MITSUBISHI ELECTRIC

R32

SERVICE MANUAL

April 2024
OCH794
REVISED EDITION-A

• Some descriptions have been changed in REVISED EDITION-A.

OCH794 is void.

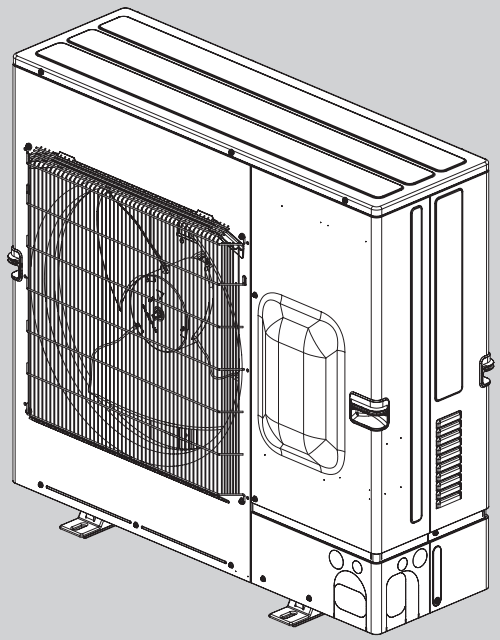
<Outdoor unit>

Model name

PUMY-SM112VKM PUMY-SM112VKM-ET
PUMY-SM125VKM PUMY-SM125VKM-ET
PUMY-SM140VKM PUMY-SM140VKM-ET
PUMY-SM112YKM PUMY-SM112YKM-ET
PUMY-SM125YKM PUMY-SM125YKM-ET
PUMY-SM140YKM PUMY-SM140YKM-ET

Salt proof model

PUMY-SM112VKM-BS PUMY-SM112VKM-ET-BS
PUMY-SM125VKM-BS PUMY-SM125VKM-ET-BS
PUMY-SM140VKM-BS PUMY-SM140VKM-ET-BS
PUMY-SM112YKM-BS PUMY-SM112YKM-ET-BS
PUMY-SM125YKM-BS PUMY-SM125YKM-ET-BS
PUMY-SM140YKM-BS PUMY-SM140YKM-ET-BS



Appendix: Installation manual (Excerpt of English Ver.)

PARTS CATALOG (OCB794)

CITY MULTI

1 SERVICE REF.

PUMY-SM112VKM.TH
PUMY-SM112VKM-ET.TH
PUMY-SM125VKM.TH
PUMY-SM125VKM-ET.TH
PUMY-SM140VKM.TH
PUMY-SM140VKM-ET.TH

PUMY-SM112YKM.TH
PUMY-SM112YKM-ET.TH
PUMY-SM125YKM.TH
PUMY-SM125YKM-ET.TH
PUMY-SM140YKM.TH
PUMY-SM140YKM-ET.TH

PUMY-SM112VKM-BS.TH
PUMY-SM112VKM-ET-BS.TH
PUMY-SM125VKM-BS.TH
PUMY-SM125VKM-ET-BS.TH
PUMY-SM140VKM-BS.TH
PUMY-SM140VKM-ET-BS.TH

PUMY-SM112YKM-BS.TH
PUMY-SM112YKM-ET-BS.TH
PUMY-SM125YKM-BS.TH
PUMY-SM125YKM-ET-BS.TH
PUMY-SM140YKM-BS.TH
PUMY-SM140YKM-ET-BS.TH

2 SAFETY PRECAUTION

2-1. Always observe for safety

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.
- Discharge the condenser before the work involving the electric parts.

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 valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.

2-2. Cautions related to new refrigerant

■ **Cautions for units utilizing refrigerant R32**

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.

Do not use refrigerant other than R32.

- If other refrigerant (R22, 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 R32 refrigerant.

- The following tools are necessary to use R32 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.
- Servicing shall be performed only as recommended by the manufacturer.

2-2-1. Warning for service

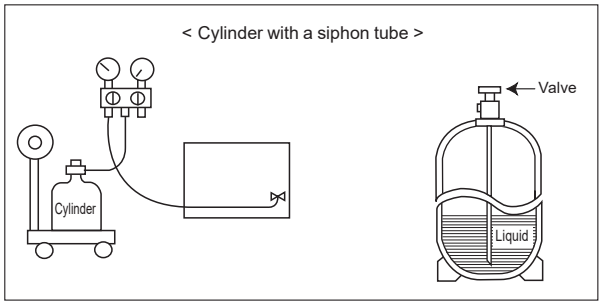
- Do not alter the unit.
- Servicing shall be performed only by methods recommended by the manufacturer.
- For installation and relocation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.
- Ask a dealer or an authorized technician to install, relocate and repair the unit.
- The appliance shall be stored so as to prevent mechanical damage from occurring.
- Be aware that refrigerants may not contain an odour.
- Pipe-work shall be protected from physical damage.
- The installation of pipe-work shall be kept to a minimum.
- Compliance with national gas regulations shall be observed.
- Keep any required ventilation openings clear of obstruction.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- Maintenance, service and repair operations shall be performed by authorized technician with required qualification.
- 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.

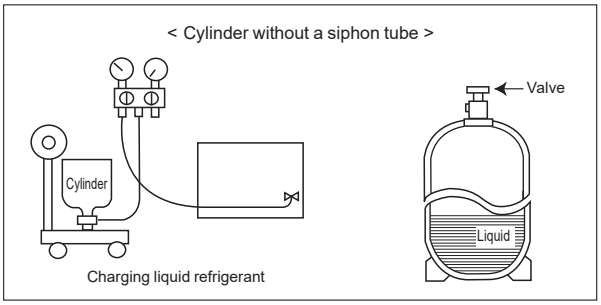
2-2-2. Cautions for service

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

2-2-3. Additional refrigerant charge

When charging directly from cylinder
R32 is a single refrigerant and its composition does not change. Therefore, both liquid charging and gas charging are possible. Liquid charging of refrigerant all at once from the low pressure side may cause the compressor malfunction. Accordingly, make sure that charging is gradual.





2-2-4. Service tools

Use the below service tools as exclusive tools for R32 refrigerant.

No.	Tool name	Specifications
1	Gauge manifold	Only for R32
		Use the existing fitting specifications. (UNF1/2)
		Use high-tension side pressure of 5.3MPa·G or over.
2	Charge hose	Only for R32
		Use pressure performance of 5.09MPa·G or over.
3	Electronic weighing scale	–
4	Gas leak detector	Use the detector for R134a, R407C, R410a or R32.
5	Adaptor for reverse flow check	Attach on vacuum pump.
6	Refrigerant charge base	–
7	Refrigerant cylinder	Only for R32
		Top of cylinder (Pink)
		Cylinder with syphon
8	Refrigerant recovery equipment	–

2-3. Precautions for salt-proof type “-BS” model

Although “-BS” model has been designed to be resistant to salt damage, observe the following precautions to maintain the performance of the unit.

- Avoid installing the unit in a location where it will be exposed directly to seawater or sea breeze.
- If the cover panel may become covered with salt, be sure to install the unit in a location where the salt will be washed away by rainwater. (If a sunshade is installed, rainwater may not clean the panel.)

- To ensure that water does not collect in the base of the outdoor unit, make sure that the base is level, not at angle. Water collecting in the base of the outdoor unit could cause rust.
- If the unit is installed in a coastal area, clean the unit with water regularly to remove any salt build-up.
- If the unit is damaged during installation or maintenance, be sure to repair it.
- Be sure to check the condition of the unit regularly.
- Be sure to install the unit in a location with good drainage.

2-4. Cautions for refrigerant piping work

New refrigerant R32 is adopted for replacement inverter series. Although the refrigerant piping work for R32 is the same as for R22, exclusive tools are necessary so as not to mix with different kind of refrigerant. Furthermore as the working pressure of R32 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 R32 is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 0.7 mm or below.)

Piping diameter and thickness

Nominal dimensions (in)	Outside diameter (mm)	Thickness (mm)	
		R32/R410A	R22
1/4	6.35	0.8	0.8
3/8	9.52	0.8	0.8
1/2	12.70	0.8	0.8
5/8	15.88	1.0	1.0
3/4	19.05	–	1.0

■ Dimensions of flare cutting and flare nut

The component molecules in HFC refrigerant are smaller compared to conventional refrigerants. In addition to that, R32 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 R32 has been specified separately from the dimensions for other refrigerants as shown below. The dimension B of flare nut for R32 also has partly been changed to increase strength as shown below. Set copper pipe correctly referring to copper pipe flaring dimensions for R32 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 ($^{0}_{-0.4}$) (mm)	
		R32/R410A	R22
1/4	6.35	9.1	9.0
3/8	9.52	13.2	13.0
1/2	12.70	16.6	16.2
5/8	15.88	19.7	19.4
3/4	19.05	–	23.3

Flare nut dimensions

Nominal dimensions (in)	Outside diameter (mm)	Dimension B ($^{0}_{-0.4}$) (mm)	
		R32/R410A	R22
1/4	6.35	17.0	17.0
3/8	9.52	22.0	22.0
1/2	12.70	26.0	24.0
5/8	15.88	29.0	27.0
3/4	19.05	–	36.0

■ Tools for R32 (The following table shows whether conventional tools can be used or not.)

Tools and materials	Use	R32 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 R32	×	×	○
Charge hose		Tool exclusive for R32	×	×	○
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R32	×	×	○
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R32	×	×	×
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R32	×	×	○

Tools and materials	Use	R32 tools	Can R22 tools be used ?	Can R407C tools be used ?	Can R410a tools be used ?
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R32	×	×	○
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 R32	×	–	×

×: Prepare a new tool. (Use the new tool as the tool exclusive for R32.)
△: Tools for other refrigerants can be used under certain conditions.
○: Tools for other refrigerants can be used.

2-5. Cautions for unit using R32 refrigerant

Basic work procedures are the same as those for conventional units using refrigerant R410A. However, pay careful attention to the following points:

1. Information on servicing

1-1. Checks on 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 systems, (1-3) to (1-7) shall be completed prior to conducting work on the systems.

1-2. Work procedure

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

1-3. 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. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

1-4. 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.

1-5. Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration 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.

1-6. No ignition sources

No person carrying out work in relation to a refrigeration 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.

1-7. 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.

1-8. Checks on the refrigeration 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 charge size 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.
- Refrigeration 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 corroded.

1-9. Checks on 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;
- no live electrical components and wiring are exposed while charging, recovering or purging the system;
- there is continuity of earth bonding

2. Repairs to sealed components

- During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
  - Ensure that the apparatus is mounted securely.
  - Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres.
  - Replacement parts shall be in accordance with the manufacturer’s specifications.

3. Repair to intrinsically safe components

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

4. 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.

5. 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.

6. Leak detection methods

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 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. For appliances containing flammable refrigerants, oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.
Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

7. 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 is followed since flammability is a consideration. The following procedure shall be adhered to:

- remove refrigerant
- purge the circuit with inert gas
- evacuate
- purge again with inert gas
- open the circuit by cutting or brazing

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times.

Compressed air or oxygen shall not be used for purging refrigerant systems.
For appliances containing flammable refrigerants, flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.
Ensure that the outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.

8. 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 upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leaktested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

9. 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 reclaimed 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 manufacturer’s 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 refrigeration system unless it has been cleaned and checked.

10. Labelling

Equipment shall be labelled stating that it has been decommissioned 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.

11. 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 are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

3 OVERVIEW OF UNITS

3-1. System construction

Outdoor unit	Horsepower	4.5 HP	5 HP	6 HP
	Model name	SM112	SM125	SM140
Applicable indoor unit	Capacity class	15 to 140		
	Number of units	1 to 12	1 to 12	1 to 12
	Total system capacity range	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 (Heat pump inverter type)														
Model type		Model name	10	15	20	25	32	40	50	63	71	80	100	125	140
Ceiling Cassette	2 by 2	PLFY-MS·VFM-E/ET		●	●	●	●	●	●						
	4-way flow	PLFY-M·VEM6-E/ET			●	●	●	●	●	●	●	●	●	●	
		PLFY-MS·VEM-E/ET			●	●	●	●	●	●		●	●	●	
Ceiling suspended		PCFY-MS·VKM-E/ET						●		●			●	●	
Wall mounted		PKFY-MS·VLM-E/ET	●	●	●	●	●	●	●						
		PKFY-MS·VKM-E/ET								●			●		
Middle static pressure		PEFY-M·VMA(L)-A1(TR)			●	●	●	●	●	●	●	●	●	●	●
		PEFY-MS·VMA(L)-A			●	●	●	●	●	●	●	●	●	●	●

Remote controller	Name	M-NET remote controller	MA remote controller
	Model name	PAR-F27MEA-E, PAR-U02MEDA	PAR-4xMAAB, PAR-4xMAA, PAR-3xMAA ("x" represents 0 or later)
	Functions	• A handy remote controller for use in conjunction with the Melans centralized management system. • Address setting is required.	• Address setting is not required.

- Authorized connectable indoor units are as follows;
  PUMY-SM112: PEFY-M50VMA-A1 + PEFY-M63VMA-A1
  PUMY-SM125: PEFY-M50VMA-A1 + PEFY-M71VMA-A1
  PUMY-SM140: PEFY-M71VMA-A1 ×2

3-2. System construction (Branch box system)

Outdoor unit	Horsepower	4.5 HP	5 HP	6 HP
	Model name	SM112	SM125	SM140
Applicable indoor unit	Capacity class	15 to 100		
	Number of units	2 to 8		
	Total system capacity range	50 to 130% of outdoor unit capacity	50 to 130% of outdoor unit capacity	50 to 130% of outdoor unit capacity
		6.3 to 16.2 kW	7.1 to 18.2 kW	8.0 to 20.2 kW
Branch box that can be connected	Number of units	1 to 2*		

* Only 1 unit can be connected to a 6-branch type branch box.

Model	System only				
	Only M, S, P series indoor units (Connection with Branch box)				
	One Branch box		Two Branch boxes		
	4-Branch box × 1	6-Branch box × 1	4-Branch box × 2	4-Branch box × 1 6-Branch box × 1	6-Branch box × 2
PUMY-SM112	2-8				Not allowed
PUMY-SM125	2-8				
PUMY-SM140	2-8				

Connectable indoor unit lineup (Heat pump inverter type)													
Model type		Model name	15	18	20	22	25	35	42	50	60	71	100
Wall mounted		MSZ-RW·VG(-E1/ER1/ET1)								●			
		MSZ-LN·VG2(-E1/ER1/ET1)					●	●		●			
		MSZ-AP·VG					●	●	●	●			
		MSZ-AP·VG(K)-E2/E7					●	●	●	●			
		MSZ-AY·VGK(P)-E1					●	●	●	●			
		MSZ-EF·VG(-E1/ER1/ET1)		●		●	●	●	●	●			
		MSZ-EF·VG(-E2/ER2/ET2)		●		●	●	●	●	●			
		MSZ-EF·VGK(-E1/ER1/ET1)		●		●	●	●	●	●			
		MSZ-BT·VG(K)(-E1/ER1/ET1)					●	●					
	Compact	MSZ-AP·VG(-E1/ER1/ET1)	●		●								
		MSZ-AP·VG(-E2/ER2/ET2)	●		●								
		MSZ-AP·VGK(-E1/ER1/ET1)	●		●								
Ceiling cassette	1-way flow	MLZ-KY·VG(-E1/ER1/ET1)			●								
		MLZ-KP·VF(-E1/ER1)					●	●		●			
	2 by 2 type	SLZ-M·FA2(-ET/ER)	●				●	●		●			
	4-way flow	PLA-M·EA2(-ET/ER)						●		●	●	●	●
Ceiling suspended		PCA-M·KA2(-ET/ER)						●		●	●	●	●
Ceiling concealed	Middle static pressure	PEAD-M·JA(L)2(-ET/ER)								●	●	●	●
	Compact	SEZ-M·DA(L)2(-ET/ER)					●	●		●	●	●	

Note:
- The lineup of a connectable indoor unit depends on a district/areas/country.

Branch box	PAC-MMK60BC	PAC-MMK40BC
Number of branches (Indoor unit that can be connected)	6 (MAX. 6 units)	4 (MAX. 4 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.

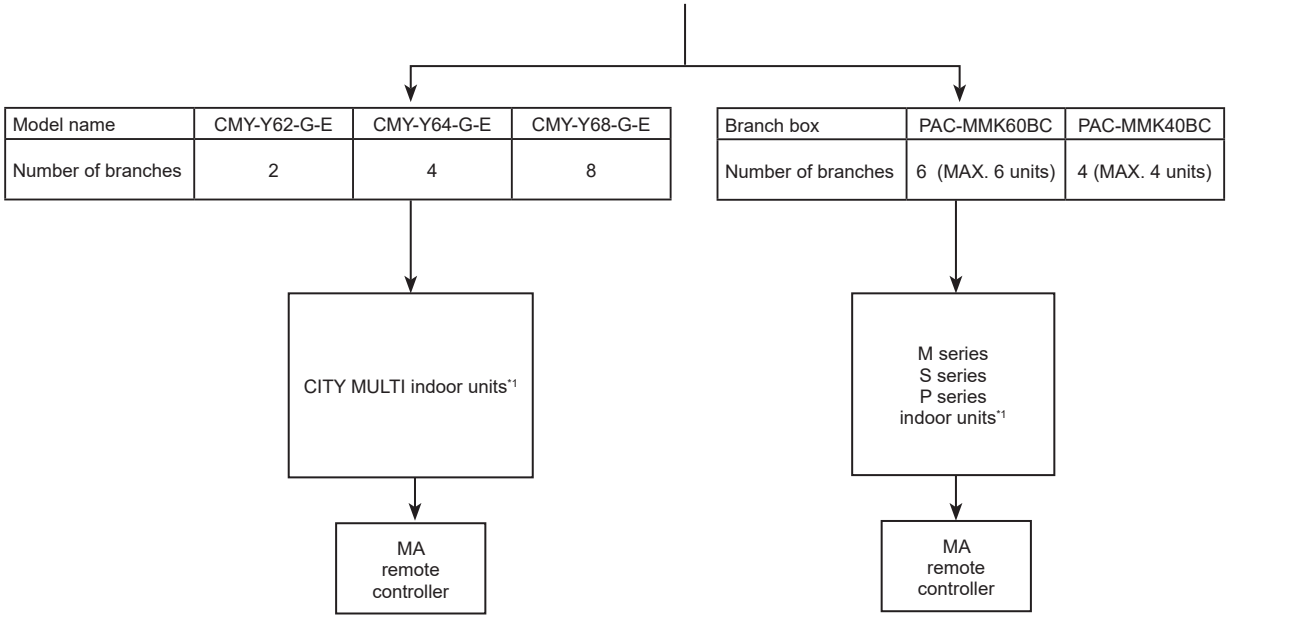
3-3. System construction (Mixed system)

Model	System only
	CITY MULTI indoor units only (Connection without Branch box)
PUMY-SM112	1-12
PUMY-SM125	1-12
PUMY-SM140	1-12

Model	Mixed system									
	One Branch box				Two Branch boxes					
	4-Branch box × 1		6-Branch box × 1		4-Branch box × 2		4-Branch box × 1 6-Branch box × 1		6-Branch box × 2	
	M, S, P	CITY MULTI	M, S, P	CITY MULTI	M, S, P	CITY MULTI	M, S, P	CITY MULTI	M, S, P	CITY MULTI
PUMY-SM112	Max. 4	Max. 5	Max. 6	Max. 3	Max. 8	Max. 3	Max. 8	Max. 2	Not allowed	
PUMY-SM125	Max. 4	Max. 5	Max. 6	Max. 3	Max. 8	Max. 3	Max. 8	Max. 2		
PUMY-SM140	Max. 4	Max. 5	Max. 6	Max. 3	Max. 8	Max. 3	Max. 8	Max. 2		

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

Branch box	PAC-MMK60BC	PAC-MMK40BC
Number of branches	6 (MAX. 6 units)	4 (MAX. 4 units)



*1. Refer to “System construction” or “System construction (Branch box system)”, for more detail.

3-4. System Specifications

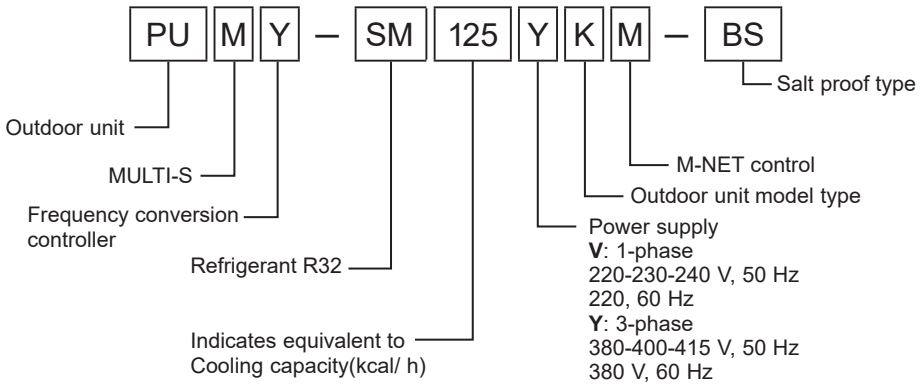
3-4-1. Outdoor Unit

Outdoor unit	Model name	SM112	SM125	SM140
Capacity	Cooling (kW)	12.5	14.0	15.5
	Heating (kW)	14.0	16.0	17.5

Cooling/Heating capacity indicates the maximum value at operation under the following condition.
Cooling Indoor: D.B. 27°C/W.B. 19°C
Outdoor: D.B. 35°C
Heating Indoor: D.B. 20°C
Outdoor: D.B. 7°C/W.B. 6°C

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

■ Outdoor unit <When using model 125>



3-4-3. Operating temperature range

	Cooling		Heating	
	Branch box (M,S,P series)	CITY MULTI	Branch box (M,S,P series)	CITY MULTI
Indoor intake air temperature	W.B. 15 to 23°C	W.B. 15 to 24°C	D.B. 20 to 27°C	D.B. 17 to 28°C
Outdoor intake air temperature	D.B. 10 to 52°C	D.B. -15 to 52°C *1, *2	D.B. −20 to 21°C W.B. −20 to 15°C	

*1. This is applied when an optional air guide is attached. The guaranteed lowest temperature is normally -5°C.
*2. A guaranteed outdoor lowest temperature is 15°C when the following indoor units are connected: PKFY-*VLM or PKFY-*VKM.

D.B.: Dry Bulb Temperature
W.B.: Wet Bulb Temperature

4 SPECIFICATIONS

Model					PUMY-SM112VKM(-BS) PUMY-SM112VKM-ET(-BS)	PUMY-SM125VKM(-BS) PUMY-SM125VKM-ET(-BS)	PUMY-SM140VKM(-BS) PUMY-SM140VKM-ET(-BS)
Power source					1-phase 220-230-240 V, 50 Hz; 1-phase 220 V, 60 Hz		
Cooling capacity (Nominal)*1		kW			12.5	14.0	15.5
		kcal/h			10,750	12,040	13,330
		Btu/h			42,650	47,768	52,886
	Power input	kW			3.32	4.19	4.81
	Current input	A			15.40 / 14.73 / 14.12	19.43 / 18.59 / 17.81	22.45 / 21.47 / 20.58
	COP	kW/kW			3.76	3.34	3.22
Temp. range of cooling	Indoor	W.B.			15 to 24°C *7		
	Outdoor	D.B.			-5 to 52°C *3		
Heating capacity (Nominal)*2		kW			14.0	16.0	17.5
		kcal/h			12,040	13,760	15,050
		Btu/h			47,768	54,592	59,712
	Power input	kW			3.33	3.73	4.15
	Current input	A			15.45 / 14.77 / 14.16	17.30 / 16.55 / 15.86	19.25 / 18.41 / 17.64
	COP	kW/kW			4.20	4.28	4.21
Temp. range of heating	Indoor	D.B.			17 to 28°C *8		
	Outdoor	W.B.			−20 to 15°C		
Indoor unit connectable	Total capacity				50 to 130% of outdoor unit capacity		
	Model/ Quantity	CITY MULTI			M/MS10 - M/MS140/12		
		Branch box*4			M/S/P15 - M/S/P100/8		
		Mixed system	4-Branch box 1 unit	CITY MULTI	M/MS10-M/MS140/5		
				Branch box	M/S/P15-M/S/P140/4		
			6-Branch box 1 unit	CITY MULTI	M/MS10-M/MS140/3		
				Branch box	M/S/P15-M/S/P140/6		
			4-Branch box 2 unit	CITY MULTI	M/MS10-M/MS140/3		
				Branch box	M/S/P15-M/S/P140/8		
			4-Branch box 1 unit + 6-Branch box 1 unit	CITY MULTI	M/MS10-M/MS140/2		
				Branch box	M/S/P15-M/S/P140/8		
Sound pressure level (SPL) (measured in anechoic room)		dB		Cooling	52	53	54
				Heating	54	56	56
Sound power level (PWL) (measured in anechoic room)		dB		Cooling	72	73	74
				Heating	74	76	76
Refrigerant piping diameter	Liquid pipe	mm (in)			9.52 (3/8)		
	Gas pipe	mm (in)			15.88 (5/8)		
Fan	Type × Quantity				Propeller Fan x 1		
	Airflow rate	m³/min			77	83	83
		L/s			1,283	1,383	1,383
		cfm			2,719	2,931	2,931
	Control, Driving mechanism				DC control		
	Motor output	kW			0.20 × 1		
	External static press.				0 Pa/30 Pa*5		
Compressor	Type × Quantity				Twin rotary hermetic compressor x 1		
	Manufacturer				Mitsubishi Electric Corporation		
	Starting method				Inverter		
	Capacity control	%		Cooling	26 to 100	24 to 100	21 to 100
				Heating	20 to 100	18 to 100	17 to 100
	Motor output	kW			3.1	3.5	3.7
	Case heater	kW			0		
	Lubricant				FW68CA (1.4 liter)		
External finish					Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1		
External dimension H × W × D		mm			981 × 1,050 × 330 (+40)		
		in			38-5/8 × 41-3/8 × 13 (+1-37/64)		
Protection devices	High pressure protection				High pressure switch		
	Inverter circuit (COMP./FAN)				Overcurrent detection, Overheat detection (Heat sink thermistor)		
	Compressor				Compressor thermistor, Overcurrent detection		
	Fan motor				Overheating, Voltage protection,		
Refrigerant	Type × original charge				R32 3.0 kg		
	Control				Linear expansion valve		
Net weight		kg (lb)			95 (209)*6		
Heat exchanger					Cross Fin and Copper tube		
HIC circuit (HIC: Heat Inter-Changer)					HIC circuit		
Defrosting method					Reversed refrigerant circuit		
Standard attachment	Document				Installation Manual		
	Accessory				Grounded lead wire, Muffler, Joint pipe-L		
Optional parts					Joint: CMY-Y62-G-E, Header: CMY-Y64/68-G-E		

Remarks

*1. Nominal cooling conditions:
Indoor: 27°C D.B./19°C W.B. [81°F D.B/66°F W.B.]
Outdoor: 35°C D.B. [95°F D.B.]
Pipe length: 7.5 m [24-9/16 ft]
Level difference: 0 m [0 ft]

*2. Nominal heating conditions:
Indoor: 20°C D.B. [68°F D.B.]
Outdoor: 7°C DB/6°C W.B. [45°F D.B./43°F W.B.]
Pipe length: 7.5 m [24-9/16 ft]
Level difference: 0 m [0 ft]

*3. −15 to 52°C D.B. [50 to 126°F D.B.] when using an optional air protect guide [PAC-SH95AG-E]
10 to 52°C D.B. when the following indoor units are connected: M/S/P series type indoor unit
15 to 52°C D.B. when the following indoor units are connected: PKFY*VLM or PKFY*VKM

*4. At least two indoor units must be connected when using branch box.

*5. It is possible to set the external static pressure to 30 Pa by Dip Switch.

*6. 96 (211), for PUMY-SM112/125/140VKM-BS.TH

*7. 15 to 23°C W.B. [59 to 73°F W.B.] when using branch box (M/S/P series)

*8. 20 to 27°C D.B. [68 to 81°F W.B.] when using branch box (M/S/P series)

Notes:

- Nominal conditions *1, *2 are subject to ISO 15042.
- 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.

Model					PUMY-SM112YKM(-BS) PUMY-SM112YKM-ET(-BS)			PUMY-SM125YKM(-BS) PUMY-SM125YKM-ET(-BS)			PUMY-SM140YKM(-BS) PUMY-SM140YKM-ET(-BS)		
Power source					3-phase 380-400-415 V, 50 Hz; 3-phase 380 V, 60 Hz								
Cooling capacity (Nominal)*1		kW			12.5			14.0			15.5		
		kcal/h			10,750			12,040			13,330		
		Btu/h			42,650			47,768			52,886		
	Power input	kW			3.32			4.19			4.81		
	Current input	A			5.31	5.04	4.86	6.70	6.37	6.14	7.74	7.35	7.09
	COP	kW/kW			3.76			3.34			3.22		
Temp. range of cooling	Indoor	W.B.			15 to 24°C *7								
	Outdoor	D.B.			-5 to 52°C *3								
Heating capacity (Nominal)*2		kW			14.0			16.0			17.5		
		kcal/h			12,040			13,760			15,050		
		Btu/h			47,768			54,592			59,712		
	Power input	kW			3.33			3.73			4.15		
	Current input	A			5.33	5.06	4.88	5.97	5.67	5.46	6.64	6.31	6.08
	COP	kW/kW			4.20			4.28			4.21		
Temp. range of heating	Indoor	D.B.			17 to 28°C *8								
	Outdoor	W.B.			−20 to 15°C								
Indoor unit connectable	Total capacity				50 to 130% of outdoor unit capacity								
	Model/ Quantity	CITY MULTI			M/MS10 - M/MS140/12								
		Branch box*4			M/S/P15 - M/S/P100/8								
		Mixed system	4-Branch box 1 unit	CITY MULTI	M/MS10-M/MS140/5								
				Branch box	M/S/P15-M/S/P140/4								
			6-Branch box 1 unit	CITY MULTI	M/MS10-M/MS140/3								
				Branch box	M/S/P15-M/S/P140/6								
			4-Branch box 2 unit	CITY MULTI	M/MS10-M/MS140/3								
				Branch box	M/S/P15-M/S/P140/8								
			4-Branch box 1 unit + 6-Branch box 1 unit	CITY MULTI	M/MS10-M/MS140/2								
				Branch box	M/S/P15-M/S/P140/8								
Sound pressure level (SPL) (measured in anechoic room)		dB		Cooling	52			53			54		
				Heating	54			56			56		
Sound power level (PWL) (measured in anechoic room)		dB		Cooling	72			73			74		
				Heating	74			76			76		
Refrigerant piping diameter	Liquid pipe	mm (in)			9.52 (3/8)								
	Gas pipe	mm (in)			15.88 (5/8)								
Fan	Type × Quantity				Propeller Fan x 1								
	Airflow rate	m³/min			77			83			83		
		L/s			1,283			1,383			1,383		
		cfm			2,719			2,931			2,931		
	Control, Driving mechanism				DC control								
	Motor output	kW			0.20 × 1								
	External static press.				0 Pa/30 Pa*5								
Compressor	Type × Quantity				Twin rotary hermetic compressor x 1								
	Manufacturer				Mitsubishi Electric Corporation								
	Starting method				Inverter								
	Capacity control	%		Cooling	26 to 100			24 to 100			21 to 100		
				Heating	20 to 100			18 to 100			17 to 100		
	Motor output	kW			3.1			3.5			3.7		
	Case heater	kW			0								
	Lubricant				FW68CA (1.4 liter)								
External finish					Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1								
External dimension H × W × D		mm			981 × 1,050 × 330 (+40)								
		in			38-5/8 × 41-3/8 × 13 (+1-37/64)								
Protection devices	High pressure protection				High pressure switch								
	Inverter circuit (COMP./FAN)				Overcurrent detection, Overheat detection (Heat sink thermistor)								
	Compressor				Compressor thermistor, Overcurrent detection								
	Fan motor				Overheating, Voltage protection,								
Refrigerant	Type × original charge				R32 3.0 kg								
	Control				Linear expansion valve								
Net weight		kg (lb)			97 (213)*6								
Heat exchanger					Cross Fin and Copper tube								
HIC circuit (HIC: Heat Inter-Changer)					HIC circuit								
Defrosting method					Reversed refrigerant circuit								
Standard attachment	Document				Installation Manual								
	Accessory				Grounded lead wire, Muffler, Joint pipe-L								
Optional parts					Joint: CMY-Y62-G-E, Header: CMY-Y64/68-G-E								

Remarks

*1. Nominal cooling conditions:
Indoor: 27°C D.B./19°C W.B. [81°F D.B/66°F W.B.]
Outdoor: 35°C D.B. [95°F D.B.]
Pipe length: 7.5 m [24-9/16 ft]
Level difference: 0 m [0 ft]

*2. Nominal heating conditions:
Indoor: 20°C D.B. [68°F D.B.]
Outdoor: 7°C DB/6°C W.B. [45°F D.B./43°F W.B.]
Pipe length: 7.5 m [24-9/16 ft]
Level difference: 0 m [0 ft]

*3. −15 to 52°C D.B. [50 to 126°F D.B.], when using an optional air protect guide [PAC-SH95AG-E]
10 to 52°C D.B. when the following indoor units are connected: M/S/P series type indoor unit
15 to 52°C D.B. when the following indoor units are connected: PKFY*VLM or PKFY*VKM

*4. At least two indoor units must be connected when using branch box.

*5. It is possible to set the external static pressure to 30 Pa by Dip Switch.

*6. 98 (216), for PUMY-SM112/125/140YKM-BS.TH

*7. 15 to 23°C W.B. [59 to 73°F W.B.] when using branch box (M/S/P series)

*8. 20 to 27°C D.B. [68 to 81°F W.B.] when using branch box (M/S/P series)

Notes:

- Nominal conditions *1, *2 are subject to ISO 15042.
- 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.

5 DATA

5-1. Selection of indoor and outdoor units

5-1-1. Cooling

Design condition		
Outdoor dry bulb temperature		45ºC
Total cooling load		12.6 kW
Room 1	Indoor dry bulb temperature	27ºC
	Indoor wet bulb temperature	20ºC
	Cooling load	4.6 kW
Room 2	Indoor dry bulb temperature	24ºC
	Indoor wet bulb temperature	18ºC
	Cooling load	8.0 kW
Other	Indoor/Outdoor piping equivalent length	60 m

Capacity of indoor unit

P·FY series	Model class of indoor unit	10	15	—	20	—	25	32	—	40	—	50	—	63	71	80	100	125	140
	Model capacity (kW)	1.2	1.7	—	2.2	—	2.8	3.6	—	4.5	—	5.6	—	7.1	8.0	9.0	11.2	14.0	16.0
M series S series P series	Model class of indoor unit	—	15	18	20	22	25	—	35	—	42	50	60	—	71	80	100	—	—
	Model capacity (kW)	—	1.5	1.8	2.0	2.2	2.5	—	3.5	—	4.2	5.0	6.0	—	7.1	8.0	10.0	—	—

■ **Cooling calculation**

- Tentative selection of indoor units
  Room1: PEFY-M50 5.6 kW (Rated)
  Room2: PEFY-M71 8.0 kW (Rated)
  In this case, the total capacity is 13.6. (5.6 + 8.0 = 13.6)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is SM125 as the total capacity of the indoor units is 13.6.
  PUMY-SM125 14.0 kW (Rated)
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor design wet bulb temperature: Room 1 (20°C) 1.03 (Refer to Figure 1.)
  Room 2 (18°C) 0.94 (Refer to Figure 1.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 5.6 × 1.03 + 8.0 × 0.94
  = 13.3 kW
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (45°C) 0.86 (Refer to Figure 2 in 4-2-1.)
  Correction factor for piping length (60 m) 0.90 (Refer to Figure 2 in 4-2-1.)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length
  = 14.0 × 0.86 × 0.90
  = 10.8 kW
- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 13.3 > CTo = 10.8, thus, select CTo.
  CTx = CTo = 10.8 kW
- Comparison with essential load
  Against the essential load 10.6 kW, the maximum system capacity is 10.8 kW: A proper outdoor unit is 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
  = 10.8 × (5.6 × 1.03)/13.3
  = 4.7 kW
  The capacity is enough for the cooling load of Room 1 (4.6 kW): A proper indoor unit is selected.
  Room2: CTx × Corrected capacity for Room2/CTi
  = 10.8 × (8.0 × 0.94)/13.3
  = 6.1 kW
  The capacity is enough for the cooling load of Room 2 (6.0 kW): A proper indoor unit is selected.

Note:

- If CTx = CTi, refer to the calculation formula in "Heating" to calculate the maximum indoor unit capacity of each room.
- 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		2°C
Total heating load		13.2 kW
Room 1	Indoor dry bulb temperature	23°C
	Heating load	5.4 kW
Room 2	Indoor dry bulb temperature	23°C
	Heating load	7.8 kW
Other	Indoor/Outdoor piping equivalent length	60 m

Capacity of indoor unit

P·FY series	Model class of indoor unit	10	15	—	20	—	25	32	—	40	—	50	—	63	71	80	100	125	140
	Model Capacity (kW)	1.4	1.9	—	2.5	—	3.2	4.0	—	5.0	—	6.3	—	8.0	9.0	10.0	12.5	16.0	18.0
M series S series P series	Model class of indoor unit	—	15	18	20	22	25	—	35	—	42	50	60	—	71	80	100	—	—
	Model Capacity (kW)	—	1.7	2.1	2.3	2.5	2.9	—	4.0	—	4.8	5.7	6.9	—	8.1	9.3	11.2	—	—

■ Heating calculation

- Tentative selection of indoor units
  Room1: PEFY-M50 6.3 kW.(Rated)
  Room2: PEFY-M71 9.0 kW.(Rated)
  In this case, the total capacity is 15.3. (6.3 + 9.0 = 15.3)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is SM125 as the total capacity of the indoor units is 15.3.
  PUMY-SM125 16.0 kW
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor temperature: Room 1 (23°C) 0.88 (Refer to Figure 3.)
  Room 2 (23°C) 0.88 (Refer to Figure 3.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 6.3 × 0.88 + 9.0 × 0.88
  = 13.5 kW
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (2°C WB) 1.00 (Refer to Figure 4.)
  Correction factor for piping length (60 m) 0.96 (Refer to "Correcting Capacity".)
  Correction factor for defrosting 0.89 (Refer to Table 1.)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length × Correction factor for defrosting
  = 16.0 × 1.00 × 0.96 × 0.89
  = 13.7 kW

Table 1 Table of correction factor for frosting and defrosting

Outdoor inlet air temp. (°C)	6	4	2	0	-2	-4	-6	-8	-10	-15	-20
Correction factor	1.00	0.91	0.83	0.82	0.83	0.84	0.89	0.89	0.89	0.89	0.89

- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 13.5 < CTo = 13.7, thus, select CTi.
  CTx = CTi = 13.5 kW
- Comparison with essential load
  Against the essential load 13.2 kW, the maximum system capacity is 13.5 kW: Proper indoor units have been 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 temperature
  = 6.3 × 0.88
  = 5.5 kW
  The capacity is enough for the heating load of Room 1 (5.4 kW): A proper indoor unit is selected.
  Room2: Rated capacity of indoor unit × Corrected capacity for the indoor design temperature
  = 9.0 × 0.88
  = 7.9 kW
  The capacity is enough for the heating load of Room 2 (7.8 kW): A proper indoor unit is selected.

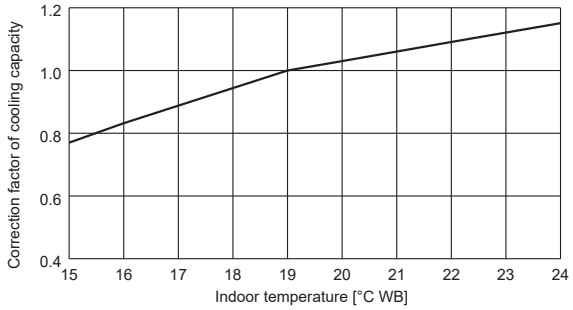
Note:

- If CTx = CTo, refer to the calculation formula in "Cooling" to calculate the maximum indoor unit capacity of each room.
- The selection of units is completed when proper units are selected.

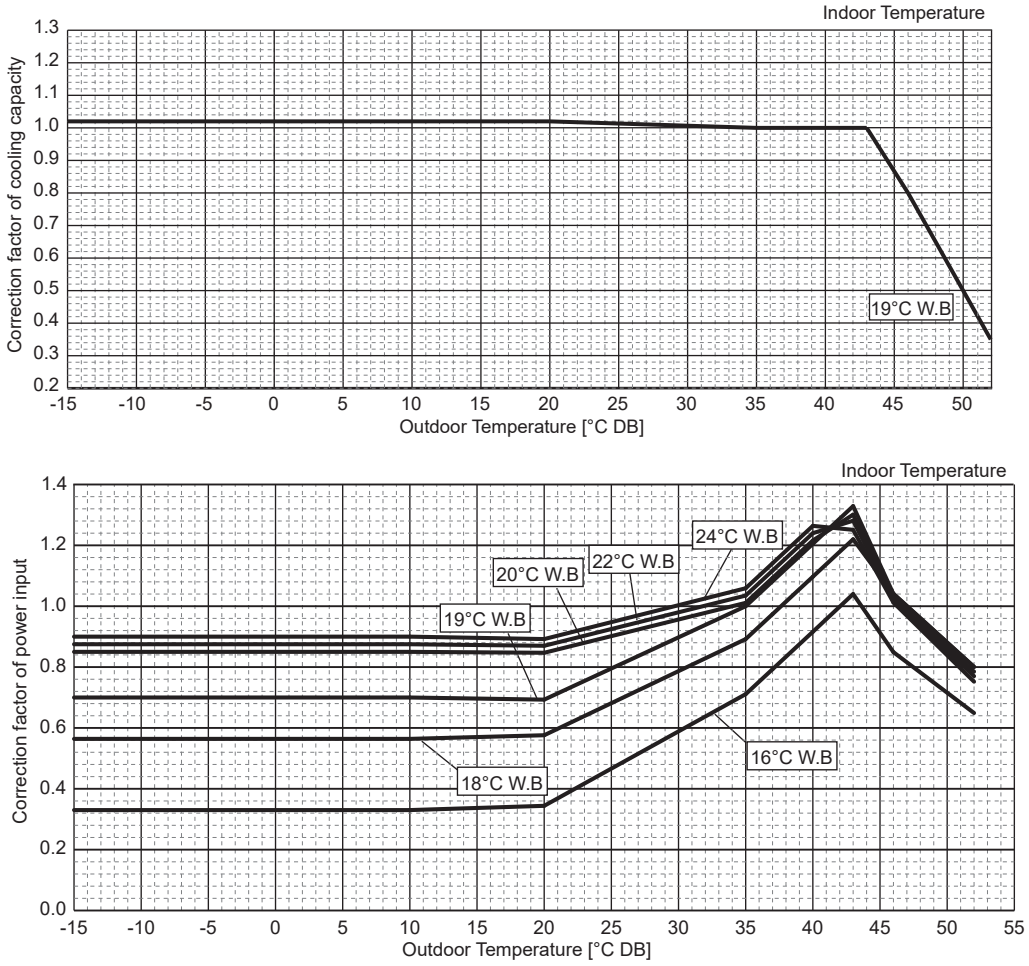
5-2. Correction by temperature

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

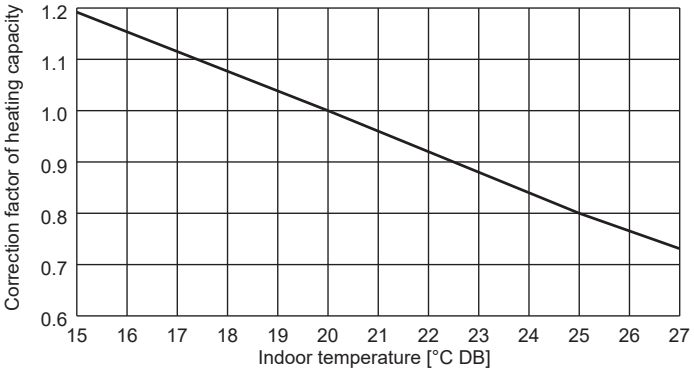


<Figure 1> Indoor unit temperature correction

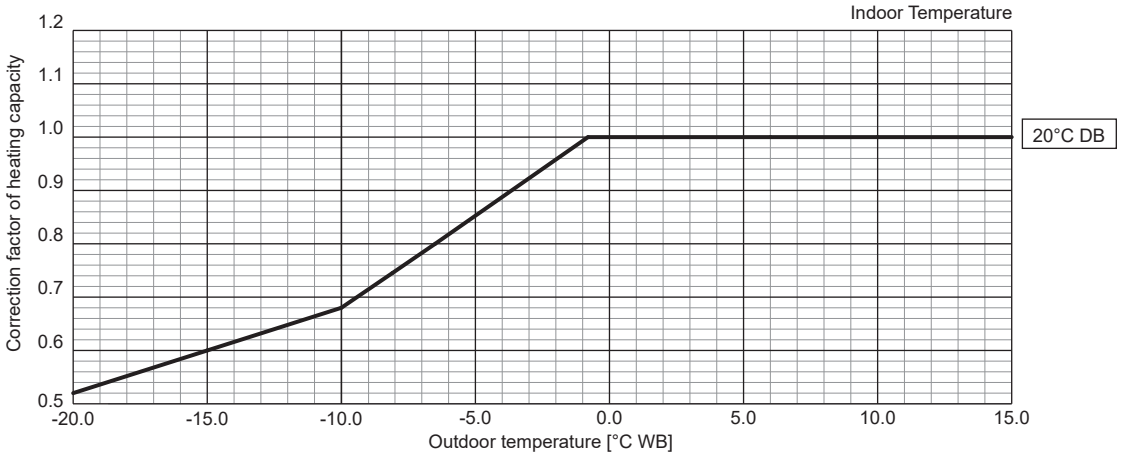


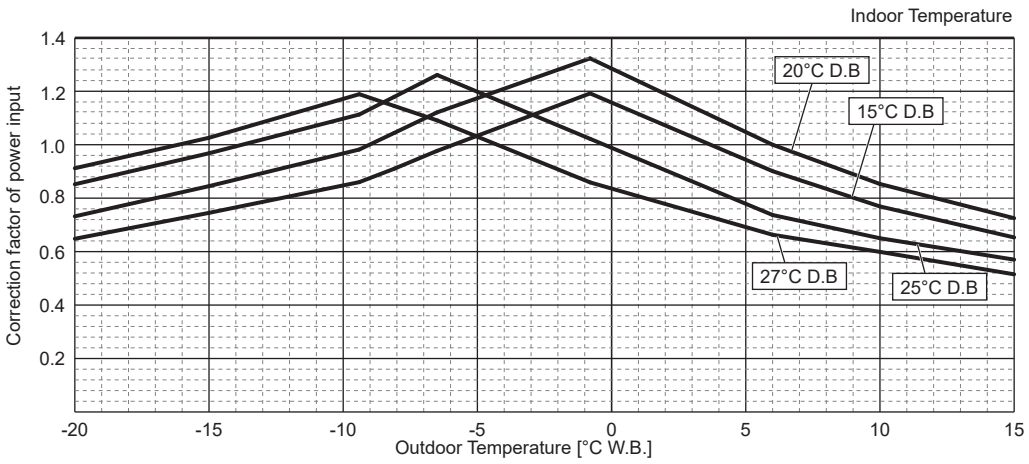
<Figure 2> Outdoor unit temperature correction

5-2-2. Heating



<Figure 3> Indoor unit temperature correction





<Figure 4> Outdoor unit temperature correction

5-3. Standard operation data (Reference data)

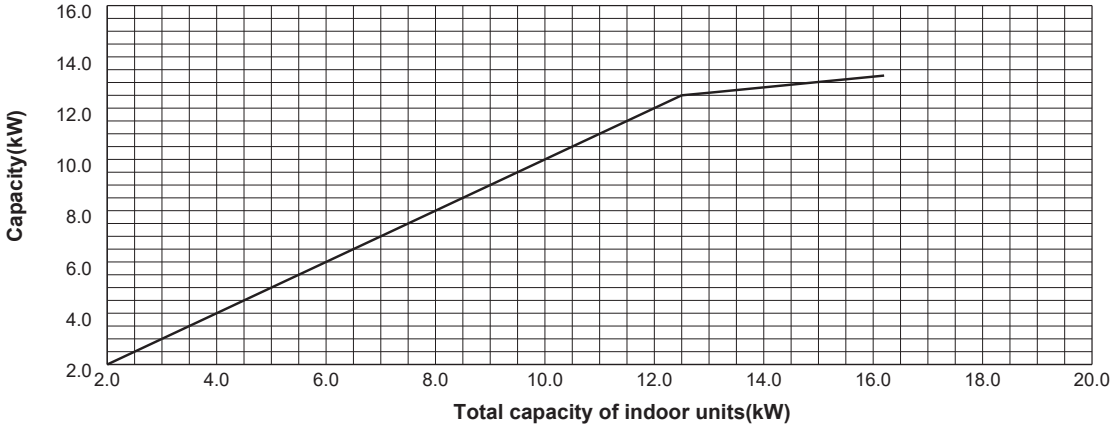
Operation				SM112		SM125		SM140	
Operating conditions	Ambient temperature	Indoor	DB/ WB	27°C/19°C	20°C/—	27°C/19°C	20°C/—	27°C/19°C	20°C/—
		Outdoor		35°C	7°C/6°C	35°C	7°C/6°C	35°C	7°C/6°C
	Indoor unit	No. of connected units	Unit	2		2		2	
		No. of units in operation		2		2		2	
		Model	—	50 × 1/63 × 1		50 × 1/71 × 1		71 × 2	
	Piping	Main pipe	m	5		5		5	
		Branch pipe		2.5		2.5		2.5	
		Total pipe length		10		10		10	
	Fan speed		—	Hi		Hi		Hi	
	Amount of refrigerant		kg	4.8		4.8		4.8	
Outdoor unit	Electric current		A	VKM 15.40 YKM 5.31	VKM 15.45 YKM 5.33	VKM 19.43 YKM 6.70	VKM 17.30 YKM 5.97	VKM 22.45 YKM 7.74	VKM 19.25 YKM 6.64
	Voltage		V	VKM 230 YKM 400		VKM 230 YKM 400		VKM 230 YKM 400	
	Compressor frequency		Hz	55	67	63	73	72	81
LEV opening	Indoor unit		Pulse	247	462	209	301	200	278
Pressure	High pressure/Low pressure		MPaG	2.90/1.00	2.30/0.70	2.93/0.97	2.31/0.63	3.12/0.92	2.17/0.60
Temp. of each section	Outdoor unit	Discharge	°C	80.6	58.1	81.4	59.7	82.2	60.2
		Heat exchanger outlet		40.7	1.3	38.4	0.2	43.3	-0.4
		Accumulator inlet		9.8	-0.1	11.3	0.0	9.3	-1.6
		Compressor inlet		10.4	-0.6	9.3	-3.4	8.6	-2.1
	Indoor unit	LEV inlet		32.4	34.0	33.3	31.7	34.2	28.4
		Heat exchanger inlet		12.8	49.2	14.0	49.2	14.4	50.4

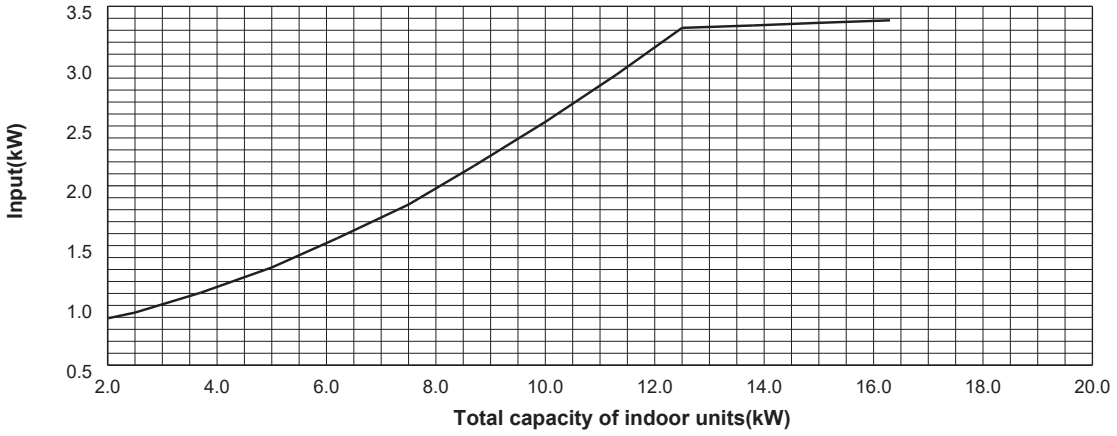
5-4. Standard capacity diagram

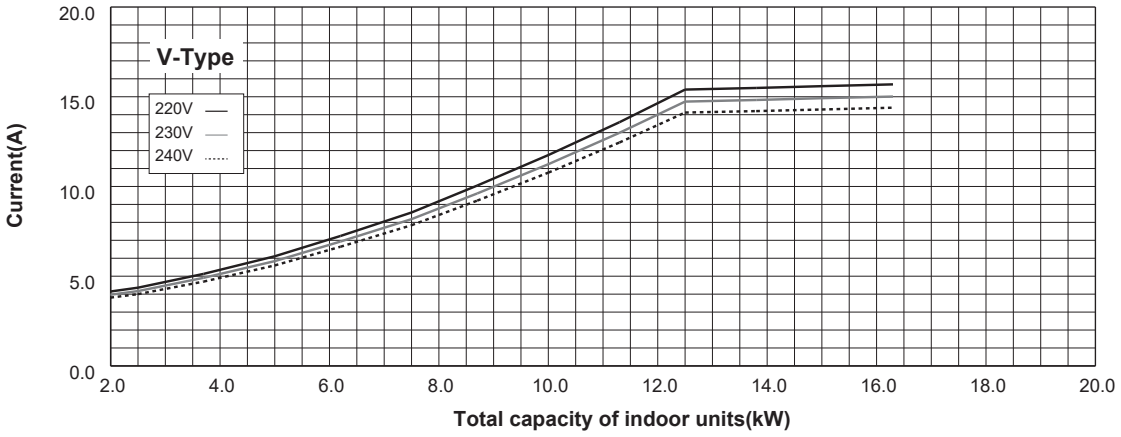
Before calculating the sum of total capacity of indoor units, please convert the value into the kW model capacity following the formula on "5-1. Selection of indoor and outdoor units".

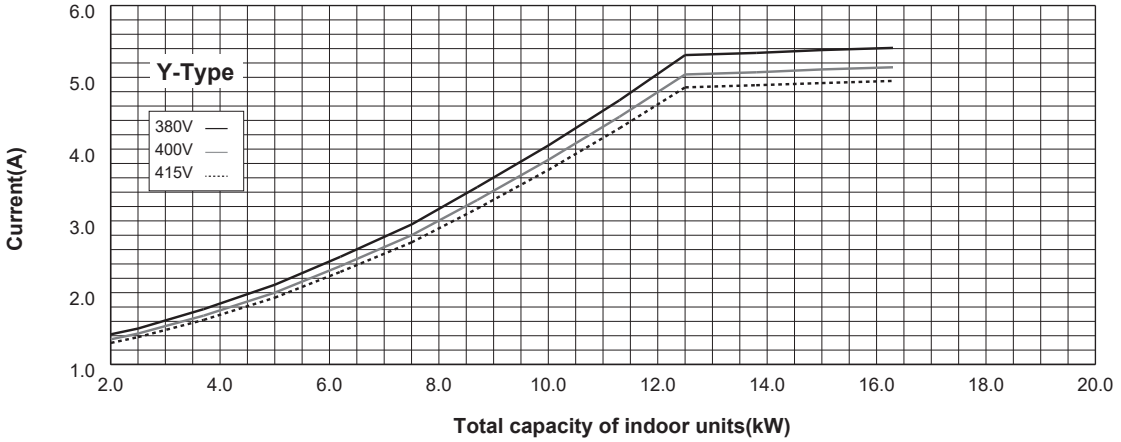
PUMY-SM112

■ **Cooling**

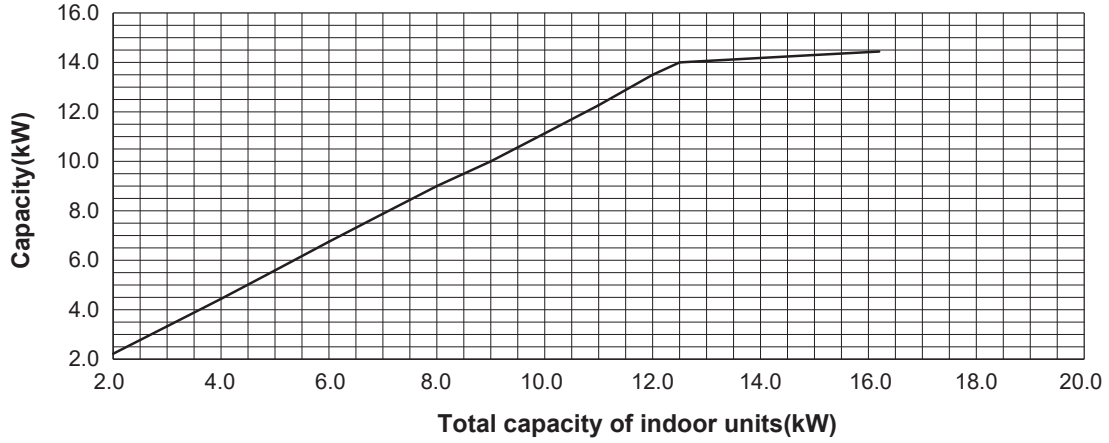


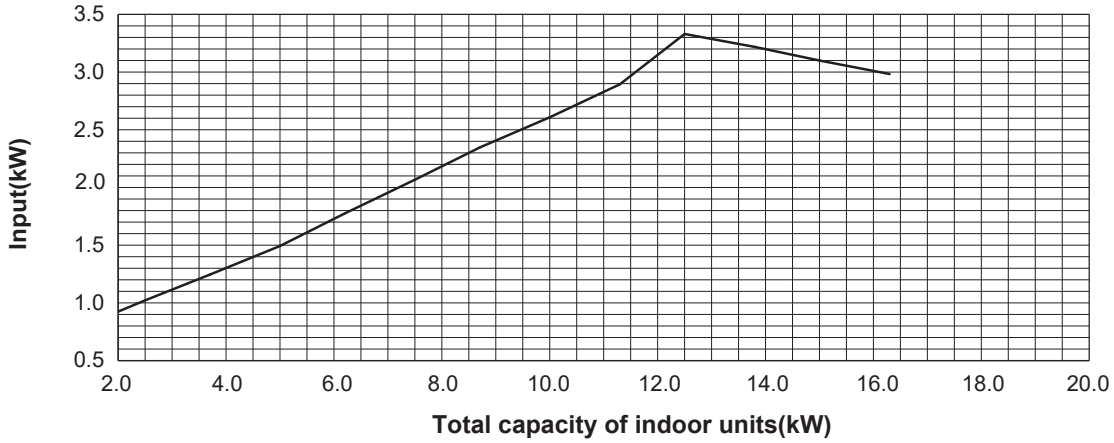


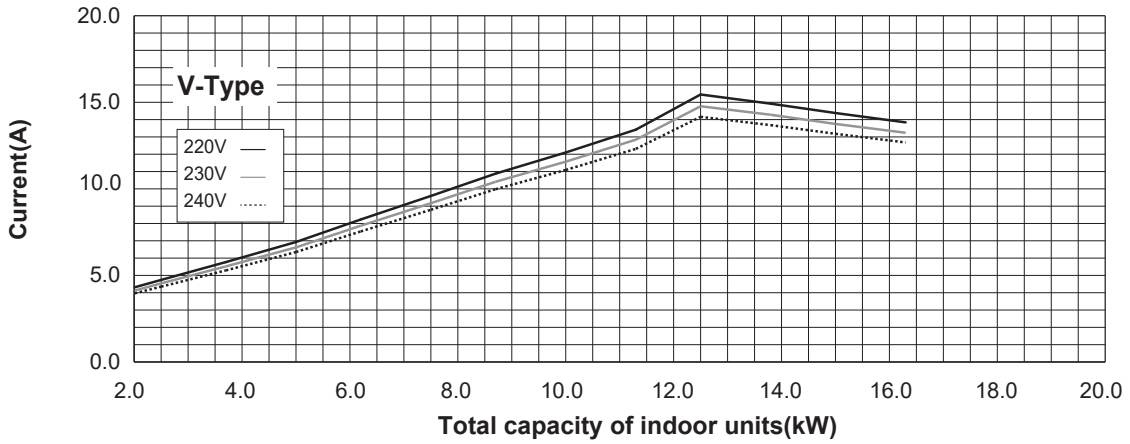


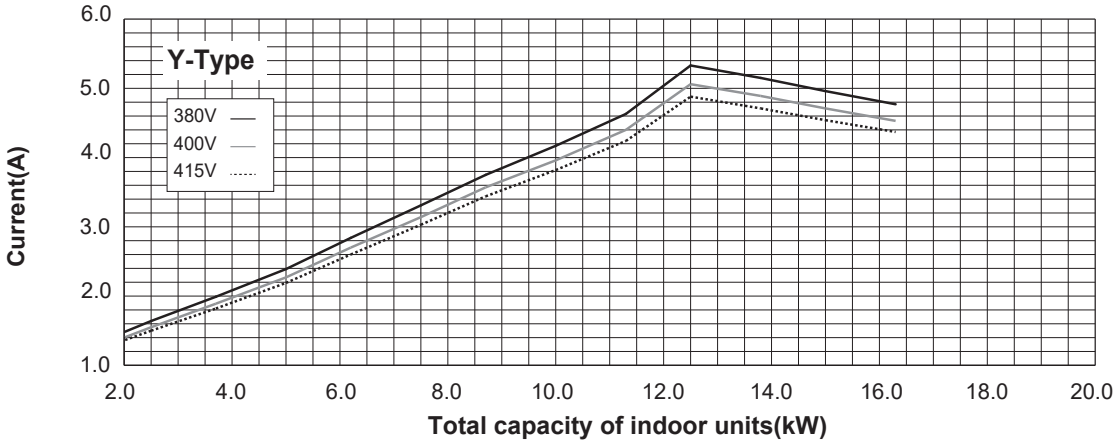


■ **Heating**


Capacity(kW)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

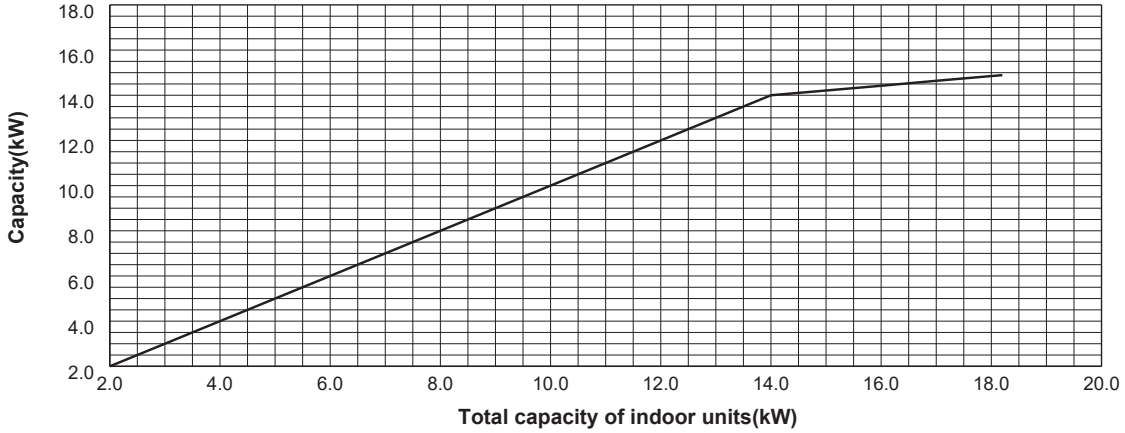

Input(kW)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

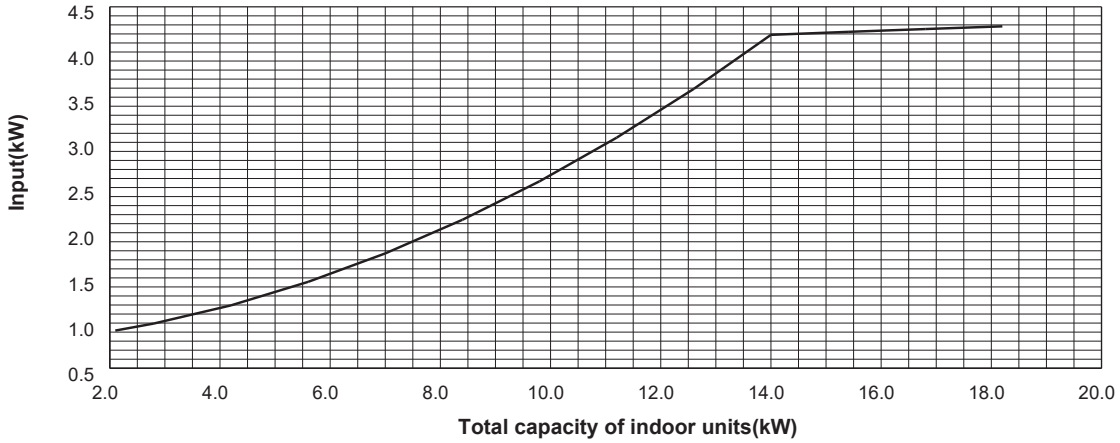

Current(A)
20.0
15.0
10.0
5.0
0.0
V-Type
220V
230V
240V
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

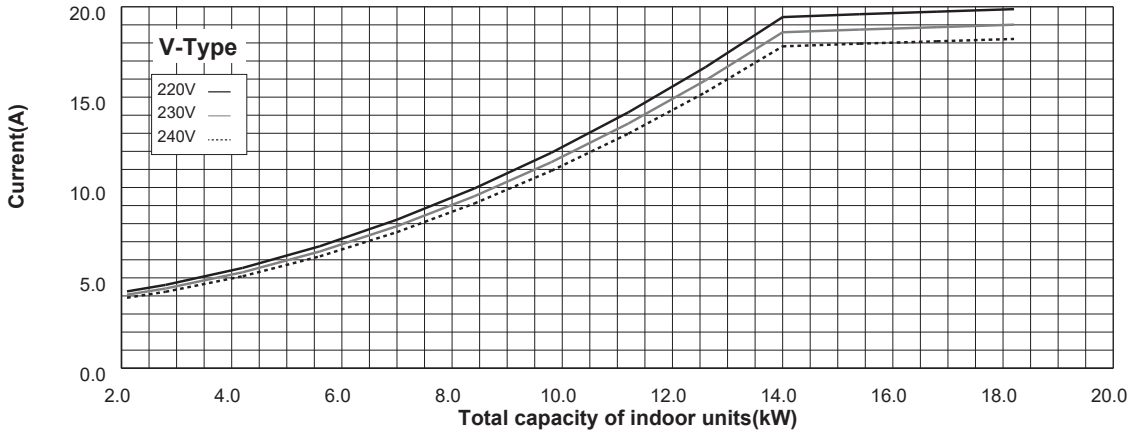

Current(A)
6.0
5.0
4.0
3.0
2.0
1.0
Y-Type
380V
400V
415V
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

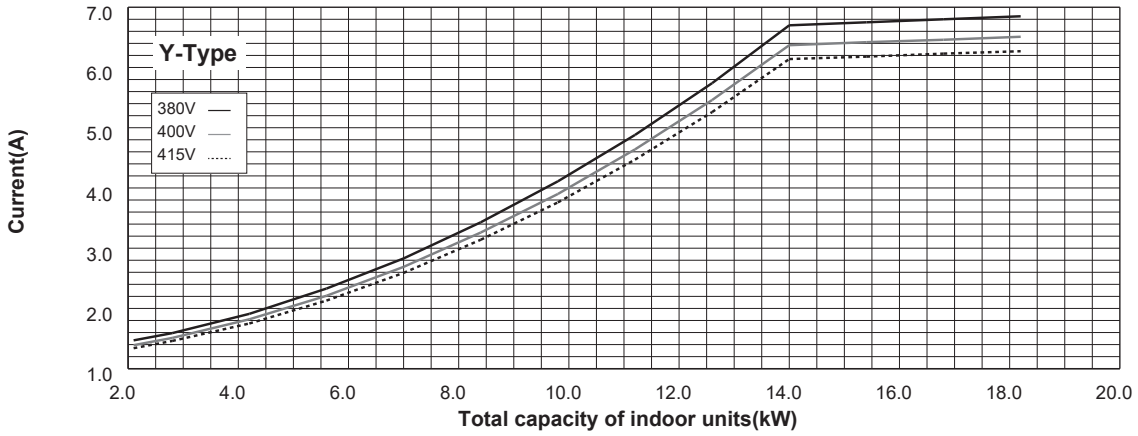
PUMY-SM125

■ Cooling

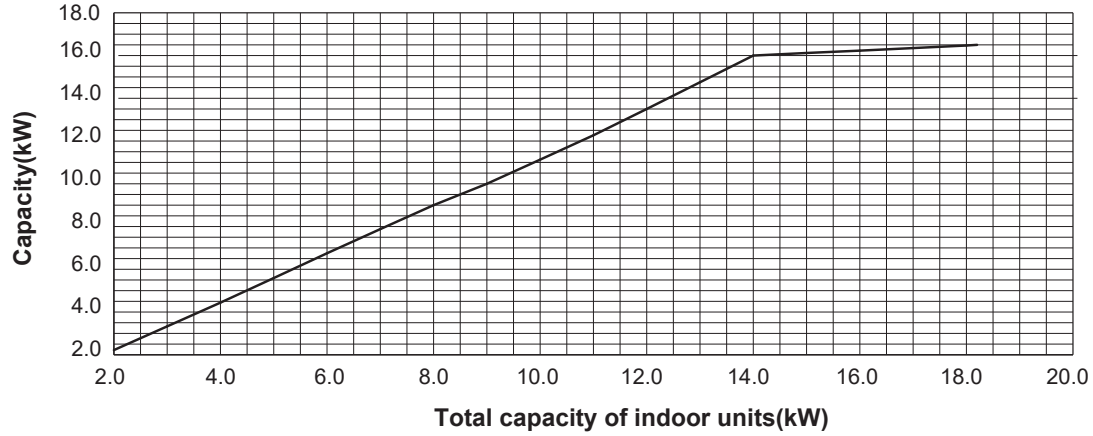


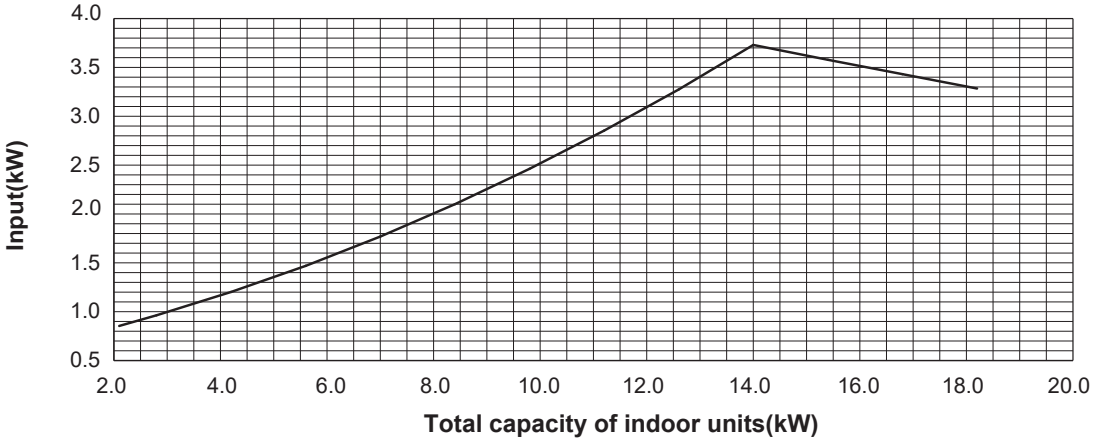


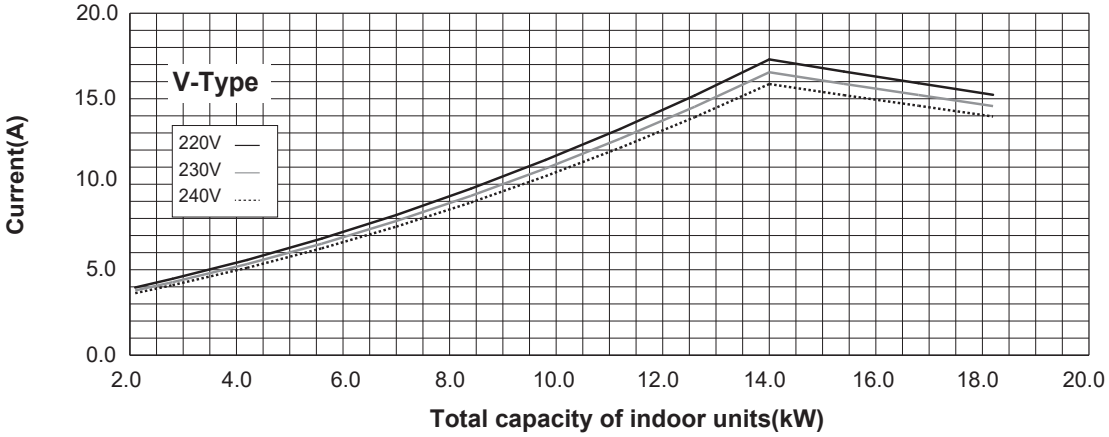


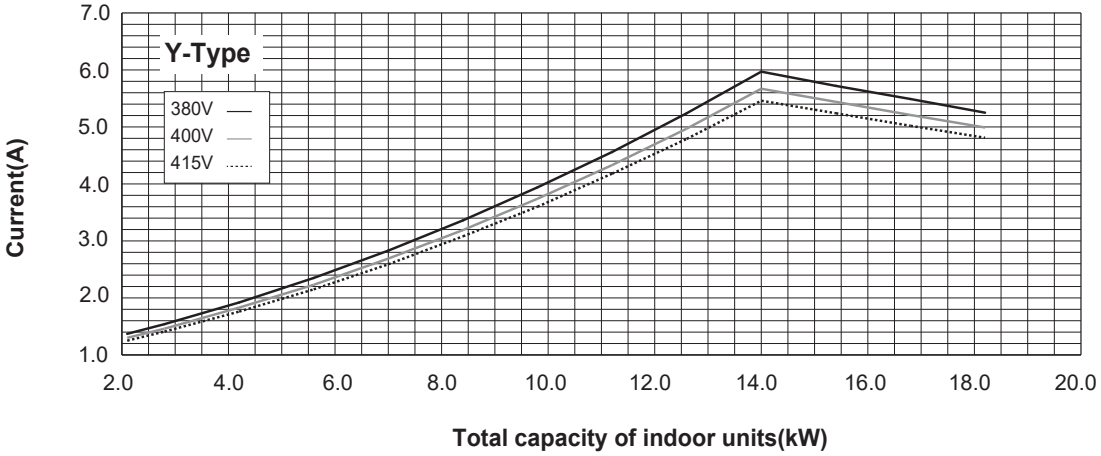


■ **Heating**


Capacity(kW)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

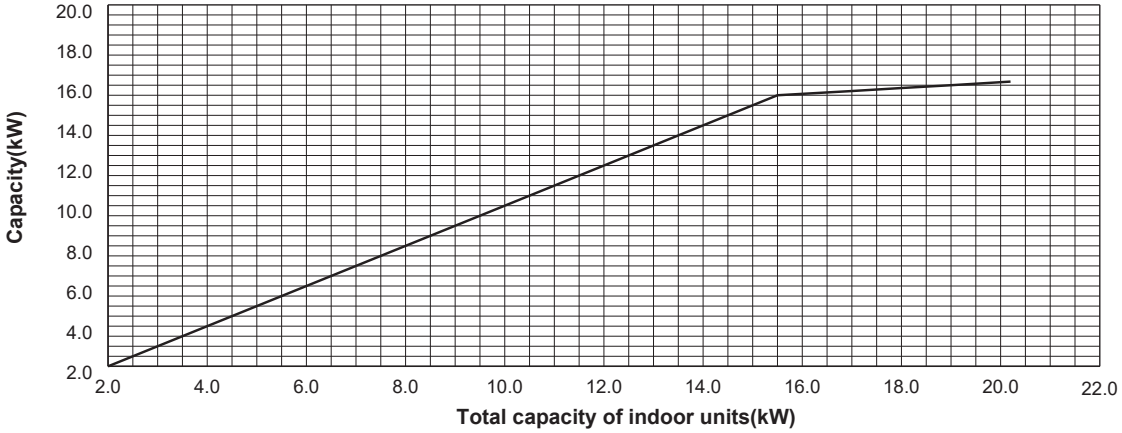

Input(kW)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

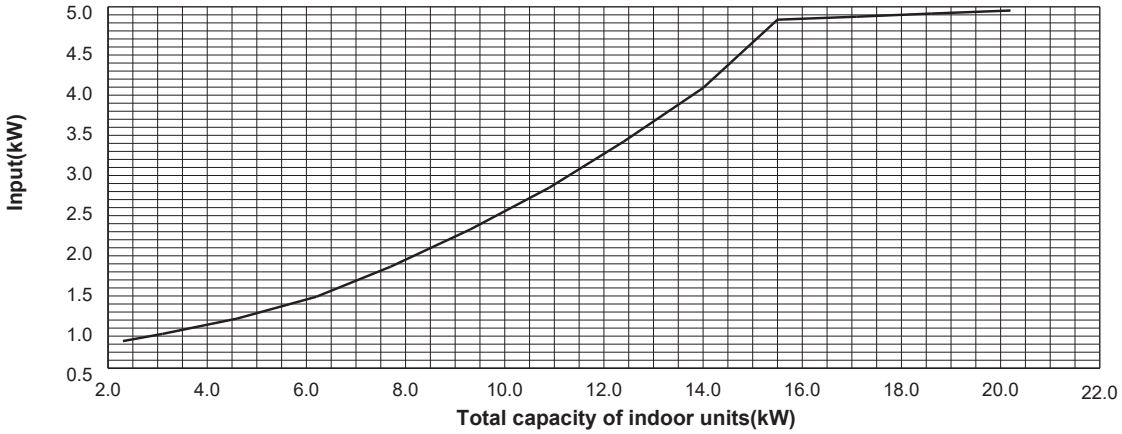

Current(A)
V-Type
220V
230V
240V
20.0
15.0
10.0
5.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

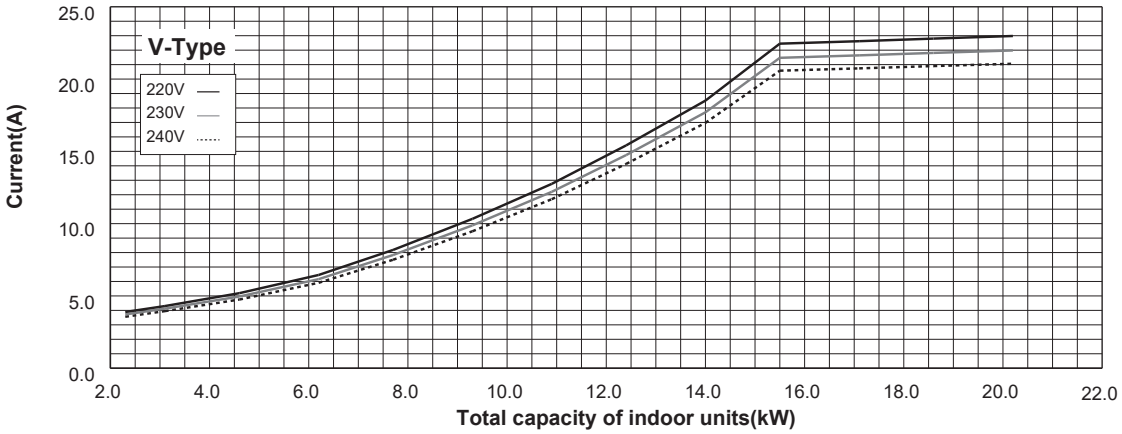

Current(A)
Y-Type
380V
400V
415V
7.0
6.0
5.0
4.0
3.0
2.0
1.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

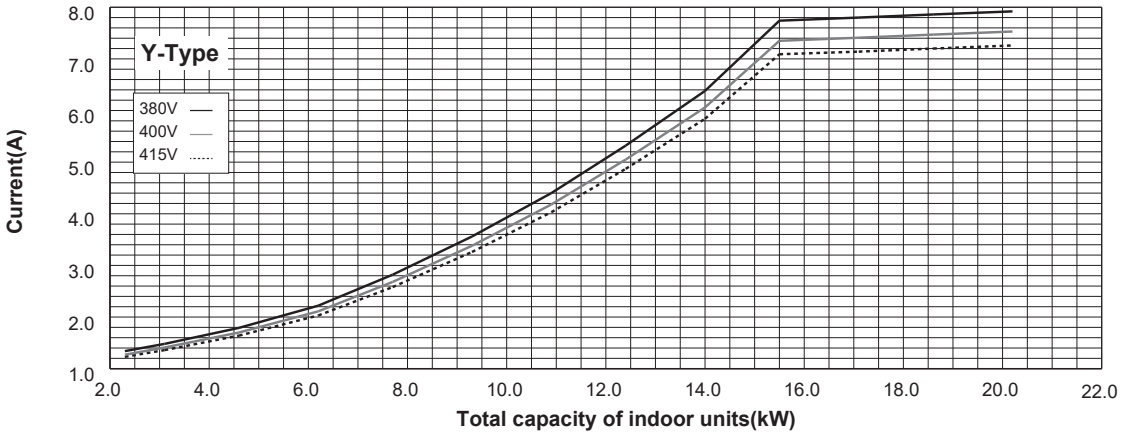
PUMY-SM140

■ Cooling

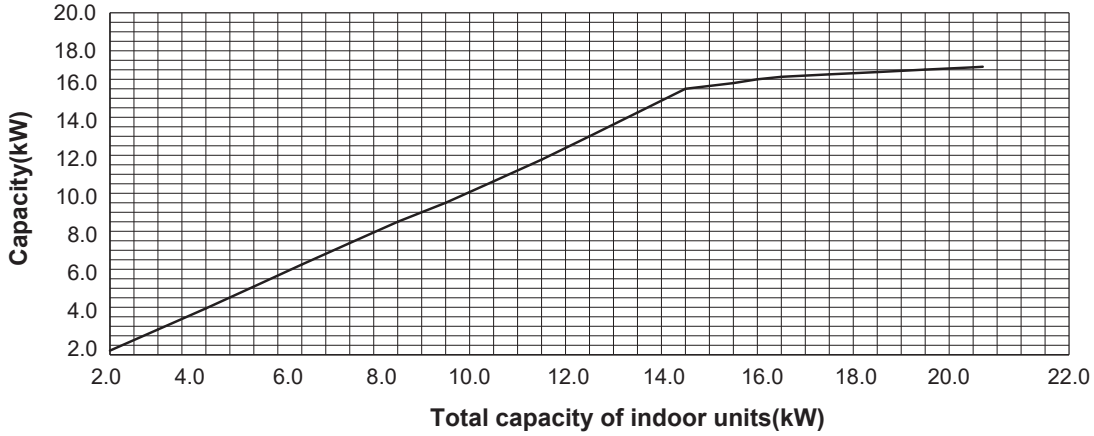


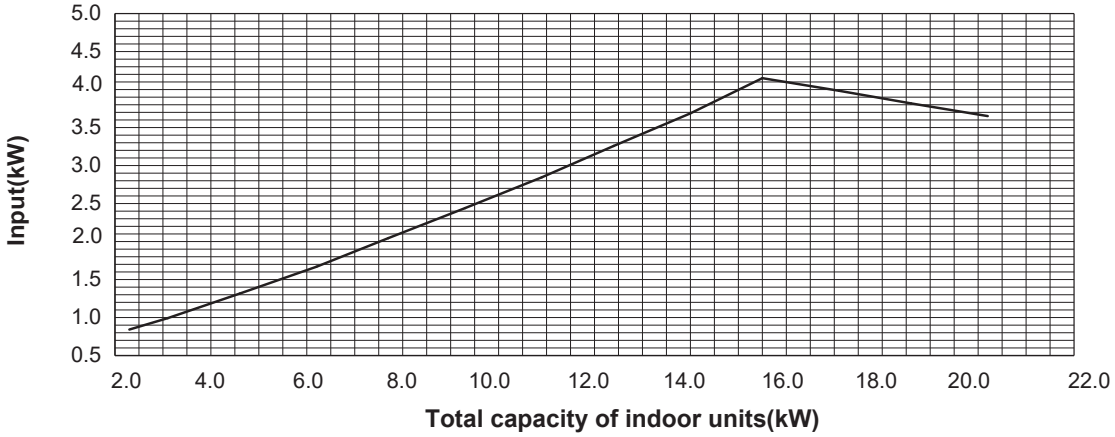


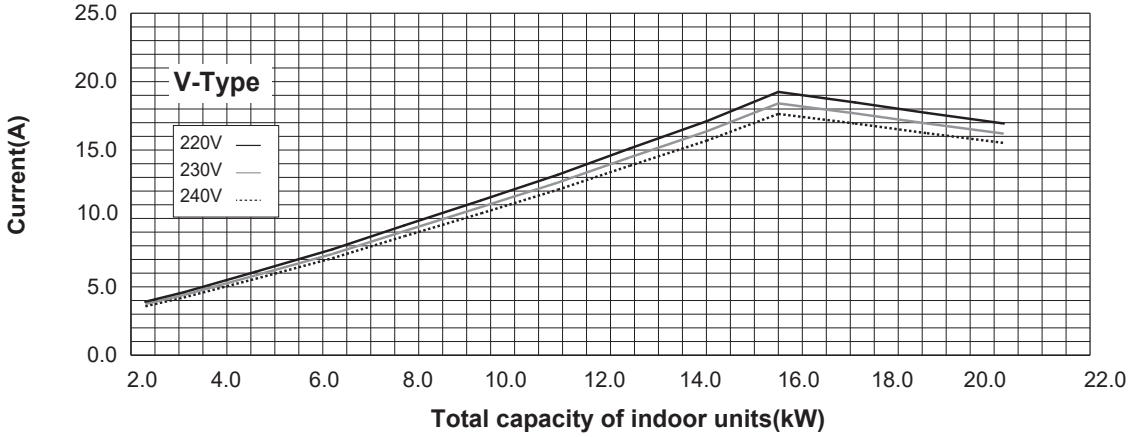


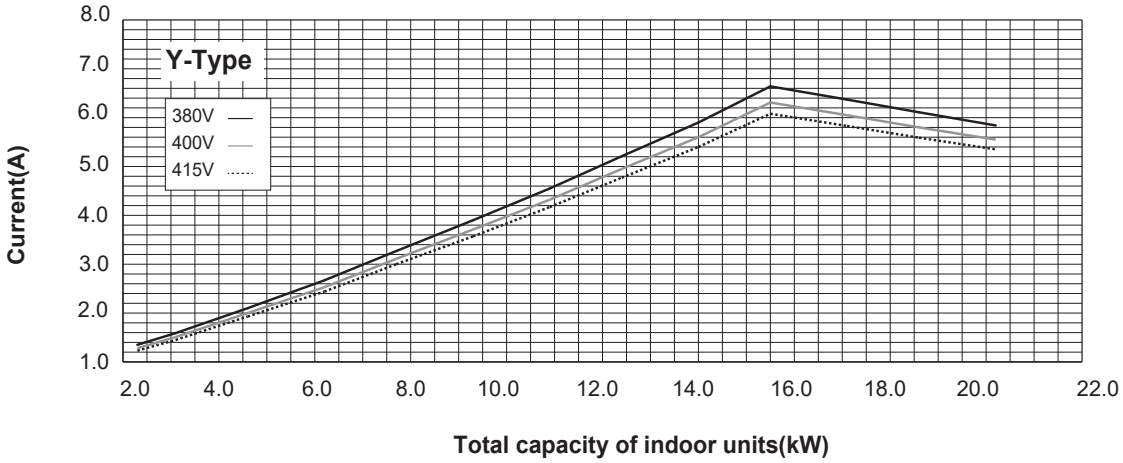


■ **Heating**


Capacity(kW)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)


Input(kW)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)


Current(A)
V-Type
220V
230V
240V
25.0
20.0
15.0
10.0
5.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)


Current(A)
Y-Type
380V
400V
415V
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)

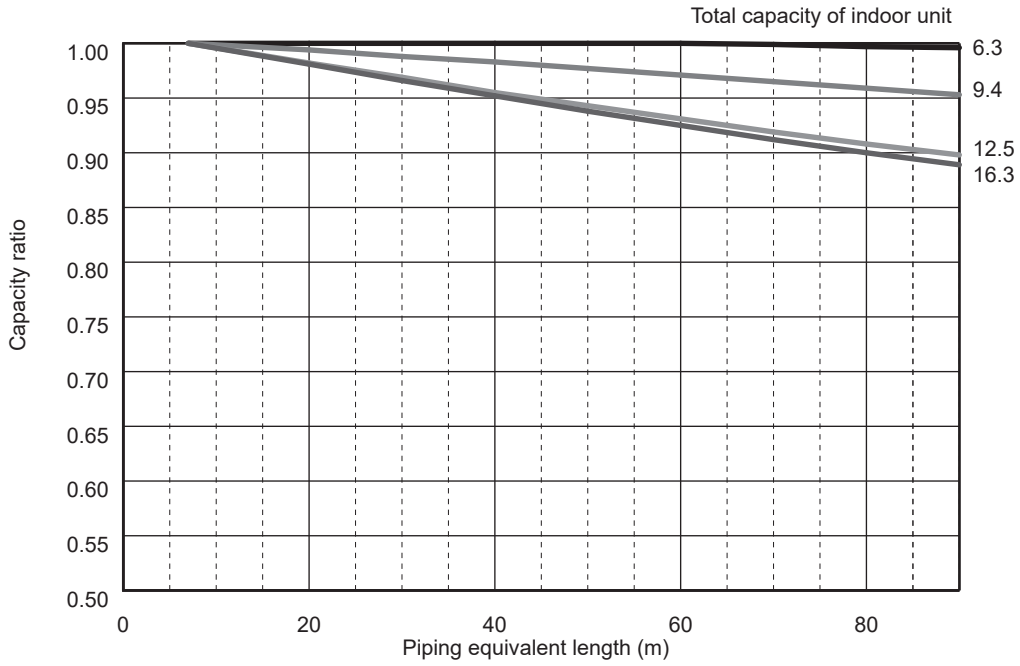
5-5. Correcting capacity for changes in the length of refrigerant piping

During cooling, obtain the ratio (and the piping equivalent length) of the outdoor units rated 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. 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**

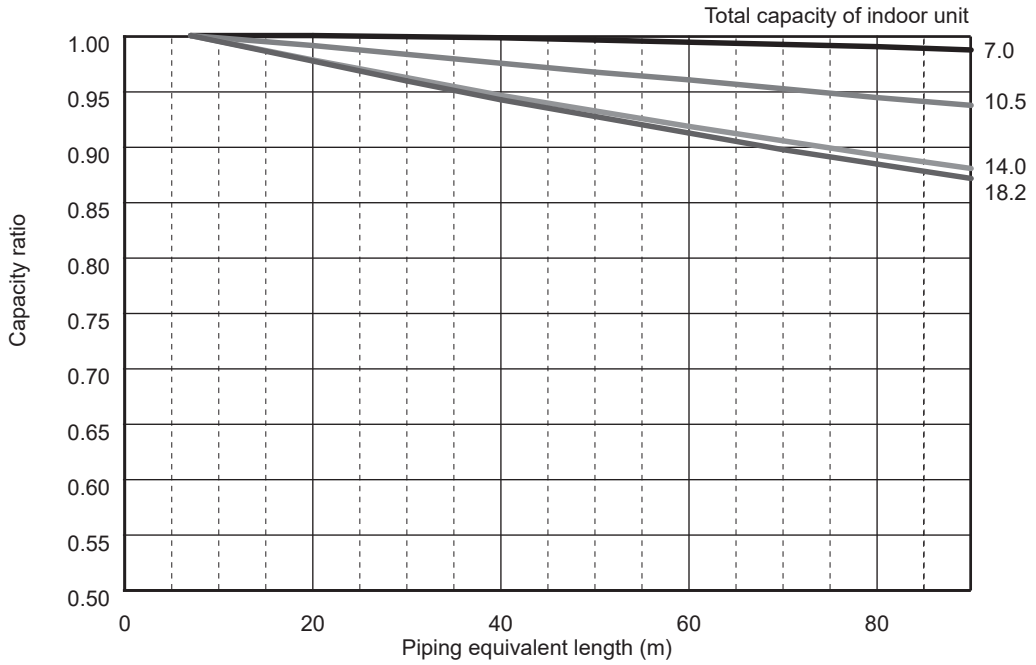
5-5-1. Cooling

PUMY-SM112



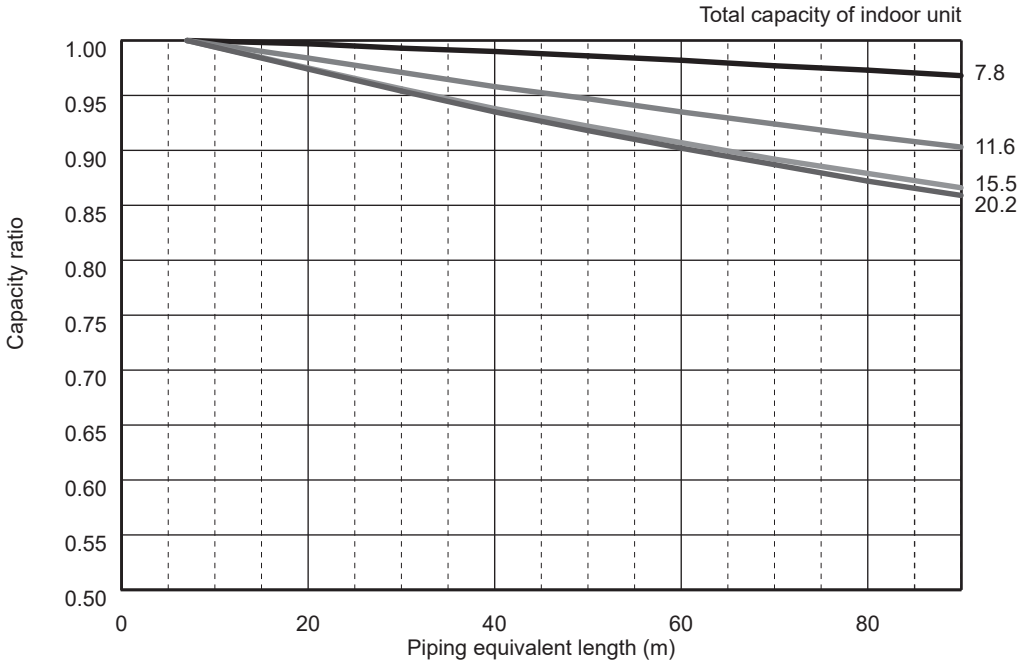
<Figure 5> Correction of refrigerant piping length

PUMY-SM125



<Figure 6> Correction of refrigerant piping length

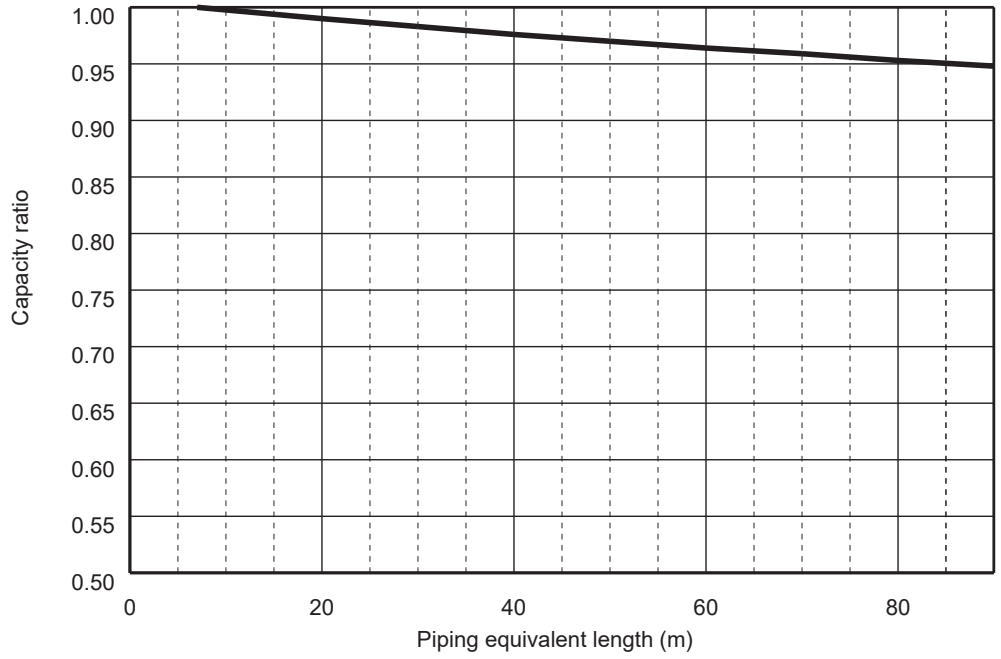
PUMY-SM140



<Figure 7> Correction of refrigerant piping length

5-5-2. Heating

PUMY-SM112 **PUMY-SM125** **PUMY-SM140**



<Figure 8> 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.

