MITSUBISHI ELECTRIC

R454B

December 2024
OCH819
REVISED EDITION-B

SERVICE MANUAL

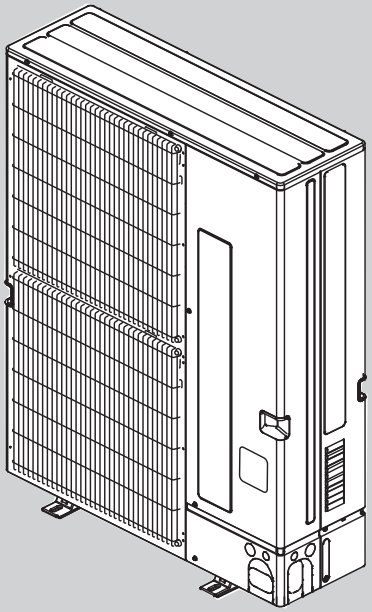
<Outdoor unit>

Model name

MXZ-SM36NL
MXZ-SM48NL
MXZ-SM60NL
MXZ-SM36NLHZ
MXZ-SM42NLHZ
MXZ-SM48NLHZ

- Some contents have been added in REVISED EDITION-B.

OCH819A is void.



Appendix: Installation manual (Excerpt of English Ver.)

PARTS CATALOG (OCB819)

1 SERVICE REF.

MXZ-SM36NL-U1
MXZ-SM48NL-U1
MXZ-SM60NL-U1
MXZ-SM36NLHZ-U1
MXZ-SM42NLHZ-U1
MXZ-SM48NLHZ-U1

2 SAFETY PRECAUTION

2-1. Meanings of symbols displayed on indoor/outdoor units

	Warning (Risk of fire) This unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the operating instructions carefully before operation.
	Service personnel are required to carefully read the operating instructions and installation manual before operation.
	Further information is available in the operating instructions, installation manual, and the like.

2-2. Always observe for safety

Before obtaining access to terminal, all supply circuit must be disconnected.

Preparation before the repair service

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the air conditioner, turn off the power-supply breaker.
- Allow time for the electrical circuits to discharge before the work involving the electric parts is performed. LED lights should go off.

Precautions during the repair service

- Do not perform the work involving the electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigerating cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.
- When opening or closing the service valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).

2-3. Cautions related to new refrigerant

■ **Cautions for units utilizing refrigerant R454B**

Use new refrigerant pipes.

- Avoid using thin pipes.

Make sure that the inside and outside of refrigerant piping is clean and it has no contaminants such as sulfur, oxides, dirt, shaving particles, etc., which are hazard to refrigerant cycle. In addition, use pipes with specified thickness.

- Contamination inside refrigerant piping can cause deterioration of refrigerant oil, etc.

Store the piping indoors, and keep both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)

- If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

The refrigerant oil applied to flare and flange connections must be ester oil, ether oil or

alkylbenzene oil in a small amount.

- If large amount of mineral oil enters, that can cause deterioration of refrigerant oil, etc.

Charge refrigerant from liquid phase of refrigerant cylinder.

- If the refrigerant is charged from gas phase, composition change may occur in refrigerant and the efficiency will be lowered.

Do not use refrigerant other than R454B.

- If other refrigerant (R22, R410A, etc.) is used, chlorine in refrigerant can cause deterioration of refrigerant oil, etc.

Use a vacuum pump with a reverse flow check valve.

- Vacuum pump oil may flow back into refrigerant cycle and that can cause deterioration of refrigerant oil, etc.

Use the following tools specifically designed for use with R454B refrigerant.

- The following tools are necessary to use R454B refrigerant.

Tools	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adaptor
Torque wrench	Electronic refrigerant charging scale

Handle tools with care.

- If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Do not use a charging cylinder.

- If a charging cylinder is used, the composition of refrigerant will change and the efficiency will be lowered.

Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.

Use the specified refrigerant only.

- Never use any refrigerant other than that specified.
- Doing so may cause a burst, an explosion, or fire when the unit is being used, serviced, or disposed of.
- Correct refrigerant is specified in the manuals and on the spec labels provided with our products.
- We will not be held responsible for mechanical failure, system malfunction, unit breakdown or accidents caused by failure to follow the instructions.

Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.

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

Do not pump down the system when a gas leak has been detected.

- The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.

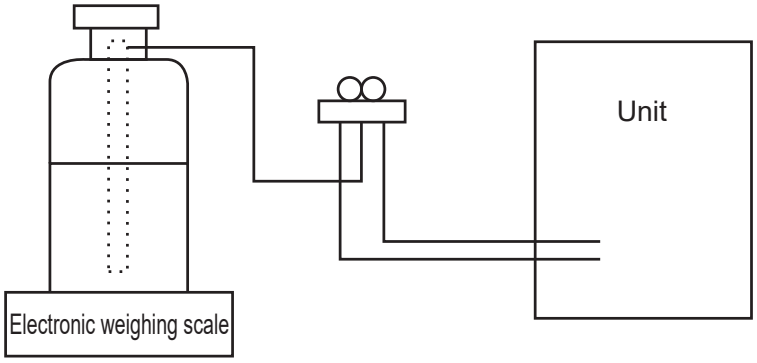
2-3-1. Warning for service

- Do not alter the unit.
- Maintenance, service and repair operations shall be performed by authorized technician with required qualification.
- Servicing shall be performed only by methods recommended by the manufacturer.
- For installation and relocation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.
- Ask a dealer or an authorized technician to install, relocate and repair the unit.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufactur-

er.
- The appliance should not be stored in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odor.
- Refrigerant piping shall be protected from physical damage.
- Field installed piping should be kept to a minimum.
- Compliance with national gas regulations shall be observed.
- All field joints shall be accessible for inspection prior to being covered or enclosed.
- Keep any required ventilation openings clear of obstruction.
- Alloys used indoors to join refrigerant containing connections shall have a melting point (liquidus temperature) greater than 427 °C.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- Be sure to have appropriate ventilation in order to prevent ignition. Furthermore, be sure to carry out fire prevention measures that there are no dangerous or flammable objects in the surrounding area.

2-3-2. Cautions for service
- Perform service after recovering the refrigerant left in unit completely.
- Do not release refrigerant in the air.
- If moisture or foreign matter might have entered the refrigerant piping during service, ensure to remove them.
- After completing service, charge the cycle with specified amount of refrigerant.

2-3-3. Additional refrigerant charge
When charging directly from cylinder
- Check that cylinder for R454B on the market is a syphon type.
- Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



2-3-4. Service tools
Use the below service tools as exclusive tools for R454B refrigerant.

No.	Tool name	Specifications
1	Gauge manifold	Only for R454B
		Use the existing fitting specifications. (UNF1/2)
		Use high-tension side pressure of 768.7 psig (5.3 MPa·G) or over.
2	Charge hose	Only for R454B
		Use pressure performance of 738.2 psig (5.09 MPa·G) or over.
3	Electronic weighing scale	–
4	Gas leak detector	Use the detector for R134a, R407C, R410A or R454B.
5	Adaptor for reverse flow check	Attach on vacuum pump.
6	Refrigerant charge base	–
7	Refrigerant cylinder	Only for R454B
		Top of cylinder (Pink)
		Cylinder with syphon
8	Refrigerant recovery equipment	–

2-4. Cautions for refrigerant piping work
New refrigerant R454B is adopted for replacement inverter series. Although the refrigerant piping work for R454B is the same as for R22/R410A, exclusive tools are necessary so as not to mix with different kind of refrigerant. Furthermore as the working pressure of R454B is 1.6 times higher than that of R22, their sizes of flared sections and flare nuts are different.

■ Thickness of pipes

Because the working pressure of R454B is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 7/256 in [0.7 mm] or below.)

Piping diameter and thickness

Nominal dimensions (in)	Outside diameter (mm)	Thickness (in [mm])	
		R454B/R410A	R22
1/4	6.35	1/32 [0.8]	1/32 [0.8]
3/8	9.52	1/32 [0.8]	1/32 [0.8]
1/2	12.70	1/32 [0.8]	1/32 [0.8]
5/8	15.88	5/128 [1.0]	5/128 [1.0]
3/4	19.05	5/128 [1.0]*	5/128 [1.0]
7/8	22.2	5/128 [1.0]*	5/128 [1.0]
1	25.4	5/128 [1.0]*	5/128 [1.0]
1-1/8	28.58	5/128 [1.0]*	5/128 [1.0]

* Use 1/2 H or H pipes.

■ Dimensions of flare cutting and flare nut

The component molecules in HFC refrigerant are smaller compared to conventional refrigerants. In addition to that, R454B is a refrigerant, which has higher risk of leakage because its working pressure is higher than that of other refrigerants.
Therefore, to enhance airtightness and strength, flare cutting dimension of copper pipe for R454B has been specified separately from the dimensions for other refrigerants as shown below. The dimension B of flare nut for R454B also has partly been changed to increase strength as shown below. Set copper pipe correctly referring to copper pipe flaring dimensions for R454B below. For 1/2 and 5/8 inch pipes, the dimension B changes. Use torque wrench corresponding to each dimension.

Flare cutting dimensions

Nominal dimensions (in)	Outside diameter (mm)	Dimension A ($^{0}_{-0.4}$) (in [mm])	
		R454B/R410A	R22
1/4	6.35	11/32-23/64 [9.1]	32/11-23/64 [9.0]
3/8	9.52	1/2-33/64 [13.2]	1/2-33/64 [13.0]
1/2	12.70	41/64-21/32 [16.6]	5/8-41/64 [16.2]
5/8	15.88	49/64-25/32 [19.7]	3/4-49/64 [19.4]
3/4	19.05	–	29/32-59/64 [23.3]

Flare nut dimensions

Nominal dimensions (in)	Outside diameter (mm)	Dimension B ($^{0}_{-0.4}$) (in [mm])	
		R454B/R410A	R22
1/4	6.35	43/64 [17.0]	43/64 [17.0]
3/8	9.52	7/8 [22.0]	7/8 [22.0]
1/2	12.70	1-3/64 [26.0]	15/16 [24.0]
5/8	15.88	1-9/64 [29.0]	1-1/16 [27.0]
3/4	19.05	–	1-27/64 [36.0]

■ Tools for R454B (The following table shows whether conventional tools can be used or not.)

Tools and materials	Use	R454B tools	Can R22 tools be used ?	Can R407C tools be used ?	Can R410A tools be used ?
Gauge manifold	Air purge, refrigerant charge and operation check	Tool exclusive for R454B	×	×	○
Charge hose		Tool exclusive for R454B	×	×	○
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R454B	×	×	○
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R454B	×	×	×
Applied oil	Apply to flared section	Ester oil, ether oil and alkylbenzene oil (minimum amount)	×	Ester oil, ether oil: ○ Alkylbenzene oil: minimum amount	Ester oil, ether oil: ○ Alkylbenzene oil: minimum amount
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R454B	×	×	○
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R454B	×	×	○

Tools and materials	Use	R454B tools	Can R22 tools be used ?	Can R407C tools be used ?	Can R410A tools be used ?
Vacuum pump	Vacuum drying and air purge	Tools for other refrigerants can be used if equipped with adopter for reverse flow check	△ (Usable if equipped with adopter for reverse flow)	△ (Usable if equipped with adopter for reverse flow)	△ (Usable if equipped with adopter for reverse flow)
Flare tool*	Flaring work of piping	Tools for other refrigerants can be used by adjusting flaring dimension	△ (Usable by adjusting flaring dimension)	△ (Usable by adjusting flaring dimension)	△ (Usable by adjusting flaring dimension)
Bender	Bend the pipes	Tools for other refrigerants can be used	○	○	○
Pipe cutter*	Cut the pipes	Tools for other refrigerants can be used	○	○	○
Welder and nitrogen gas cylinder	Weld the pipes	Tools for other refrigerants can be used	○	○	○
Refrigerant charging scale	Refrigerant charge	Tools for other refrigerants can be used	○	○	○
Vacuum gauge or thermistor vacuum gauge and vacuum valve	Check the degree of vacuum. (Vacuum valve prevents back flow of oil and refrigerant to thermistor vacuum gauge)	Tools for other refrigerants can be used	○	○	○
Charging cylinder	Refrigerant charge	Tool exclusive for R454B	×	–	×

×: Prepare a new tool. (Use the new tool as the tool exclusive for R454B.)
△: Tools for other refrigerants can be used under certain conditions.
○: Tools for other refrigerants can be used.

* Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.
- To deburr pipes, use a reamer or other deburring tools, not sandpaper.
- To cut pipes, use a pipe cutter, not a grinder or other tools that use abrasive materials.
- When cutting or deburring pipes, do not allow cutting chips or other foreign matters to enter the pipes.
- If cutting chips or other foreign matters enter pipes, wipe them off the inside of the pipes.

2-5. Cautions for the unit using R454B refrigerant

Basic work procedures are the same as those for conventional units using refrigerant R410A. However, pay careful attention to the following points. Additionally, refer to "3-6. Precautions for R454B system" in the installation manual.

■ Information on servicing

1. Checks to the area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, 2 to 6 below shall be completed prior to conducting work on the system.

2. Work procedure

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

3. General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

4. Checking for presence of refrigerant

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

5. Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

6. No ignition sources

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

7. Ventilated area

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

8. Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all

times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

9. Checks to electrical devices

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

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

■ Repairs to sealed components

Sealed electrical components shall be replaced.

■ Repair to intrinsically safe components

Intrinsically safe components must be replaced.

■ Cabling

Refer to "2-6. Using R454B refrigerant air conditioners" in the installation manual.

■ Detection of flammable refrigerants

Refer to "2-6. Using R454B refrigerant air conditioners" in the installation manual.

■ Removal and evacuation

Refer to "2-6. Using R454B refrigerant air conditioners" in the installation manual.

■ Charging procedures

Refer to "2-6. Using R454B refrigerant air conditioners" in the installation manual.

■ Decommissioning

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

- Become familiar with the equipment and its operation.
- Isolate system electrically.
- Before attempting the procedure, ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.
- Pump down refrigerant system, if possible.
- If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with instructions.
- Do not overfill cylinders (no more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

■ Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

■ Recovery

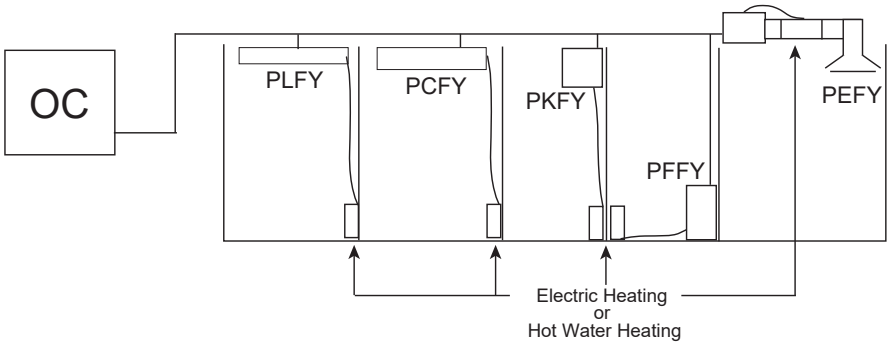
Refer to "2-6. Using R454B refrigerant air conditioners" in the installation manual.

3 OVERVIEW OF UNITS

3-1. Auxiliary heat staging for City Multi indoor units (Optional)

■ **Auxiliary heating operation controls another heat source that depends on the main system's operations, which means the interlock operation shown in 2 below will be possible.**

1. Indoor unit must be R454B UL model for this function to operate.
2. Different indoor unit applications that can be applied:



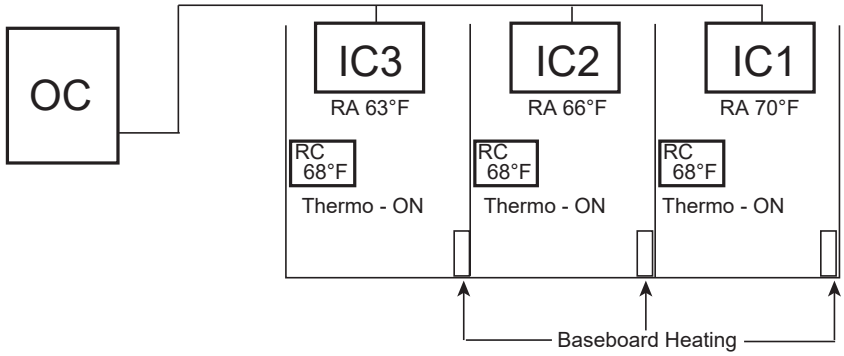
■ **Determine required indoor fan speed during defrost mode:**

• To set the fan speed, see the chapter referring to heater control in the indoor unit's technical & service manual.

■ **Determine fan speed setting during indoor thermo-OFF conditions:**

• These settings are done within indoor DIP SW1-1, DIP SW1-7 and DIP SW1-8. See the chart below for options.
• Recommended SW1-7 OFF and SW1-8 ON will determine airflow based on "Setting on the remote controller".

Auxiliary heating signal			Fan speed setting	Fan speed setting
Thermo condition			OFF	ON
SW1-1	SW1-7	SW1-8	-	-
Any	OFF	OFF	Very low	Setting on remote controller
Any	ON	OFF	Low	
Any	OFF	ON	Setting on remote controller	
ON	ON	ON	Stopped	



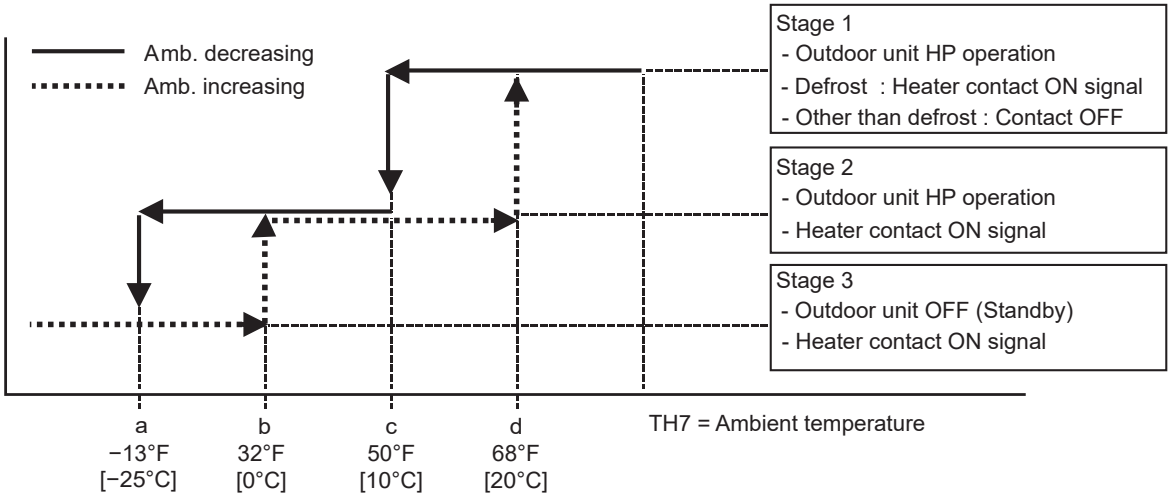
■ **Outdoor unit function item No. 0015 for auxiliary heating control:**

• Refer to "8-5-2. Additional DIP switch settings at the time of shipment" for settings.
  - OFF: Auxiliary heating function is disabled. (Initial setting)
  - ON : Auxiliary heating function is enabled.

■ **Setting outdoor unit and auxiliary heat switch over temperatures**

When the function item No. 0015 is set to "ON", the outdoor unit and the contact output operates as shown below.

• Outdoor default setting and operations are shown below:

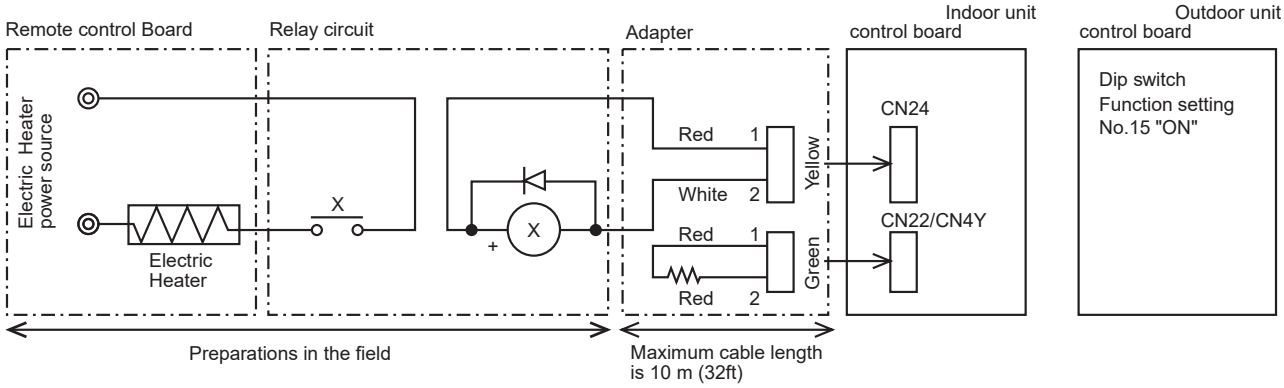


When the set temperature ranges overlap, the previously set pattern (1, 2 or 3) has a priority.
The stage 1 has the highest priority, 2 the second and then 3.

- Based on above chart listed the sequence of operation on "On ambient decrease"
  - Stage 1: (TH7 ≥ 50°F [10°C]): the outdoor unit runs in HP mode.
  - Stage 2: (TH7 = 50 to -13°F [10 to -25°C]): the outdoor unit runs in HP mode with auxiliary heating.
  - Stage 3: (TH7 ≤ -13°F [-25°C]): Auxiliary heating only (Outdoor unit is OFF).
- Based on above chart listed the sequence of operation on "On ambient increase"
  - Stage 3: (TH7 ≤ 32°F [0°C]): Auxiliary heating only (Outdoor unit is OFF).
  - Stage 2: (TH7 ≥ 32 to 68°F [0 to 20°C]): Auxiliary heating with outdoor unit in HP mode.
  - Stage 1: (TH7 ≥ 68°F [20°C]): Outdoor unit in HP mode only.

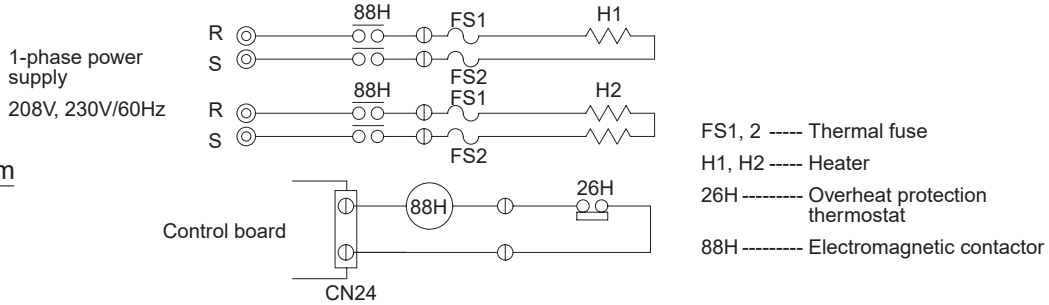
■ Locally procured wiring

- A basic connection method is shown.
  (i.e. interlocked operation with the electric heater with the fan speed setting on high)



- For relay X, use the specifications given below operation coil.
  Use the diode that is recommended by the relay manufacturer at both ends of the relay coil.
  - Rated voltage: 12 VDC
  - Power consumption: 0.9W or less
- The length of the electrical wiring for the PAC-YU25HT is 2 meters (6-1/2 ft)
- To extend this length, use sheathed 2-core cable. Do not extend the cable more than 10 meters (32 ft).
  - Control cable type: CVV, CVS, CPEV, or equivalent
  - Cable size: 0.5 mm² to 1.25 mm² (AWG22 to AWG16)
- Recommended circuit

Wiring diagram



3-2. System construction

Outdoor unit		4HP (3 ton)	4.5HP (3.5 ton)	5HP (4 ton)	7HP (5 ton)
		SM36NL SM36NLHZ	SM42NLHZ	SM48NL SM48NLHZ	SM60NL
Applicable indoor unit	Capacity class	04 to 36	04 to 54		04 to 72
	Max no. of units	11	12		
	Total system capacity range *1	50 to 130% of outdoor unit capacity			

Model name	CMY-Y62-G-E	CMY-Y64-G-E	CMY-Y68-G-E
Number of branches	2	4	8

Connectable indoor unit lineup																	
Model type		Model name		04	05	06	08	12	15	18	24	27	30	36	48	54	72
Wall mounted		PKFY-L	NKMU								●		●				
			NLMU	●		●	●	●	●	●							
Ceiling concealed	Low ESP	PEFY-L	NMSU			●	●	●	●	●	●						
	Mid ESP	PEFY-L	NMAU			●	●	●	●	●	●	●	●	●	●	●	
	High ESP																
	Flesh air																
Ceiling suspended		PCFY-L	NKMU						●		●		●	●			
Ceiling Cassette	4-way flow	PLFY-EL	NEMU					●	●	●	●		●	●	●		
	2 by 2	PLFY-L	NFMU		●		●	●	●	●							
	1-way flow																
Floor standing	Exposed																
	Concealed																
Multi-position		PVFY-L	NAMU				●	●		●	●		●	●	●	●	
Hot water																	

Remote controller	Name	MA remote controller
	Model name	PAR-42MAAUB
	Functions	• Address setting is not required.

*1. When connecting one or more PLFY-L12/18 units, total system capacity shall be equal to or lower than 105% of the outdoor unit capacity.

3-3. System construction (Branch box system)

Outdoor unit	Horsepower	4 HP (3 ton)	4.5 HP (3.5 ton)	5 HP (4 ton)	7 HP (5 ton)
	Model name	SM36NL SM36NLHZ	SM42NLHZ	SM48NL SM48NLHZ	SM60NL
Applicable indoor unit	Capacity class	06 to 36			
	Max. No. of units	4 (3)*1,*2,*3	5 (4)*1,*2,*3	8 (6)*1,*2,*3	8 (6)*1,*2,*4
	Total system capacity range*5	33 to 130% of outdoor unit capacity	29 to 130% of outdoor unit capacity	25 to 130% of outdoor unit capacity	20 to 130% of outdoor unit capacity
		12 to 46.8 kBtu/h	12 to 54.6 kBtu/h	12 to 62.4 kBtu/h	12 to 78 kBtu/h
Branch box that can be connected	Number of units	1 or 2			

*1. The number enclosed in parentheses is the maximum number of units that can be connected when 1 or more PLA/ PAA-series units is connected.
*2. When connecting 2 SVZ-series units, any indoor units other than SVZ-series cannot be connected.
When connecting 1 SVZ-series unit, the total rated capacity (cooling) should be 100% or below including the SVZ-series unit (only SM60). Also, only 1 SEZ or 1 PEAD can be included in the connection.
When connecting 3 or more SVZ-series units, consult your dealer.
*3. Maximum of 3 SEZ/PEAD-series units can be connected to a branch box.
*4. Maximum of 2 SEZ/PEAD-series units can be connected to a branch box. When connecting 1 or more SEZ/PEAD-series units, the total rated capacity (cooling) including the SEZ/PEAD-series units shall be 100% or below
*5. When connecting one or more MFZ-KX09 or PLA-AE12 units, the total system capacity shall be equal to or lower than 105% of the outdoor unit capacity.

Connectable indoor unit lineup (Heat pump inverter type)											
Model type		Model name	06	09	12	15	18	24	30	36	42
Wall-mounted	Deluxe	MSZ-FX·NL	●	●	●	●	●				
	Standard	MSZ-GX·NL	●	●	●	●	●	●			
	Designed model										
Ceiling concealed	Low static pressure*3 *4	SEZ-AD·NL		●	●	●	●				
	Middle static pressure*3 *4	PEAD-AA·NL		●	●	●	●	●	●	●	
Ceiling suspended											
Ceiling cassette	4-way flow	PLA-AE·NL			●		●	●	●	●	
	2 by 2	SLZ-AF·NL		●	●	●					
	1-way flow	MLZ-KX·NL	●	●	●		●				
Floor standing		MFZ-KX·NL		●	●	●	●				
Standard multi-position air handler		SVZ-AP·NL			●		●	●	●	●	
A-coil		PAA-AA/BA/CA·NL					●	●	●	●	

Branch box	PAC-LMA50BC	PAC-LMA30BC
Number of branches (Connectable indoor unit)	5 (MAX. 5 units)	3 (MAX. 3 units)

Note:
- A maximum of 2 branch boxes can be connected to 1 outdoor unit.

2-branch pipe (joint), optional parts	
Using 1 branch box	Not required
Using 2 branch boxes	Required Connection method: flare (MSDD-50AR2-E) Connection method: brazing (MSDD-50BR-E) Note: Select the appropriate model based on the connection method.

Option	Optional accessories of indoor units and outdoor units are available.

3-4. System Specifications

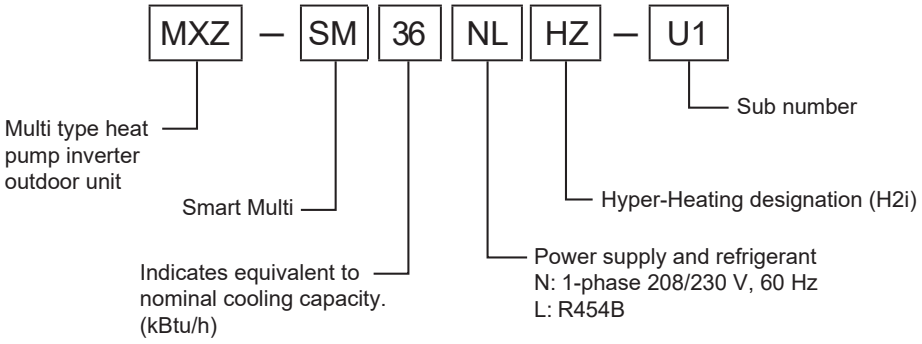
3-4-1. Outdoor Unit

Outdoor unit	Model name	SM36NL	SM36NLHZ	SM42NLHZ	SM48NL	SM48NLHZ	SM60NL
Capacity	Cooling (kBtu/h)	36	36	42	48	48	60
	Heating (kBtu/h)	41	42	48	50	54	66

Cooling/Heating capacity indicates the maximum value at operation under the following condition.

Cooling Indoor: D.B. 80°F/W.B. 67°F (D.B. 26.7°C/W.B. 19.4°C)
Outdoor: D.B. 95°F/W.B. 75°F (D.B. 35°C/W.B. 23.9°C)
Heating Indoor: D.B. 70°F/W.B. 60°F (D.B. 21.1°C/W.B. 15.6°C)
Outdoor: D.B. 47°F/W.B. 43°F (D.B. 8.3°C/W.B. 6.1°C)

3-4-2. Method for identifying MULTI-S model



4 SPECIFICATIONS

Outdoor model				MXZ-SM36NL			MXZ-SM48NL		
Indoor model				Non-Ducted	Mix	Ducted	Non-Ducted	Mix	Ducted
Cooling	Capacity Rated*1	Btu/h		36,000	36,000	36,000	48,000	48,000	48,000
	Rated power input	W		2,555	2,990	3,600	4,000	4,710	5,715
	Current input (208/230 V)	A		12.5/11.3	14.6/13.2	17.6/15.9	19.5/17.6	23.0/20.8	27.9/25.2
	EER2	Btu/h/W		14.10	12.05	10.00	12.00	10.20	8.40
	SEER2	-		23.00	20.60	18.20	23.00	20.00	17.00
Heating	Capacity Rated 47°F*2	Btu/h		41,000	41,000	41,000	50,000	50,000	50,000
	Capacity Max. 17°F*3	Btu/h		36,000	36,000	36,000	43,000	43,000	43,000
	Capacity Max. 5°F	Btu/h		29,000	29,000	29,000	35,400	35,400	35,400
	Rated power input 47°F*2	W		3,005	3,395	3,880	3,665	4,140	4,730
	Current input (208/230 V)	A		14.7/13.3	16.6/15.0	18.9/17.1	17.9/16.2	20.2/18.3	23.1/20.9
	COP 47°F*2	W/W		4.00	3.54	3.10	4.00	3.54	3.10
	HSPFIV / V	-		11.00/8.75	10.50/8.75	10.00/8.75	10.40/8.35	9.95/8.00	9.50/7.70
Power source				1-phase 208/230 V, 60 Hz					
Breaker size	(ODU only/ODU+IDU)		A	30/40					
Minimum circuit ampacity	(ODU only/ODU+IDU)		A	36/42					
Indoor unit connectable	Total capacity			50 to 130% of outdoor unit capacity					
	Model/ Quantity*4	CITY MULTI		04 - 36/11			04 - 54/12		
		Branch box		06 - 36/4			06 - 36/8		
Sound pressure level (SPL) (measured in anechoic room)		dB <A>		49/53			51/54		
Refrigerant piping diameter	Liquid pipe	in (mm)		3/8 (ø9.52)					
	Gas pipe	in (mm)		5/8 (ø15.88)					
Fan*5	Type × Quantity			Propeller fan × 2					
	Airflow rate	m^3/min		112					
		L/s		1,867					
		cfm		3,955					
	Control, Driving mechanism			DC control					
	Motor output	kW		0.070 × 2					
	External static pressure			0					
Compressor	Type × Quantity			Twin rotary hermetic compressor x 1					
	Manufacturer			Mitsubishi Electric Corporation					
	Starting method			Inverter					
	Motor output	kW		2.7			3.4		
	Case heater	kW		0					
	Lubricant			RM68EH 78 oz. (2.3L)					
External finish				Galvanized Steel Sheet <Munsell 3Y 7.8/ 1.1>					
External dimension H × W × D		mm		1,338 × 1,050 × 330 (+25)					
		in		52-11/16 × 41-11/32 × 13 (+1)					
Protection devices	High pressure protection			High pressure switch					
	Inverter circuit (COMP./FAN)			Overcurrent detection, Overheat detection (Heat sink thermistor)					
	Compressor			Compressor thermo, Overcurrent detection, Thermal protector					
	Fan motor			Overheating/Voltage protection					
Refrigerant	Type × original charge			R454B 2 lbs. 11 oz. (1.2 kg)					
	Control			Linear Expansion Valve					
Net weight		lb (kg)		250 (113)					
Heat exchanger				Cross fin and tube					
HIC circuit (HIC: Heat Inter-Changer)				HIC circuit					
Defrosting method				Reversed refrigerant circuit					
Guaranteed operation range	Cooling	D.B.		D.B 23 to 115°F [D.B.-5 to 46°C]*5, *6, *7, *8					
	Heating	W.B.		W.B. -13 to 59°F [W.B. -25 to 15°C]					

Remarks

*1. Rating cooling conditions:
Indoor: 80°F D.B. /67 °F W.B. (26.7°C D.B./19.4°C W.B.)
Outdoor: 95°F D.B. (35.0°C D.B.)

*2. Rating heating conditions:
Indoor: 70°F D.B. (21.1°C D.B.)
Outdoor: 47°F D.B./43°F W.B. (8.3°C D.B./6.1°C W.B.)

*3. Heating conditions:
Indoor: 70°F D.B. (21.1°C D.B.)
Outdoor: 17°F D.B./15°F W.B. (-8.3°C D.B./-9.4°C W.B.)

*4. It cannot be connected to mixed CITY MULTI indoor unit and branch box indoor unit.

*5. 5 to 115°F D.B. (-15 to 46°C D.B.), when an optional Air Outlet Guide is installed. However, this condition does not apply to the indoor units listed in *6.

*6. 50 to 115°F D.B. (10 to 46°C D.B.), when connecting PKFY-L04/06/08/12NLMU type indoor unit.

*7. When the temperature is below 50°F D.B. (10 °C D.B.), noise could potentially occur.

*8. When PCFY is operated in cooling at an outside temperature of 68°F D.B. (20 °C D.B.) or lower, refrigerant noise could potentially occur.

Notes:

- Due to continuing improvement, above specifications are subject to change without notice.
- See the following for unit conversion: kcal/h = kW × 860, Btu/h = kW × 3,412, cfm = m^3/min × 35.31, lb = kg × 0.4536
  Above specification data is subject to rounding variation.
- Refer to the indoor unit's service manual for the indoor units specifications.
- Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.

Outdoor model				MXZ-SM36NLHZ			MXZ-SM42NLHZ			MXZ-SM48NLHZ		
Indoor model				Non-Ducted	Mix	Ducted	Non-Ducted	Mix	Ducted	Non-Ducted	Mix	Ducted
Cooling	Capacity Rated*1		Btu/h	36,000	36,000	36,000	42,000	42,000	42,000	48,000	48,000	48,000
	Rated power input		W	2,485	2,835	3,305	3,135	3,530	4,040	3,665	4,160	4,800
	Current input (208/230 V)		A	12.2/11.0	13.9/12.5	16.2/14.6	15.3/13.9	17.3/15.6	19.8/17.9	17.9/16.2	20.3/18.4	23.5/21.2
	EER2		Btu/h/W	14.50	12.70	10.90	13.40	11.90	10.40	13.10	11.55	10.00
	SEER2		-	23.00	20.35	17.70	21.50	19.50	17.50	23.00	20.50	18.00
Heating	Capacity Rated 47°F*2		Btu/h	42,000	42,000	42,000	48,000	48,000	48,000	54,000	54,000	54,000
	Capacity Max. 17°F*3		Btu/h	42,000	42,000	42,000	48,000	48,000	48,000	54,000	54,000	54,000
	Capacity Max. 5°F		Btu/h	42,000	42,000	42,000	48,000	48,000	48,000	54,000	54,000	54,000
	Capacity Max. -13°F			42,000	42,000	42,000	48,000	48,000	48,000	54,000	54,000	54,000
	Rated power input 47°F*2		W	3,080	3,330	3,620	3,435	3,975	4,690	3,960	4,400	4,950
	Current input (208/230 V)		A	15.1/13.6	16.3/14.7	17.7/16.0	16.8/15.2	19.4/17.6	22.9/20.7	19.4/17.5	21.5/19.5	24.2/21.9
	COP 47°F*2		W/W	4.00	3.70	3.40	4.10	3.54	3.00	4.00	3.60	3.20
	HSPFIV / V		-	12.00/10.65	11.25/10.20	10.50/9.80	11.10/9.80	10.55/9.30	10.00/8.80	11.50/9.80	10.75/9.05	10.00/8.30
Power source				1-phase 208/230 V, 60 Hz								
Breaker size		(ODU only/ODU+IDU)	A	40/45								
Minimum circuit ampacity		(ODU only/ODU+IDU)	A	45/51								
Indoor unit connectable	Total capacity			50 to 130% of outdoor unit capacity								
	Model/ Quantity*4		CITY MULTI	04 - 36/11			04 - 54/12			04 - 54/12		
			Branch box	06 - 36/4			06 - 36/5			06 - 36/8		
Sound pressure level (SPL) (measured in anechoic room)			dB <A>	49/53			50/54			51/54		
Refrigerant piping diameter	Liquid pipe		in (mm)	3/8 (ø9.52)								
	Gas pipe		in (mm)	5/8 (ø15.88)								
Fan*5	Type × Quantity			Propeller fan × 2								
	Airflow rate		m³/min	108								
			L/s	1,800								
			cfm	3,810								
	Control, Driving mechanism			DC control								
	Motor output		kW	0.200 × 2								
	External static pressure			0								
Compressor	Type × Quantity			Twin rotary hermetic compressor × 1								
	Manufacturer			Mitsubishi Electric Corporation								
	Starting method			Inverter								
	Motor output		kW	2.7			3.0			3.2		
	Case heater		kW	0								
	Lubricant			RM68EH 78 oz. (2.3L)								
External finish				Galvanized Steel Sheet <Munsell 3Y 7.8/ 1.1>								
External dimension H × W × D			mm	1,338 × 1,050 × 330 (+25)								
			in	52-11/16 × 41-11/32 × 13 (+1)								
Protection devices	High pressure protection			High pressure switch								
	Inverter circuit (COMP./FAN)			Overcurrent detection, Overheat detection (Heat sink thermistor)								
	Compressor			Compressor thermo, Overcurrent detection, Thermal protector								
	Fan motor			Overheating/Voltage protection								
Refrigerant	Type × original charge			R454B 6 lbs. 10 oz. (3.0kg)								
	Control			Linear Expansion Valve								
Net weight			lb (kg)	283 (128)								
Heat exchanger				Cross fin and tube								
HIC circuit (HIC: Heat Inter-Changer)				HIC circuit								
Defrosting method				Reversed refrigerant circuit								
Guaranteed operation range	Cooling		D.B.	D.B 23 to 115°F [D.B.-5 to 46°C]*5, *6, *7, *8								
	Heating		W.B.	W.B. -13 to 59°F [W.B. -25 to 15°C]								

Remarks

*1. Rating cooling conditions:
Indoor: 80°F D.B. /67 °F W.B. (26.7°C D.B./19.4°C W.B.)
Outdoor: 95°F D.B. (35.0°C D.B.)

*2. Rating heating conditions:
Indoor: 70°F D.B. (21.1°C D.B.)
Outdoor: 47°F D.B./43°F W.B. (8.3°C D.B./6.1°C W.B.)

*3. Heating conditions:
Indoor: 70°F D.B. (21.1°C D.B.)
Outdoor: 17°F D.B./15°F W.B. (-8.3°C D.B./-9.4°C W.B.)

*4. It cannot be connected to mixed CITY MULTI indoor unit and branch box indoor unit.

*5. 5 to 115°F D.B. (-15 to 46°C D.B.), when an optional Air Outlet Guide is installed. However, this condition does not apply to the indoor units listed in *6.

*6. 50 to 115°F D.B. (10 to 46°C D.B.), when connecting PKFY-L04/06/08/12NLMU type indoor unit.

*7. When the temperature is below 50°F D.B. (10 °C D.B.), noise could potentially occur.

*8. When PCFY is operated in cooling at an outside temperature of 68°F D.B. (20 °C D.B.) or lower, refrigerant noise could potentially occur.

Notes:

- Due to continuing improvement, above specifications are subject to change without notice.
- See the following for unit conversion: kcal/h = kW × 860, Btu/h = kW × 3,412, cfm = m³/min × 35.31, lb = kg/0.4536
  Above specification data is subject to rounding variation.
- Refer to the indoor unit's service manual for the indoor units specifications.
- Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.

Outdoor model				MXZ-SM60NL		
Indoor model				Non-Ducted	Mix	Ducted
Cooling	Capacity Rated*1		Btu/h	60,000	60,000	60,000
	Rated power input		W	5,000	5,610	6,385
	Current input (208/230 V)		A	24.5/22.2	27.5/24.9	31.3/28.3
	EER2		Btu/h/W	12.00	10.70	9.40
	SEER2		-	20.00	18.20	16.40
Heating	Capacity Rated 47°F*2		Btu/h	66,000	66,000	66,000
	Capacity Max. 17°F*3		Btu/h	65,000	65,000	65,000
	Capacity Max. 5°F		Btu/h	46,500	46,500	46,500
	Rated power input 47°F*2		W	4,720	5,230	5,865
	Current input (208/230 V)		A	23.1/20.9	25.6/23.2	28.7/26.0
	COP 47°F*2		W/W	4.10	3.70	3.30
	HSPFIV / V		-	10.50/8.65	10.00/8.05	9.50/7.45
Power source				1-phase 208/230 V, 60 Hz		
Breaker size		(ODU only/ODU+IDU)	A	40/50		
Minimum circuit ampacity		(ODU only/ODU+IDU)	A	45/55		
Indoor unit connectable	Total capacity			50 to 130% of outdoor unit capacity		
	Model/ Quantity*4		CITY MULTI	04 - 72 /12		
			Branch box	06 - 36 / 8		
Sound pressure level (SPL) (measured in anechoic room)			dB <A>	58/59		
Refrigerant piping diameter	Liquid pipe		in (mm)	3/8 (ø9.52)		
	Gas pipe		in (mm)	3/4 (ø19.05)		
Fan*5	Type × Quantity			Propeller fan × 2		
	Airflow rate		m^3/min	141		
			L/s	2,350		
			cfm	4,975		
	Control, Driving mechanism			DC control		
	Motor output		kW	0.200 × 2		
	External static pressure			0		
Compressor	Type × Quantity			Twin rotary hermetic compressor x 1		
	Manufacturer			Mitsubishi Electric Corporation		
	Starting method			Inverter		
	Motor output		kW	4.1		
	Case heater		kW	0		
	Lubricant			RM68EH 78 oz. (2.3L)		
External finish				Galvanized Steel Sheet <Munsell 3Y 7.8/ 1.1>		
External dimension H × W × D			mm	1,338 × 1,050 × 330 (+25)		
			in	52-11/16 × 41-11/32 × 13 (+1)		
Protection devices	High pressure protection			High pressure switch		
	Inverter circuit (COMP./FAN)			Overcurrent detection, Overheat detection(Heat sink thermistor)		
	Compressor			Compressor thermo, Overcurrent detection, Thermal protector		
	Fan motor			Overheating/Voltage protection		
Refrigerant	Type × original charge			R454B 6 lbs. 10 oz. (3.0kg)		
	Control			Linear Expansion Valve		
Net weight			lb (kg)	278 (126)		
Heat exchanger				Cross fin and tube		
HIC circuit (HIC: Heat Inter-Changer)				HIC circuit		
Defrosting method				Reversed refrigerant circuit		
Guaranteed operation range	Cooling		D.B.	D.B 23 to 115°F [D.B.-5 to 46°C]*5, *6, *7, *8		
	Heating		W.B.	W.B. -13 to 59°F [W.B. -25 to 15°C]		

Remarks

*1. Rating cooling conditions:
Indoor: 80°F D.B. /67 °F W.B. (26.7°C D.B./19.4°C W.B.)
Outdoor: 95°F D.B. (35.0°C D.B.)

*2. Rating heating conditions:
Indoor: 70°F D.B. (21.1°C D.B.)
Outdoor: 47°F D.B./43°F W.B. (8.3°C D.B./6.1°C W.B.)

*3. Heating conditions:
Indoor: 70°F D.B. (21.1°C D.B.)
Outdoor: 17°F D.B./15°F W.B. (-8.3°C D.B./-9.4°C W.B.)

*4. It cannot be connected to mixed CITY MULTI indoor unit and branch box indoor unit.

*5. 5 to 115°F D.B. (-15 to 46°C D.B.), when an optional Air Outlet Guide is installed. However, this condition does not apply to the indoor units listed in *6.

*6. 50 to 115°F D.B. (10 to 46°C D.B.), when connecting PKFY-L04/06/08/12NLMU type indoor unit.

*7. When the temperature is below 50°F D.B. (10 °C D.B.), noise could potentially occur.

*8. When PCFY is operated in cooling at an outside temperature of 68°F D.B. (20 °C D.B.) or lower, refrigerant noise could potentially occur.

Note:

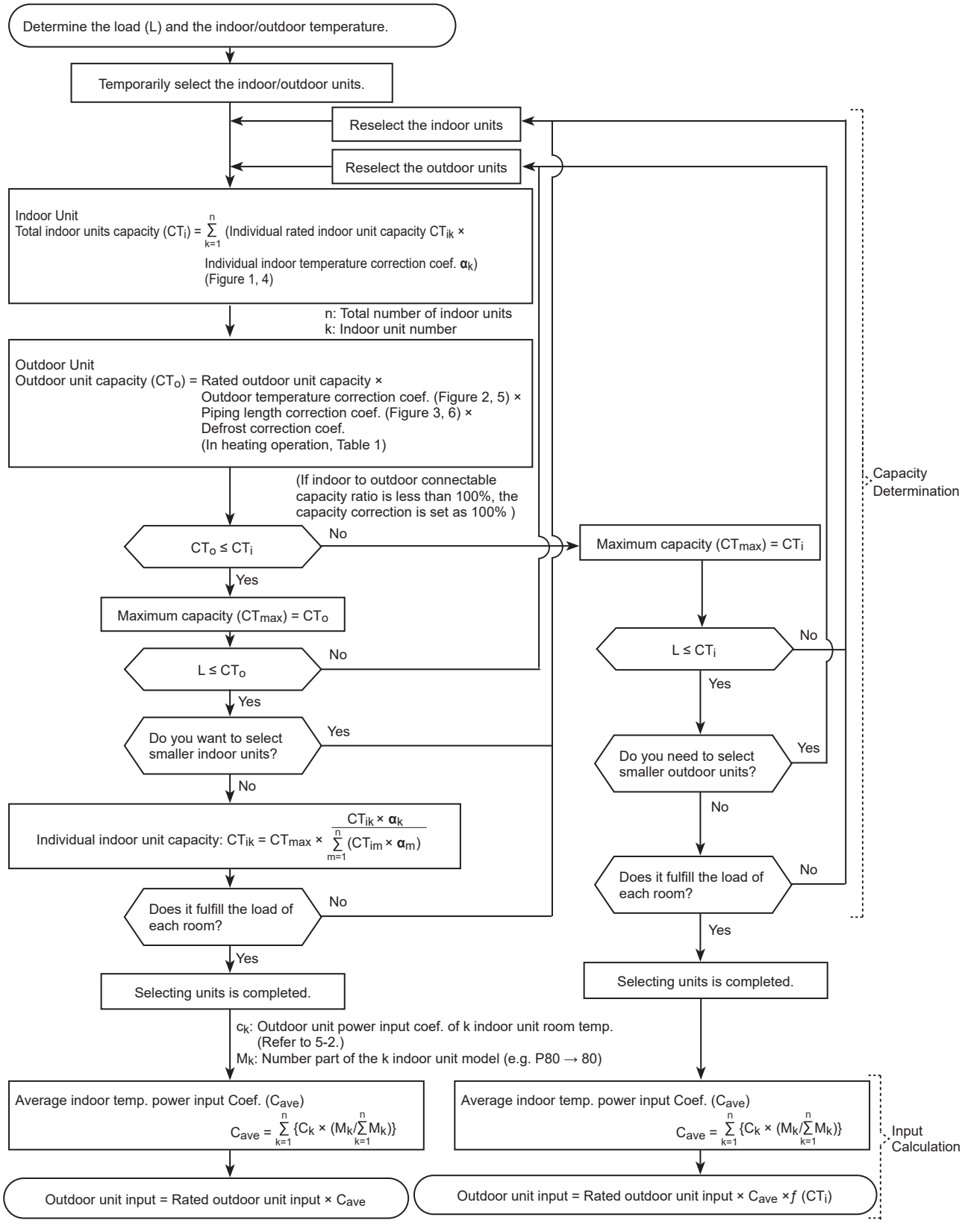
- Due to continuing improvement, above specifications are subject to change without notice.
- See the following for unit conversion: kcal/h = kW × 860, Btu/h = kW × 3,412, cfm = m^3/min × 35.31, lb = kg/0.4536
  Above specification data is subject to rounding variation.
- Refer to the indoor unit's service manual for the indoor units specifications.
- Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.

5 DATA

5-1. Selection of indoor and outdoor units

■ **How to determine the capacity when less than or equal to 100% indoor model size units are connected in total:**

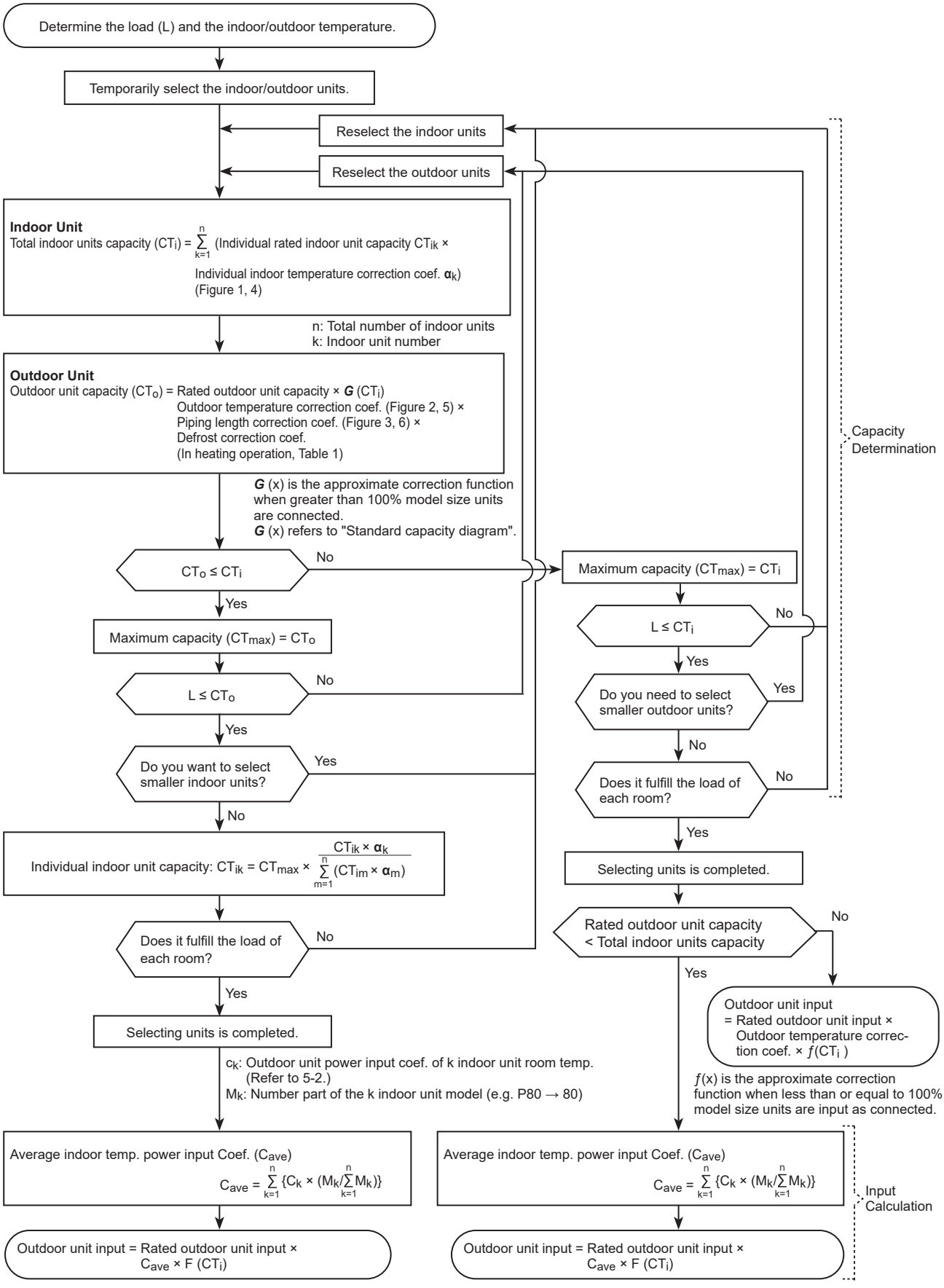
The purpose of this flow chart is to select the indoor and outdoor units. For other purposes, this flow chart is intended only for reference.



f(x) is the approximate correction function when less than or equal to 100% model size units are input as connected.

■ How to determine the capacity when greater than 100% indoor model size units are connected in total

The purpose of this flow chart is to select the indoor and outdoor units. For other purposes, this flow chart is intended only for reference.



F (x) is the approximate correction function when greater than 100% model size units are input as connected.

5-1-1. Cooling

Design condition		
Outdoor dry bulb temperature		98.6ºF (37.0ºC)
Total cooling load		30.3 kBtu/h
Room 1	Indoor dry bulb temperature	80.6ºF (27.0ºC)
	Indoor wet bulb temperature	68.0ºF (20.0ºC)
	Cooling load	13.6 kBtu/h
Room 2	Indoor dry bulb temperature	75.2ºF (24.0ºC)
	Indoor wet bulb temperature	66.2ºF (19.0ºC)
	Cooling load	16.7 kBtu/h
Other	Indoor/Outdoor piping equivalent length	250 ft

Capacity of indoor unit

- CITY MULTI series

Model class of indoor unit	04	05	06	08	12	15	18	24	27	30	36	48	54	72
Model capacity (kBtu/h)	4.0	5.0	6.0	8.0	12.0	15.0	18.0	24.0	27.0	30.0	36.0	48.0	54.0	72.0

- M, S, P series

Model name	Capacity class							
	06	09	12	15	18	24	30	36
SVZ-AP	-	-	11.4	-	18.0	22.8	27.0	33.0
SLZ-AF	-	9.0	12.0	14.1	-	-	-	-
SEZ-AD	-	8.9	12.0	15.0	18.0	-	-	-
MFZ-KX	-	9.0	12.0	15.0	18.0	-	-	-
MLZ-KX	6.0	9.0	11.3	-	16.4	-	-	-
MSZ-FX	6.0	9.0	12.0	15.0	17.2	-	-	-
MSZ-GX	6.0	9.0	12.0	14.0	18.0	22.4	-	-
PEAD-AA	-	9.0	12.0	15.0	18.0	21.2	27.0	36.0
PLA-AE	-	-	12.0	-	18.0	24.0	30.0	36.0
PAA	-	-	-	-	18.0	23.6	31.0	32.0

■ Cooling calculation

- Tentative selection of indoor units
  Room1: PEFY-L15 15.0 kBtu/h (Rated)
  Room2: PEFY-L18 18.0 kBtu/h (Rated)
  In this case, the total capacity is 33.0. (15.0 + 18.0 = 33.0)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is SM36NL as the total capacity of the indoor units is 33.0.
  SM36NL 36.0 kBtu/h (Rated)
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor design wet bulb temperature: Room 1 (68.0°F) 1.02 (Refer to Figure 1 in 5-2-1.)
  Room 2 (66.2°F) 0.95 (Refer to Figure 1 in 5-2-1.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 15.0 × 1.02 + 18.0 × 0.95
  = 32.4 kBtu/h
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (98.6°F) 0.98 (Refer to Figure 2 in 5-2-1.)
  Correction factor for piping length (250 ft) 0.93 (Refer to Figure 7 in 5-5-1.)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length × G(CTi)*1
  = 36.0 × 0.98 × 0.93
  = 32.8 kBtu/h

*1. G(CTi) is used only when greater than 100% indoor model size are connected in total. Refer to Standard capacity diagram.

- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 32.4 < CTo = 32.8, thus, select CTi.
  CTx = CTi = 32.4 kBtu/h
- Comparison with essential load
  Against the essential load 30.3 kW, the maximum system capacity is 32.4 kW: A proper outdoor unit is selected.
- Calculation for the maximum indoor unit capacity of each room
  When CTx = CTi, use the calculation formula below.
  Room1: Rated capacity of indoor unit × Correction factor for indoor design temperature
  = 15.0 × 1.02
  = 15.3 kBtu/h
  The capacity is enough for the cooling load of Room 1 (13.6 kBtu/h): A proper indoor unit is selected.

Room2: CTx × Indoor unit rating × Correction factor for indoor design temperature
= 18.0 × 0.95
= 17.1 kBtu/h
The capacity is enough for the cooling load of Room 2 (16.7 kBtu/h): A proper indoor unit is selected.

Note:
- Go on to the selection of units for heating after the selection for cooling has successfully completed. If failed, try again until proper units are selected.

5-1-2. Heating

Design condition		
Outdoor wet bulb temperature		35.6ºF (2.0ºC)
Total heating load		32.3 kBtu/h
Room 1	Indoor dry bulb temperature	69.8ºF (21.0ºC)
	Heating load	15.5 kBtu/h
Room 2	Indoor dry bulb temperature	73.4ºF (23.0ºC)
	Heating load	16.8 kBtu/h
Other	Indoor/Outdoor piping equivalent length	328 ft

Capacity of indoor unit

- CITY MULTI series

Model class of indoor unit	04	05	06	08	12	15	18	24	27	30	36	48	54
Model capacity (kBtu/h)	4.5	5.6	6.7	9.0	13.5	17.0	20.0	27.0	30.0	34.0	40.0	54.0	60.0

- M, S, P series

Model name	Capacity class							
	06	09	12	15	18	24	30	36
SVZ-AP	-	-	15.0	-	20.0	25.0	30.0	34.2
SLZ-AF	-	11.0	13.0	18.0	-	-	-	-
SEZ-AD	-	12.0	15.0	18.0	20.0	-	-	-
MFZ-KX	-	12.0	15.0	18.0	20.0	-	-	-
MLZ-KX	7.2	12.0	14.6	-	19.0	-	-	-
MSZ-FX	9.0	12.0	13.2	16.5	17.0	-	-	-
MSZ-GX	7.2	10.9	14.4	18.0	21.6	27.6	-	-
PEAD-AA	-	12.0	14.0	18.0	19.0	26.0	30.8	38.0
PLA-AE	-	-	14.0	-	19.0	26.0	32.0	38.0
PAA	-	-	-	-	19.0	26.0	32.0	38.0

■ Heating calculation

- Tentative selection of indoor units
  Room1: PEFY-L15 17.0 kBtu/h (Nominal)
  Room2: PEFY-L18 20.0 kBtu/h (Nominal)
  In this case, the total capacity is 33.0. (15.0 + 18.0 = 33.0)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is SM36NL as the total capacity of the indoor units is 33.0.
  SM36NL 41.0 kBtu/h
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor temperature: Room 1 (69.8°F) 1.00 (Refer to Figure 3 in 5-2-2.)
  Room 2 (73.4°F) 0.92 (Refer to Figure 3 in 5-2-2.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 17.0 × 1.00 + 20.0 × 0.92
  = 35.4 kW
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (35.6°F WB) 1.00 (Refer to Figure 4 in 5-2-2.)
  Correction factor for piping length (328 ft) 0.94 (Refer to Figure 11 in 5-5-2.)
  Correction factor for defrosting 0.85 (Refer to Table 1.)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length × Correction factor for defrosting (× G(CTi))*1
  = 41.0 × 1.00 × 0.94 × 0.85
  = 32.7 kBtu/h

*1. G(CTi) is used only when greater than 100% indoor model size are connected in total. Refer to Standard capacity diagram.

Table 1 Table of correction factor for frosting and defrosting

Outdoor inlet air temp. [°F (°C) W.B.]	43(6)	37(4)	36(2)	32(0)	28(-2)	25(-4)	21(-6)	18(-8)	14(-10)	5(-15)	-4(-20)	-13(-25)
Correction factor	1.00	0.94	0.85	0.84	0.85	0.86	0.95	0.95	0.95	0.95	0.95	0.95

- Determination of maximum system capacity (CTx)

Comparison between CTi and CTo:
CTi = 35.4 > CTo = 32.7, thus, select CTo.
CTx = CTo = 32.7 kBtu/h

- Comparison with essential load
  Against the essential load 32.3 kBtu/h, the maximum system capacity is 32.7 kBtu/h: Proper indoor units have been selected.
- Calculation for the maximum indoor unit capacity of each room
  When CTx = CTo, use the calculation formula below.
  Room1: CTx × Corrected capacity for Room1/CTi
  = 32.7 × (17.0 × 1.00)/35.4
  = 15.7 kBtu/h
  The capacity is enough for the heating load of Room 1 (15.5 kW): A proper indoor unit is selected.
  Room2: CTx × Corrected capacity for Room1/CTi
  = 32.7 × (20.0 × 0.92)/(35.4)
  = 17.0 kW
  The capacity is enough for the heating load of Room 2 (16.8 kW): A proper indoor unit is selected.

Note:
- The selection of units is completed when proper units are selected.

5-1-3. Power input of outdoor unit

- Outdoor unit: MXZ-SM36NL
- Indoor unit 1: PEFY-L15
  Indoor unit 2: PEFY-L18

■ Cooling

- Nominal power input of outdoor unit 2.56 kW
- Calculation of the average indoor temperature power input coefficient
  - Coefficient of the outdoor unit for indoor unit 1
    (Outdoor temp. 98.6°F [37.0°C] D.B., Indoor temp. 68.0°F [20.0°C] W.B.)
    1.04 (Refer to Figure 2 in 5-2-1)
  - Coefficient of the outdoor unit for indoor unit 2
    (Outdoor temp. 98.6°F [37.0°C] D.B., Indoor temp. 64.4°F [18.0°C] W.B.)
    0.85 (Refer to Figure 2 in 5-2-1.)
  - Average indoor temp. power input coefficient (Cave) = $\sum_{k=1}^{n}\{Ck \times (Mk/\sum_{k=1}^{n}Mk)\}$
    n: Total number of the indoor units
    k: Number of the indoor unit
    ck: Outdoor unit power input coefficient of k indoor unit room temp.
    Mk: Number part of the k indoor unit model (e.g. P80: 80)
  - Correction Coefficient of Indoor temperature = 1.04 × 15/(15 +18) + 0.85 × 18/(15 + 18)
    = 0.94
- Coefficient of the partial load f(CTi)
  Total indoor units capacity = 15 + 18 = 33, thus, f(CTi) = 0.9 (Refer to the tables in 5-4. “Standard Capacity Diagram”.)
- Outdoor power input (PIo)
  Maximum System Capacity (CTx) = Total outdoor unit capacity (CTo), so use the following formula:
  PIo = Outdoor unit cooling nominal power input × Correction coefficient of indoor temperature × f(CTi)
  = 2.56 × 0.94 × 0.9
  = 2.17 kW

■ Heating

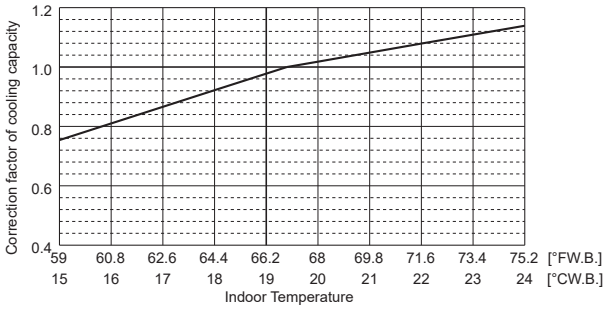
- Nominal power input of outdoor unit 3.01 kW
- Calculation of the average indoor temperature power input coefficient
  - Coefficient of the outdoor unit for indoor unit 1 (Outdoor temp. 26.6°F [-3°C] W.B., Indoor temp. 70°F [21.1°C] D.B.)
    1.16 (Refer to Figure 4 in 5-2-2.)
  - Coefficient of the outdoor unit for indoor unit 2 (Outdoor temp. 26.6°F [-3°C] W.B., Indoor temp. 78.8°F [26.0°C] D.B.)
    1.09 (Refer to Figure 4 in 5-2-2.)
  - Average indoor temp. power input coefficient (Cave) = $\sum_{k=1}^{n}\{Ck \times (Mk/\sum_{k=1}^{n}Mk)\}$
    n: Total number of the indoor units
    k: Number of the indoor unit
    ck: Outdoor unit power input coefficient of k indoor unit room temp.
    Mk: Number part of the k indoor unit model (e.g. P80: 80)
  - Correction Coefficient of Indoor temperature = 1.16 × 15/(15 + 18) + 1.09 × 18/(15 + 18)
    = 1.12
- Coefficient of the partial load f(CTi)
  Total indoor units capacity = 15 +18 = 33, thus, f(CTi) = 0.9 (Refer to the tables in 5-4. “Standard capacity diagram”.)
- Outdoor power input (PIo)
  Maximum System Capacity (CTx) = Total Indoor unit capacity (CTi), so use the following formula
  PIo = Outdoor unit heating nominal power input × Correction coefficient of indoor temperature × f(CTi)
  = 3.01 × 1.12 × 0.9

= 3.03 kW

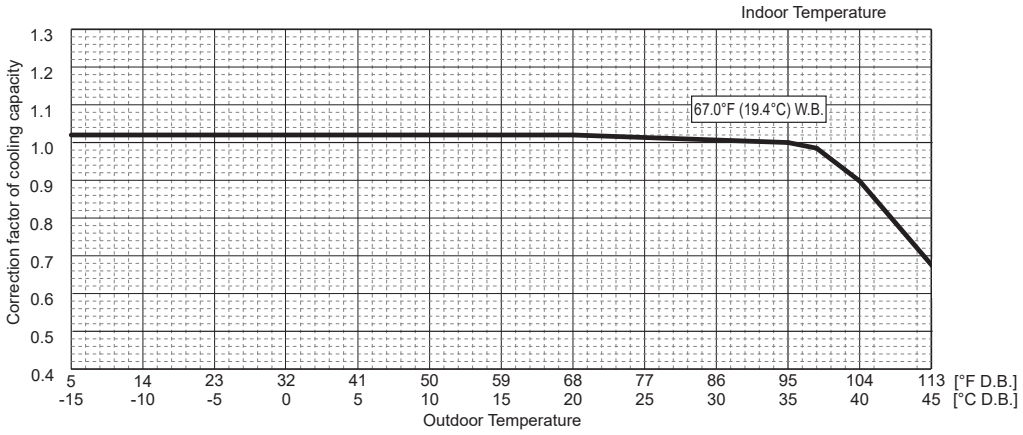
5-2. Correction by temperature

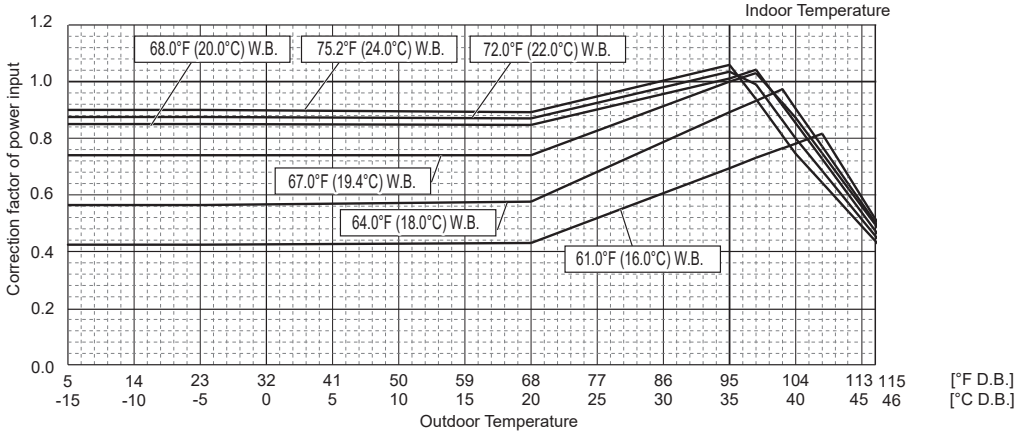
The outdoor units have varied capacity at different designing temperature. With the nominal cooling/heating capacity value and the ratio below, the capacity can be observed at various temperature.

5-2-1. Cooling



<Figure 1> Indoor unit temperature correction

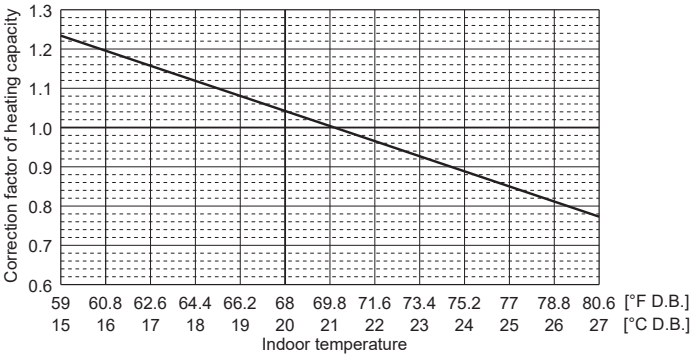




<Figure 2> Outdoor unit temperature correction

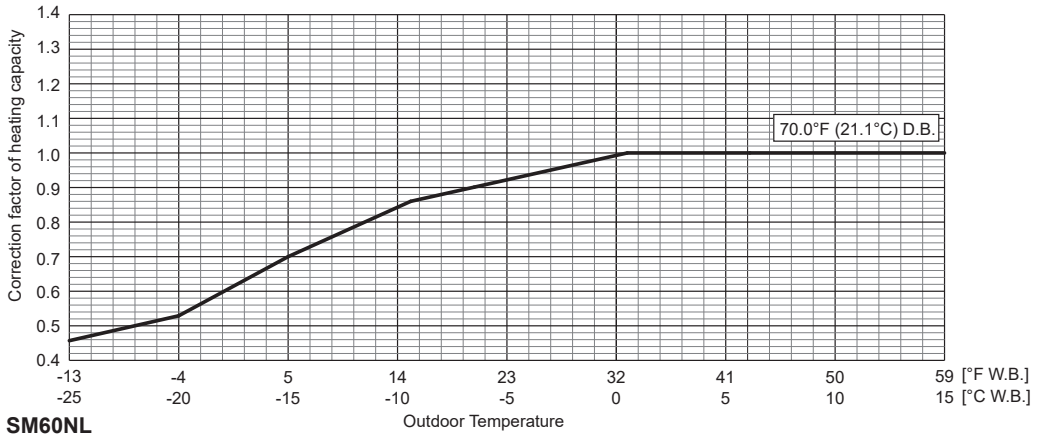
5-2-2. Heating

MXZ-SM36NL-U1 **MXZ-SM48NL-U1** **MXZ-SM60NL-U1**

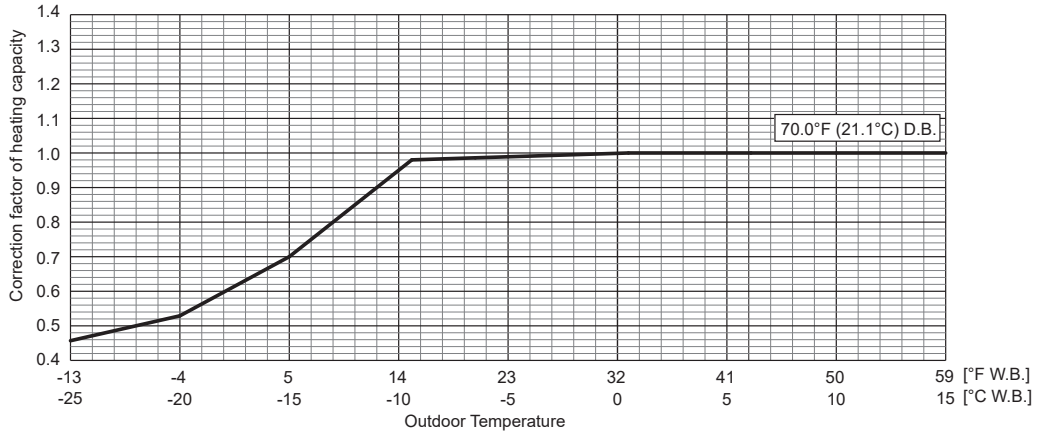


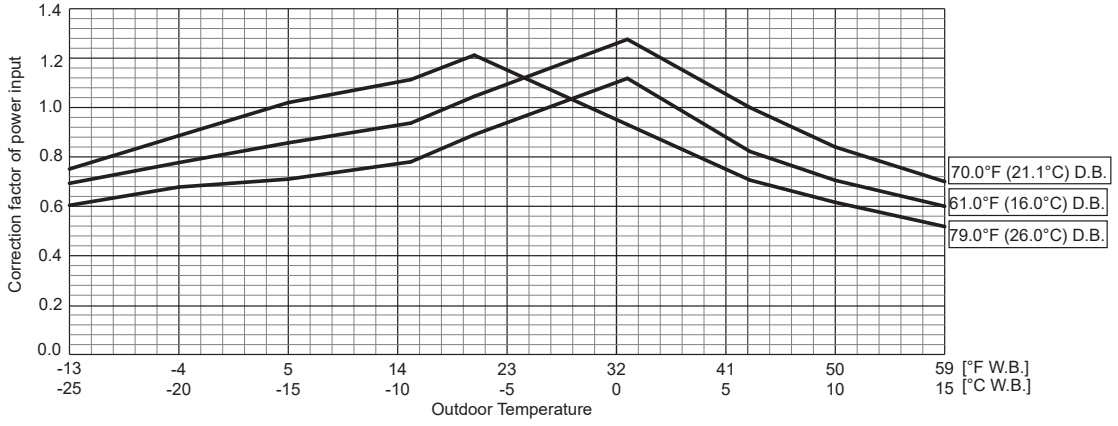
<Figure 3> Indoor unit temperature correction

SM36/48NL

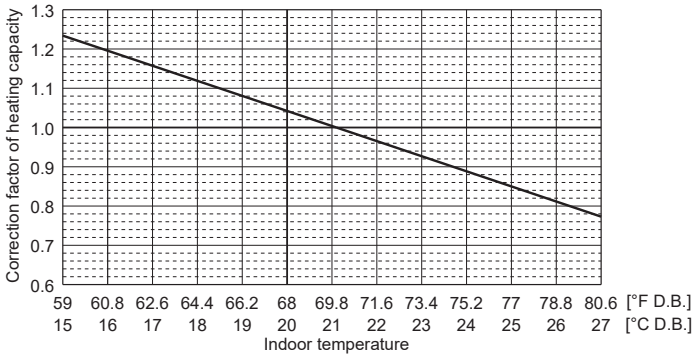


SM60NL

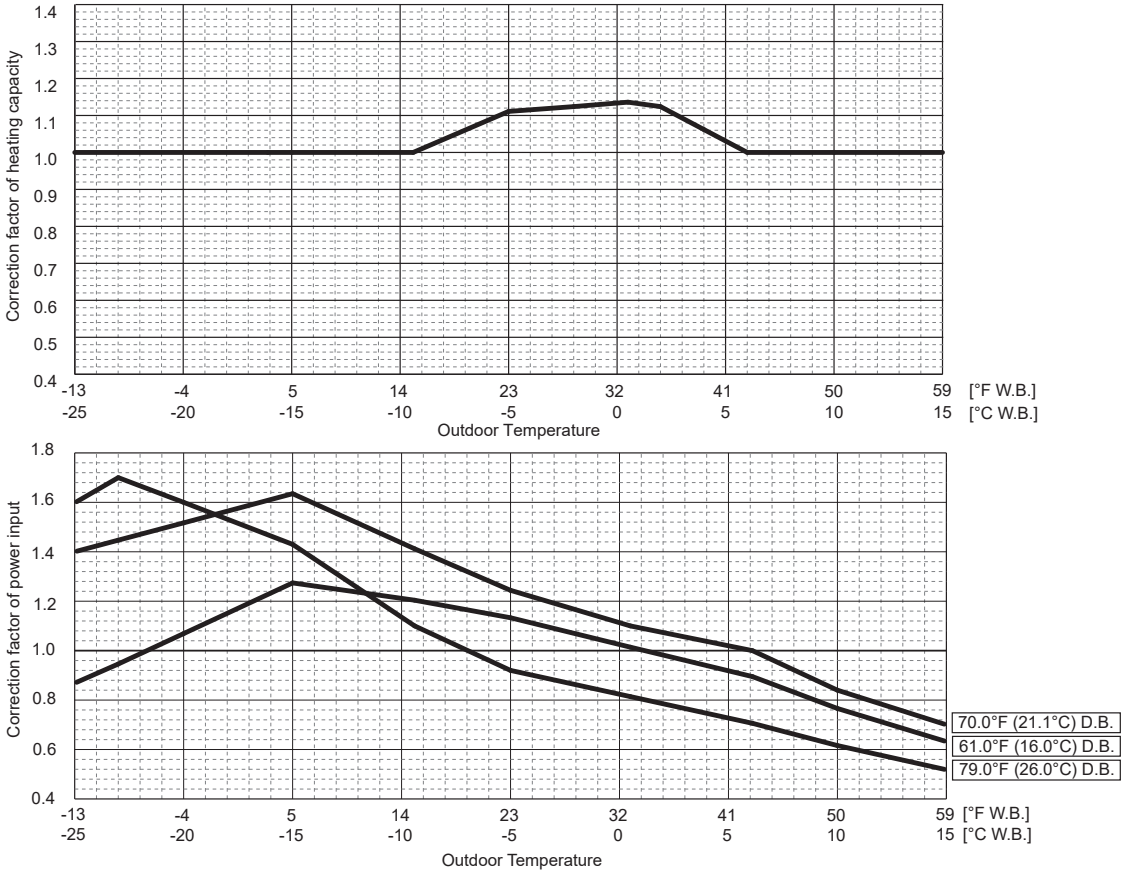




<Figure 4> Outdoor unit temperature correction



<Figure 5> Indoor unit temperature correction



<Figure 6> Outdoor unit temperature correction

5-3. Standard operation data (Reference data)

Operation				MXZ-SM36NL		MXZ-SM48NL		MXZ-SM60NL	
Operating conditions	Ambient temperature	Indoor	DB/WB	80°F/67°F [26.7°C/19.4°C]	70°F/60°F [21.1°C/15.6°C]	80°F/67°F [26.7°C/19.4°C]	70°F/60°F [21.1°C/15.6°C]	80°F/67°F [26.7°C/19.4°C]	70°F/60°F [21.1°C/15.6°C]
		Outdoor		95°F/75°F [35.0°C/23.9°C]	47°F / 43°F [8.3°C/6.1°C]	95°F/ 75°F [35.0°C/23.9°C]	47°F/43°F [8.3°C/6.1°C]	95°F/75°F [35.0°C/23.9°C]	47°F/43°F [8.3°C/6.1°C]
	Indoor unit	No. of connected units	Unit	3		4		4	
		No. of units in operation		3		4		4	
		Model	—	12 × 3		12 × 4		12 × 4	
	Piping	Main pipe	Ft (m)	9.84 (3)		9.84 (3)		9.84 (3)	
		Branch pipe		15.09 (4.6)		15.09 (4.6)		15.09 (4.6)	
		Total pipe length		55.11 (16.8)		70.2 (21.4)		70.2 (21.4)	
	Fan speed		—	Hi		Hi		Hi	
	Amount of refrigerant		LBS. OZ. (kg)	14 LBS. 12 OZ. (6.7)		15 LBS. (6.8)		19 LBS. 6 OZ. (8.8)	
Outdoor unit	Electric current		A	11.3	13.3	17.6	16.2	22.2	20.9
	Voltage		V	230		230		230	
	Compressor frequency		Hz	46	58	62	73	58	64
LEV opening	Indoor unit		Pulse	258	370	181	213	218	289
Pressure	High pressure/Low pressure		psig [MPaG]	410/143 [2.83/0.99]	299/97 [2.06/0.67]	410/143 [2.83/0.99]	302/91 [2.08/0.63]	389/140 [2.68/0.96]	314/94 [2.17/0.65]
Temp. of each section	Outdoor unit	Discharge	°F [°C]	146.7 [63.7]	151.8 [66.5]	174.6 [79.2]	159.3 [70.7]	147.7 [64.3]	130.1 [54.5]
		Heat exchanger outlet		100.2 [37.9]	35.6 [2.0]	100.8 [38.2]	33.3 [0.7]	102.2 [39.0]	34.0 [1.1]
		Accumulator inlet		56.7 [13.7]	35.4 [1.9]	55.4 [13.0]	33.1 [0.6]	53.8 [12.1]	33.8 [1.0]
		Compressor inlet		56.7 [13.7]	35.3 [1.8]	66.2 [19.0]	43.2 [6.2]	53.4 [11.9]	33.3 [0.7]
	Indoor unit	LEV inlet		65.5 [18.6]	88.3 [31.3]	64.6 [18.1]	77.9 [25.5]	64.4 [18.0]	83.5 [28.6]
		Heat exchanger inlet		57.1 [14.0]	135.1 [57.3]	55.1 [12.9]	140.9 [60.5]	52.1 [11.2]	119.1 [48.4]

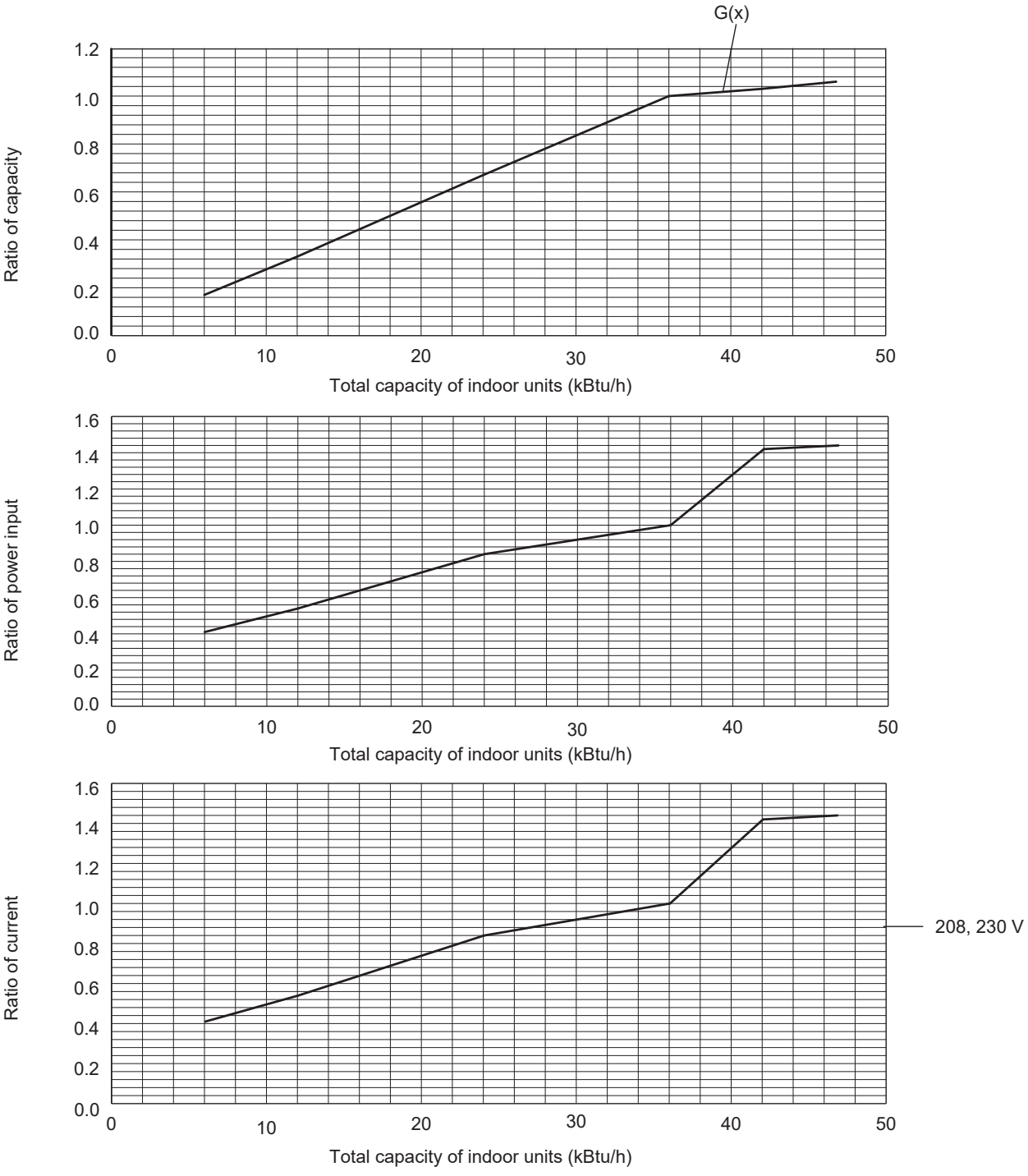
Operation				MXZ-SM36NLHZ		MXZ-SM42NLHZ		MXZ-SM48NLHZ	
Operating conditions	Ambient temperature	Indoor	DB/WB	80°F/67°F [26.7°C/19.4°C]	70°F/60°F [21.1°C/15.6°C]	80°F/67°F [26.7°C/19.4°C]	70°F/60°F [21.1°C/15.6°C]	80°F/67°F [26.7°C/19.4°C]	70°F/60°F [21.1°C/15.6°C]
		Outdoor		95°F/75°F [35.0°C/23.9°C]	47°F / 43°F [8.3°C/6.1°C]	95°F/ 75°F [35.0°C/23.9°C]	47°F/43°F [8.3°C/6.1°C]	95°F/ 75°F [35.0°C/23.9°C]	47°F/43°F [8.3°C/6.1°C]
	Indoor unit	No. of connected units	Unit	3		3		4	
		No. of units in operation		3		3		4	
		Model	—	12 × 3		12 × 2 + 18 × 1		12 × 4	
	Piping	Main pipe	Ft (m)	9.84 (3)		9.84 (3)		9.84 (3)	
		Branch pipe		15.09 (4.6)		15.09 (4.6)		15.09 (4.6)	
		Total pipe length		55.11 (16.8)		55.11 (16.8)		70.2 (21.4)	
	Fan speed		—	Hi		Hi		Hi	
	Amount of refrigerant		LBS. OZ. (kg)	18 LBS. 12 OZ. (8.5)		18 LBS. 12 OZ. (8.5)		19 LBS(8.6)	
Outdoor unit	Electric current		A	11.0	13.6	13.9	15.2	16.2	17.5
	Voltage		V	230		230		230	
	Compressor frequency		Hz	33	43	40	48	44	52
LEV opening	Indoor unit		Pulse	273	390	300	438	210	215
Pressure	High pressure/Low pressure		psig [MPaG]	353/148 [2.44/1.02]	301/100 [2.08/0.69]	364/143 [2.51/0.98]	310/98 [2.14/0.68]	376/145 [2.60/1.00]	306/96 [2.11/0.66]
Temp. of each section	Outdoor unit	Discharge	°F [°C]	146.7 [63.7]	151.8 [66.5]	143.7 [62.1]	140.6 [60.4]	149.4 [65.2]	137.7 [58.7]
		Heat exchanger outlet		100.2 [37.9]	35.6 [2.0]	100.1 [37.8]	36.2 [2.3]	101.3 [38.5]	35.1 [1.7]
		Accumulator inlet		56.7 [13.7]	35.4 [1.9]	56.1 [13.4]	36.0 [2.2]	55.9 [13.3]	35.2 [1.8]
		Compressor inlet		56.7 [13.7]	35.3 [1.8]	55.4 [13.0]	34.1 [1.2]	56.3 [13.5]	35.2 [1.8]
	Indoor unit	LEV inlet		65.5 [18.6]	88.3 [31.3]	75.0 [23.9]	78.1 [25.6]	75.2 [24.0]	74.7 [23.7]
		Heat exchanger inlet		57.1 [14.0]	135.1 [57.3]	56.3 [13.5]	121.9 [50.0]	53.0 [11.7]	122.6 [50.4]

5-4. Standard capacity diagram

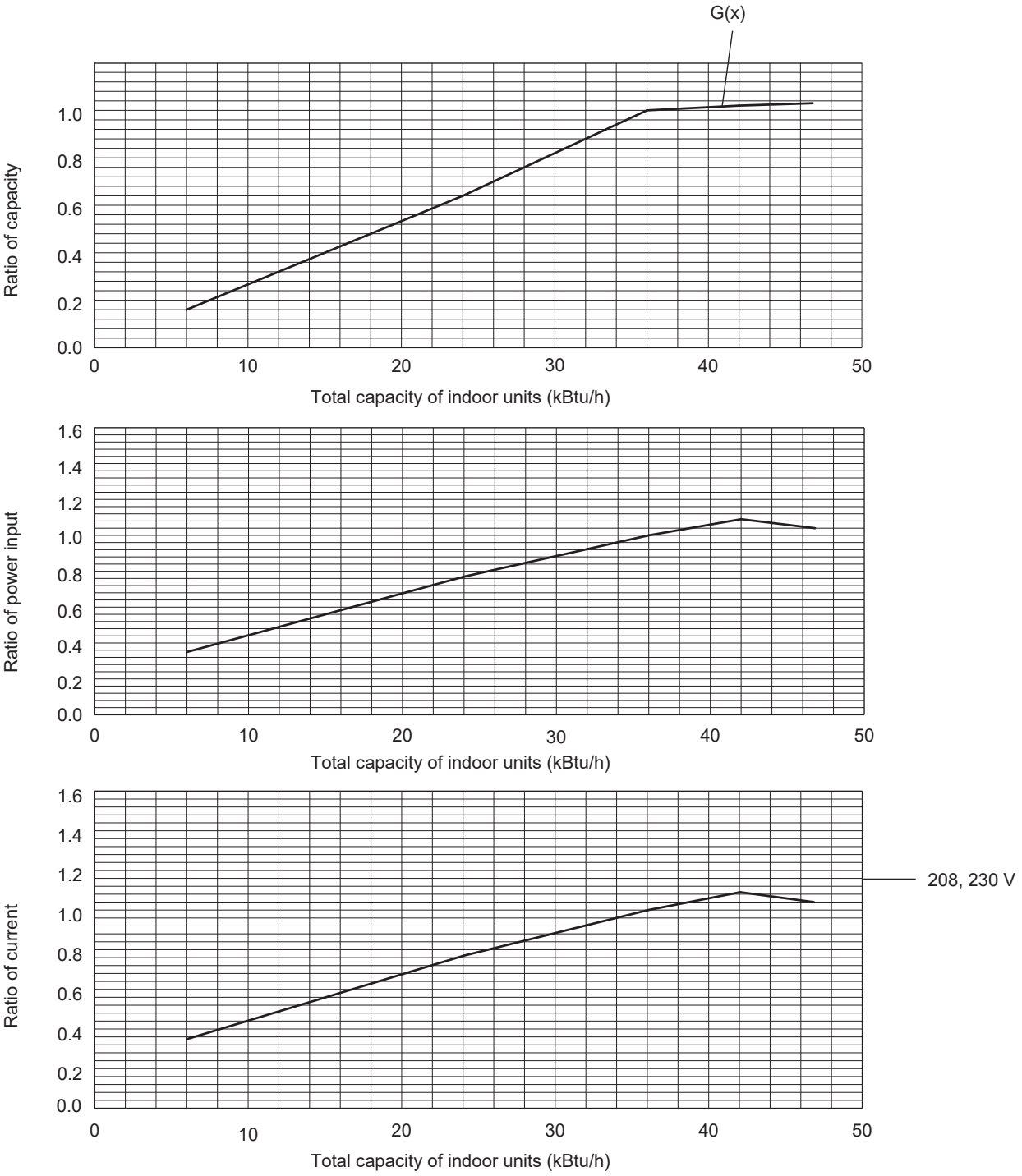
Before calculating the sum of total capacity of indoor units, please convert the value into the Btu/h model capacity following the formula on "5-1. Selection of indoor and outdoor units".

