MITSUBISHI ELECTRIC

HFC utilized R410A

June 2022
OCH790

SERVICE MANUAL

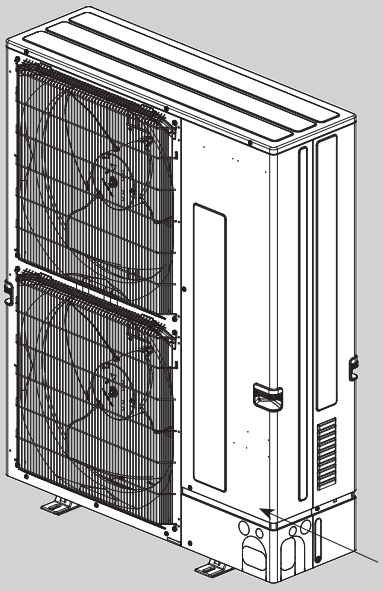
<Outdoor unit>

Model name

PUMY-P112VKM6 PUMY-P112VKM6-ER
PUMY-P125VKM6 PUMY-P125VKM6-ER
PUMY-P140VKM6 PUMY-P140VKM6-ER
PUMY-P112YKM5 PUMY-P112YKM5-ER
PUMY-P125YKM5 PUMY-P125YKM5-ER
PUMY-P140YKM5 PUMY-P140YKM5-ER

Salt proof model

PUMY-P112VKM6-BS PUMY-P112VKM6-ERBS
PUMY-P125VKM6-BS PUMY-P125VKM6-ERBS
PUMY-P140VKM6-BS PUMY-P140VKM6-ERBS
PUMY-P112YKM5-BS PUMY-P112YKM5-ERBS
PUMY-P125YKM5-BS PUMY-P125YKM5-ERBS
PUMY-P140YKM5-BS PUMY-P140YKM5-ERBS



Model name indication

Appendix: Installation manual (Exerpt of English Ver.)

PARTS CATALOG (OCB790)

CITY MULTI

1 SERVICE REF.

PUMY-P112VKM6
PUMY-P112VKM6-ER
PUMY-P125VKM6
PUMY-P125VKM6-ER
PUMY-P140VKM6
PUMY-P140VKM6-ER

PUMY-P112YKM5
PUMY-P112YKM5-ER
PUMY-P125YKM5
PUMY-P125YKM5-ER
PUMY-P140YKM5
PUMY-P140YKM5-ER

PUMY-P112VKM6-BS
PUMY-P112VKM6-ERBS
PUMY-P125VKM6-BS
PUMY-P125VKM6-ERBS
PUMY-P140VKM6-BS
PUMY-P140VKM6-ERBS

PUMY-P112YKM5-BS
PUMY-P112YKM5-ERBS
PUMY-P125YKM5-BS
PUMY-P125YKM5-ERBS
PUMY-P140YKM5-BS
PUMY-P140YKM5-ERBS

2 SAFETY PRECAUTION

2-1. Cautions related to new refrigerant

■ **Cautions for units utilizing refrigerant R410A**

Preparation before the repair service

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the air conditioner, turn off the power-supply breaker.
- Discharge the condenser before the work involving the electric parts.

Precautions during the repair service

- Do not perform the work involving the electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigerating cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.
- When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.

Use new refrigerant pipes.

- Avoid using thin pipes.

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

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

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

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

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

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

Charge refrigerant from liquid phase of refrigerant cylinder.

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

Do not use refrigerant other than R410A.

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

Use a vacuum pump with a reverse flow check valve.

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

Use the following tools specifically designed for use with R410A refrigerant.

- The following tools are necessary to use R410A refrigerant.

Tools 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.

Do not use a charging cylinder.

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

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

Use the specified refrigerant only.

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

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

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

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

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

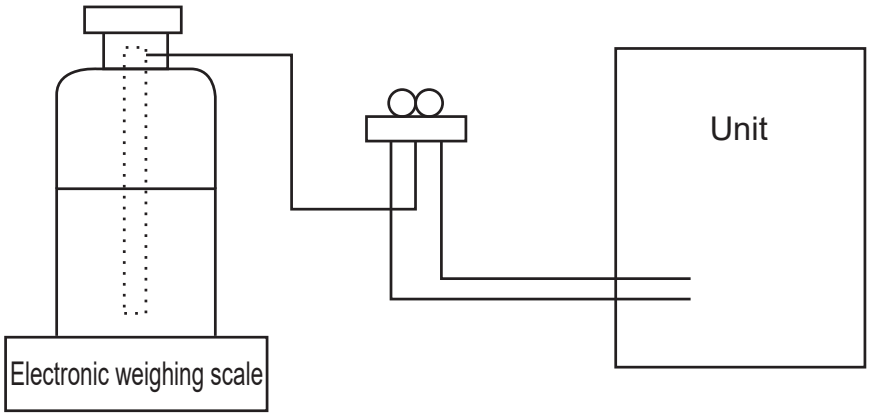
2-1-1. Cautions for service

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

2-1-2. Additional refrigerant charge

When charging directly from cylinder

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



2-1-3. Service tools

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

No.	Tool name	Specifications
1	Gauge manifold	Only for R410A
		Use the existing fitting specifications. (UNF1/2)
		Use high-tension side pressure of 5.3MPa·G or over.
2	Charge hose	Only for R410A
		Use pressure performance of 5.09MPa·G or over.
3	Electronic weighing scale	–
4	Gas leak detector	Use the detector for R134a, R407C or R410A.
5	Adaptor for reverse flow check	Attach on vacuum pump.

No.	Tool name	Specifications
6	Refrigerant charge base	–
7	Refrigerant cylinder	Only for R410A
		Top of cylinder (Pink)
		Cylinder with syphon
8	Refrigerant recovery equipment	–

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

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

- Avoid installing the unit in a location where it will be exposed directly to seawater or sea breeze.
- If the cover panel may become covered with salt, be sure to install the unit in a location where the salt will be washed away by rainwater. (If a sunshade is installed, rainwater may not clean the panel.)
- To ensure that water does not collect in the base of the outdoor unit, make sure that the base is level, not at angle. Water collecting in the base of the outdoor unit could cause rust.
- If the unit is installed in a coastal area, clean the unit with water regularly to remove any salt build-up.
- If the unit is damaged during installation or maintenance, be sure to repair it.
- Be sure to check the condition of the unit regularly.
- Be sure to install the unit in a location with good drainage.

2-2-1. Cautions for refrigerant piping work

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

■ Thickness of pipes

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

Piping diameter and thickness

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

■ Dimensions of flare cutting and flare nut

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

Flare cutting dimensions

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

Flare nut dimensions

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

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

Tools and materials	Use	R410A tools	Can R22 tools be used ?	Can R407C tools be used ?
Gauge manifold	Air purge, refrigerant charge and operation check	Tool exclusive for R410A	×	×
Charge hose		Tool exclusive for R410A	×	×
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R410A	×	×
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R410A	×	×
Applied oil	Apply to flared section	Ester oil, ether oil and alkylbenzene oil (minimum amount)	×	Ester oil, ether oil: ○ Alkylbenzene oil: minimum amount
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R410A	×	×
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R410A	×	×
Vacuum pump	Vacuum drying and air purge	Tools for other refrigerants can be used if equipped with adopter for reverse flow check	△ (Usable if equipped with adopter for reverse flow)	△ (Usable if equipped with adopter for reverse flow)
Flare tool*	Flaring work of piping	Tools for other refrigerants can be used by adjusting flaring dimension	△ (Usable by adjusting flaring dimension)	△ (Usable by adjusting flaring dimension)
Bender	Bend the pipes	Tools for other refrigerants can be used	○	○
Pipe cutter*	Cut the pipes	Tools for other refrigerants can be used	○	○
Welder and nitrogen gas cylinder	Weld the pipes	Tools for other refrigerants can be used	○	○
Refrigerant charging scale	Refrigerant charge	Tools for other refrigerants can be used	○	○
Vacuum gauge or thermistor vacuum gauge and vacuum valve	Check the degree of vacuum. (Vacuum valve prevents back flow of oil and refrigerant to thermistor vacuum gauge)	Tools for other refrigerants can be used	○	○
Charging cylinder	Refrigerant charge	Tool exclusive for R410A	×	–

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

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

3 OVERVIEW OF UNITS

3-1. System construction

Outdoor unit	Horsepower	4.5 HP	5 HP	6 HP
	Model name	P112	P125	P140
Applicable indoor unit	Capacity class	10 to 140		
	Number of units	1 to 9	1 to 10	1 to 12
	Total system capacity range	50 to 130% of outdoor unit capacity*1 *2		

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

Connectable indoor unit lineup

Model type		Model name	10	15	20	25	32	40	50	63	71	80	100	125	140
Cassette ceiling	2 by 2	PLFY-P·VFM-E		●	●	●	●	●	●						
	2-way flow	PLFY-P·VLMD-E			●	●	●	●	●	●		●	●	●	
	4-way flow	PLFY-P·VEM-E			●	●	●	●	●	●		●	●	●	
		PLFY-M·VEM6-E			●	●	●	●	●	●	●	●	●	●	
		PLFY-M·VEM-E			●	●	●	●	●	●		●	●	●	
	1-way flow	PMFY-P·VBM-E			●	●	●	●							
Ceiling concealed		PEFY-P·VMA(L)-E/E2			●	●	●	●	●	●	●	●	●	●	●
		PEFY-P·VMA(L)-E3/E4			●	●	●	●	●	●	●	●	●	●	●
		PEFY-P·VMHS-E						●	●	●	●	●	●	●	●
		PEFY-P·VMR-E-L/R			●	●	●								
		PEFY-M·VMA-A1			●	●	●	●	●	●	●	●	●	●	●
Wall mounted		PKFY-P·VLM-E	●	●	●	●	●	●	●						
		PKFY-P·VKM-E								●			●		
Ceiling suspended		PCFY-P·VKM-E						●		●			●	●	
Floor standing	Exposed	PFFY-P·VLEM-E			●	●	●	●	●	●					
		PFFY-P·VKM-E			●	●	●	●							
	Concealed	PFFY-P·VLRM(M)-E			●	●	●	●	●	●					
		PFFY-P·VCM-E			●	●	●	●	●	●					
Ceiling concealed	Fresh air*3	PEFY-P·VMHS-E-F												●	
Lossnay		GUF·RD(H)4*4							●				●		
Air to Water unit*2		PWFY-P·VM-E1/E2-AU											●		

CONNECTION KIT
PAC-LV11M-J

M series indoor unit*5, *6
MSZ-SF·VA/VE series
MSZ-EF·VE/VG(K) series
MSZ-FH·VE series
MFZ-KJ·VE series
MFZ-KT·VG series
MFXZ-KW·VG series
MSZ-LN·VG(2) series
MSZ-AP·VG(K) series
MSZ-AP·VF series

Wireless remote controller

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

*1. When the indoor unit of Fresh Air type is connected with the outdoor unit, the maximum connectable total indoor unit capacity is 110%.
*2. When connecting PWFY series (Note that the connection is not allowed inside EU countries and the UK.)
Only 1 PWFY-P100VM-E-AU can be connected. PWFY-P200VM-E-AU and PWFY-P100VM-E-BU cannot be connected.
The PWFY unit cannot be the only unit connected to an outdoor unit. Select an indoor unit so that the total rated capacity of the indoor units, excluding the PWFY unit, is 50 to 100% of the outdoor unit capacity.
*3. PUMY is connectable to Fresh Air type indoor unit.
It is possible to connect 1 Fresh Air type indoor unit to 1 outdoor unit. (1:1 system)
Operating temperature range (outdoor temperature) for fresh air type indoor units differ from other indoor units.
Refer to "3-4-3. Operating temperature range".
*4. Do not connect Lossnay remote controller(s). (PZ-61DR-E, PZ-60DR-E, PZ-52SF-E, PZ-43SMF-E)
*5. When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT.
*6. The CONNECTION KIT cannot be connected to the indoor unit whose model name is 60 or larger and LN 18.

3-2. System construction (Branch box system)

Outdoor unit	Horsepower	4.5 HP	5 HP	6 HP
	Model name	P112	P125	P140
Applicable indoor unit	Capacity class	15 to 100		
	Number of units	2 to 8		
	Total system capacity range*1	50 to 130% of outdoor unit capacity	50 to 130% of outdoor unit capacity	50 to 130% of outdoor unit capacity
		6.3 to 16.2 kW	7.1 to 18.2 kW	8.0 to 20.2 kW
Branch box that can be connected	Number of units*1	1 to 2		

*1. When connecting ecodan unit(s), the total capacity of connected Air to Air indoor units is up to 130% of the outdoor unit. (Air to Air 130% + ecodan). However, when operating Air to Air indoor unit(s) in heating mode and ecodan unit(s) in DHW or heating mode at the same time, the total capacity of connected Air to Air units is below:
PUMY-P112: 1.3 kW, PUMY-P125: 2.8 kW, PUMY-P140: 4.3 kW
However, the following combinations can be connected:
PUMY-P112: MSZ-SF15VA or MSZ-AP15VF × 1
PUMY-P125: MSZ-SF15VA or MSZ-AP15VF × 2
PUMY-P140: MSZ-SF15VA or MSZ-AP15VF × 3

↓

Connectable indoor unit lineup (Heat pump inverter type)														
Model type		Model name	15	18	20	22	25	35	42	50	60	71	80	100
Wall mounted	Deluxe	MSZ-RW·VG					●	●						
		MSZ-FH·VE					●	●		●				
		MSZ-LN·VG(2)					●	●		●				
	Standard	MSZ-GF·VE									●	●		
		MSZ-SF·VE					●	●	●	●				
		MSZ-AP·VG-E1/E6					●	●	●	●				
		MSZ-AP·VG(K)-E2/E3/E7					●	●	●	●				
		MSZ-EF·VE		●		●	●	●	●	●				
		MSZ-EF·VG-E1/E2		●		●	●	●	●	●				
		MSZ-EF·VGK-E1		●		●	●	●	●	●				
	Compact	MSZ-SF·VA	●		●									
		MSZ-AP·VF	●		●									
		MSZ-AP·VG-E3	●		●									
		MSZ-AP·VGK-E2	●		●									
Ceiling concealed	Low static pressure	SEZ-KD·VA(L)					●	●		●	●	●		
		SEZ-M·DA(L)					●	●		●	●	●		
		SEZ-M·DA(L)2						●		●	●	●		
	Middle static pressure	PEAD-RP·JA(L)Q(.UK)								●	●	●		●
		PEAD-M·JA(L)								●	●	●		●
		PEAD-M·JA(L)2								●	●	●		●
4-way ceiling cassette	2 by 2 type	SLZ-KF·VA2					●	●		●				
		SLZ-M·FA	●				●	●		●				
		SLZ-M·FA2	●				●	●		●				
	Standard	PLA-RP·EA(.UK)						●		●	●	●		●
		PLA-M·EA						●		●	●	●		●
		PLA-M·EA2						●		●	●	●		●
Ceiling suspended		PCA-RP·KAQ						●		●	●	●		●
		PCA-M·KA						●		●	●	●		●
		PCA-M·KA2						●		●	●	●		●
Floor standing		MFZ-KJ·VE2					●	●		●				
		MFZ-KT·VG					●	●		●				
1-way ceiling cassette		MLZ-KA·VA					●	●		●				
		MLZ-KP·VF					●	●		●				

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

Connectable ecodan unit	
Model type	Model name
Cylinder Unit	EHST20C series (except EHST20C-MEC)
Hydrobox	EHSC series (except EHSC-MEC)

Note:
- Only 1 Cylinder Unit or Hydrobox can be connected.

Branch box	PAC-MK53/54BC PAC-MK53BCB	PAC-MK33/34BC PAC-MK33BCB
Number of branches (Indoor unit that can be connected)	5 (MAX. 5 units)	3 (MAX. 3 units)

Note:
- A maximum of 2 branch boxes can be connected to 1 outdoor unit.
- PAC-MK31/51BC(B) cannot use for connecting a Cylinder Unit or a Hydrobox.

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

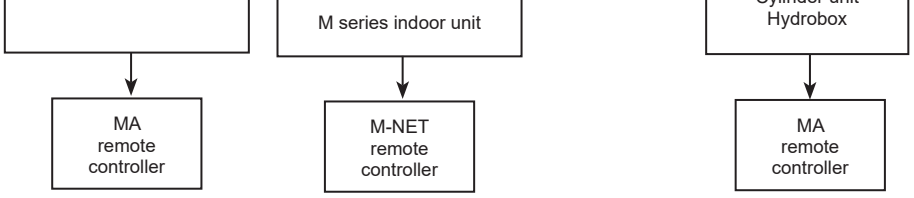
Option	Optional accessories of indoor units and outdoor units are available.

3-3. System construction (Mixed system)

Outdoor unit		Model name	P112		P125		P140	
Applicable indoor unit	Capacity class	CITY MULTI indoor unit*4*5	15 to 140					
		Via branch box	15 to 100					
	Number of units*1		Via branch box	CITY MULTI indoor	Via branch box	CITY MULTI indoor	Via branch box	CITY MULTI indoor
		1 branch box	5	5	5	5	5	5
		2 branch boxes	7 or 8*2	3 or 2*2	8	3	8	3
	Total system capacity range*1		6.3 to 16.2 kW		7.1 to 18.2 kW		8.0 to 20.2 kW	
			50 to 130% of outdoor unit capacity					

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

Branch box	PAC-MK5*BC	PAC-MK3*BC
Number of branches	5 (MAX. 5 units)	3 (MAX. 3 units)



*1. When connecting ecodan unit, the total capacity of connected Air to Air indoor units is up to 130% of the outdoor unit (Air to Air 130% + ecodan). However, when operating Air to Air indoor unit(s) in heating mode and ecodan unit in DHW or heating mode at the same time, the maximum connectable Air to Air indoor unit is below.

Model name	ATA total capacity	Can be exceptionally connected
P112	1.3 kW	MSZ-SF15VE or MSZ-AP15VF × 1
P125	2.8 kW	MSZ-SF15VE or MSZ-AP15VF × 2
P140	4.3 kW	MSZ-SF15VE or MSZ-AP15VF × 3

*2. When connecting 7 indoor units via branch box, connectable CITY MULTI indoor units are 3; connecting 8 indoor units via branch box, connectable CITY MULTI indoor units are 2.
*3. Refer to “3-1. System construction” or “3-2. System construction (Branch box system)”, for more detail.
*4. PKFY-P10/15/20/25/32VLM, PFFY-P*VKM, PFFY-P*VCM, PFFY-P*VL* type indoor units cannot be used with Mixed system.
*5. PEFY-P*VMHS-E-F can be connected within the total rated capacity and maximum number of connected units.

3-4. System Specifications

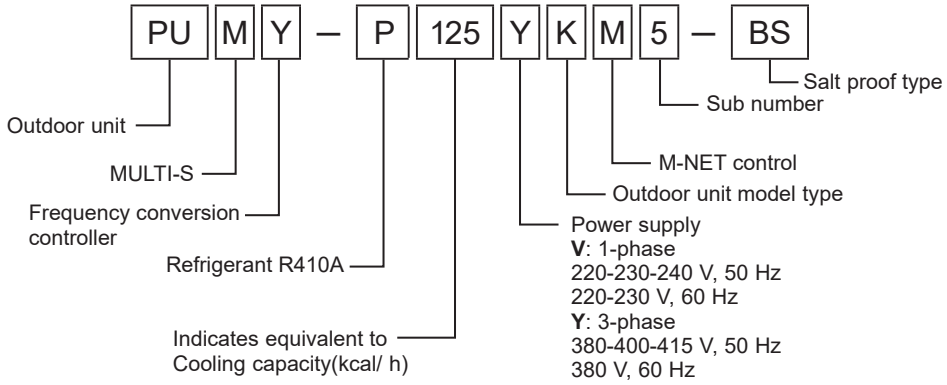
3-4-1. Outdoor Unit

Outdoor unit	Model name	P112	P125	P140
Capacity	Cooling (kW)	12.5	14.0	15.5
	Heating (kW)	14.0	16.0	18.0

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

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

■ Outdoor unit <When using model 125>



3-4-3. Operating temperature range

	Cooling	Heating
Indoor intake air temperature	W.B. 15 to 24°C	D.B. 15 to 27°C
Outdoor intake air temperature	D.B. −5 to 52°C[*1]	W.B. −20 to 15°C

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

*1. 10 to 52°C D.B.:When connecting PKFY-P10/15/20/25/32VLM, PFFY-P20/25/32VKM, PFFY-P20/25/32VCM, PFFY-P20/25/32VLEM, PFFY-P20/25/32VLRM(M), and M series, S series, and P series type indoor unit.

■ When connecting fresh air type indoor unit

PEFY-P·VMHS-E-F

	Cooling	Heating
Indoor and outdoor intake air temperature	D.B. 17 to 43°C[*2] W.B. 15.5 to 35°C	D.B. -5 to 20°C[*3]

*2. Thermo-OFF (FAN-mode) automatically starts if the outdoor temp. is lower than 17°C D.B.
*3. Thermo-OFF (FAN-mode) automatically starts if the outdoor temp. is higher than 21°C D.B.

■ When connecting PWFY unit

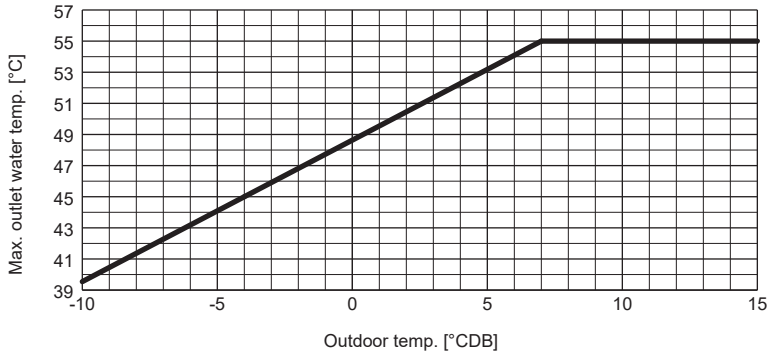
	Cooling	Heating
Indoor intake water temperature	—[*4]	D.B. 10 to 45°C
Outdoor intake air temperature	—[*4]	W.B. -20 to 15°C

*4. PWFY series can operate in Heating mode but not in Cooling mode. An indoor unit other than that of PWFY series can operate in Cooling mode.
A PWFY series and other series cannot operate simultaneously.
The operation of PWFY series takes precedence over other series. While a PWFY series is operating, other series do not operate.
The set temperature on the remote controller represents the target temperature of the outlet water.

■ When connecting Cylinder Unit or Hydrobox

	Cooling	DHW only	ATW Heating only	DHW + ATA Heating[*5]	ATW Heating + ATA Heating[*5]
Outlet water temperature	—[*6]	55°C Max.	55°C Max.	55°C Max.	45 to 55°C Max.
Outdoor temperature	—[*6]	−20 to 35°C	−20 to 21°C	7 to 35°C	−10 to 35°C[*7]

*5. ATA unit: Air to Air unit (other than PWFY, Cylinder Unit or Hydrobox)
*6. Cylinder Unit and Hydrobox cannot operate Cooling mode in connecting PUMY.
*7. When outdoor temp. is less than 7°C, outlet water temp. is lowered. (Refer to the figure below "Temperature curve of max. outlet water".)
Furthermore, outlet air temperature is lowered.



3-4-3-1. Temperature curve of max. outlet water

4 SPECIFICATIONS

Model					PUMY-P112VKM6(-BS) PUMY-P112VKM6-ER(BS)	PUMY-P125VKM6(-BS) PUMY-P125VKM6-ER(BS)	PUMY-P140VKM6(-BS) PUMY-P140VKM6-ER(BS)
Power source					1-phase 220-230-240 V, 50 Hz; 1-phase 220-230 V, 60 Hz		
Cooling capacity (Nominal)*1		kW			12.5	14.0	15.5
		kcal/h			10,750	12,040	13,330
		Btu/h			42,650	47,768	52,886
	Power input	kW			4.34	5.00	5.17
	Current input	A			20.03 - 19.16 - 18.36, 20.03 - 19.16	23.08 - 22.08 - 21.16, 23.08 - 22.08	23.86 - 22.83 - 21.87, 23.86 - 22.83
	COP	kW/kW			2.88	2.80	3.00
Temp. range of cooling	Indoor	W.B.			15 to 24°C		
	Outdoor	D.B.			−5 to 52°C *3*4		
Heating capacity (Nominal)*2		kW			14.0	16.0	18.0
		kcal/h			12,040	13,760	15,480
		Btu/h			47,768	54,592	61,416
	Power input	kW			3.49	4.06	4.63
	Current input	A			16.11 - 15.41 - 14.77, 16.11 - 15.41	18.74 - 17.93 - 17.18, 18.74 - 17.93	21.37 - 20.44 - 19.59, 21.37 - 20.44
	COP	kW/kW			4.01	3.94	3.89
Temp. range of heating	Indoor	D.B.			15 to 27°C		
	Outdoor	W.B.			−20 to 15°C		
Indoor unit connectable	Total capacity				50 to 130% of outdoor unit capacity		
	Model/ Quantity	CITY MULTI			P10 - P140 / 9	P10 - P140 / 10	P10 - P140 / 12
		Branch box*6			P15 - P100 / 8	P15 - P100 / 8	P15 - P100 / 8
		Mixed system	Branch box 1 unit*6	CITY MULTI	P15 - P140 / 5	P15 - P140 / 5	P15 - P140 / 5
				Branch box	P15 - P100 / 5	P15 - P100 / 5	P15 - P100 / 5
			Branch box 2 units*6	CITY MULTI	P15 - P140 / 3 or 2 *5	P15 - P140 / 3	P15 - P140 / 3
				Branch box	P15 - P100 / 7 or 8 *5	P15 - P100 / 8	P15 - P100 / 8
Sound pressure level (SPL) (measured in anechoic room)		dB <A>			49/51	50/52	51/53
Sound power level (PWL) (measured in anechoic room)		dB <A>			69/71	70/72	71/73
Refrigerant piping diameter	Liquid pipe	mm (in)			9.52 (3/8)		
	Gas pipe	mm (in)			15.88 (5/8)		
Fan	Type × Quantity				Propeller Fan x 2		
	Airflow rate	m³/min			110		
		L/s			1,833		
		cfm			3,884		
	Control, Driving mechanism				DC control		
	Motor output	kW			0.074 + 0.074		
	External static press.				0		
Compressor	Type × Quantity				Scroll hermetic compressor x 1		
	Manufacturer				Mitsubishi Electric Corporation		
	Starting method				Inverter		
	Capacity control	%			Cooling 26 to 100 Heating 20 to 100	Cooling 24 to 100 Heating 18 to 100	Cooling 21 to 100 Heating 17 to 100
	Motor output	kW			2.9	3.5	3.9
	Case heater	kW			0		
	Lubricant				FV50S (2.3liter)		
External finish					Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1		
External dimension H × W × D		mm			1,338 × 1,050 × 330 (+40)		
		in			52-11/16 × 41-11/32 × 13 (+1-9/16)		
Protection devices	High pressure protection				High pressure switch		
	Inverter circuit (COMP./FAN)				Overcurrent detection, Overheat detection (Heat sink thermistor)		
	Compressor				Compressor thermistor, Overcurrent detection		
	Fan motor				Overheating, Voltage protection, Overcurrent detection		
Refrigerant	Type × original charge				R410A 4.8 kg		
	Control				Linear expansion valve		
Net weight		kg (lb)			122 (269)		
Heat exchanger					Cross Fin and Copper tube		
HIC circuit (HIC: Heat Inter-Changer)					Double pipe heat exchanger		
Defrosting method					Reversed refrigerant circuit		
Standard attachment	Document				Installation Manual		
	Accessory				Grounded lead wire ×1		
Optional parts					Joint: CMY-Y62-G-E, Header: CMY-Y64/68-G-E, Branch box: PAC-MK34/54BC		

Remarks

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

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

*3. 10 to 52°C D.B. [50 to 126°F D.B.], when connecting following models: PKFY-P10/15/20/25/32VLM, PFFY-P20/25/32VLEM, PFFY-P20/25/32VL-RM(M), PFFY-P20/25/32VKM, PFFY-P20/25/32VCM; and M series, S series, and P series type indoor unit.

*4. −15 to 52°C D.B. [50 to 126°F D.B.], when using an optional air protect guide [PAC-SH95AG-E]. However, this condition does not apply to the indoor unit listed in *3.

*5. When connecting 7 indoor units via branch box, connectable CITY MULTI indoor units are 3; connecting 8 indoor units via branch box, connectable CITY MULTI indoor units are 2.

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

Notes:

- Nominal conditions *1, *2 are subject to ISO 15042.
- Due to continuing improvement, above specifications are subject to change without notice.
- See the following for unit conversion: kcal/h = kW × 860, Btu/h = kW × 3,412, cfm = m³/min × 35.31, lb = kg/0.4536
  Above specification data is subject to rounding variation.

Model					PUMY-P112YKM5(-BS) PUMY-P112YKM5-ER(BS)	PUMY-P125YKM5(-BS) PUMY-P125YKM5-ER(-BS)	PUMY-P140YKM5(-BS) PUMY-P140YKM5-ER(BS)
Power source					3-phase 380-400-415 V, 50 Hz; 3-phase 380 V, 60 Hz		
Cooling capacity (Nominal)[*1]		kW			12.5	14.0	15.5
		kcal/h			10,750	12,040	13,330
		Btu/h			42,650	47,768	52,886
	Power input	kW			4.34	5.00	5.17
	Current input	A			7.76 - 6.97 - 6.36. 7.76	8.94 - 8.02 - 7.33, 8.94	9.25 - 8.30 - 7.58, 9.25
	COP	kW/kW			2.88	2.80	3.00
Temp. range of cooling	Indoor	W.B.			15 to 24°C		
	Outdoor	D.B.			−5 to 52°C [*3*4]		
Heating capacity (Nominal)[*2]		kW			14.0	16.0	18.0
		kcal/h			12,040	13,760	15,480
		Btu/h			47,768	54,592	61,416
	Power input	kW			4.34	5.00	5.17
	Current input	A			6.24 - 5.60 - 5.12, 6.24	7.26 - 6.52 - 5.95, 7.26	8.28 - 7.43 - 6.79, 8.28
	COP	kW/kW			4.01	3.94	3.89
Temp. range of heating	Indoor	D.B.			15 to 27°C		
	Outdoor	W.B.			−20 to 15°C		
Indoor unit connectable	Total capacity				50 to 130% of outdoor unit capacity		
	Model/ Quantity	CITY MULTI			P10 - P140 / 9	P10 - P140 / 10	P10 - P140 / 12
		Branch box[*6]			P15 - P100 / 8	P15 - P100 / 8	P15 - P100 / 8
		Mixed system	Branch box 1 unit[*6]	CITY MULTI	P15 - P140 / 5	P15 - P140 / 5	P15 - P140 / 5
				Branch box	P15 - P100 / 5	P15 - P100 / 5	P15 - P100 / 5
			Branch box 2 units[*6]	CITY MULTI	P15 - P140 / 3 or 2 [*5]	P15 - P140 / 3	P15 - P140 / 3
				Branch box	P15 - P100 / 7 or 8 [*5]	P15 - P100 / 8	P15 - P100 / 8
Sound pressure level (SPL) (measured in anechoic room)		dB <A>			49/51	50/52	51/53
Sound power level (PWL) (measured in anechoic room)		dB <A>			69/71	70/72	71/73
Refrigerant piping diameter	Liquid pipe	mm (in)			9.52 (3/8)		
	Gas pipe	mm (in)			15.88 (5/8)		
Fan	Type × Quantity				Propeller Fan × 2		
	Airflow rate	m^3/min			110		
		L/s			1,833		
		cfm			3,884		
	Control, Driving mechanism				DC control		
	Motor output	kW			0.074 + 0.074		
	External static press.				0		
Compressor	Type × Quantity				Scroll hermetic compressor × 1		
	Manufacturer				Mitsubishi Electric Corporation		
	Starting method				Inverter		
	Capacity control	%			Cooling 26 to 100 Heating 20 to 100	Cooling 24 to100 Heating 18 to 100	Cooling 21 to 100 Heating 17 to 100
	Motor output	kW			2.9	3.5	3.9
	Case heater	kW			0		
	Lubricant				FV50S (2.3liter)		
External finish					Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1		
External dimension H × W × D		mm			1338 × 1050 × 330 (+40)		
		in			52-11/16 × 41-11/32 × 13 (+1-9/16)		
Protection devices	High pressure protection				High pressure switch		
	Inverter circuit (COMP./FAN)				Overcurrent detection, Overheat detection(Heat sink thermistor)		
	Compressor				Compressor thermistor, Over current detection		
	Fan motor				Overheating, Voltage protection, Over current detection		
Refrigerant	Type × original charge				R410A 4.8 kg		
	Control				Linear expansion valve		
Net weight		kg (lb)			125 (276)		
Heat exchanger					Cross Fin and Copper tube		
HIC circuit (HIC: Heat Inter-Changer)					Double pipe heat exchanger		
Defrosting method					Reversed refrigerant circuit		
Standard attachment	Document				Installation Manual		
	Accessory				Grounded lead wire ×1		
Optional parts					Joint: CMY-Y62-G-E, Header: CMY-Y64/68-G-E, Branch box: PAC-MK34/54BC		

Remarks

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

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

*3. 10 to 52°C D.B. [50 to 126°F D.B.], when connecting following models: PKFY-P10/15/20/25/32VLM, PFFY-P20/25/32VLEM, PFFY-P20/25/32VL-RM(M), PFFY-P20/25/32VKM, PFFY-P20/25/32VCM; and M series, S series, and P series type indoor unit.

*4. −15 to 52°C D.B. [50 to 126°F D.B.], when using an optional air protect guide [PAC-SH95AG-E]. However, this condition does not apply to the indoor unit listed in *3.

*5. When connecting 7 indoor units via branch box, connectable CITY MULTI indoor units are 3; connecting 8 indoor units via branch box, connectable CITY MULTI indoor units are 2.

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

Notes:

- Nominal conditions *1, *2 are subject to ISO 15042.
- Due to continuing improvement, above specifications are subject to change without notice.
- See the following for unit conversion: kcal/h = kW × 860, Btu/h = kW × 3,412, cfm = m^3/min × 35.31, lb = kg/0.4536
  Above specification data is subject to rounding variation.

5 DATA

5-1. Selection of indoor and outdoor units

5-1-1. Cooling

Design condition		
Outdoor dry bulb temperature		39ºC
Total cooling load		10.6 kW
Room 1	Indoor dry bulb temperature	27ºC
	Indoor wet bulb temperature	20ºC
	Cooling load	4.6 kW
Room 2	Indoor dry bulb temperature	24ºC
	Indoor wet bulb temperature	18ºC
	Cooling load	6.0 kW
Other	Indoor/Outdoor piping equivalent length	60 m

Capacity of indoor unit

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

■ Cooling calculation

- Tentative selection of indoor units
  Room1: PEFY-P50 5.6 kW (Rated)
  Room2: PEFY-P71 8.0 kW (Rated)
  In this case, the total capacity is 13.6. (5.6 + 8.0 = 13.6)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is P125 as the total capacity of the indoor units is 13.6.
  PUMY-P125 14.0 kW (Rated)
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor design wet bulb temperature: Room 1 (20°C) 1.03 (Refer to Figure 1.)
  Room 2 (18°C) 0.94 (Refer to Figure 1.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 5.6 × 1.03 + 8.0 × 0.94
  = 13.3 kW
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (39°C) 0.92 (Refer to Figure 2.)
  Correction factor for piping length (60 m) 0.88 (Refer to "Correcting Capacity".)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length
  = 14.0 × 0.92 × 0.88
  = 11.3 kW
- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 13.3 > CTo = 11.3, thus, select CTo.
  CTx = CTo = 11.3 kW
- Comparison with essential load
  Against the essential load 10.6 kW, the maximum system capacity is 11.3 kW: A proper outdoor unit is selected.
- Calculation for the maximum indoor unit capacity of each room
  When CTx = CTo, use the calculation formula below.
  Room1: CTx × Corrected capacity for Room1/CTi
  = 11.3 × (5.6 × 1.03)/13.3
  = 4.9 kW
  The capacity is enough for the cooling load of Room 1 (4.6 kW): A proper indoor unit is selected.
  Room2: CTx × Corrected capacity for Room2/CTi
  = 11.3 × (8.0 × 0.94)/13.3
  = 6.4 kW
  The capacity is enough for the cooling load of Room 2 (6.0 kW): A proper indoor unit is selected.

Note:

- If CTx = CTi, refer to the calculation formula in "Heating" to calculate the maximum indoor unit capacity of each room.
- Go on to the selection of units for heating after the selection for cooling has successfully completed. If failed, try again until proper units are selected.

5-1-2. Heating

Design condition		
Outdoor wet bulb temperature		2°C
Total heating load		13.2 kW
Room 1	Indoor dry bulb temperature	23°C
	Heating load	5.4 kW
Room 2	Indoor dry bulb temperature	23°C
	Heating load	7.8 kW
Other	Indoor/Outdoor piping equivalent length	60 m

Capacity of indoor unit

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

■ Heating calculation

- Tentative selection of indoor units
  Room1: PEFY-P50 6.3kW.(Rated)
  Room2: PEFY-P71 9.0kW.(Rated)
  In this case, the total capacity is 15.3. (6.3 + 9.0 = 15.3)
- Tentative selection of outdoor unit
  Proper outdoor unit in this case is P125 as the total capacity of the indoor units is 15.3.
  PUMY-P125 16.0 kW
- Calculation for the corrected capacity of the total indoor units (CTi)
  Correction factor for indoor temperature: Room 1 (23°C) 0.88 (Refer to Figure 3.)
  Room 2 (23°C) 0.88 (Refer to Figure 3.)
  CTi = Σ (Rated capacity of indoor unit × Correction factor for indoor temperature)
  = 6.3 × 0.88 + 9.0 × 0.88
  = 13.5 kW
- Calculation for the corrected capacity of the outdoor unit (CTo)
  Correction factor for outdoor temperature (2°C WB) 1.00 (Refer to Figure 4.)
  Correction factor for piping length (60 m) 0.96 (Refer to "Correcting Capacity".)
  Correction factor for defrosting 0.89 (Refer to Table 1.)
  CTo = Rated capacity of outdoor unit × Correction factor for outdoor temperature × Correction factor for piping length × Correction factor for defrosting
  = 16.0 × 1.00 × 0.96 × 0.89
  = 13.7 kW

Table 1 Table of correction factor for frosting and defrosting

Outdoor inlet air temp. (°C)	6	4	2	0	-2	-4	-6	-8	-10	-15	-20
Correction factor	1.00	0.98	0.89	0.88	0.89	0.90	0.95	0.95	0.95	0.95	0.95

- Determination of maximum system capacity (CTx)
  Comparison between CTi and CTo:
  CTi = 13.5 < CTo = 13.7, thus, select CTi.
  CTx = CTi = 13.5 kW
- Comparison with essential load
  Against the essential load 13.2 kW, the maximum system capacity is 13.5 kW: Proper indoor units have been selected.
- Calculation for the maximum indoor unit capacity of each room
  When CTx = CTi, use the calculation formula below.
  Room1: Rated capacity of Indoor unit × Correction factor for indoor temperature
  = 6.3 × 0.88
  = 5.5 kW
  The capacity is enough for the heating load of Room 1 (5.4 kW): A proper indoor unit is selected.
  Room2: Rated capacity of indoor unit × Corrected capacity for the indoor design temperature
  = 9.0 × 0.88
  = 7.9 kW
  The capacity is enough for the heating load of Room 2 (7.8 kW): A proper indoor unit is selected.

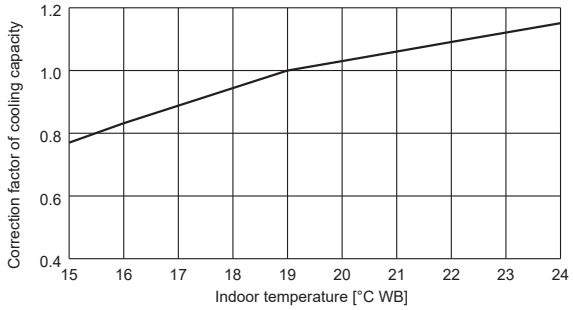
Note:

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

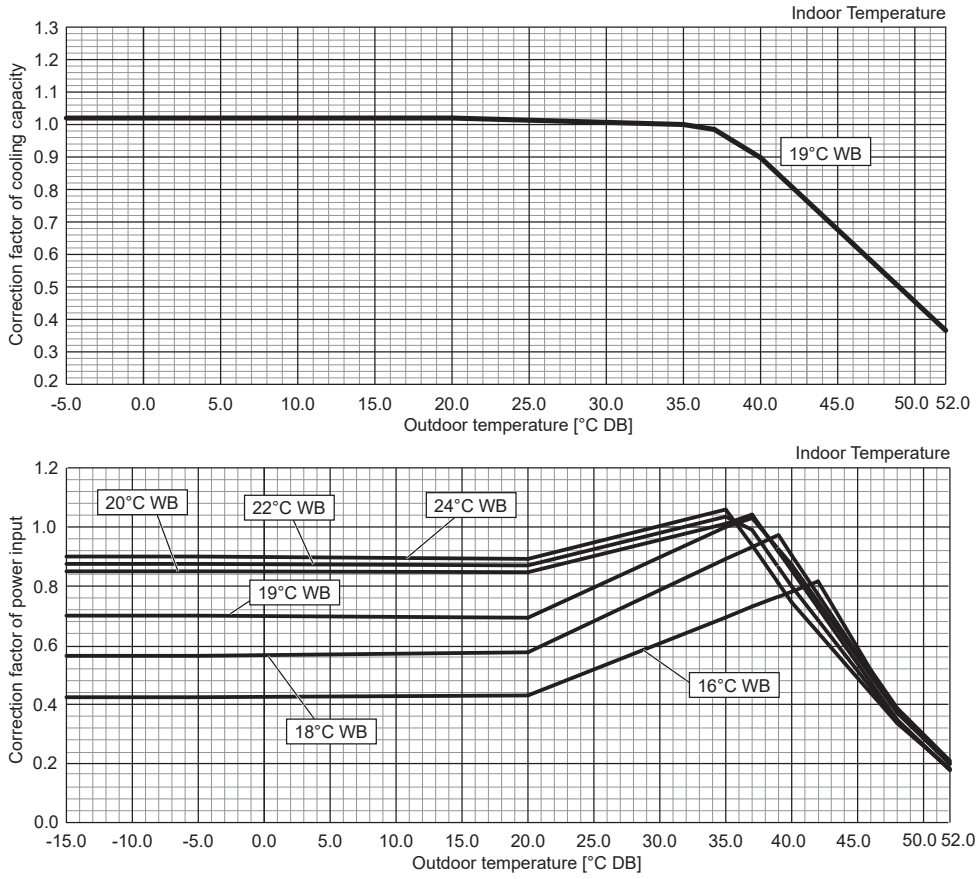
5-2. Correction by temperature

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

5-2-1. Cooling

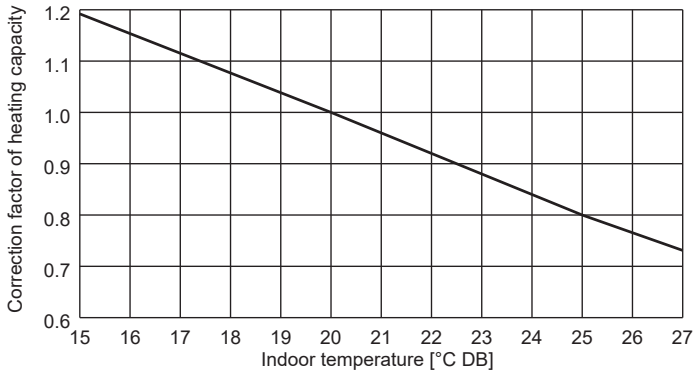


<Figure 1> Indoor unit temperature correction

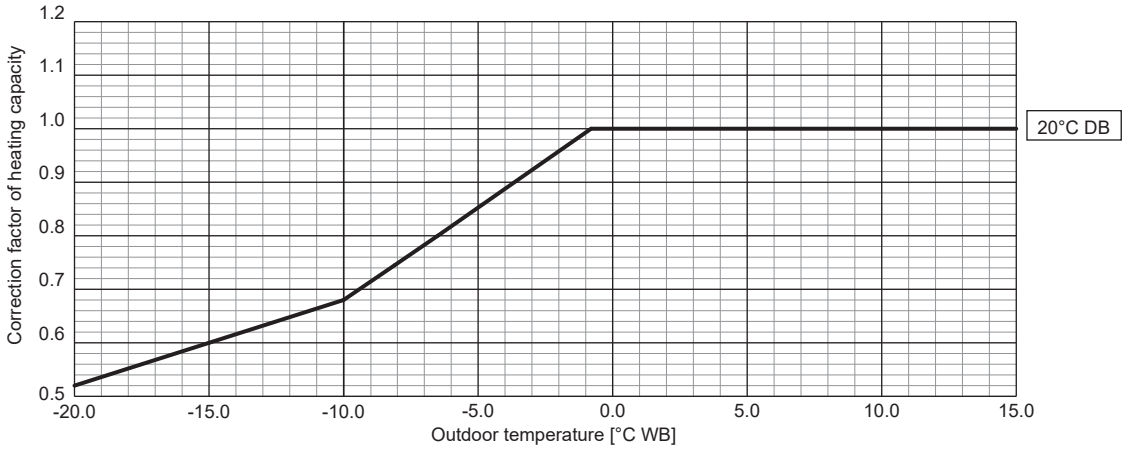


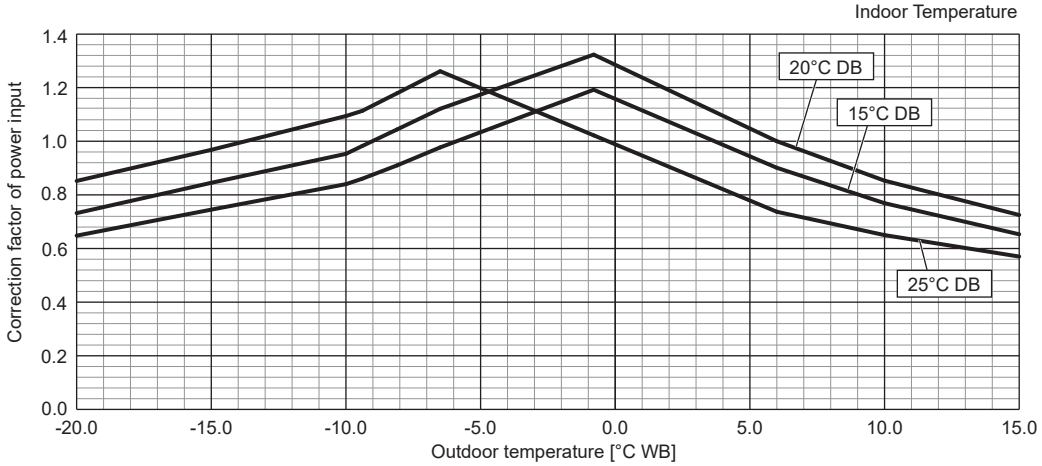
<Figure 2> Outdoor unit temperature correction

5-2-2. Heating



<Figure 3> Indoor unit temperature correction





<Figure 4> Outdoor unit temperature correction

5-3. Standard operation data (Reference data)

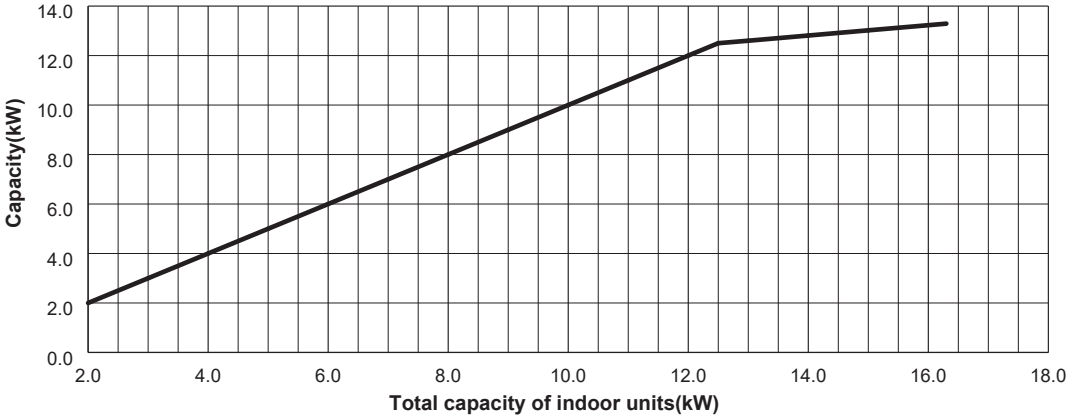
Operation				PUMY-P112VKM6(-BS) PUMY-P112YKM5(-BS) PUMY-P112VKM6-ER(BS) PUMY-P112YKM5-ER(BS)		PUMY-P125VKM6(-BS) PUMY-P125YKM5(-BS) PUMY-P125VKM6-ER(BS) PUMY-P125YKM5-ER(BS)		PUMY-P140VKM6(-BS) PUMY-P140YKM5(-BS) PUMY-P140VKM6-ER(-BS) PUMY-P140YKM5-ER(-BS)	
Operating conditions	Ambient temperature	Indoor	DB/ WB	27°C/19°C	20°C/—	27°C/19°C	20°C/—	27°C/19°C	20°C/—
		Outdoor		35°C	7°C/6°C	35°C	7°C/6°C	35°C	7°C/6°C
	Indoor unit	No. of connected units	Unit	2		2		2	
		No. of units in operation		2		2		2	
		Model	—	50 × 1/63 × 1		63 × 2		63 × 1/80 ×1	
	Piping	Main pipe	m	5		5		5	
		Branch pipe		2.5		2.5		2.5	
		Total pipe length		10		10		10	
	Fan speed		—	Hi		Hi		Hi	
	Amount of refrigerant		kg	7.2		7.2		7.2	
Outdoor unit	Electric current		A	16.17/5.26	17.38/5.67	21.67/7.12	21.91/7.22	25.84/8.58	25.54/8.48
	Voltage		V	230/400		230/400		230/400	
	Compressor frequency		Hz	67	69	84	86	96	96
LEV opening	Indoor unit		Pulse	357	421	447	525	511	586
Pressure	High pressure/Low pressure		MPaG	2.70/0.94	2.86/0.70	2.86/0.88	2.87/0.67	2.95/0.85	2.95/0.65
Temp. of each section	Outdoor unit	Discharge	°C	67.0	71.9	69.7	72.1	70.7	73.2
		Heat exchanger outlet		40.2	2.0	40.8	1.3	43.7	0.9
		Accumulator inlet		8.7	1.0	8.0	0.2	5.6	−0.6
		Compressor inlet		10.7	1.3	9.1	0.1	7.8	−0.7
	Indoor unit	LEV inlet		18.9	32.4	17.7	33.0	17.0	33.4
		Heat exchanger inlet		12.3	55.5	11.1	55.7	10.4	56.8

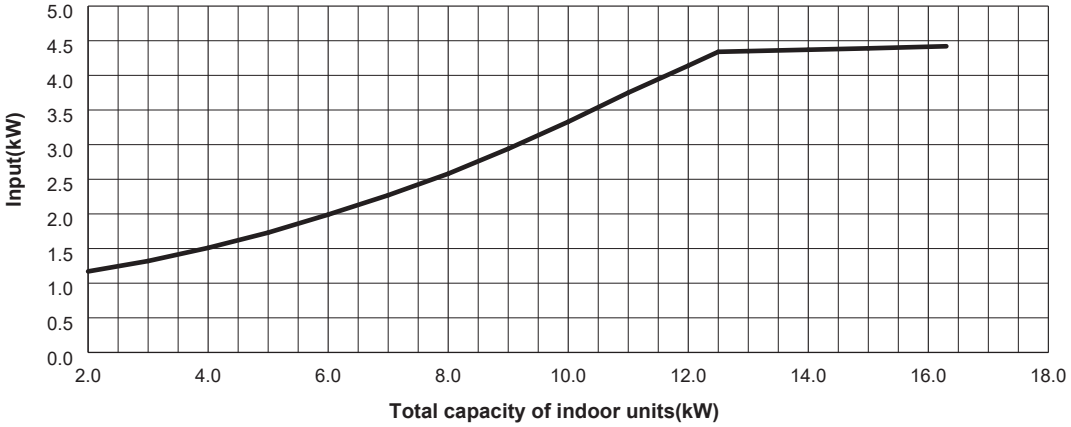
5-4. Standard capacity diagram

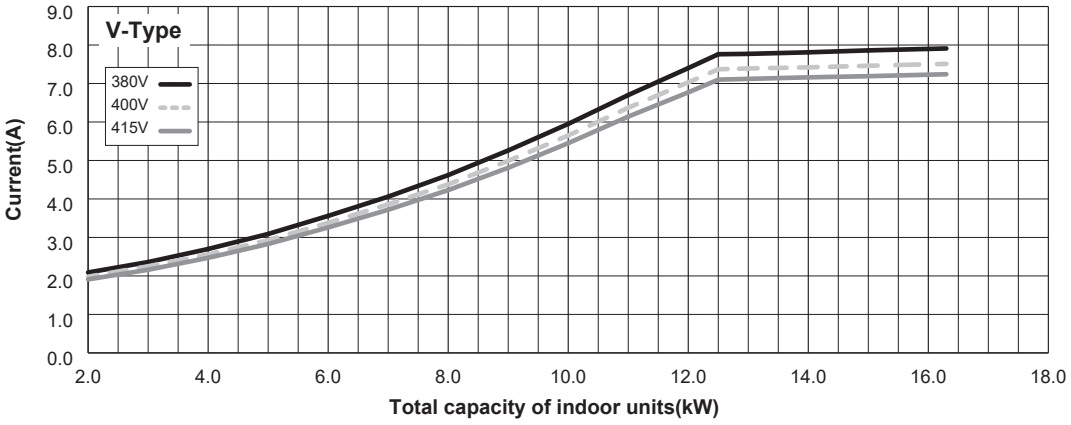
Before calculating the sum of total capacity of indoor units, please convert the value into the kW model capacity following the formula on "4-1. Selection of indoor and outdoor units".