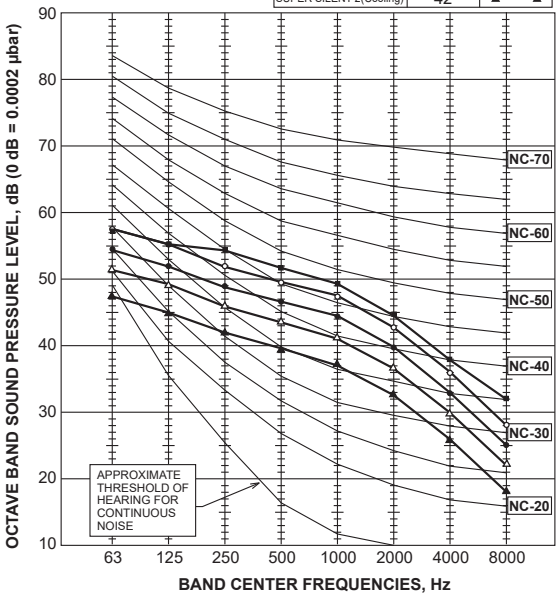
Correction factor diagram

Outdoor inlet air temp. (°C)	6	4	2	0	-2	-4	-6	-8	-10	-15	-20
Correction factor	1.00	0.91	0.83	0.82	0.83	0.84	0.89	0.89	0.89	0.89	0.89

5-6. Noise criterion curves

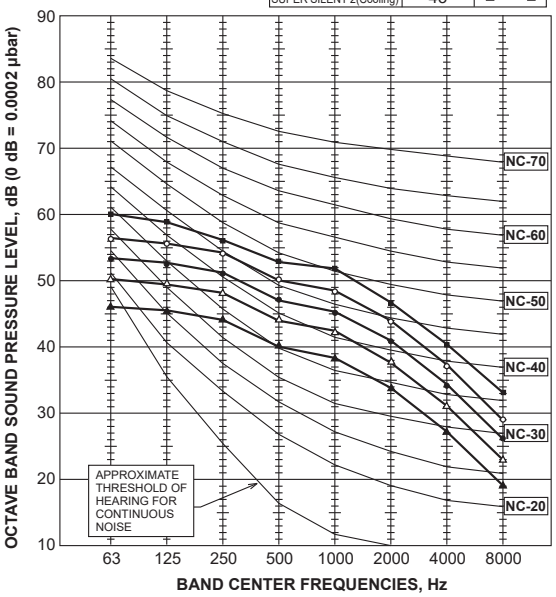
PUMY-SM112

MODE	SPL(dB)	LINE
HEATING	54	
COOLING	52	
SILENT(Cooling)	49	
SUPER SILENT 1(Cooling)	46	
SUPER SILENT 2(Cooling)	42	



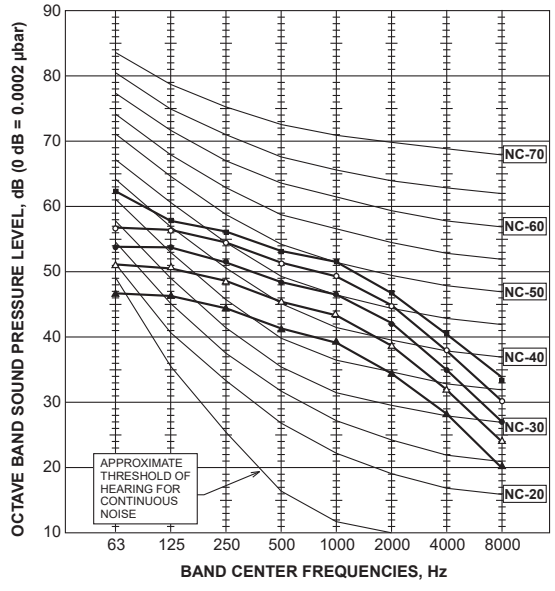
PUMY-SM125

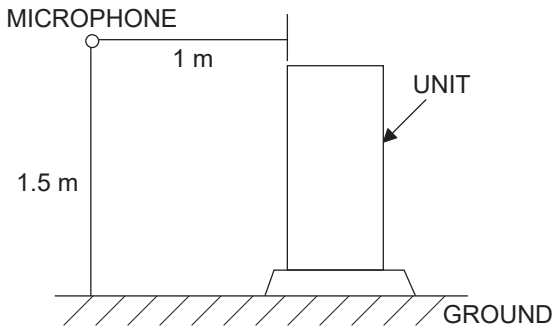
MODE	SPL(dB)	LINE
HEATING	56	
COOLING	53	
SILENT(Cooling)	50	
SUPER SILENT 1(Cooling)	47	
SUPER SILENT 2(Cooling)	43	



PUMY-SM140

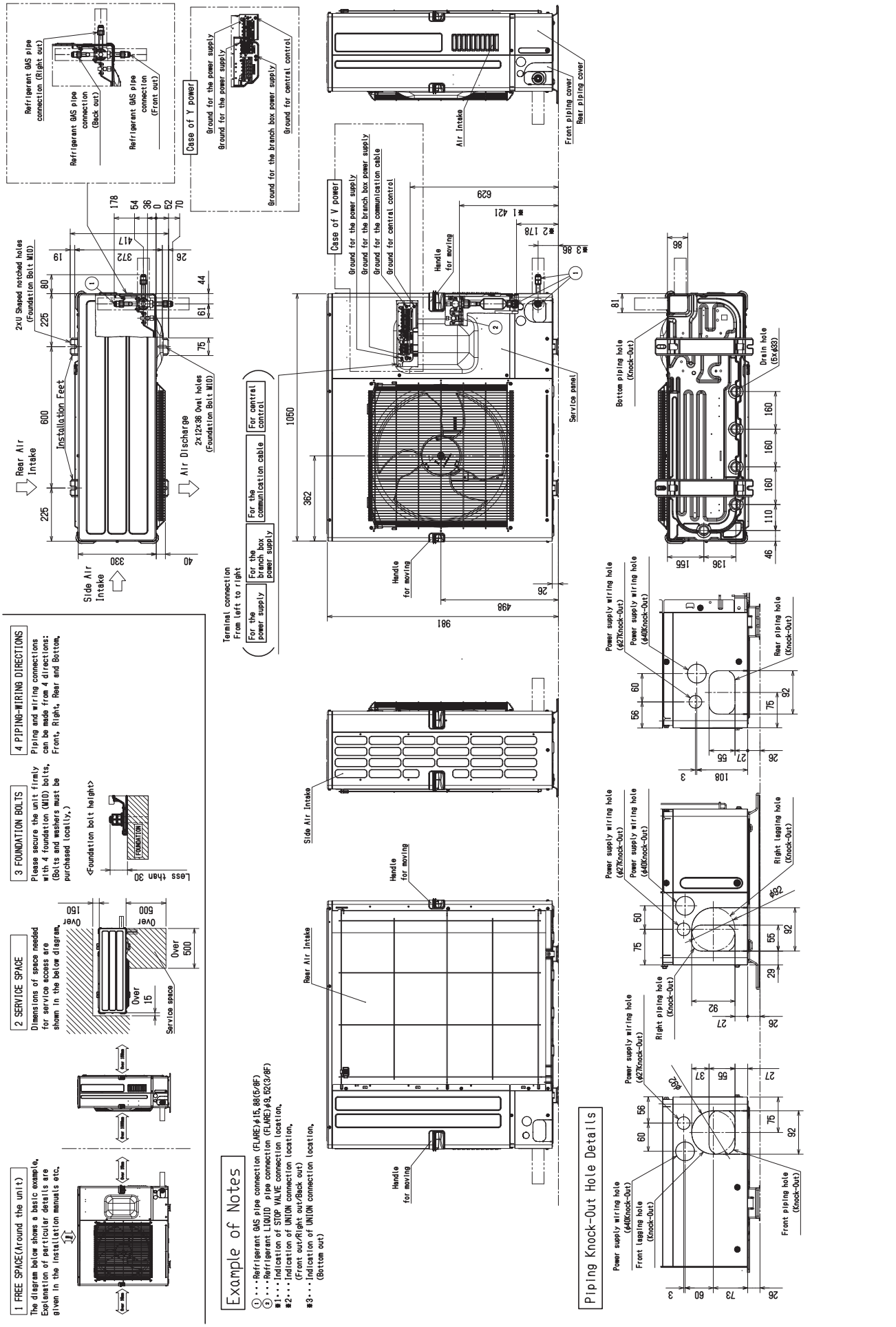
MODE	SPL(dB)	LINE
HEATING	56	
COOLING	54	
SILENT(Cooling)	51	
SUPER SILENT 1(Cooling)	48	
SUPER SILENT 2(Cooling)	44	





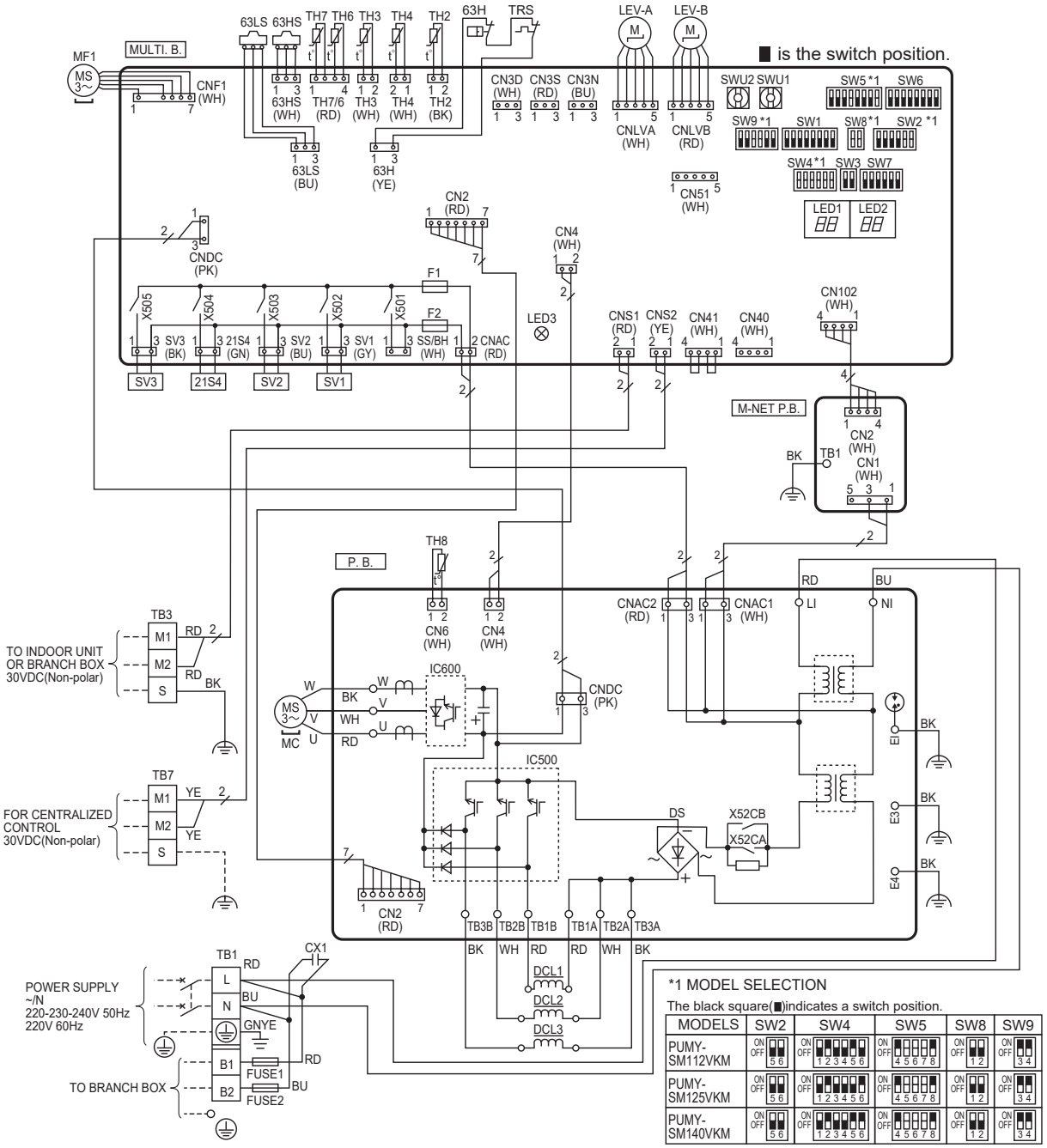
6 OUTLINES AND DIMENSIONS

Unit: mm



7 WIRING DIAGRAM

PUMY-SM112VKM **PUMY-SM125VKM** **PUMY-SM140VKM**



*1 MODEL SELECTION

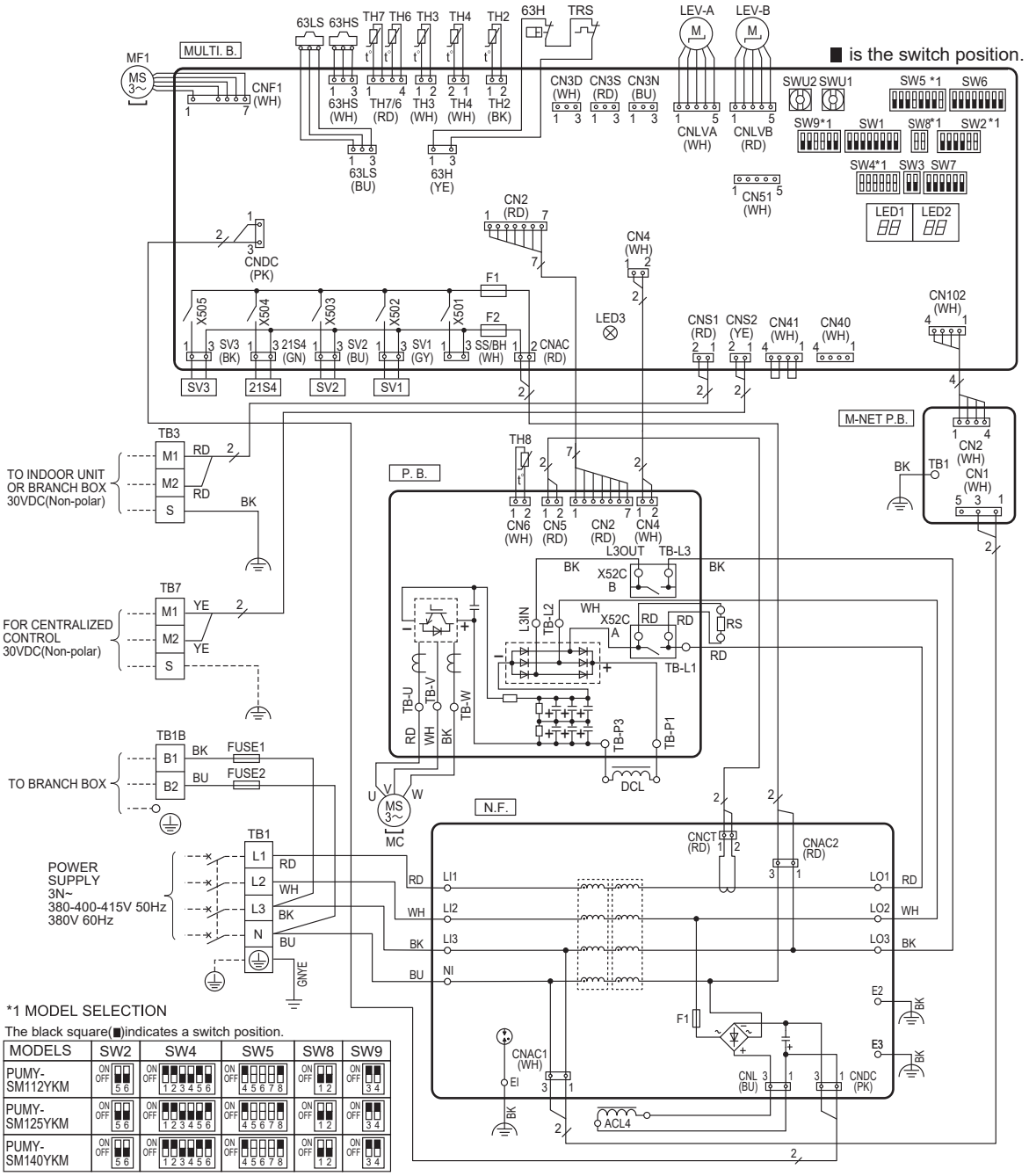
The black square(■)indicates a switch position.

MODELS	SW2	SW4	SW5	SW8	SW9
PUMY-SM112VKM	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 4 5 6 7 8	ON OFF 1 2	ON OFF 3 4
PUMY-SM125VKM	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 4 5 6 7 8	ON OFF 1 2	ON OFF 3 4
PUMY-SM140VKM	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 4 5 6 7 8	ON OFF 1 2	ON OFF 3 4

【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply/Branch Box>	TH7	Thermistor <Ambient>	SW5	Switch <Function Selection>
TB3	Terminal Block <Indoor/Outdoor, Branch Box/Outdoor Transmission Line>	TH8	Thermistor <Heat Sink>	SW6	Switch <Function Selection>
		LEV-A, LEV-B	Linear Expansion Valve	SW7	Switch <Function Selection>
TB7	Terminal Block <Centralized Control Transmission Line>	DCL1, DCL2, DCL3	Reactor	SW8	Switch <Model Selection>
		CX1	Capacitor	SW9	Switch <Function/Model Selection>
FUSE1,FUSE2	Fuse <T20AL250V>	TRS	Thermal Protector	SWU1	Switch <Unit Address Selection, ones digit>
MC	Motor for Compressor	P.B.	Power Circuit Board	SWU2	Switch <Unit Address Selection, tens digit>
MF1	Fan Motor	U/V/W	Connection Terminal <U/V/W-Phase>	SS/BH	Connector <Connection for Option>
63H	High Pressure Switch	LI	Connection Terminal <L-Phase>	CN3D	Connector <Connection for Option>
63HS	High Pressure Sensor	NI	Connection Terminal <N-Phase>	CN3S	Connector <Connection for Option>
63LS	Low Pressure Sensor	TB1A, TB2A, TB3A, TB1B, TB2B, TB3B	Connection Terminal <Reactor>	CN3N	Connector <Connection for Option>
SV1	Solenoid Valve Coil <Bypass Valve>			CN51	Connector <Connection for Option>
SV2	Solenoid Valve Coil <Liquid Shut-off Valve>	EI, E3, E4	Connection Terminal <Electrical Parts Box>	LED1,LED2	LED <Operation Inspection Display>
SV3	Solenoid Valve Coil <Gas Shut-off Valve>	X52CA/B	52C Relay	LED3	LED <Power Supply to Main Microcomputer>
21S4	Solenoid Valve Coil <4-Way Valve>	MULTI.B.	Multi Controller Circuit Board	F1,F2	Fuse <T6.3AL250V>
TH2	Thermistor <HIC Pipe>	SW1	Switch <Display Selection>	X501~505	Relay
TH3	Thermistor <Outdoor Liquid Pipe>	SW2	Switch <Function Selection>	M-NET P.B.	M-NET Power Circuit Board
TH4	Thermistor <Compressor>	SW3	Switch <Test Run>	TB1	Connection Terminal <Electrical Parts Box>
TH6	Thermistor <Suction Pipe>	SW4	Switch <Model Selection>		

PUMY-SM112YKM **PUMY-SM125YKM** **PUMY-SM140YKM**



*1 MODEL SELECTION

The black square(■)indicates a switch position.

MODELS	SW2	SW4	SW5	SW8	SW9
PUMY-SM112YKM	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 4 5 6 7 8	ON OFF 1 2	ON OFF 3 4
PUMY-SM125YKM	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 4 5 6 7 8	ON OFF 1 2	ON OFF 3 4
PUMY-SM140YKM	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 4 5 6 7 8	ON OFF 1 2	ON OFF 3 4

【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply>	TH8	Thermistor <Heat Sink>	SW5	Switch <Function Selection>
TB1B	Terminal Block <Branch Box>	RS	Rush Current Protect Resistor	SW6	Switch <Function Selection>
TB3	Terminal Block <Indoor/Outdoor, Branch Box/Outdoor Transmission Line>	LEV-A, LEV-B	Linear Expansion Valve	SW7	Switch <Function Selection>
		ACL4	Reactor	SW8	Switch <Model Selection>
TB7	Terminal Block <Centralized Control Transmission Line>	DCL	Reactor	SW9	Switch <Function/Model Selection>
		TRS	Thermal Protector	SWU1	Switch <Unit Address Selection, ones digit>
FUSE1,FUSE2	Fuse <T20AL250V>	P.B.	Power Circuit Board	SWU2	Switch <Unit Address Selection, tens digit>
MC	Motor for Compressor	TB-U/V/W	Connection Terminal <U/V/W-Phase>	SS/BH	Connector <Connection for Option>
MF1	Fan Motor	TB-L1/L2/L3	Connection Terminal <L1/L2/L3-Power Supply>	CN3D	Connector <Connection for Option>
63H	High Pressure Switch	TB-P1/P3	Connection Terminal	CN3S	Connector <Connection for Option>
63HS	High Pressure Sensor	X52CA/B	52C Relay	CN3N	Connector <Connection for Option>
63LS	Low Pressure Sensor	N.F.	Noise Filter Circuit Board	CN51	Connector <Connection for Option>
SV1	Solenoid Valve Coil <Bypass Valve>	LO1/LO2/LO3	Connection Terminal <L1/L2/L3-Power Supply>	LED1,LED2	LED <Operation Inspection Display>
SV2	Solenoid Valve Coil <Liquid Shut-off Valve>	LI1/LI2/LI3/NI	Connection Terminal <L1/L2/L3-Power Supply>	LED3	LED <Power Supply to Main Microcomputer>
SV3	Solenoid Valve Coil <Gas Shut-off Valve>	EI, E2, E3	Connection Terminal <Electrical Parts Box>	F1,F2	Fuse <T6.3AL250V>
21S4	Solenoid Valve Coil <4-Way Valve>	F1	Fuse <T6.3AL250V>	X501~505	Relay
TH2	Thermistor <HIC Pipe>	MULTI.B.	Multi Controller Circuit Board	M-NET P.B.	M-NET Power Circuit Board
TH3	Thermistor <Outdoor Liquid Pipe>	SW1	Switch <Display Selection>	TB1	Connection Terminal <Electrical Parts Box>
TH4	Thermistor <Compressor>	SW2	Switch <Function Selection>		
TH6	Thermistor <Suction Pipe>	SW3	Switch <Test Run>		
TH7	Thermistor <Ambient>	SW4	Switch <Model Selection>		

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.
   • Register control systems into remote controller(s). Never touch the on/off switch of the remote controller(s). Refer to ″Special function operation setting (for M-NET Remote Controller)″ as for settings.
   In MA remote controller(s), this registration is unnecessary.
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.

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	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
UE	1302	High pressure trouble or compressor 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/EF	1521/1522	Refrigerant leakage		O		The error cannot be canceled by the remote controller after this error detection. The error code may be displayed as EF when the abnormality is re-notified.
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			
UP	4210	Compressor overcurrent interruption/Failure in 12 VDC power supply circuit on power circuit board		O		

Error code (2 digits)	Error code (4 digits)	Trouble	Detected Unit			Remarks
			Indoor	Outdoor	Remote Controller	
U9	4220	Voltage shortage/overvoltage/PAM error/L1 open phase/primary current sensor error/power synchronization signal 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			
P4	5701	Contact failure of drain float switch	O			
A0	6600	Duplex address error	O	O	O	Only M-NET Remote controller is detected.
A2	6602	Transmission processor hardware error	O	O	O	Only M-NET Remote controller is detected.
A3	6603	Transmission bus BUSY error	O	O	O	Only M-NET Remote controller is detected.
A6	6606	Signal communication error with transmission processor	O	O	O	Only M-NET Remote controller is detected.
A7	6607	No ACK error	O		O	Only M-NET Remote controller is detected.
A8	6608	No response frame error	O		O	Only M-NET Remote controller is detected.
FH	6815	Supervisor mode alarm kit communication error 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	7130	Incompatible unit combination		O		

Notes:
- When the outdoor unit detects No ACK error/No response error, the target indoor unit is treated as a stop, 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 indoor unit or remote controller for the detail of error detected in indoor unit or remote controller.

■ Self-diagnosis function

The indoor and outdoor units can be diagnosed automatically using the self-diagnosis switch (SW1) and LED1, LED2 (LED indication) found on the outdoor multi controller circuit board.
LED indication: Set all contacts of SW1 to OFF.

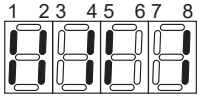
■ During normal operation

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	52C	21S4	SV1	SV2	SV3	—	Always lit

- Example

When the compressor, SV1 and SV2 are on during cooling operation.



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

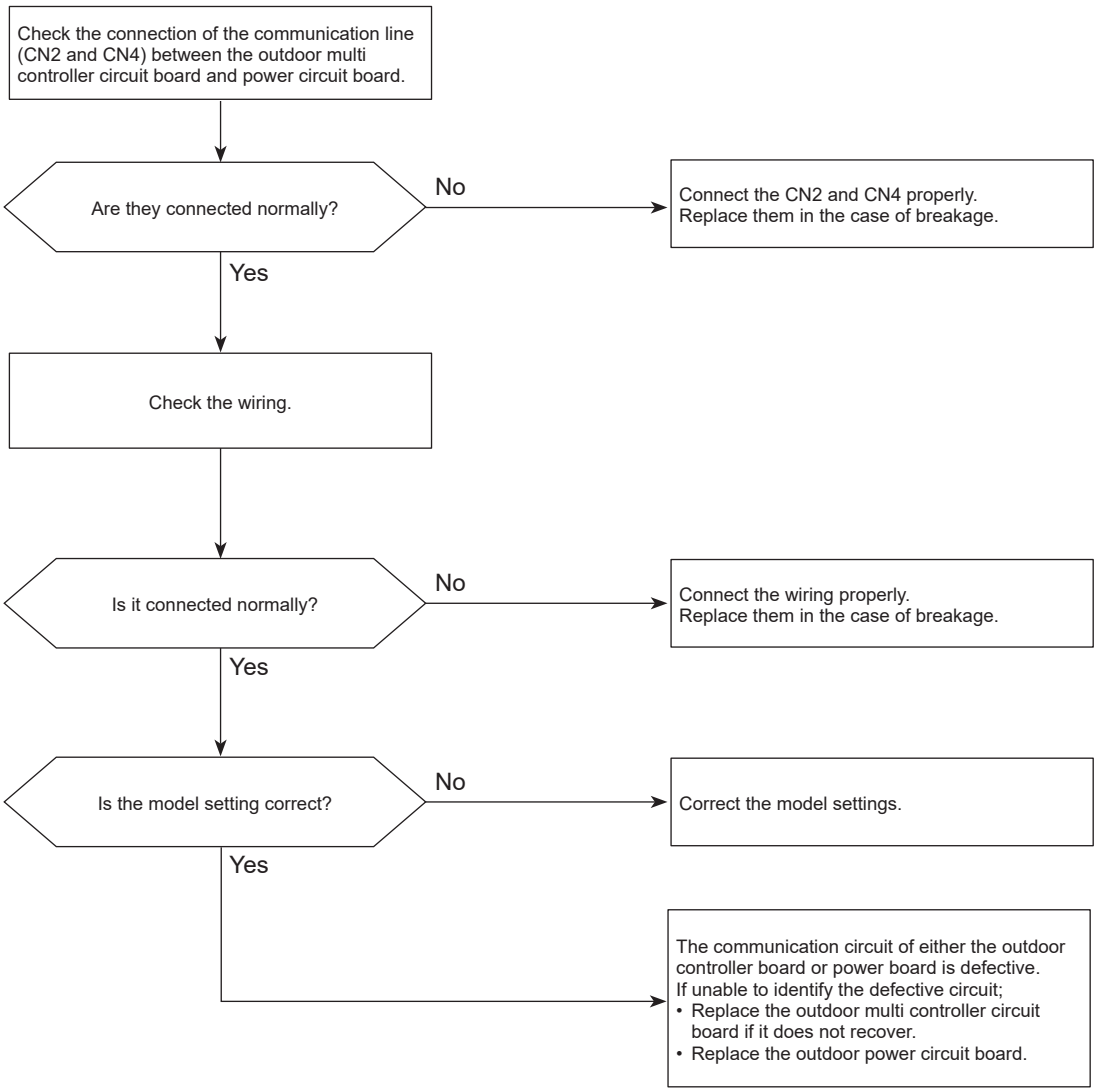
Abnormal points and detection methods

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

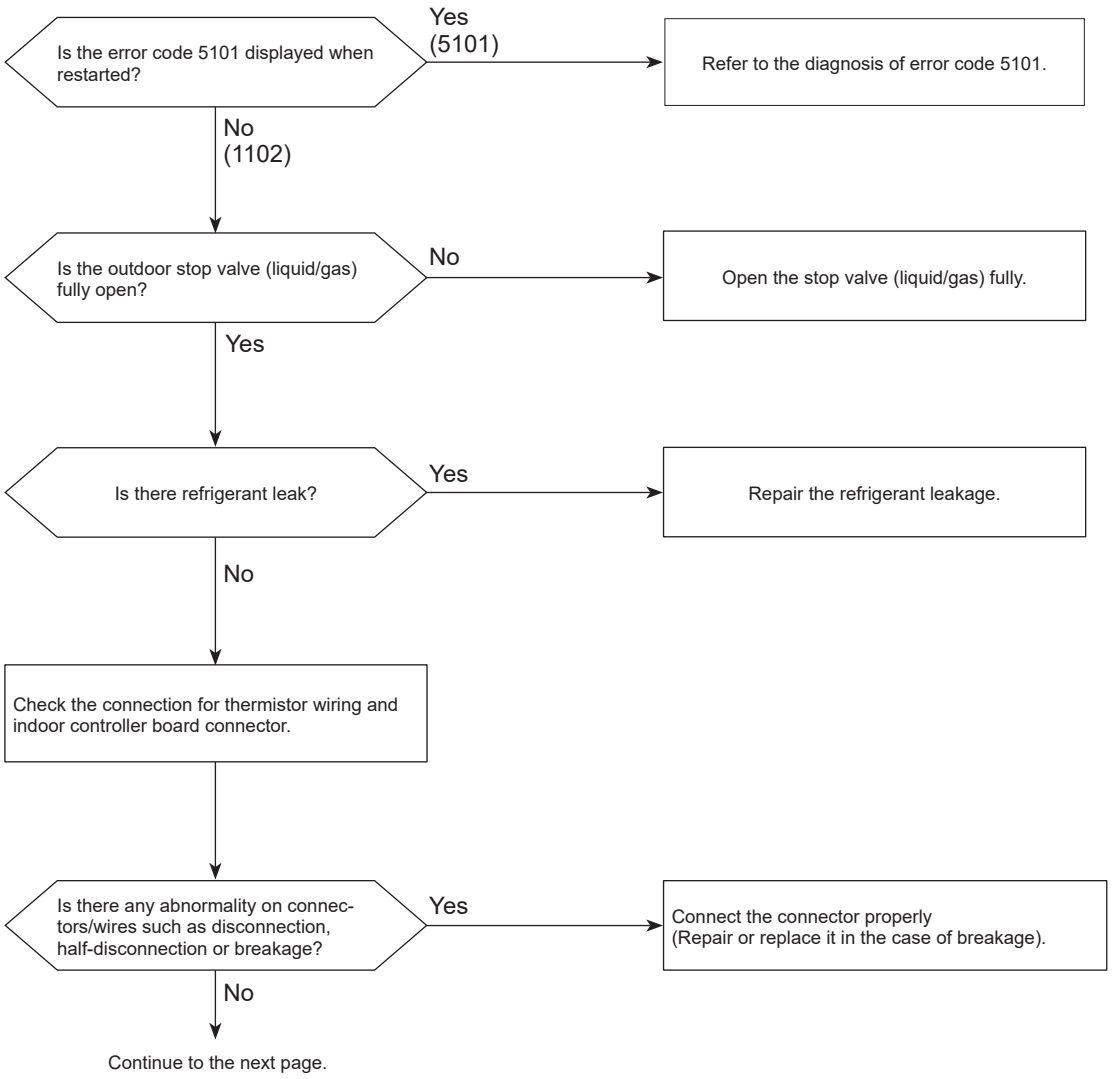
- TH4 falls into either of the following temperature conditions:
  - over 105°C continuously for 5 minutes
  - over 110°C
- The saturation temperature converted from the pressure detected by the high pressure sensor exceeds 40°C during defrosting, and TH4 exceeds 105°C

TH4:
Thermistor <Compressor>
LEV:
Linear expansion valve

Causes and checkpoints

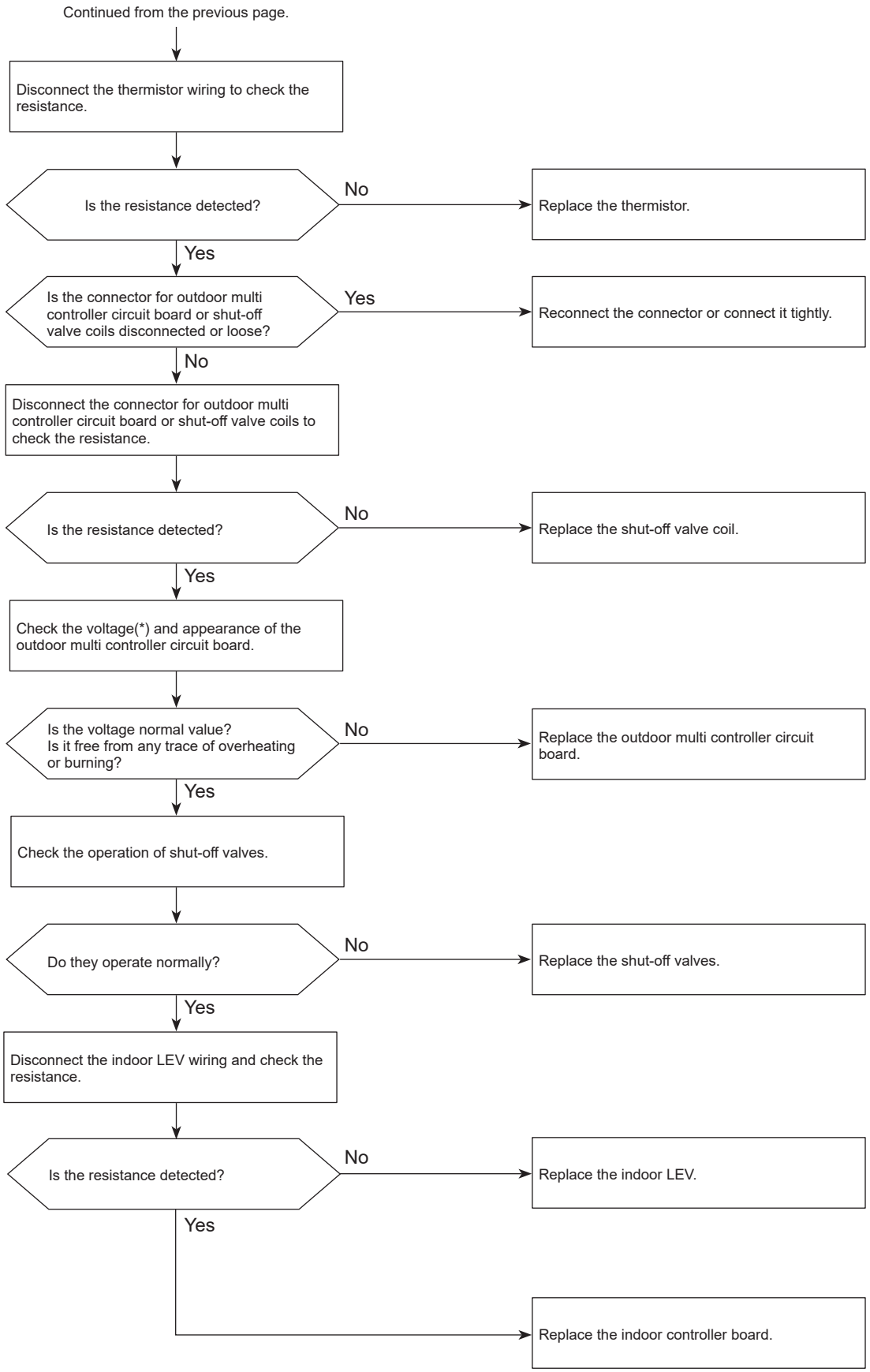
- Malfunction of stop valve
- Over-heated compressor operation caused by shortage of refrigerant
- Defective thermistor
- Defective outdoor multi controller circuit board
- LEV performance failure
- Defective indoor controller board
- Clogged refrigerant system caused by foreign object
- Refrigerant 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

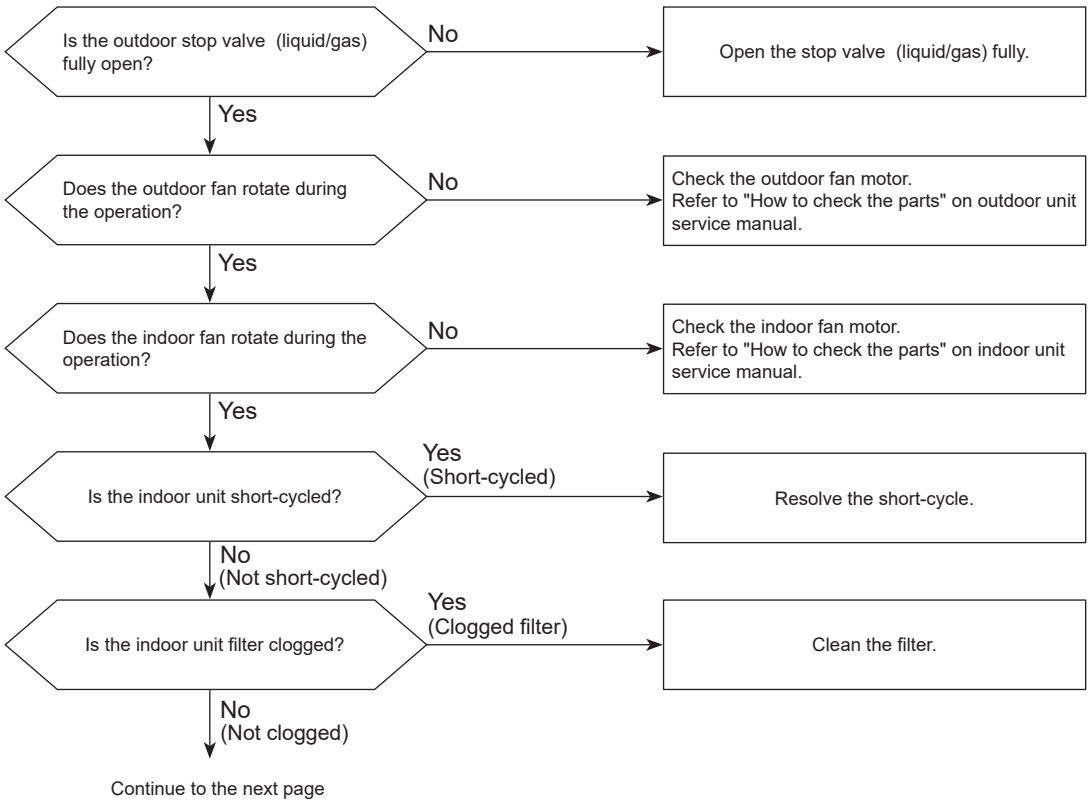
63L equipped model
- Low pressure (63L is in operation)
  63L operates (under 0.00 MPaG) during compressor operation.

63L:
Low pressure switch
LEV:
Linear expansion valve
SV1:
Solenoid valve
TH7:
Thermistor <Ambient>

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
- Defective low pressure sensor
- Malfunction of low pressure sensor input circuit on outdoor multi controller circuit board

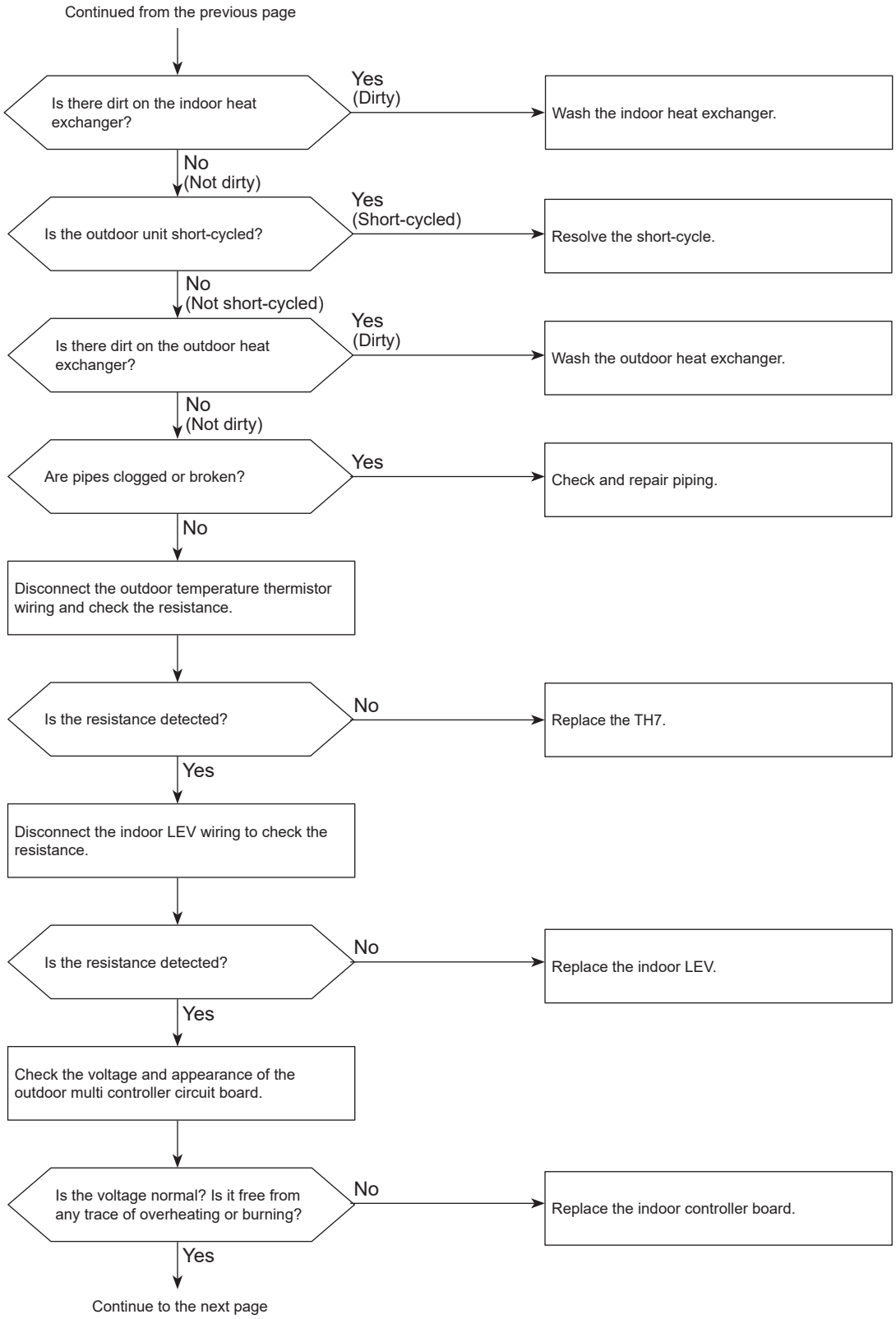
Diagnosis of failure



Continue to the next page

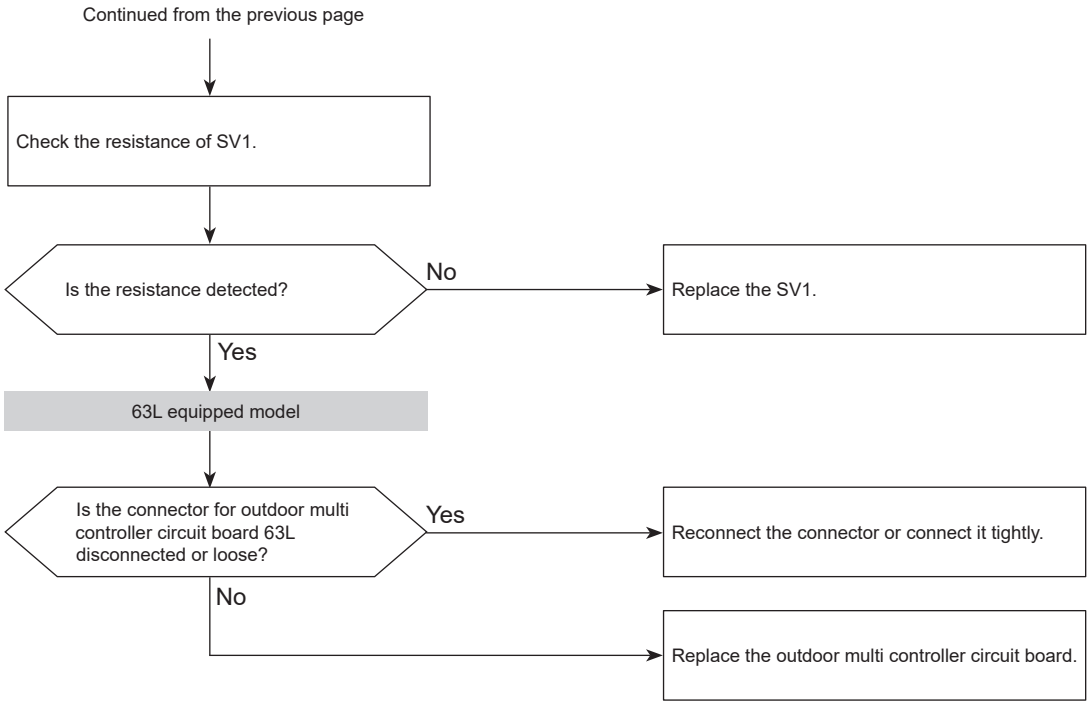
1300 (UL): Low pressure trouble

Diagnosis of failure



1300 (UL): Low pressure trouble

Diagnosis of failure



1302 (UE): High pressure trouble

Abnormal points and detection methods

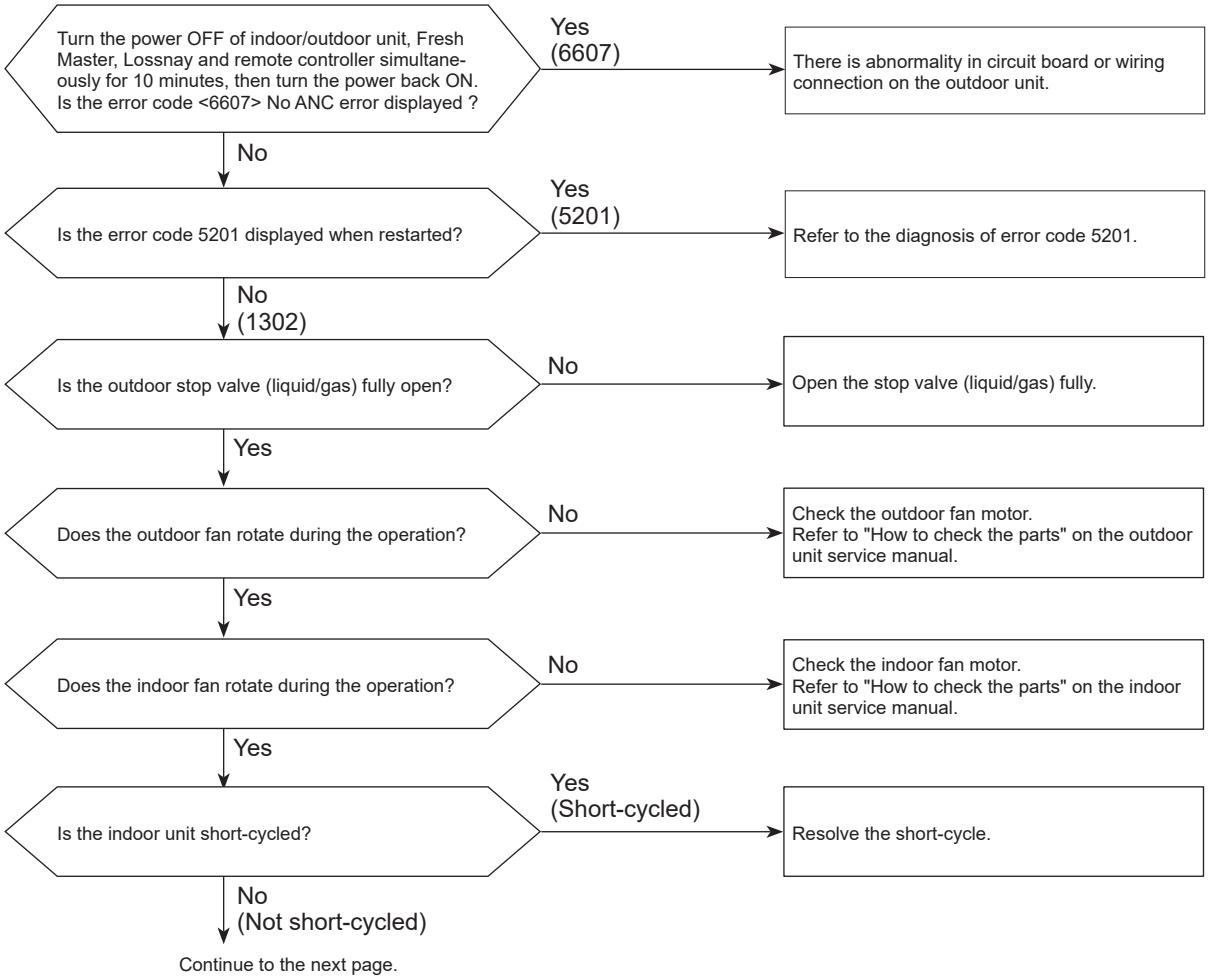
- High pressure abnormality (63H operation)
  63H operates(*) during compressor operation.
  (* 4.15 MPaG)
- High pressure abnormality (63HS detected)
  - A pressure detected by 63HS is 4.31 MPaG or more during compressor operation.
  - A pressure detected by 63HS is 4.14 MPaG or more for 3 minutes during compressor operation.

63H:
High pressure switch
63HS:
High pressure sensor
LEV:
Linear expansion valve
SV1:
Solenoid valve
TH7:
Thermistor <Ambient>
TRS:
Thermal protector

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

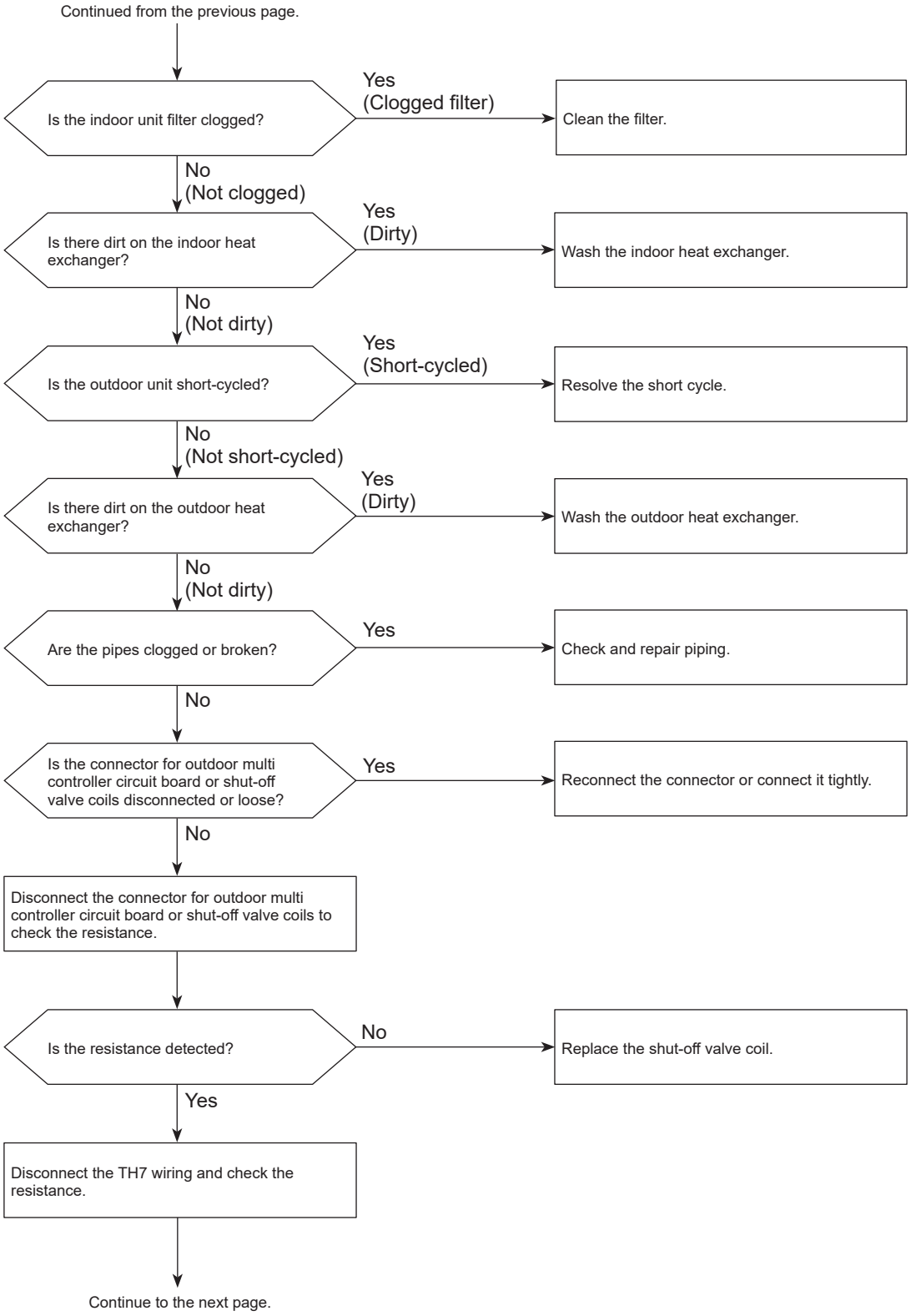
Diagnosis of failure



Continue to the next page.

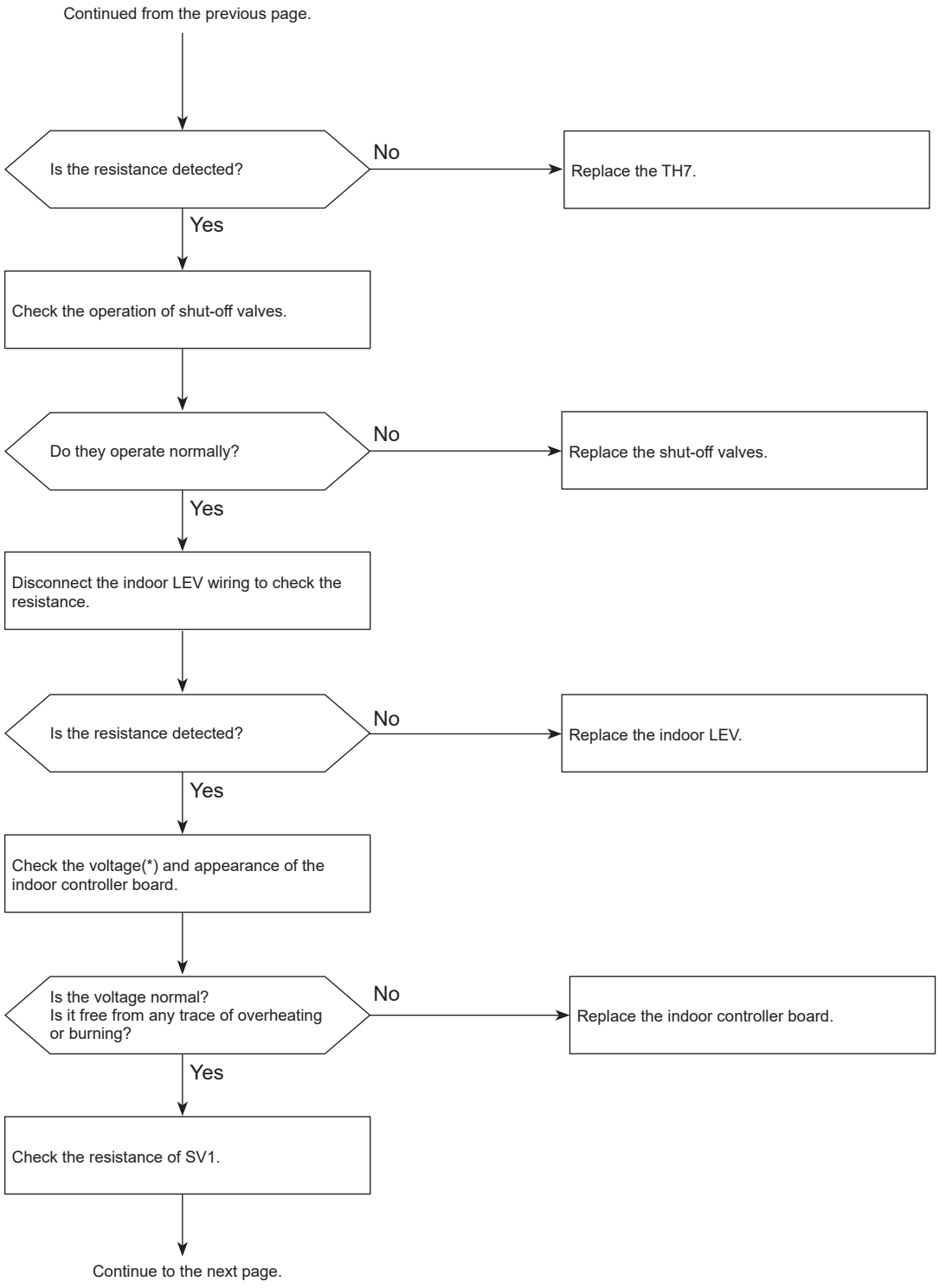
1302 (UE): High pressure trouble

Diagnosis of failure



1302 (UE): High pressure trouble

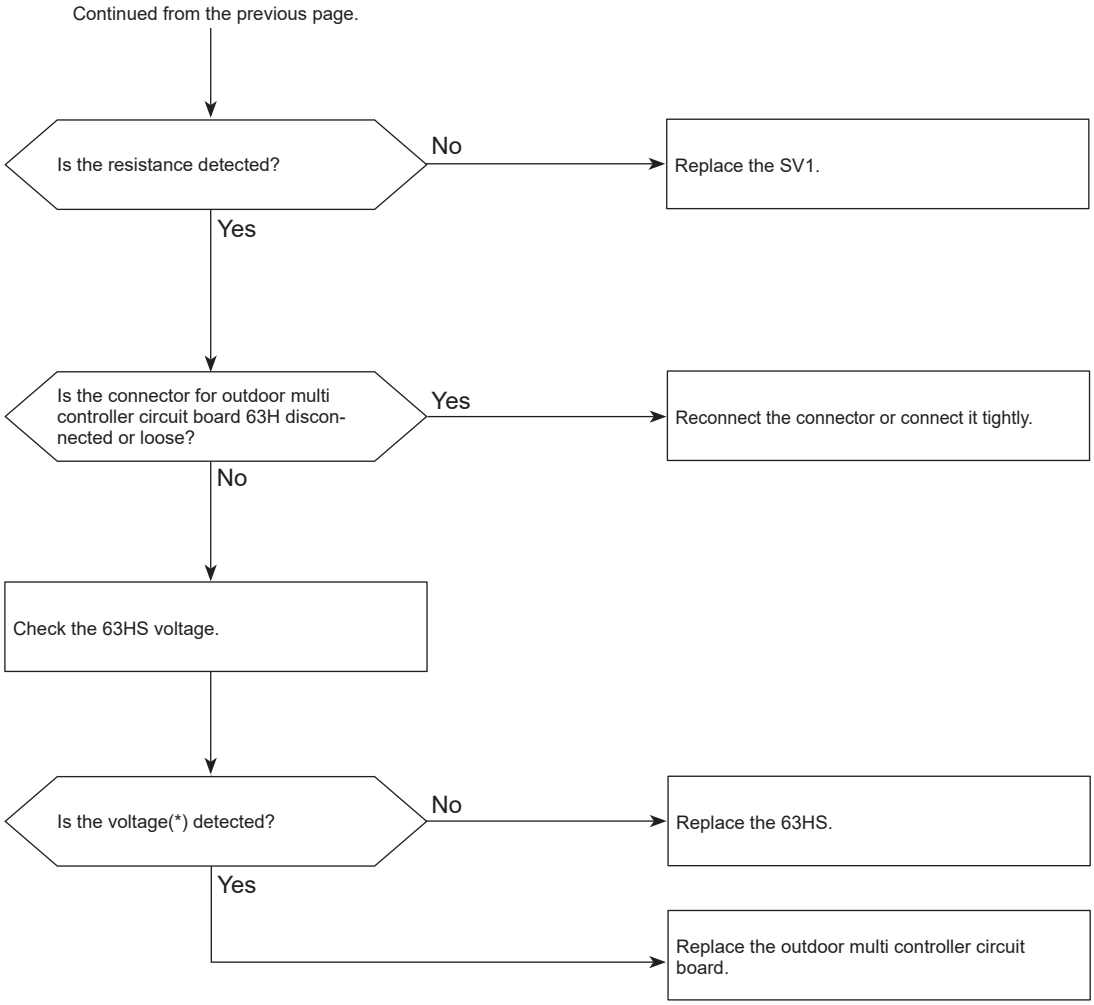
Diagnosis of failure



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

1302 (UE): High pressure 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 -15°C* or less is detected for 5 consecutive minutes even though the indoor LEV has the minimum open pulse.

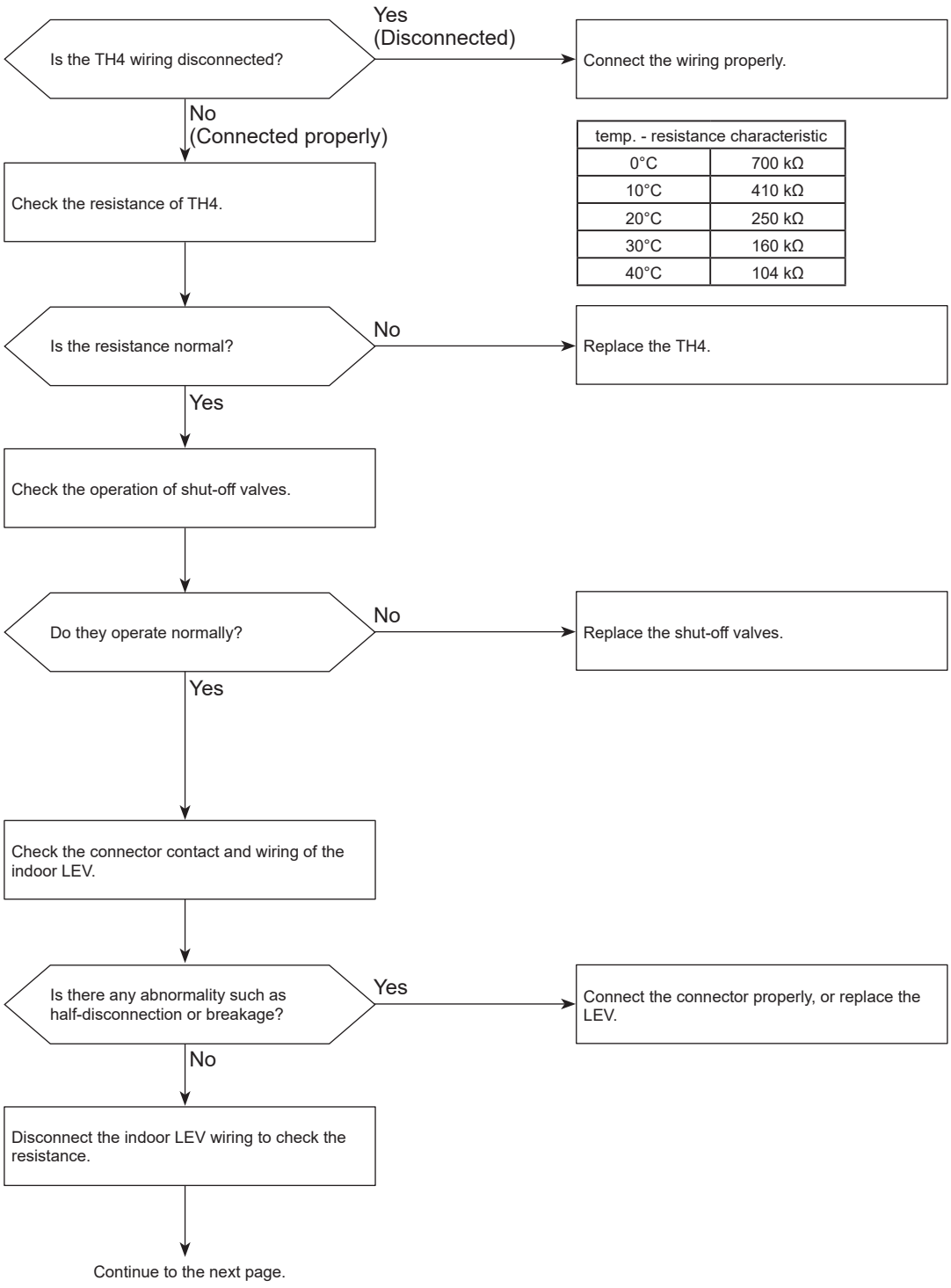
LEV:
Linear expansion valve
TH4:
Thermistor <Compressor>
63HS:
High pressure sensor

* 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
- Malfunction of shut-off valves

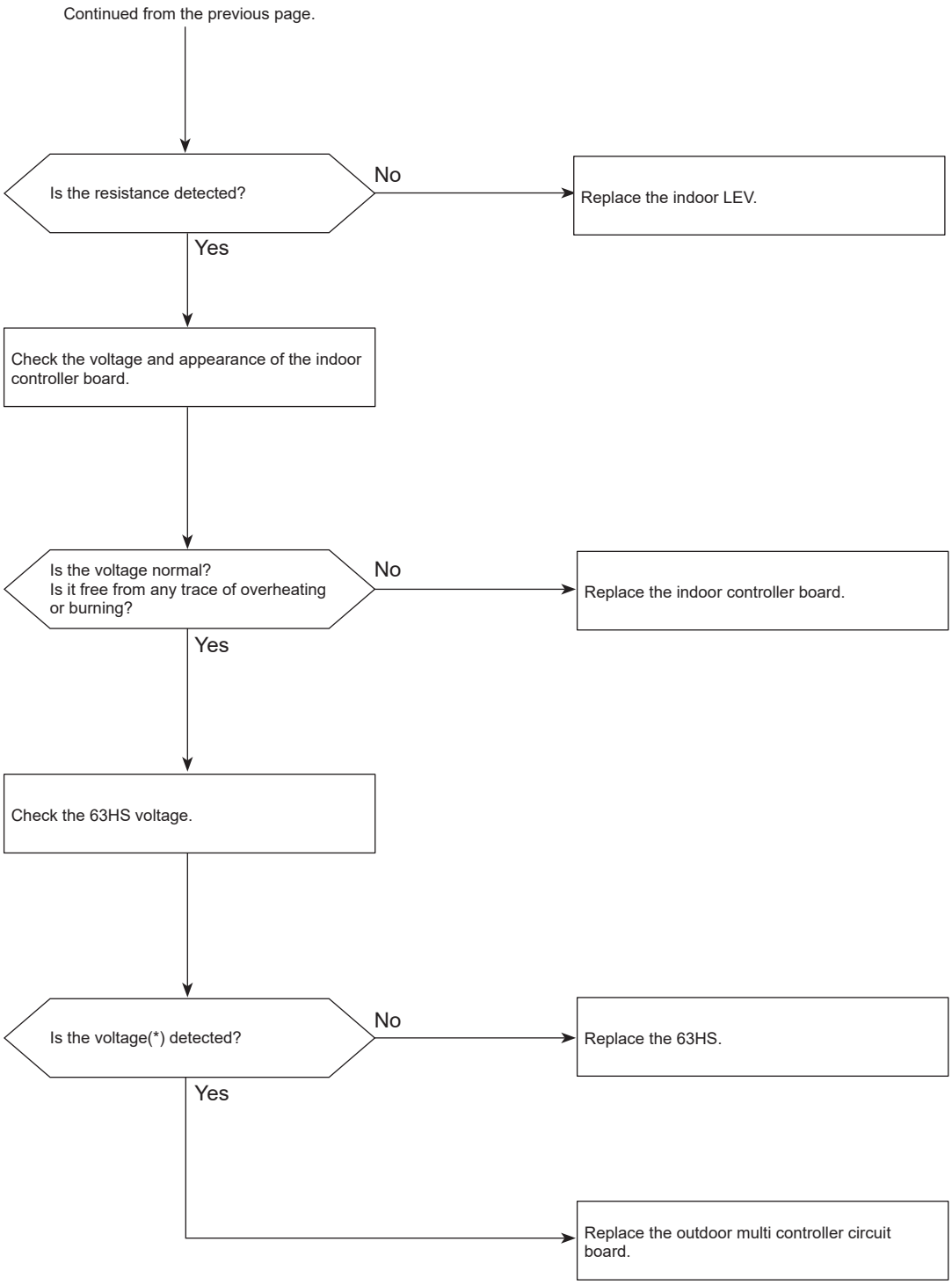
Diagnosis of failure



temp. - resistance characteristic	
0°C	700 kΩ
10°C	410 kΩ
20°C	250 kΩ
30°C	160 kΩ
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

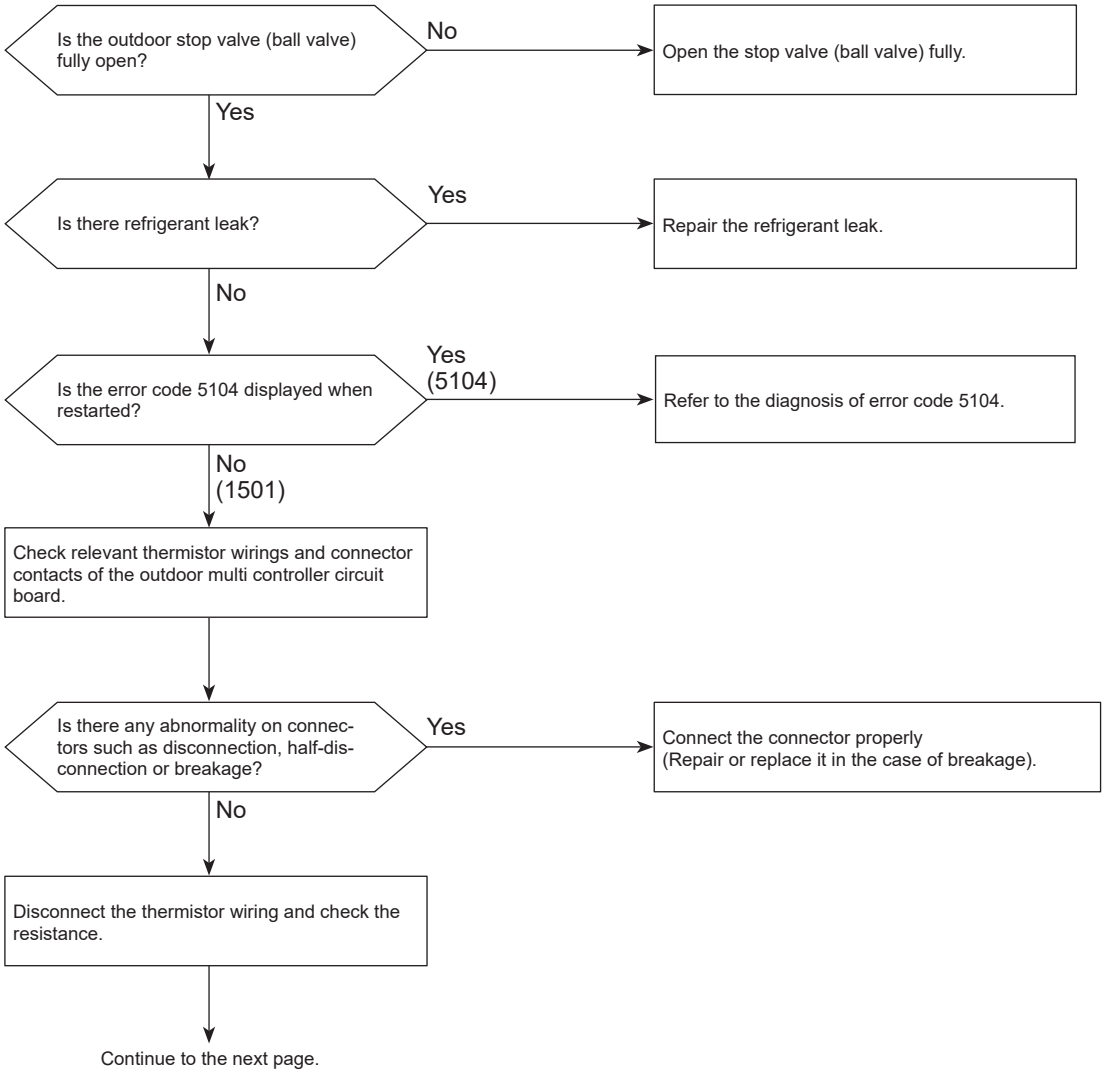
- All of the following conditions have been satisfied for 15 consecutive minutes:
  - The compressor is operating in HEAT mode.
  - Discharge superheat is 80°C or more.
  - Difference between TH7 and TH3 fits the formula of TH7−TH3 < 5°C
  - The saturation temperature converted from the pressure detected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

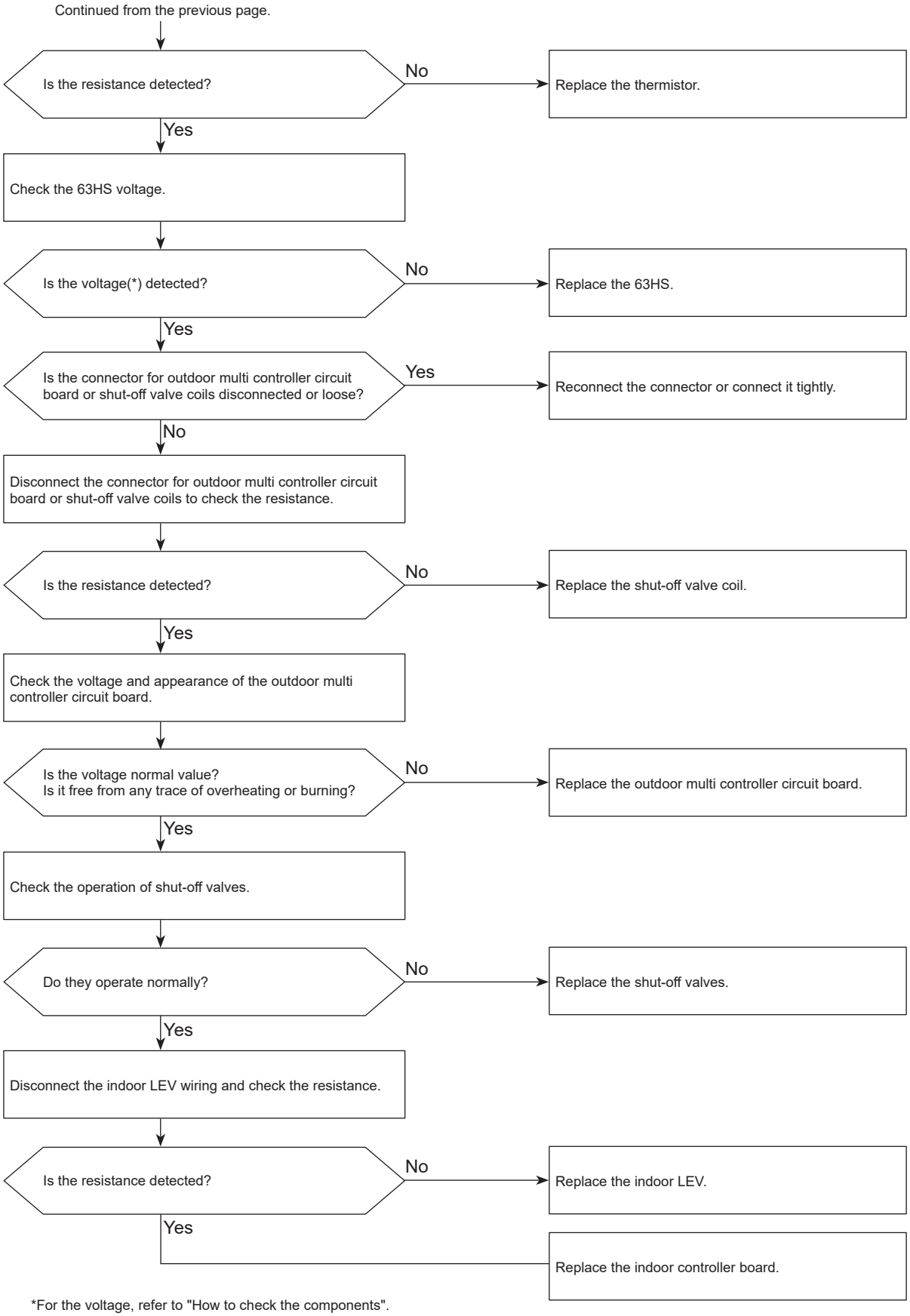
TH3:
Thermistor <Outdoor liquid pipe>
TH7:
Thermistor <Ambient>
LEV:
Linear expansion valve
63HS:
High pressure sensor

Diagnosis of failure



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 ≥ −2°C
TH23j−TH21j ≥ −2°C

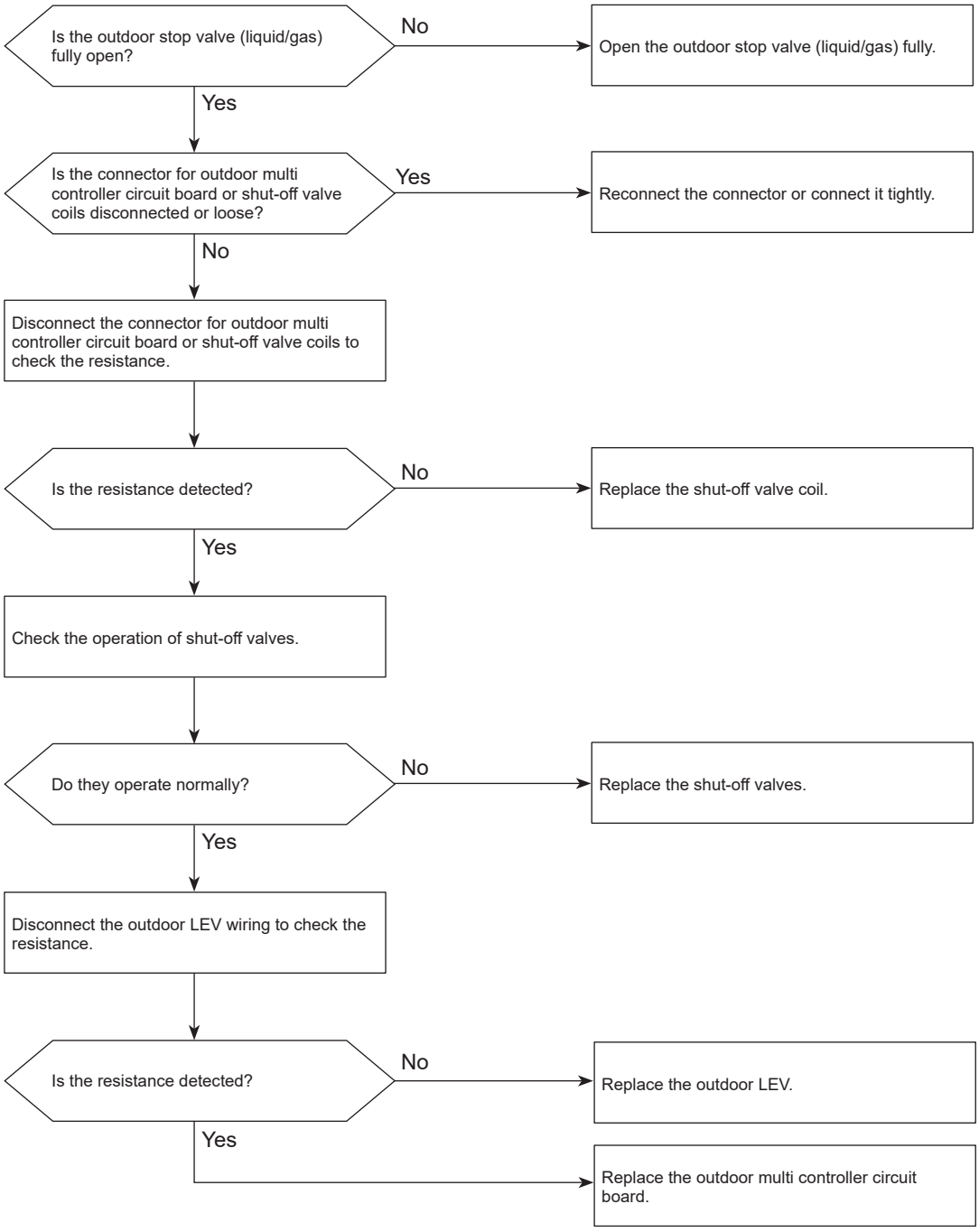
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

Causes and checkpoints

- Outdoor liquid/gas valve is closed.
- Malfunction of outdoor LEV (LEV1) (blockage)
- Malfunction of shut-off valves

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

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.

