

TECHNICAL & SERVICE MANUAL

[Model Name]	[Service Ref.]	
<Outdoor unit>		
MXZ-4C36NAHZ	MXZ-4C36NAHZ	MXZ-4C36NAHZ-U1
MXZ-5C42NAHZ	MXZ-5C42NAHZ	MXZ-5C42NAHZ-U1
MXZ-8C48NAHZ	MXZ-8C48NAHZ	MXZ-8C48NAHZ-U1
MXZ-8C48NA	MXZ-8C48NA	MXZ-8C48NA-U1
MXZ-8C60NA	MXZ-8C60NA-U1	
<Branch box>		
PAC-MKA50BC	PAC-MKA50BC	
PAC-MKA30BC	PAC-MKA30BC	
PAC-MKA51BC	PAC-MKA51BC	
PAC-MKA31BC	PAC-MKA31BC	

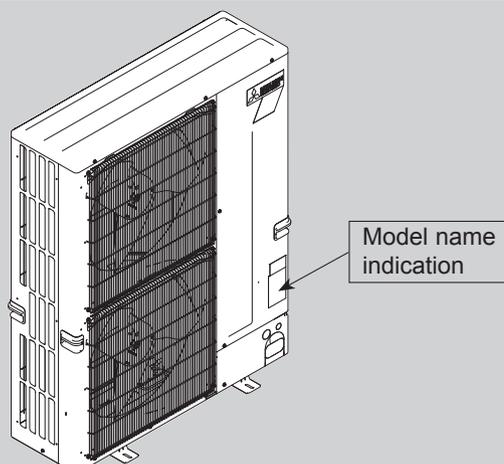
Revision:

- Corrected the value of rated power consumption at heating in page 12 in REVISED EDITION-D.
- Some descriptions have been modified.

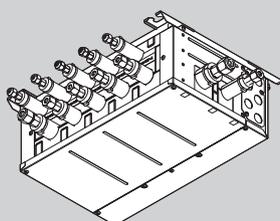
OCH573 REVISED EDITION-C is void.

Notes:

- This service manual describes technical data of outdoor unit and branch box. As for indoor units, refer to its service manual.
- RoHS compliant products have <G> mark on the spec name plate.



OUTDOOR UNIT: MXZ-4C36NAHZ



BRANCH BOX: PAC-MKA51BC

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PARTS CATALOG (OCB573)

TECHNICAL CHANGES

Service ref. have been changed as follows.

MXZ-4C36NAHZ	➔	MXZ-4C36NAHZ-U1
MXZ-5C42NAHZ	➔	MXZ-5C42NAHZ-U1
MXZ-8C48NAHZ	➔	MXZ-8C48NAHZ-U1
MXZ-8C48NA	➔	MXZ-8C48NA-U1

- The shape of piping around a stop valve (T7W E04 410) has been changed.
- The shape of valve bed has been changed.

1

SAFETY PRECAUTION

1-1. ALWAYS OBSERVE FOR SAFETY

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

1-2. CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R410A

Use new refrigerant 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 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 gas 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 for R410A	
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.

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.

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.

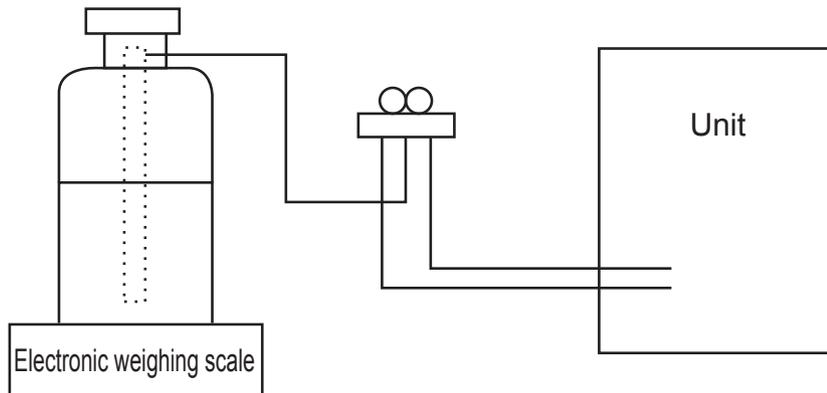
[1] Cautions for service

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

[2] Additional refrigerant charge

When charging directly from cylinder

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



[3] Service tools

- (1) 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 MPaG] or over.
2	Charge hose	·Only for R410A
		·Use pressure performance of 738.2 PSIG [5.09MPaG] or over.
3	Electronic 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	—

1-3. Cautions for refrigerant piping work

New refrigerant R410A is adopted for replacement inverter series. Although the refrigerant piping work for R410A is 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.

1 Thickness of pipes

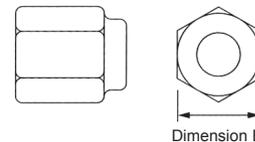
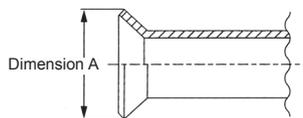
Because the working pressure of R410A is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 7/256 in [0.7 mm] or below.)

Diagram below: Piping diameter and thickness

Nominal dimensions (in)	Outside diameter (mm)	Thickness : in [mm]	
		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]

2 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

Unit : in [mm]

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

Flare nut dimensions

Unit: in [mm]

Nominal dimensions (in)	Outside diameter (mm)	Dimension B	
		R410A	R22
1/4	6.35	43/64 [17.0]	17.0
3/8	9.52	7/8 [22.0]	22.0
1/2	12.70	1-3/64 [26.0]	24.0
5/8	15.88	1-9/64 [29.0]	27.0
3/4	19.05	—	36.0

3 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		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.

2

OVERVIEW OF UNITS

2-1. CONSTRUCTION OF SYSTEM

Outdoor unit			MXZ-4C36NAHZ(-U1)	MXZ-5C42NAHZ(-U1)	MXZ-8C48NAHZ(-U1) MXZ-8C48NA(-U1)	MXZ-8C60NA-U1
			4HP	4.5HP	5HP	7HP
Rated capacity (kBTU/h)	Cooling		36	42	48	60
	Heating		45	48	54	66
	Refrigerant		R410A			
Connectable indoor unit	Capacity	Type 06 to Type 36 Caution: The indoor unit which rated capacity exceeds 36 kBTU/h (Type 36) can NOT be connected.				
	Number of units	2 ^(*) to 4 units	2 ^(*) to 5 units	2 ^(*) to 8 units	2 ^(*) to 8 units	
	Total system wide capacity	33 to 130% of outdoor unit capacity (12 to 46.8 kBTU/h)	29 to 130% of outdoor unit capacity (12 to 54.6 kBTU/h)	25 to 130% of outdoor unit capacity (12 to 62.4 kBTU/h)	20 to 130% of outdoor unit capacity (12 to 78 kBTU/h)	
Connectable branch box	Number of units	1 or 2 units				



Connectable indoor unit lineups (Heat pump inverter type)		Model name	Capacity class [kBTU/h]							
Model type			06	09	12	15	18	24	30	36
Wall mounted	Deluxe	MSZ-FE09/12/18NA		●	●		●			
		MSZ-FH06/09/12/15NA, 18NA2	●	●	●	●	●			
	Designer	MSZ-EF09/12/15/18NA(W/B/S)		●	●	●	●			
		Standard	MSZ-GE06/09/12/15/18/24NA	●	●	●	●	●	●	
		MSZ-GL06/09/12/15/18/24NA	●	●	●	●	●			
Ceiling concealed	Low static pressure*3	SEZ-KD09/12/15/18NA		●	●	●	●			
	Middle static pressure*3	PEAD-A24/30/36AA5						●	●	
4-way ceiling cassette	2 by 2 type	SLZ-KA09/12/15NA		●	●	●				
		Standard	PLA-A12/18/24/30/36BA6			●	●	●	●	
			PLA-A12/18/24/30/36EA7*4			●	●	●	●	
Floor standing		MFZ-KA09/12/18NA		●	●		●			
		MFZ-KJ09/12/15/18NA		●	●	●	●			
Multi-position*2		MVZ-A12/18/24/30/36AA4			●		●	●		



Branch box	PAC-MKA50BC	PAC-MKA51BC	PAC-MKA30BC	PAC-MKA31BC
Number of branches (Indoor unit that can be connected)	5 branches (MAX. 5 units)		3 branches (MAX. 3 units)	

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



2-branch pipe (joint): Optional parts		
In case of using 1-branch box	No need	
In case of using 2-branch boxes	Model name	Connection method
	MSDD-50AR-E	flare
	MSDD-50BR-E	brazing
		Select a model according to the connection method.



Option	Optional accessories for indoor units and outdoor units are available.
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*1 1 for MVZ model. Single unit connection is possible with MVZ-series unit.

*2 When connecting a multi-position unit(s), set additional constraints as follows. For connections other than those specified below, consult your dealer.

• Models other than MXZ-8C60NA

Number of connecting multi-position unit	Constraints
2	Any indoor units other than multi-position models are not connectable.
1	None (Only the ordinal constraints apply.)

• MXZ-8C60NA (For each connected branch box)

Number of connecting multi-position unit	Constraints
2	Any indoor units other than multi-position models are not connectable.
1	<ul style="list-style-type: none"> The total system wide capacity should be 100% or below including the MVZ-series unit. Only 1 SEZ or 1 PEAD can be included in the connection.

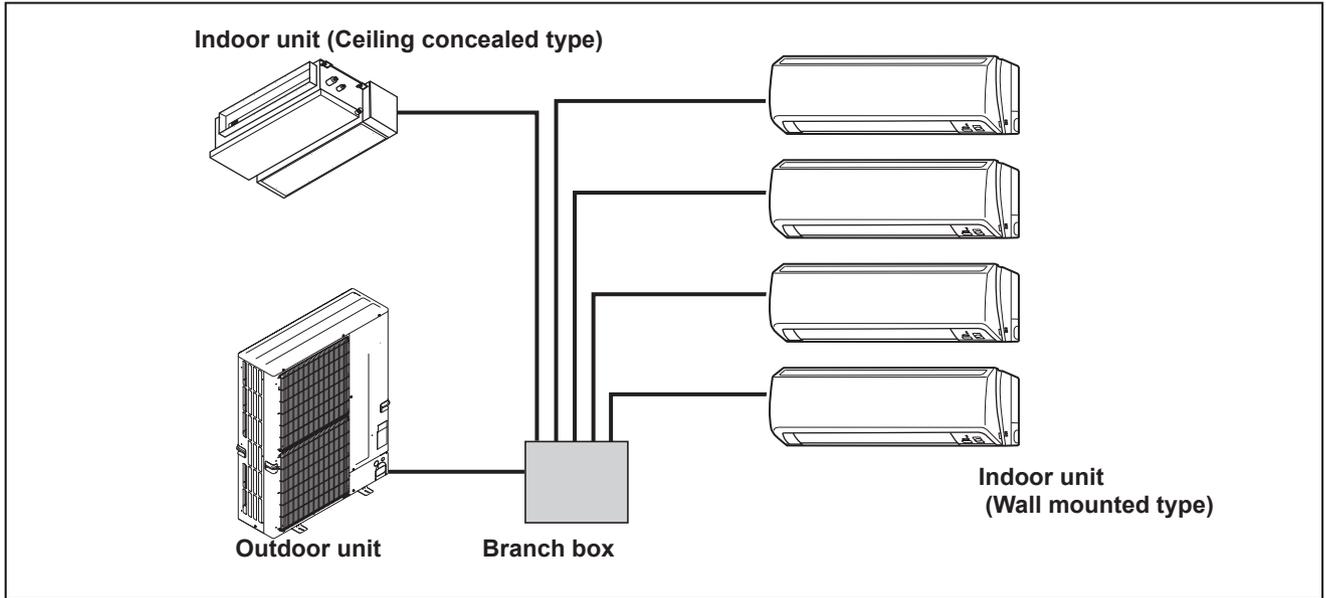
*3 For MXZ-8C60NA; When connecting the SEZ and PEAD-series units, the total system wide capacity per 1 branch box should be 100% or below including the SEZ and PEAD-series units. (Only if connecting to PAC-MKA50/51BC)

*4 When the system includes even 1 unit of PLA-A-EA7, the number of the maximum connectable indoor units is decreased as follows: 3 for MXZ-4C36NAHZ-U1, 4 for MXZ-5C42NAHZ-U1, and 6 for MXZ-8C48NA(HZ)-U1 and MXZ-8C60NA-U1

2-2. SYSTEM OUTLINE

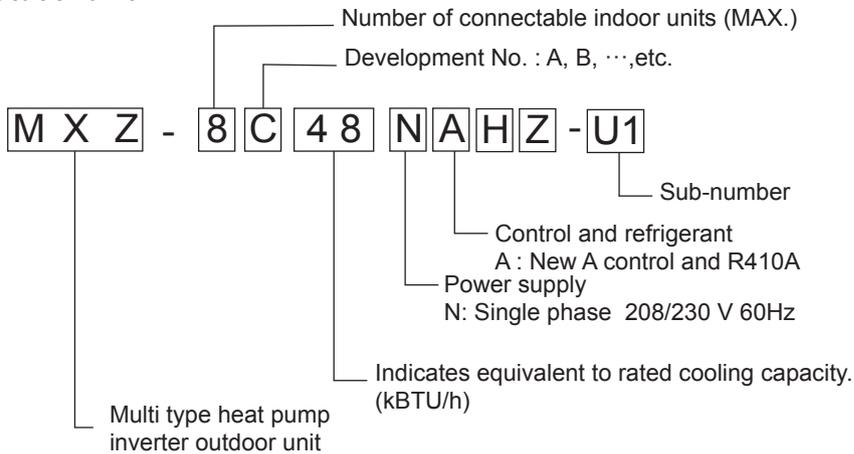
The additional connection of the branch box together with employment of the compact trunk-looking outdoor unit can successfully realize a long distance piping for large houses. Equipped with a microcomputer, the branch box can translate the transmission signal of indoor units to achieve the optimum control.

2-2-1. System example

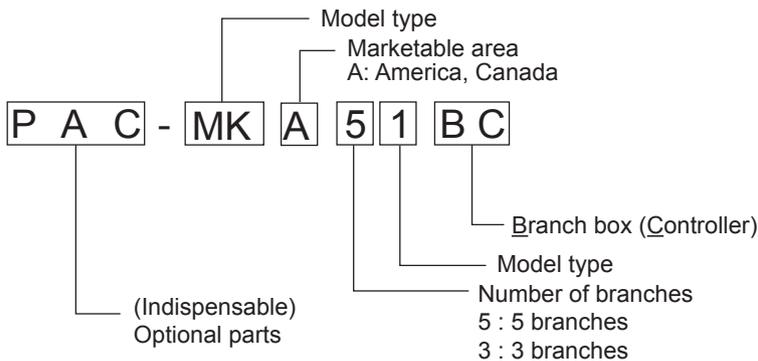


2-2-2. Method for identifying

■ Outdoor unit

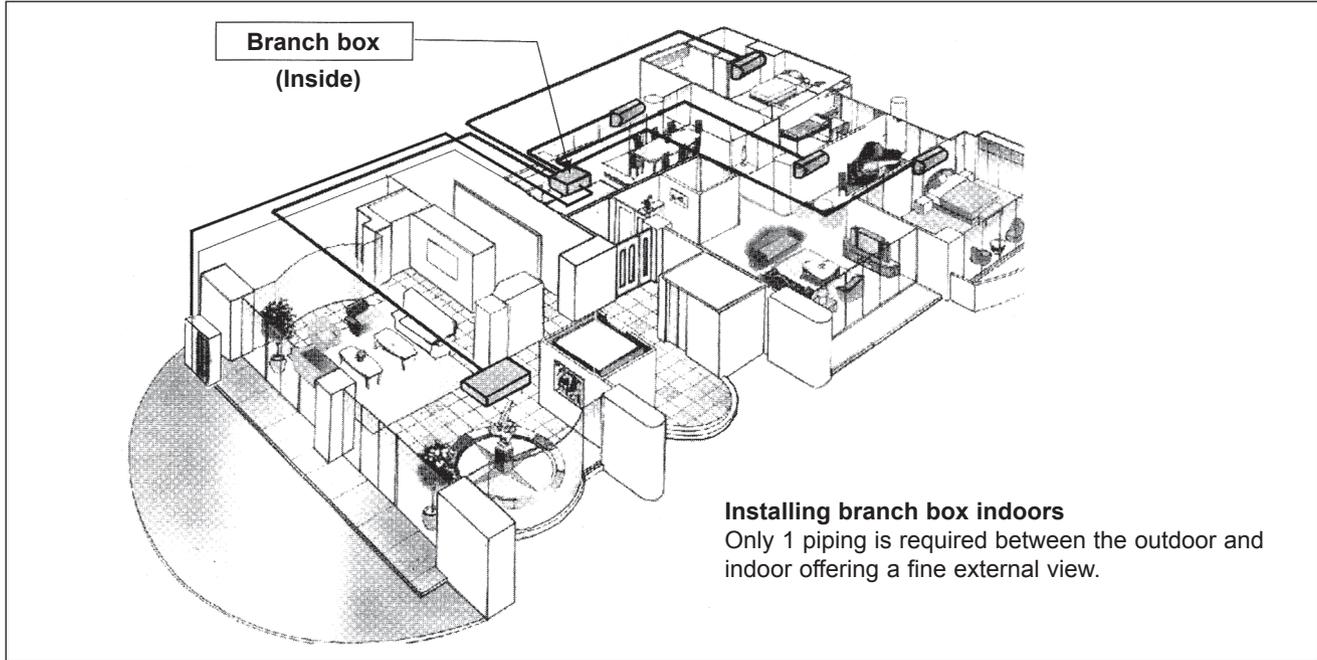


■ Branch box

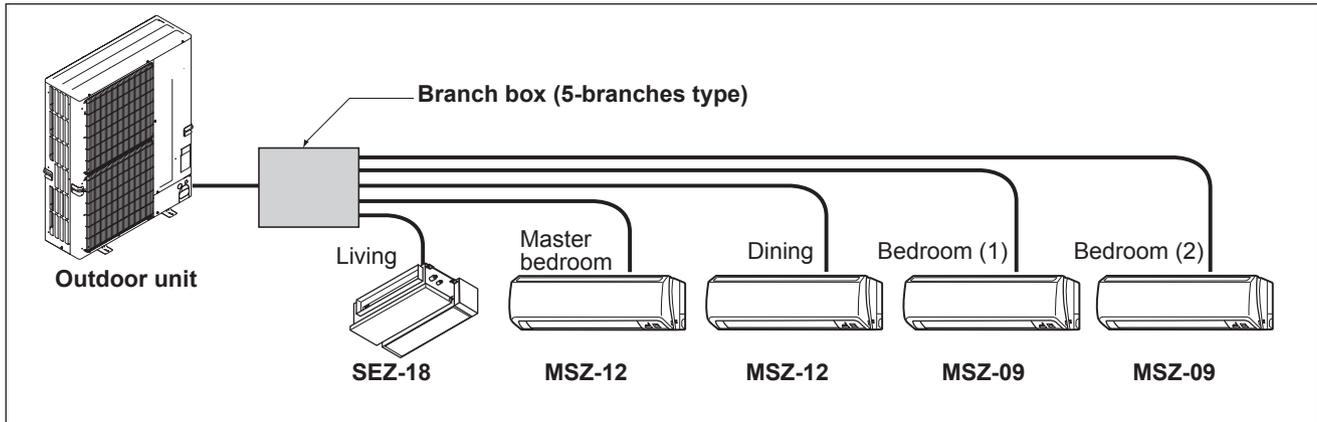


2-3. TYPICAL COMBINATION EXAMPLE

Branch box is located **INSIDE** of condominium



■ System example of 5 indoor units



■ Verification (In case of MXZ-8C48NAHZ)

The rated capacity should be determined by observing the table below. The unit's quantities are limited to 1(*) to 8 units. For the next step, make sure that the selected total rated capacity is in a range of 12 to 62.4 kBTU/h.

The total indoor unit capacity should be within the outdoor units. (= 48.0 kBTU/h is preferred).

Combination of excessive indoor units and an outdoor unit may reduce the capacity of each indoor unit.

The rated indoor capacity is as the table below.

*Single unit connection is possible only with MVZ model. Connect 2 or more units for models other than MVZ.

Example:

SEZ-18	=	18	}	Total rated capacity
		+		
MSZ-12	=	12		
		+		
MSZ-12	=	12		
		+		
MSZ-09	=	9		
		+		
MSZ-09	=	9		
		+		
		=		$60 \leq 62.4 \text{ kBTU/h}$

Indoor unit type (capacity class)	06	09	12	15	18	24	30	36
Rated capacity (cooling) (kBTU/h)	6	9	12	15	18	24	30	36

2-4. SIMPLIFIED PIPING SYSTEM

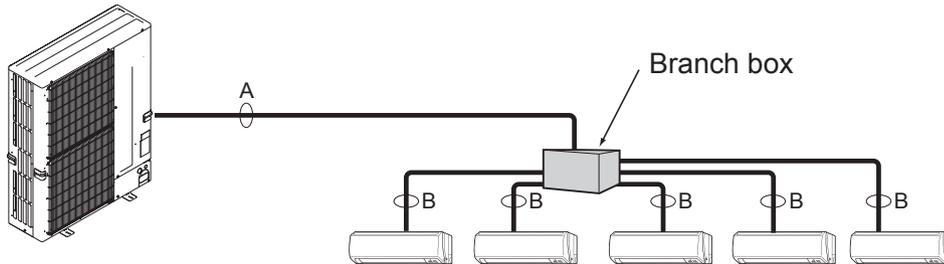
Piping connection size

	A	B
Liquid	$\phi 3/8$ inch [9.52 mm]	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.)
Gas	$\phi 5/8$ inch / $\phi 3/4$ inch* [15.88 mm] / [19.05 mm]	

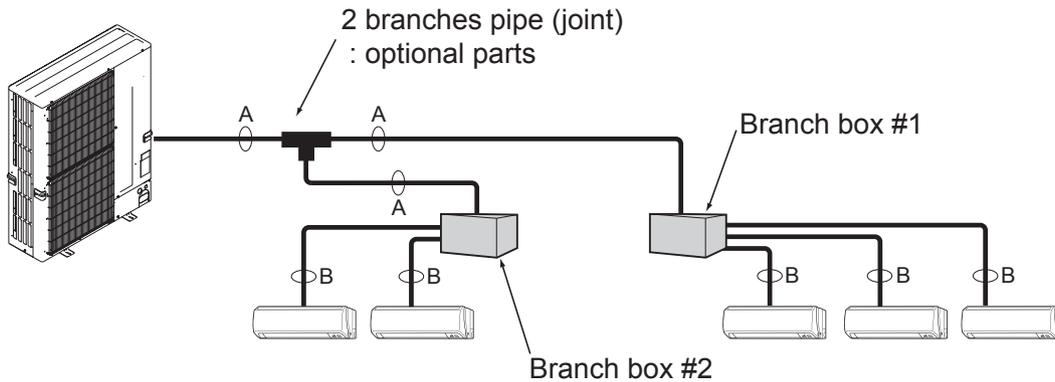
* MXZ-8C60NA only

Flare connection employed. (No brazing!)

- In case of using 1-branch box
Flare connection employed (No brazing)



- In case of using 2-branch boxes



- Installation procedure (2 branches pipe (joint))
Refer to the installation manuals of MSDD-50AR-E and MSDD-50BR-E.

3

SPECIFICATIONS

3-1. OUTDOOR UNIT: MXZ-4C36/5C42/8C48NAHZ(-U1), MXZ-8C48NA(-U1), MXZ-8C60NA-U1

Conversion formula: kcal/h = kW × 860
BTU/h = kW × 3412
CFM = m³/min × 35.31

Service Ref.			MXZ-4C36NAHZ(-U1)			MXZ-5C42NAHZ(-U1)			
Standard performance	Indoor type		Non-Ducted	Mix	Ducted	Non-Ducted	Mix	Ducted	
	Cooling	Capacity Rated* ¹	BTU/h	36,000	36,000	36,000	42,000	42,000	42,000
		Rated power consumption* ¹	W	2,570	2,845	3,180	3,130	3,470	3,890
		EER	BTU/Wh	14.00	12.65	11.30	13.40	12.10	10.80
		SEER	BTU/Wh	19.1	17.5	15.8	19.0	17.0	15.0
	Heating	Capacity Rated 47°F* ¹	BTU/h	45,000	45,000	45,000	48,000	48,000	48,000
		Capacity Max. 17°F* ²	BTU/h	45,000	45,000	45,000	48,000	48,000	48,000
		Capacity Max. 5°F	BTU/h	45,000	45,000	45,000	48,000	48,000	48,000
		Rated power consumption 47°F* ¹	W	3,340	3,795	4,250	3,430	3,890	4,350
		COP 47°F* ¹	BTU/Wh	3.95	3.48	3.10	4.10	3.62	3.23
HSPF IV/V		BTU/Wh	11.3/9.2	10.7/8.9	10.1/8.5	11.0/9.1	10.6/9.0	10.1/8.8	
OUTDOOR UNIT	Connectable indoor units (Max.)		4			5			
	Max. Connectable Capacity	BTU/h	46,000			54,000			
	Power supply		1 Phase 208/230 V, 60 Hz						
	Breaker Size/Max. fuse size		50 A/52 A 50 A/50 A (for the models with U1)						
	Min. circuit ampacity		42 A						
	Sound level (Cool/Heat)	dB	49/ 53			50/ 54			
	External finish		Munsell 3Y 7.8/ 1.1						
	Refrigerant control		Linear Expansion Valve						
	Compressor		Hermetic						
		Model	ANB33FJSMT						
		Motor output	kW	2.8			3.0		
		Starting method		Inverter					
	Heat exchanger		Plate fin coil						
	Fan	Fan (drive) × No.		Propeller fan × 2					
		Fan motor output	kW	0.06 + 0.06 0.074 + 0.074 (for the models with U1)					
		Airflow	m ³ /min (CFM)	110 (3885)					
	Dimensions (H × W × D)	W	in (mm)	41-11/32 (1050)					
		D	in (mm)	13+1 (330+25)					
		H	in (mm)	52-11/16 (1338)					
	Weight	lb (kg)		276 (125)					
Refrigerant	Refrigerant		R410A						
	Charge	lb (kg)	10 lbs. 9 oz.(4.8)						
	Oil/Model	oz (L)	78 (2.3)/Ethereal oil (FV50S)						
Protection devices	High pressure protection		HP switch						
	Compressor protection		Compressor thermo, Overcurrent detection						
	Fan motor protection		Overheating/Voltage protection						
Guaranteed operation range		(cool)	D.B 23 to 115°F [D.B.-5 to 46°C] * ³						
		(heat)	D.B. -13 to 70°F [D.B. -25 to 21°C]						
REFRIGERANT PIPING	Total Piping length (Max.)		ft (m) 492 (150)						
	Farthest		ft (m) 262 (80)						
	Max. Height difference		ft (m) 164 (50)* ⁴						
	Chargeless length		ft (m) 0						
	Piping diameter	Liquid	φinch (mm)	φ3/8 (9.52)					
		Gas	φinch (mm)	φ5/8 (15.88)					
	Connection method	Indoor side		Flared					
Outdoor side		Flared							

*¹ Rating conditions 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 [D.B. 35.0°C]
Heating Indoor : D.B. 70°F [D.B. 21.1°C]
Outdoor : D.B. 47°F/W.B. 43°F [D.B. 8.3°C/W.B. 6.1°C]
*² Conditions Heating Indoor : D.B. 70°F [D.B. 21.1°C]
Outdoor : D.B. 17°F/W.B. 15°F [D.B. -8.3°C/W.B. -9.4°C]
*³ D.B. 5 to 115°F [D.B. -15 to 46°C], when an optional Air Outlet Guide is installed.
*⁴ 131 ft [40 m], in case of installing outdoor unit lower than indoor unit.

Note: Refer to the indoor unit's service manual for the indoor units specifications.

3-2. BRANCH BOX: PAC-MKA50BC PAC-MKA51BC PAC-MKA30BC PAC-MKA31BC

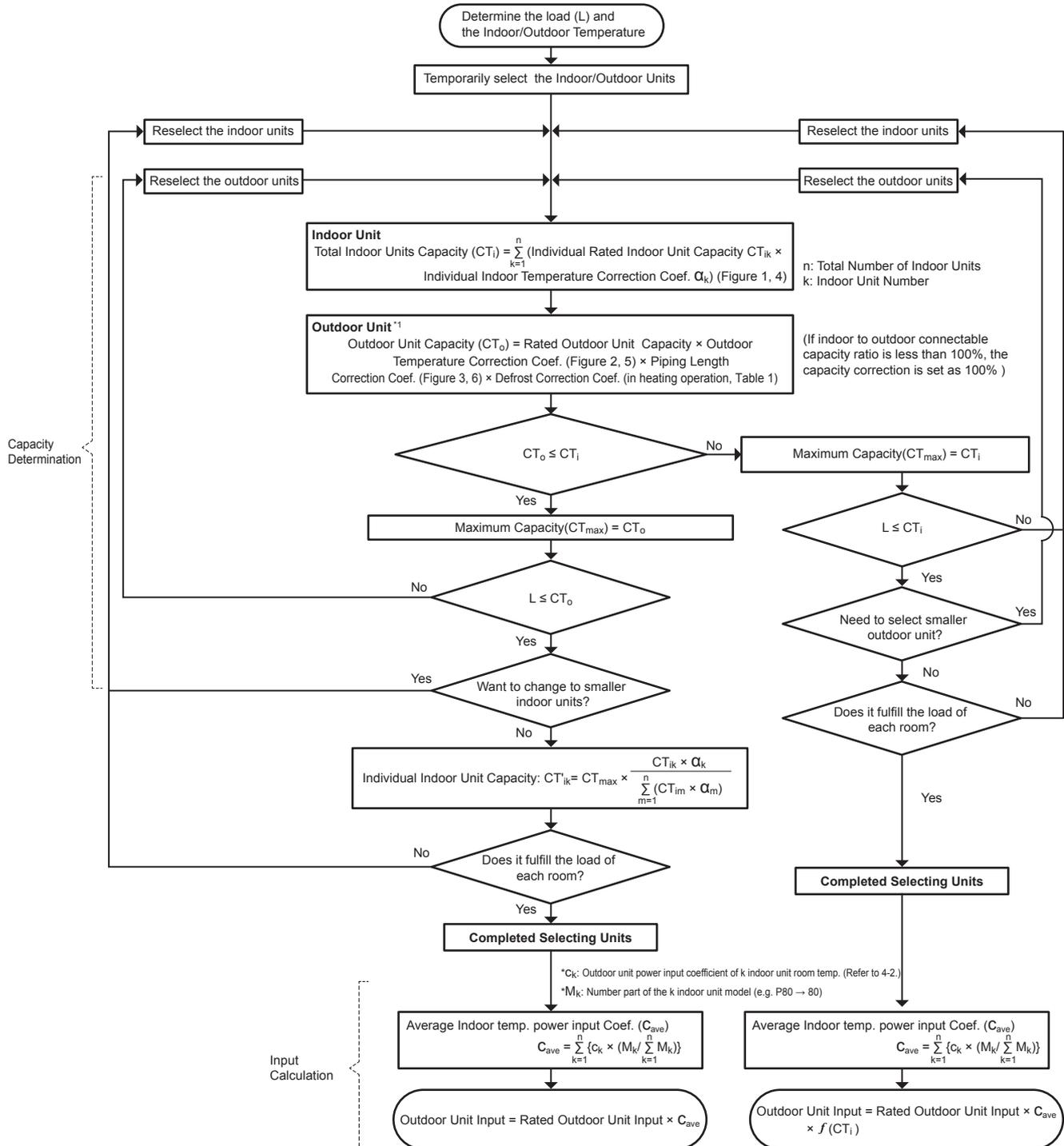
Model name				PAC-MKA50BC PAC-MKA51BC	PAC-MKA30BC PAC-MKA31BC
Connectable number of indoor units				Maximum 5	Maximum 3
Power supply				Single phase, 208/230 V, 60 Hz	
Input		kW		0.003	
Running current		A		0.05	
External finish				Galvanized sheets	
Dimensions	Width		inch (mm)	17-23/32 (450)	
	Depth		inch (mm)	11-1/32 (280)	
	Height		inch (mm)	6-11/16 (170)	
Weight			lb (kg)	16 (7.4)	15 (6.7)
Piping connection (Flare)	Branch (indoor side)*	Liquid	inch (mm)	$\phi 1/4 (6.35) \times 5 \{A,B,C,D,E\}$	$\phi 1/4 (6.35) \times 3 \{A,B,C\}$
		Gas	inch (mm)	$\phi 3/8 (9.52) \times 4 \{A,B,C,D\}$, $\phi 1/2 (12.7) \times 1\{E\}$	$\phi 3/8 (9.52) \times 3 \{A,B,C\}$
	Main (outdoor side)	Liquid	inch (mm)	$\phi 3/8 (9.52)$	
		Gas	inch (mm)	$\phi 5/8 (15.88)$	

*The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size for indoor and branch box. If the piping connection size of branch box does not match the piping connection size of indoor units, use optional different-diameter (deformed) joints to the branch box side. (Connect deformed joint directly to the branch box side.)

4-1. SELECTION OF COOLING/HEATING UNITS

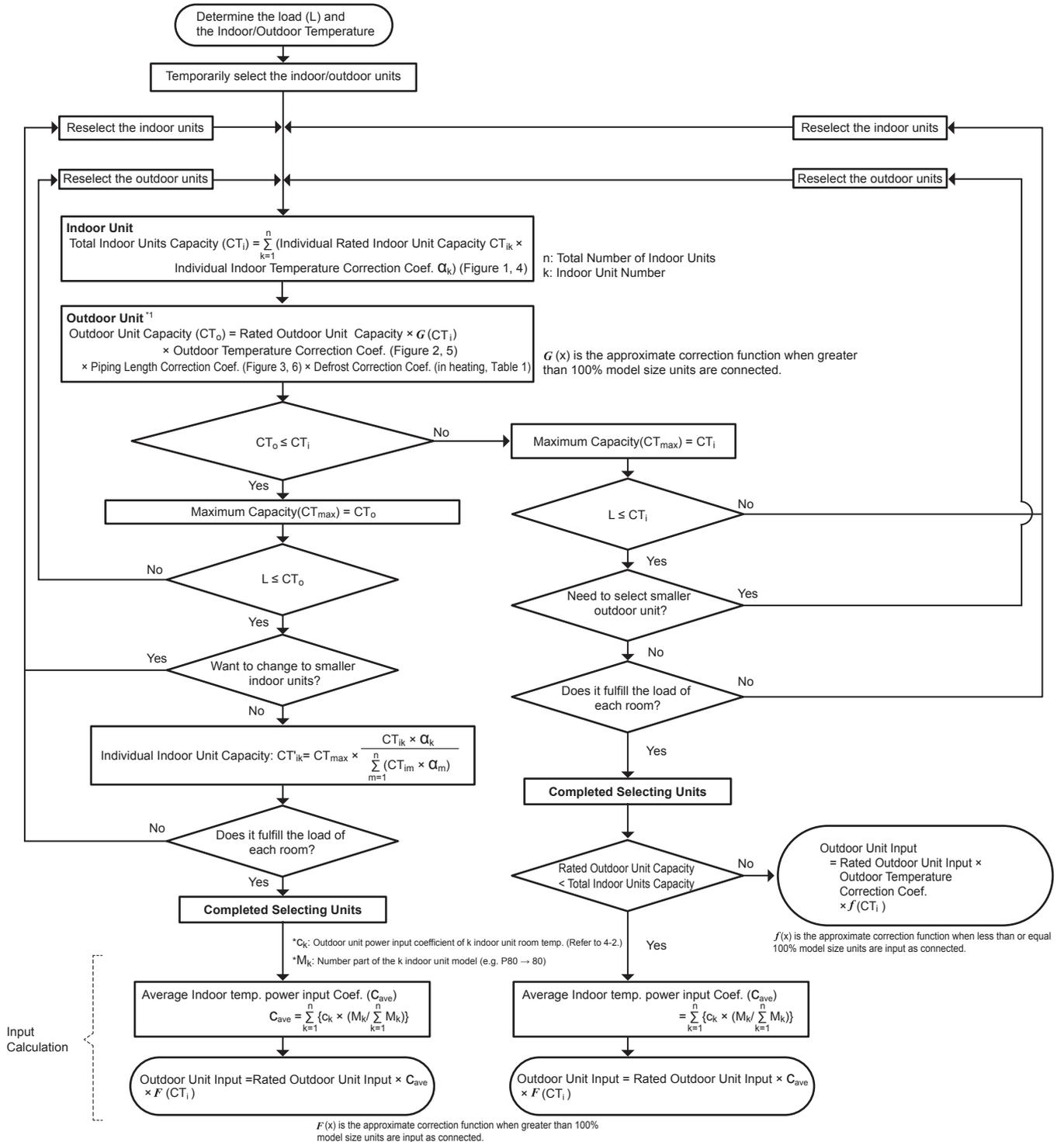
How to determine the capacity when less than or equal 100% indoor model size units are connected in total:

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.



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.



<Cooling>

Design Condition	
Outdoor Design Dry Bulb Temperature	98.6°F (37.0°C)
Total Cooling Load	29.6 kBTU/h
Room1	
Indoor Design Dry Bulb Temperature	80.6°F (27.0°C)
Indoor Design Wet Bulb Temperature	68.0°F (20.0°C)
Cooling Load	13.6 kBTU/h
Room2	
Indoor Design Dry Bulb Temperature	75.2°F (24.0°C)
Indoor Design Wet Bulb Temperature	66.2°F (19.0°C)
Cooling Load	16.0 kBTU/h
<Other>	
Indoor/Outdoor Equivalent Piping Length	250 ft

Capacity of indoor unit

	Model Number for indoor unit	Model 06	Model 09	Model 12	Model 15	Model 18	Model 24	Model 30	Model 36
M series	Model Capacity [kBTU/h]	6.0	9.0	12.0	14.0* ¹ 15.0* ²	17.0* ³ 17.2* ⁴	22.5	—	—
P series		—	—	12.0	—	18.0	24.0	30.0	36.0
SEZ		—	8.1	11.5	14.1	17.2	—	—	—
SLZ		—	8.4	11.1	15.0	—	—	—	—
MVZ		—	—	12.0	—	18.0	24.0	30.0	36.0

*1 For MSZ-GE/GL15NA
 *2 For the models other than *1 above
 *3 For MFZ-KA/KJ18NA
 *4 For the models other than *3 above

1. Cooling Calculation

(1) Temporary Selection of Indoor Units

Room1
MSZ-FH15 **15.0 kBTU/h (Rated)**

Room2
MSZ-FH18 **17.2 kBTU/h (Rated)**

(2) Total Indoor Units Capacity

15 + 18 = 33

(3) Selection of Outdoor Unit

The P36 outdoor unit is selected as total indoor units capacity is P33
MXZ-4C36

(4) Total Indoor Units Capacity Correction Calculation

Room1
Indoor Design Wet Bulb Temperature Correction (68.0°F) **1.02 (Refer to Figure 1)**

Room2
Indoor Design Wet Bulb Temperature Correction (66.2°F) **0.95 (Refer to Figure 1)**

Total Indoor Units Capacity (CTi)

$$CTi = \sum (\text{Indoor Unit Rating} \times \text{Indoor Design Temperature Correction})$$

$$= 15.0 \times 1.02 + 17.2 \times 0.95$$

$$= 31.6 \text{ kBTU/h}$$

(5) Outdoor Unit Correction Calculation

Outdoor Design Dry Bulb Temperature Correction (98.6°F) **0.98 (Refer to Figure 2)**

Piping Length Correction (250 ft) **0.93 (Refer to Figure 3)**

Total Outdoor Unit Capacity (CTo)

$$CTo = \text{Outdoor Rating} \times \text{Outdoor Design Temperature Correction} \times \text{Piping Length Correction}$$

$$= 36.0 \times 0.98 \times 0.93$$

$$= 32.8 \text{ kBTU/h}$$

(6) Determination of Maximum System Capacity

Comparison of Capacity between Total Indoor Units Capacity (CTi) and Total Outdoor Unit Capacity (CTo)

CTi = 31.6 < CTo = 32.8, thus, select CTi.

CTx = CTi = 31.6 kBTU/h

(7) Comparison with Essential Load

Against the essential load 29.6 kBTU/h, the maximum system capacity is 31.6 kBTU/h: Proper outdoor units have been selected.

(8) Calculation of Maximum Indoor Unit Capacity of Each Room

CTx = CTi, thus, calculate by the calculation below

Room1
Indoor Unit Rating × Indoor Design Temperature Correction
= 15.0 × 1.02
= 15.3 kBTU/h **OK: fulfills the load 13.6 kBTU/h**

Room2
Indoor Unit Rating × Indoor Design Temperature Correction
= 17.2 × 0.95
= 16.3 kBTU/h **OK: fulfills the load 16.0 kBTU/h**

Go on to the heating trial calculation since the selected units fulfill the cooling loads of Room 1, 2.

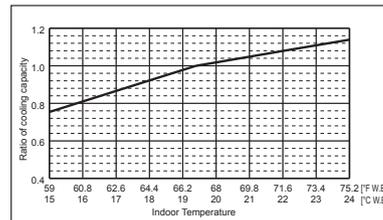


Figure 1 Indoor unit temperature correction
To be used to correct indoor unit only

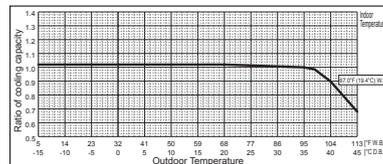


Figure 2 Outdoor unit temperature correction
To be used to correct outdoor unit only

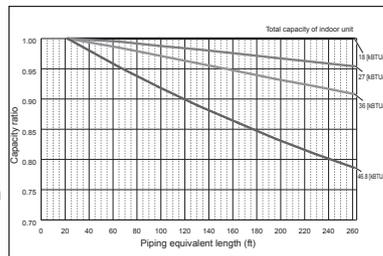


Figure 3 Correction of refrigerant piping length

<Heating>

Design Condition	
Outdoor Design Wet Bulb Temperature	35.6°F (2.0°C)
Total Heating Load	34.4 kBTU/h
Room1	
Indoor Design Dry Bulb Temperature	69.8°F (21.0°C)
Heating Load	16.3 kBTU/h
Room2	
Indoor Design Dry Bulb Temperature	73.4°F (23.0°C)
Heating Load	18.1 kBTU/h
<Other> Indoor/Outdoor Equivalent Piping Length	230 ft

Capacity of indoor unit

	Model Number for indoor unit	Model 06	Model 09	Model 12	Model 15	Model 18	Model 24	Model 30	Model 36
M series	Model Capacity [kBTU/h]	6.0	10.9	13.6 ^{*1} 14.4 ^{*2} 13.0 ^{*3}	18	20.3 ^{*1} 21.6 ^{*2} 21.0 ^{*3}	27.6	—	—
P series		—	—	13.5	—	18.0	26.0	34.0	40.0
SEZ		—	10.9	13.6	18.0	17.2	—	—	—
SLZ		—	10.2	13.7	17.1	—	—	—	—
MVZ		—	—	12.0	—	18.0	27.0	34.0	40.0

*1 For MSZ-FH/FE12,18NA
*2 For MSZ-GE/GL12,18NA
*3 For the models other than *1 and *2 above

2. Heating Calculation

(1) Temporary Selection of Indoor Units

Room1	MSZ-FH15	18.0 kBTU/h (Rated)
Room2	MSZ-FH18	20.3 kBTU/h (Rated)

(2) Total Indoor Units Capacity

15 + 18 = 33

(3) Selection of Outdoor Unit

The P36 outdoor unit is selected as total indoor units capacity is P33
MXZ-4C36 45.0 kBTU/h

(4) Total Indoor Units Capacity Correction Calculation

Room1	Indoor Design Dry Bulb Temperature Correction (69.8°F)	1.00 (Refer to Figure 4)
Room2	Indoor Design Dry Bulb Temperature Correction (73.4°F)	0.92 (Refer to Figure 4)

Total Indoor Units Capacity (CTi)

$$CTi = \sum (\text{Indoor Unit Rating} \times \text{Indoor Design Temperature Correction})$$

$$= 18.0 \times 1.00 + 20.3 \times 0.92$$

$$= 36.7 \text{ kBTU/h}$$

(5) Outdoor Unit Correction Calculation

Outdoor Design Wet Bulb Temperature Correction (35.6°F)	1.0 (Refer to Figure 5)
Piping Length Correction (230 ft)	0.96 (Refer to Figure 6)
Defrost Correction	0.89 (Refer to Table 1)

Total Outdoor Unit Capacity (CTo)

$$CTo = \text{Outdoor Unit Rating} \times \text{Outdoor Design Temperature Correction} \times \text{Piping Length Correction} \times \text{Defrost Correction}$$

$$= 45.0 \times 1.0 \times 0.96 \times 0.89$$

$$= 38.4 \text{ kBTU/h}$$

Table 1 Table of correction factor at frost and defrost

Outdoor Intake temperature <W.B.> (°C)	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	1.0	0.98	0.89	0.88	0.89	0.9	0.95	0.95	0.95	0.95	0.95	0.95

(6) Determination of Maximum System Capacity

Comparison of Capacity between Total Indoor Units Capacity (CTi) and Total Outdoor Unit Capacity (CTo)

CTi = 36.7 < CTo = 38.4, thus, select CTi.

CTx = CTi = 36.7 kBTU/h

(7) Comparison with Essential Load

Against the essential load 34.4 kBTU/h, the maximum system capacity is 36.7 kBTU/h: Proper outdoor units have been selected.

(8) Calculation of Maximum Indoor Unit Capacity of Each Room

CTx = CTi, thus, calculate by the calculation below

Room1

Maximum Capacity × Room1 Capacity after the Temperature Correction / (Room1,2 Total Capacity after the Temperature Correction)

$$= 36.7 \times (18.0 \times 1.00) / (18.0 \times 1.00 + 20.3 \times 0.92)$$

$$= 18.0 \text{ kBTU/h} \quad \text{OK: fulfills the load 16.3 kBTU/h}$$

Room2

Maximum Capacity × Room1 Capacity after the Temperature Correction / (Room1,2 Total Capacity after the Temperature Correction)

$$= 36.7 \times (20.3 \times 0.92) / (18.0 \times 1.00 + 20.3 \times 0.92)$$

$$= 18.7 \text{ kBTU/h} \quad \text{OK: fulfills the load 18.1 kBTU/h}$$

Completed selecting units since the selected units fulfill the heating loads of Room 1, 2.

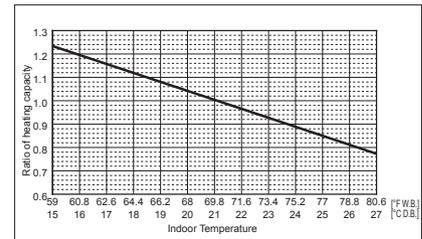


Figure 4 Indoor unit temperature correction
To be used to correct indoor unit only

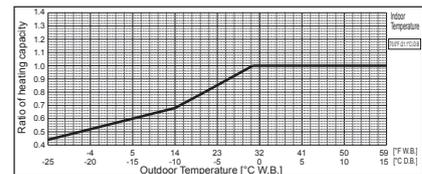


Figure 5 Outdoor unit temperature correction
To be used to correct outdoor unit only

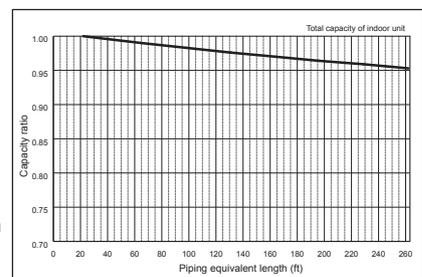


Figure 6 Correction of refrigerant piping length

3. Power input of outdoor unit

Outdoor unit : MXZ-4C36
Indoor unit 1 : MSZ-FH15
Indoor unit 2 : MSZ-FH18

<Cooling>

(1) Rated power input of outdoor unit **2.57 kW**

(2) Calculation of the average indoor temperature power input coefficient

Coefficient of the outdoor unit for indoor unit 1 (Outdoor temp. 98.6°F [37.0°C] D.B., Indoor temp. 68.0°F [20.0°C] W.B.)
1.04 (Refer to "4-2. CORRECTING BY TEMPERATURE".)

Coefficient of the outdoor unit for indoor unit 2 (Outdoor temp. 98.6°F [37.0°C] D.B., Indoor temp. 64.4°F [18.0°C] W.B.)
0.85 (Refer to "4-2. CORRECTING BY TEMPERATURE".)

$$\text{Average indoor temp. power input coefficient } (C_{ave}) = \sum_{k=1}^n \{C_k \times (M_k / \sum_{k=1}^n M_k)\}$$

n: Total number of the indoor units
k: Number of the indoor unit
 C_k : Outdoor unit power input coefficient of k indoor unit room temp.
 M_k : Number part of the k indoor unit model (e.g. P80 → 80)

$$= 1.04 \times 15 / (15 + 18) + 0.85 \times 18 / (15 + 18) \\ = 0.94$$

(3) Coefficient of the partial load f (CTi)

Total Indoor units capacity
15 + 18 = 33, thus, f (CTi) = 0.9 (Refer to the tables in "4-4.STANDARD CAPACITY DIAGRAM".)

(4) Outdoor power input (Plo)

Maximum System Capacity (CTx) = Total Outdoor unit Capacity (CTo), so use the following formula
 $P_{lo} = \text{Outdoor unit Cooling Rated Power Input} \times \text{Correction Coefficient of Indoor temperature} \times f$ (CTi)
 $= 2.57 \times 0.94 \times 0.9$
 $= 2.2 \text{ kW}$

<Heating>

(1) Rated power input of outdoor unit **3.34 kW**

(2) Calculation of the average indoor temperature power input coefficient

Coefficient of the outdoor unit for indoor unit 1 (Outdoor temp. 26.6°F [-3°C] W.B., Indoor temp. 68.0°F [20°C] D.B.)
1.34 (Refer to "4-2. CORRECTING BY TEMPERATURE".)

Coefficient of the outdoor unit for indoor unit 2 (Outdoor temp. 26.6°F [-3°C] W.B., Indoor temp. 77.0°F [25°C] D.B.)
1.09 (Refer to "4-2. CORRECTING BY TEMPERATURE".)

$$\text{Average indoor temp. power input coefficient } (C_{ave}) = \sum_{k=1}^n \{c_k \times (M_k / \sum_{k=1}^n M_k)\}$$

n: Total number of the indoor units

k: Number of the indoor unit

c_k: Outdoor unit power input coefficient of k indoor unit room temp.

M_k: Number part of the k indoor unit model (e.g. P80 → 80)

$$\begin{aligned} &= 1.34 \times 15 / (15 + 18) + 1.09 \times 18 / (15 + 18) \\ &= 1.20 \end{aligned}$$

(3) Coefficient of the partial load f (CTi)

Total indoor units capacity

15 + 18 = 33, thus, f (CTi) = 0.9 (Refer to the tables in "4-4. STANDARD CAPACITY TEMPERATURE".)

(4) Outdoor power input (Plo)

Maximum System Capacity (CTx) = Total Indoor unit Capacity (CTi), so use the following formula

$$\begin{aligned} Plo &= \text{Outdoor unit Heating Rated Power Input} \times \text{Correction Coefficient of Indoor temperature} \times f(\text{CTi}) \\ &= 3.34 \times 1.20 \times 0.9 \\ &= 3.61 \text{ kW} \end{aligned}$$

4-2. CORRECTION BY TEMPERATURE

MXZ-4C36/5C42/8C48NA(HZ), 8C60NA could have varied capacity at different designing temperature. Using the nominal cooling/heating capacity value and the ratio below, the capacity can be observed at various temperature.

<Cooling>

		MXZ	
		4C36	5C42
Nominal cooling capacity	BTU/h	36,000	48,000
Input	kW	2.57	3.13

		MXZ	
		8C48	8C60
Nominal cooling capacity	BTU/h	48,000	60,000
Input	kW	4.00	4.80

Figure 7 Indoor unit temperature correction

To be used to correct indoor unit capacity only

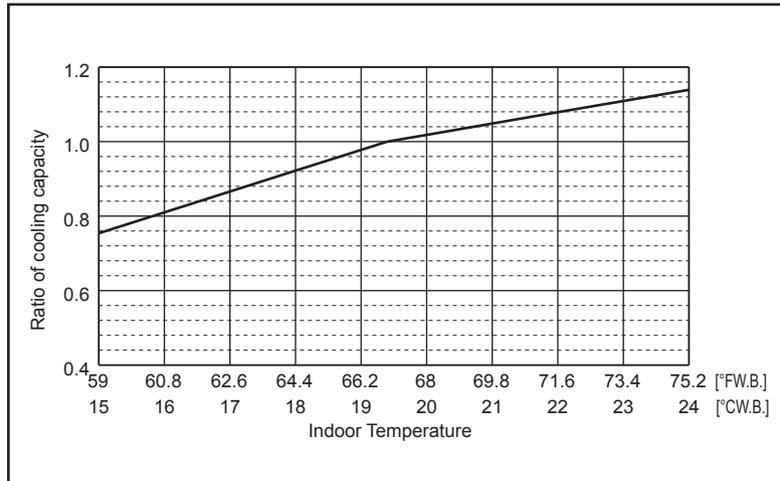
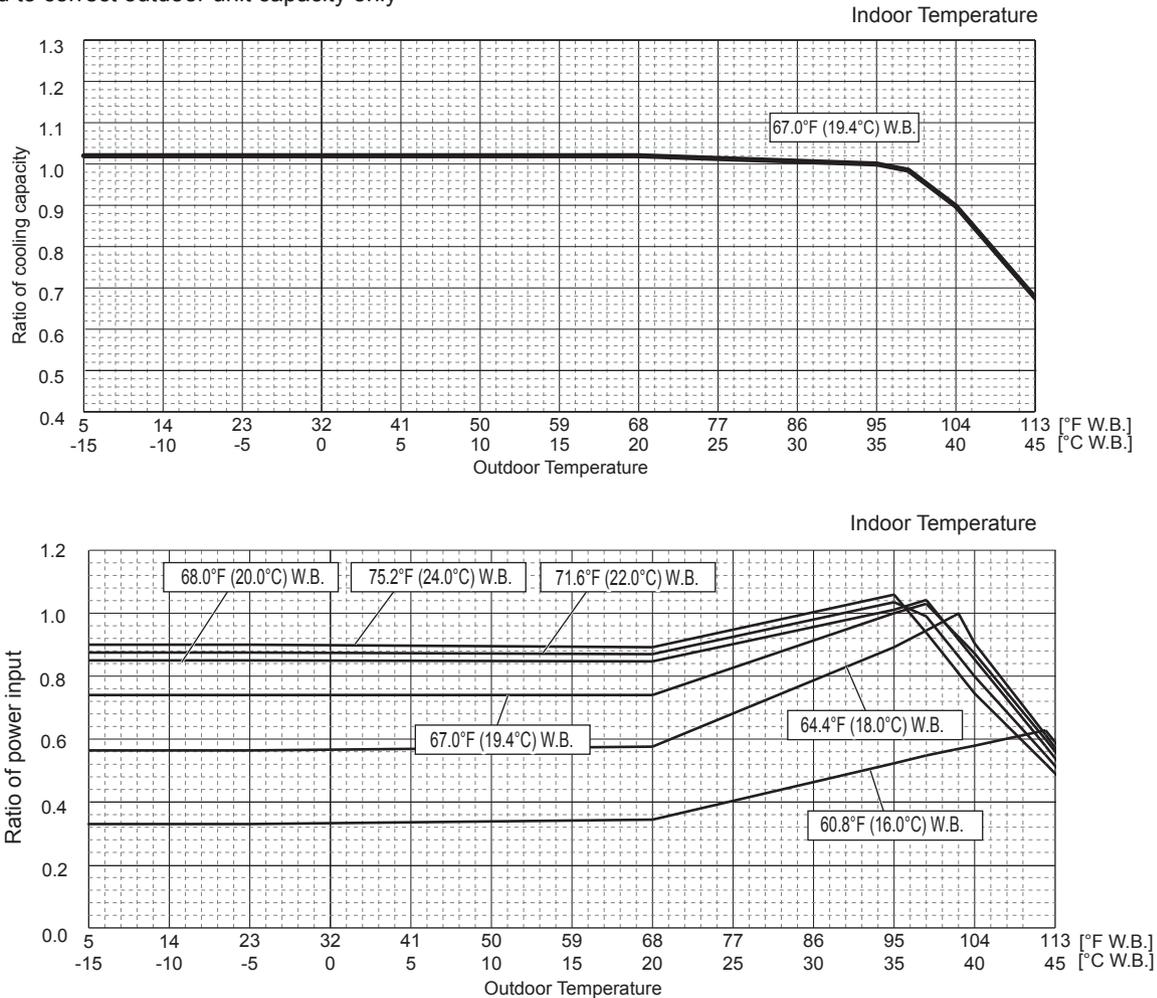


Figure 8 Outdoor unit temperature correction

To be used to correct outdoor unit capacity only



<Heating>

		MXZ	
		8C48NA	8C60NA
Nominal heating capacity	BTU/h	54,000	66,000
Input	kW	4.22	5.67

Figure 9 Indoor unit temperature correction
To be used to correct indoor unit capacity only

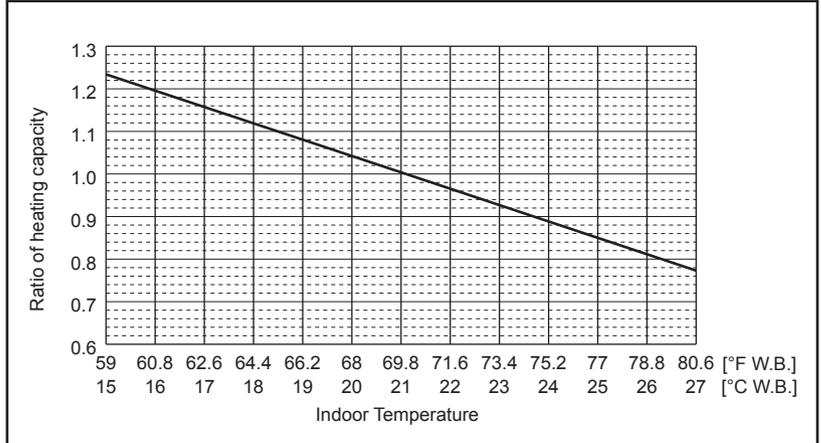
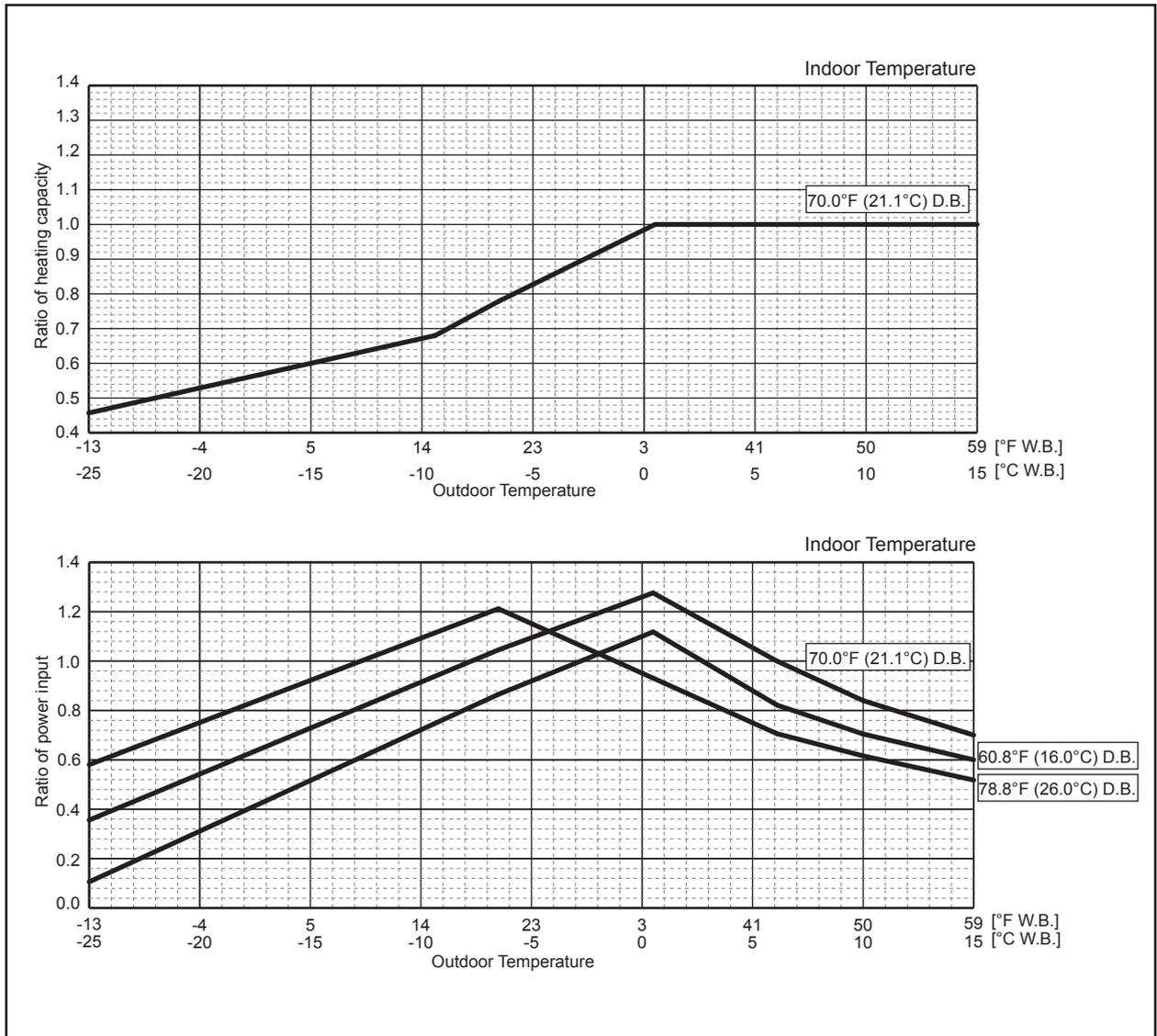


Figure 10 Outdoor unit temperature correction
To be used to correct outdoor unit capacity only



<Heating> (NAHZ)

Figure 11 Indoor unit temperature correction
To be used to correct indoor unit capacity only

		MXZ		
		4C36NAHZ	5C42NAHZ	8C48NAHZ
Nominal heating capacity	BTU/h	45,000	48,000	54,000
Input	kW	3.34	3.43	4.22

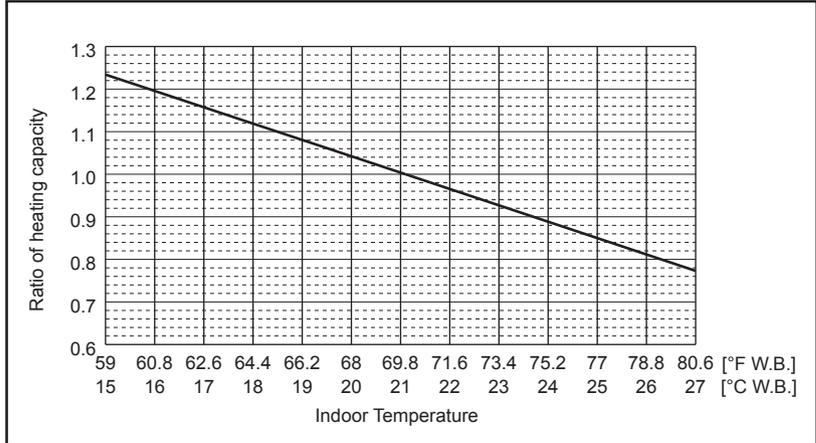
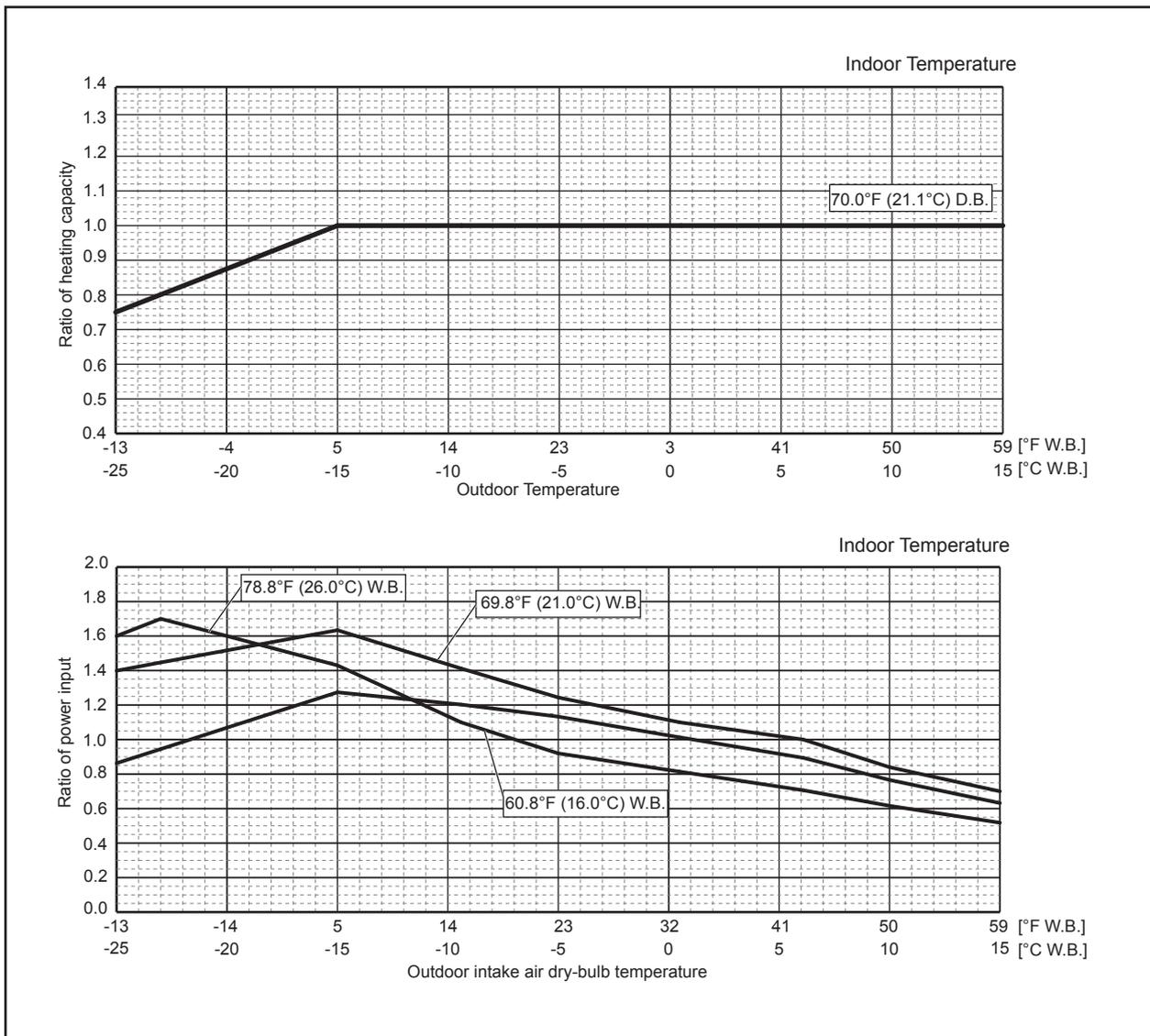


Figure 12 Outdoor unit temperature correction
To be used to correct outdoor unit capacity only



4-3. STANDARD OPERATION DATA (REFERENCE DATA)

Operation				Outdoor unit model			
				MXZ-4C36NAHZ		MXZ-5C42NAHZ	
Operating conditions	Ambient temperature	Indoor	DB/WB	80°F/67°F	70°F/60°F	80°F/67°F	70°F/60°F
		Outdoor		95°F/75°F	47°F/43°F	95°F/75°F	47°F/43°F
	Indoor unit	No. of connected units	Unit	4		4	
		No. of units in operation		4		4	
		Model		—		09 × 2 + 12 × 2	
	Piping	Main pipe	m	9.84 (3)		9.84 (3)	
		Branch pipe		14.76 (4.5)		14.76 (4.5)	
		Total pipe length		68.90 (21)		68.90 (21)	
	Fan speed		—	Hi		Hi	
	Amount of refrigerant		lb oz (kg)	17 lb 7 oz (7.9)		17 lb 7 oz (7.9)	
Outdoor unit	Electric current		A	14.1	18.7	17.2	19.1
	Voltage		V	230		230	
	Compressor frequency		Hz	59	74	70	80
LEV opening	Indoor unit		Pulse	112	128	129	128
Pressure	High pressure/Low pressure		MPaG	2.57/0.98	2.78/0.64	2.72/0.80	2.80/0.56
			PSIG	373/142	403/93	395/116	406/81
Temp. of each section	Outdoor unit	Discharge	°F [°C]	143.8 [62.1]	151.5 [66.4]	148.6 [64.8]	145.8 [63.2]
		Heat exchanger outlet		100.8 [38.2]	36.7 [2.6]	101.8 [38.8]	35.6 [2.0]
		Accumulator inlet		50.5 [10.3]	36.1 [2.3]	49.5 [9.7]	34.9 [1.6]
		Compressor inlet		47.1 [8.4]	34.0 [1.1]	45.3 [7.4]	32.7 [0.4]
	Indoor unit	LEV inlet		70.0 [21.1]	103.5 [39.7]	83.7 [28.7]	100.2 [37.9]
		Heat exchanger inlet		54.1 [12.3]	138.9 [59.4]	49.6 [9.8]	132.3 [55.7]

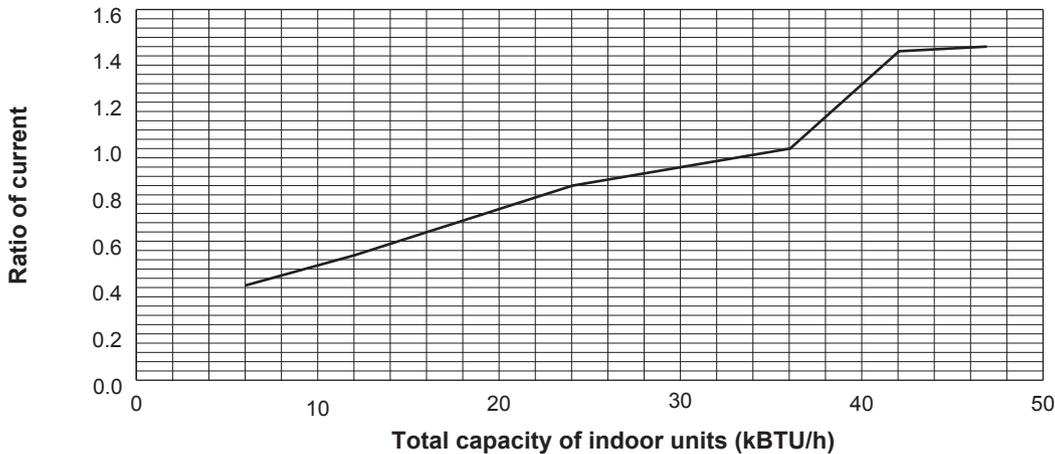
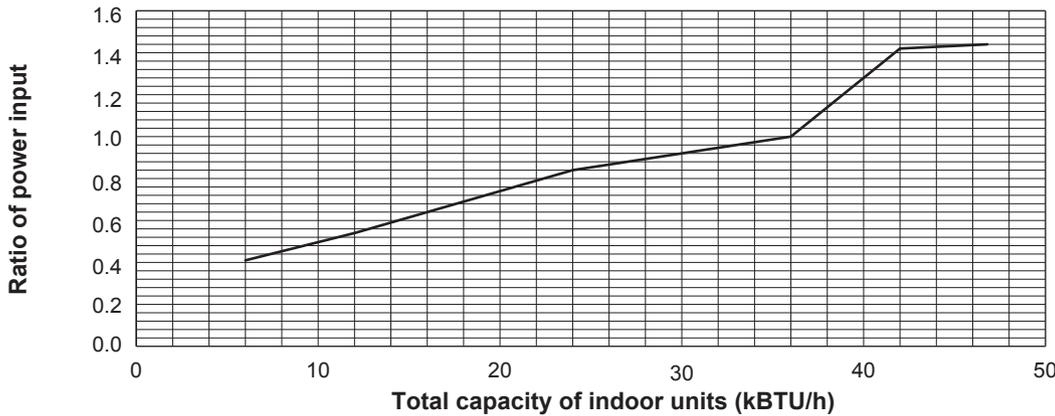
Operation				Outdoor unit model			
				MXZ-8C48NA/NAHZ		MXZ-8C60NA	
Operating conditions	Ambient temperature	Indoor	DB/WB	80°F/67°F	70°F/60°F	80°F/67°F	70°F/60°F
		Outdoor		95°F/75°F	47°F/43°F	95°F/75°F	47°F/43°F
	Indoor unit	No. of connected units	Unit	4		5	
		No. of units in operation		4		5	
		Model		—		12 × 4	
	Piping	Main pipe	m	9.84 (3)		9.84 (3)	
		Branch pipe		14.76 (4.5)		14.76 (4.5)	
		Total pipe length		68.90 (21)		83.79 (25.5)	
	Fan speed		—	Hi		Hi	
	Amount of refrigerant		lb oz (kg)	17 lb 7 oz (7.9)		20 lb (8.9)	
Outdoor unit	Electric current		A	22.1	21.9	20.4	24.4
	Voltage		V	230		230	
	Compressor frequency		Hz	86	91	45	51
LEV opening	Indoor unit		Pulse	112	132	187	229
Pressure	High pressure/Low pressure		MPaG	2.83/0.77	2.82/0.55	2.84/0.92	2.44/0.672
			PSIG	410/112	409/80	412/134	354/97.5
Temp. of each section	Outdoor unit	Discharge	°F [°C]	157.6 [69.8]	149.2 [65.1]	167 [75.0]	133.9 [56.6]
		Heat exchanger outlet		105.6 [40.9]	34.3 [1.3]	98.8 [37.1]	51.1 [10.2]
		Accumulator inlet		47.1 [8.4]	33.4 [0.8]	49.5 [9.7]	32.4 [0.2]
		Compressor inlet		42.4 [5.8]	30.6 [-0.8]	72.5 [22.5]	31.6 [-0.2]
	Indoor unit	LEV inlet		71.1 [21.7]	98.8 [37.1]	59.7 [15.4]	81.9 [27.7]
		Heat exchanger inlet		47.5 [8.6]	134.6 [57.0]	52.5 [11.4]	104.2 [40.1]

4-4. STANDARD CAPACITY DIAGRAM

Before calculating the sum of total capacity of indoor units, please convert the value into the kW model capacity following the formula on "4-1. Method for obtaining system cooling and heating capacity".