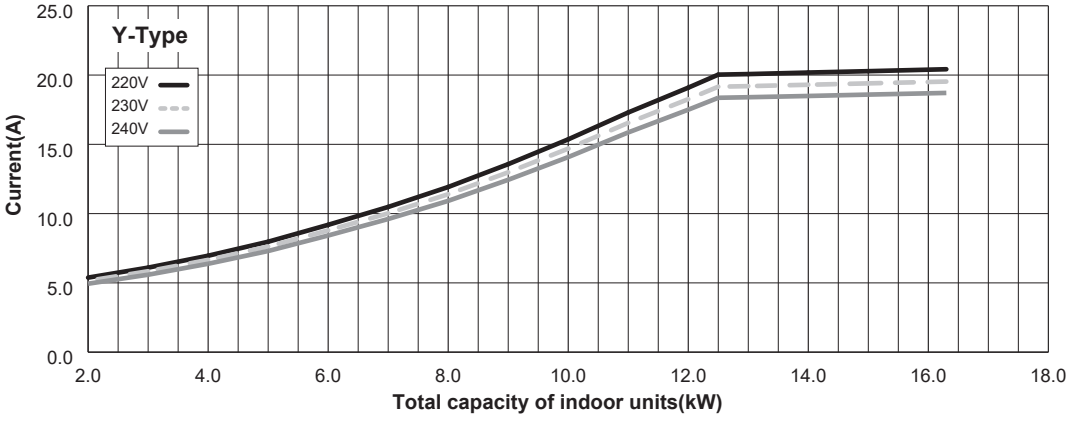
PUMY-P112VKM6(-BS) **PUMY-P112VKM6-ER(BS)**
PUMY-P112YKM5(-BS) **PUMY-P112YKM5-ER(BS)**

■ Cooling

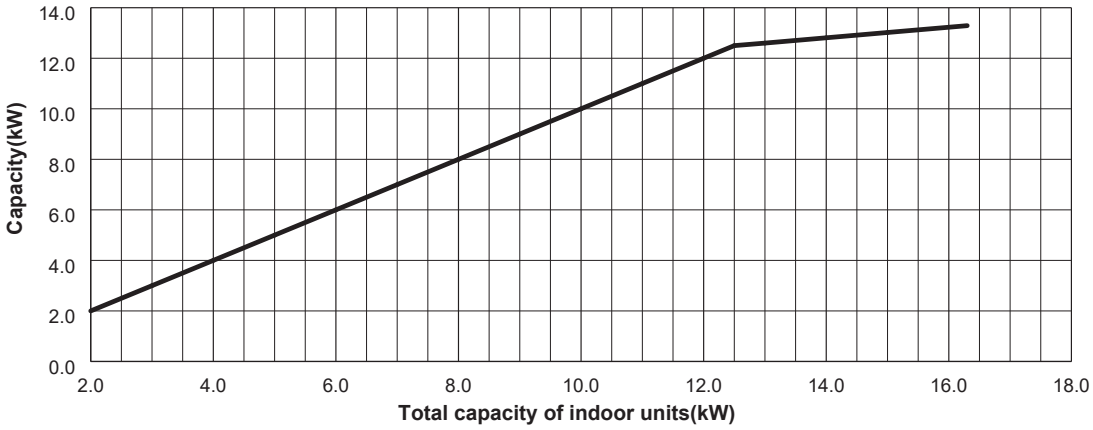


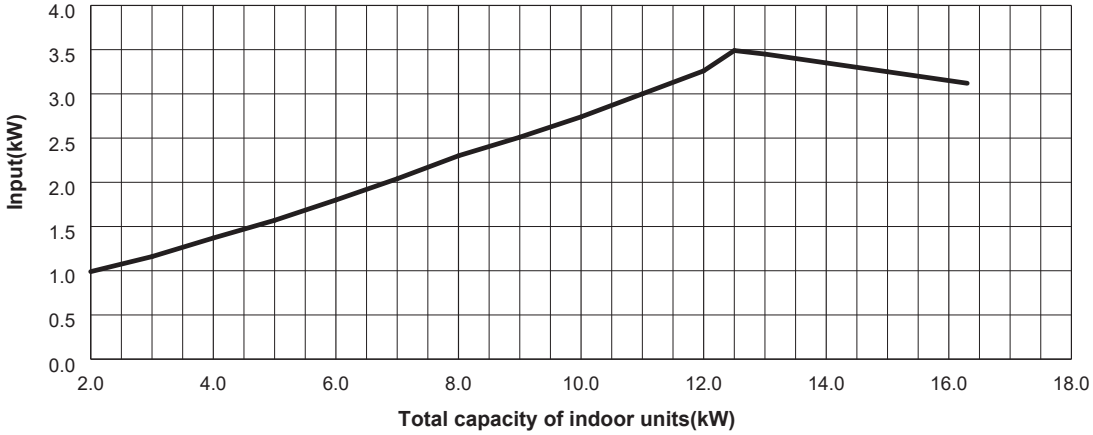


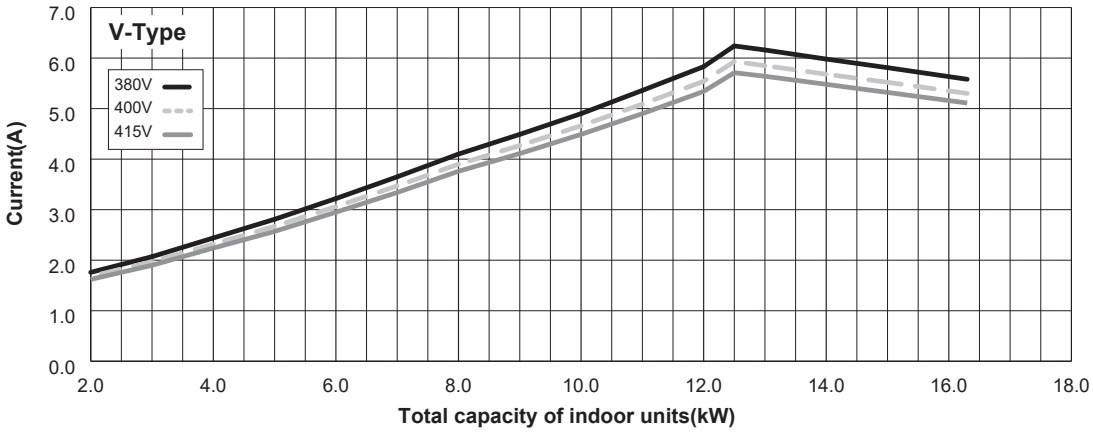


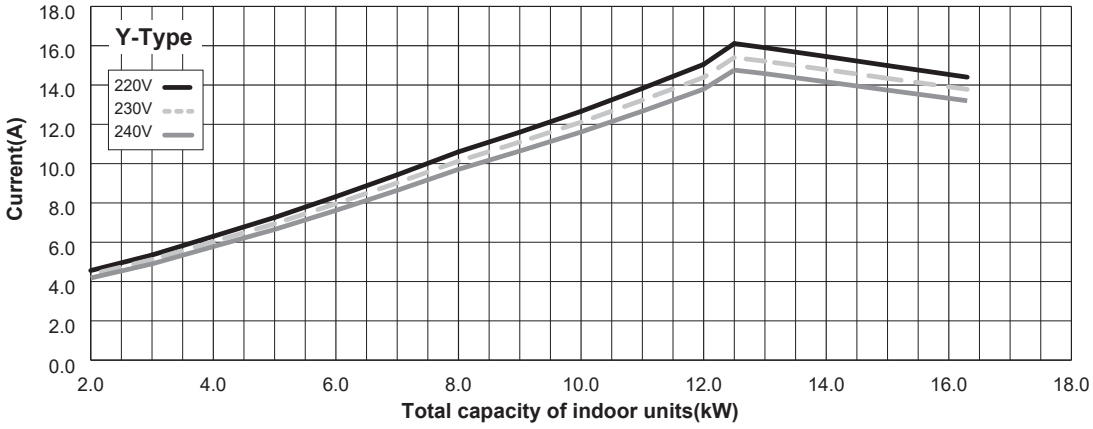


■ Heating

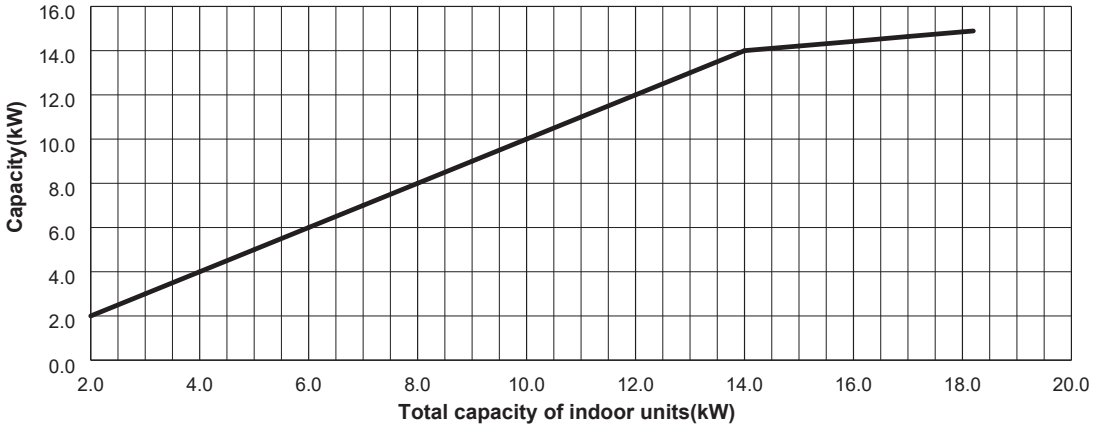

Capacity(kW)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
Total capacity of indoor units(kW)

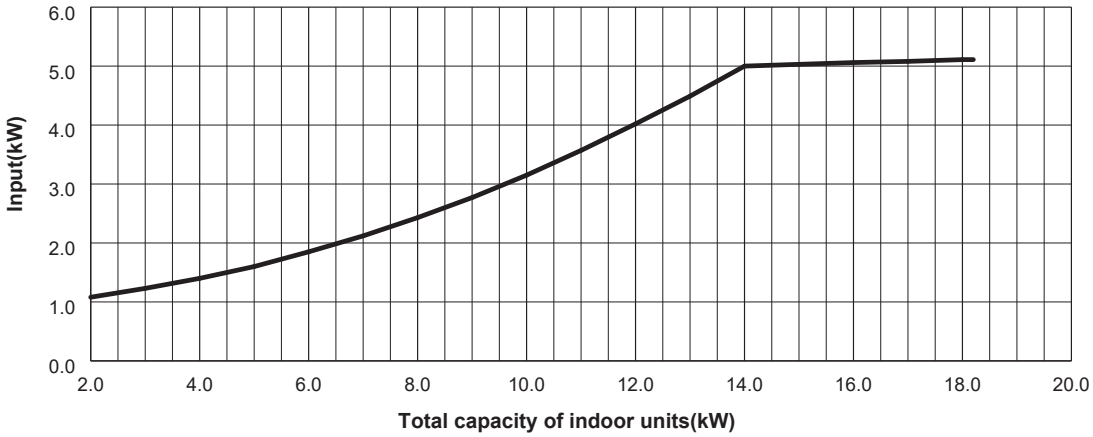

Input(kW)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
Total capacity of indoor units(kW)

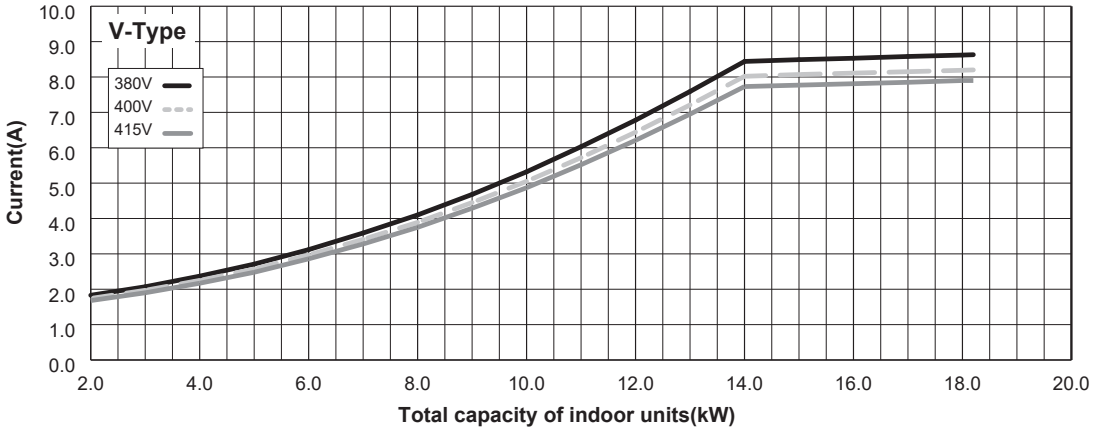

V-Type
380V
400V
415V
Current(A)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
Total capacity of indoor units(kW)

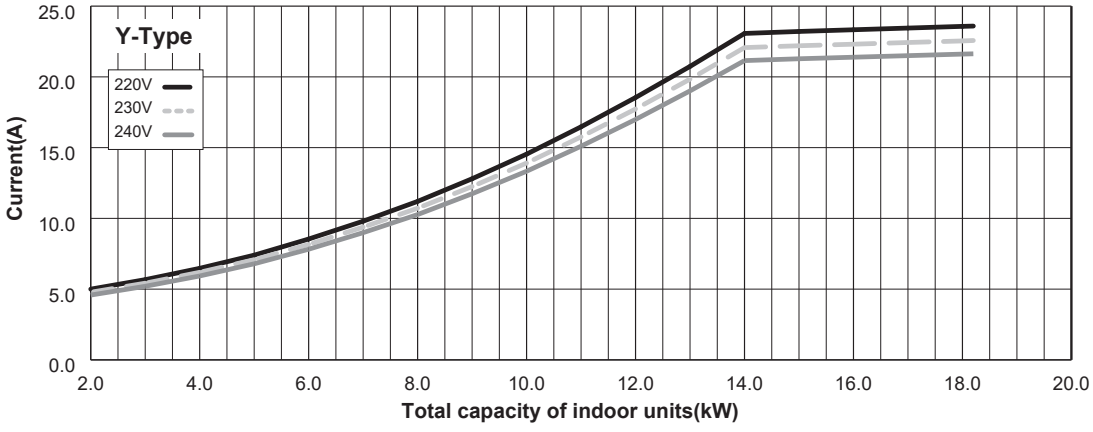

Y-Type
220V
230V
240V
Current(A)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
Total capacity of indoor units(kW)

■ Cooling

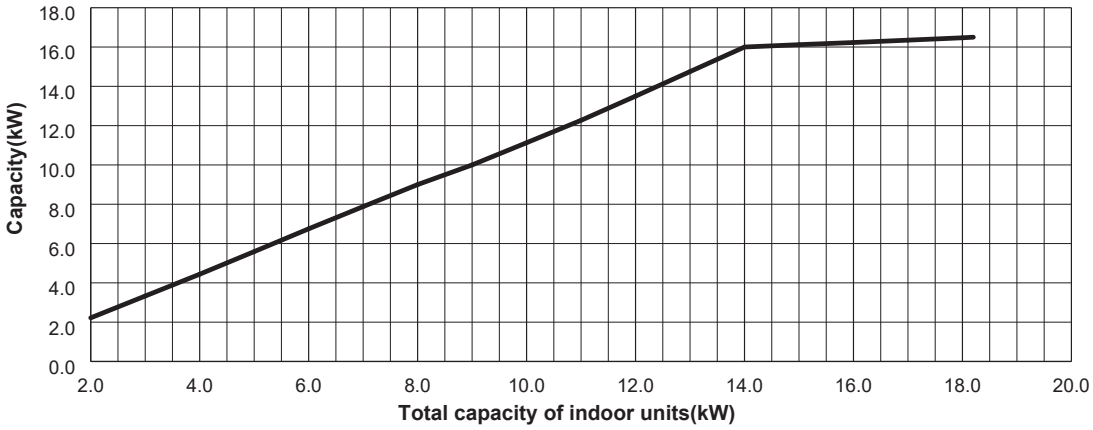

Capacity(kW)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

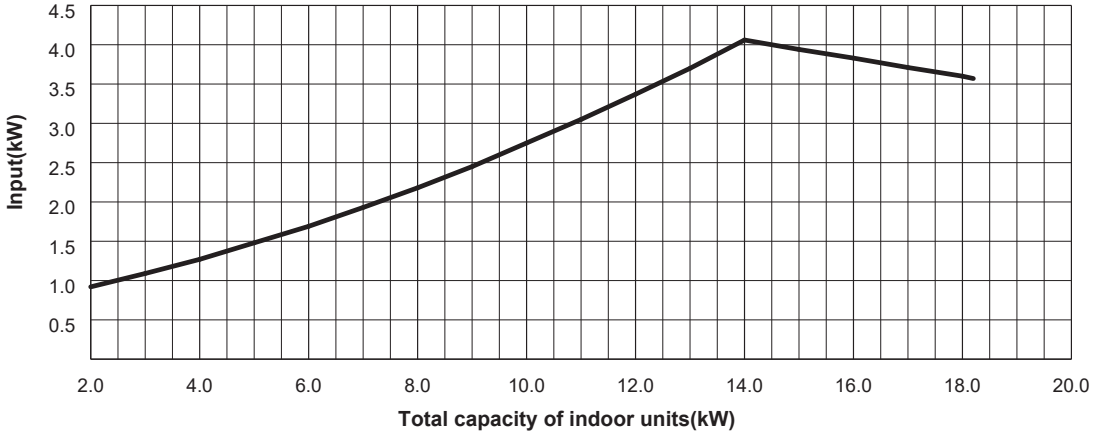

Input(kW)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

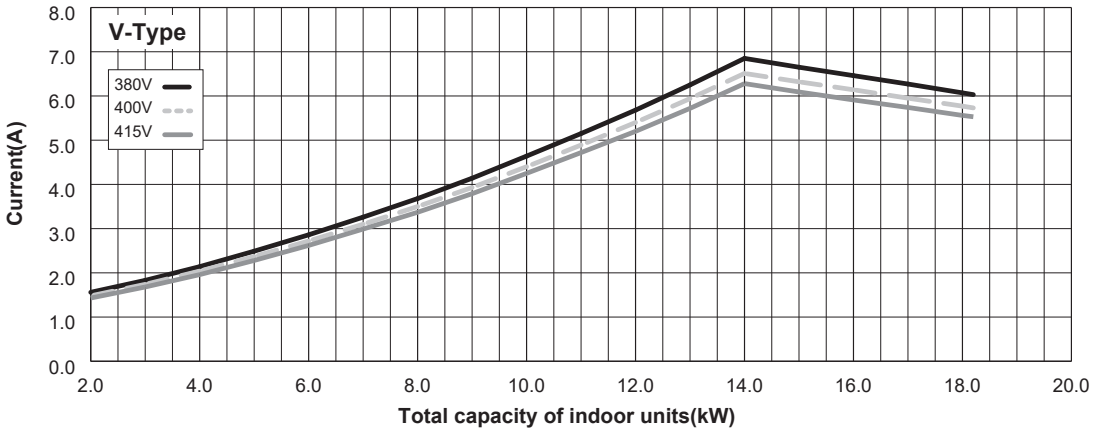

V-Type
380V
400V
415V
Current(A)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

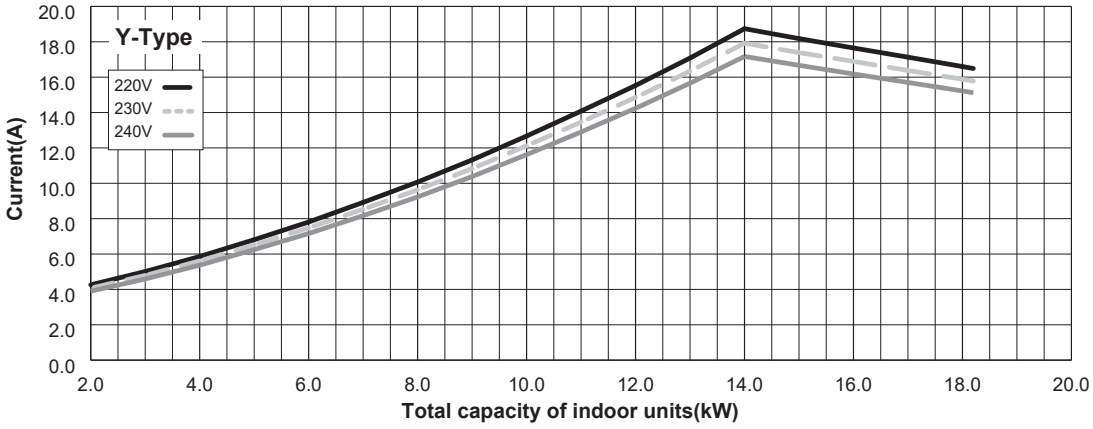

Y-Type
220V
230V
240V
Current(A)
25.0
20.0
15.0
10.0
5.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0
Total capacity of indoor units(kW)

■ Heating


Capacity(kW)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Total capacity of indoor units(kW)

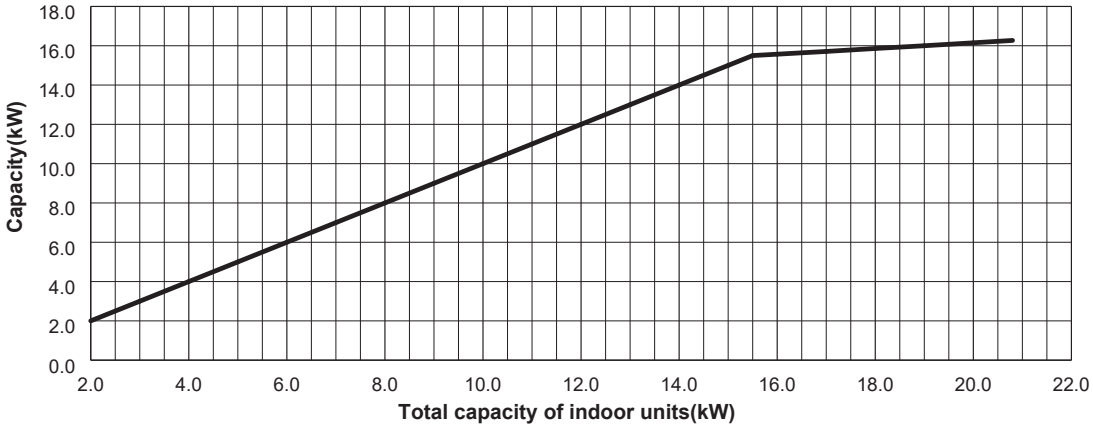

Input(kW)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Total capacity of indoor units(kW)

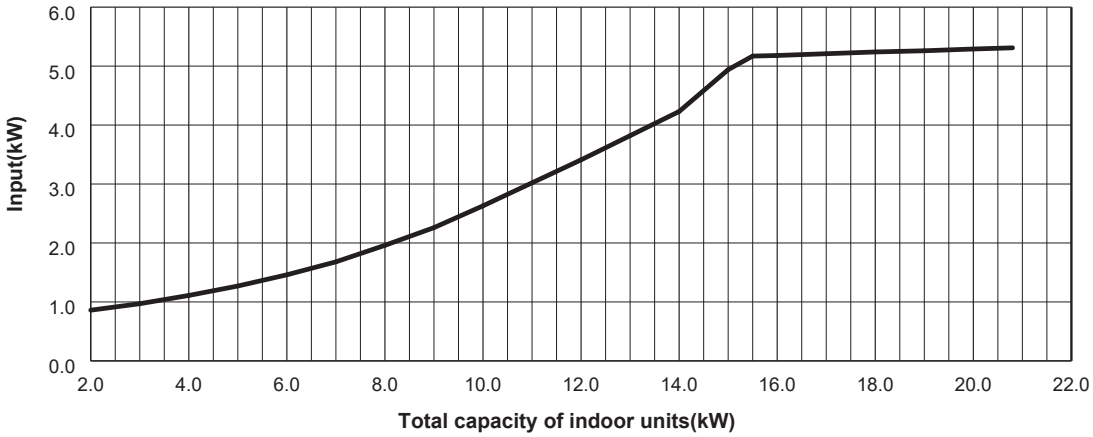

V-Type
380V
400V
415V
Current(A)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Total capacity of indoor units(kW)

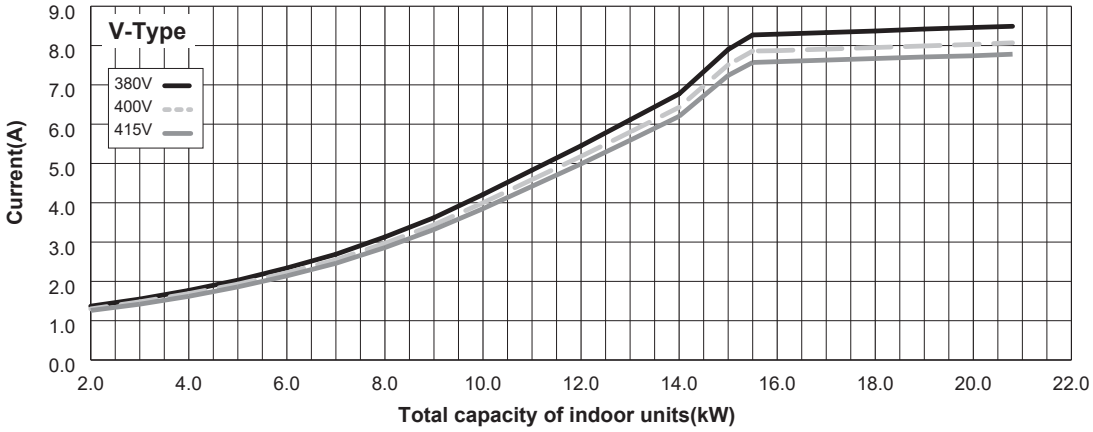

Y-Type
220V
230V
240V
Current(A)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Total capacity of indoor units(kW)

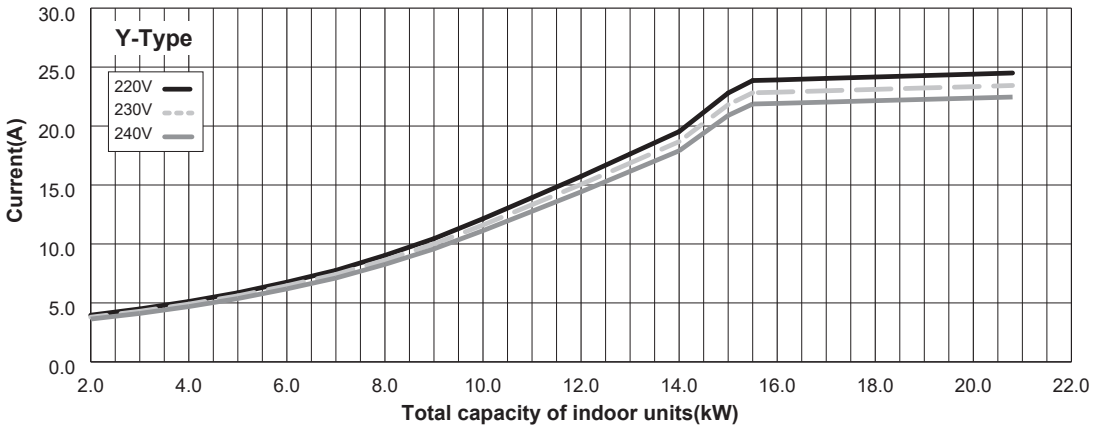
PUMY-P140VKM6(-BS) **PUMY-P140VKM6-ER(BS)**
PUMY-P140YKM5(-BS) **PUMY-P140YKM5-ER(BS)**

■ Cooling

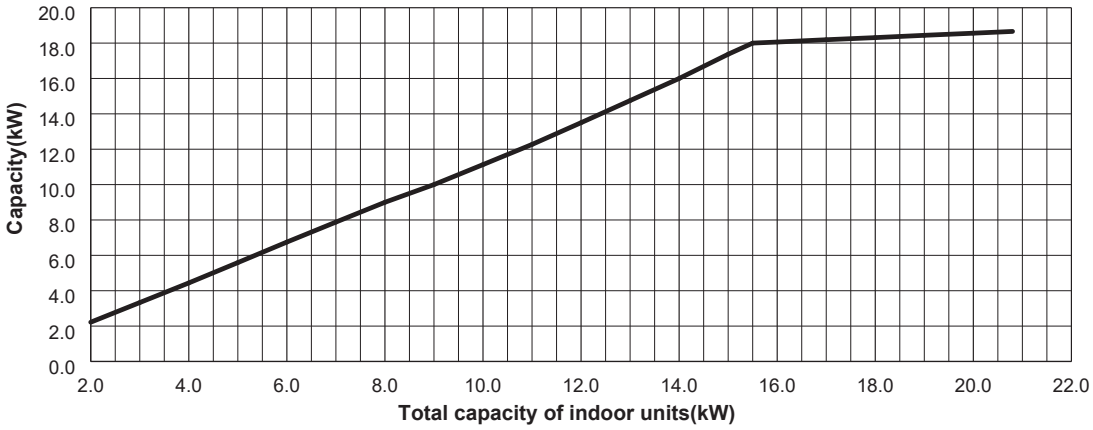


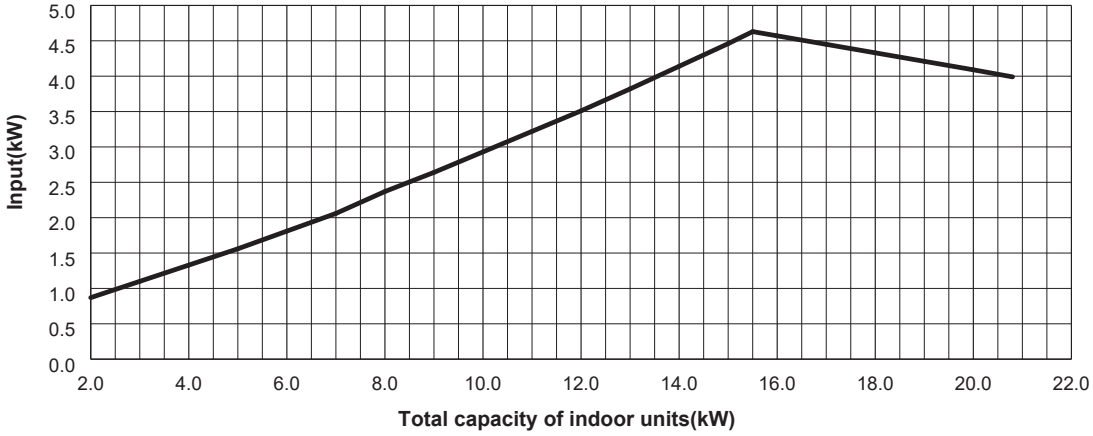


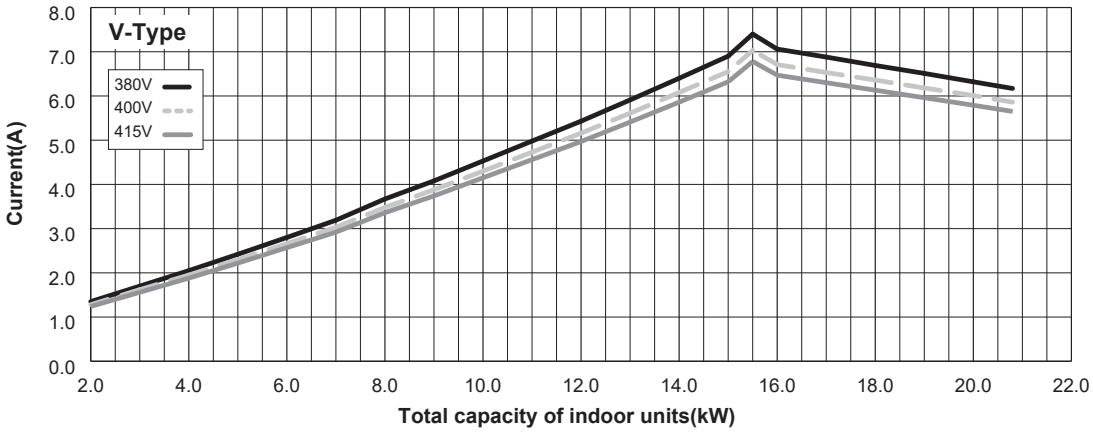


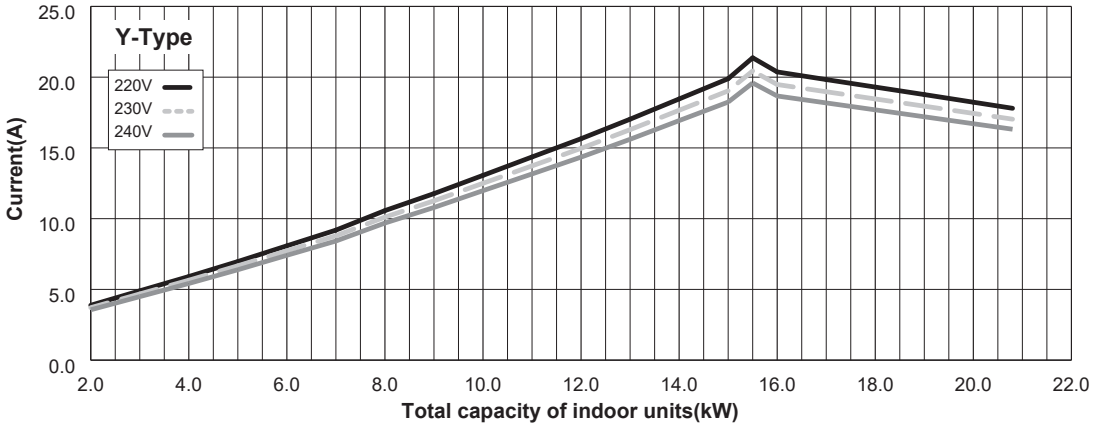


■ Heating


Capacity(kW)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)


Input(kW)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)


V-Type
380V
400V
415V
Current(A)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0
Total capacity of indoor units(kW)


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

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

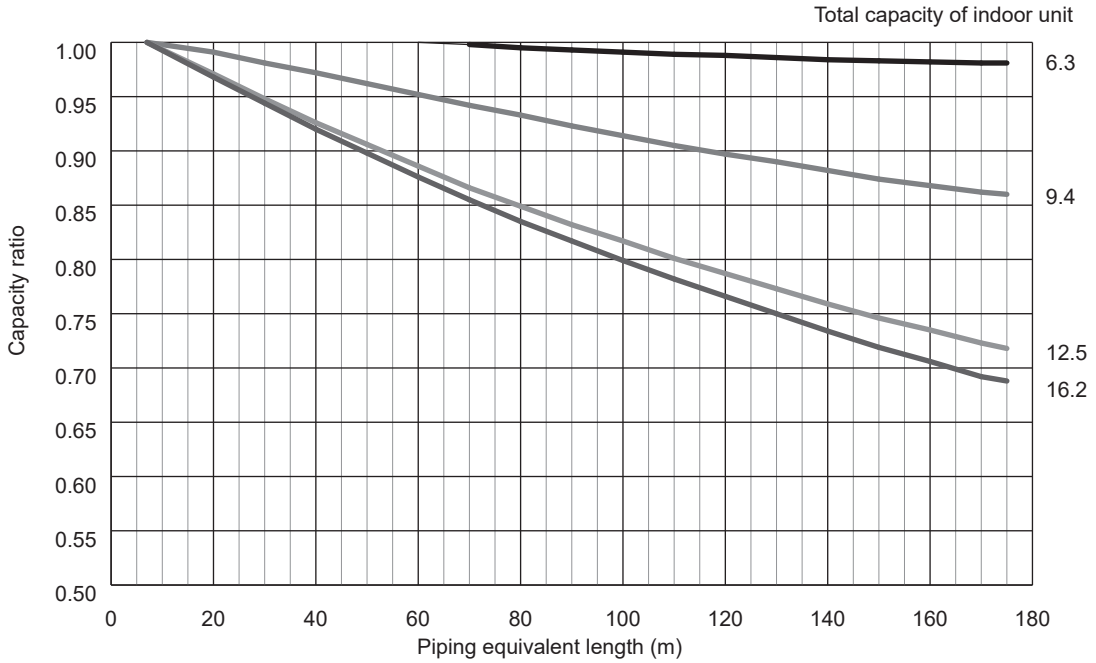
During cooling, obtain the ratio (and the piping equivalent length) of the outdoor units rated capacity and the total in-use indoor capacity, and find the capacity ratio corresponding to the standard piping length from Figure 5 to 7. Then multiply by the cooling capacity from Figure 1 and 2 in “4-2.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

■ **Capacity Correction Curve**

5-5-1. Cooling

PUMY-P112VKM6(-BS)
PUMY-P112YKM5(-BS)

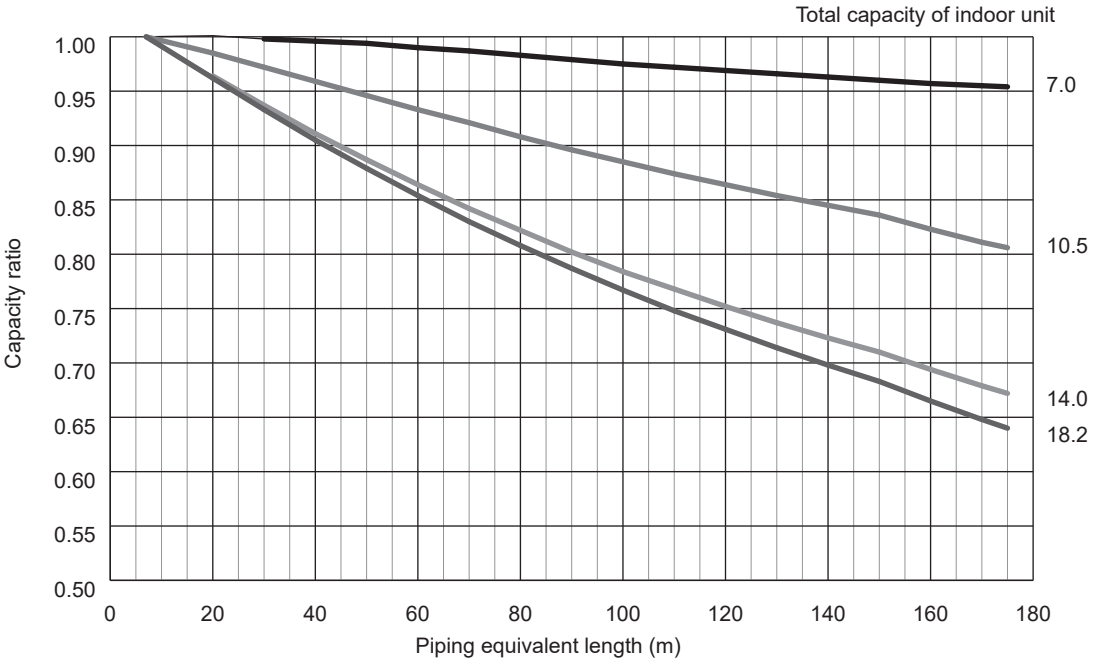
PUMY-P112VKM6-ER(BS)
PUMY-P112YKM5-ER(BS)



<Figure 5> Correction of refrigerant piping length

PUMY-P125VKM6(-BS)
PUMY-P125YKM5(-BS)

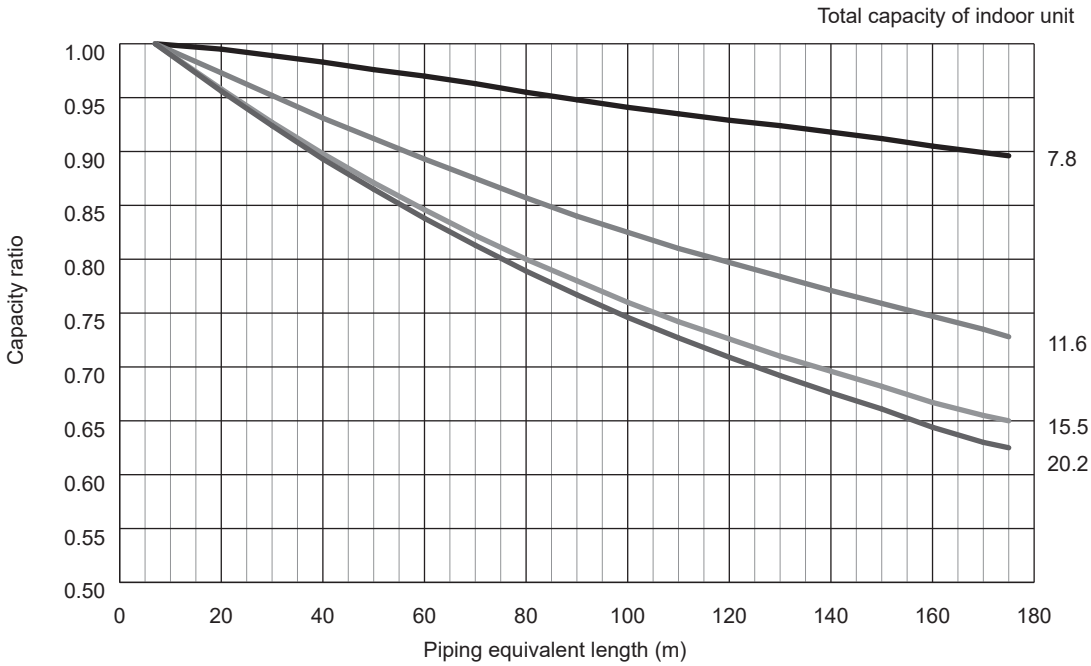
PUMY-P125VKM6-ER(BS)
PUMY-P125YKM5-ER(BS)



<Figure 6> Correction of refrigerant piping length

PUMY-P140VKM6(-BS)
PUMY-P140YKM5(-BS)

PUMY-P140VKM6-ER(BS)
PUMY-P140YKM5-ER(BS)

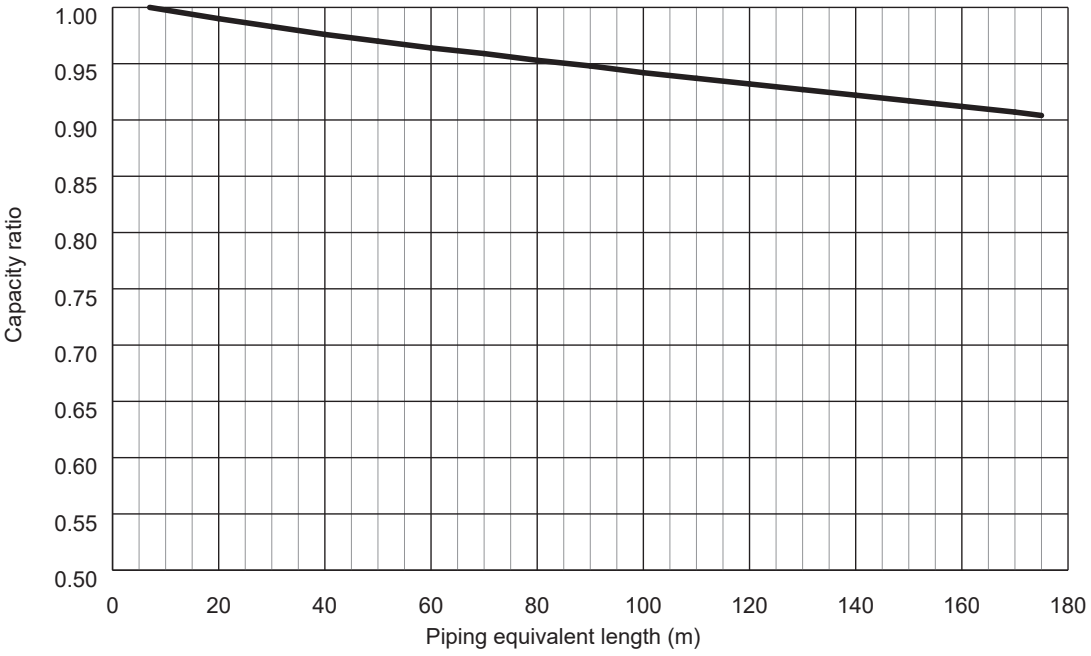


<Figure 7> Correction of refrigerant piping length

5-5-2. Heating

PUMY-P112/125/140VKM6(-BS)
PUMY-P112/125/140YKM5(-BS)

PUMY-P112/125/140VKM6-ER(BS)
PUMY-P112/125/140YKM5-ER(BS)



<Figure 8> Correction of refrigerant piping length

■ Method for obtaining the piping equivalent length

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

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

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

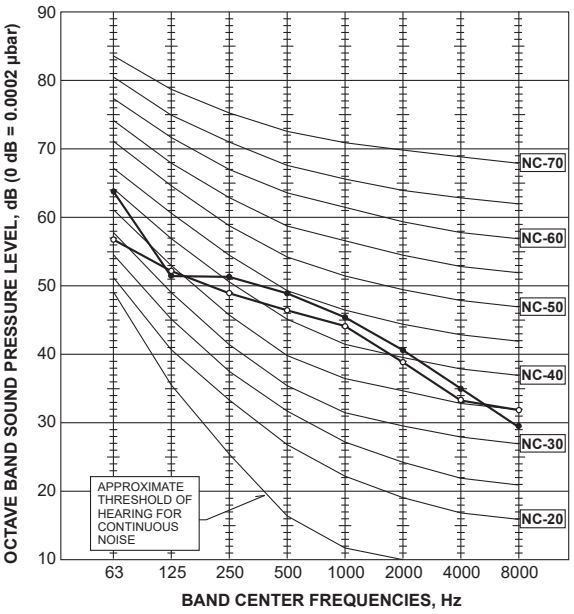
Correction factor diagram

Outdoor Intake temperature (°C WB)	6	4	2	0	-2	-4	-6	-8	-10	-15	-20
Correction factor	1.00	0.98	0.89	0.88	0.89	0.90	0.95	0.95	0.95	0.95	0.95

5-6. Noise criterion curves

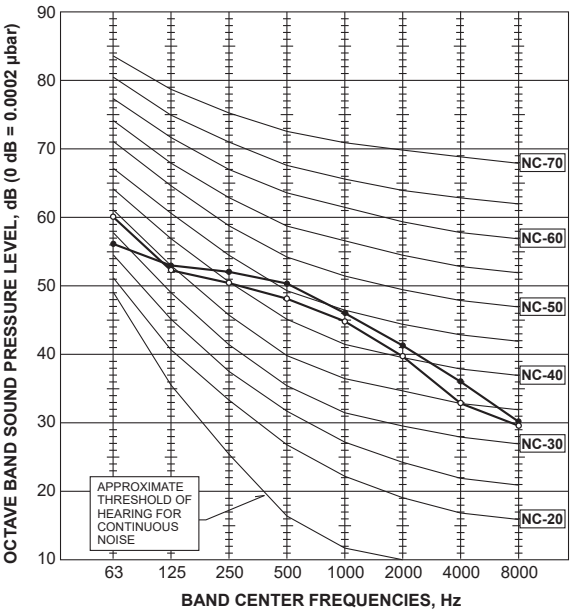
PUMY-P112VKM6(-BS)
PUMY-P112YKM5(-BS)
PUMY-P112VKM6-ER(BS)
PUMY-P112YKM5-ER(BS)

Mode	SPL(dB)	LINE
Cooling	49	○—○
Heating	51	●—●



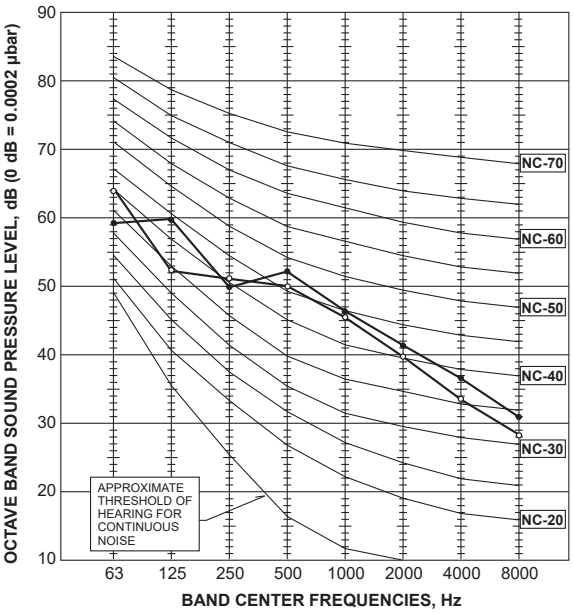
PUMY-P125VKM6(-BS)
PUMY-P125YKM5(-BS)
PUMY-P125VKM6-ER(BS)
PUMY-P125YKM5-ER(BS)

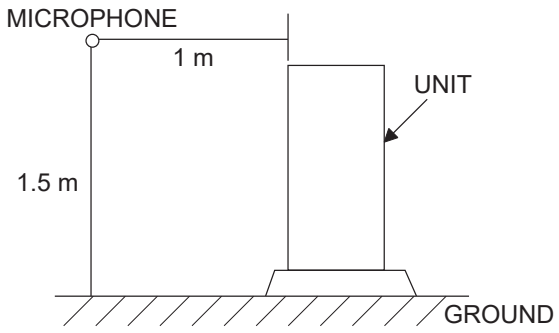
Mode	SPL(dB)	LINE
Cooling	50	○—○
Heating	52	●—●



PUMY-P140VKM6(-BS)
PUMY-P140YKM5(-BS)
PUMY-P140VKM6-ER(BS)
PUMY-P140YKM5-ER(BS)