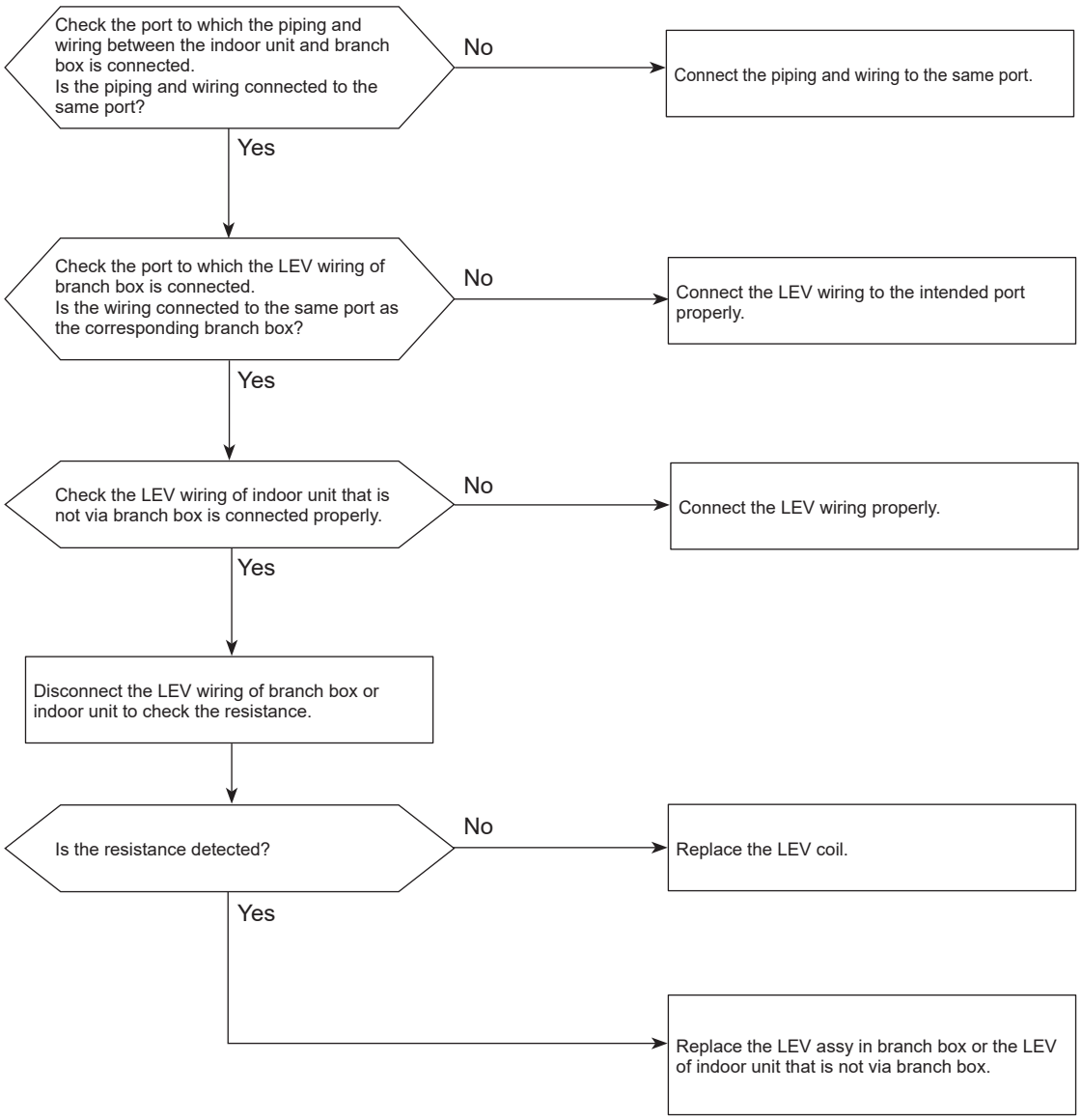
All of the following conditions have been satisfied:

- 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 ≤ −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 −20°C or more:

TH22j−TH21j ≤ −10°C
TH23j−TH21j ≤ −10°C
TH22j ≤ 3°C
TH23j ≤ 3°C

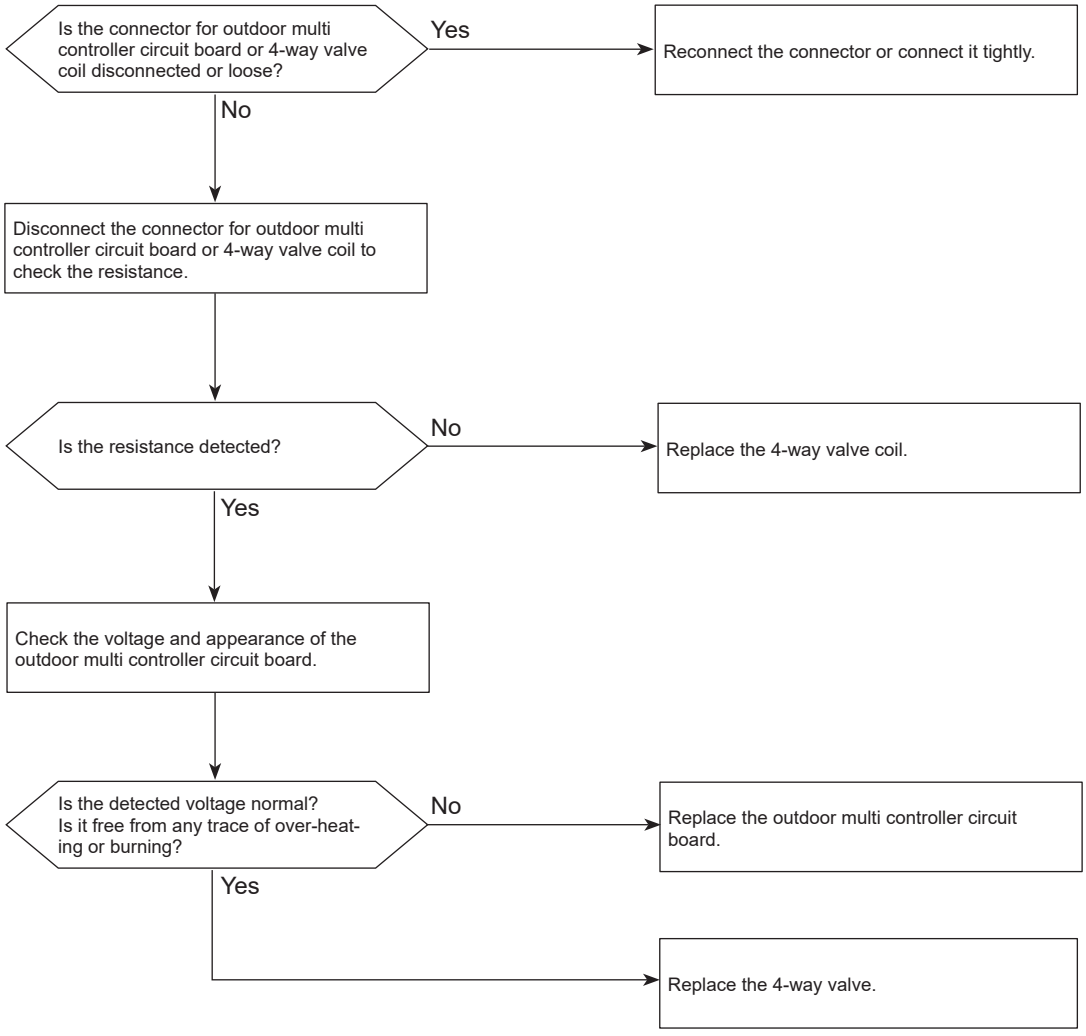
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

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
- 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.

1521/1522 (FL/EF): Refrigerant leakage

Abnormal points and detection methods

Refrigerant is leaking from the air conditioner.
The refrigerant sensor has detected refrigerant leak.
Refrigerant is leaking in the room where the alarm is beeping.

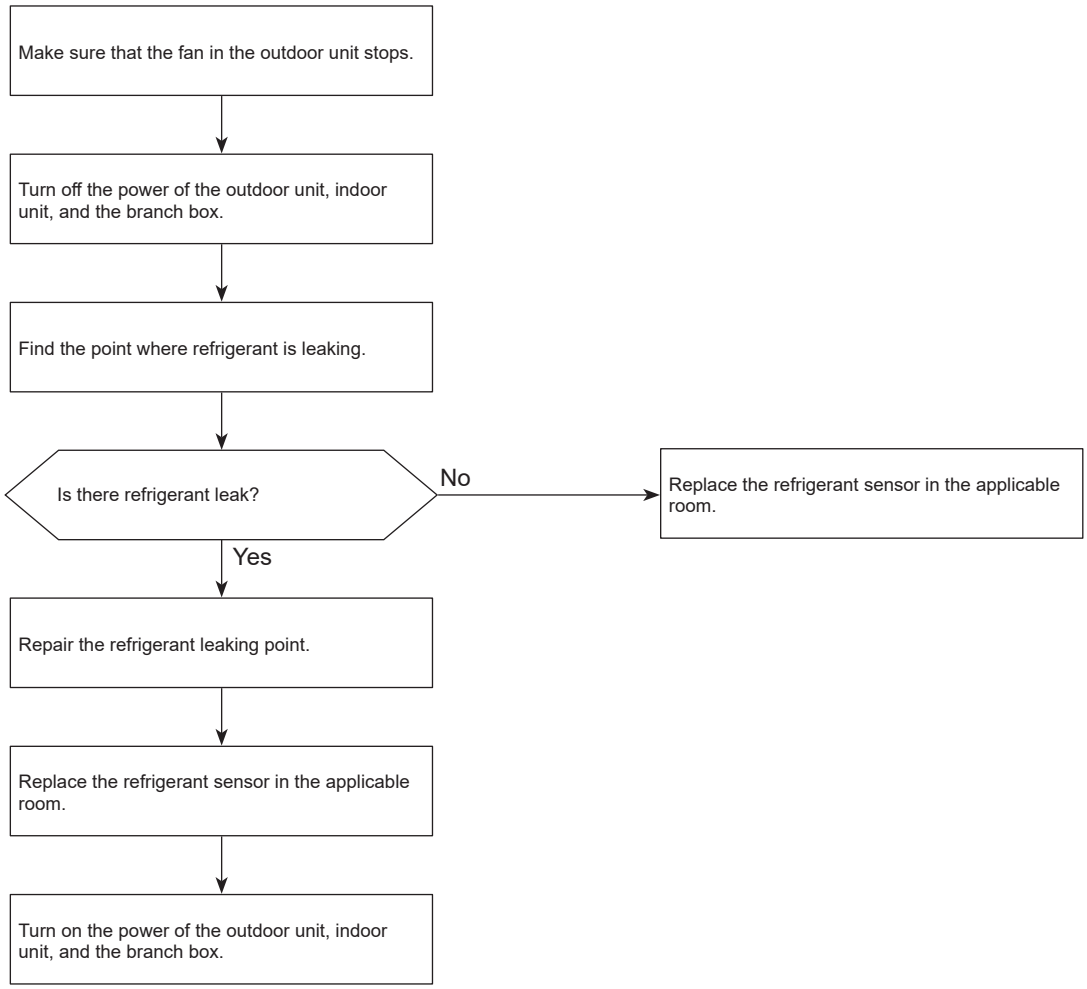
Causes and checkpoints

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

Notes:

- When this error occurs, both of the alarm in the applicable room and the supervisor mode alarm beep. Also, the system closes the shut-off valve and performs refrigerant recovery.
- 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.

Diagnosis of failure



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

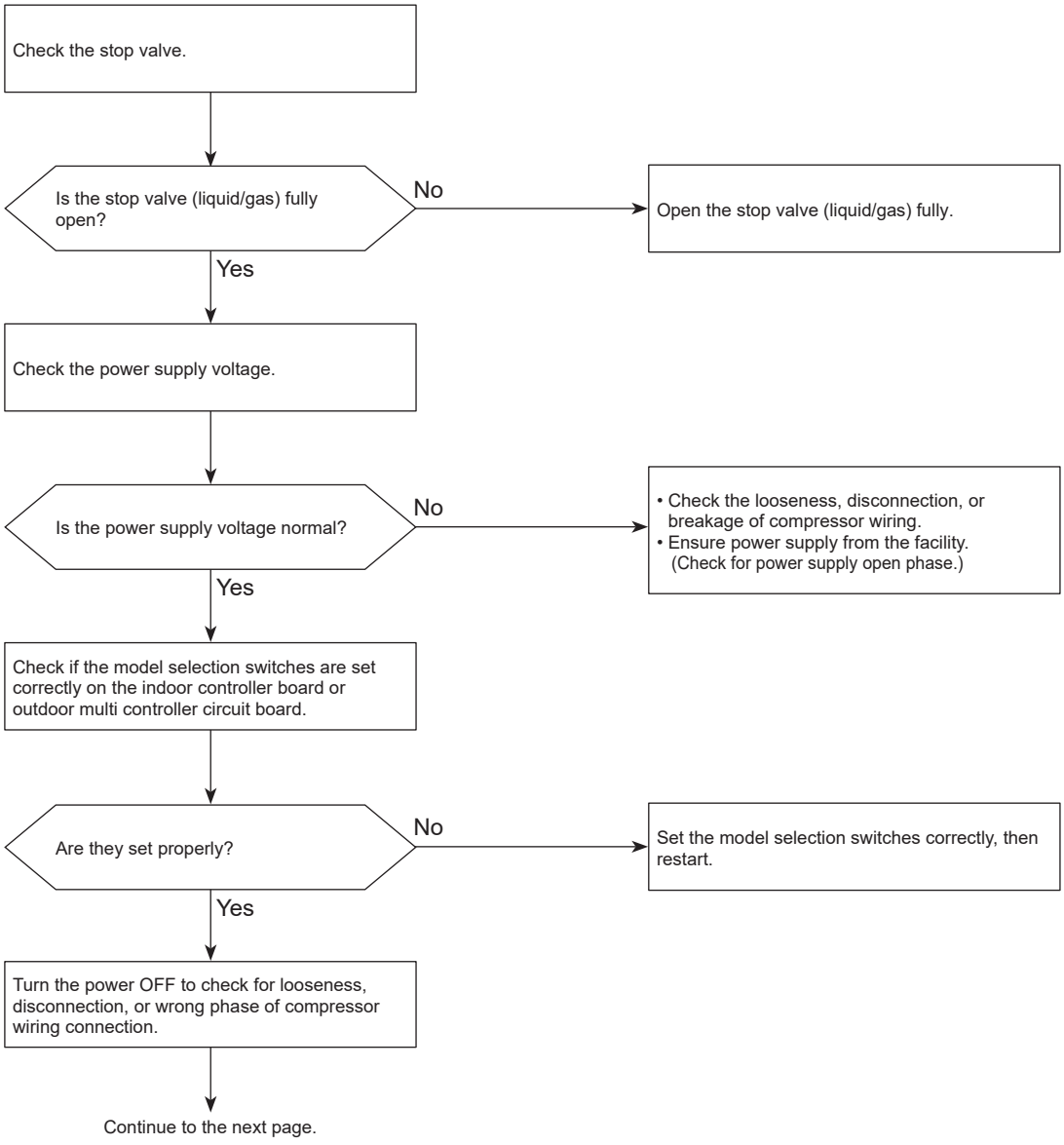
Abnormal points and detection methods

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

Causes and checkpoints

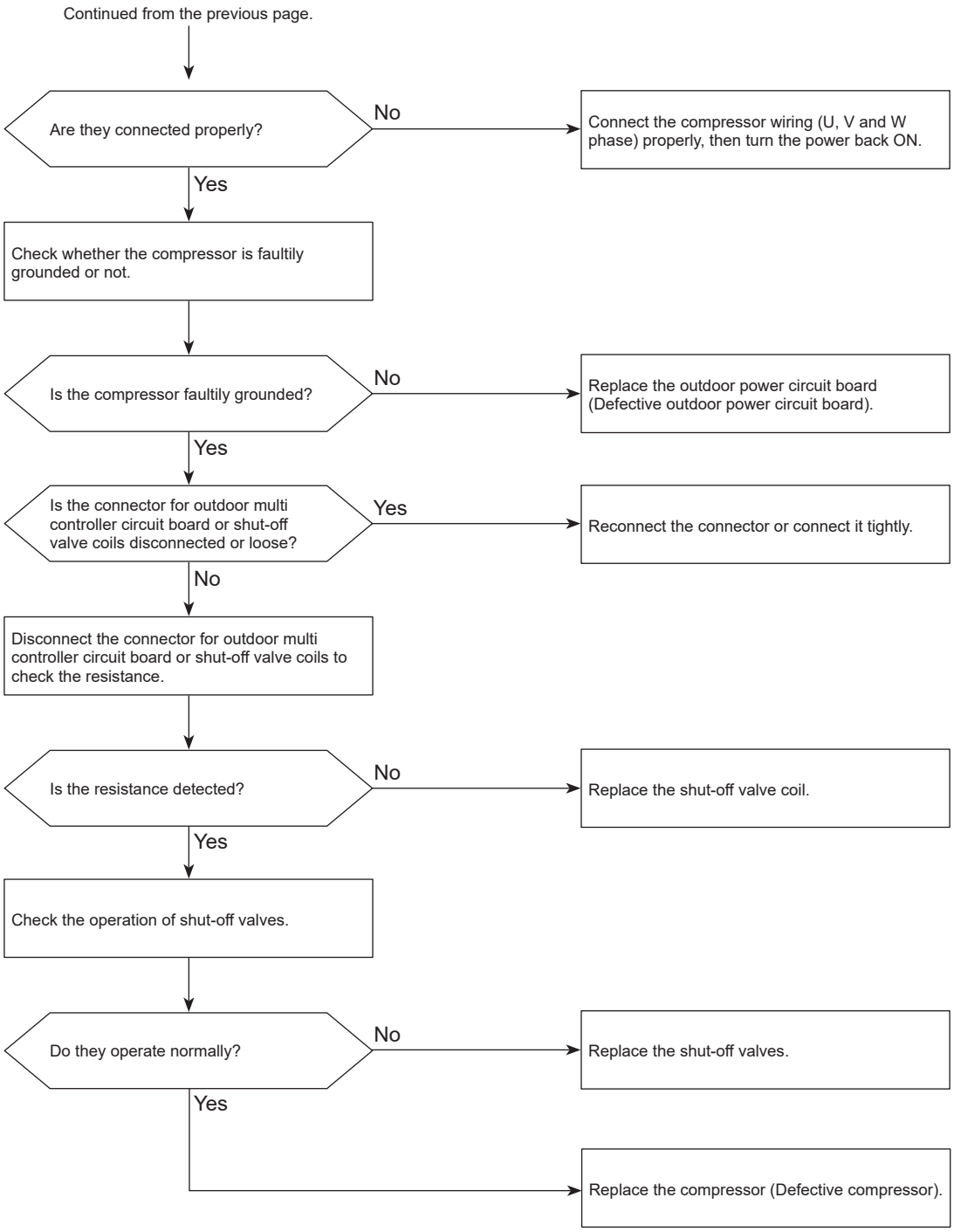
- Closed stop valve
- Decrease of power supply voltage
- Looseness, disconnection, or wrong phase of compressor wiring connection
- Incorrect DIP-SW setting of model selection on the outdoor controller board
- Defective compressor
- Defective outdoor power circuit board

Diagnosis of failure



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

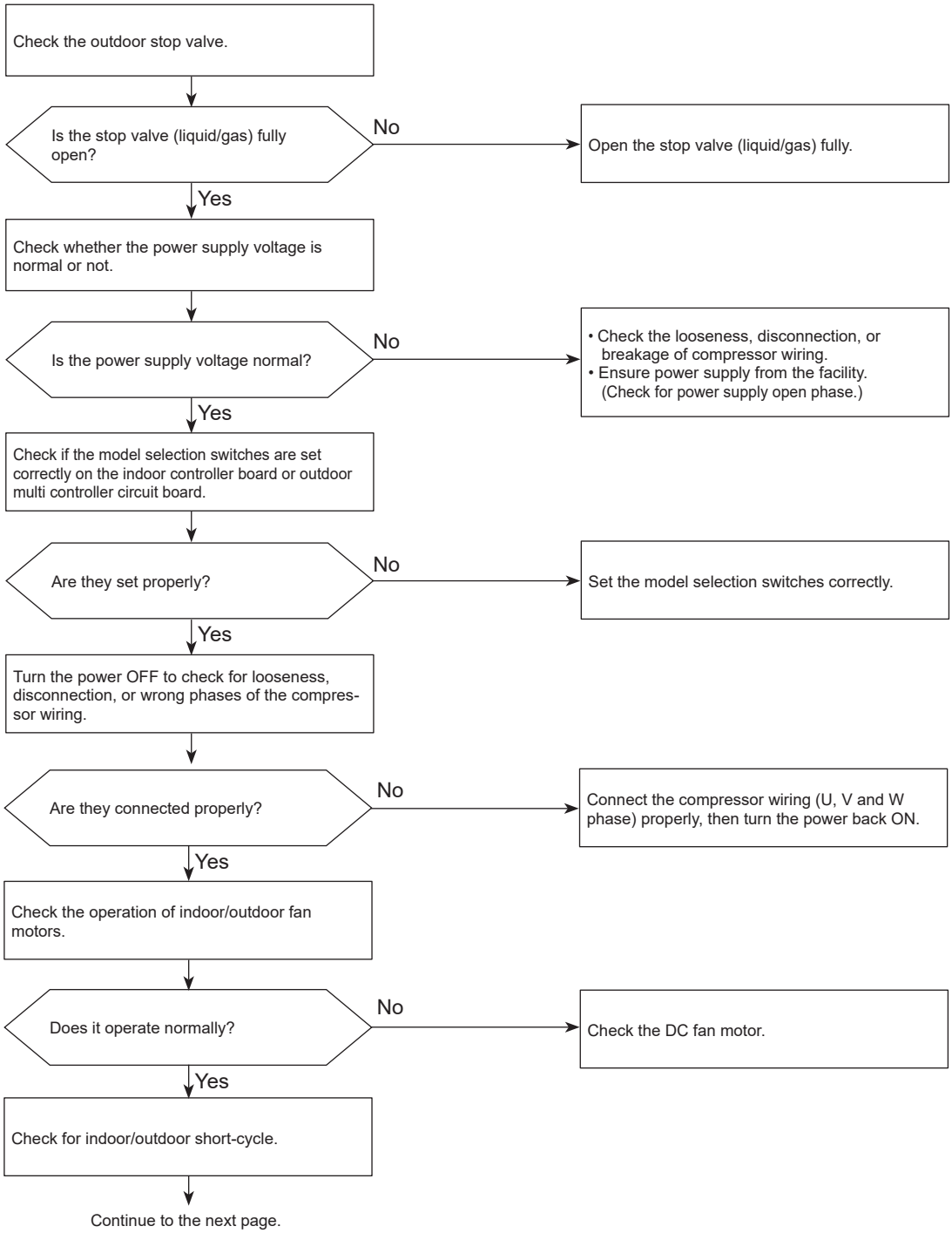
Abnormal points and detection methods

- Overcurrent of DC bus or compressor is detected 30 or more seconds after the compressor starts the operation.
- 12 VDC power is not supplied from the 12 VDC supply circuit on the power circuit board.

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
- Malfunction of shut-off valves

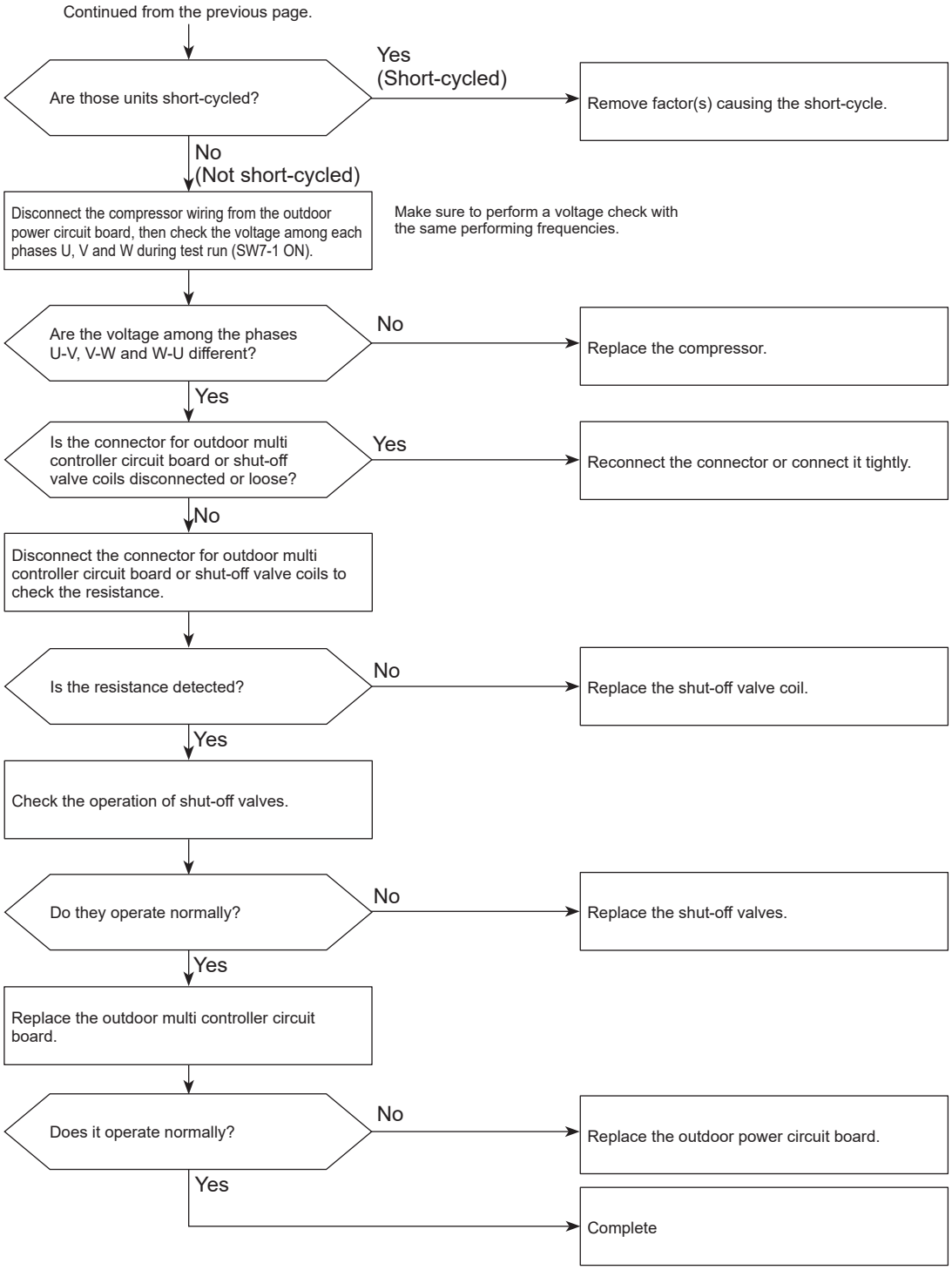
Diagnosis of failure



Continue to the next page.

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

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.

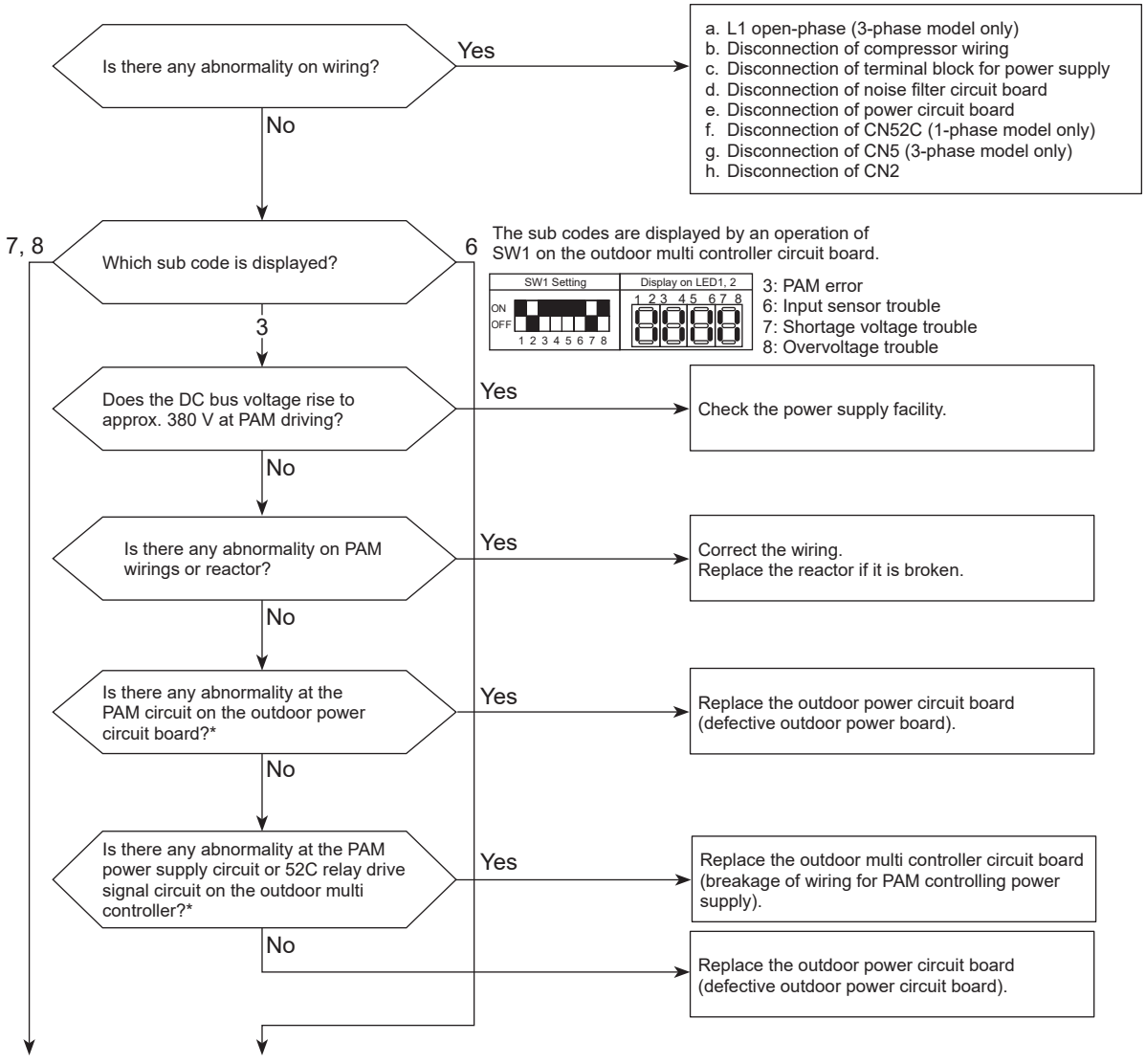
Any of the following conditions is satisfied while the detections value of primary current is 0.1 A or less.
- The operational frequency is 40 Hz or more.
- The compressor current is 6 A or more.

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)

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.

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.

No → Check the power supply facility.

Yes

Check the bus voltage read by the microprocessor with an operation of SW1 on the outdoor multi controller circuit board.

The bus voltage can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1, 2	Unit
ON / OFF 1 2 3 4 5 6 7 8	0–9999	V

Is the power supply normal?

No → Check the power supply facility.

Yes

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

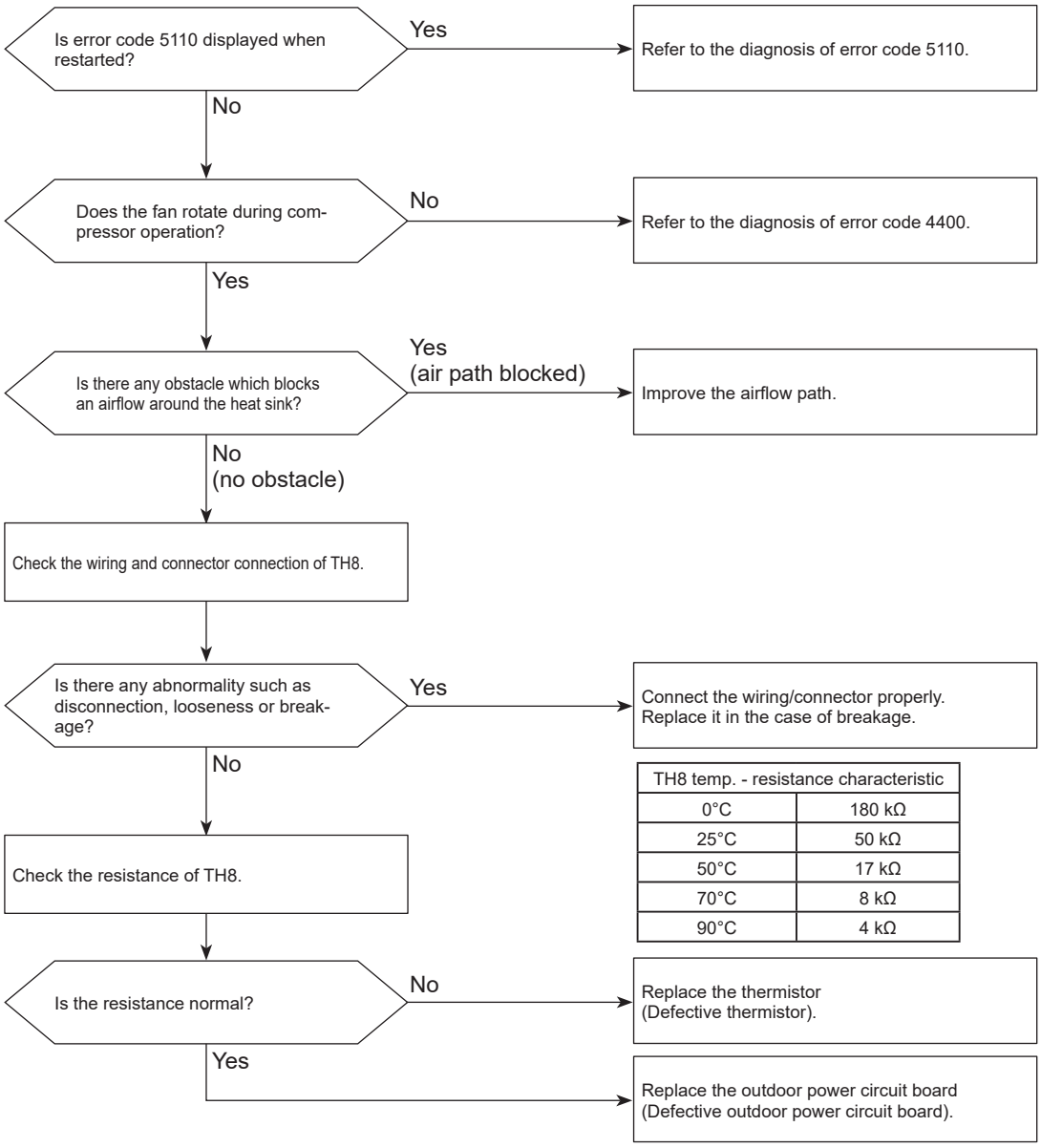
TH8 detects a temperature outside the specified range during compressor operation.

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

Diagnosis of failure



TH8 temp. - resistance characteristic	
0°C	180 kΩ
25°C	50 kΩ
50°C	17 kΩ
70°C	8 kΩ
90°C	4 kΩ

4250 (U6): Power module trouble

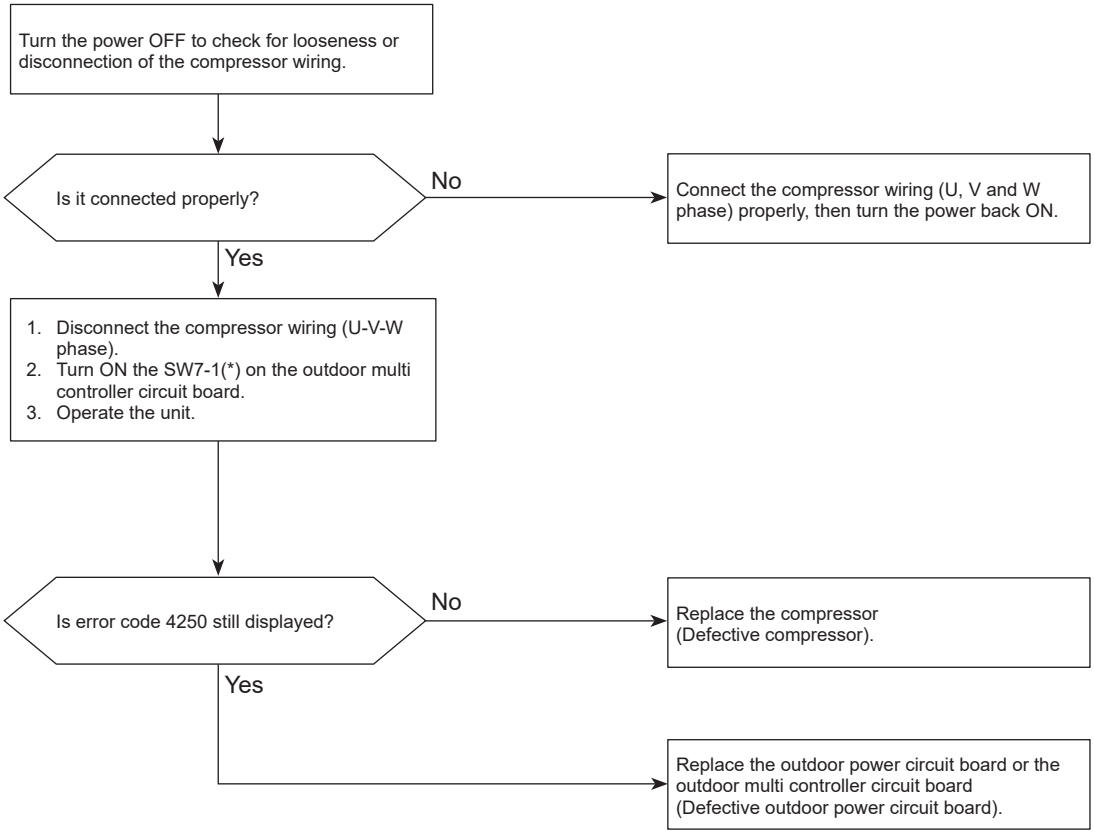
Abnormal points and detection methods

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



* SW7-1 ON: Ignore 5300(UH) error.

4400 (U8): Fan trouble (Outdoor unit)

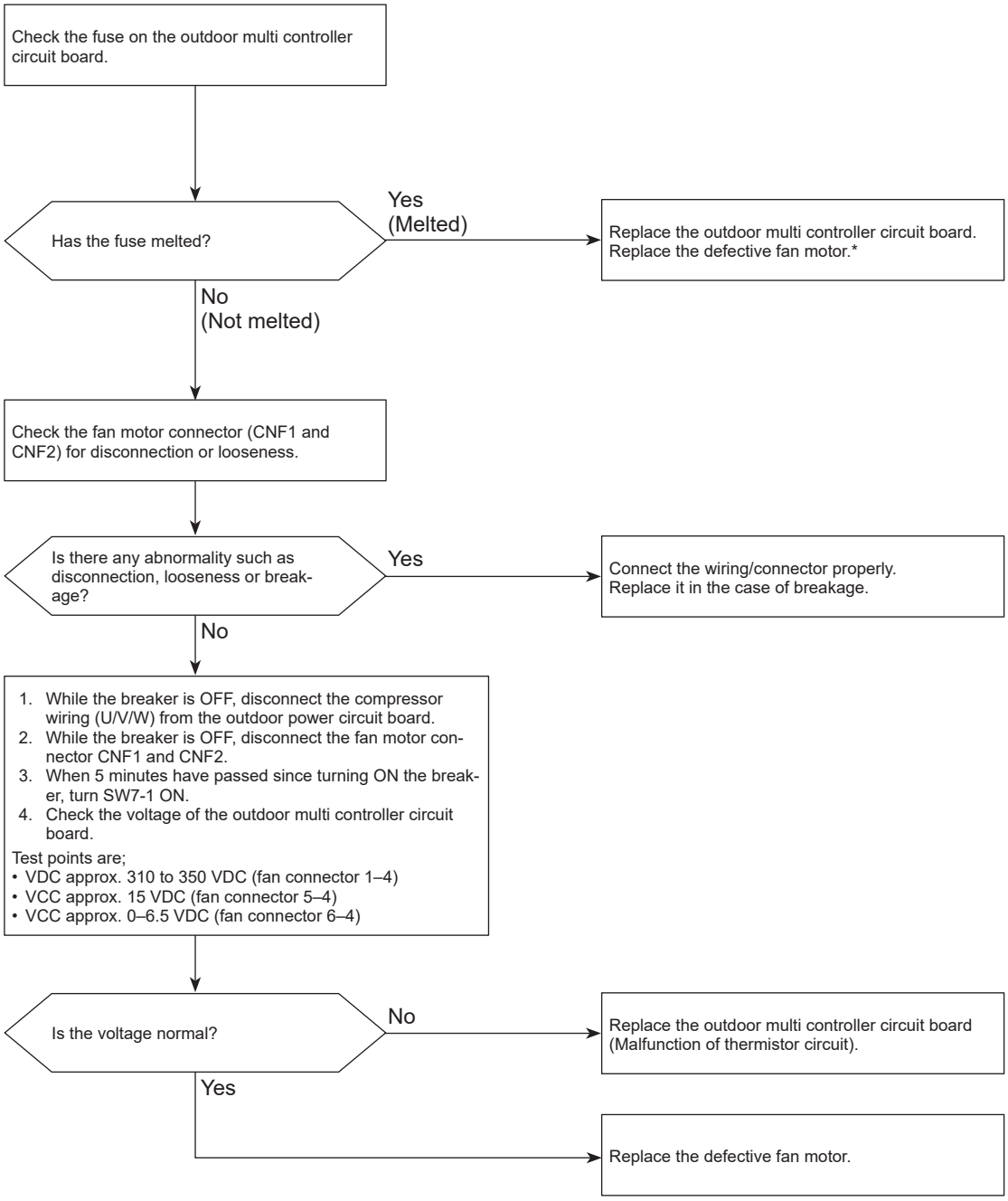
Abnormal points and detection methods

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 SW7-1 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.

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.)

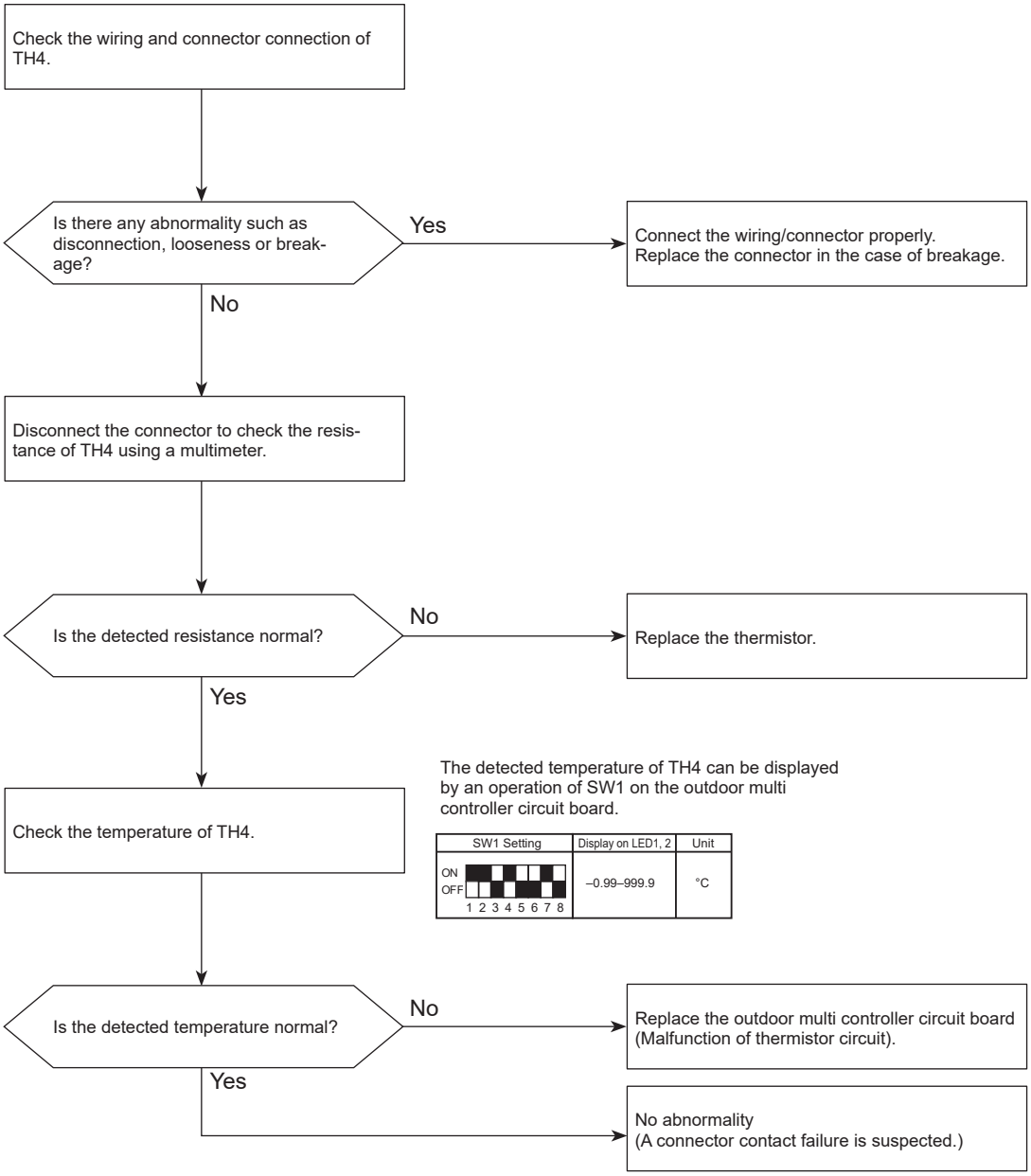
Open:
3°C or less*
Short:
217°C or more
TH4:
Thermistor <Compressor>

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.)

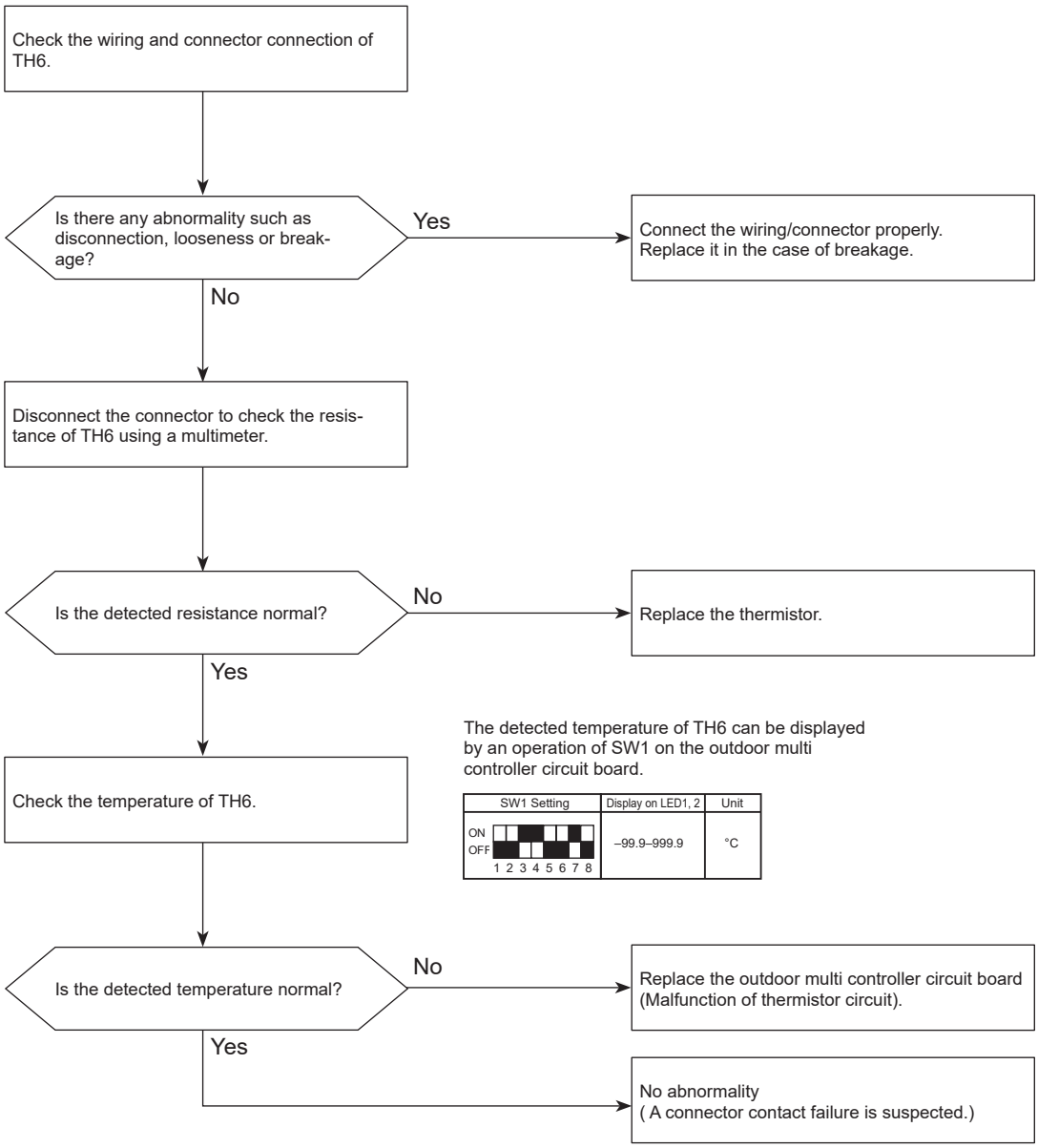
Open:
−40°C or less
Short:
90°C or more
TH6:
Thermistor <Suction pipe>

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.)

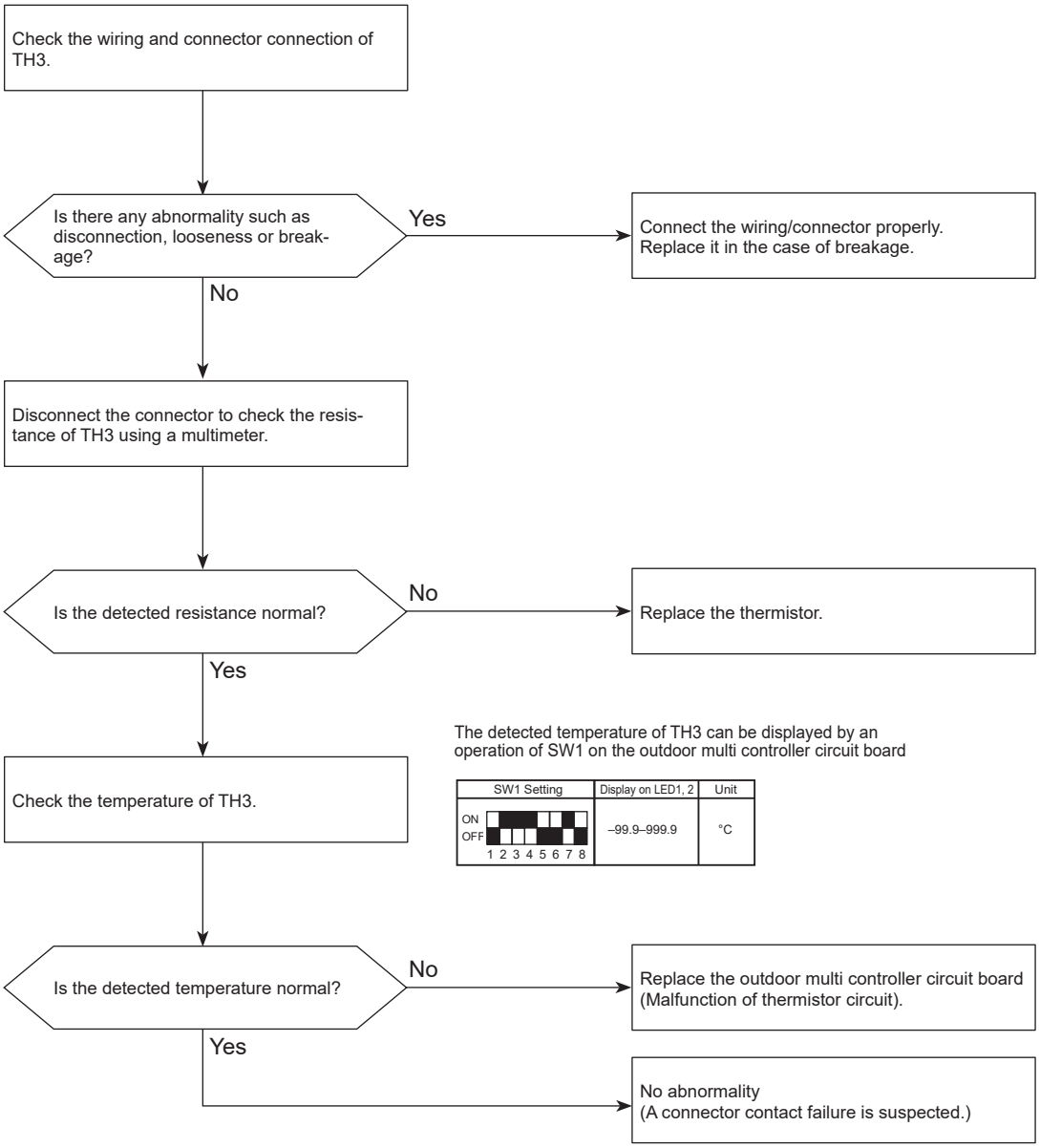
Open:
−40°C or less
Short:
90°C or more
TH3:
Thermistor <Outdoor liquid pipe>

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



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

Abnormal points and detection methods

TH7 is found to be open/short

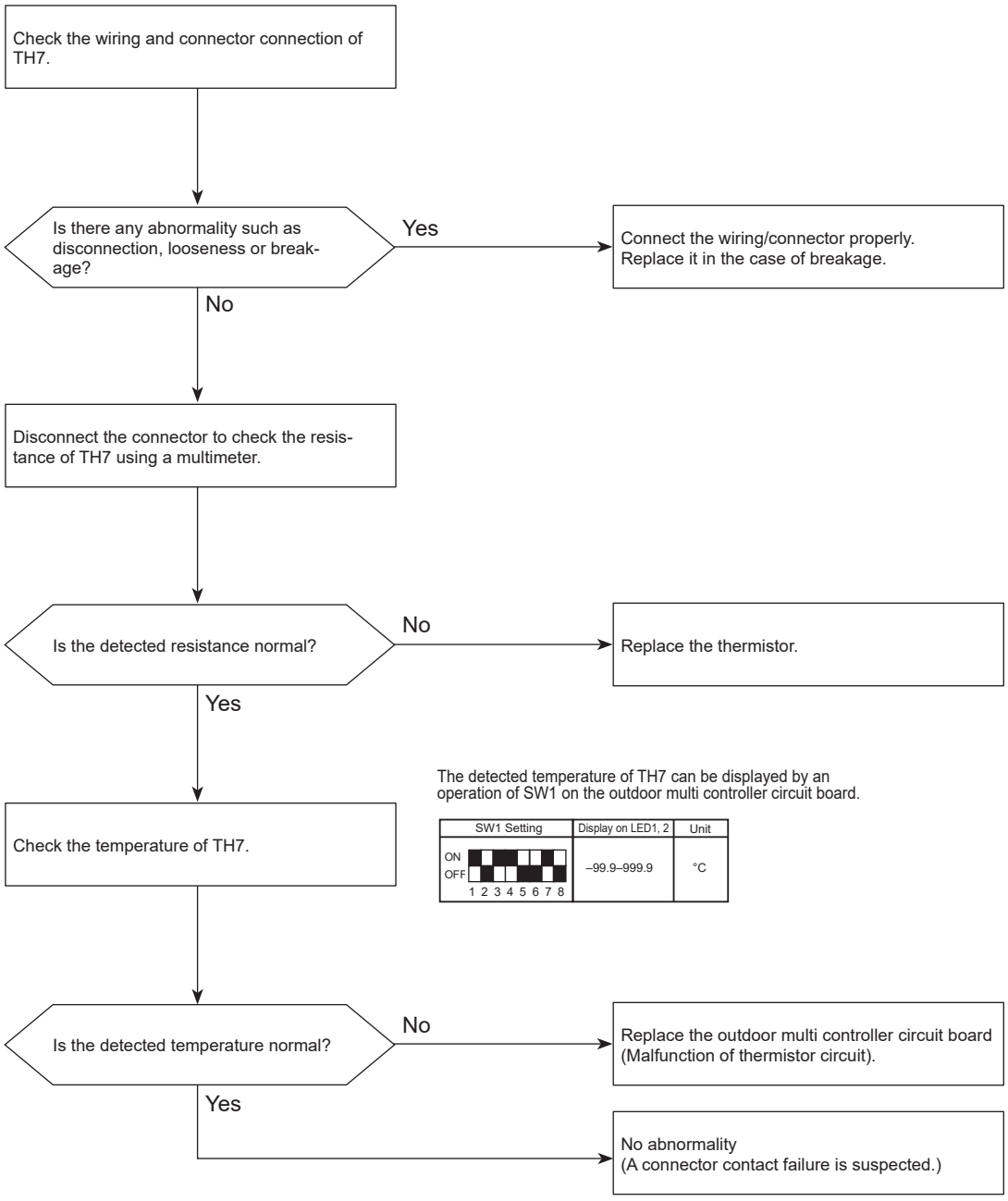
Open:
−40°C or less
Short:
90°C or more
TH7:
Thermistor <Ambient>

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



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

Abnormal points and detection methods

TH2 is found to be open/short.

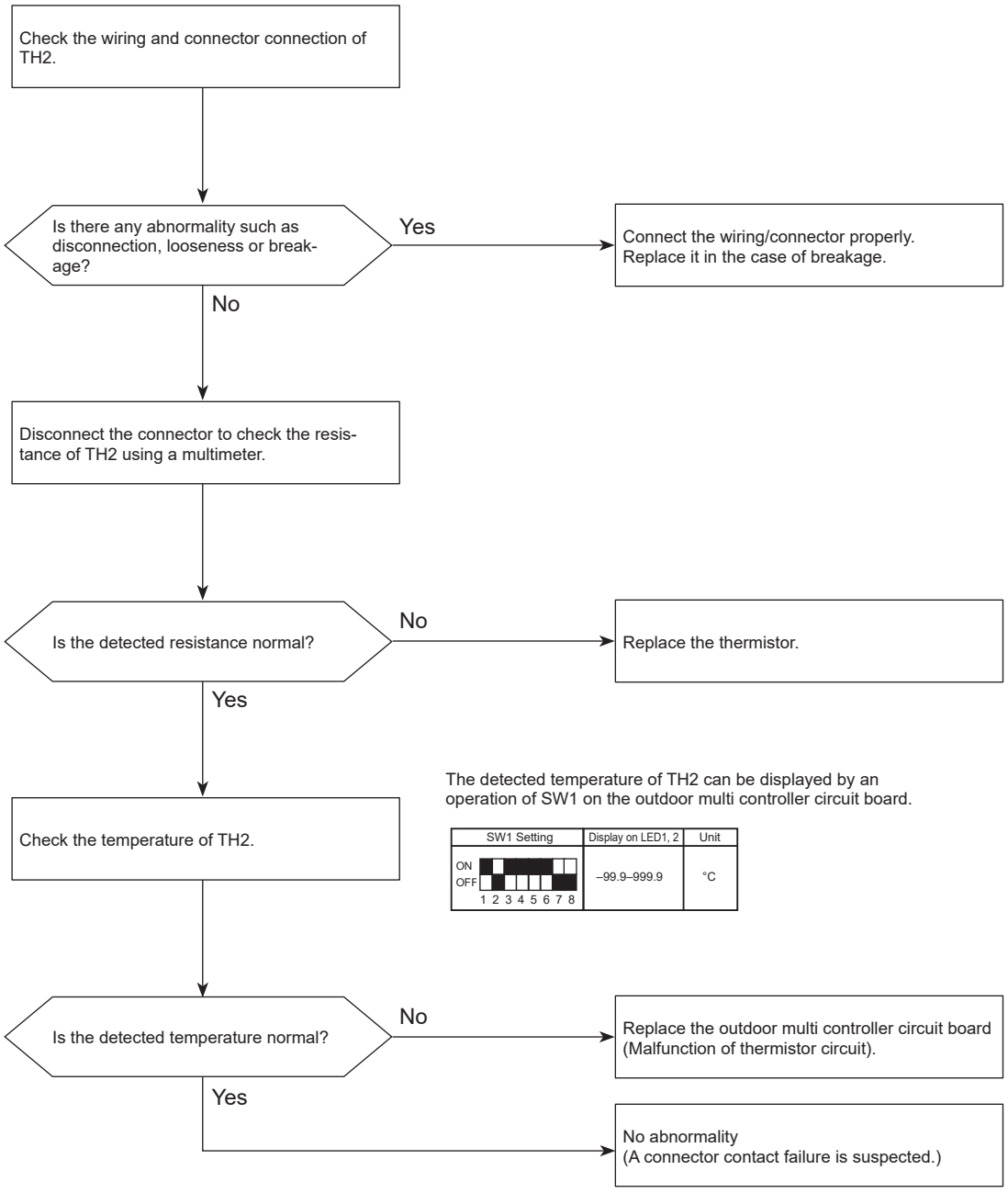
Open:
−40°C or less
Short:
90°C or more
TH2:
Thermistor <HIC pipe>

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.

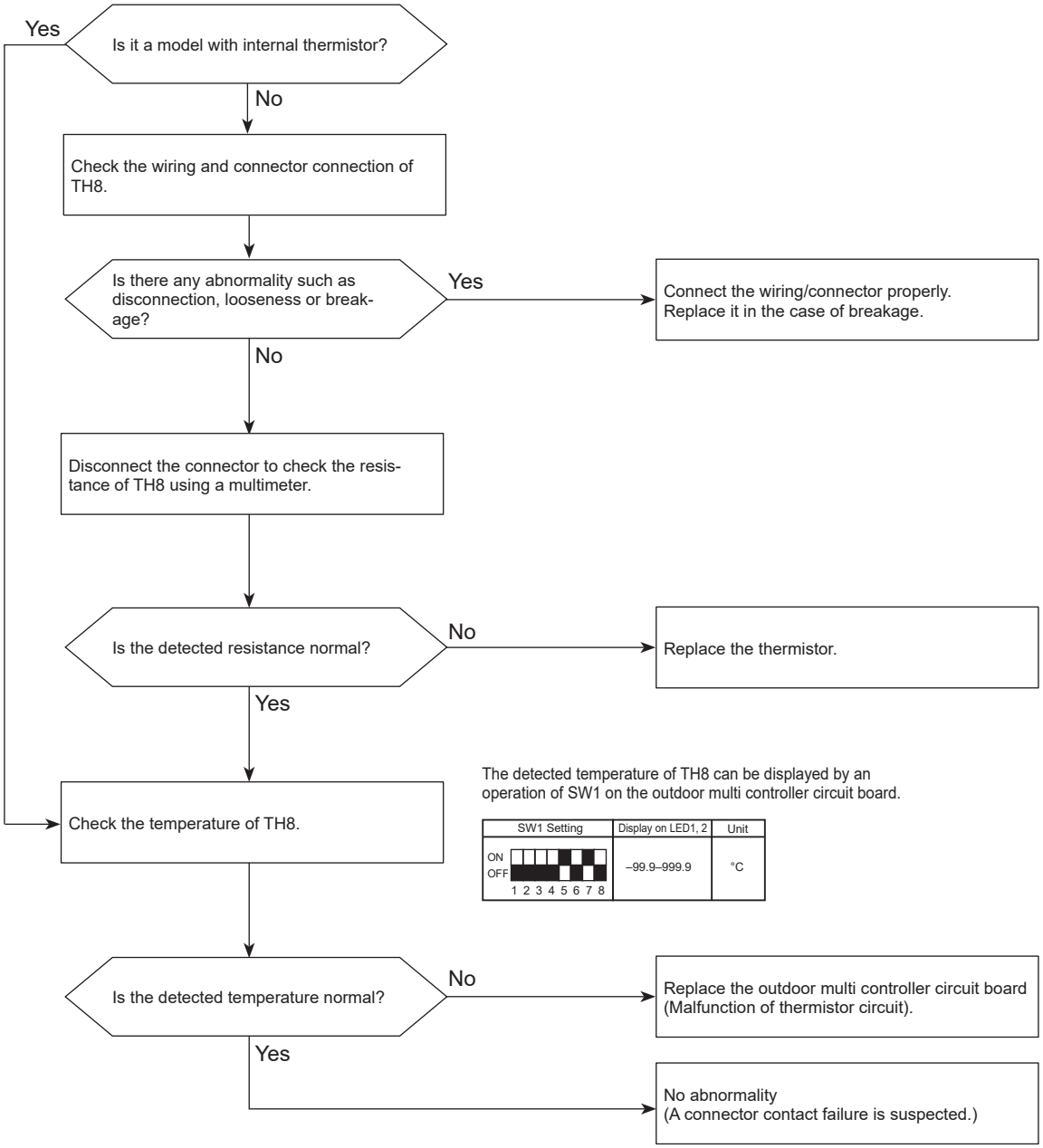
- V model <Internal thermistor>
  Open:
  −35.1°C or less
  Short:
  170.3°C or more
- Y model
  Open:
  −34.8°C or less
  Short:
  102°C or more
  TH8:
  Thermistor <Heat sink>

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

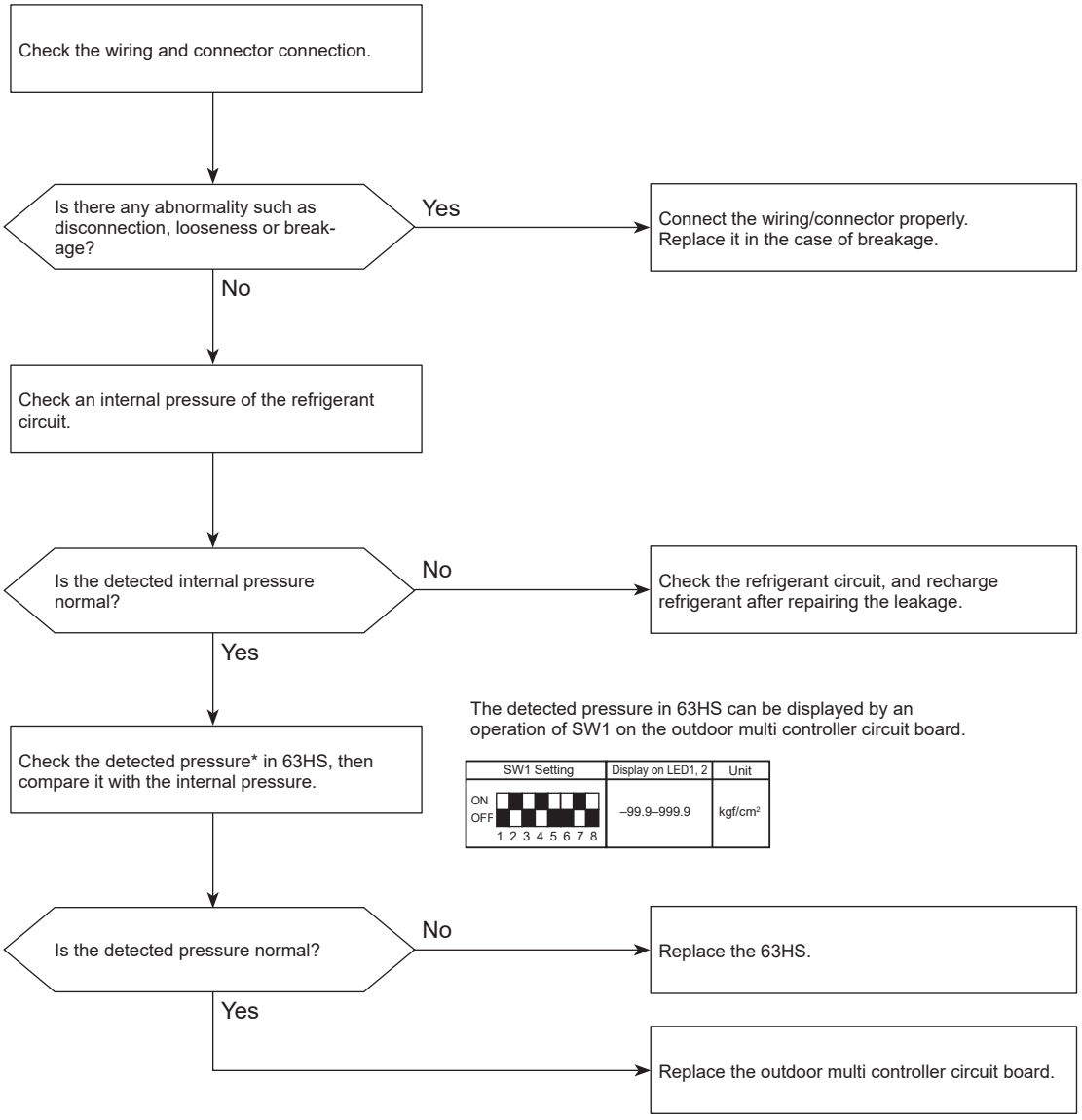
- The detected pressure in the high pressure sensor is 1 kgf/cm^2 or less during operation, the compressor stops operation and enters into an anti-restart mode for 3 minutes.
- The detected pressure is 1 kgf/cm^2 or less immediately before restarting, the compressor falls into an abnormal stop with error 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 SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1, 2	Unit
ON / OFF 1 2 3 4 5 6 7 8	–99.9–999.9	kgf/cm^2

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

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

Abnormal points and detection methods

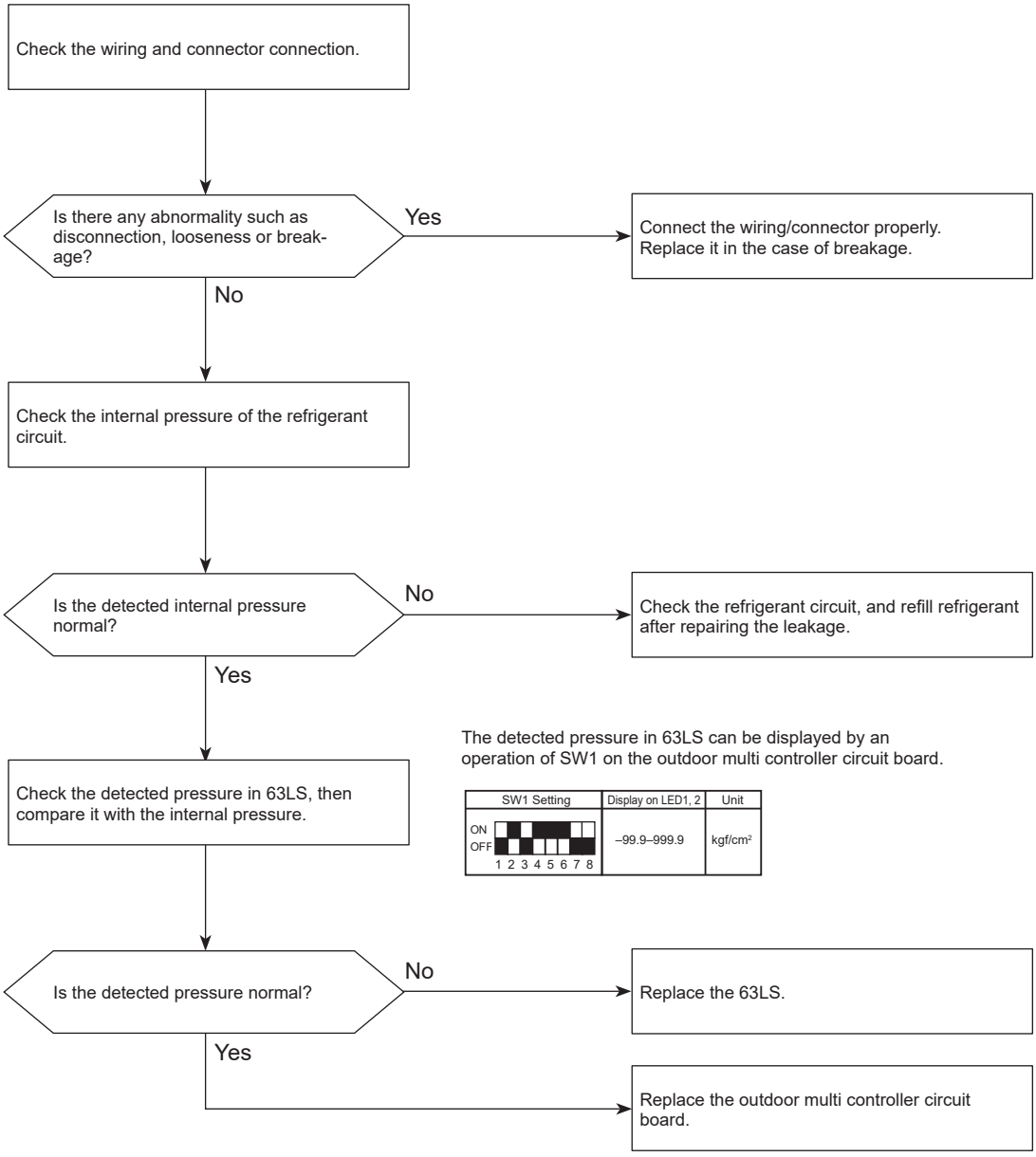
- The detected pressure in the low pressure sensor is −2.3 kgf/cm^2 or less, or 23.1 kgf/cm^2 or more during operation, the compressor stops operation with error code 5202.
- For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, 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 SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1, 2	Unit
ON / OFF 1 2 3 4 5 6 7 8	–99.9–999.9	kgf/cm^2

5300 (UH): Current sensor trouble

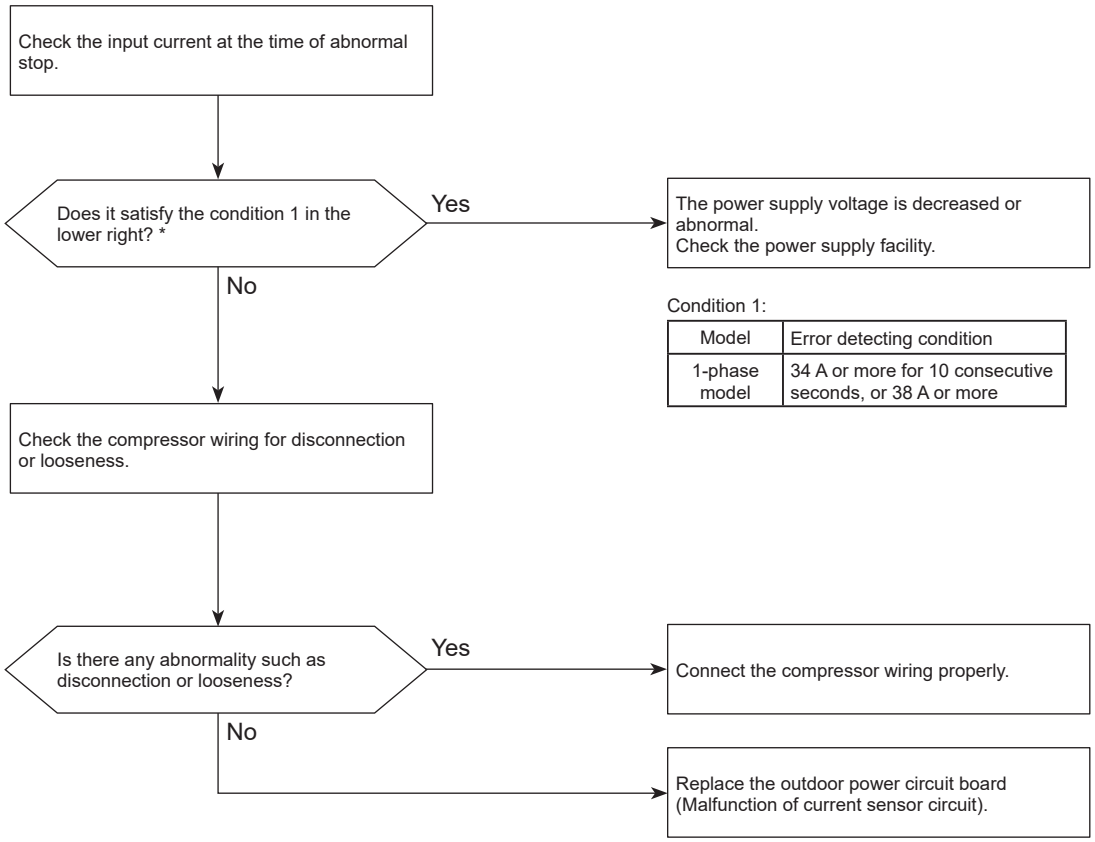
Abnormal points and detection methods

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

Diagnosis of failure



Condition 1:

Model	Error detecting condition
1-phase model	34 A or more for 10 consecutive seconds, or 38 A or more

* Applicable only for single phase model

5558 (FH): Refrigerant sensor error

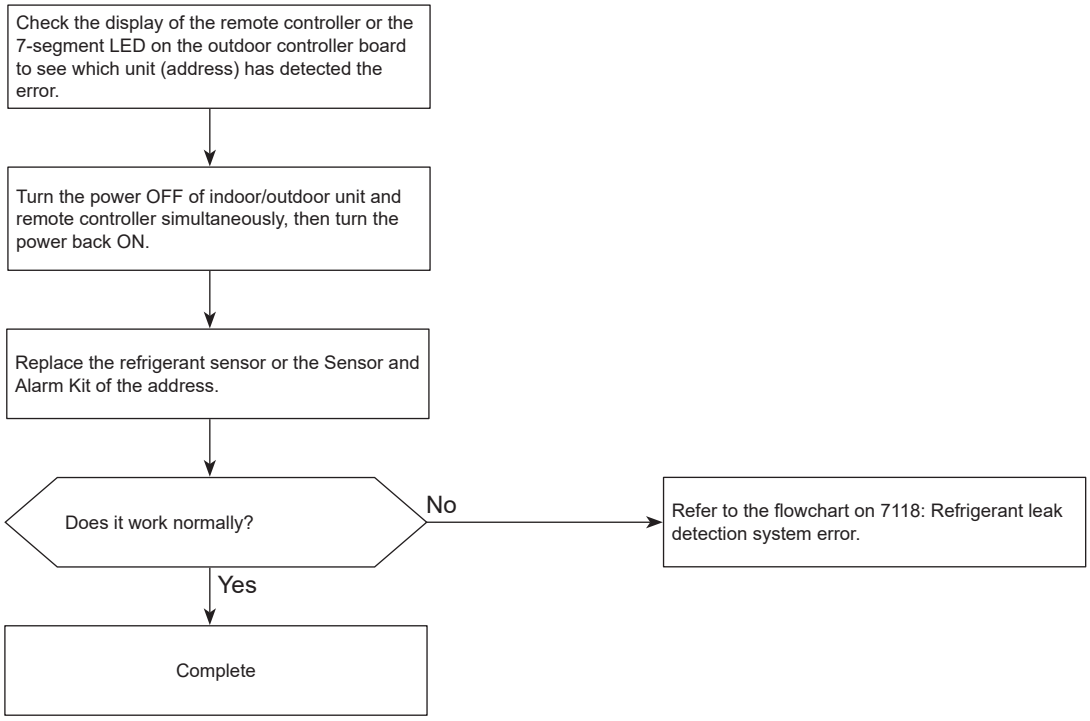
Abnormal points and detection methods

A refrigerant sensor has failed.

Causes and checkpoints

- A refrigerant sensor connected to an M-IC has failed.
- A Sensor and Alarm Kit connected to a branch box has failed.