4-4-1. MXZ-4C36NAHZ <cooling>

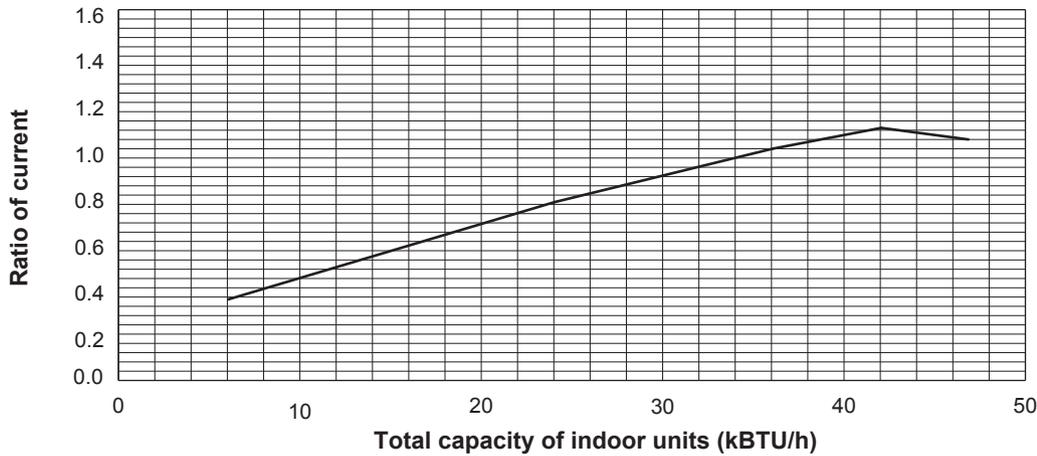
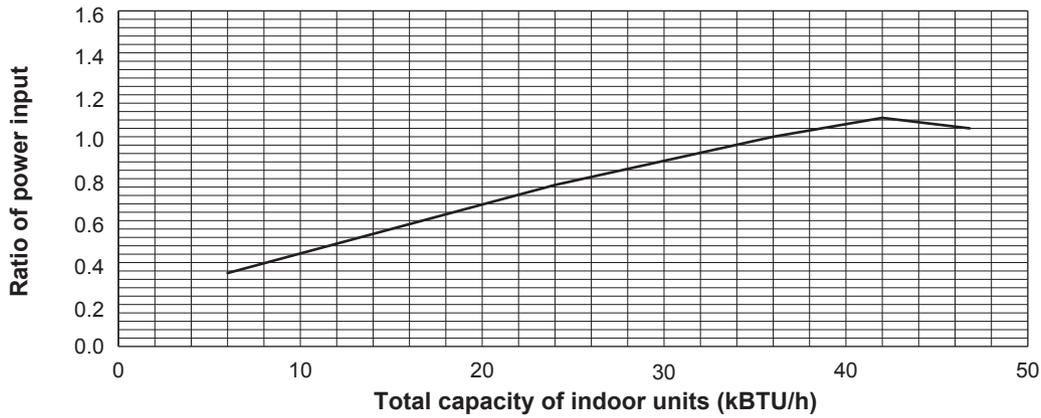
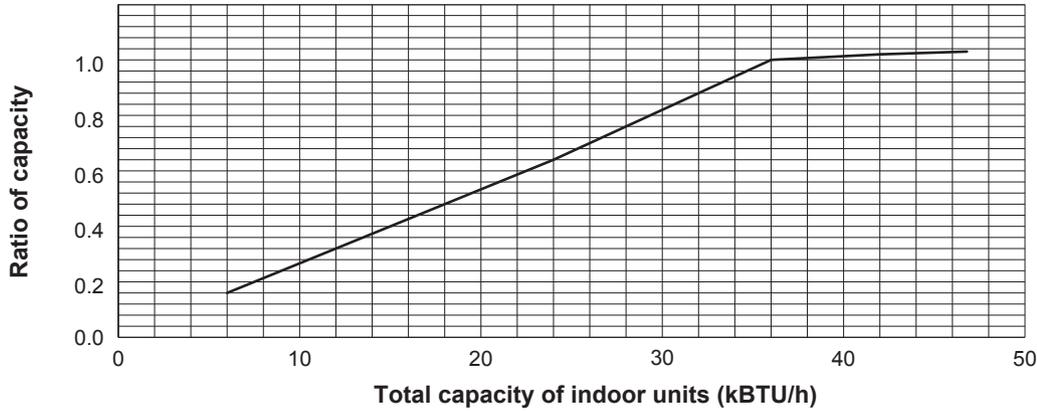
		MXZ 4C36NAHZ
Nominal cooling capacity	BTU/h	36,000
Input	kW	2.57
Current (208V)	A	12.8
Current (230V)	A	11.6



— 208, 230 V

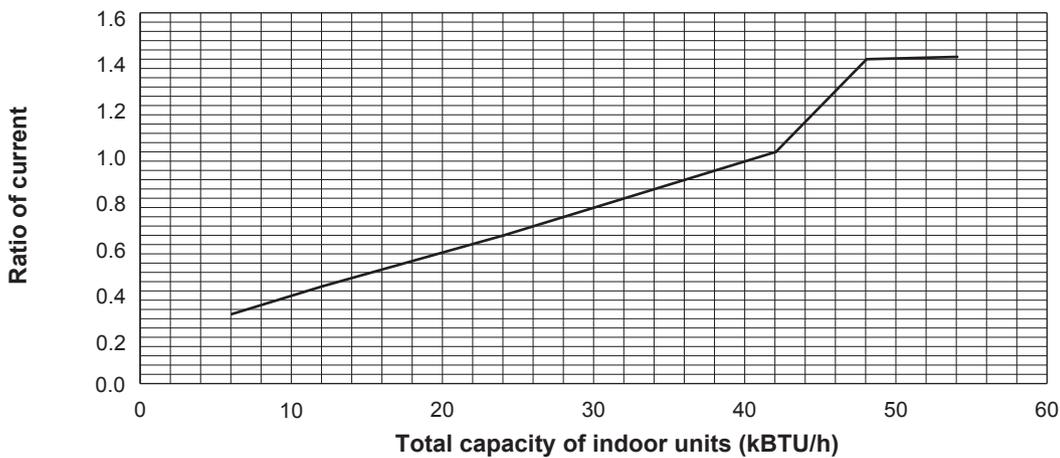
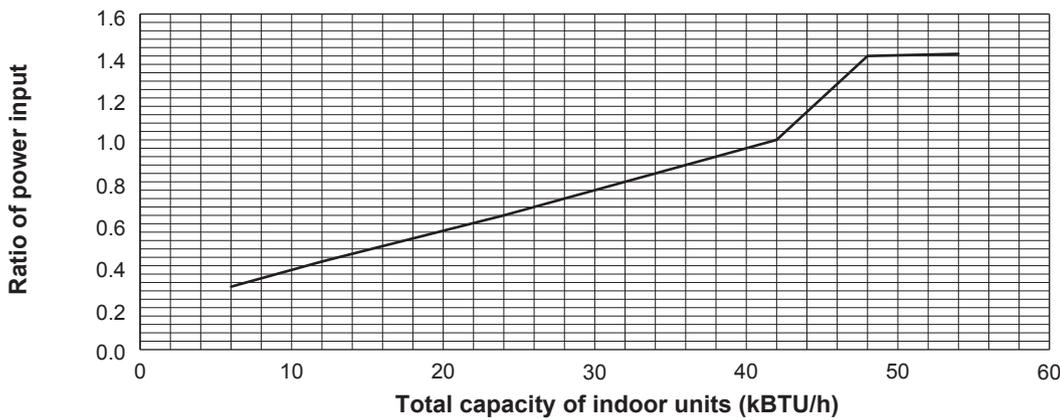
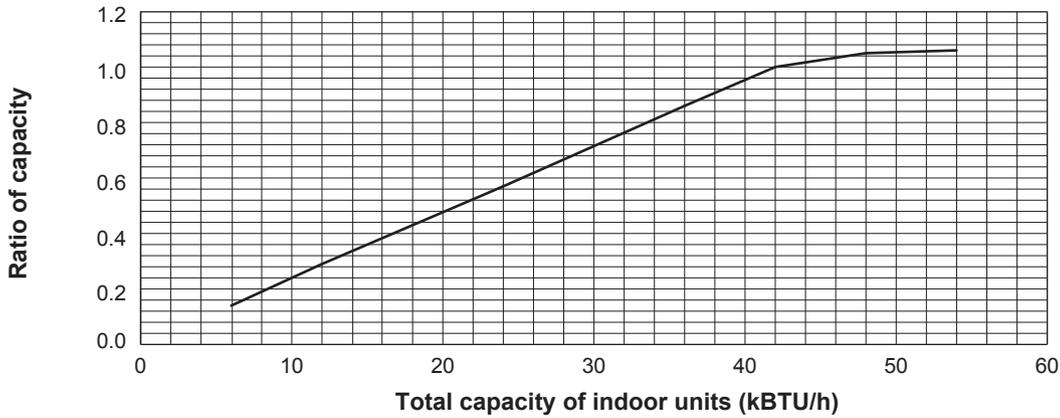
4-4-2. MXZ-4C36NAHZ <heating>

		MXZ 4C36NAHZ
Nominal cooling capacity	BTU/h	45,000
Input	kW	3.34
Current (208V)	A	16.4
Current (230V)	A	14.8



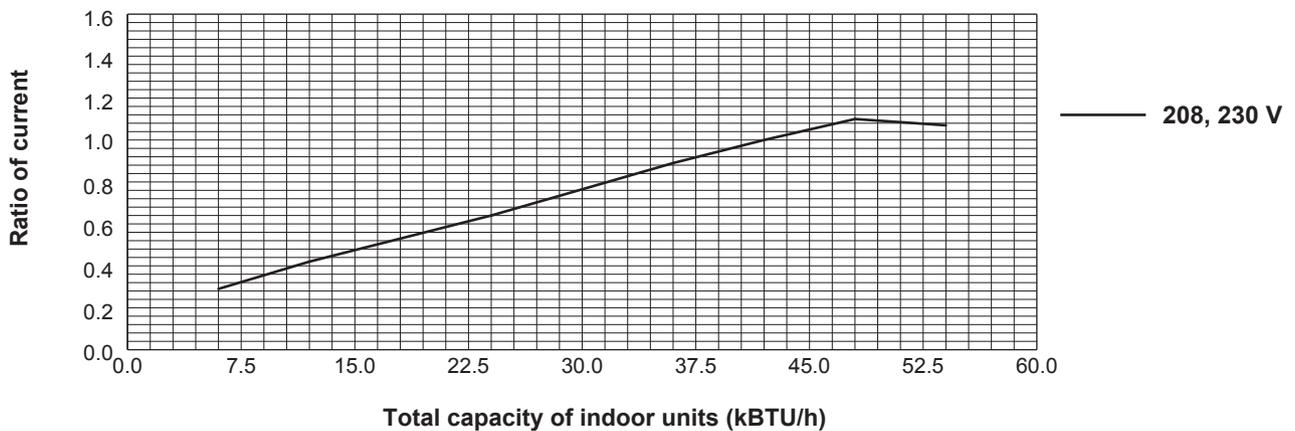
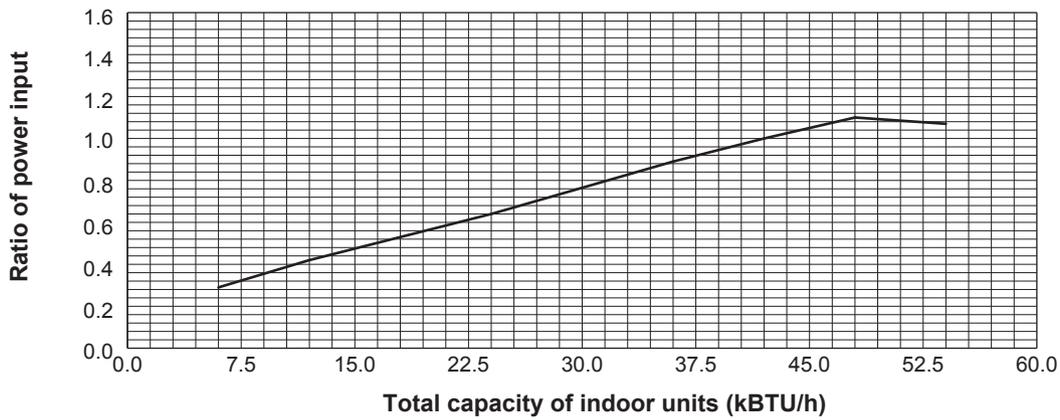
4-4-3. MXZ-5C42NAHZ <cooling>

		MXZ 5C42NAHZ
Nominal cooling capacity	BTU/h	42,000
Input	kW	3.13
Current (208V)	A	15.4
Current (230V)	A	14.0



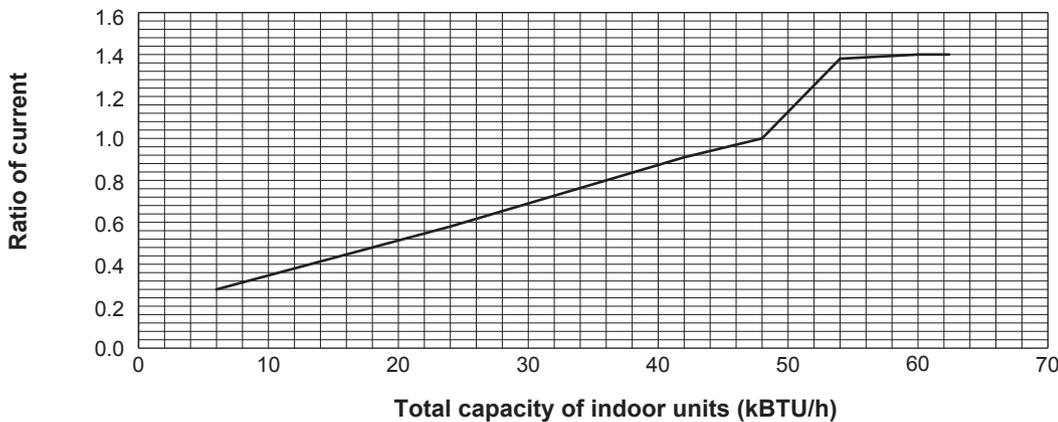
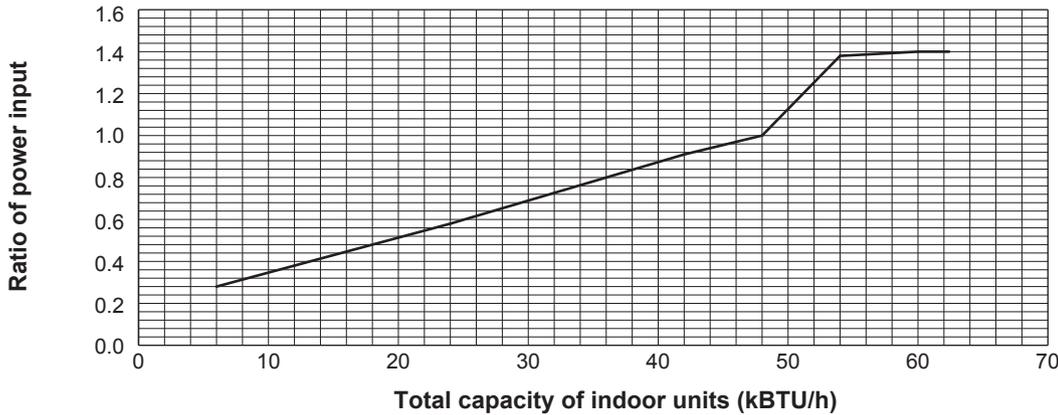
4-4-4. MXZ-5C42NAHZ <heating>

		MXZ 5C42NAHZ
Nominal cooling capacity	BTU/h	48,000
Input	kW	3.43
Current (208V)	A	16.8
Current (230V)	A	15.2



4-4-5. MXZ-8C48NA MXZ-8C48NAHZ <cooling>

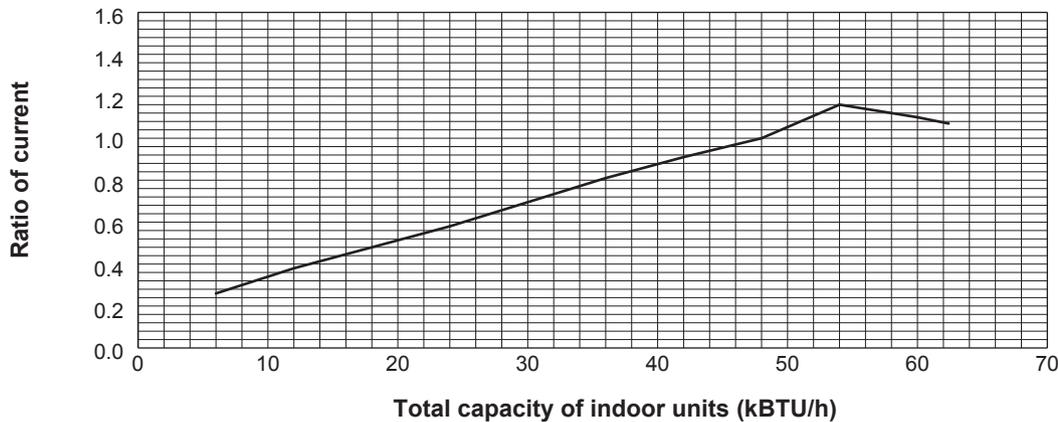
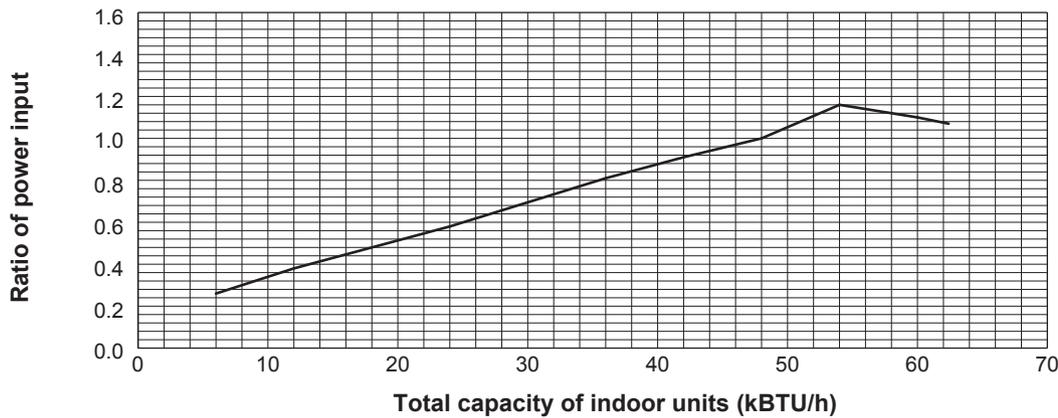
		MXZ 8C48NAHZ
Nominal cooling capacity	BTU/h	48,000
Input	kW	4.00
Current (208V)	A	19.5
Current (230V)	A	17.6



— 208, 230 V

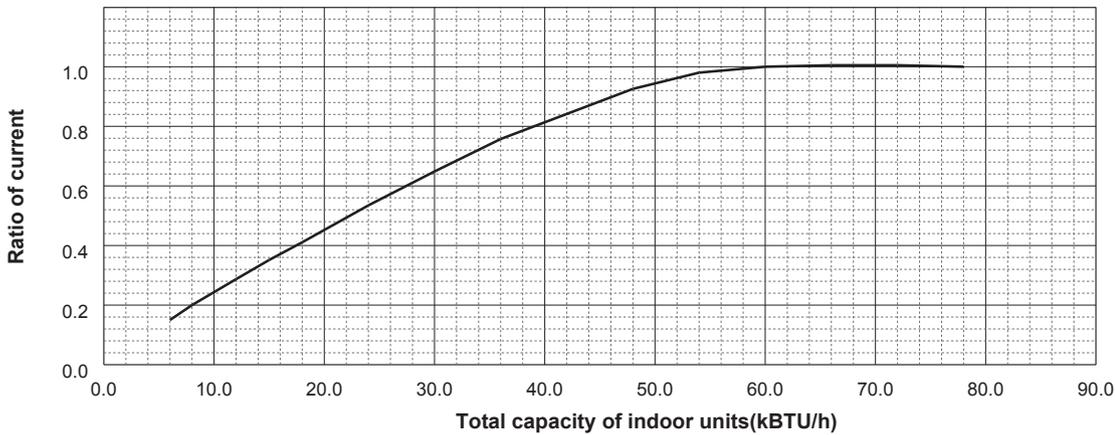
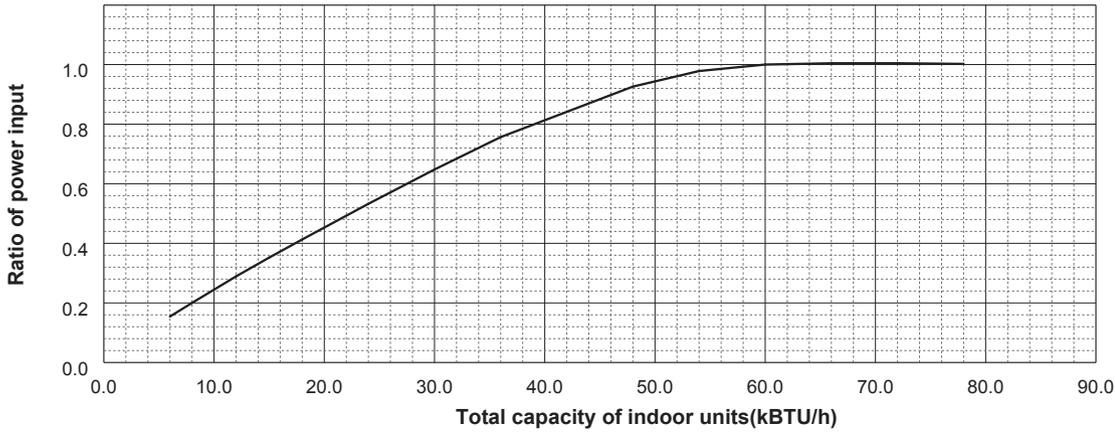
4-4-6. MXZ-8C48NA MXZ-8C48NAHZ <heating>

		MXZ
		8C48NA(HZ)
Nominal cooling capacity	BTU/h	54,000
Input	kW	4.22
Current (208V)	A	20.5
Current (230V)	A	18.6



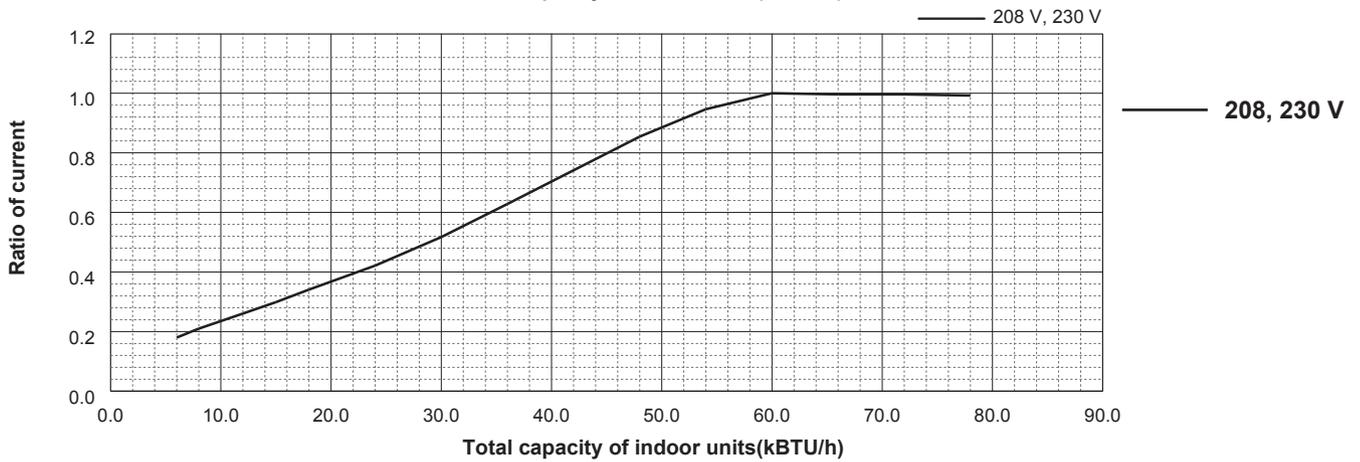
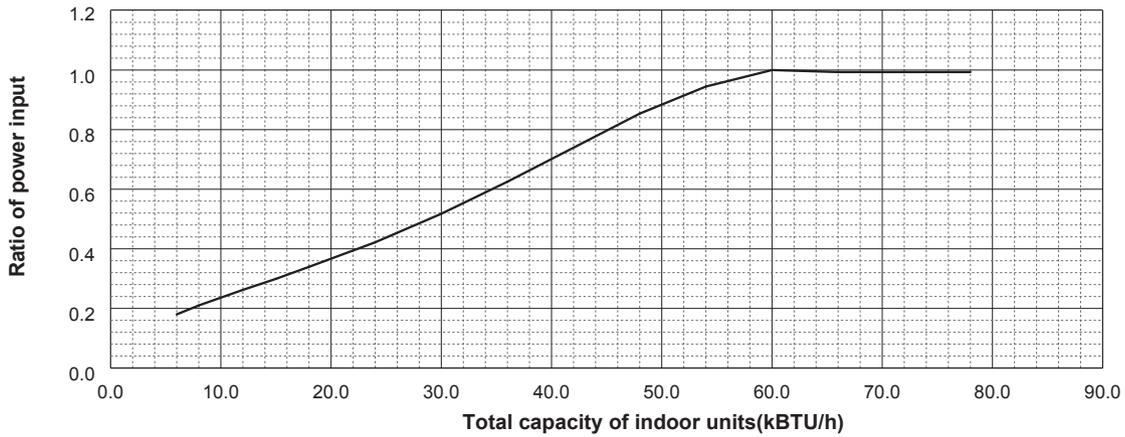
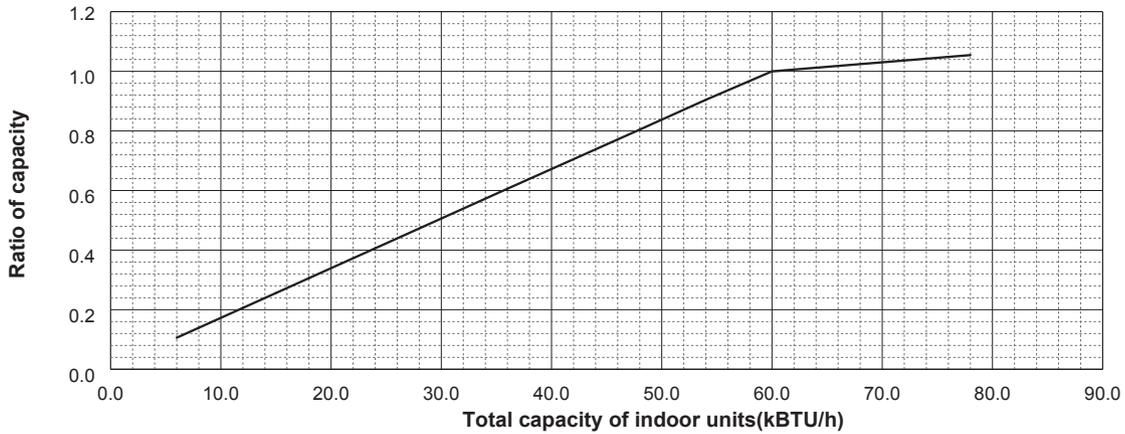
4-4-7. MXZ-8C60NA <cooling>

		MXZ
		8C60NA
Nominal cooling capacity	BTU/h	60,000
Input	kW	4.80
Current (208V)	A	24.1
Current (230V)	A	21.8



4-4-8. MXZ-8C60NA <heating>

		MXZ 8C60NA
Nominal cooling capacity	BTU/h	66,000
Input	kW	5.67
Current (208V)	A	28.5
Current (230V)	A	25.7



4-5. CORRECTING CAPACITY FOR CHANGES IN THE LENGTH OF REFRIGERANT PIPING

- (1) During cooling, obtain the ratio (and the equivalent piping length) of the outdoor units rated capacity and the total in-use indoor capacity, and find the capacity ratio corresponding to the standard piping length from Figure 13 to 18. Then multiply by the cooling capacity from Figure 7 and 8 in "4-2. CORRECTION BY TEMPERATURE" to obtain the actual capacity.
- (2) During heating, find the equivalent piping length, and find the capacity ratio corresponding to standard piping length from Figure 17. Then multiply by the heating capacity from Figure 9 to 12 in "4-2. CORRECTION BY TEMPERATURE" to obtain the actual capacity.

(1) Capacity Correction Curve

Figure 13 MXZ-4C36NAHZ <Cooling>

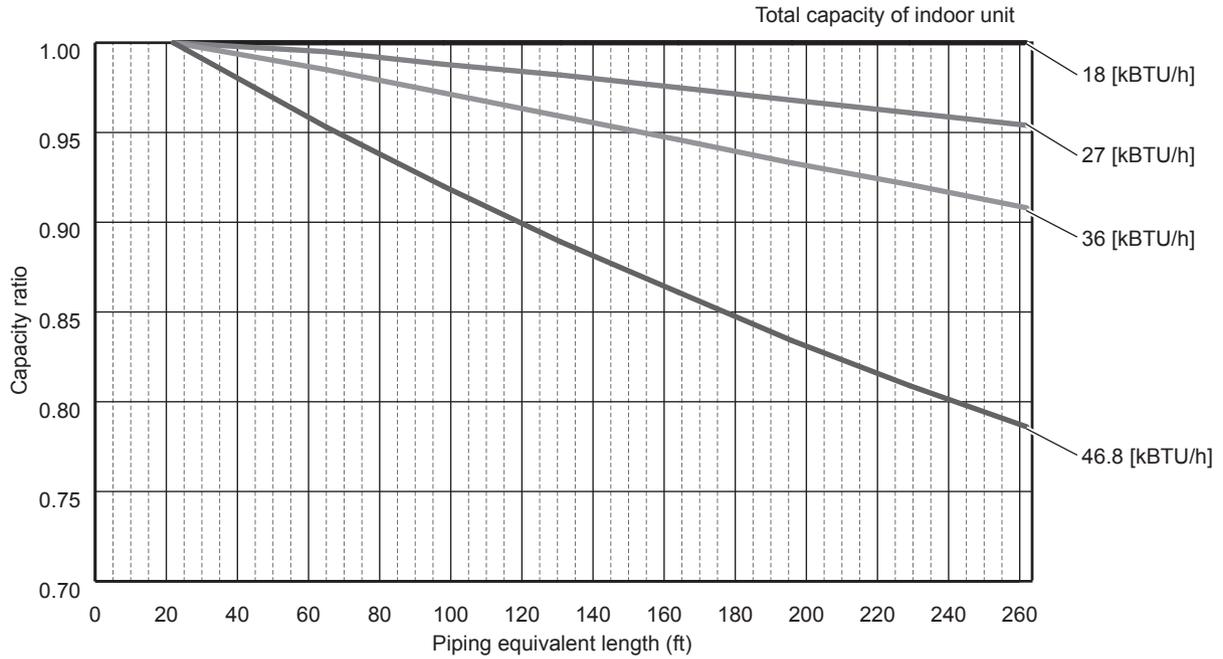


Figure 14 MXZ-5C42NAHZ <Cooling>

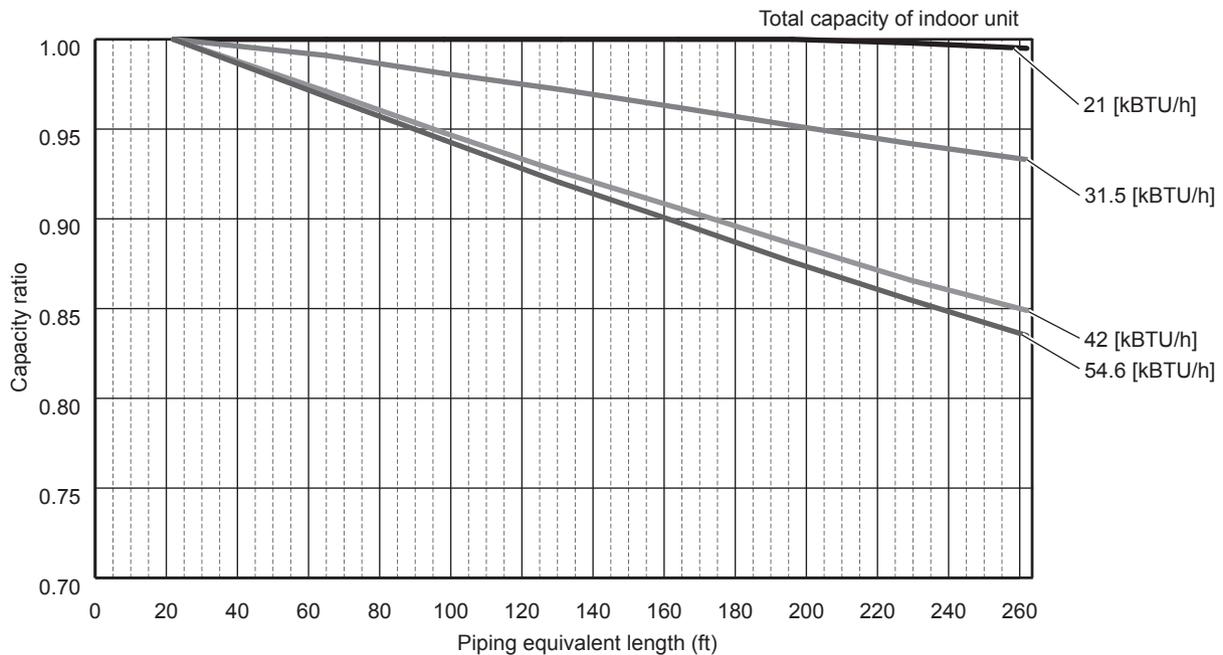


Figure 15 MXZ-8C48NA <Cooling>

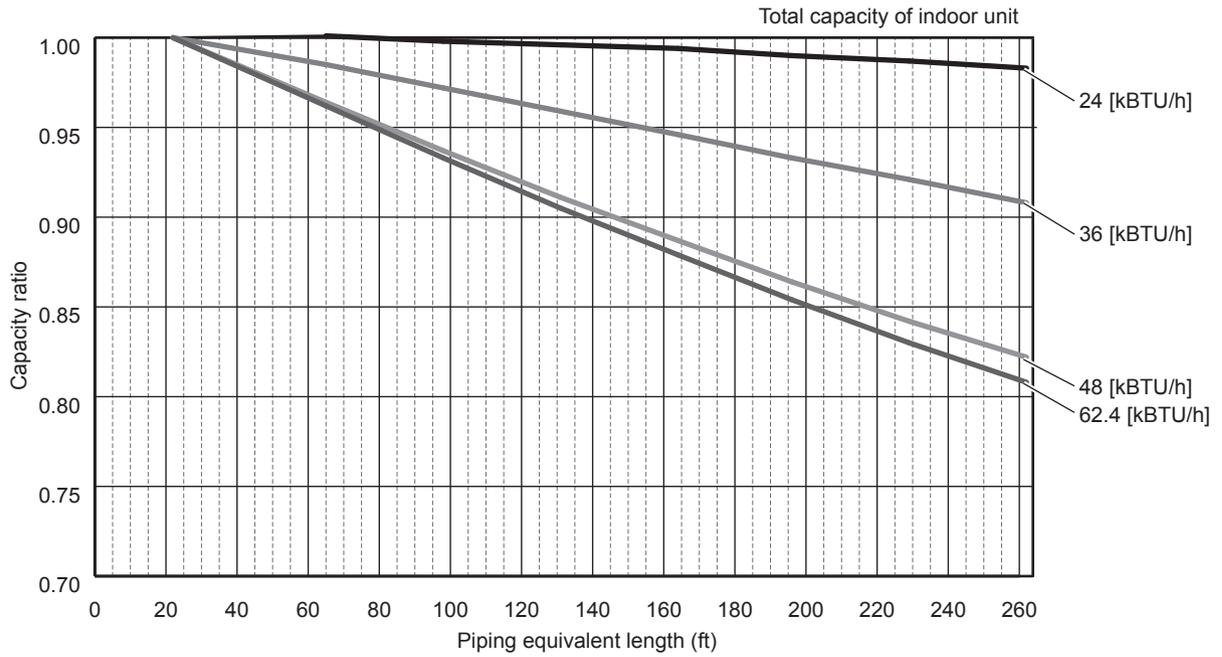


Figure 16 MXZ-8C60NA <Cooling>

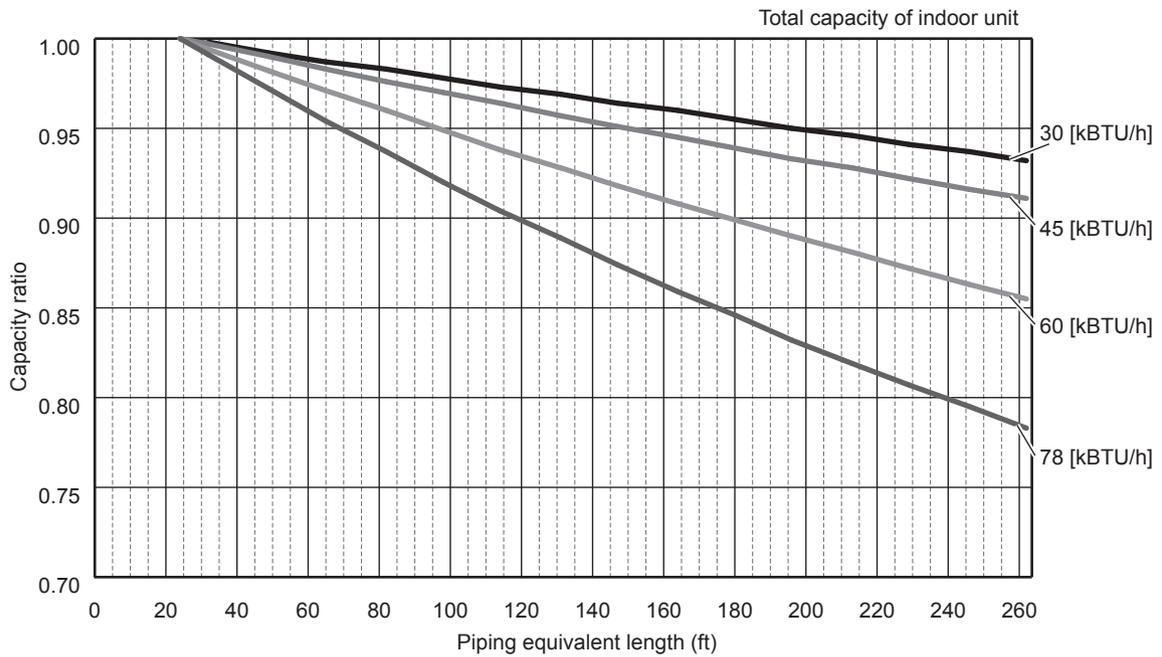


Figure 17 MXZ-4C36NAHZ/5C42NAHZ/8C48NA <Heating>

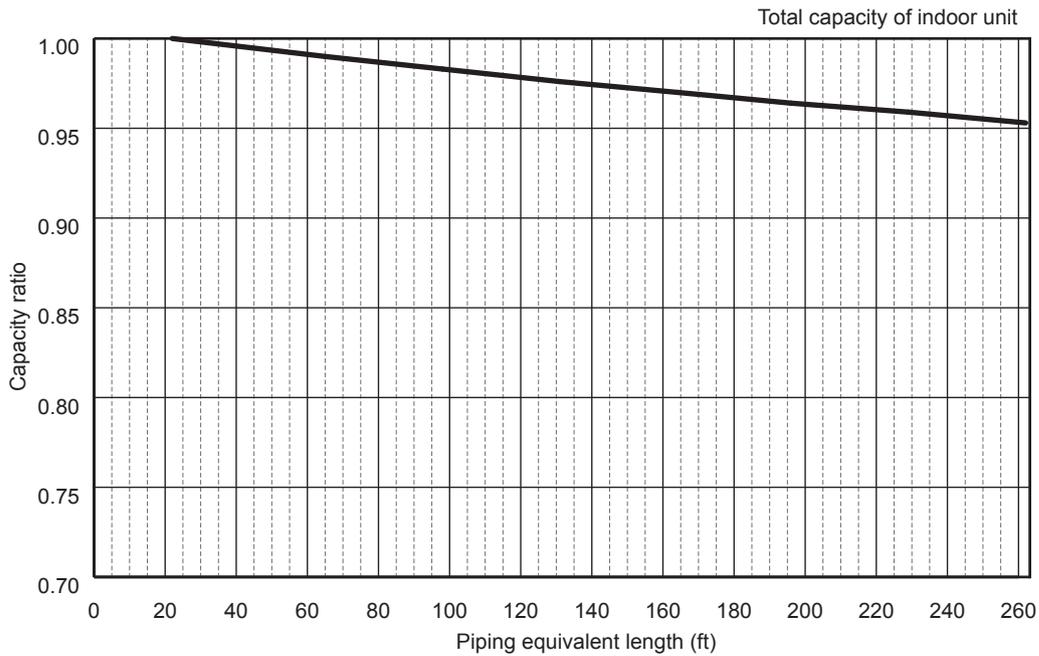
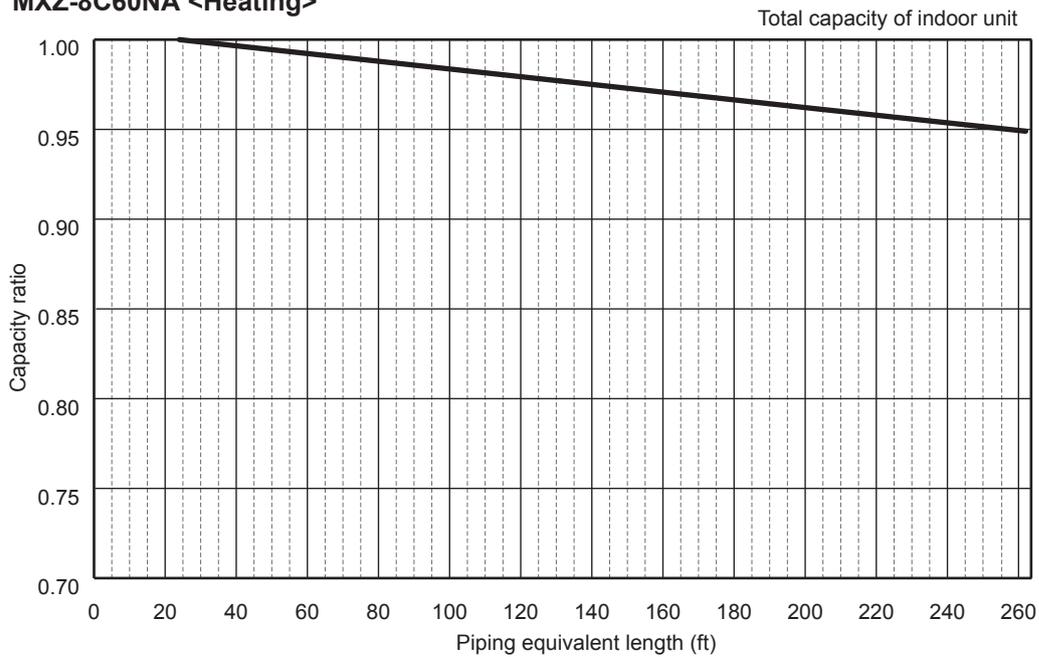


Figure 18 MXZ-8C60NA <Heating>



(2) Method for Obtaining the Equivalent Piping Length

Equivalent length for type P60 = (length of piping to farthest indoor unit) + (0.3 × number of bends in the piping) (m)

Length of piping to farthest indoor unit: type P60.....80 m

4-5-1. 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.

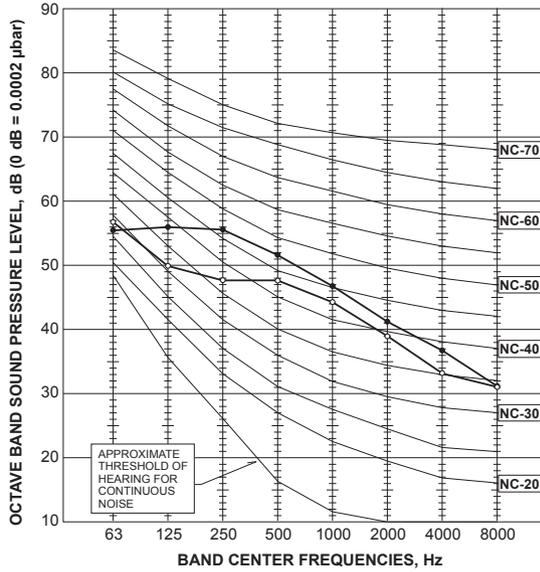
Correction factor diagram

Outdoor Intake temperature <W.B. °F (°C)>	43(6)	39(4)	36(2)	32(0)	28(-2)	25(-4)	21(-6)	18(-8)	14(-10)	5(-15)	-4(-20)	-13(-25)
Correction factor	1.0	0.98	0.89	0.88	0.89	0.9	0.95	0.95	0.95	0.95	0.95	0.95

4-6. NOISE CRITERION CURVES

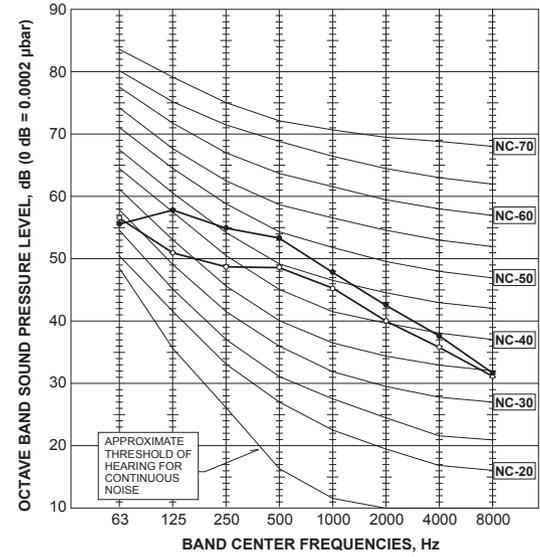
MXZ-4C36NAHZ
MXZ-4C36NAHZ-U1

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



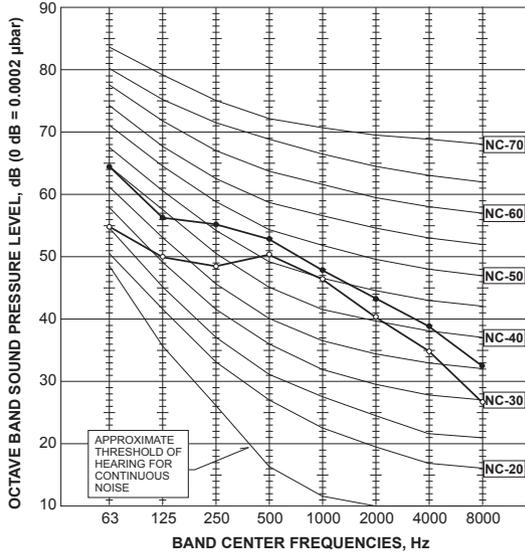
MXZ-5C42NAHZ
MXZ-5C42NAHZ-U1

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



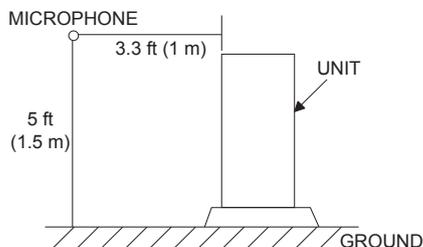
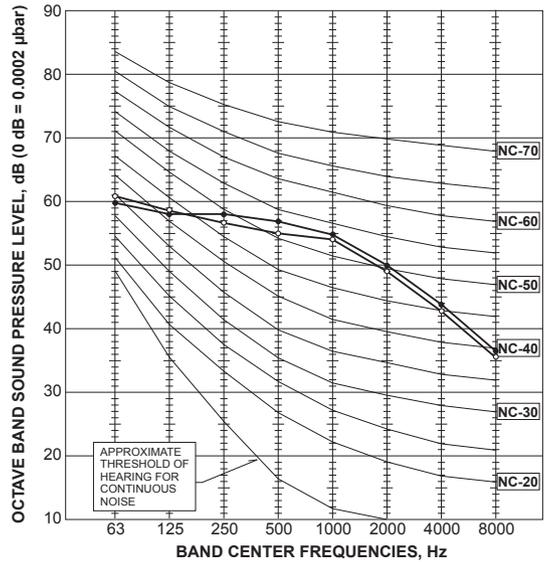
MXZ-8C48NA
MXZ-8C48NA-U1
MXZ-8C48NAHZ
MXZ-8C48NAHZ-U1

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



MXZ-8C60NA-U1

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



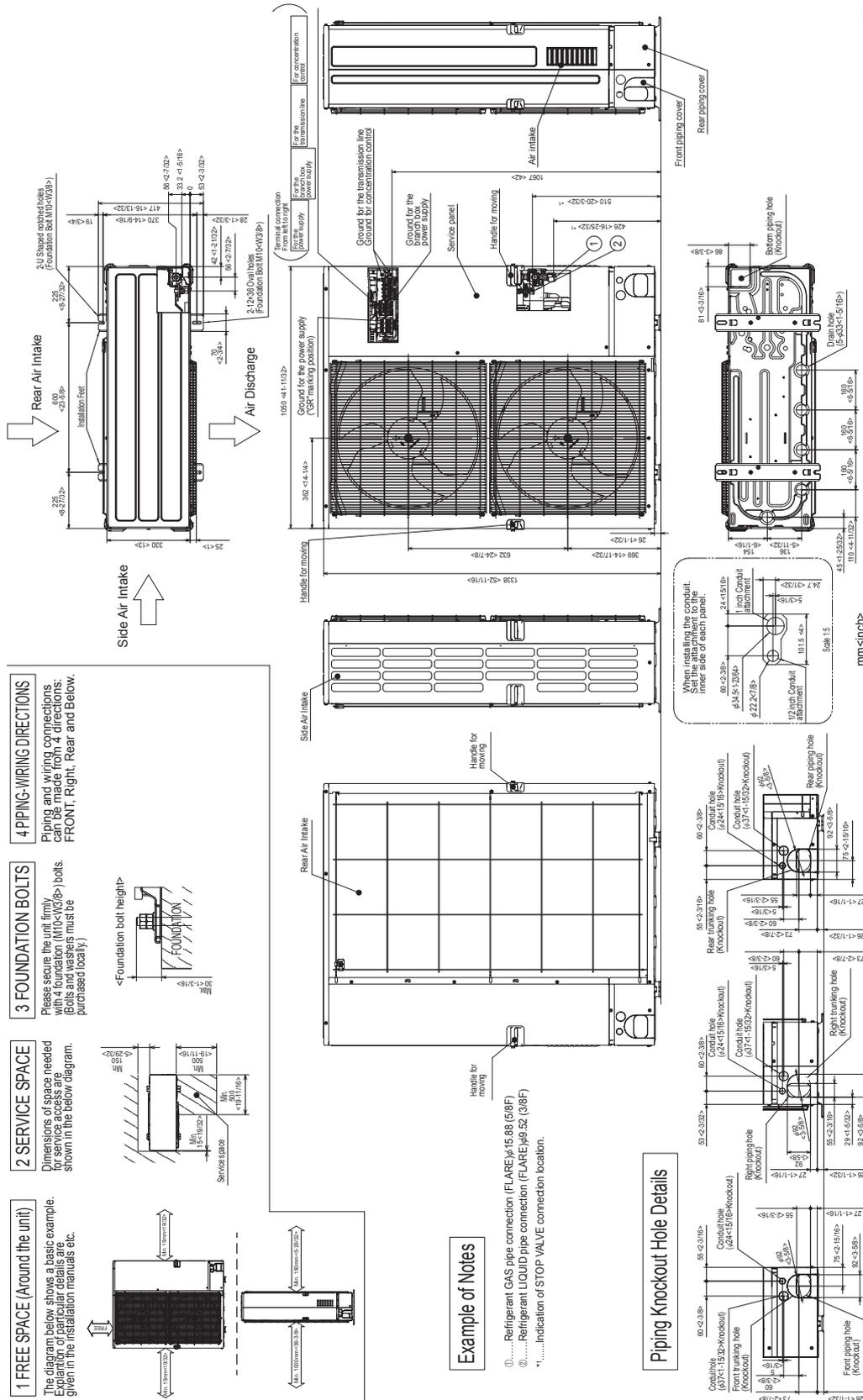
5-1. OUTDOOR UNIT MXZ-4C36NAHZ

MXZ-5C42NAHZ

MXZ-8C48NAHZ

MXZ-8C48NA

Unit: mm <inch>



4 PIPING-WIRING DIRECTIONS

Piping and wiring connections can be made from 4 directions: FRONT, Right, Rear and Below.

3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10xW3/8") bolts. (Bolt and washers must be purchased locally)

2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.

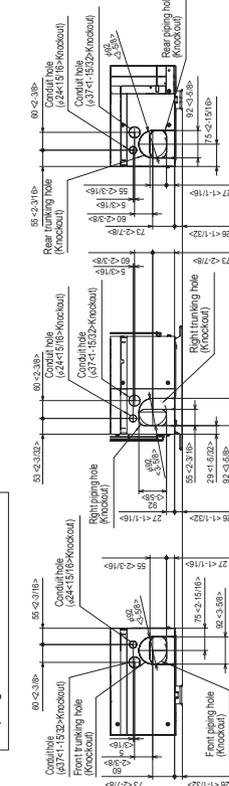
1 FREE SPACE (Around the unit)

The diagram below shows a basic example. Explanation of particular details are given in the installation manuals etc.

Example of Notes

- ①.....Refrigerant GAS pipe connection (FLARE)φ15.88 (5/8F)
- ②.....Refrigerant LIQUID pipe connection (FLARE)φ9.52 (3/8F)
- *1.....Indication of STOP VALVE connection location.

Piping Knockout Hole Details



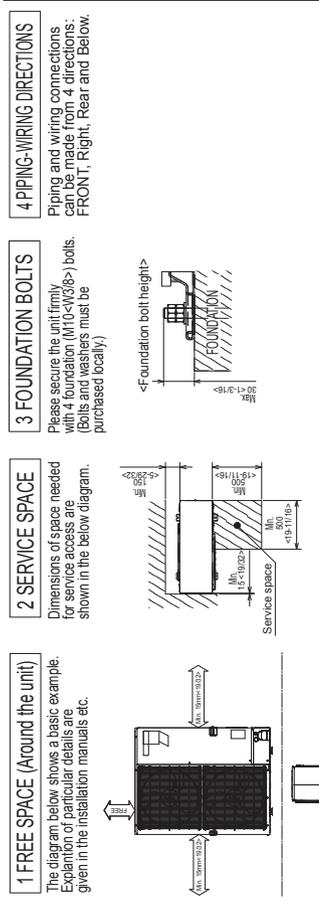
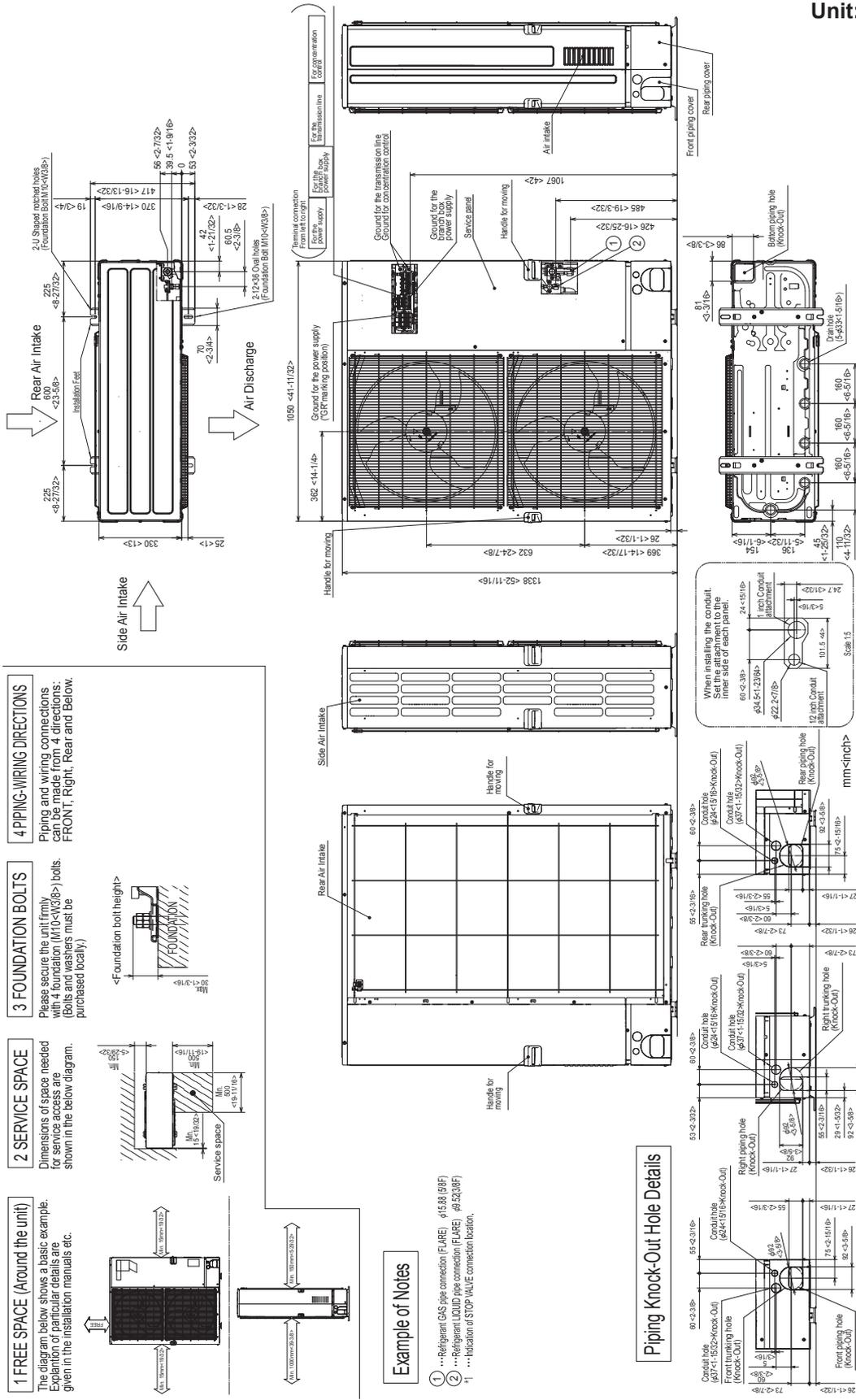
MXZ-4C36NAHZ-U1

MXZ-5C42NAHZ-U1

MXZ-8C48NAHZ-U1

MXZ-8C48NA-U1

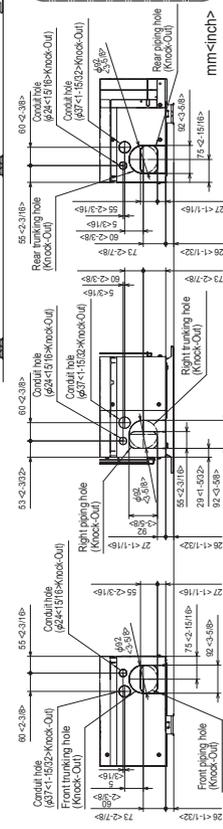
Unit: mm <inch>



Example of Notes

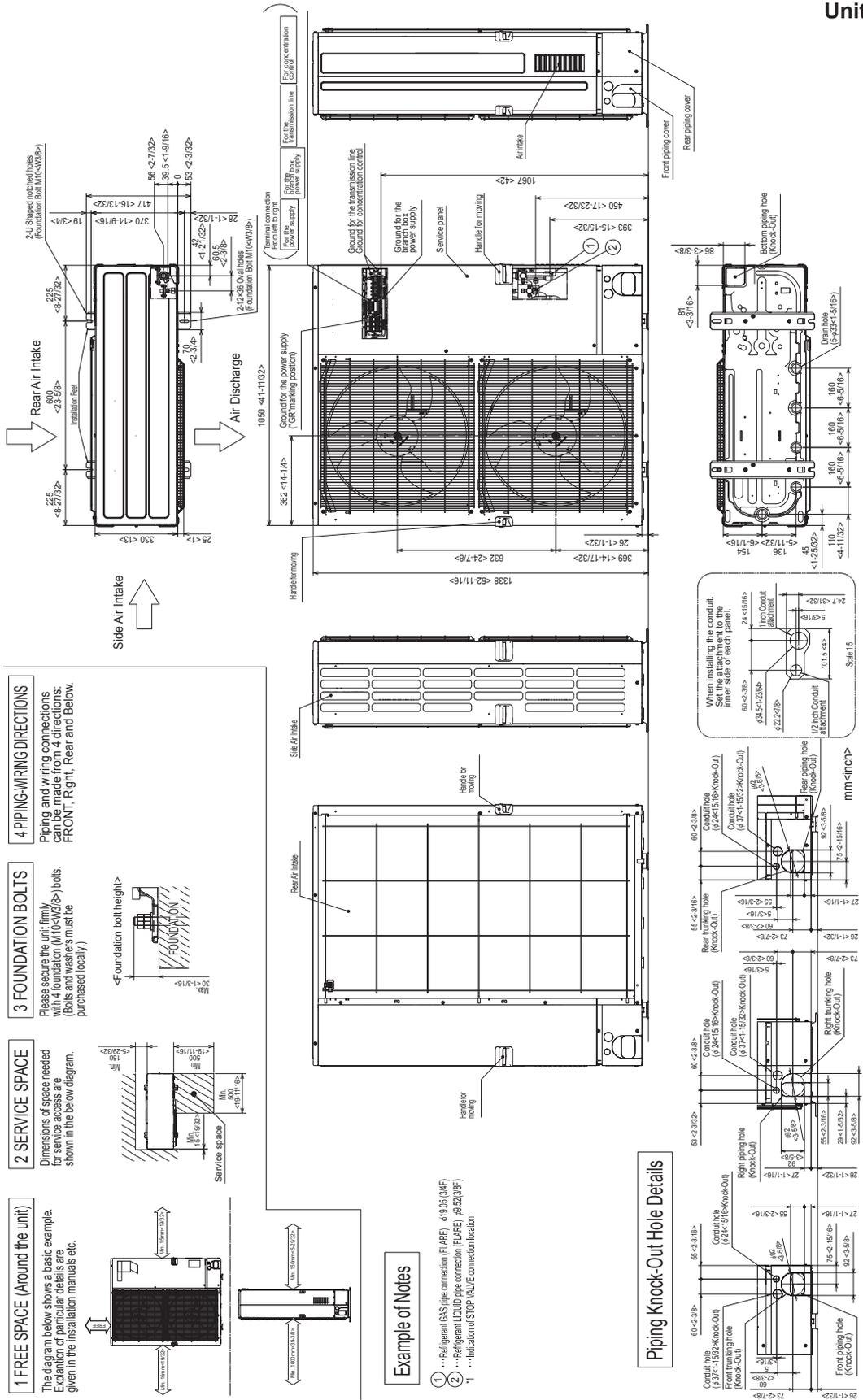
- ① **Refrigerant GAS pipe connection (FLARE) φ15.88 (5/8F)
- ② **Refrigerant LIQUID pipe connection (FLARE) φ6.32(3/8F)
- ③ **Indication of STOP VALVE connection location.

Piping Knock-Out Hole Details



MXZ-8C60NA-U1

Unit: mm <inch>



4 PIPING-WIRING DIRECTIONS
Piping and wiring connections can be made from 4 directions: FRONT, Right, Rear and Below.

3 FOUNDATION BOLTS
Please secure the unit firmly with 4 foundation (M10x1/3) bolts. (Bolts and washers must be purchased locally.)

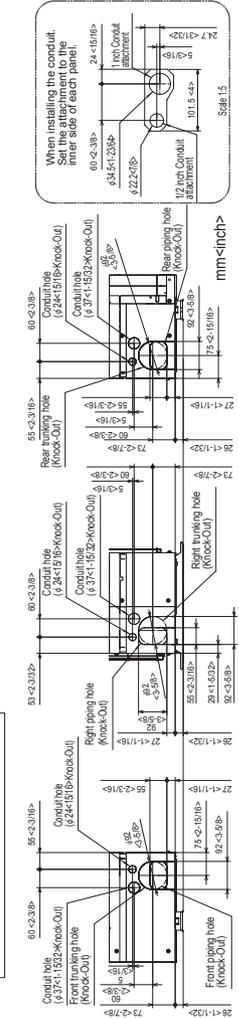
2 SERVICE SPACE
Dimensions of space needed for service access are shown in the below diagram.

1 FREE SPACE (Around the unit)
The diagram below shows a basic example. Expansion of particular details are given in the installation manuals etc.

Example of Notes

- ① **Refrigerant GAS pipe connection (FLARE) #19.05 (3/4F)
- ② **Refrigerant LIQUID pipe connection (FLARE) #6.52 (3/8F)
- † ...Indication of STOP VALVE connection location.

