MITSUBISHI ELECTRIC

HFC utilized
R410A

November 2024
OCH800
REVISED EDITION-D

SERVICE MANUAL

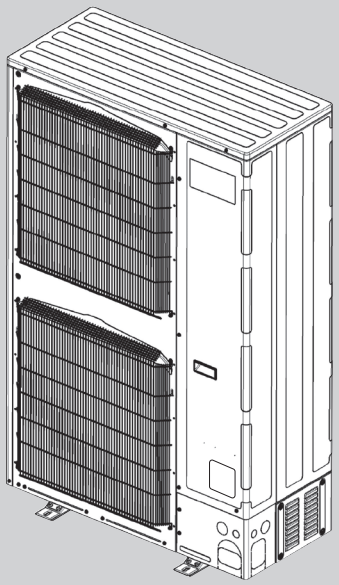
<Outdoor unit>

Model name

MXZ-SM72TAM-U1
MXZ-SM96TAM-U1
MXZ-SM120TAM-U1

- Some descriptions have been changed in REVISED EDITION-D.

OCH800C is void.



1. SERVICE REF. ····· 2
2. SAFETY PRECAUTION ····· 3
3. OVERVIEW OF UNITS ····· 7
4. SPECIFICATIONS ····· 12
5. DATA ····· 13
6. OUTLINES AND DIMENSIONS ····· 31
7. WIRING DIAGRAM ····· 32
8. TROUBLESHOOTING ····· 33
9. DISASSEMBLY PROCEDURE ····· 118
10. SYSTEM CONSTRUCTION ····· 125
11. ELECTRICAL WIRING ····· 127
12. REFRIGERANT PIPING TASKS ····· 128
13. REMOTE CONTROLLER ····· 130

Appendix: Installation manual (Excerpt of English Ver.)

PARTS CATALOG (OCB800)

1 SERVICE REF.

MXZ-SM72TAM-U1
MXZ-SM96TAM-U1
MXZ-SM120TAM-U1

2 SAFETY PRECAUTION

2-1. Always observe for safety

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

Preparation before the repair service

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the air conditioner, turn off the power-supply breaker.
- 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 service valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).

2-2. Cautions related to new refrigerant

■ **Cautions for units utilizing refrigerant R410A**

Use new refrigerant pipes.

- Avoid using thin pipes.

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

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

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

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

The refrigerant oil applied to flare and flange connections must be ester oil, ether oil or alkylbenzene oil in a small amount.

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

Charge refrigerant from liquid phase of refrigerant cylinder.

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

Do not use refrigerant other than R410A.

- 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 R410A refrigerant.

- The following tools are necessary to use R410A refrigerant.

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

Handle tools with care.

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

Do not use a charging cylinder.

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

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

Use the specified refrigerant only.

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

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

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

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

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

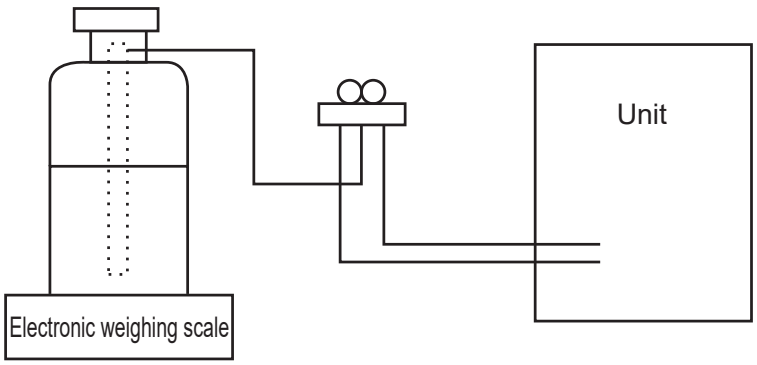
2-2-1. Cautions for service

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

2-2-2. Additional refrigerant charge

When charging directly from cylinder

- Check that cylinder for R410A on the market is a syphon type.
- Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



2-2-3. Service tools

Use the below service tools as exclusive tools for R410A refrigerant.

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

2-3. Cautions for refrigerant piping work

New refrigerant R410A is adopted for replacement inverter series. Although the refrigerant piping work for R410A 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 R410A 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 R410A is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 7/256 in [0.7 mm] or below.)

Piping diameter and thickness

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

* Use 1/2 H or H pipes.

■ Dimensions of flare cutting and flare nut

The component molecules in HFC refrigerant are smaller compared to conventional refrigerants. In addition to that, R410A 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 R410A has been specified separately from the dimensions for other refrigerants as shown below. The dimension B of flare nut for R410A also has partly been changed to increase strength as shown below. Set copper pipe correctly referring to copper pipe flaring dimensions for R410A below. For 1/2 and 5/8 inch pipes, the dimension B changes. Use torque wrench corresponding to each dimension.



Flare cutting dimensions

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

Flare nut dimensions

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

■ Tools for R410A (The following table shows whether conventional tools can be used or not.)

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

×: Prepare a new tool. (Use the new tool as the tool exclusive for R410A.)
△: Tools for other refrigerants can be used under certain conditions.
○: Tools for other refrigerants can be used.

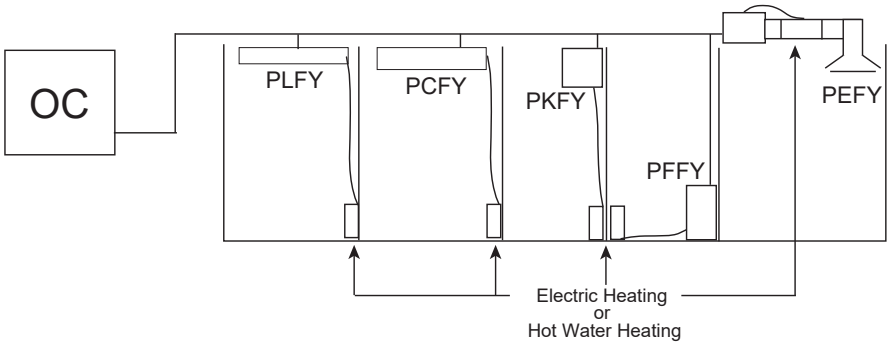
* Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.
- To deburr pipes, use a reamer or other deburring tools, not sandpaper.
- To cut pipes,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

3 OVERVIEW OF UNITS

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

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

1. Indoor unit must be R410A UL model for this function to operate.
2. Different indoor unit applications that can be applied:



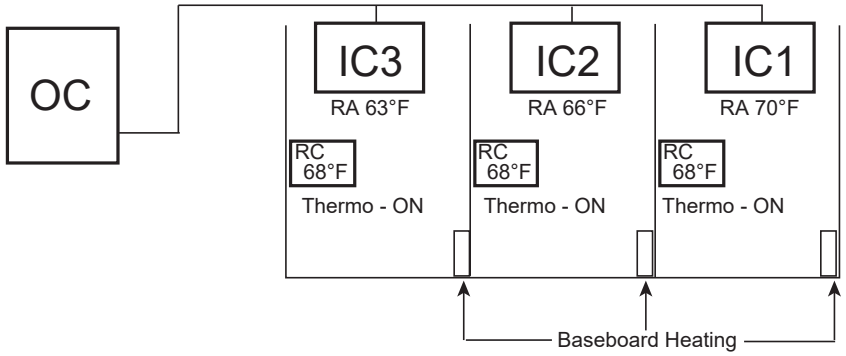
■ **Determine required indoor fan speed during defrost mode:**

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

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

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

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



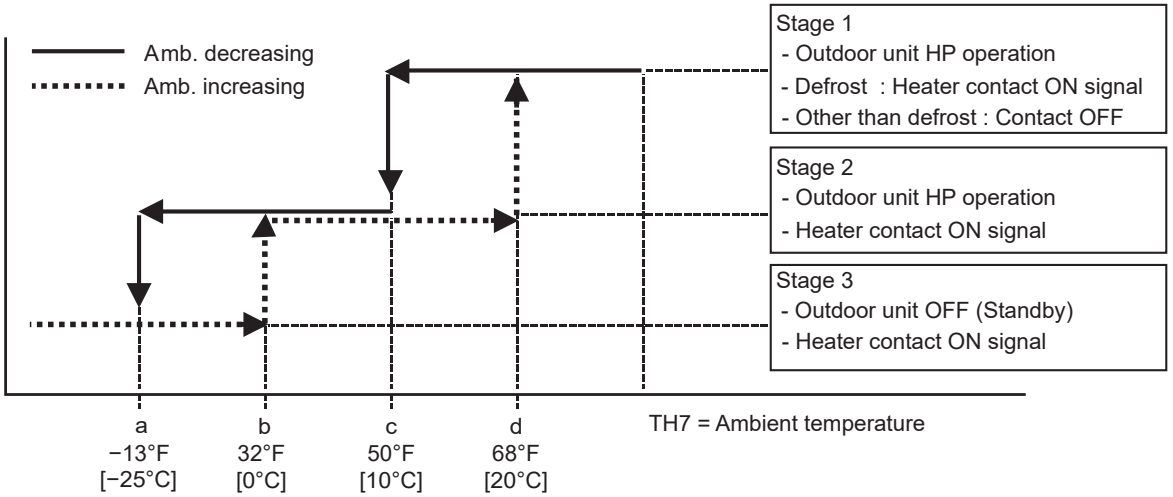
■ **Outdoor unit DIP SW5-4 for auxiliary heating control:**

• Set DIP SW5-4 when the power of the unit is turned off.
  - OFF: Auxiliary heating function is disabled. (Initial setting)
  - ON : Auxiliary heating function is enabled.

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

When the DIP SW 5-4 is set to "ON", the outdoor unit and the contact output operates as shown below.

• Outdoor default setting and operations are shown below:

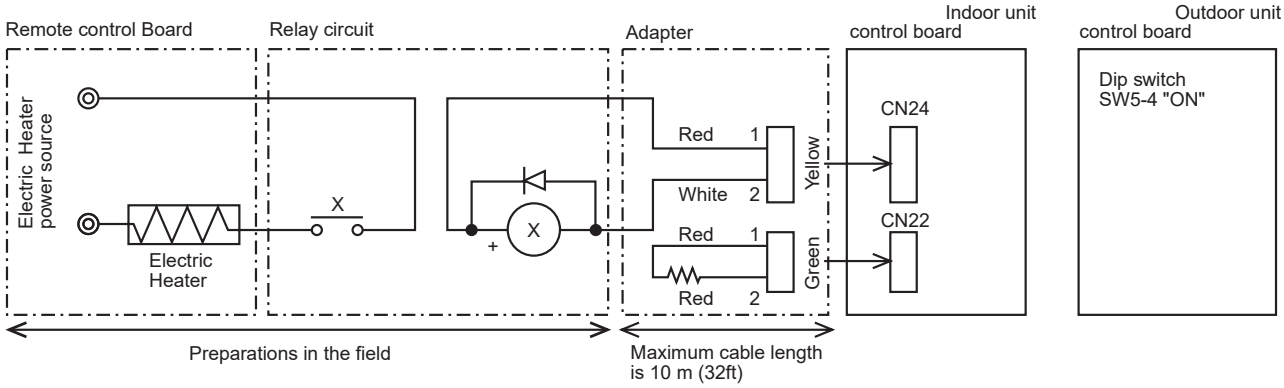


When the set temperature ranges overlap, the previously set pattern (1, 2 or 3) has a priority.
The stage 1 has the highest priority, 2 the second and then 3.

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

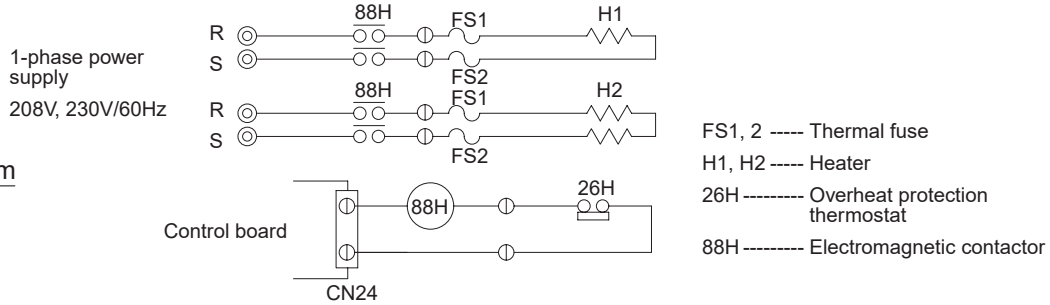
■ Locally procured wiring

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



- For relay X, use the specifications given below operation coil.
  Use the diode that is recommended by the relay manufacturer at both ends of the relay coil.
  - Rated voltage: 12 VDC
  - Power consumption: 0.9W or less
- The length of the electrical wiring for the PAC-YU24HT is 2 meters (6-1/2 ft)
- To extend this length, use sheathed 2-core cable. Do not extend the cable more than 10 meters (32 ft).
  - Control cable type: CVV, CVS, CPEV, or equivalent
  - Cable size: 0.5 mm² to 1.25 mm² (AWG22 to AWG16)
- Recommended circuit

Wiring diagram



3-2. System construction

Outdoor unit		8HP (6 ton)	10HP (8 ton)	12HP (10 ton)
		SM72TAM	SM96TAM	SM120TAM
Applicable indoor unit	Capacity class	04 to 72	04 to 96	
	Max no. of units	23	30	
	Total system capacity range	50 to 130% of outdoor unit capacity		

↓

Model name	CMY-Y62-G-E, CMY-Y62GA-E	CMY-Y64-G-E	CMY-Y68-G-E
Number of branches	2	4	8

↓

Connectable indoor unit lineup

Model type	Model name			04	05	06	08	12	15	18	24	27	30	36	48	54	72	96
Ceiling Cassette	4-way flow	PLFY-EP	NEMU-E					●	●	●	●		●	●	●			
	2 by 2	PLFY-P	NFMU-E		●		●	●	●	●								
	1-way flow	PMFY-P	NBMU-E			●	●	●	●									
Ceiling concealed		PEFY-P	NMAU			●	●	●		●	●	●	●	●	●	●		
			NMSU-E			●	●	●	●	●	●							
			NMHU-E						●	●	●	●	●	●	●	●		
			NMHSU-E														●	●
Wall mounted		PKFY-P	NKMU-E								●		●					
			NLMU-E	●		●	●	●	●	●								
Ceiling suspended		PCFY-P	NKMU-E						●		●		●	●				
Floor standing	Exposed	PFFY-P	NEMU-E			●	●	●	●	●	●							
	Concealed	PFFY-P	NRMU-E			●	●	●	●	●	●							
Multi-position 4-way air handling unit		PVFY-P	NAMU-E			●	●	●		●	●		●	●	●	●		

↓

Remote controller	Name	M-NET remote controller	MA remote controller
	Model name	PAR-F27MEA-E, PAR-U01MEDU	PAR-21MAA, PAR-41MAA
	Functions	• A handy remote controller for use in conjunction with the Melans centralized management system. • Address setting is required.	• Address setting is not required.

3-3. System construction (Branch box system)

Outdoor unit	Horsepower		8 HP (6 ton)	10 HP (8 ton)	12 HP (10 ton)
	Model name		SM72TAM	SM96TAM	SM120TAM
	Nominal capacity (kBtu/h)	Cooling	72	96	120
		Heating	80	108	135
	Refrigerant		R410A		
Applicable indoor unit	Capacity class		06 to 36		
	Max no. of units		12 (6)*1, *2, *3	12 (8)*1, *2, *3	12 (10)*1, *2, *3
	Total system capacity range		50 to 130% of outdoor unit capacity		
			36 to 93 kBtu/h	48 to 124 kBtu/h	60 to 156 kBtu/h
Branch box that can be connected	Number of units		1 to 3		

Connectable indoor unit lineup (Heat pump inverter type)										
Model type		Model name	06	09	12	15	18	24	30	36
Wall-mounted	Deluxe	MSZ-FH·NA	●	●	●	●				
		MSZ-FH·NA2					●			
		MSZ-FS·NA	●	●	●	●	●			
	Standard	MSZ-GL·NA	●	●	●	●	●	●		
		MSZ-GS	●	●	●	●	●	●		
	Designer	MSZ-EF·NA(W/B/S)		●	●	●	●			
Ceiling concealed	Low static pressure	SEZ-KD·NA		●	●	●	●			
	P-series Middle static pressure	PEAD-A·AA		●	●	●	●	●	●	●
4-way ceiling cassette	P-series 22*22	SLZ-KF·NA		●	●	●				
	P-series 33*33	PLA-A·EA			●		●	●	●	●
1-way ceiling cassette		MLZ-KP·NA(2)		●	●		●			
Floor standing		MFZ-KJ·NA		●	●	●	●			
Standard multi-position air handler		SVZ-KP·NA			●		●	●	●	●

Branch box	PAC-MKA52/53BC	PAC-MKA32/33BC
Number of branches (Indoor unit that can be connected)	5 (MAX. 5 units)	3 (MAX. 3 units)

Note:
- A maximum of 3 branch boxes can be connected to 1 outdoor unit.

2-branch pipe (joint), optional parts		
	Model name	Note
Using 1 branch box	PAC-SG71RJ-E	For SM72/96TAM
	PAC-SL02RJ-E	For SM120TAM
Using 2 or more branch boxes	MSDD-50AR-E	Connection method: flare
	MSDD-50BR-E	Connection method: brazing
	CMY-Y62-GA-E	Connection method: brazing

Note: Select the appropriate model based on the capacity and the connection method.

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

*1. The number enclosed in parentheses is the maximum number of units that can be connected when 1 or more PLA-A·EA units is connected.
*2. When connecting PEAD-A24/30/36AA or SVZ series unit, the maximum total capacity of the units that can be connected each branch box is 60 kBtu/h.
*3. When connecting an SVZ-series unit(s), set additional constraints as follows. For connections other than those specified below, consult your dealer.

Number of connecting SVZ-series unit	Constraints (For each connected branch box)
2	Any indoor units other than SVZ-series units are not connectable.
1	Only 1 PEAD can be included in the connection.

For connections other than those specified in 1 and 2, including connections with multi-position units, consult a dealer.

3-4. System Specifications

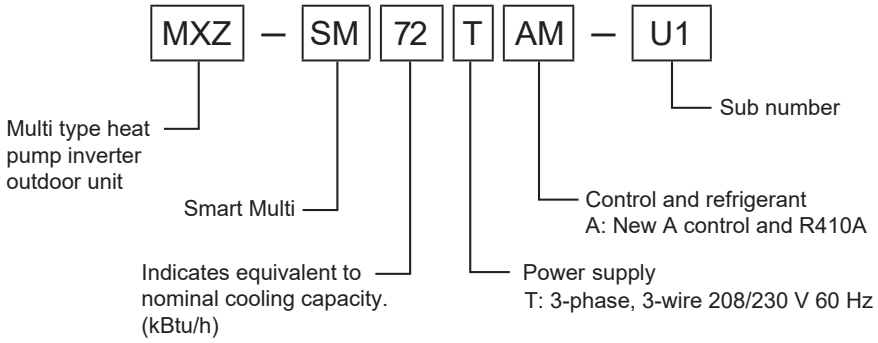
3-4-1. Outdoor Unit

Outdoor unit	Model name	SM72TAM	SM96TAM	SM120TAM
Nominal capacity	Cooling (kBtu/h)	72	96	120
	Heating (kBtu/h)	80	108	135
Compressor (kW)		4.1	5.3	7.0

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

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

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



4 SPECIFICATIONS

Outdoor model				MXZ-SM72TAM-U1		MXZ-SM96TAM-U1		MXZ-SM120TAM-U1	
Indoor Model				Non-Ducted	Ducted	Non-Ducted	Ducted	Non-Ducted	Ducted
Cooling capacity (Nominal)*1			kW	21.1		28.1		35.2	
			Btu/h	72,000		96,000		120,000	
		Power input	kW	5.67		8.16		10.7	
		Current input	A	16.6-15.0		23.9-21.6		31.3-28.3	
	(Rated)		kW	20.2		27		33.4	
			Btu/h	69,000		92,000		114,000	
		Power input	kW	4.88	5.07	6.93	7.31	9.35	9.53
		Current input	A	14.3-12.9	14.8-13.4	20.2-18.3	21.4-19.3	27.3-24.7	27.8-25.2
Heating capacity (Nominal)*2			kW	23.4		31.7		39.6	
			Btu/h	80,000		108,000		135,000	
		Power input	kW	5.36		7.61		9.87	
		Current input	A	15.7-14.2		22.2-20.1		28.8-26.1	
	(Rated)		kW	22.6		30.2		37.8	
			Btu/h	77,000		103,000		129,000	
		Power input	kW	4.86	5.12	6.86	7.24	9.11	9.21
		Current input	A	14.2-12.8	15.0-13.5	20.0-18.1	21.2-19.1	26.6-24.1	26.9-24.3
Power source				3-phase 3-wire 208-230V 60Hz					
Breaker size		(ODU only/ODU+IDU)	A	40/60				50/70	
Minimum Circuit Ampacity		(ODU only/ODU+IDU)	A	32/50				47/65	
Maximum Overcurrent Protection		(ODU only/ODU+IDU)	A	58/76				84/102	
Indoor unit connectable	Total capacity			50 to 130% of outdoor unit cooling rated capacity					
	Model/ Quantity *3	CITY MULTI		04 - 72 / 23		04 - 96 / 30		04 - 96 / 30	
		Branch box		06 - 36 / 12		06 - 36 / 12		06 - 36 / 12	
Sound pressure level (SPL) (measured in anechoic room)		dB <A>		53/54		58/59		61/62	
Refrigerant piping diameter	Liquid pipe	in (mm)		3/8 (9.52) *4				1/2 (12.7)	
	Gas pipe	in (mm)		7/8 (22.2)				1-1/8 (28.58)	
Fan*5	Type × Quantity			Propeller Fan × 2					
	Airflow rate	m³/min		149		169		208	
		L/s		2,480		2,820		3,470	
		cfm		5,260		5,965		7,345	
	Control, Driving mechanism			DC control					
	Motor output	kW		0.285 + 0.285					
	External static press.			0 in.WG (0 Pa) / 0.12 in.WG (30 Pa)					
Compressor	Type × Quantity			Scroll hermetic compressor× 1					
	Manufacturer			Siam Compressor Industry Co., Ltd.					
	Starting method			Inverter					
	Motor output	kW		4.1		5.3		7.0	
	Case heater	kW		0					
	Lubricant			FVC68D 101oz. (3.0L)					
External finish				Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1					
External dimension H × W × D		mm		1,662 × 1,050 × 460 (+45)					
		in		65-7/16 × 41-11/32 × 18-7/64 (+ 1-49/64)					
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			R410A 9.3 kg					
	Control			Linear expansion valve					
Net weight		lb (kg)		432 (196)					
Heat exchanger				Cross fin and copper tube					
HIC circuit (HIC: Heat Inter-Changer)				Double pipe heat exchanger					
Defrosting method				Reversed refrigerant circuit					
Standard attachment	Document			Installation Manual					
	Accessory			Joint pipe×1 set, Grounding lead wire ×1					
Optional parts				Joint: CMY-Y62-G-E/CMY-Y62-GA-E, Header: CMY-Y64/68-G-E					
Guaranteed operation range	Cooling	D.B.		-5 to 46°C [23 to 115°F]*6*7*8					
	Heating	W.B.		-20 to 15°C [-4 to 59°F]					

Remarks

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

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

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

*4. Liquid pipe diameter: 12.7mm, when further piping length is longer than 90m, and when PEFY-P72 or P96 is connected.

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

*6. 5 to 115°F D.B. (-15 to 46°C D.B.), when an optional Air Outlet Guide is installed. However, this condition does not apply to the indoor units listed in *7.

*7. 50 to 115°F D.B. (10 to 46°C D.B.), when connecting PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU, and PFFY-P06/08/12NRMU type indoor unit.

*8. When the temperature is below 50°F D.B. (10 °C D.B.) with branch box system, noise could potentially occur.

Notes:

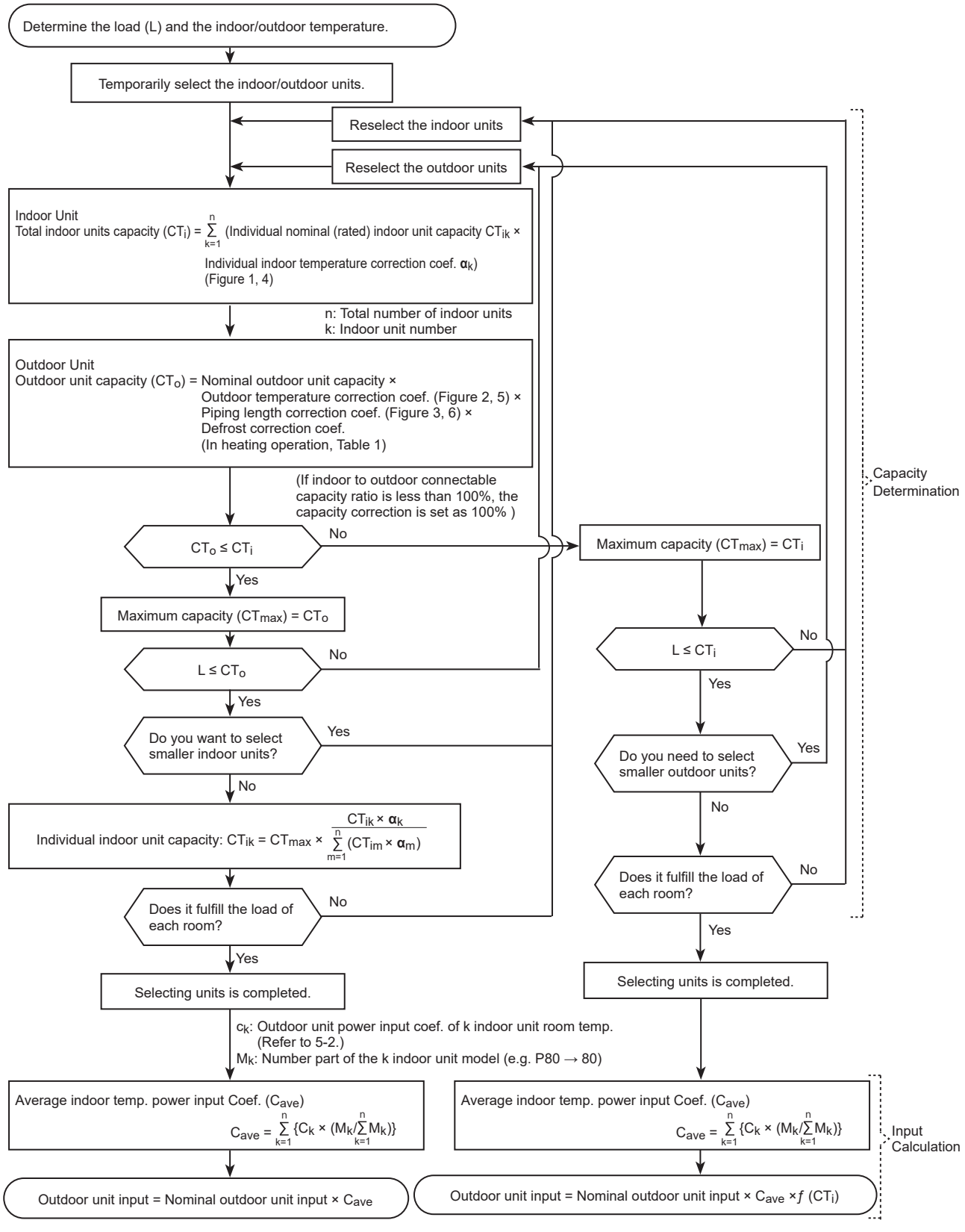
- Nominal conditions *1, *2 are subject to AHRI 1230.
- Due to continuing improvement, above specifications are subject to change without notice.
- See the following for unit conversion: kcal/h = kW × 860, Btu/h = kW × 3,412, cfm = m³/min × 35.31, lb = kg × 0.4536
  Above specification data is subject to rounding variation.
- Refer to the indoor unit's service manual for the indoor units specifications.
- Details on foundation work, duct work, insulation work, electrical wiring, power source switch, and other items shall be referred to the Installation Manual.

5 DATA

5-1. Selection of indoor and outdoor units

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

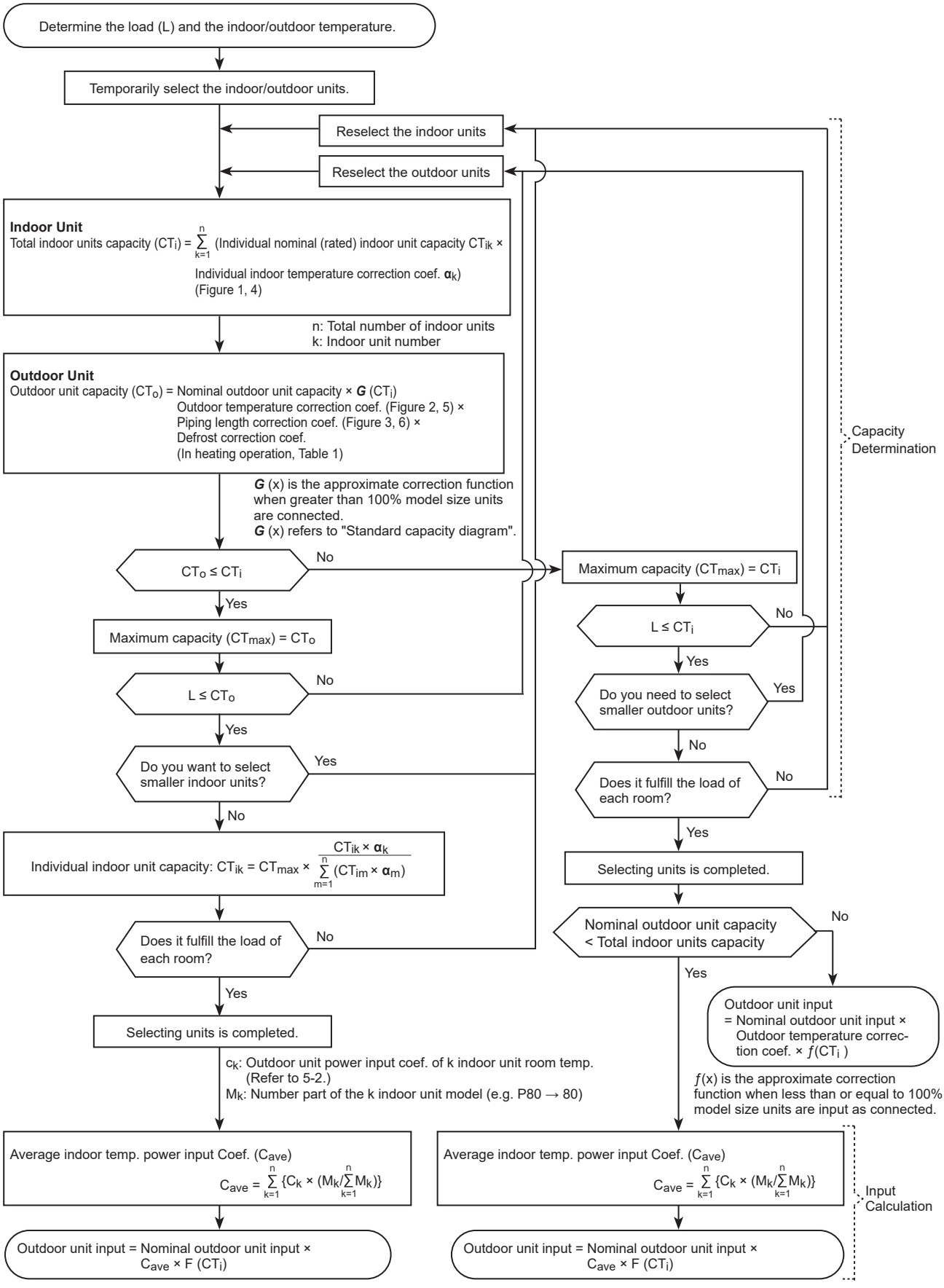
The purpose of this flow chart is to select the indoor and outdoor units. For other purposes, this flow chart is intended only for reference.



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

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

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



5-1-1. Cooling

Design condition		
Outdoor dry bulb temperature		98.6ºF (37.0ºC)
Total cooling load		60.6 kBtu/h
Room 1	Indoor dry bulb temperature	80.6ºF (27.0ºC)
	Indoor wet bulb temperature	64.4ºF (20.0ºC)
	Cooling load	27.2 kBtu/h
Room 2	Indoor dry bulb temperature	75.2ºF (24.0ºC)
	Indoor wet bulb temperature	64.4ºF (19.0ºC)
	Cooling load	33.4 kBtu/h
Other	Indoor/Outdoor piping equivalent length	196 ft

Capacity of indoor unit

- CITY MULTI series

Model class of indoor unit	04	05	06	08	12	15	18	24	27	30	36	48	54	72	96
Model capacity (kBtu/h)	4.0	5.0	6.0	8.0	12.0	15.0	18.0	24.0	27.0	30.0	36.0	48.0	54.0	72.0	96.0

- M, S, P series

Model name	Capacity class							
	06	09	12	15	18	24	30	36
SVZ	-	-	12.0	-	18.0	24.0	30.0	36.0
SLZ-KF	-	8.4	11.1	15.0	-	-	-	-
SEZ-KD	-	8.1	11.5	14.1	17.2	-	-	-
MFZ-KJ	-	9.0	12.0	15.0	17.0	-	-	-
MLZ-KP	-	9.0	12.0	-	17.2	-	-	-
MSZ-FH	6.0	9.0	12.0	15.0	17.2	-	-	-
MSZ-FS	6.0	9.0	12.0	15.0	17.2	-	-	-
MSZ-GL	6.0	9.0	12.0	14.0	17.2	22.5	-	-
MSZ-GS	6.0	9.0	12.0	14.0	17.2	22.5	-	-
MSZ-EF	-	9.0	12.0	15.0	18.0	-	-	-
PEAD	-	9.0	12.0	15.0	18.0	24.0	30.0	36.0
PLA	-	-	12.0	-	18.0	24.0	30.0	36.0

■ Cooling calculation

- Tentative selection of indoor units
  Room1: PEFY-P30 30.0 kBtu/h (Nominal)
  Room2: PEFY-P36 36.0 kBtu/h (Nominal)
  In this case, the total capacity is 66.0. (30.0 + 36.0 = 66.0)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is SM72TAM as the total capacity of the indoor units is 66.0.
  SM72TAM 72.0 kBtu/h (Nominal)
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor design wet bulb temperature: Room 1 (68.0°F) 1.02 (Refer to Figure 1 in 5-2-1.)
  Room 2 (66.2°F) 0.95 (Refer to Figure 1 in 5-2-1.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 30.0 × 1.02 + 36.0 × 0.95
  = 64.8 kBtu/h
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (95.0°F) 1.00 (Refer to Figure 2 in 5-2-1.)
  Correction factor for piping length (196 ft) 0.93 (Refer to Figure 5 in 5-5-1.)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length × G(CTi)*1
  = 72.0 × 1.00 × 0.93
  = 66.96 kBtu/h

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

- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 64.8 < CTo = 66.96, thus, select CTi.
  CTx = CTi = 64.8 kBtu/h
- Comparison with essential load
  Against the essential load 60.6 kW, the maximum system capacity is 64.8 kW: A proper outdoor unit is selected.
- Calculation for the maximum indoor unit capacity of each room
  When CTx = CTi, use the calculation formula below.
  Room1: Rated capacity of indoor unit × Correction factor for indoor design temperature
  = 30.0 × 1.02

= 30.6 kBtu/h
The capacity is enough for the cooling load of Room 1 (27.2 kBtu/h): A proper indoor unit is selected.

Room2: CTx × Indoor unit rating × Correction factor for indoor design temperature
= 36.0 × 0.95
= 34.2 kBtu/h
The capacity is enough for the cooling load of Room 2 (33.4 kBtu/h): A proper indoor unit is selected.

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

5-1-2. Heating

Design condition		
Outdoor wet bulb temperature		35.6ºF (2.0ºC)
Total heating load		67.5 kBtu/h
Room 1	Indoor dry bulb temperature	69.8ºF (21.0ºC)
	Heating load	32.2 kBtu/h
Room 2	Indoor dry bulb temperature	73.4ºF (23.0ºC)
	Heating load	35.3 kBtu/h
Other	Indoor/Outdoor piping equivalent length	196 ft

Capacity of indoor unit

- CITY MULTI series

Model class of indoor unit	04	05	06	08	12	15	18	24	27	30	36	48	54	72	96
Model capacity (kBtu/h)	4.5	5.6	6.7	9.0	13.5	17.0	20.0	27.0	30.0	34.0	40.0	54.0	60.0	80.0	108.0

- M, S, P series

Model name	Capacity class							
	06	09	12	15	18	24	30	36
SVZ	-	-	12.0	-	18.0	27.0	34.0	40.0
SLZ-KF	-	10.2	13.7	17.1	-	-	-	-
SEZ-KD	-	10.9	13.6	18.0	17.2	-	-	-
MFZ-KJ	-	10.9	13.0	18.0	21.0	-	-	-
MLZ-KP	-	10.9	13.0	-	21.0	-	-	-
MSZ-FH	8.7	10.9	13.6	18.0	20.3	-	-	-
MSZ-FS	8.7	10.9	13.6	18.0	20.3	-	-	-
MSZ-GL	7.2	10.9	14.4	18.0	21.6	27.6	-	-
MSZ-GS	7.2	10.9	14.4	18.0	21.6	27.6	-	-
MSZ-EF	-	10.9	13.0	18.0	21.0	-	-	-
PEAD	-	10.9	13.5	15.7	18.0	26.0	34.0	40.0
PLA	-	-	13.5	-	18.0	26.0	34.0	40.0

■ Heating calculation

- Tentative selection of indoor units
  Room1: PEFY-P30 34.0 kBtu/h (Nominal)
  Room2: PEFY-P36 40.0 kBtu/h (Nominal)
  In this case, the total capacity is 74.0. (34.0 + 40.0 = 74.0)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is SM72TAM as the total capacity of the indoor units is 74.0.
  SM72TAM 80.0 kBtu/h
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor temperature: Room 1 (69.8°F) 1.00 (Refer to Figure 3 in 5-2-2.)
  Room 2 (73.4°F) 0.92 (Refer to Figure 3 in 5-2-2.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 34.0 × 1.00 + 40.0 × 0.92
  = 70.8 kW
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (35.6°F WB) 1.00 (Refer to Figure 4 in 5-2-2.)
  Correction factor for piping length (196 ft) 0.96 (Refer to Figure 8 in 5-5-2.)
  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 (× G(CTi))*1
  = 80.0 × 1.00 × 0.96 × 0.89
  = 68.35 kBtu/h

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

Table 1 Table of correction factor for frosting and defrosting

Outdoor inlet air temp. [°F (°C) W.B.]	43(6)	37(4)	36(2)	32(0)	28(-2)	25(-4)	21(-6)	18(-8)	14(-10)	5(-15)	-4(-20)	-13(-25)
Correction factor	1.00	0.98	0.89	0.88	0.89	0.90	0.95	0.95	0.95	0.95	0.95	0.95

- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 70.8 > CTo = 68.35, thus, select CTo.
  CTx = CTo = 68.35 kBtu/h
- Comparison with essential load
  Against the essential load 67.5 kBtu/h, the maximum system capacity is 68.35 kBtu/h: Proper indoor units have been selected.
- Calculation for the maximum indoor unit capacity of each room
  When CTx = CTo, use the calculation formula below.
  Room1: CTx × Corrected capacity for Room1/CTi
  = 68.35 × (34.0 × 1.00)/70.8
  = 32.8 kBtu/h
  The capacity is enough for the heating load of Room 1 (32.2 kW): A proper indoor unit is selected.
  Room2: CTx × Corrected capacity for Room1/CTi
  = 68.35 × (40.0 × 0.92)/(70.8)
  = 35.5 kW
  The capacity is enough for the heating load of Room 2 (35.3 kW): A proper indoor unit is selected.

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

5-1-3. Power input of outdoor unit

- Outdoor unit: MXZ-SM72TAM
- Indoor unit 1: PEFY-P30
  Indoor unit 2: PEFY-P36

■ Cooling

- Nominal power input of outdoor unit 5.67 kW
- Calculation of the average indoor temperature power input coefficient
  - Coefficient of the outdoor unit for indoor unit 1
    (Outdoor temp. 98.6°F [37.0°C] D.B., Indoor temp. 64.4°F [18.0°C] W.B.)
    0.93 (Refer to Figure 2 in 5-2-1)
  - Coefficient of the outdoor unit for indoor unit 2
    (Outdoor temp. 98.6°F [37.0°C] D.B., Indoor temp. 64.4°F [18.0°C] W.B.)
    0.93 (Refer to Figure 2 in 5-2-1.)
  - Average indoor temp. power input coefficient (Cave) = $\sum_{k=1}^{n}\{Ck \times (Mk/\sum_{k=1}^{n}Mk)\}$
    n: Total number of the indoor units
    k: Number of the indoor unit
    ck: Outdoor unit power input coefficient of k indoor unit room temp.
    Mk: Number part of the k indoor unit model (e.g. P80: 80)
  - Correction Coefficient of Indoor temperature = 0.93 × 30/(30 + 36) + 0.93 × 36/(30 + 36)
    = 0.93
- Coefficient of the partial load f(CTi)
  Total indoor units capacity = 30 + 36 = 66, thus, f(CTi) = 0.89 (Refer to the tables in 5-4. “Standard Capacity Diagram”.)
- Outdoor power input (PIo)
  Maximum System Capacity (CTx) = Total outdoor unit capacity (CTo), so use the following formula:
  PIo = Outdoor unit cooling nominal power input × Correction coefficient of indoor temperature × f(CTi)
  = 5.67 × 0.93 × 0.89
  = 4.69 kW

■ Heating

- Nominal power input of outdoor unit 5.36 kW
- Calculation of the average indoor temperature power input coefficient
  - Coefficient of the outdoor unit for indoor unit 1 (Outdoor temp. 35.6°F [2.0°C] W.B., Indoor temp. 69.8°F [21.0°C] D.B.)
    1.20 (Refer to Figure 4 in 5-2-2.)
  - Coefficient of the outdoor unit for indoor unit 2 (Outdoor temp. 35.6°F [2.0°C] W.B., Indoor temp. 73.4°F [23.0°C] D.B.)
    1.04 (Refer to Figure 4 in 5-2-2.)
  - Average indoor temp. power input coefficient (Cave) = $\sum_{k=1}^{n}\{Ck \times (Mk/\sum_{k=1}^{n}Mk)\}$
    n: Total number of the indoor units
    k: Number of the indoor unit
    ck: Outdoor unit power input coefficient of k indoor unit room temp.
    Mk: Number part of the k indoor unit model (e.g. P80: 80)
  - Correction Coefficient of Indoor temperature = 1.20 × 30/(30 + 36) + 1.04 × 36/(30 + 36)

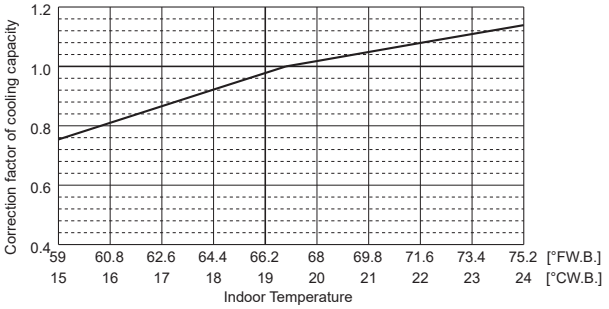
= 1.11

- Coefficient of the partial load f(CTi)
  Total indoor units capacity = 30 + 36 = 66, thus, f(CTi) = 0.9 (Refer to the tables in 5-4. “Standard capacity diagram”.)
- Outdoor power input (PIo)
  Maximum System Capacity (CTx) = Total Indoor unit capacity (CTi), so use the following formula
  PIo = Outdoor unit heating nominal power input × Correction coefficient of indoor temperature × f(CTi)
  = 5.36 × 1.11 × 0.9
  = 5.35 kW

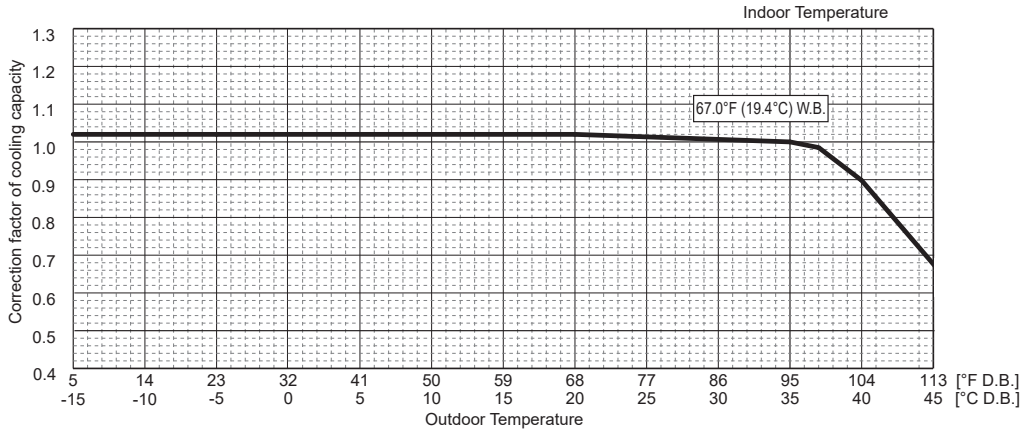
5-2. Correction by temperature

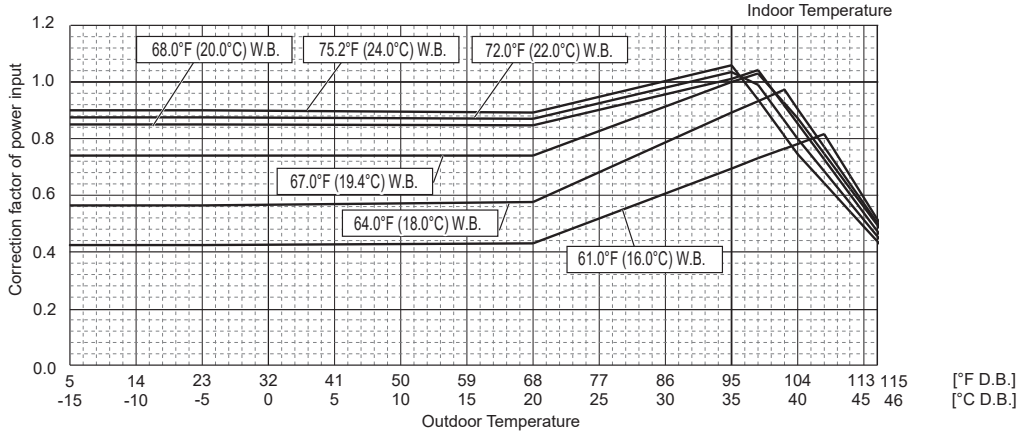
The outdoor units have varied capacity at different designing temperature. With the nominal cooling/heating capacity value and the ratio below, the capacity can be observed at various temperature.

5-2-1. Cooling



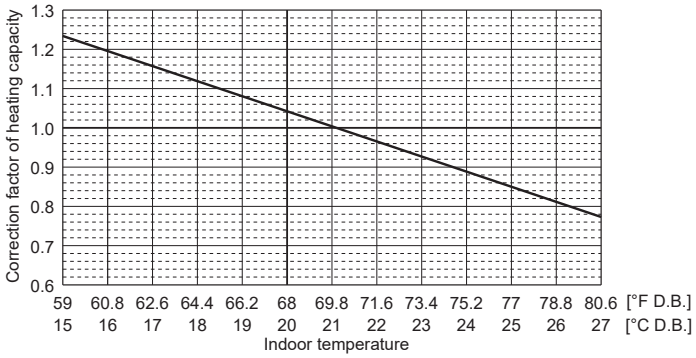
<Figure 1> Indoor unit temperature correction



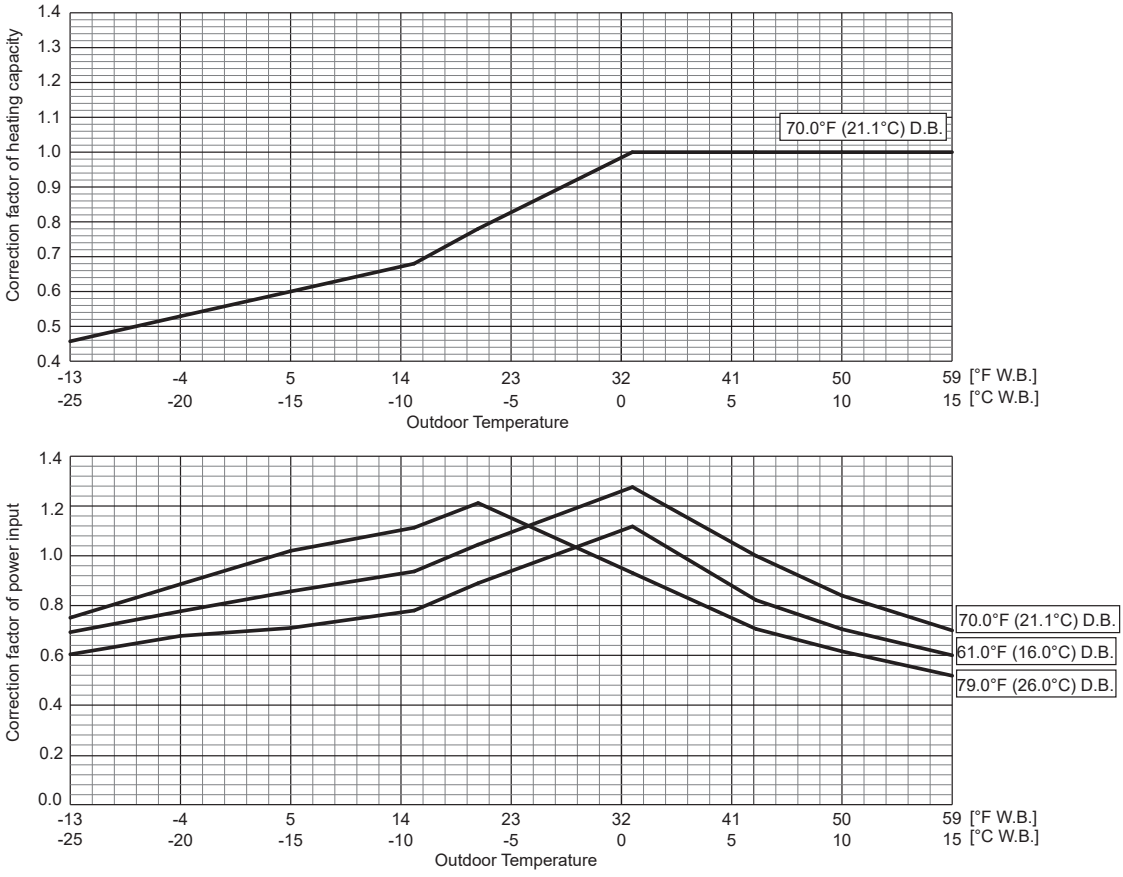


<Figure 2> Outdoor unit temperature correction

5-2-2. Heating



<Figure 3> Indoor unit temperature correction



<Figure 4> Outdoor unit temperature correction

5-3. Standard operation data (Reference data)

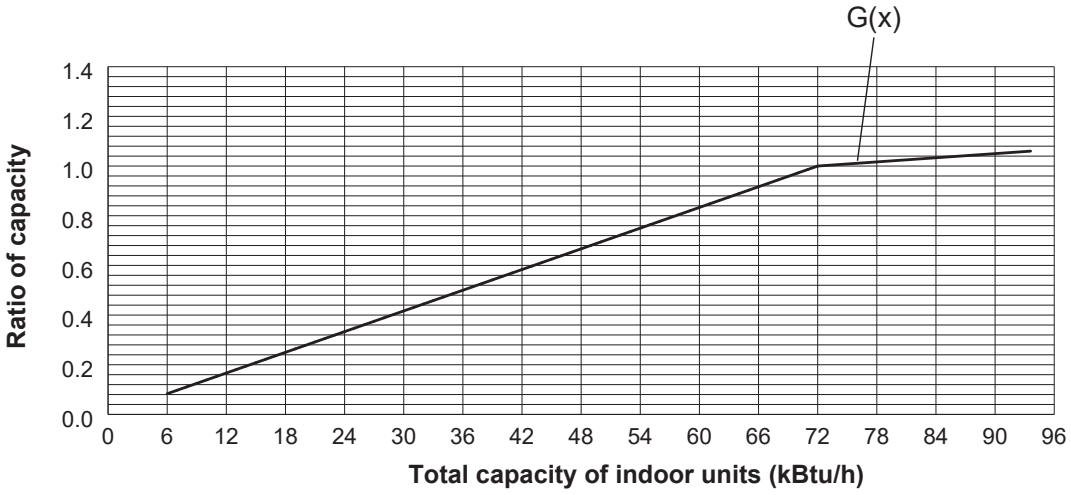
Operation				MXZ-SM72TAM-U1		MXZ-SM96TAM-U1		MXZ-SM120TAM-U1	
Operating conditions	Ambient temperature	Indoor	DB/WB	80°F/67°F (26.7°C/19.4°C)	70°F/60°F (21.1°C/15.6°C)	80°F/67°F (26.7°C/19.4°C)	70°F/60°F (21.1°C/15.6°C)	80°F/67°F (26.7°C/19.4°C)	70°F/60°F (21.1°C/15.6°C)
		Outdoor		95°F/75°F (35.0°C/23.9°C)	47°F / 43°F (8.3°C/6.1°C)	95°F/ 75°F (35.0°C/23.9°C)	47°F/43°F (8.3°C/6.1°C)	95°F/75°F (35.0°C/23.9°C)	47°F/43°F (8.3°C/6.1°C)
	Indoor unit	No. of connected units	Unit	6		8		10	
		No. of units in operation		6		8		10	
		Model	—	12 × 6		12 × 8		12 × 10	
	Piping	Main pipe	Ft (m)	15 (4.6)		15 (4.6)		15 (4.6)	
		Branch pipe		35 (10.7)		35 (10.7)		60 (18.3)	
		Total pipe length		225 (68.6)		295 (89.9)		615 (187.5)	
	Fan speed		—	Hi		Hi		Hi	
	Amount of refrigerant		LBS. OZ. (kg)	30 LBS. 39 OZ. (13.8)		33 LBS. 41 OZ. (15.2)		39 LBS. 116 OZ. (17.8)	
Outdoor unit	Electric current		A	16.6	15.7	23.9	22.2	31.3	28.8
	Voltage		V	230		230		230	
	Compressor frequency		Hz	46	55	63	77	79	97
LEV opening	Indoor unit		Pulse	214	221	208	235	249	254
Pressure	High pressure/Low pressure		psig (MPaG)	403/148 (2.78/1.02)	330/99 (2.28/0.68)	403/145 (2.78/1.00)	335/93 (2.31/0.64)	442/139 (3.05/0.96)	331/88 (2.28/0.61)
Temp. of each section	Outdoor unit	Discharge	°F (°C)	145.9 (63.3)	134.1 (56.7)	159.2 (70.6)	135.6 (57.5)	158.3 (70.2)	148.6 (64.8)
		Heat exchanger outlet		103.4 (39.7)	31.3 (-0.4)	98.9 (37.2)	29.0 (-1.7)	103.7 (39.8)	28.8 (-1.8)
		Accumulator inlet		52.6 (11.4)	31.3 (-0.4)	52.0 (11.1)	29.0 (−1.7)	50.0 (10.0)	28.8 (-1.8)
		Compressor inlet		52.1 (11.1)	30.6 (-0.8)	51.0 (10.6)	27.7 (-2.4)	48.4 (9.1)	25.3 (-3.7)
	Indoor unit	LEV inlet		88.2 (31.2)	83.0 (28.3)	82.1 (27.8)	83.5 (28.6)	90.7 (32.6)	82.4 (28.0)
		Heat exchanger inlet		54.0 (12.2)	125.3 (51.8)	53.7 (12.0)	127.3 (52.9)	54.1 (12.3)	145.6 (63.1)

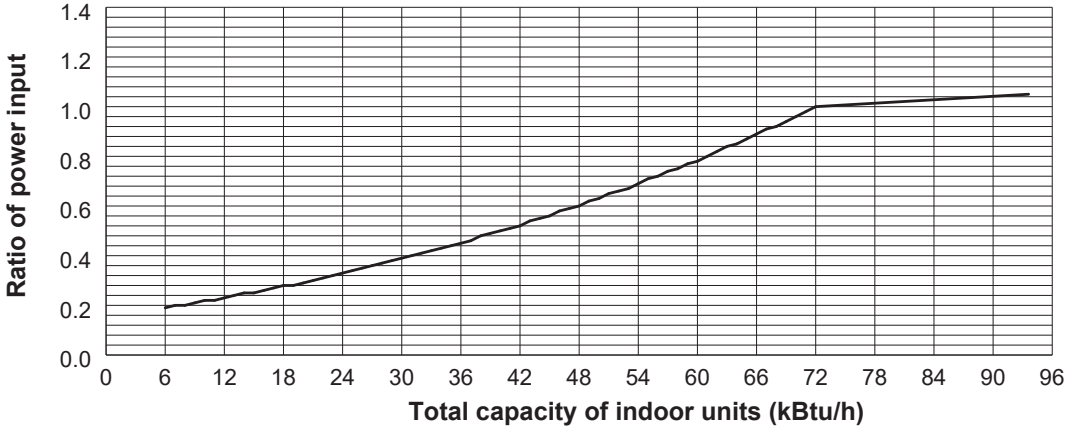
5-4. Standard capacity diagram

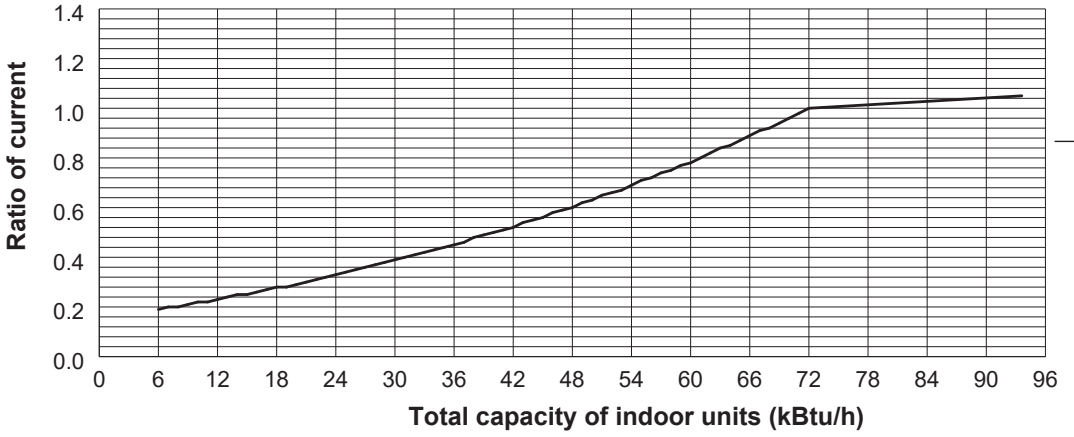
Before calculating the sum of total capacity of indoor units, please convert the value into the Btu/h model capacity following the formula on "5-1. Selection of indoor and outdoor units".

MXZ-SM72TAM-U1

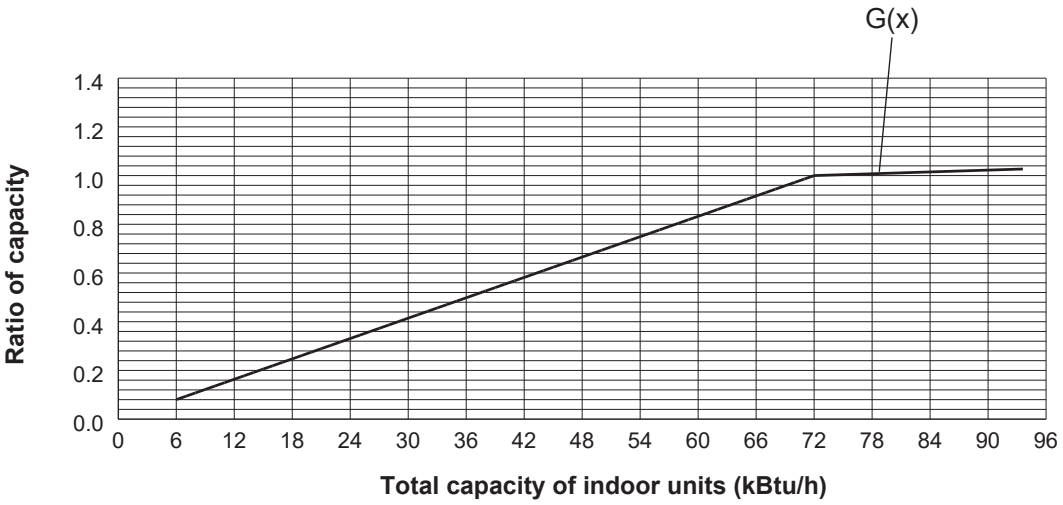
■ **Cooling**

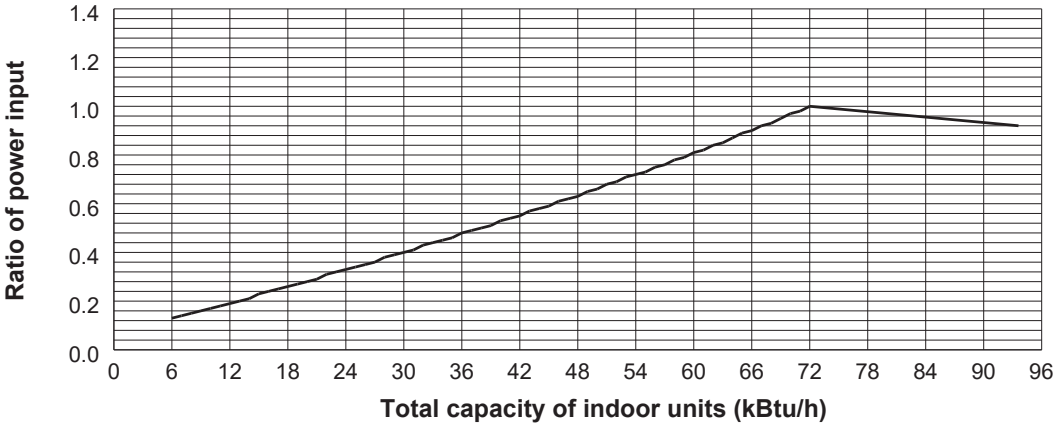


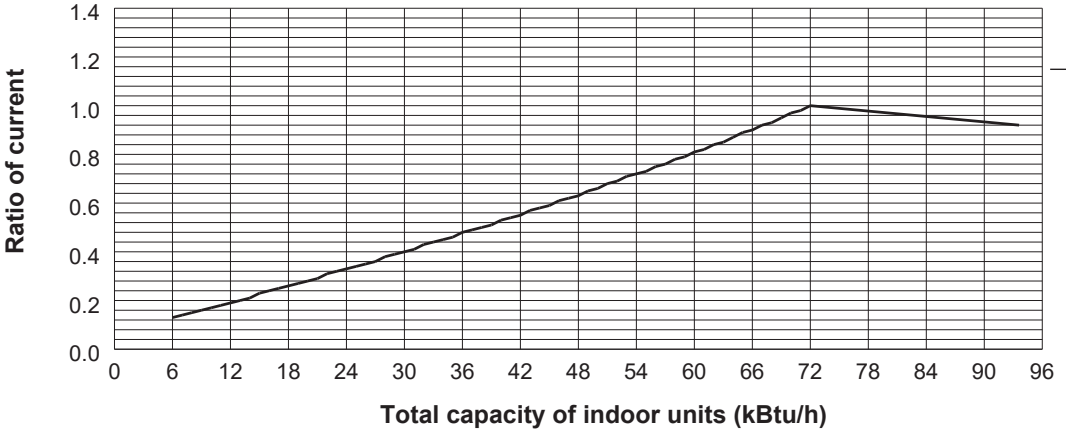




■ **Heating**

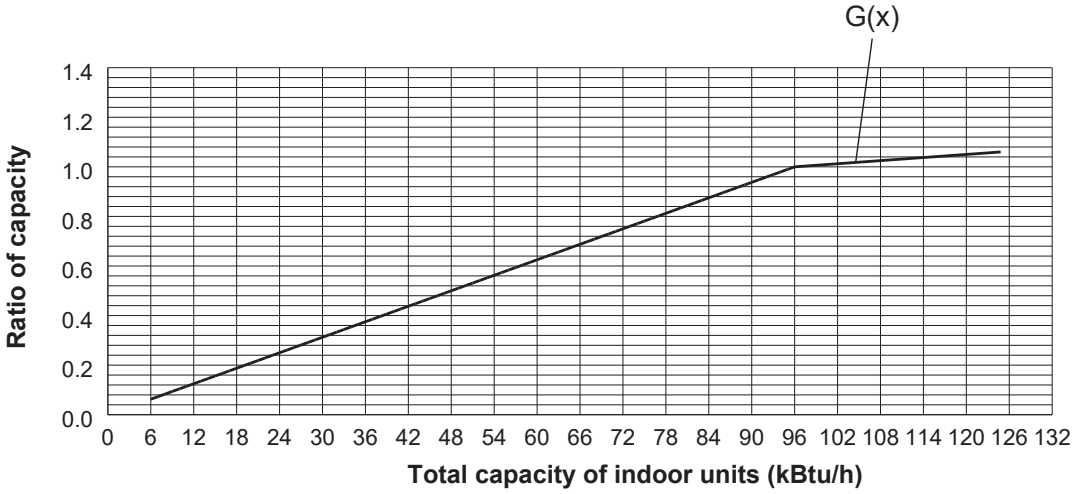

G(x)
Ratio of capacity
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96
Total capacity of indoor units (kBtu/h)

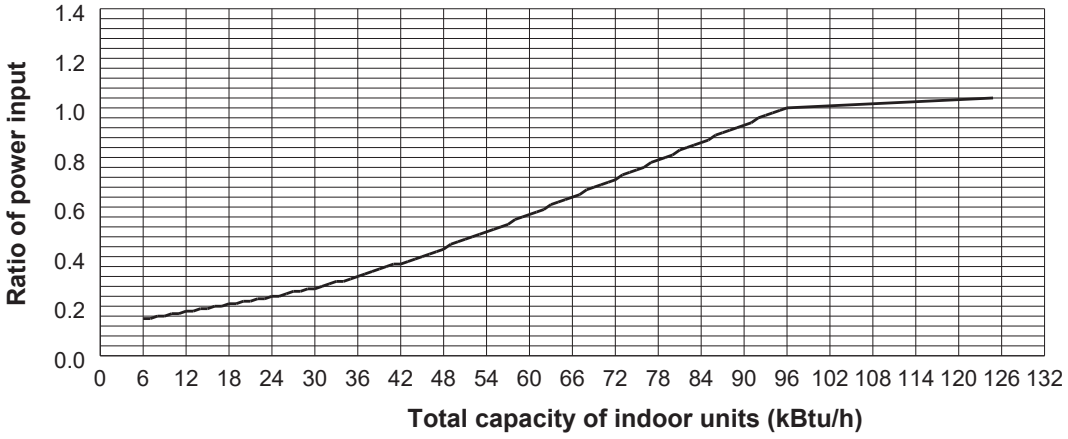

Ratio of power input
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96
Total capacity of indoor units (kBtu/h)

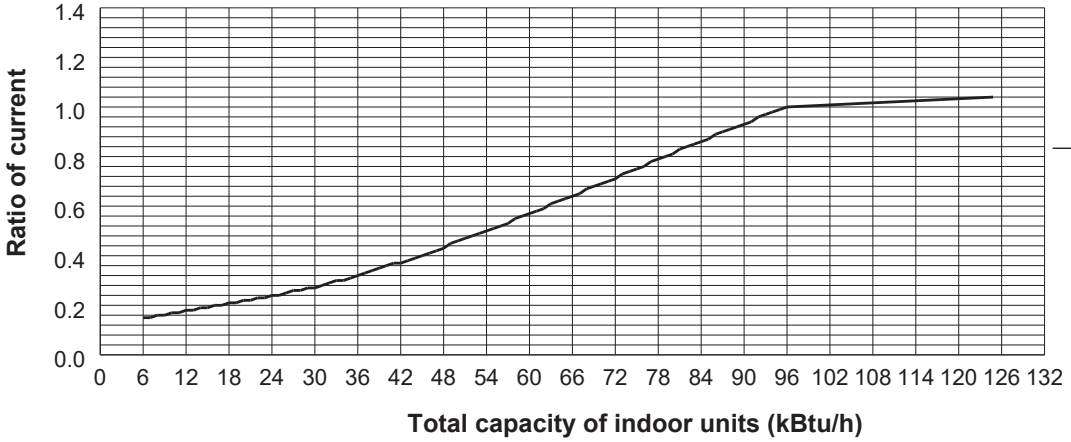

Ratio of current
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96
Total capacity of indoor units (kBtu/h)
208, 230 V

MXZ-SM96TAM-U1

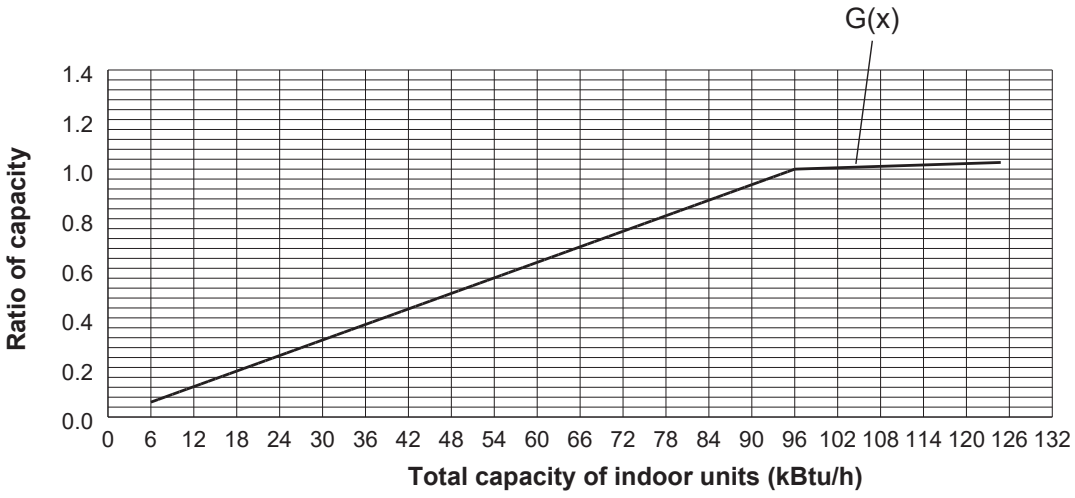
■ **Cooling**

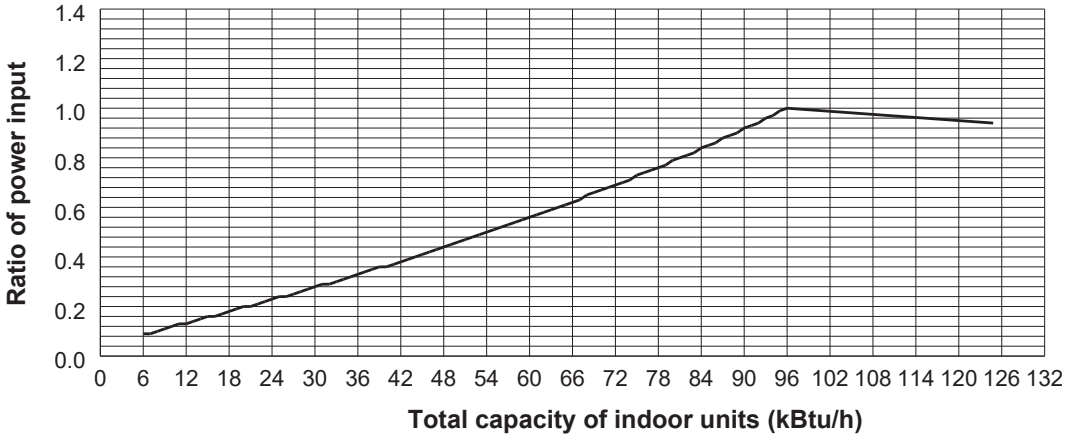


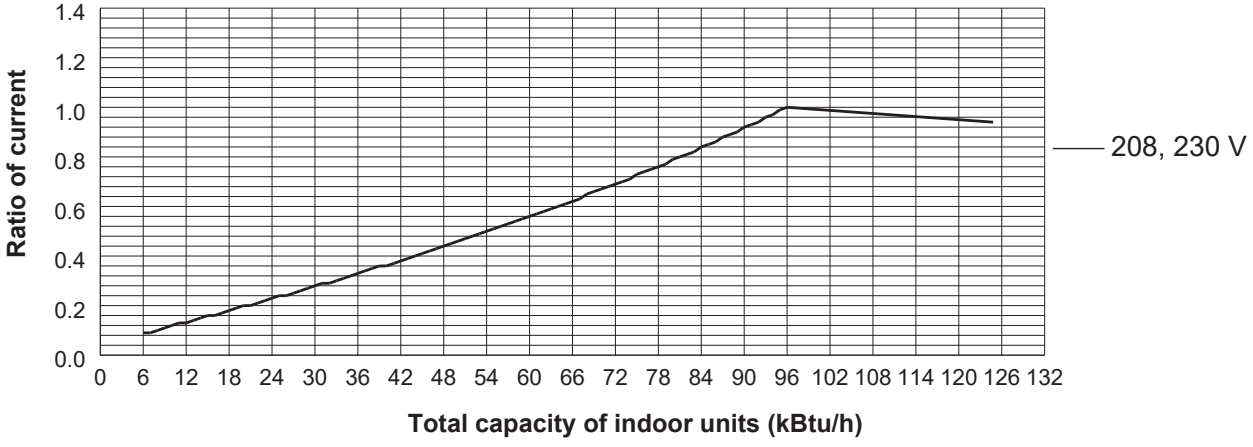




■ **Heating**

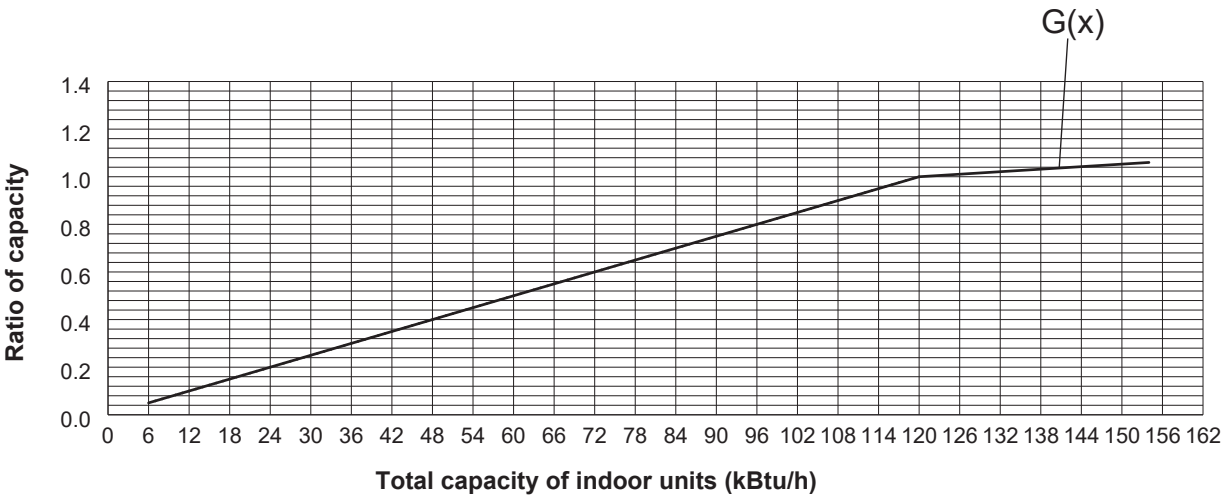

G(x)
Ratio of capacity
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132
Total capacity of indoor units (kBtu/h)