Diagnosis of failure



6600 (A0): Duplex address error

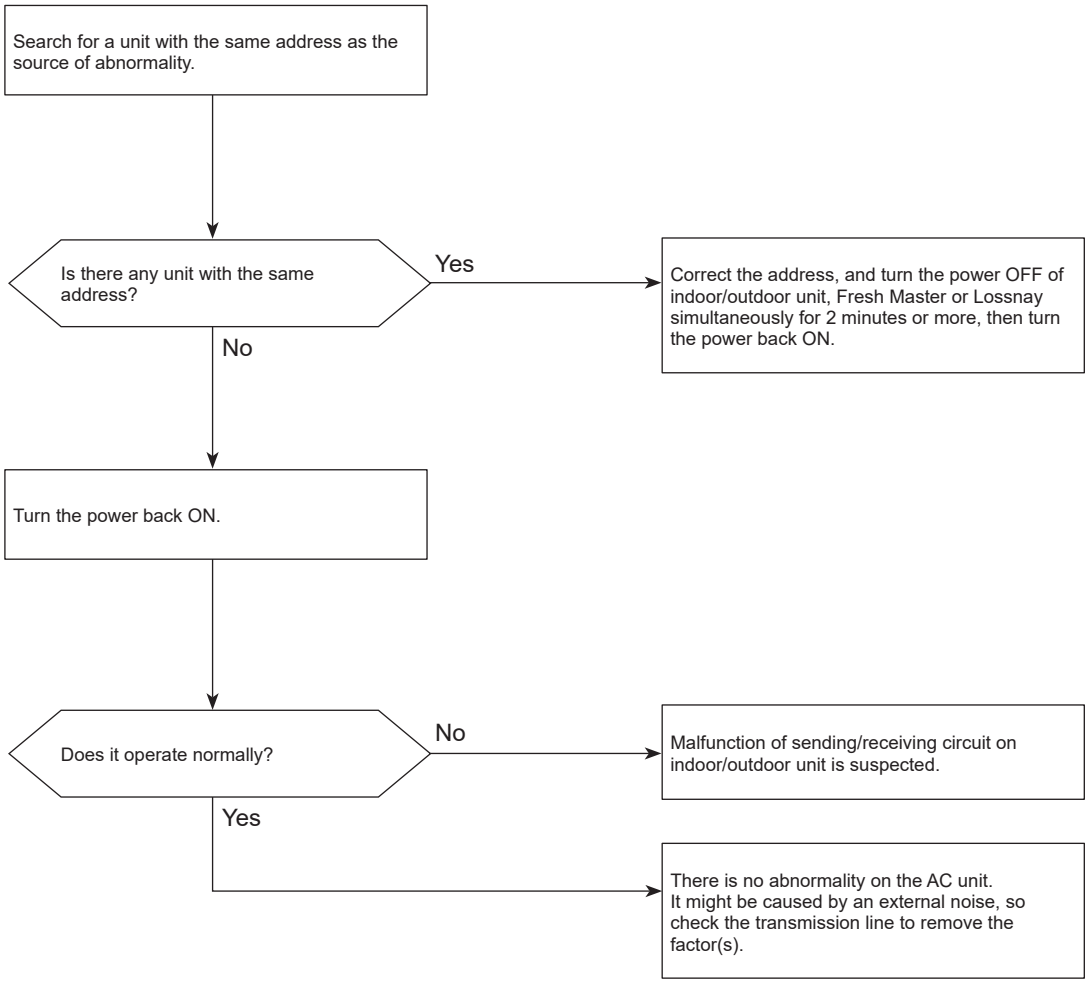
Abnormal points and detection methods

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

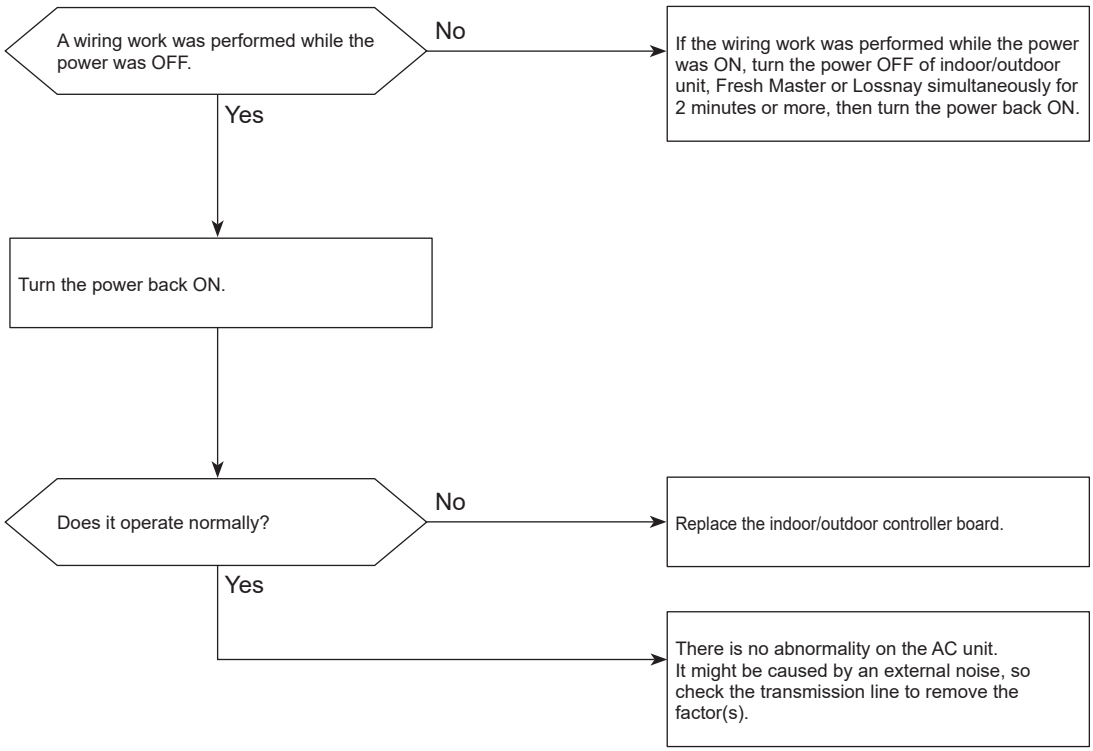
Abnormal points and detection methods

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

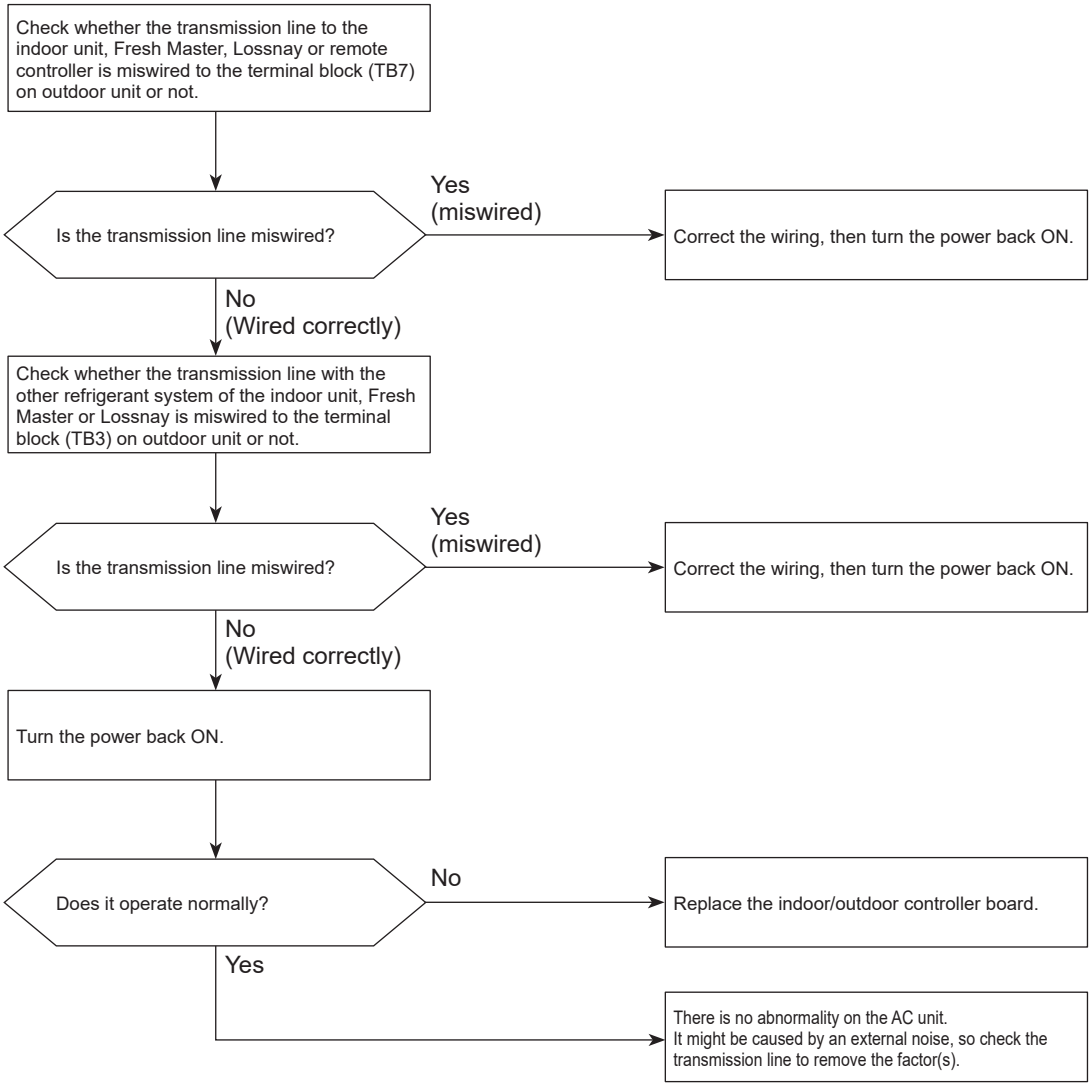
Abnormal points and detection methods

- 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

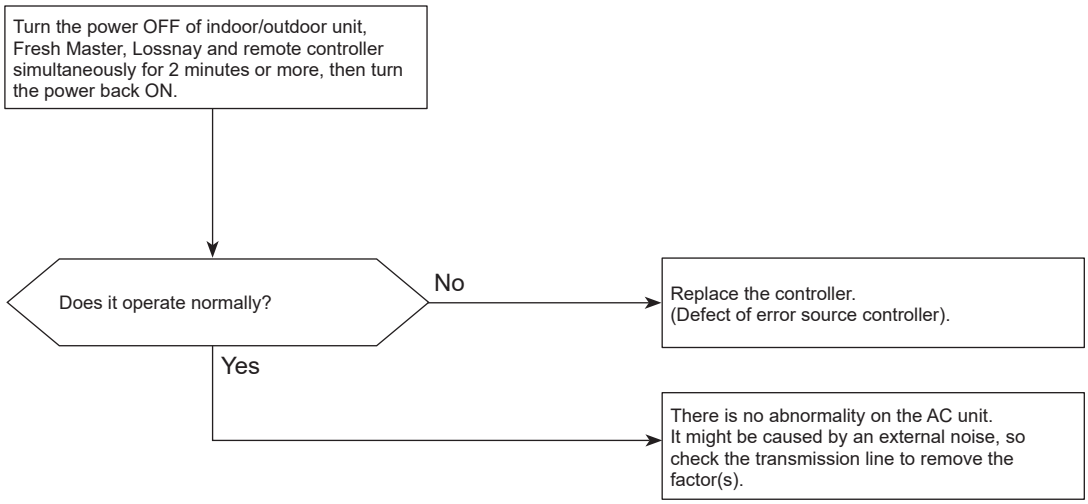
Abnormal points and detection methods

- 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: 200 m - For remote controller line: 12 m • Decline of transmission voltage/signal due to unmatched transmission line types - Types for shield line: CVVS, CPEVS, or MVVS - Line diameter: 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
■ 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

6607 (A7): No ACK error

Abnormal points and detection methods

■ 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.

Causes and checkpoints

- 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.

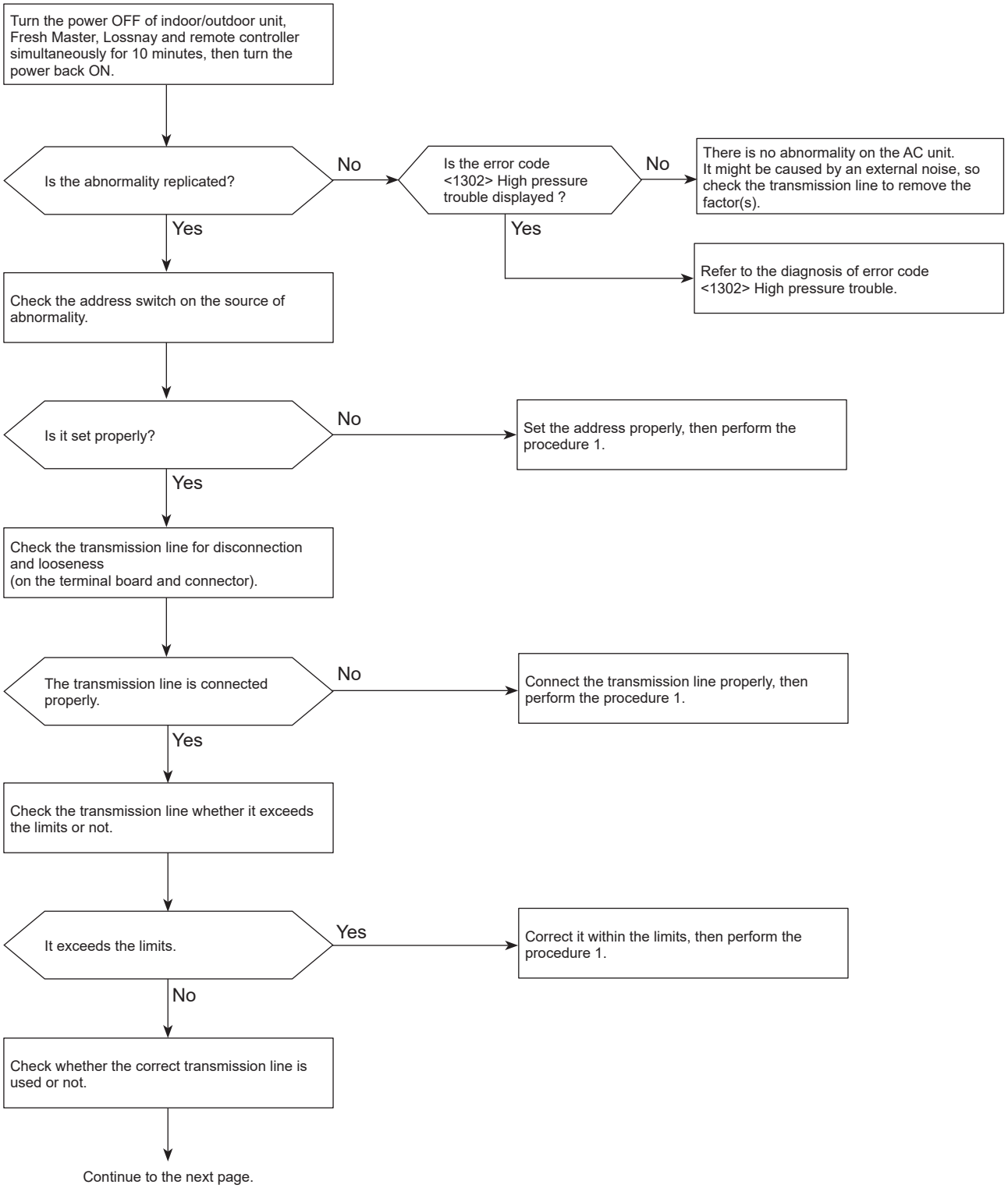
6607 (A7): No ACK error

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.

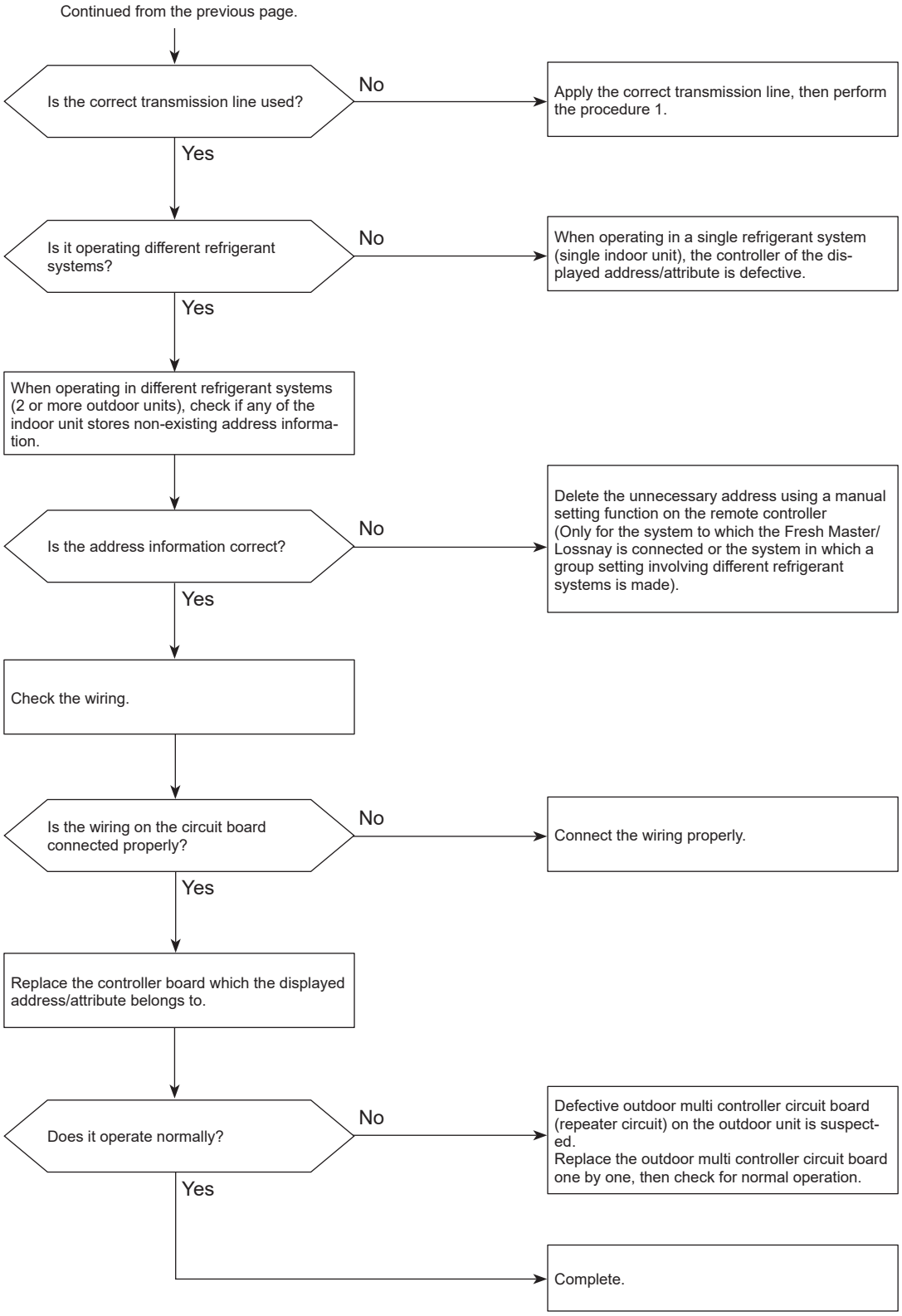
Procedure 1:



Continue to the next page.

6607 (A7): No ACK error

Diagnosis of failure



6608 (A8): No response frame error

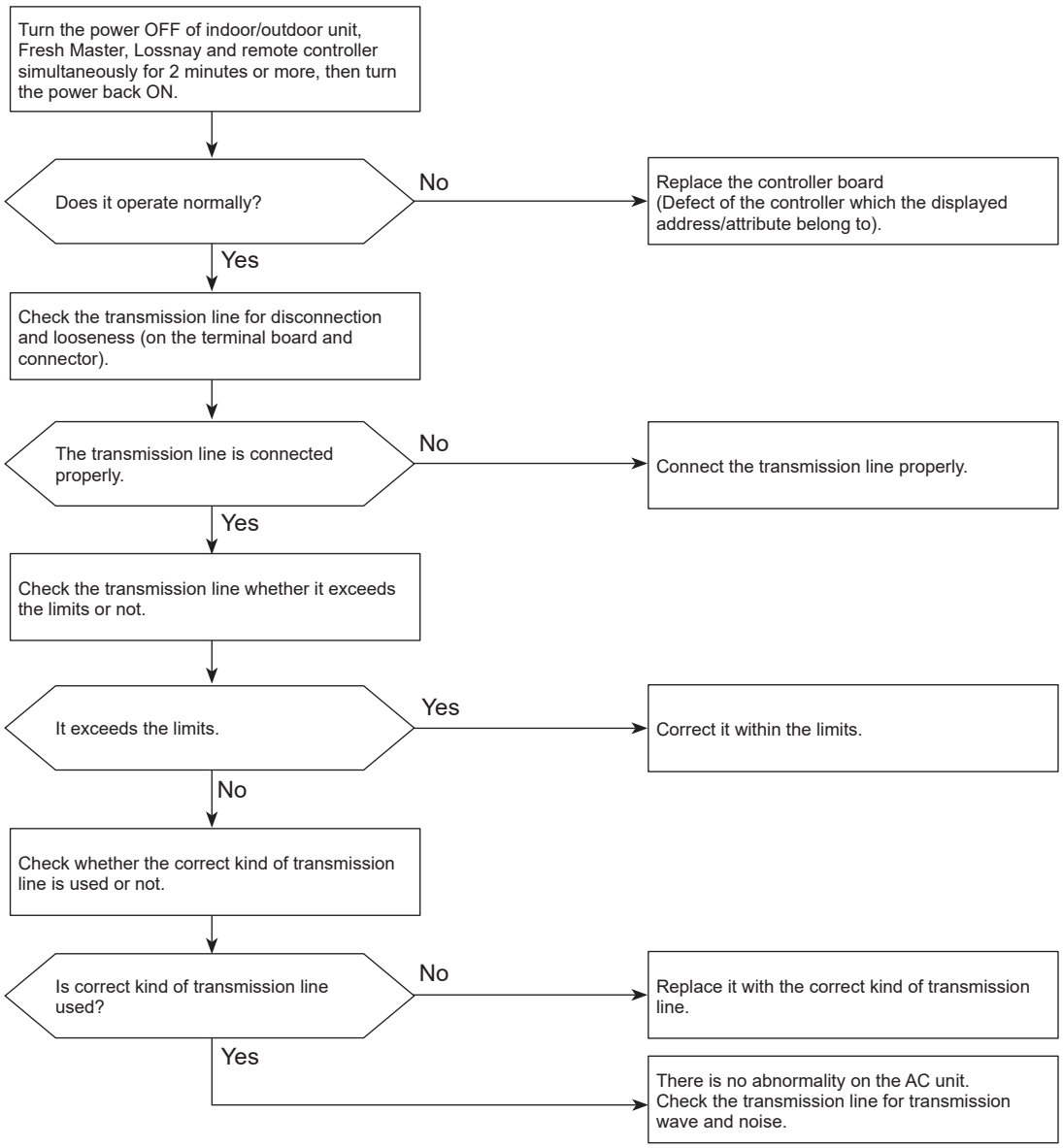
Abnormal points and detection methods

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: 200 m
  - On remote controller line: 12 m
- Decline of transmission voltage/signal due to un-matched transmission line types
  - Types for shield line: CVVS, CPEVS, or MVVS
  - Line diameter: 1.25 mm^2 or more
- Accidental malfunction of error source controller

Diagnosis of failure



6815 (FH): Supervisor mode alarm kit communication error, MA supervisor remote controller communication error

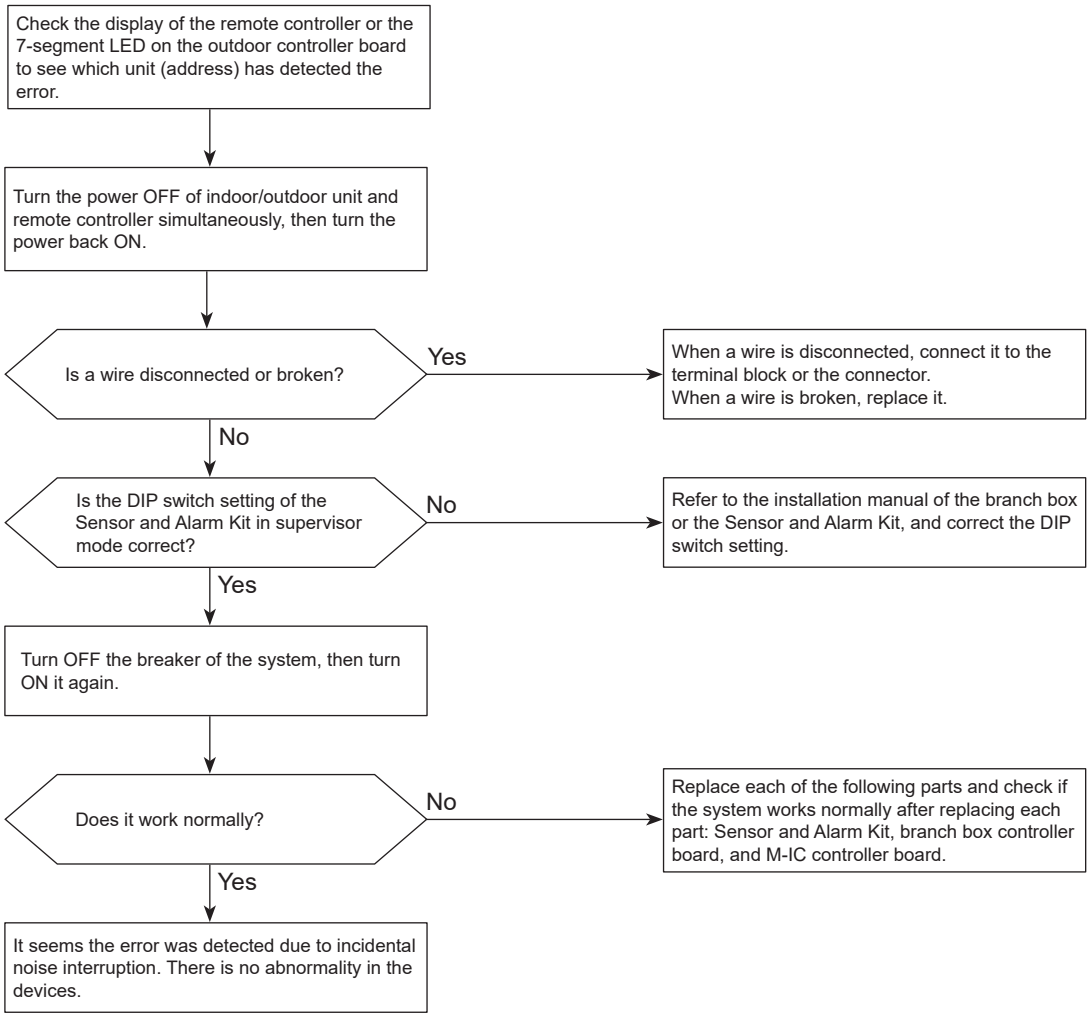
Abnormal points and detection methods

An communication error has occurred with a Sensor and Alarm Kit in supervisor mode or with an MA remote controller in supervisor mode.

Causes and checkpoints

- A wire of the MA remote controller in supervisor mode connected to M-IC is incorrect or broken.
- A wire of a Sensor and Alarm Kit in supervisor mode connected to a branch box is incorrect or broken, or a DIP switch has not been set.

Diagnosis of failure



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

Abnormal points and detection methods

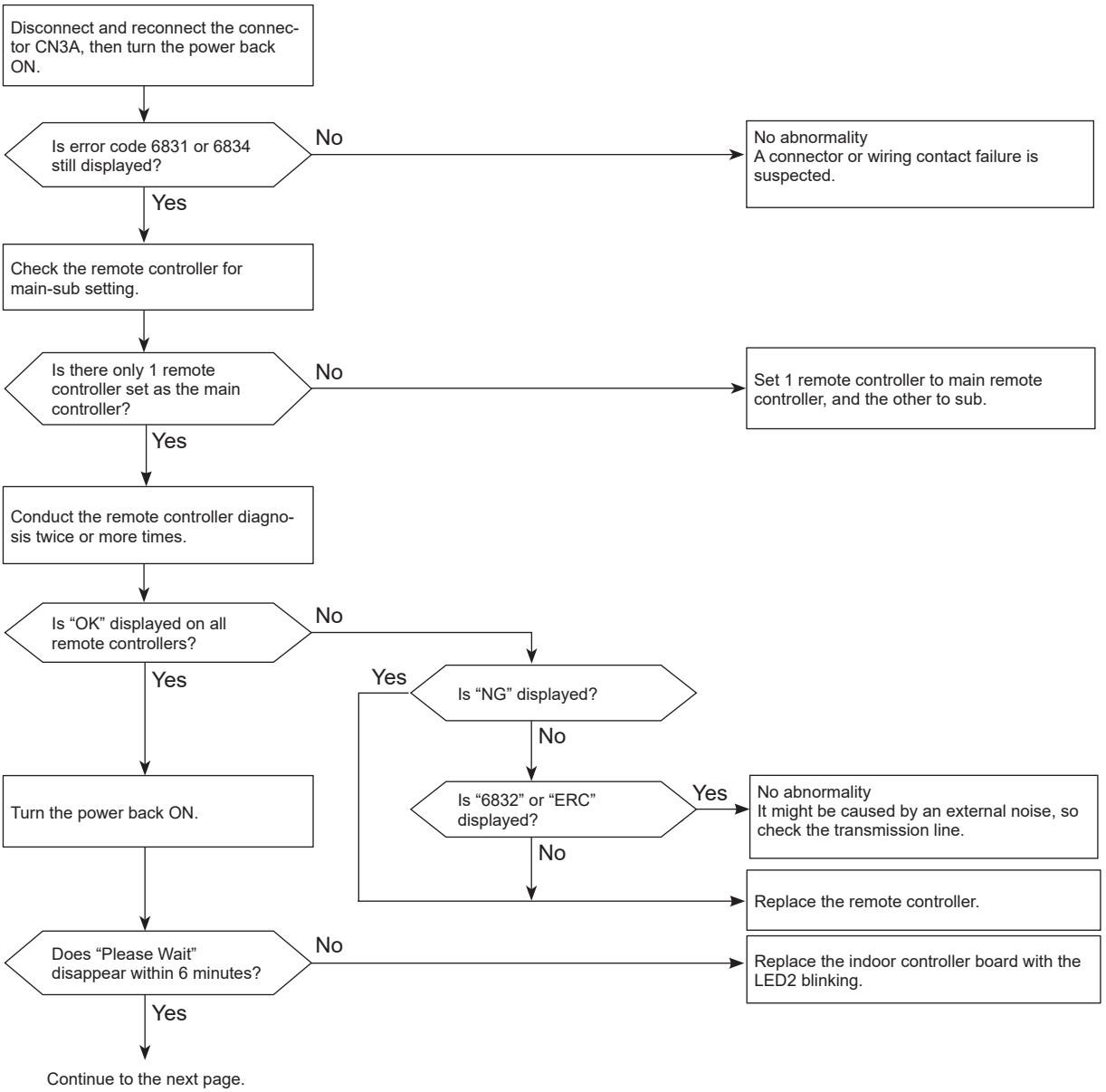
Detected in remote controller or indoor unit:

- 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 indoor unit Installation Manual.)
- 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



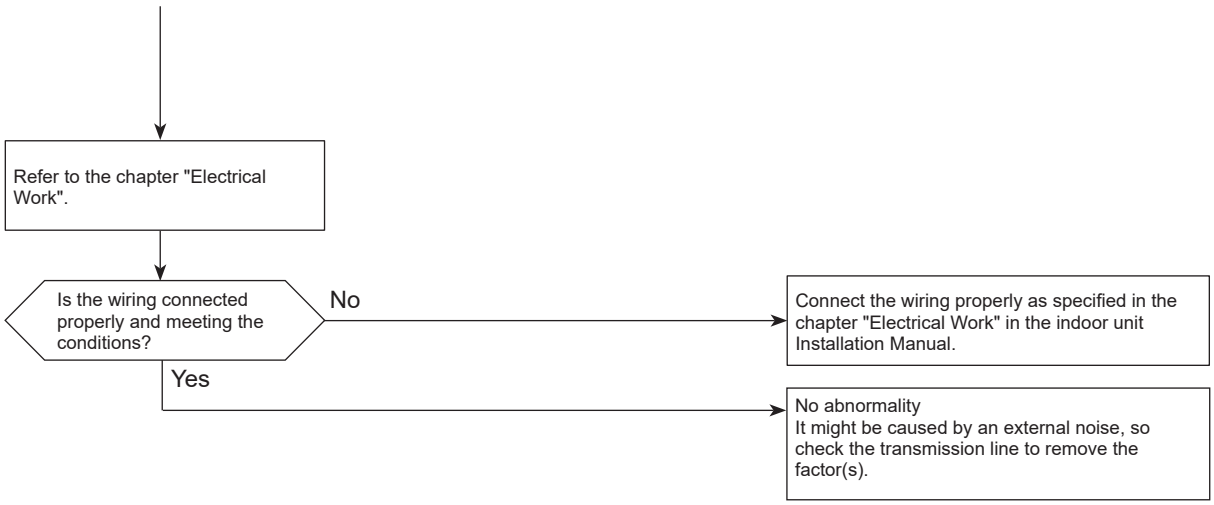
Note:

- 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

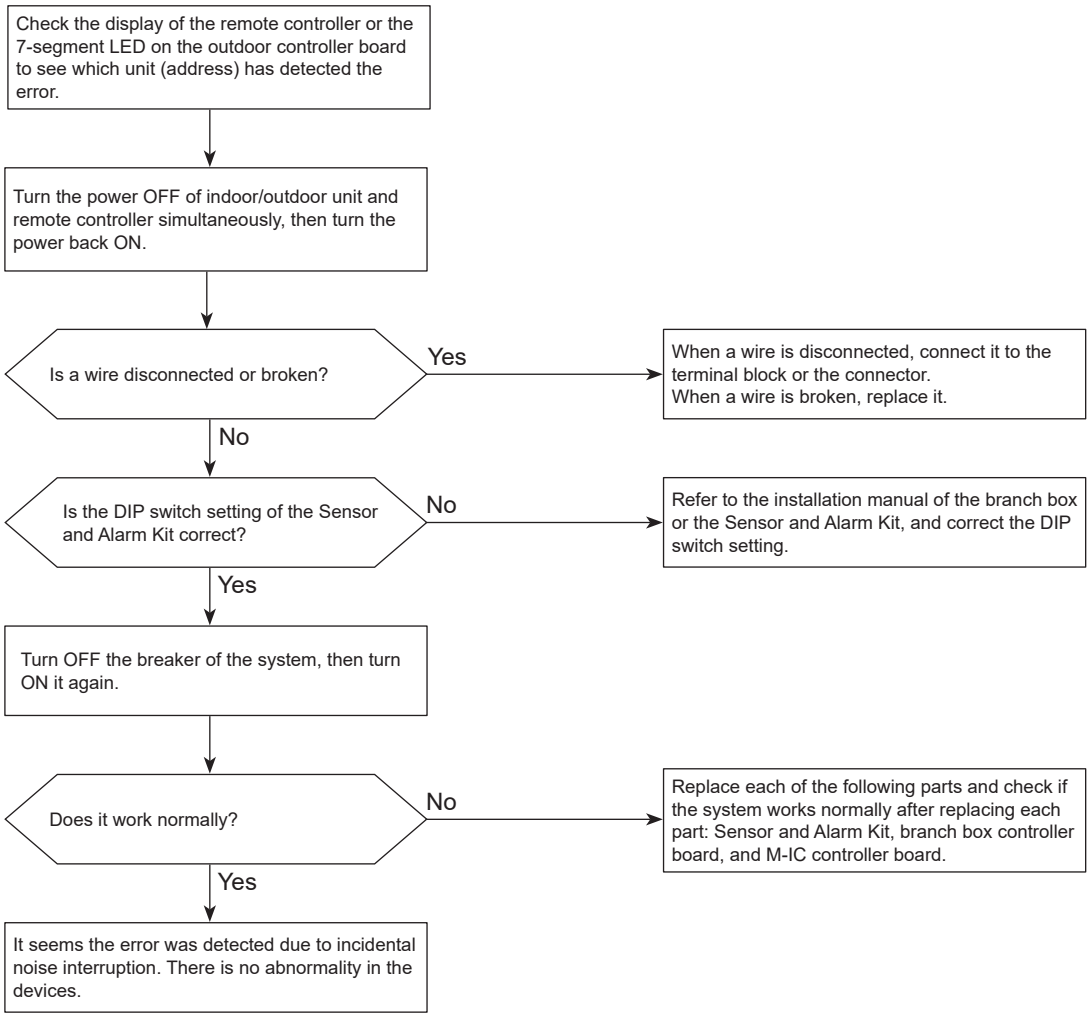
Abnormal points and detection methods

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

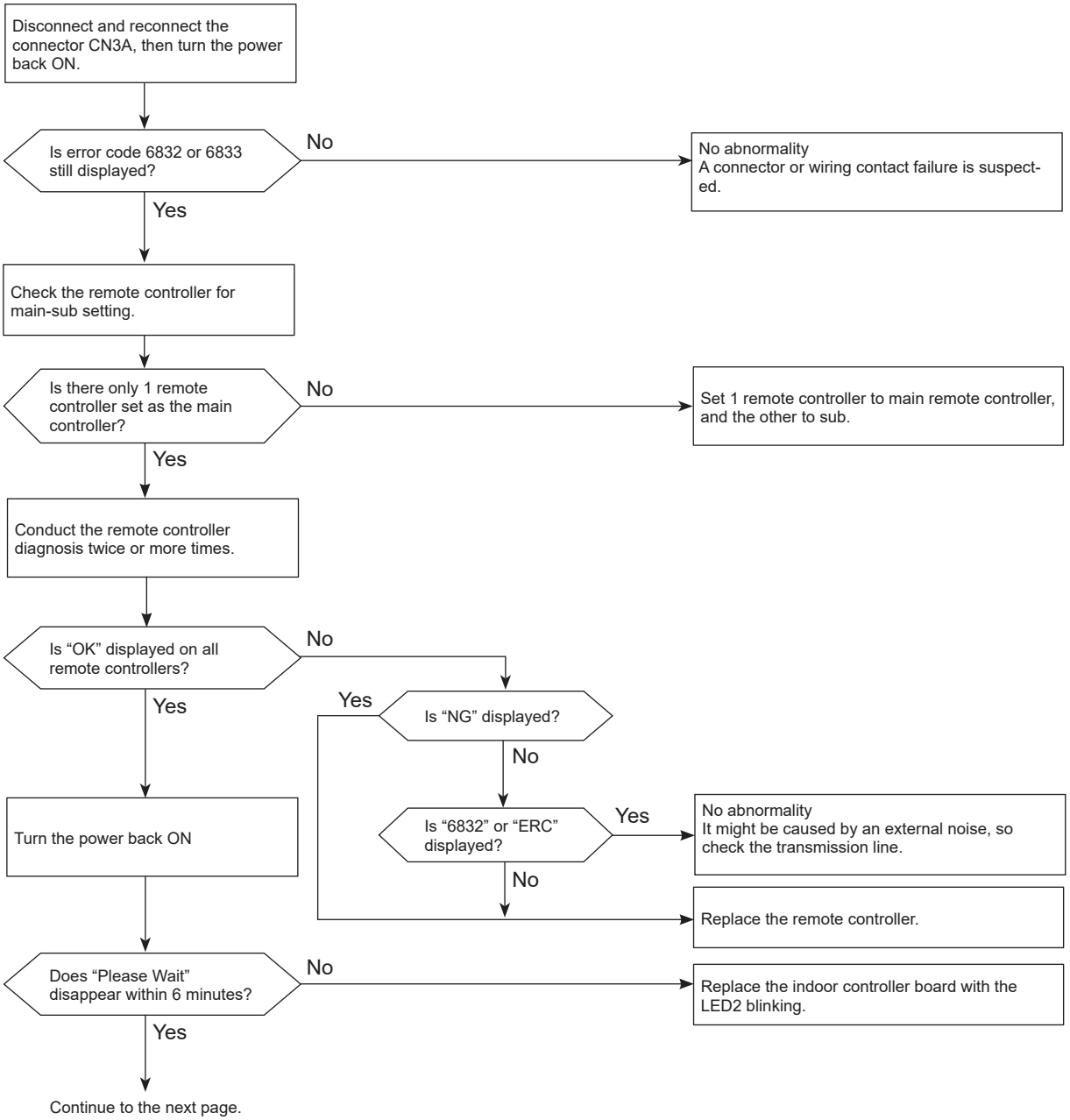
Abnormal points and detection methods

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

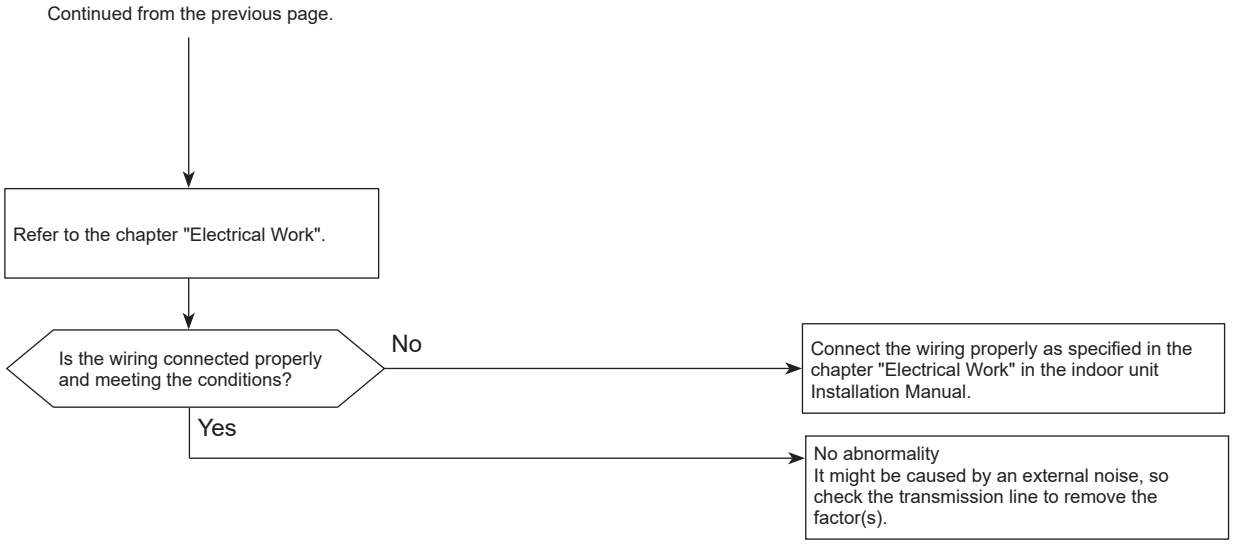


Note:

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

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

Diagnosis of failure



7100 (EF): Total capacity error

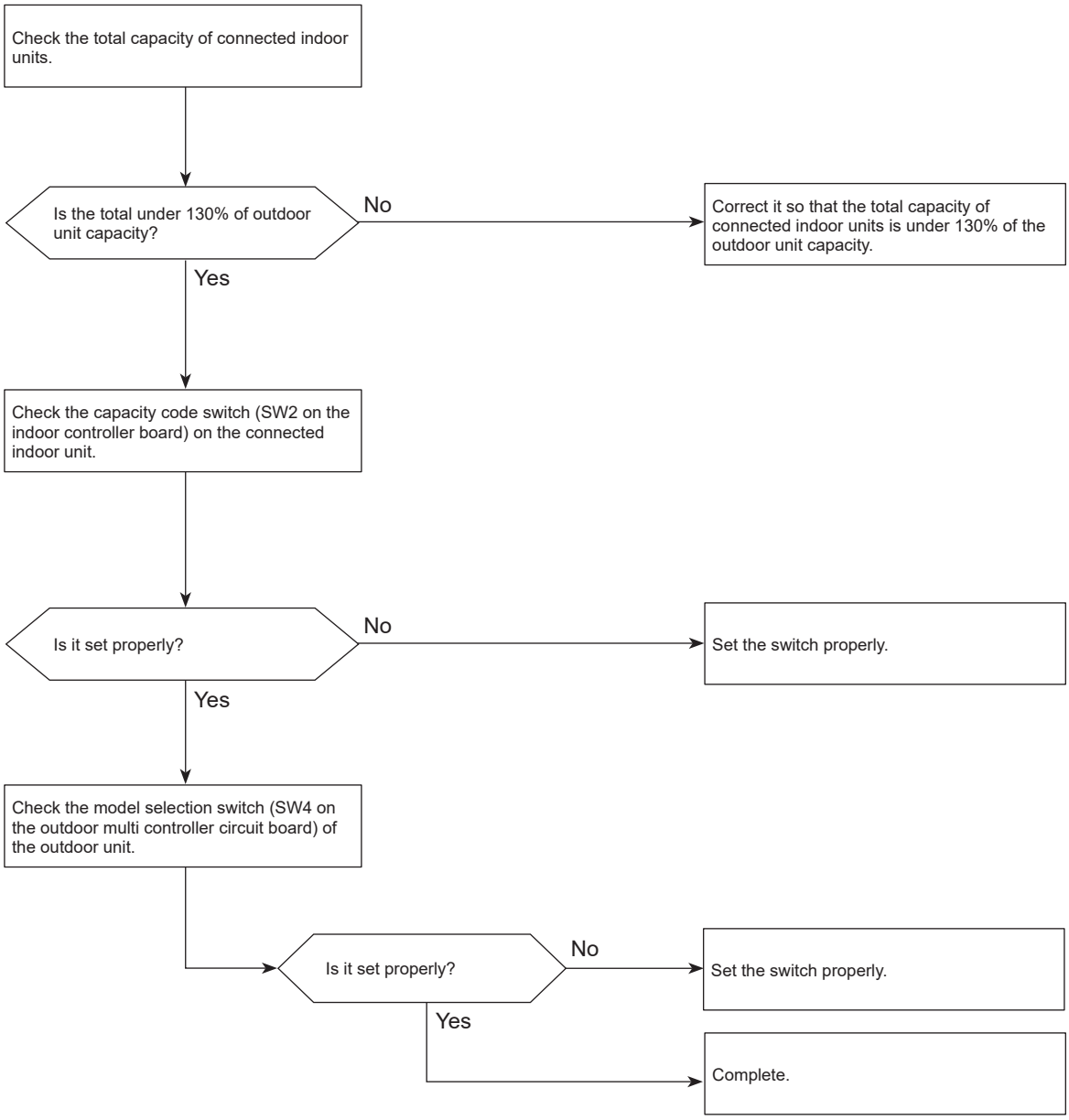
Abnormal points and detection methods

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

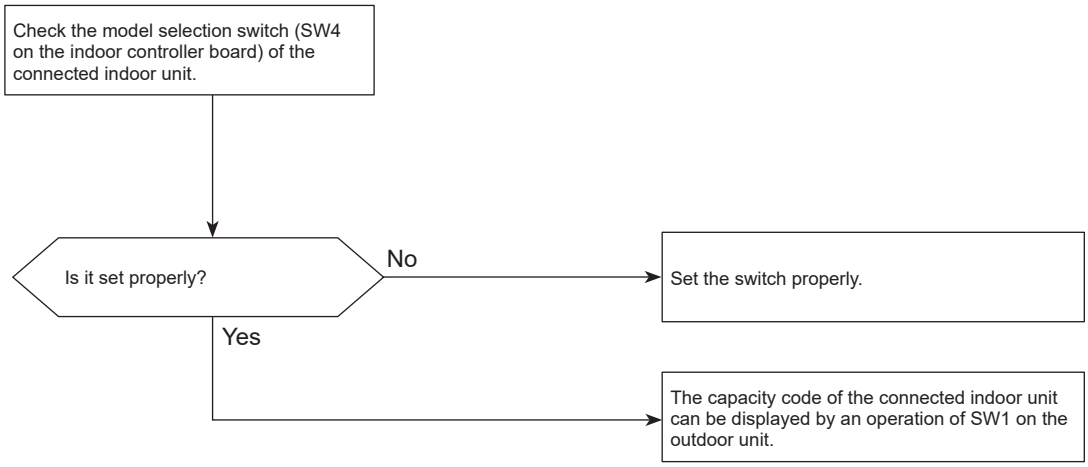
Abnormal points and detection methods

- 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

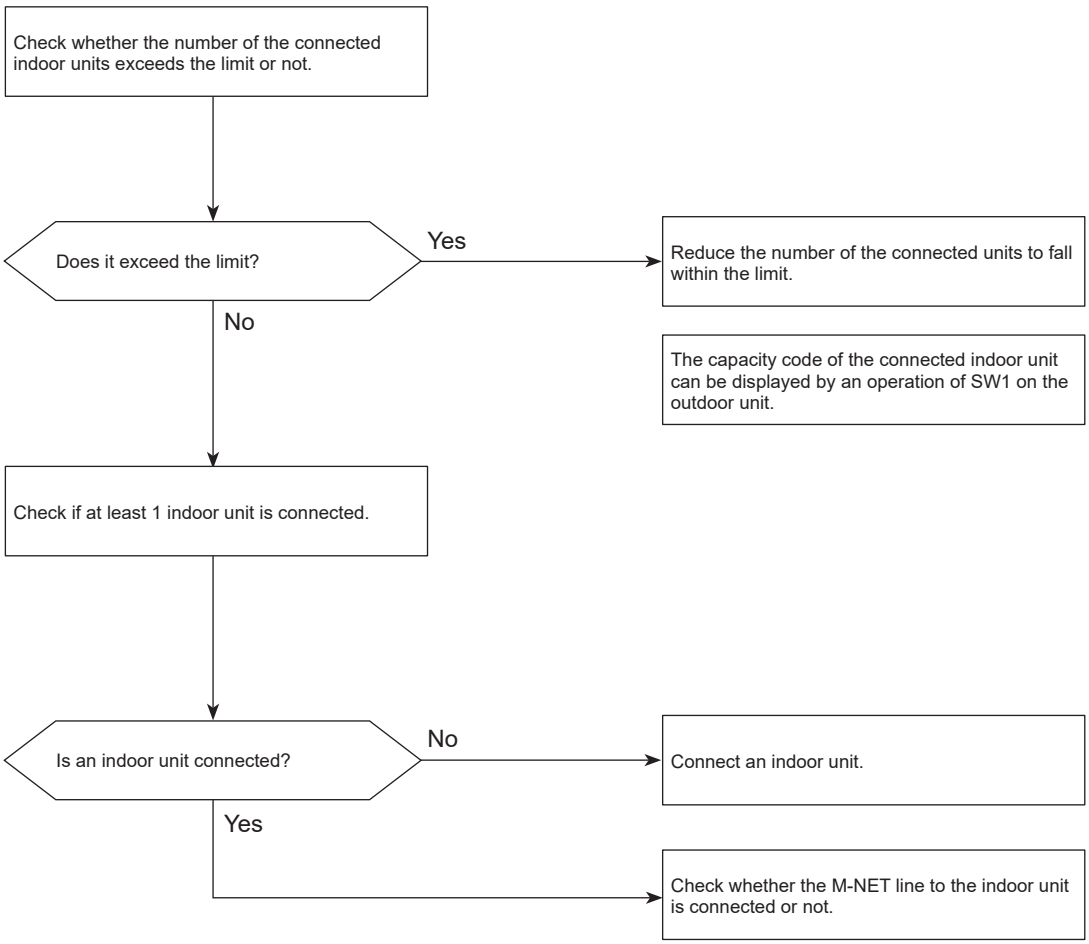
The number of the connected indoor units exceeds the limit, error code 7102 is displayed.

Causes and checkpoints

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

- Connectable up to 12 indoor units
- Connect at least 1 indoor unit (Abnormal if connected none).
- Connectable up to 2 branch boxes

Diagnosis of failure



7105 (EF): Address setting error

Abnormal points and detection methods

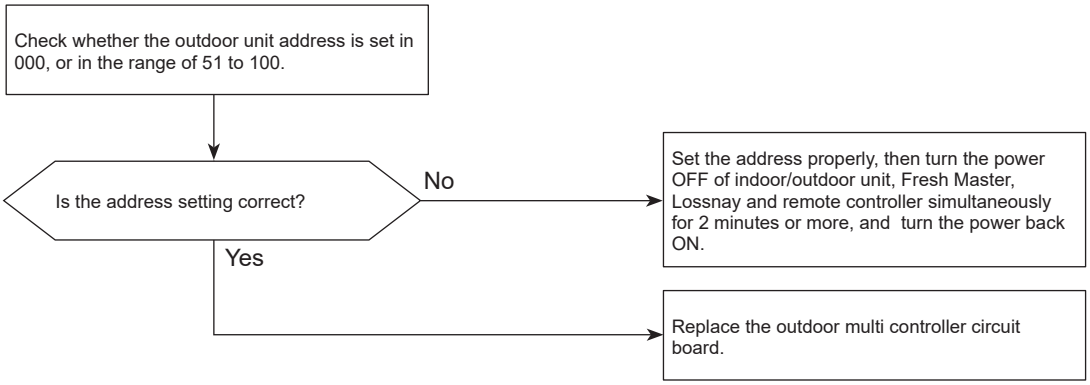
The address setting is wrong.

Causes and checkpoints

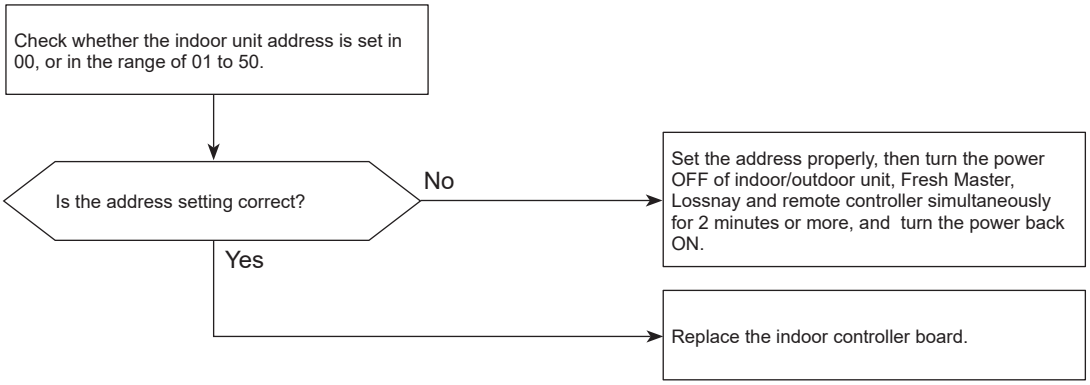
There is a unit without correct address setting in the range specified in the installation manual.

Diagnosis of failure

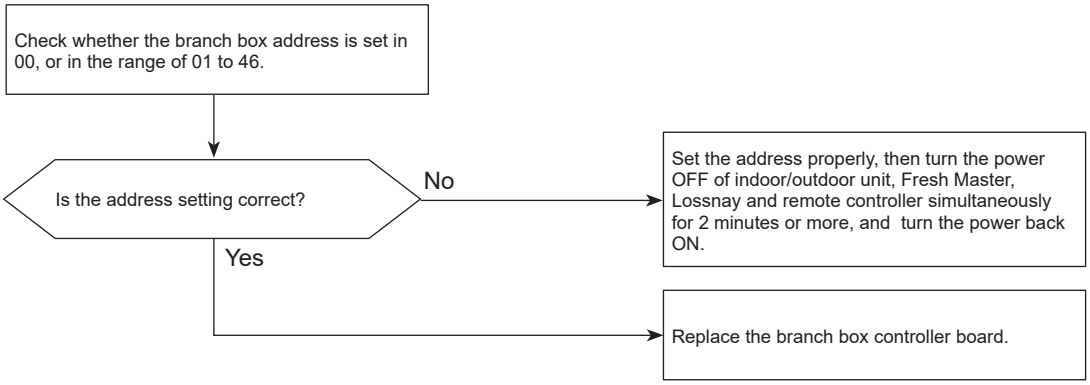
<Outdoor unit>



<Indoor unit>



<Branch box>

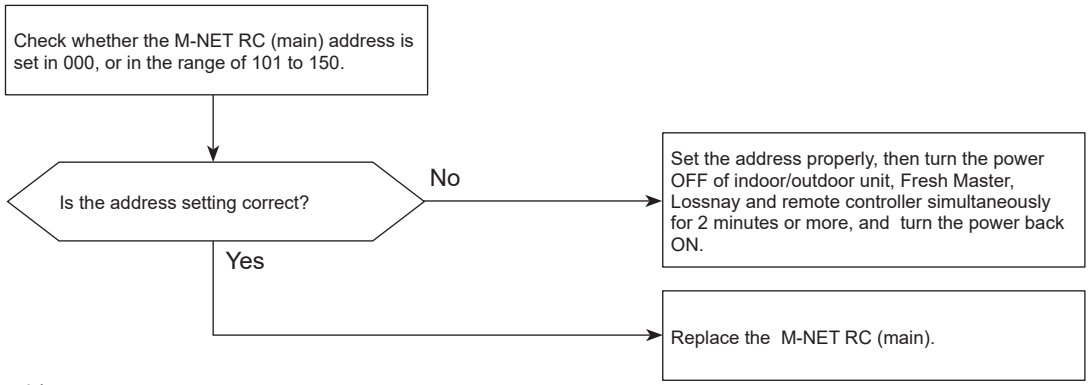


Note: Branch box address
When setting the address, use a number within the range of 1–50.
Ex. The set address is (47) and there are 5 indoor units (A, B, C, D, and E).
If A: (47), B: (48), C: (49), D: (50), and E: (51), E is incorrect because it exceeds 50.

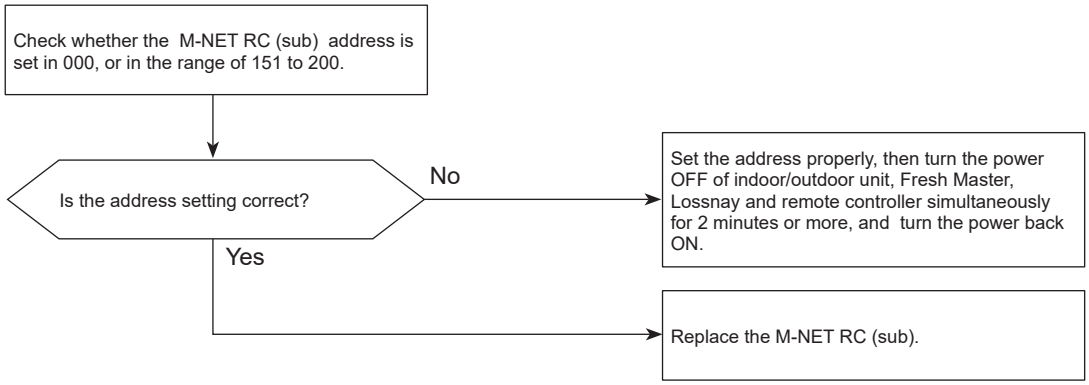
7105 (EF): Address setting error

Diagnosis of failure

<M-NET RC (main)>



<M-NET RC (sub)>



7118 (EF): Refrigerant leak detection system error

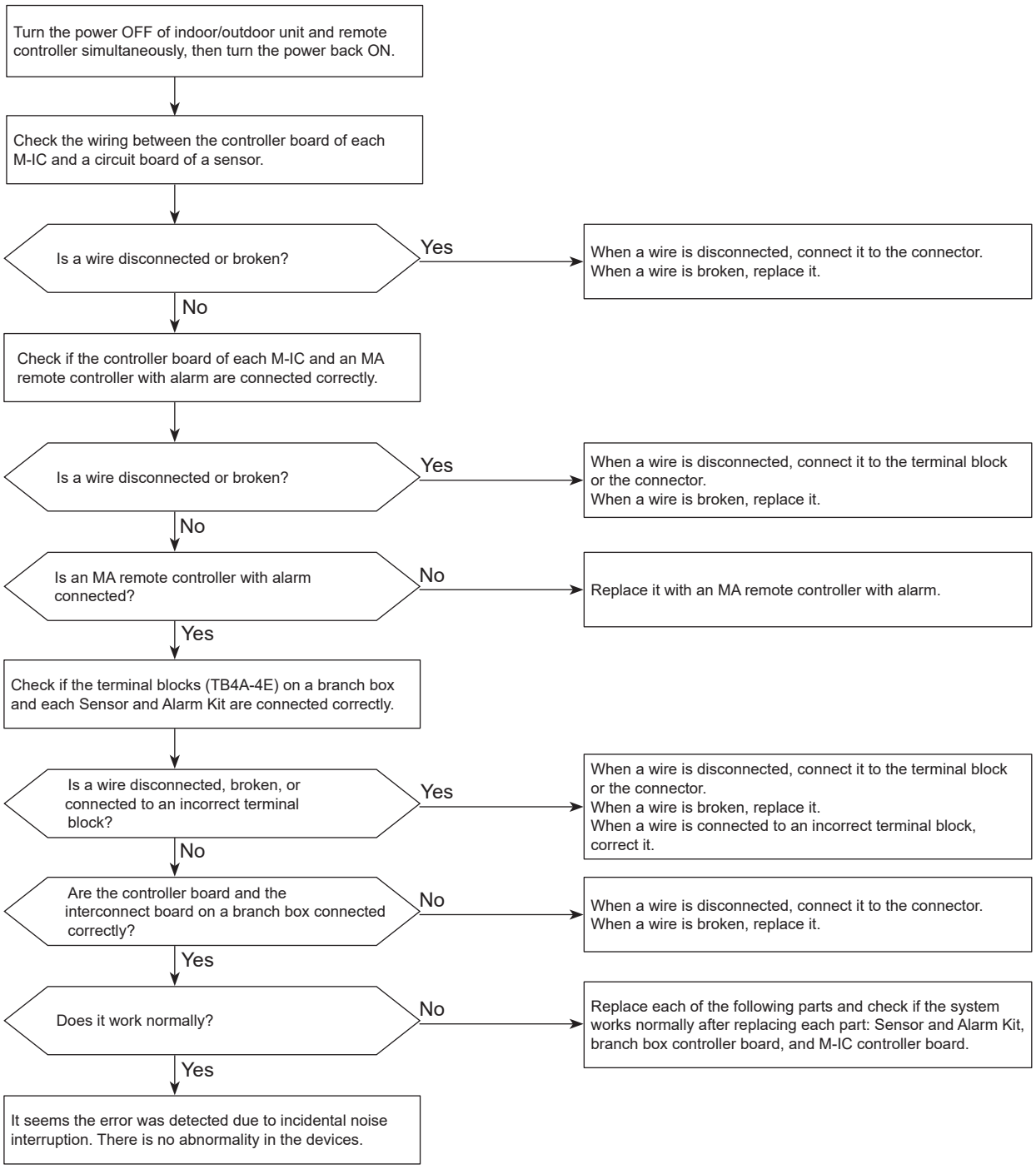
Abnormal points and detection methods

The system construction is not appropriate, so refrigerant leak cannot be detected at start-up. The outdoor unit detects this error.

Causes and checkpoints

- A refrigerant sensor is not connected to an M-IC or there is an abnormality in the connection.
- An MA remote controller with alarm is not connected to an M-IC or there is an abnormality in the connection.
- Required number of Sensor and Alarm Kits is not connected to the branch box or there is an abnormality in the connection.
- The outdoor unit could not receive information of the system construction correctly due to incidental noise interruption to the communication circuit.

Diagnosis of failure



7130 (EF): Incompatible unit combination error

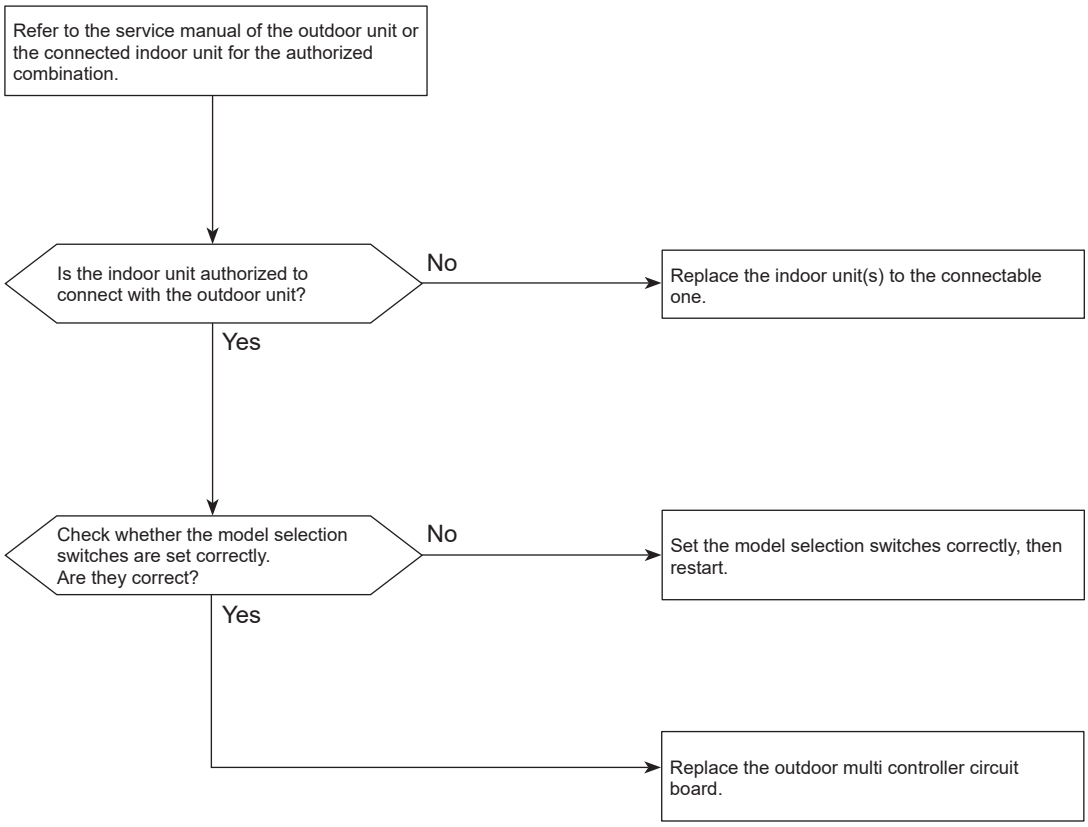
Abnormal points and detection methods

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. M-NET 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. • The address of the indoor units in the same group or the remote controller is not set correctly. • The indoor units connected in the other system are not set in the same group by the remote controller. • 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 is not on. • The fuse on the indoor unit controller board is blown.
The display of the remote controller does not come up.	• The power supply of the outdoor unit is not on. • The connector of transmission outdoor power board is not connected. • The number of connected indoor units in the refrigeration system is over the limit or the number of connected remote controller is over the limit. • M-NET remote controller is connected to MA remote controller cable. • The transmission line of the indoor/outdoor unit is shorted or down. • M-NET remote controller cable is shorted or down. • Transmission outdoor power board failure.
“Startup screen” keeps being displayed or it is displayed periodically. (“Startup screen” is usually displayed about 3 minutes after the power supply of the outdoor unit is on.)	• The power supply for the feeding expansion unit for the transmission line is not on. • The address of the outdoor unit remains “00”. • The address of the indoor unit or the remote controller is not set correctly. • MA remote controller is connected to the transmission line of the indoor/outdoor unit.
The remote controller does not operate.	• 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.

Inspection method and solution	
Check the part where the abnormality occurs. 1. The entire system 2. In the entire refrigerant system 3. In 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.

8-3-2. 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 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

■ SWU1 and SWU2

SWU2 (tens digit) SWU1 (ones digit)

Bit	When to set
Rotary switch	Before turning the power ON

■ SW1: Digital display switch

Initial setting

The black square (■) indicates a switch position.

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

■ SW2: 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	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.	• SW2-1 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 SW2-1 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	Clear error history	Activated	Deactivated	OFF to ON under suspension after the power is turned on.	To clear error history.	-
4	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.
5	-	-	-	-	-	-
6	-	-	-	-	-	-

■ SW3: Trial operation

Initial setting

The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting		
		ON	OFF	When to set
1	ON/OFF from outdoor unit	Activated	Deactivated	Any time after the power is turned ON.
2	Mode setting	Heating	Cooling	

■ SW2/SW4/SW8/SW9: Model switch

Refer to the wiring diagram for details.

■ SW5: 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	Demand control setting for Australia*1	Activated	Deactivated	Any time	Turn ON to activate the demand control for Australia.	(Do not turn this ON if the unit is in outside Australia)
2	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.
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	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.
6	Decreasing the target sub cool (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 sub cool value is too small.
7	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.*2	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.
8	-	-	-	-	-	-

*1. Refer to "Outdoor unit input/output connector".

*2. SW5-7 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.

■ SW6: Function switch

Initial setting

The black square (■) indicates a switch position.

SW6-6	OFF	ON

Target Pdm (kg/cm²)	29.5	31.5

SW6-7	OFF	OFF	ON	ON
SW6-8	OFF	ON	OFF	ON
Target ETm (°C)	9	11	6	5

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	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.
5	External static pressure mode	Activated	Deactivated	Any time	To raise the fan rotation to raise the performance when an external static pressure is applied.	It can support the external static pressure up to 30 Pa. The power input and the sound level become larger due to increasing the outdoor unit's fan rotation.
6	Switching the target discharge pressure (Pdm)	Activated	Deactivated	Any time	To raise the performance by setting the PDm higher during HEAT operation.	Power consumption increases due to a higher frequency. (The performance would not increase at the maximum operating frequency.)
7	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	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.
8	Switching (2) the target evaporation temperature (ETm)	Activated	Deactivated	Any time		

■ 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	Ignore current sensor abnormality and rotational frequency abnormality of outdoor fan motor	Activated	Deactivated	OFF to ON under suspension after the power is turned on.*3	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.
2	Set the freeze stat heater (optional part) to be energized only during heating.	Activated	Deactivated	Any time	Power consumption is reduced by limiting the energization of the freeze stat heater to heating only.	When SW7-2 is OFF, the freeze stat heater is energized even when the compressor is stopped during cooling to prevent fan from being damaged due to snow blowing inside the outdoor unit and freezing.
3	-	-	-	-	-	-
4	Maximum frequency down at 1 hour after COOL operation	Activated	Deactivated	Any time	To reduce condensation on the indoor unit by lowering the frequency	The performance might be insufficient.
5	-	-	-	-	-	-
6	Manual defrost	Activated	Deactivated	During compressor running in HEAT 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. (HEAT operation is stopped temporarily.)

*3. Make sure to wait for 5 minutes after turning the breaker ON.

■ SW9: Function switch

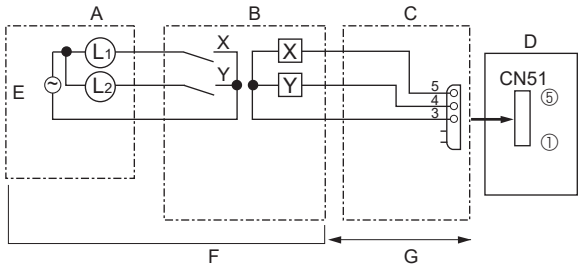
Initial setting

The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	Auto change over from remote controller (IC with the minimum address)	Activated	Deactivated	Before turning the power ON	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.
2	Switching the Silent/ Demand mode	Demand control	Silent mode	Any time	-	About the Silent mode/Demand control setting, refer to “Outdoor unit input/output connector”.
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-

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: Lamp power supply

F: Procure locally

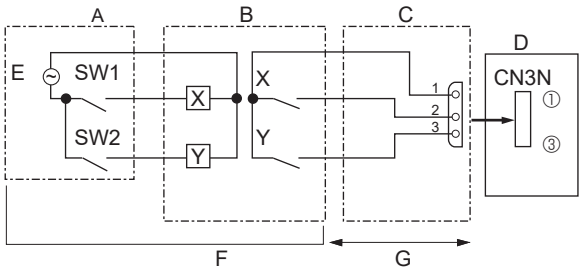
G: Max. 10m [32 ft]

L1: Error display lamp

L2: Compressor operation lamp

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

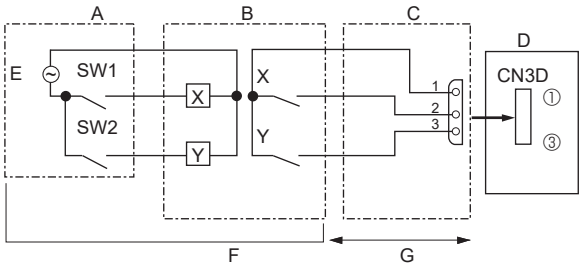
SW2: Switch

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)

The silent mode and the demand control are selected by switching the DIP switch 9-2 on outdoor controller board.
It is possible to set it to the following power consumption (compared with ratings) by setting SW1, 2.

	Outdoor controller board DIP SW9-2	SW1	SW2	Function
Silent mode (Cooling only)	OFF	OFF	OFF	Normal
		ON	OFF	Silent mode
		OFF	ON	Super silent mode 1
		ON	ON	Super silent mode 2
Demand control	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Stop)

8-7. How to check the parts

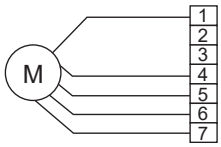
8-7-1. Checkpoints for each part

■ Thermistors

Disconnect the connector then measure the resistance with a multimeter (at the ambient temperature 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)



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

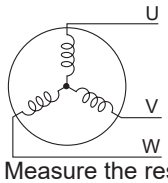
Connector pins	Normal	Abnormal
Red - Blue	1.1 ± 0.05 MΩ	Open or short (Short, for White - Blue)
Brown - Blue	40 ± 4 kΩ	
Orange - Blue	220 ± 22 kΩ	
White - Blue	Open	

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

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

Normal	Abnormal
1725 ± 172.5 Ω	Open or short

■ Motor for compressor (MC)



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

Model	Normal	Abnormal
PUMY-SM•VKM	0.440 ± 0.022 Ω	Open or short
PUMY-SM•YKM	0.880 ± 0.044 Ω	

■ Solenoid valve coil <Bypass valve> (SV1)

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

Normal	Abnormal
1182.5 ± 83 Ω	Open or short

■ Liquid shut-off valve coil (SV2)

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

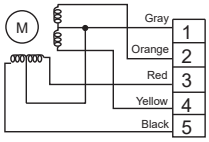
Normal	Abnormal
1182.5 ± 83 Ω	Open or short

■ Gas shut-off valve coil (SV3)

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

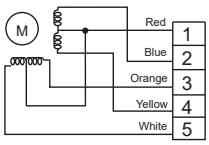
Normal	Abnormal
1182.5 ± 83 Ω	Open or short

■ 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		

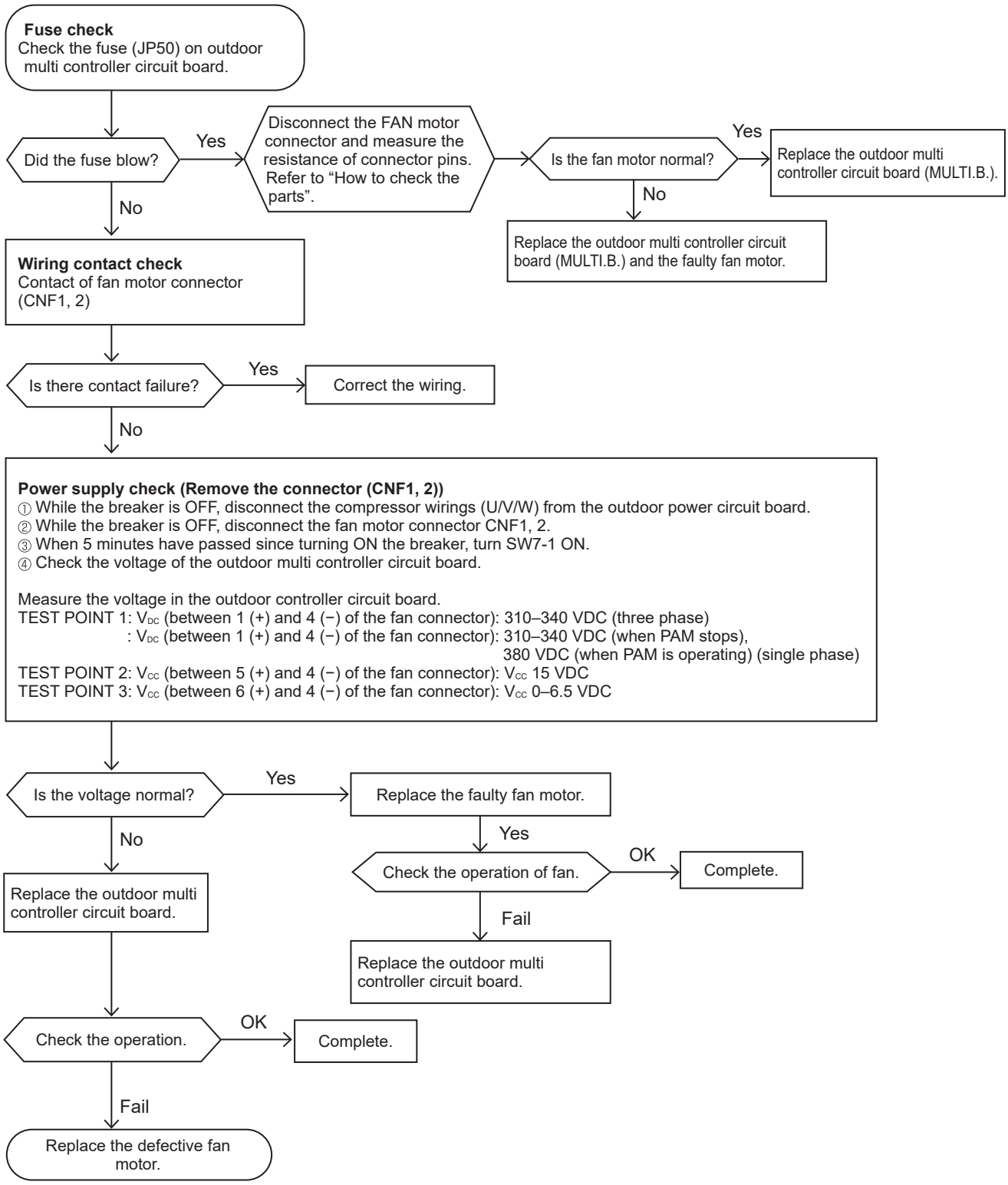
8-7-2. Check method of DC fan motor (fan motor/outdoor multi controller circuit board)

■ 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 SW7-1 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.

8-8. How to check the components

8-8-1. Thermistor feature chart

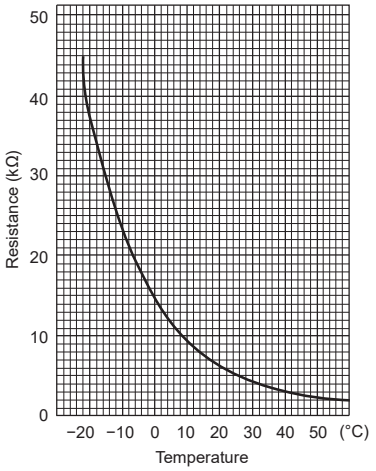
■ Low temperature thermistors

- 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
0°C	15 kΩ
10°C	9.6 kΩ
20°C	6.3 kΩ
25°C	5.2 kΩ
30°C	4.3 kΩ
40°C	3.0 kΩ



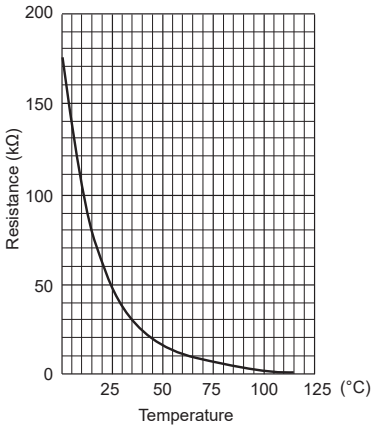
■ Medium temperature thermistor

- 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
0°C	180 kΩ
25°C	50 kΩ
50°C	17 kΩ
70°C	8 kΩ
90°C	4 kΩ



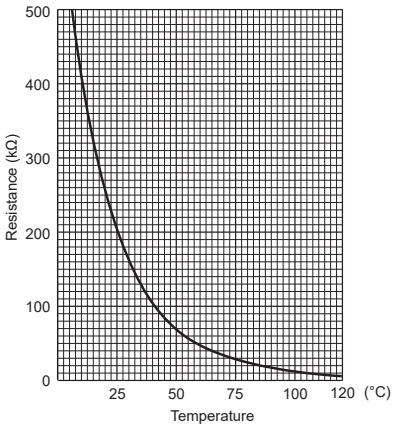
■ High temperature thermistor

- 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
20°C	250 kΩ
30°C	160 kΩ
40°C	104 kΩ
50°C	70 kΩ
60°C	48 kΩ
70°C	34 kΩ
80°C	24 kΩ
90°C	17.5 kΩ
100°C	13.0 kΩ
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 (SW1) as shown in the figure below, the pressure as measured by the high pressure sensor appears on the LED1,2 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, 2.
   - When the gauge pressure is between 0 and 0.098 MPaG, internal pressure is caused due to gas leak.
   - When the pressure displayed on the self-diagnosis LED1, 2 is between 0 and 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, 2 exceeds 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, 2 after 15 minutes have passed since the start of operation. (Compare them by MPaG/psig unit.)
   - When the difference between both pressures is within 0.25 MPaG, both the high pressure sensor and the control board are normal.
   - When the difference between both pressures exceeds 0.25 MPaG, the high pressure sensor has a problem. (performance deterioration)
   - 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, 2 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, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 is between 0 and 0.098 MPaG, the high pressure sensor has a problem.
   - When the pressure displayed on the self-diagnosis LED1, 2 is approximately 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, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 5.0 MPaG, the high pressure sensor has a problem.
   - If other than listed above, the control board has a problem.

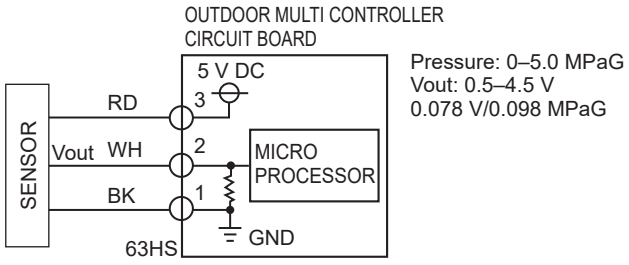
■ High pressure sensor configuration (63HS)

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 0.098 MPaG.

Note:

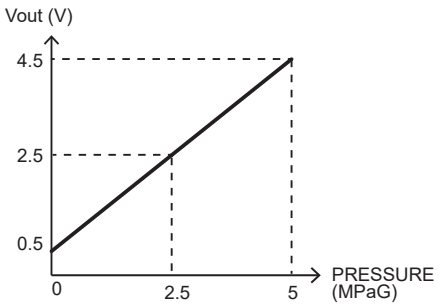
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

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



Pressure: 0–5.0 MPaG
Vout: 0.5–4.5 V
0.078 V/0.098 MPaG

③–①: 5 V (DC)
②–①: Output Vout (DC)



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 (SW1) 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, 2.
   - When the gauge pressure is between 0 and 0.098 MPaG, internal pressure is caused due to gas leak.
   - When the pressure displayed on the self-diagnosis LED1, 2 is between 0 and 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 30°C or less, and the pressure displayed on the self-diagnosis LED1, 2 exceeds 1.7 MPaG, go to the method 3.
   - When the outdoor temperature exceeds 30°C, and the pressure displayed on the self-diagnosis LED1, 2 exceeds 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, 2 after 15 minutes have passed since the start of operation. (Compare them by MPaG/psig unit.)
   - When the difference between both pressures is within 0.2 MPaG, both the low pressure sensor and the control board are normal.
   - When the difference between both pressures exceeds 0.2 MPaG, the low pressure sensor has a problem. (performance deterioration)
   - When the pressure displayed on the self-diagnosis LED1, 2 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, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 is between 0 and 0.098 MPaG, the low pressure sensor has a problem.
   - When the pressure displayed on the self-diagnosis LED1, 2 is approximately 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, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 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, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 1.7 MPaG, the control board has a problem.
   - If other than listed above, go to the method 2.

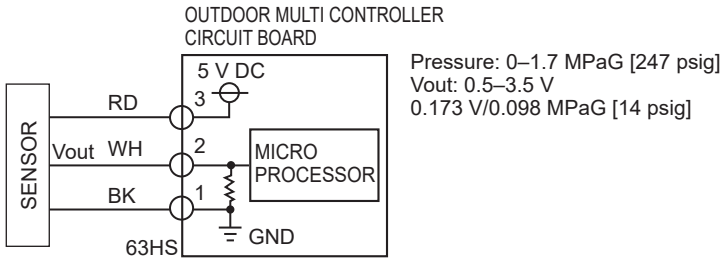
■ Low pressure sensor configuration (63LS)

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 0.098 MPaG.

Note:

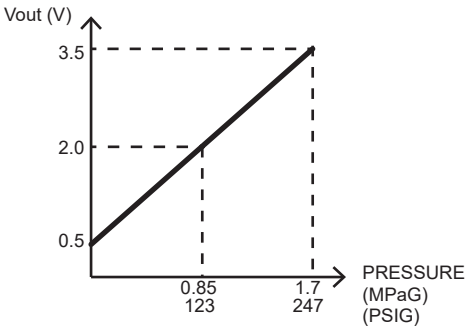
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

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



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

③–①: 5 V (DC)
②–①: Output Vout (DC)

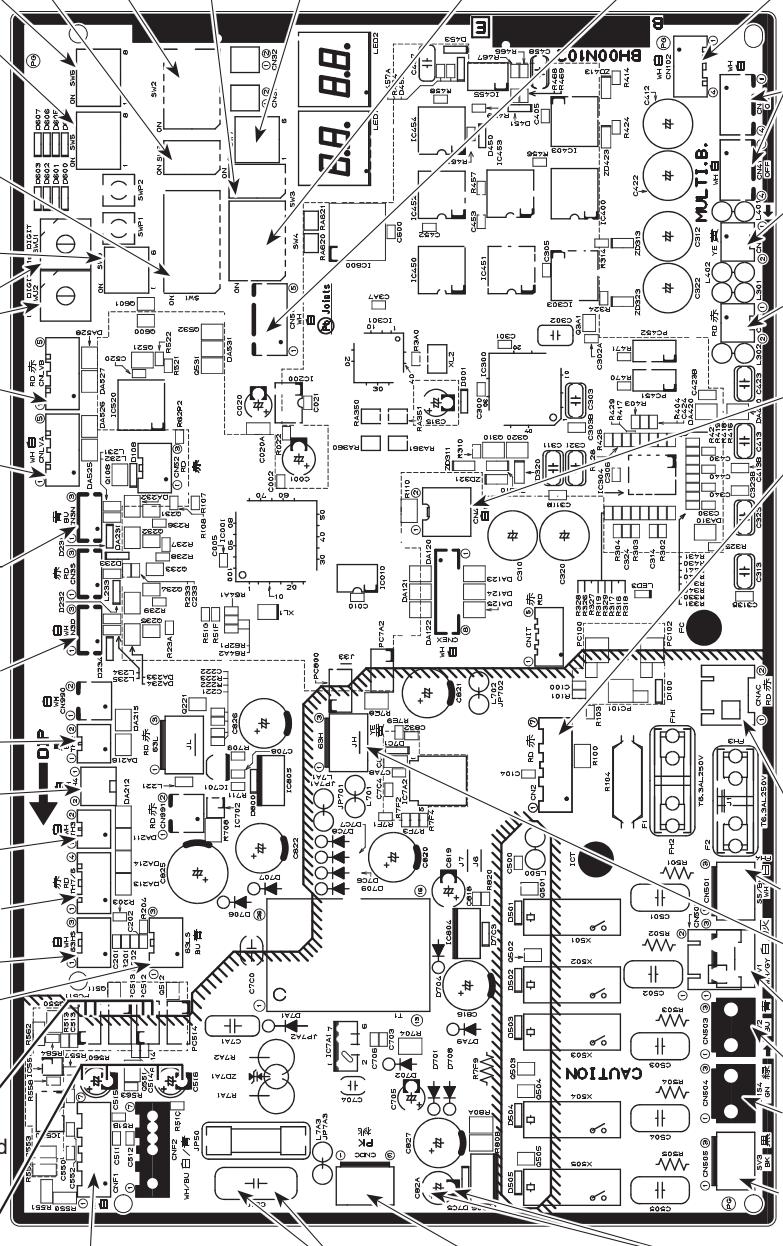


8-9. Test point diagram

■ Outdoor multi controller circuit board

⚠Caution:

- TEST POINT①is high voltage.



SW8
Model selection

SW6
Function selection

SW5
Function selection

SW2
Pump down

SW3
Test run

SW7
Manual defrost

SW4
Model selection

CN51
External signal output

CN102
Connect to the M-NET power circuit board (CN2)

CN40,CN41
Centralized control power supply/ For storing jumper connector selection

CNS2
Transmission wire of centralized control

CNS1
Indoor/ outdoor unit connecting wire

CN4
Connect to the outdoor power circuit board (CN4)

CN2
Connect to the outdoor power circuit board (CN2)
①–⑤:
Power circuit board → Transmitting signal to the multi 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

CNAC
Power supply for multi controller circuit board 230 VAC

SS/BH
Base heater

63H
High pressure switch

SV1
Bypass valve

SV2
Liquid shut-off valve

21S4
4-way valve

SV3
Gas shut-off valve

SW1
Display selection (Self-diagnosis)

SW9
Function selection

SWU2, SWU1
Address setting

CNLVB
Linear expansion Valve

CNLVA
Linear expansion Valve

CN3N
Auto change over

CN3D
Input of silent mode or demand control

TH2 Thermistor
<HIC pipe>

TH4 Thermistor
<Compressor>

TH3 Thermistor
<Outdoor liquid pipe>

TH7/TH6 Thermistor
<Ambient/ Suction pipe>

63HS
High pressure sensor

63LS
Low pressure sensor

V_{FG} (TEST POINT④)
(Voltage between pin3 and pin4 of PC511 or PC512):
(Correspond to CNF1 ⑦(+)–④(−))

V_{SP}
(Voltage between pins of C515 and C516):
0 VDC (when stopped)
1–6.5 VDC (when operated)
(Same as CNF1 ⑥(+)–④(−))

V_{DC} (TEST POINT①)
(Voltage between pins of C510)
:310–340 VDC (Y)
:310–380 VDC (V)
(Same as CNF1 ①(+)–④(−))

V_{CC} (TEST POINT②)
(Voltage between pins of C82A): 15 VDC
(Same as CNF1 ⑤(+)–④(−))

CNF1
Connect to fan motors
①–④: 310–340 VDC (Y)
: 310–380 VDC (V)
⑤–④: 15 VDC
⑥–④: 0–6.5 VDC
⑦–④: 15 VDC (when stopped)
0–15 VDC pulse (when operated)

CNDC
310–340 VDC (Y)
310–380 VDC (V)
(①(+)–③(−))

■ Outdoor power circuit board

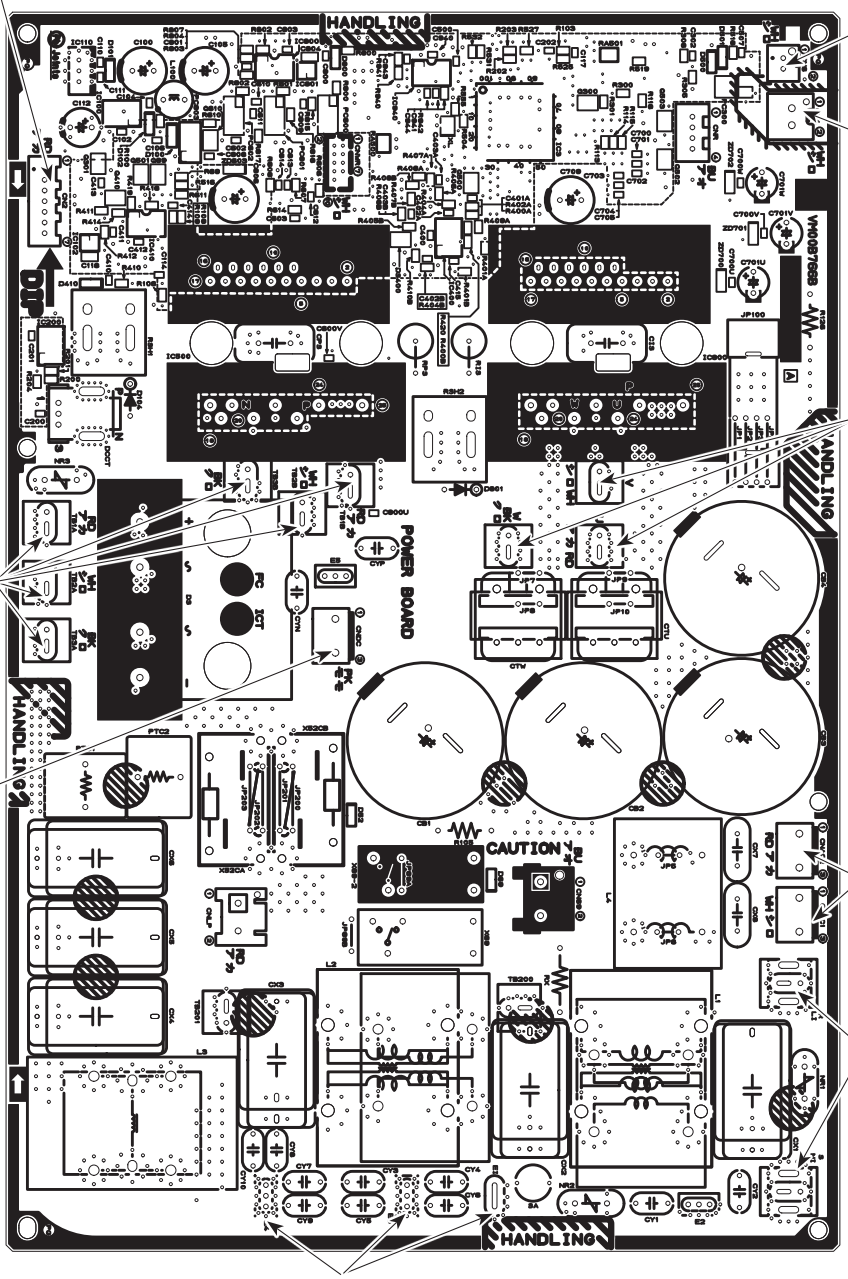
PUMY-SM112VKM **PUMY-SM125VKM** **PUMY-SM140VKM**

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], [P2]–[L3], [N2]–[L1], [N2]–[L2], [N2]–[L3]
(3) Check of INVERTER circuit
[P3]–[U], [P3]–[V], [P3]–[W], [N3]–[U], [N3]–[V], [N3]–[W]

Note: The marks [R], [S], [L1], [L2], [L3], [P1], [P2], [P3], [N1], [N2], [N3], [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

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

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

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

CNDC
280–380 VDC (①+, ③–)
Connect to the outdoor controller circuit board (CNDC)

CNAC1
230 VAC
Connect to the M-NET power circuit board (CN1)

CNAC2
230 VAC
Connect to the outdoor multi controller circuit board (CNAC)

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

EI, E3, E4
Connect to the electrical parts box

■ Outdoor power circuit board

PUMY-SM112YKM **PUMY-SM125YKM** **PUMY-SM140YKM**

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.).