Piping Knock-Out Hole Details

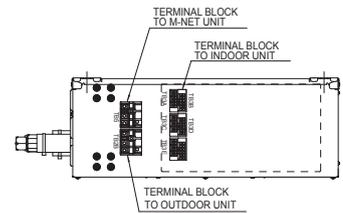
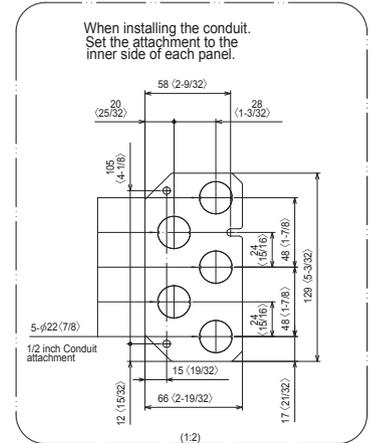
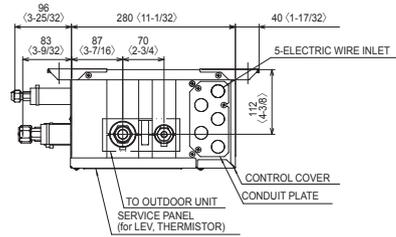
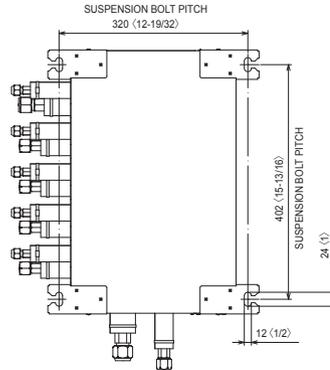
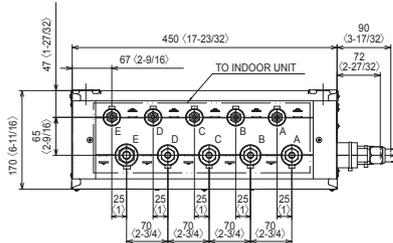


5-2. BRANCH BOX PAC-MKA50BC PAC-MKA51BC

Unit: mm <inch>

SUSPENSION BOLT : W3/8(M10)
REFRIGERANT PIPE FLARED CONNECTION Unit: inch

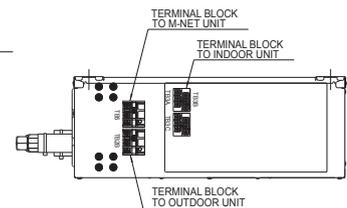
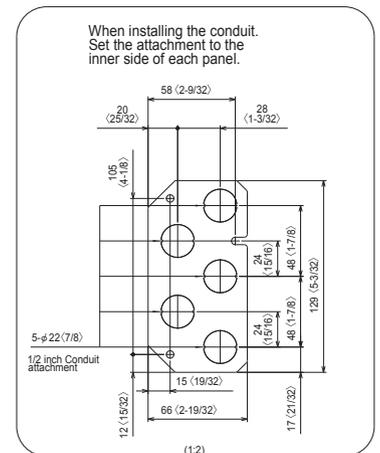
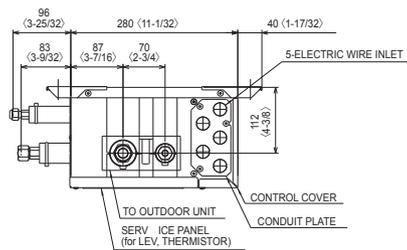
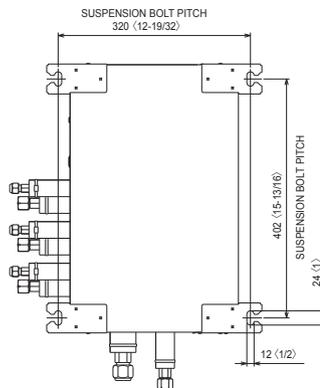
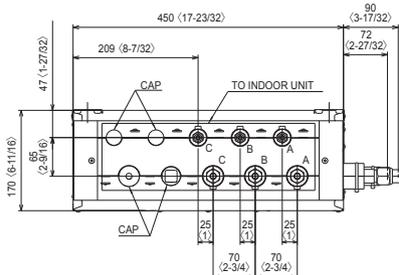
	A	B	C	D	E	TO OUTDOOR UNIT
LIQUID PIPE	1/4F	1/4F	1/4F	1/4F	1/4F	3/8F
GAS PIPE	3/8F	3/8F	3/8F	3/8F	1/2F	5/8F



PAC-MKA30BC PAC-MKA31BC

SUSPENSION BOLT : W3/8(M10)
REFRIGERANT PIPE FLARED CONNECTION Unit: inch

	A	B	C		TO OUTDOOR UNIT
LIQUID PIPE	1/4F	1/4F	1/4F		3/8F
GAS PIPE	3/8F	3/8F	3/8F		5/8F

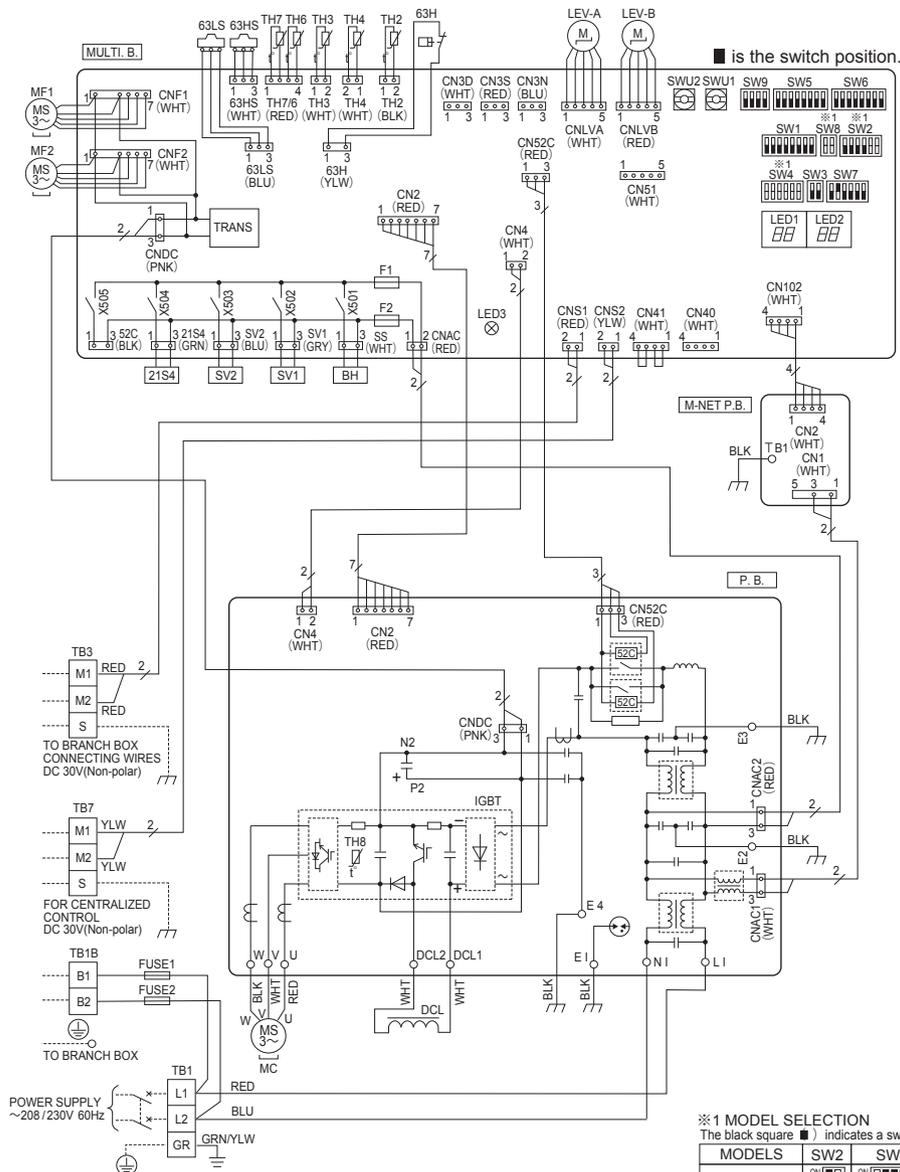


6-1. OUTDOOR UNIT MXZ-4C36NAHZ

MXZ-5C42NAHZ

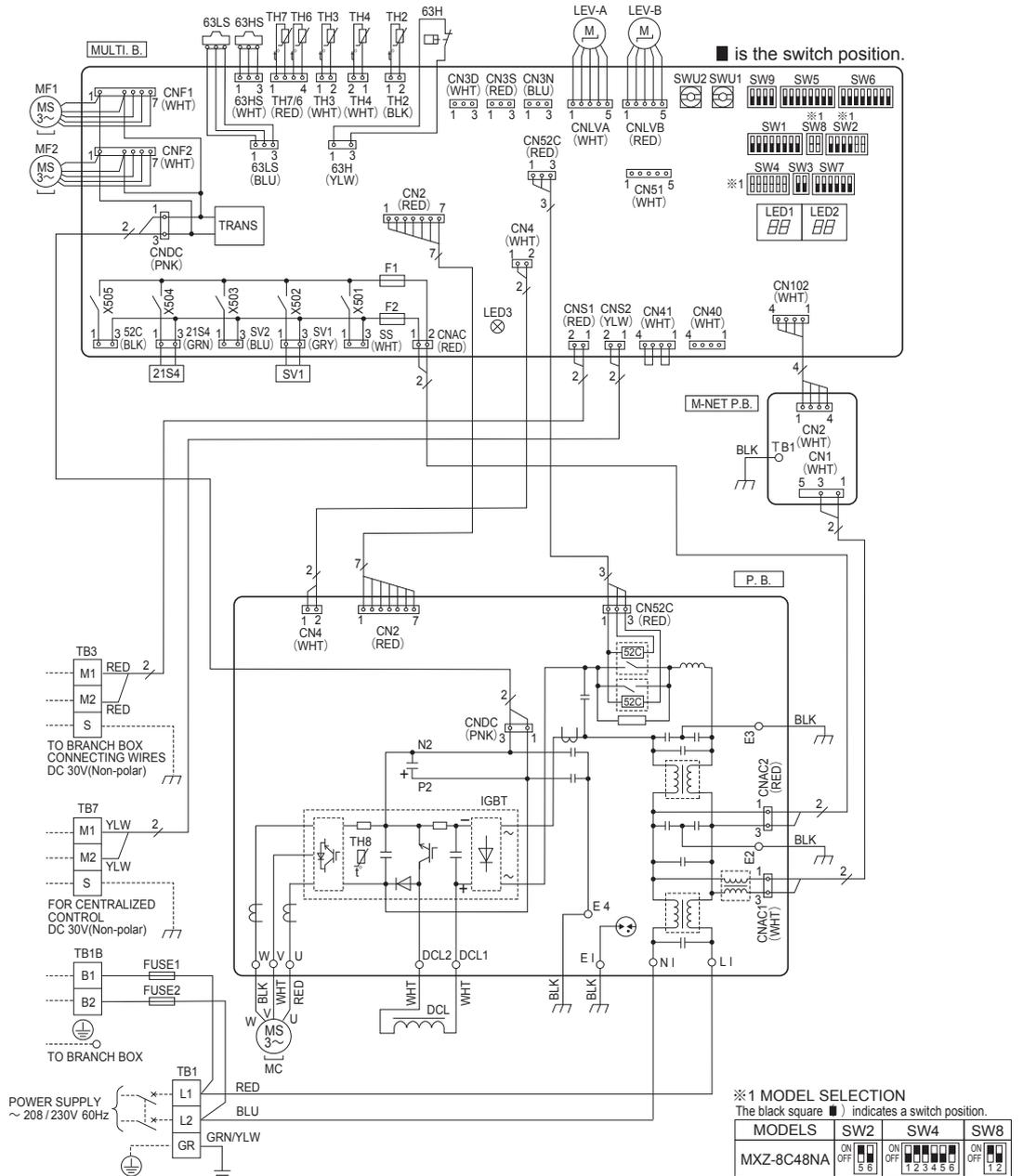
MXZ-8C48NAHZ

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH6	Thermistor (Suction Pipe)	SW7	Switch (Function Selection)
TB1B	Terminal Block (Branch Box)	TH7	Thermistor (Ambient)	SW8	Switch (Model Selection)
TB3	Terminal Block (Branch box/Outdoor Transmission Line)	TH8	Thermistor (Heat Sink)	SW9	Switch (Function Selection)
TB7	Terminal Block (Centralized Control Transmission Line)	LEV-A,LEV-B	Electronic Expansion Valve	SWU1	Switch (Unit Address Selection, 1st digit)
FUSE1,FUSE2	Fuse (T20AL250V)	DCL	Reactor	SWU2	Switch (Unit Address Selection, 2nd digit)
MC	Motor For Compressor	P.B.	Power Circuit Board	CNS1	Connector (Branch box/Outdoor Transmission Line)
MF1,MF2	Fan Motor	U/V/W	Connection Terminal (U/V/W-Phase)	CNS2	Connector (Centralized Control Transmission Line)
21S4	Solenoid Valve (Four-Way Valve)	LI	Connection Terminal (L-Phase)	SS	Connector (Base heater)
63H	High Pressure Switch	NI	Connection Terminal (N-Phase)	CN3D	Connector (Connection For Option)
63HS	High Pressure Sensor	DCL1,DCL2	Connection Terminal (Reactor)	CN3S	Connector (Connection For Option)
63LS	Low Pressure Sensor	IGBT	Power Module	CN3N	Connector (Connection For Option)
SV1	Solenoid Valve (Bypass Valve)	E1,E2,E3,E4	Connection Terminal (Ground)	CN51	Connector (Connection For Option)
SV2	Solenoid Valve (Switching Valve)	MULTI.B.	Controller Circuit Board	LED1,LED2	LED (Operation Inspection Display)
BH	Base heater	SW1	Switch (Display Selection)	LED3	LED (Power Supply to Main Microcomputer)
TH2	Thermistor (Hic Pipe)	SW2	Switch (Function Selection)	F1,F2	Fuse (T6,3AL250V)
TH3	Thermistor (Outdoor Liquid Pipe)	SW3	Switch (Test Run)	X501~505	Relay
TH4	Thermistor (Compressor)	SW4	Switch (Model Selection)	M-NET P.B.	M-NET Power Circuit Board
		SW5	Switch (Function Selection)	TB1	Connection Terminal (Ground)
		SW6	Switch (Function Selection)		



MXZ-8C48NA

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH7	Thermistor (Ambient)	SW7	Switch (Function Selection)
TB1B	Terminal Block (Branch Box)	TH8	Thermistor (Heat Sink)	SW8	Switch (Model Selection)
TB3	Terminal Block (Branch box/Outdoor Transmission Line)	LEV-A,LEV-B	Electronic Expansion Valve	SW9	Switch (Function Selection)
TB7	Terminal Block (Centralized Control Transmission Line)	DCL	Reactor	SWU1	Switch (Unit Address Selection, 1st digit)
FUSE1,FUSE2	Fuse (T20AL250V)	P.B.	Power Circuit Board	SWU2	Switch (Unit Address Selection, 2nd digit)
MC	Motor For Compressor	U/V/W	Connection Terminal (U/V/W-Phase)	CNS1	Connector (Branch box/Outdoor Transmission Line)
MF1,MF2	Fan Motor	LI	Connection Terminal (L-Phase)	CNS2	Connector (Centralized Control Transmission Line)
21S4	Solenoid Valve (Four-Way Valve)	NI	Connection Terminal (N-Phase)	SS	Connector (Connection For Option)
63H	High Pressure Switch	DCL1,DCL2	Connection Terminal (Reactor)	CN3D	Connector (Connection For Option)
63HS	High Pressure Sensor	IGBT	Power Module	CN3S	Connector (Connection For Option)
63LS	Low Pressure Sensor	E1,E2,E3,E4	Connection Terminal (Ground)	CN3N	Connector (Connection For Option)
SV1	Solenoid Valve (Bypass Valve)	MULTI.B.	Controller Circuit Board	CN51	Connector (Connection For Option)
TH2	Thermistor (Hic Pipe)	SW1	Switch (Display Selection)	LED1,LED2	LED (Operation Inspection Display)
TH3	Thermistor (Outdoor Liquid Pipe)	SW2	Switch (Function Selection)	LED3	LED (Power Supply to Main Microcomputer)
TH4	Thermistor (Compressor)	SW3	Switch (Test Run)	F1,F2	Fuse (T6,3AL250V)
TH6	Thermistor (Suction Pipe)	SW4	Switch (Model Selection)	X501~505	Relay
		SW5	Switch (Function Selection)	M-NET P.B.	M-NET Power Circuit Board
		SW6	Switch (Function Selection)	TB1	Connection Terminal (Ground)

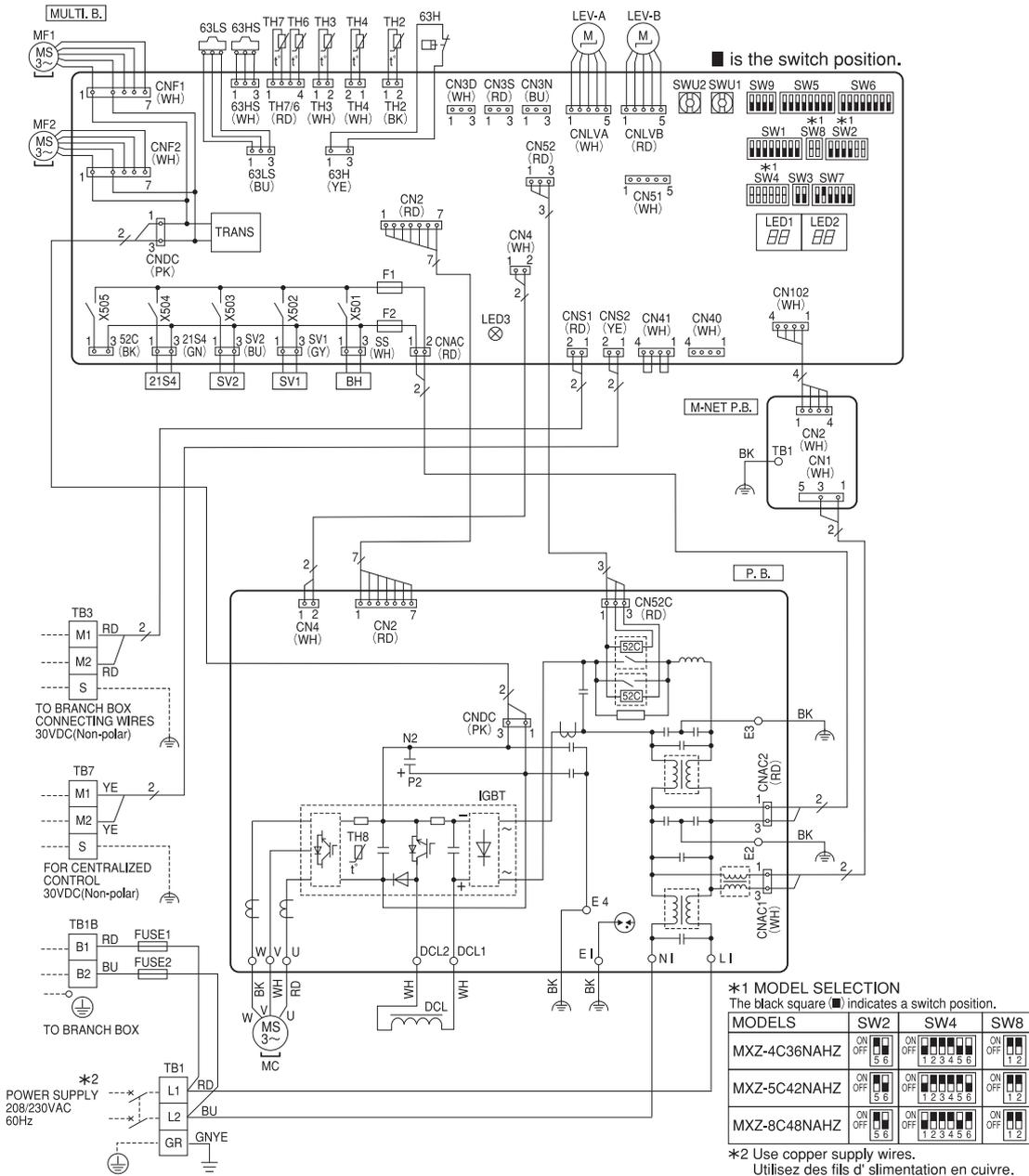


MXZ-4C36NAHZ-U1

MXZ-5C42NAHZ-U1

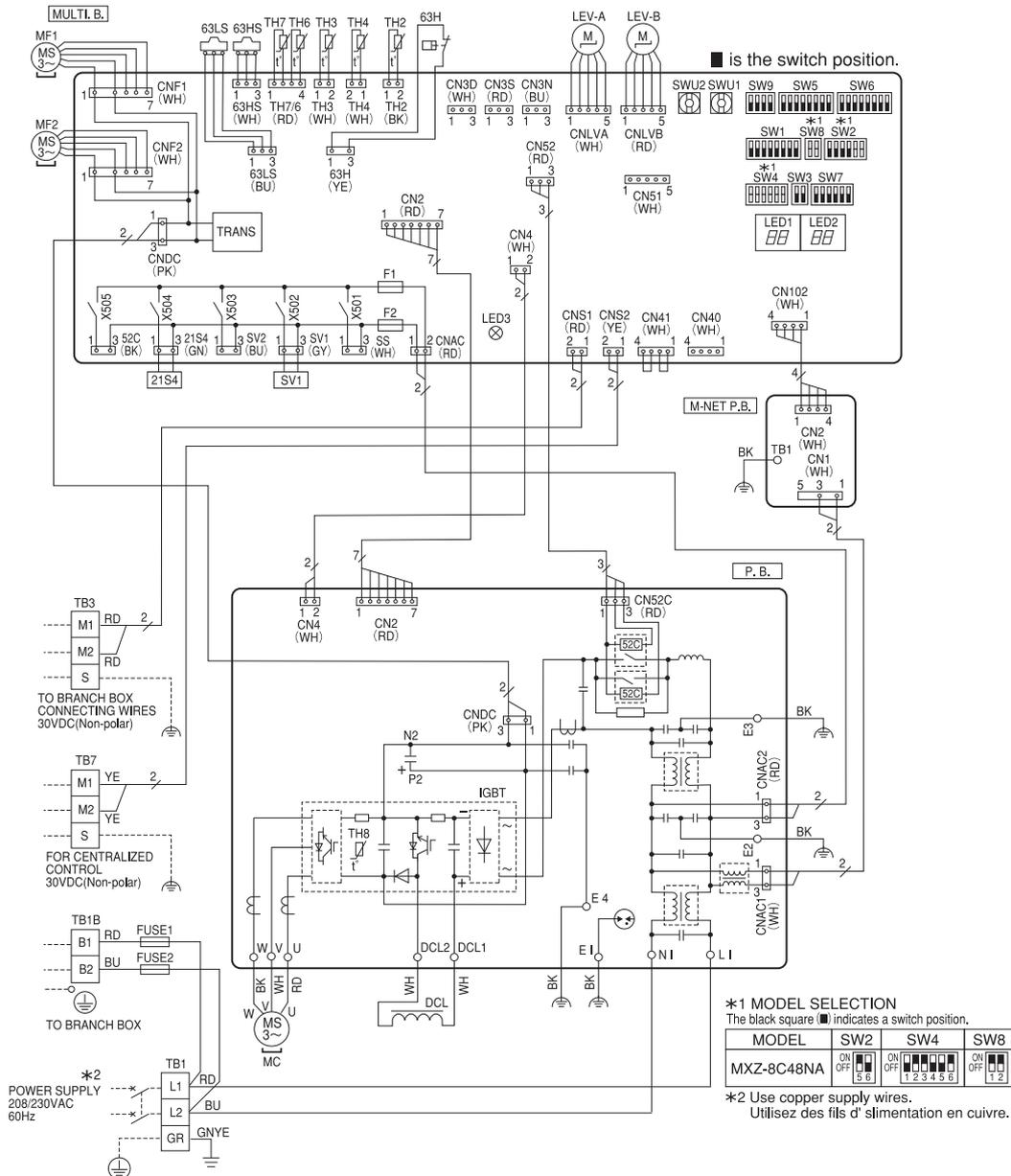
MXZ-8C48NAHZ-U1

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH7	Thermistor (Ambient)	SW9	Switch (Function Selection)
TB1B	Terminal Block (Branch Box)	TH8	Thermistor (Heat Sink)	SWU1	Switch (Unit Address Selection, ones digit)
TB3	Terminal Block (Branch Box/Outdoor Transmission Line)	LEV-A, LEV-B	Linear Expansion Valve	SWU2	Switch (Unit Address Selection, tens digit)
TB7	Terminal Block (Centralized Control Transmission Line)	DCL	Reactor	CNS1	Connector (Branch Box/Outdoor Transmission Line)
FUSE1, FUSE2	Fuse (T20AL250V)	P.B.	Power Circuit Board	CNS2	Connector (Centralized Control Transmission Line)
MC	Motor For Compressor	U/V/W	Connection Terminal (U/V/W-Phase)	SS	Connector (Connection For Option)
MF1, MF2	Fan Motor	LI	Connection Terminal (L-Phase)	CN3D	Connector (Connection For Option)
21S4	Solenoid Valve Coil (4-Way Valve)	NI	Connection Terminal (N-Phase)	CN3S	Connector (Connection For Option)
63H	High Pressure Switch	DCL1, DCL2	Connection Terminal (Reactor)	CN3N	Connector (Connection For Option)
63HS	High Pressure Sensor	IGBT	Power Module	CN51	Connector (Connection For Option)
63LS	Low Pressure Sensor	E1, E2, E3, E4	Connection Terminal (Electrical Parts Box)	LED1, LED2	LED (Operation Inspection Display)
SV1	Solenoid Valve Coil (Bypass Valve)	MULTI.B.	Multi Controller Circuit Board	LED3	LED (Power Supply to Main Microcomputer)
SV2	Solenoid Valve (Switching Valve)	SW1	Switch (Display Selection)	F1, F2	Fuse (T6.3AL250V)
BH	Base Heater	SW2	Switch (Function Selection)	X501~505	Relay
TH2	Thermistor (Hic Pipe)	SW3	Switch (Test Run)	M-NET P.B.	M-NET Power Circuit Board
TH3	Thermistor (Outdoor Liquid Pipe)	SW4	Switch (Model Selection)	TB1	Connection Terminal (Electrical Parts Box)
TH4	Thermistor (Compressor)	SW5	Switch (Function Selection)		
TH6	Thermistor (Suction Pipe)	SW6	Switch (Function Selection)		
		SW7	Switch (Function Selection)		
		SW8	Switch (Model Selection)		



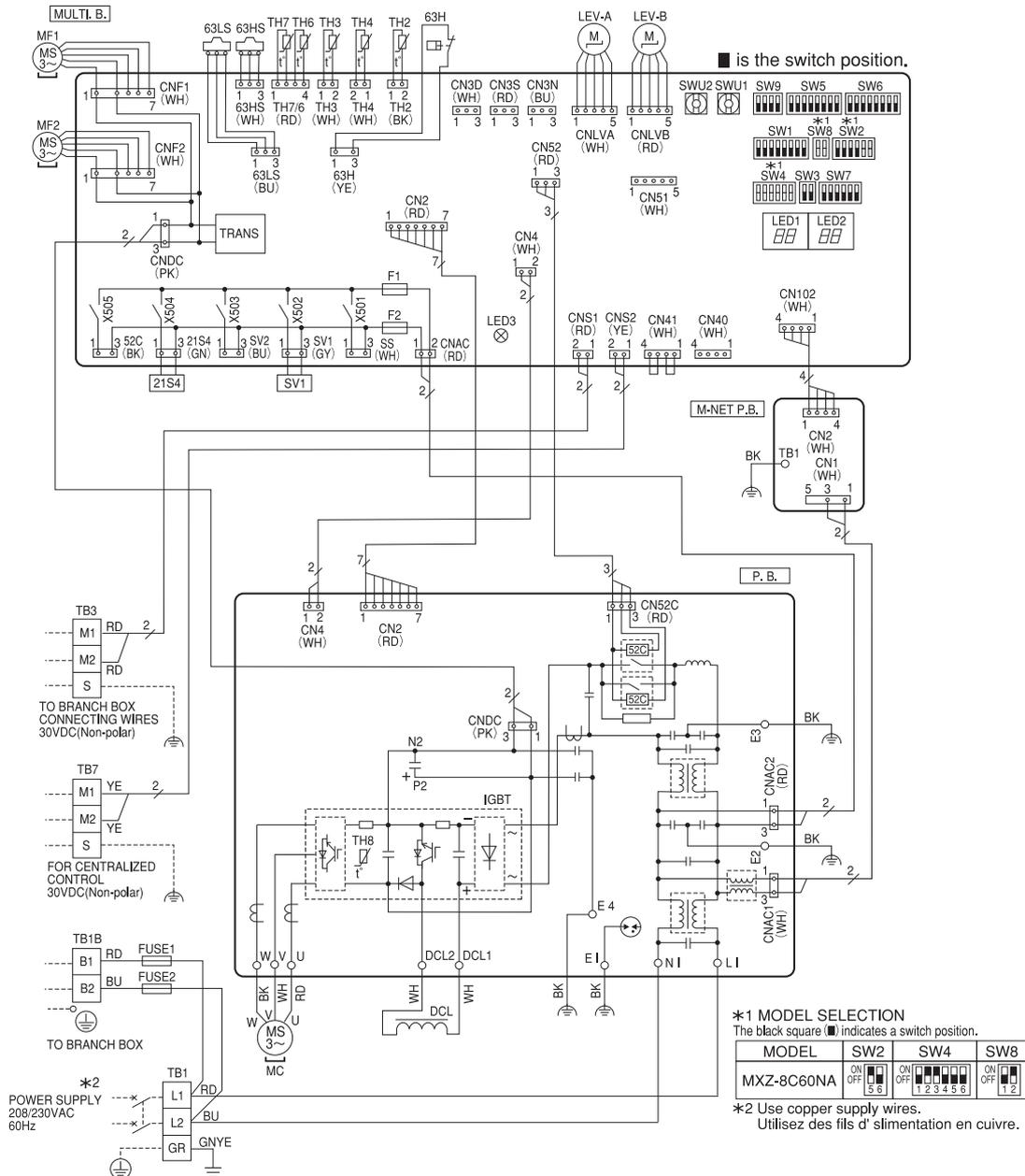
MXZ-8C48NA-U1

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH8	Thermistor (Heat Sink)	SW9	Switch (Function Selection)
TB1B	Terminal Block (Branch Box)	LEV-A, LEV-B	Linear Expansion Valve	SWU1	Switch (Unit Address Selection, ones digit)
TB3	Terminal Block (Branch Box/Outdoor Transmission Line)	DCL	Reactor	SWU2	Switch (Unit Address Selection, tens digit)
TB7	Terminal Block (Centralized Control Transmission Line)	P.B.	Power Circuit Board	CNS1	Connector (Branch Box/Outdoor Transmission Line)
FUSE1, FUSE2	Fuse (T20AL250V)	U/V/W	Connection Terminal (U/V/W-Phase)	CNS2	Connector (Centralized Control Transmission Line)
MC	Motor For Compressor	LI	Connection Terminal (L-Phase)	SS	Connector (Connection For Option)
MF1, MF2	Fan Motor	NI	Connection Terminal (N-Phase)	CN3D	Connector (Connection For Option)
21S4	Solenoid Valve Coil (4-Way Valve)	DCL1, DCL2	Connection Terminal (Reactor)	CN3S	Connector (Connection For Option)
63H	High Pressure Sensor	IGBT	Power Module	CN3N	Connector (Connection For Option)
63HS	High Pressure Sensor	E1, E2, E3, E4	Connection Terminal (Electrical Parts Box)	CN51	Connector (Connection For Option)
63LS	Low Pressure Sensor	MULTI.B.	Multi Controller Circuit Board	LED1, LED2	LED (Operation Inspection Display)
SV1	Solenoid Valve Coil (Bypass Valve)	SW1	Switch (Display Selection)	LED3	LED (Power Supply to Main Microcomputer)
TH2	Thermistor (Hic Pipe)	SW2	Switch (Function Selection)	F1, F2	Fuse (T6.3AL250V)
TH3	Thermistor (Outdoor Liquid Pipe)	SW3	Switch (Test Run)	X501~505	Relay
TH4	Thermistor (Compressor)	SW4	Switch (Model Selection)	M-NET P.B.	M-NET Power Circuit Board
TH6	Thermistor (Suction Pipe)	SW5	Switch (Function Selection)	TB1	Connection Terminal (Electrical Parts Box)
TH7	Thermistor (Ambient)	SW6	Switch (Function Selection)		
		SW7	Switch (Function Selection)		
		SW8	Switch (Model Selection)		



MXZ-8C60NA-U1

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH8	Thermistor (Heat Sink)	SW9	Switch (Function Selection)
TB1B	Terminal Block (Branch Box)	LEV-A, LEV-B	Linear Expansion Valve	SWU1	Switch (Unit Address Selection, ones digit)
TB3	Terminal Block (Branch Box/Outdoor Transmission Line)	DCL	Reactor	SWU2	Switch (Unit Address Selection, tens digit)
TB7	Terminal Block (Centralized Control Transmission Line)	P.B.	Power Circuit Board	CNS1	Connector (Branch Box/Outdoor Transmission Line)
FUSE1, FUSE2	Fuse (T20AL250V)	U/V/W	Connection Terminal (U/V/W-Phase)	CNS2	Connector (Centralized Control Transmission Line)
MC	Motor For Compressor	LI	Connection Terminal (L-Phase)	SS	Connector (Connection For Option)
MF1, MF2	Fan Motor	NI	Connection Terminal (N-Phase)	CN3D	Connector (Connection For Option)
21S4	Solenoid Valve Coil (4-Way Valve)	DCL1, DCL2	Connection Terminal (Reactor)	CN3S	Connector (Connection For Option)
63H	High Pressure Switch	IGBT	Power Module	CN3N	Connector (Connection For Option)
63HS	High Pressure Sensor	E1, E2, E3, E4	Connection Terminal (Electrical Parts Box)	CN51	Connector (Connection For Option)
63LS	Low Pressure Sensor	MULTI.B.	Multi Controller Circuit Board	LED1, LED2	LED (Operation Inspection Display)
SV1	Solenoid Valve Coil (Bypass Valve)	SW1	Switch (Display Selection)	LED3	LED (Power Supply to Main Microcomputer)
TH2	Thermistor (Hic Pipe)	SW2	Switch (Function Selection)	F1, F2	Fuse (T6.3AL250V)
TH3	Thermistor (Outdoor Liquid Pipe)	SW3	Switch (Test Run)	X501~505	Relay
TH4	Thermistor (Compressor)	SW4	Switch (Model Selection)	M-NET P.B.	M-NET Power Circuit Board
TH6	Thermistor (Suction Pipe)	SW5	Switch (Function Selection)	TB1	Connection Terminal (Electrical Parts Box)
TH7	Thermistor (Ambient)	SW6	Switch (Function Selection)		
		SW7	Switch (Function Selection)		
		SW8	Switch (Model Selection)		



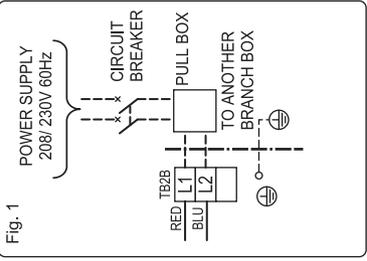
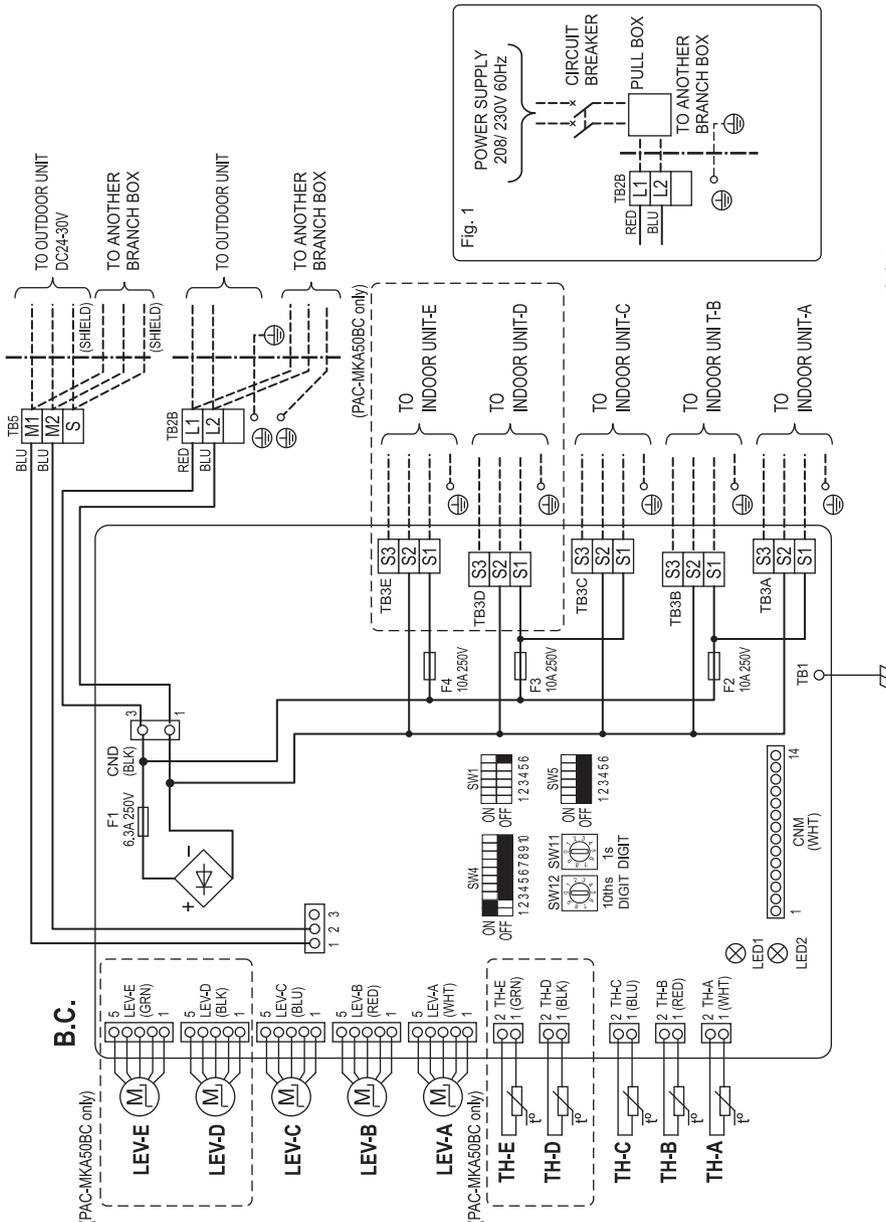
6-2. BRANCH BOX PAC-MKA50BC PAC-MKA30BC

- <Note>
- At servicing for outdoor unit, always follow the wiring diagram of outdoor unit.
 - Caution for electrical work.
 - Use copper supply wires.
 - When work to supply power separately to Branch box and outdoor units are applied, refer to Fig. 1.
 - For the connection method, please refer to the Branch box Installation Manual.

- <Remarque>
- Pour le service de l'unité extérieure, suivez toujours le diagramme de câblage de l'unité extérieure.
 - Précautions relatives aux travaux électriques.
 - Utilisez des câbles d'alimentation en cuivre.
 - Lorsque des travaux pour alimenter séparément le boîtier de dérivation et les unités extérieures sont effectués, reportez-vous à la Fig. 1.
 - Pour la méthode de raccordement, veuillez vous reporter au mode d'emploi du boîtier de dérivation.

<Symbols used in wiring diagram>

□ : Terminal block, □□ : Connector
 □ : Dip switch (■(black square) indicates a switch position)



• start-up

Mark	Meaning	Function
LED 1	Main power supply	Main power supply (208/230V)
LED 2		Power on → Lamps are lit.

• normal operating

Mark	Meaning	Function
LED 1	Main power supply	Lamp is lit
LED 2	Total number of indoor units	Blink depend on the total number <example> The total number is 2 ① Blink 2 times. ② Turn off for three sec. ③ Repeat ① to ②.

SW1-1	INDOOR UNIT-A	OFF	ON
SW1-2	INDOOR UNIT-B	NOT CONNECT	CONNECT
SW1-3	INDOOR UNIT-C	NOT CONNECT	CONNECT
SW1-4	INDOOR UNIT-D	NOT CONNECT	CONNECT
SW1-5	INDOOR UNIT-E	NOT CONNECT	CONNECT
SW1-6	NO USE		

PAC-MKA 50BC only

After each indoor unit is connected to the outdoor unit, turn on the switch corresponding to each indoor unit. For example, when the indoor units are connected to INDOOR UNIT-A and C, turn SW1-1 and SW1-3 to on.

SYMBOL	NAME
B.C.	Branch box controller board
F1	Fuse 250V 6.3A
F2-F4 <B.C.>	Fuse 250V 10A
SW1 <B.C.>	Switch for indoor unit connection *1
SW4 <B.C.>	Switch for mode selection
SW5 <B.C.>	Not in use
CNM <B.C.>	Connector <Connection for service>
LED1,2 <B.C.>	Light emitting diode *2
LEVA-E	Linear expansion valve *3
THA-E	Thermistor <Gas pipe> *3
TB2B	Terminal block <R10 Power Supply>
TB5	Terminal block <R10 Transmission>
TB5A-E <B.C.>	Terminal block To indoor unit-A-E *3
SW11 <B.C.>	Address Setting 1s DIGIT
SW12 <B.C.>	Address Setting 10ths DIGIT

*1 SW1 setting
 *2 LED on Branch box controller board for service
 *3 D and E for PAC-MKA50BC only.

<Combination of indoor units>
 Enter the location of combined indoor units with modal name in each blank below because it is necessary for service and maintenance.

Indoor unit - A	Indoor unit - B	Indoor unit - C	Indoor unit - D	Indoor unit - E
-----------------	-----------------	-----------------	-----------------	-----------------

PAC-MKA51BC

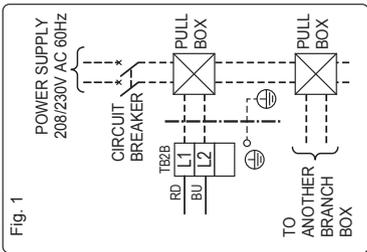
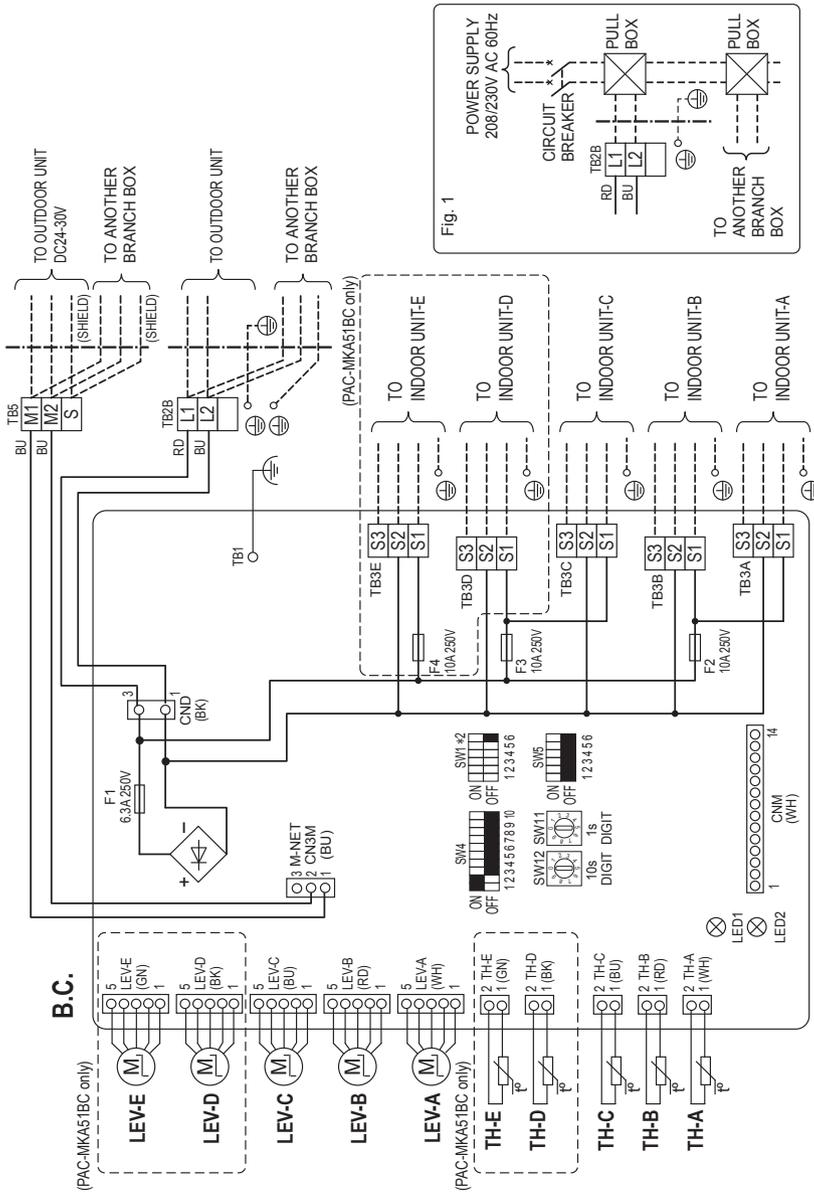
PAC-MKA31BC

- <Note>
- At servicing for outdoor unit, always follow the wiring diagram of outdoor unit.
 - Caution for electrical work.
 - Use copper supply wires.
 - When work to supply power separately to Branch box and outdoor units are applied, refer to Fig. 1.
 - For the connection method, please refer to the Branch box Installation Manual.

<Symbols used in wiring diagram>

□ : Terminal block, □□ : Connector

■ : Dip switch (■(black square) indicates a switch position)



SYMBOL	NAME	OFF	ON
B.C.	Branch box controller board	NOT CONNECT	CONNECT
F1	Fuse <UL 6.3A 250V AC>	NOT CONNECT	CONNECT
F2-F4	Fuse <UL 10A 250V AC> #1	NOT CONNECT	CONNECT
SW1	Switch for indoor unit connection #2	NOT CONNECT	CONNECT
SW4	Switch for function selection	NOT CONNECT	CONNECT
SW5	Switch for function selection	NOT CONNECT	CONNECT
CNM	Connector <Connection for service>		
LED1,2	Light emitting diode #3		
TB3A-E	Terminal block <To Indoor unit-A-E> #4		
SW11	Address Setting tens digit		
SW12	Address Setting tens digit		
LEVA-E	Linear expansion valve #4		
THA-E	Thermistor <Gas pipe> #4		
TB2B	Terminal block <To Power Supply>		
TB5	Transmission line		

*1 F4 for PAC-MKA51BC only

*2 SW1 setting

Mark	Meaning	Function
LED 1	Main power supply	Main power supply (208/230V)
LED 2	normal operating	Power on → Lamps are lit
Mark	Meaning	Function
LED 1	Main power supply	Lamp is lit
LED 2	Total number of indoor units	Blink depend on the total number <example> The total number is 2
		① Blink 2 times.
		② Turn off for 3 sec.
		③ Repeat ① to ②.

*4 D and E for PAC-MKA51BC only.

SW1-1	INDOOR UNIT-A	INDOOR UNIT-B	INDOOR UNIT-C	INDOOR UNIT-D	INDOOR UNIT-E
SW1-1	CONNECT	CONNECT	CONNECT	CONNECT	CONNECT
SW1-2	CONNECT	CONNECT	CONNECT	CONNECT	CONNECT
SW1-3	CONNECT	CONNECT	CONNECT	CONNECT	CONNECT
SW1-4	CONNECT	CONNECT	CONNECT	CONNECT	CONNECT
SW1-5	CONNECT	CONNECT	CONNECT	CONNECT	CONNECT
SW1-6	NO USE				

After each indoor unit is connected to the outdoor unit, turn on the switch corresponding to each indoor unit. For example, when the indoor unit is connected to INDOOR UNIT-A, and C, turn SW1-1 and SW1-3 to on.

*3 LED on Branch box controller board for service

<Combination of indoor units>
Enter the location of combined indoor units with model name in each blank below because it is necessary for service and maintenance.

Indoor unit-A	Indoor unit-B	Indoor unit-C	Indoor unit-D	Indoor unit-E
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7-2. REFRIGERANT SYSTEM DIAGRAM

MXZ-4C36NAHZ

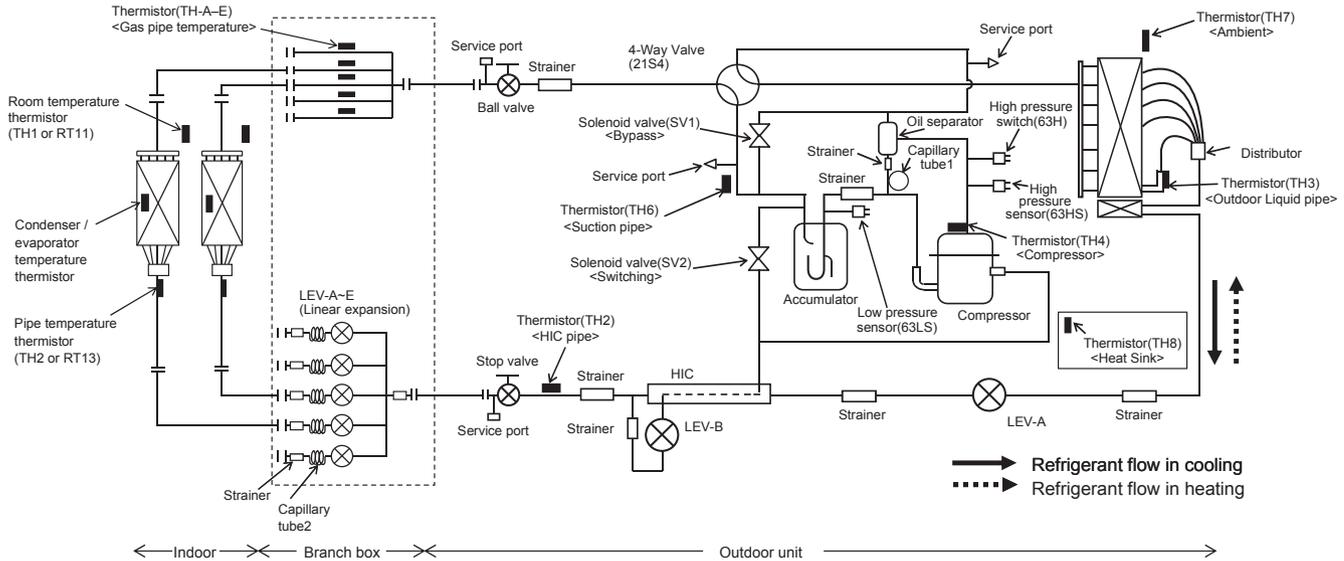
MXZ-5C42NAHZ

MXZ-8C48NAHZ

MXZ-4C36NAHZ-U1

MXZ-5C42NAHZ-U1

MXZ-8C48NAHZ-U1

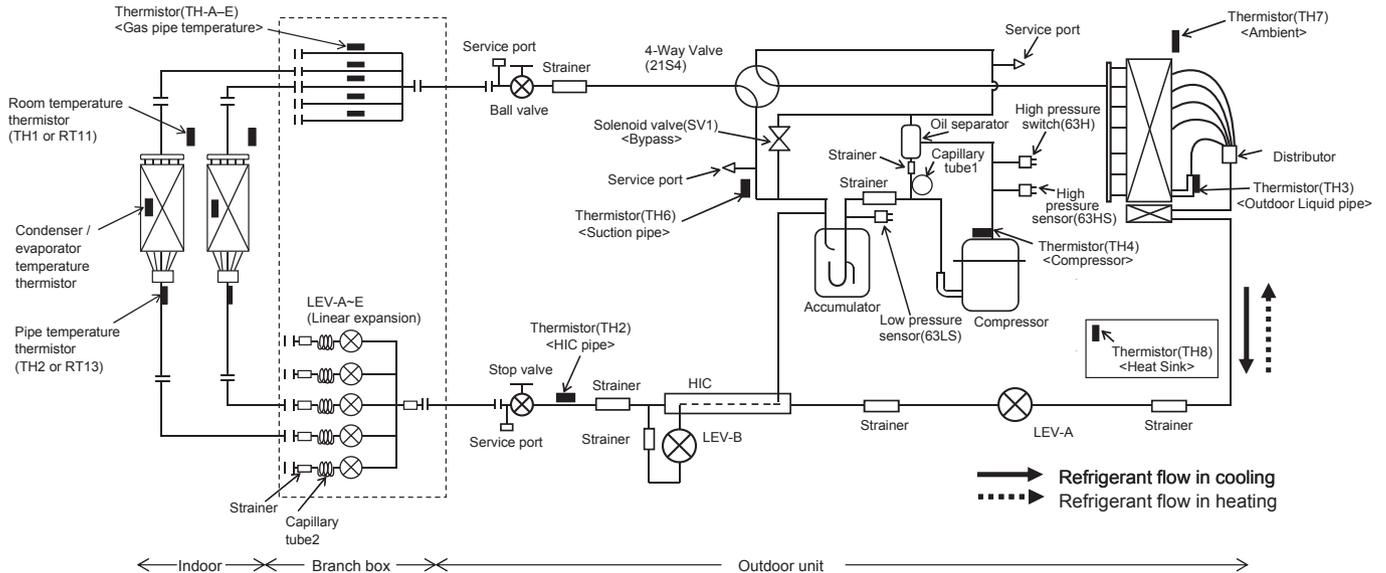


Unit: inch (mm)

		Capillary tube 1 (For return of oil from oil separator)	Capillary tube 2 behind LEV (in cooling mode)
Outdoor unit	MXZ-4C36NAHZ(-U1) MXZ-5C42NAHZ(-U1) MXZ-8C48NAHZ(-U1)	$\phi 0.098 \times \phi 0.031 \times L(39-1/2)$ ($\phi 2.5 \times \phi 0.8 \times L1000$)	
Branch box	PAC-MKA50BC PAC-MKA51BC	—	$(\phi 0.157 \times \phi 0.117 \times L(5-1/8)) \times 5$ ($(\phi 4 \times \phi 3.0 \times L130) \times 5$)
	PAC-MKA30BC PAC-MKA31BC	—	$(\phi 0.157 \times \phi 0.117 \times L(5-1/8)) \times 3$ ($(\phi 4 \times \phi 3.0 \times L130) \times 3$)

MXZ-8C48NA

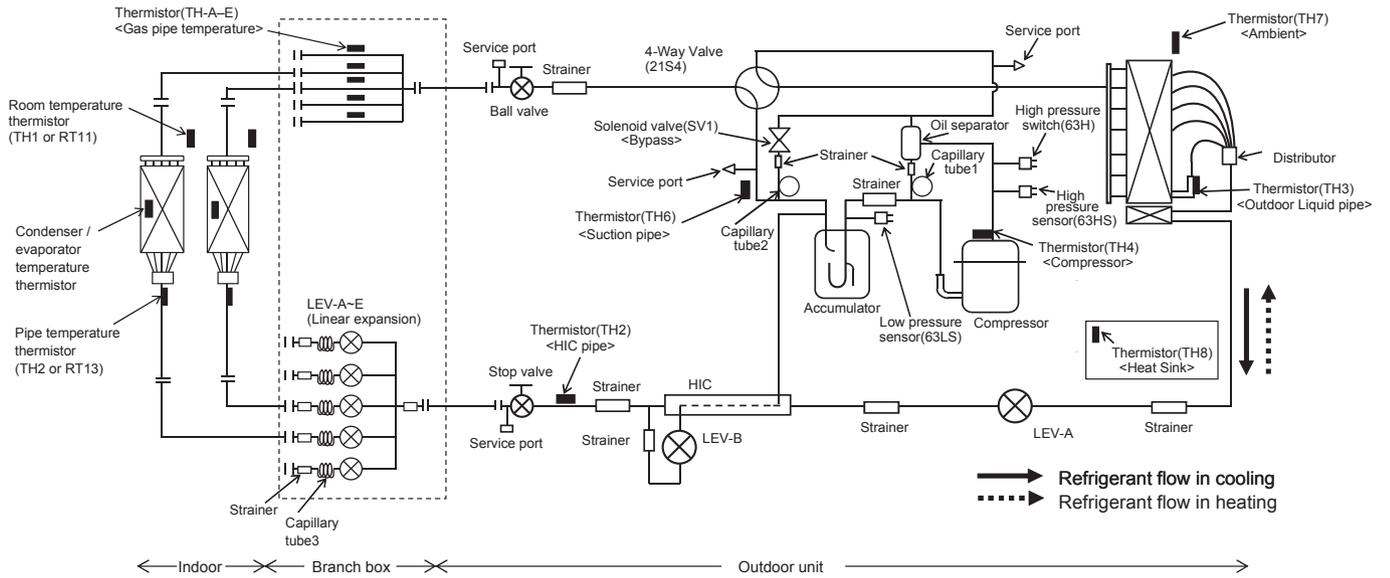
MXZ-8C48NA-U1



Unit: inch (mm)

		Capillary tube 1 (For return of oil from oil separator)	Capillary tube 2 behind LEV (in cooling mode)
Outdoor unit	MXZ-8C48NA(-U1)	$\phi 0.098 \times \phi 0.031 \times L(39-1/2)$ ($\phi 2.5 \times \phi 0.8 \times L1000$)	
Branch box	PAC-MKA50BC PAC-MKA51BC	—	$(\phi 0.157 \times \phi 0.117 \times L(5-1/8)) \times 5$ ($(\phi 4 \times \phi 3.0 \times L130) \times 5$)
	PAC-MKA30BC PAC-MKA31BC	—	$(\phi 0.157 \times \phi 0.117 \times L(5-1/8)) \times 3$ ($(\phi 4 \times \phi 3.0 \times L130) \times 3$)

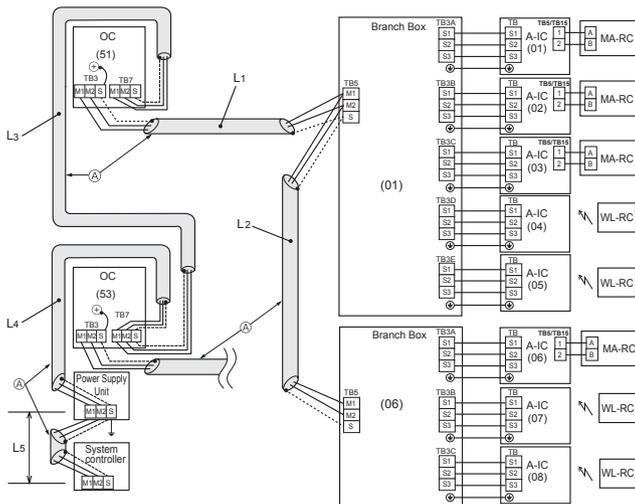
MXZ-8C60NA-U1



Unit: inch (mm)

		Capillary tube 1 (For return of oil from oil separator)	Capillary tube 2 (For solenoid valve (SV1))	Capillary tube 3 behind LEV (in cooling mode)
Outdoor unit	MXZ-8C60NA-U1	$\phi 0.098 \times \phi 0.031 \times L(39-1/2)$ ($\phi 2.5 \times \phi 0.8 \times L800$)	$\phi 4.0 \times \phi 3.0 \times L500$	
Branch box	PAC-MKA50BC PAC-MKA51BC	—	—	$(\phi 0.157 \times \phi 0.117 \times L(5-1/8)) \times 5$ ($(\phi 4 \times \phi 3.0 \times L130) \times 5$)
	PAC-MKA30BC PAC-MKA31BC	—	—	$(\phi 0.157 \times \phi 0.117 \times L(5-1/8)) \times 3$ ($(\phi 4 \times \phi 3.0 \times L130) \times 3$)

7-3. TYPICAL CONTROL SYSTEM



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.

Longest length via outdoor units:

$L1 + L2 + L3 + L4 + L5 \leq 500 \text{ m (1640 ft.) (1.25 mm}^2 \text{ or more)}$

Longest transmission cable length

$L1 + L2, L3 + L4, L5 \leq 200 \text{ m (656 ft.) (1.25 mm}^2 \text{ or more)}$

Note: M-NET remote controller cannot be connected with a refrigerant system which includes branch box.

(1) Difference between display and operation

- ① When operating the system using the system controller, details of those operations will not appear on the display of the wireless remote controller.
- ② The set temperature range is different in the wireless remote controller that comes with room air conditioner and the system controller. The room air conditioner has a wider range. If the target temperature is set to below 63°F [17°C] or less, or 86°F [30°C] or more by the wireless remote controller that comes with room air conditioner, the temperature displayed on the system controller may be converted to their maximum/minimum set temperature. For instance, when HEAT operation at 61°F [16°C] is set at the room air conditioner, the system controller may display 63°F [17°C].
- ③ When the DRY mode is set with the wireless remote controller, the room air conditioner automatically set the optimum target temperature. The system controller will display the target temperature as a set temperature.
- ④ When the DRY mode is set with the system controller, the room air conditioner performs the DRY mode control operation according to the temperature set with the system controller.

(2) Timer operation

- ① Timer operation should be set using only one controller from the remote controller that comes with the room air conditioner, the system controller or the MA remote controller. If more than one controller is used to set the timer at the same time, the timer will not function properly.
- ② When the timer is set with the wireless remote controller; the system controller will not show the timer display.
- ③ The timer set with the system controller will not be cancelled with the wireless remote controller.

(3) Manual operation prohibition

- ① When the manual operation (ON/OFF, set temperature, or operation mode) is prohibited with the system controller, the command to perform the prohibited operation will not be accepted from the wireless remote controller that comes with the room air conditioner. The operation partially enabled by the system controller can be operated with the wireless remote controller. Regardless of whether the operation is disabled or enabled, 3 short beeps will sound when the signal is sent from the wireless remote controller.

(4) Trouble

- ① If the MA remote controller or the system controller shows the abnormal indication, clear it by stopping the operation with one of the following: the MA remote controller, the system controller, or the wireless remote controller. (Abnormal indication of the air conditioner could be recovered automatically, but that of the MA remote controller or the system controller cannot be recovered unless the operation is stopped.)



(5) Group setting

① MA group or M-NET group setting cannot be set.

(6) Restricted functions

The following functions of system controller cannot be used.

- DIDO controller (Interlock with the air conditioner)
- Fan control of energy saving control or peak cut control function
- Air conditioning charge [TG-2000A]
- Set temperature range limiting function
- Operation mode changeover limit (season changing) [PAC-SF44SRA]
- Dual set point function
- Setback mode
- Hold function

8-1. TROUBLESHOOTING

<Check code displayed by self-diagnosis and actions to be taken for service (summary)>

Present and past check codes are logged, and they can be displayed on the wired remote controller and multi controller circuit board of outdoor unit. Actions to be taken for service, which depends on whether or not the trouble is reoccurring in the field, are summarized in the table below. Check the contents below before investigating details.

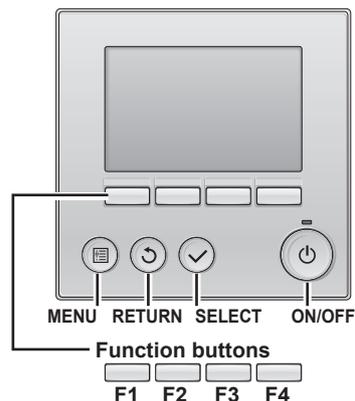
Unit conditions at service	Check code	Actions to be taken for service (summary)
The trouble has reoccurred.	Displayed	Judge what is wrong and take a corrective action according to "8-3 SELF-DIAGNOSIS ACTION BY FLOWCHART".
	Not displayed	Conduct troubleshooting and ascertain the cause of the trouble according to "8-4. TROUBLESHOOTING BY INFERIOR PHENOMENA".
The trouble is not reoccurring.	Logged	<ul style="list-style-type: none"> ① Consider the temporary defects such as the work of protection devices in the refrigerant circuit including compressor, poor connection of wiring, noise, etc. Re-check the symptom, and check the installation environment, refrigerant amount, weather when the trouble occurred, matters related to wiring, etc. ② Reset check code logs and restart the unit after finishing service. ③ There is no abnormality concerning of parts such as electrical component, controller board, remote controller, etc.
	Not logged	<ul style="list-style-type: none"> ① Re-check the abnormal symptom. ② Conduct troubleshooting and ascertain the cause of the trouble according to "8-4. TROUBLESHOOTING BY INFERIOR PHENOMENA". ③ Continue to operate unit for the time being if the cause is not ascertained. ④ There is no abnormality concerning of parts such as electrical component, controller board, remote controller, etc.

8-2. CHECK POINTS FOR TEST RUN

8-2-1. 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 and electrical wiring are 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 side for full 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 settled.
- (2) Safety check :
With the insulation tester of 500V, inspect the insulation resistance.
Do not touch the transmission cable and remote controller cable with the tester.
The resistance should be over 1.0 MΩ. Do not proceed inspection if the resistance is under 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:
Turn the power supply switch of the outdoor unit to on for compressor protection. For a test run, wait at least 12 hours from this point.
- (4) More than 12 hours later from power supply to the outdoor unit, turn all power switch to on for the test run.
Perform test run according to the "Operation procedure" table of the bottom of this page.
While test running, make test run reports .

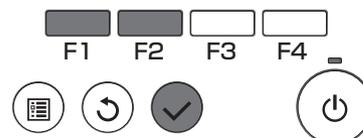
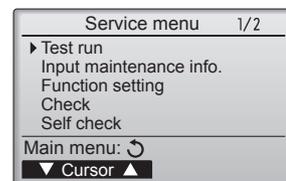
8-2-2. Test run for wired remote controller <PAR-31MAA>



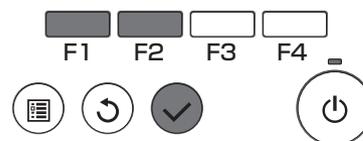
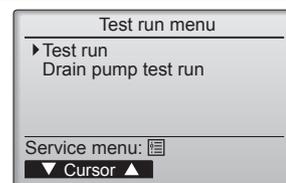
① Select "Service" from the Main menu, and press the button.



Select "Test run" with the **F1** or **F2** button, and press the button.



② Select "Test run" with the **F1** or **F2** button, and press the button.



Test run operation

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

Cool mode: Check the cold air blow out.
Heat mode: Check the heat blow out.



Press the button and open the Vane setting screen.

Auto vane check*

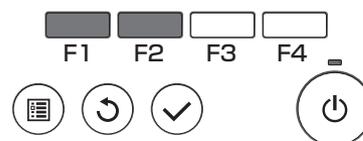
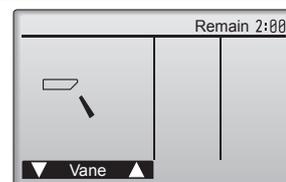
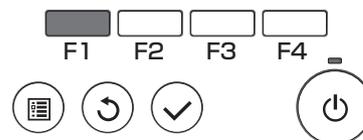
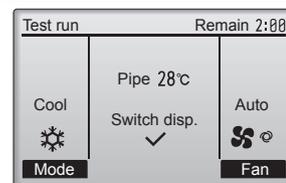
Check the auto vane with the **F1** **F2** buttons.
 Check the operation of the outdoor unit fan, also.



Press the button to return to "Test run operation".



Press the button.



When the test run is completed, the "Test run menu" screen will appear.
 The test run will automatically stop after 2 hours.

*The function is available only for the model with vanes.

8-2-3. Test run

(1) Using remote controller

Refer to the indoor unit installation manual.

- Be sure to perform the test run individually 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 indoor units connected all at once, faulty connections of the refrigerant pipes and cables cannot be detected.
- The compressor operation is not available for 3 minutes at least after the power is supplied.
- The compressor can emit noise just after turn on the power supply or in case of low outside air temperature.

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.

(2) Using SW3 in outdoor unit

In 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 "(1) Using remote controller."

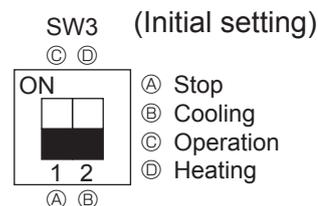
SW3-1	ON	Cooling operation
SW3-2	OFF	
SW3-1	ON	Heating operation
SW3-2	ON	

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

● **Setting procedure**

The setting of test run (ON/OFF) and its operation mode (cooling/heating) can be set by SW3 on the multi controller circuit board of outdoor unit.

- ① Set operation mode (cooling or heating) by SW3-2.
- ② Start test run by setting SW3-1 to ON (⤴) with the indicated operation mode of SW3-2.
- ③ Finish test run by setting SW3-1 to OFF (⤵).
 - Operation mode cannot be changed by SW3-2 during test run.
 - To change the test run operation mode, stop the test run by 3-1, and restart test run by SW3-1 after the mode is changed by SW3-2.
 - Test run automatically stops 2 hours later by 2-hour OFF timer function.
 - Test run can be performed by the remote controller.
 - The remote controller display of test run by outdoor unit is the same as that of test run by remote controller.
 - If test run is set with the outdoor unit, the test run is performed for all indoor units.
 - The remote controller operation becomes unavailable once the test run is set with the outdoor unit.



- 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 service port due to the small difference in pressure in the pipes. The unit is not faulty.

When a test run is started by "Using SW3 in outdoor unit", even if it carries out stop instructions by remote controller, outdoor unit does not stop. A test run is not ended. In this case, please set SW3 in outdoor unit to off.

- **After power is supplied or after an operation stops for a while, a small clicking noise may be heard from the inside of the branch box. The electronic expansion valve is opening and closing. The unit is not faulty.**

Note: Be sure to wait at least 3 minutes after turning on the power supply before setting SW3-1 and SW3-2. If the DIP switches are set before 3 minutes has elapsed, the test run may not start.

8-2-4. 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.

Check code (2 digits)	Check code (4 digits)	Trouble	Detected Unit			Remarks
			Indoor	Outdoor	Remote Controller	
Ed	0403	Serial communication error		○		Outdoor unit Multi controller board—Power board communication trouble
U2	1102	Compressor temperature trouble		○		Check delay code 1202
UE	1302	High pressure trouble		○		Check delay code 1402
U7	1500	Superheat due to low discharge temperature trouble		○		Check delay code 1600
U2	1501	Refrigerant shortage trouble		○		Check delay code 1601
		Closed valve in cooling mode		○		Check delay code 1501
EF	1508	4-way valve trouble in heating mode		○		Check delay code 1608
UF	4100	Compressor current interruption (locked compressor)		○		Check delay code 4350
UP	4210	Compressor overcurrent interruption		○		
U9	4220	Voltage shortage/overvoltage/PAM error/L1 open phase/primary current sensor error/power synchronization signal error		○		Check delay code 4320
U5	4230	Heat sink temperature trouble		○		Check delay code 4330
U6	4250	Power module trouble		○		Check delay code 4350
U8	4400	Fan trouble (Outdoor)		○		Check delay code 4500
U3	5101	Compressor temperature thermistor (TH4) open / short		○		
U4	5102	Suction pipe temperature thermistor (TH6) open / short		○		
U4	5105	Outdoor liquid pipe temperature thermistor (TH3) open/short		○		Check delay code 1205
U4	5106	Ambient temperature thermistor (TH7) open/short		○		Check delay code 1221
U4	5109	HIC pipe temperature thermistor (TH2) open/short		○		Check delay code 1222
U4	5110	Heat sink temperature thermistor (TH8) open/short		○		Check delay code 1214
F5	5201	High pressure sensor (63HS) trouble		○		Check delay code 1402
F3	5202	Low pressure sensor (63LS) trouble		○		Check delay code 1400
UH	5300	Current sensor trouble/Primary current error		○		Check delay code 4310
A0	6600	Duplex address error	○	○	○	Only M-NET Remote controller is detected.
A2	6602	Transmission processor hardware error	○	○	○	Only M-NET Remote controller is detected.
A3	6603	Transmission bus BUSY error	○	○	○	Only M-NET Remote controller is detected.
A6	6606	Signal communication error with transmission processor	○	○	○	Only M-NET Remote controller is detected.
A7	6607	No ACK error	○	○	○	Only M-NET Remote controller is detected.
A8	6608	No response frame error	○	○	○	Only M-NET Remote controller is detected.
E0/E4	6831	MA communication receive error	○	○	○	Only MA Remote controller is detected.
E3/E5	6832	MA communication send error	○	○	○	Only MA Remote controller is detected.
E3/E5	6833	MA communication send error	○	○	○	Only MA Remote controller is detected.
E0/E4	6834	MA communication receive error	○	○	○	Only MA Remote controller is detected.
EF	7100	Total capacity error		○		
EF	7101	Capacity code error	○	○		
EF	7102	Connecting excessive number of units and branch boxes		○		
EF	7105	Address setting error		○		
EF	7130	Incompatible unit combination		○		

NOTES:

1. When the outdoor unit detects No ACK error/No response error, an object indoor unit is treated as a stop, and not assumed to be abnormal.
2. The check codes displayed on the units may be different between the error source and others. In that case, please refer to the check code of error source by displayed attribute and address.
3. 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 LED indication (LED1, LED2) found on the outdoor multi controller circuit board.
LED indication : Set all contacts of SW1 to OFF.

• During normal operation

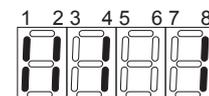
The LED indicates the drive state of the controller in the outdoor unit.

Bit	1	2	3	4	5	6	7	8
Indication	Compressor operated	52C	21S4	SV1	SV2*	—	—	Always lit

*SV2 is not equipped to MXZ-8C48/60NA.

[Example]

When the compressor and SV1 are on during cooling operation.



