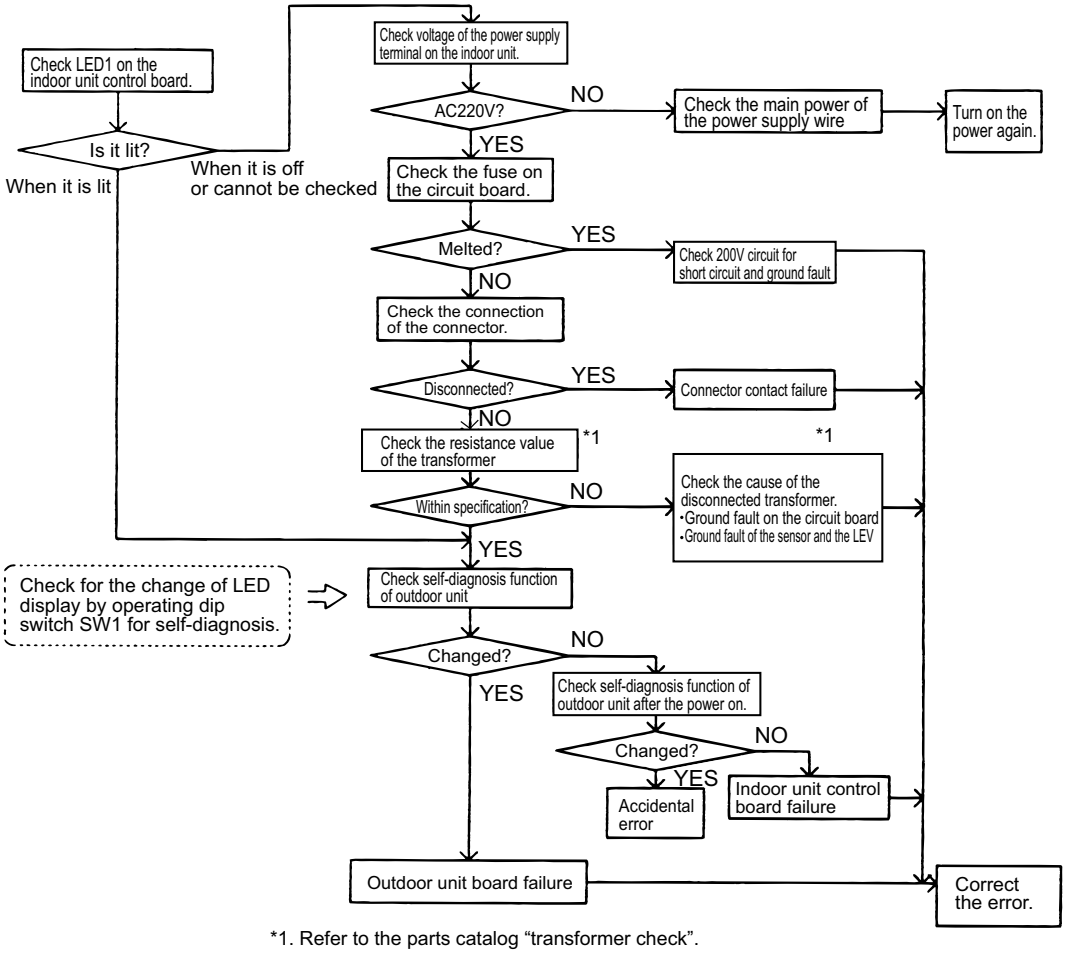
1) The power is not supplied to the indoor unit.

- The main power of the indoor unit (AC220V) 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
- The indoor unit board failure

2) The outdoor control board failure

As the indoor unit does not interact with the outdoor unit, the outdoor unit model cannot be recognized.

(2) Check method and remedy



*1. Refer to the parts catalog “transformer check”.

In case of ME remote controller

3. Phenomena

"HO" display on the remote controller does not disappear, and no operation is performed even if the button is pressed.

(1) Cause

Without using MELANS

1) Outdoor unit address is set to "00"
2) A wrong address is set.
   - The address of the indoor unit that is connected to the remote controller is incorrect. (It should equal the ME remote controller address plus 100.)
   - A wrong address is set to the ME remote controller. (100 must be added to the address of the indoor unit.)
3) Faulty wiring of the terminal block for transmission line (TB5) of the indoor unit in the same group with the remote controller.
4) The centralized control switch (SW2-1) on the outdoor unit is set to ON.
5) Disconnection or faulty wiring of indoor unit transmission line.
6) Disconnection between the terminal block for M-NET line connection (TB5) of the indoor unit and the male connector (CN2M)
7) The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for the transmission line for centralized control.
8) Outdoor unit control board failure
9) Indoor unit control board failure
10) Remote controller failure

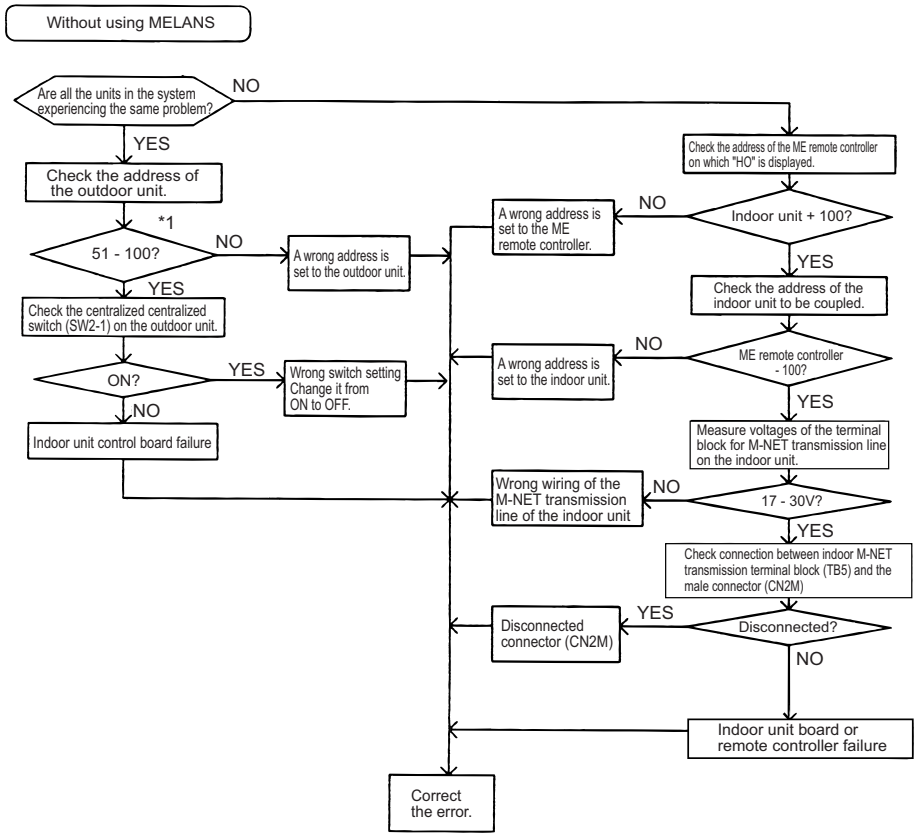
Interlocking control with MELANS

11) No group registration is made using MELANS. (The indoor unit and the ME remote controller are not grouped.)
12) Disconnected transmission line for centralized control (TB7) of the outdoor unit
13) The male power supply connector is connected to CN40 on more than one outdoor unit, or the connector is connected to CN40 on the outdoor unit in the system to which a power supply unit for transmission line is connected.

Using MELANS

14) When MELANS is used, "HO" display on the remote controller will disappear when the indoor unit and the local remote controller (ME remote controller) are grouped.
    If "HO" does not disappear after the registration, check the causes (2) 1) - 3).

(2) Check method and remedy



*1. When the indoor unit address is set to 1 - 50, the address will be forcibly set to 100.

In case of ME remote controller

4. Phenomena

"88" appears on the remote controller when the address is registered or confirmed.

(1) Cause, check method and remedy

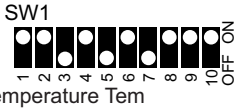
Cause	Check method and remedy
An error occurs when the address is registered or confirmed. (common)	
1. A wrong address is set to the unit to be coupled.	(1) Confirm the address of unit to be coupled.
2. The transmission line of the unit to be coupled is disconnected or is not connected.	(2) Check the connection of transmission line.
3. Circuit board failure of the unit to be coupled	(3) Check voltage of the terminal block for transmission line of the unit to be coupled.
	1) Normal if voltage is between DC17 and 30V.
4. Improper transmission line work	2) Check (4) in case other than 1).
Generates at interlocking registration between LOSSNAY and the indoor unit	
5. The power of LOSSNAY is OFF.	(4) Check for the main power of LOSSNAY.
Generates at confirmation of controllers used in the system in which the indoor units connected to different outdoor units are grouped	
6. The power of the outdoor unit to be confirmed has been cut off.	(5) Check the power supply of the outdoor unit which is coupled with the unit to be confirmed.
7. The power of the outdoor unit to be confirmed has been cut off.	(6) Check that the transmission line for centralized control (TB7) of the outdoor unit is not disconnected.
8. When the indoor units connected to different outdoor units are grouped without MELANS, the male power supply connector is not connected to the female power supply switch connector (CN40) for the transmission line for centralized control.	(7) Check voltage of the transmission line for centralized control.
9. The male power supply connectors on 2 or more outdoor units are connected to the female power supply switch connector (CN40) for the transmission line for centralized control.	1) Normal when voltage is between 10V and 30V
10. In the system to which MELANS is connected, the male power supply connector is connected to the female power supply switch connector (CN40) for the transmission line for centralized control.	2) Check 8 - 11 described on the left in case other than 1).
11. Short circuit of the transmission line for centralized control	

Both for MA remote controller and ME remote controller

1. Phenomena

Although cooling operation starts with the normal remote controller display, the capacity is not enough

(1) Cause, check method and remedy

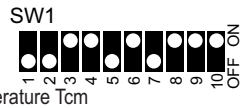
Cause	Check method and remedy
1. Compressor frequency does not rise sufficiently. ♦Faulty detection of pressure sensor. ♦Protection works and compressor frequency does not rise due to high discharge temperature ♦Protection works and compressor frequency does not rise due to high pressure ♦Pressure drops excessively.	(1) Check pressure difference between the detected pressure by the pressure sensor and the actual pressure with self-diagnosis LED. -> If the accurate pressure is not detected, check the pressure sensor. (Refer to the page on Troubleshooting of Pressure Sensor in outdoor unit service handbook) Note: Lower inlet pressure by the low pressure sensor than the actual pressure causes insufficient capacity. SW1 setting High pressure sensor  Low pressure sensor  (2) Check temperature difference between the evaporating temperature (Te) and the target evaporating temperature (Tem) with self-diagnosis LED. Note: Higher Te than Tem causes insufficient capacity. SW1 setting Evaporating temperature Te  Target evaporating temperature Tem  Note: Protection works and compressor frequency does not rise even at higher Te than Tem due to high discharge temperature and high pressure. At high discharge temperature: Refer to 1102 in outdoor unit service handbook At high pressure: Refer to 1302 in outdoor unit service handbook
2. HBC controller LEV1 and 2 actuation failure ♦Insufficient refrigerant flows due to LEV malfunction (not enough opening) or protection works and compressor frequency does not rise due to pressure drop.	Refer to the page of LEV troubleshooting ([4] -1-).(page 166)
3. RPM error of the outdoor unit FAN ♦Motor failure or board failure, or airflow rate decrease due to clogging of the heat exchanger ♦The fan is not properly controlled as the outdoor temperature cannot be precisely detected by the temperature sensor. ♦The fan is not properly controlled as the pressure cannot be precisely detected by the pressure sensor.	Refer to the page on troubleshooting of the outdoor unit fan in outdoor unit service handbook Refer to 5106 in outdoor unit service handbook Refer to 1302 in outdoor unit service handbook

Cause	Check method and remedy
4. Long piping length 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. 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 Protection works and compressor frequency does not rise due to high discharge temperature.	Refer to 1-1. (Compressor frequency does not rise sufficiently.)(page 158) Refer to the page on refrigerant amount adjustment(page 88)
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). When the temperature drops significantly, the foreign object may clog the pipe. -> Remove the foreign object inside the pipe.
8. The indoor unit inlet temperature is excessively. (Less than 15°C [59°F] WB)	Check the inlet air temperature and for short cycling. Change the environment where the indoor unit is used.
9. Compressor failure 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. HBC controller LEV3 actuation failure Sufficient cold water is not supplied as sufficient sub cool cannot be secured on the HBC controller due to LEVI, 2, and 3 actuation failure.	Refer to the page of LEV troubleshooting ([4] -1-).(page 166)
11. TH12, TH15 and 63HS1 sensor failure or faulty wiring LEV3 is not controlled normally.	♦Check the thermistor. ♦Check wiring.
12. HBC controller valve block actuation failure Sufficient cold water is not supplied because of the insufficient water flow rate and coexistence of cold and hot water on the HBC controller due to valve block actuation failure.	♦Refer to the section on valve block fault under "Troubleshooting." (page 178)

2. Phenomena

Although heating operation starts with the normal remote controller display, the capacity is not enough.

(1) Cause, check method and remedy

Cause	Check method and remedy
1. Compressor frequency does not rise sufficiently. ♦Faulty detection of pressure sensor. ♦Protection works and compressor frequency does not rise due to high discharge temperature ♦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. -> If the accurate pressure is not detected, check the pressure sensor. (Refer to the page on Trouble-shooting of Pressure Sensor in outdoor unit service handbook) Note: Higher inlet pressure by the high pressure sensor than the actual pressure causes insufficient capacity. SW1 setting High pressure sensor  Low pressure sensor  (2) Check the difference between the condensing temperature (Tc) and the target condensing temperature (Tcm) with self-diagnosis LED. Note: Higher Tc than Tcm causes insufficient capacity. SW1 setting Condensing temperature Tc  Target condensing temperature Tcm  Note: Protection works and compressor frequency does not rise even at lower Tc than Tcm due to high discharge temperature and high pressure. At high discharge temperature: Refer to 1102 in outdoor unit service handbook At high pressure: Refer to 1302 in outdoor unit service handbook

	Cause	Check method and remedy
2.	HBC controller LEV1 and 2 actuation failure Sufficient hot water is not supplied on the HBC controller due to HBC controller LEVI, 2, and 3 actuation failure.	Refer to the page of LEV troubleshooting ([4] -1-). (page 166)
3.	Temperature reading error on the indoor unit piping temperature sensor 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 ♦Motor failure or board failure, or airflow rate decrease, pressure drop due to clogging of the heat exchanger leading to high discharge temperature ♦The fan is not properly controlled as the temperature cannot be precisely detected with the piping sensor.	Refer to the page on outdoor unit fan in outdoor unit service handbook
5.	Insulation failure of the refrigerant piping	
6.	Long piping length 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. -> 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. ->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 Protection works and compressor frequency does not rise due to low discharge temperature Refrigerant recovery operation is likely to start.	Refer to 2 - 1. (Compressor frequency does not rise sufficiently.)(page 160) Refer to the page on refrigerant amount adjustment.(page 88)
11.	Compressor failure (same as in case of cooling)	Check the discharge temperature.
12.	HBC controller LEV3 actuation failure 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 page of LEV troubleshooting ([4] -1-). (page 166)
13.	HBC controller valve block actuation failure Sufficient hot water is not supplied because of the insufficient water flow rate and coexistence of cold and hot water on the HBC controller due to valve block actuation failure.	Refer to the section on valve block fault under "Troubleshooting." (page 178)

3. Phenomena

Outdoor unit stops at times during operation.

(1) 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 SW1.
	Error mode	(2)	Reoperate the unit to find the mode that stops the unit by displaying preliminary error history on LED display with SW1. Refer to the reference page for each error mode.
1)	Abnormal high pressure		
2)	Abnormal discharge air temperature		
3)	Heatsink thermistor failure		*Display the indoor piping temperature table with SW1 to check whether the freeze proof operation runs properly, and check the temperature.
4)	Thermistor failure		
5)	Pressure sensor failure		
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.)		

[3] Investigation of Transmission Wave Shape/Noise

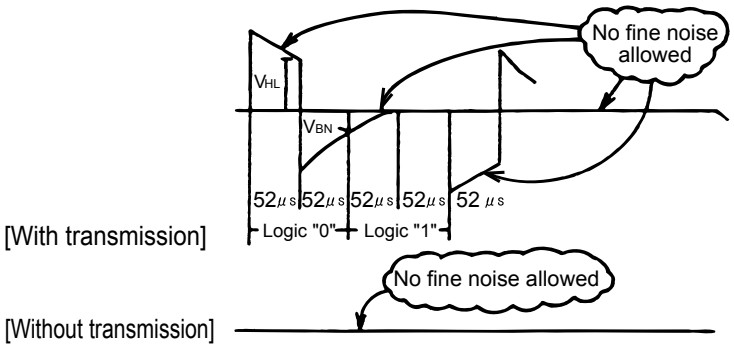
1. M-NET transmission

Control is performed by exchanging signals between the outdoor unit and the indoor unit (ME remote controller) 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 6608	No ACK error 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. When they are bundled, erroneous operation may be caused.
	3. The specified wire is used for the transmission line.	Use the specified transmission line. Type: Shielded wire CVVS/CPEVS/MVVS (For ME remote controller) Diameter: 1.25mm^2 [AWG16] or more (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. 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. 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. 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. 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. 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. Type: Shielded wire CVVS/CPEVS/MVVS (For ME remote controller) Diameter: 1.25mm^2 [AWG16] or more (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).

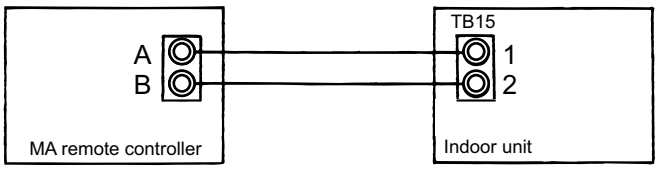
2. MA remote controller transmission

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

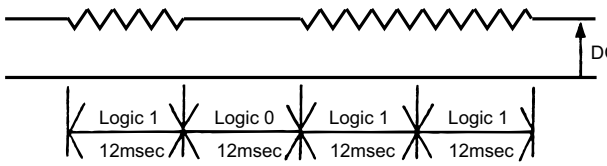
If noise is generated on the transmission line, and the communication between the MA remote controller and the indoor unit is interrupted for 3 minutes in a row, MA transmission error (6831) will occur.

(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 msec/bit ± 5%
② Voltage among terminals must be between DC9 and 12 V.

[4] Troubleshooting Principal Parts

-1- LEV

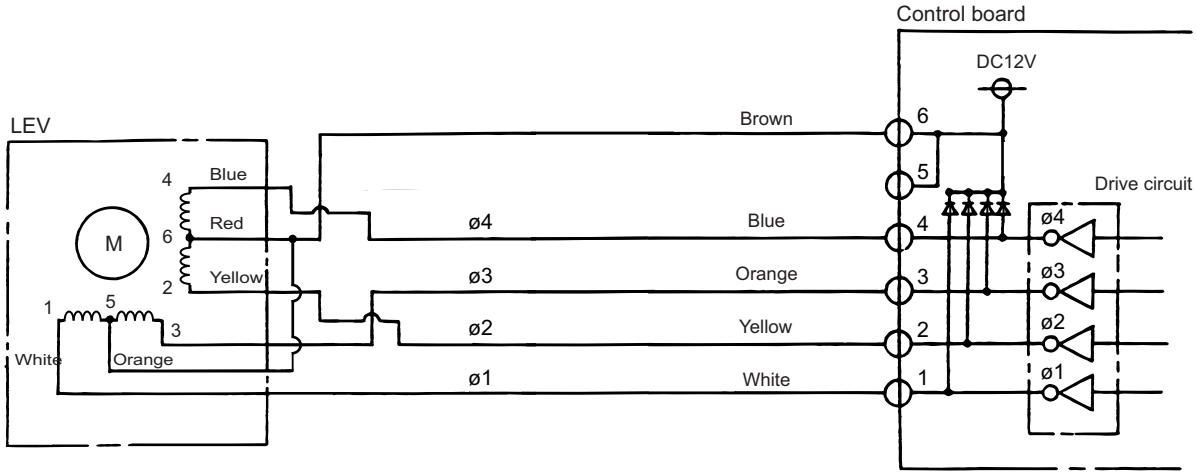
LEV operation

HBC controller LEVI, 2, and 3 (linear expansion valves) are driven by the pulse signal from the control board and are controlled by a stepping motor.