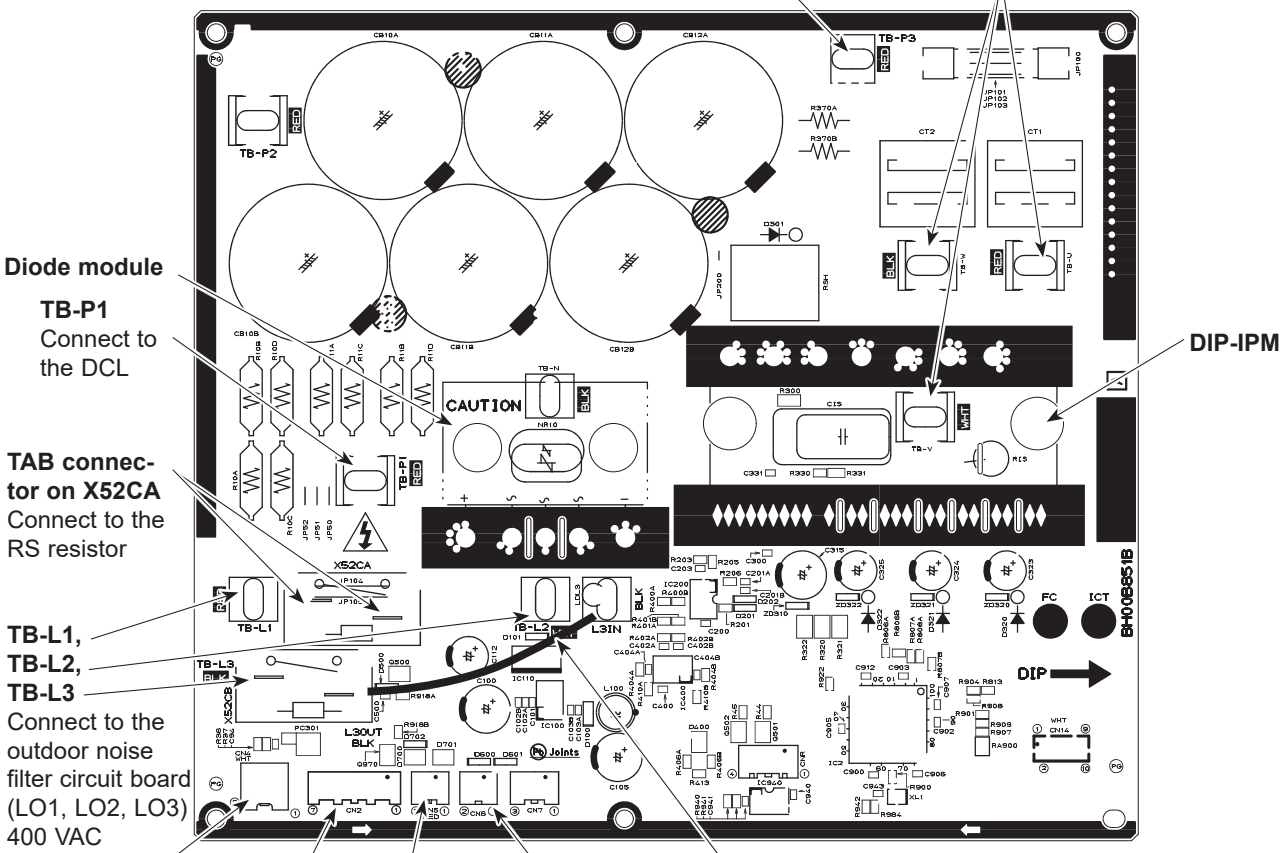
1. Check of the diode module
[L1]–[P1], [L2]–[P1], [L3]–[P1], [L1]–[N1], [L2]–[N1], [L3]–[N1]

2. Check of DIP-IPM
[P2]–[U], [P2]–[V], [P2]–[W], [N2]–[U], [N2]–[V], [N2]–[W]

Note: The marks [L1], [L2], [L3], [N1], [N2], [P1], [P2], [U], [V], and [W] shown in the diagram are not actually printed on the board.

TB-P3
Connect to the DCL

TB-U, TB-V, TB-W
Connect the compressor (MC)
Voltage among phases:
10-400VAC



Diode module

TB-P1
Connect to the DCL

TAB connector on X52CA
Connect to the RS resistor

TB-L1, TB-L2, TB-L3
Connect to the outdoor noise filter circuit board (LO1, LO2, LO3) 400 VAC

DIP-IPM

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

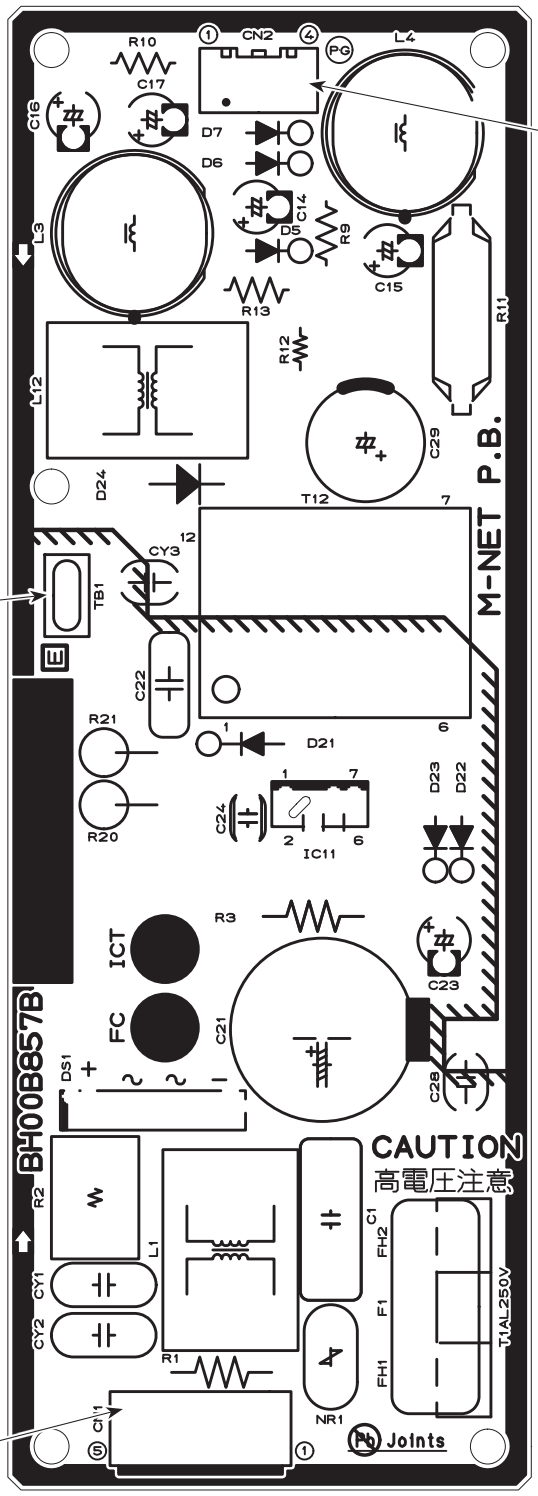
CN5
Detection of primary current (Connect to the outdoor noise filter circuit board (CNCT))

L3OUT-L3IN
Lead connect

CN2
Connect to the outdoor multi controller circuit board (CN2)
①–⑤: Power circuit board → Transmitting signal to the outdoor multi controller circuit board (0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: Not used
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC
[⑤ : ⊖ ①, ②, ⑥, ⑦ : ⊕]

CN6
Thermistor
<Heat sink> (TH8)

■ **M-NET power circuit board**



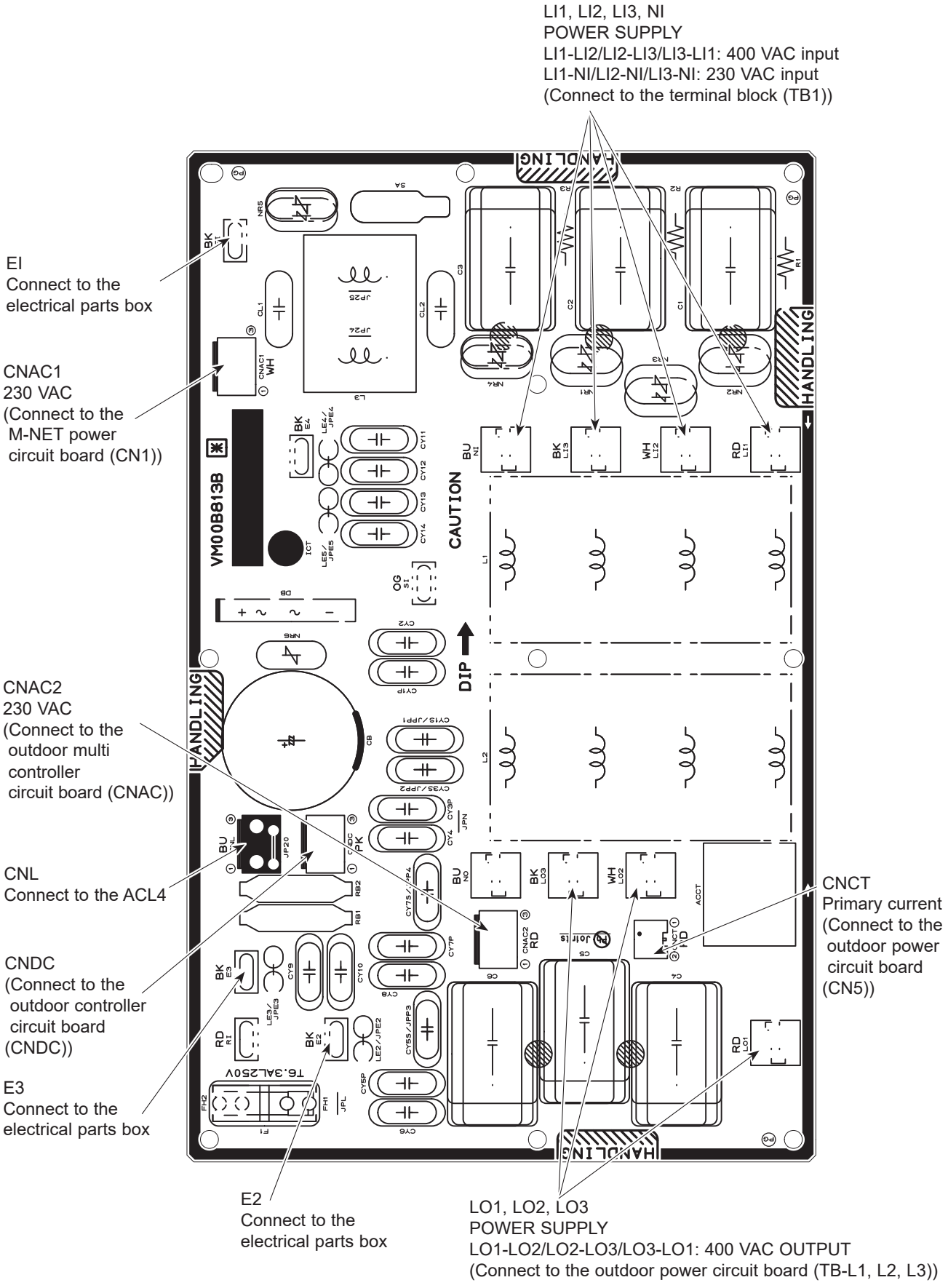
CN2
Connect to the outdoor multi controller circuit board (CN102)
①–②: 24–30 VDC
③–④: 24–30 VDC

TB1
Connect to the electrical parts box

CN1
- Connect to the outdoor noise filter circuit board (CNAC1) (Y)
- Connect to the outdoor power circuit board (CNAC1) (V)
  ①–③: 230 VAC

■ **Outdoor noise filter circuit board**

PUMY-SM112YKM **PUMY-SM125YKM** **PUMY-SM140YKM**



8-10. Outdoor unit information display

SW: setting
0: OFF
1: ON

No.	SW1 setting 12345678	Contents	LED1, 2							
			1	2	3	4	5	6	7	8
0	00000000	Relay output (at normal state)	Compressor operation	52C	21S4	SV1	SV2	SV3	—	Always lighting
		Error code (at abnormal state)	0000–9999 (The address of the detecting source unit and the error code are alternately displayed.) Note: When abnormality occurs, check display.							
1	10000000	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	01000000	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	11000000	Protection input	Heat sink overheating	Compressor over current interception	Voltage abnormality	Insufficient refrigerant amount abnormality	Current sensor/ primary current abnormality	63LS abnormality	63HS abnormality	start over current interception abnormality delay
			Note: Display detected microprocessor protection or abnormality							
4	00100000	Protection input	Abnormality in the number of indoor units	Refrigerant Leakage	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	10100000	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	01100000	Abnormality delay display 2	Heat sink overheating delay	Compressor over current interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start over current interception abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
7	11100000	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	00010000	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	10010000	Abnormality delay history 2	Heat sink overheating delay	Compressor over current interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start over current interception abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
10	01010000	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	11010000	Abnormality code history 1 (the latest)	Alternating display of addresses 0000–9999 and abnormality code (including abnormality delay code) Followings are 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) 1222: Thermistor <HIC> (TH2) 1400: Low pressure sensor 1402: High pressure (63H), High pressure sensor (63HS) 1600: Discharge superheat (SHd), Over charge refrigerant 1601: Insufficient refrigerant, Closed cooling valve 1608: 4-way valve disconnection 4310: Current sensor open/short 4320: Undervoltage, overvoltage, or power module 4330: Heat sink temperature 4350: Power module 4500: Outdoor fan motor 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	00110000	Abnormality code history 2								
13	10110000	Abnormality code history 3								
14	01110000	Abnormality code history 4								
15	11110000	Abnormality code history 5								
16	00001000	Abnormality code history 6								
17	10001000	Abnormality code history 7								
18	01001000	Abnormality code history 8								
19	11001000	Abnormality code history 9								
20	00101000	Abnormality code history 10 (the oldest)								
21	10101000	Cumulative time	0–9999 (unit: 1 hour) Note: Display of cumulative compressor operating time							
22	01101000	Cumulative time	0–9999 (unit: 10 hours) Note: Display of cumulative compressor operating time							
23	11101000	Outdoor unit operation display	Compressor energizing	Compressor operating prohibition	Compressor in operation	Abnormality detection	—	—	—	—

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
24	00011000	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	10011000	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	01011000	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	11011000	Capacity code (No. 2 indoor unit)								
28	00111000	Capacity code (No. 3 indoor unit)								
29	10111000	Capacity code (No. 4 indoor unit)								
30	01111000	Capacity code (No. 5 indoor unit)								
31	11111000	IC1 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
32	00000100	IC2 operation mode								
33	10000100	IC3 operation mode								
34	01000100	IC4 operation mode								
35	11000100	IC5 operation mode	Note: Display of indoor unit operating mode							
36	00100100	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	10100100	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	01100100	Communication demand capacity	0–255 (%) Note: Display of communication demand capacity							
39	11100100	Number of compressor ON/ OFF	0000–9999 (unit: x10) Note: Display a count of compressor operation/stop							
40	00010100	Compressor operating current	0–999.9 (Arms) Note: Display detected current							
41	10010100	Input current of outdoor unit								
42	01010100	Thermo-ON operating time	0000–9999 (unit: x10) Note: Display cumulative time of thermo-ON operation							
43	11010100	Total capacity of thermo-ON	0–255 Note: Display total capacity code of indoor units in thermo-ON							
44	00110100	Number of indoor units	0–255 Note: Display number of connected indoor units							
45	10110100	DC bus voltage	0–9999 (V) Note: Display bus voltage							
46	01110100	State of LEV control	Td over heat 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	11110100	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	00001100	State of compressor frequency control 2	Heat sink over heat 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	10001100	Protection input	63LS abnormality	HIC abnormality	—	Frozen protection	4-way valve disconnection abnormality	Delay caused by blocked valve in cooling mode	TH6 abnormality	Power module abnormality
50	01001100	The second current value when microprocessor of power board abnormality is detected	0–999.9[Arms] Note: Display data at time of abnormality							
51	11001100	Heatsink temperature when microprocessor of power board abnormality is detected	−99.9–999.9 (°C) Note: Display data at time of abnormality							

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
52	00101100	Outdoor LEV-A opening pulse	0–2000 (pulse) Note: Display of opening pulse of outdoor LEV							
53	10101100	Outdoor LEV-A opening pulse abnormality delay								
54	01101100	Outdoor LEV-A opening pulse abnormality								
55	11101100	Outdoor LEV-B opening pulse								
56	00011100	Outdoor LEV-B opening pulse abnormality delay								
57	10011100	Outdoor LEV-B opening pulse abnormality								
58	01011100	63LS (Low pressure)	−99.9–999.9 (kgf/cm²) Note: Display of data from sensor and thermistor							
59	11011100	63LS abnormality delay								
60	00111100	63 LS abnormality								
61	10111100	TH2 (HIC pipe)	−99.9–999.9 (°C) Note: Display of data from sensor and thermistor							
62	01111100	TH2 (HIC) abnormality delay								
63	11111100	TH2 (HIC) abnormality								
64	00000010	Operational frequency	0–255 (Hz) Note: Display of actual operating frequency							
65	10000010	Target frequency	0–255 (Hz) Note: Display of target frequency							
66	01000010	Outdoor fan control step number	0–15 Note: Display of number of outdoor fan control steps (target)							
69	10100010	IC1 LEV Opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
70	01100010	IC2 LEV Opening pulse								
71	11100010	IC3 LEV Opening pulse								
72	00010010	IC4 LEV Opening pulse								
73	10010010	IC5 LEV Opening pulse								
74	01010010	High pressure sensor (Pd)	−99.9–999.9 (kgf/cm²) Note: Display detected data of outdoor unit sensors and thermistors							
75	11010010	TH4(Compressor) (Td) data	−99.9–999.9 (°C) Note: Display detected data of outdoor unit sensors and thermistors							
76	00110010	TH6(Suction pipe) (ET) data								
77	10110010	TH7 (Ambient) data								
78	01110010	TH3 (Outdoor liquid pipe) data								
80	00001010	TH8 (Heat sink) data								
81	10001010	IC1 TH23 (Gas)	−99.9–999.9 (°C) (When indoor unit is not connected, it is displayed as 0.) Note: Display detected data of indoor unit thermistors							
82	01001010	IC2 TH23 (Gas)								
83	11001010	IC3 TH23 (Gas)								
84	00101010	IC4 TH23 (Gas)								
85	10101010	IC5 TH23 (Gas)								
86	01101010	IC1 TH22 (Liquid)								
87	11101010	IC2 TH22 (Liquid)								
88	00011010	IC3 TH22 (Liquid)								
89	10011010	IC4 TH22 (Liquid)								
90	01011010	IC5 TH22 (Liquid)								
91	11011010	IC1 TH21 (Intake)								
92	00111010	IC2 TH21 (Intake)								
93	10111010	IC3 TH21 (Intake)								
94	01111010	IC4 TH21 (Intake)								
95	11111010	IC5 TH21 (Intake)								
96	00000110	Outdoor SC (cooling)	−99.9–999.9 (°C) Note: Display of outdoor subcool (SC) data							
97	10000110	Target subcool step	−2–4 Note: Display of target subcool step data							
98	01000110	IC1 SC/SH	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
99	11000110	IC2 SC/SH								
100	00100110	IC3 SC/SH								
101	10100110	IC4 SC/SH								
102	01100110	IC5 SC/SH								
103	11100110	Discharge superheat (SHd)	−99.9–999.9 (°C) Note: Display of outdoor discharge superheat (SHd) data							
105	10010110	Target Pd display (heating) kgf/cm²	Pdm (0.0–30.0) (kgf/cm²) Note: Display of all control target data							
106	01010110	Target ET display (cooling)	ETm (−2.0–23.0) (°C) Note: Display of all control target data							

No.	SW1 setting 12345678	Contents	LED1, 2 1	2	3	4	5	6	7	8
107	11010110	Target outdoor SC (cooling)	SCm (0.0–20.0) (°C) Note: Display of all control target data							
108	00110110	Target indoor SC/SH (IC1)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
109	10110110	Target indoor SC/SH (IC2)								
110	01110110	Target indoor SC/SH (IC3)								
111	11110110	Target indoor SC/SH (IC4)								
112	00001110	Target indoor SC/SH (IC5)								
113	10001110	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	01001110	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	11001110	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	00101110	IC9 operation mode	STOP	Fan	Cooling Thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
117	10101110	IC10 operation mode								
118	01101110	IC11 operation mode								
119	11101110	IC12 operation mode	Note: Display of indoor unit operation mode							
120	00011110	Target indoor SC/SH (IC9)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
121	10011110	Target indoor SC/SH (IC10)								
122	01011110	Target indoor SC/SH (IC11)								
123	11011110	Target indoor SC/SH (IC12)								
124	00111110	IC9 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality delay							
125	10111110	IC10 LEV opening pulse abnormality delay								
126	01111110	IC11 LEV opening pulse abnormality delay								
127	11111110	IC12 LEV opening pulse abnormality delay								
128	00000001	Actual frequency of abnormality delay	0–255 (Hz) Note: Display of actual frequency at time of abnormality delay							
129	10110001	Fan step number at time of abnormality delay	0–15 Note: Display of fan step number at time of abnormality delay							
131	11000001	IC1 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Delay of opening pulse of indoor LEV at time of abnormality delay							
132	00100001	IC2 LEV opening pulse abnormality delay								
133	10100001	IC3 LEV opening pulse abnormality delay								
134	01100001	IC4 LEV opening pulse abnormality delay								
135	11100001	IC5 LEV opening pulse abnormality delay								
136	00010001	High pressure sensor data at time of abnormality delay kgf/cm²	−99.9–999.9 (kgf/cm²) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
137	10010001	TH4 (Compressor) sensor data at time of abnormality delay	−99.9–999.9 (°C) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
138	01010001	TH6 (Suction pipe) sensor data at time of abnormality delay								
139	11010001	TH3 (Outdoor liquid pipe) sensor data at time of abnormality delay								
140	00110001	TH8 (Heat sink) sensor data at time of abnormality delay								

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
141	10110001	OC SC (cooling) at time of abnormality delay	−99.9–999.9(°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
142	01110001	IC1 SC/SH at time of abnormality delay								
143	11110001	IC2 SC/SH at time of abnormality delay								
144	00001001	IC3 SC/SH at time of abnormality delay								
145	10001001	IC4 SC/SH at time of abnormality delay								
146	01001001	IC5 SC/SH at time of abnormality delay								
147	11001001	IC9 SC/SH at time of abnormality delay								
148	00100001	IC10 SC/SH at time of abnormality delay								
149	10101001	IC11 SC/SH at time of abnormality delay								
150	01101001	IC12 SC/SH at time of abnormality delay								
151	11101001	IC9 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
152	00011001	IC10 LEV opening pulse at time of abnormality								
153	10011001	IC11 LEV opening pulse at time of abnormality								
154	01011001	IC12 LEV opening pulse at time of abnormality								
155	11011001	IC9 SC/SH at time of abnormality	−99.9–999.9 (°C) 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							
156	00111001	IC10 SC/SH at time of abnormality								
157	10111001	IC11 SC/SH at time of abnormality								
158	01111001	IC12 SC/SH at time of abnormality								
159	11111001	IC9 Capacity code	0–255 Notes: Display of indoor unit capacity code The No.1 unit will start from the M-NET address with the lowest number							
160	00000101	IC10 Capacity code								
161	10000101	IC11 Capacity code								
162	01000101	IC12 Capacity code								
163	11000101	IC9 SC/SH	−99.9–999.9 (°C) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
164	00100101	IC10 SC/SH								
165	10100101	IC11 SC/SH								
166	01100101	IC12 SC/SH								
170	01010101	ROM version monitor	0.00–99.99 (ver) Note: Display of version data of ROM							
171	11010101	ROM type	Note: Display of ROM type							
172	00110101	Check sum mode	0000–FFFF Note: Display of check sum code of ROM							
173	10110101	IC9 TH23 (Gas)	−99.9–999.9 (°C) Note: Display detected data of indoor unit thermistors							
174	01110101	IC10 TH23 (Gas)								
175	11110101	IC11 TH23 (Gas)								
176	00001101	IC12 TH23 (Gas)								
177	10001101	IC9 TH22 (Liquid)								
178	01001101	IC10 TH22 (Liquid)								
179	11001101	IC11 TH22 (Liquid)								
180	00101101	IC12 TH22 (Liquid)								
185	10011101	IC9 TH21 (Intake)								
186	01011101	IC10 TH21 (Intake)								
187	11011101	IC11 TH21 (Intake)								
188	00111101	IC12 TH21 (Intake)								

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
189	10111101	History of voltage error (U9/4220)	—	—	PAM error	Converter Fault	Power synchroniza-tion signal error	L1 open phase error	Under voltage error	Over voltage error
190	01111101	External connec-tion 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	11111101	External connec-tion 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	00000011	Actual frequency of abnormality	0–255 (Hz) Note: Display of actual frequency at time of abnormality							
193	10000011	Fan step number at time of abnormality	0–15 Note: Display of fan step number at time of abnormality							
195	11000011	IC1 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
196	00100011	IC2 LEV opening pulse at time of abnormality								
197	10100011	IC3 LEV opening pulse at time of abnormality								
198	01100011	IC4 LEV opening pulse at time of abnormality								
199	11100011	IC5 LEV opening pulse at time of abnormality								
200	00010011	High pressure sensor data at time of abnormali-ty	−99.9–999.9 (kgf/cm²) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
201	10010011	TH4 (Compres-sor) sensor data at time of abnormality	−99.9–999.9 (°C) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
202	01010011	TH6 (Suction pipe) sensor data at time of abnormality								
203	11010011	TH3 (Outdoor liquid pipe) sensor data at time of abnormality								
204	00110011	TH8 (Heat sink) sensor data at time of abnormali-ty								
205	10110011	OC SC (cooling) at time of abnormality	−99.9–999.9 (°C) 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	01110011	IC1 SC/SH at time of abnormali-ty								
207	11110011	IC2 SC/SH at time of abnormali-ty								
208	00001011	IC3 SC/SH at time of abnormali-ty								
209	10001011	IC4 SC/SH at time of abnormali-ty								
210	01001011	IC5 SC/SH at time of abnormali-ty								
211	11001011	IC6 Capacity code	0–255 Note: Display of indoor unit capacity code The No.1 unit will start from the M-NET address with the lowest number.							
212	00101011	IC7 Capacity code								
213	10101011	IC8 Capacity code								
214	01101011	IC6 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
215	11101011	IC7 operation mode								
216	00011011	IC8 operation mode	Note: Display of indoor unit operation mode							
217	10011011	IC6 LEV opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
218	01011001	IC7 LEV opening pulse								
219	11011001	IC8 LEV opening pulse								

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
220	00111011	IC6 TH23 (Gas)	−99.9–999.9 (°C) Note: Display detected data of indoor unit thermistor							
221	10111011	IC7 TH23 (Gas)								
222	01111011	IC8 TH23 (Gas)								
223	11111011	IC6 TH22 (liquid)								
224	00000111	IC7 TH22 (liquid)								
225	10000111	IC8 TH22 (liquid)								
226	01000111	IC6 TH21 (intake)								
227	11000111	IC7 TH21 (intake)								
228	00100111	IC8 TH21 (intake)								
229	10100111	IC6 SC/SH	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
230	01100111	IC7 SC/SH								
231	11100111	IC8 SC/SH								
232	00010111	Target indoor SC/SH (IC6)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
233	10010111	Target indoor SC/SH (IC7)								
234	01010111	Target indoor SC/SH (IC8)								
235	11010111	IC6 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality delay							
236	00110111	IC7 LEV opening pulse abnormality delay								
237	10110111	IC8 LEV opening pulse abnormality delay								
238	01110111	IC6 SC/SH at time of abnormality delay	−99.9–999.9 (°C) 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	11110111	IC7 SC/SH at time of abnormality delay								
240	00001111	IC8 SC/SH at time of abnormality delay								
241	10001111	IC6 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
242	01001111	IC7 LEV opening pulse at time of abnormality								
243	11001111	IC8 LEV opening pulse at time of abnormality								
244	00101111	IC6 SC/SH at time of abnormality	−99.9–999.9 (°C) 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	10101111	IC7 SC/SH at time of abnormality								
246	01101111	IC8 SC/SH at time of abnormality								
250	01011111	IC9 LEV opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
251	11011111	IC10 LEV opening pulse								
252	00111111	IC11 LEV opening pulse								
253	10111111	IC12 LEV opening pulse								

9 DISASSEMBLY PROCEDURE

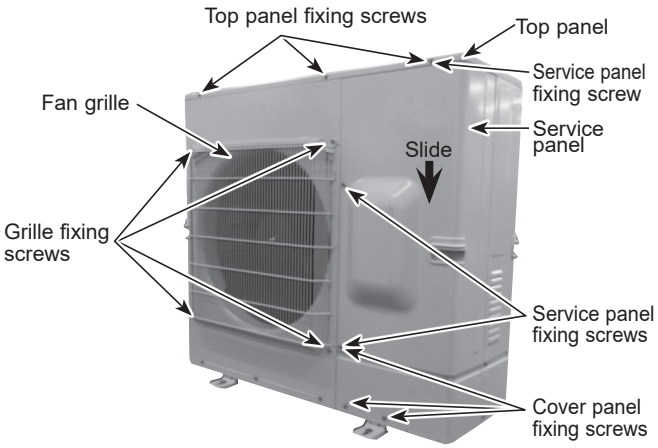
——→: Indicates the visible parts in the photos/figures.
- - - - - - - →: Indicates the invisible parts in the photos/figures.

Note:
- Turn OFF the power supply before disassembly.

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)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the front panel.
4. Remove 4 grille fixing screws (5 × 12) to detach the fan grille. (See Photo 1)
5. Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2)
6. Disconnect the connectors CNF1 on the outdoor multi controller circuit board in the electrical parts box. (See photo 4)
7. Loosen a clamp on the side of the motor support. (See Photo 3)
8. 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].

Photo 2

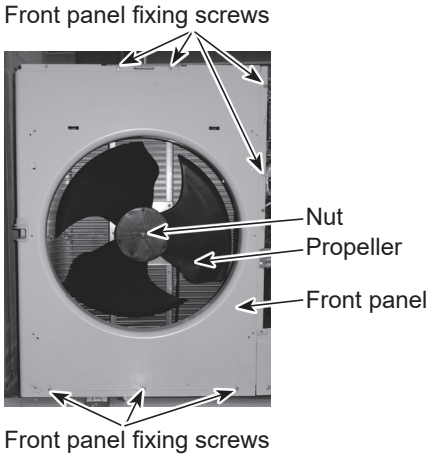
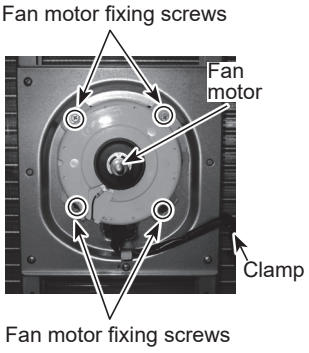


Photo 3



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.
   (See Photo 5 for VKM type, or Photo 7 for YKM type)
4. Remove all the following connectors from the outdoor multi controller circuit board;

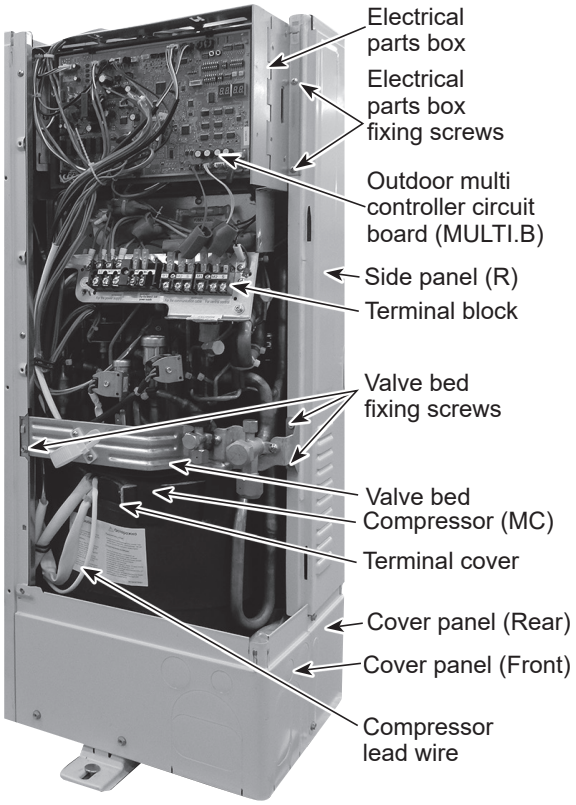
   <Diagram symbol in the connector housing>
   - Fan motor (CNF1)

- 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)
- Linear Expansion valves (LEV-A, LEV-B)
- Liquid shut-off valve (SV2)
- Gas shut-off valve (SV3)

Pull out the disconnected wires from the electrical parts box.

5. Remove the comp felt (top).
6. Remove a nut from the terminal cover to remove the cover, and disconnect the compressor lead wire. (See Photo11)
7. 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



4. Disassembling the electrical parts box (VKM type)

1. Disconnect all the connectors on the multi controller circuit board.
2. Remove 2 screws (A) which fix the plate holding the multi controller circuit board and the electrical parts box. (See Photo 5)
3. Remove the multi controller circuit board. (See Photo 5)
4. Disconnect the M-NET power board connector on the back plate of the controller circuit board.
5. Disconnect the connectors of reactor on the back plate of the electrical parts box. (See Photo 6)
6. Remove 6 screws (B) on the back plate of the electrical parts box. (See Photo 6)
7. Remove the 3 reactors. (See Photo 6)

Notes:
- When reassembling the electrical parts box, make sure that the wirings are correct.
- When exchanging the reactor, make sure to exchange all the 3 reactors.

Photo 5

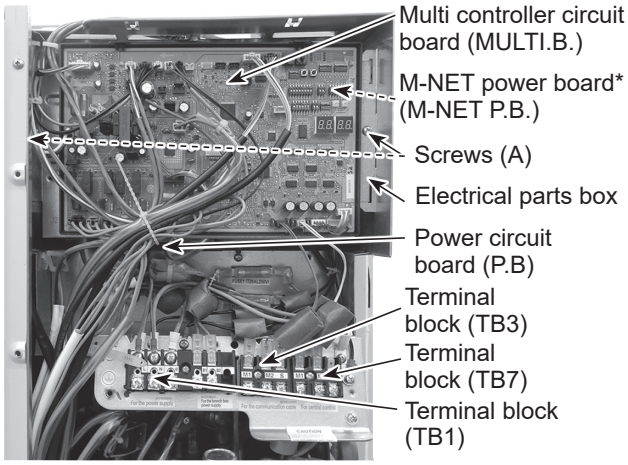
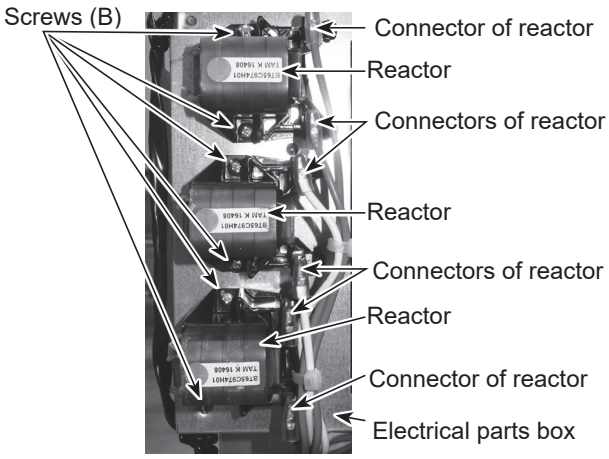


Photo 6



* The M-NET power board is installed behind the multi controller circuit board.

5. Disassembling the electrical parts box (YKM type)

1. Disconnect all the connectors on the multi controller circuit board.
2. Remove 2 screws (A) which fix the plate holding the multi controller circuit board and the electrical parts box.
3. Remove the multi controller circuit board. (See Photo 7)
4. Disconnect the M-NET power board connector on the back plate of the controller circuit board.
5. Disconnect all the connectors on the noise filter circuit board. (See Photo 8)
6. Remove 9 supports on the noise filter circuit board. (See Photo 8)
7. Remove the noise filter circuit board. (See Photo 8)
8. Remove the noise filter plate fixing screws. (See Photo 8)
9. Disconnect the connectors of reactor on the bottom plate of the electrical parts box. (See Photo 9)
10. Remove 4 screws (B) on the bottom plate of the electrical parts box. (See Photo 9)
11. Remove the reactor. (See Photo 9)

Note:

- When reassembling the electrical parts box, make sure that the wirings are correct.

Photo 7

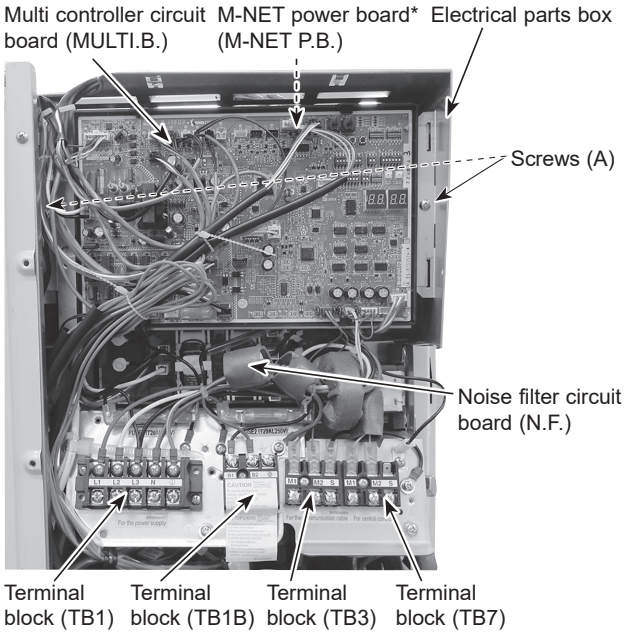


Photo 8

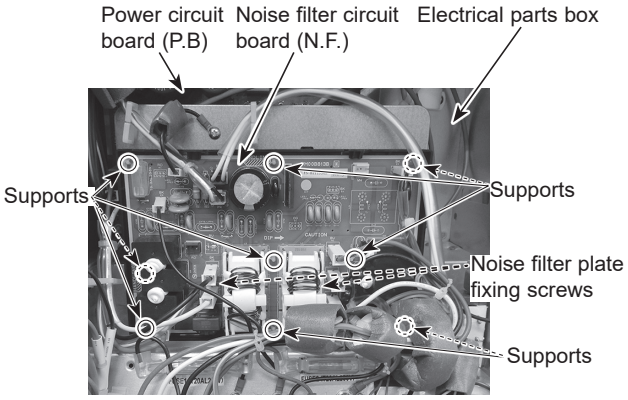
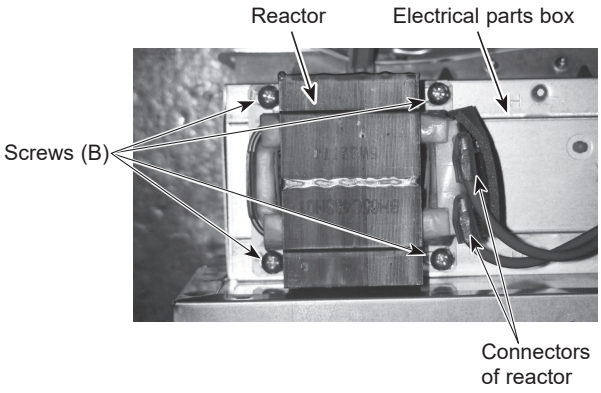


Photo 9



* The M-NET power board is installed behind the multi controller circuit board.

6. Removing thermistors

■ Removing the thermistors <Compressor> (TH4) / <HIC pipe> (TH2)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connectors TH4 and TH2 on the multi controller board in the electrical parts box.
4. Loosen the fastener fixing the connectors to the electrical parts box. (See Photo 10)
5. Pull out the thermistor <HIC pipe> (TH2) from the sensor holder. (See Photo 13)
6. Remove the comp felt (top) and pull out the thermistor <Compressor> (TH4) from the sensor holder. (See Photo 11)

Photo 10

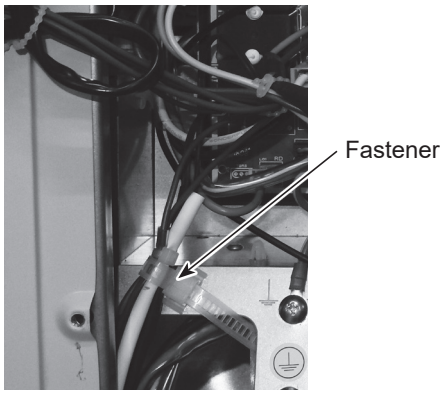
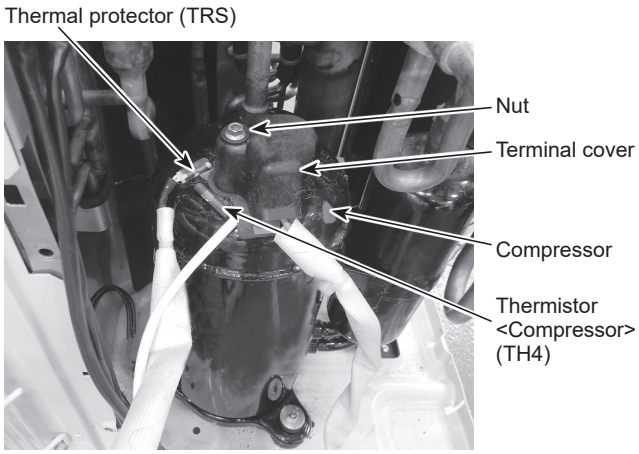


Photo 11



■ Removing the thermistors <Outdoor liquid pipe> (TH3) / <Suction pipe> (TH6) / <Ambient> (TH7), and the thermal protector (TRS)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the side panel (R) by removing the following screws:
   • Electrical parts box fixing screws (4 × 10): 2 pieces
   • Valve bed fixing screws (5 × 12): 2 pieces
   • Side panel fixing screw on the right side of the panel (5 × 12): 1 piece
   • Side panel fixing screw in the rear of the panel (5 × 12): 3 pieces
4. Disconnect the following connectors on the multi controller circuit board in the electrical parts box.
   • TH3: White
   • TH6/7: Red
5. Loosen the fastener fixing the connector to the electrical parts box. (See Photo 10)
6. Pull out each thermistor from the sensor holder. (See Photo 12, 13)

Note:

- When replacing the thermistor <Ambient> (TH7), replace it together with the thermistor <Suction pipe> (TH6) since they are combined together.
- When replacing the thermal protector (TRS), replace it together with the connector of the high pressure switch (63H) since they are combined together.

Photo 12

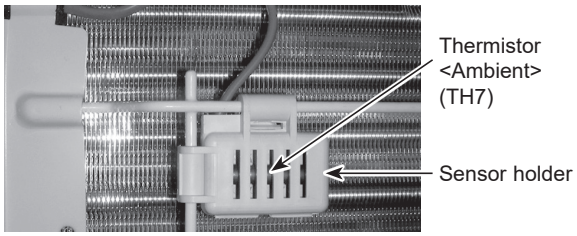


Photo 13

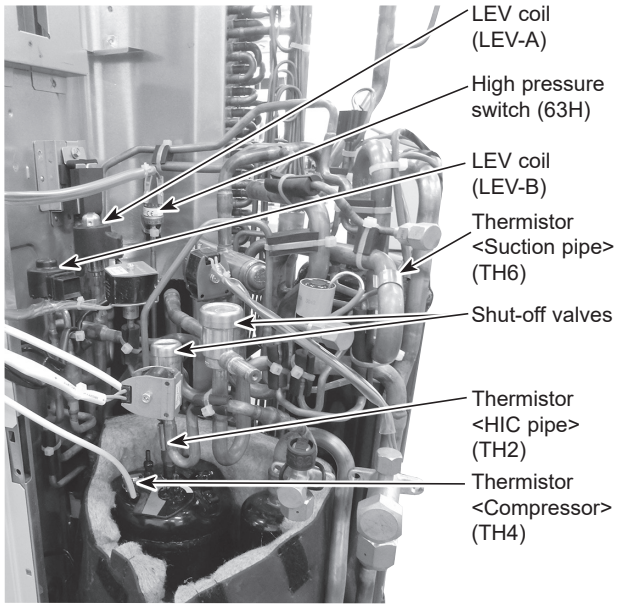
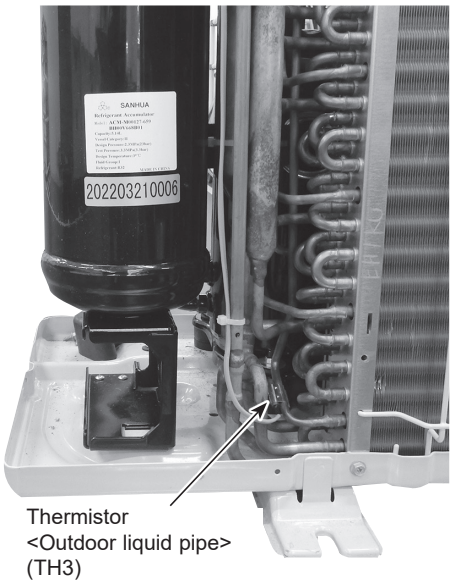


Photo 14



7. Removing LEV coils

1. Remove the service panel. (See Photo 1)
2. Disconnect the connector CNL VA for LEV-A and CNL VB for LEV-B on the multi controller circuit board in the electrical parts box.
3. Remove each LEV coil by sliding the coil upward. (See Photo 13)

8. 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. (Refer to procedure 3)
4. Remove the linear expansion valve coil.
5. Recover refrigerant.
6. Remove the welded part of linear expansion valve.

⚠**Caution:**
- Recover refrigerant with the stop valves 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 (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

9. Removing shut-off valve coils (for liquid shut-off valve and gas shut-off valve)

1. Remove the service panel. (See Photo 1)
2. Disconnect the connector SV2 for the liquid shut-off valve and the connector SV3 for the gas shut-off valve on the multi controller circuit board in the electrical parts box.
3. Remove shut-off valve coil fixing screws (M4 x 6).
4. Remove the shut-off valve coils toward you. (See Photo 15)

Note:
- Tighten the coils with a torque of 1.47-1.96 N·m [1.08-1.45 lbf·ft].

10. 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 shut-off valve coil. (Refer to procedure 9)
5. Recover refrigerant.
6. Remove the welded part of the shut-off valve. (See Photo 15)

⚠Caution:
- Recover refrigerant with the stop valves 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.

11. 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.

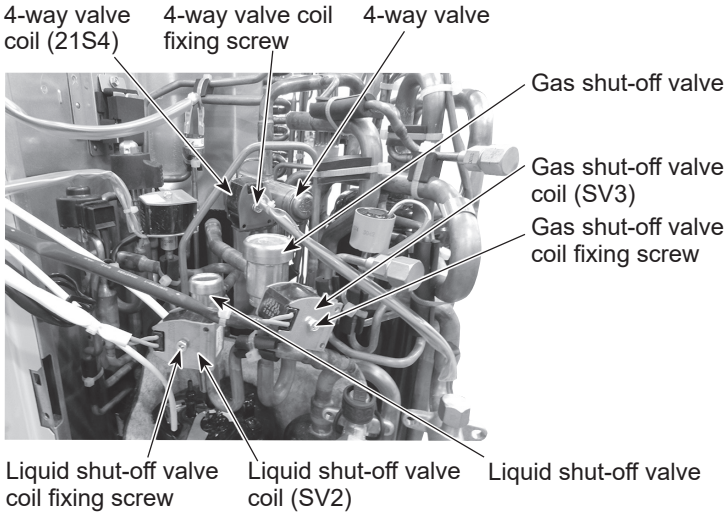
12. Removing the 4-way valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (Refer to procedure 3)
4. Remove 3 valve bed fixing screws (5 × 12) and 4 stop valve fixing screws (5 × 16), then remove the valve bed. (See Photo 4)
5. Remove 4 side panel (R) fixing screws (5 × 12) in the rear of the unit, then remove the right side panel.
6. Remove the 4-way valve coil. (See Photo 15)
7. Recover refrigerant.
8. Remove the welded part of 4-way valve.

⚠Caution:
- Recover refrigerant with the stop valves 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 (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 15



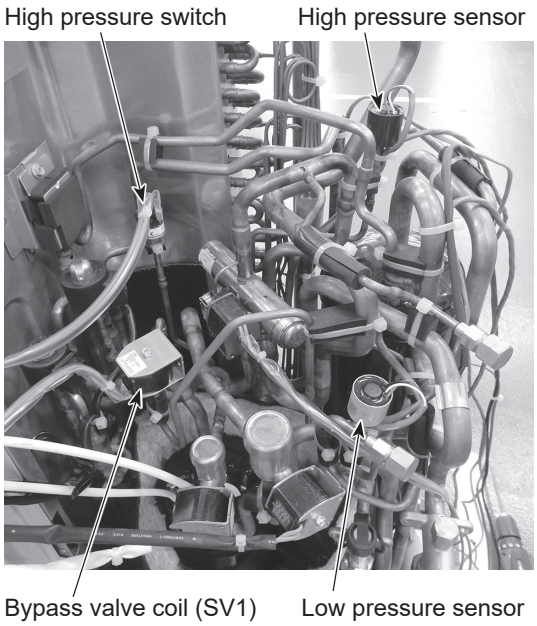
13. Removing bypass valve coil (SV1) and bypass valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connector SV1 on the multi controller circuit board in the electrical parts box.
4. Remove the electrical parts box. (Refer to procedure 3)
5. Remove the bypass valve coil fixing screw (M4 × 6).
6. Remove the bypass valve coil by sliding the coil upward. (See Photo 16)
7. Recover refrigerant.
8. Remove the welded part of bypass valve.

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

Notes:
- Recover refrigerant without spreading it in the air.
- When installing the bypass 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.

Photo 16



14. 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. (Refer to procedure 3)
4. Remove the side panel (R). (Refer to procedure 6)
5. Pull out the lead wire of high pressure switch.
6. Recover refrigerant.
7. Remove the welded part of high pressure switch.

⚠**Caution:**
- Recover refrigerant with the stop valves 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 (100°C or more), then braze the pipes so that the inside of pipes are not oxidized.

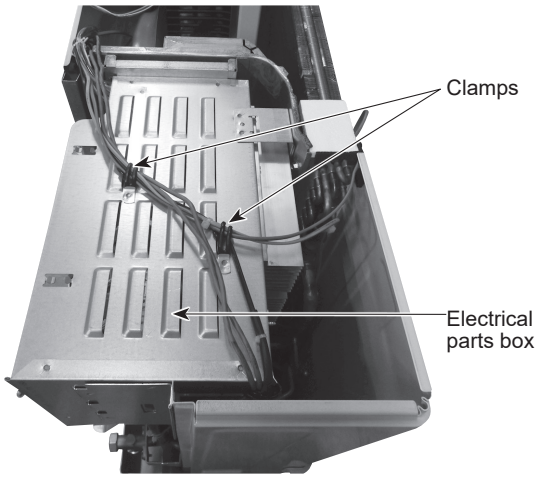
15. Removing the low pressure sensor (63LS) and the high pressure sensor (63HS)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the side panel (R). (Refer to procedure 6)
4. Disconnect the connectors 63LS and 63HS on the multi controller circuit board in the electrical parts box.
5. Loosen the clamps which are fixing the low pressure sensor and high pressure sensor lead wire to the top of the electrical parts box. (See Photo 17)
6. Recover refrigerant.
7. Remove the welded part of low pressure sensor and high pressure sensor.

⚠**Caution:**
- Recover refrigerant with the stop valves 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 (100°C or more), then braze the pipes so that the inside of pipes are not oxidized.

Photo 17



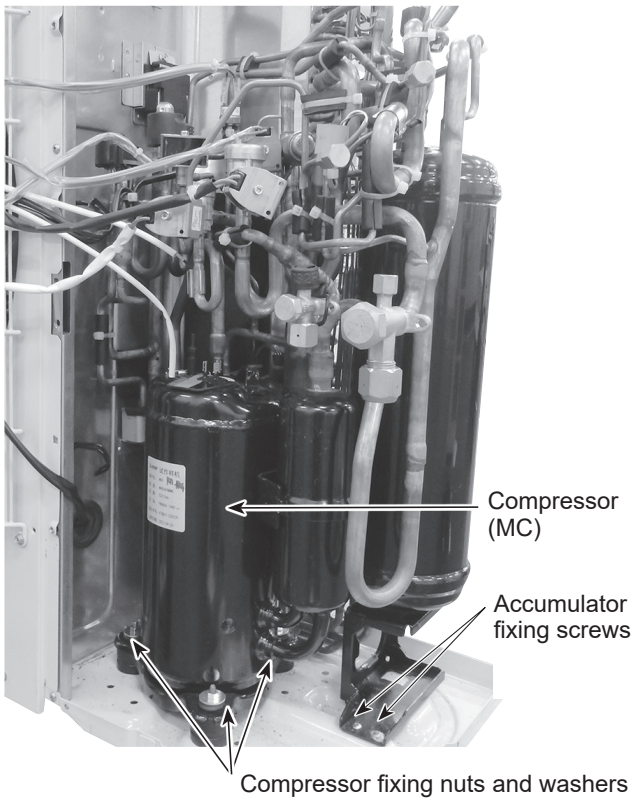
16. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (Refer to procedure 3)
4. Remove the valve bed by removing the following screws:
   • Valve bed fixing screws (5 × 12): 3 pieces
   • Stop valve fixing screws (5 × 16): 4 pieces
5. Remove 2 cover panel (front) fixing screws (5 × 12) and remove the cover panel (front).
6. Remove 5 cover panel (rear) fixing screws (5 × 12) and remove the cover panel (rear).
7. Remove 2 side panel (R) fixing screws in the rear of the panel (5 × 12) and remove the side panel (R).
8. Remove the comp felt (top) and (body).
9. Remove the nut on the terminal cover to remove the terminal cover, and remove the compressor lead wire. (See Photo 11)
10. Remove the thermistor <Compressor> (TH4).
11. Recover refrigerant.
12. Remove the 3 compressor fixing nuts and washers for motor using spanner or adjustable wrench.
13. Remove the welded pipe of compressor inlet and outlet and then remove the compressor.

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

Notes:
• Recover refrigerant without spreading it in the air.
• When reconnecting the compressor wirings, ensure that the connection is correct: Check the color of the wiring and the label on the terminal block, and connect properly.

Photo 18



17. 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. (Refer to procedure 3)
4. Remove the valve bed. (Refer to the procedure 16-4)
5. Remove the cover panel (front). (Refer to the procedure 16-5)
6. Remove the cover panel (rear). (Refer to the procedure 16-6)
7. Remove the side panel (R). (Refer to the procedure 16-7)
8. Recover refrigerant.
9. Remove welded pipe of accumulator inlet and outlet.
10. Remove 2 accumulator leg fixing screws (4 × 10). (See Photo 18)

⚠**Caution:**

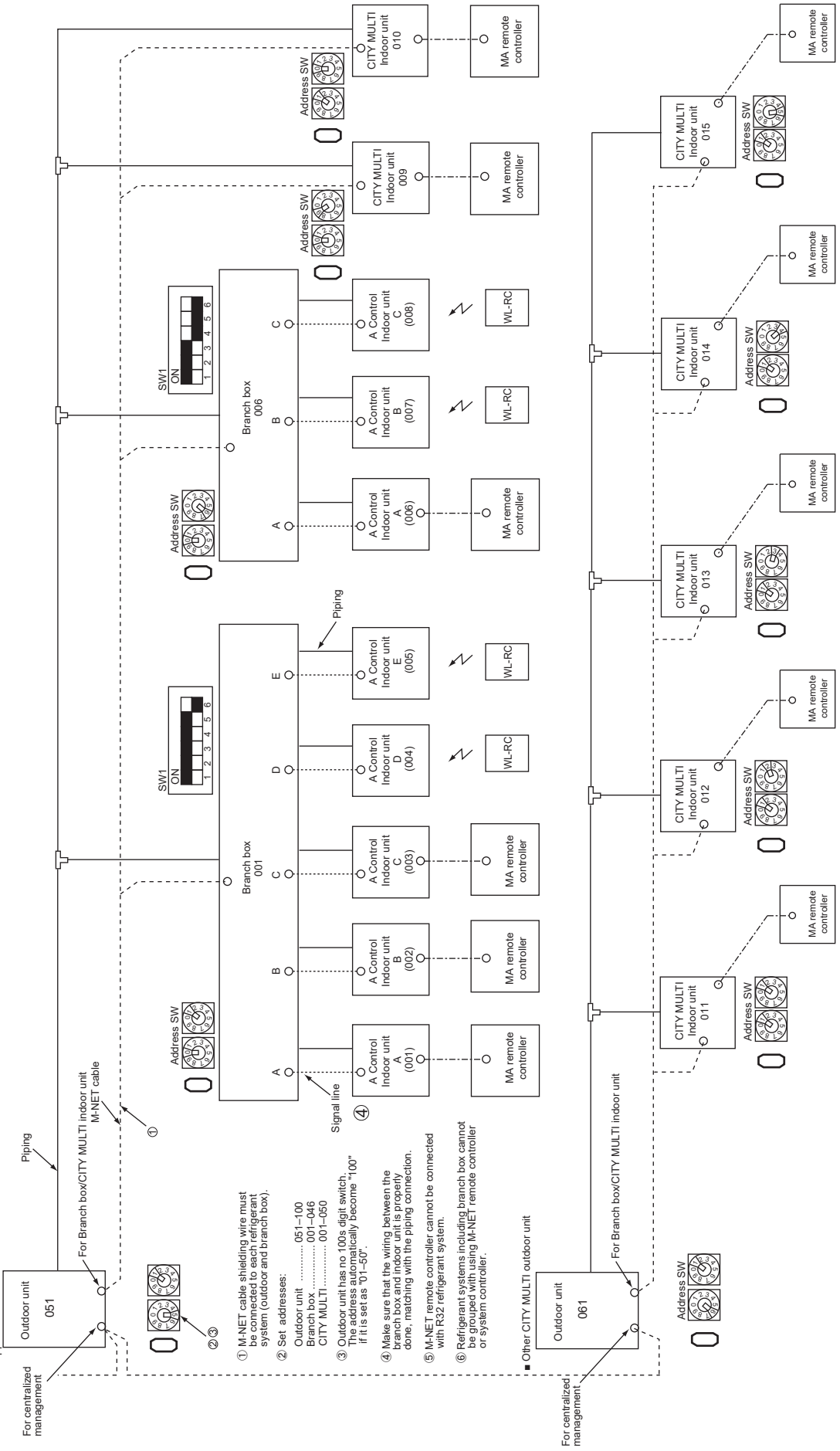
- Recover refrigerant with the stop valves opened through both the check valves and the service ports.

Note:

- Recover refrigerant without spreading it in the air.

10 SYSTEM CONSTRUCTION

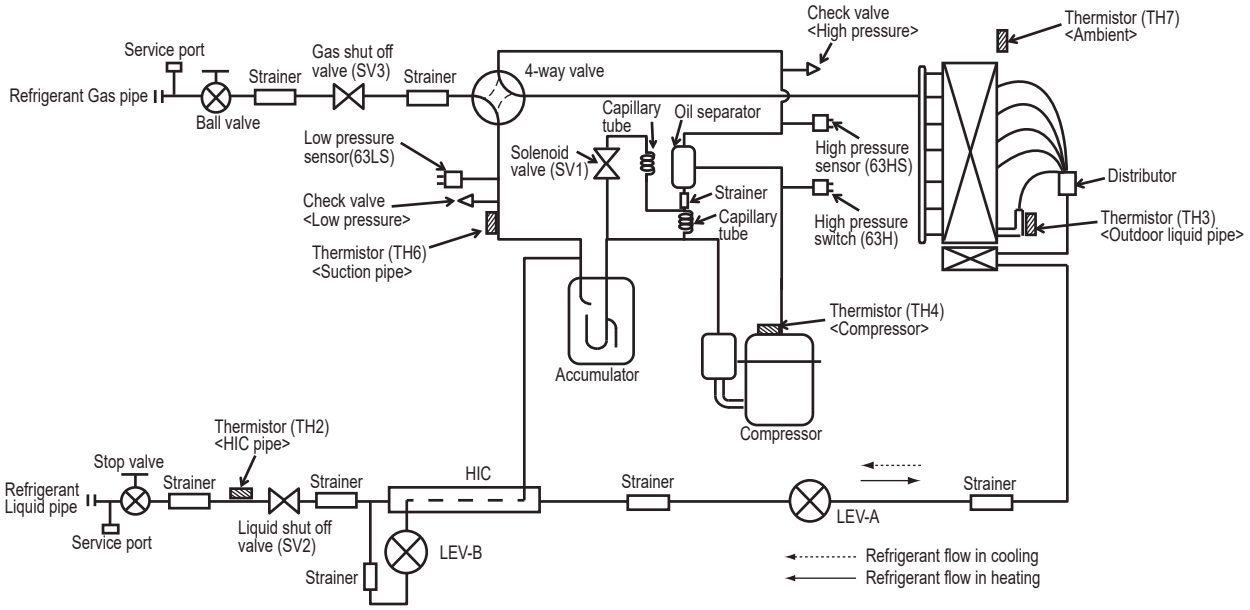
10-1. Example of refrigerant piping and transmission cable wiring



10-2. Special function operation and settings for M-NET remote controller

Refer to “Special function operation and settings” for setting details.

10-3. Refrigerant system diagram

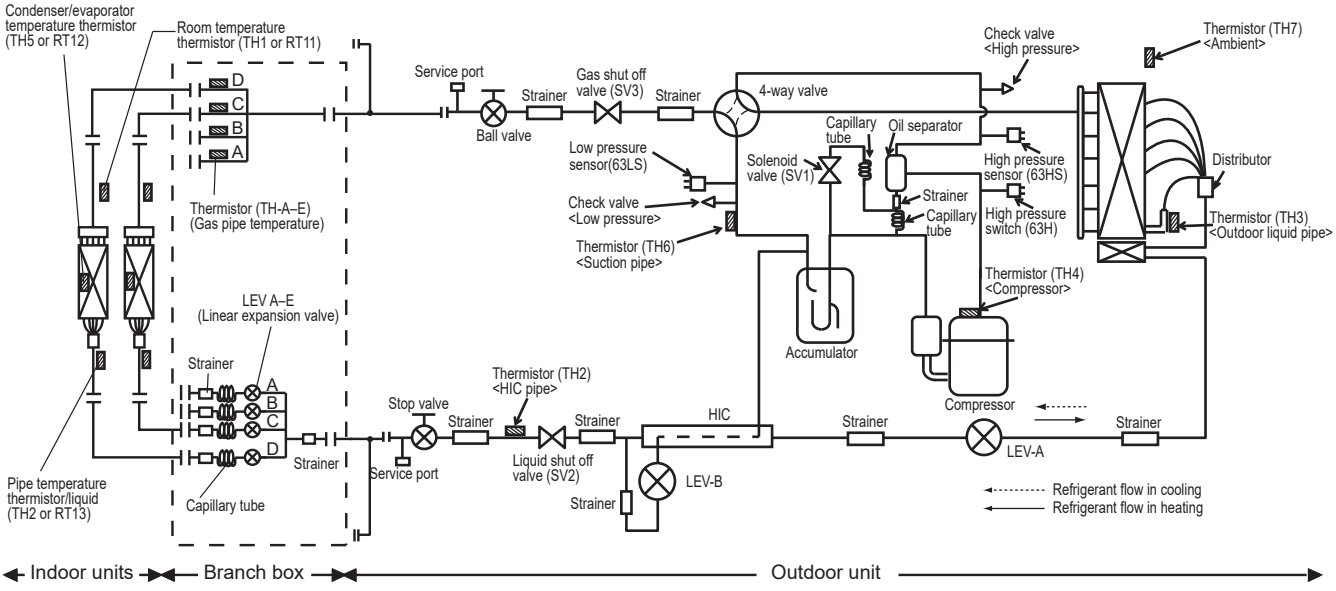


Refrigerant piping specifications <dimensions of flared connector>

Unit: mm < in >

Capacity \ Item		Liquid piping		Gas piping
Indoor unit	M(S)10/15/20/25/32/40/50	The farthest piping length from the first joint ≤ 30 m	ø6.35 <1/4>	ø12.7 <1/2>
		The farthest piping length from the first joint > 30 m	ø9.52 <3/8>	
	M(S)63/80/100/125/140	ø9.52 <3/8>		ø15.88 <5/8>
Outdoor unit	SM112/125/140	ø9.52 <3/8>		ø15.88 <5/8>

10-4. Refrigerant system diagram (when using branch box)



Note:

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

10-5. Selecting pipe size

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

10-6. 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

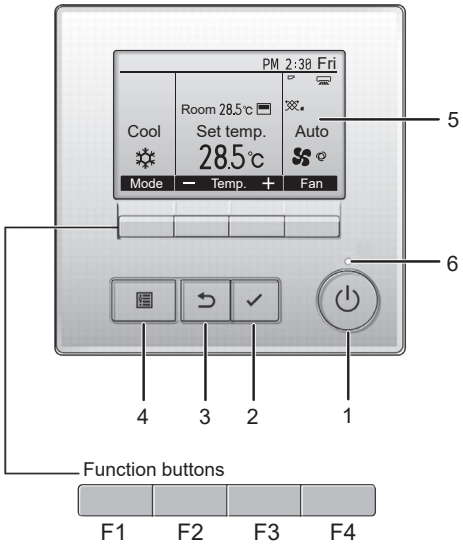
If a large amount of R32 refrigerant leaks in a room, suffocation or fire may result. Satisfy the installation area specified in the installation manual to meet safety standards.

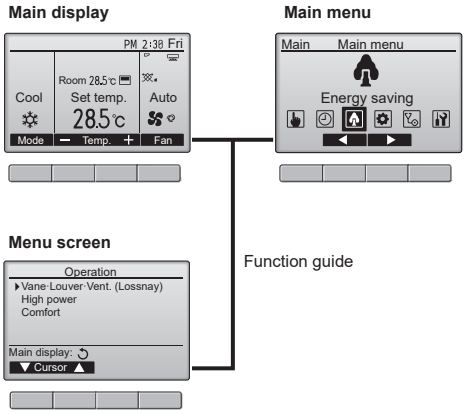
13 REMOTE CONTROLLER

13-1. Remote controller functions

13-1-1. PAR-41MAA

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 button
   Press to save the setting.
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.

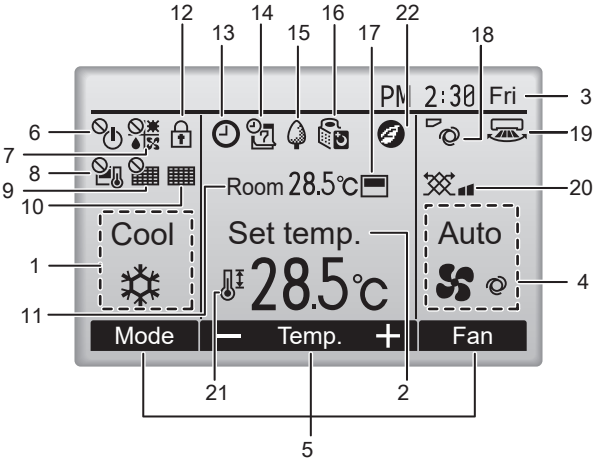
F4: Function button 4
Main display: Press to change the fan speed.
Menu screen: The button function varies depending on the screen.

Display

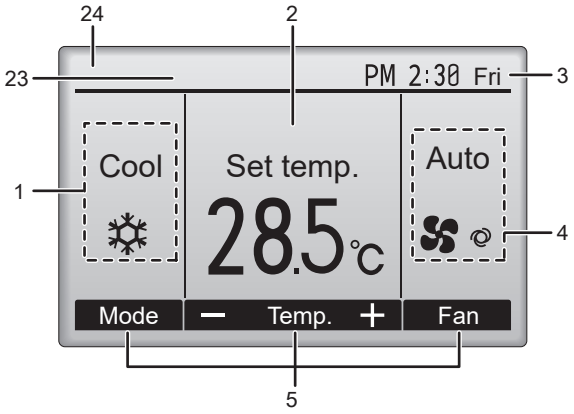
The main display can be displayed in 2 different modes: ″Full″ and ″Basic″. The initial setting is ″Full″. To switch to the ″Basic″ mode, change the setting on the Main display setting. (Refer to operation manual included with remote controller.)

■ 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 the On/Off timer, Night setback, or Auto-off timer function is enabled.
    : Appears when the timer is disabled by the centralized control system.
14. : Appears when the 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 a ″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 check code appears during the preliminary error.

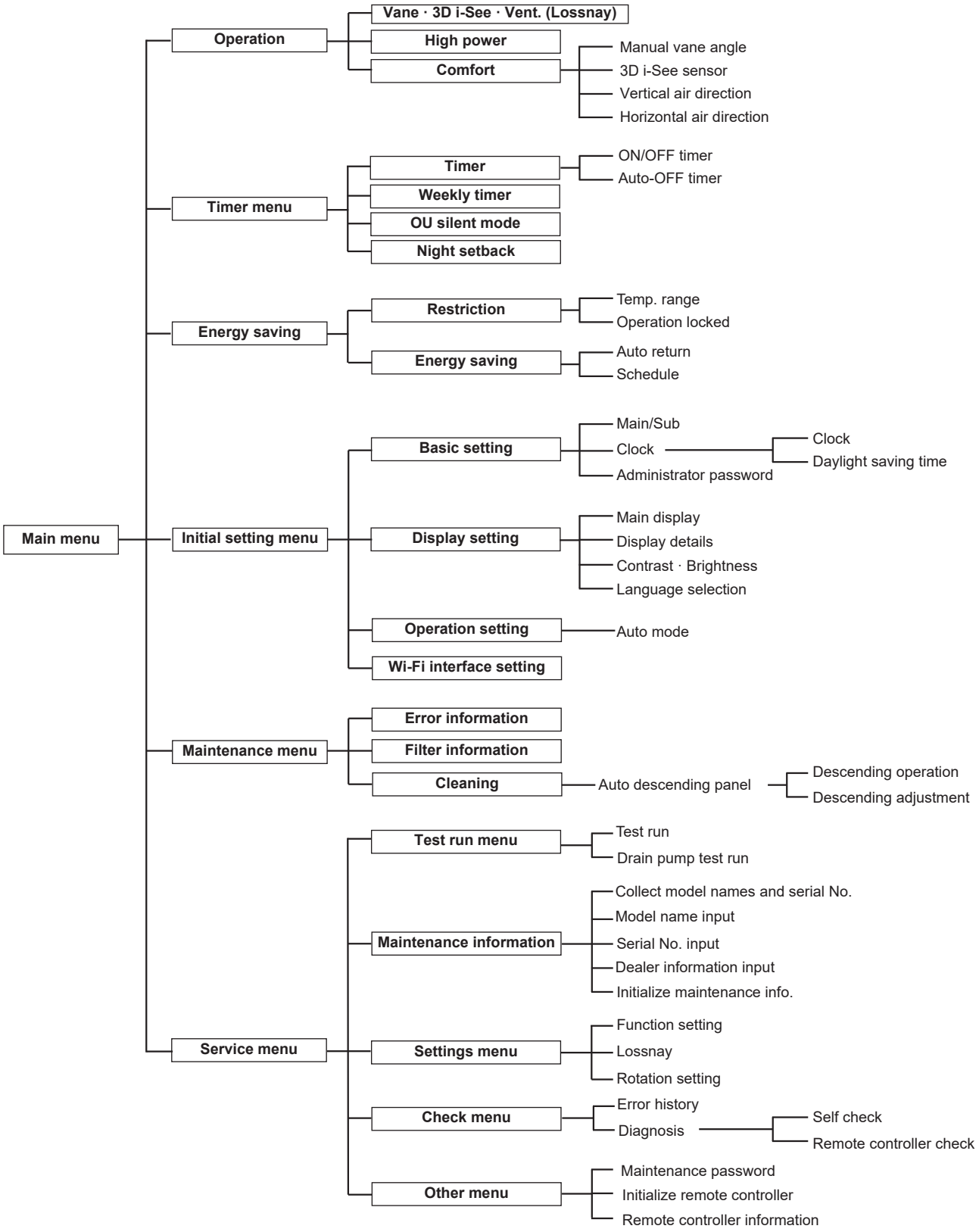
*1. These functions are not applied to the floor standing models.

Menu structure

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

Note:

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



Main menu list

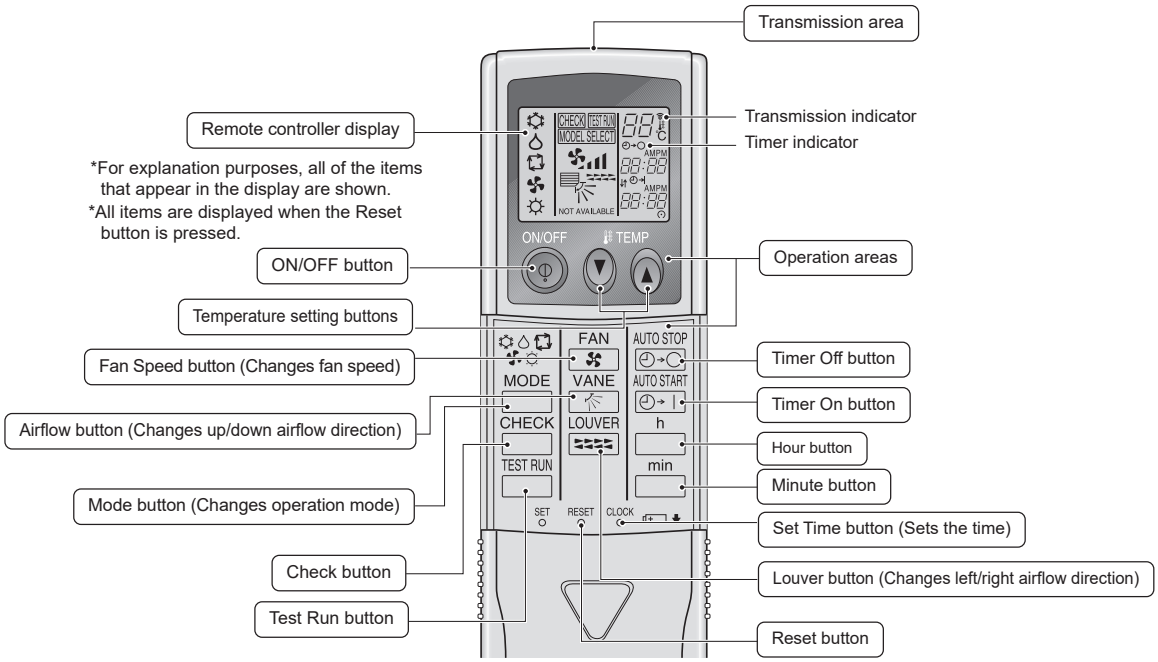
Main menu	Setting and display items		Setting details
Operation	Vane · 3D i-See · Vent. (Vane.Vent. (Lossnay))		Vane: Use to set the vertical air direction. Louver: Use to set the horizontal air direction. 3D i-See sensor: This setting is available only for the air conditioners that support easy setting function of motion sensing air direction. Vent: Use to set the amount of ventilation.
	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	Vertical air direction • Sets the vertical airflow direction (vane) of each unit.
			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 times. • Time can be set in 5-minute increments.
		Auto-OFF timer	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 times. • Up to 8 operation patterns can be set for each day. (Not valid when the 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 times for each day of the week. • Select the desired silent level from ″Normal,″ ″Middle,″ and ″Quiet.″
	Night setback *1		Use to make Night setback settings. • Select ″Yes″ to enable the setting, and ″No″ to disable the setting. The temperature range and the start/stop times can be set.
Energy saving	Restriction	Temp. range *2	Use to restrict the preset temperature range. • Different temperature ranges can be set for different operation modes.
		Operation lock	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 times 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.
	Energy data (for unit time, month, and day)		Displays the amount of power consumption during operation. • Unit time data: Data for the last one-month period can be displayed in 30-minute units. • Monthly/daily data: Data for the last 14-month period are displayed in day-and month-units. * Data can be deleted. * Data are obtained based on the power consumption estimated from the operating state.
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 • Outdoor unit silent mode setting • Night set back
	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 either Celsius (°C) or Fahrenheit (°F). Room temp.: Set 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.
Maintenance	Error information		Use to check error information when an error occurs. • Check 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 the Service menu to bring up the Test run menu. • Test run • Drain pump test run
	Input maintenance info.		Select ″Input maintenance Info.″ from the Service menu to bring up the Maintenance information screen. The following settings can be made from the 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.
		LOSSNAY setting	This setting is required only when the operation of CITY MULTI units is interlocked with LOSSNAY units.
	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.
	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-SL97A-E

Controller interface

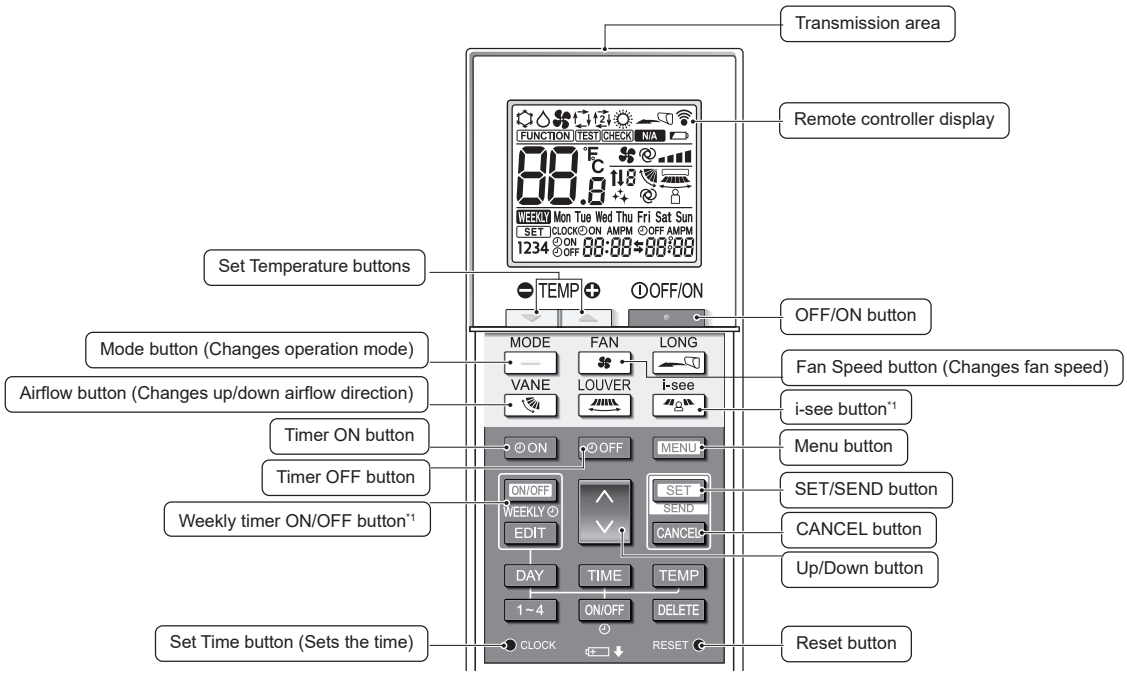


Instructions for use

- 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.

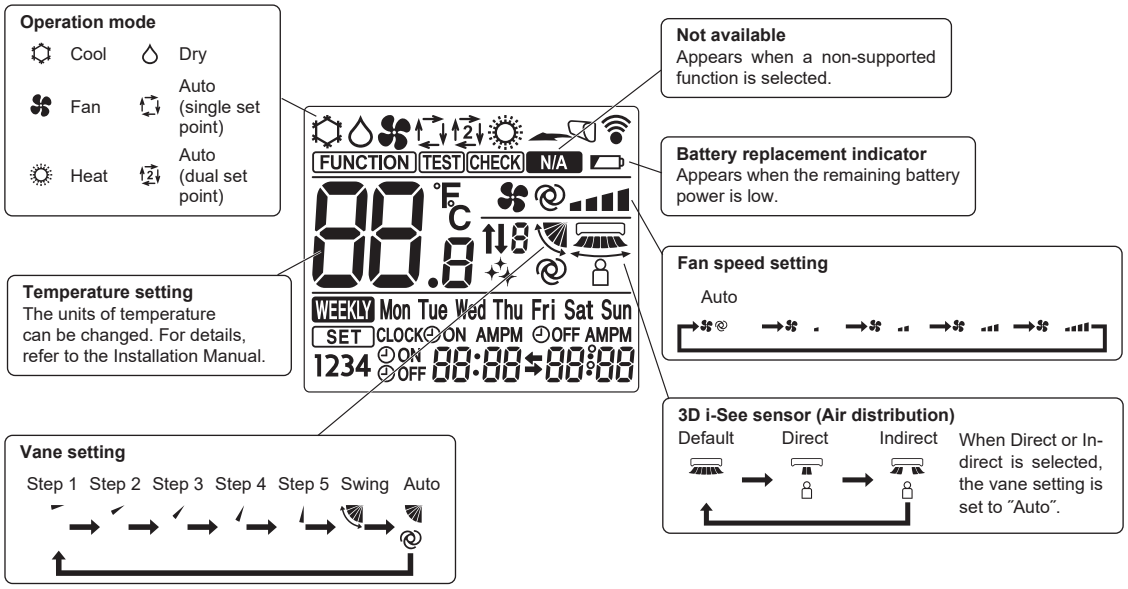
13-1-3. PAR-SL101A-E

Controller interface



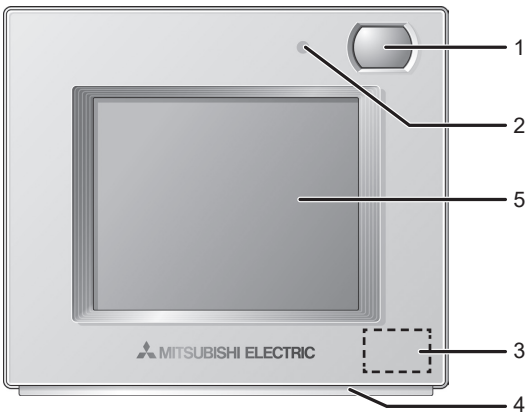
*1. This button is enabled or disabled depending on the model of the indoor unit.

Display



13-1-4. PAR-U02MEDA

Controller interface



1. Occupancy Sensor
   The occupancy sensor detects vacancy for energy saving control.
2. Brightness Sensor
   The brightness sensor detects the brightness of the room for energy saving control.
3. Temperature & Humidity Sensor
   The sensor detects the room temperature and the relative humidity.
4. LED Indicator
   The LED indicator indicates the operation status in different colors.
   The LED indicator lights up during normal operation, lights off when units are stopped, and blinks when an error occurs.
5. Touch panel & Backlit LCD
   The touch panel shows the operation settings screen.
   When the backlight is off, touching the panel turns the backlight on, and it will stay lit for a predetermined period of time.

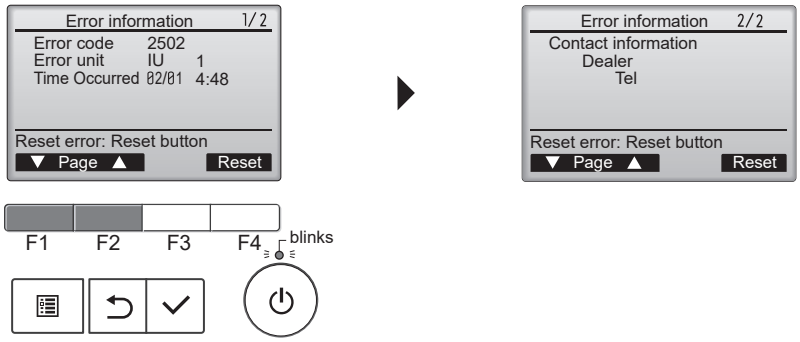
13-2. Error information

Operating instructions

■ How to check the error information when an error occurs

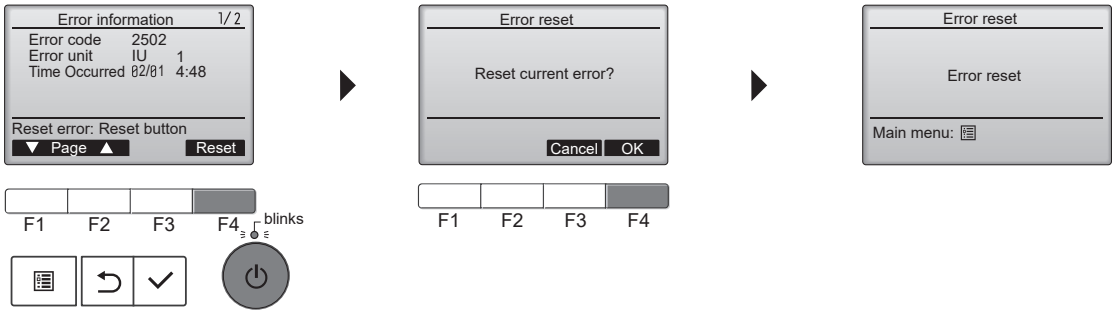
When an error occurs, the following screen will appear. Check the error status, stop the operation, and consult your dealer.

1. Check the error information
   Check 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 the F1 or F2 button to go to the next screen.
   • Contact information (dealer's phone number) will appear if the information has been registered.



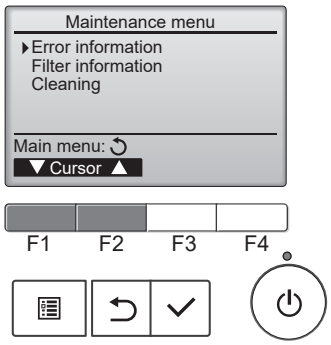
2. Reset the error
   - Press the F4 button or the [⏻] button to reset the error that is occurring.
   - Select ″OK″ with the F4 button.

Note:
- Errors cannot be reset while the ON/OFF operation is prohibited.
- To go back to the service menu, press [☰] 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 the maintenance menu. Errors cannot be reset on this screen.