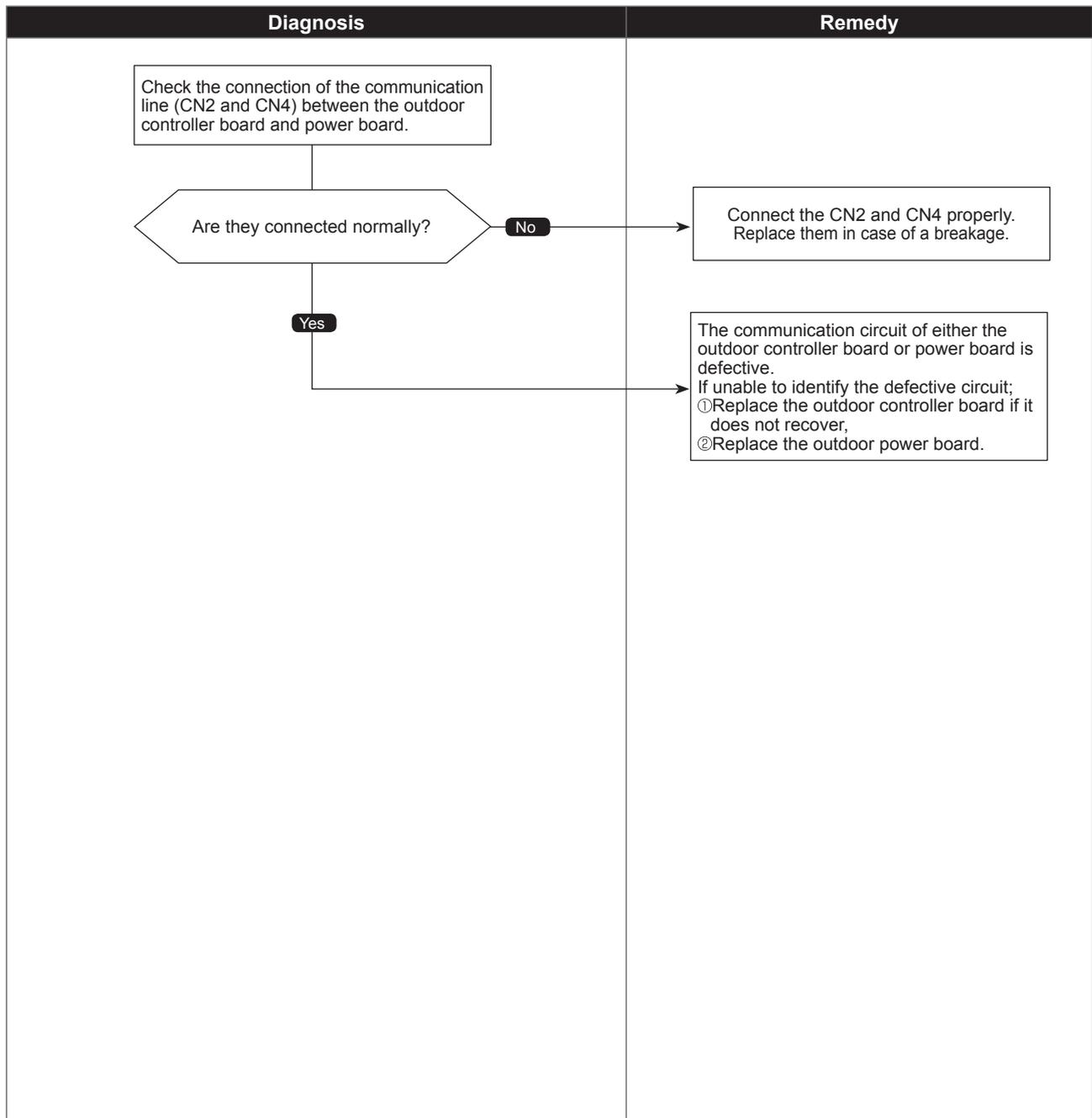
8-3. SELF-DIAGNOSIS ACTION BY FLOWCHART

Check code	Serial communication error
0403	
(Ed)	

Abnormal points and detection methods	Causes and check points
Abnormal if serial communication between the outdoor controller board and outdoor power board is defective.	<ul style="list-style-type: none"> ① Wire breakage or contact failure of connector CN2 or CN4 ② Malfunction of power board communication circuit on outdoor controller board ③ Malfunction of communication circuit on outdoor power board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

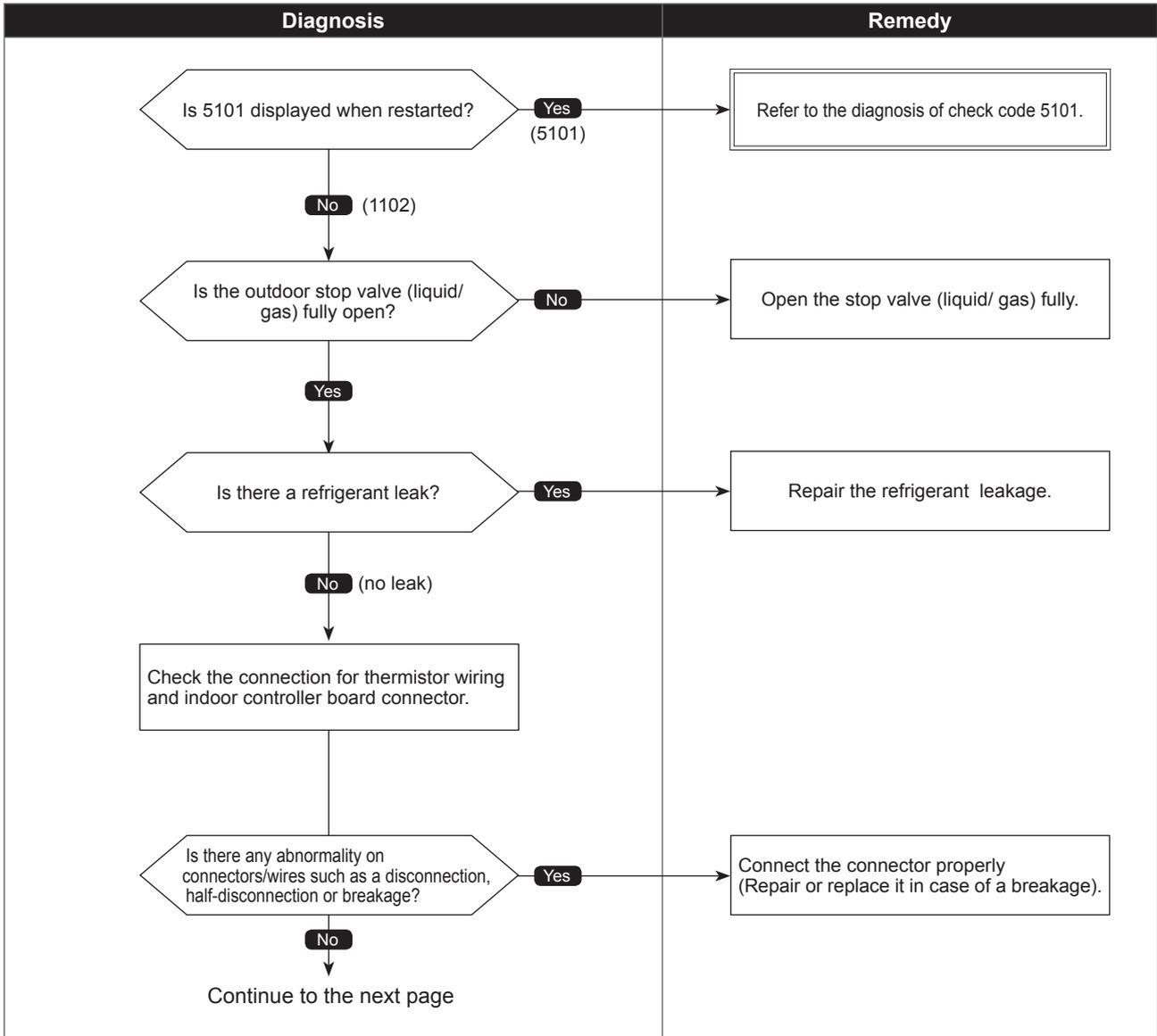


Compressor temperature trouble

Abnormal points and detection methods	Causes and check points
<p>(1) Abnormal if TH4 falls into following temperature conditions;</p> <ul style="list-style-type: none"> ●exceeds 230°F [110°C] continuously for 5 minutes ●exceeds 257°F [125°C] <p>(2) Abnormal if a pressure detected by the high pressure sensor and converted to saturation temperature exceeds 104°F [40°C] during defrosting, and TH4 exceeds 230°F [110°C].</p> <p>TH4: Thermistor <Compressor> LEV: Electronic expansion valve</p>	<ul style="list-style-type: none"> ① Malfunction of stop valve ② Over-heated compressor operation caused by shortage of refrigerant ③ Defective thermistor ④ Defective outdoor controller board ⑤ LEV performance failure ⑥ Defective indoor controller board ⑦ Clogged refrigerant system caused by foreign object ⑧ Refrigerant shortage while in heating operation (Refrigerant liquid accumulation in compressor while indoor unit is OFF/thermo-OFF.)

●Diagnosis of defectives

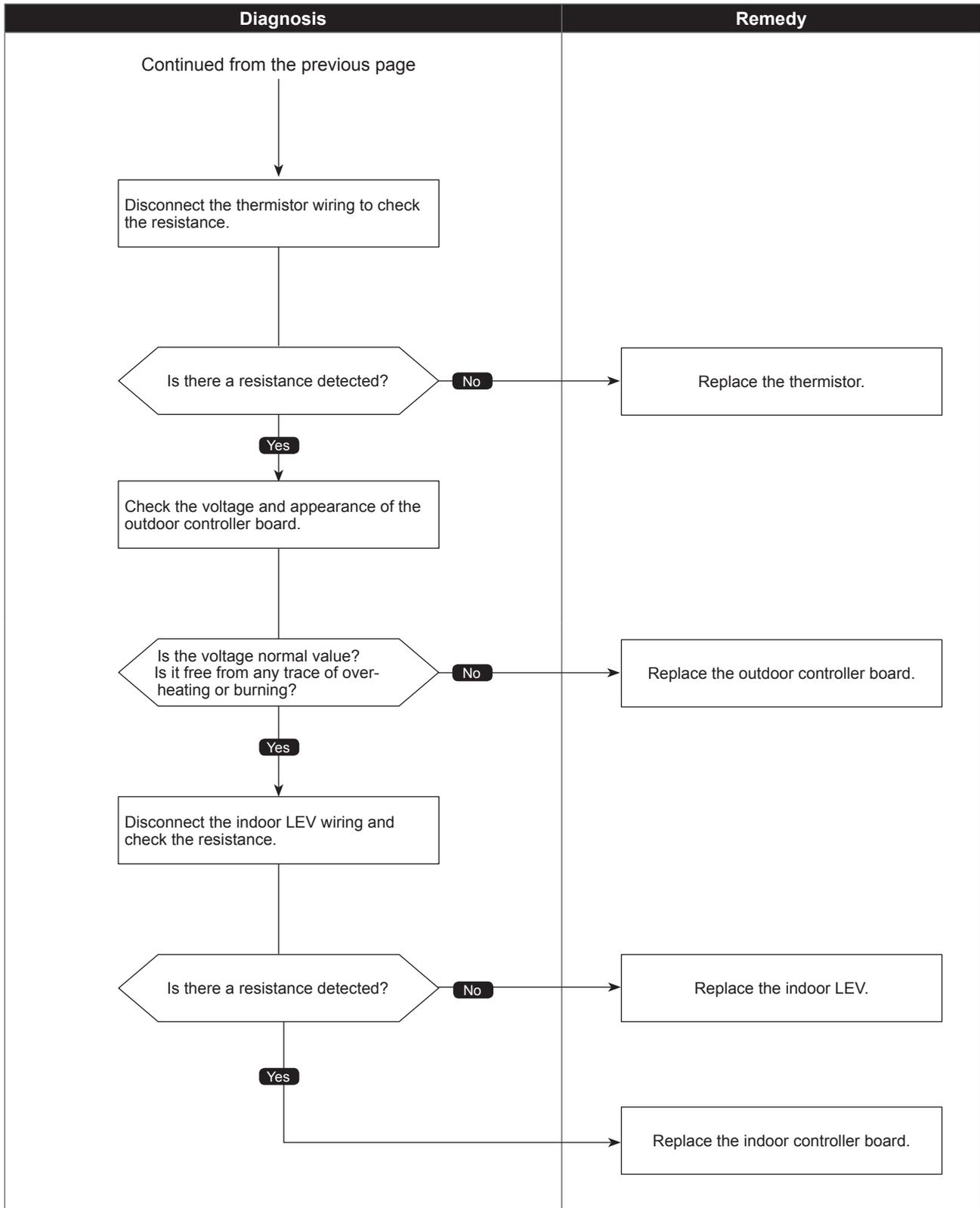
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Compressor temperature trouble

●Diagnosis of defectives

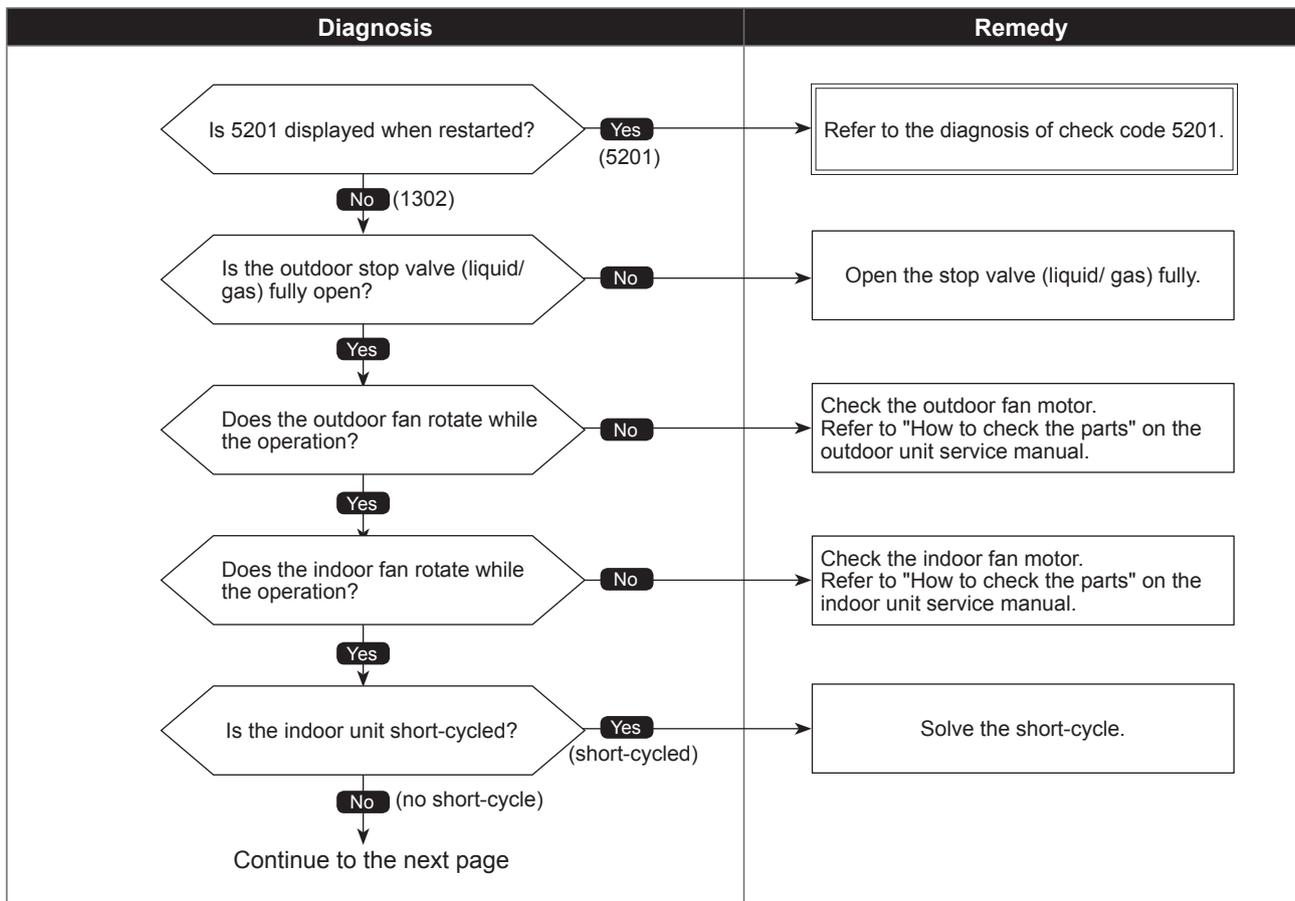
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Abnormal points and detection methods	Causes and check points
<p>(1) High pressure abnormality (63H operation) Abnormal if 63H operates(*) during compressor operation. (*602 PSIG [4.15 MPaG])</p> <p>(2) High pressure abnormality (63HS detected) 1. Abnormal if a pressure detected by 63HS exceeds 625 PSIG [4.31 MPaG] or more during compressor operation. 2. Abnormal if a pressure detected by 63HS exceeds 600 PSIG [4.14 MPaG] or more for 3 minutes during compressor operation.</p> <p>63H : High pressure switch 63HS: High pressure sensor LEV : Electronic expansion valve SV1 : Solenoid valve TH7 : Thermistor <Ambient></p>	<p>① Defective operation of stop valve (not fully open) ② Clogged or broken pipe ③ Malfunction or locked outdoor fan motor ④ Short-cycle of outdoor unit ⑤ Dirt of outdoor heat exchanger ⑥ Remote controller transmitting error caused by noise interference ⑦ Contact failure of the outdoor controller board connector ⑧ Defective outdoor controller board ⑨ Short-cycle of indoor unit ⑩ Decreased airflow, clogged filter, or dirt on indoor unit. ⑪ Malfunction or locked indoor fan motor ⑫ Decreased airflow caused by defective inspection of outdoor temperature thermistor (It detects lower temperature than actual temperature.) ⑬ Indoor LEV performance failure ⑭ Malfunction of fan driving circuit ⑮ SV1 performance failure ⑯ Defective high pressure sensor ⑰ Defective high pressure sensor input circuit on outdoor controller board</p>

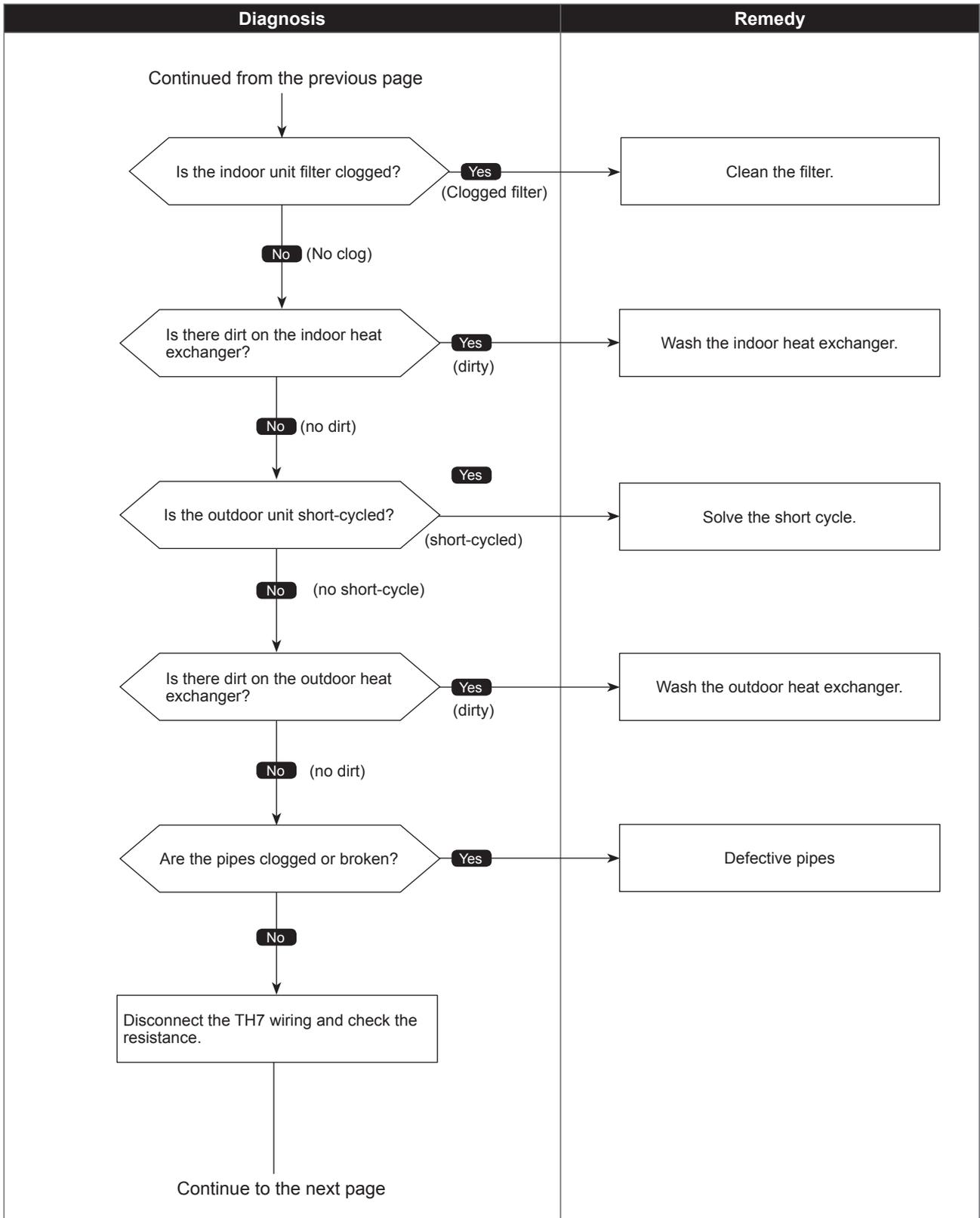
●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



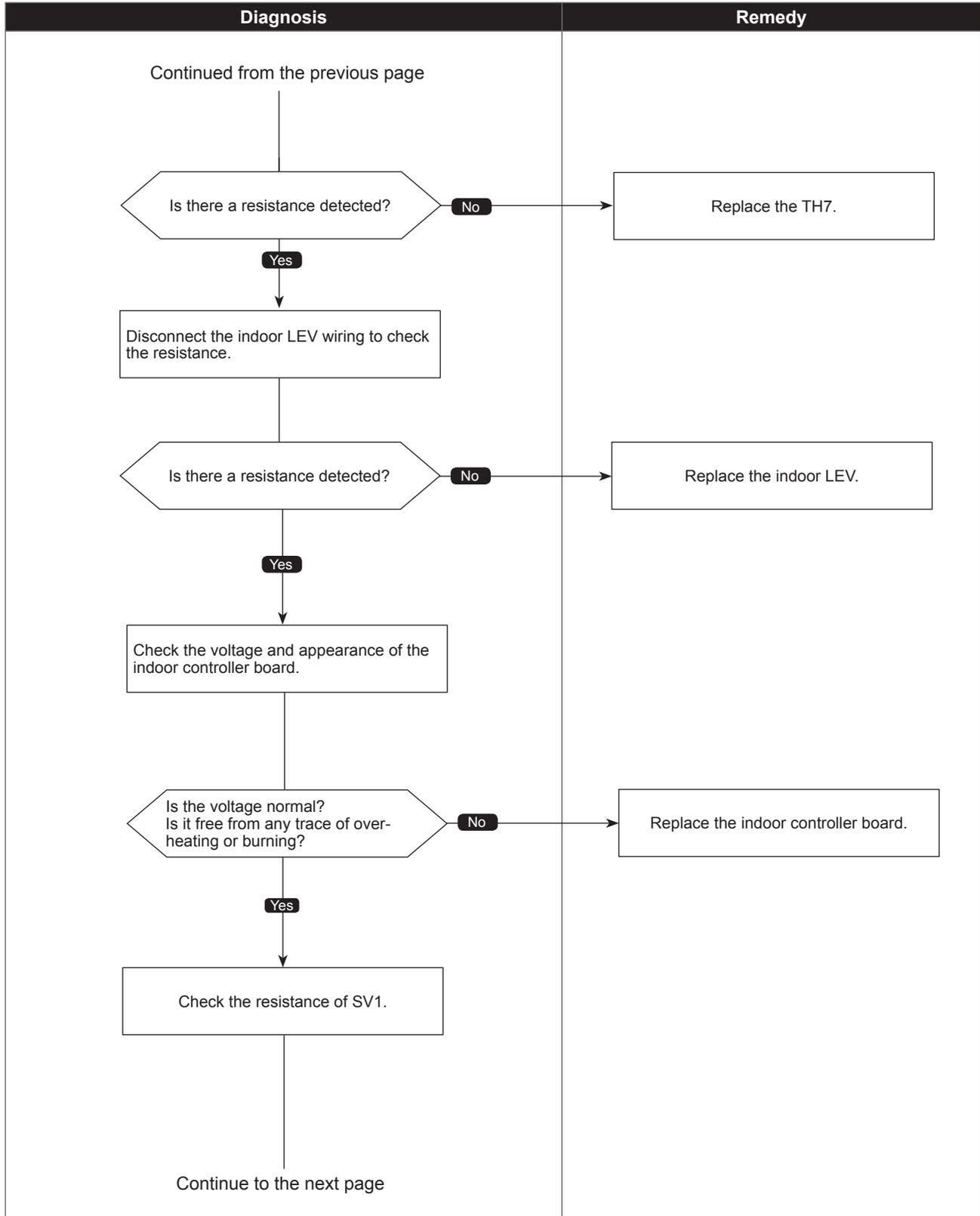
●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



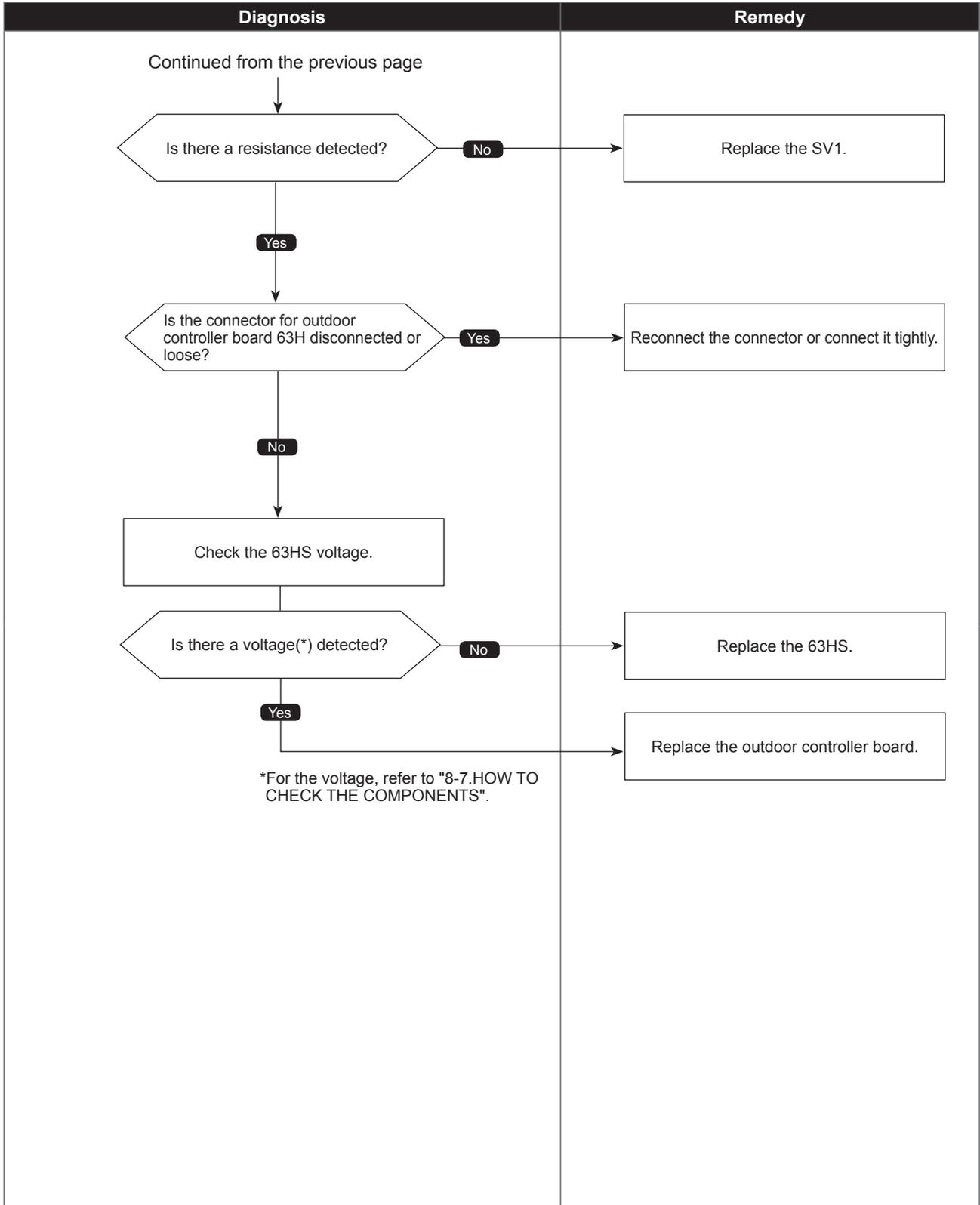
•Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



•Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

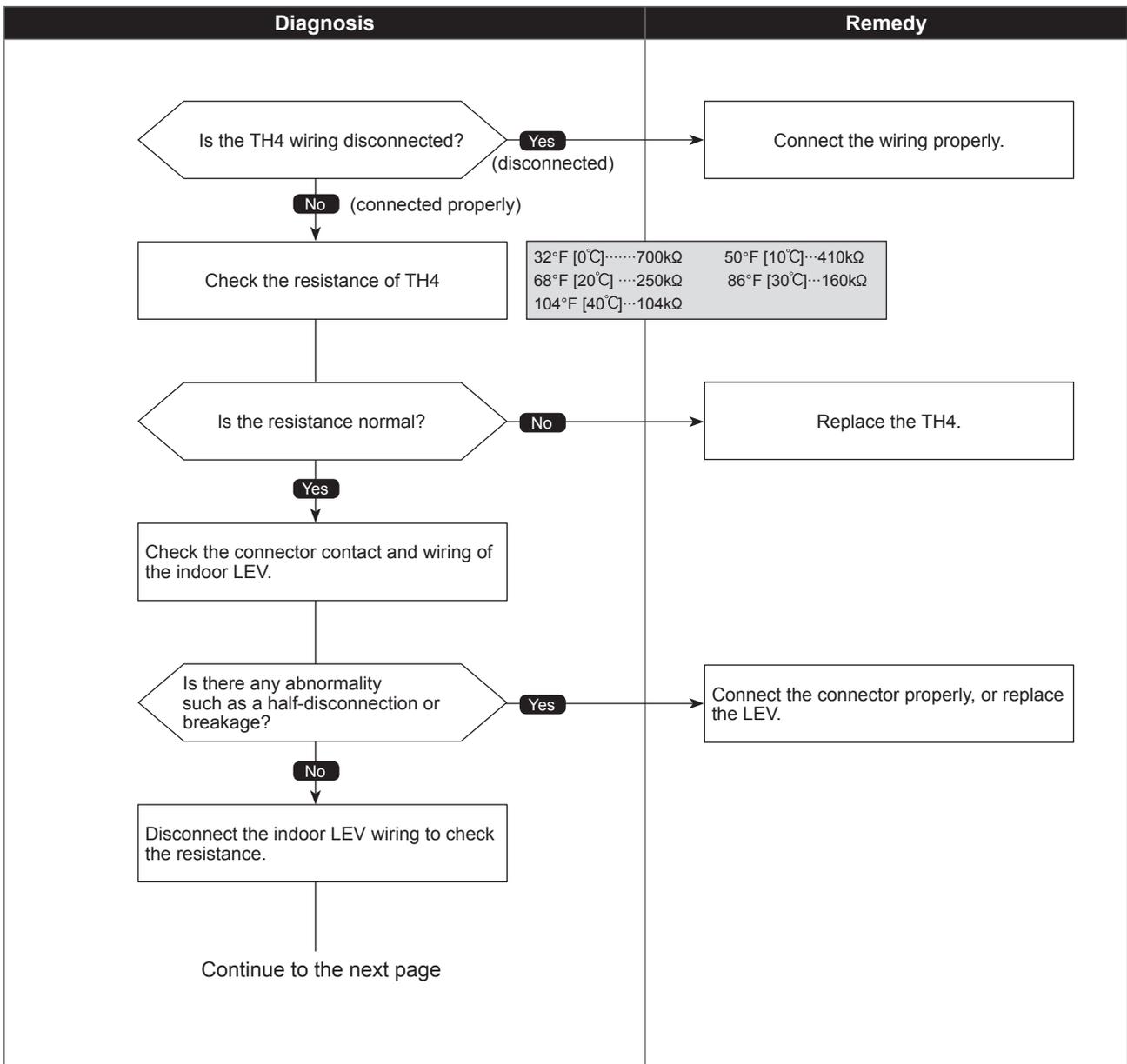


Superheat due to low discharge temperature trouble

Abnormal points and detection methods	Causes and check points
<p>Abnormal if the discharge superheat is continuously detected -27°F [-15°C](*) or less for 5 minutes even though the indoor LEV has minimum open pulse after the compressor starts operating for 10 minutes.</p> <p>LEV : Electronic expansion valve TH4 : Thermistor <Compressor> 63HS: High pressure sensor</p> <p>*At this temperature, conditions for the abnormality detection will not be satisfied if no abnormality is detected on either TH4 or 63HS.</p>	<ul style="list-style-type: none"> ① Disconnection or loose connection of TH4 ② Defective holder of TH4 ③ Disconnection of LEV coil ④ Disconnection of LEV connector ⑤ LEV performance failure

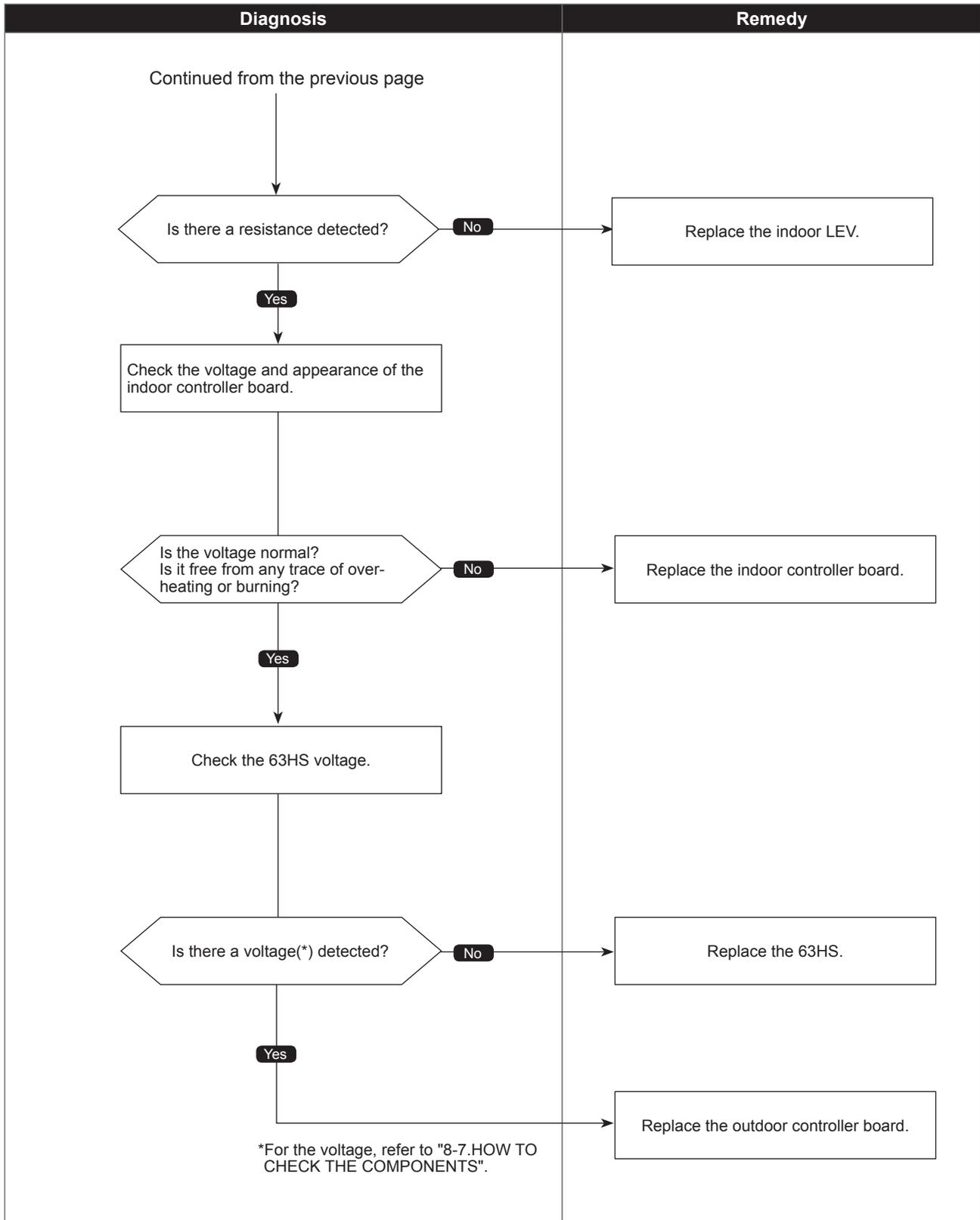
●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

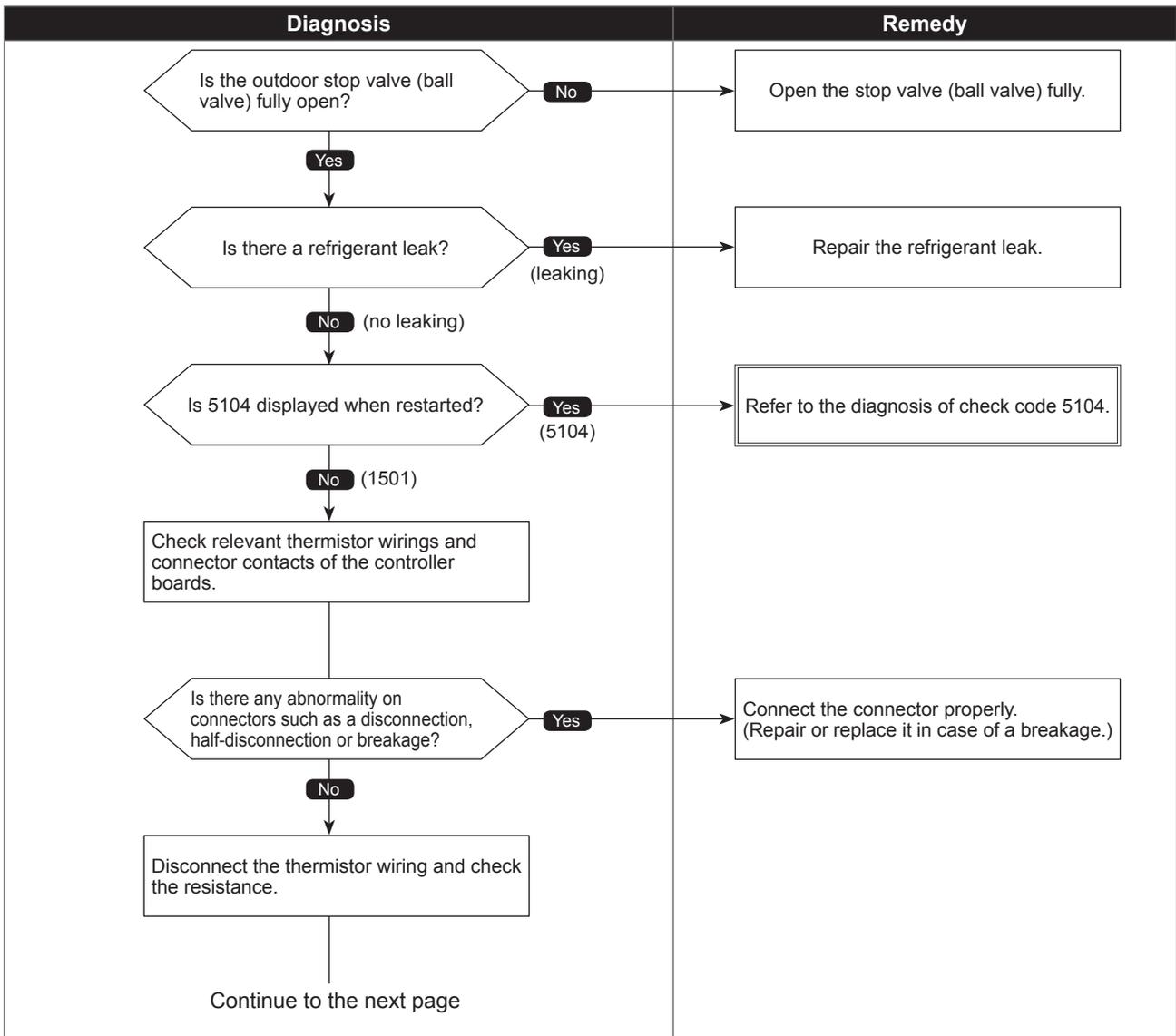


Refrigerant shortage trouble

Abnormal points and detection methods	Causes and check points
<p>(1) Abnormal when all of the following conditions are satisfied for 15 consecutive minutes:</p> <ol style="list-style-type: none"> 1. The compressor is operating in HEAT mode. 2. Discharge super heat is 144°F [80°C] or more. 3. Difference between TH7 and the TH3 applies to the formula of (TH7-TH3 < 9°F [5°C]). 4. The saturation temperature converted from a high pressure sensor detects below 95°F [35°C]. <p>(2) Abnormal when all of the following conditions are satisfied:</p> <ol style="list-style-type: none"> 1. The compressor is in operation. 2. When cooling, discharge superheat is 144°F [80°C] or more, and the saturation temperature converted from a high pressure sensor is over -40°F [-40°C]. 3. When heating, discharge superheat is 162°F [90°C] or more. 	<ol style="list-style-type: none"> ① Defective operation of stop valve (not fully open) ② Defective thermistor ③ Defective outdoor controller board ④ Indoor LEV performance failure ⑤ Gas leakage or shortage ⑥ Defective 63HS <p>TH3 : Thermistor <Outdoor liquid pipe> TH7 : Thermistor <Ambient> LEV : Electronic expansion valve 63HS: High pressure sensor</p>

●Diagnosis of defectives

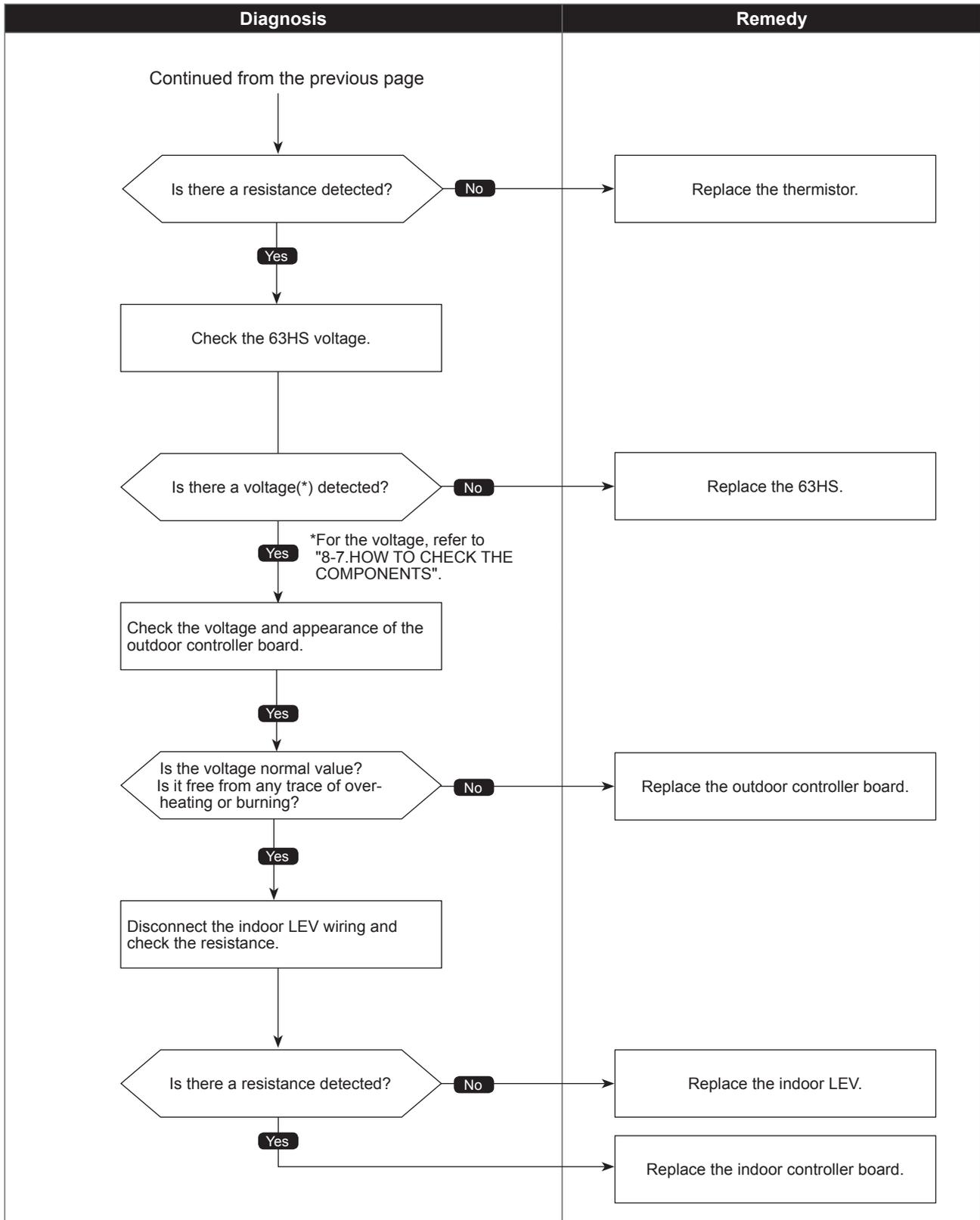
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Refrigerant shortage trouble

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Closed valve in cooling mode

Abnormal points and detection methods	Causes and check points
<p>Abnormal if stop valve is closed during cooling operation.</p> <p>Abnormal when both of the following temperature conditions are satisfied for 20 minutes or more during cooling operation.</p> <ol style="list-style-type: none"> 1. TH22j - TH21j \geq -3.6°F [-2°C] 2. TH23j - TH21j \geq -3.6°F [-2°C] <p>Note: For indoor unit, the abnormality is detected if an operating unit satisfies the condition.</p>	<p>① Outdoor liquid/gas valve is closed.</p> <p>② Multifunction of outdoor LEV (LEV-A) (blockage)</p> <p>TH21: Indoor intake temperature thermistor (RT11 or TH1) TH22: Indoor liquid pipe temperature thermistor (RT13 or TH2) TH23: Branch box gas pipe temperature thermistor (TH-A to E) LEV: Electronic expansion valve</p>

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

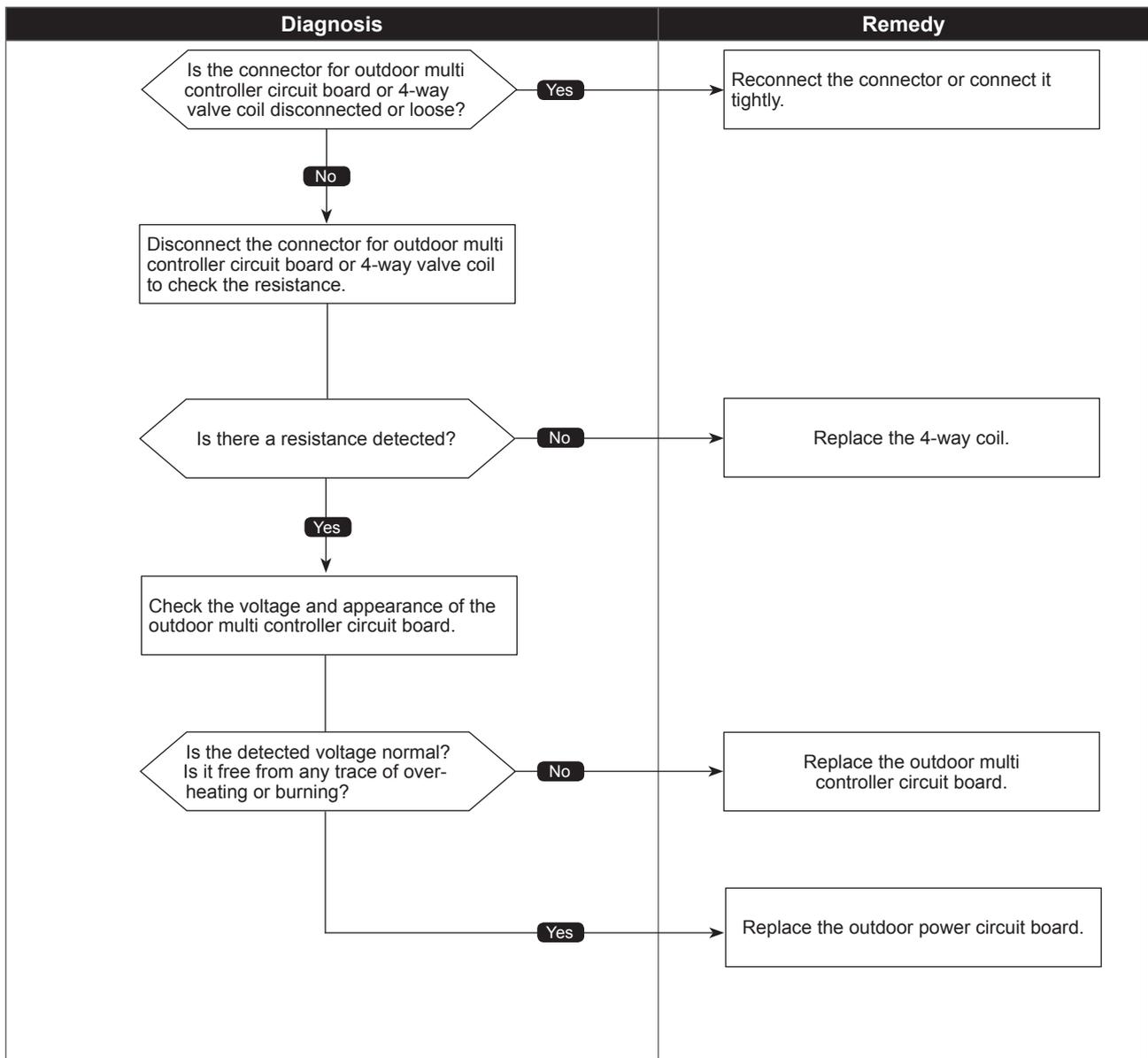
Diagnosis	Remedy
<pre> graph TD Q1{{Is the outdoor stop valve (liquid/gas) fully open?}} Q1 -- No --> R1[Open the outdoor stop valve (liquid/gas) fully.] Q1 -- Yes --> P1[Disconnect the outdoor LEV wiring to check the resistance.] P1 --> Q2{{Is there a resistance detected?}} Q2 -- No --> R2[Replace the outdoor LEV.] Q2 -- Yes --> R3[Replace the outdoor controller board.] </pre>	

4-way valve trouble in heating mode

Abnormal points and detection methods	Causes and check points
<p>Abnormal if 4-way valve does not operate during heating operation.</p> <p>Abnormal when any of the following temperature conditions is satisfied for 3 minutes or more during heating operation</p> <ol style="list-style-type: none"> 1. TH22j - TH21j \leq -18°F [-10°C] 2. TH23j - TH21j \leq -18°F [-10°C] 3. TH22j \leq 37.4°F [3°C] 4. TH23j \leq 37.4°F [3°C] <p>Note: For indoor unit, the abnormality is detected if an operating unit satisfies the condition.</p>	<ol style="list-style-type: none"> ① 4-way valve failure ② Disconnection or failure of 4-way valve coil ③ Clogged drain pipe ④ Disconnection or loose connection of connectors ⑤ Malfunction of input circuit on outdoor multi controller circuit board ⑥ Defective outdoor power circuit board <p>TH21: Indoor intake temperature thermistor (RT11 or TH1) TH22: Indoor liquid pipe temperature thermistor (RT13 or TH2) TH23: Branch box gas pipe temperature thermistor (TH-A to E)</p>

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Abnormal points and detection methods	Causes and check points
Abnormal if overcurrent of DC bus or compressor is detected before 30 seconds after the compressor starts operating.	<ol style="list-style-type: none"> ① Closed stop valve ② Decrease of power supply voltage ③ Looseness, disconnection, or wrong phase of compressor wiring connection ④ Model selection error on indoor controller board or outdoor multi controller circuit board ⑤ Defective compressor ⑥ Defective outdoor power circuit board

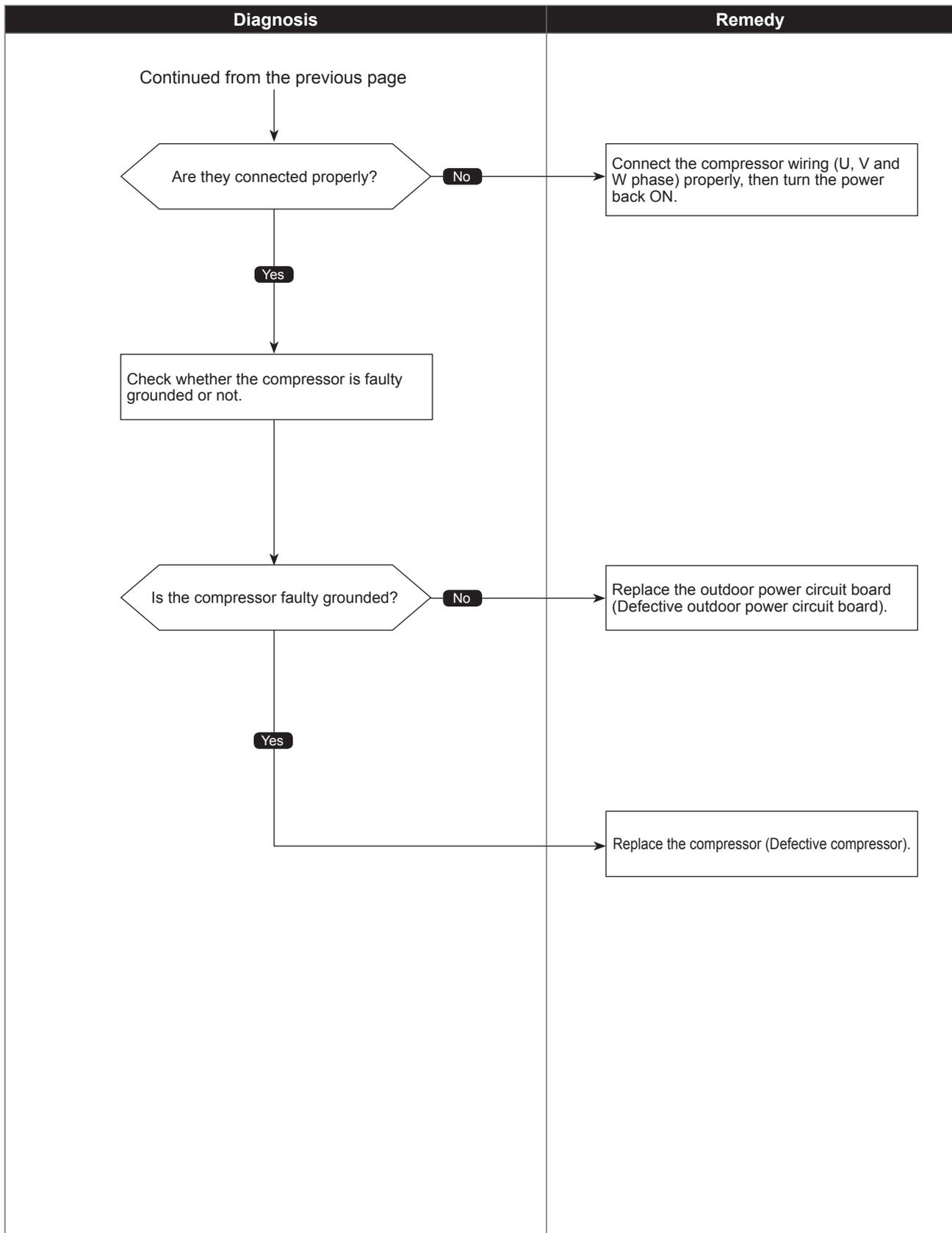
●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
<pre> graph TD A[Check the stop valve.] --> B{Is the stop valve (liquid/gas) fully open?} B -- No --> C[Open the stop valve (liquid/gas) fully.] B -- Yes --> D[Check the power supply voltage.] D --> E{Is the power supply voltage normal?} E -- No --> F["• Check the looseness, disconnection, or breakage of compressor wiring. • Ensure power supply from the facility. (Check for power supply open phase.)"] E -- Yes --> G[Check if the model selection switch is set correctly on the indoor controller board or outdoor multi controller circuit board.] G --> H{Are they set properly?} H -- No --> I[Set the model selection switch correctly, then restart.] H -- Yes --> J[Turn the power OFF to check for looseness, disconnection, or wrong phase of compressor wiring connection.] J --> K[Continue to the next page] </pre>	<p>Open the stop valve (liquid/gas) fully.</p> <p>• Check the looseness, disconnection, or breakage of compressor wiring. • Ensure power supply from the facility. (Check for power supply open phase.)</p> <p>Set the model selection switch correctly, then restart.</p>

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

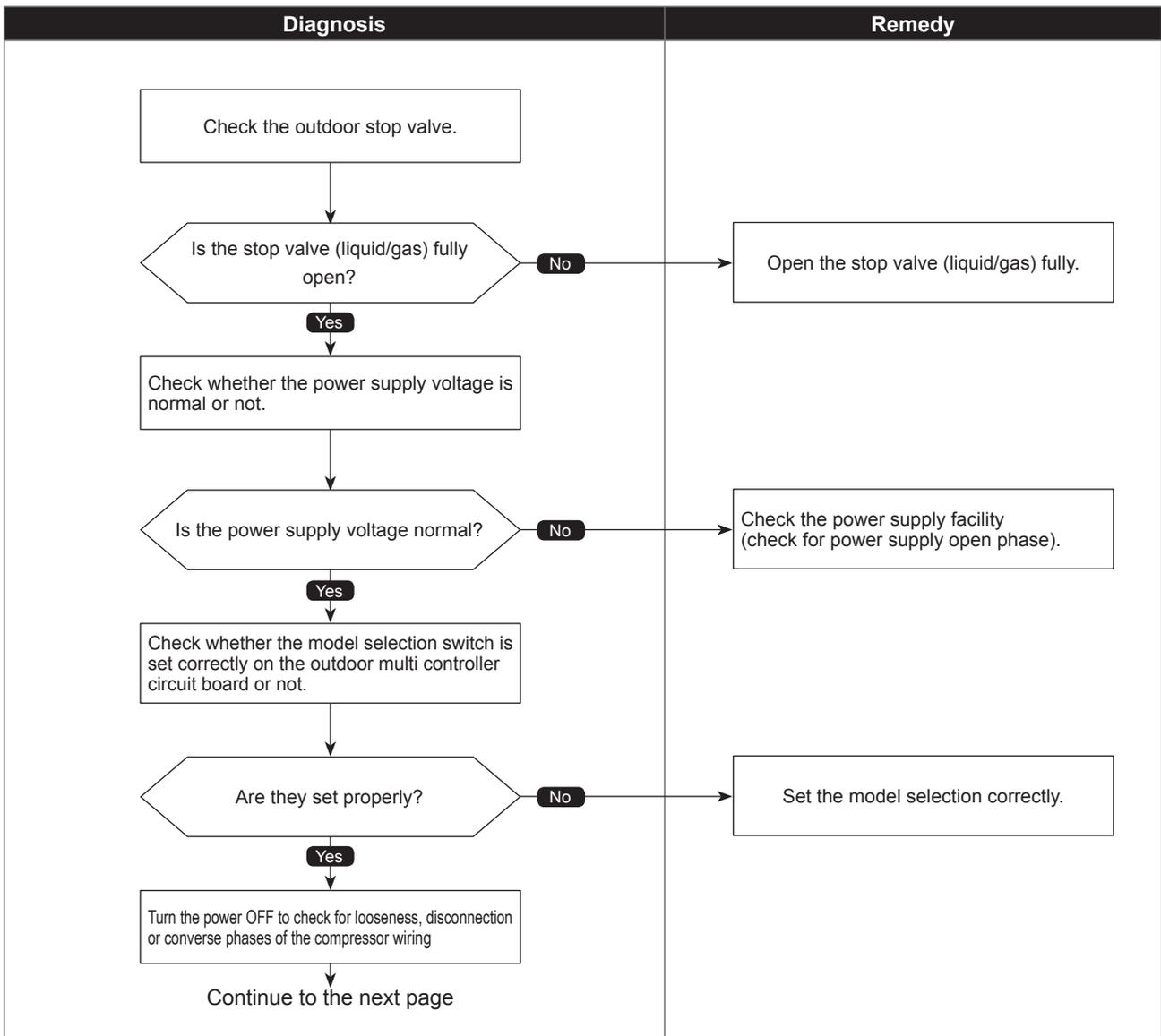


Compressor overcurrent interruption

Abnormal points and detection methods	Causes and check points
Abnormal if overcurrent of DC or the compressor is detected after 30 seconds since the compressor starts operating.	<ol style="list-style-type: none"> ① Closed outdoor stop valve ② Decrease of power supply voltage ③ Looseness, disconnection or reverse phase of compressor wiring connection ④ Malfunction of indoor/outdoor fan ⑤ Short-cycle of indoor/outdoor unit ⑥ Model selection error upon replacement of outdoor multi controller circuit board ⑦ Malfunction of input circuit on outdoor multi controller circuit board ⑧ Defective compressor ⑨ Defective outdoor power circuit board

●Diagnosis of defectives

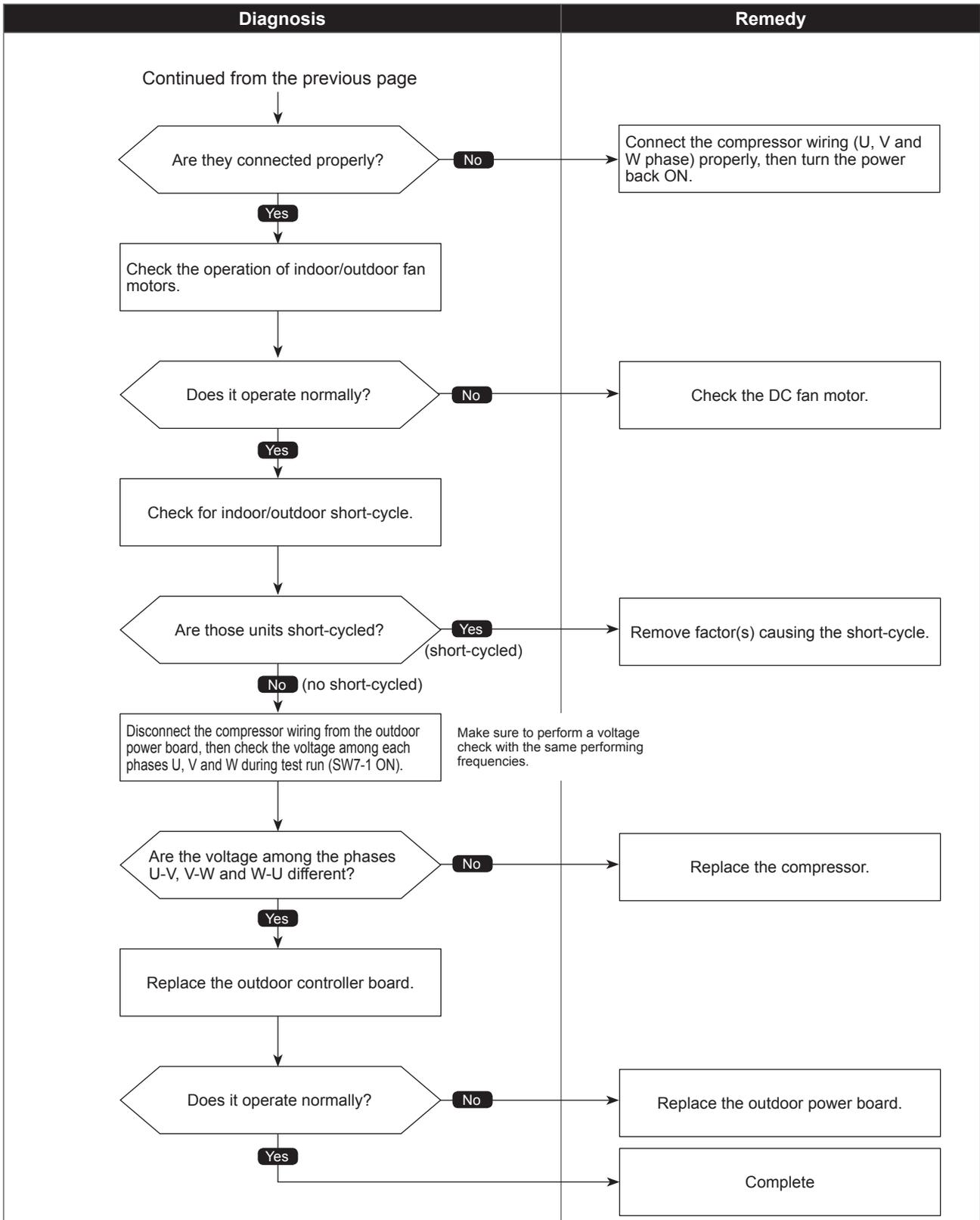
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Compressor overcurrent interruption

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



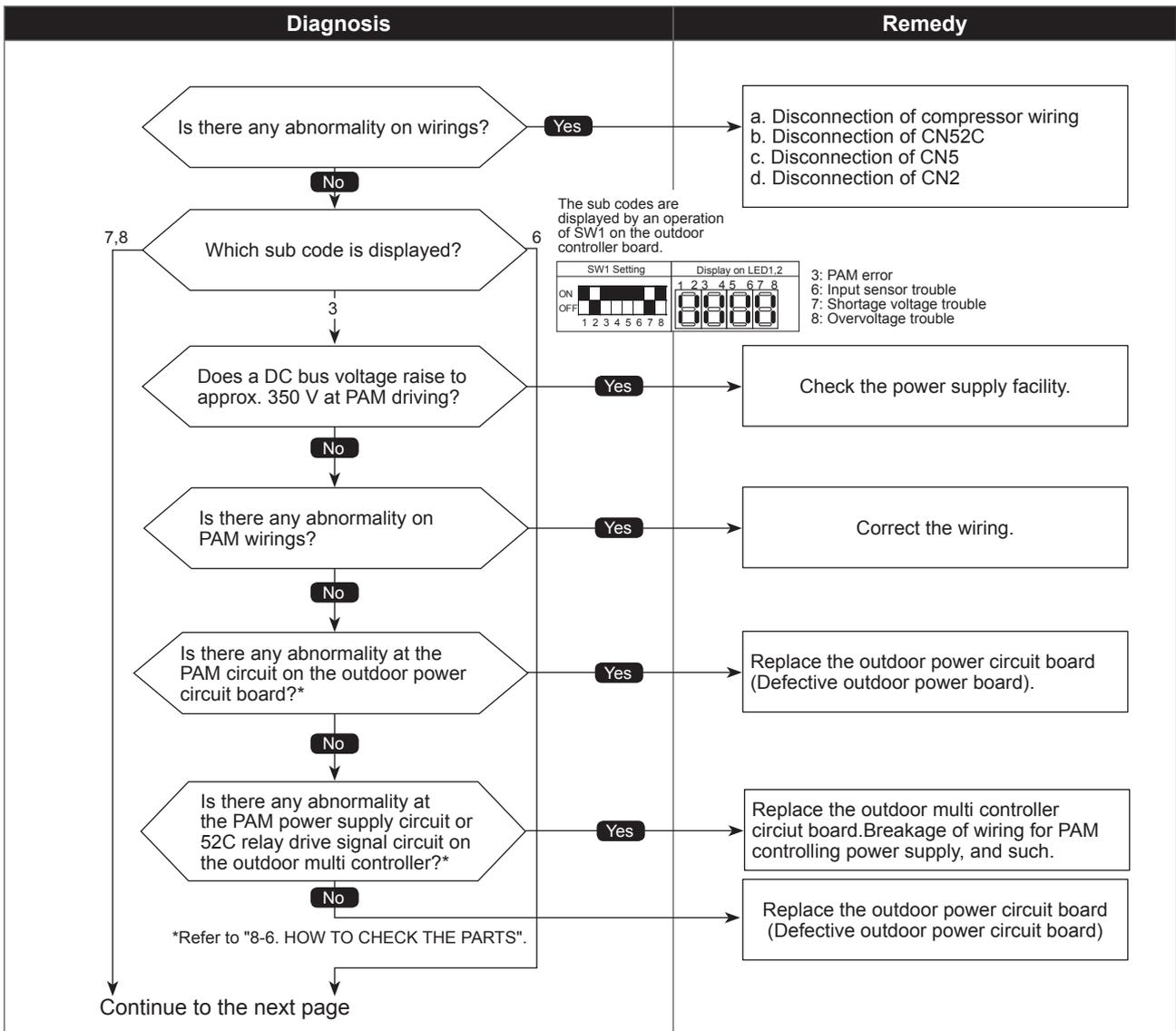
Voltage shortage /Overvoltage/PAM error/L1 open phase/ Primary current sensor error/Power synchronization signal error

Abnormal points and detection methods	Causes and check points
<p>Abnormal if any of following symptoms are detected;</p> <ul style="list-style-type: none"> ●Decrease of DC bus voltage to 200V ●Increase of DC bus voltage to 400V ●DC bus voltage stays at 310V or less for consecutive 30 seconds when the operational frequency is over 20 Hz. ●When any of following conditions is satisfied while the detections value of primary current is 0.1A or less. <ol style="list-style-type: none"> 1. The operational frequency is 40Hz or more. 2. The compressor current is 6A or more. 	<ol style="list-style-type: none"> ① Decrease/increase of power supply voltage ② Primary current sensor failure ③ Disconnection of compressor wiring ④ Malfunction of 52C ⑤ Disconnection or contact failure of CN52C ⑥ Defective outdoor power circuit board ⑦ Malfunction of 52C driving circuit on outdoor multi controller circuit board ⑧ Disconnection of CN5 ⑨ Disconnection of CN2 ⑩ Malfunction of primary current detecting circuit on outdoor power circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