(1) HBC controller LEV

The valve opening changes according to the number of pulses.

1) Control boards and the LEV (HBC controller LEV1, 2, 3)



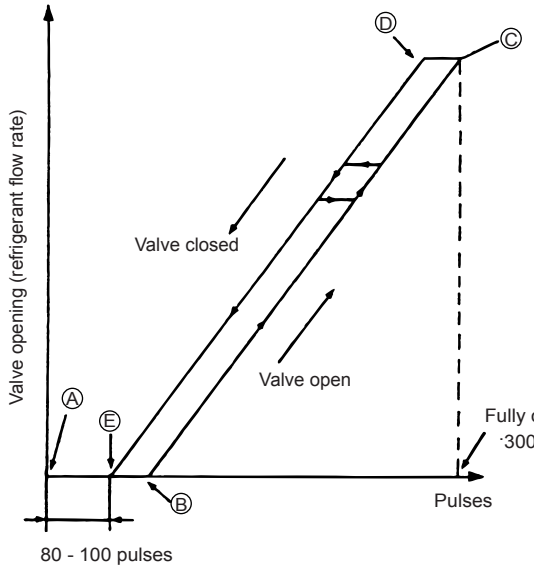
2) Pulse signal output and valve operation

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.

3) LEV valve closing and opening operation



* Upon power on, the HBC controller circuit board sends 3200 Hz pulse signals to the LEVs (HBC controller LEV 1, 2, and 3) to determine the valve position and bring the valve to the position as indicated by Ⓐ in the diagram.

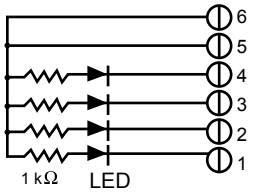
When the valve operates smoothly, no sound from LEV or no vibration occurs, however, when the pulses change from Ⓔ to Ⓐ in the chart or the valve is locked, a big sound occurs.

*Whether a sound is generated or not can be determined by holding a screwdriver against it, then placing your ear against the handle.

*1 The LEV opening may become greater depending on the operation status.

Fully open *1
·3000 pulses (HBC controller LEV1, 2, 3)

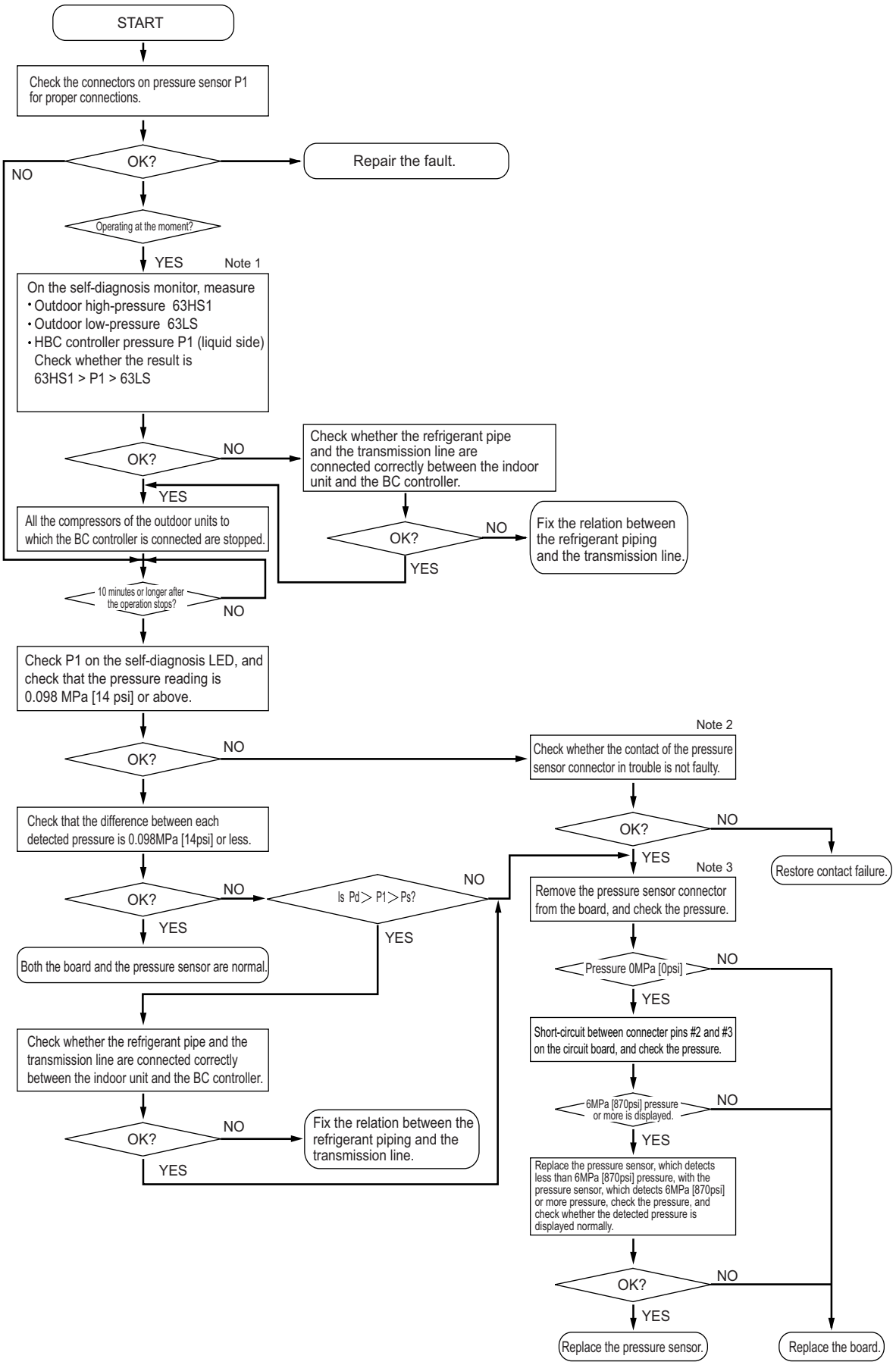
(2) Judgment methods and possible failure mode

Malfunction mode	Judgment method	Remedy
Microcomputer driver circuit failure	Disconnect the control board connector and connect the check LED as shown in the figure below.  resistance : 0.25W 1kΩ LED : DC15V 20mA or more When the main power is turned on, the indoor unit circuit board outputs pulse signals to the indoor unit LEV for 10 seconds. 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.
LEV mechanism is locked	If the LEV is locked, the drive motor runs idle, and makes a small clicking sound. When the valve makes a closing and opening sound, the valve has a problem.	Replace the LEV.
Disconnected or short-circuited LEV motor coil	Measure resistance between the coils (red - white, red -orange, brown - yellow, brown - blue) using a tester. They are normal if resistance is 150ohm ± 10%.	Replace the LEV coils.
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 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.

-2- Troubleshooting Principal Parts of HBC Controller

1. Pressure sensor

Troubleshooting flow chart for pressure sensor



Note

1) Check the self-diagnosis switch (Outdoor control board SW1).

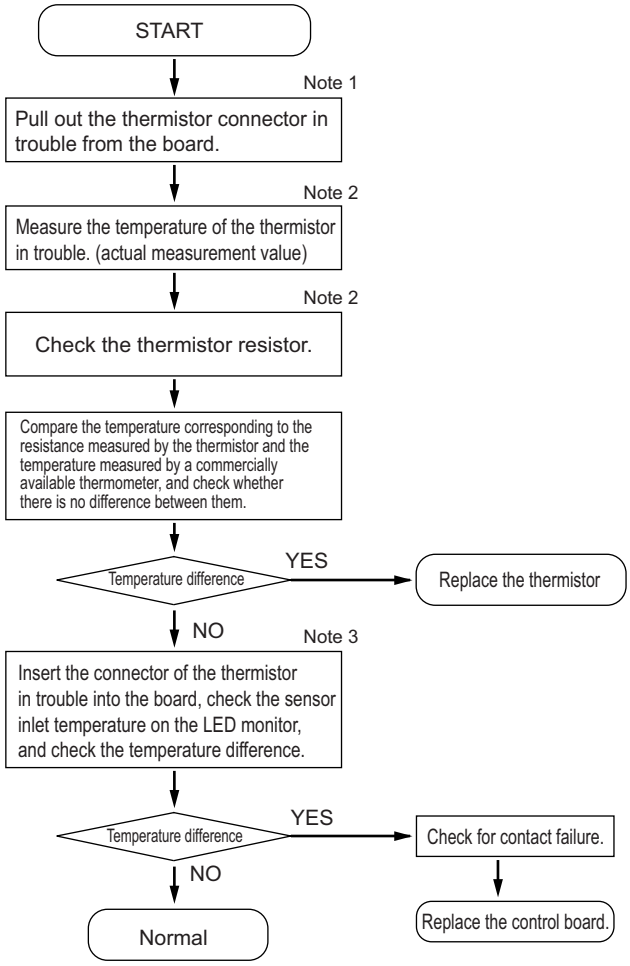
Measurement data	Symbol	SW1 setting value
Outdoor high pressure	63HS1	
Outdoor low pressure	63LS	
HBC controller pressure (liquid side)	PS	

Note

2) Check CNP1 connector on the HBC controller control board for proper connections.
3) 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.

2. Temperature sensor

Troubleshooting instructions for thermistor



Note

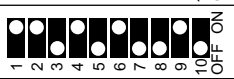
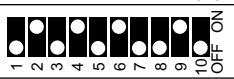
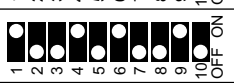
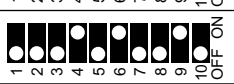
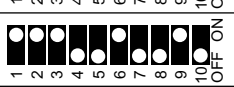
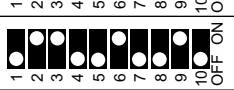
1) Connectors on the circuit board are connected to the sensors as follows. Unplug the corresponding connectors before checking each sensor.

Sensor	Connectable connector
TH11~TH12	CN501
TH13~TH14	CN502
TH15~TH16	CN511
TH31a~TH31b	CN503
TH31c~TH31d	CN504
TH31e~TH31f	CN508
TH31g~TH31h	CN509
TH32~TH33	CN510
TH31i~TH31j, TH34	CN505
TH31k~TH31l, TH35	CN506
TH31m~TH31n	CN507
TH31o	CN515
TH31p	CN516

2)

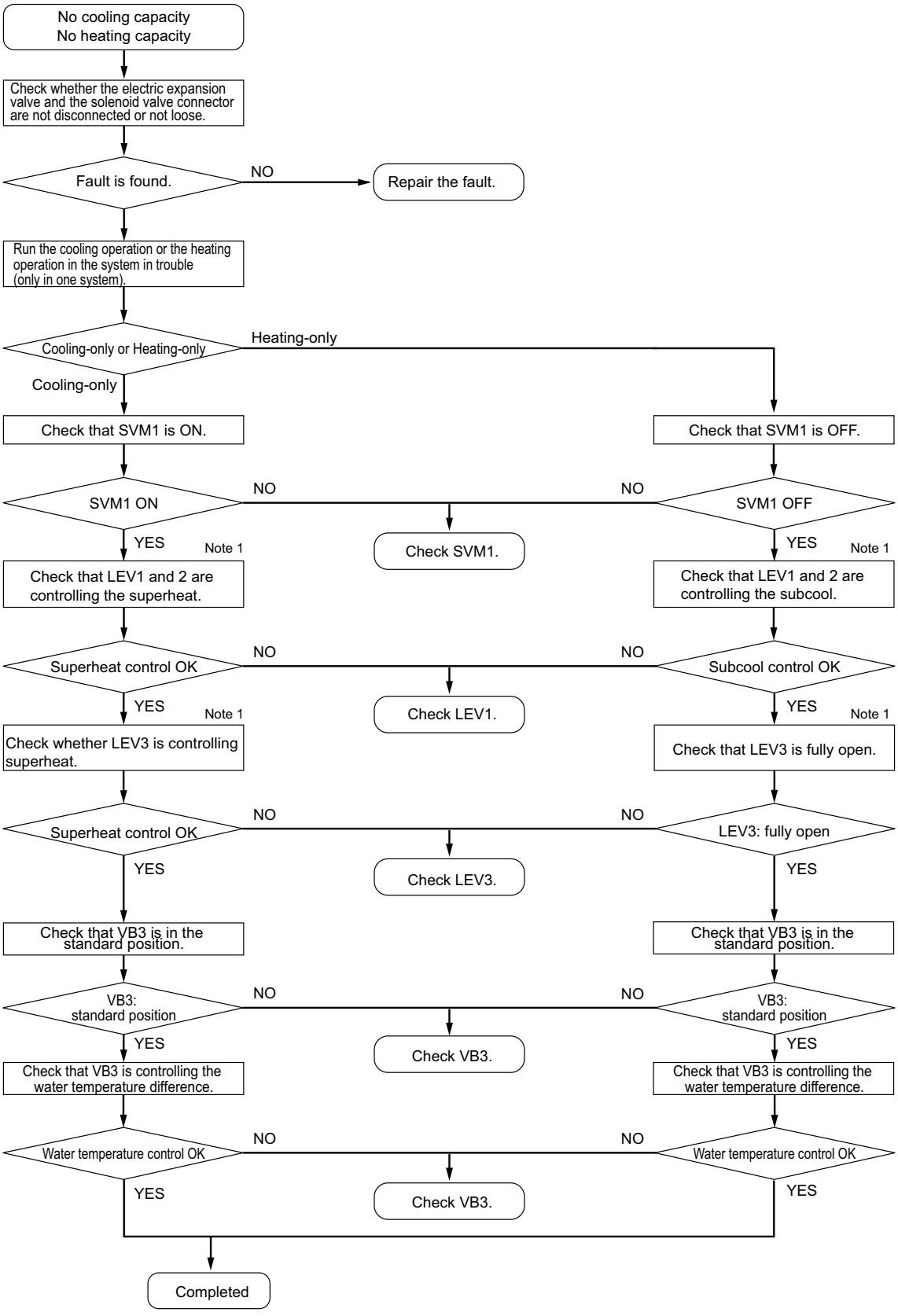
- Pull out the sensor connector from the I/O board, Do not pull the sensor by holding the lead wire.
- Measure the resistance with such as a tester.
- Compare the measured value with that of shown in the figure below. When the result is ± 10%, it is normal.

3) Check the self-diagnosis switch (Outdoor control board SW4).

Measurement data	Symbol	SW4 setting value
Liquid-side refrigerant temp. of Heating-main heat exchanger	TH11	
Liquid-side refrigerant temp. of Cooling-main heat exchanger	TH12	
Gas-side refrigerant temp. of Heating-main heat exchanger	TH13	
Gas-side refrigerant temp. of Cooling-main heat exchanger	TH14	
Bypass inlet temperature	TH15	
Bypass outlet temperature	TH16	
1st port returned water temp.	T31a	
2nd port returned water temp.	T31b	
3rd port returned water temp.	T31c	
4th port returned water temp.	T31d	
5th port returned water temp.	T31e	
6th port returned water temp.	T31f	
7th port returned water temp.	T31g	
8th port returned water temp.	T31h	
Outlet water temp. of Heating-main heat exchanger	TH32	
Outlet water temp. of Cooling-main heat exchanger	TH33	
Water pump 2 discharge water temp.	TH34	
Water pump 1 discharge water temp.	TH35	
9th port returned water temp.	TH31i	
10th port returned water temp.	TH31j	
11th port returned water temp.	TH31k	
12th port returned water temp.	TH31l	
13th port returned water temp.	TH31m	
14th port returned water temp.	TH31n	
15th port returned water temp.	TH31o	
16th port returned water temp.	TH31p	