Mode	SPL(dB)	LINE
Cooling	51	○—○
Heating	53	●—●





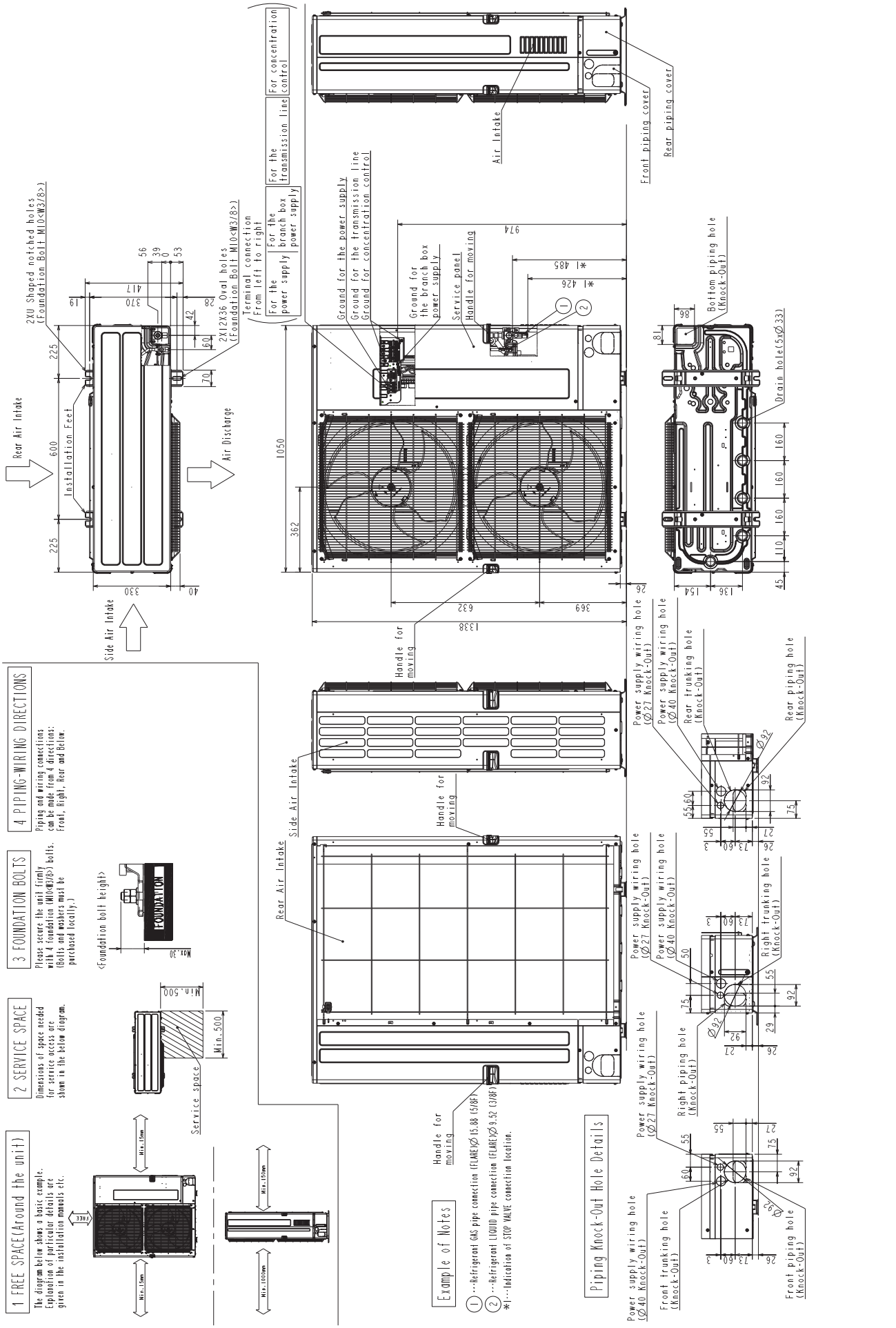
6 OUTLINES AND DIMENSIONS

PUMY-P112VKM6(-BS)
PUMY-P112VKM6-ER(BS)

PUMY-P125VKM6(-BS)
PUMY-P125VKM6-ER(BS)

PUMY-P140VKM6(-BS)
PUMY-P140VKM6-ER(BS)

Unit: mm

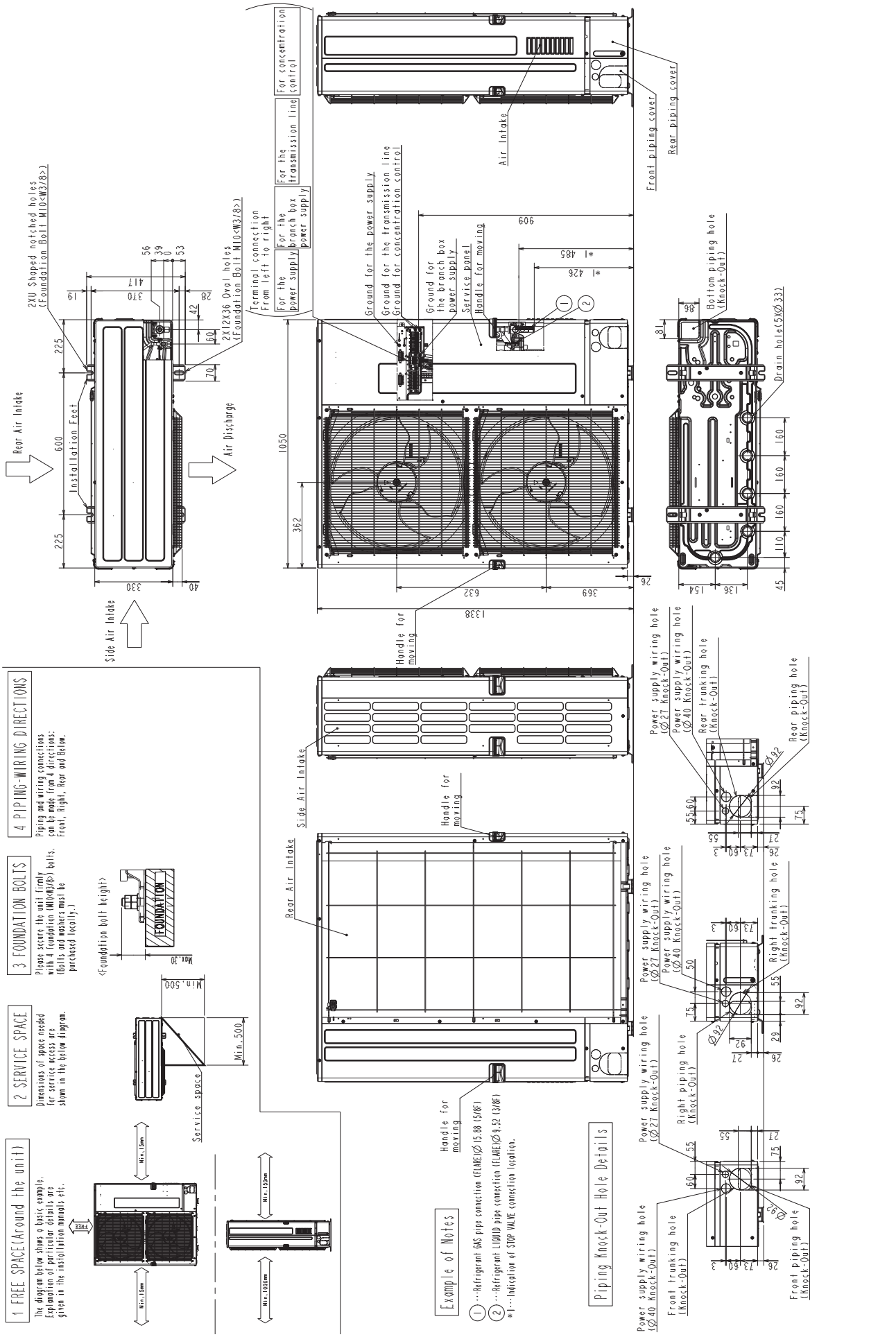


PUMY-P112YKM5(-BS)
PUMY-P112YKM5-ER(BS)

PUMY-P125YKM5(-BS)
PUMY-P125YKM5-ER(BS)

PUMY-P140YKM5(-BS)
PUMY-P140YKM5-ER(BS)

Unit: mm

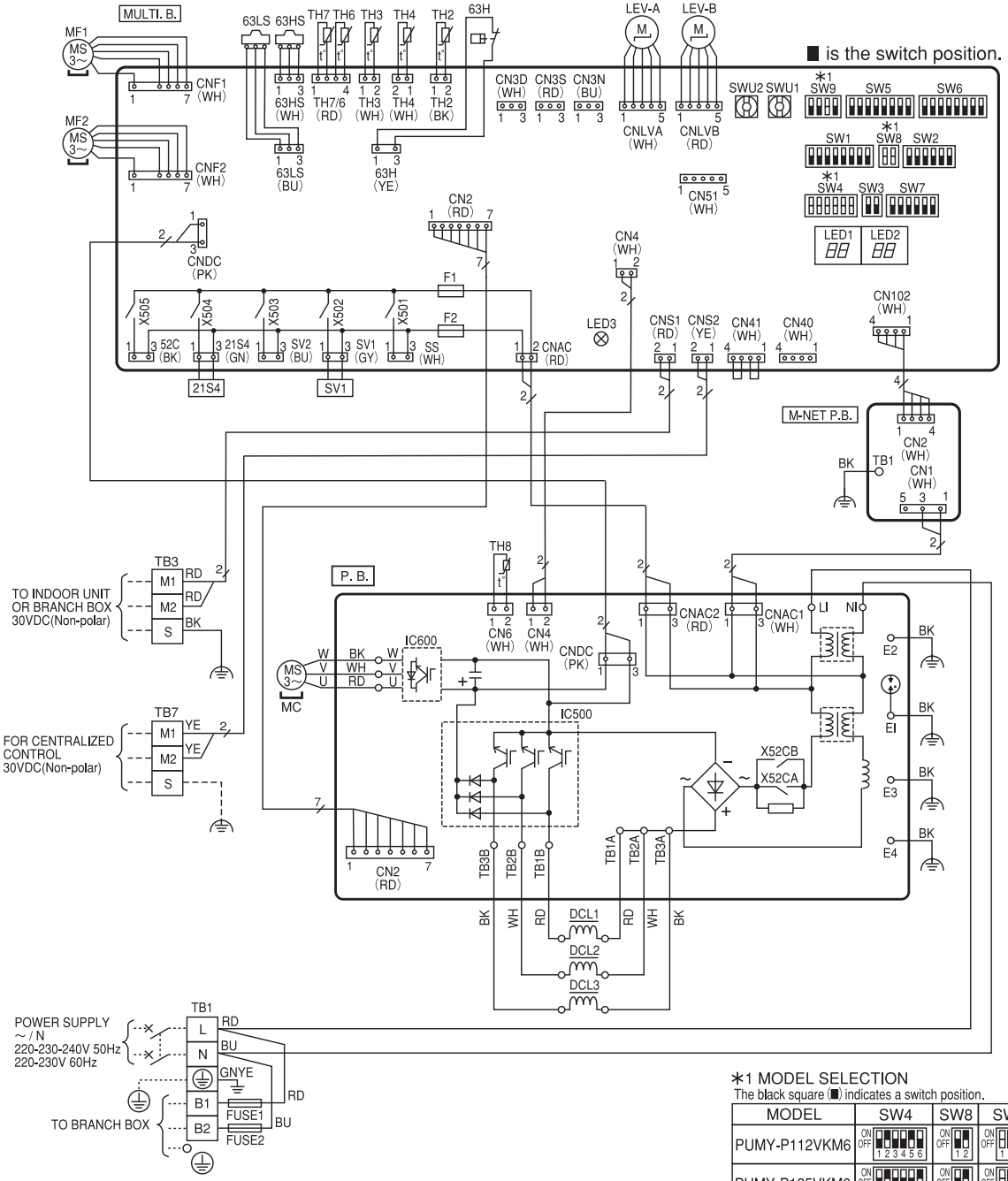


7 WIRING DIAGRAM

PUMY-P112VKM6(-BS)
PUMY-P112VKM6-ER(BS)

PUMY-P125VKM6(-BS)
PUMY-P125VKM6-ER(BS)

PUMY-P140VKM6(-BS)
PUMY-P140VKM6-ER(BS)



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

MODEL	SW4	SW8	SW9
PUMY-P112VKM6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 1 2 3 4
PUMY-P125VKM6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 1 2 3 4
PUMY-P140VKM6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 1 2 3 4

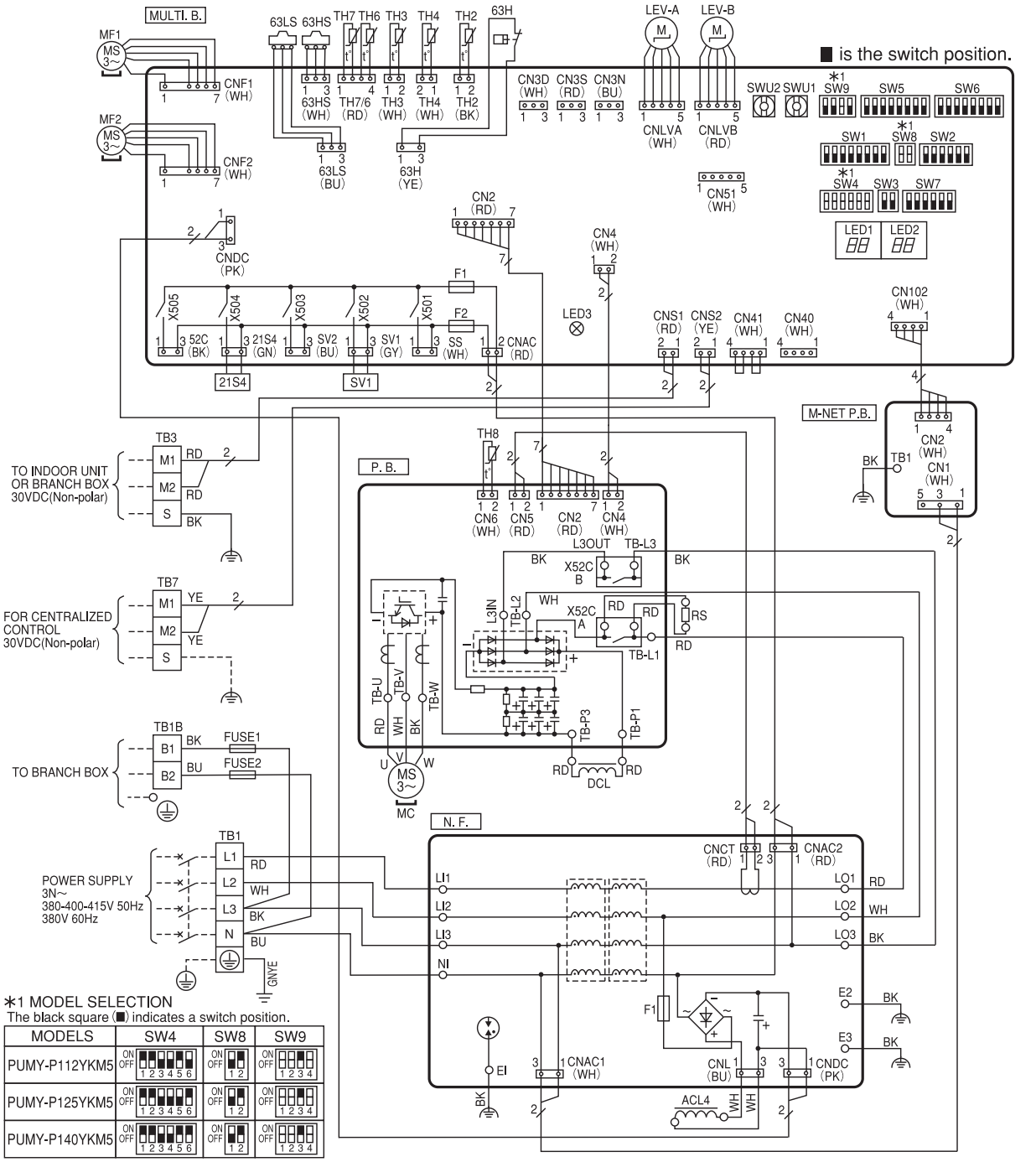
【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block〈Power Supply〉	TH8	Thermistor〈Heat Sink〉	SW5	Switch〈Function Selection〉
TB3	Terminal Block〈Indoor/Outdoor, Branch Box/Outdoor Transmission Line〉	LEV-A, LEV-B	Linear Expansion Valve	SW6	Switch〈Function Selection〉
		DCL1, DCL2, DCL3	Reactor	SW7	Switch〈Function Selection〉
TB7	Terminal Block〈Centralized Control Transmission Line〉	P.B.	Power Circuit Board	SW8	Switch〈Model Selection〉
		U/V/W	Connection Terminal〈U/V/W-Phase〉	SW9	Switch〈Function/Model Selection〉
FUSE1, FUSE2	Fuse〈T20AL250V〉	LI	Connection Terminal〈L-Phase〉	SWU1	Switch〈Unit Address Selection, ones digit〉
MC	Motor for Compressor	NI	Connection Terminal〈N-Phase〉	SWU2	Switch〈Unit Address Selection, tens digit〉
MF1, MF2	Fan Motor	TB1A, TB2A, TB3A TB1B, TB2B, TB3B	Connection Terminal〈Reactor〉	SS	Connector〈Connection for Option〉
21S4	Solenoid Valve Coil〈4-Way Valve〉			CN3D	Connector〈Connection for Option〉
63H	High Pressure Switch	IC500	Converter	CN3S	Connector〈Connection for Option〉
63HS	High Pressure Sensor	IC600	Inverter	CN3N	Connector〈Connection for Option〉
63LS	Low Pressure Sensor	EI, E2, E3, E4	ConnectionTerminal〈Electrical Parts Box〉	CN51	Connector〈Connection for Option〉
SV1	Solenoid Valve Coil〈Bypass Valve〉	X52CA, X52CB	Relay	LED1, LED2	LED〈Operation Inspection Display〉
TH2	Thermistor〈HIC Pipe〉	MULTI.B.	Multi Controller Circuit Board	LED3	LED〈Power Supply to Main Microcomputer〉
TH3	Thermistor〈Outdoor Liquid Pipe〉	SW1	Switch〈Display Selection〉	F1, F2	Fuse〈T6.3AL250V〉
TH4	Thermistor〈Compressor〉	SW2	Switch〈Function Selection〉	X501～X505	Relay
TH6	Thermistor〈Suction Pipe〉	SW3	Switch〈Test Run〉	M-NET P.B.	M-NET Power Circuit Board
TH7	Thermistor〈Ambient〉	SW4	Switch〈Model Selection〉	TB1	ConnectionTerminal〈Electrical Parts Box〉

PUMY-P112YKM5(-BS)
PUMY-P112YKM5-ER(BS)

PUMY-P125YKM5(-BS)
PUMY-P125YKM5-ER(BS)

PUMY-P140YKM5(-BS)
PUMY-P140YKM5-ER(BS)



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

MODELS	SW4	SW8	SW9
PUMY-P112YKM5	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 1 2 3 4
PUMY-P125YKM5	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 1 2 3 4
PUMY-P140YKM5	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 1 2 3 4

【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block 〈Power Supply〉	TH8	Thermistor 〈Heat Sink〉	SW4	Switch 〈Model Selection〉
TB1B	Terminal Block 〈Branch Box〉	RS	Rush Current Protect Resistor	SW5	Switch 〈Function Selection〉
TB3	Terminal Block 〈Indoor/Outdoor, Branch Box/Outdoor Transmission Line〉	LEV-A,LEV-B	Linear Expansion Valve	SW6	Switch 〈Function Selection〉
		ACL4	Reactor	SW7	Switch 〈Function Selection〉
TB7	Terminal Block 〈Centralized Control Transmission Line〉	DCL	Reactor	SW8	Switch 〈Model Selection〉
		P.B.	Power Circuit Board	SW9	Switch 〈Function/Model Selection〉
FUSE1,FUSE2	Fuse 〈T20AL250V〉	TB-U/V/W	Connection Terminal 〈U/V/W-Phase〉	SWU1	Switch 〈Unit Address Selection, ones digit〉
MC	Motor for Compressor	TB-L1/L2/L3	Connection Terminal 〈L1/L2/L3-Power Supply〉	SWU2	Switch 〈Unit Address Selection, tens digit〉
MF1,MF2	Fan Motor	TB-P1/P3	Connection Terminal 〈Reactor〉	SS	Connector 〈Connection for Option〉
21S4	Solenoid Valve Coil 〈4-Way Valve〉	X52CA/B	52C Relay	CN3D	Connector 〈Connection for Option〉
63H	High Pressure Switch	N.F.	Noise Filter Circuit Board	CN3S	Connector 〈Connection for Option〉
63HS	High Pressure Sensor	LO1/LO2/LO3	Connection Terminal 〈L1/L2/L3-Power Supply〉	CN3N	Connector 〈Connection for Option〉
63LS	Low Pressure Sensor	LI1/LI2/LI3/NI	Connection Terminal 〈L1/L2/L3/N-Power Supply〉	CN51	Connector 〈Connection for Option〉
SV1	Solenoid Valve Coil 〈Bypass Valve〉	EI,E2,E3	ConnectionTerminal 〈Electrical Parts Box〉	LED1,LED2	LED 〈Operation Inspection Display〉
TH2	Thermistor 〈HIC Pipe〉	F1	Fuse 〈T6.3AL250V〉	LED3	LED 〈Power Supply to Main Microcomputer〉
TH3	Thermistor 〈Outdoor Liquid Pipe〉	MULTI.B.	Multi Controller Circuit Board	F1,F2	Fuse 〈T6.3AL250V〉
TH4	Thermistor 〈Compressor〉	SW1	Switch 〈Display Selection〉	X501～505	Relay
TH6	Thermistor 〈Suction Pipe〉	SW2	Switch 〈Function Selection〉	M-NET P.B.	M-NET Power Circuit Board
TH7	Thermistor 〈Ambient〉	SW3	Switch 〈Test Run〉	TB1	ConnectionTerminal 〈Electrical Parts Box〉

8 TROUBLESHOOTING

8-1. Checkpoints for test run

8-1-1. Procedures before test run

1. Before a test run, make sure that the following work is completed.
   • Installation related:
   Make sure that the panel of cassette type is installed and electrical wiring is done.
   Otherwise electrical functions like auto vane will not operate normally.
   • Piping related:
   Perform leakage test of refrigerant and drain piping. Make sure that all joints are perfectly insulated.
   Check stop valves on both liquid and gas sides are fully open.
   • Electrical wiring related:
   Check ground wire, transmission cable, remote controller cable, and power supply cable for secure connection.
   Make sure that all switch settings of address or adjustments for special specification systems are correctly made.
2. Safety check:
   • With the insulation 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 less than 1.0 MΩ.
   • Inspect between the outdoor unit power supply terminal block and ground first, metallic parts like refrigerant pipes or the electrical box next, then inspect all electrical wiring of outdoor unit, indoor unit, and all linked equipment.
3. Before operation:
   • For compressor protection, turn on the breaker for the outdoor unit and wait at least 12 hours before a test run.
   • Register control systems into remote controller(s). Never touch the on/off switch of the remote controller(s). Refer to ″Special function operation setting (for M-NET Remote Controller)″ as for settings.
   In MA remote controller(s), this registration is unnecessary.
4. More than 12 hours later after turning on the power to the outdoor unit, turn on all the power switches for the test run.
   Perform test run and make test run reports.

8-1-2. Test run for M-NET remote controller

Refer to “Test run” for operation procedure.

8-1-3. Countermeasures for error during test run

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

Error code (2 digits)	Error code (4 digits)	Trouble	Detected Unit			Remarks
			Indoor	Outdoor	Remote Controller	
Ed	0403	Serial communication error/Model selection SW error		O		Outdoor unit outdoor multi controller circuit board – Power circuit board communication trouble Incorrect setting of model selection
U2	1102	Compressor temperature trouble		O		Check delay code 1202
UE	1302	High pressure trouble		O		Check delay code 1402
U7	1500	Superheat due to low discharge temperature trouble		O		Check delay code 1600
U2	1501	Refrigerant shortage trouble		O		Check delay code 1601
		Closed valve in cooling mode		O		Check delay code 1501
P6	1503	Freeze protection of plate heat exchanger	O			
		Freeze protection of branch box or indoor unit	O			
EF	1508	4-way valve trouble in heating mode		O		Check delay code 1608
L6	2135	Circulation water freeze protection	O			
PA	2500	Water leakage	O			
P5	2502	Drain overflow protection	O			
P4	2503	Drain sensor abnormality	O			
UF	4100	Compressor current interruption (locked compressor)		O		Check delay code 4350
Pb	4114	Fan trouble (Indoor unit)	O			
UP	4210	Compressor overcurrent interruption		O		
U9	4220	Voltage shortage/overvoltage/PAM error/L1 open phase/primary current sensor error/power synchronization signal error		O		Check delay code 4320
U5	4230	Heat sink temperature trouble		O		Check delay code 4330
U6	4250	Power module trouble		O		Check delay code 4350
U8	4400	Fan trouble (Outdoor unit)		O		Check delay code 4500
U3	5101	Air inlet thermistor (TH21) open/short	O			
		Compressor temperature thermistor (TH4) open/short		O		Check delay code 1202
U4	5102	Liquid pipe temperature thermistor (TH22) open/short	O			
		Suction pipe temperature thermistor (TH6) open/short		O		Check delay code 1211
U4	5103	Gas pipe temperature thermistor (TH23) open/short	O			
U4	5105	Outdoor liquid pipe temperature thermistor (TH3) open/short		O		Check delay code 1205
U4	5106	Ambient temperature thermistor (TH7) open/short		O		Check delay code 1221
U4	5109	HIC pipe temperature thermistor (TH2) open/short		O		Check delay code 1222
U4	5110	Heat sink temperature thermistor (TH8) open/short		O		Check delay code 1214
F5	5201	High pressure sensor (63HS) trouble		O		Check delay code 1402
F3	5202	Low pressure sensor (63LS) trouble		O		Check delay code 1400
UH	5300	Primary current error		O		Check delay code 4310
P4	5701	Contact failure of drain float switch	O			
A0	6600	Duplex address error	O	O	O	Only M-NET Remote controller is detected.
A2	6602	Transmission processor hardware error	O	O	O	Only M-NET Remote controller is detected.
A3	6603	Transmission bus BUSY error	O	O	O	Only M-NET Remote controller is detected.
A6	6606	Signal communication error with transmission processor	O	O	O	Only M-NET Remote controller is detected.
A7	6607	No ACK error	O		O	Only M-NET Remote controller is detected.
A8	6608	No response frame error	O		O	Only M-NET Remote controller is detected.
E0/E4	6831	MA communication receive error	O		O	Only MA Remote controller is detected.
E3/E5	6832	MA communication send error	O		O	Only MA Remote controller is detected.
E3/E5	6833	MA communication send error	O		O	Only MA Remote controller is detected.
E0/E4	6834	MA communication receive error	O		O	Only MA Remote controller is detected.
EF	7100	Total capacity error		O		
EF	7101	Capacity code error	O	O		
EF	7102	Connecting excessive number of units and branch boxes		O		
EF	7105	Address setting error		O		
EF	7130	Incompatible unit combination		O		

Notes:
- When the outdoor unit detects No ACK error/No response error, the target indoor unit is treated as a stop, and not assumed to be abnormal.
- The error codes displayed on the units may be different between the error source and others. In that case, please refer to the error code of error source by displayed attribute and address.
- Refer to the service manual of indoor unit or remote controller for the detail of error detected in indoor unit or remote controller.

■ Self-diagnosis function

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

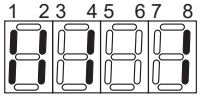
■ During normal operation

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

- Example

When the compressor and SV1 are on during cooling operation.



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

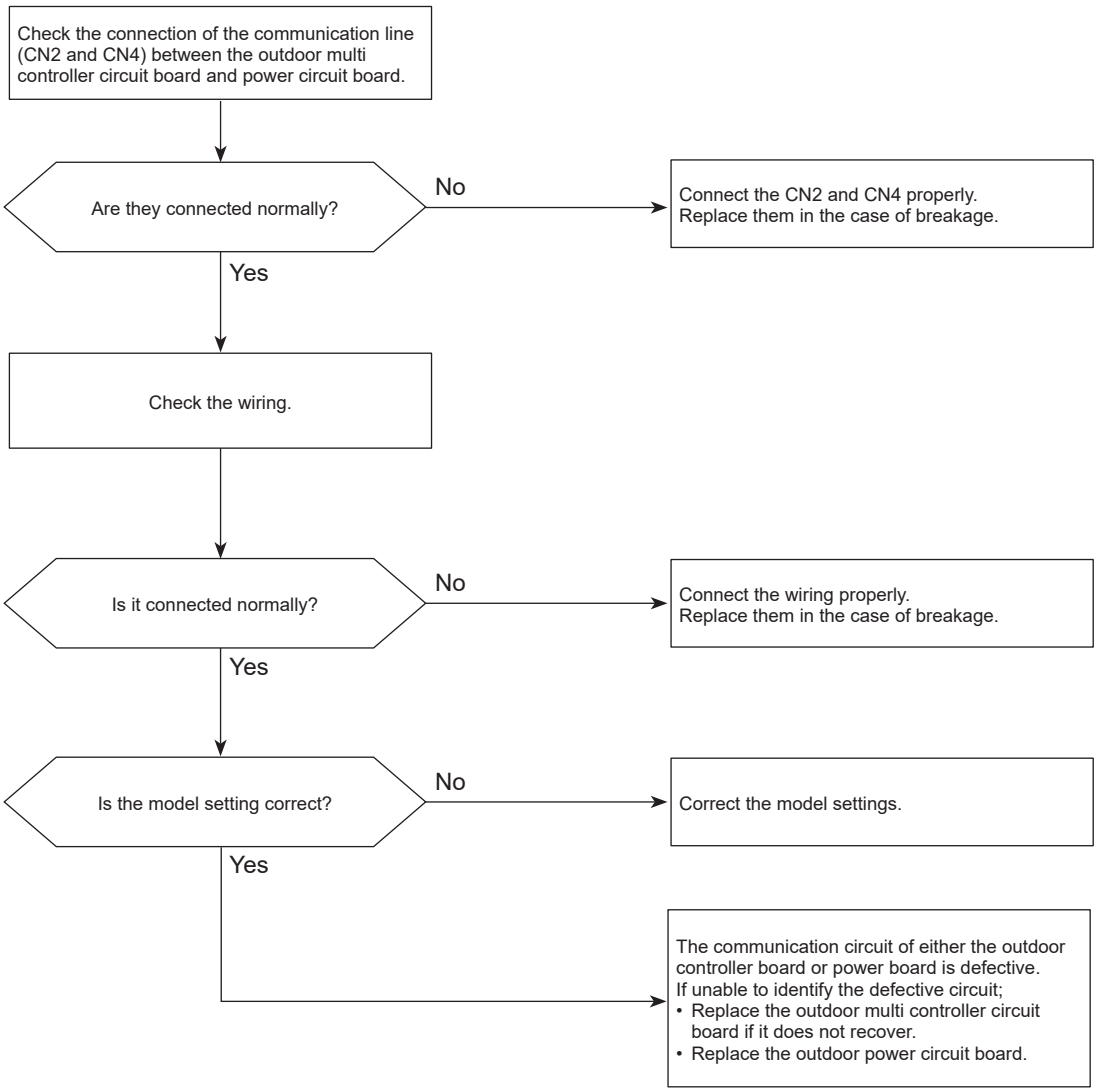
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



1102 (U2): Compressor temperature trouble

Abnormal points and detection methods

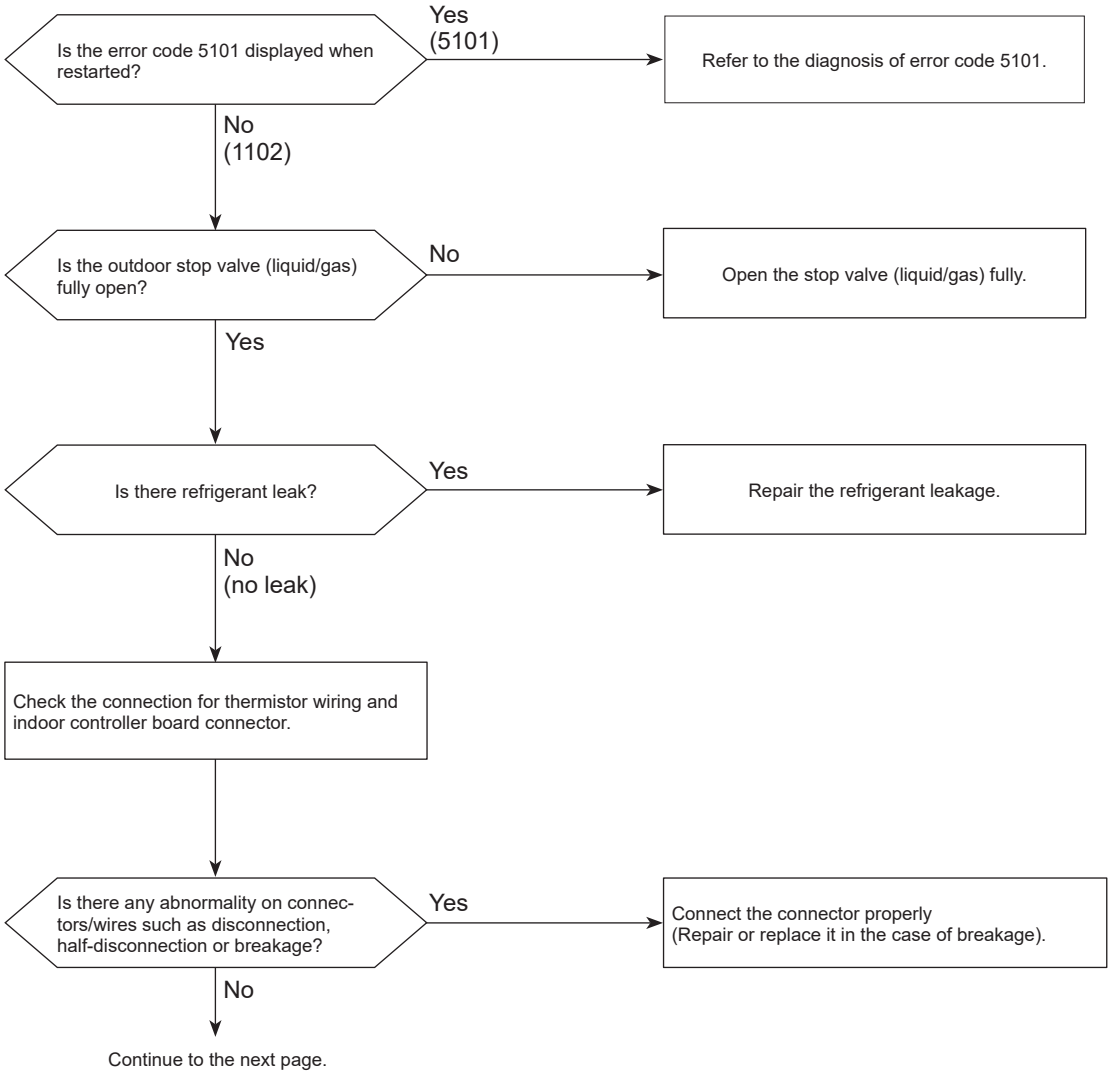
- TH4 falls into either of the following temperature conditions:
  - over 110°C [230°F] continuously for 5 minutes
  - over 125°C [257°F]
- The saturation temperature converted from the pressure detected by the high pressure sensor exceeds 40°C [104°F] during defrosting, and TH4 exceeds 110°C [230°F]

TH4:
Thermistor <Compressor>
LEV:
Linear expansion valve

Causes and checkpoints

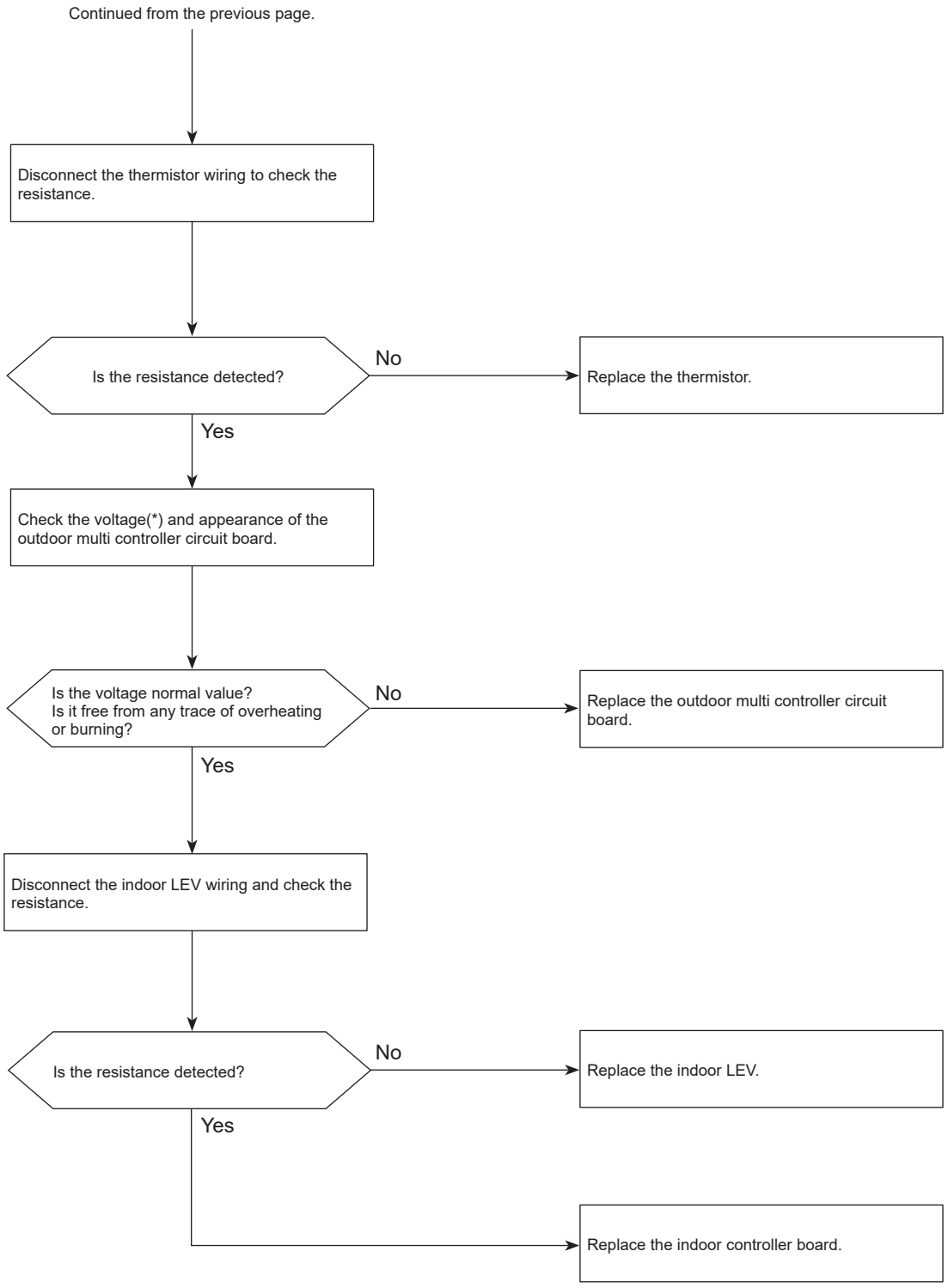
- Malfunction of stop valve
- Over-heated compressor operation caused by shortage of refrigerant
- Defective thermistor
- Defective outdoor multi controller circuit board
- LEV performance failure
- Defective indoor controller board
- Clogged refrigerant system caused by foreign object
- Refrigerant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

Diagnosis of failure



1102 (U2): Compressor temperature trouble

Diagnosis of failure



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

1302 (UE): High pressure trouble

Abnormal points and detection methods

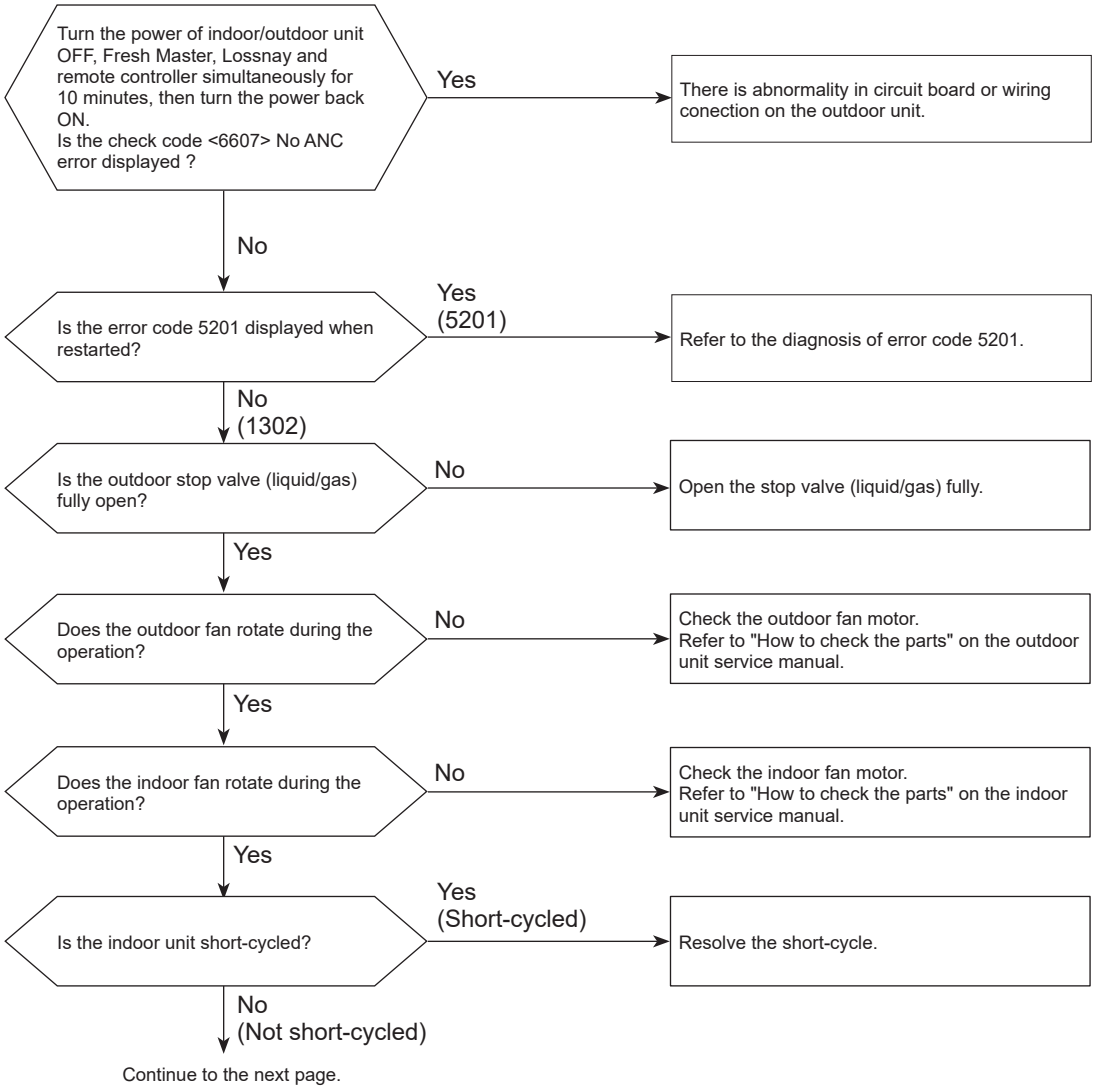
- High pressure abnormality (63H operation)
  63H operates(*) during compressor operation.
  (* 4.15 MPaG [602 psig])
- High pressure abnormality (63HS detected)
  - A pressure detected by 63HS is 4.31 MPaG [625 psig] or more during compressor operation.
  - A pressure detected by 63HS is 4.14 MPaG [600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

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

Causes and checkpoints

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

Diagnosis of failure



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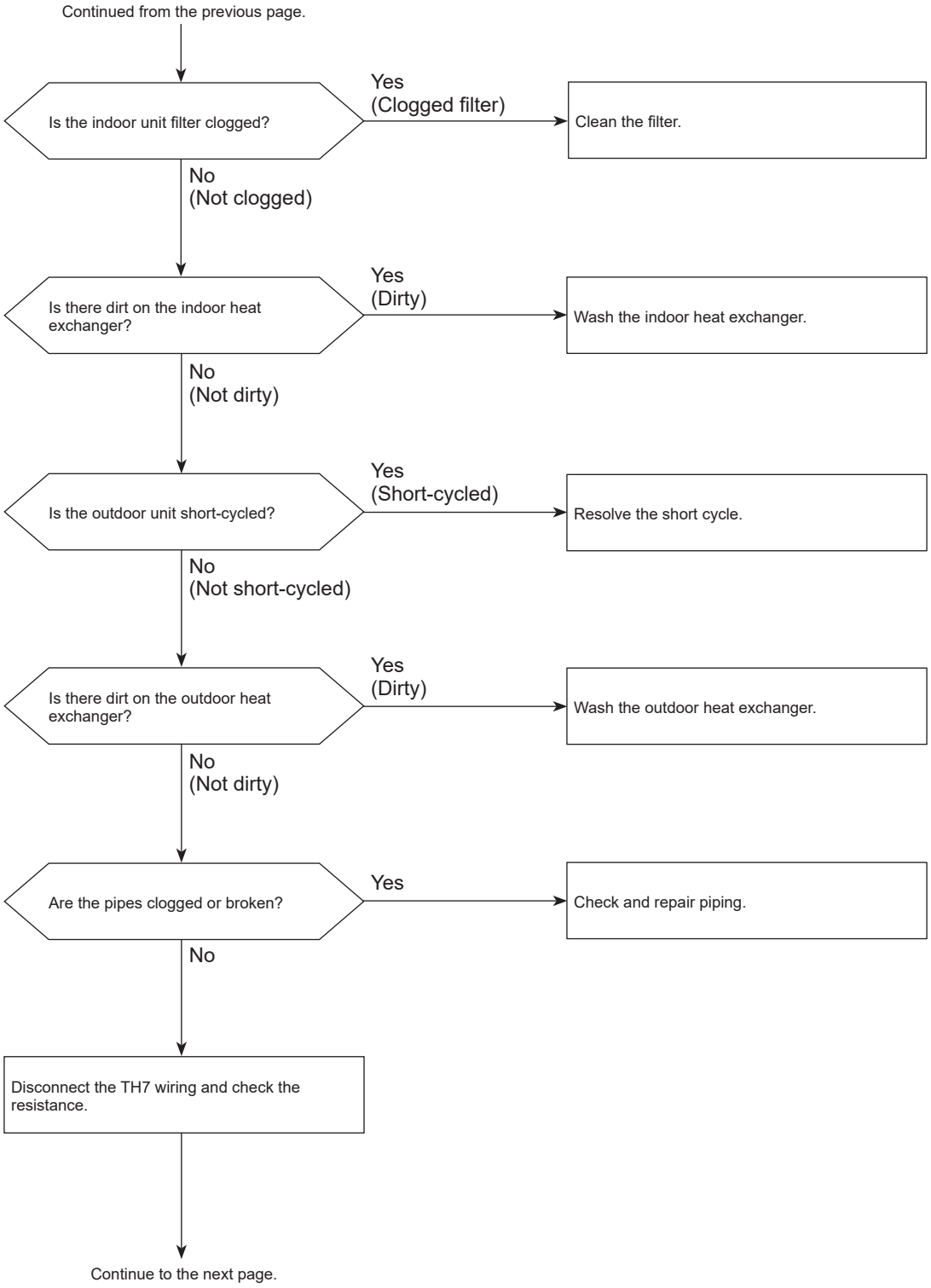
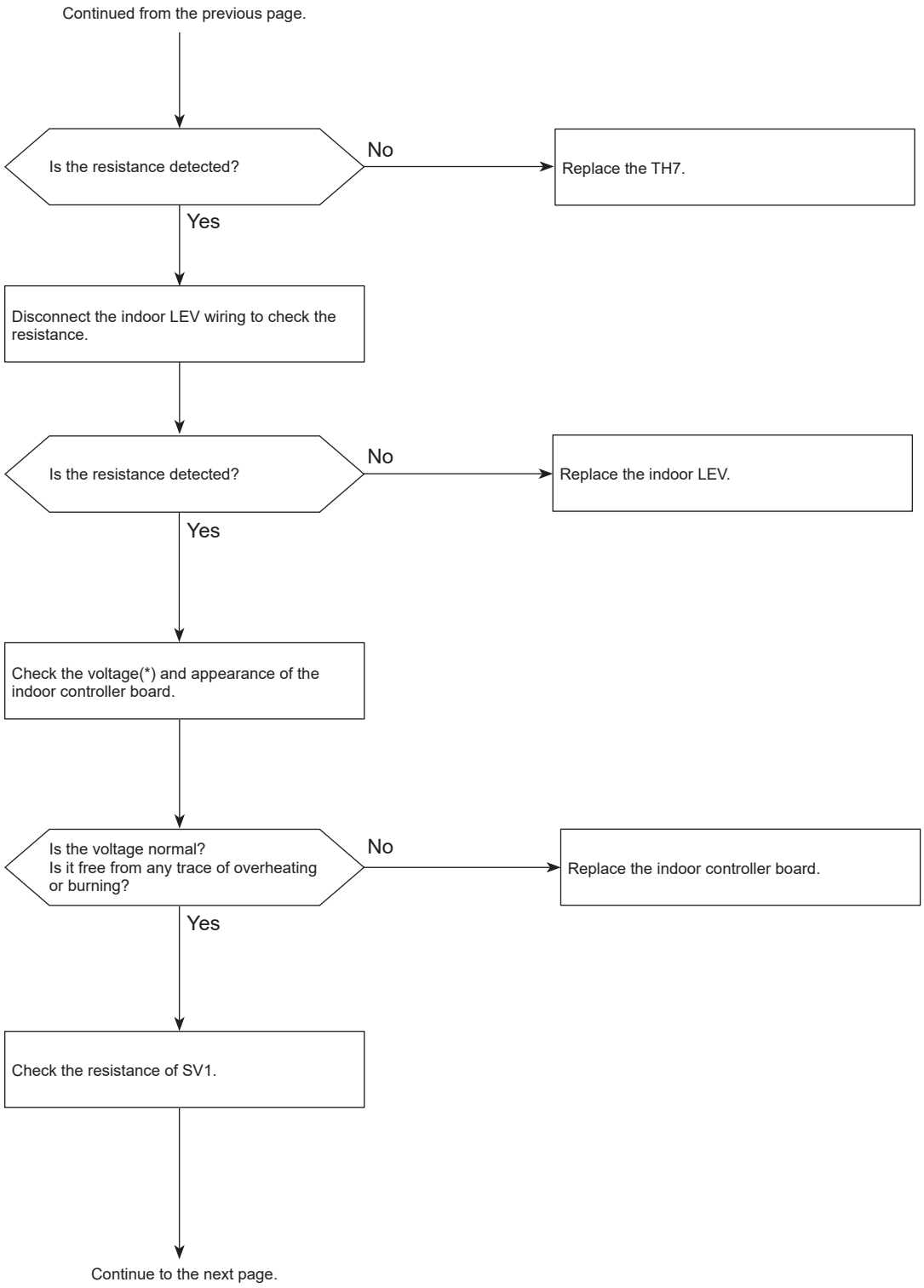
1302 (UE): High pressure trouble