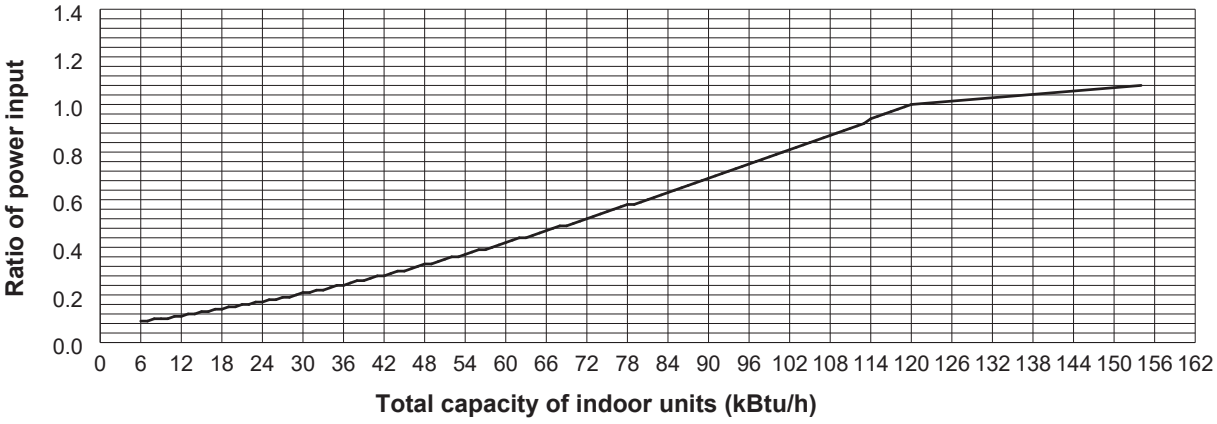

Ratio of power input
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132
Total capacity of indoor units (kBtu/h)

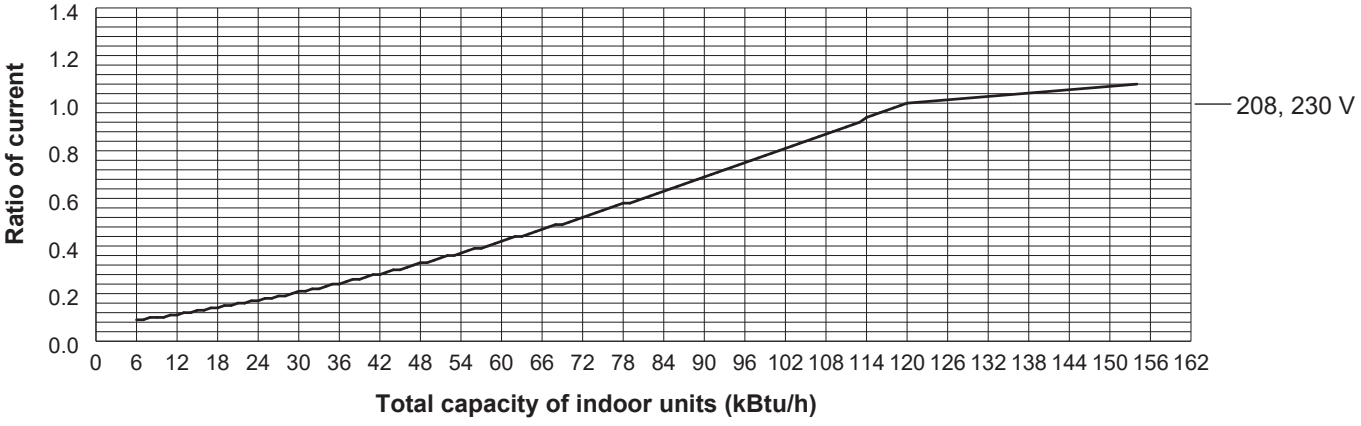

Ratio of current
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132
Total capacity of indoor units (kBtu/h)
208, 230 V

MXZ-SM120TAM-U1

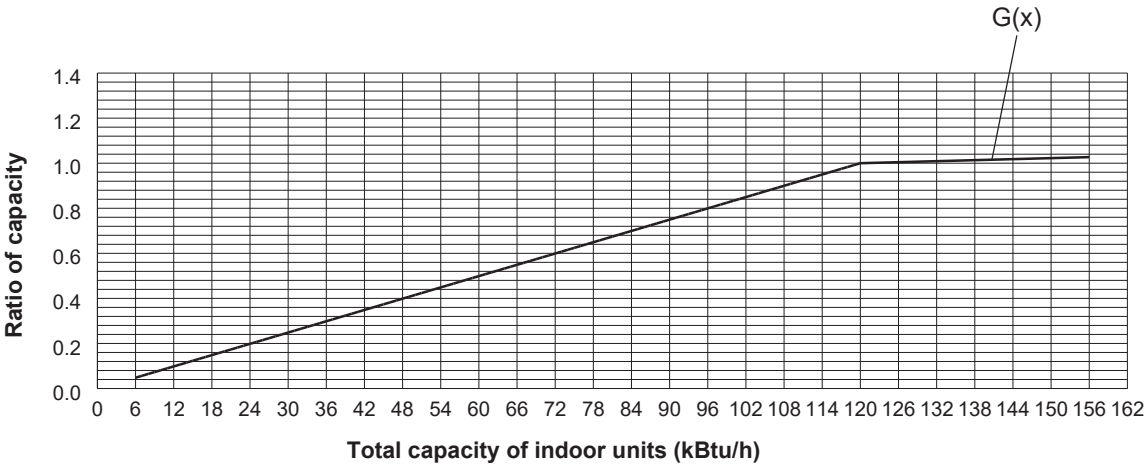
■ **Cooling**

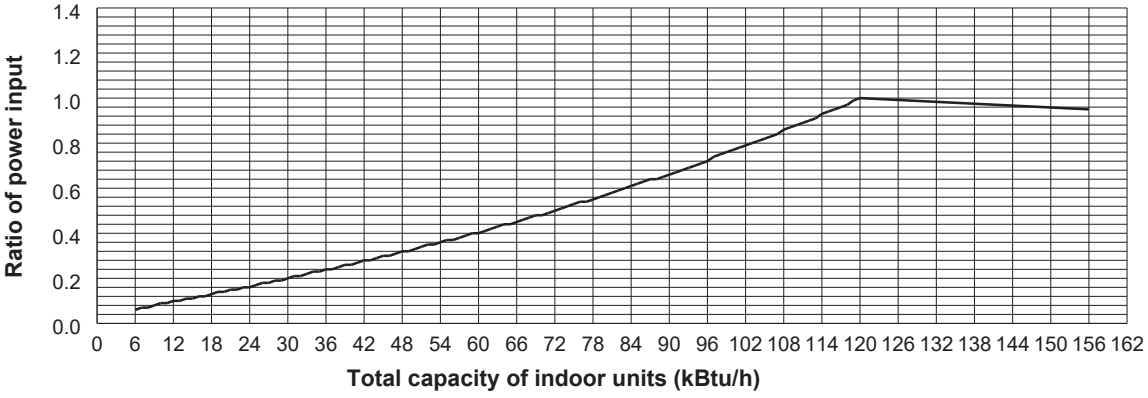


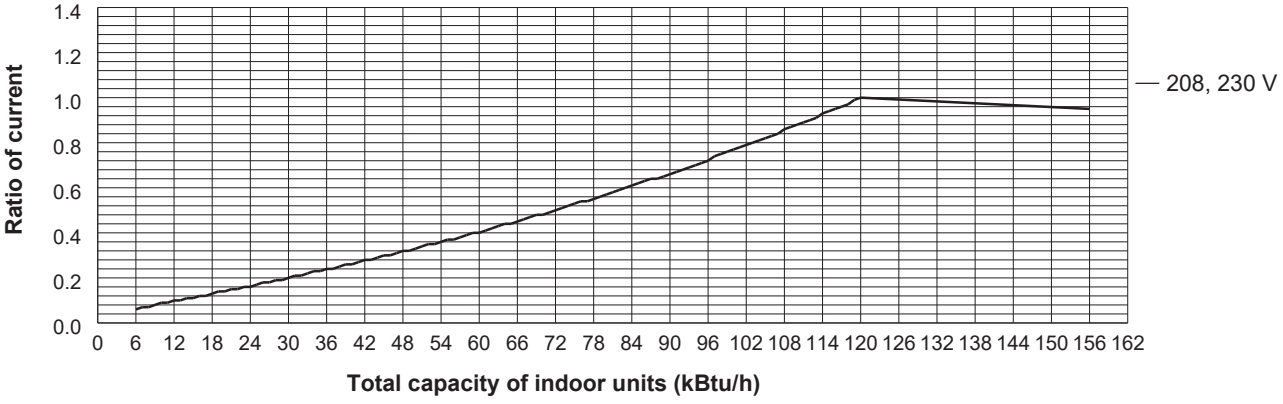




■ Heating


G(x)
Ratio of capacity
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132 138 144 150 156 162
Total capacity of indoor units (kBtu/h)


Ratio of power input
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132 138 144 150 156 162
Total capacity of indoor units (kBtu/h)


Ratio of current
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132 138 144 150 156 162
Total capacity of indoor units (kBtu/h)
208, 230 V

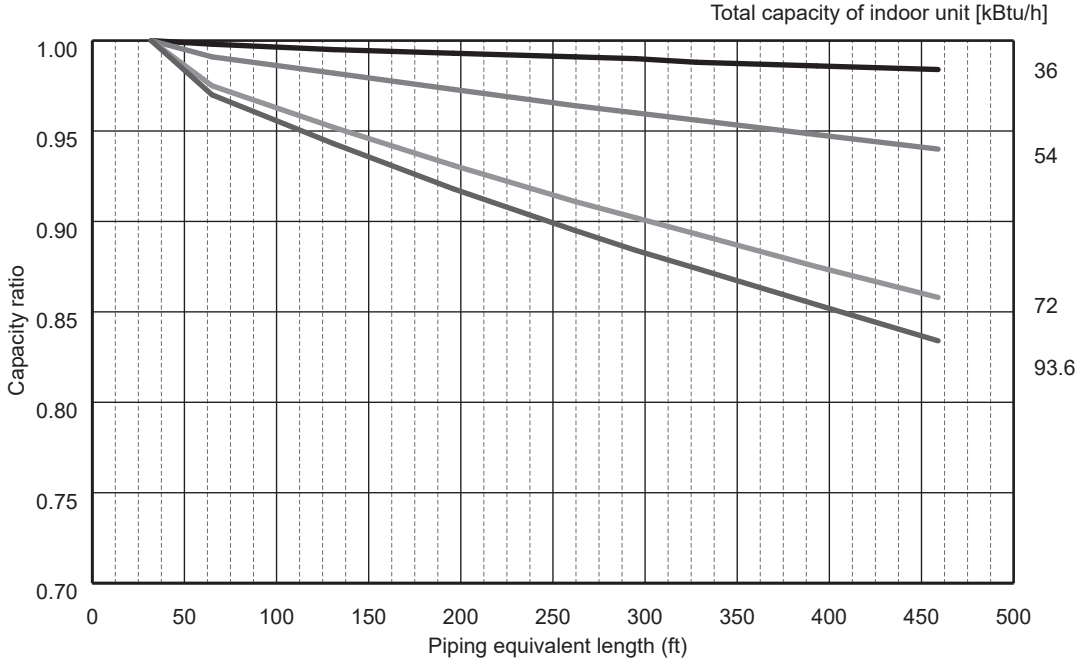
5-5. Correcting capacity for changes in the length of refrigerant piping

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

■ **Capacity Correction Curve**

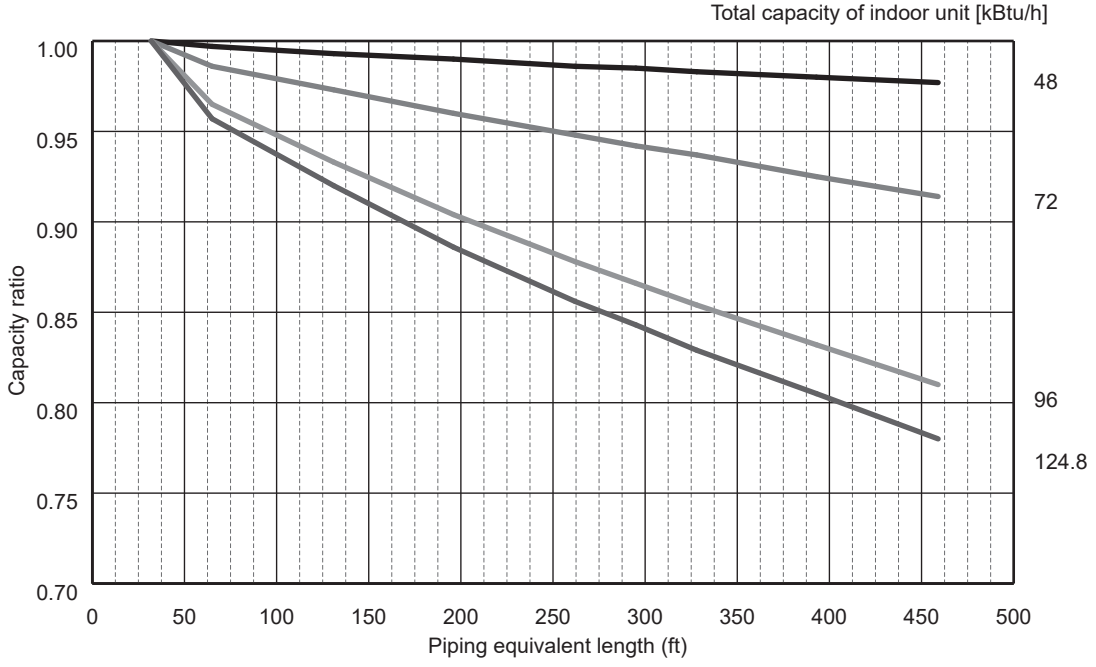
5-5-1. Cooling

MXZ-SM72TAM-U1



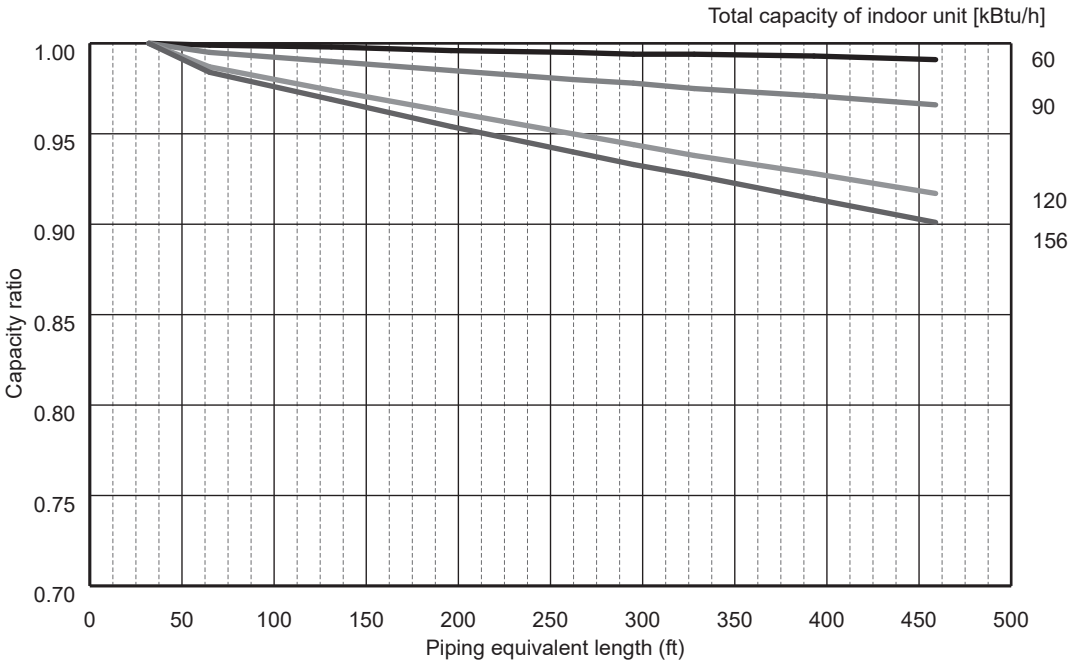
<Figure 5> Correction of refrigerant piping length

MXZ-SM96TAM-U1



<Figure 6> Correction of refrigerant piping length

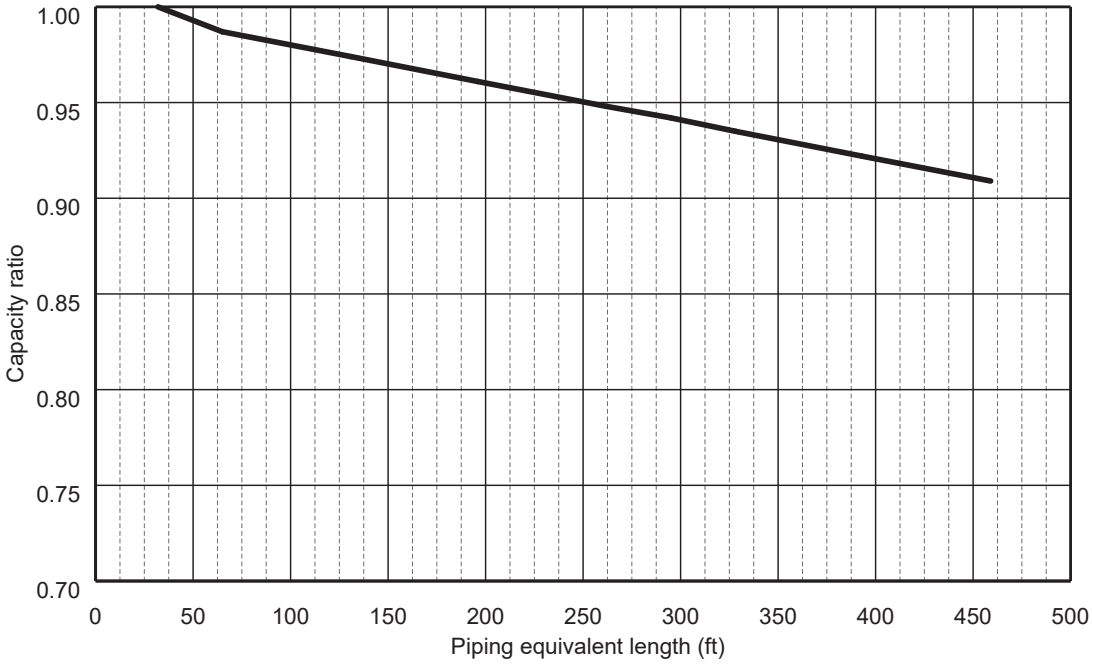
MXZ-SM120TAM-U1



<Figure 7> Correction of refrigerant piping length

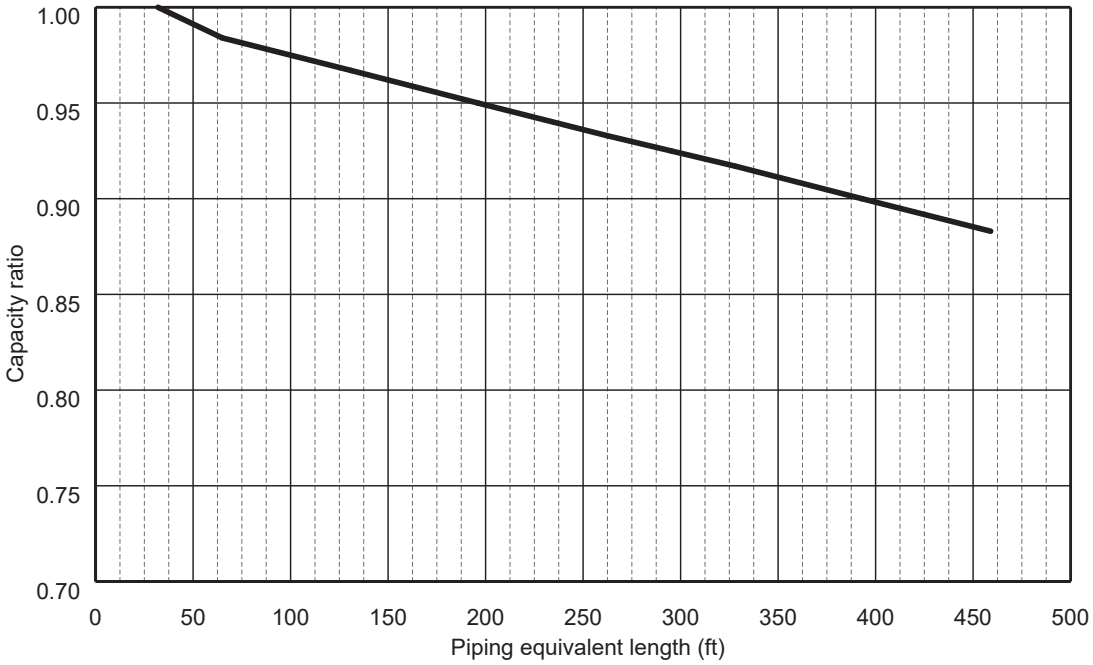
5-5-2. Heating

MXZ-SM72TAM-U1



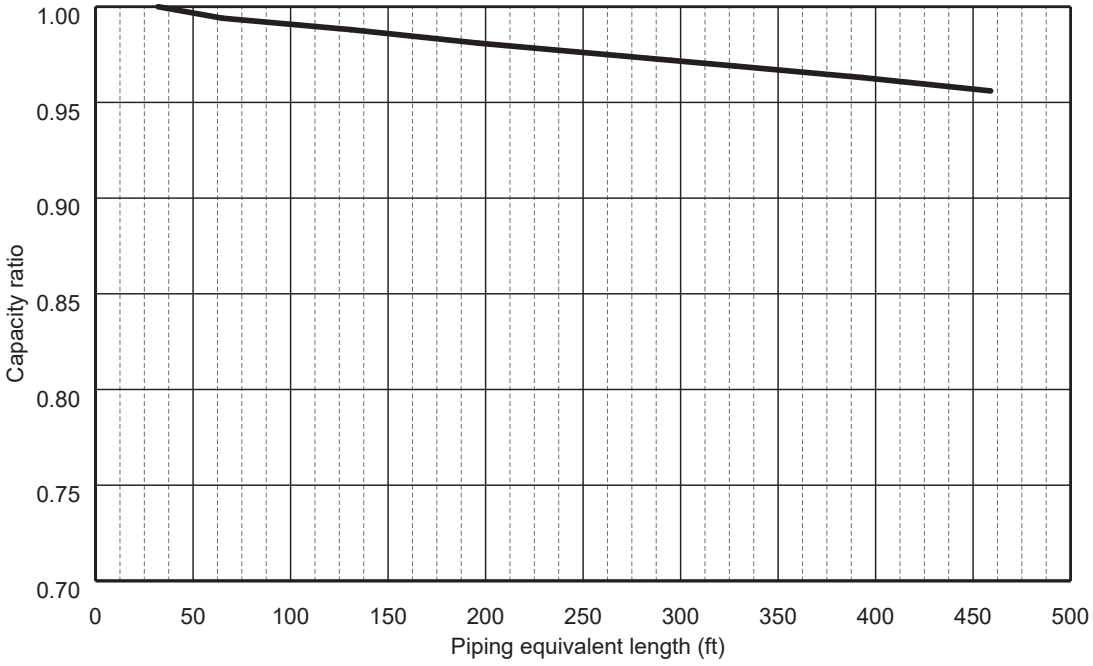
<Figure 8> Correction of refrigerant piping length

MXZ-SM96TAM-U1



<Figure 9> Correction of refrigerant piping length

MXZ-SM120TAM-U1



<Figure 10>Correction of refrigerant piping length

■ Method for obtaining the piping equivalent length

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

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

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

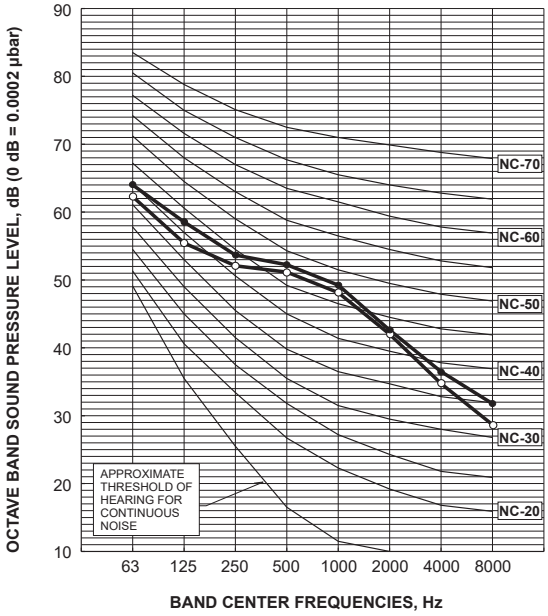
Correction factor diagram

Outdoor Intake temperature [°F(°C)WB]	43(6)	37(4)	36(2)	32(0)	28(−2)	25(−4)	21(−6)	18(−8)	14(−10)	5(−15)	−4(−20)	−13(−25)
Correction factor	1.00	0.98	0.89	0.88	0.89	0.90	0.95	0.95	0.95	0.95	0.95	0.95

5-6. Noise criterion curves

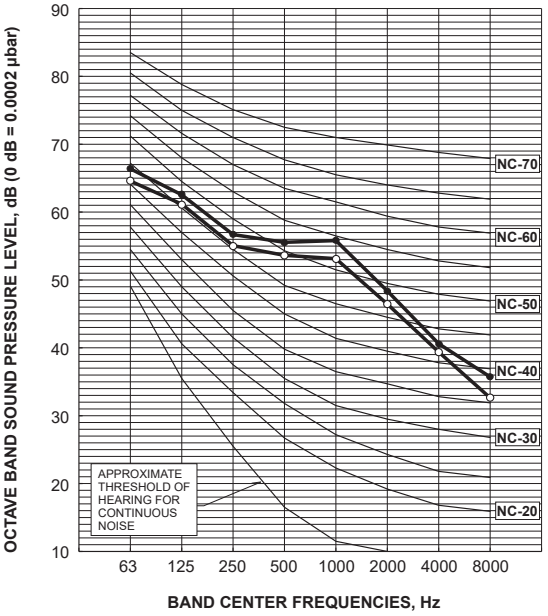
MXZ-SM72TAM-U1

MODE	SPL(dB)	LINE
COOLING	53	○—○
HEATING	54	●—●



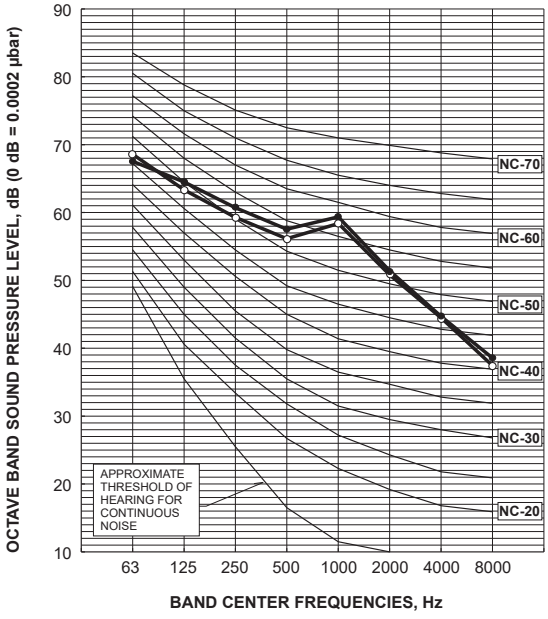
MXZ-SM96TAM-U1

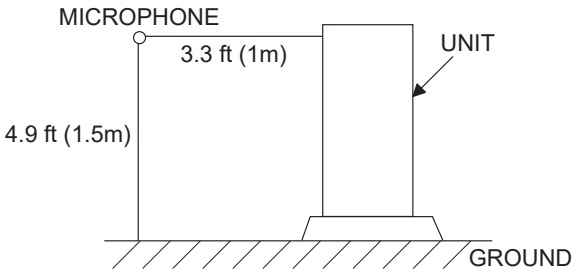
MODE	SPL(dB)	LINE
COOLING	58	○—○
HEATING	59	●—●



MXZ-SM120TAM-U1

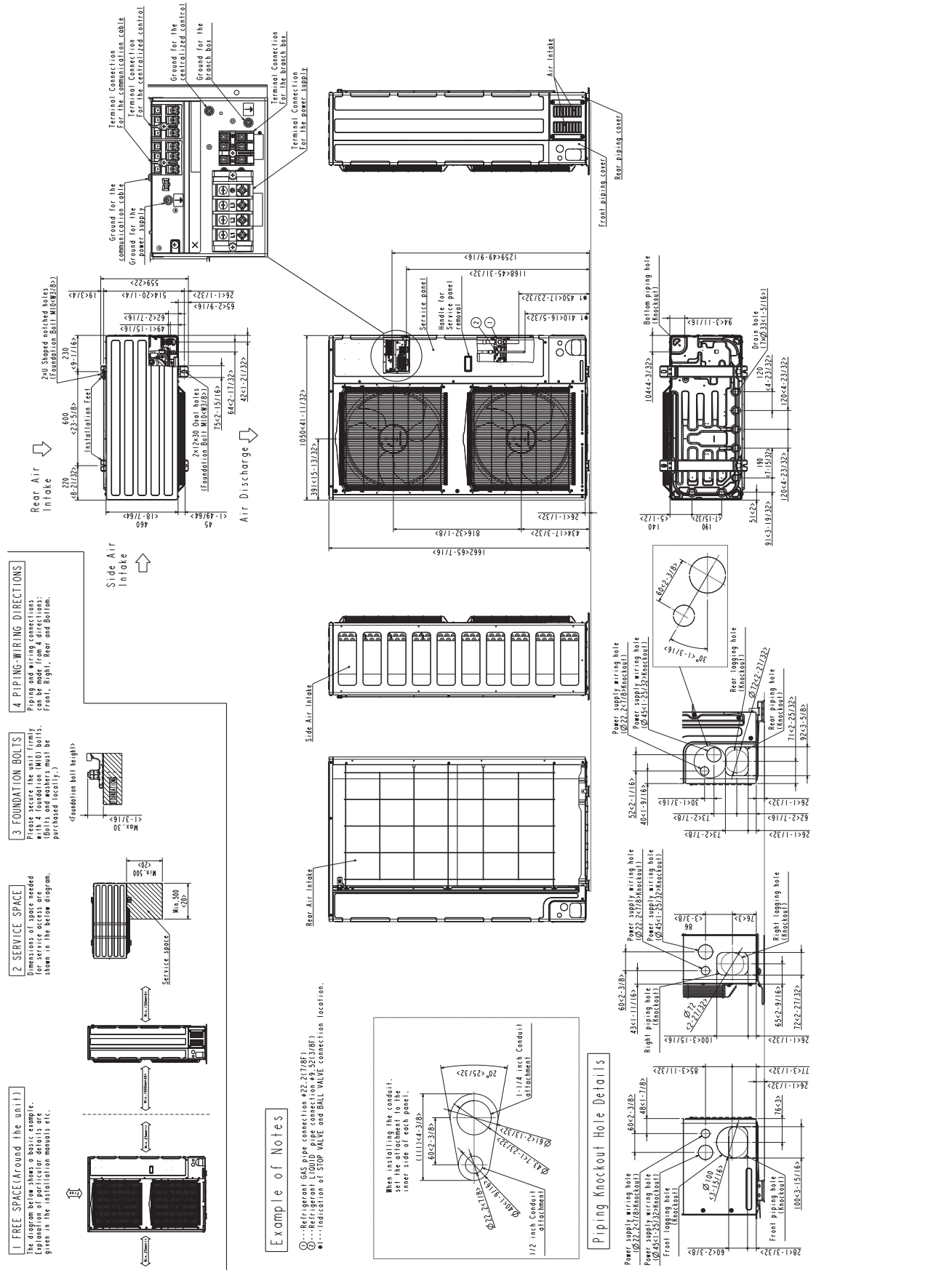
MODE	SPL(dB)	LINE
COOLING	61	○—○
HEATING	62	●—●



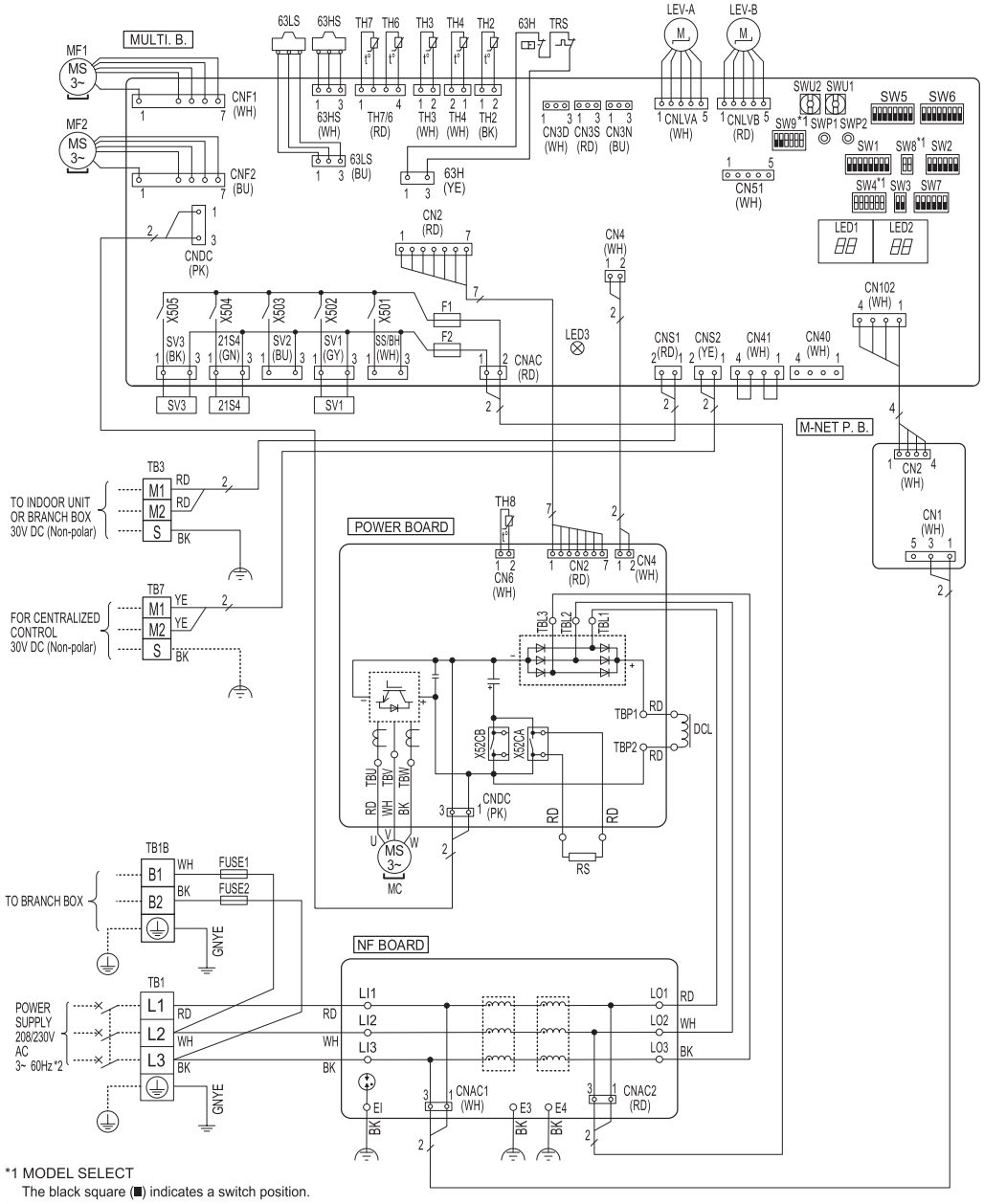


6 OUTLINES AND DIMENSIONS

Unit: mm <inch>



7 WIRING DIAGRAM



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

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

MODEL	SW4	SW8	SW9
MXZ-SM 72TAM	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4 5 6
MXZ-SM 96TAM	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4 5 6
MXZ-SM 120TAM	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4 5 6

【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply>	TRS	Compressor Protecter	SW6	Switch <Function Selection>
TB1B	Terminal Block <Branch Box>	RS	Rush Current Protect Resistor	SW7	Switch <Function Selection>
TB3	Terminal Block <Indoor/Outdoor, Branch Box/Outdoor>	LEV-A, LEV-B	Linear Expansion Valve	SW8	Switch <Model Selection>
TB7	Terminal Block <Centralized Control Transmission Line>	DCL	Reactor	SW9	Switch <Function/Model Selection>
FUSE1, FUSE2	Fuse <T20AL250V>	POWER BOARD	Power Circuit Board	SWP1	Switch <Display Selection>
MC	Motor for Compressor	TBL1,TBL2,TBL3	Connection Terminal <L1/L2/L3-Power Supply>	SWP2	Switch <Display Selection>
MF1, MF2	Fan Motor	TBP1,TBP2	Connection Terminal <Reactor>	SWU1	Switch <Unit Address Selection, ones digit>
63H	High Pressure Switch	TBU,TBV,TBW	Connection Terminal <U/V/W-Phase>	SWU2	Switch <Unit Address Selection, tens digit>
63HS	High Pressure Sensor	X52CA,X52CB	Relay with Connection Terminal	SS/BH	Connector <Connection for Option>
63LS	Low Pressure Sensor	NF BOARD	Noise Filter Circuit Board	CN3D	Connector <Connection for Option>
SV1	Solenoid Valve Coil <Bypass Valve>	LI1, LI2, LI3	Connection Terminal <L1/L2/L3-Power Supply>	CN3S	Connector <Connection for Option>
SV3	Solenoid Valve Coil <Oil return Valve>	LO1, LO2, LO3	Connection Terminal <L1/L2/L3-Power Supply>	CN3N	Connector <Connection for Option>
21S4	Solenoid Valve Coil <4-Way Valve>	EI, E3, E4	Connection Terminal <Electrical Parts Box>	CN51	Connector <Connection for Option>
TH2	Thermistor <HIC Pipe>	MULTI.B.	Multi Controller Circuit Board	LED1, LED2	LED <Operation Inspection Display>
TH3	Thermistor <Outdoor Liquid Pipe>	SW1	Switch <Display Selection>	LED3	LED <Power Supply to Main Microcomputer>
TH4	Thermistor <Compressor>	SW2	Switch <Function/Model Selection>	F1, F2	Fuse <T6.3AL250V>
TH6	Thermistor <Suction Pipe>	SW3	Switch <Test Run>	M-NET P.B.	M-NET Power Circuit Board
TH7	Thermistor <Ambient>	SW4	Switch <Model Selection>		
TH8	Thermistor <Heat Sink>	SW5	Switch <Function 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.
   - The unit might NOT run, in order to protect the compressor, in the case of low outside air temperature.*
   • 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.

⚠**Caution:**
• The compressor may not operate immediately after recovery from power failure. Refer to "SW6-3" in 8-5. "Internal switch function table" for how to deal with it.

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
UL	1300	Low pressure trouble		O		
UE	1302	High pressure trouble or compressor protector / thermal protector trouble		O		Check delay code 1402
U7	1500	Superheat due to low discharge temperature trouble		O		Check delay code 1600
U2	1501	Refrigerant shortage trouble		O		Check delay code 1601
		Closed valve in cooling mode		O		Check delay code 1501
P6	1503	Freeze protection of plate heat exchanger	O			
		Freeze protection of branch box or indoor unit	O			
EF	1508	4-way valve trouble in heating mode		O		Check delay code 1608

Error code (2 digits)	Error code (4 digits)	Trouble	Detected Unit			Remarks
			Indoor	Outdoor	Remote Controller	
FL/EF	1521/1522	Refrigerant leakage	O	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		
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	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 or No response error, the target indoor unit is treated as stopped and not assumed to be abnormal.
- The error codes displayed on the units may be different between the error source and others. In that case, please refer to the error code of error source by displayed attribute and address.
- Refer to the service manual of 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.

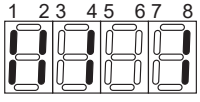
■ During normal operation

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



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

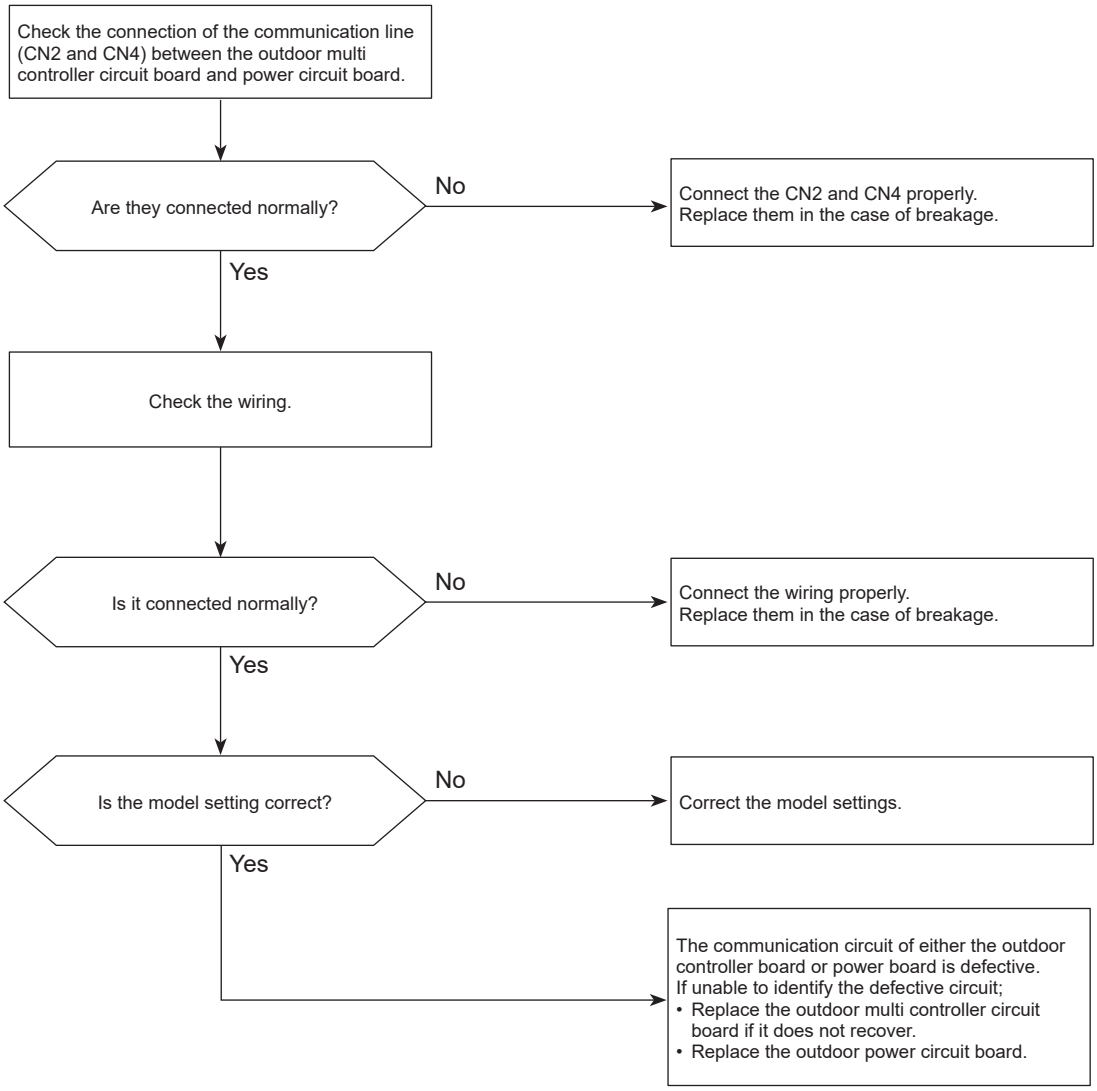
Abnormal points and detection methods

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

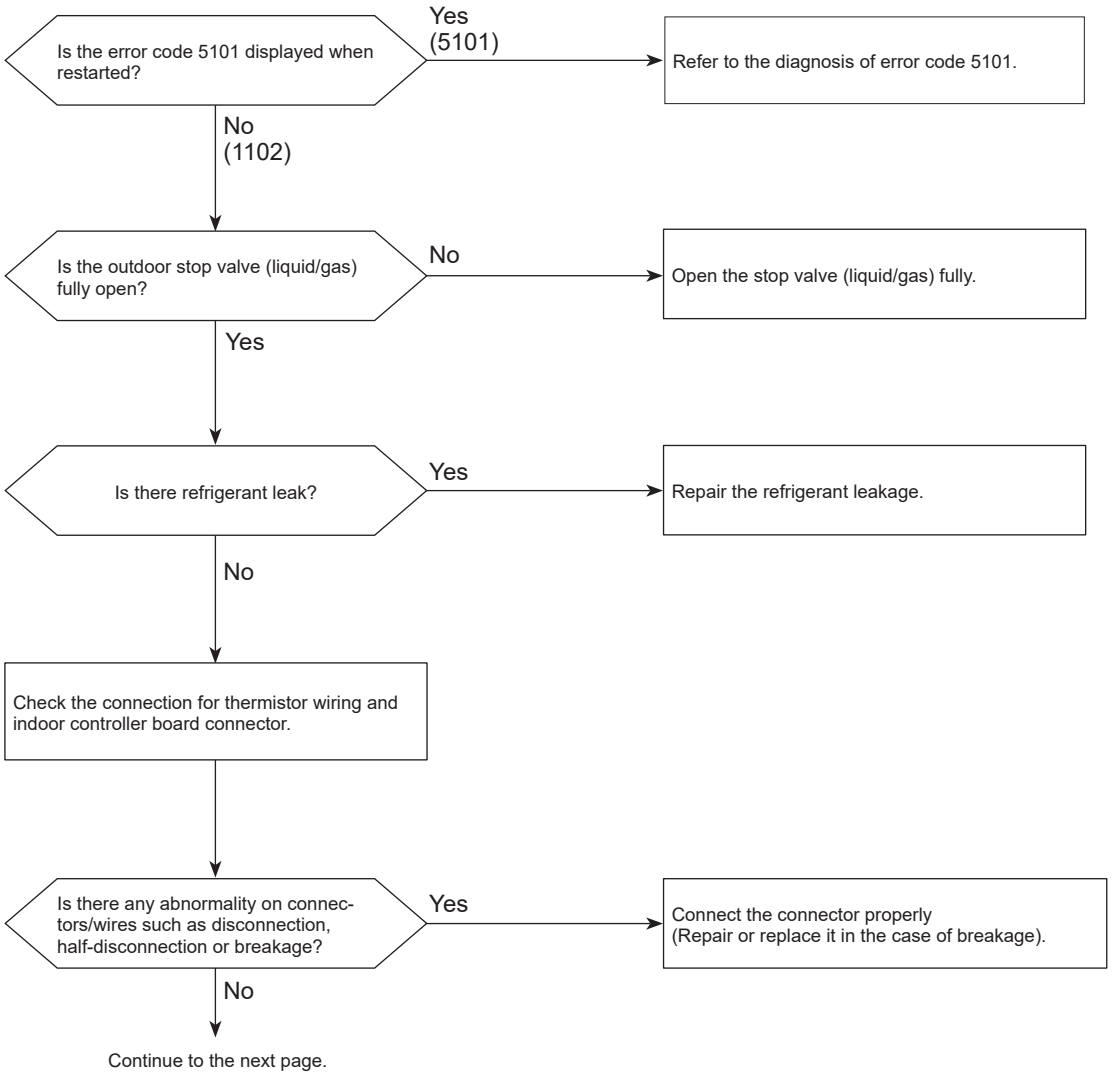
- TH4 falls into either of the following temperature conditions:
  - over 230°F (110°C) continuously for 5 minutes
  - over 257°F (125°C)
- The saturation temperature converted from the pressure detected by the high pressure sensor exceeds 104°F (40°C) during defrosting, and TH4 exceeds 230°F (110°C)

TH4:
Thermistor <Compressor>
LEV:
Linear expansion valve

Causes and checkpoints

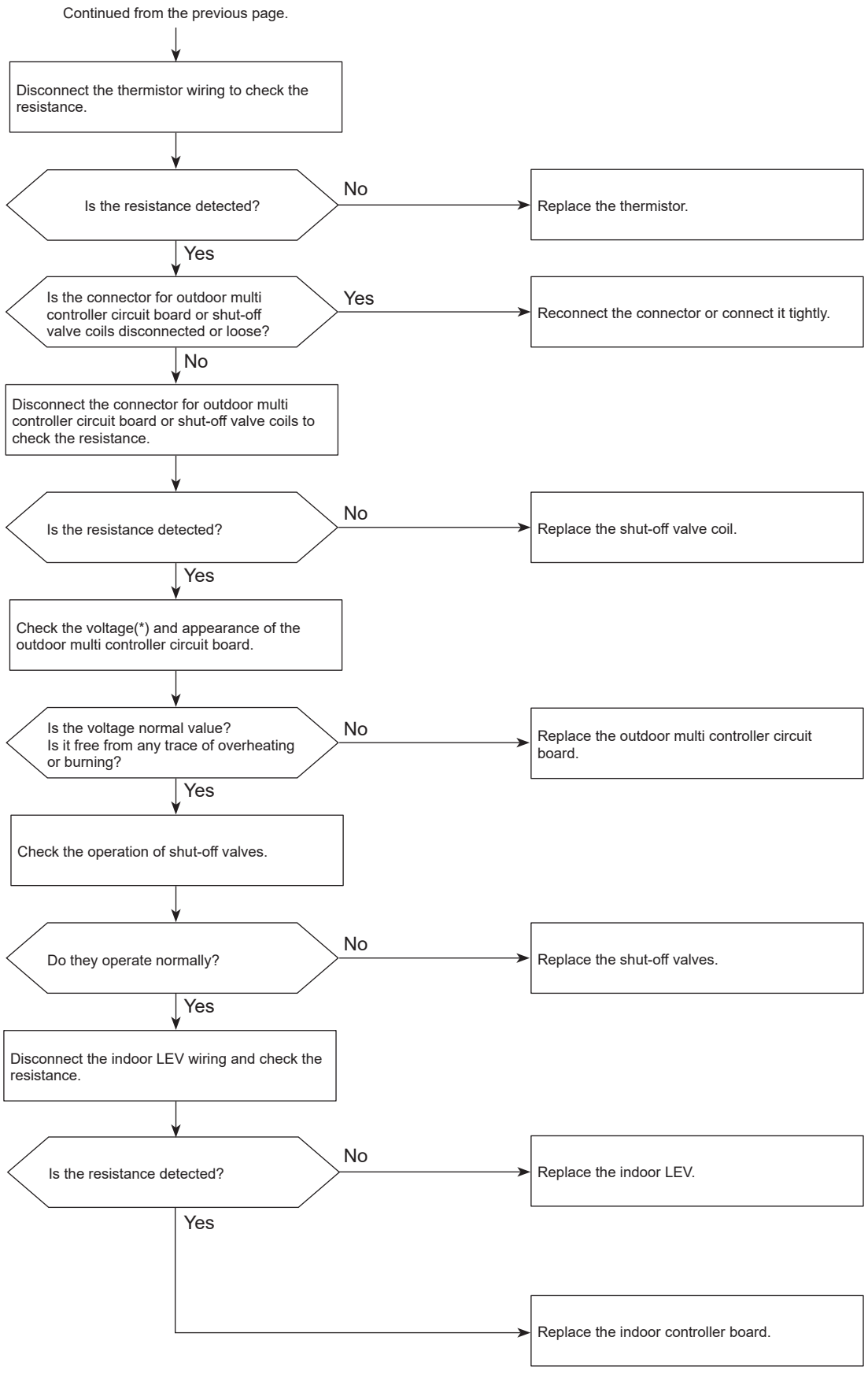
- Malfunction of stop valve
- Over-heated compressor operation caused by shortage of refrigerant
- Defective thermistor
- Defective outdoor multi controller circuit board
- LEV performance failure
- Defective indoor controller board
- Clogged refrigerant system caused by foreign object
- Refrigerant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

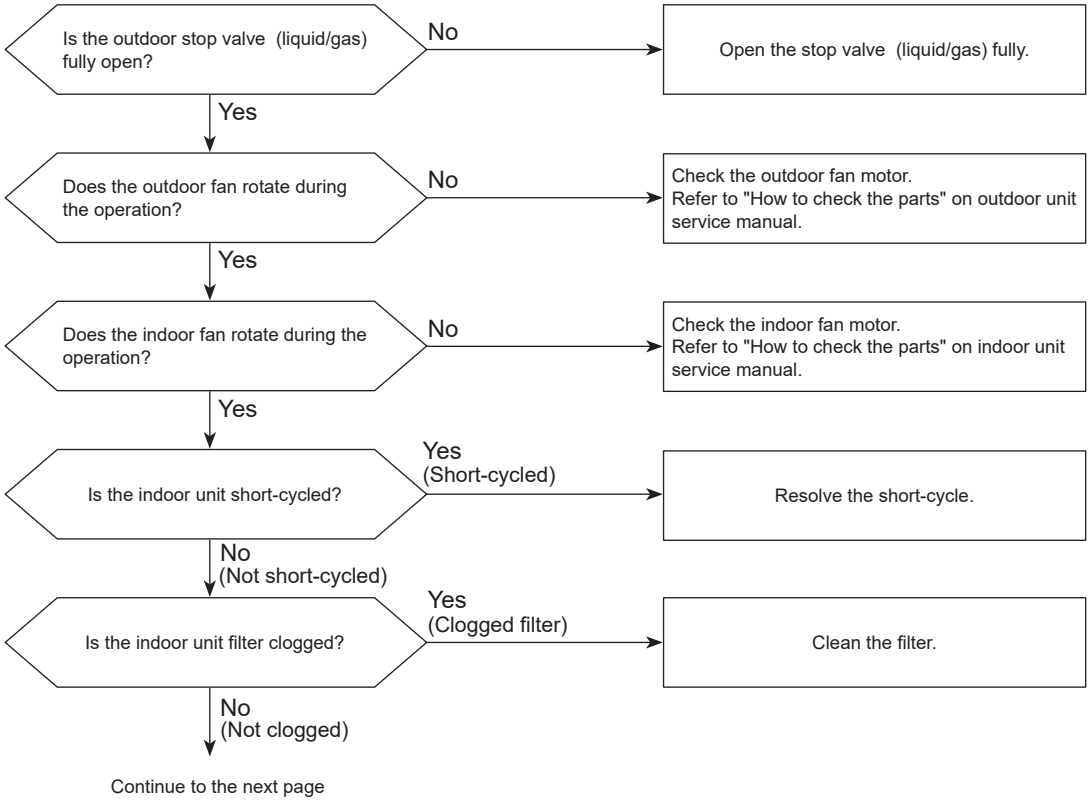
63L equipped model
- Low pressure (63L is in operation)
  63L operates (under 0.00 MPaG) during compressor operation.

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

Causes and checkpoints

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

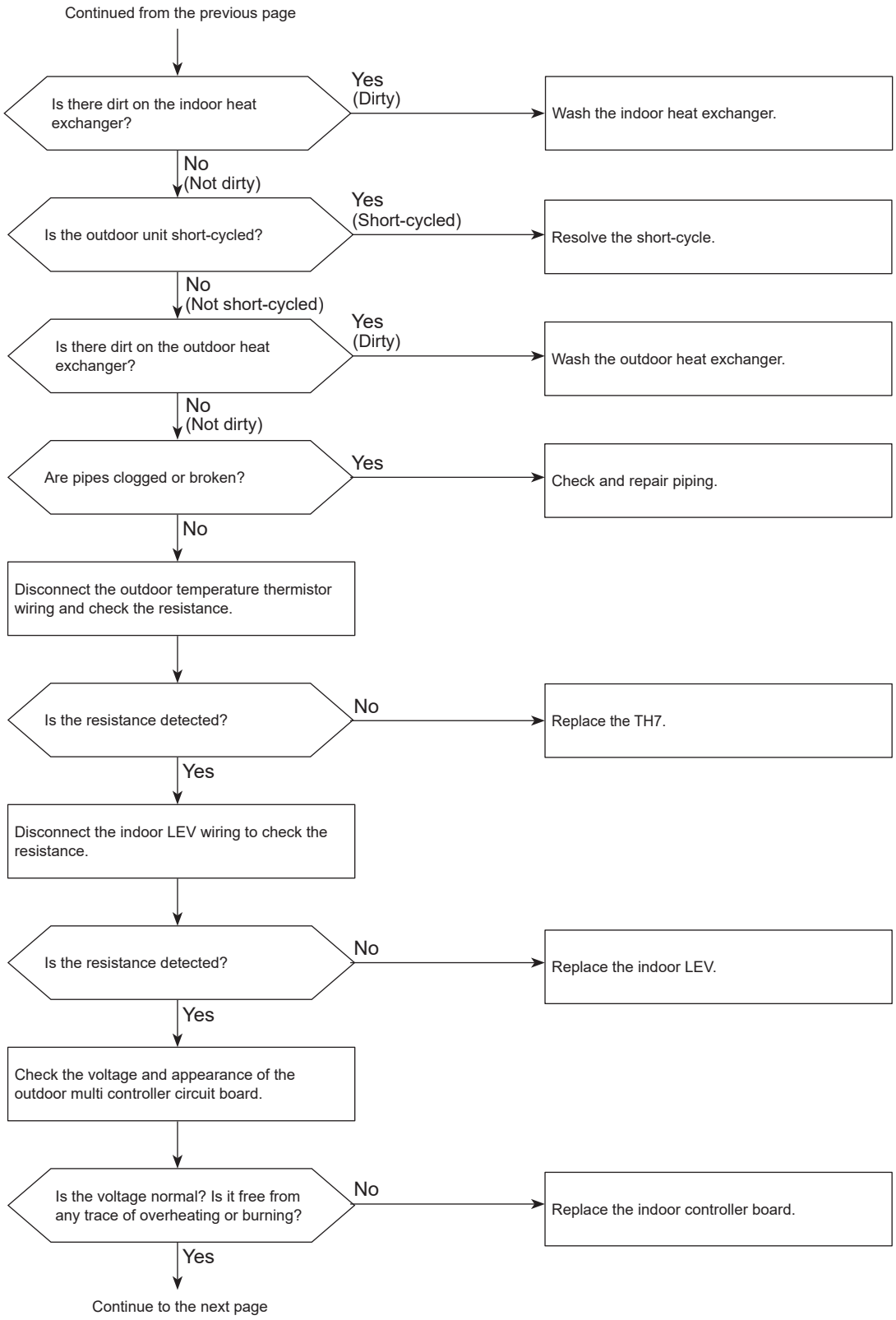
Diagnosis of failure



Continue to the next page

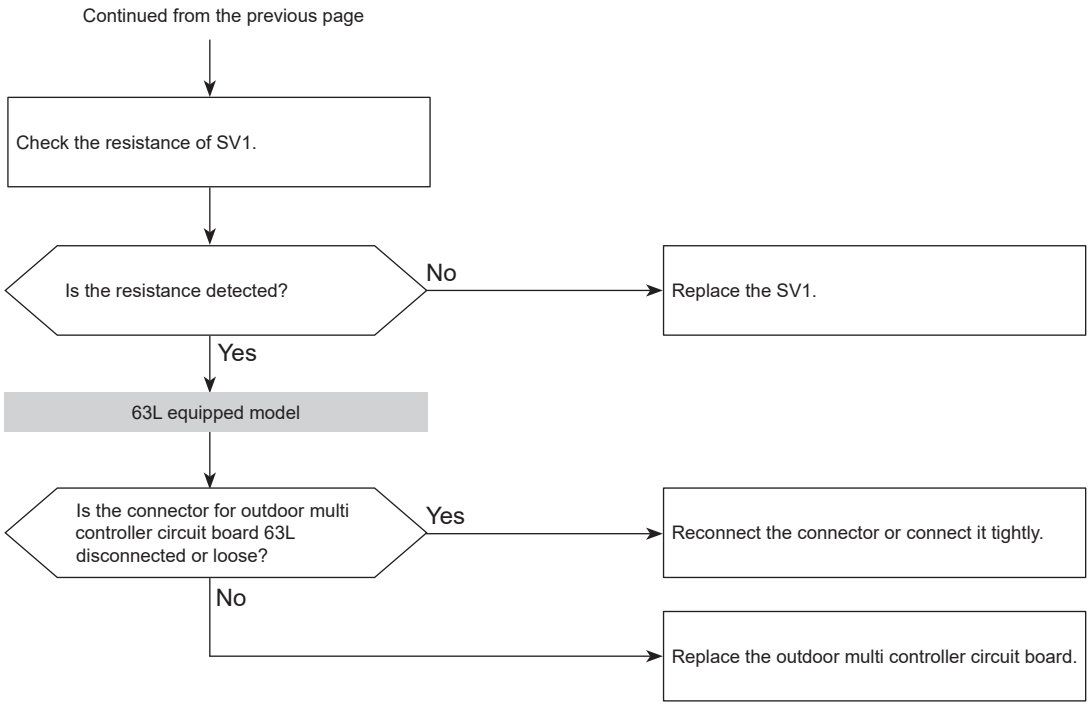
1300 (UL): Low pressure trouble

Diagnosis of failure



1300 (UL): Low pressure trouble

Diagnosis of failure



1302 (UE): High pressure trouble

Abnormal points and detection methods

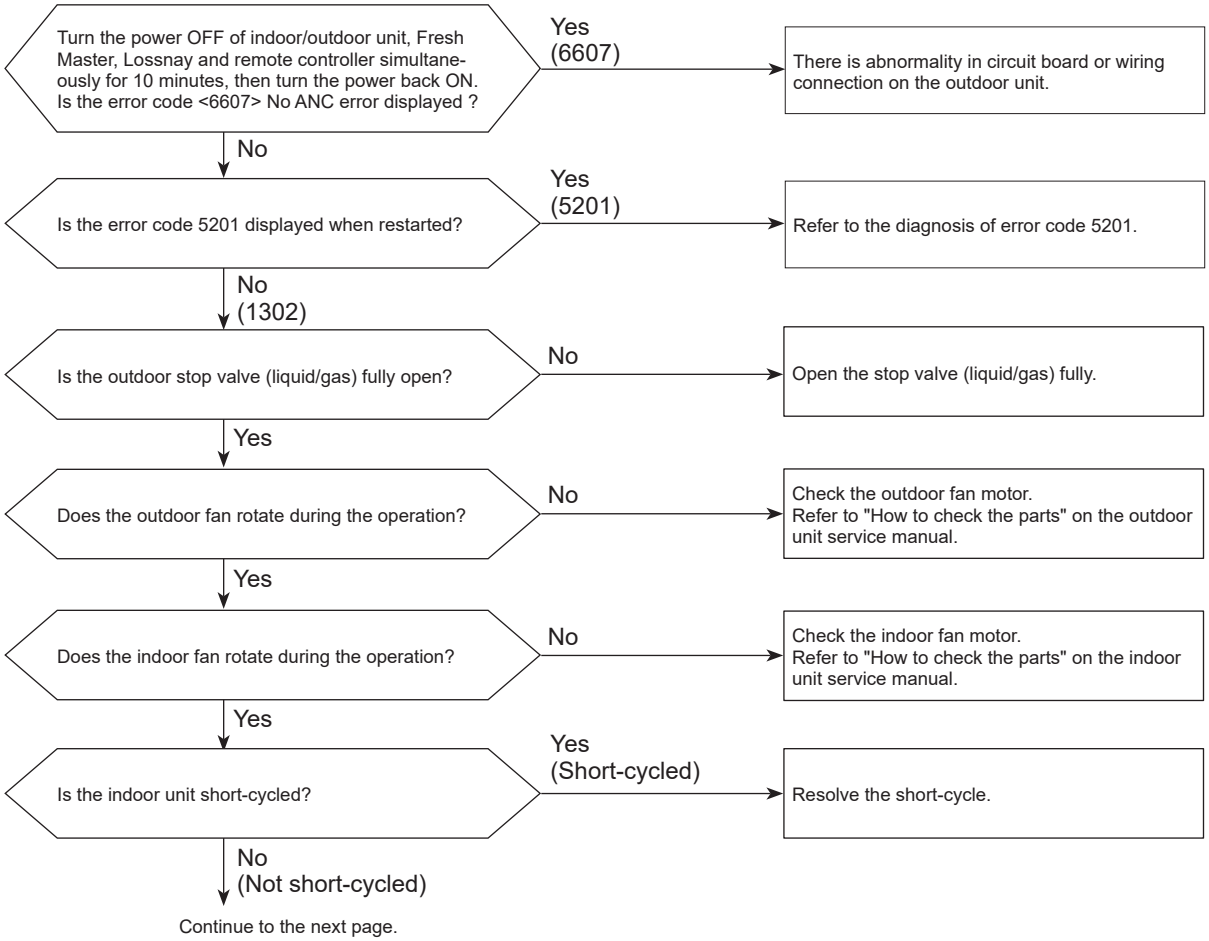
- High pressure abnormality (63H operation)
  63H operates(*) during compressor operation.
  (* 602 psig [4.15 MPaG])
- High pressure abnormality (63HS detected)
  - A pressure detected by 63HS is 625 psig (4.31 MPaG) or more during compressor operation.
  - A pressure detected by 63HS is 600 psig (4.14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

63H:
High pressure switch
63HS:
High pressure sensor
LEV:
Linear expansion valve
SV1:
Solenoid valve
TH7:
Thermistor <Ambient>
TH4:
Thermistor <Compressor>
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

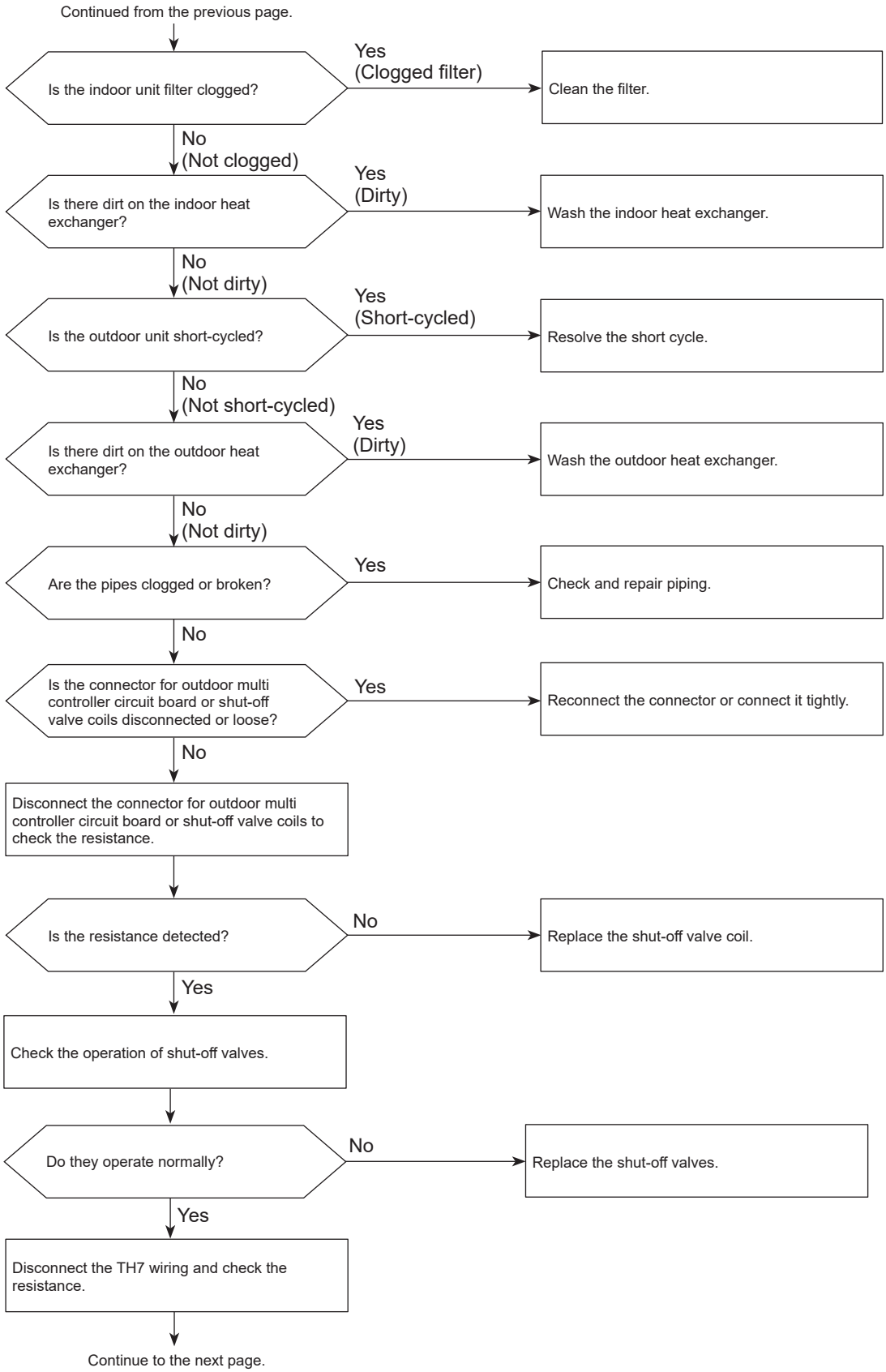
Diagnosis of failure



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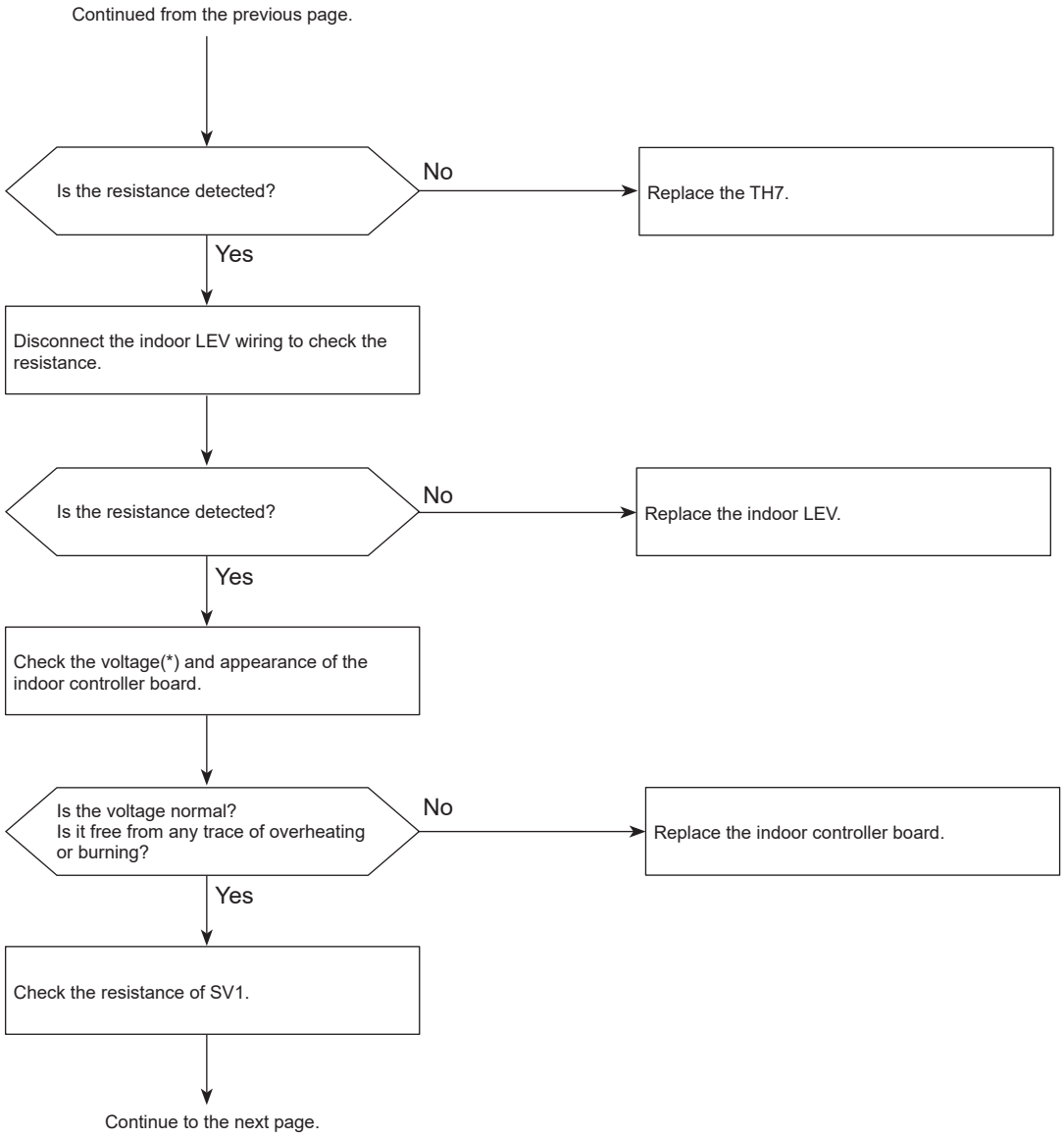
1302 (UE): High pressure trouble

Diagnosis of failure



1302 (UE): High pressure trouble

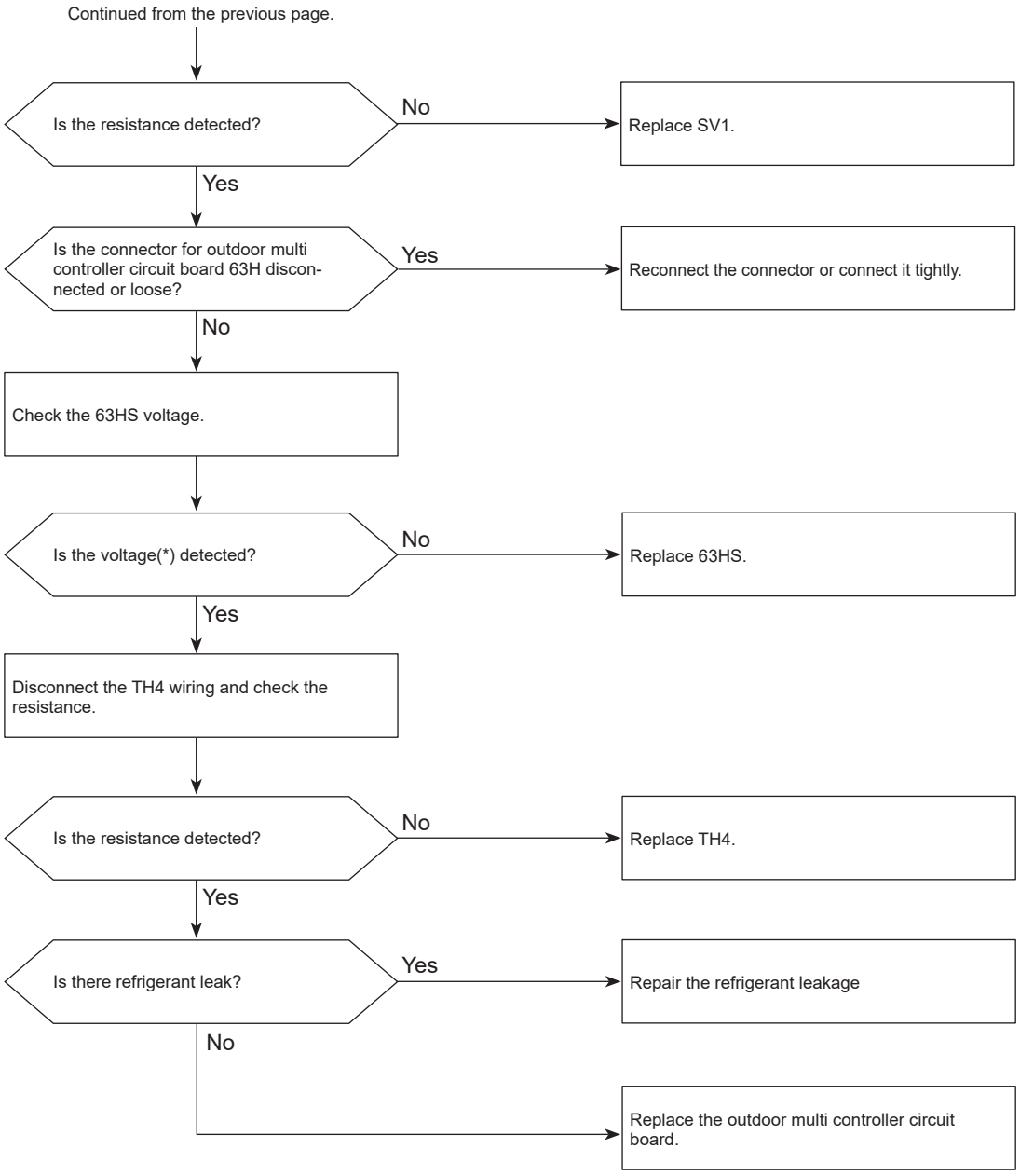
Diagnosis of failure



*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 -27°F (-15°C)* or less is detected for 5 consecutive minutes even though the indoor LEV has the minimum open pulse.