3. Troubleshooting flow chart for LEV, Solenoid valve, and Valve block

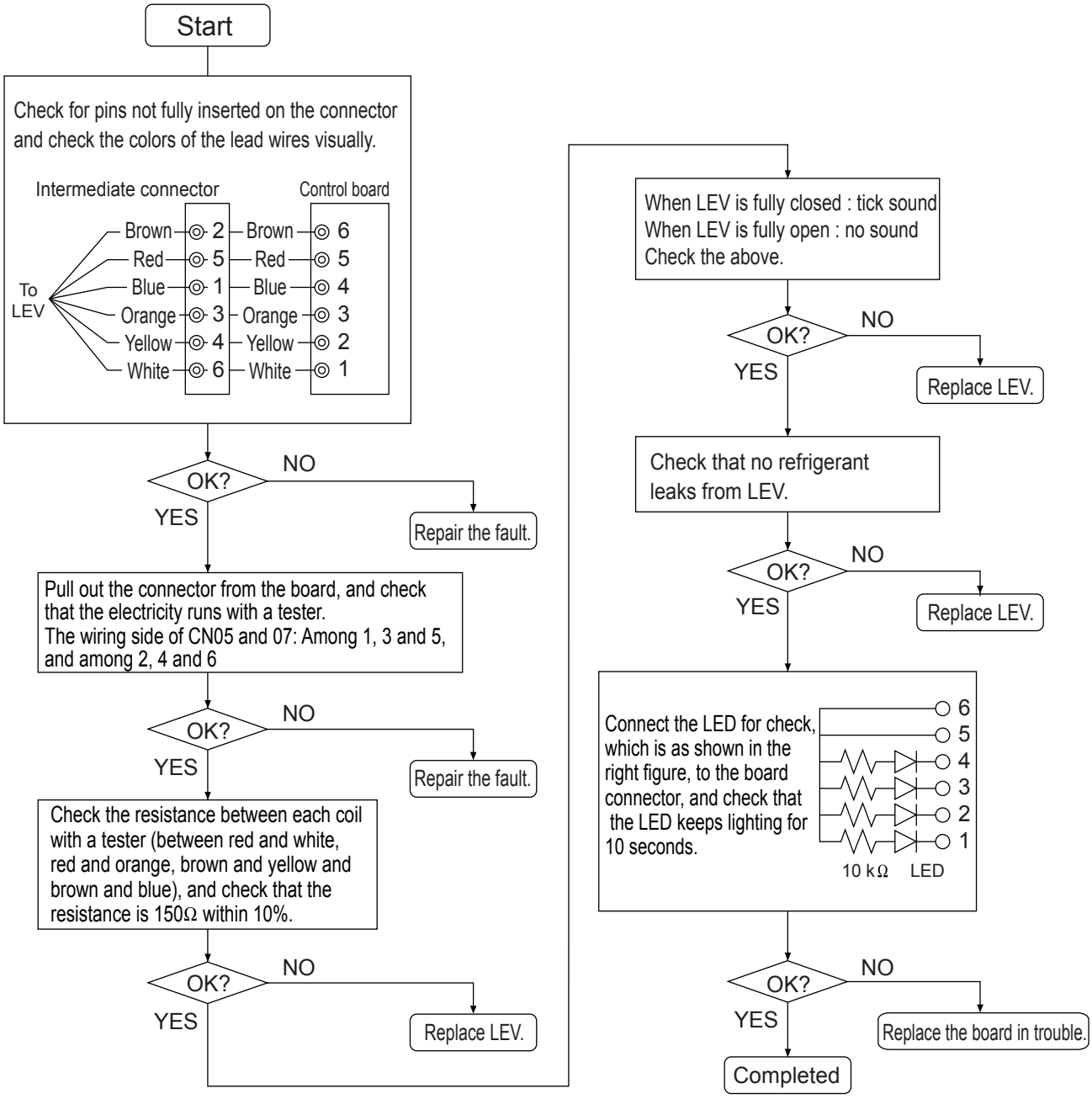
(1) LEV



Note

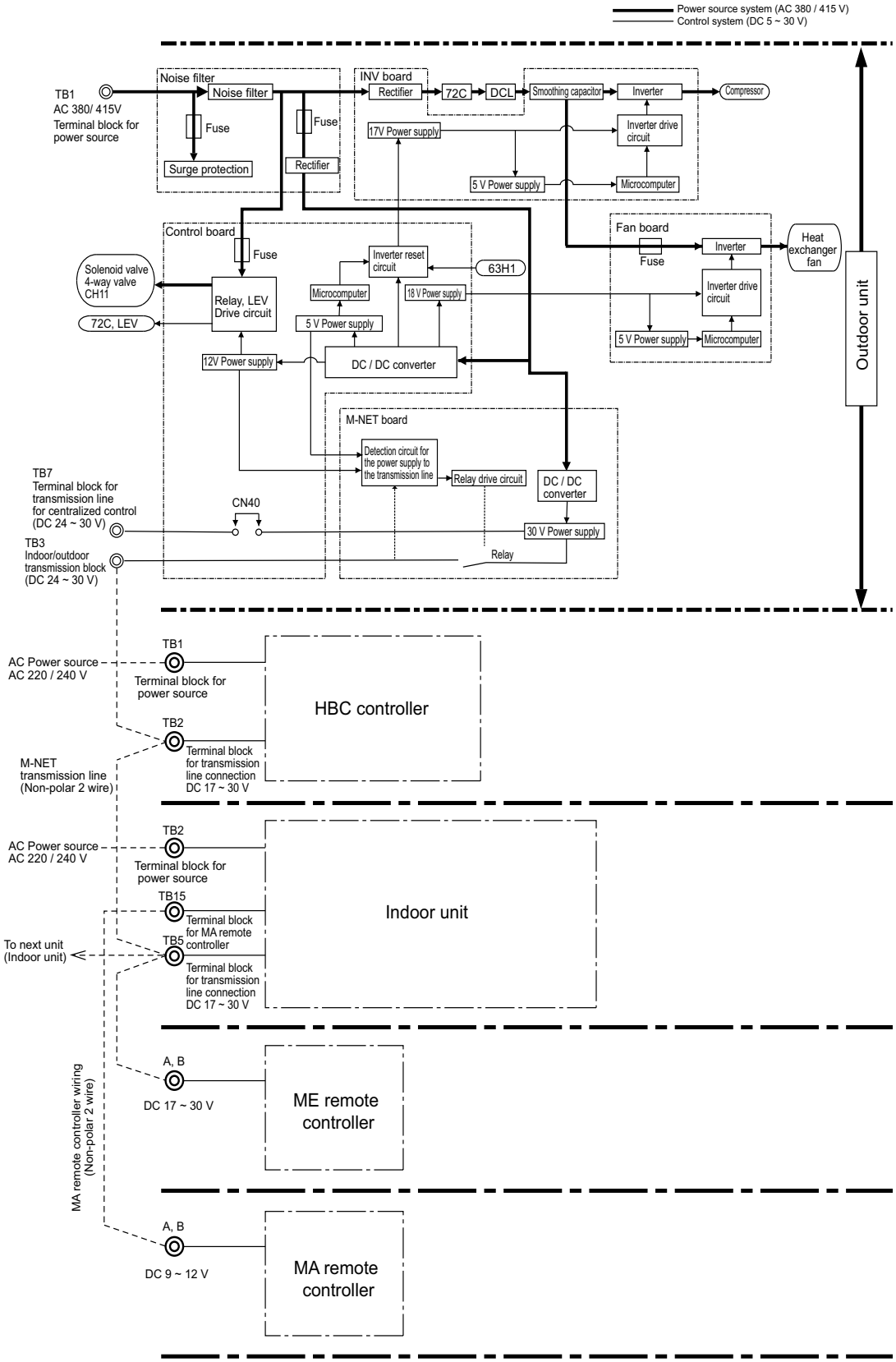
1) Refer to Chapter "Control" for superheat, subcool, and water temperature difference.

Troubleshooting flow chart for solenoid valve body



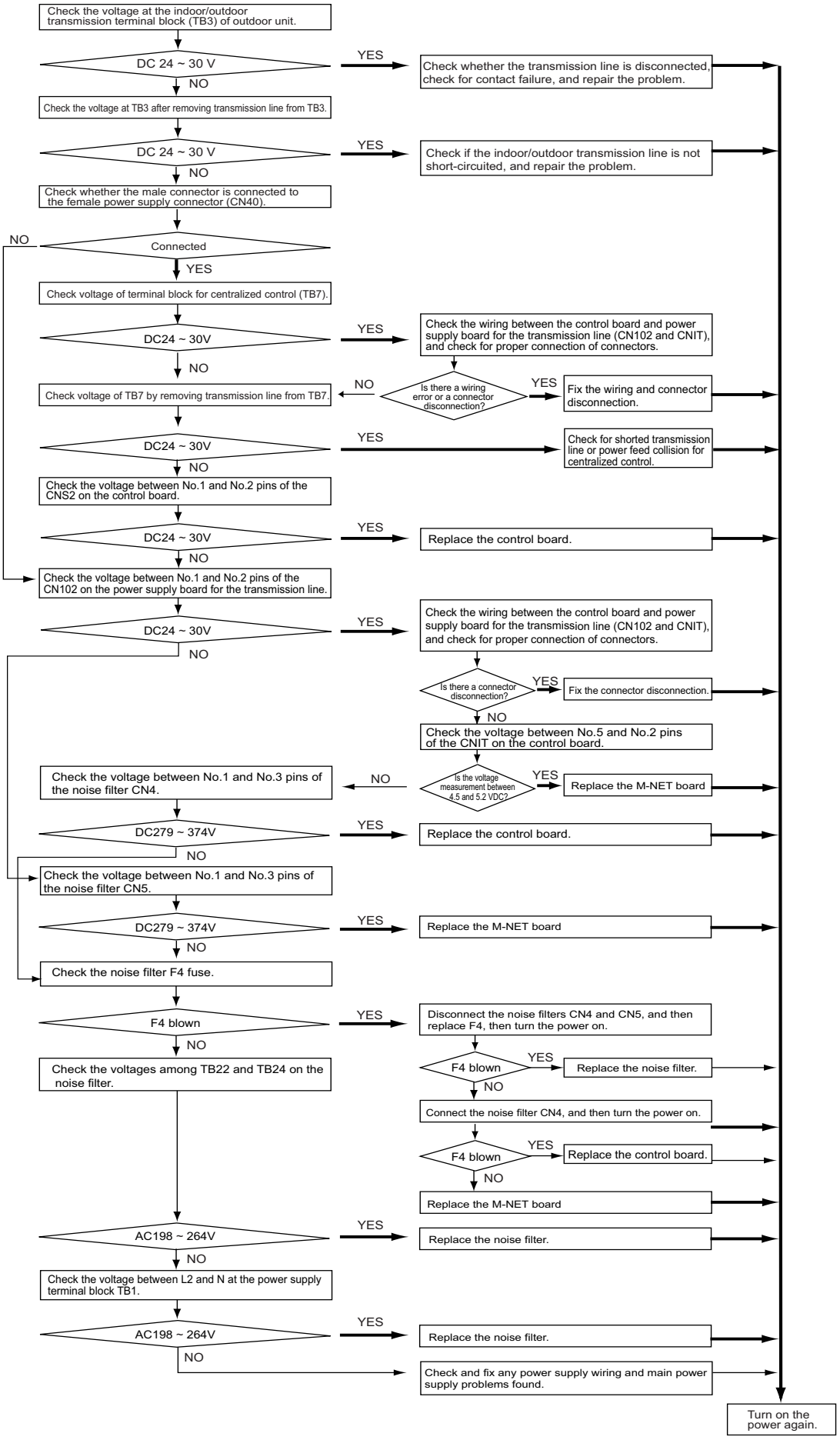
-3- Control Circuit

(1) Control power source function block



* MA remote controllers and ME remote controllers cannot be used together.
(Both the ME and MA remote controller can be connected to a system with a system controller.)

(2) Troubleshooting transmission power circuit of outdoor unit



[5] Refrigerant Leak

1. Leak spot: In the case of extension pipes and HBC controller (Cooling season)

1) Mount a pressure gauge on the service check joint (CJ2) on the low-pressure side.
2) Stop all the indoor units, and close the high-pressure side refrigerant service valve (BV2) on the outdoor unit while the compressor is being stopped.
3) Stop all the indoor units; turn on SW2-4 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.)
4) In the pump down mode (SW2-4 is ON), all the indoor units 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.
5) Close the service ball valve (BV1) on the low-pressure pipe on the outdoor unit.
6) Collect the refrigerant that remains in the extended pipe for the HBC controller. Do not discharge refrigerant into the atmosphere when it is collected.
7) Repair the leak.
8) After repairing the leak, vacuum[*1] the extension pipe and the HBC controller.
9) To adjust refrigerant amount, open the ball valves (BV1 and BV2) inside the outdoor unit and turn off SW2-4.

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 SW3-2 from ON to OFF when SW3-1 on the outdoor control board is 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) Stop all the indoor units, and stop the compressor.

1) To stop all the indoor units and the compressors, turn SW3-2 from ON to OFF when SW3-1 on the outdoor control board is ON.
2) Check that all the indoor units are being stopped.

(3) Close the ball valves (BV1 and BV2).

(4) Collect the refrigerant that remains inside the outdoor unit. Do not discharge refrigerant into air into the atmosphere when it is collected.

(5) Repair the leak.

(6) After repairing the leak, replace the dryer with the new one, and perform evacuation [*1] inside the outdoor unit.

(7) To adjust refrigerant amount, open the ball valves (BV1 and BV2) inside the outdoor unit.

*1. Refer to Chapter I [8] Vacuum Drying (Evacuation) for detailed procedure.(page 10)

3. Leak spot: In the case of extension pipe and HBC controller (Heating season)

(1) Run all the indoor units in heating test run mode.

1) To run the indoor unit in test run mode, turn SW3-2 from ON to OFF when SW3-1 on the outdoor control board is 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 SW3-2 from ON to OFF when SW3-1 on the outdoor control board is ON.
2) Check that all the indoor units are stopped.

(3) Close the ball valves (BV1 and BV2).

(4) Extract any residual refrigerant in the extension pipes and HBC controller. Do not discharge refrigerant into air when it is collected.

(5) Repair the leak.

(6) After repairing the leak, evacuate the air from the extension pipes and HBC controller*1. Then, open the ball valves (BV1 and BV2), and operate the unit in the refrigerant charge adjust mode.

4. Leak spot: In the case of outdoor unit (Heating season)

1) Extract the refrigerant from the entire system (outdoor units, extension pipes, and HBC controller). 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 + HBC controller), and charge the system with that amount. Refer to Chapter VII [3] 3. for the proper amount of refrigerant charge.(page 89)

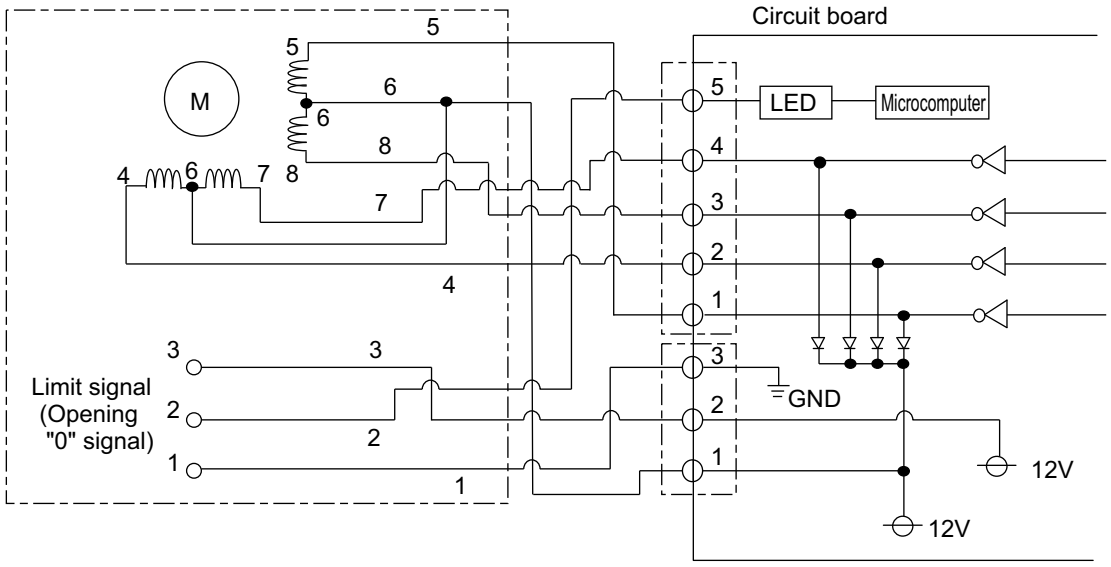
*1. Refer to Chapter I [8] Vacuum Drying (Evacuation) for detailed procedure.(page 10)

[6] Servicing the HBC controller

1. Valve block

VB3 (valve block) is driven by the pulse signal from the HBC controller control board and are controlled by a stepping motor.

1) HBC controller control board and valve block (VB3)



2) Pulse signal output and valve motion

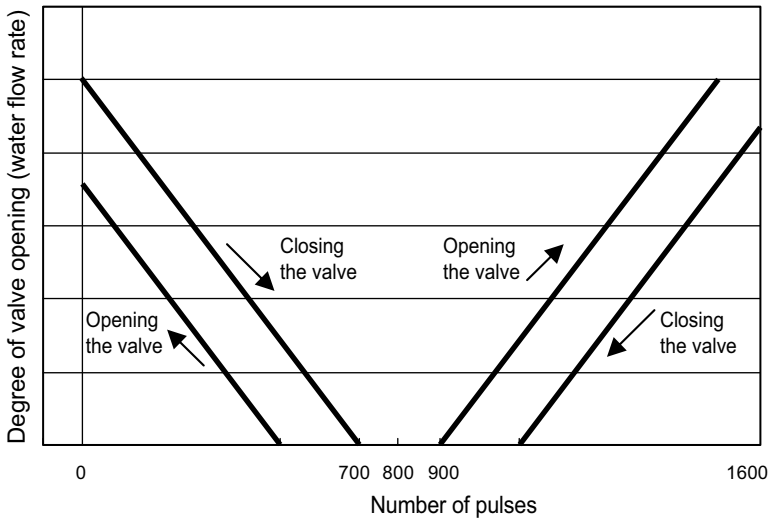
Output (phase) number	Output status			
	1	2	3	4
4	ON	ON	OFF	OFF
5	OFF	ON	ON	OFF
7	OFF	OFF	ON	ON
8	ON	OFF	OFF	ON

When valve opens (0→C800 or H800): 4→3→2→1

When valve closes (C800 or H800→0): 1→2→3→4

- If the LEDs (VB3a-VB3p) on the control board are lit, check the relevant valve blocks for loose connectors and faulty wiring. Make sure that the valve blocks are properly controlling the refrigerant flow.
- If the LED is unlit, check all valve blocks for proper operation.
- If the problem persists after taking the above measures, replace the circuit board.

3) Opening and closing of the valve



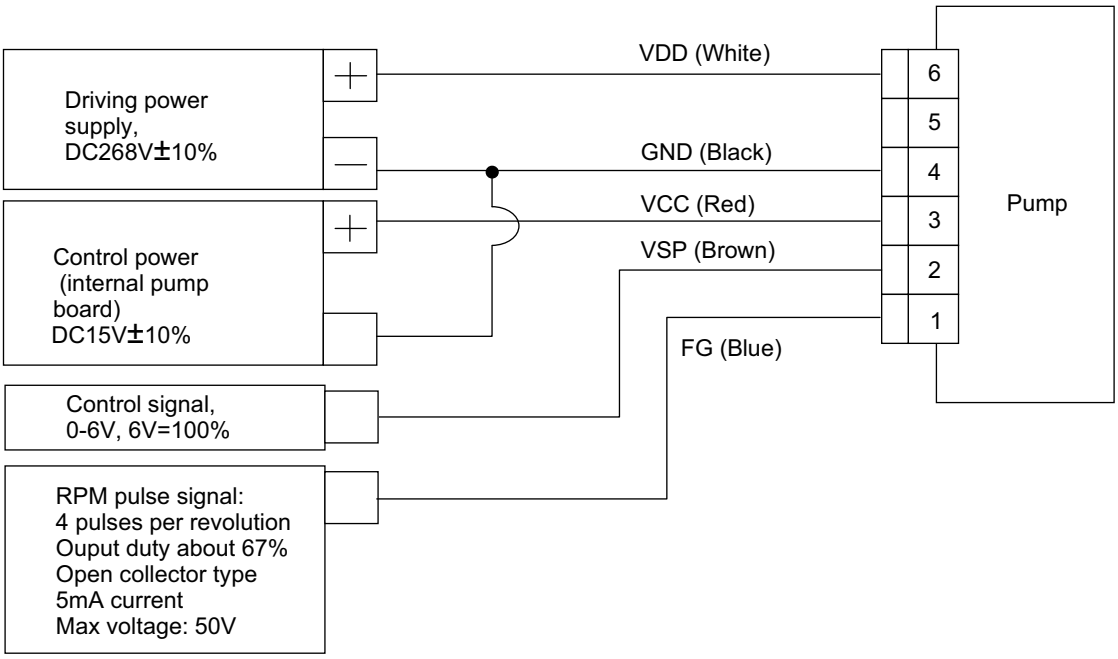
2. Water pump

Check the connector and make sure that it is connected properly.
Check the driving power supply, control power supply for the pumps internal board, and check the control signal voltage by connecting each voltage to ground. (Control signal voltage will be 0V when stopped and 6V when running at 100%)
If these are voltages are not correct then investigate the HBC pump power supply board.

If the supply voltages are correct, and the control signal is being sent and the pump will still not operate the likely causes are:

- Internal pump control board failure - replace pump. (Note: The internal pump control board is usually damaged when removing and replacing the connector with the power supply turned on. Always remove the pump connector with the power supply turned off.)
- Coil failure - replace pump. If the windings have been damaged the pump will require replacing.
- Internal mechanical failure such as bearing failure, turbine failure, magnet degradation. This will require pump replacement.

Before replacement the causes must be investigated and resolved. The pump shaft bearings and magnets can be easily damaged by overheating due to dry running or water system blockage. Check the strainer for blockage, investigate the water circuit for blockage and or foreign material, and that there is no air in the system or an uncontrolled leak.

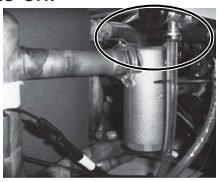


[7] Instructions for debris removal operation

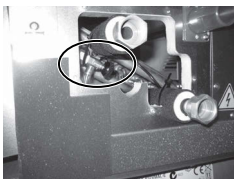
This operation removes the debris that may have been introduced during installation from the water circuit.
Perform this operation **after completion of water- and refrigerant-piping work, air tightness test, evacuation of refrigerant circuits, refrigerant charging, and electrical work.**

1.Preparation for debris removal operation

1.Set DIP SW 5-1 (valve opening when stopped), DIP SW 5-2 (nullification of drain over-flow error for 9 hours) from off to on.