MXZ-SM36NL-U1 **MXZ-SM36NLHZ-U1**

■ **Cooling**

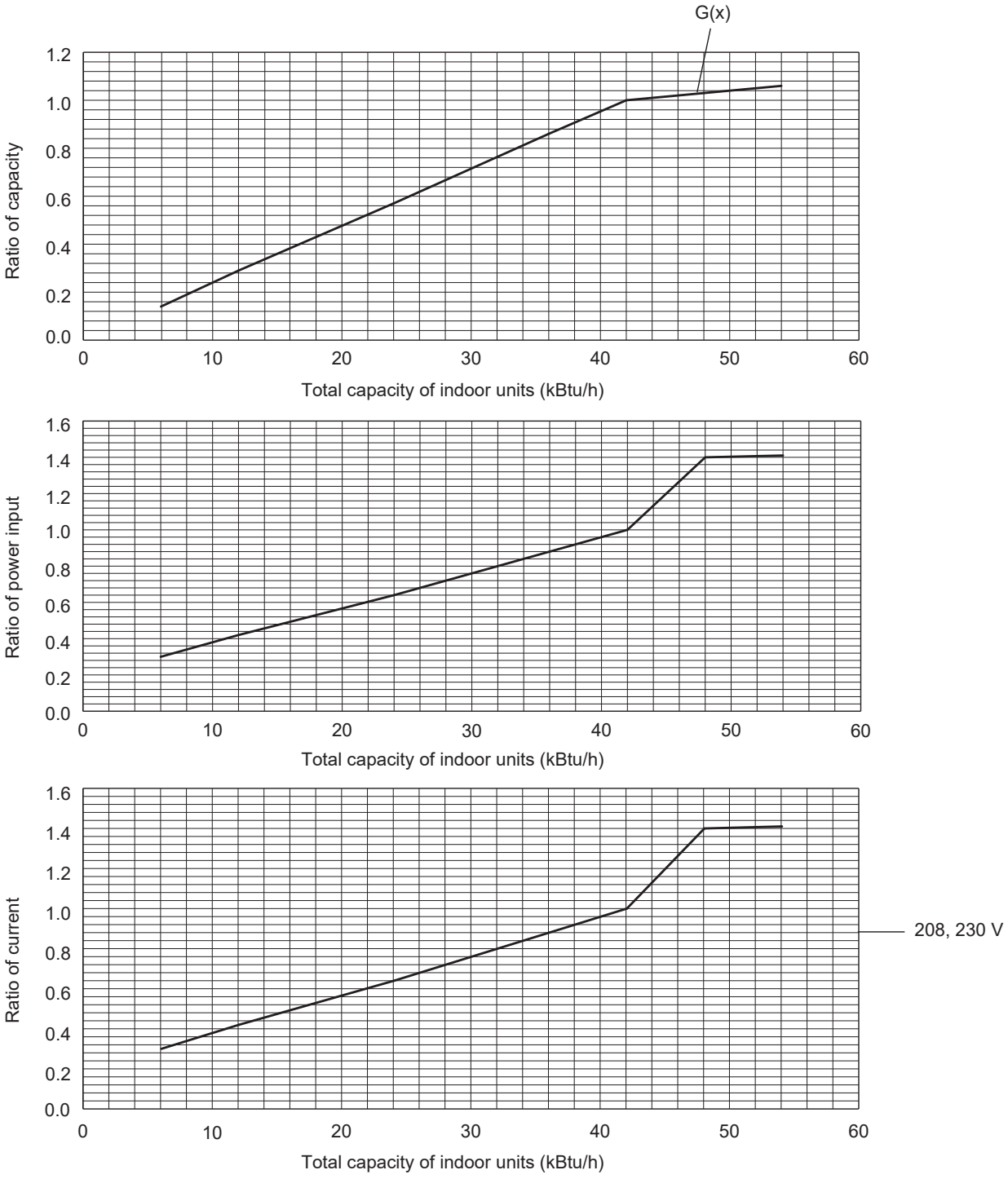


■ Heating

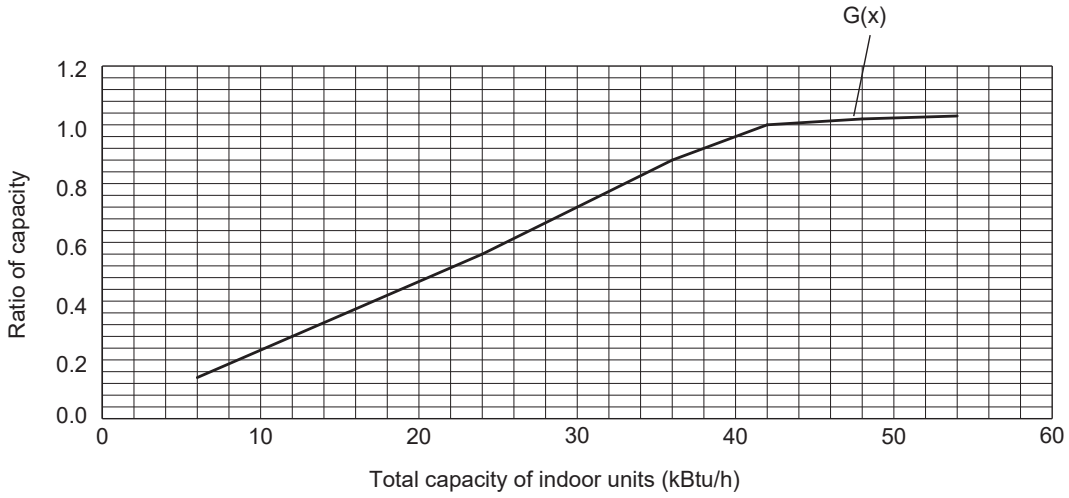

G(x)
Ratio of capacity
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
Total capacity of indoor units (kBtu/h)
Ratio of power input
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
Total capacity of indoor units (kBtu/h)
Ratio of current
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
Total capacity of indoor units (kBtu/h)
208, 230 V

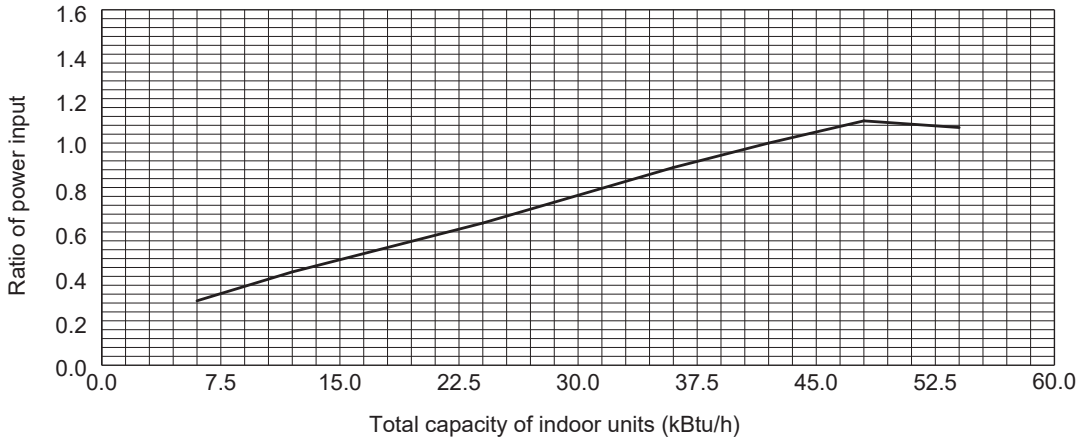
MXZ-SM42NLHZ-U1

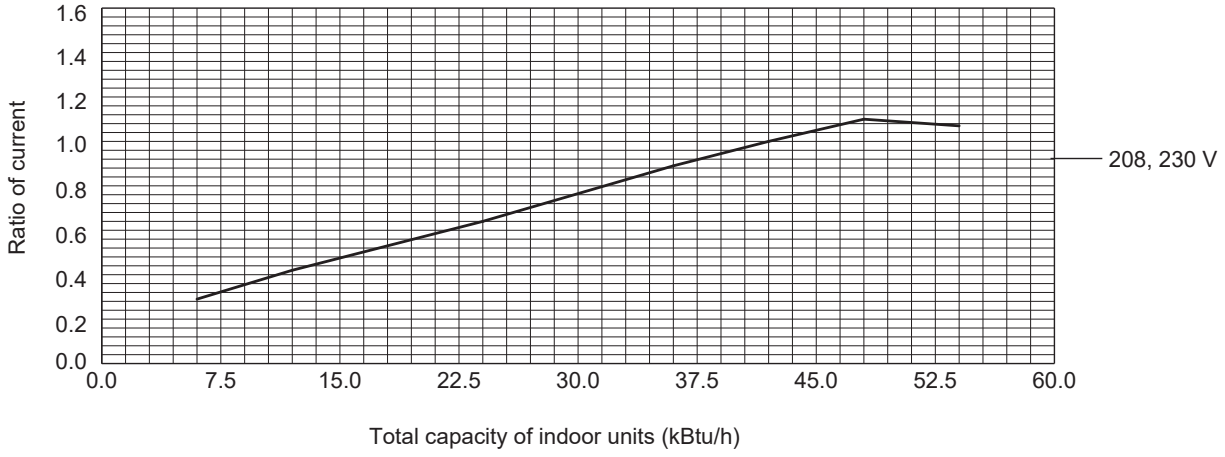
■ Cooling



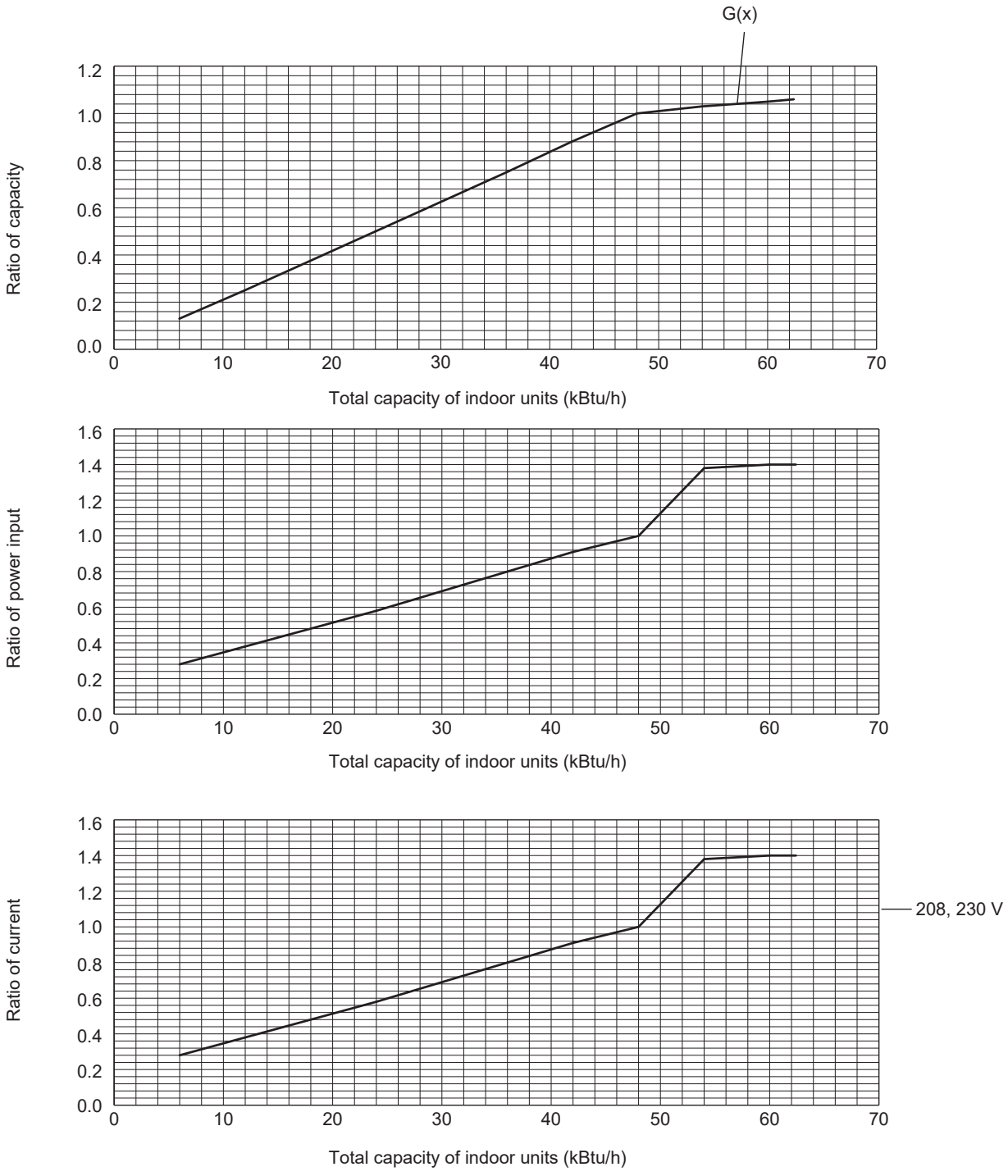
■ Heating


G(x)
Ratio of capacity
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
Total capacity of indoor units (kBtu/h)

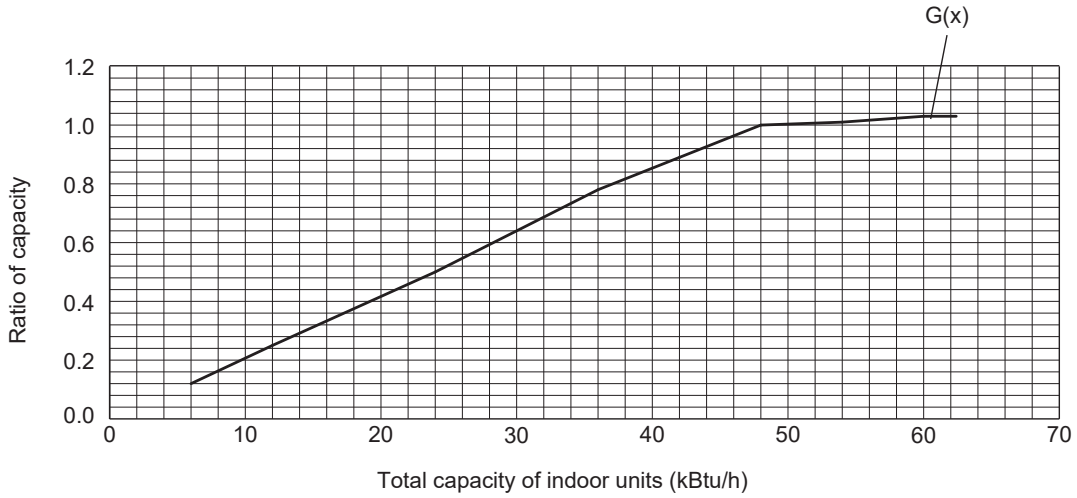

Ratio of power input
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
7.5
15.0
22.5
30.0
37.5
45.0
52.5
60.0
Total capacity of indoor units (kBtu/h)

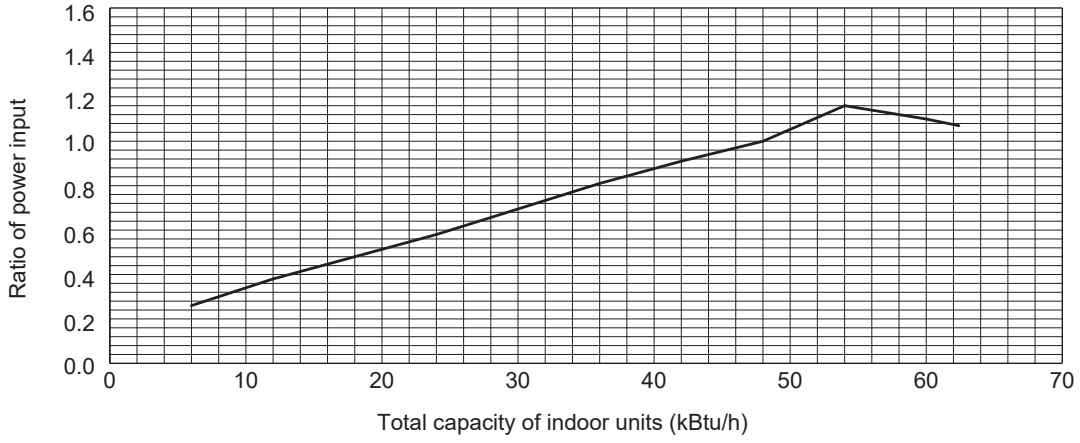

Ratio of current
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
7.5
15.0
22.5
30.0
37.5
45.0
52.5
60.0
Total capacity of indoor units (kBtu/h)
208, 230 V

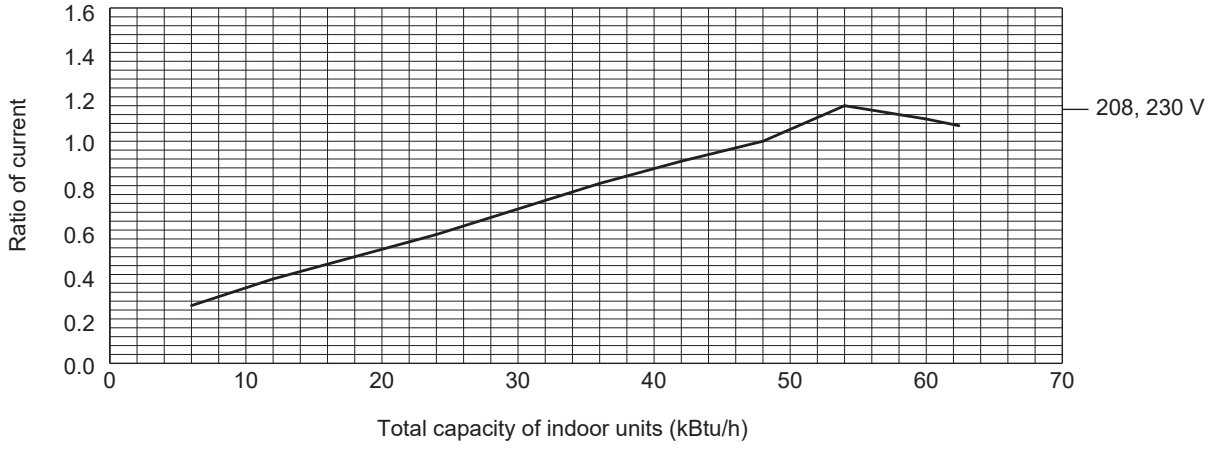
■ Cooling


G(x)
Ratio of capacity
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Total capacity of indoor units (kBtu/h)
Ratio of power input
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Total capacity of indoor units (kBtu/h)
Ratio of current
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
208, 230 V
0
10
20
30
40
50
60
70
Total capacity of indoor units (kBtu/h)

■ Heating

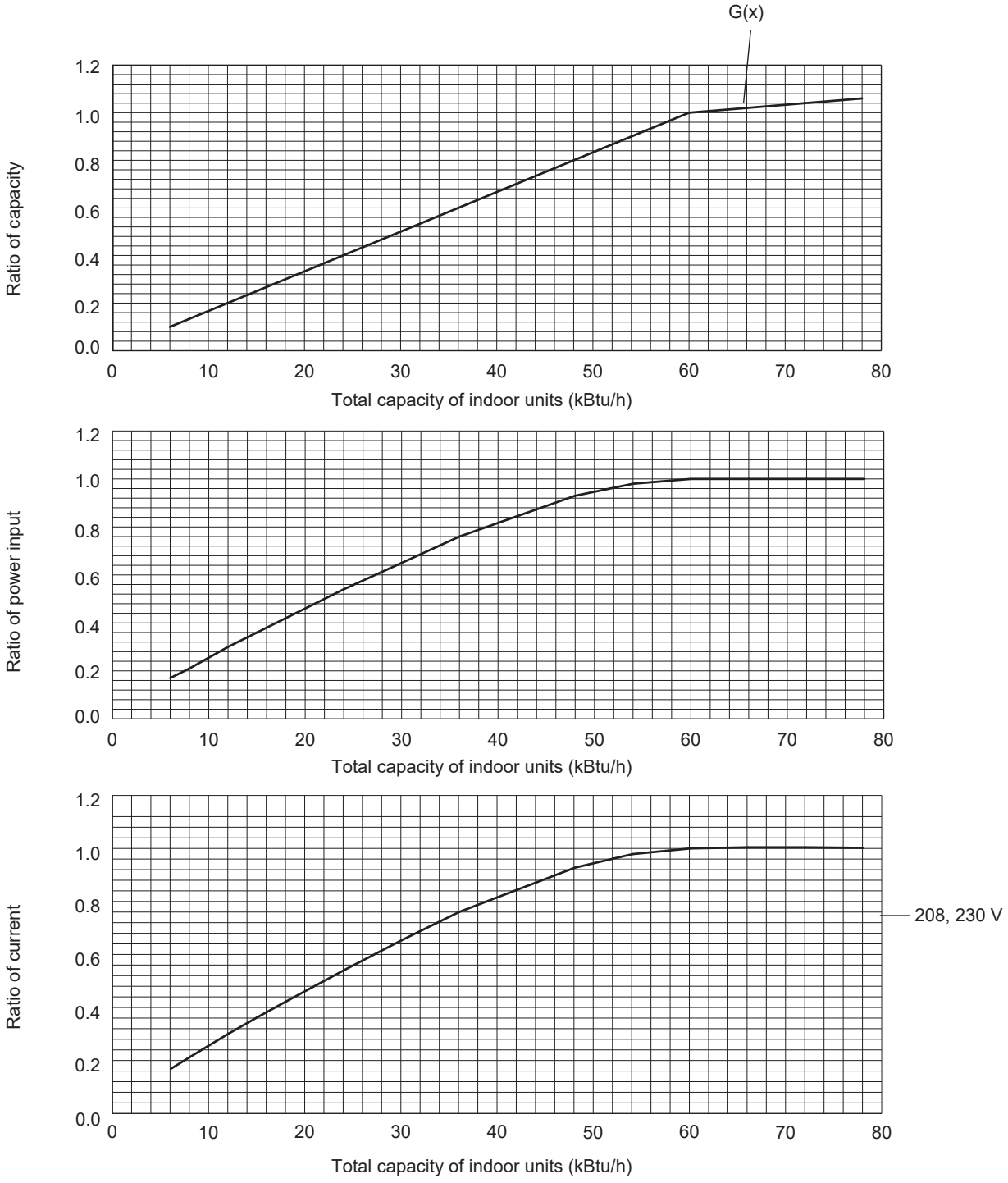

G(x)
Ratio of capacity
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Total capacity of indoor units (kBtu/h)


Ratio of power input
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Total capacity of indoor units (kBtu/h)

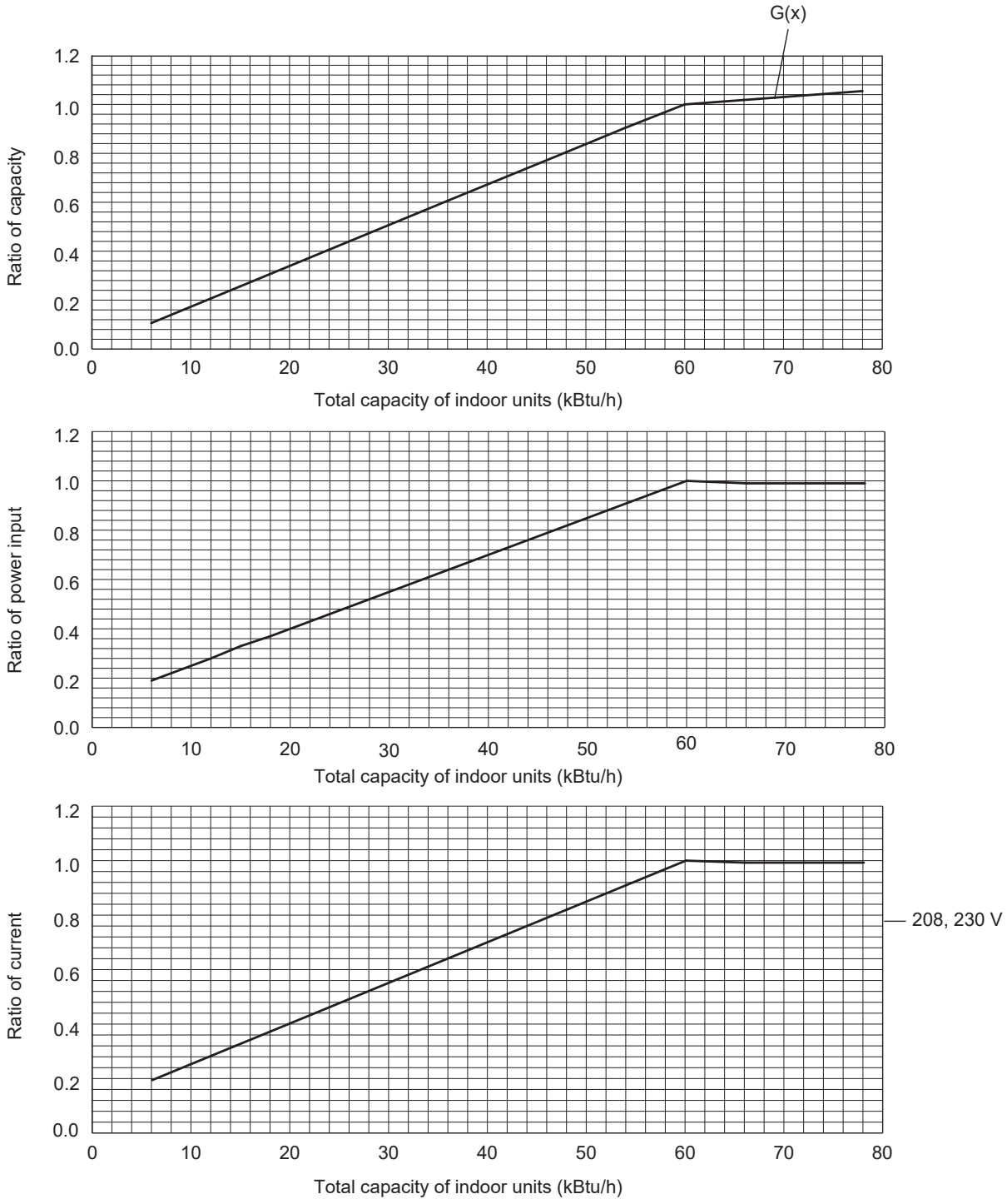

Ratio of current
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
Total capacity of indoor units (kBtu/h)
208, 230 V

MXZ-SM60NL-U1

■ Cooling



■ Heating


G(x)
Ratio of capacity
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
70
80
Total capacity of indoor units (kBtu/h)
Ratio of power input
Total capacity of indoor units (kBtu/h)
Ratio of current
Total capacity of indoor units (kBtu/h)
208, 230 V

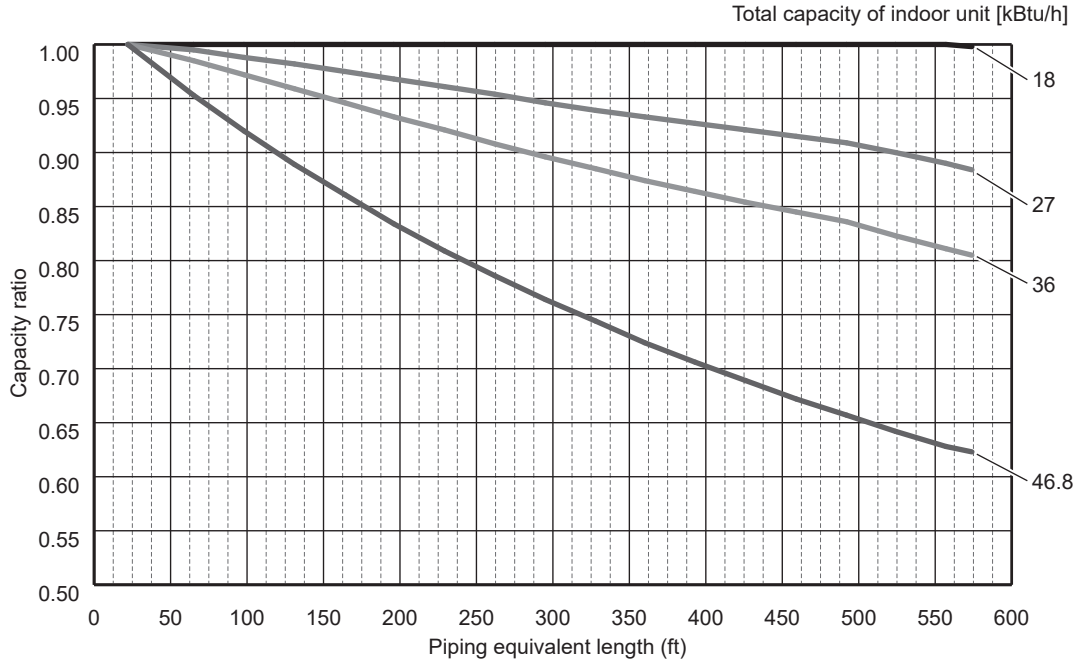
5-5. Correcting capacity for changes in the length of refrigerant piping

During cooling, obtain the ratio (and the piping equivalent length) of the outdoor units nominal capacity and the total in-use indoor capacity, and find the capacity ratio corresponding to the standard piping length from Figure 5 to 7. Then multiply by the cooling capacity from Figure 1 and 2 in "5-2. Correction by temperature" to obtain the actual capacity. During heating, find the piping equivalent length, and find the capacity ratio corresponding to standard piping length from Figure 8 to 10. Then multiply by the heating capacity from Figure 3 and 4 in "5-2. Correction by temperature" to obtain the actual capacity.

■ **Capacity Correction Curve**

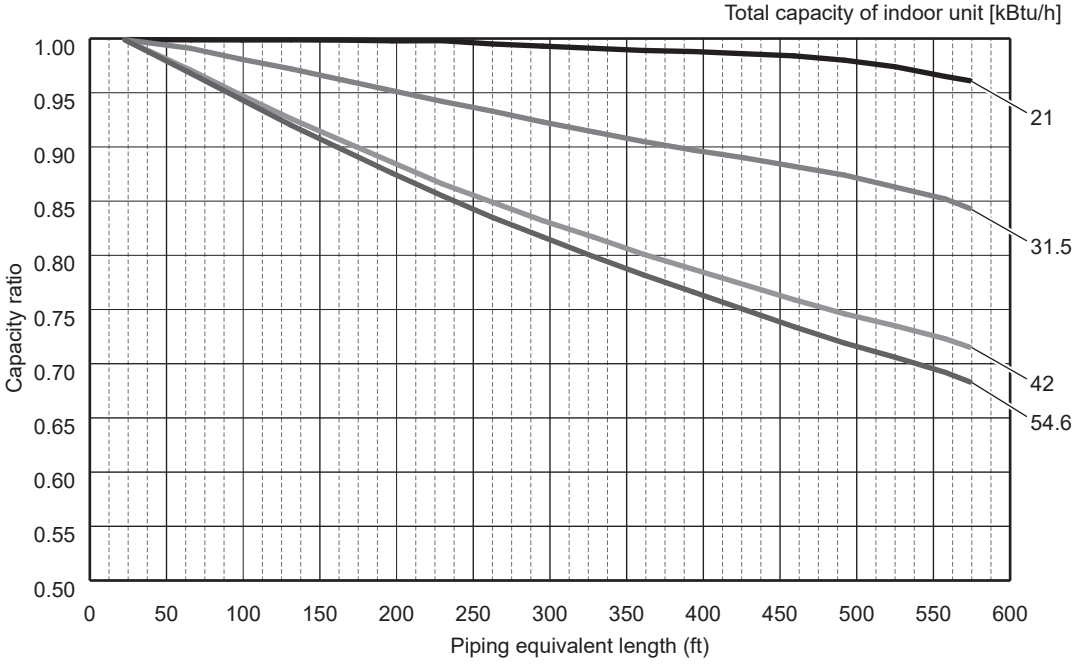
5-5-1. Cooling

MXZ-SM36NL-U1 **MXZ-SM36NLHZ-U1**



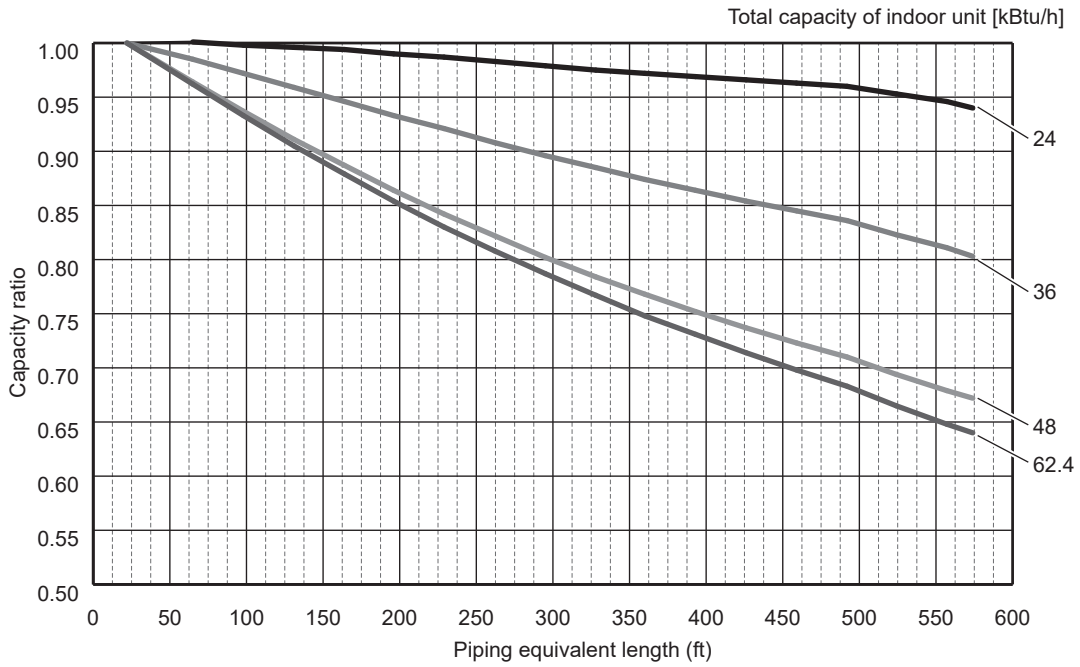
<Figure 7> Correction of refrigerant piping length

MXZ-SM42NLHZ-U1



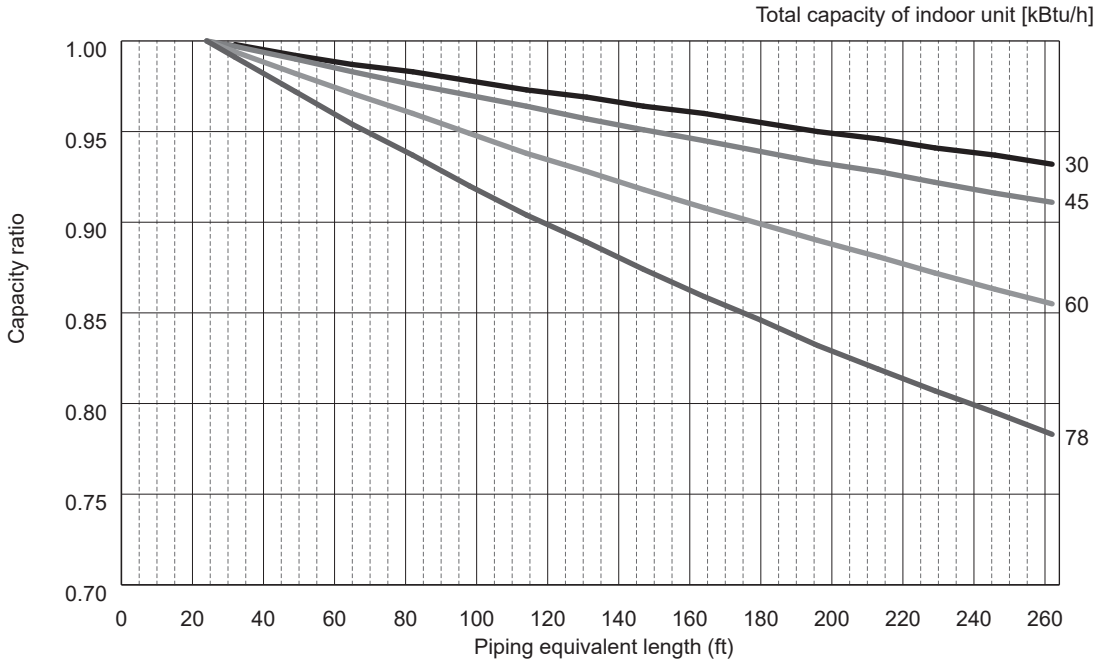
<Figure 8> Correction of refrigerant piping length

MXZ-SM48NL-U1 **MXZ-SM48NLHZ-U1**



<Figure 9> Correction of refrigerant piping length

MXZ-SM60NL-U1



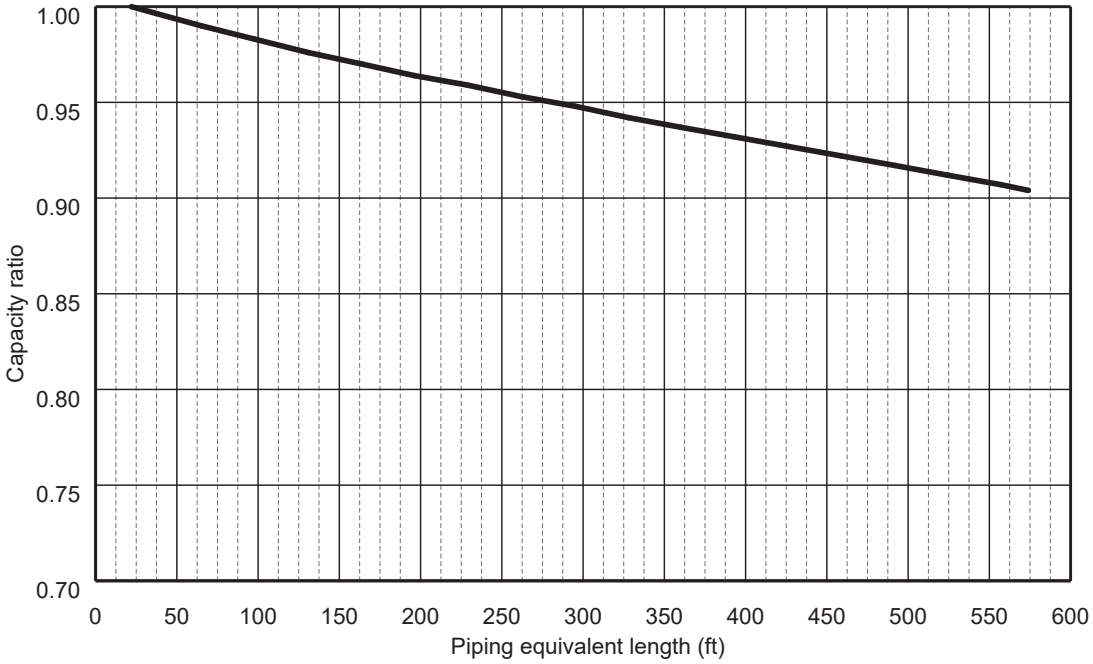
<Figure 10>Correction of refrigerant piping length

5-5-2. Heating

MXZ-SM36NL-U1
MXZ-SM36NLHZ-U1

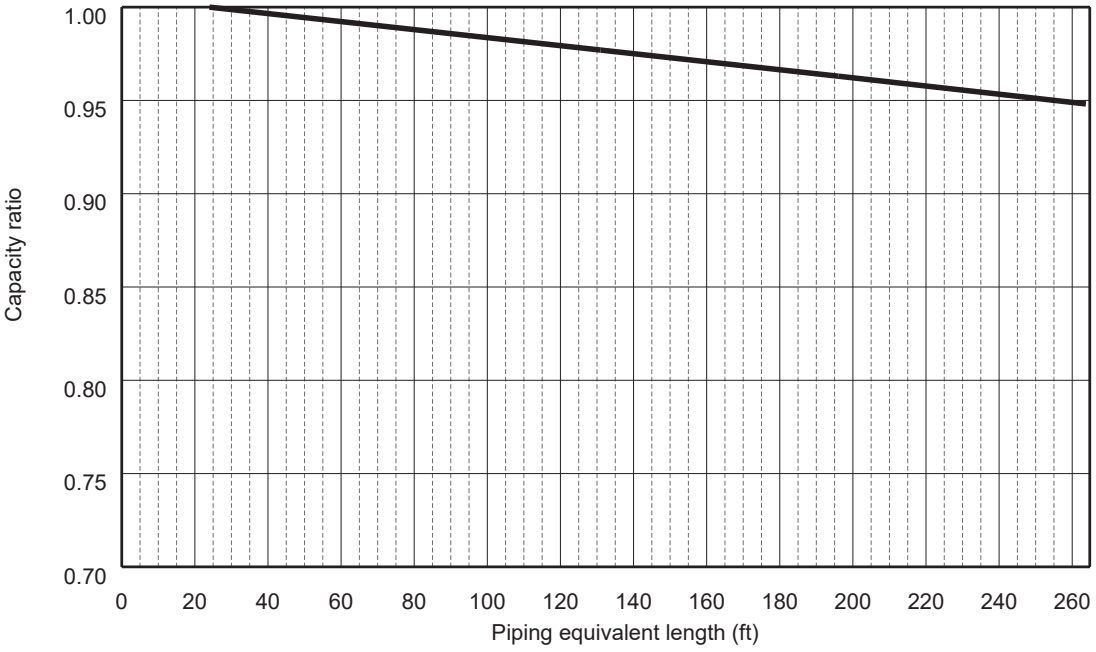
MXZ-SM42NLHZ-U1

MXZ-SM48NL-U1
MXZ-SM48NLHZ-U1



<Figure 11> Correction of refrigerant piping length

MXZ-SM60NL-U1



<Figure 12>Correction of refrigerant piping length

■ Method for obtaining the piping equivalent length

Piping equivalent length = piping length to the farthest indoor unit + 0.3 × number of bends in the piping (m)

5-5-3. Correction of heating capacity for frost and defrosting

If heating capacity has been reduced due to frost formation or defrosting, multiply the capacity by the appropriate correction factor from the following table to obtain the actual heating capacity.

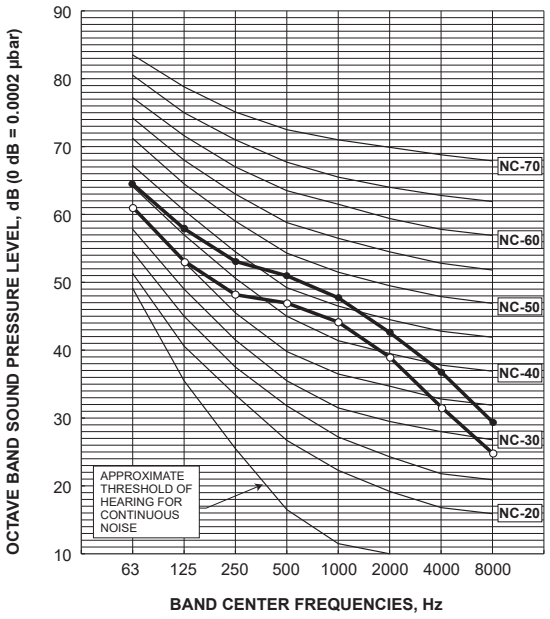
Correction factor diagram

Outdoor Intake temperature [°F(°C)WB]	43(6)	37(4)	36(2)	32(0)	28(−2)	25(−4)	21(−6)	18(−8)	14(−10)	5(−15)	−4(−20)	−13(−25)
Correction factor	1.00	0.94	0.85	0.84	0.85	0.86	0.95	0.95	0.95	0.95	0.95	0.95

5-6. Noise criterion curves

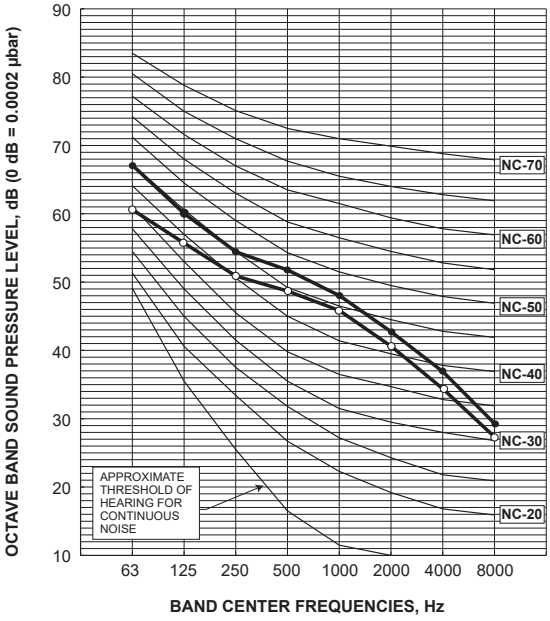
MXZ-SM36NL-U1
MXZ-SM36NLHZ-U1

MODE	SPL(dB)	LINE
COOLING	49	○—○
HEATING	53	●—●



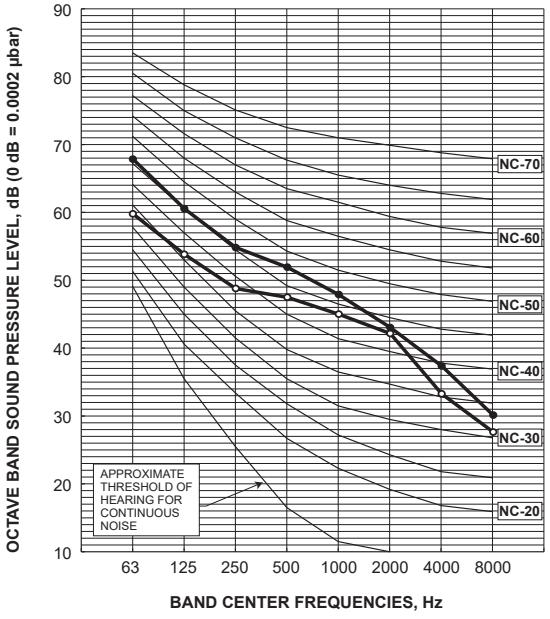
MXZ-SM48NL-U1
MXZ-SM48NLHZ-U1

MODE	SPL(dB)	LINE
COOLING	51	○—○
HEATING	54	●—●



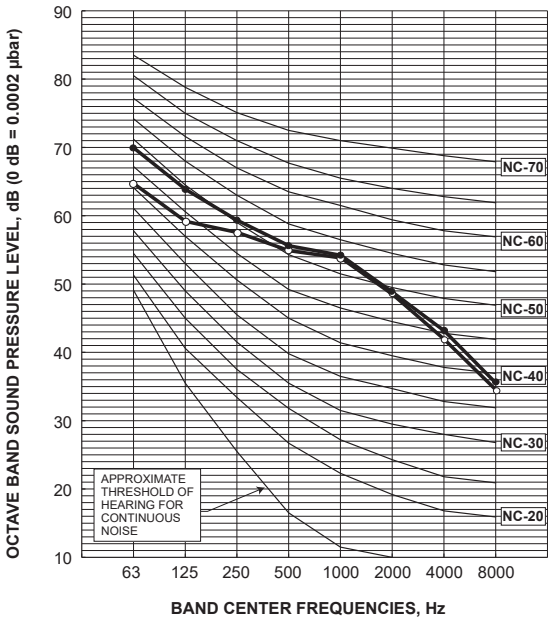
MXZ-SM42NLHZ-U1

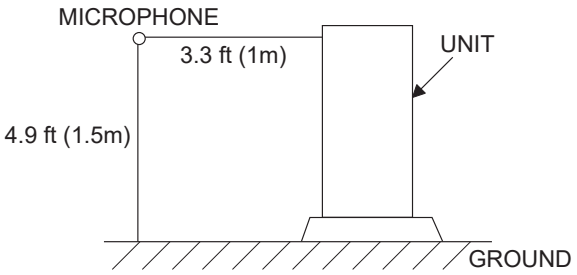
MODE	SPL(dB)	LINE
COOLING	50	○—○
HEATING	54	●—●



MXZ-SM60NL-U1

MODE	SPL(dB)	LINE
COOLING	58	○—○
HEATING	59	●—●

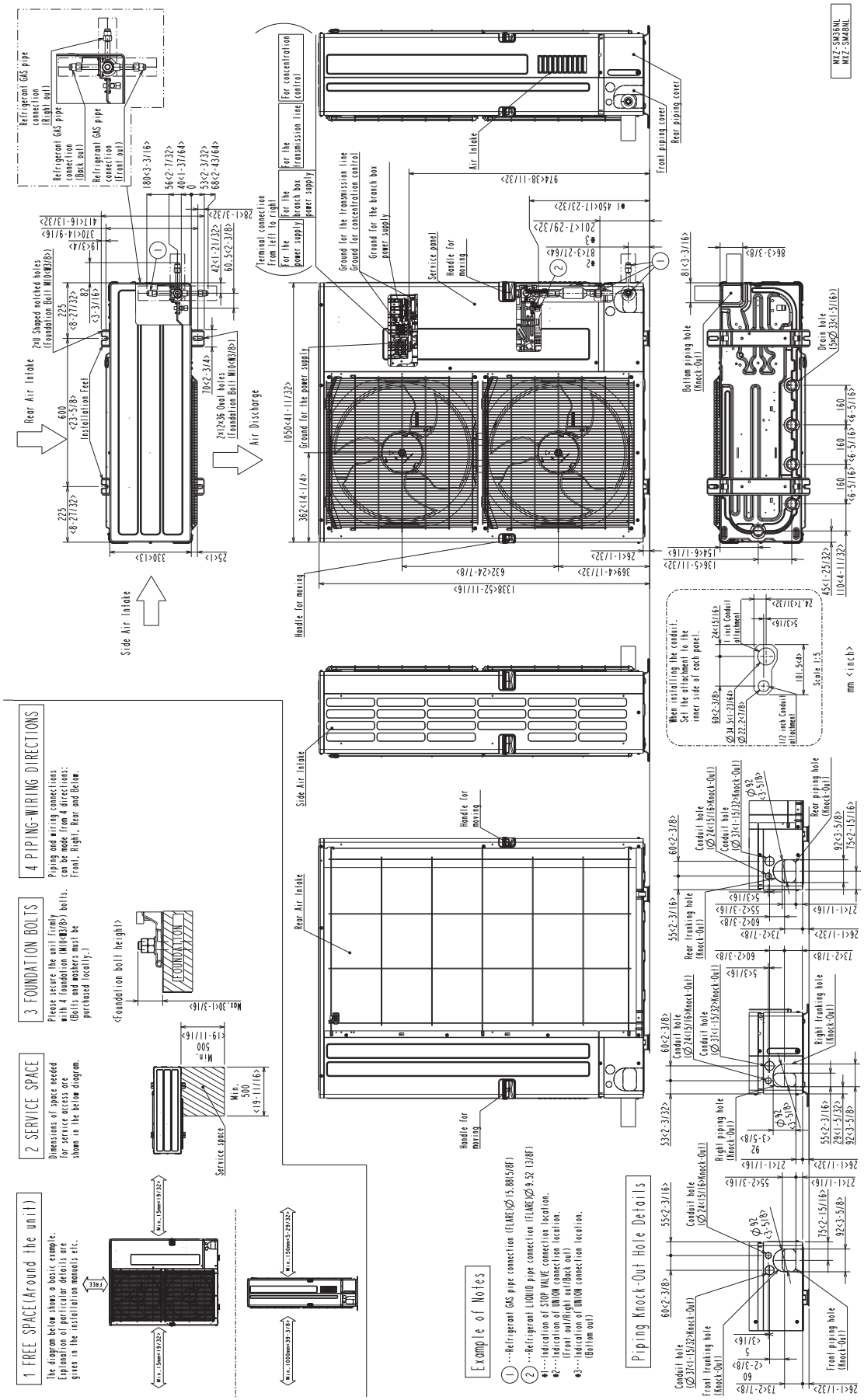




6 OUTLINES AND DIMENSIONS

MXZ-SM36NL-U1 **MXZ-SM48NL-U1**

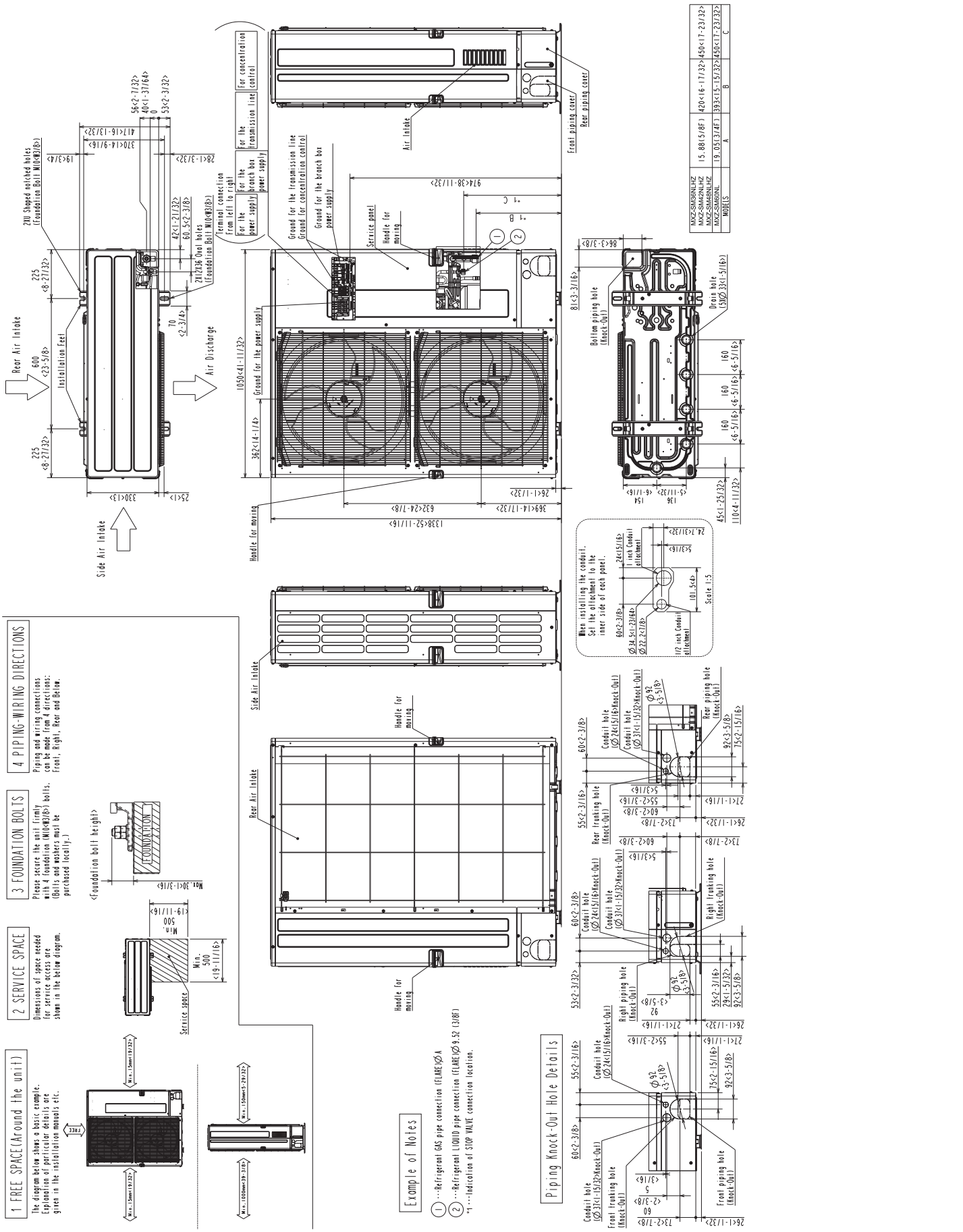
Unit: mm <inch>



MXZ-SM36NLHZ-U1
MXZ-SM42NLHZ-U1

MXZ-SM48NLHZ-U1
MXZ-SM60NL-U1

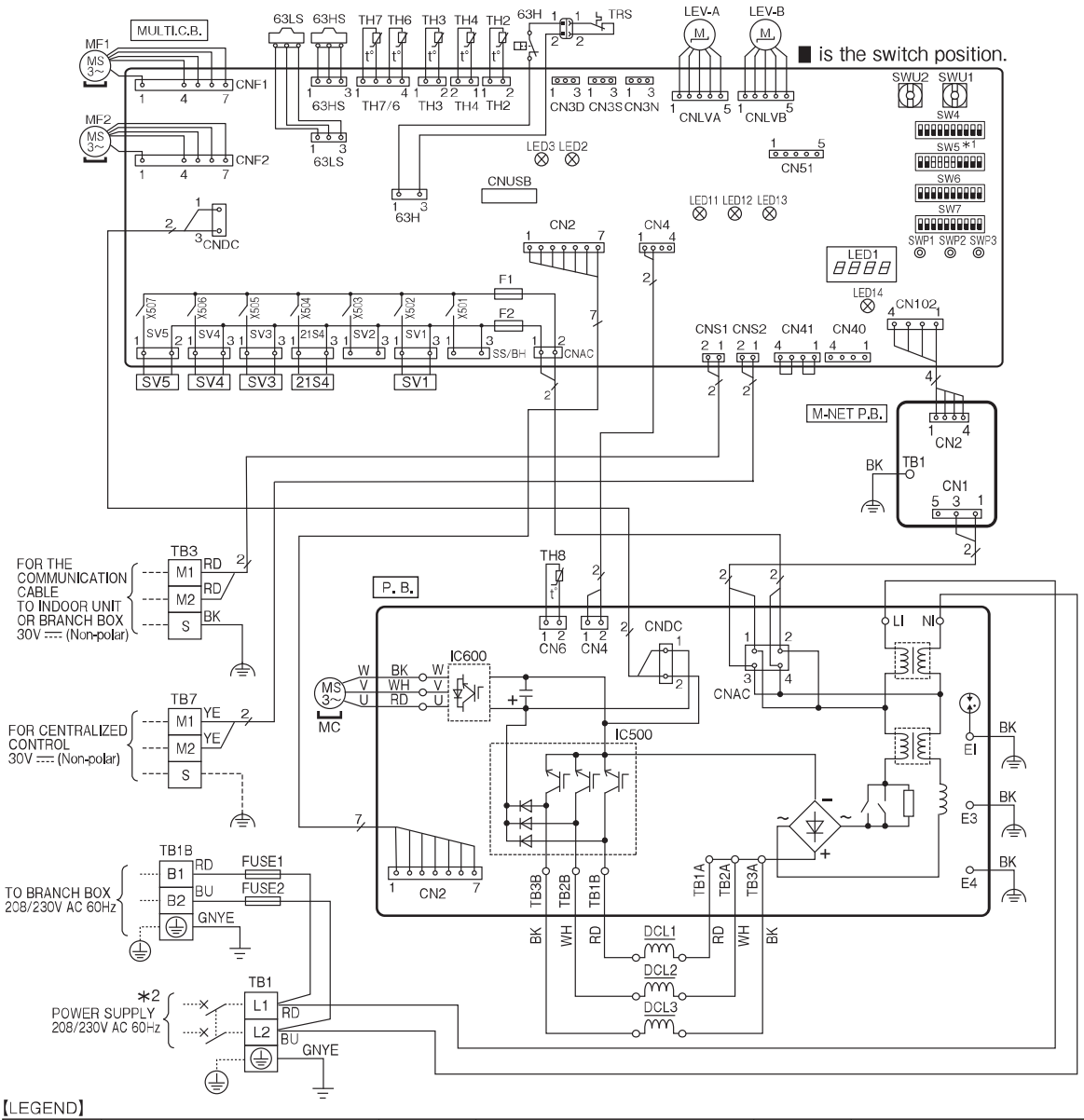
Unit: mm <inch>



MODELS	A	B	C
MXZ-SM36NLHZ MXZ-SM42NLHZ MXZ-SM48NLHZ	15.88(5/8F)	420<16-17/32>	450<17-23/32>
MXZ-SM60NL	19.05(3/4F)	393<15-15/32>	450<17-23/32>

7 WIRING DIAGRAM

MXZ-SM36NL-U1 **MXZ-SM48NL-U1**



【LEGEND】

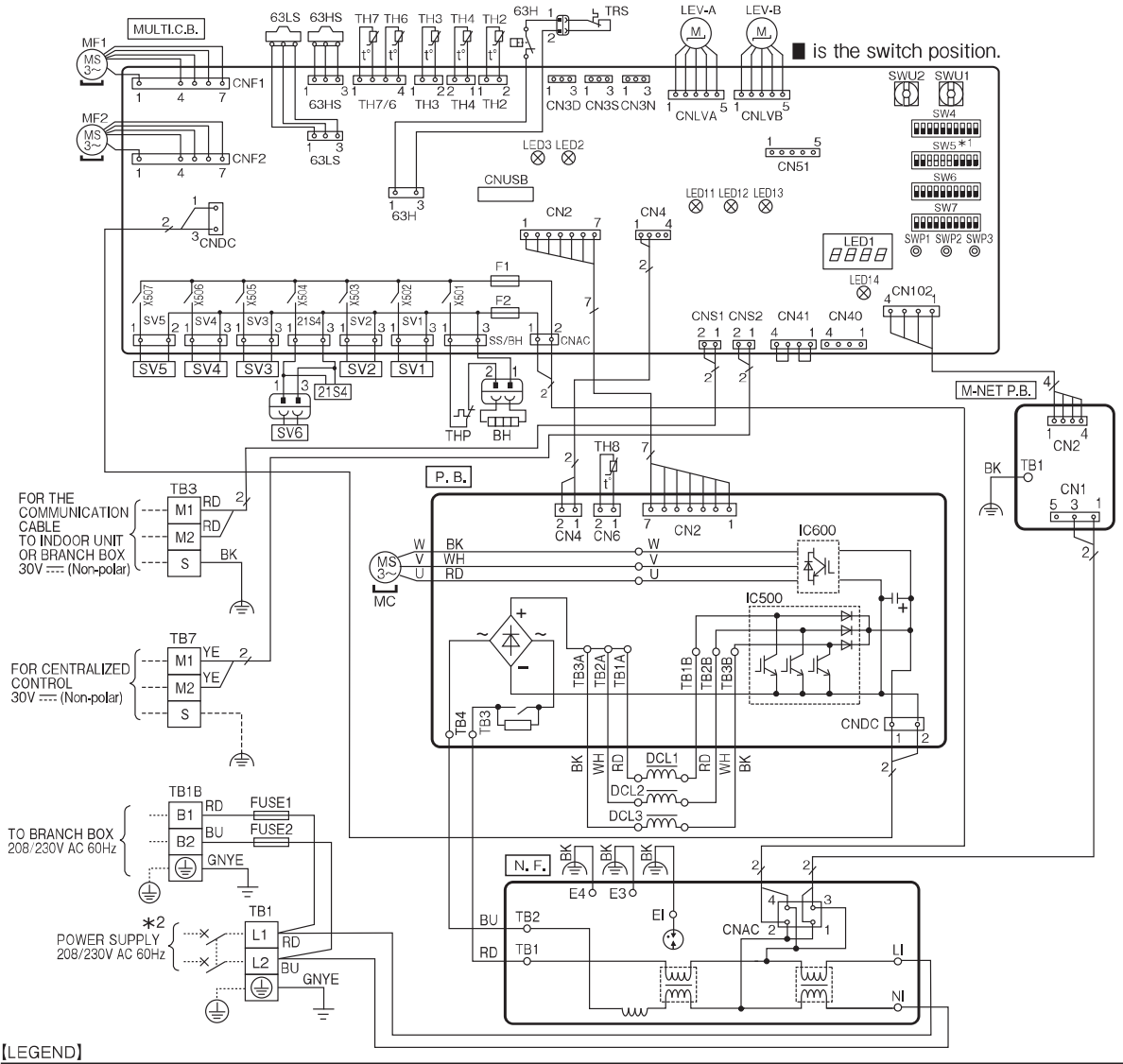
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block ⟨Power Supply⟩	TH6	Thermistor⟨Suction Pipe⟩	SWU1	Switch⟨Unit Address Selection, ones digit⟩
TB1B	Terminal Block ⟨Branch box⟩	TH7	Thermistor ⟨Ambient⟩	SWU2	Switch⟨Unit Address Selection, tens digit⟩
TB3	Terminal Block ⟨Indoor/Outdoor, Branch box/Outdoor Transmission Line⟩	TH8	Thermistor ⟨Heat Sink⟩	SWP3	Switch⟨Function Selection⟩
		TRS	Thermal Protector	SS/BH	Connector⟨Connection for Option⟩
TB7	Terminal Block ⟨Centralized Control Transmission Line⟩	LEV-A, LEV-B	Linear Expansion Valve	CN3D	Connector⟨Connection for Option⟩
		DCL1, DCL2, DCL3	Reactor	CN3S	Connector⟨Connection for Option⟩
FUSE1, FUSE2	Fuse⟨T20AL250V⟩	P.B.	Power Circuit Board	CN3N	Connector⟨Connection for Option⟩
MC	Motor for Compressor	U/V/W	Connection Terminal⟨U/V/W-Phase⟩	CN51	Connector⟨Connection for Option⟩
MF1, MF2	Fan Motor	LI	Connection Terminal⟨L1-Phase⟩	LED1	LED ⟨Operation Inspection Display⟩
21S4	Solenoid Valve Coil⟨4-Way Valve⟩	NI	Connection Terminal⟨L2-Phase⟩	LED11	Normal operation⟨Lit⟩/IC Error⟨Blink⟩
63H	High Pressure Switch	TB1A, TB2A, TB3A TB1B, TB2B, TB3B	Connection Terminal⟨Reactor⟩	LED12	Normal operation⟨Lit⟩Error⟨Blink⟩ for central control transmission
63HS	High Pressure Sensor				
63LS	Low Pressure Sensor	IC500	Converter	LED13	Normal operation⟨Lit⟩Error⟨Blink⟩ for indoor/outdoor transmission
SV1	Solenoid Valve Coil⟨Bypass Valve⟩	IC600	Inverter		
SV3	Solenoid Valve Coil⟨Bypass Valve⟩	EI, E3, E4	ConnectionTerminal⟨Electrical Parts Box⟩	LED14	LED ⟨Power Supply to Main Microcomputer⟩
SV4	Solenoid Valve Coil⟨Liquid Shut-off Valve⟩	MULTI.C.B	Multi Controller Circuit Board	F1, F2	Fuse⟨T6.3AL250V⟩
SV5	Solenoid Valve Coil⟨Gas Shut-off Valve⟩	SW4	Switch ⟨Display Selection⟩	X501~X507	Relay
TH2	Thermistor⟨HIC Pipe⟩	SW5	Switch ⟨Model Selection⟩	CNUSB	USB TYPE A
TH3	Thermistor⟨Outdoor Liquid Pipe⟩	SW6	Switch ⟨Function Selection/Test Run⟩	M-NET P.B.	M-NET Power Circuit Board
TH4	Thermistor⟨Compressor⟩	SW7	Switch ⟨Function Selection⟩	TB1	ConnectionTerminal⟨Electrical Parts Box⟩

*1 MODEL SELECTION
The black square (■) indicates a switch position.

MODEL	SW5	MODEL	SW5
MXZ-SM36NL	ON OFF 3 4 5 6	MXZ-SM48NL	ON OFF 3 4 5 6

*2 Use copper supply wires.
Utiliser des fils d'alimentation en cuivre.

MXZ-SM36NLHZ-U1 **MXZ-SM42NLHZ-U1** **MXZ-SM48NLHZ-U1**



【LEGEND】

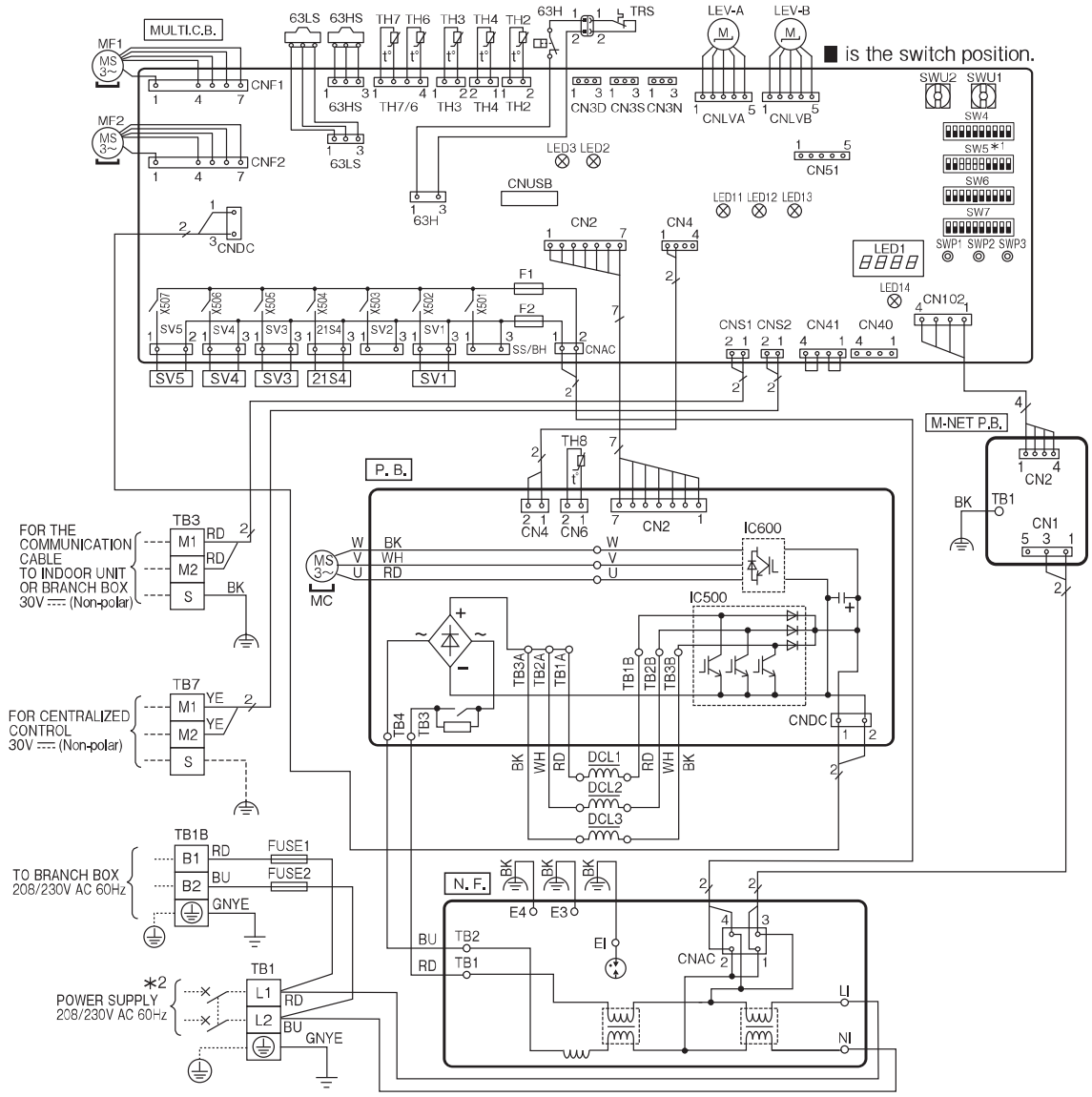
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block ⟨Power Supply⟩	TH4	Thermistor⟨Compressor⟩	SW6	Switch⟨Function Selection/Test Run⟩
TB1B	Terminal Block ⟨Branch box⟩	TH6	Thermistor⟨Suction Pipe⟩	SW7	Switch⟨Function Selection⟩
TB3	Terminal Block ⟨Indoor/Outdoor, Branch box/Outdoor Transmission Line⟩	TH7	Thermistor⟨Ambient⟩	SWU1	Switch⟨Unit Address Selection, ones digit⟩
		TH8	Thermistor⟨Heat Sink⟩	SWU2	Switch⟨Unit Address Selection, tens digit⟩
TB7	Terminal Block ⟨Centralized Control Transmission Line⟩	TRS	Thermal Protector<Compressor>	SWP3	Switch⟨Function Selection⟩
		LEV-A, LEV-B	Linear Expansion Valve	SS/BH	Base Heater
FUSE1, FUSE2	Fuse⟨T20AL250V⟩	DCL1, DCL2, DCL3	Reactor	CN3D	Connector⟨Connection for Option⟩
MC	Motor for Compressor	N.F.	Noise Filter Board	CN3S	Connector⟨Connection for Option⟩
MF1, MF2	Fan Motor	LI	Connection Terminal⟨L1-Phase⟩	CN3N	Connector⟨Connection for Option⟩
21S4	Solenoid Valve Coil⟨4-Way Valve⟩	NI	Connection Terminal⟨L2-Phase⟩	CN51	Connector⟨Connection for Option⟩
63H	High Pressure Switch	TB1, TB2	ConnectionTerminal⟨Power Circuit Board⟩	LED1	LED⟨Operation Inspection Display⟩
63HS	High Pressure Sensor	EI, E3, E4	ConnectionTerminal⟨Electrical Parts Box⟩	LED11	Normal operation⟨Lit⟩/IC Error⟨Blink⟩
63LS	Low Pressure Sensor	P.B.	Power Circuit Board	LED12	Normal operation⟨Lit⟩Error⟨Blink⟩ for central control transmission
SV1	Solenoid Valve Coil⟨Bypass Valve⟩	TB3, TB4	ConnectionTerminal⟨Noise Filter Board⟩		
SV2	Solenoid Valve Coil⟨Switching Valve⟩	U/V/W	Connection Terminal⟨U/V/W-Phase⟩	LED13	Normal operation⟨Lit⟩Error⟨Blink⟩ for indoor/outdoor transmission
SV3	Solenoid Valve Coil⟨Bypass Valve⟩	TB1A, TB2A, TB3A TB1B, TB2B, TB3B	Connection Terminal⟨Reactor⟩		
SV4	Solenoid Valve Coil⟨Liquid Shut-off Valve⟩			LED14	LED⟨Power Supply to Main Microcomputer⟩
SV5	Solenoid Valve Coil⟨Gas Shut-off Valve⟩	IC500	Converter	F1, F2	Fuse⟨T6.3AL250V⟩
SV6	Solenoid Valve Coil⟨Injection⟩	IC600	Inverter	X501~X507	Relay
BH	Base Heater	MULTI.C.B	Multi Controller Circuit Board	CNUSB	USB TYPE A
THP	Thermal Protector<Base Heater>	SW4	Switch⟨Display Selection⟩	M-NET P.B.	M-NET Power Circuit Board
TH2	Thermistor⟨HIC Pipe⟩	SW5	Switch⟨Model Selection⟩	TB1	ConnectionTerminal⟨Electrical Parts Box⟩
TH3	Thermistor⟨Outdoor Liquid Pipe⟩				

*1 MODEL SELECTION
The black square(■) indicates a switch position.

MODEL	SW5	MODEL	SW5
MXZ-SM36NLHZ	ON OFF 3 4 5 6	MXZ-SM48NLHZ	ON OFF 3 4 5 6
MXZ-SM42NLHZ	ON OFF 3 4 5 6		

*2 Use copper supply wires.
Utiliser des fils d'alimentation en cuivre.

MXZ-SM60NL-U1



【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block ⟨Power Supply⟩	TH7	Thermistor⟨Ambient⟩	SW7	Switch⟨Function Selection⟩
TB1B	Terminal Block ⟨Branch box⟩	TH8	Thermistor⟨Heat Sink⟩	SWU1	Switch⟨Unit Address Selection, ones digit⟩
TB3	Terminal Block ⟨Indoor/Outdoor, Branch box/Outdoor Transmission Line⟩	TRS	Thermal Protector	SWU2	Switch⟨Unit Address Selection, tens digit⟩
		LEV-A, LEV-B	Linear Expansion Valve	SWP3	Switch⟨Function Selection⟩
TB7	Terminal Block ⟨Centralized Control Transmission Line⟩	DCL1, DCL2, DCL3	Reactor	SS/BH	Connector⟨Connection for Option⟩
		N.F.	Noise Filter Board	CN3D	Connector⟨Connection for Option⟩
FUSE1, FUSE2	Fuse⟨T20AL250V⟩	LI	Connection Terminal⟨L1-Phase⟩	CN3S	Connector⟨Connection for Option⟩
MC	Motor for Compressor	NI	Connection Terminal⟨L2-Phase⟩	CN3N	Connector⟨Connection for Option⟩
MF1, MF2	Fan Motor	TB1, TB2	ConnectionTerminal⟨Power Circuit Board⟩	CN51	Connector⟨Connection for Option⟩
21S4	Solenoid Valve Coil⟨4-Way Valve⟩	EI, E3, E4	ConnectionTerminal⟨Electrical Parts Box⟩	LED1	LED⟨Operation Inspection Display⟩
63H	High Pressure Switch	P.B.	Power Circuit Board	LED11	Normal operation⟨Lit⟩/IC Error⟨Blink⟩
63HS	High Pressure Sensor	TB3, TB4	ConnectionTerminal⟨Noise Filter Board⟩	LED12	Normal operation⟨Lit⟩Error⟨Blink⟩ for central control transmission
63LS	Low Pressure Sensor	U/V/W	Connection Terminal⟨U/V/W-Phase⟩		
SV1	Solenoid Valve Coil⟨Bypass Valve⟩	TB1A, TB2A, TB3A TB1B, TB2B, TB3B	Connection Terminal⟨Reactor⟩	LED13	Normal operation⟨Lit⟩Error⟨Blink⟩ for indoor/outdoor transmission
SV3	Solenoid Valve Coil⟨Bypass Valve⟩				
SV4	Solenoid Valve Coil⟨Liquid Shut-off Valve⟩	IC500	Converter	LED14	LED⟨Power Supply to Main Microcomputer⟩
SV5	Solenoid Valve Coil⟨Gas Shut-off Valve⟩	IC600	Inverter	F1, F2	Fuse⟨T6.3AL250V⟩
TH2	Thermistor⟨HIC Pipe⟩	MULTI.C.B	Multi Controller Circuit Board	X501~X507	Relay
TH3	Thermistor⟨Outdoor Liquid Pipe⟩	SW4	Switch⟨Display Selection⟩	CNUSB	USB TYPE A
TH4	Thermistor⟨Compressor⟩	SW5	Switch⟨Model Selection⟩	M-NET P.B.	M-NET Power Circuit Board
TH6	Thermistor⟨Suction Pipe⟩	SW6	Switch⟨Function Selection/Test Run⟩	TB1	ConnectionTerminal⟨Electrical Parts Box⟩

*1 MODEL SELECTION
The black square (■) indicates a switch position.

MODEL	SW5
MXZ-SM60NL	ON OFF 3 4 5 6

*2 Use copper supply wires.
Utiliser des fils d'alimentation en cuivre.

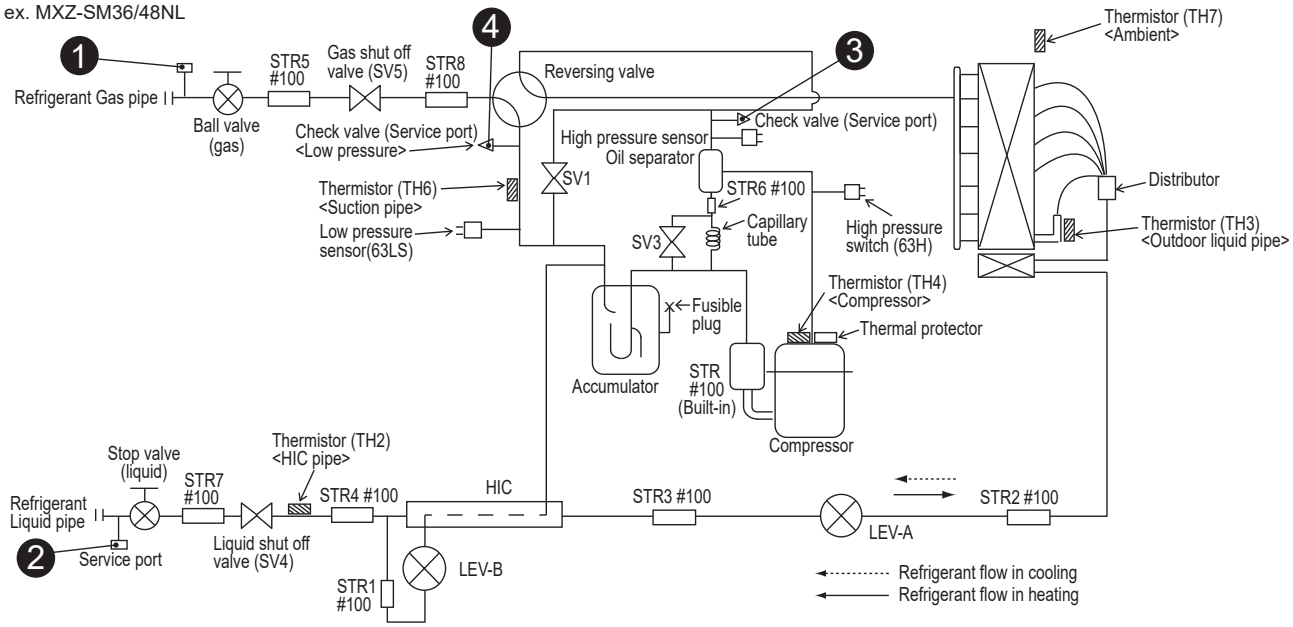
8 TROUBLESHOOTING

8-1. Checkpoints for test run

8-1-1. Procedures before test run

1. Before a test run, make sure that the following work is completed.
   • Installation related:
   Make sure that the panel of cassette type is installed and electrical wiring is done.
   Otherwise electrical functions like auto vane will not operate normally.
   • Piping related:
   Perform leakage test of refrigerant and drain piping. Make sure that all joints are perfectly insulated.
   Check stop valves on both liquid and gas sides are fully open.
   • Electrical wiring related:
   Check ground wire, transmission cable, remote controller cable, and power supply cable for secure connection.
   Make sure that all switch settings of address or adjustments for special specification systems are correctly made.
2. Safety check:
   • With the insulation multimeter of 500 V, inspect the insulation resistance.
   • Do not touch the transmission cable and remote controller cable with the multimeter.
   • The resistance should be over 1.0 MΩ. Do not proceed inspection if the resistance is less than 1.0 MΩ.
   • Inspect between the outdoor unit power supply terminal block and ground first, metallic parts like refrigerant pipes or the electrical box next, then inspect all electrical wiring of outdoor unit, indoor unit, and all linked equipment.
3. Before operation:
   • For compressor protection, turn on the breaker for the outdoor unit and wait at least 12 hours before a test run.
   - The unit might NOT run, in order to protect the compressor, in the case of low outside air temperature.*
4. More than 12 hours later after turning on the power to the outdoor unit, turn on all the power switches for the test run.
   Perform test run and make test run reports.

⚠Caution:
• Recover refrigerant and vacuum through the check valves and the service ports (four locations shown in the diagram below). Open the stop valves when you work.



8-1-2. Test run
Refer to "13-4. Test run" for operation procedure.

8-1-3. Error information
Refer to “13-2. Error information” when an error occurs.

8-1-4. Error history
Refer to “13-6. Error history” to check the errors occurred in the past.

8-1-5. Self-diagnosis
Refer to "13-7. Self-diagnosis" to search for the error history.

8-1-6. Countermeasures for error during test run

If a problem occurs during test run, a code number will appear on the remote controller (or LED on the outdoor unit), and the air conditioning system will automatically cease operating.
Determine the nature of the abnormality and apply corrective measures.
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Error code (2 digits)	Error code (4 digits)	Trouble	Detected Unit				Remarks
			Indoor	Outdoor	Power Supply Interface	Remote Controller	
Ed	0403	Serial communication error/Model selection SW error		O			Outdoor unit outdoor multi controller circuit board – Power circuit board communication trouble, Incorrect setting of model selection
U2	1102	Compressor temperature trouble		O			Check delay code 1202
UL	1300	Low pressure trouble		O			
UE	1302	High pressure trouble or thermal protector trouble		O			Check delay code 1402
U7	1500	Superheat due to low discharge temperature trouble		O			Check delay code 1600
U2	1501	Refrigerant shortage trouble		O			Check delay code 1601
		Closed valve in cooling mode		O			Check delay code 1501
P6	1503	Freeze protection of plate heat exchanger	O				
		Freeze protection of branch box or indoor unit	O				
EF	1508	4-way valve trouble in heating mode		O			Check delay code 1608
FL	1521	Refrigerant leakage	O	O			The error cannot be canceled by the remote controller after this error detection.
FL	1522	Refrigerant leakage / Refrigerant sensor error	O	O			The error cannot be canceled by the remote controller after this error detection.
L6	2135	Circulation water freeze protection	O				
PA	2500	Water leakage	O				
P5	2502	Drain overflow protection	O				
P4	2503	Drain sensor abnormality	O				
-	3121	Out-of-range outside air temperature		O			
UF	4100	Compressor current interruption (locked compressor)		O			Check delay code 4350
Pb	4114	Fan trouble (Indoor unit)	O				
EF	4130	Power source failure of control board			O		
EF	4136	Circuit failure of safety shut-off valve			O		
UP	4210	Compressor overcurrent interruption/Failure in 12 VDC power supply circuit on power circuit board		O			
U9	4220	Voltage shortage/overvoltage/PAM error/L1 open phase/primary current sensor error/power synchronization signal error/Primary voltage error		O			Check delay code 4320
U5	4230	Heat sink temperature trouble		O			Check delay code 4330
U6	4250	Power module trouble		O			Check delay code 4350
U8	4400	Fan trouble (Outdoor unit)		O			Check delay code 4500
U3	5101	Air inlet thermistor (TH21) open/short	O				
		Compressor temperature thermistor (TH4) open/short		O			Check delay code 1202
U4	5102	Liquid pipe temperature thermistor (TH22) open/short	O				
		Suction pipe temperature thermistor (TH6) open/short		O			Check delay code 1211
U4	5103	Gas pipe temperature thermistor (TH23) open/short	O				
U4	5105	Outdoor liquid pipe temperature thermistor (TH3) open/short		O			Check delay code 1205
U4	5106	Ambient temperature thermistor (TH7) open/short		O			Check delay code 1221
U4	5109	HIC pipe temperature thermistor (TH2) open/short		O			Check delay code 1222
U4	5110	Heat sink temperature thermistor (TH8) open/short		O			Check delay code 1214
F5	5201	High pressure sensor (63HS) trouble		O			Check delay code 1402
F3	5202	Low pressure sensor (63LS) trouble		O			Check delay code 1400
UH	5300	Primary current error		O			Check delay code 4310
FH	5558	Refrigerant sensor error	O	O			The error cannot be canceled by the remote controller after this error detection.
P4	5701	Contact failure of drain float switch	O				
A0	6600	Duplex address error	O	O		O	
A2	6602	Transmission processor hardware error	O	O		O	
A3	6603	Transmission bus BUSY error	O	O		O	
A6	6606	Signal communication error with transmission processor	O	O		O	
A7	6607	No ACK error	O			O	
A8	6608	No response frame error	O			O	
FH	6815	MA supervisor remote controller communication error	O				
E0/E4	6831	MA communication receive error	O			O	Only MA Remote controller is detected.
E4	6831	Sensor and Alarm Kit communication error	O				
E3/E5	6832	MA communication send error	O			O	Only MA Remote controller is detected.
E3/E5	6833	MA communication send error	O			O	Only MA Remote controller is detected.
E0/E4	6834	MA communication receive error	O			O	Only MA Remote controller is detected.
EF	7100	Total capacity error		O			
EF	7101	Capacity code error	O	O			
EF	7102	Connecting excessive number of units and branch boxes		O			
EF	7105	Address setting error		O			
EF	7118	Refrigerant leak detection system error	O				
EF	7119	Connection error of M-NET line (origin)	O		O		
EF	7120	Connection error of M-NET line (not origin)	O		O		
EF	7121	Power supply failure	O	O			
EE	7130	Incompatible unit combination		O			

Notes:

- When DIP SW6-6 is ON, the system performs refrigerant recovery even if communication fails. When the error code is 6602 (A2), 6603 (A3), 6606 (A6), 6607 (A7), 6608 (A8), 6840 (E6), 6841 (E9), 6842 (E7), 6843 (E6), or 6846 (EC), refer to the section "Communication error when DIP SW6-6 is ON" in the following page.

- When DIP SW6-6 is OFF and the outdoor unit detects No ACK error or No response error, the target indoor unit is treated as stopped and not assumed to be abnormal.
- The error codes displayed on the units may be different between the error source and others. In that case, please refer to the error code of error source by displayed attribute and address.
- Refer to the service manual of the indoor unit or the remote controller for details of the errors detected by the indoor unit or the remote controller or any errors not indicated in the table above.

■ Self-diagnosis function

The indoor and outdoor units can be diagnosed automatically using the self-diagnosis switch (SW4) and LED1 (LED indication) found on the outdoor multi controller circuit board.
LED indication: Set all contacts of SW4 to OFF.

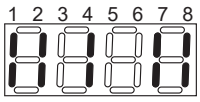
■ During normal operation

The LED indicates the drive state of the controller in the outdoor unit.

Bit	1	2	3	4	5	6	7	8
Indication	Compressor operated	Always lit	21S4	SV1	(SV2)	SV3	SV4	SV5

- Example

When the compressor, SV1, SV4, and SV5 are on during cooling operation.



6602 (A2) / 6603 (A3) / 6606 (A6) / 6607 (A7) / 6608 (A8) / 6840 (E6) / 6841 (E9) / 6842 (E7) / 6843 (E6) / 6846 (EC): Communication error when DIP SW6-6 is ON

Abnormal points and detection methods

A communication error has occurred.

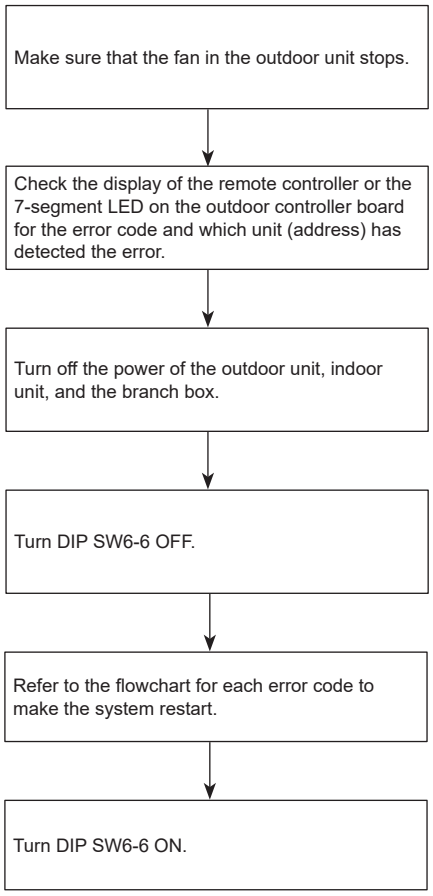
Causes and checkpoints

- There is an abnormality in the communication line or communication system.

Notes:

- When this error occurs, the system closes the shut-off valves and performs refrigerant recovery.
- When this error occurs, all indoor units start fan operation for safety purpose. The operation time differs depending on the unit.
- When this error occurs, do not turn off the power until the fan in the outdoor unit stops. Ventilate the room with the indoor unit in which this error has occurred and make sure there is no ignition source before turning off the power.
- Turn SW6-6 ON after the communication error is resolved. If the communication error occurs again while SW6-6 is on, the refrigerant recovery operation will be performed and the system will not start up.

Diagnosis of failure



0403 (Ed): Serial communication error / Model selection SW error

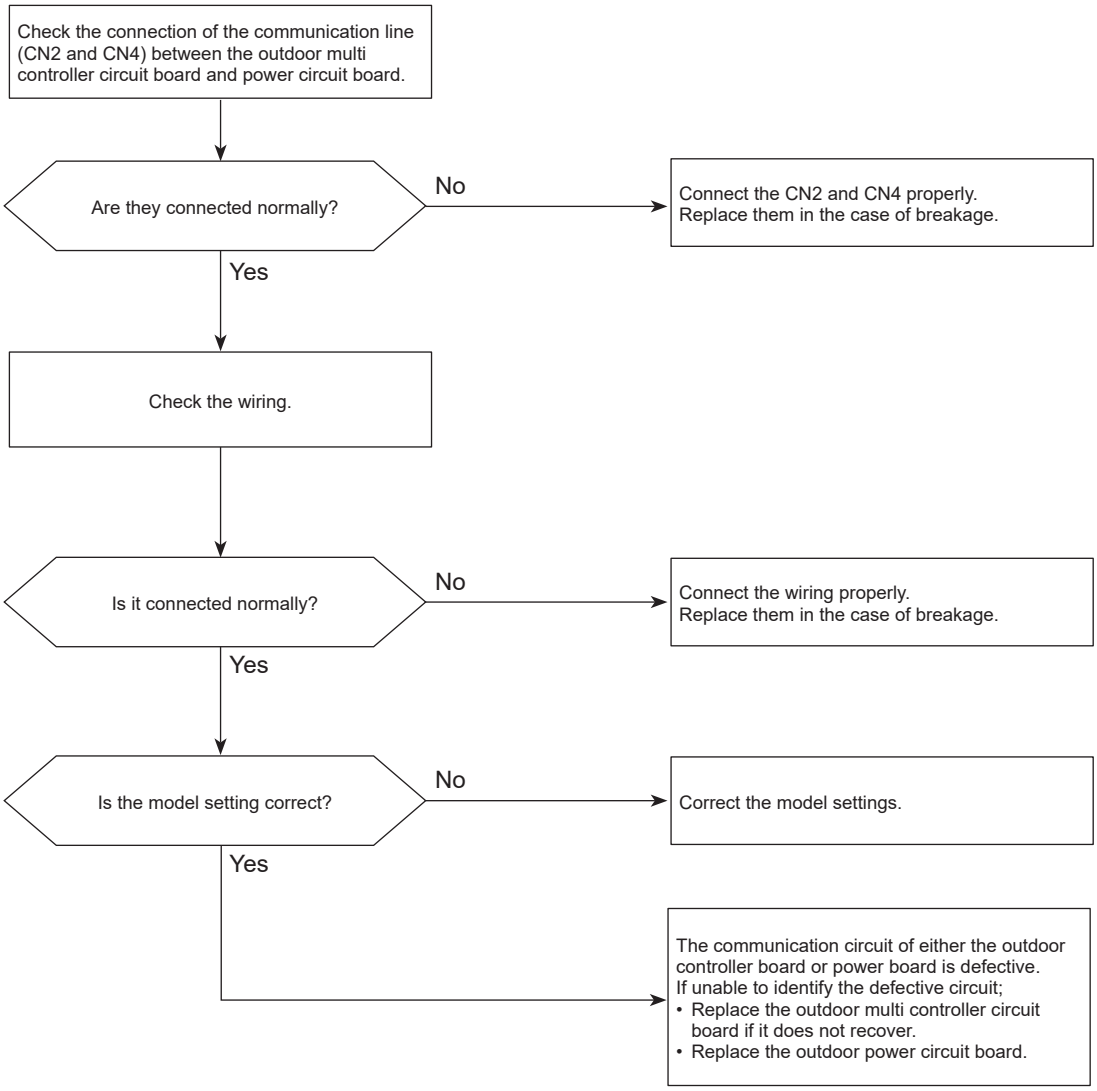
Abnormal points and detection methods

Serial communication between the outdoor multi controller circuit board and outdoor power circuit board is defective.

Causes and checkpoints

- Wire breakage or contact failure of connector CN2 or CN4
- Malfunction of power board communication circuit on outdoor multi controller circuit board
- Malfunction of communication circuit on outdoor power circuit board
- Incorrect setting of model selection

Diagnosis of failure



1102 (U2): Compressor temperature trouble

Abnormal points and detection methods

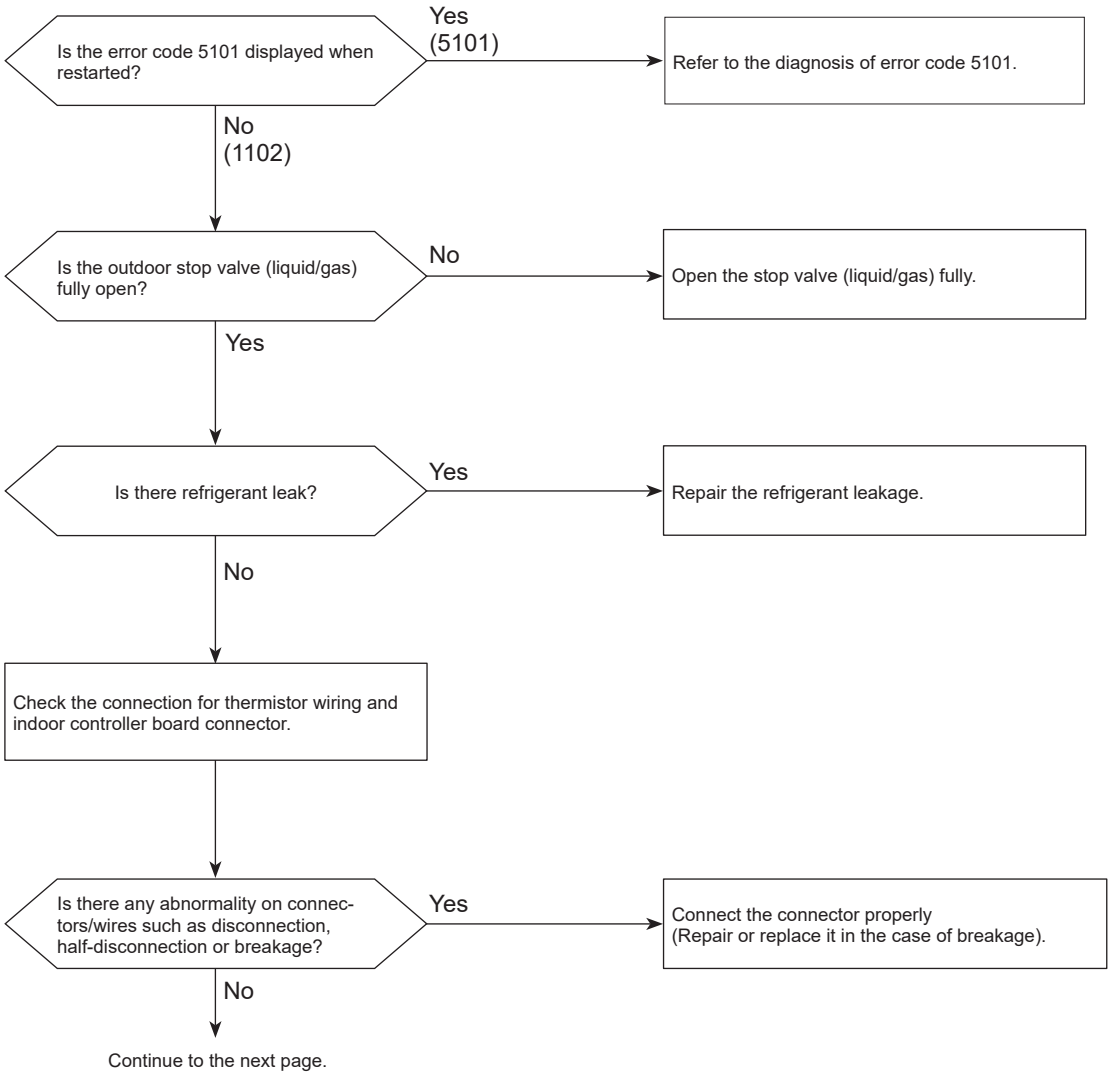
- TH4 falls into either of the following temperature conditions:
  - over 221°F (105°C) continuously for 5 minutes
  - over 230°F (110°C)
- The saturation temperature converted from the pressure detected by the high pressure sensor exceeds 104°F (40°C) during defrosting, and TH4 exceeds 221°F (105°C)

TH4:
Thermistor <Compressor>
LEV:
Linear expansion valve
SV4/SV5:
Shut-off valve

Causes and checkpoints

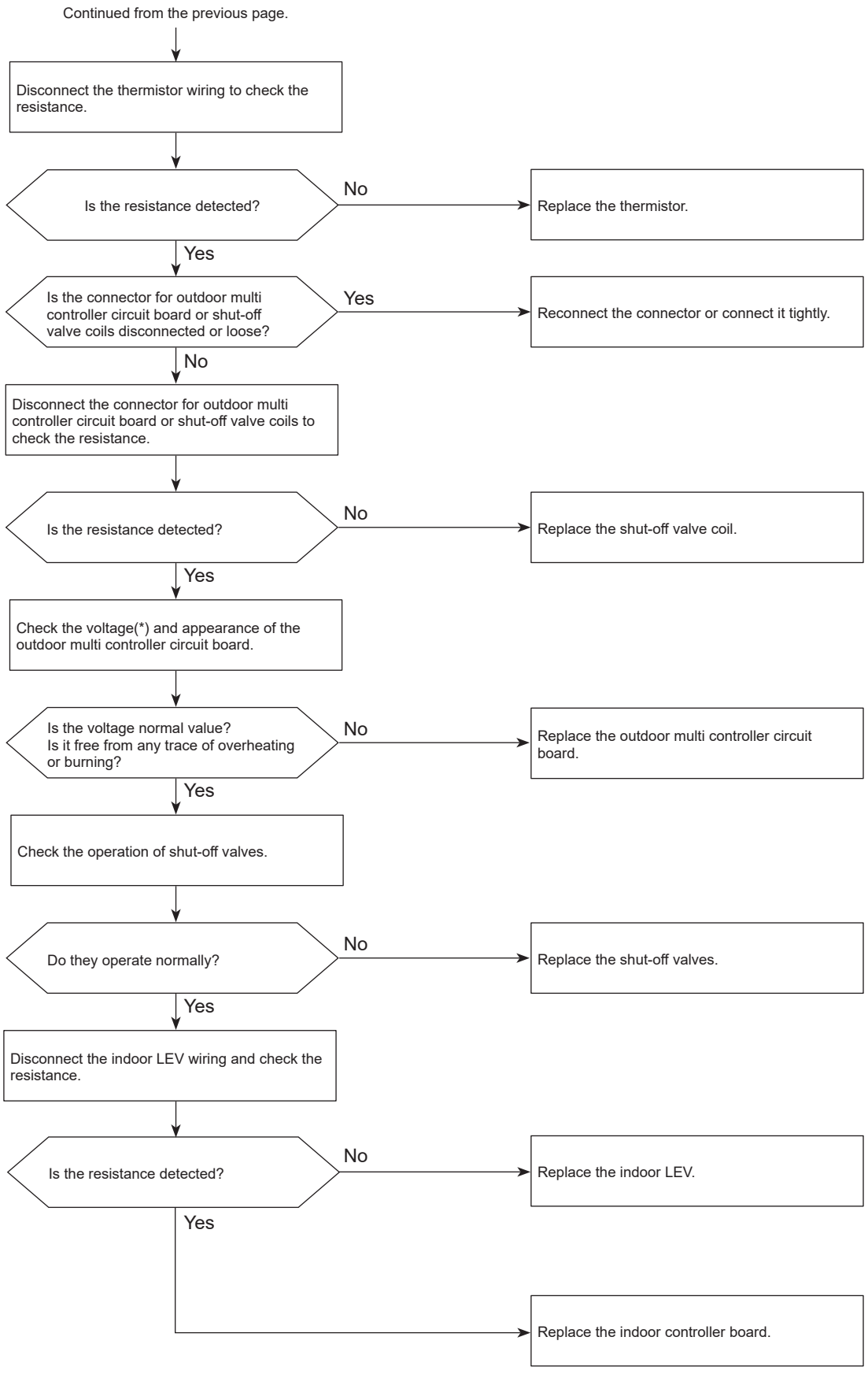
- Malfunction of stop valve
- Over-heated compressor operation caused by shortage of refrigerant
- Defective thermistor
- Defective outdoor multi controller circuit board
- LEV performance failure
- Defective indoor controller board
- Clogged refrigerant system caused by foreign object
- Refrigerant shortage (Refrigerant liquid accumulation in compressor while indoor unit is OFF/thermo-OFF.)
- Malfunction of shut-off valves

Diagnosis of failure



1102 (U2): Compressor temperature trouble

Diagnosis of failure



*For the voltage, refer to "How to check the components".

1300 (UL): Low pressure trouble

Abnormal points and detection methods

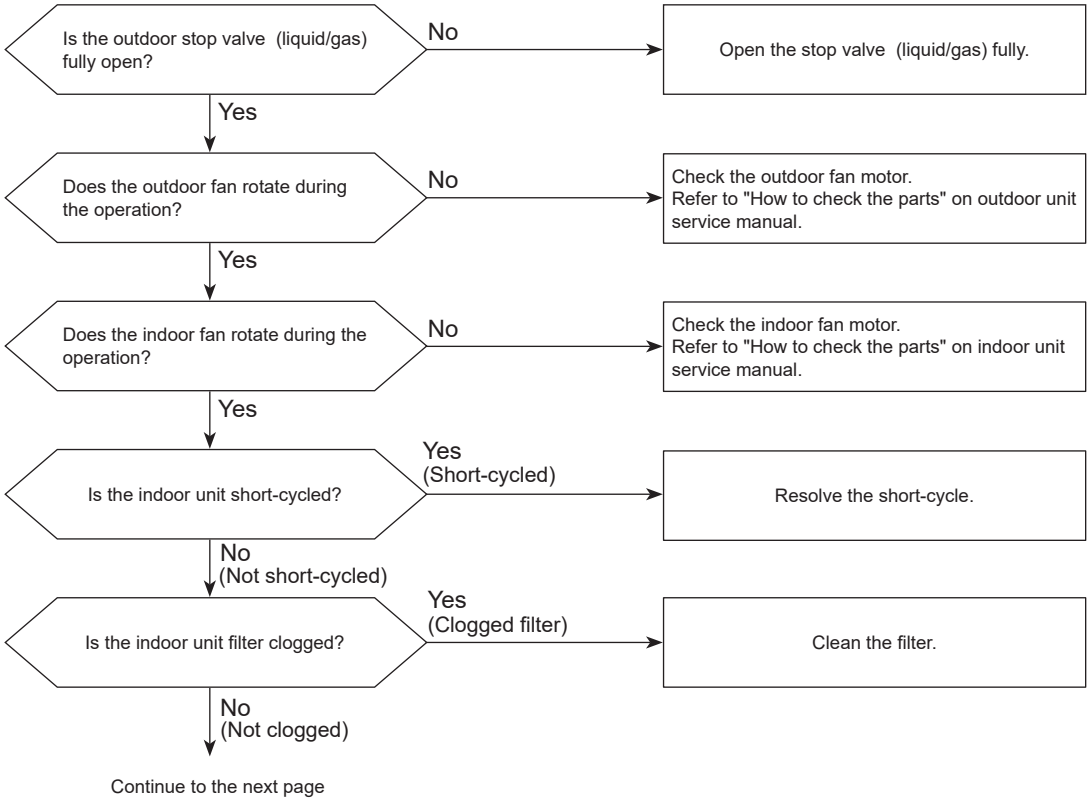
63L equipped model
- Low pressure (63L is in operation)
  63L operates (under 0.00 MPaG) during compressor operation.