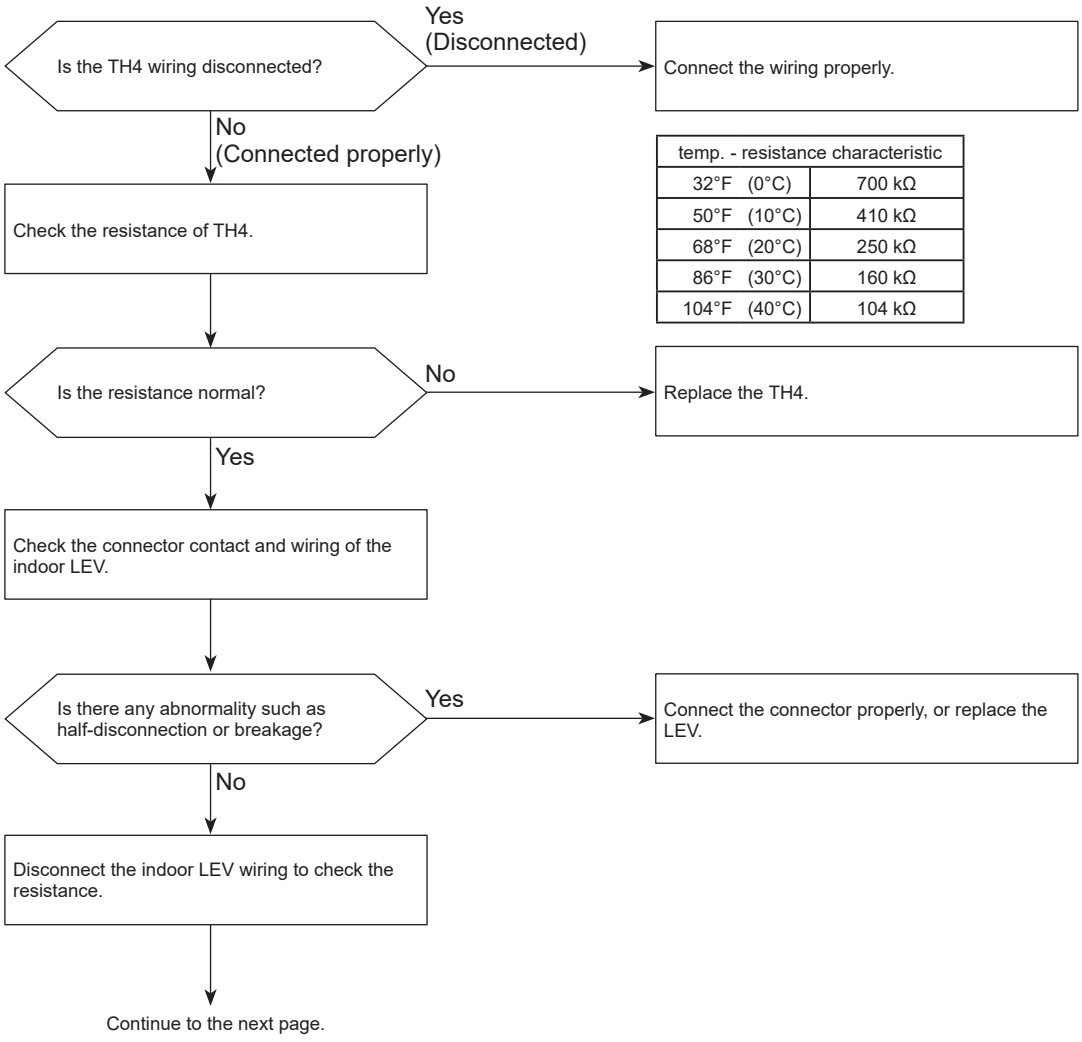
LEV:
Linear expansion valve
TH4:
Thermistor <Compressor>
63HS:
High pressure sensor

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

Causes and checkpoints

- Disconnection or loose connection of TH4
- Defective holder of TH4
- Disconnection of LEV coil
- Disconnection of LEV connector
- LEV performance failure
- Malfunction of shut-off valves

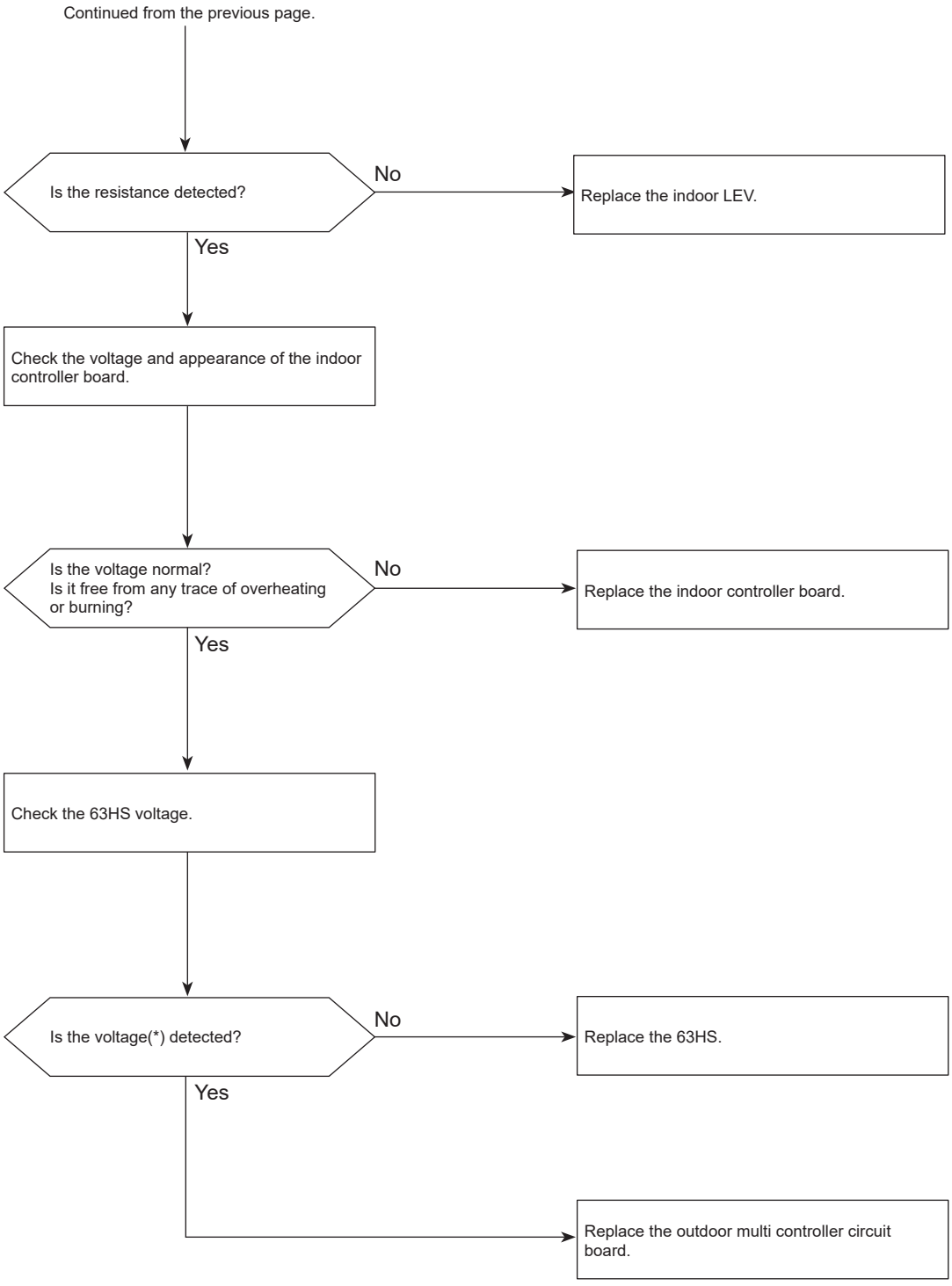
Diagnosis of failure



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

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

Diagnosis of failure



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

1501 (U2): Refrigerant shortage trouble

Abnormal points and detection methods

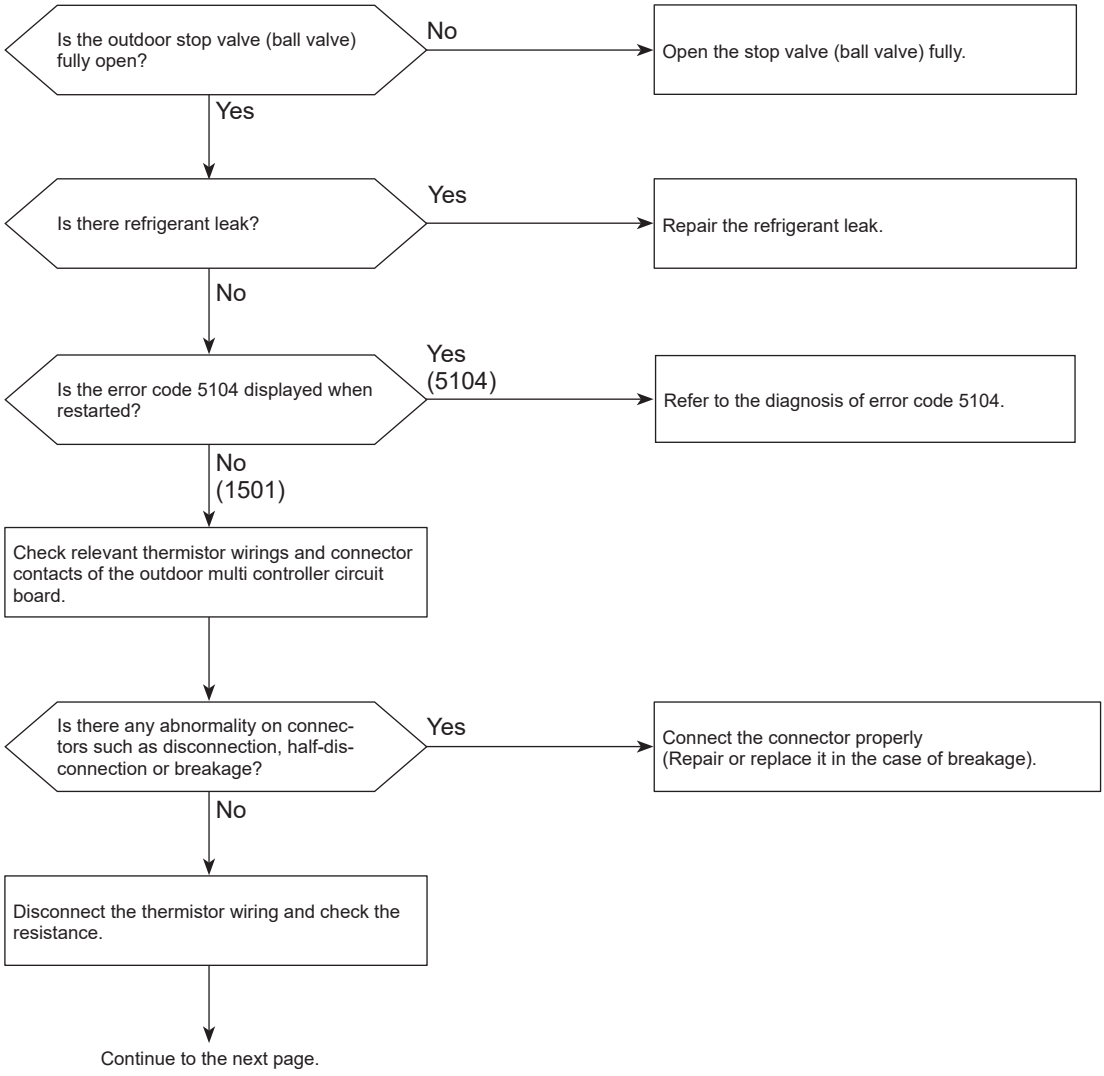
- All of the following conditions have been satisfied for 15 consecutive minutes:
  - The compressor is operating in HEAT mode.
  - Discharge superheat is 176°F (80°C) or more.
  - Difference between TH7 and TH3 fits the formula of TH7−TH3 < 9°F (5°C)
  - The saturation temperature converted from the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

Causes and checkpoints

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

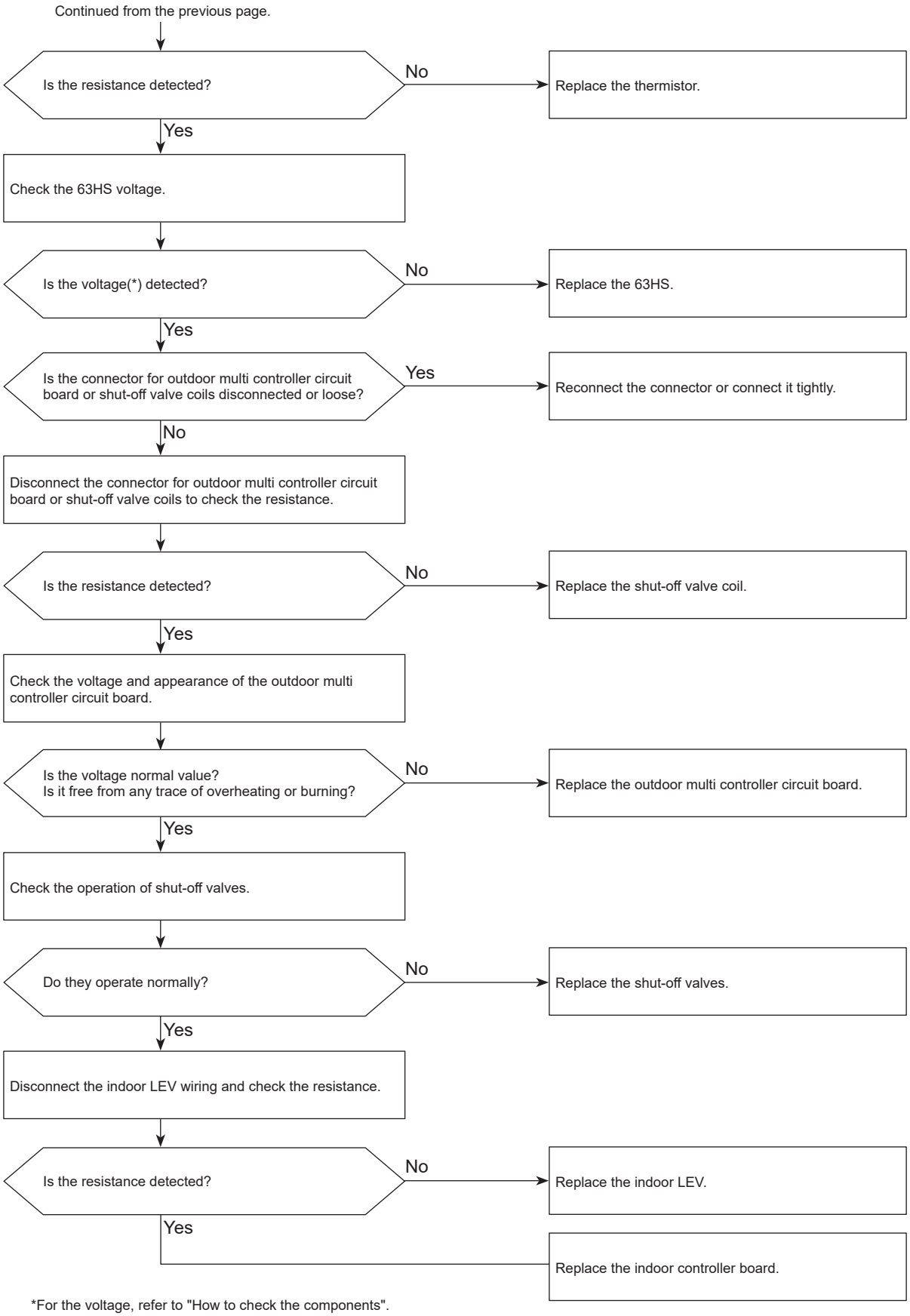
TH3:
Thermistor <Outdoor liquid pipe>
TH7:
Thermistor <Ambient>
LEV:
Linear expansion valve
63HS:
High pressure sensor

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

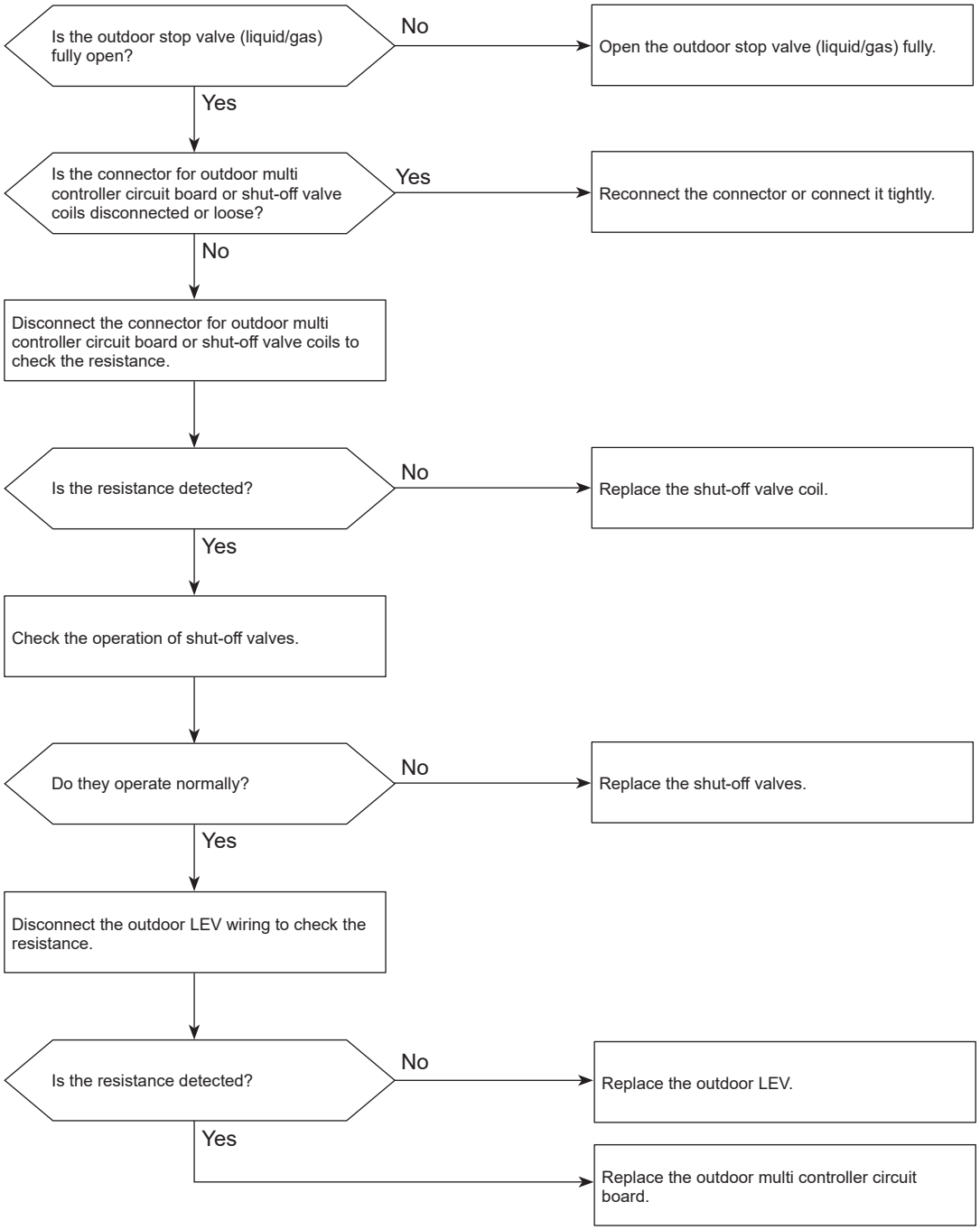
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

Causes and checkpoints

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

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.

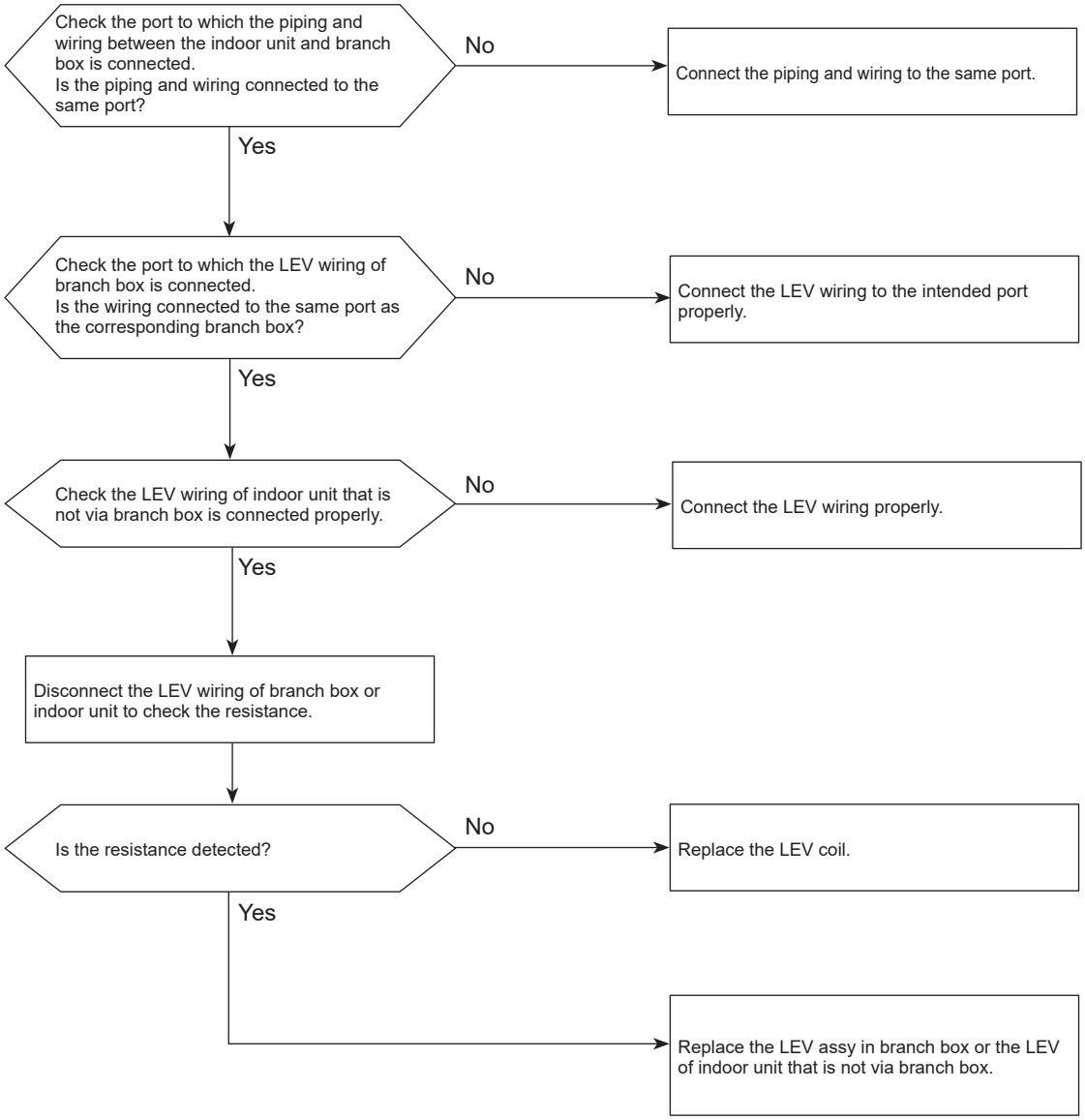
All of the following conditions have been satisfied:

- 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 ≤ 23°F (−5 °C) for 5 consecutive minutes.

Causes and checkpoints

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

Diagnosis of failure



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

Abnormal points and detection methods

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

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

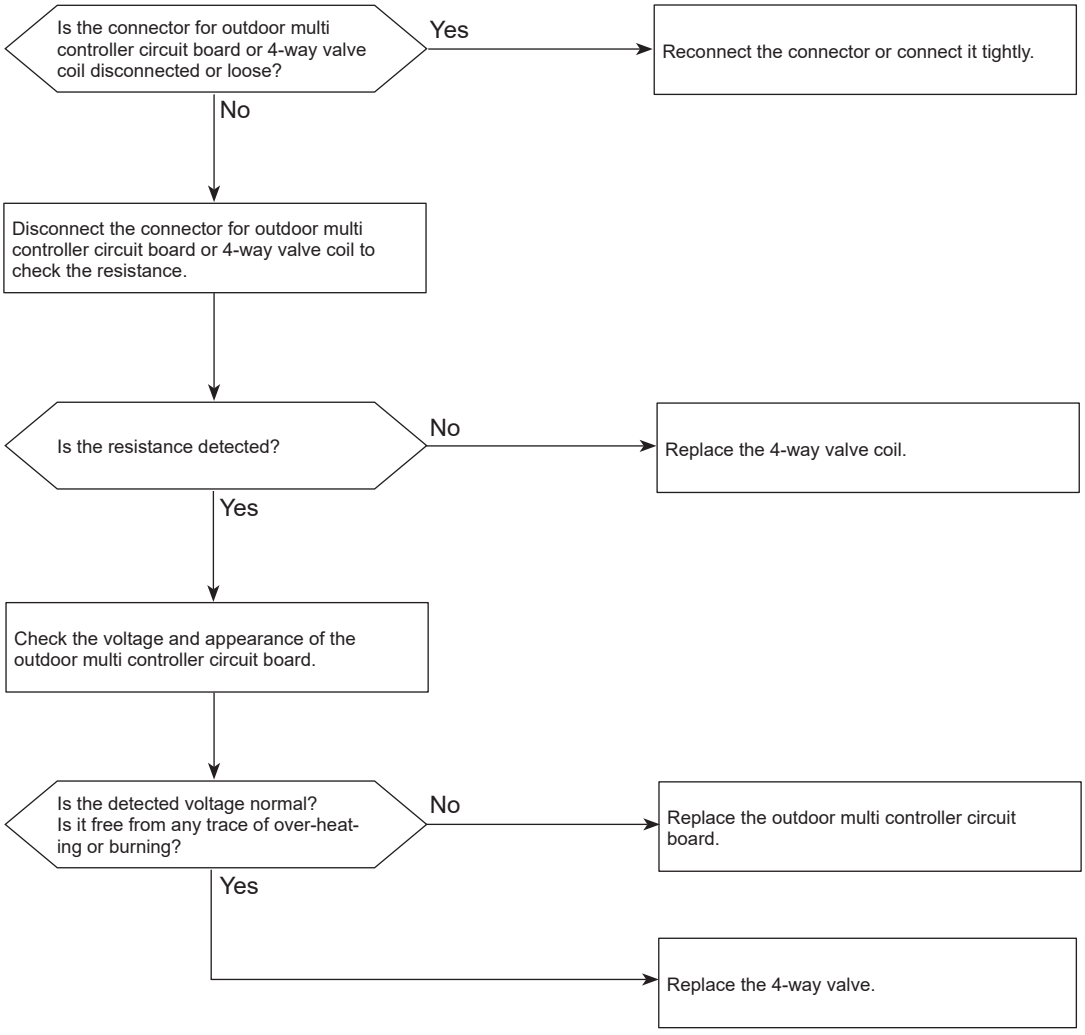
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

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

Causes and checkpoints

- 4-way valve failure
- Disconnection or failure of 4-way valve coil
- 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.

3121: Out-of-range outside air temperature

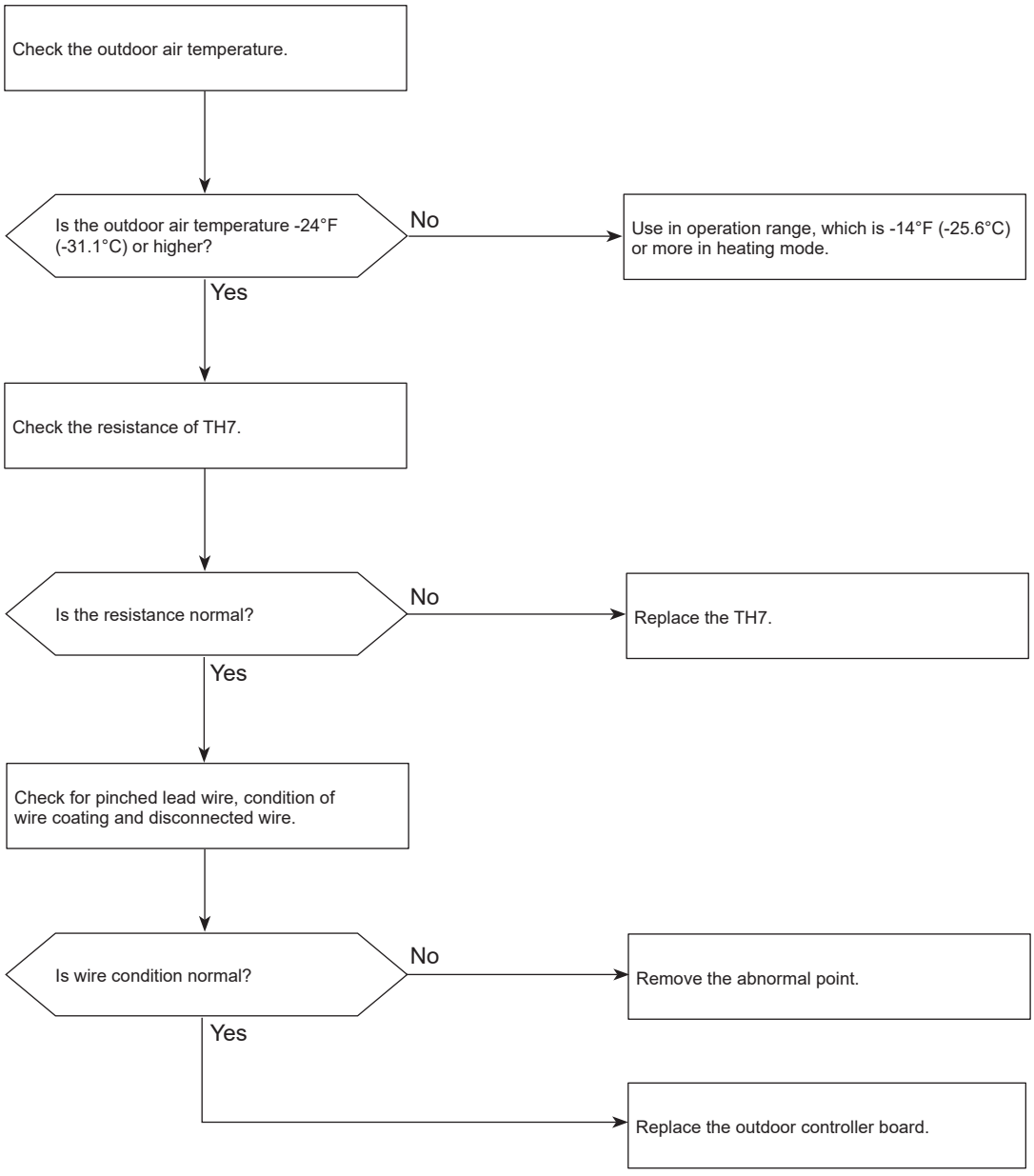
Abnormal points and detection methods

- When the thermistor temperature of -24°F (-31.1°C) or below has continuously been detected for 3 minutes during heating operation (during compressor operation), the unit makes an error stop and "3121" appears on the LED1 and LED2.
- The compressor restarts when the thermistor temperature is -14°F (-25.6°C) or above.
- If the unit is turned OFF, the outdoor temperature error will be canceled.

Causes and checkpoints

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

Diagnosis of failure



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

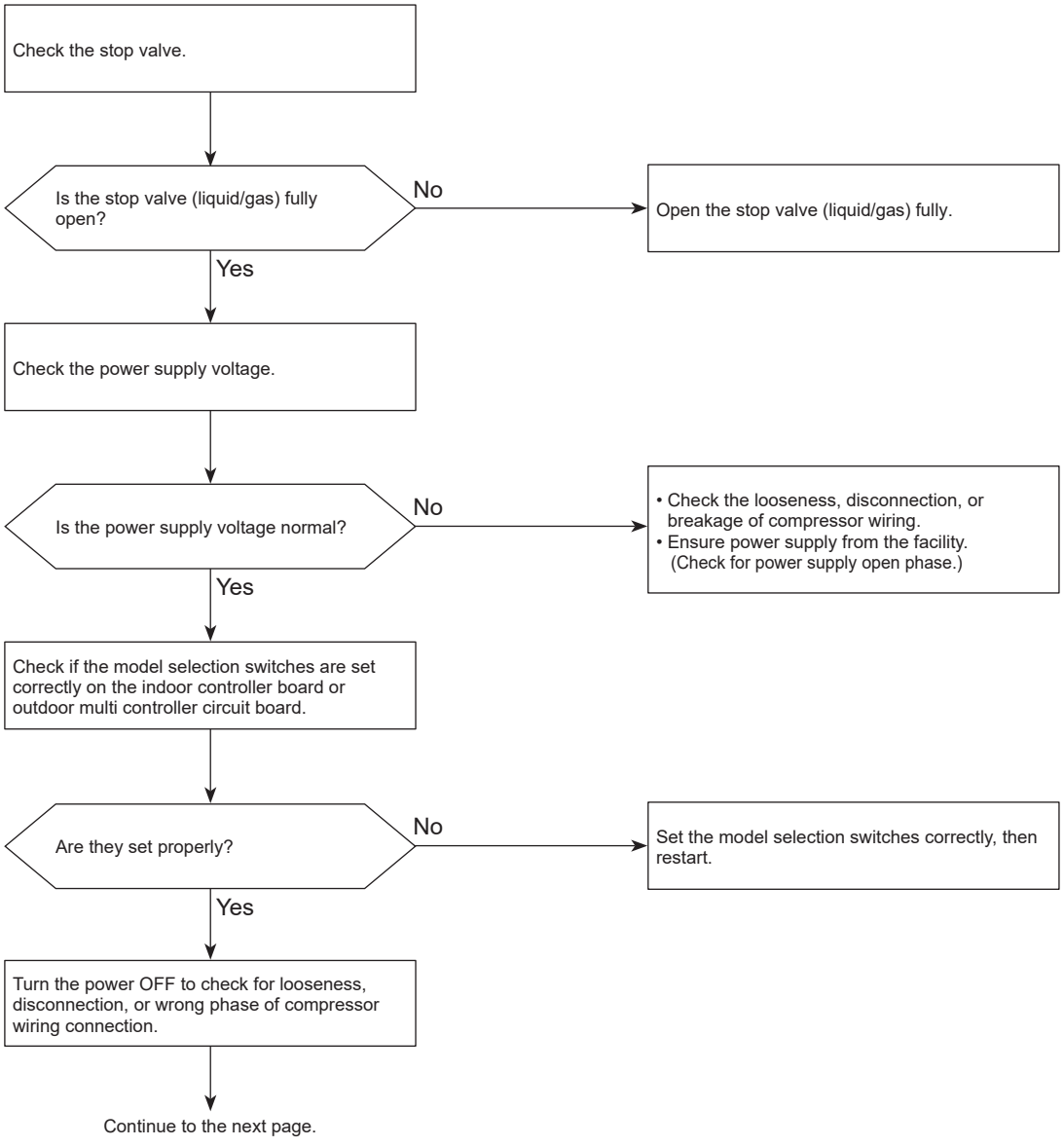
Abnormal points and detection methods

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

Causes and checkpoints

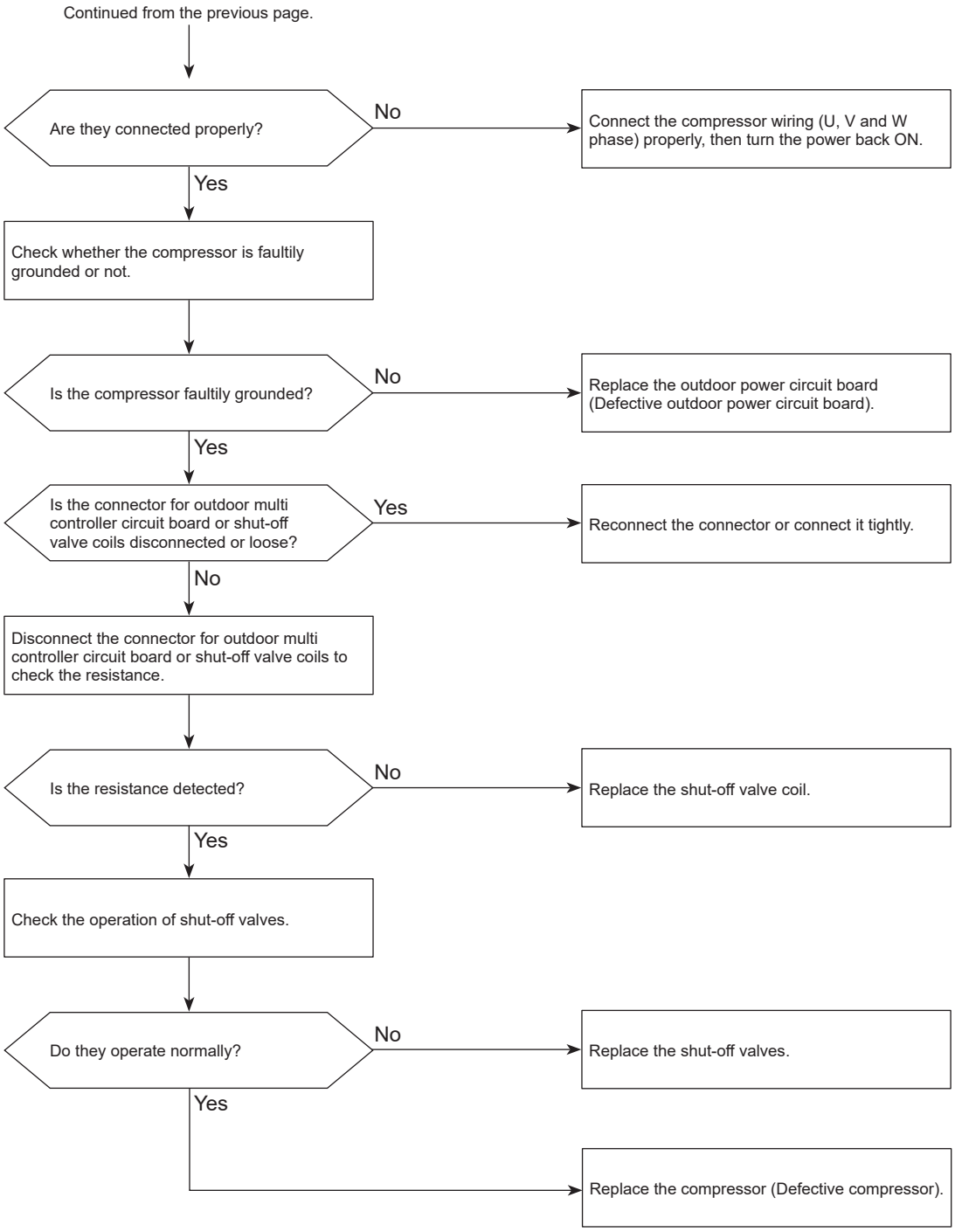
- Closed stop valve
- Decrease of power supply voltage
- Looseness, disconnection, or wrong phase of compressor wiring connection
- Incorrect DIP-SW setting of model selection on the outdoor controller board
- Defective compressor
- Defective outdoor power circuit board

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

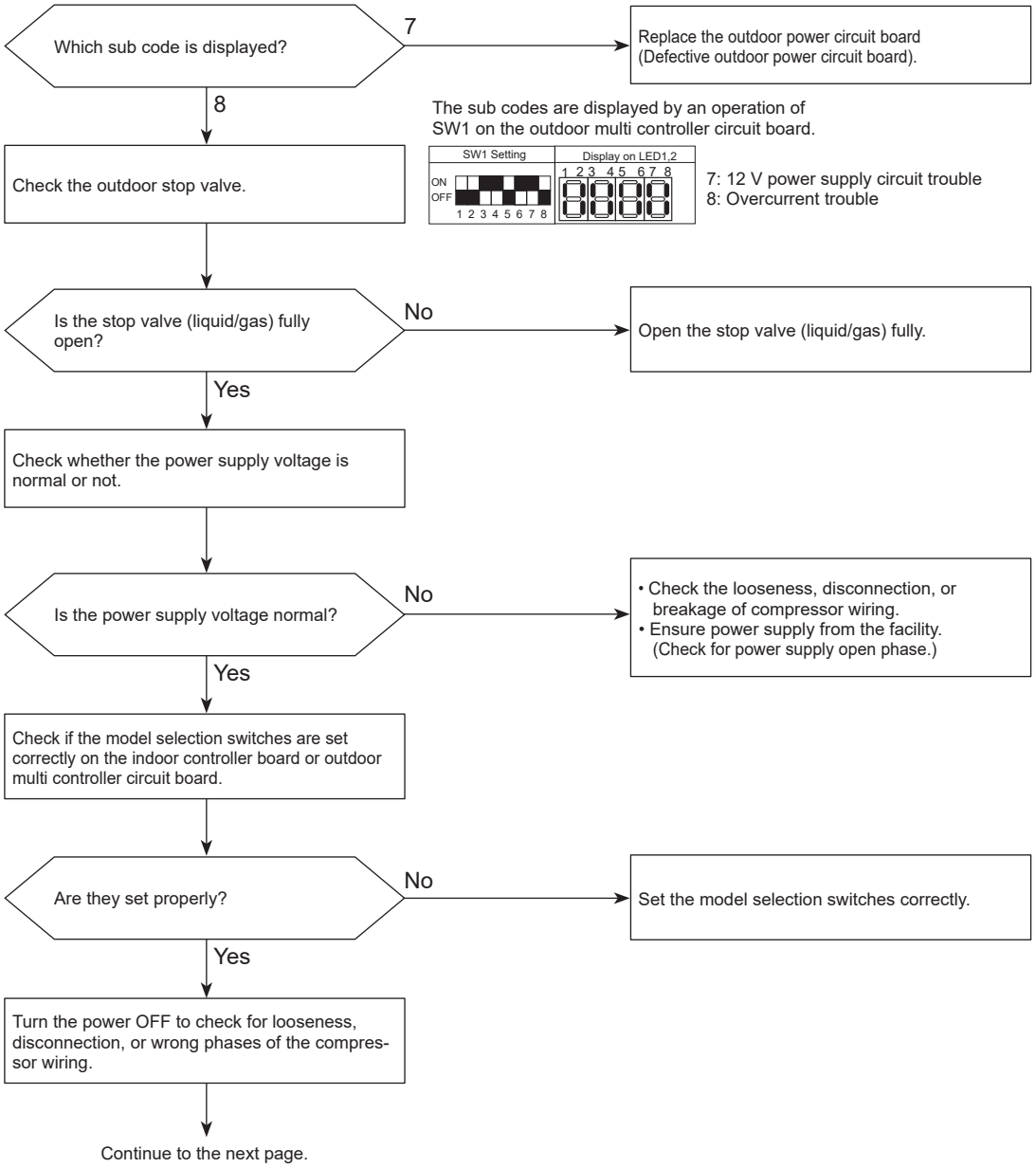
Abnormal points and detection methods

- 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

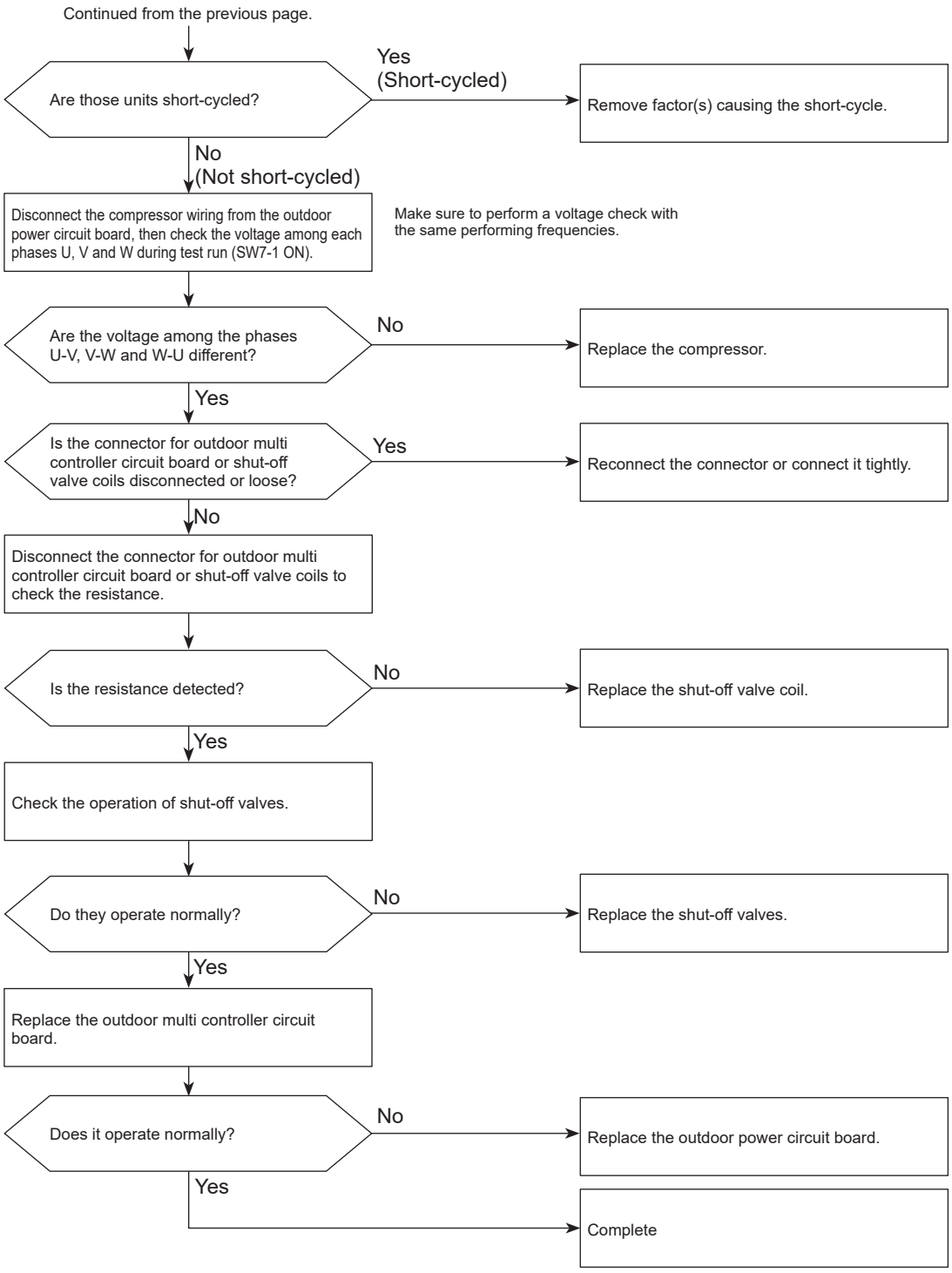
Diagnosis of failure



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), 200 V (3-phase)
- Increase of DC bus voltage to 400 V (1-phase), 380 V (3-phase)
- DC bus voltage stays at 310 V or less for 30 consecutive seconds when the operational frequency is over 20 Hz.

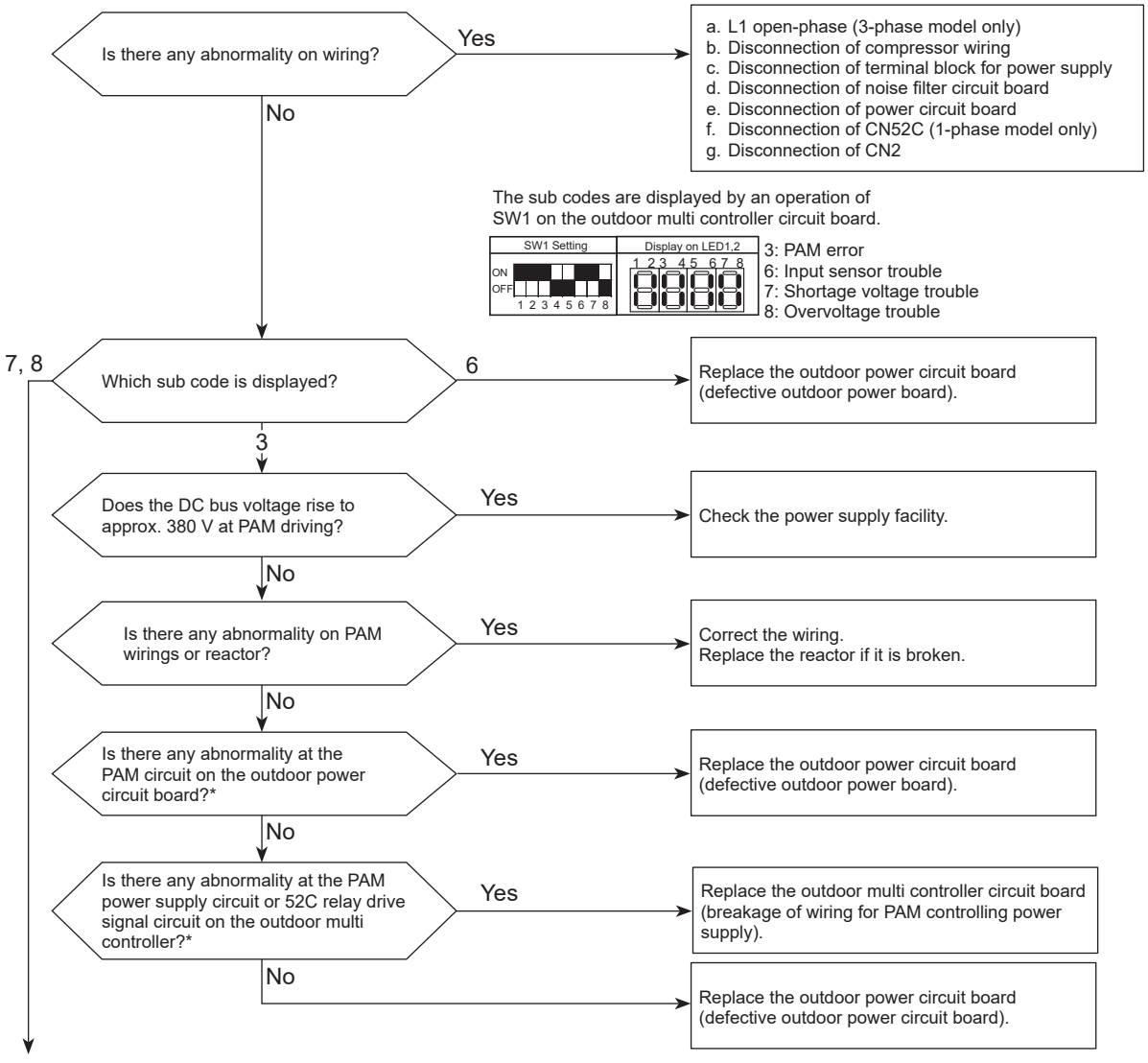
Any of the following conditions is satisfied while the detections value of primary current is 0.1 A or less.
- The operational frequency is 40 Hz or more.
- The compressor current is 6 A or more.

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 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

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

Is the power supply normal?

No → Check the power supply facility.

Yes

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

Check the bus voltage at the test points listed below on the outdoor power circuit board using a multimeter.
Test points: CNDC 1-3 pin

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

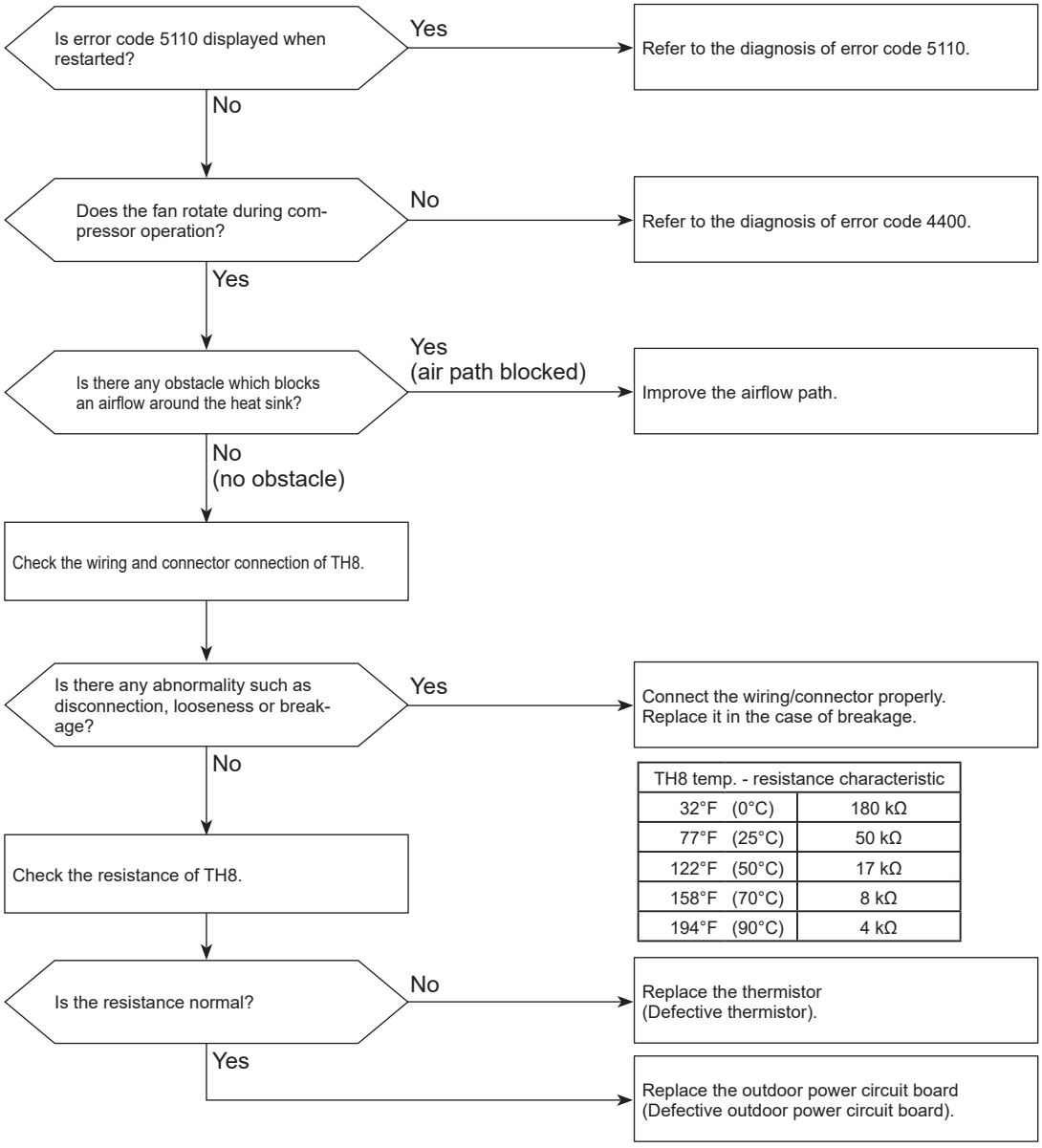
TH8 detects a temperature outside the specified range during compressor operation.

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

4250 (U6): Power module trouble

Abnormal points and detection methods

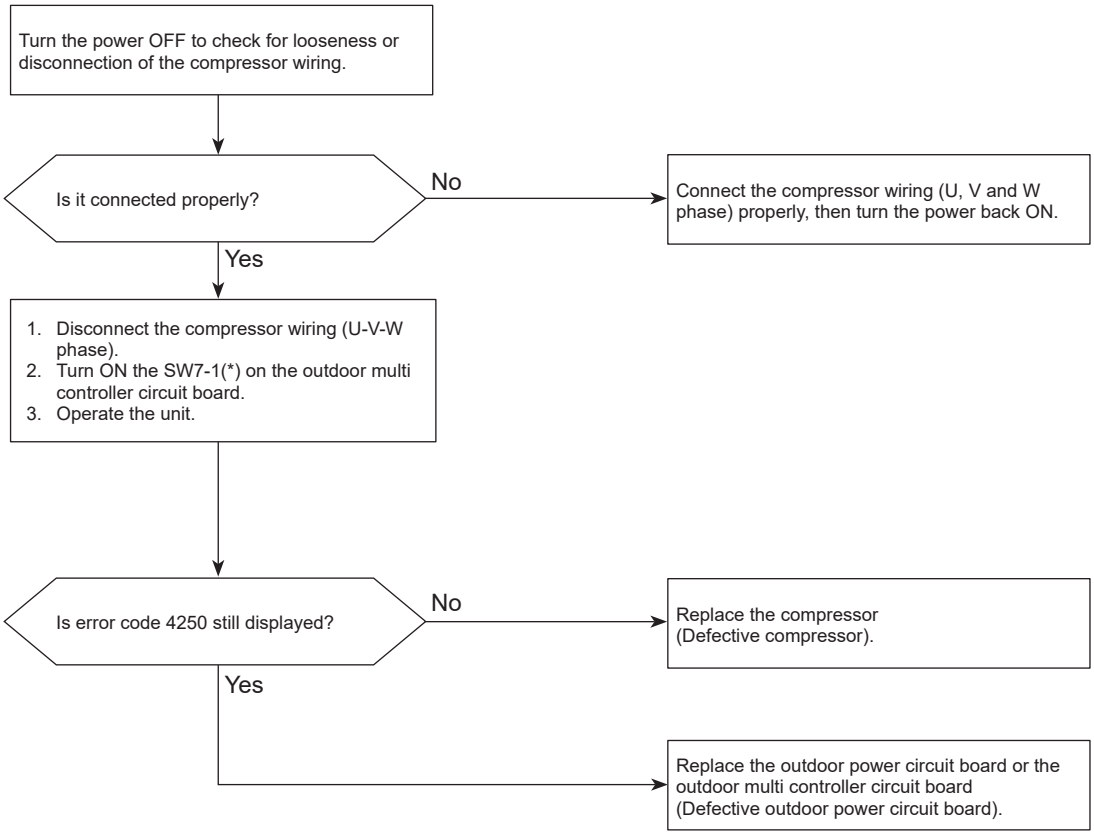
Both of the following conditions have been satisfied:

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

Causes and checkpoints

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

Diagnosis of failure



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

4400 (U8): Fan trouble (Outdoor unit)

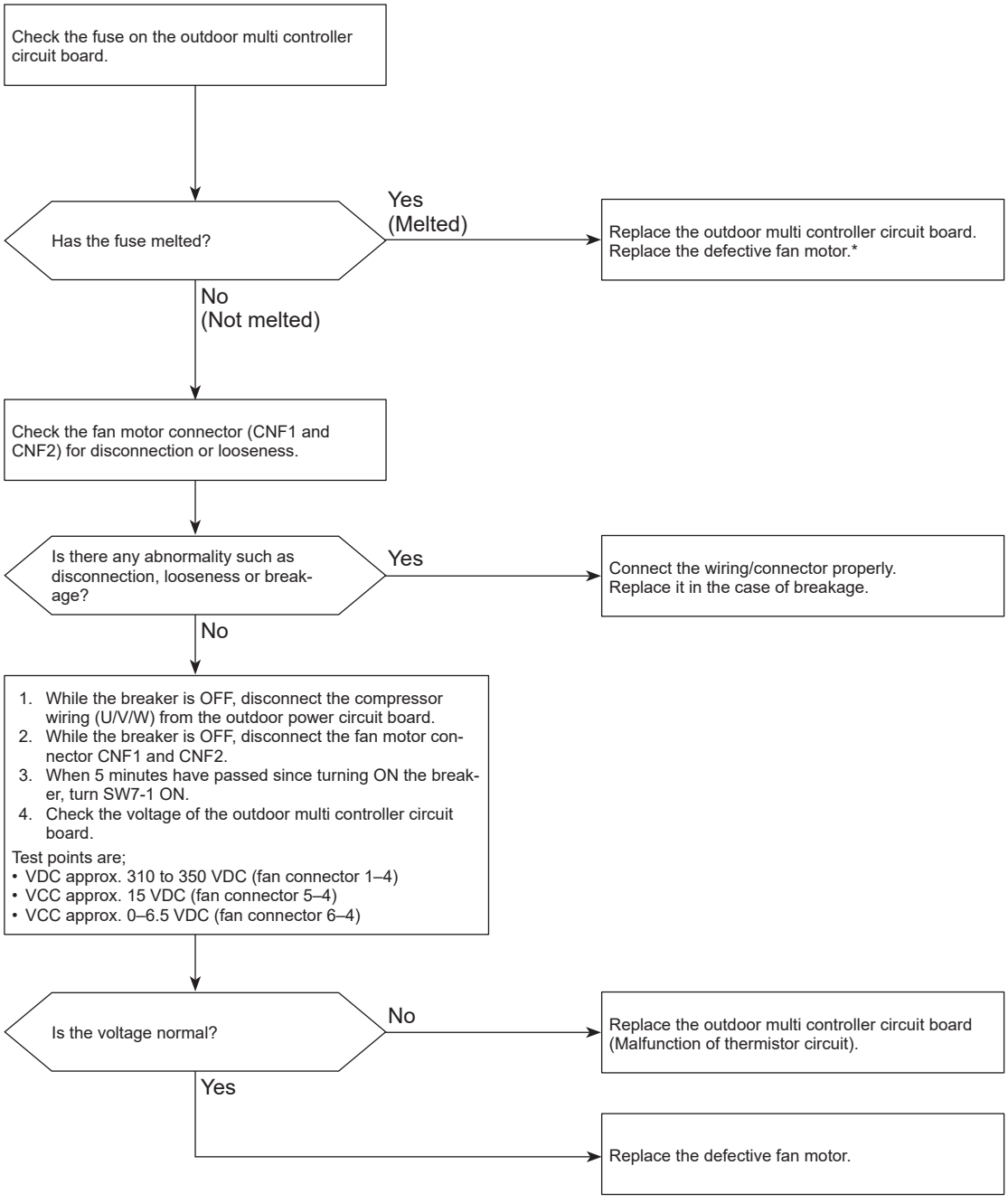
Abnormal points and detection methods

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. The detection is also disabled when the outdoor temperature is 41°F (5°C) or less in cooling operation, and -4°F (-20°C) or less in heating)

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

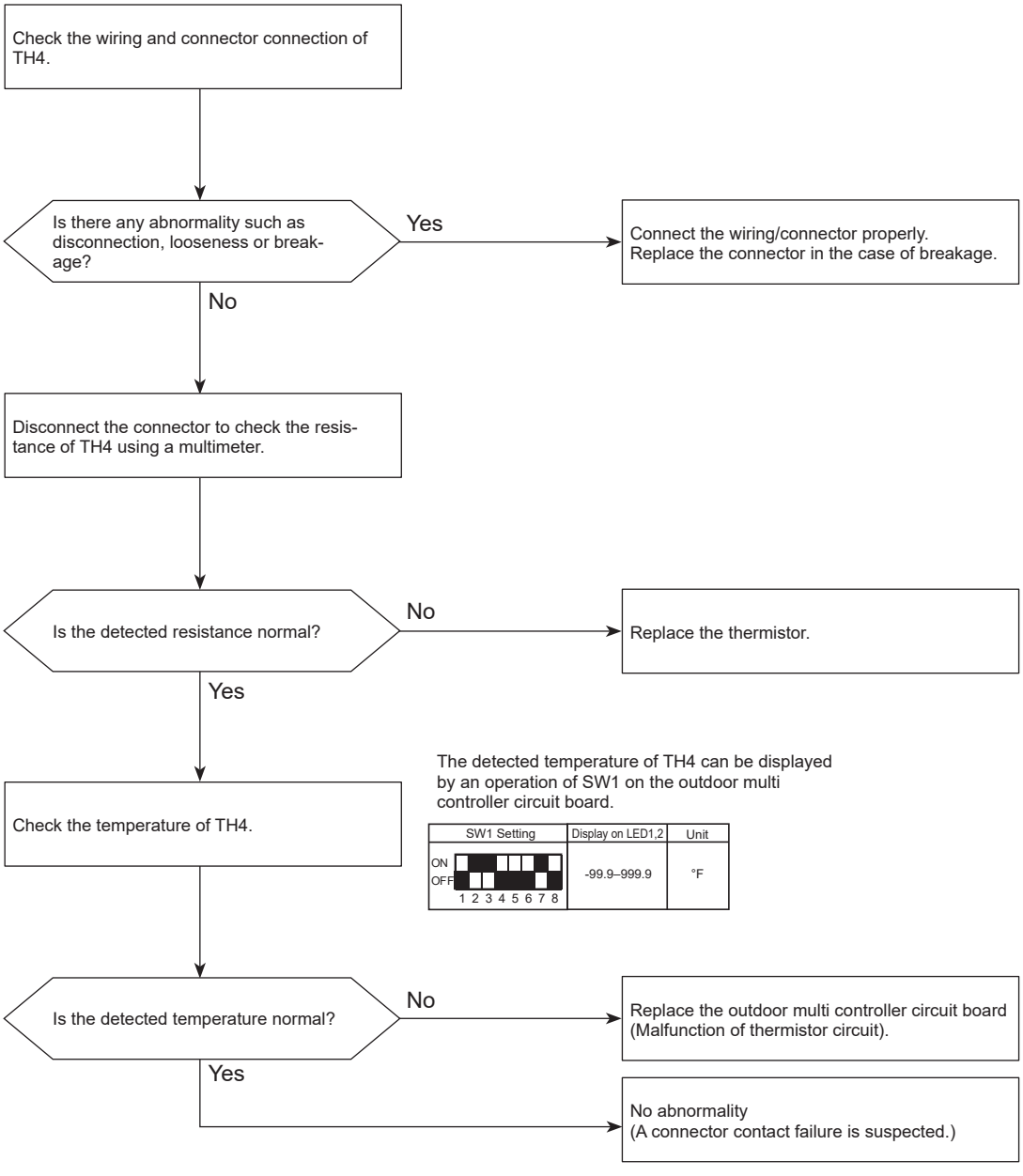
* -10°C [14°F] or less when PEFY-P·VMH(S)-E-F is connected.