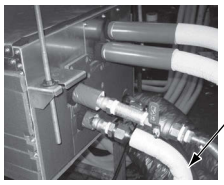
HBC controller



Indoor unit (Example: PEFY-WP-VMA-E)

2.Turn on the breaker, and then open the air vent valves on the HBC controller and the indoor units.
Refer to the Installation Manual for the location of air vent valves.
(If there are air vent valves on the field-installed pipes, open the valves as well.)

3.Supply water from the suction pipe on the HBC controller.



Install a non-return valve to prevent water in the water circuit flowing back to the water supply pipe, or remove the water supply hose after the air vent operation.

4.**Check that water comes from each air vent valve, and perform the debris removal operation.**

2.Debris removal operation

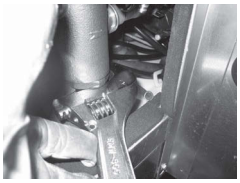
1.If there are a large amount of debris in the water in the field-installed pipes, set DIPSW4-1 from OFF to ON.
(Refer to the flowchart for debris removal operation for details.)
Perform the debris removal operation. (Each air vent valve should stay open.)

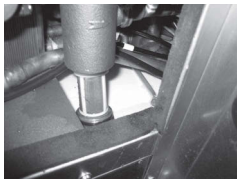
LED and DIPSW positions

2. Forty minutes after the completion of debris removal operation, the LED will indicate "Air0." The LED indication will change to "Air1," "Air2," and "AirE" in order. Then, the water pump will stop.

3.Stop the water supply, and check that no water is coming out of the air vent valves. Then, set the dipswitch 4-1 from ON to OFF.

4.Set DIP SW4-6 to on, and switch off the HBC controller. Open the air-vent valve and the water-vent valve.
Slowly open the strainer closest to the water supply to the HBC. (Note that if it is opened fast, water may blast out.)
Remove the strainer, clean its inside, and refit it.





5.Slowly open the other strainer which is the furthest from the water supply.
(After the cleaning, set DIPSW4-6 to OFF.)

6.Make sure the strainers are re-installed.

Flowchart for debris removal operation (DIPSW4-1 is ON.)

Step 1 Intermittent operation of water pump (20 min) — The operation is performed while air is discharged from the water pipe. [Air1]

↓

Step 2 Operation of all indoor units (20 min) — Debris in the pipe will accumulate into the strainer by operating all indoor units. [Air2 to AirE]

(1)The operation can be forced to stop by setting DIPSW4-4 from OFF to ON.
(2)If it is found during any step that air ventilation has not been completed to the desired degree, start over at Step 2-1.

<General cautions>
(1)To avoid malfunction, do not connect or disconnect the power connector of the water pump being powered on.
(2)Check for water leaks from the field-installed pipe joint during operation.
(3)Do not pull the clip on the connection of the water pipe with pliers so that undue force is applied.
(4)If Error appears on the LED, turn off the breaker, turn it back on, and start over at step 2-1.

3.End processing

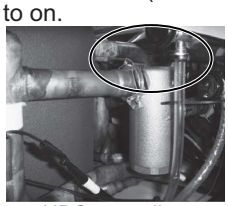
Set the dipswitches 5-1 and 5-2 to OFF after completion of debris removal operation.

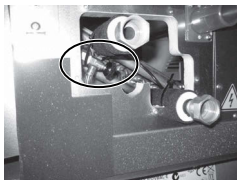
[8] Instructions for the air vent operation

This operation removes the air that remains after water is supplied to the water circuit.
Perform this operation **after completion of water- and refrigerant-piping work, air tightness test, evacuation of refrigerant circuits, and refrigerant charging (and debris removal, if performed).**
* When main-HBCs are conected in parallel, please do not operate them at the same time.

1.Preparation for the air vent operation

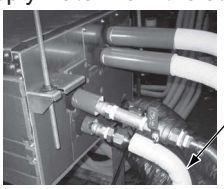
1.Set DIP SW 5-1 (valve opening when stopped), DIP SW 5-2 (nullification of drain over-flow error for 9 hours) from off to on.


HBC controller


Indoor unit (Example: PEFY-WP-VMA-E)

2.Turn on the breaker, and then open the air vent valves on the HBC controller and the indoor units.
Refer to the Installation Manual for the location of air vent valves.
(If there are air vent valves on the field-installed pipes, open the valves as well.)

3.Supply water from the suction pipe on the HBC controller.


Install a non-return valve to prevent water in the water circuit flooding back to the water supply pipe, or remove the water supply hose after the air vent operation.

4.**Check that water comes from each air vent valve, and perform the air vent operation.**

2.Air vent operation

1.Set DIPSW4-3 from OFF to ON.
2.The LED will indicate "Air1" "Air2" "Air3" "Air4" and "AirE" in order over a period of up to 140~380 minutes, and after 140~380 minutes have passed, the water pump will stop.


LED and DIPSW positions

3.Set the dipswitch 4-3 from ON to OFF.
4.Close the all air vent valves.
5.Stop the water supply.

3.Checking for the presence of residual air

1.Set DIPSW4-5 from OFF to ON, and operate the water pump.
2.If there is residual air in the circuit, it will be noisy. Check for water leaks from the pipe, and then, perform the air vent operation again.

Flowchart for air vent operation (DIPSW4-3 is ON.)

Step 1	Intermittent operation of water pump (20 min)	The operation is performed while air is discharged from the water pipe. [Air1]
↓		
Step 2	Operation of all indoor units (20 min)	The residual air will be roughly removed by operating all indoor units. [Air2]
↓		
Step 3	Operation of individual indoor unit (10 min per one branch)	The residual air will be removed by operating indoor units for each branch. [Air3]
↓		
Step 4	Heating operation of all indoor units (20 min)	The saturated air in the circulating water will be removed by performing heating operation for all indoor units and raising the temperature of the circulating water. [Air4 to AirE]

(1)The operation can be forced to stop by setting DIPSW4-4 from OFF to ON.
(2) If it is found during any step that air ventilation has not been completed to the desired degree, go back to Step 2-1.
(3)If Error appears on the LED, turn off the breaker, turn it back on, and start over at step 2-1.

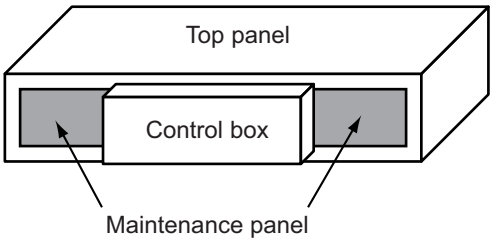
4.End processing

Set the dipswitches 5-1 and 5-2 to OFF after completion of air vent operation.

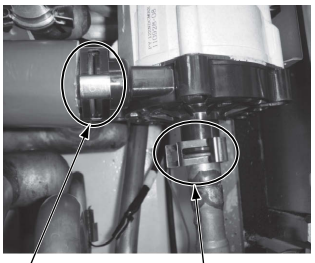
[9] Instructions for the water pump replacement

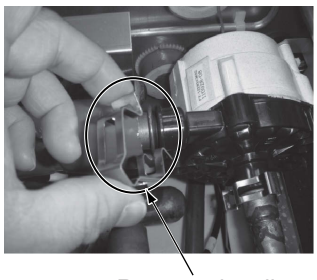
1.After turning off the power to the HBC controller, replace the water pump. To stop the water flow from the indoor unit, perform the following DIPSW operations.
When replacing the water pump near the water supply port, set DIPSW4-6 to ON (DIPSW4-7 to OFF).
When replacing the other water pump, set DIPSW4-6 and DIPSW4-7 to ON.

2.Open the top panel and maintenance panel of the water pump to be replaced.

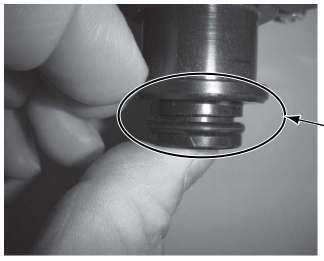


3.Remove the clips on the inlet/outlet of the water pump.

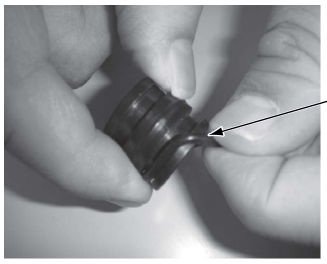




4.Remove the water pump by pulling out the inlet/outlet of the water pump.



5.After removing the water pump, check the O-ring on the sleeve for damage. If O-ring is damaged, replace the O-ring with a new one.

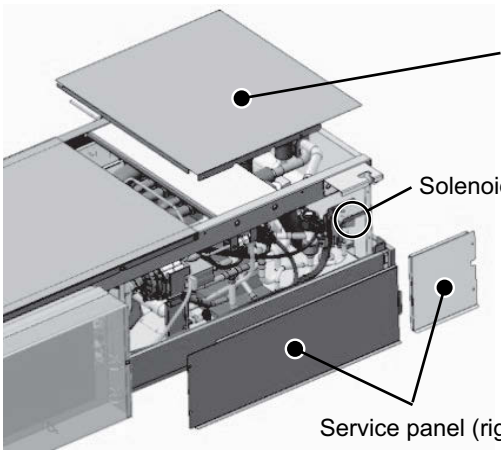
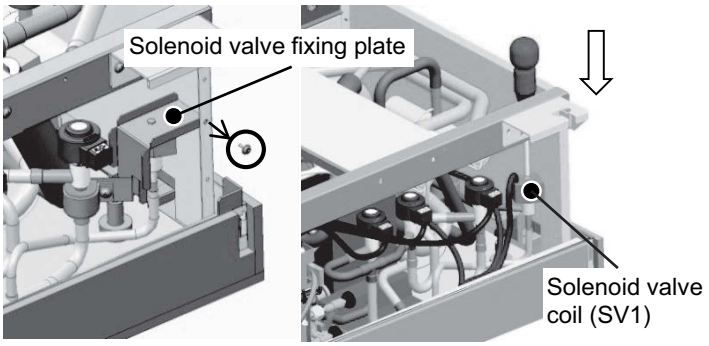


6.Insert the water pump again so that debris is not trapped in the O-ring, and install the clip.
When inserting the water pump, lubricate the O-ring with soapy water.

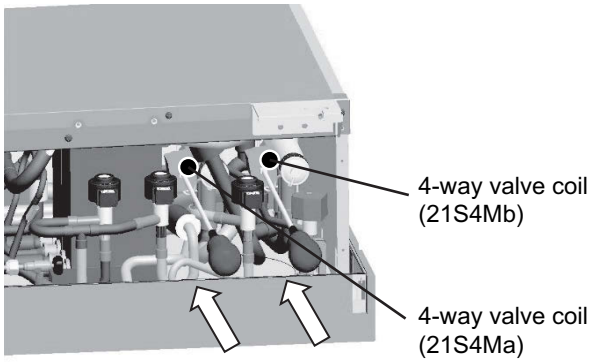
7.After closing the panels, turn on the power to the HBC controller, and perform the air vent operation.

Replacement procedures for each service part

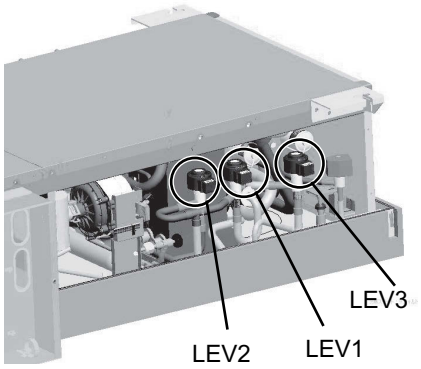
1. Solenoid valve coil (SV1)

Operation procedures	Illustrations	Operation location
(1) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (2) Remove the two fixing screws from the service panel (top right) and then remove the service panel (top right). (3) Disconnect the corresponding solenoid valve coil connector from the control board. (4) Remove the control box and then remove the solenoid valve coil wires secured by clamps. (5) Remove one solenoid valve coil fixing screw from the top (indicated by direction of the arrow in the figure) and then remove the solenoid valve coil. (6) Remove the one fixing screw and then remove the solenoid valve fixing plate. (7) Install the new solenoid valve coil in the position indicated in the figure and then connect the connector to the control board.	 	In ceiling space

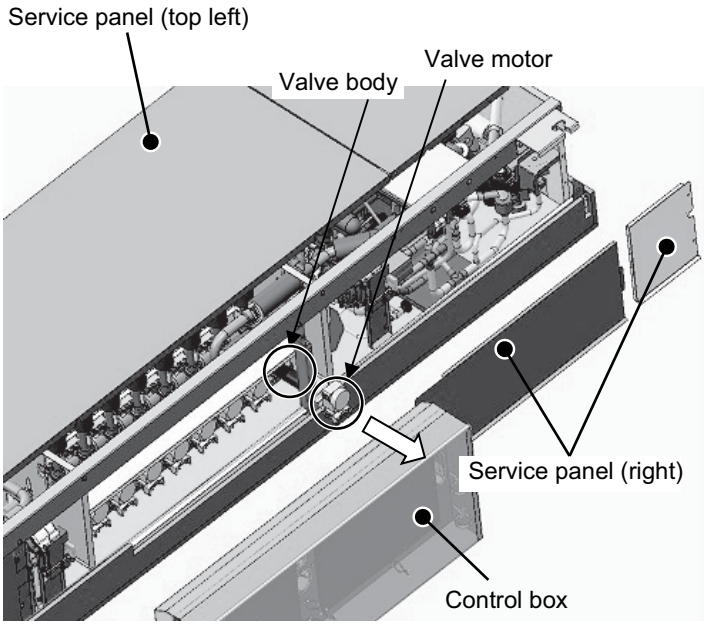
2. 4-way valve coils (21S4Ma, 21S4Mb)

Operation procedures	Illustrations	Operation location
(1) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (2) Disconnect the corresponding solenoid valve coil connector from the control board. (3) Remove the two 4-way valve coil fixing screws from the front (indicated by direction of the arrow in the figure) and then remove two 4-way valve coils. (4) Remove the control box and then remove the 4-way valve coil wires secured by clamps. They are also secured to the solenoid valve coil wires with cable ties so remove the cable ties. (5) Install the new 4-way valve coils in the positions indicated in the figure and then connect the connectors to the control board. * Take care not to mix up the 4-way valve coils on the left and right when installing them.		In ceiling space

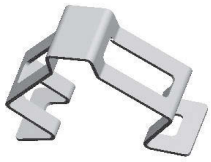
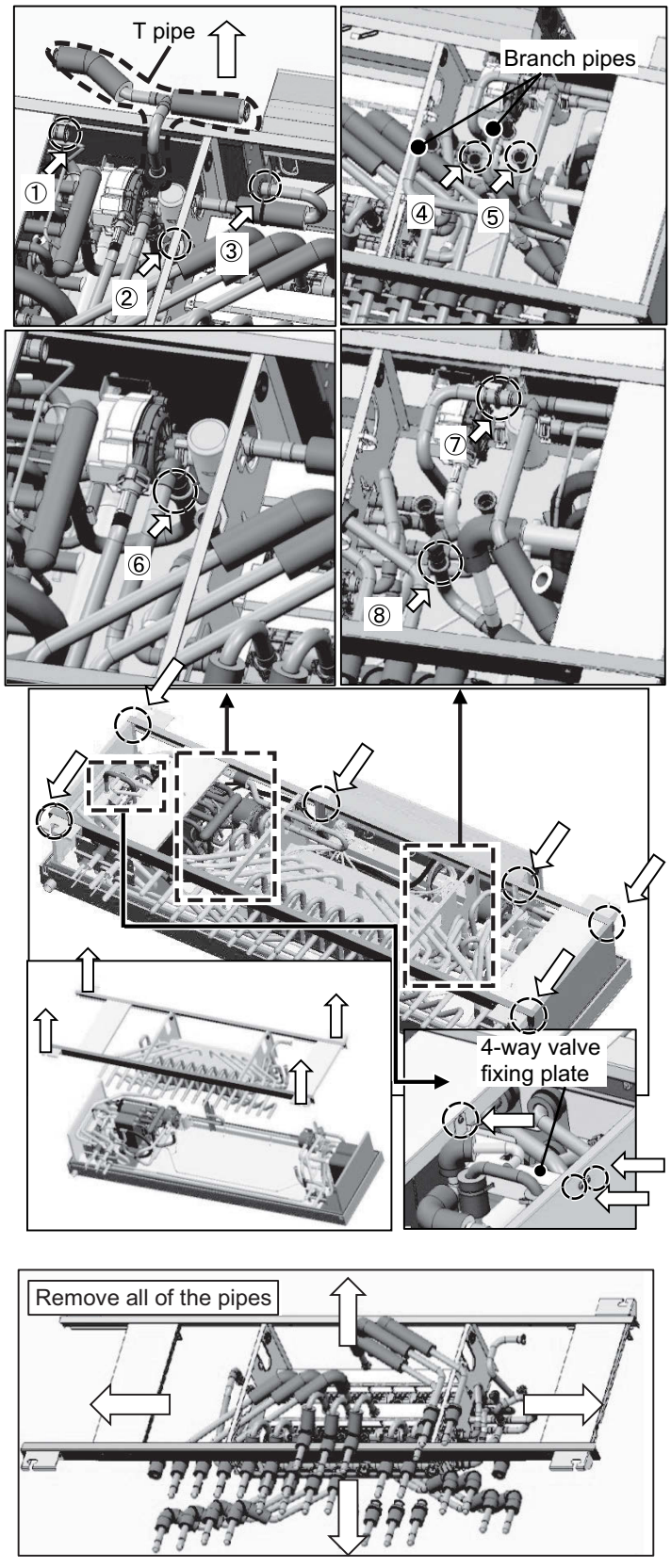
3. LEV coils (LEV1, LEV2, LEV3)

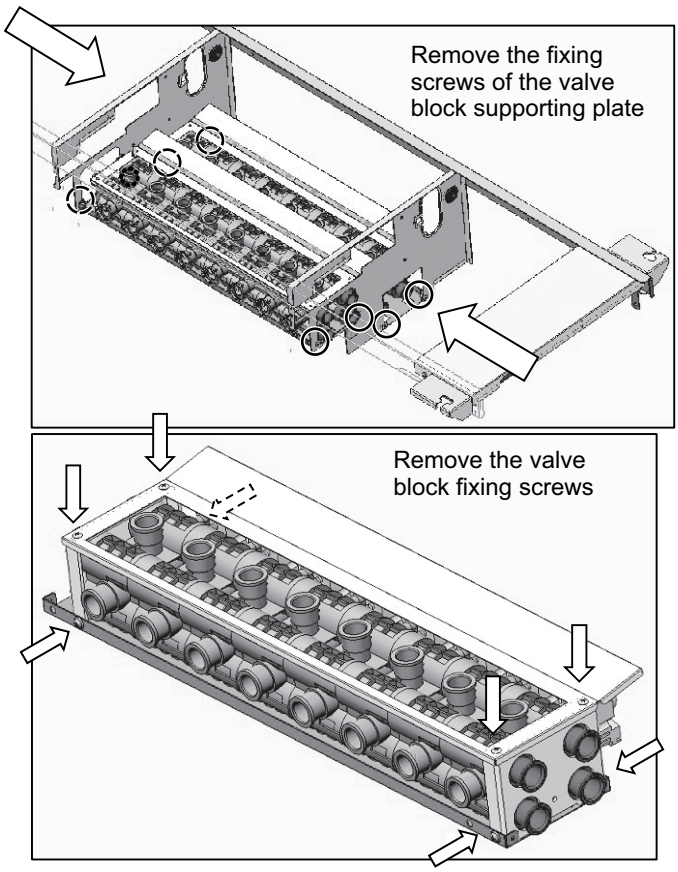
Operation procedures	Illustrations	Operation location
(1) Remove four fixing screws from the service panel (right) and then remove the service panel (right). (2) Disconnect the corresponding LEV coil connectors from the control board. (3) Remove the control box and then remove the LEV coil wires secured by clamps and cable ties. (4) Rotate the LEV coils slightly and then remove them in the upward direction. (5) Install the new LEV coils in the positions indicated in the figure and then connect the connectors to the control board. ∗Take care not to mix up the three LEV coils when installing them. ∗Rotate the LEV coils until you hear them snap into place to attach them properly.		In ceiling space