63L:
Low pressure switch
LEV:
Linear expansion valve
TH7:
Thermistor <Ambient>
SV1/SV6:
Solenoid valve
21S4:
4-way valve
SV4/SV5:
Shut-off valve

Causes and checkpoints

- Defective operation of stop valve (not fully open)
- Clogged or broken pipe
- Malfunction or locked outdoor fan motor
- Short-cycle of outdoor unit
- Dirt of outdoor heat exchanger
- Remote controller transmitting error caused by noise interference
- Contact failure of outdoor multi controller circuit board connector
- Defective outdoor multi controller circuit board
- Short-cycle of indoor unit
- Decreased airflow, clogged filter, or dirt on indoor unit
- Malfunction or locked indoor fan motor
- Decreased airflow caused by defective inspection of outdoor temperature thermistor (It detects lower temperature than actual temperature.)
- Indoor LEV performance failure
- Malfunction of fan driving circuit
- SV1 performance failure
- SV6 performance failure
- Defective low pressure sensor
- Malfunction of low pressure sensor input circuit on outdoor multi controller circuit board
- Malfunction of 4-way valve
- Malfunction of shut-off valves

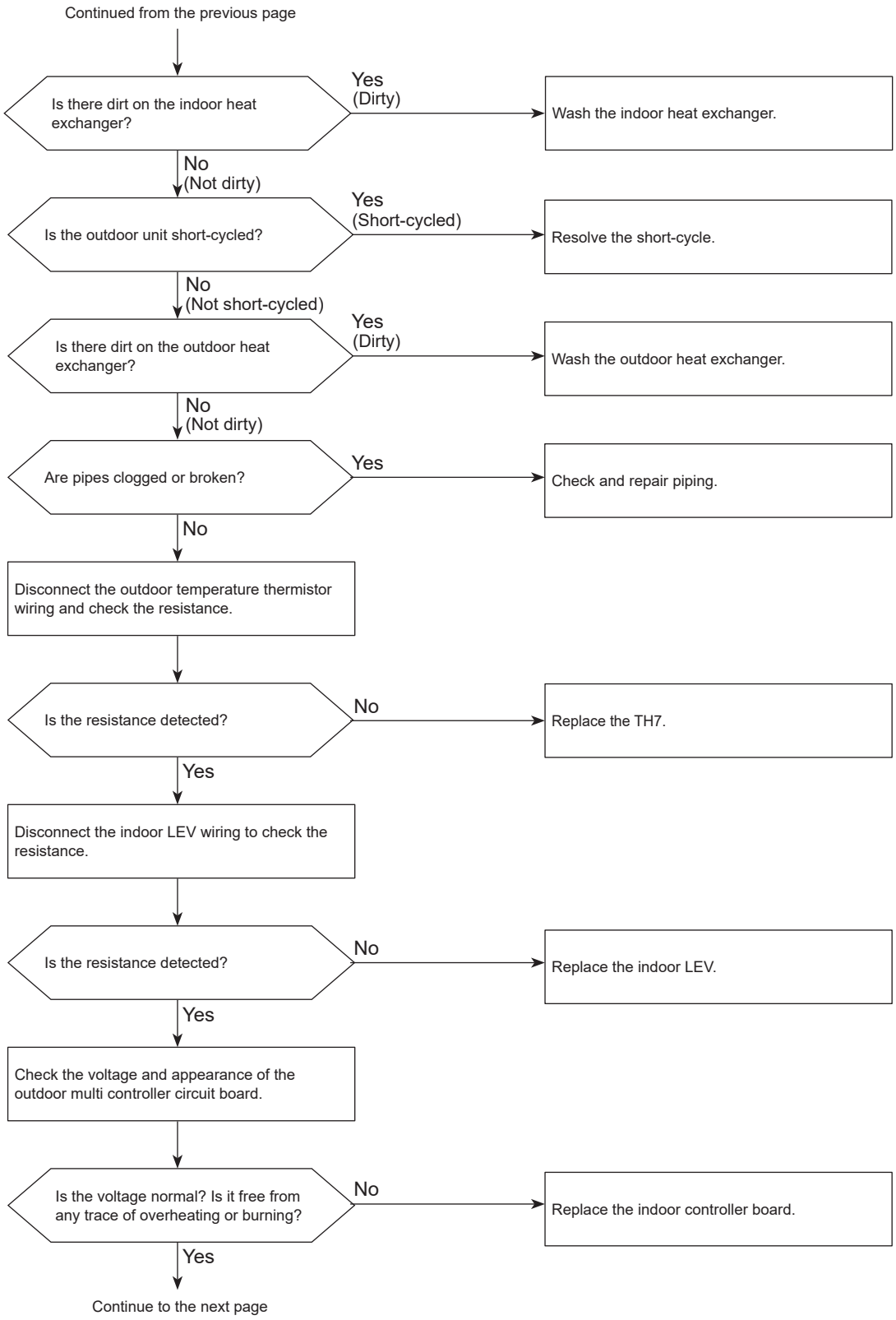
Diagnosis of failure



Continue to the next page

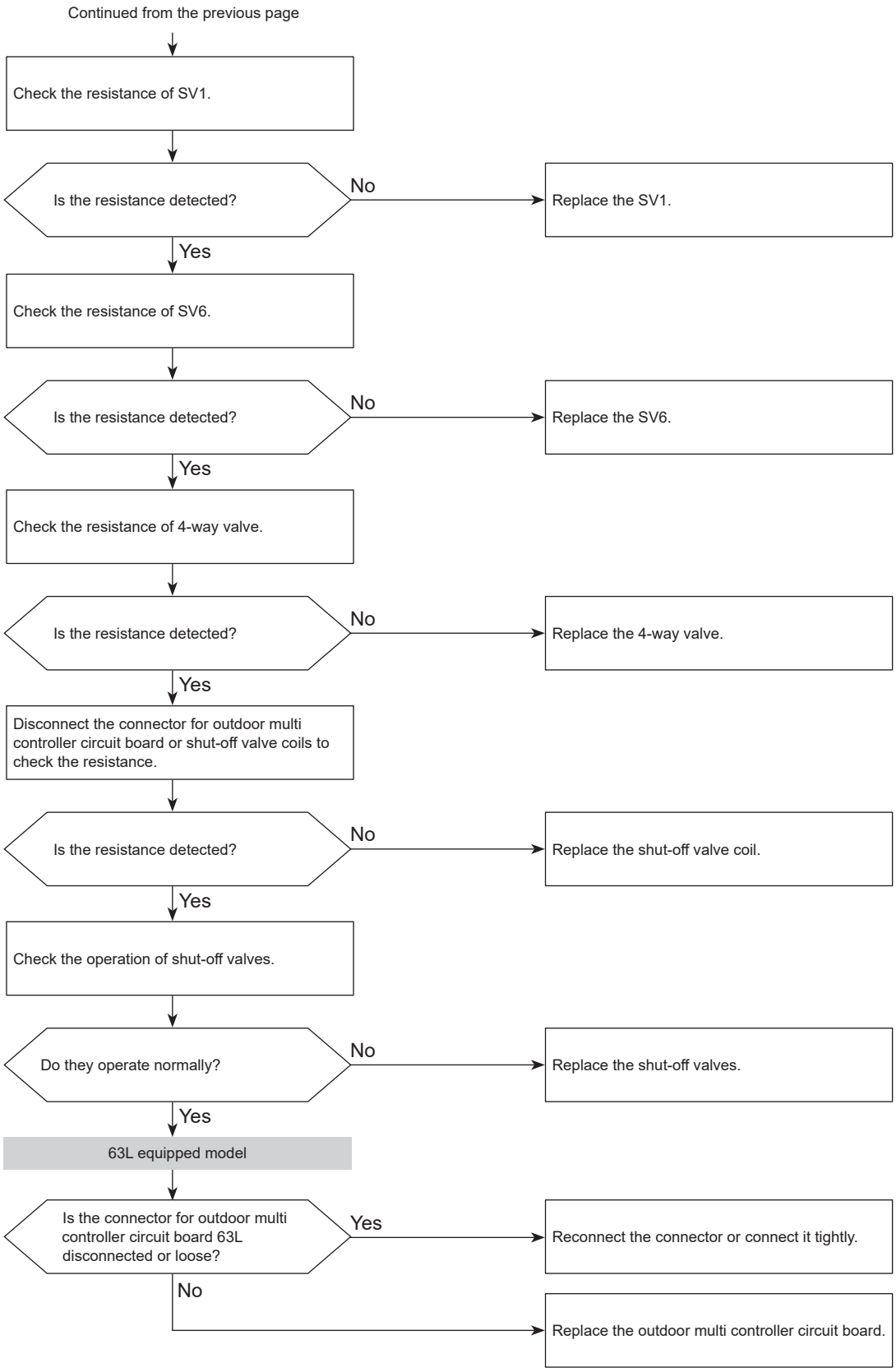
1300 (UL): Low pressure trouble

Diagnosis of failure



1300 (UL): Low pressure trouble

Diagnosis of failure



1302 (UE): High pressure trouble or thermal protector trouble

Abnormal points and detection methods

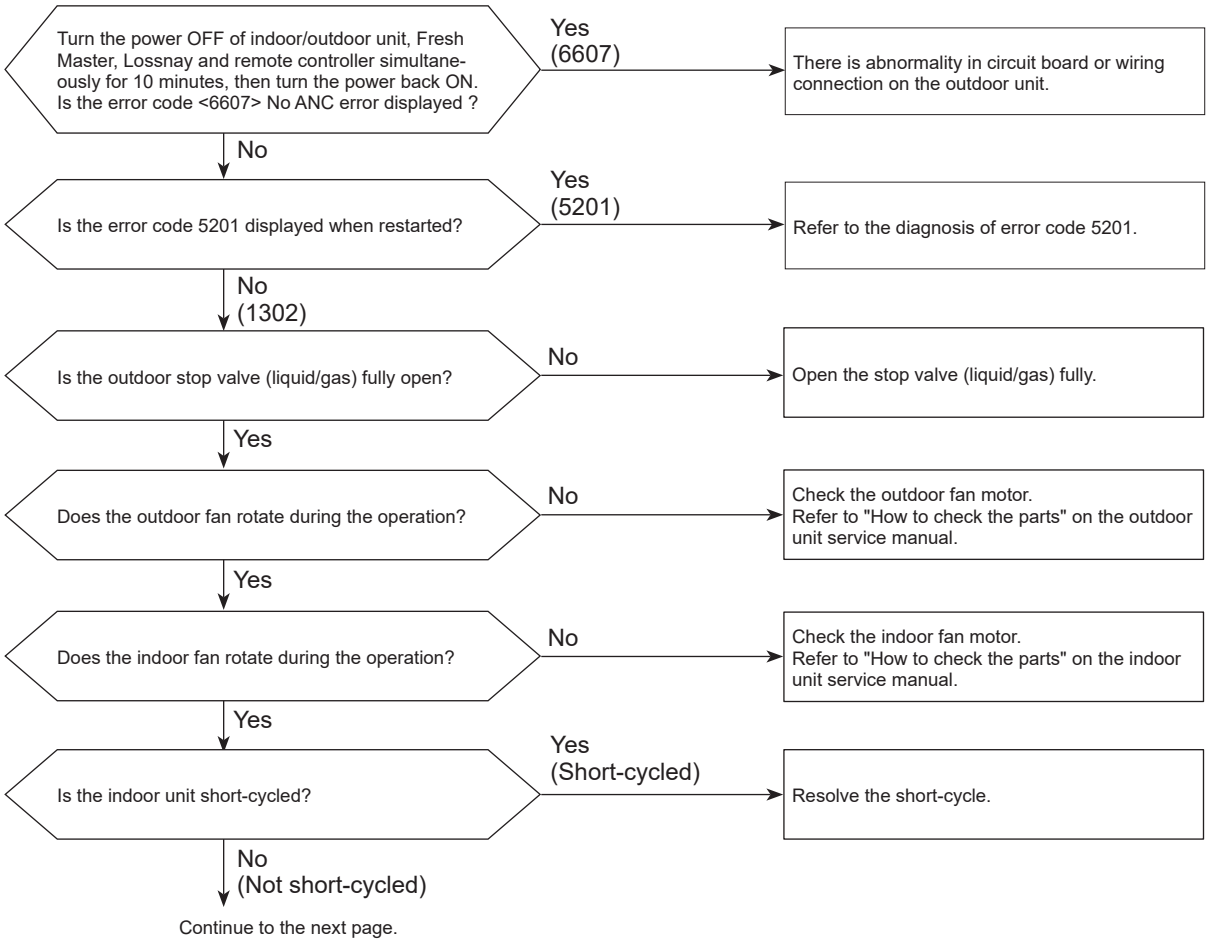
- High pressure abnormality (63H operation)
  63H operates(*) during compressor operation.
  (* 602 psig [4.15 MPaG])
- High pressure abnormality (63HS detected)
  - A pressure detected by 63HS is 625 psig (4.31 MPaG) or more during compressor operation.
  - A pressure detected by 63HS is 600 psig (4.14 MPaG) or more for 3 minutes during compressor operation.
- Compressor temperature abnormality (TRS operation)
  TRS operates(*) during compressor operation.
  (*248˚F [120˚C])

63H:
High pressure switch
63HS:
High pressure sensor
LEV:
Linear expansion valve
SV1:
Solenoid valve
TH7:
Thermistor <Ambient>
TH4:
Thermistor <Compressor>
TRS:
Thermal protector
SV4/SV5:
Shut-off valve

Causes and checkpoints

- Faulty operation of stop valve (not fully open)
- Clogged or broken pipe
- Malfunction or locked outdoor fan motor
- Short-cycle of outdoor unit
- Dirt of outdoor heat exchanger
- Remote controller transmitting error caused by noise interference
- Contact failure of the outdoor multi controller circuit board connector
- Defective outdoor circuit board
- Short-cycle of indoor unit
- Decreased airflow, clogged filter, or dirt on indoor unit
- Malfunction or locked indoor fan motor
- Decreased airflow caused by faulty inspection of outdoor temperature thermistor (It detects lower temperature than actual temperature.)
- Indoor LEV performance failure
- Malfunction of fan driving circuit
- SV1 performance failure
- Defective High pressure sensor
- Defective High pressure sensor input circuit on outdoor multi controller circuit board
- High compressor temperature (Thermal protector TRS operated)
- Malfunction of shut-off valves

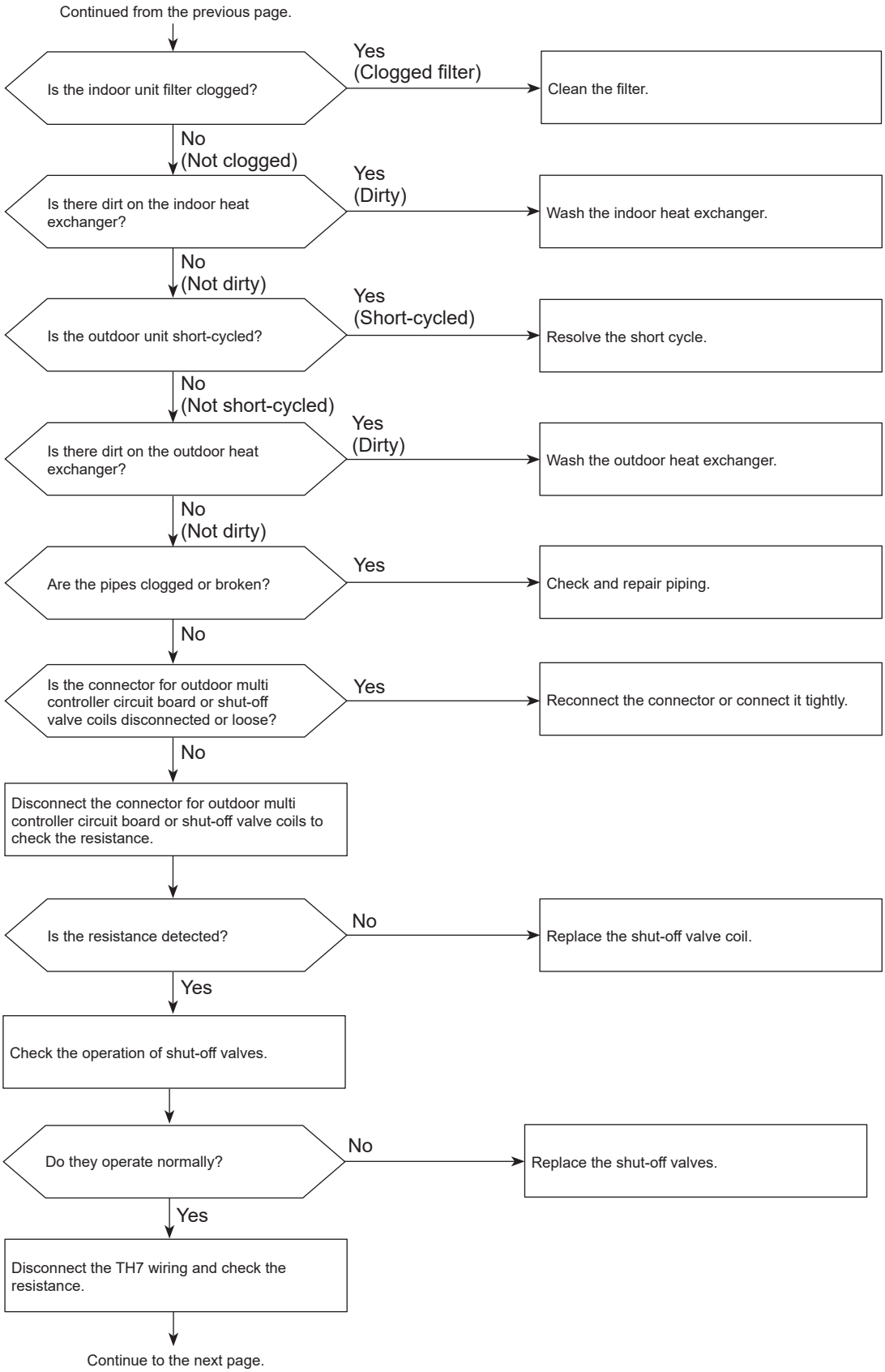
Diagnosis of failure



Continue to the next page.

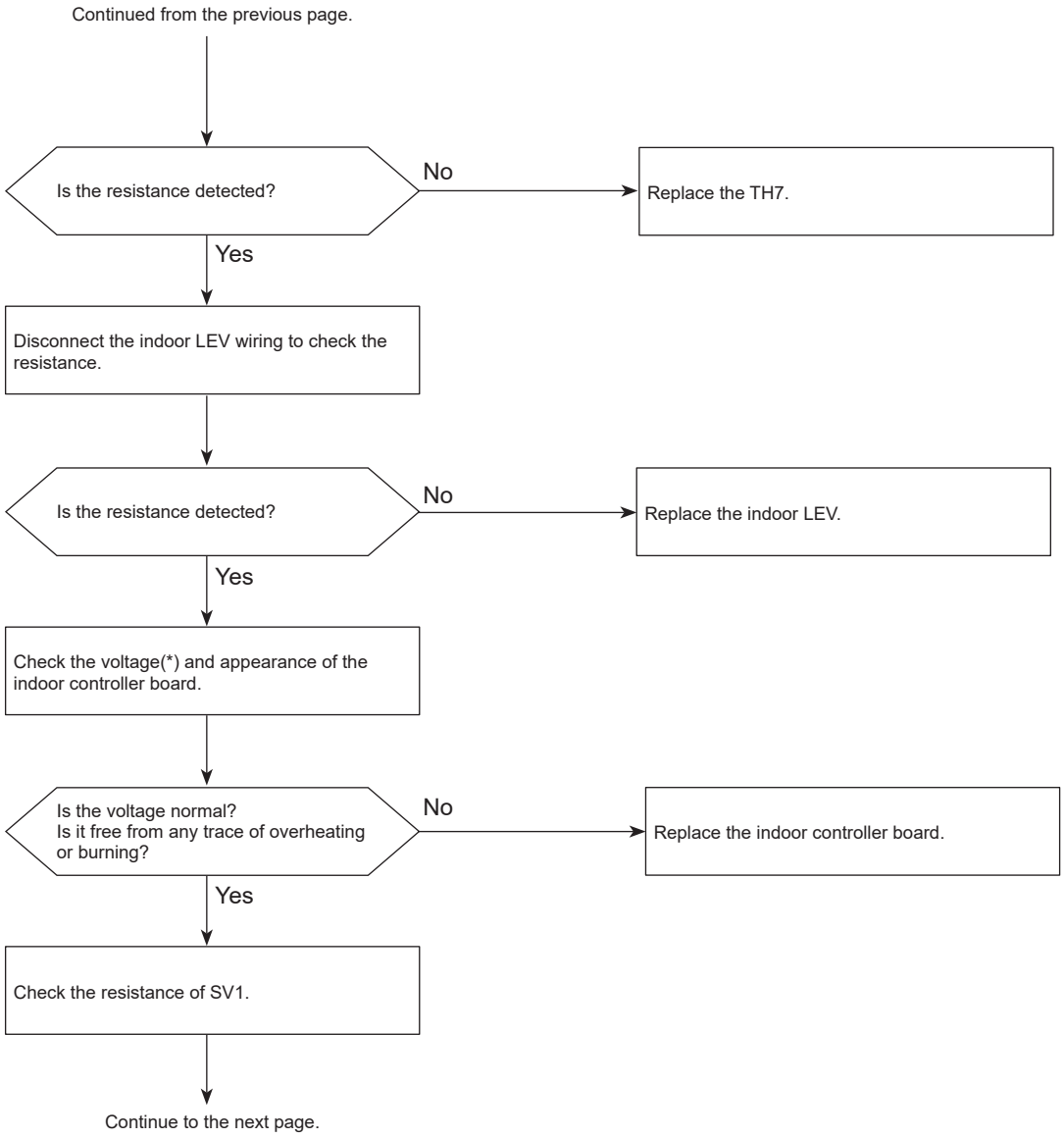
1302 (UE): High pressure trouble or thermal protector trouble

Diagnosis of failure



1302 (UE): High pressure trouble or thermal protector trouble

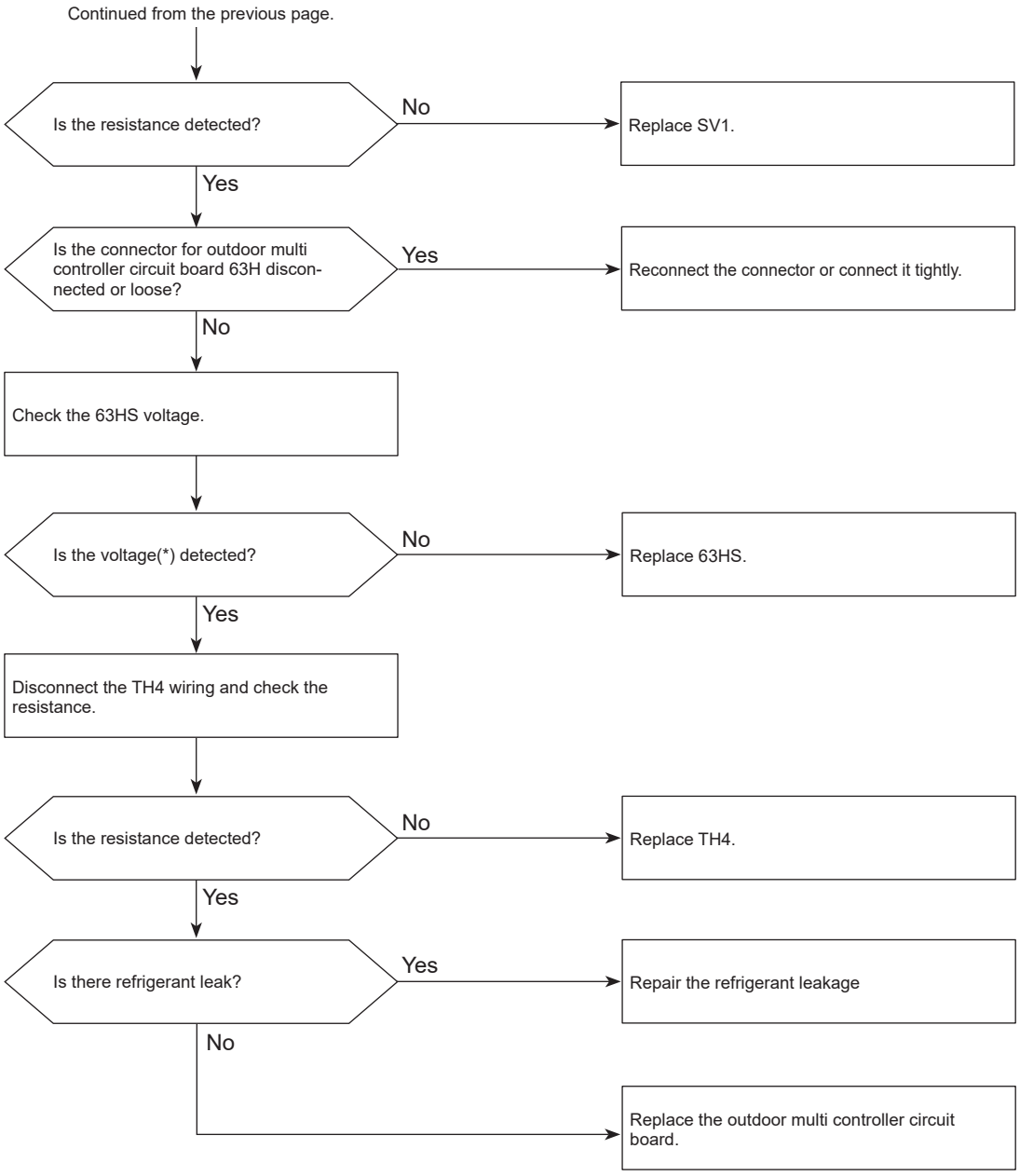
Diagnosis of failure



*For the voltage, refer to "How to check the components".

1302 (UE): High pressure trouble or thermal protector trouble

Diagnosis of failure



*For the voltage, refer to "How to check the components".

1500 (U7): Superheat due to low discharge temperature trouble

Abnormal points and detection methods

10 or more minutes after the compressor starts operation, if a discharge superheat of -27°F (-15°C)* or less is detected for 5 consecutive minutes even though the indoor LEV has the minimum open pulse.

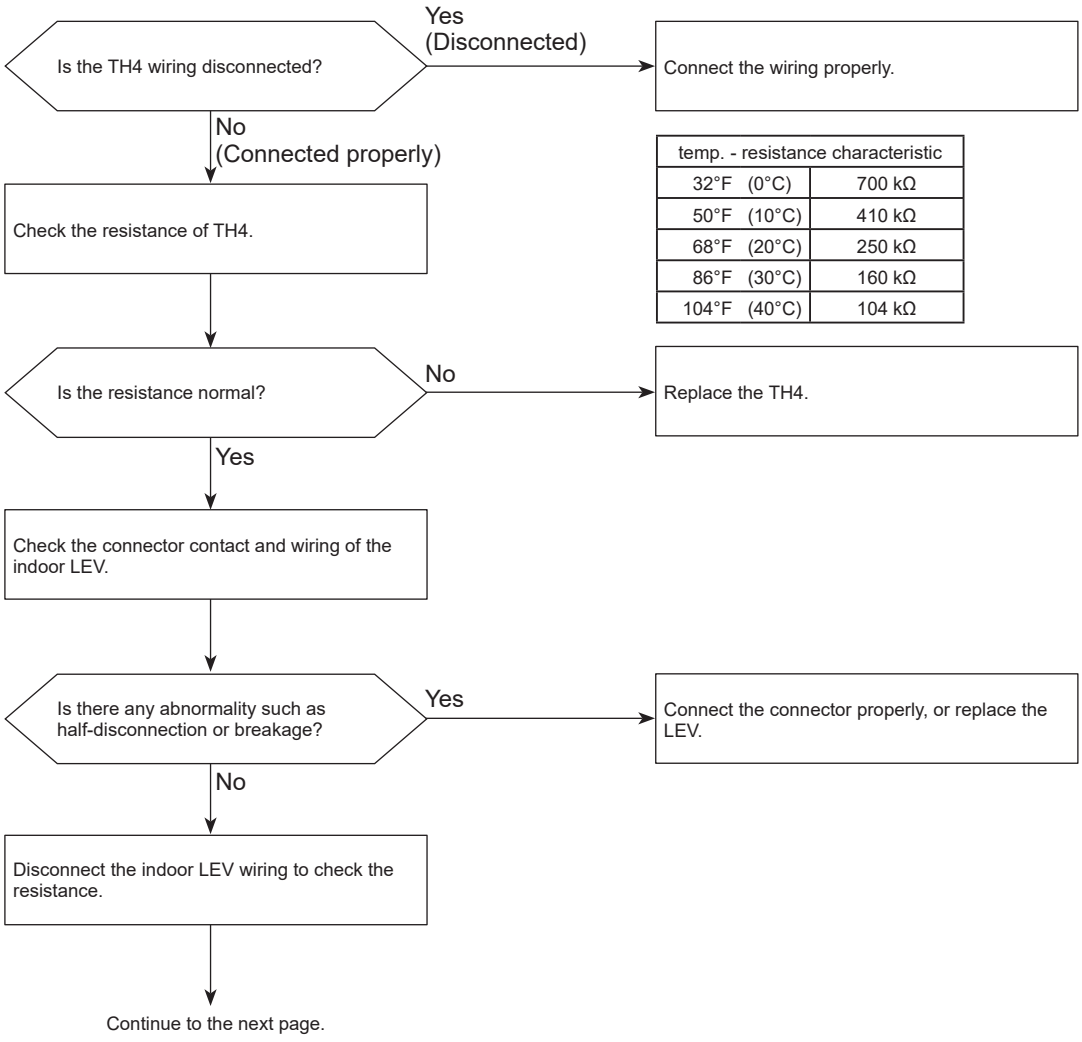
LEV:
Linear expansion valve
TH4:
Thermistor <Compressor>
63HS:
High pressure sensor

* At this temperature, conditions for the abnormality detection will not be satisfied if no abnormality is detected on either TH4 or 63HS.

Causes and checkpoints

- Disconnection or loose connection of TH4
- Defective holder of TH4
- Disconnection of LEV coil
- Disconnection of LEV connector
- LEV performance failure

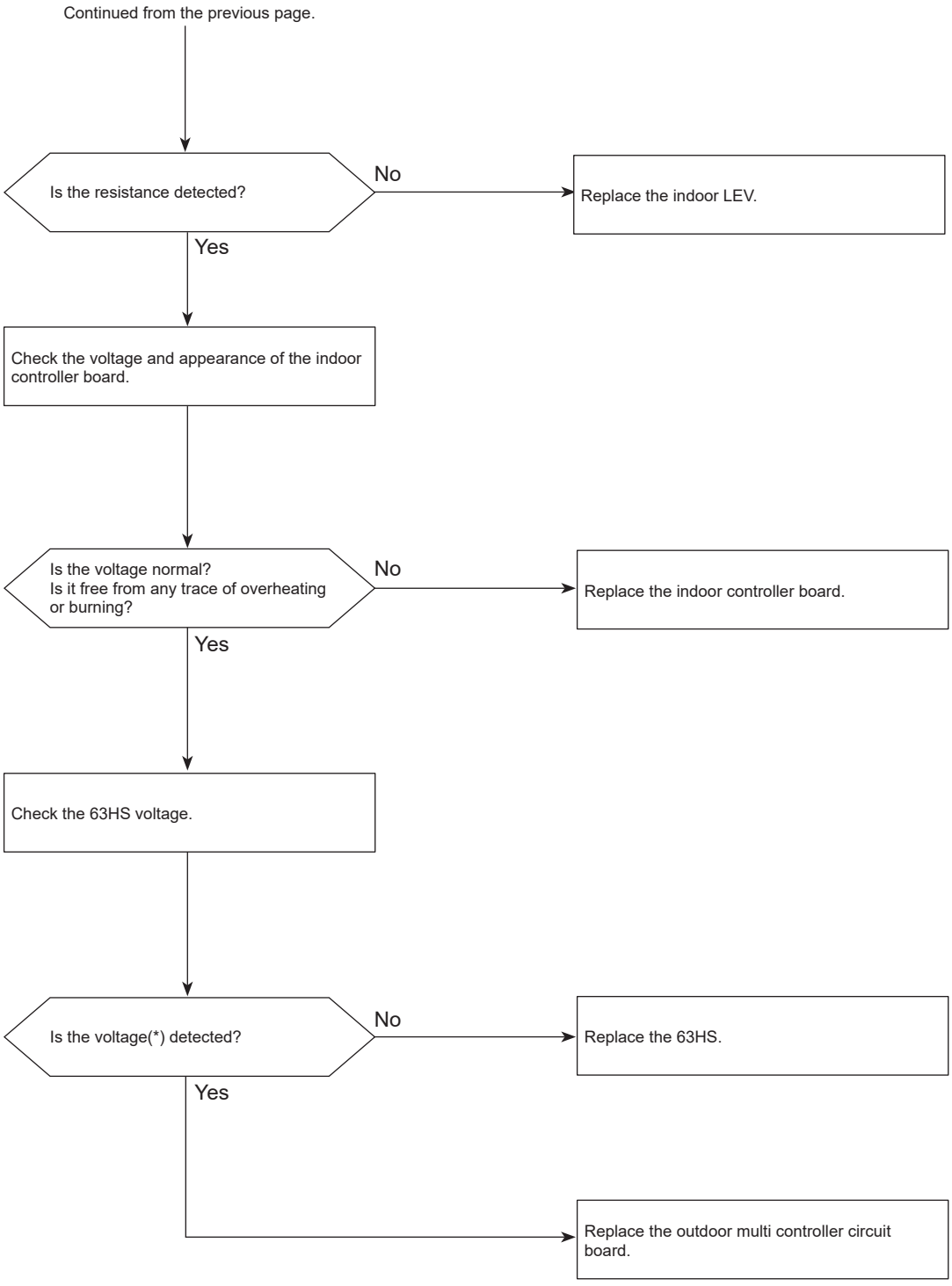
Diagnosis of failure



temp. - resistance characteristic	
32°F (0°C)	700 kΩ
50°F (10°C)	410 kΩ
68°F (20°C)	250 kΩ
86°F (30°C)	160 kΩ
104°F (40°C)	104 kΩ

1500 (U7): Superheat due to low discharge temperature trouble

Diagnosis of failure



*For the voltage, refer to "How to check the components".

1501 (U2): Refrigerant shortage trouble

Abnormal points and detection methods

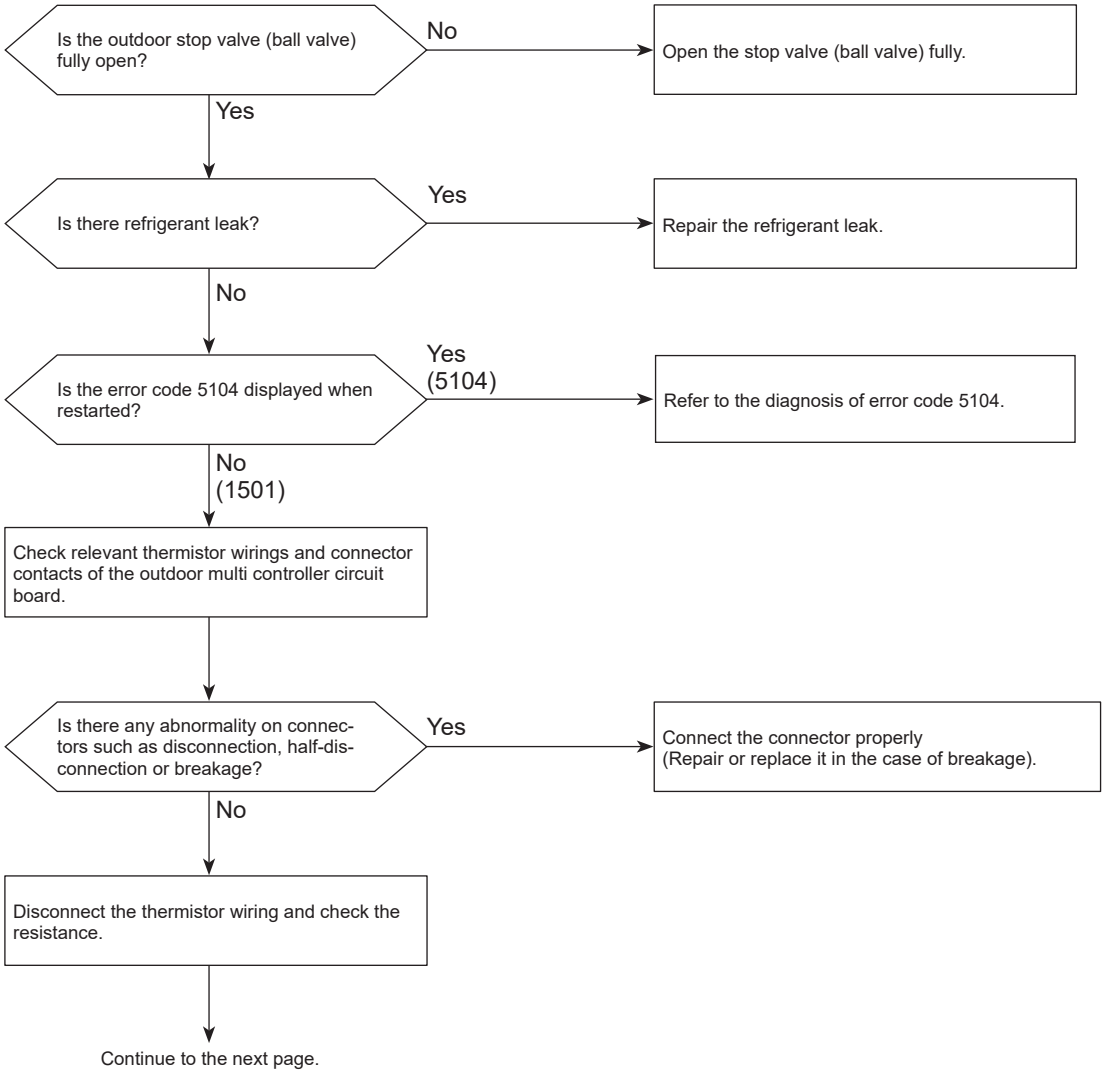
- All of the following conditions have been satisfied for 15 consecutive minutes:
  - The compressor is operating in HEAT mode.
  - Discharge superheat is 176°F (80°C) or more.
  - Difference between TH7 and TH3 fits the formula of TH7−TH3 < 9°F (5°C)
  - The saturation temperature converted from the pressure detected by the high pressure sensor is below 95°F (35°C).
- All of the following conditions have been satisfied:
  - The compressor is in operation.
  - When cooling, discharge superheat is 144°F (80°C) or more, and the saturation temperature converted from the pressure detected by the high pressure sensor is over −40°F (−40°C).
  - When heating, discharge superheat is 162°F (90°C) or more.

Causes and checkpoints

- Defective operation of stop valve (not fully open)
- Defective thermistor
- Defective outdoor multi controller circuit board
- Indoor LEV performance failure
- Gas leakage or shortage
- Defective 63HS
- Malfunction of shut-off valves
- Miswiring between indoor unit and branch box

TH3:
Thermistor <Outdoor liquid pipe>
TH7:
Thermistor <Ambient>
LEV:
Linear expansion valve
63HS:
High pressure sensor
SV4/SV5:
Shut-off valve

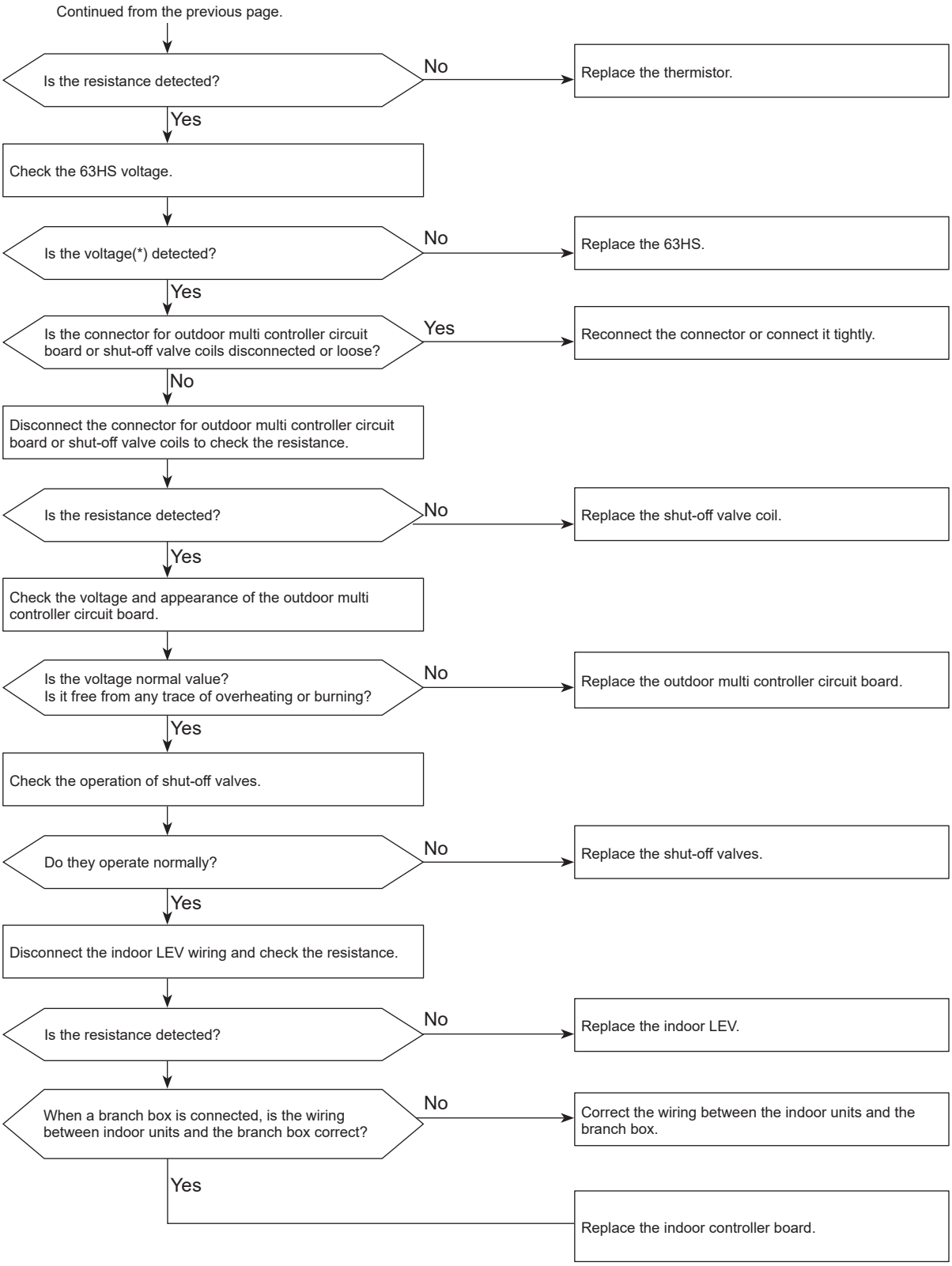
Diagnosis of failure



Continue to the next page.

1501 (U2): Refrigerant shortage trouble

Diagnosis of failure



*For the voltage, refer to "How to check the components".

1501 (U2): Closed valve in cooling mode

Abnormal points and detection methods

Stop valve is closed during cooling operation.
Both of the following temperature conditions have been satisfied for 20 minutes or more during cooling operation.

TH22j−TH21j ≥ −3.6°F (−2°C)
TH23j−TH21j ≥ −3.6°F (−2°C)

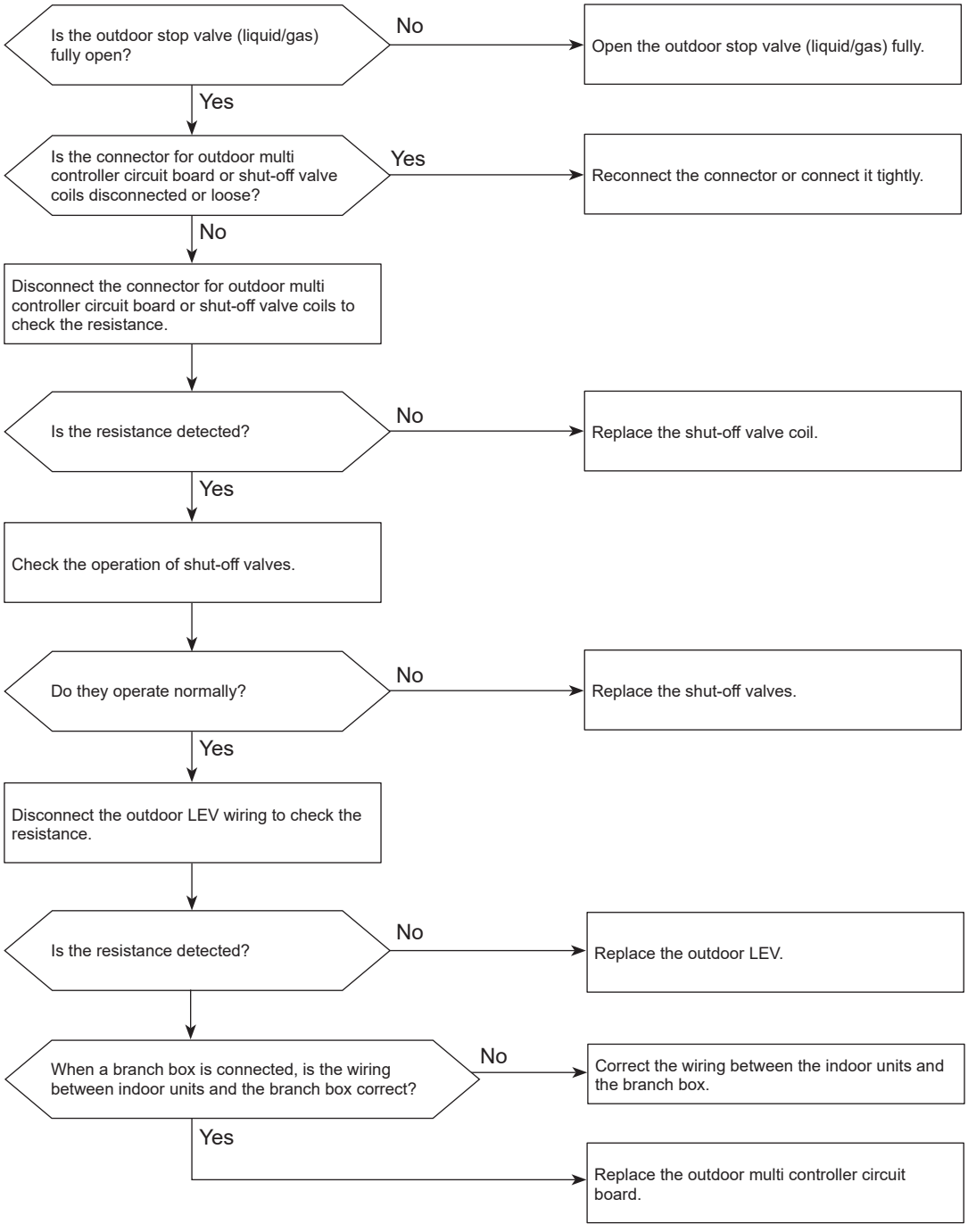
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

Causes and checkpoints

- Outdoor liquid/gas valve is closed.
- Malfunction of outdoor LEV (LEV1) (blockage)
- Malfunction of shut-off valves
- Miswiring between indoor unit and branch box

TH21:
Indoor intake temperature thermistor (RT11 or TH1)
TH22:
Indoor liquid pipe temperature thermistor (RT13 or TH2)
TH23:
Indoor gas pipe temperature thermistor (TH-A to E)
LEV:
Linear expansion valve
SV4/SV5:
Shut-off valve

Diagnosis of failure



1503 (P6): Freeze protection of plate heat exchanger / Freeze protection of branch box or indoor unit

Abnormal points and detection methods

The purpose of the error code is to prevent indoor unit from freezing or condensation which is caused when a refrigerant keeps flowing into the indoor unit that is not operating.

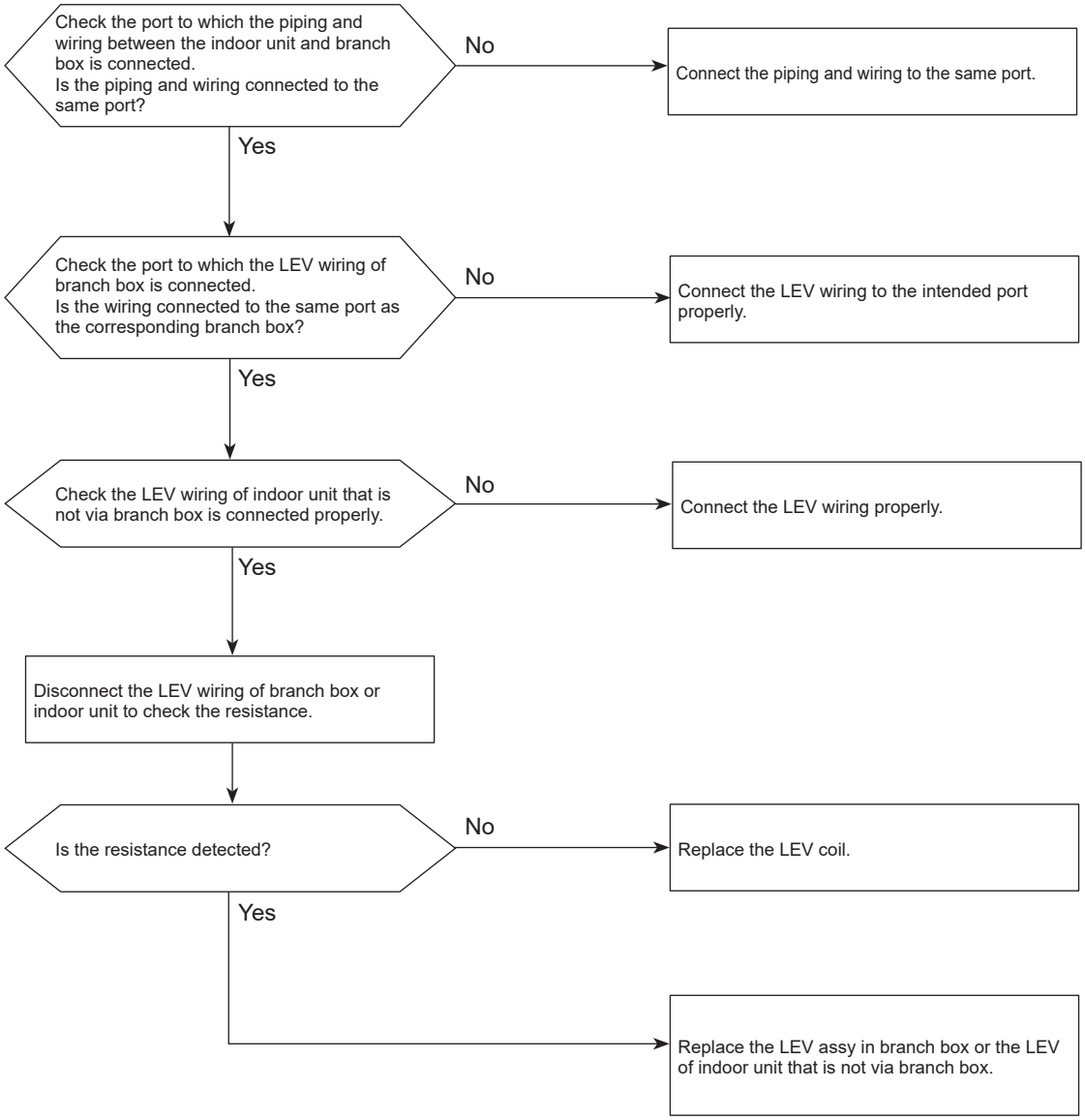
All of the following conditions have been satisfied:

- The compressor is operating in COOL mode.
- 15 minutes have passed after the startup of the compressor, or the change in the number of operating indoor units is made (including a change by turning thermo-ON/OFF).
- After the condition 2 above is satisfied, the thermistor of indoor unit in STOP detects TH22j ≤ 23°F (−5 °C) for 5 consecutive minutes.

Causes and checkpoints

- Wrong piping connection between indoor unit and branch box
- Miswiring between indoor unit and branch box
- Miswiring of LEV in branch box
- Malfunction of LEV in branch box

Diagnosis of failure



1508 (EF): 4-way valve trouble in heating mode

Abnormal points and detection methods

4-way valve does not operate during heating operation.
Any of the following temperature conditions is satisfied for 3 minutes or more during heating operation when the outdoor temperature is −4°F (−20°C) or more:

TH22j−TH21j ≤ −18°F (−10°C)
TH23j−TH21j ≤ −18°F (−10°C)
TH22j ≤ 37.4°F (3°C)
TH23j ≤ 37.4°F (3°C)

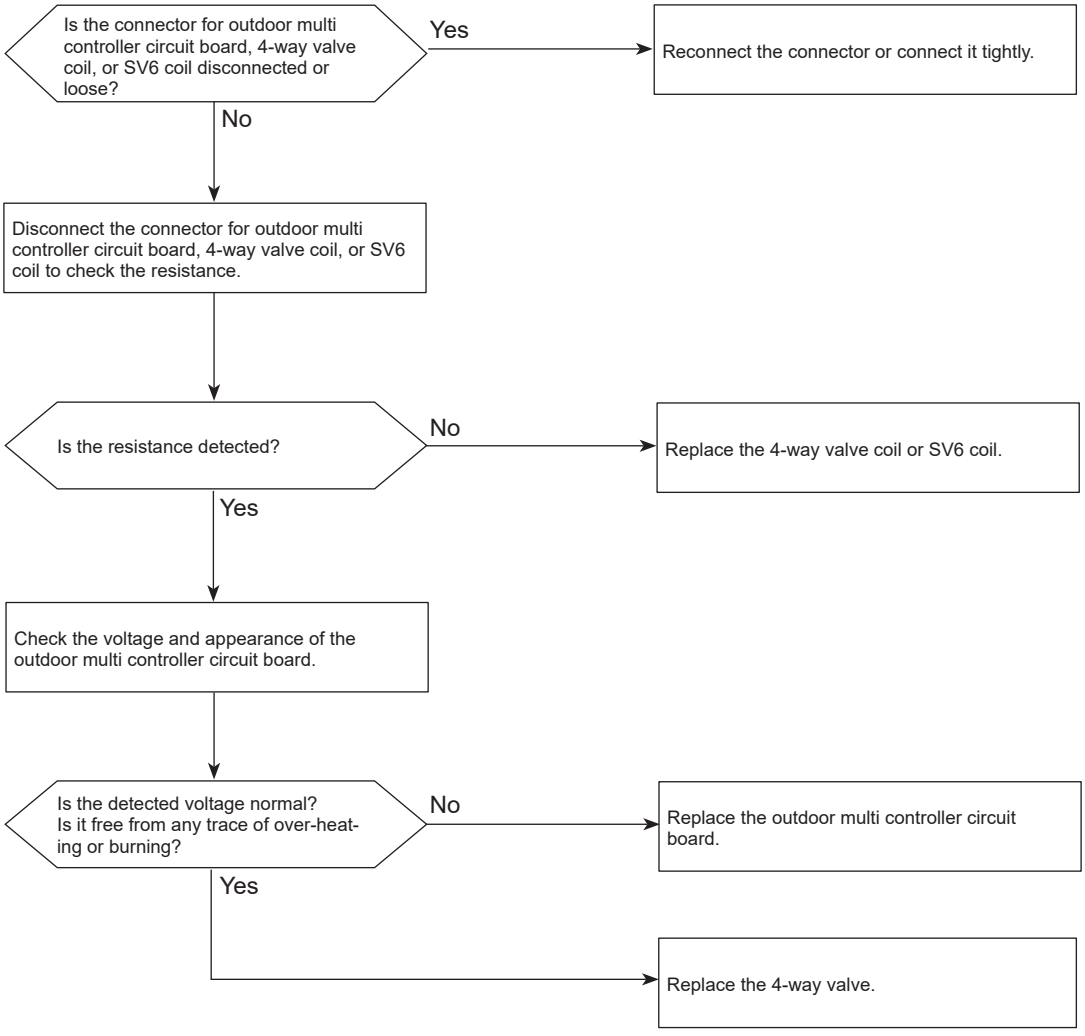
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

TH21:
Indoor intake temperature thermistor (RT11 or TH1)
TH22:
Indoor liquid pipe temperature thermistor (RT13 or TH2)
TH23:
Indoor gas pipe temperature thermistor (TH-A to E)

Causes and checkpoints

- 4-way valve failure
- Disconnection or failure of 4-way valve coil
- Disconnection or failure of SV6 coil
- Clogged drain pipe
- Disconnection or loose connection of connectors
- Malfunction of input circuit on outdoor multi controller circuit board
- Defective outdoor power circuit board

Diagnosis of failure



Refer to "How to check the parts" for ohm values.

1521 (FL): Refrigerant leakage

Abnormal points and detection methods

The refrigerant sensor has detected refrigerant leak.

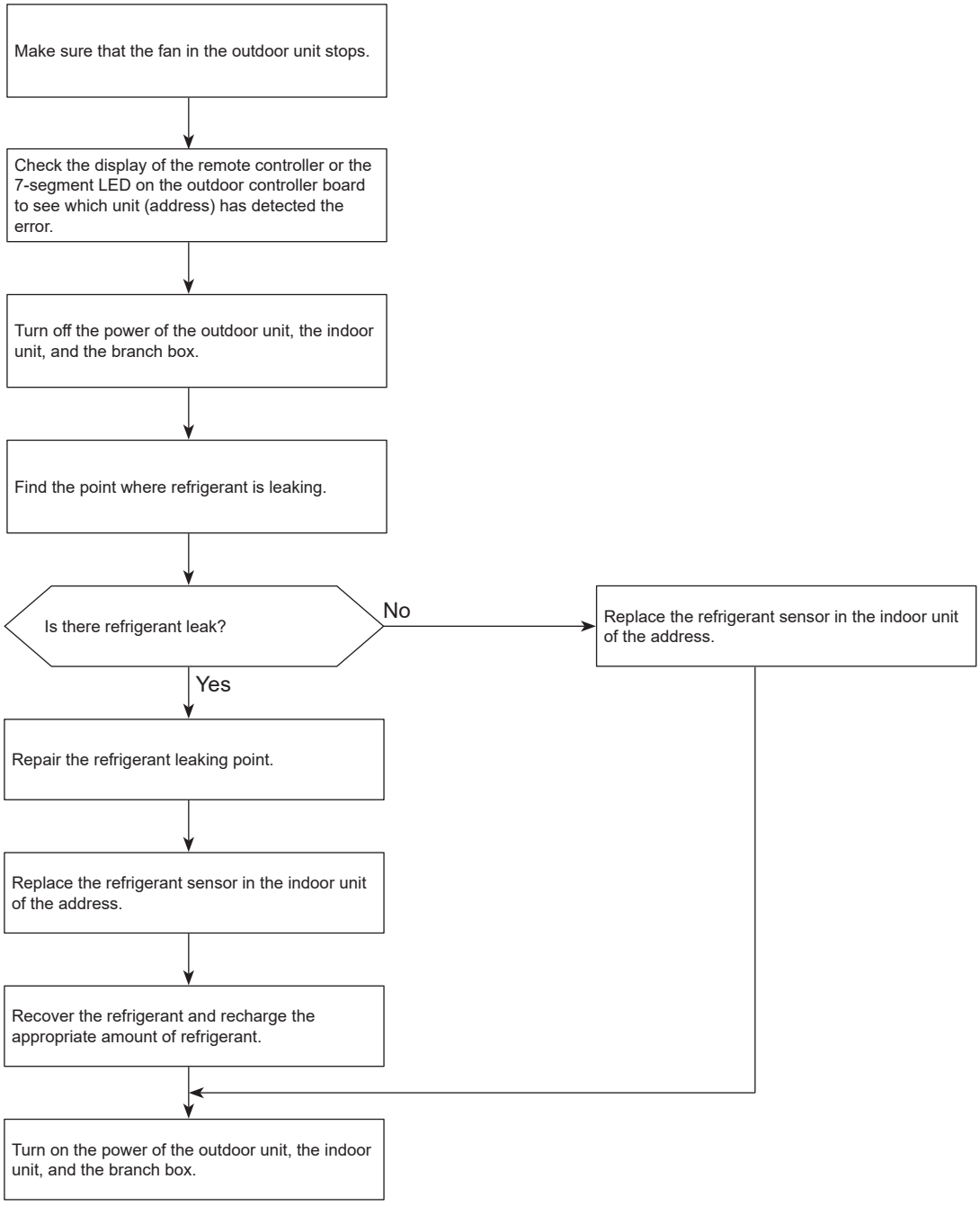
Causes and checkpoints

- Refrigerant leak from the air conditioner or the piping
- False detection (The refrigerant sensor reacted to other gas.)

Notes:

- When this error occurs, both the controller in the applicable room and the controller in the supervisor room produce an alarm. Also, the system closes the shut-off valve and performs refrigerant recovery.
- When this error occurs, all indoor units start fan operation for safety purpose. The operation time differs depending on the unit.
- In case of a system without an alarm, check the display of the remote controller or the 7-segment LED on the outdoor controller board to see which unit (address) has detected the error.
- When this error occurs, ventilate the room.
- When this error occurs, do not turn off the power until the fan in the outdoor unit stops. Ventilate the room with the indoor unit in which this error has occurred and make sure there is no ignition source before turning off the power.

Diagnosis of failure



1522 (FL): Refrigerant leakage / Refrigerant sensor error / Communication error

Abnormal points and detection methods

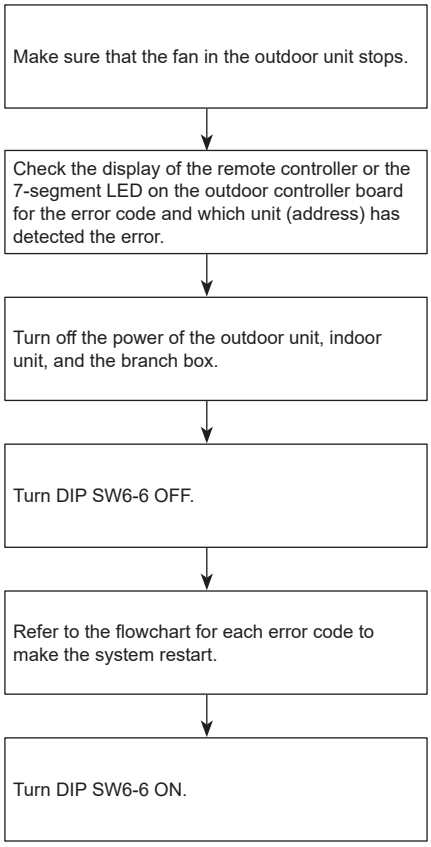
Any of the following conditions is detected:
- The refrigerant sensor has detected refrigerant leak.
- A refrigerant sensor has failed.
- A communication error has occurred.

Causes and checkpoints

- Refrigerant leak from the air conditioner or the piping
- False detection (The refrigerant sensor reacted to other gas.)
- A refrigerant sensor connected to the indoor unit has failed.
- A refrigerant sensor is not installed in the indoor unit.
- There is an abnormality in the communication line or communication system.

Notes:
- When this error occurs, the system closes the shut-off valve and performs refrigerant recovery.
- When this error occurs, all indoor units start fan operation for safety purpose. The operation time differs depending on the unit.
- This error is either a refrigerant leak (1521), a refrigerant sensor error (5558), or a communication error (6602/6603/6606/6607/6608/6840/6841/6842/6843/6846).
- When this error occurs, do not turn off the power until the fan in the outdoor unit stops. Ventilate the room with the indoor unit in which this error has occurred and make sure there is no ignition source before turning off the power.

Diagnosis of failure



3121: Out-of-range outside air temperature

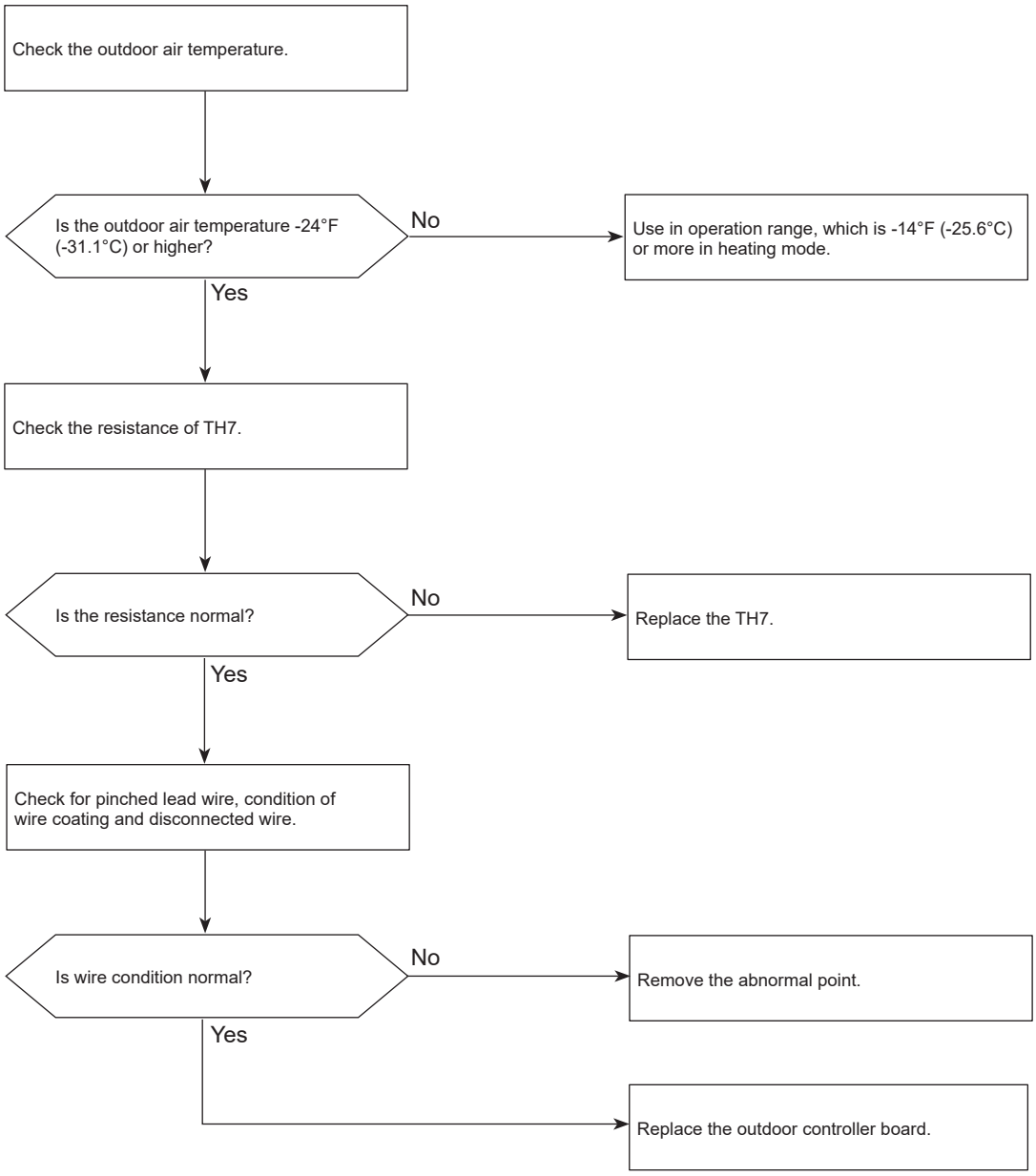
Abnormal points and detection methods

- When the thermistor temperature of -24°F (-31.1°C) or below has continuously been detected for 3 minutes during heating operation (during compressor operation), the unit makes an error stop and "3121" appears on the LED1.
- The compressor restarts when the thermistor temperature is -14°F (-25.6°C) or above.
- If the unit is turned OFF, the outdoor temperature error will be canceled.

Causes and checkpoints

- Outdoor air temperature
- Thermistor failure
- Wire failure
- Defective outdoor controller board

Diagnosis of failure



4100 (UF): Compressor current interruption (Locked compressor)

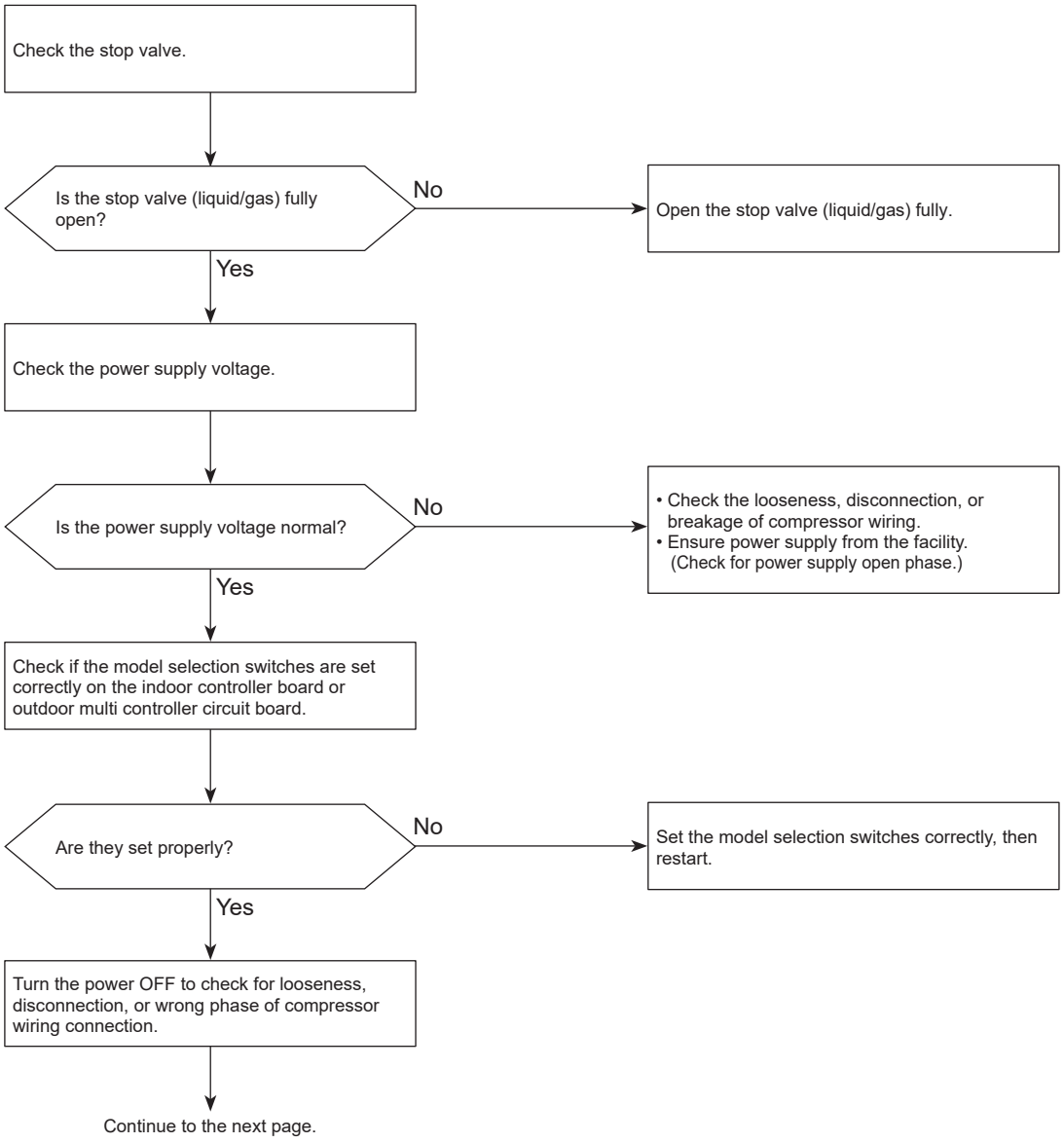
Abnormal points and detection methods

Overcurrent of DC bus or compressor is detected within 30 seconds after the compressor starts the operation.

Causes and checkpoints

- Closed stop valve
- Decrease of power supply voltage
- Looseness, disconnection, or wrong phase of compressor wiring connection
- Incorrect DIP-SW setting of model selection on the outdoor controller board
- Defective compressor
- Defective outdoor power circuit board
- Malfunction of shut-off valves

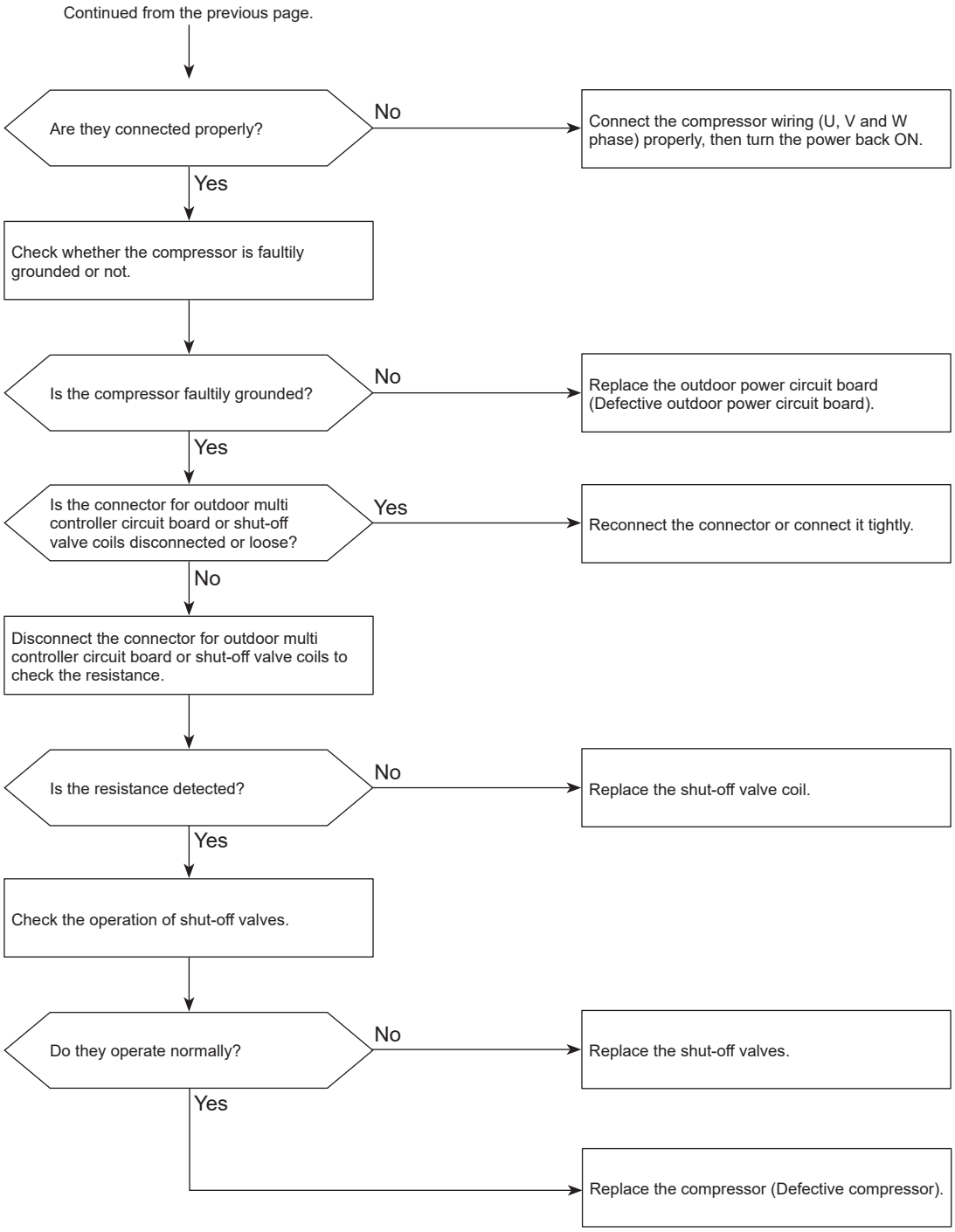
Diagnosis of failure



Continue to the next page.

4100 (UF): Compressor current interruption (Locked compressor)

Diagnosis of failure



4210 (UP): Compressor overcurrent interruption/Failure in 12 VDC power supply circuit on power circuit board

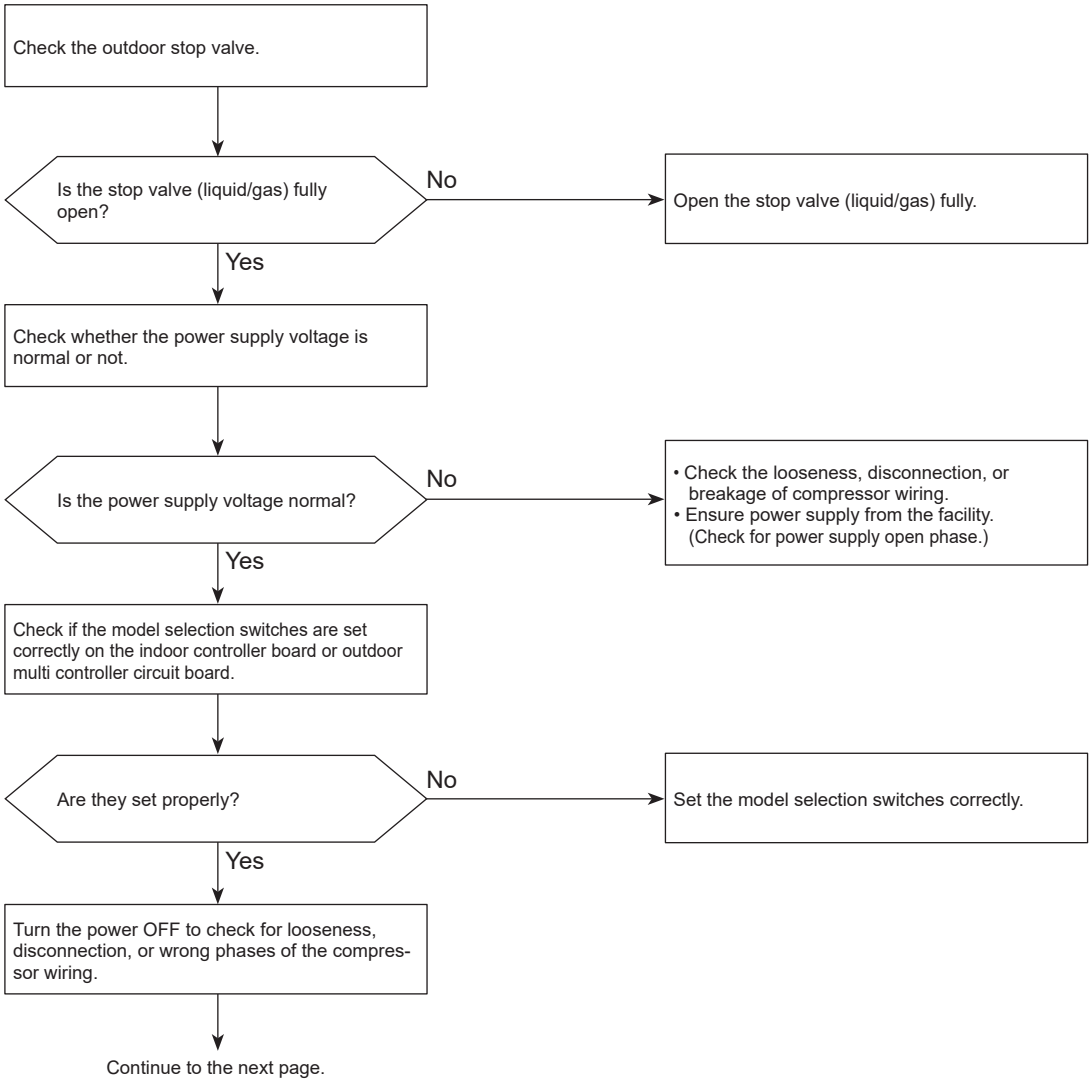
Abnormal points and detection methods

- Overcurrent of DC bus or compressor is detected 30 or more seconds after the compressor starts the operation.

Causes and checkpoints

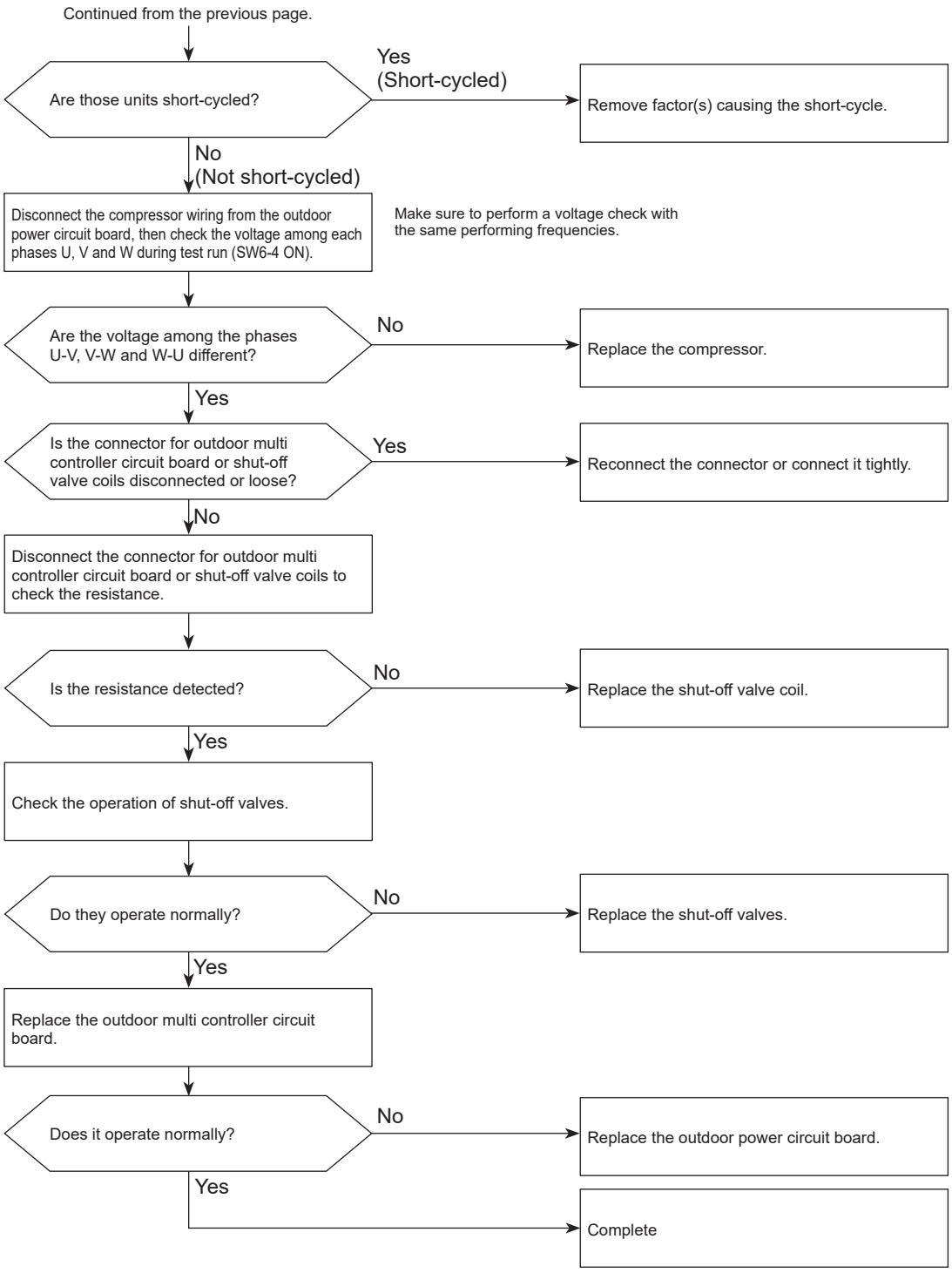
- Closed outdoor stop valve
- Decrease of power supply voltage
- Looseness, disconnection, or wrong phase of compressor wiring connection
- Model selection error on indoor controller board or outdoor multi controller circuit board
- Defective compressor
- Defective outdoor power circuit board
- Defective outdoor multi controller circuit board
- Malfunction of indoor/outdoor unit fan
- Short-cycle of indoor/outdoor unit

Diagnosis of failure



4210 (UP): Compressor overcurrent interruption/Failure in 12 VDC power supply circuit on power circuit board

Diagnosis of failure



4220 (U9): Voltage shortage/Overvoltage/PAM error/L1 open phase/ Primary current sensor error/Power synchronization signal error/Primary voltage error

Abnormal points and detection methods

Any of the following symptoms are detected;
- Decrease of DC bus voltage to 200 V (1-phase), 350 V (3-phase)
- Increase of DC bus voltage to 400 V (1-phase), 760 V (3-phase)
- DC bus voltage stays at 310 V or less for 30 consecutive seconds when the operational frequency is over 20 Hz.
- Decrease of power supply voltage to 162 V (1-phase)
- Increase of power supply voltage to 290 V (1-phase)
- A short or open circuit is detected in the power supply voltage detection circuit during operation.

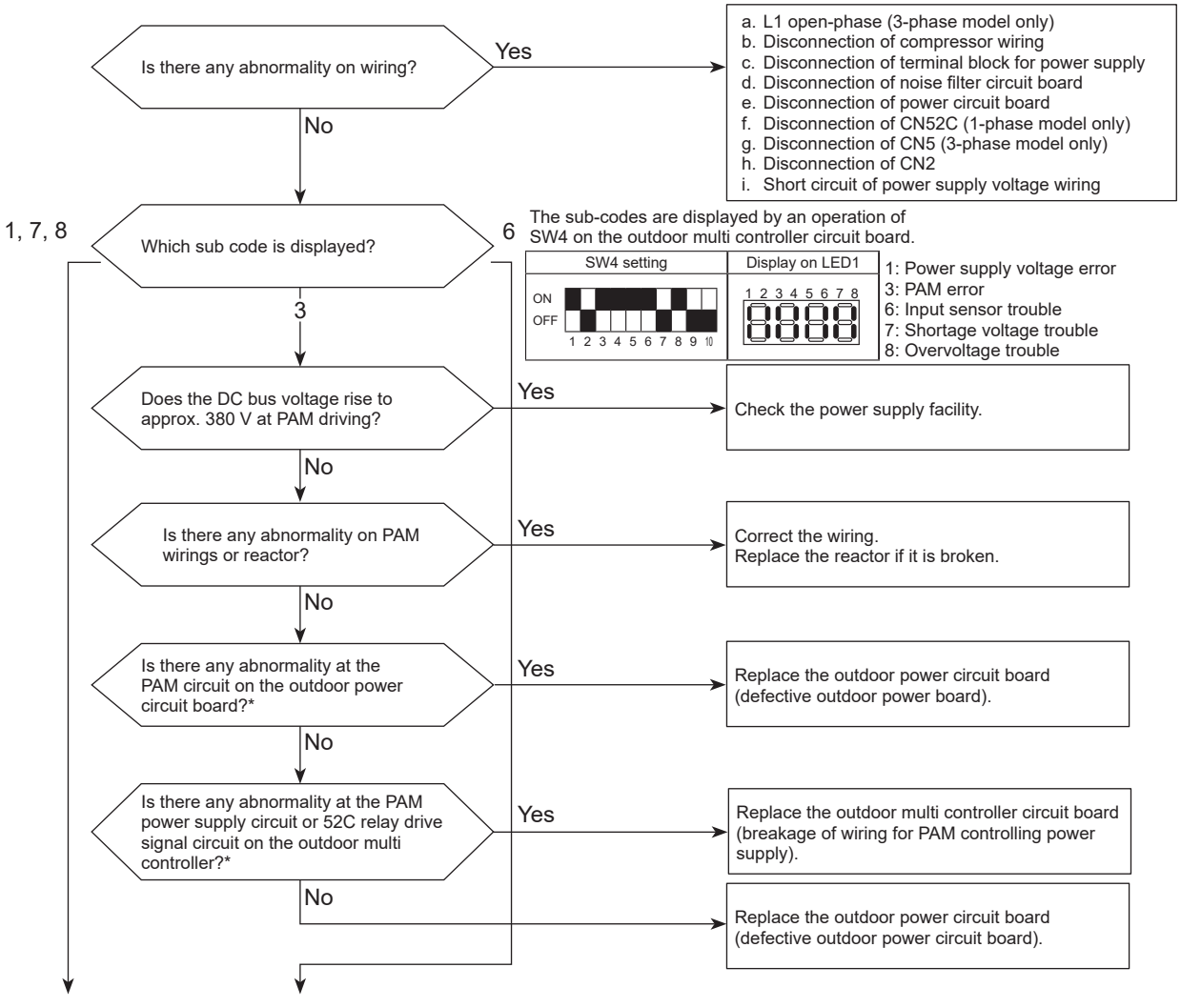
Any of the following conditions is satisfied while the detections value of primary current is 0.1 A or less.
- The operational frequency is 40 Hz or more.
- The compressor current is 6 A or more.

Causes and checkpoints

- Decrease/increase of power supply voltage
- L1 open-phase (3-phase only)
- Primary current sensor failure
- Disconnection of compressor wiring
- Malfunction of 52C relay
- Defective outdoor power circuit board
- Malfunction of 52C relay driving circuit on outdoor multi controller circuit board
- Disconnection of CN5 (3-phase only)
- Disconnection of CN2
- Malfunction of primary current detecting circuit on outdoor power circuit board
- Malfunction of resistor connected to 52C relay on outdoor power circuit board (3-phase only)
- Short circuit of power supply voltage wiring

1-phase: 1-phase model
3-phase: 3-phase 3-wire model
The black square (■) indicates a switch position.

Diagnosis of failure



Continue to the next page.

*Refer to "How to check the parts".

4220 (U9): Voltage shortage/Overvoltage/PAM error/L1 open phase/ Primary current sensor error/Power synchronization signal error

The black square (■) indicates a switch position.

Diagnosis of failure

Continued from the previous page.

1, 7, 8

6

Is the outdoor unit 1-phase model or 3-phase model?

1-phase model → Replace the outdoor power circuit board (Defective outdoor power circuit board).

3-phase model

Is CN5 connected properly without any contact failure?

No → Correct the CN5 wiring.

Yes

Is there any breakage of ACCT on the noise filter circuit board?

Yes → Replace the noise filter circuit board.

No → Replace the outdoor power circuit board (Defective outdoor power circuit board).

Check the power supply voltage on the terminal block of the outdoor unit.

Is the power supply normal?

No → Check the power supply facility.

Yes

Which sub-code is displayed?

1 → Replace the outdoor power circuit board (Defective outdoor power circuit board).

7, 8

The sub-codes are displayed by an operation of SW4 on the outdoor multi controller circuit board.

SW4 setting	Display on LED1
ON / OFF 1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8

1: Power supply voltage error
3: PAM error
6: Input sensor trouble
7: Shortage voltage trouble
8: Overvoltage trouble

Check the bus voltage read by the microprocessor with an operation of SW4 on the outdoor multi controller circuit board.

The bus voltage can be displayed by an operation of SW4 on the outdoor multi controller circuit board.

SW4 setting	Display on LED1	Unit
ON / OFF 1 2 3 4 5 6 7 8 9 10	0–9999	V

Check the bus voltage at the test points listed below on the outdoor power circuit board using a multimeter.
single phase model: CNDC 1-2pin
three phase model: N2-P2

Is the bus voltage normal?

No → Check the resistor connected to 52C relay and reactor.
Replace it if the resistor is broken.
Replace the outdoor power circuit board if the resistor is not broken.

Yes → Operate the unit and check if the problem occurs again.

4230 (U5): Heat sink temperature trouble

Abnormal points and detection methods

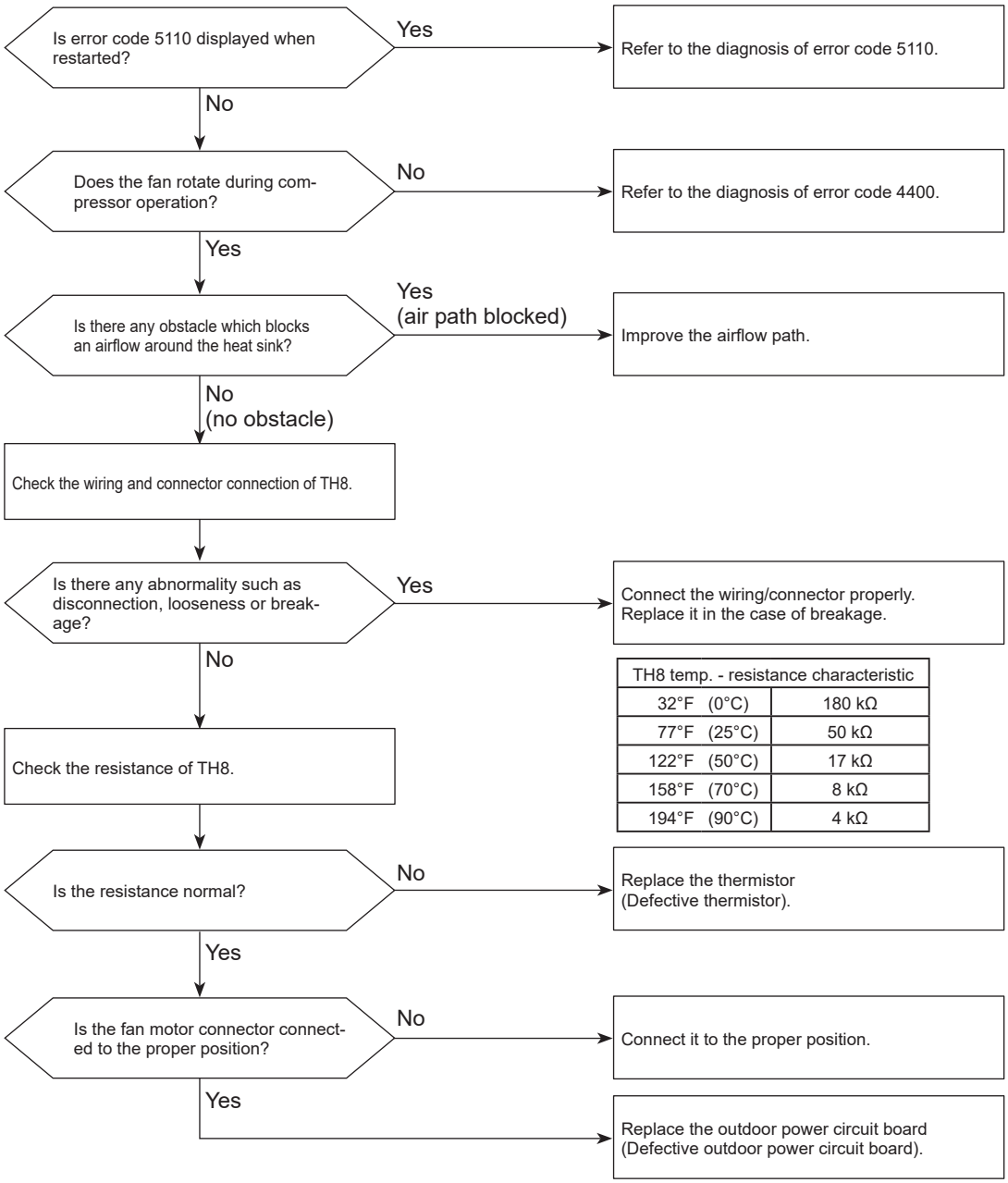
TH8 detects a temperature outside the specified range during compressor operation.

TH8: Thermistor <Heat sink>

Causes and checkpoints

- Blocked outdoor fan
- Malfunction of outdoor fan motor
- Blocked airflow path
- Rise of ambient temperature
- Characteristic defect of thermistor
- Malfunction of input circuit on outdoor power circuit board
- Malfunction of outdoor fan driving circuit
- Miswiring of fan motor

Diagnosis of failure



TH8 temp. - resistance characteristic	
32°F (0°C)	180 kΩ
77°F (25°C)	50 kΩ
122°F (50°C)	17 kΩ
158°F (70°C)	8 kΩ
194°F (90°C)	4 kΩ

4250 (U6): Power module trouble

Abnormal points and detection methods

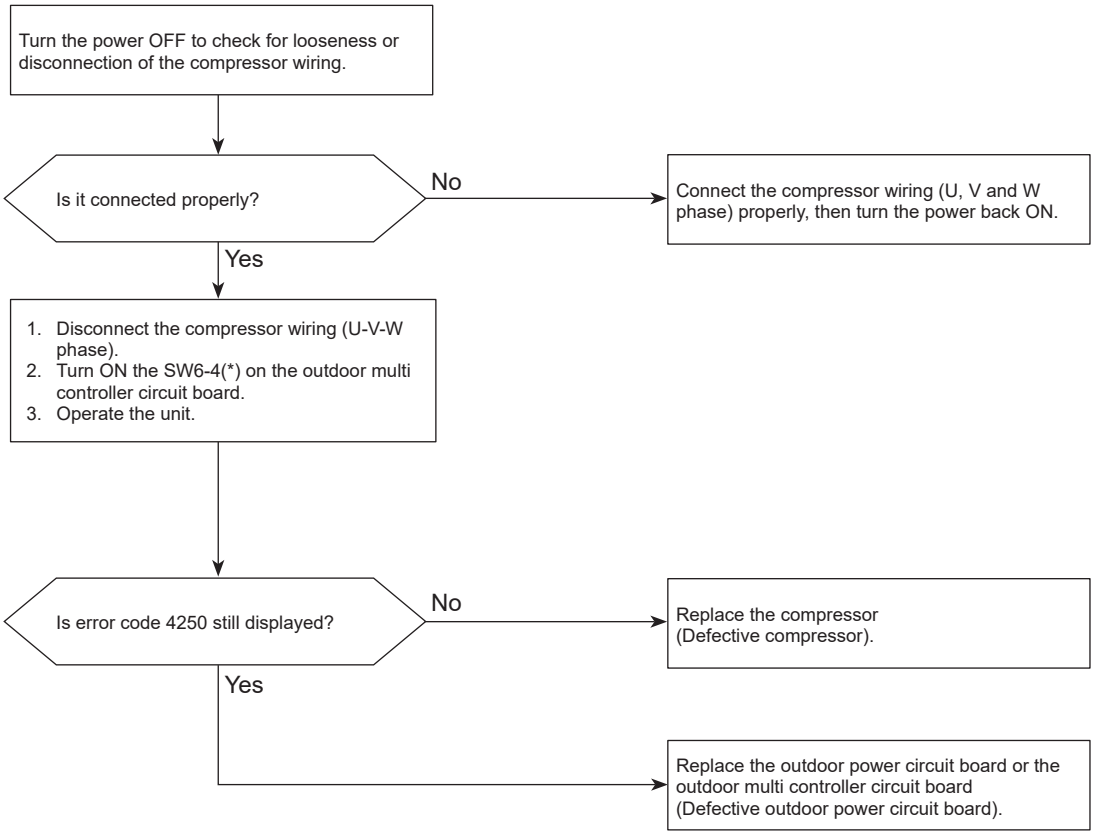
Both of the following conditions have been satisfied:

- Overcurrent of DC bus or compressor is detected during compressor operation.
- Inverter power module is determined to be faulty.

Causes and checkpoints

- Short-circuit caused by looseness or disconnection of compressor wiring
- Defective compressor
- Defective outdoor power circuit board

Diagnosis of failure



* SW6-4 ON: Ignore 5300(UH) error.

4400 (U8): Fan trouble (Outdoor unit)

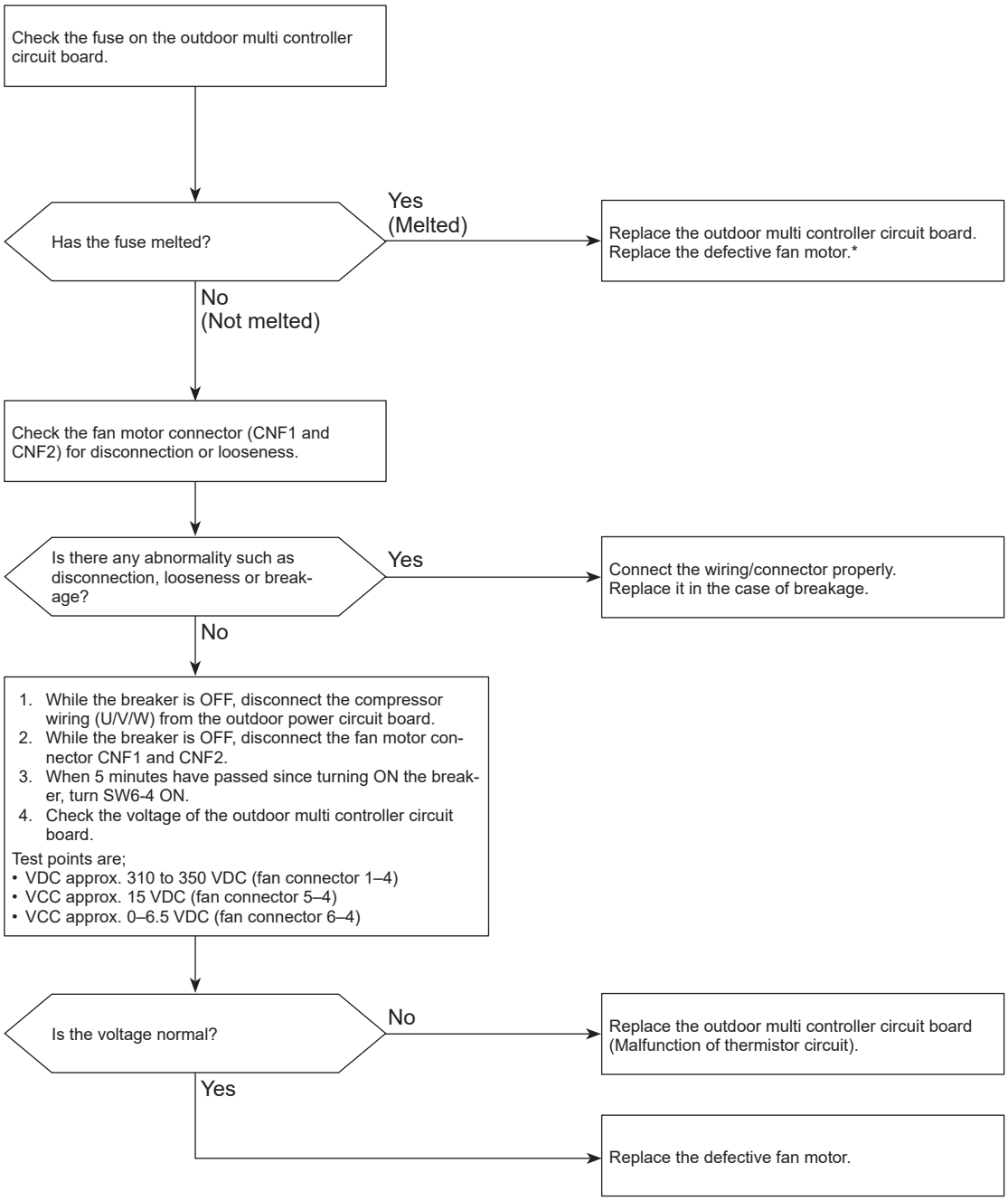
Abnormal points and detection methods

No rotational frequency is detected, a value outside the specified range is detected during fan motor operation.