Diagnosis of failure



1302 (UE): High pressure trouble

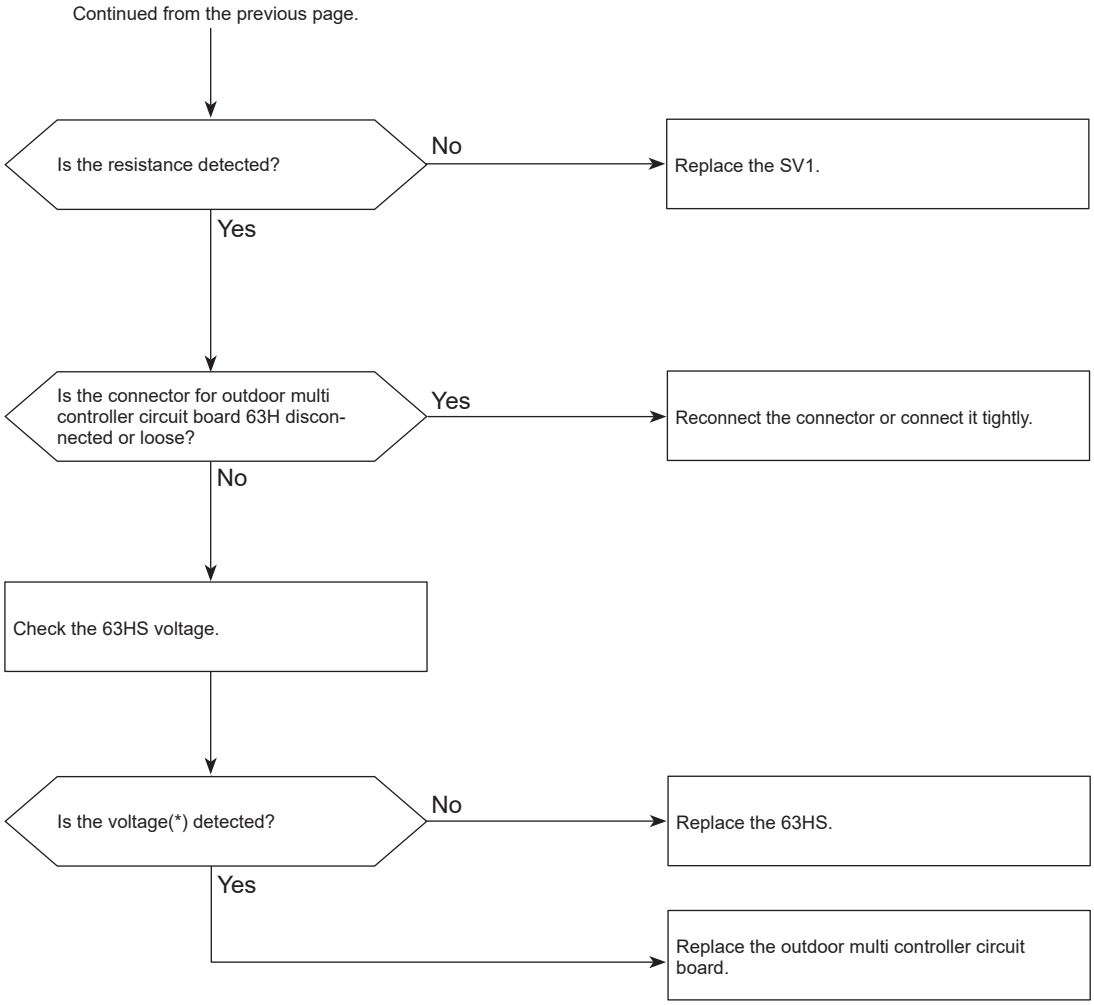
Diagnosis of failure



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

1302 (UE): High pressure trouble

Diagnosis of failure



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

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

Abnormal points and detection methods

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

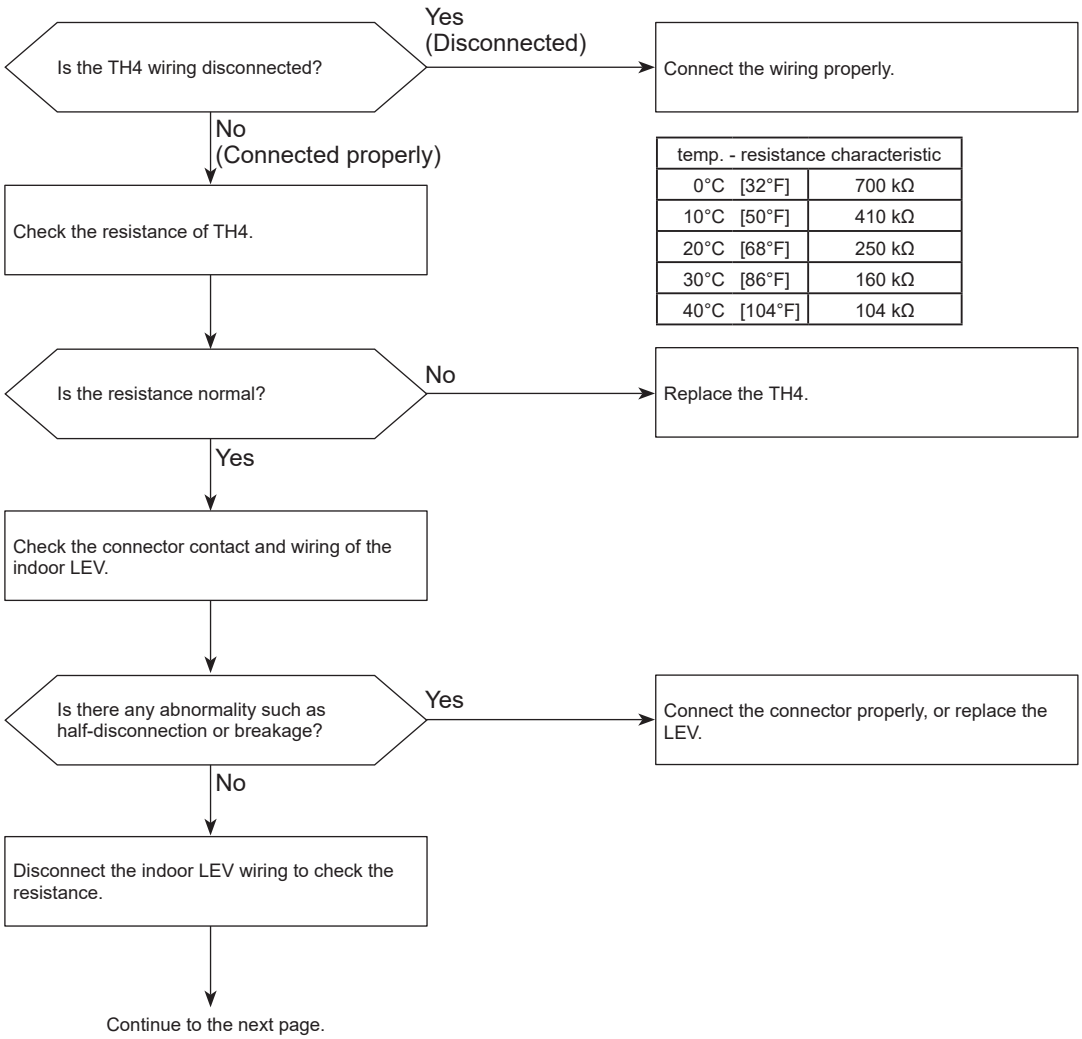
LEV:
Linear expansion valve
TH4:
Thermistor <Compressor>
63HS:
High pressure sensor

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

Causes and checkpoints

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

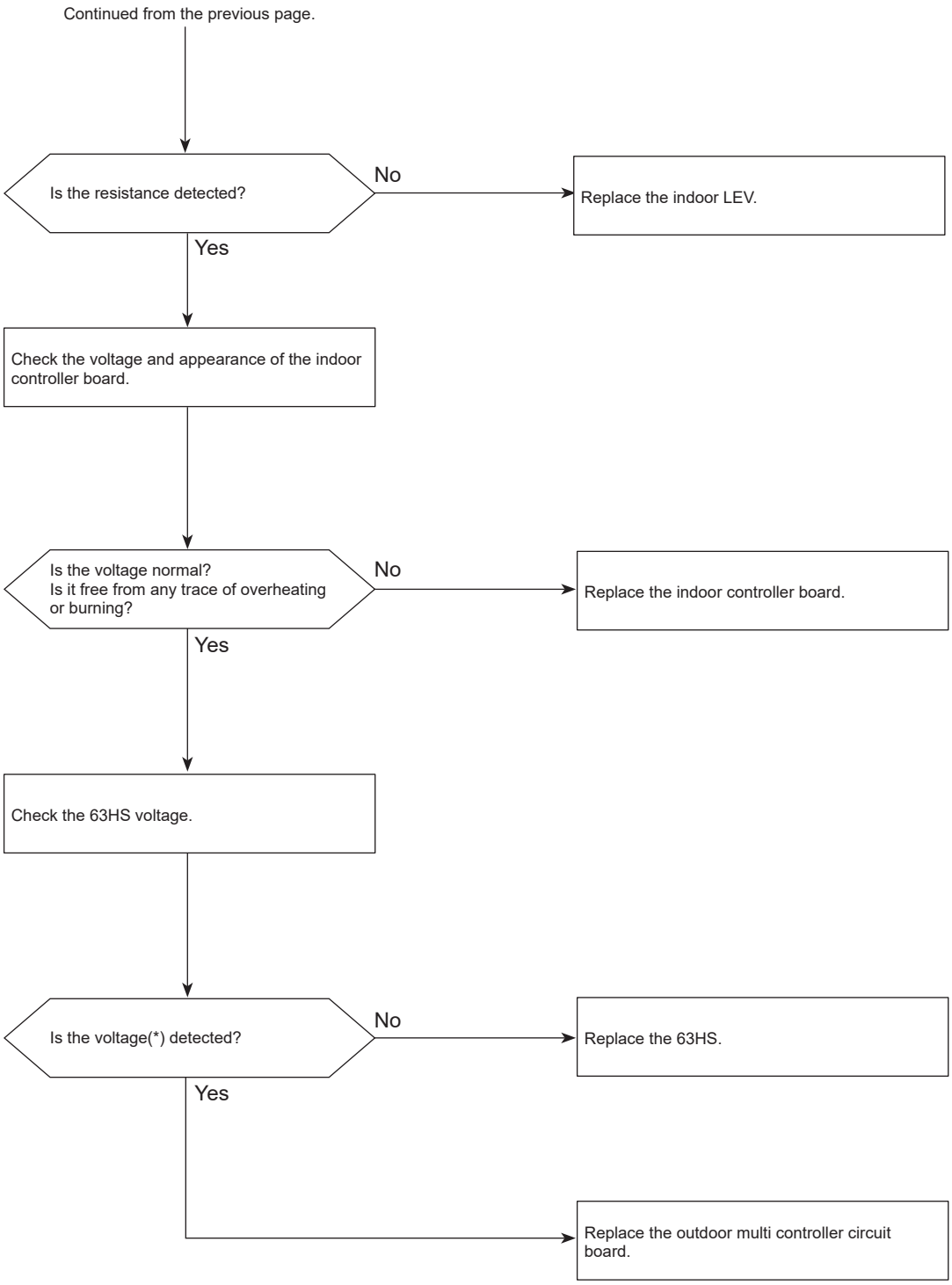
Diagnosis of failure



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

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

Diagnosis of failure



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

1501 (U2): Refrigerant shortage trouble

Abnormal points and detection methods

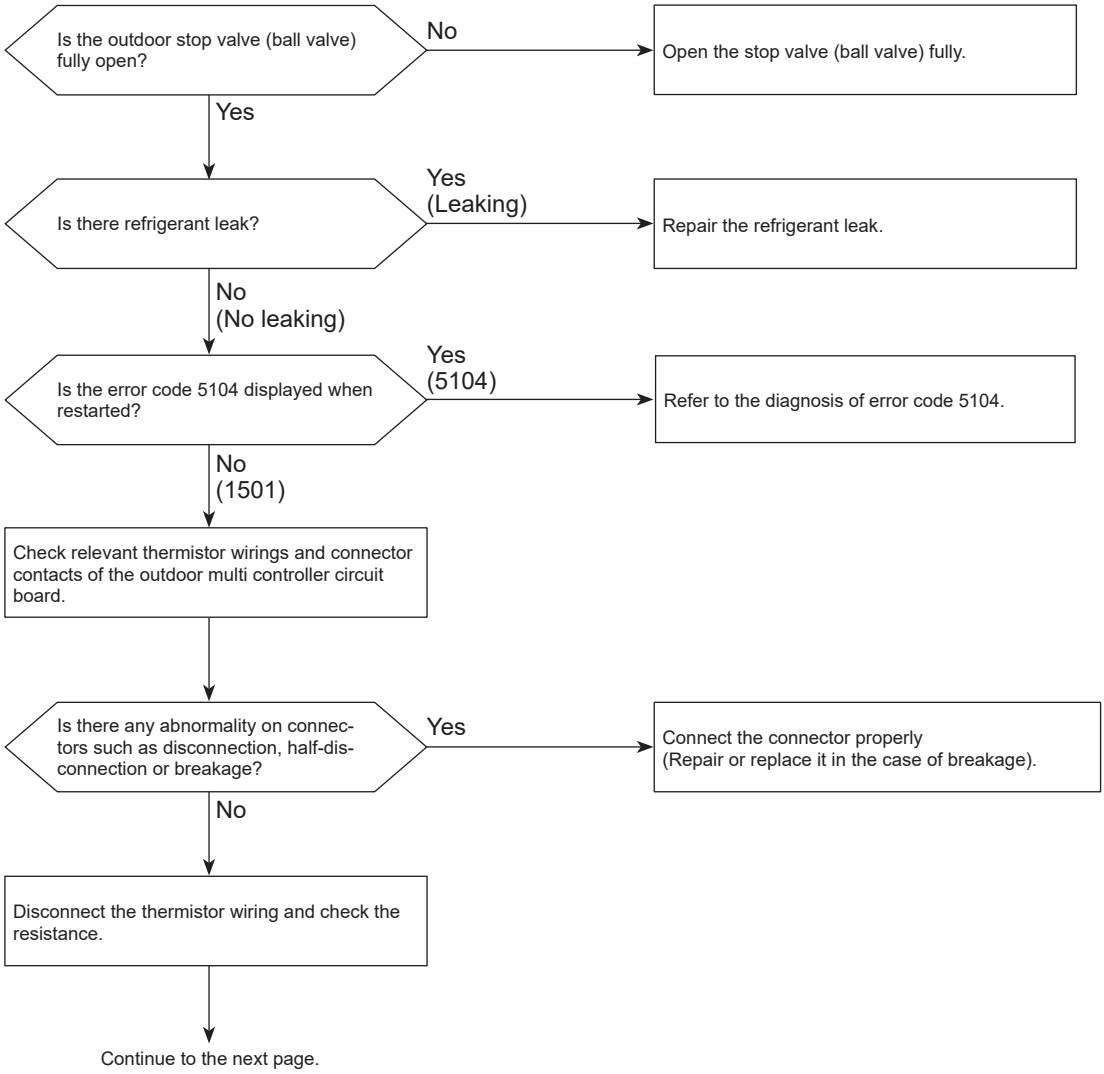
- All of the following conditions have been satisfied for 15 consecutive minutes:
  - The compressor is operating in HEAT mode.
  - Discharge superheat is 80°C [144°F] or more.
  - Difference between TH7 and TH3 fits the formula of TH7−TH3 < 5°C [9°F]
  - The saturation temperature converted from the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

Causes and checkpoints

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

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

Diagnosis of failure



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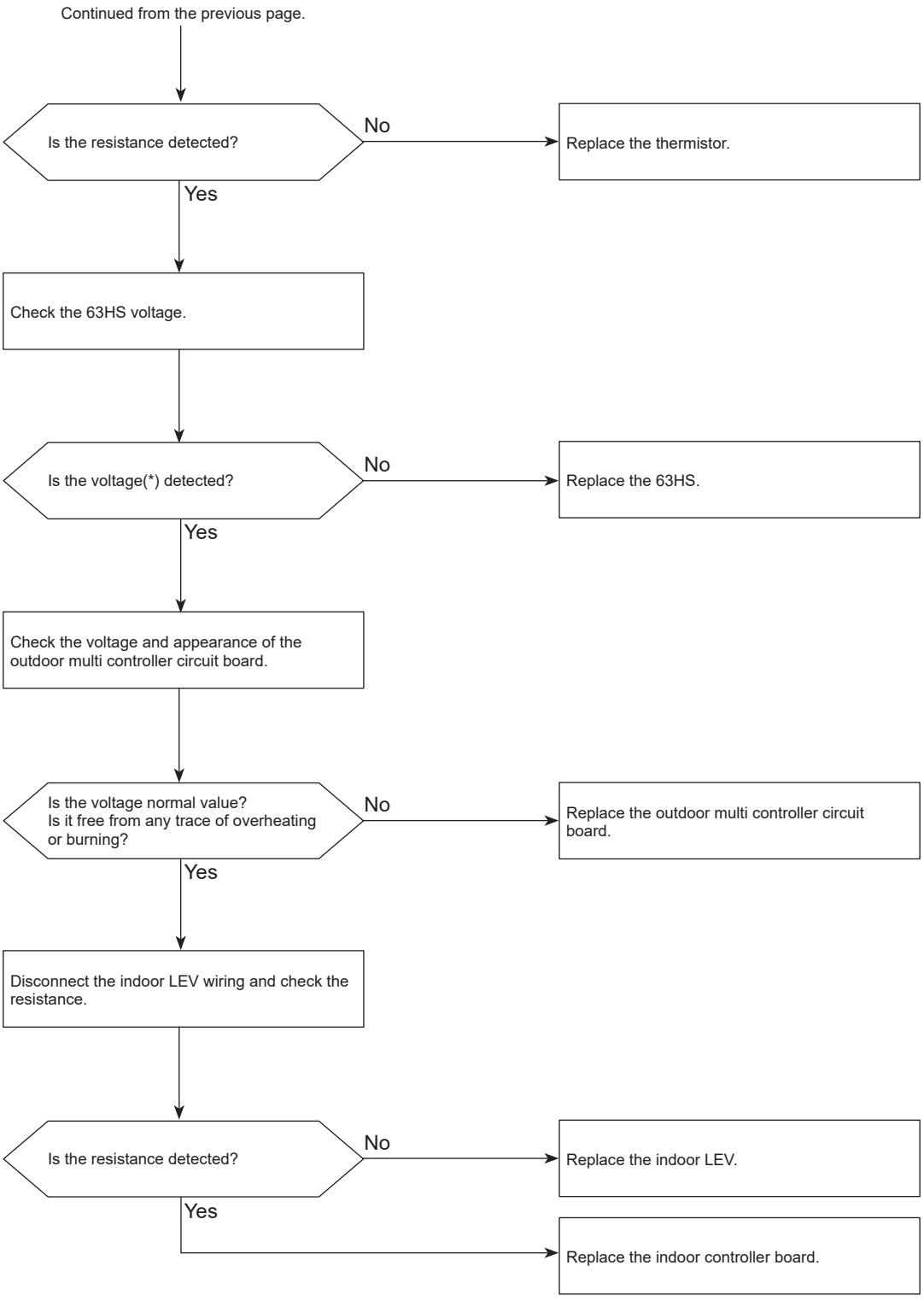
1501 (U2): Refrigerant shortage trouble

Diagnosis of failure



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

1501 (U2): Closed valve in cooling mode

Abnormal points and detection methods

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

TH22j−TH21j ≥ −2°C [−3.6°F]
TH23j−TH21j ≥ −2°C [−3.6°F]

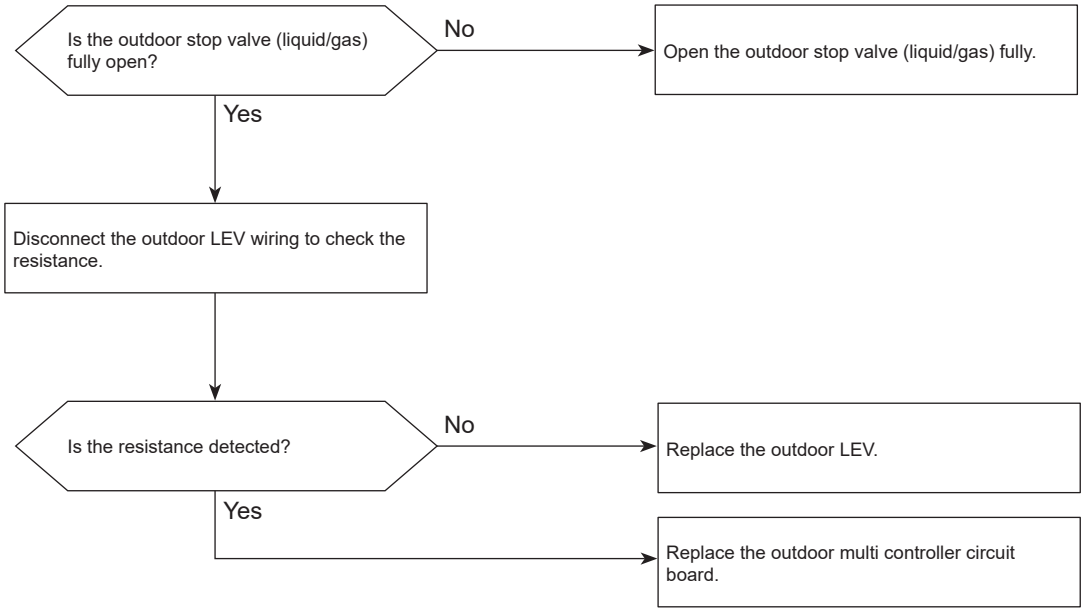
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

Causes and checkpoints

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

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

Diagnosis of failure



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

Abnormal points and detection methods

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

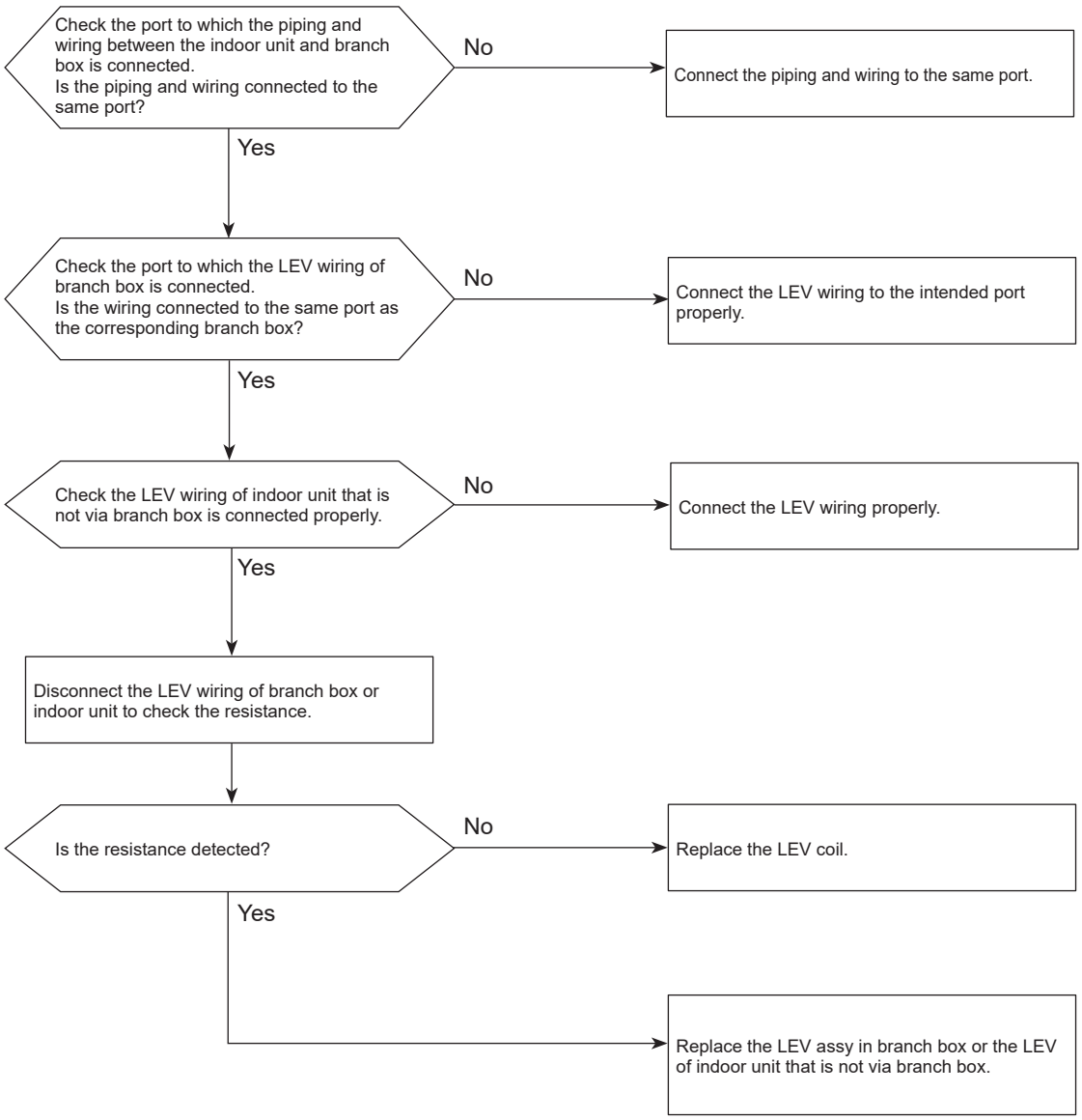
All of the following conditions have been satisfied:

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

Causes and checkpoints

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

Diagnosis of failure



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

Abnormal points and detection methods

4-way valve does not operate during heating operation.
Any of the following temperature conditions is satisfied for 3 minutes or more during heating operation

TH22j−TH21j ≤ −10°C [−18°F]
TH23j−TH21j ≤ −10°C [−18°F]
TH22j ≤ 3°C [37.4°F]
TH23j ≤ 3°C [37.4°F]

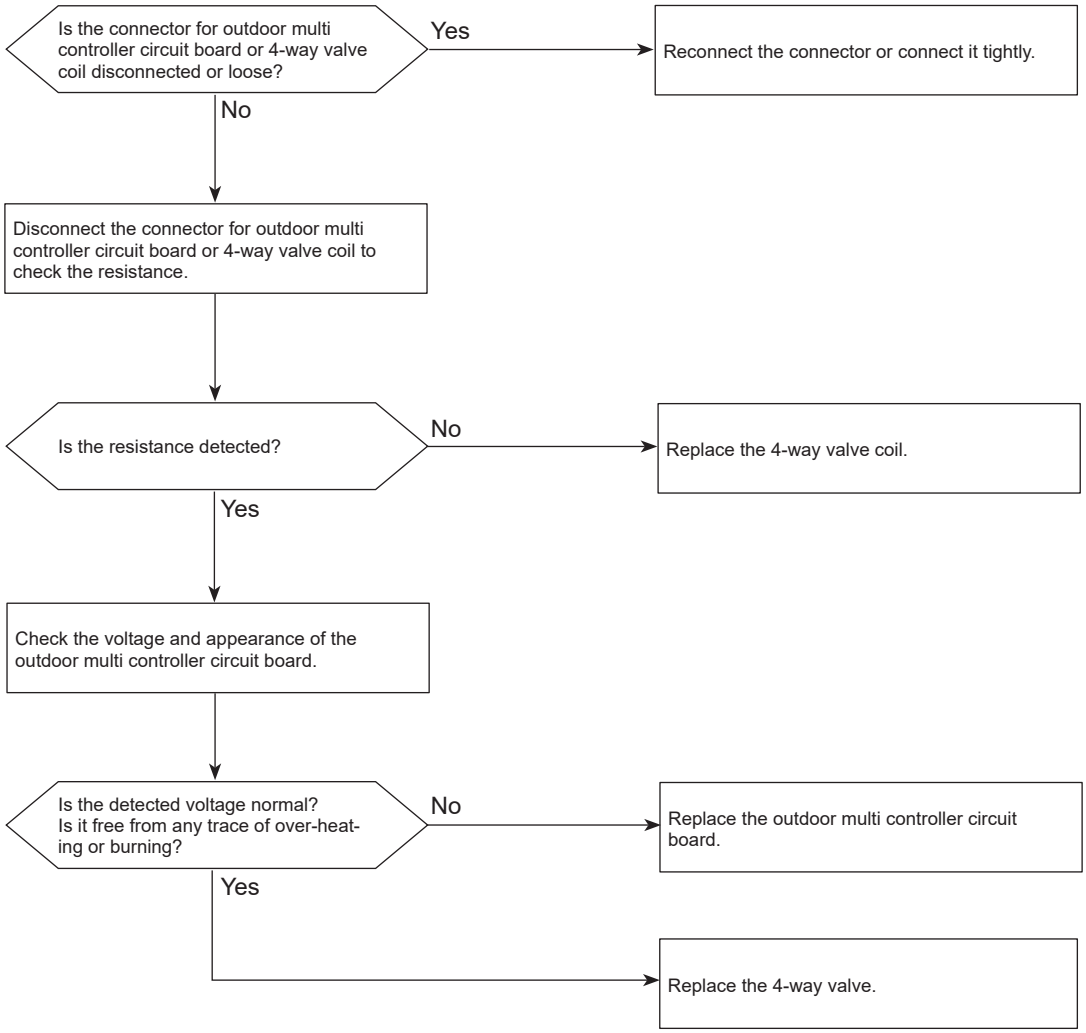
Note:
- For indoor unit, the abnormality is detected if an operating unit satisfies the condition.

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

Causes and checkpoints

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

Diagnosis of failure



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

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

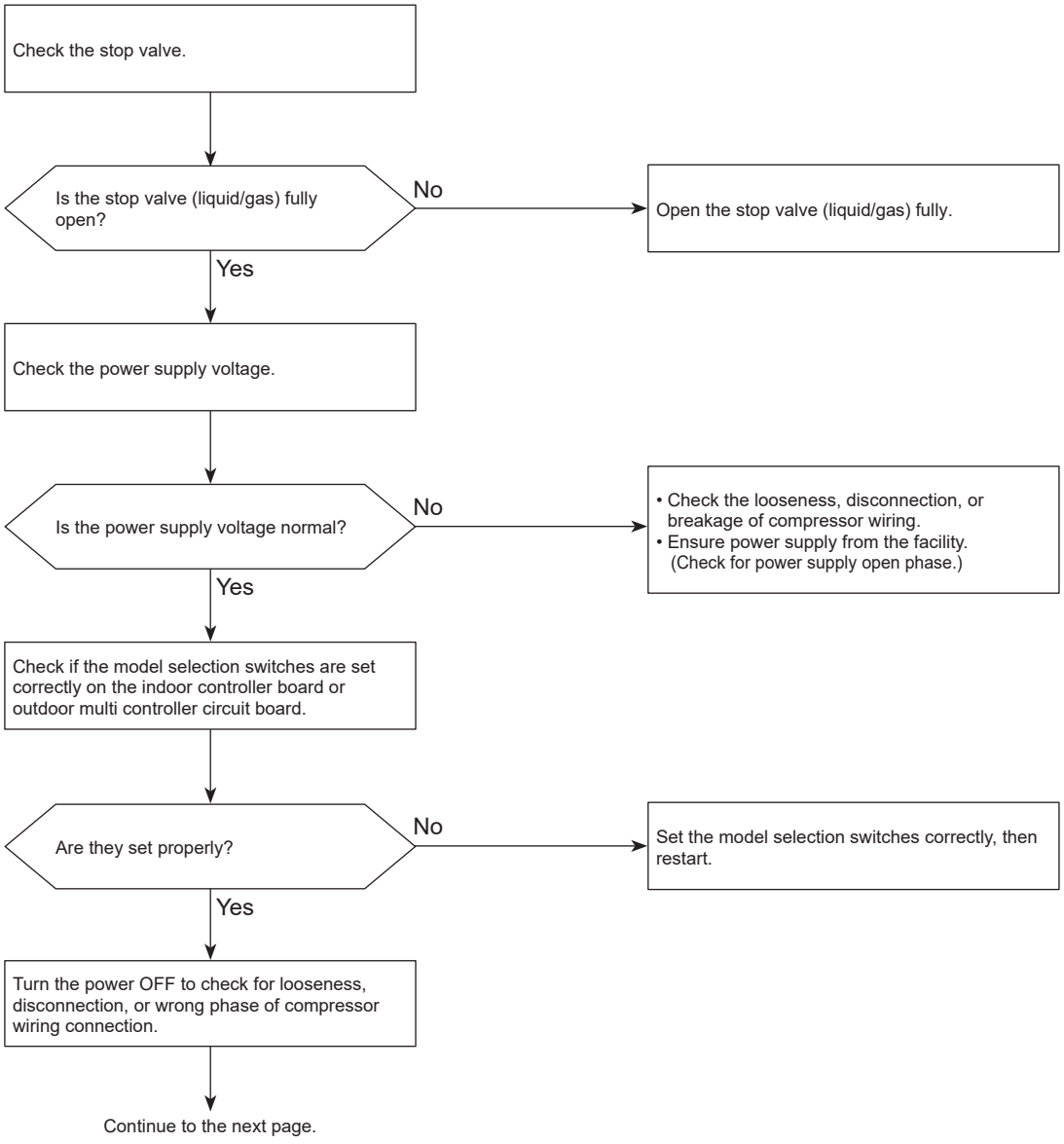
Abnormal points and detection methods

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

Causes and checkpoints

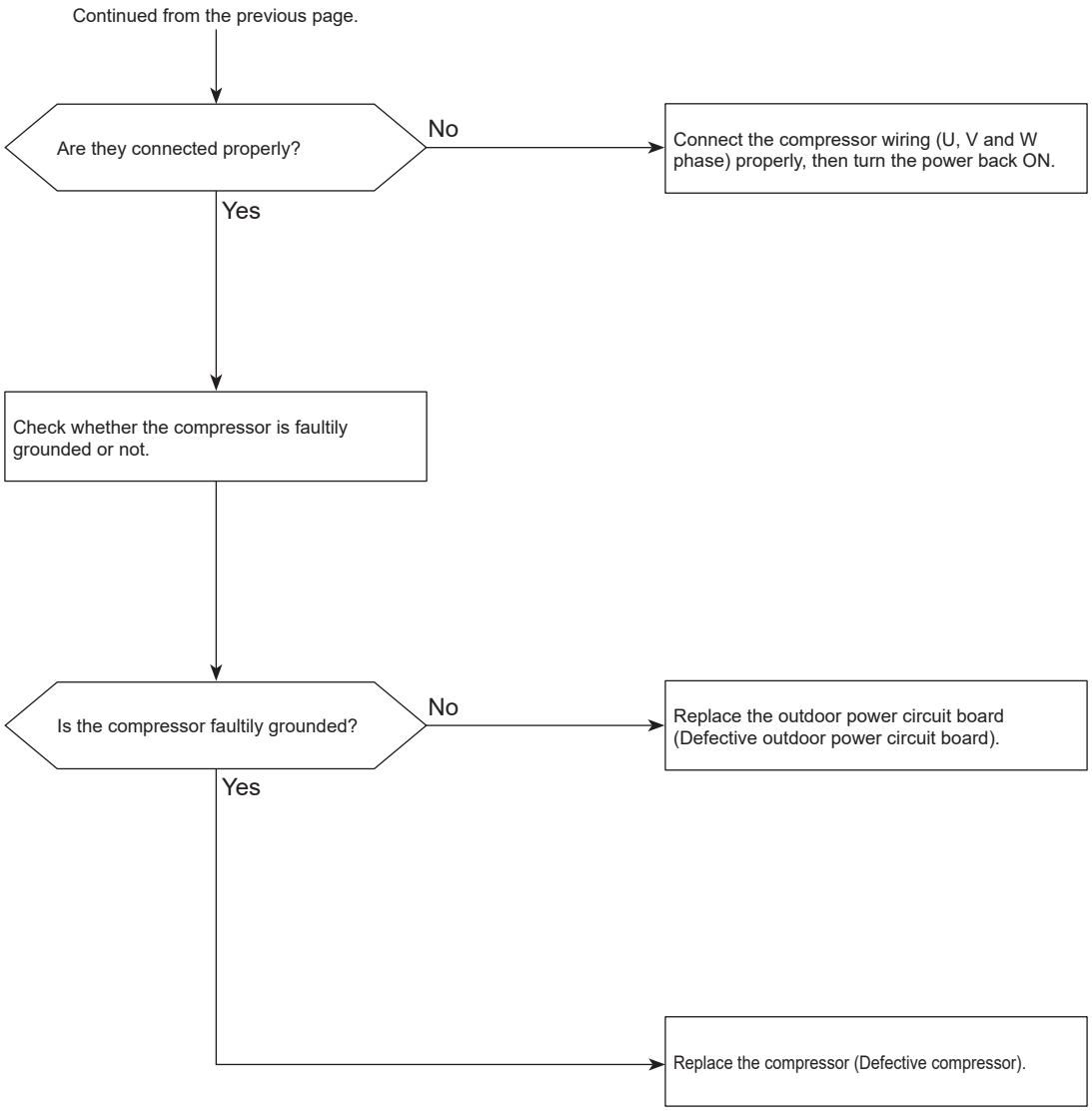
- Closed stop valve
- Decrease of power supply voltage
- Looseness, disconnection, or wrong phase of compressor wiring connection
- Incorrect DIP-SW setting of model selection on the outdoor controller board
- Defective compressor
- Defective outdoor power circuit board

Diagnosis of failure



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

Diagnosis of failure



4210 (UP): Compressor overcurrent interruption

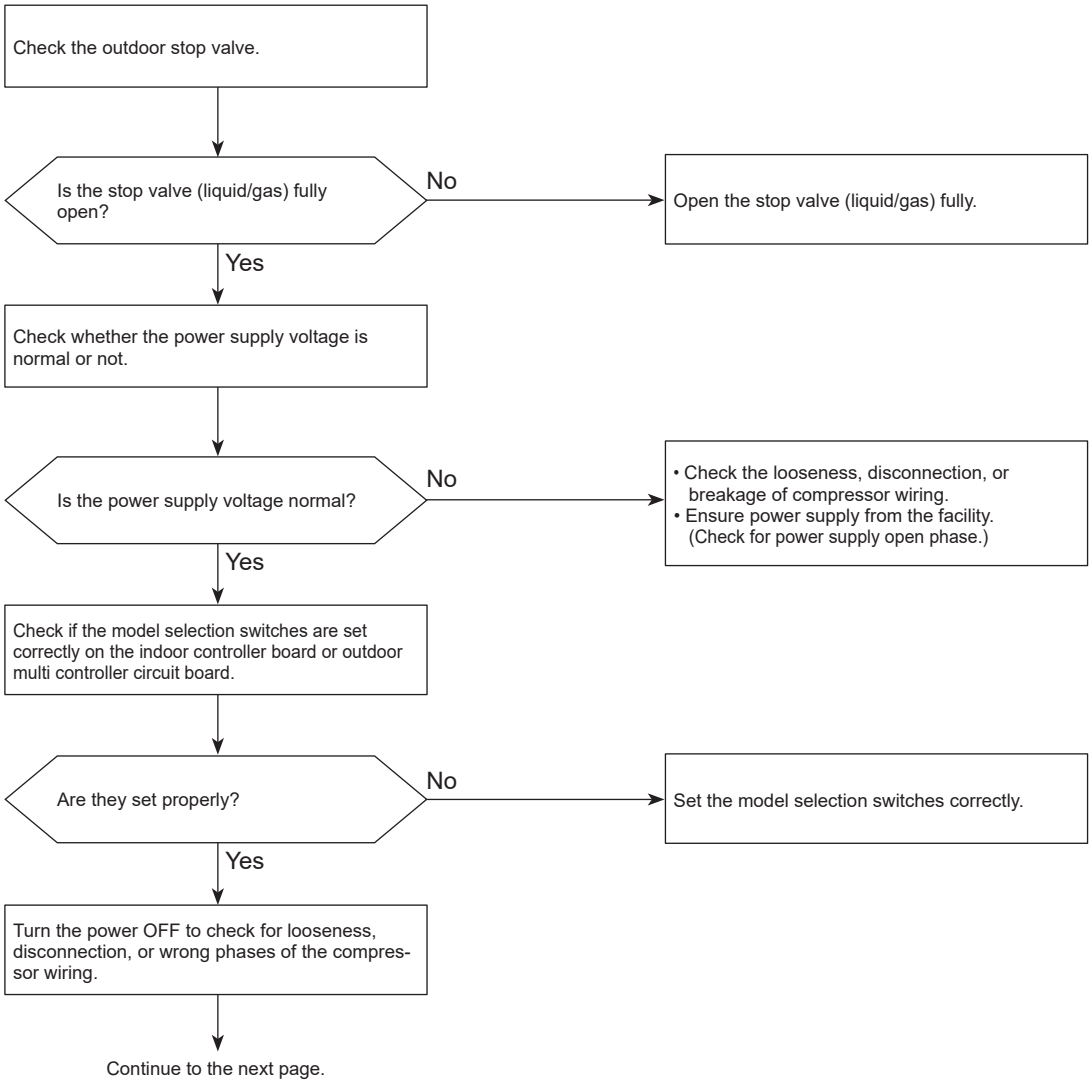
Abnormal points and detection methods

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

Causes and checkpoints

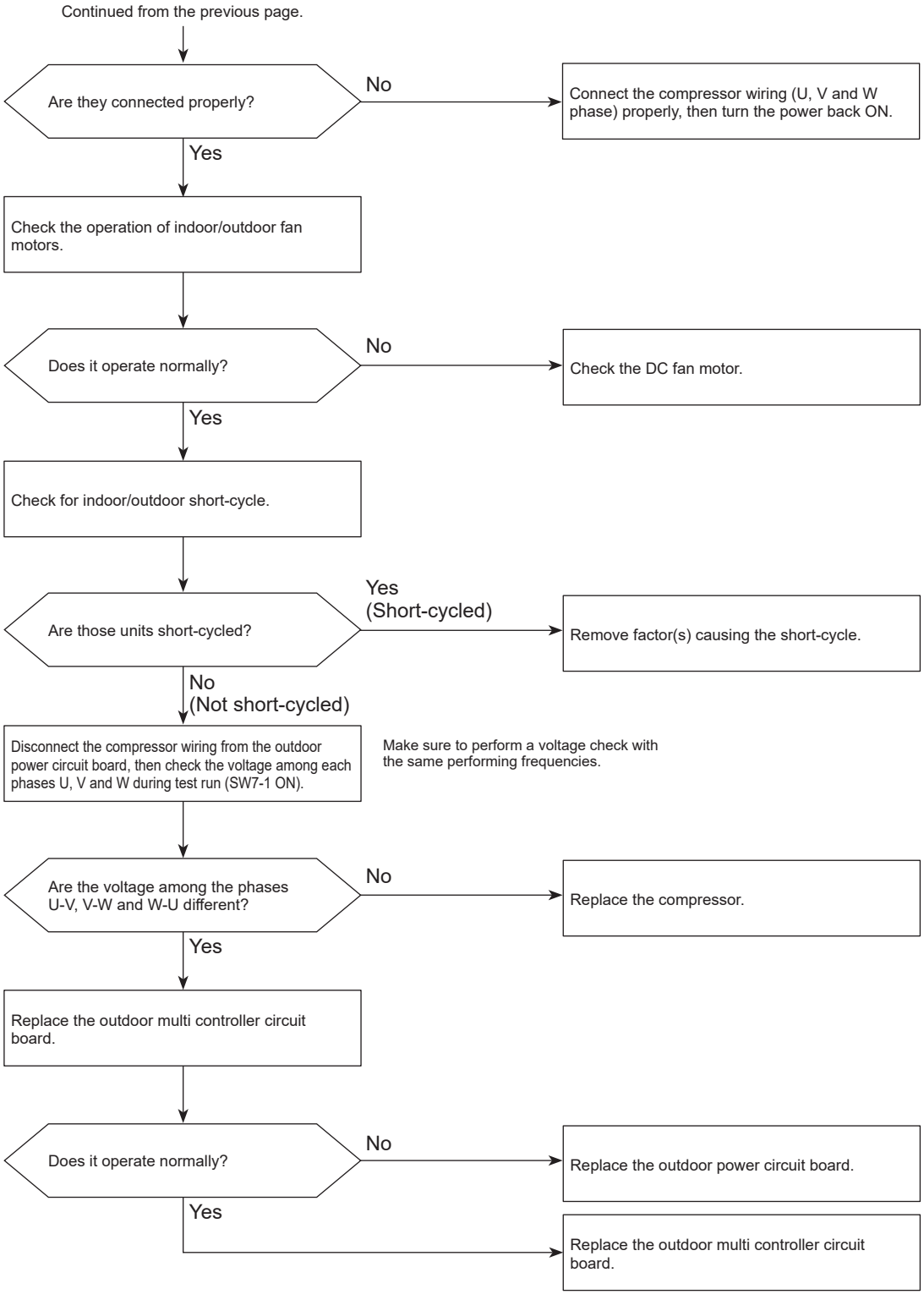
- Closed outdoor stop valve
- Decrease of power supply voltage
- Looseness, disconnection, or wrong phase of compressor wiring connection
- Model selection error on indoor controller board or outdoor multi controller circuit board
- Defective compressor
- Defective outdoor power circuit board
- Defective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

Diagnosis of failure



4210 (UP): Compressor overcurrent interruption

Diagnosis of failure



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

Abnormal points and detection methods

Any of the following symptoms are detected;
- Decrease of DC bus voltage to 200 V (1-phase), 350 V (3-phase)
- Increase of DC bus voltage to 400 V (1-phase), 760 V (3-phase)
- DC bus voltage stays at 310 V or less for 30 consecutive seconds when the operational frequency is over 20 Hz.

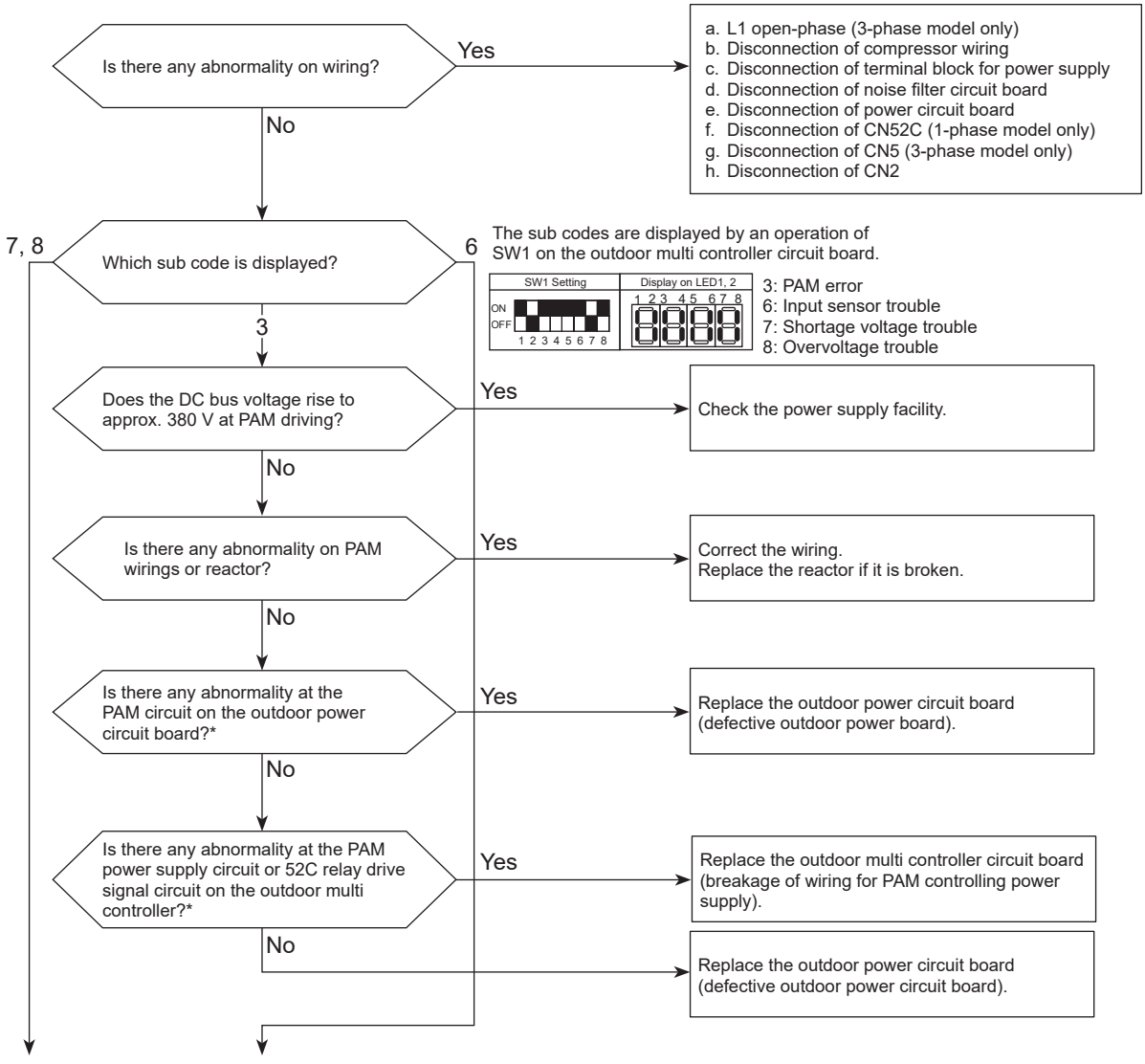
Any of the following conditions is satisfied while the detections value of primary current is 0.1 A or less.
- The operational frequency is 40 Hz or more.
- The compressor current is 6 A or more.

Causes and checkpoints

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

1-phase: 1-phase model
3-phase: 3-phase 4-wire model
The black square (■) indicates a switch position.

Diagnosis of failure



Continue to the next page.

*Refer to "How to check the parts".

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

The black square (■) indicates a switch position.

Diagnosis of failure

Continued from the previous page.

7, 8

6

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

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

3-phase model

Is CN5 connected properly without any contact failure?

No → Correct the CN5 wiring.

Yes

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

Yes → Replace the noise filter circuit board.

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

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

No → Check the power supply facility.

Yes

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

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

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

Is the power supply normal?

No → Check the power supply facility.

Yes

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

Is the bus voltage normal?

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

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

4230 (U5): Heat sink temperature trouble

Abnormal points and detection methods

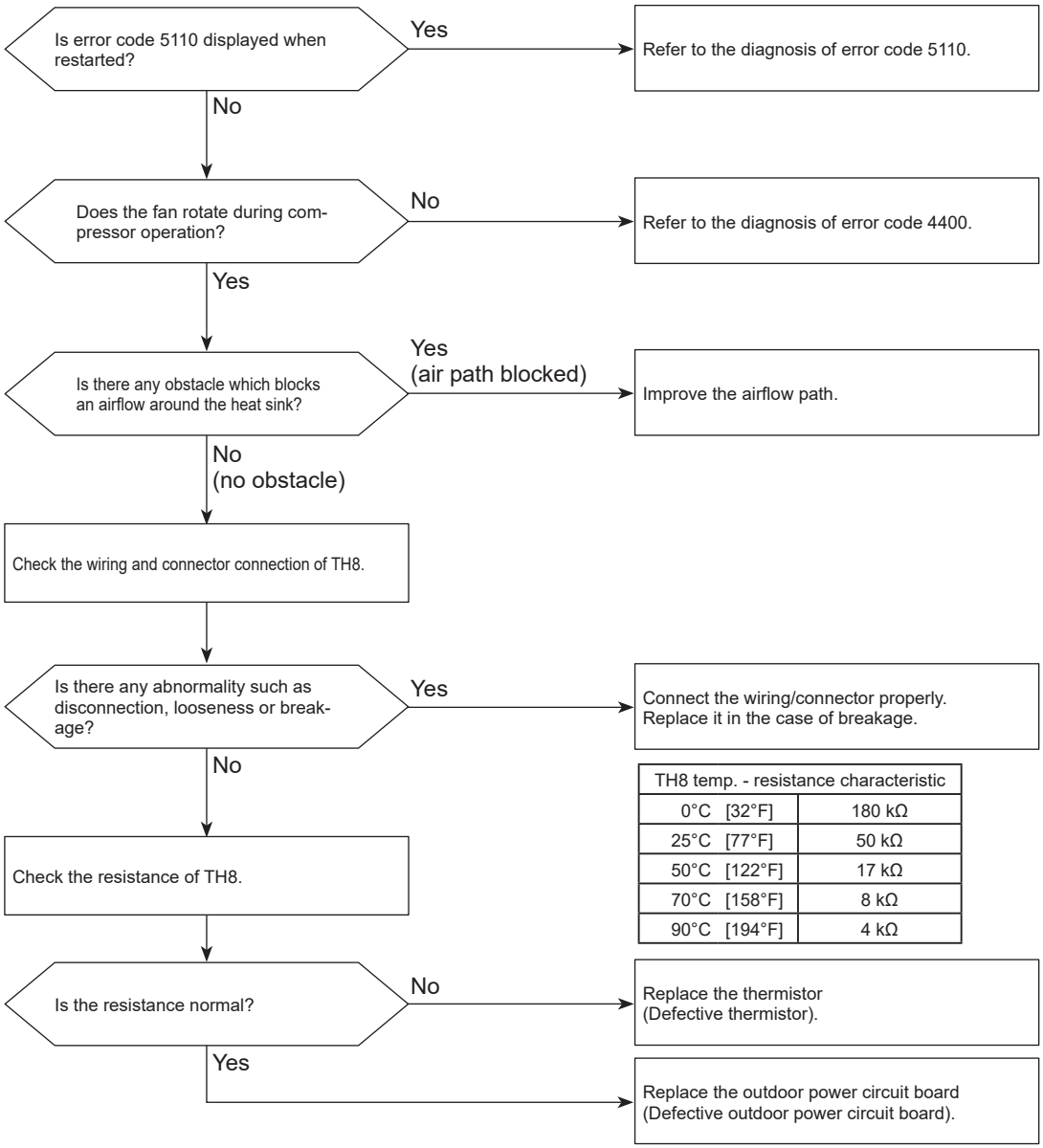
TH8 detects a temperature outside the specified range during compressor operation.