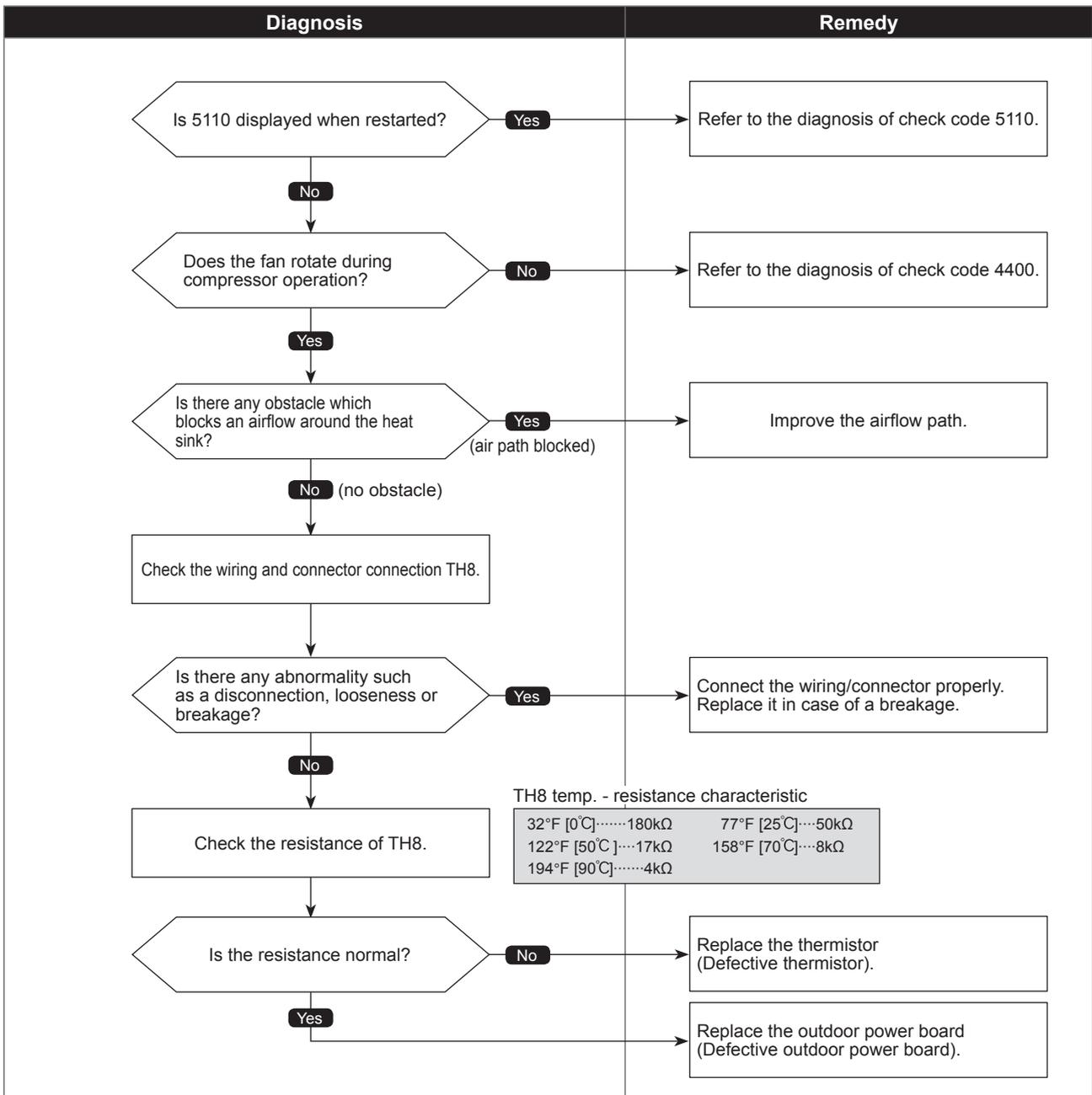


Heat sink temperature trouble

Abnormal points and detection methods	Causes and check points
<p>Abnormal if TH8 detects a temperature outside the specified range during compressor operation.</p> <p>TH8: Thermistor <Heat sink></p>	<ul style="list-style-type: none"> ① Blocked outdoor fan ② Malfunction of outdoor fan motor ③ Blocked airflow path ④ Rise of ambient temperature ⑤ Characteristic defect of thermistor ⑥ Malfunction of input circuit on outdoor power board ⑦ Malfunction of outdoor fan driving circuit

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

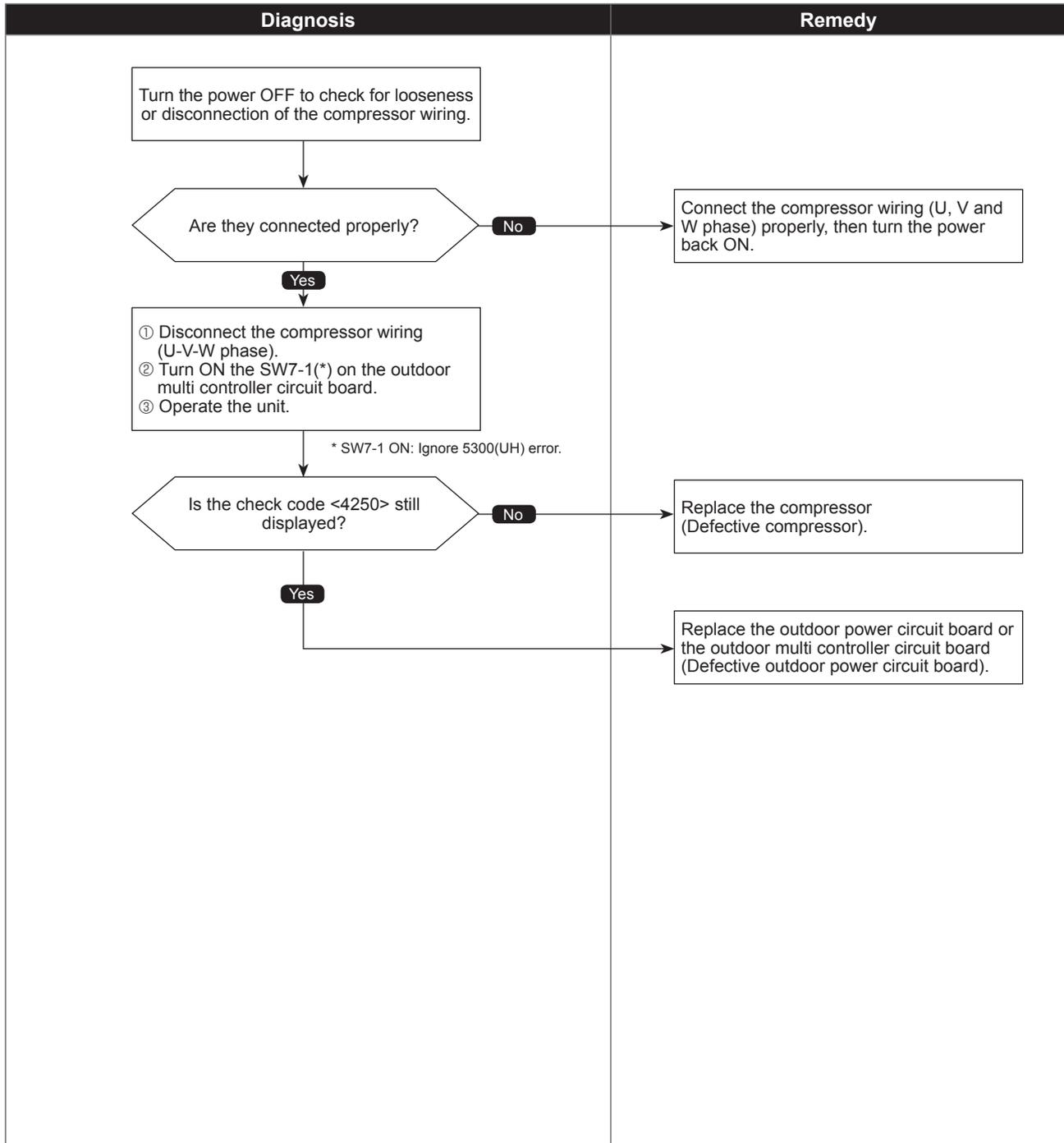


Power module trouble or overcurrent trouble

Abnormal points and detection methods	Causes and check points
Abnormal if both of the following conditions are satisfied: 1. Overcurrent of DC bus or compressor is detected during compressor operation. 2. Inverter power module is determined to be defected.	① Short-circuit caused by looseness or disconnection of compressor wiring ② Defective compressor ③ Defective outdoor power circuit board

●Diagnosis of defectives

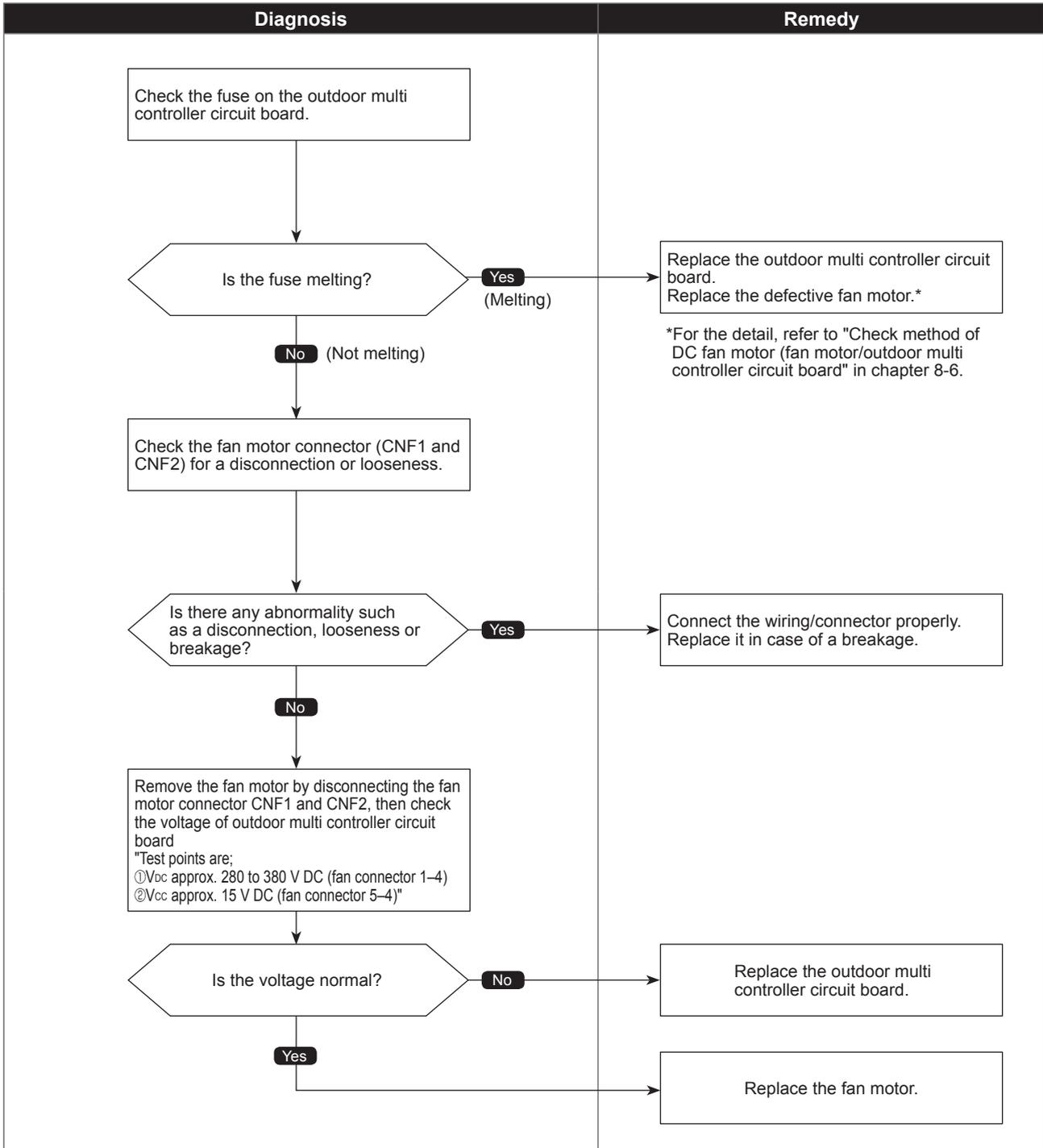
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Abnormal points and detection methods	Causes and check points
Abnormal if no rotational frequency is detected, or detected a value outside the specified range during fan motor operation.	① Malfunction of fan motor ② Disconnection of CNF connector ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Compressor temperature thermistor (TH4) open/short

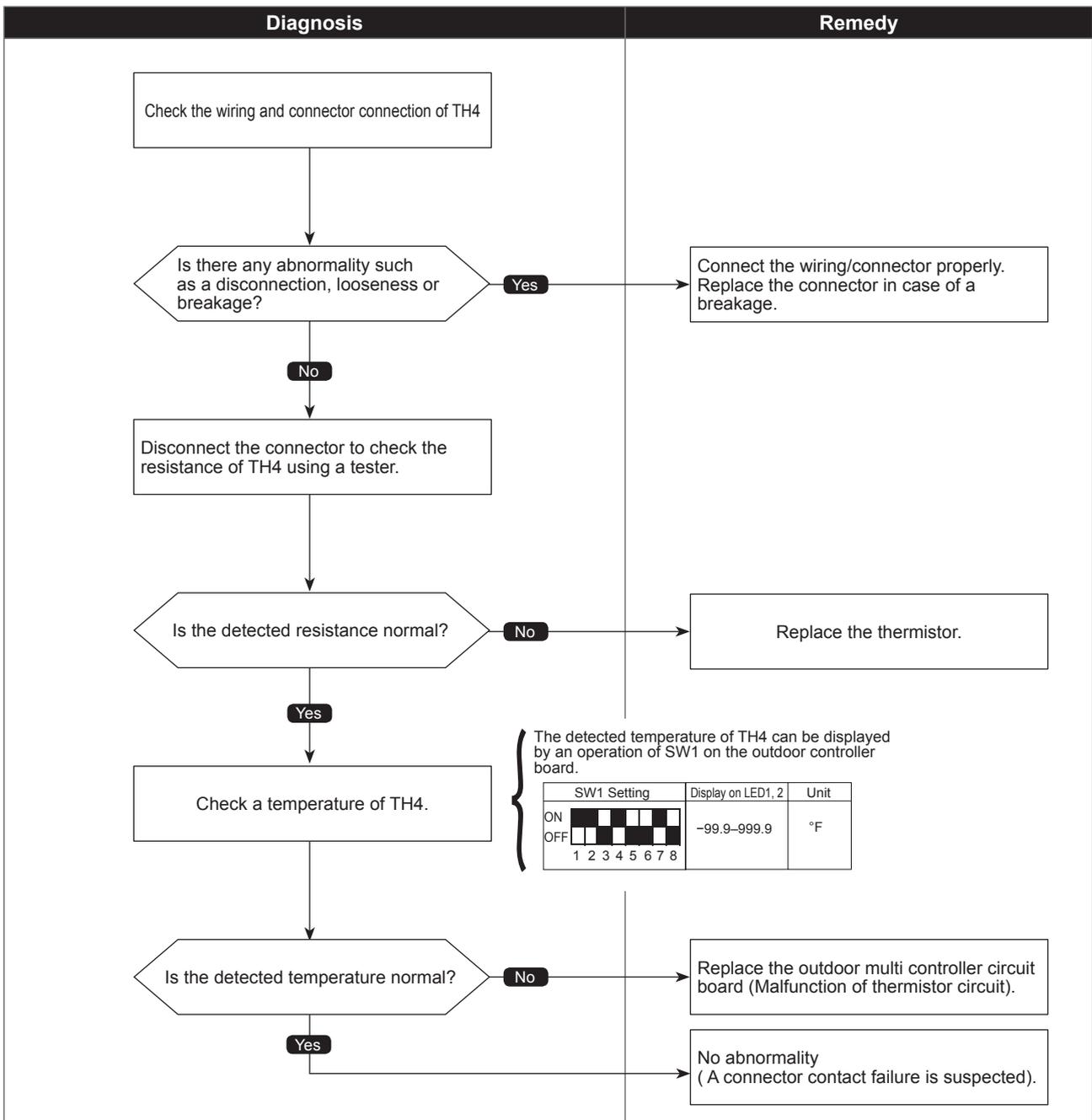
<Detected in outdoor unit>

Abnormal points and detection methods	Causes and check points
Abnormal if TH4 detects to be open/short. (The open/short detection is disabled for 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.) Open: 37.4°F [3°C] or less Short: 422.6°F [217°C] or more TH4: Thermistor <Compressor>	① Disconnection or contact failure of connectors ② Characteristic defect of thermistor ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



Suction pipe temperature thermistor (TH6) open/short

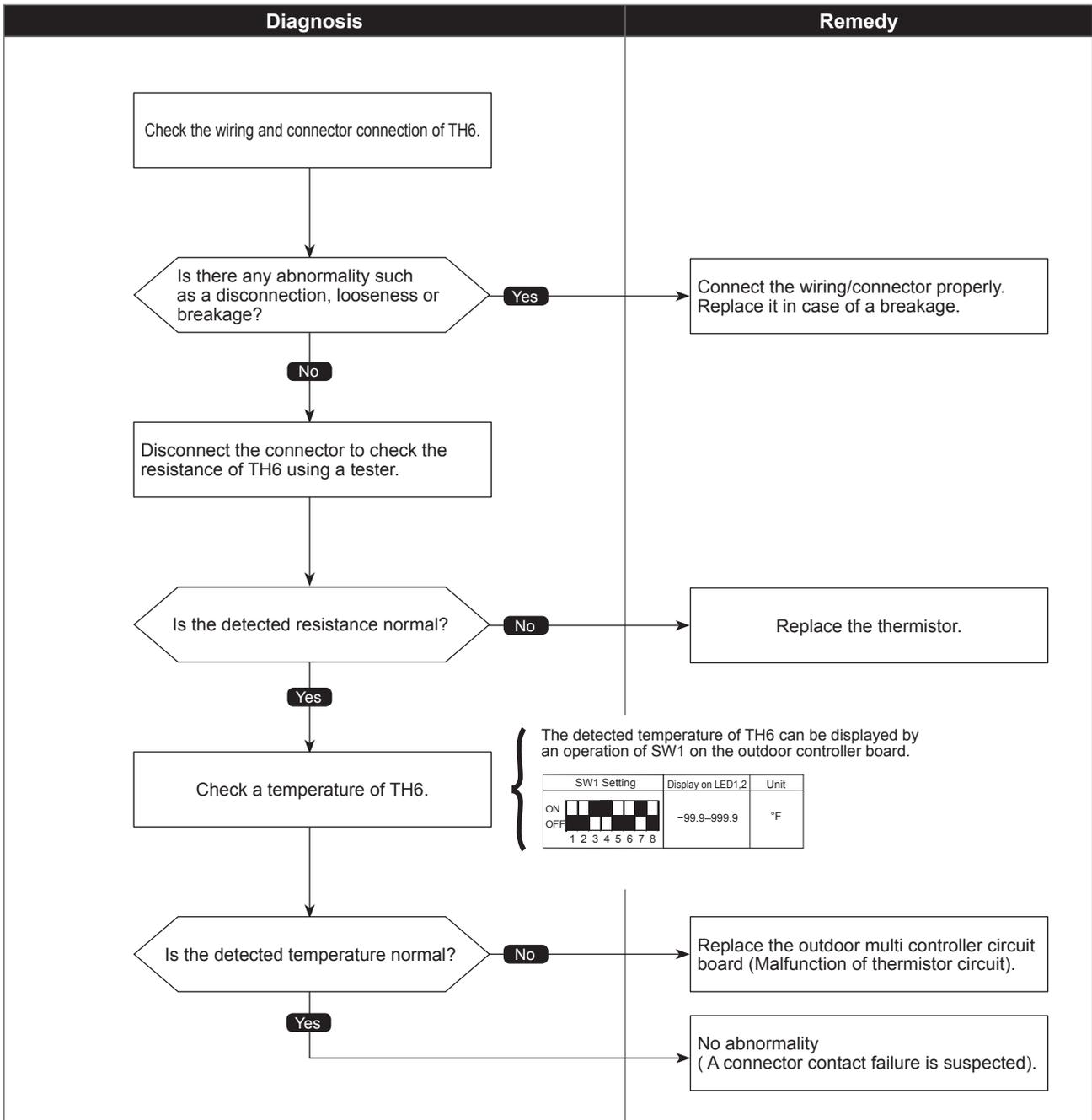
<Detected in outdoor unit>

Abnormal points and detection methods	Causes and check points
Abnormal if TH6 detects to be open/short. (The open/short detection is disabled during 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>	① Disconnection or contact failure of connectors ② Characteristic defect of thermistor ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



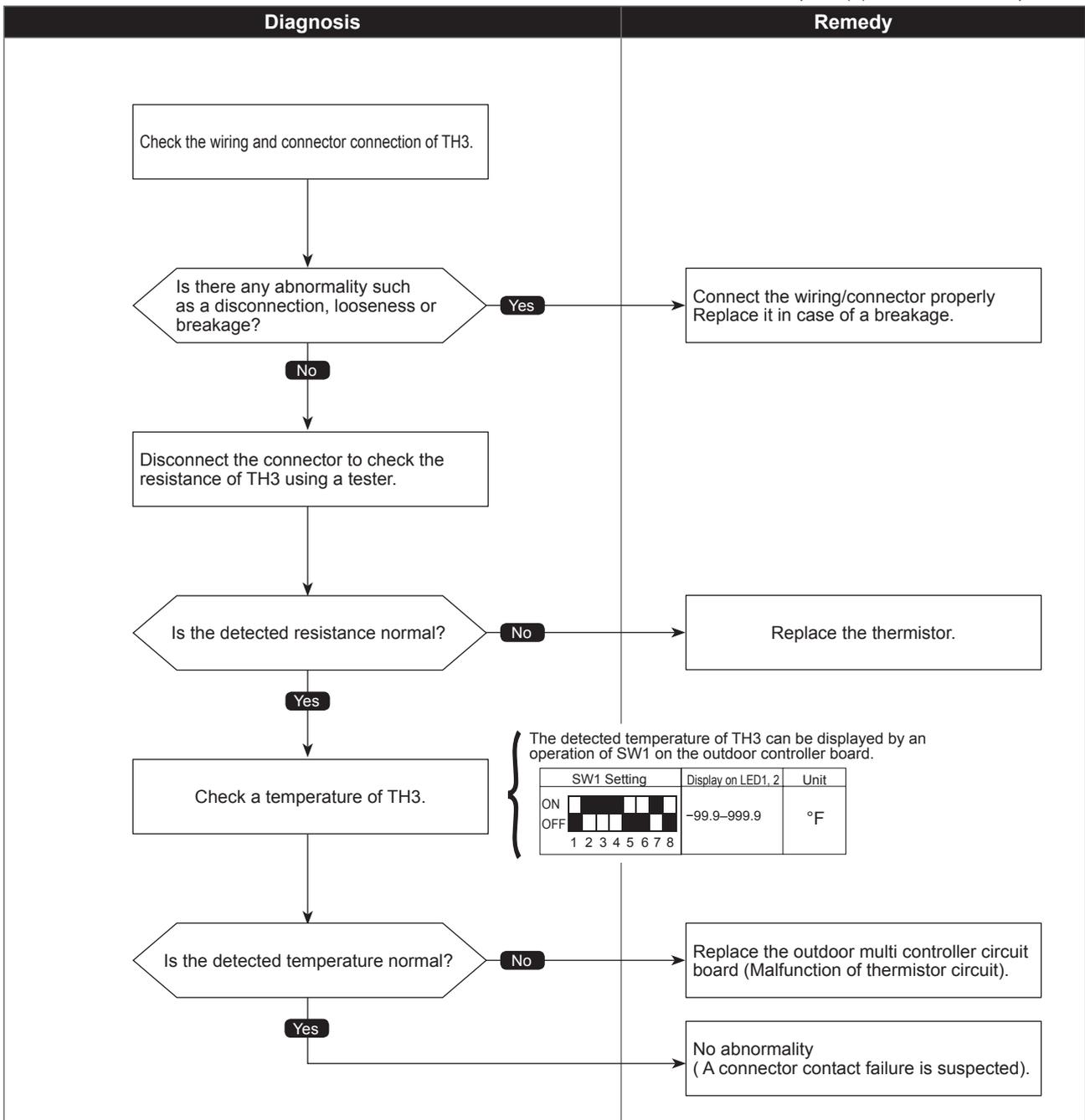
Outdoor liquid pipe temperature thermistor (TH3) open/short

Abnormal points and detection methods	Causes and check points
Abnormal if TH3 detects to be open/short. (The open/short detection is disabled during 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>	① Disconnection or contact failure of connectors ② Characteristic defect of thermistor ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



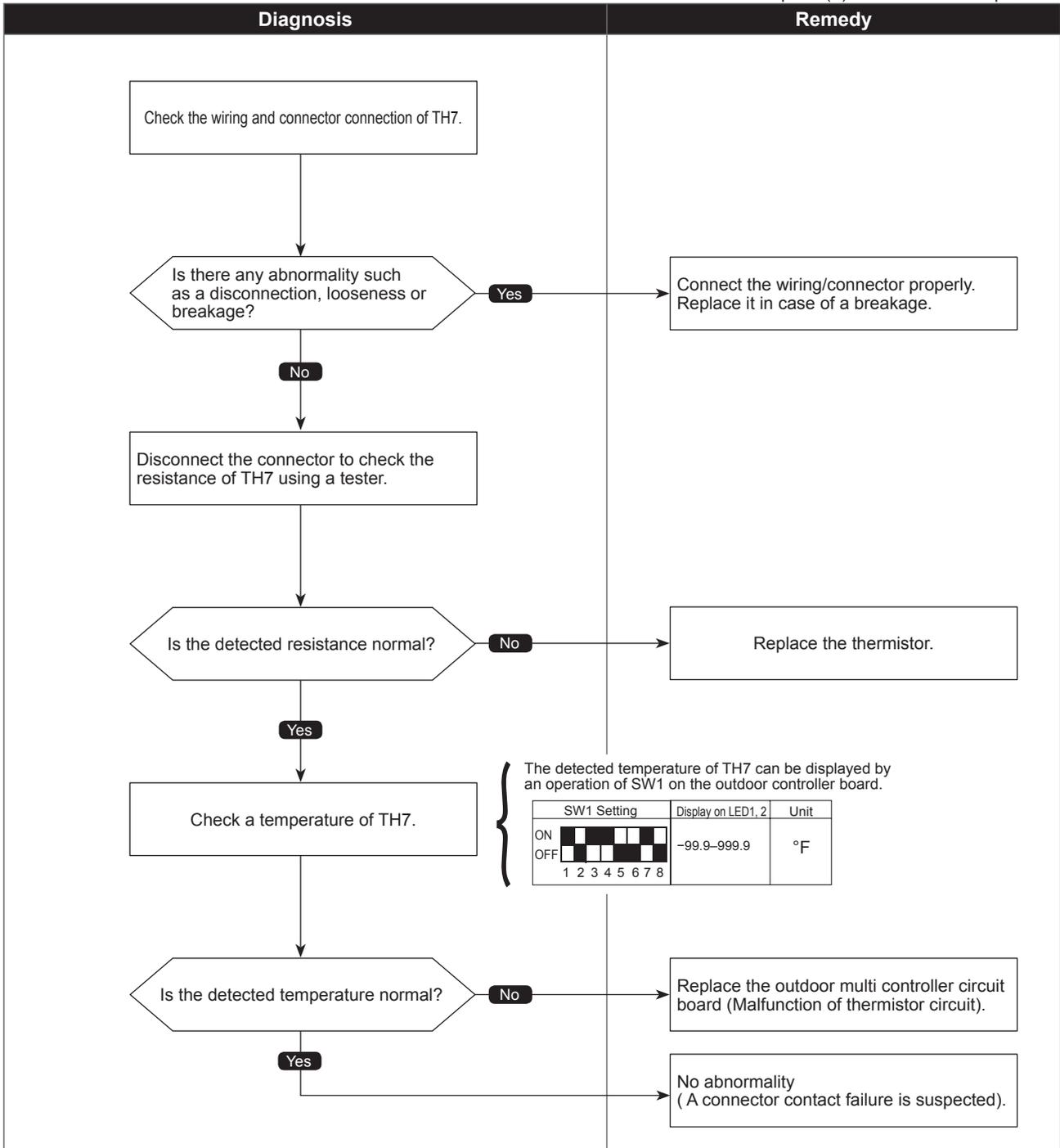
Ambient temperature thermistor (TH7) open/short

Abnormal points and detection methods	Causes and check points
Abnormal if TH7 detects to be open/short Open: -40°F [-40°C] or less Short: 194°F [90°C] or more TH7: Thermistor <Ambient>	① Disconnection or contact failure of connectors ② Characteristic defect of thermistor ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



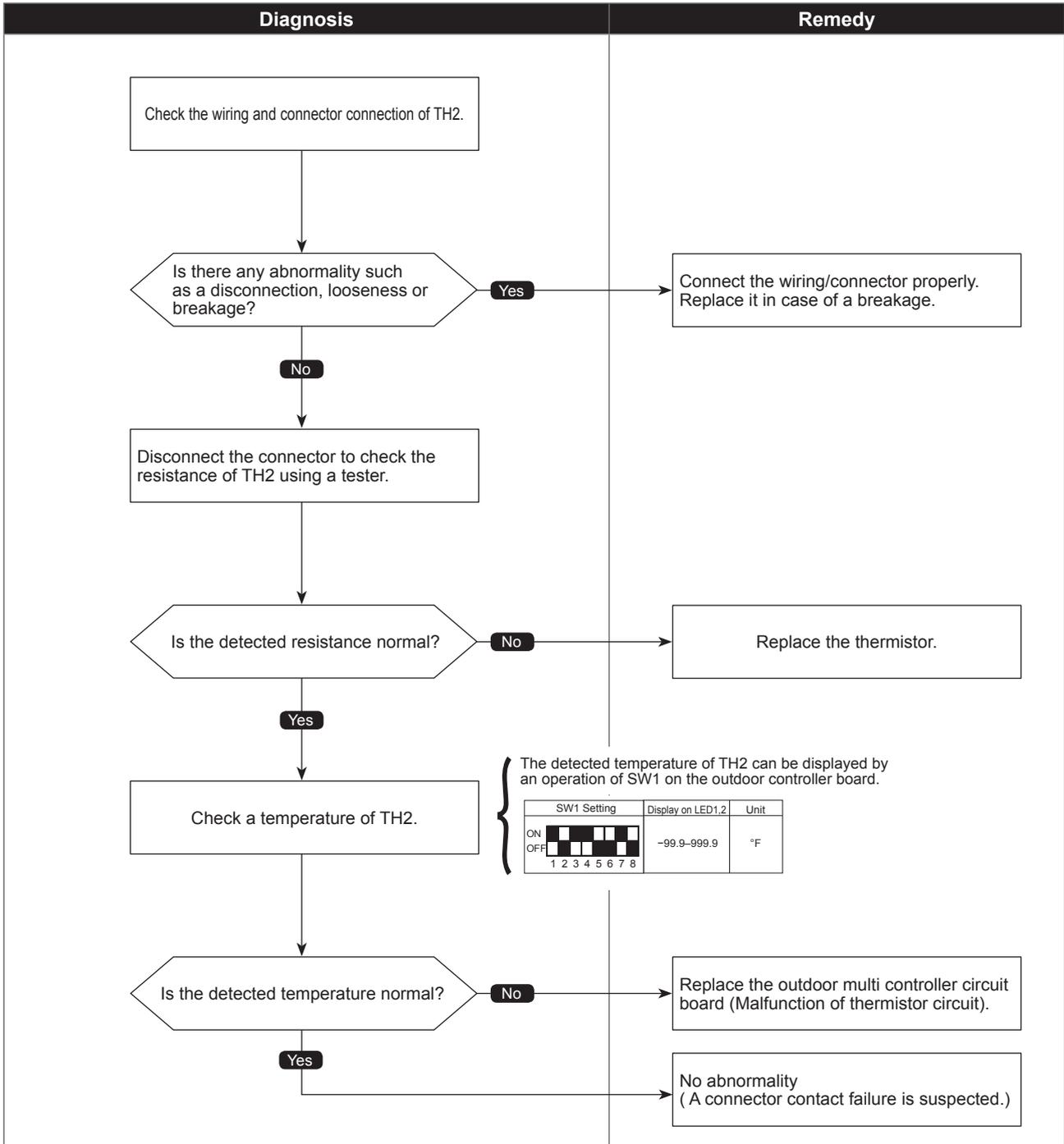
HIC pipe temperature thermistor (TH2) open/short

Abnormal points and detection methods	Causes and check points
Abnormal if TH2 detects to be open/short. Open: -40°F [-40°C] or less Short: 194°F [90°C] or more TH2: Thermistor <HIC pipe>	① Disconnection or contact failure of connectors ② Characteristic defect of thermistor ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



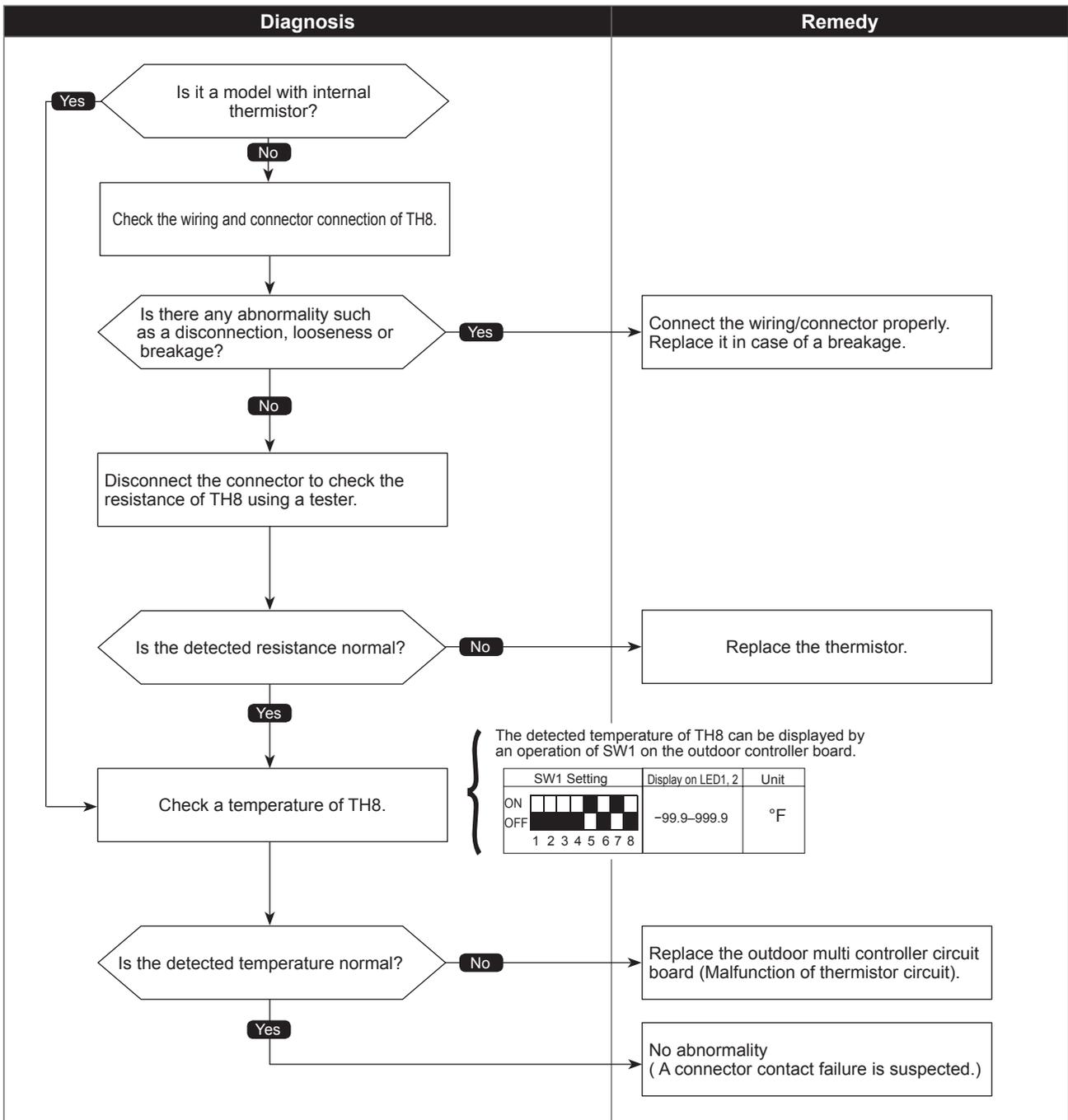
Heat sink temperature thermistor (TH8) open/short

Abnormal points and detection methods	Causes and check points
Abnormal if TH8 detects to be open/short. Open: -31.2°F [-35.1°C] or less Short: 338.5°F [170.3°C] or more TH8: Thermistor <Heat sink>	① Disconnection or contact failure of connectors ② Characteristic defect of thermistor ③ Defective outdoor multi controller circuit board

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



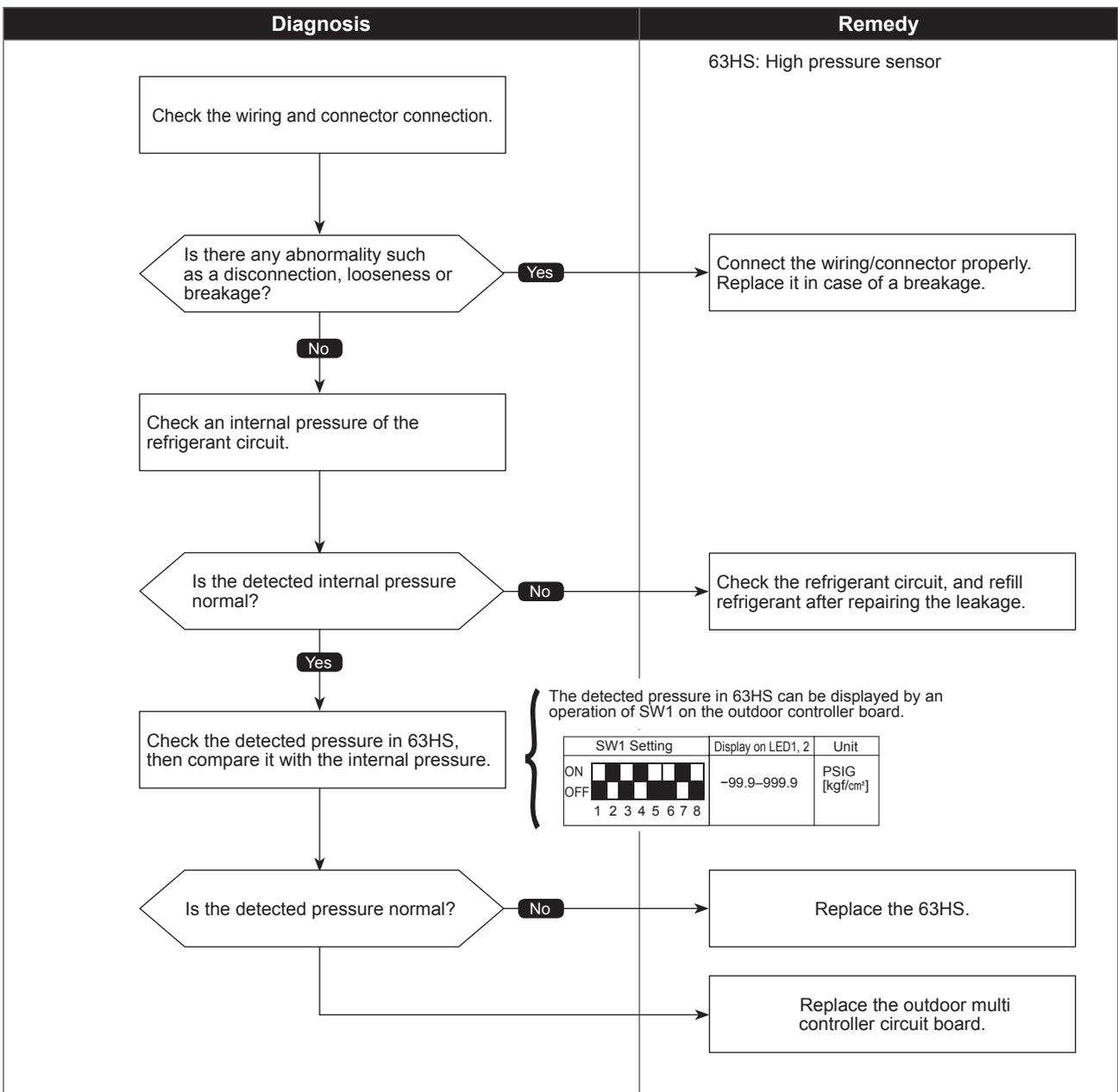
High pressure sensor (63HS) trouble

Abnormal points and detection methods	Causes and check points
<p>① When the detected pressure in the high pressure sensor is 14.2 PSIG [1 kgf/cm²] or less during operation, the compressor stops operation and enters into an anti-restart mode for 3 minutes.</p> <p>② When the detected pressure is 14.2 PSIG [1 kgf/cm²] or less immediately before restarting, the compressor falls into an abnormal stop with a check code <5201>.</p> <p>③ For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, above mentioned symptoms are not determined as abnormal.</p>	<p>① Defective high pressure sensor</p> <p>② Decrease of internal pressure caused by gas leakage</p> <p>③ Disconnection or contact failure of connector</p> <p>④ Malfunction of input circuit on outdoor multi controller circuit board</p>

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



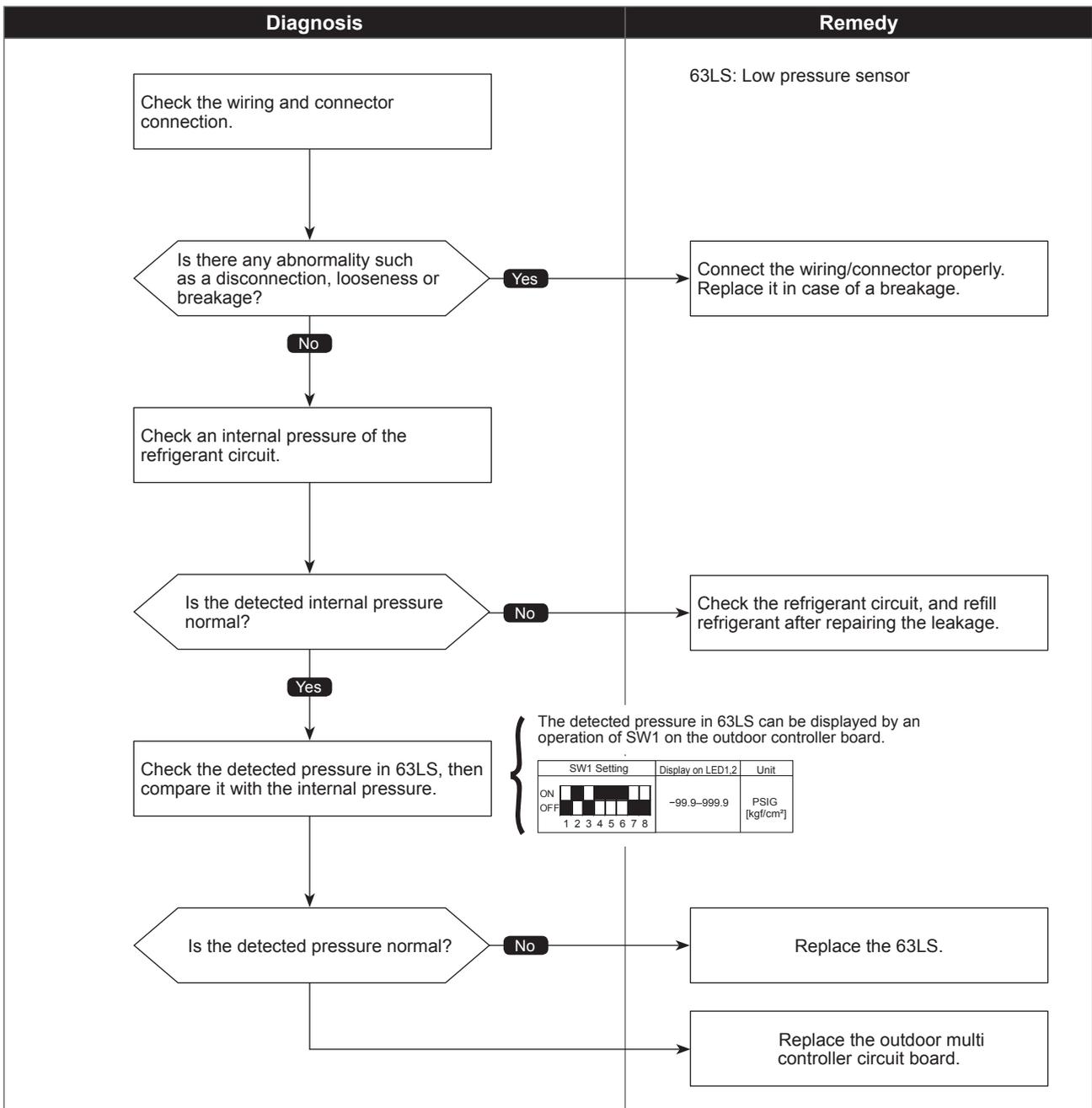
Low pressure sensor (63LS) trouble

Abnormal points and detection methods	Causes and check points
<p>① When the detected pressure in the low pressure sensor is -32.7 PSIG [-2.3kgf/cm^2] or less, or 328.6 PSIG [23.1kgf/cm^2] or more during operation, the compressor stops operation with a check code <5202>.</p> <p>② For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, above mentioned symptoms are not determined as abnormal.</p>	<p>① Defective low pressure sensor</p> <p>② Decrease of internal pressure caused by gas leakage</p> <p>③ Disconnection or contact failure of connector</p> <p>④ Malfunction of input circuit on outdoor multi controller circuit board</p>

● Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



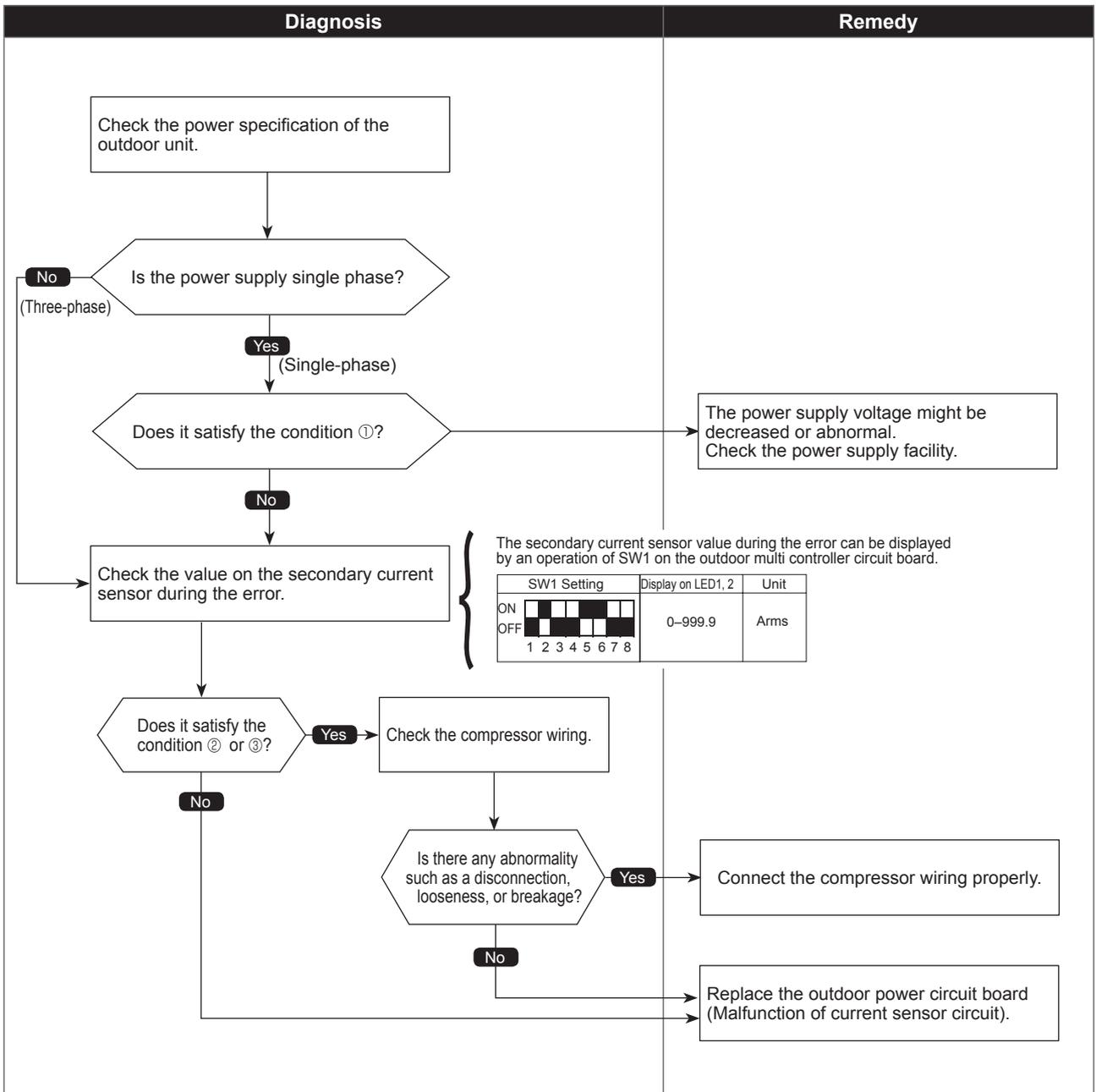
Current sensor trouble/Primary current error

Abnormal points and detection methods	Causes and check points				
<p>Abnormal if any of the following conditions is detected:</p> <p>① Primary current sensor detects any of the following conditions (single phase unit only):</p> <table border="1"> <tr> <td>10 consecutive-second detection</td> <td>One-time detection</td> </tr> <tr> <td>34 A</td> <td>38 A</td> </tr> </table> <p>② Secondary current sensor detects 25 A or more. ③ Secondary current sensor detects 1.0 A or less.</p>	10 consecutive-second detection	One-time detection	34 A	38 A	<p>① Decrease/trouble of power supply voltage ② Disconnection of compressor wiring ③ Current sensor trouble on outdoor power circuit board ④ Wiring through current sensor (penetration type) is not done.</p>
10 consecutive-second detection	One-time detection				
34 A	38 A				

●Diagnosis of defectives

The black square (■) indicates a switch position.

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

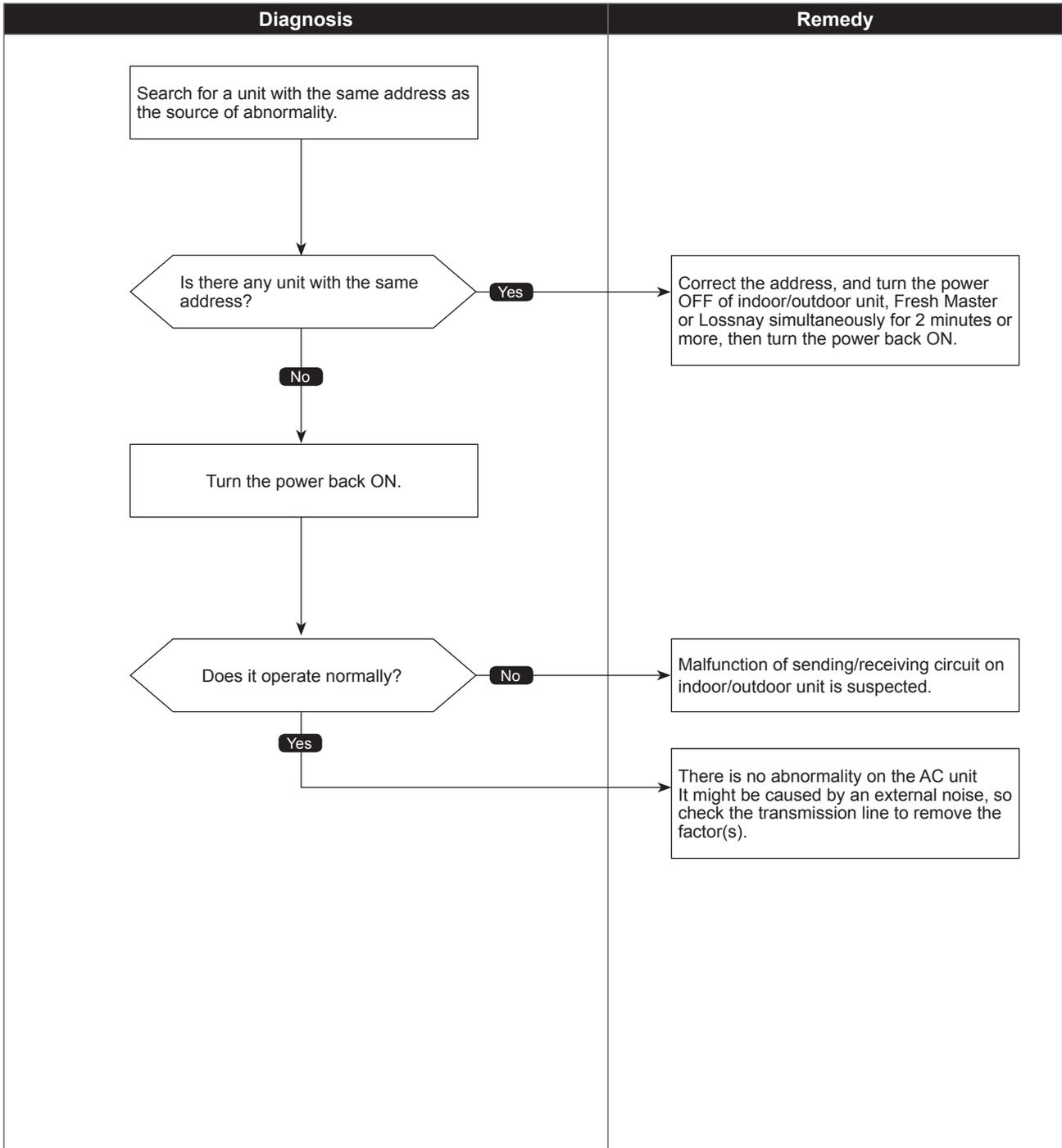
6600
(A0)

Duplex address error

Abnormal points and detection methods	Causes and check points
Abnormal if 2 or more units with the same address are existing.	① There are 2 units or more with the same address in their controller among outdoor unit, indoor unit, Fresh Master, Lossnay or remote controller ② Noise interference on indoor/outdoor connectors

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Transmission processor hardware error

Abnormal points and detection methods	Causes and check points
Abnormal if the transmission line shows "1" although the transmission processor transmitted "0".	① 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 ② Malfunction of transmitting circuit on transmission processor ③ Noise interference on indoor/outdoor connectors

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

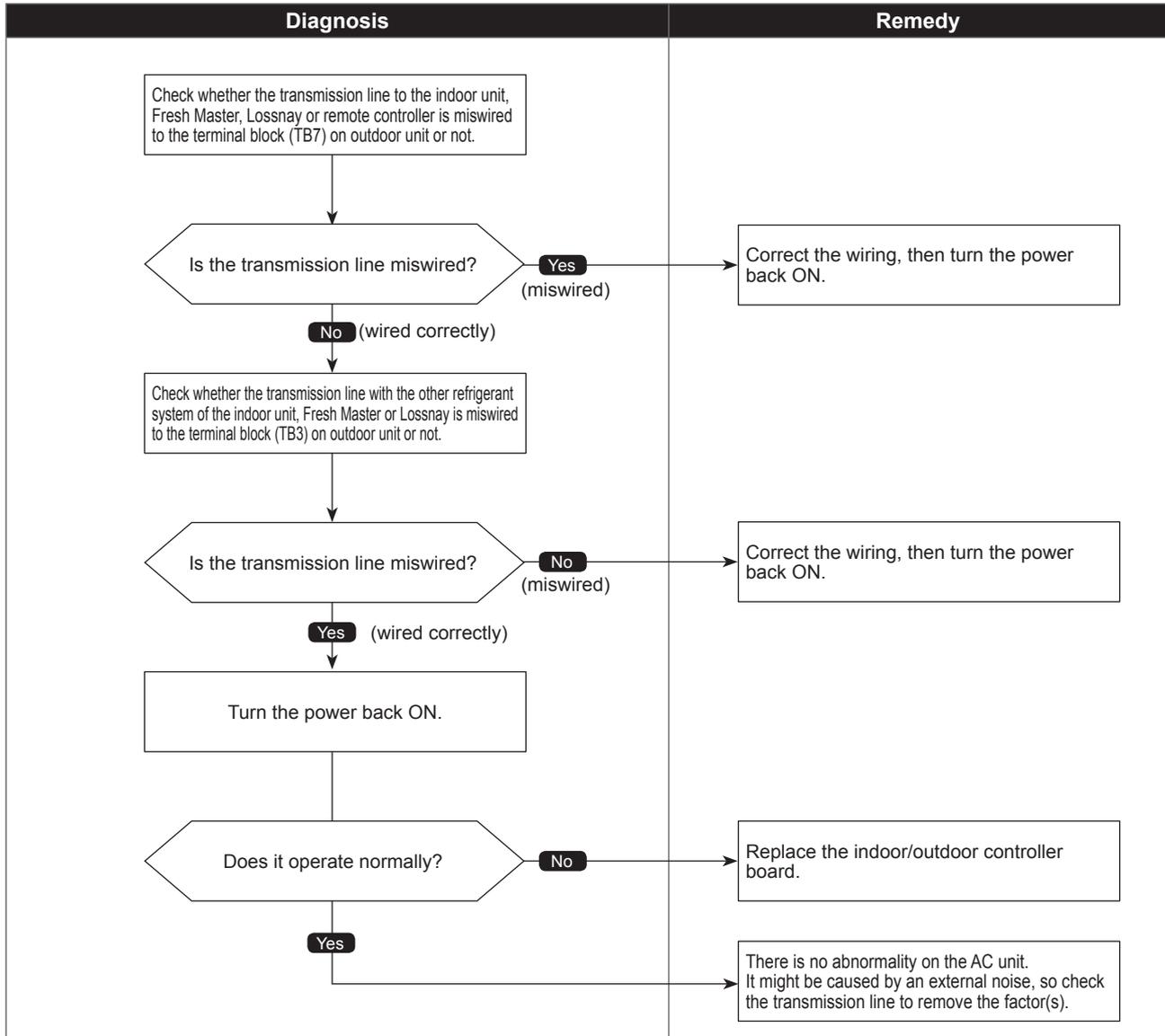
Diagnosis	Remedy
<pre> graph TD Q1{{A wiring work was performed while the power OFF.}} Q1 -- No --> R1[If the wiring work was performed while the power ON, turn the power OFF of indoor/outdoor unit, Fresh Master or Lossnay simultaneously for 2 minutes or more, then turn the power back ON.] Q1 -- Yes --> P1[Turn the power back ON.] P1 --> Q2{{Does it operate normally?}} Q2 -- No --> R2[Replace the indoor/outdoor controller board.] Q2 -- Yes --> R3[There is no abnormality on the AC unit. It might be caused by an external noise, so check the transmission line to remove the factor(s).] </pre>	<div data-bbox="965 716 1391 848" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> If the wiring work was performed while the power ON, turn the power OFF of indoor/outdoor unit, Fresh Master or Lossnay simultaneously for 2 minutes or more, then turn the power back ON. </div> <div data-bbox="965 1182 1391 1272" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Replace the indoor/outdoor controller board. </div> <div data-bbox="965 1318 1391 1451" style="border: 1px solid black; padding: 5px;"> There is no abnormality on the AC unit. It might be caused by an external noise, so check the transmission line to remove the factor(s). </div>

Transmission bus BUSY error

Abnormal points and detection methods	Causes and check points
<p>① Over error by collision Abnormal if no-transmission status caused by a transmitting data collision is consecutive for 8 to 10 minutes.</p> <p>② Abnormal if a status, that data is not allowed on the transmission line because of noise and such, is consecutive for 8 to 10 minutes</p>	<p>① The transmission processor is unable to transmit due to a short-cycle voltage such as noise is mixed on the transmission line.</p> <p>② 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.</p> <p>③ 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.</p>

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

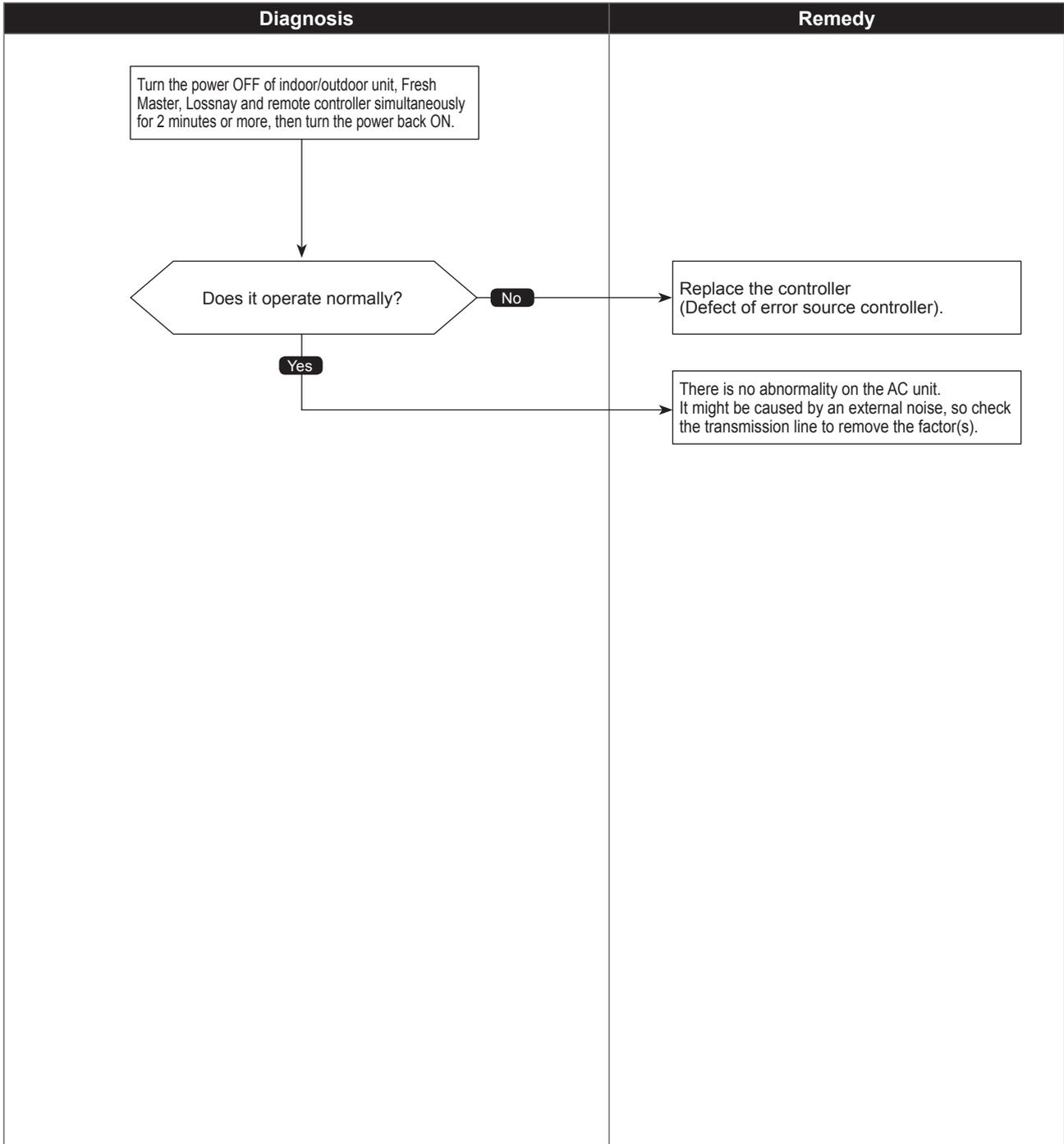


Signal communication error with transmission processor

Abnormal points and detection methods	Causes and check points
① Abnormal if the data of unit/transmission processor were not normally transmitted. ② Abnormal if the address transmission from the unit processor was not normally transmitted.	① Accidental disturbance such as noise or lightning surge ② Hardware malfunction of transmission processor

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



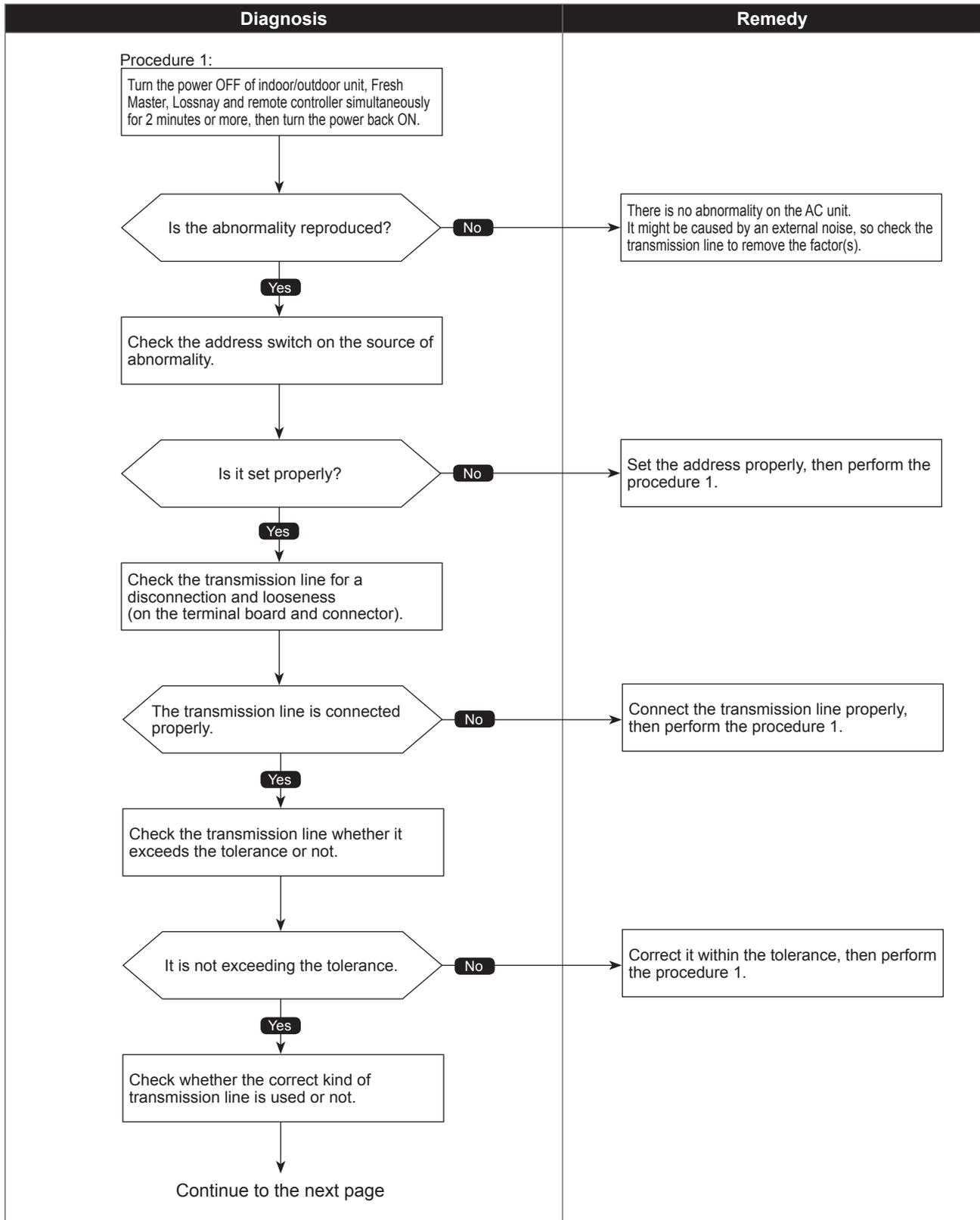
No ACK error

Abnormal points and detection methods	Causes and check points
<p>① Represents a common error detection An abnormality detected by the sending side controller when receiving no ACK from the receiving side, though signal was once sent. The sending side searches the error in 30 seconds interval for 6 times continuously.</p>	<p>① The previous address unit does not exist since the address switch was changed while in electric continuity status. ② Decline of transmission voltage/signal caused by tolerance over on transmission line ·At the furthest end: 656 ft [200 m] ·On remote controller line: 39 ft [12 m] ③ Decline of transmission voltage/ signal due to unmatched transmission line types ·Types for shield line: CVVS, CPEVS ·Line diameter: AWG16 [1.25 mm²] or more ④ Decline of transmission voltage/ signal due to excessive number of connected units ⑤ Malfunction due to accidental disturbance such as noise or lightning surge ⑥ Defect of error source controller</p>
<p>② The cause of displayed address and attribute is on the outdoor unit side An abnormality detected by the indoor unit if receiving no ACK when transmitting signal from the indoor unit to the outdoor unit.</p>	<p>① Contact failure of indoor/outdoor unit transmission line ② Disconnection of transmission connector (CN2M) on indoor unit ③ Malfunction of sending/receiving circuit on indoor/outdoor unit</p>
<p>③ The cause of displayed address and attribute is on the indoor unit side An abnormality detected by the remote controller if receiving no ACK when sending data from the remote controller to the indoor unit.</p>	<p>① While operating with multi refrigerant system indoor units, an abnormality is detected when the indoor unit transmit signal to the remote controller during the other refrigerant-system outdoor unit is turned OFF, or within 2 minutes after it turned back ON. ② Contact failure of indoor unit or remote controller transmission line ③ Disconnection of transmission connector (CN2M) on indoor unit ④ Malfunction of sending/receiving circuit on indoor unit or remote controller</p>
<p>④ The cause of the displayed address and attribute is on the remote controller side An abnormality detected by the indoor unit if receiving no ACK when transmitting signal from the indoor unit to the remote controller.</p>	<p>① While operating with multi refrigerant system indoor units, an abnormality is detected when the indoor unit transmit signal to the remote controller during the other refrigerant-system outdoor unit is turned OFF, or within 2 minutes after it turned back ON. ② Contact failure of indoor unit or remote controller transmission line ③ Disconnection of transmission connector (CN2M) on indoor unit ④ Malfunction of sending/receiving circuit on indoor unit or remote controller</p>

Abnormal points and detection methods	Causes and check points
<p>⑤ The cause of displayed address and attribute is on the Fresh Master side An abnormality detected by the indoor unit if receiving no ACK when transmitting signal from the indoor unit to the Fresh Master.</p>	<p>① While the indoor unit is operating with multi refrigerant system Fresh Master, an abnormality is detected when the indoor unit transmits signal to the remote controller while the outdoor unit with the same refrigerant system as the Fresh Master is turned OFF, or within 2 minutes after it turned back ON.</p> <p>② Contact failure of indoor unit or Fresh Master transmission line</p> <p>③ Disconnection of transmission connector (CN2M) on indoor unit or Fresh Master</p> <p>④ Malfunction of sending/receiving circuit on indoor unit or Fresh Master</p>
<p>⑥ The cause of displayed address and attribute is on Lossnay side An abnormality detected by the indoor unit if receiving no ACK when the indoor unit transmit signal to the Lossnay.</p>	<p>① An abnormality is detected when the indoor unit transmits signal to Lossnay while the Lossnay is turned OFF.</p> <p>② While the indoor unit is operating with the other refrigerant Lossnay, an abnormality is detected when the indoor unit transmits signal to the Lossnay while the outdoor unit with the same refrigerant system as the Lossnay is turned OFF, or within 2 minutes after it turned back ON.</p> <p>③ Contact failure of indoor unit or Lossnay transmission line</p> <p>④ Disconnection of transmission connector (CN2M) on indoor unit</p> <p>⑤ Malfunction of sending/receiving circuit on indoor unit or Lossnay</p>
<p>⑦ The controller of displayed address and attribute is not recognized.</p>	<p>① The previous address unit does not exist since the address switch was changed while in electric continuity status.</p> <p>② An abnormality detected at transmitting from the indoor unit since the Fresh Master/Lossnay address are changed after synchronized setting of Fresh Master/Lossnay by the remote controller.</p>