4. Valve motor and valve body

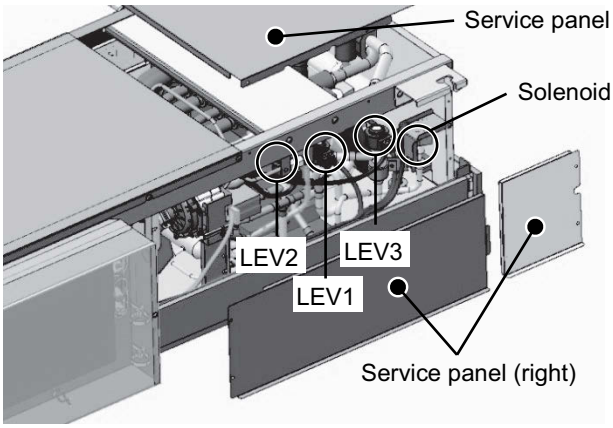
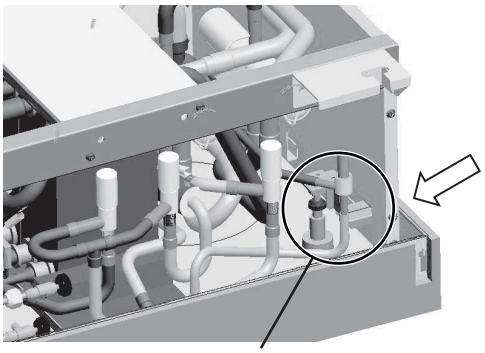
Operation procedures	Illustrations	Operation location
(1) Perform the operation to drain the water from the system if necessary in accordance with the following. ♦When replacing only valve motor: Draining water from system not necessary ♦When replacing valve body: Draining water from system necessary (2) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (3) Remove the two fixing screws from the service panel (top left) and then remove the service panel (top left). (4) Disconnect the corresponding valve motor connector from the control board. (5) Remove the four control box fixing screws and then remove the control box. Disconnect each wire connector and then completely remove the control box. (6) Perform the removal operation in accordance with the following. ♦When replacing only valve motor: Remove the two fixing screw and then remove the valve motor. ♦When replacing valve body: Remove the motor as described above and then pull out the valve body in the direction of the arrow indicated in the figure.		In ceiling space

5. Valve block

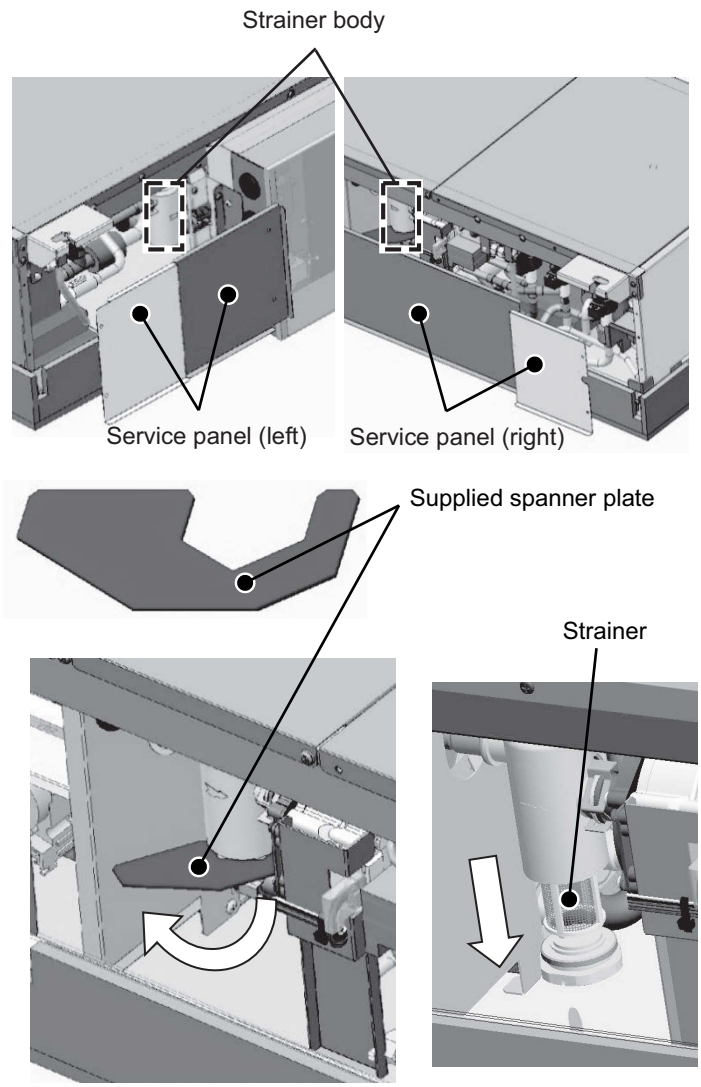
Operation procedures	Illustrations	Operation location
(1) Collect the refrigerant and water and then carry out the unit from the ceiling space. (2) Remove all of the service panels (top, front, and back). (3) Disconnect all connectors from the control board. (4) Remove the clips (figure below) connecting the pipes shown in the figure and then remove the T pipe in the upward direction. (① to ③ in the figure)  Clip (5) Remove the clips connecting the branch pipes and then remove the two branch pipes in the upward direction. (④ and ⑤ in the figure) (6) Remove the clips connecting the pipes shown in the figure. (⑥ to ⑧ in the figure) (7) Remove the 4-way valve fixing plate. (3 screws) (8) Remove the ten screws indicated by the arrows in the figure that are securing the front frame and back frame control box supporting plates. (9) Hold the lifting brackets and lift up the valve block assembly to remove it. (10) Remove all of the pipes from the valve block assembly.		Below ceiling

Operation procedures	Illustrations	Operation location
(11) Remove the 8 fixing screws of the plates supporting the valve block shown in the figure. (12) Remove the 8 screws securing the valve block and then replace the valve block. ∗It is recommend to replace all nipples with new ones because damage to an O-ring attached to a nipple may cause water to leak during recovery after replacement of a valve block.		Below ceiling

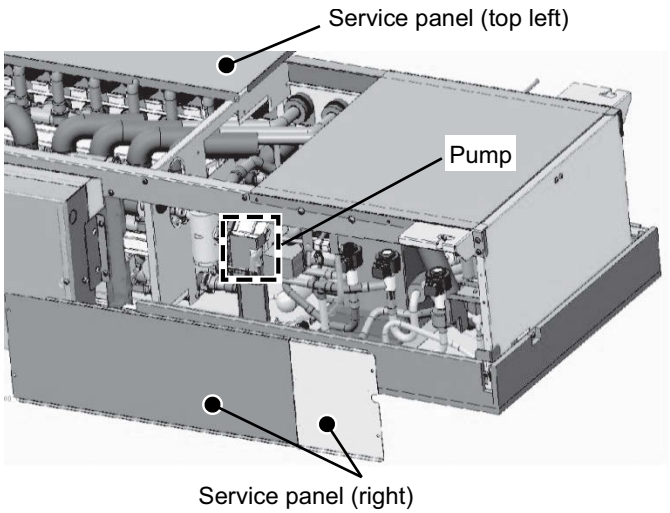
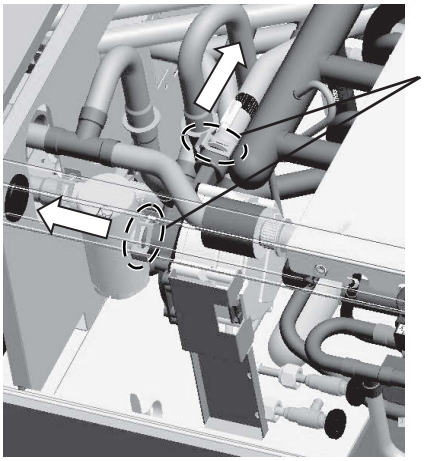
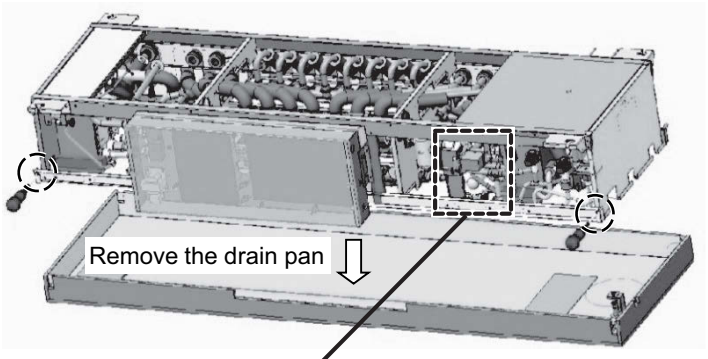
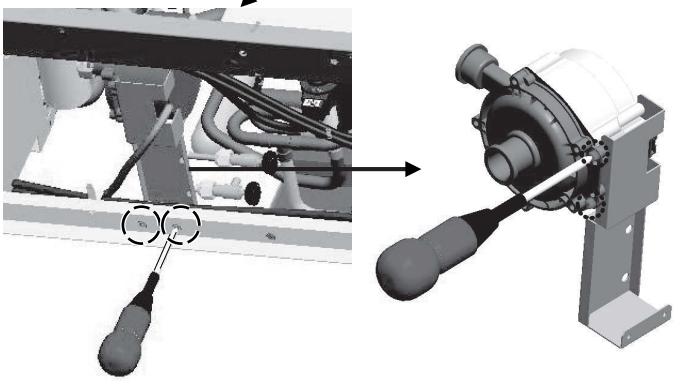
6. Solenoid valve and LEV body

Operation procedures	Illustrations	Operation location
(1) Collect the refrigerant and water and then carry out the unit from the ceiling space. (2) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (3) Remove the two fixing screws from the service panel (top right) and then remove the service panel (top right). (4) Disconnect the corresponding valve coil connectors from the control board and also remove the coil from the valve. (For how to remove the coil, follow the operation procedures of 1.) (5) Remove the float switch and fixing plate from the drain pan (to prevent them from catching fire when the brazing is performed). Remove the two fixing screws from the direction of the arrow indicated in the figure. (6) Protect the heat insulation material around the corresponding valve to prevent it from burning. (7) Debraze the corresponding valve to remove it and then replace it.	  Float switch	Below ceiling

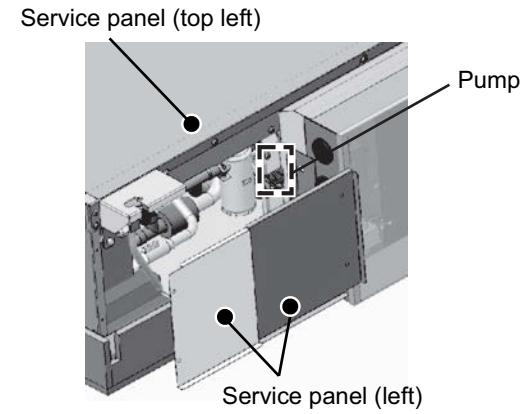
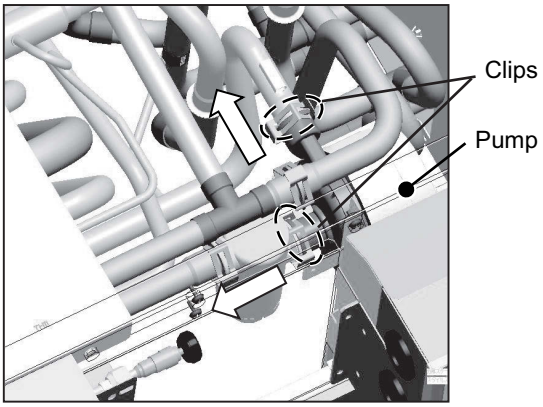
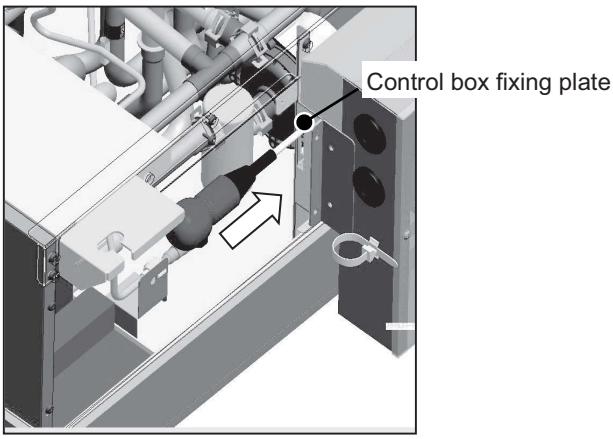
7. Strainer

Operation procedures	Illustrations	Operation location
(1) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (When strainer on heating-main water pump side) (2) Remove the four fixing screws from the service panel (left) and then remove the service panel (left). (When strainer on cooling-main cold water pump side) (3) Use the supplied spanner plate to open the cover at the bottom of the strainer. (4) Pull out the strainer downward to remove it and then replace it. ∗Fully tighten the cover at the bottom of the strainer. Failing to do so may cause a water leakage.		In ceiling space

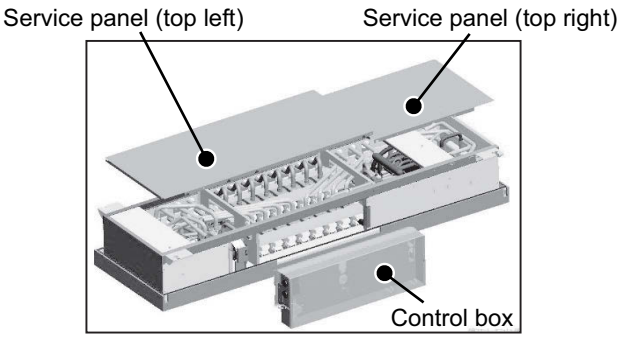
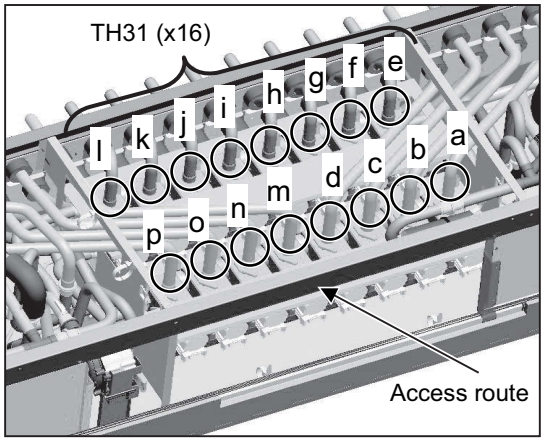
8. Pump (right side of control box)

Operation procedures	Illustrations	Operation location
(1) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (2) Remove the two fixing screws from the service panel (top left) and then remove the service panel (top left). (3) Disconnect the pump connector. ∗Do not disconnect and connect the pump connector while the power is on. Doing so may cause a failure.		In ceiling space
(4) Remove the control box and then remove the pump and float switch wires secured by clamps. (5) Remove the two clips connecting the pump and pipes and then move the pipes by hand in the direction indicated by the arrow in the figure.		
(6) Remove the two screws securing the drain pan and then remove the drain pan. ∗If you have a screwdriver with a handle that is 100 mm or less, there is no need to remove the drain pan.		
(7) Remove the two fixing screws of the pump fixing plate and then remove the pump and plate. (8) Remove the two screws securing the pump and plate from the side (direction of arrow) and then replace the pump.		

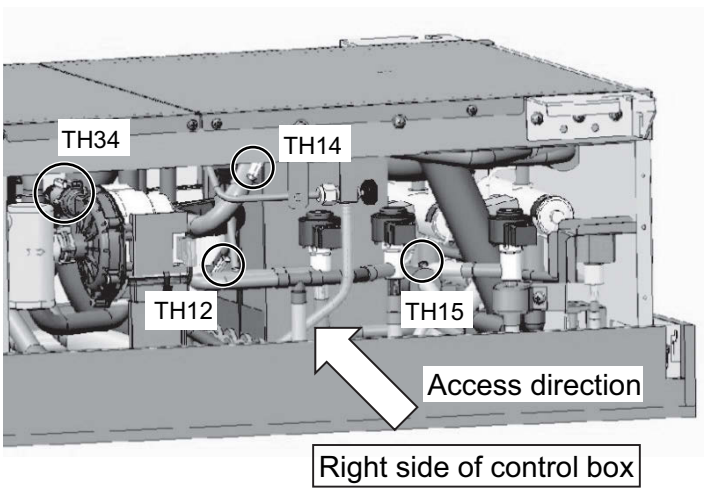
9. Pump (left side of control box)

Operation procedures	Illustrations	Operation location
(1) Remove the four fixing screws from the service panel (left) and then remove the service panel (left). (2) Remove the two fixing screws from the service panel (top left) and then remove the service panel (top left). (3) Disconnect the pump connector. ∗Do not disconnect and connect the pump connector while the power is on. Doing so may cause a failure.		In ceiling space
(4) Remove the two clips connecting the pump and pipes and then move the pipes by hand in the direction indicated by the arrow in the figure.		
(5) Remove the control box and then remove the pump wires secured by clamps. (6) Remove the one control box fixing screw and then remove the control box fixing plate. (7) Remove the two screws securing the pump and plate from the side (direction of arrow) and then replace the pump.		