TH8: Thermistor <Heat sink>

Causes and checkpoints

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

Diagnosis of failure



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

4250 (U6): Power module trouble

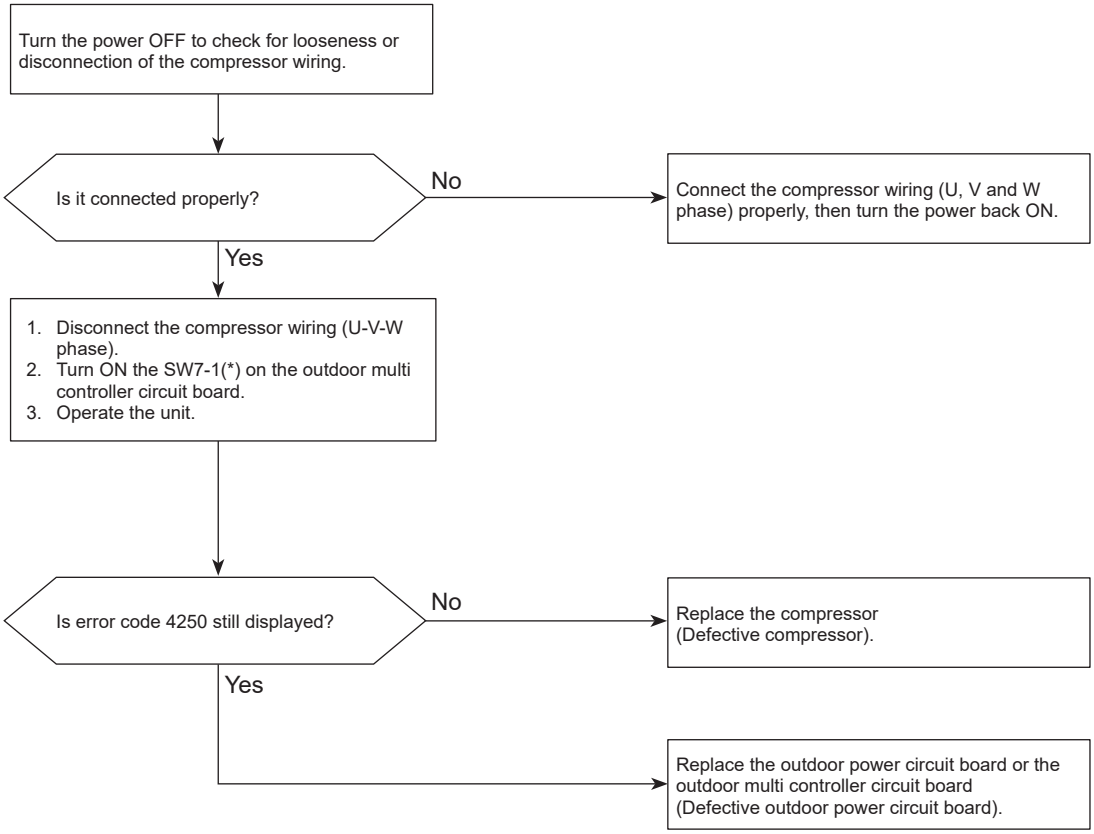
Abnormal points and detection methods

Both of the following conditions have been satisfied:
- Overcurrent of DC bus or compressor is detected during compressor operation.
- Inverter power module is determined to be faulty.

Causes and checkpoints

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

Diagnosis of failure



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

4400 (U8): Fan trouble (Outdoor unit)

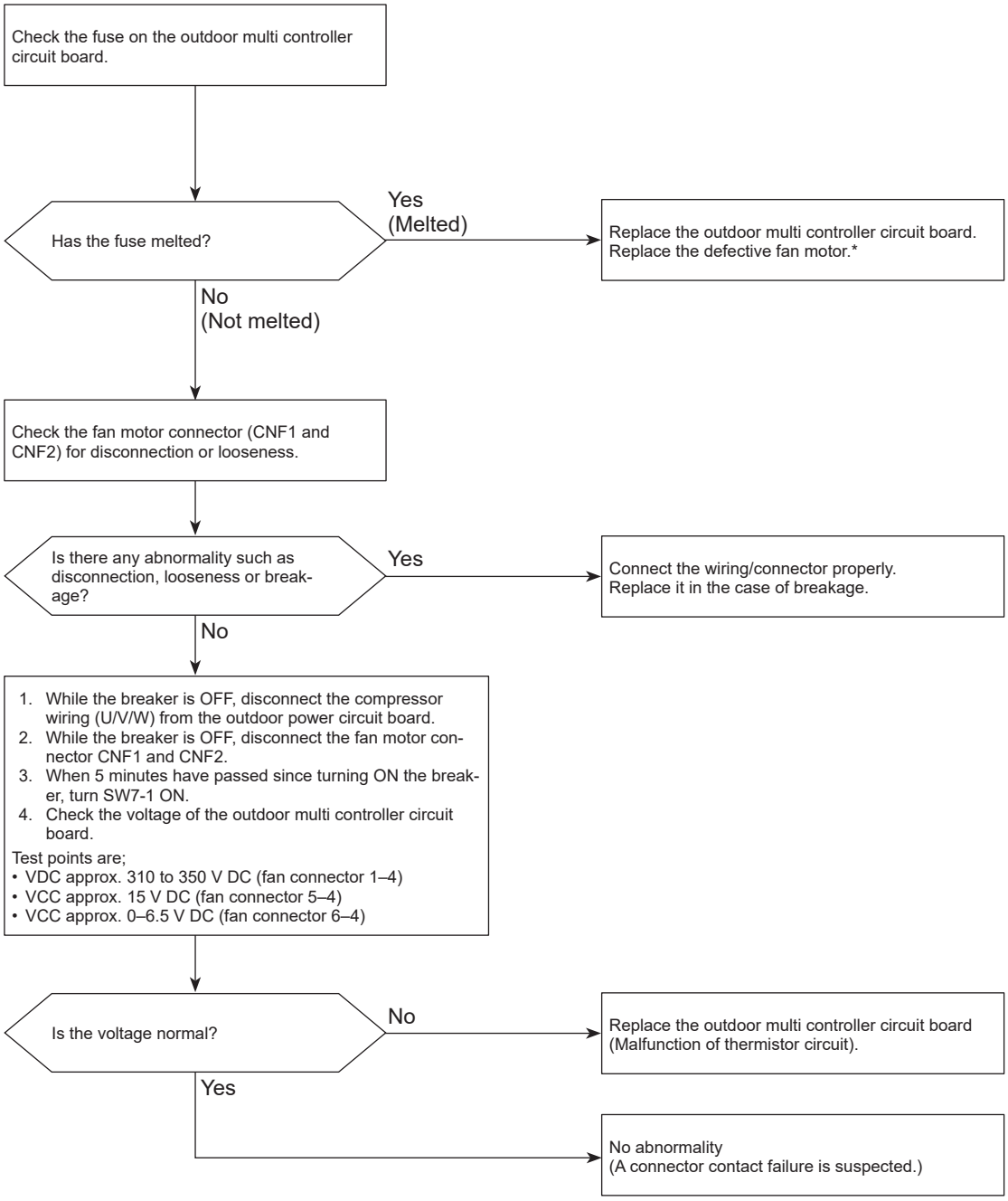
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



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

Note:
- Set SW7-1 OFF after the troubleshooting completes.

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

Abnormal points and detection methods

TH4 is found to be open/short.
(The open/short detection is disabled for 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.)

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

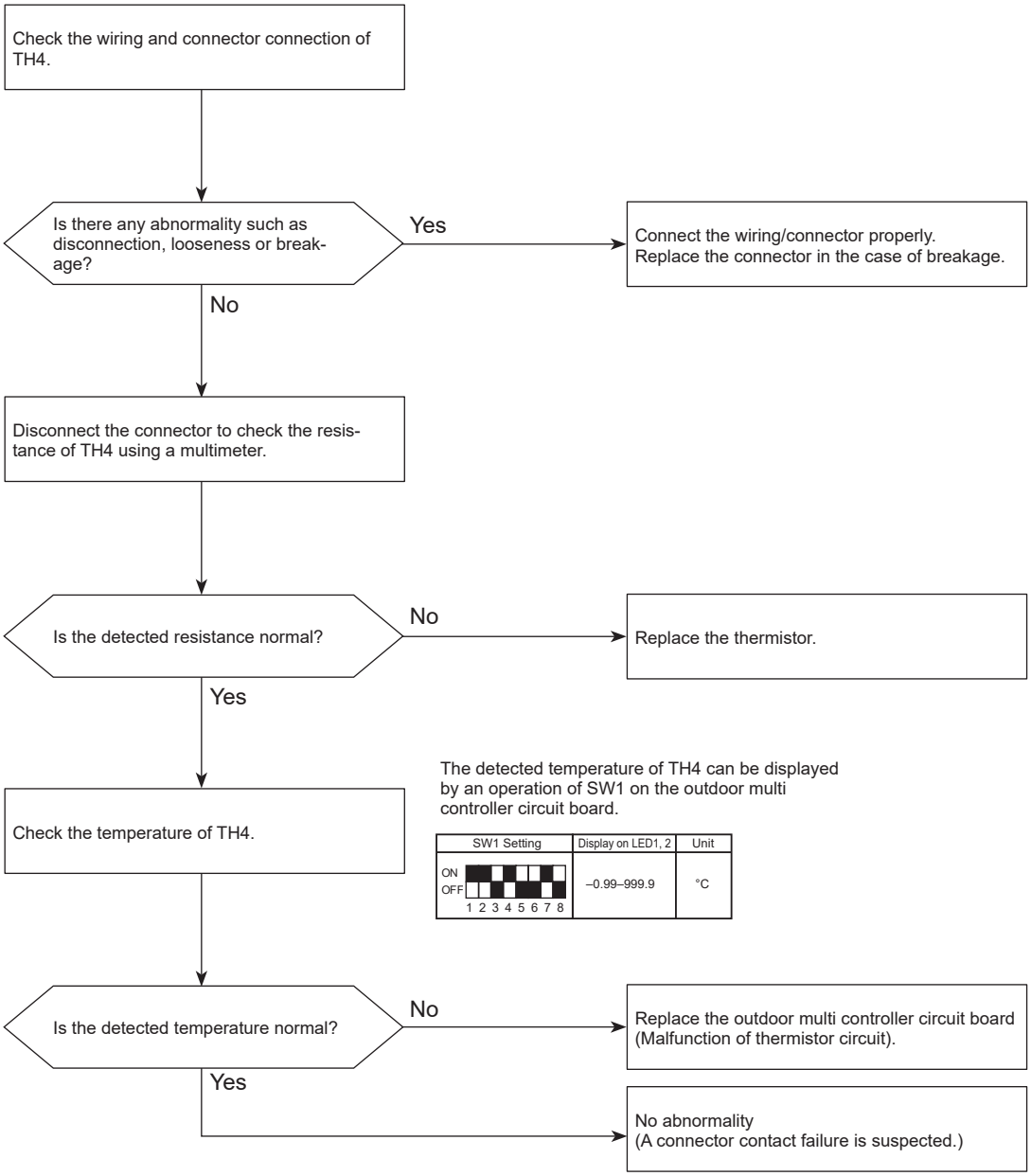
* -10°C [14°F] or less when PEFY-P·VMH(S)-E-F is connected.

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

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

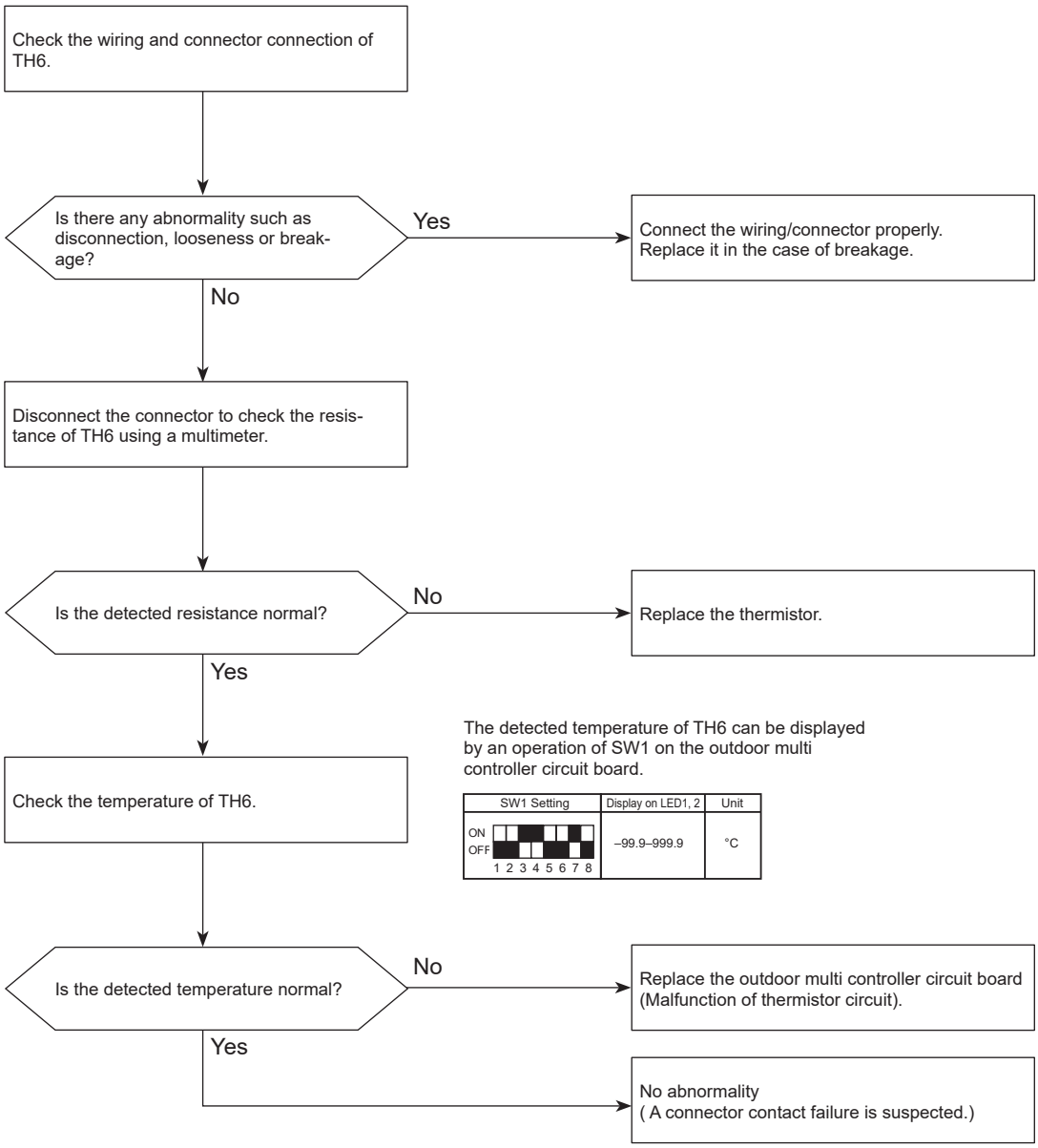
Open:
−40°C [−40°F] or less
Short:
90°C [194°F] or more
TH6:
Thermistor <Suction pipe>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

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

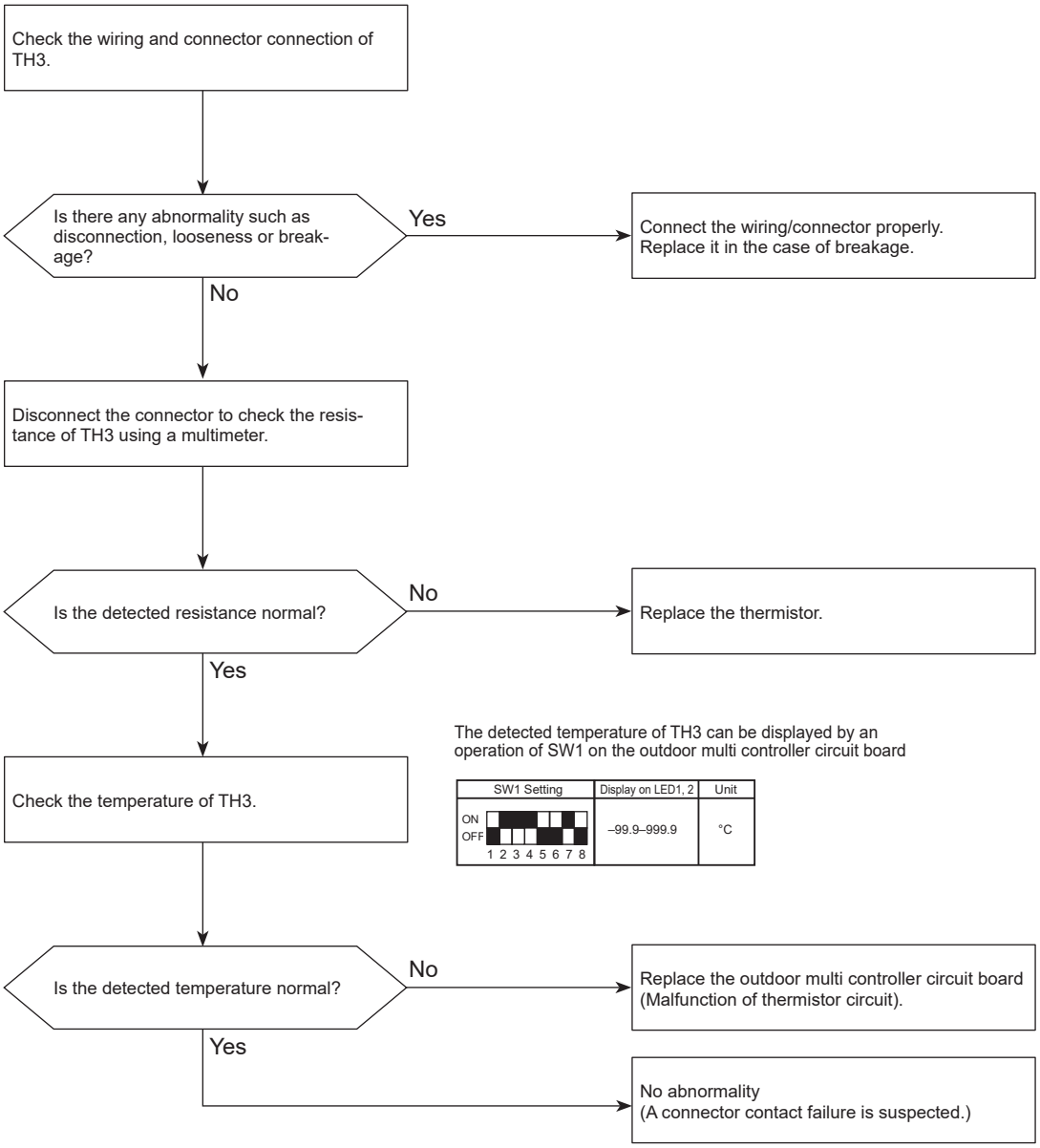
Open:
−40 [−40°F] or less
Short:
90 [194°F] or more
TH3:
Thermistor <Outdoor liquid pipe>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

TH7 is found to be open/short

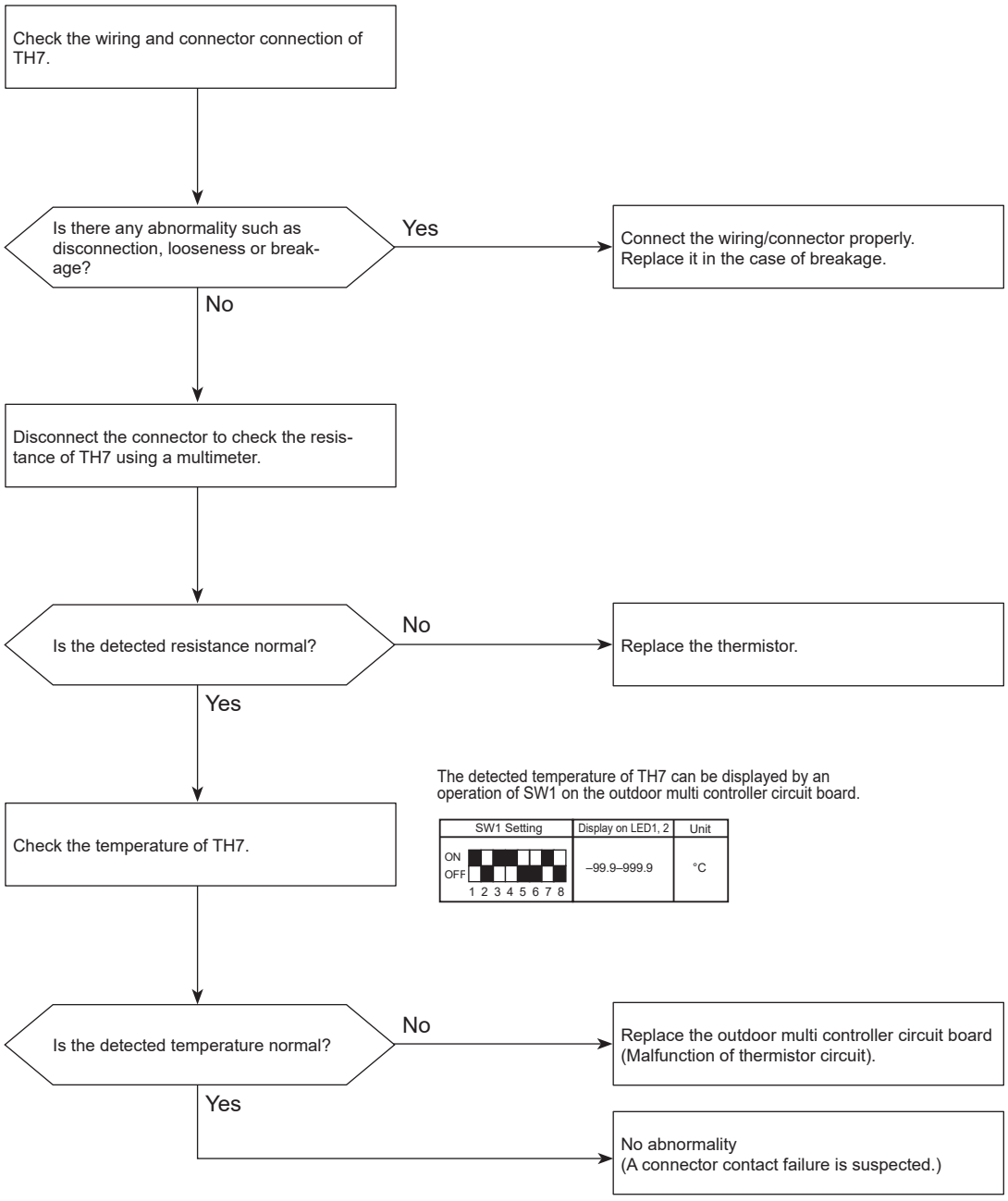
Open:
−40°C [−40°F] or less
Short:
90°C [194°F] or more
TH7:
Thermistor <Ambient>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



The detected temperature of TH7 can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

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

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

Abnormal points and detection methods

TH2 is found to be open/short.

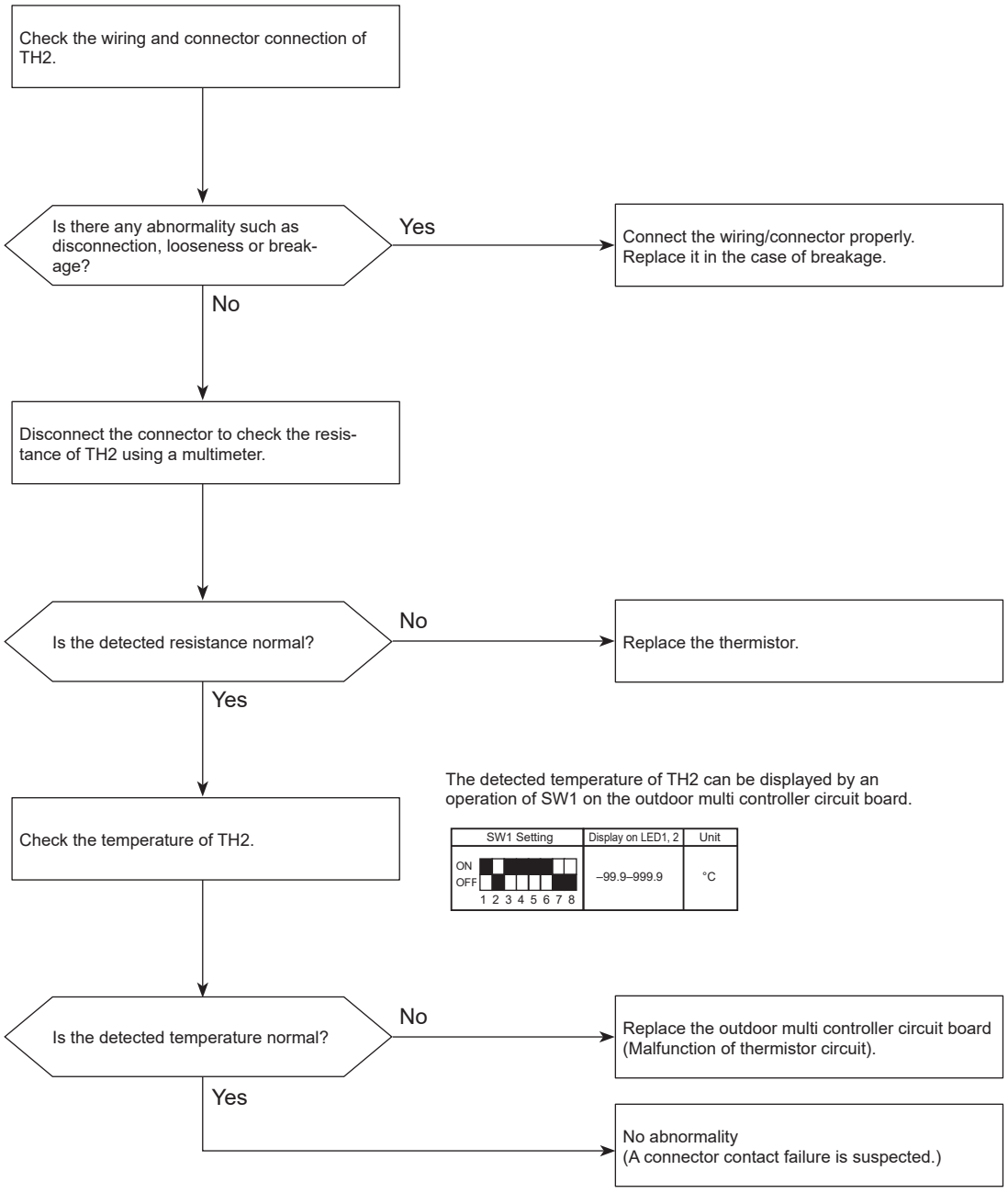
Open:
−40°C [−40°F] or less
Short:
90°C [194°F] or more
TH2:
Thermistor <HIC pipe>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

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

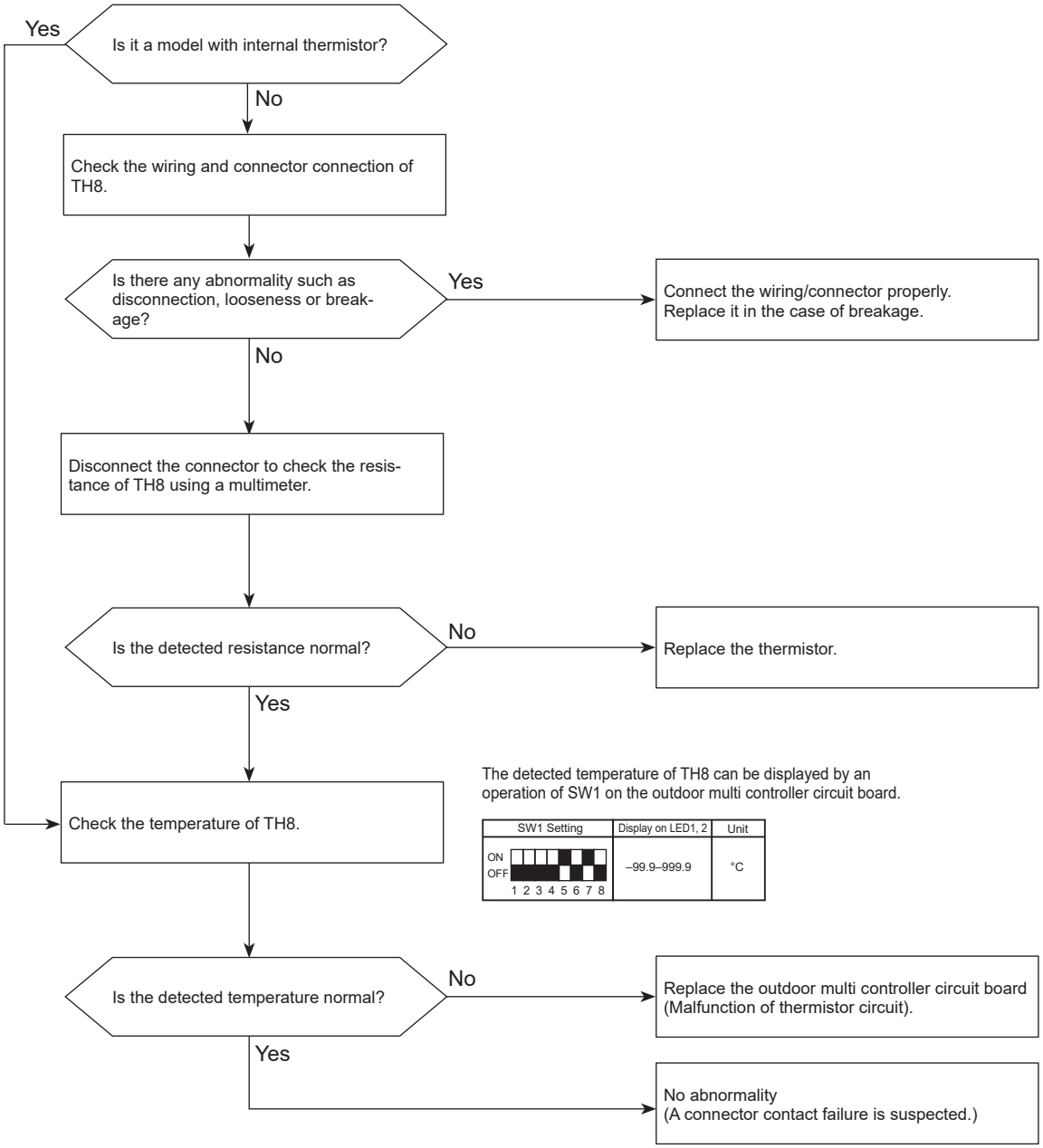
- V model <Internal thermistor>
  Open:
  −35.1°C [−31.2°F] or less
  Short:
  170.3°C [338.5°F] or more
- Y model
  Open:
  −34.8°C [−30.6°F] or less
  Short:
  102°C [215.6°F] or more
  TH8:
  Thermistor <Heat sink>

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



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

Abnormal points and detection methods

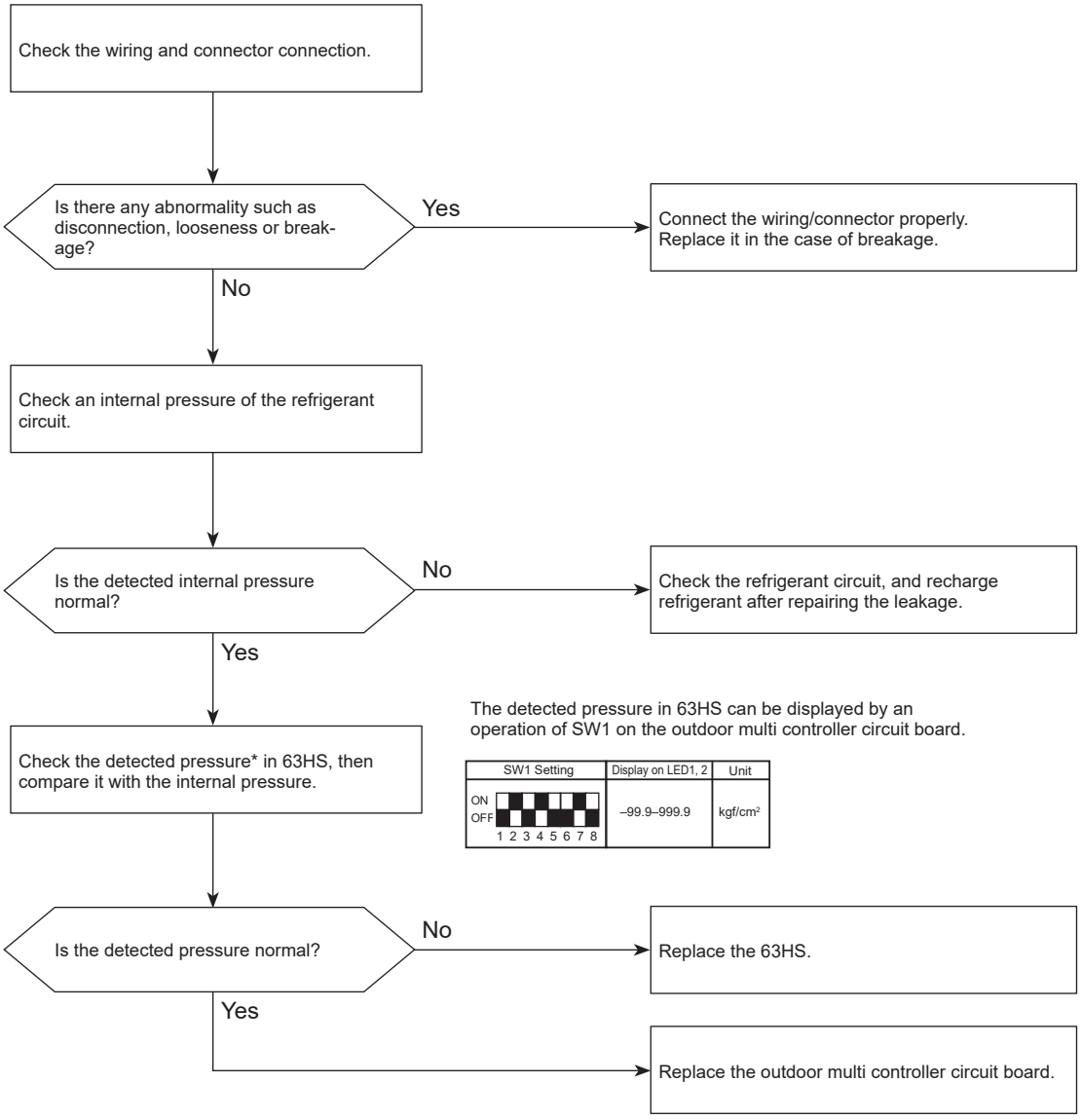
- The detected pressure in the high pressure sensor is 1kgf/cm^2 [14PSIG] or less during operation, the compressor stops operation and enters into an anti-restart mode for 3 minutes.
- The detected pressure is 1kgf/cm^2 [14PSIG] or less immediately before restarting, the compressor falls into an abnormal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

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



The detected pressure in 63HS can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

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

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

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

Abnormal points and detection methods

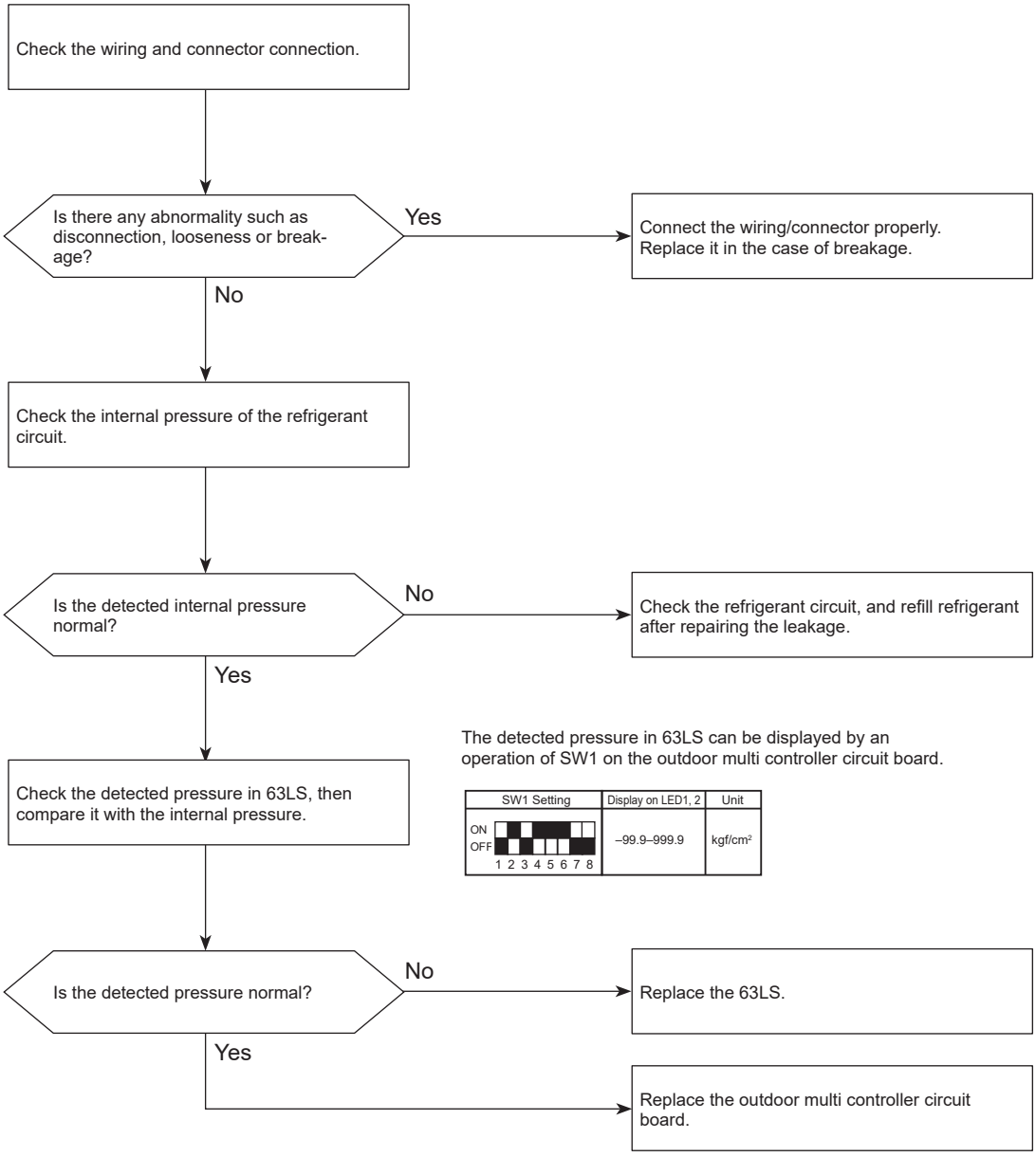
- The detected pressure in the low pressure sensor is −2.3kgf/cm^2 [-33 PSIG] or less, or 23.1kgf/cm^2 [329 PSIG] or more during operation, the compressor stops operation with error code 5202.
- For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning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

Causes and checkpoints

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

The black square (■) indicates a switch position.

Diagnosis of failure



The detected pressure in 63LS can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

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

5300 (UH): Current sensor trouble

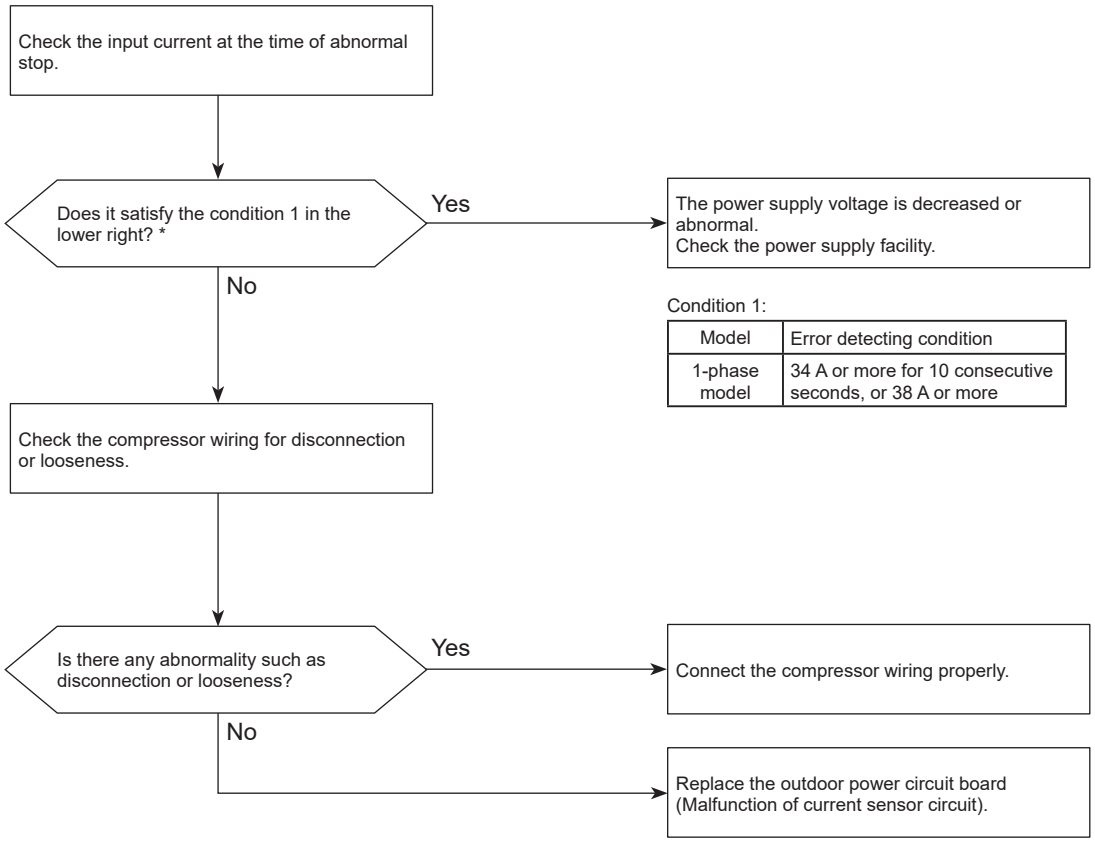
Abnormal points and detection methods

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

Causes and checkpoints

- Decrease/Trouble of power supply voltage
- Disconnection of compressor wiring
- Input sensor trouble on outdoor power circuit board

Diagnosis of failure



Condition 1:

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

* Applicable only for single phase model

6600 (A0): Duplex address error

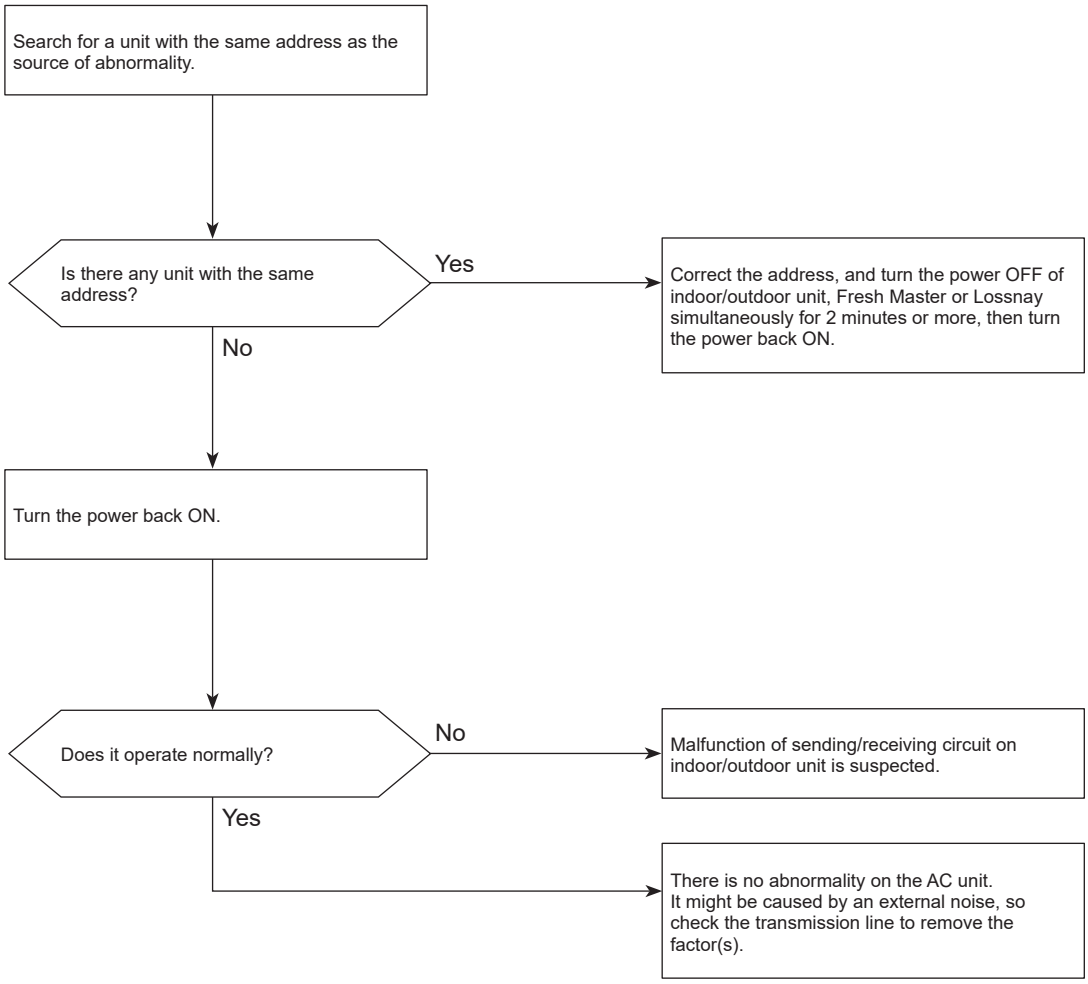
Abnormal points and detection methods

2 or more units with the same address exist.

Causes and checkpoints

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

Diagnosis of failure



6602 (A2): Transmission processor hardware error

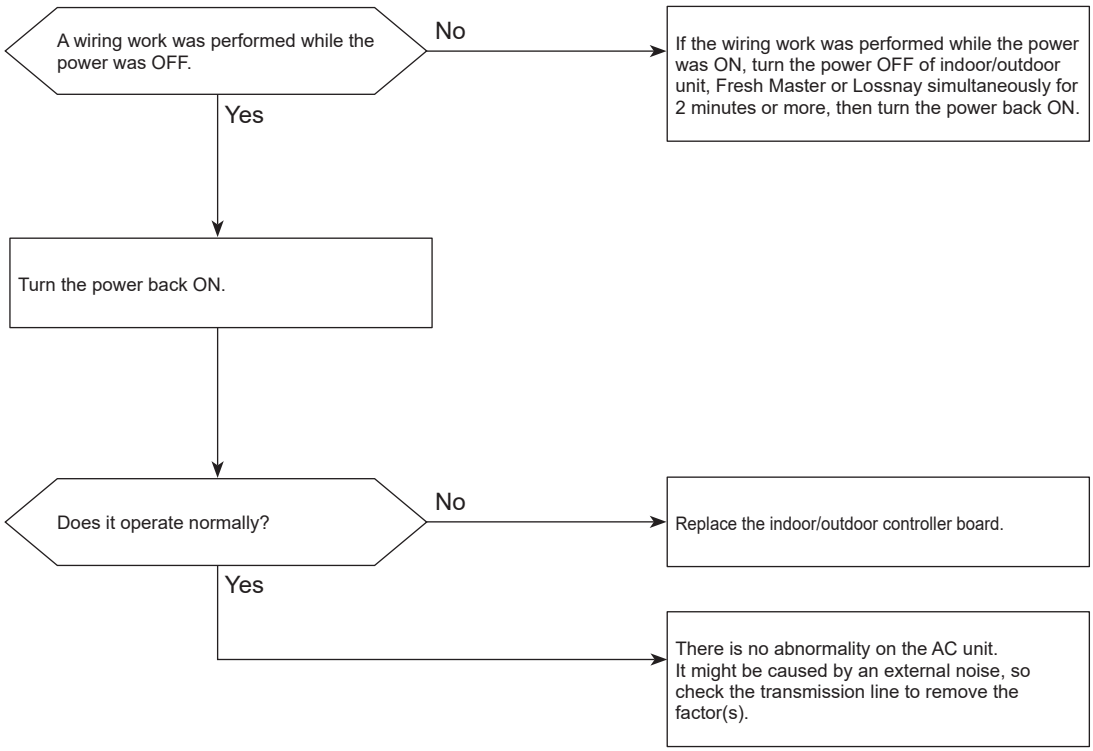
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



6603 (A3): Transmission bus BUSY error

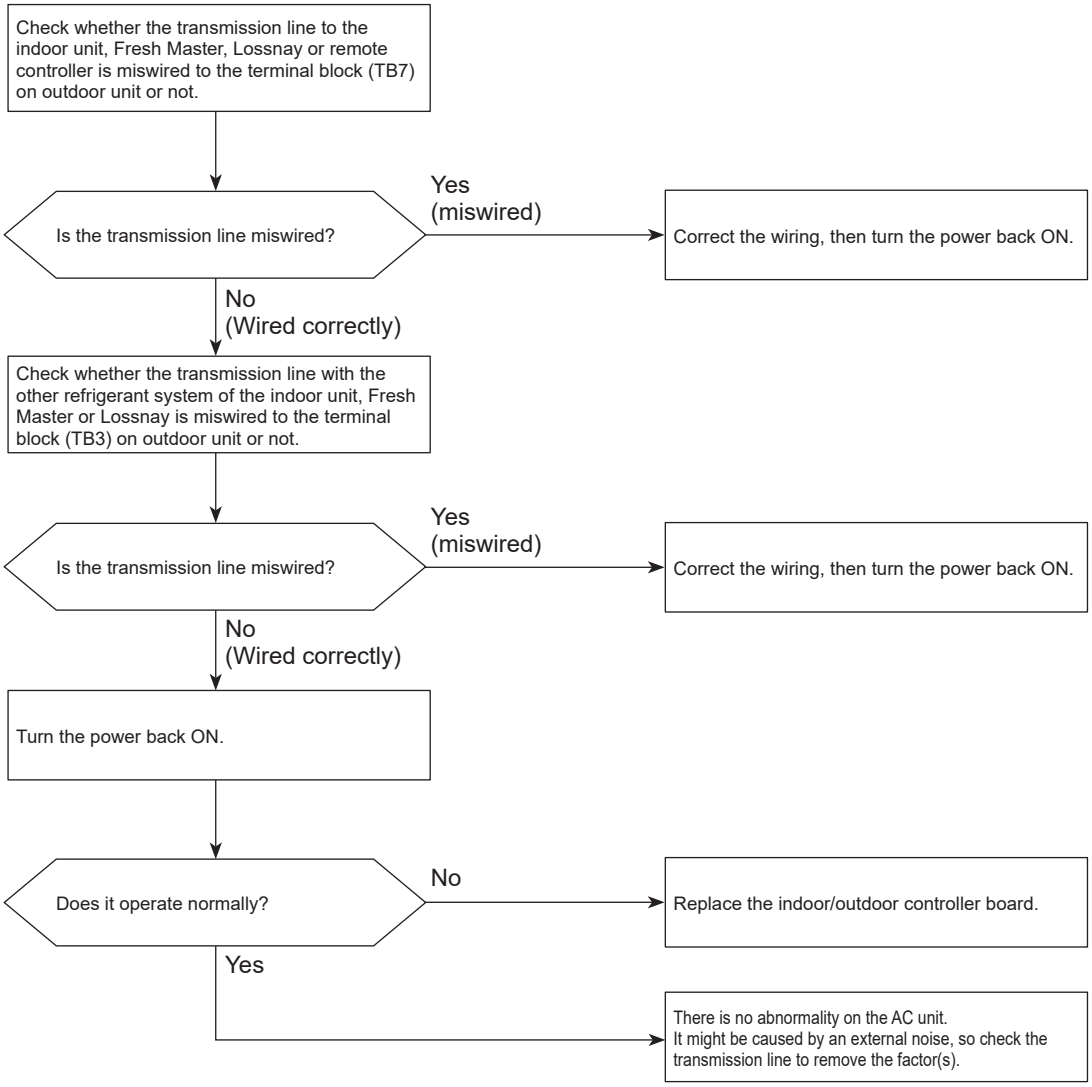
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



6606 (A6): Signal communication error with transmission processor

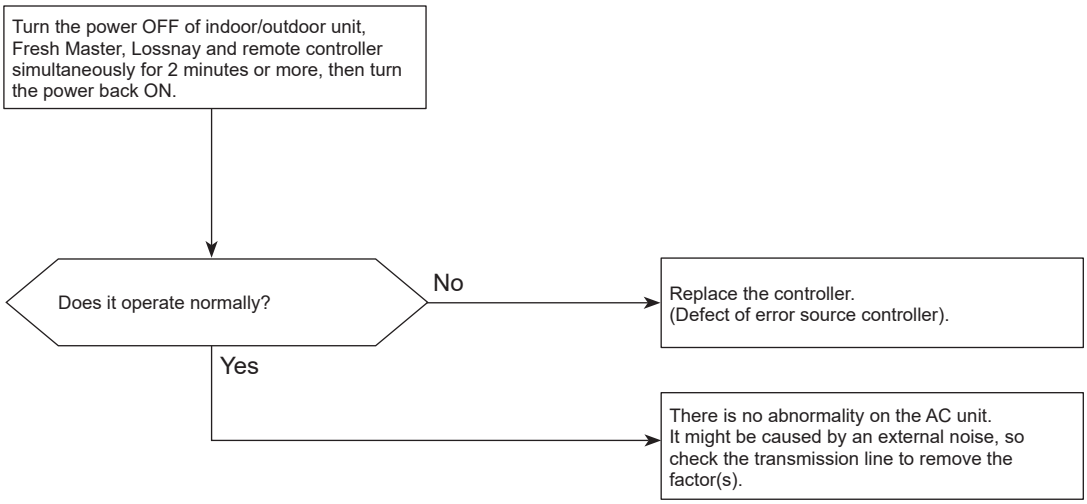
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