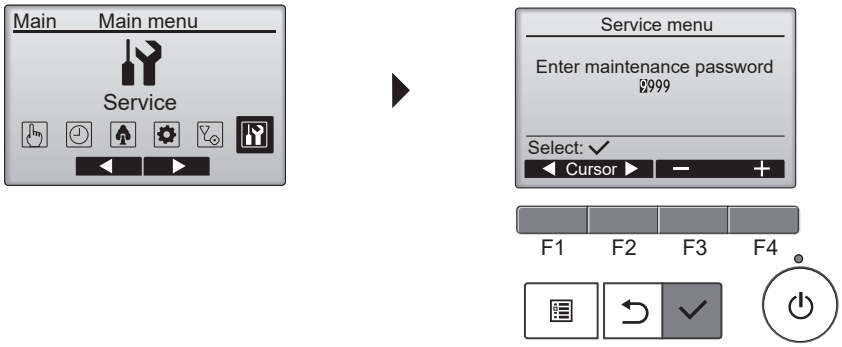


13-3. Service menu

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

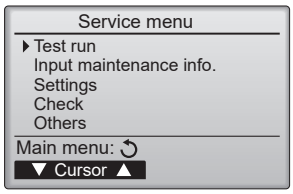
Operating instructions

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



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

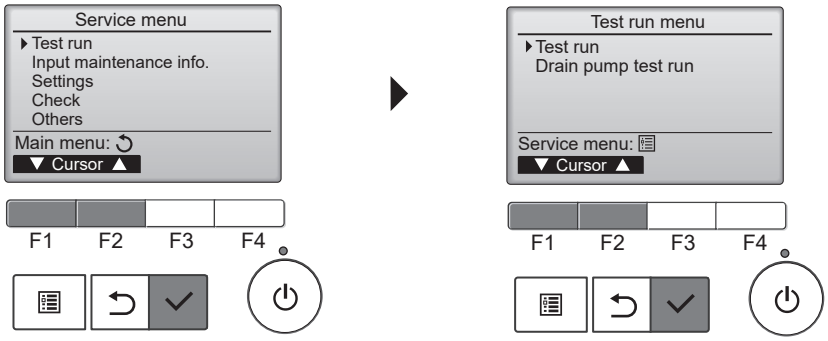
- To go back to the service menu, press [ ] button.
- To return to the previous screen, press [ ] button.

13-4. Test run

13-4-1. PAR-41MAA

Operating instructions

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

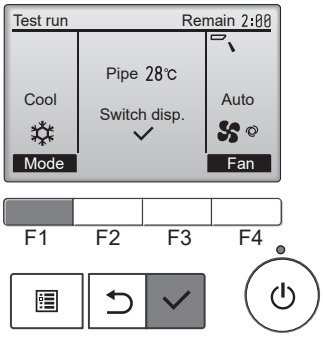


■ Test run operation

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

   Cooling mode: Check the cold air blows out.
   Heating mode: Check the heat blows out.

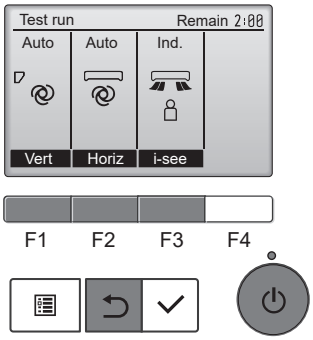
2. Check the operation of the outdoor unit's fan.
3. Press the [✓] button and open the vane setting screen.



■ Auto vane check

1. Check the auto vane with the F1, F2 and F3 buttons.
2. Press the [ ] button to return to ″Test run operation″.
3. Press the [⏻] button.

Notes:
- When the test run is completed, the ″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.



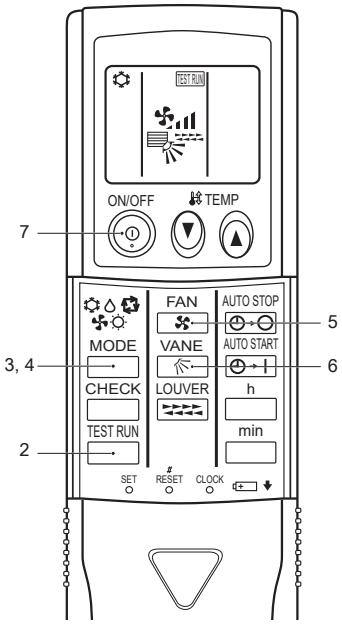
13-4-2. PAR-SL97A-E

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 the 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 the MODE button to activate COOL mode, then check whether cool air blows out from the unit.
4. Press the MODE button to activate HEAT mode, then check whether warm air blows out from the unit.
5. Press the FAN button and check whether strong air blows out from the unit.
6. Press the VANE button and check whether the auto vane operates properly.
7. Press the 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 FAN, DRY or AUTO mode.



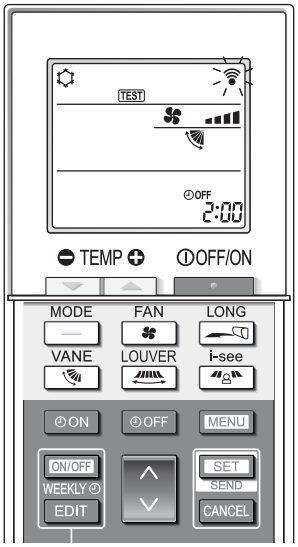
13-4-3. PAR-SL101A-E

Operating instructions

1. Stop the air conditioner
   - Press the button to stop the air conditioner.
   - If the weekly timer is enabled (WEEKLY is shown on the display), press the ON/OFF WEEKLY button to disable it (WEEKLY is off).
2. Start the test run
   - Press the MENU button for 5 seconds.
     CHECK appears on the display and the unit starts the service mode.
   - Press the 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 the button to stop the test run.
   • After 2 hours, the stop signal is transmitted.



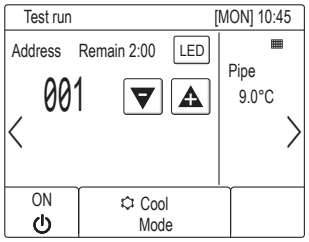
13-4-4. PAR-U02MEDA

Operating instructions

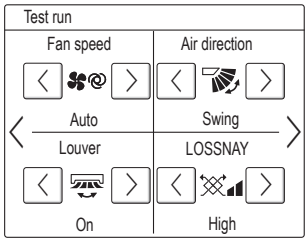
- Read the section about Test run in the indoor unit Installation Manual before performing a test run.
- During the test run, indoor units will be forced to operate in the Thermo-ON status.
  Except the set temperature, normal operation functions are accessible during test run.
- By selecting the address of another indoor unit, the liquid pipe temperature of the selected unit can be monitored.
- The test run will automatically end in 2 hours.

Notes:

- When AHC is controlled from the controller
  To monitor the operating status of AHC, touch the [<] button on the [Test run] screen and access the [General equipment] screen.
- To set the humidity setting for the humidifier (when one is connected to the AHC), touch the [>] button on the [Indoor unit setting] screen.



[Test run screen]



[Indoor unit setting screen]

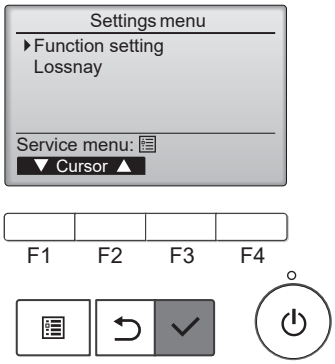
13-5. Function setting

13-5-1. PAR-41MAA

Operating instructions

1. Open the function setting screen.
   • Select ″Service″ from the main menu, and press the [✓] button.
   • Select ″Setting″ from the service menu, and press the [✓] button.
   • Select ″Function setting″ and press the [✓] button.

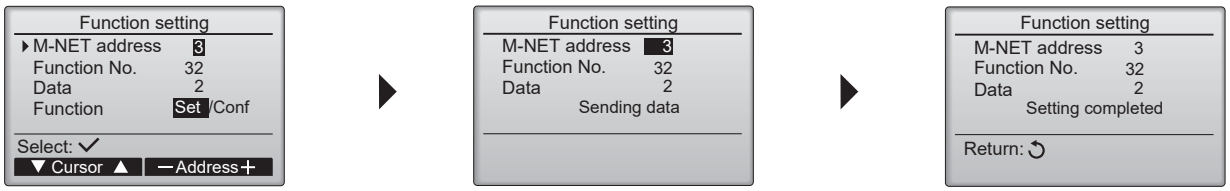
   Function setting screen will appear.



2. Set the function.
   - Press the F1 or F2 button to move the cursor to one of the following: M-NET address, function setting number, or setting value.
   - Press the F3 or F4 button to change the settings to the desired settings.
   - Once the settings have been completed, press the [✓] button.
     A screen will appear indicating that the settings information is being sent.
   - To check the current settings of a given unit, enter the setting for its M-NET address and function setting number, select Conf for the Function, and press the [✓] button.
     A screen will appear indicating that the settings are being searched for.
     When the search is done, the current settings will appear.

   When the settings information has been sent, a screen will appear indicating its completion.
   - To make additional settings, press the [↺] button to return to the screen shown in the above step. Set the function numbers for other indoor units by following the same steps.

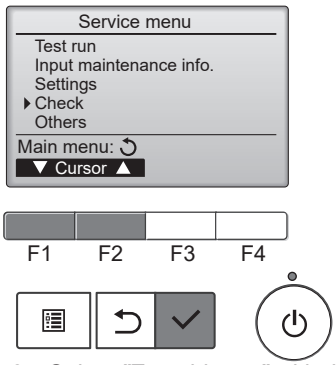
Notes:
- Refer to the indoor unit Installation Manual for information about the initial settings of indoor units, function setting numbers, and setting values.
- Be sure to write down the settings for all functions if any of the initial settings has been changed after the completion of installation work.



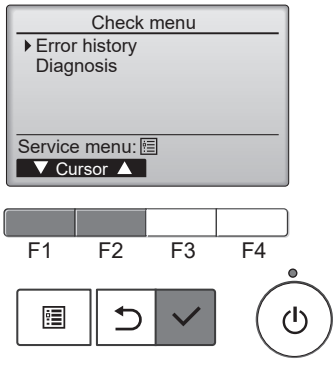
13-6. Error history

Operating instructions

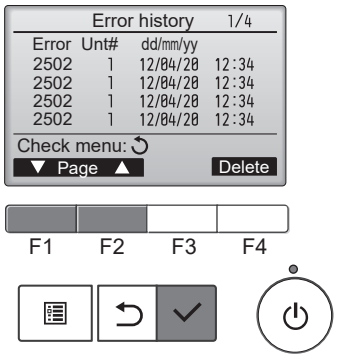
1. Open the Service menu and select “Check”.
   - Select ″Service″ from the main menu, and press the [✓] button.
   - Select ″Check″ with the F1 or F2 button, and press the [✓] button.



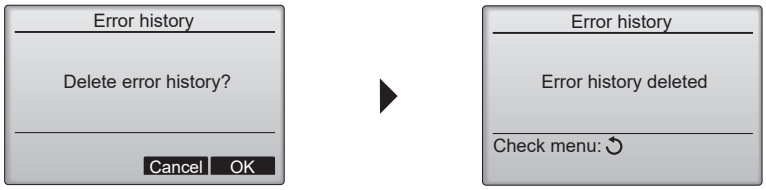
2. Select ″Error history″ with the F1 or F2 button, and press the [✓] button.



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 the F4 button (Delete) on the screen that shows error history.
   A confirmation screen will appear asking if you want to delete the error history.
   • Press the F4 button (OK) to delete the history.
   ″Error history deleted″ will appear on the screen.
   • Press the [⮌] button to go back to the check menu screen.

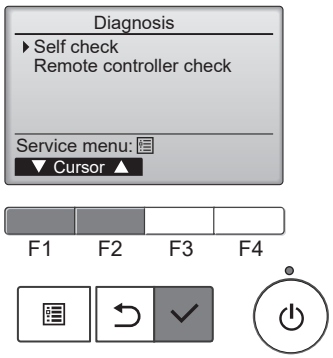


13-7. Self-diagnosis

13-7-1. PAR-41MAA

Operating instructions

1. Open “Self check” screen
   • Select ″Service″ from the main menu, and press the [✓] button.
   • Select ″Check″ from the service menu, and press the [✓] button.
   • Select ″Diagnosis″ from the check menu, and press the [✓] button.
   • Select ″Self check″ with the F1 or F2 button, and press the [✓] button.
   Self check screen will appear.

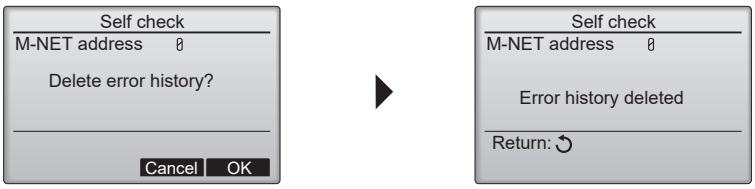


2. Enter the M-NET address with the F1 or F2 button, and press the [✓] button.
   • Check code, unit number, attribute, and indoor unit demand signal ON/OFF status at the contact will appear.
   ″-″ will appear when there is no error history.

<Error history is shown.>

<Error history is not shown.>

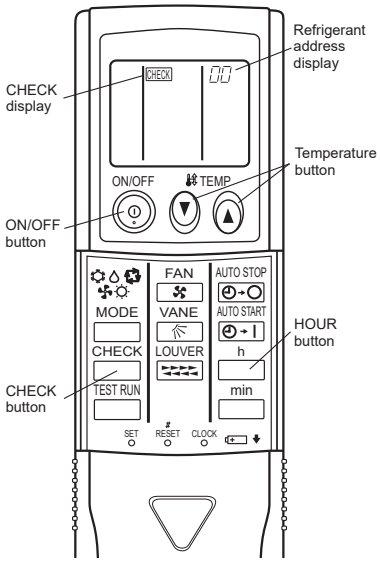
3. Reset the error history.
   • Press the F4 button (reset) on the screen that shows the error history.
   A confirmation screen will appear to ask you if you want to delete the error history.
   • Press the F4 button (OK) to delete the error history.
   ″Request rejected″ will appear if deletion fails.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



13-7-2. PAR-SL97A-E

Operating instructions

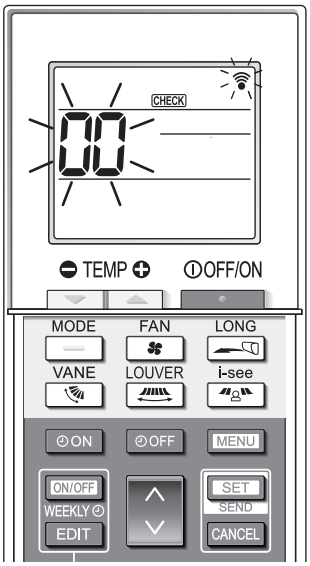
1. Press the CHECK button twice.
   CHECK appears, and the refrigerant address ″00″ blinks.
   Make sure that the remote controller's display has stopped before continuing.
2. Press the buttons to select the refrigerant address of the indoor unit for self-diagnosis.
   Set the address of the indoor unit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



13-7-3. PAR-SL101A-E

Operating instructions

1. Press the button to stop the air conditioner.
   If the weekly timer is enabled (WEEKLY is shown on the display), press the ON/OFF WEEKLY button to disable it (WEEKLY is off).
2. Press the MENU button for 5 seconds. CHECK appears and the unit starts the self-check mode.
3. Press the button to select the refrigerant address (M-NET address) of the indoor unit for which you want to perform the self-check.
4. Press the SET button.
   If an error is detected, the check code is indicated by the number of beeps from the indoor unit and the number of blinks of the OPERATION INDICATOR lamp.
5. Press the button.
   CHECK and the refrigerant address (M-NET address) go off and the self-check is completed.

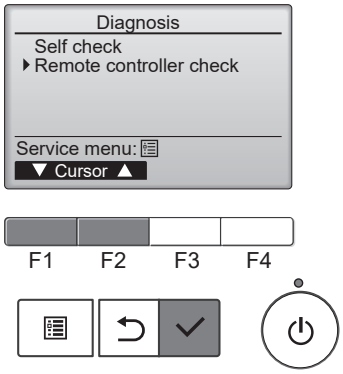


13-8. Remote controller check

Operating instructions

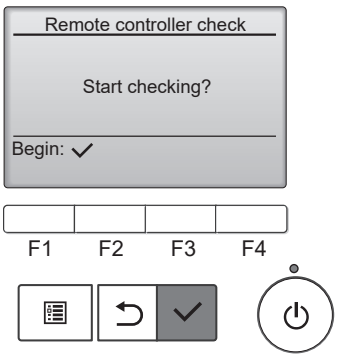
If operations cannot be completed with the remote controller, diagnose the remote controller with this function.

1. Go to the “Remote controller check” screen.
   - Select ″Service″ from the main menu, and press the [✓] button.
   - Select ″Check″ from the service menu, and press the [✓] button.
   - Select ″Diagnosis″ from the check menu, and press the [✓] button.
   - Select ″Remote controller check″ with the F1 or F2 button, and press the [✓] button.



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

Notes:
- To cancel the remote controller check and exit the ″Remote controller check″ menu screen, press the [☰] or the [⮌] 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.

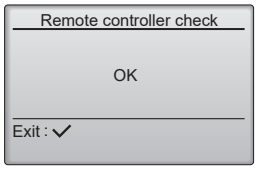
NG (ALL0, ALL1):

• 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 the [✓] 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.

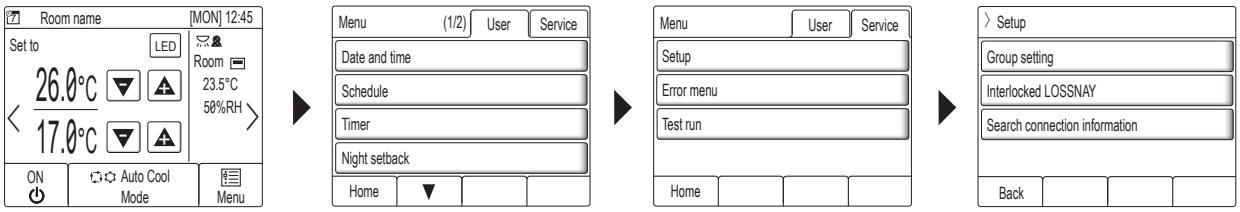
13-9. Special function operation setting

13-9-1. PAR-U02MEDA

M-NET remote controller cannot be connected with a refrigerant system which includes branch box.
It is necessary to perform “group settings” and “Interlocked LOSSNAY” at making group settings of different refrigerant systems (multiple outdoor unit).

Operating instructions

1. Touch the "Menu" on the home screen.
2. Touch the "Service" on the menu (user) screen.
3. Touch the "Setup" on the menu (service) screen.
4. Setup screen will appear.



Home screen | Menu (User) screen | Menu (Service) screen | Setup screen

■ Group settings

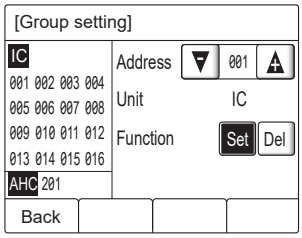
Enter the indoor unit controlled by the remote controller, check the content of entries, and clear entries, etc.
Use the following screen to register the indoor units and the AHC to be controlled from the controller.

1. Select an indoor unit or an AHC address in the [Address] field.
   The number of units that can be registered.
   Indoor unit: 16 units maximum
   AHC: 1 unit maximum

Note:

• AHC cannot be controlled from the controller unless indoor units are registered with the system.

2. Touch the [Set] button to register the address, and touch the [Del] to delete the address.
   Successful address registration/deletion: The registered address(es) will appear on the left side of the screen.
   Deleted address will not appear on the screen.
   Error: “Request denied.” or “Is not to be connected” will appear.



■ Interlocked LOSSNAY:

Use this function to interlock the operation of indoor units and LOSSNAY units.

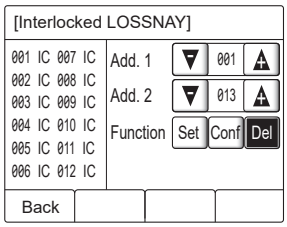
1. To register LOSSNAY units
   • Select the indoor unit address in the Add. 1 section.
   • Select the interlocked LOSSNAY address in the Add. 2 section.

Touch the [Set] button to save the setting.

2. To search for an interlocked setting
   • Touch the [Conf] button to display in the left column the addresses of the units that are interlocked with the unit whose address was set in the Add. 1 section.
3. To delete the interlock settings
   • After taking Step 2 above, select the address to be deleted in the Add. 2 section, and then touch the [Del] button.

Note:

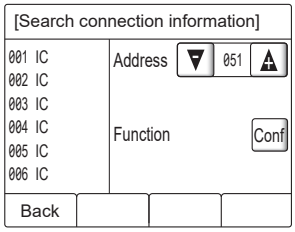
• When the setting or deletion is successfully completed, “Completed” will appear below [Function] field on the screen. If setting or deletion fails, “Request denied” will appear below [Function] field on the screen.



■ Search connection information

Use this screen to specify a unit and search for the controllers that are connected to the unit.

1. Select an address in the [Address] field.
2. Touch the [Conf] button to search for the interlocked units.
   The results will appear in the left column. (When multiple units are found, the addresses that do not fit on the first page will appear on the successive pages.)
   Search error: “Request denied.” will appear.



After completing the settings, touch the [Back] button on the setup screen. The message “Collecting the information from the air conditioner.” will appear, and then the screen will jump to the home screen. This signals the completion of the setup process. Access the Service Menu from the home screen to make the settings for other items as necessary.

CITY MULTI

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO100-8310, JAPAN

Issued: Apr. 2024 No. OCH794A
Published: Jul. 2023 No. OCH794
Made in Japan

MITSUBISHI ELECTRIC

CITY MULTI

Air-Conditioners
PUMY-SM112, SM125, SM140VKM
PUMY-SM112, SM125, SM140YKM

For use with R32

INSTALLATION MANUAL	FOR INSTALLER	English
INSTALLATIONSHANDBUCH	FÜR INSTALLATEURE	Deutsch
MANUEL D'INSTALLATION	POUR L'INSTALLATEUR	Français
INSTALLATIEHANDLEIDING	VOOR DE INSTALLATEUR	Nederlands
MANUAL DE INSTALACIÓN	PARA EL INSTALADOR	Español
MANUALE DI INSTALLAZIONE	PER L'INSTALLATORE	Italiano
ΕΓΧΕΙΡΙΔΙΟ ΟΔΗΓΙΩΝ ΕΓΚΑΤΑΣΤΑΣΗΣ	ΓΙΑ ΑΥΤΟΝ ΠΟΥ ΚΑΝΕΙ ΤΗΝ ΕΓΚΑΤΑΣΤΑΣΗ	Ελληνικά
MANUAL DE INSTALAÇÃO	PARA O INSTALADOR	Português
INSTALLATIONSMANUAL	TIL INSTALLATØREN	Dansk
INSTALLATIONSMANUAL	FÖR INSTALLATÖREN	Svenska
MONTAJ EL KİTABI	MONTÖR İÇİN	Türkçe
РУКОВОДСТВО ПО УСТАНОВКЕ	ДЛЯ УСТАНОВИТЕЛЯ	Русский
ПОСІБНИК З УСТАНОВЛЕННЯ	ДЛЯ СПЕЦІАЛІСТА З МОНТАЖУ	Українська
РЪКОВОДСТВО ЗА МОНТАЖ	ЗА МОНТАЖНИКА	Български
INSTRUKCJA MONTAŻU	DLA INSTALATORA	Polski
INSTALLASJONSHÅNDBOK	FOR MONTØR	Norsk
ASENNUSOPAS	ASENTAJALLE	Suomi
INSTALAČNÍ PŘÍRUČKA	PRO MONTÁŽNÍ PRACOVNÍKY	Čeština
NÁVOD NA INŠTALÁCIU	PRE MONTÉRA	Slovenčina
TELEPÍTÉSI KÉZIKÖNYV	A TELEPÍTŐ RÉSZÉRE	Magyar
NAMESTITVENI PRIROČNIK	ZA MONTERJA	Slovenščina
MANUAL DE INSTALARE	PENTRU INSTALATOR	Română
PAIGALDUSJUHEND	PAIGALDAJALE	Eesti
MONTĀŽAS ROKASGRĀMATA	UZSTĀDĪŠANAS SPECIĀLISTAM	Latviski
MONTAVIMO VADOVAS	SKIRTA MONTUOTOJUI	Lietuviškai
PRIRUČNIK ZA POSTAVLJANJE	ZA INSTALATERA	Hrvatski
UPUTSTVO ZA UGRADNJU	ZA MONTERA	Srpski

Contents

For safe and correct use, read this manual and the indoor unit installation manual thoroughly before installing the air-conditioner unit.

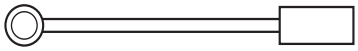
Note: This symbol mark is for related countries only.
This symbol mark is according to the directive 2012/19/EU Article 14 Information for users and Annex IX.
Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and reused.
This symbol means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from your household waste.
Please, dispose of this equipment at your local community waste collection/recycling centre.
In the European Union there are separate collection systems for used electrical and electronic product.
Please, help us to conserve the environment we live in!

⚠ **Caution:**
- **Do not vent R32 into the atmosphere.**

Confirmation of parts attached

en

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 “6. Electrical work”.



Grounding lead wire

1. Safety precautions

- ► **Before installing the unit, make sure you read all the “Safety precautions”.**
- ► **Please report to or take consent by the supply authority before connection to the system.**
- ► **PUMY-SM·VKM series complying with IEC/EN 61000-3-12**
- ► **PUMY-SM·VKM series is designed for use in the residential, commercial and light-industrial environment.**
- ► **PUMY-SM·YKM series is designed as professional equipment.**

⚠ **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.

After installation work has been completed, explain the “Safety Precautions,” use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⏚ : Indicates a part which must be grounded.

⚠ **Warning:**
Carefully read the labels affixed to the main unit.

MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

	**WARNING** (Risk of fire)	This mark is for R32 refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R32, 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 OPERATION MANUAL carefully before operation.	
	Service personnel are required to carefully read the OPERATION MANUAL and INSTALLATION MANUAL before operation.	
	Further information is available in the OPERATION MANUAL, INSTALLATION MANUAL, and the like.	

⚠ **Warning:**
- **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.**
- **This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.**
- **For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R32 refrigerant. If pipe components not designed for R32 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.**

1. Safety precautions

- **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, it may ignite or poisonous gases will be released.**
- **All electric 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.**
- **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.**
- **The appliance shall be installed in accordance with national wiring regulations.**
- **If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.**
- **When installing or relocating, or servicing the air conditioner, use only the specified refrigerant (R32) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, 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 fire may result.**
- **Do not alter the unit. It may cause fire, electric shock, injury or water leakage.**
- **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, it may ignite or 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 shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).**
- **Do not pierce or burn.**
- **Be aware that refrigerants may not contain an odour.**
- **Pipe-work shall be protected from physical damage.**
- **The installation of pipe-work shall be kept to a minimum.**
- **Compliance with national gas regulations shall be observed.**
- **Keep any required ventilation openings clear of obstruction.**
- **Do not use low temperature solder alloy in case of brazing the refrigerant pipes.**
- **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 or poisonous gases may 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 will 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 always keep the power on, except during maintenance.**
- **Refrigerant pipes must be protected against external force.**

en

1.1. 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), or sulfuric gas, areas exposed to 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 them off the inside of the pipes.

1. Safety precautions

1.2. Before installation (relocation)

⚠ **Caution:**

- **Be extremely careful when transporting the units. Two or more persons are needed to handle the unit, as it weighs 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 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 tightened too much, the flare nut can break after an extended period and refrigerant can leak out.**

1.3. Before electric work

⚠ **Caution:**

- **Be sure to install circuit breakers. If not installed, electric shock may result.**
- **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 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.**

1.4. 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 five minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.**

1.5. Using R32 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 4.1.) Note the following if reusing existing pipes that carried R22 refrigerant.**

- Replace the existing flare nuts and flare the flared sections again.
- Do not use thin pipes. (Refer to 4.1.)

- **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 lines, oil deterioration or compressor breakdown may result.**
- **Use ester oil, ether oil, 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 R32 refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.**
- **Use the following tools specifically designed for use with R32 refrigerant. The following tools are necessary to use R32 refrigerant. Contact your nearest dealer for any questions.**

Tools (for R32)	
Gauge manifold	Flare 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 lines, refrigeration oil deterioration may result.**

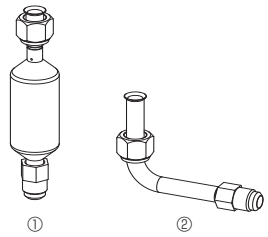


Fig. 1-1

1.6. Accessories of outdoor unit (Fig. 1-1)

The piping in the figure on the left is included. Use it in connection with the on-site piping. Refer to 4.2.

① Muffler ·····×1
② Joint pipe-L ·····×1

2. Installation location

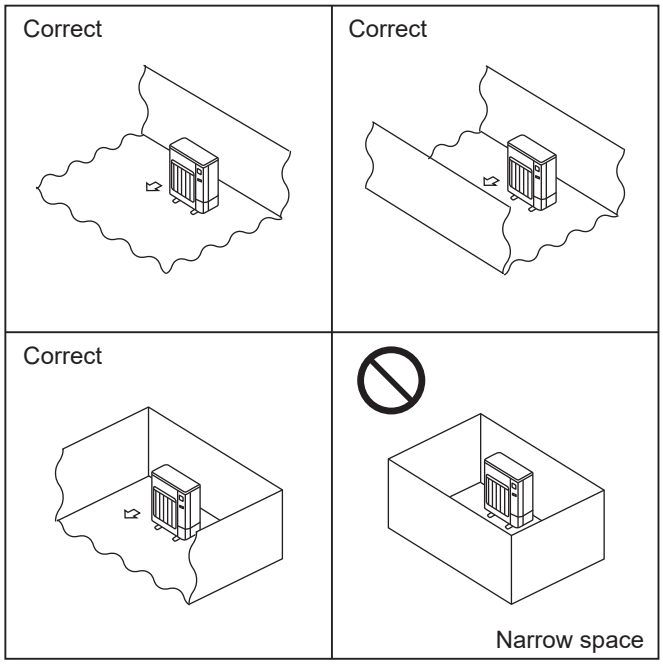


Fig. 2-1

2.1. Refrigerant pipe

Refer to Fig. 4-3, 4-4, 4-5.

2.2. Choosing the outdoor unit installation location

- R32 is heavier than air—as well as other refrigerants—so tends to accumulate at the base (in the vicinity of the floor). If R32 accumulates around base, it may reach a flammable concentration in case room is small. To avoid ignition, maintaining a safe work environment is required by ensuring appropriate ventilation. If a refrigerant leak is confirmed in a room or an area where there is insufficient ventilation, refrain from using of flames until the work environment can be improved by ensuring appropriate ventilation.
- 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.
- Refrigerant pipes connection shall be accessible for maintenance purposes.
- Install outdoor units in a place where at least one of the four sides is open, or in a sufficiently large space without depressions. (Fig. 2-1)
- Do not install the outdoor unit at the inside of building such as a basement or machinery room, where the refrigerant stagnates.

2. Installation location

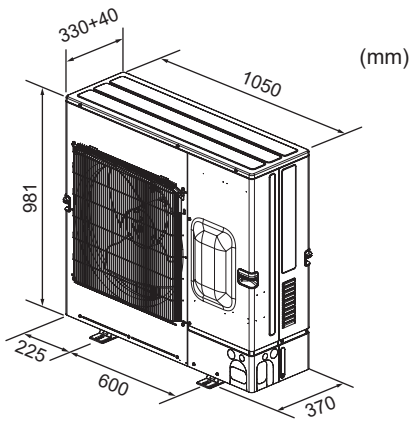


Fig. 2-2

2.3. Outline dimensions (Outdoor unit) (Fig. 2-2)

Constraints on indoor unit installation

You should note that indoor units that can be connected to this outdoor unit are the following models.

- Indoor units with model numbers 10-140 can be connected.
  When using Branch box, Indoor units with model numbers 15-100 can be connected.
  Refer to the table 1 below for possible room, indoor unit combinations.

Verification

The rated capacity should be determined by observing the table below. The unit's quantities are limited as shown in the following table 2. For the next step, make sure that the total rated capacity selected will stay in a range of 50% – 130% of the outdoor unit capacity.

- PUMY-SM112 6.3 – 16.2 kW
- PUMY-SM125 7.1 – 18.2 kW
- PUMY-SM140 8.0 – 20.2 kW

Table 1-1 City Multi indoor units

Indoor unit type	10	15	20	22	25	28	32	36	40	45	50	56	63
Rated capacity (Cooling) (kW)	1.2	1.7	2.2	2.5	2.8	3.2	3.6	4.0	4.5	5.0	5.6	6.3	7.1

Indoor unit type	71	80	100	125	140
Rated capacity (Cooling) (kW)	8.0	9.0	11.2	14.0	16.0

Table 1-2 M, S, P series

Indoor unit type	15	20	22	25	35	42	50	60	71	80	100
Rated capacity (Cooling) (kW)	1.5	2.0	2.2	2.5	3.5	4.2	5.0	6.0	7.1	8.0	10.0

Table 2 Connectable indoor units and Branch boxes quantities

Model	Only system					
	Only City Multi indoor units (Connection without Branch box)	Only M, S, P series indoor units (Connection with Branch box)				
		One Branch box		Two Branch boxes		
		4-Branch box × 1	6-Branch box × 1	4-Branch box × 2	4-Branch box × 1 6-Branch box × 1	6-Branch box × 2
PUMY-SM112	1-12	2-8				Not allowed
PUMY-SM125	1-12	2-8				
PUMY-SM140	1-12	2-8				

Model	Mixed system									
	One Branch box				Two Branch boxes					
	4-Branch box × 1		6-Branch box × 1		4-Branch box × 2		4-Branch box × 1 6-Branch box × 1		6-Branch box × 2	
	M, S, P	City Multi	M, S, P	City Multi	M, S, P	City Multi	M, S, P	City Multi	M, S, P	City Multi
PUMY-SM112	Max. 4	Max. 5	Max. 6	Max. 3	Max. 8	Max. 3	Max. 8	Max. 2	Not allowed	
PUMY-SM125	Max. 4	Max. 5	Max. 6	Max. 3	Max. 8	Max. 3	Max. 8	Max. 2		
PUMY-SM140	Max. 4	Max. 5	Max. 6	Max. 3	Max. 8	Max. 3	Max. 8	Max. 2		

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.
Thus, combine indoor units with an outdoor unit within the outdoor unit's capacity, if possible.

2. Installation location

2.4. Ventilation and service space

Note:

The dimensions given along the arrows below are required to guarantee the air conditioner's performance. Install the unit in as wide a place as possible for later service or repairs.

2.4.1. When installing a single outdoor unit

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

Refer to the figures for each case.

① Obstacles at rear only (Fig. 2-3)

② Obstacles at rear and above only (Fig. 2-4)

③ Obstacles at rear and sides only (Fig. 2-5)

④ Obstacles at front only (Fig. 2-6)

- ＊ When using an optional air outlet guide, the clearance is 500 mm or more.

⑤ Obstacles at front and rear only (Fig. 2-7)

- ＊ When using an optional air outlet guide, the clearance is 500 mm or more.

⑥ Obstacles at rear, sides, and above only (Fig. 2-8)

- Do not install the optional air outlet guides for upward airflow.

2.4.2. When installing multiple outdoor units

Leave 25 mm space or more between the units.

① Obstacles at rear only (Fig. 2-9)

② Obstacles at rear and above only (Fig. 2-10)

- No more than 3 units must be installed side by side. In addition, leave space as shown.
- Do not install the optional air outlet guides for upward airflow.

③ Obstacles at front only (Fig. 2-11)

- ＊ When using an optional air outlet guide, the clearance is 1000 mm or more.

④ Obstacles at front and rear only (Fig. 2-12)

- ＊ When using an optional air outlet guide, the clearance is 1000 mm or more.

⑤ Single parallel unit arrangement (Fig. 2-13)

- ＊ When using an optional air outlet guide installed for upward airflow, the clearance is 1000 mm or more.

⑥ Multiple parallel unit arrangement (Fig. 2-14)

- ＊ When using an optional air outlet guide installed for upward airflow, the clearance is 1500 mm or more.

⑦ Stacked unit arrangement (Fig. 2-15)

- The units can be stacked up to 2 units high.
- No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

UNIT: mm

en

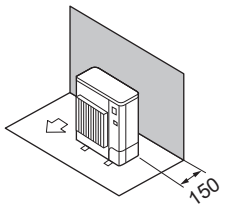


Fig. 2-3

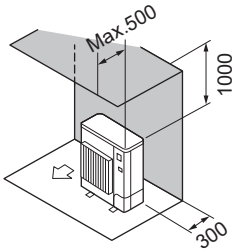


Fig. 2-4

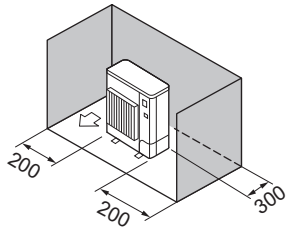


Fig. 2-5

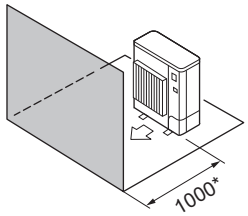


Fig. 2-6

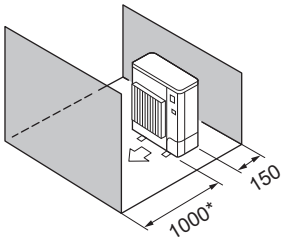


Fig. 2-7

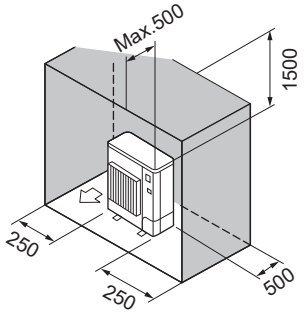


Fig. 2-8

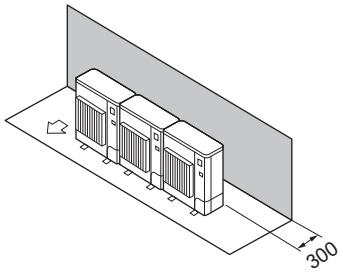


Fig. 2-9

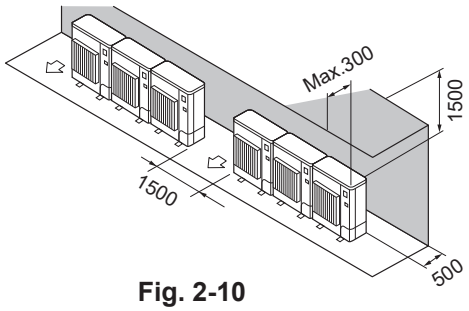


Fig. 2-10

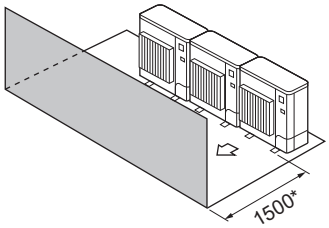


Fig. 2-11

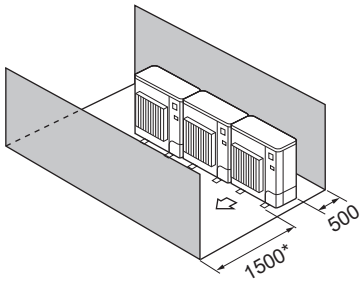


Fig. 2-12

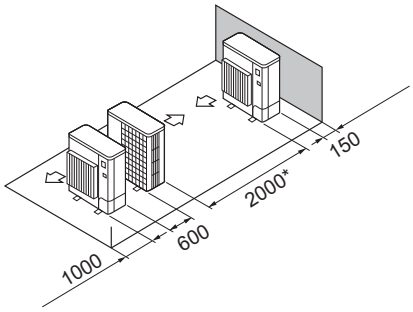


Fig. 2-13

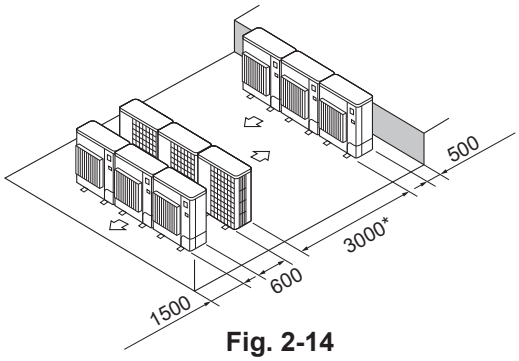


Fig. 2-14

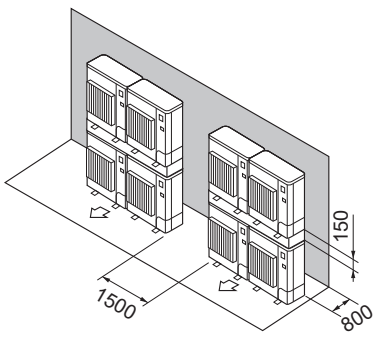


Fig. 2-15

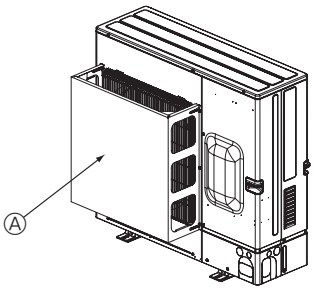


Fig. 2-16

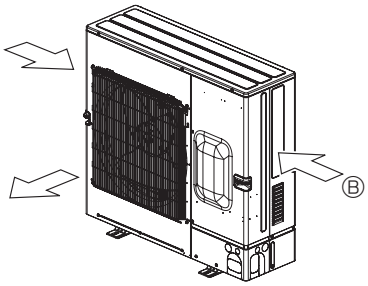


Fig. 2-17

2.4.3. 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 two examples of precautions against strong winds.

① Install an optional air protect guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-16)

Ⓐ Air protect guide

② Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-17)

Ⓑ Wind direction

2. Installation location

2.5. Minimum installation area

■ Indoor units

Install in a room with a floor area of A_{min} or more, corresponding to refrigerant quantity m (factory-charged refrigerant + locally added refrigerant).

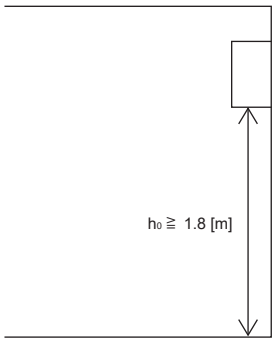
* For the factory-charged refrigerant amount, refer to the spec nameplate or installation manual.
For the amount to be added locally, refer to the installation manual.

Install the indoor unit so that the height from the floor to the bottom of the indoor unit is h_0.

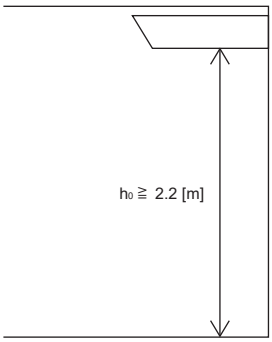
For wall mounted: 1.8 m or more

For ceiling suspended, cassette and ceiling concealed: 2.2 m or more

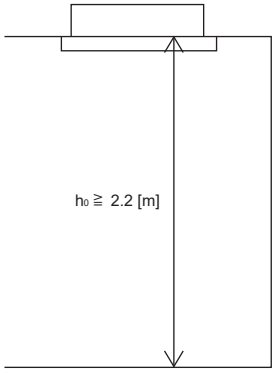
* There are restrictions in installation height for each model, so read the installation manual for the particular unit.



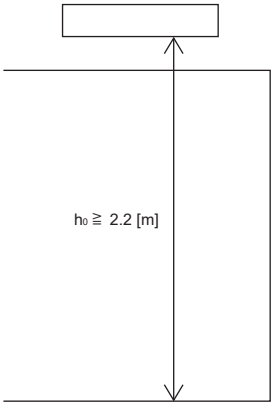
Wall mounted



Ceiling suspended

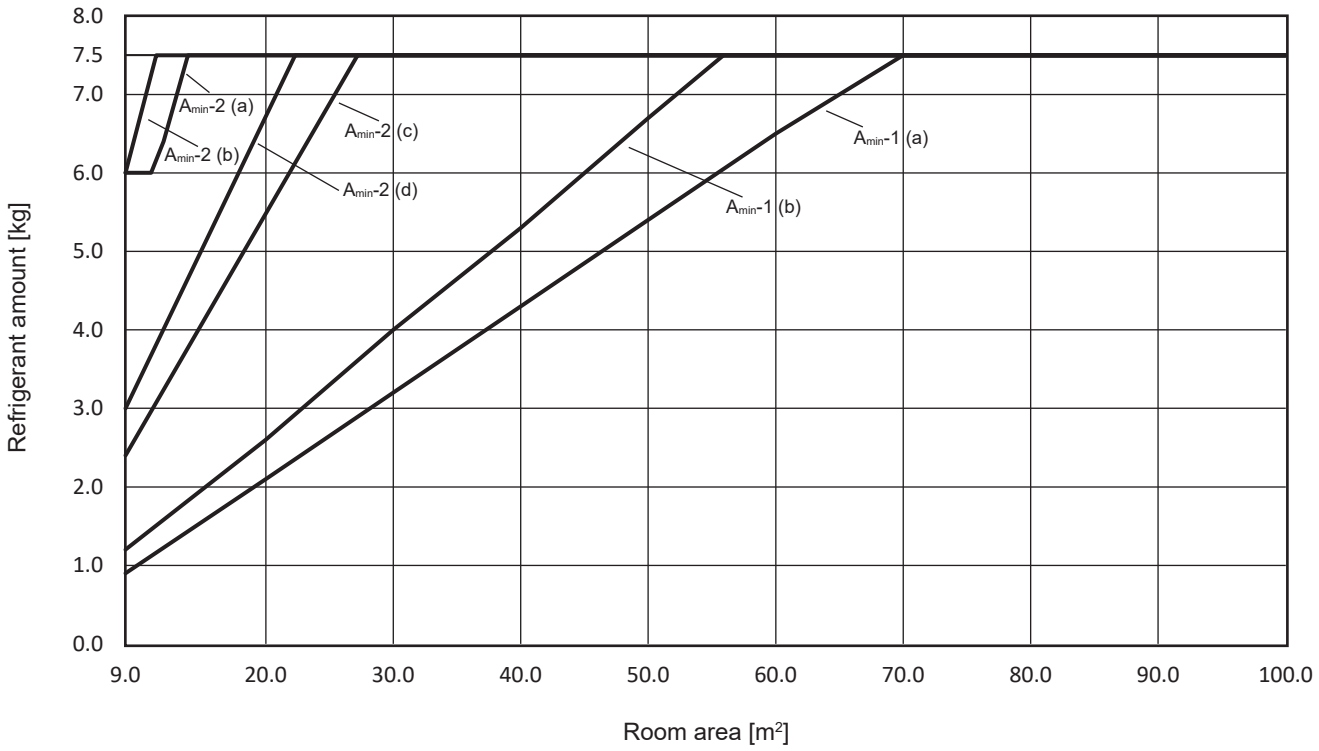


Cassette



Ceiling concealed

en



City Multi indoor unit (without the SENSOR AND ALARM KIT connection)			
Installation height: 1.8 m		Installation height: 2.2 m	
A_{min}-1 (a)		A_{min}-1 (b)	
A_{min}	m_{max}	A_{min}	m_{max}
[m²]	[kg]	[m²]	[kg]
9.0	0.9	9.0	1.2
10.0	1.0	10.0	1.3
11.0	1.2	11.0	1.4
12.0	1.3	12.0	1.6
13.0	1.4	13.0	1.7
14.0	1.5	14.0	1.8
15.0	1.6	15.0	2.0
20.0	2.1	20.0	2.6
25.0	2.7	25.0	3.3
30.0	3.2	30.0	4.0
35.0	3.8	35.0	4.6
40.0	4.3	40.0	5.3
45.0	4.9	45.0	6.0
50.0	5.4	50.0	6.7
55.0	6.0	55.0	7.3
60.0	6.5	55.9	7.5
65.0	7.1		
68.4	7.5		

CITY MULTI indoor unit with refrigerant sensor or Branch box system (with the SENSOR AND ALARM KIT connection)							
Rooms other than on the lowest floor of the basement				Rooms on the lowest floor of the basement			
Installation height: 1.8 m		Installation height: 2.2 m		Installation height: 1.8 m		Installation height: 2.2 m	
A_{min}-2 (a)		A_{min}-2 (b)		A_{min}-2 (c)		A_{min}-2 (d)	
A_{min}	m_{max}	A_{min}	m_{max}	A_{min}	m_{max}	A_{min}	m_{max}
[m²]	[kg]	[m²]	[kg]	[m²]	[kg]	[m²]	[kg]
9.0	6.0	9.0	6.0	9.0	2.4	9.0	3.0
10.0	6.0	10.0	6.6	10.0	2.7	10.0	3.3
11.0	6.0	11.0	7.2	11.0	3.0	11.0	3.7
12.0	6.4	11.4	7.5	12.0	3.3	12.0	4.0
13.0	7.0	100.0	7.5	13.0	3.5	13.0	4.3
13.9	7.5			14.0	3.8	14.0	4.7
100.0	7.5			15.0	4.1	15.0	5.0
				20.0	5.5	20.0	6.7
				25.0	6.9	22.3	7.5
				27.2	7.5	100.0	7.5
				100.0	7.5		

Fig. 2-18

2. Installation location

2.6. Precautions for R32 system

This air conditioner unit uses a mildly flammable R32 refrigerant.
This system is supported by the safety standard complying with the Enhanced Tightness Refrigerant System of IEC60335-2-40.
Install the unit according to the following requirements so that the system can satisfy the standards.

- For piping connection, use the 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 in Fig. 2-18 are satisfied.
  Install an indoor unit with refrigerant sensor or the SENSOR AND ALARM KIT depending on the conditions. Refer to 2.7. for the detail.

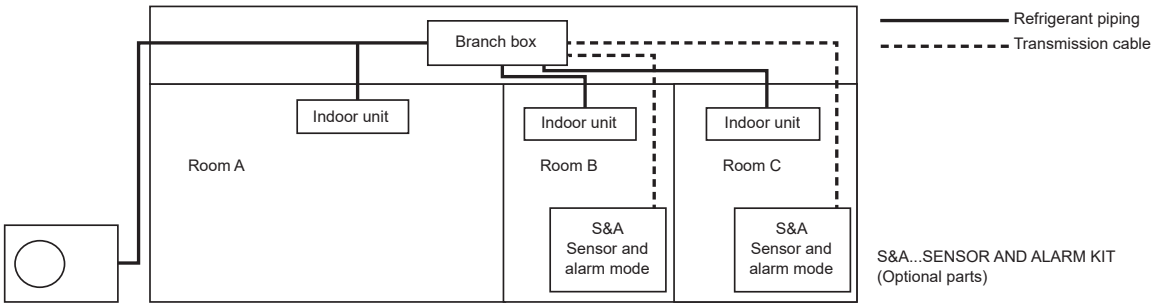
<When the system requires the SENSOR ALARM KIT connection>

- For the Branch box system, be sure to install the SENSOR AND ALARM KIT for each indoor unit.
- Install the SENSOR AND ALARM KIT into the specified area within 30 cm above a floor. Refer to the installation manual of the SENSOR AND ALARM KIT for the detail.
- Never install the Branch box in a room.
- Ensure that the Branch box is installed above the ceiling of corridor, bath room, etc., where persons are not regularly there.
  Do not provide any vent or mesh between the space where the Branch box will be installed and the room below it.
- Install the Supervisor Alarm based on the standards in IEC60335-2-40 when it is required such as in a hotel or a hospital.
  The mode of the SENSOR AND ALARM KIT can be changed to the Sensor and alarm mode or Supervisor mode.
  For the setting when the Supervisor Alarm is connected, refer to the installation manual of the Branch box and SENSOR AND ALARM KIT.
- When the sensor detects the refrigerant leakage, the system closes the shut-off valve and performs refrigerant recovery while the alarm sounds.
  Take appropriate measures in a service because the air conditioner cannot be operated again after the refrigerant recovery operation.
- The sensor must be replaced after it detects a refrigerant leak. Refer to the installation manual of the SENSOR AND ALARM KIT for the detail.

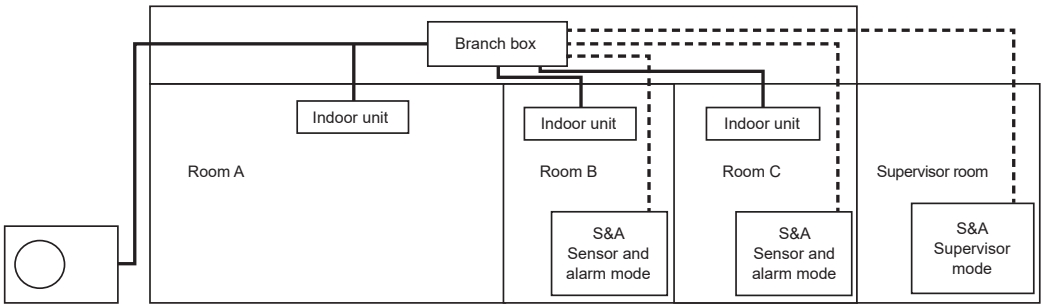
Precautions for the system connection

- For the Branch box system, install the SENSOR AND ALARM KIT for each indoor unit.
  Note:
  For the Branch box system, the air conditioner does not operate if the SENSOR AND ALARM KIT is not installed for each indoor unit.
  The CITY MULTI indoor unit without refrigerant sensor can be installed as long as the minimum installation area A_{min}-1 is satisfied.

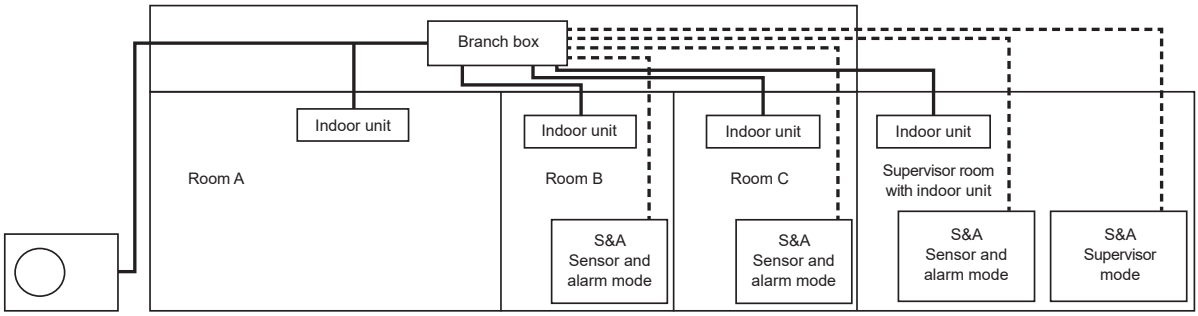
en



- The Supervisor Alarm is necessary for the environment required in IEC60335-2-40 such as in a place where the movement of people is limited (a hospital, etc.) or where there is a sleeping facility (a hotel, etc.).
  The mode must be set to the Supervisor mode when the SENSOR AND ALARM KIT is used as the Supervisor Alarm.
  Refer to the installation manual of the SENSOR AND ALARM KIT for the detail.

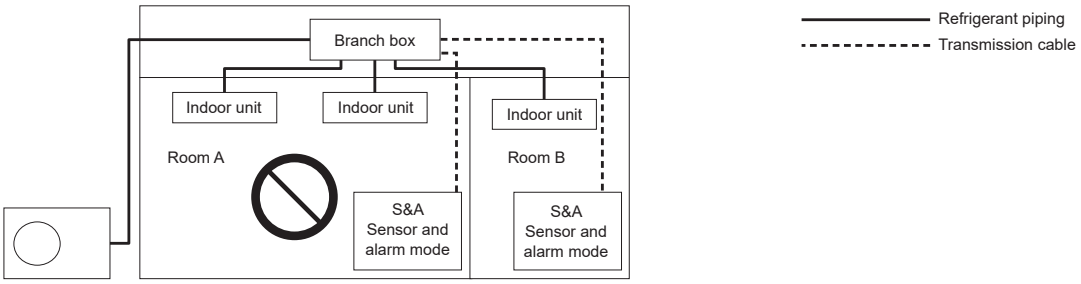


- If the Supervisor room also has an indoor unit with the same refrigerant system, set the Supervisor mode and Sensor and alarm mode and install the SENSOR AND ALARM KIT respectively.
  Refer to the installation manual of the SENSOR AND ALARM KIT for the detail.

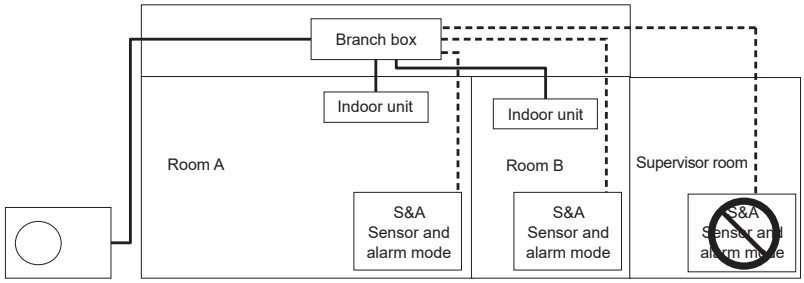


2. Installation location

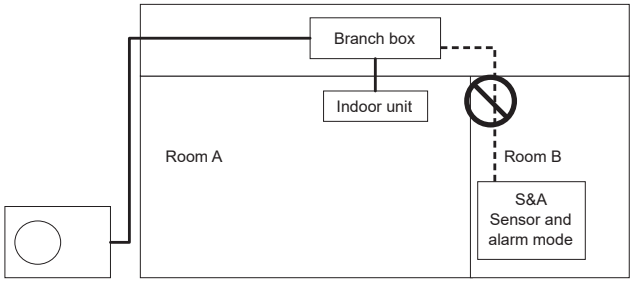
- Be sure to install the SENSOR AND ALARM KIT for each indoor unit when the Branch box is connected in the system.
  When multiple indoor units are installed in a room, install the SENSOR AND ALARM KIT for each indoor unit.



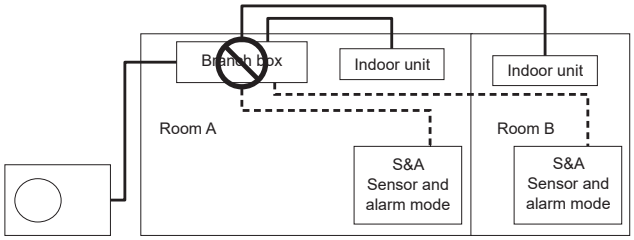
- Be sure to set the mode of the SENSOR AND ALARM KIT to the Supervisor mode when the Supervisor Alarm is connected.



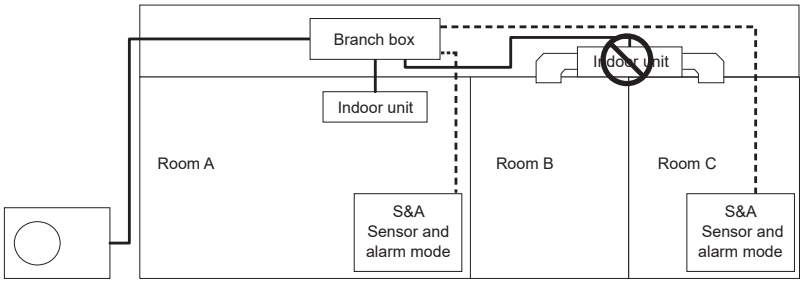
- Be sure to install the SENSOR AND ALARM KIT in the room where an indoor unit is installed.



- Do not install the Branch box in a room.



- Do not install an indoor unit across a number of rooms.

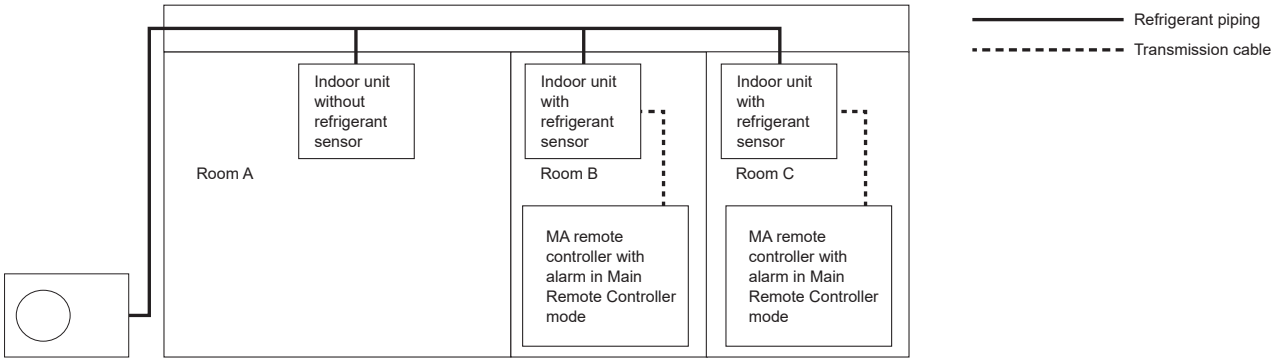


2. Installation location

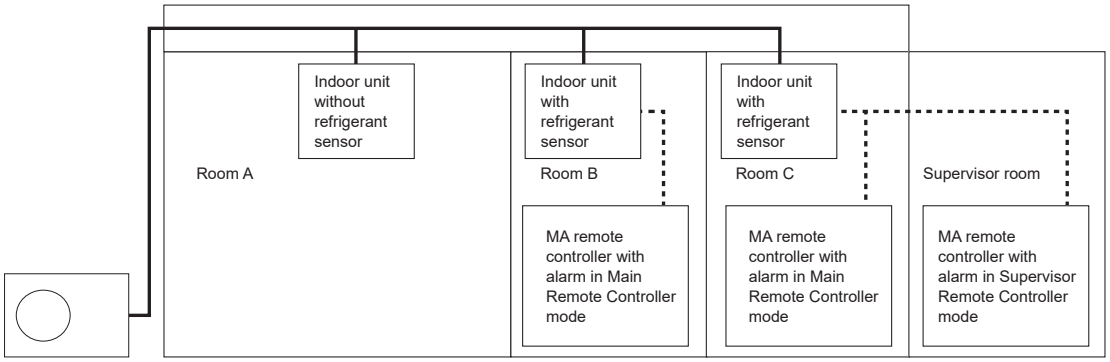
<When the system requires the connection of the CITY MULTI indoor unit with refrigerant sensor>

- For the CITY MULTI indoor unit with refrigerant sensor, be sure to connect the MA remote controller with alarm for each indoor unit.
- Install the Supervisor Alarm based on the standards in IEC60335-2-40 when it is required such as in a hotel or a 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 the MA remote controller in Supervisor Remote Controller mode is connected, refer to the installation manual of the CITY MULTI indoor unit with refrigerant sensor and the MA remote controller with alarm.
- When the sensor detects the refrigerant leakage, the system closes the shut-off valve and performs refrigerant recovery while the alarm sounds.
  Take appropriate measures in a service because the air conditioner cannot be operated again after the refrigerant recovery operation.
- The sensor must be replaced after it detects a refrigerant leak. Refer to the installation manual of the CITY MULTI indoor unit with refrigerant sensor for the detail.

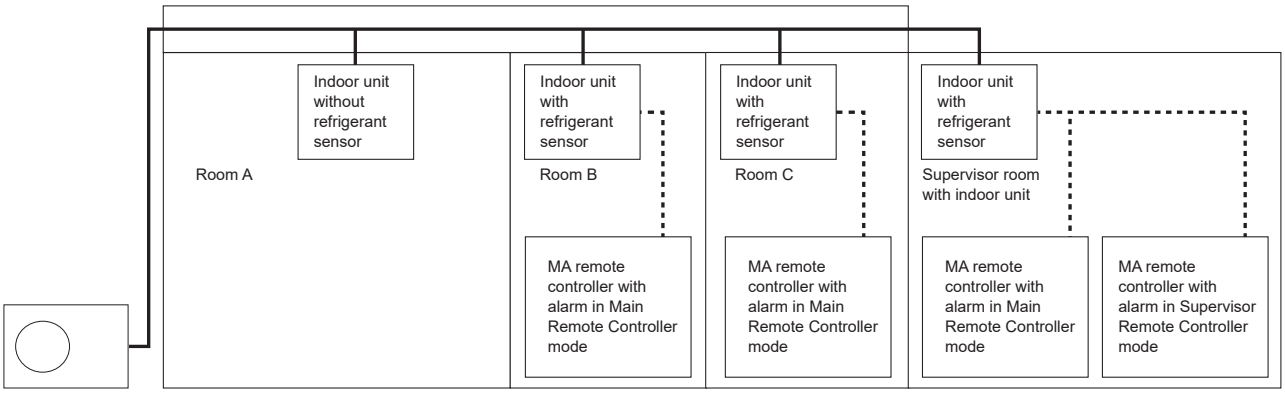
Note:
For the CITY MULTI indoor unit with refrigerant sensor, the air conditioner does not operate if the MA remote controller with alarm is not installed for each indoor unit.
The CITY MULTI indoor unit without refrigerant sensor can be installed as long as the minimum installation area A_{min}-1 is satisfied.



- The Supervisor Alarm is necessary for the environment required in IEC60335-2-40 such as in a place where the movement of people is limited (a hospital, etc.) or where there is a sleeping facility (a hotel, etc.).
- The mode must be set to the Supervisor Remote Controller mode when the MA remote controller with alarm is used as the Supervisor Alarm.
  Refer to the installation manual of the MA remote controller with alarm for the detail.

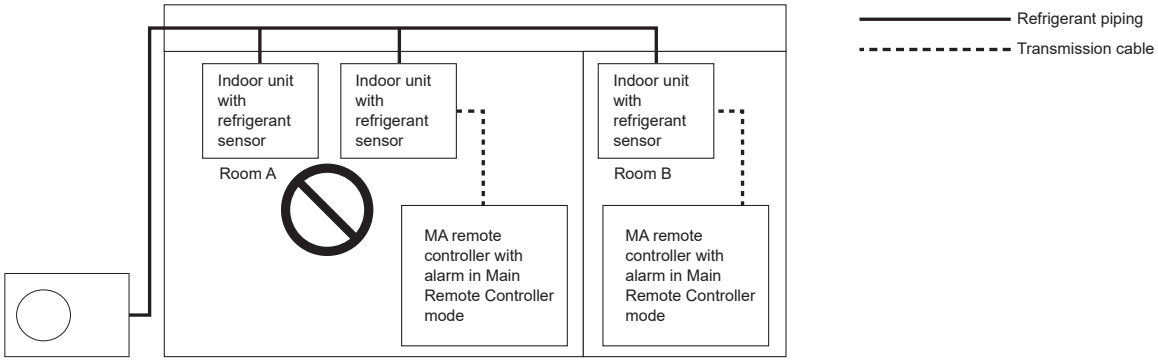


- If the Supervisor room also has an indoor unit with the same refrigerant system, set the Supervisor Remote Controller mode and Main Remote Controller mode and install the MA remote controller with alarm respectively.
  Refer to the installation manual of the MA remote controller with alarm for the detail.

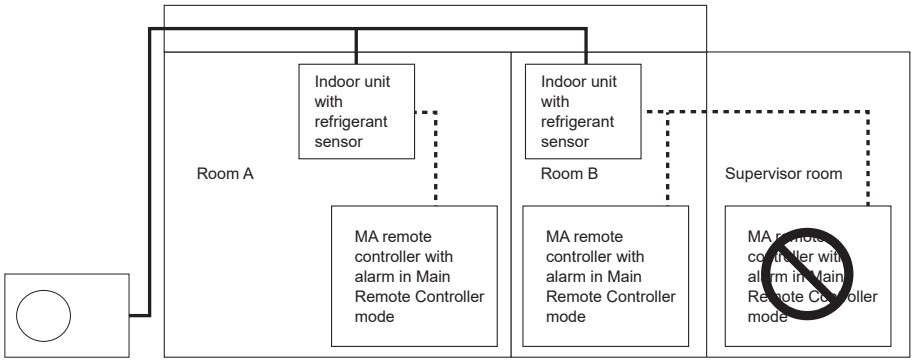


2. Installation location

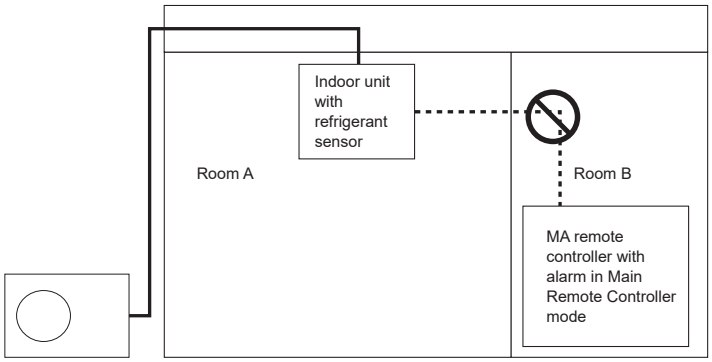
- Be sure to install the MA remote controller with alarm for each indoor unit when the CITY MULTI indoor unit with refrigerant sensor is connected in the system. When multiple CITY MULTI indoor units with refrigerant sensor are installed in a room, install the MA remote controller with alarm for each indoor unit.



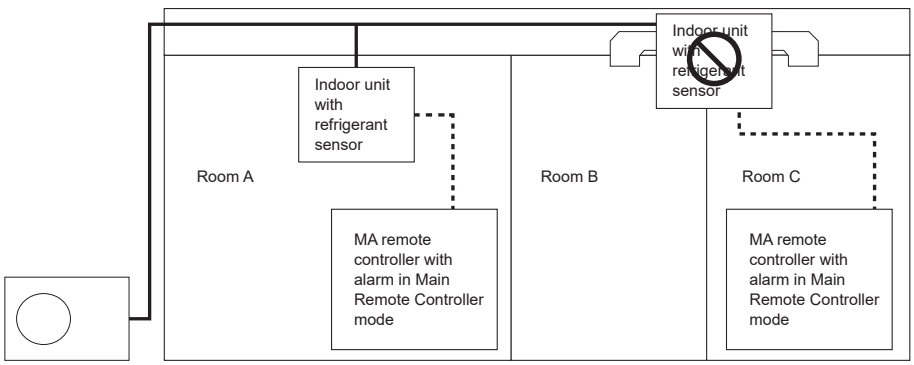
- Be sure to set the mode of the MA remote controller with alarm to the Supervisor Remote Controller mode when the Supervisor Alarm is connected.



- Be sure to install the MA remote controller with alarm in the room where an indoor unit is installed.



- Do not install an indoor unit across a number of rooms.



2. Installation location

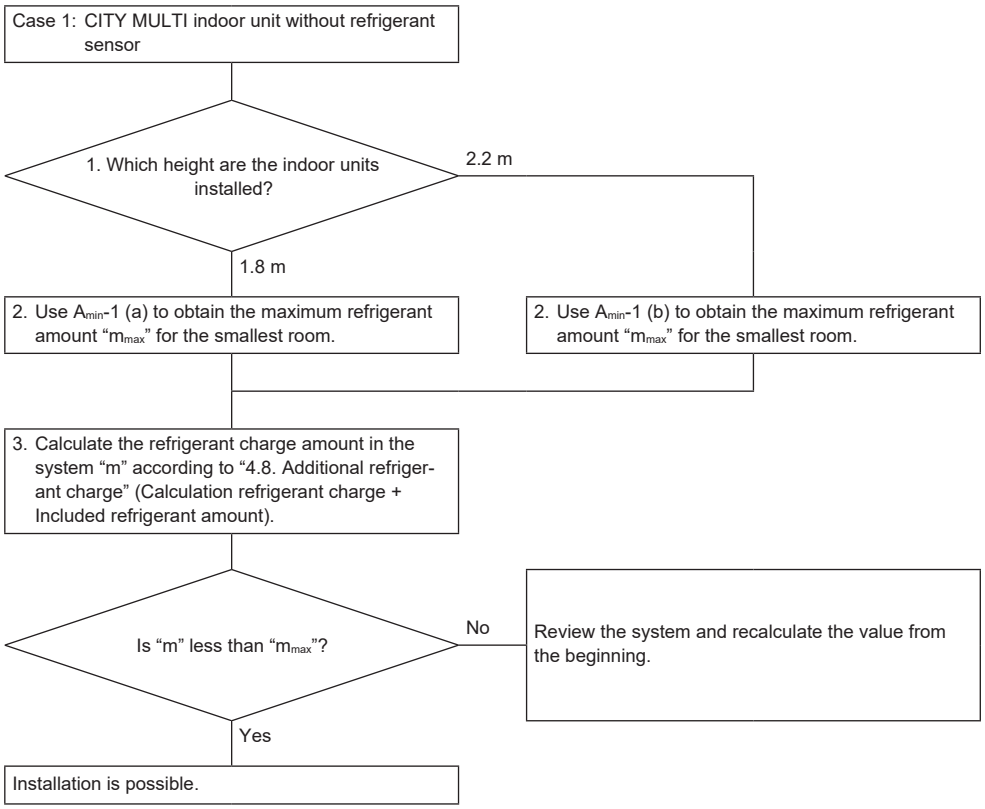
2.7. Calculation of the minimum installation area

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.

Use Fig. 2-18 to calculate the maximum allowable refrigerant amount for the smallest room where the CITY MULTI indoor unit without refrigerant sensor or the CITY MULTI indoor unit with refrigerant sensor or the Branch box system (with the SENSOR AND ALARM KIT connection) is to be installed.

<Case 1: CITY MULTI indoor unit without refrigerant sensor>

1. Confirm the installation height of indoor units. Use the values of A_{min}-1 (a) when the installation height is 1.8 m and those of A_{min}-1 (b) when the height is 2.2 m.
   Note:
   The wall-mounted unit cannot be installed in the area lower than 1.8 m, and the other indoor units cannot be installed in the area lower than 2.2 m.
2. Calculate the maximum allowable refrigerant amount "m_{max}" for the smallest room.
3. Calculate the refrigerant amount in the system according to 4.8.
4. An indoor unit can be installed if the refrigerant amount in the system "m" is less than "m_{max}".
   Review the system if the condition is not satisfied.

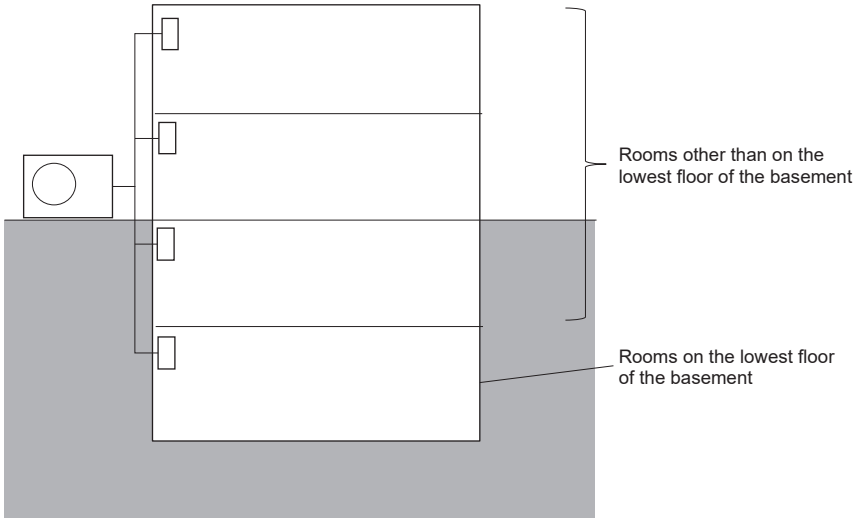


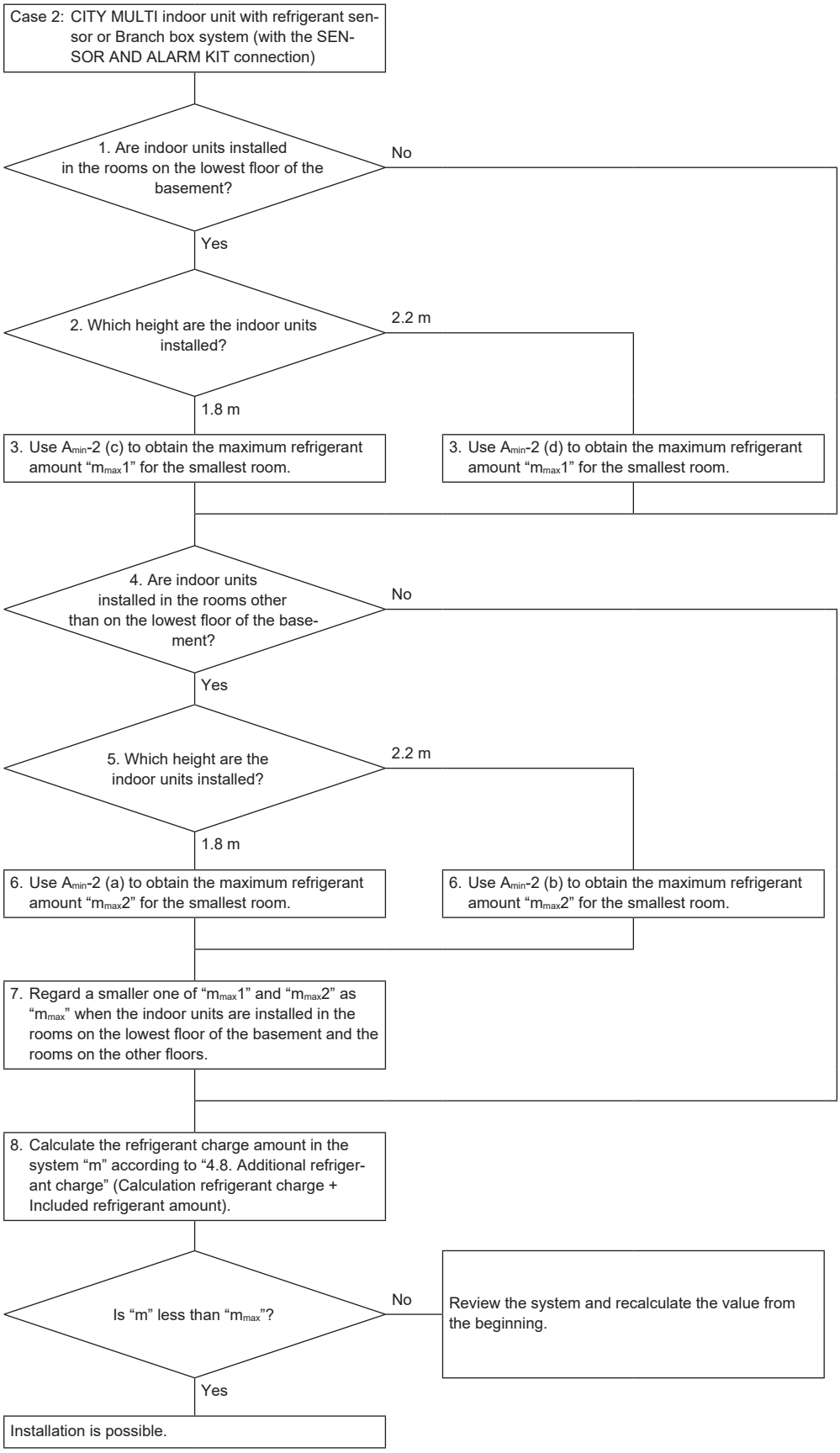
en

2. Installation location

<Case 2: CITY MULTI indoor unit with refrigerant sensor or Branch box system (with the SENSOR AND ALARM KIT connection)>
For rooms on the lowest floor of the basement and rooms on the other floors, calculate each maximum allowable refrigerant amount for the minimum installation area and select the smallest value.

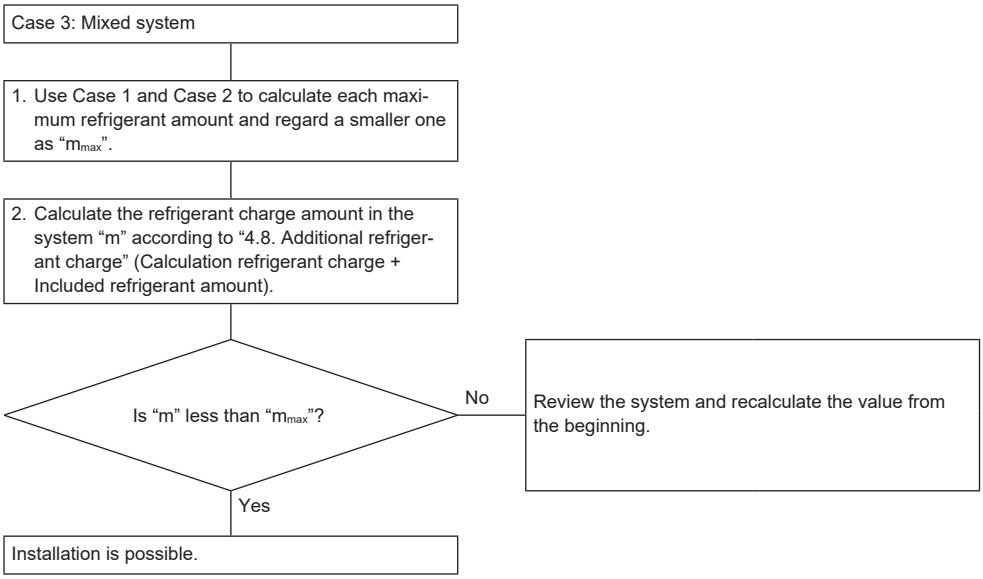
1. Confirm whether or not indoor units are installed in the rooms on the lowest floor of the basement.
2. Confirm the installation height of the indoor units when the indoor units are installed in the rooms on the lowest floor of the basement.
   Use the values of A_{min}-2 (c) when the installation height is 1.8 m and those of A_{min}-2 (d) when the height is 2.2 m.
   Note:
   The wall-mounted unit cannot be installed in the area lower than 1.8 m and the other indoor units cannot be installed in the area lower than 2.2 m.
3. Calculate the maximum allowable refrigerant amount "$m_{max}1$" for the smallest room.
4. Confirm whether or not indoor units are installed in the rooms other than on the lowest floor of the basement.
5. Confirm the installation height of indoor units when the indoor units are installed in the rooms other than on the lowest floor of the basement.
   Use the values of A_{min}-2 (a) when the installation height is 1.8 m and those of A_{min}-2 (b) when the height is 2.2 m.
6. Calculate the maximum allowable refrigerant amount "$m_{max}2$" for the smallest room.
7. When both of "$m_{max}1$" and "$m_{max}2$" have been obtained, regard a smaller value as "m_{max}". When either one has been obtained, regard the value as "m_{max}".
8. An indoor unit can be installed if the refrigerant amount in the system "m" is less than "m_{max}".
   Review the system if the condition is not satisfied.



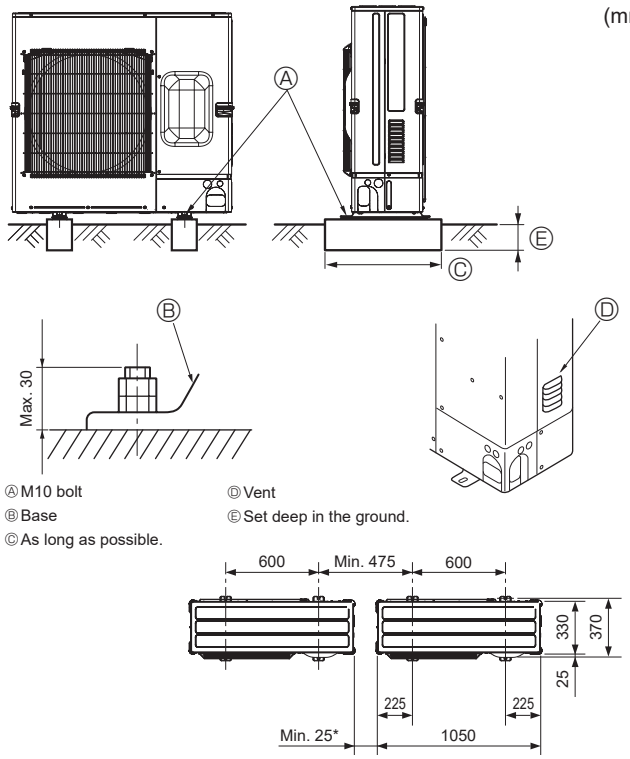

Case 2: CITY MULTI indoor unit with refrigerant sensor or Branch box system (with the SENSOR AND ALARM KIT connection)
1. Are indoor units installed in the rooms on the lowest floor of the basement?
No
Yes
2. Which height are the indoor units installed?
2.2 m
1.8 m
3. Use Amin-2 (c) to obtain the maximum refrigerant amount "mmax1" for the smallest room.
3. Use Amin-2 (d) to obtain the maximum refrigerant amount "mmax1" for the smallest room.
4. Are indoor units installed in the rooms other than on the lowest floor of the basement?
No
Yes
5. Which height are the indoor units installed?
2.2 m
1.8 m
6. Use Amin-2 (a) to obtain the maximum refrigerant amount "mmax2" for the smallest room.
6. Use Amin-2 (b) to obtain the maximum refrigerant amount "mmax2" for the smallest room.
7. Regard a smaller one of "mmax1" and "mmax2" as "mmax" when the indoor units are installed in the rooms on the lowest floor of the basement and the rooms on the other floors.
8. Calculate the refrigerant charge amount in the system "m" according to "4.8. Additional refrigerant charge" (Calculation refrigerant charge + Included refrigerant amount).
Is "m" less than "mmax"?
No
Review the system and recalculate the value from the beginning.
Yes
Installation is possible.

2. Installation location

<Case 3: Mixed system>
For the mixed system, use the smallest value of each maximum allowable refrigerant amount "m_{max}" obtained in Case 1 and Case 2.
An indoor unit can be installed if the refrigerant amount in the system "m" is less than the maximum allowable refrigerant amount "m_{max}".
Review the system if the condition is not satisfied.



3. Installing the outdoor unit



Ⓐ M10 bolt
Ⓑ Base
Ⓒ As long as possible.
Ⓓ Vent
Ⓔ Set deep in the ground.

* When installing a single outdoor unit, the clearance is 15 mm or more.

Fig. 3-1

- Be sure to install the unit in a sturdy, level surface to prevent rattling noises during operation. (Fig. 3-1)

<Foundation specifications>

Foundation bolt	M10
Thickness of concrete	120 mm
Length of bolt	70 mm
Weight-bearing capacity	320 kg

- Make sure that the length of the foundation bolt is within 30 mm of the bottom surface of the base.
- Secure the base of the unit firmly with four-M10 foundation bolts in sturdy locations.

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 (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 unit on a rigid structure to prevent excessive operation sound or vibration.**

en

4. Installing the refrigerant piping

4.1. Precautions for devices that use R32 refrigerant

- **Refer to page 3 for precautions not included below on using air conditioners with R32 refrigerant.**
- **Use ester oil, ether oil, 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 to the below. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.**

⚠ Warning:

When installing or relocating, or servicing the air conditioner, use only the specified refrigerant (R32) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines.
If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, 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.

ø6.35, ø9.52, ø12.7	Thickness 0.8 mm
ø15.88	Thickness 1.0 mm

- **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 4.15 MPa [601 psig] or higher according to local standards.**

⚠ Caution:

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.**

4. Installing the refrigerant piping

4.2. Selecting pipe size

Conversion formula

1/4 F	ø6.35 mm
3/8 F	ø9.52 mm
1/2 F	ø12.7 mm
5/8 F	ø15.88 mm
3/4 F	ø19.05 mm

4.2.1. Pipe size

A, B, C, D, E (Fig. 4-3, 4, 5)

	Liquid pipe	Gas pipe
PUMY-SM112-140	ø9.52 mm	ø15.88 mm

a, b, c~j (Fig. 4-3, 4, 5)

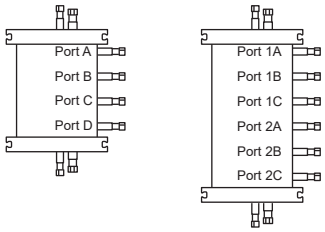
Indoor unit series	Model number	Liquid pipe		Gas pipe
CityMulti	10-50	a, b, c, d, e, f ≦ 30 m	ø6.35 mm	ø12.7 mm
		a, b, c, d, e, f > 30 m	ø9.52 mm *1	
	63-140	ø9.52 mm		ø15.88 mm
M series or S series *3	15-42	ø6.35 mm		ø9.52 mm
	50-60	ø6.35 mm		ø12.7 mm
	71-80	ø9.52 mm		ø15.88 mm
P series *3	35-60 *2	ø6.35 mm		ø12.7 mm
	71-100	ø9.52 mm		ø15.88 mm

*1 If the piping length after the first joint exceeds 30 m, use a pipe size of ø9.52 for the pipes of the system that exceeds 30 m.