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

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

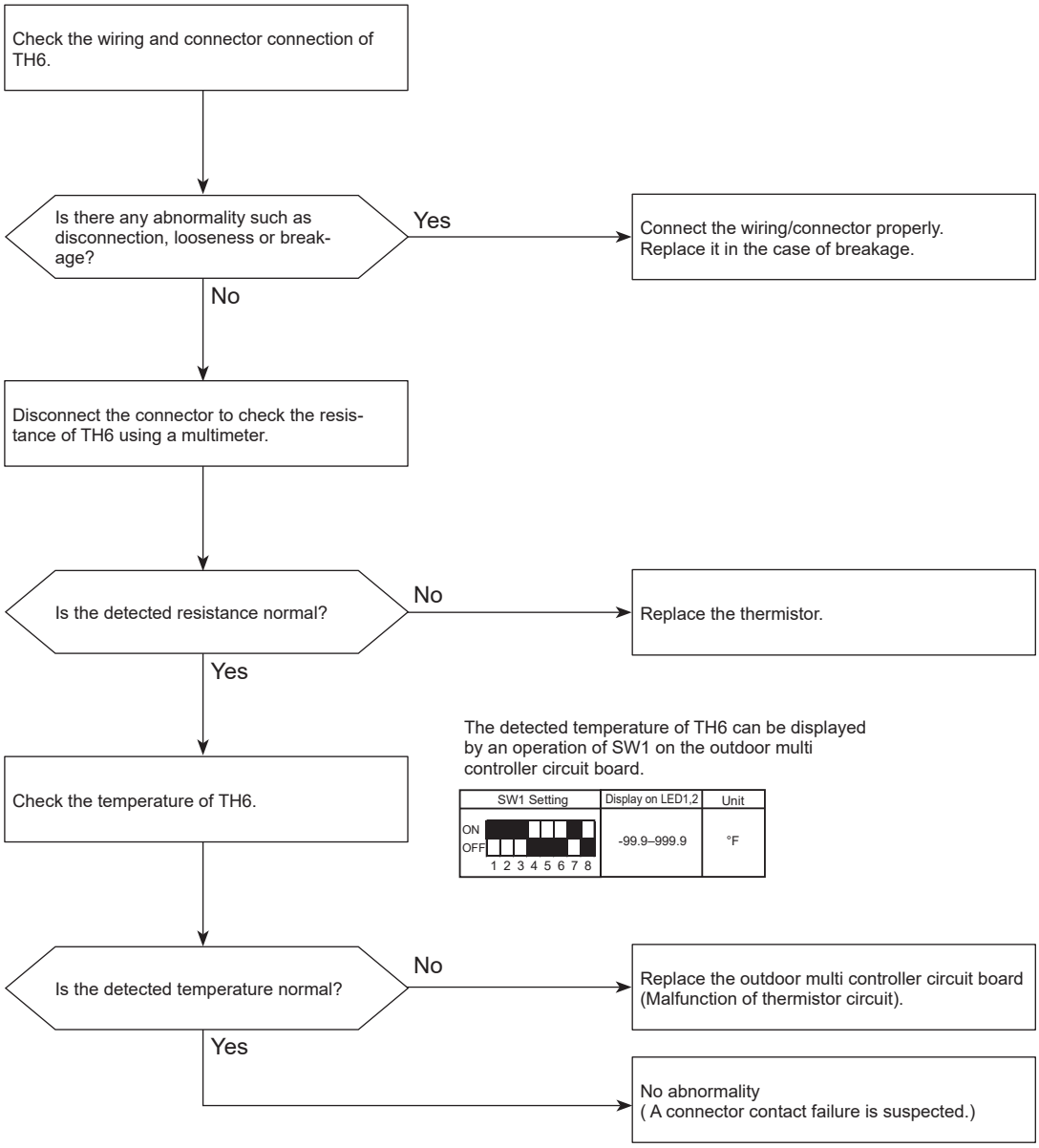
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH6:
Thermistor <Suction pipe>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

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

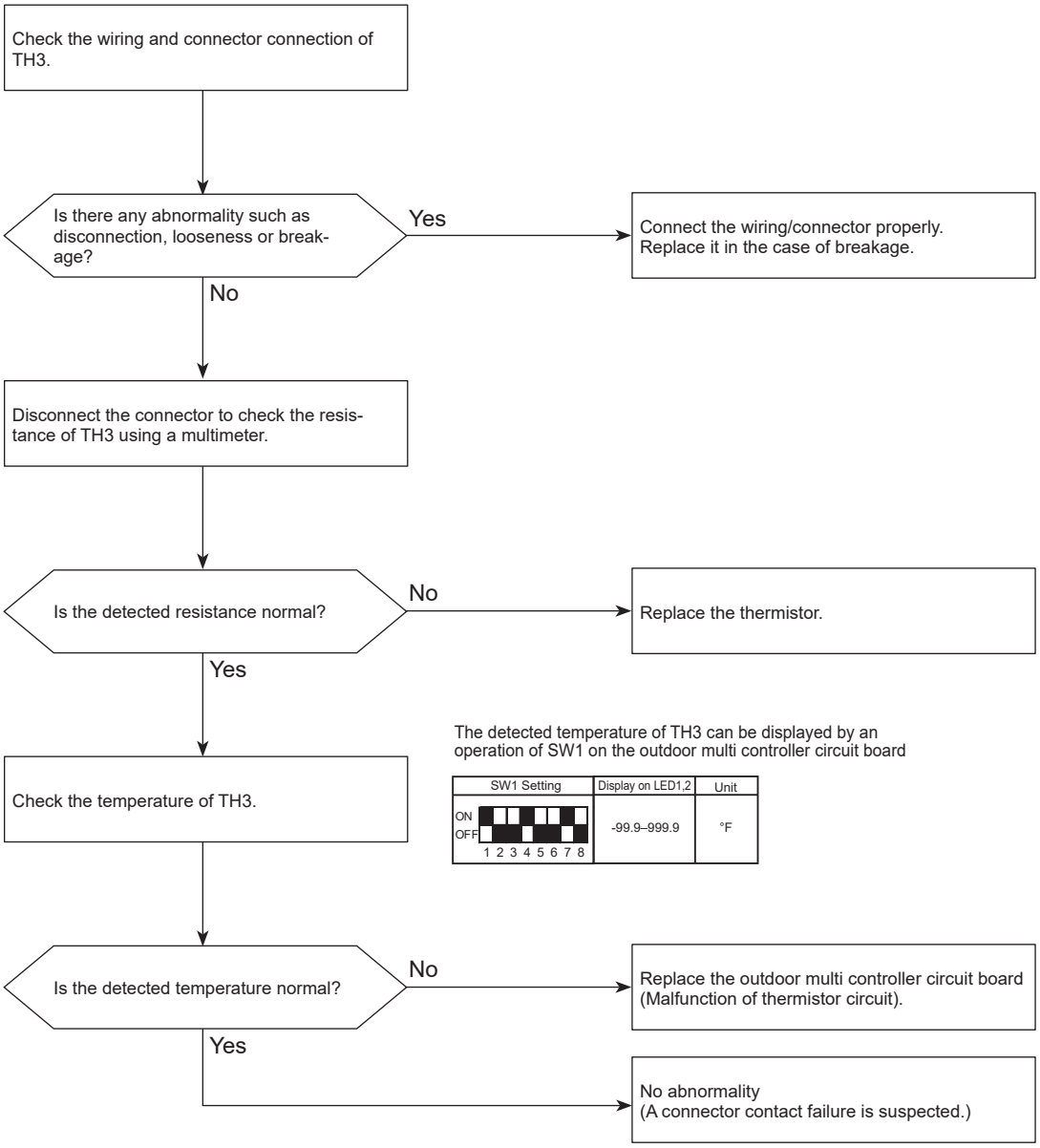
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH3:
Thermistor <Outdoor liquid pipe>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

TH7 is found to be open/short

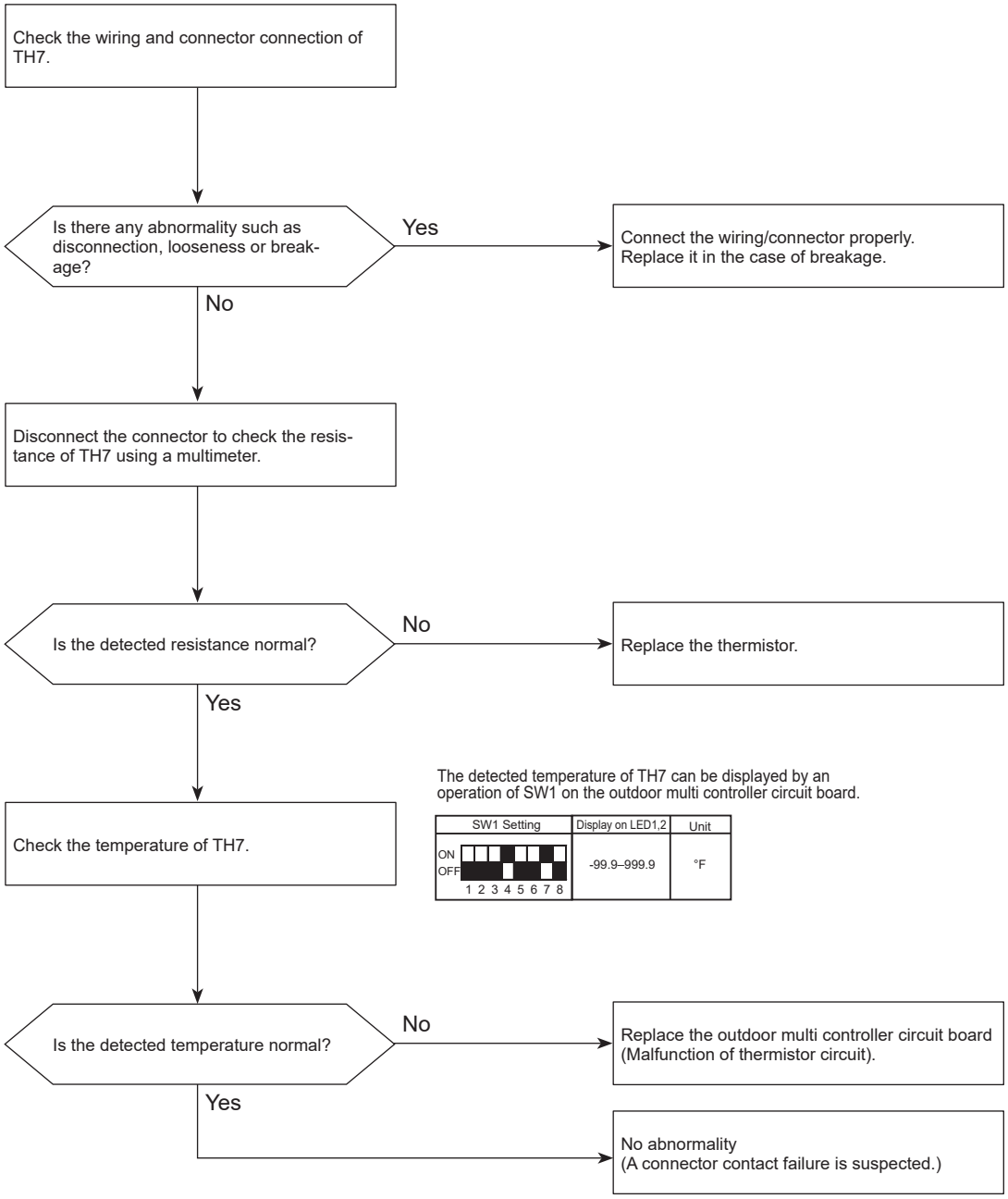
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH7:
Thermistor <Ambient>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

TH2 is found to be open/short.

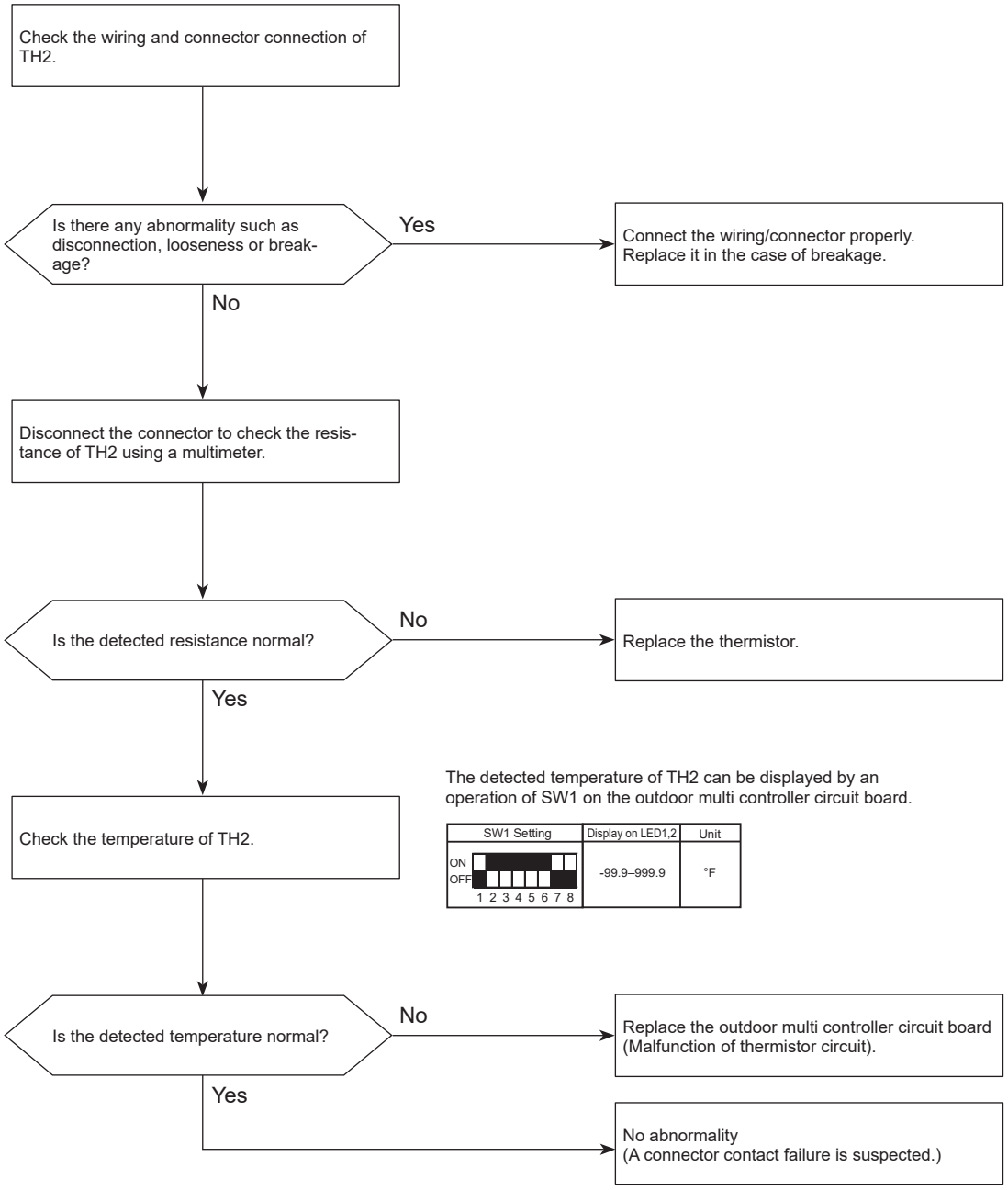
Open:
−40°F (−40°C) or less
Short:
194°F (90°C) or more
TH2:
Thermistor <HIC pipe>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

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

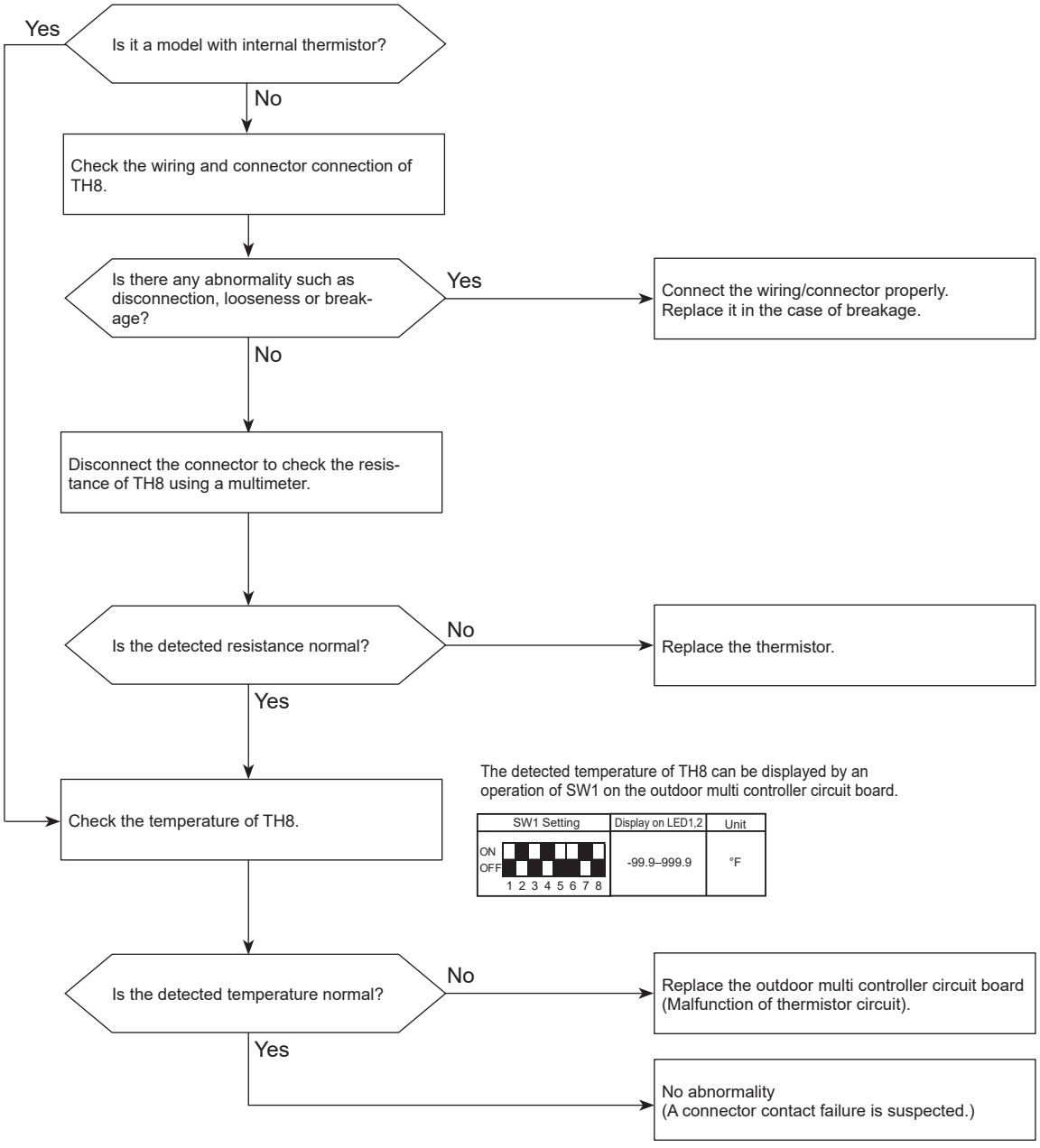
- Y model
  Open:
  −30.6°F (−34.8°C) or less
  Short:
  215.6°F (102°C) or more
  TH8:
  Thermistor <Heat sink>

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

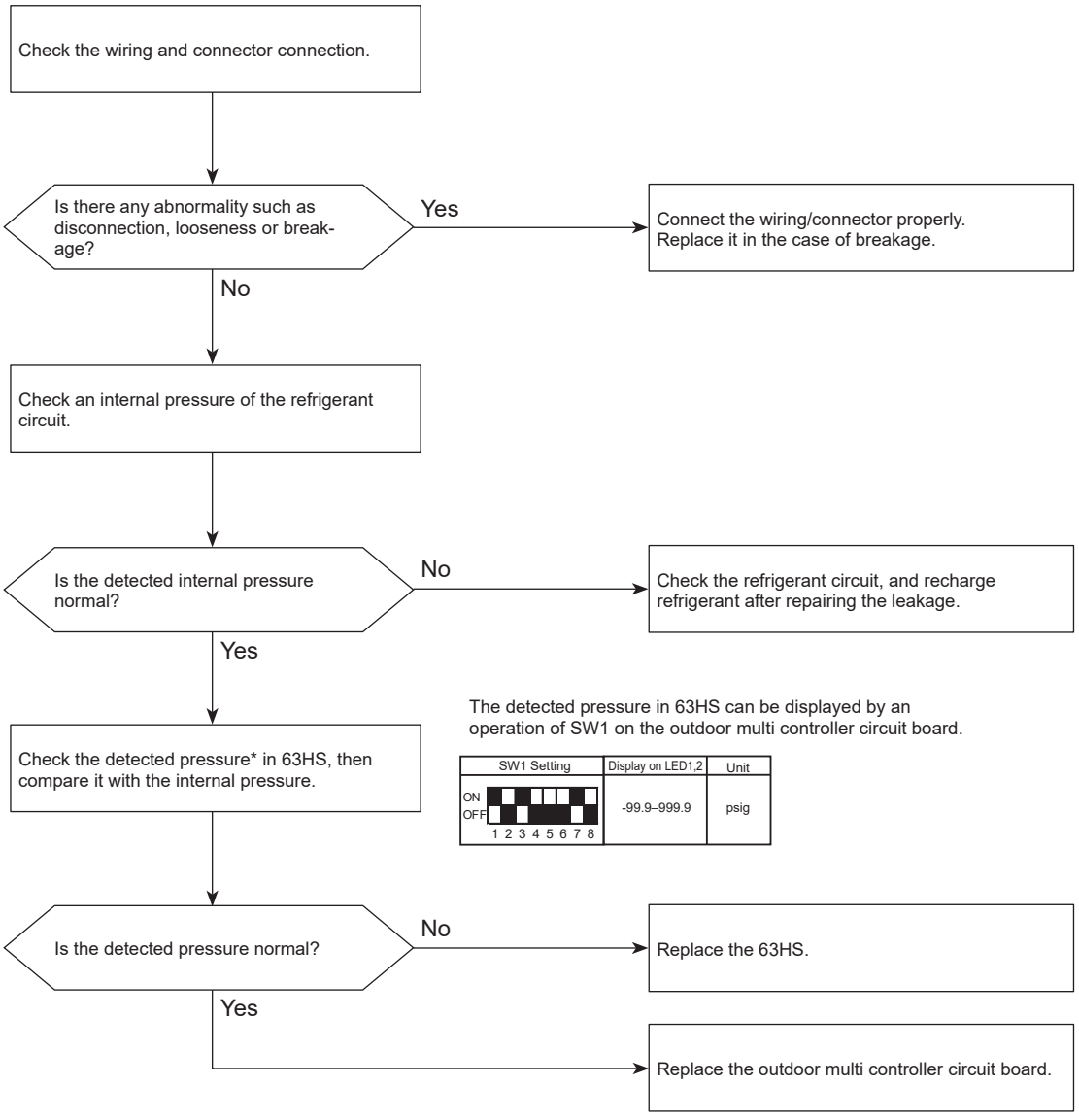
- The detected pressure in the high pressure sensor is 14 psig (1kgf/cm^2) or less during operation, the compressor stops operation and enters into an anti-restart mode for 3 minutes.
- The detected pressure is 14 psig (1kgf/cm^2) or less immediately before restarting, the compressor falls into an abnormal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

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

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

Abnormal points and detection methods

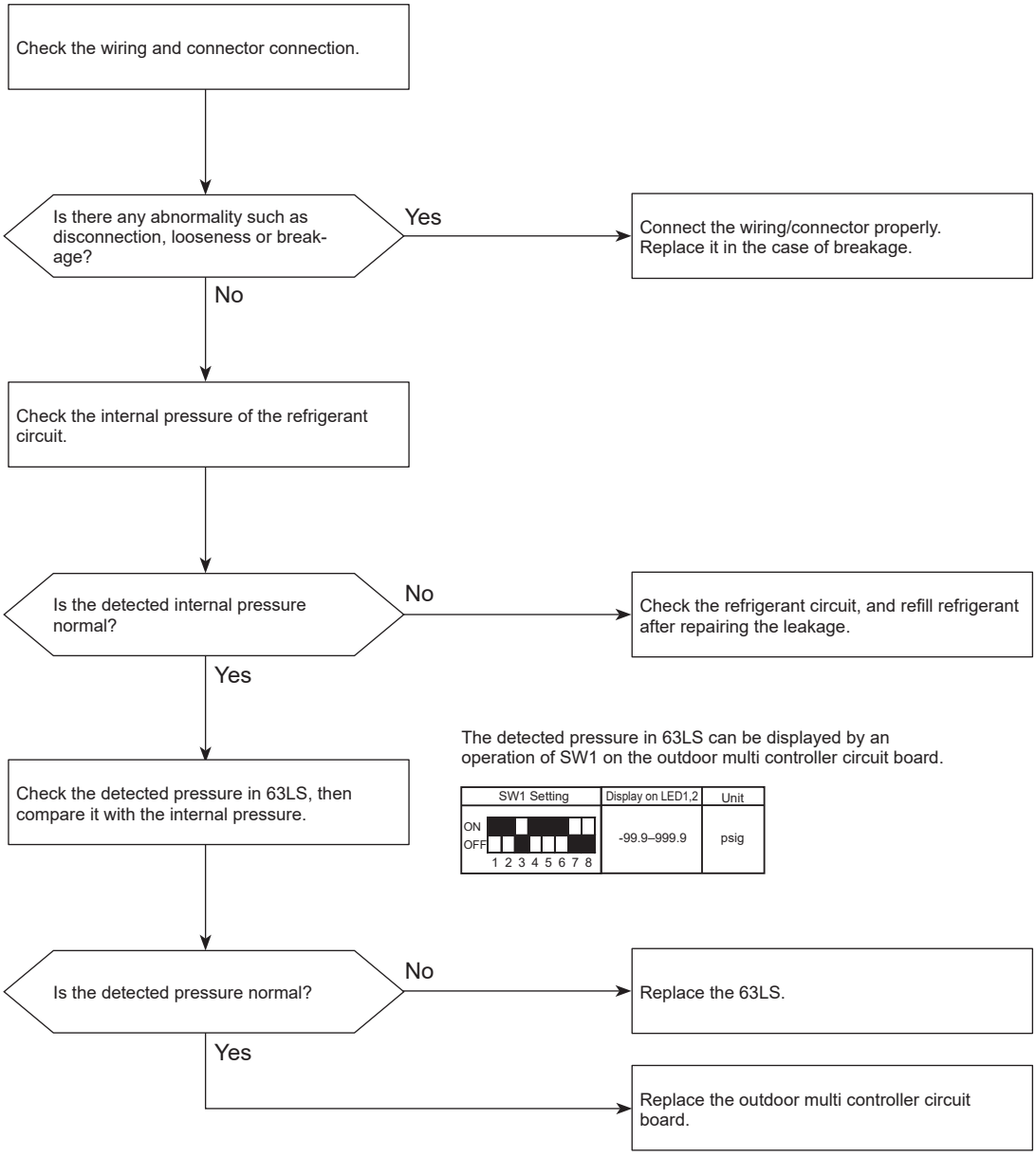
- The detected pressure in the low pressure sensor is -33 psig (−2.3 kgf/cm^2) or less, or 329 psig (23.1 kgf/cm^2) or more during operation, the compressor stops operation with error code 5202.
- For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning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

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



The detected pressure in 63LS can be displayed by an operation of 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	psig

5300 (UH): Current sensor trouble

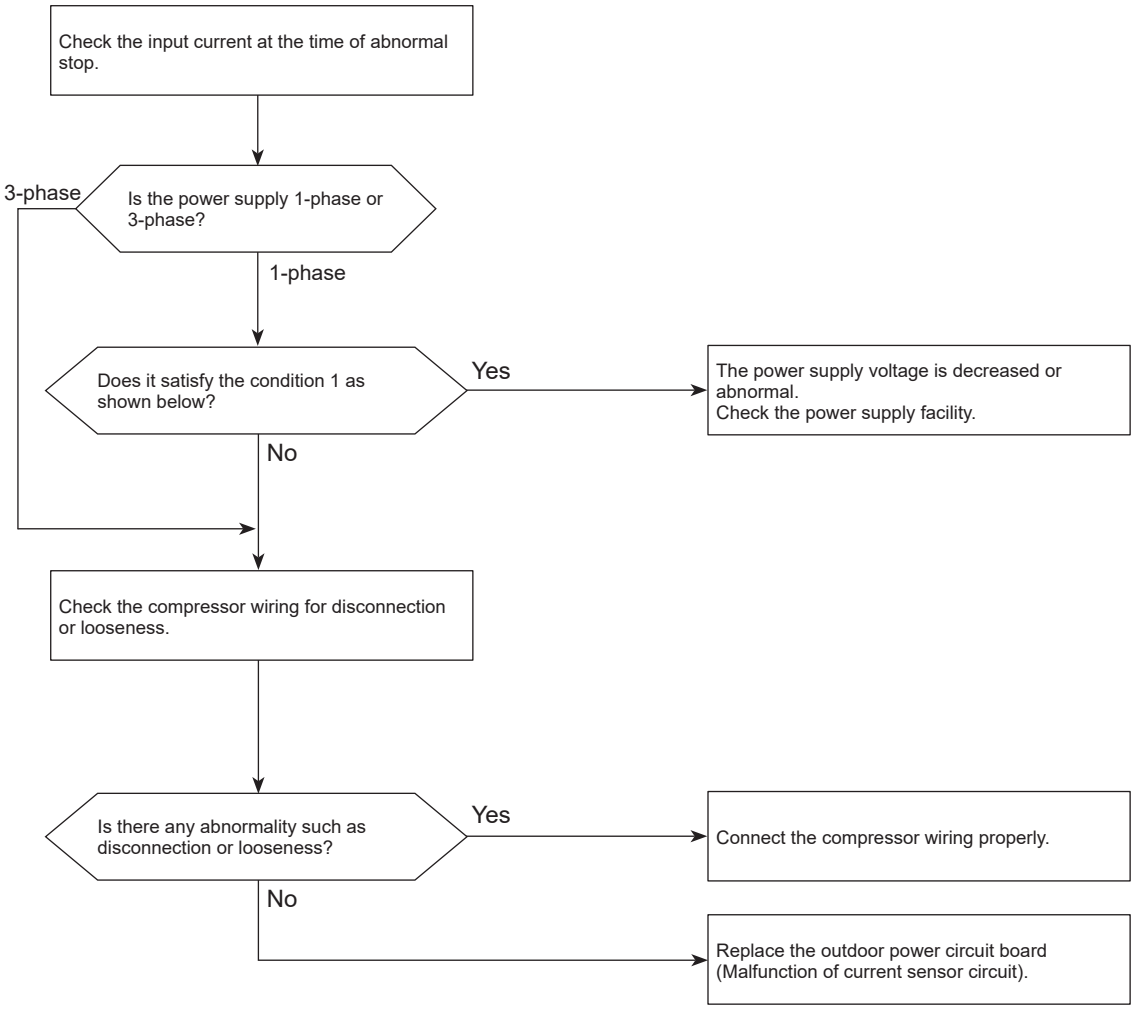
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



Condition 1:

Model	Error detecting condition
1-phase model	37 A or more for 10 consecutive seconds, or 40 A or more

5558 (FH): Refrigerant sensor error

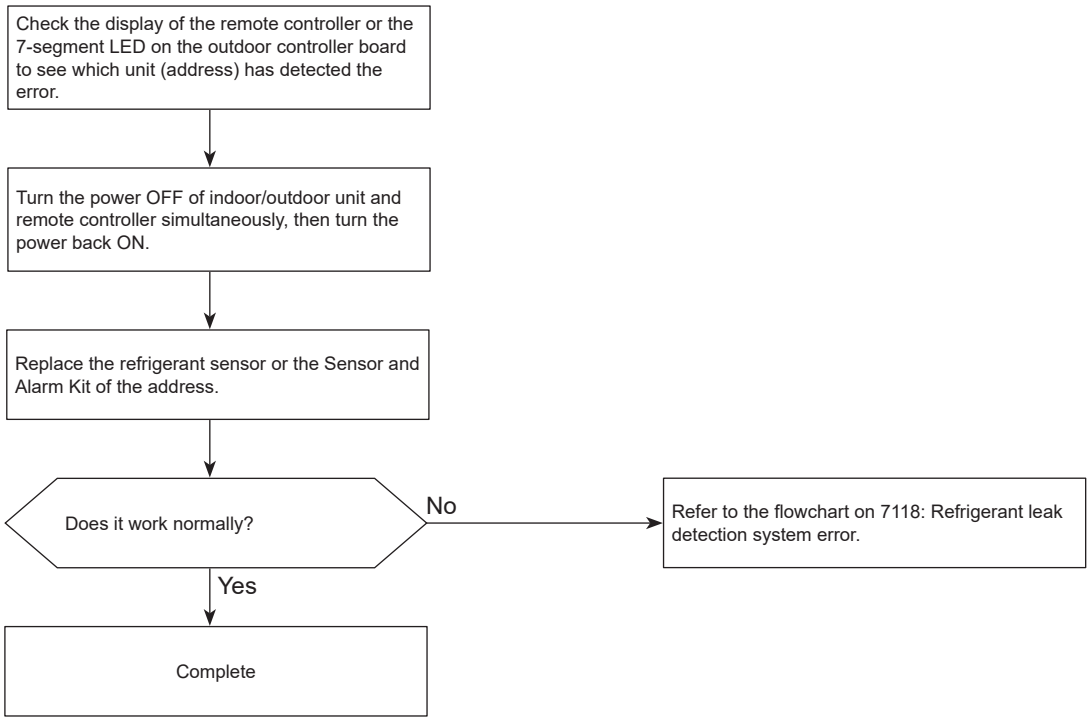
Abnormal points and detection methods

A refrigerant sensor has failed.

Causes and checkpoints

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

Diagnosis of failure



6600 (A0): Duplex address error

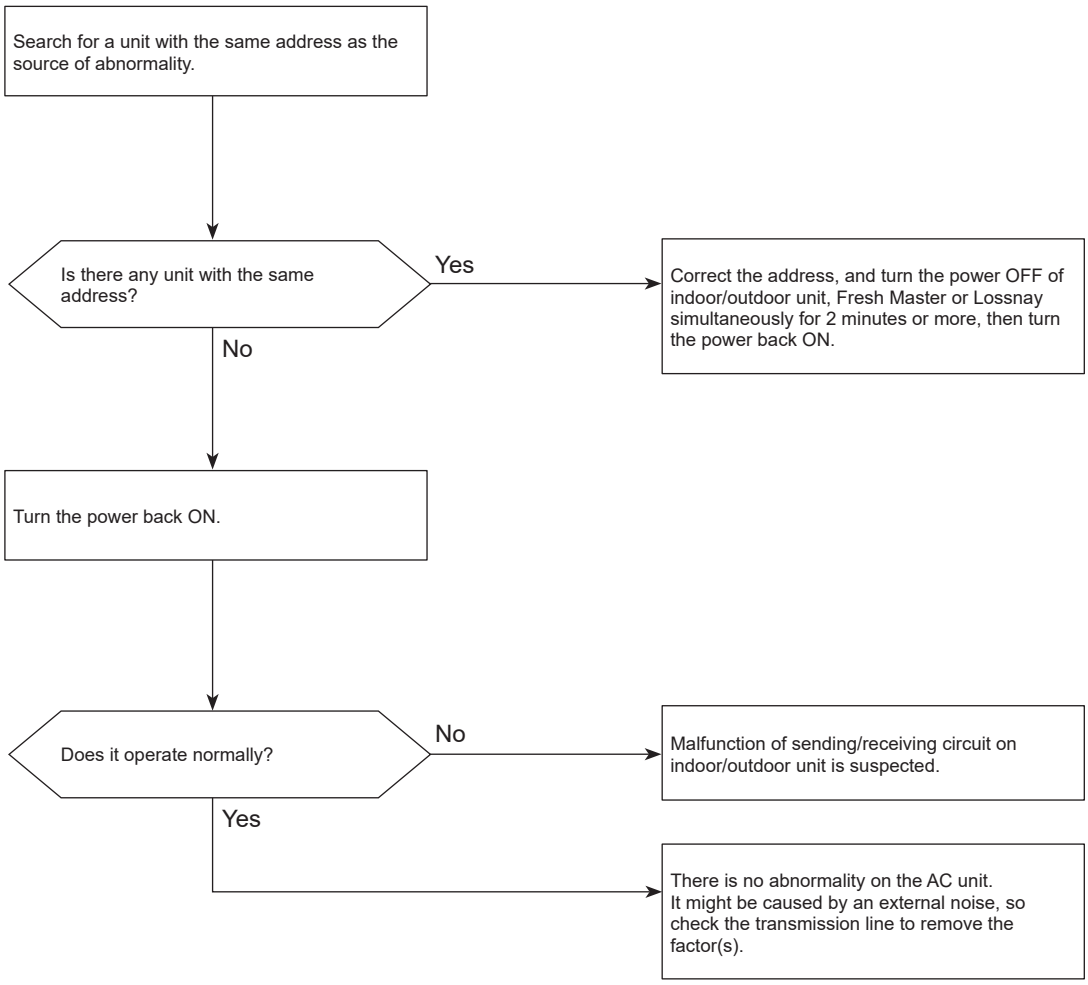
Abnormal points and detection methods

2 or more units with the same address exist.

Causes and checkpoints

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

Diagnosis of failure



6602 (A2): Transmission processor hardware error

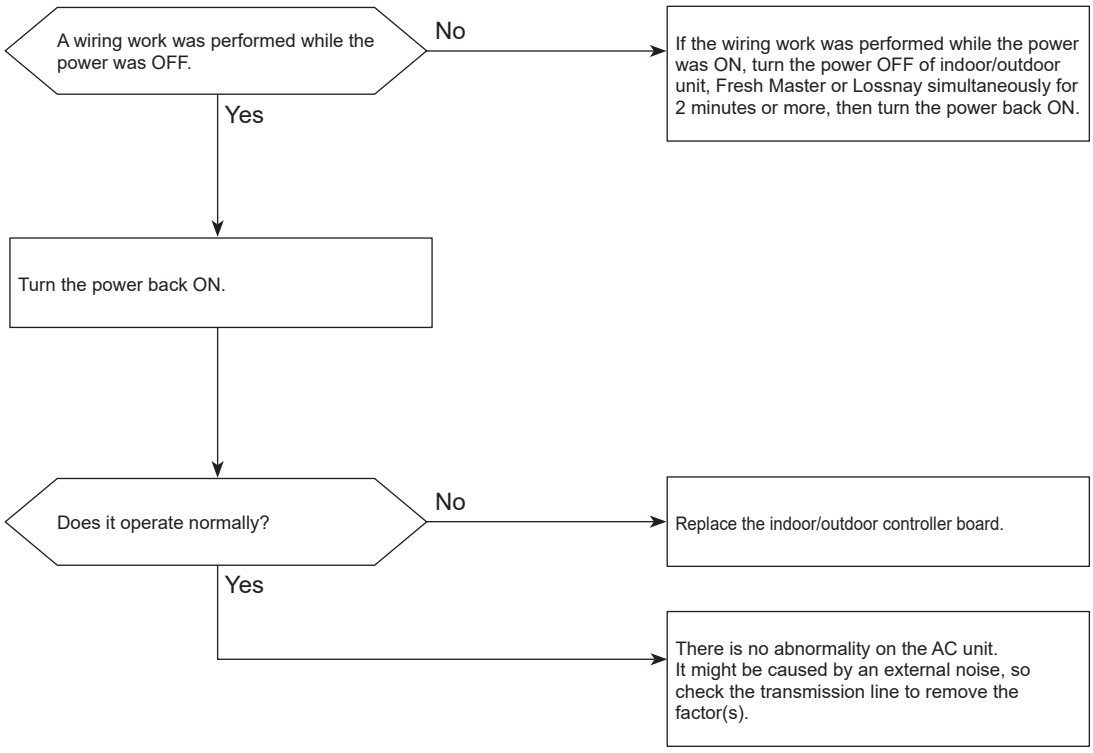
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



6603 (A3): Transmission bus BUSY error

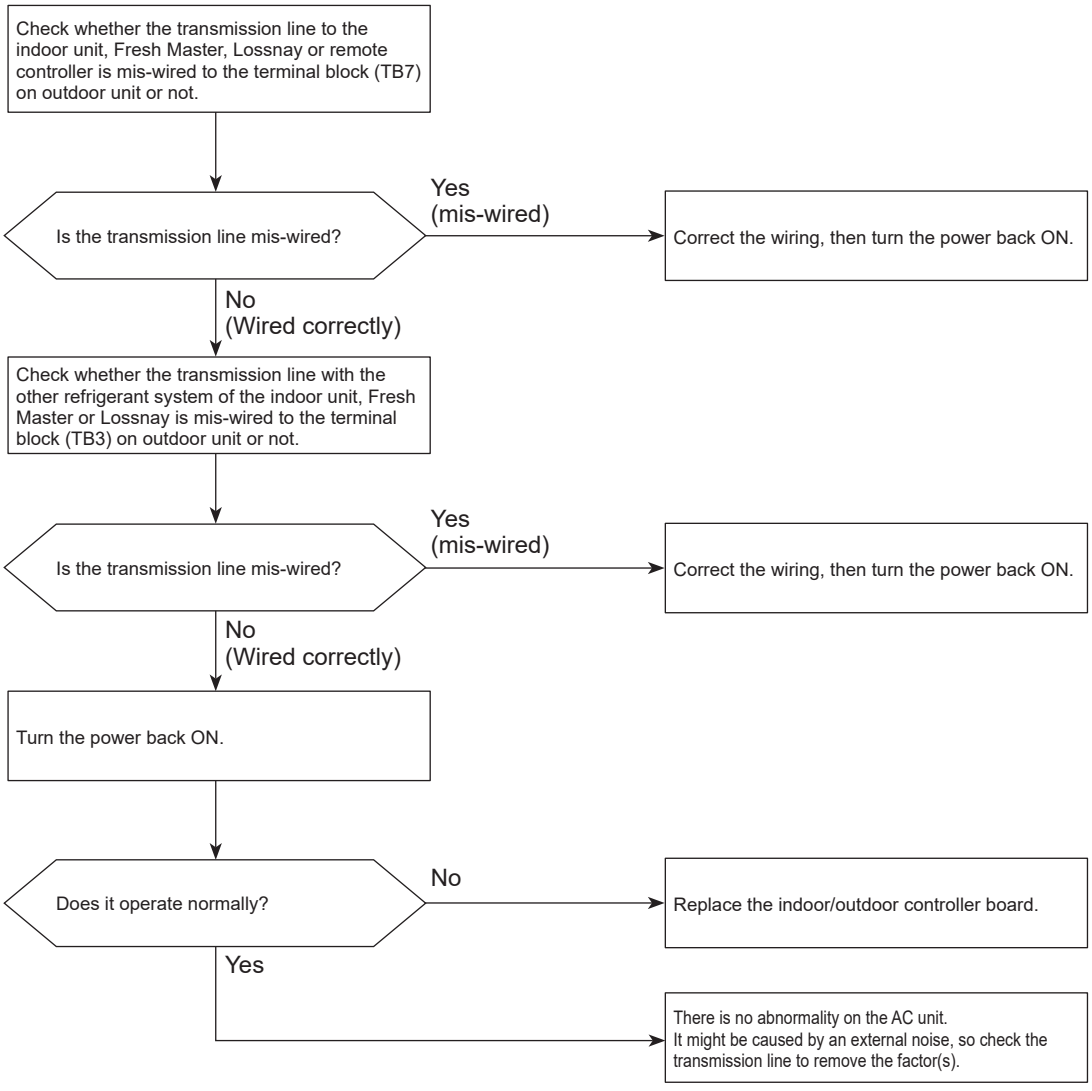
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



6606 (A6): Signal communication error with transmission processor

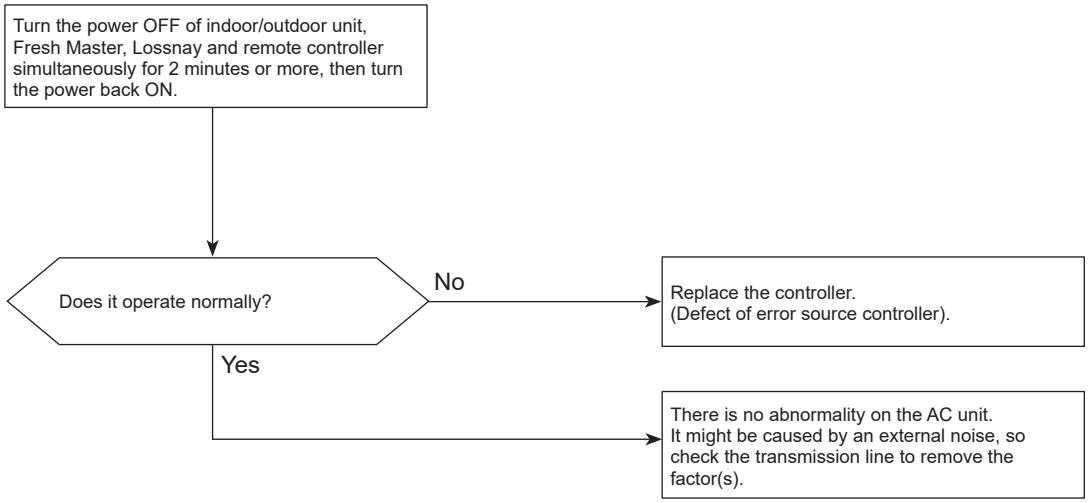
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



6607 (A7): No ACK error

Abnormal points and detection methods

Causes and checkpoints

■ Common to all

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

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

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

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

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

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

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

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

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

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

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

6607 (A7): No ACK error

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

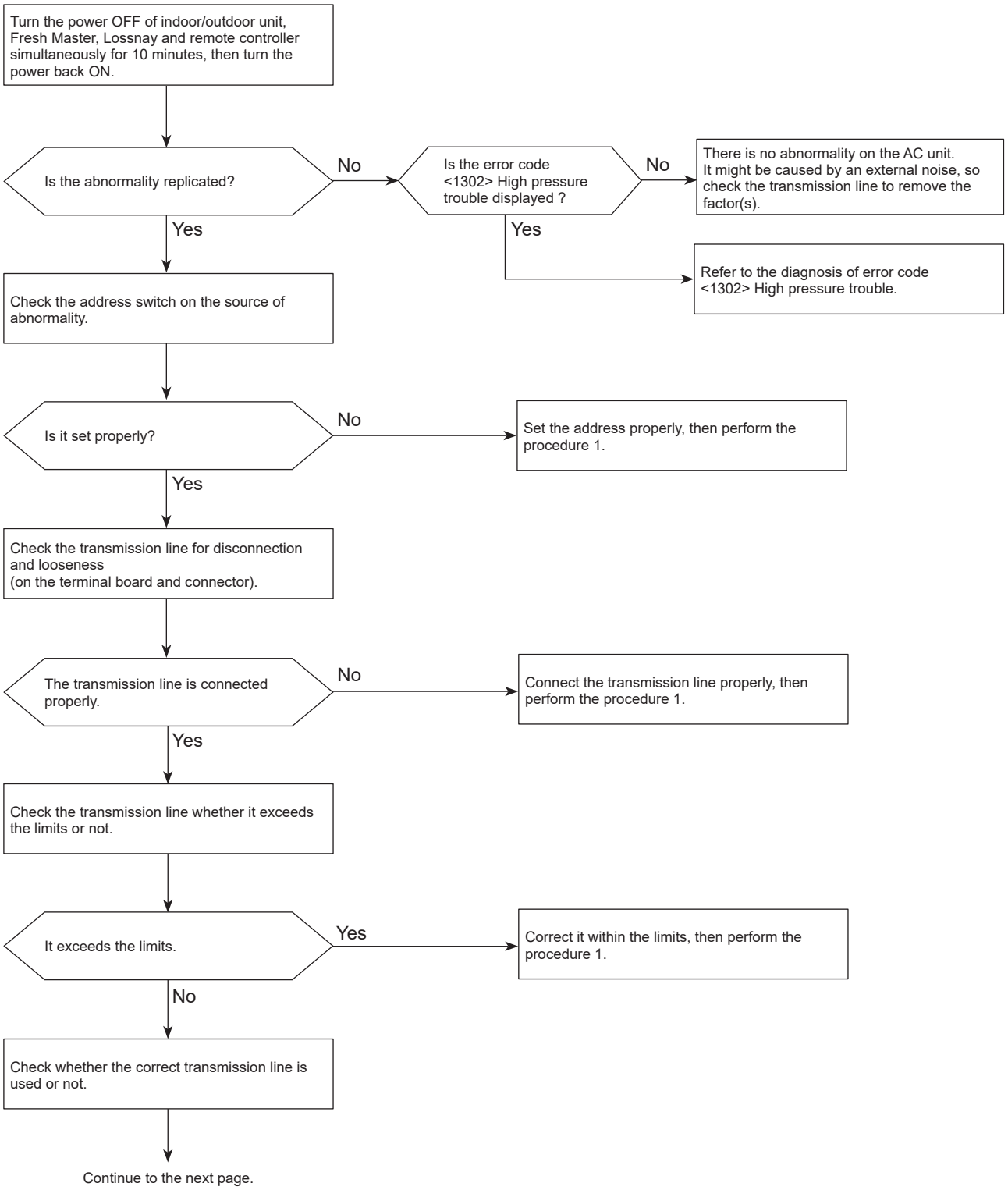
6607 (A7): No ACK error

Diagnosis of failure

Note:

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

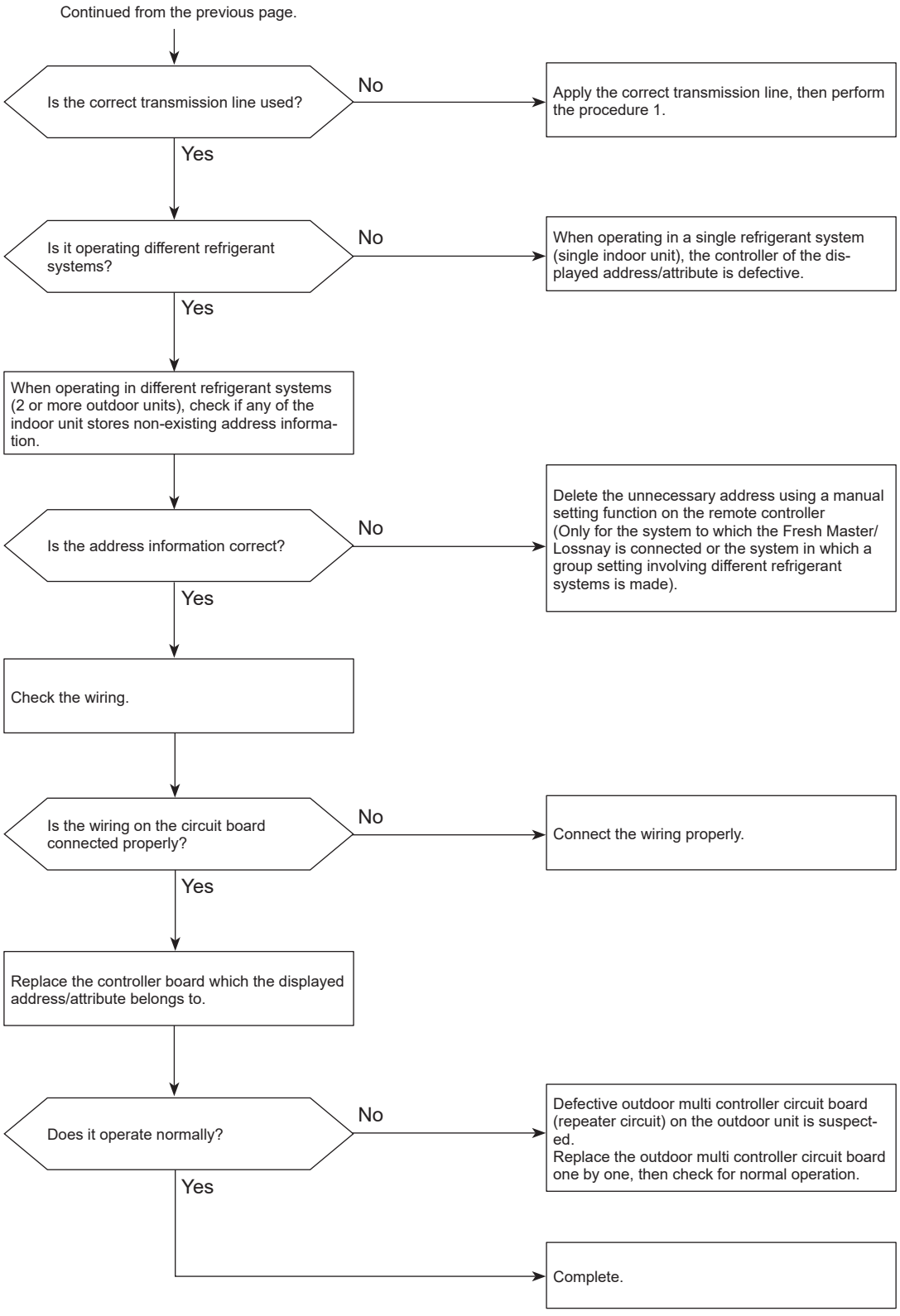
Procedure 1:



Continue to the next page.

6607 (A7): No ACK error

Diagnosis of failure



6608 (A8): No response frame error

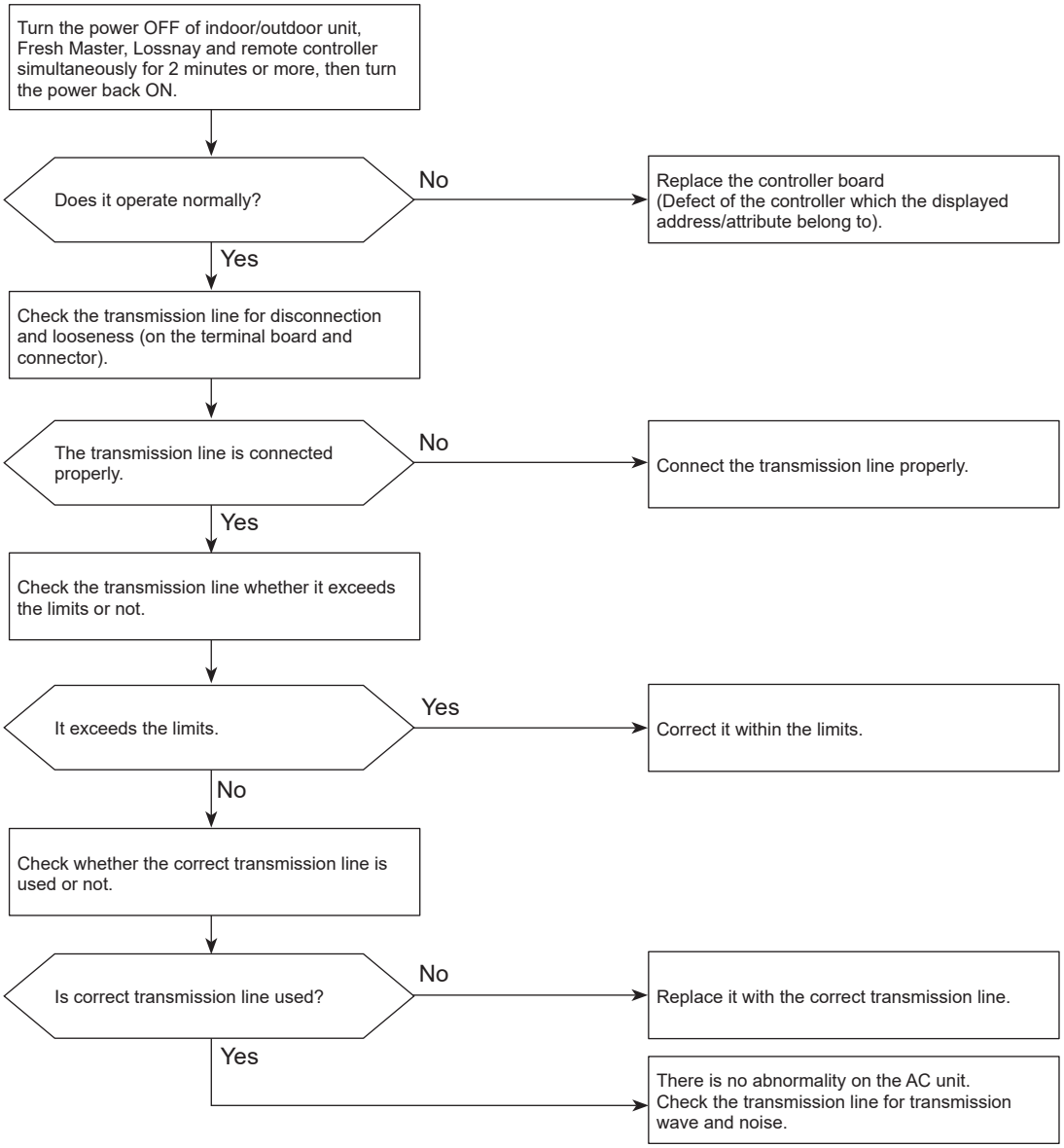
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



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

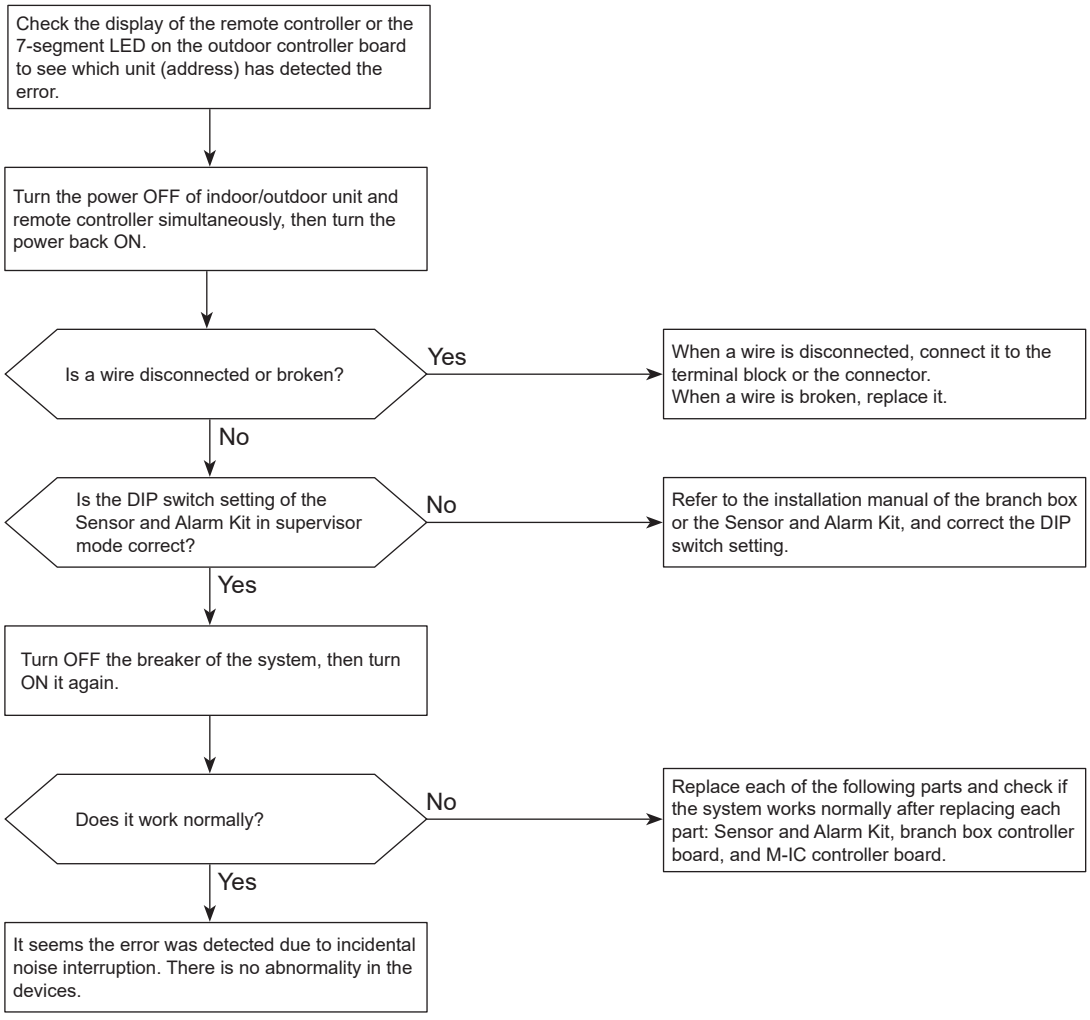
Abnormal points and detection methods

A 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 the indoor unit 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

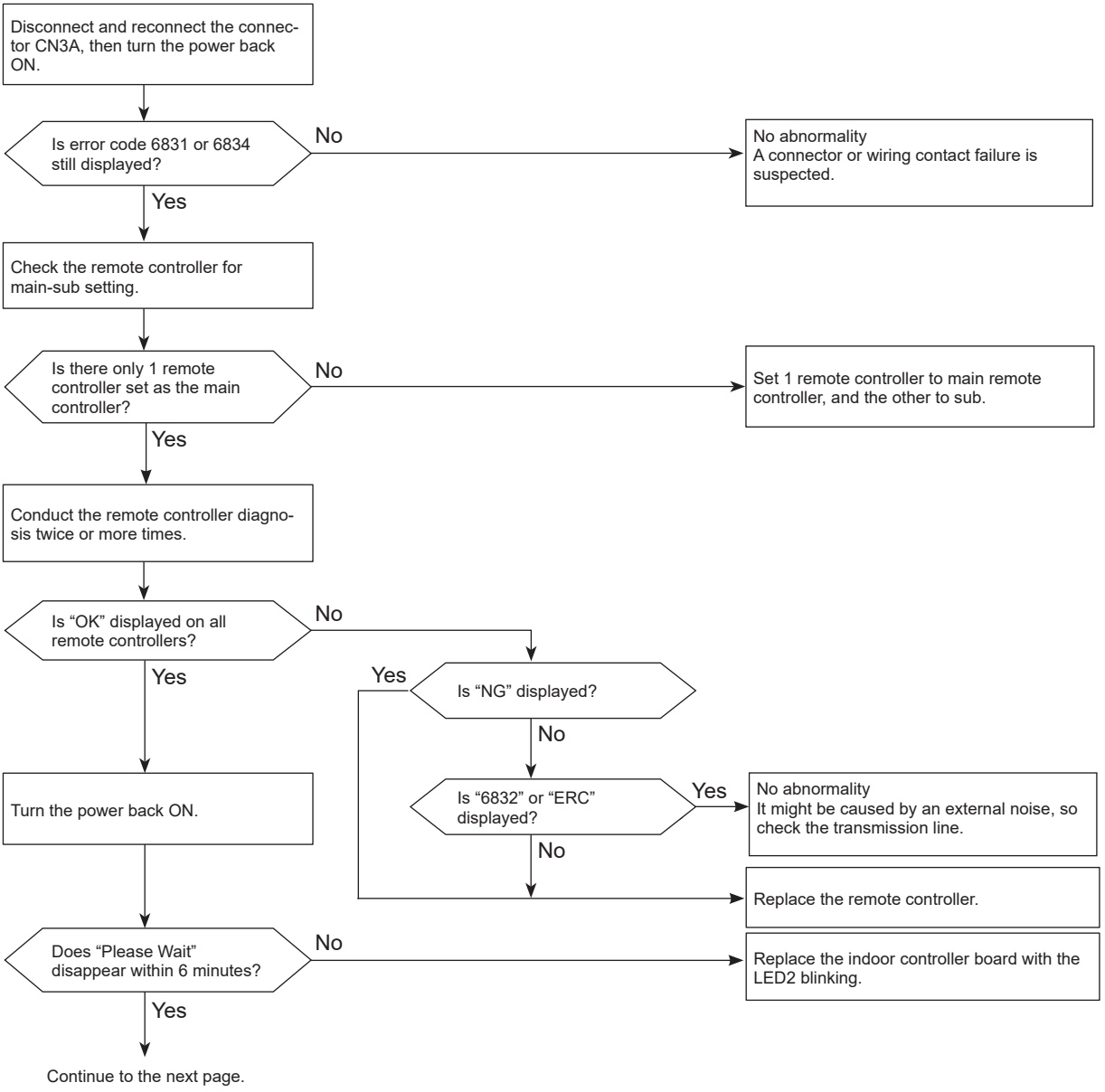
Detected in remote controller or indoor unit:

- 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 installation manual of the indoor unit.)
- Malfunction of the remote controller sending/receiving circuit in the indoor unit with the LED2 blinking.
- Malfunction of the remote controller sending/receiving circuit
- Remote controller transmitting error caused by noise interference

Diagnosis of failure

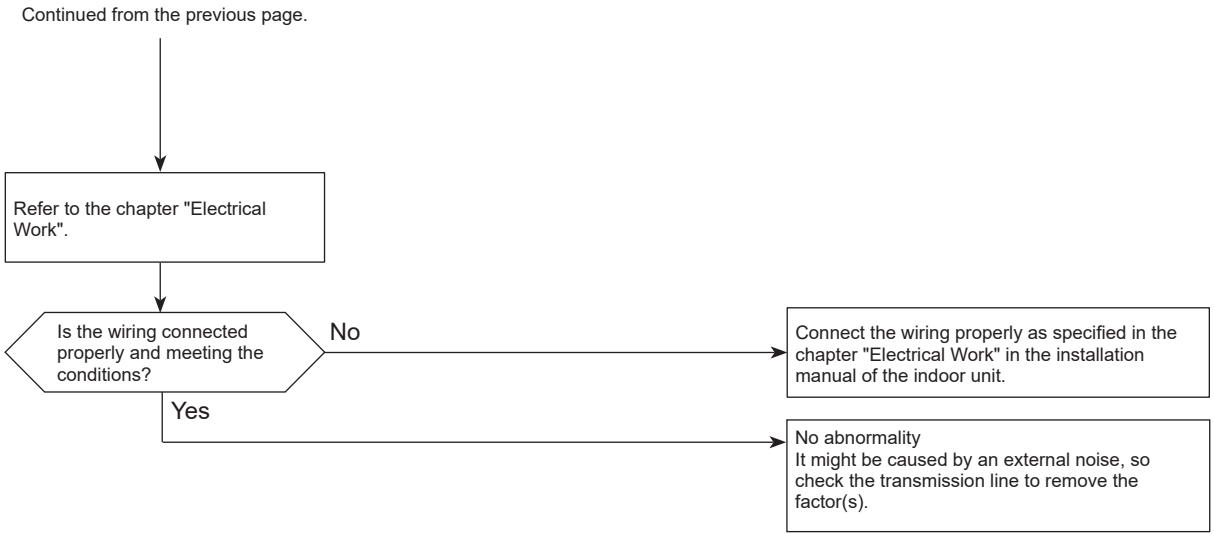


Note:

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

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

Diagnosis of failure



6831 (E4): Sensor and Alarm Kit communication error

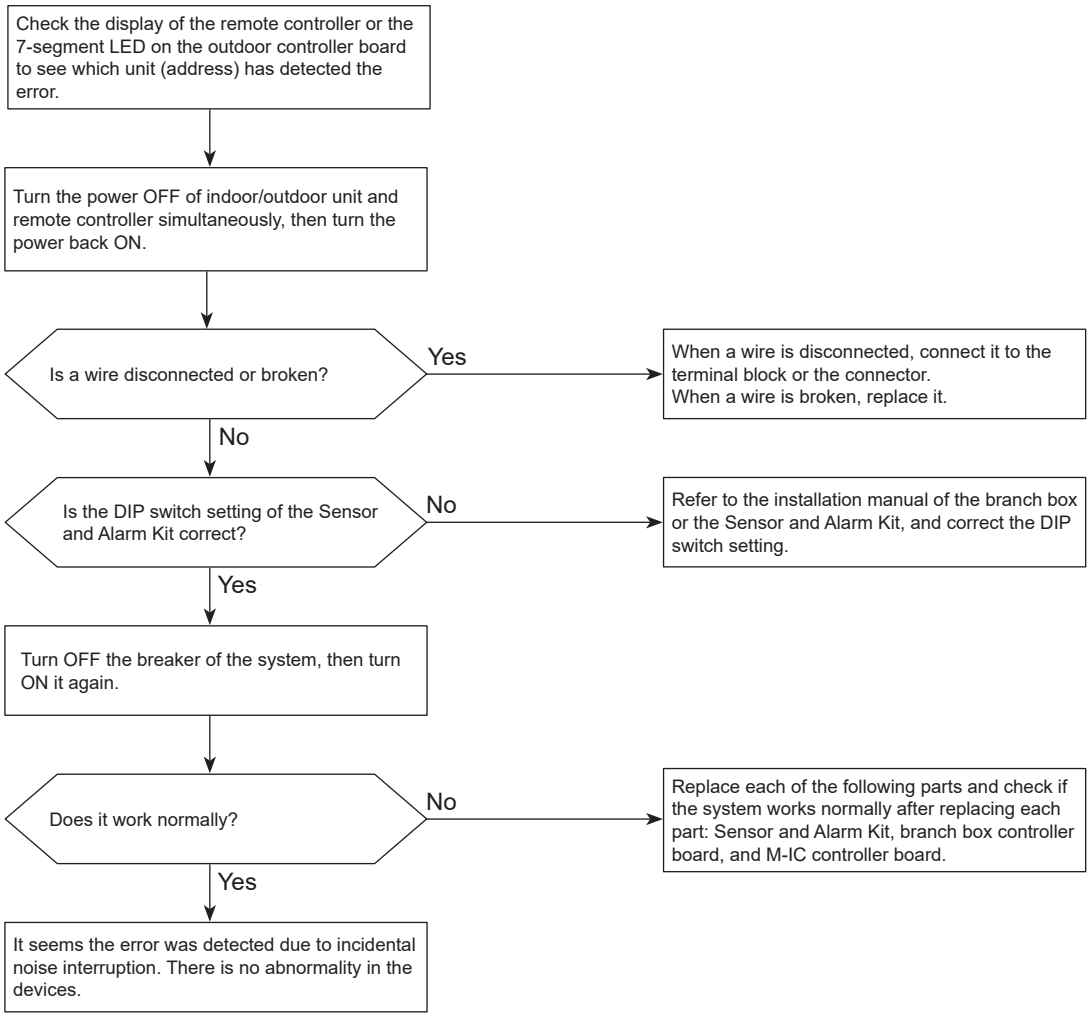
Abnormal points and detection methods

An communication error has occurred with a refrigerant sensor.

Causes and checkpoints

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

Diagnosis of failure



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

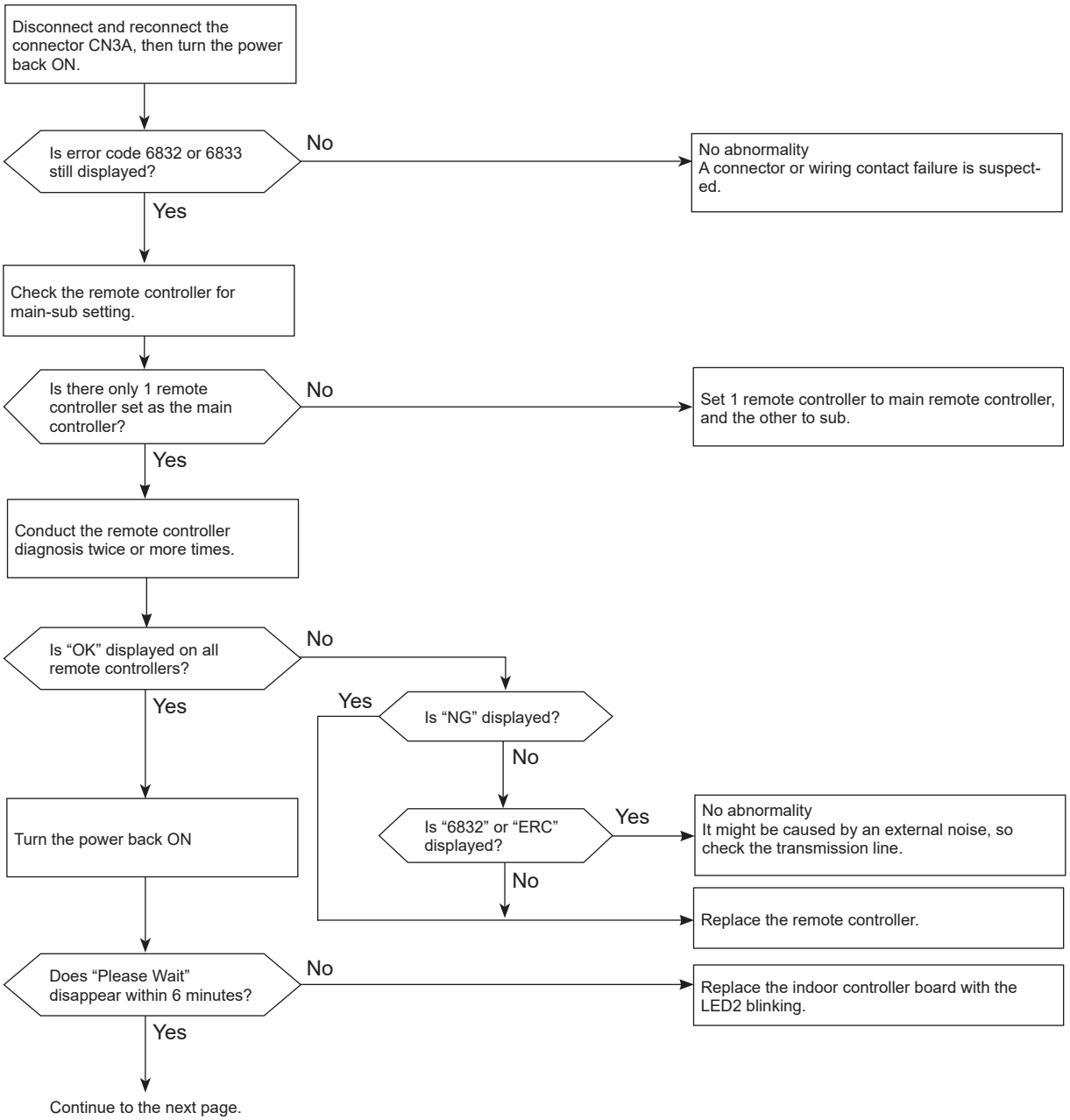
Abnormal points and detection methods

Detected in remote controller or indoor unit.

Causes and checkpoints

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

Diagnosis of failure



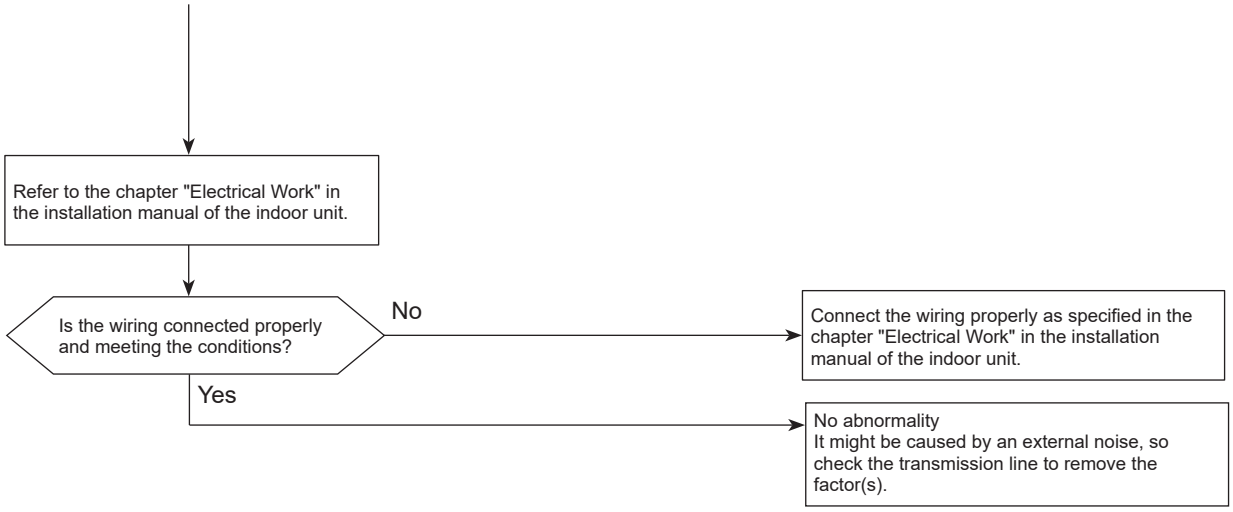
Note:

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

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

Diagnosis of failure

Continued from the previous page.