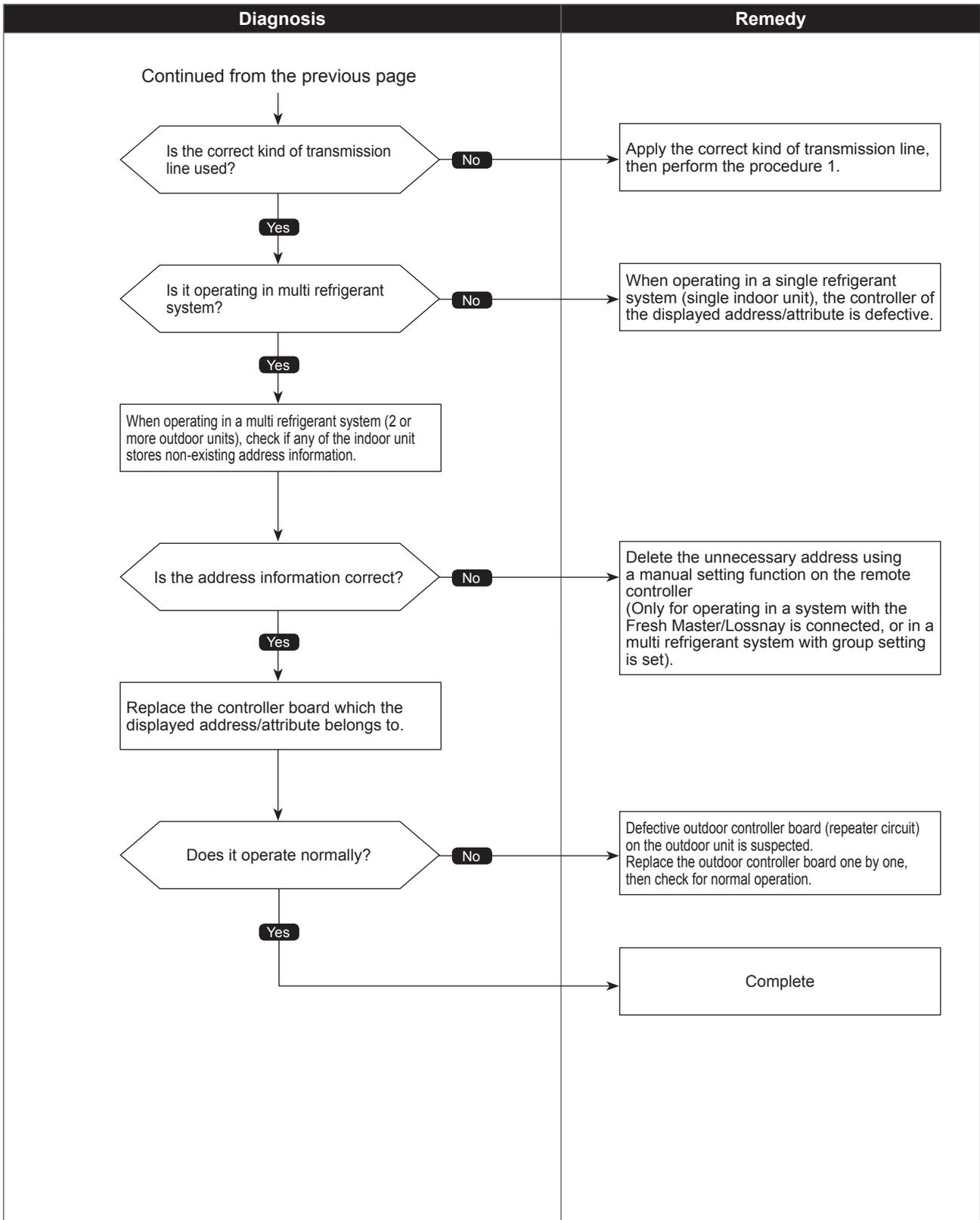
●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

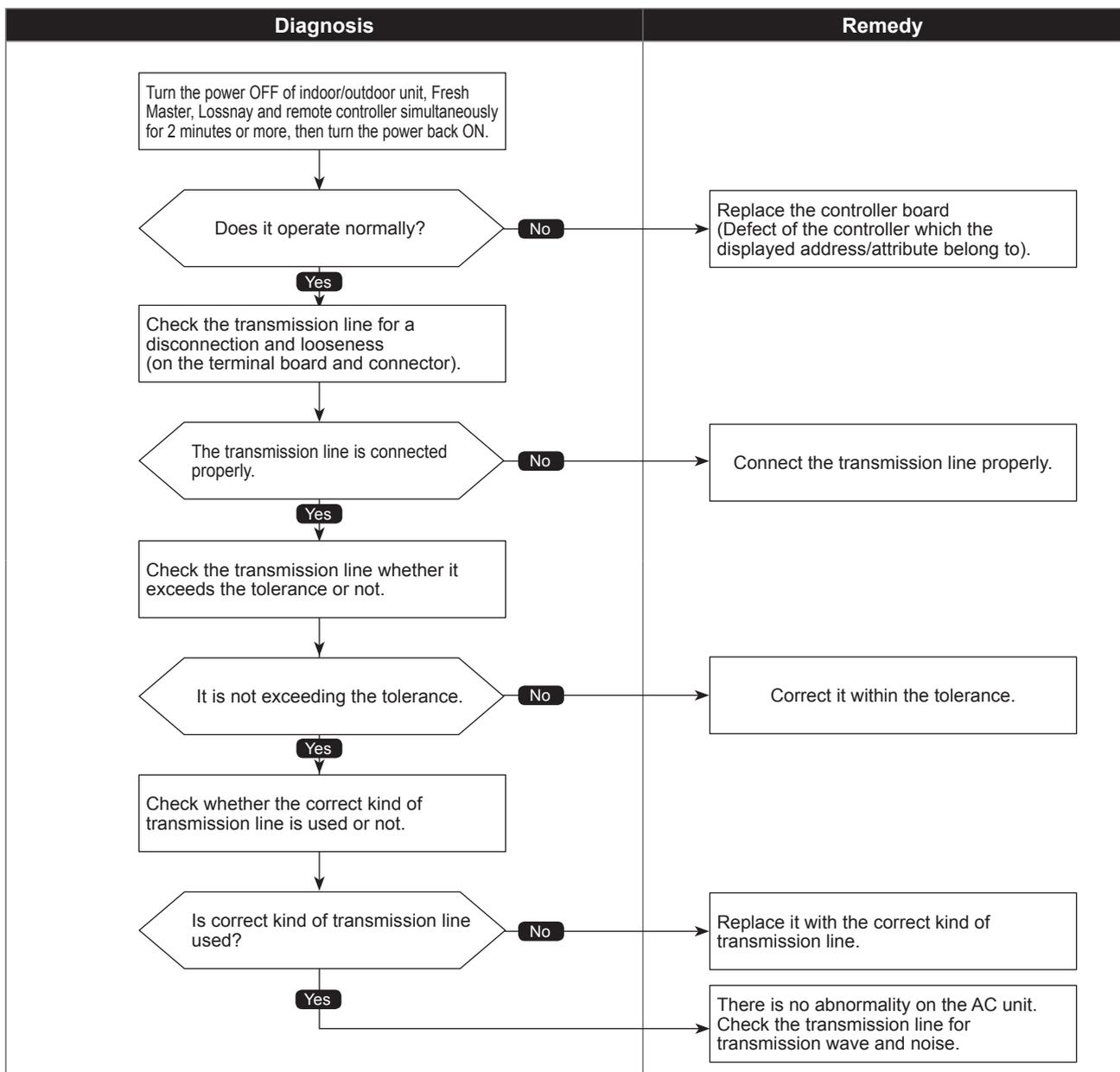


No response frame error

Abnormal points and detection methods	Causes and check points
Abnormal if receiving no response command while already received ACK. The sending side searches the error in 30 seconds interval for 6 times continuously.	① Continuous failure of transmission due to noise etc ② Decline of transmission voltage/signal caused by tolerance over on transmission line ·At the furthest end: 656 ft [200 m] ·On remote controller line: 39 ft [12 m] ③ Decline of transmission voltage/ signal due to unmatched transmission line types ·Types for shield line: CVVS, CPEVS ·Line diameter: AWG16 [1.25 mm ²] or more ④ Accidental malfunction of error source controller

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

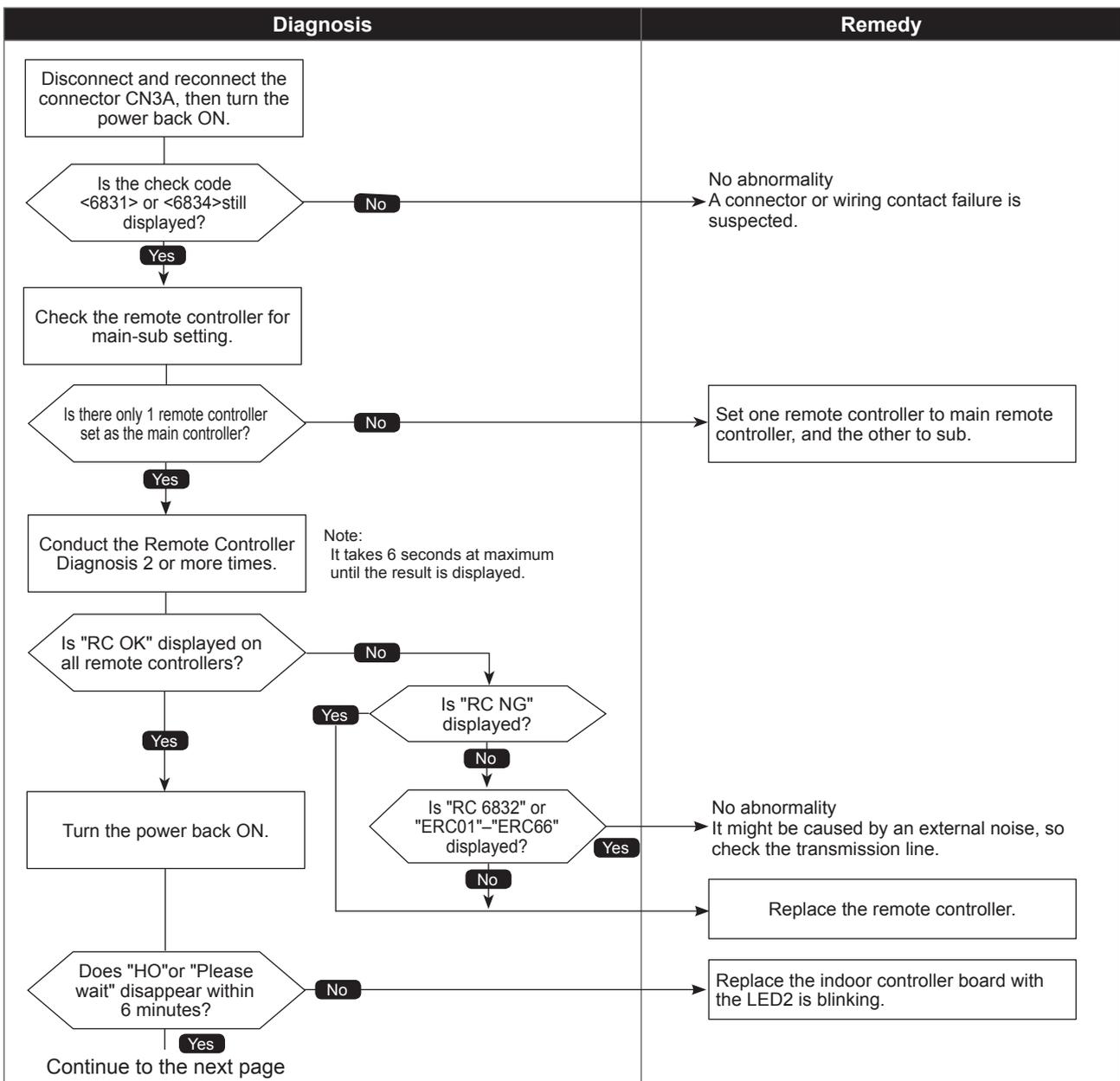


MA communication receive error

Abnormal points and detection methods	Causes and check points
<p>Detected in remote controller or indoor unit:</p> <ul style="list-style-type: none"> ① When the main or sub remote controller cannot receive signal from indoor unit which has the "0" address. ② When the sub remote controller cannot receive signal. ③ When the indoor controller board cannot receive signal from remote controller or another indoor unit. ④ When the indoor controller board cannot receive signal. 	<ul style="list-style-type: none"> ① Contact failure of remote controller wirings ② Irregular Wiring (A wiring length, number of connecting remote controllers or indoor units, or a wiring thickness does not meet the conditions specified in the chapter "Electrical Work" in the indoor unit Installation Manual.) ③ Malfunction of the remote controller sending/receiving circuit on indoor unit with the LED2 is blinking. ④ Malfunction of the remote controller sending/receiving circuit ⑤ Remote controller transmitting error caused by noise interference

●Diagnosis of defectives

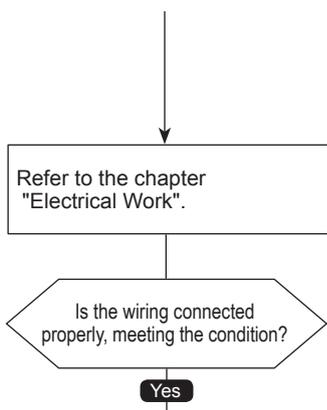
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards



MA communication receive error

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards

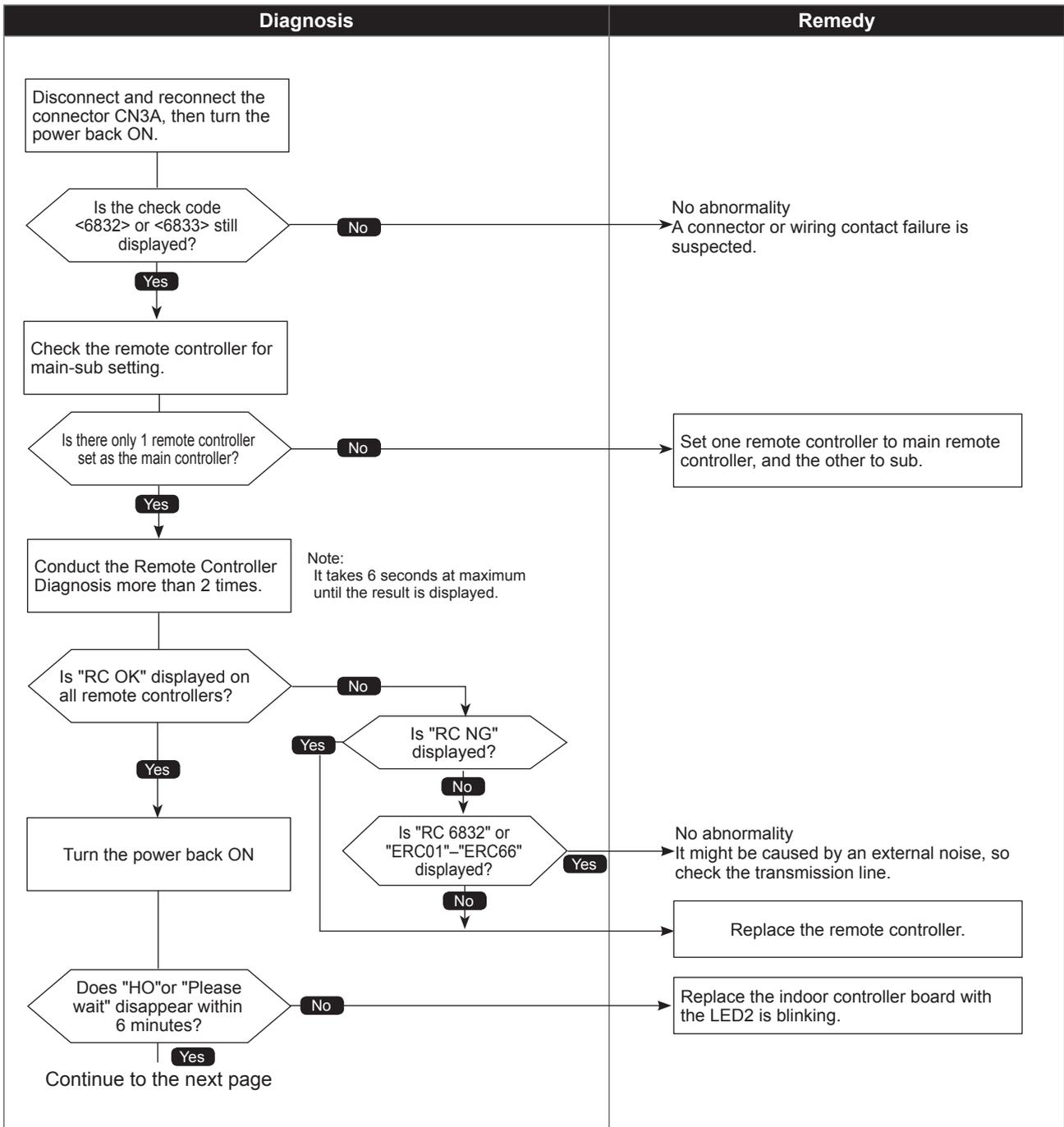
Diagnosis	Remedy
<p>Continued from the previous page</p>  <pre> graph TD Start[Continued from the previous page] --> Step1[Refer to the chapter "Electrical Work".] Step1 --> Decision{Is the wiring connected properly, meeting the condition?} Decision -- No --> Remedy1[Connect the wiring properly as specified in the chapter "Electrical Work" in the indoor unit Installation Manual.] Decision -- Yes --> Remedy2[No abnormality. It might be caused by an external noise, so check the transmission line to remove the factor(s).] </pre>	<p>Connect the wiring properly as specified in the chapter "Electrical Work" in the indoor unit Installation Manual.</p> <p>No abnormality It might be caused by an external noise, so check the transmission line to remove the factor(s).</p>

MA communication send error

Abnormal points and detection methods	Causes and check points
Detected in remote controller or indoor unit.	<ul style="list-style-type: none"> ① There are 2 remote controllers set as main. ② Malfunction of remote controller sending/receiving circuit ③ Malfunction of sending/receiving circuit on indoor controller board ④ Remote controller transmitting error caused by noise interference

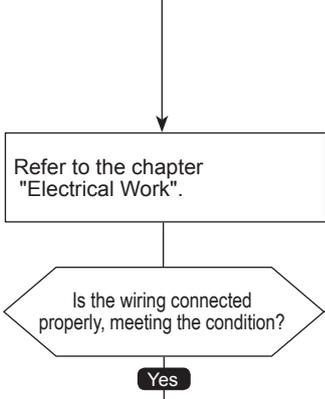
●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards



●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards

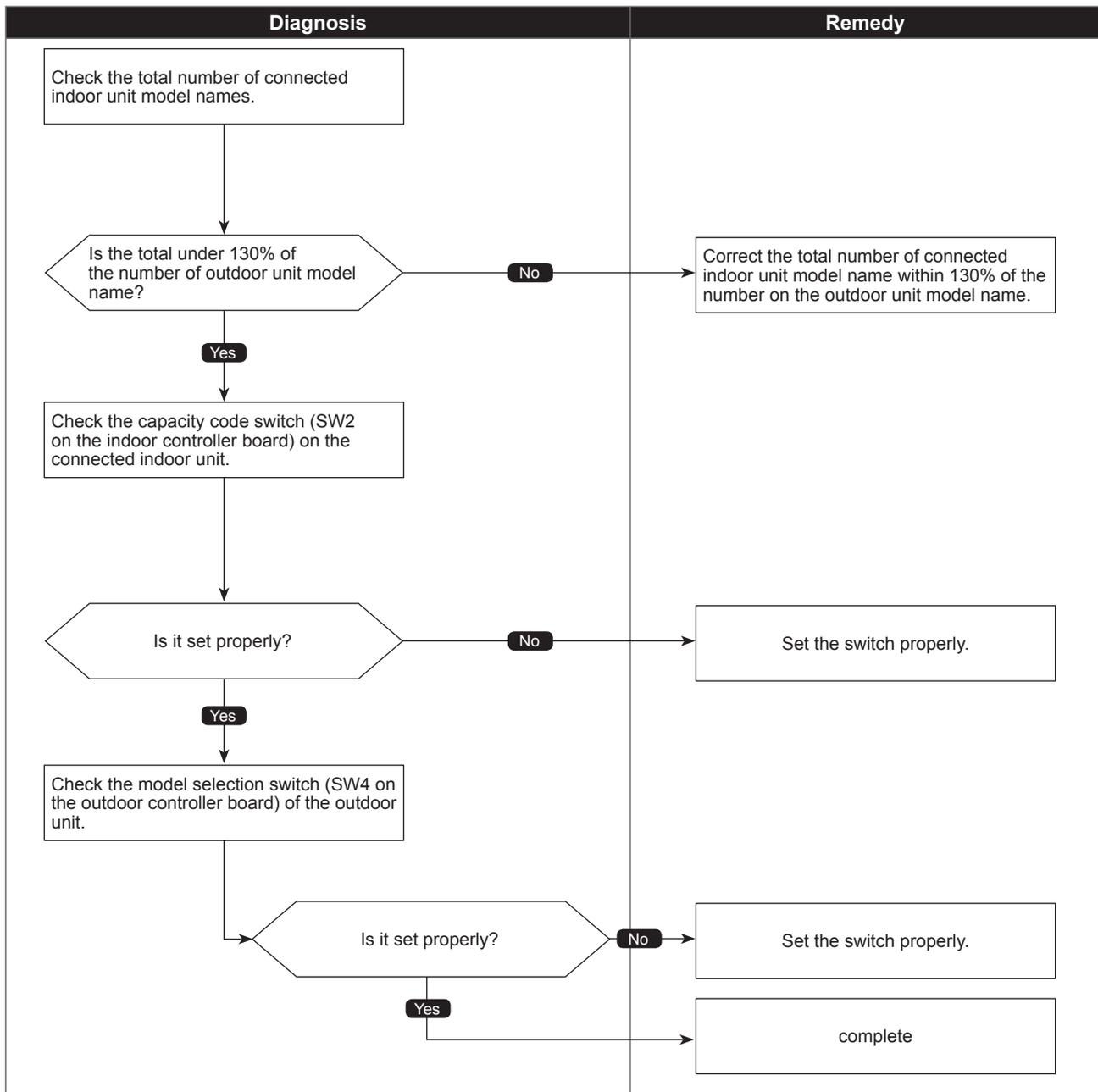
Diagnosis	Remedy
<p>Continued from the previous page</p>  <pre> graph TD Start[Continued from the previous page] --> Step1[Refer to the chapter "Electrical Work".] Step1 --> Decision{Is the wiring connected properly, meeting the condition?} Decision -- No --> Remedy1[Connect the wiring properly as specified in the chapter "Electrical Work" in the indoor unit Installation Manual.] Decision -- Yes --> Remedy2[No abnormality. It might be caused by an external noise, so check the transmission line to remove the factor(s).] </pre>	<p>Connect the wiring properly as specified in the chapter "Electrical Work" in the indoor unit Installation Manual.</p> <p>No abnormality It might be caused by an external noise, so check the transmission line to remove the factor(s).</p>

Total capacity error

Abnormal points and detection methods	Causes and check points
When the total of the number on connected indoor unit model names exceeds the specified capacity level (130% of the number on the outdoor unit model name), a check code <7100> is displayed.	① The total of number on connected indoor unit model names exceeds the specified capacity level: <ul style="list-style-type: none"> · 4C36: up to code 29 · 5C42: up to code 35 · 8C48: up to code 40 · 8C60: up to code 59 ② The model name code of the outdoor unit is registered wrongly.

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

7101
(EF)

Capacity code error

Abnormal points and detection methods	Causes and check points
When the capacity of connected indoor unit is over, a check code <7101> is displayed.	The model name of connected indoor unit (model code) is read as incompatible. The connectable indoor units are: ·P6 to P36 model (code 4 to 20)

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

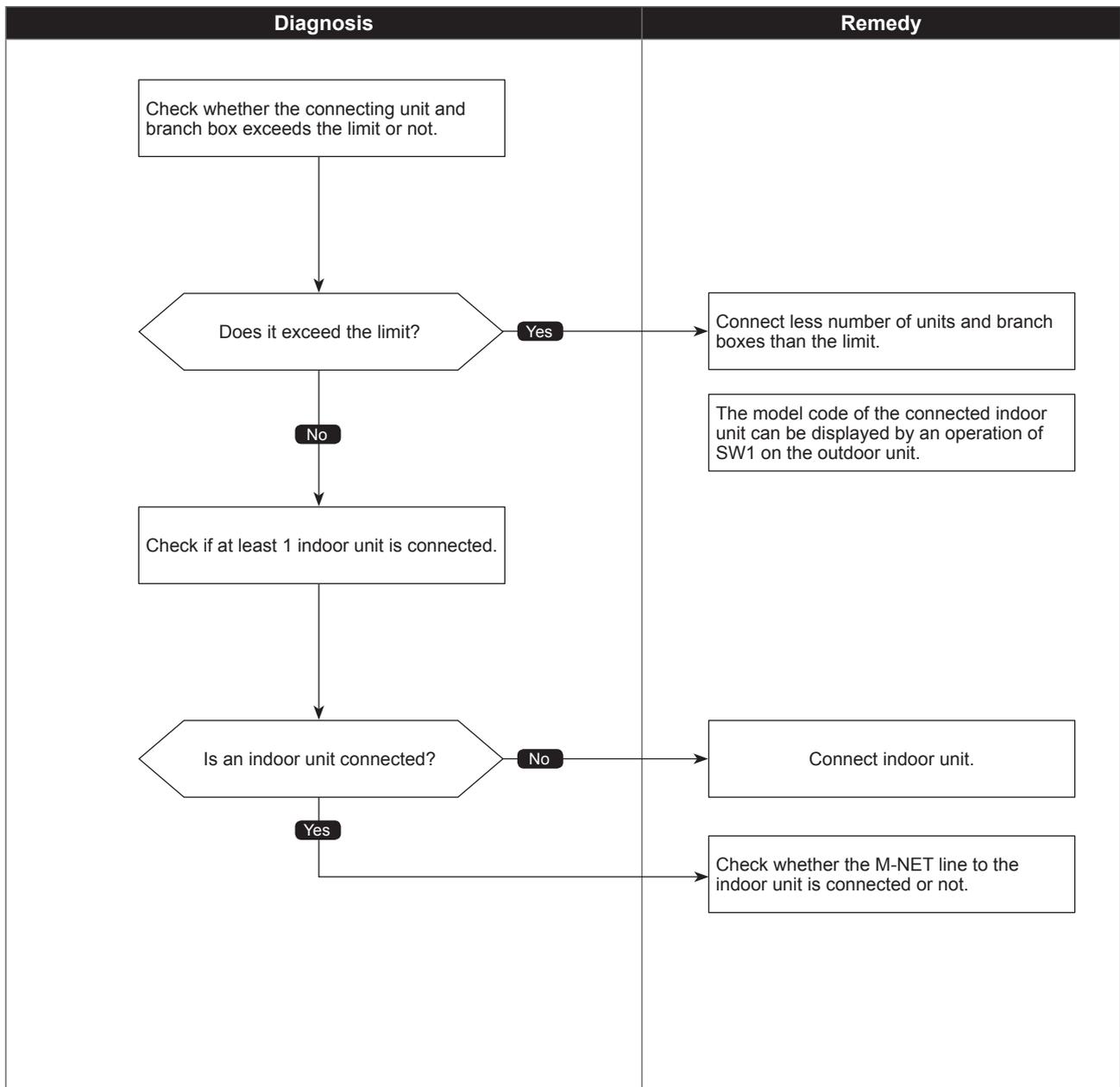
Diagnosis	Remedy
<pre>graph TD; A[Check the model selection switch (SW4 on the indoor controller board) of the connected indoor unit.] --> B{Is it set properly?}; B -- No --> C[Set the switch properly.]; B -- Yes --> D[The model code of the connected indoor unit can be displayed by an operation of SW1 on the outdoor unit.];</pre>	

Connecting excessive number of units and branch boxes

Abnormal points and detection methods	Causes and check points
When the connected indoor units or branch boxes exceed the limit, a check code <7102> is displayed.	Connecting more indoor units and branch boxes than the limit. Abnormal if connecting status does not comply with the following limit; ① Connectable up to 4 (4C36), 5 (5C42), 8 (8C48/60) units ② Connect at least 1 indoor unit (Abnormal if connected none) ③ Connectable up to 2 branch boxes

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Address setting error

Abnormal points and detection methods	Causes and check points
The address setting of outdoor unit or branch box is wrong.	Wrongly set address of branch box The outdoor unit is not set in 000, or in the range of 51 to 100.

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
<p><Outdoor unit></p> <p>Check whether the outdoor unit address is set in 000, or in the range of 51 to 100.</p> <p>Is the address setting correct?</p> <p>Yes</p> <p>No</p>	<p>Set the address properly, then turn the power OFF of indoor/outdoor unit, Fresh Master, Lossnay and remote controller simultaneously for 2 minutes or more, and turn the power back ON.</p> <p>Replace the outdoor controller board.</p>
<p><Branch box></p> <p>Check whether the branch box address is set in 000, or in the range of 001 to 050.</p> <p>Is the address setting correct?</p> <p>Yes</p> <p>No</p>	<p>Set the address properly, then turn the power OFF of indoor/outdoor unit, branch box, Fresh Master, Lossnay, and remote controller simultaneously for 2 minutes or more, and turn the power back ON.</p> <p>Replace the branch box controller board.</p>
<p>Note: Branch box address When setting the address, use a number within the range of 1–50. Ex. The set address is (47) and there are 5 indoor units (A, B, C, D, and E). If A: (47), B: (48), C: (49), D: (50), and E: (51), E is incorrect because it exceeds 50.</p>	

Check code

7130
(EF)

Incompatible unit combination

Abnormal points and detection methods	Causes and check points
When the connected indoor unit is not connectable with the outdoor unit, the outdoor unit detects the error at startup.	Connecting indoor unit(s) which is not authorized to connect to the outdoor unit.

●Diagnosis of defectives

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

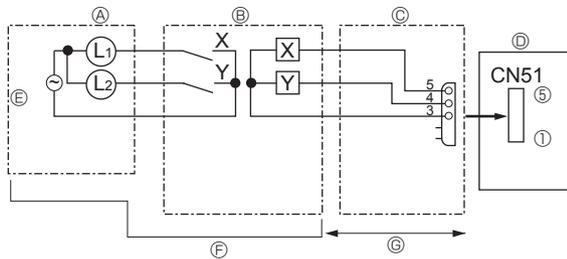
Diagnosis	Remedy
<p>Refer to the service manual of the outdoor unit or the connected indoor unit for the authorized combination.</p> <p>Is the indoor unit authorized to connect with the outdoor unit?</p> <p>Yes</p> <p>Check whether the model selection switch is set correctly. Are they correct?</p> <p>Yes</p>	<p>Replace the indoor unit(s) to the connectable one.</p> <p>Set the model selection switch correctly, then restart.</p> <p>Replace the outdoor controller board.</p>

8-4. TROUBLESHOOTING BY INFERIOR PHENOMENA

Phenomena	Factor	Countermeasure
1. Remote controller display works normally and the unit performs cooling operation, however, the capacity cannot be fully obtained. (The air does not cool well.)	<ul style="list-style-type: none"> ① Refrigerant shortage ② Filter clogging ③ Heat exchanger clogging ④ Air duct short cycle 	<ul style="list-style-type: none"> ① If refrigerant leaks, discharging temperature rises and LEV opening increases. Inspect leakage by checking the temperature and opening. Check pipe connections for gas leakage. ② Open intake grille and check the filter. Clean the filter by removing dirt or dust on it. ③ If the filter is clogged, indoor pipe temperature rises and discharging pressure increases. Check if heat exchanger is clogged by inspecting discharging pressure. Clean the heat exchanger. ④ Remove the blockage.
2. Remote controller display works normally and the unit performs heating operation, however, the capacity cannot be fully obtained.	<ul style="list-style-type: none"> ① Linear expansion valve fault Opening cannot be adjusted well due to linear expansion valve fault. ② Refrigerant shortage ③ Lack of insulation for refrigerant piping ④ Filter clogging ⑤ Heat exchanger clogging ⑥ Air duct short cycle ⑦ Bypass circuit of outdoor unit fault 	<ul style="list-style-type: none"> ① Discharging temperature and indoor heat exchanger temperature does not rise. Inspect the failure by checking discharging pressure. Replace linear expansion valve. ② If refrigerant leaks, discharging temperature rises and LEV opening increases. Inspect leakage by checking the temperature and opening. Check pipe connections for gas leakage. ③ Check the insulation. ④ Open intake grille and check the filter. Clean the filter by removing dirt or dust on it. ⑤ If the filter is clogged, indoor pipe temperature rises and discharging pressure increases. Check if heat exchanger is clogged by inspecting discharging pressure. Clean the heat exchanger. ⑥ Remove the blockage. ⑦ Check refrigerant system during operation.
<ul style="list-style-type: none"> 3.① For 3 minutes after temperature adjuster turns off, the compressor will not start operating even if temperature adjuster is turned on. ② For 3 minutes after temperature adjuster turns on, the compressor will not stop operating even if temperature adjuster is turned off. (Compressor stops operating immediately when turning off by the remote controller.) 	<ul style="list-style-type: none"> ① ② Normal operation (For protection of compressor) 	<ul style="list-style-type: none"> ① ② Normal operation
4. The compressor that is running soon after powered on is slow to speed up.	<p>The rate of speed-up is kept at 2 Hz/ min. during 4 hours after powered on.</p> <p>This can prevent a compressor failure that occurs when a non-energized compressor speeds up rapidly with refrigerant collected in the compressor.</p>	Normal operation

8-5. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR

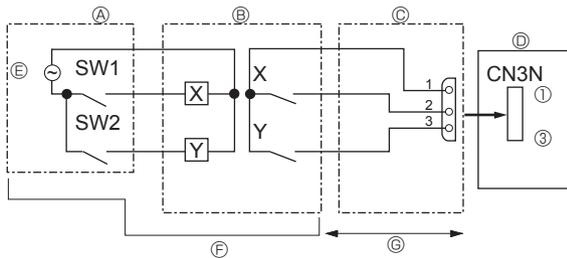
• State (CN51)



- Ⓐ Distant control board
- Ⓑ Relay circuit
- Ⓒ External output adapter (PAC-SA88HA-E)
- Ⓓ Outdoor unit control board
- Ⓔ Lamp power supply
- Ⓕ Procure locally
- Ⓖ Max. 10 m

L1: Error display lamp
 L2: Compressor operation lamp
 X, Y: Relay (Coil standard of 0.9W or less for 12 V DC)
 X, Y: Relay (1mA DC)

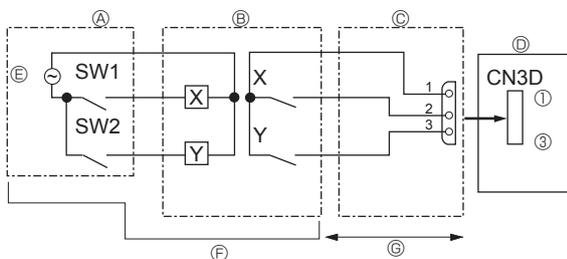
• Auto change over (CN3N)



- Ⓐ Remote control panel
- Ⓑ Relay circuit
- Ⓒ External input adapter (PAC-SC36NA-E)
- Ⓓ Outdoor unit control board
- Ⓔ Relay power supply
- Ⓕ Procure locally
- Ⓖ Max. 10 m

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

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

	Outdoor controller board DIP SW9-2	SW1	SW2	Function
Silent mode	OFF	ON	—	Silent mode operation
Demand control	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Stop)

8-6. HOW TO CHECK THE PARTS

OUTDOOR UNIT:

MXZ-4C36NAHZ

MXZ-5C42NAHZ

MXZ-8C48NAHZ

MXZ-8C48NA

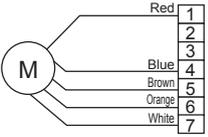
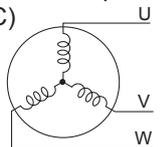
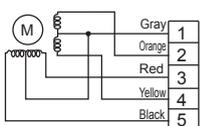
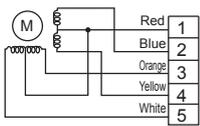
MXZ-4C36NAHZ-U1

MXZ-5C42NAHZ-U1

MXZ-8C48NAHZ-U1

MXZ-8C48NA-U1

MXZ-8C60NA-U1

Parts name	Check points														
Thermistor (TH3) <Outdoor liquid pipe> Thermistor (TH4) <Compressor> Thermistor (TH6) <Suction pipe> Thermistor (TH7) <Ambient> Thermistor (TH8) <Heat Sink>	Disconnect the connector then measure the resistance with a tester. (At the ambient temperature 50 to 80°F [10 to 30 °C]) <table border="1" style="margin-top: 10px;"> <thead> <tr> <th></th> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>TH4</td> <td>160 to 410 kΩ</td> <td rowspan="4">Open or short</td> </tr> <tr> <td>TH3</td> <td rowspan="2">4.3 to 9.6 kΩ</td> </tr> <tr> <td>TH6</td> </tr> <tr> <td>TH7</td> </tr> <tr> <td>TH8*</td> <td>39 to 105 kΩ</td> <td></td> </tr> </tbody> </table> <p>* TH8 is internal thermistor of power module. (Y)</p>		Normal	Abnormal	TH4	160 to 410 kΩ	Open or short	TH3	4.3 to 9.6 kΩ	TH6	TH7	TH8*	39 to 105 kΩ		
	Normal	Abnormal													
TH4	160 to 410 kΩ	Open or short													
TH3	4.3 to 9.6 kΩ														
TH6															
TH7															
TH8*	39 to 105 kΩ														
Fan motor (MF1, MF2) 	Measure the resistance between the connector pins with a tester. (At the ambient temperature 20°C) <table border="1" style="margin-top: 10px;"> <thead> <tr> <th colspan="4">Normal</th> <th>Abnormal</th> </tr> <tr> <th>Red - Blue</th> <th>Brown - Blue</th> <th>Orange - Blue</th> <th>White - Blue</th> <th rowspan="2">Open or short (Short, for White - Blue)</th> </tr> </thead> <tbody> <tr> <td>1.1 ± 0.05 MΩ</td> <td>40 ± 4 kΩ</td> <td>220 ± 22 kΩ</td> <td>Open</td> </tr> </tbody> </table>	Normal				Abnormal	Red - Blue	Brown - Blue	Orange - Blue	White - Blue	Open or short (Short, for White - Blue)	1.1 ± 0.05 MΩ	40 ± 4 kΩ	220 ± 22 kΩ	Open
Normal				Abnormal											
Red - Blue	Brown - Blue	Orange - Blue	White - Blue	Open or short (Short, for White - Blue)											
1.1 ± 0.05 MΩ	40 ± 4 kΩ	220 ± 22 kΩ	Open												
Solenoid valve coil <4-way valve> (21S4)	Measure the resistance between the terminals with a tester. (At the ambient temperature 68°F [20 °C]) <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>1567.5 ± 156.8 Ω</td> <td>Open or short</td> </tr> </tbody> </table>	Normal	Abnormal	1567.5 ± 156.8 Ω	Open or short										
Normal	Abnormal														
1567.5 ± 156.8 Ω	Open or short														
Motor for compressor (MC) 	Measure the resistance between the terminals with a tester. (Winding temperature 68°F [20 °C]) <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>0.305 Ω ± 0.015 Ω</td> <td>Open or short</td> </tr> </tbody> </table>	Normal	Abnormal	0.305 Ω ± 0.015 Ω	Open or short										
Normal	Abnormal														
0.305 Ω ± 0.015 Ω	Open or short														
Solenoid valve coil <Bypass valve> (SV1) <Switching valve> (SV2)**	Measure the resistance between the terminals with a tester. (At the ambient temperature 68°F [20 °C]) <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Normal</th> <th>Abnormal</th> </tr> </thead> <tbody> <tr> <td>1197 ± 10 Ω</td> <td>Open or short</td> </tr> </tbody> </table>	Normal	Abnormal	1197 ± 10 Ω	Open or short										
Normal	Abnormal														
1197 ± 10 Ω	Open or short														
Linear expansion Valve (LEV-A) 	<table border="1" style="margin-top: 10px;"> <thead> <tr> <th colspan="4">Normal</th> <th>Abnormal</th> </tr> <tr> <th>Gray - Black</th> <th>Gray - Red</th> <th>Gray - Yellow</th> <th>Gray - Orange</th> <th rowspan="2">Open or short</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">46 ± 3 Ω</td> </tr> </tbody> </table>	Normal				Abnormal	Gray - Black	Gray - Red	Gray - Yellow	Gray - Orange	Open or short	46 ± 3 Ω			
Normal				Abnormal											
Gray - Black	Gray - Red	Gray - Yellow	Gray - Orange	Open or short											
46 ± 3 Ω															
Linear expansion Valve (LEV-B) 	<table border="1" style="margin-top: 10px;"> <thead> <tr> <th colspan="4">Normal</th> <th>Abnormal</th> </tr> <tr> <th>Red - White</th> <th>Red - Orange</th> <th>Red - Yellow</th> <th>Red - Blue</th> <th rowspan="2">Open or short</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">46 ± 4 Ω</td> </tr> </tbody> </table>	Normal				Abnormal	Red - White	Red - Orange	Red - Yellow	Red - Blue	Open or short	46 ± 4 Ω			
Normal				Abnormal											
Red - White	Red - Orange	Red - Yellow	Red - Blue	Open or short											
46 ± 4 Ω															

**MXZ-NAHZ only
OCH573D

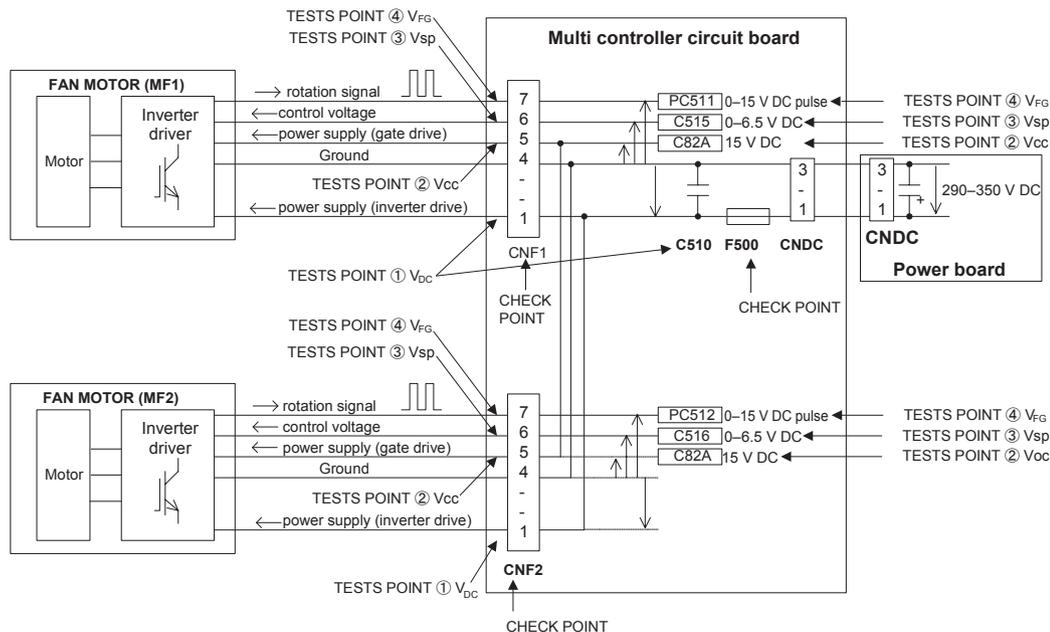
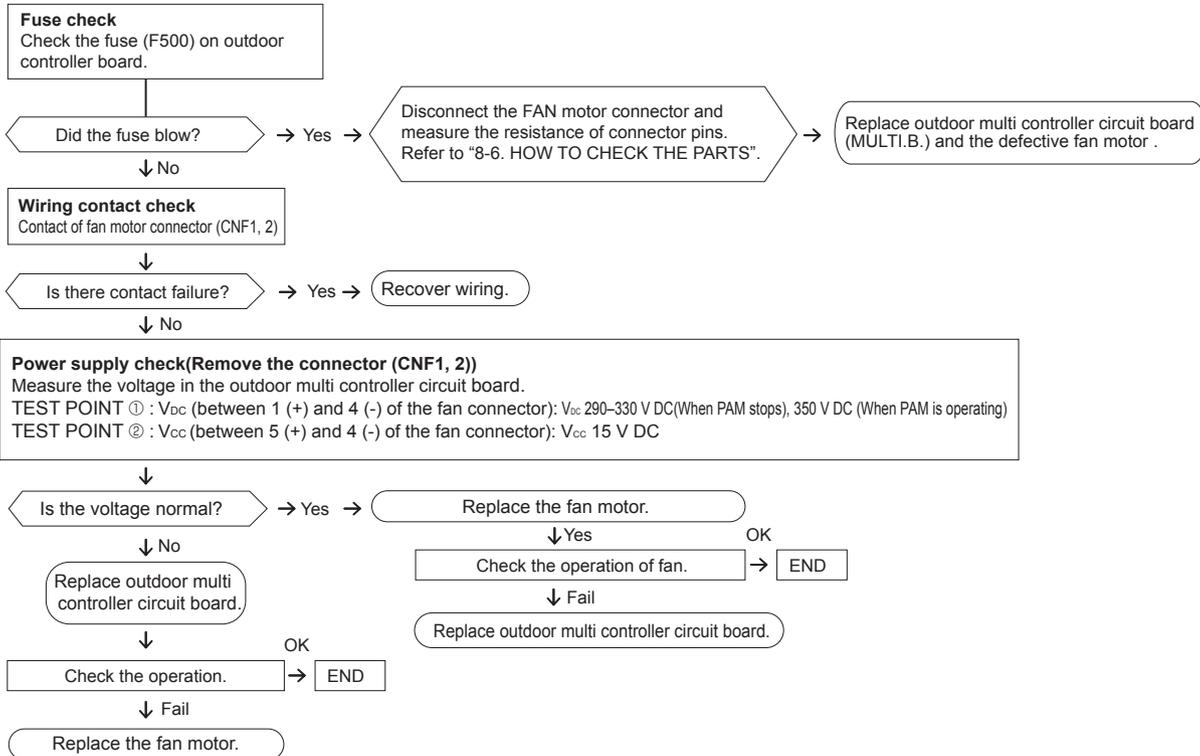
Check method of DC fan motor (fan motor/outdoor multi controller circuit board)

① Notes

- 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.)

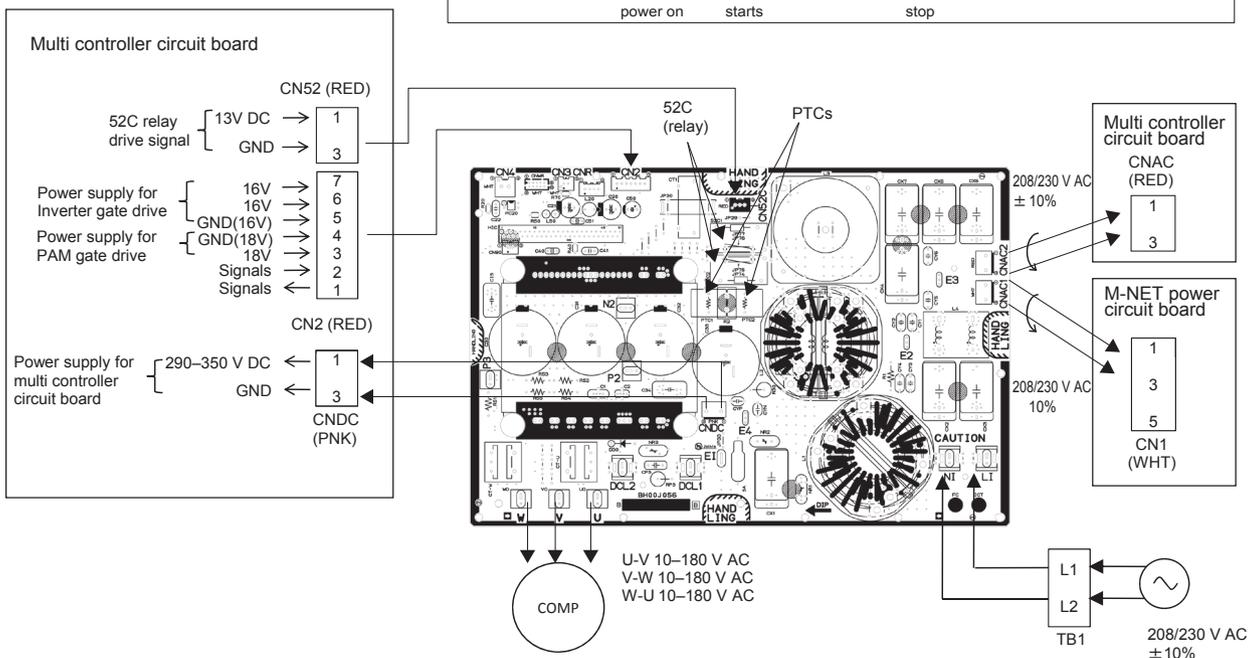
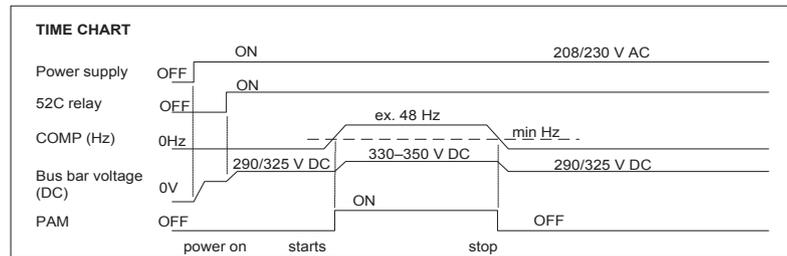
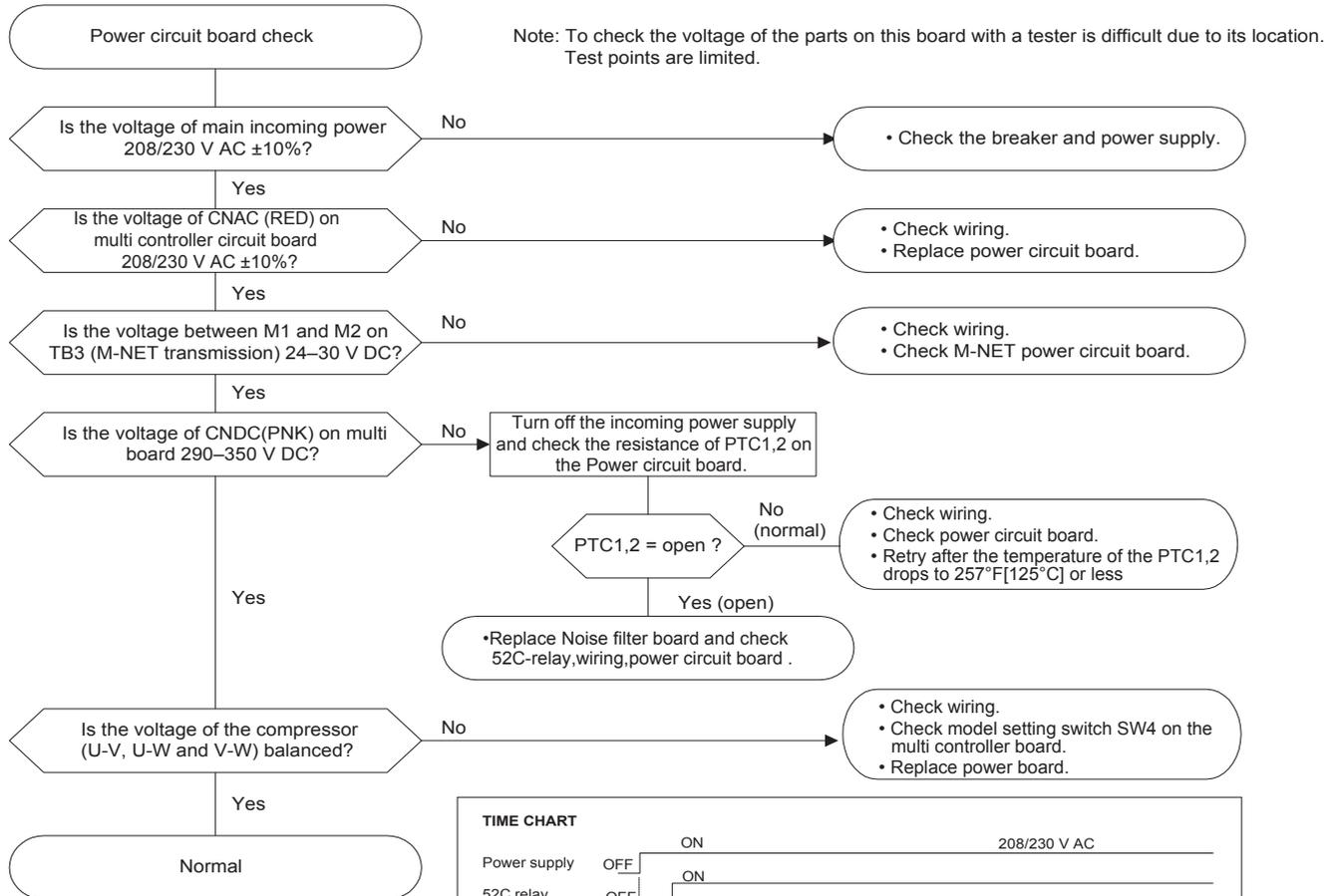
② Self check

Symptom : The outdoor fan cannot rotate.

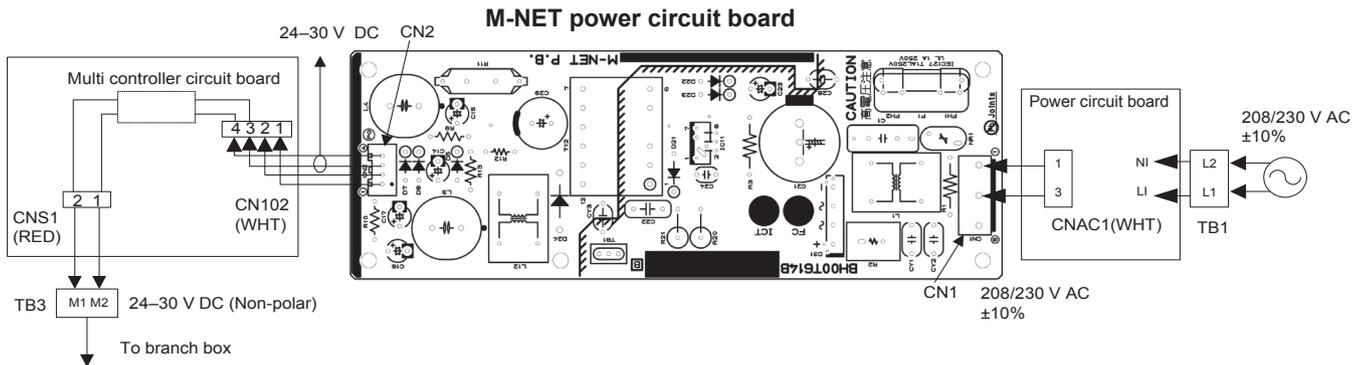
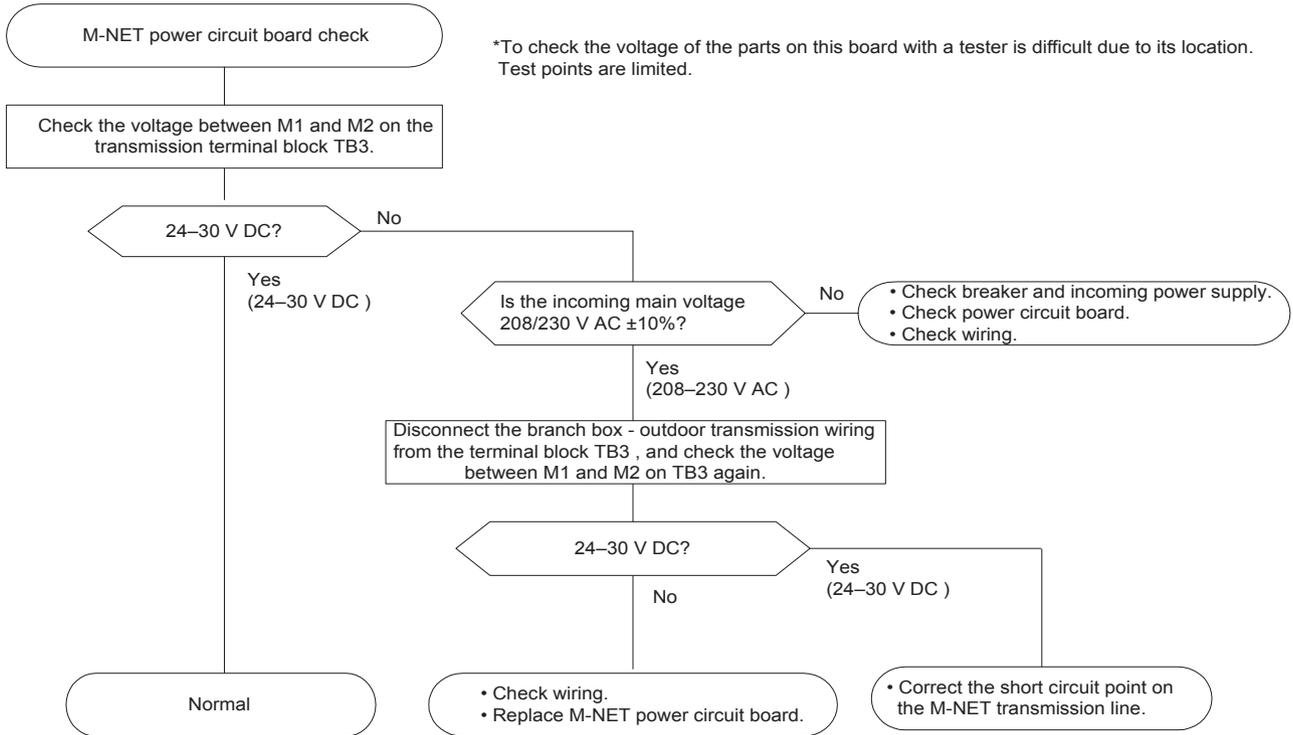


- The inverter control P.C. board is built in the fan motor of this outdoor unit.
- When F500 that is on multi controller board is blown, change the fan motor and multi controller board at the same time (F500 is impossible to change).
- For outdoor unit, there are 2 fan motors (up and down; MF1/MF2), it is possible to connect to either CNF1 or CNF2 on the board.
- It is abnormal when the abnormality is detected from either both fan motors or only one motor.

Check method of power circuit board



Check method of M-NET power circuit board



8-7. HOW TO CHECK THE COMPONENTS

<Thermistor characteristic Graph>

Low temperature thermistors

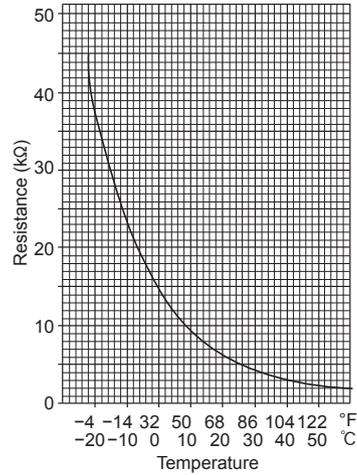
- Thermistor <HIC pipe> (TH2)
- Thermistor <Outdoor liquid pipe> (TH3)
- Thermistor <Suction pipe> (TH6)
- Thermistor <Ambient> (TH7)

Thermistor R0 = 15 kΩ ± 3 %

B constant = 3480 ± 2 %

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

32°F [0°C]	15 kΩ	86°F [30°C]	4.3 kΩ
50°F [10°C]	9.6 kΩ	104°F [40°C]	3.0 kΩ
68°F [20°C]	6.3 kΩ		
77°F [25°C]	5.2 kΩ		



Medium temperature thermistor

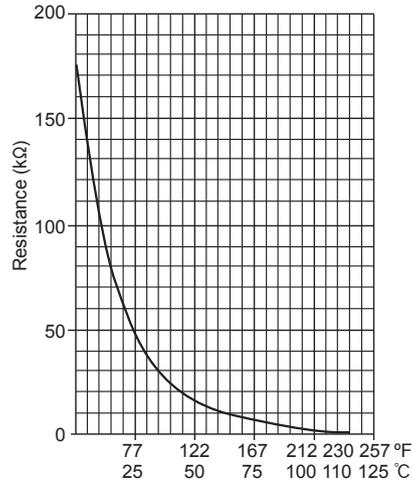
- Thermistor <Heat sink> (TH8)

Thermistor R50 = 17 kΩ ± 2 %

B constant = 4170 ± 3 %

$$R_t = 17 \exp\left\{4170 \left(\frac{1}{273+t} - \frac{1}{323} \right)\right\}$$

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

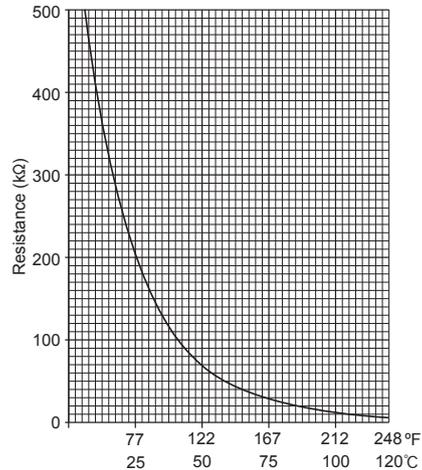
- Thermistor <Compressor> (TH4)

Thermistor R120 = 7.465 kΩ ± 2 %

B constant = 4057 ± 2 %

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

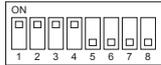
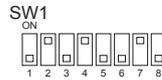
68°F [20°C]	250 kΩ	158°F [70°C]	34 kΩ
86°F [30°C]	160 kΩ	176°F [80°C]	24 kΩ
104°F [40°C]	104 kΩ	194°F [90°C]	17.5 kΩ
122°F [50°C]	70 kΩ	212°F [100°C]	13.0 kΩ
140°F [60°C]	48 kΩ	230°F [110°C]	9.8 kΩ



<HIGH PRESSURE SENSOR>

• 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 figure at left shows that the switches 1 through 4 are set to ON and 5 through 8 are set to OFF.

(1) While the outdoor unit is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1, 2.

- 1) When the gauge pressure is between 0 and 14 PSIG [0.098 MPaG], internal pressure is caused due to gas leak.
- 2) When the pressure displayed on self-diagnosis LED1, 2 is between 14 PSIG [0.098 MPaG], the connector may be defective or be disconnected. Check the connector and go to (4).
- 3) When the pressure displayed on self-diagnosis LED1, 2 exceeds 725 PSIG [5.0 MPaG], go to (3).
- 4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

(2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1,2 after 15 minutes have passed since the start of operation. (Compare them by PSIG [MPaG] unit.)

- 1) When the difference between both pressures is within 36 PSIG [0.25 MPaG], both the high pressure sensor and the control board are normal.
- 2) When the difference between both pressures exceeds 36 PSIG [0.25 MPaG], the high pressure sensor has a problem. (performance deterioration)
- 3) When the pressure displayed on 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.

- 1) When the pressure displayed on self-diagnosis LED1, 2 is between 0 and 14 PSIG [0.098 MPaG], the high pressure sensor has a problem.
- 2) When the pressure displayed on 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 self-diagnosis LED1, 2.

- 1) When the pressure displayed on the self-diagnosis LED1, 2 exceeds 725 PSIG [5.0 MPaG], the high pressure sensor has a problem.
- 2) If other than 1), the control board has a problem.

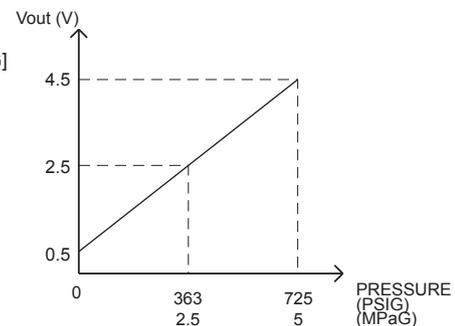
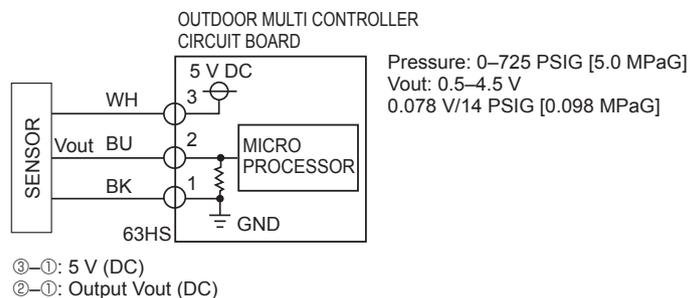
• High Pressure Sensor Configuration (63HS)

The high pressure sensor consists of the circuit shown in the figure below. If 5 V DC is applied between the white and the black wires, voltage corresponding to the pressure between the blue and the black wires will be output, and the value of this voltage will be converted by the microcomputer. 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.

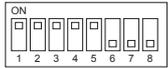
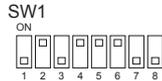
	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1



<LOW PRESSURE SENSOR>

• 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 figure at left shows that the switches 1 through 4 are set to ON and 5 through 8 are set to OFF.

(1) While the outdoor unit is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1, 2.

- 1) When the gauge pressure is between 0 and 14 PSIG [0.098 MPaG], internal pressure is caused due to gas leak.
- 2) When the pressure displayed on self-diagnosis LED1, 2 is between 0 and 14 PSIG [0.098 MPaG], the connector may be defective or be disconnected. Check the connector and go to (4).
- 3) When the outdoor temperature is 86°F [30°C] or less, and the pressure displayed on self-diagnosis LED1, 2 exceeds 247 PSIG [1.7 MPaG], go to (3).
When the outdoor temperature exceeds 86°F [30°C], and the pressure displayed on self-diagnosis LED1, 2 exceeds 247 PSIG [1.7 MPaG], go to (5).
- 4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

(2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1, 2 after 15 minutes have passed since the start of operation. (Compare them by PSIG [MPaG] unit.)

- 1) When the difference between both pressures is within 29 PSIG [0.2MPaG], both the low pressure sensor and the control board are normal.
- 2) When the difference between both pressures exceeds 29 PSIG [0.2MPaG], the low pressure sensor has a problem. (performance deterioration)
- 3) 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 display.

- 1) 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.
- 2) When the pressure displayed on 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.

- 1) When the pressure displayed on the self-diagnosis LED1, 2 exceeds 247 PSIG [1.7 MPaG], the low pressure LED sensor has a problem.
- 2) If other than 1), 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.

- 1) When the pressure displayed on the self-diagnosis LED1, 2 exceeds 247 PSIG [1.7 MPaG], the control board has a problem.
- 2) If other than 1), go to (2).

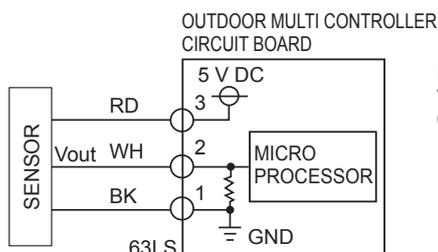
• Low Pressure Sensor Configuration (63LS)

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

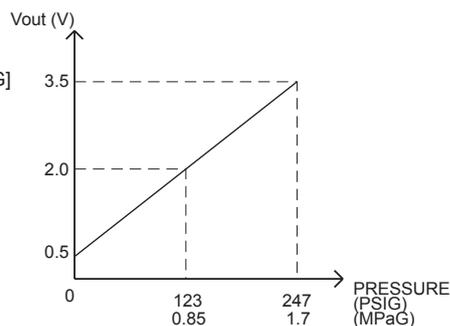
Note:

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

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

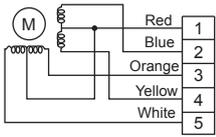


Pressure: 0–247 PSIG [1.7 MPaG]
Vout: 0.5–3.5 V
0.173 V/14 PSIG [0.098 MPaG]



- ③—① : 5 V (DC)
②—① : Output Vout (DC)

BRANCH BOX: PAC-MKA50BC PAC-MKA51BC PAC-MKA30BC PAC-MKA31BC

Parts name	Check points															
Thermistor (TH-A-E) <Gas pipe>	Disconnect the connector then measure the resistance with a tester. (At the ambient temperature 50 to 86°F [10 to 30°C]) <table border="1" data-bbox="411 390 1225 478" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th data-bbox="411 390 818 426">Normal</th> <th data-bbox="818 390 1225 426">Abnormal</th> </tr> </thead> <tbody> <tr> <td data-bbox="411 426 818 478" style="text-align: center;">4.3 to 9.6kΩ</td> <td data-bbox="818 426 1225 478" style="text-align: center;">Open or short</td> </tr> </tbody> </table>		Normal	Abnormal	4.3 to 9.6kΩ	Open or short										
Normal	Abnormal															
4.3 to 9.6kΩ	Open or short															
Linear expansion valve (LEV-A-E) 	Disconnect the connector then measure the resistance with a tester. (Winding temperature 68°F [20°C]) <table border="1" data-bbox="411 579 1225 714" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4" data-bbox="411 579 954 625">Normal</th> <th data-bbox="954 579 1225 625">Abnormal</th> </tr> </thead> <tbody> <tr> <td data-bbox="411 625 547 667" style="text-align: center;">Red - White</td> <td data-bbox="547 625 683 667" style="text-align: center;">Red - Orange</td> <td data-bbox="683 625 818 667" style="text-align: center;">Red - Yellow</td> <td data-bbox="818 625 954 667" style="text-align: center;">Red - Blue</td> <td data-bbox="954 625 1225 714" rowspan="2" style="text-align: center; vertical-align: middle;">Open or short</td> </tr> <tr> <td colspan="4" data-bbox="411 667 954 714" style="text-align: center;">$46 \pm 4\Omega$</td> </tr> </tbody> </table>		Normal				Abnormal	Red - White	Red - Orange	Red - Yellow	Red - Blue	Open or short	$46 \pm 4\Omega$			
Normal				Abnormal												
Red - White	Red - Orange	Red - Yellow	Red - Blue	Open or short												
$46 \pm 4\Omega$																

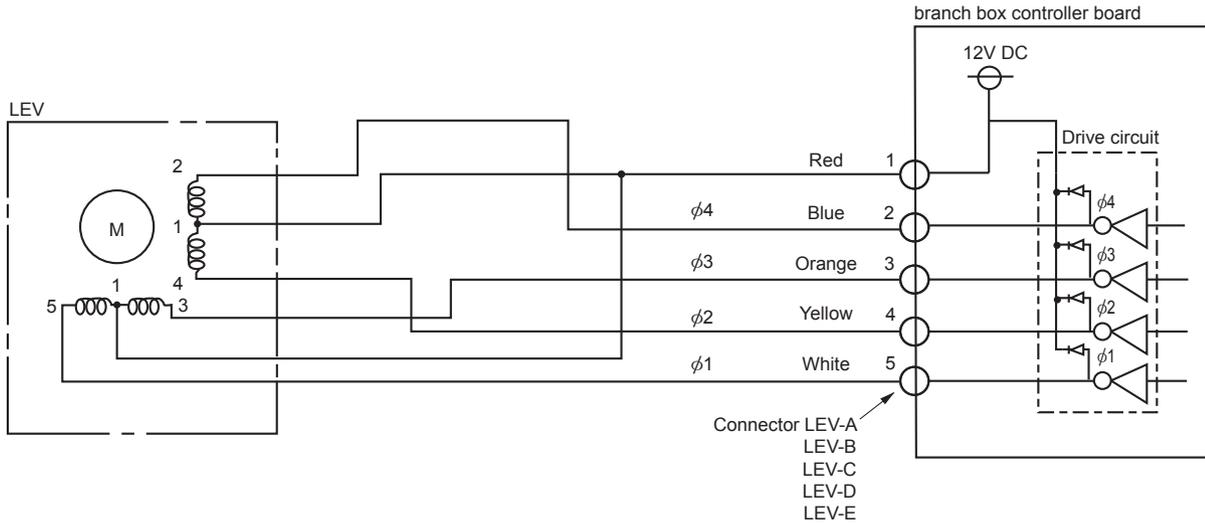
Linear expansion valve (LEV) in Branch box

(1) Operation summary of the linear expansion valve

• Linear expansion valve open/close through stepping motor after receiving the pulse signal from the branch box controller board.