Causes and checkpoints

- Malfunction of fan motor
- Disconnection of CNF connector
- Defective outdoor multi controller circuit board

Diagnosis of failure



* For the detail, refer to "Check method of DC fan motor (fan motor/outdoor multi controller circuit board)".

Note:

- Set SW6-4 OFF after the troubleshooting completes.
- The fan sometimes starts on-off cycle operation during low-load operation or cooling at low outside temperature. It is not abnormal; the operation ensures reliability of the product.
- One of the two fans may operate during low-load operation or cooling operation at low outside temperature. The operation is to ensure reliability, not abnormal.

5101 (U3): Compressor temperature thermistor (TH4) open/short <Detected in outdoor unit>

Abnormal points and detection methods

TH4 is found to be open/short.
(The open/short detection is disabled for 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation. The detection is also disabled when the outdoor temperature is 41°F (5°C) or less in cooling operation, and -4°F (-20°C) or less in heating)

Open:
37.4°F (3°C) or less*
Short:
422.6°F (217°C) or more
TH4:
Thermistor <Compressor>

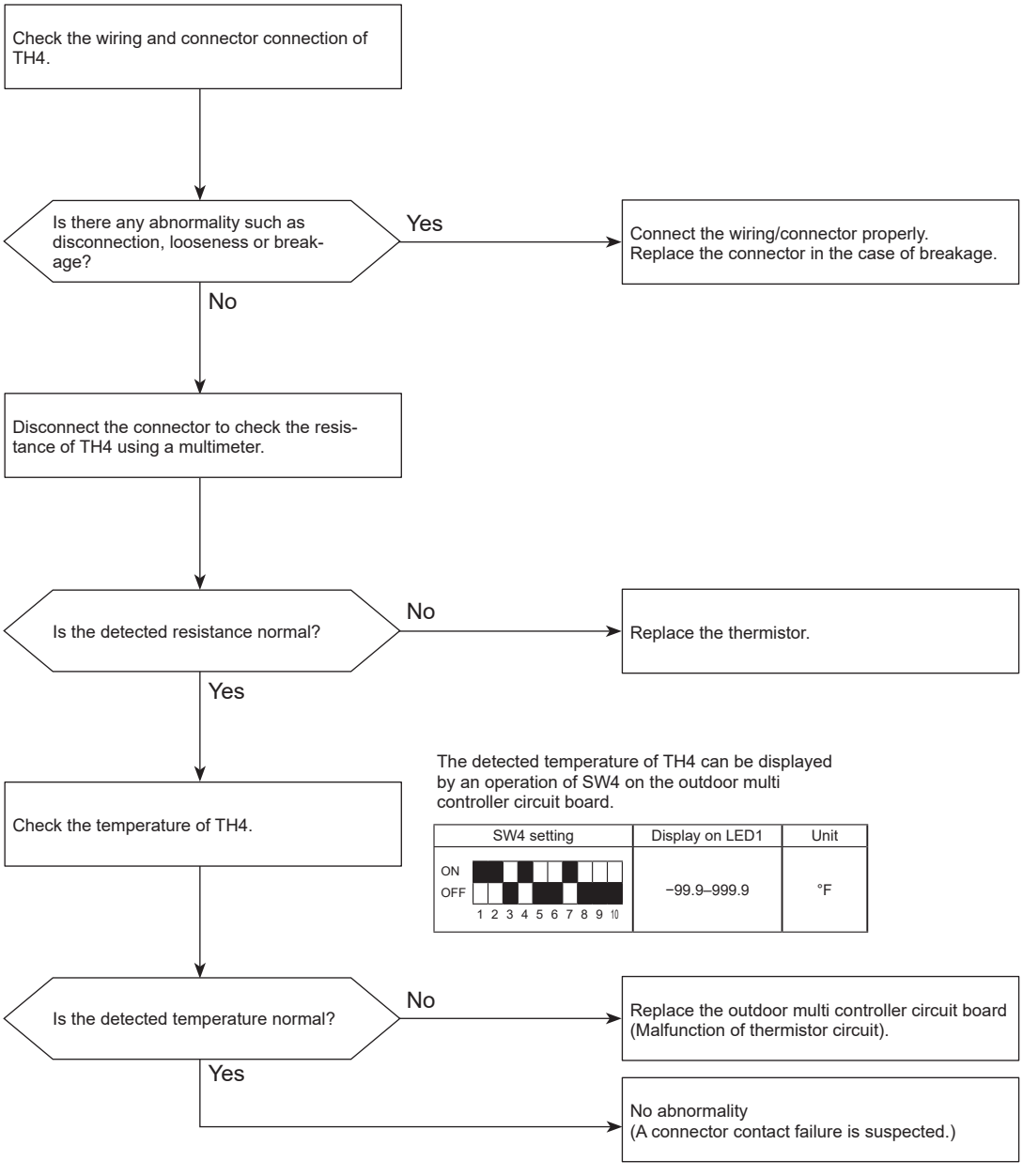
* -10°C [14°F] or less when PEFY-P·VMH(S)-E-F is connected.

Causes and checkpoints

- Disconnection or contact failure of connectors
- Faulty thermistor
- Defective outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



5102 (U4): Suction pipe temperature thermistor (TH6) open/short <Detected in outdoor unit>

Abnormal points and detection methods

TH6 is found to be open/short.
(The open/short detection is disabled for 10 seconds to 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.)

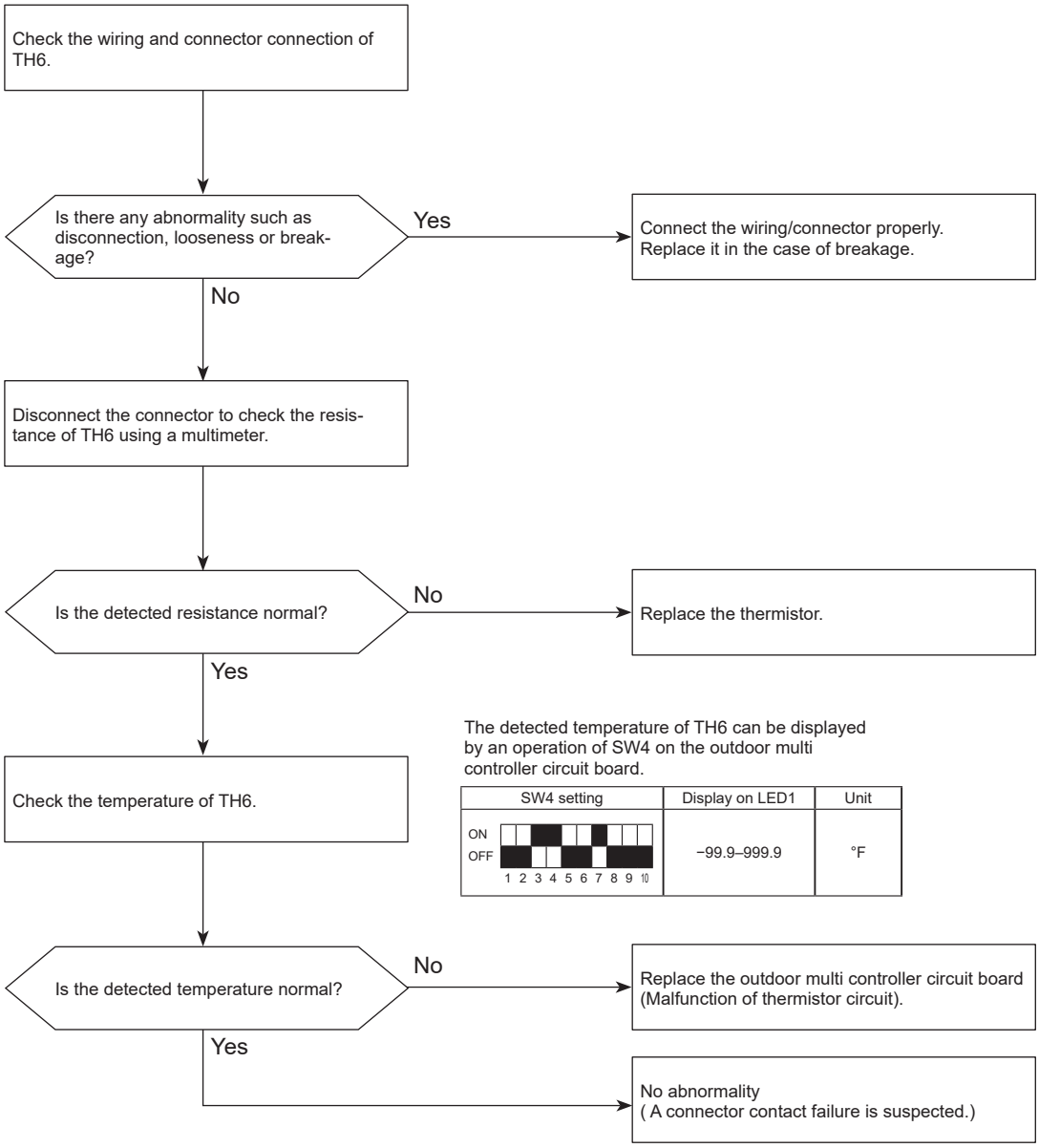
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH6:
Thermistor <Suction pipe>

Causes and checkpoints

- Disconnection or contact failure of connectors
- Faulty thermistor
- Defective outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



5105 (U4): Outdoor liquid pipe temperature thermistor (TH3) open/ short

Abnormal points and detection methods

TH3 is found to be open/short.
(The open/short detection is disabled for 10 seconds to 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.)

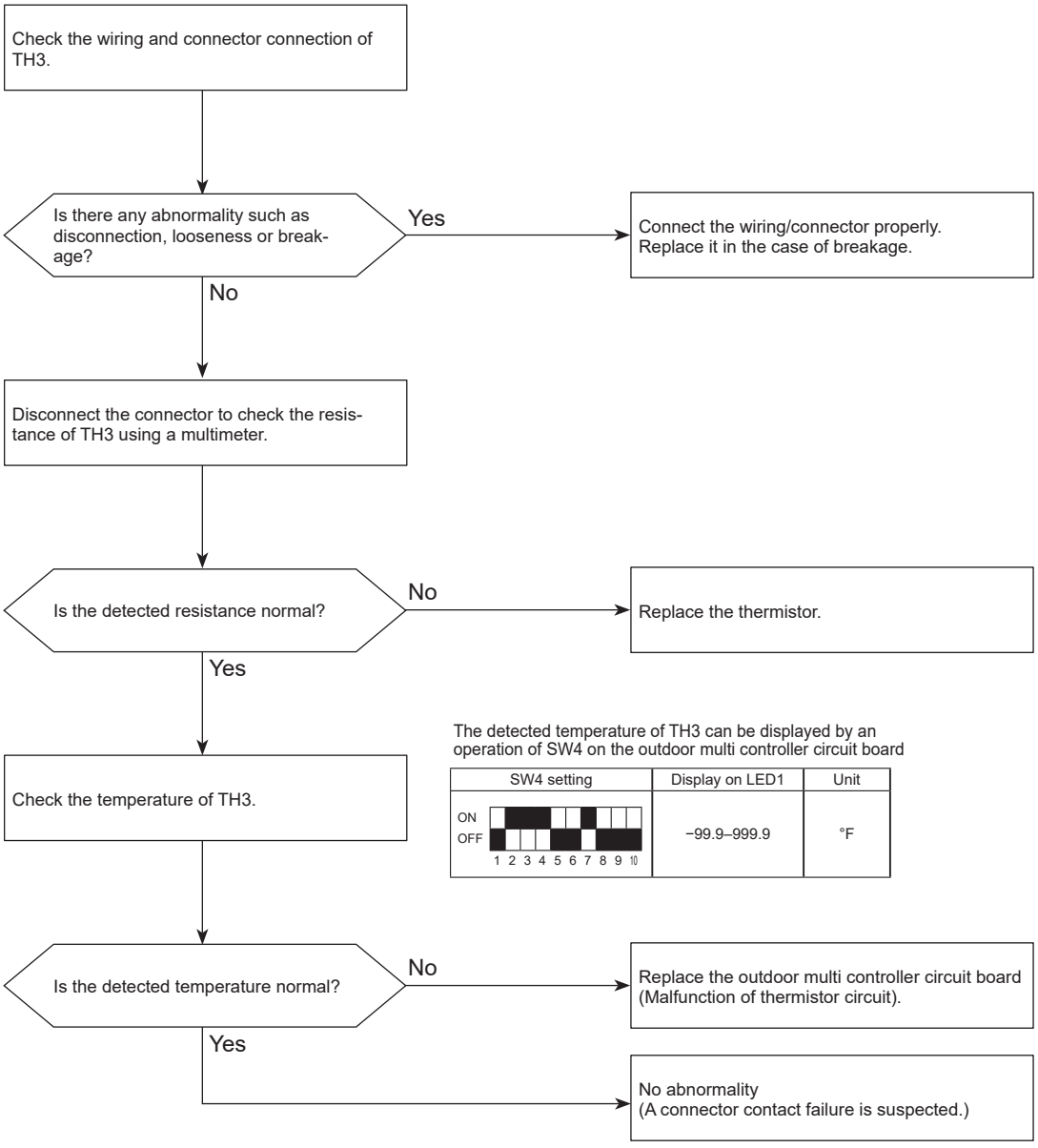
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH3:
Thermistor <Outdoor liquid pipe>

Causes and checkpoints

- Disconnection or contact failure of connectors
- Faulty thermistor
- Defective outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



The detected temperature of TH3 can be displayed by an operation of SW4 on the outdoor multi controller circuit board

SW4 setting	Display on LED1	Unit
ON / OFF 1 2 3 4 5 6 7 8 9 10	−99.9–999.9	°F

5106 (U4): Ambient temperature thermistor (TH7) open/short

Abnormal points and detection methods

TH7 is found to be open/short

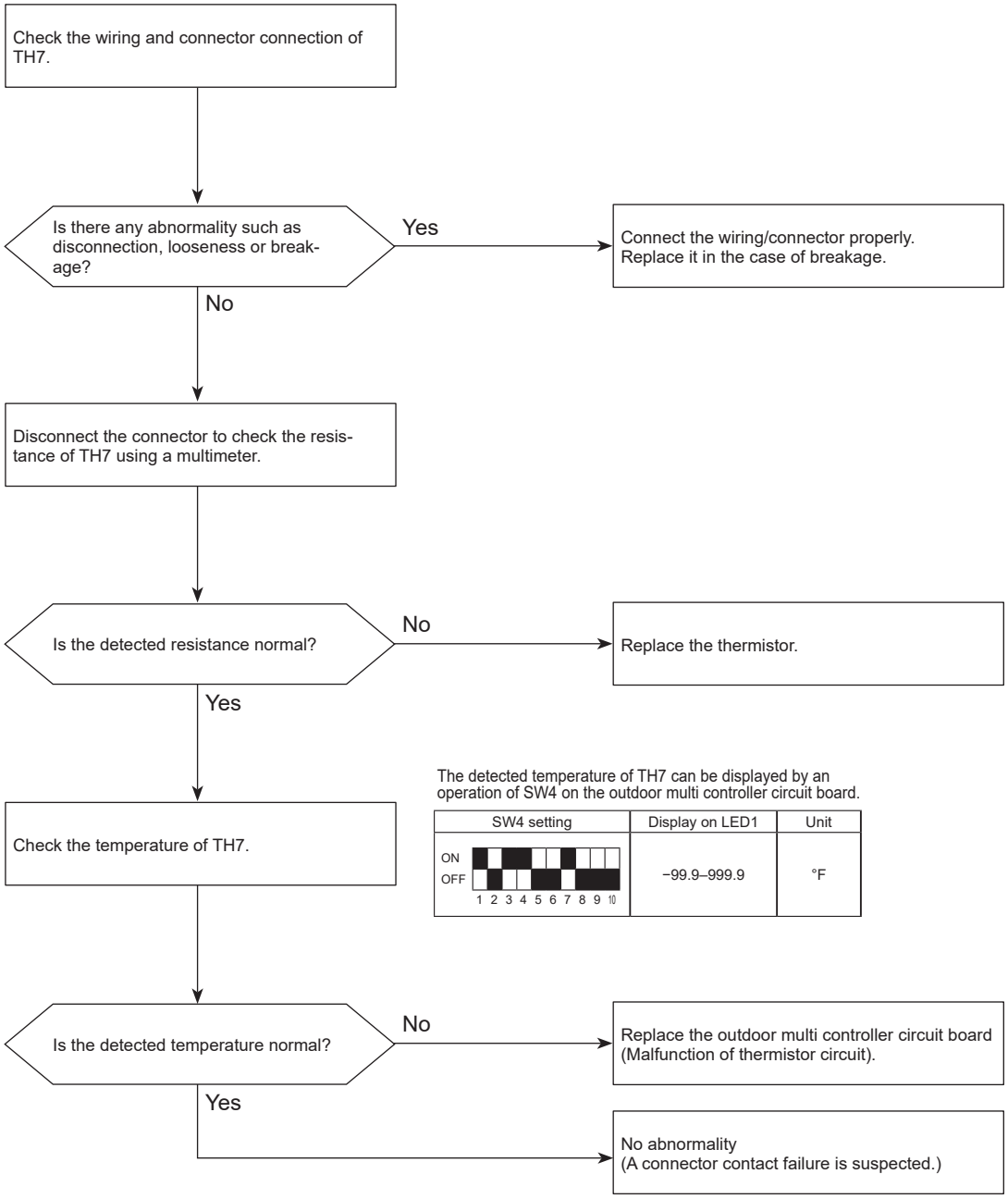
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH7:
Thermistor <Ambient>

Causes and checkpoints

- Disconnection or contact failure of connectors
- Faulty thermistor
- Defective outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



The detected temperature of TH7 can be displayed by an operation of SW4 on the outdoor multi controller circuit board.

SW4 setting	Display on LED1	Unit
ON / OFF 1 2 3 4 5 6 7 8 9 10	−99.9–999.9	°F

5109 (U4): HIC pipe temperature thermistor (TH2) open/short

Abnormal points and detection methods

TH2 is found to be open/short.

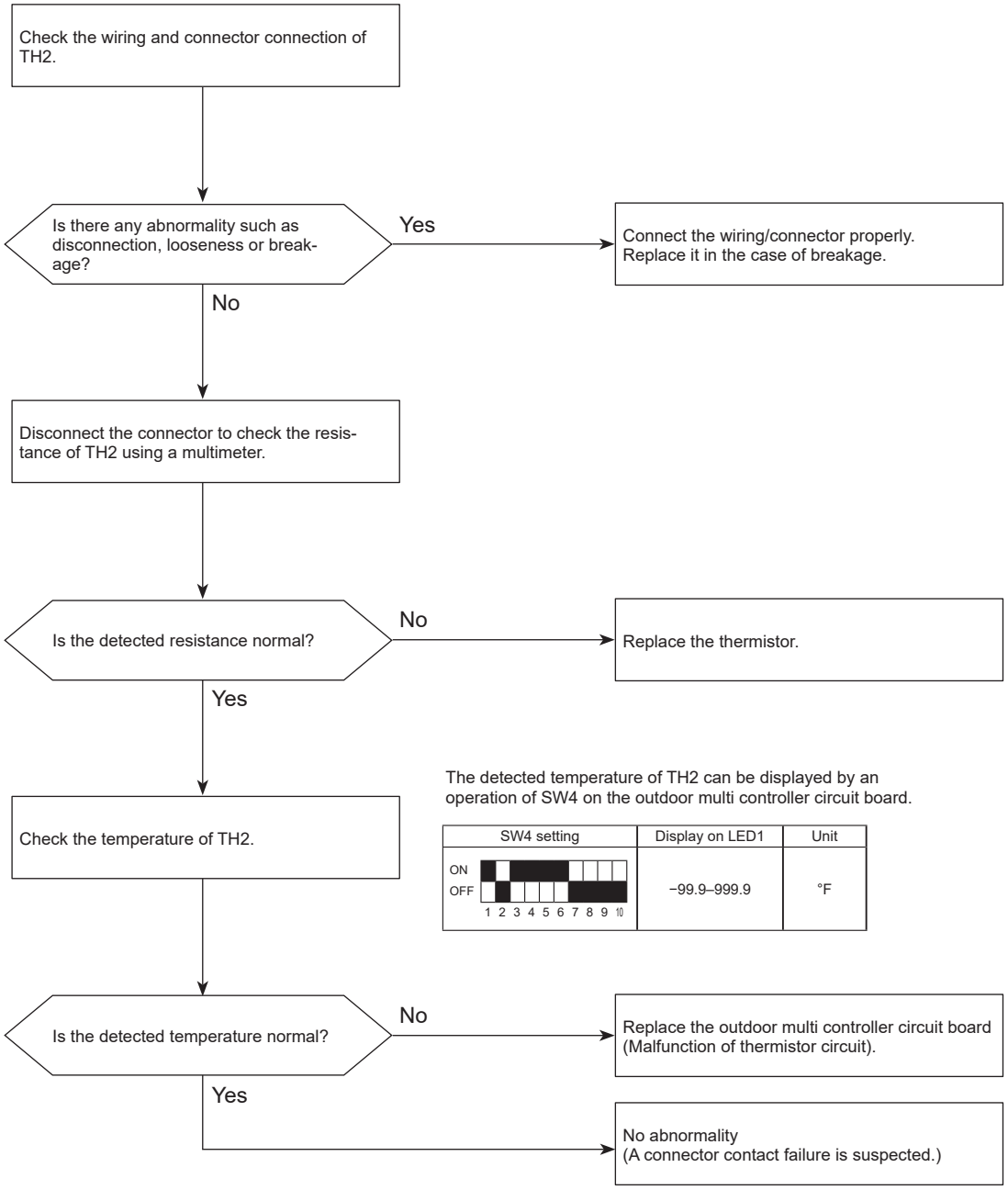
Open:
−31°F (−35°C) or less
Short:
194°F (90°C) or more
TH2:
Thermistor <HIC pipe>

Causes and checkpoints

- Disconnection or contact failure of connectors
- Faulty thermistor
- Defective outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



5110 (U4): Heat sink temperature thermistor (TH8) open/short

Abnormal points and detection methods

TH8 (Internal thermistor) is found to be open/short.

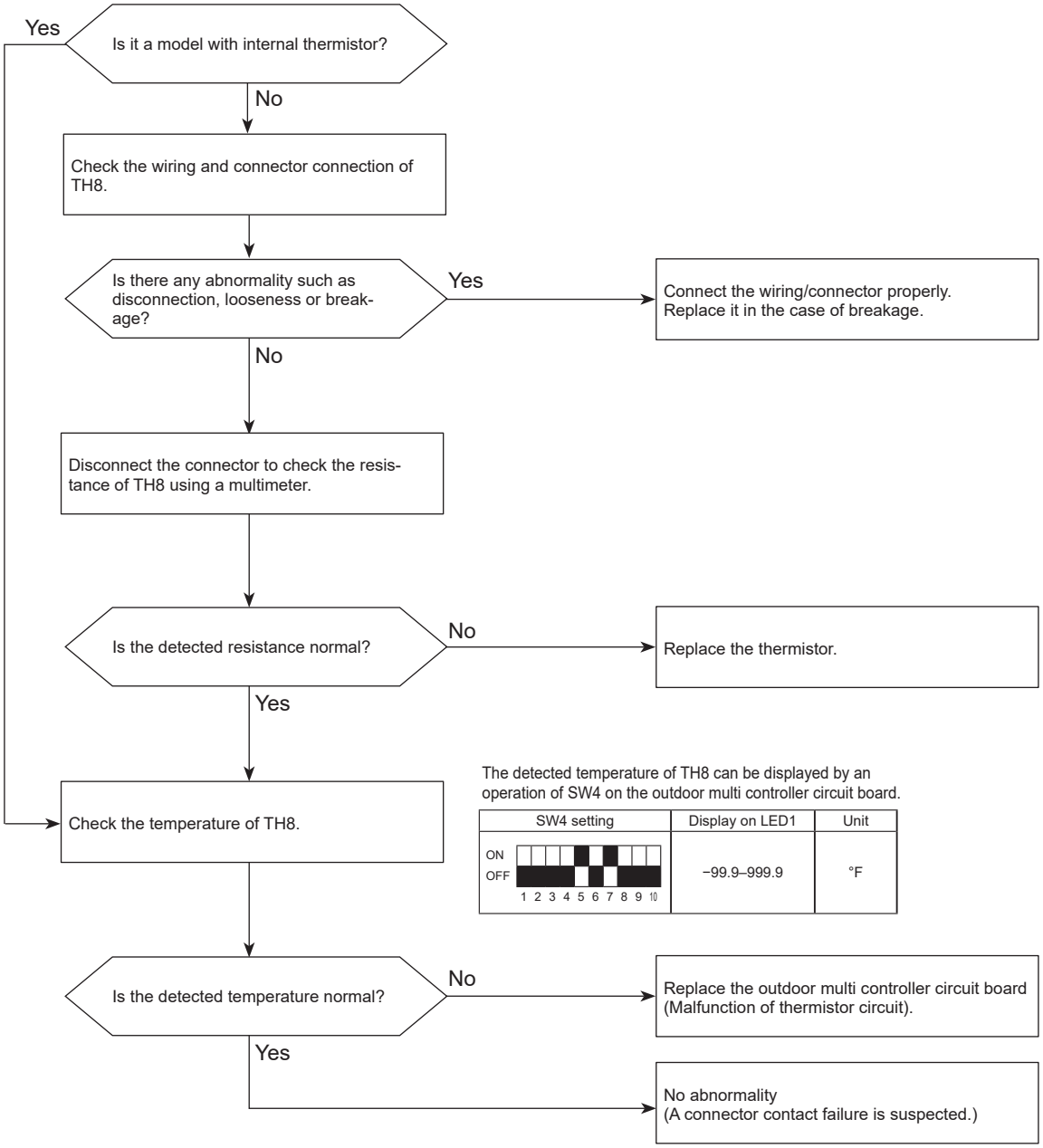
- Open:
  −55.1°F (−48.4°C) or less
  Short:
  216.3°F (102.4°C) or more
  TH8:
  Thermistor <Heat sink>

Causes and checkpoints

- Disconnection or contact failure of connectors
- Faulty thermistor
- Defective outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



5201 (F5): High pressure sensor (63HS) trouble

Abnormal points and detection methods

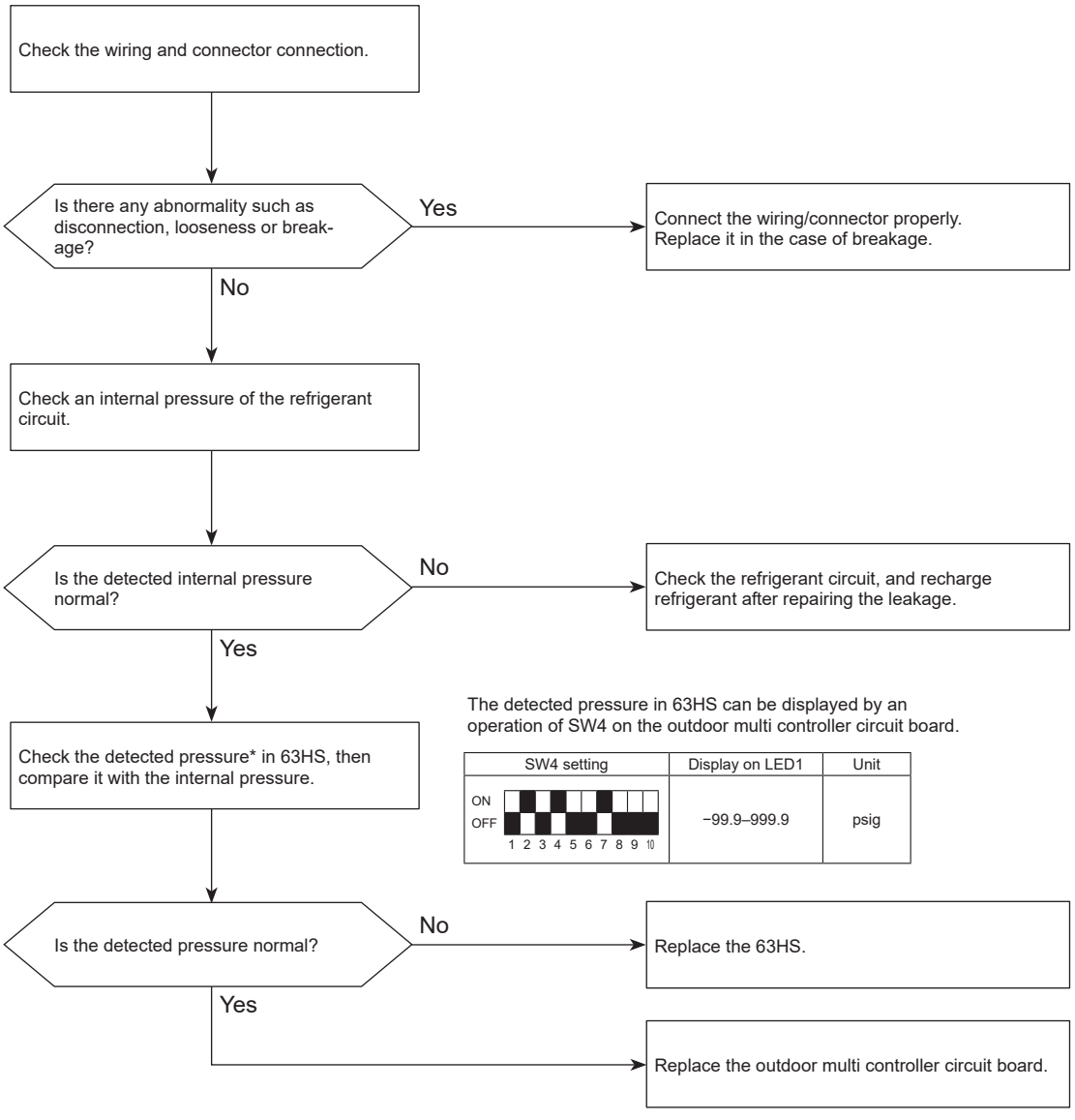
- The detected pressure in the high pressure sensor is 14 psig (1kgf/cm^2) or less during operation, the compressor stops operation and enters into an anti-restart mode for 3 minutes.
- The detected pressure is 14 psig (1kgf/cm^2) or less immediately before restarting, the compressor falls into an abnormal stop with error code 5201.
- For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, above mentioned symptoms are not determined to be abnormal.

Causes and checkpoints

- Defective high pressure sensor
- Decrease of internal pressure caused by gas leakage
- Disconnection or contact failure of connector
- Malfunction of input circuit on outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



The detected pressure in 63HS can be displayed by an operation of SW4 on the outdoor multi controller circuit board.

SW4 setting	Display on LED1	Unit
ON / OFF 1 2 3 4 5 6 7 8 9 10	−99.9–999.9	psig

*For the pressure, refer to “How to check the components”.

5202 (F3): Low pressure sensor (63LS) trouble

Abnormal points and detection methods

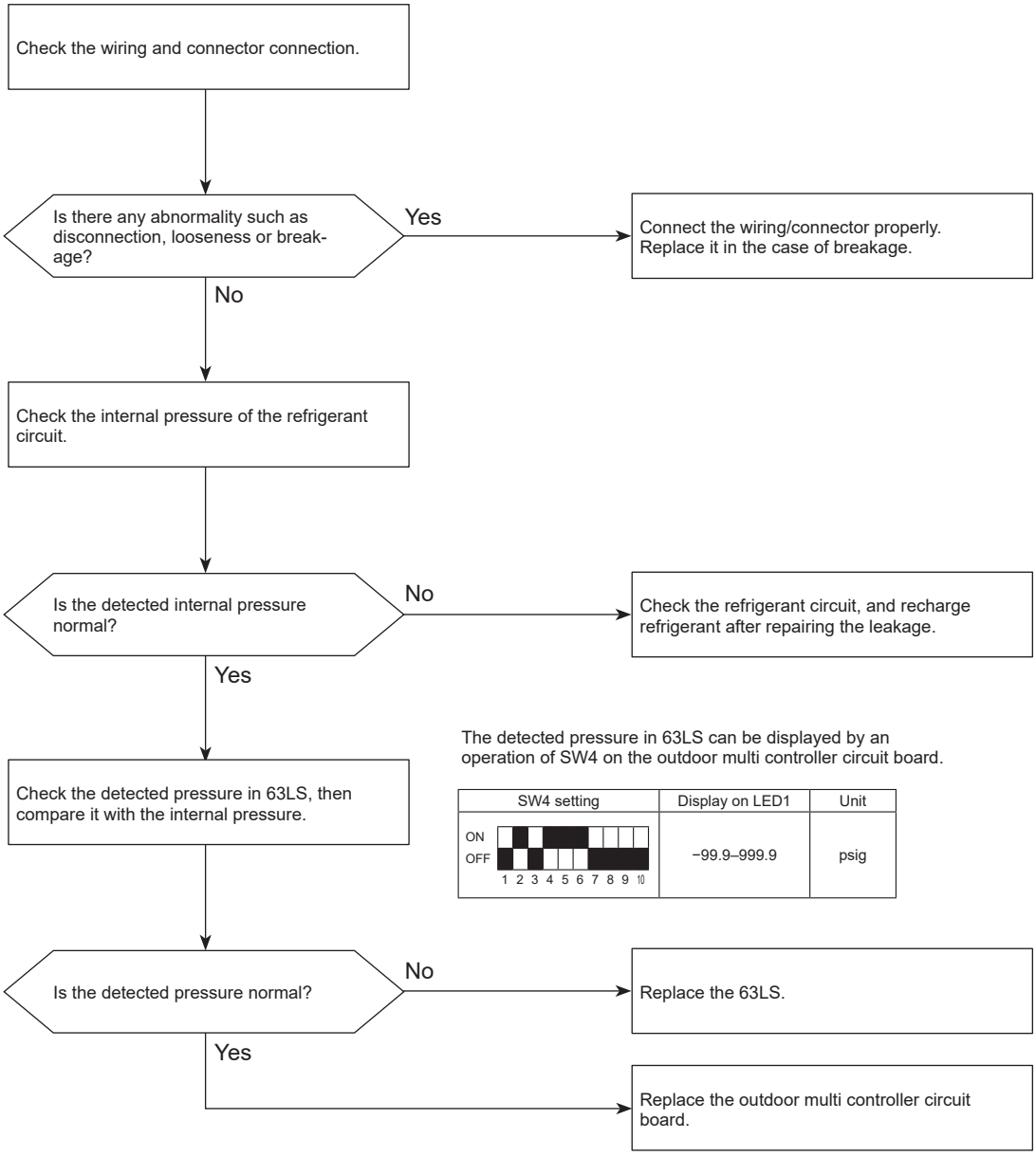
- The detected pressure in the low pressure sensor is -33 psig (−2.3 kgf/cm^2) or less, or 329 psig (23.1 kgf/cm^2) or more during operation, the compressor stops operation with error code 5202.
- For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, above mentioned symptoms are not determined to be abnormal.

Causes and checkpoints

- Defective low pressure sensor
- Decrease of internal pressure caused by gas leakage
- Disconnection or contact failure of connector
- Malfunction of input circuit on outdoor multi controller circuit board

The black square (■) indicates a switch position.

Diagnosis of failure



The detected pressure in 63LS can be displayed by an operation of SW4 on the outdoor multi controller circuit board.

SW4 setting	Display on LED1	Unit
ON / OFF 1 2 3 4 5 6 7 8 9 10	−99.9–999.9	psig

5300 (UH): Current sensor trouble

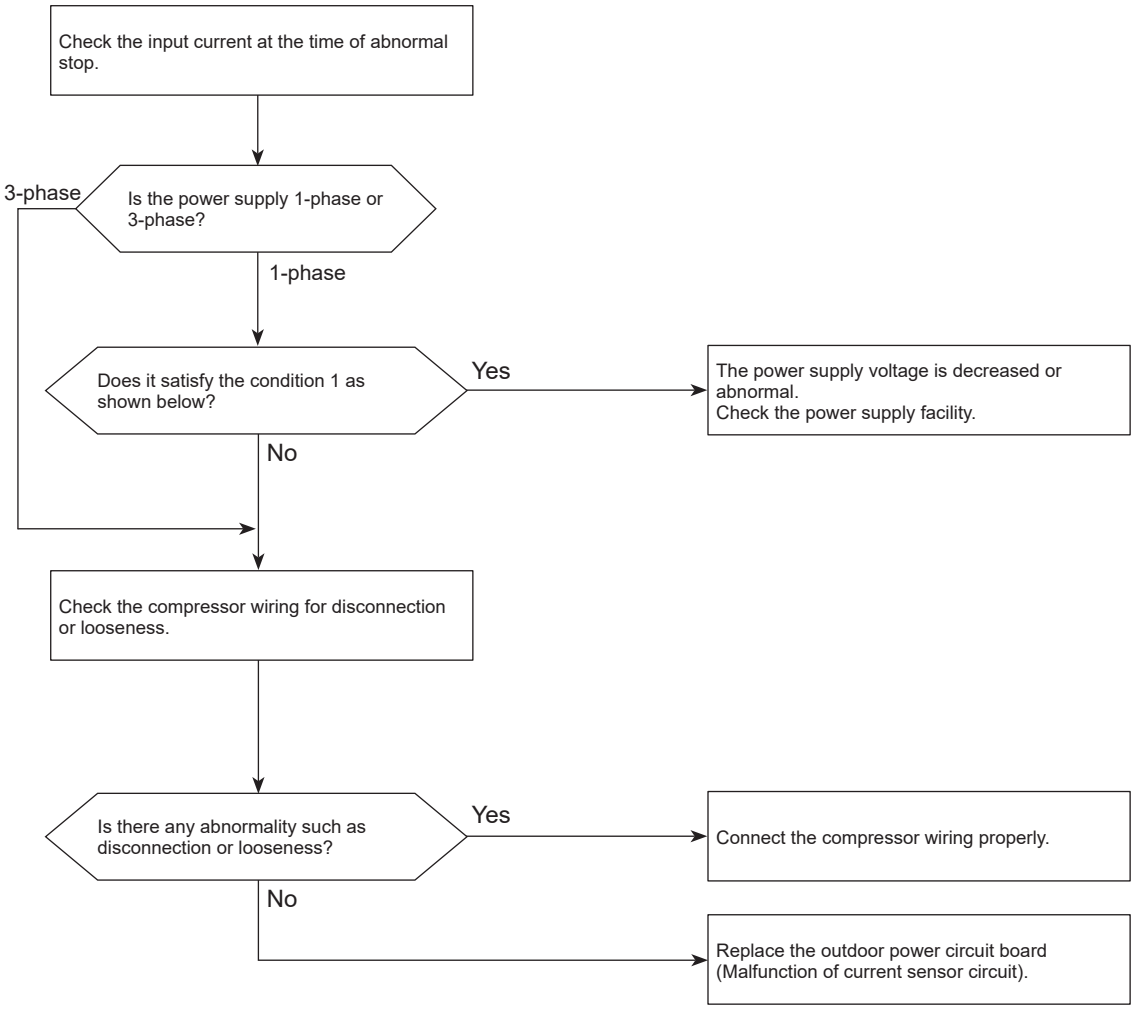
Abnormal points and detection methods

The detected current sensor input value (primary current) during compressor operation is outside the specified range.

Causes and checkpoints

- Decrease/Trouble of power supply voltage
- Disconnection of compressor wiring
- Input sensor trouble on outdoor power circuit board
- Wiring through current sensor (penetration type) is not done.

Diagnosis of failure



Condition 1:

Model name	10 consecutive-second detection	One-time detection
MXZ-SM36/48NL	34A	38A
MXZ-SM36/42/48NLHZ MXZ-SM60NL	37A	40A

5558 (FH): Refrigerant sensor error

Abnormal points and detection methods

A refrigerant sensor has failed.

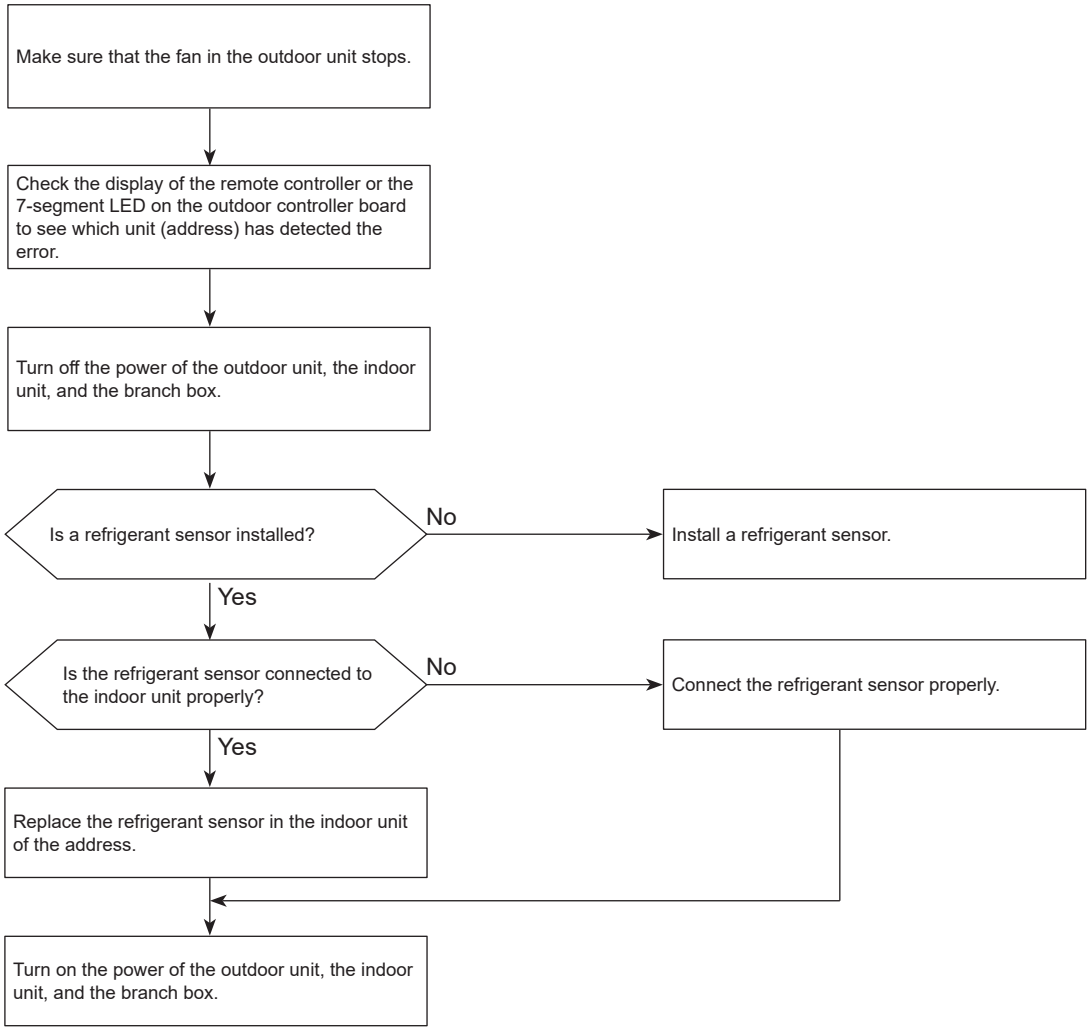
Note:

- When this error occurs, both the controller in the applicable room and the controller in the supervisor room produce an alarm. Also, the system closes the shut-off valve and performs refrigerant recovery.
- When this error occurs, all indoor units start fan operation for safety purpose. The operation time differs depending on the unit.
- In case of a system without an alarm, check the display of the remote controller or the 7-segment LED on the outdoor controller board to see which unit (address) has detected the error.
- When this error occurs, do not turn off the power until the fan in the outdoor unit stops. Ventilate the room with the indoor unit in which this error has occurred and make sure there is no ignition source before turning off the power.

Causes and checkpoints

- A refrigerant sensor connected to the indoor unit has failed.
- A refrigerant sensor is not installed in the indoor unit.

Diagnosis of failure



6600 (A0): Duplex address error

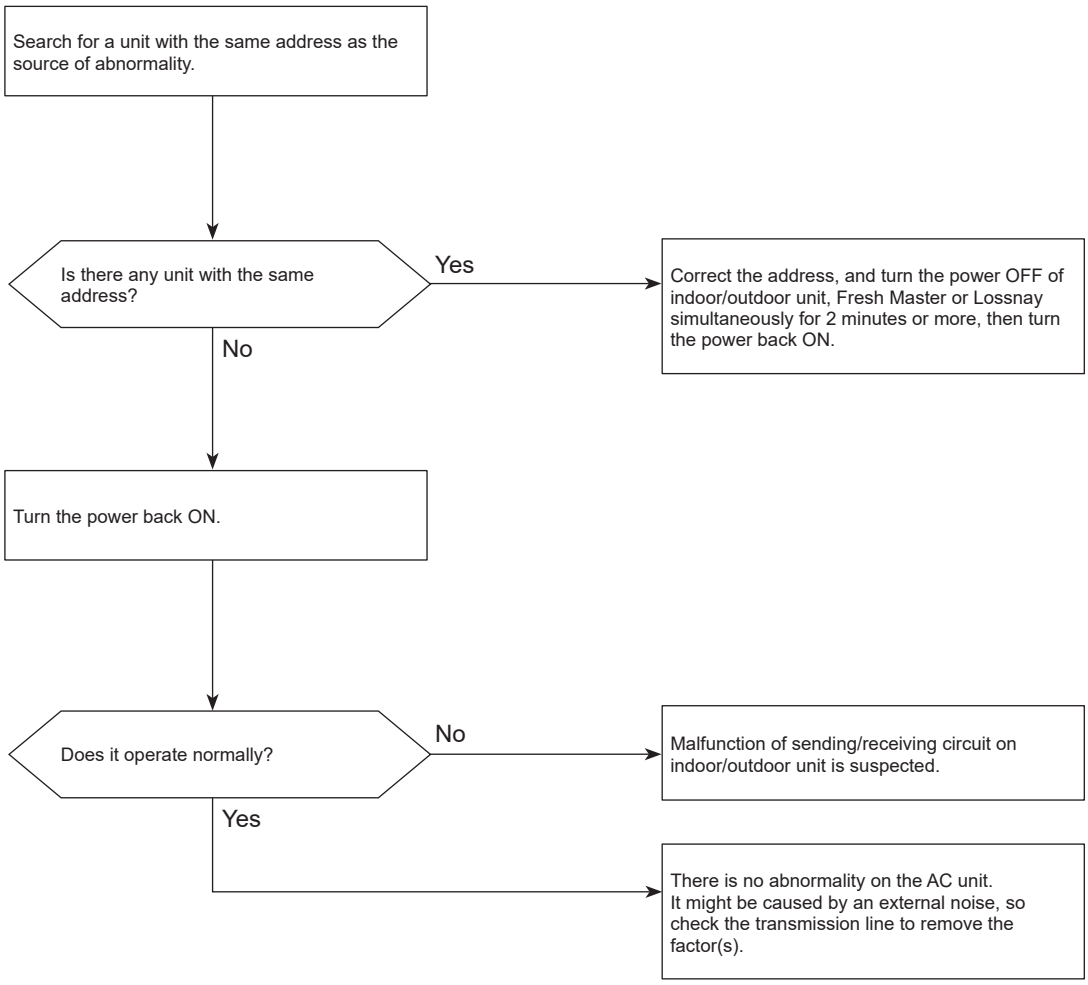
Abnormal points and detection methods

2 or more units with the same address exist.

Causes and checkpoints

- There are 2 units or more with the same address in their controller among outdoor unit, indoor unit, Fresh Master, Lossnay or remote controller.
- Noise interference on indoor/outdoor connectors

Diagnosis of failure



6602 (A2): Transmission processor hardware error

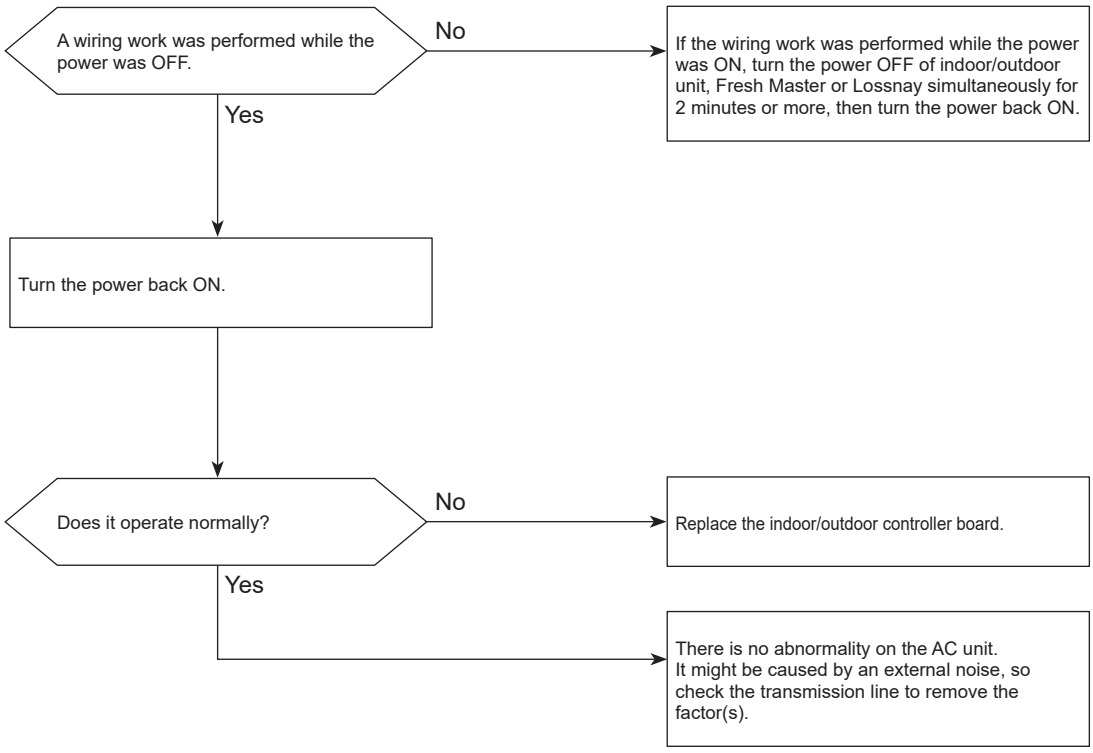
Abnormal points and detection methods

The transmission line shows “1” although the transmission processor transmitted “0”.

Causes and checkpoints

- A transmitting data collision occurred because of a wiring work or polarity change has performed while the power is ON on either of the indoor/outdoor unit, Fresh Master or Lossnay.
- Malfunction of transmitting circuit on transmission processor
- Noise interference on indoor/outdoor connectors

Diagnosis of failure



6603 (A3): Transmission bus BUSY error

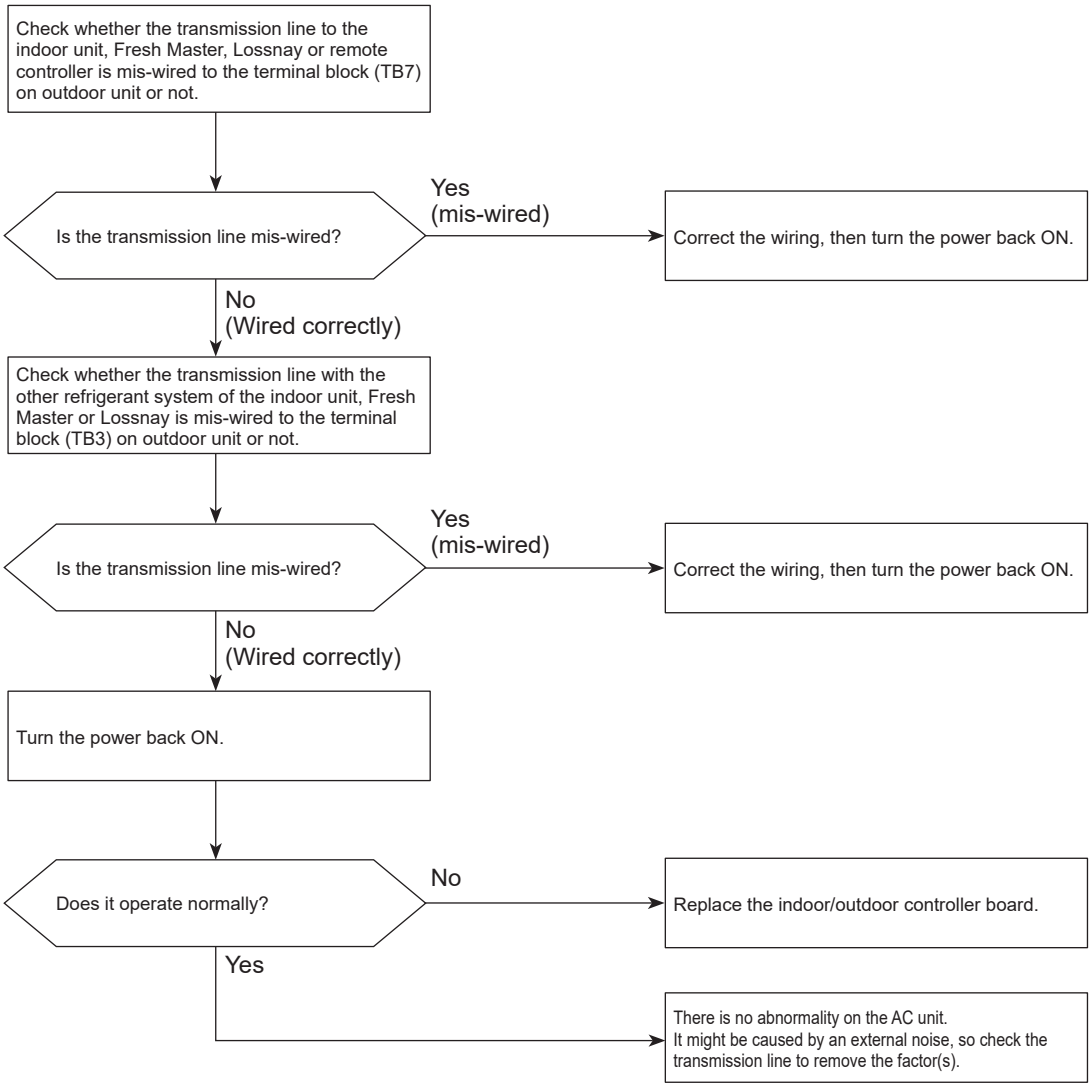
Abnormal points and detection methods

- Transmission fails due to collision and it continues for 8 to 10 minutes.
- Data cannot be output on the transmission line because of noise etc. consecutively for 8 to 10 minutes.

Causes and checkpoints

- The transmission processor is unable to transmit due to a short-cycle voltage such as noise is mixed on the transmission line.
- The transmission processor is unable to transmit due to an increase of transmission data amount caused by a miswiring of the terminal block (transmission line) (TB3) and the terminal block (centralized control line) (TB7) on the outdoor unit.
- The share on transmission line becomes high due to a mixed transmission caused by a malfunction of repeater on the outdoor unit, which is a function to connect/disconnect transmission from/to control system and centralized control system.

Diagnosis of failure



6606 (A6): Signal communication error with transmission processor

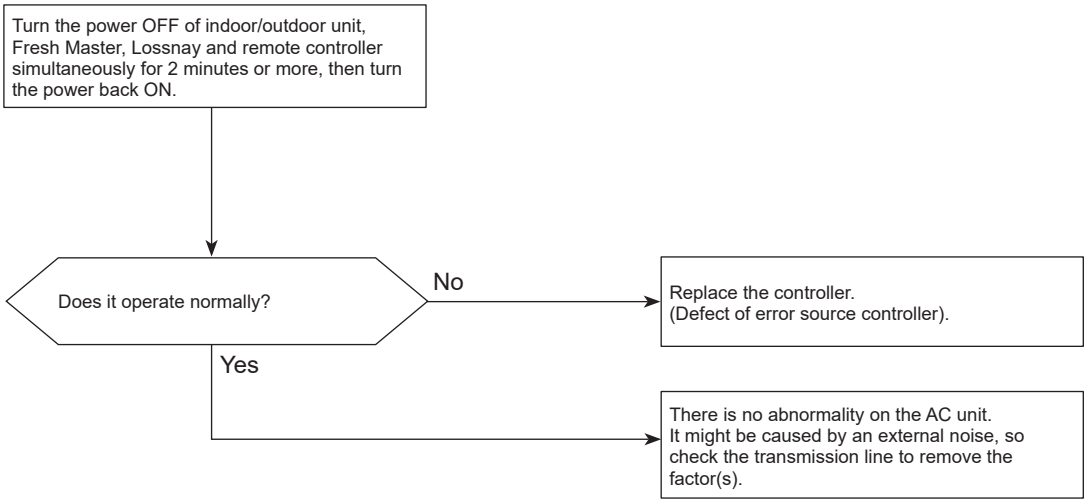
Abnormal points and detection methods

- The data of unit/transmission processor were not normally transmitted.
- The address transmission from the unit processor was not normally transmitted.

Causes and checkpoints

- Accidental disturbance such as noise or lightning surge
- Hardware malfunction of transmission processor

Diagnosis of failure



6607 (A7): No ACK error

Abnormal points and detection methods

Causes and checkpoints

■ Common to all

An abnormality detected by the sending side controller when receiving no ACK from the receiving side, though signal was once sent. The sending side detects the abnormality when that occurs 6 times in succession at 30 second intervals.

- The previous address unit does not exist since the address switch was changed while power was on.
- Decline of transmission voltage/signal because the transmission line exceeds the following limits.
  - Indoor/outdoor transmission line maximum distance: 656 ft (200 m)
  - For remote controller line: 39 ft (12 m)
- Decline of transmission voltage/signal due to unmatched transmission line types
  - Types for shield line: CVVS, CPEVS, or MVVS
  - Line diameter: AWG 16 (1.25 mm^2) or more
- Decline of transmission voltage/signal due to excessive number of connected units
- Malfunction due to accidental disturbance such as noise or lightning surge
- Defect of error source controller

■ The address/attribute of the outdoor unit was displayed:

An abnormality detected by the indoor unit if it received no ACK when transmitting signal to the outdoor unit.

- Contact failure of indoor/outdoor unit transmission line.
- Disconnection of transmission connector (CN2M) on indoor unit.
- Malfunction of sending/receiving circuit on indoor/outdoor unit.
- Disconnection of the connectors on the circuit board
- Cut off of power supply for outdoor unit caused by high pressure protection (63H).

■ The address/attribute of the indoor unit was displayed:

An abnormality detected by the remote controller if it received no ACK when transmitting signal to the indoor unit.

- While operating with the indoor units in a different refrigerant system, an abnormality is detected when the indoor unit transmits signal to the remote controller during the other refrigerant-system outdoor unit is turned OFF, or within 2 minutes after it turned back ON.
- Contact failure of indoor unit or remote controller transmission line
- Disconnection of transmission connector (CN2M) on indoor unit
- Malfunction of sending/receiving circuit on indoor unit or remote controller

■ The address/attribute of the remote controller was displayed:

An abnormality detected by the indoor unit if it received no ACK when transmitting signal to the remote controller.

- While operating with the indoor units in a different refrigerant system, an abnormality is detected when the indoor unit transmits signal to the remote controller during the other refrigerant-system outdoor unit is turned OFF, or within 2 minutes after it turned back ON.
- Contact failure of indoor unit or remote controller transmission line
- Disconnection of transmission connector (CN2M) on indoor unit
- Malfunction of sending/receiving circuit on indoor unit or remote controller

6607 (A7): No ACK error

Abnormal points and detection methods	Causes and checkpoints
■ The address/attribute of Fresh Master was displayed: An abnormality detected by the indoor unit if it received no ACK when transmitting signal to the Fresh Master.	• While the indoor unit is operating with the remote controller in a different refrigerant system, an abnormality is detected when the indoor unit transmits signal to the remote controller while the outdoor unit in the same refrigerant system as the Fresh Master is turned OFF, or within 2 minutes after it turned back ON. • Contact failure of indoor unit or Fresh Master transmission line • Disconnection of transmission connector (CN2M) on indoor unit or Fresh Master • Malfunction of sending/receiving circuit on indoor unit or Fresh Master
■ The address/attribute of Lossnay was displayed: An abnormality detected by the indoor unit if it received no ACK when transmitting signal to the Lossnay.	• An abnormality is detected when the indoor unit transmits signal to Lossnay while the Lossnay is turned OFF. • While the indoor unit is operating with Lossnay in a different refrigerant system, an abnormality is detected when the indoor unit transmits signal to the Lossnay while the outdoor unit in the same refrigerant system as the Lossnay is turned OFF, or within 2 minutes after it turned back ON. • Contact failure of indoor unit or Lossnay transmission line • Disconnection of transmission connector (CN2M) on indoor unit • Malfunction of sending/receiving circuit on indoor unit or Lossnay
■ The displayed address/attribute is not assigned to any controller.	• The previous address unit does not exist since the address switch was changed while power was on. • The abnormality was detected when the indoor unit sent or received signal because the address of the Fresh Master/Lossnay was changed after a setting for linking the Fresh master/Lossnay was made on the remote controller.

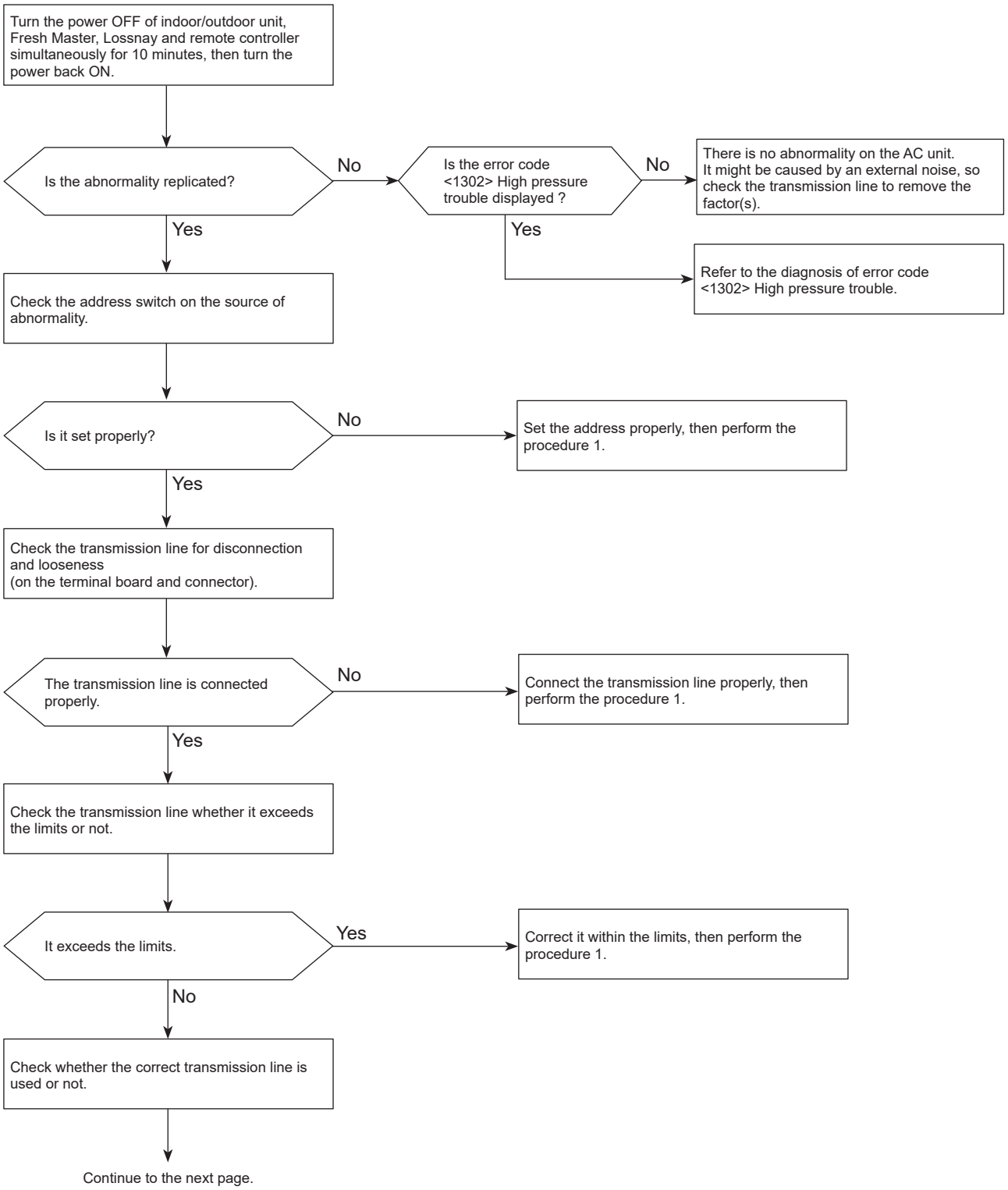
6607 (A7): No ACK error

Diagnosis of failure

Note:

- When the address of the outdoor unit is displayed as abnormal, the outdoor circuit board may be faulty. If the unit is not restored after conducting the following procedure, check the outdoor circuit board.

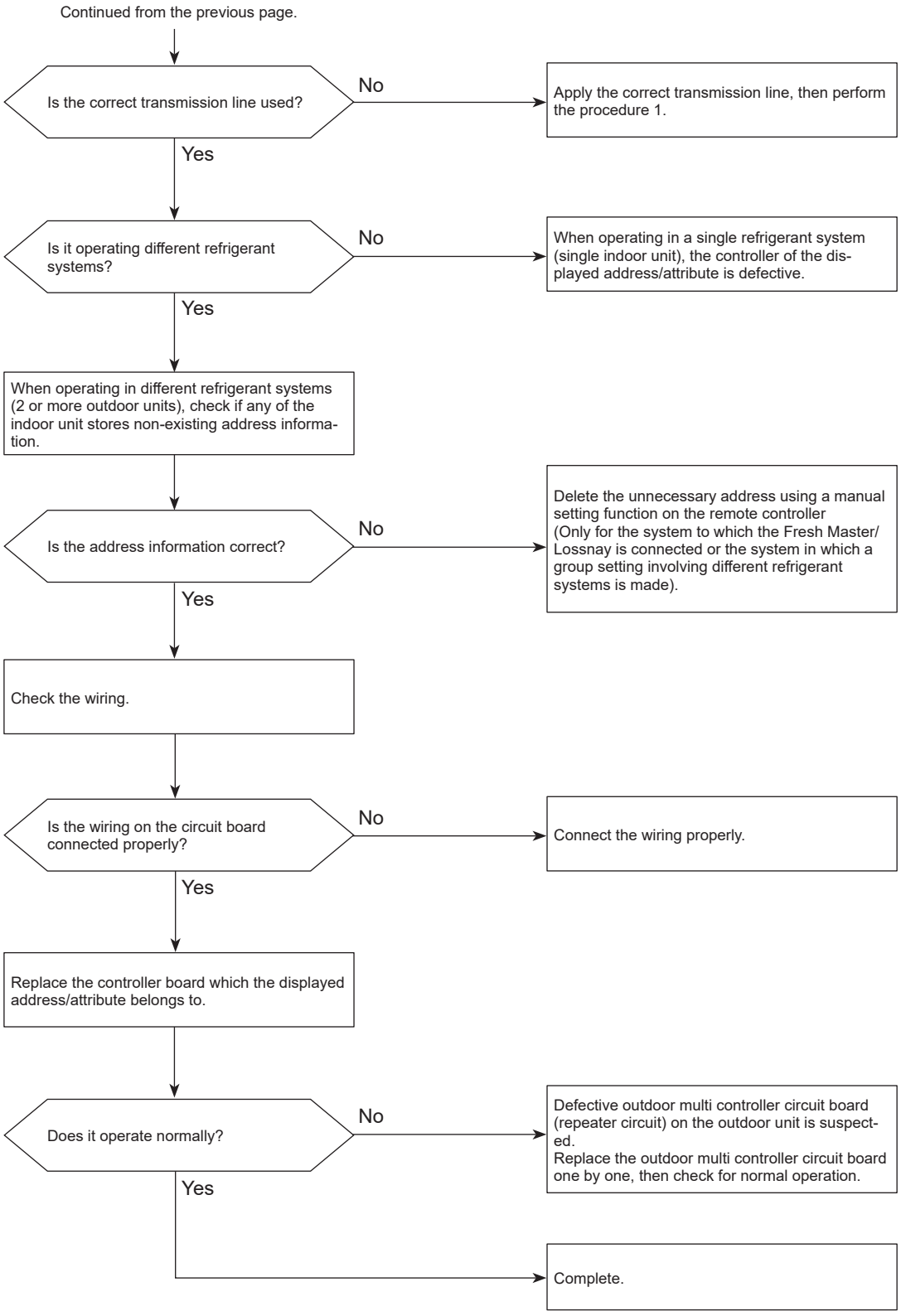
Procedure 1:



Continue to the next page.

6607 (A7): No ACK error

Diagnosis of failure



6608 (A8): No response frame error

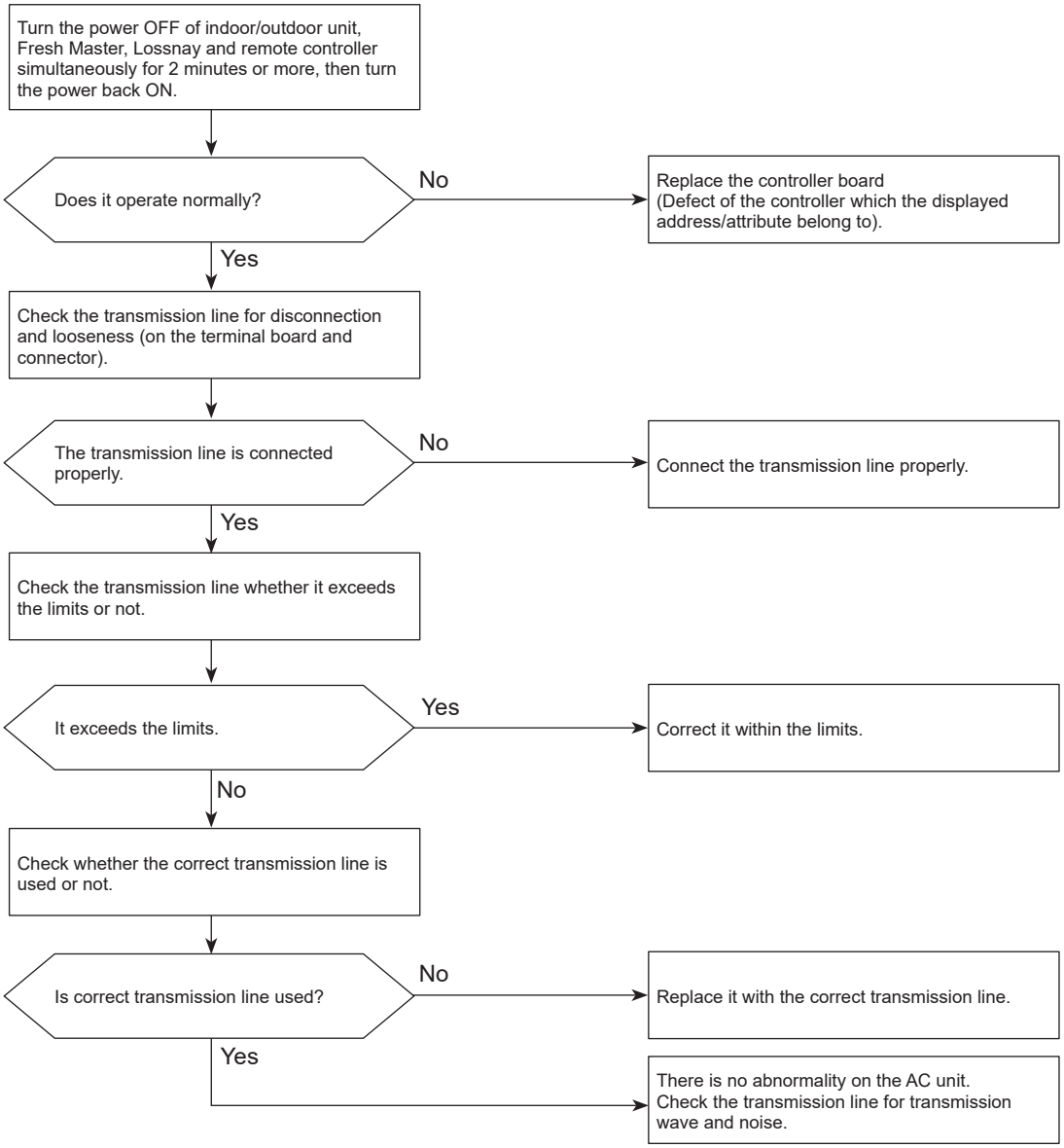
Abnormal points and detection methods

Although the sending side controller received ACK that notifies the reception of signal, no response command is transmitted from the receiving side.
The sending side detects the abnormality when that occurs 6 times in succession at 30 second intervals.

Causes and checkpoints

- Continuous failure of transmission due to noise, etc.
- Decline of transmission voltage/signal because the transmission line exceeds the following limits.
  - Indoor/outdoor transmission line maximum distance: 656 ft (200 m)
  - On remote controller line: 39 ft (12 m)
- Decline of transmission voltage/signal due to unmatched transmission line types
  - Types for shield line: CVVS, CPEVS, or MVVS
  - Line diameter: AWG 16 (1.25 mm^2) or more
- Accidental malfunction of error source controller

Diagnosis of failure



6815 (FH): MA supervisor remote controller communication error

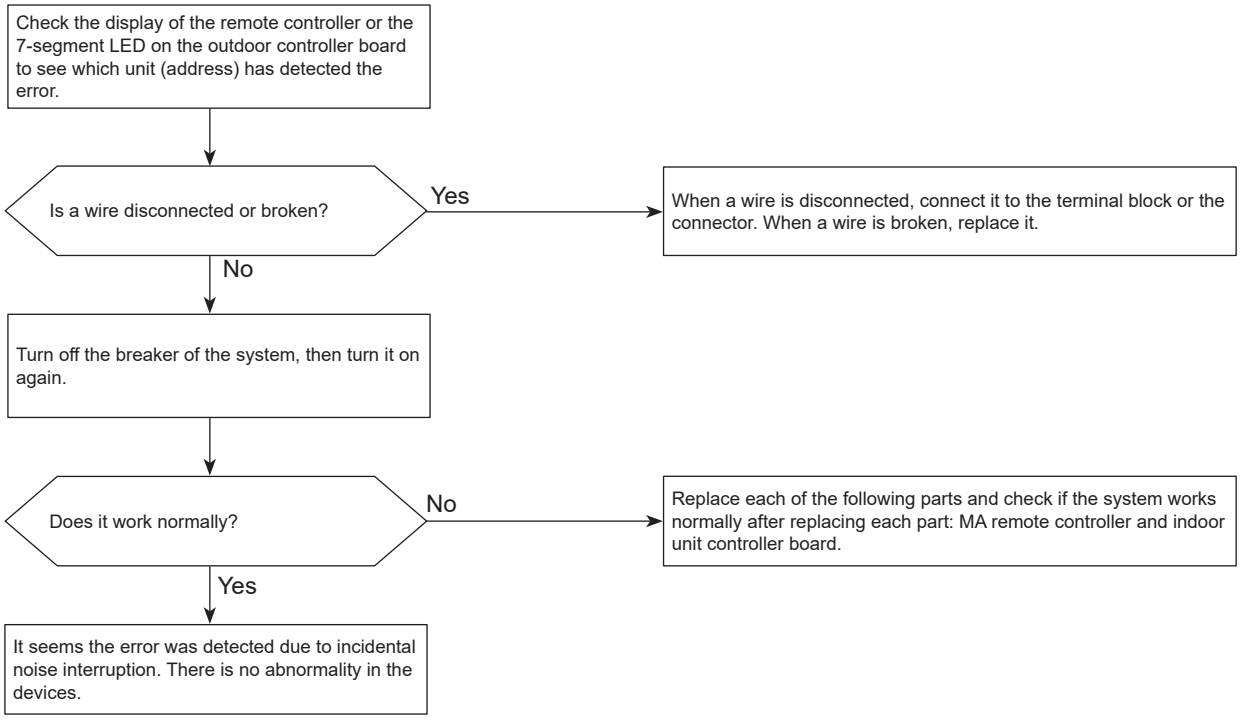
Abnormal points and detection methods

A communication error has occurred with an MA remote controller in supervisor mode.

Causes and checkpoints

- A wire of the MA remote controller in supervisor mode connected to the indoor unit is incorrect or broken.

Diagnosis of failure



6831 (E0)/6834 (E4): MA communication receive error

Abnormal points and detection methods

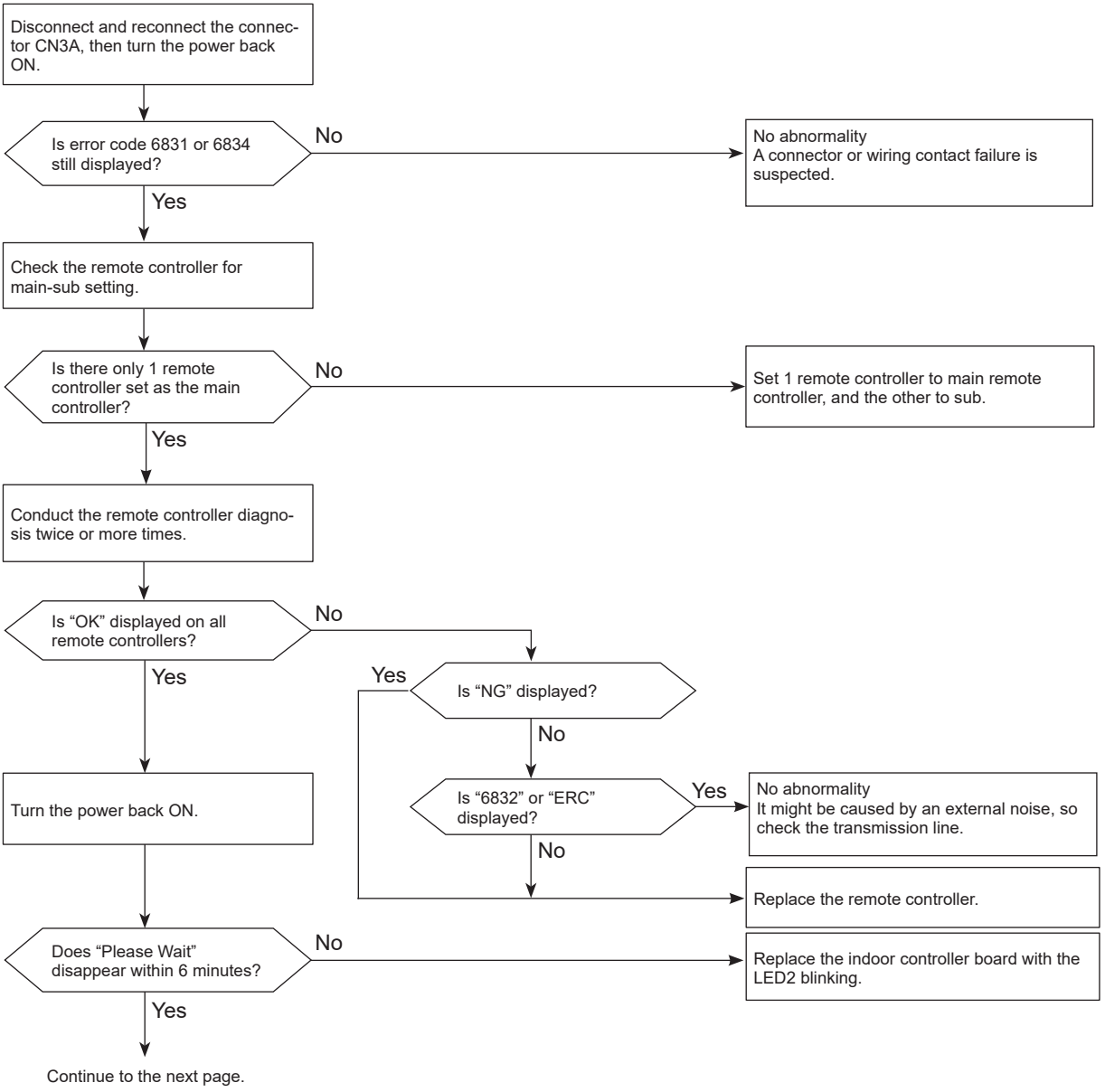
Detected in remote controller or indoor unit:

- The main or sub remote controller cannot receive signal from indoor unit which has the “0” address.
- The sub remote controller cannot receive signal.
- The indoor controller board cannot receive signal from remote controller or another indoor unit.
- The indoor controller board cannot receive signal.

Causes and checkpoints

- Contact failure of remote controller wiring
- Irregular wiring
  (A wiring length, number of connecting remote controllers or indoor units, or a wiring thickness does not meet the conditions specified in the chapter “Electrical Work” in the installation manual of the indoor unit.)
- Malfunction of the remote controller sending/receiving circuit in the indoor unit with the LED2 blinking.
- Malfunction of the remote controller sending/receiving circuit
- Remote controller transmitting error caused by noise interference

Diagnosis of failure



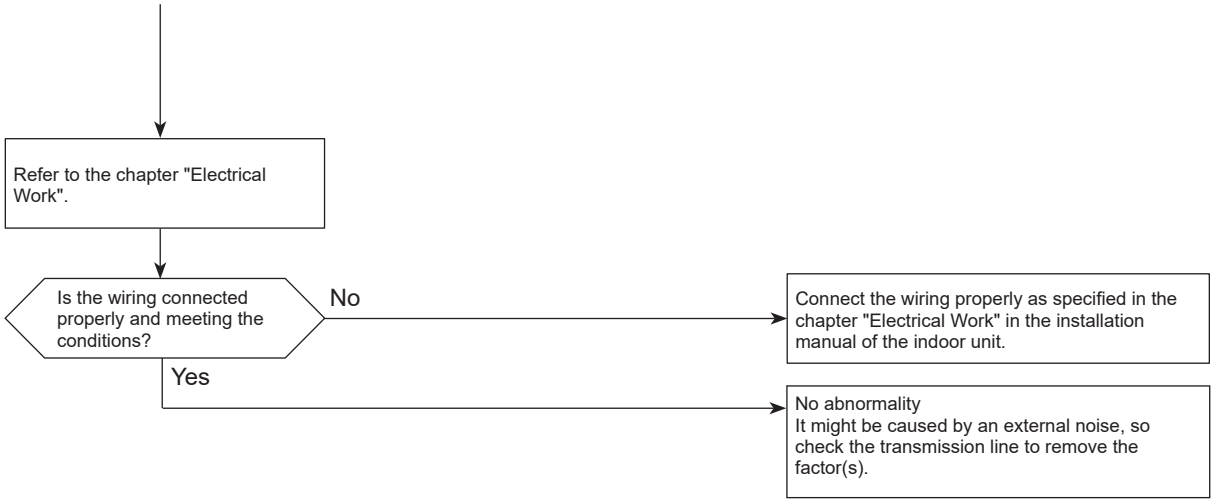
Note:

- It takes 6 seconds at maximum until the result is displayed.

6831 (E0)/6834 (E4): MA communication receive error

Diagnosis of failure

Continued from the previous page.



6831 (E4): Sensor and Alarm Kit communication error

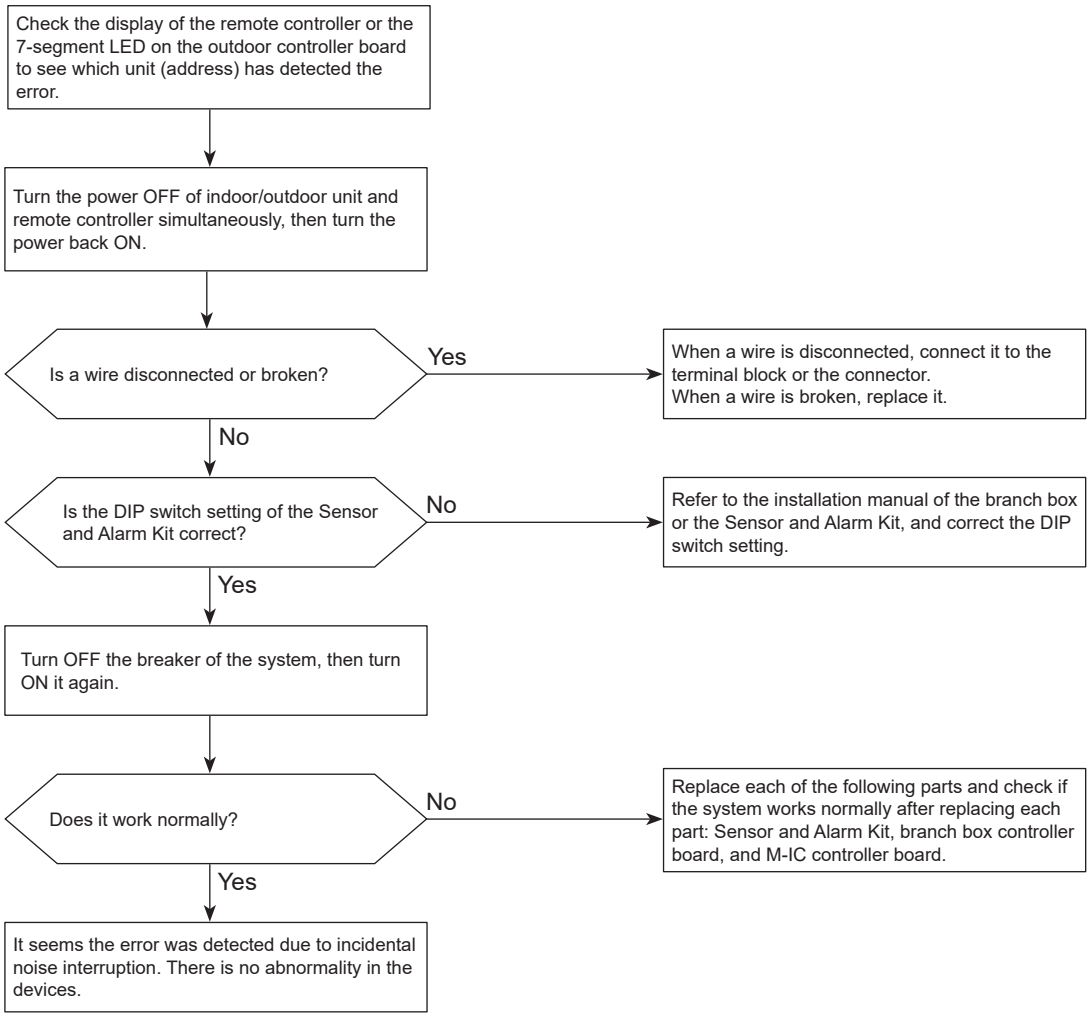
Abnormal points and detection methods

An communication error has occurred with a refrigerant sensor.

Causes and checkpoints

- A wire of a refrigerant sensor connected to an M-IC is incorrect or broken.
- A wire of a Sensor and Alarm Kit connected to a branch box is incorrect or broken, or a DIP switch has not been set.

Diagnosis of failure



6832 (E3)/6833 (E5): MA communication send error

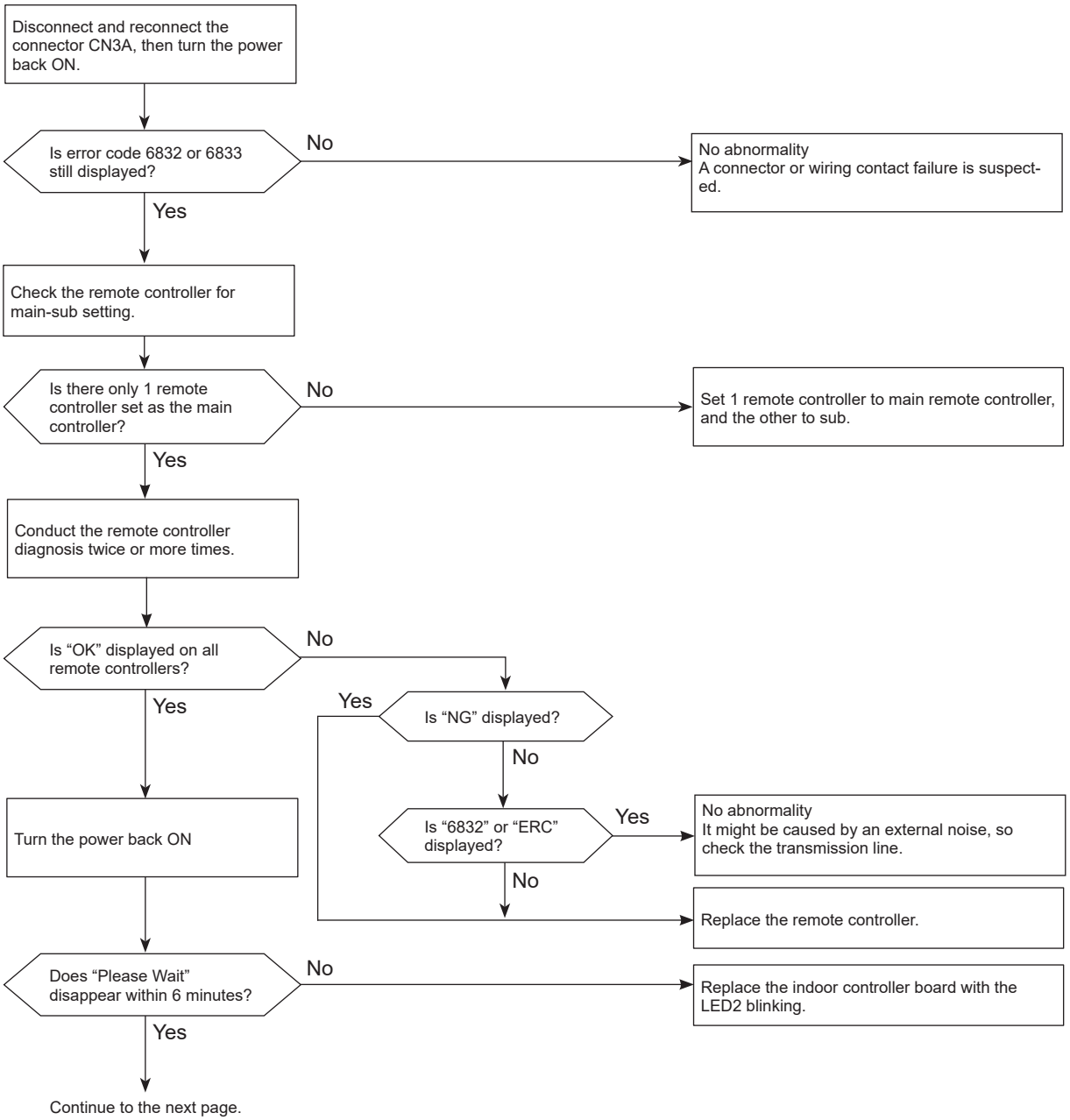
Abnormal points and detection methods

Detected in remote controller or indoor unit.

Causes and checkpoints

- There are 2 remote controllers set as main.
- Malfunction of remote controller sending/receiving circuit
- Malfunction of sending/receiving circuit on indoor controller board
- Remote controller transmitting error caused by noise interference

Diagnosis of failure



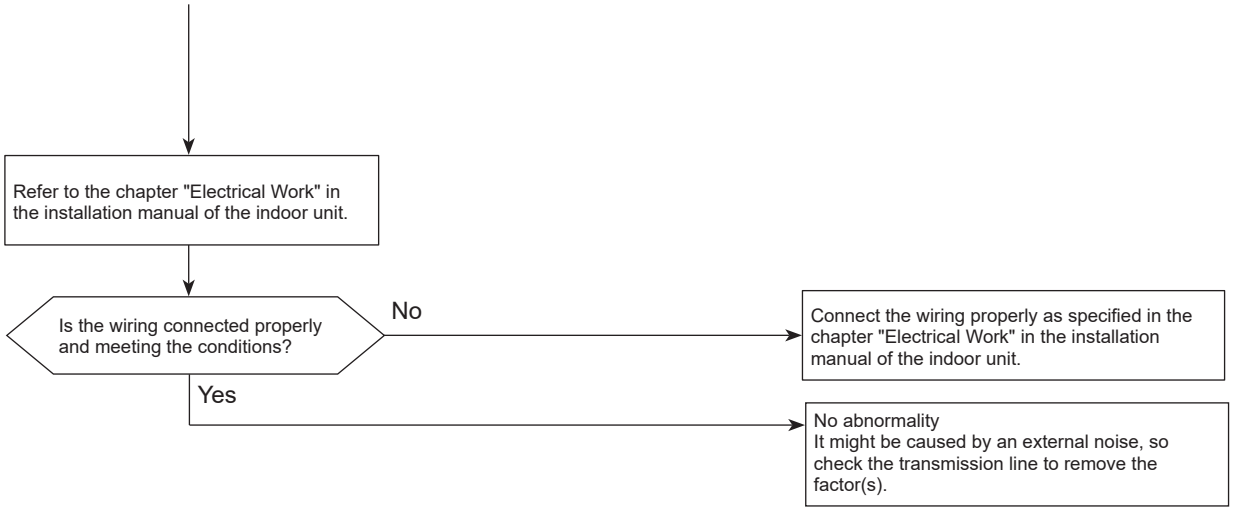
Note:

- It takes 6 seconds at maximum until the result is displayed.

6832 (E3)/6833 (E5): MA communication send error

Diagnosis of failure

Continued from the previous page.



7100 (EF): Total capacity error

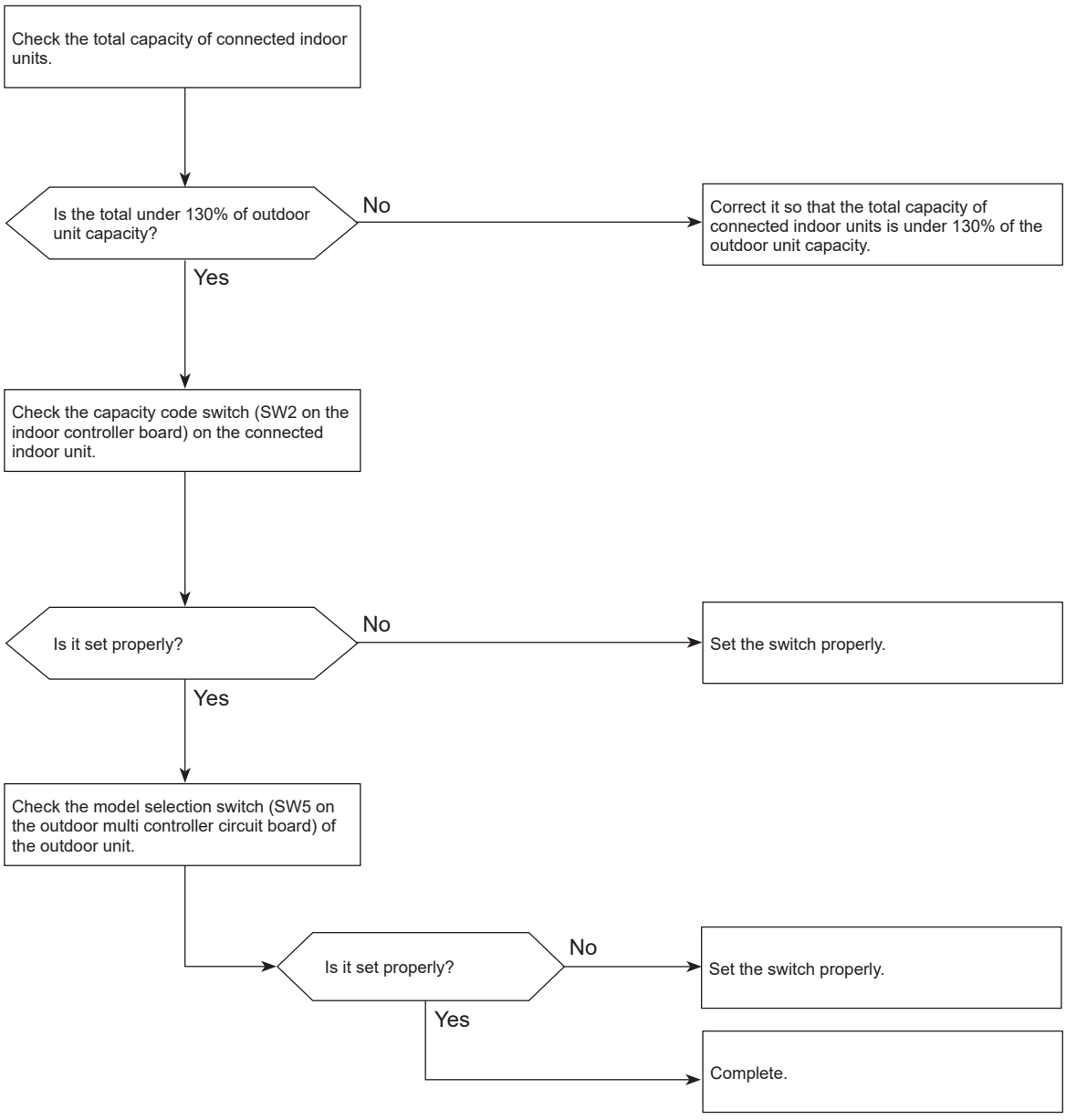
Abnormal points and detection methods

The sum of the model class of the connected indoor units exceeds the specified value (130% of the outdoor unit model class), error code 7100 is displayed.

Causes and checkpoints

- The total of number on connected indoor unit model names exceeds the specified capacity level.
- The setting of the model selection switches of the outdoor unit is registered wrongly.

Diagnosis of failure



7101 (EF): Capacity code error

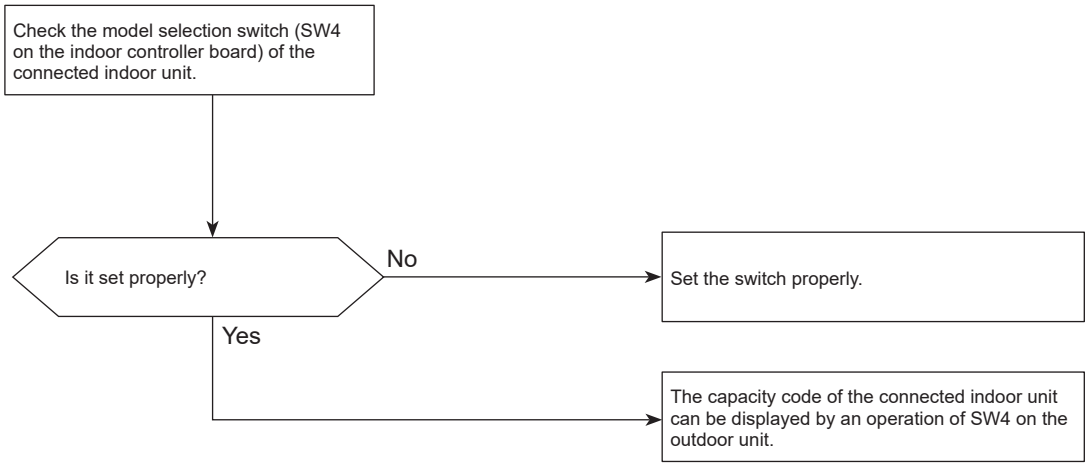
Abnormal points and detection methods

- A connected indoor unit is incompatible, error code 7101 is displayed.

Causes and checkpoints

The model name of connected indoor unit (capacity code) is read as incompatible.