7100 (EF): Total capacity error

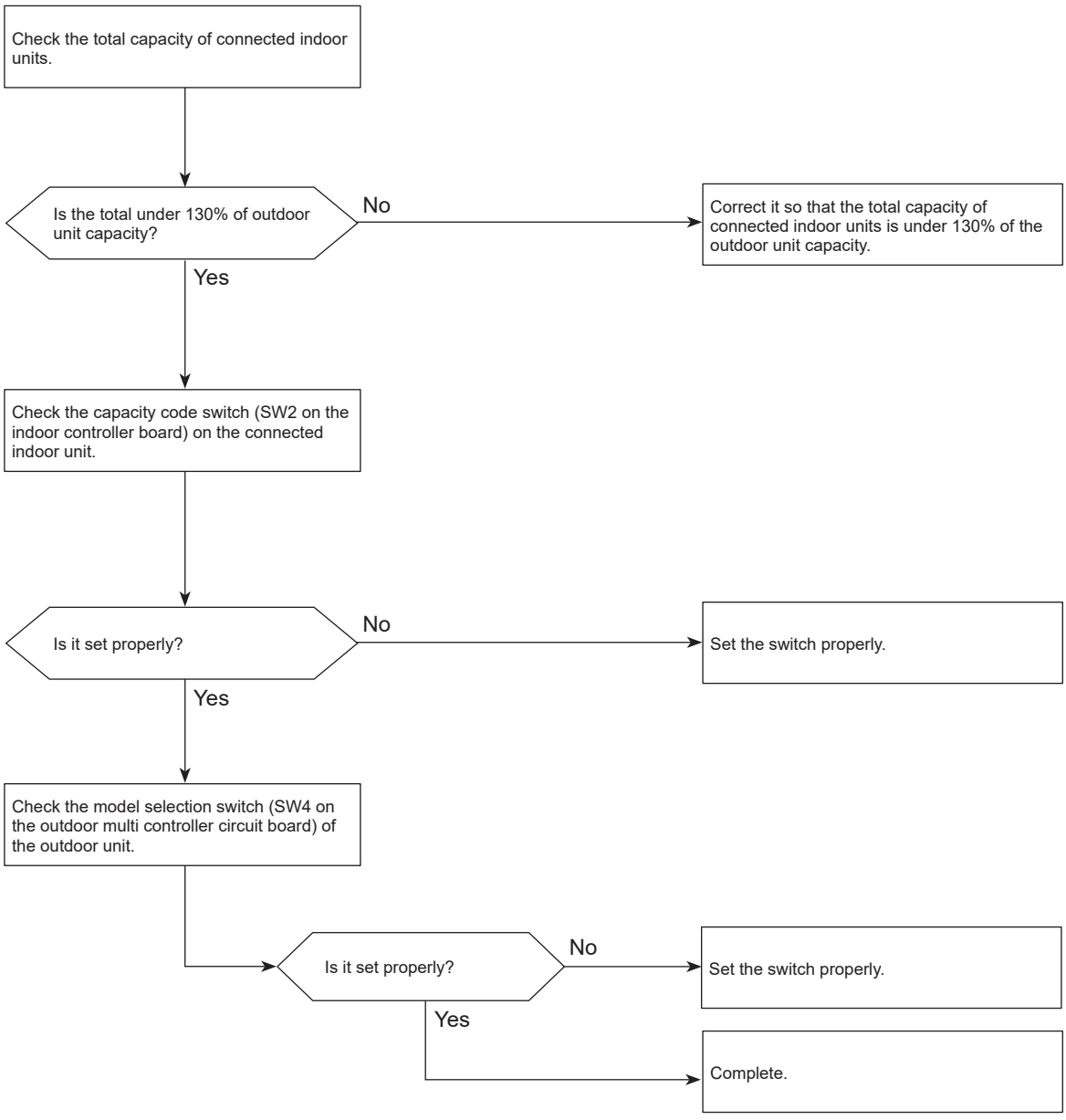
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



7101 (EF): Capacity code error

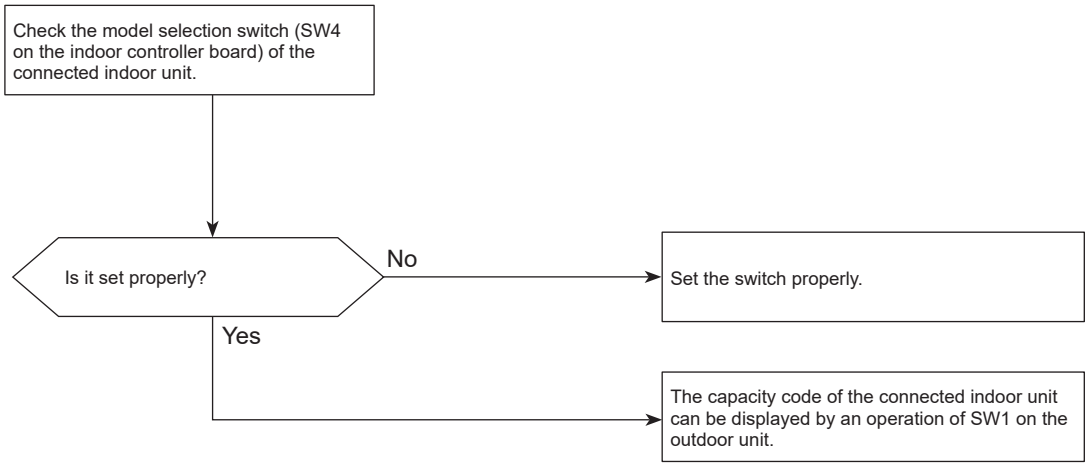
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



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

Abnormal points and detection methods

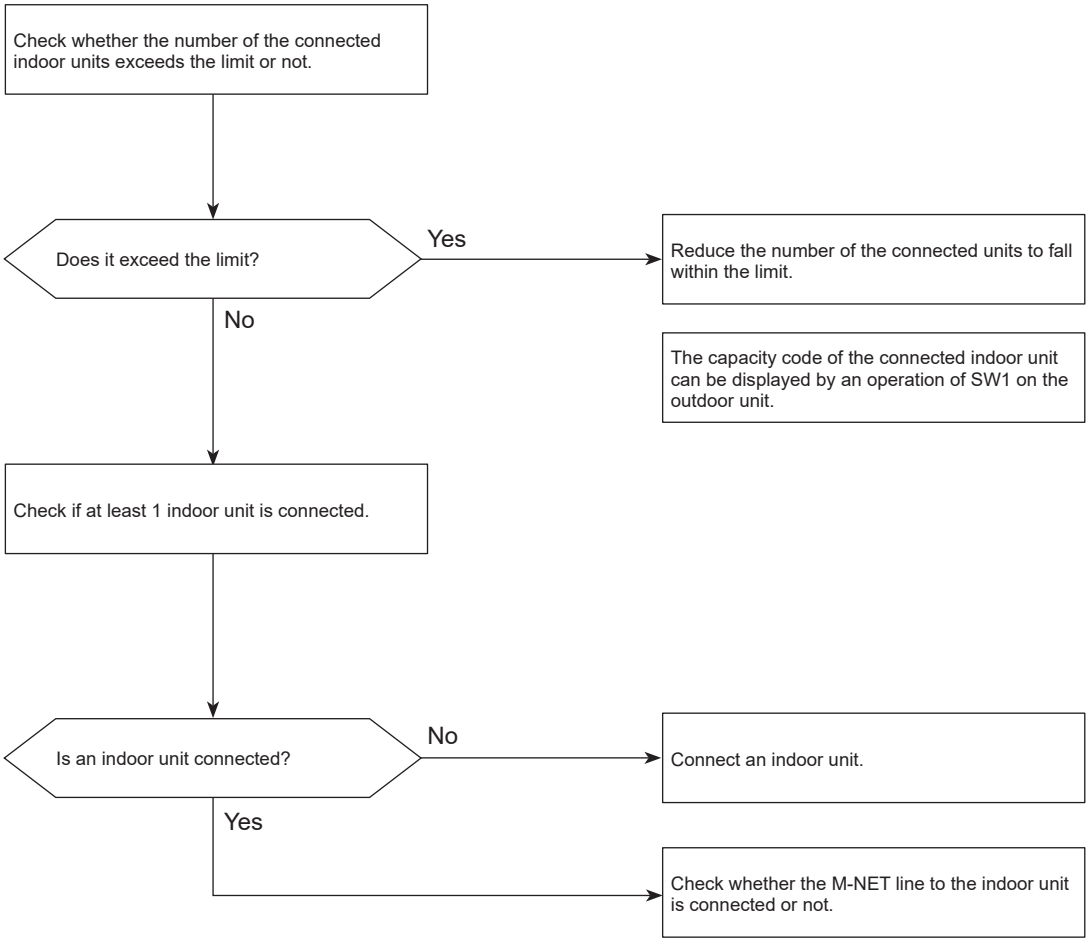
The number of the connected indoor units exceeds the limit, error code 7102 is displayed.

Causes and checkpoints

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

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

Diagnosis of failure



7105 (EF): Address setting error

Abnormal points and detection methods

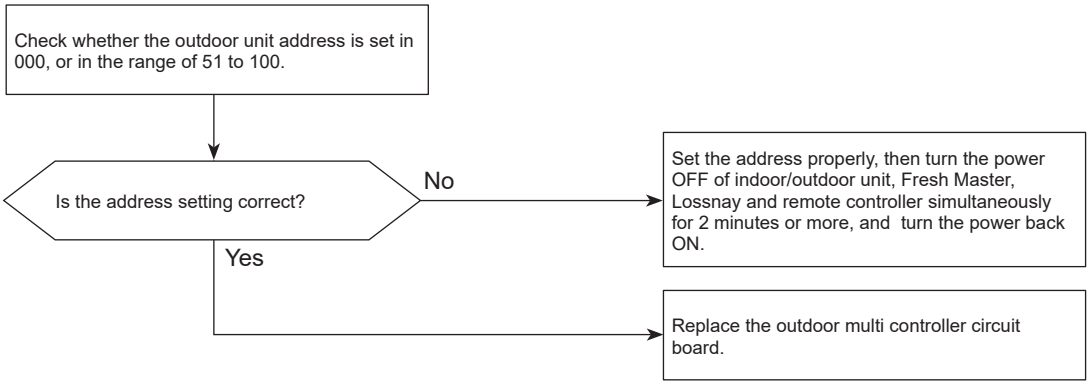
The address setting is wrong.

Causes and checkpoints

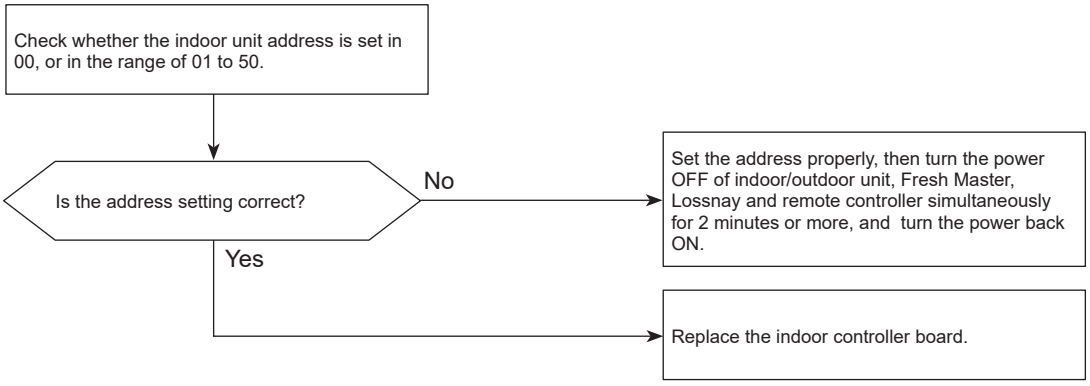
There is a unit without correct address setting in the range specified in the installation manual.

Diagnosis of failure

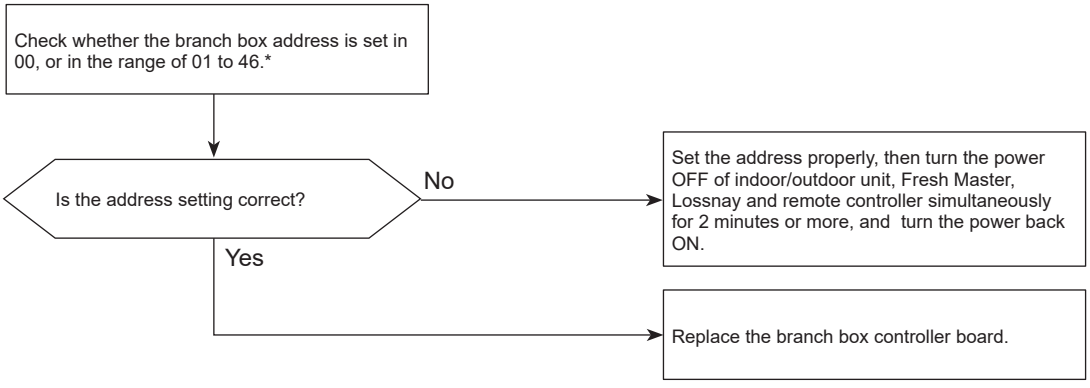
<Outdoor unit>



<Indoor unit>



<Branch box>

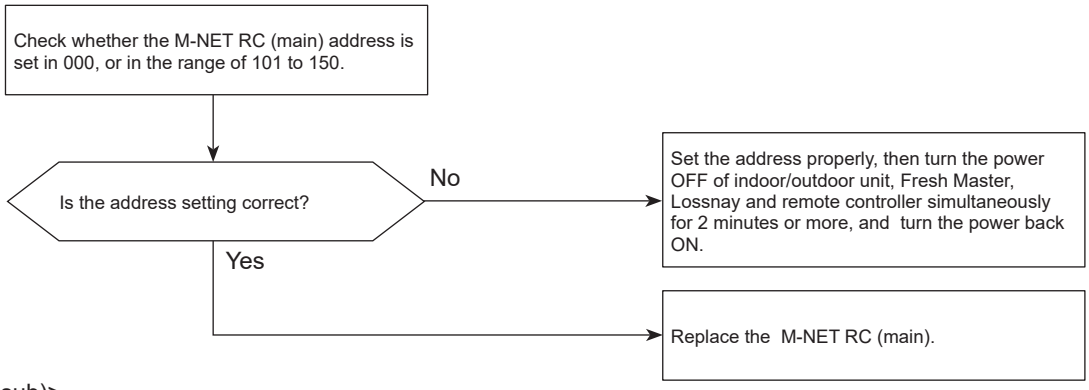


* Branch box port addresses are set sequentially and they must not exceed 50. For example, when 5 indoor units are connected and the branch box address (port A address) is set to 47, it is not allowable because the port E address exceeds 50 (A: 47, B: 48, C: 49, D: 50, E: 51).

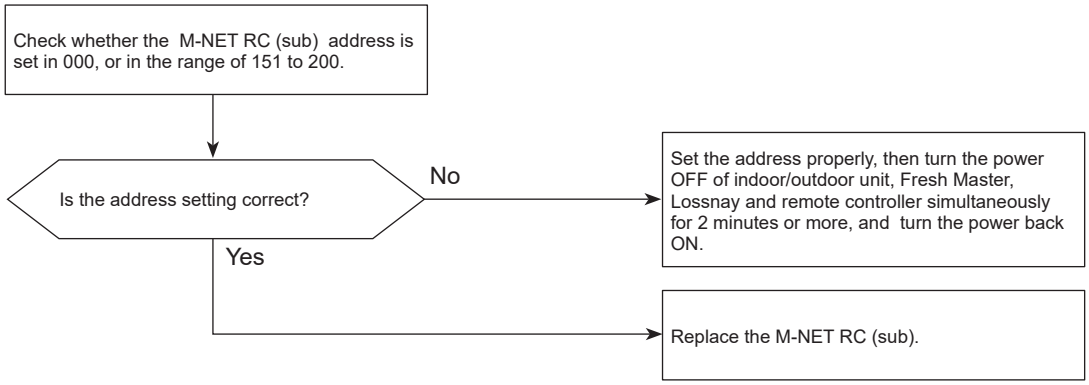
7105 (EF): Address setting error

Diagnosis of failure

<M-NET RC (main)>



<M-NET RC (sub)>



7118 (EF): Refrigerant leak detection system error

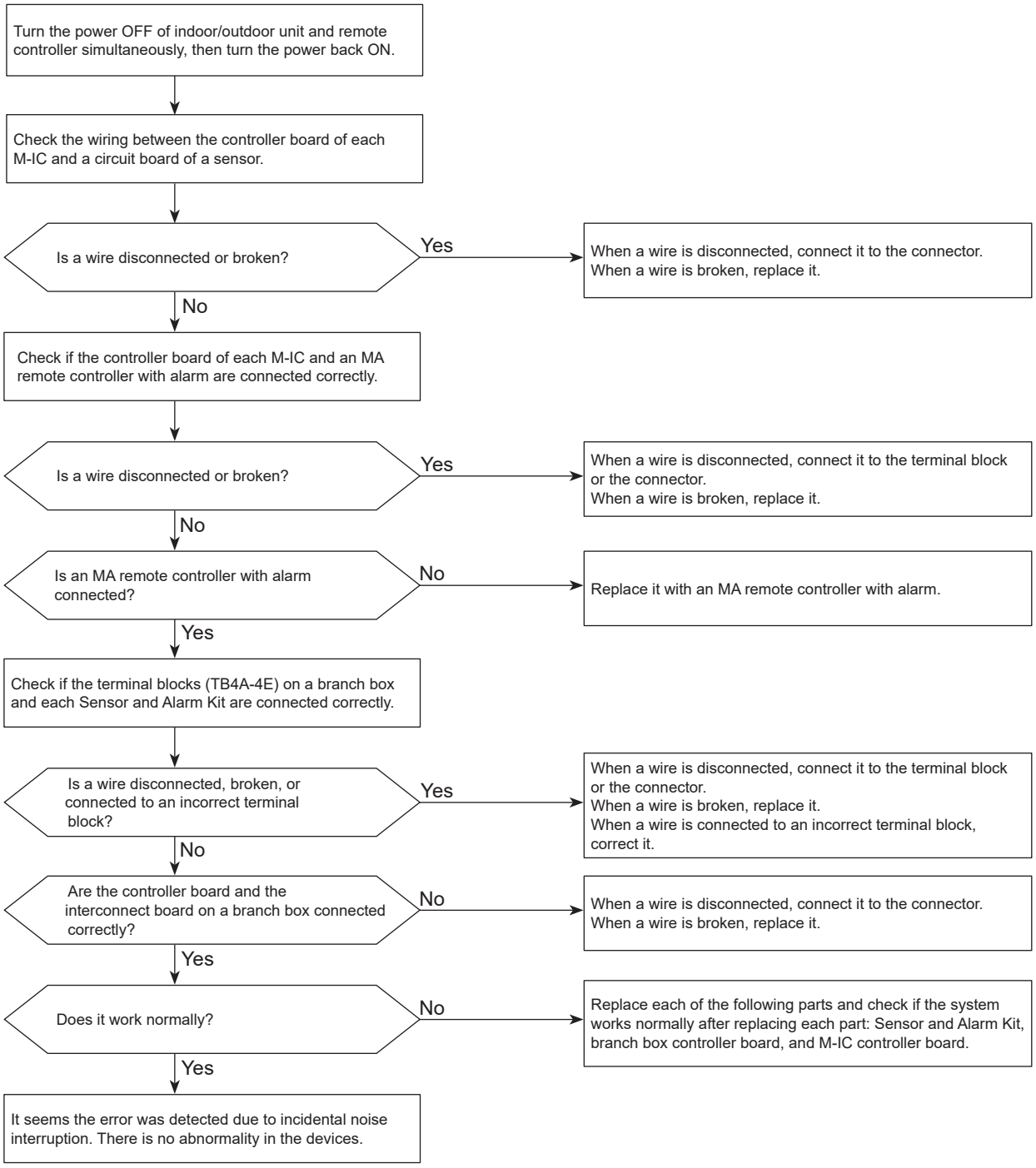
Abnormal points and detection methods

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

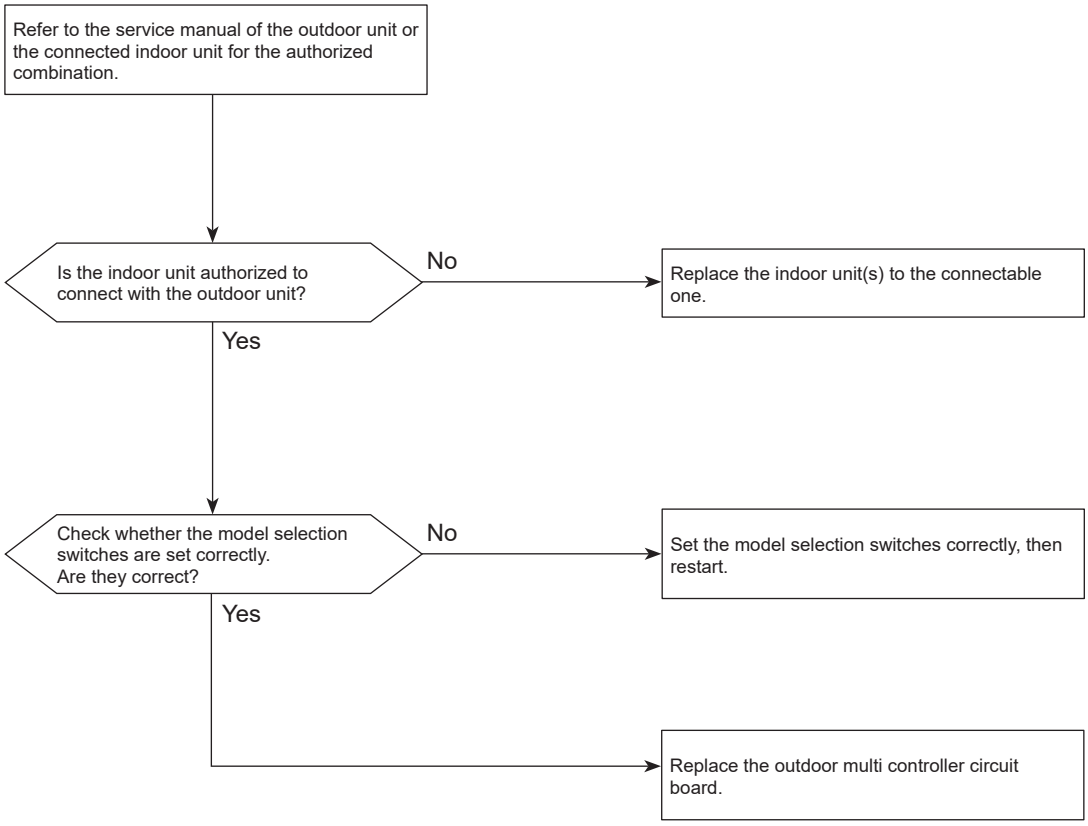
Abnormal points and detection methods

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 95°F (35°C). Then low speed operates for 2 minutes and operates at the normal set air volume. (Hot adjust control)
Indoor unit remote controller shows "Please Wait" indicator for about 2 minutes when turning ON power supply. Display: "Please Wait" blinks	The system is in the process of startup. Operate remote controller again after “Please Wait” disappears.
Drain pump does not stop while unit has been stopped. Display: Light is off	After a stop of cooling operation, unit continues to operate drain pump for 3 minutes and then stops.
Drain pump continues to operate while unit has been stopped. Display: —	Unit continues to operate drain pump if drainage is generated, even during a stop.

8-5. Internal switch function table

■ 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*1	Activated	Deactivated	Any time after the power is turned ON.
2	Mode setting	Heating	Cooling	

*1. Test run on PWFY series cannot be run by the outdoor unit. Use a switch on the indoor unit or a remote controller to perform test run.

■ 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	-	-	-	-	-	-
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	Auxiliary heater	Activated	Deactivated	Before turning the power ON	To transmit a connection permission signal of the auxiliary heater to the connected CITY MULTI indoor unit.	Turn ON the switch only when the auxiliary heater is connected and operated.
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.*1	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	While the outdoor unit is in HEAT operation, fully close the LEV on the indoor unit which is in FAN or COOL.*2	Activated	Deactivated	Any time	To reduce the room temperature increase by setting the LEV opening lower for the indoor units in FAN or COOL.	The refrigerant is more likely to collect in the indoor units in FAN or COOL, which can cause refrigerant shortage of units, resulting in less capacity and increase in discharge temperature.

*1. 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.

*2. SW5-8 Countermeasure against room temperature rise for indoor unit in FAN and COOL mode.

■ 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	ON	OFF	ON
SW6-8	OFF	OFF	ON	ON
Target ETm (°F [°C])	48 [9]	52 [11]	43 [6]	57 [14]

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	Preventing the compressor from operating for a defined period of time when the breaker turns on for the first time under low ambient temperature	Deactivated	Activated (Normal)	Any time	To prevent the compressor from break down This function does not allow the compressor to operate until any of (1) to (3) is satisfied. (1) 7.3 hours has passed after the breaker turns on. (2) Ambient temperature (TH7) > 14°F (-10°C) (3) Compressor temperature (TH4) > 41°F (5°C) Turn the switch on when you want the compressor to operate in the event of an unexpected breaker off such as a power failure.	Using this function may cause a breakdown of the compressor, so ask your dealer if this function can be used or not. It is not recommended to keep the switch on all the time.
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 0.12 in. WG (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	Setting to energize the freeze stat heater (optional part) only during heating	Activated*4	Deactivated *5	Any time	To reduce snow on the base, even it blows inside the unit, by setting the base heater ON while the HEAT operation is stopped.	Power consumption raises while the operation is stopped.
3	High heating performance mode	Activated	Deactivated	Any time	To raise the performance of HEAT operation if it is insufficient.	The performance may not be raised depending on the capacity of indoor units in operation, or outside air temperature.
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	Simultaneous cooling and heating with external heater	Activated	Deactivated	Any time	The simultaneous operation of cooling and heating will be possible by installing an external heater to the CITY MULTI indoor unit.	For the installation of external heater and the indoor unit setting, refer to the indoor unit service manual.
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.

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

gized.

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

■ SW9: Function switch

Initial setting



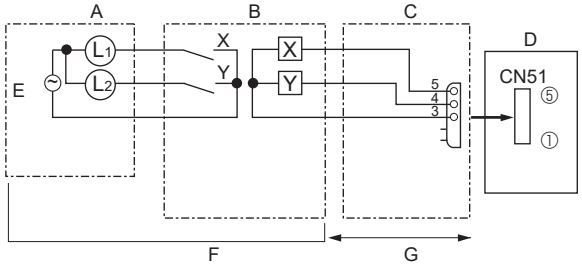
The black square (■) indicates a switch position.

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*6	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	-	-	-	-	-	-

*6. When a PWFY series is connected, this function is always disable regardless of the switch.

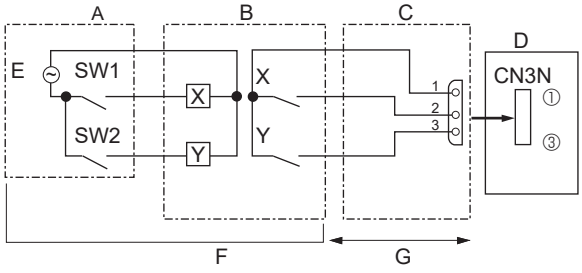
8-6. Outdoor unit input/output connector

■ State (CN51)



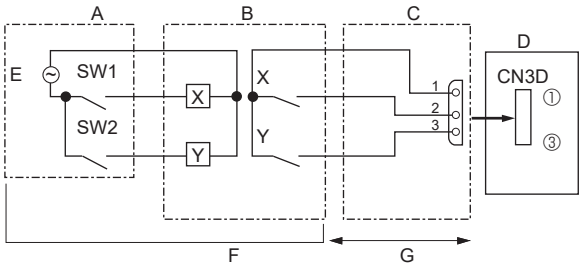
A: Distant control board
B: Relay circuit
C: External output adapter (PAC-SA88HA-E)
D: Outdoor unit control board
E: Output power supply
F: Procure locally
G: Max. 10m [32 ft]
L1: Error display output
L2: Compressor operation output
X, Y: Relay (coil rating: ≤ 0.9W. DC 12 VDC)

■ Auto changeover (CN3N)



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

■ Silent Mode/Demand Control (CN3D)



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

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	
				Cooling	Heating
Silent mode	OFF	OFF ON	OFF OFF	Normal Silent mode	Normal Silent mode
Demand control	ON	OFF ON ON OFF	OFF OFF ON ON	100% (Normal) 75% 50% 0% (Stop)	

8-7. How to check the parts

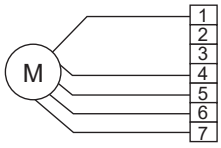
8-7-1. Checkpoints for each part

■ Thermistors

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

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

■ Fan motor (MF1, MF2)



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

Connector pins	Normal	Abnormal
1 - 4	1.3 ± 0.06 MΩ	Open or short (Short, for 7 - 4 and 5 - 4)
5 - 4	Open	
6 - 4	220 ± 22 kΩ	
7 - 4	Open	

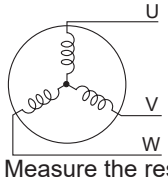
* See the spec name plate indicated in the diagram for the model name of fan motor.
"X" in the model name of fan motor represents numbers and letters.

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

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

Normal	Abnormal
1725 ± 172.5 Ω	Open or short

■ Motor for compressor (MC)



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

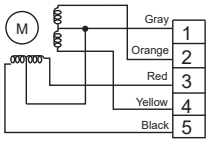
Normal	Abnormal
0.121 ± 0.006 Ω	Open or short

■ Solenoid valve coil <Bypass valve> (SV1)

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

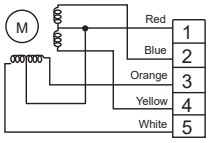
Normal	Abnormal
1182.5 ± 83 Ω	Open or short

■ 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		

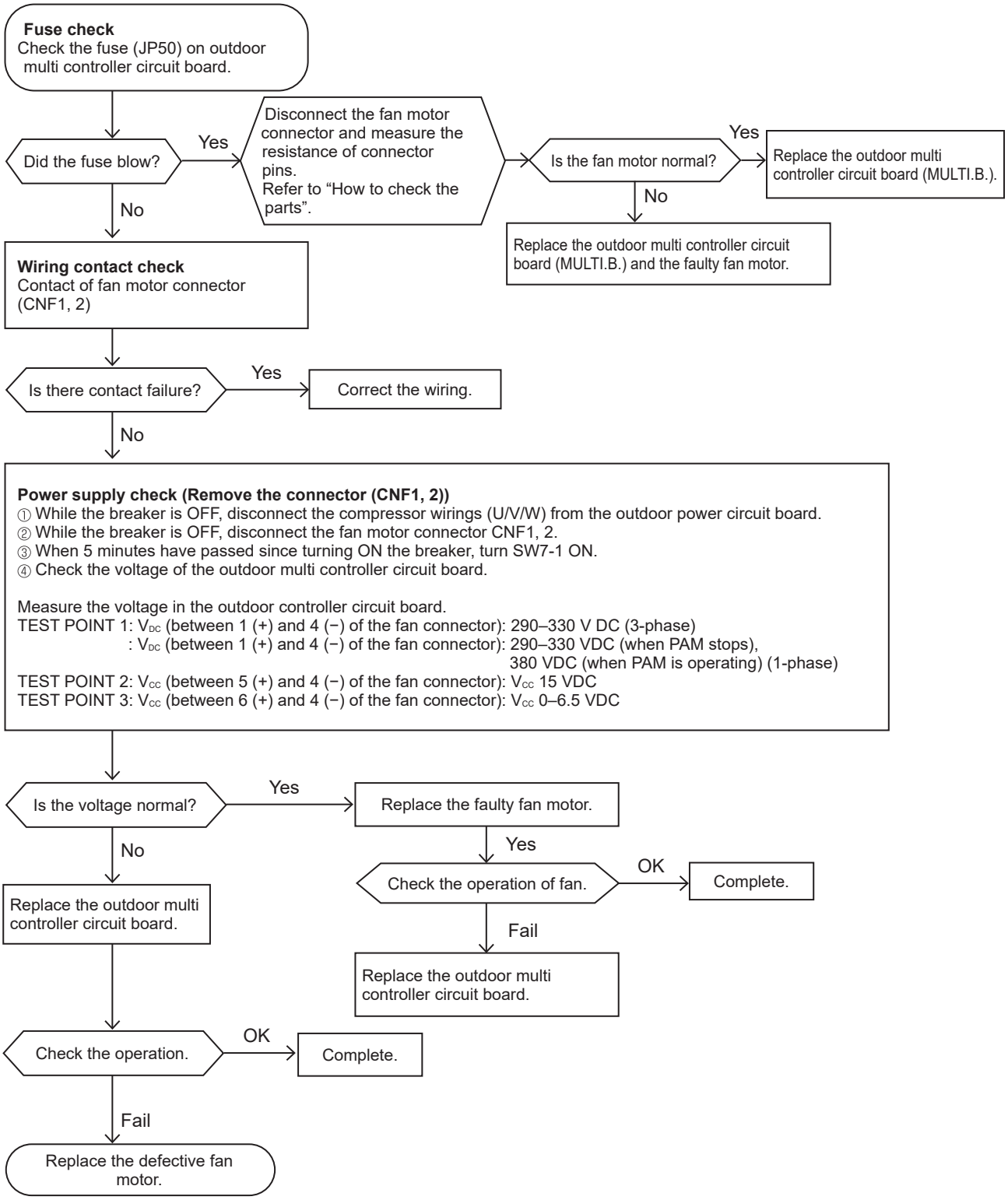
8-7-2. Check method of DC fan motor (fan motor/outdoor multi controller circuit board)

■ 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

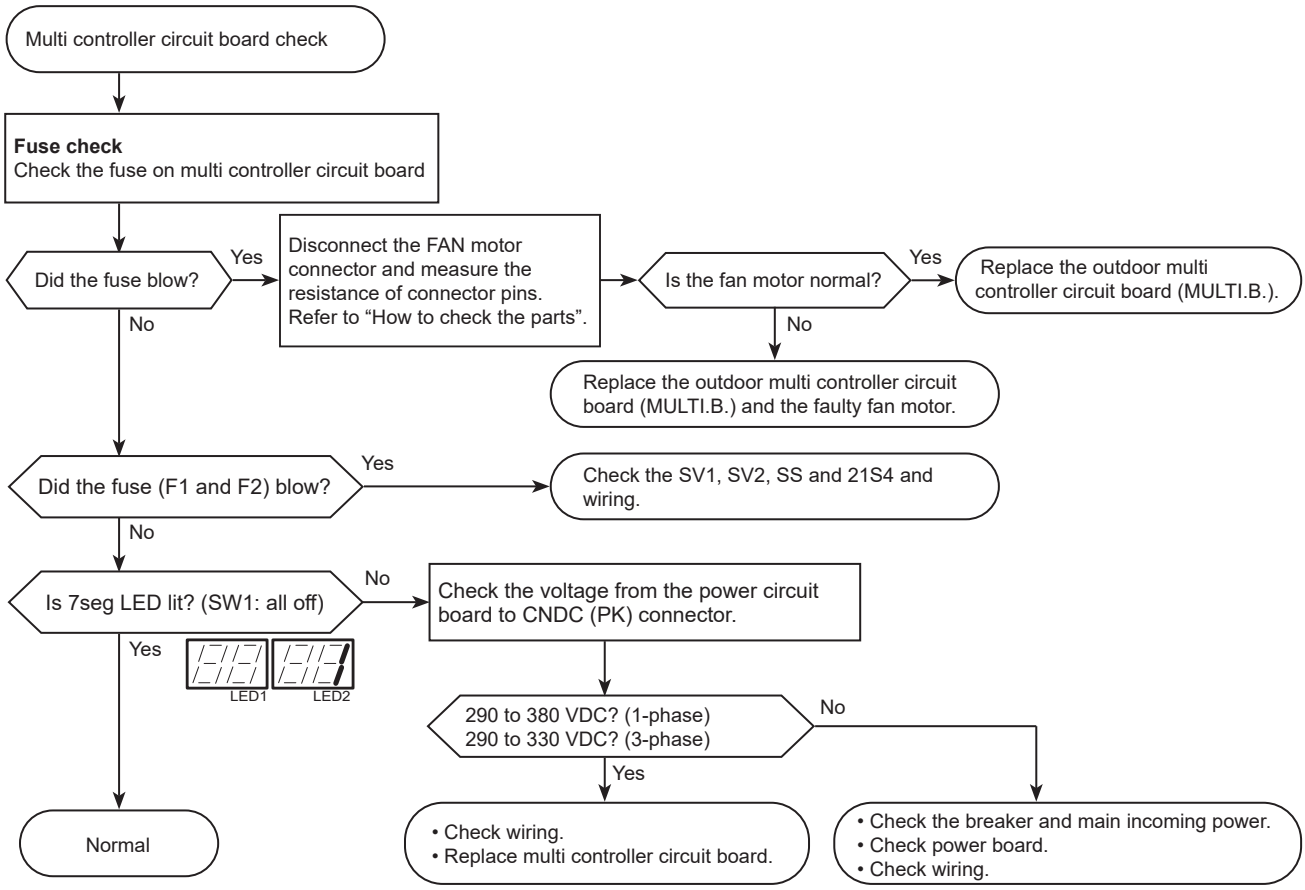
Symptom: The outdoor fan cannot rotate.

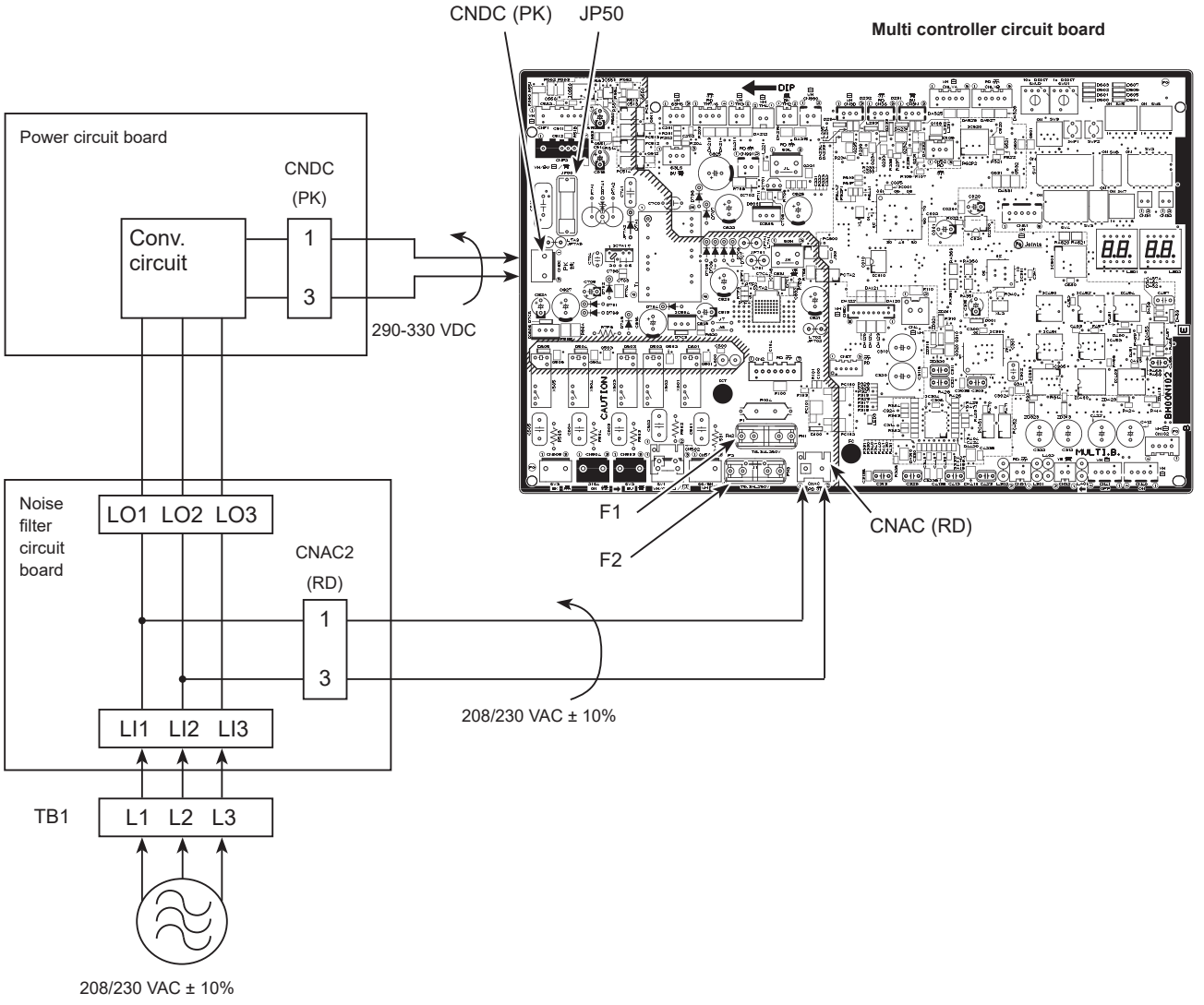


Note:

- 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.

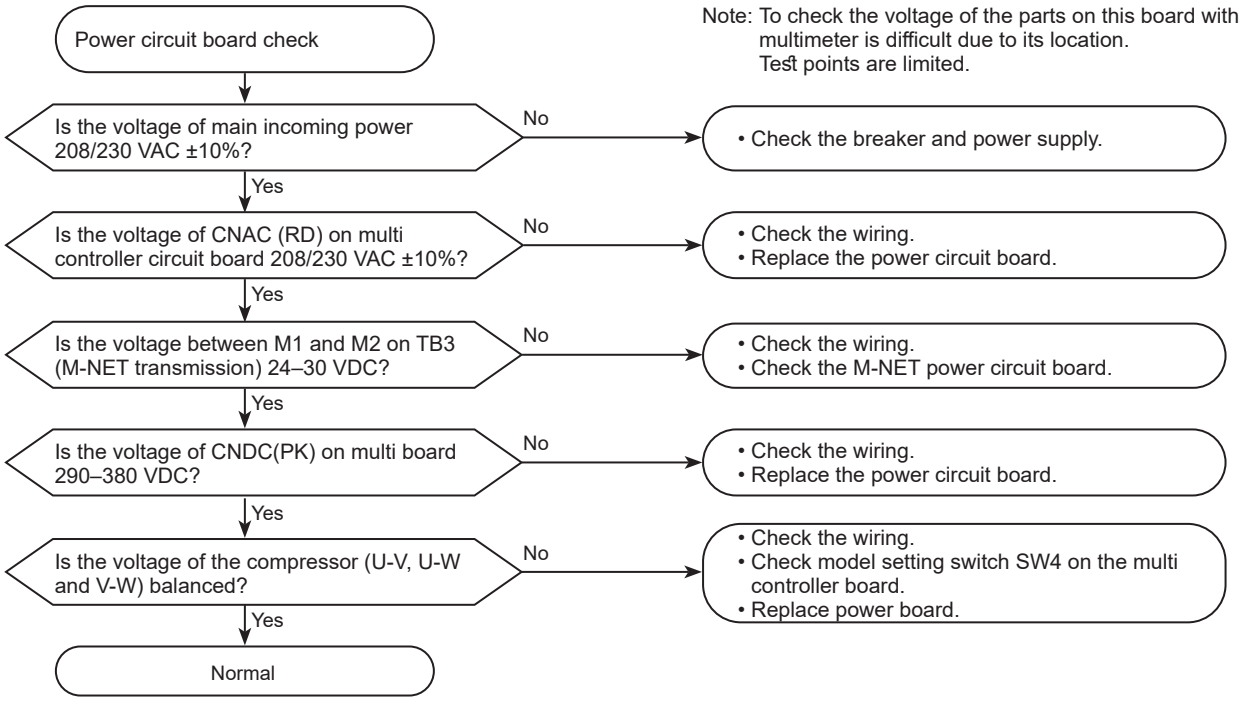
8-7-3. Check method of multi controller circuit board

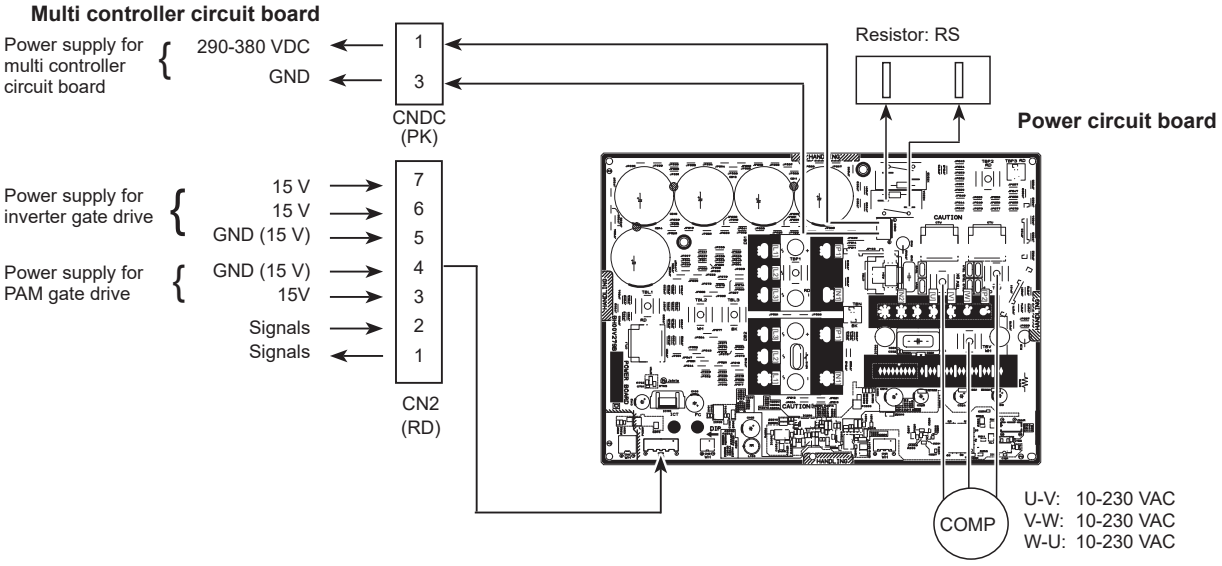


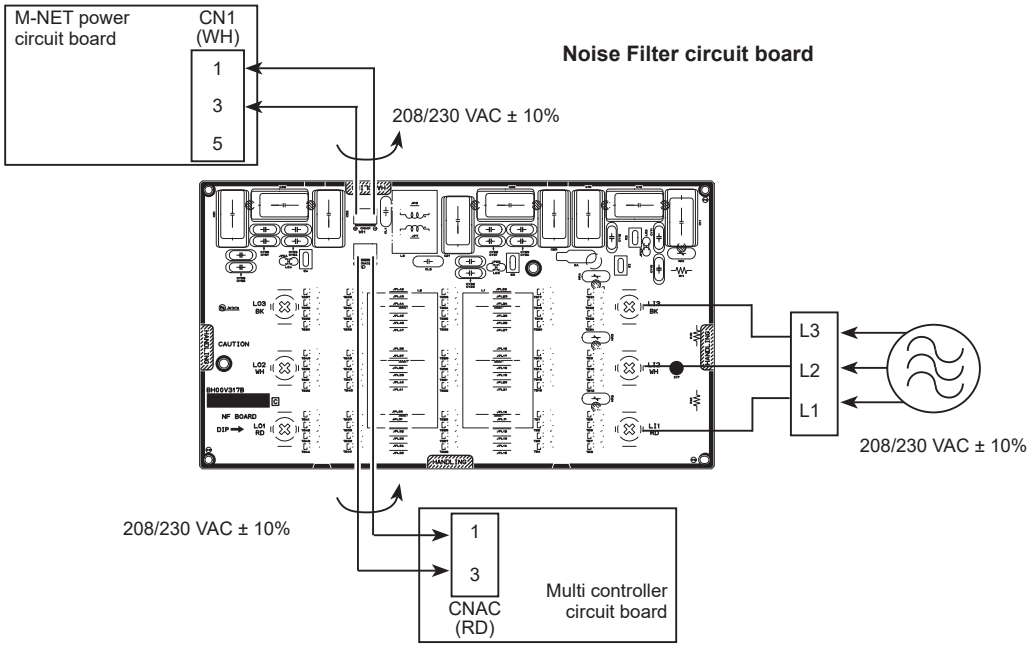


8-7-4. Check method of power circuit board

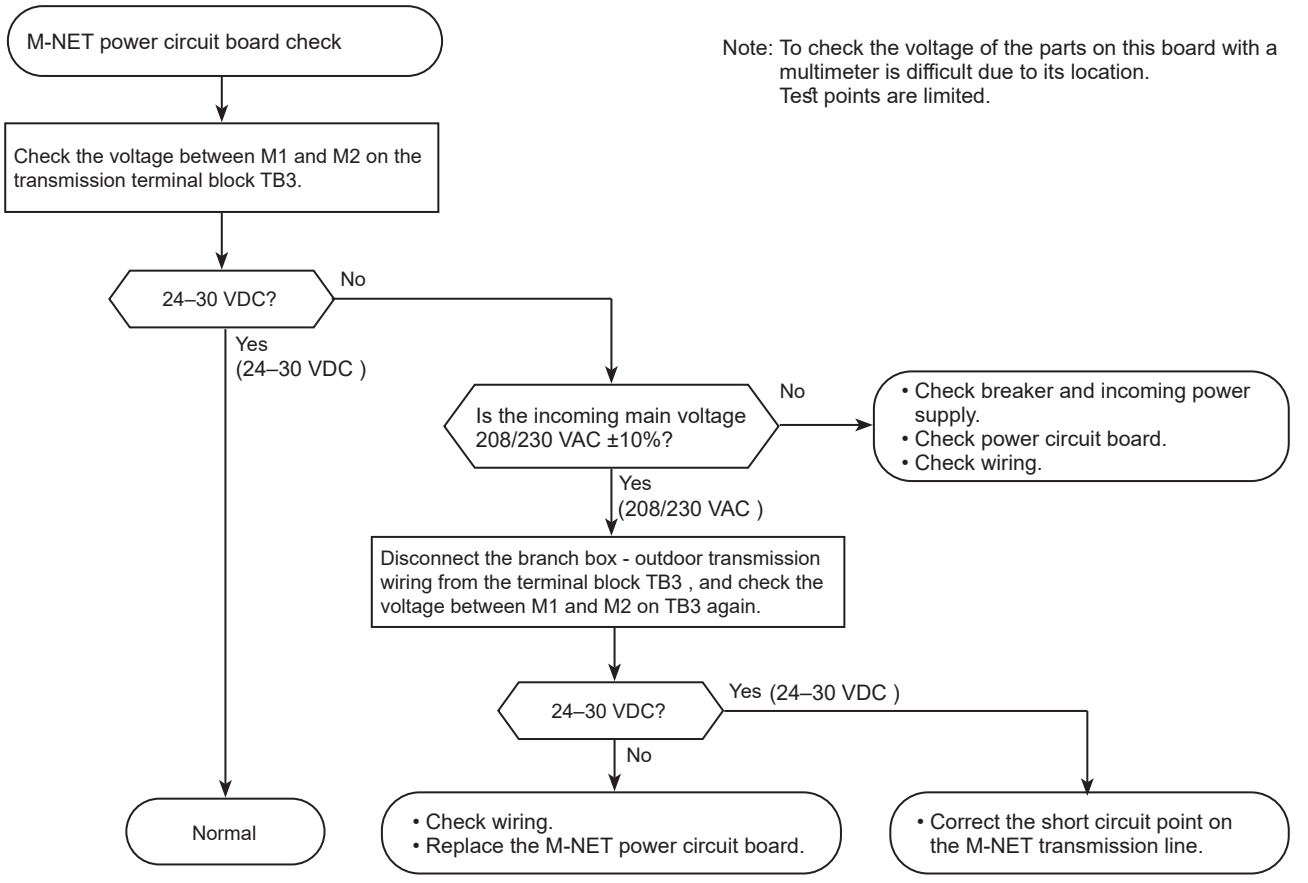
Note: To check the voltage of the parts on this board with a multimeter is difficult due to its location. Test points are limited.





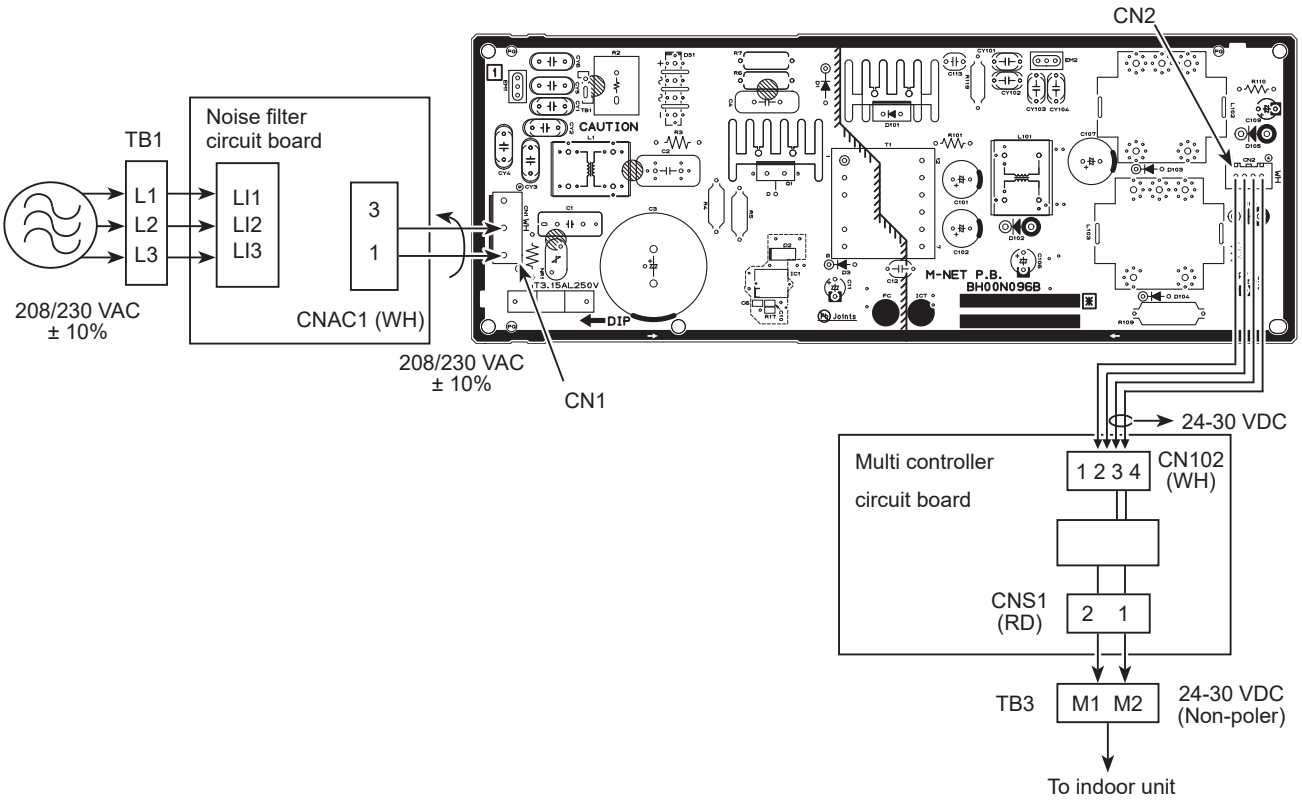


8-7-5. Check method of M-NET power circuit board



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

M-NET Power circuit board



8-8. How to check the components

8-8-1. Thermistor feature chart

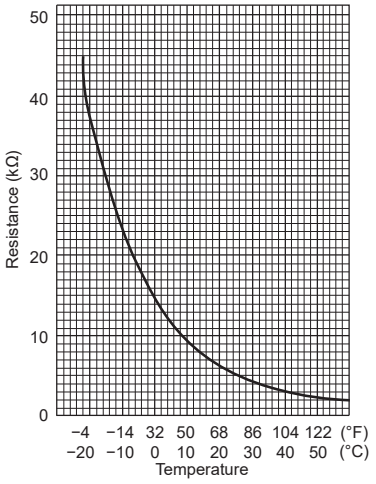
■ Low temperature thermistors

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

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

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

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



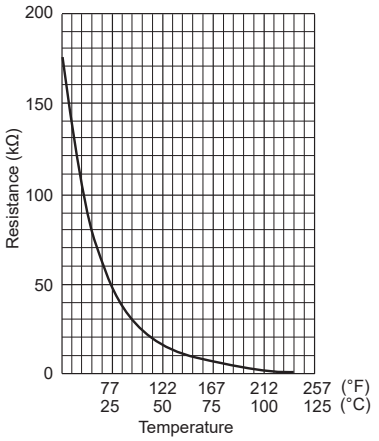
■ Medium temperature thermistor

- TH8 (Heat sink)

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

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

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



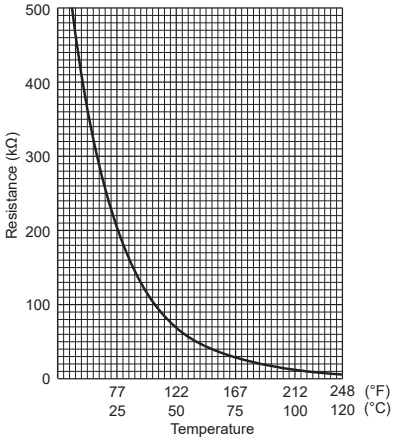
■ High temperature thermistor

- TH4 (Compressor)

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

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

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



8-8-2. High pressure sensor

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

By configuring the digital display setting switch (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 14 psig (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 14 psig (0.098 MPaG), the connector may be faulty or be disconnected. Check the connector and go to the method 4.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 725 psig (5.0 MPaG), go to the method 3.
   - If other than listed above, compare the pressures while the sensor is running. Go to the method 2.
2. Compare the gauge pressure and the pressure displayed on the self-diagnosis LED1, 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 36 psig (0.25 MPaG), both the high pressure sensor and the control board are normal.
   - When the difference between both pressures exceeds 36 psig (0.25 MPaG), the high pressure sensor has a problem. (performance deterioration)
   - When the pressure displayed on the self-diagnosis LED1, 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 14 psig (0.098 MPaG), the high pressure sensor has a problem.
   - When the pressure displayed on the self-diagnosis LED1, 2 is approximately 725 psig (5.0 MPaG), the control board has a problem.
4. Remove the high pressure sensor from the control board, and short-circuit between the pin 2 and pin 3 connectors (63HS) to check the pressure with the self-diagnosis LED1, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 725 psig (5.0 MPaG), the high pressure sensor has a problem.
   - If other than listed above, the control board has a problem.

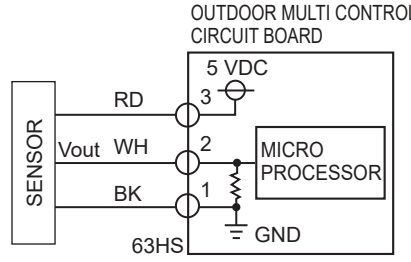
■ High pressure sensor configuration (63HS)

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

Note:

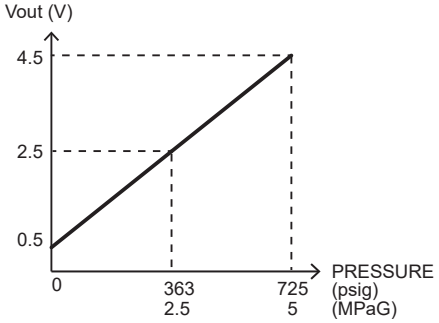
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

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



③–①: 5 V (DC)
②–①: Output Vout (DC)

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



8-8-3. Low pressure sensor

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

By configuring the digital display setting switch (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 14 psig (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 14 psig (0.098 MPaG), the connector may be faulty or be disconnected. Check the connector and go to the method 4.
   - When the outdoor temperature is 86°F (30°C) or less, and the pressure displayed on the self-diagnosis LED1, 2 exceeds 247 psig (1.7 MPaG), go to the method 3.
   - When the outdoor temperature exceeds 86°F (30°C), and the pressure displayed on the self-diagnosis LED1, 2 exceeds 247 psig (1.7 MPaG), go to the method 5.
   - If other than listed above, compare the pressures while the sensor is running. Go to the method 2.
2. Compare the gauge pressure and the pressure displayed on the self-diagnosis LED1, 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 29 psig (0.2 MPaG), both the low pressure sensor and the control board are normal.
   - When the difference between both pressures exceeds 29 psig (0.2 MPaG), the low pressure sensor has a problem. (performance deterioration)
   - When the pressure displayed on the self-diagnosis LED1, 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 14 psig (0.098 MPaG), the low pressure sensor has a problem.
   - When the pressure displayed on the self-diagnosis LED1, 2 is approximately 247 psig (1.7 MPaG), the control board has a problem.
4. Remove the low pressure sensor from the control board, and short-circuit between the pin 2 and pin 3 connectors (63LS) to check the pressure with the self-diagnosis LED1, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 247 psig (1.7 MPaG), the low pressure sensor has a problem.
   - If other than listed above, the control board has a problem.
5. Remove the high pressure sensor (63HS) from the control board, and insert it into the connector for the low pressure sensor (63LS) to check the pressure with the self-diagnosis LED1, 2.
   - When the pressure displayed on the self-diagnosis LED1, 2 exceeds 247 psig (1.7 MPaG), the control board has a problem.
   - If other than listed above, go to the method 2.

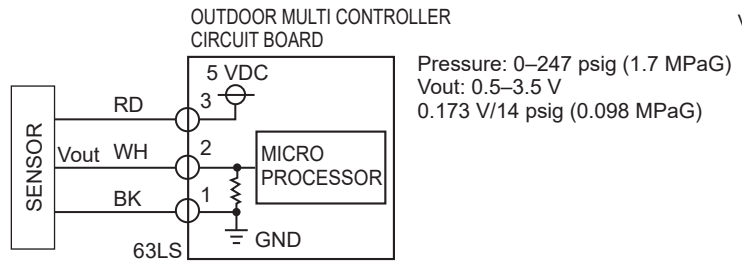
■ Low pressure sensor configuration (63LS)

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

Note:

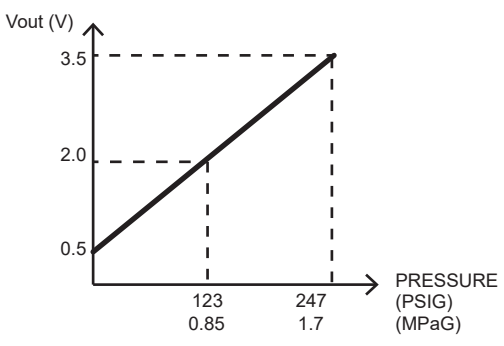
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

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



③-①: 5 V (DC)
②-①: Output Vout (DC)

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

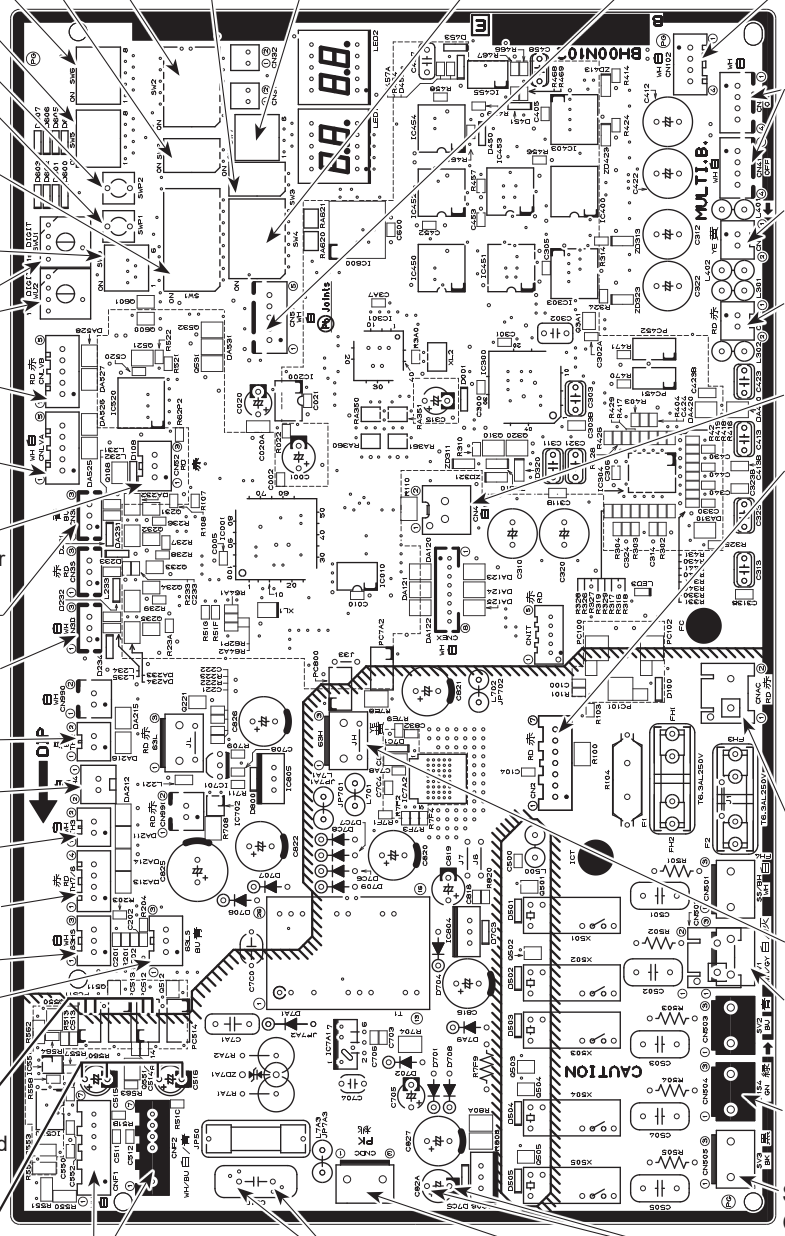


8-9. Test point diagram

■ Outdoor multi controller circuit board

⚠Caution:

- TEST POINT①is high voltage.