• Valve position can be changed in proportion to the number of pulse signal.

<Connection between the branch box controller board and the linear expansion valve>



<Output pulse signal and the valve operation>

Output (Phase)	Output							
	1	2	3	4	5	6	7	8
$\phi 1$	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
$\phi 2$	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
$\phi 3$	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
$\phi 4$	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

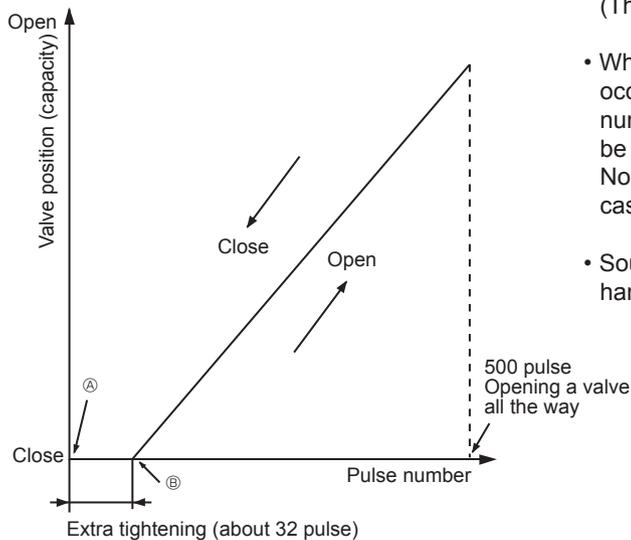
Opening a valve : 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1 → 8

Closing a valve : 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 1

The output pulse shifts in above order.

• When linear expansion valve operation stops, all output phases become OFF.

(2) Linear expansion valve operation



• When the power is turned on, 700 pulse closing valve signal will be sent till it goes to ① point in order to define the valve position. (The pulse signal is being sent for about 20 seconds.)

• When the valve moves smoothly, there is no sound or vibration occurring from the linear expansion valve : however, when the pulse number moves from ② to ① or when the valve is locked, sound can be heard.

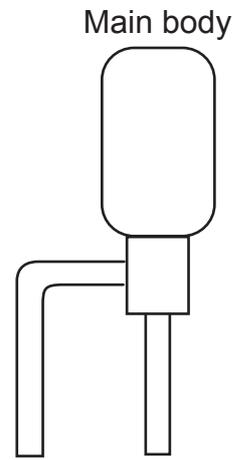
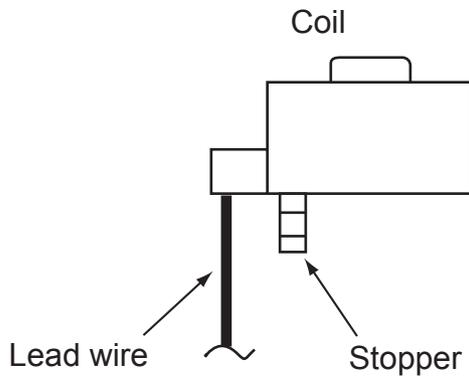
No sound is heard when the pulse number moves from ② to ① in case coil is burnt out or motor is locked by open-phase.

• Sound can be detected by placing the ear against the screw driver handle while putting the screw driver to the linear expansion valve.

(3) How to attach and detach the coil of linear expansion valve

<Composition>

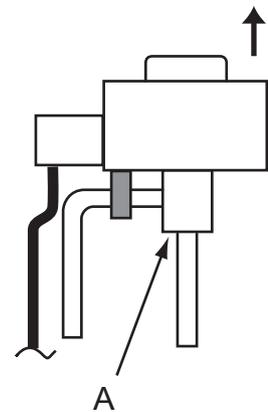
Linear expansion valve is separable into the main body and the coil as shown in the diagram below.



<How to detach the coil>

Hold the lower part of the main body (shown as A) firmly so that the main body does not move and detach the coil by pulling it upward.

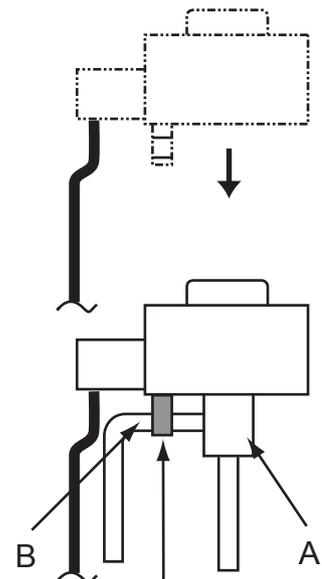
Be sure to detach the coil holding main body firmly. Otherwise pipes can bend due to stress.



<How to attach the coil>

Hold the lower part of the main body (shown as A) firmly so that the main body does not move and attach the coil by inserting it downward into the main body. Then securely attach the coil stopper to pipe B. (At this time, be careful that stress is not added to lead wire and main body is not wound by lead wire.) If the stopper is not firmly attached to pipe B, coil may be detached from the main body and that can cause defective operation of linear expansion valve.

To prevent piping stress, be sure to attach the coil holding the main body of linear expansion valve firmly. Otherwise pipe may break.



Be sure to attach the stopper to pipe B.

Troubleshooting

Problem	Check point	Corrective measure
Locked expansion valve	If the linear expansion valve becomes locked and the motor is still operating, the motor will emit a clicking noise and will not function. This clicking noise indicates an abnormality.	Replace the linear expansion valve.
Short circuit or broken circuit in expansion valve motor coil	Use an all-purpose electrical meter to measure the resistance between the different coils (red-white, red-orange, brown-yellow, brown-blue). Normal resistance is within a range of $46\Omega \pm 4\%$.	Replace the linear expansion valve.
Valve does not close completely.	In order to check the linear expansion valve, operate 1 indoor unit in the fan mode and another in the cooling mode. Then, use the outdoor multi controller board to operate the monitor and check the pipe temperature of the indoor unit. The linear expansion valve should be fully closed when the fan is operating. The temperature measured by the temperature sensor will drop if there is any leakage. If the measured temperature is significantly lower than that on the remote controller, this indicates that the valve is not closed. It is not necessary to replace the linear expansion valve if the leak of refrigerant is small and does not cause a malfunction.	Replace the linear expansion valve if there is a major leak of refrigerant.
Incorrect connection or connection failure	① Check improperly connected connector terminals and the wire colors. ② Remove the connector on the controller board side and check electrical conductance.	Continuity check of wrong part

8-8. TEST POINT DIAGRAM

Outdoor multi controller circuit board

MXZ-4C36NAHZ

MXZ-5C42NAHZ

MXZ-8C48NAHZ

MXZ-8C48NA

MXZ-4C36NAHZ-U1

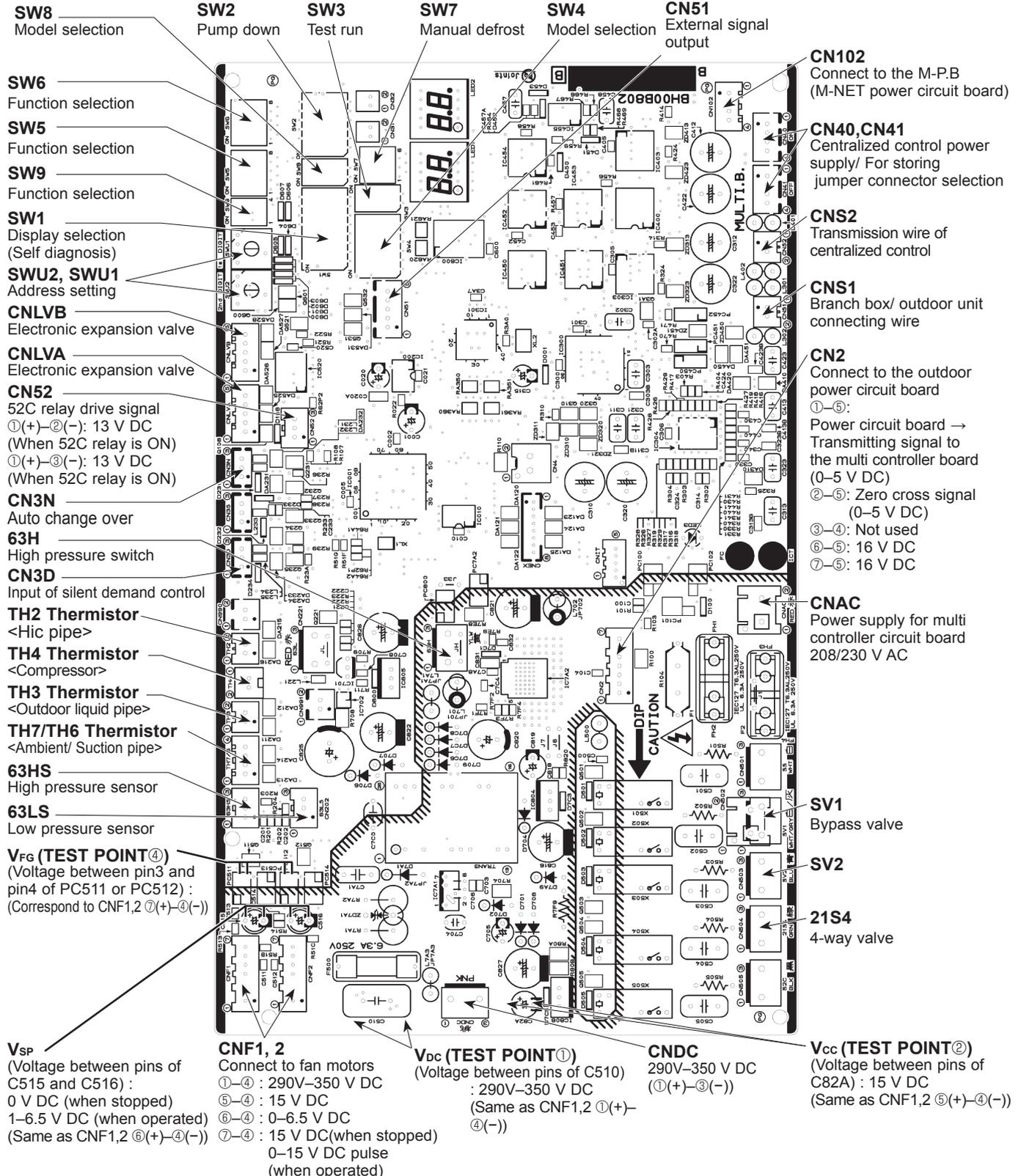
MXZ-5C42NAHZ-U1

MXZ-8C48NAHZ-U1

MXZ-8C48NA-U1

MXZ-8C60NA-U1

<CAUTION> TEST POINT ① is high voltage.



Outdoor power circuit board

MXZ-4C36NAHZ

MXZ-5C42NAHZ

MXZ-8C48NAHZ

MXZ-8C48NA

MXZ-4C36NAHZ-U1

MXZ-5C42NAHZ-U1

MXZ-8C48NAHZ-U1

MXZ-8C48NA-U1

MXZ-8C60NA-U1

Brief Check of POWER MODULE

Usually, they are in a state of being short-circuited if they are broken. Measure the resistance in the following points (connectors, etc.).

If they are short-circuited, it means that they are broken.

1. Check of POWER MODULE

① Check of DIODE circuit

R - L1, S - L1, R - N1, S - N1

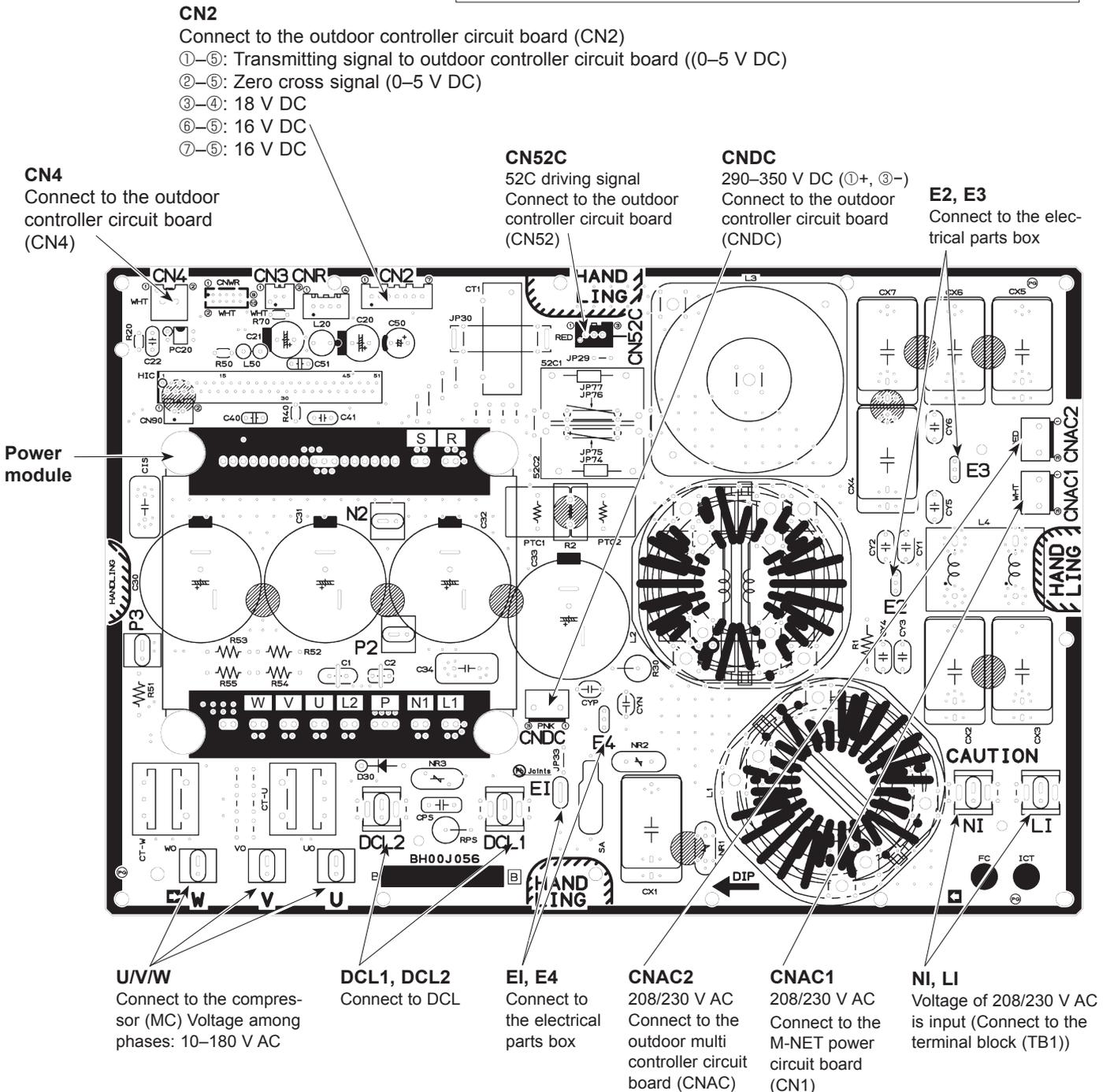
② Check of IGBT circuit

L2 - N1

③ Check of INVERTER circuit

P - U, P - V, P - W, N1 - U, N1 - V, N1 - W

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

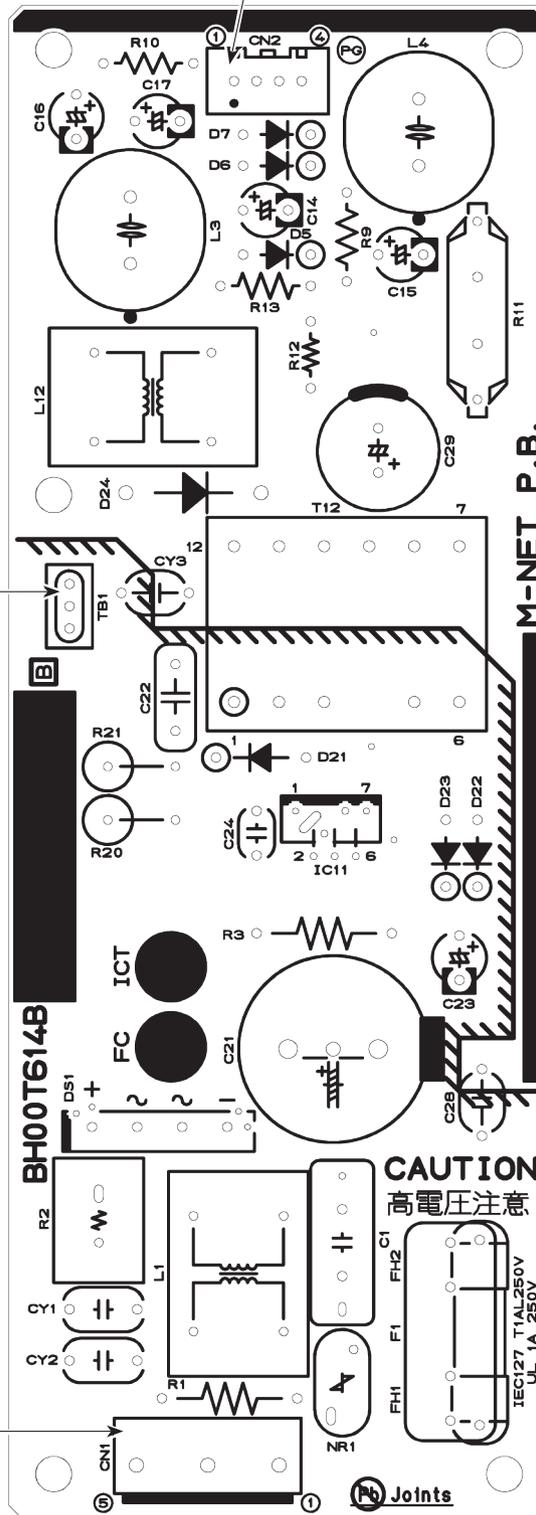


M-NET power circuit board
MXZ-4C36NAHZ
MXZ-5C42NAHZ
MXZ-8C48NAHZ
MXZ-8C48NA
MXZ-4C36NAHZ-U1
MXZ-5C42NAHZ-U1
MXZ-8C48NAHZ-U1
MXZ-8C48NA-U1
MXZ-8C60NA-U1

CN2
 Connect to the outdoor multi controller circuit board (CN102)
 ①-②: 24-30 V DC
 ③-④: 24-30 V DC

TB1
 Connect to the electrical parts box

CN1
 Connect to the outdoor power circuit board (CNAC1)
 ①-③: 220-240 V AC



Branch box controller board
PAC-MKA50BC PAC-MKA51BC
PAC-MKA30BC PAC-MKA31BC

TH-A to E
 Connect to thermistor-A to E
TH-D and E for PAC-MKA50/51BC only

LEV-A to E
 Connect to LEV-A to E
LEV-D and E for PAC-MKA50/51BC only

CN3M
 Connected to the terminal block (TB5) (M-NET transmission connecting wire) 24-30 V DC (non polar)

LED1,LED2
 ·Startup
 Main power supply (208/230 V AC)
 ·Normal operating
 LED1:Main power supply
 LED2:Blink depend on the total number of indoor units.

<Example>
 The total number is 2,
 ①Blink 2 times
 ②Turn OFF for 3 seconds
 ③Repeat ①—②

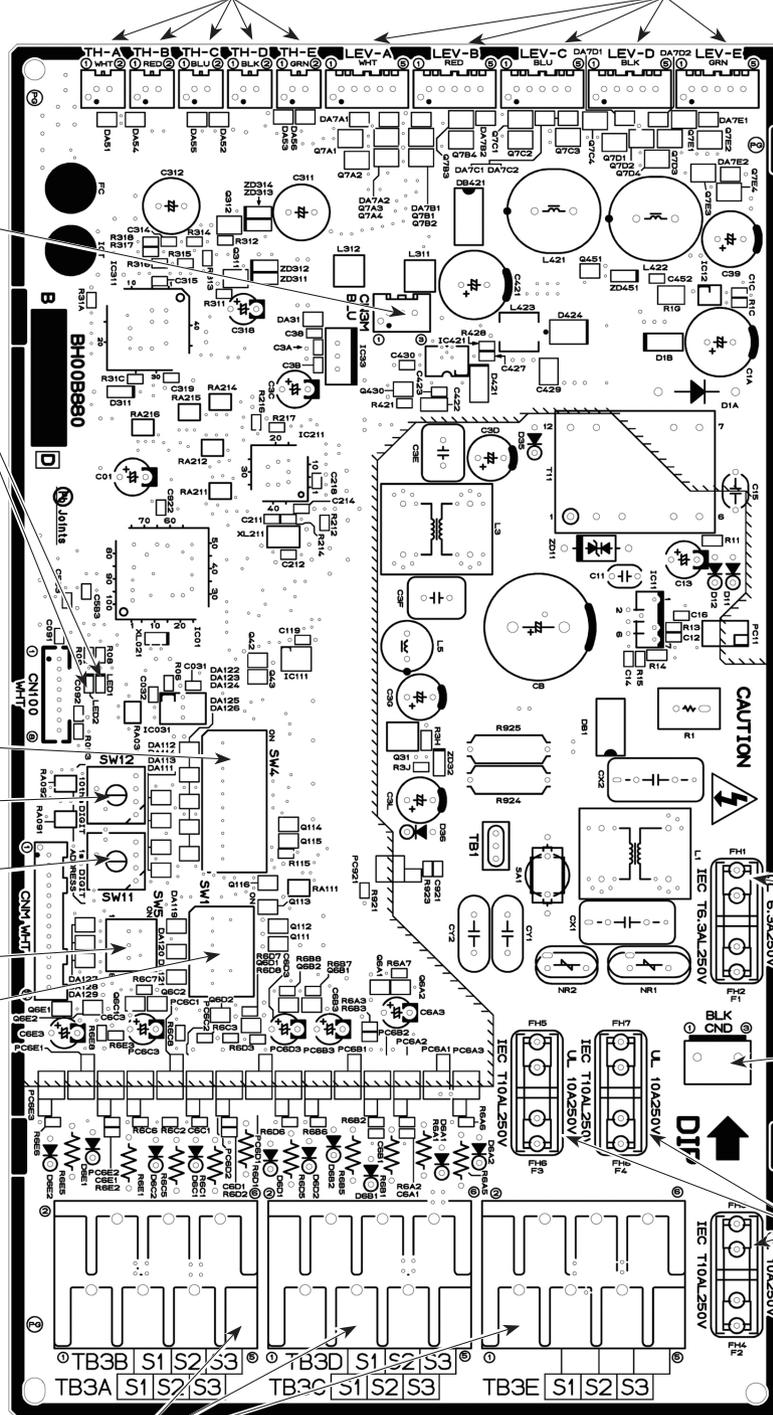
SW4
 Mode selection

SW12
 Address setting tens DIGIT

SW11
 Address setting ones DIGIT

SW5
 Service setting

SW1
 Indoor unit connection



F1
 Fuse 6.3 A 250 V

CND
 Power supply for Branch box Controller board
 ①—③208/230 V AC

F2,F3,F4
 Fuse 10 A 250 V
 F4 for PAC-MKA50/51BC only

TB3A to E
 Connect to indoor unit
 ①—③. Power supply
 ②—④ 208/230 V AC

TB3D and TB3E for PAC-MKA50/51BC only
 ③—⑤. Transmission
 ④—⑥ 0-24 V DC

8-9. INTERNAL SWITCH FUNCTION TABLE

(1) Function of switches

MXZ-4C36NAHZ(-U1)

MXZ-5C42NAHZ(-U1)

MXZ-8C48NAHZ(-U1)

MXZ-8C48NA(-U1)

The black square (■) indicates a switch position.

Switch	Step	Function	Operation in Each Switch Setting		Remarks	Purpose	Additional Information	
			ON	OFF				
SWU1 ones digit SWU2 tens digit	Rotary switch	 (tens digit) (ones digit)			<Initial settings> 			
	1-8	 ON OFF 1 2 3 4 5 6 7 8			<Initial settings> 			
SW1 Digital Display Switch	1	Selects operating system startup	With centralized controller	Without centralized controller	<Initial settings> 	Turn ON when the centralized controller is connected to the outdoor unit.	<ul style="list-style-type: none"> SW2-1 must be turned ON if a central controller is connected to the system. An example of this would be a TC-24, EW-50A, AG-150, AE50 or AE200. If SW2-1 is not turned on while using a central controller, in rare circumstances problems may be encountered such as indoor units not responding to group commands. Therefore, turning SW2-1 ON is recommended if a central controller is used. Group setting of 2 or more A-C units which is connected to branch box via centralized controller is not allowed. 	
			Clear	Do not clear				When relocating units or connecting additional units.
	2	Connection Information Clear Switch	Clear	Do not clear	<Initial settings> 	When relocating units or connecting additional units.	—	
			Clear abnormal data	Normal				To delete an error history.
	3	Abnormal data clear switch input	Run adjustment mode	Normal	<Initial settings> 	To facilitate outdoor unit the pumping down operation. Frequency = Fixed to 65 Hz Indoor-electronic expansion valve = Fully open Outdoor fan step = Fixed to 10	—	
			Clear	Normal				—
4	Pump down	Run adjustment mode	Normal	<Initial settings> 	To facilitate outdoor unit the pumping down operation. Frequency = Fixed to 65 Hz Indoor-electronic expansion valve = Fully open Outdoor fan step = Fixed to 10	—		
		Clear	Normal				—	
5	—	—	—	<Initial settings> 	—	—		
		—	—				—	
SW2-5, 6/ SW4/ SW8 Model Switch	1-6	MODEL SELECTION 1:ON 0:OFF		<Initial settings> Set for each capacity.	—	Please 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.		
		MODELS	SW2				SW4	SW8
		MXZ-4C36NAHZ	ON OFF 5 6				ON OFF 1 2 3 4 5 6	ON OFF 1 2
		MXZ-5C42NAHZ	ON OFF 5 6				ON OFF 1 2 3 4 5 6	ON OFF 1 2
		MXZ-8C48NAHZ	ON OFF 5 6				ON OFF 1 2 3 4 5 6	ON OFF 1 2
		MXZ-8C48NA	ON OFF 5 6				ON OFF 1 2 3 4 5 6	ON OFF 1 2
SW3 Trial operation	1	ON/OFF from outdoor unit	ON	OFF	<Initial settings> 	Turn ON to activate the demand control for Australia.	(Do not turn this ON if the unit is in outside Australia)	
			Heating	Cooling				
	2	Mode setting	Australia setting	Normal	<Initial settings> 	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.	
			Enable	Normal				
	3	—	—	—	<Initial settings> 	—	—	
			—	—				
4	—	—	—	<Initial settings> 	—	—		
		—	—					
5	Change the indoor unit's LEV opening at defrost	Enable	Normal	<Initial settings> 	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 becomes louder.		
		Enable	Normal					
6	Switching the target sub cool (Heating mode)	Enable	Normal	<Initial settings> 	To decrease the target sub cool value. 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.		
		Enable	Normal					

Continue to the next page

Switch	Step	Function	Operation in Each Switch Setting		Remarks	Purpose	Additional Information
			ON	OFF			
SW5 function switch	7	During the outdoor unit is in HEAT operation, additionally increase about 50 to 70 pulses of the LEV opening on the indoor unit which is in FAN, STOP, COOL, or thermo-OFF.*1	Active	Inactive	Can be set when OFF or during operation	To additionally increase 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	During the outdoor unit is in operation, fully closes the electronic expansion valve on the indoor unit which is in FAN, COOL, STOP, or thermo-OFF.*2	Enable	Normal	Before turning the power ON.	To reduce the room temperature increase by setting the LEV opening lower for the units in thermo-OFF operation.	The refrigerant is more likely to collect in the units with thermo-OFF operation, and causing the units refrigerant shortage. (Results in less capacity and increase of discharge temperature.)
	1	—	—	—	—	—	—
	2	—	—	—	—	—	—
	3	—	—	—	—	—	—
	4	Change of defrosting control	Enable (For high humidity)	Normal	—	To shorten the defrosting prohibition time in high humidity (or heavy snow) region, in order to reduce malfunctions caused by frost.	The performance of the HEAT operation is somewhat reduced since the defrosting operation is frequently performed.
	5	—	—	—	—	—	—
	6	Switching the target discharge pressure (PdM)	Enable	Normal	Can be set when OFF or during operation	To raise the performance by setting the PdM higher during HEAT operation.	Power consumption is raised due to a higher frequency. (The performance would not be raise at the maximum operating frequency)
SW6 function switch	7	Switching (1) the target evaporation temperature (ETm)	Enable	Normal	SW6-7	To raise/reduce the performance by changing the target ETm during COOL operation.	Switching it to raise the performance, it raises the power consumption, and produces more dew condensation.
	8	Switching (2) the target evaporation temperature (ETm)	Enable	Normal	SW6-8 Target ETm (C)	Switch to raise the performance: raises the performance Switch to reduce the performance: prevents dew condensation	Switching it to reduce the performance, it makes the performance insufficient.
	1	Ignore current sensor abnormality	Enable	Normal	After turning the power ON.	To perform a test run for electrical parts alone without running the compressor.	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)	During heating operation only*3	Include when the heating operation is OFF*4	Can be set when OFF or during operation	It reduces 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	—	—	—	—	—	—
	4	Maximum frequency down at 1 hour after COOL operation	Enable	Normal	Can be set when OFF or during operation	To reduce dew condensation on the indoor unit by lowering the frequency.	The performance might be insufficient.
	5	—	—	—	—	—	—
	6	Manual defrost	Manual defrost	Normal	During compressor running in HEAT mode.	Turn ON when it is necessary to perform the defrosting operation forcibly. (Effective only at startup, or 10 minutes after the last defrosting operation)	It performs the defrosting operation forcibly. (HEAT operation is stopped temporarily.)
SW9 Function Switch	1	Auto change over from remote controller (IC with the minimum address)	Enable	Disable	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	Can be set when OFF or during operation	—	About the Silent mode/Demand control setting, refer to "8-5. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR".
	3	—	—	—	—	—	—
	4	—	—	—	—	—	—

*1 SW5-7 Opens the indoor-electronic 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.

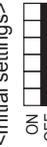
*2 SW5-8 Countermeasure against room temperature rise for indoor unit in FAN, COOL, and thermo-OFF (heating) mode.

*3 During heating operation and the ambient temperature is 39°F [4°C] or below, the freeze prevention heater is energized.

*4 During 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.

PAC-MKA50BC PAC-MKA51BC PAC-MKA30BC PAC-MKA31BC

The black square (■) indicates a switch position.

Switch	Step	Function	Operation in Each Switch Setting		Remarks	Additional Information																				
			ON	OFF																						
SWU11 Ones digit address setting SW12 Tens digit address setting	Rotary switch	How to set addresses Example: if address is "3", remain SW12 (for over 10) at "0", and match SW11 (for 1 to 9) with "3".			<Initial settings> 	—																				
SW1 Indoor unit connection	1-5	<table border="1" data-bbox="367 1260 494 1827"> <tr> <td></td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>1</td> <td>Not connected</td> <td>Connected</td> </tr> <tr> <td>2</td> <td>Not connected</td> <td>Connected</td> </tr> <tr> <td>3</td> <td>Not connected</td> <td>Connected</td> </tr> <tr> <td>4*</td> <td>Not connected</td> <td>Connected</td> </tr> <tr> <td>5*</td> <td>Not connected</td> <td>Connected</td> </tr> <tr> <td>6</td> <td>Not used</td> <td></td> </tr> </table>		OFF	ON	1	Not connected	Connected	2	Not connected	Connected	3	Not connected	Connected	4*	Not connected	Connected	5*	Not connected	Connected	6	Not used			<Initial settings> 	After each indoor unit is connected to the outdoor unit, turn ON the switch corresponding to each indoor unit. For example, when the indoor units are connected to INDOOR UNIT-A and C, turn SW1-1 and SW1-3 to ON.
	OFF	ON																								
1	Not connected	Connected																								
2	Not connected	Connected																								
3	Not connected	Connected																								
4*	Not connected	Connected																								
5*	Not connected	Connected																								
6	Not used																									
SW4 Mode selection	1	Change temperature indication	Fahrenheit temperature	Celsius temperature	<Initial settings> 	—																				
	2	Power-supply voltage setting	230 V	208 V																						
	3	Change operation if M-NET communication error occurs.	Stop operation	Continued operation																						
	4	Automatic restoration when the power comes back ON.*2	Inactive	Active																						
	5-10	—	—	—																						
SW5 Service setting	1-3	Change INDOOR UNIT No. for monitoring	Refer to "8-11. BRANCH BOX UNIT OPERATION MONITOR FUNCTION".		<Initial settings> 	—																				

*1 Only for 5-branches model; NOT USED for 3-branches model.

*2 Note that the automatic restoration starts after the unit has stopped once.

8-10. OUTDOOR UNIT FUNCTIONS

SW:setting
 0...OFF
 1...ON

No.	SW1 setting 12345678	Display mode	Display on the LED1, 2 (display data)								Notes
			1	2	3	4	5	6	7	8	
0	00000000	Relay output display	Compressor operation	52C	21S4	SV1	(SV2)			Always lighting	ON: light on OFF: light off
1	10000000	Check display	0000-9999 (Alternating display of addresses and check code)	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	When abnormality occurs, check display. Light on at time of abnormality
2	01000000	Indoor unit check status	Superheat due to low discharge temperature	Superheat due to low discharge temperature	Compressor shell temperature abnormality	TH4 abnormality	TH3 abnormality	Outdoor fan rotation frequency abnormality	TH7 abnormality	TH8 abnormality	
3	01000000	Protection input	Compressor over current interception	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	Display detected microprocessor protection or abnormality
4	00100000	Protection input	Address double setting abnormality	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)	
5	10100000	Abnormality delay display 1	Superheat due to low discharge temperature 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	Display all abnormalities remaining in abnormality delay
6	01100000	Abnormality delay display 2	Compressor over current interception 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	
7	11100000	Abnormality delay display 3	TH2 abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by blocked valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/short delay		
8	00010000	Abnormality delay history 1	Superheat due to low discharge temperature 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	
9	10010000	Abnormality delay history 2	Compressor over current interception 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	Display all abnormalities remaining in abnormality delay
10	01010000	Abnormality delay history 3	TH2 abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by blocked valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/short delay		
11	11010000	Abnormality code history 1 (the latest)	Abnormality delay	Abnormality delay	Abnormality delay	Abnormality delay	Abnormality delay	Abnormality delay	Abnormality delay		
12	00110000	Abnormality code history 2	Discharge/Comp. temperature	Discharge/Comp. temperature	Thermistor <Compressor>(TH4)	Thermistor <Compressor>(TH4)	Discharge superheat (SHd)	Over charge refrigerant			
13	10110000	Abnormality code history 3	Thermistor <Outdoor liquid pipe> (TH3)	Thermistor <Outdoor liquid pipe> (TH3)	Thermistor <Suction pipe> (TH6)	Thermistor <Suction pipe> (TH6)	Insufficient refrigerant	Closed cooling valve			
14	01110000	Abnormality code history 4	Thermistor <Heat sink> (TH8)	Thermistor <Heat sink> (TH8)	Thermistor <Ambient> (TH7)	Thermistor <Ambient> (TH7)	4-way valve disconnection	Current sensor open/short			
15	11110000	Abnormality code history 5	Thermistor <HIC> (TH2)	Thermistor <HIC> (TH2)	Low pressure sensor	High pressure (63H)	Undervoltage, overvoltage, or power module	Heat sink temperature			
16	00001000	Abnormality code history 6	High pressure sensor	High pressure sensor	High pressure (63H)	High pressure sensor (63HS)	Power module	Outdoor fan motor			
17	10001000	Abnormality code history 7	High pressure (63H)	High pressure (63H)	High pressure (63H)	High pressure (63H)	Power module	Outdoor fan motor			
18	01001000	Abnormality code history 8	Power module	Power module	Power module	Power module	Power module	Power module			
19	11001000	Abnormality code history 9	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor			
20	00101000	Abnormality code history 10 (the oldest)	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor	Outdoor fan motor			
21	10101000	Cumulative time	0-9999 (unit: 1 hour)	0-9999 (unit: 1 hour)							Display of cumulative compressor operating time
22	01101000	Cumulative time	Compressor energizing	Compressor energizing							Light ON/Light OFF
23	11101000	Outdoor unit operation display	Compressor operating prohibition	Compressor operating prohibition	Compressor in operation	Abnormality detection	Compressor in operation	Abnormality detection			Cooling: light on, Heating: light blinking Stop fan: light off
24	00011000	Indoor unit operation mode	No.1 unit mode	No.2 unit mode	No.3 unit mode	No.4 unit mode	No.5 unit mode	No.6 unit mode	No.7 unit mode	No.8 unit mode	Thermo ON: light on Thermo OFF: light off
25	10011000	Indoor unit operation display	No.1 unit operation	No.2 unit operation	No.3 unit operation	No.4 unit operation	No.5 unit operation	No.6 unit operation	No.7 unit operation	No.8 unit operation	

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
			1	2	3	4	5	6	7	8	
26	01011000	Capacity code (No. 1 indoor unit)									<ul style="list-style-type: none"> •Display of indoor unit capacity code •The No. 1 unit will start from the M-NET address with the lowest number
27	11011000	Capacity code (No. 2 indoor unit)									
28	00111000	Capacity code (No. 3 indoor unit)									
29	10111000	Capacity code (No. 4 indoor unit)									
30	01111000	Capacity code (No. 5 indoor unit)									
31	11111000	IC1 operation mode									<ul style="list-style-type: none"> •Display of indoor unit operating mode
32	00000100	IC2 operation mode									
33	10000100	IC3 operation mode									
34	01000100	IC4 operation mode									
35	11000100	IC5 operation mode									
36	00100100	OC operation mode	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF				
37	10100100	External connection status	Heating/Cooling	Abnormal/normal	DEFROST/NO	Refrigerant pull back/no	Excitation current/no	3-min.delay/no			Light on/light off Input: light off No input: light on
38	01100100	Communication demand capacity	0-255 (%)								Display of communication demand capacity
39	11100100	Number of compressor ON/OFF	0000-9999 (unit: x10)								Display a count of compressor operation/stop
40	00010100	Compressor operating current	0-999.9 (A rms)								Display detected current
41	10010100	Input current of outdoor unit									Display cumulative time of thermo-ON operation
42	01010100	Thermo-ON operating time	0000-9999 (unit: x10)								Display total capacity code of indoor units in thermo-ON
43	11010100	Total capacity of thermo-ON	0-255								Display number of connected indoor units
44	00110100	Number of indoor units	0-255								Display bus voltage
45	10110100	DC bus voltage	0-999.9 (V)								Display active LEV control
46	01110100	State of LEV control	Td over heat prevention	SHd decrease prevention	Min.Sj correction depends on Td	Min.Sj correction depends on Shd	LEV opening correction depends on Pd	LEV opening correction depends on Td	Correction of high compression ratio prevention	Freeze prevention control at the beginning of SHd	Display active compressor frequency control
47	11110100	State of compressor frequency control 1	Condensing temperature limit control	Compressor temperature control	Secondary current control	Discharge temp. (heating) backup control	Pd abnormality (heating)	Pd Back up control(heating)	Hz-up inhibit control at the beginning of SHd	Power module abnormality	Display data at time of abnormality
48	00001100	State of compressor frequency control 2	Heat sink over heat prevention control	Secondary current control	HIC abnormality	Input current control	Frequency restrain of receipt voltage change	Low pressure decrease prevention	TH6 abnormality		
49	10001100	Protection input	63LS abnormality	HIC abnormality	Frozen protection	4-way valve disconnection abnormality	Delay caused by blocked valve in cooling mode	Power module abnormality			
50	01001100	The second current value when microprocessor of POWER BOARD abnormality is selected	0-999.9 [A rms]								
51	11001100	Heat sink temperature when microprocessor of POWER BOARD abnormality is detected	-99.9-999.9 (°F)								

Content
State of compressor frequency(Hz) control
Discharge pressure control
Compressor temperature control
SV control
Abnormal rise of Pd control
Heat sink over heat prevention control
Secondary current control
Input current control
Hz correction of receipt voltage decrease prevention
Hz restrain of receipt voltage change

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
			1	2	3	4	5	6	7	8	
52	00101100	Outdoor LEV-A opening pulse	0-2000 (pulse)								Display of opening pulse of outdoor LEV
53	10101100	Outdoor LEV-A opening pulse abnormality delay									
54	01101100	Outdoor LEV-A opening pulse abnormality									
55	11101100	Outdoor LEV-B opening pulse									
56	00011100	Outdoor LEV-B opening pulse abnormality delay									
57	10011100	Outdoor LEV-B opening pulse abnormality									
58	01011100	63LS (Low pressure)	-99.9-999.9 (PSIG)								Display of data from sensor and thermistor
59	11011100	63LS abnormality delay									
60	00111100	63 LS abnormality									
61	10111100	TH2 (HIC pipe)	-99.9-999.9 (°F)								
62	01111100	TH2(HC) abnormality delay									
63	11111100	TH2 (HIC) abnormality	-99.9-999.9 (°F)								
64	00000010	Operational frequency	0-255 (Hz)								Display of actual operating frequency
65	10000010	Target frequency	0-255 (Hz)								Display of target frequency
66	01000010	Outdoor fan control step number	0-15								Display of number of outdoor fan control steps (target)
69	10100010	IC1 LEV Opening pulse									Display of opening pulse of indoor LEV
70	01100010	IC2 LEV Opening pulse									
71	11100010	IC3 LEV Opening pulse	0-2000 (pulse)								
72	00010010	IC4 LEV Opening pulse									
73	10010010	IC5 LEV Opening pulse									
74	01010010	High pressure sensor (Pd)	-99.9-999.9 (PSIG)								Display detected data of outdoor unit sensors and thermistors
75	11010010	TH4(Compressor)Td) data									
76	00110010	TH6(Suction pipe)ET) data									
77	10110010	TH7(Ambient) data	-99.9-999.9 (°F)								
78	01110010	TH3(Outdoor liquid pipe) data									
80	00001010	TH8(Heat sink) data									
81	10001010	IC1 TH23 (Gas)									Display detected data of indoor unit thermistor
82	01001010	IC2 TH23 (Gas)									
83	11001010	IC3 TH23 (Gas)									
84	00101010	IC4 TH23 (Gas)									
85	10101010	IC5 TH23 (Gas)									

-99.9-999.9 (°F)
(When indoor unit is not connected, it is displayed as 0.)

No.	SW1 setting 12345678	Display mode	Display on the LED1, 2 (display data)								Notes	
			1	2	3	4	5	6	7	8		
128	00000001	Actual frequency of abnormality delay	0-255 (Hz)									Display of actual frequency at time of abnormality delay
129	10110001	Fan step number at time of abnormality delay	0-15									Display of fan step number at time of abnormality delay
131	11000001	IC1 LEV opening pulse abnormality delay	0-2000 (pulse)									Delay of opening pulse of indoor LEV at time of abnormality delay
132	00100001	IC2 LEV opening pulse abnormality delay										
133	10100001	IC3 LEV opening pulse abnormality delay										
134	01100001	IC4 LEV opening pulse abnormality delay										
135	11100001	IC5 LEV opening pulse abnormality delay										
136	00010001	High pressure sensor data at time of abnormality delay	-99.9-999.9 (PSIG)									
137	10010001	TH4 (Compressor) sensor data at time of abnormality delay										
138	01010001	TH6 (Suction pipe) sensor data at time of abnormality delay										
139	11010001	TH3 (Outdoor liquid pipe) sensor data at time of abnormality delay	-99.9-999.9 (°F)									
140	00110001	TH8 (Heat sink) sensor data at time of abnormality delay										
141	10110001	OC SC (cooling) at time of abnormality delay										
142	01110001	IC1 SC/SH at time of abnormality delay										Display of data from High pressure sensor, all thermistors, and SC/SH at time of abnormality delay
143	11110001	IC2 SC/SH at time of abnormality delay										
144	00001001	IC3 SC/SH at time of abnormality delay										
145	10001001	IC4 SC/SH at time of abnormality delay	-99.9-999.9 (degree)									
146	01001001	IC5 SC/SH at time of abnormality delay	During heating: subcool (SC) During cooling: superheat (SH) (Fixed to "0" during cooling operation)									
147	11001001	IC9 SC/SH at time of abnormality delay										
148	00100001	IC10 SC/SH at time of abnormality delay										
149	10101001	IC11 SC/SH at time of abnormality delay										
150	01101001	IC12 SC/SH at time of abnormality delay										

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
			1	2	3	4	5	6	7	8	
151	11101001	IC9 LEV opening pulse at time of abnormality	0-2000 (pulse)								Display of opening pulse of indoor LEV at time of abnormality
152	00011001	IC10 LEV opening pulse at time of abnormality									
153	10011001	IC11 LEV opening pulse at time of abnormality									
154	01011001	IC12 LEV opening pulse at time of abnormality									
155	11011001	IC9 SC/SH at time of abnormality									
156	00111001	IC10 SC/SH at time of abnormality									
157	10111001	IC11 SC/SH at time of abnormality	-99.9-999.9 (degree) During heating; subcool (SC) During cooling; superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data at time of abnormality
158	01111001	IC12 SC/SH at time of abnormality									
159	11111001	IC9 Capacity code									Display of indoor unit capacity code
160	0000101	IC10 Capacity code									The No.1 unit will start from the M-NET address with the lowest number
161	10000101	IC11 Capacity code									
162	01000101	IC12 Capacity code									
163	11000101	IC9 SC/SH									
164	00100101	IC10 SC/SH									
165	10100101	IC11 SC/SH	-99.9-999.9 (degree) During heating; subcool (SC) During cooling; superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data
166	01100101	IC12 SC/SH									
170	01010101	ROM version monitor	0.00-99.99 (ver)								Display of version data of ROM
171	11010101	ROM type									Display of ROM type
172	00110101	Check sum mode	0000-FFFF								Display of check sum code of ROM
173	10110101	IC9 TH23 (Gas)									
174	01110101	IC10 TH23 (Gas)									
175	11110101	IC11 TH23 (Gas)									
176	00001101	IC12 TH23 (Gas)									
177	10001101	IC9 TH22 (Liquid)									
178	01001101	IC10 TH22 (Liquid)									
179	11001101	IC11 TH22 (Liquid)									
180	00101101	IC12 TH22 (Liquid)									
185	10011101	IC9 TH21 (Intake)									
186	01011101	IC10 TH21 (Intake)									
187	11011101	IC11 TH21 (Intake)									
188	00111101	IC12 TH21 (Intake)									
189	10111101	History of voltage error (U9/4220)	-	-	PAM error	Converter Fault	Power synchronization signal error	L1 open phase error	Under voltage error	Over voltage error	
192	00000011	Actual frequency of abnormality	0-255 (Hz)								Display of actual frequency at time of abnormality
193	10000011	Fan step number at time of abnormality	0-15								Display of fan step number at time of abnormality

No.	SW1 setting 12345678	Display mode	Display on the LED1, 2 (display data)								Notes
			1	2	3	4	5	6	7	8	
195	11000011	IC1 LEV opening pulse at time of abnormality									Display of opening pulse of indoor LEV at time of abnormality
196	00100011	IC2 LEV opening pulse at time of abnormality									
197	10100011	IC3 LEV opening pulse at time of abnormality									
198	01100011	IC4 LEV opening pulse at time of abnormality									
199	11100011	IC5 LEV opening pulse at time of abnormality									
200	00010011	High pressure sensor data at time of abnormality	-99.9--999.9 (PSIG)								Display of data from High pressure sensor, and all thermistors, at time of abnormality.
201	10010011	TH4 (Compressor) sensor data at time of abnormality									
202	01010011	TH6 (Suction pipe) sensor data at time of abnormality									
203	11010011	TH3 (Outdoor liquid pipe) sensor data at time of abnormality									
204	00110011	TH8 (Heat sink) sensor data at time of abnormality	-99.9--999.9 (°F)								
205	10110011	OC SC (cooling) at time of abnormality	-99.9--999.9 (degree)								Display of outdoor SC data at time of abnormality
206	01110011	IC1 SC/SH at time of abnormality									Display of indoor SC/SH data at time of abnormality
207	11110011	IC2 SC/SH at time of abnormality									
208	00001011	IC3 SC/SH at time of abnormality	-99.9--999.9 (degree)								
209	10001011	IC4 SC/SH at time of abnormality	During heating: subcool (SC) During cooling: superheat (SH) (Fixed to "0" during cooling operation)								
210	01001011	IC5 SC/SH at time of abnormality									
211	11001011	IC6 Capacity code									Display of indoor unit capacity code The No.1 unit will start from the M-NET address with the lowest number
212	00101011	IC7 Capacity code	0-255								
213	10101011	IC8 Capacity code									
214	01101011	IC6 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF			Display of indoor unit operation mode
215	11101011	IC7 operation mode									
216	00011011	IC8 operation mode									Display of opening pulse of indoor LEV
217	10011011	IC6 LEV opening pulse	0-2000 (pulse)								
218	01011001	IC7 LEV opening pulse									
219	11011001	IC8 LEV opening pulse									

8-11. BRANCH BOX UNIT OPERATION MONITOR FUNCTION

[When option part 'A-Control Service Tool (PAC-SK52ST)' is connected to branch box controller board (CNM)]
 Digital indicator LED1 displays 2 digit number or code to inform operation condition and the meaning of check code by controlling DIP SW2 on 'A-Control Service Tool'.

<Table1> SW5 setting The black square (■) indicates a switch position.

SW5 setting	Detail
	Common
	Indoor-A
	Indoor-B
	Indoor-C
	Indoor-D
	Indoor-E

Operation indicator:

- SW2 - Use to set the displayed item
- SW5 - Use to set the displayed unit

<Table2> Functions

The black square (■) indicates a switch position.

SW2 setting	SW5 setting*1	Display detail	Explanation for display	Unit
	Common	Status of branch box	<p>During startup</p> <p>During error detection Displays a check code, and M-NET address of the unit which the check code was detected. Example: If the check code 2520 is detected in the address3, 0.5 s 0.5 s 0.5 s 2.0 s 03 → 25 → 20 → □□</p> <p>During no power supply F8</p> <p>Other Displays the number of units in operation. 0 to 5</p>	—
	Individual unit	Status of branch box	<p>During startup</p> <p>During error detection Displays a check code, and M-NET address of the selected unit.</p> <p>During no power supply F8</p> <p>Other Displays an operation mode of the selected unit. 0: Stop C: Cool/Dry H: Heat d: Defrost</p>	—

*1 Refer to the <Table 1> for the appropriate setting for the function.

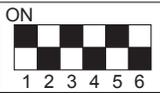
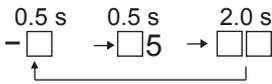
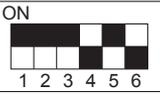
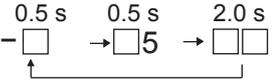
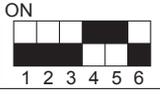
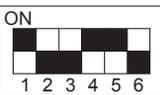
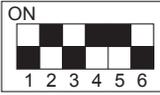
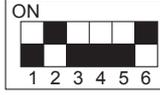
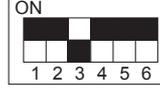
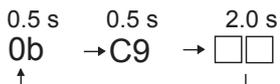
The black square (■) indicates a switch position.

SW2 setting	SW5 setting*1	Display detail	Explanation for display	Unit
	Common	Not used	—	—
	Individual unit	Actual opening pulse of LEV (Direct-operated conversion value) 0 to 500	0 to 500 (When it is 100 pulse or more, it displays a hundredth, tens, and unit digit by turns.) Example: When 150 pulse, <div style="text-align: center;"> 0.5 s 0.5 s 2.0 s □ 1 → 50 → □ □ ↑—————┘ </div>	Pulse
	Common	Not used	—	—
	Individual unit	Error history	Displays a check code, and M-NET address of the unit which the check code was detected. Example: If the check code 2520 is detected in the address3, <div style="text-align: center;"> 0.5 s 0.5 s 0.5 s 2.0 s 03 → 25 → 20 → □ □ ↑—————┘ </div>	Code display
	Common	The number of unit(s) operating in Thermo-ON	0 to 5	Number
	Individual unit	Operating status of unit	83: Abnormal 00: Stop 06: Forced stop 0C: Defrost 29: Hot adjust mode 05: Standby mode 2A: Auxiliary heater is ON. 0A: Thermo-ON 01: In operation	Code display
	Common	The number of indoor unit(s) connected to this branch box.	0 to 5	Number
	Individual unit	M-NET address	00 to FF Displays an M-NET address of the selected unit.	Code display
	Common	Not used	—	—
	Individual unit	Capacity setting in Qj	03 to 50	Code display
	Common	Not used	—	—
	Individual unit	Indoor thermistor <pipe temperature/ liquid> (TH2)	-38 to 190 [-39 to 88] (When the temperature is 0°F or less, "-" and temperature are displayed by turns.) Example: When -5°F, <div style="text-align: center;"> 0.5 s 0.5 s 2.0 s - □ → □ 5 → □ □ ↑—————┘ </div>	°F [°C]*2

*1 Refer to the <Table 1> for the appropriate setting for the function.

*2 SW4-1 OFF = °C, ON = °F

The black square (■) indicates a switch position.

SW2 setting	SW5 setting*1	Display detail	Explanation for display	Unit
	Common	Not used	—	—
	Individual unit	Indoor thermistor <pipe temperature/ 2-phase> (TH5)	-38 to 190 [-39 to 88] (When the temperature is 0°F or less, "-" and temperature are displayed by turns.) Example: When -5°F, <div style="text-align: center;">  </div>	°F [°C]*2
	Common	Not used	—	—
	Individual unit	Branch box pipe thermistor (TH-A, B, C, D, E)	-43 to 196 [-42 to 91] (When the temperature is 0°F or less, "-" and temperature are displayed by turns.) Example: When -5°F, <div style="text-align: center;">  </div>	°F [°C]*2
	Common	Not used	—	—
	Individual unit	Indoor thermistor <room temperature> (TH1)	43 to 102 [8 to 39]	°F [°C]*2
	Common	Not used	—	—
	Individual unit	Set temperature of indoor unit	61 to 88 [10 to 31]	°F [°C]*2
	Common	S/W version	Displays a S/W version number.	Code display
	Individual unit		Example: If it is a ver. 12.34, <div style="text-align: center;">  </div>	
	Common	Not used	—	—
	Individual unit	LEV opening pulse (gear operated value)	0 to 2000	Pulse
	Common	S/W ROM check sum	0000 to FFFF	Code display
	Individual unit		Example: If it is 0BC9h, <div style="text-align: center;">  </div>	

*1 Refer to the <Table 1> for the appropriate setting for the function.

*2 SW4-1 OFF = °C, ON = °F

8-12. SELECTING FUNCTIONS USING THE REMOTE CONTROLLER

Each function can be set as necessary using the remote controller. The setting of function for each unit can only be done by the remote controller. Select function available from the <Table 1> .

(1) Functions available when setting the unit number to 00

Note that the functions in the table below are available only when P-series indoor unit and the wired remote controller is used.

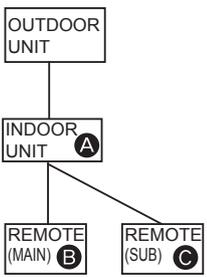
<Table 1> Function selections

Function	Settings	Mode No.	Setting No.	● : Initial setting (when sent from the factory)	Remarks
Power failure automatic recovery	OFF	01	1		The setting can be made to each indoor unit individually.
	ON*		2	●	
Indoor temperature detecting	Average data from each indoor unit	02	1	●	
	Data from the indoor unit with remote controller		2		
	Data from main remote controller		3		
LOSSNAY connectivity	Not supported	03	1	●	
	Supported (Indoor unit does not intake outdoor air through LOSSNAY)		2		
	Supported (Indoor unit intakes outdoor air through LOSSNAY)		3		
Power supply voltage	230V	04	1	●	
	208V		2		
Frost prevention temperature	36°F [2°C]	15	1		
	37°F [3°C]		2	●	
Humidifier control	When the compressor operates, the humidifier also operates.	16	1	●	
	When the fan operates, the humidifier also operates.		2		

* After the power supply returns, the indoor unit will not operate for 3 minutes (Some kind of indoor units operate for 30 seconds, after that, it stops for 3 minutes). This is normal operation.

Meaning of "Function setting"

Mode02:indoor temperature detecting

No.	Indoor temperature(ta)=			
No.1	Average data of the sensor on all the indoor units*	Initial setting	ta=A	ta=A
No.2	The data of the sensor on the indoor unit that is connected with remote controller		ta=A	ta=A
No.3	The data of the sensor on main remote controller		ta=B	ta=B

*Since the setting is applied to each indoor unit while branch box is connected, the indoor unit is controlled based on the sensor data of itself, not the average data.

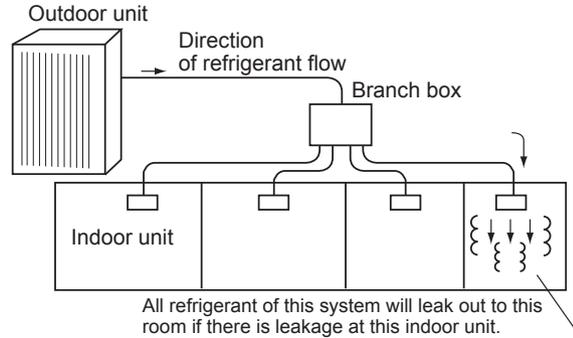
9 PRECAUTIONS AGAINST REFRIGERANT LEAKAGE

9-1. PRECAUTIONS AGAINST REFRIGERANT LEAKAGE

9-1-1. 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
 Maximum refrigerant concentration of R410A of a room is 0.44kg/m³ accordance with ISO 5149-1.
 To facilitate calculation, the maximum concentration is expressed in units of kg/m³ (kg of R410A per m³)
Maximum concentration of R410A: 0.44kg/m³
 (ISO 5149-1)



9-1-2. Confirming procedure of R410A concentration

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

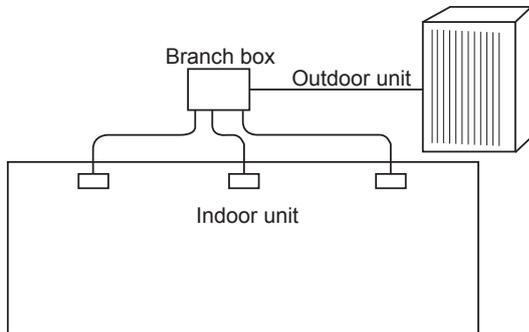
- (1) Calculate total refrigerant amount by each refrigerant system. Total refrigerant amount is pre-charged refrigerant at ex-factory plus additional charged amount at field installation.**

Note:
 When single refrigeration system consists of several independent refrigeration circuit, figure out the total refrigerant amount by each independent refrigerant circuit.

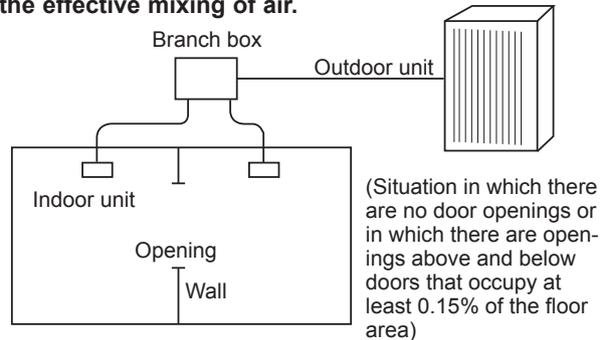
- (2) Calculate room volumes (m³) and find the room with the smallest volume**

The part with represents the room with the smallest volume.

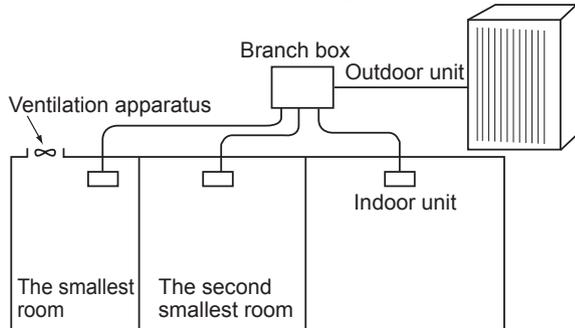
- (a) Situation in which there are no partitions**



- (b) There are partitions, but there are openings that allow the effective mixing of air.**



- (c) 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:**

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

Maximum concentration of R410A:0.44kg/m³

If the calculation results do not exceed the maximum concentration, perform the same calculations for the larger second and third room, etc., until it has been determined that nowhere the maximum concentration will be exceeded.

10

DISASSEMBLY PROCEDURE

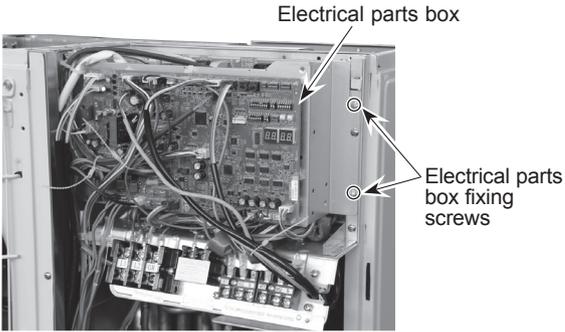
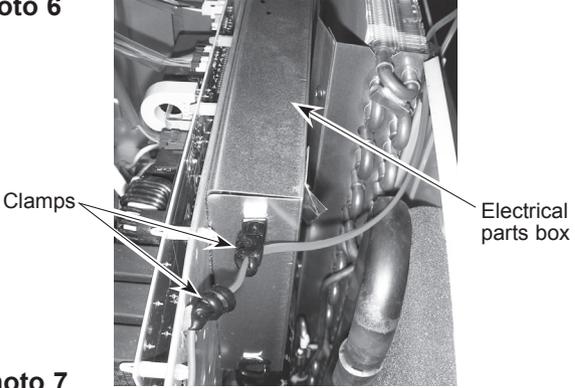
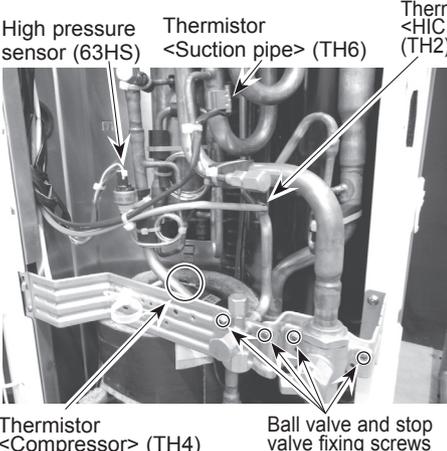
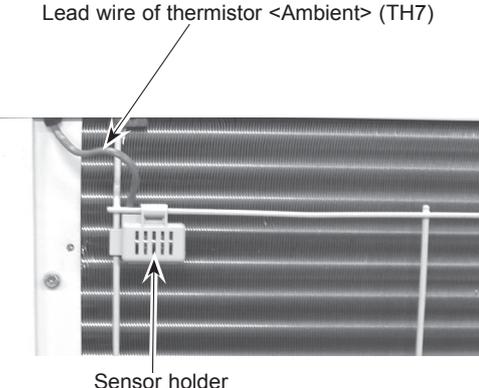
10-1. OUTDOOR UNIT MXZ-4C36NAHZ(-U1)

MXZ-5C42NAHZ(-U1)

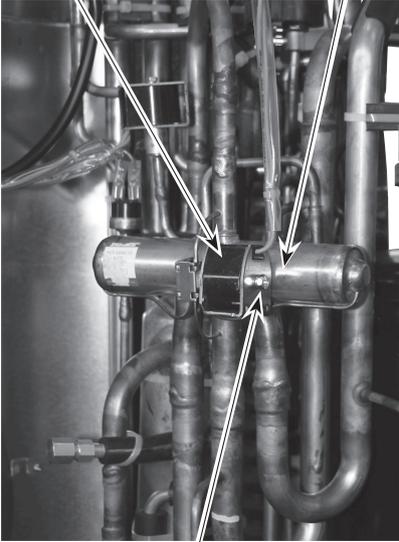
Note: Turn OFF the power supply before disassembly.
MXZ-8C48NAHZ(-U1)

OPERATING PROCEDURE	PHOTOS & ILLUSTRATION
<p>1. Removing the service panel and top panel</p> <ol style="list-style-type: none"> Remove 3 service panel fixing screws (5 × 12), then slide the hook on the right downward to remove the service panel. Remove screws (3 for front, 3 for rear/5 × 12) of the top panel and remove it. 	<p>Photo 1</p>
<p>2. Removing the fan motor (MF1, MF2)</p> <ol style="list-style-type: none"> Remove the service panel. (See Photo 1) Remove the top panel. (See Photo 1) Remove 4 fan grille fixing screws (5 × 12) to detach the fan grille. (See photo 1) Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2) Disconnect the connectors, CNF1 and CNF2 on the multi controller circuit board in the electrical parts box. Remove 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3) <p>Note: Tighten the propeller fan with a torque of 5.7 ± 0.3 N·m. [4.2 ± 0.2 ft = lbs]</p>	<p>Photo 2</p> <p>Photo 3</p>
<p>3. Removing the electrical parts box</p> <ol style="list-style-type: none"> Remove the service panel. (See Photo 1) Remove the top panel. (See Photo 1) Disconnect the connecting wire from terminal block. Remove all of the following connectors from multi controller circuit board; <Diagram symbol in the connector housing> <ul style="list-style-type: none"> Fan motor (CNF1, CNF2) Thermistor <HIC pipe> (TH2) Thermistor <Outdoor liquid pipe> (TH3) Thermistor <Compressor> (TH4) Thermistor <Suction pipe/Ambient, Outdoor> (TH7/6) High pressure switch (63H) High pressure sensor (63HS) Low pressure sensor (63LS) 4-way valve (21S4) Bypass valve (SV1, SV2) Electronic expansion valve (LEV-A, LEV-B) Base heater (SS) Pull out the disconnected wire from the electrical parts box. Remove the terminal cover and disconnect the compressor lead wire from the comp. terminal. (See Figure 1.) <p>Note: The terminal cover can be easily removed by using a blade of flathead screwdriver.</p> <p>Figure 1</p>	<p>Photo 4</p>

From the previous page.

OPERATING PROCEDURE	PHOTOS
<p>(6) Remove 2 electrical parts box fixing screws (4 × 10), then detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.</p>	<p>Photo 5</p> 
<p>4. Removing the thermistor <Suction pipe> (TH6)</p> <ol style="list-style-type: none"> (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Disconnect the connector, TH7/6 (red), on the multi controller circuit board in the electrical parts box. (4) Loosen the wire clamps on the side of the electrical parts box, and next to it. (5) Pull out the thermistor <Suction pipe> (TH6) from the sensor holder. <p>Note: When replacing thermistor <Suction pipe> (TH6), replace it together with thermistor <Ambient> (TH7) since they are combined together. Refer to procedure No.5 below to remove thermistor <Ambient> (TH7).</p>	<p>Photo 6</p>  <p>Photo 7</p> 
<p>5. Removing the thermistor <Ambient> (TH7)</p> <ol style="list-style-type: none"> (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Disconnect the connector TH7/6 (red) on the multi controller circuit board in the electrical parts box. (4) Loosen the wire clamps on top of the electrical parts box. (See Photo 6) (5) Pull out the thermistor <Ambient> (TH7) from the sensor holder. <p>Note: When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction pipe> (TH6), since they are combined together. Refer to procedure No.4 above to remove thermistor <Suction pipe> (TH6).</p>	<p>Photo 8</p> 



OPERATING PROCEDURE	PHOTOS
<p>6. Removing the thermistor <Outdoor liquid pipe> (TH3) and thermistor <Compressor> (TH4), thermistor <HIC pipe> (TH2)</p> <ol style="list-style-type: none">(1) Remove the service panel. (See Photo 1)(2) Disconnect the connectors, TH3 (white) and TH4 (white), TH2 (black) on the multi controller circuit board in the electrical parts box.(3) Loosen the clamp for the lead wire in the rear of the electrical parts box.(4) Pull out the thermistor <Outdoor liquid pipe> (TH3) and thermistor <Compressor> (TH4) from the sensor holder. (See Photo 7 and 9)	<p>Photo 9</p>  <p>Thermistor <Outdoor liquid pipe> (TH3)</p>
<p>7. Removing the 4-way valve coil (21S4)</p> <ol style="list-style-type: none">(1) Remove the service panel. (See Photo 1) <p>[Removing the 4-way valve coil]</p> <ol style="list-style-type: none">(2) Remove 4-way valve coil fixing screw (M5 × 7).(3) Remove the 4-way valve coil by sliding the coil toward you.(4) Disconnect the connector 21S4 (green) on the multi controller circuit board in the electrical parts box.	<p>Photo 10</p> <p>4-way valve coil (21S4) 4-way valve</p>  <p>4-way valve coil fixing screw</p>
<p>8. Removing the 4-way valve</p> <ol style="list-style-type: none">(1) Remove the service panel. (See Photo 1)(2) Remove the top panel. (See Photo 1)(3) Remove the electrical parts box (See photo 5)(4) Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 × 16), then remove the valve bed. (See Photo 4 and 7)(5) Remove 2 cover panel fixing screws (5 × 12), then slide the cover panel (front) upward to remove it. (The cover panel (front) is fixed to the cover panel (rear) with a hook on the rear side. (See Photo 4)(6) Remove the cover panel (rear) fixing screws (2 for right side and 2 for rear/ 5 × 12), then slide the cover panel (rear) upward to remove it. (See Photo 4) (The cover panel (rear) is fixed to the side panel (R) with 2 screws.)(7) Remove 3 side panel (R) fixing screws (5 × 12) in the rear of the unit, then slide the side panel (R) upward to remove it. (The side panel (R) is fixed to the side plate with hooks on the rear side.)(8) Remove the 4-way valve coil. (See Photo 10)(9) Recover refrigerant.(10) Remove the welded part of 4-way valve. <p>Note 1: Recover refrigerant without spreading it in the air.</p> <p>Note 2: The welded part can be removed easily by removing the side panel (R).</p> <p>Note 3: 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.</p>	

OPERATING PROCEDURE

9. Removing bypass valve coil (SV1, SV2) 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). (Refer to procedure 8(5))
- (4) Remove the cover panel (rear) (Refer to procedure 8(6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (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) or SV2 (blue) on the multi controller circuit board in the electrical parts box.
- (9) Remove the electrical parts box. (See photo 5)
- (10) Recover refrigerant.
- (11) Remove the welded part of bypass valve.