Diagnosis of failure



7102 (EF): Connecting excessive number of units and branch boxes

Abnormal points and detection methods

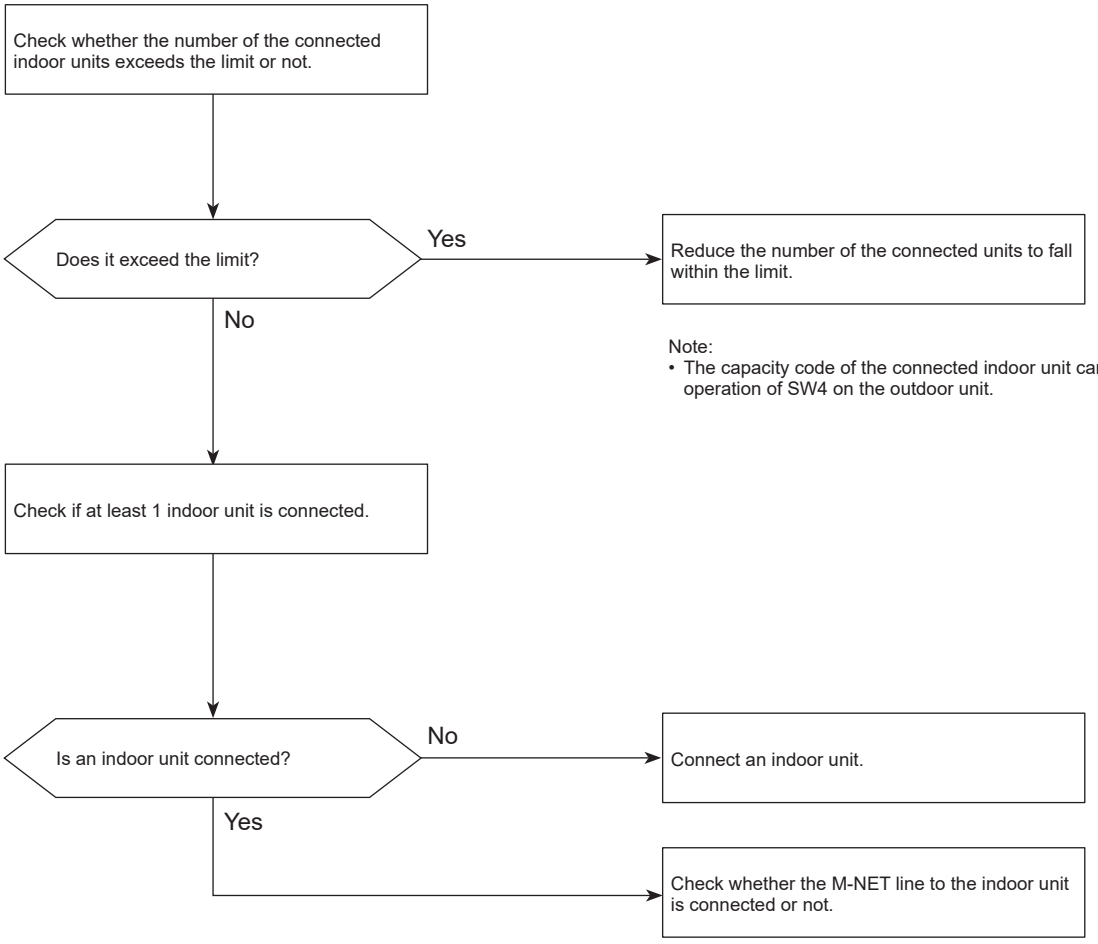
The number of the connected indoor units exceeds the limit, error code 7102 is displayed.

Causes and checkpoints

Connecting more indoor units and branch boxes than the limit.
If connecting status does not comply with the following limit;

- Maximum connectable indoor unit.
- Connect at least 1 indoor unit (Abnormal if connected none).
- Connectable up to 2 branch boxes

Diagnosis of failure



Note:

- The capacity code of the connected indoor unit can be displayed by an operation of SW4 on the outdoor unit.

7105 (EF): Address setting error

Abnormal points and detection methods

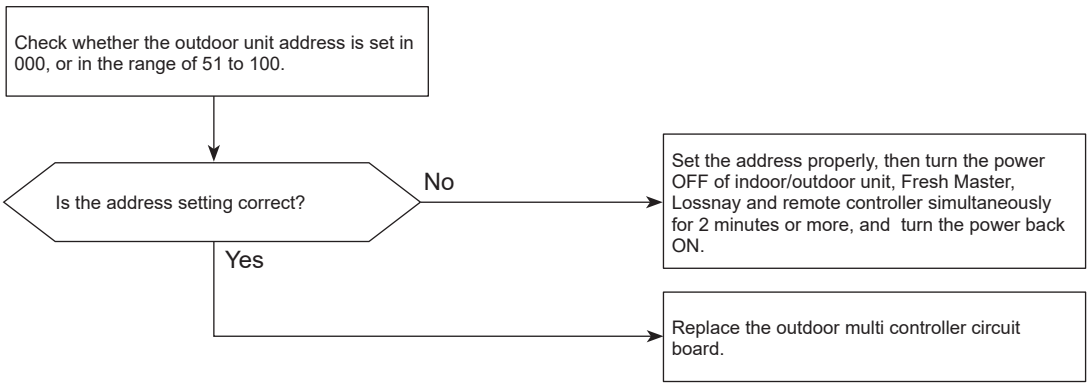
The address setting is wrong.

Causes and checkpoints

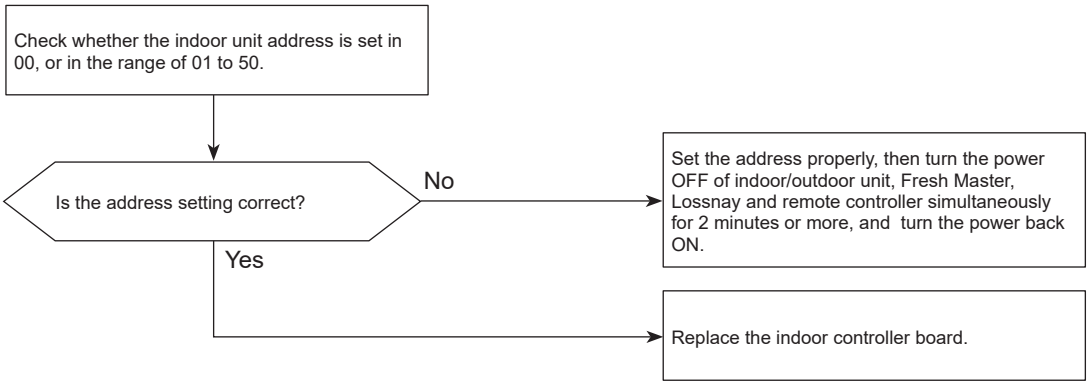
There is a unit without correct address setting in the range specified in the installation manual.

Diagnosis of failure

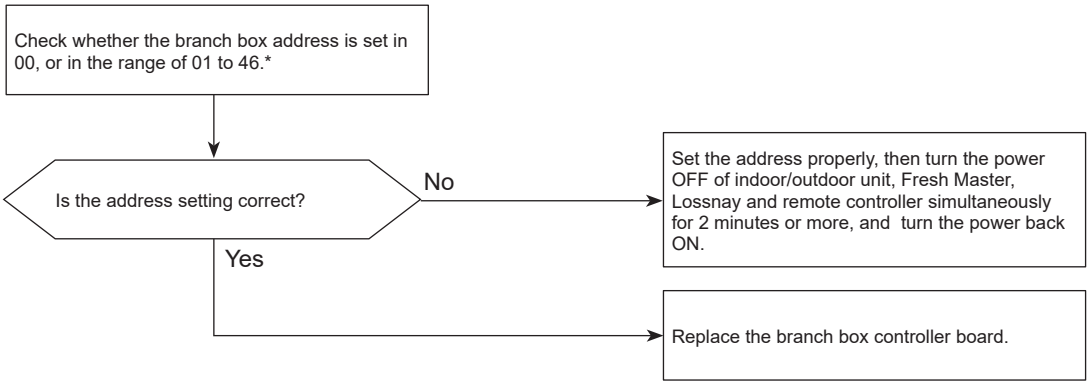
<Outdoor unit>



<Indoor unit>



<Branch box>



* Branch box port addresses are set sequentially and they must not exceed 50. For example, when 5 indoor units are connected and the branch box address (port A address) is set to 47, it is not allowable because the port E address exceeds 50 (A: 47, B: 48, C: 49, D: 50, E: 51).

7121 (EF): Power supply failure

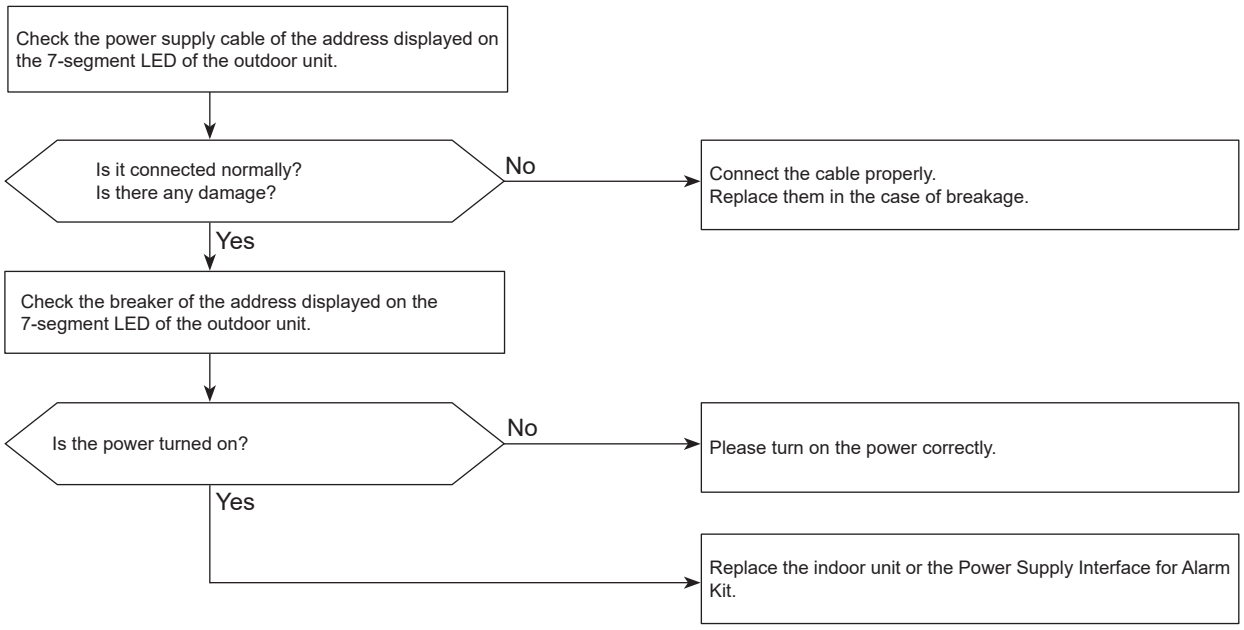
Abnormal points and detection methods

- Occurs when power is not supplied to the indoor unit or the Power Supply Interface for Alarm Kit at the initial startup of the outdoor unit.

Causes and checkpoints

- Power is not supplied to the indoor unit or the Power Supply Interface for Alarm Kit.
- Check whether the indoor unit or the Power Supply Interface for Alarm Kit is properly connected.

Diagnosis of failure



7130 (EE): Incompatible unit combination error

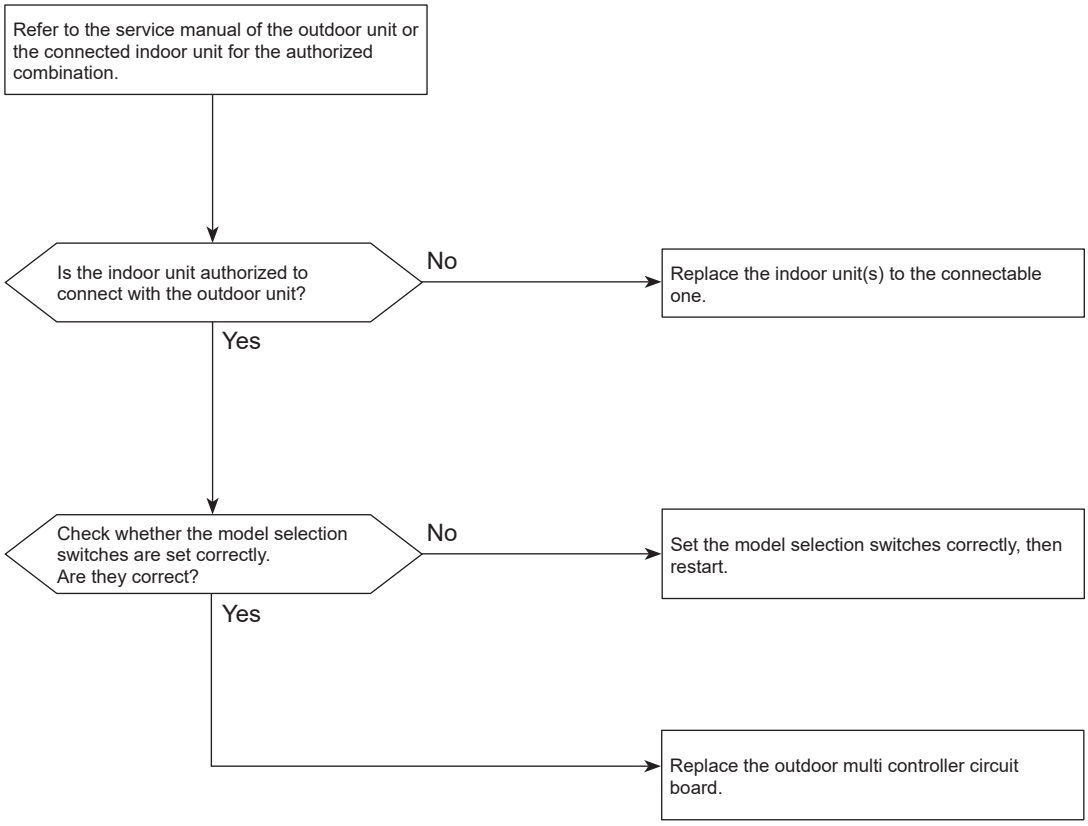
Abnormal points and detection methods

The connected indoor unit is not compatible with the outdoor unit, the outdoor unit detects the error at startup.

Causes and checkpoints

Connecting indoor unit(s) which is not authorized to connect to the outdoor unit.

Diagnosis of failure



8-2. Remote controller diagnosis

Refer to “Remote controller check” in MA remote controller operation manual.

8-3. Remote controller trouble

8-3-1. For MA remote controller systems

Symptom or inspection code	Cause
Though the content of operation is displayed on the remote controller, some indoor units do not operate.	• The power supply of the indoor unit is not on. • Wiring between indoor units in the same group is not finished. • M-IC and A-IC are connected in the same group. • The fuse on the indoor unit controller board is blown.
Though the indoor unit operates, the display of the remote controller goes out soon.	• The power supply of the indoor unit (Main) is not on. • In the case of connecting the system controller, the setting of the system controller does not correspond to that of MA remote controller. • The fuse on the indoor unit (Main) controller board is blown.
The display of the remote controller does not come up.	The remote controller is not fed until the power supply of both indoor unit and outdoor unit is on and the startup of both units is finished normally. • The power supply of the indoor unit is not on. • The power supply of the outdoor unit is not on. • The number of connected remote controllers is over the limit (Maximum: 2 units) or the number of connected indoor units is over the limit (Maximum: 16 units). • The address of the indoor unit is “00” and the address for the outdoor unit is the one other than “00”. • The transmission line of the indoor/outdoor unit is connected to TB15. • MA remote controller is connected to the transmission line of the indoor/outdoor unit. • The remote controller cable is shorted or down. • The power supply cable or the transmission line is shorted or down. • The fuse on the indoor unit controller board is blown.
“Please Wait” keeps being displayed or it is displayed periodically. (“Please Wait” is usually displayed for 3 minutes after the power supply of the outdoor unit is on.)	• The power supply of the outdoor unit is not on. • The power supply of the feeding expansion unit for the transmission line is not on. • The setting of MA remote controller is not main remote controller, but sub-remote controller. • MA remote controller is connected to the transmission line of the indoor/outdoor unit.
The remote controller does not operate.	• The power supply of the indoor unit (Main) is not on. • The transmission line of the indoor/outdoor unit is connected to TB15. • The transmission line of the indoor/outdoor unit is shorted, down or badly contacted. • The fuse on the indoor unit controller board is blown.

Inspection method and solution	
• Check the part where the abnormality occurs. 1. The entire system 2. In the entire refrigerant system 3. In the same group only 4. 1 indoor unit only	In the case of the entire system or in the entire refrigerant system • Check the self-diagnosis LED of the outdoor unit. • Check the items shown in the left that are related to the outdoor unit. In the case of in the same group only or 1 indoor unit only • Check the items shown in the left that are related to the indoor unit.

8-4. The following symptoms do not represent product failure

Symptom	Cause
Even the cooling (heating) operation selection button is pressed, the indoor unit cannot be operated. Display: "Cooling (Heating)" blinks	The indoor unit cannot cool (heat) if other indoor units are heating (cooling).
The auto vane runs freely. Display: Normal display	Because of the control operation of auto vane, it may change over to horizontal blow automatically from the downward blow in cooling because the downward blow operation has been continued for 1 hour. At defrosting in heating, hot adjusting and thermostat OFF, it automatically changes over to horizontal blow.
Fan setting changes during heating. Display: Normal display	Ultra-low speed operation is commenced at thermostat OFF. Light air automatically change over to set value by time or piping temperature at thermostat ON.
Fan stops during heating operation. Display: "Heat Defrost ☼"	The fan stops during defrosting.
Fan does not stop while operation has been stopped. Display: Light is off	Fan runs for 1 minute after stopping to exhaust residual heat (only in heating).
No setting of fan while start SW has been turned on. Display: "Heat Standby ☼"	Ultra-low speed operation for 5 minutes after SW ON or until piping temperature reaches 95°F (35°C). Then low speed operates for 2 minutes and operates at the normal set air volume. (Hot adjust control)
Indoor unit remote controller shows "Please Wait" indicator for about 2 minutes when turning ON power supply. Display: "Please Wait" blinks	The system is in the process of startup. Operate remote controller again after “Please Wait” disappears.
Drain pump does not stop while unit has been stopped. Display: Light is off	After a stop of cooling operation, unit continues to operate drain pump for 3 minutes and then stops.
Drain pump continues to operate while unit has been stopped. Display: —	Unit continues to operate drain pump if drainage is generated, even during a stop.

8-5. Internal switch function table

8-5-1. Function of switches

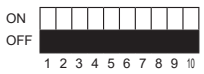
■ SWU1 and SWU2

SWU2 (tens digit) SWU1 (ones digit)

Bit	When to set
Rotary switch	Before turning the power ON

■ SW4: Digital display switch

Initial setting



The black square (■) indicates a switch position.

Bit	When to set	Purpose
1-10	Any time	To display outdoor unit’s information to the LED on outdoor multi controller circuit board. Refer to “8-10. Outdoor unit information display”.

■ SW5: Function switch

Initial setting

* Initial settings for SW5-3, 5-4, 5-5, and 5-6 are depending on the capacity.

The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	Select operating system startup	With centralized controller	Without centralized controller	Before turning the power ON	Turn ON when the centralized controller is connected to the outdoor unit.	• SW5-1 must be turned ON if a centralized controller is connected to the system. An example of this would be a TC-24, EB50A, AG150, AE50 or AE200. If SW5-1 is OFF, while using a centralized controller, in rare circumstances problems may be encountered such as indoor units not responding to group commands. • Group setting of 2 or more A-IC units which are connected to branch box via centralized controller is not allowed.
2	Clear connection information	Activated	Deactivated	Before turning the power ON	To clear connection information.	• Clear connection information when relocating units or connecting additional units.
3 4 5 6	Model selection			Before turning the power ON	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-

■ SW6: Function switch

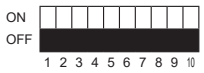
Initial setting

The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	ON/OFF from outdoor unit	Activated	Deactivated	Anytime after the power is turned ON	-	-
2	Mode setting	Heating	Cooling	Anytime after the power is turned ON	-	-
3	Manual defrost	Activated	Deactivated	While the compressor is running in Heating mode	Turn ON when it is necessary to perform the defrosting operation forcedly. (Effective only at startup, or 10 minutes after the last defrosting operation)	It performs the defrosting operation forcedly. (Heating operation is stopped temporarily.)
4	Ignore current sensor abnormality and rotational frequency abnormality of outdoor fan motor	Activated	Deactivated	Anytime after the power is turned ON	To perform a test run for electrical parts alone without running the compressor. Also, to perform the troubleshooting of electrical parts without operating the outdoor unit's fan.	Make sure to connect the connectors to the compressor after checking the electrical parts. Be careful not to get electrical shock while working on electrical parts.
5	Pump down	Activated	Deactivated	While the compressor is running	To facilitate outdoor unit the pumping down operation. Frequency = Fixed to 65 Hz Indoor-linear expansion valve = Fully open Outdoor fan step = Fixed to 10	Refer to a section referring to the pumping down on outdoor units installation manuals. It might not be possible to collect all the refrigerant if the amount is excessive. Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.
6	Refrigerant recovery operation when a communication error occurs	Activated	Deactivated	Any time	Performs refrigerant recovery operation when a communication error occurs for safety purpose	Set this function to OFF during installation or servicing, otherwise refrigerant recovery operation is activated frequently. Switch it to ON when a test run is completed for safety purpose.
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	Self-diagnosis monitor display / SW4 function setting mode	SW4 function setting mode	Self-diagnosis monitor display	Anytime after the power is turned ON.	-	-

■ SW7: Function switch

Initial setting



The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-

8-5-2. Additional DIP switch settings at the time of shipment

To set the function, turn on SW6-10, set SW4, and then press and hold down SWP3 for 2 seconds or longer. This changes the setting (OFF/ON). The setting is displayed on LED1 by illuminating “Pattern No.” and “ON” or ”OFF” alternately at intervals of 1 second. Make sure that the function is set correctly. You need to reset the settings when replacing the controller board. Write the setting you have selected in the electric wiring label on the service panel.

Function Item No.	Switch (SW4) 12345678910	Function	Operation in each switch setting			Purpose	Additional information
			ON	OFF	When to set		
0001	1000000000	Clear abnormal data	Activated	Deactivated	OFF to ON any time after the power is turned on	To delete an error history.	-
0003	1100000000	Switching the target discharge pressure (Pdm)	Activated	Deactivated	Any time	To raise the performance by setting the Pdm higher during HEAT operation.*1	Power consumption increases due to a higher frequency. (The performance would not increase at the maximum operating frequency.) Refrigerant flow noise may occur during heating operation.
0004	0010000000	Switching (1) the target evaporation temperature (ETm)	Activated	Deactivated	Any time	To raise/lower the temperature by changing the target ETm during COOL operation. Switch to lower the temperature: raises the performance Switch to raise the temperature: prevents condensation.*2	Switching it to lower the temperature, it raises the power consumption, and produces more condensation. Switching it to raise the temperature, it makes the performance insufficient.
0005	1010000000	Switching (2) the target evaporation temperature (ETm)	Activated	Deactivated	Any time		
0006	0110000000	Switching the primary current limitation	Activated	Deactivated	When the compressor is stopped	To lower the primary current limit by 29.5 A. This switch is used for a model with a breaker capacity 40 A.	The performance of the unit might be somewhat reduced since the frequency would not rise enough due to the lowered current limitation.
0008	0001000000	Decreasing the target subcool (Heating mode)	Activated	Deactivated	Any time	To reduce the discharge temperature decrease due to refrigerant liquid accumulation in the units	A refrigerant flow noise might be generated if the subcool value is too small.
0009	1001000000	Auto change over from remote controller (IC with the minimum address)	Activated	Deactivated	When the compressor is stopped	Enables the indoor unit with the minimum address to select AUTO mode, and switches the operation mode of the other indoor units to the same mode	Cannot be set when the centralized control is ON.
0012	0011000000	Change of defrosting control	Activated (For high humidity)	Deactivated	Any time	To shorten the defrosting prohibition time in high humidity (or heavy snow) region, in order to reduce malfunctions caused by frost	The performance of HEAT operation is somewhat reduced since the defrosting operation is frequently performed.
0015	1111000000	Auxiliary heater	Activated	Deactivated	When the compressor is stopped	To transmit a connection permission signal of the auxiliary heater to the connected CITY MULTI indoor unit	Turn ON the switch only when the auxiliary heater is connected and operated.
0016	0000100000	Simultaneous cooling and heating with external heater	Activated	Deactivated	Any time	The simultaneous operation of cooling and heating will be possible by installing an external heater to the CITY MULTI indoor unit.	For the installation of external heater and the indoor unit setting, refer to the indoor unit service manual.
0017	1000100000	High heating performance mode (except for NLHZ model)	Activated	Deactivated	Any time	To raise the performance of HEAT operation if it is insufficient	The performance may not be raised depending on the capacity of indoor units in operation, or outside air temperature.
0019	1100100000	Change the indoor unit’s LEV opening at startup	Activated	Deactivated	Any time	To set the LEV opening at startup higher than usual (+150 pulses), To improve the operation with the LEV almost clogged	The refrigerant flow noise at startup become louder.
0021	1010100000	Setting to energize the freeze stat heater (optional part) only during heating	Activated *3	Deactivated *4	Any time	To reduce snow on the base, even it blows inside the unit, by setting the base heater ON while the HEAT operation is stopped	Power consumption raises while the operation is stopped.
0025	1001100000	Change the indoor unit’s LEV opening at defrost	Activated	Deactivated	Any time	To set the LEV opening higher than usual during defrosting operation (Only Qj ≤ 10 is valid, + 300 pulses), To avoid the discharge temperature increase and provide efficient defrosting operation	The refrigerant flow noise during the defrosting operation become louder.

Function Item No.	Switch (SW4) 12345678910	Function	Operation in each switch setting			Purpose	Additional information
			ON	OFF	When to set		
0026	0101100000	While the outdoor unit is in HEAT operation, additionally increase by 50 to 70 pulses of the LEV opening on the indoor unit which is in FAN, STOP, COOL or thermo-OFF. *5	Activated	Deactivated	Any time	To additionally increase by about 50 to 70 pulses of the LEV opening for units other than in HEAT operation, To avoid a refrigerant shortage (less capacity) due to refrigerant liquid accumulation in the units which is not in operation	A refrigerant flow noise might be generated in units other than the one in operation.
0028	0011100000	While the outdoor unit is in HEAT operation, fully close the LEV on the indoor unit which is in FAN or COOL.*6	Activated	Deactivated	Any time	To reduce the room temperature increase by setting the LEV opening lower for the indoor units in FAN or COOL	The refrigerant is more likely to collect in the indoor units in FAN or COOL, which can cause refrigerant shortage of units, resulting in less capacity and increase in discharge temperature.
0029	1011100000	Maximum frequency down at 1 hour after COOL operation	Activated	Deactivated	Any time	To reduce dew condensation on the indoor unit by lowering the frequency	The performance might be insufficient.
0034	0100010000	Data collection enabled	Enabled	Disabled	Anytime after the power is turned ON.	Refer to “8-11. Operation data collection and storage functions.”	-
0035	1100010000	Data collection during an error	Disabled	Enabled	While the compressor is running in Heating mode	Refer to “8-11. Operation data collection and storage functions.”	-
0036	0010010000	Stop fan operation when an indoor unit is in thermo-OFF	Activated	Deactivated	Any time	To prevent a room temperature increasing or decreasing too much (This function is only for CITY MULTI indoor units.)	Fan operation of all the indoor units in thermo-OFF can be set to OFF by this function.
0121	1001111000	Switching CN51 (External signal output)	Activated	Deactivated	When the compressor is stopped	When this function is activated, external signal is output to integrate the unit with external devices when refrigerant leaks or a refrigerant sensor has an abnormality. External signal is not output when these abnormalities are canceled.	When this function is deactivated, external signal is output when other abnormalities occur and it is not output when these abnormalities are canceled.

*1.

No.0003		OFF	ON
Target Pdm (kgf/cm²)	36/48/60NL	27.9	29.8
	36/42/48NLHZ	29.8	31.7

*2.

No. 0004	OFF	ON	OFF	ON
No. 0005	OFF	OFF	ON	ON
Target ETm (°C)	9	11	6	5

*3. When the ambient temperature is 39°F (4°C) or below during heating operation, the freeze prevention heater is energized.

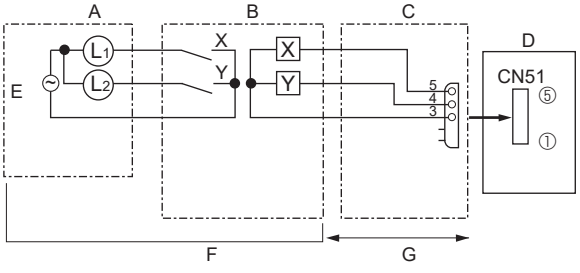
*4. When heating mode is OFF (include thermo-OFF in cooling mode), and the ambient temperature is 39°F (4°C) or below, the freeze prevention heater is energized.

*5. Function item No.0026 Opens the indoor-linear expansion valve as a countermeasure against the indoor unit in FAN, COOL, STOP, or thermo-OFF operation with refrigerant-shortage status due to an accumulation of liquid refrigerant in the indoor unit.

*6. Function item No.0028 Countermeasure against room temperature rise for indoor unit in FAN and COOL mode

8-6. Outdoor unit input/output connector

■ State (CN51)



A: Distant control board

B: Relay circuit

C: External output adapter (PAC-SA88HA-E)

D: Outdoor unit control board

E: Output power supply

F: Procure locally

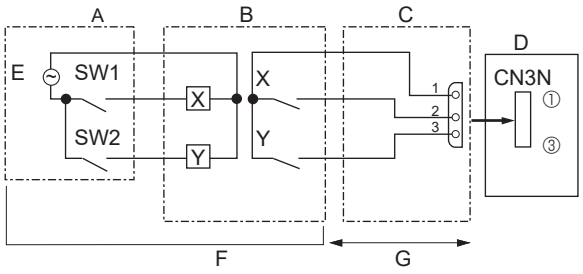
G: Max. 10m [32 ft]

L1: Error display output

L2: Compressor operation output

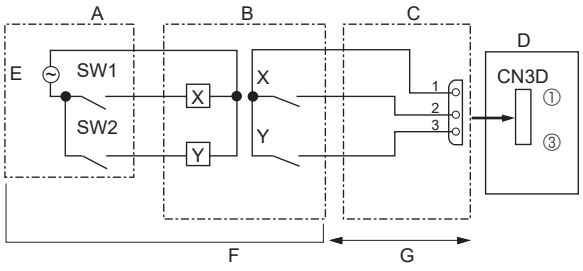
X, Y: Relay (coil rating: ≤ 0.9W. DC 12 VDC)

■ Auto changeover (CN3N)



A: Remote control panel
B: Relay circuit
C: External input adapter (PAC-SC36NA-E)
D: Outdoor unit control board
E: Relay power supply
F: Procure locally
G: Max. 10 m [32 ft]
SW1: Switch
SW2: Switch
X, Y: Relay (contact rating: ≥ 0.1 A. 15 VDC, min. applicable load: ≤ 1 mA)
SW1-ON: Heating, SW1-OFF: Cooling
SW2-ON: Validity of SW1, SW2-OFF: Invalidity of SW1

■ Silent Mode/Demand Control (CN3D)



A: Remote control panel
B: Relay circuit
C: External input adapter (PAC-SC36NA-E)
D: Outdoor unit control board
E: Relay power supply
F: Procure locally
G: Max. 10 m [32 ft]
SW1: Switch
SW2: Switch
X, Y: Relay (contact rating: ≥ 0.1 A. 15 VDC, min. applicable load: ≤ 1 mA)

	SW1	SW2	Function
Silent mode	ON	-	Silent mode operation

8-7. How to check the parts

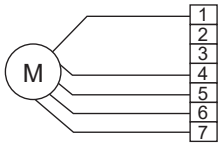
8-7-1. Checkpoints for each part

■ Thermistors

Disconnect the connector then measure the resistance with a multimeter (at the ambient temperature 50 to 86°F [10 to 30°C]).

Thermistors	Normal	Abnormal
TH4 (Compressor)	160 to 410 kΩ	Open or short
TH2 (HIC pipe)	4.3 to 9.6 kΩ	
TH3 (Outdoor liquid pipe)		
TH6 (Suction pipe)		
TH7 (Ambient)		
TH8 (Heat sink)	39 to 105 kΩ	

■ Fan motor (MF1, MF2)



Measure the resistance between the connector pins with a multimeter (at the ambient temperature 68°F [20°C]).

Connector pins	Normal	Abnormal
	SIC-82XX / SIC-88XX*	
1 - 4	1.1 ± 0.05 MΩ	Open or short (Short, for 7 - 4 and 5 - 4)
5 - 4	40 ± 4 kΩ	
6 - 4	220 ± 22 kΩ	
7 - 4	Open	

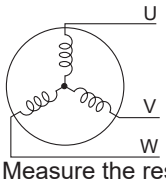
* See the spec name plate indicated in the diagram for the model name of fan motor.
"X" in the model name of fan motor represents numbers and letters.

■ Solenoid valve coil <4-way valve> (21S4)

Measure the resistance between the terminals with a multimeter (at the ambient temperature 68°F [20°C]).

Normal	Abnormal
1567.5 ± 156.8 Ω	Open or short

■ Motor for compressor (MC)



Measure the resistance between the terminals with a multimeter (at the ambient temperature 68°F [20°C]).

Model	Normal	Abnormal
MXZ-SM36NL-U1 MXZ-SM48NL-U1	0.440 ± 0.022 Ω	Open or short
MXZ-SM36NLHZ-U1 MXZ-SM42NLHZ-U1 MXZ-SM48NLHZ-U1 MXZ-SM60NL-U1	0.490 ± 0.025 Ω	Open or short

■ Solenoid valve coil <Bypass valve> (SV1, SV2*, SV3, SV6*)

* SV2 is only for NLHZ models.

Measure the resistance between the terminals with a multimeter (at the ambient temperature 68°F [20°C]).

Normal	Abnormal
1197 ± 10 Ω	Open or short

■ Liquid shut-off valve coil (SV4)

Measure the resistance between the terminals with a multimeter (at the ambient temperature 20°C).

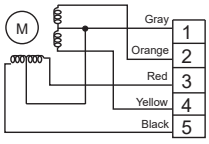
Normal	Abnormal
1182.5 ± 83 Ω	Open or short

■ Gas shut-off valve coil (SV5)

Measure the resistance between the terminals with a multimeter (at the ambient temperature 20°C).

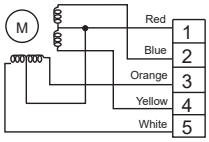
Normal	Abnormal
572.3 ± 40 Ω	Open or short

■ Linear expansion valve (LEV-A)



Connector pins	Normal	Abnormal
Gray - Black	46 ± 3 Ω	Open or short
Gray - Red		
Gray - Yellow		
Gray - Orange		

■ Linear expansion valve (LEV-B)



Connector pins	Normal	Abnormal
Red - White	46 ± 4 Ω	Open or short
Red - Orange		
Red - Yellow		
Red - Blue		

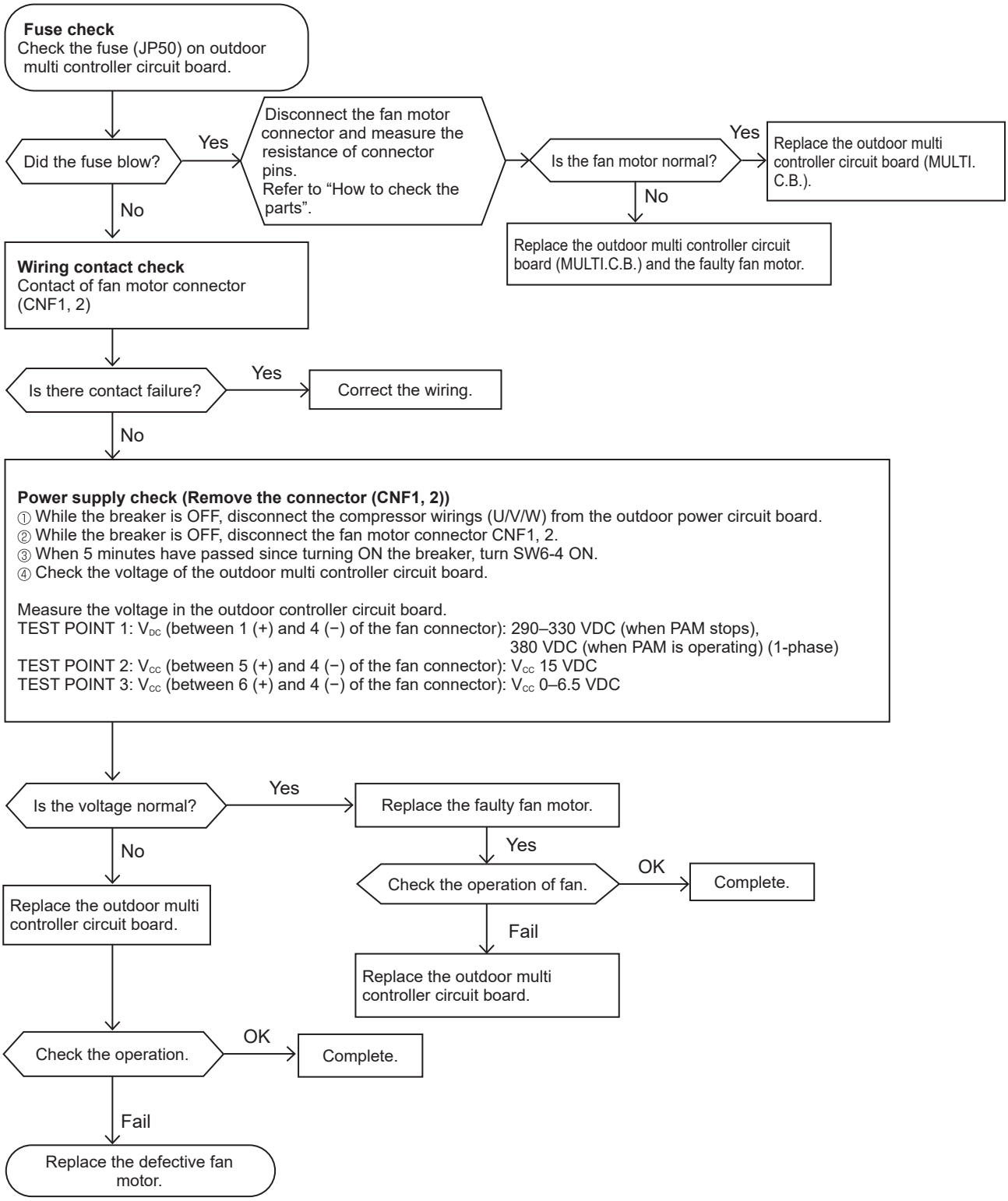
8-7-2. Check method of DC fan motor (fan motor/outdoor multi controller circuit board)

■ Precaution

- High voltage is applied to the connector (CNF1, 2) for the fan motor. Pay attention to the service.
- Do not pull out the connector (CNF1, 2) for the motor with the power supply on. (It causes trouble of the outdoor multi controller circuit board and fan motor.)

■ Self-check

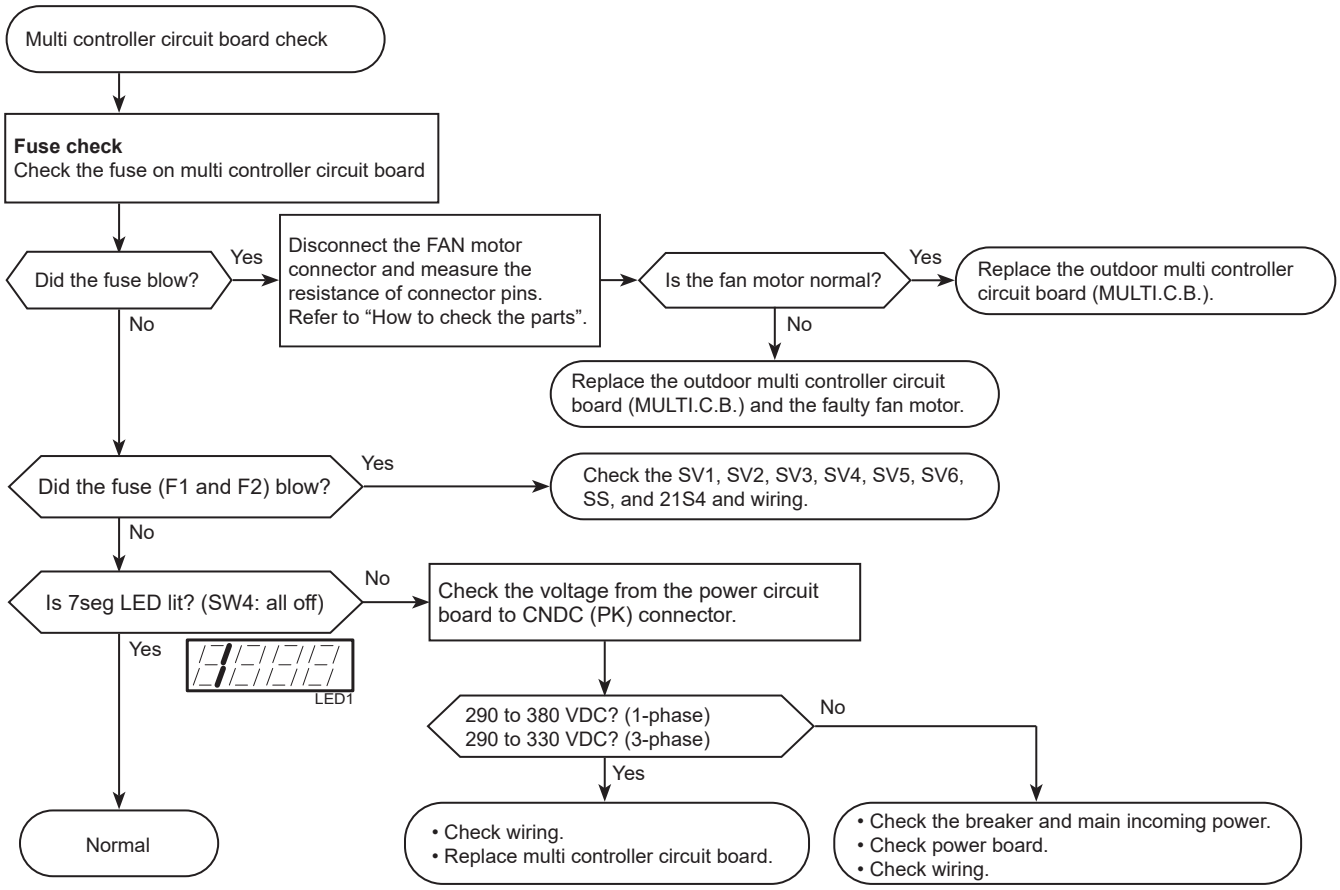
Symptom: The outdoor fan cannot rotate.

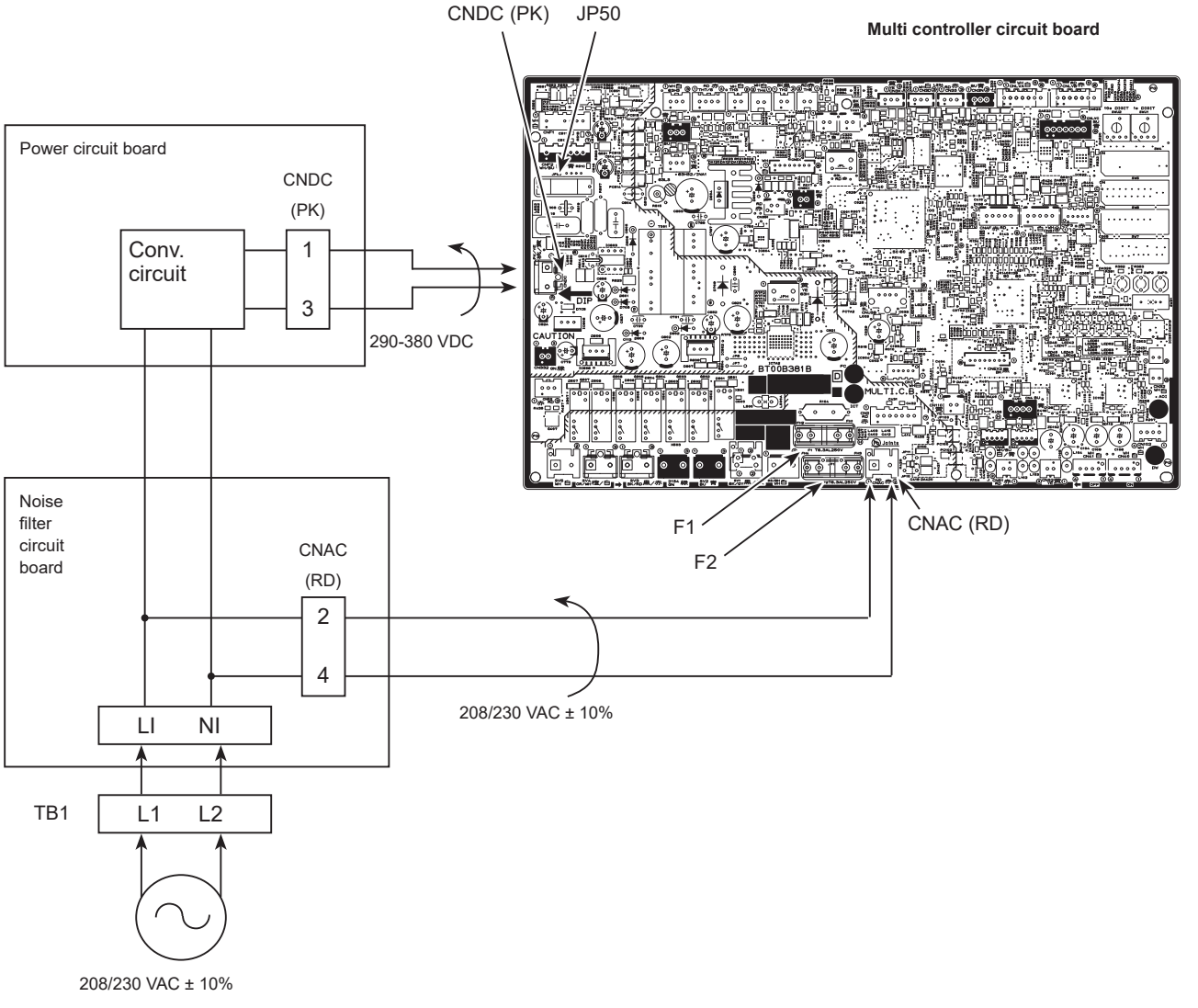


Note:

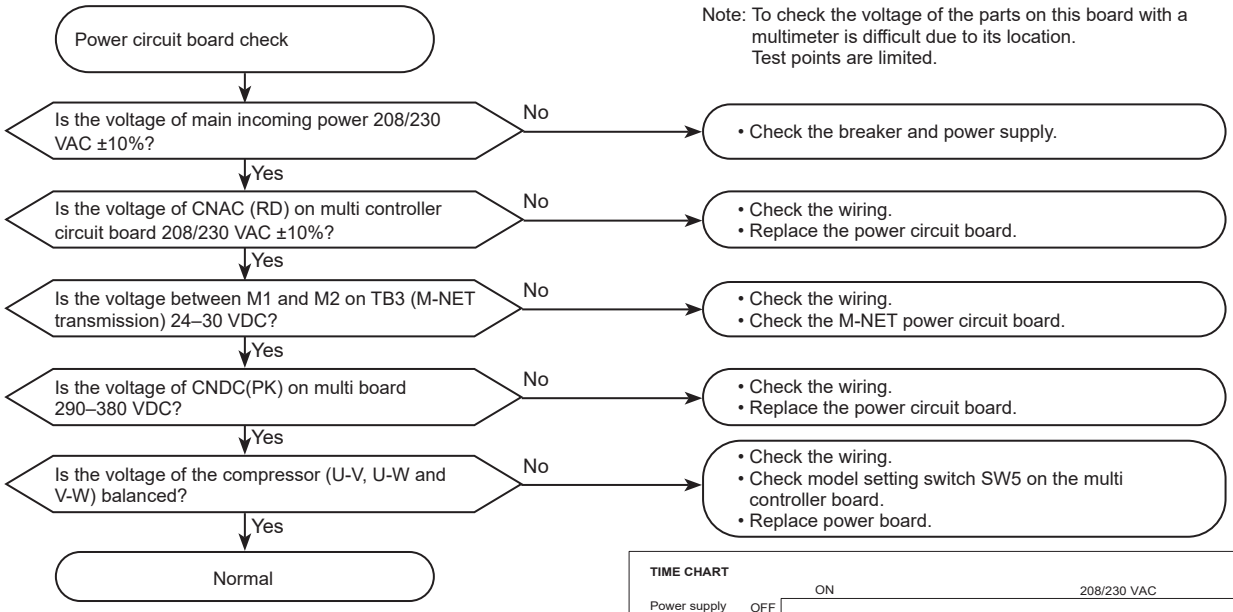
- Turn SW6-4 OFF after the troubleshooting completes.
- The fan sometimes starts on-off cycle operation during low load operation or cooling at low outside temperature. It is not abnormal; the operation ensures reliability of the product.

8-7-3. Check method of multi controller circuit board

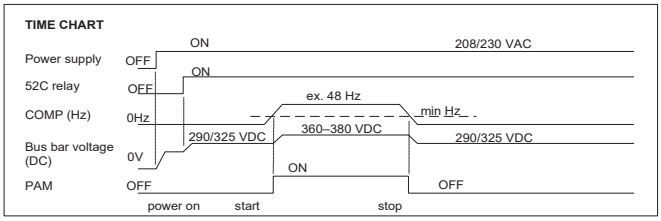




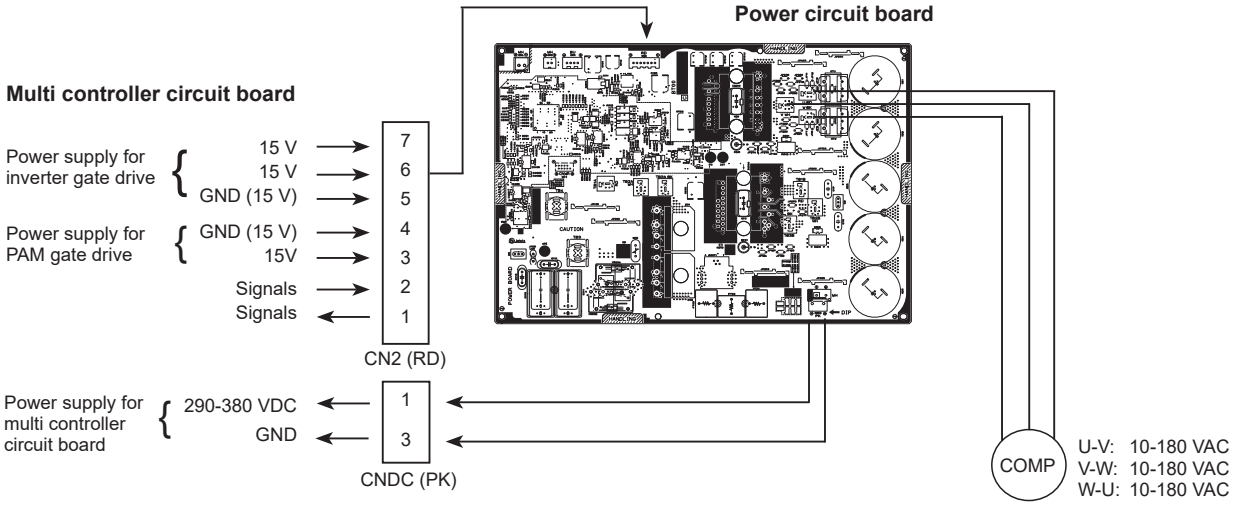
8-7-4. Check method of power circuit board

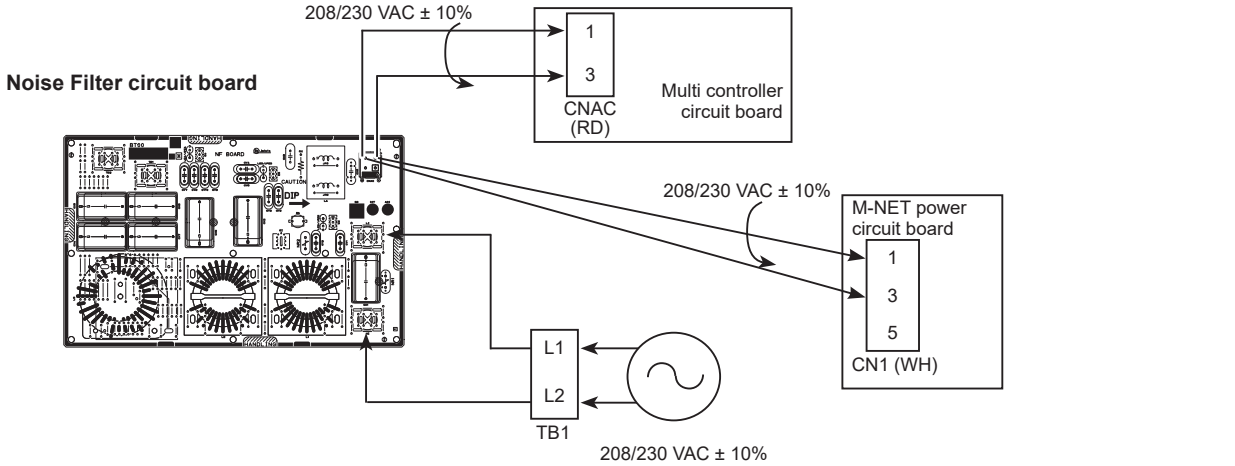


Note: To check the voltage of the parts on this board with a multimeter is difficult due to its location.
Test points are limited.

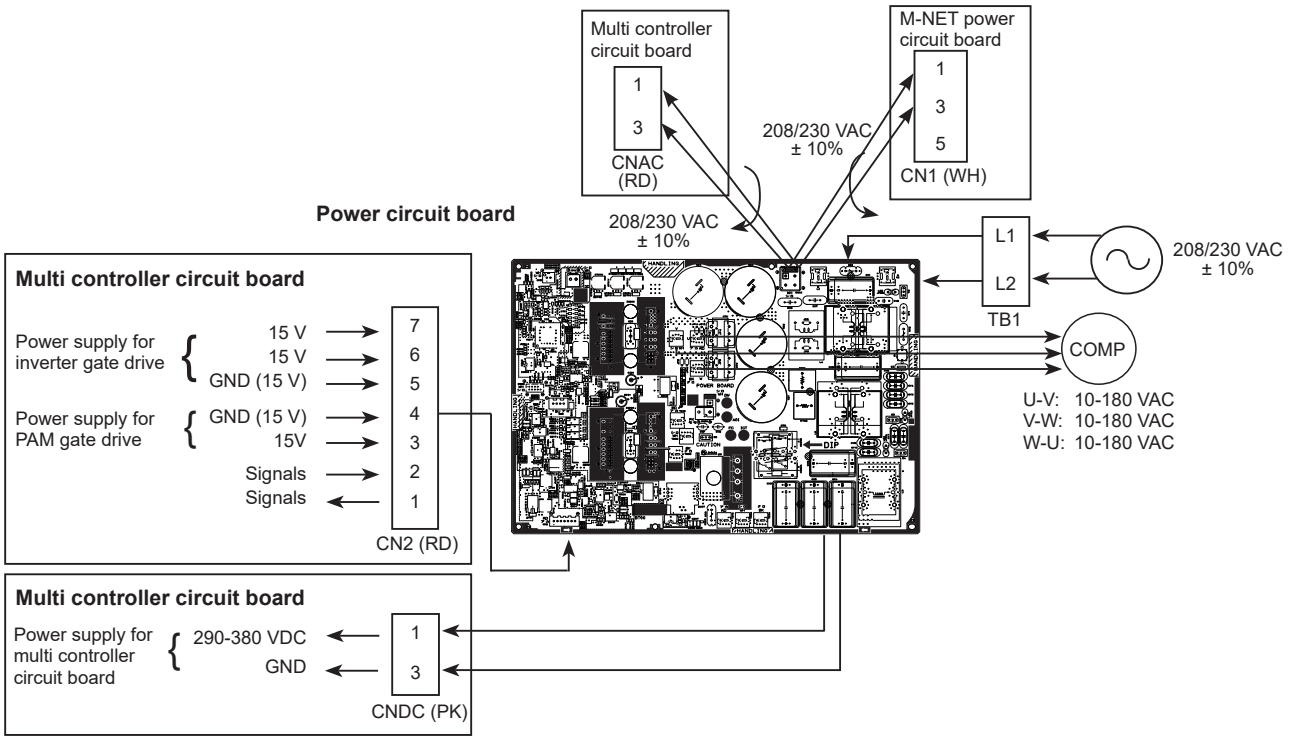


MXZ-SM36NLHZ-U1
MXZ-SM42NLHZ-U1
MXZ-SM48NLHZ-U1
MXZ-SM60NL-U1

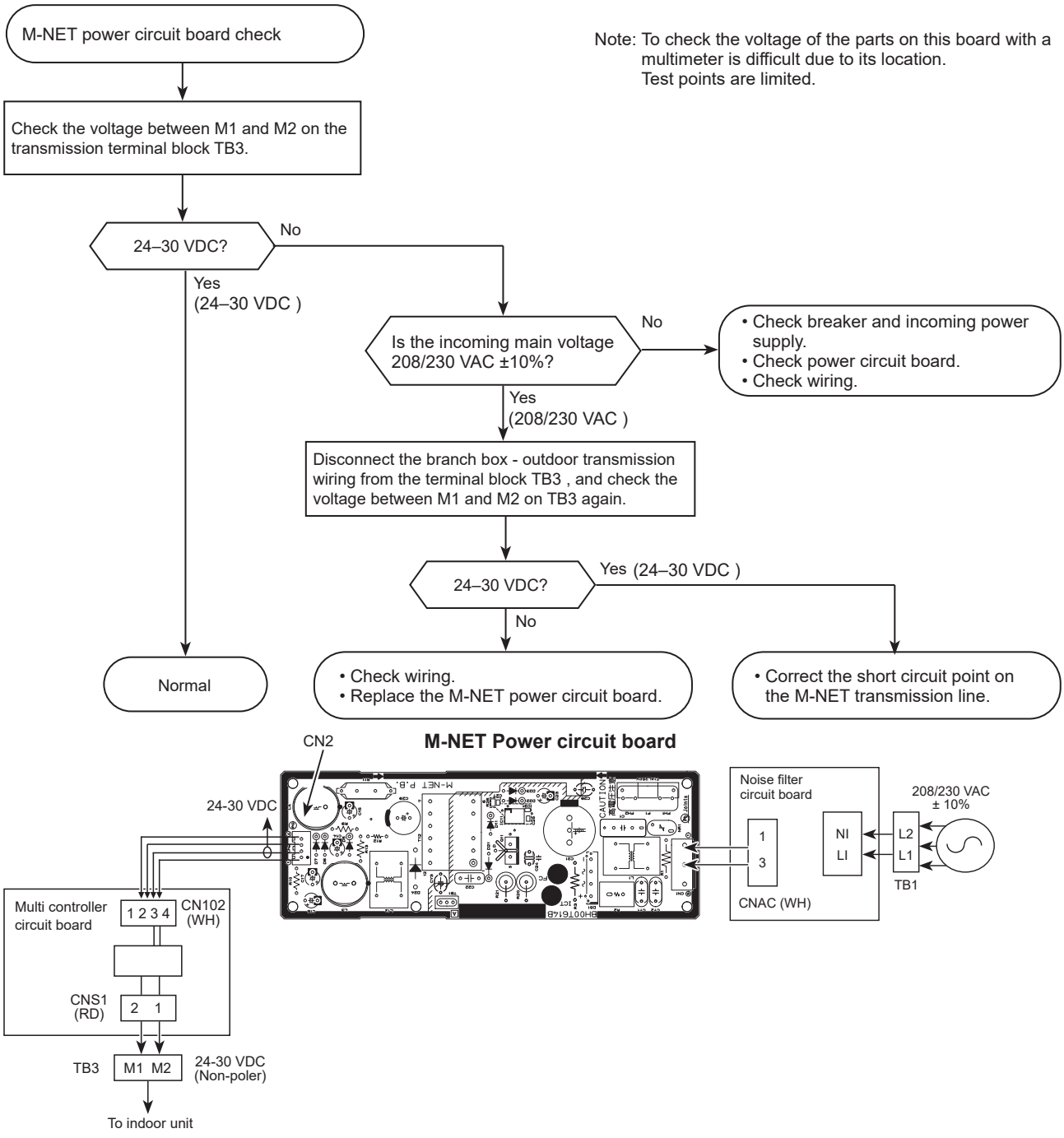




MXZ-SM36NL-U1
MXZ-SM48NL-U1



8-7-5. Check method of M-NET power circuit board



Note: To check the voltage of the parts on this board with a multimeter is difficult due to its location.
Test points are limited.

8-8. How to check the components

8-8-1. Thermistor feature chart

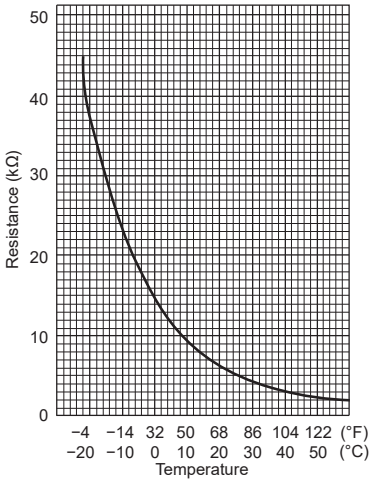
■ Low temperature thermistors

- TH2 (HIC pipe)
- TH3 (Outdoor liquid pipe)
- TH6 (Suction pipe)
- TH7 (Ambient)

Thermistor R0 = 15 kΩ ± 3 %
B constant = 3480 ± 1 %

$$R_t = 15\exp\{3480(\frac{1}{273+t} - \frac{1}{273})\}$$

Temperature	Resistance value
32°F (0°C)	15 kΩ
50°F (10°C)	9.6 kΩ
68°F (20°C)	6.3 kΩ
77°F (25°C)	5.2 kΩ
86°F (30°C)	4.3 kΩ
104°F (40°C)	3.0 kΩ



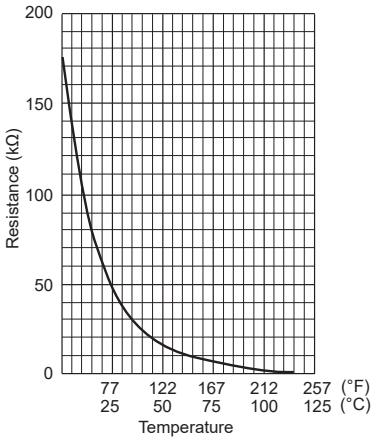
■ Medium temperature thermistor

- TH8 (Heat sink)

Thermistor R50 = 17 kΩ ± 2 %
B constant = 4150 ± 3 %

$$R_t = 17\exp\{4150(\frac{1}{273+t} - \frac{1}{323})\}$$

Temperature	Resistance value
32°F (0°C)	180 kΩ
77°F (25°C)	50 kΩ
122°F (50°C)	17 kΩ
158°F (70°C)	8 kΩ
194°F (90°C)	4 kΩ



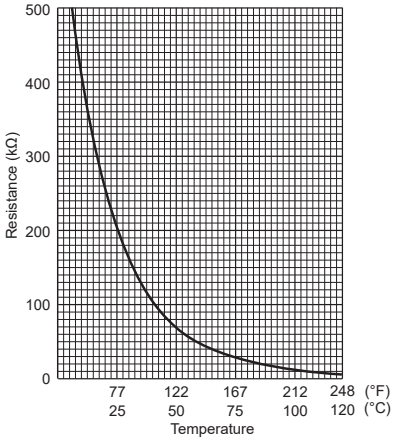
■ High temperature thermistor

- TH4 (Compressor)

Thermistor R120 = 7.465 kΩ ± 2 %
B constant = 4057 ± 2 %

$$R_t = 7.465\exp\{4057(\frac{1}{273+t} - \frac{1}{393})\}$$

Temperature	Resistance value
68°F (20°C)	250 kΩ
86°F (30°C)	160 kΩ
104°F (40°C)	104 kΩ
122°F (50°C)	70 kΩ
140°F (60°C)	48 kΩ
158°F (70°C)	34 kΩ
176°F (80°C)	24 kΩ
194°F (90°C)	17.5 kΩ
212°F (100°C)	13.0 kΩ
230°F (110°C)	9.8 kΩ



8-8-2. High pressure sensor

■ The methods of comparing the high pressure sensor measurement and gauge pressure

By configuring the digital display setting switch (SW4) as shown in the figure below, the pressure as measured by the high pressure sensor appears on the LED1 on the control board.

The black square (■) indicates a switch position.

1. While the outdoor unit is stopped, compare the gauge pressure and the pressure displayed on the self-diagnosis LED1.
   - When the gauge pressure is between 0 and 14 psig (0.098 MPaG), internal pressure is caused due to gas leak.
   - When the pressure displayed on the self-diagnosis LED1 is between 0 and 14 psig (0.098 MPaG), the connector may be faulty or be disconnected. Check the connector and go to the method 4.
   - When the pressure displayed on the self-diagnosis LED1 exceeds 725 psig (5.0 MPaG), go to the method 3.
   - If other than listed above, compare the pressures while the sensor is running. Go to the method 2.
2. Compare the gauge pressure and the pressure displayed on the self-diagnosis LED1 after 15 minutes have passed since the start of operation. (Compare them by MPaG/psig unit.)
   - When the difference between both pressures is within 36 psig (0.25 MPaG), both the high pressure sensor and the control board are normal.
   - When the difference between both pressures exceeds 36 psig (0.25 MPaG), the high pressure sensor has a problem. (performance deterioration)
   - When the pressure displayed on the self-diagnosis LED1 does not change, the high pressure sensor has a problem.
3. Remove the high pressure sensor from the control board to check the pressure on the self-diagnosis LED1.
   - When the pressure displayed on the self-diagnosis LED1 is between 0 and 14 psig (0.098 MPaG), the high pressure sensor has a problem.
   - When the pressure displayed on the self-diagnosis LED1 is approximately 725 psig (5.0 MPaG), the control board has a problem.
4. Remove the high pressure sensor from the control board, and short-circuit between the pin 2 and pin 3 connectors (63HS) to check the pressure with the self-diagnosis LED1.
   - When the pressure displayed on the self-diagnosis LED1 exceeds 725 psig (5.0 MPaG), the high pressure sensor has a problem.
   - If other than listed above, the control board has a problem.

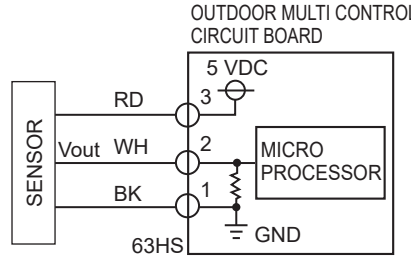
■ High pressure sensor configuration (63HS)

The high pressure sensor consists of the circuit shown in the figure below. If 5 VDC is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microprocessor. The output voltage is 0.078 V per 14 psig (0.098 MPaG).

Note:

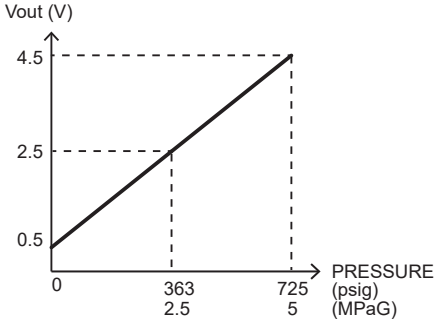
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1



③–①: 5 V (DC)
②–①: Output Vout (DC)

Pressure: 0–725 psig (5.0 MPaG)
Vout: 0.5–4.5 V
0.078 V/14 psig (0.098 MPaG)



8-8-3. Low pressure sensor

■ The methods of comparing the low pressure sensor measurement and gauge pressure

By configuring the digital display setting switch (SW4) as shown in the figure below, the pressure as measured by the low pressure sensor appears on the LED1 on the control board.

The black square (■) indicates a switch position.

1. While the outdoor unit is stopped, compare the gauge pressure and the pressure displayed on the self-diagnosis LED1.
   - When the gauge pressure is between 0 and 14 psig (0.098 MPaG), internal pressure is caused due to gas leak.
   - When the pressure displayed on the self-diagnosis LED1 is between 0 and 14 psig (0.098 MPaG), the connector may be faulty or be disconnected. Check the connector and go to the method 4.
   - When the outdoor temperature is 86°F (30°C) or less, and the pressure displayed on the self-diagnosis LED1 exceeds 247 psig (1.7 MPaG), go to the method 3.
   - When the outdoor temperature exceeds 86°F (30°C), and the pressure displayed on the self-diagnosis LED1 exceeds 247 psig (1.7 MPaG), go to the method 5.
   - If other than listed above, compare the pressures while the sensor is running. Go to the method 2.
2. Compare the gauge pressure and the pressure displayed on the self-diagnosis LED1 after 15 minutes have passed since the start of operation. (Compare them by MPaG/psig unit.)
   - When the difference between both pressures is within 29 psig (0.2 MPaG), both the low pressure sensor and the control board are normal.
   - When the difference between both pressures exceeds 29 psig (0.2 MPaG), the low pressure sensor has a problem. (performance deterioration)
   - When the pressure displayed on the self-diagnosis LED1 does not change, the low pressure sensor has a problem.
3. Remove the low pressure sensor from the control board to check the pressure with the self-diagnosis LED1.
   - When the pressure displayed on the self-diagnosis LED1 is between 0 and 14 psig (0.098 MPaG), the low pressure sensor has a problem.
   - When the pressure displayed on the self-diagnosis LED1 is approximately 247 psig (1.7 MPaG), the control board has a problem.
4. Remove the low pressure sensor from the control board, and short-circuit between the pin 2 and pin 3 connectors (63LS) to check the pressure with the self-diagnosis LED1.
   - When the pressure displayed on the self-diagnosis LED1 exceeds 247 psig (1.7 MPaG), the low pressure sensor has a problem.
   - If other than listed above, the control board has a problem.
5. Remove the high pressure sensor (63HS) from the control board, and insert it into the connector for the low pressure sensor (63LS) to check the pressure with the self-diagnosis LED1.
   - When the pressure displayed on the self-diagnosis LED1 exceeds 247 psig (1.7 MPaG), the control board has a problem.
   - If other than listed above, go to the method 2.

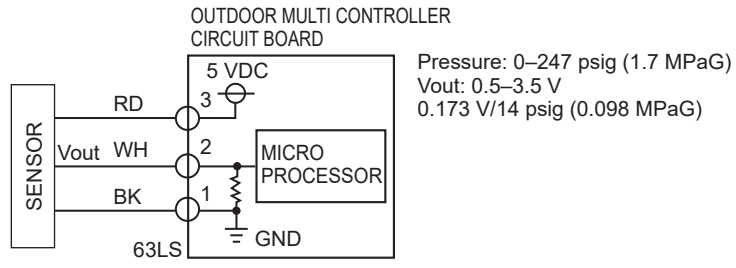
■ Low pressure sensor configuration (63LS)

The low pressure sensor consists of the circuit shown in the figure below. If 5 VDC is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microprocessor. The output voltage is 0.173 V per 14 psig (0.098 MPaG).

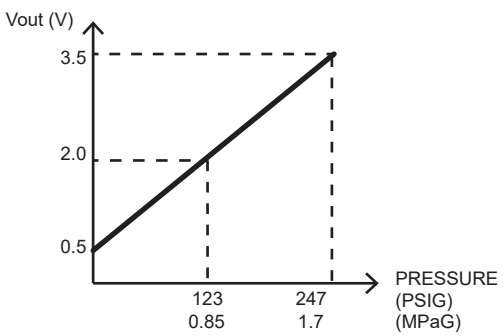
Note:

- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1



Pressure: 0–247 psig (1.7 MPaG)
Vout: 0.5–3.5 V
0.173 V/14 psig (0.098 MPaG)



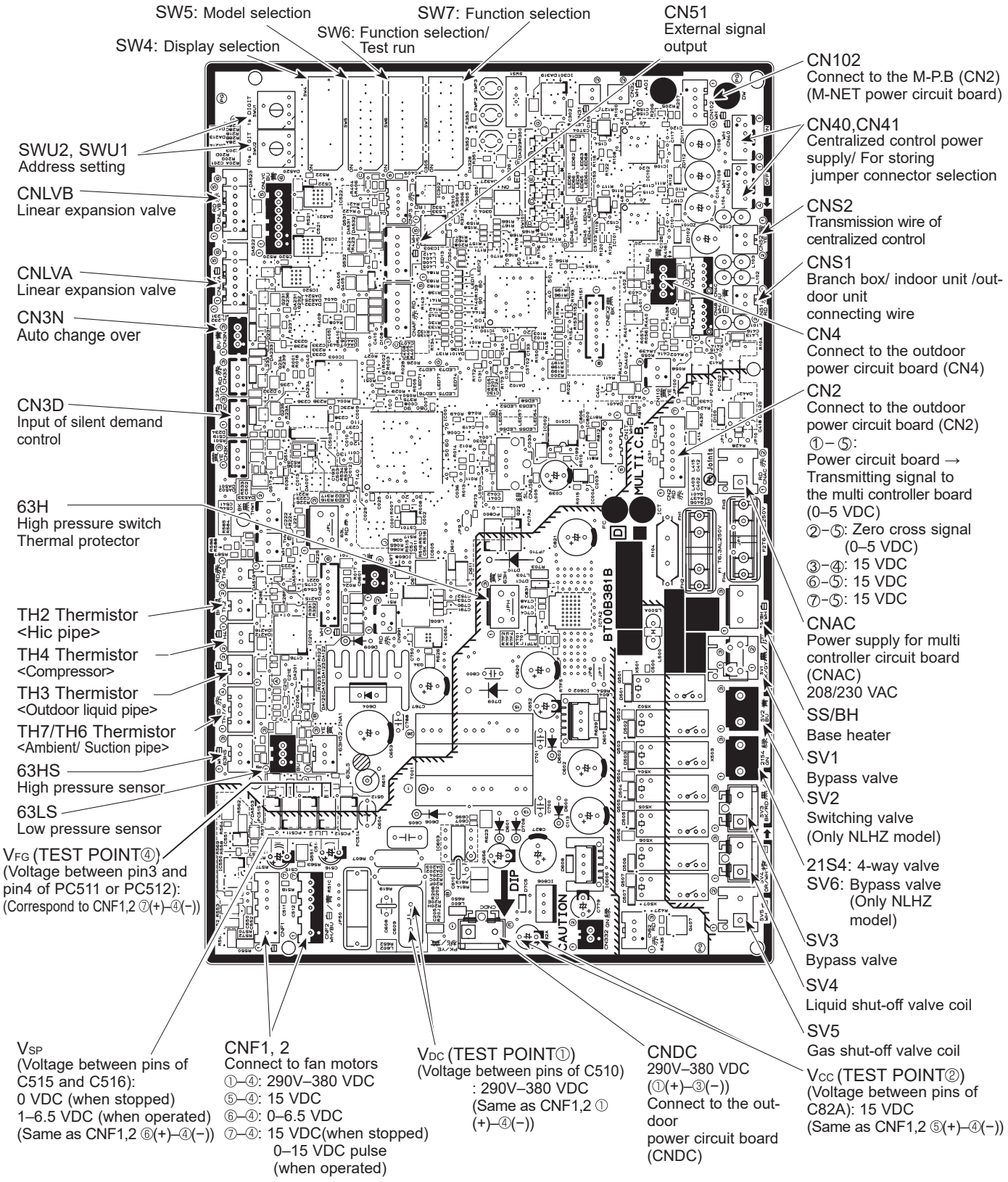
③-①: 5 V (DC)
②-①: Output Vout (DC)

8-9. Test point diagram

■ Outdoor multi controller circuit board

⚠Caution:

- TEST POINT①is high voltage.



■ **Outdoor power circuit board**

MXZ-SM60NL-U1
MXZ-SM36NLHZ-U1
MXZ-SM42NLHZ-U1
MXZ-SM48NLHZ-U1

Brief check of the power module
If they are short-circuited, it means that they are broken.
Measure the resistance in the following points (connectors, etc.).

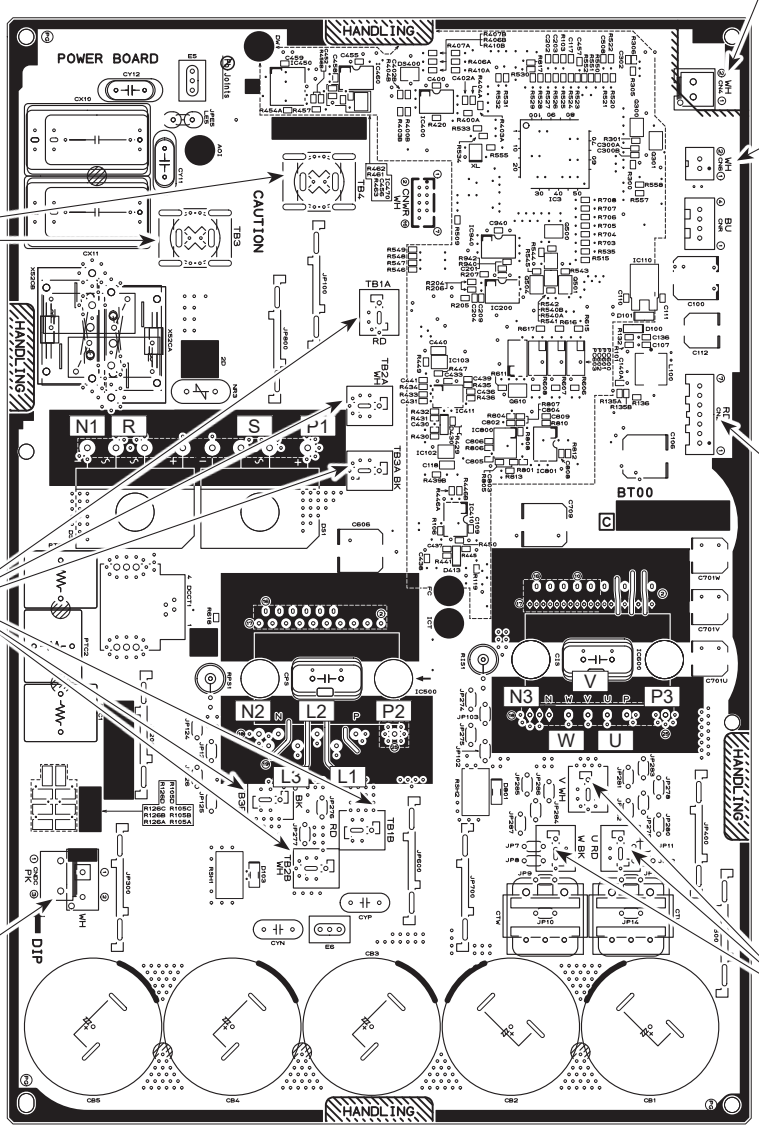
1. Check of power module
(1) Check of DIODE circuit
[R]–[L1], [S]–[L1], [R]–[N1], [S]–[N1]
(2) Check of IGBT circuit
[L2]–[N1]
(3) Check of INVERTER circuit
[P]–[U], [P]–[V], [P]–[W], [N1]–[U], [N1]–[V], [N1]–[W]

Note: The marks [R], [S], [L1], [L2], [P], [N1], [U], [V], and [W] shown in the diagram are not actually printed on the board.

CN4
Connect to the outdoor multi controller circuit board (CN4)

CN6
Thermistor (TH8)

TB3, TB4
Voltage of 208/230 VAC is input
(Connect to the outdoor noise filter board (TB1, TB2)) M6 2.8±0.2 N·m



CN2
Connect to the outdoor multi controller circuit board (CN2)
①–⑤: Transmitting signal to outdoor controller circuit board ((0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: 15 VDC
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC

TB1A, TB2A, TB3A,
TB1B, TB2B, TB3B
Connect to DCL

TB-U, TB-V, TB-W
Connect to the compressor (MC)
Voltage among phases: 10-180 VAC

CNDC
290–380 VDC (①+, ②–)
Connect to the outdoor multi controller circuit board (CNDC)

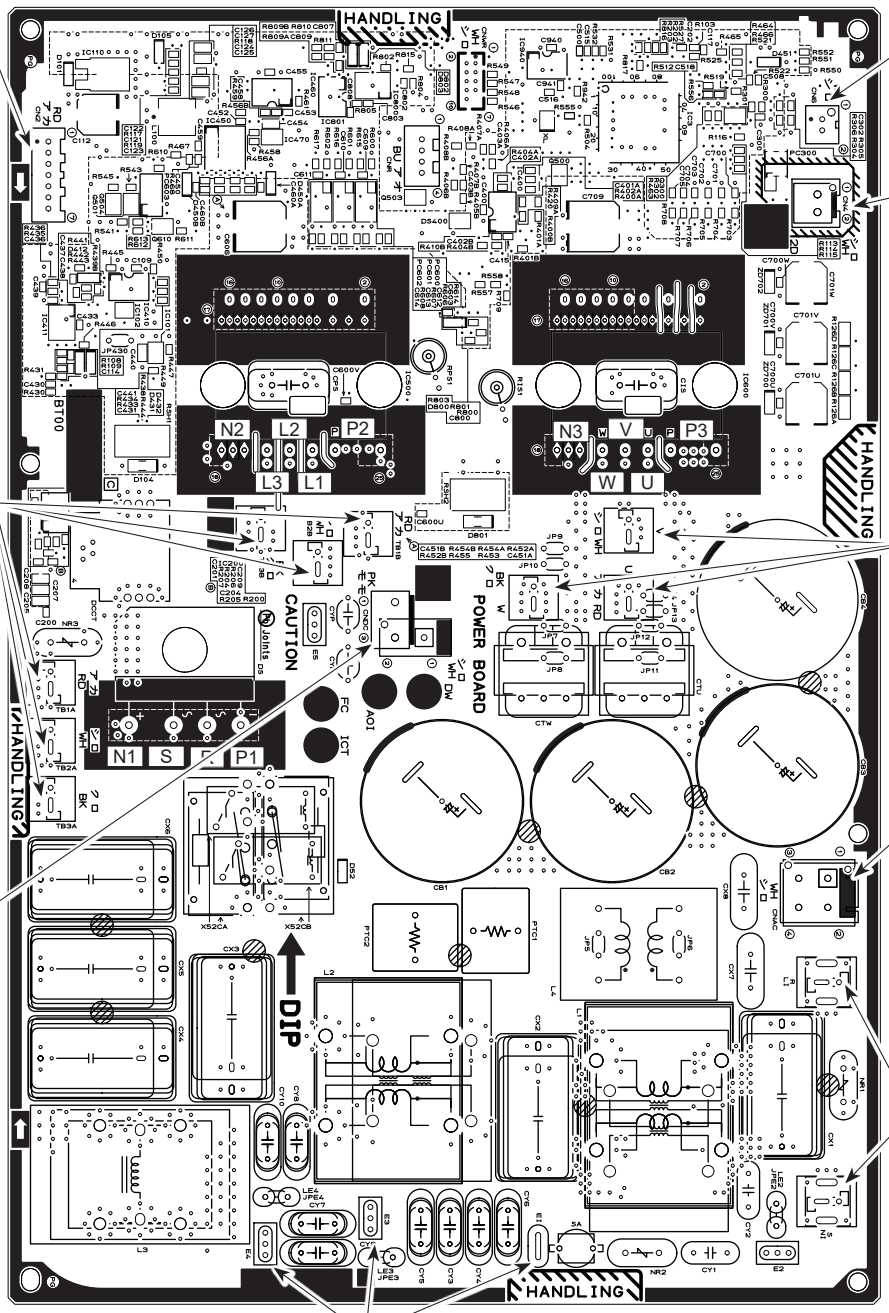
MXZ-SM36NL-U1
MXZ-SM48NL-U1

Brief check of the power module
If they are short-circuited, it means that they are broken.
Measure the resistance in the following points (connectors, etc.).

1. Check of power module
(1) Check of DIODE circuit
[R]–[P1], [S]–[P1], [R]–[N1], [S]–[N1]
(2) Check of IGBT circuit
[P2]–[L1], [P2]–[L2], [N2]–[L1], [N2]–[L2]
(3) Check of INVERTER circuit
[P3]–[U], [P3]–[V], [P3]–[W], [N3]–[U], [N3]–[V], [N3]–[W]

Note: The marks [R], [S], [L1], [L2], [P], [N1], [U], [V], and [W] shown in the diagram are not actually printed on the board.

CN2
Connect to the outdoor multi controller circuit board (CN2)
①–⑤: Transmitting signal to outdoor controller circuit board ((0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: 15 VDC
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC



CN6
Thermistor (TH8)

CN4
Connect to the outdoor multi controller circuit board (CN4)

TB1B, TB3B, TB2B, TB1A, TB2A, TB3A
Connect to DCL

U/V/W
Connect to the compressor (MC) Voltage among phases:
10–180 VAC

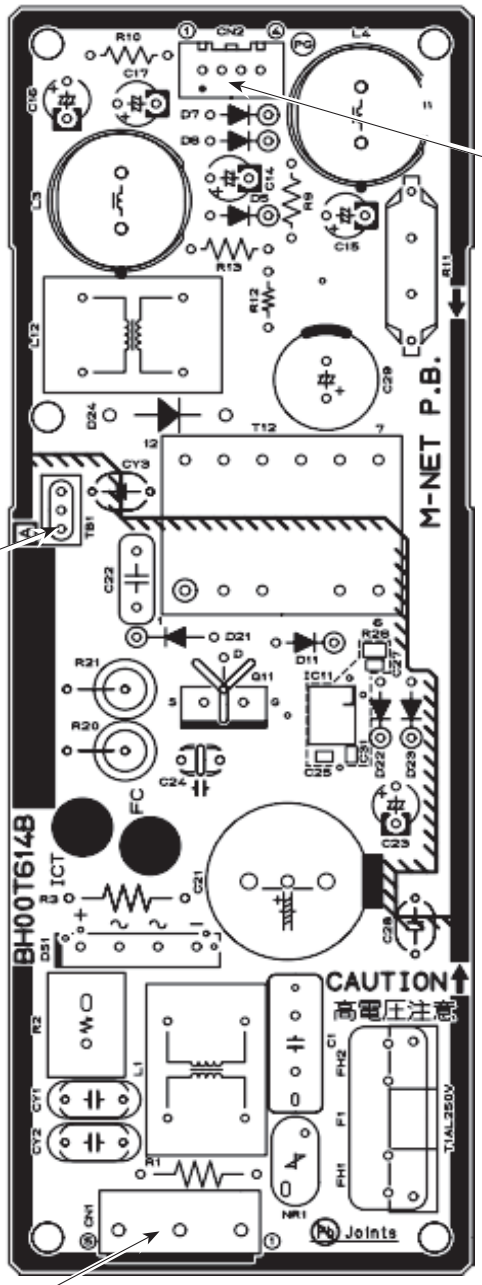
CNAC
208/230 VAC
Connect to the outdoor multi controller circuit board (CNAC)
Connect to the M-NET power circuit board (CN1)

CNDC
290–380 VDC (①+, ③−)
Connect to the outdoor controller circuit board (CNDC)

R/LI, S/NI
Voltage of 208/230 VAC is input
(Connect to the terminal block (TB1))

EI, E3, E4
Connect to the electrical parts box

■ M-NET power circuit board



CN2
Connect to the outdoor multi controller circuit board (CN102)
– : 24–30 VDC
– : 24–30 VDC

TB1
Connect to the electrical parts box

CN1
Connect to the outdoor power circuit board (CNAC)
– : 208/230 VAC

■ **Outdoor noise filter circuit board**

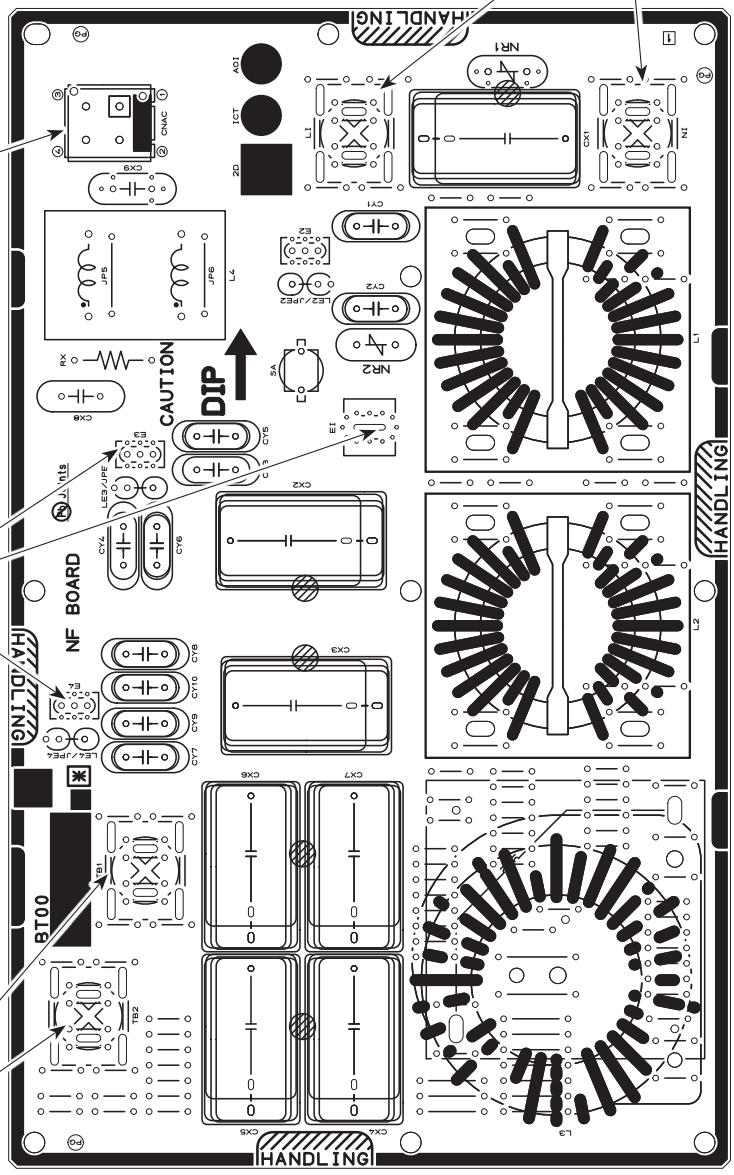
MXZ-SM60NL-U1
MXZ-SM36NLHZ-U1
MXZ-SM42NLHZ-U1
MXZ-SM48NLHZ-U1

LI, NI
POWER SUPPLY
Voltage of 208/230 VAC is input
(Connect to the terminal block (TB1))
M6 2.8±0.2 N·m

CNAC
208/230 VAC
Connect to the out door multi controller circuit board (CNAC)
Connect to the M-NET power circuit board (CN1)

EI, E3, E4
Connect to the electrical parts box

TB1, TB2
POWER SUPPLY
Voltage of 208/230 VAC
(Connect to the outdoor power circuit board (TB3, TB4))
M6 2.8±0.2 N·m



8-10. Outdoor unit information display

SW: setting
0: OFF
1: ON

No.	SW4 setting 12345678910	Contents	LED1 1	2	3	4	5	6	7	8
0	0000000000	Relay output	Compressor operation	Always lit	21S4	SV1	(SV2)	SV3	SV4	SV5
		Error code	0000–9999 (Alternating display of addresses and error code) Note: When abnormality occurs, check the display.							
1	1000000000	Indoor unit check status	No.1 unit check	No.2 unit check	No.3 unit check	No.4 unit check	No.5 unit check	No.6 unit check	No.7 unit check	No.8 unit check
			Note: Light on at time of abnormality							
2	0100000000	Protection input	High pressure abnormality	Superheat due to low discharge temperature	Compressor shell temperature abnormality	TH4 abnormality	TH3 abnormality	Outdoor fan rotation frequency abnormality	TH7 abnormality	TH8 abnormality
			Note: Display detected microprocessor protection or abnormality							
3	1100000000	Protection input	Heat sink overheating	Compressor overcurrent interception	Voltage abnormality	Insufficient refrigerant amount abnormality	Current sensor/ primary current abnormality	63LS abnormality	63HS abnormality	start overcurrent interception abnormality delay
			Note: Display detected microprocessor protection or abnormality							
4	0010000000	Protection input	Abnormality in the number of indoor units	Address double setting abnormality	Indoor unit capacity error	Over capacity	Indoor unit address error	Outdoor unit address error	Current sensor open/ short	Serial communication abnormality (outdoor unit)
			Note: Display detected microprocessor protection or abnormality							
5	1010000000	Abnormality delay display 1	High pressure abnormality delay	Superheat due to low discharge temperature delay	Compressor shell temperature abnormality delay	TH4 abnormality delay	TH3 abnormality delay	Outdoor fan rotation frequency abnormality delay	TH7 abnormality delay	TH8 abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
6	0110000000	Abnormality delay display 2	Heat sink overheating delay	Compressor overcurrent interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start overcurrent interception abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
7	1110000000	Abnormality delay display 3	63LS abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by closed valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/ short delay	—
			Note: Display all abnormalities remaining in abnormality delay							
8	0001000000	Abnormality delay history 1	High pressure abnormality delay	Superheat due to low discharge temperature delay	Compressor shell temperature abnormality delay	TH4 abnormality delay	TH3 abnormality delay	Outdoor fan rotation frequency abnormality delay	TH7 abnormality delay	TH8 abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
9	1001000000	Abnormality delay history 2	Heat sink overheating delay	Compressor overcurrent interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start overcurrent interception abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
10	0101000000	Abnormality delay history 3	63LS abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by closed valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/ short delay	—
			Note: Display all abnormalities remaining in abnormality delay							
11	1101000000	Abnormality code history 1 (the latest)	Alternating display of addresses 0000–9999 and abnormality code (including abnormality delay code) Following is the delay code and the details of the abnormal delay. 1202: Discharge/Comp. temperature, Thermistor <Compressor>(TH4) 1205: Thermistor <Outdoor liquid pipe> (TH3) 1211: Thermistor <Suction pipe> (TH6) 1214: Thermistor <Heat sink> (TH8) 1221: Thermistor <Ambient> (TH7) 1402: High pressure (63H), High pressure sensor (63HS) 1600: Over charge refrigerant 1601: Insufficient refrigerant 4135: Power synchronization signal abnormality delay 4320: Frequency converter insufficient wiring voltage 4330: Heat sink temperature 4350: Power module Notes: • Display abnormalities up to present (including abnormality terminals) • History record in 1 is the latest; records become older in sequence; history record in 10 is the oldest.								
12	0011000000	Abnormality code history 2								
13	1011000000	Abnormality code history 3								
14	0111000000	Abnormality code history 4								
15	1111000000	Abnormality code history 5								
16	0000100000	Abnormality code history 6								
17	1000100000	Abnormality code history 7								
18	0100100000	Abnormality code history 8								
19	1100100000	Abnormality code history 9								
20	0010100000	Abnormality code history 10 (the oldest)								
21	1010100000	Cumulative time	0–9999 (unit: 1 hour) Note: Display of cumulative compressor operating time							

	SW4 setting	Contents	LED1							
No.	12345678910		1	2	3	4	5	6	7	8
22	0110100000	Cumulative time	0–9999 (unit: 10 hours) Note: Display of cumulative compressor operating time							
23	1110100000	Outdoor unit operation display	Excitation Current	Restart after 3 minutes	Compressor operation	Abnormality detection	—	—	—	—
24	0001100000	Indoor unit operation mode	No.1 unit mode	No.2 unit mode	No.3 unit mode	No.4 unit mode	No.5 unit mode	No.6 unit mode	No.7 unit mode	No.8 unit mode
			Cooling: light on, Heating: light blinking, Stop fan: light off							
25	1001100000	Indoor unit operation display	No.1 unit Thermo ON	No.2 unit Thermo ON	No.3 unit Thermo ON	No.4 unit Thermo ON	No.5 unit Thermo ON	No.6 unit Thermo ON	No.7 unit Thermo ON	No.8 unit Thermo ON
26	0101100000	Capacity code (No. 1 indoor unit)	0–255 Notes: •Display of indoor unit capacity code •The No. 1 unit will start from the M-NET address with the lowest number							
27	1101100000	Capacity code (No. 2 indoor unit)								
28	0011100000	Capacity code (No. 3 indoor unit)								
29	1011100000	Capacity code (No. 4 indoor unit)								
30	0111100000	Capacity code (No. 5 indoor unit)								
31	1111100000	IC1 operation mode	OFF	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
32	0000010000	IC2 operation mode								
33	1000010000	IC3 operation mode								
34	0100010000	IC4 operation mode								
35	1100010000	IC5 operation mode	Note: Display of indoor unit operating mode							
36	0010010000	OC operation mode	Compressor ON/OFF	Heating/ Cooling	Abnormal/ Normal	Defrost/No	Refrigerant pull back/No	Excitation current/No	3-min delay/ No	—
			Note: Light on/light off							
37	1010010000	External connection status	CN3N1–3 input	CN3N1–2 input	CN3S1–2 input	CN3D1-3 input	CN3D1-2 input	—	—	—
			Note: Input: light on, No input: light off							
38	0110010000	Communication demand capacity	0–255 (%) Note: Display of communication demand capacity							
39	1110010000	Number of compressor ON/ OFF	0000–9999 (unit: x10) Note: Display a count of compressor operation/stop							
40	0001010000	Compressor operating current	0–999.9 (Arms) Note: Display detected current							
41	1001010000	Input current of outdoor unit	0–999.9 (A) Note: Display detected current							
42	0101010000	Thermo-ON operating time	0000–9999 (unit: x10) Note: Display cumulative time of thermo-ON operation							
43	1101010000	Total capacity of thermo-ON	0–255 Note: Display total capacity code of indoor units in thermo-ON							
44	0011010000	Number of indoor units	0–255 Note: Display number of connected indoor units							
45	1011010000	DC bus voltage	0–9999 (V) Note: Display bus voltage							
46	0111010000	State of LEV control	Td overheat prevention	SHd decrease prevention	Min.Sj correction depends on Td	Min.Sj correction depends on Shd	LEV opening correction depends on Pd	LEV opening correction depends on Td	Correction of high compression ratio prevention	—
			Note: Display active LEV control							
47	1111010000	State of compressor frequency control 1	Condensing temperature limit control	Compressor temperature control	—	Discharge temp. (heating) backup control	Pd abnormality control (heating)	Pd Back up control (heating)	—	Freeze prevention control at the beginning of SHd
			Note: Display active compressor frequency control							
48	0000110000	State of compressor frequency control 2	Heat sink overheat prevention control	Secondary current control	Input current control	—	Frequency restrain of receipt voltage change	Low pressure decrease prevention	Hz-up inhibit control at the beginning of SHd	—
			Note: Display active compressor frequency control							
49	1000110000	Protection input	63LS abnormality	TH2 abnormality	—	—	4-way valve disconnection abnormality	Frozen protection	TH6 abnormality	Power module abnormality
50	0100110000	The second current value when microprocessor of power board abnormality is detected	0–999.9 (Arms) Note: Display data at time of abnormality							

No.	SW4 setting 12345678910	Contents	LED1 1	2	3	4	5	6	7	8
51	1100110000	Heatsink temperature when microprocessor of power board abnormality is detected	−99.9–999.9 (°F) (Short/Open: −99.9 or 999.9) Note: Display data at time of abnormality							
52	0010110000	Outdoor LEV-A opening pulse	0–2000 (pulse) Note: Display of opening pulse of outdoor LEV							
53	1010110000	Outdoor LEV-A opening pulse abnormality delay								
54	0110110000	Outdoor LEV-A opening pulse abnormality								
55	1110110000	Outdoor LEV-B opening pulse								
56	0001110000	Outdoor LEV-B opening pulse abnormality delay								
57	1001110000	Outdoor LEV-B opening pulse abnormality								
58	0101110000	63LS (Low pressure)	−99.9–999.9 (psig) (Short/open: −99.9 or 999.9) Note: Display of data from sensor and thermistor							
59	1101110000	63LS abnormality delay								
60	0011110000	63 LS abnormality								
61	1011110000	TH2 (HIC pipe)	−99.9–999.9 (°F) (Short/open: −99.9 or 999.9) Note: Display of data from sensor and thermistor							
62	0111110000	TH2 (HIC) abnormality delay								
63	1111110000	TH2 (HIC) abnormality								
64	0000001000	Operational frequency	0–255 (Hz) Note: Display of actual operating frequency							
65	1000001000	Target frequency	0–255 (Hz) Note: Display of target frequency							
66	0100001000	Outdoor fan control step number	0–15 Note: Display of number of outdoor fan control steps (target)							
67	1100001000	Function item No.	0–255							
68	0010001000	Primary voltage	0-9999 (V)							
69	1010001000	IC1 LEV Opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
70	0110001000	IC2 LEV Opening pulse								
71	1110001000	IC3 LEV Opening pulse								
72	0001001000	IC4 LEV Opening pulse								
73	1001001000	IC5 LEV Opening pulse								
74	0101001000	High pressure sensor (Pd)	−99.9–999.9 (psig) (Short/open: −99.9 or 999.9) Note: Display of outdoor subcool (SC) data and detection data from high pressure sensor and each thermistor							
75	1101001000	TH4(Compressor) (Td) data	−99.9–999.9 (°F) (Short/open: −99.9 or 999.9) Note: Display of outdoor subcool (SC) data and detection data from high pressure sensor and each thermistor							
76	0011001000	TH6(Suction pipe) (ET) data								
77	1011001000	TH7 (Ambient) data								
78	0111001000	TH3 (Outdoor liquid pipe) data								
80	0000101000	TH8 (Heat sink) data								
81	1000101000	IC1 TH23 (Gas)	−99.9–999.9 (°F) (When indoor unit is not connected, it is displayed as 0.) Note: Display detected data of indoor unit thermistors							
82	0100101000	IC2 TH23 (Gas)								
83	1100101000	IC3 TH23 (Gas)								
84	0010101000	IC4 TH23 (Gas)								
85	1010101000	IC5 TH23 (Gas)								
86	0110101000	IC1 TH22 (Liquid)								
87	1110101000	IC2 TH22 (Liquid)								
88	0001101000	IC3 TH22 (Liquid)								
89	1001101000	IC4 TH22 (Liquid)								
90	0101101000	IC5 TH22 (Liquid)								
91	1101101000	IC1 TH21 (Intake)								
92	0011101000	IC2 TH21 (Intake)								
93	1011101000	IC3 TH21 (Intake)								
94	0111101000	IC4 TH21 (Intake)								
95	1111101000	IC5 TH21 (Intake)								
96	0000011000	Outdoor SC (cooling)	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) Note: Display of outdoor subcool (SC) data							
97	1000011000	Target subcool step	−99.9–999.9 (°C) Note: Display of target subcool step data							

	SW4 setting	Contents	LED1							
No.	12345678910		1	2	3	4	5	6	7	8
98	0100011000	IC1 SC/SH	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
99	1100011000	IC2 SC/SH								
100	0010011000	IC3 SC/SH								
101	1010011000	IC4 SC/SH								
102	0110011000	IC5 SC/SH								
103	1110011000	Discharge superheat (SHd)	−99.9–999.9 (°C) Note: Display of outdoor discharge superheat (SHd) data							
105	1001011000	Target Pd display (heating) kgf/cm²	Pdm (0.0–30.0) (kgf/cm²) Note: Display of all control target data							
106	0101011000	Target ET display (cooling)	ETm (−2.0–23.0) (°C) Note: Display of all control target data							
107	1101011000	Target outdoor SC (cooling)	SCm (0.0–20.0) (°C) Note: Display of all control target data							
108	0011011000	Target indoor SC/SH (IC1)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
109	1011011000	Target indoor SC/SH (IC2)								
110	0111011000	Target indoor SC/SH (IC3)								
111	1111011000	Target indoor SC/SH (IC4)								
112	0000111000	Target indoor SC/SH (IC5)								
113	1000111000	Indoor unit check status (IC9-12)	No.9 unit check	No.10 unit check	No.11 unit check	No.12 unit check	—	—	—	—
			Note: Light on at time of abnormality							
114	0100111000	Indoor unit operation mode (IC9-12)	No.9 unit mode	No.10 unit mode	No.11 unit mode	No.12 unit mode	—	—	—	—
			Note: COOL/DRY: light on, HEAT: light blinking, FAN/STOP: light off							
115	1100111000	Indoor unit operation display (IC9-12)	No.9 unit operation	No.10 unit operation	No.11 unit operation	No.12 unit operation	—	—	—	—
			Note: Thermo-ON: light on, Thermo-OFF: light off							
116	0010111000	IC9 operation mode	STOP	Fan	Cooling Thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
117	1010111000	IC10 operation mode								
118	0110111000	IC11 operation mode								
119	1110111000	IC12 operation mode	Note: Display of indoor unit operation mode							
120	0001111000	Target indoor SC/SH (IC9)	SCm/SHm (0.0–14.0) (°C) Note: Display of all control target data							
121	1001111000	Target indoor SC/SH (IC10)								
122	0101111000	Target indoor SC/SH (IC11)								
123	1101111000	Target indoor SC/SH (IC12)								
124	0011111000	IC9 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality delay							
125	1011111000	IC10 LEV opening pulse abnormality delay								
126	0111111000	IC11 LEV opening pulse abnormality delay								
127	1111111000	IC12 LEV opening pulse abnormality delay								
128	0000000100	Actual frequency of abnormality delay	0–255 (Hz) Note: Display of actual frequency at time of abnormality delay							
129	1011000100	Fan step number at time of abnormality delay	0–15 Note: Display of fan step number at time of abnormality delay							
130	0100000100	Outdoor LEV-A opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of outdoor LEV-A at time of abnormality delay							
131	1100000100	IC1 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Delay of opening pulse of indoor LEV at time of abnormality delay							
132	0010000100	IC2 LEV opening pulse abnormality delay								
133	1010000100	IC3 LEV opening pulse abnormality delay								
134	0110000100	IC4 LEV opening pulse abnormality delay								
135	1110000100	IC5 LEV opening pulse abnormality delay								

	SW4 setting	Contents	LED1							
No.	12345678910		1	2	3	4	5	6	7	8
136	0001000100	High pressure sensor data at time of abnormality delay	−99.9–999.9 (psig) (Short/open: −99.9 or 999.9) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
137	1001000100	TH4 (Compressor) sensor data at time of abnormality delay	−99.9–999.9 (°F) (Short/open: −99.9 or 999.9) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
138	0101000100	TH6 (Suction pipe) sensor data at time of abnormality delay								
139	1101000100	TH3 (Outdoor liquid pipe) sensor data at time of abnormality delay								
140	0011000100	TH8 (Heat sink) sensor data at time of abnormality delay								
141	1011000100	OC SC (cooling) at time of abnormality delay	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation)							
142	0111000100	IC1 SC/SH at time of abnormality delay	Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
143	1111000100	IC2 SC/SH at time of abnormality delay								
144	0000100100	IC3 SC/SH at time of abnormality delay								
145	1000100100	IC4 SC/SH at time of abnormality delay								
146	0100100100	IC5 SC/SH at time of abnormality delay								
147	1100100100	IC9 SC/SH at time of abnormality delay								
148	0010000100	IC10 SC/SH at time of abnormality delay								
149	1010100100	IC11 SC/SH at time of abnormality delay								
150	0110100100	IC12 SC/SH at time of abnormality delay								
151	1110100100	IC9 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
152	0001100100	IC10 LEV opening pulse at time of abnormality								
153	1001100100	IC11 LEV opening pulse at time of abnormality								
154	0101100100	IC12 LEV opening pulse at time of abnormality								
155	1101100100	IC9 SC/SH at time of abnormality	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to “0” during cooling operation)							
156	0011100100	IC10 SC/SH at time of abnormality	Note: Display of indoor SC/SH data at time of abnormality							
157	1011100100	IC11 SC/SH at time of abnormality								
158	0111100100	IC12 SC/SH at time of abnormality								
159	1111100100	IC9 Capacity code	0–255 Notes: Display of indoor unit capacity code							
160	0000010100	IC10 Capacity code								
161	1000010100	IC11 Capacity code								
162	0100010100	IC12 Capacity code								
163	1100010100	IC9 SC/SH	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
164	0010010100	IC10 SC/SH								
165	1010010100	IC11 SC/SH								
166	0110010100	IC12 SC/SH								

	SW4 setting	Contents	LED1							
No.	12345678910		1	2	3	4	5	6	7	8
170	0101010100	ROM version monitor	0.00–99.99 (ver) Note: Display of version data of ROM							
171	1101010100	ROM type	Note: Display of ROM type							
172	0011010100	Check sum mode	0000–FFFF Note: Display of check sum code of ROM							
173	1011010100	IC9 TH23 (Gas)	−99.9–999.9 (°F) Note: Display detected data of indoor unit thermistors							
174	0111010100	IC10 TH23 (Gas)								
175	1111010100	IC11 TH23 (Gas)								
176	0000110100	IC12 TH23 (Gas)								
177	1000110100	IC9 TH22 (Liquid)								
178	0100110100	IC10 TH22 (Liquid)								
179	1100110100	IC11 TH22 (Liquid)								
180	0010110100	IC12 TH22 (Liquid)								
185	1001110100	IC9 TH21 (Intake)								
186	0101110100	IC10 TH21 (Intake)								
187	1101110100	IC11 TH21 (Intake)								
188	0011110100	IC12 TH21 (Intake)								
189	1011110100	4420 Error history	Primary voltage error	—	PAM error	Converter fault	Power synchronization signal error	L1 open phase error	Under voltage error	Over voltage error
190	0111110100	External connection status at time of abnormality delay	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input	—	—	—
191	1111110100	External connection status at time of abnormality	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input	—	—	—
192	0000001100	Actual frequency of abnormality	0–255 (Hz) Note: Display of actual frequency at time of abnormality							
193	1000001100	Fan step number at time of abnormality	0–15 Note: Display of fan step number at time of abnormality							
194	0100001100	Outdoor LEV-A opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of outdoor LEV-A at time of abnormality							
195	1100001100	IC1 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
196	0010001100	IC2 LEV opening pulse at time of abnormality								
197	1010001100	IC3 LEV opening pulse at time of abnormality								
198	0110001100	IC4 LEV opening pulse at time of abnormality								
199	1110001100	IC5 LEV opening pulse at time of abnormality								
200	0001001100	High pressure sensor data at time of abnormality	−99.9–999.9 (psig) (Short/open: −99.9 or 999.9) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
201	0001001100	TH4 (Compressor) sensor data at time of abnormality	−99.9–999.9 (°F) (Short/open: −99.9 or 999.9) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
202	0101001100	TH6 (Suction pipe) sensor data at time of abnormality								
203	1101001100	TH3 (Outdoor liquid pipe) sensor data at time of abnormality								
204	0011001100	TH8 (Heat sink) sensor data at time of abnormality								

	SW4 setting	Contents	LED1							
No.	12345678910		1	2	3	4	5	6	7	8
205	1011001100	OC SC (cooling) at time of abnormality	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data at time of abnormality							
206	0111001100	IC1 SC/SH at time of abnormality								
207	1111001100	IC2 SC/SH at time of abnormality								
208	0000101100	IC3 SC/SH at time of abnormality								
209	1000101100	IC4 SC/SH at time of abnormality								
210	0100101100	IC5 SC/SH at time of abnormality								
211	1100101100	IC6 Capacity code	0–255 Note: Display of indoor unit capacity code							
212	0010101100	IC7 Capacity code								
213	1010101100	IC8 Capacity code								
214	0110101100	IC6 operation mode	OFF	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
215	1110101100	IC7 operation mode								
216	0001101100	IC8 operation mode	Note: Display of indoor unit operation mode							
217	1001101100	IC6 LEV opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
218	0101100100	IC7 LEV opening pulse								
219	1101100100	IC8 LEV opening pulse								
220	0011101100	IC6 TH23 (Gas)	−99.9–999.9 (°F) Note: Display detected data of indoor unit thermistor							
221	1011101100	IC7 TH23 (Gas)								
222	0111101100	IC8 TH23 (Gas)								
223	1111101100	IC6 TH22 (liquid)								
224	0000011100	IC7 TH22 (liquid)								
225	1000011100	IC8 TH22 (liquid)								
226	0100011100	IC6 TH21 (intake)								
227	1100011100	IC7 TH21 (intake)								
228	0010011100	IC8 TH21 (intake)								
229	1010011100	IC6 SC/SH	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
230	0110011100	IC7 SC/SH								
231	1110011100	IC8 SC/SH								
232	0001011100	Target indoor SC/SH (IC6)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
233	1001011100	Target indoor SC/SH (IC7)								
234	0101011100	Target indoor SC/SH (IC8)								
235	1101011100	IC6 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality delay							
236	0011011100	IC7 LEV opening pulse abnormality delay								
237	1011011100	IC8 LEV opening pulse abnormality delay								
238	0111011100	IC6 SC/SH at time of abnormality delay	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data at time of abnormality delay							
239	1111011100	IC7 SC/SH at time of abnormality delay								
240	0000111100	IC8 SC/SH at time of abnormality delay								
241	1000111100	IC6 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
242	0100111100	IC7 LEV opening pulse at time of abnormality								
243	1100111100	IC8 LEV opening pulse at time of abnormality								

	SW4 setting	Contents	LED1							
No.	12345678910		1	2	3	4	5	6	7	8
244	0010111100	IC6 SC/SH at time of abnormality	−99.9–999.9 (°C) (Short/open: −99.9 or 999.9) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data at time of abnormality delay							
245	1010111100	IC7 SC/SH at time of abnormality								
246	0110111100	IC8 SC/SH at time of abnormality								
250	0101111100	IC9 LEV opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
251	1101111100	IC10 LEV opening pulse								
252	0011111100	IC11 LEV opening pulse								
253	1011111100	IC12 LEV opening pulse								

8-11. Operation data collection and storage functions

Operation data of the units collected on the outdoor unit can be recorded in the flash memory of the control board. This data can also be exported to and recorded in a USB memory stick. Refer to “8-11-3. Storing data on a USB memory stick” for information on storing data on a USB memory stick. Refer to “8-11-4. Collecting operation data” for information on the collection of operation data.