SW8
Model selection

SW6
Function selection

SW5
Function selection

SWP2
Display selection

SWP1
Display selection

SW1
Display selection
(Self-diagnosis)

SW9
Model selection/
Function selection

SWU2, SWU1
Address setting

CNLVB
Linear expansion Valve

CNLVA
Linear expansion Valve

CN52
Connect to the noise filter circuit board (CN52)

CN3N
Auto change over

CN3D
Input of 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 CNF1,2 ⑦(+)–④(−))

V_{SP}
(Voltage between pins of C515 and C516):
0 VDC (when stopped)
1–6.5 VDC (when operated)
(Same as CNF1,2 ⑥(+)–④(−))

CNF1, 2
Connect to fan motors
①–④: 290–330 VDC
⑤–④: 15 VDC
⑥–④: 0–6.5 VDC
⑦–④: 15 VDC (when stopped)
0–15 VDC pulse
(when operated)

V_{DC} (TEST POINT①)
(Voltage between pins of C510)
: 290–330 VDC
(Same as CNF1,2 ①(+)–④(−))

CNDC
290–330 VDC
(①(+)–③(−))

V_{CC} (TEST POINT②)
(Voltage between pins of C82A): 15 VDC
(Same as CNF1,2 ⑤(+)–④(−))

SW2
Model selection/
Pump down

SW3
Test run

SW7
Function selection

SW4
Model selection

CN51
External signal output

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

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 board (0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: Not used
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC

CNAC
Power supply for multi controller board (CNAC2) 208/230 VAC

63H
High pressure switch

SV1
Bypass valve

21S4
4-way valve

SV3
Oil return valve

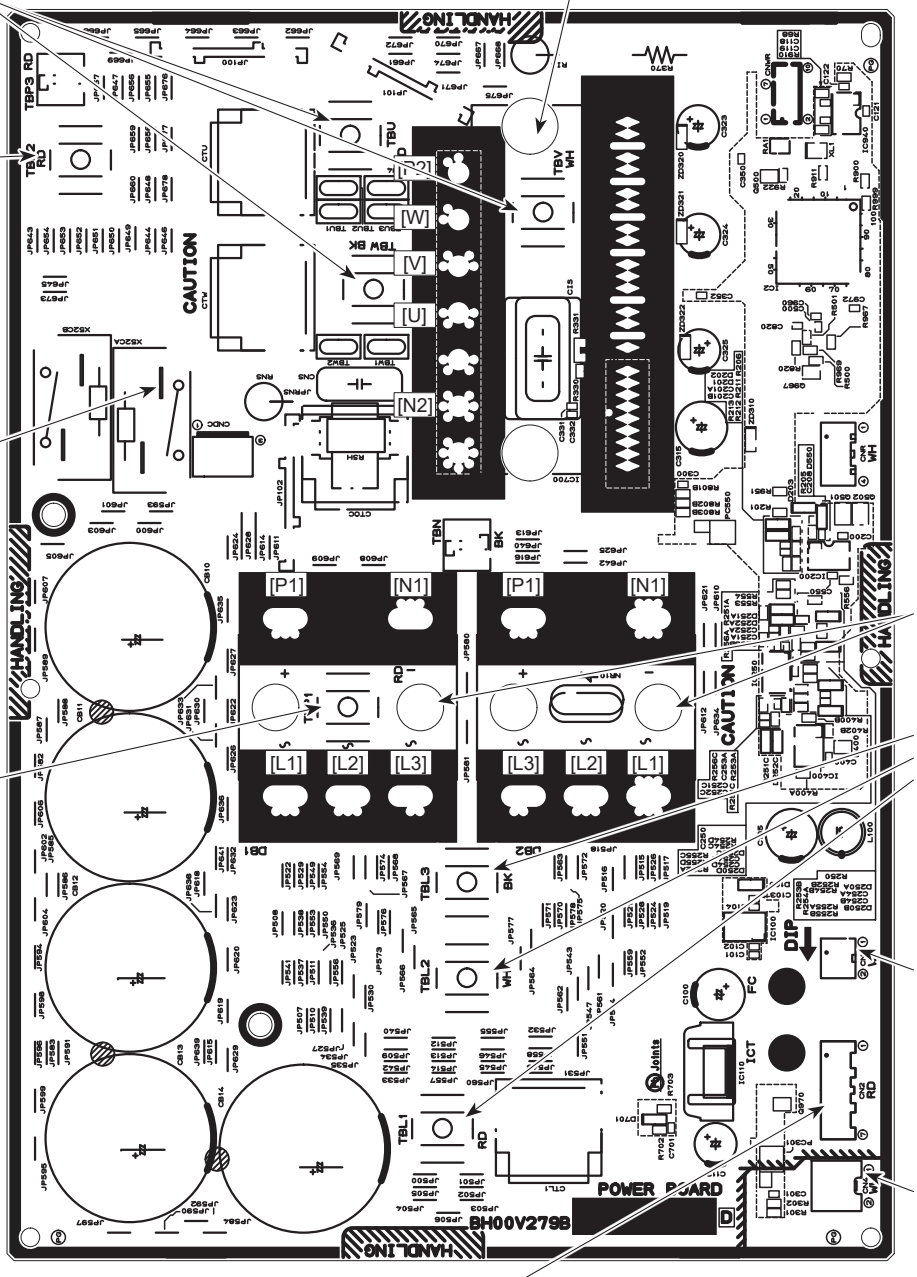
■ Outdoor power circuit board

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 (DB1 or DB2)
[L1]–[P1], [L2]–[P1], [L3]–[P1], [L1]–[N1], [L2]–[N1], [L3]–[N1]

2. Check of IPM (IC700)
[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.



TBU, TBV, TBW
Connect the compressor (MC)
Voltage among phases:
10-230 VAC
M5 2.2 ± 0.2 N·m

IPM (IC700)

TBP2
Connect to the DCL
M5 2.2 ± 0.2 N·m

TAB connector on X52CA
Connect to the RS resistor

Diode module (DB1, DB2)

TBP1
Connect to the DCL
M5 2.2 ± 0.2 N·m

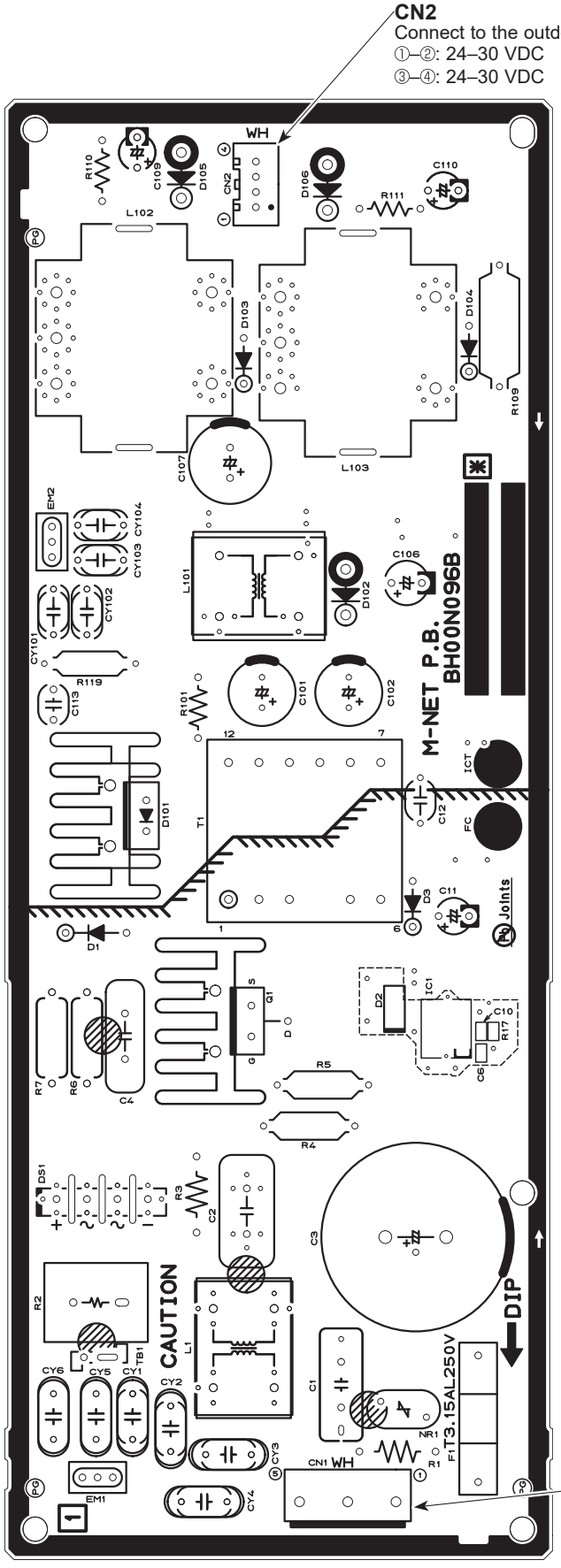
TBL3
TBL2
TBL1
Connect to the outdoor noise filter circuit board (LO1, LO2, LO3)
208/230 VAC
M5 2.2 ± 0.2 N·m

CN6
Thermistor <Heat Sink> (TH8)

CN4
Connect to the outdoor circuit board (CN4)

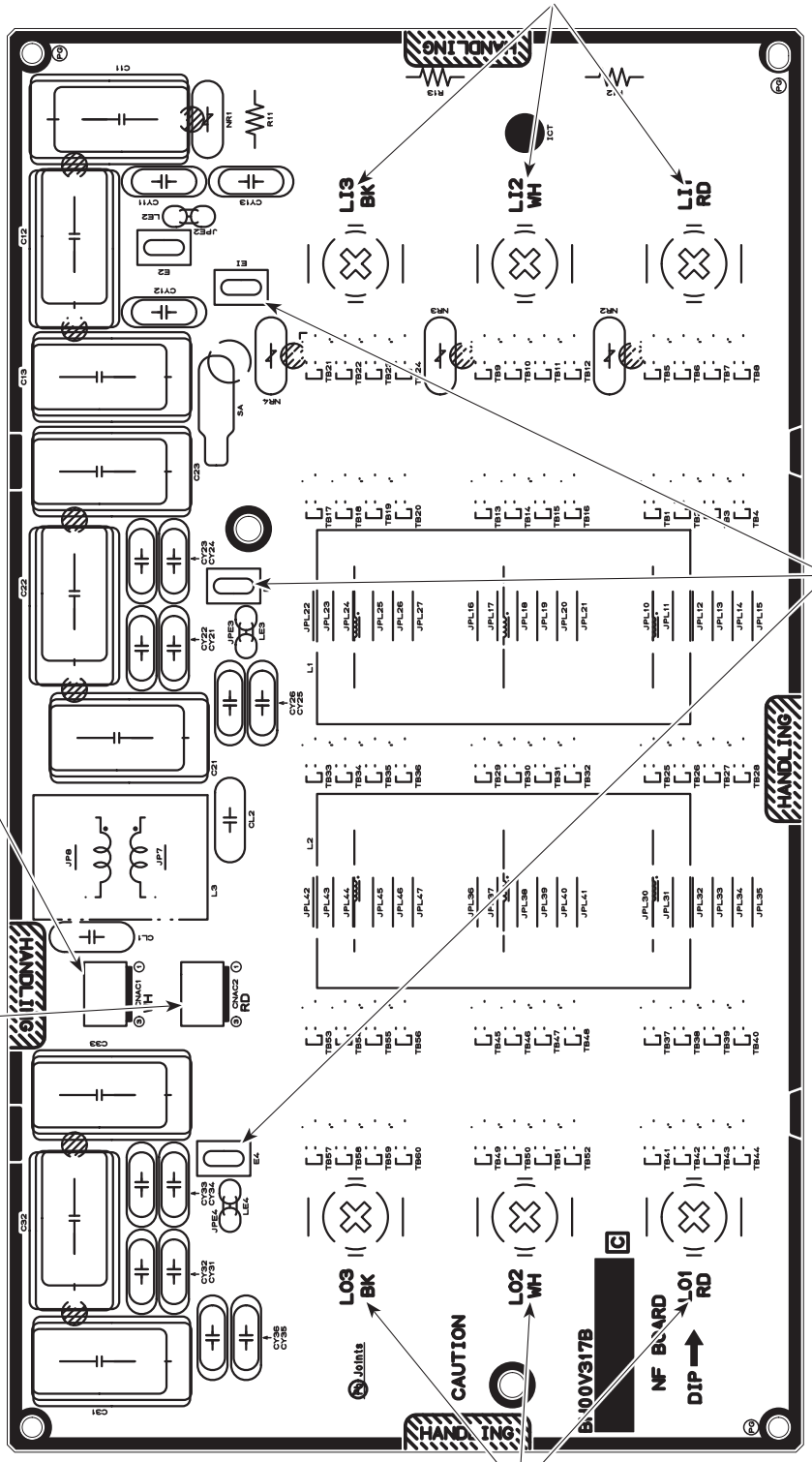
CN2
Connect to the outdoor controller circuit board (CN2)
①–⑤: Power circuit board → Transmitting signal to the controller board (0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: Not used
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC
[⑤: (−) ①, ②, ⑥, ⑦: (+)]

■ M-NET power circuit board



■ Outdoor noise filter circuit board

LI1, LI2, LI3
POWER SUPPLY
Voltage of 208/230 VAC is input
(Connect to the terminal block (TB1))
M6 2.8 ± 0.2 N·m



EI, E3, E4
Connect to the electrical parts box

CNAC1
208/230 VAC
Connect to the M-NET power circuit board (CN1)

CNAC2
208/230 VAC
Connect to the outdoor multi controller circuit board (CNAC)

LO1, LO2, LO3
POWER SUPPLY
Voltage of 208/230 VAC is input
(Connect to the outdoor power circuit board (TBL1, TBL2, TBL3))
M6 2.8 ± 0.2 N·m

8-10. Outdoor unit information display

SW: setting
0: OFF
1: ON

	SW1 setting	Contents	LED1, 2							
No.	12345678		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 (Alternating display of addresses and error code) 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
2	01000000		No.9 unit check	No.10 unit check	No.11 unit check	No.12 unit check	No.13 unit check	No.14 unit check	No.15 unit check	No.16 unit check
3	11000000		No.17 unit check	No.18 unit check	No.19 unit check	No.20 unit check	No.21 unit check	No.22 unit check	No.23 unit check	No.24 unit check
4	00100000		No.25 unit check	No.26 unit check	No.27 unit check	No.28 unit check	No.29 unit check	No.30 unit check	—	—
			Note: Light on at time of abnormality							
5	10100000	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							
6	01100000	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							
7	11100000	Protection input	Abnormality in the number of indoor units	Address double setting abnormality	Indoor unit capacity error	Over capacity	Indoor unit address error	Outdoor unit address error	Current sensor open/ short	Serial communication abnormality (outdoor unit)
			Note: Display detected microprocessor protection or abnormality							
8	00010000	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							
9	10010000	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							
10	01010000	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	Delay of failure in 12 V DC power supply circuit on power circuit board
			Note: Display all abnormalities remaining in abnormality delay							
11	11010000	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							
12	00110000	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							
13	10110000	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	Delay of failure in 12 V DC power supply circuit on power circuit board
			Note: Display all abnormalities remaining in abnormality delay							

No.	SW1 setting 12345678	Contents	LED1, 2							
			1	2	3	4	5	6	7	8
14	01110000	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) 1601: Insufficient refrigerant 1608: 4-way valve disconnection 4165: Power synchronization signal 4310: Current sensor 4320: Undervoltage 4330: Heat sink temperature 4350: Power module, (Start) over current, Failure in 12 V DC power supply circuit on power circuit board 4500: Outdoor fan motor Notes: • Display abnormalities up to present (including abnormality delay) • History record in 1 is the latest; records become older in sequence; history record in 10 is the oldest.							
15	11110000	Abnormality code history 2								
16	00001000	Abnormality code history 3								
17	10001000	Abnormality code history 4								
18	01001000	Abnormality code history 5								
19	11001000	Abnormality code history 6								
20	00101000	Abnormality code history 7								
21	10101000	Abnormality code history 8								
22	01101000	Abnormality code history 9								
23	11101000	Abnormality code history 10 (the oldest)								
24	00011000	Cumulative time	0–9999 (unit: 1 hour) Note: Display of cumulative compressor operating time							
25	10011000	Cumulative time	0–9999 (unit: 10 hours) Note: Display of cumulative compressor operating time							
26	01011000	Outdoor unit operation display	Compressor energizing	Compressor operating prohibition	Compressor in operation	Abnormality detection	—	—	—	—
27	11011000	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
28	00111000		No.9 unit mode	No.10 unit mode	No.11 unit mode	No.12 unit mode	No.13 unit mode	No.14 unit mode	No.15 unit mode	No.16 unit mode
29	10111000		No.17 unit mode	No.18 unit mode	No.19 unit mode	No.20 unit mode	No.21 unit mode	No.22 unit mode	No.23 unit mode	No.24 unit mode
30	01111000		No.25 unit mode	No.26 unit mode	No.27 unit mode	No.28 unit mode	No.29 unit mode	No.30 unit mode	—	—
			Cooling: light on, Heating: light blinking, Stop fan: light off							
31	11111000	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
32	00000100		No.9 unit Thermo ON	No.10 unit Thermo ON	No.11 unit Thermo ON	No.12 unit Thermo ON	No.13 unit Thermo ON	No.14 unit Thermo ON	No.15 unit Thermo ON	No.16 unit Thermo ON
33	10000100		No.17 unit Thermo ON	No.18 unit Thermo ON	No.19 unit Thermo ON	No.20 unit Thermo ON	No.21 unit Thermo ON	No.22 unit Thermo ON	No.23 unit Thermo ON	No.24 unit Thermo ON
34	01000100		No.25 unit Thermo ON	No.26 unit Thermo ON	No.27 unit Thermo ON	No.28 unit Thermo ON	No.29 unit Thermo ON	No.30 unit Thermo ON	—	—
			Thermo ON: light on, Thermo OFF: light off							
35	11000100	Capacity code (No.1 to 30 indoor units)	0–255 Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
36	00100100	IC operation mode (No. 1 to 30 units)	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
			Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
37	10100100	OC operation mode	Compressor ON/OFF	Heating/ Cooling	Abnormal/ normal	DEFROST/ NO	Refrigerant recovery/no	Excitation current/no	3-min delay/ no	—
			Note: Light on/light off							
38	01100100	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							
39	11100100	Communication demand capacity	0–255 (%) Note: Display of communication demand capacity							
40	00010100	Number of compressor ON/ OFF	0000–9999 (unit: x10) Note: Display a count of compressor operation/stop							
41	10010100	Compressor operating current	0–999.9 (Arms) Note: Display detected current							
42	01010100	Input current of outdoor unit								
43	11010100	Thermo-ON operating time	0000–9999 (unit: x10) Note: Display cumulative time of thermo-ON operation							
44	00110100	Total capacity of thermo-ON	0–255 Note: Display total capacity code of indoor units in thermo-ON							
45	10110100	Number of indoor units	0–255 Note: Display number of connected indoor units							
46	01110100	DC bus voltage	0–9999 (V) Note: Display bus voltage							

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
47	11110100	State of LEV control	Cooling/ Heating: Td over heat prevention	Cooling: SHd decrease prevention	Cooling/ Heating: Min.Sj correction depends on Td	Cooling/ Heating: Min.Sj correction depends on Shd	Heating: LEV opening correction depends on Pd	Heating: LEV opening correction depends on Td	Cooling: Correction of high compression ratio prevention	—
			Note: Display active LEV control							
48	00001100	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 (High pressure and overheating control: only when connected to Ecodan)							
49	10001100	State of compressor frequency control 2	Heat sink over heat prevention control	Secondary current control	Input current control	Unbalance control of 3-phase power supply	Frequency restrain of receipt voltage change	Low pressure decrease prevention	Hz-up inhibit control at the beginning of SHd	High pressure and overheating control
			Note: Display active compressor frequency control (High pressure and overheating control: only when connected to Ecodan)							
50	01001100	Protection input	63LS abnormality	HIC abnormality	—	Frozen protection	4-way valve disconnection abnormality	Delay caused by closed valve in cooling mode	TH6 abnormality	Power module abnormality
			Note: Display detected microprocessor protection or abnormality							
51	11001100	The second current value when microprocessor of power board abnormality is detected	0–999.9 (Arms) Note: Display data at time of abnormality							
52	00101100	Heatsink temperature when microprocessor of power board abnormality is detected	−99.9–999.9 (°F) Note: Display data at time of abnormality							
53	10101100	Outdoor LEV-A opening pulse	0–2000 (pulse) Note: Display of data at time of abnormality and abnormality delay							
54	01101100	Outdoor LEV-A opening pulse abnormality delay								
55	11101100	Outdoor LEV-A opening pulse abnormality								
56	00011100	Outdoor LEV-B opening pulse								
57	10011100	Outdoor LEV-B opening pulse abnormality delay								
58	01011100	Outdoor LEV-B opening pulse abnormality								
59	11011100	63LS (Low pressure)	−99.9–999.9 (psig) Note: Display of data from sensor							
60	00111100	63LS abnormality delay	−99.9–999.9 (psig) Display of data at time of abnormality and abnormality delay							
61	10111100	63 LS abnormality								
62	01111100	TH2 (HIC pipe)	−99.9–999.9 (°F) Note: Display of data from thermistor							
63	11111100	TH2 (HIC) abnormality delay	−99.9–999.9 (°F) Note: Display of data at time of abnormality and abnormality delay							
64	00000010	TH2 (HIC) abnormality								
65	10000010	Operational frequency	0–255 (Hz) Note: Display of actual operating frequency							
66	01000010	Target frequency	0–255 (Hz) Note: Display of target frequency							
67	11000010	Outdoor fan control step number	0–15 Note: Display of number of outdoor fan control steps (target)							
68	00100010	Indoor LEV Opening pulse (No. 1 to 30 units)	0–2000 (pulse) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
69	10100010	High pressure sensor (Pd)	−99.9–999.9 (psig) Note: Display of detected data of outdoor unit sensors and thermistors							

No.	SW1 setting 12345678	Contents	LED1, 2 1	2	3	4	5	6	7	8
70	01100010	TH4(Compressor) (Td) data	−99.9–999.9 (°F) Note: Display of detected data of outdoor unit sensors and thermistors							
71	11100010	TH6(Suction pipe) (ET) data								
72	00010010	TH7 (Ambient) data								
73	10010010	TH3 (Outdoor liquid pipe) data								
74	01010010	TH8 (Heat sink) data								
75	11010010	TH23 (Gas) data (No. 1 to 30 indoor units)	−99.9–999.9 (°F) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
76	00110010	TH22 (Liquid) data (No. 1 to 30 indoor units)								
77	10110010	TH21 (Intake) data (No. 1 to 30 indoor units)								
78	01110010	Outdoor SC (cooling)	−99.9–999.9 (°C) Note: Display of outdoor subcool (SC) data							
79	11110010	Target subcool step	−2–4 Note: Display of target subcool step data							
80	00001010	Indoor SC/SH (No. 1 to 30 units)	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
81	10001010	Discharge superheat (SHd)	−99.9–999.9 (°C) Note: Display of outdoor discharge superheat (SHd) data							
82	01001010	Target Pd display (heating) kgf/cm²	Pdm (0.0–30.0) (kgf/cm²) Note: Display of all control target data							
83	11001010	Target ET display (cooling)	ETm (−2.0–23.0) (°C) Note: Display of all control target data							
84	00101010	Target outdoor SC (cooling)	SCm (0.0–20.0) (°C) Note: Display of all control target data							
85	10101010	Target indoor SC/SH (No. 1 to 30 units)	SCm/SHm (0.0–20.0) (°C) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
86	01101010	Actual frequency of abnormality delay	0–255 (Hz) Note: Display of actual frequency at time of abnormality delay							
87	11101010	Fan step number at time of abnormality delay	0–15 Note: Display of fan step number at time of abnormality delay							
88	00011010	Indoor LEV opening pulse abnormality delay (No. 1 to 30 units)	0–2000 (pulse) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
89	10011010	High pressure sensor data at time of abnormality delay	−99.9–999.9 (psig) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
90	01011010	TH4 (Compressor) sensor data at time of abnormality delay	−99.9–999.9 (°F) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
91	11011010	TH6 (Suction pipe) sensor data at time of abnormality delay								
92	00111010	TH3 (Outdoor liquid pipe) sensor data at time of abnormality delay								
93	10111010	TH8 (Heat sink) sensor data at time of abnormality delay								
94	01111010	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) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
95	11111010	IC SC/SH at time of abnormality delay (No. 1 to 30 units)								
96	00000110	ROM version monitor	0.00–99.99 (ver) Note: Display of version data of ROM							
97	10000110	ROM type	Note: Display of ROM type							

No.	SW1 setting 12345678	Contents	LED1, 2 1	2	3	4	5	6	7	8
98	01000110	Check sum mode	0000–FFFF Note: Display of check sum code of ROM							
99	11000110	Backup heating determination value a	−99.9–999.9(°F) Note: Disclosure is required only for the US							
100	00100110	Backup heating determination value b								
101	00100110	Backup heating determination value c								
102	01100110	Backup heating determination value d								
103	11100110	Detailed and latest history of voltage error (U9/4220)	— Note: Flagging the latest history of U9 error	Active filter abnormality	PAM error	Converter Fault	Power synchronization signal error	L1 open phase error	Under voltage error	Over voltage error
104	00010110	External connection status at time of abnormality delay	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input	—	—	—
105	10010110	External connection status at time of abnormality	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input	—	—	—
106	01010110	Actual frequency of abnormality	0–255 (Hz) Note: Display of actual frequency at time of abnormality							
107	11010110	Fan step number at time of abnormality	0–15 Note: Display of fan step number at time of abnormality							
108	00110110	Detailed and latest error history (UP/4220)	— Note: Flagging the latest history of UP error	—	—	—	—	—	Failure in 12 V DC power supply circuit on power circuit board	Over current abnormality
109	10110110	IC LEV opening pulse at time of abnormality (No. 1 to 30 units)	0–2000 (pulse) Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							
110	01110110	High pressure sensor data at time of abnormality	−99.9–999.9 (psig) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
111	11110110	TH4 (Compressor) sensor data at time of abnormality	−99.9–999.9 (°F) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
112	00001110	TH6 (Suction pipe) sensor data at time of abnormality								
113	10001110	TH3 (Outdoor liquid pipe) sensor data at time of abnormality								
114	01001110	TH8 (Heat sink) sensor data at time of abnormality								
115	11001110	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)							
116	00101110	IC SC/SH at time of abnormality (No. 1 to 30 units)	Notes: •Address and display data are alternately displayed every second. •Pressing SWP2 changes the displayed unit in ascending order; it returns to No. 1 after No. 30.							

9 DISASSEMBLY PROCEDURE

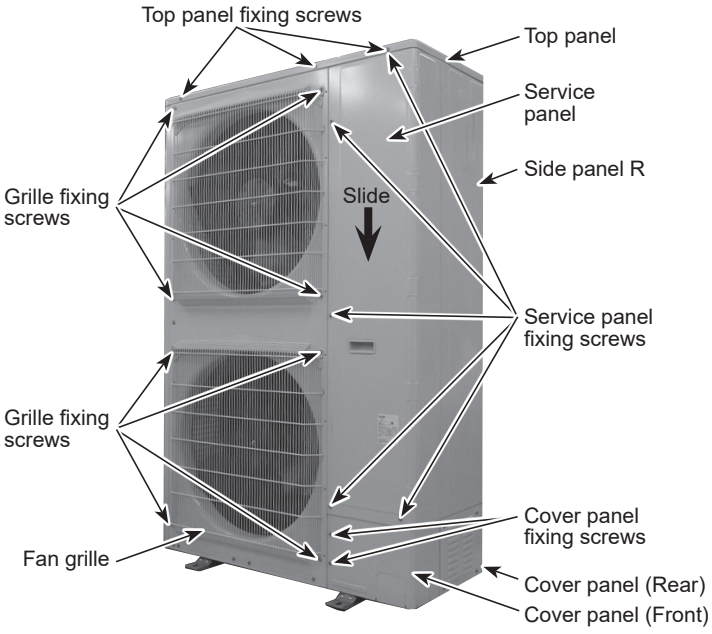
——→: Indicates the visible parts in the photos/figures.
- - - - - - - →: Indicates the invisible parts in the photos/figures.

Note:
- Turn OFF the power supply before disassembly.

1. Removing the panels on the right side of the unit

1. Remove service panel fixing screws (5 × 12) and slide the hook on the right downward to remove the service panel.
2. Remove screws (5 × 12) of the top panel and remove it.
3. Remove front cover panel fixing screws (5 × 12) and remove the front cover panel.
4. Remove back cover panel fixing screws (5 × 12) and remove the back cover panel.
5. Remove side panel R fixing screws (5 × 12) in the rear of the unit and then remove the side panel R.

Photo 1



2. Removing the fan motor (MF1, MF2)

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

Photo 2

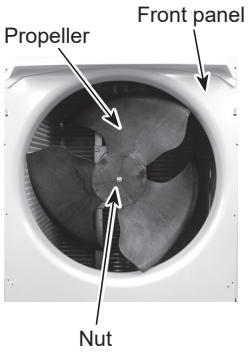
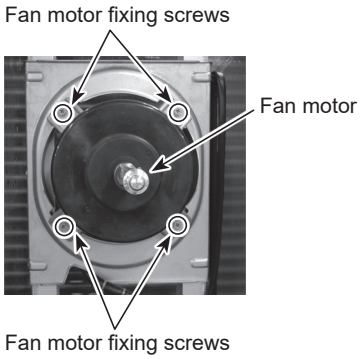


Photo 3



3. Removing the electrical parts box

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connecting wire from the terminal block.

4. Remove all the following connectors from the outdoor multi controller circuit board;

   <Diagram symbol in the connector housing>
   • Fan motor (CNF1, CNF2)
   • Thermistor <HIC pipe> (TH2)
   • Thermistor <Outdoor liquid pipe> (TH3)
   • Thermistor <Compressor> (TH4)
   • Thermistor <Suction pipe/Ambient> (TH6/7)
   • High pressure switch/Thermal protector (63H/TRS)
   • High pressure sensor (63HS)
   • Low pressure sensor (63LS)
   • 4-way valve (21S4)
   • Bypass valve (SV1)
   • Oil return valve (SV3)
   • Linear expansion valves (LEV-A, LEV-B)

   Pull out the disconnected wires from the electrical parts box.
5. Remove the cover panel front. (See Photo 1)
6. Remove the cover panel rear. (See Photo 1)
7. Remove the side panel R. (See Photo 1)
8. Remove the terminal cover and disconnect the compressor lead wire.
9. Remove electrical parts box fixing screws (5 × 12) and detach the electrical parts box by pulling it upward.

Photo 4

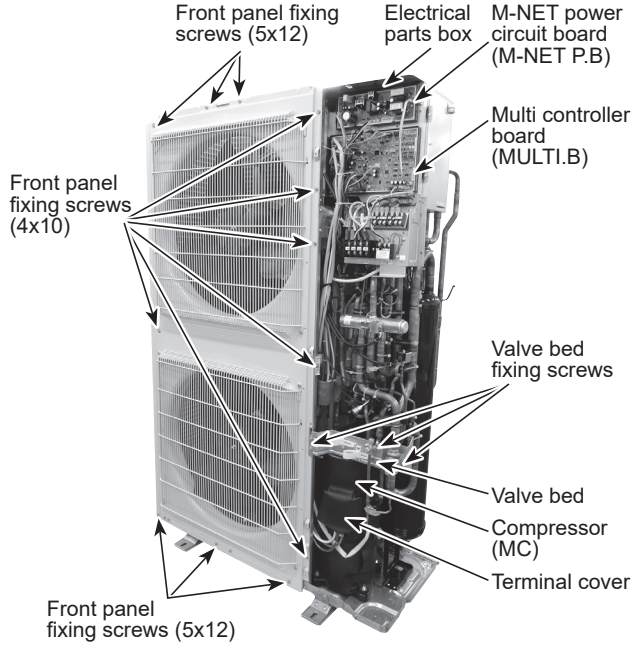
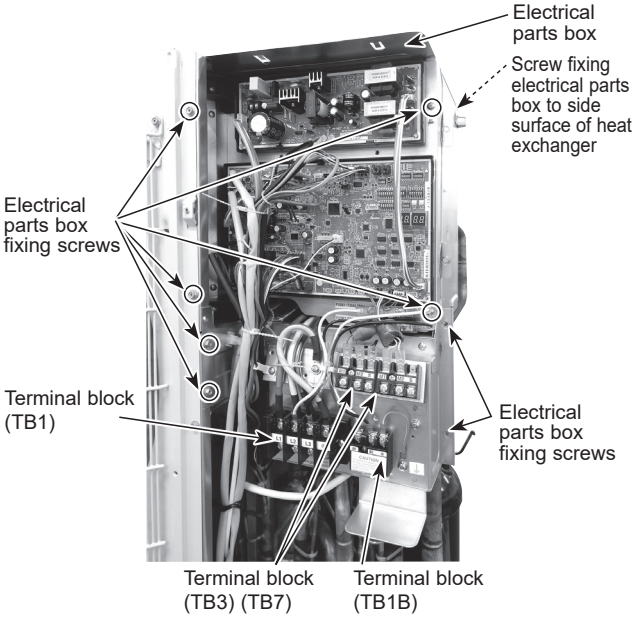


Photo 5



4. Removing thermistors

■ Removing thermistors <Suction pipe> (TH6) and <Ambient> (TH7)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connectors TH6 and TH7 (red) on the outdoor multi controller circuit board in the electrical parts box.
4. Remove the cover panel front. (See Photo 1)
5. Remove the cover panel rear. (See Photo 1)
6. Remove the side panel R. (See Photo 1)
7. Remove the wire of TH7 from the clamps and clips on the bottom and the side of the electrical parts box. (See Photo 6)
8. Pull out the thermistor <Ambient> (TH7) from the sensor holder. (See Photo 8)
9. Pull out the thermistor <Suction pipe> (TH6) from the sensor holder. (See Photo 7)

Note:
• When replacing thermistor <Suction pipe> (TH6) or <Ambient> (TH7), replace them together since they are combined together.

Photo 6

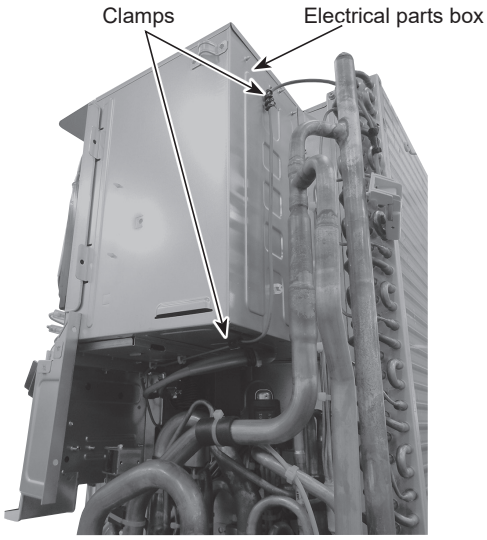


Photo 7

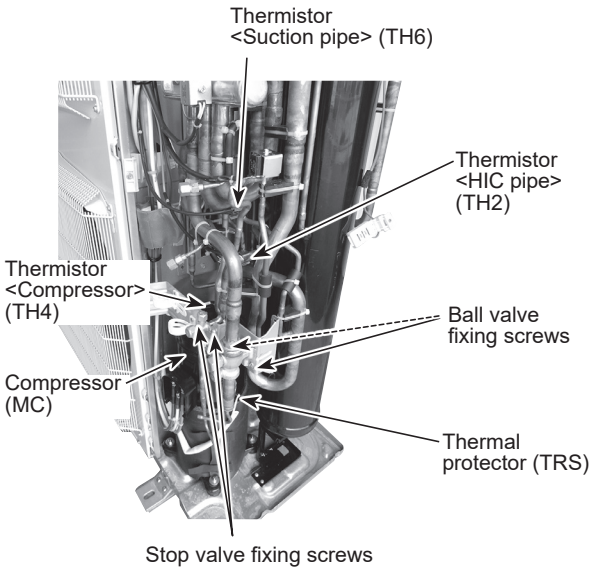
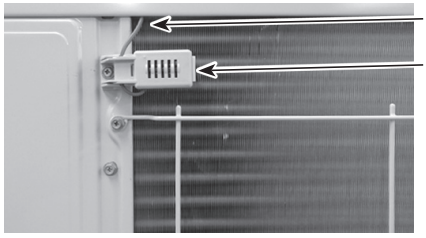


Photo 8



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

1. Remove the service panel. (See Photo 1)
2. Disconnect the connectors TH4 and TH2 on the multi controller board in the electrical parts box.
3. Loosen the clamp or band for the lead wire of the electrical parts box and the separator.
4. Pull out the thermistor <Compressor> (TH4) from the sensor holder and the thermal protector (TRS). (See Photo 7)
5. Remove the thermal protector (TRS) from the holder. (See Photo 7)

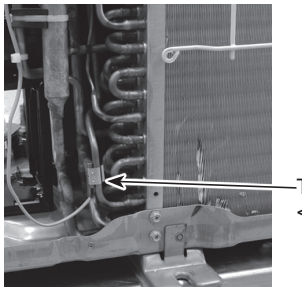
■ Removing the thermistor <Outdoor liquid pipe> (TH3)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove the side panel R. (See Photo 1)
6. Disconnect the connector, TH3 (white), on the multi controller board in the electrical parts box.
7. Loosen the clamp or band for the lead wire of the electrical parts box and the separator.
8. Pull out the thermistor <Outdoor liquid pipe> (TH3) from the sensor holder. (See Photo 9)

Note:

• Attach the band to the same position when loosening it.

Photo 9



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

1. Remove the service panel. (See Photo 1)
2. Remove 4-way valve coil fixing screws (M5 × 7).
3. Remove the 4-way valve coil by sliding the coil toward you.

4. Loosen the clamp or band for the lead wire of the electrical parts box and the separator.
5. Disconnect the connector 21S4 on the outdoor multi controller circuit board in the electrical parts box.

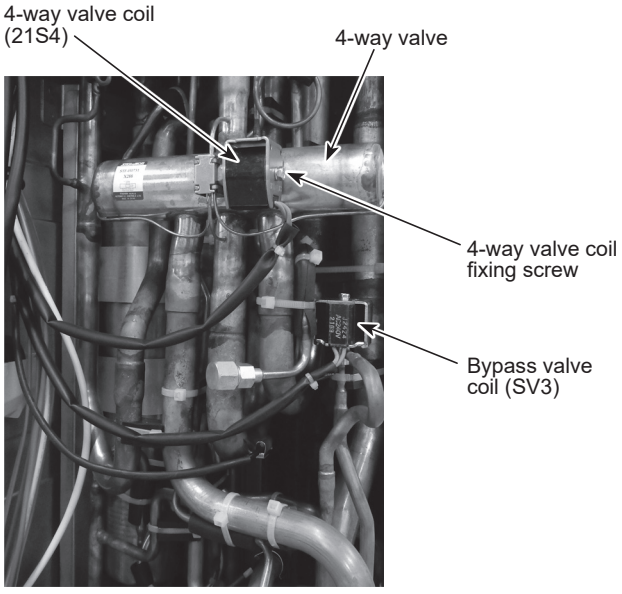
6. Removing the 4-way valve

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove the side panel R. (See Photo 1)
6. Remove the electrical parts box. (See Photo 5)
7. Remove 4 ball valve and stop valve fixing screws (5 × 16) then valve bed fixing screws (5 × 12) and remove the valve bed. (See Photo 7)
8. Remove the 4-way valve coil.
9. Recover refrigerant.
10. Remove the welded part of 4-way valve.

Notes:

- Recover refrigerant without spreading it in the air.
- When installing the 4-way valve, cover it with a wet cloth to prevent it from heating (248°F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).

Photo 10



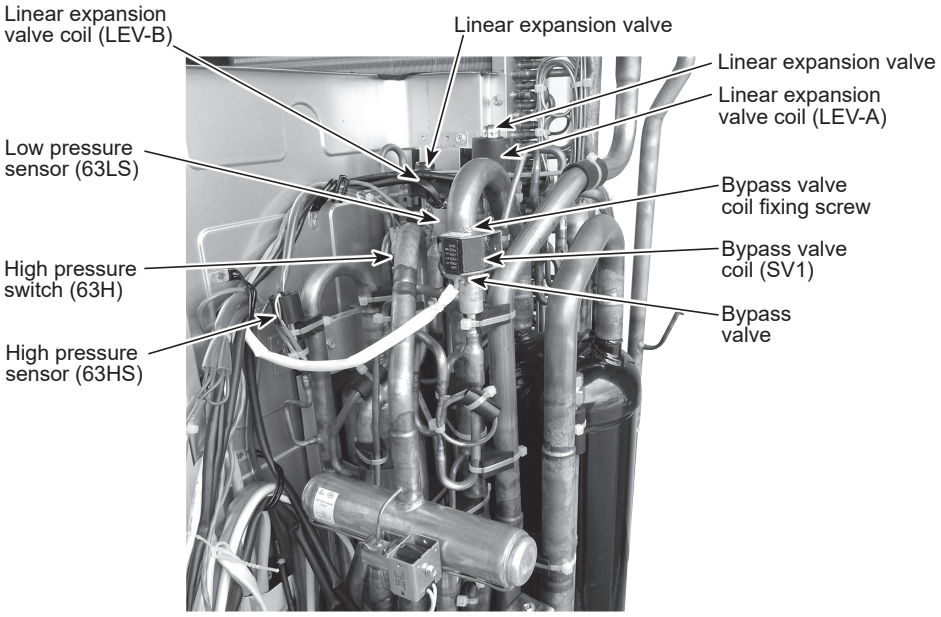
7. Removing bypass valve coil (SV1, SV3) and bypass valve

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

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 (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).

Photo 11



8. Removing the high pressure switch (63H), high pressure sensor (63HS), and low pressure sensor (63LS)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove the side panel R. (See Photo 1)
6. Pull out the lead wire of high pressure switch or disconnect the connector 63HS (white) and connector 63LS (blue) from the multi controller circuit board in the electrical parts box.
7. Remove the electrical parts box. (See Photo 5)
8. Recover refrigerant.
9. Remove the welded part of high pressure switch, high pressure sensor and low pressure sensor.

Notes:

- Recover refrigerant without spreading it in the air.
- When installing the high pressure switch, high pressure sensor and low pressure sensor, cover it with a wet cloth to prevent it from heating (212°F [100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.
- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).

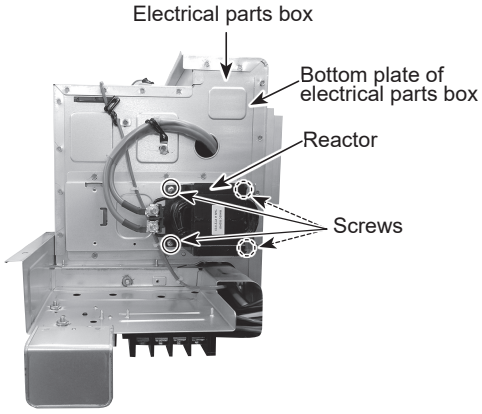
9. Removing linear expansion valve (LEV-A, LEV-B)

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

10. Removing the reactor (DCL)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove the side panel R. (See Photo 1)
6. Remove the electrical parts box. (See Photo 5)
7. Disconnect the lead wires from the reactor. (See Photo 12)
8. Disconnect the terminals of reactor on the bottom plate of the electrical parts box. (See Photo 12)
9. Remove screws of the reactor (DCL) on the bottom plate of the electrical parts box. (See Photo 12)
10. Remove the reactor.

Photo 12



11. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove ball valve and stop valve fixing screws (5 × 16) then valve bed fixing screws (5 × 12) and remove the valve bed. (See Photo 13)
6. Remove the comp felt covering the compressor, and remove the thermistor <Compressor> (TH4), thermal protector (TRS), and the lead wires. (See Photo 7 and 13)
7. Recover refrigerant.
8. Remove the 3 compressor fixing nuts for motor using spanner or adjustable wrench.
9. Remove the welded pipe of motor for compressor inlet and outlet and then remove the compressor.

Note:

• Recover refrigerant without spreading it in the air.

Photo 13

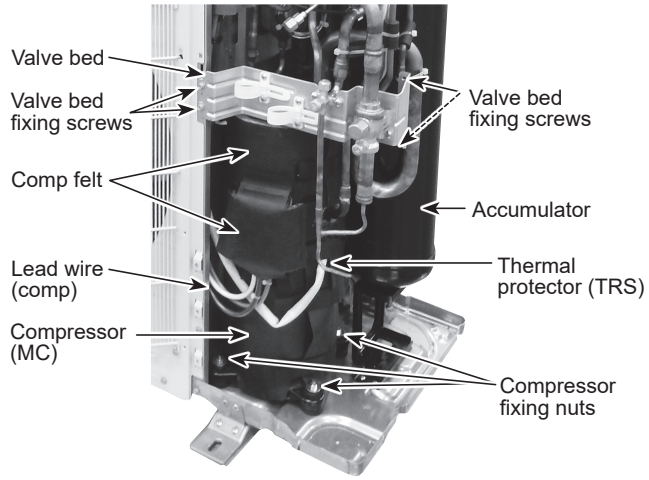
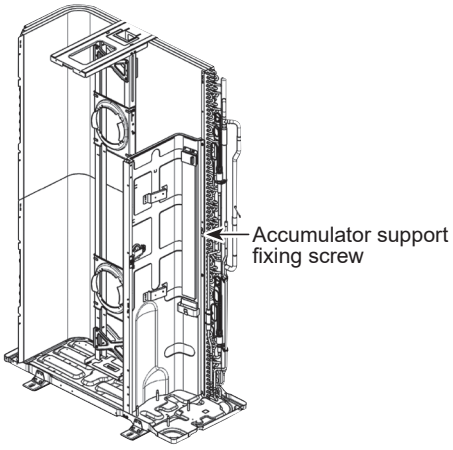


Figure 1



12. Removing the accumulator

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove the side panel R. (See Photo 1)
6. Remove the electrical parts box. (See Photo 5)
7. Recover refrigerant.
8. Remove 4 welded pipes of accumulator inlets and outlets. (See Photo 14)
9. Remove accumulator leg fixing screws (2 [4 × 10] screws and 2 [5 × 12] screws). (See Photo 15 and Figure 1)

Note:

• Recover refrigerant without spreading it in the air.
• Use 2 wrenches when tightening screws.

Photo 14

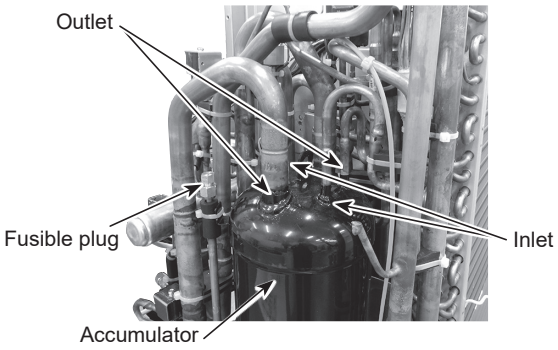
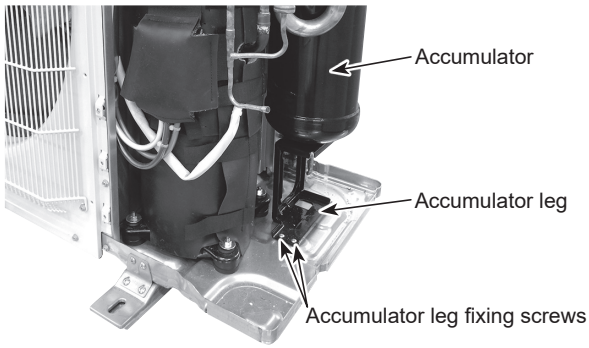


Photo 15

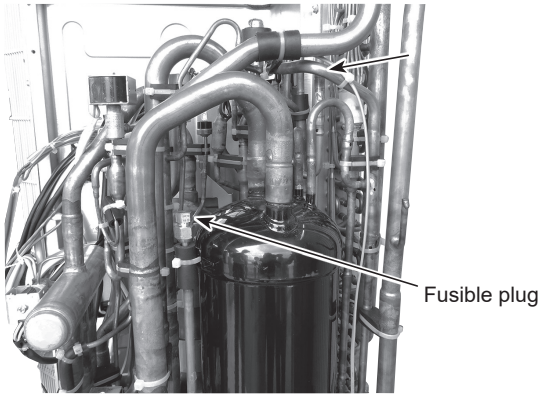


13. Changing the fusible plug

See the following descriptions.

- Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it. The temperature of the fusible plug must not become 140°F (60°C) or more while working. Protect the fusible plug with a wet cloth when necessary. (The fusible plug breaks at 158°F [70°C]).
- Tighten the screw in 14 - 18 N·m* (11-13 lbf·ft) with 2 wrenches.
  *1 N·m ≈ 10 kgf·cm

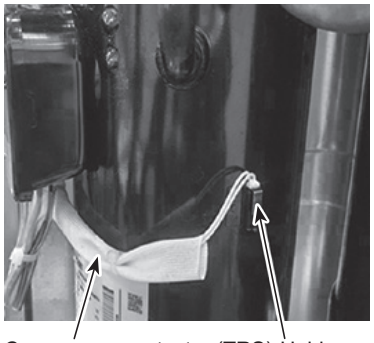
Photo 16



14. Removing the compressor protector (TRS)

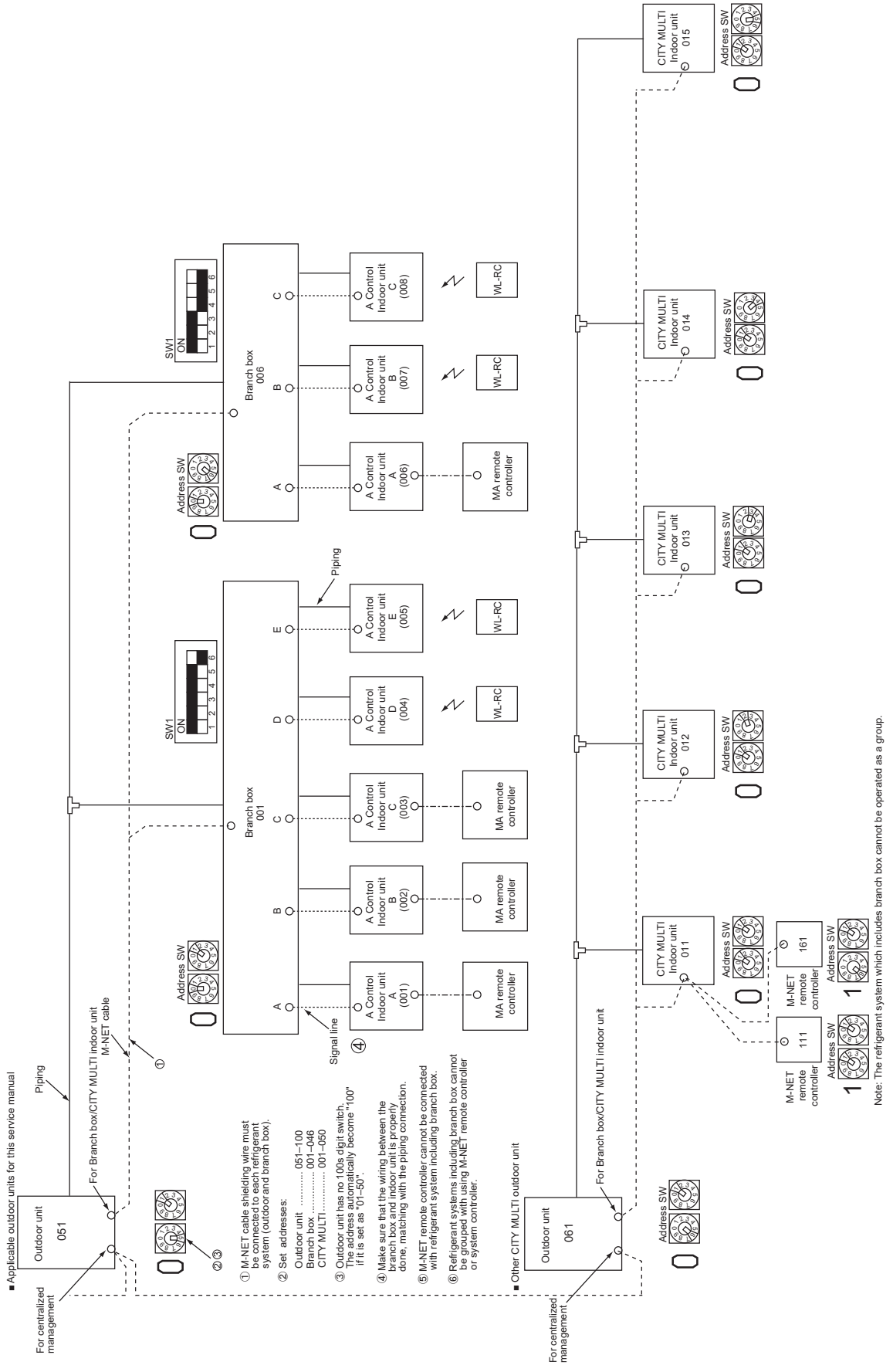
1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel front. (See Photo 1)
4. Remove the cover panel rear. (See Photo 1)
5. Remove the side panel R. (See Photo 1)
6. Pull out the lead wire of high pressure switch and disconnect the connector, 63H (yellow) from the multi controller board in the electrical parts box. (See Photo 11)
7. Remove the comp felt covering the compressor. (See Photo 13)
8. Loosen the clamp or band for the lead wire of the electrical parts box and separator.
9. Pull out the compressor protector (TRS) from the holder. (See Photo 17)

Photo 17



10 SYSTEM CONSTRUCTION

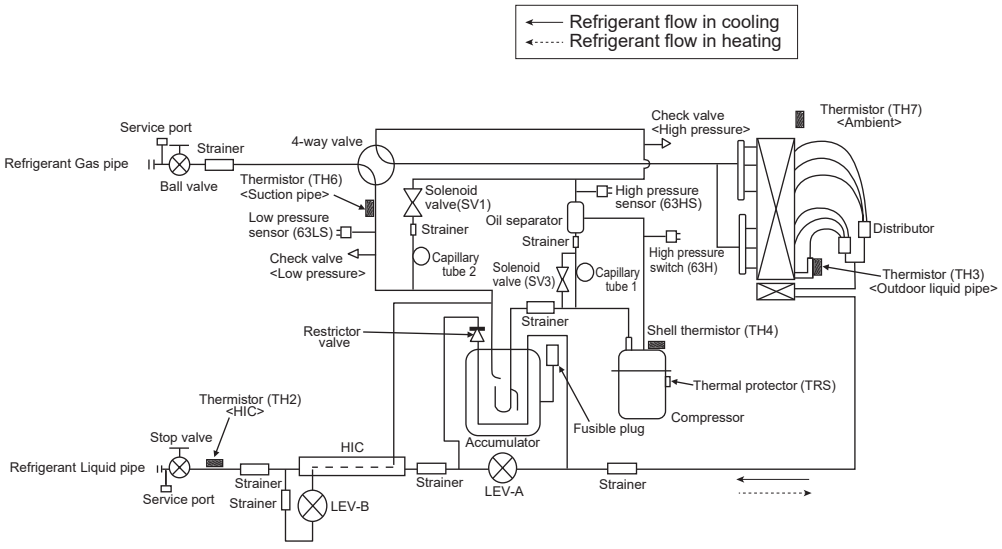
10-1. Example of refrigerant piping and transmission cable wiring



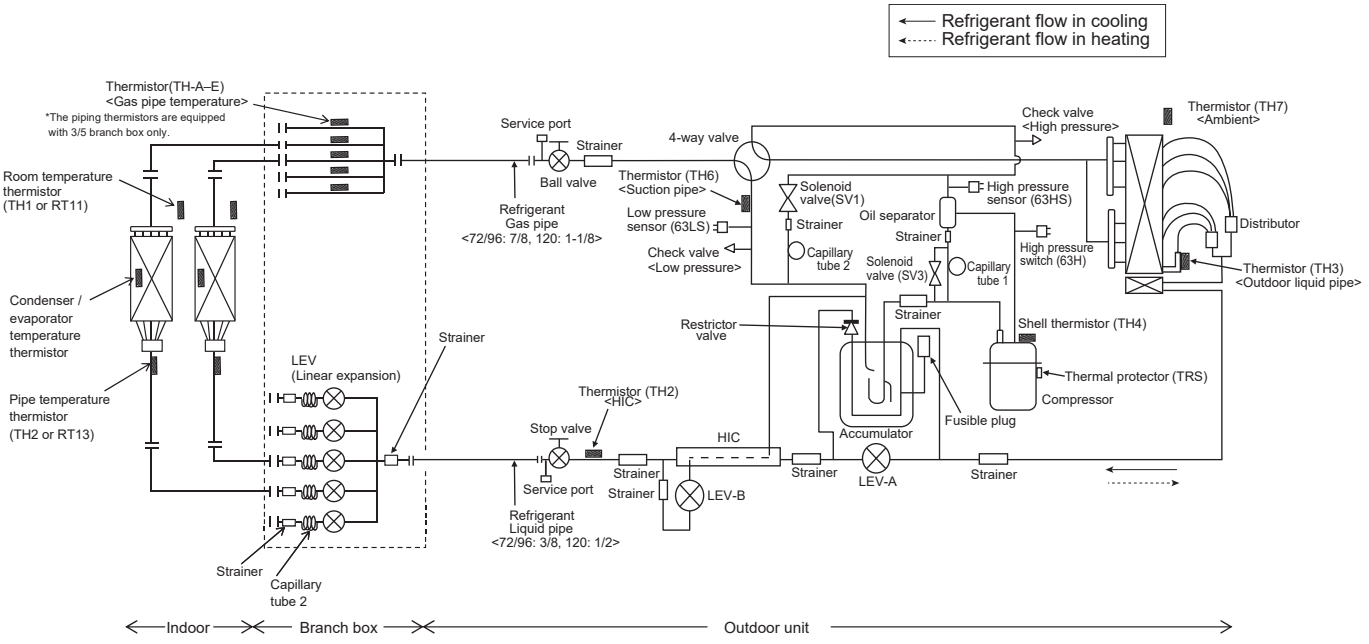
10-2. Special function operation and settings for M-NET remote controller

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

10-3. Refrigerant system diagram



Capillary tube 1 [inch(mm)]: ø0.094 × ø0.031 × L23.62 (ø2.4 × ø0.8 × L600)
Capillary tube 2 [inch(mm)]: ø0.157 × ø0.118 × L8.66 (ø4.0 × ø3.0 × L220)



Capillary tube 1 [inch(mm)]: ø0.094 × ø0.031 × L23.62 (ø2.4 × ø0.8 × L600)
Capillary tube 2 [inch(mm)]: ø0.157 × ø0.118 × L8.66 (ø4.0 × ø3.0 × L220)

10-4. Selecting pipe size

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

10-5. 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.

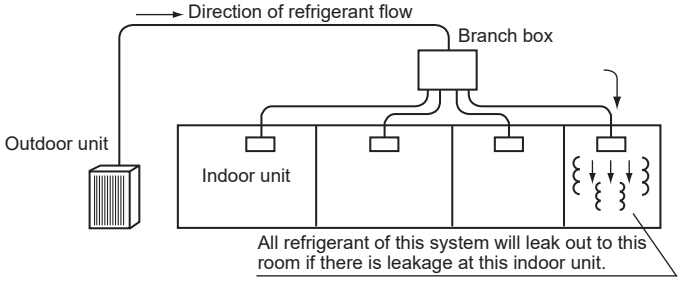
12-2. Precautions against refrigerant leakage

12-2-1. Introduction

R410A refrigerant of this air conditioner is non-toxic and non-flammable but leaking of large amount from an indoor unit into the room where the unit is installed may be deleterious. To prevent possible injury, the rooms should be large enough to keep the R410A concentration specified by ISO 5149-1 as follows.

■ Maximum concentration of R410A: 0.027 lbs/ft^3 (0.44 kg/m^3) (ISO 5149-1)

Maximum refrigerant concentration of R410A of a room is 0.027 lbs/ft^3 (0.44kg/m^3) in accordance with ISO 5149-1.
To facilitate calculation, the maximum concentration is expressed in units of lbs/ft^3 [kg/m^3] (lbs [kg] of R410A per ft^3 [m^3])



12-2-2. Confirming procedure of R410A concentration

Follow 1 to 3 to confirm the R410A concentration and take appropriate treatment, if necessary.

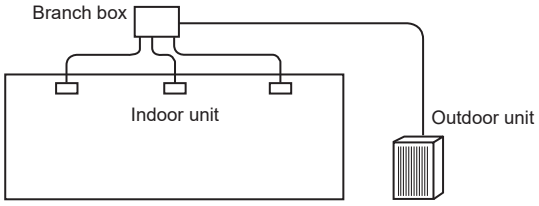
1. Calculate total refrigerant amount by each refrigerant system. Total refrigerant amount is precharged refrigerant before shipment plus additional charged amount at field installation.

Note:

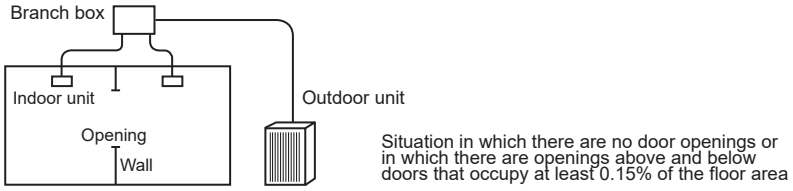
- When the air conditioning system consists of several independent refrigerant system, figure out the total refrigerant amount by each independent refrigerant system.

2. Calculate room volumes (ft^3 [m^3]) and find the room with the smallest volume.
   The part with ▭ represents the room with the smallest volume.

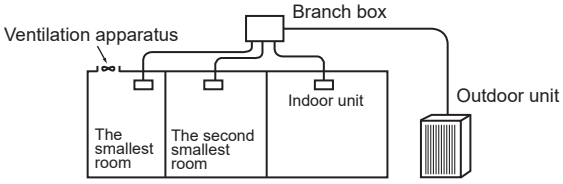
2-1. Situation in which there are no partitions



2-2. There are partitions, but there are openings that allow the effective mixing of air.



2-3. If the smallest room has mechanical ventilation apparatus that is linked to a household gas detection and alarm device, the calculations should be performed for the second smallest room.



3. Use the results of calculations 1 and 2 to calculate the refrigerant concentration.

$$\frac{\text{Total refrigerant in the refrigerating unit (lbs [kg])}}{\text{The smallest room in which an indoor unit has been installed (ft}^3\text{ [m}^3\text{])}} \leq \text{Maximum concentration (lbs/ft}^3\text{ [kg/m}^3\text{])*}$$

*Maximum concentration of R410A: 0.027lbs/ft^3 [0.44kg/m^3]

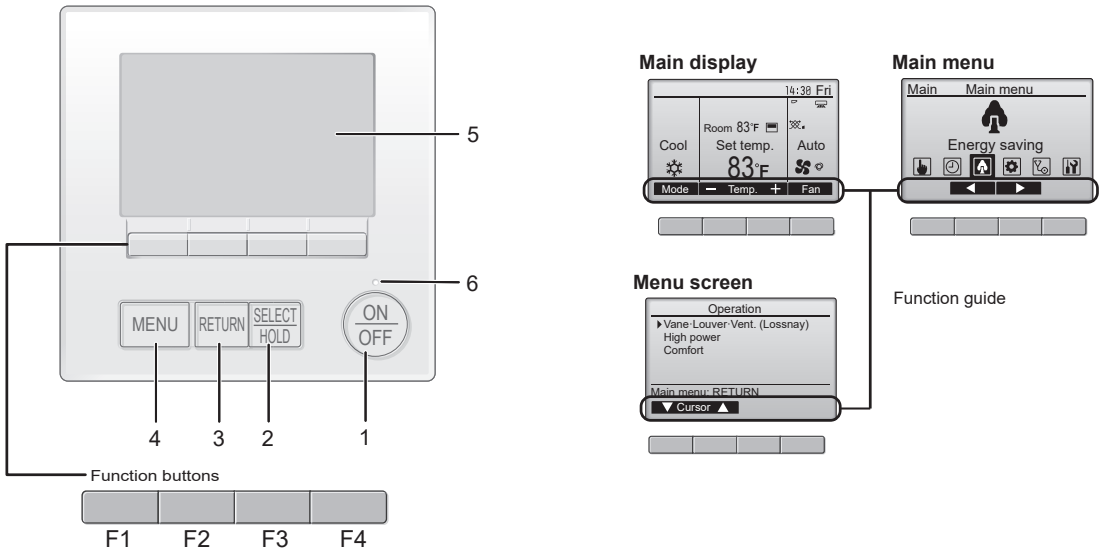
If the calculation results do not exceed the maximum concentration, perform the same calculation for larger rooms until it has been determined that nowhere exceeds the maximum concentration.

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

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

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

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

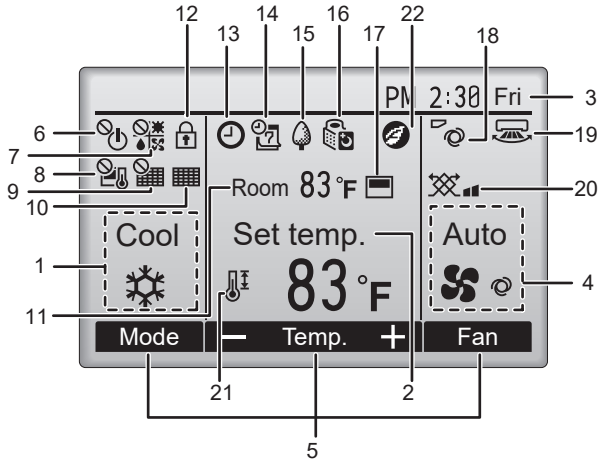
F4: Function button 4
Main display: Press to change the fan speed.
Menu screen: The button function varies depending on the screen.

Display

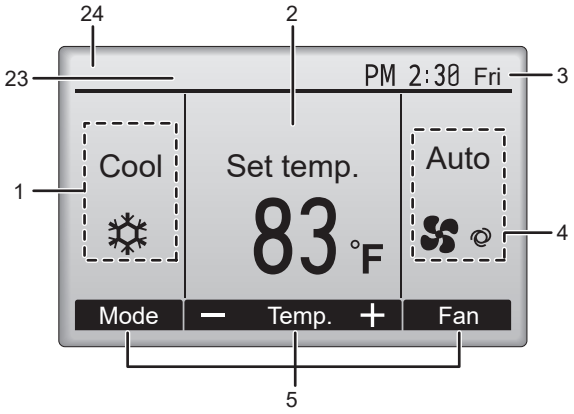
The main display can be displayed in 2 different modes: [Full] and [Basic]. The initial setting is [Full]. To switch to [Basic] mode, change the setting on the [Main display] setting. (Refer to operation manual included with remote controller.)

■ [Full] mode

All icons are displayed for explanation.



■ [Basic] mode



Note:

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

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

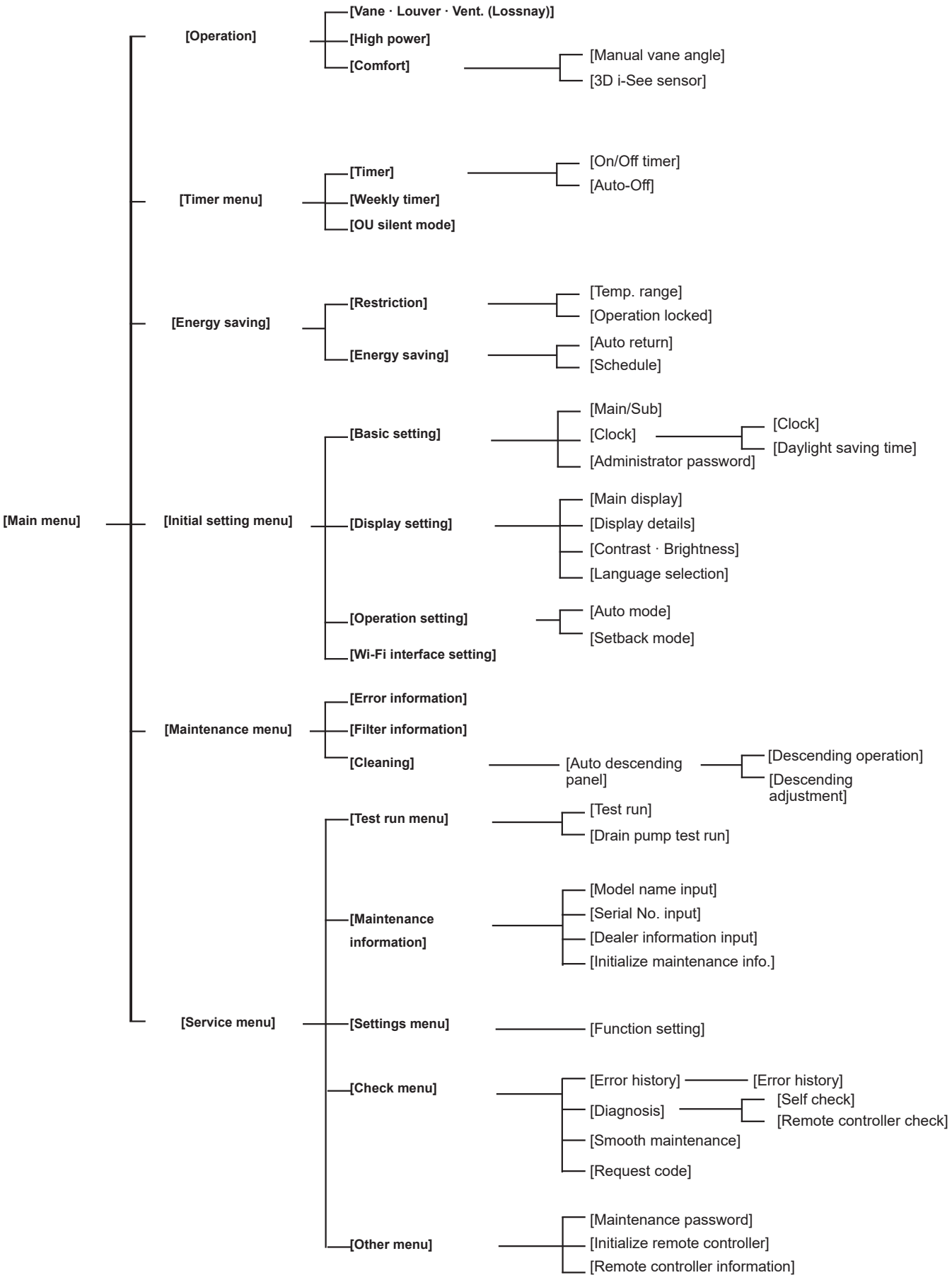
*1. These functions are not applied to the floor standing models.

Menu structure

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

Note:

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



Main menu list

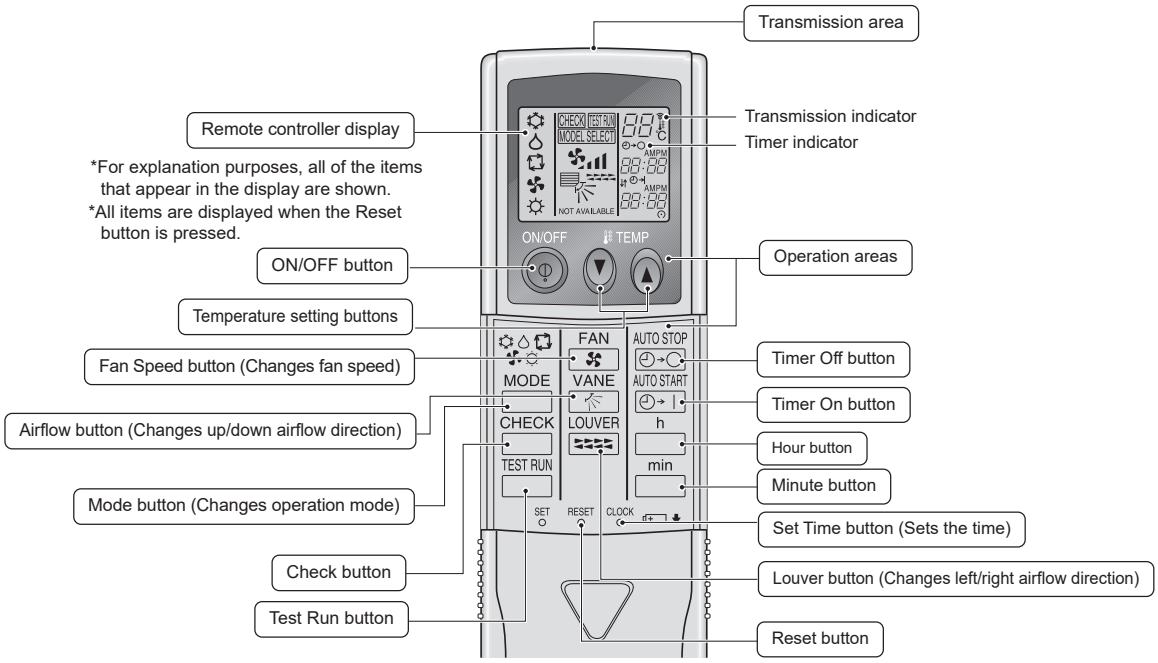
[Main menu]	Setting and display items		Setting details
[Operation]	[Vane · Louver · Vent. (Lossnay)]		Use to set the vane angle. • Select a desired vane setting. Use to turn on/off the louver. • Select a desired setting from [On] and [Off]. Use to set the amount of ventilation. • Select a desired setting from [Off], [Low], and [High].
	[High power] *3		Use to reach the comfortable room temperature quickly. • Units can be operated in the High-power mode for up to 30 minutes.
	[Comfort]	[Manual vane angle]	• Use to fix each vane angle.
			Horizontal air direction • Sets the horizontal airflow direction (vane) of each unit.
		[3D i-See sensor]	Use to set the following functions for 3D i-See sensor. • Air distribution • Energy saving option • Seasonal airflow
[Timer]	[Timer]	[On/Off timer] *1	Use to set the operation ON/OFF times. • Time can be set in 5-minute increments.
		[Auto-Off]	Use to set the Auto-Off time. • Time can be set to a value from 30 to 240 in 10-minute increments.
	[Weekly timer] *1, *2		Use to set the weekly operation ON/OFF times. • Up to 8 operation patterns can be set for each day. (Not valid when [On/Off timer] is enabled.)
	[OU silent mode] *1, *3		Use to set the time periods in which priority is given to quiet operation of outdoor units over temperature control. Set the Start/Stop times for each day of the week. • Select the desired silent level from normal, middle, and quiet.
[Energy saving]	[Restriction]	[Temp. range] *2	Use to restrict the preset temperature range. • Different temperature ranges can be set for different operation modes.
		[Operation locked]	Use to lock selected functions. • The locked functions cannot be operated.
	[Energy saving]	[Auto return] *2	Use to get the units to operate at the preset temperature after performing energy saving operation for a specified time period. • Time can be set to a value from 30 and 120 in 10-minute increments. (This function will not be valid when the preset temperature ranges are restricted.)
		[Schedule] *1, *3	Set the start/stop 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.
[Initial setting]	[Basic setting]	[Main/Sub]	When connecting 2 remote controllers, one of them needs to be designated as a sub controller.
		[Clock]	Use to set the current time.
		[Daylight saving time]	Set the daylight saving time.
		[Administrator password]	The administrator password is required to make the settings for the following items. • [Timer] setting • [Energy saving] setting • [Weekly timer] setting • [Restriction] setting • [OU silent mode] setting
	[Display setting]	[Main display]	Use to switch between [Full] and [Basic] modes for the main display, and use to change the background colors of the display to black.
		[Display details]	Make the settings for the remote controller related items as necessary. [Clock]: The initial settings are [Yes] and [24h] format. [Temperature]: Set to either celsius (°C) or fahrenheit (°F). [Room temp.]: Set to Show or Hide. Auto mode: Set Auto mode display or Only Auto display.
		[Contrast • Brightness]	Use to adjust screen contrast and brightness.
		[Language selection]	Use to select the desired language.
	[Operation setting]	[Auto mode]	Whether or not to use [Auto mode] can be selected by using the button. This setting is valid only when indoor units with [Auto mode] function are connected.
		[Setback mode]	Whether or not to use [Setback mode] can be selected by using the button. This setting is valid only when indoor units with [Setback mode] function are connected.
[Maintenance]	[Error information]		Use to check error information when an error occurs. • 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 [Service menu] to bring up the [Test run menu]. • [Test run] • [Drain pump test run]
	[Input maintenance info.]		Select [Input maintenance Info.] from [Service menu] to bring up [Maintenance information] screen. The following settings can be made from [Maintenance information] screen. • [Model name input] • [Serial No. input] • [Dealer information input] • [Initialize maintenance info.]
	[Settings]	[Function setting]	Make the settings for the indoor unit functions via the remote controller as necessary.
	[Check]	[Error history]	Display the error history and execute [Delete error history?].
		[Diagnosis]	[Self check]: Error history of each unit can be checked via the remote controller. [Remote controller check]: When the remote controller does not work properly, use the remote controller checking function to troubleshoot the problem.
		[Smooth maintenance] *3	Use to display the maintenance data of indoor/outdoor units.
		[Request code] *3	Use to check operation data such as thermistor temperature and error information.
	[Others]	[Maintenance password]	Use to change the maintenance password.
		[Initialize remote controller]	Use to initialize the remote controller to the factory shipment status.
		[Remote controller information]	Use to display the remote controller model name, software version, and serial number.