Refer to the notes below.

10. Removing the high pressure switch (63H) and high pressure sensor (63HS)

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

Refer to the notes below.

11. Removing the 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). (Refer to procedure 8(5))
- (4) Remove the cover panel (rear) (Refer to procedure 8(6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (6) Disconnect the connector 63LS (blue) on 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 low pressure sensor.

Refer to the notes below.

12. Removing electronic 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). (Refer to procedure 8(5))
- (4) Remove the cover panel (rear) (Refer to procedure 8(6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (6) Remove the electrical expansion valve coil. (See Photo 11,12)
- (7) Remove the electrical parts box. (See Photo 5)
- (8) Recover refrigerant.
- (9) Remove the welded part of electrical expansion valve.

Refer to the notes on the right.

PHOTOS

Photo 11

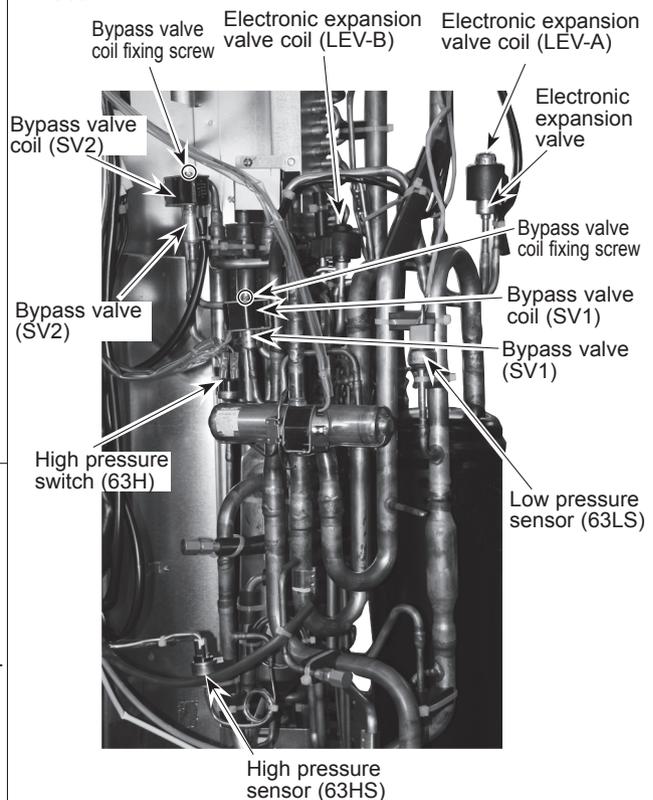
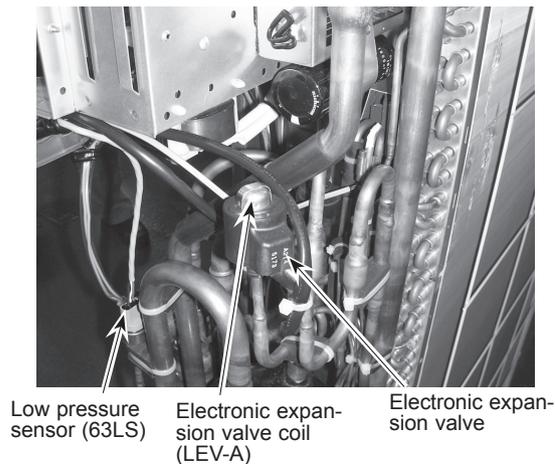


Photo 12



Notes:

1. Recover refrigerant without spreading it in the air.
2. The welded part can be removed easily by removing the side panel (R).
3. When installing the following parts, cover it with a wet cloth to prevent it from heating as the temperature below, then braze the pipes so that the inside of pipes are not oxidized;
 - Bypass valve (procedure 9), 248°F [120°C] or more
 - High pressure switch and high pressure sensor (procedure 10), 212°F [100°C] or more
 - Low pressure sensor (procedure 11), 212°F [100°C] or more
 - LEV (procedure 12), 248°F [120°C] or more

OPERATING PROCEDURE

13. Removing the compressor (MC)

- (1) Remove the service panel. (See Photo 1)
- (2) Remove the top panel. (See Photo 1)
- (3) Remove 2 front cover panel fixing screws (5 × 12) and remove the front cover panel. (See Photo 4)
- (4) Remove front panel fixing screws, 5 (5x12) and 2 (4 × 10) and remove the front panel. (See Photo 4)
- (5) Remove 4 back cover panel fixing screws (5 × 12) and remove the back cover panel.
- (6) Remove the electrical parts box. (See Photo 5)
- (7) Remove the valve bed. (Refer to procedure 8 (4))
- (8) Remove the cover panel (front). (Refer to procedure 8(5))
- (9) Remove the cover panel (rear) (Refer to procedure 8(6))
- (10) Remove the side panel (R). (Refer to procedure 8 (7))
- (11) Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 2)
- (12) Recover refrigerant.
- (13) Remove the 3 compressor fixing nuts for motor using spanner or adjustable wrench.
- (14) 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.

PHOTOS & ILLUSTRATION

Photo 13

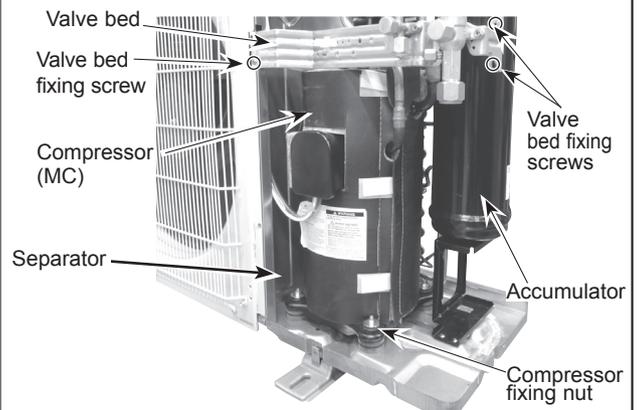
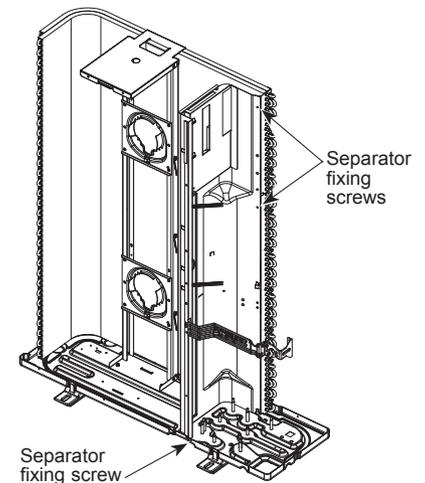


Figure 2



14. Removing the accumulator

- (1) Remove the service panel. (See Photo 1)
- (2) Remove the top panel. (See Photo 1)
- (3) Remove the front cover panel. (Refer to procedure 13 (3))
- (4) Remove the back cover panel. (Refer to procedure 13 (5))
- (5) Remove the electrical parts box. (See Photo 5)
- (6) Remove the valve bed. (See procedure 8 (4))
- (7) Remove the cover panel (front). (Refer to procedure 8(5))
- (8) Remove the cover panel (rear) (Refer to procedure 8(6))
- (9) Remove the side panel (R). (Refer to procedure 8 (7))
- (10) Recover refrigerant.
- (11) Remove 2 welded pipes of accumulator inlet and outlet.
- (12) Remove 2 accumulator leg fixing screws (4 × 10). (See Photo 15)

Note: Recover refrigerant without spreading it in the air.

Photo 14

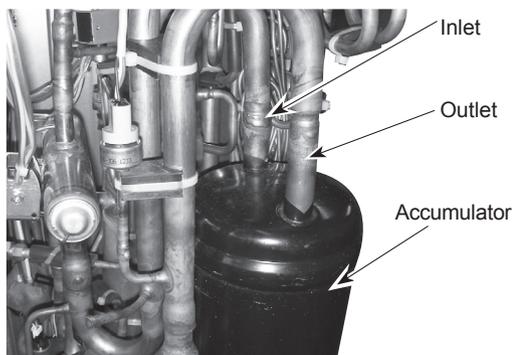
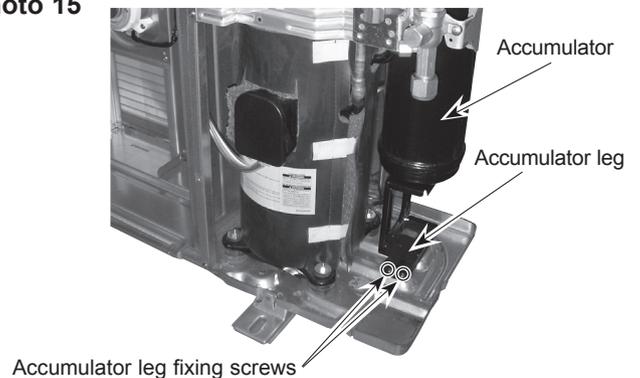


Photo 15



OPERATING PROCEDURE

15. Removing the reactor (DCL)

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

16. Removing the base heater

- (1) Remove the service panel. (See Photo 1)
- (2) Remove the top panel. (See Photo 1)
- (3) Remove 4 fan grille fixing screws (5 x 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) Remove all of the following connectors from multi controller circuit board;
<Diagram symbol in the connector housing>
 - Fan motor (CNF1, CNF2)
 - Base heater (SS)Pull out the disconnected wire from the electrical parts box. (See Photo 4)
- (6) Loosen the wire clamps on the side of the motor support and separator.
- (7) Remove 2 motor support fixing screws (5 x 12), then remove the motor support with fan motor still attached. (See Photo 16)
- (8) Remove 4 base heater cover fixing screws (4 x 10), then remove the base heater cover.
- (9) Remove the base heater. (See Photo 17)

Note1: Tighten the propeller fan with a torque of $5.7 \pm 0.3 \text{ N}\cdot\text{m}$
[$4.2 \pm 0.2 \text{ ft}\cdot\text{lbs}$]

Note2: Rotate the propeller fan and make sure that the base heater and the lead wires do not interfere with the movement of the propeller fan.

PHOTOS & ILLUSTRATION

Figure 3

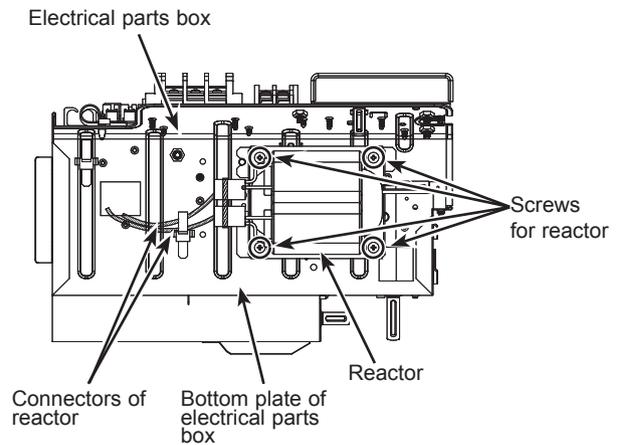


Photo 16

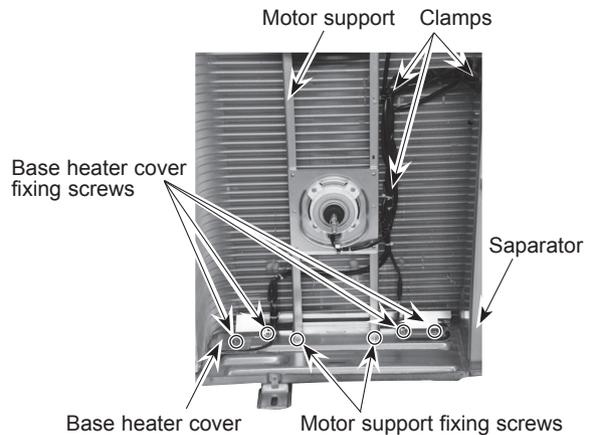
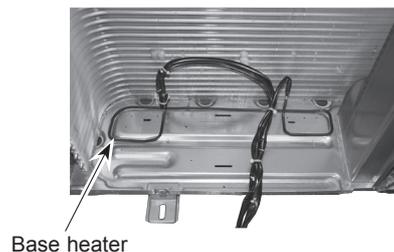


Photo 17



Note: Turn OFF the power supply before disassembly.

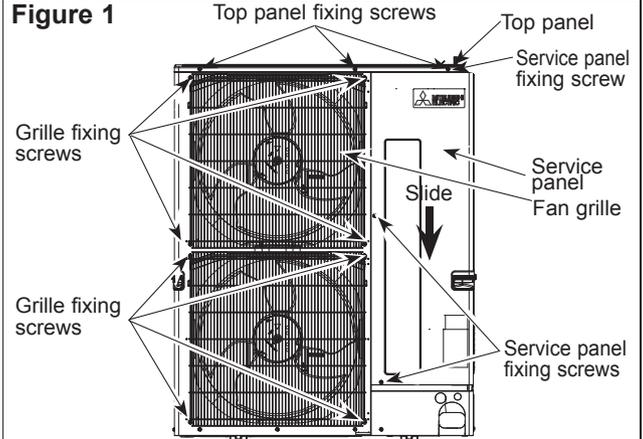
OPERATING PROCEDURE

PHOTOS & ILLUSTRATION

1. Removing the service panel and top panel

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

Figure 1



2. Removing the fan motor (MF1, MF2)

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

Note1: Tighten the propeller fan with a torque of $5.7 \pm 0.3 \text{ N}\cdot\text{m}$ [$4.2 \pm 0.2 \text{ ft} \cdot \text{lbs}$]

Photo 1

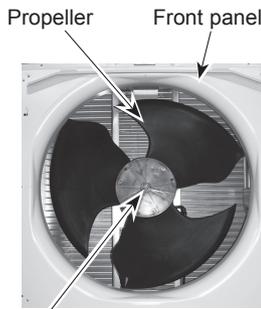
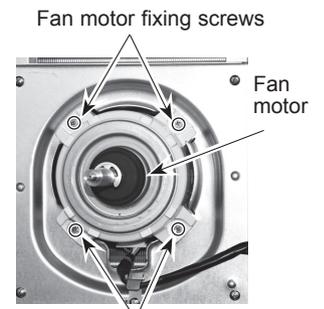


Photo 2



3. Removing the electrical parts box

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Disconnect the connecting wire from terminal block.
- (4) Remove all the following connectors from 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, Outdoor> (TH7/6)
 - High pressure switch (63H)
 - High pressure sensor (63HS)
 - Low pressure sensor (63LS)
 - 4-way valve (21S4)
 - Bypass valve (SV1)
 - Electronic expansion valve (LEV-A, LEV-B)
 Pull out the disconnected wire from the electrical parts box.
- (5) Remove the terminal cover and disconnect the compressor lead wire from the comp. terminal. (See Figure 2.)

Note: The terminal cover can be easily removed by using a blade of flathead screwdriver.

Figure 2

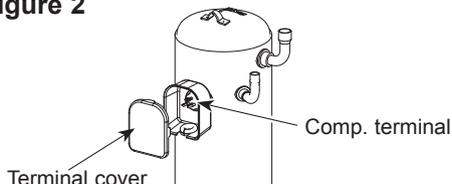
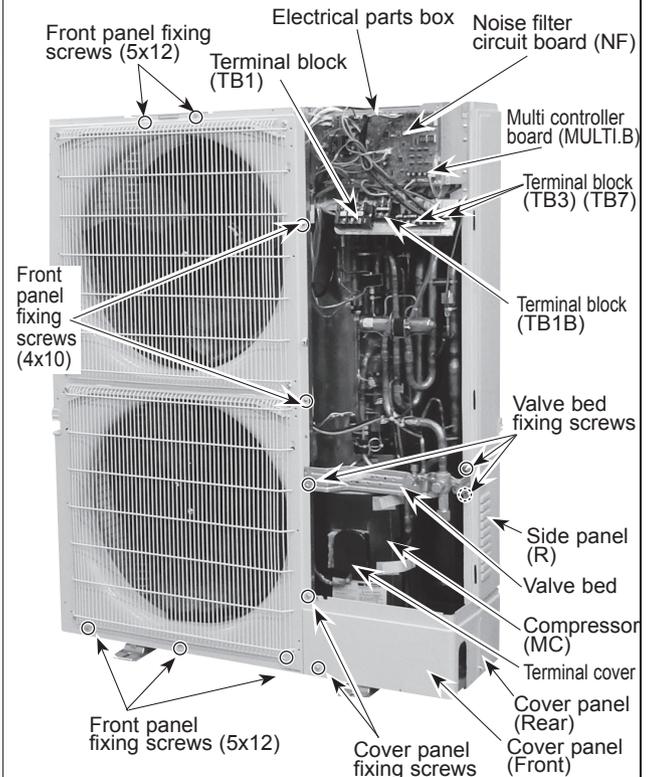


Photo 3



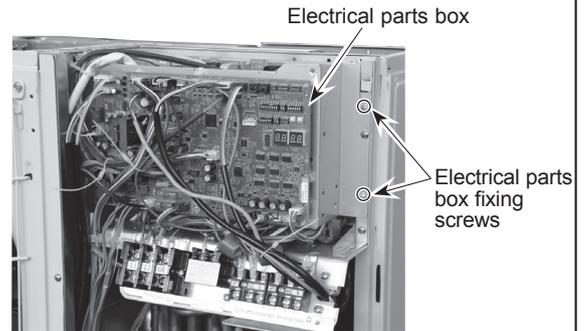
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OPERATING PROCEDURE

- (6) Remove 2 electrical parts box fixing screws (4 × 10) and detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.

PHOTOS

Photo 4



4. Removing the thermistor <Suction pipe> (TH6)

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Disconnect the connector, TH7/6 (red), on the Multi controller circuit board in the electrical parts box.
- (4) Loosen the wire clamps on top of the electrical parts box.
- (5) Pull out the thermistor <Suction pipe> (TH6) from the sensor holder.

Note: When replacing thermistor <Suction pipe> (TH6), replace it together with thermistor <Ambient> (TH7) since they are combined together. Refer to procedure No.5 below to remove thermistor <Ambient> (TH7).

Photo 5

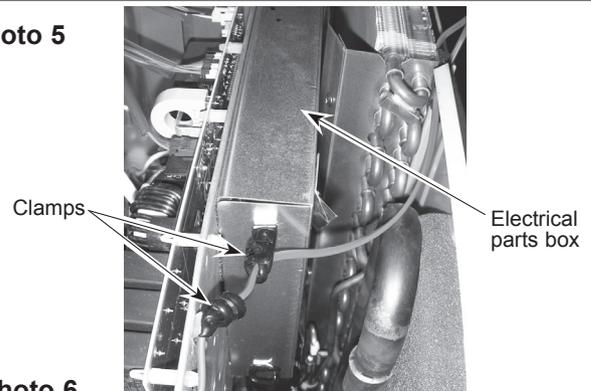
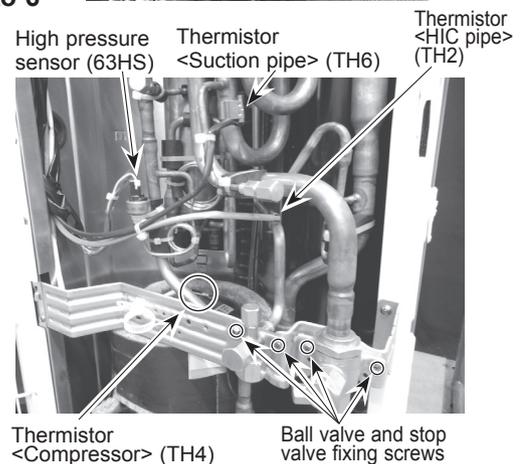


Photo 6

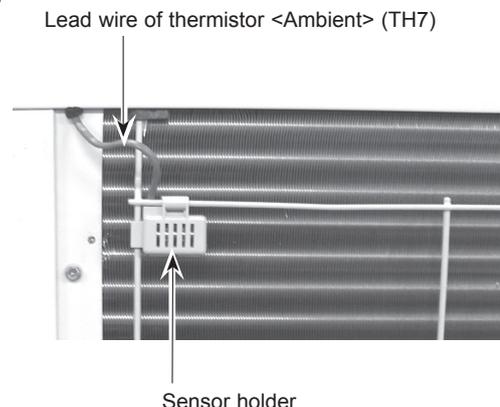


5. Removing the thermistor <Ambient> (TH7)

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Disconnect the connector TH7/6 (red) on the multi controller circuit board in the electrical parts box.
- (4) Loosen the wire clamps on top of the electrical parts box. (See Photo 5.)
- (5) Pull out the thermistor <Ambient> (TH7) from the sensor holder.

Note: When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction pipe> (TH6), since they are combined together. Refer to procedure No.4 above to remove thermistor <Suction pipe> (TH6).

Photo 7



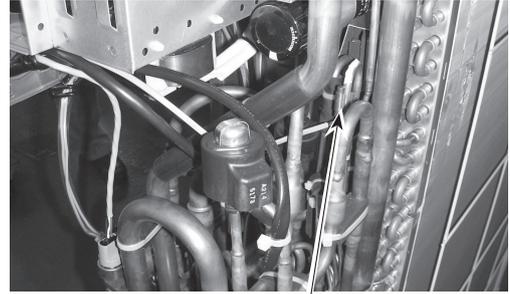
OPERATING PROCEDURE

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

- (1) Remove the service panel. (See Figure 1)
- (2) Disconnect the connectors, TH3 (white) and TH4 (white), TH2 (black) on the multi controller circuit board in the electrical parts box.
- (3) Loosen the clamp for the lead wire in the rear of the electrical parts box.
- (4) Pull out the thermistor <Outdoor liquid pipe> (TH3) and thermistor <Compressor> (TH4) from the sensor holder. (See Photo 6 and 8)

PHOTOS

Photo 8



Thermistor
<Outdoor liquid pipe> (TH3)

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

- (1) Remove the service panel. (See Figure 1)

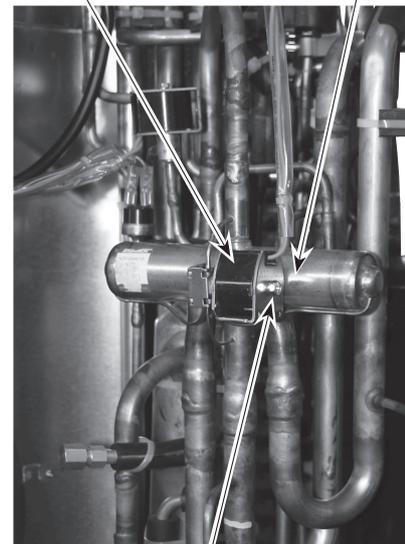
[Removing the 4-way valve coil]

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

Photo 9

4-way valve coil (21S4)

4-way valve



4-way valve coil
fixing screw

8. Removing the 4-way valve

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

Note 1: Recover refrigerant without spreading it in the air.

Note 2: The welded part can be removed easily by removing the side panel (R).

Note 3: When installing the four-way valve, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

OPERATING PROCEDURE

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

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Remove the cover panel (front). (Refer to procedure 8 (5))
- (4) Remove the cover panel (rear). (Refer to procedure 8 (6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (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) on the multi controller circuit board in the electrical parts box.
- (9) Remove the electrical parts box. (See Photo 4)
- (10) Recover refrigerant.
- (11) Remove the welded part of bypass valve.

Refer to the notes below.

10. Removing the high pressure switch (63H) and high pressure sensor (63HS)

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

Refer to the notes below.

11. Removing the low pressure sensor (63LS)

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

Refer to the notes below.

12. Removing electrical expansion valve (LEV-A, LEV-B)

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

Refer to the notes on the right.

PHOTOS

Photo 10

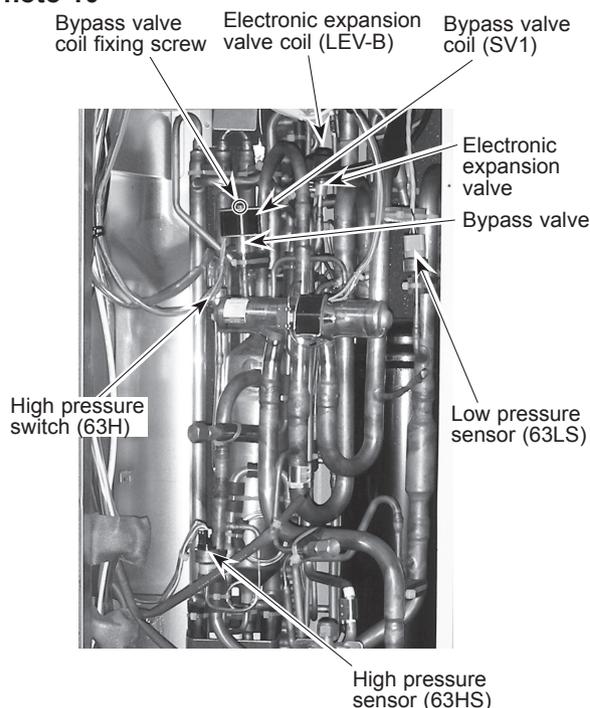
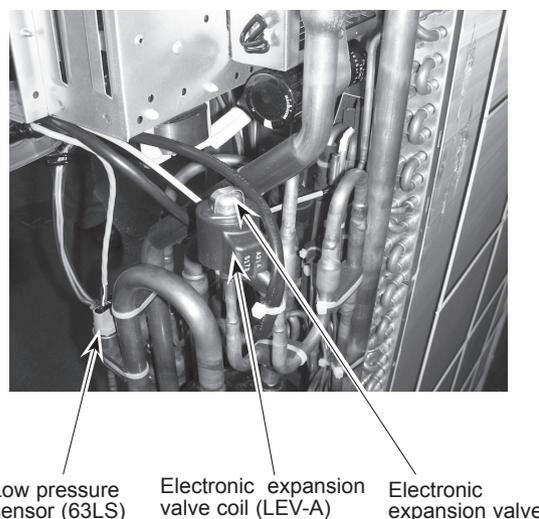


Photo 11



Notes:

1. Recover refrigerant without spreading it in the air.
2. The welded part can be removed easily by removing the side panel (R).
3. When installing the following parts, cover it with a wet cloth to prevent it from heating as the temperature below, then braze the pipes so that the inside of pipes are not oxidized;
 - Bypass valve (procedure 9), 248°F [120°C] or more
 - High pressure switch and high pressure sensor (procedure 10), 212°F [100°C] or more
 - Low pressure sensor (procedure 11), 212°F [100°C] or more
 - LEV (procedure 12), 248°F [120°C] or more

OPERATING PROCEDURE

13. Removing the compressor (MC)

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Remove 2 front cover panel fixing screws (5 × 12) and remove the front cover panel. (See Photo 3)
- (4) Remove front panel fixing screws, 5 (5x12) and 2 (4 x 10) and remove the front panel. (See Photo 3)
- (5) Remove 4 back cover panel fixing screws (5 × 12) and remove the back cover panel.
- (6) Remove the electrical parts box. (See Photo 4)
- (7) Remove the valve bed. (Refer to procedure 8 (4))
- (8) Remove the cover panel (front). (Refer to procedure 8 (5))
- (9) Remove the cover panel (rear). (Refer to procedure 8 (6))
- (10) Remove the right side panel. (Refer to procedure 8 (7))
- (11) Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 3)
- (12) Recover refrigerant.
- (13) Remove the 3 compressor fixing nuts for motor using spanner or adjustable wrench.
- (14) 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.

PHOTOS & ILLUSTRATION

Photo 13

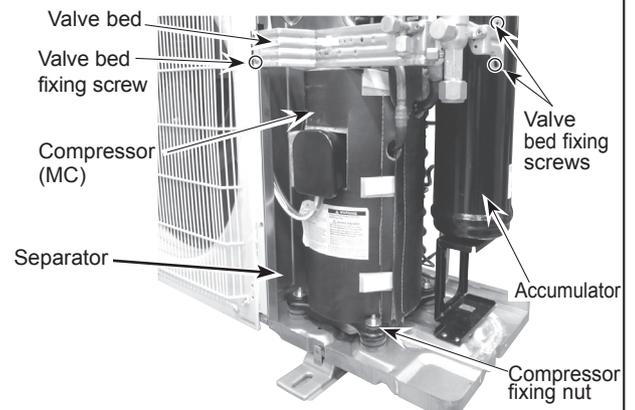
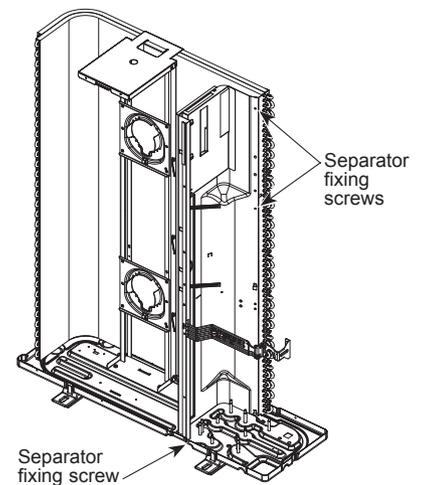


Figure 3



14. Removing the accumulator

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Remove the front cover panel. (Refer to procedure 13 (3))
- (4) Remove the back cover panel. (Refer to procedure 13 (5))
- (5) Remove the electrical parts box. (See Photo 4)
- (6) Remove the valve bed. (Refer to procedure 8 (4))
- (7) Remove the cover panel (front). (Refer to procedure 8 (5))
- (8) Remove the cover panel (rear). (Refer to procedure 8 (6))
- (9) Remove the side panel (R). (Refer to procedure 8 (7))
- (10) Recover refrigerant.
- (11) Remove 2 welded pipes of accumulator inlet and outlet.
- (12) Remove 2 accumulator leg fixing screws (4 × 10). (See Photo 15)

Note: Recover refrigerant without spreading it in the air.

Photo 14

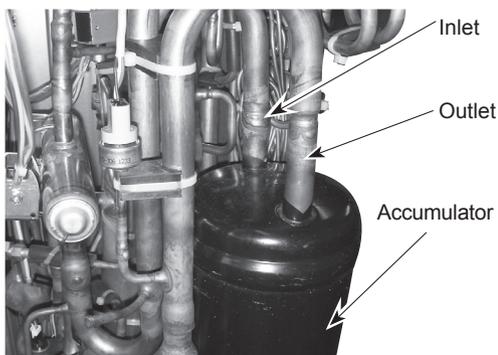
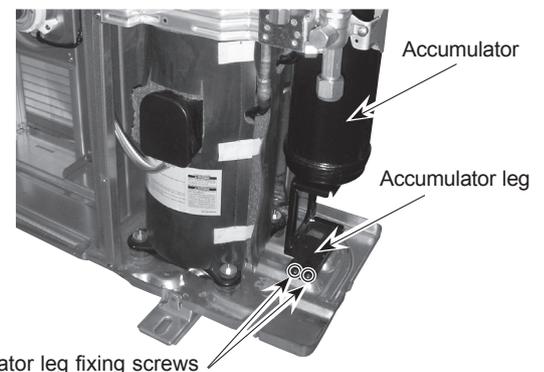


Photo 15



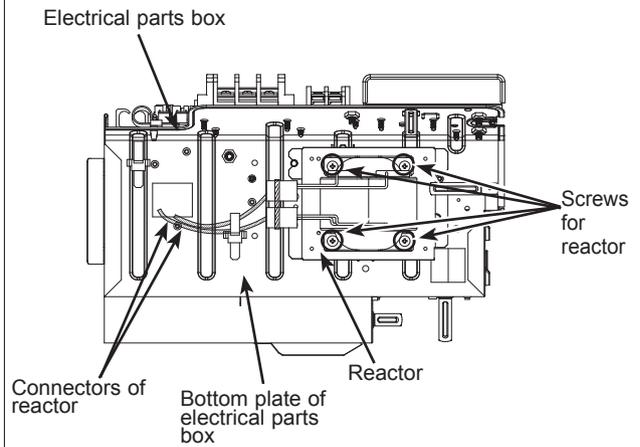
OPERATING PROCEDURE

15. Removing the reactor (DCL)

- (1) Remove the service panel. (See Figure 1)
- (2) Remove the top panel. (See Figure 1)
- (3) Remove the electrical parts box (See photo 4)
- (4) Remove 4 screws for reactor (4 x 10) to remove the reactor. (See Figure 4)

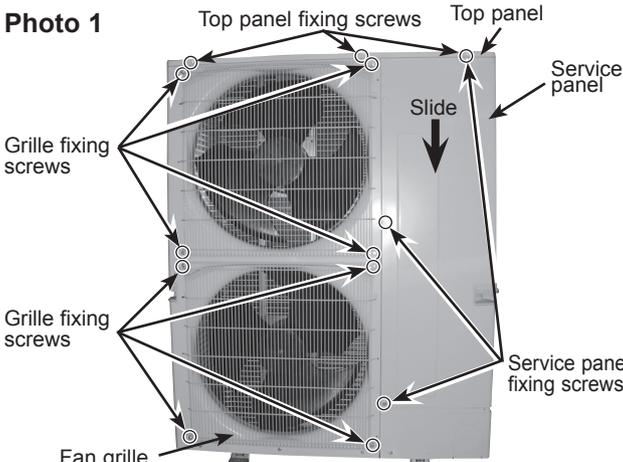
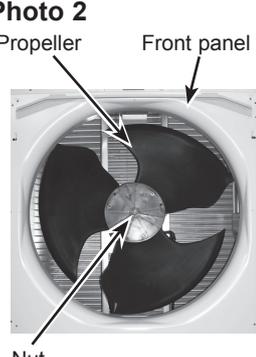
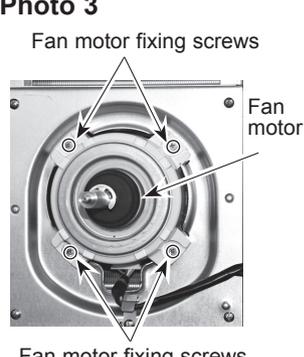
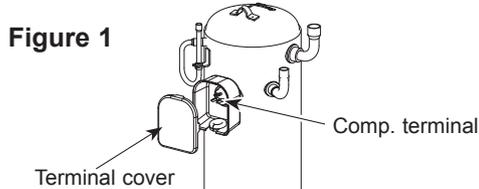
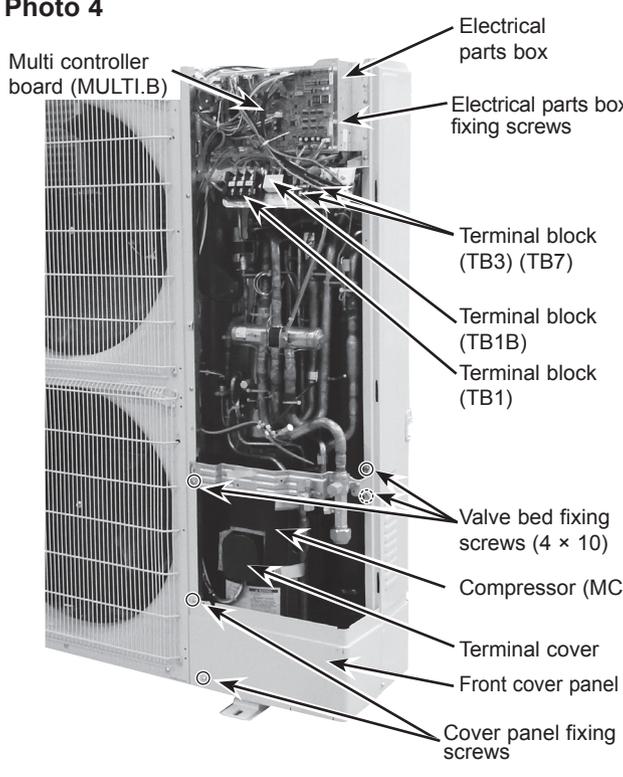
ILLUSTRATION

Figure 4

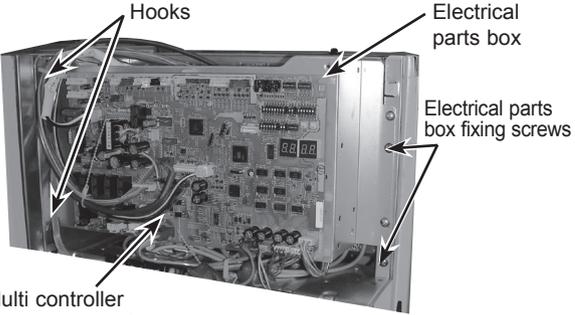
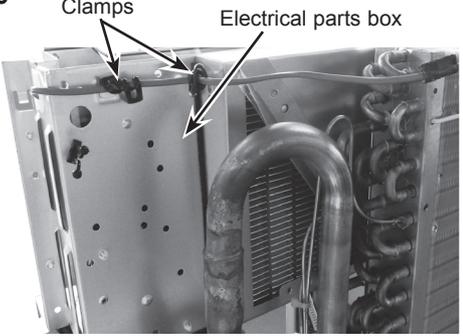
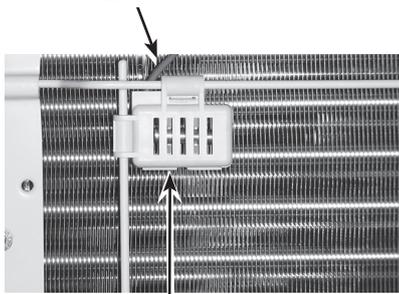


MXZ-8C60NA-U1

Note: Turn OFF the power supply before disassembly.

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the service panel and top panel</p> <p>(1) Remove 3 service panel fixing screws (5 × 12) and slide the hook on the right downward to remove the service panel.</p> <p>(2) Remove screws (3 for front, 3 for rear/5 × 12) of the top panel and remove it.</p>	<p>Photo 1</p> 
<p>2. Removing the fan motor (MF1, MF2)</p> <p>(1) Remove the service panel. (See Photo 1)</p> <p>(2) Remove 4 fan grille fixing screws (5 × 12) to detach the fan grille. (See Photo 1)</p> <p>(3) Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2.)</p> <p>(4) Disconnect the connectors, CNF1 and CNF2 on multi controller board in electrical parts box.</p> <p>(5) Remove 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3)</p> <p>Note1: Tighten the propeller fan with a torque of 5.7 ± 0.3 N·m [4.2 ± 0.2 ft = lbs]</p>	<p>Photo 2</p>  <p>Photo 3</p> 
<p>3. Removing the electrical parts box</p> <p>(1) Remove the service panel. (See Photo 1)</p> <p>(2) Remove the top panel. (See Photo 1)</p> <p>(3) Disconnect the connecting wire from terminal block. (See Photo 5)</p> <p>(4) Remove all the following connectors from outdoor multi controller circuit board;</p> <p><Diagram symbol in the connector housing></p> <ul style="list-style-type: none"> • Fan motor (CNF1, CNF2) • Thermistor <HIC pipe> (TH2) • Thermistor <Outdoor liquid pipe> (TH3) • Thermistor <Compressor> (TH4) • Thermistor <Suction pipe/Ambient, Outdoor> (TH7/6) • High pressure switch (63H) • High pressure sensor (63HS) • Low pressure sensor (63LS) • 4-way valve (21S4) • Bypass valve (SV1) • Electronic expansion valve (CNLVA/CNLVB) <p>Pull out the disconnected wire from the electrical parts box.</p> <p>(5) Remove the terminal cover and disconnect the compressor lead wire.</p> <p>Note: The terminal cover can be easily removed by using a blade of flathead screwdriver.</p> <p>Figure 1</p> 	<p>Photo 4</p> 

From the previous page.

OPERATING PROCEDURE	PHOTOS
<p>(6) Remove 2 electrical parts box fixing screws (4 × 10) then detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.</p>	<p>Photo 5</p>  <p>Hooks</p> <p>Electrical parts box</p> <p>Electrical parts box fixing screws</p> <p>Multi controller board (MULTI.B)</p>
<p>4. Removing the thermistor <Suction pipe> (TH6)</p> <ol style="list-style-type: none">(1) Remove the service panel. (See Photo 1)(2) Remove the top panel. (See Photo 1)(3) Disconnect the connectors, TH7/6 (red), on the multi controller circuit board in the electrical parts box.(4) Loosen the wire clamps on the back of electrical parts box.(5) Pull out the thermistor <Suction pipe> (TH6) from the sensor holder. <p>Note: When replacing thermistor <Suction pipe> (TH6), replace it together with thermistor <Ambient> (TH7) since they are combined together. Refer to procedure No.5 below to remove thermistor <Ambient> (TH7).</p>	<p>Photo 6</p>  <p>Clamps</p> <p>Electrical parts box</p>
<p>5. Removing the thermistor <Ambient> (TH7)</p> <ol style="list-style-type: none">(1) Remove the service panel. (See Photo 1)(2) Remove the top panel. (See Photo 1)(3) Disconnect the connector TH7/6 (red) on the multi controller circuit board in the electrical parts box.(4) Loosen the wire clamps on top of the electrical parts box. (See Photo 6.)(5) Pull out the thermistor <Ambient> (TH7) from the sensor holder. <p>Note: When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction pipe> (TH6), since they are combined together. Refer to procedure No.4 above to remove thermistor <Suction pipe> (TH6).</p>	<p>Photo 7</p>  <p>Thermistor <Low pressure saturated temp.> (TH6)</p> <p>Photo 8</p>  <p>Lead wire of thermistor <Ambient> (TH7)</p> <p>Sensor holder</p>

OPERATING PROCEDURE

6. Removing the thermistors

Thermistor <HIC> (TH2) and thermistor <Compressor> (TH4)

- (1) Remove the service panel. (See Photo 1)
- (2) Disconnect the connectors, TH2 (black) and TH4 (white), on the multi controller board in the electrical parts box.
- (3) Pull out the thermistor <HIC> (TH2) and thermistor <Compressor> (TH4) from the sensor holder. (See Photo 9-1)

Thermistor <Outdoor pipe> (TH3)

- (1) Remove the service panel. (See Photo 1)
- (2) Disconnect the connector, TH3 (white), on the Multi controller board in the electrical parts box.
- (3) Loosen the clamp for the lead wire on the bottom of the electrical parts box.
- (4) Pull out the thermistor <Outdoor pipe> (TH3) from the sensor holder. (See Photo 9-2)

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

- (1) Remove the service panel. (See Photo 1)

[Removing the 4-way valve coil]

- (2) Remove 4-way valve coil fixing screw (M4 × 6).
- (3) Remove the 4-way valve coil by sliding the coil toward you.
- (4) Disconnect the connector 21S4 (green) on the multi controller circuit board in the electrical parts box.

8. Removing the 4-way valve

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

Note 1: Recover refrigerant without spreading it in the air.

Note 2: The welded part can be removed easily by removing the right side panel.

Note 3: When installing the four-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.

PHOTOS

Photo 9-1

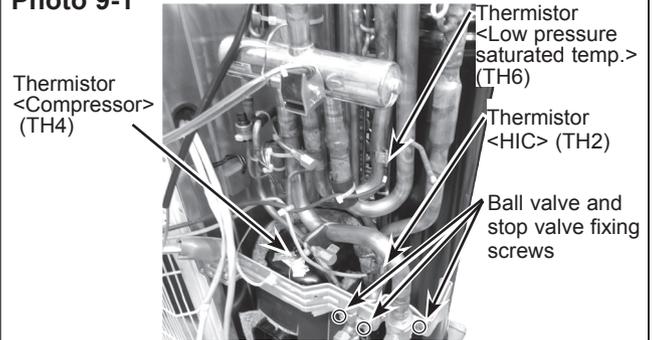


Photo 9-2

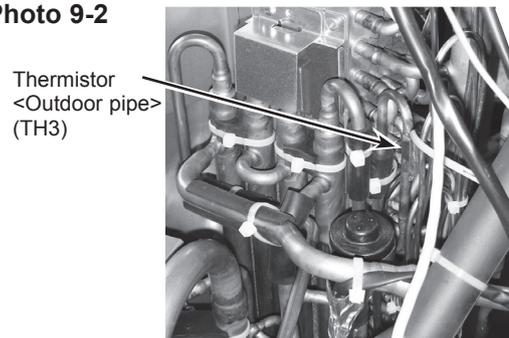


Photo 10



OPERATING PROCEDURE

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

- (1) Remove the service panel. (See Photo 1)
- (2) Remove the top panel. (See Photo 1)
- (3) Remove the cover panel (front). (Refer to procedure 8(5))
- (4) Remove the cover panel (rear) (Refer to procedure 8(6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (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) on the multi controller circuit board in the electrical parts box.
- (9) Remove the electrical parts box. (See Photo 5)
- (10) Recover refrigerant.
- (11) Remove the welded part of bypass valve.

Refer to the notes below.

10. Removing the high pressure switch (63H) and high pressure sensor (63HS)

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

Refer to the notes below.

11. Removing the 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). (Refer to procedure 8(5))
- (4) Remove the cover panel (rear) (Refer to procedure 8(6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (6) Disconnect the connector 63LS (blue) on 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 low pressure sensor.

Refer to the notes below.

12. Removing electronic 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). (Refer to procedure 8(5))
- (4) Remove the cover panel (rear) (Refer to procedure 8(6))
- (5) Remove the side panel (R). (Refer to procedure 8 (7))
- (6) Remove the electronic expansion valve coil. (See Photo 12)
- (7) Remove the electrical parts box. (See Photo 5)
- (8) Recover refrigerant.
- (9) Remove the welded part of electronic expansion valve.

PHOTOS

Photo 11

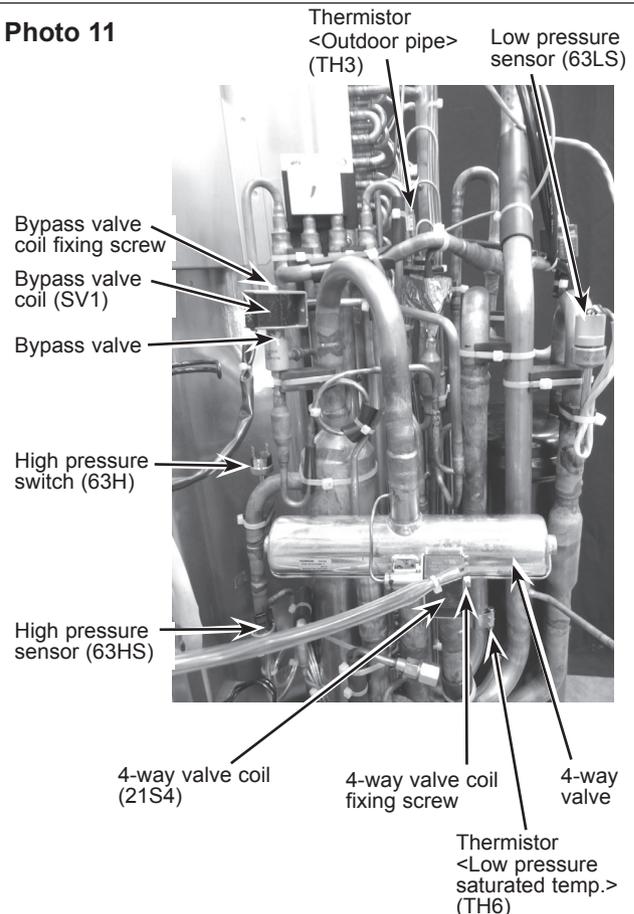
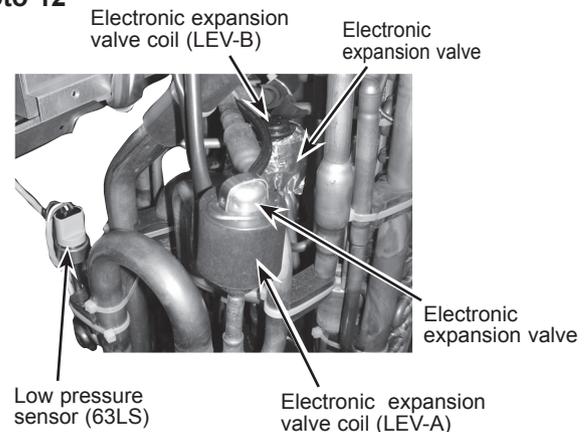


Photo 12



Notes:

1. Recover refrigerant without spreading it in the air.
2. The welded part can be removed easily by removing the right side panel.
3. When installing the following parts, cover it with a wet cloth to prevent it from heating as the temperature below, then braze the pipes so that the inside of pipes are not oxidized;
 - Bypass valve (procedure 9), 248°F [120°C] or more
 - High pressure switch and high pressure sensor (procedure 10), 212°F [100°C] or more
 - Low pressure sensor (procedure 11), 100°C or more
 - LEV (procedure 12), 248°F [120°C] or more

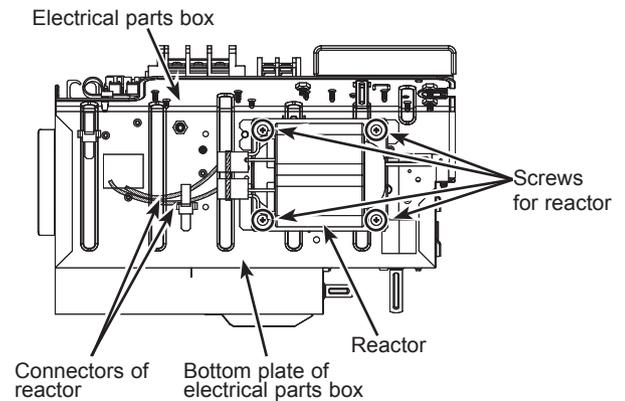
OPERATING PROCEDURE

13. Removing the reactor (DCL)

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

PHOTOS & ILLUSTRATION

Figure 2



14. Removing the compressor (MC)

- (1) Remove the service panel. (See Photo 1)
- (2) Remove the top panel. (See Photo 1)
- (3) Remove the electrical parts box. (See Photo 5)
- (4) Remove the valve bed. (Refer to procedure 8 (4))
- (5) Remove the cover panel (front). (Refer to procedure 8(5))
- (6) Remove the cover panel (rear) (Refer to procedure 8(6))
- (7) Remove the side panel (R). (Refer to procedure 8 (7))
- (8) Remove front panel fixing screws, 5 (5x12) and 2 (4 x 10) and remove the front panel. (See Photo 4)
- (9) Remove 3 separator fixing screws (4 x 10) and remove the separator. (See Figure 3)
- (10) Recover refrigerant.
- (11) Remove the 3 compressor fixing nuts using spanner or adjustable wrench.
- (12) 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.

Figure 3

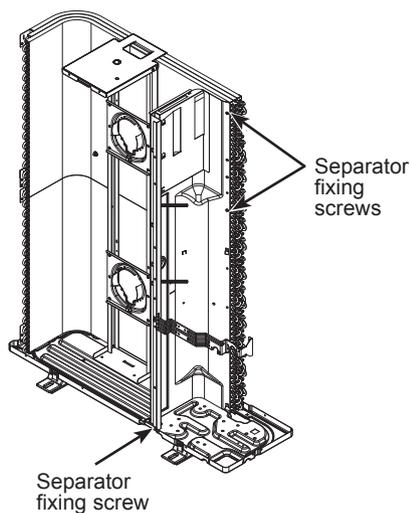


Photo 13

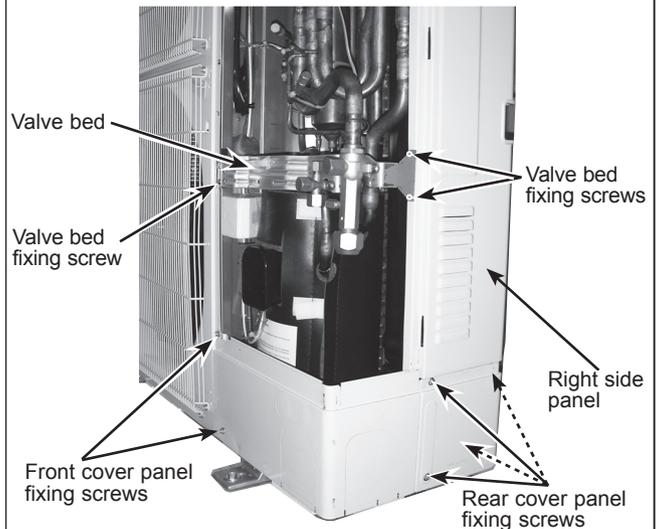
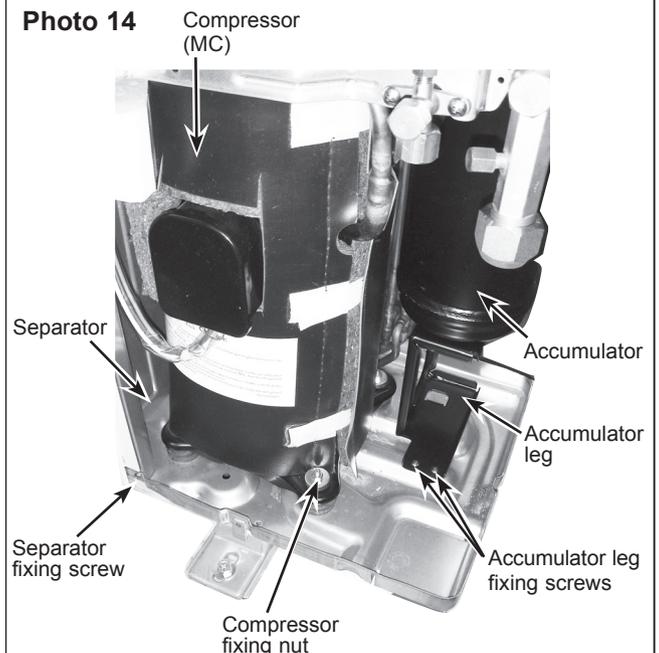


Photo 14



OPERATING PROCEDURE

15. Removing the accumulator

- (1) Remove the service panel. (See Photo 1)
- (2) Remove the top panel. (See Photo 1)
- (3) Remove the electrical parts box. (See Photo 5)
- (4) Remove the valve bed. (See procedure 8 (4))
- (5) Remove the cover panel (front). (Refer to procedure 8(5))
- (6) Remove the cover panel (rear) (Refer to procedure 8(6))
- (7) Remove the side panel (R). (Refer to procedure 8 (7))
- (8) Recover refrigerant.
- (9) Remove 2 welded pipes of accumulator inlet and outlet.
- (10) Remove 2 accumulator leg fixing screws (4 × 10). (See Photo 16)

Note: Recover refrigerant without spreading it in the air.

PHOTOS

Photo 15

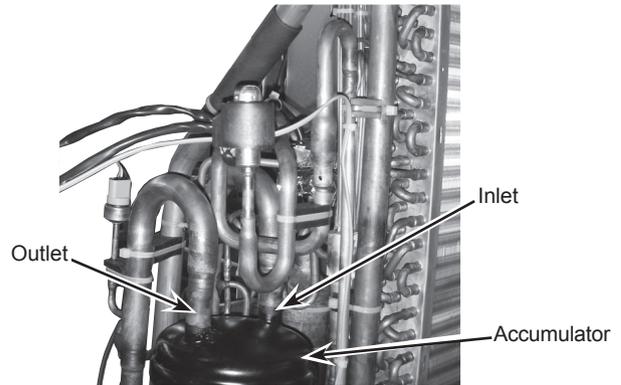
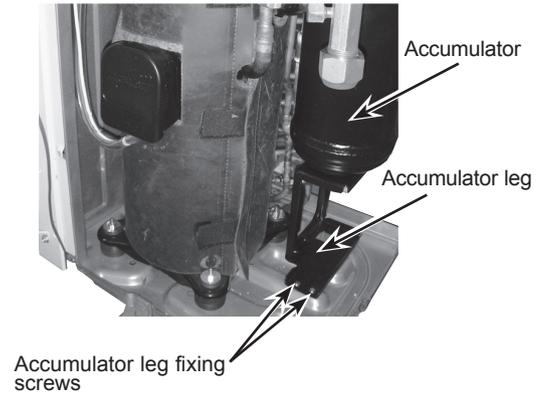
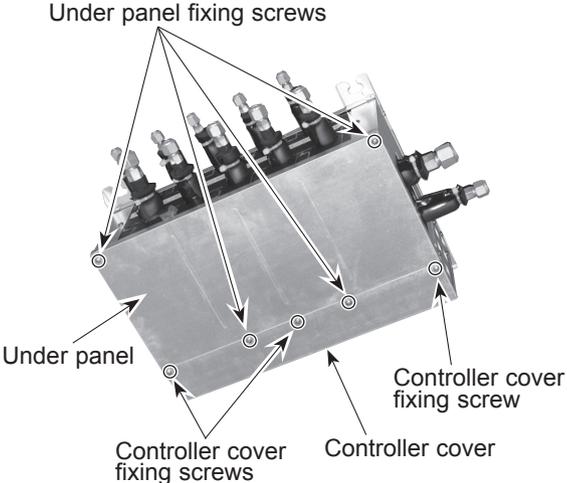
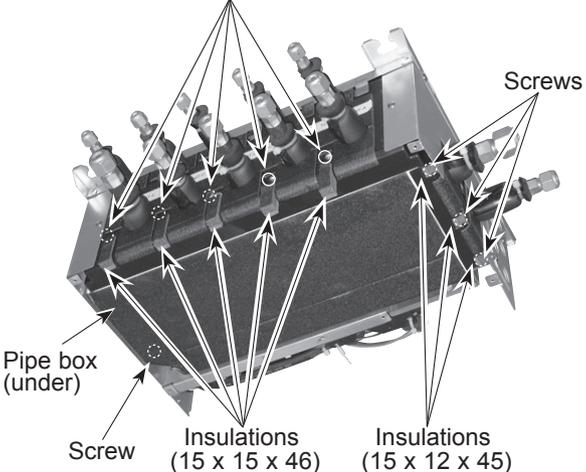
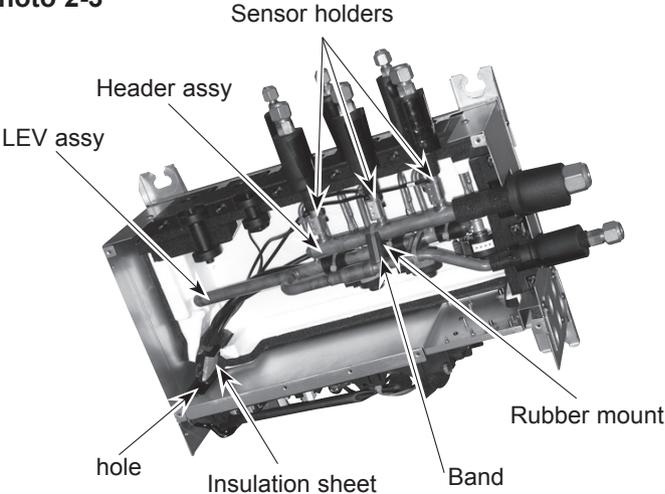
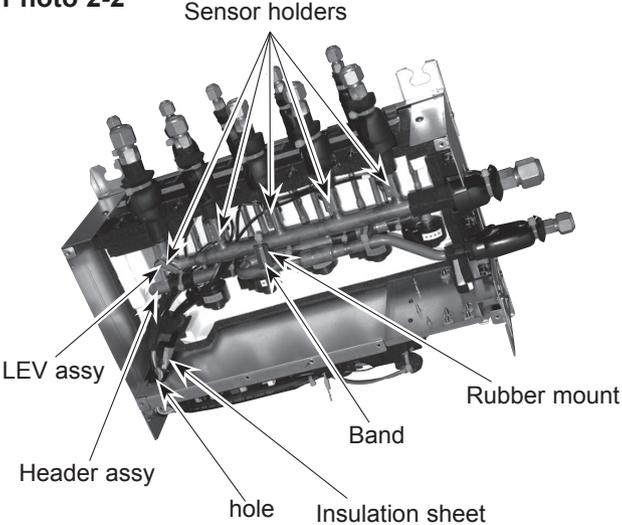


Photo 16



10-2. BRANCH BOX: PAC-MKA50BC PAC-MKA51BC PAC-MKA30BC PAC-MKA31BC
PHOTO: PAC-MKA50/51BC

OPERATING PROCEDURE	PHOTOS
<p>1. Removing the controller cover and under panel</p> <p>(1) Remove 3 controller cover fixing screws (4 × 10) to detach the controller cover. (See Photo 1)</p> <p>(2) Remove 4 under panel fixing screws (4 × 10) to remove the under panel. (See Photo 1)</p>	<p>Photo 1</p>  <p>Under panel fixing screws</p> <p>Under panel</p> <p>Controller cover fixing screw</p> <p>Controller cover fixing screws</p> <p>Controller cover</p>
<p>2. Removing the thermistor (TH-A-E*)</p> <p>(1) Remove the controller cover. (See Photo 1)</p> <p>(2) Remove the under panel. (See Photo 1)</p> <p>(3) Remove 8 insulations, then remove 9 pipe box (under) fixing screws (4 × 10). (See Photo 2-1)</p> <p>(4) Pull out the thermistor(s), TH-A-E, from the sensor holders mounted on the gas pipe. (See Photo 2-2)</p> <p>(5) Loosen the insulation sheet which bundles the thermistor connectors.</p> <p>(6) Loosen the side clamps, then disconnect the connector(s) on the controller board.</p> <p>(7) Pull out the lead wire(s) through the hole to the controller board side.</p> <p>*TH-A-C for PAC-MKA30/31BC. (See Photo 2-3)</p>	<p>Photo 2-1</p>  <p>Pipe box (under) fixing screws</p> <p>Screws</p> <p>Pipe box (under)</p> <p>Screw</p> <p>Insulations (15 x 15 x 46)</p> <p>Insulations (15 x 12 x 45)</p>
<p>Photo 2-3</p>  <p>Sensor holders</p> <p>Header assy</p> <p>LEV assy</p> <p>hole</p> <p>Insulation sheet</p> <p>Band</p> <p>Rubber mount</p>	<p>Photo 2-2</p>  <p>Sensor holders</p> <p>LEV assy</p> <p>Header assy</p> <p>hole</p> <p>Insulation sheet</p> <p>Band</p> <p>Rubber mount</p>

OPERATING PROCEDURE

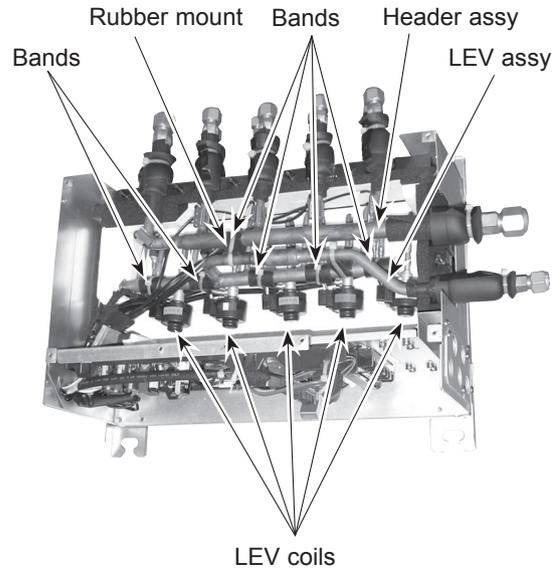
3. Removing the LEV coil (LEV-A-E*)

- (1) Remove the controller cover. (See Photo 1)
- (2) Remove the under cover. (See Photo 1)
- (3) Remove 8 insulations, then remove 9 pipe cover fixing screws (4 x 10). (See Photo 2-1)
- (4) Cut the bands that fixes the lead wire, then pull out the LEV coil(s) (LEV-A-E*). (See Photo 3)
- (5) Loosen the insulation sheet which bundles the LEV lead wires.
- (6) Loosen the side clamps, then disconnect the connector(s) on the controller board.
- (7) Pull out the lead wire(s) through the hole to the controller board side.
(See Photo 2-2 or 2-3)

*LEV-A-C for PAC-MKA30/31BC. (See Photo 2-3)

PHOTOS

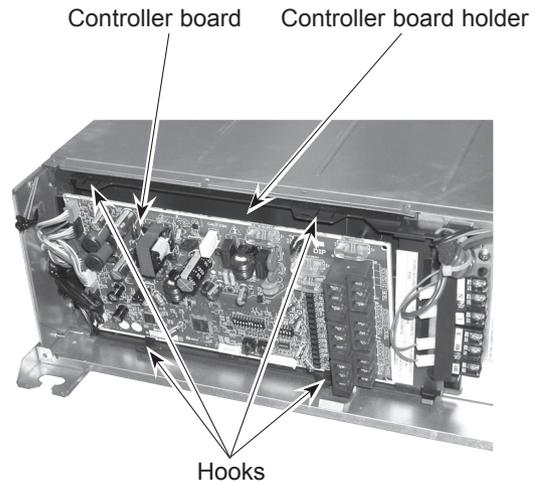
Photo 3



4. Removing the controller board

- (1) Remove the controller cover. (See Photo 1)
- (2) Loosen the side clamps, then disconnect the connectors on the controller board.
- (3) Pick an upper edge of the controller board, then pull forward. The controller board is fixed to the controller board holder with 4 hooks. (See Photo 4)
- (4) Remove the controller board from the controller board holder.

Photo 4



OPERATING PROCEDURE

5. Removing the LEV assy

- (1) Remove the controller cover. (See Photo 1)
- (2) Remove the under panel. (See Photo 1)
- (3) Remove 8 the insulations, then remove 9 pipe cover fixing screws (4 x 10). (See Photo 2-1)
- (4) Loosen the side clamps, then disconnect the LEV connectors on the controller board.
- (5) Pull out the lead wires through the hole to the controller board side.

<Removing the header assy>

- (6) Cut the band which fixes the header assy and LEV assy together, then remove the rubber mount. (See Photo 3)
- (7) Remove the header assy. (See Photo 5-1)

<Disassembling the pipe box>

- (8) Remove 2 side panel fixing screws (4 x 10). (See Photo 5-1)
- (9) Pull out the pipe box (top) and separate it from the side panel. (See Photo 5-2)
- (10) Turn the pipe box (top) upside down. (See Photo 5-3).
- (11) Remove 5 insulations, then remove 5 pipe box (top) fixing screws (4 x 10).
- (12) Turn the pipe box (top) upside down again, facing the pipe side up.
- (13) Separate the pipe box (center) from the pipe box (top). (See Photo 5-4.)
- (14) Remove the LEV assy.

<Pipe box cap only for PAC-MKA30/31BC>

The pipe box caps are placed in 2 unused pipe holes between the pipe box top, center and under. (See Photo 5-5)

Photo 5-4

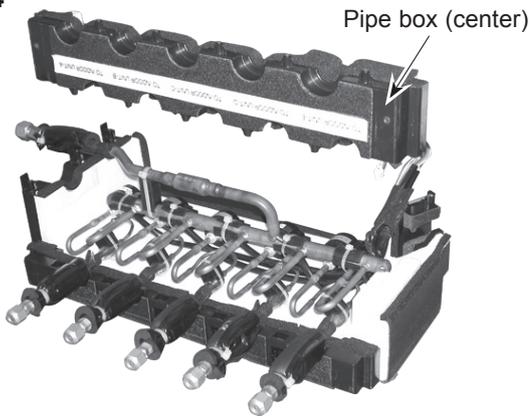
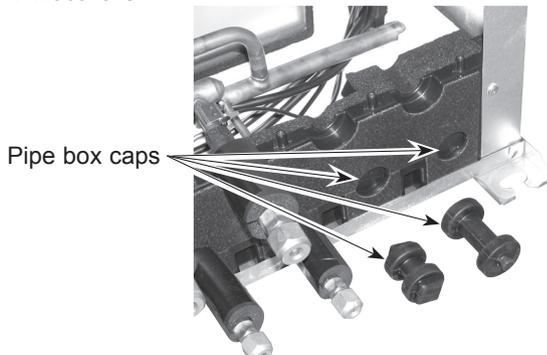


Photo 5-5



PHOTOS

Photo 5-1

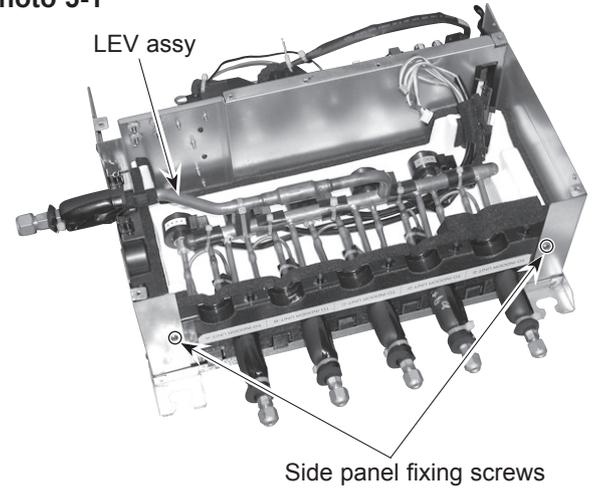


Photo 5-2

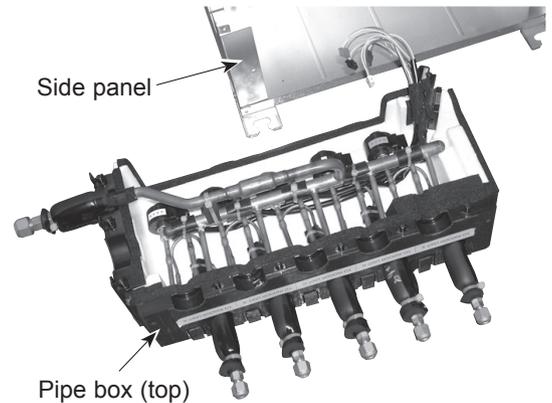
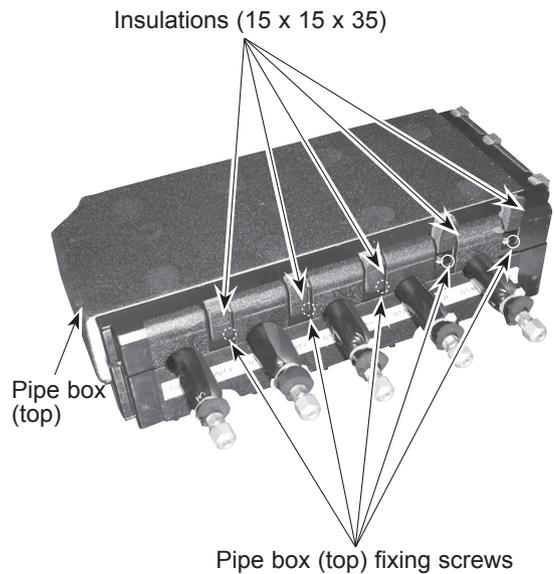


Photo 5-3



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