8-11-1. Preparation

A USB memory stick and a portable battery charger are required to store data on a USB memory stick (not supplied). Prepare a USB memory stick and a portable battery charger as described in “8-11-2. Necessary materials”.

8-11-2. Necessary materials

The use of the USB function requires a USB memory stick and a portable battery charger. See below for the types of USB memory stick and portable charger that can be used.

■ USB memory stick

Use a USB memory stick that meets the following specifications.

- USB 2.0 compatible
- Formatted in FAT 32
- Without a security function

■ Portable battery charger

Use a portable battery charger that meets the following specifications for rewriting the software.

- USB 2.0 compatible
- Voltage and amperage rating of 5 V and 2.1 A (Max.)

A LEAD WIRE ASSY USB is required to connect the control board and the portable charger. Use a cable that meets the following specifications.

- [Type A male] - [Male XA connector for the PCB] USB cable

For details of "LEAD WIRE ASSY USB", please contact the sales office. The connector on the control board side is a female XA connector for the PCB.

8-11-3. Storing data on a USB memory stick

Store operation data recorded in the flash memory on the control board in a USB memory stick. The content of the stored file can be confirmed using the maintenance tool. Operation data should be stored in a dedicated mode (Store Mode). The procedure for making the operation data settings is shown below.

1. Preparation of a USB memory stick

Since the size of the saved file containing operation data is 50 MB, prepare a USB memory stick with 50 MB or more available memory. A USB memory stick which has other data in it may also be used. However, it is recommended to clear the remaining data in advance to prevent any malfunctions. The saved file is named "MNTXXX.MT." XXX represents a serial number from 000 to 100. Since files named "MNT101.MT" or more cannot be created, unnecessary folders and files should be deleted.

2. Storing on a USB memory stick

Data can be stored to a USB memory stick either with the main power to the outdoor unit turned ON (Method 2) or OFF (Method1). For safety reasons, it is recommended to store the data on a USB memory stick with the main power to the outdoor unit turned OFF (Method 1). If turning off the power is not feasible, take appropriate measures to ensure safety.

■ Method 1: Storing data on a USB memory stick with the main power to the outdoor unit turned OFF (Recommended)

Starting up the unit in the data storage mode

- Turn off the main power to the outdoor unit.

- Connect a USB memory stick to the USB port (CNUSB) on the control board.
- With SWP3 (ENTER) being held down, connect the portable battery charger to the XA connector (CN601) for the PCB, and supply power to the control board. Wait for five seconds until the USB memory stick is recognized.
- [Usb] will appear on the LED1. (See the figure below.) If [Usb] does not appear, please check if system was started in Storage Mode or USB memory stick is not connected or switch SWP3 may not be pressed deeply enough.
- When [Usb] has appeared on the LED1, lift the finger off SWP3 (ENTER). The unit is now in the data storage mode.

Storing data
- Press SWP3 (ENTER). If the data storage process has properly started, the progress (0-99) will be shown on the LED1.
- [End] on the LED1 indicates successful completion of the data storage process. It takes approximately five minutes for the data storage process to be completed.

Ending the data storage mode
- When done storing data, disconnect the USB memory stick from the control board.
- Press and hold SWP3 (ENTER) for approximately 10 seconds until [End] disappears from the LED1.
- Restart the indoor and outdoor units that were stopped to perform data storage.
- If the data collection process needs to be started, check the operation data collection status by following the procedures explained in “8-11-4. Collecting operation data” and making the necessary settings.

■ Method 2: Storing data on a USB memory stick with the main power to the outdoor unit turned ON

Starting up the unit in the data storage mode
- Stop the operation of all indoor units. Although operation data can be collected without stopping all indoor units, doing so may be detected as a communication error.
- Connect a USB memory stick to the USB port (CNUSB) on the control board. Wait for five seconds until the USB memory stick is recognized.
- Press and hold SWP3 (ENTER) for approximately 10 seconds until [Usb] appears on the LED1.
- When [Usb] has appeared on the LED, lift the finger off SWP3 (ENTER). The unit is now in the data storage mode.

Storing data
- Press SWP3 (ENTER). If the data storage process has properly started, the progress (0-99) will be shown on the LED1.
- [End] on the LED indicates successful completion of the data storage process. It takes approximately five minutes for the data storage process to be completed.

Ending the data storage mode
- When done storing data, disconnect the USB memory stick from the control board.
- Press and hold SWP3 (ENTER) for approximately 10 seconds until [End] disappears from the LED1.
- Restart the indoor and outdoor units that were stopped to perform data storage.
- If the data collection process needs to be started, check the operation data collection status by following the procedures explained in “8-11-4. Collecting operation data” and making the necessary settings.

Note:
- Display of [Usb] and [End]


■ Confirmation of stored file

Confirm that the operation data is stored in the USB memory stick. Insert the USB memory stick into a computer, and check the contents in the memory stick. Check that there is a file named “MNTXXX.MT” in the memory stick. “XXX” represents serial numbers from “000” to “100.”

8-11-4. Collecting operation data

This function is used to collect the operation data of the outdoor and indoor units via M-NET, and record the data in the flash memory on the control board. When the memory is full, it is overwritten from the first segment. The settings for checking the status of operation data collection, for starting/ending data collection, and for continuing/stopping error-data collection are made, using the switches on the control board. The items to be set are shown in the table below. The data collection setting is enabled by default, and the setting for error data collection during an error is disabled by default.

Switch setting			Function	Operation set by the switch (LED1 indication)			Unit for setting
SW6-10	SW4						
	No.	12345678910		ON	OFF	When to set	
OFF	277	1010100010	Data being collected	-	-	Anytime after the power is turned ON.	OC setting is necessary.
ON	34	0100010000	Data collection enabled	Enabled	Disabled	Anytime after the power is turned ON.	OC setting is necessary.
ON	35	1100010000	Data collection during an error	Enabled	Disabled	While the compressor is running in Heating mode	OC setting is necessary.

Note:
- When setting SW4 on the control board, make sure the outdoor unit is energized. Also refer to "8-5. Internal switch function table" as a reference.

The procedure for making the operation data settings is shown below.

1. Status confirmation

Confirm the current status of operation data collection by setting the switches on the control board following the table shown above.
Switch setting: SW6-10: OFF
SW4: 277
Check the status on the maintenance LED display (LED1).

- When [ON] or [OFF] is displayed, go to step 2 and the later steps.
- When [Err] is displayed, go to step 3 and the later steps.
- When [F-Er] is displayed, it indicates an error in the flash memory on the control board.

2. Setting Start and End of data collection

1. Set the switches on the control board by following the table shown above.
   Switch setting: SW6-10: ON
   SW4: 34
2. Press SWP3 (ENTER). With each switch operation, the setting can be alternately switched ON and OFF.
3. After conducting the step 1, check that the operating condition is stable.
   Data collection start: OFF (Enabled)
   Data collection end: ON (Disabled)
   Setting procedure is now completed.

3. Settings for error-data collection during an error

Stops or continues error-data collection when an error occurs.

1. Referring to the table above, set the control switches.
   Switch setting: SW6-10: ON
   SW4: 35
   Stop collecting error-data when an error occurs: OFF
   Continue collecting error-data when an error occurs: ON
2. To set the switches, press SWP3 (ENTER). Pressing SWP3 (ENTER) toggles between ON and OFF. Error data in the 6000's and the 7000's will be collected, regardless of the SW4 (35) settings.

4. Restarting data collection

If “Err” is shown, it indicates that data collection is being suspended for some reason, even though data collection is enabled. To restart, it is necessary to set the switches on the control board. Referring to 2-1 and 2-2, set the switches on the control board from OFF (original setting) to ON, and then to OFF again, and make sure the switches settings are indicated as being ON, following the instructions in 1.

9 DISASSEMBLY PROCEDURE

MXZ-SM36NL-U1 **MXZ-SM48NL-U1**

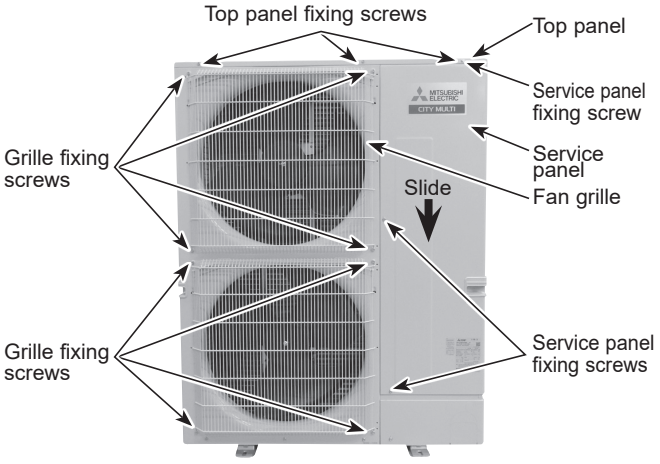
——→: Indicates the visible parts in the photos/figures.
- - - - - - - →: Indicates the invisible parts in the photos/figures.

Note:
- Turn OFF the power supply before disassembly.
- When you remove bands before disassembly, be sure to fix them without looseness when assembling.
- The red markers indicate that flammable refrigerant is charged. If you remove the markers, put them back to the original position after the work is completed.

1. Removing the service panel and top panel

1. Remove 3 service panel fixing screws (5 × 12) and slide the hook on the right downward to remove the service panel.
2. Remove screws (2 for front, 3 for rear/5 × 12) of the top panel and remove it.

Photo 1



2. Removing the fan motor (MF1, MF2)

1. Remove the service panel. (See Photo 1)
2. Remove 4 grille fixing screws (5 × 12) to detach the fan grille. (See Photo 1)
3. Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2)
4. Disconnect the connectors CNF1 and CNF2 on outdoor multi controller circuit board in the electrical parts box.
5. Remove 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3)

Note:
- Tighten the propeller fan with a torque of 5.7 ± 0.3 N·m [4.2 ± 0.2 lbf·ft].
- Match the connector colors of the fan motor connector and the outdoor multi controller circuit board when connecting them.

Photo 2

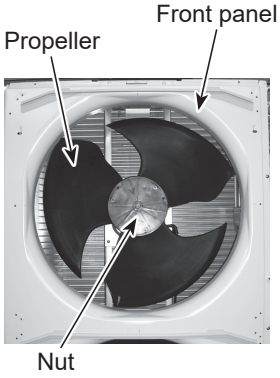
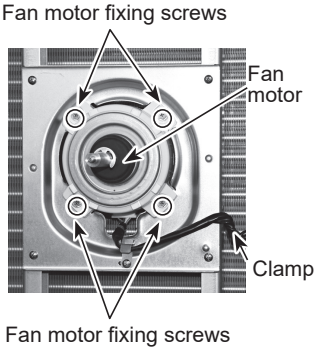


Photo 3



3. Removing the electrical parts box

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)

3. Disconnect the connecting wire from the terminal block.
4. Remove all the following connectors from the outdoor multi controller circuit board;

   <Diagram symbol in the connector housing>
   • Fan motor (CNF1, CNF2)
   • Thermistor <HIC pipe> (TH2)
   • Thermistor <Outdoor liquid pipe> (TH3)
   • Thermistor <Compressor> (TH4)
   • Thermistor <Suction pipe/Ambient> (TH6/7)
   • High pressure switch (63H)
   • High pressure sensor (63HS)
   • Low pressure sensor (63LS)
   • 4-way valve (21S4)
   • Bypass valve (SV1, SV3)
   • Shut-off valve (SV4, SV5)
   • Linear expansion valves (CNLVA, CNLVB)

   Pull out the disconnected wires from the electrical parts box.
5. Remove the terminal cover and disconnect the compressor lead wire from the comp. terminal. (See Photo 6)
6. Remove 2 electrical parts box fixing screws (4 × 10) and detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.

Photo 4

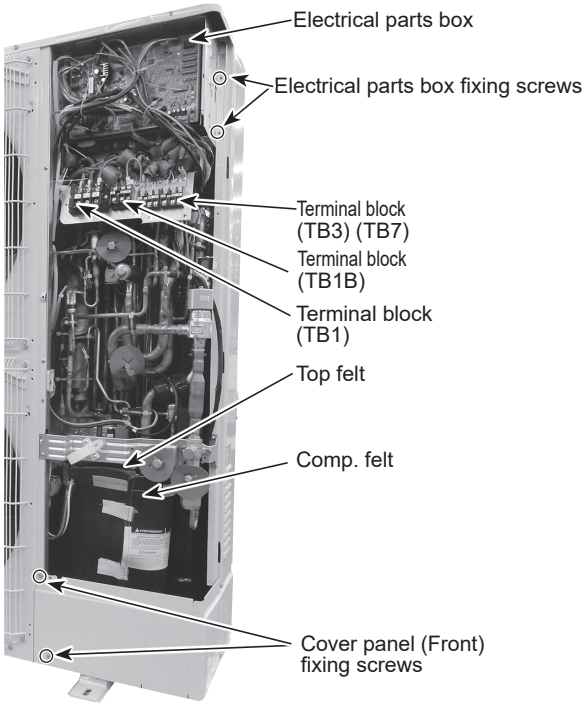


Photo 5

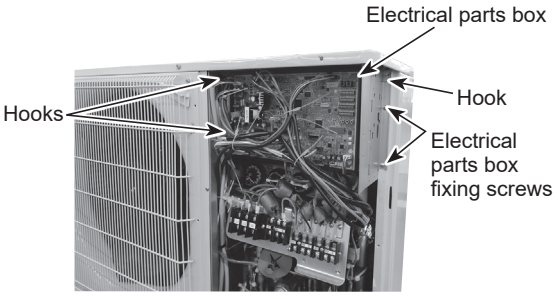
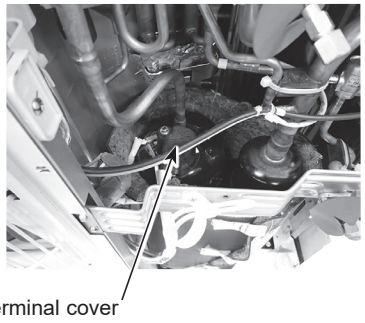


Photo 6



4. Removing thermistors

■ Removing the thermistor <Suction pipe> (TH6)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connectors TH6 and TH7 on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on the top of the electrical parts box.
5. Pull out the thermistor <Suction pipe> (TH6) from the sensor holder. (See Photo 8)

Note:
• When replacing thermistor <Suction pipe> (TH6), replace it together with thermistor <Ambient> (TH7) since they are combined together. Refer to "Removing the thermistor <Ambient> (TH7)" below.

Photo 7

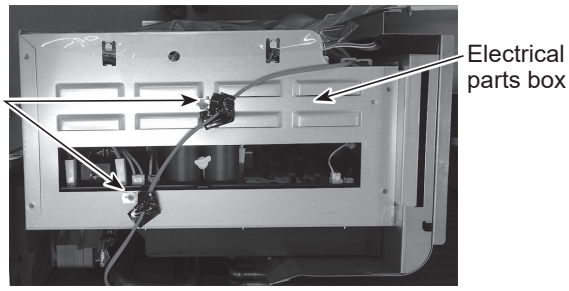
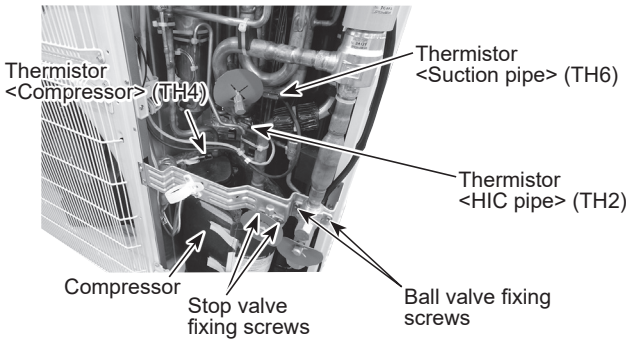


Photo 8



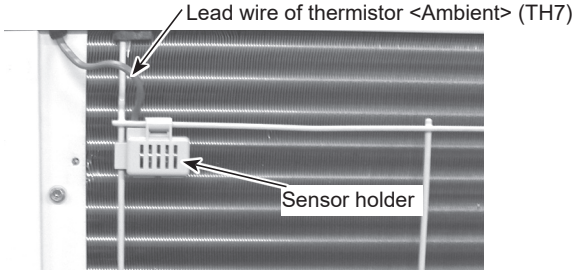
■ Removing the thermistor <Ambient> (TH7)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connector TH7 on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box. (See Photo 7)
5. Pull out the thermistor <Ambient> (TH7) from the sensor holder.

Note:

- When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction pipe> (TH6), since they are combined together. Refer to "Removing the thermistor <Suction pipe> (TH6)" above.

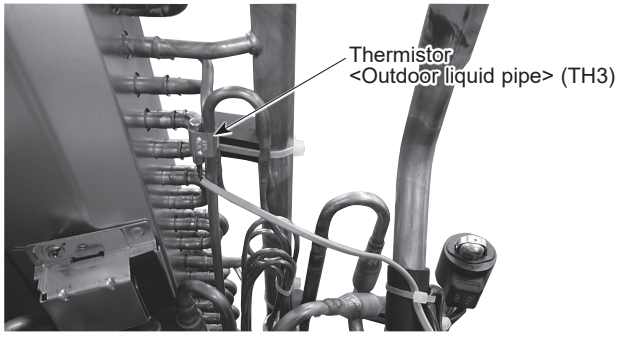
Photo 9



■ Removing the thermistor <Outdoor liquid pipe> (TH3), thermistor <Compressor> (TH4), and thermistor <HIC pipe> (TH2)

1. Remove the service panel. (See Photo 1)
2. Disconnect the connectors TH3, TH4, and TH2 on the outdoor multi controller circuit board in the electrical parts box.
3. Pull out the thermistor <Outdoor liquid pipe> (TH3) , thermistor <Compressor> (TH4) and thermistor <HIC pipe> (TH2) from the sensor holder. (See Photo 8 and 10)

Photo 10



5. Removing the 4-way valve coil (21S4)

1. Remove the service panel. (See Photo 1)
2. Remove 4-way valve coil fixing screws (M5 × 7).
3. Remove the 4-way valve coil by sliding the coil toward you.
4. Disconnect the connector 21S4 on the outdoor multi controller circuit board in the electrical parts box.

6. Removing the 4-way valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)

4. Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 × 16), then remove the valve bed. (See Photo 4 and 8)
5. Remove 2 cover panel fixing screws (5 x 12), then slide the cover panel (front) upward to remove it. (The cover panel (front) is fixed to the cover panel (rear) with a hook on the rear side.) (See Photo 4)
6. Remove the cover panel (rear) fixing screws (2 for right side and 2 for rear/ 5 x 12), then slide the cover panel (rear) upward to remove it. (See Photo 4) (The cover panel (rear) is fixed to the side panel (R) with 2 screws.)
7. Remove 3 side panel (R) fixing screws (5 × 12) in the rear of the unit, then slide the side panel (R) upward to remove it. (The side panel (R) is fixed to the side plate with hooks on the rear side.)
8. Remove the 4-way valve coil. (See Photo 11)
9. Recover refrigerant.
10. Remove the 2 rubber mounts on the bypass pipes. (See Photo 12)
11. Remove the 5 welded points on the pipe (C-R) assy.
12. Remove the welded point on the pipe (R-B) assy.
13. Remove the welded part of 4-way valve.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the 4-way valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 11

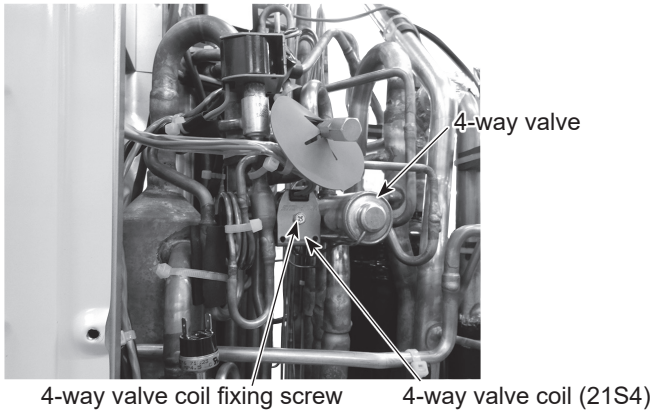


Photo 12

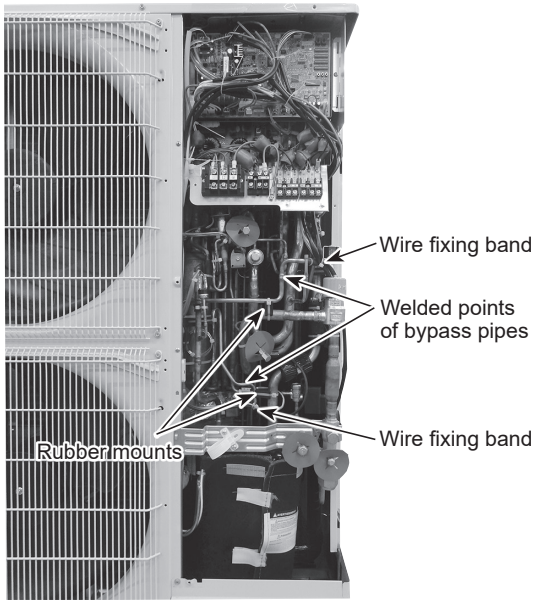


Figure 1

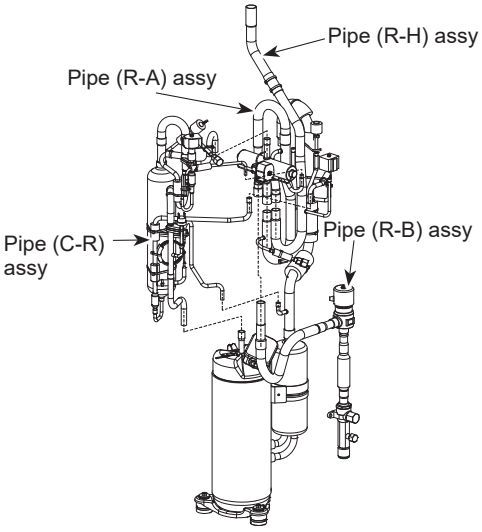
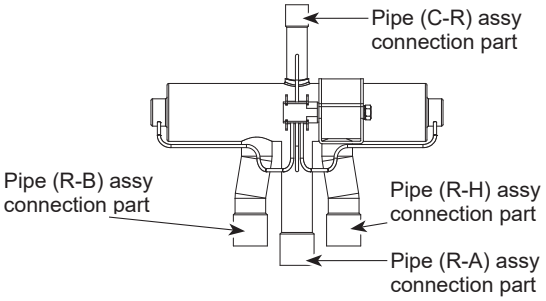


Figure 2



7. Removing bypass valve coil (SV1, SV3) and bypass valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)

7. Remove the bypass valve coil fixing screw (M4 × 6).
8. Remove the bypass valve coil by sliding the coil upward.
9. Disconnect the connectors SV1 and SV3 on the multi controller circuit board in the electrical parts box.
10. Recover refrigerant.
11. Remove the welded part of bypass valve.

⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:

- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the bypass valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

8. Removing the high pressure switch (63H)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Pull out the lead wire of high pressure switch.
8. Recover refrigerant.
9. Remove the welded part of high pressure switch.

⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:

- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the high pressure switch, cover it with a wet cloth to prevent it from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

9. Removing the low pressure sensor (63LS) and the high pressure sensor (63HS)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Disconnect the connectors 63LS and 63HS on the multi controller circuit board in the electrical parts box.
8. Recover refrigerant.
9. Remove the welded part of low pressure sensor.

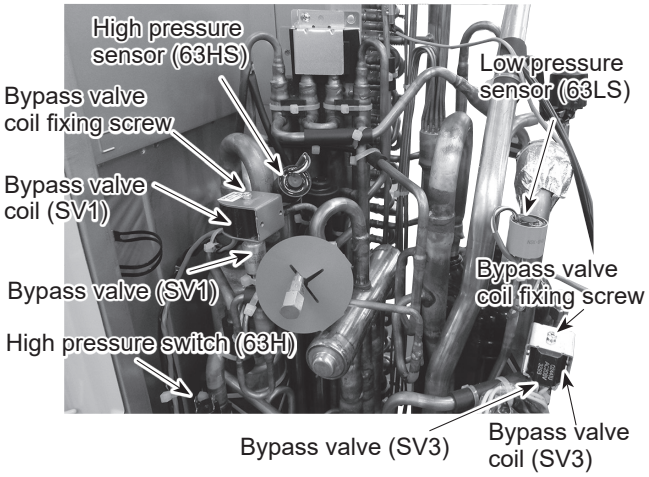
⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:

- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the low pressure sensor and high pressure sensor, cover them with a wet cloth to prevent them from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 13



10. Removing linear expansion valve (LEV-A, LEV-B)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Remove the linear expansion valve coil.
8. Recover refrigerant.
9. Remove the welded part of linear expansion valve.

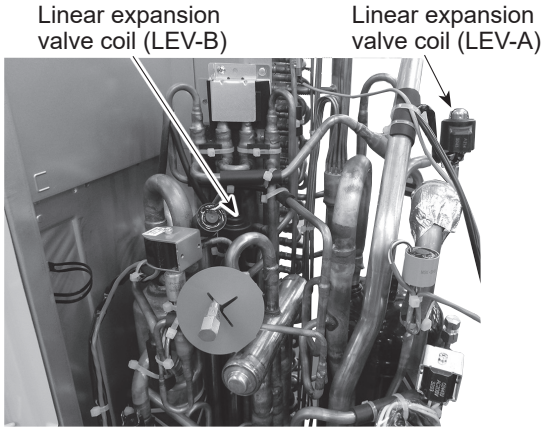
⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:

• Recover refrigerant without spreading it in the air.
• The welded part can be removed easily after removing the side panel (R).
• When installing the linear expansion valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

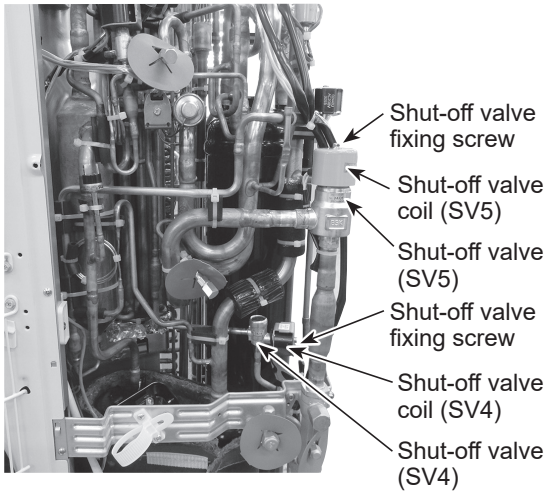
Photo 14



11. Removing shut-off valve coils

1. Remove the service panel. (See Photo 1)
2. Disconnect the connector SV4 and the connector SV5 on the multi controller circuit board in the electrical parts box.
3. Remove shut-off valve coil fixing screws (SV4: M4 x 6, SV5: M5 x 8).
4. Slide the shut-off valve coils to remove. (See Photo 15)

Photo 15



12. Removing shut-off valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (Refer to procedure 3)
4. Remove the valve bed. (See procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)

6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Remove the shut-off valve coils. (Refer to procedure 11)
9. Recover refrigerant.
10. Remove the welded part of the shut-off valve.

⚠Caution:
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the shut-off valve, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

13. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the valve bed. (See procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove 5 front panel fixing screws (5 × 12), and remove the front panel. (See Photo 4)
8. Remove the side panel (R). (Refer to procedure 6-7)
9. Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 3)
10. Recover refrigerant.
11. Remove the top felt and the comp. felt, and then remove the thermistor <Compressor> (TH4) and the lead wires for compressor.
12. Remove the 2 rubber mounts on the bypass pipes of the compressor inlet and outlet and the 2 wire fixing bands. Then, separate the bypass pipes at the welded points (2 points).
13. Remove the welded pipe of compressor inlet and outlet and then remove the compressor.

⚠Caution:
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- See Figure 5 for the cut-off points on the compressor inlet and outlet pipes.
- Use an appropriate tool for hexagon nuts of 10 mm width across flats to remove and attach compressor fixing nuts. A tool with the length of 140 mm is recommended as your work space is narrow.
- Compressor fixing screws are non-magnetic.
- Work in a pair when removing a welded part.

Photo 16

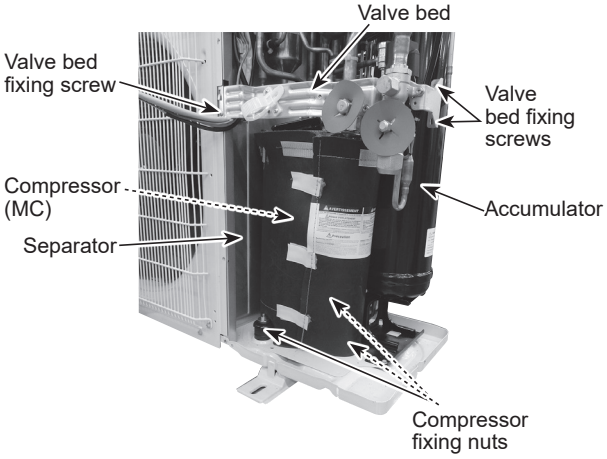


Figure 3

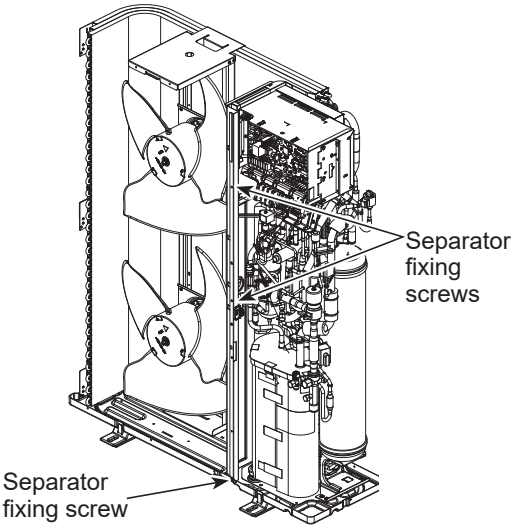


Figure 4

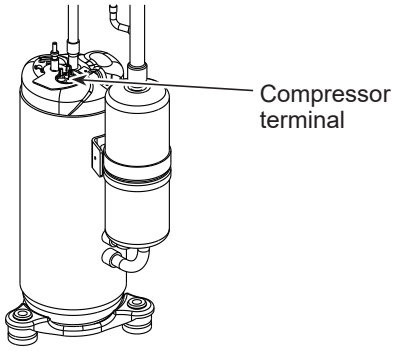
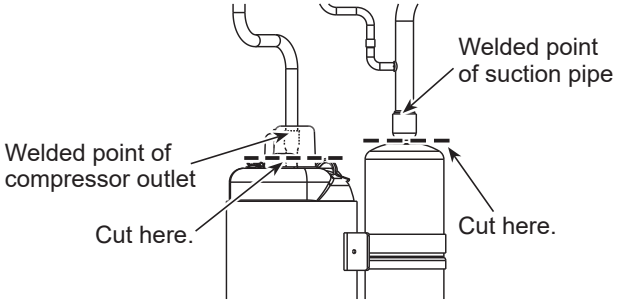


Figure 5



14. Removing the accumulator

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the valve bed. (Refer to the procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Recover refrigerant.
9. Remove 2 welded pipes of accumulator inlets and outlets.
10. Remove 2 accumulator leg fixing screws (5 × 12).

⚠**Caution:**

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:

• Recover refrigerant without spreading it in the air.

Photo 17

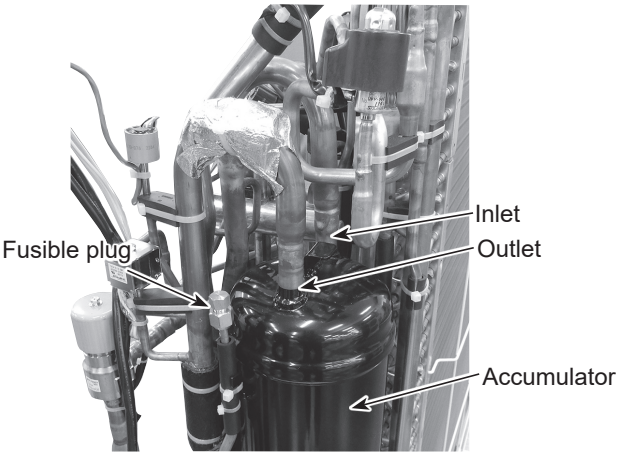
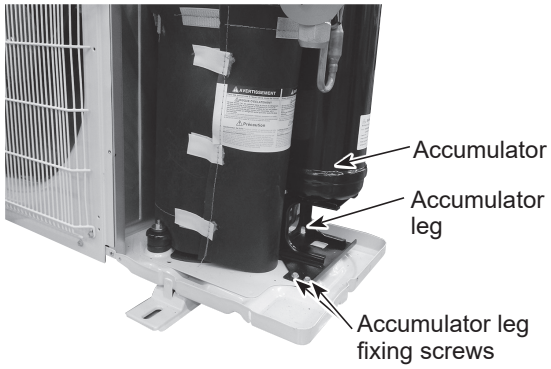


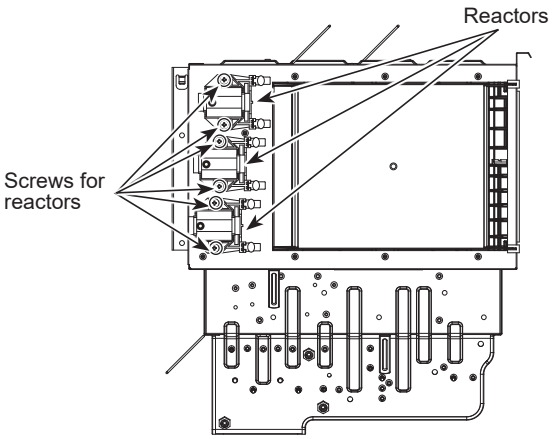
Photo 18



15. Removing the reactor (DCL)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove 6 screws (4 x 10) for reactors to remove the reactors. (See Figure 6)

Figure 6



16. Changing the fusible plug

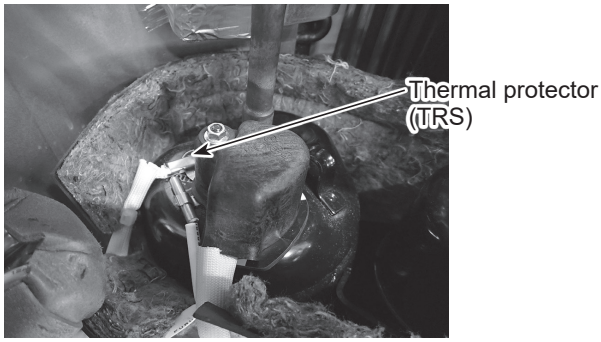
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. (See Photo 17)
- The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).
- Tighten the screw in 14 - 18 N·m* (11-13 lbf·ft) with 2 wrenches.

* 1 N·m ≈ 10 kgf·cm

17. Removing the thermal protector (TRS)

1. Remove the service panel. (See Photo 1)
2. Remove the cover panel (front). (Refer to procedure 6-5)
3. Pull out the lead wire of high pressure switch and disconnect the connector (63H) from the multi controller board in the electrical parts box. (See Photo 13)
4. Remove the top felt covering the compressor.
5. Loosen the clamp or band for the lead wire of the electrical parts box and separator.
6. Pull out the thermal protector (TRS) from the holder. (See Photo 19)

Photo 19



18. Removing the fuse holders

1. Remove the service panel. (See Photo 1)
2. Remove the fuse covers. (See Figure 4)
3. Remove 2 screws (3 x 12) for fuse holders to remove the fuse holders. (See Figure 7 and Photo 20)

Note:
- Bracket, circuit board and other parts can get deformed when inserting and removing the fuse cover.
- Remove the fuse cover in the way that surrounding parts will not be affected.

Photo 20

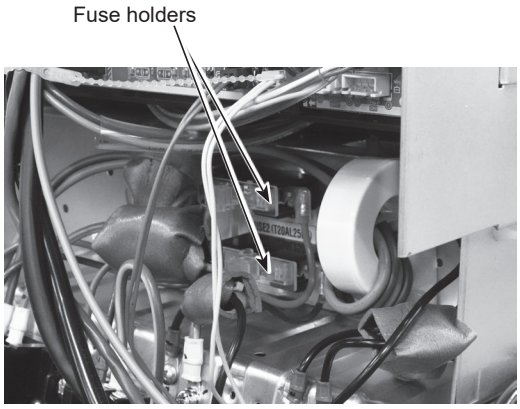
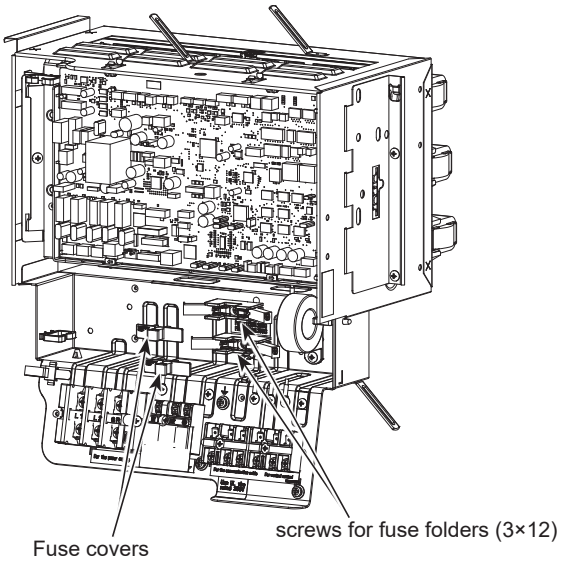


Figure 7



MXZ-SM60NL-U1

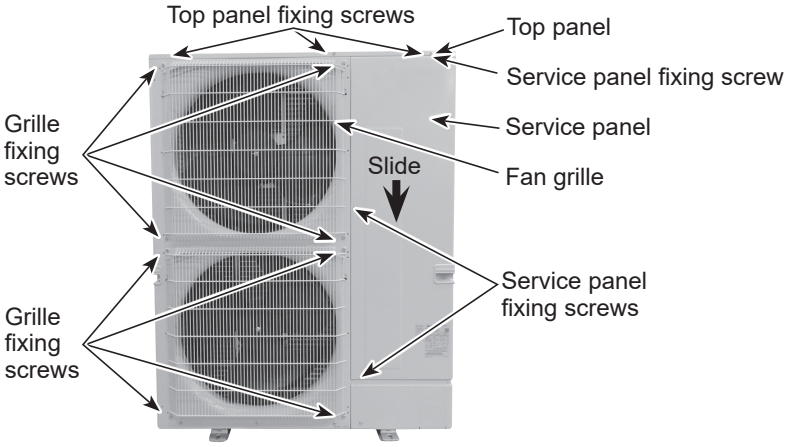
——→: Indicates the visible parts in the photos/figures.
- - - - - - - →: Indicates the invisible parts in the photos/figures.

Note:
- Turn OFF the power supply before disassembly.
- The red markers indicate that flammable refrigerant is charged. If you remove the markers, put them back to the original position after the work is completed.

1. Removing the service panel and top panel

1. Remove 3 service panel fixing screws (5 × 12) and slide the hook on the right downward to remove the service panel.
2. Remove screws (2 for front, 3 for rear/5 × 12) of the top panel and remove it.

Photo 1



2. Removing the fan motor (MF1, MF2)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove 4 grille fixing screws (5 × 12) to detach the fan grille. (See Photo 1)
4. Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2)
5. Disconnect the connectors CNF1 and CNF2 on outdoor multi controller circuit board in electrical parts box.
6. Remove 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3)

Note:
- Tighten the propeller fan with a torque of 5.7 ± 0.3N·m [4.2 ± 0.2 lbf·ft].
- Match the connector colors of the fan motor connector and the outdoor multi controller circuit board when connecting them.

Photo 2

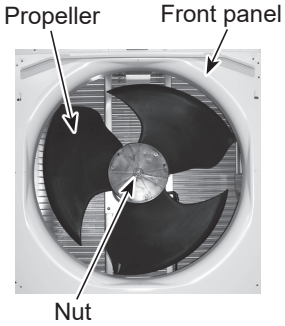
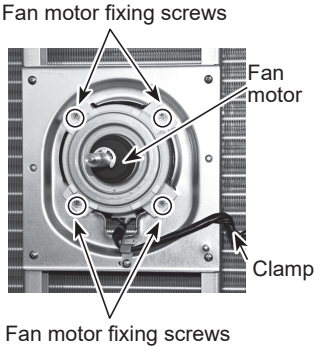


Photo 3



3. Removing the electrical parts box

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connecting wire from terminal block.
4. Remove all the following connectors from outdoor multi controller circuit board;

<Diagram symbol in the connector housing>
- Fan motor (CNF1, CNF2)
- Thermistor <HIC pipe> (TH2)
- Thermistor <Outdoor liquid pipe> (TH3)

- Thermistor <Compressor> (TH4)
- Thermistor <Suction pipe/Ambient> (TH6/7)
- High pressure switch (63H)
- High pressure sensor (63HS)
- Low pressure sensor (63LS)
- 4-way valve (21S4)
- Bypass valve (SV1, SV3)
- Shut-off valve (SV4, SV5)
- Linear expansion valve (CNLVA, CNLVB)

Pull out the disconnected wires from the electrical parts box.

5. Remove the terminal cover and disconnect the compressor lead wire from the comp. terminal. The terminal cover can be easily removed by using a blade of flathead screwdriver. (See Photo 6)
6. Remove 2 electrical parts box fixing screws (4 × 10) and detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.

Photo 4

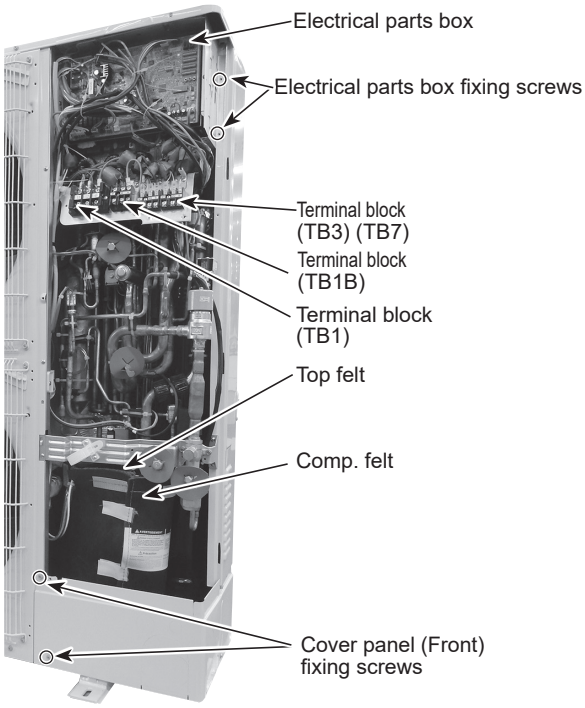


Photo 5

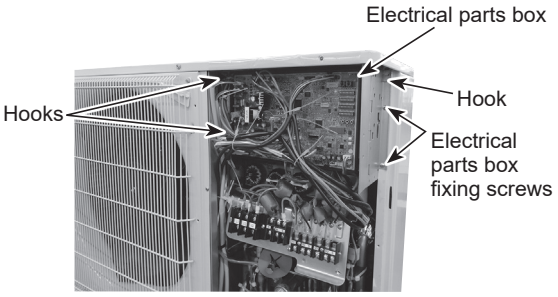
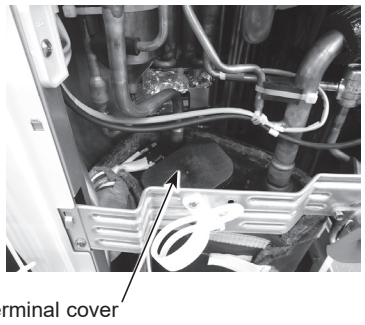


Photo 6



4. Removing thermistors

■ Removing the thermistor <Suction pipe> (TH6)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connectors TH6 and TH7 on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box.
5. Pull out the thermistor <Suction pipe> (TH6) from the sensor holder. (See Photo 8)

Note:

- When replacing thermistor <Suction pipe> (TH6), replace it together with thermistor <Ambient> (TH7) since they are combined together. Refer to "Removing the thermistor <Ambient> (TH7)" below.

Photo 7

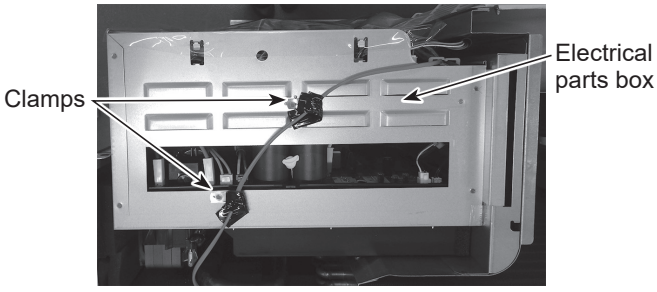
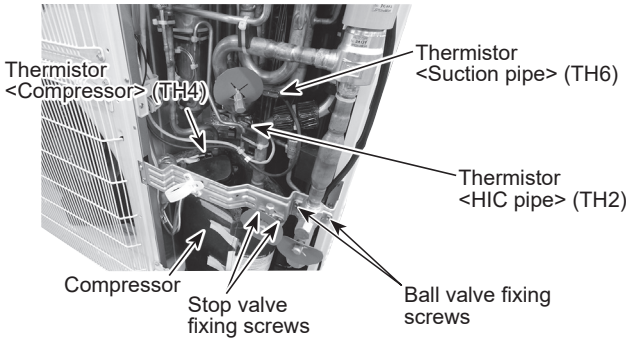


Photo 8



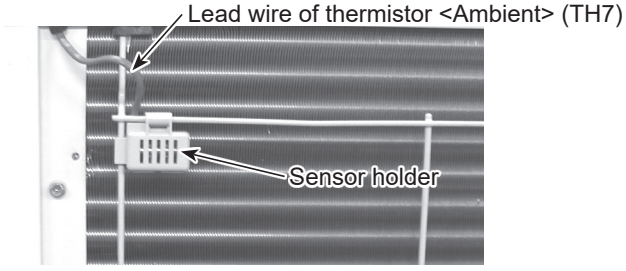
■ Removing the thermistor <Ambient> (TH7)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connector TH7 on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box. (See Photo 7)
5. Pull out the thermistor <Ambient> (TH7) from the sensor holder.

Note:

- When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction pipe> (TH6), since they are combined together. Refer to "Removing the thermistor <Suction pipe> (TH6)" above.

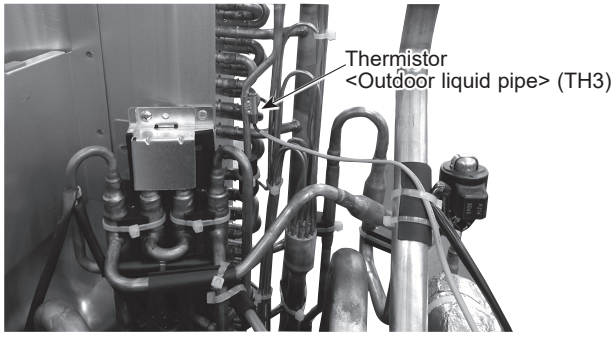
Photo 9



■ Removing the thermistor <Outdoor liquid pipe> (TH3), thermistor <Compressor> (TH4), and thermistor <HIC pipe> (TH2)

1. Remove the service panel. (See Photo 1)
2. Disconnect the connectors TH3, TH4, and TH2 on the outdoor multi controller circuit board in the electrical parts box.
3. Pull out the thermistor <Outdoor liquid pipe> (TH3) , thermistor <Compressor> (TH4) and thermistor <HIC pipe> (TH2) from the sensor holder. (See Photo 8 and 10)

Photo 10



5. Removing the 4-way valve coil (21S4)

1. Remove the service panel. (See Photo 1)
2. Remove 4-way valve coil fixing screw (M5 × 7).
3. Remove the 4-way valve coil by sliding the coil toward you.
4. Disconnect the connector 21S4 on the outdoor multi controller circuit board in the electrical parts box.

6. Removing the 4-way valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 × 16) and then remove the valve bed. (See Photo 4 and 8)
5. Remove 2 cover panel fixing screws (5 x 12), then slide the cover panel (front) upward to remove it. The cover panel (front) is fixed to the cover panel (rear) with a hook on the rear side. (See Photo 4)
6. Remove the cover panel (rear) fixing screws (2 for right side and 2 for rear/ 5 x 12), then slide the cover panel (rear) upward to remove it. (See Photo 4) (The cover panel (rear) is fixed to the side panel (R) with 2 screws.)
7. Remove 3 side panel (R) fixing screws (5 × 12) in the rear of the unit, then slide the side panel (R) upward to remove it. (The side panel (R) is fixed to the side plate with hooks on the rear side.)
8. Remove the 4-way valve coil. (See Photo 11)
9. Recover refrigerant.
10. Remove the 2 rubber mounts on the bypass pipes. (See Photo 12)
11. Remove the 5 welded points on the pipe (C-R) assy.
12. Remove the welded point on the pipe (R-B) assy.
13. Remove the welded part of 4-way valve.

⚠Caution:
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the 4-way valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 11

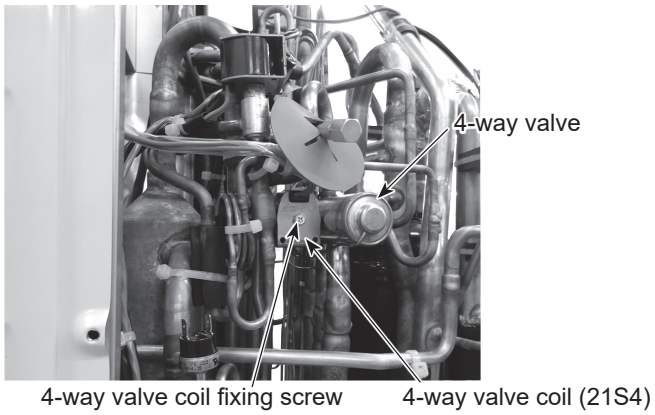


Figure 1

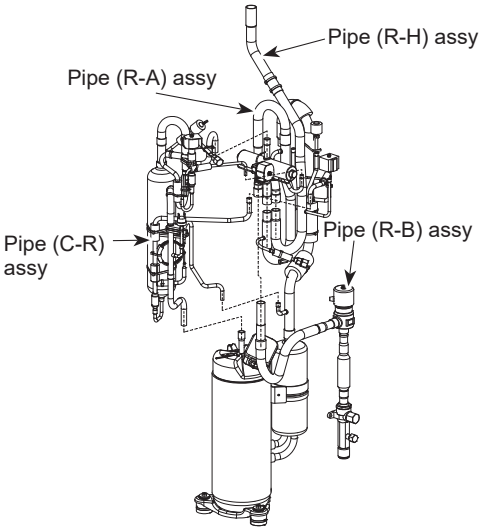


Photo 12

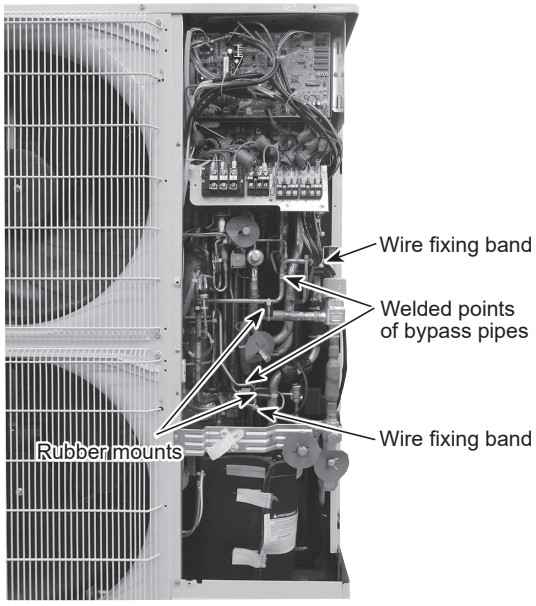
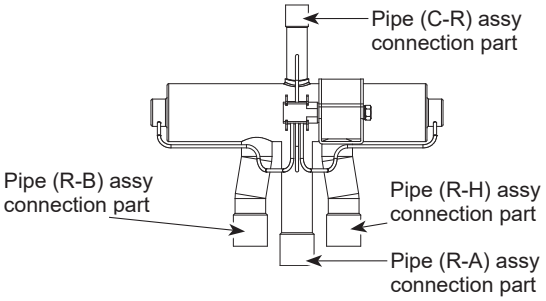


Figure 2



7. Removing the bypass valve coil (SV1, SV3) and the bypass valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Remove the bypass valve coil fixing screw (M4 × 6).
8. Remove the bypass valve coil by sliding the coil upward.
9. Disconnect the connector SV1 and SV3 on the multi controller circuit board in the electrical parts box.
10. Recover refrigerant.
11. Remove the welded part of bypass valve.

⚠Caution:
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the bypass valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

8. Removing the high pressure switch (63H)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Pull out the lead wire of high pressure switch.
8. Recover refrigerant.
9. Remove the welded part of high pressure switch.

⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:

- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the high pressure switch, cover it with a wet cloth to prevent it from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

9. Removing the low pressure sensor (63LS) and the high pressure sensor (63HS)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Disconnect the connectors 63LS and 63HS on the multi controller circuit board in the electrical parts box.
8. Recover refrigerant.
9. Remove the welded part of low pressure sensor.

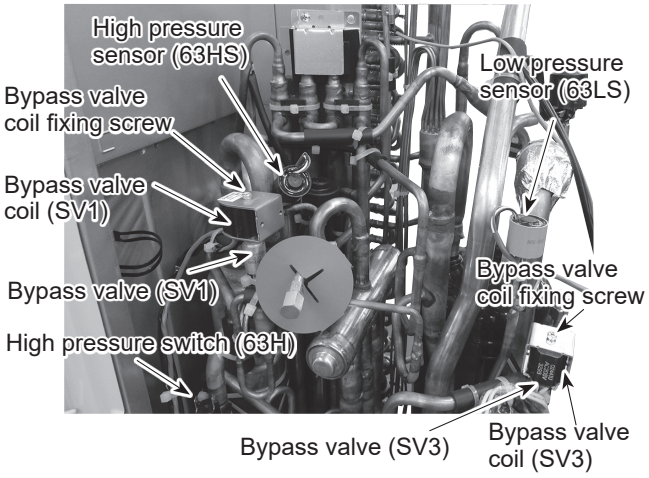
⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:

- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the low pressure sensor and high pressure sensor, cover them with a wet cloth to prevent them from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 13



10. Removing linear expansion valve (LEV-A, LEV-B)

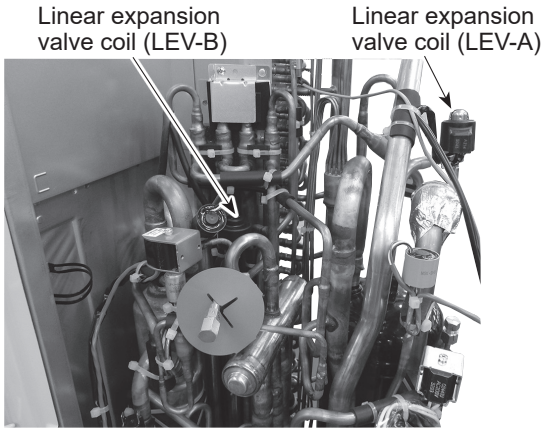
1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Remove the linear expansion valve coil. (See Photo 14)
8. Recover refrigerant.
9. Remove the welded part of linear expansion valve.

⚠Caution:

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the linear expansion valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

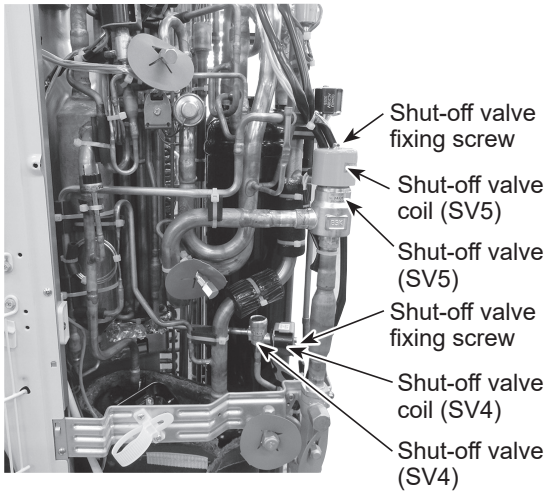
Photo 14



11. Removing shut-off valve coils

1. Remove the service panel. (See Photo 1)
2. Disconnect the connector SV4 and the connector SV5 on the multi controller circuit board in the electrical parts box.
3. Remove shut-off valve coil fixing screws (SV4: M4 x 6, SV5: M5 x 8).
4. Slide the shut-off valve coils to remove. (See Photo 15)

Photo 15



12. Removing shut-off valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (Refer to procedure 3)
4. Remove the valve bed. (See procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Remove the shut-off valve coils. (Refer to procedure 11)
9. Recover refrigerant.
10. Remove the welded part of the shut-off valve.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the shut-off valve, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

13. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the valve bed. (Refer to procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove 5 front panel fixing screws (5 × 12), and remove the front panel. (See Photo 4)
8. Remove the side panel (R). (Refer to procedure 6-7)
9. Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 3)
10. Recover refrigerant.
11. Remove the top felt and the comp. felt, and then remove the thermistor <Compressor> (TH4) and the lead wires for compressor.
12. Remove the 2 rubber mounts on the bypass pipes of the compressor inlet and outlet and the 2 wire fixing bands. Then, separate the bypass pipes at the welded points (2 points).
13. Remove the welded pipe of compressor inlet and outlet and then remove the compressor.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- See Figure 5 for the cut-off points on the compressor inlet and outlet pipes.
- Use an appropriate tool for hexagon nuts of 10 mm width across flats to remove and attach compressor fixing nuts. A tool with the length of 140 mm is recommended as your work space is narrow.
- Compressor fixing screws are non-magnetic.
- Work in a pair when removing a welded part.

Photo 16

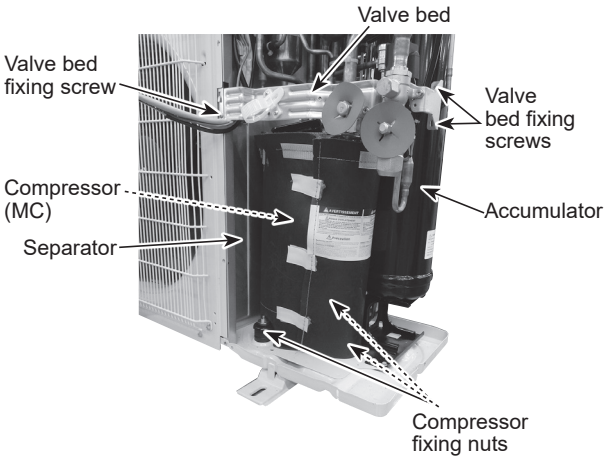


Figure 3

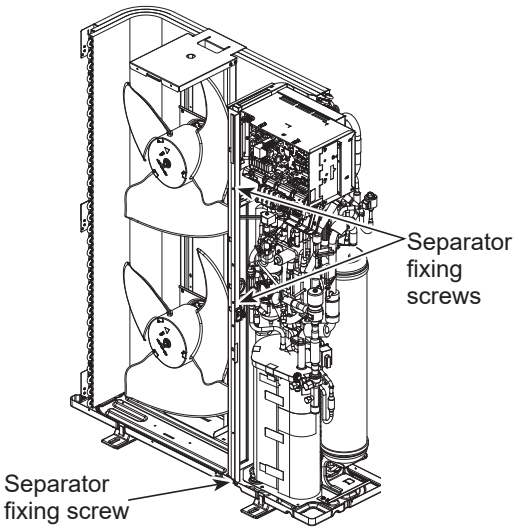


Figure 4

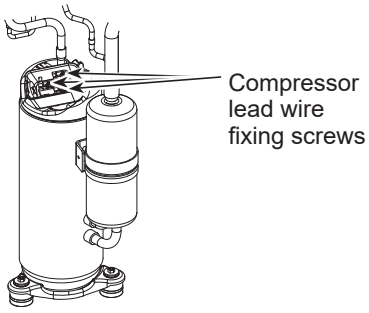
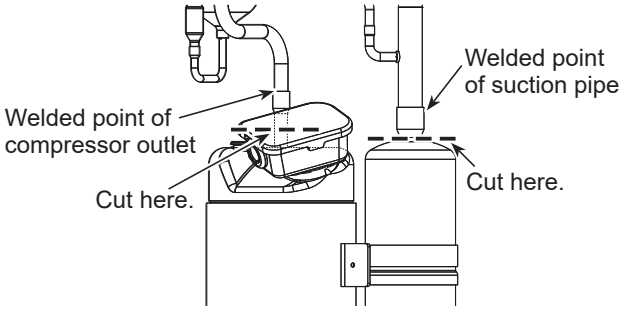


Figure 5



14. Removing the accumulator

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the valve bed. (Refer to procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Recover refrigerant.
9. Remove 2 welded pipes of accumulator inlet and outlet.
10. Remove 2 accumulator leg fixing screws (5 × 12).

⚠**Caution:**

- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:

- Recover refrigerant without spreading it in the air.

Photo 17

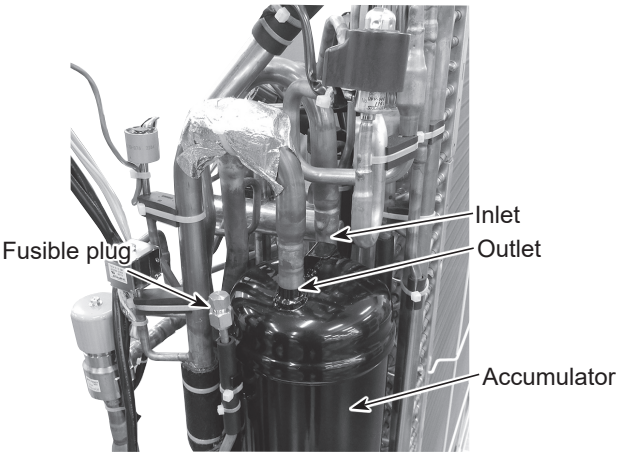
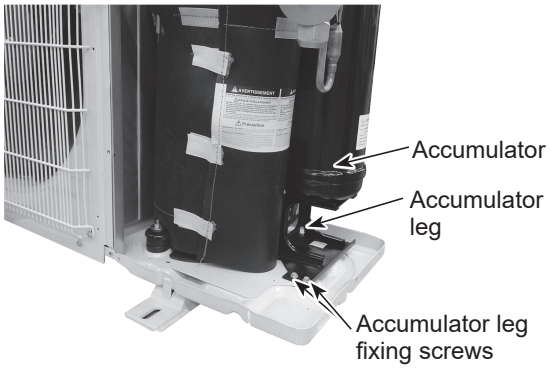


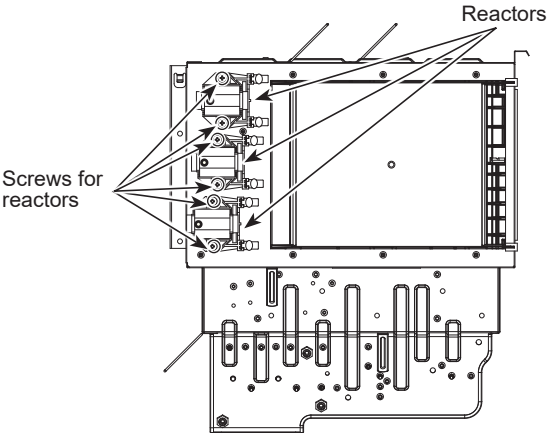
Photo 18



15. Removing the reactor (DCL)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove 6 screws (4 x 10) for reactors to remove the reactors. (See Figure 6)

Figure 6



16. Changing the fusible plug

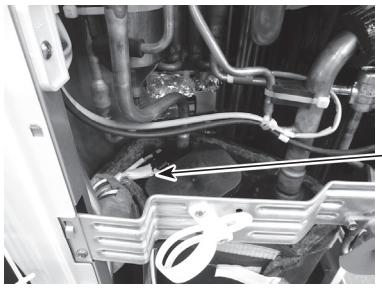
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. (See Photo 17)
- The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).
- Tighten the screw in 14 - 18 N·m* (11-13 lbf·ft) with 2 wrenches.

* 1 N·m ≈ 10 kgf·cm

17. Removing the thermal protector (TRS)

1. Remove the service panel. (See Photo 1)
2. Remove the cover panel (front). (Refer to procedure 6-5)
3. Pull out the lead wire of high pressure switch and disconnect the connector (63H) from the multi controller board in the electrical parts box. (See Photo 11)
4. Remove the comp felt covering the compressor.
5. Loosen the clamp or band for the lead wire of the electrical parts box and separator.
6. Pull out the thermal protector (TRS) from the holder. (See photo 19)

Photo 19



18. Removing the fuse holders

1. Remove the service panel. (See Photo 1)
2. Remove 2 screws (4 x 10) for cont. base to remove the cont. base. (See Figure 7)
3. Remove the fuse covers. (See Figure 8)
4. Remove 2 screws (3 x 12) for fuse holders to remove the fuse holders. (See Figure 8 and Photo 20)

Note:
- Bracket, circuit board and other parts can get deformed when inserting and removing the fuse cover.
- Remove the fuse cover in the way that surrounding parts will not be affected.

Photo 20

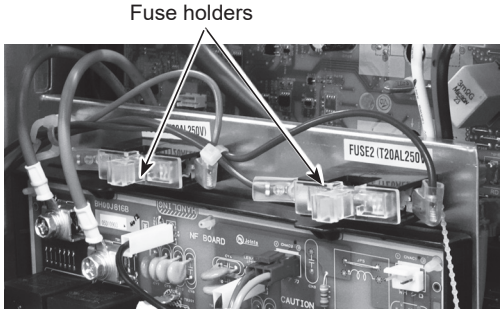


Figure 7

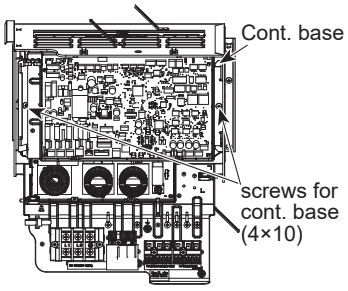
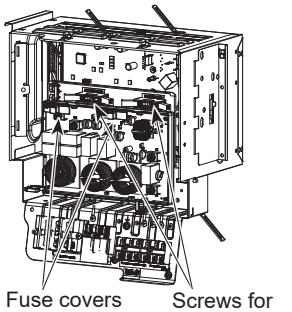


Figure 8



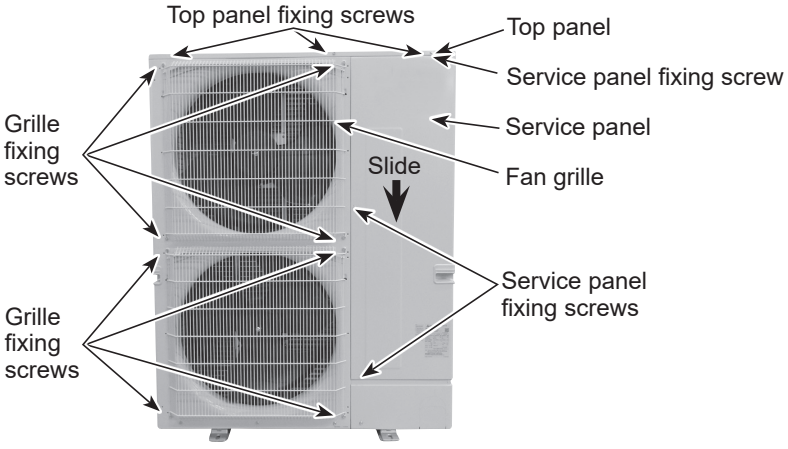
——→: Indicates the visible parts in the photos/figures.
- - - - - - - →: Indicates the invisible parts in the photos/figures.

Note:
- Turn OFF the power supply before disassembly.
- The red markers indicate that flammable refrigerant is charged. If you remove the markers, put them back to the original position after the work is completed.

1. Removing the service panel and top panel

1. Remove 3 service panel fixing screws (5 × 12) and slide the hook on the right downward to remove the service panel.
2. Remove screws (2 for front, 3 for rear/5 × 12) of the top panel and remove it.

Photo 1



2. Removing the fan motor (MF1, MF2)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove 4 grille fixing screws (5 × 12) to detach the fan grille. (See Photo 1)
4. Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2)
5. Disconnect the connectors CNF1 and CNF2 on outdoor multi controller circuit board in electrical parts box.
6. Remove 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3)

Note:
- Tighten the propeller fan with a torque of 5.7 ± 0.3N·m [4.2 ± 0.2 lbf·ft].
- Match the connector colors of the fan motor connector and the outdoor multi controller circuit board when connecting them.

Photo 2

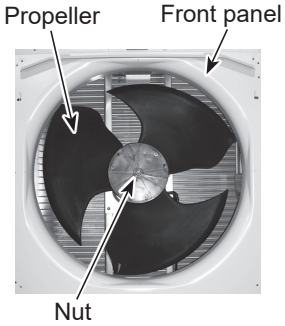
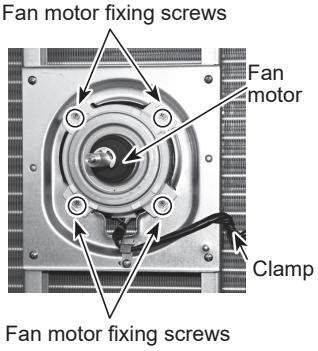


Photo 3



3. Removing the electrical parts box

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connecting wire from terminal block.
4. Remove all the following connectors from outdoor multi controller circuit board;

<Diagram symbol in the connector housing>
- Fan motor (CNF1, CNF2)
- Thermistor <HIC pipe> (TH2)
- Thermistor <Outdoor liquid pipe> (TH3)

• Thermistor <Compressor> (TH4)
• Thermistor <Suction pipe/Ambient> (TH6/7)
• High pressure switch (63H)
• High pressure sensor (63HS)
• Low pressure sensor (63LS)
• 4-way valve (21S4)
• Bypass valve (SV1, SV2, SV3)
• Shut-off valve (SV4, SV5)
• Linear expansion valve (CNLVA, CNLVB)
• Base heater (SS/BH)
Pull out the disconnected wires from the electrical parts box.

5. Remove the terminal cover and disconnect the compressor lead wire from the comp. terminal. The terminal cover can be easily removed by using a blade of flathead screwdriver. (See Photo 6)
6. Remove 2 electrical parts box fixing screws (4 × 10) and detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.

Photo 4

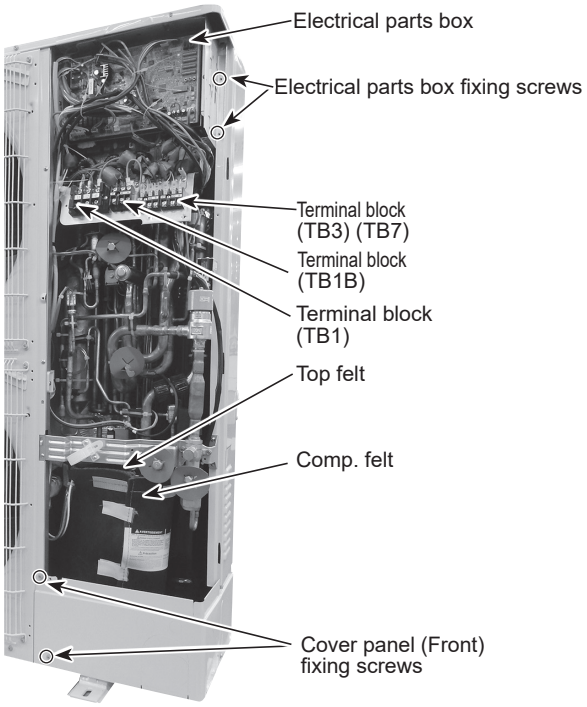


Photo 5

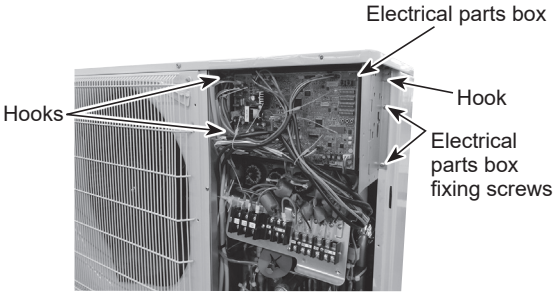
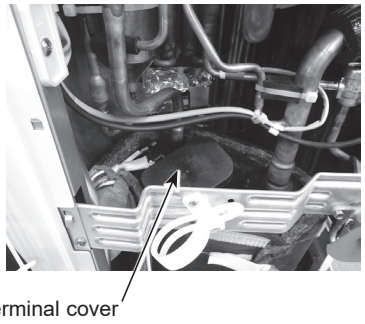


Photo 6



4. Removing thermistors

■ Removing the thermistor <Suction pipe> (TH6)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connectors TH6 and TH7 on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box.
5. Pull out the thermistor <Suction pipe> (TH6) from the sensor holder. (See Photo 8)

Note:
• When replacing thermistor <Suction pipe> (TH6), replace it together with thermistor <Ambient> (TH7) since they are combined together. Refer to "Removing the thermistor <Ambient> (TH7)" below.

Photo 7

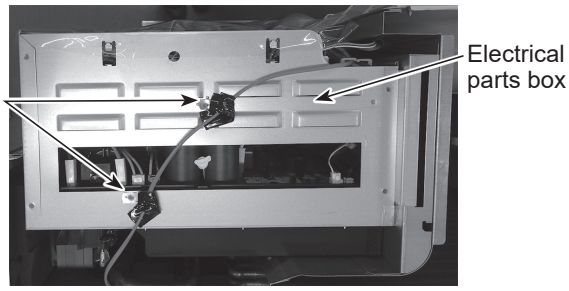
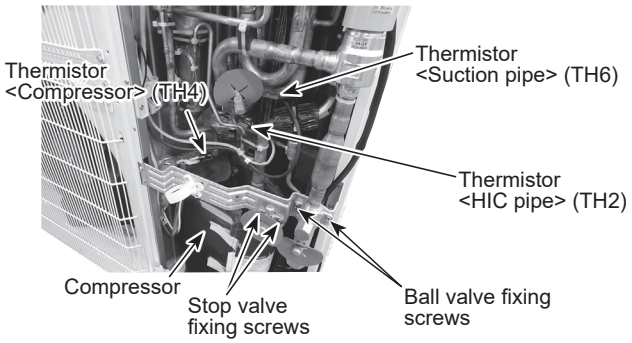


Photo 8



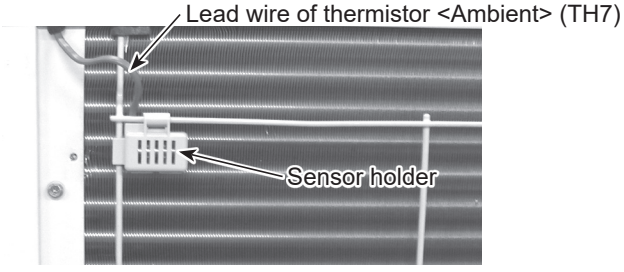
■ Removing the thermistor <Ambient> (TH7)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connector TH7 on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box. (See Photo 7.)
5. Pull out the thermistor <Ambient> (TH7) from the sensor holder.

Note:

- When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction pipe> (TH6), since they are combined together. Refer to "Removing the thermistor <Suction pipe> (TH6)" above.

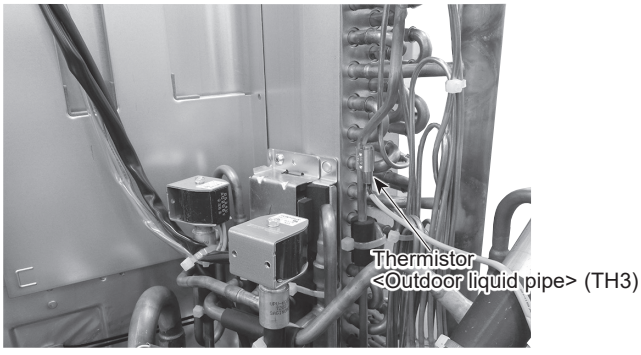
Photo 9



■ Removing the thermistor <Outdoor liquid pipe> (TH3), thermistor <Compressor> (TH4), and thermistor <HIC pipe> (TH2)

1. Remove the service panel. (See Photo 1)
2. Disconnect the connectors TH3, TH4, and TH2 on the outdoor multi controller circuit board in the electrical parts box.
3. Pull out the thermistor <Outdoor liquid pipe> (TH3) , thermistor <Compressor> (TH4) and thermistor <HIC pipe> (TH2) from the sensor holder. (See Photo 8 and 10)

Photo 10



5. Removing the 4-way valve coil (21S4)

1. Remove the service panel. (See Photo 1)
2. Remove 4-way valve coil fixing screw (M5 × 7).
3. Remove the 4-way valve coil by sliding the coil toward you.
4. Disconnect the connector 21S4 on the outdoor multi controller circuit board in the electrical parts box.

6. Removing the 4-way valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)

3. Remove the electrical parts box. (See Photo 5)
4. Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 × 16) and then remove the valve bed. (See Photo 4 and 8)
5. Remove 2 cover panel fixing screws (5 x 12), then slide the cover panel (front) upward to remove it. The cover panel (front) is fixed to the cover panel (rear) with a hook on the rear side. (See Photo 4)
6. Remove the cover panel (rear) fixing screws (2 for right side and 2 for rear/ 5 x 12), then slide the cover panel (rear) upward to remove it. (See Photo 4) (The cover panel (rear) is fixed to the side panel (R) with 2 screws.)
7. Remove 3 side panel (R) fixing screws (5 × 12) in the rear of the unit, then slide the side panel (R) upward to remove it. (The side panel (R) is fixed to the side plate with hooks on the rear side.)
8. Remove the 4-way valve coil. (See Photo 11)
9. Recover refrigerant.
10. Remove the 2 rubber mounts on the bypass pipes. (See Photo 12)
11. Remove the 5 welded points on the pipe (C-R) assy.
12. Remove the welded point on the pipe (R-B) assy.
13. Remove the welded part of 4-way valve.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the 4-way valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 11

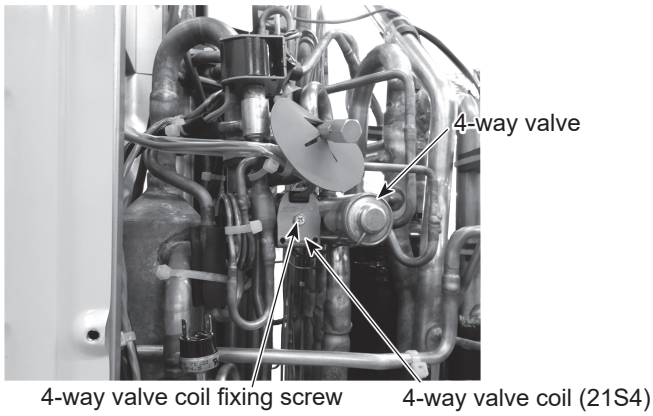


Photo 12

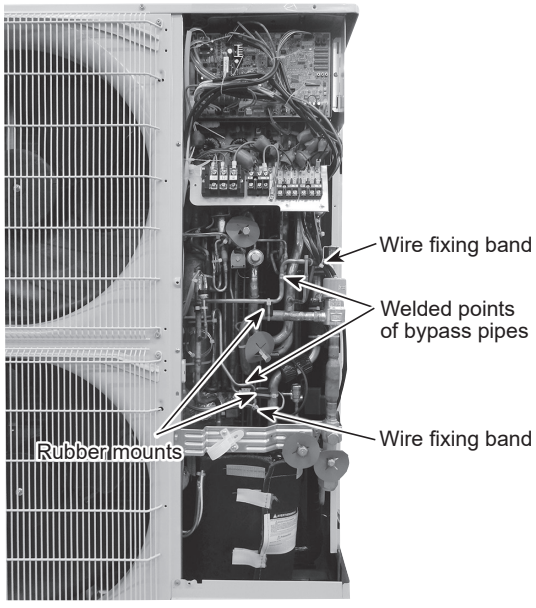


Figure 1

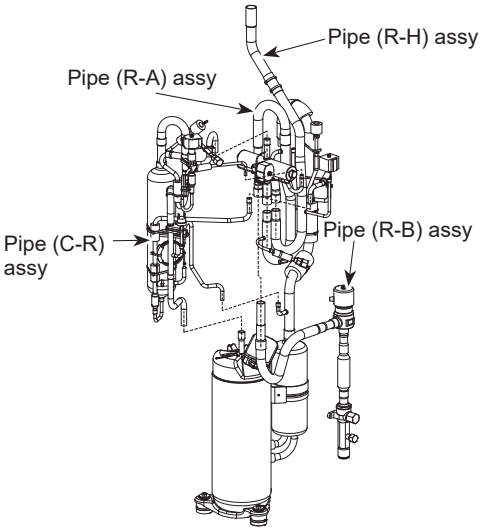
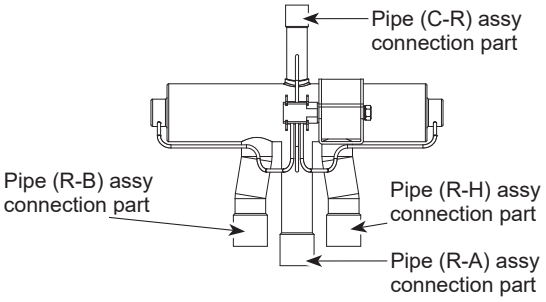


Figure 2



7. Removing bypass valve coil (SV1, SV2, SV3, SV6) and bypass valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)

6. Remove the side panel (R). (Refer to procedure 6-7)
7. Remove the bypass valve coil fixing screw (M4 × 6).
8. Remove the bypass valve coil by sliding the coil upward.
9. Disconnect the connector SV1, SV2, SV3 and SV6 on the multi controller circuit board in the electrical parts box.
10. Recover refrigerant.
11. Remove the welded part of bypass valve.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the bypass valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

8. Removing the high pressure switch (63H)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Pull out the lead wire of high pressure switch.
8. Recover refrigerant.
9. Remove the welded part of high pressure switch.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the high pressure switch, cover it with a wet cloth to prevent it from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

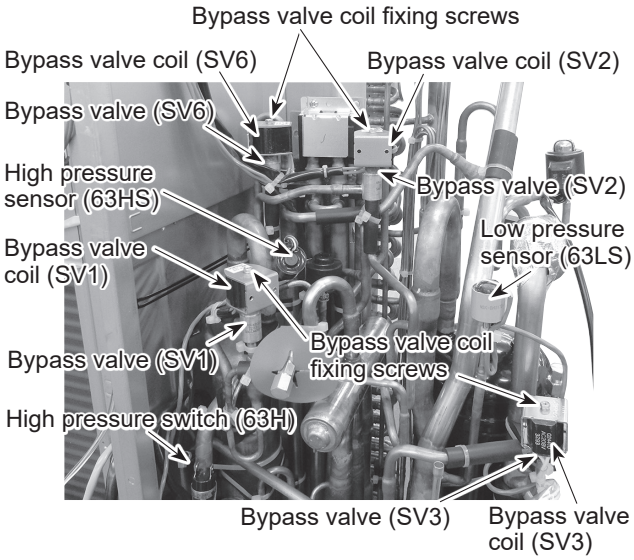
9. Removing the low pressure sensor (63LS) and the high pressure sensor (63HS)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Disconnect the connectors 63LS and 63HS on the multi controller circuit board in the electrical parts box.
8. Recover refrigerant.
9. Remove the welded part of low pressure sensor.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the low pressure sensor and high pressure sensor, cover them with a wet cloth to prevent them from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 13



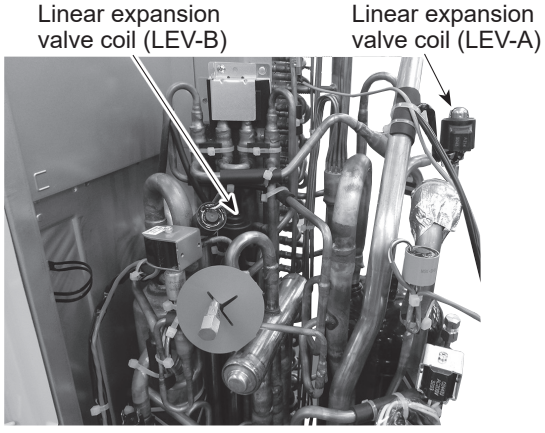
10. Removing linear expansion valve (LEV-A, LEV-B)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the cover panel (front). (Refer to procedure 6-5)
5. Remove the cover panel (rear). (Refer to procedure 6-6)
6. Remove the side panel (R). (Refer to procedure 6-7)
7. Remove the linear expansion valve coil. (See Photo 14)
8. Recover refrigerant.
9. Remove the welded part of linear expansion valve.

⚠**Caution:**
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the linear expansion valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.

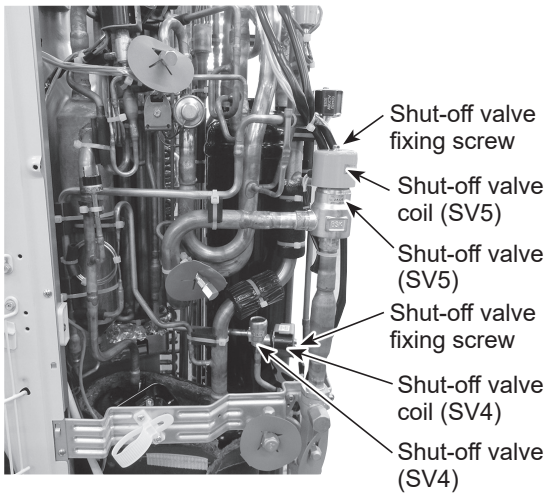
Photo 14



11. Removing shut-off valve coils

1. Remove the service panel. (See Photo 1)
2. Disconnect the connector SV4 and the connector SV5 on the multi controller circuit board in the electrical parts box.
3. Remove shut-off valve coil fixing screws (SV4: M4 x 6, SV5: M5 x 8).
4. Slide the shut-off valve coils to remove. (See Photo 15)

Photo 15



12. Removing shut-off valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (Refer to procedure 3)
4. Remove the valve bed. (See procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Remove the shut-off valve coils. (Refer to procedure 11)
9. Recover refrigerant.
10. Remove the welded part of the shut-off valve.

⚠Caution:
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the shut-off valve, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

13. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the valve bed. (Refer to procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Remove 5 front panel fixing screws (5 × 12), and remove the front panel. (See Photo 4)
9. Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 3)
10. Recover refrigerant.
11. Remove the top felt and the comp. felt, and then remove the thermistor <Compressor> (TH4) and the lead wires for compressor.
12. Remove the 2 rubber mounts on the bypass pipes of the compressor inlet and outlet and the 2 wire fixing bands. Then, separate the bypass pipes at the welded points (2 points).
13. Remove the welded pipe of compressor inlet and outlet and then remove the compressor.

⚠Caution:
- Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- See Figure 5 for the cut-off points on the compressor inlet and outlet pipes.
- Use an appropriate tool for hexagon nuts of 10 mm width across flats to remove and attach compressor fixing nuts. A tool with the length of 140 mm is recommended as your work space is narrow.
- Compressor fixing screws are non-magnetic.
- Work in a pair when removing a welded part.