*2 When using 35, 50 type indoor unit of P series, use the flare nut attached to the indoor unit.
Do not use the flare nut in the indoor unit accessory. If it is used, a gas leakage or even a pipe extraction may occur.

*3 If the pipe size of indoor unit is different, use a different-diameter joint.

4.2.2. Valve size of Branch box



(1) Valve size of Branch box for outdoor unit/other Branch box

Liquid pipe	ø9.52 mm
Gas pipe	ø15.88 mm

(2) Valve size of Branch box for indoor unit

4-branches model

Port A	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port B	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port C	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port D	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm

6-branches model

Port 1A	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port 1B	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port 1C	Liquid pipe	ø6.35 mm
	Gas pipe	ø12.7 mm
Port 2A	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port 2B	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Port 2C	Liquid pipe	ø9.52 mm
	Gas pipe	ø15.88 mm

4.2.3. Different-diameter joint (optional parts)

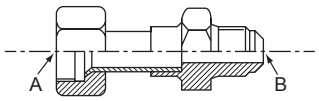


Fig. 4-1

Fig. 4-2

Model name	Connected pipes diameter	Diameter A	Diameter B
	mm	mm	mm
PAC-SJ88RJ-E	ø9.52 → ø12.7	ø9.52	ø12.7
PAC-SK88RJ-E	ø12.7 → ø9.52	ø12.7	ø9.52
PAC-SK89RJ-E	ø12.7 → ø15.88	ø12.7	ø15.88
PAC-SJ87RJ-E	ø6.35 → ø9.52	ø6.35	ø9.52
PAC-SK90RJ-E	ø9.52 → ø15.88	ø9.52	ø15.88

Model name	Connected pipes diameter	Outside Diameter A	Inside Diameter B
	mm	mm	mm
PAC-SG78RJB-E	ø9.52 → ø12.7	ø9.52	ø12.7
PAC-SG77RJB-E	ø6.35 → ø9.52	ø6.35	ø9.52
PAC-SG76RJB-E	ø9.52 → ø15.88	ø9.52	ø15.88
PAC-SK91RJ-E	ø9.52 → ø6.35	ø9.52	ø6.35
PAC-SK82RJ-E	ø15.88 → ø9.52	ø15.88	ø9.52
PAC-SK85RJ-E	ø15.88 → ø12.7	ø15.88	ø12.7

4.2.4. Branch pipe (optional parts)

According to the connection method, you can choose the favorite one.

2-branch joint	CMY-Y62-G-E
4-branch header	CMY-Y64-G-E
8-branch header	CMY-Y68-G-E

2-branch pipe (Joint)

Model name	Connection method
MSDD-50AR2-E	flare
MSDD-50BR-E	brazing

■ **Installation procedure (2 branches pipe (Joint))**

Refer to the installation manuals of MSDD-50AR2-E and MSDD-50BR-E.

4. Installing the refrigerant piping

4.3. Pipe length and height difference

4.3.1. Connection without Branch box (Fig. 4-3)

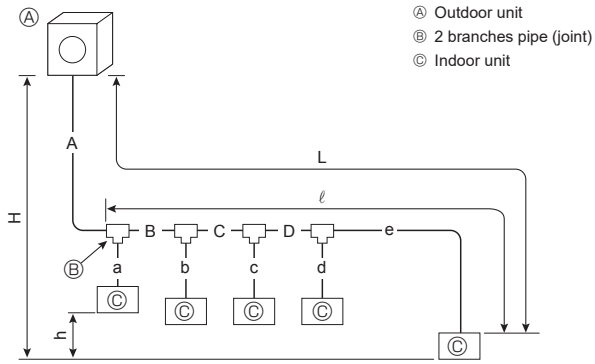


Fig. 4-3 (a)

Permissible length (one-way)	Total piping length	A+B+C+D+a+b+c+d+e ≦ 120 m
	Farthest piping length (L)	L = A+B+C+D+e ≦ 70 m
	Farthest piping length after the first branch (ℓ)	ℓ = B+C+D+e ≦ 50 m
Permissible height difference (one-way)	In indoor/outdoor section (H)	H ≦ 50 m (In the case of outdoor unit is set higher than indoor unit)
		H ≦ 40 m (In the case of outdoor unit is set lower than indoor unit)
	In each indoor unit (h)	h ≦ 15 m

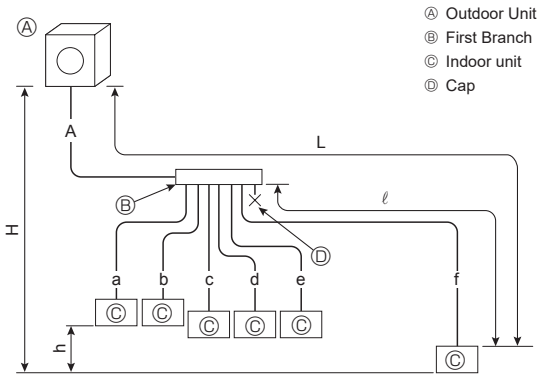
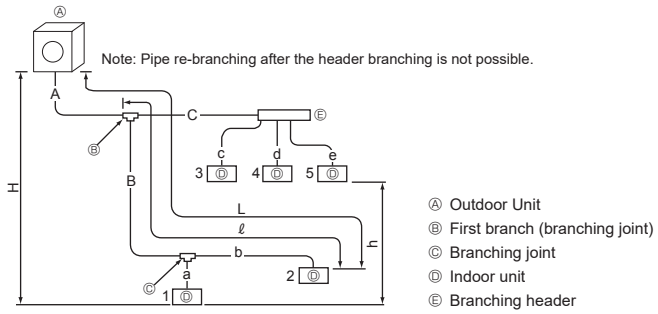


Fig. 4-3 (b)

Permissible length (one-way)	Total piping length	A+a+b+c+d+e+f ≦ 120 m
	Farthest piping length (L)	L = A+f ≦ 70 m, ℓ = f ≦ 50 m
Permissible height difference (one-way)	In indoor/outdoor section (H)	H ≦ 50 m (In the case of outdoor unit is set higher than indoor unit)
		H ≦ 40 m (In the case of outdoor unit is set lower than indoor unit)
	In each indoor unit (h)	h ≦ 15 m



Permissible length (one-way)	Total piping length	A+B+C+a+b+c+d+e ≦ 120 m
	Farthest piping length (L)	L = A+B+b ≦ 70 m
	Farthest piping length after the first branch (ℓ)	B+b ≦ 50 m
Permissible height difference (one-way)	In indoor/outdoor section (H)	H ≦ 50 m (In the case of outdoor unit is set higher than indoor unit)
		H ≦ 40 m (In the case of outdoor unit is set lower than indoor unit)
	In each indoor unit (h)	h ≦ 15 m

Fig. 4-3 (c)

en

4. Installing the refrigerant piping

4.3.2. Connection with Branch box (Fig. 4-4)

- 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.

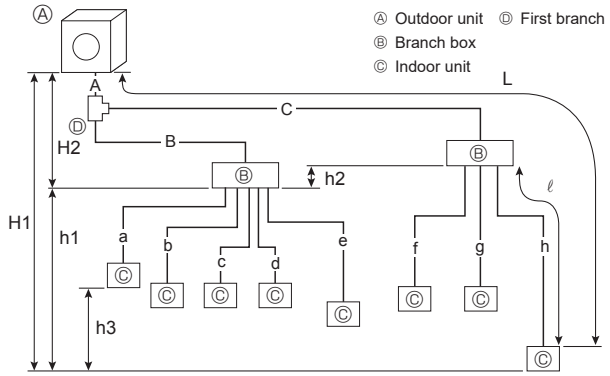


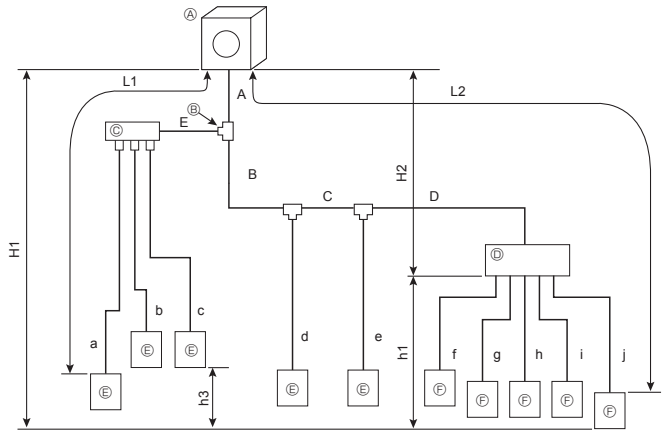
Fig. 4-4

en

Permissible length (one-way)	Total piping length	A + B + C + a + b + c + d + e + f + g + h ≦ 120 m
	Farthest piping length (L)	A + C + h ≦ 80 m
	Piping length between outdoor unit and Branch boxes	A + B + C ≦ 55 m
	Farthest Branch box from the first joint	C ≦ 50 m
	Farthest piping length after Branch box (ℓ)	h ≦ 25 m
	Total piping length between Branch boxes and indoor units	a + b + c + d + e + f + g + h ≦ 95 m
Permissible height difference (one-way)	In indoor/outdoor section (H1) Branch box/outdoor unit section (H2)	H1, H2 ≦ 50 m (In the case of outdoor unit is set higher than indoor unit)
		H1, H2 ≦ 40 m (In the case of outdoor unit is set lower than indoor unit)
	In Branch box/indoor unit section (h1)	h1 + h2 ≦ 15 m
	In each branch unit (h2)	h2 ≦ 15 m
	In each indoor unit (h3)	h3 ≦ 12 m
Number of bends	When using a branch joint	|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
	When not using a branch joint	|A + a|, |A + b|, |A + c|, |A + d|, |A + C + e|, |A + C + f|, |A + C + g|, |A + C + h| ≦ 15

4.3.3. Mixed system (City Multi indoor units and M, S, P series indoor units via Branch box) (Fig. 4-5)

1. In case of using one Branch box

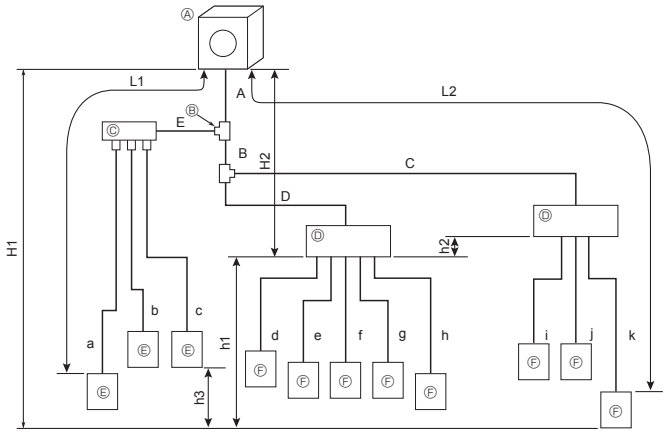


Ⓐ Outdoor Unit
Ⓑ First joint
Ⓒ Branch header (CMY)
Ⓓ Branch box
Ⓔ CityMulti Indoor unit
Ⓕ M, S, P series Indoor unit

Fig. 4-5 (a)

Permissible length (One-way)	Total piping length	A + B + C + D + E + a + b + c + d + e + f + g + h + i + j ≦ 120 m
	Farthest piping length (L1)	A + E + a or A + B + C + e ≦ 70 m
	Farthest piping length. Via Branch box (L2)	A + B + C + D + j ≦ 80 m
	Piping length between outdoor unit and Branch box	A + B + C + D ≦ 55 m
	Farthest piping length from the first joint	B + C + D or B + C + e ≦ 50 m
	Farthest piping length after Branch box	j ≦ 25 m
	Total piping length between Branch boxes and indoor units	f + g + h + i + j ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H1)	H1, H2 ≦ 50 m (In the case of outdoor unit is set higher than indoor unit)
	Branch box/outdoor unit section (H2)	H1, H2 ≦ 40 m (In the case of outdoor unit is set lower than indoor unit)
	In Branch box/indoor unit section (h1)	h1 ≦ 15 m
	In each indoor unit (h3)	h3 ≦ 12 m
Number of bends		|A + E + a|, |A + E + b|, |A + E + c|, |A + B + d|, |A + B + C + e|, |A + B + C + D + f|, |A + B + C + D + g|, |A + B + C + D + h|, |A + B + C + D + i|, |A + B + C + D + j| ≦ 15

2. In case of using two Branch boxes

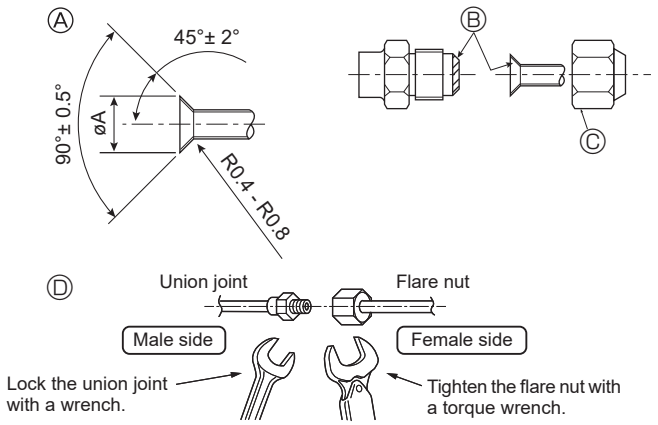


Ⓐ Outdoor Unit
Ⓑ First joint
Ⓒ Branch header (CMY)
Ⓓ Branch box
Ⓔ CityMulti Indoor unit
Ⓕ M, S, P series Indoor unit

Fig. 4-5 (b)

Permissible length (One-way)	Total piping length	A + B + C + D + E + a + b + c + d + e + f + g + h + i + j + k ≦ 120 m
	Farthest piping length (L1)	A + E + a ≦ 70 m
	Farthest piping length. Via Branch box (L2)	A + B + C + k ≦ 80 m
	Piping length between outdoor unit and Branch boxes	A + B + C + D ≦ 55 m
	Farthest piping length from the first joint	B + C or E + a ≦ 50 m
	Farthest piping length after Branch box	k ≦ 25 m
	Farthest Branch box from outdoor unit	A + B + C ≦ 55 m
	Total piping length between Branch boxes and indoor units	d + e + f + g + h + i + j + k ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H1)	H1, H2 ≦ 50 m (In the case of outdoor unit is set higher than indoor unit)
	Branch box/outdoor unit section (H2)	H1, H2 ≦ 40 m (In the case of outdoor unit is set lower than indoor unit)
	In Branch box/indoor unit section (h1+h2)	h1 + h2 ≦ 15 m
	In each branch unit (h1)	h2 ≦ 15 m
	In each indoor unit (h3)	h3 ≦ 12 m
Number of bends		|A + E + a|, |A + E + b|, |A + E + c|, |A + B + D + d|, |A + B + D + e|, |A + B + D + f|, |A + B + D + g|, |A + B + D + h|, |A + B + C + i|, |A + B + C + j|, |A + B + C + k| ≦ 15

en



Ⓐ Flare cutting dimensions
Ⓓ Flare nut tightening torque

Fig. 4-6

Ⓐ (Fig. 4-6)

Copper pipe O.D. (mm)	Flare dimensions øA dimensions (mm)
ø6.35	8.7 - 9.1
ø9.52	12.8 - 13.2
ø12.7	16.2 - 16.6
ø15.88	19.3 - 19.7

Ⓓ (Fig. 4-6)

Copper pipe O.D. (mm)	Flare nut O.D. (mm)	Tightening torque (N·m)
ø6.35	17	14 - 18
ø6.35	22	34 - 42
ø9.52	22	34 - 42
ø12.7	26	49 - 61
ø12.7	29	68 - 82
ø15.88	29	68 - 82
ø15.88	36	100 - 120

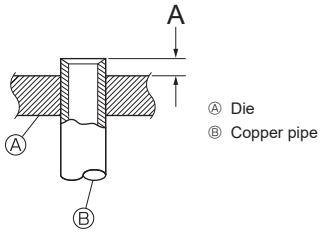


Fig. 4-7

4.4. Connecting pipes (Fig. 4-6)

- 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, or condensation may occur on the surface of the insulation material. (Insulation material Heat-resistant temperature: 120 °C, Thickness: 15 mm or more)
  * 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 9 mm or more).
- Apply thin layer of refrigerant oil to pipe and joint seating surface before tightening flare nut. Ⓐ
- Apply refrigerating machine oil over the entire flare seat surface. Ⓑ
- Use the flare nuts for the following pipe size. Ⓒ
- For connection, first align the center, then tighten the first 3 to 4 turns of flare nut by hand.
- Use 2 wrenches to tighten piping connections. Ⓓ
- Use leak detector or soapy water to check for gas leaks after connections are completed.
- When bending the pipes, be careful not to break them. Bend radius of 100 mm to 150 mm is sufficient.
- Make sure the pipes do not contact the compressor. Abnormal noise or vibration may result.

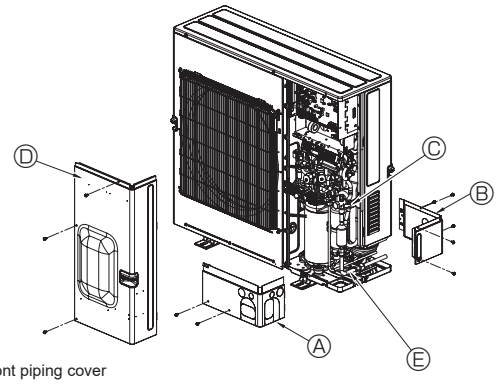
① Pipes must be connected starting from the indoor unit.
Flare nuts must be tightened with a torque wrench.
② Flare the liquid pipes and gas pipes and apply a thin layer of refrigeration oil (Applied on site).

- When usual pipe sealing is used, refer to Table 4 for flaring of R32 refrigerant pipes. The size adjustment gauge can be used to confirm A measurements.

⚠ **Warning:**
When installing the unit, securely connect the refrigerant pipes before starting the compressor.

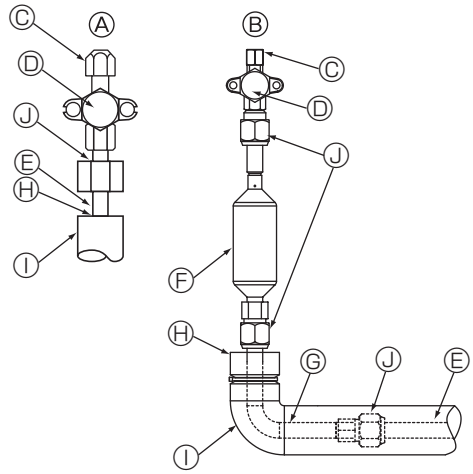
Table 4 (Fig. 4-7)

Copper pipe O.D. (mm)	A (mm)	
	Flare tool for R32	Flare tool for R22·R407C
	Clutch type	
ø6.35	0 - 0.5	1.0 - 1.5
ø9.52	0 - 0.5	1.0 - 1.5
ø12.7	0 - 0.5	1.0 - 1.5
ø15.88	0 - 0.5	1.0 - 1.5
ø19.05	0 - 0.5	1.0 - 1.5



Ⓐ Front piping cover
Ⓑ Piping cover
Ⓒ Stop valve
Ⓓ Service panel
Ⓔ Bend radius : 100 mm - 150 mm

Fig. 4-8



Ⓐ Stop valve <Liquid side>
Ⓑ Stop valve <Gas side>
Ⓒ Service port
Ⓓ Open/Close section
Ⓔ Local pipe
Ⓕ Muffler
Ⓖ Joint pipe-L
Ⓗ Sealed
Ⓘ Pipe cover
Ⓙ Use two wrenches here.

Fig. 4-9

4.5. Refrigerant piping (Fig. 4-8)

Remove the service panel Ⓓ (three screws) and the front piping cover Ⓐ (two screws) and rear piping cover Ⓑ (five screws).

① Make sure that the stop valve is closed, and connect the Muffler and the extended pipe.

② <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.

⚠ **Caution:**
Be sure to connect the Muffler, otherwise abnormal vibration or noise will occur.

③ Vacuum-evacuate air from the indoor unit and the connection piping.

④ After connecting the refrigerant pipes, check the connected pipes and the indoor unit for gas leaks. (Refer to 4.6. Refrigerant pipe airtight testing method)

⑤ Vacuumize the refrigerant lines 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 valve, 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 evacuate air from the refrigerant lines.
- After the valve work is completed, tighten the valve caps to the correct torque: 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.

⑥ Use sealant to seal the ends of the thermal insulation around the pipe connection sections to prevent water from entering the thermal insulation.

4.6. Refrigerant pipe airtight testing method

(1) Connect the testing tools.
- Make sure the stop valves Ⓐ Ⓑ are closed and do not open them.
- Add pressure to the refrigerant lines through the service port Ⓒ of the liquid stop valve Ⓐ and the gas stop valve Ⓑ.

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
① Pressurize to 0.5 MPa (5 kgf/cm^{2}G), wait five minutes, and make sure the pressure does not decrease.
② Pressurize to 1.5 MPa (15 kgf/cm^{2}G), wait five minutes, and make sure the pressure does not decrease.
③ Pressurize to 4.15 MPa (41.5 kgf/cm^{2}G) and measure the surrounding temperature and refrigerant pressure.

(3) If the specified pressure holds for about one day and does not decrease, the pipes have passed the test and there are no leaks.
- If the surrounding temperature changes by 1°C, the pressure will change by about 0.01 MPa (0.1 kgf/cm^{2}G). Make the necessary corrections.

(4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.

⚠ **Caution:**
If an airtightness test was performed on the outdoor unit when it was relocated, vacuumize the refrigerant lines with the stop valves opened through both the check valves and the service ports.

en

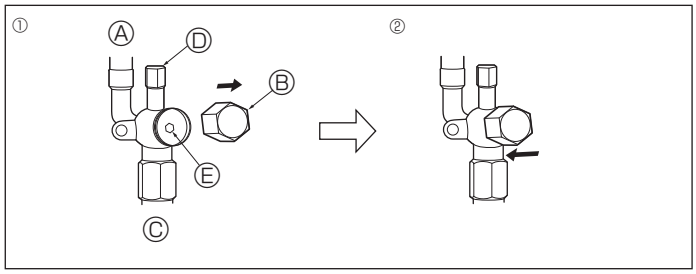
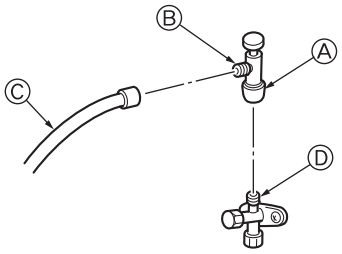


Fig. 4-10



* The figure to the left is an example only. The stop valve shape, service port position, etc., may vary according to the model.

* Turn section Ⓐ only.
(Do not further tighten sections Ⓐ and Ⓑ together.)

Ⓒ Charge hose
Ⓓ Service port

Fig. 4-11

4.7. Stop valve opening method (Fig. 4-10)

• Gas side

① Remove the cap and turn the valve rod counterclockwise as far as it will go with the use of a 5 mm hexagonal wrench. Stop turning when it hits the stopper. (ø15.88: Approximately 13 revolutions)

② Make sure that the stop valve is open completely 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 4 mm hexagonal wrench. Stop turning when it hits the stopper. (ø9.52: Approximately 10 revolutions)

② Make sure that the stop valve is open completely and rotate the cap back to its original position.

Ⓐ Unit side
Ⓑ Cap
Ⓒ Local pipe side
Ⓓ Service port
Ⓔ Valve stem

Refrigerant pipes are protectively wrapped

• The pipes can be protectively wrapped up to a diameter of ø90 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 will enter the unit and breakdown may result.)

Precautions when using the charge valve (Fig. 4-11)

Do not tighten the service port too much when installing it, otherwise, the valve core could be deformed and become loose, causing a gas leak.

After positioning section Ⓑ in the desired direction, turn section Ⓐ only and tighten it. Do not further tighten sections Ⓐ and Ⓑ together after tightening section Ⓐ.

⚠ **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.**

4. Installing the refrigerant piping

4.8. Additional refrigerant charge

Additional refrigerant charge

Refrigerant for the indoor units is not included in the outdoor unit when the unit is shipped from the factory.
Refrigerant of 1.4 kg equivalent to 27 m total extended piping length is already included when the outdoor unit is shipped. *1
Thus, if the total extended piping length is 27 m or less, there is no need to charge with additional refrigerant for the piping. If the total extended piping length exceeds 27 m, 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.

* 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.

Calculation of additional refrigerant charge

- Calculate the additional charge amount based on the designated amount for total capacity of connected indoor units and the extended piping. When the amount for the extended piping is less than 0, calculate the additional charge amount without it.
- Calculate the additional refrigerant charge using the procedure shown below, and charge with the additional refrigerant.
- For amounts less than 0.1 kg, round up the calculated additional refrigerant charge. (For example, if the calculated charge is 6.01 kg, round up the charge to 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 be over 4.5 kg. (Refer to 2.3. for the capacity of indoor units, and 4.2. and 4.3. for extended piping.)

<Additional Charge>

Calculation of refrigerant charge

Additional refrigerant charge for the piping	=	Additional refrigerant charge for the indoor units	+	Liquid pipe size Total length of ø9.52 × 0.051	+	Liquid pipe size Total length of ø6.35 × 0.019	-	Refrigerant amount for outdoor unit
(kg)		1.8 kg		(m) × 0.051 (kg/m)		(m) × 0.019 (kg/m)		1.4 kg *1

Additional charge amount for piping *2

*1 In case of the PKFY model indoor unit is in the refrigerant cycle, refrigerant of 0.6 kg equivalent to 11 m total extended piping length is already included when the outdoor unit is shipped.
*2 If this value is less than 0, the additional charge amount for the piping shall be 0.

Included refrigerant amount when shipped from the factory

Included refrigerant amount
3.0 kg

<Example>
Outdoor model : SM140 — A : ø9.52 30 m
Indoor 1 : MS100 (11.2 kW) — a : ø9.52 15 m
2 : MS40 (4.5 kW) — b : ø6.35 10 m
} At the conditions below:
The total length of each pipe size is as follows:
ø9.52 : A = 30 m
ø9.52 : a = 15 m
ø6.35 : b = 10 m
<Calculation example>
Additional refrigerant charge
1.8 + (30 + 15) × 0.051 + 10 × 0.019 - 1.4 = 2.9 kg (rounded up)

5. Drainage piping work

Outdoor unit drainage pipe connection

When drain piping is necessary, use the drain socket or the drain pan (option).

Drain socket	PAC-SG61DS-E
Drain pan	PAC-SH97DP-E

en

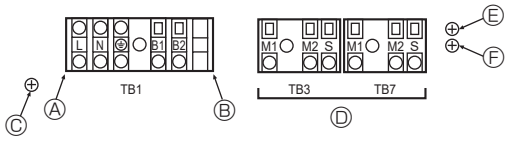
6. Electrical work

6.1. Caution

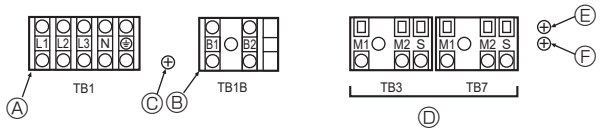
① Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.
② Use self-extinguishing distribution cables for power supply wiring.
③ Wiring for control (hereinafter referred to as transmission line) shall be (5 cm or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert transmission line and power source wire in the same conduit.)
④ Be sure to provide designated grounding work to outdoor unit.
⑤ Give some allowance to wiring for electrical part box of indoor and outdoor units, because the box is sometimes removed at the time of service work.
⑥ Never connect the main power source to terminal block of transmission line. If connected, electrical parts will be burnt out.
⑦ Use 2-core shield cable for transmission line. If transmission lines of different systems are wired with the same multiplecore cable, the resultant poor transmitting and receiving will cause erroneous operations.
⑧ Only the transmission line specified should be connected to the terminal block for outdoor unit transmission.
(Transmission line to be connected with indoor unit : Terminal block TB3 for transmission line, Other : Terminal block TB7 for centralized control)
Erroneous connection does not allow the system to operate.
⑨ In case to connect with the upper class controller or to conduct group operation in different refrigerant systems, the control line for transmission is required between the outdoor units each other.
Connect this control 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 from CN41 of one outdoor unit to CN40.
⑩ Group is set by operating the remote controller.
⑪ Power on the indoor units and the branch box side first, then the outdoor side.
⑫ Make sure that the transmission line and power supply wiring do not contact the coil of the shut-off valve. The insulation of the wiring may tear.

en

<PUMY-SM·VKM>



<PUMY-SM·YKM>



Ⓐ Power source
Ⓑ Power supply for Branch box
Ⓒ Screw on the electrical component box for ground connection (TB1/TB1B)
Ⓓ Transmission line
Ⓔ Screw on the electrical component box for ground connection (TB3)
Ⓕ Screw on the electrical component box for ground connection (TB7)

Fig. 6-1

6.2. Control box and connecting position of wiring (Fig. 6-1)

1. Connect the wiring between the outdoor unit and the indoor unit or Branch box to the transmission terminal block (TB3) of the outdoor unit.
Connect the wiring between the outdoor unit and the centralized control system to the transmission terminal block (TB7) of the outdoor unit.
Connect the ground of the shielded wiring to the shield terminal (S) of the terminal block (TB3) or (TB7).
If the connection of the outdoor unit's transmission power supply connector has been changed from CN41 to CN40, connect the shield terminal (S) of the terminal block (TB7) to the screw (Ⓕ) using the included lead wire.
* The shield (S) terminal of the transmission terminal block (TB3) is connected to the ground (Ⓔ) when the unit is shipped from the factory.
2. The terminal (B1) and (B2) on the terminal block (TB1B or TB1) is for supplying power to the Branch box (220 – 240 VAC).
3. Remove the knock-out pieces from the piping cover, pass the power supply and transmission wires through the appropriate knock-out holes, and connect the wires to the terminal block.
4. Fix power source wiring to terminal box by using buffer bushing for tensile force (PG connection or the like).

⚠ **Caution:**
Never connect the transmission line for the indoor unit or the centralized control system transmission line to this terminal block (TB1). If the transmission lines are connected, the indoor unit terminal block or centralized control terminal block could be damaged.

6.3. Wiring transmission cables

① **Types of control cables**

1. Wiring transmission cables

Types of transmission cables	Shielding wire CVVS, CPEVS or MVVS
Cable diameter	More than 1.25 mm²
Maximum wiring length	Within 200 m

2. M-NET Remote control cables

Types of remote control cables	Shielding wire CVVS, CPEVS or MVVS
Cable diameter	0.5 to 1.25 mm²
Remarks	When 10 m is exceeded, use cable with the same specifications as transmission line wiring cables.

3. MA Remote control cable

Type of remote control cable	Sheathed 2-core cable (unshielded) CVV
Cable diameter	0.3 to 1.25 mm² *
Remarks	Within 200 m *

* Cable diameter and length may differ depending on the remote controller. Refer to installation manual of each remote controller for details.

② **Wiring examples**

• Controller name, symbol and allowable number of controllers.

Name		Symbol	Allowable number of controllers
Outdoor unit controller		OC	–
Indoor unit controller	CITY MULTI series	M-IC	1 to 12 units per 1 OC *1
	M, S, P series	A-IC	2 to 8 units per 1 OC *1
Branch box		BC	0 to 2 units per 1 OC *1
Remote controller	M-NET	M-NET RC *2	Maximum of 12 controllers for 1 OC (Can not be connected if Branch box is used.) *1
	MA	MA-RC	Maximum of 2 per group
	Wireless	WL-RC	–

Note:
***1. The number of connectable units may be limited by some conditions such as an indoor unit's capacity or each unit's equivalent power consumption.**
***2. Don't use the Lossnay controller (PZ-61DR-E, PZ-43SMF-E, PZ-52SF-E, PZ-60DR-E).**

<Wiring Method and Address Setting: include Branch box system>
Please refer to the Branch box Installation Manual.

6. Electrical work

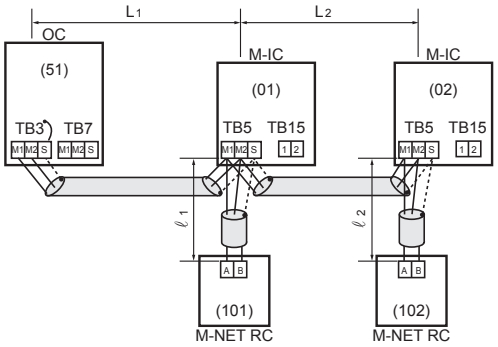
6.4. System control

Example of an M-NET remote controller system (Address setting is necessary.)

<Example for wiring control cables, wiring method and address setting, permissible lengths, and the constraint items are listed in the standard system with detailed explanation.>

Example for the standard operation

■ **Example of wiring transmission cables**



1 M-NET remote controller for each CITY MULTI series indoor unit
There is no need for setting the hundreds digit on the M-NET remote controller.

en

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.
For the system including the CITY MULTI indoor unit with refrigerant sensor, M-NET remote controller (M-NET RC) cannot be used.

■ **Wiring Method and Address Settings**

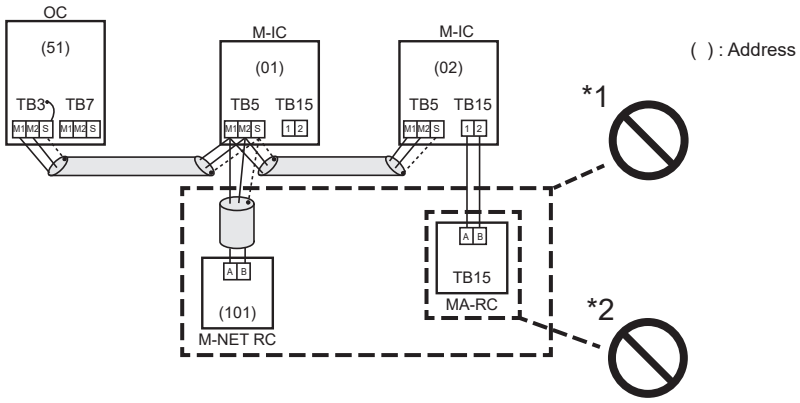
1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1, M2 and the ground terminal on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals M1 and M2 on transmission cable terminal block (TB5) for each indoor unit with the terminal block on M-NET the remote controller (M-NET RC).
4. Set the address setting switch (on P.C.B) as shown below.

Unit	Range	Setting Method
M-IC	001 to 050	—
OC	051 to 100	Use the smallest address of all the indoor unit plus 50. * The address automatically becomes “100” if it is set as “01–50”.
M-NET RC	101 to 150	Indoor unit address plus 100

■ **Permissible Lengths**

1. Indoor/Outdoor transmission line Maximum length:
   L1 + L2 ≦ 200 m (1.25 mm² or more)
2. M-NET Remote controller cable length:
   ℓ1, ℓ2 ≦ 10 m (0.5 to 1.25 mm²)
   If the length exceeds 10 m, use a 1.25 mm² shielded wire. The section of the cable that exceeds 10 m must be included in the maximum length via outdoor units and maximum transmission cable length.

■ **Constraint items**

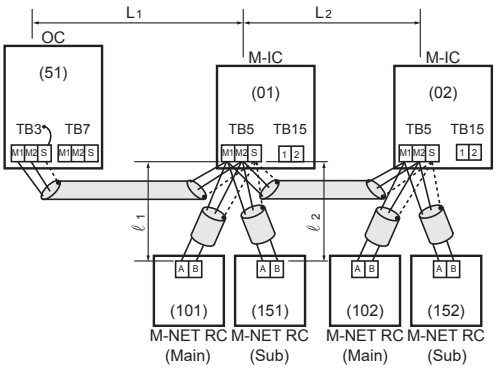


*1. M-NET remote controller (M-NET RC) and MA remote controller (MA RC) cannot be used together.
*2. Do not connect anything with TB15 of CITY MULTI series indoor unit (M-IC).

6. Electrical work

Example for the operation using 2 M-NET remote controllers

■ **Example of wiring Transmission cables**



( ) : Address

Using 2 M-NET remote controllers for each CITY MULTI series indoor unit.

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.
For the system including the CITY MULTI indoor unit with refrigerant sensor, M-NET remote controller (M-NET RC) cannot be used.

en

■ **Wiring Method and Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1, M2 and the ground terminal on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals M1 and M2 on transmission cable terminal block (TB5) for each indoor unit with the terminal block on M-NET the remote controller (M-NET RC).
4. Set the address setting switch (on P.C.B) as shown below.

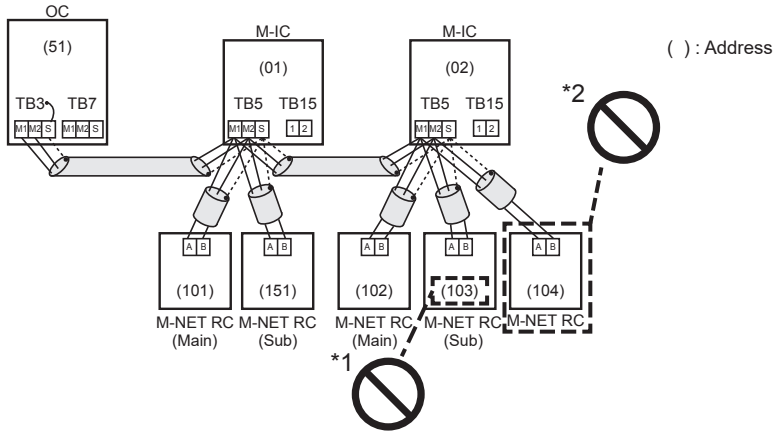
Unit	Range	Setting Method
M-IC	001 to 050	—
OC	051 to 100	Use the smallest address of all the indoor units plus 50. * The address automatically becomes “100” if it is set as “01–50”.
M-NET RC (Main)	101 to 150	Indoor unit address plus 100
M-NET RC (Sub)	151 to 200	Indoor unit address plus 150

■ **Permissible Lengths**

1. Indoor/Outdoor transmission line Maximum length:
   L1 + L2 ≦ 200 m (1.25 mm² or more)
2. M-NET Remote controller cable length:
   ℓ1+ℓ2 ≦ 10 m (0.5 to 1.25 mm²)

If the length exceeds 10 m, use a 1.25 mm² shielded wire. The section of the cable that exceeds 10 m must be included in the maximum length via outdoor units and maximum transmission cable length.

■ **Constraint items**



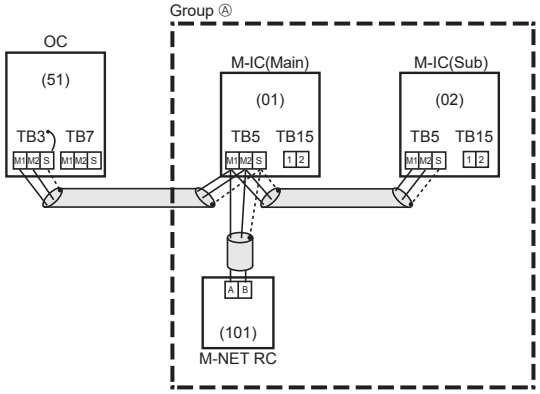
( ) : Address

*1. Use the CITY MULTI series indoor unit (M-IC) address plus 150 as the sub M-NET remote controller address. In this case, it should be 152.
*2. 3 or more M-NET remote controllers (M-NET RC) cannot be connected to 1 CITY MULTI series indoor unit.

6. Electrical work

Example for the group operation

■ **Example of wiring transmission cables**



( ) : Address

Multiple CITY MULTI series indoor units operated together by 1 M-NET remote controller.

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.
For the system including the CITY MULTI indoor unit with refrigerant sensor, M-NET remote controller (M-NET RC) cannot be used.

■ **Wiring Method and Address Settings**

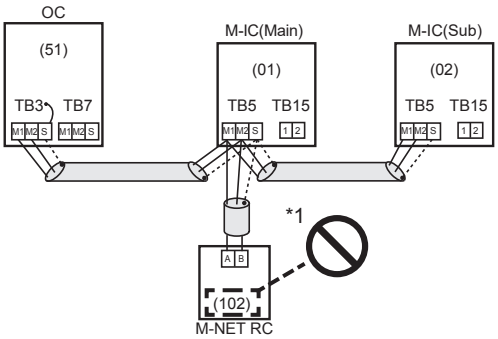
1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1 and M2 and the ground terminal on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals M1 and M2 on transmission cable terminal block (TB5) of the M-IC main unit with the most recent address within the same CITY MULTI series indoor unit (M-IC) group to terminal block on the M-NET remote controller.
4. Set the address setting switch (on P.C.B) as shown below.

Unit	Range	Setting Method
M-IC (Main)	001 to 050	Use the smallest address within the same group of CITY MULTI series indoor units.
M-IC (Sub)	001 to 050	Use an address, other than that of the M-IC (Main) from among the units within the same group of indoor units. This must be in sequence with the M-IC (Main).
OC	051 to 100	Use the smallest address of all the CITY MULTI series indoor units plus 50. * The address automatically becomes “100” if it is set as “01–50”.
M-NET RC	101 to 150	Set at an M-IC (Main) address within the same group plus 100.

5. Use the CITY MULTI series indoor unit (M-IC) within the group with the most functions as the M-IC (Main) unit.

■ **Permissible Lengths**
Same as that of standard operation

■ **Constraint items**



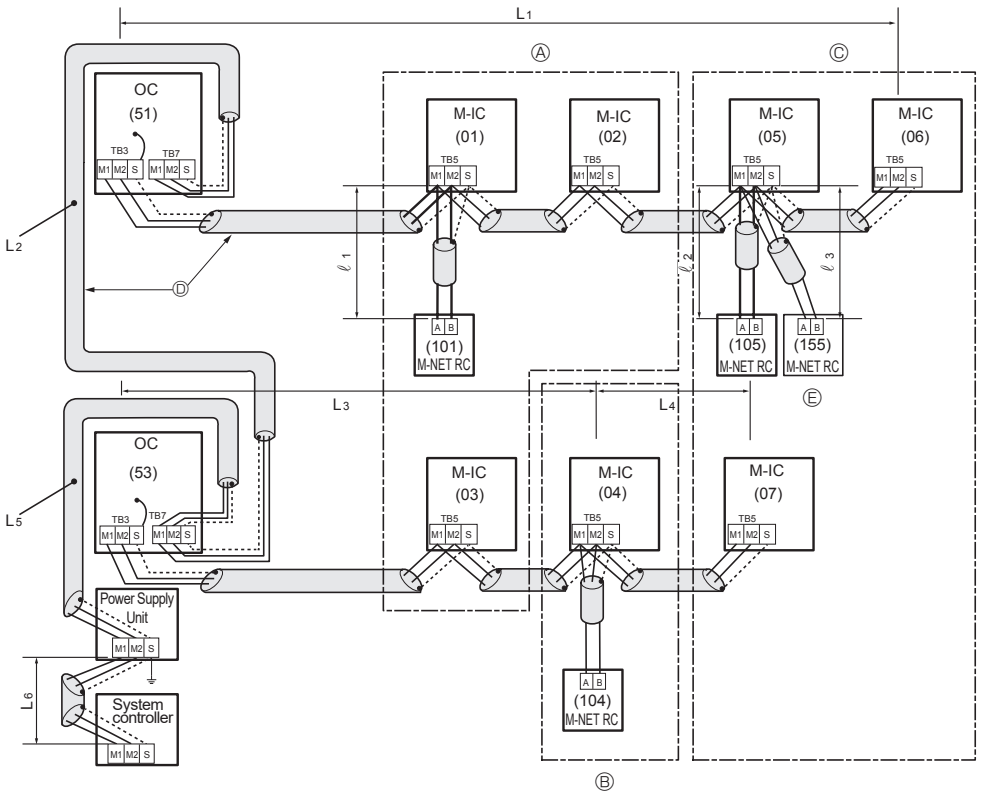
( ) : Address

*1. The M-NET remote controller address is the CITY MULTI series indoor unit main address plus 100. In this case, it should be 101.

6. Electrical work

Example of a group operation system with 2 or more outdoor units and an M-NET remote controller. (Address settings are necessary.)

■ **Examples of wiring transmission cables**



( ) : Address

Ⓐ : Group
Ⓑ : Group
Ⓒ : Group
Ⓓ : Shielded Wire
Ⓔ : Sub M-NET Remote Controller

Note:
For the system including the CITY MULTI indoor unit with refrigerant sensor, M-NET remote controller (M-NET RC) cannot be used.

■ **Wiring Method and Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the CITY MULTI series indoor unit (M-IC), as well for all OC-OC, and IC-IC wiring.
2. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1, M2 and terminal S on the transmission cable terminal block of the CITY MULTI series indoor unit (M-IC).
3. Connect terminals M1 and M2 on the transmission cable terminal block of the CITY MULTI series indoor unit (M-IC) that has the most recent address within the same group to the terminal block on the M-NET remote controller (M-NET RC).
4. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
5. Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC (Main)	01 to 50	Use the smallest address within the same group of CITY MULTI series indoor units.
M-IC (Sub)	01 to 50	Use an address, other than the M-IC (Main) in the same group of CITY MULTI series indoor units. This must be in sequence with the M-IC (Main).
OC	51 to 100	Use the smallest address of all the CITY MULTI series indoor units plus 50. * The address automatically becomes “100” if it is set as “01–50”.
M-NET RC (Main)	101 to 150	Set at an M-IC (Main) address within the same group plus 100.
M-NET RC (Sub)	151 to 200	Set at an M-IC (Main) address within the same group plus 150.
MA-RC	-	Address setting is not necessary. (Main/sub setting is necessary.)

6. The group setting operations among the multiple CITY MULTI series indoor units are done by the M-NET remote controller (M-NET RC) after the electrical power has been turned on.
7. When the system controller is connected to the system, set SW2-1 on all outdoor units to ON.
   Also, set the power supply switching connectors (CN40, CN41) as follows.

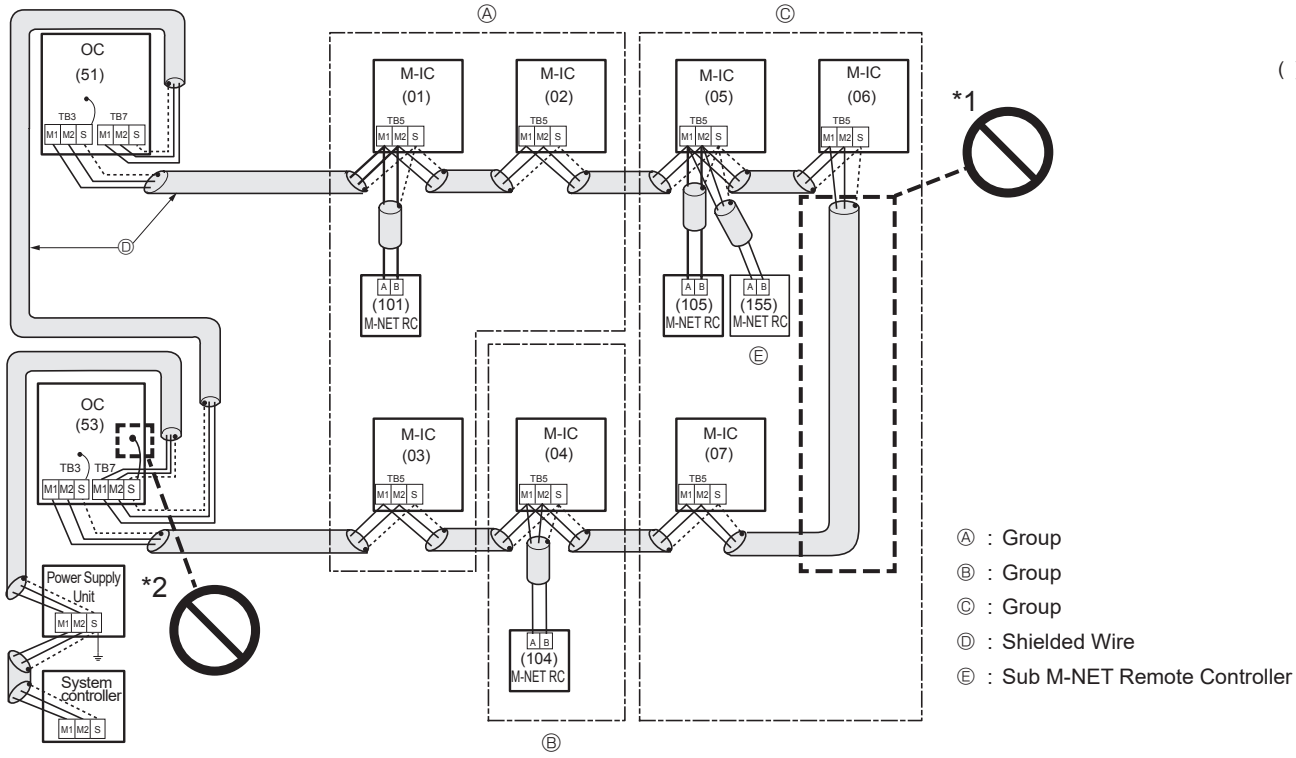
Refrigerant system	Connection with system controller	Transmission line power supply unit	Group operation in different refrigerant systems	Power supply switching connector settings
Single refrigerant	–	–	–	Remains CN41 (default setting)
Multiple refrigerants	No	–	No	Remains CN41 (default setting)
			Yes	For one outdoor unit only, switch the power supply switching connector (CN41) to (CN40). * Short-circuit the S (shield) terminal and the ground terminal (⏚) of the terminal block (TB7) of one outdoor unit switched to CN40.
	Connection with indoor/outdoor transmission line	Not required	Yes/No	
	Connection with central control system transmission line	Required	Yes/No	Remains CN41 (default setting)

6. Electrical work

■ **Permissible Lengths**

1. Maximum line length via outdoor unit:
   L1+L2+L3+L4, L3+L4+L5+L6, L1+L2+L5+L6 ≦ 500 m (1.25 mm² or more)
2. Indoor/outdoor transmission line Maximum length:
   L1, L3+L4, L2+L5, L6 ≦ 200 m (1.25 mm² or more)
3. M-NET Remote controller cable length:
   ℓ1, ℓ2 + ℓ3 ≦ 10 m (0.5 to 1.25 mm²)
   If the length exceeds 10 m, use a 1.25 mm² shielded wire.
   The section of the cable that exceeds 10 m must be included in the maximum length via outdoor units and maximum transmission cable length.

■ **Constraint items**



( ) : Address

Ⓐ : Group
Ⓑ : Group
Ⓒ : Group
Ⓓ : Shielded Wire
Ⓔ : Sub M-NET Remote Controller

Set all addresses to ensure that they are not overlapped.
M-NET remote controller and MA remote controller cannot be connected with the CITY MULTI series indoor unit of the same group wiring together.

*1. Never connect together the terminal blocks (TB5) for transmission wires for CITY MULTI series indoor units (M-IC) that have been connected to different outdoor units (OC).
*2. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit with the earth.

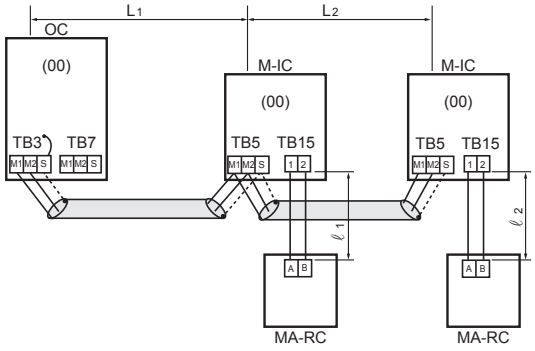
6. Electrical work

Example of an MA remote controller system (Address setting is not necessary.)

<In the case of same group operation, need to set the address that is only main CITY MULTI series indoor unit.>

Example for the standard operation

■ **Example of wiring transmission cables**



( ) : Address

1 MA remote controller for each indoor unit

en

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.
For the system including the CITY MULTI indoor unit with refrigerant sensor, address settings are necessary.

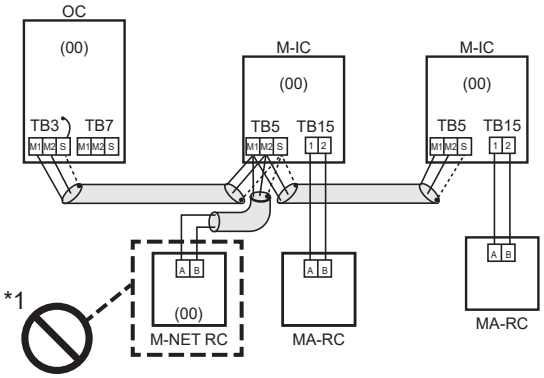
■ **Wiring Method and Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1 and M2 on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals 1 and 2 on transmission cable terminal block (TB15) for each CITY MULTI series indoor unit with the terminal block for the MA remote controller (MA-RC).

■ **Permissible Lengths**

1. Indoor/outdoor transmission line Maximum length:
   L1 + L2 ≦ 200 m (1.25 mm² or more)
2. MA remote controller cable length:
   ℓ1, ℓ2 ≦ 200 m (0.3 to 1.25 mm²)

■ **Constraint items**



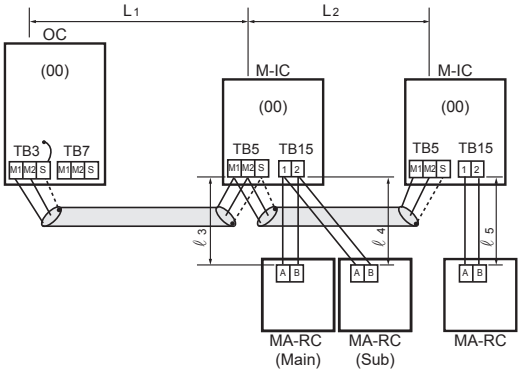
( ) : Address

*1. The MA remote controller and the M-NET remote controller cannot be used together with the CITY MULTI series indoor unit of the same group.

6. Electrical work

Example for the operation using 2 remote controllers

■ **Example of wiring transmission cables**



( ) : Address

Using 2 MA remote controllers for each CITY MULTI series indoor unit.

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.
For the system including the CITY MULTI indoor unit with refrigerant sensor, address settings are necessary.

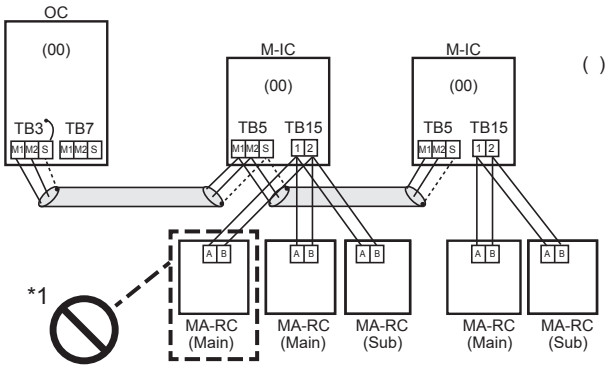
■ **Wiring Method and Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1 and M2 on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals 1 and 2 on transmission cable terminal block (TB15) for each CITY MULTI series indoor unit with the terminal block for the MA remote controller (MA-RC).
4. In the case of using 2 remote controllers, connect terminals 1 and 2 on transmission cable terminal block (TB15) for each indoor unit with the terminal block for 2 MA remote controllers.
   - Set either one of the MA remote controllers to “sub remote controller”.
   - Refer to the installation manual of MA remote controller.

■ **Permissible Lengths**

1. Indoor/outdoor transmission line Maximum length:
   L1 + L2 ≦ 200 m (1.25 mm² or more)
2. MA remote controller cable length:
   ℓ3 +ℓ4, ℓ5 ≦ 200 m (0.3 to 1.25 mm²)

■ **Constraint items**



( ) : Address

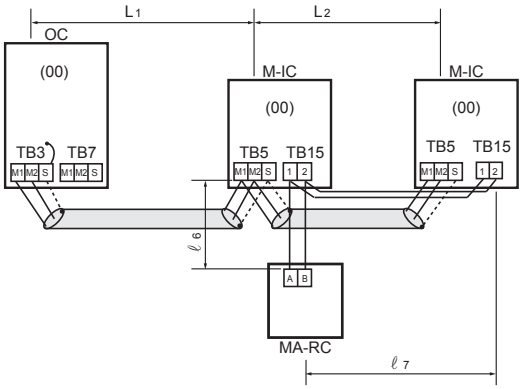
*1. 3 MA remote controllers or more cannot be connected with the CITY MULTI series indoor unit of the same group.

6. Electrical work

Example for the group operation

Note:
The CITY MULTI indoor unit with refrigerant sensor cannot be included in the group.

■ **Example of wiring transmission cables**



( ) : Address

en

Multiple indoor units operated together by 1 MA remote controller.

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.
For the system including the CITY MULTI indoor unit with refrigerant sensor, address settings are necessary.

■ **Wiring Method and Address Settings**

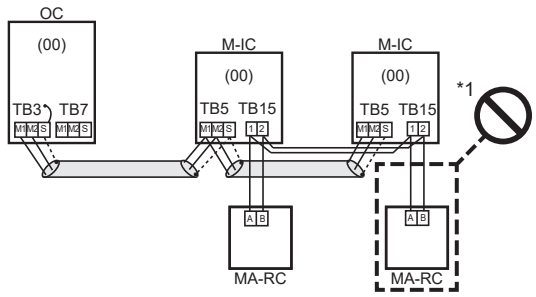
1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1 and M2 on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals 1 and 2 on transmission cable terminal block (TB15) for each CITY MULTI series indoor unit with the terminal block for the MA remote controller (MA-RC).
4. In the case of group operation using MA remote controller (MA-RC), connect terminals 1 and 2 on transmission cable terminal block (TB15) of each CITY MULTI series indoor unit. Use non-polarized 2-core wire.
5. In the case of same group operation, need to set the address that is only main CITY MULTI series indoor unit. Please set the smallest address within number 01–50 of the CITY MULTI series indoor unit with the most functions in the same group.

■ **Permissible Lengths**

1. Indoor/outdoor transmission line Maximum length:
   L1 + L2 ≦ 200 m (1.25 mm² or more)
2. MA remote controller cable length:
   ℓ6 +ℓ7 ≦ 200 m (0.3 to 1.25 mm²)

■ **Constraint items**

( ) : Address

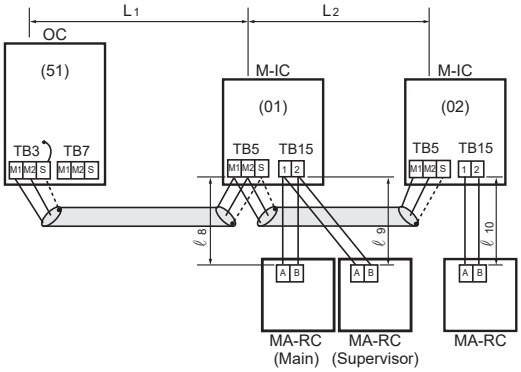


*1. The second MA remote controller is connected with the terminal block (TB15) for the MA remote controller of the same CITY MULTI series indoor unit (M-IC) as the first MA remote control.

6. Electrical work

Example for the operation using Supervisor Remote Controller mode (Address settings are necessary.)

■ **Example of wiring transmission cables**



( ) : Address

Using 2 MA remote controllers with alarm for CITY MULTI series indoor unit.

Note:
Combinations of standard operation, operation using 2 M-NET remote controllers, and group operation are possible.

en

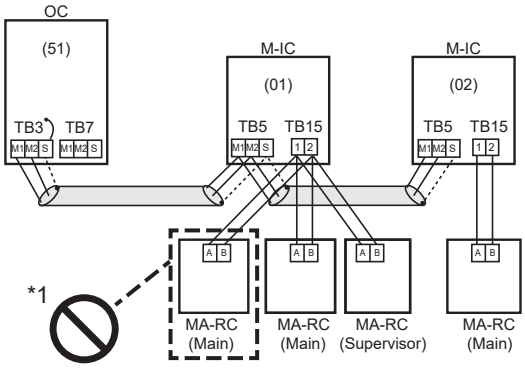
■ **Wiring Method and Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1 and M2 on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of each CITY MULTI series indoor unit (M-IC). Use nonpolarized 2-core wire.
3. Connect terminals 1 and 2 on transmission cable terminal block (TB15) for each CITY MULTI series indoor unit with the terminal block for the MA remote controller (MA-RC).
4. In the case of using 2 remote controllers, connect terminals 1 and 2 on transmission cable terminal block (TB15) for each indoor unit with the terminal block for 2 MA remote controllers.
   - Set either one of the MA remote controllers to “Supervisor Remote Controller”.
   - Refer to the installation manual of MA remote controller.

■ **Permissible Lengths**

1. Indoor/outdoor transmission line Maximum length:
   L1 + L2 ≦ 200 m (1.25 mm² or more)
2. MA remote controller cable length:
   ℓ8, ℓ9 ≦ 100 m, ℓ10 ≦ 200 m (0.3 to 1.25 mm²)

■ **Constraint items**



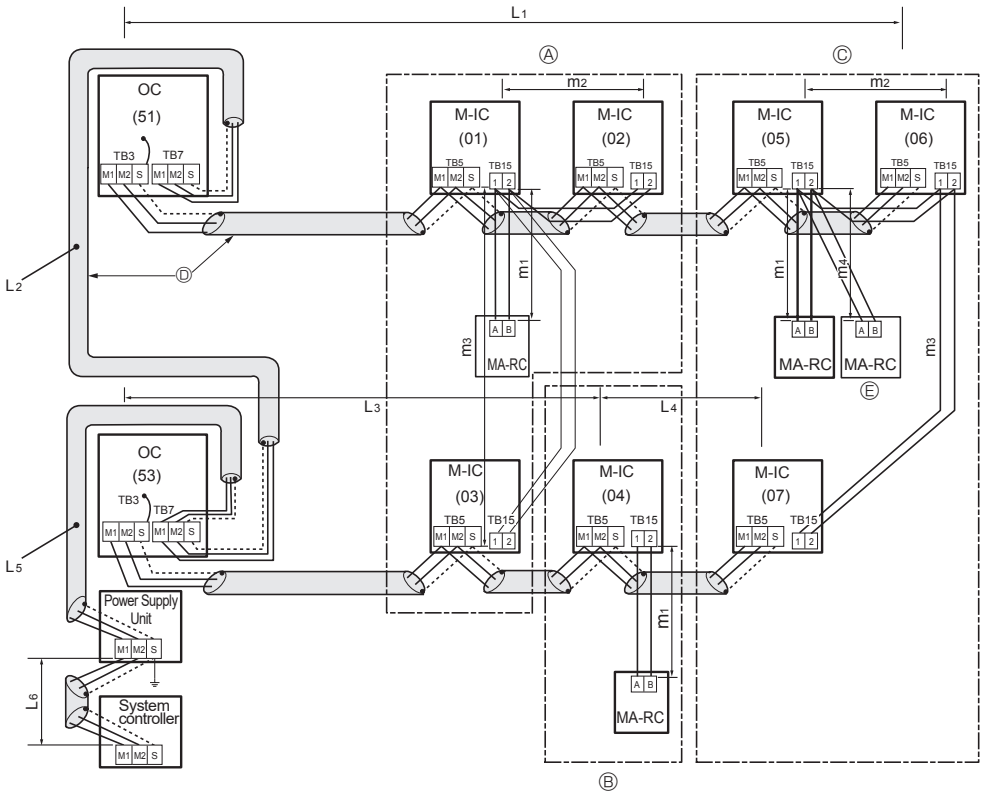
( ) : Address

*1. 3 MA remote controllers or more cannot be connected with the CITY MULTI series indoor unit of the same group.

6. Electrical work

Example of a group operation with 2 or more outdoor units and MA remote controllers. (Address settings are necessary.)

■ **Examples of wiring transmission cables**



( ) : Address

Ⓐ : Group
Ⓑ : Group
Ⓒ : Group
Ⓓ : Shielded Wire
Ⓔ : Sub MA Remote Controller

■ **Wiring Method Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the CITY MULTI series indoor unit (M-IC), as well for all OC-OC, and IC-IC wiring.
2. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block of the CITY MULTI series indoor unit (M-IC).
3. Connect terminals 1 and 2 on the terminal block for MA remote controller line (TB15) on the indoor unit (M-IC) to the terminal block on the MA remote controller (MA-RC). (Nonpolarized two-wire)
4. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
5. Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC (Main)	01 to 50	Use the smallest address within the same group of indoor units.
M-IC (Sub)	01 to 50	Use an address, other than the M-IC (Main) in the same group of M-NET indoor units. This must be in sequence with the M-IC (Main).
OC	51 to 100	Use the smallest address of all the indoor units plus 50. * The address automatically becomes “100” if it is set as “01–50”.
M-NET RC (Main)	101 to 150	Set at an M-IC (Main) address within the same group plus 100.
M-NET RC (Sub)	151 to 200	Set at an M-IC (Main) address within the same group plus 150.
MA-RC	-	Address setting is not necessary. (Main/sub setting is necessary.)

6. When the system controller is connected to the system, set SW2-1 on all outdoor units to ON.
   Also, set the power supply switching connectors (CN40, CN41) as follows.

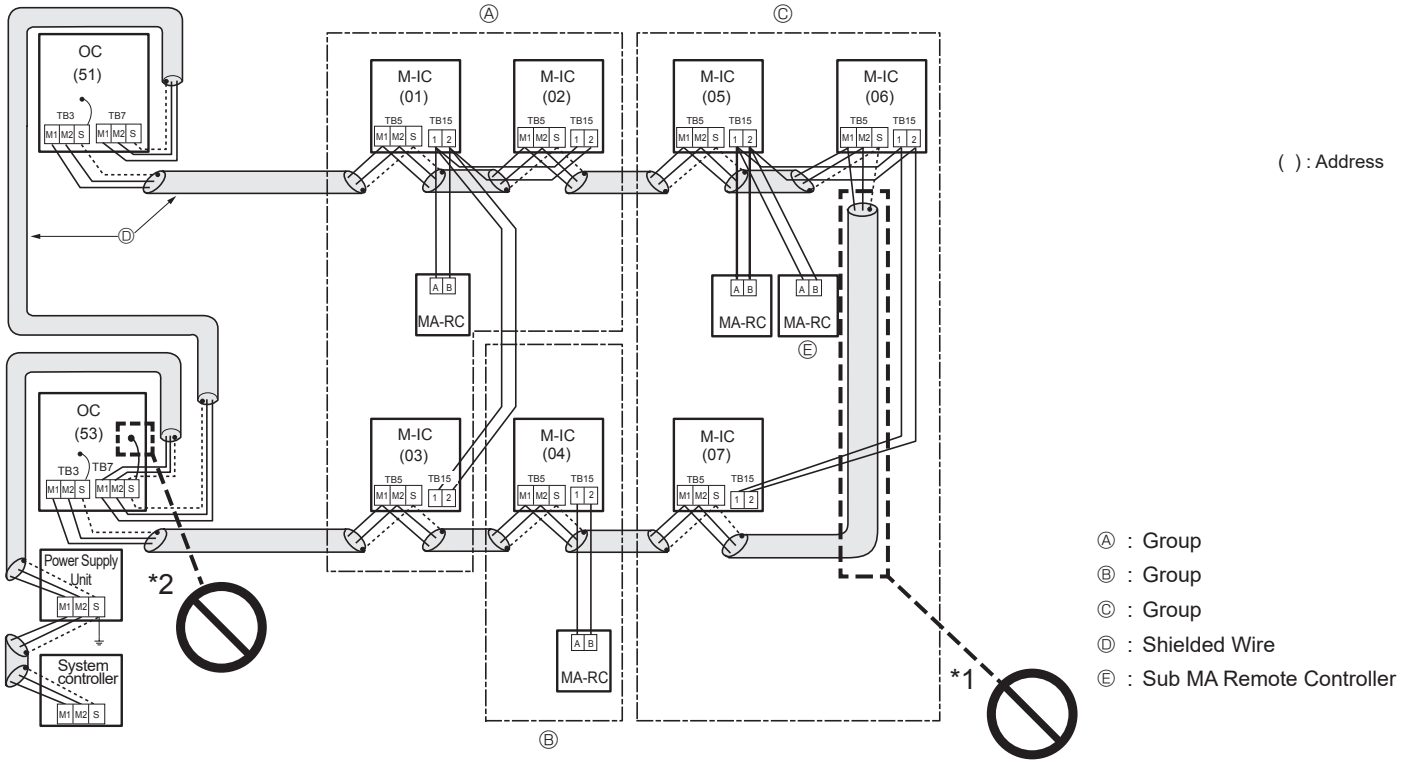
Refrigerant system	Connection with system controller	Transmission line power supply unit	Group operation in different refrigerant systems	Power supply switching connector settings
Single refrigerant	–	–	–	Remains CN41 (default setting)
Multiple refrigerants	No	–	No	Remains CN41 (default setting)
			Yes	For one outdoor unit only, switch the power supply switching connector (CN41) to (CN40). * Short-circuit the S (shield) terminal and the ground terminal (⏚) of the terminal block (TB7) of one outdoor unit switched to CN40.
	Connection with indoor/outdoor transmission line	Not required	Yes/No	
	Connection with central control system transmission line	Required	Yes/No	Remains CN41 (default setting)

6. Electrical work

■ **Permissible Lengths**

1. Maximum line length via outdoor unit (M-NET cable):
   L1+L2+L3+L4, L3+L4+L5+L6, L1+L2+L5+L6 ≦ 500 m (1.25 mm² or more)
2. Indoor/outdoor transmission line Maximum length (M-NET cable):
   L1 and L3+L4 and L2+L5 and L6 ≦ 200 m (1.25 mm² or more)
3. MA Remote controller cable length:
   m1 and m1+m2+m3 and m1+m2+m3+m4 ≦ 200 m (0.3 to 1.25 mm²)

■ **Constraint items**



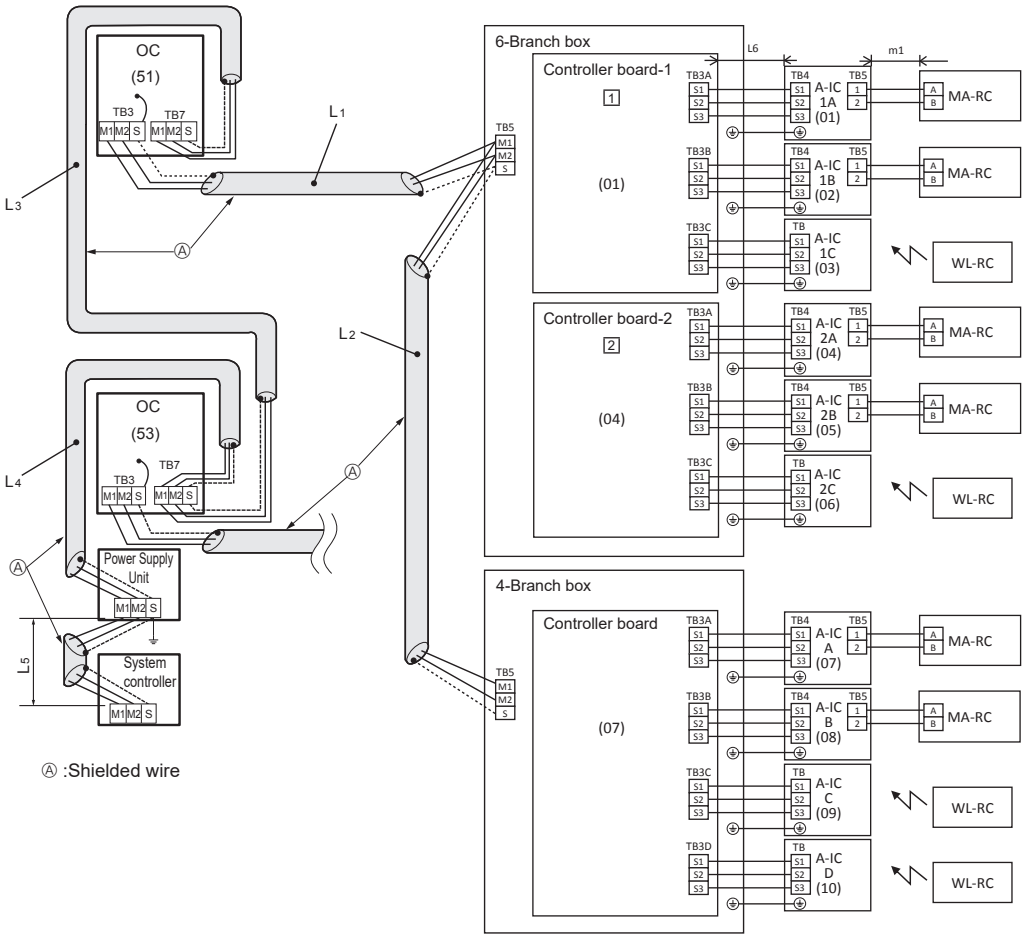
M-NET remote controller and MA remote controller cannot be connected with the CITY MULTI series indoor unit of the same group wiring together.

*1. Never connect together the terminal blocks (TB5) for transmission wires for CITY MULTI series indoor units (M-IC) that have been connected to different outdoor units (OC).

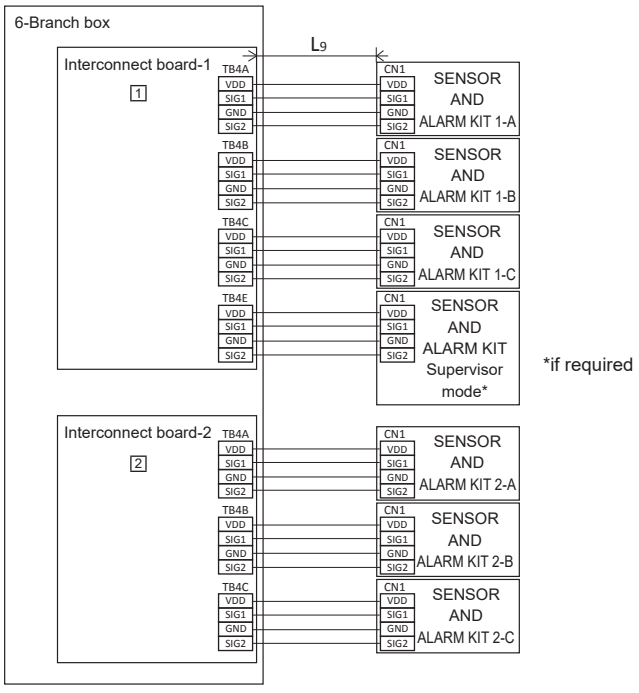
*2. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit with the earth.

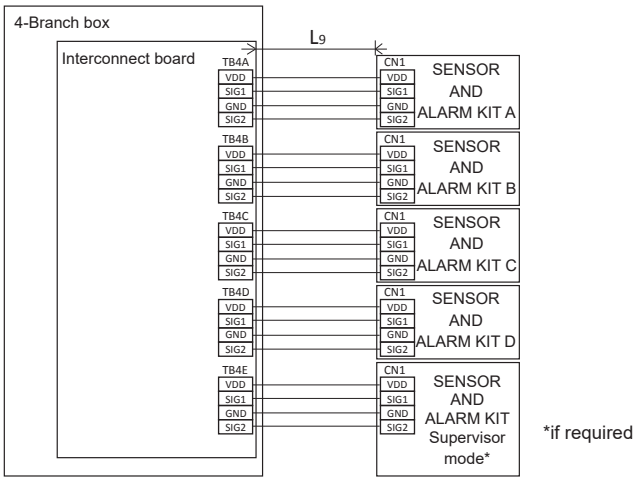
Example of a system using Branch box and A-Control indoor unit

■ **Examples of wiring transmission cables**



■ **Example of SENSOR AND ALARM KIT Wiring**





SENSOR AND ALARM KIT - Branch box connection cable length:
L9 ≦ 40 m (0.5 mm²)
* For details, refer to the Branch box/SENSOR AND ALARM KIT Installation Manual.

6. Electrical work

■ **Wiring Method Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the Branch box, as well for all OC-OC and BC-BC wiring.
2. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block (TB5) of the Branch box.
3. Connect terminals 1 and 2 on the transmission cable terminal block (TB5/TB15) of the A-control indoor unit (A-IC), to the terminal block on the MA remote controller (MA-RC).
4. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
5. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit to the earth.
6. Set the address setting switch as follows.

Unit	Range	Setting Method
A-IC	01 to 50	According to the set address of connected Branch box, set the A-IC addresses sequentially by SW1 on Branch box. (For example, when setting the Branch box address to 01, A-IC addresses set 01, 02, 03 and 04.)
Branch box	01 to 50	Use a number within the range 1–50, but it should not make the highest address of connected A-IC exceed 50.
OC	51 to 100	Use the smallest address of all the Branch box plus 50. * The address automatically becomes “100” if it is set as “01–50”.
MA-RC	-	Address setting is not necessary.

7. When the system controller is connected to the system, set SW2-1 on all outdoor units to ON.
   Also, set the power supply switching connectors (CN40, CN41) as follows.

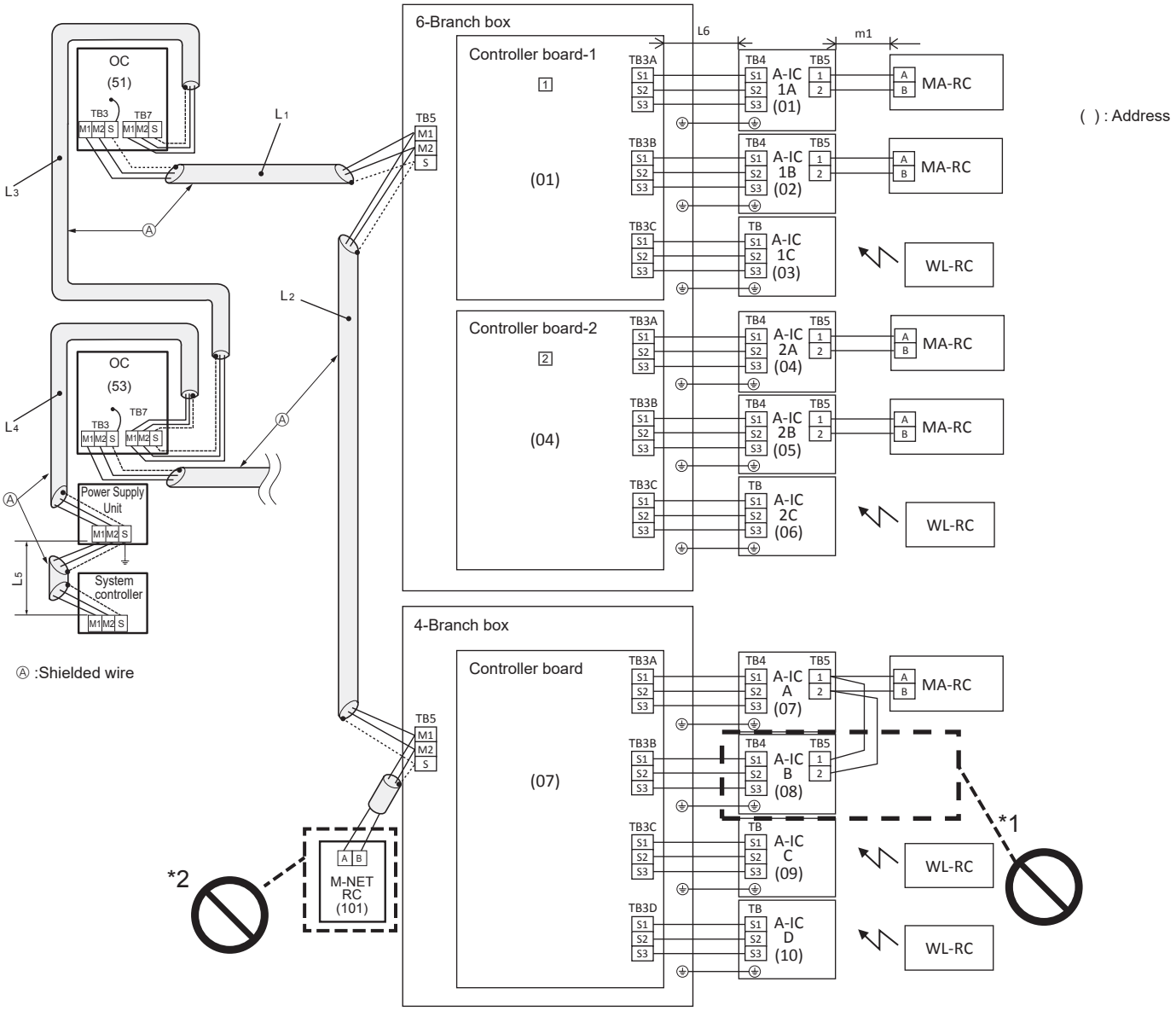
Refrigerant system	Connection with system controller	Transmission line power supply unit	Group operation in different refrigerant systems	Power supply switching connector settings
Single refrigerant	–	–	–	Remains CN41 (default setting)
Multiple refrigerants	No	–	No	Remains CN41 (default setting)
			Yes	For one outdoor unit only, switch the power supply switching connector (CN41) to (CN40). * Short-circuit the S (shield) terminal and the ground terminal (⏚) of the terminal block (TB7) of one outdoor unit switched to CN40.
	Connection with indoor/outdoor transmission line	Not required	Yes/No	
	Connection with central control system transmission line	Required	Yes/No	Remains CN41 (default setting)

■ **Permissible Lengths**

1. Maximum line length via outdoor unit (M-NET cable):
   L1+L2+L3+L4+L5 ≦ 500 m (1.25 mm² or more)
2. Branch box/outdoor transmission line Maximum length (M-NET cable):
   L1+L2, L3+L4, L5 ≦ 200 m (1.25 mm² or more)
3. Indoor/Branch box transmission line Maximum length (A-Control cable) :
   L6 ≦ 25 m (1.5 mm²)
4. MA Remote controller cable length:
   m1 ≦ 200 m (0.3 to 1.25 mm²)

6. Electrical work

■ **Constraint items**



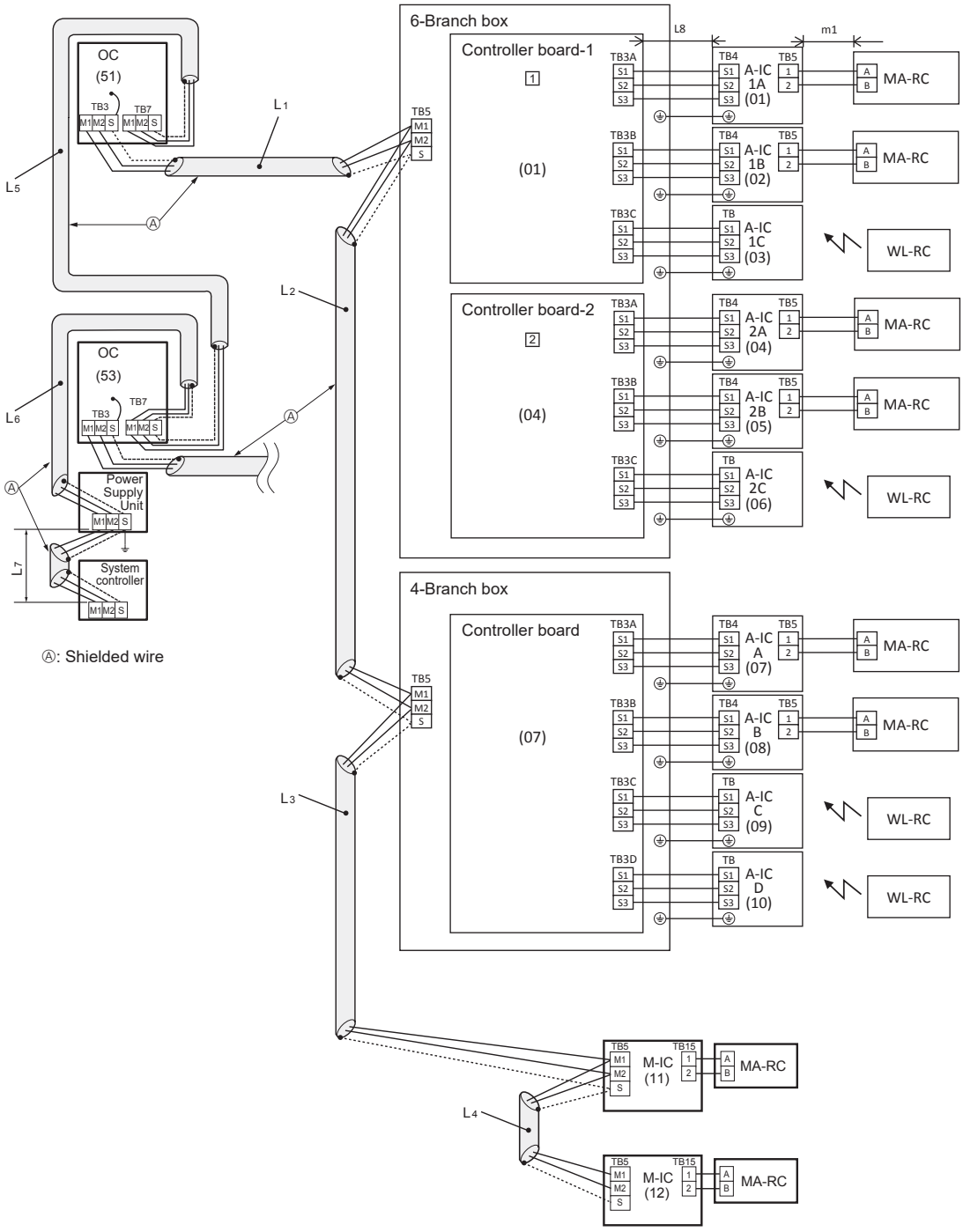
Different refrigerant systems cannot be connected together.

*1. Plural indoor units cannot be operated by a single remote controller.
*2. M-NET remote controller cannot be connected.

6. Electrical work

Example of a system using Branch box, A-Control indoor unit, and CITY MULTI series indoor unit.