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

13-1-2. PAR-FL32MA

Controller interface

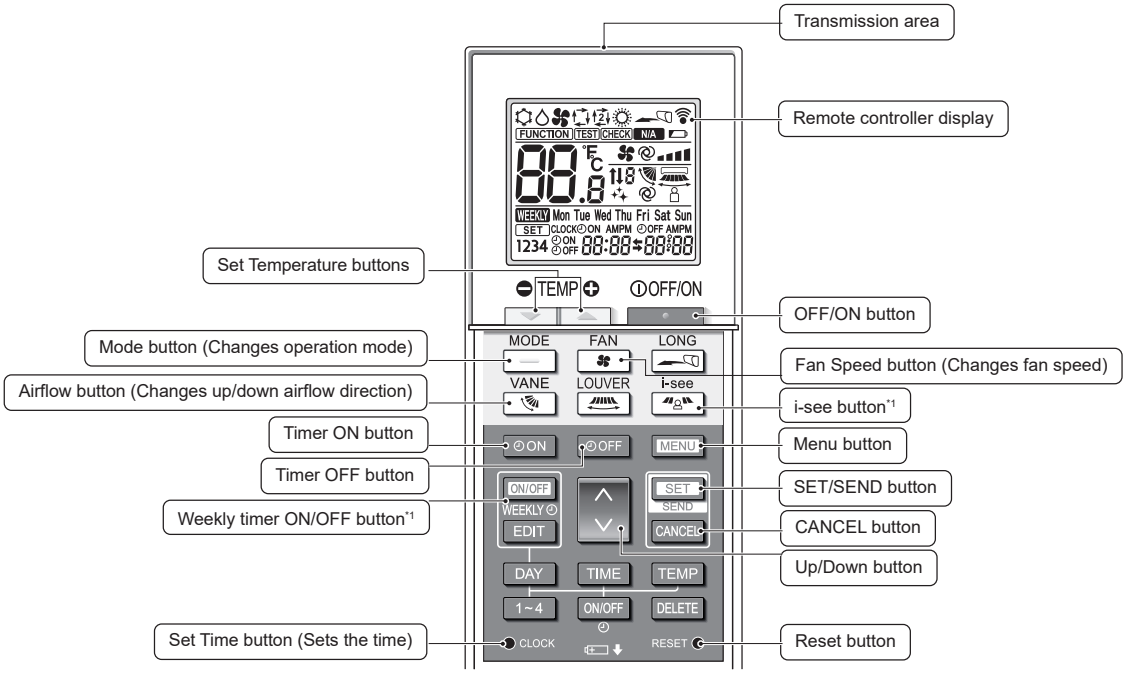


Instructions for use

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

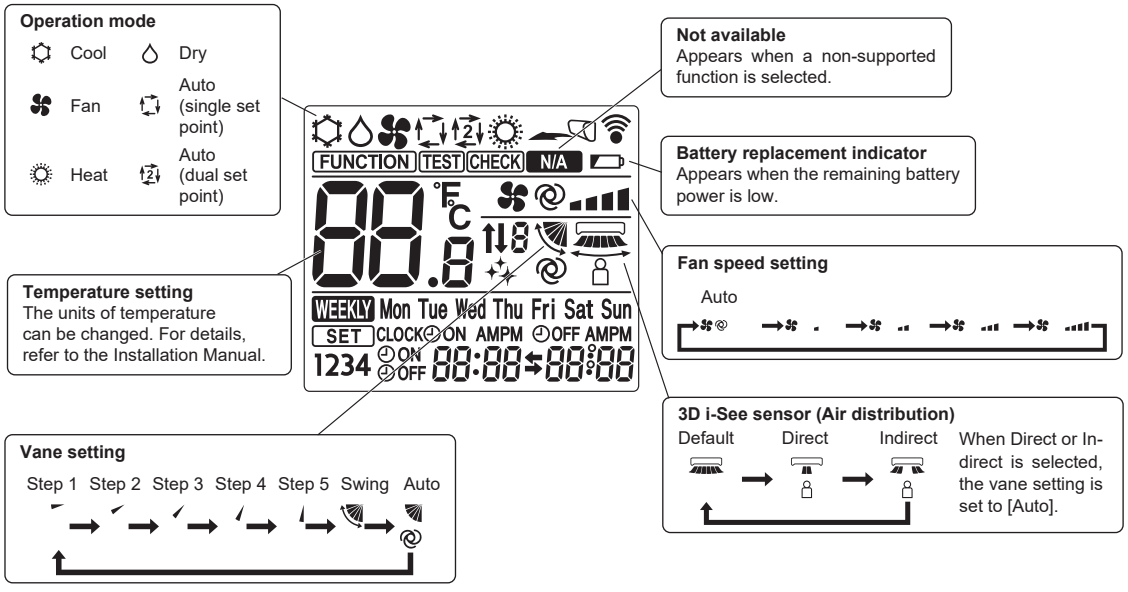
13-1-3. PAR-SL101A-E

Controller interface



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

Display



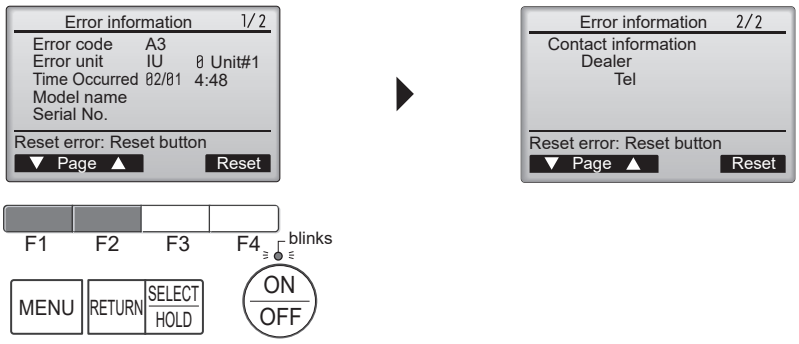
13-2. [Error information]

Operating instructions

■ How to check the error information when an error occurs

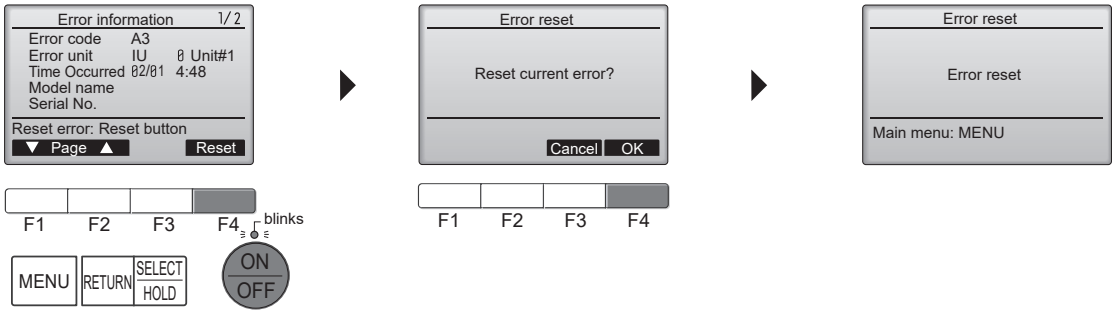
When an error occurs, the following screen will appear. Check the error status, stop the operation, and consult your dealer.

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



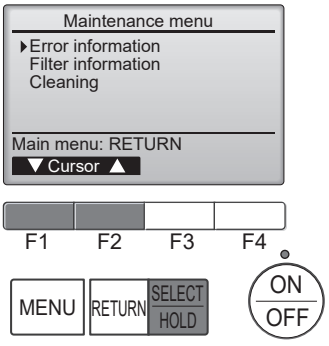
2. Reset the error
   - Press F4 button or [ON/OFF] button to reset the error that is occurring.
   - Select [OK] with F4 button.

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



■ How to check the error information later

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

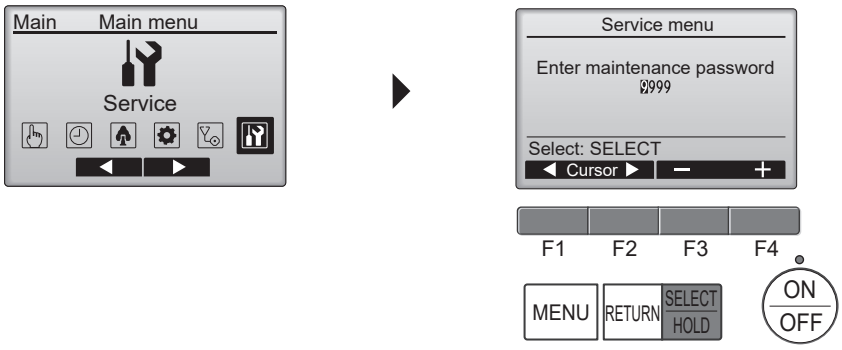


13-3. [Service menu]

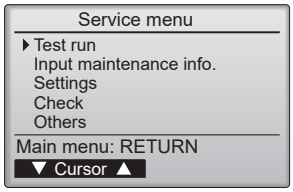
Note:
- Maintenance password is required to set each item in the service menu.

Operating instructions

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



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



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



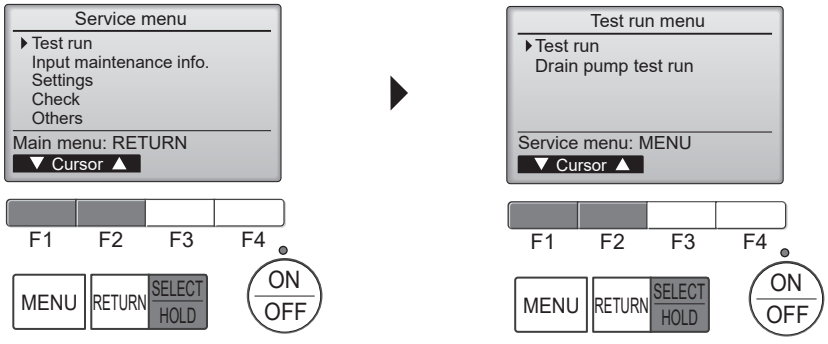
Notes:
- To go back to [Service menu], press [MENU] button.
- To return to the previous screen, press [RETURN] button.

13-4. [Test run]

13-4-1. PAR-41MAA

Operating instructions

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



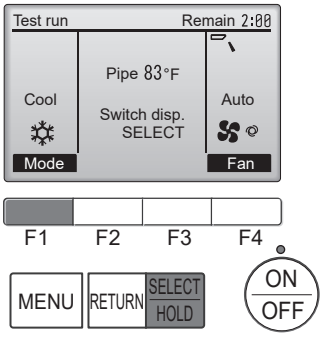
■ Test run operation

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

   Cooling mode: Check the cold air blows out.

Heating mode: Check the heat blows out.

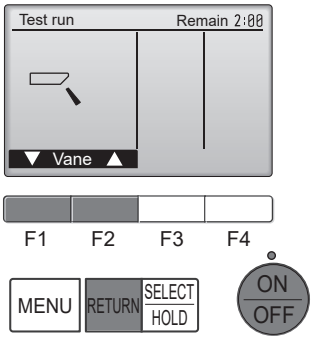
2. Check the operation of the outdoor unit's fan.
3. Press [SELECT] button and open the vane setting screen.



■ Auto vane check

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

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



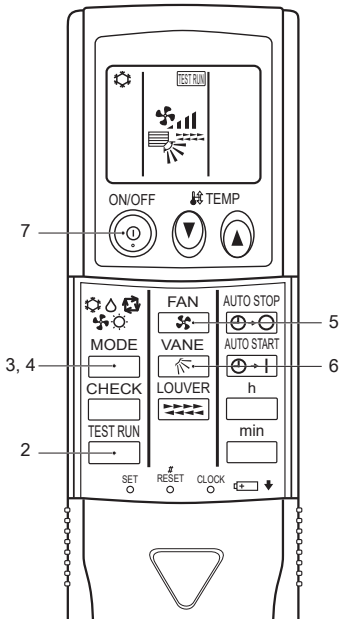
13-4-2. PAR-FL32MA

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

Operating instructions

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

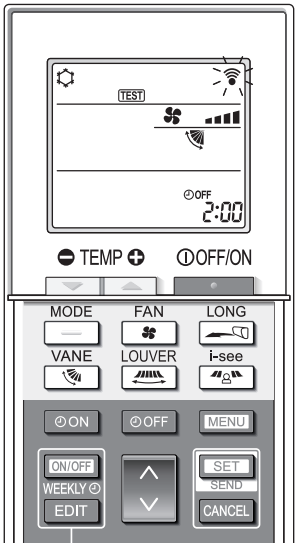
Notes:
- Point the remote controller towards the indoor unit receiver to perform steps 2 to 7.
- It is not possible to run in the fan, the dry or the auto mode.



13-4-3. PAR-SL101A-E

Operating instructions

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



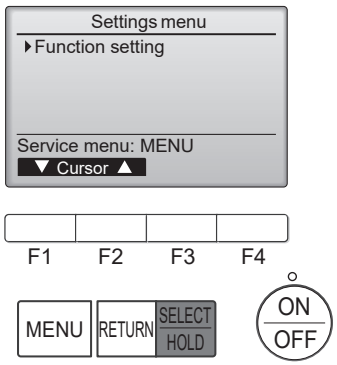
13-5. [Function setting]

13-5-1. PAR-41MAA

Operating instructions

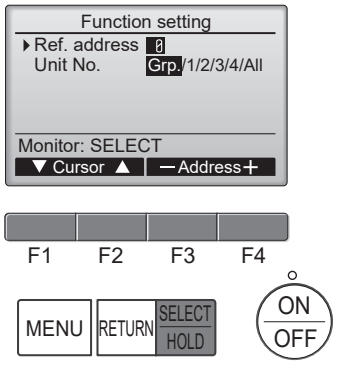
1. Open the [Function setting] screen.
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Setting] from [Service menu], and press [SELECT] button.
   - Select [Function setting] and press [SELECT] button.

   [Function setting] screen will appear.

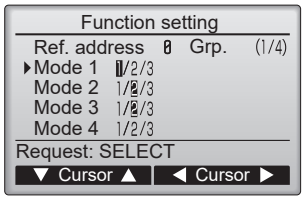


2. Set the indoor unit refrigerant addresses and indoor numbers
   - Enter the indoor unit refrigerant addresses and indoor numbers with F1 - F4 buttons, and then press [SELECT] button to confirm the current setting.

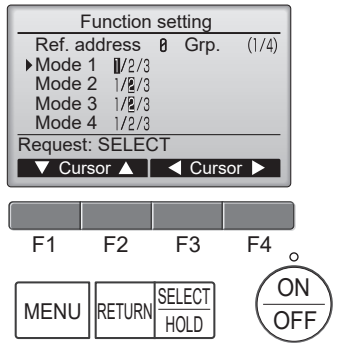
Note: Checking the indoor unit No.
- When [SELECT] button is pressed, the target indoor unit will start fan operation. If the unit is common or when running all units, all indoor units for the selected refrigerant address will start fan operation.



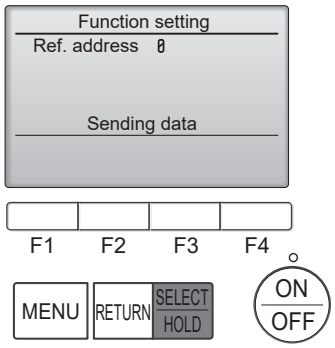
3. Check the current settings
   - When data collection from the indoor units is completed, the current settings appears highlighted. Non-highlighted items indicate that no function settings are made.
     Screen appearance varies depending on [Unit No.] setting.



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



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

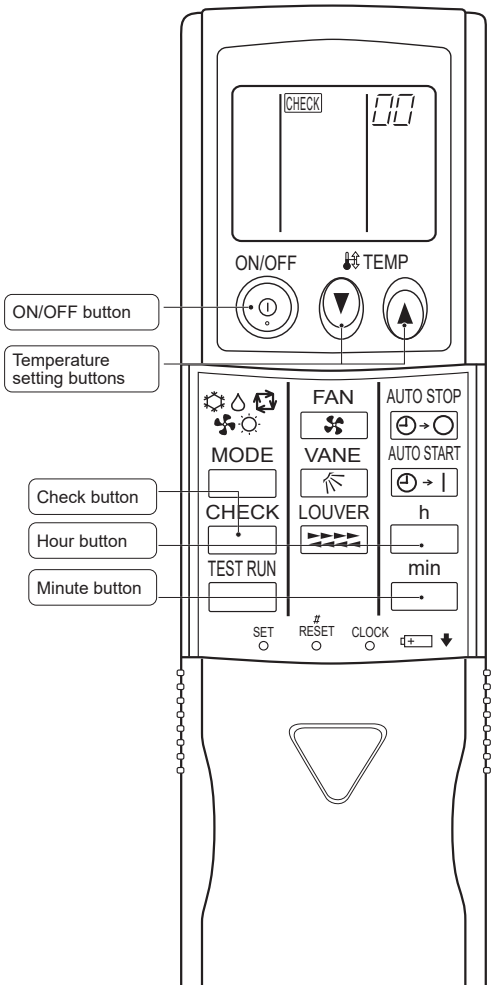


Notes:
- Make the above settings only on Mr. Slim units as necessary.
- The above function settings are not available for City Multi units.
- Refer to the installation manual of the indoor unit for the information about initial settings, mode numbers, and setting numbers of indoor units.
- Be sure to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

13-5-2. PAR-FL32MA

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

An example of function selection flow



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

Function setting

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

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

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

Operating instructions

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

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

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

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

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

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

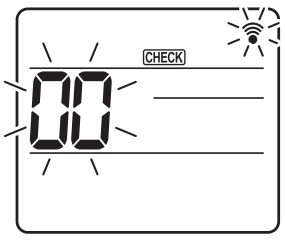
5. Repeat steps 3 and 4 to make other function setting on the same unit.
6. Repeat steps 2 to 4 to change the unit and make function settings on it.
7. Complete the function settings
   • Press button.

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

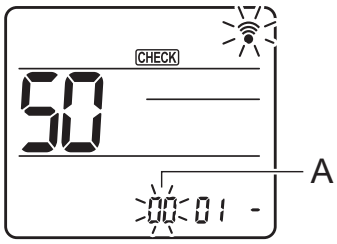
13-5-3. PAR-SL101A-E

Operating instructions

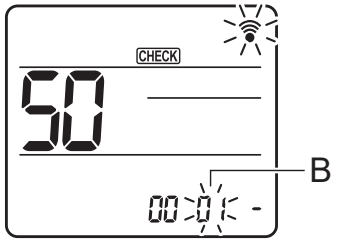
1. Go to the function select mode.
   • Press MENU button for 5 seconds. (Start this operation from the status of remote controller display turned off.)
   CHECK appears on the display and ″00″ blinks.
   • Press button to enter ″50″.
   • Direct the wireless remote controller toward the receiver of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



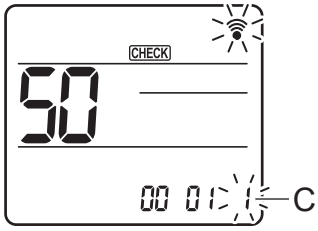
2. Set the unit number.
   • Press button to set unit number A.
   • Direct the wireless remote controller toward the receiver of the indoor unit and press SET button.



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



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



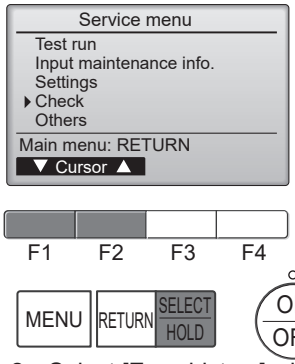
5. Select multiple functions continuously.
   - Repeat the steps 3 and 4 to change multiple function settings continuously.
6. Complete function selections.
   - Direct the wireless remote controller toward the sensor of the indoor unit and press ○ button.

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

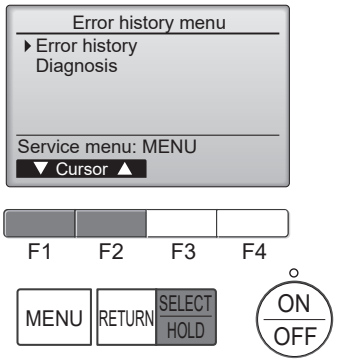
13-6. [Error history]

Operating instructions

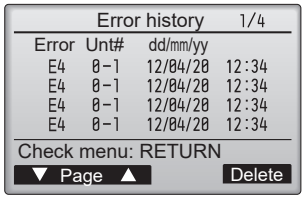
1. Open [Service menu] and select [Check].
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Check] with F1 or F2 button, and press [SELECT] button.



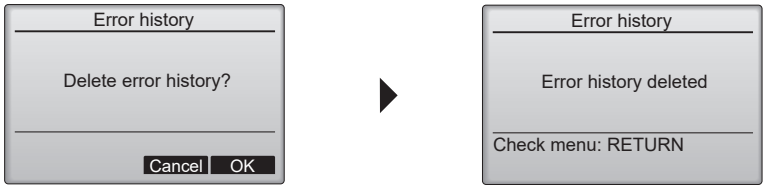
2. Select [Error history] with F1 or F2 button, and press [SELECT] button.



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



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

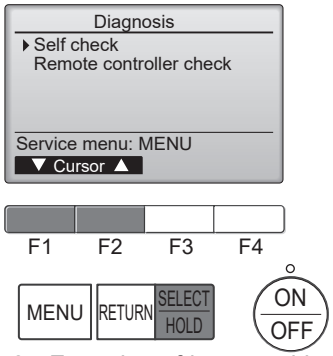


13-7. Self-diagnosis

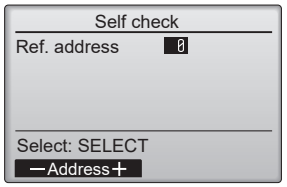
13-7-1. PAR-41MAA

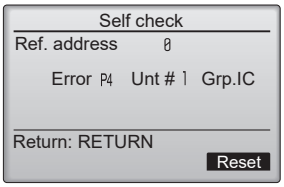
Operating instructions

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

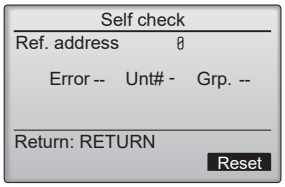


2. Enter the refrigerant address with F1 or F2 button, and press [SELECT] button.
   - Check code, unit number, attribute, and indoor unit demand signal ON/OFF status at the contact will appear.
     [-] will appear when there is no error history.



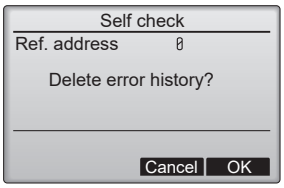


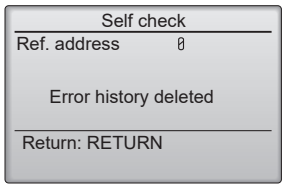
<Error history is shown.>



<When there is no error history.>

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





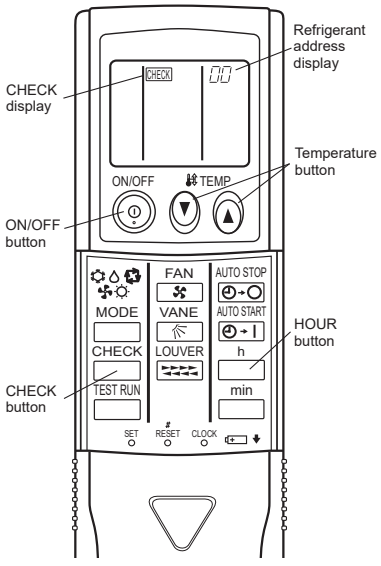
Notes:
- To go back to [Service menu], press [MENU] button
- To return to the previous screen, press [RETURN] button

13-7-2. PAR-FL32MA

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

Operating instructions

1. Press CHECK button twice.
   CHECK appears, and the refrigerant address ″00″ blinks.
   Make sure that the remote controller's display has stopped before continuing.
2. Press buttons to select the refrigerant address of the indoor unit for self-diagnosis.
   Set refrigerant address using the outdoor unit's DIP switch (SW1).
   For more information, see the outdoor unit installation manual.
3. Point the remote controller at the sensor of the indoor unit and press h button.
   If an air conditioner error occurs, the indoor unit's sensor emits an intermittent buzzer sound, the operation light blinks, and the check code is output.
4. Point the remote controller at the sensor of the indoor unit and press button.
   The check mode is cancelled.



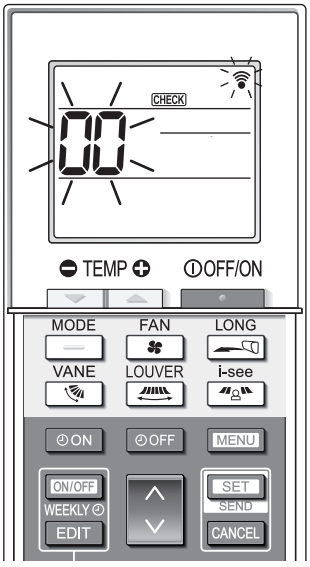
13-7-3. PAR-SL101A-E

Operating instructions

1. Press button to stop the air conditioner.

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

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

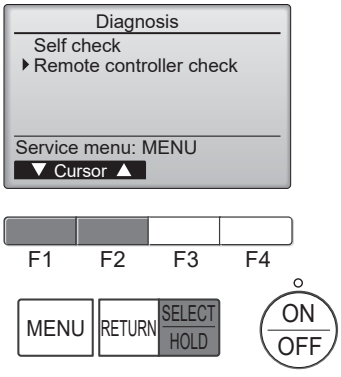


13-8. [Remote controller check]

Operating instructions

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

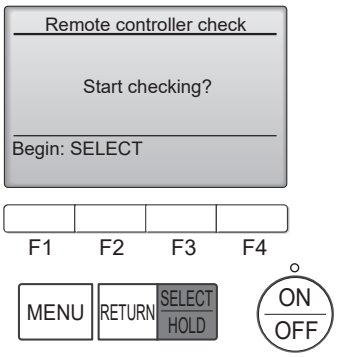
1. Go to [Remote controller check] screen.
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Check] from [Service menu], and press [SELECT] button.
   - Select [Diagnosis] from [Check menu], and press [SELECT] button.
   - Select [Remote controller check] with F1 or F2 button,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



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

Notes:

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



3. Check the result of the remote controller check.

See the following descriptions for each result:

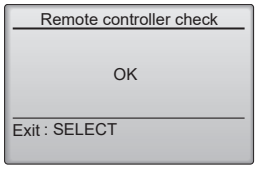
[OK]:
- The remote controller has no problem. Check other parts to find problems.

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

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

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

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



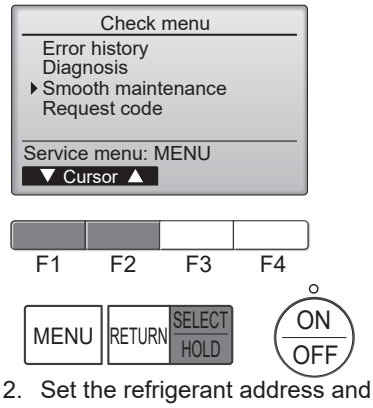
Remote controller check results screen

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

13-9. [Smooth Maintenance]

Operating instructions

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



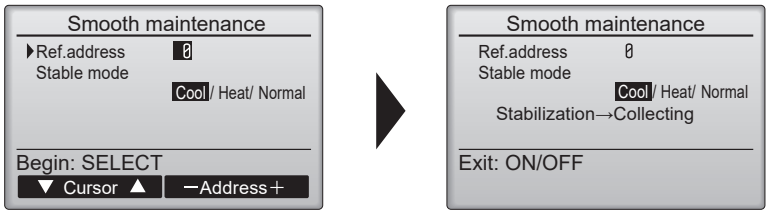
2. Set the refrigerant address and the stable mode.
   - Select the item to be changed with F1 or F2 button.
   - Select the required setting with F3 or F4 button.
     [Ref.address] setting: 0 - 15

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

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

Note:

• Stable mode will take approx. 20 minutes.



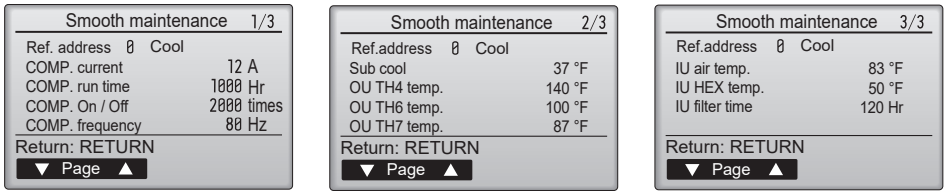
3. The operation data will appear.

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

Note:

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

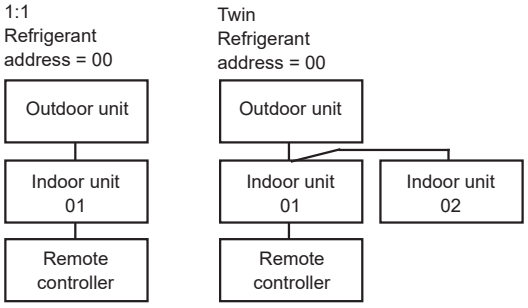
• To return to the previous screen, press [RETURN] button



■ Refrigerant address

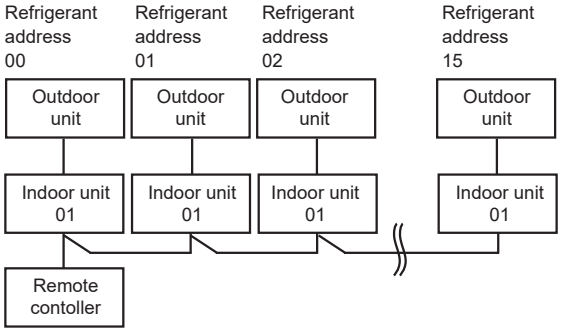
• Single refrigerant system

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



• Multi refrigerant system (group control)

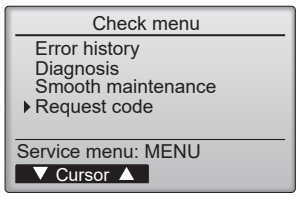
Up to 16 refrigerant systems (16 outdoor units) can be connected as a group by 1 remote controller. To check or set the refrigerant addresses.



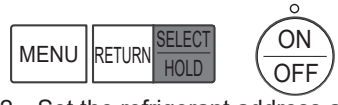
13-10. [Request code]

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

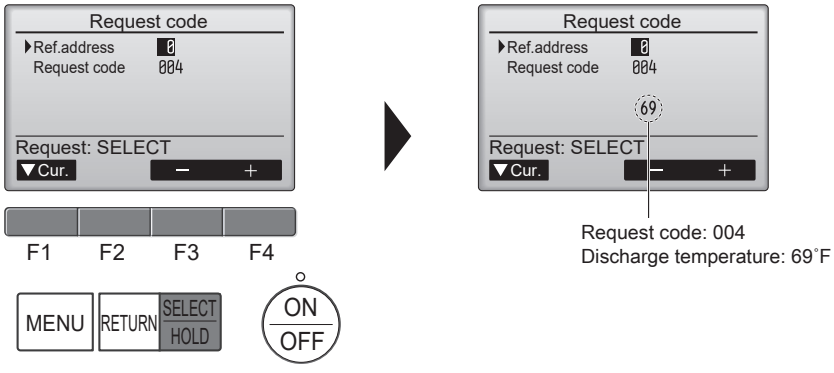
1. Go to [Request code] screen.
   • Select [Service] from [Main menu], and press [SELECT] button.
   • Select [Check] with F1 or F2 button, and press [SELECT] button.
   • Select [Request code] with F1 or F2 button, and press [SELECT] button.







2. Set the refrigerant address and the request code.
   - Select the item to be changed with F1 or F2 button.
   - Select the required setting with F3 or F4 button.
     [Ref.address] setting: 0 – 15
     [Request code] setting
   - Press [SELECT] button. Data will be collected and displayed.



MITSUBISHI ELECTRIC CORPORATION

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

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MITSUBISHI ELECTRIC

Air-Conditioners OUTDOOR UNIT
MXZ-SM72/96/120TAM

Intertek 9700058

HFC utilized R410A

INSTALLATION MANUAL

FOR INSTALLER

For safe and correct use, please read this Installation Manual thoroughly before installing the air-conditioner unit.

English

MANUEL D'INSTALLATION

POUR L'INSTALLATEUR

Veuillez lire le manuel d'installation en entier avant d'installer ce climatiseur pour éviter tout accident et vous assurer d'une utilisation correcte.

Français

MANUAL DE INSTALACIÓN

PARA EL INSTALADOR

Para un uso seguro y correcto, lea detalladamente este manual de instalación antes de montar la unidad de aire acondicionado.

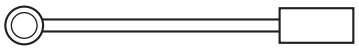
Español

Contents

1. Safety precautions 1
2. Installation location 4
3. Installing the outdoor unit 8
4. Installing the refrigerant piping 8
5. Drainage piping work 15
6. Electrical work 16
7. Test run 34
8. Special Functions 35

Confirmation of parts attached

In addition to this manual, the following part is supplied with the outdoor unit.
It is used for grounding the S terminal of transmission terminal block TB7.
For details refer to “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.

⚠ 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.

⚠ 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.**
- **For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R410A refrigerant.**
- **This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**
- **Children should be supervised to ensure that they do not play with the appliance.**
- **The R410A refrigerant in the HFC system is pressurized 1.6 times the pressure of usual refrigerants. If pipe components not designed for R410A refrigerant are used and the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.**
- **When installing the unit, use appropriate protective equipment and tools for safety. Failure to do so could cause injuries.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**
- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.**
- **Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.**
- **All 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.**
- **Be sure to connect the power supply cords and the connecting wires for the indoor units, outdoor units, and branch boxes directly to the units (no intermediate connections). Intermediate connections can lead to communication errors if water enters the cords or wires and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.**
- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.**
- **Use only specified cables for wiring. The wiring connections must be made securely with no tension applied on the terminal connections. Also, never splice the cables for wiring (unless otherwise indicated in this document). Failure to observe these instructions may result in overheating or a fire.**
- **The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.**
- **When installing or relocating, or servicing the outdoor unit, use only the specified refrigerant (R410A) 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. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.**
- **The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.**
- **After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.**
- **When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.**

en

1. Safety precautions

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.

1.2. Before installation (relocation)

⚠ **Caution:**

- **Be extremely careful when transporting the units. This work requires more than one person due to the heavy weight. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or the edge of other parts.**
- **Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stabs or other injuries.**
- **The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.**
- **Do not clean the air conditioner unit with water. Electric shock may result.**
- **Tighten all flare nuts to specification using a torque wrench. If 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.**
- **Please follow applicable federal, state, or local codes to prevent potential leakage/electric shock. Or install a ground fault interrupt for the prevention of leakage and electric shock.**
- **For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.**
- **When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.**
- **Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.**
- **Use circuit breakers (ground fault 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 10 minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.**

1. Safety precautions

1.5. Using R410A 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 R410A refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.**
- **Use the following tools specifically designed for use with R410A refrigerant. The following tools are necessary to use R410A refrigerant. Contact your nearest dealer for any questions.**

Tools (for R410A)	
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.**
- **Do not use a charging cylinder. If a charging cylinder is used, the composition of the refrigerant will change and the efficiency will be lowered.**

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

Joint pipe is included with the outdoor unit. Refer to 4.5.2 and use it in connection with the on-site piping.

	Connected pipes diameter mm (in)			Shape	Connect to	Connection method	Q'ty
1	ø9.52 (3/8)	→	ø9.52 (3/8)	straight	Liquid pipe	brazing	1 (SM72/96 model only)
2	ø22.2 (7/8)	→	ø22.2 (7/8)	straight	Gas pipe	brazing	1 (SM72/96 model only)
3	ø9.52 (3/8)	→	ø12.7 (1/2)	straight	Liquid pipe	brazing	1 (SM120 model only)
4	ø22.2 (7/8)	→	ø28.58 (1-1/8)	straight	Gas pipe	brazing	1 (SM120 model only)
5	ø28.58 (1-1/8)	→	ø28.58 (1-1/8)	L-shape	Gas pipe	brazing	1 (SM120 model only)

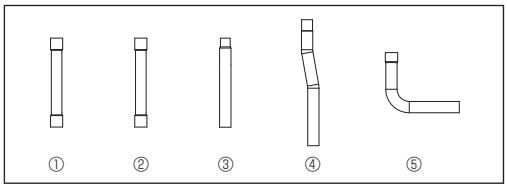


Fig. 1-1

2. Installation location

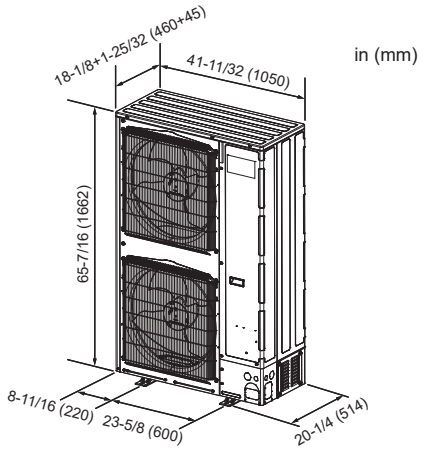


Fig. 2-1

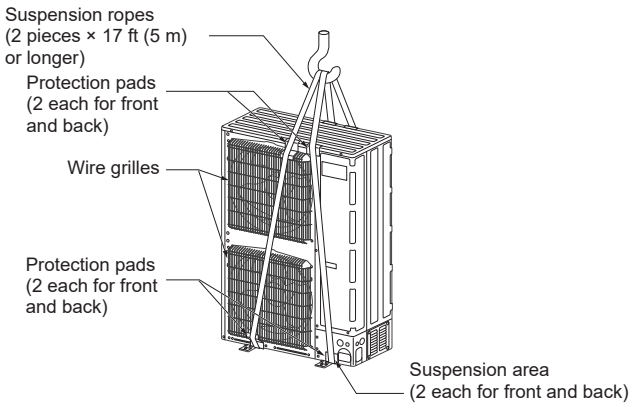


Fig. 2-2

2.1. Refrigerant pipe

Refer to 4.2. Pipe length and height difference.

2.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Transport the unit using rope or a cart, etc. Transporting the unit by holding the service panel handles may result in injury. If the unit is carried from the bottom, hands or fingers may be pinched.

2.3. Outline dimensions (Outdoor unit) (Fig. 2-1)

2.4. Transporting the unit

- Transport the unit using rope or a cart, etc. Transporting the unit by holding the service panel handles may result in injury.

2.4.1. Hanging the unit (Fig. 2-2)

- Do not subject the unit to shocks or impacts.
- When delivering the unit by suspending it, use two straps that are each 17 ft (5 m) or more in length.
- Place protection pads (boards, etc.) on parts that come into direct contact with the straps, such as the corners of the unit, etc., to prevent scratches.

⚠ **Warning:**

- **When delivering the unit, be sure to suspend it from specified positions on the unit.**
  Additionally, be sure to secure it so that it does not shift from side to side, and support it at four points.
- **If the unit is carried or suspended with support at only three points, the unit will be unstable and may tip over or fall, resulting in injury.**

en

2. Installation location

2.5. Constraints on indoor unit installation

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

- Indoor units with model numbers 04-96 can be connected.
- When using Branch box, Indoor units with model numbers 06-36 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.

- MXZ-SM72 36 – 93 kBtu/h
- MXZ-SM96 48 – 124 kBtu/h
- MXZ-SM120 60 – 156 kBtu/h

Table 1-1: City Multi indoor units (P·FY series)

Indoor unit type	P04	P05	P06	P08	P12	P15	P18	P24	P30	P36	P48	P54	P72	P96
Rated capacity (Cooling) (kBtu/h)	4	5	6	8	12	15	18	24	30	36	48	54	72	96

Table 1-2: M series, P series, S series

Model No.	06	09	12	15	18	24	30	36
Rated capacity (Cooling) (kBtu/h)	6	9	12	15	18	24	30	36

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.

Table 2: Maximum connectable indoor unit quantities

- City Multi indoor units

SM72	23
SM96	30
SM120	30

- Branch Box system (M, S, P series indoor units via Branch box)

SM72	12 (6) *1 *2 *3
SM96	12 (8) *1 *2 *3
SM120	12 (10) *1 *2 *3

Table 3: Connectable Branch box quantities (In case of Branch Box system)

Model	Branch box
MXZ-SM72/96/120	1-3

*1 The number enclosed in parentheses is the maximum number of units that can be connected when 1 or more PLA-A·EA units is connected.
*2 When connecting PEAD-A24/30/36AA or SVZ series unit, the maximum total capacity of the units that can be connected each branch box is 60 kBtu/h.
*3 When connecting a SVZ-series unit(s), set additional constraints as follows.
For connections other than those specified below, consult your dealer.

Number of connecting SVZ-series unit	Constraints (For each connected branch box)
2	Any indoor units other than SVZ-series units are not connectable.
1	Only 1 PEAD can be included in the connection.

For connections other than those specified in 1 and 2, including connections with SVZ-series units, consult a dealer.

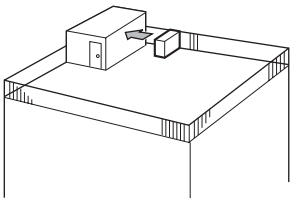


Fig. 2-3

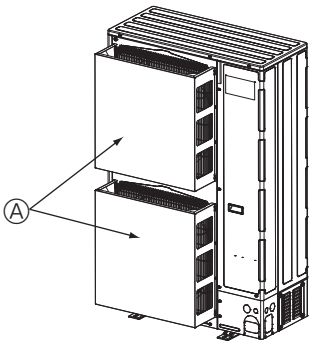
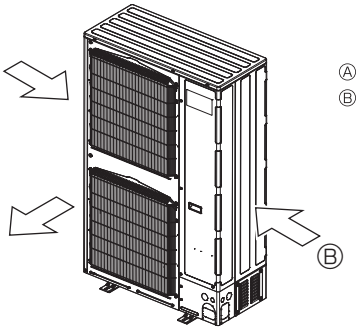


Fig. 2-4



Ⓐ Air protect guide
Ⓑ Wind direction

Fig. 2-5

2.6. Ventilation and service space

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

2.6.1. 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 three examples of precautions against strong winds.

① Face the air outlet towards the nearest available wall about 19-11/16 inch (500 mm) away from the wall. (Fig. 2-3)
② 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. 2-4)
③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-5)

2. Installation location

in (mm)

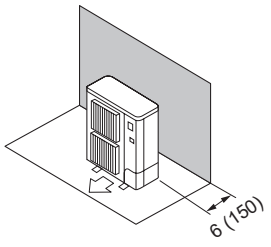


Fig. 2-6

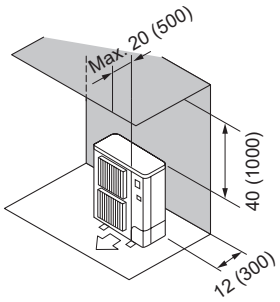


Fig. 2-7

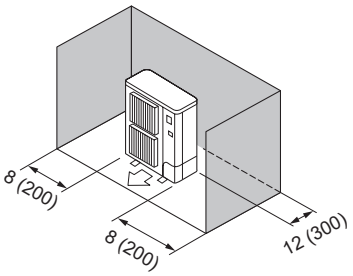


Fig. 2-8

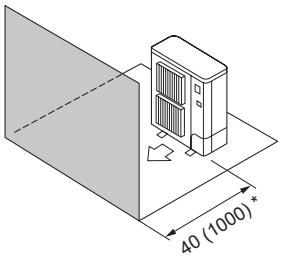


Fig. 2-9

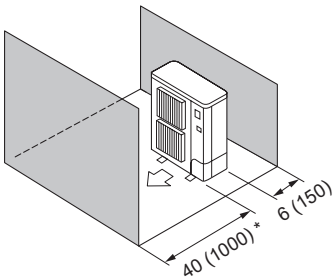


Fig. 2-10

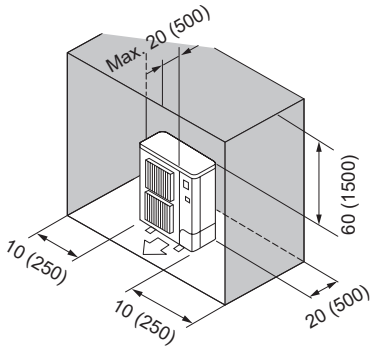


Fig. 2-11

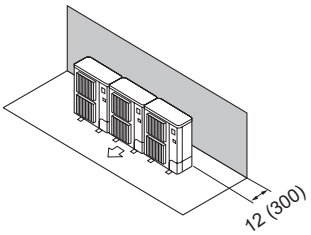


Fig. 2-12

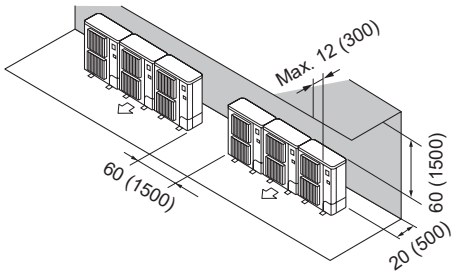


Fig. 2-13

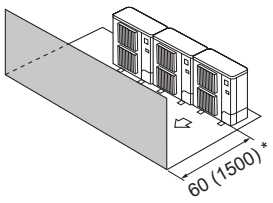


Fig. 2-14

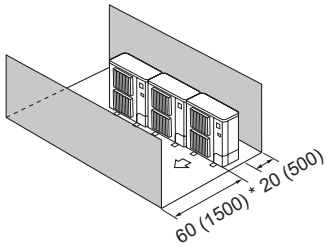


Fig. 2-15

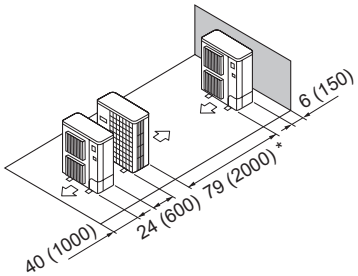


Fig. 2-16

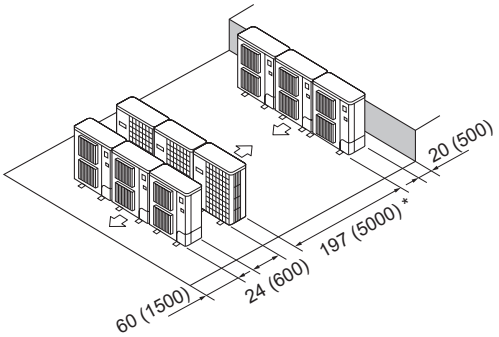


Fig. 2-17

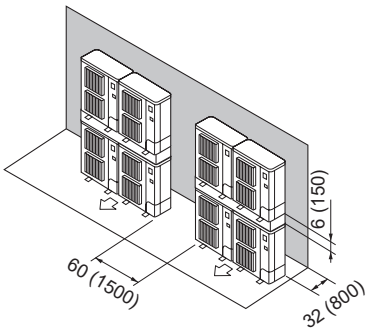


Fig. 2-18

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2.6.2. 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 (Fig. 2-6)

② Obstacles at rear and above (Fig. 2-7)

③ Obstacles at rear and sides (Fig. 2-8)

④ Obstacles at front (Fig. 2-9)

* When using the optional air outlet guides, the clearance is 20" (500 mm) or more.

⑤ Obstacles at front and rear (Fig. 2-10)

* When using the optional air outlet guides, the clearance is 20" (500 mm) or more.

⑥ Obstacles at rear, sides, and above (Fig. 2-11)

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

2.6.3. When installing multiple outdoor units

Leave 1" (25 mm) space or more between the units.

① Obstacles at rear (Fig. 2-12)

② Obstacles at rear and above (Fig. 2-13)

• 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 (Fig. 2-14)

* When using the optional air outlet guides, the clearance is 40" (1000 mm) or more.

④ Obstacles at front and rear (Fig. 2-15)

* When using the optional air outlet guides, the clearance is 40" (1000 mm) or more.

⑤ Single parallel unit arrangement (Fig. 2-16)

* When using the optional air outlet guides installed for upward airflow, the clearance is 40" (1000 mm) or more.

⑥ Multiple parallel unit arrangement (Fig. 2-17)

* When using the optional air outlet guides installed for upward airflow, the clearance is 60" (1500 mm) or more.

⑦ Stacked unit arrangement (Fig. 2-18)

• 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.

3. Installing the outdoor unit

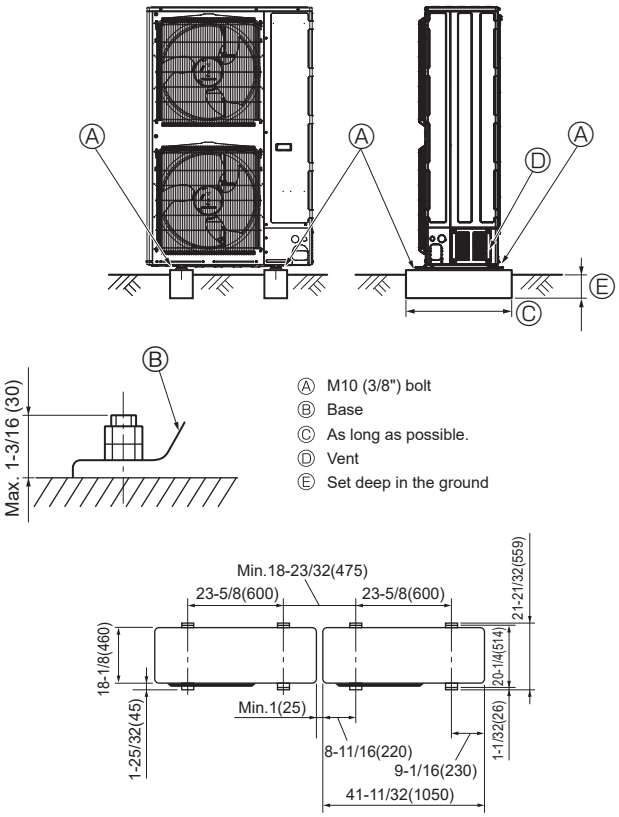


Fig. 3-1

- 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 (3/8")
Thickness of concrete	120 mm (4-23/32")
Length of bolt	70 mm (2-3/4")
Weight-bearing capacity	320 kg (705 lbs)

- Make sure that the length of the foundation bolt is within 30 mm (1-3/16") 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, ø13/16" × 19/32" or less) and install on site.

⚠ Warning:

- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**

⚠ Caution:

- **Install the unit on a rigid structure to prevent excessive operation sound or vibration.**

4. Installing the refrigerant piping

4.1. Precautions for devices that use R410A refrigerant

- Refer to 1.5. for precautions not included below on using air conditioners with R410A 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 outdoor unit, use only the specified refrigerant (R410A) 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 mm (1/4 in), ø9.52 mm (3/8 in), ø12.7 mm (1/2 in)	Thickness 0.8 mm (0.032 in)
ø15.88 mm (5/8 in), ø19.05 mm (3/4 in), ø22.2 mm (7/8 in), ø28.58 mm (1-1/8 in)	Thickness 1.0 mm (0.039 in)

- 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.**

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4. Installing the refrigerant piping

4.2. Pipe length and height difference

4.2.1. Connection without Branch Box (Fig. 4-1)

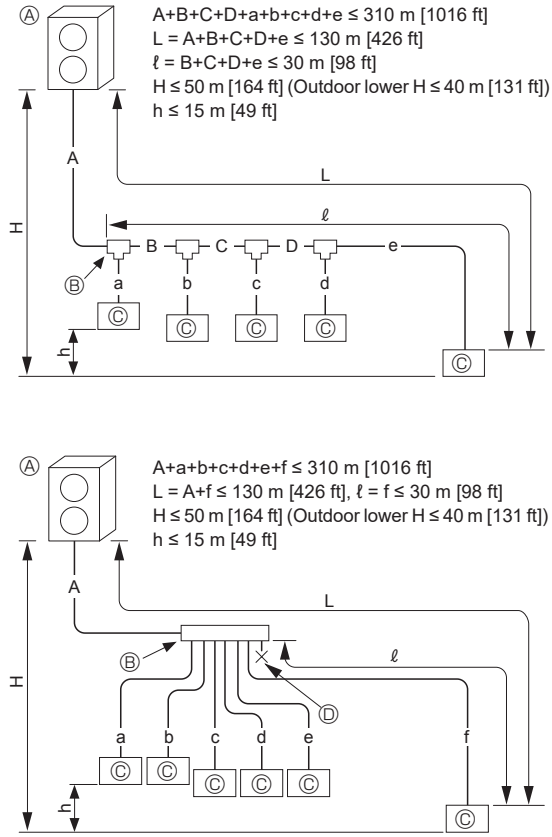


Fig. 4-1

⚠ Caution:
Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant when charging will lead to malfunction. Refer to 4.7 for the calculation of the amount of refrigerant.

Conversion formula

1/4 F	ø6.35 (1/4)
3/8 F	ø9.52 (3/8)
1/2 F	ø12.7 (1/2)
5/8 F	ø15.88 (5/8)
3/4 F	ø19.05 (3/4)
7/8 F	ø22.2 (7/8)
1-1/8 F	ø28.58 (1-1/8)

A mm [in]

Model	Liquid pipe		Gas pipe
MXZ-SM72	All	ø9.52 [3/8]*	ø22.2 [7/8]
MXZ-SM96	L ≤ 90 m [295 ft]	ø9.52 [3/8]*	ø22.2 [7/8]
	L > 90 m [295 ft]	ø12.7 [1/2]	
MXZ-SM120	All	ø12.7 [1/2]	ø28.58 [1-1/8]

B, C, D

Total down-stream capacity of indoor units	Model	Liquid pipe		Gas pipe
– 54 kBtu/h	MXZ-SM72	All	ø9.52 [3/8]	ø15.88 [5/8]
	MXZ-SM96	L ≤ 90 m [295 ft]	ø9.52 [3/8]	
		L > 90 m [295 ft]	ø12.7 [1/2]	
	MXZ-SM120	All	ø12.7 [1/2]	
54 – 76 kBtu/h	MXZ-SM72	All	ø9.52 [3/8]*	ø19.05 [3/4]
	MXZ-SM96	L ≤ 90 m [295 ft]	ø9.52 [3/8]*	
		L > 90 m [295 ft]	ø12.7 [1/2]	
	MXZ-SM120	All	ø12.7 [1/2]	
76 – 124 kBtu/h	MXZ-SM72	All	ø9.52 [3/8]*	ø22.2 [7/8]
	MXZ-SM96	L ≤ 90 m [295 ft]	ø9.52 [3/8]*	
		L > 90 m [295 ft]	ø12.7 [1/2]	
	MXZ-SM120	All	ø12.7 [1/2]	
124 kBtu/h –	MXZ-SM120	All	ø12.7 [1/2]	ø28.58 [1-1/8]

L: The farthest piping length from the outdoor unit to an indoor unit.

* ø12.7 [1/2] when connecting the indoor unit for PEFY-P72 or P96.

a, b, c, d, e, f mm [in]

Model number	Liquid pipe	Gas pipe
04, 05, 06, 08, 12, 15, 18	ø6.35 [1/4]	ø12.7 [1/2]
24, 27, 30, 36, 48, 54	ø9.52 [3/8]	ø15.88 [5/8]
72	ø9.52 [3/8]	ø19.05 [3/4]
96	ø9.52 [3/8]	ø22.2 [7/8]

Branch kit model
CMY-Y62-G-E

4-Branching header	8-Branching header
CMY-Y64-G-E	CMY-Y68-G-E

When connecting the branch kit and branching header to ø28.58 [1-1/8] size piping, PAC-SL03RJ-E is also required.

Piping preparation

① Table below shows the specifications of pipes commercially available.

Outside diameter	Insulation thickness	Insulation material
mm (in)	mm (in)	
6.35 (1/4)	8 (5/16)	Heat resisting foam plastic 0.045 specific gravity
9.52 (3/8)	8 (5/16)	
12.7 (1/2)	8 (5/16)	
15.88 (5/8)	8 (5/16)	
19.05 (3/4)	8 (5/16)	
22.2 (7/8)	8 (5/16)	
28.58 (1-1/8)	8 (5/16)	

② Ensure that the 2 refrigerant pipes are insulated to prevent condensation.

③ Refrigerant pipe bending radius must be 4" (100 mm) or more.

⚠ Caution:
Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and lack of thickness may cause dew drippage.

⚠ Warning:
When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.

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4. Installing the refrigerant piping

4.2.2. Connection with Branch box (Fig. 4-2)

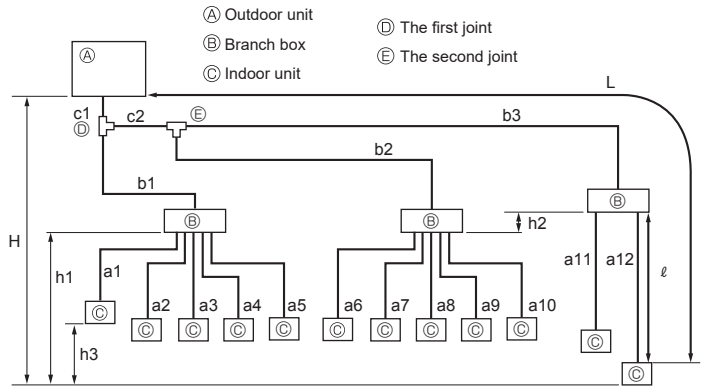


Fig. 4-2

Permissible length (one-way)	Total piping length	c1 + c2 + b1 + b2 + b3 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 + a9 + a10 + a11 + a12 ≤ 240 m [787 ft]
	Farthest piping length (L) *1	c1 + c2 + b3 + a12 ≤ 80 m [262 ft]
	Piping length between outdoor unit and branch boxes	c1 + c2 + b1 + b2 + b3 ≤ 95 m [311 ft]
	Farthest branch box from the first joint	c2 + b3 ≤ 30 m [98 ft]
	Farthest piping length after branch box (ℓ)	a12 ≤ 25 m [82 ft]
	Total piping length between branch boxes and indoor units	a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 + a9 + a10 + a11 + a12 ≤ 145 m [475 ft]
Permissible height difference (one-way)	In indoor/outdoor section (H) *2	H ≤ 50 m [164 ft] (In the case of outdoor unit is set higher than indoor unit)
		H ≤ 40 m [131 ft] (In the case of outdoor unit is set lower than indoor unit)
	In branch box / indoor unit section	h1 + h2 ≤ 15 m [49 ft]
	In each branch unit (h2)	h2 ≤ 15 m [49 ft]
	In each indoor unit (h3)	h3 ≤ 12 m [39 ft]
Number of bends		| c1 + b1 + a1 |, | c1 + b1 + a2 |, | c1 + b1 + a3 |, | c1 + b1 + a4 |, | c1 + b1 + a5 |, | c1 + c2 + b2 + a6|, |c1 + c2 + b2 + a7|, |c1 + c2 + b2 + a8|, |c1 + c2 + b2 + a9|, |c1 + c2 + b2 + a10|, |c1 + c2 + b3 + a11|, |c1 + c2 + b3 + a12| ≤ 23

*1 The piping specification table does not provide a minimum line set length. However, indoor units with connected piping length less than 16 ft. (5 m) could produce intermittent noise during normal system operation in very quiet environments. Please be aware of this important information when installing and locating the indoor unit within the conditioned space.
*2 Branch box should be placed within the level between the outdoor unit and indoor units.

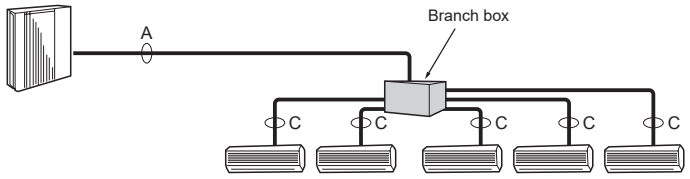
⚠ **Caution:**
Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant when charging will lead to malfunction.
Refer to 4.7 for the calculation of the amount of refrigerant.

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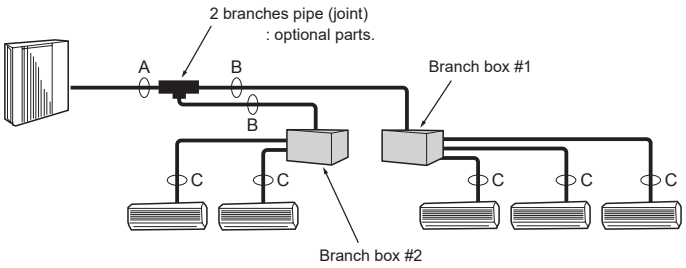
4. Installing the refrigerant piping

■ **In the case of using 1-branch box**

Flare connection employed. (No. brazing)



■ **In the case of using 2-branch boxes**



■ **In the case of using 3-branch boxes**

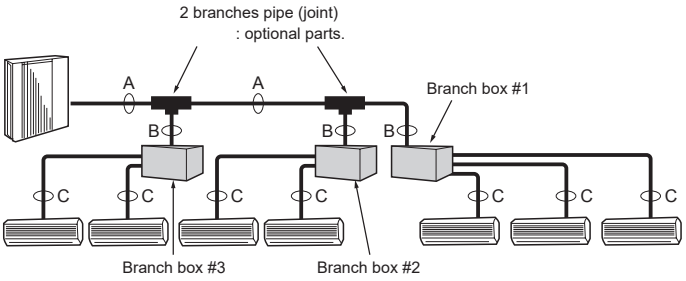


Fig. 4-3

Refrigerant pipe flared connection of branch box mm (in)

	To indoor unit					To outdoor unit
	A	B	C	D	E	
Liquid pipe	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø9.52 (3/8)
Gas pipe	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)	ø12.7 (1/2)	ø15.88 (5/8)

* 3-branch type : only A, B, C

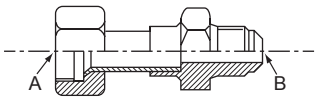


Fig. 4-4

Conversion formula

1/4 F	ø6.35 (1/4)
3/8 F	ø9.52 (3/8)
1/2 F	ø12.7 (1/2)
5/8 F	ø15.88 (5/8)
3/4 F	ø19.05 (3/4)
7/8 F	ø22.2 (7/8)
1-1/8 F	ø28.58 (1-1/8)



Fig. 4-5

2-branch pipe (Joint): Optional parts (According to the connection method, you can choose the favorite one.)

Model name	Connection method
MSDD-50AR-E	flare
MSDD-50BR-E	brazing
CMY-Y62-GA-E	brazing

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

Refer to the Installation Manuals of MSDD-50AR-E, MSDD-50BR-E and CMY-Y62-GA-E.

Selecting pipe size (Fig. 4-3)

A mm [in]

Model	Liquid pipe	Gas pipe
MXZ-SM72	ø9.52 [3/8]	ø22.2 [7/8]
MXZ-SM96	ø9.52 [3/8]	ø22.2 [7/8]
MXZ-SM120	ø12.7 [1/2]	ø28.58 [1-1/8]

B

Total down-stream capacity of indoor units	Model	Liquid pipe	Gas pipe
– 54 kBtu/h	MXZ-SM72	ø9.52 [3/8]	ø15.88 [5/8]
	MXZ-SM96	ø9.52 [3/8]	
	MXZ-SM120	ø12.7 [1/2]	
54 – 76 kBtu/h	MXZ-SM72	ø9.52 [3/8]	ø19.05 [3/4]
	MXZ-SM96	ø9.52 [3/8]	
	MXZ-SM120	ø12.7 [1/2]	
76 kBtu/h –	MXZ-SM72	ø9.52 [3/8]	ø22.2 [7/8]
	MXZ-SM96	ø9.52 [3/8]	
	MXZ-SM120	ø12.7 [1/2]	

C

The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size of branch box with indoor unit.

If the piping connection size of branch box does not match the piping connection size of indoor unit, use optional different-diameter (deformed) joints to the branch box side.

(Connect deformed joint directly to the branch box side.)

■ **Pipe size (Branch box-Indoor unit) *Case of M series or S series Indoor unit**

Indoor unit type	(Btu/h)	06	09	12	15	18	24	30	36
Pipe size (mm (in))	Liquid	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)
	Gas	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)	ø12.7 (1/2)	ø12.7 (1/2)	ø15.88 (5/8)	ø15.88 (5/8)	ø15.88 (5/8)

■ **Pipe size (Branch box-Indoor unit) *Case of P series indoor unit**

Indoor unit type	(Btu/h)	09	12	15	18	24	30	36
Pipe size (mm (in))	Liquid	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)
	Gas	ø9.52 (3/8)	ø12.7 (1/2)	ø12.7 (1/2)	ø12.7 (1/2)	ø15.88 (5/8)	ø15.88 (5/8)	ø15.88 (5/8)

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

Different-diameter joint (optional parts) (Fig. 4-4, 4-5)

Model name	Connected pipes diameter mm (in)	Diameter A mm (in)	Diameter B mm (in)
MAC-A454JP-E	ø9.52 (3/8) → ø12.7 (1/2)	ø9.52 (3/8)	ø12.7 (1/2)
MAC-A455JP-E	ø12.7 (1/2) → ø9.52 (3/8)	ø12.7 (1/2)	ø9.52 (3/8)
MAC-A456JP-E	ø12.7 (1/2) → ø15.88 (5/8)	ø12.7 (1/2)	ø15.88 (5/8)
PAC-493PI	ø6.35 (1/4) → ø9.52 (3/8)	ø6.35 (1/4)	ø9.52 (3/8)
PAC-SG76RJ-E	ø9.52 (3/8) → ø15.88 (5/8)	ø9.52 (3/8)	ø15.88 (5/8)
PAC-SG75RJ-E	ø15.88 (5/8) → ø19.05 (3/4)	ø15.88 (5/8)	ø19.05 (3/4)
PAC-SG71RJ-E	ø15.88 (5/8) *1 → ø22.2 (7/8) *2	ø15.88 (5/8) *1	ø22.2 (7/8) *2
PAC-SL02RJ-E	ø15.88 (5/8) *1 → ø28.58 (1-1/8) *2	ø15.88 (5/8) *1	ø28.58 (1-1/8) *2
PAC-SL03RJ-E	ø22.2 (7/8) → ø28.58 (1-1/8) *2	ø22.2 (7/8)	ø28.58 (1-1/8) *2

*1 When connecting to MSDD-50AR-E or a branch box, flare the pipes on-site. Use the nuts that are included with the 2-branch pipe and branch box.

*2 Brazing

Piping preparation

① Table below shows the specifications of pipes commercially available.

Outside diameter	Insulation thickness	Insulation material
mm (in)	mm (in)	
6.35 (1/4)	8 (5/16)	Heat resisting foam plastic 0.045 specific gravity
9.52 (3/8)	8 (5/16)	
12.7 (1/2)	8 (5/16)	
15.88 (5/8)	8 (5/16)	
19.05 (3/4)	8 (5/16)	
22.2 (7/8)	8 (5/16)	
28.58 (1-1/8)	8 (5/16)	

② Ensure that the 2 refrigerant pipes are insulated to prevent condensation.

③ Refrigerant pipe bending radius must be 4" (100 mm) or more.

⚠ **Caution:**

Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and branch box, and lack of thickness may cause dew drippage.

en

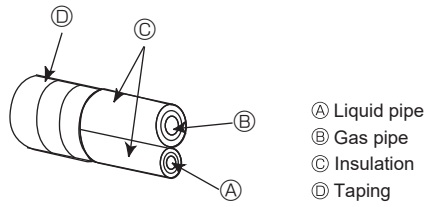
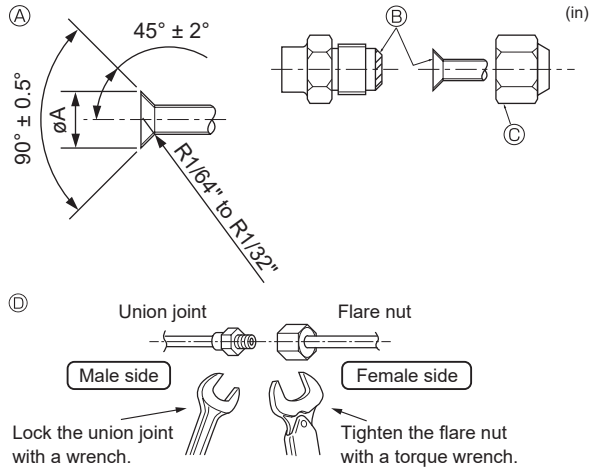


Fig. 4-6



Ⓐ Flare cutting dimensions
Ⓓ Flare nut tightening torque

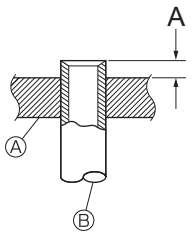
Fig. 4-7

Ⓐ (Fig. 4-7)

Copper pipe O.D. (mm) (in)	Flare dimensions øA dimensions (mm) (in)
ø6.35 (1/4)	8.7 - 9.1 (5/16 - 3/8)
ø9.52 (3/8)	12.8 - 13.2 (1/2 - 33/64)
ø12.7 (1/2)	16.2 - 16.6 (41/64 - 21/32)
ø15.88 (5/8)	19.3 - 19.7 (49/64 - 25/32)
ø19.05 (3/4)	23.6 - 24.0 (15/16 - 61/64)

Copper pipe O.D. (mm) (in)	Flare nut O.D. (mm) (in)	Tightening torque (N·m)* (lbf·ft)
ø6.35 (1/4)	17 (43/64)	14 - 18 (11 - 13)
ø6.35 (1/4)	22 (7/8)	34 - 42 (26 - 30)
ø9.52 (3/8)	22 (7/8)	34 - 42 (26 - 30)
ø9.52 (3/8)	26 (1-3/64)	49 - 61 (37 - 44)
ø12.7 (1/2)	26 (1-3/64)	49 - 61 (37 - 44)
ø12.7 (1/2)	29 (1-9/64)	68 - 82 (51 - 60)
ø15.88 (5/8)	29 (1-9/64)	68 - 82 (51 - 60)
ø15.88 (5/8)	36 (1-27/64)	100 - 120 (74 - 88)
ø19.05 (3/4)	36 (1-27/64)	100 - 120 (74 - 88)

* 1 N·m≒10 kgf·cm



Ⓐ Die
Ⓑ Copper pipe

Fig. 4-8

4.3. Connecting pipes (Fig. 4-6) (Fig. 4-7)

- 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, 248 °F, Thickness: 15 mm, 5/8 inch 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.
- Be sure to separate thermal insulation for gas and liquid refrigerant pipes.
- 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 (3/8 inch) or more).

[Fig. 4-7]

- 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 as follows. Ⓒ
- 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 (4 inch) to 150 mm (6 inch) are sufficient.
- Make sure the pipes do not contact the compressor. Abnormal noise or vibration may result.

①Pipes must be connected starting from the indoor unit.
Flare nuts must be tightened with a torque wrench.
②Flare 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 2 for flaring of R410A refrigerant pipes.
  The size adjustment gauge can be used to confirm A measurements.

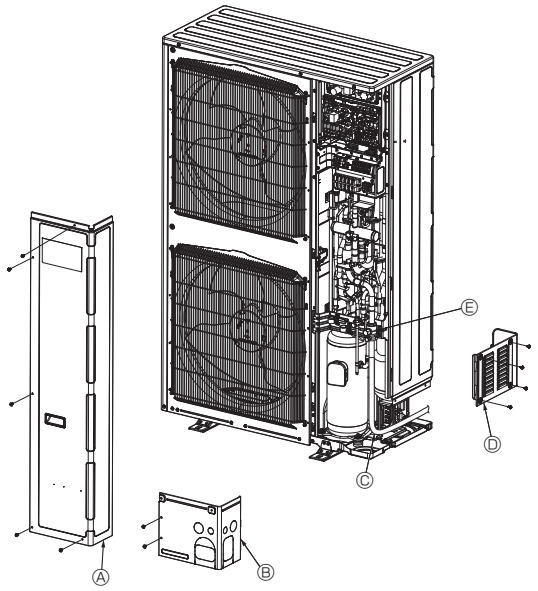
⚠ Warning:
When installing the unit, securely connect the refrigerant pipes before starting the compressor.

⚠ Caution:
- **Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.**

Table 2 (Fig. 4-8) mm (in)

Copper pipe O.D.	A	
	Flare tool for R410A	Flare tool for R22·R407C
	Clutch type	
ø6.35 (1/4)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø9.52 (3/8)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø12.7 (1/2)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø15.88 (5/8)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø19.05 (3/4)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)

en



Ⓐ Service panel
Ⓑ Front piping cover
Ⓒ Bend radius : 100 mm [4"] or more
Ⓓ Rear piping cover
Ⓔ Stop (Ball) valve

Fig. 4-9

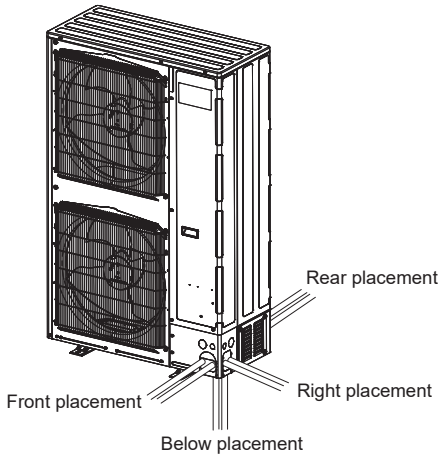


Fig. 4-10

4.4. Refrigerant piping (Fig. 4-9)

Remove the service panel Ⓐ (5 screws) and the front piping cover Ⓑ (2 screws) and rear piping cover Ⓓ (4 screws).

① Perform refrigerant piping connections for the indoor/outdoor unit when the outdoor unit's stop valve is completely closed.

② Vacuum-purge air from the indoor unit and the connection piping.

③ Attach the front cover and back cover to match each of the directions the piping passes through. (Fig. 4-10)

Evacuation

Evacuate with the valve of the outdoor unit closed and evacuate both the connection piping and the indoor unit from the service port provided on the valve of the outdoor unit using a vacuum pump. (Always evacuate from the service port of both liquid pipe and gas pipe.) After the vacuum reaches 650 Pa [abs] [0.0943 psi/5 Torr], continue evacuation for at least one hour or more. Then, stop the vacuum pump and leave it for 1 hour. Ensure the degree of vacuum has not increased. **(If the degree of vacuum increase is larger than 130 Pa [0.01886 psi/1.0 Torr], water might have entered. Apply pressure to dry nitrogen gas up to 0.05 MPa [7.25 psi/375 Torr] and vacuum again.)** Finally, seal in with the liquid refrigerant through the liquid pipe, and adjust the gas piping to obtain an appropriate amount of the refrigerant during operation.

* Never perform air purging using refrigerant.

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). This will completely connect the refrigerant lines of the indoor and outdoor units.

- If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
- Use a leak detector or soapy water to check for gas leaks at the pipe connection sections of the outdoor unit.
- Do not use the refrigerant from the unit to purge air from the refrigerant lines.
- After the valve work is completed, tighten the valve caps to the correct torque: 20 to 24.5 N·m [14 to 18 lbf·ft] (200 to 245 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.

Refrigerant pipes are protectively wrapped

- When routing piping using a piping cover, cut out the knockout in the piping cover (Ⓔ or Ⓓ) following the groove, and wrap the pipes. (Fig. 4-10)

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.)

Note:

<Triple Evacuation>

- Evacuate the system to 4,000 microns from both service valves. System manifold gauges must not be used to measure vacuum. A micron gauge must be used at all times.
  - Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 psig.
- Evacuate the system to 1,500 microns from the suction service valve.
  - Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 psig.
- Evacuate the system to 500 microns. System must hold the vacuum at 500 microns for a minimum of 1 hour.
- Conduct a rise test for a minimum of 30 minutes.