Photo 16

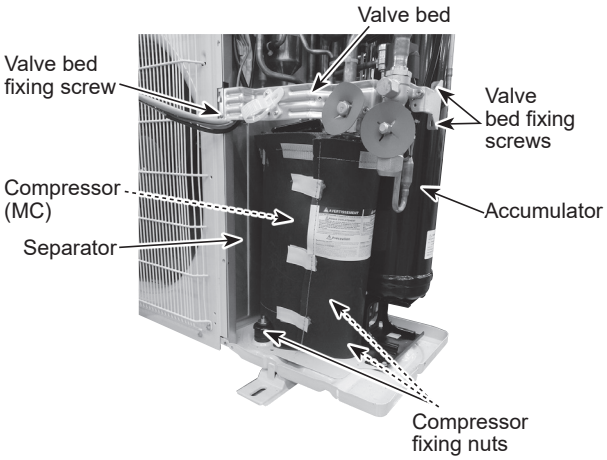


Figure 3

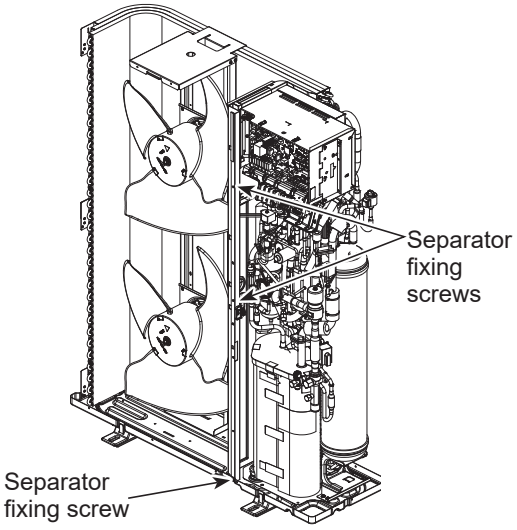


Figure 4

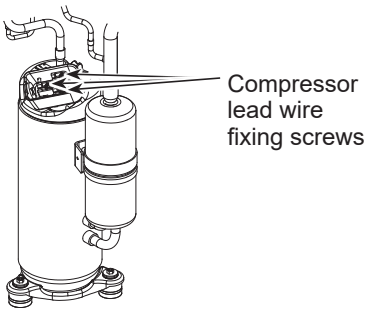
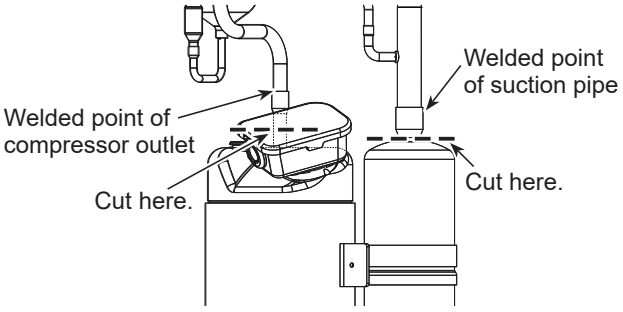


Figure 5



14. Removing the accumulator

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove the valve bed. (Refer to procedure 6-4)
5. Remove the cover panel (front). (Refer to procedure 6-5)
6. Remove the cover panel (rear). (Refer to procedure 6-6)
7. Remove the side panel (R). (Refer to procedure 6-7)
8. Recover refrigerant.
9. Remove 2 welded pipes of accumulator inlet and outlet.
10. Remove 2 accumulator leg fixing screws (5 × 12).

⚠**Caution:**

• Recover refrigerant with the stop valve and the ball valve opened through both the check valves and the service ports.

Note:

• Recover refrigerant without spreading it in the air.

Photo 17

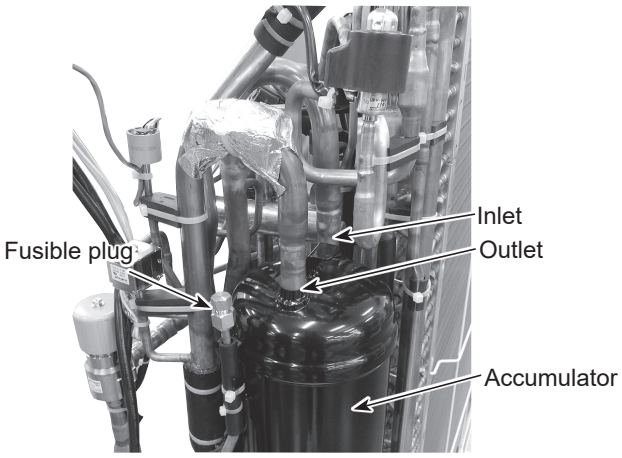
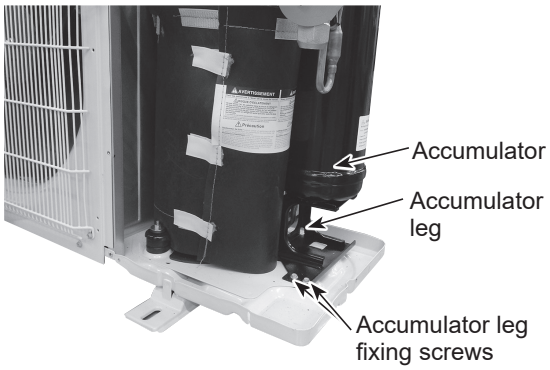


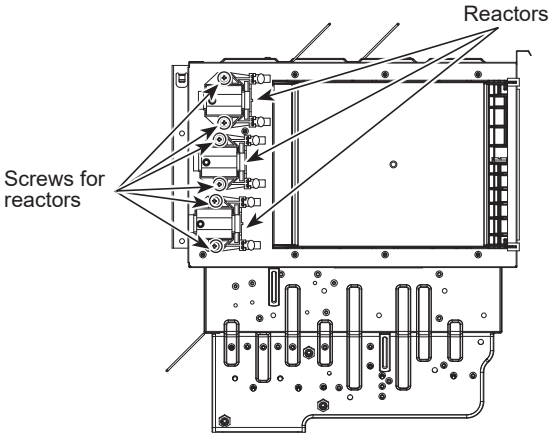
Photo 18



15. Removing the reactor (DCL)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove 6 screws (4 x 10) for reactors to remove the reactors. (See Figure 6)

Figure 6



16. Removing the base heater

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the front panel.
4. Remove all the following connectors from outdoor multi controller circuit board;

   <Diagram symbol in the connector housing>
   • Fan motor (CNF1, CNF2)
   • Base heater (SS/BH)
   Pull out the disconnected wires from the electrical parts box.

5. Loosen the wire clamps on the side of the motor support and separator.
6. Remove 2 motor support fixing screws (5 x 12), then remove the motor support with fan motor still attached. (See Photo 19)
7. Remove 2 base heater cover fixing screws (4 x 10), then remove the base heater cover.
8. Remove the base heater. (See Photo 20)

Notes:
- Tighten the propeller fan with a torque of 5.7 ± 0.3 N·m [4.2 ± 0.2 lbf·ft].
- Rotate the propeller fan and make sure that the base heater and the lead wires do not interfere with the movement of the propeller fan.

Photo 19

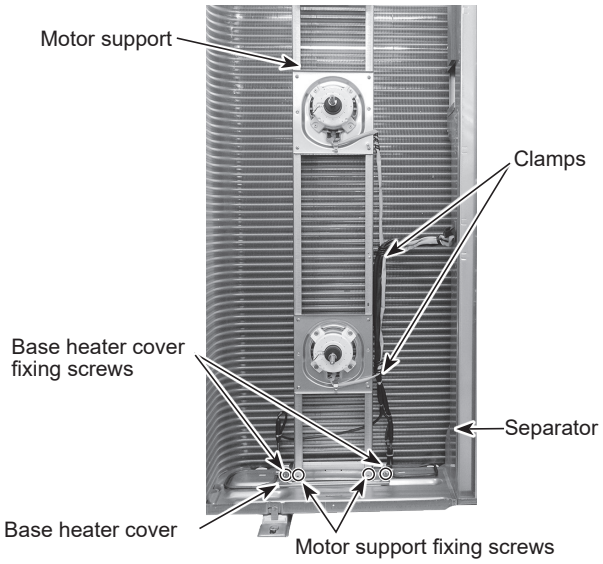
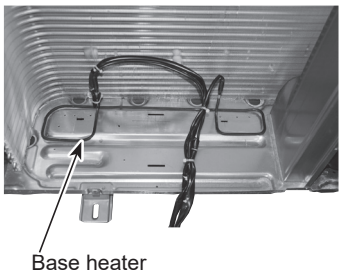


Photo 20



17. Changing the fusible plug

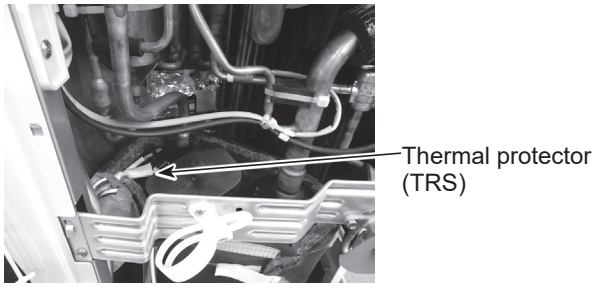
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. (See Photo 17)
- The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).
- Tighten the screw in 14 - 18 N·m* (11-13 lbf·ft) with 2 wrenches.

* 1 N·m ≈ 10 kgf·cm

18. Removing the thermal protector (TRS)

1. Remove the service panel. (See Photo 1)
2. Remove the cover panel (front). (Refer to procedure 6-5)
3. Pull out the lead wire of high pressure switch and disconnect the connector (63H) from the multi controller board in the electrical parts box. (See Photo 13)
4. Remove the comp felt covering the compressor.
5. Loosen the clamp or band for the lead wire of the electrical parts box and separator.
6. Pull out the thermal protector (TRS) from the holder. (See photo 21)

Photo 21



19. Removing the fuse holders

1. Remove the service panel. (See Photo 1)
2. Remove 2 screws (4 x 10) for cont. base to remove the cont. base. (See Figure 7)
3. Remove the fuse covers. (See Figure 8)
4. Remove 2 screws (3 x 12) for fuse holders to remove the fuse holders. (See Figure 8 and Photo 22)

Note:

- Bracket, circuit board and other parts can get deformed when inserting and removing the fuse cover.
- Remove the fuse cover in the way that surrounding parts will not be affected.

Photo 22

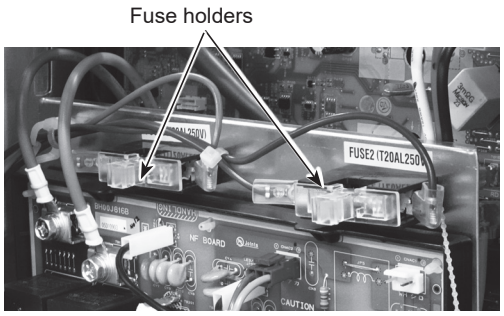


Figure 7

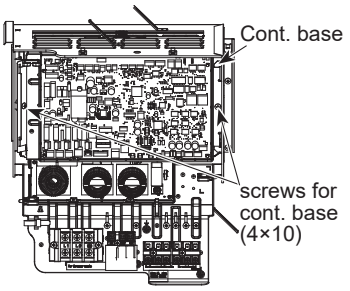
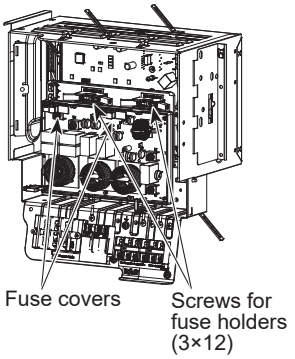
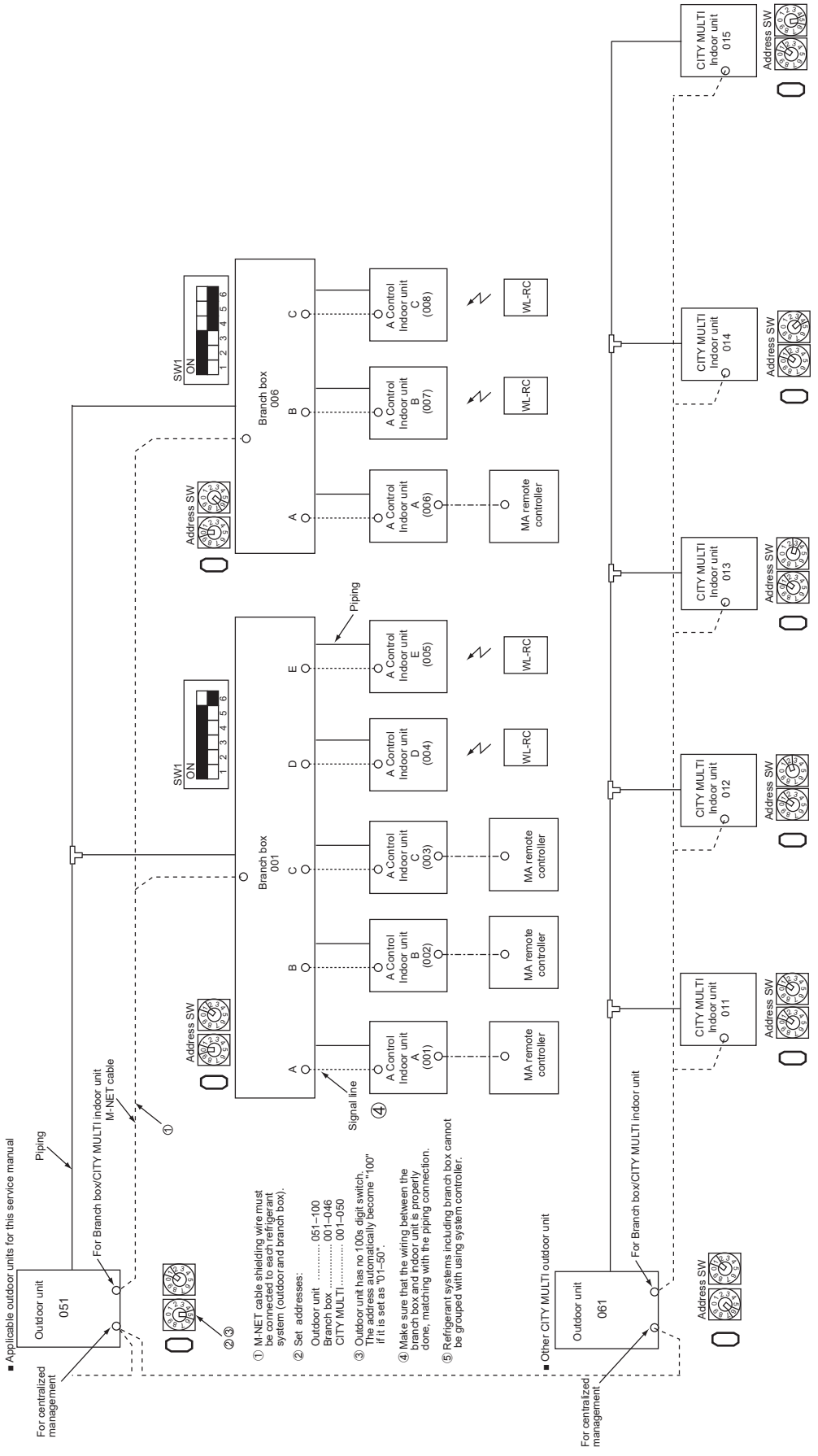


Figure 8



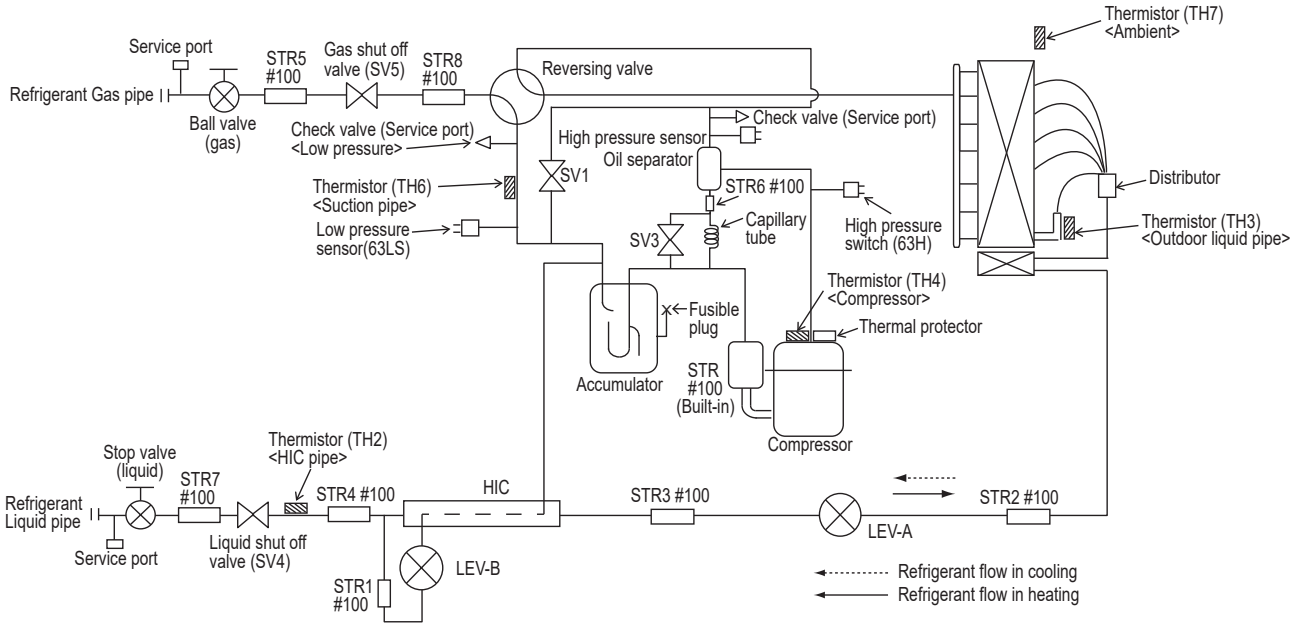
10 SYSTEM CONSTRUCTION

10-1. Example of refrigerant piping and transmission cable wiring



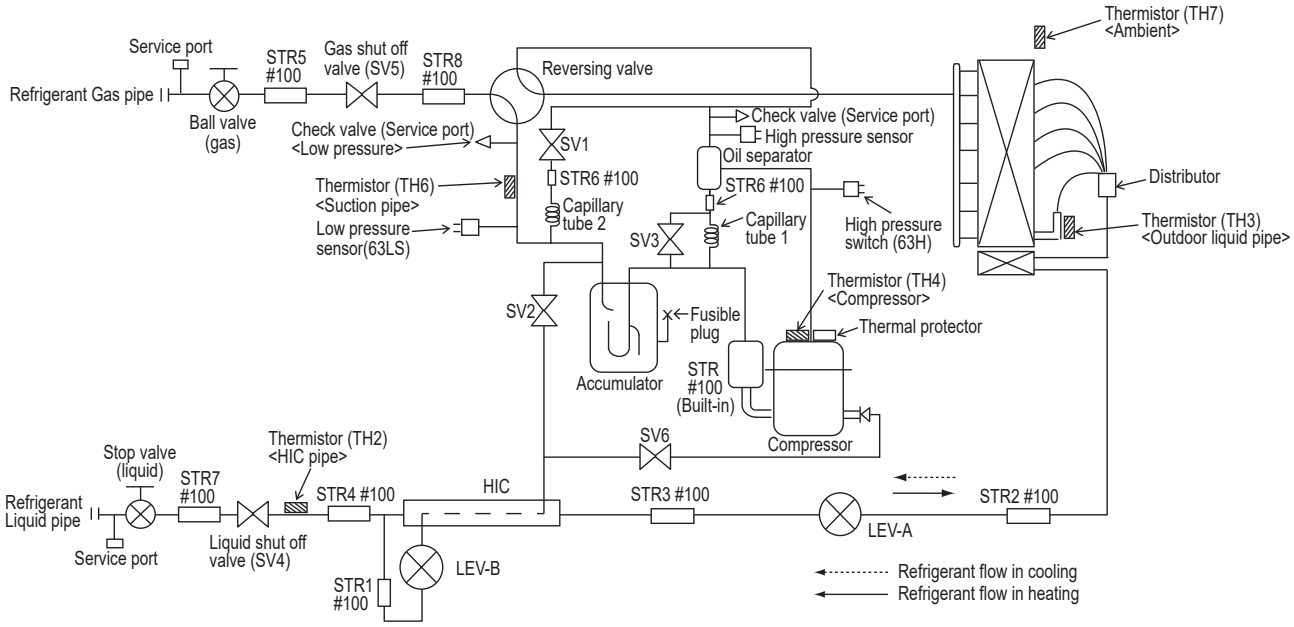
10-2. Refrigerant system diagram

MXZ-SM36NL-U1 **MXZ-SM48NL-U1**

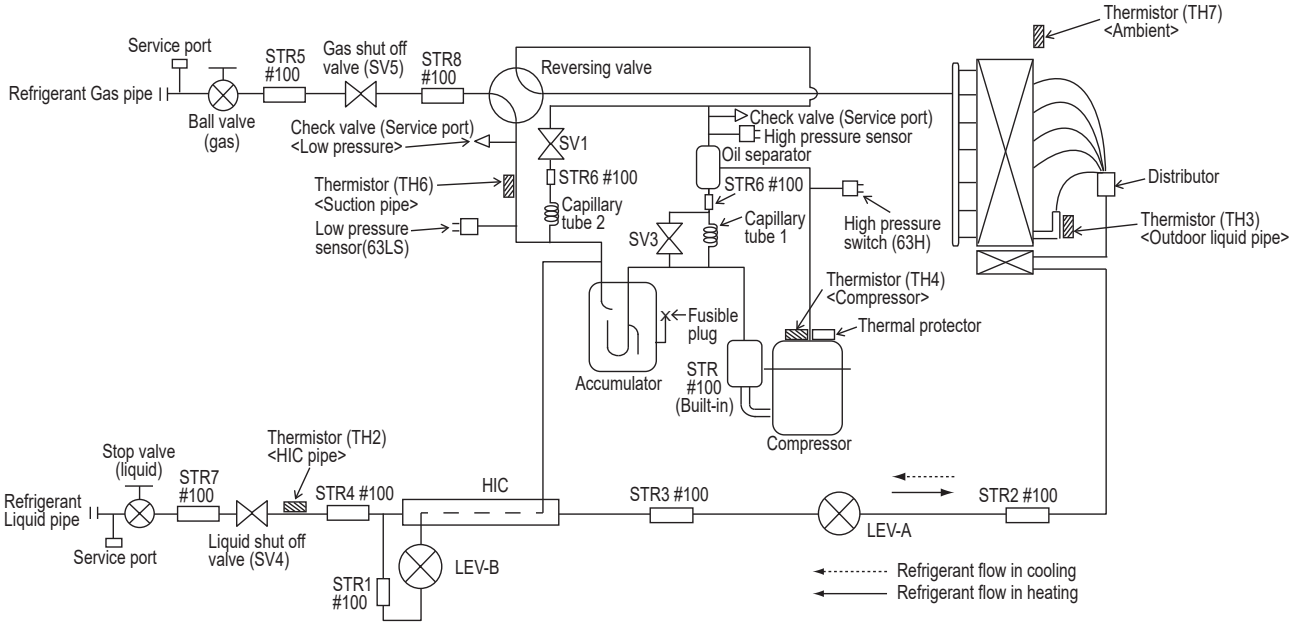


Capillary tube for oil separator (inch [mm]): ø0.098 × ø0.031 × L39.37 (ø2.5 × ø0.8 × L1000)
Capillary tube for solenoid valve (inch [mm]): ø0.157 × ø0.117 × L19.685 (ø4.0 × ø3.0 × L500)

MXZ-SM36NLHZ-U1 **MXZ-SM42NLHZ-U1** **MXZ-SM48NLHZ-U1**



Capillary tube for oil separator (inch [mm]): ø0.098 × ø0.031 × L39.37 (ø2.5 × ø0.8 × L1000)
Capillary tube for solenoid valve (inch [mm]): ø0.157 × ø0.117 × L19.685 (ø4.0 × ø3.0 × L500)



Capillary tube for oil separator [inch(mm)]: ø0.098 × ø0.031 × L39.37 (ø2.5 × ø0.8 × L1000)
Capillary tube for solenoid valve [inch(mm)]: ø0.157 × ø0.117 × L19.685 (ø4.0 × ø3.0 × L500)

10-3. Selecting pipe size

Refer to installation manual “Selecting pipe size” for piping connection.

10-4. System control

Refer to installation manual “Wiring transmission cables” for system control.

11 ELECTRICAL WIRING

Refer to installation manual “Electrical work” for details.

12 REFRIGERANT PIPING TASKS

12-1. Refrigerant piping system

Refer to installation manual “Pipe length and height difference” for refrigerant piping system.

12-2. Precautions against refrigerant leakage

12-2-1. Introduction

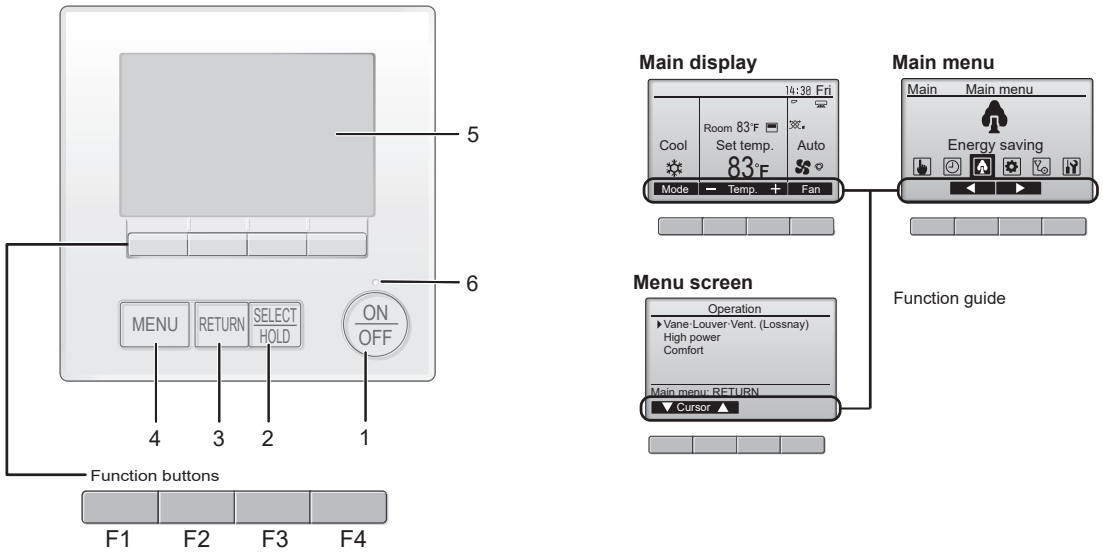
If a large amount of R454B refrigerant leaks in a room, suffocation or fire may result. Satisfy the installation area specified in the installation manual to meet safety standards.

13 REMOTE CONTROLLER

13-1. Remote controller functions

13-1-1. PAR-42MAAUB

Controller interface



Note:

- The functions of the function buttons change depending on the screen. Refer to the button function guide that appears at the bottom of the LCD for the functions they serve on a given screen. When the system is centrally controlled, the button function guide that corresponds to the locked button will not appear.

1. [ON/OFF] button
   Press to turn ON/OFF the indoor unit.
2. [SELECT/HOLD] button
   Press to save the setting.
   When the main menu is displayed, pressing this button will enable/disable the [HOLD] function.
3. [RETURN] button
   Press to return to the previous screen.
4. [MENU] button
   Press to open the main menu.
5. Backlit LCD
   Operation settings will appear.
   When the backlight is off, pressing any button, except for the [ON/OFF] button, turns the backlight on, and it will stay lit for a certain period of time depending on the screen.
6. ON/OFF lamp
   This lamp lights up in green while the unit is in operation. It blinks while the remote controller is starting up or when there is an error.

F1: Function button 1
Main display: Press to change the operation mode.
Menu screen: The button function varies depending on the screen.

F2: Function button 2
Main display: Press to decrease temperature.
Main menu: Press to move the cursor left.
Menu screen: The button function varies depending on the screen.

F3: Function button 3
Main display: Press to increase temperature.
Main menu: Press to move the cursor right.
Menu screen: The button function varies depending on the screen.

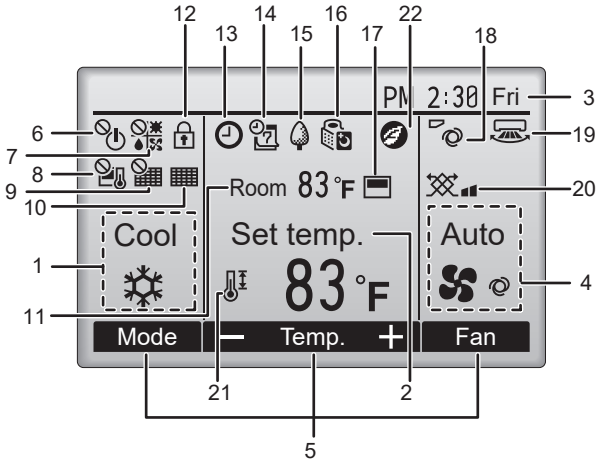
F4: Function button 4
Main display: Press to change the fan speed.
Menu screen: The button function varies depending on the screen.

Display

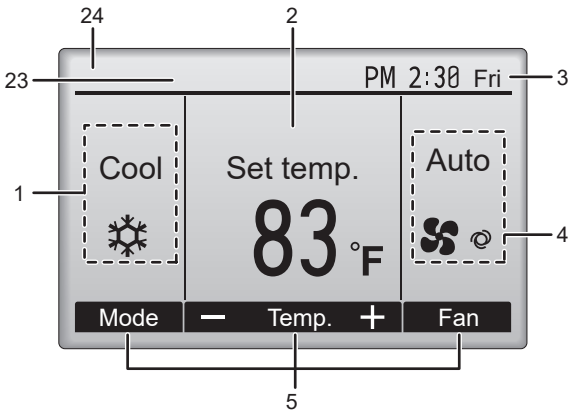
The main display can be displayed in 2 different modes: [Full] and [Basic]. The initial setting is [Full]. To switch to [Basic] mode, change the setting on the [Main display] setting. (Refer to operation manual included with remote controller.)

■ [Full] mode

All icons are displayed for explanation.



■ [Basic] mode



Note:

• Most settings (except ON/OFF, mode, fan speed, temperature) can be made from the main menu.

1. Operation mode
2. Preset temperature
3. Clock
4. Fan speed
5. Button function guide: Functions of the corresponding buttons appear here.
6. : Appears when the ON/OFF operation is centrally controlled.
7. : Appears when the operation mode is centrally controlled.
8. : Appears when the preset temperature is centrally controlled.
9. : Appears when the filter reset function is centrally controlled.
10. : Appears when filter needs maintenance.
11. Room temperature
12. : Appears when the buttons are locked.
13. : Appears when [On/Off timer] or [Auto-off] function is enabled.
    : Appears when the timer is disabled by the centralized control system.
14. : Appears when [Weekly timer] is enabled.
15. : Appears while the units are operated in the energy saving mode.
    (Will not appear on some models of indoor units)
16. : Appears while the outdoor units are operated in the silent mode.
17. : Appears when the built-in thermistor on the remote controller is activated to monitor the room temperature (11).
    : Appears when the thermistor on the indoor unit is activated to monitor the room temperature.
18. : Indicates the vane setting.
19. : Indicates the louver setting.[*1]
20. : Indicates the ventilation setting.
21. : Appears when the preset temperature range is restricted.
22. : Appears when an energy saving operation is performed using [3D i-See sensor] function.[*1]
23. Centrally controlled: Appears for a certain period of time when a centrally-controlled item is operated.
24. Preliminary error display: A error code appears during the preliminary error.

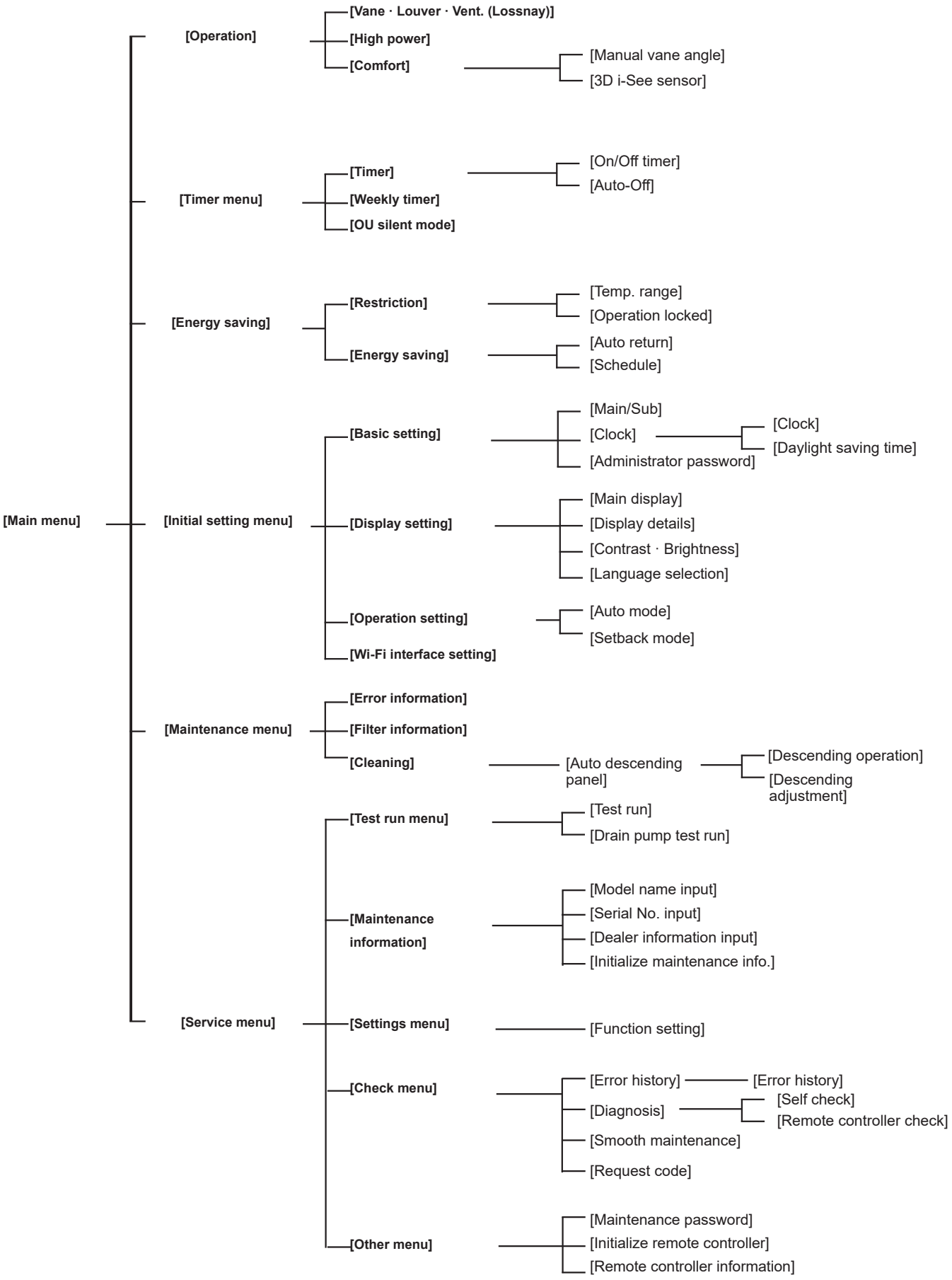
*1. These functions are not applied to the floor standing models.

Menu structure

Press [MENU] button.
Move the cursor to the desired item with the F1 and F2 buttons, and press [SELECT] button

Note:

- Not all functions are available on all models of indoor units.



Main menu list

[Main menu]	Setting and display items		Setting details
[Operation]	[Vane · Louver · Vent. (Lossnay)]		Use to set the vane angle. • Select a desired vane setting. Use to turn on/off the louver. • Select a desired setting from [On] and [Off]. Use to set the amount of ventilation. • Select a desired setting from [Off], [Low], and [High].
	[High power] *3		Use to reach the comfortable room temperature quickly. • Units can be operated in the High-power mode for up to 30 minutes.
	[Comfort]	[Manual vane angle]	• Use to fix each vane angle.
			Horizontal air direction • Sets the horizontal airflow direction (vane) of each unit.
		[3D i-See sensor]	Use to set the following functions for 3D i-See sensor. • Air distribution • Energy saving option • Seasonal airflow
[Timer]	[Timer]	[On/Off timer] *1	Use to set the operation ON/OFF time. • Time can be set in 5-minute increments.
		[Auto-Off]	Use to set the Auto-Off time. • Time can be set to a value from 30 to 240 in 10-minute increments.
	[Weekly timer] *1, *2		Use to set the weekly operation ON/OFF time. • Up to 8 operation patterns can be set for each day. (Not valid when [On/Off timer] is enabled.)
	[OU silent mode] *1, *3		Use to set the time periods in which priority is given to quiet operation of outdoor units over temperature control. Set the start/stop time for each day of the week. • Select the desired silent level from normal, middle, and quiet.
[Energy saving]	[Restriction]	[Temp. range] *2	Use to restrict the preset temperature range. • Different temperature ranges can be set for different operation modes.
		[Operation locked]	Use to lock selected functions. • The locked functions cannot be operated.
	[Energy saving]	[Auto return] *2	Use to get the units to operate at the preset temperature after performing energy saving operation for a specified time period. • Time can be set to a value from 30 and 120 in 10-minute increments. (This function will not be valid when the preset temperature ranges are restricted.)
		[Schedule] *1, *3	Set the start/stop time to operate the units in the energy saving mode for each day of the week, and set the energy saving rate. • Up to 4 energy saving operation patterns can be set for each day. • Time can be set in 5-minute increments. • Energy saving rate can be set to a value from 0% or 50 to 90% in 10% increments.
[Initial setting]	[Basic setting]	[Main/Sub]	When connecting 2 remote controllers, one of them needs to be designated as a sub controller.
		[Clock]	Use to set the current time.
		[Daylight saving time]	Set the daylight saving time.
		[Administrator password]	The administrator password is required to make the settings for the following items. • [Timer] setting • [Energy saving] setting • [Weekly timer] setting • [Restriction] setting • [OU silent mode] setting
	[Display setting]	[Main display]	Use to switch between [Full] and [Basic] modes for the main display, and use to change the background colors of the display to black.
		[Display details]	Make the settings for the remote controller related items as necessary. [Clock]: The initial settings are [Yes] and [24h] format. [Temperature]: Set to either celsius (°C) or fahrenheit (°F). [Room temp.]: Set to Show or Hide. Auto mode: Set Auto mode display or Only Auto display.
		[Contrast • Brightness]	Use to adjust screen contrast and brightness.
		[Language selection]	Use to select the desired language.
	[Operation setting]	[Auto mode]	Whether or not to use [Auto mode] can be selected by using the button. This setting is valid only when indoor units with [Auto mode] function are connected.
		[Setback mode]	Whether or not to use [Setback mode] can be selected by using the button. This setting is valid only when indoor units with [Setback mode] function are connected.
[Maintenance]	[Error information]		Use to check error information when an error occurs. • Error code, error source, refrigerant address, model name, manufacturing number, contact information (dealer's phone number) can be displayed. (The model name, manufacturing number, and contact information need to be registered in advance to be displayed.)
	[Filter information]		Use to check the filter status. • The filter sign can be reset.
	[Cleaning]	[Auto descending panel]	Use to lift and lower the auto descending panel (Optional parts).

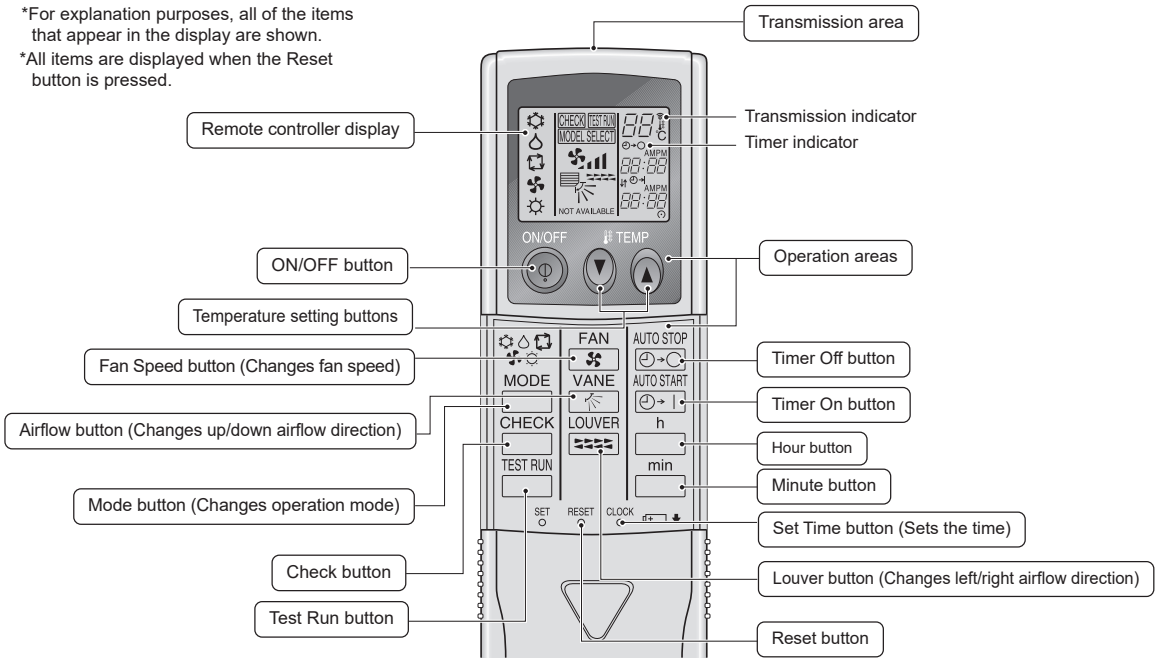
[Main menu]	Setting and display items		Setting details
[Service]	[Test run]		Select [Test run] from [Service menu] to bring up the [Test run menu]. • [Test run] • [Drain pump test run]
	[Input maintenance info.]		Select [Input maintenance Info.] from [Service menu] to bring up [Maintenance information] screen. The following settings can be made from [Maintenance information] screen. • [Model name input] • [Serial No. input] • [Dealer information input] • [Initialize maintenance info.]
	[Settings]	[Function setting]	Make the settings for the indoor unit functions via the remote controller as necessary.
	[Check]	[Error history]	Display the error history and execute [Delete error history?].
		[Diagnosis]	[Self check]: Error history of each unit can be checked via the remote controller. [Remote controller check]: When the remote controller does not work properly, use the remote controller checking function to troubleshoot the problem.
		[Smooth maintenance] *3	Use to display the maintenance data of indoor/outdoor units.
		[Request code] *3	Use to check operation data such as thermistor temperature and error information.
	[Others]	[Maintenance password]	Use to change the maintenance password.
		[Initialize remote controller]	Use to initialize the remote controller to the factory shipment status.
		[Remote controller information]	Use to display the remote controller model name, software version, and serial number.

*1. Clock setting is required.
*2. 1°C (2°F) increments.
*3. This function is available only when certain outdoor units are connected.

13-1-2. PAR-FL32MA

Controller interface

*For explanation purposes, all of the items that appear in the display are shown.
*All items are displayed when the Reset button is pressed.

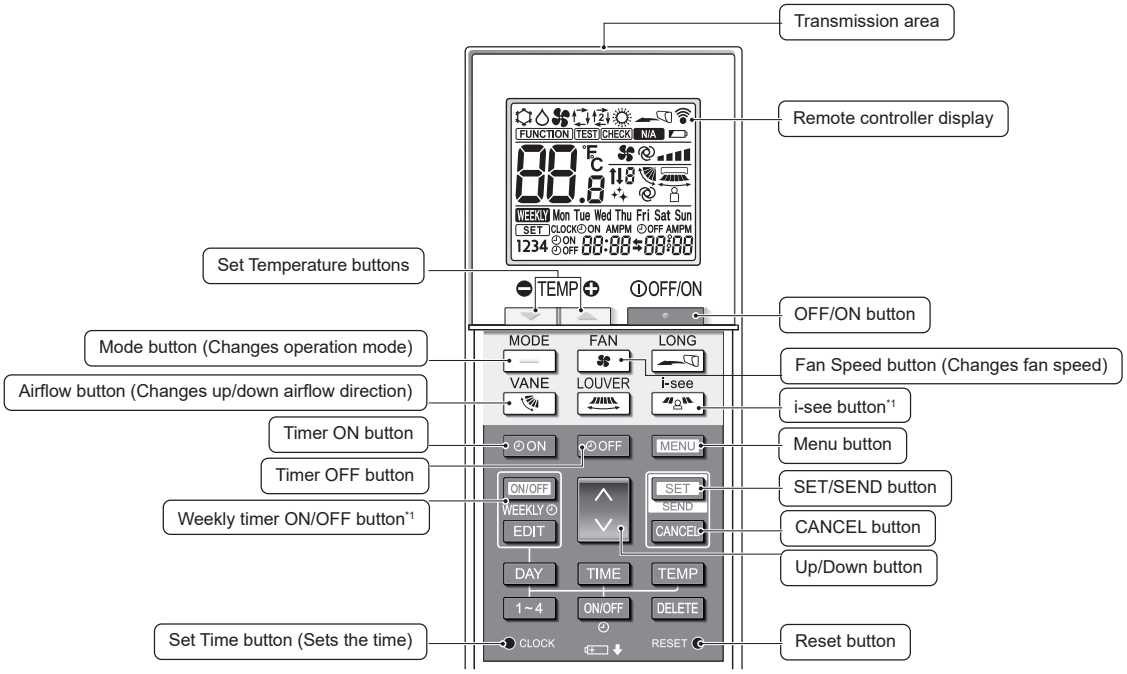


Instructions for use

- When using the wireless remote controller, point it towards the receiver on the indoor unit.
- If the remote controller is operated within approximately three minutes after power is supplied to the indoor unit, the indoor unit may beep three times as the unit is performing the initial automatic check.
- The indoor unit beeps to confirm that the signal transmitted from the remote controller has been received.
  Signals can be received up to approximately 7 meters in a direct line from the indoor unit in an area 45 to the left and right of the unit.
  However, illumination such as fluorescent lights and strong light can affect the ability of the indoor unit to receive signals.
- If the operation lamp near the receiver on the indoor unit is blinking, the unit needs to be inspected. Consult your dealer for service.
- Handle the remote controller carefully. Do not drop the remote controller or subject it to strong shocks.
  In addition, do not get the remote controller wet or leave it in a location with high humidity.
- To avoid misplacing the remote controller, install the holder included with the remote controller on a wall and be sure to always place the remote controller in the holder after use.

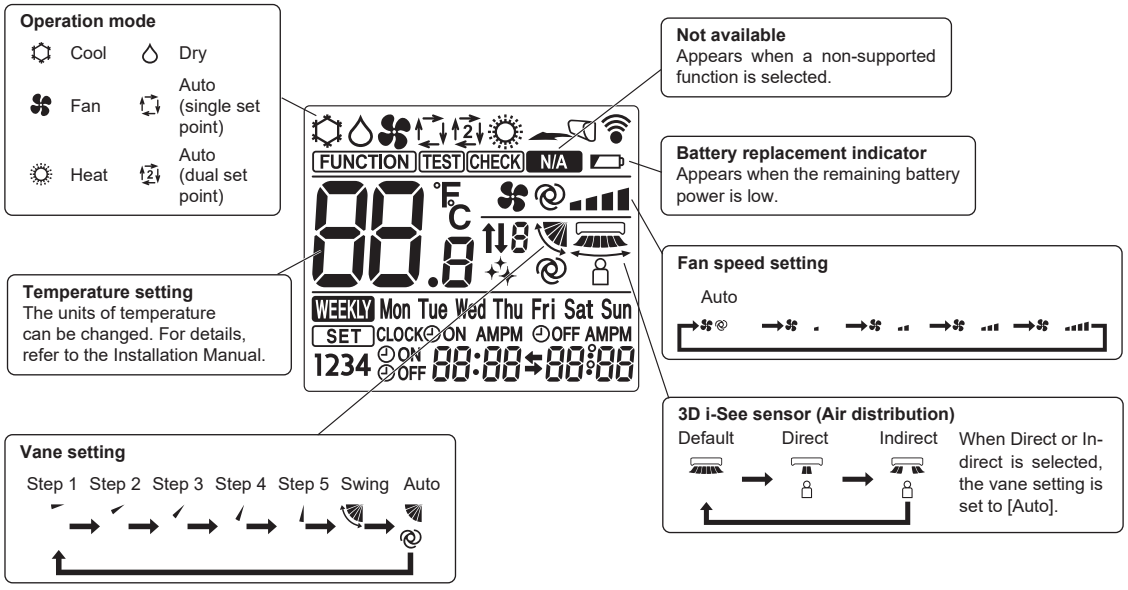
13-1-3. PAR-SL101A-E

Controller interface



*1. This button is enabled or disabled depending on the model of the indoor unit.

Display



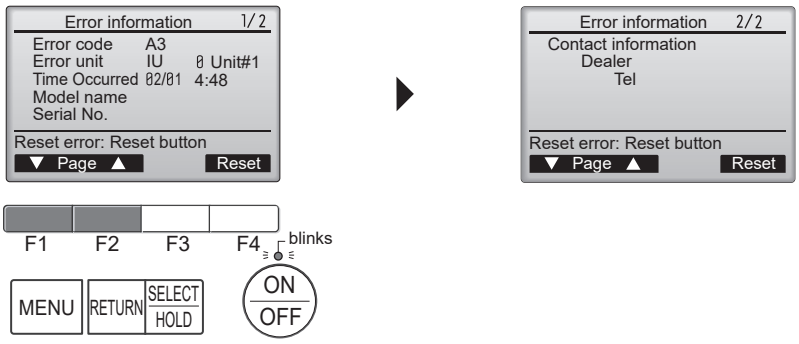
13-2. [Error information]

Operating instructions

■ How to check the error information when an error occurs

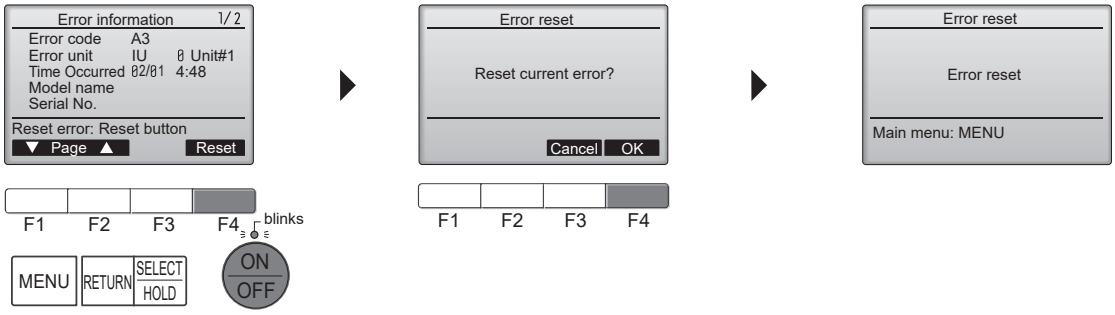
When an error occurs, the following screen will appear. Check the error status, stop the operation, and consult your dealer.

1. Check the error information
   Error code, error unit, refrigerant address, date and time of occurrence, model name, and serial number will appear.
   The model name and serial number will appear only if the information has been registered.
   • Press F1 or F2 button to go to the next screen.
   • Contact information (dealer's phone number) will appear if the information has been registered.



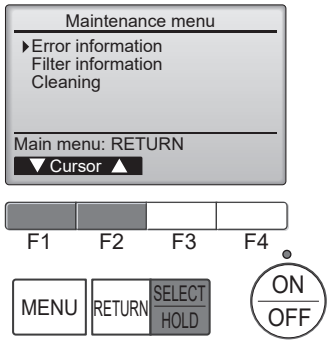
2. Reset the error
   - Press F4 button or [ON/OFF] button to reset the error that is occurring.
   - Select [OK] with F4 button.

Note:
- Errors cannot be reset while the ON/OFF operation is prohibited.
- To go back to [Service menu], press [MENU] button.



■ How to check the error information later

While no errors are occurring, page 2/2 of the error information can be viewed by selecting [Error information] from [Maintenance menu]. Errors cannot be reset on this screen.

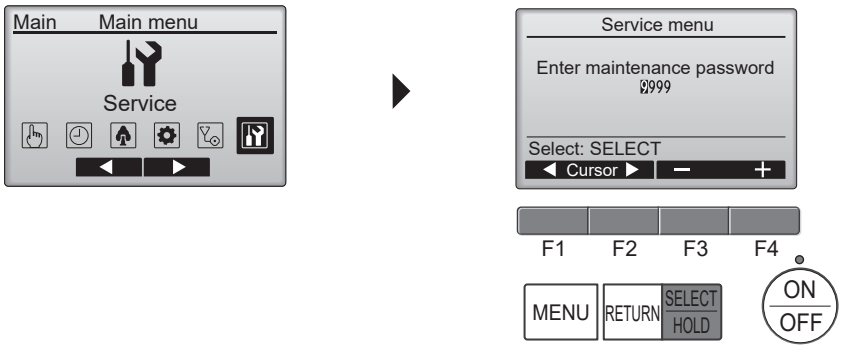


13-3. [Service menu]

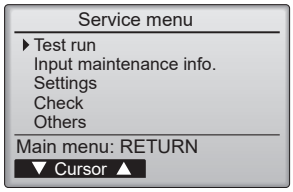
Note:
- Maintenance password is required to set each item in the service menu.

Operating instructions

1. Press [MENU] button to open the main menu.
2. Select [Service] from [Main menu], and press [SELECT] button.
   A window asking for the password will appear when [Service menu] is selected.



3. Enter the current maintenance password (4 numerical digits).
   Move the cursor to the digit you want to change with F1 or F2 button and set each number (0 through 9) with F3 or F4 button.
4. Press [SELECT] button.
   [Service menu] will appear if the password matches.



Notes:
- The initial maintenance password is ″9999″. Change the default password as necessary to prevent unauthorized access. Have the password available for those who need it.
- If you forget your maintenance password, you can initialize the password to the default password ″9999″ by pressing and holding F1 button for 10 seconds on the maintenance password setting screen.
- Air conditioning units need to be stopped depending on the item you want to set. Remote controller might not be used when the system is centrally controlled. The following screen will appear in this case.

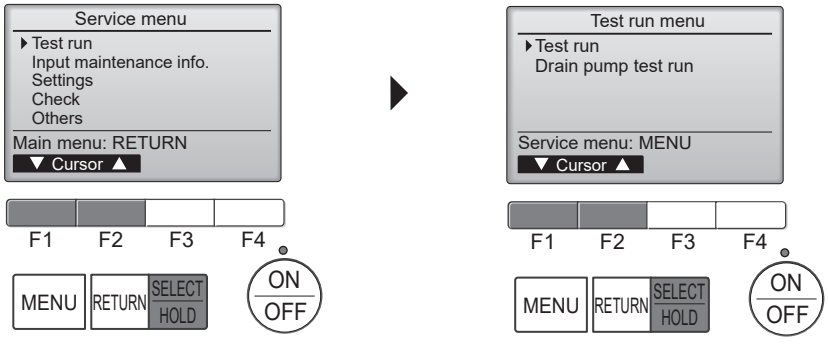
Notes:
- To go back to [Service menu], press [MENU] button.
- To return to the previous screen, press [RETURN] button.

13-4. [Test run]

13-4-1. PAR-42MAAUB

Operating instructions

1. Select [Service] from [Main menu], and press [SELECT] button.
2. Select [Test run] with F1 or F2 button, and press [SELECT] button.



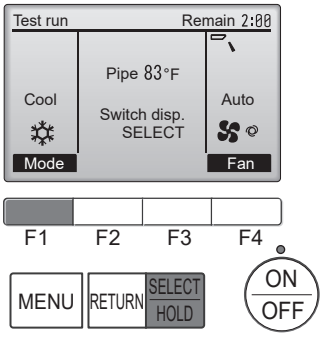
■ Test run operation

1. Press F1 button to go through the operation modes in the order of [Cool] and [Heat].

   Cooling mode: Check if the cold air blows out.

Heating mode: Check if the heat blows out.

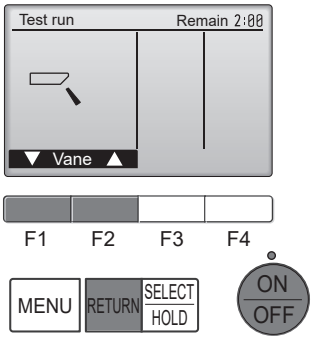
2. Check the operation of the outdoor unit's fan.
3. Press [SELECT] button and open the vane setting screen.



■ Auto vane check

1. Check the auto vane with F1 and F2 buttons.
2. Press [RETURN] button to return to test run operation.
3. Press [ON/OFF] button.

Notes:
- When the test run is completed, [Test run menu] screen will appear.
- The test run will automatically stop after 2 hours.
- The function is available only for the model with vanes.



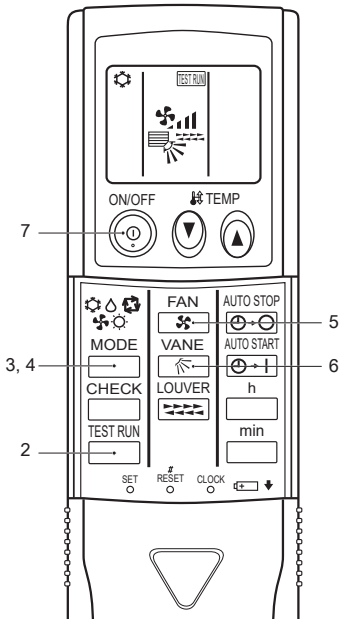
13-4-2. PAR-FL32MA

Measure an impedance between the power supply terminal block on the outdoor unit and ground with a 500 V Megger and check that it is equal to or greater than 1.0 MΩ.

Operating instructions

1. Turn on the main power to the unit.
2. Press TEST RUN button twice continuously.
   (Start this operation from the status of remote controller display turned off.)
   The symbol of TEST RUN and current operation mode are displayed.
3. Press MODE button to activate the cool mode [☼], then check whether cool air blows out from the unit.
4. Press MODE button to activate the heat mode [☼], then check whether warm air blows out from the unit.
5. Press FAN button and check whether strong air blows out from the unit.
6. Press VANE button and check whether the auto vane operates properly.
7. Press ◎ button to stop the test run.

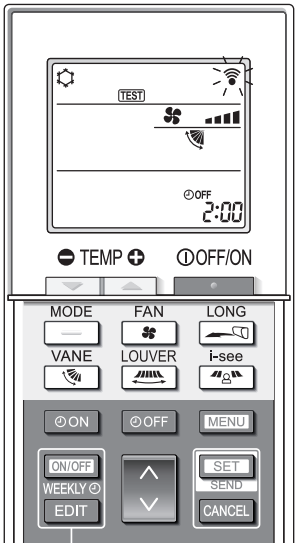
Notes:
- Point the remote controller towards the indoor unit receiver to perform steps 2 to 7.
- It is not possible to run in the fan, the dry or the auto mode.



13-4-3. PAR-SL101A-E

Operating instructions

1. Stop the air conditioner
   - Press [ ] button to stop the air conditioner.
   - If the weekly timer is enabled (WEEKLY is shown on the display), press [ON/OFF WEEKLY] button to disable it (WEEKLY is off).
2. Start the test run
   - Press [MENU] button for 5 seconds.
     CHECK appears on the display and the unit starts the service mode.
   - Press [MENU] button.
     TEST appears on the display and the unit starts the test run mode.
   - Press the following buttons to start the test run.
     [ ]: Switch the operation mode between cooling and heating and start the test run.
     [ ]: Switch the fan speed and start the test run.
     [ ]: Switch the airflow direction and start the test run.
     [ ]: Switch the louver and start the test run.
     [SET]: Start the test run.
3. Stop the test run.
   - Press [ ] button to stop the test run.
   - After 2 hours, the stop signal is transmitted.



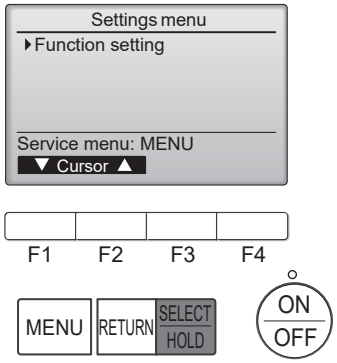
13-5. [Function setting]

13-5-1. PAR-42MAAUB

Operating instructions

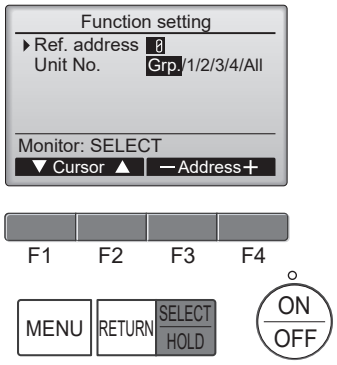
1. Open the [Function setting] screen.
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Setting] from [Service menu], and press [SELECT] button.
   - Select [Function setting] and press [SELECT] button.

   [Function setting] screen will appear.

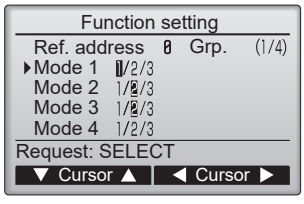


2. Set the indoor unit refrigerant addresses and indoor numbers
   - Enter the indoor unit refrigerant addresses and indoor numbers with F1 - F4 buttons, and then press [SELECT] button to confirm the current setting.

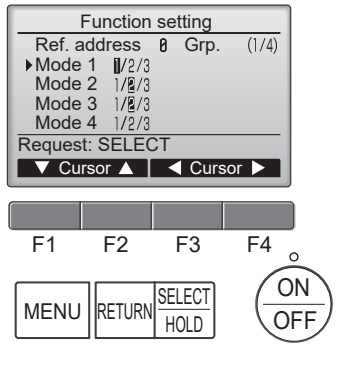
Note: Checking the indoor unit No.
- When [SELECT] button is pressed, the target indoor unit will start fan operation. If the unit is common or when running all units, all indoor units for the selected refrigerant address will start fan operation.



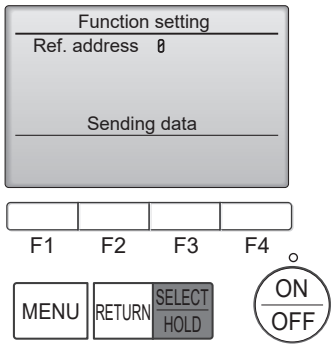
3. Check the current settings
   - When data collection from the indoor units is completed, the current settings appears highlighted. Non-highlighted items indicate that no function settings are made.
     Screen appearance varies depending on [Unit No.] setting.



4. Change the current settings
   - Use F1 or F2 button to move the cursor to select the mode number, and change the setting number with F3 or F4 button.



5. Complete the function settings
   - When the settings are completed, press [SELECT] button to send the setting data from the remote controller to the indoor units.
     When the transmission is successfully completed, the screen will return to [Function setting] screen.

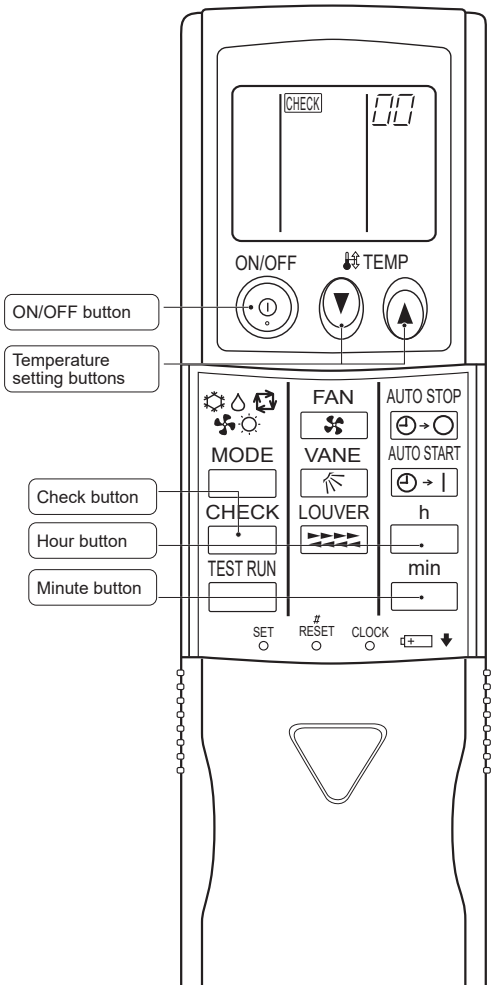


Notes:
- Make the above settings only on Mr. Slim units as necessary.
- The above function settings are not available for City Multi units.
- Refer to the installation manual of the indoor unit for the information about initial settings, mode numbers, and setting numbers of indoor units.
- Be sure to write down the settings for all functions if any of the initial settings has been changed after the completion of installation work.

13-5-2. PAR-FL32MA

Functions can be selected with the wireless remote controller. Function selection using wireless remote controller is available only for refrigerant system with wireless function. Refrigerant address cannot be specified by the wireless remote controller.

An example of function selection flow



An example of a function selection flow is shown below. It shows how to turn off the function that raises the set temperature by 4 degrees during heating operation. (Mode 24: 2)

Function setting

Mode	Mode No.	Setting	Setting No.	Target unit No.
Raising the set temperature by 4 degrees	24	OFF	02	01

1. Press CHECK button twice continuously.
   CHECK will appear and "00" will blink. (Self-diagnosis mode)
   Enter the address "50" during self-diagnosis mode, then press h button.
2. Enter the unit No. "01" (since "01" is assigned to the target unit).
   (Enter the address during self-diagnosis mode, then press min button.)
   Note: You cannot specify the refrigerant address.
3. Enter the mode No. "24" (function that raises set temperature by 4 degrees during heating operation).
   (Enter the address during self-diagnosis mode, then press h button.)
4. Enter the setting No. "02" (OFF).
   (Enter the address during self-diagnosis mode, then press h button.)
5. No
6. Yes
   Change the unit No.
   Finished
   No
7. End the function selection.
   (End the check mode.)

Note:
When you switch the mode to function selection mode with a wireless remote controller, the unit ends function selection mode automatically if nothing is input for 10 minutes or longer.

Operating instructions

1. Press CHECK button twice continuously. → CHECK appears and ″00″ blinks.
   • Press TEMP button once to set the address number to ″50″.
   • Direct the wireless remote controller toward the receiver of the indoor unit and press h button.
2. Enter the unit number.
   • Press TEMP button to enter the unit number.
   • Direct the wireless remote controller toward the receiver of the indoor unit and press min button.
   By setting the unit number with min button, the specified indoor unit starts performing fan operation.
   Detect which unit is assigned to which number using this function. If unit number is set to AL, all the indoor units in the same refrigerant system start performing fan operation simultaneously.

Notes:
- If a unit number that cannot be recognized by the unit is entered, 3 beeps of 0.4 seconds will be emitted. Reenter the unit number.
- If the signal was not received by the sensor, no beep or a ″double beep″ will be emitted. Reenter the unit number.

3. Select a mode.
   • Press TEMP button to set a mode.
   • Direct the wireless remote controller toward the sensor of the indoor unit and press h button.
   → The sensor-operation indicator will blink and beeps will be emitted to indicate the current setting number.
   Current setting number: 1 = 1 beep (1 second)
   2 = 2 beeps (1 second each)
   3 = 3 beeps (1 second each)

Notes:
- If a mode number that cannot be recognized by the unit is entered, 3 beeps of 0.4 seconds will be emitted. Reenter the mode number.
- If the signal was not received by the sensor, no beep or a ″double beep″ will be emitted. Reenter the mode number.

4. Select the setting number.
   • Press TEMP button to select the setting number.
   • Direct the wireless remote controller toward the receiver of the indoor unit and press h button.
   → The sensor-operation indicator will blink and beeps will be emitted to indicate the setting number.
   Setting number: 1 = 1 beep (0.4 seconds each)
   2 = 2 beeps (0.4 seconds each, repeated twice)
   3 = 2 beeps (0.4 seconds each, repeated 3 times)

Notes:
- If a setting number that cannot be recognized by the unit is entered, the setting will turn back to the original setting.
- If the signal was not received by the sensor, no beep or a ″double beep″ will be emitted. Reenter the setting number.

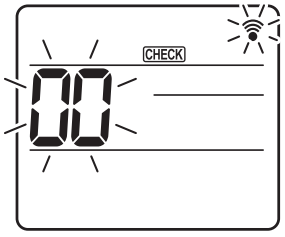
5. Repeat steps 3 and 4 to make other function setting on the same unit.
6. Repeat steps 2 to 4 to change the unit and make function settings on it.
7. Complete the function settings
   • Press button.

Note:
- Do not use the wireless remote controller for 30 seconds after completing the function setting.

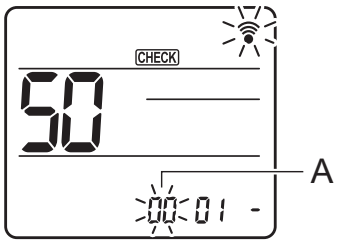
13-5-3. PAR-SL101A-E

Operating instructions

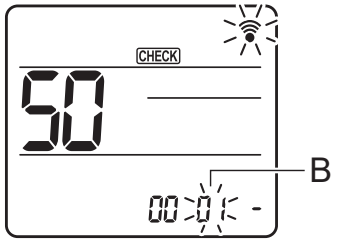
1. Go to the function select mode.
   • Press MENU button for 5 seconds. (Start this operation from the status of remote controller display turned off.)
   CHECK appears on the display and ″00″ blinks.
   • Press button to enter ″50″.
   • Direct the wireless remote controller toward the receiver of the indoor unit and press SET button.



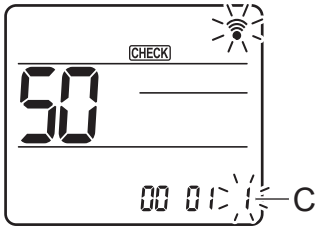
2. Set the unit number.
   • Press button to set unit number A.
   • Direct the wireless remote controller toward the receiver of the indoor unit and press SET button.



3. Select a mode
   - Press ⇕ button to set the mode number B.
   - Direct the wireless remote controller toward the receiver of the indoor unit and press SET button.
     Current setting number: 1=1 beep (1 second)
     2=2 beeps (1 second each)
     3=3 beeps (1 second each)



4. Select the setting number.
   - Press ⇕ button to change the setting number C.
   - Direct the wireless remote controller toward the receiver of the indoor unit and press SET button.



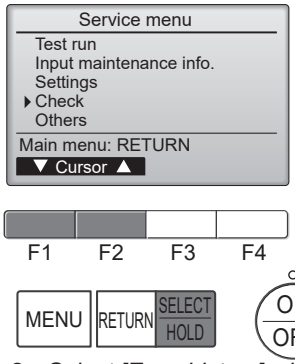
5. Select multiple functions continuously.
   - Repeat the steps 3 and 4 to change multiple function settings continuously.
6. Complete function selections.
   - Direct the wireless remote controller toward the sensor of the indoor unit and press ○ button.

Note:
- Be sure to write down the settings for all functions if any of the initial settings has been changed after the completion of installation work.

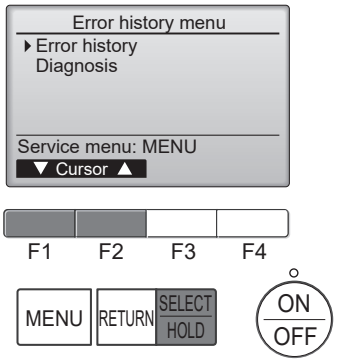
13-6. [Error history]

Operating instructions

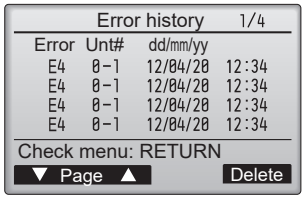
1. Open [Service menu] and select [Check].
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Check] with F1 or F2 button, and press [SELECT] button.



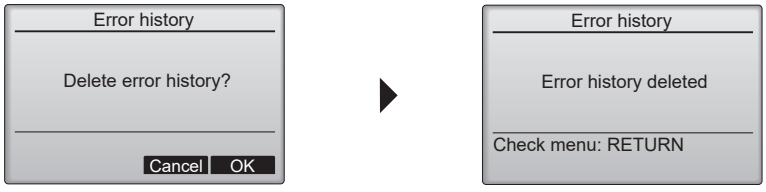
2. Select [Error history] with F1 or F2 button, and press [SELECT] button.



3. 16 error history records will appear.
   4 records are shown per page, and the top record on the first page indicates the latest error record.



4. Delete the error history.
   - Press F4 button [Delete].
     A confirmation screen will appear asking if you want to delete the error history.
   - Press F4 button [OK] to delete the history.
     [Error history deleted] will appear on the screen.
   - Press [RETURN] button to go back to [Check menu] screen.

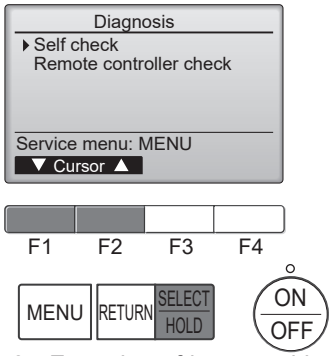


13-7. Self-diagnosis

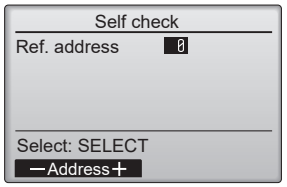
13-7-1. PAR-42MAAUB

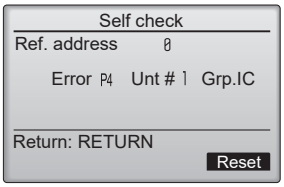
Operating instructions

1. Open [Self check] screen
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Check] from [Service menu], and press [SELECT] button.
   - Select [Diagnosis] from [Check menu], and press [SELECT] button.
   - Select [Self check] with F1 or F2 button, and press [SELECT] button.
     [Self check] screen will appear.

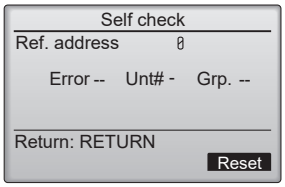


2. Enter the refrigerant address with F1 or F2 button, and press [SELECT] button.
   - Error code, unit number, attribute, and indoor unit demand signal ON/OFF status at the contact will appear.
     [-] will appear when there is no error history.



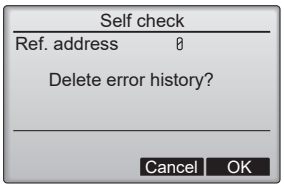


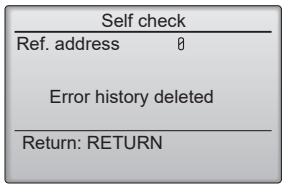
<Error history is shown.>



<When there is no error history.>

3. Reset the error history.
   • Press F4 button [Reset].
   A confirmation screen will appear to ask you if you want to delete the error history.
   • Press F4 button [OK] to delete the error history.
   [Request rejected] will appear if deletion fails.
   [Unit not exist] will appear if no indoor unit is assigned to the entered address.





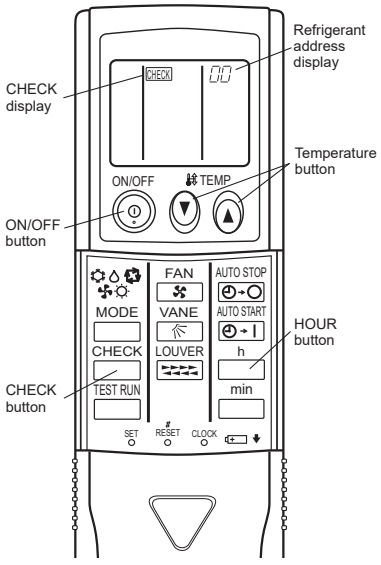
Notes:
- To go back to [Service menu], press [MENU] button
- To return to the previous screen, press [RETURN] button

13-7-2. PAR-FL32MA

When a malfunction occurs to air conditioners, both of the indoor unit and the outdoor unit will stop and the operation lamp will blink to inform the unusual stop.

Operating instructions

1. Press CHECK button twice.
   CHECK appears, and the refrigerant address ″00″ blinks.
   Make sure that the remote controller's display has stopped before continuing.
2. Press ▼ ▲ buttons to select the refrigerant address of the indoor unit for self-diagnosis.
   Set the address of the indoor unit that is to be self-diagnosed.
3. Point the remote controller at the sensor of the indoor unit and press h button.
   If an air conditioner error occurs, the indoor unit's sensor emits an intermittent buzzer sound, the operation light blinks, and the error code is output.
4. Point the remote controller at the sensor of the indoor unit and press ⏻ button.
   The check mode is cancelled.

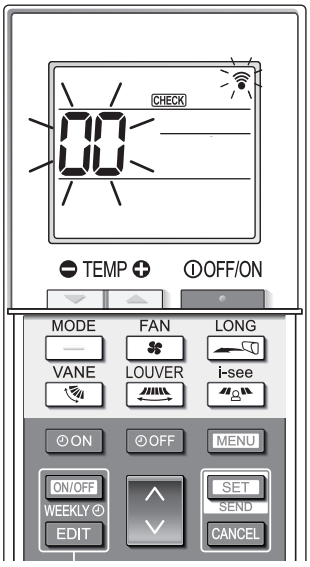


13-7-3. PAR-SL101A-E

Operating instructions

1. Press ON/OFF button to stop the air conditioner.
   If the weekly timer is enabled (WEEKLY is shown on the display), press ON/OFF WEEKLY button to disable it (WEEKLY is off).

2. Press MENU button for 5 seconds. CHECK appears and the unit starts the self-check mode.
3. Press ▲▼ button to select the refrigerant address (M-NET address) of the indoor unit for which you want to perform the self-check.
4. Press SET button.
   If an error is detected, the error code is indicated by the number of beeps from the indoor unit and the number of blinks of the operation indicator lamp.
5. Press ▬ button.
   CHECK and the refrigerant address (M-NET address) go off and the self-check is completed.

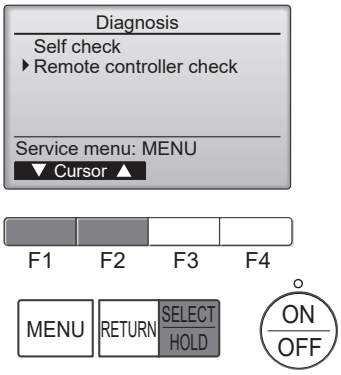


13-8. [Remote controller check]

Operating instructions

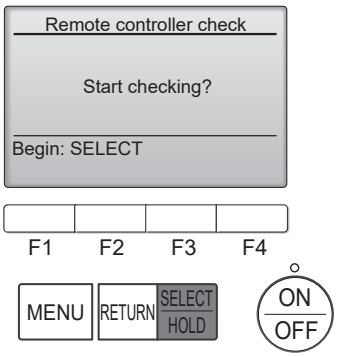
If operations cannot be completed with the remote controller, diagnose the remote controller with this function.

1. Go to [Remote controller check] screen.
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Check] from [Service menu], and press [SELECT] button.
   - Select [Diagnosis] from [Check menu], and press [SELECT] button.
   - Select [Remote controller check] with F1 or F2 button, and press [SELECT] button.



2. Start the remote controller check.
   - Select [Remote controller check] from [Diagnosis], and press [SELECT] button to start the remote controller check and see the check results.

Notes:
- To cancel the remote controller check and exit [Remote controller check] menu screen, press [MENU] or [RETURN] button.
- The remote controller will not reboot itself.



3. Check the result of the remote controller check.

See the following descriptions for each result:

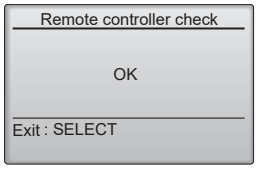
[OK]:
- The remote controller has no problem. Check other parts to find problems.

[E3], [6832]:
- There is noise on the transmission line, or the indoor unit or another remote controller is faulty. Check the transmission line and the other remote controllers.

[NG] (ALL0, ALL1):
- Send-receive circuit fault. The remote controller needs to be replaced.

[ERC]:
- The number of data errors is the discrepancy between the number of bits in the data transmitted from the remote controller and that of the data that was actually transmitted over the transmission line. If data errors are found, check the transmission line for external noise interference.

If [SELECT] button is pressed after the remote controller check results are displayed, remote controller check will end, and the remote controller will automatically reboot itself.



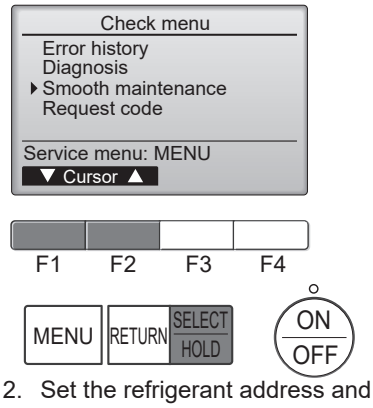
Remote controller check results screen

Note:
- Check the remote controller display and see if anything is displayed (including lines). Nothing will appear on the remote controller display if the correct voltage (8.5 – 12 VDC) is not supplied to the remote controller. If this is the case, check the remote controller wiring and indoor units.

13-9. [Smooth Maintenance]

Operating instructions

1. Go to [Smooth maintenance] screen.
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Check] with F1 or F2 button, and press [SELECT] button.
   - Select [Smooth maintenance] with F1 or F2 button, and press [SELECT] button.



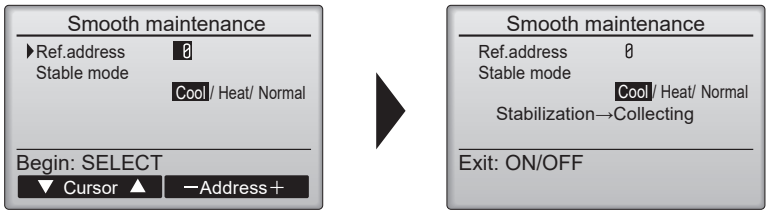
2. Set the refrigerant address and the stable mode.
   - Select the item to be changed with F1 or F2 button.
   - Select the required setting with F3 or F4 button.
     [Ref.address] setting: 0 - 15

[Stable mode] setting: [Cool/Heat/Normal]

• Press [SELECT] button, Fixed operation will start.

Note:

• Stable mode will take approx. 20 minutes.



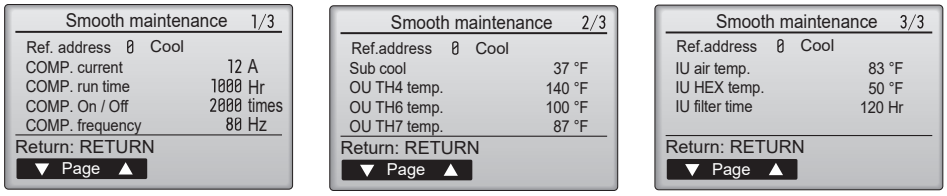
3. The operation data will appear.

The compressor-accumulated operating (COMP. run) time is 10-hour unit, and the compressor-number of operation times (COMP. ON/OFF) is a 100-time unit (fractions discarded).

Note:

• To go back to [Service menu], press [MENU] button

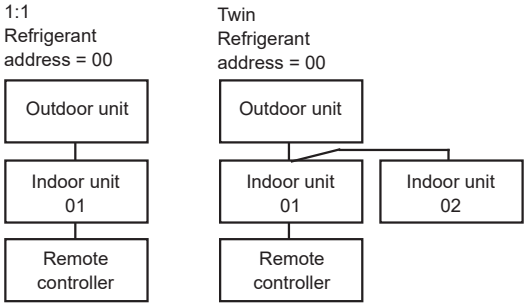
• To return to the previous screen, press [RETURN] button



■ Refrigerant address

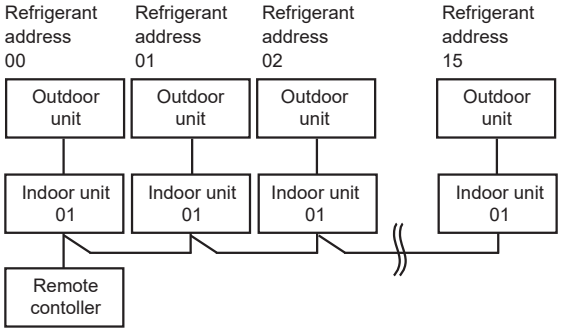
• Single refrigerant system

In the case of single refrigerant system, the refrigerant address is ″00″ and no operation is required.
Simultaneous twin, triple units belong to this category (single refrigerant system).



• Multi refrigerant system (group control)

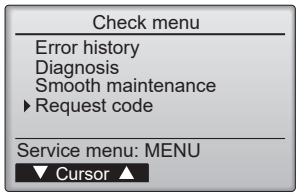
Up to 16 refrigerant systems (16 outdoor units) can be connected as a group by 1 remote controller. To check or set the refrigerant addresses.

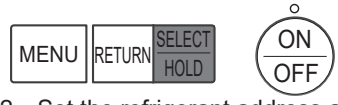


13-10. [Request code]

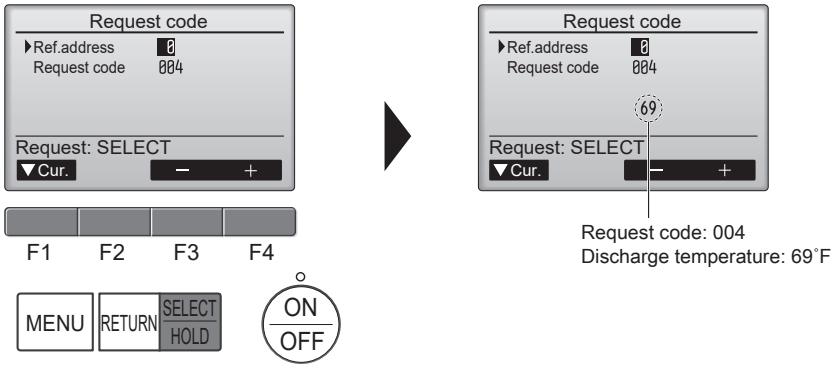
Details on the operation data including each thermistor temperature and error history can be confirmed with the remote controller.

1. Go to [Request code] screen.
   • Select [Service] from [Main menu], and press [SELECT] button.
   • Select [Check] with F1 or F2 button, and press [SELECT] button.
   • Select [Request code] with F1 or F2 button, and press [SELECT] button.





2. Set the refrigerant address and the request code.
   - Select the item to be changed with F1 or F2 button.
   - Select the required setting with F3 or F4 button.
     [Ref.address] setting: 0 – 15
     [Request code] setting
   - Press [SELECT] button. Data will be collected and displayed.



MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO100-8310, JAPAN

Issued: Dec. 2024 No. OCH819B
Issued: Nov. 2024 No. OCH819A
Published: Sep. 2024 No. OCH819
Made in Japan

MITSUBISHI ELECTRIC

Air-Conditioners

MXZ-SM36/48/60NL
MXZ-SM36/42/48NLHZ

REFRIGERANT
R454B

INSTALLATION MANUAL

FOR INSTALLER

For safe and correct use, please read this installation manual thoroughly before installing the air-conditioner unit.

English

MANUEL D'INSTALLATION

POUR L'INSTALLATEUR

Veuillez lire le manuel d'installation en entier avant d'installer ce climatiseur pour éviter tout accident et vous assurer d'une utilisation correcte.

Français

MANUAL DE INSTALACIÓN

PARA EL INSTALADOR

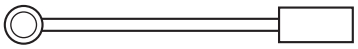
Para un uso seguro y correcto, lea detalladamente este manual de instalación antes de montar la unidad de aire acondicionado.

Español

Contents

1. Confirmation of parts attached

In addition to this manual, the following part is supplied with the outdoor unit. It is used for grounding the S terminal of transmission terminal block TB7.
For details, refer to “7. Electrical work”.



Ground wire

2. Safety precautions

2-1. Precautions

Before installing the unit, make sure you read all the “Safety precautions”.
Please report to or take consent by the supply authority before connecting the unit to the system.
After installation work has been completed, explain this “Safety precautions” and how to maintain the unit to the customer according to the operation manual. Then, perform a test run to ensure normal operation. Both the installation manual and the operation manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⚠ **Warning:**
Describes precautions that must be observed to prevent danger of injury or death to the user.

⚠ **Caution:**
Describes precautions that must be observed to prevent damage to the unit.

⏚:
Indicates a part which must be grounded.

■ **Meanings of symbols displayed on indoor/outdoor units**

	Warning (Risk of fire) This unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the operating instructions carefully before operation.
	Service personnel are required to carefully read the operating instructions and installation manual before operation.
	Further information is available in the operating instructions, installation manual, and the like.

⚠ **Warning:**

- Carefully read the labels affixed to the main unit.
- The unit must not be installed by the user. Ask a dealer or an authorized technician to install the unit. If the unit is installed incorrectly, water leakage, electric shock, or fire may result.
- For installation work, follow the instructions in the installation manual and use tools and pipe components specifically made for use with R454B refrigerant.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- R454B refrigerant in the HFC system is pressurized 1.6 times the pressure of usual refrigerants. If pipe components not designed for R454B refrigerant are used and the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.
- When installing the unit, use appropriate protective equipment and tools for safety. Failure to do so could cause injuries.
- The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.
- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
- If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded.
  Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.
- Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.
- All electrical work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The units must be powered by dedicated power lines, and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.
- Be sure to connect the power supply cords and the connecting wires for the indoor units, outdoor units, and branch boxes directly to the units (no intermediate connections). Intermediate connections can lead to communication errors if water enters the cords or wires and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.
- Use only specified cables for wiring. The wiring connections must be made securely with no tension applied on the terminal connections. Also, never splice the cables for wiring (unless otherwise indicated in this document). Failure to observe these instructions may result in overheating or a fire.
- The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.
- When installing, relocating, or servicing the outdoor unit, use only the specified refrigerant (R454B) to charge the refrigerant circuit. Do not mix it with any other refrigerant and do not allow air to remain in the circuit. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant circuit, and may result in an explosion and other hazards. The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.
- Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.
- Use only authorized accessories and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or

en

fire may result.
- Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.
- The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.
- After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.
- When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance should not be stored in a room with continuously operating ignition sources. (for example: open flames, an operating gas appliance, or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odor.
- Refrigerant piping shall be protected from physical damage.
- Field installed piping should be kept to a minimum.
- Compliance with national gas regulations shall be observed.
- All field joints shall be accessible for inspection prior to being covered or enclosed.
- Keep any required ventilation openings clear of obstruction.
- Alloys used indoors to join refrigerant containing connections shall have a melting point (liquidus temperature) greater than 427 °C.
- When performing brazing work, be sure to ventilate the room sufficiently. Make sure that there are no hazardous or flammable materials nearby. When performing the work in a closed room, small room, or similar location, make sure that there are no refrigerant leaks before performing the work. If refrigerant leaks and accumulates, it may ignite and poisonous gases may be released.
- If refrigerant gas leaks during installation work or operation, ventilate the room. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, it may ignite or poisonous gases will be released.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- Keep gas-burning appliances, electric heaters, and other fire sources (ignition sources) away from the location where installation, repair, and other air conditioner work will be performed. If refrigerant comes into contact with a flame, poisonous gases may be released.
- Do not smoke during work and transportation.
- When installing or removing the air conditioner, carry the refrigerant leak detector.
- For safety purposes, be sure to always keep the power on, except during maintenance.
- Refrigerant pipes must be protected against external force.

2-2. Before installation

⚠ **Caution:**
- Do not use the unit in an unusual environment. If the air conditioner is installed in areas exposed to steam, volatile oil (including machine oil), sulfuric gas, or high salt content such as the seaside, or areas where the unit will be covered by snow, the performance can be significantly reduced and the internal parts can be damaged.
- Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.
- The outdoor unit produces condensation during the heating operation. Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.
- When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high frequency medical equipment, and radio communications equipment can cause the air conditioner to malfunction or breakdown. The air conditioner may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.
- Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.
  - To deburr pipes, use a reamer or other deburring tools, not sandpaper.
  - To cut pipes, use a pipe cutter, not a grinder or other tools that use abrasive materials.
  - When cutting or deburring pipes, do not allow cutting chips or other foreign matters to enter the pipes.
  - If cutting chips or other foreign matters enter pipes, wipe the inside of the pipes to remove them off.

2-3. Before installation (Relocation)

⚠ **Caution:**
- Be extremely careful when transporting the units. Two or more persons are needed to handle the unit, as it weighs 44 lbs [20 kg] or more. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or the edge of other parts.
- Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stabs or other injuries.
- The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.
- Do not clean the air conditioner unit with water. Electric shock may result.
- Tighten all flare nuts to specification using a torque wrench. If they are tightened too much, they can break after an extended period and refrigerant can leak out.

2-4. Before electric work

⚠ **Caution:**
- Be sure to install circuit breakers. If it is not installed, electric shock may result.
- Please follow applicable federal/state/local codes to prevent potential leakage/electric shock, or install a ground fault circuit interrupter for the prevention of leakage and electric shock.
- For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.
- When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.
- Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.
- Use circuit breakers (ground fault circuit interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.

2-5. Before starting the test run

⚠ **Caution:**
- Turn on the main power switch more than 12 hours before starting operation. Starting operation just after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation season.
- Before starting operation, check that all panels, guards and other protective parts are correctly installed. Rotating, hot, or high voltage parts can cause injuries.
- Do not touch any switch with wet hands. Electric shock may result.
- Do not touch the refrigerant pipes with bare hands during operation. The refrigerant pipes are hot or cold depending on the condition of the flowing refrigerant. If you touch the pipes, burns or frostbite may result.
- After stopping operation, be sure to wait at least 5 minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.

2-6. Using R454B refrigerant air conditioners

⚠ **Caution:**
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not

contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to the table "Pipe length and thickness" in "5-1. Precautions for devices that use R454B refrigerant".) Note the followings when using existing pipes.
- Replace the existing flare nuts and flare the flared sections again.
- Do not use thin pipes. (Refer to the table "Pipe length and thickness" in "5-1. Precautions for devices that use R454B refrigerant".)

• Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant circuit, oil deterioration or compressor breakdown may result.
• Use ester oil, ether oil, or alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result.
• Do not use refrigerant other than R454B refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.
• Use the following tools specifically designed for use with R454B refrigerant. The following tools are necessary to use R454B refrigerant. Contact your nearest dealer for any questions.

Tools (for R454B)
- Gauge manifold
- Flaring tool
- Charge hose
- Size adjustment gauge
- Gas leak detector
- Vacuum pump adapter
- Torque wrench
- Electronic refrigerant charging scale

• Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant circuit, refrigeration oil deterioration may result.
• Do not use a charging cylinder. If a charging cylinder is used, the composition of the refrigerant will change and the efficiency will be lowered.
• Cabling
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
• Detection of flammable refrigerants
Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
The following leak detection methods are deemed acceptable for all refrigerant systems.
Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.
Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
• Removal and evacuation
When breaking into the refrigerant circuit to make repairs - or for any other purpose -conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.
The following procedure shall be adhered to:
- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas;
- evacuate;
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes.
For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times.
Compressed air or oxygen shall not be used for purging refrigerant systems.
For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.
• Charging procedures
In addition to conventional charging procedures, the following requirements shall be followed.
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

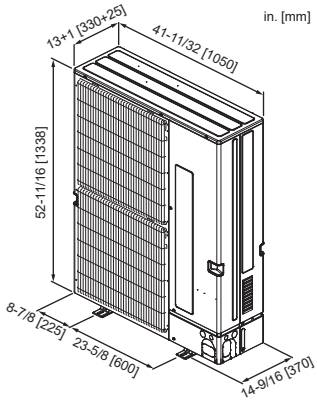
Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.
• Recovery
When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available.
All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order.
Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant.
If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.
The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant.
The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

3. Installation location

3-1. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

3-2. Outline dimensions (Outdoor unit)



3-3. Constraints on indoor unit installation

You should note that the indoor units that can be connected to this outdoor unit have the following constraints.

- Indoor units with model numbers 04-72 can be connected.
- When using a branch box, indoor units with model numbers 06-36 can be connected.
- Refer to the tables below to decide possible rooms and indoor unit combinations.
- Combinations in which the total capacity of indoor units exceeds the capacity of the outdoor unit will reduce the cooling capacity of each indoor unit below their rated cooling capacity. Therefore, select the indoor units so that the total capacity does not exceed the capacity of the outdoor unit as much as possible.
- Mixed systems of indoor units with the City Multi/M, P, S series are prohibited.

Verification

- The rated capacity should be determined by observing the tables of "City Multi indoor units" and "M, P, S series indoor units" shown below.
- See also the table of "Number of connectable indoor units".
- Make sure that the total rated capacity will stay in the range of 50–130% of the outdoor unit capacity.
  - MXZ-SM36: 18 – 46 (37) kBtu/h*1
  - MXZ-SM42: 21 – 54 (44) kBtu/h*1
  - MXZ-SM48: 24 – 62 (50) kBtu/h*1
  - MXZ-SM60: 30 – 78 (63) kBtu/h*1

City Multi indoor units (L·FY series)

Indoor unit type	L04	L05	L06	L08	L12	L15	L18	L24	L30	L36	L48	L54	L72
Rated capacity (Cooling) (kBtu/h)	4	5	6	8	12	15	18	24	30	36	48	54	72

M, P, S series indoor units

Model No.	06	09	12	15	18	24	30	36
Rated capacity (Cooling) (kBtu/h)	6	9	12	15	18	24	30	36

Maximum number of connectable indoor units

Models	Maximum number of connectable City Multi indoor units	Maximum number of connectable M, S, P series indoor units (via branch box)
SM36	11	4 (3)*2, *3, *4
SM42	12	5 (4)*2, *3, *4
SM48	12	8 (6)*2, *3, *4
SM60	12	8 (6)*2, *3, *5

*1. The number enclosed in the parenthesis is the total rated capacity of indoor units when 1 or more MFZ-KX09, PLA-AE12, or PLFY-EL12/18 are connected. Make sure that the total rated capacity will stay in the range of 50–105% of the outdoor unit capacity.

*2. The number enclosed in the parenthesis is the maximum number of units that can be connected when 1 or more PLA-AE·NL or PAA-A·A units is connected.

*3. When connecting SVZ-series unit(s), set additional constraints for each branch box as follows:
- When connecting 2 SVZ-series units: Any indoor units other than SVZ-series cannot be connected.
- When connecting 1 SVZ-series unit: The total rated capacity (cooling) should be 100% or below including the SVZ-series unit (only SM60).
  Only 1 SEZ or 1 PEAD can be included in the connection.
- When connecting 3 or more SVZ-series units: Consult a dealer.

*4. Maximum of 3 SEZ/PEAD-series units can be connected to a branch box.

*5. Maximum of 2 SEZ/PEAD-series units can be connected to a branch box.
When connecting 1 or more SEZ/PEAD-series units, the total rated capacity (cooling) including the SEZ/PEAD-series units shall be 100% or below.

Lineup of connectable indoor units

Any indoor units not listed in the table below cannot be connected.

Connectable indoor units (City Multi)																		
Model type		Model name		04	05	06	08	12	15	18	24	27	30	36	48	54	72
Wall mounted		PKFY-L	NKMU								●		●				
			NLMU	●		●	●	●	●	●							
Ceiling concealed	Low ESP	PEFY-L	NMSU			●	●	●	●	●	●						
	Mid ESP	PEFY-L	NMAU			●	●	●	●	●	●	●	●	●	●	●	
Ceiling suspended		PCFY-L	NKMU						●		●		●	●			

Connectable indoor units (City Multi)																	
Model type		Model name		04	05	06	08	12	15	18	24	27	30	36	48	54	72
Ceiling cassette	4-way flow	PLFY-EL	NEMU					●	●	●	●		●	●	●		
	2 by 2	PLFY-L	NFMU		●		●	●	●	●							
Multi-position		PVFY-L	NAMU				●	●		●	●		●	●	●	●	

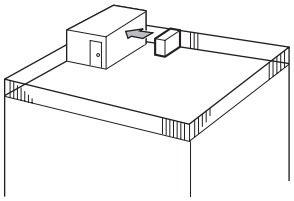
Connectable indoor units (M, P, S series)										
Model type		Model name	06	09	12	15	18	24	30	36
Wall-mounted	Deluxe	MSZ-FX·NL	●	●	●	●	●			
	Standard	MSZ-GX·NL	●	●	●	●	●	●		
Ceiling concealed	Low static pressure	SEZ-AD·NL		●	●	●	●			
	Middle static pressure	PEAD-AA·NL		●	●	●	●	●	●	●
Ceiling cassette	4-way flow	PLA-AE·NL			●		●	●	●	●
	2 by 2	SLZ-AF·NL		●	●	●				
	1-way flow	MLZ-KX·NL	●	●	●		●			
Floor standing		MFZ-KX·NL		●	●	●	●			
Standard multi-position air handler		SVZ-AP·NL			●		●	●	●	●
A-Coil		PAA-AA/BA/CA·NL					●	●	●	●

3-4. Ventilation and service space

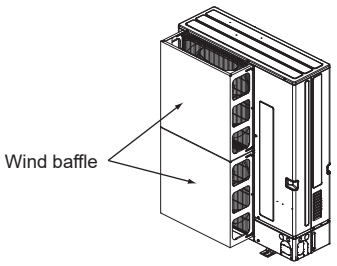
■ Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result. The following shows 3 examples of precautions against strong winds.

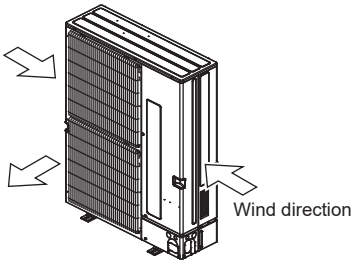
1. Face the air outlet towards the nearest available wall about 20" (500 mm) away from the wall.



2. Install an optional wind baffle if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet.



3. Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible.



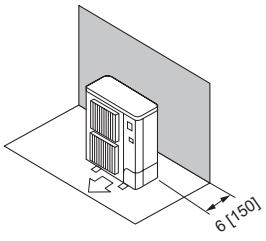
■ When there are obstacles around the unit

- The dimensions given along the arrows in the figures below are required to guarantee the air conditioner's performance. Install the unit in a place as wide as possible for later service or repairs.
- Minimum dimensions are given in the figures below. When there is an obstacle above the unit, maximum dimensions are also given.
- Refer to the figures for each case.