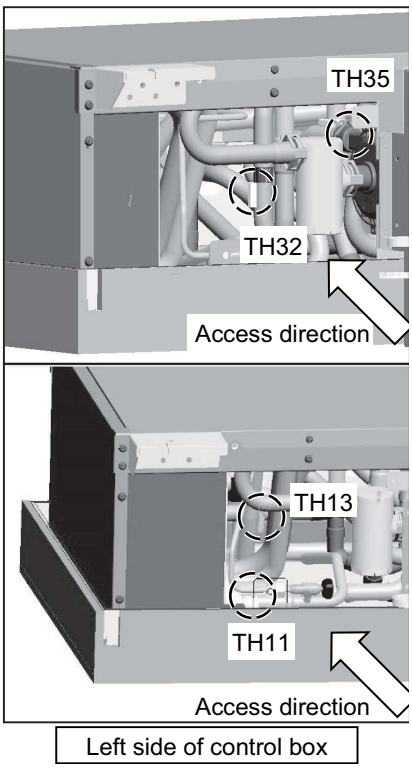
10. Thermistor (TH31)

Operation procedures	Illustrations	Operation location
(1) Remove the two fixing screws from the service panel (top right) and then remove the service panel (top right). (2) Remove the two fixing screws from the service panel (top left) and then remove the service panel (top left). (3) Disconnect all TH31 connectors from the control board. (4) Remove the four control box fixing screws and then remove the control box. (5) Remove the thermistor (TH34). <Refer to 11.> (Because of same connector as TH31) (6) Pull out TH31 from the top of the unit and then replace it.	 	In ceiling space

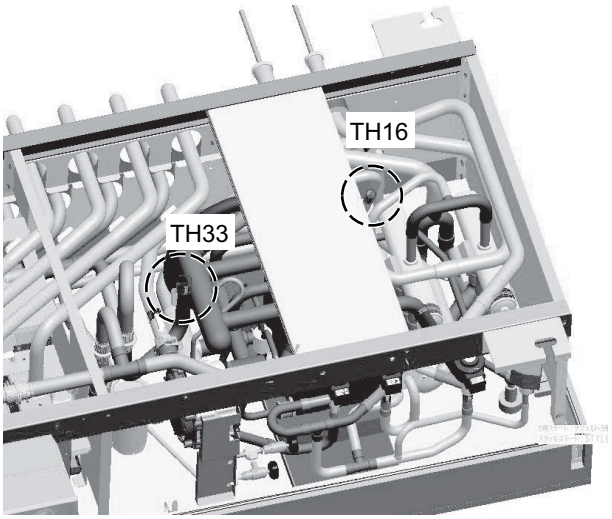
11. Thermistors (TH12, TH14, TH15, and TH34)

Operation procedures	Illustrations	Operation location
(1) Disconnect the connectors of the thermistor to be replaced from the control board. (2) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (3) Remove the thermistor from the front of the unit and then replace it. (4) Remove the control box and then remove the thermistor wires secured by clamps. (5) In the case of TH12, also remove TH11. In the case of TH14, also remove TH13. In the case of TH15, also remove TH16. In the case of TH34, also remove TH31i and TH31j. (Because of same connector as corresponding thermistor) <Refer to 10.>		In ceiling space

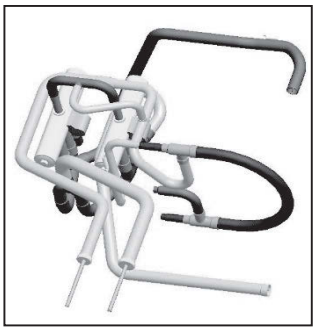
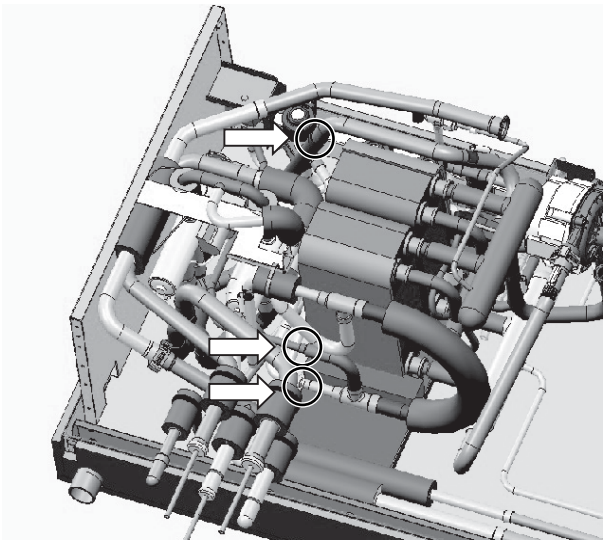
12. Thermistors (TH11, TH13, TH32, and TH35)

Operation procedures	Illustrations	Operation location
(1) Disconnect the connectors of the thermistor to be replaced from the control board. (2) Remove the four fixing screws from the service panel (left) and then remove the service panel (left). (3) Remove the thermistor from the front of the unit and then replace it. (4) Remove the control box and then remove the thermistor wires secured by clamps. (5) In the case of TH11, also remove TH12. In the case of TH13, also remove TH14. In the case of TH32, also remove TH33. In the case of TH35, also remove TH31k and TH31l. (Because of same connector as corresponding thermistor) <Refer to 10.>		In ceiling space

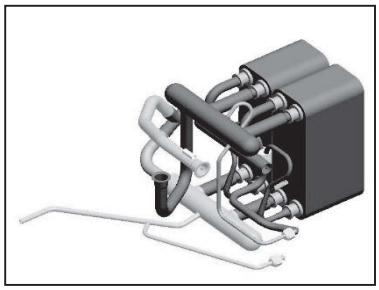
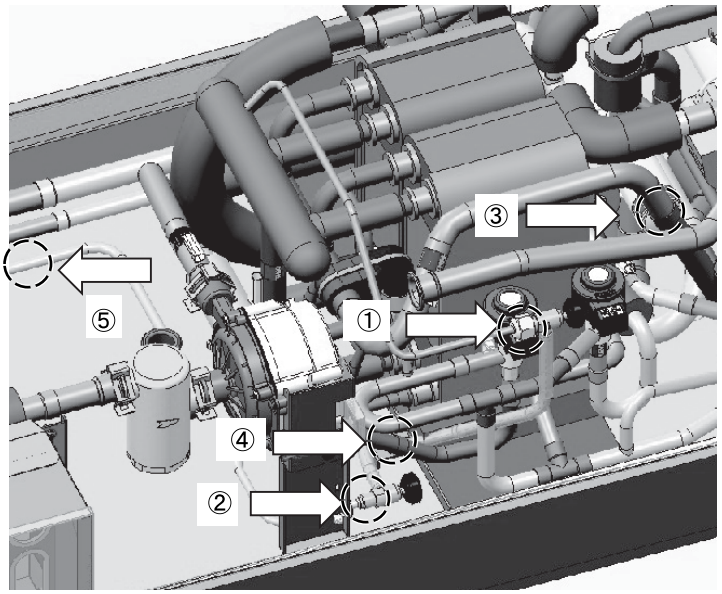
13. Thermistors (TH16 and TH33)

Operation procedures	Illustrations	Operation location
(1) Disconnect the connectors of the thermistor to be replaced from the control board. (2) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (3) Remove the two fixing screws from the service panel (top right) and then remove the service panel (top right). (4) Remove the thermistor from the top of the unit and then replace it. (5) Remove the control box and then remove the thermistor wires secured by clamps. (6) In the case of TH16, also remove TH15. In the case of TH33, also remove TH32. (Because of same connector as corresponding thermistor) <Refer to 10.>		In ceiling space

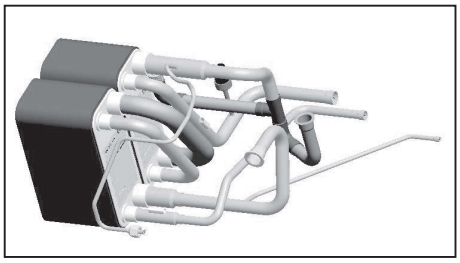
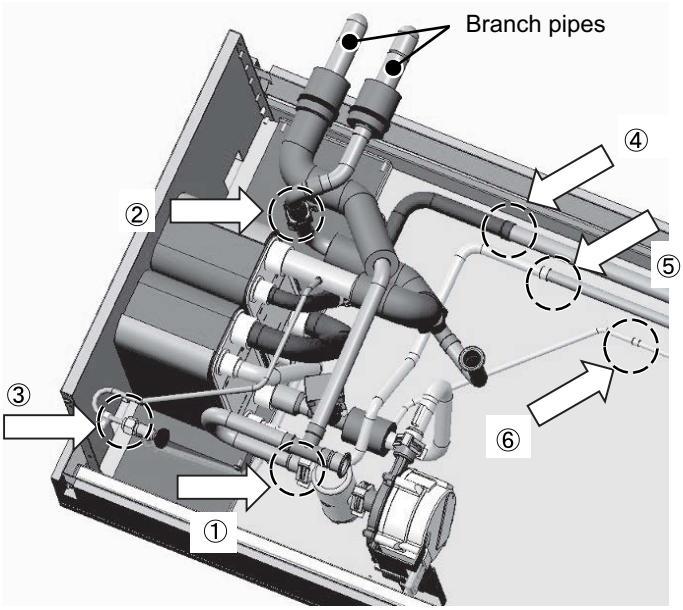
14. 4-way valve body (21S4)

Operation procedures	Illustrations	Operation location
(1) 1.Perform the operation as described in (1) to (8) of 5. (2) Debraze the three places indicated in the figure and then replace the 4-way valve with a service part. When brazing, protect the heat insulation material to prevent it from burning.  4- way valve service part		Below ceiling

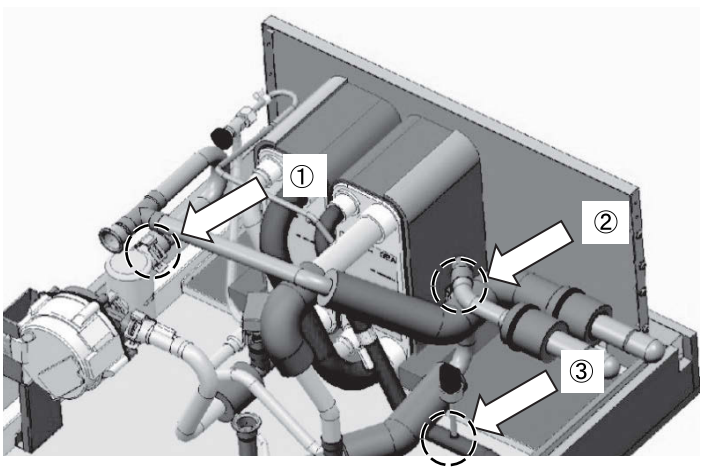
15. Plate heat exchanger (cooling-main side)

Operation procedures	Illustrations	Operation location
(1) Perform the work as described in (1) to (8) of 5. (2) Remove the two flare nuts of the water purge valve and air purge valve. (① and ② in the figure) (3) Debraze the three places indicated in the figure and then replace the plate heat exchanger with a service part. (③, ④, and ⑤ in the figure)  Plate heat exchanger (cooling-main side) service part		Below ceiling

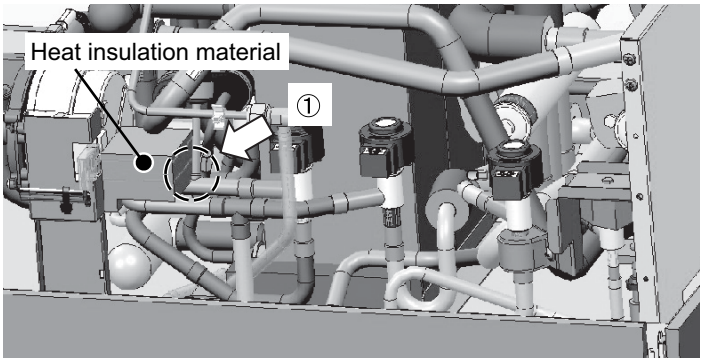
16. Plate heat exchanger (heating-main side)

Operation procedures	Illustrations	Operation location
(1) Perform the work as described in (1) to (8) of 5. (2) Remove the clips connecting the pipes in the two places shown in the figure and then remove the branch pipes in the upward direction. (① and ② in the figure) (3) Remove the one flare nut of the air purge valve. (③ in the figure) (4) Debraze the three places indicated in the figure and then replace the plate heat exchanger with a service part. (④, ⑤, and ⑥ in the figure)  Plate heat exchanger (heating-main side) service part		Below ceiling

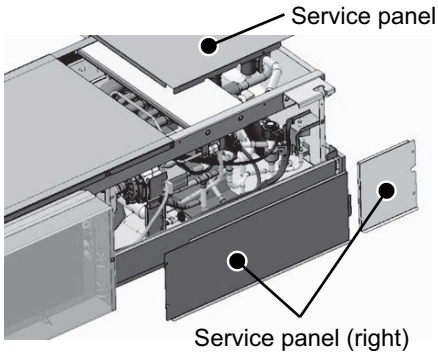
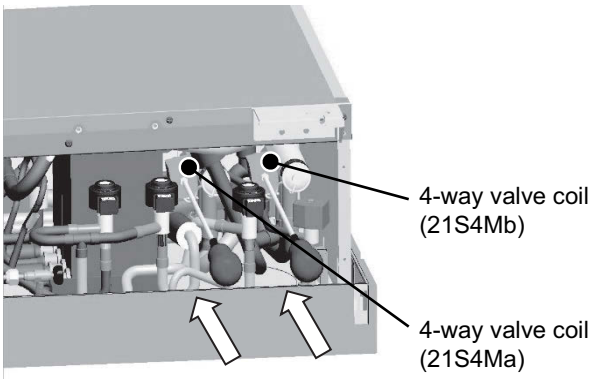
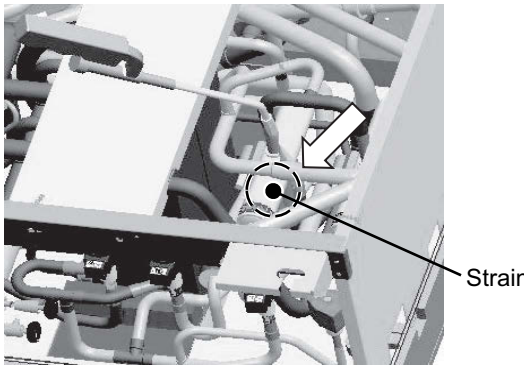
17. Pressure sensor

Operation procedures	Illustrations	Operation location
(1) Perform the work as described in (1) to (8) of 5. (2) Remove the clips connecting the pipes in the two places shown in the figure and then remove the branch pipes in the upward direction. (① and ② in the figure) (3) Debraze the brazed portion of the pressure sensor indicated in the figure and then replace the pressure sensor with a service part. (③ in the figure) ∗Protect the heat insulation material around the pressure sensor so as not to burn it with the flame of the torch.		Below ceiling

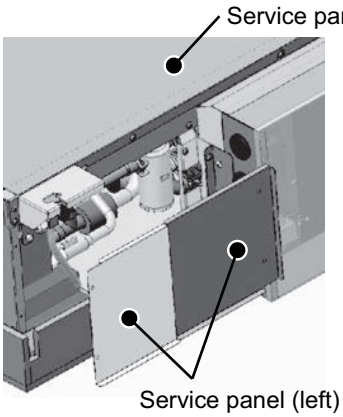
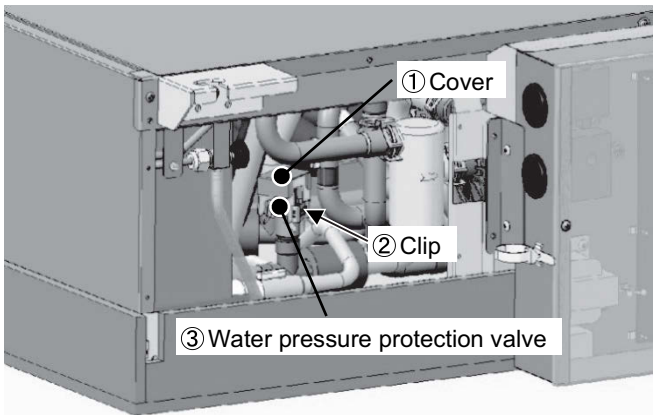
18. Pressure sensor (PS3)

Operation procedures	Illustrations	Operation location
(1) Perform the work as described in (1) to (8) of 5. (2) Cut the cable ties securing the heat insulation material indicated in the figure and then remove the heat insulation material. (3) Debraze the brazed portion of the pressure sensor indicated in the figure and then replace the pressure sensor with a service part. (① in the figure) ∗Protect the heat insulation material around the pressure sensor so as not to burn it with the flame of the torch.		Below ceiling

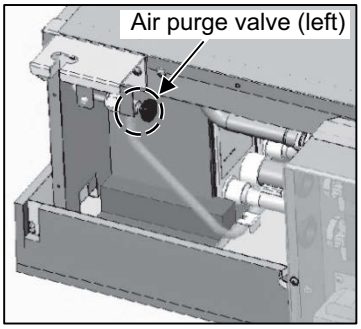
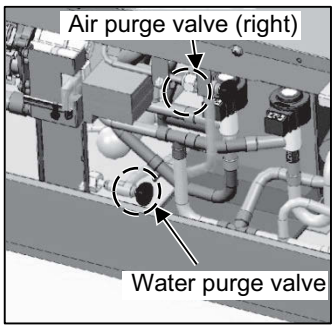
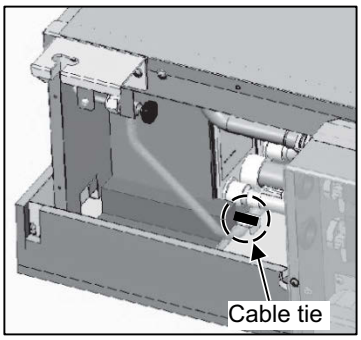
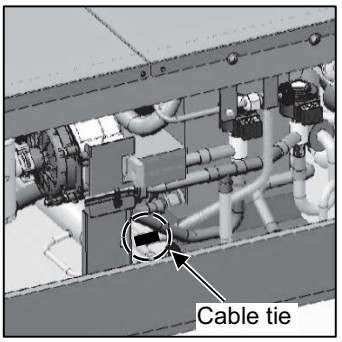
19. Strainer in front of 4-way valve

Operation procedures	Illustrations	Operation location
(1) Collect the refrigerant and water and then carry out the unit from the ceiling space. (2) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (3) Remove the two fixing screws from the service panel (top right) and then remove the service panel (top right). (4) Disconnect the 4-way valve coil connector from the control board. (5) Remove the one 4-way valve coil fixing screw from the front (indicated by direction of the arrow in the figure) and then remove the 4-way valve coil so as not to burn the wires with the brazing flame. (6) Debraze the positions indicated in the figure, remove the strainer inside the pipe, and then replace it with a service part.	  	Below ceiling

20. Water pressure protection valve

Operation procedures	Illustrations	Operation location
(1) Remove the two fixing screws from the service panel (top left) and then remove the service panel (top left). (2) Remove the cover above the water pressure protection valve (① in the figure) in the upward direction from the top. Then remove the clip toward the front (② in the figure). Remove the water pressure protection valve (③ in the figure) upward and replace it with a service part.	 	In ceiling space

21. Water purge valve and air purge valve

Operation procedures	Illustrations	Operation location
(1) Remove the four fixing screws from the service panel (right) and then remove the service panel (right). (2) Remove the four fixing screws from the service panel (left) and then remove the service panel (left). (3) Cut the cable ties securing the PVC tubes and plates. (4) Remove the clamps securing the pipes of the air purge valve and water purge valve from the plates. (5) Loosen the flare nuts with a spanner and then replace the valves with service parts. (6) Secure the PVC tubes to the plates in their original position. ∗To prevent rough movement when the valves are opened. (7) Perform the air purge operation.  Water purge valve and air purge valve service parts	   	In ceiling space

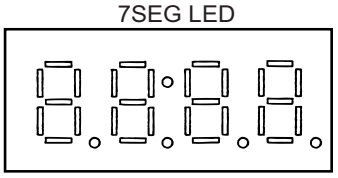
Ⅸ LED Monitor Display on the Outdoor Unit Board

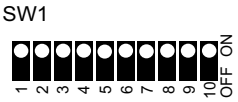
[1] How to Read the LED on the Service Monitor

-1- Outdoor unit board

1. How to read the LED

By setting the DIP SW 1-1 through 1-10 (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.





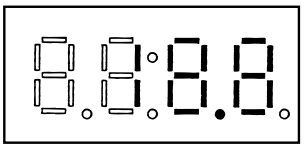
SW1-10 is represented as “0” in the table.

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

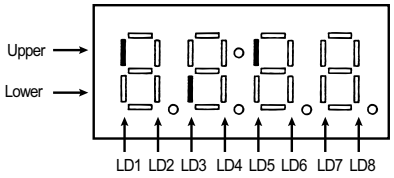
Example: When the pressure data sensor reads 18.8kg/cm^2 (Item No. 58)

- 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

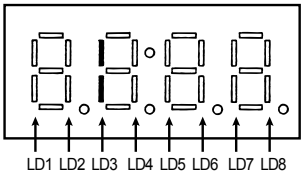


2) Flag display

Example: When 21S4a, 21S4b, SV1a are ON. (Item No. 3)

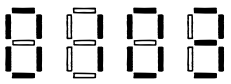
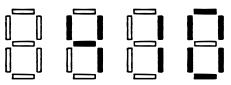
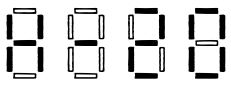
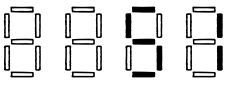


Example: 3-minutes restart mode (Item No. 14)



2. LED display at initial setting

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		[410] : R410A
3	Model and capacity		[H-20] : Cooling/Heating 20 HP 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.

3. Time data storage function

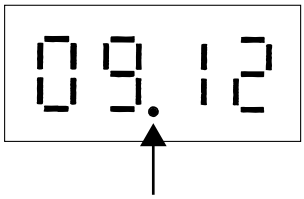
The outdoor unit has a simple clock function that enables the unit to calculate the current time with an internal timer by receiving the time set by the system controller, such as G(B)-50A.
If an error (including a preliminary error) occurs, the error history data and the error detection time are stored 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 G(B)-50A 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 G(B)-50A, 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.)