6607 (A7): No ACK error

Abnormal points and detection methods

Causes and checkpoints

■ Common to all

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

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

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

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

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

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

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

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

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

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

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

■ The address/attribute of Fresh Master was displayed:

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

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

6607 (A7): No ACK error

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

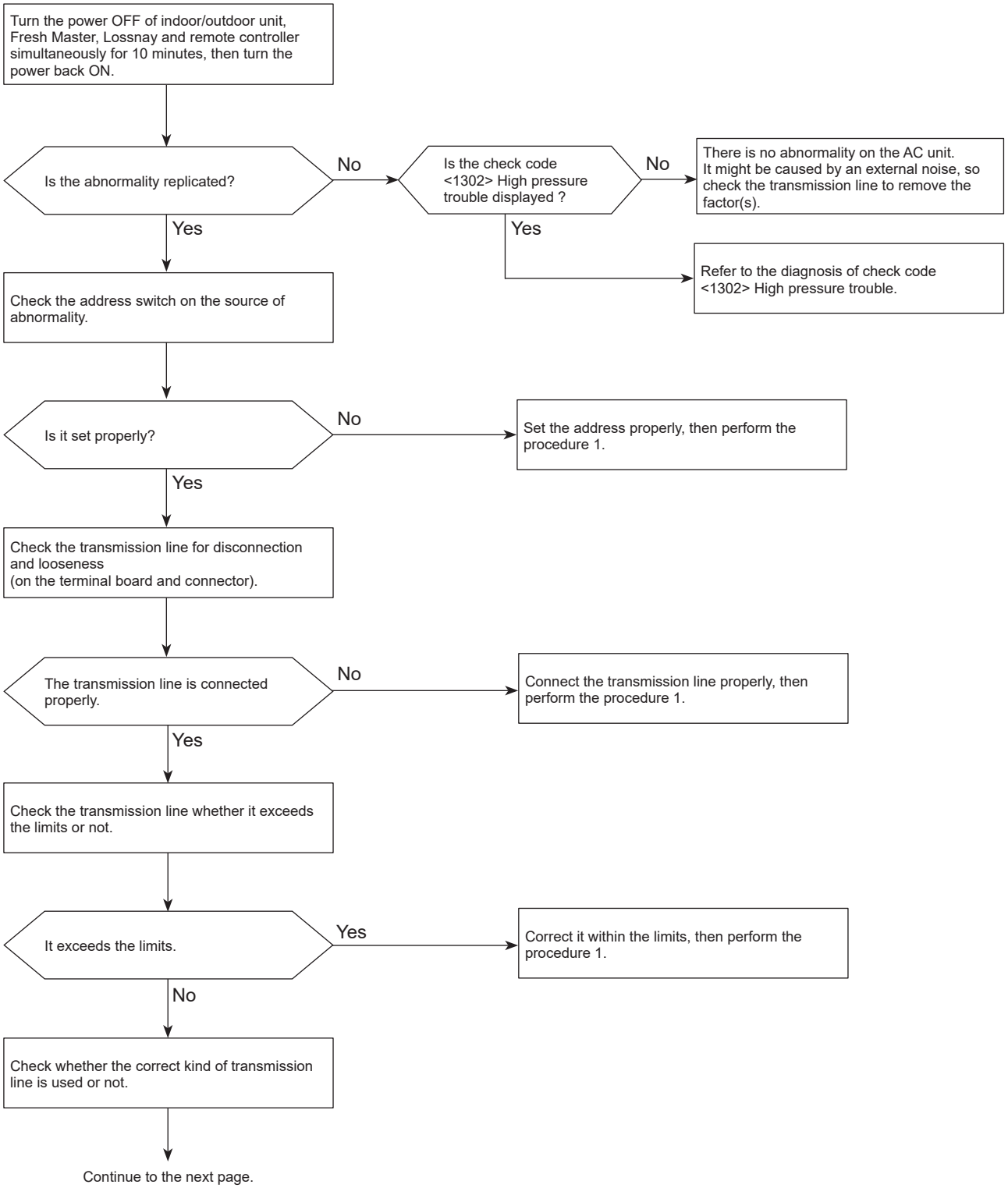
6607 (A7): No ACK error

Diagnosis of failure

Note:

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

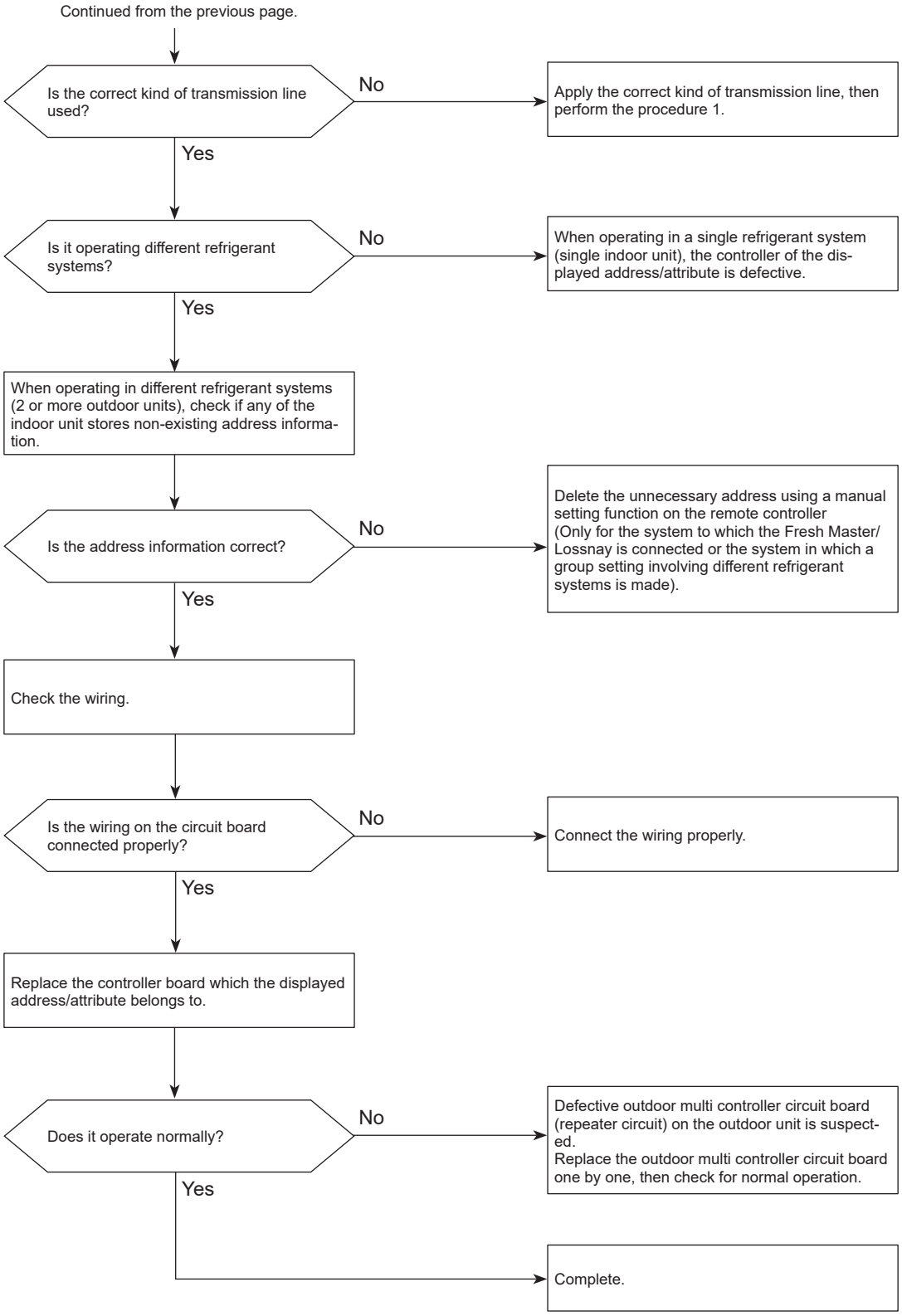
Procedure 1:



Continue to the next page.

6607 (A7): No ACK error

Diagnosis of failure



6608 (A8): No response frame error

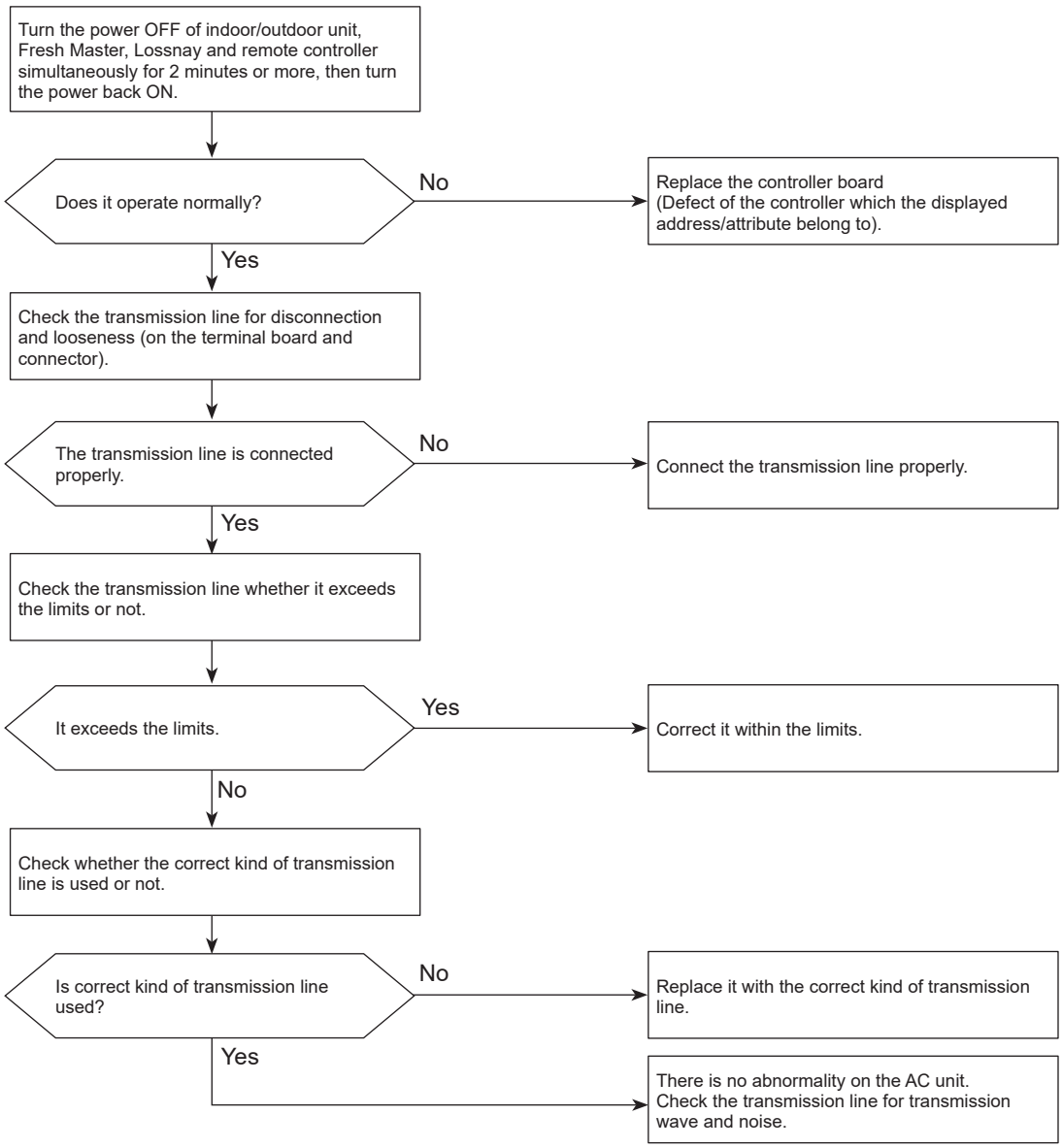
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



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

Abnormal points and detection methods

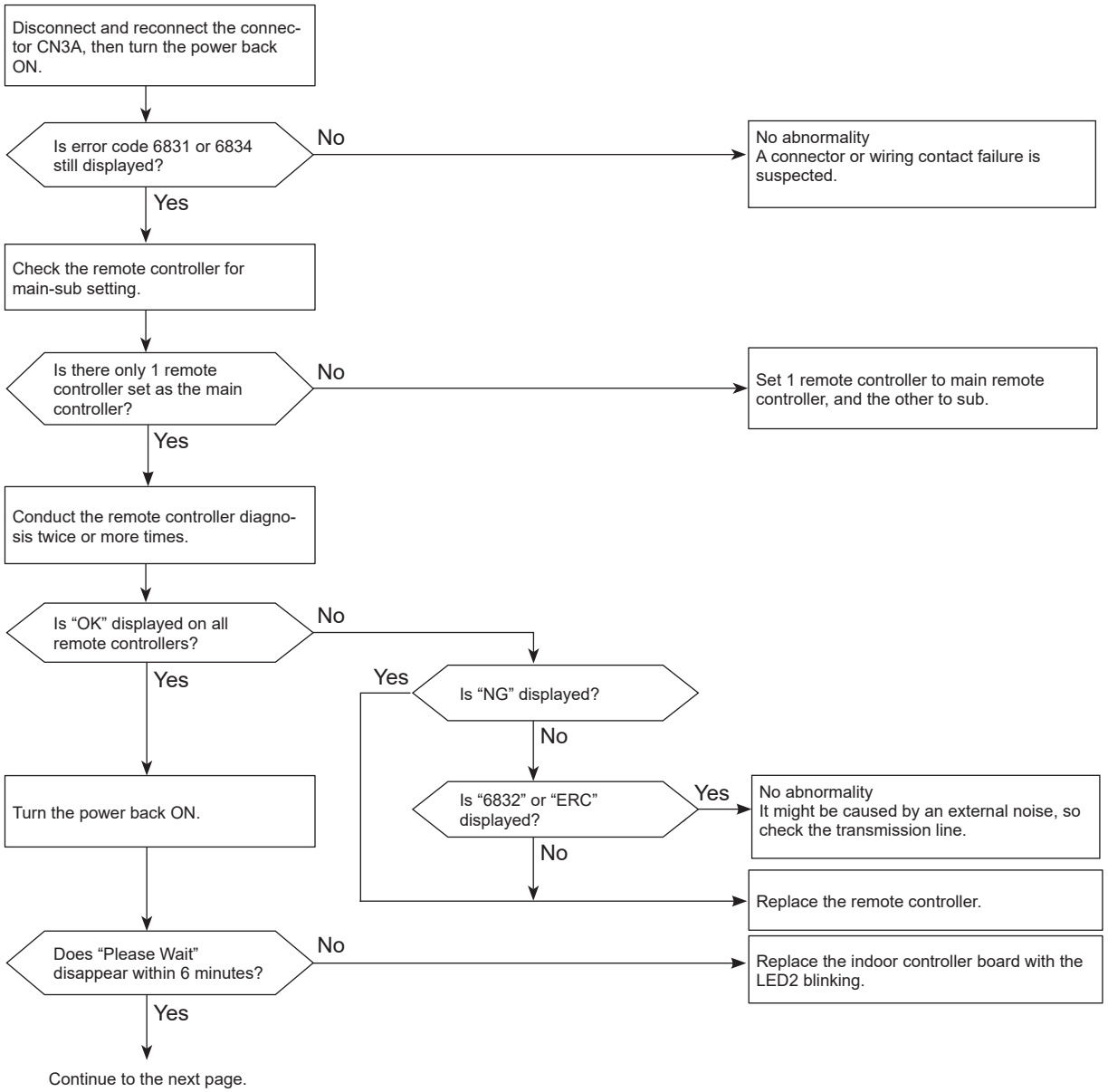
Detected in remote controller or indoor unit:

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

Causes and checkpoints

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

Diagnosis of failure



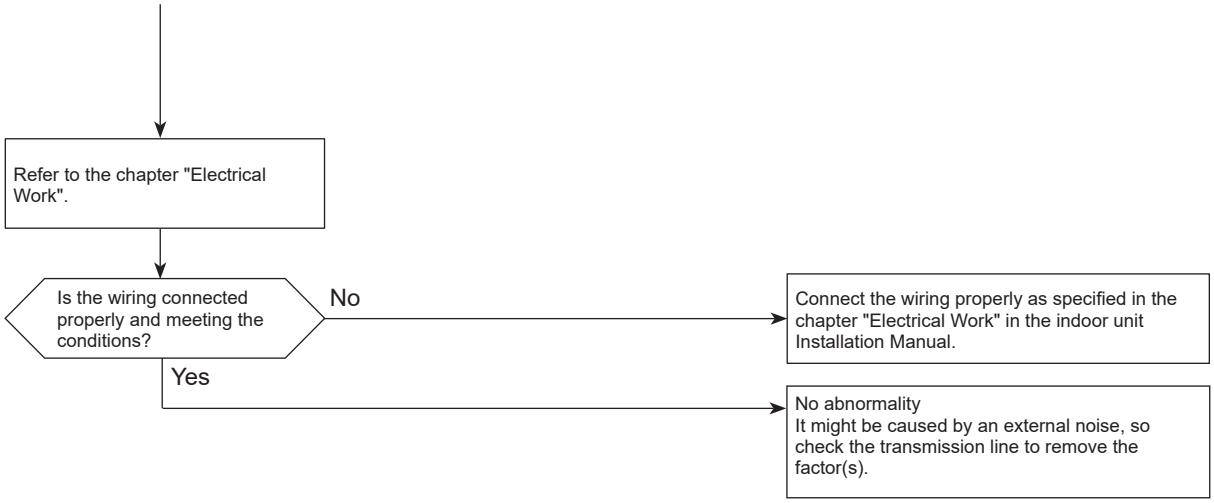
Note:

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

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

Diagnosis of failure

Continued from the previous page.



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

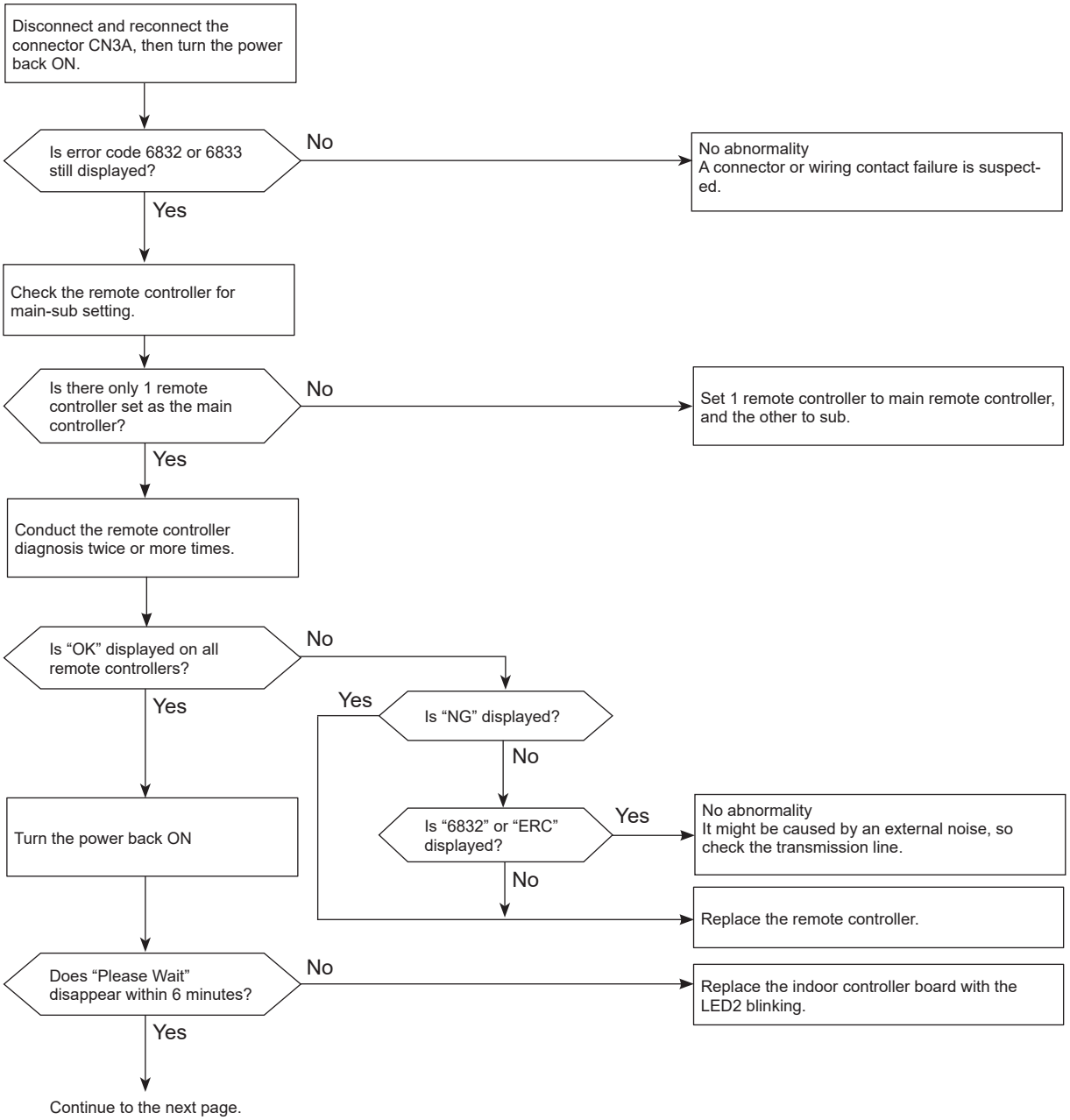
Abnormal points and detection methods

Detected in remote controller or indoor unit.

Causes and checkpoints

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

Diagnosis of failure

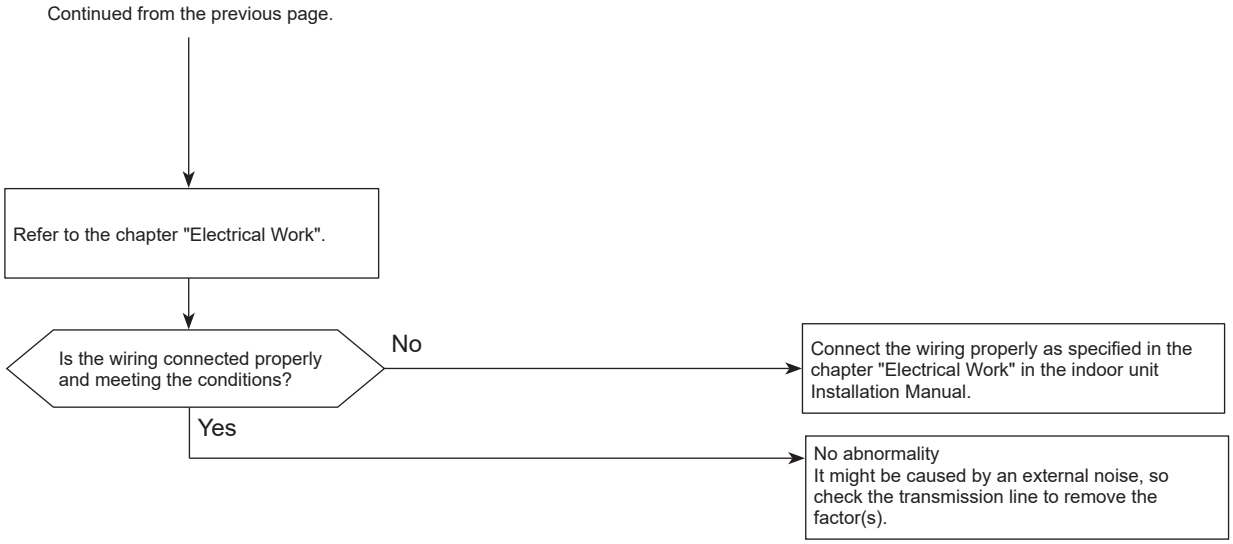


Note:

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

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

Diagnosis of failure



7100 (EF): Total capacity error

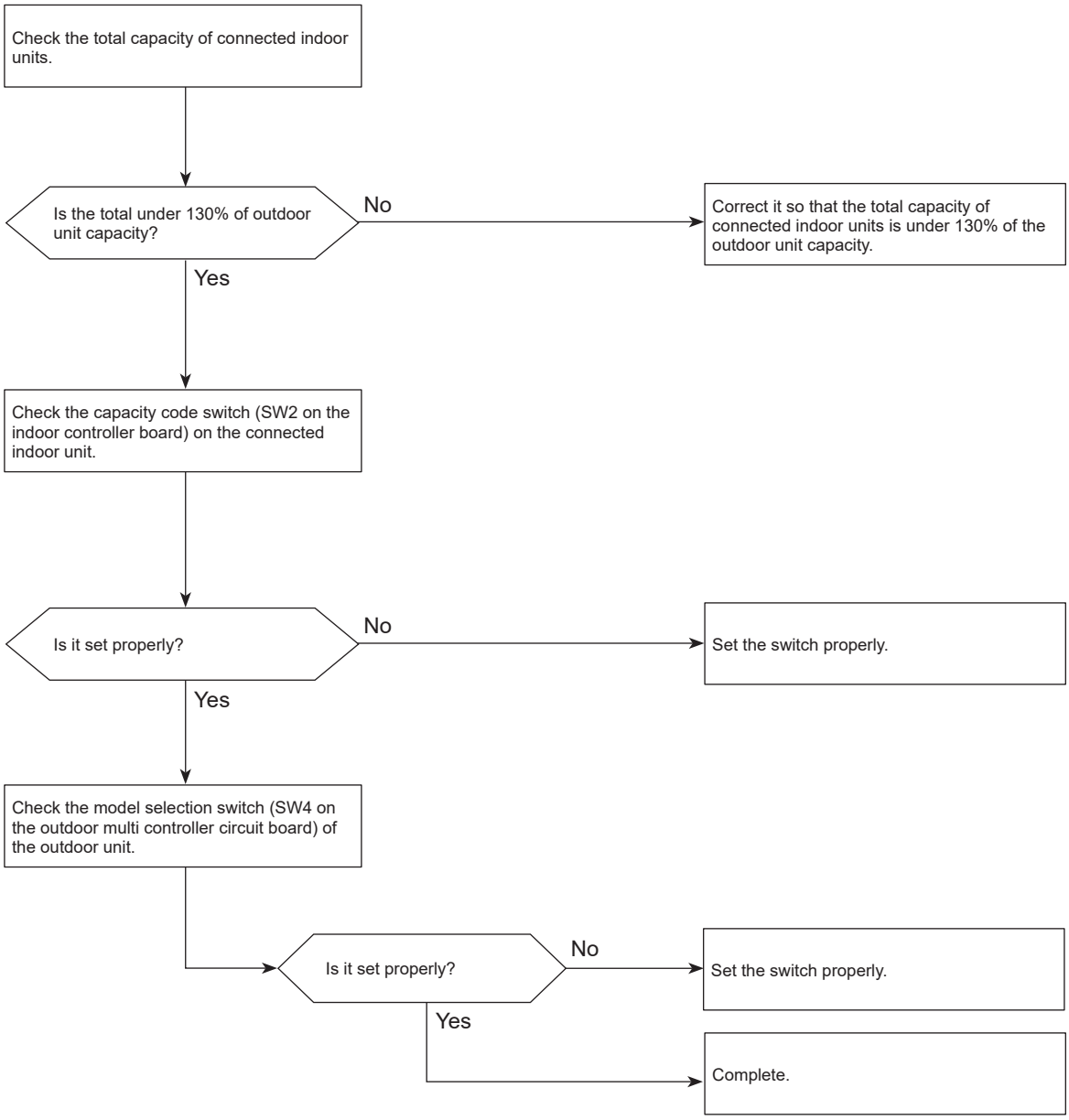
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



7101 (EF): Capacity code error

Abnormal points and detection methods

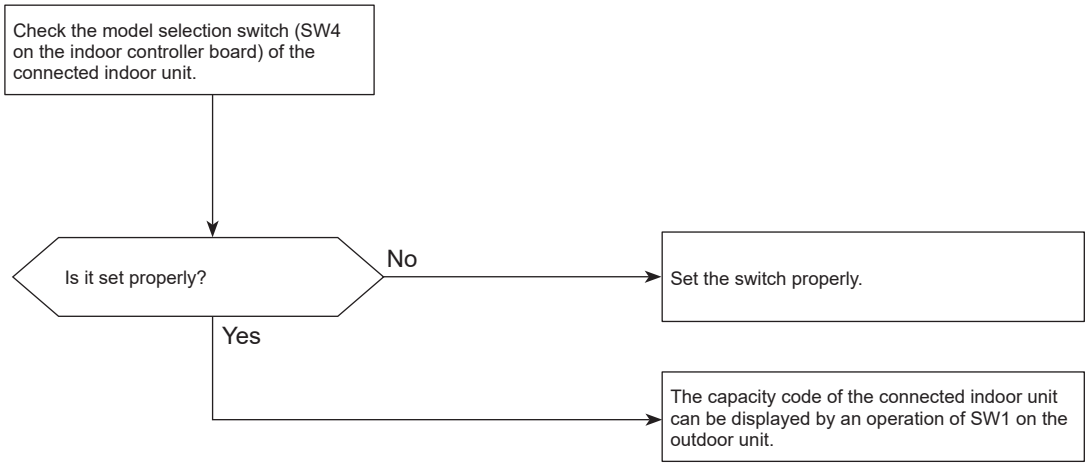
- A connected indoor unit is incompatible, error code 7101 is displayed.

Causes and checkpoints

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

- P112 to P140 model:
  P10 to P140 model (capacity code 2 to 28)
- When connecting via branch box:
  P15 to P100 model (capacity code 4 to 20)
- PWFY unit:
  P100 model (capacity code 20)

Diagnosis of failure



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

Abnormal points and detection methods

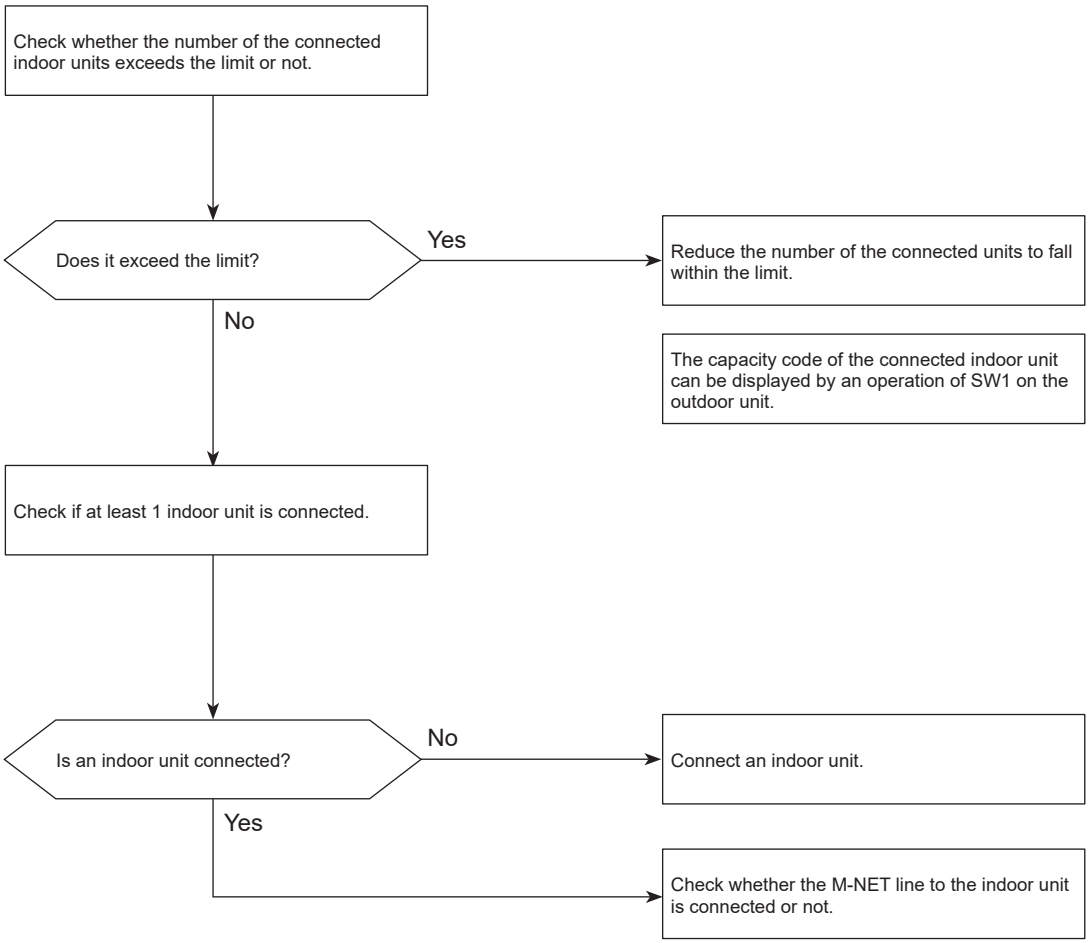
The number of the connected indoor units exceeds the limit, error code 7102 is displayed.

Causes and checkpoints

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

- Connectable up to 12 indoor units
- Connect at least 1 indoor unit (Abnormal if connected none).
- Connectable up to 2 branch boxes
- Connectable up to 1 Air to Water unit (PWFY unit, Cylinder Unit, or Hydrobox)
- When connecting PWFY unit, Cylinder Unit, or Hydrobox, connect at least 1 indoor unit (other than Air to Water unit).
- Connectable up to 1 PEFY-P·VMH-E-F

Diagnosis of failure



7105 (EF): Address setting error

Abnormal points and detection methods

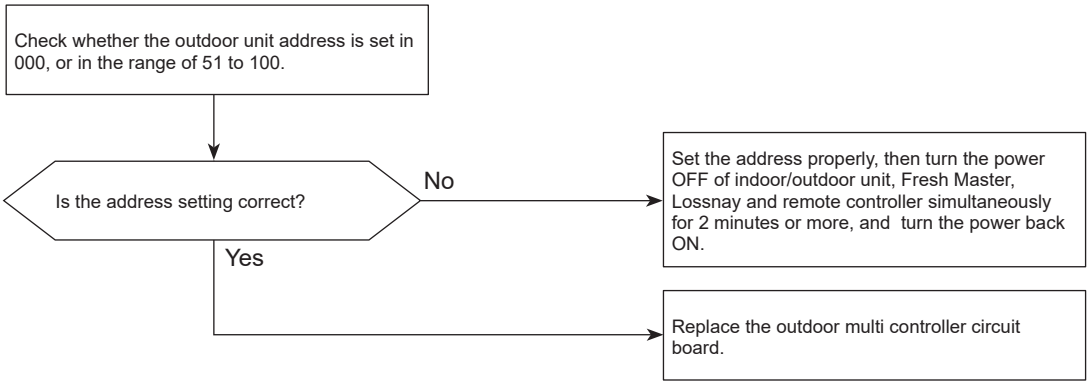
The address setting of connected outdoor unit is wrong.

Causes and checkpoints

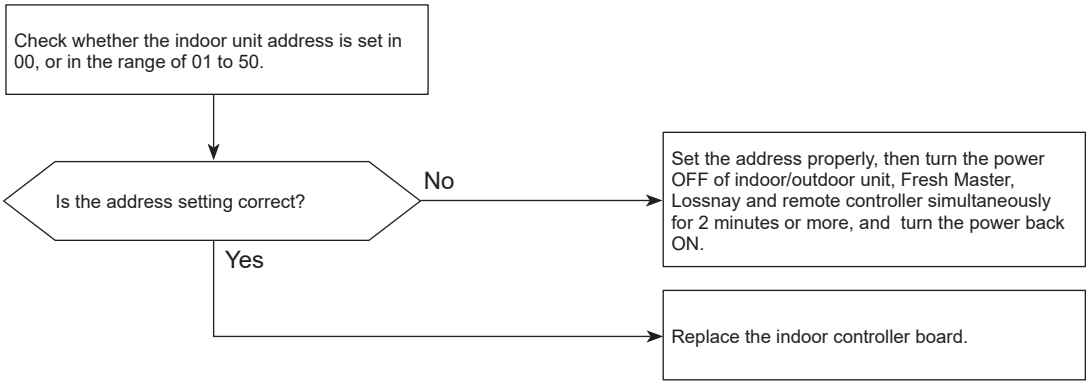
There is a unit without correct address setting in the range specified in the installation manual.

Diagnosis of failure

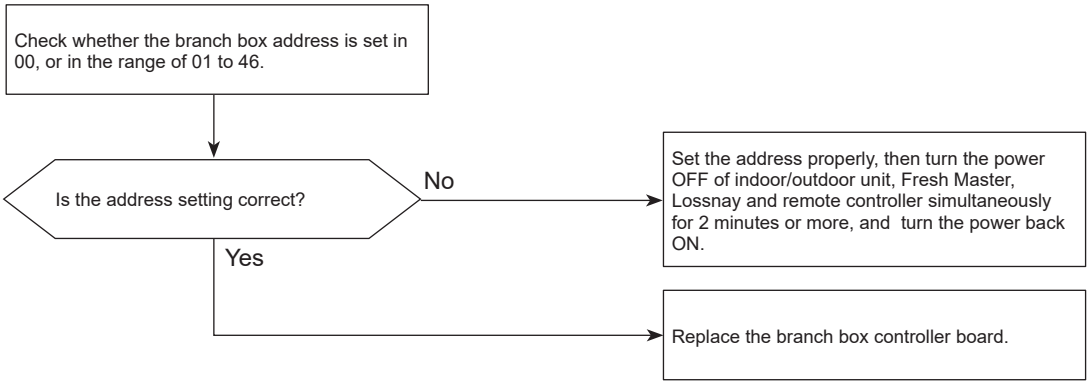
<Outdoor unit>



<Indoor unit>



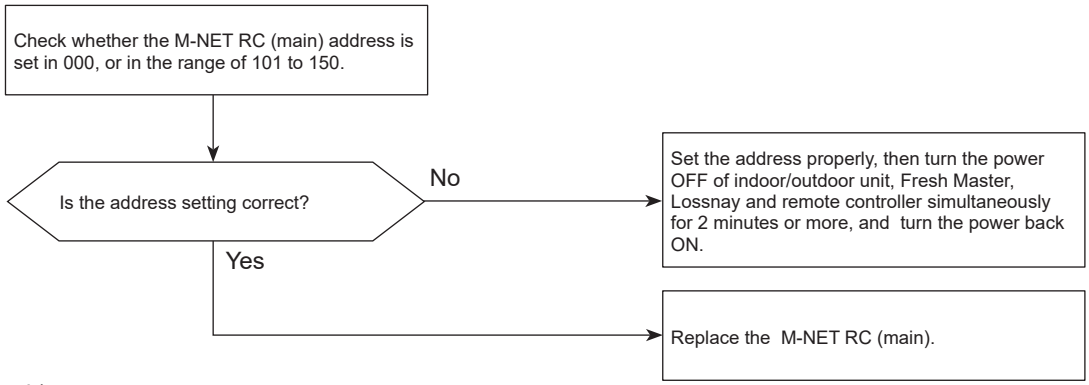
<Branch box>



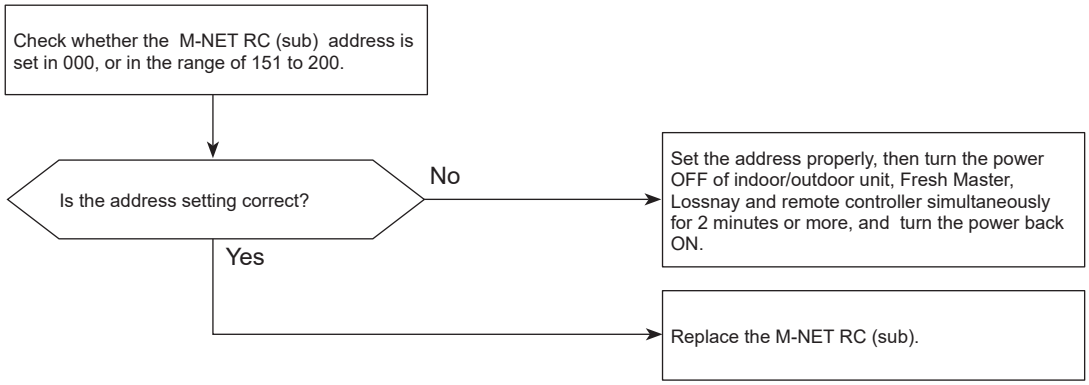
7105 (EF): Address setting error

Diagnosis of failure

<M-NET RC (main)>



<M-NET RC (sub)>



7130 (EF): Incompatible unit combination error

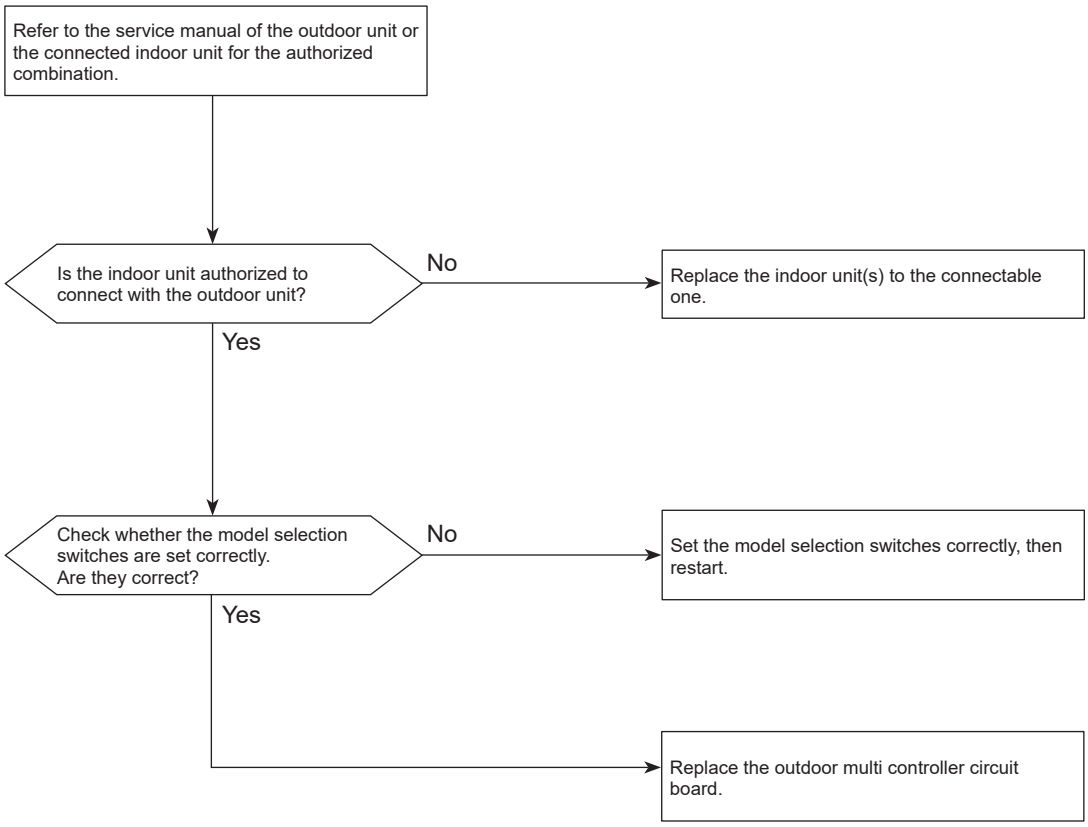
Abnormal points and detection methods

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

Causes and checkpoints

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

Diagnosis of failure



8-2. Remote controller diagnosis

Refer to “Remote controller check” for MA remote controller system.

8-3. Remote controller trouble

8-3-1. M-NET remote controller systems

Symptom or inspection code	Cause
Though the content of operation is displayed on the remote controller, some indoor units do not operate.	• The power supply of the indoor unit is not on. • The address of the indoor units in the same group or the remote controller is not set correctly. • The indoor units connected in the other system are not set in the same group by the remote controller. • The fuse on the indoor unit controller board is blown.
Though the indoor unit operates, the display of the remote controller goes out soon.	• The power supply of the indoor unit is not on. • The fuse on the indoor unit controller board is blown.
The display of the remote controller does not come up.	• The power supply of the outdoor unit is not on. • The connector of transmission outdoor power board is not connected. • The number of connected indoor units in the refrigeration system is over the limit or the number of connected remote controller is over the limit. • M-NET remote controller is connected to MA remote controller cable. • The transmission line of the indoor/outdoor unit is shorted or down. • M-NET remote controller cable is shorted or down. • Transmission outdoor power board failure.
“Startup screen” keeps being displayed or it is displayed periodically. (“Startup screen” is usually displayed about 3 minutes after the power supply of the outdoor unit is on.)	• The power supply for the feeding expansion unit for the transmission line is not on. • The address of the outdoor unit remains “00”. • The address of the indoor unit or the remote controller is not set correctly. • MA remote controller is connected to the transmission line of the indoor/outdoor unit.
The remote controller does not operate.	• The transmission line of the indoor/outdoor unit is connected to TB15. • The transmission line of the indoor/outdoor unit is shorted down or badly contacted.

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

8-3-2. For MA remote controller systems

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

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

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

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

8-5. Internal switch function table

■ SWU1 and SWU2

SWU2 (tens digit) SWU1 (ones digit)

Bit	When to set
Rotary switch	Before turning the power ON

■ SW1: Digital display switch

Initial setting

The black square (■) indicates a switch position.

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

■ SW2: Function switch

Initial setting

The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	Select operating system startup	With centralized controller	Without centralized controller	Before turning the power ON	Turn ON when the centralized controller is connected to the outdoor unit.	• SW2-1 must be turned ON if a centralized controller is connected to the system. An example of this would be a TC-24, EB50A, AG150, AE50 or AE200. If SW2-1 is OFF, while using a centralized controller, in rare circumstances problems may be encountered such as indoor units not responding to group commands. • Group setting of 2 or more A-IC units which are connected to branch box via centralized controller is not allowed.
2	Clear connection information	Activated	Deactivated	Before turning the power ON	To clear connection information.	• Clear connection information when relocating units or connecting additional units.
3	Clear error history	Activated	Deactivated	OFF to ON under suspension after the power is turned on.	To clear error history.	-
4	Pump down	Activated	Deactivated	While the compressor is running	To facilitate outdoor unit the pumping down operation. Frequency = Fixed to 65 Hz Indoor-linear expansion valve = Fully open Outdoor fan step = Fixed to 10	Refer to a section referring to the pumping down on outdoor units Installation Manuals. It might not be possible to collect all the refrigerant if the amount is excessive. Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.
5	-	-	-	-	-	-
6	-	-	-	-	-	-

■ SW3: Trial operation

Initial setting

The black square (■) indicates a switch position.

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

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

■ SW4/SW8: Model switch

Model selection

MODEL	SW4	SW8	SW9
PUMY-P112VKM6			
PUMY-P125VKM6			
PUMY-P140VKM6			

MODEL	SW4	SW8	SW9
PUMY-P112YKM5			
PUMY-P125YKM5			
PUMY-P140YKM5			

The black square (■) indicates a switch position.

Bit	When to set
1-6	Before the power is turned ON.

■ SW5: Function switch

Initial setting

The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	Demand control setting for Australia*2	Activated	Deactivated	Any time	Turn ON to activate the demand control for Australia.	(Do not turn this ON if the unit is in outside Australia)
2	Change the indoor unit's LEV opening at startup	Activated	Deactivated	Any time	To set the LEV opening at startup higher than usual (+150 pulses). To improve the operation with the LEV almost clogged.	The refrigerant flow noise at startup become louder.
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	Change the indoor unit's LEV opening at defrost	Activated	Deactivated	Any time	To set the LEV opening higher than usual during defrosting operation. (Only Qj ≤ 10 is valid, + 300 pulses) To avoid the discharge temperature increase and provide efficient defrosting operation.	The refrigerant flow noise during the defrosting operation become louder.
6	Decreasing the target sub cool (Heating mode)	Activated	Deactivated	Any time	To reduce the discharge temperature decrease due to refrigerant liquid accumulation in the units.	A refrigerant flow noise might be generated if the sub cool value is too small.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
7	While the outdoor unit is in HEAT operation, additionally increase by 50 to 70 pulses of the LEV opening on the indoor unit which is in FAN, STOP, COOL or thermo-OFF.*3	Activated	Deactivated	Any time	To additionally increase by about 50 to 70 pulses of the LEV opening for units other than in HEAT operation. To avoid a refrigerant shortage (less capacity) due to refrigerant liquid accumulation in the units which is not in operation.	A refrigerant flow noise might be generated in units other than the one in operation.
8	While the outdoor unit is in HEAT operation, fully close the LEV on the indoor unit which is in FAN or COOL.*4	Activated	Deactivated	Any time	To reduce the room temperature increase by setting the LEV opening lower for the indoor units in FAN or COOL.	The refrigerant is more likely to collect in the indoor units in FAN or COOL, which can cause refrigerant shortage of units, resulting in less capacity and increase in discharge temperature.

*2. Refer to “Outdoor unit input/output connector”.
*3. SW5-7 Opens the indoor-linear expansion valve as a countermeasure against the indoor unit in FAN, COOL, STOP, or thermo-OFF operation with refrigerant-shortage status due to an accumulation of liquid refrigerant in the indoor unit.
*4. SW5-8 Countermeasure against room temperature rise for indoor unit in FAN and COOL mode.

■ SW6: Function switch

Initial setting

The black square (■) indicates a switch position.

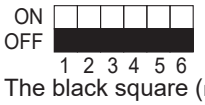
SW6-6	OFF	ON
Target Pdm (kg/cm²)	29.5	31.5

SW6-7	OFF	ON	OFF	ON
SW6-8	OFF	OFF	ON	ON
Target ETm (°C [°F])	9 [48]	11 [52]	6 [43]	14 [57]

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	Change of defrosting control	Activated (For high humidity)	Deactivated	Any time	To shorten the defrosting prohibition time in high humidity (or heavy snow) region, in order to reduce malfunctions caused by frost.	The performance of HEAT operation is somewhat reduced since the defrosting operation is frequently performed.
5	-	-	-	Any time	-	-
6	Switching the target discharge pressure (Pdm)	Activated	Deactivated	Any time	To raise the performance by setting the PDm higher during HEAT operation.	Power consumption increases due to a higher frequency. (The performance would not increase at the maximum operating frequency.)
7	Switching (1) the target evaporation temperature (ETm)	Activated	Deactivated	Any time	To raise/lower the temperature by changing the target ETm during COOL operation. Switch to lower the temperature: raises the performance Switch to raise the temperature: prevents condensation	Switching it to lower the temperature, it raises the power consumption, and produces more condensation. Switching it to raise the temperature, it makes the performance insufficient.
8	Switching (2) the target evaporation temperature (ETm)	Activated	Deactivated	Any time		

■ SW7: Function switch

Initial setting



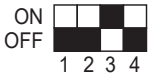
The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	Ignore current sensor abnormality and rotational frequency abnormality of outdoor fan motor	Activated	Deactivated	OFF to ON under suspension after the power is turned on.*5	To perform a test run for electrical parts alone without running the compressor. Also, to perform the troubleshooting of electrical parts without operating the outdoor unit’s fan.	Make sure to connect the connectors to the compressor after checking the electrical parts. Be careful not to get electrical shock while working on electrical parts.
2	Set the freeze stat heater (optional part) to be energized only during heating.	Activated	Deactivated	Any time	Power consumption is reduced by limiting the energization of the freeze stat heater to heating only.	When SW7-2 is OFF, the freeze stat heater is energized even when the compressor is stopped during cooling to prevent fan from being damaged due to snow blowing inside the outdoor unit and freezing.
3	-	-	-	-	-	-
4	Maximum frequency down at 1 hour after COOL operation	Activated	Deactivated	Any time	To reduce condensation on the indoor unit by lowering the frequency	The performance might be insufficient.
5	-	-	-	-	-	-
6	Manual defrost	Activated	Deactivated	During compressor running in HEAT mode.	Turn ON when it is necessary to perform the defrosting operation forcedly. (Effective only at startup, or 10 minutes after the last defrosting operation)	It performs the defrosting operation forcedly. (HEAT operation is stopped temporarily.)

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

■ SW9: Function switch

Initial setting



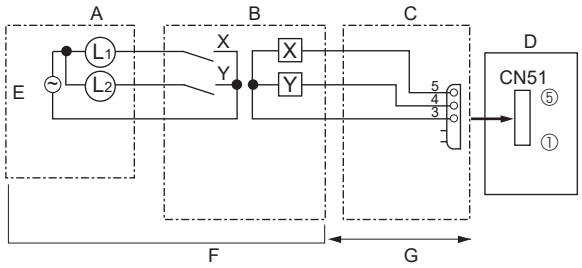
The black square (■) indicates a switch position.