■ **Examples of wiring transmission cables**

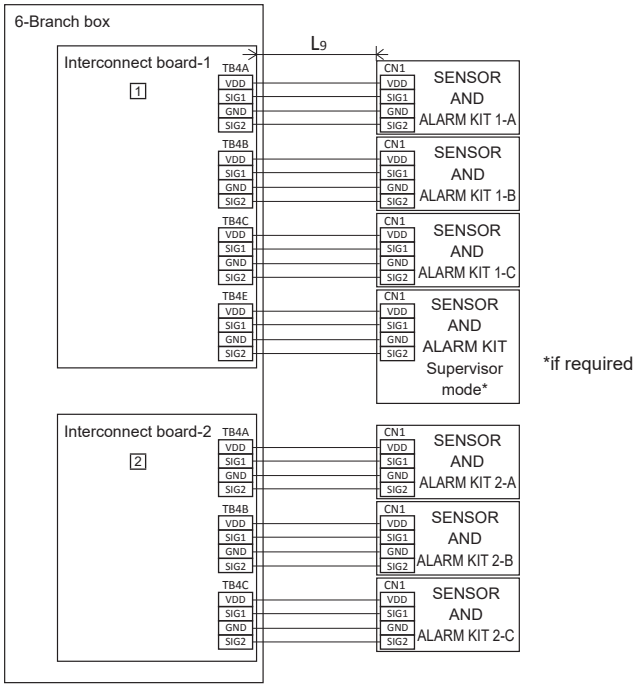


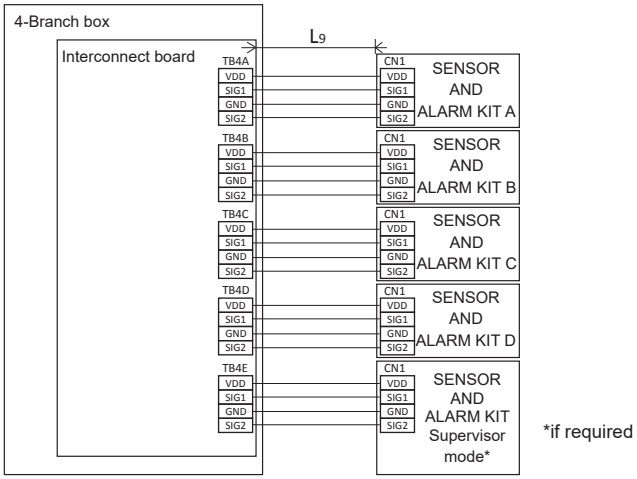
( ) : Address

en

6. Electrical work

■ **Example of SENSOR AND ALARM KIT Wiring**





SENSOR AND ALARM KIT - Branch box connection cable length:
L9 ≦ 40 m (0.5 mm²)
* For details, refer to the Branch box/SENSOR AND ALARM KIT Installation Manual.

en

■ **Wiring Method Address Settings**

1. Always use shielded wire when making connections between the outdoor unit (OC) and the Branch box or CITY MULTI series indoor unit (M-IC), as well for all OC-OC, IC-IC, BC-BC and IC-BC wiring.
2. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block (TB5) of the Branch box or CITY MULTI series indoor unit (M-IC).
3. Connect terminals 1 and 2 on the transmission cable terminal block (TB5/TB15) of the A-control indoor unit (A-IC) or CITY MULTI series indoor unit (M-IC), to the terminal block on the MA remote controller (MA-RC).
4. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
5. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit to the earth.
6. Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC	01 to 50	-
A-IC	01 to 50	According to the set address of connected Branch box, set the A-IC addresses sequentially by SW1, SW11, SW12 on Branch box. (For example, when the Branch box address is set to 01, set the A-IC addresses to 01, 02, 03 and 04.)
Branch box	01 to 50	Use a number within the range 1-50, but it should not make the highest address of connected A-IC exceed 50.
OC	51 to 100	Use the smallest address of all the Branch box plus 50. * The address automatically becomes “100” if it is set as “01–50”.
MA-RC	-	Address setting is not necessary.

7. When the system controller is connected to the system, set SW2-1 on all outdoor units to ON.
   Also, set the power supply switching connectors (CN40, CN41) as follows.

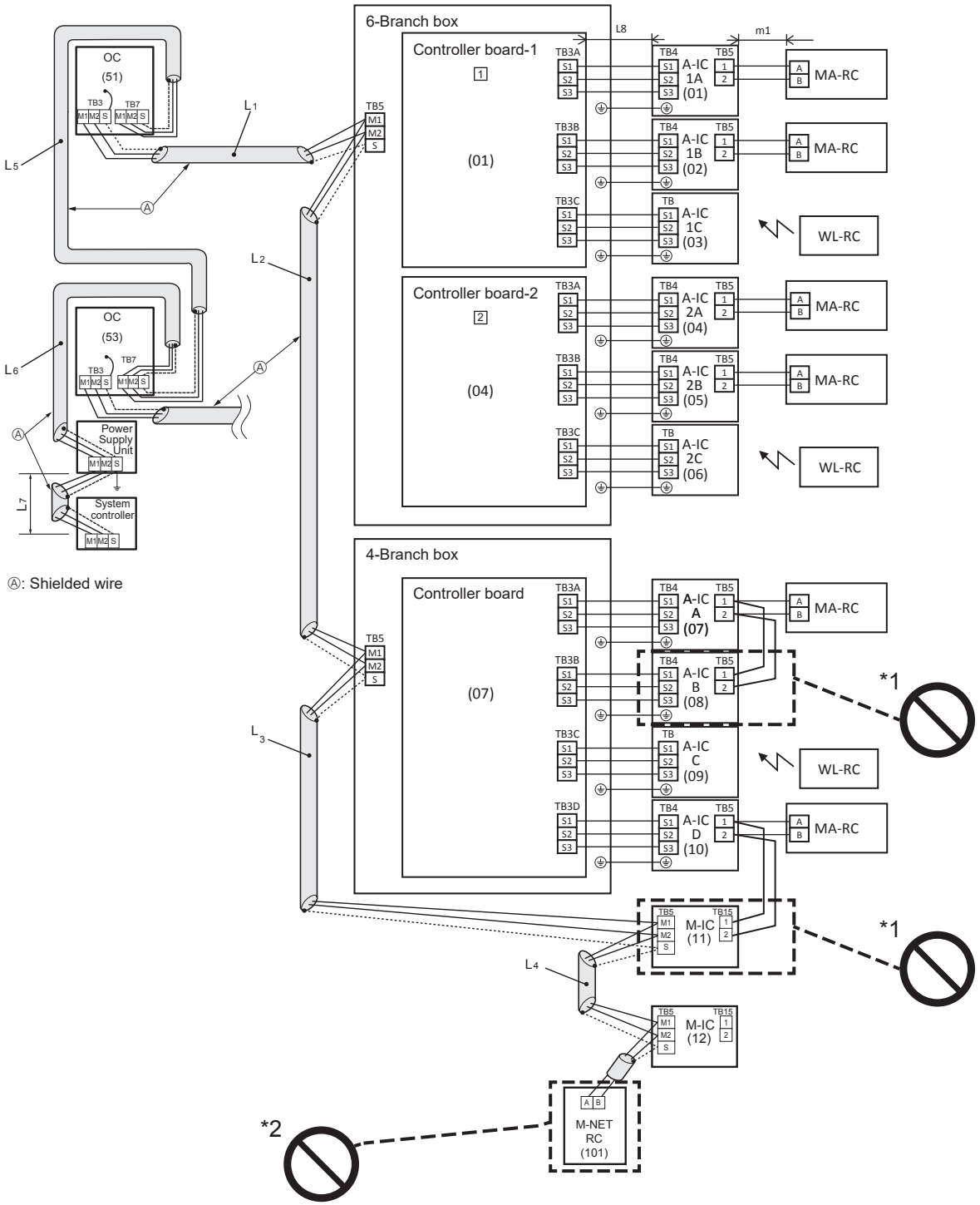
Refrigerant system	Connection with system controller	Transmission line power supply unit	Group operation in different refrigerant systems	Power supply switching connector settings
Single refrigerant	–	–	–	Remains CN41 (default setting)
Multiple refrigerants	No	–	No	Remains CN41 (default setting)
			Yes	For one outdoor unit only, switch the power supply switching connector (CN41) to (CN40). * Short-circuit the S (shield) terminal and the ground terminal (⏚) of the terminal block (TB7) of one outdoor unit switched to CN40.
	Connection with indoor/outdoor transmission line	Not required	Yes/No	
	Connection with central control system transmission line	Required	Yes/No	Remains CN41 (default setting)

6. Electrical work

■ **Permissible Lengths**

1. Maximum line length via outdoor unit (M-NET cable):
   L1+L2+L3+L4+L5+L6+L7 ≦ 500 m (1.25 mm² or more)
2. Indoor/Branch box/outdoor transmission line Maximum length (M-NET cable):
   L1+L2+L3+L4, L5 +L6 and L7 ≦ 200 m (1.25 mm² or more)
3. Indoor/Branch box transmission line Maximum length (A-Control cable):
   L8 ≦ 25 m (1.5 mm²)
4. MA Remote controller cable length:
   m1 ≦ 200 m (0.3 to 1.25 mm²)

■ **Constraint items**



Different refrigerant systems cannot be connected together.

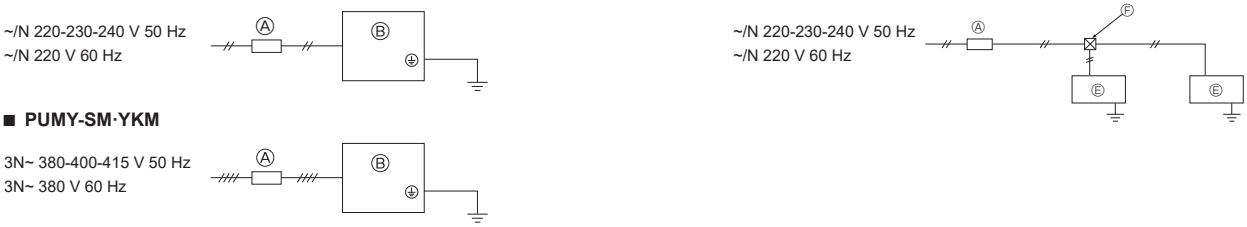
*1. Plural indoor units cannot be operated by a single remote controller.
*2. M-NET remote controller cannot be connected.

en

6.5. Wiring of main power supply and equipment capacity

Schematic Drawing of Wiring: When Not Using a Branch box (Example) (Fig. 6-2)

■ **PUMY-SM·VKM**



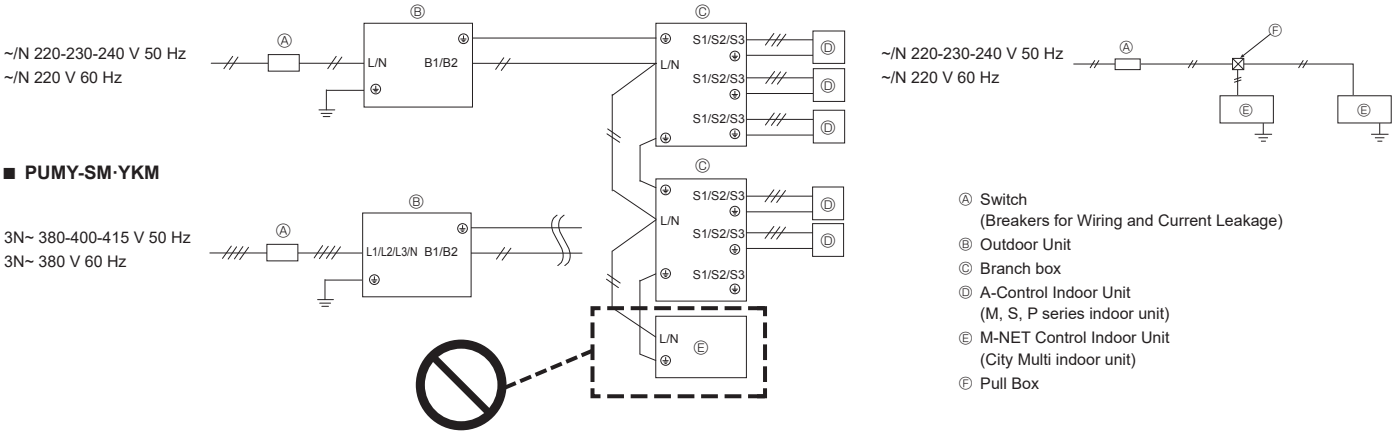
■ **PUMY-SM·YKM**

Fig. 6-2

Schematic Drawing of Wiring: When using a Branch box (Example) (Fig. 6-3)

<When Power Is Supplied from the Outdoor Unit>

■ **PUMY-SM·VKM**



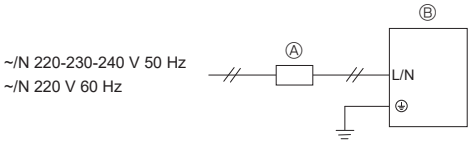
■ **PUMY-SM·YKM**

Ⓐ Switch
(Breakers for Wiring and Current Leakage)
Ⓑ Outdoor Unit
Ⓒ Branch box
Ⓓ A-Control Indoor Unit
(M, S, P series indoor unit)
Ⓔ M-NET Control Indoor Unit
(City Multi indoor unit)
Ⓕ Pull Box

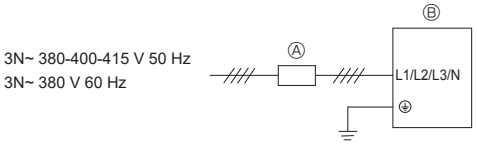
* The M-NET Control Indoor unit cannot receive power supplied from an outdoor unit, so provide it with power separately.

<When Power Is Supplied Separately>

■ **PUMY-SM·VKM**



■ **PUMY-SM·YKM**



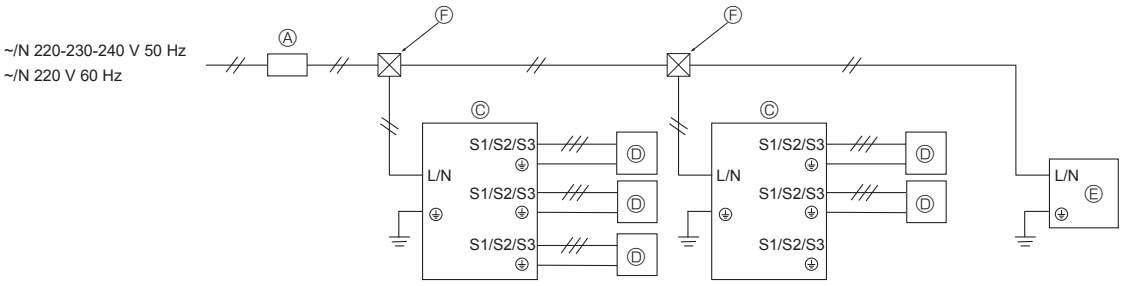


Fig. 6-3

6. Electrical work

Cross-sectional area of Wire for Main Power Supply and On/Off Capacities

<When power is supplied separately>

Model		Power Supply	Minimum Wire Cross-sectional area (mm^2)		Breaker for Wiring *1	Breaker for Current Leakage
			Main Cable	Ground		
Outdoor Unit	SM112-140VKM	~/N 220-230-240 V 50 Hz ~/N 220 V 60 Hz	6.0	6.0	32 A	32 A 30 mA 0.1 sec. or less
	SM112-140YKM	3N~ 380-400-415 V 50 Hz *2 3N~ 380 V 60 Hz	2.5	2.5	16 A	16 A 30 mA 0.1 sec. or less

<When power is supplied from the outdoor unit>

Model		Power Supply	Minimum Wire Cross-sectional area (mm^2)		Breaker for Wiring *1	Breaker for Current Leakage
			Main Cable	Ground		
Outdoor Unit	SM112-140VKM	~/N 220-230-240 V 50 Hz ~/N 220 V 60 Hz	6.0	6.0	40 A	40 A 30 mA 0.1 sec. or less
	SM112-140YKM	3N~ 380-400-415 V 50 Hz *2 3N~ 380 V 60 Hz	4.0	4.0	25 A	25 A 30 mA 0.1 sec. or less

*1 A breaker with at least 3.0 mm contact separation in each poles shall be provided. Use non-fuse breaker (NF) or earth leakage breaker (NV).

*2 In multi-phase appliances, the colour of the neutral conductor of the supply cord, if any, shall be blue.

<Indoor units> When power is supplied separately

Total operating current of the indoor unit	Minimum wire thickness (mm^2)			Ground-fault interrupter *1	Local switch (A)		Breaker for wiring (NFB)
	Main Cable	Branch	Ground		Capacity	Fuse	
F0 = 16 A or less *2	1.5	1.5	1.5	20 A current sensitivity *3	16	16	20
F0 = 25 A or less *2	2.5	2.5	2.5	30 A current sensitivity *3	25	25	30
F0 = 32 A or less *2	4.0	4.0	4.0	40 A current sensitivity *3	32	32	40

Apply to IEC61000-3-3 about max. permissive system impedance.

*1 The Ground-fault interrupter should support inverter circuit.
The Ground-fault interrupter should combine using of local switch or wiring breaker.

*2 Please take the larger of F1 or F2 as the value for F0.

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 12)/C}

Connect to Branch box (PAC-MMK·BC)

Indoor unit		V1	V2
Type 1	PCA-M·KA2	19.8	2.4
	SEZ-M·DA(L)2		
Type 2	PEAD-M·JA(L)2	18.6	3.0
Type 3	PLA-M·EA2	17.1	2.4
	SLZ-M·FA2		
Type 4	MLZ-KP·VF	9.9	
Type 5	MLZ-KY·VG	7.4	
	MSZ-AP·VG(K)		
	MSZ-AY·VGK		
	MSZ-EF·VG-E2/ER2/ET2, MSZ-EF·VGK-E1/ER1/ET1		
	MSZ-LN·VG2		
	MSZ-RW·VG		
Type 6	MSZ-EF·VG-E1/ER1/ET1	6.8	
Type 7	MSZ-BT·VG(K)	6.1	
Type 8	Branch box (PAC-MMK40BC)	5.1	3.0
Type 9	Branch box (PAC-MMK60BC)	10.2	6.0

Connect to City Multi

Indoor unit		V1	V2
Type 10	PCFY-MS·VKM	19.8	2.4
	PKFY-MS·VLM		
	PKFY-MS·VKM		
Type 11	PEFY-M·VMA(L)-A1	18.6	3.0
Type 12	PLFY-M·VEM6	17.1	2.4
	PLFY-MS·VEM		
	PLFY-MS·VFM		

C : Multiple of tripping current at tripping time 0.01s

Please pick up “C” from the tripping characteristic of the breaker.

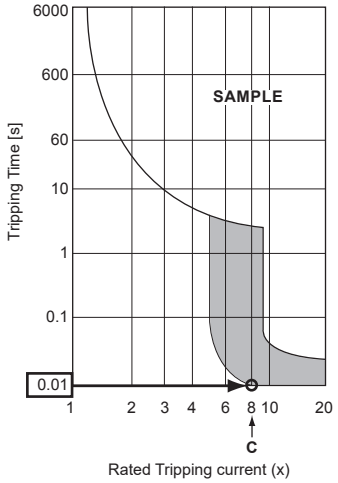
6. Electrical work

<Example of “F2” calculation>
Condition PLFY-M·VEM6-E × 4 + PEFY-M·VMA(L)-A1 × 1, C = 8 (refer to right sample chart)
F2 = 17.1 × 4/8 + 18.6 × 1/8
= 10.875
→ 16 A breaker (Tripping current = 8 × 16 A at 0.01s)
*3 Current sensitivity is calculated using the following formula.
G1 = V2 × (Quantity of Type1) + V2 × (Quantity of Type2) + V2 × (Quantity of Type3) + ··· + V2 × (Quantity of Type12)
+ V3 × (Wire length[km])

G1	Current sensitivity
30 or less	30 mA 0.1 sec. or less
100 or less	100 mA 0.1 sec. or less

Wire thickness	V3
1.5 mm²	48
2.5 mm²	56
4.0 mm²	66

Sample chart

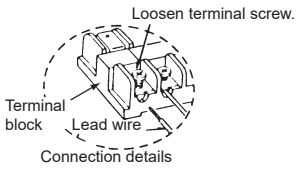


en

1. **Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.**
2. **The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker consideration of voltage drops. Make sure the power-supply voltage does not drop more than 10%.**
3. **Specific wiring requirements should adhere to the wiring regulations of the region.**
4. **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.**
5. **Install an earth longer than other 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.**

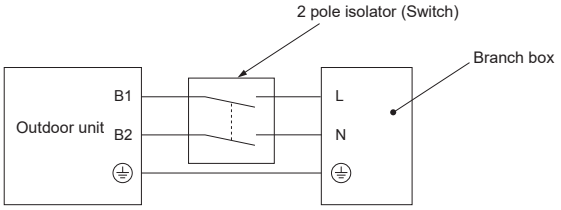
⚠ **Caution:**
- **Be careful not to make mis-wiring.**
- **Firmly tighten the terminal screws to prevent them from loosening.**
- **After tightening, pull the wires lightly to confirm that they not move.**
- **If the connecting wire is incorrectly connected to the terminal block, the unit does not operate normally.**
- **Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.**
- **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.**



IMPORTANT
Make sure that the current leakage breaker is one compatible with higher harmonics.
Always use a current leakage breaker that is compatible with higher harmonics as this unit is equipped with an inverter.
The use of an inadequate breaker can cause the incorrect operation of inverter.

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.

⚠ **Warning:**
- **Please turn off the main power supply when servicing. And do not touch the B1, B2 terminals when the power is energized. If isolator should be used between outdoor unit and Branch box, please use 2 pole type. (Please refer to figure below.)**



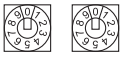
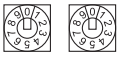
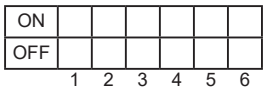
⚠ **Caution:**
After using the isolator, be sure to turn off and on the main power supply to reset the system. Otherwise, the outdoor unit may not be able to detect the Branch box(es) or indoor units.

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.

6. Electrical work

6.6. Address setting

Switch address setting

<table>
<tr><td></td><td>Outdoor</td><td colspan="2">Branch box
* The 6-Branch box model is equipped with two control boards. For detailed settings, refer to the Branch box Installation Manual.</td><td>M, S, P series Indoor</td><td>CITY MULTI series</td></tr>
<tr><td></td><td></td><td>Address</td><td>Connection Setting</td><td></td><td></td></tr>
<tr><td>Switch</td><td> 
tens digit ones digit
SWU2 SWU1</td><td> 
tens digit ones digit
SW12 SW11</td><td> 
SW1</td><td>None</td><td> 
tens digit ones digit
SW12 SW11</td></tr>
<tr><td>Range</td><td>51 - 100</td><td>1 - 50</td><td>–</td><td>–</td><td>1 - 50</td></tr>
<tr><td>Setting</td><td>CITY MULTI series Indoor or Branch box address +50</td><td>• According to the set address (for example, 01), the addresses for the connected indoor units are set sequentially (for example, 02, 03, and 04).
• The 6-Branch box model is equipped with two control boards, so settings are required for each of the control boards.
<table><tr><td>SW1</td><td>1
ON</td><td>2
ON</td><td>3
ON</td><td>4
ON</td><td></td></tr><tr><td>Port</td><td>A</td><td>B</td><td>C</td><td>D</td><td></td></tr><tr><td>Address</td><td>01</td><td></td><td></td><td></td><td>(SW11, 12)</td></tr><tr><td></td><td></td><td>02</td><td>03</td><td>04</td><td>(sequential numbers)</td></tr></table></td><td>Refer to the following table.</td><td>There are no address settings for the indoor units.</td><td>–</td></tr>
</table>

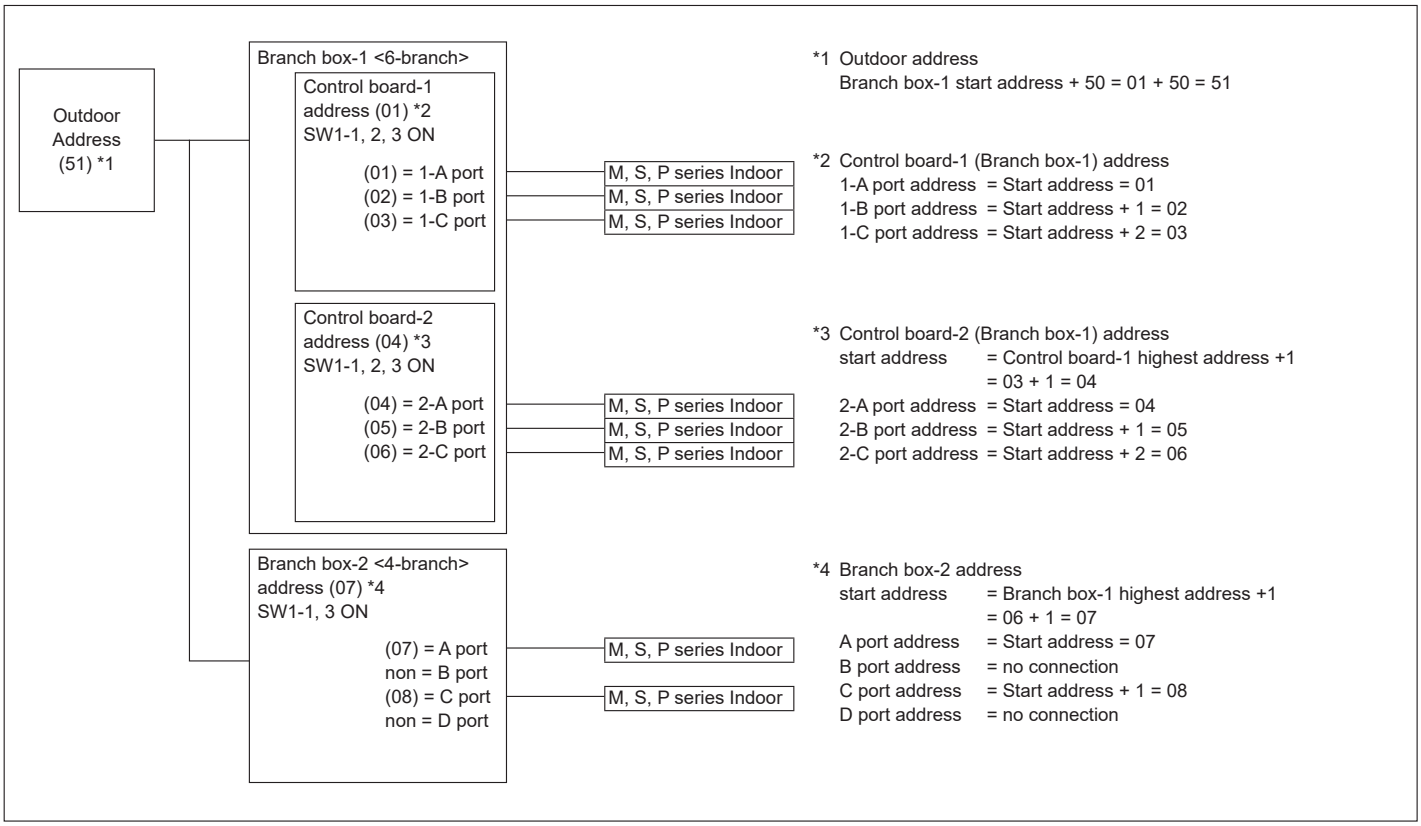
• Specify whether indoor units are connected to each port.

	4-Branch model			6-Branch model					
				Control board-1			Control board-2		
SW1	Port	OFF	ON	Port	OFF	ON	Port	OFF	ON
1	A	Not connected	Connected	1-A	Not connected	Connected	2-A	Not connected	Connected
2	B	Not connected	Connected	1-B	Not connected	Connected	2-B	Not connected	Connected
3	C	Not connected	Connected	1-C	Not connected	Connected	2-C	Not connected	Connected
4	D	Not connected	Connected	Not used			Not used		
5	Not used			Not used			Not used		
6	Supervisor alarm	Not connected	Connected	Supervisor alarm	Not connected	Connected	Not used		

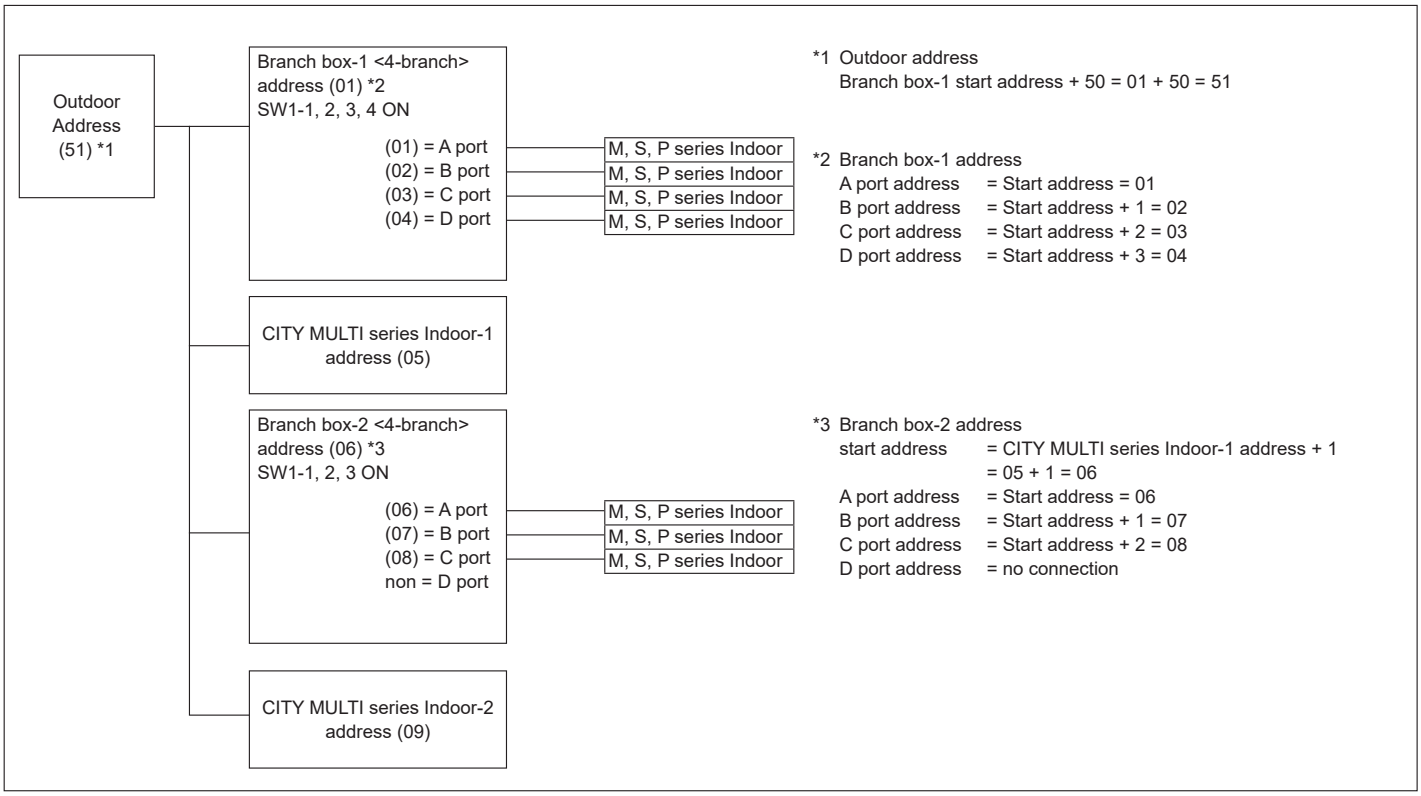
Note: 1. Branch box address
When setting the address, use a number within the range 1–50.

en

Ex1. Outdoor + Branch-1 <6-Branch> (M, S, P series Indoor 1-A, 1-B, 1-C, 2-A, 2-B, 2-C) + Branch-2 <4-Branch> (M, S, P series Indoor A, C)



Ex2. Outdoor + Branch-1 <4-Branch> (M, S, P series Indoor A, B, C, D) + Branch-2 <4-Branch> (M, S, P series Indoor A, B, C) + CITY MULTI series Indoor-1 + CITY MULTI series Indoor-2



7. Test run

7.1. Before test run

► **After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and no disconnection of one phase in the supply.**

► **Use a 500-volt M-ohm tester 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 control wiring (low voltage circuit) terminals.**

⚠ **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 accumulating 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. If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due the accumulation of refrigerant in the compressor.
3. After connecting the wires to the compressor, the compressor will start to warm up after power is supplied. After supplying power for the times indicated below, measure the insulation resistance again.
   - The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for 12 hours.
     (The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.)
   - To operate the compressor with refrigerant accumulated in the compressor, the compressor must be warmed up at least 12 hours to prevent breakdown.
4. 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.**
- **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. Keep the power switch turned on during the operational season.

► **The followings must be checked as well.**

- The outdoor unit is not faulty. LED on the control board of the outdoor unit flash when the outdoor unit is faulty.
- Both the gas and liquid stop valves are completely open.

en

7.2. Test run

7.2.1. Using remote controller

Refer to the indoor unit installation manual.

- 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, if any, 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 turn on the power supply or in case of low outside air temperature.
- 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 operates so the compressor will not operate for 3 minutes to protect the air conditioner.

7.2.2. Using SW3 in outdoor unit

Note:

In case of the test run from outdoor unit, all indoor units operate. Therefore, you can not 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 with reference to "7.2.1. Using remote controller."

■ **Test run (from the outdoor unit)**

① Set SW3-2 to select the operation mode.

SW3-2	ON	Heating operation
	OFF	Cooling operation

② After setting SW3-2, set SW3-1 from OFF to ON. The test run starts.
   * Before setting SW3-1, make sure that the circuit breaker is turned on.
   * Even if the setting for SW3-2 changes during the test run, the operation mode will not change.
   * Set SW3-1 to OFF to finish the test run.

- 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.

7.3. Refrigerant collecting (Pump down)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the 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 3 to 4 minutes after the power (circuit breaker) is turned ON.
⑤ Perform the test run for cooling operation (SW3-1: ON and SW3-2: OFF). The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and test run for cooling operation begins. Immediately after performing the test run for cooling operation, set the outdoor service switch SW2-4 (pump down switch) from OFF to ON.
   * Do not continue to operate for a long time with the switch SW2-4 set to ON. Make sure to switch it to OFF after pump down is completed.
   * Only set the SW3-1 to ON if the unit is stopped. However, even if the unit is stopped and the SW3-1 is set to ON less than 3 minutes after the compressor stops, refrigerant collecting operation cannot be performed. Wait until the compressor has been stopped for 3 minutes and then set the SW3-1 to ON again.
⑥ Fully close the gas stop valve when the pressure reading on the gauge drops 0.05 - 0.00 MPa (approximately 0.5 - 0.0 kgf/cm^2)
⑦ Stop the air conditioner operation (SW3-1: OFF). Set the outdoor service switch SW2-4 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 0.05 MPa (0.5 kgf/cm^2). 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.

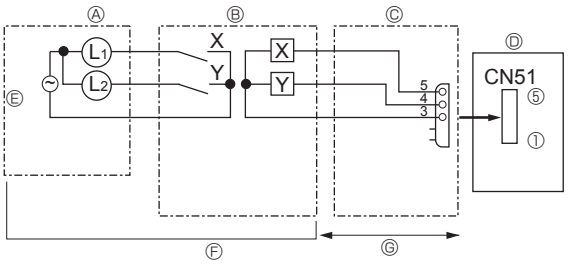
⚠ **Warning:**

- **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.**

8. Special functions

8.1. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR

• State (CN51)

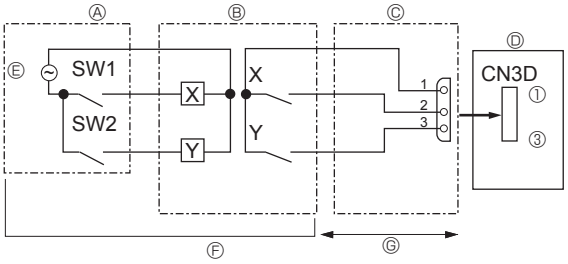


Ⓐ Distant control board
Ⓑ Relay circuit
Ⓒ External output adapter (PAC-SA88HA-E)
Ⓓ Outdoor unit control board

L1: Error display lamp
L2: Compressor operation lamp
X, Y: Relay (coil rating: ≦ 0.9 W, 12 VDC)

Ⓔ Lamp power supply
Ⓕ Procure locally
Ⓖ Max. 10 m

• Silent Mode / Demand Control (CN3D)



Ⓐ Remote control panel
Ⓑ Relay circuit
Ⓒ External input adapter (PAC-SC36NA-E)
Ⓓ Outdoor unit control board

SW1: Switch
SW2: Switch
X, Y: Relay (contact rating: ≧ 0.1 A, 15 VDC / min. applicable load: ≦ 1 mA)

Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m

The silent mode and the demand control are selected by switching the DIP switch 9-2 on outdoor controller board.
It is possible to set it to the following power consumption (compared with ratings) by setting SW1, 2.

	Outdoor controller board DIP SW9-2	SW1	SW2	Function
Silent mode	OFF	OFF	OFF	Normal
		ON	OFF	Silent mode *
		OFF	ON	Super silent mode1 *
		ON	ON	Super silent mode2 *
Demand control	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Stop)

* Cooling only

• External static pressure mode (30 Pa)

The external static pressure mode (30 Pa) is enabled by switching the DIP switch SW6-5 on the outdoor controller board to ON.
However, the silent mode cannot be used when this mode is enabled.

Outdoor controller board DIP SW6-5	ON	OFF
External static pressure mode (30 Pa)	Enabled	Disabled

9. Preventive maintenance for the unit

The maintenance cycle does not indicate the guarantee period.

The list below is applicable under the following conditions:
- The unit is used normally: it does not start and stop frequently. (The number of start/stop is 6 times or less per hour in normal use though it depends on the model.)
- The operating time is assumed to be 10 hours a day and 2,500 hours a year. (It can be longer for the unit which operates during the night.)

Additionally, the “maintenance cycle” and “replacement cycle” need to be reviewed to be shortened when the following conditions are satisfied:
- The unit is used under high temperature or high humidity, or in the place where the temperature or humidity changes severely.
- The unit is used in the place where the power (voltage, frequency, or waveform) fluctuates a lot. (The unit cannot be used if the power is out of the allowable range.)
- The unit is used in the place where a lot of vibration or impacts are applied.
- The unit is used in a bad environment such as in the dusty area, the high-salt area, or the area where noxious gas (sulfur dioxide or hydrogen sulfide) or oil-mist exists.
- The unit starts and stops frequently or the operating time is long (such as under 24-hour air conditioning).

List of “inspection cycle” and “maintenance cycle”

Part name	Inspection cycle	Maintenance cycle (Replacement or repairing)
Compressor	1 year	20,000 hours
Motor		20,000 hours
Electronic boards		25,000 hours
Heat exchanger		5 years
Expansion valve		20,000 hours
Valve (solenoid valve, 4-way valve)		20,000 hours
Sensor		5 years
Drain pan		8 years

EU DECLARATION OF CONFORMITY
EU-KONFORMITÄTSERKLÄRUNG
DÉCLARATION DE CONFORMITÉ UE
EU-CONFORMITEITSVERKLARING
DECLARACIÓN DE CONFORMIDAD UE
DICHIARAZIONE DI CONFORMITÀ UE
ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ ΕΕ
DECLARAÇÃO DE CONFORMIDADE UE
EU-OVERENSSTEMMELSESERKLÆRING
EU-FÖRSÄKRAN OM ÖVERENSSTÄMMELSE
AB UYGUNLUK BEYANI
ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ НОРМАМ ЕС
ДЕКЛАРАЦІЯ ВІДПОВІДНОСТІ ВИМОГАМ ЄС
ЕС ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ
DEKLARACJA ZGODNOŚCI UE
EU-ERKLÆRING OM SAMSVAR
EU-VAATIMUSTENMUKAISUUSVAKUUTUS
EU PROHLÁŠENÍ O SHODĚ
EÚ VYHLÁSENIE O ZHODE
EU MEGFELELŐSÉGI NYILATKOZAT
IZJAVA EU O SKLADNOSTI
DECLARAŢIE DE CONFORMITATE UE
EL-I VASTAVUSDEKLARATSIOON
ES ATBILSTĪBAS DEKLARĀCIJA
ES ATITIKTIES DEKLARACIJA
EU IZJAVA O SUKLADNOSTI
EU IZJAVA O USAGLAŠENOSTI

MITSUBISHI ELECTRIC CONSUMER PRODUCTS (THAILAND) CO., LTD.
AMATA CITY CHONBURI 700/406 MOO 7, TAMBON DON HUA ROH, AMPHUR MUANG, CHONBURI 20000, THAILAND

hereby declares under its sole responsibility that the air conditioner(s) and heat pump(s) for use in residential, commercial, and light-industrial environments described below:
erklärt hiermit auf seine alleinige Verantwortung, dass die Klimaanlage(n) und Wärmepumpe(n) für das häusliche, kommerzielle und leichtindustrielle Umfeld wie unten beschrieben:
déclare par la présente et sous sa propre responsabilité que le(s) climatiseur(s) et la/les pompe(s) à chaleur destinés à un usage dans des environnements résidentiels, commerciaux et d'industrie légère décrits ci-dessous :
verklaart hierbij onder eigen verantwoordelijkheid dat de voor huishoudelijke, handels- en lichtindustriële omgevingen bestemde airconditioner(s) en warmtepomp(en) zoals onderstaand beschreven:
por la presente declara, bajo su exclusiva responsabilidad, que el(los) acondicionador(es) de aire y la(s) bomba(s) de calor previsto(s) para su uso en entornos residenciales, comerciales y de industria ligera que se describen a continuación:
conferma con la presente, sotto la sua esclusiva responsabilità, che i condizionatori d'aria e le pompe di calore destinati all'utilizzo in ambienti residenziali, commerciali e semi-industriali e descritti di seguito:
με το παρόν δηλώνει με αποκλειστική ευθύνη ότι το ή τα κλιματιστικά και η ή οι αντλίες θερμότητας για χρήση σε οικιακά, εμπορικά και ελαφρά βιομηχανικά περιβάλλοντα που περιγράφονται παρακάτω:
declara pela presente, e sob sua exclusiva responsabilidade, que o(s) aparelho(s) de ar condicionado e a(s) bomba(s) de calor destinados a utilização em ambientes residenciais, comerciais e de indústria ligeira descritos em seguida:
erklærer hermed under eneansvar, at det/de herunder beskrevne airconditionanlæg og varmepumpe(r) til brug i beboelses- og erhvervsmiljøer samt i miljøer med let industri:
intygar härmed att luftkonditioneringarna och värmepumparna som beskrivs nedan för användning i bostäder, kommersiella miljöer och lätta industriella miljöer:
ev, ticaret ve hafif sanayi ortamlarında kullanıma yönelik aşağıda açıklanan klima ve ısıtma pompalarıyla ilgili aşağıdaki hususları yalnızca kendi sorumluluğunda olmak üzere beyan eder:
настоящим заявляет под свою исключительную ответственность, что кондиционер (-ы) и тепловой (-ые) насос (-ы) для использования в описанных ниже жилых, коммерческих и небольших складских и промышленных помещениях:
цим заявляє, беручи на себе повну відповідальність за це, що кондиціонер (-и) й тепловий (-і) насос (-и), описані нижче й призначені для використання в житлових приміщеннях, торговельних залах і на підприємствах легкої промисловості:
декларира с настоящата на своя собствена отговорност, че климатикът(те) и термопомпата(ите), посочени по-долу и предназначени за употреба в жилищни, търговски и лекопромишлени среди:
niniejszym oświadcza na swoją wyłączną odpowiedzialność, że klimatyzatory i pompy ciepła do zastosowań w środowisku mieszkalnym, handlowym i lekko uprzemysłowionym opisane poniżej:
erklærer et fullstendig ansvar for undernevnte klimaanlegg og varmepumper ved bruk i boliger, samt kommersielle og lettindustrielle miljøer:
vakuuttaa täten yksinomaisella vastuullaan, että jäljempänä kuvatut asuinrakennuksiin, pienteollisuuskäyttöön ja kaupalliseen käyttöön tarkoitetut ilmastointilaitteet ja lämpöpumput:
týmto na vlastní odpovědnost prohlašuje, že níže popsané klimatizační jednotky a tepelná čerpadla pro použití v obytných prostředích, komerčních prostředích a prostředích lehkého průmyslu:
týmto na svoju výlučnú zodpovednosť vyhlasuje, že nasledovné klimatizačné jednotky a tepelné čerpadlá určené na používanie v obytných a obchodných priestoroch a v prostredí ľahkého priemyslu:
alulírott kizárólagos felelősségére nyilatkozik, hogy az alábbi lakossági, kereskedelmi és kisipari környezetben való használatra szánt klímaberendezés(ek) és hőszivattyú(k):
na lastno odgovornost izjavlja, da so spodaj opisane klimatske naprave in toplotne črpalke, namenjene za uporabo v stanovanjskih, poslovnih in lahkoindustrijskih okoljih:
declară prin prezenta, pe proprie răspundere, faptul că aparatele de climatizare şi pompele de căldură descrise mai jos şi destinate utilizării în medii rezidenţiale, comerciale şi din industria uşoară:
kinnitab oma ainuvastutusel, et allpool toodud elu-, äri- ja kergtööstuskeskkondades kasutamiseks mõeldud kliimaseadmed ja soojuspumbad:
ar šo, vienpersoniski uzņemoties atbildību, paziņo, ka tālāk aprakstītais(-īties) gaisa kondicionētājs(-i) un siltumsūknis(-ņi) ir paredzēti lietošanai dzīvojamajās, komercdarbības un vieglās rūpniecības telpās, kas aprakstītas tālāk:
šiuo vien tik savo atsakomybe pareiškia, kad toliau apibūdintas (-i) oro kondicionierius (-iai) ir šilumos siurblys (-iai), skirtas (-i) naudoti toliau apibūdintose gyvenamosiose, komercinėse ir lengvosios pramonės aplinkose:
ovime izjavljuje pod isključivom odgovornošću da je/su klimatizacijski uređaj(i) i toplinska dizalica(e) opisan(i) u nastavku namijenjen(i) za upotrebu u stambenim i poslovnim okruženjima te okruženjima lake industrije:
ovim izjavljuje na svoju isključivu odgovornost da su klima-uređaji i toplotne pumpe za upotrebu u stambenim, komercijalnim okruženjima i okruženjima lake industrije opisani u nastavku:

MITSUBISHI ELECTRIC, PUMY-SM112VKM, PUMY-SM125VKM, PUMY-SM140VKM
PUMY-SM112VKM-BS, PUMY-SM125VKM-BS, PUMY-SM140VKM-BS

is/are in conformity with provisions of the following Union harmonisation legislation.
die Bestimmungen der folgenden Harmonisierungsrechtsvorschriften der Union erfüllt/erfüllen.
est/sont conforme(s) aux dispositions de la législation d'harmonisation de l'Union suivante.
voldoet/voldoen aan bepalingen van de volgende harmonisatiewetgeving van de Unie.
cumple(n) con las disposiciones de la siguiente legislación de armonización de la Unión.
sono in conformità con le disposizioni della seguente normativa dell'Unione sull'armonizzazione.
συμμορφώνονται με τις διατάξεις της ακόλουθης νομοθεσίας εναρμόνισης της Ένωσης.
está/estão em conformidade com as disposições da seguinte legislação de harmonização da União.
er i overensstemmelse med bestemmelserne i følgende harmoniserede EU-lovgivning.
uppfyller villkoren i följande harmoniserade föreskrifter inom unionen.
aşağıdaki Avrupa Birliği uyumlaştırma mevzuatının hükümlerine uygundur.
соответствуют положениям следующих законодательных актов Союза о гармонизации.
відповідають положенням вказаного далі законодавства Союзу щодо гармонізації.
е/са в съответствие с разпоредбите на следното законодателство на Съюза за хармонизация.
są zgodne z przepisami następującego unijnego prawodawstwa harmonizacyjnego.
er i samsvar med forskriftene til følgende EU-lovgivning om harmonisering.
ovat unionin seuraavan yhdenmukaistamislainsäädännön säännösten mukaisia.
jsou v souladu s ustanoveními následujících harmonizačních právních předpisů Unie.
spĺňajú ustanovenia nasledujúcich harmonizovaných noriem EÚ.
megfelel(nek) az Unió alábbi harmonizációs jogszabályi előírásainak.
v skladu z določbami naslednje usklajevalne zakonodaje Unije.
sunt în conformitate cu dispoziţiile următoarei legislaţii de armonizare a Uniunii.
vastavad järgmiste Euroopa Liidu ühtlustatud õigusaktide sätetele.
atbilst šādiem ES harmonizētajiem tiesību aktu noteikumiem.
taip pat atitinka kitų toliau išvardytų suderintųjų Sąjungos direktyvų nuostatas.
sukladan(i) odredbama sljedećeg zakonodavstva Unije za sukladnost.
u skladu sa odredbama sledećeg usklađivanja zakonodavstva Unije.

2014/35/EU: Low Voltage
2006/42/EC: Machinery
2014/30/EU: Electromagnetic Compatibility
2011/65/EU, (EU) 2015/863 and (EU) 2017/2102: RoHS Directive
2014/68/EU: Pressure Equipment Directive

Issued: **1 Aug. 2023** **Yukihiro KITAMURA**
THAILAND: **Manager, Quality Assurance Department**

EU DECLARATION OF CONFORMITY
EU-KONFORMITÄTSERKLÄRUNG
DÉCLARATION DE CONFORMITÉ UE
EU-CONFORMITEITSVERKLARING
DECLARACIÓN DE CONFORMIDAD UE
DICHIARAZIONE DI CONFORMITÀ UE
ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ ΕΕ
DECLARAÇÃO DE CONFORMIDADE UE
EU-OVERENSSTEMMELSESERKLÆRING
EU-FÖRSÄKRAN OM ÖVERENSSTÄMMELSE
AB UYGUNLUK BEYANI
ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ НОРМАМ ЕС
ДЕКЛАРАЦІЯ ВІДПОВІДНОСТІ ВИМОҐАМ ЄС
ЕС ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ
DEKLARACJA ZGODNOŚCI UE
EU-ERKLÆRING OM SAMSVAR
EU-VAATIMUSTENMUKAISUUSVAKUUTUS
EU PROHLÁŠENÍ O SHODĚ
EÚ VYHLÁSENIE O ZHODE
EU MEGFELELŐSÉGI NYILATKOZAT
IZJAVA EU O SKLADNOSTI
DECLARAŢIE DE CONFORMITATE UE
EL-I VASTAVUSDEKLARATSIOON
ES ATBILSTĪBAS DEKLARĀCIJA
ES ATITIKTIES DEKLARACIJA
EU IZJAVA O SUKLADNOSTI
EU IZJAVA O USAGLAŠENOSTI

MITSUBISHI ELECTRIC CONSUMER PRODUCTS (THAILAND) CO., LTD.
AMATA CITY CHONBURI 700/406 MOO 7, TAMBON DON HUA ROH, AMPHUR MUANG, CHONBURI 20000, THAILAND

hereby declares under its sole responsibility that the air conditioner(s) and heat pump(s) for use in residential, commercial, and light-industrial environments described below:
erklärt hiermit auf seine alleinige Verantwortung, dass die Klimaanlage(n) und Wärmepumpe(n) für das häusliche, kommerzielle und leichtindustrielle Umfeld wie unten beschrieben:
déclare par la présente et sous sa propre responsabilité que le(s) climatiseur(s) et la/les pompe(s) à chaleur destinés à un usage dans des environnements résidentiels, commerciaux et d'industrie légère décrits ci-dessous :
verklaart hierbij onder eigen verantwoordelijkheid dat de voor huishoudelijke, handels- en lichtindustriële omgevingen bestemde airconditioner(s) en warmtepomp(en) zoals onderstaand beschreven:
por la presente declara, bajo su exclusiva responsabilidad, que el(los) acondicionador(es) de aire y la(s) bomba(s) de calor previsto(s) para su uso en entornos residenciales, comerciales y de industria ligera que se describen a continuación:
conferma con la presente, sotto la sua esclusiva responsabilità, che i condizionatori d'aria e le pompe di calore destinati all'utilizzo in ambienti residenziali, commerciali e semi-industriali e descritti di seguito:
με το παρόν δηλώνει με αποκλειστική ευθύνη ότι το ή τα κλιματιστικά και η ή οι αντλίες θερμότητας για χρήση σε οικιακά, εμπορικά και ελαφρά βιομηχανικά περιβάλλοντα που περιγράφονται παρακάτω:
declara pela presente, e sob sua exclusiva responsabilidade, que o(s) aparelho(s) de ar condicionado e a(s) bomba(s) de calor destinados a utilização em ambientes residenciais, comerciais e de indústria ligeira descritos em seguida:
erklærer hermed under eneansvar, at det/de herunder beskrevne airconditionanlæg og varmepumpe(r) til brug i beboelses- og erhvervsmiljøer samt i miljøer med let industri:
intygar härmed att luftkonditioneringarna och värmepumparna som beskrivs nedan för användning i bostäder, kommersiella miljöer och lätta industriella miljöer:
ev, ticaret ve hafif sanayi ortamlarında kullanıma yönelik aşağıda açıklanan klima ve ısıtma pompalarıyla ilgili aşağıdaki hususları yalnızca kendi sorumluluğunda olmak üzere beyan eder:
настоящим заявляет под свою исключительную ответственность, что кондиционер (-ы) и тепловой (-ые) насос (-ы) для использования в описанных ниже жилых, коммерческих и небольших складских и промышленных помещениях:
цим заявляє, беручи на себе повну відповідальність за це, що кондиціонер (-и) й тепловий (-і) насос (-и), описані нижче й призначені для використання в житлових приміщеннях, торговельних залах і на підприємствах легкої промисловості:
декларира с настоящата на своя собствена отговорност, че климатикът(те) и термопомпата(ите), посочени по-долу и предназначени за употреба в жилищни, търговски и лекопромишлени среди:
niniejszym oświadcza na swoją wyłączną odpowiedzialność, że klimatyzatory i pompy ciepła do zastosowań w środowisku mieszkalnym, handlowym i lekko uprzemysłowionym opisane poniżej:
erklærer et fullstendig ansvar for undernevnte klimaanlegg og varmepumper ved bruk i boliger, samt kommersielle og lettindustrielle miljøer:
vakuuttaa täten yksinomaisella vastuullaan, että jäljempänä kuvatut asuinrakennuksiin, pienteollisuuskäyttöön ja kaupalliseen käyttöön tarkoitetut ilmastointilaitteet ja lämpöpumput:
tímto na vlastní odpovědnost prohlašuje, že níže popsané klimatizační jednotky a tepelná čerpadla pro použití v obytných prostředích, komerčních prostředích a prostředích lehkého průmyslu:
týmto na svoju výlučnú zodpovednosť vyhlasuje, že nasledovné klimatizačné jednotky a tepelné čerpadlá určené na používanie v obytných a obchodných priestoroch a v prostredí ľahkého priemyslu:
alulírott kizárólagos felelősségére nyilatkozik, hogy az alábbi lakossági, kereskedelmi és kisipari környezetben való használatra szánt klímaberendezés(ek) és hőszivattyú(k):
na lastno odgovornost izjavlja, da so spodaj opisane klimatske naprave in toplotne črpalke, namenjene za uporabo v stanovanjskih, poslovnih in lahkoindustrijskih okoljih:
declară prin prezenta, pe proprie răspundere, faptul că aparatele de climatizare şi pompele de căldură descrise mai jos şi destinate utilizării în medii rezidenţiale, comerciale şi din industria uşoară:
kinnitab oma ainuvastutusel, et allpool toodud elu-, äri- ja kergtööstuskeskkondades kasutamiseks mõeldud kliimaseadmed ja soojuspumbad:
ar šo, vienpersoniski uzņemoties atbildību, paziņo, ka tālāk aprakstītais(-ītie) gaisa kondicionētājs(-i) un siltumsūknis(-ņi) ir paredzēti lietošanai dzīvojamajās, komercdarbības un vieglās rūpniecības telpās, kas aprakstītas tālāk:
šiuo vien tik savo atsakomybe pareiškia, kad toliau apibūdintas (-i) oro kondicionierius (-iai) ir šilumos siurblys (-iai), skirtas (-i) naudoti toliau apibūdintose gyvenamosiose, komercinėse ir lengvosios pramonės aplinkose:
ovime izjavljuje pod isključivom odgovornošću da je/su klimatizacijski uređaj(i) i toplinska dizalica(e) opisan(i) u nastavku namijenjen(i) za upotrebu u stambenim i poslovnim okruženjima te okruženjima lake industrije:
ovim izjavljuje na svoju isključivu odgovornost da su klima-uređaji i toplotne pumpe za upotrebu u stambenim, komercijalnim okruženjima i okruženjima lake industrije opisani u nastavku:

MITSUBISHI ELECTRIC, PUMY-SM112YKM, PUMY-SM125YKM, PUMY-SM140YKM
PUMY-SM112YKM-BS, PUMY-SM125YKM-BS, PUMY-SM140YKM-BS

is/are in conformity with provisions of the following Union harmonisation legislation.
die Bestimmungen der folgenden Harmonisierungsrechtsvorschriften der Union erfüllt/erfüllen.
est/sont conforme(s) aux dispositions de la législation d'harmonisation de l'Union suivante.
voldoet/voldoen aan bepalingen van de volgende harmonisatiewetgeving van de Unie.
cumple(n) con las disposiciones de la siguiente legislación de armonización de la Unión.
sono in conformità con le disposizioni della seguente normativa dell'Unione sull'armonizzazione.
συμμορφώνονται με τις διατάξεις της ακόλουθης νομοθεσίας εναρμόνισης της Ένωσης.
está/estão em conformidade com as disposições da seguinte legislação de harmonização da União.
er i overensstemmelse med bestemmelserne i følgende harmoniserede EU-lovgivning.
uppfyller villkoren i följande harmoniserade föreskrifter inom unionen.
aşağıdaki Avrupa Birliği uyumlaştırma mevzuatının hükümlerine uygundur.
соответствуют положениям следующих законодательных актов Союза о гармонизации.
відповідають положенням вказаного далі законодавства Союзу щодо гармонізації.
е/са в съответствие с разпоредбите на следното законодателство на Съюза за хармонизация.
są zgodne z przepisami następującego unijnego prawodawstwa harmonizacyjnego.
er i samsvar med forskriftene til følgende EU-lovgivning om harmonisering.
ovat unionin seuraavan yhdenmukaistamislainsäädännön säännösten mukaisia.
jsou v souladu s ustanoveními následujících harmonizačních právních předpisů Unie.
spĺňajú ustanovenia nasledujúcich harmonizovaných noriem EÚ.
megfelel(nek) az Unió alábbi harmonizációs jogszabályi előírásainak.
v skladu z določbami naslednje usklajevalne zakonodaje Unije.
sunt în conformitate cu dispoziţiile următoarei legislaţii de armonizare a Uniunii.
vastavad järgmiste Euroopa Liidu ühtlustatud õigusaktide sätetele.
atbilst šādiem ES harmonizētajiem tiesību aktu noteikumiem.
taip pat atitinka kitų toliau išvardytų suderintųjų Sąjungos direktyvų nuostatas.
sukladan(i) odredbama sljedećeg zakonodavstva Unije za sukladnost.
u skladu sa odredbama sledećeg usklađivanja zakonodavstva Unije.

2014/35/EU: Low Voltage
2006/42/EC: Machinery
2014/30/EU: Electromagnetic Compatibility
2011/65/EU, (EU) 2015/863 and (EU) 2017/2102: RoHS Directive
2014/68/EU: Pressure Equipment Directive

Issued: **1 Aug. 2023** **Yukihiro KITAMURA**
THAILAND: **Manager, Quality Assurance Department**

UK DECLARATION OF CONFORMITY

MITSUBISHI ELECTRIC CONSUMER PRODUCTS (THAILAND) CO., LTD.
AMATA CITY CHONBURI 700/406 MOO 7, TAMBON DON HUA ROH, AMPHUR MUANG, CHONBURI 20000, THAILAND

hereby declares under its sole responsibility that the air conditioner(s) and heat pump(s) for use in residential, commercial, and light-industrial environments described below:

MITSUBISHI ELECTRIC, PUMY-SM112VKM, PUMY-SM125VKM, PUMY-SM140VKM
PUMY-SM112VKM-BS, PUMY-SM125VKM-BS, PUMY-SM140VKM-BS

is/are in conformity with provisions of the following UK legislation

The Electrical Equipment (Safety) Regulations 2016
The Supply of Machinery (Safety) Regulations 2008
The Electromagnetic Compatibility Regulations 2016
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
The Pressure Equipment (Safety) Regulations 2016

Issued:	**1 Aug. 2023**	**Yukihiro KITAMURA**
THAILAND:		**Manager, Quality Assurance Department**

UK DECLARATION OF CONFORMITY

MITSUBISHI ELECTRIC CONSUMER PRODUCTS (THAILAND) CO., LTD.
AMATA CITY CHONBURI 700/406 MOO 7, TAMBON DON HUA ROH, AMPHUR MUANG, CHONBURI 20000, THAILAND

hereby declares under its sole responsibility that the air conditioner(s) and heat pump(s) for use in residential, commercial, and light-industrial environments described below:

MITSUBISHI ELECTRIC, PUMY-SM112YKM, PUMY-SM125YKM, PUMY-SM140YKM
PUMY-SM112YKM-BS, PUMY-SM125YKM-BS, PUMY-SM140YKM-BS

is/are in conformity with provisions of the following UK legislation

The Electrical Equipment (Safety) Regulations 2016
The Supply of Machinery (Safety) Regulations 2008
The Electromagnetic Compatibility Regulations 2016
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
The Pressure Equipment (Safety) Regulations 2016

Issued:	**1 Aug. 2023**	**Yukihiro KITAMURA**
THAILAND:		**Manager, Quality Assurance Department**

<ENGLISH>
English is original. The other languages versions are translation of the original.

⚠ CAUTION

- Refrigerant leakage may cause suffocation. Provide ventilation in accordance with EN378-1.
- Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Never put batteries in your mouth for any reason to avoid accidental ingestion.
- Battery ingestion may cause choking and/or poisoning.
- Install the unit on a rigid structure to prevent excessive operation sound or vibration.
- The A-weighted sound pressure level is below 70dB.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.

<DEUTSCH>
Das Original ist in Englisch. Die anderen Sprachversionen sind vom Original übersetzt.

⚠ VORSICHT

- Wenn Kältemittel austritt, kann dies zu Ersticken führen. Sorgen Sie in Übereinstimmung mit EN378-1 für Durchlüftung.
- Die Leitungen müssen isoliert werden. Direkter Kontakt mit nicht isolierten Leitungen kann zu Verbrennungen oder Erfrierungen führen.
- Nehmen Sie niemals Batterien in den Mund, um ein versehentliches Verschlucken zu vermeiden.
- Durch das Verschlucken von Batterien kann es zu Erstickungen und/oder Vergiftungen kommen.
- Installieren Sie das Gerät auf einem stabilen Untergrund, um übermäßige Betriebsgeräusche oder -schwingungen zu vermeiden.
- Der A-gewichtete Schalldruckpegel ist niedriger als 70dB.
- Dieses Gerät ist vorgesehen für die Nutzung durch Fachleute oder geschultes Personal in Werkstätten, in der Leichtindustrie und in landwirtschaftlichen Betrieben oder für die kommerzielle Nutzung durch Laien.

<FRANÇAIS>
L'anglais est l'original. Les versions fournies dans d'autres langues sont des traductions de l'original.

⚠ PRECAUTION

- Une fuite de réfrigérant peut entraîner une asphyxie. Fournissez une ventilation adéquate en accord avec la norme EN378-1.
- Assurez-vous que la tuyauterie est enveloppée d'isolant. Un contact direct avec la tuyauterie nue peut entraîner des brûlures ou des engelures.
- Ne mettez jamais des piles dans la bouche pour quelque raison que ce soit pour éviter de les avaler par accident.
- Le fait d'ingérer des piles peut entraîner un étouffement et/ou un empoisonnement.
- Installez l'appareil sur une structure rigide pour prévenir un bruit de fonctionnement et une vibration excessifs.
- Le niveau de pression acoustique pondéré est en dessous de 70 dB.
- Cet appareil est conçu pour un utilisateur expert ou les utilisateurs formés en magasin, dans l'industrie légère et dans l'agriculture ou dans le commerce par le profane.

<NEDERLANDS>
Het Engels is het origineel. De andere taalversies zijn vertalingen van het origineel.

⚠ VOORZICHTIG

- Het lekken van koelvloeistof kan verstikking veroorzaken. Zorg voor ventilatie in overeenstemming met EN378-1.
- Isoleer de leidingen met isolatiemateriaal. Direct contact met de onbedekte leidingen kan leiden tot brandwonden of bevriezing.
- Stop nooit batterijen in uw mond om inslikking te voorkomen.
- Het inslikken van batterijen kan verstikking of vergiftiging veroorzaken.
- Installeer het apparaat op een stabiele structuur om overmatig lawaai of trillingen te voorkomen.
- Het niveau van de geluidsdruk ligt onder 70 dB(A).
- Dit apparaat is bedoeld voor gebruik door ervaren of opgeleide gebruikers in werkplaatsen, in de lichte industrie en op boerderijen, of voor commercieel gebruik door leken.

<ESPAÑOL>
El idioma original del documento es el inglés. Las versiones en los demás idiomas son traducciones del original.

⚠ CUIDADO

- Las pérdidas de refrigerante pueden causar asfixia. Se debe proporcionar la ventilación determinada en EN378-1.
- Asegúrese de colocar el aislante alrededor de las tuberías. El contacto directo con la tubería puede ocasionar quemaduras o congelación.
- Para evitar una ingestión accidental, no coloque las pilas en su boca bajo ningún concepto.
- La ingestión de las pilas puede causar asfixia y/o envenenamiento.
- Coloque la unidad en una estructura rígida para evitar que se produzcan sonidos o vibraciones excesivos debidos a su funcionamiento.
- El nivel de presión acústica ponderado A es inferior a 70 dB.
- Este aparato está destinado a su uso por parte de usuarios expertos o capacitados en talleres, industrias ligeras y granjas, o a su uso comercial por parte de personas no expertas.

<ITALIANO>
Il testo originale è redatto in lingua Inglese. Le altre versioni linguistiche rappresentano traduzioni dell'originale.

⚠ ATTENZIONE

- Le perdite di refrigerante possono causare asfissia. Prevedere una ventilazione adeguata in conformità con la norma EN378-1.
- Accertarsi di applicare materiale isolante intorno alle tubature. Il contatto diretto con le tubature non schermate può provocare ustioni o congelamento.
- Non introdurre in nessun caso le batterie in bocca onde evitare ingestioni accidentali.
- L'ingestione delle batterie può provocare soffocamento e/o avvelenamento.
- Installare l'unità su una struttura rigida in modo da evitare rumore o vibrazioni eccessivi durante il funzionamento.
- Il livello di pressione del suono ponderato A è inferiore a 70dB.
- Questa apparecchiatura è destinata all'utilizzo da parte di utenti esperti o addestrati in negozi, industria leggera o fattorie oppure a un uso commerciale da parte di persone non esperte.

<ΕΛΛΗΝΙΚΑ>
Η γλώσσα του πρωτοτύπου είναι η αγγλική. Οι εκδόσεις άλλων γλωσσών είναι μεταφράσεις του πρωτοτύπου.

⚠ ΠΡΟΣΟΧΗ

- Η διαρροή του ψυκτικού ενδέχεται να προκαλέσει ασφυξία. Φροντίστε για τον εξαερισμό σύμφωνα με το πρότυπο EN378-1.
- Φροντίστε να τυλίξετε με μονωτικό υλικό τη σωλήνωση. Η απευθείας επαφή με τη γυμνή σωλήνωση ενδέχεται να προκαλέσει εγκαύματα ή κρυοπαγήματα.
- Μη βάζετε ποτέ τις μπαταρίες στο στόμα σας για κανένα λόγο ώστε να αποφύγετε την κατά λάθος κατάποσή τους.
- Η κατάποση μπαταριών μπορεί να προκαλέσει πνιγμό ή/και δηλητηρίαση.
- Εγκαταστήστε τη μονάδα σε σταθερή κατασκευή ώστε να αποφύγετε τον έντονο ήχο λειτουργίας ή τους κραδασμούς.
- Η Α-σταθμισμένη στάθμη ηχητικής πίεση είναι κάτω των 70dB.
- Η συσκευή αυτή προορίζεται για χρήση από έμπειρους ή εκπαιδευμένους χρήστες σε καταστήματα, στην ελαφριά βιομηχανία και σε αγροκτήματα, ή για εμπορική χρήση από άτομα τα οποία δεν είναι ειδήμονες.

<PORTUGUÊS>
O idioma original é o inglês. As versões em outros idiomas são traduções do idioma original.

⚠ CUIDADO

- A fuga de refrigerante pode causar asfixia. Garanta a ventilação em conformidade com a norma EN378-1.
- Certifique-se de que envolve as tubagens com material de isolamento. O contacto directo com tubagens não isoladas pode resultar em queimaduras ou ulcerações provocadas pelo frio.
- Nunca coloque pilhas na boca, por nenhum motivo, para evitar a ingestão acidental.
- A ingestão de uma pilha pode causar obstrução das vias respiratórias e/ou envenenamento.
- Instale a unidade numa estrutura robusta, de forma a evitar ruídos ou vibrações excessivos durante o funcionamento.
- O nível de pressão sonora ponderado A é inferior a 70 dB.
- Este equipamento destina-se a ser utilizado por especialistas ou utilizadores com formação em lojas, na indústria ligeira e em quintas, ou para utilização comercial por leigos.

<DANSK>
Engelsk er originalen. De andre sprogversioner er oversættelser af originalen.

⚠ FORSIGTIG

- Lækage af kølemiddel kan forårsage kvælning. Sørg for udluftning i overensstemmelse med EN378-1.
- Sørg for at pakke rørene ind i isolering. Direkte kontakt med ubeklædte rør kan forårsage forbrændinger eller forfrysninger.
- Batterier må under ingen omstændigheder tages i munden for at forhindre utilsigtet indtagelse.
- Indtagelse af batterier kan forårsage kvælning og/eller forgiftning.
- Installér enheden på en fast struktur for at forhindre for høje driftslyde eller vibrationer.
- Det A-vægtede lydtrykniveau er under 70dB.
- Dette apparat er beregnet til at blive brugt af eksperter eller udlærte brugere i butikker, inden for let industri og på gårde eller til kommerciel anvendelse af lægmænd.

<SVENSKA>
Engelska är originalspråket. De övriga språkversionerna är översättningar av originalet.

⚠ FÖRSIKTIGHET

- Köldmedelsläckage kan leda till kvävning. Tillhandahåll ventilation i enlighet med EN378-1.
- Kom ihåg att linda isolering runt rören. Direktkontakt med bara rör kan leda till brännskador eller köldskador.
- Stoppa aldrig batterier i munnen, de kan sväljas av misstag.
- Om ett batteri sväljs kan det leda till kvävning och/eller förgiftning.
- Montera enheten på ett stadigt underlag för att förhindra höga driftljud och vibrationer.
- Den A-vägda ljudtrycksnivån är under 70dB.
- Denna apparat är ämnad för användning av experter eller utbildade användare i affärer, inom lätt industri och på lantbruk, eller för kommersiell användning av lekmän.

<TÜRKÇE>
Aslı İngilizcedir. Diğer dillerdeki sürümler aslının çevirisidir.

⚠ DİKKAT

- Soğutucu kaçağı boğulmaya neden olabilir. EN378-1 uyarınca uygun havalandırma sağlayın.
- Borular etrafına yalıtım yapıldığından emin olun. Borulara doğrudan çıplak elle dokunulması yanıklara veya soğuk ısırıklarına neden olabilir.
- Kazara yutmamak için, pilleri kesinlikle hiçbir amaçla ağzınızda tutmayın.
- Pillerin yutulması boğulmaya ve/veya zehirlenmeye yol açabilir.
- Aşırı çalışma seslerini veya titreşimi önlemek için, üniteyi sağlam bir yapı üzerine monte edin.
- A ağırlıklı ses gücü seviyesi 70dB'nin altındadır.
- Bu cihaz atölyelerde, hafif endüstriyel tesislerde ve çiftliklerde uzman veya eğitimli kullanıcılar tarafından kullanılmak üzere veya normal kullanıcılar tarafından ticari kullanım için tasarlanmıştır.

<РУССКИЙ>
Языком оригинала является английский. Версии на других языках являются переводом оригинала.

⚠ ОСТОРОЖНО

- Утечка хладагента может стать причиной удушья. Обеспечьте вентиляцию в соответствии с EN378-1.
- Обязательно оберните трубы изоляционной обмоткой. Непосредственный контакт с неизолированным трубопроводом может привести к ожогам или обморожению.
- Запрещается класть элементы питания в рот по каким бы то ни было причинам во избежание случайного проглатывания.
- Попадание элемента питания в пищеварительную систему может стать причиной удушья и/или отравления.
- Устанавливайте устройство на жесткую структуру во избежание чрезмерного шума или чрезмерной вибрации во время работы.
- Уровень звукового давления по шкале A не превышает 70 дБ.
- Данное устройство предназначено для использования специалистами или обученным персоналом в магазинах, на предприятиях легкой промышленности и фермах или для коммерческого применения непрофессионалами.

<УКРАЇНСЬКА>
Переклад оригіналу. Текст іншими мовами є перекладом оригіналу.

⚠ ОБЕРЕЖНО

- Виток холодоагенту може призвести до удушення. Необхідно забезпечити вентиляцію відповідно до стандарту EN 378-1.
- Труби необхідно обмотати ізоляційним матеріалом. Прямий контакт із непокритою трубою може призвести до опіку або обмороження.
- Забороняється класти елементи живлення в рот із будь-яких причин, оскільки є ризик випадкового їх проковтнути.
- Попадання елемента живлення в травну систему може стати причиною задухи та/або отруєння.
- Встановлюйте блок на міцній конструкції, щоб уникнути надмірного рівня звуку роботи або вібрації.
- Рівень амплітудно зваженого акустичного тиску становить нижче 70 дБ.
- Цей прилад призначається для використання спеціалістами або особами, що пройшли відповідне навчання, у крамницях, легкій промисловості та сільськогосподарських підприємствах, а також для комерційного використання неспеціалістами.

<БЪЛГАРСКИ>
Оригиналът е текстът на английски език. Версиите на други езици са преводи на оригинала.

⚠ ВНИМАНИЕ

- Изтичането на хладилен агент може да причини задушаване. Осигурете вентилация съобразно с EN378-1.
- Не забравяйте да увиете изолация около тръбите. Директният контакт с оголени тръби може да причини изгаряне или измръзване.
- При никакви обстоятелства не поставяйте батериите в устата си, за да не ги погълнете по невнимание.
- Това може да доведе до задушаване и/или натравяне.
- Монтирайте тялото върху твърда конструкция, за да предотвратите прекомерен шум или вибрации по време на работа.
- А-претегленото ниво на звуково налягане е под 70 dB.
- Този уред е предназначен за използване от експерти или обучени потребители в магазини, в леката промишленост и във ферми, или за търговска употреба от неспециалисти.

<POLSKI>
Językiem oryginału jest język angielski. Inne wersje językowe stanowią tłumaczenie oryginału.

⚠ UWAGA

- Wyciek czynnika chłodniczego może spowodować uduszenie. Należy zapewnić wentylację zgodnie z normą EN378-1.
- Należy pamiętać, aby owinąć izolację wokół przewodów rurowych. Bezpośredni kontakt z niezabezpieczonymi przewodami rurowymi może doprowadzić do poparzeń lub odmrożeń.
- Nie wolno wkładać baterii do ust z jakiegokolwiek powodu, aby uniknąć przypadkowego połknięcia.
- Połknięcie baterii może spowodować zadławienie i/lub zatrucie.
- Zainstalować urządzenie na sztywnej konstrukcji, aby zapobiec nadmiernemu hałasowi i wibracjom.
- Poziom dźwięku A nie przekracza 70 dB.
- W sklepach, w przemyśle lekkim i w gospodarstwach rolnych urządzenie powinni obsługiwać profesjonalni lub przeszkoleni użytkownicy, a w środowisku handlowym mogą to być osoby nieposiadające fachowej wiedzy.

<NORSK>
Originalspråket er engelsk. De andre språkversjonene er oversettelser av originalen.

⚠ FORSIKTIG

- Kjølemiddellekkasje kan forårsake kvelning. Sørg for ventilering i samsvar med EN378-1.
- Pass på at isoleringen pakkes godt rundt røret. Direkte kontakt med ukledte rør kan forårsake brannskader eller forfrysninger.
- Aldri plasser batteri i munnen, da dette kan medføre en risiko for at du svelger batteriet ved et uhell.
- Hvis du svelger et batteri, kan du risikere kvelning og/eller forgiftning.
- Installer enheten på en stabil struktur for å forhindre unødvendig mye driftsstøy eller vibrering.
- Det A-vektede lydtrykknivået er under 70 dB.
- Dette apparatet er ment for bruk av eksperter eller faglært personell i butikker, lettindustri og på gårder, eller for kommersielt bruk av ikke-fagmenn.

<SUOMI>
Englanti on alkuperäinen. Muut kieliversiot ovat alkuperäiskappaleen käännöksiä.

⚠ HUOMIO

- Vuotava kylmäaine voi aiheuttaa tukehtumisen. Ilmanvaihdon on oltava EN378-1-standardin mukainen.
- Kääri putken ympärille eristysmateriaalia. Paljaan putken koskettamisesta voi seurata palotai paleltumavammoja.
- Älä koskaan laita paristoja suuhun, jotta et vahingossa nielaisisi niitä.
- Paristojen nieleminen voi aiheuttaa tukehtumisen ja/tai myrkytyksen.
- Asenna yksikkö tukeviin rakenteisiin, jotta sen käytöstä ei syntyisi ylimääräistä ääntä tai tärinää.
- A-painotettu äänenpainetaso on alle 70 dB.
- Laite on tarkoitettu asiantuntijoiden tai laitteelle koulutuksen saaneiden käyttöön kaupoissa, pienteollisuudessa ja maatiloilla tai maallikoille kaupalliseen käyttöön.

<ČEŠTINA>
Originál je v angličtině. Ostatní jazykové verze jsou překladem originálu.

⚠ POZOR

- Únik chladicího média může způsobit udušení. Zajistěte větrání v souladu s normou EN 378-1.
- Okolo potrubí vždy omotejte izolaci. Přímý kontakt s obnaženým potrubím může způsobit popálení nebo omrzliny.
- Nikdy nevkládejte baterie do úst, aby nedošlo k jejich polknutí.
- Polknutí baterie může způsobit zadušení a/nebo otravu.
- Jednotku nainstalujte na pevnou konstrukci, aby nedocházelo ke vzniku nadměrného provozního hluku a vibrací.
- Hladina akustického tlaku A je nižší než 70 dB.
- Toto zařízení je určeno pro prodejny, lehký průmysl a farmy, kde je musí obsluhovat odborníci a školení uživatelé, a pro komerční použití, kde je mohou obsluhovat laici.

<SLOVENČINA>
Preklad anglického originálu. Všetky jazykové verzie sú preložené z angličtiny.

⚠ UPOZORNENIE

- Únik chladiva môže spôsobiť udusenie. Zabezpečte vetranie podľa normy EN 378-1.
- Nezabudnite potrubie obaliť izoláciou. Priamy kontakt s nezabaleným potrubím môže spôsobiť popáleniny alebo omrzliny.
- Batérie si nikdy z akéhokoľvek dôvodu neklaďte do úst, aby nedošlo k ich náhodnému požitiu.
- Požitie batérií môže vyvolať dusenie a/alebo otravu.
- Nainštalujte jednotku na pevný konštrukčný prvok, aby ste obmedzili nadmerný prevádzkový hluk a vibrácie.
- Hladina akustického tlaku vážená podľa krivky A je nižšia ako 70 dB.
- Toto zariadenie je určené na používanie odborníkmi alebo zaškolenými používateľmi v komerčných priestoroch, v prostredí ľahkého priemyslu, na farmách, alebo na komerčné použitie bežnými používateľmi.

<MAGYAR>
Az angol változat az eredeti. A többi nyelvi változat az eredeti fordítása.

⚠ VIGYÁZAT

- A hűtőközeg szivárgása fulladást okozhat. Gondoskodjon az EN378-1 szabvány előírásai szerinti szellőzésről.
- Feltétlenül szigetelje körbe a csöveket. A csupasz cső megérintése égési vagy fagyási sérülést okozhat.
- Ne vegyen a szájába elemet semmilyen célból, mert véletlenül lenyelheti!
- A lenyelt elem fulladást és/vagy mérgezést okozhat.
- A készüléket merev szerkezetre szerelje fel, hogy megakadályozza a túlzott üzemi zajt és vibrációt.
- Az A-súlyozott hangnyomásszint 70 dB alatt van.
- A készülék üzletek, a könnyűipar és gazdaságok szakértő vagy képzett felhasználói, valamint laikus felhasználók általi kereskedelmi használatra készült.

<SLOVENŠČINA>
Izvirnik je v angleščini. Druge jezikovne različice so prevodi izvirnika.

⚠ POZOR

- Puščanje hladiva lahko povzroči zadušitev. Zagotovite prezračevanje po standardu EN378-1.
- Cevi ovijte z izolacijo. Neposredni stik z golimi cevmi lahko povzroči opekline ali ozebline.
- Nikoli in iz nobenega razloga ne vstavljajte baterij v usta, da jih po nesreči ne pogoltnete.
- Če baterije pogoltnete, se lahko zadušite in/ali zastrupite.
- Enoto namestite na togo konstrukcijo, da preprečite pretiran zvok ali tresljaje med delovanjem.
- A-utežena raven zvočnega tlaka je pod 70 dB.
- Naprava je namenjena za uporabo s strani strokovnih ali ustrezno usposobljenih uporabnikov v trgovinah, lahki industriji in na kmetijah ter za komercialno uporabo s strani nestrokovnih uporabnikov.

<ROMÂNĂ>
Textul original este în limba engleză. Versiunile pentru celelalte limbi sunt traduceri ale originalului.

⚠ ATENŢIE

- Scurgerea de agent frigorific poate cauza asfixierea. Asiguraţi o ventilaţie corespunzătoare, conform standardului EN378-1.
- Asiguraţi-vă că înfăşuraţi materialul izolator în jurul conductelor. Contactul direct cu conductele neizolate se poate solda cu arsuri sau degerături.
- Nu introduceţi niciodată şi pentru niciun motiv bateriile în gură, pentru a evita ingerarea accidentală a acestora.
- Ingerarea bateriilor poate cauza sufocarea şi/sau intoxicarea.
- Instalaţi unitatea pe o structură rigidă pentru a preveni producerea unui nivel excesiv de sunete sau vibraţii.
- Nivelul de presiune acustică ponderat în A este mai mic de 70 dB.
- Acest aparat este destinat utilizării de către utilizatori specializaţi sau instruiţi în cadrul spaţiilor comerciale, spaţiilor din cadrul industriei uşoare şi al fermelor sau în scopuri comerciale de către nespecialişti.

<EESTI>
Originaaljuhend on ingliskeelne. Muudes keeltes versioonid on originaali tõlked.

⚠ ETTEVAATUST!

- Külmaaine leke võib põhjustada lämbumist. Tuulutamine standardi EN378-1 kohaselt.
- Mähkige torude ümber kindlasti isolatsiooni. Vahetu kontakt paljaste torudega võib põhjustada põletusi või külmakahjustusi.
- Hoiduge patareide tahtmatust allaneelamisest, ärge kunagi pange ühelgi põhjusel patareisid suhu.
- Patarei allaneelamine võib põhjustada lämbumist ja/või mürgitust.
- Paigaldage seade jäigale struktuurile, et vältida ülemäärast tööheli ja vibreerimist.
- A-filtriga helirõhu tase on madalam kui 70 dB.
- Seade on mõeldud kasutamiseks asjatundjatele ja väljaõppe läbinud kasutajatele poodides, kergtööstuses ja taludes ning kommertskasutuseks tavaisikute poolt.

<LATVISKI>
Oriģināls ir angļu valodā. Versijas citās valodās ir oriģināla tulkojums.

⚠ UZMANĪBU

- Aukstumaģenta noplūdes gadījumā pastāv nosmakšanas risks. Ir jānodrošina standartam EN378-1 atbilstoša ventilēšana.
- Aptiniet caurules ar izolējošu materiālu. Pieskaroties neaptītām caurulēm, var gūt apdegumus vai apsaldējumus.
- Aizliegts ievietot baterijas mutē; pastāv norīšanas risks.
- Bateriju norīšana var izraisīt aizrīšanos un/vai saindēšanos.
- Uzstādiet iekārtu uz izturīgas struktūras, lai izvairītos no pārlieku liela darbības trokšņa vai vibrācijas.
- A — izsvarotais skaņas spiediena līmenis ir mazāks par 70 dB.
- Šo iekārtu paredzēts lietot speciālistiem vai apmācītiem lietotājiem veikalos, vieglās rūpniecības telpās un lauksaimniecības fermās, kā arī to var lietot nespeciālisti komerciālām vajadzībām.

<LIETUVIŠKAI>
Originalas yra anglų k. Versijos kitomis kalbomis yra originalo vertimas.

⚠ ATSARGIAI

- Dėl šaltnešio nuotėkio galima uždusti. Išvėdinkite patalpas pagal EN378-1.
- Būtinai vamzdelius apvyniokite izoliacija. Prisilietus prie plikų vamzdelių galima nusideginti arba nušalti.
- Siekdami išvengti atsitiktinio prarijimo, niekada nedėkite baterijų į burną.
- Prarijus bateriją galima užspringti ir / arba apsinuodyti.
- Įrenginį sumontuokite ant tvirtos struktūros, kad nesigirdėtų pernelyg didelio veikimo triukšmo ar vibracijos.
- A svertinis garso slėgio lygis nesiekia 70 dB;
- šis prietaisas skirtas naudoti specialistui ar išmokytiems naudotojams dirbtuvėse, lengvojoje pramonėje ar ūkiuose arba komerciniam naudojimui nespecialistams.

<HRVATSKI>
Tekst je izvorno napisan na engleskom jeziku. Tekst na ostalim jezicima predstavlja prijevod izvorno napisanog teksta.

⚠ OPREZ

- Curenje rashladnog sredstva može uzrokovati gušenje. Osigurajte ventilaciju u skladu s normom HR EN378-1.
- Obvezno stavite izolaciju oko položenih cijevi. Izravni doticaj s golim cijevima može dovesti do opeklina ili smrzavanja.
- Nikada ne stavljajte baterije u usta ni zbog kojeg razloga kako biste izbjegli slučajno gutanje.
- Gutanje baterija može prouzročiti gušenje i/ili trovanje.
- Postavite jedinicu na čvrstu površinu kako biste izbjegli prebučan zvuk tijekom rada ili pojavu vibracija.
- Razina zvučnog tlaka A niža je od 70dB.
- Ovaj uređaj mogu upotrebljavati stručnjaci ili osposobljeni korisnici u trgovinama, lakoj industriji i na poljoprivrednim gospodarstvima ili laici u komercijalne svrhe.

<SRPSKI>
Prevod originala. Verzije na drugim jezicima su prevodi originala.

⚠ OPREZ

- Curenje rashladne tečnosti može da dovede do gušenja. Obezbedite ventilaciju u skladu sa EN378-1.
- Obavezno obmotajte izolaciju oko cevi. Direktan kontakt sa golom cevi može izazvati opekotine ili promrzline.
- Nikada nemojte stavljati baterije u usta iz bilo kog razloga, kako bi se sprečilo slučajno gutanje.
- Gutanje baterija može da izazove gušenje i/ili trovanje.
- Ugradite jedinicu na čvrstu strukturu kako biste sprečili previše jak zvuk rada ili vibracije.
- A-ponderisani nivo jačine pritiska zvuka je ispod 70 dB.
- Ovaj uređaj je namenjen za upotrebu od strane stručnih ili obučenih korisnika u prodavnicama, u lakoj industriji i na farmama ili za komercijalnu upotrebu od strane nekvalifikovanih lica.

Importer in European and surrounding region.

Mitsubishi Electric Europe B.V.
Capronilaan 34, 1119 NS, Schiphol Rijk, The Netherlands

French Branch
2, Rue De L'Union, 92565 RUEIL MALMAISON Cedex France

German Branch
Mitsubishi-Electric-Platz 1 40882 Ratingen North Rhine-Westphalia Germany

Belgian Branch
8210 Loppem, Autobaan 2, Belgium

Irish Branch
Westgate Business Park, Ballymount Road, Upper Ballymount, Dublin 24, Ireland

Italian Branch
Via Energy Park, 14 20871 Vimercate (MB), Italy

Norwegian Branch
Gneisveien 2D, 1914 Ytre Enebakk, Norway

Portuguese Branch
Avda. do Forte 10, 2794-019 Carnaxide, Lisbon, Portugal

Spanish Branch
Av. Castilla, 2 Parque Empresarial San Fernando - Ed. Europa, 28830 San Fernando de Henares (Madrid), Spain

Scandinavian Branch
Hammarbacken 14, P.O. Box 750, SE-19127, Sollentuna, Sweden

UK Branch
Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England, UK

Polish Branch
Krakowska 48, PL-32-083 Balice, Poland

MITSUBISHI ELECTRIC TURKEY ELEKTRİK ÜRÜNLERI A.Ş.
Şerifali Mahallesi Kale Sokak No: 41 34775 Ümraniye, İstanbul, Turkey

ООО «Мицубиси Электрик (РУС)»
115114, Российская Федерация, г. Москва, ул. Летниковская, д. 2, стр. 1, 5 этаж

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, TOKYO 100-8310, JAPAN

BH79A694W03