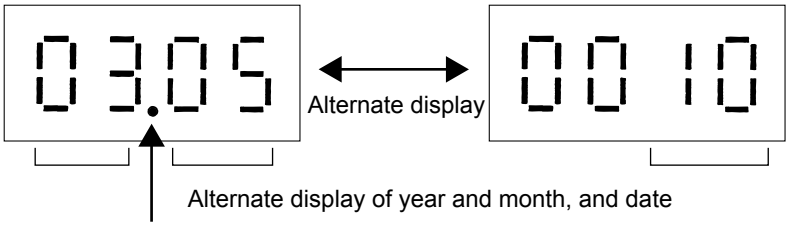
(1) Reading the time data:

1) Time display
   Example: 12 past 9



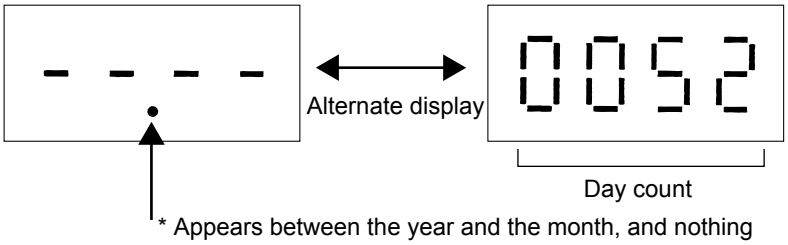
* Disappears if the time data is deviated due to a power failure, or if a system controller that sets the time is not connected.

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



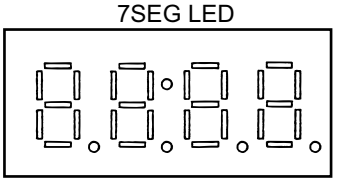
* Appears between the year and the month, and nothing appears when the date is displayed.

-2- HBC controller/Sub-HBC board

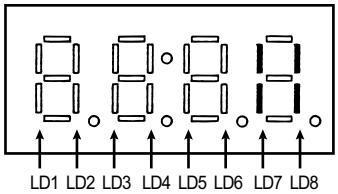
1. How to read the LED

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

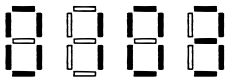
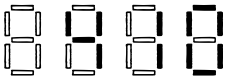
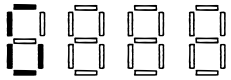
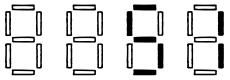


LD1: Pump in operation
LD2: DIP SW 5-4 ON
LD3: DIP SW 5-5 ON
LD5: 72C
LD7: HB
LD8: Microcomputer in operation



2. LED display at initial setting

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		[410] : R410A
3	Model and capacity		[GA] : HBC controller [GB] : Sub-HBC
4	Communication address		[51] : Address 51

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 monitor display

Current data

No.	SW1	Item		Display								Unit (A, B) *1		Remarks
	1234567890			LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
0	0000000000	Relay output display 1 Lighting		Comp in operation				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 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		SV1a		SV2		A	A	
			Bottom				SV5b							
4	0010000000	Relay output display 3	Top	SV4a	SV4b	SV4c	SV5c		SV4d	SV9	Power supply for indoor transmission line	A	A	
			Bottom											
5	1010000000													
6	0110000000													
7	1110000000	Special control		Retry operation	Emergency operation					Communication error between the OC and OS	Communication error 3-minute restart delay mode	B	B	
8	0001000000													
9	1001000000	Communication demand capacity		0000 to 9999								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.

*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.	SW1	Item		Display								Unit (A, B) *1		Remarks
	1234567890			LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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		HB operation signal		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	
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. The lamp goes off when the error is reset. 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 No47	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 Lit during heating 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 No47	Unit No. 48			
23	1110100000		Top	Unit No. 49	Unit No. 50									
			Bottom											

*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.	SW1	Item		Display								Unit (A, B) *1		Remarks
	1234567890			LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
24	0001100000	Indoor unit thermo-stat	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 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 No47	Unit No. 48			
27	1101100000		Top	Unit No. 49	Unit No. 50									
			Bottom											
28	0011100000													
29	1011100000													
30	0111100000													
31	1111100000													
32	0000010000													
33	1000010000													
34	0100010000													
35	1100010000													
36	0010010000													
37	1010010000	HB operation mode		Cooling-only ON	Cooling-only OFF	Heating-only ON	Heating-only OFF	Mixed-mode ON	Mixed-mode OFF	Fan	Stop	B		
38	0110010000													
39	1110010000	Outdoor unit Operation mode		Permissible stop	Standby	Cooling	Cooling-main	Heating	Heating-main			A	A	
40	0001010000													
41	1001010000													
42	0101010000	Outdoor unit control mode		Stop	Thermo OFF	Abnormal stop	Scheduled control	Initial start up	Defrost	Oil balance	Low fre-quency oil recovery	A	A	
43	1101010000				Refrigerant recovery							A	A	
44	0011010000													

*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.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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	
49	1000110000												
50	0100110000	TH5	-99.9 to 999.9								A	A	
51	1100110000												
52	0010110000												
53	1010110000												
54	0110110000												
55	1110110000												
56	0001110000	THHS1	-99.9 to 999.9								A	A	The unit is [°C]
57	1001110000												
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	
60	0011110000												
61	1011110000												
62	0111110000												
63	1111110000												
64	0000001000												
65	1000001000												
66	0100001000												
67	1100001000												
68	0010001000												
69	1010001000												
70	0110001000												
71	1110001000												

*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.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
72	0001001000												
73	1001001000												
74	0101001000												
75	1101001000												
76	0011001000												
77	1011001000												
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	
85	1010101000												
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												
90	0101101000												
91	1101101000	COMP operating frequency	0000 to 9999								A	A	The unit is [rps]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												
93	1011101000	All AK (OC+OS)	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.

Current data

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
94	0111101000	AK	0000 to 9999								A	A	
95	1111101000	FAN	0000 to 9999								A	A	Fan output [%]
96	0000011000	Fan inverter output frequency	0000 to 9999								A	A	Twice the actual output frequency
97	1000011000												
98	0100011000												
99	1100011000												
100	0010011000												
101	1010011000												
102	0110011000												
103	1110011000												
104	0001011000												
105	1001011000												
106	0101011000												
107	1101011000												
108	0011011000												
109	1011011000												
110	0111011000												
111	1111011000	COMP bus voltage	00.0 to 999.9								A	A	The unit is [V]
112	0000111000												
113	1000111000												
114	0100111000												
115	1100111000												
116	0010111000	Number of times the unit went into the mode to remedy wet vapor suction	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.

Current data

No.	SW1	Item		Display								Unit (A, B) *1		Remarks
	1234567890			LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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	
119	1110111000													
120	0001111000													
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
122	0101111000													
123	1101111000	COMP number of start-stop events Upper 4 digits		0000 to 9999								A	A	Count-up at start-up The unit is [Time]
124	0011111000	COMP number of start-stop events Lower 4 digits		0000 to 9999								A	A	
125	1011111000													
126	0111111000													
127	1111111000													
128	0000000100													
129	1000000100	Integrated operation time of compressor (for rotation purpose)		0000 to 9999								B		The unit is [h]
130	0100000100													
131	1100000100													
132	0010000100	Relay output display HB	Top	SVM1	21S4a	21S4b	72C	Float SW	Disconnected float SW connector			B		
			Bottom											
133	1010000100													
134	0110000100													
135	1110000100	Pump 1 specified voltage HB		0001 to 0100								B		

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Current data

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
136	0001000100	Pump 2 specified voltage HB	0000 to 0100								B		
137	1001000100	The revolutions of the water pump 1	0000 to 9999								B		
138	0101000100	The revolutions of the water pump 2	0000 to 9999								B		
139	1101000100	TH11 HB	-99.9 to 999.9								B		
140	0011000100	TH12 HB	-99.9 to 999.9								B		
141	1011000100	TH13 HB	-99.9 to 999.9								B		
142	0111000100	TH14 HB	-99.9 to 999.9								B		
143	1111000100	TH15 HB	-99.9 to 999.9								B		
144	0000100100	TH16 HB	-99.9 to 999.9								B		
145	1000100100	TH31a HB	-99.9 to 999.9								B		
146	0100100100	TH31b HB	-99.9 to 999.9								B		
147	1100100100	TH31c HB	-99.9 to 999.9								B		
148	0010100100	TH31d HB	-99.9 to 999.9								B		
149	1010100100	TH31e HB	-99.9 to 999.9								B		
150	0110100100	TH31f HB	-99.9 to 999.9								B		
151	1110100100	TH31g HB	-99.9 to 999.9								B		
152	0001100100	TH31h HB	-99.9 to 999.9								B		

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Current data

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
153	1001100100	TH32 HB	-99.9 to 999.9								B		
154	0101100100	TH33 HB	-99.9 to 999.9								B		
155	1101100100	TH34 HB	-99.9 to 999.9								B		
156	0011100100	TH35 HB	-99.9 to 999.9								B		
157	1011100100												
158	0111100100												
159	1111100100	SC1 HB	-99.9 to 999.9								B		
160	0000010100	SC2 HB	-99.9 to 999.9								B		
161	1000010100	SH1 HB	-99.9 to 999.9								B		
162	0100010100	SH2 HB	-99.9 to 999.9								B		
163	1100010100	SH16 HB	-99.9 to 999.9								B		
164	0010010100	PS1 HB	-99.9 to 999.9								B		
165	1010010100	LEV1 HB	0000 to 3000								B		
166	0110010100	LEV2 HB	0000 to 3000								B		
167	1110010100	LEV3 HB	0000 to 3000								B		
168	0001010100												
169	1001010100												
170	0101010100												
171	1101010100												
172	0011010100												

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Current data

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
173	1011010100												
174	0111010100												
175	1111010100												
176	0000110100												
177	1000110100												
178	0100110100	Error history 1	0000 to 9999								B	B	Address and error codes highlighted If no errors are detected, "---- " appears on the display. Preliminary error information of the OS does not appear on the OC. Neither preliminary error information of the OC nor error information of the IC appears on the OS.
179	1100110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
180	0010110100	Error history 2	0000 to 9999								B	B	
181	1010110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
182	0110110100	Error history 3	0000 to 9999								B	B	
183	1110110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
184	0001110100	Error history 4	0000 to 9999								B	B	
185	1001110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
186	0101110100	Error history 5	0000 to 9999								B	B	
187	1101110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
188	0011110100	Error history 6	0000 to 9999								B	B	
189	1011110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
190	0111110100	Error history 7	0000 to 9999								B	B	
191	1111110100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
192	0000001100	Error history 8	0000 to 9999								B	B	
193	1000001100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
194	0100001100	Error history 9	0000 to 9999								B	B	
195	1100001100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
196	0010001100	Error history 10	0000 to 9999								B	B	
197	1010001100	Error details of inverter	Error details of inverter (0001-0120)								A	A	
198	0110001100	Error history of inverter (At the time of last data backup before error)	0000 to 9999								B	B	
199	1110001100	Error details of inverter	Error details of inverter (0001-0120)								A	A	

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Current data

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
200	0001001100												

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Data before error

No.	SW1	Item		Display								Unit (A, B) *1		Remarks
	1234567890			LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
201	1001001100	Outdoor unit operation status		HB operation signal		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	HB operation mode		Cooling-only ON	Cooling-only OFF	Heating-only ON	Heating-only OFF	Mixed-mode ON	Mixed-mode OFF	Fan	Stop	A	A	
204	0011001100													
205	1011001100	Outdoor unit Operation mode		Permissible stop	Standby	Cooling	Cooling-main	Heating	Heating-main			A	A	
206	0111001100													
207	1111001100													
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				Refrigerant recovery							A	A	
210	0100101100													
211	1100101100	Relay output display 1 Lighting		Comp in operation				72C		OC	Always lit	A	A	
212	0010101100	Relay output display 2 Lighting	Top	21S4a		CH11		SV1a		SV2		A	A	
			Bottom				SV5b							
213	1010101100	Relay output display 3 Lighting	Top	SV4a	SV4b	SV4c	SV5c		SV4d	SV9	Lit while power to the indoor units is being supplied	A	A	
			Bottom											
214	0110101100													
215	1110101100													

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Data before error

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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	
220	0011101100												
221	1011101100	TH5	-99.9 to 999.9								A	A	
222	0111101100												
223	1111101100												
224	0000011100												
225	1000011100												
226	0100011100												
227	1100011100	THHS1	-99.9 to 999.9								A	A	The unit is [°C]
228	0010011100												
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	
231	1110011100												
232	0001011100												
233	1001011100												
234	0101011100												
235	1101011100												
236	0011011100												
237	1011011100												
238	0111011100												
239	1111011100												
240	0000111100												
241	1000111100												
242	0100111100												

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Data before error

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
243	1100111100												
244	0010111100												
245	1010111100												
246	0110111100												
247	1110111100												
248	0001111100												
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	
256	0000000010												
257	1000000010	Total frequencies (OC+OS)	0000 to 9999								B		Control data [Hz]
258	0100000010	Total frequency of each unit	0000 to 9999								A	A	
259	1100000010	COMP frequency	0000 to 9999								A	A	
260	0010000010												
261	1010000010												
262	0110000010												
263	1110000010												
264	0001000010	All AK (OC+OS)	0000 to 9999								B		
265	1001000010	AK	0000 to 9999								A	A	
266	0101000010	FAN	0000 to 9999								A	A	Fan inverter output [%]
267	1101000010	Fan inverter output frequency	0000 to 9999								A	A	Twice the actual output frequency

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Data before error

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
268	0011000010												
269	1011000010												
270	0111000010												
271	1111000010												
272	0000100010												
273	1000100010												
274	0100100010												
275	1100100010												
276	0010100010												
277	1010100010												
278	0110100010												
279	1110100010												
280	0001100010												
281	1001100010												
282	0101100010	COMP bus voltage	00.0 to 999.9								A	A	The unit is [V]
283	1101100010												
284	0011100010												
285	1011100010												
286	0111100010												
287	1111100010												
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	
290	0100010010												
291	1100010010												
292	0010010010												
293	1010010010												

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Data before error

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
294	0110010010	COMP number of start-stop events Upper 4 digits	0000 to 9999								A	A	Count-up at start-up The unit is [Time]
295	1110010010	COMP number of start-stop events Lower 4 digits	0000 to 9999								A	A	
296	0001010010												
297	1001010010												
298	0101010010												
299	1101010010												
300	0011010010	Integrated operation time of compressor (for rotation purpose)	0000 to 9999								B		The unit is [h]

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Current data

No.	SW1	Item	Display								Unit (A, B)*1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
301	1011010010	Power supply unit	OC/OS ↔ Address								B		
302	0111010010	Start-up unit	OC/OS↔ Address								B		
303	1111010010												
304	0000110010												
305	1000110010												
306	0100110010												
307	1100110010												
308	0010110010												
309	1010110010												
310	0110110010												
311	1110110010												
312	0001110010												
313	1001110010												
314	0101110010												
315	1101110010												
316	0011110010												
317	1011110010												
318	0111110010												
319	1111110010												
320	0000001010	TH31a (HS)	-99.9 to 999.9								B		
321	1000001010	TH31b (HS)	-99.9 to 999.9								B		
322	0100001010	TH31c (HS)	-99.9 to 999.9								B		
323	1100001010	TH31d (HS)	-99.9 to 999.9								B		
324	0010001010	TH31e (HS)	-99.9 to 999.9								B		
325	1010001010	TH31f (HS)	-99.9 to 999.9								B		
326	0110001010	TH31g (HS)	-99.9 to 999.9								B		
327	1110001010	TH31h (HS)	-99.9 to 999.9								B		

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Current data

No.	SW1	Item	Display								Unit (A, B)*1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
328	0001001010	TH31i (HS)	-99.9 to 999.9								B		
329	1001001010	TH31j (HS)	-99.9 to 999.9								B		
330	0101001010	TH31k (HS)	-99.9 to 999.9								B		
331	1101001010	TH31l (HS)	-99.9 to 999.9								B		
332	0011001010	TH31m (HS)	-99.9 to 999.9								B		
333	1011001010	TH31n(HS)	-99.9 to 999.9								B		
334	0111001010	TH31o (HS)	-99.9 to 999.9								B		
335	1111001010	TH31p (HS)	-99.9 to 999.9								B		
336	0000101010	TH32 (HS)	-99.9 to 999.9								B		
337	1000101010	TH33 (HS)	-99.9 to 999.9								B		
338	0100101010	PS3	-99.9 to 999.9								B		
339	1100101010												
340	0010101010												
341	1010101010												
342	0110101010												
343	1110101010												
344	0001101010												
345	1001101010												
346	0101101010												
347	1101101010												
348	0011101010												
349	1011101010												
350	0111101010												

*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.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
351	1111101010	IC1 Address/capacity code	0000 to 9999				0000 to 9999				B		Displayed alternately every 5 seconds
352	0000011010	IC2 Address/capacity code	0000 to 9999				0000 to 9999						
353	1000011010	IC3 Address/capacity code	0000 to 9999				0000 to 9999						
354	0100011010	IC4 Address/capacity code	0000 to 9999				0000 to 9999						
355	1100011010	IC5 Address/capacity code	0000 to 9999				0000 to 9999						
356	0010011010	IC6 Address/capacity code	0000 to 9999				0000 to 9999						
357	1010011010	IC7 Address/capacity code	0000 to 9999				0000 to 9999						
358	0110011010	IC8 Address/capacity code	0000 to 9999				0000 to 9999						
359	1110011010	IC9 Address/capacity code	0000 to 9999				0000 to 9999						
360	0001011010	IC10 Address/capacity code	0000 to 9999				0000 to 9999						
361	1001011010	IC11 Address/capacity code	0000 to 9999				0000 to 9999						
362	0101011010	IC12 Address/capacity code	0000 to 9999				0000 to 9999						
363	1101011010	IC13 Address/capacity code	0000 to 9999				0000 to 9999						
364	0011011010	IC14 Address/capacity code	0000 to 9999				0000 to 9999						
365	1011011010	IC15 Address/capacity code	0000 to 9999				0000 to 9999						
366	0111011010	IC16 Address/capacity code	0000 to 9999				0000 to 9999						
367	1111011010	IC17 Address/capacity code	0000 to 9999				0000 to 9999						

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
368	0000111010	IC18 Address/capacity code	0000 to 9999				0000 to 9999				B		Displayed alternately every 5 seconds
369	1000111010	IC19 Address/capacity code	0000 to 9999				0000 to 9999						
370	0100111010	IC20 Address/capacity code	0000 to 9999				0000 to 9999						
371	1100111010	IC21 Address/capacity code	0000 to 9999				0000 to 9999						
372	0010111010	IC22 Address/capacity code	0000 to 9999				0000 to 9999						
373	1010111010	IC23 Address/capacity code	0000 to 9999				0000 to 9999						
374	0110111010	IC24 Address/capacity code	0000 to 9999				0000 to 9999						
375	1110111010	IC25 Address/capacity code	0000 to 9999				0000 to 9999						
376	0001111010	IC26 Address/capacity code	0000 to 9999				0000 to 9999						
377	1001111010	IC27 Address/capacity code	0000 to 9999				0000 to 9999						
378	0101111010	IC28 Address/capacity code	0000 to 9999				0000 to 9999						
379	1101111010	IC29 Address/capacity code	0000 to 9999				0000 to 9999						
380	0011111010	IC30 Address/capacity code	0000 to 9999				0000 to 9999						
381	1011111010	IC31 Address/capacity code	0000 to 9999				0000 to 9999						
382	0111111010	IC32 Address/capacity code	0000 to 9999				0000 to 9999						
383	1111111010	IC33 Address/capacity code	0000 to 9999				0000 to 9999						
384	0000000110	IC34 Address/capacity code	0000 to 9999				0000 to 9999						
385	1000000110	IC35 Address/capacity code	0000 to 9999				0000 to 9999						
386	0100000110	IC36 Address/capacity code	0000 to 9999				0000 to 9999						
387	1100000110	IC37 Address/capacity code	0000 to 9999				0000 to 9999						
388	0010000110	IC38 Address/capacity code	0000 to 9999				0000 to 9999						
389	1010000110	IC39 Address/capacity code	0000 to 9999				0000 to 9999						
390	0110000110	IC40 Address/capacity code	0000 to 9999				0000 to 9999						
391	1110000110	IC41 Address/capacity code	0000 to 9999				0000 to 9999						
392	0001000110	IC42 Address/capacity code	0000 to 9999				0000 to 9999						
393	1001000110	IC43 Address/capacity code	0000 to 9999				0000 to 9999						
394	0101000110	IC44 Address/capacity code	0000 to 9999				0000 to 9999						
395	1101000110	IC45 Address/capacity code	0000 to 9999				0000 to 9999						