Bit	Function	Operation in each switch setting			Purpose	Additional information
		ON	OFF	When to set		
1	Auto change over from remote controller (IC with the minimum address)	Activated*6	Deactivated	Before turning the power ON	Enables the indoor unit with the minimum address to select AUTO mode, and switches the operation mode of the other indoor units to the same mode.	Cannot be set when the centralized control is ON.
2	Switching the Silent/ Demand mode	Demand control	Silent mode	Any time	-	About the Silent mode/Demand control setting, refer to “Outdoor unit input/output connector”.
3	-	-	-	-	-	-
4	-	-	-	-	-	-

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

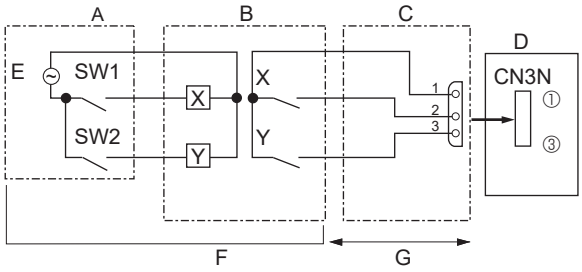
8-6. Outdoor unit input/output connector

■ State (CN51)



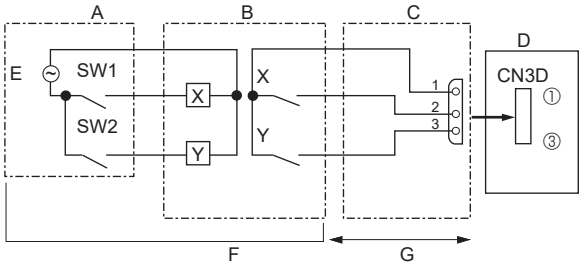
A: Distant control board
B: Relay circuit
C: External output adapter (PAC-SA88HA-E)
D: Outdoor unit control board
E: Lamp power supply
F: Procure locally
G: Max. 10m [32 ft]
L1: Error display lamp
L2: Compressor operation lamp
X, Y: Relay (coil rating: ≤ 0.9W. DC 12 VDC)

■ Auto changeover (CN3N)



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

■ Silent Mode/Demand Control (CN3D)



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

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

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

8-7. How to check the parts

8-7-1. Checkpoints for each part

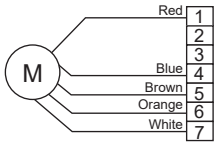
■ Thermistors

Disconnect the connector then measure the resistance with a multimeter (at the ambient temperature 10 to 30°C [50 to 80°F]).

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

* TH8 is internal thermistor of power module. (V)

■ Fan motor (MF1, MF2)



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

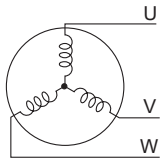
Connector pins	Normal	Abnormal
Red - Blue	1.1 ± 0.05 MΩ	Open or short (Short, for White - Blue)
Brown - Blue	40 ± 4 kΩ	
Orange - Blue	220 ± 22 kΩ	
White - Blue	Open	

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

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

Normal	Abnormal
2085 ± 208.5 Ω	Open or short

■ Motor for compressor (MC)



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

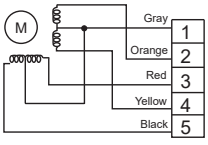
Model	Normal	Abnormal
PUMY-P•VKM	0.305 ± 0.015 Ω	Open or short
PUMY-P•YKM	0.466 ± 0.023 Ω	

■ Solenoid valve coil <Bypass valve> (SV1)

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

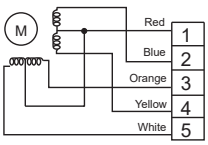
Normal	Abnormal
1182.5 ± 83 Ω	Open or short

■ Linear expansion valve (LEV-A)



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

■ Linear expansion valve (LEV-B)



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

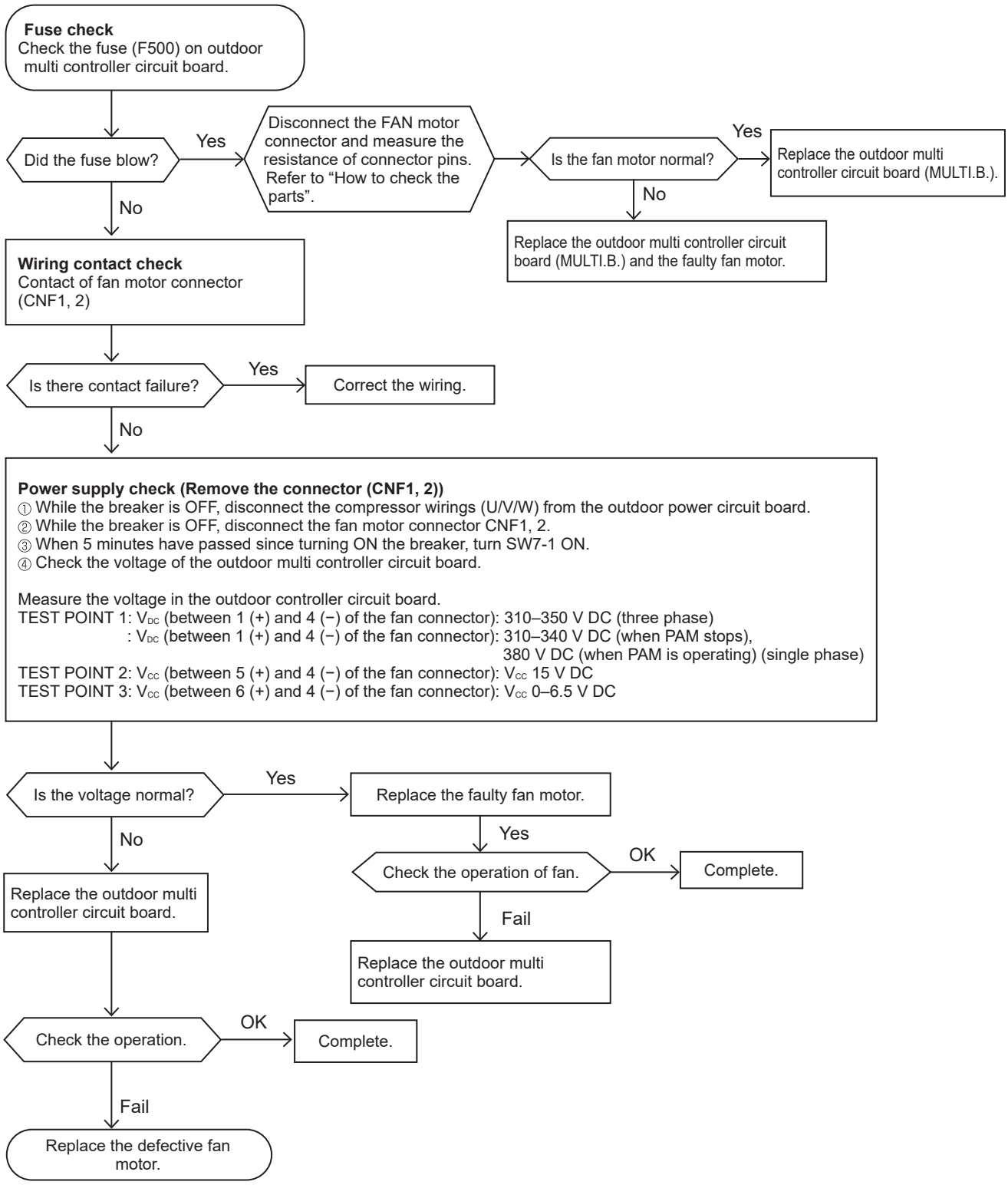
8-7-2. Check method of DC fan motor (fan motor/outdoor multi controller circuit board)

■ Precaution

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

■ Self-check

Symptom: The outdoor fan cannot rotate.



Note:

- Turn SW7-1 OFF after the troubleshooting completes.
- The fan sometimes starts on-off cycle operation during low load operation or cooling at low outside temperature. It is not abnormal; the operation ensures reliability of the product.

8-8. How to check the components

8-8-1. Thermistor feature chart

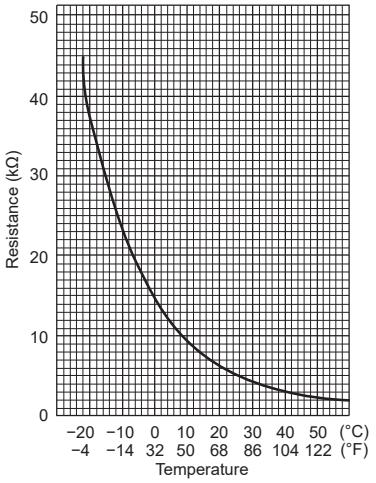
■ Low temperature thermistors

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

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

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

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



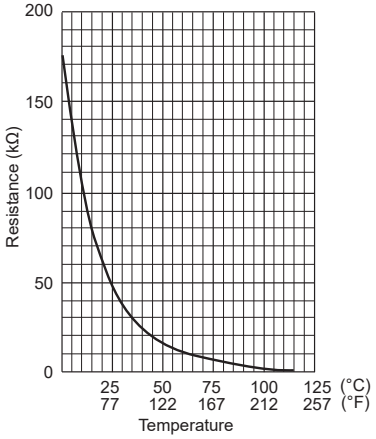
■ Medium temperature thermistor

- TH8 (Heat sink)

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

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

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



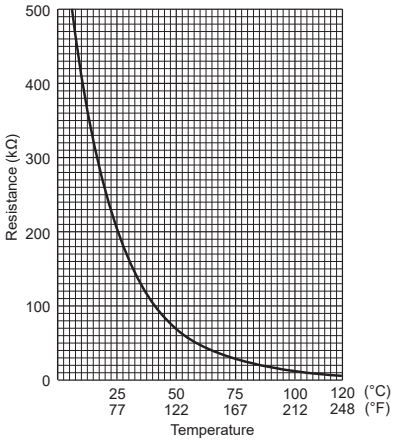
■ High temperature thermistor

- TH4 (Compressor)

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

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

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



8-8-2. High pressure sensor

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

By configuring the digital display setting switch (SW1) as shown in the figure below, the pressure as measured by the high pressure sensor appears on the LED1 on the control board.

The black square (■) indicates a switch position.

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

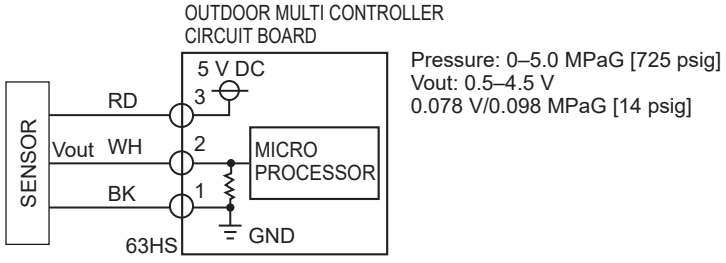
■ High pressure sensor configuration (63HS)

The high pressure sensor consists of the circuit shown in the figure below. If 5 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 microprocessor. The output voltage is 0.078 V per 0.098 MPaG [14 psig].

Note:

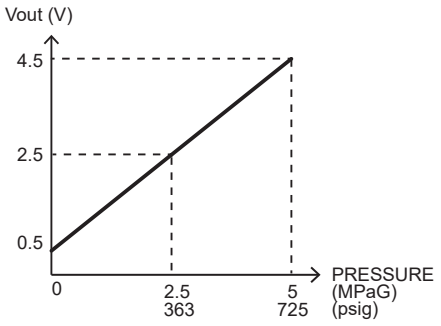
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

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



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

③–①: 5 V (DC)
②–①: Output Vout (DC)



8-8-3. Low pressure sensor

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

By configuring the digital display setting switch (SW1) as shown in the figure below, the pressure as measured by the low pressure sensor appears on the LED1 on the control board.

The black square (■) indicates a switch position.

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

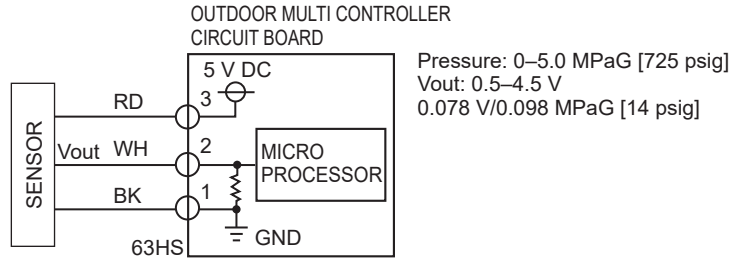
■ Low pressure sensor configuration (63LS)

The low pressure sensor consists of the circuit shown in the figure below. If 5 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 microprocessor. The output voltage is 0.173 V per 0.098 MPaG [14 psig].

Note:

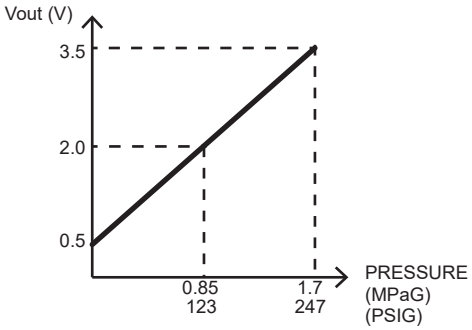
- The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

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



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

③–①: 5 V (DC)
②–①: Output Vout (DC)

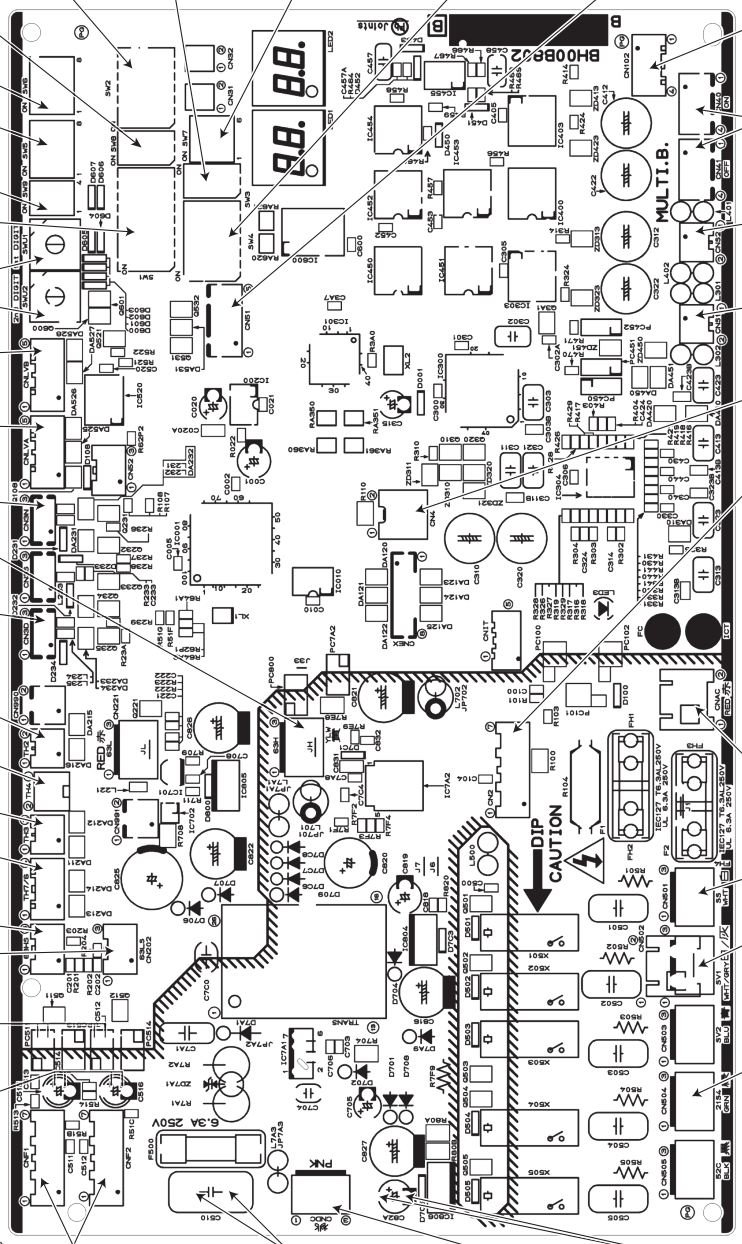


8-9. Test point diagram

■ Outdoor multi controller circuit board

⚠Caution:

- TEST POINT①is high voltage.



SW2
Pump down

SW3
Test run

SW7
Manual defrost

SW4
Model selection

CN51
External signal output

SW8
Model selection

SW6
Function selection

SW5
Function selection

SW9
Function selection

SW1
Display selection
(Self-diagnosis)

SWU2, SWU1
Address setting

CNLVB
Linear expansion valve

CNLVA
Linear expansion valve

CN3N
Auto change over

63H
High pressure switch

CN3D
Input of silent mode or demand control

TH2 Thermistor
<HIC pipe>

TH4 Thermistor
<Compressor>

TH3 Thermistor
<Outdoor liquid pipe>

TH7/TH6 Thermistor
<Ambient/Suction pipe>

63HS
High pressure sensor

63LS
Low pressure sensor

V_{FG} (TEST POINT④)
(Voltage between pin3 and pin4 of PC511 or PC512):
(Correspond to CNF1, 2 ⑦(+)–④(−))

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

CNF1, 2
Connect to fan motors
①–④: 310–340 V DC (Y)
: 310–380 V DC (V)
⑤–④: 15 V DC
⑥–④: 0–6.5 V DC
⑦–④: 15 V DC (when stopped)
0–15 V DC pulse
(when operated)

V_{DC} (TEST POINT①)
(Voltage between pins of C510)
: 310–340 V DC (Y)
: 310–380 V DC (V)
(Same as CNF1,2 ①(+)–④(−))

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

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

CN102
Connect to the M-NET power circuit board

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

CNS2
Transmission wire of centralized control

CNS1
Indoor/outdoor unit connecting wire

CN4
Connect to the outdoor power circuit board.

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

CNAC
Power supply for outdoor multi controller circuit board
230 V AC

SS
Base heater

SV1
Bypass valve

21S4
4-way valve

■ **Outdoor power circuit board**

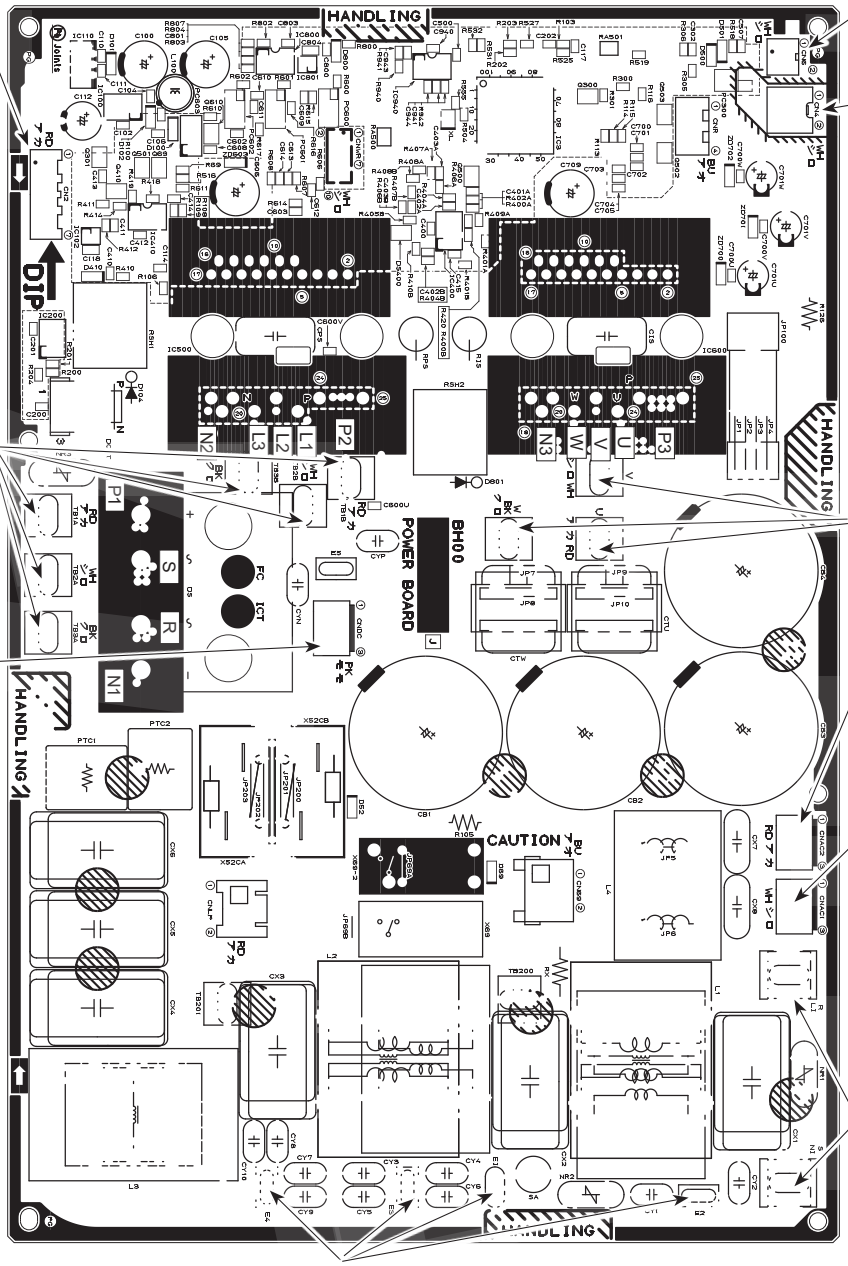
PUMY-P112VKM6(-BS)
PUMY-P112VKM6-ER(BS)
PUMY-P125VKM6(-BS)
PUMY-P125VKM6-ER(BS)
PUMY-P140VKM6(-BS)
PUMY-P140VKM6-ER(BS)

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

1. Check of POWER MODULE
   1 Check of DIODE circuit
   R - P1 S - P1 R - N1 S - N1
   2 Check of IGBT circuit
   P2 - L1 P2 - L2 N2 - L1 N2 - L2
   3 Check of INVERTER circuit
   P3 - U , P3 - V , P3 - W , N3 - U , N3 - V , N3 - W

Note: The marks R , S , L1 , L2 , P1 , N1 , U , V and W shown in the diagram are not actually printed on the board.

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



CN6
Thermistor (TH8)

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

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

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

CNDC
310–380 VDC (①+, ③−)
Connect to the outdoor controller circuit board (CN52)

CNAC2
220-240 VAC
Connect to the outdoor multi controller circuit board (CNAC)

CNAC1
220-240 VAC
Connect to the M-NET power circuit board (CN1)

R/LI, S/NI
Voltage of 220-240 VAC is input (Connect to the terminal block (TB1))

EI, E2, E3, E4
Connect to the electrical parts box

■ Outdoor power circuit board

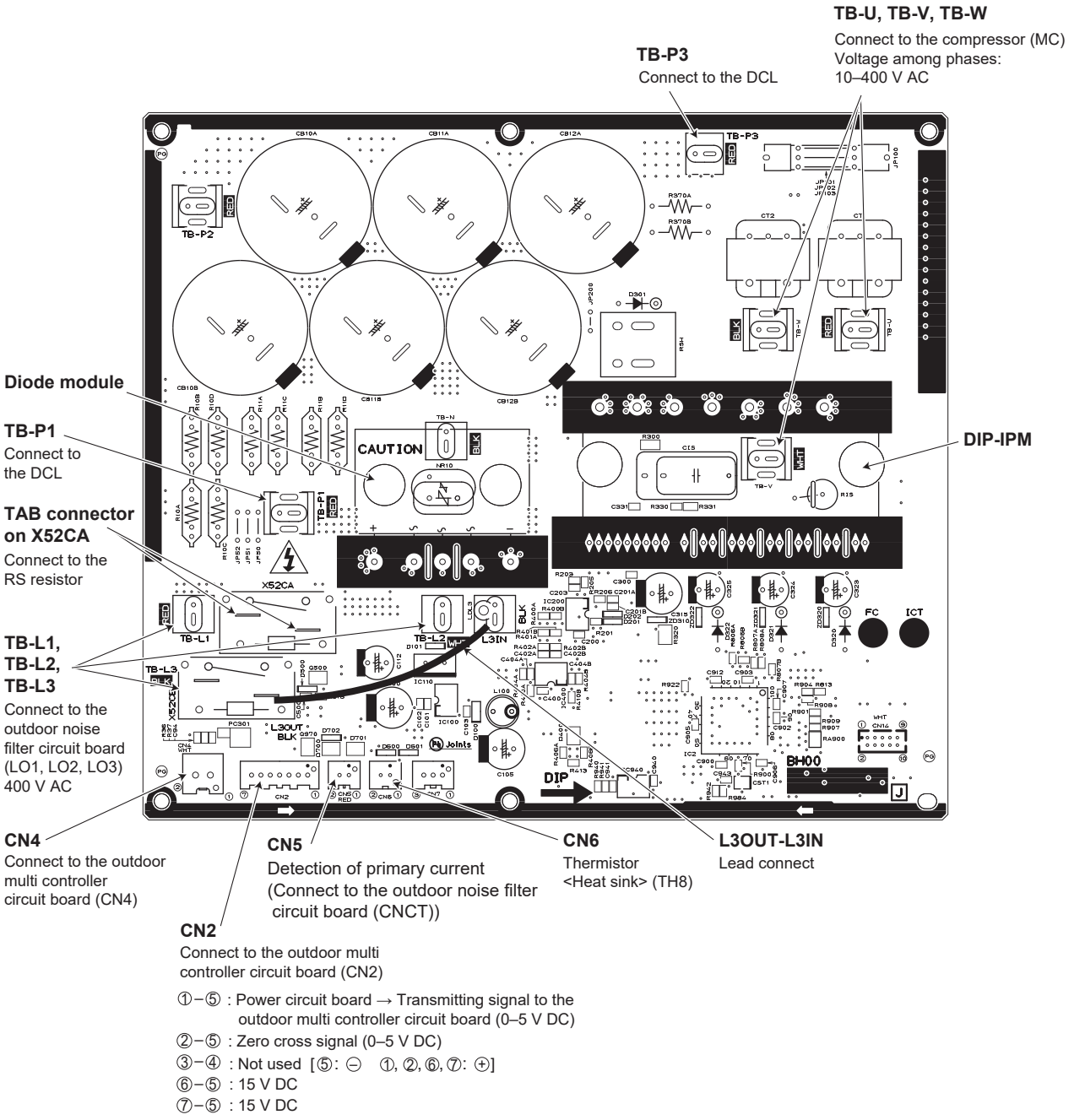
PUMY-P112YKM5(-BS)
PUMY-P112YKM5-ER(BS)
PUMY-P125YKM5(-BS)
PUMY-P125YKM5-ER(BS)
PUMY-P140YKM5(-BS)
PUMY-P140YKM5-ER(BS)

Brief Check of POWER MODULE

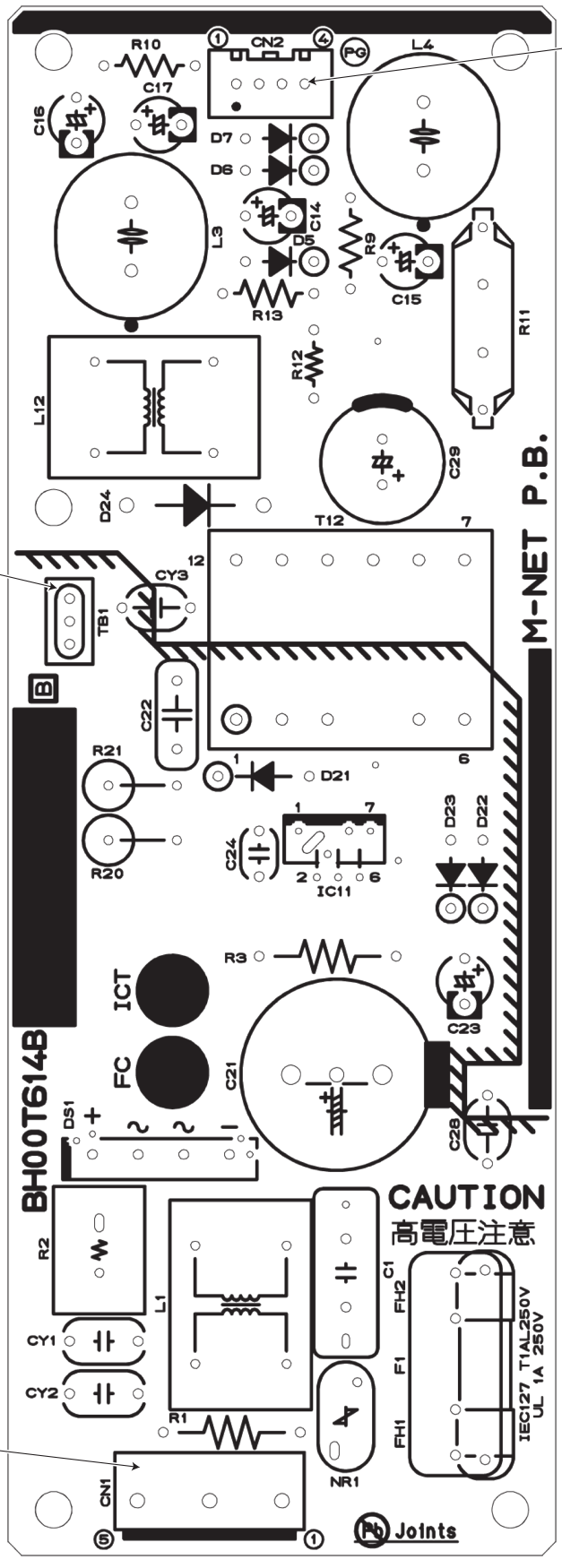
If they are short-circuited, it means that they are broken.
Measure the resistance in the following points (connectors, etc.).

1. Check of DIODE MODULE
   L1-P1, L2-P1, L3-P1, L1-N1, L2-N1, L3-N1
2. Check of DIP-IPM
   P2-U, P2-V, P2-W, N2-U, N2-V, N2-W

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



■ M-NET power circuit board



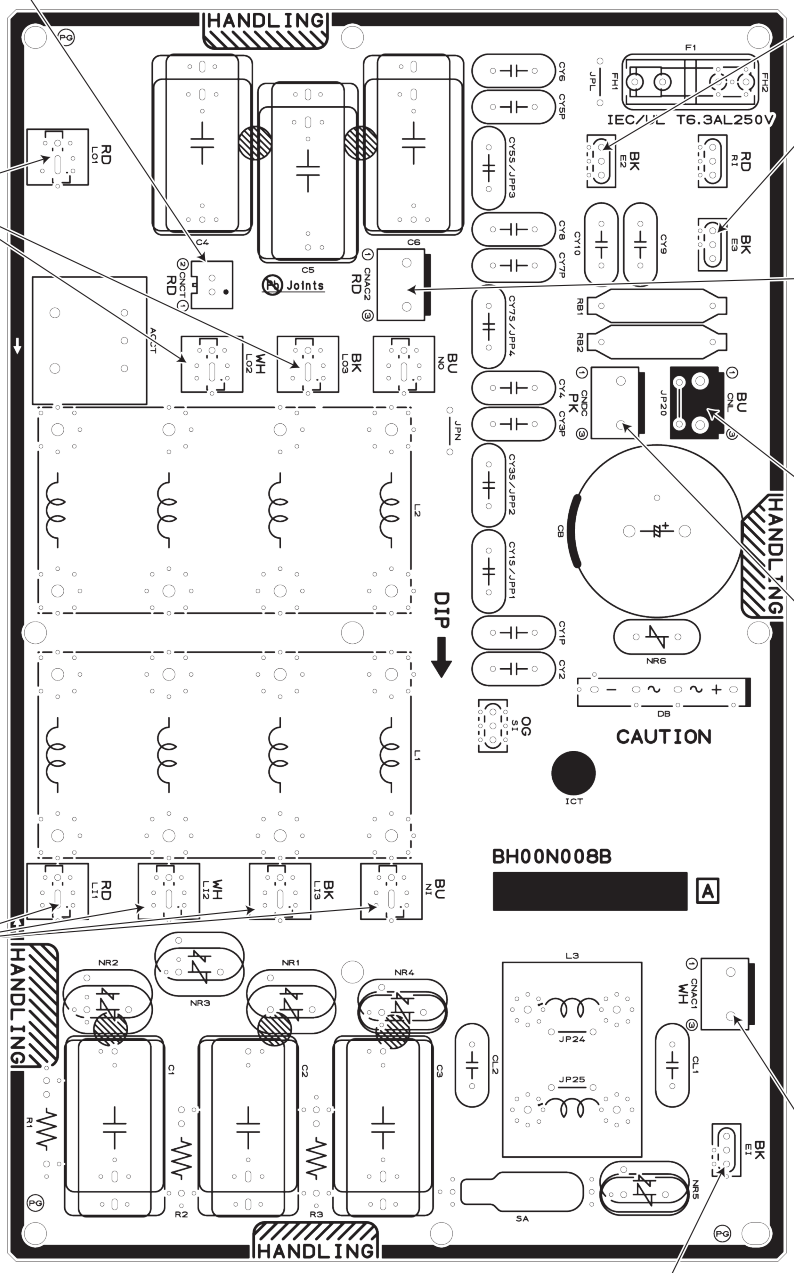
■ Outdoor noise filter circuit board

PUMY-P112YKM5(-BS)
PUMY-P112YKM5-ER(BS)
PUMY-P125YKM5(-BS)
PUMY-P125YKM5-ER(BS)
PUMY-P140YKM5(-BS)
PUMY-P140YKM5-ER(BS)

CNCT
Primary current
Connect to the outdoor power circuit board (CN5)

LO1, LO2, LO3 POWER SUPPLY
LO1-LO2/LO2-LO3/ LO3-LO1: 400V AC input
Connect to the outdoor power circuit board (TB-L1,TBL2, TB-L3)

LI1, LI2, LI3, NI POWER SUPPLY
LI1-LI2/LI2-LI3/LI3-LI1: 400V AC input
LI1-NI/LI2-NI/LI3-NI: 230V AC input
Connect to the terminal block (TB1)



E2
Connect to the electrical parts box

E3
Connect to the electrical parts box

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

CNL
Connect to the ACL4

CNDC
Connect to the outdoor multi controller circuit board (CNDC)
310–350 V DC (①+, ③ –)

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

EI
Connect to the electrical parts box

8-10. Outdoor unit information display

SW: setting
0: OFF
1: ON

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
0	00000000	Relay output (at normal state)	Compressor operation	52C	21S4	SV1	(SV2)	—	—	Always lighting
		Error code (at abnormal state)	0000–9999 (Alternating display of addresses and error code) Note: When abnormality occurs, check display.							
1	10000000	Indoor unit check status	No.1 unit check	No.2 unit check	No.3 unit check	No.4 unit check	No.5 unit check	No.6 unit check	No.7 unit check	No.8 unit check
			Note: Light on at time of abnormality							
2	01000000	Protection input	High pressure abnormality	Superheat due to low discharge temperature	Compressor shell temperature abnormality	TH4 abnormality	TH3 abnormality	Outdoor fan rotation frequency abnormality	TH7 abnormality	TH8 abnormality
			Note: Display detected microprocessor protection or abnormality							
3	11000000	Protection input	Heat sink overheating	Compressor over current interception	Voltage abnormality	Insufficient refrigerant amount abnormality	Current sensor/ primary current abnormality	63LS abnormality	63HS abnormality	start over current interception abnormality delay
			Note: Display detected microprocessor protection or abnormality							
4	00100000	Protection input	Abnormality in the number of indoor units	Address double setting abnormality	Indoor unit capacity error	Over capacity	Indoor unit address error	Outdoor unit address error	Current sensor open/ short	Serial communication abnormality (outdoor unit)
			Note: Display detected microprocessor protection or abnormality							
5	10100000	Abnormality delay display 1	High pressure abnormality delay	Superheat due to low discharge temperature delay	Compressor shell temperature abnormality delay	TH4 abnormality delay	TH3 abnormality delay	Outdoor fan rotation frequency abnormality delay	TH7 abnormality delay	TH8 abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
6	01100000	Abnormality delay display 2	Heat sink overheating delay	Compressor over current interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start over current interception abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
7	11100000	Abnormality delay display 3	63LS abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by closed valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/ short delay	—
			Note: Display all abnormalities remaining in abnormality delay							
8	00010000	Abnormality delay history 1	High pressure abnormality delay	Superheat due to low discharge temperature delay	Compressor shell temperature abnormality delay	TH4 abnormality delay	TH3 abnormality delay	Outdoor fan rotation frequency abnormality delay	TH7 abnormality delay	TH8 abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
9	10010000	Abnormality delay history 2	Heat sink overheating delay	Compressor over current interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start over current interception abnormality delay
			Note: Display all abnormalities remaining in abnormality delay							
10	01010000	Abnormality delay history 3	63LS abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by closed valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/ short delay	—
			Note: Display all abnormalities remaining in abnormality delay							
11	11010000	Abnormality code history 1 (the latest)	Alternating display of addresses 0000–9999 and abnormality code (including abnormality delay code) Followings are the delay code and the details of the abnormal delay 1202: Discharge/Comp. temperature, Thermistor <Compressor>(TH4) 1205: Thermistor <Outdoor liquid pipe> (TH3) 1211: Thermistor <Suction pipe> (TH6) 1214: Thermistor <Heat sink> (TH8) 1221: Thermistor <Ambient> (TH7) 1222: Thermistor <HIC> (TH2) 1400: Low pressure sensor 1402: High pressure (63H), High pressure sensor (63HS) 1600: Discharge superheat (SHd), Over charge refrigerant 1601: Insufficient refrigerant, Closed cooling valve 1608: 4-way valve disconnection 4310: Current sensor open/short 4320: Undervoltage, overvoltage, or power module 4330: Heat sink temperature 4350: Power module 4500: Outdoor fan motor Notes: • Display abnormalities up to present (including abnormality terminals) • History record in 1 is the latest; records become older in sequence; history record in 10 is the oldest.								
12	00110000	Abnormality code history 2								
13	10110000	Abnormality code history 3								
14	01110000	Abnormality code history 4								
15	11110000	Abnormality code history 5								
16	00001000	Abnormality code history 6								
17	10001000	Abnormality code history 7								
18	01001000	Abnormality code history 8								
19	11001000	Abnormality code history 9								
20	00101000	Abnormality code history 10 (the oldest)								
21	10101000	Cumulative time	0–9999 (unit: 1 hour) Note: Display of cumulative compressor operating time							
22	01101000	Cumulative time	0–9999 (unit: 10 hours) Note: Display of cumulative compressor operating time							
23	11101000	Outdoor unit operation display	Compressor energizing	Compressor operating prohibition	Compressor in operation	Abnormality detection	—	—	—	—

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
24	00011000	Indoor unit operation mode	No.1 unit mode	No.2 unit mode	No.3 unit mode	No.4 unit mode	No.5 unit mode	No.6 unit mode	No.7 unit mode	No.8 unit mode
			Cooling: light on, Heating: light blinking, Stop fan: light off							
25	10011000	Indoor unit operation display	No.1 unit Thermo ON	No.2 unit Thermo ON	No.3 unit Thermo ON	No.4 unit Thermo ON	No.5 unit Thermo ON	No.6 unit Thermo ON	No.7 unit Thermo ON	No.8 unit Thermo ON
26	01011000	Capacity code (No. 1 indoor unit)	0–255 Notes: •Display of indoor unit capacity code •The No. 1 unit will start from the M-NET address with the lowest number							
27	11011000	Capacity code (No. 2 indoor unit)								
28	00111000	Capacity code (No. 3 indoor unit)								
29	10111000	Capacity code (No. 4 indoor unit)								
30	01111000	Capacity code (No. 5 indoor unit)								
31	11111000	IC1 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
32	00000100	IC2 operation mode								
33	10000100	IC3 operation mode								
34	01000100	IC4 operation mode								
35	11000100	IC5 operation mode	Note: Display of indoor unit operating mode							
36	00100100	OC operation mode	Compressor ON/OFF	Heating/ Cooling	Abnormal/ normal	DEFROST/ NO	Refrigerant pull back/no	Excitation current/no	3-min delay/ no	—
			Note: Light on/light off							
37	10100100	External connection status	CN3N1–3 input	CN3N1–2 input	CN3S1–2 input	CN3D1-3 input	CN3D1-2 input	—	—	—
			Note: Input: light off, No input: light on							
38	01100100	Communication demand capacity	0–255 (%) Note: Display of communication demand capacity							
39	11100100	Number of compressor ON/ OFF	0000–9999 (unit: x10) Note: Display a count of compressor operation/stop							
40	00010100	Compressor operating current	0–999.9 (Arms) Note: Display detected current							
41	10010100	Input current of outdoor unit								
42	01010100	Thermo-ON operating time	0000–9999 (unit: x10) Note: Display cumulative time of thermo-ON operation							
43	11010100	Total capacity of thermo-ON	0–255 Note: Display total capacity code of indoor units in thermo-ON							
44	00110100	Number of indoor units	0–255 Note: Display number of connected indoor units							
45	10110100	DC bus voltage	0–9999 (V) Note: Display bus voltage							
46	01110100	State of LEV control	Td over heat prevention	SHd decrease prevention	Min.Sj correction depends on Td	Min.Sj correction depends on Shd	LEV opening correction depends on Pd	LEV opening correction depends on Td	Correction of high compression ratio prevention	—
			Note: Display active LEV control							
47	11110100	State of compressor frequency control 1	Condensing temperature limit control	Compressor temperature control	—	Discharge temp. (heating) backup control	Pd abnormality control (heating)	Pd Back up control (heating)	—	Freeze prevention control at the beginning of SHd
			Note: Display active compressor frequency control							
48	00001100	State of compressor frequency control 2	Heat sink over heat prevention control	Secondary current control	Input current control	—	Frequency restrain of receipt voltage change	Low pressure decrease prevention	Hz-up inhibit control at the beginning of SHd	—
			Note: Display active compressor frequency control							
49	10001100	Protection input	63LS abnormality	HIC abnormality	—	Frozen protection	4-way valve disconnection abnormality	Delay caused by blocked valve in cooling mode	TH6 abnormality	Power module abnormality
50	01001100	The second current value when microprocessor of power board abnormality is detected	0–999.9[Arms] Note: Display data at time of abnormality							
51	11001100	Heatsink temperature when microprocessor of power board abnormality is detected	−99.9–999.9 (°C) Note: Display data at time of abnormality							

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

No.	SW1 setting 12345678	Contents	LED1, 2 1	2	3	4	5	6	7	8
107	11010110	Target outdoor SC (cooling)	SCm (0.0–20.0) (°C) Note: Display of all control target data							
108	00110110	Target indoor SC/SH (IC1)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
109	10110110	Target indoor SC/SH (IC2)								
110	01110110	Target indoor SC/SH (IC3)								
111	11110110	Target indoor SC/SH (IC4)								
112	00001110	Target indoor SC/SH (IC5)								
113	10001110	Indoor unit check status (IC9-12)	No.9 unit check	No.10 unit check	No.11 unit check	No.12 unit check	—	—	—	—
			Note: Light on at time of abnormality							
114	01001110	Indoor unit operation mode (IC9-12)	No.9 unit mode	No.10 unit mode	No.11 unit mode	No.12 unit mode	—	—	—	—
			Note: COOL/DRY: light on, HEAT: light blinking, FAN/STOP: light off							
115	11001110	Indoor unit operation display (IC9-12)	No.9 unit operation	No.10 unit operation	No.11 unit operation	No.12 unit operation	—	—	—	—
			Note: Thermo-ON: light on, Thermo-OFF: light off							
116	00101110	IC9 operation mode	STOP	Fan	Cooling Thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
117	10101110	IC10 operation mode								
118	01101110	IC11 operation mode								
119	11101110	IC12 operation mode	Note: Display of indoor unit operation mode							
120	00011110	Target indoor SC/SH (IC9)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
121	10011110	Target indoor SC/SH (IC10)								
122	01011110	Target indoor SC/SH (IC11)								
123	11011110	Target indoor SC/SH (IC12)								
124	00111110	IC9 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality delay							
125	10111110	IC10 LEV opening pulse abnormality delay								
126	01111110	IC11 LEV opening pulse abnormality delay								
127	11111110	IC12 LEV opening pulse abnormality delay								
128	00000001	Actual frequency of abnormality delay	0–255 (Hz) Note: Display of actual frequency at time of abnormality delay							
129	10110001	Fan step number at time of abnormality delay	0–15 Note: Display of fan step number at time of abnormality delay							
131	11000001	IC1 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Delay of opening pulse of indoor LEV at time of abnormality delay							
132	00100001	IC2 LEV opening pulse abnormality delay								
133	10100001	IC3 LEV opening pulse abnormality delay								
134	01100001	IC4 LEV opening pulse abnormality delay								
135	11100001	IC5 LEV opening pulse abnormality delay								
136	00010001	High pressure sensor data at time of abnormality delay kgf/cm²	−99.9–999.9 (kgf/cm²) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
137	10010001	TH4 (Compressor) sensor data at time of abnormality delay	−99.9–999.9 (°C) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality delay							
138	01010001	TH6 (Suction pipe) sensor data at time of abnormality delay								
139	11010001	TH3 (Outdoor liquid pipe) sensor data at time of abnormality delay								
140	00110001	TH8 (Heat sink) sensor data at time of abnormality delay								

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

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
189	10111101	History of voltage error (U9/4220)	—	—	PAM error	Converter Fault	Power synchroniza-tion signal error	L1 open phase error	Under voltage error	Over voltage error
190	01111101	External connec-tion status at time of abnormality delay	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input	—	—	—
191	11111101	External connec-tion status at time of abnormality	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input	—	—	—
192	00000011	Actual frequency of abnormality	0–255 (Hz) Note: Display of actual frequency at time of abnormality							
193	10000011	Fan step number at time of abnormality	0–15 Note: Display of fan step number at time of abnormality							
195	11000011	IC1 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
196	00100011	IC2 LEV opening pulse at time of abnormality								
197	10100011	IC3 LEV opening pulse at time of abnormality								
198	01100011	IC4 LEV opening pulse at time of abnormality								
199	11100011	IC5 LEV opening pulse at time of abnormality								
200	00010011	High pressure sensor data at time of abnormali-ty	−99.9–999.9 (kgf/cm²) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
201	10010011	TH4 (Compres-sor) sensor data at time of abnormality	−99.9–999.9 (°C) Note: Display of data from high pressure sensor, all thermistors, and SC/SH at time of abnormality							
202	01010011	TH6 (Suction pipe) sensor data at time of abnormality								
203	11010011	TH3 (Outdoor liquid pipe) sensor data at time of abnormality								
204	00110011	TH8 (Heat sink) sensor data at time of abnormali-ty								
205	10110011	OC SC (cooling) at time of abnormality	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data at time of abnormality							
206	01110011	IC1 SC/SH at time of abnormali-ty								
207	11110011	IC2 SC/SH at time of abnormali-ty								
208	00001011	IC3 SC/SH at time of abnormali-ty								
209	10001011	IC4 SC/SH at time of abnormali-ty								
210	01001011	IC5 SC/SH at time of abnormali-ty								
211	11001011	IC6 Capacity code	0–255 Note: Display of indoor unit capacity code The No.1 unit will start from the M-NET address with the lowest number.							
212	00101011	IC7 Capacity code								
213	10101011	IC8 Capacity code								
214	01101011	IC6 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF	—	—
215	11101011	IC7 operation mode								
216	00011011	IC8 operation mode	Note: Display of indoor unit operation mode							
217	10011011	IC6 LEV opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
218	01011001	IC7 LEV opening pulse								
219	11011001	IC8 LEV opening pulse								

	SW1 setting	Contents	LED1, 2							
No.	12345678		1	2	3	4	5	6	7	8
220	00111011	IC6 TH23 (Gas)	−99.9–999.9 (°C) Note: Display detected data of indoor unit thermistor							
221	10111011	IC7 TH23 (Gas)								
222	01111011	IC8 TH23 (Gas)								
223	11111011	IC6 TH22 (liquid)								
224	00000111	IC7 TH22 (liquid)								
225	10000111	IC8 TH22 (liquid)								
226	01000111	IC6 TH21 (intake)								
227	11000111	IC7 TH21 (intake)								
228	00100111	IC8 TH21 (intake)								
229	10100111	IC6 SC/SH	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data							
230	01100111	IC7 SC/SH								
231	11100111	IC8 SC/SH								
232	00010111	Target indoor SC/SH (IC6)	SCm/SHm (0.0–20.0) (°C) Note: Display of all control target data							
233	10010111	Target indoor SC/SH (IC7)								
234	01010111	Target indoor SC/SH (IC8)								
235	11010111	IC6 LEV opening pulse abnormality delay	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality delay							
236	00110111	IC7 LEV opening pulse abnormality delay								
237	10110111	IC8 LEV opening pulse abnormality delay								
238	01110111	IC6 SC/SH at time of abnormality delay	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data at time of abnormality delay							
239	11110111	IC7 SC/SH at time of abnormality delay								
240	00001111	IC8 SC/SH at time of abnormality delay								
241	10001111	IC6 LEV opening pulse at time of abnormality	0–2000 (pulse) Note: Display of opening pulse of indoor LEV at time of abnormality							
242	01001111	IC7 LEV opening pulse at time of abnormality								
243	11001111	IC8 LEV opening pulse at time of abnormality								
244	00101111	IC6 SC/SH at time of abnormality	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to “0” during cooling operation) Note: Display of indoor SC/SH data at time of abnormality delay							
245	10101111	IC7 SC/SH at time of abnormality								
246	01101111	IC8 SC/SH at time of abnormality								
250	01011111	IC9 LEV opening pulse	0–2000 (pulse) Note: Display of opening pulse of indoor LEV							
251	11011111	IC10 LEV opening pulse								
252	00111111	IC11 LEV opening pulse								
253	10111111	IC12 LEV opening pulse								

9 DISASSEMBLY PROCEDURE

PUMY-P112VKM6(-BS) **PUMY-P125VKM6(-BS)** **PUMY-P140VKM6(-BS)**
PUMY-P112VKM6-ER(BS) **PUMY-P125VKM6-ER(BS)** **PUMY-P140VKM6-ER(BS)**

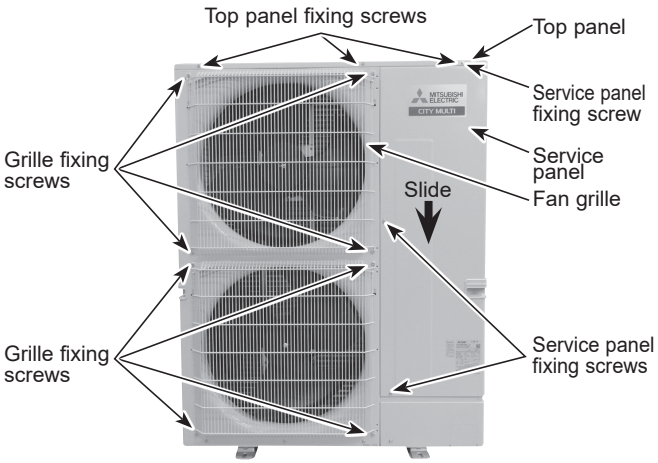
→: Indicates the visible parts in the photos/figures.

Note:
- Turn OFF the power supply before disassembly.

1. Removing the service panel and top panel

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

Photo 1



2. Removing the fan motor (MF1, MF2)

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

Note:
- Tighten the propeller fan with a torque of 5.7 ± 0.3N·m [4.2 ± 0.2 lbf·ft].

Photo 2

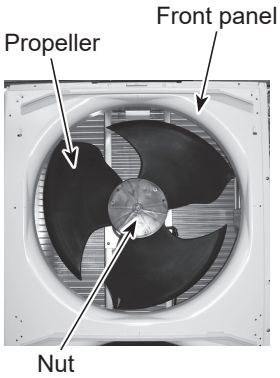
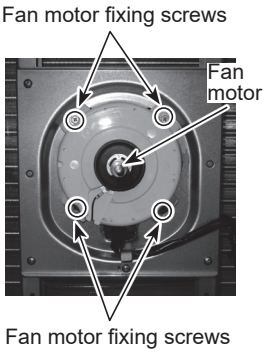


Photo 3



3. Removing the electrical parts box

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

<Diagram symbol in the connector housing>
- Fan motor (CNF1, CNF2)
- Thermistor <HIC pipe> (TH2)
- Thermistor <Outdoor liquid pipe> (TH3)
- Thermistor <Compressor> (TH4)

- Thermistor <Suction pipe/Ambient> (TH6/7)
- High pressure switch (63H)
- High pressure sensor (63HS)
- Low pressure sensor (63LS)
- 4-way valve (21S4)
- Bypass valve (SV1)

Pull out the disconnected wires from the electrical parts box.