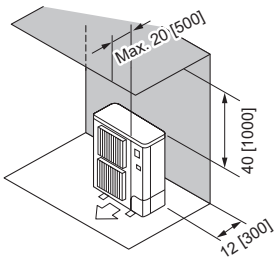
in. [mm]

When installing a single outdoor unit

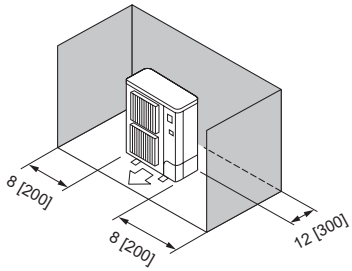
a. Obstacles at rear



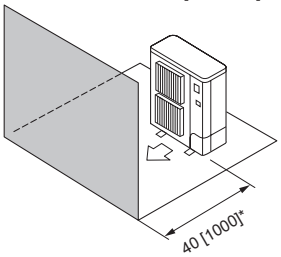
b. Obstacles at rear and above



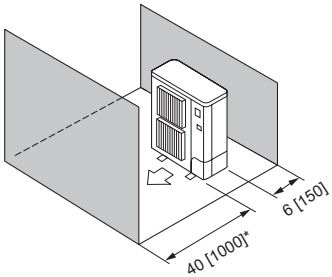
c. Obstacles at rear and sides



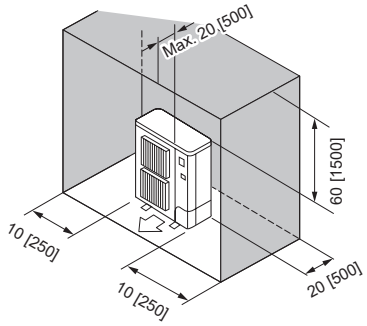
d. Obstacles at front
- When using optional air outlet guides, the clearance is 20 in. [500 mm] or more.



e. Obstacles at front and rear
- When using optional air outlet guides, the clearance is 20 in. [500 mm] or more.



f. Obstacles at rear, sides, and above
- Do not install optional air outlet guides for upward airflow.

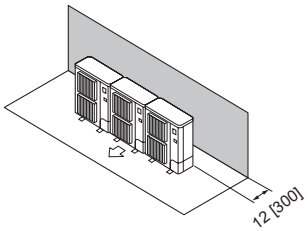


en

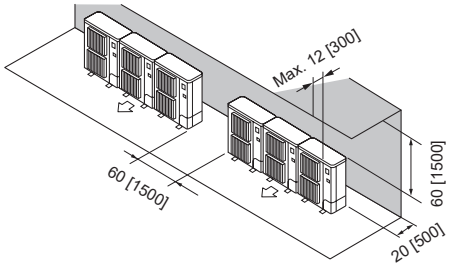
When installing multiple outdoor units

Leave a space of 1" (25 mm) or more between the units.

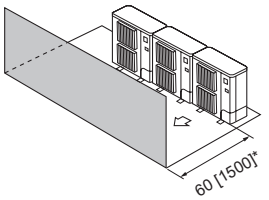
g. Obstacles at rear



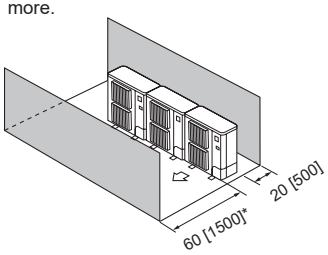
h. Obstacles at rear and above
- 4 or more units must not be installed side by side.
- Do not install the optional air outlet guides for upward airflow.



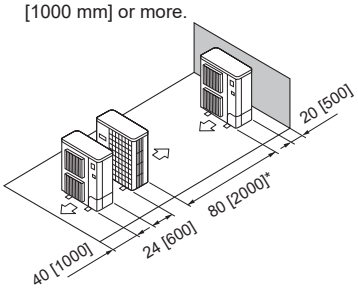
i. Obstacles at front
- When using optional air outlet guides, the clearance is 40” (1000 mm) or more.



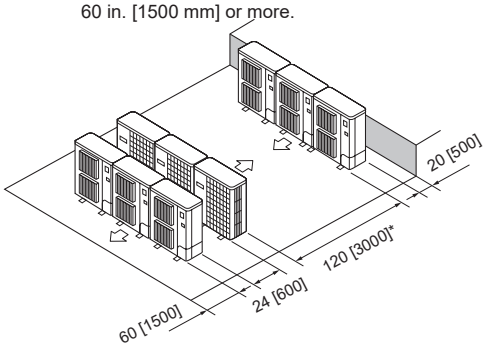
j. Obstacles at front and rear
- When using optional air outlet guides, the clearance is 40 in. [1000 mm] or more.



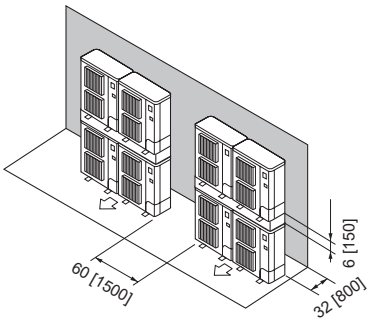
k. Single parallel arrangement
- When using optional air outlet guides installed for upward airflow, the clearance is 40 in. [1000 mm] or more.



l. Multiple parallel arrangement
- When using optional air outlet guides installed for upward airflow, the clearance is 60 in. [1500 mm] or more.



m. Stacked arrangement
- Maximum of 2 units can be stacked.
- 3 or more stacked units must not be installed side by side.

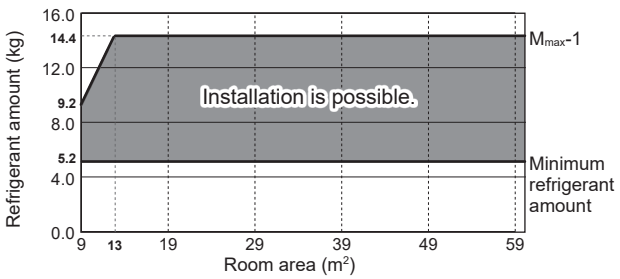


3-5. Minimum installation area

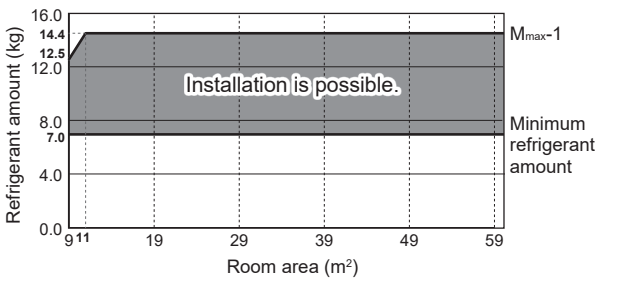
■ Precautions for the indoor unit installation location

- Read the installation manual of each indoor unit because there are restrictions on installation height depending on the model.
- Observe the refrigerant amount in the table below for the floor area where the indoor unit is installed.
- When using ducted systems for one or more rooms, first determine the system's refrigerant amount, and then refer to the installation manual of the indoor unit to check each room's restriction for minimum area.

MXZ-SM36/48NL



MXZ-SM60NL, MXZ-SM36/42/48NLHZ



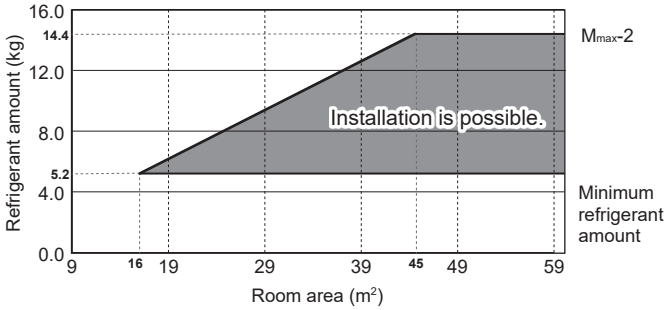
Minimum installation area and refrigerant amount

M_{max}-1									
MXZ-SM36/48NL					MXZ-SM60NL MXZ-SM36/42/48NLHZ				
A_{min} *1		M_{max}			A_{min} *1		M_{max}		
[m²]	[ft²]	[kg]	[lbs, oz]		[m²]	[ft²]	[kg]	[lbs, oz]	
9	97	9.2	20	4	9	97	12.5	27	8
10	108	10.6	23	5	10	108	14.3	31	8
11	118	11.9	26	3	11	118	14.4	31	11
12	129	13.2	29	1	12	129	14.4	31	11
13	140	14.4	31	11	13	140	14.4	31	11
14	151	14.4	31	11	14	151	14.4	31	11
15	161	14.4	31	11	15	161	14.4	31	11
16	172	14.4	31	11	16	172	14.4	31	11
17	183	14.4	31	11	17	183	14.4	31	11
18	194	14.4	31	11	18	194	14.4	31	11
19	205	14.4	31	11	19	205	14.4	31	11
20	215	14.4	31	11	20	215	14.4	31	11

*1. The installation restrictions are determined based on refrigerant leak amount because shut-off valves are mounted on the outdoor unit. Calculate M_{max} based on the minimum installation area.

When installing indoor units in the lowest floor of the basement

MXZ-SM36/48/60NL, MXZ-SM36/42/48NLHZ

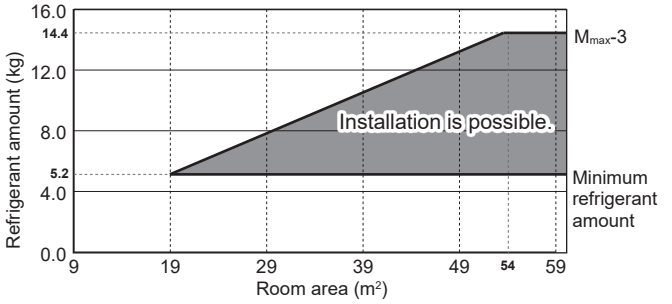


*2. When installing an indoor unit in the lowest floor of the basement, make sure refrigerant does not accumulate. Calculate M_{max} based on the total area of the lowest floor of the basement.

M_{max}-2 (When installing indoor units in the lowest floor of the basement) MXZ-SM36/48/60NL MXZ-SM36/42/48NLHZ				
TA*2		M_{max}		
[m²]	[ft²]	[kg]	[lbs, oz]	
9	97	2.9	6	6
10	108	3.2	7	0
11	118	3.5	7	11
12	129	3.9	8	9
13	140	4.2	9	4
14	151	4.5	9	14
15	161	4.8	10	9
20	215	6.5	14	5
25	269	8.1	17	13
30	323	9.7	21	6
35	377	11.3	24	14
40	431	13.0	28	10
45	484	14.4	31	11
50	538	14.4	31	11
55	592	14.4	31	11
60	646	14.4	31	11

When disabling the refrigerant sensor of the indoor unit

MXZ-SM36/48/60NL, MXZ-SM36/42/48NLHZ



*3. Refrigerant sensors can be disabled in some indoor units. Calculate M_{max} based on the installation area of the room where refrigerant sensor is to be disabled.

M_{max}-3 (When disabling the refrigerant sensor of the indoor unit) MXZ-SM36/48/60NL MXZ-SM36/42/48NLHZ				
A*3		M_{max}		
[m²]	[ft²]	[kg]	[lbs, oz]	
9	97	2.4	5	4
10	108	2.7	5	15
11	118	2.9	6	6
12	129	3.2	7	0
13	140	3.5	7	11
14	151	3.7	8	2
15	161	4.0	8	13
20	215	5.4	11	14
25	269	6.7	14	12
30	323	8.1	17	13
35	377	9.4	20	11
40	431	10.8	23	12
45	484	12.1	26	10
50	538	13.5	29	12
55	592	14.4	31	11
60	646	14.4	31	11

3-6. Precautions for R454B system

The air conditioner uses R454B, a mildly flammable refrigerant. This system is supported by the safety standard complying with the Enhanced Tightness Refrigerant System of UL60335-2-40. Install the unit according to the following requirements so that the system can satisfy the standards.

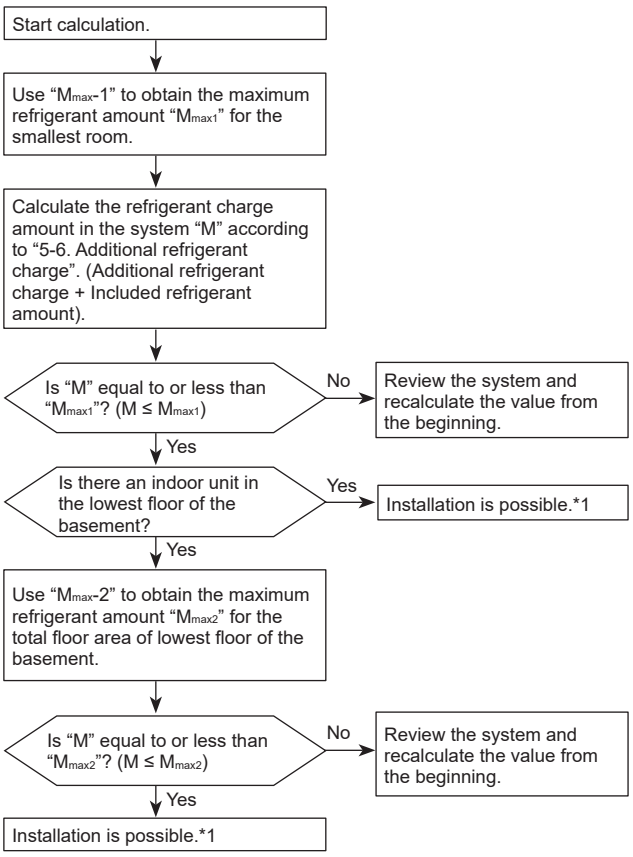
- For piping connection, use a mechanical joint (brazing and flare connection, etc.) complying with the latest version of ISO14903. Ensure that the piping installed in a room is securely protected from damage due to an external force.
- Be sure to install an indoor unit in a room where the conditions indicated in "3-5. Minimum installation area" are satisfied.
- When the power sources of the outdoor unit, indoor unit, and branch box are different, power the outdoor unit last.
- LEAK DETECTION SYSTEM installed. Unit must be powered except for service.
- Put the attached label on breaker, and explain it to customers. When the wiring circuit breaker or isolating switch is OFF, a leak detection system is not working because electricity is not supplied.
- A refrigerant sensor is required for this system. When it detects a refrigerant leak or abnormality, the system closes the shut-off valves and performs refrigerant recovery.
- Turn on the DIP switch 6-6 after a test run. This enables the system to perform refrigerant recovery even if communication fails.
- The indoor unit is equipped with a refrigerant sensor. Remove the refrigerant sensor to simulate the indoor unit operating in the refrigerant recovery mode (mitigation action). When the refrigerant recovery operation is successfully completed, the fan of the outdoor unit stops. The indoor unit operates in refrigerant recovery mode for a maximum of 10 minutes.
- Take appropriate measures when servicing the air conditioner. Otherwise, the air conditioner may not operate again after refrigerant recovery.
- The sensor must be replaced after it detects a refrigerant leak. Refer to the installation manual of the indoor unit.
- Refrigerant sensors can be disabled in some indoor units when M_{max}-3 (see "3-5. Minimum installation area") is satisfied. Refer to the installation manual of the indoor unit for details of disabling the refrigerant sensor.
- Pay special attention to the installation locations, such as a basement, etc. where refrigeration gas can accumulate, since refrigerant is heavier than the air. When installing an indoor unit in the lowest floor of the basement, M_{max}-2 (see "3-5. Minimum installation area") shall be satisfied.
- For some indoor units, an alarm will go off when a refrigerant leak is detected. Additionally, an alarm is available by installing the optional MA remote controller with alarm or the optional alarm kit. For details, refer to the manual of each optional part.
- To avoid the risk of fire, when the wall mounted indoor unit is connected, flare connections shall be installed in the indoor unit or outdoor unit.

en

3-7. Calculation of the minimum installation area

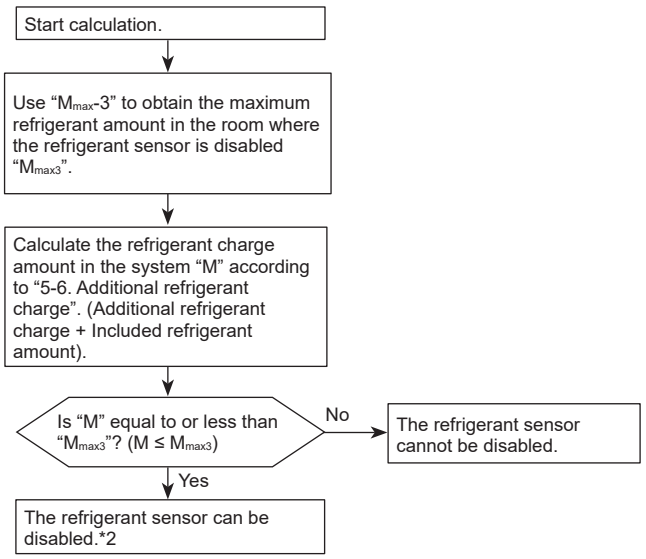
The maximum allowable refrigerant amount is calculated based on the floor area of each room where the system is connected so that the system can satisfy the safety standards. Refer to "3-5. Minimum installation area" to calculate the maximum allowable refrigerant amount for the smallest room where the indoor unit is to be installed. Follow the flowchart below.

Check the installation area 1



*1. Move on to the flowchart on the right when you want to disable a refrigerant sensor in any room.

Check the installation area 2 (When disabling the refrigerant sensor)



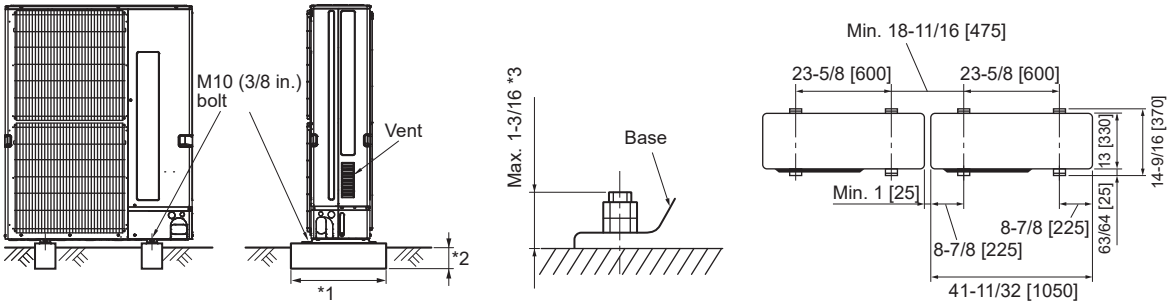
*2. Note that the refrigerant sensor cannot be disabled in some indoor unit.

en

4. Installing the outdoor unit

Be sure to install the unit in a sturdy and level surface to prevent rattling noises during operation. (See the figures below.)

in. [mm]



*1. The dimension of the foundation should be as long as possible.
*2. The foundation must be deeply set in the ground.
*3. Make sure that the length between the bottom surface of the base and the top of the foundation bolt is within 1-3/16 in. [30 mm]. Secure the base of the unit firmly with 4-M10 foundation bolts in a sturdy location.

Foundation specifications

Foundation bolt	M10 (3/8 in.)
Thickness of concrete	4-23/32 in. [120 mm]
Length of bolt	2-3/4 in. [70 mm]
Weight-bearing capacity	705 lbs [320 kg]

Installing the outdoor unit

- Do not block the vent. If the vent is blocked, operation will be hindered and breakdown may result.
- In addition to the unit base, use the installation holes on the back of the unit to attach wires, etc., if necessary to install the unit. Use self-tapping screws (ø13/16 × 19/32 in. [ø5 × 15 mm] or less) and install on site.

⚠ **Warning:**

- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
- The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.

⚠ **Caution:**

- Install the unit on a rigid structure to prevent excessive operation sound or vibration.

5. Installing refrigerant piping

5-1. Precautions for devices that use R454B refrigerant

- Carefully read "2.2 Before installation" to "2.6 Using R454B refrigerant air conditioners" for installing air conditioners with R454B refrigerant.
- Use ester oil, ether oil, or alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections.
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Use refrigerant pipes with the thicknesses specified in the table "Pipe length and thickness" below. Make sure the inside of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.

⚠ **Warning:**

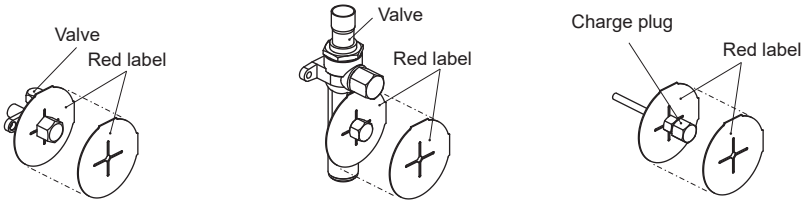
When installing, relocating, or servicing the outdoor unit, use only the specified refrigerant (R454B) to charge the refrigerant circuit. Do not mix it with any other refrigerant and do not allow air to remain in the circuit. If the air is mixed with the refrigerant, it can cause abnormal high pressure in the refrigerant circuit, and may result in an explosion and other hazards. The use of any refrigerant that is not specified for the system will cause mechanical failure, system malfunction, or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

Pipe length and thickness

Pipe length	Thickness
1/4 in. [ø6.35 mm], 3/8 in. [ø9.52 mm], 1/2 in. [ø12.7 mm]	1/32 in. [0.8 mm]
ø5/8 in. [ø15.88 mm], 3/4 in. [ø19.05 mm]	5/128 in. [1.0 mm]

Note:

- Do not use pipes thinner than those specified above.
- The thicknesses listed in the table above are based on Japanese standards. Use pipes with a maximum working pressure of 601 psig [4.15 MPa] or higher according to local standards.
- Red labels on the valves and the charge plugs indicate that flammable refrigerant is used. If you removed them for piping work, be sure to return them to their original positions after the work is completed.



en

5-2. Selecting pipe size

Piping preparation

Specifications of commercially available pipes

in. [mm]

Outside diameter	Insulation thickness	Insulation material
1/4 [ø6.35]	5/16 [8]	Heat resisting foam plastic 0.045 specific gravity
3/8 [ø9.52]	5/16 [8]	
1/2 [ø12.7]	5/16 [8]	
5/8 [ø15.88]	5/16 [8]	
3/4 [ø19.05]	5/16 [8]	

Conversion table

in. [mm]

Nominal	Outside diameter
1/4 F	1/4 [ø6.35]
3/8 F	3/8 [ø9.52]
1/2 F	1/2 [ø12.7]
5/8 F	5/8 [ø15.88]
3/4 F	3/4 [ø19.05]

⚠ **Caution:**
Be sure to use the insulation appropriate for the thickness. Excessive thickness may cause incorrect installation of the indoor unit and a lack of thickness, which may cause dew drippage.

⚠ **Warning:**
When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.

Pipe size

Pipe size between the outdoor unit and the first branch joint/header/box or between the branch joint and branch header/box

in. [mm]

Model	Liquid pipe	Gas pipe
SM36/42/48	3/8 [ø9.52]	5/8 [ø15.88]
SM60		3/4 [ø19.05] (5/8 [15.88*])

* Only for pipes between the branch joint and each branch box when 2 branch boxes are connected to SM60 and the total capacity of indoor units is 53 kBtu/h or less.

Pipe size between the indoor unit to the branch joint/header/box

in. [mm]

Indoor unit series	Model number	Liquid pipe	Gas pipe
City Multi	04, 05, 06, 08, 12, 15, 18	1/4 [ø6.35]	1/2 [ø12.7]
	24, 27, 30, 36, 48, 54	3/8 [ø9.52]	5/8 [ø15.88]
	72	3/8 [ø9.52]	3/4 [ø19.05]
M or S series	06, 09, 12	1/4 [ø6.35]	3/8 [ø9.52]
	15, 18	1/4 [ø6.35]	1/2 [ø12.7]
	24, 30, 36	3/8 [ø9.52]	5/8 [ø15.88]
P series	09	1/4 [ø6.35]	3/8 [ø9.52]
	12, 15, 18	1/4 [ø6.35]	1/2 [ø12.7]
	24, 30, 36	3/8 [ø9.52]	5/8 [ø15.88]

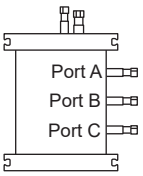
Note:
- When both of the following items are satisfied, the gas pipe size shall be increased by one size.
  - All connected indoor units are A-COIL type (PAA).
  - Total piping length is 32 ft [10 m] or shorter.

Valve size of branch box

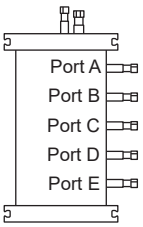
in. [mm]

Pipe	To indoor unit					To outdoor unit
	A	B	C	D	E	
Liquid pipe	1/4 [ø6.35]	1/4 [ø6.35]	1/4 [ø6.35]	1/4 [ø6.35]	1/4 [ø6.35]	3/8 [ø9.52]
Gas pipe	3/8 [ø9.52]	3/8 [ø9.52]	3/8 [ø9.52]	3/8 [ø9.52]	1/2 [ø12.7]	5/8 [ø15.88]

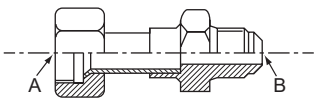
3-branch model



5-branch model



Different-diameter joint (optional part)



in. [mm]

Model name	Connected pipes diameter	Diameter A	Diameter B
PAC-SJ88RJ-E	3/8 [ø9.52] → 1/2 [ø12.7]	3/8 [ø9.52]	1/2 [ø12.7]
PAC-SK88RJ-E	1/2 [ø12.7] → 3/8 [ø9.52]	1/2 [ø12.7]	3/8 [ø9.52]
PAC-SK89RJ-E	1/2 [ø12.7] → 5/8 [ø15.88]	1/2 [ø12.7]	5/8 [ø15.88]
PAC-SJ87RJ-E	1/4 [ø6.35] → 3/8 [ø9.52]	1/4 [ø6.35]	3/8 [ø9.52]
PAC-SK90RJ-E	3/8 [ø9.52] → 5/8 [ø15.88]	3/8 [ø9.52]	5/8 [ø15.88]
PAC-SK87RJ-E	5/8 [ø15.88] → 3/4 [ø19.05]	5/8 [ø15.88]	3/4 [ø19.05]

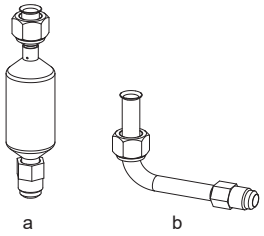
Branch joint/header

Type	Model name	Connection method
2-branch joint	MSDD-50AR2-E*	flare
	MSDD-50BR-E*	brazing
2-branch joint	CMY-Y62-G-E	-
4-branch header	CMY-Y64-G-E	-
8-branch header	CMY-Y68-G-E	-

* For installation procedure, refer to the installation manuals of MSDD-50AR2-E and MSDD-50BR-E.

Accessories of the outdoor unit

The parts shown below are included (only for MXZ-SM36/48NL). Use them for on-site piping.



a. Muffler .....×1
b. Joint pipe-L.....×1

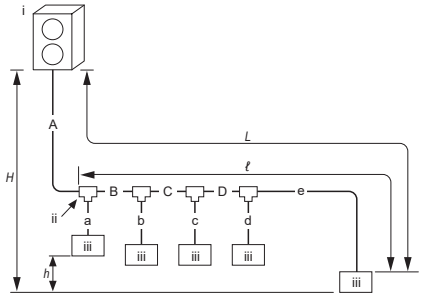
5-3. Pipe length and height difference

Note:

- For the pipe size of the sections indicated by capital letters (A, B, C, ...) and small letters (a, b, c, ...) in the figures below, see "Pipe size" in "5-2 Selecting pipe size".
- If the pipe size of the indoor unit is different, use a different-diameter joint. Connect the joint directly to the branch box side. See "Branch joint/header" in "5-2 Selecting pipe size".
- Use an optional branch piping kit as a branch joint/header. See "Branch joint/header" in "5-2 Selecting pipe size".
- The lineup of a connectable indoor unit depends on a district/areas/country.

Connection without a branch box

■ Connection with branch joints

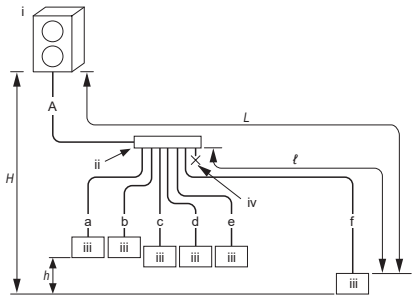


i. Outdoor unit
ii. First branch joint
iii. Indoor unit
L: Farthest piping length
ℓ: Farthest piping length after first branch joint
H: Height difference between outdoor unit and indoor unit
h: Height difference between indoor units

			SM36/48NL	SM36/42/48NLHZ SM60NL
Permissible length	Total piping length (A+B+C+D+a+b+c+d+e)		≤ 787 ft [240 m]	≤ 492 ft [150 m]
	L (A+B+C+D+e)		≤ 262 ft [80 m]	≤ 262 ft [80 m]
	ℓ (B+C+D+e)		≤ 98 ft [30 m]	
Permissible height difference	*H*	When the outdoor unit is set higher than the indoor units	≤ 164 ft [50 m]	
		When the outdoor unit is set lower than the indoor units	≤ 131 ft [40 m] (98 ft [30 m]*)	≤ 131 ft [40 m]
	h		≤ 49 ft [15 m]	

*When PKFY-L04/06/08/12NLMU is included.

■ Connection with a branch header



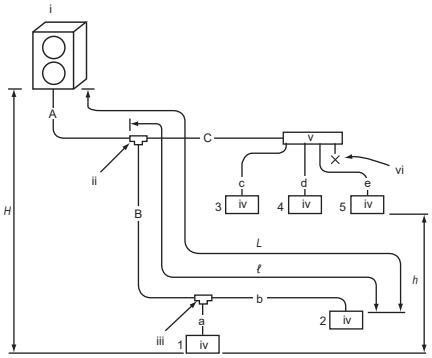
i. Outdoor unit
ii. First branch header
iii. Indoor unit
iv. Cap
L: Farthest piping length
ℓ: Farthest piping length after first branch header
H: Height difference between outdoor unit and indoor unit
h: Height difference between indoor units

			SM36/48NL	SM36/42/48NLHZ SM60NL
Permissible length	Total piping length (A+a+b+c+d+e+f)		≤ 787 ft [240 m]	≤ 492 ft [150 m]
	L (A+f)		≤ 262 ft [80 m]	≤ 262 ft [80 m]
	ℓ (f)		≤ 98 ft [30 m]	
Permissible height difference	*H*	When the outdoor unit is set higher than the indoor units	≤ 164 ft [50 m]	
		When the outdoor unit is set lower than the indoor units	≤ 131 ft [40 m] (98 ft [30 m]*)	≤ 131 ft [40 m]
	h		≤ 49 ft [15 m]	

*When PKFY-L04/06/08/12NLMU is included.

en

■ **Connection with both a branch header and branch joints**



i. Outdoor unit
ii. First branch joint
iii. Branch joint
iv. Indoor unit
v. Branch header
vi. Blind caps

L: Farthest piping length
ℓ: Farthest piping length after first branch joint
H: Height difference between outdoor unit and indoor unit
h: Height difference between indoor units

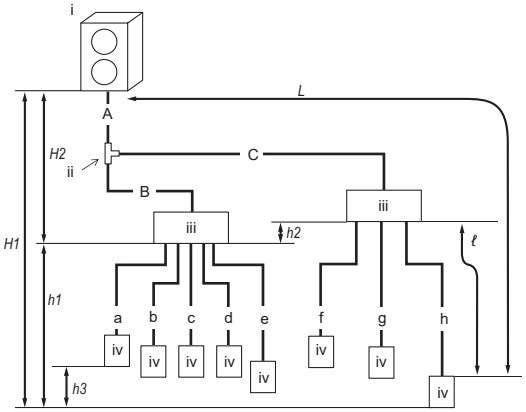
			SM36/48NL	SM36/42/48NLHZ SM60NL
Permissible length	Total piping length (A+B+C+a+b+c+d+e)		≤ 787 ft [240 m]	≤ 492 ft [150 m]
	L (A+B+b)		≤ 262 ft [80 m]	≤ 262 ft [80 m]
	ℓ (B+b)		≤ 98 ft [30 m]	
Permissible height difference	*H*	When the outdoor unit is set higher than the indoor units	≤ 164 ft [50 m]	
		When the outdoor unit is set lower than the indoor units	≤ 131 ft [40 m] (98 ft [30 m]*)	≤ 131 ft [40 m]
	h		≤ 49 ft [15 m]	

*When PKFY-L04/06/08/12NLMU is included.

Note:
- Pipes cannot be branched after the header joint.

Connection with branch box

- This unit has flared connections on each indoor unit and branch box and outdoor unit sides.
- Remove the valve cover of the outdoor unit, then connect the pipe.
- Refrigerant pipes are used to connect the branch boxes and the outdoor unit.



i. Outdoor unit
ii. First branch joint
iii. Branch box
iv. Indoor unit

L: Farthest piping length
ℓ: Farthest piping length after branch box
H1: Height difference between outdoor unit and indoor unit
H2: Height difference between outdoor unit and branch box
h1: Height difference between branch box and indoor unit
h2: Height difference between branch boxes
h3: Height difference between indoor units

			SM36/42/48/60
Permissible length	Total piping length (A+B+C+a+b+c+d+e+f+g+h)		≤ 492 ft [150 m]
	*L**1 (A+C+h)		≤ 262 ft [80 m]
	Total piping length between the outdoor unit and branch boxes (A+B+C)		≤ 180 ft [55m]
	Piping length between first branch joint and farthest branch box (C)		≤ 98 ft [30 m]
	ℓ (h)		≤ 82 ft [25 m]
	Total piping length between branch boxes and indoor units (a+b+c+d+e+f+g+h)		≤ 312 ft [95 m]
Permissible height difference	*H1*	When the outdoor unit is set higher than indoor units	≤ 164 ft [50 m]
		When the outdoor unit is set lower than indoor units	≤ 131 ft [40 m]
	H2	When the outdoor unit is set higher than branch box	≤ 164 ft [50m]
		When the outdoor unit is set lower than branch box	≤ 131ft [40m]
	h1+*h2*		≤ 49 ft [15 m]
	h2		≤ 49 ft [15 m]
	h3		≤ 39 ft [12 m]
Number of bends	|A+B+a|, |A+B+b|, |A+B+c|, |A+B+d|, |A+B+e|, |A+C+f|, |A+C+g|, |A+C+h|		≤ 15

*1. The piping specification table does not provide a minimum piping length. However, when an indoor unit is connected with piping less than 16 ft [5 m], it could produce intermittent noise during normal system operation in very quiet environments. Please be aware of this important information when installing and locating an indoor unit in such environments.

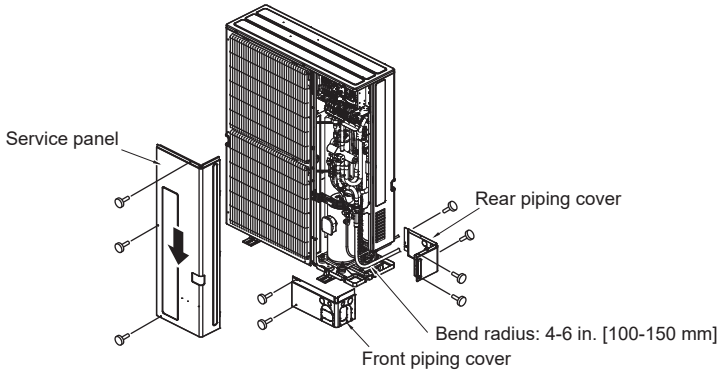
5-4. Procedures for installing refrigerant piping

⚠ **Warning:**

When installing the unit, securely connect the refrigerant pipes before starting the compressor.

1. Removing panels

Remove the service panel (3 screws), the front piping cover (2 screws), and the rear piping cover (4 screws).



2. Connecting pipes

Note:

- When bending the pipes, be careful not to break them. Bend radius shall be 4 to 6 in. (100 to 150 mm).
- Make sure that the pipes do not contact the compressor. Otherwise, abnormal noise or vibration may result.
- For MXZ-SM36/48NL
  - Make sure that the valves are closed before connecting the muffler and the extended pipe.
  - When extending the pipe downward, connect the muffler and the extended pipe.
  - When extending the pipe forward, sideward, or backward, connect the muffler, the joint pipe-L (make it point to the extending direction), and then the extended pipe.
- For MXZ-SM36/42/48NLHZ and MXZ-SM60NL
  - Make sure that the valves are closed before connecting the extended pipe.

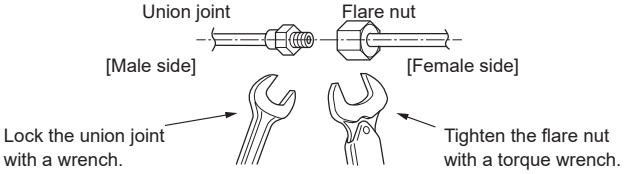
⚠ **Caution:**

Be sure to connect the muffler for MXZ-SM36/48NL, otherwise abnormal vibration or noise may occur.

1. Always start connecting pipes from the indoor unit.
   - Use the flare nuts shown in the table below.
   - Flare nuts must be tightened with a torque wrench. Use 2 wrenches to tighten piping connections as shown in the figure below.

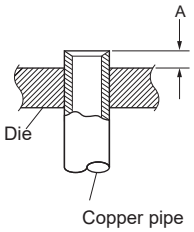
in. [mm]

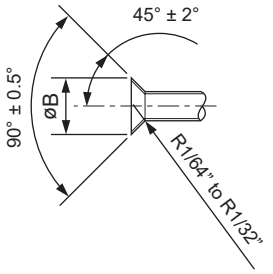
Outside dimension of copper pipe	Outside dimension of flare nut	Tightening torque ft·lbs [N·m*]
1/4 [ø6.35]	17 (43/64)	10 - 13 [14 - 18]
1/4 [ø6.35]	22 (7/8)	25 - 30 [34 - 42]
3/8 [ø9.52]	22 (7/8)	25 - 30 [34 - 42]
3/8 [ø9.52]	26 (1-3/64)	35 - 44 [49 - 61]
1/2 [ø12.7]	26 (1-3/64)	35 - 44 [49 - 61]
1/2 [ø12.7]	29 (1-9/64)	49 - 59 [68 - 82]
5/8 [ø15.88]	29 (1-9/64)	49 - 59 [68 - 82]
5/8 [ø15.88]	36 (1-27/64)	71 - 87 [100 - 120]
3/4 [ø19.05]	36 (1-27/64)	71 - 87 [100 - 120]

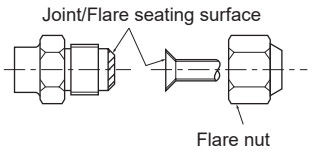


* 1 N·m ≈ 10 kgf·cm

2. Flare the liquid and gas pipes and apply a thin layer of refrigeration oil (on site). Be sure to apply refrigerant oil to the flare and joint seating surface before tightening a flare nut.
   - When using an usual flaring tool, refer to the figures and table below.
   - To ensure the dimension A, you can use a size adjustment gauge.







in. [mm]

Outside dimension of copper pipe	Dimension A		Dimensions øB
	Flaring tool for R32/R410A/R454B (Clutch type)	Flaring tool for R22·R407C (Clutch type)	
1/4 [ø6.35]	0 - 1/64 [0 - 0.5]	3/64 - 1/16 [1.0 - 1.5]	5/16 - 3/8 [8.7 - 9.1]
3/8 [ø9.52]			1/2 - 33/64 [12.8 - 13.2]
1/2 [ø12.7]			41/64 - 21/32 [16.2 - 16.6]
5/8 [ø15.88]			49/64 - 25/32 [19.3 - 19.7]
3/4 [ø19.05]			15/16 - 61/64 [23.6 - 24.0]

3. For connection, first align the center, then tighten the first 3 to 4 turns of flare nut by hand.

3. Nitrogen pressure test method for refrigerant pipes

After connecting the refrigerant pipes, check the connected pipes and the indoor unit for gas leaks. Use leak detector or soapy water.

1. Connect the testing tools.
   - Make sure both of the 2 valves are closed. See the figure below for the valves.
   - Add pressure to the refrigerant circuit through the service port of the liquid stop valve and the gas valve.
2. Add pressure little by little. Do not add pressure to the specified pressure all at once.
   - Pressurize to 73 psig [0.5MPa, 5.1 kgf/cm2G], wait 5 minutes, and make sure the pressure does not decrease.
   - Pressurize to 218 psig [1.5MPa, 15.3kgf/cm2G], wait 5 minutes, and make sure the pressure does not decrease.
   - Pressurize to 601 psig [4.15MPa, 42.3kgf/cm2G] and measure the surrounding temperature and refrigerant pressure.
3. If the specified pressure holds for about 1 day and does not decrease, the pipes have passed the test and there are no leaks.
   - If the surrounding temperature changes by 1.8°F [1°C], the pressure will change by about 1.5 psig [0.01MPa, 0.1kgf/cm2G]. Make the necessary corrections.
4. If the pressure decreases in steps 2 or 3, there is a gas leak. Find the point where the gas leaks.

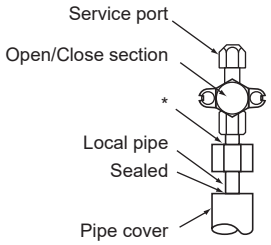
en

Note:

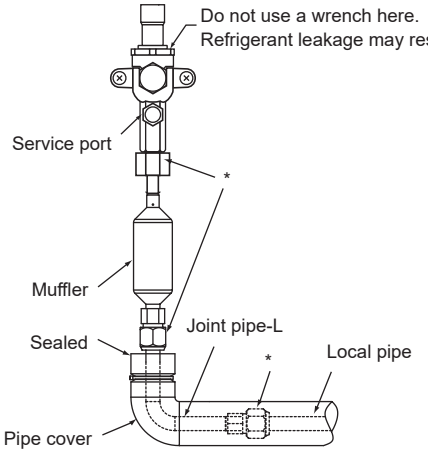
- Field-made refrigerant joints indoors shall be tightness tested. The method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the MAXIMUM ALLOWABLE PRESSURE. No leak shall be detected.

MXZ-SM36/48NL

Stop valve at liquid side



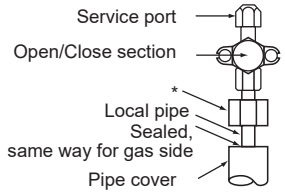
Ball valve at gas side



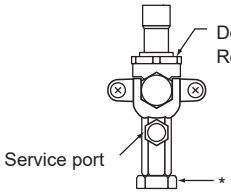
*Use 2 wrenches to tighten piping connections.

MXZ-SM60NL, MXZ-SM36/42/48NLHZ

Stop valve at liquid side



Ball valve at gas side



*Use 2 wrenches to tighten piping connections.

4. Vacuum evacuation

1. Evacuate the air from the indoor unit and the connection piping.
   Evacuate with the valve of the outdoor unit closed and evacuate both the connection piping and the indoor unit from the service port provided on the valve of the outdoor unit using a vacuum pump. (Always evacuate from the service port of both liquid pipe and gas pipe.) After the vacuum reaches 0.0943 psig/5 Torr [650 Pa (abs)], continue evacuation for at least 1 hour or more. Then, stop the vacuum pump and leave it for 1 hour. Ensure the degree of vacuum has not increased. (If the degree of vacuum increase is larger than 0.01886 psig/1.0 Torr [130 Pa], water might have entered. Apply pressure to dry nitrogen gas up to 7.25 psig [0.05MPa, 0.51kgf/cm2G] and vacuum again.)
   - Note: Never perform air purging using refrigerant.
2. Vacuumize the refrigerant circuit through the service port of the liquid and gas stop valves. And then open the stop valves completely (for both the liquid and gas stop valves). The outdoor unit has the shut-off valves, so the refrigerant line of the indoor and outdoor units are not connected until the air conditioner operates after being energized.
   - If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
   - Use a leak detector or soapy water to check for gas leaks at the pipe connection sections of the outdoor unit.
   - Do not use the refrigerant from the unit to purge air from the refrigerant circuit.
   - After the valve work is completed, tighten the valve caps to the correct torque: 14 to 18 ft·lbs [20 to 25 N·m] (200 to 250 kgf·cm). Failure to replace and tighten the caps may result in refrigerant leakage. In addition, do not damage the insides of the valve caps as they act as a seal to prevent refrigerant leakage.

Note: Triple Evacuation

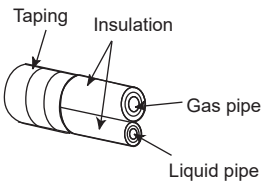
- Evacuate the system to 4,000 microns from both service valves. System manifold gauges must not be used to measure vacuum. A micron gauge must be used at all times.
  - Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 psig [0MPa, 0kgf/cm2G].
- Evacuate the system to 1,500 microns from the suction service valve.
  - Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 psig [0MPa, 0kgf/cm2G].
- Evacuate the system to 500 microns. System must hold the vacuum at 500 microns for a minimum of 1 hour.
- Conduct a rise test for a minimum of 30 minutes.

5. Insulation work

en

⚠ **Caution:**

Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.



- Conduct sufficient anti-condensation and insulation work to prevent water dripping from the refrigerant piping. (liquid pipe/gas pipe)
- Increase insulation depending on the environment where the refrigerant piping is installed. Otherwise, condensation may occur on the surface of the insulation material. (Insulation material heat-resistant temperature: 248°F [120 °C]; thickness: 5/8 in. [15 mm] or more) Note that when the refrigerant piping is used in locations subject to high temperature and humidity such as in the attic, further addition of insulation may be required.
- To insulate the refrigerant piping, apply heat-resistant polyethylene foam between the indoor unit and insulation material as well as to the net between the insulation material filling all gaps. (Condensation forming on the piping may result in condensation in the room or burns when contacting the piping.)
- The indoor parts of the drain pipe should be wrapped with polyethylene foam insulation materials (specific gravity of 0.03, thickness of 3/8 in. [9 mm] or more).
- Use sealant to seal the ends of the thermal insulation around the pipe connection sections to prevent water from entering the thermal insulation.

Refrigerant pipes are protectively wrapped

- The pipes can be protectively wrapped up to a diameter of 3-9/16" [ø90 mm] before or after connecting the pipes. Cut out the knockout in the pipe cover following the groove and wrap the pipes.

Pipe inlet gap

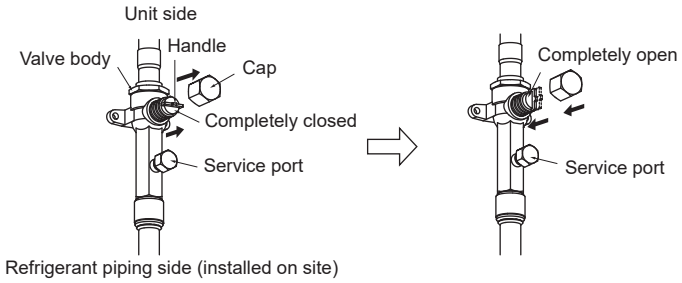
- Use putty or sealant to seal the pipe inlet around the pipes so that no gaps remain. (If the gaps are not closed, noise may be emitted or water and dust may enter the unit, resulting in a breakdown.)

5-5. Valve opening methods

The valve opening method varies according to the outdoor unit model. Use the appropriate method to open the valves.

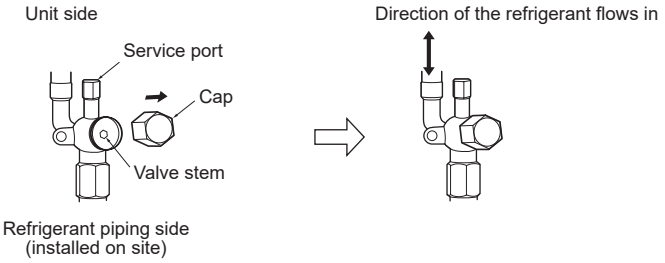
■ Gas side

1. Remove the cap, pull the handle toward you and rotate the valve 1/4 turn in a counterclockwise direction to open it.
2. Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.



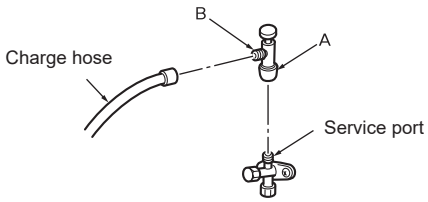
■ Liquid side

1. Remove the cap and turn the valve rod counterclockwise as far as it will go with the use of a 3/16" [4 mm] hexagonal wrench. Stop turning when it hits the stopper.
2. Make sure that the stop valve is open completely and rotate the cap back to its original position.



■ Precautions when using the charge valve

Do not over-tighten the service port during installation, otherwise the valve core may be deformed and loosen, causing a gas leak.
After positioning the section B in the desired direction, turn the section A only and tighten it. Do not further tighten the sections A and B together after tightening the section A.



Note:

- The figure in the left is only an example. The stop valve shape, service port position, etc., may vary according to the model.

⚠ **Warning:**

- When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- When installing the unit, securely connect the refrigerant pipes before starting the compressor.

5-6. Additional refrigerant charge

Additional refrigerant charge

Refrigerant for the indoor units and the extended piping is not included in the outdoor unit when the unit is shipped from the factory. Therefore, charge each refrigerant piping system with additional refrigerant at the installation site. In addition, in order to carry out service, enter the size and length of each liquid pipe and additional refrigerant charge amounts in the spaces provided on the “Refrigerant amount” plate on the outdoor unit.

Note:

- When the unit is stopped, charge the unit with the additional refrigerant through the liquid stop valve after the pipe extensions and indoor units have been vacuumized.
- When the unit is operating, add refrigerant to the gas check valve using a safety charger. Do not add liquid refrigerant directly to the check valve.

en

Calculation of additional refrigerant charge

■ Calculating formula and reference values

Additional refrigerant charge	=	Amount for the liquid pipe size of ø6.35	+	Amount for the liquid pipe size of ø9.52	+
		(ft) × 0.22 (oz/ft) (m) × 20.0 (g/m)		(ft) × 0.58 (oz/ft) (m) × 54.0 (g/m)	

Total capacity of connected indoor units	Amount for the indoor units
	SM36/48/60NL SM36/42/48NLHZ
27 or less	8 lbs 14 oz [4.0 kg]
28 to 54	11 lbs 1 oz [5.0 kg]
55 or more	11 lbs 8 oz [5.2 kg]

■ Included refrigerant amount when shipped from the factory

- MXZ-SM36/48NL: 2 lbs 11 oz [1.2 kg]
- MXZ-SM36/42/48NLHZ, MXZ-SM60NL: 6 lbs 10 oz [3.0 kg]

■ **Calculation example**

Condition

Outdoor unit: MXZ-SM48NL	A: ø9.52 98 ft [30 m]
Indoor unit 1: Model 24	a: ø9.52 49 ft [15 m]
Indoor unit 2: Model 15	b: ø6.35 32 ft [10 m]
Indoor unit 3: Model 08	c: ø6.35 32 ft [10 m]
Indoor unit 4: Model 08	d: ø6.35 66 ft [20 m]

Calculation

- The total length of each liquid line: ø9.52: A + a = 30 + 15 = 148 ft [45 m]
  ø6.35: b + c + d = 10 + 10 + 20 = 131 ft [40 m]
- The total capacity of connected indoor units: 24 + 15 + 08 + 08 = 55
- Additional refrigerant charge: 131 ft × 0.22 oz/ft + 148 ft × 0.58 oz/ft + 11 lbs 8 oz = 18 lbs 11 oz
  [40 m × 20.0 g/m / 1000 + 45 m × 54.0 g/m / 1000 + 5.2 kg = 8.5 kg] (rounded up)

Explanation

- Calculate the additional refrigerant charge using the liquid pipe size and length of the extended piping and total capacity of connected indoor units.
- Calculate the additional refrigerant charge using the procedure shown above, and charge with the additional refrigerant.
- Round up the first decimal place of the calculated value. (For example, if the calculated value is 6.01 kg, the mount of additional refrigerant charge is 6.1 kg.)
- The amount of additional refrigerant, which is calculated from the total capacity of indoor units and the combination of extended pipes, must not exceed the following amount:
  MXZ-SM36/48NL: 29 lbs 1 oz [13.2 kg]
  MXZ-SM36/42/48NLHZ, MXZ-SM60NL: 25 lbs 2 oz [11.4 kg]

Note:

- After charging the refrigerant, fill in "DATE OF FIRST CHARGE", "ADDITIONAL CHARGE", and "TOTAL CHARGE" columns on the name plate.

6. Drainage piping work

Drainage pipe connection for outdoor units

When drain piping is necessary, use the following drain socket or the drain pan (optional part). However, they can not be used for MXZ-SM36/42/48NLHZ (Hyper Heating model).

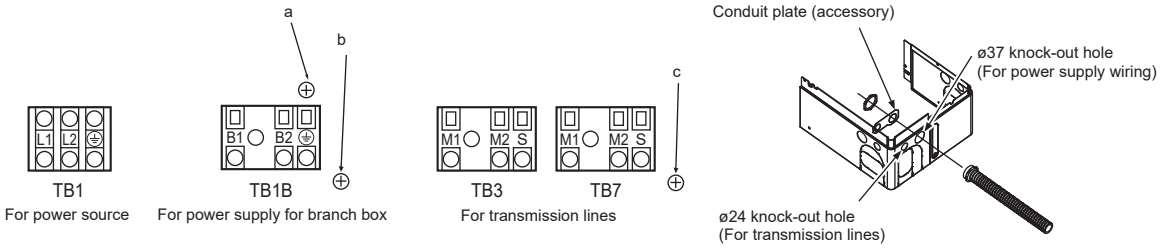
- Drain socket: PAC-SG61DS-E
- Drain pan: PAC-SH97DP-E

7. Electrical work

7-1. Caution

- Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.
- Use self-extinguishing distribution cables for power supply wiring.
- Wiring for control (hereinafter referred to as transmission lines) shall be apart from power supply wiring by 2 in. [5 cm] or more so that it is not influenced by electric noise from power supply wiring. (Do not insert the transmission lines and power supply wiring in the same conduit.)
- Be sure to provide designated grounding work to the outdoor unit.
- Give some allowance to wiring for electrical part box of indoor and outdoor units, because the box is sometimes removed at service work.
- Never connect the main power source to the terminal block of the transmission line. If connected, electrical parts will be burnt out.
- Use 2-core shielded wire for transmission lines. If transmission lines of different systems are wired with the same multiple-core cable, the resultant poor transmitting and receiving will cause erroneous operations.
- Only the specified transmission line shall be connected to the terminal block for outdoor unit transmission. Erroneous connection does not allow the system to operate.
  - Connect the transmission line connected with the indoor unit to TB3. (TB3 is a terminal block for the transmission line.)
  - Connect others to TB7. (TB7 is a terminal block for centralized control.)
- If connecting with the upper class controller or conducting group operation in different refrigerant systems, the transmission line is required between the outdoor units. Connect the transmission line between the terminal blocks for centralized control (2-wire line with no polarity). When conducting group operation in different refrigerant systems without connecting to the upper class controller, replace the insertion of the short circuit connector of one outdoor unit from CN41 to CN40.
- Before turning on the outdoor unit, be sure to turn on the indoor units and the branch boxes.

7-2. Control box and connecting positions of wiring



a. Screw on the electrical parts box for ground connection (TB3)
b. Screw on the electrical parts box (TB1B)
c. Screw on the electrical parts box for ground connection (TB7)

1. Connect the wiring between the outdoor unit and the indoor unit/branch box to TB3 on the outdoor unit.
   Connect the wiring between the outdoor unit and the centralized control system to TB7 on the outdoor unit.
   When using shielded wires, connect the ground of the shielded wire to the shield terminal S on TB3 or TB7.
   If the connection of the short circuit connector has been changed from CN41 to CN40, connect the shield terminal S on TB7 to the screw "c" using the included lead wire. Note that the shield terminal S on TB3 is connected to the screw "a" when the unit is shipped from the factory.
2. Conduit plates are provided. Remove the knock-out pieces from the piping cover, pass the power supply wiring and the transmission lines through the appropriate knock-out holes, and connect the wires to the terminal block.
3. TB1B is for supplying power to the branch box (208/230 V, max. 6A).
4. Fix power supply wiring to the terminal block by using buffer bushing for tensile force (PG connection or the like).

⚠ **Caution:**

Never connect the transmission line for the branch box or the transmission line of the central control system to TB1B. If the transmission lines are connected, the indoor unit, branch box or system controller could be damaged.

7-3. Wiring transmission cables

■ Types of transmission cables

Transmission lines for:	Types:	Diameter:	Remarks:
Outdoor unit to indoor unit/ branch box	2-core shielded wire CVVS, CPEVS or MVVS	More than 1.25 mm^2 [AWG 16]	Maximum wiring length: Within 656 ft [200 m]
MA remote controller	2-core sheathed wire (unshielded) CVV	0.3 to 1.25 mm^2 [AWG 22 to AWG 16] (0.75 to 1.25 mm^2 [AWG 18 to AWG 16]) Connected with simple remote controller	Maximum wiring length: Within 656 ft [200 m]

■ Unit, symbol, and connectable number

Unit		Symbol	Number of connectable units	
Outdoor unit		OC	–	
Indoor unit	City Multi series	M-IC	MXZ-SM36	Refer to 3-3. Constraints on indoor unit installation.
			MXZ-SM42	
			MXZ-SM48	
			MXZ-SM60	
	M, S, P series (A-Control)	A-IC	MXZ-SM36	
			MXZ-SM42	
			MXZ-SM48	
			MXZ-SM60	
Branch box		BC	0 to 2 per outdoor unit *1	
Remote controller	MA	MA-RC	Maximum of 2 per group	
	Wireless	WL-RC	–	

*1. The number of connectable units may be limited depending on some conditions such as capacity of the indoor unit or equivalent power consumption of each unit.

Note:
- See below for the symbols not indicated in the table above:
  TB: Terminal block
  L, *ℓ*: Length of the transmission line
  The number in the parenthesis is an address.
- Refer to the installation manual of the optional parts as well for the restrictions of connectable indoor units.

1. Operation system with MA-RC

Wiring methods for the operation examples shown below
- Use feed wiring to connect the terminals M1 and M2 on TB3 of OC to the terminals M1 and M2 on TB5 of each M-IC. Use non-polarized 2-core wires.
- Connect the terminals 1 and 2 on TB15 of each M-IC with the terminal block of MA-RC.
- For group operation, connect terminals 1 and 2 on TB15 of each M-IC. Use non-polarized 2-core wire.
- For group operation, set the M-IC with the most functionality in the group as the main M-IC. You only need to set the address for the main M-IC. Set the smallest address to the main M-IC.
- Combination of the 3 operation examples shown below are possible.

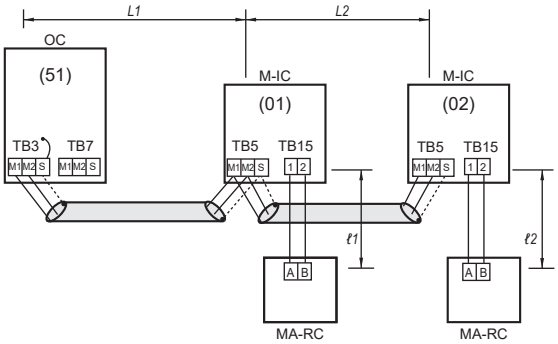
Permissible length

Section	Length	Diameter
Maximum length between M-IC and OC (*L1*+*L2*)	≤ 656 ft [200 m]	AWG 16 [1.25 mm²] or more
Length between M-IC and MA-RC (*ℓ1*, *ℓ2*, *ℓ3*+*ℓ4*, *ℓ5*, *ℓ6*+*ℓ7*)	≤ 656 ft [200 m]	AWG 22 to AWG 16 [0.3 to 1.25 mm²]

Note:
- If the length is 32 ft [10 m] or greater, use an AWG 16 [1.25 mm²] shielded wire. In this case, the wire length shall satisfy the following inequality.
  "Maximum length between M-IC and OC" + "Length between M-IC and MA-RC" ≤ 656ft [200m]

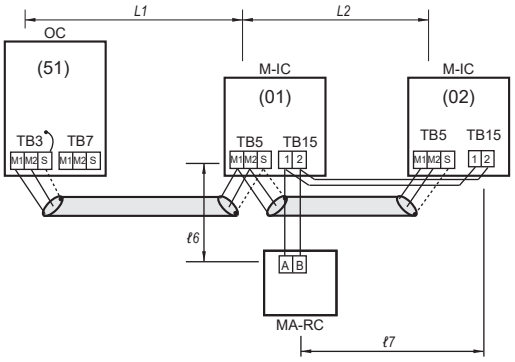
■ Standard operation (1 MA-RC for each M-IC)

Good

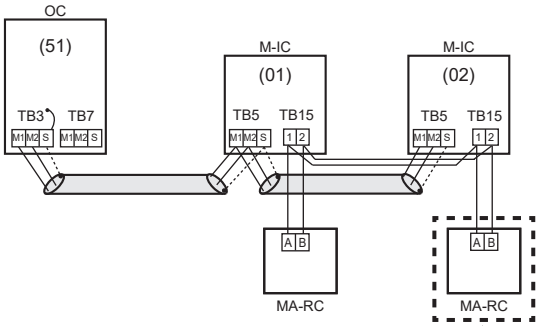


■ **Group operation (Multiple M-ICs operate together by 1 MA-RC.)**

Good



No good



The second MA-RC cannot be connected with TB15 of the same M-IC that the first MA-RC is connected.

2. Group operation system with 2 or more OCs and an MA-RC

Wiring methods for the operation example shown below

- Always use shielded wires when making connections between OC and M-IC, OC and OC, or M-IC and M-IC wiring.
- Use feed wiring to connect the terminals M1, M2, and S on TB3 of OC to the terminals M1, M2, and S on TB5 of M-IC.
- Connect the terminals 1 and 2 on TB15 of M-IC to the terminal block on the MA-RC. Use non-polarized 2-core wires.
- Connect the terminals M1, M2, and S on TB7 of each OC.
- Do not change the jumper connector CN41 on the outdoor multi controller circuit board.
- Grounding with the terminal S on TB7 is unnecessary. Connect the terminal S on the power supply unit to ground.
- Address settings (on the outdoor unit PCB) are required.

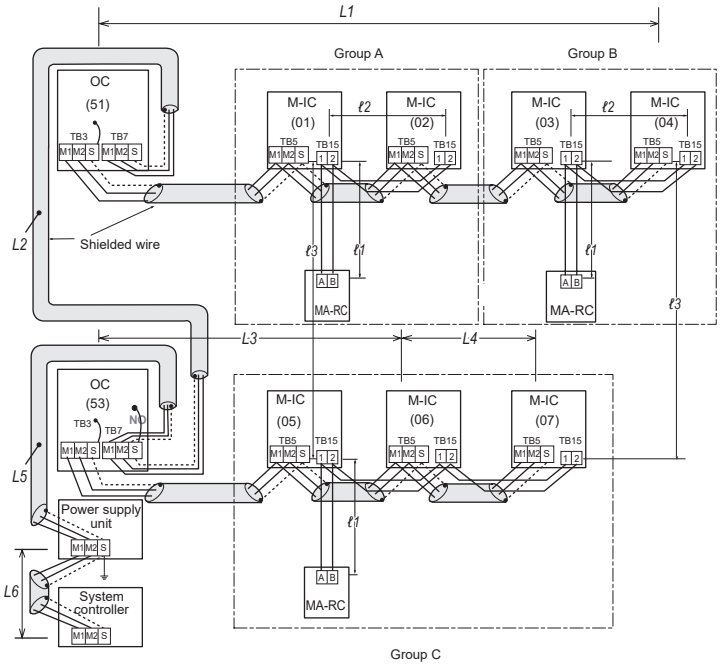
Permissible length

Section	Length	Diameter
Maximum line length via OC (*L1+L2+L3+L4*, *L1+L2+L5+L6*)	≤ 1640 ft [500 m]	AWG 16 [1.25 mm²] or more
Maximum length between M-IC and OC (*L1*, *L3+L4*, *L2+L5*, *L6*)	≤ 656 ft [200 m]	AWG 16 [1.25 mm²] or more

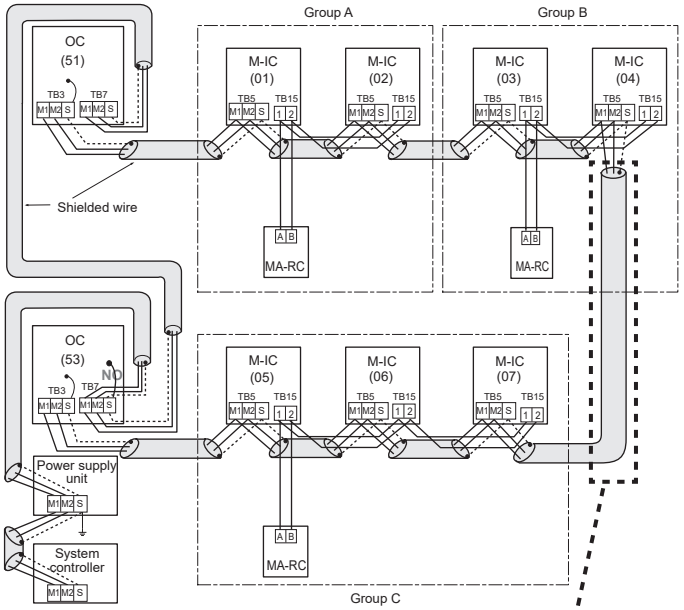
Address setting on PCB

Unit	Range	Remarks
Main M-IC	001 to 050	Use the smallest address in the M-ICs in the same group.
Sub M-IC	001 to 050	The address must be in sequence with the main M-IC address.
OC	051 to 100	Add 50 to the smallest M-IC address. The address is automatically set to “100” if "01–50" is entered.
MA-RC	-	Address setting is not necessary.

Good



No good



Never connect TB5 of M-IC with that have been connected to different OC.

3. Operation system with BC and A-IC

Wiring methods for the operation example shown below

- Always use shielded wire when making connections between OC and BC or OC and OC wiring.
- Use feed wiring to connect the terminals M1, M2, and S on TB3 of OC to the terminals M1, M2, and S on TB5 of BC.
- Connect the terminals 1 and 2 on TB5/TB15 of A-IC to the terminal block on the MA-RC. Use non-polarized 2-core wires.
- Connect the terminals M1, M2, and S on TB7 of each OC.
- Do not change the jumper connector CN41 on the outdoor multi controller circuit board.
- Grounding with the terminal S on TB7 is unnecessary. Connect the terminal S on the power supply unit to ground.
- Address settings (on the outdoor unit PCB) are required.

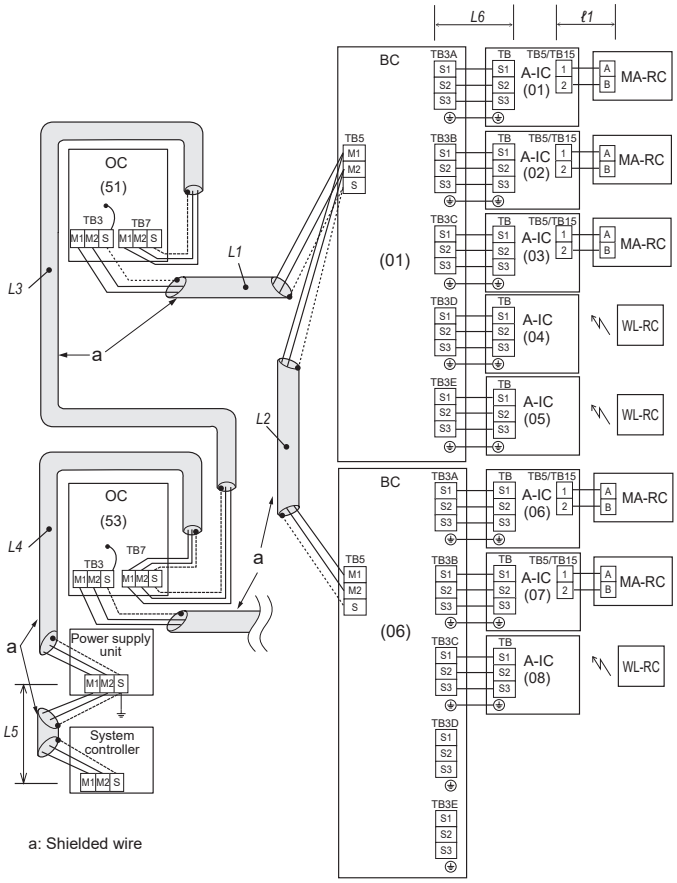
Permissible length

Section	Length	Diameter
Maximum line length via OC (*L1*+*L2*+*L3*+*L4*+*L5*)	≤ 1640 ft [500 m]	AWG 16 [1.25 mm²] or more
Maximum length between BC and OC (*L1*+*L2*, *L3*+*L4*, *L5*)	≤ 656 ft [200 m]	AWG 16 [1.25 mm²] or more
Maximum length between BC and A-IC (*L6*)	≤ 82 ft [25 m]	AWG 16 [1.25 mm²]
Length between A-IC and remote controller (*ℓ1*)	≤ 656 ft [200 m]	AWG 22 to AWG 16 [0.3 to 1.25 mm²]*

Address setting on PCB

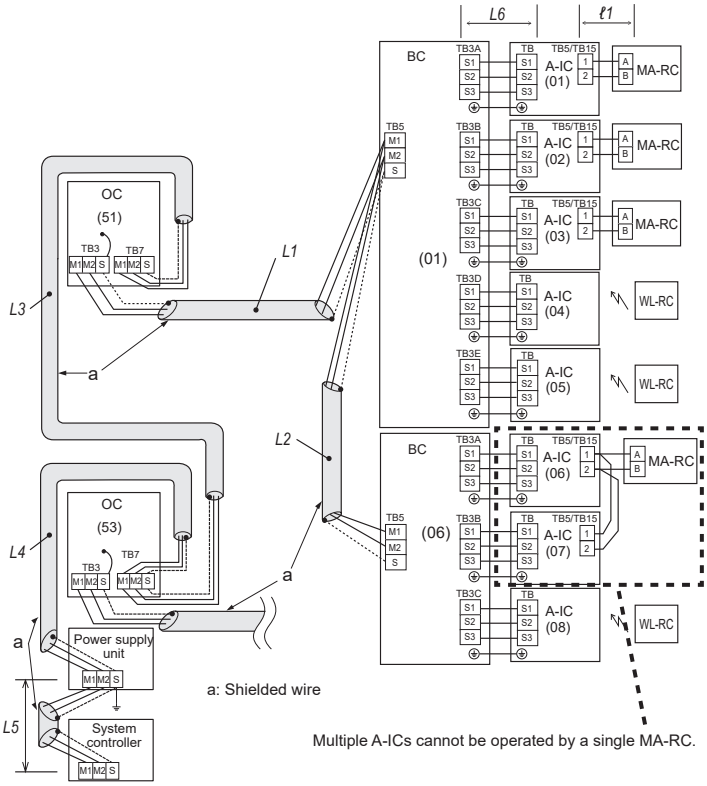
Unit	Range	Remarks
BC	001 to 050	Decide the BC address so that the address of the port does not exceed 50.
A-IC (Ports on BC)	001 to 050	Set addresses to the ports on BC where an A-IC is connected. The address of the first port is the same as that of BC, and the addresses of the other ports are set in sequence. For example, when 5 A-ICs are connected and the BC address (the first port address) is set to 01, the other port addresses are 02, 03, 04, and 05.
OC	051 to 100	Add 50 to the BC address. The address is automatically set to “100” if "01–50” is entered.
MA-RC	-	Address setting is not necessary.

Good



a: Shielded wire

No good



a: Shielded wire

Multiple A-ICs cannot be operated by a single MA-RC.

Note:

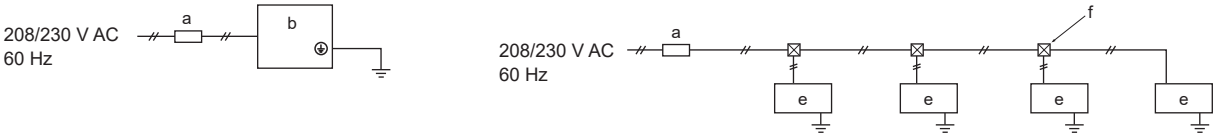
- Different refrigerant systems cannot be connected together.

en

7-4. Wiring of main power supply and equipment capacity

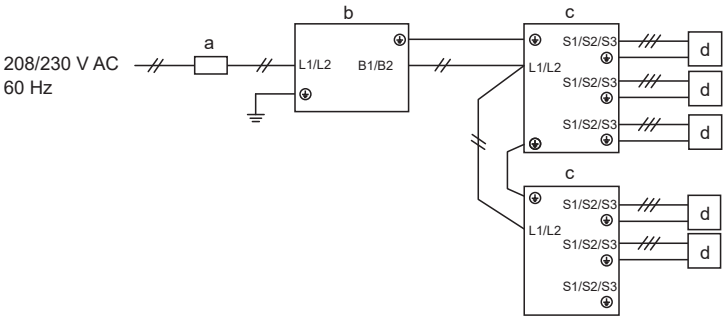
Schematic drawing of wiring

■ **Without a branch box**

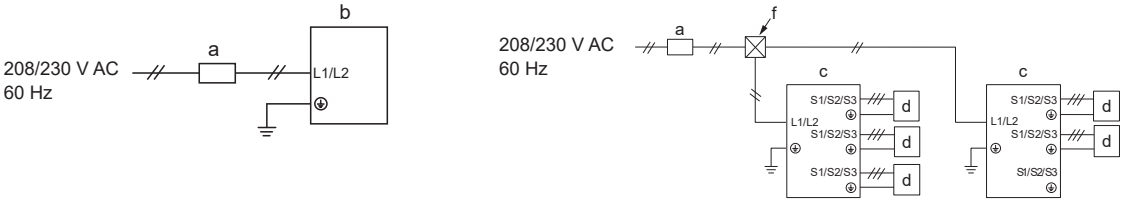


■ **With a branch box**

When power is supplied from an outdoor unit



When power is supplied separately



a. Switch (Ground fault circuit interrupter)
b. Outdoor unit
c. Branch box
d. A-Control indoor unit (M, S, P series indoor unit)
e. City multi series indoor unit
f. Pull box

Note:
- A separate power supply is required for the City Multi indoor unit, as it cannot be powered by an outdoor unit.

Thickness of main power supply wires

When power is supplied separately

Model		Power supply	Minimum wire thickness (mm² [AWG])		Conduit size	Breaker for wiring*1
			Main cable *2	Ground		
Outdoor unit	36/48NL	208/230 V AC, 60 Hz	5.3 [AWG 10]	5.3 [AWG 10]	1*3	30 A
	36/42/48NLHZ		8.4 [AWG 8]	8.4 [AWG 8]	1*3	40 A
	60NL		8.4 [AWG 8]	8.4 [AWG 8]	1*3	40 A
Branch box			Refer to the installation manual of the branch box.			

Model		Ground fault circuit interrupter (if necessary)	Minimum circuit ampacity	Maximum rating of over current protector device
Outdoor Unit	36/48NL	30 A 30 mA 0.1 sec. or less	36 A	64 A
	36/42/48NLHZ	40 A 30 mA 0.1 sec. or less	45 A	80 A
	60NL	40 A 30 mA 0.1 sec. or less	45 A	80 A
Branch box		Refer to the installation manual of branch box.		

When power is supplied from the outdoor unit

Model		Power supply	Minimum wire thickness (mm² [AWG])		Conduit size	Breaker for wiring*1
			Main cable *2	Ground		
Outdoor unit	36/48NL	208/230 V AC, 60 Hz	8.4 [AWG 8]	8.4 [AWG 8]	1*3	40 A
	36/42/48NLHZ		13.3 [AWG 6]	13.3 [AWG 6]	1	45 A
	60NL		13.3 [AWG 6]	13.3 [AWG 6]	1	50 A
Branch box			Refer to the installation manual of the branch box.			

Model		Ground fault circuit interrupter (if necessary)	Minimum circuit ampacity	Maximum rating of over current protector device
Outdoor Unit	36/48NL	40 A 30 mA 0.1 sec. or less	42 A	70 A
	36/42/48NLHZ	45 A 30 mA 0.1 sec. or less	51 A	86 A
	60NL	50 A 30 mA 0.1 sec. or less	55 A	90 A
Branch box		Refer to the installation manual of the branch box.		

*1. Please follow applicable federal, state, or local codes to prevent potential leakage/electric shock. Or install a ground fault circuit interrupter for the prevention of leakage and electric shock.
*2. Use copper supply wires. Use electric wires with a rated voltage greater than 300 V.
*3. Although the conduit size is larger than the size specified for the wire thickness according to the UL standards, use a conduit size of 1 inch.

Note:
- If a ground fault circuit interrupter is used, it should be compatible with higher harmonics as this unit is equipped with an inverter. Using an inadequate breaker can cause the incorrect operation of inverter.

ON/OFF capacities

Total operating current of the indoor unit	Minimum wire thickness (mm²/AWG)			Ground fault circuit interrupter (option)*1	Local switch (A)		Breaker for wiring (NFB)
	Main cable	Branch	Ground		Capacity	Fuse	
F*2 = 15 A or less	2.1/14	2.1/14	2.1/14	15 A current sensitivity *3	15	15	15
F*2 = 20 A or less	3.3/12	3.3/12	3.3/12	20 A current sensitivity *3	20	20	20
F*2 = 30 A or less	5.3/10	5.3/10	5.3/10	30 A current sensitivity *3	30	30	30

*1. The ground fault circuit interrupter should support inverter circuit.
The ground fault circuit interrupter should combine using of local switch or circuit breaker.

*2. Please take the larger value of F1 or F2 as the value for F.
F1 = Total operating maximum current of the indoor units × 1.2
F2 = {V1 × (Quantity of Type 1)/C} + {V1 × (Quantity of Type 2)/C} + {V1 × (Quantity of Type 3)/C} + {V1 × (Quantity of Type 4)/C} + … + {V1 × (Quantity of Type 13)/C}
See the table below for values of V1 and V2.

Calculation examples of "F2"

- Condition: PEFY-NMSU × 4 + PEFY-NMAU × 1, C = 8 (Refer to sample chart below.)
- Calculation: F2 = 18.6 × 4/8 + 30.5 × 1/8
  = 13.11
  = 16 A breaker (Tripping current = 8 × 16 A at 0.01 second)

*3. Current sensitivity is calculated using the following formula.
G1 = V2 × (Quantity of Type 1) + V2 × (Quantity of Type 2) + V2 × (Quantity of Type 3) + … + V2 × (Quantity of Type 13) + V3 × (Wire length [km])

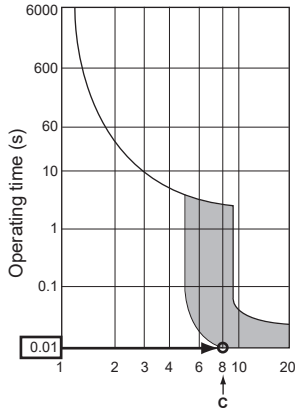
G1	Current sensitivity
30 or less	30 mA 0.1 second or less
100 or less	100 mA 0.1 second or less

Wire thickness (mm²/AWG)	V3
2.1/14	48
3.3/12	56
5.3/10	66

Values of V1 and V2

Indoor unit		V1	V2
Type 1	PEAD-AA·NL	30.5	2.4
Type 2	SVZ-AP·NL, PAA-AA/BA/CA·NL	26.9	2.4
Type 3	SEZ-AD·NL	18.6	3.4
Type 4	PLA-AE·NL, SLZ-AF*NL	17.1	2.4
Type 5	MLZ-KX·NL	10.8	2.4
Type 6	MSZ-FX·NL, MSZ-GX·NL, MFZ-KX·NL	7.4	2.4
Type 7	Branch box	5.1	3.0
Type 8	PVFY-L·NAMU	38.0	1.6
Type 9	PEFY-L·NMAU	30.5	2.3
Type 10	PCFY-L·NKMU	19.8	2.4
Type 11	PEFY-L·NMSU	18.6	2.4
Type 12	PLFY-EL·NEMU, PLFY-L·NFMU	17.1	2.4
Type 13	PKFY-L·NKMU, PKFY-L·NLMU	9.9	2.4

Example chart of operating characteristics



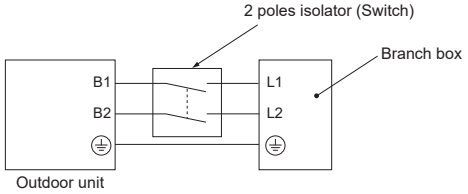
C: Factor of the rated current (minimum value) at the operating time of 0.01 second
Please check the operating characteristics of your breaker as "C" differs depending on the breaker.

Note:

- Use a separate power supply for the outdoor unit and the indoor unit.
- Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.
- The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker considering voltage drops. Make sure the power-supply voltage does not drop more than 10%.
- Specific wiring requirements should adhere to the wiring regulations of the region.
- Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57). For example, use wiring such as YZW.
- Install an earth longer than other cables.
- Never splice the power cable or the indoor-outdoor-branch box connection cable, otherwise it may result in a smoke, a fire or communication failure.
- Be sure to connect the outdoor-branch box/indoor-branch box connecting cables directly to the units (no intermediate connections). Intermediate connections can lead to communication errors if water enters the cables and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point. If an intermediate connection is necessary, be sure to take measures to prevent water from entering the cables.

⚠ **Warning:**

- Be sure to use specified wires to connect so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.
- Be sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.
- Be sure to attach the terminal block covers/panel of the outdoor unit securely. If it is not attached correctly, if could result in a fire or an electric shock due to dust, water. etc.
- Please turn off the main power supply when servicing. And do not touch the B1, B2 terminals when the power is energized. If the isolator should be used between the outdoor unit and the branch box/indoor unit and the branch box, please use the 3-pole type or 2-pole type isolator. (Please refer to the figure below.)
- Turn on the main power when the ambient temperature is -13°F [-25°C] or higher.
- At -13°F [-25°C], the unit will require at least 4 hours of stand-by before operation due to warm electrical parts.

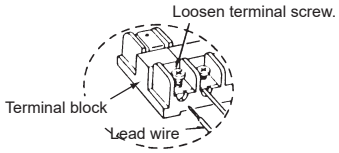


⚠ **Caution:**

- Be careful not to make mis-wiring.
- Firmly tighten the terminal screws to prevent loosening.
- After tightening, pull the wires lightly to confirm that they not move.
- If the connecting wire is incorrectly connected to the terminal block, the unit does not operate normally.
- Some installation site may require attachment of a ground fault circuit interrupter. If no ground fault circuit interrupter is installed, it may cause an electric shock.

en

- Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.
- Properly route wiring so as not to contact the sheet metal edge or a screw tip.
- Refer to the figure below for connection details.



- After using the isolator, be sure to turn off and on the main power supply to reset the system. Otherwise, the outdoor unit may not be able to detect the branch box(es) or indoor units.

7-5. Address settings

Switches for address settings

■ Outdoor unit

- Rotary switch

- Range: 51-100
- Remarks: Add 50 to the smallest indoor unit or branch box address.

■ Branch box

- Rotary switch

- Range: 01-50
- Remarks: Decide the branch box address first. (Branch box address = Port A address) The other port addresses are set sequentially.
  For example, when 5 indoor units are connected and the branch box address (port A address) is set to 01, the other port addresses are 02, 03, 04, and 05.
  The branch box address of 47 is not allowable because the port E address exceeds 50 in this case (A: 47, B: 48, C: 49, D: 50, E: 51).

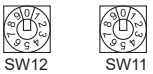
Example when an indoor unit is connected to each port							Remarks
Port	A	B	C	D	E	-	-
SW1	1	2	3	4	5	6	Set SW1 to ON when an indoor unit is connected, and to OFF when an indoor unit is not connected. SW1-6 is not used.
	ON	ON	ON	ON	ON	-	
Address	01					-	SW11, 12
		02	03	04	05	-	Sequential number

■ M, S, P series indoor unit

Address settings are not required for M, S, P series indoor units.

■ City Multi series indoor unit

- Rotary switch

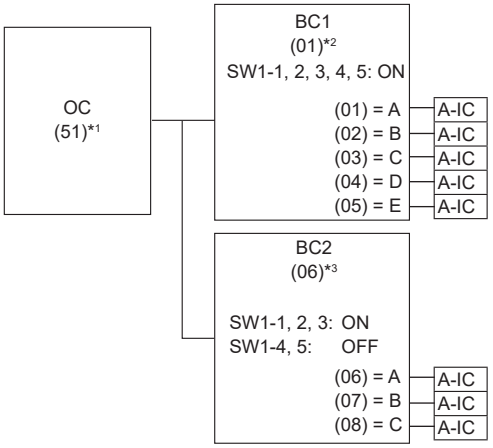


- Range: 01-50

Examples

See below for the symbols.
- OC: Outdoor unit
- BC: Branch box
- A-IC: A-Control indoor unit (M, S, P series indoor unit)
- The number in the parenthesis is an address.

Ex. 1: OC + BC1 (5 A-ICs are connected to A, B, C, D, E) + BC2 (3 A-ICs are connected to A, B, C)

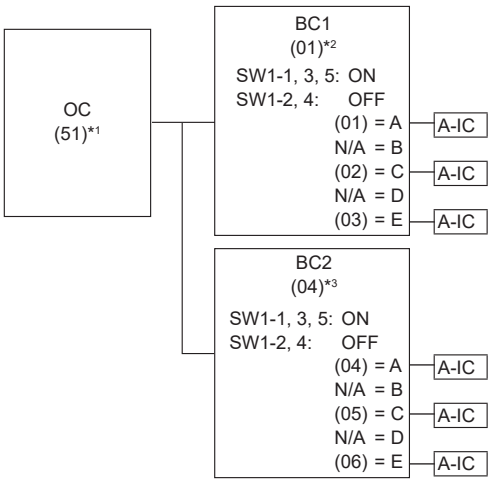


*1. OC address
Start address of BC1 + 50 = 01 + 50 = 51

*2. BC1 address
A-port address = Start address = 01
B-port address = Start address + 1 = 02
C-port address = Start address + 2 = 03
D-port address = Start address + 3 = 04
E-port address = Start address + 4 = 05

*3. BC2 address
Start address of BC2
= The largest number in the port addresses of BC1 + 1
= 05 + 1 = 06
A-port address = Start address = 06
B-port address = Start address + 1 = 07
C-port address = Start address + 2 = 08

Ex. 2: OC + BC1 (3 A-ICs are connected to A, C, E) + BC2 (3 A-ICs are connected to A, C, E)



*1. OC address
Start address of BC1 + 50 = 01 + 50 = 51

*2. BC1 address
A-port address = Start address = 01
B-port address = N/A
C-port address = Start address + 1 = 02
D-port address = N/A
E-port address = Start address + 2 = 03

*3. BC2 address
Start address of BC2
= The largest number in the port addresses of BC1 + 1
= 03 + 1 = 04
A-port address = Start address = 04
B-port address = N/A
C-port address = Start address + 1 = 05
D-port address = N/A
E-port address = Start address + 2 = 06

8. Test run

8-1. Before test run

- After completing installation, wiring, and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in power supply wiring or transmission lines, wrong polarity, and connection of a phase in the supply.
- Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1 MΩ.
- Do not carry out this test on the terminals for transmission lines (low voltage circuit).

⚠ **Warning:**
Do not use the air conditioner if the insulation resistance is less than 1 MΩ.

■ Insulation resistance

After installation or after the power source to the unit has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulation in the compressor. This is not a malfunction. Perform the following procedures.

1. Remove the wires from the compressor and measure the insulation resistance of the compressor.
2. When the insulation resistance is below 1 MΩ, the resistance may have been dropped due to refrigerant accumulation in the compressor.
3. Connect the wires to the compressor and supply power to warm up the compressor for 12 hours.
   - To operate the compressor with refrigerant accumulation, it must be warmed up at least 12 hours to prevent breakdown.
   - The resistance will rise above 1 MΩ after 12 hours when the insulation resistance has been dropped due to refrigerant accumulation.
   - The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.
4. Measure the insulation resistance again. If the insulation resistance rises above 1 MΩ, the compressor is not faulty.

⚠ **Caution:**
- The compressor will not operate unless the power supply phase connection is correct.
- When the power sources of the outdoor unit, indoor unit, and branch box are different, power the outdoor unit last.
- Turn on the power at least 12 hours before starting operation. Starting operation immediately after turning on the main power switch can result in severe damage to internal parts.
- Always keep the power on except during maintenance for safety.

Note:
- The followings must be checked as well.
  - Confirm that LED on the control board of the outdoor unit does not flash. It flashes when the outdoor unit is faulty.
  - Confirm that both the gas and liquid stop valves are completely open.

8-2. Test run

Using remote controller

Refer to the installation manual of the indoor unit for details.
- Be sure to perform the test run for each indoor unit. Make sure each indoor unit operates properly following the installation manual attached to the unit.
- If you perform the test run for all indoor units at once, you cannot detect any erroneous connection of the refrigerant pipes and the connecting wires.
- The compressor operation is not available for 3 minutes at least after the power is supplied.
- The compressor can emit noise just after turning on the power supply or when the outside temperature is low.
- Depending on the operating conditions, the outdoor unit fan may stop while the compressor is operating, but this is not a malfunction.

About the restart protective mechanism
- Once the compressor stops, the restart preventive device activates so the compressor will not operate for 3 minutes to protect the air conditioner.

en

Using SW6 in the outdoor unit

Note:
- When performing a test run from the outdoor unit, all indoor units operate. Therefore, you cannot detect any erroneous connection of refrigerant pipes and the connecting wires. If it aims at detection of any erroneous connection, be sure to carry out the test run from remote controller according to “7-2-1. Using remote controller”.

SW6 setting for test run
- Cooling operation: Set SW6-1 to ON; Set SW6-2 to OFF.
- Heating operation: Set SW6-1 to ON; Set SW6-2 to ON.

After performing the test run, set SW6-1 to OFF.
- A few seconds after the compressor starts, a clanging noise may be heard from the inside of the outdoor unit. The noise is coming from the check valve due to the small difference in pressure in the pipes. The unit is not faulty.
- To change the test run operation mode during the test run, stop the test run by turning SW6-1 to OFF first. Change the test run operation mode with SW6-2, and then resume the test run by turning SW6-1 to ON.

8-3. Refrigerant collecting (Pump down)

Perform the following procedure to collect refrigerant when moving an indoor unit or an outdoor unit.

1. Turn off the circuit breaker.
2. Connect the low pressure side of the gauge manifold to the service port of the gas side stop valve.
3. Close the liquid stop valve.
4. Supply power (circuit breaker).
   - Start-up of the indoor-outdoor communication takes about 3 minutes after the power (circuit breaker) is turned on. Start the pump-down operation after 3 to 4 minutes since the power (circuit breaker) is turned ON.
5. Perform a test run for cooling operation (SW6-1: ON and SW6-2: OFF). The compressor (outdoor unit) and ventilators (indoor and outdoor units) will start operating and the test run for cooling operation begins. Immediately after performing the test run for cooling operation, set the outdoor service switch SW6-5 (pump down switch) from OFF to ON.
   - Do not continue to operate for a long time with the switch SW6-5 set to ON. Make sure to switch it to OFF after pump down is completed.
   - Only set the SW6-1 to ON if the unit is stopped. However, even if the unit is stopped and the SW6-1 is set to ON less than 3 minutes after the compressor stops, the refrigerant collecting operation cannot be performed. Wait until compressor has been stopped for 3 minutes and then set the SW6-1 to ON again.
6. Fully close the gas stop valve when the pressure on the gauge drops 7.1 - 0.0 psig (approximately 0.5 - 0.0 kgf/cm2)
7. Stop the air conditioner operation (SW6-1: OFF and SW6-2: OFF). Set the outdoor service switch SW6-5 from ON to OFF.
8. Turn off the power supply (circuit breaker).
   - If too much refrigerant has been added to the air conditioner system, the pressure may not drop to 7.1 psig (0.5 kgf/cm2). If this occurs, use a refrigerant collecting device to collect all of the refrigerant in the system, and then recharge the system with the correct amount of refrigerant after the indoor and outdoor units have been relocated.

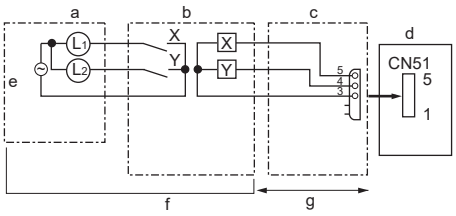
⚠ **Warning:**

- When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.
- Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.

9. Special Functions

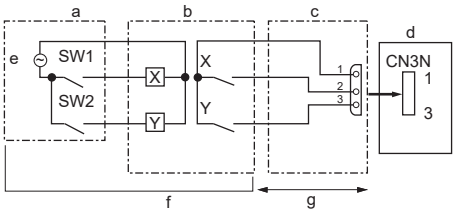
9-1. Outdoor unit input/output connector

■ **State (CN51)**



a. Remote control panel
b. Relay circuit
c. External output adapter (PAC-SA88HA-E)
d. Outdoor unit control board
e. Output power supply
f. Procure locally.
g. Max. 32 ft [10 m]
L1: Error display output
L2: Compressor operation output
X, Y: Relay (Coil rating: ≤ 0.9 W, 12 V DC)

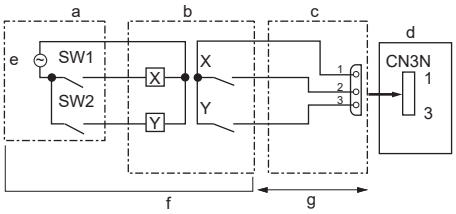
■ **Auto change over (CN3N)**



a. Remote control panel
b. Relay circuit
c. External input adapter (PAC-SC36NA-E)
d. Outdoor unit control board
e. Relay power supply
f. Procure locally.
g. Max. 32 ft [10 m]
SW1: Switch
SW2: Switch
X, Y: Relay (Contact rating: ≥ 0.1 A, 15 V DC
Minimum applicable load: ≤ 1 mA)

	ON	OFF
SW1	Heating	Cooling
SW2	Validating SW1	Invalidating SW1

■ **Silent Mode (CN3D)**



a. Remote control panel
b. Relay circuit
c. External input adapter (PAC-SC36NA-E)
d. Outdoor unit control board
e. Relay power supply
f. Procure locally.
g. Max. 32 ft [10 m]
SW1: Switch
SW2: Switch
X, Y: Relay (Contact rating: ≥ 0.1 A, 15 V DC
Minimum applicable load: ≤ 1 mA)

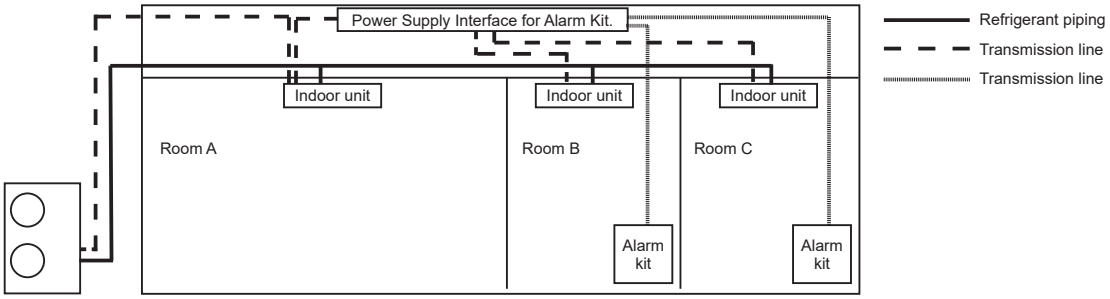
	SW1	SW2	Function
Silent mode	ON	-	Silent mode operation

9-2. Precautions when connecting the alarm kit

Connect the alarm kit to the Power Supply Interface for Alarm Kit. Maximum of 8 alarm kits can be connected to the Power Supply Interface for Alarm Kit. For installation details, refer to the manual of the alarm kit and Power Supply Interface for Alarm Kit. (Both are optional parts.)

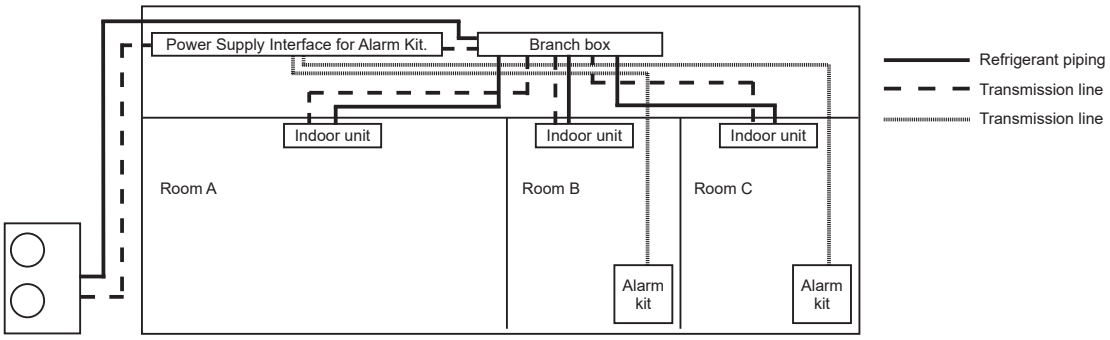
For City Multi system

- Install the Power Supply Interface for Alarm Kit above the indoor unit installed in the room where you want to install the alarm kit.
- If the indoor unit under the Power Supply Interface for Alarm Kit detects a refrigerant leak, all the alarm kits connected to the Power Supply Interface for Alarm Kit will go off.



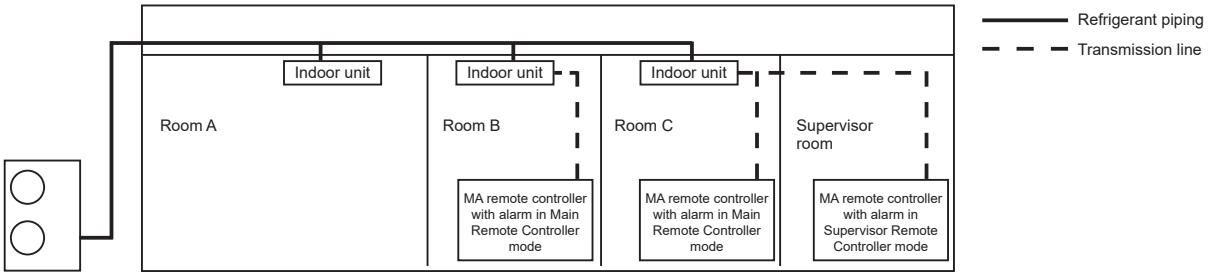
For branch box system

- Install the Power Supply Interface for Alarm Kit above the branch box connected to the indoor unit installed in the room where you want to install the alarm kit.
- If the indoor unit under the branch box to which Power Supply Interface for Alarm Kit is connected detects a refrigerant leak, all the alarm kits connected to the Power Supply Interface for Alarm Kit will go off.
- Only one Power Supply Interface for Alarm Kit can be connected per branch box.



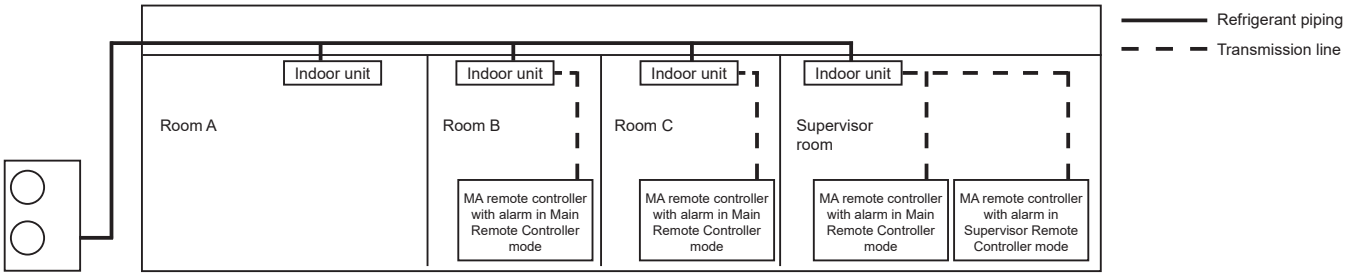
9-3. Precautions when connecting MA remote controller in Supervisor Remote Controller mode

- Install the supervisor alarm where required, such as in a hotel or hospital.
- The mode of the MA remote controller with alarm can be changed to the Main Remote Controller mode or Supervisor Remote Controller mode.
- For the setting when MA remote controller in Supervisor Remote Controller mode is connected, refer to the installation manual of the MA remote controller with alarm.



When the surpervisor room also has an indoor unit with the same refrigerant system

- When the surpervisor room also has an indoor unit with the same refrigerant system, set each MA remote controller to Supervisor Remote Controller mode and Main Remote Controller mode. Do not set both two MA remote controllers to Supervisor Remote Controller mode.
- Refer to the installation manual of the MA remote controller with alarm for details.



en

Supplier's Declaration of Conformity
47 CFR §2.1077 Compliance Information

Unique Identifier: MXZ-SM*NL(HZ)* series

Responsible Party - U.S. Contact Information
Mitsubishi Electric Trane HVAC US LLC
1340 Satellite Blvd, Suwanee, GA
30024
United States
+1-800-433-4822

FCC Compliance Statement
This device complies with part 18 of the FCC Rules.

This product is designed and intended for use in the residential, commercial and light-industrial environment.
Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO100-8310, JAPAN

Printed in Japan
RG79F667H03