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
396	0011000110	IC46 Address/capacity code	0000 to 9999				0000 to 9999				B		Displayed alternately every 5 seconds
397	1011000110	IC47 Address/capacity code	0000 to 9999				0000 to 9999						
398	0111000110	IC48 Address/capacity code	0000 to 9999				0000 to 9999						
399	1111000110	IC49 Address/capacity code	0000 to 9999				0000 to 9999						
400	0000100110	IC50 Address/capacity code	0000 to 9999				0000 to 9999						
401	1000100110												
402	0100100110												
403	1100100110												
404	0010100110												
405	1010100110												
406	0110100110												
407	1110100110												
408	0001100110	IC1 Suction temperature	-99.9 to 999.9								B		The unit is [°C]
409	1001100110	IC2 Suction temperature	-99.9 to 999.9										
410	0101100110	IC3 Suction temperature	-99.9 to 999.9										
411	1101100110	IC4 Suction temperature	-99.9 to 999.9										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
412	0011100110	IC5 Suction temperature	-99.9 to 999.9								B		The unit is [°C]
413	1011100110	IC6 Suction temperature	-99.9 to 999.9										
414	0111100110	IC7 Suction temperature	-99.9 to 999.9										
415	1111100110	IC8 Suction temperature	-99.9 to 999.9										
416	0000010110	IC9 Suction temperature	-99.9 to 999.9										
417	1000010110	IC10 Suction temperature	-99.9 to 999.9										
418	0100010110	IC11 Suction temperature	-99.9 to 999.9										
419	1100010110	IC12 Suction temperature	-99.9 to 999.9										
420	0010010110	IC13 Suction temperature	-99.9 to 999.9										
421	1010010110	IC14 Suction temperature	-99.9 to 999.9										
422	0110010110	IC15 Suction temperature	-99.9 to 999.9										
423	1110010110	IC16 Suction temperature	-99.9 to 999.9										
424	0001010110	IC17 Suction temperature	-99.9 to 999.9										
425	1001010110	IC18 Suction temperature	-99.9 to 999.9										
426	0101010110	IC19 Suction temperature	-99.9 to 999.9										
427	1101010110	IC20 Suction temperature	-99.9 to 999.9										
428	0011010110	IC21 Suction temperature	-99.9 to 999.9										
429	1011010110	IC22 Suction temperature	-99.9 to 999.9										
430	0111010110	IC23 Suction temperature	-99.9 to 999.9										
431	1111010110	IC24 Suction temperature	-99.9 to 999.9										
432	0000110110	IC25 Suction temperature	-99.9 to 999.9										
433	1000110110	IC26 Suction temperature	-99.9 to 999.9										
434	0100110110	IC27 Suction temperature	-99.9 to 999.9										
435	1100110110	IC28 Suction 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.

Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
436	0010110110	IC29 Suction temperature	-99.9 to 999.9								B		The unit is [°C]
437	1010110110	IC30 Suction temperature	-99.9 to 999.9										
438	0110110110	IC31 Suction temperature	-99.9 to 999.9										
439	1110110110	IC32 Suction temperature	-99.9 to 999.9										
440	0001110110	IC33 Suction temperature	-99.9 to 999.9										
441	1001110110	IC34 Suction temperature	-99.9 to 999.9										
442	0101110110	IC35 Suction temperature	-99.9 to 999.9										
443	1101110110	IC36 Suction temperature	-99.9 to 999.9										
444	0011110110	IC37 Suction temperature	-99.9 to 999.9										
445	1011110110	IC38 Suction temperature	-99.9 to 999.9										
446	0111110110	IC39 Suction temperature	-99.9 to 999.9										
447	1111110110	IC40 Suction temperature	-99.9 to 999.9										
448	0000001110	IC41 Suction temperature	-99.9 to 999.9										
449	1000001110	IC42 Suction temperature	-99.9 to 999.9										
450	0100001110	IC43 Suction temperature	-99.9 to 999.9										
451	1100001110	IC44 Suction temperature	-99.9 to 999.9										
452	0010001110	IC45 Suction temperature	-99.9 to 999.9										
453	1010001110	IC46 Suction temperature	-99.9 to 999.9										
454	0110001110	IC47 Suction temperature	-99.9 to 999.9										
455	1110001110	IC48 Suction temperature	-99.9 to 999.9										
456	0001001110	IC49 Suction temperature	-99.9 to 999.9										
457	1001001110	IC50 Suction temperature	-99.9 to 999.9										
458	0101001110	IC1 Inlet pipe temperature	-99.9 to 999.9								B		The unit is [°C]
459	1101001110	IC2 Inlet pipe temperature	-99.9 to 999.9										
460	0011001110	IC3 Inlet pipe temperature	-99.9 to 999.9										
461	1011001110	IC4 Inlet pipe temperature	-99.9 to 999.9										
462	0111001110	IC5 Inlet pipe temperature	-99.9 to 999.9										
463	1111001110	IC6 Inlet 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.

Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
464	0000101110	IC7 Inlet pipe temperature	-99.9 to 999.9								B		The unit is [°C]
465	1000101110	IC8 Inlet pipe temperature	-99.9 to 999.9										
466	0100101110	IC9 Inlet pipe temperature	-99.9 to 999.9										
467	1100101110	IC10 Inlet pipe temperature	-99.9 to 999.9										
468	0010101110	IC11 Inlet pipe temperature	-99.9 to 999.9										
469	1010101110	IC12 Inlet pipe temperature	-99.9 to 999.9										
470	0110101110	IC13 Inlet pipe temperature	-99.9 to 999.9										
471	1110101110	IC14 Inlet pipe temperature	-99.9 to 999.9										
472	0001101110	IC15 Inlet pipe temperature	-99.9 to 999.9										
473	1001101110	IC16 Inlet pipe temperature	-99.9 to 999.9										
474	0101101110	IC17 Inlet pipe temperature	-99.9 to 999.9										
475	1101101110	IC18 Inlet pipe temperature	-99.9 to 999.9										
476	0011101110	IC19 Inlet pipe temperature	-99.9 to 999.9										
477	1011101110	IC20 Inlet pipe temperature	-99.9 to 999.9										
478	0111101110	IC21 Inlet pipe temperature	-99.9 to 999.9										
479	1111101110	IC22 Inlet pipe temperature	-99.9 to 999.9										
480	0000011110	IC23 Inlet pipe temperature	-99.9 to 999.9										
481	1000011110	IC24 Inlet pipe temperature	-99.9 to 999.9										
482	0100011110	IC25 Inlet pipe temperature	-99.9 to 999.9										
483	1100011110	IC26 Inlet pipe temperature	-99.9 to 999.9										
484	0010011110	IC27 Inlet pipe temperature	-99.9 to 999.9										
485	1010011110	IC28 Inlet pipe temperature	-99.9 to 999.9										
486	0110011110	IC29 Inlet pipe temperature	-99.9 to 999.9										
487	1110011110	IC30 Inlet pipe temperature	-99.9 to 999.9										
488	0001011110	IC31 Inlet pipe temperature	-99.9 to 999.9										
489	1001011110	IC32 Inlet pipe temperature	-99.9 to 999.9										
490	0101011110	IC33 Inlet pipe temperature	-99.9 to 999.9										
491	1101011110	IC34 Inlet pipe temperature	-99.9 to 999.9										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
492	0011011110	IC35 Inlet pipe temperature	-99.9 to 999.9								B		The unit is [°C]
493	1011011110	IC36 Inlet pipe temperature	-99.9 to 999.9										
494	0111011110	IC37 Inlet pipe temperature	-99.9 to 999.9										
495	1111011110	IC38 Inlet pipe temperature	-99.9 to 999.9										
496	0000111110	IC39 Inlet pipe temperature	-99.9 to 999.9										
497	1000111110	IC40 Inlet pipe temperature	-99.9 to 999.9										
498	0100111110	IC41 Inlet pipe temperature	-99.9 to 999.9										
499	1100111110	IC42 Inlet pipe temperature	-99.9 to 999.9										
500	0010111110	IC43 Inlet pipe temperature	-99.9 to 999.9										
501	1010111110	IC44 Inlet pipe temperature	-99.9 to 999.9										
502	0110111110	IC45 Inlet pipe temperature	-99.9 to 999.9										
503	1110111110	IC46 Inlet pipe temperature	-99.9 to 999.9										
504	0001111110	IC47 Inlet pipe temperature	-99.9 to 999.9										
505	1001111110	IC48 Inlet pipe temperature	-99.9 to 999.9										
506	0101111110	IC49 Inlet pipe temperature	-99.9 to 999.9										
507	1101111110	IC50 Inlet pipe temperature	-99.9 to 999.9										
508	0011111110												
509	1011111110												
510	0111111110												
511	1111111110												

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Setting data

No.	SW1	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		
515	1100000001	HB/TU 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	
519	1110000001												
520	0001000001												
521	1001000001												
522	0101000001												

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
523	1101000001	IC1 Outlet pipe temperature	-99.9 to 999.9								B		The unit is [°C]
524	0011000001	IC2 Outlet pipe temperature	-99.9 to 999.9										
525	1011000001	IC3 Outlet pipe temperature	-99.9 to 999.9										
526	0111000001	IC4 Outlet pipe temperature	-99.9 to 999.9										
527	1111000001	IC5 Outlet pipe temperature	-99.9 to 999.9										
528	0000100001	IC6 Outlet pipe temperature	-99.9 to 999.9										
529	1000100001	IC7 Outlet pipe temperature	-99.9 to 999.9										
530	0100100001	IC8 Outlet pipe temperature	-99.9 to 999.9										
531	1100100001	IC9 Outlet pipe temperature	-99.9 to 999.9										
532	0010100001	IC10 Outlet pipe temperature	-99.9 to 999.9										
533	1010100001	IC11 Outlet pipe temperature	-99.9 to 999.9										
534	0110100001	IC12 Outlet pipe temperature	-99.9 to 999.9										
535	1110100001	IC13 Outlet pipe temperature	-99.9 to 999.9										
536	0001100001	IC14 Outlet pipe temperature	-99.9 to 999.9										
537	1001100001	IC15 Outlet pipe temperature	-99.9 to 999.9										
538	0101100001	IC16 Outlet pipe temperature	-99.9 to 999.9										
539	1101100001	IC17 Outlet pipe temperature	-99.9 to 999.9										
540	0011100001	IC18 Outlet pipe temperature	-99.9 to 999.9										
541	1011100001	IC19 Outlet pipe temperature	-99.9 to 999.9										
542	0111100001	IC20 Outlet pipe temperature	-99.9 to 999.9										
543	1111100001	IC21 Outlet pipe temperature	-99.9 to 999.9										
544	0000010001	IC22 Outlet pipe temperature	-99.9 to 999.9										
545	1000010001	IC23 Outlet pipe temperature	-99.9 to 999.9										
546	0100010001	IC24 Outlet pipe temperature	-99.9 to 999.9										
547	1100010001	IC25 Outlet pipe temperature	-99.9 to 999.9										
548	0010010001	IC26 Outlet pipe temperature	-99.9 to 999.9										
549	1010010001	IC27 Outlet pipe temperature	-99.9 to 999.9										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
550	0110010001	IC28 Outlet pipe temperature	-99.9 to 999.9								B		The unit is [°C]
551	1110010001	IC29 Outlet pipe temperature	-99.9 to 999.9										
552	0001010001	IC30 Outlet pipe temperature	-99.9 to 999.9										
553	1001010001	IC31 Outlet pipe temperature	-99.9 to 999.9										
554	0101010001	IC32 Outlet pipe temperature	-99.9 to 999.9										
555	1101010001	IC33 Outlet pipe temperature	-99.9 to 999.9										
556	0011010001	IC34 Outlet pipe temperature	-99.9 to 999.9										
557	1011010001	IC35 Outlet pipe temperature	-99.9 to 999.9										
558	0111010001	IC36 Outlet pipe temperature	-99.9 to 999.9										
559	1111010001	IC37 Outlet pipe temperature	-99.9 to 999.9										
560	0000110001	IC38 Outlet pipe temperature	-99.9 to 999.9										
561	1000110001	IC39 Outlet pipe temperature	-99.9 to 999.9										
562	0100110001	IC40 Outlet pipe temperature	-99.9 to 999.9										
563	1100110001	IC41 Outlet pipe temperature	-99.9 to 999.9										
564	0010110001	IC42 Outlet pipe temperature	-99.9 to 999.9										
565	1010110001	IC43 Outlet pipe temperature	-99.9 to 999.9										
566	0110110001	IC44 Outlet pipe temperature	-99.9 to 999.9										
567	1110110001	IC45 Outlet pipe temperature	-99.9 to 999.9										
568	0001110001	IC46 Outlet pipe temperature	-99.9 to 999.9										
569	1001110001	IC47 Outlet pipe temperature	-99.9 to 999.9										
570	0101110001	IC48 Outlet pipe temperature	-99.9 to 999.9										
571	1101110001	IC49 Outlet pipe temperature	-99.9 to 999.9										
572	0011110001	IC50 Outlet pipe temperature	-99.9 to 999.9										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B)*1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B)*1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
600	0001101001	IC28SH	-99.9 to 999.9								B		The unit is [°C]
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										
608	0000011001	IC36SH	-99.9 to 999.9										
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										

*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.	SW1	Item	Display								Unit (A, B)*1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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										

*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.	SW1	Item	Display								Unit (A, B)*1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
650	0101000101	IC28SC	-99.9 to 999.9								B		The unit is [°C]
651	1101000101	IC29SC	-99.9 to 999.9										
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										
673	1000010101												
674	0100010101												
675	1100010101												

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Setting data

No.	SW1	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	
677	1010010101												
678	0110010101												
679	1110010101	Fan board S/W version	0.00 to 99.99								A	A	
680	0001010101												
681	1001010101												
682	0101010101												
683	1101010101												
684	0011010101												
685	1011010101												
686	0111010101												
687	1111010101												

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Setting data

No.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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

*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.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
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
712	0001001101												
713	1001001101												

*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.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
714	0101001101												
715	1101001101												
716	0011001101												
717	1011001101												
718	0111001101												
719	1111001101												
720	0000101101												
721	1000101101												
722	0100101101	TH31i HB	-99.9 to 999.9								B		Fully open: 0 C: Cooling H: Heating
723	1100101101	TH31j HB	-99.9 to 999.9								B		
724	0010101101	TH31k HB	-99.9 to 999.9								B		
725	1010101101	TH31l HB	-99.9 to 999.9								B		
726	0110101101	TH31m HB	-99.9 to 999.9								B		
727	1110101101	TH31n HB	-99.9 to 999.9								B		
728	0001101101	TH31o HB	-99.9 to 999.9								B		
729	1001101101	TH31p HB	-99.9 to 999.9								B		
730	0101101101	Valve block VBa HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
731	1101101101	Valve block VBb HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
732	0011101101	Valve block VBc HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
733	1011101101	Valve block VBd HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
734	0111101101	Valve block VBe HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
735	1111101101	Valve block VBf HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
736	0000011101	Valve block VBg HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
737	1000011101	Valve block VBh HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
738	0100011101	Valve block VBi HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
739	1100011101	Valve block VBj HB									B		

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
740	0010011101	Valve block VBk HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		Fully open: 0 C: Cooling H: Heating
741	1010011101	Valve block VBl HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
742	0110011101	Valve block VBm HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
743	1110011101	Valve block VBn HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
744	0001011101	Valve block VBo HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
745	1001011101	Valve block VBp HB	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
746	0101011101	Valve block VBa HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
747	1101011101	Valve block VBb HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
748	0011011101	Valve block VBc HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
749	1011011101	Valve block VBd HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
750	0111011101	Valve block VBe HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
751	1111011101	Valve block VBf HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
752	0000111101	Valve block VBg HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
753	1000111101	Valve block VBh HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
754	0100111101	Valve block VBi HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
755	1100111101	Valve block VBj HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
756	0010111101	Valve block VBk HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
757	1010111101	Valve block VBl HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
758	0110111101	Valve block VBm HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
759	1110111101	Valve block VBn HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
760	0001111101	Valve block VBo HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
761	1001111101	Valve block VBp HS	0 or C 1 to C999 or H 1 to H999 or 1000 to 9999								B		
762	0101111101	PT1	-99.9 to 999.9								B		
763	1101111101	dPHM	-99.9 to 999.9								B		

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
764	0011111101	IC1 Operation mode	0000 : Stop 0001 : Ventilation 0002 : Cooling 0003 : Heating 0004 : Dry								B		The four LDs on the left (LD1-4) display operation mode, and the four LDs on the right (LD5-LD8) display port address. (Displayed alternately every five seconds)
765	1011111101	IC2 Operation mode											
766	0111111101	IC3Operation mode											
767	1111111101	IC4 Operation mode											
768	0000000011	IC5 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.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
769	1000000011	IC6 Operation mode	0000 : Stop 0001 : Ventilation 0002 : Cooling 0003 : Heating 0004 : Dry								B		The four LDs on the left (LD1-4) display operation mode, and the four LDs on the right (LD5-LD8) display port address. (Displayed alternately every five seconds)
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.	SW1	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		The four LDs on the left (LD1-4) display operation mode, and the four LDs on the right (LD5-LD8) display port address. (Displayed alternately every five seconds)
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										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
825	1001110011	IC12 filter	0000 to 9999								B		Hours since last maintenance [h]
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										
840	0001001011	IC27 filter	0000 to 9999										
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										

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Data on indoor unit system

No.	SW1	Item	Display								Unit (A, B)* 1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
853	1010101011	IC40 filter	0000 to 9999								B		Hours since last maintenance [h]
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.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
864	0000011011												
865	1000011011												
866	0100011011												
867	1100011011												
868	0010011011												
869	1010011011												
870	0110011011												
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]
874	0101011011												
875	1101011011												
876	0011011011												
877	1011011011												
878	0111011011												
879	1111011011												
880	0000111011	Control board Reset counter	0 to 254								A	A	The unit is [time]
881	1000111011	INV board Reset counter	0 to 254								A	A	
882	0100111011												
883	1100111011												
884	0010111011	Fan board Reset counter	0 to 254								A	A	The unit is [time]
885	1010111011												
886	0110111011												

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Other types of data

No.	SW1	Item	Display								Unit (A, B) *1		Remarks
	1234567890		LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8	OC	OS	
887	1110111011												
888	0001111011												
889	1001111011												
890	0101111011												
891	1101111011												
892	0011111011												
893	1011111011												
894	0111111011												
895	1111111011												
896	0000000111												
897	1000000111												
898	0100000111												
899	1100000111												
900	0010000111												
901	1010000111												
902	0110000111												
903	1110000111												
904	0001000111												
905	1001000111												
906	0101000111												
907	1101000111												
1020	0011111111												
1021	1011111111												
1022	0111111111												
1023	1111111111												

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Service Handbook

Model

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