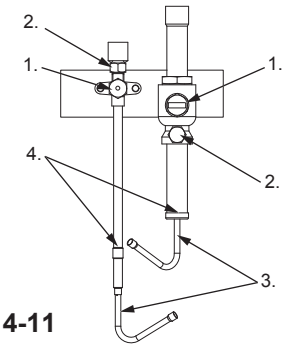


Fig. 4-11

4.5. Installing the refrigerant piping (main pipe) (Fig. 4-11)

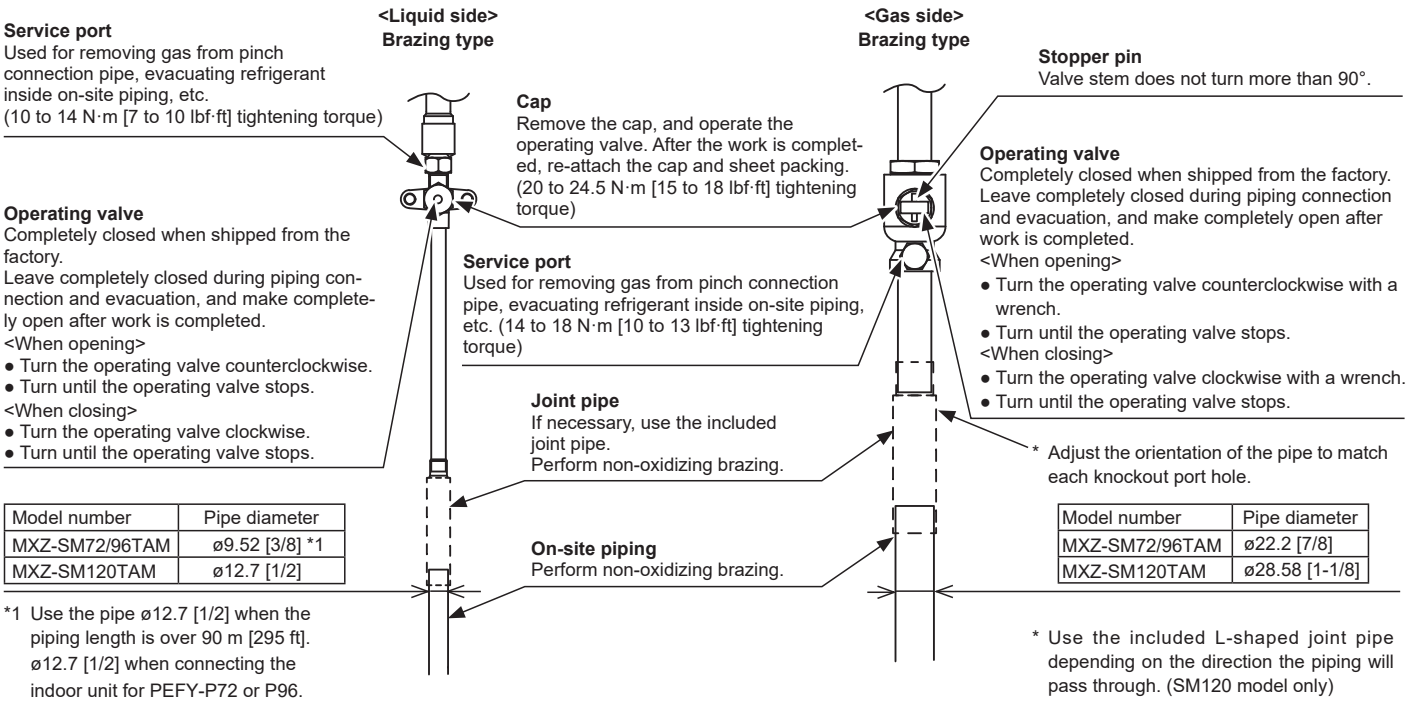
4.5.1. Removing pinch connection pipes

- Perform piping connection and valve operation according to the procedure.
- Pinch connection pipes are attached to the on-site piping end of the liquid side and gas side operation valves when shipped from the factory in order to prevent gas leakage. When connecting the refrigerant piping to the outdoor unit, remove the pinch connection pipe of the operation valve according to the following procedure.

Procedure

1. Check that the operation valves are completely closed (turned clockwise).
2. Attach a charging hose to the service port of the liquid side and gas side operation valves, and remove the gas inside the pinch connection pipes.
3. After removing the gas from inside the pinch connection pipes, cut the pinch connection pipes at the position shown in the figure, and remove the refrigerant oil inside.
4. After the work is completed, heat the brazing section and remove the pinch connection pipes.

4.5.2. Piping connection and valve operation (Fig. 4-12)



Model number	Pipe diameter
MXZ-SM72/96TAM	ø9.52 [3/8] *1
MXZ-SM120TAM	ø12.7 [1/2]

*1 Use the pipe ø12.7 [1/2] when the piping length is over 90 m [295 ft]. ø12.7 [1/2] when connecting the indoor unit for PEFY-P72 or P96.

Model number	Pipe diameter
MXZ-SM72/96TAM	ø22.2 [7/8]
MXZ-SM120TAM	ø28.58 [1-1/8]

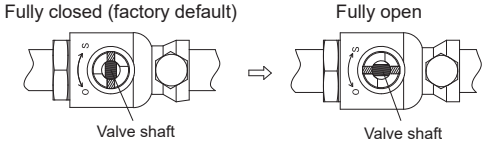
Fig. 4-12

- Refer to the table to the under for the cap and operating valve section tightening torque. As a guideline when not using a torque wrench, tighten until the tightening torque suddenly increases.

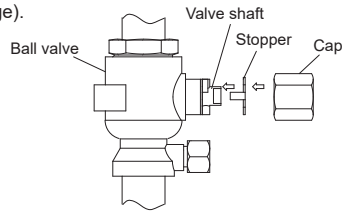
When widening the piping on-site, be sure to satisfy the minimum pipe coupling depth in the table below.

Pipe diameter (in (mm))	Minimum coupling depth (in (mm))
More than 7/32 (5), less than 11/32 (8)	1/4 (6)
More than 11/32 (8), less than 1/2 (12)	9/32 (7)
More than 1/2 (12), less than 21/32 (16)	11/32 (8)
More than 21/32 (16), less than 1 (25)	13/32 (10)
More than 1 (25), less than 1-13/32 (35)	1/2 (12)
More than 1-13/32 (35), less than 1-25/32 (45)	9/16 (14)

Follow the procedure below to open or close the valve (after refrigerant leak test, purging work, and refrigerant charge).



1. Remove the cap.
2. Remove the stopper.
3. Fully open the valve.
4. Attach the removed stopper.
5. Tighten the cap.



Note:
Be sure to attach the stopper. Failure to do so may lead to unintentional rotation of the valve shaft, that is to say, the valve opened in the above procedure may be closed, causing the flow of refrigerant interrupted.

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⚠ **Caution:**

- **Wrap the body of the operation valve with a wet towel before performing brazing work. If the body of the operation valve reaches a temperature of 120°C [248°F] or higher, the device may be damaged.**
- **During brazing work, be careful not to apply the flame to the surrounding wiring or sheet metal. If they come into contact with the flame, they may be burned or fail due to the heat.**
- **Perform non-oxidizing brazing through nitrogen substitution. Oxidization on the inside of the refrigerant piping may cause deterioration of refrigerant oil or compressor malfunction.**
- **After evacuation and refrigerant filling is completed, completely open the valve. If the unit is operated with the valve closed, the high pressure side or low pressure side of the refrigerant circuit will become improperly pressurized, which may damage the compressor.**
- **Determine the amount of additional refrigerant charge (refer to "4.7. Additional refrigerant charge"), and charge refrigerant additionally through the service port after completing piping connection work.**

⚠ **Warning:**

- **When installing the unit, securely connect the refrigerant pipes before starting the compressor.**
- **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.**

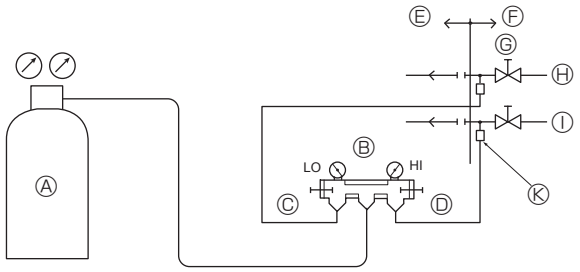
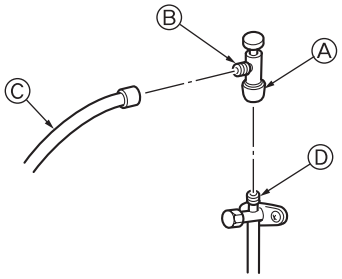


Fig. 4-13



* 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. 4-14

4.6. Refrigerant pipe airtight testing method

Airtight test (Fig. 4-13)

Airtight test should be made by pressurizing nitrogen gas. For the test method, refer to the following figure.

(1) Connecting the testing tool. Make a test with the stop valve closed. Be also sure to pressurize both liquid or high-pressure pipe and gas or low pressure pipe.

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
- ① Pressurize to 0.5 MPa [73 psig], wait five minutes, and make sure the pressure does not decrease.
- ② Pressurize to 1.5 MPa [218 psig], wait five minutes, and make sure the pressure does not decrease.
- ③ Pressurize to 4.15 MPa [601 psig] 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 [1.8°F], the pressure will change by about 0.01 MPa [1.5 psig]. 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.

Ⓐ Nitrogen gas	Ⓕ Outdoor unit
Ⓑ System analyzer	Ⓖ Stop valve
Ⓒ Lo-knob	Ⓗ Liquid pipe or high-pressure pipe
Ⓓ Hi-knob	Ⓘ Gas pipe or low-pressure pipe
Ⓔ To indoor unit	Ⓚ Service port

Precautions when using the charge valve (Fig. 4-14)

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 Ⓐ.

4.7. Additional refrigerant charge

Additional refrigerant charge

Refrigerant for the extended piping is not included in the outdoor unit when the unit is shipped from the factory. Therefore, charge each refrigerant piping system with additional refrigerant at the installation site. In addition, in order to carry out service, enter the size and length of each liquid pipe and additional refrigerant charge amounts in the spaces provided on the “Refrigerant amount” plate on the outdoor unit.

* 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 using the liquid pipe size and length of the extended piping and total capacity of connected indoor units.
- Calculate the additional refrigerant charge using the procedure shown to the right, 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 16.3 kg (575 oz). (Refer to 2.5. for the capacity of indoor units, and 4.1. for extended piping.)

<Additional Charge>
Calculation of refrigerant charge

Pipe size Liquid pipe ø6.35	+	Pipe size Liquid pipe ø9.52	+	Pipe size Liquid pipe ø12.7	+	Total capacity of connected indoor units	Amount for the indoor units
(m) × 19.0 (g/m) {(ft) × 0.21 (oz/ft)}		(m) × 50.0 (g/m) {(ft) × 0.55 (oz/ft)}		(m) × 92.0 (g/m) {(ft) × 0.99 (oz/ft)}		— 54	2.5 kg (88 oz)
						55 — 92	3.0 kg (106 oz)
						93 — 105	3.5 kg (123 oz)
						106 — 116	4.0 kg (141 oz)
						117 — 124	4.5 kg (159 oz)
						125 — 133	5.0 kg (176 oz)
						134 — 139	5.5 kg (194 oz)
						140 —	6.1 kg (215 oz)

Included refrigerant amount when shipped from the factory

Model name	Included refrigerant amount
MXZ-SM72/96/120	9.3 kg (328 oz)

<Example>
Outdoor model : MXZ-SM120TAM
Indoor 1 : model 27
2 : model 27
3 : model 27
4 : model 27
5 : model 12

A: ø12.7 30 m (98 ft)
a: ø9.52 15 m (49 ft)
b: ø9.52 10 m (32 ft)
c: ø9.52 10 m (32 ft)
d: ø9.52 10 m (32 ft)
e: ø6.35 15 m (49 ft)

} At the conditions below:

The total length of each liquid line is as follows:
ø12.7 (1/2) : A = 30 m (98 ft)
ø9.52 (3/8) : a + b + c + d = 45 m (145 ft)
ø6.35 (1/4) : e = 15 m (49 ft)
The total capacity of connected indoor unit is as follows:
27 + 27 + 27 + 27 + 12 = 120
<Calculation example>
Additional refrigerant charge

$$30 \times \frac{92.0}{1000} + 45 \times \frac{50.0}{1000} + 15 \times \frac{19.0}{1000} + 4.5 = 9.8 \text{ kg (rounded up)}$$

(98 × 0.99 + 145 × 0.55 + 49 × 0.21 + 159 = 347 oz)

5. Drainage piping work

Outdoor unit drainage pipe connection

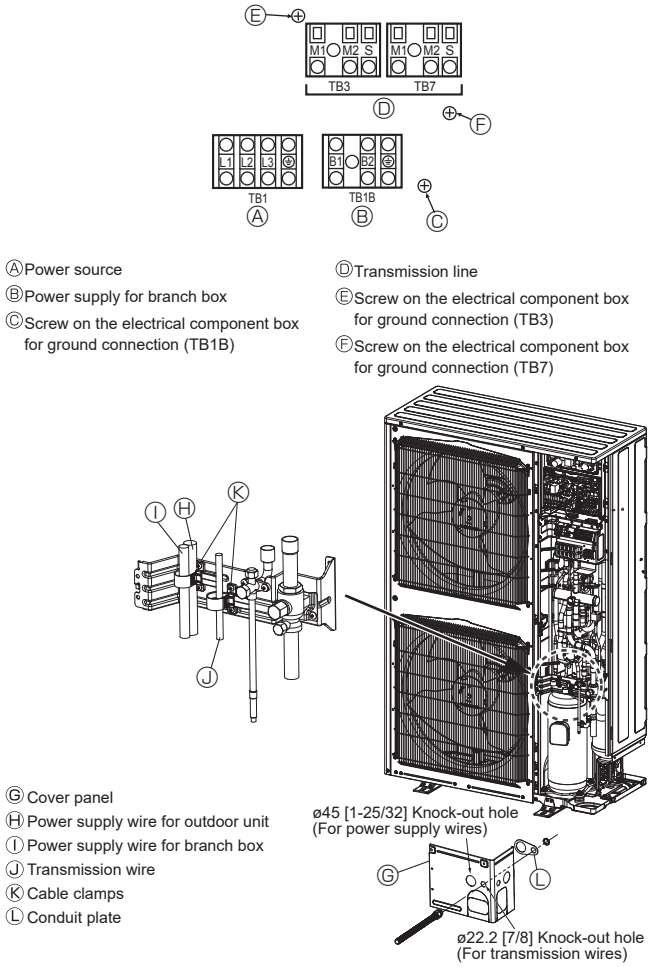
When drain piping is necessary, use the drain socket or the drain pan (option).

Drain socket	PAC-SK27DS-E
Drain pan	PAC-SJ83DP-E

6. Electrical work

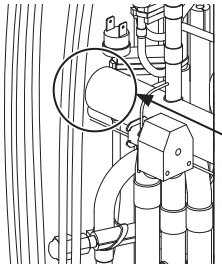
6.1. Caution

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 [2 inch] 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 the case to connect with centralized 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 centralized 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 Before turning outdoor unit on, be sure to turn the indoor units and the branch boxes on.



Ⓐ Power source
Ⓑ Power supply for branch box
Ⓒ Screw on the electrical component box for ground connection (TB1B)
Ⓓ Transmission line
Ⓔ Screw on the electrical component box for ground connection (TB3)
Ⓕ Screw on the electrical component box for ground connection (TB7)
Ⓖ Cover panel
Ⓗ Power supply wire for outdoor unit
Ⓘ Power supply wire for branch box
Ⓙ Transmission wire
Ⓚ Cable clamps
Ⓛ Conduit plate

Fig. 6-1



When connecting wiring to the terminal block during wiring work, route the wiring so that it does not come into direct contact with especially hot parts (such as the 4 way valve) of the devices inside the outdoor unit.

Fig. 6-2

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.
When using shielded wiring, 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 grounding lead wire attached this manual.
* The shield terminal (S) of the transmission terminal block (TB3) is connected to the ground (Ⓔ) when the unit is shipped from the factory.
2. Conduit mounting plates are being provided. 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.
3. The terminal block (TB1B) is for supplying power to the branch box (208/230 V, max 18A).
4. Fix the power supply and transmission wires using clamps Ⓚ. Refer to Fig. 6-1.

⚠ **Caution:**
Never connect the transmission line for the branch box or the central control system transmission line to this terminal block (TB1B). If the transmission lines are connected, the indoor unit terminal block, branch box 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 [AWG16]
Maximum wiring length	Within 200 m [656 ft]

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 [AWG20 to AWG16]
Remarks	When 10 m [32 ft] is exceeded, use cable with the same specifications as 1. Wiring transmission cable

3. MA Remote control cable

Type of remote control cable	Sheathed 2 - core cable (unshielded) CVV
Cable diameter	0.3 to 1.25 mm² [AWG22 to AWG16] (0.75 to 1.25 mm² [AWG20 to AWG16])*
Remarks	Within 200 m [656 ft]

* Connected with simple remote controller.

② **Connection restrictions**

• 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	MXZ-SM72	Refer to 2.5. Constraints on indoor unit installation.
			MXZ-SM96	
			MXZ-SM120	
	M, S, P series	A-IC	MXZ-SM72	
			MXZ-SM96	
			MXZ-SM120	
Branch box		BC	0 to 3 units per 1 OC	
Remote controller	M-NET	M-NET RC *2	Maximum of 30 controllers for 1 OC *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).**

6. Electrical work

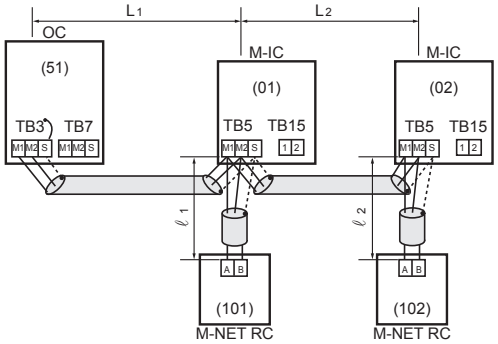
6.4. System control

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**



( ) : Address

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.

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

■ **Wiring Method and Address Settings**

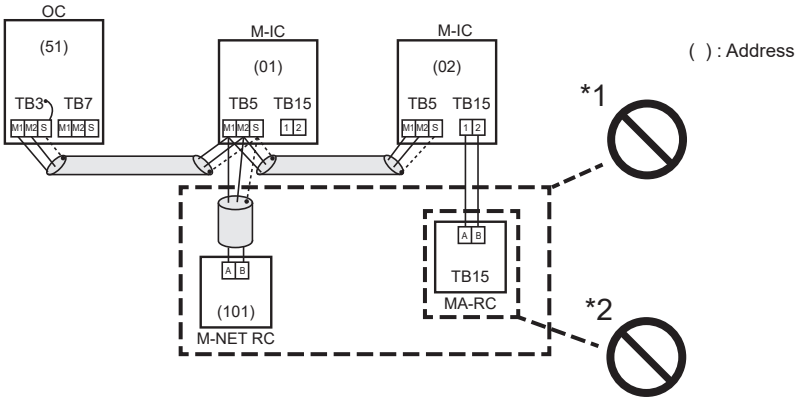
1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1, M2 and the ground terminal on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal 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. Maximum transmission cable length between indoor and outdoor unit:
   L1 + L2 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
2. M-NET Remote controller cable length:
   ℓ1, ℓ2 ≤ 10 m [32 ft] (0.5 to 1.25 mm² [AWG20 to AWG16])
   If the length exceeds 10 m [32 ft], use a 1.25 mm² [AWG16] shielded wire. The section of the cable that exceeds 10 m [32 ft] must be included in the maximum length via outdoor units and maximum transmission cable length.

■ **Constraint items**



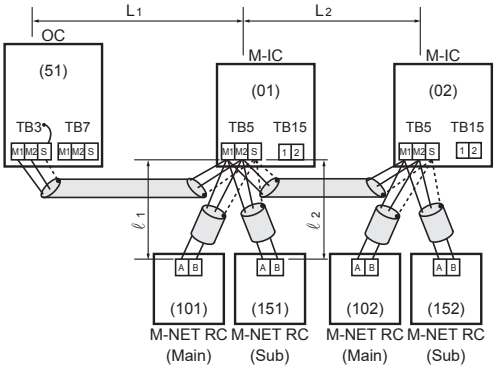
( ) : Address

*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).

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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.

■ 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.

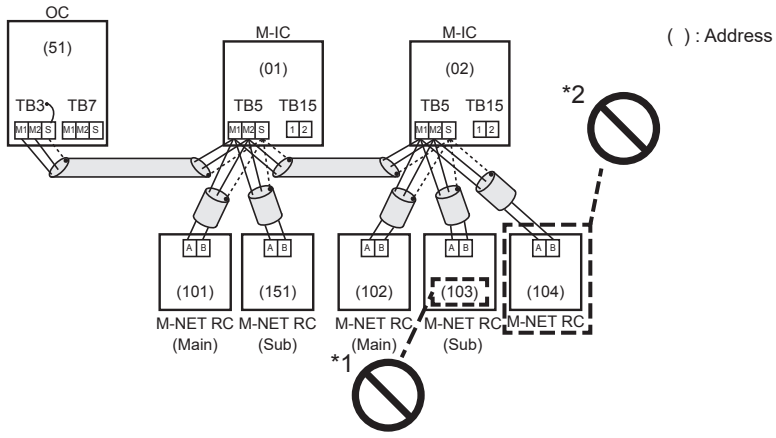
Unit	Range	Setting Method
M-IC	001 to 050	—
OC	051 to 100	Use the smallest address of all the indoor units plus 50. * The address automatically becomes “100” if it is set as “01–50”.
M-NET RC (Main)	101 to 150	Indoor unit address plus 100.
M-NET RC (Sub)	151 to 200	Indoor unit address plus 150.

■ Permissible Lengths

1. Maximum transmission cable length between indoor and outdoor unit (1.25 mm² [AWG16] or more):
   L1 + L2 ≤ 200 m [656 ft]
2. M-NET Remote controller cable length:
   ℓ1+ℓ2 ≤ 10 m [32 ft] (0.5 to 1.25 mm² [AWG20 to AWG16])

If the length exceeds 10 m [32 ft], use a 1.25 mm² [AWG16] shielded wire. The section of the cable that exceeds 10 m [32 ft] must be included in the maximum length via outdoor units and maximum transmission cable length.

■ Constraint items



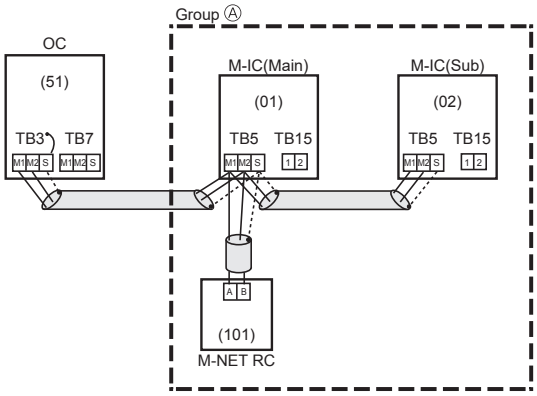
( ) : Address

*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.

■ **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.

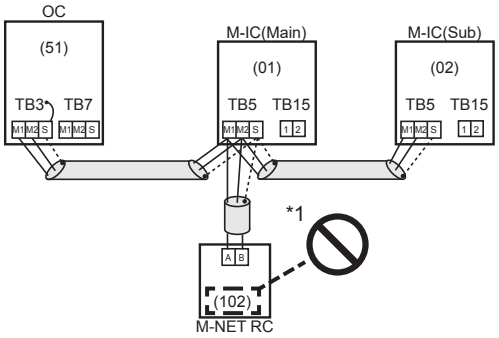
Unit	Range	Setting Method
M-IC (Main)	001 to 050	Use the smallest address within the same group of CITY MULTI series indoor units.
M-IC (Sub)	001 to 050	Use an address, other than that of the M-IC (Main) from among the units within the same group of indoor units. This must be in sequence with the M-IC (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

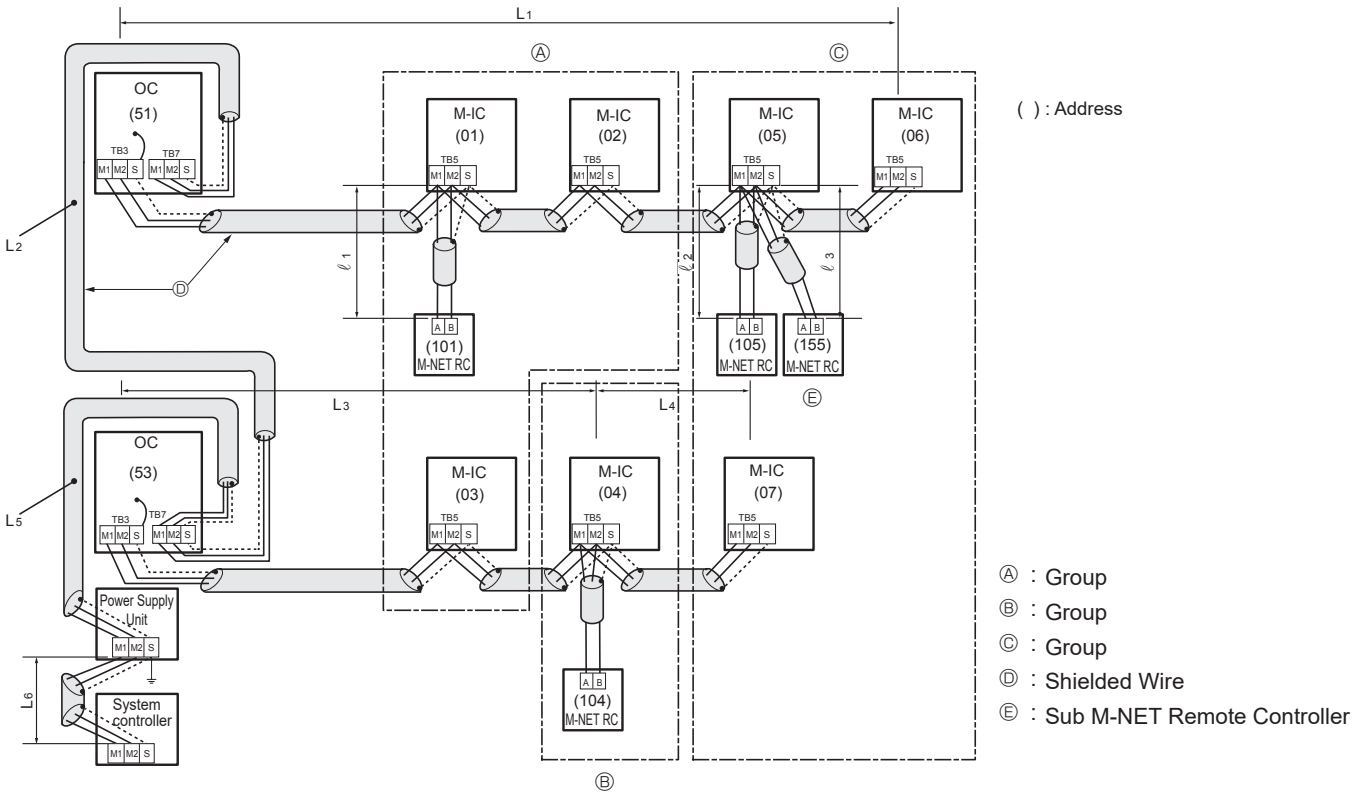
*1. The M-NET remote controller address is the CITY MULTI series indoor unit main address plus 100. In this case, it should be 101.

en

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**



■ **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.

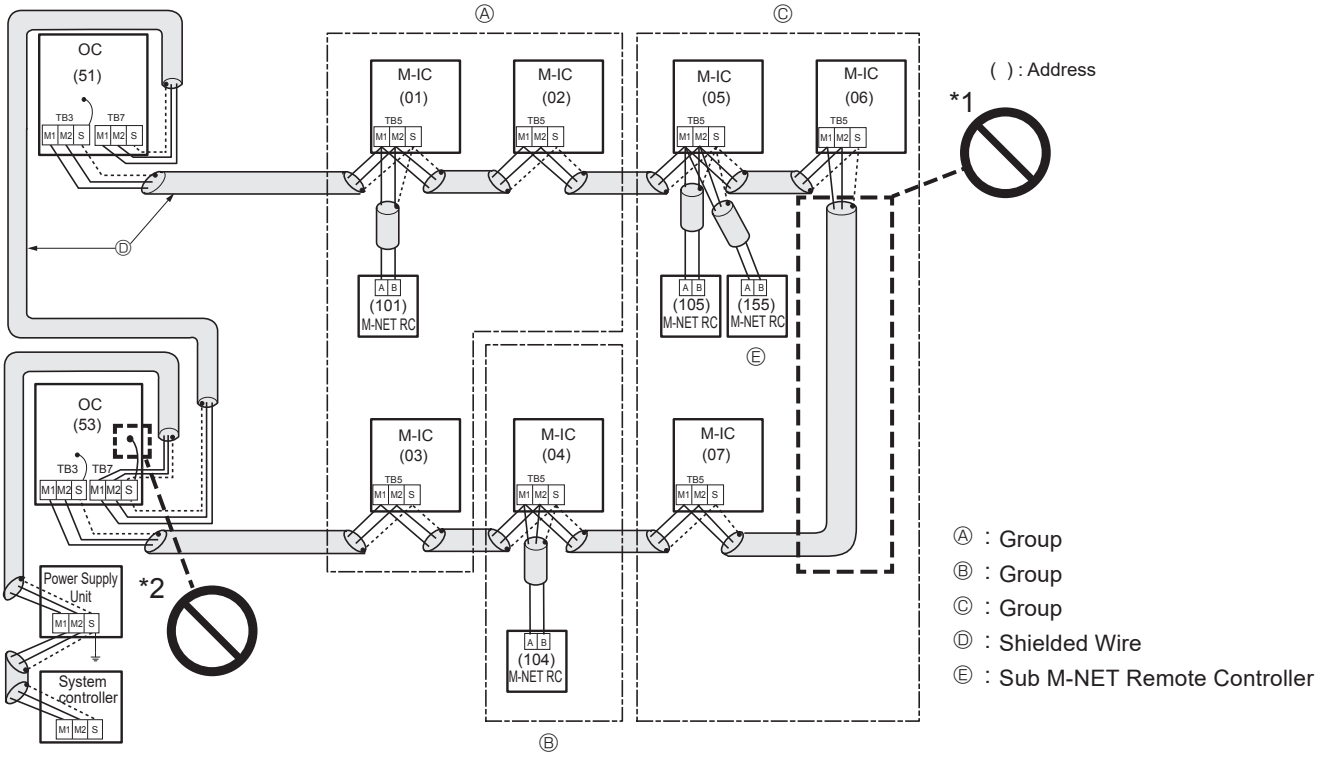
Refrigerant system	Connection with system controller	Transmission line power supply unit	Group operation in different refrigerant systems	Power supply switching connector settings
Single refrigerant	–	–	–	Remains CN41 (default setting)
Multiple refrigerants	No	–	No	Remains CN41 (default setting)
			Yes	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 transmission cable length via outdoor unit:
   L1+L2+L3+L4, L3+L4+L5+L6, L1+L2+L5+L6 ≤ 500 m [1640 ft] (1.25 mm² [AWG16] or more)
2. Maximum transmission cable length between indoor, branch box and outdoor unit:
   L1, L3+L4, L2+L5, L6 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
3. M-NET Remote controller cable length:
   ℓ1, ℓ2 + ℓ3 ≤ 10 m [32 ft] (0.5 to 1.25 mm² [AWG20 to AWG16])
   If the length exceeds 10 m [32 ft], use a 1.25 mm² [AWG16] shielded wire.
   The section of the cable that exceeds 10 m [32 ft] must be included in the maximum length via outdoor units and maximum transmission cable length.

■ **Constraint items**



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.

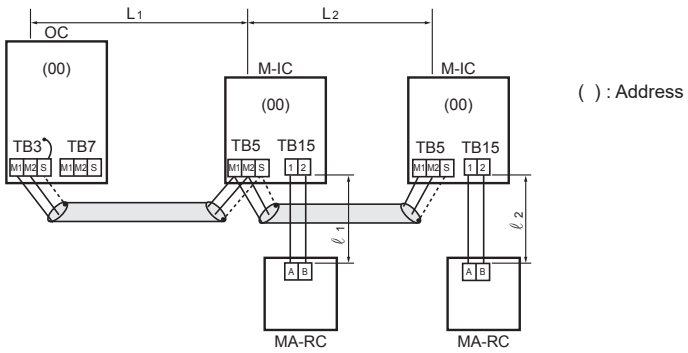
*1. Never connect together the terminal blocks (TB5) for transmission wires for CITY MULTI series indoor units (M-IC) that have been connected to different outdoor units (OC).
*2. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal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

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**



1 MA remote controller for each indoor unit

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

en

6. Electrical work

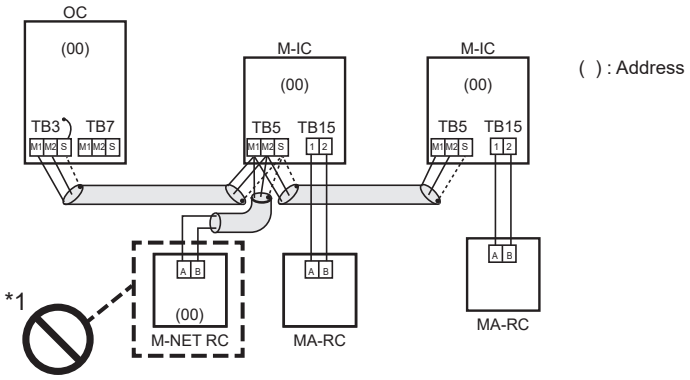
■ **Wiring Method and Address Settings**

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. Maximum transmission cable length between indoor and outdoor unit:
   L1 + L2 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
2. MA remote controller cable length:
   ℓ1, ℓ2 ≤ 200 m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])

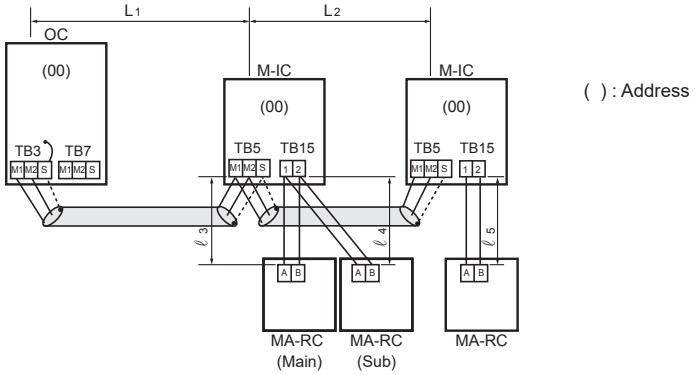
■ **Constraint items**



*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.

Example for the operation using 2 remote controllers

■ **Example of wiring transmission cables**



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.

■ **Wiring Method and Address Settings**

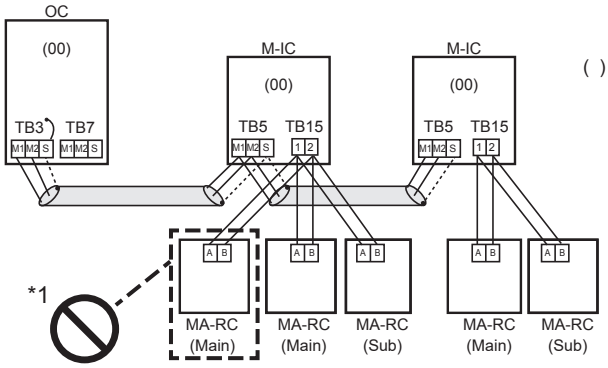
1. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
2. Use feed wiring to connect terminals M1 and M2 on transmission cable terminal block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable terminal block (TB5) of 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. Maximum transmission cable length between indoor and outdoor unit:
   L1 + L2 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
2. MA remote controller cable length:
   ℓ3 +ℓ4, ℓ5 ≤ 200 m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])

6. Electrical work

■ **Constraint items**

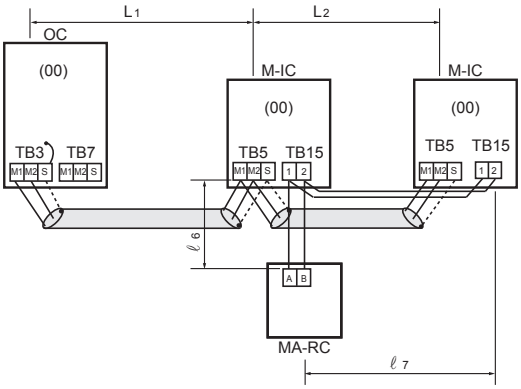


( ) : Address

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

Example for the group operation

■ **Example of wiring transmission cables**



( ) : Address

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.

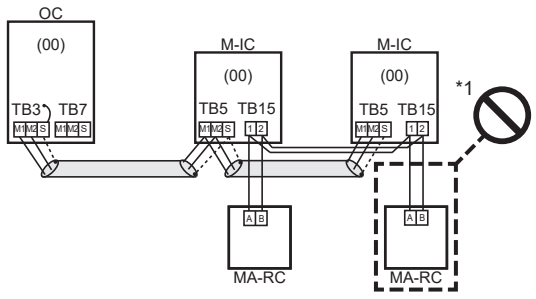
■ **Wiring Method and Address Settings**

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. Maximum transmission cable length between indoor and outdoor unit:
   L1 + L2 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
2. MA remote controller cable length:
   $\ell 6 + \ell 7$ ≤ 200 m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])

■ **Constraint items**



( ) : Address

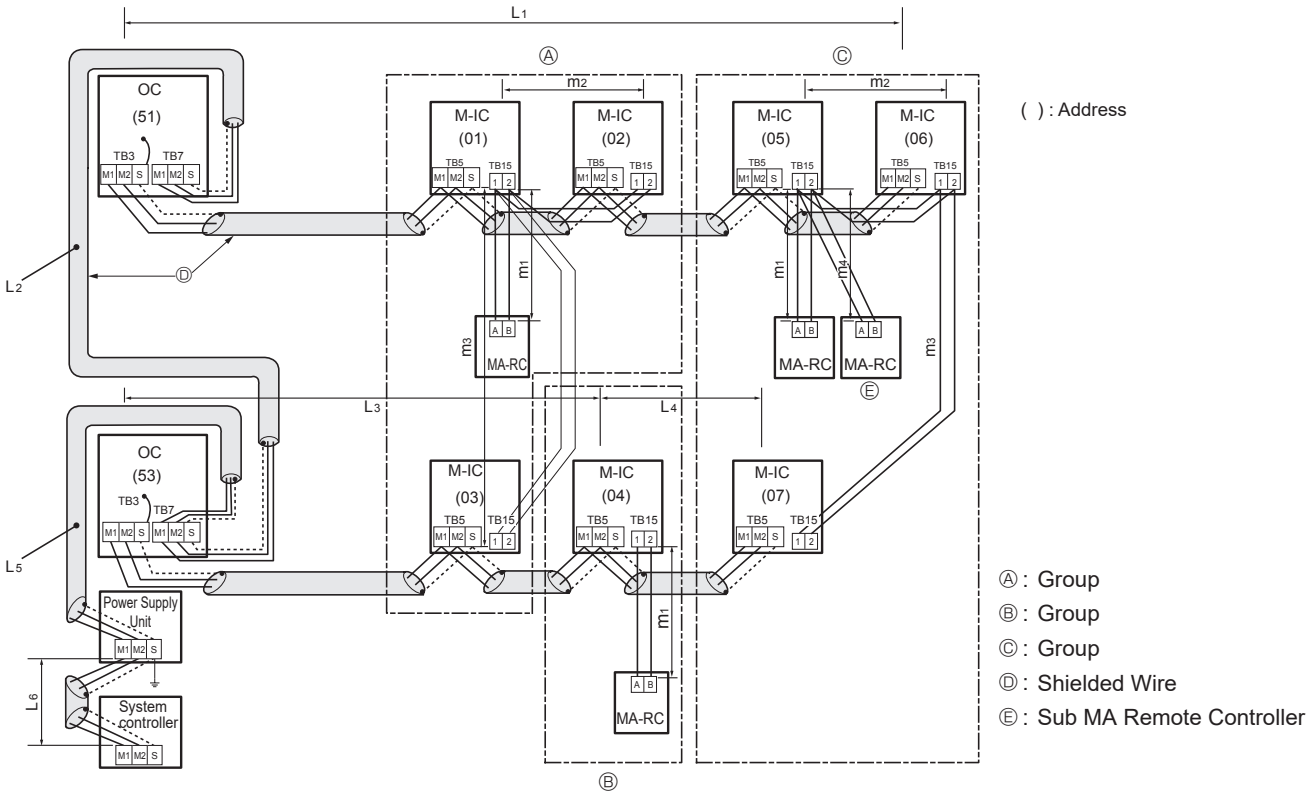
*1. The second MA remote controller is connected with the terminal block (TB15) for the MA remote controller of the same CITY MULTI series indoor unit (M-IC) as the first MA remote control.

en

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**



■ **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)

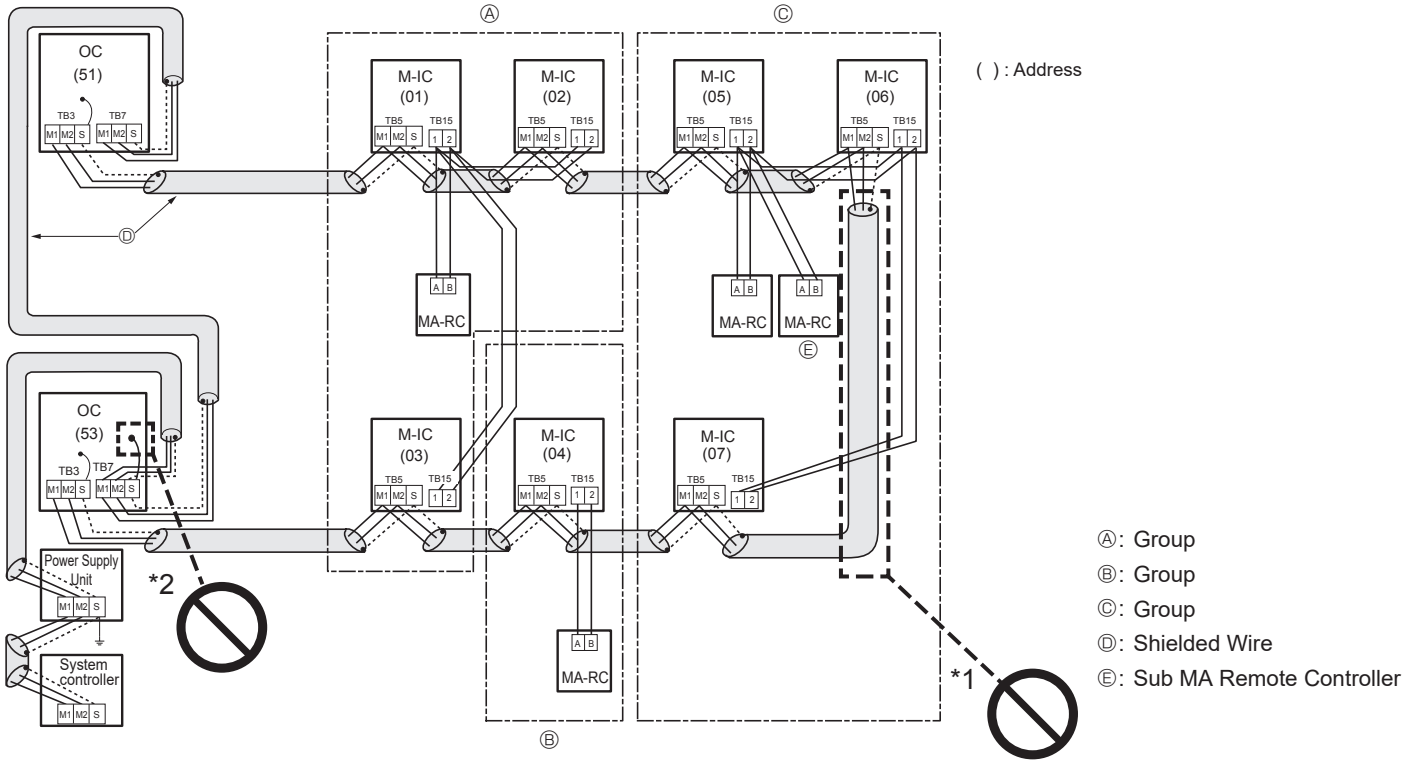
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6. Electrical work

■ **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 [1640 ft] (1.25 mm² [AWG16] or more)
2. Maximum transmission cable length between indoor and outdoor unit. (M-NET cable):
   L1 and L3+L4 and L2+L5 and L6 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
3. MA Remote controller cable length:
   m1 and m1+m2+m3 and m1+m2+m3+m4 ≤ 200 m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])

■ **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.

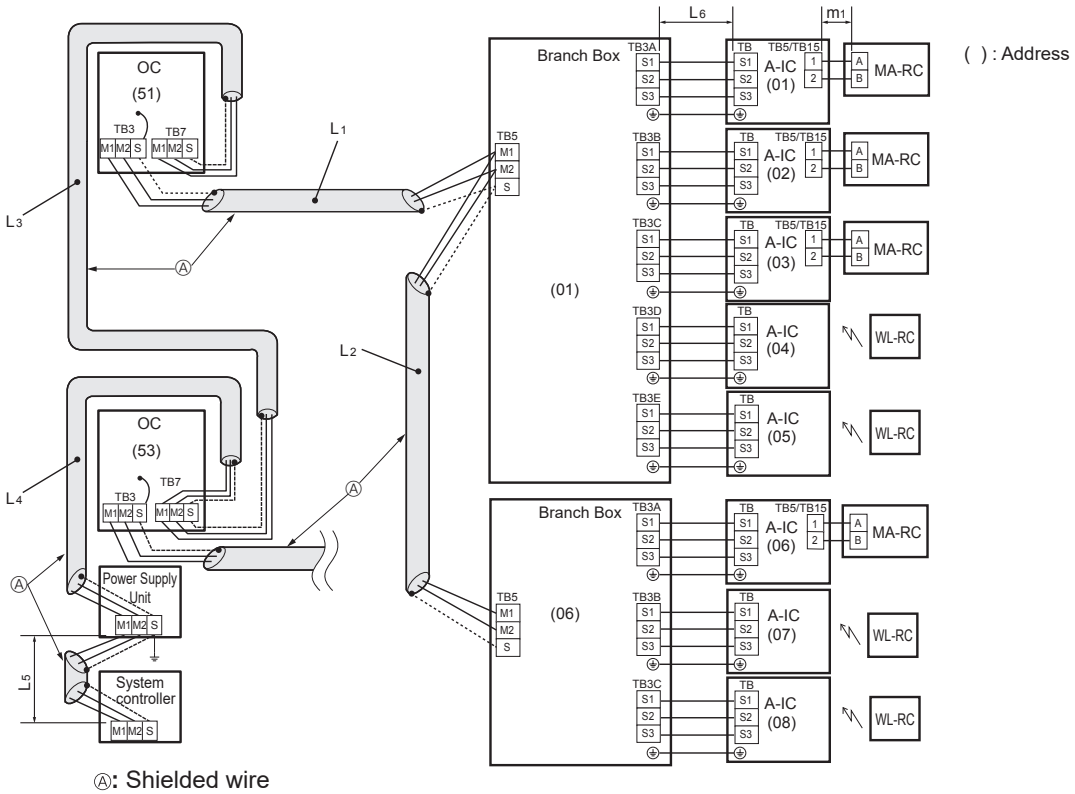
*1. Never connect together the terminal blocks (TB5) for transmission wires for CITY MULTI series indoor units (M-IC) that have been connected to different outdoor units (OC).

*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.

6. Electrical work

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

■ Examples of wiring transmission cables



■ 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, 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, 04 and 05.)
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)

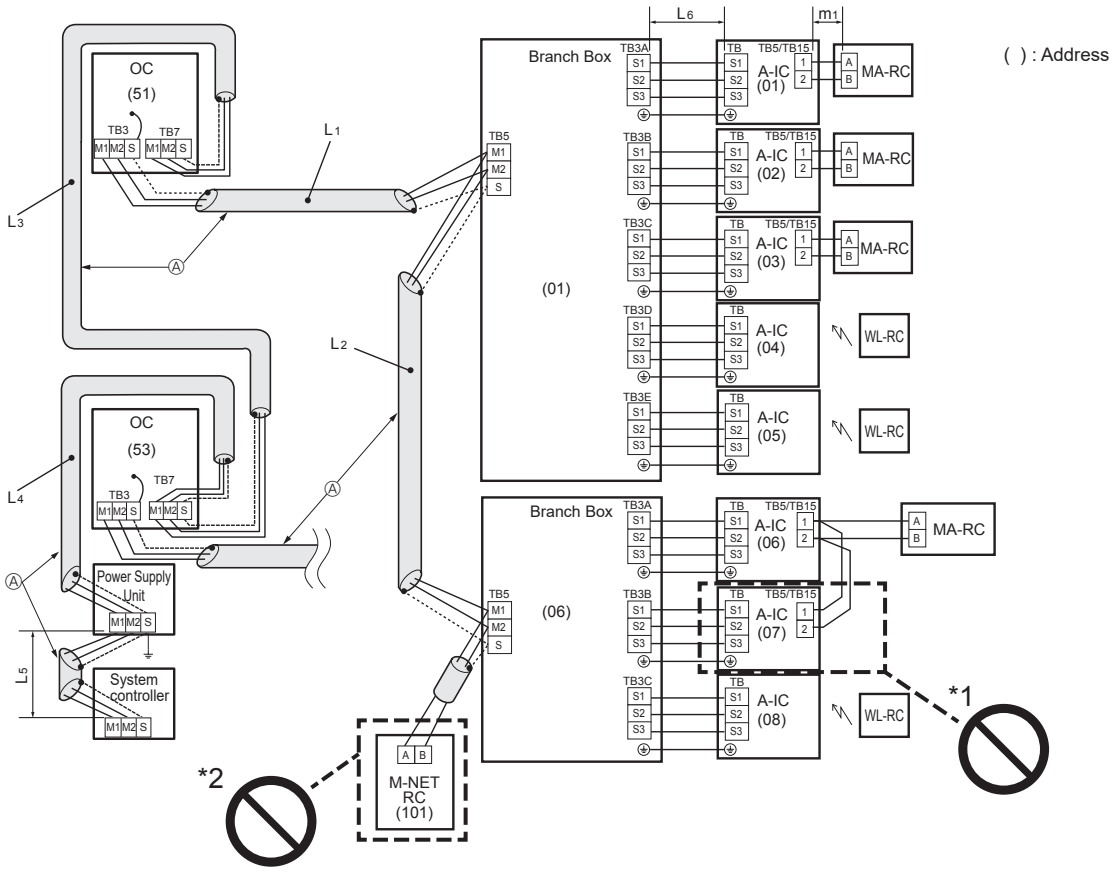
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6. Electrical work

■ **Permissible Lengths**

1. Maximum line length via outdoor unit (M-NET cable):
   L1+L2+L3+L4+L5 ≤ 500 m [1640 ft] (1.25 mm² [AWG16] or more)
2. Maximum transmission cable length between Branch box and outdoor unit. (M-NET cable):
   L1+L2, L3+L4, L5 ≤ 200 m [656 ft] (1.25 mm² [AWG16] or more)
3. Maximum transmission cable length between branch box and outdoor unit. (A-Control cable):
   L6 ≤ 25 m [82 ft] (1.5 mm² [AWG14])
4. MA Remote controller cable length:
   m1 ≤ 200 m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])

■ **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

6.5. Wiring of main power supply and equipment capacity

Ⓐ Switch (Breakers for Wiring and Current Leakage (if you use))
Ⓑ Outdoor Unit
Ⓒ Branch Box
Ⓓ A-Control indoor unit (M, S, P series indoor unit)
Ⓔ CITY MULTI series indoor unit
Ⓕ Pull Box

Schematic Drawing of Wiring: When Not Using a Branch box (Example) (Fig. 6-3)

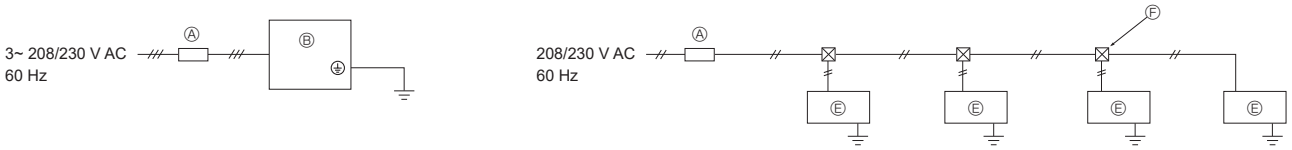


Fig. 6-3

Schematic Drawing of Wiring Connection with Branch box (Example) (Fig. 6-4)
<When power to Branch box is supplied from the outdoor unit>

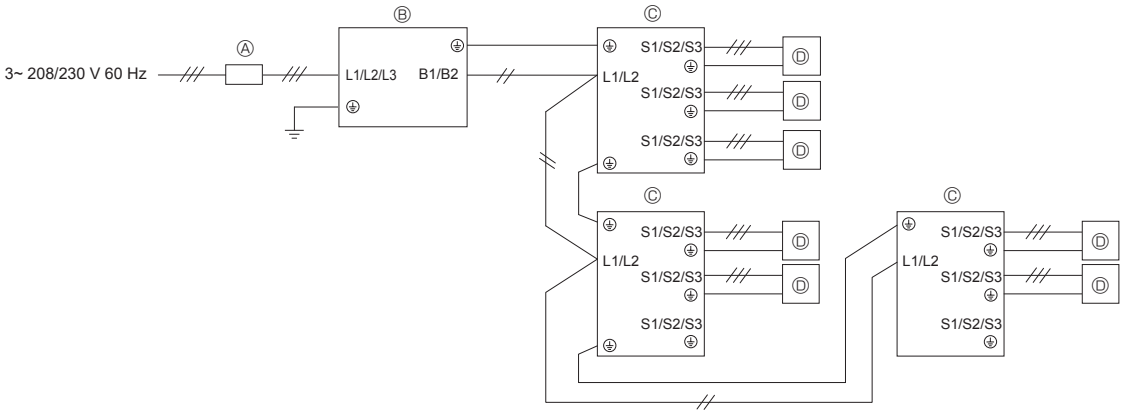


Fig. 6-4

<When power is supplied separately>

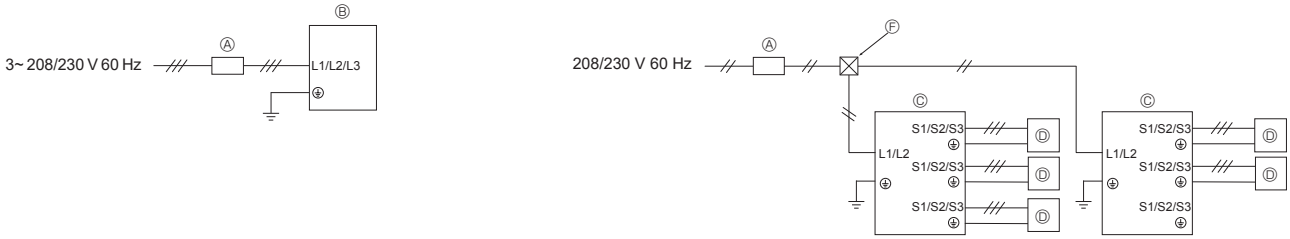


Fig. 6-5

Thickness of Wire for Main Power Supply and On/Off Capacities
<When power is supplied separately>

Model		Power Supply	Minimum Wire Thickness (mm² [AWG])		Conduit size	Breaker for Wiring*1	Breaker for Current Leakage (if you use)	Minimum circuit ampacity	Maximum rating of over current protector device
			Main Cable*2	Ground					
Outdoor Unit	MXZ-SM72TAM	208/230 V AC, 60 Hz	8.4 [AWG8]	8.4 [AWG8]	1-1/4*3	40 A	40 A 30 mA 0.1 sec. or less	32	58
	MXZ-SM96TAM		8.4 [AWG8]	8.4 [AWG8]	1-1/4*3	40 A	40 A 30 mA 0.1 sec. or less	32	58
	MXZ-SM120TAM		13.3 [AWG6]	13.3 [AWG6]	1-1/4*3	50 A	50 A 30 mA 0.1 sec. or less	47	84
Branch Box			Refer to Installation Manual of Branch Box.						

<When power is supplied from the outdoor unit>

Model		Power Supply	Minimum Wire Thickness (mm² [AWG])		Conduit size	Breaker for Wiring*1	Breaker for Current Leakage (if you use)	Minimum circuit ampacity	Maximum rating of over current protector device
			Main Cable*2	Ground					
Outdoor Unit	MXZ-SM72TAM	208/230 V AC, 60 Hz	21.2 [AWG4]	21.2 [AWG4]	1-1/4	60 A	60 A 30 mA 0.1 sec. or less	50	76
	MXZ-SM96TAM		21.2 [AWG4]	21.2 [AWG4]	1-1/4	60 A	60 A 30 mA 0.1 sec. or less	50	76
	MXZ-SM120TAM		21.2 [AWG4]	21.2 [AWG4]	1-1/4	70 A	70 A 30 mA 0.1 sec. or less	65	102
Branch Box			Refer to Installation Manual of Branch Box.						

*1 Please follow applicable federal, state, or local codes to prevent potential leakage/electric shock. Or install a ground fault interrupt for the prevention of leakage and electric shock.

IMPORTANT
If a current leakage breaker is used, it should be 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.

***2. Use copper supply wires. Use the electric wires over the rating voltage 300 V.**
*3. Although the conduit size is larger than the size specified for the wire thickness according to UL standards, use a conduit size of 1-1/4 inch.

6. Electrical work

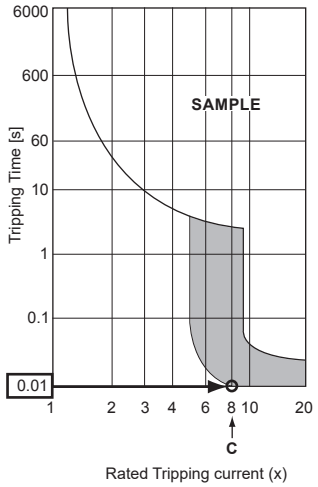
Total operating current of the indoor unit	Minimum wire thickness (mm²/AWG)			Ground-fault interruper *1 (if you use)	Local switch (A)		Breaker for wiring (NFB)
	Main Cable	Branch	Ground		Capacity	Fuse	
F0 = 15 A or less *2	2.1/14	2.1/14	2.1/14	15 A current sensitivity *3	15	15	15
F0 = 20 A or less *2	3.3/12	3.3/12	3.3/12	20 A current sensitivity *3	20	20	20
F0 = 30 A or less *2	5.3/10	5.3/10	5.3/10	30 A current sensitivity *3	30	30	30

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 Type1)/C} + {V1 × (Quantity of Type2)/C} + {V1 × (Quantity of Type3)/C} + {V1 × (Quantity of Type4)/C} + … + {V1 × (Quantity of Type14)/C}

Indoor unit		V1	V2
Type 1	PEAD-A·AA9	30.1	2.2
Type 2	PEAD-A·AA, SVZ-KP·NA	26.9	2.4
Type 3	PLA-A·EA7, SEZ-KD·NA	19.8	
Type 4	SLZ-KF·NA, PLA-A·EA8	17.1	
Type 5	MLZ-KP·NA (2)	9.9	
Type 6	MFZ-KJ·NA, MSZ-GL·NA, MSZ-GS·NA, MSZ-FS·NA, MXZ-EF·NA2W(B)(S)-U1	7.4	
Type 7	MSZ-FH·NA, MSZ-FH·NA2, MSZ-EF·NAW(B)(S)-U1	6.8	
Type 8	Branch box	5.1	3.0
Type 9	PEFY-P·NMAU-E3, PVFY-P·NAMU	38.0	1.6
Type 10	PKFY-P·NKMU, PEFY-P·NMSU, PCFY-P·NKMU, PLFY-EP·NEMU, PLFY-P·NFMU, PMFY-P·NBMU-ER5, PKFY-P·NLMU	19.8	2.4
Type 11	PEFY-P·NMHU, PFFY-P·NEMU, PFFY-P·NRMU	0.0	0.0
Type 12	PEFY-P·NMHSU	13.8	4.8
Type 13	PEFY-P·NMAU-E4, PEFY-P·NMAU-E5	18.6	3.0
Type 14	PMFY-P·NBMU-ER6	9.9	2.4

C : Multiple of tripping current at tripping time 0.01s
Please pick up “C” from the tripping characteristic of the breaker.

Sample chart



<Example of “F2” calculation>
* Condition PEFY-NMSU × 4 + PEFY-NMAU-E3 × 1, C = 8 (refer to right sample chart)
F2 = 19.8 × 4/8 + 38 × 1/8
= 14.65
→ 16 A breaker (Tripping current = 8 × 16 A at 0.01 s)
*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 Type14) + V3 × (Wire length [km])

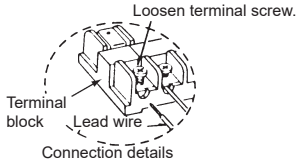
G1	Current sensitivity
30 or less	30 mA 0.1 sec or less
100 or less	100 mA 0.1 sec or less

Wire thickness (mm²/AWG)	V3
2.1/14	48
3.3/12	56
5.3/10	66

1. **Use a separate power supply for the outdoor unit and indoor unit.**
2. **Bear in mind ambient conditions (ambient temperature,direct sunlight, rain water,etc.) when proceeding with the wiring and connections.**
3. **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%.**
4. **Specific wiring requirements should adhere to the wiring regulations of the region.**
5. **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.**
6. **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.**



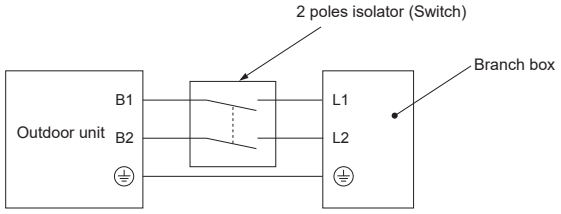
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6. Electrical work

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/indoor unit and branch box, please use 3-pole type or 2-pole type.**
  (Please refer to figure below.)
- **Turn on the main power when the ambient temperature is -20°C (-4°F) or higher.**
- **Under conditions of -20°C (-4°F), it needs at least 4hr stand by before the units operate in order to warm the electrical parts.**



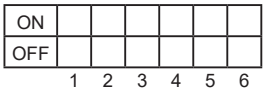
⚠ **Caution:**
After using the isolator, be sure to turn off and on the main power supply to reset the system. Otherwise, the outdoor unit may not be able to detect the branch box(es) or indoor units.

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

Unit / Address	Outdoor	Branch box		M, S, P series Indoor	CITY MULTI series	
		Address	Connection Setting			
Switch	 tens digit SWU2  ones digit SWU1	 tens digit SW12  ones digit SW11	 SW1	None	 tens digit SW12  ones digit SW11	
range	51 - 100	1 - 50	–	–	1 - 50	
setting	CITY MULTI series Indoor or Branch Box address +50	• According to the set address (for example, 01), the addresses for the connected indoor units are set sequentially (for example, 02, 03, 04, and 05). SW1: 1 ON, 2 ON, 3 ON, 4 ON, 5 ON Port: A, B, C, D, E Address: 01 (SW11, 12), 02, 03, 04, 05 (sequential numbers)	• Specify whether indoor units are connected to each port (A, B, C, D, and E). SW1 1: Port A: OFF disconnected, ON connected SW1 2: Port B: OFF disconnected, ON connected SW1 3: Port C: OFF disconnected, ON connected SW1 4: Port D: OFF disconnected, ON connected SW1 5: Port E: OFF disconnected, ON connected SW1 6: not use	There are no address settings for the indoor units.	–	

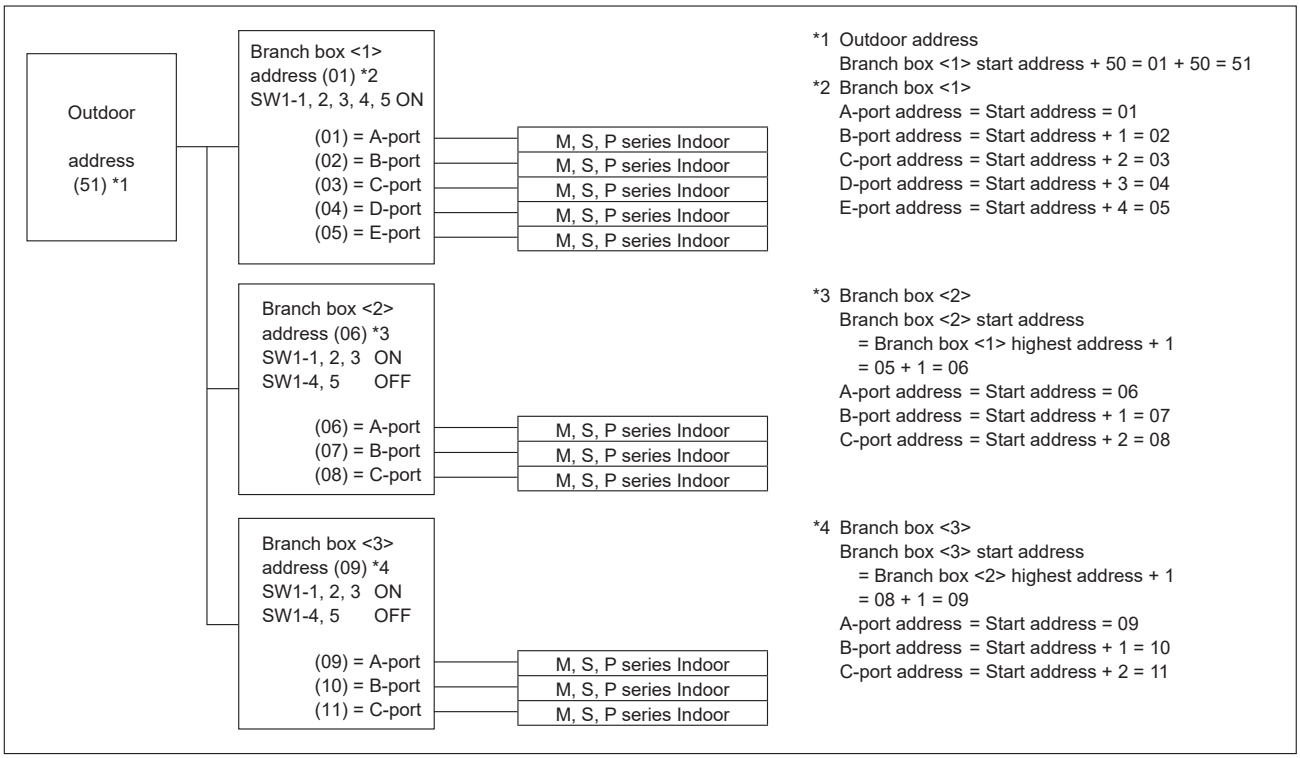
Note: 1. Branch box address

When setting the address, use a number within the range 1–50.

E.g. The set address is (47) and there are 5 indoor units (A, B, C, D, and E).

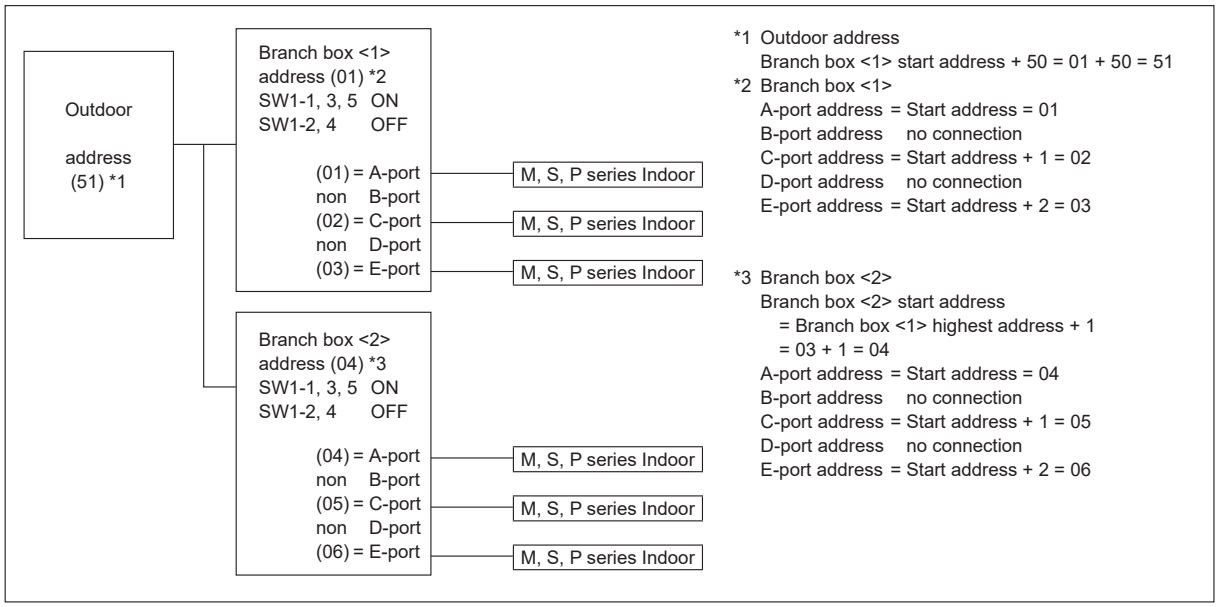
If A: (47), B: (48), C: (49), D: (50), and E: (51), E is incorrect because it exceeds 50.

E.g. 1. Outdoor + Branch <1> (M, S, P series Indoor A, B, C, D, E) + Branch <2> (M, S, P series Indoor A, B, C) + Branch <3> (M, S, P series Indoor A, B, C)



en

E.g. 2. Outdoor + Branch <1> (M, S, P series Indoor A, C, E) + Branch <2> (M, S, P series Indoor A, C, E)



*1 Outdoor address
Branch box <1> start address + 50 = 01 + 50 = 51

*2 Branch box <1>
A-port address = Start address = 01
B-port address no connection
C-port address = Start address + 1 = 02
D-port address no connection
E-port address = Start address + 2 = 03

*3 Branch box <2>
Branch box <2> start address
= Branch box <1> highest address + 1
= 03 + 1 = 04
A-port address = Start address = 04
B-port address no connection
C-port address = Start address + 1 = 05
D-port address no connection
E-port address = Start address + 2 = 06

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 megohmmeter to check that the resistance between the power supply terminals and ground is at least 1 MΩ.

► Do not carry out this test on the 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.**

- The unit might NOT run, in order to protect the compressor, in the case of outside air temperature below 14°F (-10°C).
- 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.

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 4 minutes at least after the power is supplied.

- The compressor can emit noise just after turn on the power supply or in the 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 the case of the test run from outdoor unit, all indoor units operate. Therefore, you cannot detect any erroneous connection of refrigerant pipes and the connecting wires. If it aims at detection of any erroneous connection, be sure to carry out the test run from remote controller with reference to "7.2.1. Using remote controller".

SW3-1	**ON**	**Cooling operation**
SW3-2	**OFF**	
SW3-1	**ON**	**Heating operation**
SW3-2	**ON**	

* After performing the test run, set SW3-1 to OFF.

- A few seconds after the compressor starts, a clanging noise may be heard from the inside of the outdoor unit. The noise is coming from the check valve due to the small difference in pressure in the pipes. The unit is not faulty.

The test run operation mode cannot be changed by DIP switch SW3-2 during the test run. (To change the test run operation mode during the test run, stop the test run by DIP switch SW3-1. After changing the test run operation mode, resume the test run by switch SW3-1.)

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 7.1 - 0.0 psig (approximately 0.5 - 0.0 kgf/cm^2)
⑦ Stop the air conditioner operation (SW3-1: OFF and SW3-2: 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 7.1 psig (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:

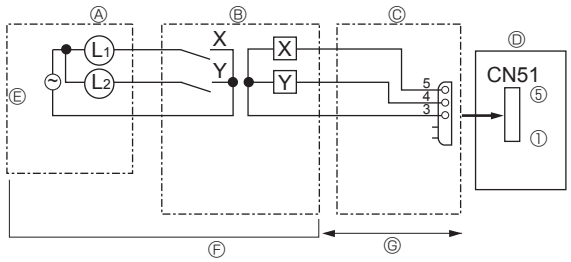
- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.**
- **Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.**

en

8. Special Functions

8.1. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR

• State (CN51)

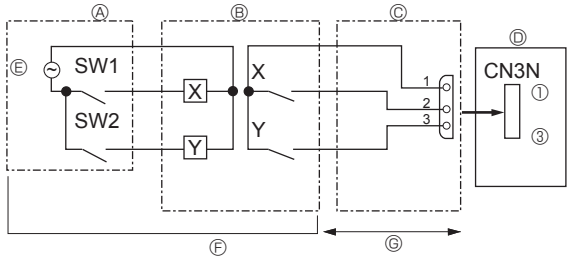


Ⓐ Distant control board
Ⓑ Relay circuit
Ⓒ External output adapter (PAC-SA88HA-E)
Ⓓ Outdoor unit control board

L1: Error display lamp
L2: Compressor operation lamp
X, Y: Relay (coil rating: ≤ 0.9 W, 12 V DC)

Ⓔ Lamp power supply
Ⓕ Procure locally
Ⓖ Max. 10 m [32 ft]

• Auto change over (CN3N)



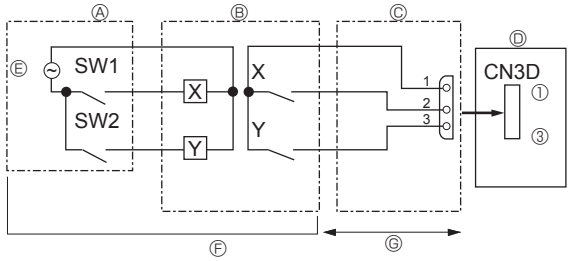
Ⓐ Remote control panel
Ⓑ Relay circuit
Ⓒ External input adapter (PAC-SC36NA-E)
Ⓓ Outdoor unit control board

SW1: Switch
SW2: Switch
X, Y: Relay (contact rating : ≥ 0.1 A, 15 V DC; min. applicable load: ≤ 1 mA)

Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m [32 ft]

	ON	OFF
SW1	Heating	Cooling
SW2	Validity of SW1	Invalidity of SW1

• 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 V DC; min. applicable load: ≤ 1 mA)

Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m [32 ft]

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	
				cooling	heating
Silent mode	OFF	OFF	OFF	Normal	Normal
		ON	OFF	Silent mode	Silent mode
Demand control	ON	OFF	OFF	100 % (Normal)	
		ON	OFF	75 %	
		ON	ON	50 %	
		OFF	ON	0 % (Stop)	

• External static pressure mode (0.12 in. WG (30 Pa))

The external static pressure mode (0.12 in. WG (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 (0.12 in. WG (30 Pa))	Enabled	Disabled

en

<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.

<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.

<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.

Supplier's Declaration of Conformity

47 CFR §2.1077 Compliance Information

Unique Identifier: MXZ-SM*TAM series
NTXMSM* series

Responsible Party - U.S. Contact Information

Mitsubishi Electric Trane HVAC US LLC
1340 Satellite Blvd, Suwanee, GA
30024
United States
+1-800-433-4822

FCC Compliance Statement

This device complies with part 18 of the FCC Rules.

This product is designed and intended for use in the residential, commercial and light-industrial environment.

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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