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

Photo 4

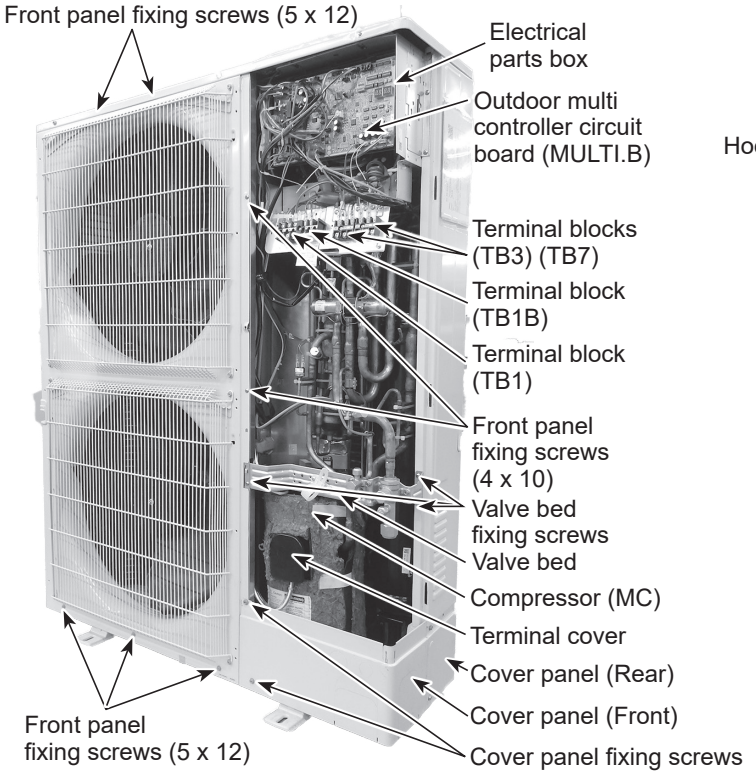
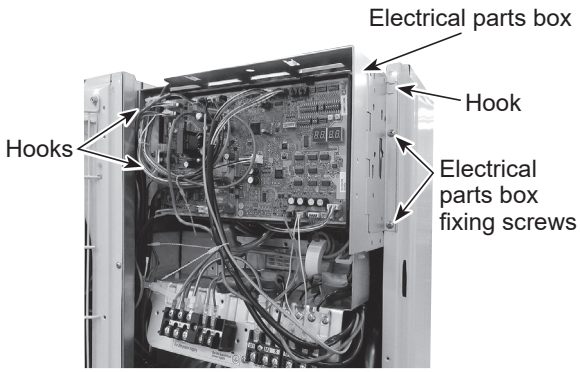


Photo 5



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

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connectors TH6 and TH7 (red) on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on the side 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 to remove thermistor <Ambient> (TH7).

Photo 6

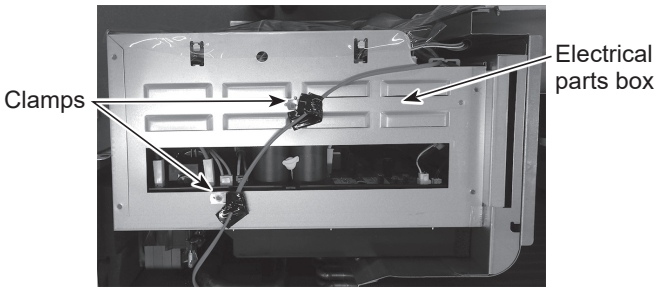
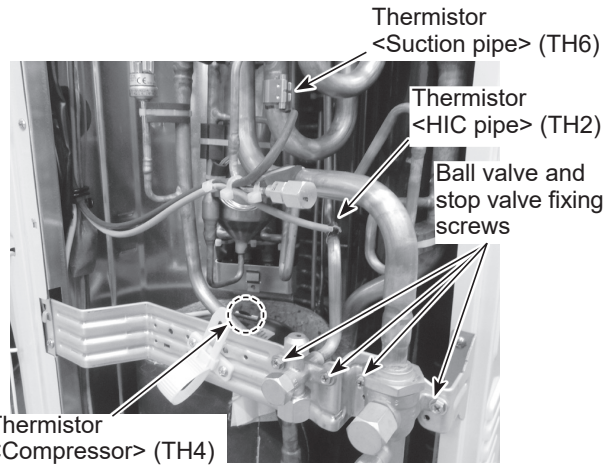


Photo 7



5. Removing the thermistor <Ambient> (TH7)

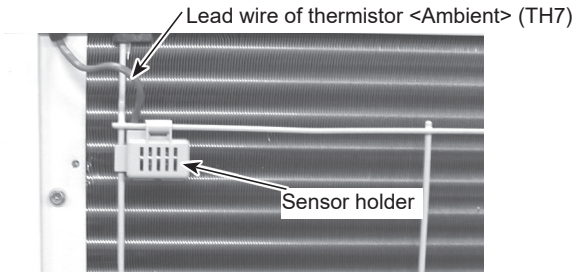
1. Remove the service panel. (See Photo 1)

2. Remove the top panel. (See Photo 1)
3. Disconnect the connector TH7 (red) on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box. (See Photo 6)
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 to remove thermistor <Suction pipe> (TH6).

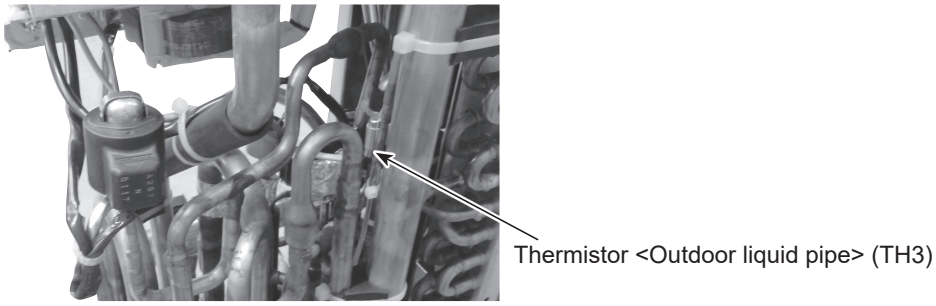
Photo 8



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

1. Remove the service panel. (See Photo 1)
2. Disconnect the connectors TH3 (white), TH4 (white), and TH2 (black) on the outdoor 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.

Photo 9



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

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

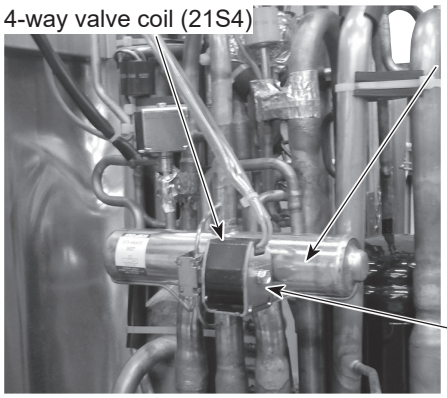
8. Removing the 4-way valve

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

Notes:

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

Photo 10



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

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

10. Removing the high pressure switch (63H)

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

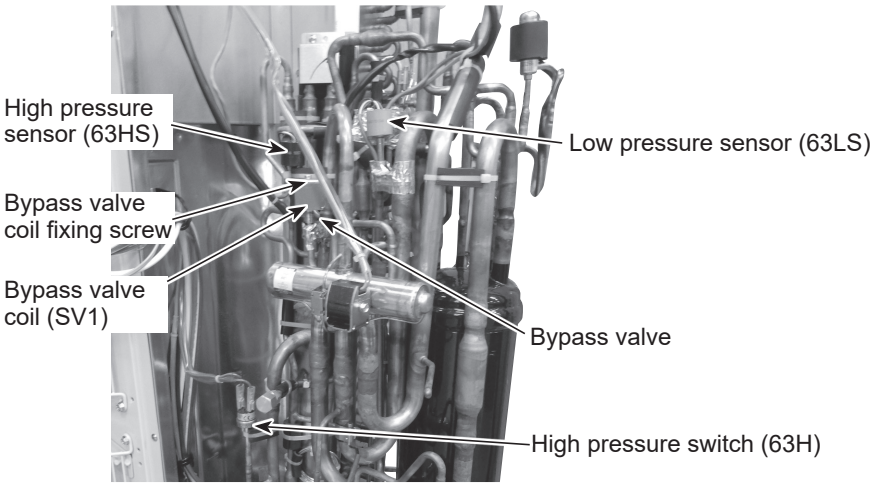
Notes:
- Recover refrigerant without spreading it in the air.
- The welded part can be removed easily after removing the side panel (R).
- When installing the high pressure switch, cover it with a wet cloth to prevent it from heating (100°C or more), then braze the pipes so that the inside of pipes are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

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

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

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

Photo 11



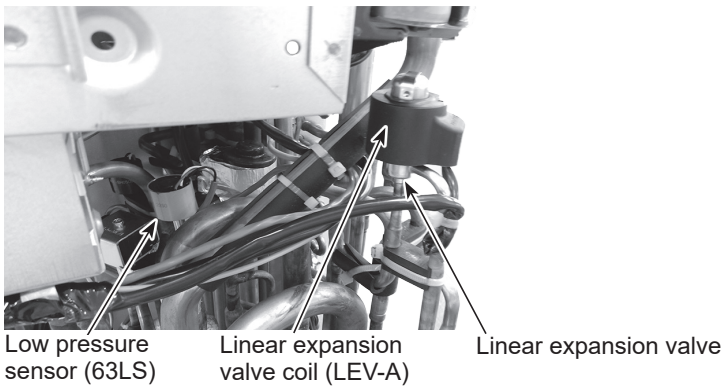
12. Removing linear expansion valve (LEV-A, LEV-B)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the electrical parts box. (See Photo 5)
4. Remove 3 side panel (R) fixing screws (5 × 12) in the rear of the unit and remove the side panel (R).
5. Remove the linear expansion valve coil.
6. Recover refrigerant.
7. Remove the welded part of linear expansion valve.

Note:

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

Photo 12



13. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove 2 cover panel (front) fixing screws (5 × 12) and remove the cover panel (front). (See Photo 4)
4. Remove front panel fixing screws 5 (5 × 12) and 2 (4 × 10), and remove the front panel. (See Photo 4)
5. Remove 4 cover panel (rear) fixing screws (5 × 12) and remove the cover panel (rear).
6. Remove the electrical parts box. (See Photo 5)
7. Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 × 16) and then remove the valve bed. (See Photo 4 and 7)
8. Remove 3 side panel (R) fixing screws (5 × 12) in the rear of the unit and then remove the side panel (R).
9. Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 1)
10. Recover refrigerant.
11. Remove the 3 compressor fixing nuts for motor 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.

Photo 13

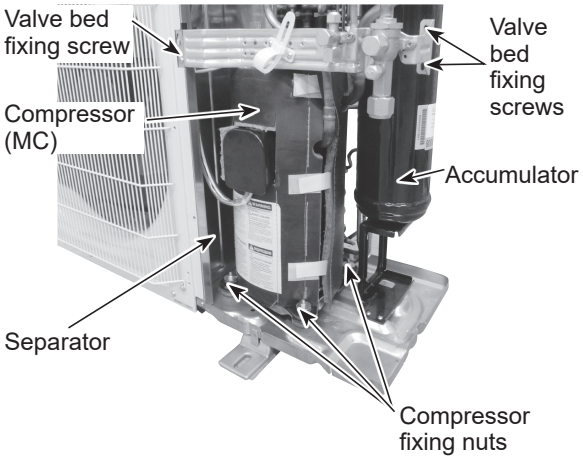
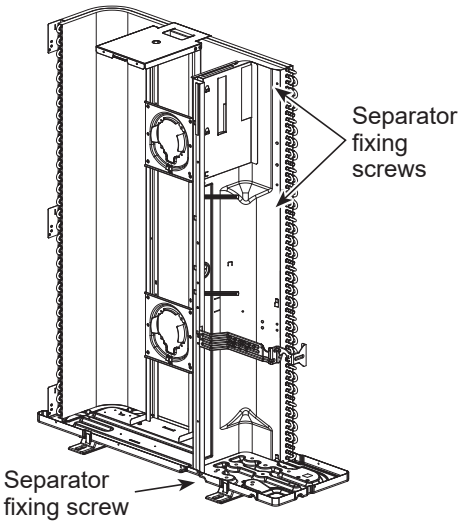


Figure 1



14. Removing the accumulator

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

Note:

• Recover refrigerant without spreading it in the air.

Photo 14

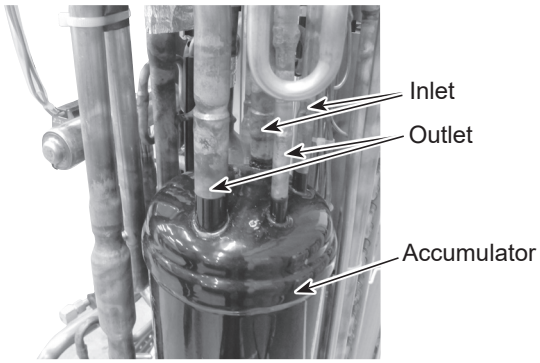
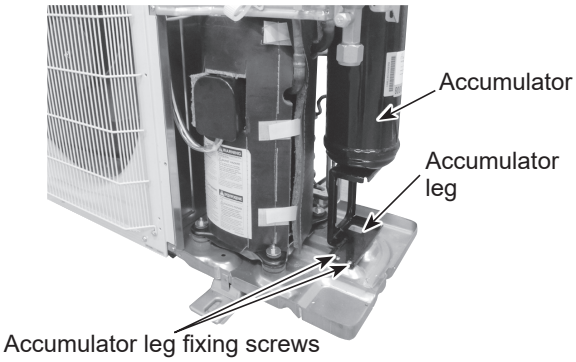


Photo 15

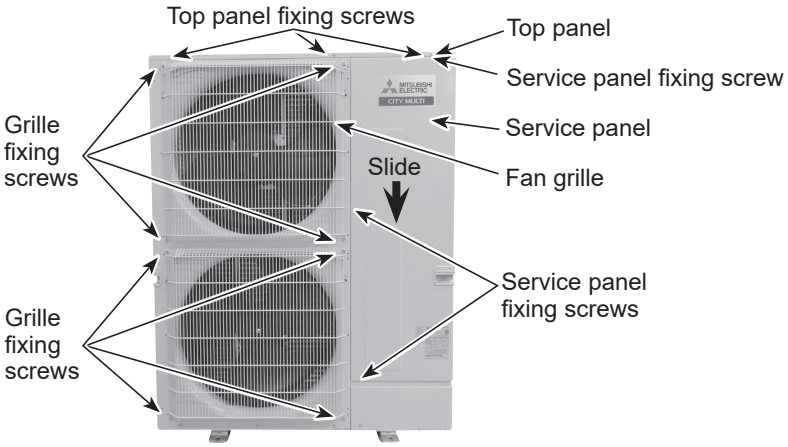


Note:
- Turn OFF the power supply before disassembly.

1. Removing the service panel and top panel

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

Photo 1



2. Removing the fan motor (MF1, MF2)

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

Note:
- Tighten the propeller fan with a torque of 5.7 ± 0.3N·m [4.2 ± 0.2 lbf·ft].

Photo 2

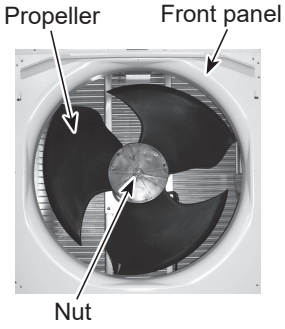
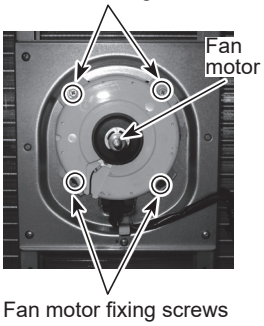


Photo 3



3. Removing the electrical parts box

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

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

Pull out the disconnected wires from the electrical parts box.

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

Photo 4

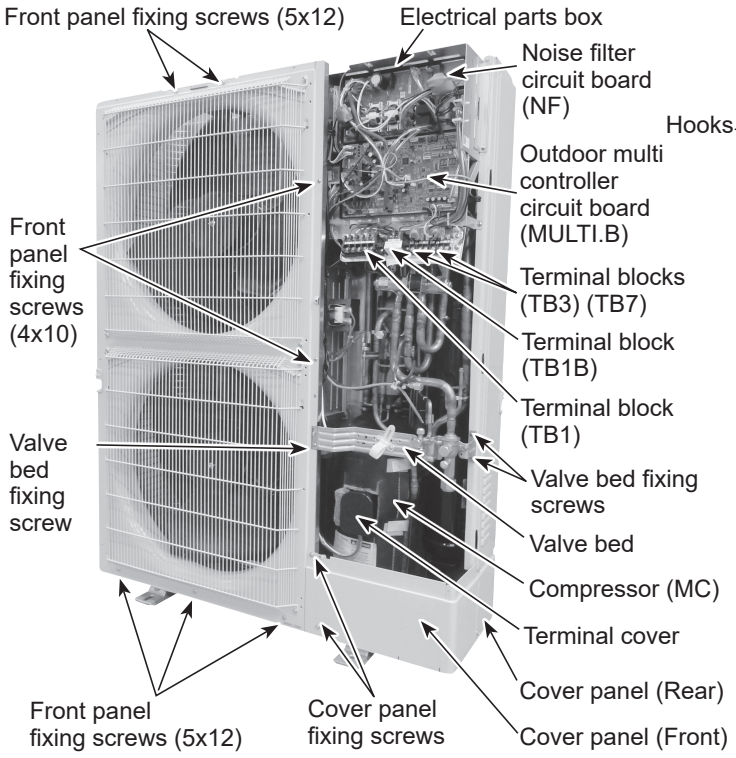
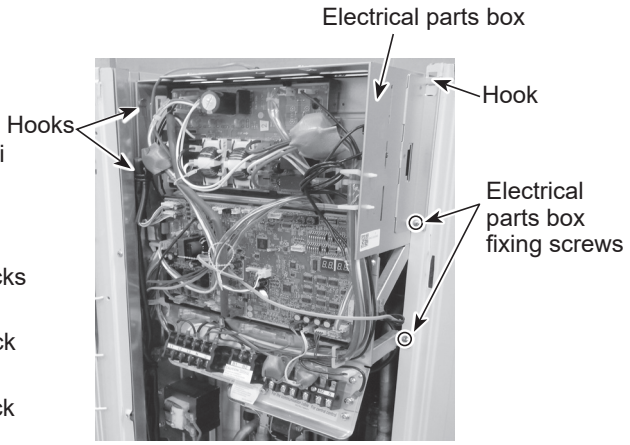


Photo 5



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

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

Note:

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

Photo 6

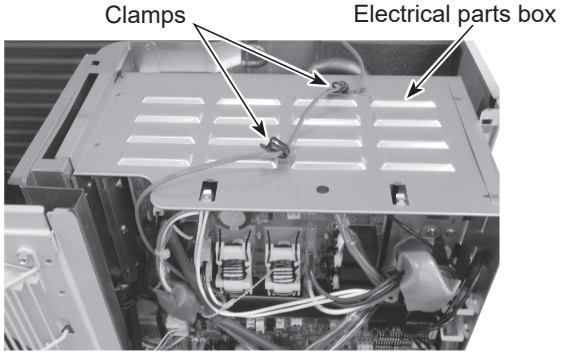
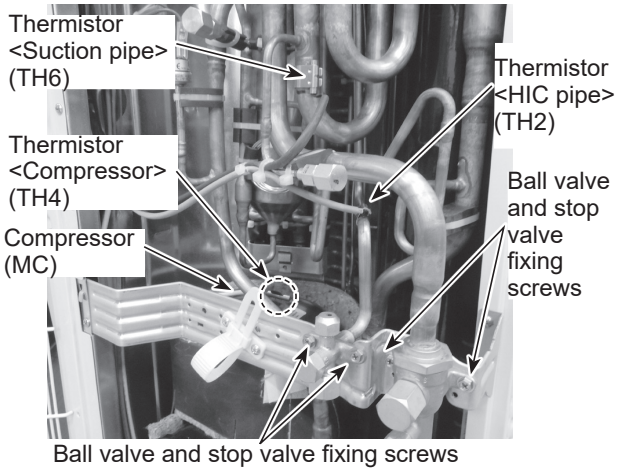


Photo 7



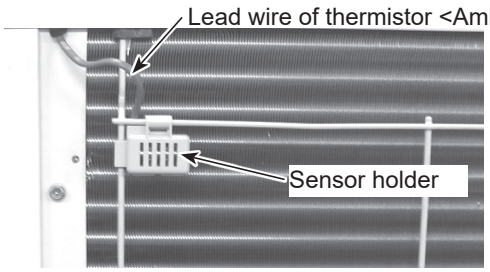
5. Removing the thermistor <Ambient> (TH7)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Disconnect the connector TH7 (red) on the outdoor multi controller circuit board in the electrical parts box.
4. Loosen the wire clamps on top of the electrical parts box. (See Photo 6.)
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 to remove thermistor <Suction pipe> (TH6).

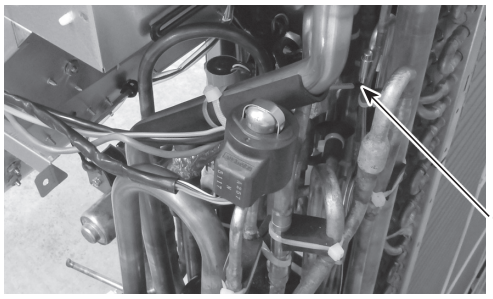
Photo 8



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

1. Remove the service panel. (See Photo 1)
2. Disconnect the connectors TH3 (white), TH4 (white), and TH2 (black) on the outdoor 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)

Photo 9



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

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

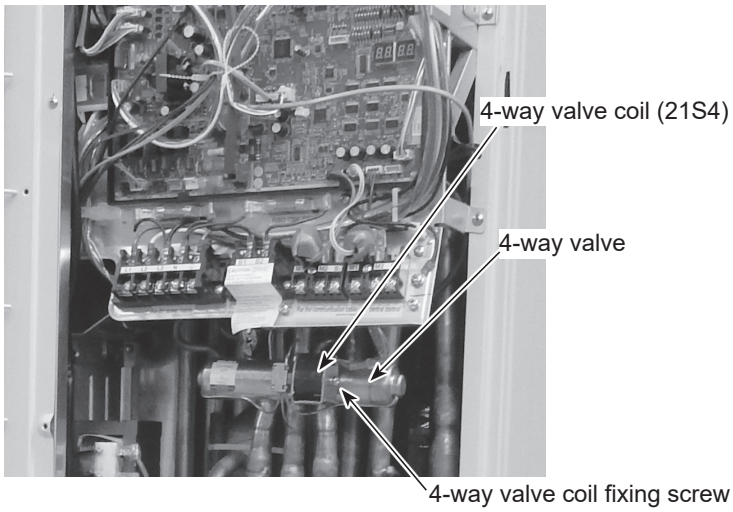
8. Removing the 4-way valve

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

Notes:

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

Photo 10



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.

Notes:

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

10. Removing the high pressure switch (63H)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the 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.
7. Remove the electrical parts box. (See Photo 5)
8. Recover refrigerant.
9. Remove the welded part of high pressure switch.

Notes:

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

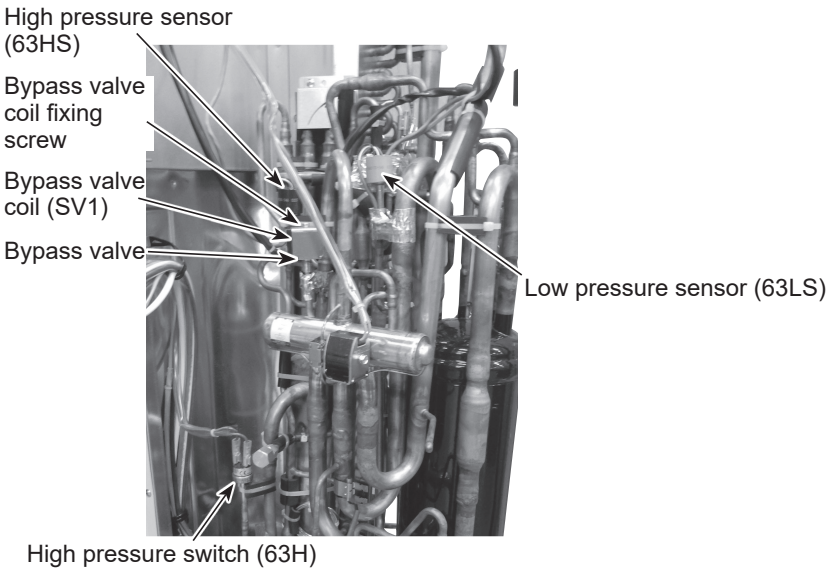
11. Removing the low pressure sensor (63LS) and high pressure sensor (63HS)

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. Disconnect the connectors 63LS (blue) and 63HS (white) 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.

Notes:

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

Photo 11



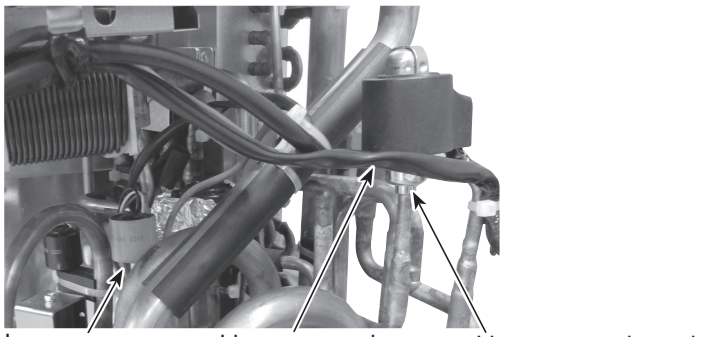
12. Removing linear expansion valve (LEV-A, LEV-B)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove the cover panel (front). (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 linear 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 linear expansion valve.

Note:

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

Photo 12



13. Removing the compressor (MC)

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove 2 cover panel (front) fixing screws (5 × 12) and remove the cover panel (front). (See Photo 4)
4. Remove front panel fixing screws, 5 (5x12) and 2 (4 x 10) and remove the front panel. (See Photo 4)
5. Remove 4 cover panel (rear) fixing screws (5 × 12) and remove the cover panel (rear).
6. Remove the electrical parts box. (See Photo 5)
7. Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 × 16) and then remove the valve bed. (See Photo 4 and 7)
8. Remove 3 side panel (R) fixing screw (5 × 12) in the rear of the unit and then remove the side panel (R).
9. Remove 3 separator fixing screws (4 × 10) and remove the separator. (See Figure 2)
10. Recover refrigerant.
11. Remove the 3 compressor fixing nuts for motor 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.

Photo 13

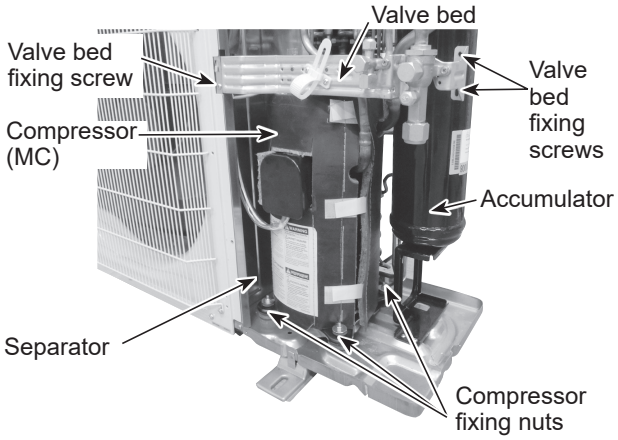
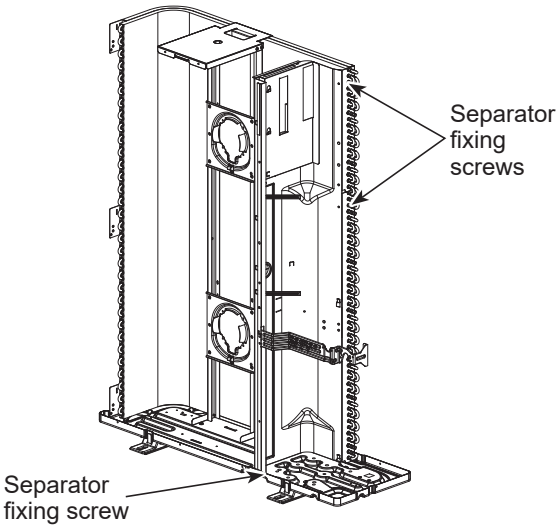


Figure 2



14. Removing the accumulator

1. Remove the service panel. (See Photo 1)
2. Remove the top panel. (See Photo 1)
3. Remove 2 cover panel (front) fixing screws (5 × 12) and remove the cover panel (front). (See Photo 4)
4. Remove 4 cover panel (rear) fixing screws (5 × 12) and remove the cover panel (rear).
5. Remove the electrical parts box. (See Photo 5)
6. Remove 3 valve bed fixing screws (4 × 10) and 4 ball valve and stop valve fixing screws (5 ×16) , and then remove the valve bed. (See Photo 4 and 7)
7. Remove 3 side panel (R) fixing screw (5 × 12) in the rear of the unit and then remove the side panel (R).
8. Recover refrigerant.
9. Remove 4 welded pipes of accumulator inlet and outlet.
10. Remove 2 accumulator leg fixing screws (4 × 10).

Note:

• Recover refrigerant without spreading it in the air.

Photo 14

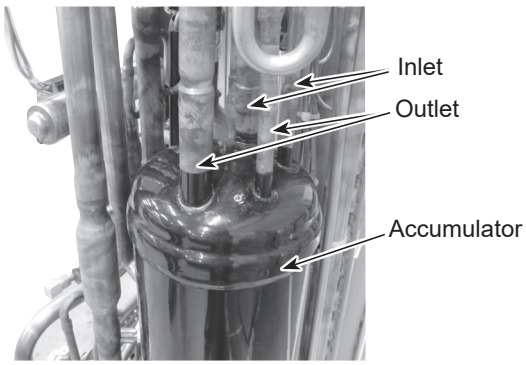
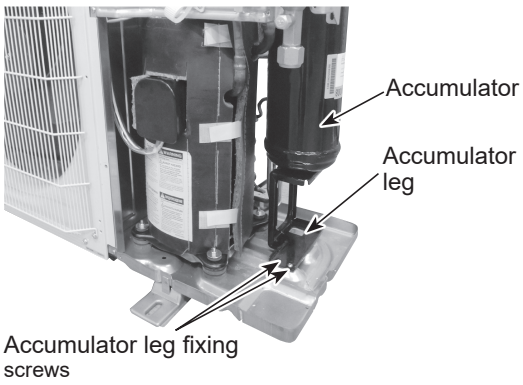
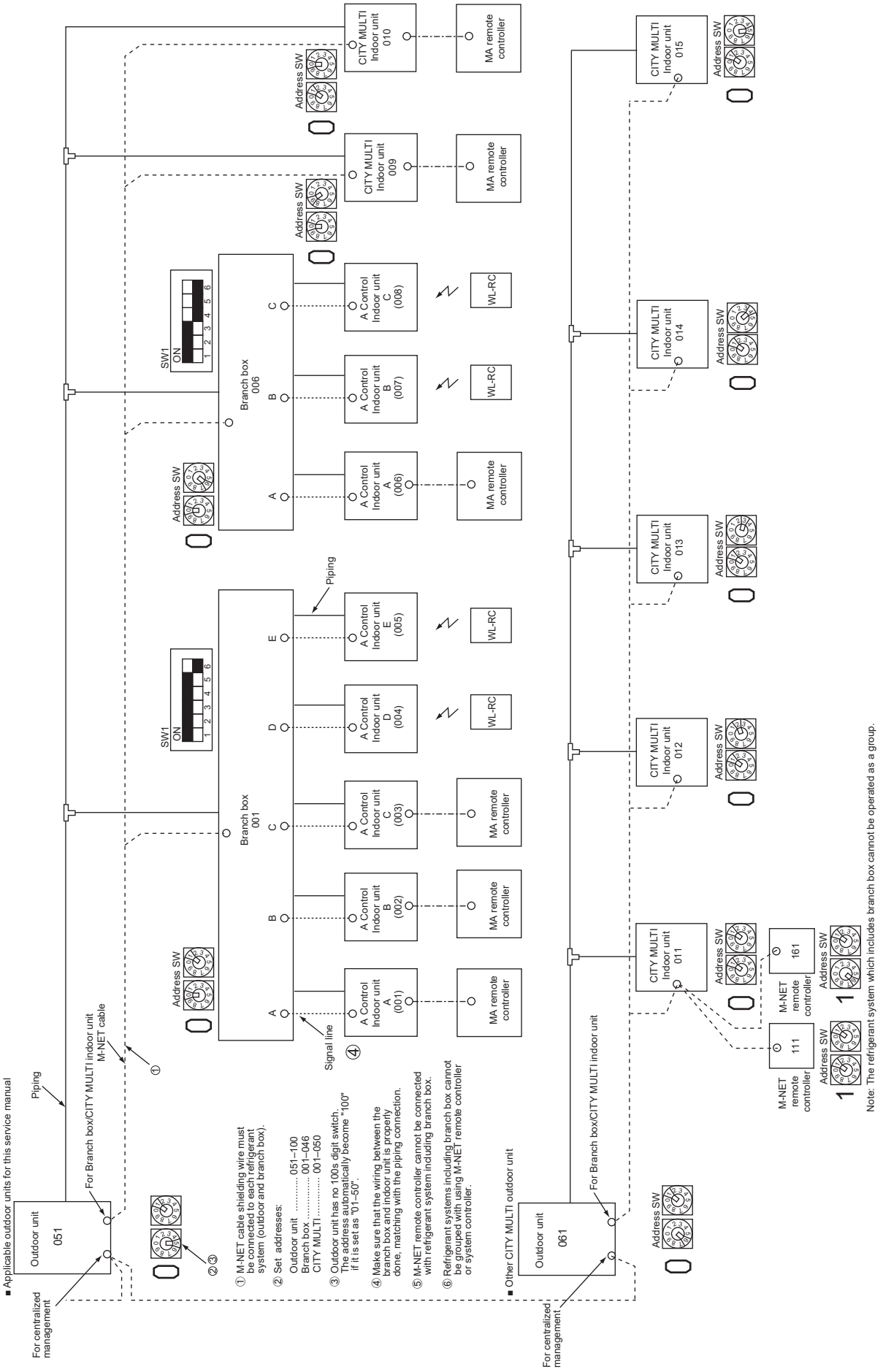


Photo 15



10 SYSTEM CONSTRUCTION

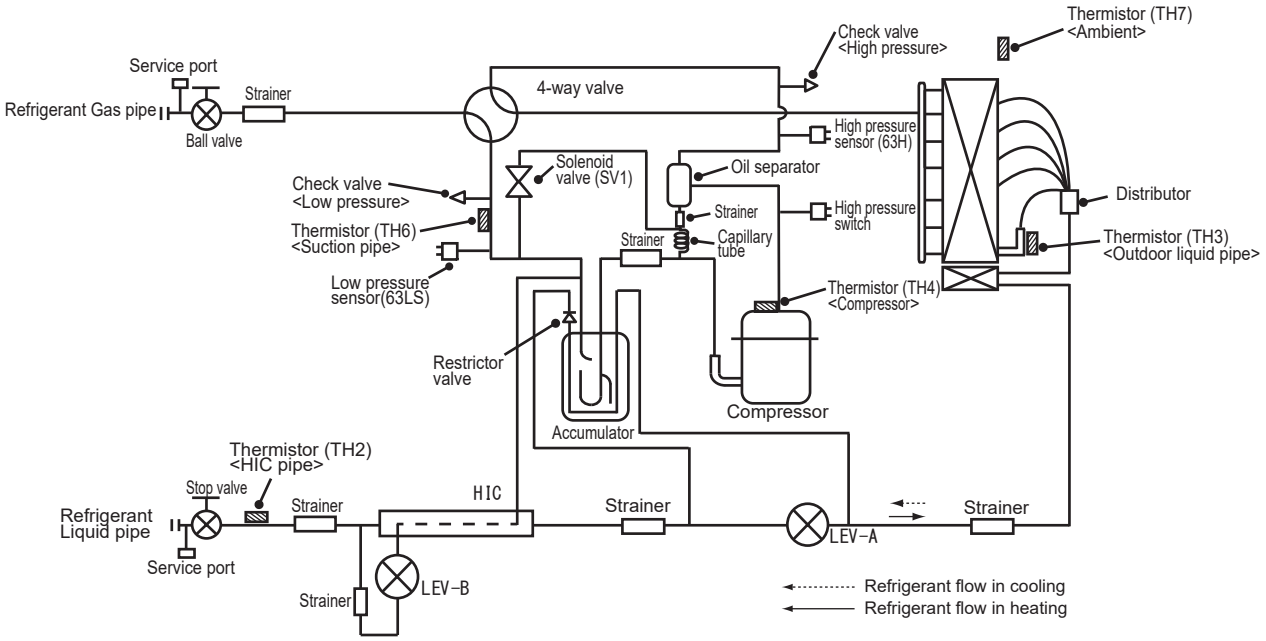
10-1. Example of refrigerant piping and transmission cable wiring



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

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

10-3. Refrigerant system diagram



Capillary tube for oil separator: ø2.5 × ø0.8 × L1000

Refrigerant piping specifications <dimensions of flared connector>

Unit: mm < in >

Capacity \ Item		Liquid piping	Gas piping
Indoor unit	P10, P15, P20, P25, P32, P40, P50	ø6.35 <1/4>	ø12.7 <1/2>
	P63, P80, P100, P125, P140	ø9.52 <3/8>	ø15.88 <5/8>
Outdoor unit	P112, P125, P140	ø9.52 <3/8>	ø15.88 <5/8>

Note:

- When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT.

10-4. Selecting pipe size

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

10-5. System control

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

11 ELECTRICAL WIRING

Refer to installation manual “6. Electrical work” for details.

12 REFRIGERANT PIPING TASKS

12-1. Refrigerant piping system

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

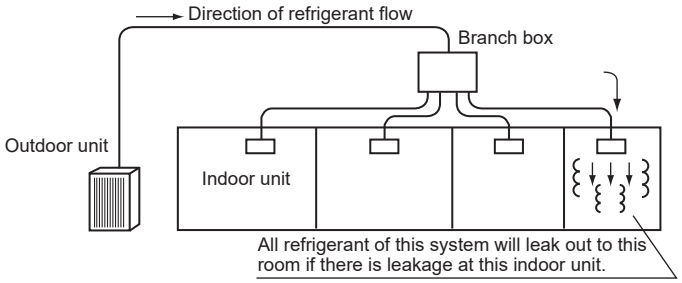
12-2. PRECAUTIONS AGAINST REFRIGERANT LEAKAGE

12-2-1. Introduction

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

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

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



12-2-2. Confirming procedure of R410A concentration

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

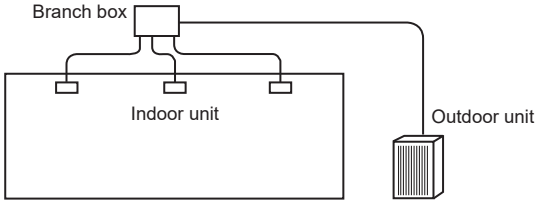
1. Calculate total refrigerant amount by each refrigerant system. Total refrigerant amount is precharged refrigerant before shipment plus additional charged amount at field installation.

Note:

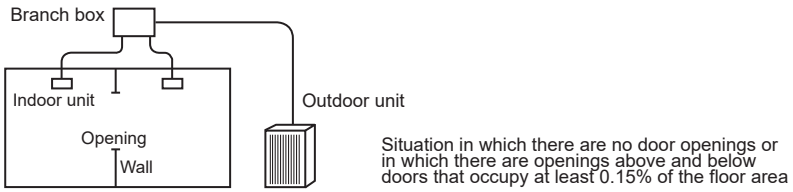
- When the air conditioning system consists of several independent refrigerant system, figure out the total refrigerant amount by each independent refrigerant system.

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

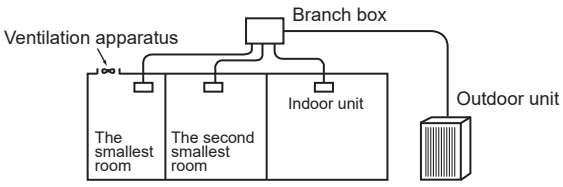
2-1. Situation in which there are no partitions



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



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



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

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

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

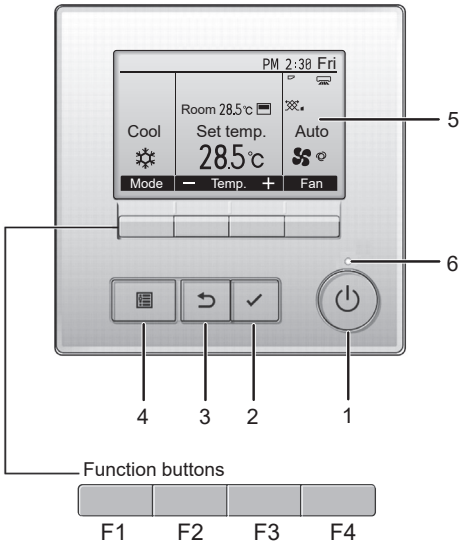
3-1. If the calculation results do not exceed the maximum concentration, perform the same calculation for larger rooms until it has been determined that nowhere exceeds the maximum concentration.

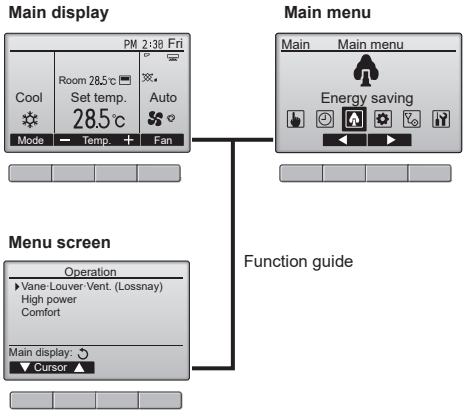
13 REMOTE CONTROLLER

13-1. Remote controller functions

13-1-1. PAR-41MAA

Controller interface





Note:

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

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

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

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

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

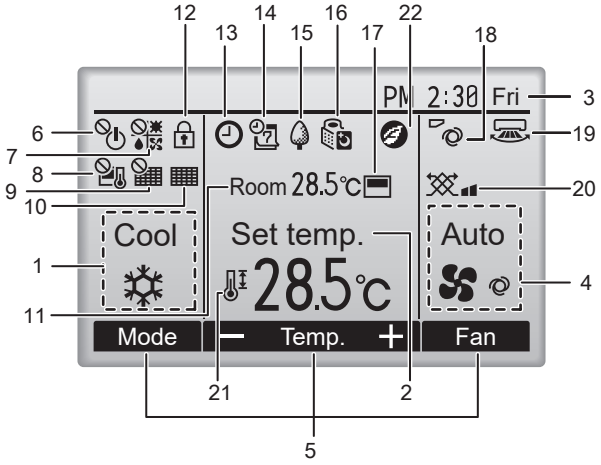
F4: Function button 4
Main display: Press to change the fan speed.
Menu screen: The button function varies depending on the screen.

Display

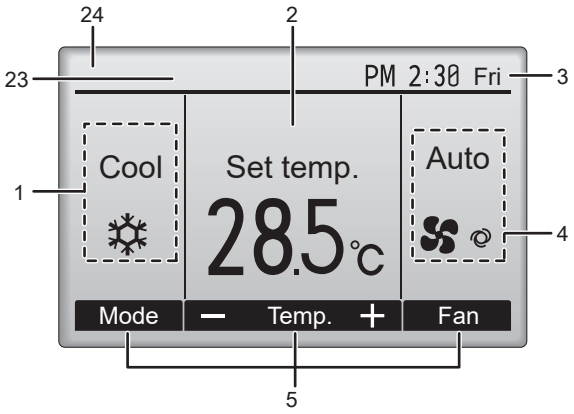
The main display can be displayed in 2 different modes: ″Full″ and ″Basic″. The initial setting is ″Full″. To switch to the ″Basic″ mode, change the setting on the Main display setting. (Refer to operation manual included with remote controller.)

■ Full mode

All icons are displayed for explanation.



■ Basic mode



Note:

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

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

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

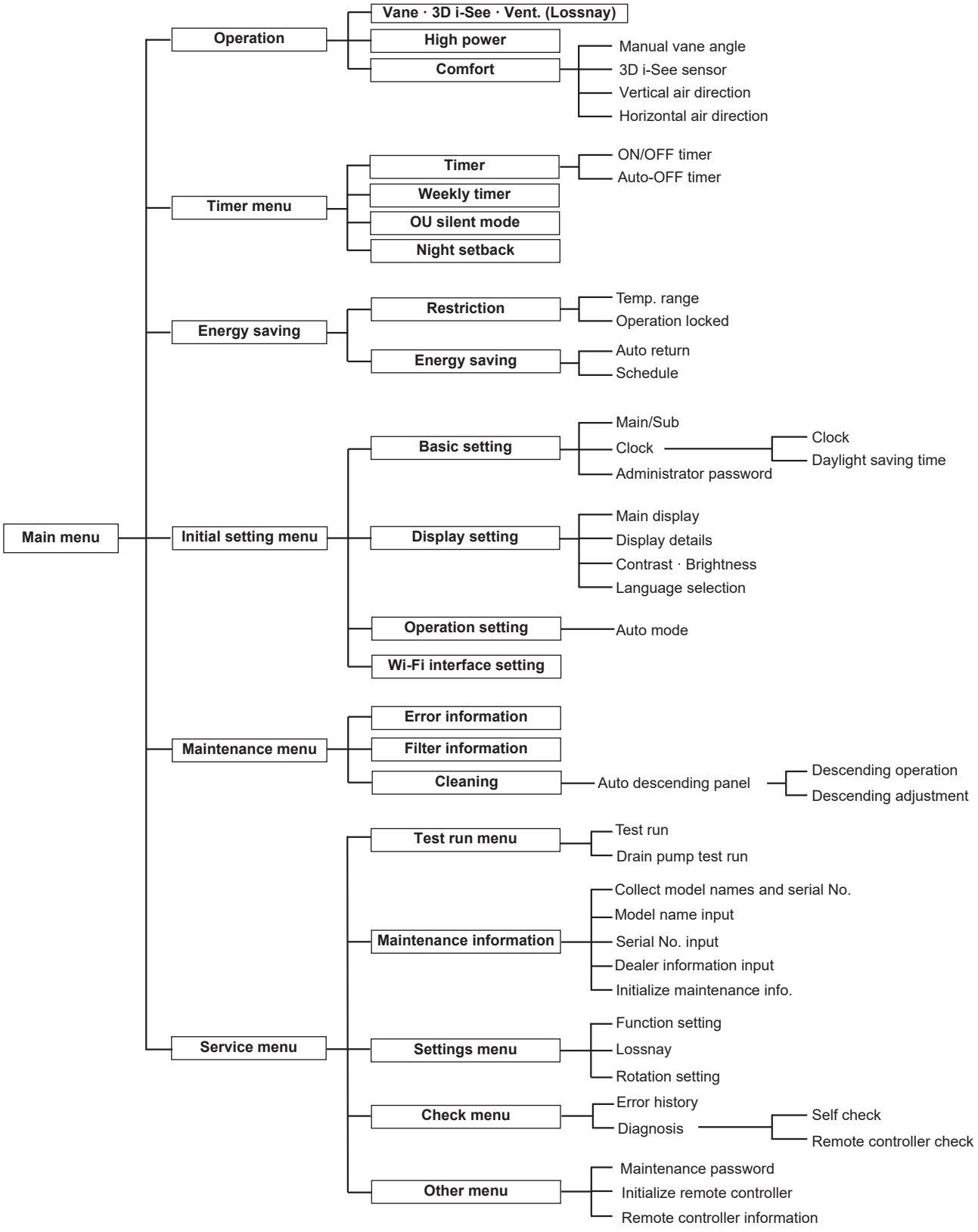
Menu structure

Press the [☰] button.

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

Note:

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



Main menu list

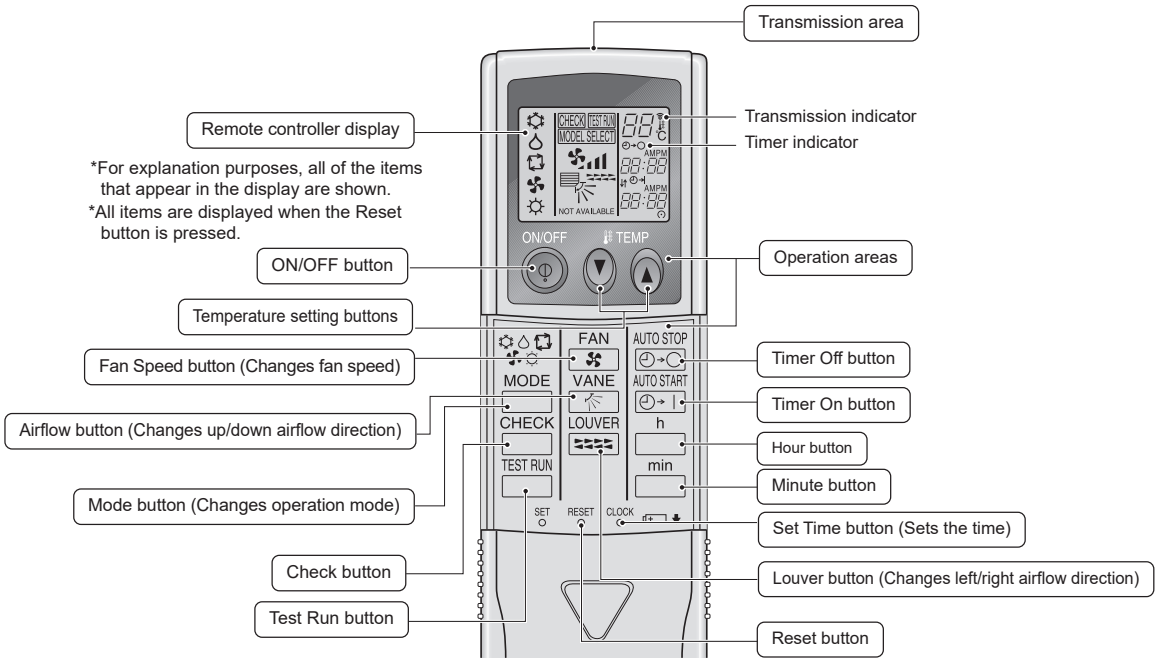
Main menu	Setting and display items		Setting details
Operation	Vane · 3D i-See · Vent. (Vane.Vent. (Lossnay))		Vane: Use to set the vertical air direction. Louver: Use to set the horizontal air direction. 3D i-See sensor: This setting is available only for the air conditioners that support easy setting function of motion sensing air direction. Vent: Use to set the amount of ventilation.
	High power *3		Use to reach the comfortable room temperature quickly. • Units can be operated in the High-power mode for up to 30 minutes.
	Comfort	Manual vane angle	Vertical air direction • Sets the vertical airflow direction (vane) of each unit.
			Horizontal air direction • Sets the horizontal airfow direction (vane) of each unit.
		3D i-See sensor	Use to set the following functions for 3D i-See sensor. • Air distribution • Energy saving option • Seasonal airflow

Main menu	Setting and display items		Setting details
Timer	Timer	ON/OFF timer *1	Use to set the operation ON/OFF times. • Time can be set in 5-minute increments.
		Auto-OFF timer	Use to set the Auto-OFF time. • Time can be set to a value from 30 to 240 in 10-minute increments.
	Weekly timer *1, *2		Use to set the weekly operation ON/OFF times. • Up to 8 operation patterns can be set for each day. (Not valid when the ON/OFF timer is enabled.)
	OU silent mode *1, *3		Use to set the time periods in which priority is given to quiet operation of outdoor units over temperature control. Set the Start/Stop times for each day of the week. • Select the desired silent level from ″Normal,″ ″Middle,″ and ″Quiet.″
	Night setback *1		Use to make Night setback settings. • Select ″Yes″ to enable the setting, and ″No″ to disable the setting. The temperature range and the start/stop times can be set.
Energy saving	Restriction	Temp. range *2	Use to restrict the preset temperature range. • Different temperature ranges can be set for different operation modes.
		Operation lock	Use to lock selected functions. • The locked functions cannot be operated.
	Energy saving	Auto return *2	Use to get the units to operate at the preset temperature after performing energy saving operation for a specified time period. • Time can be set to a value from 30 and 120 in 10-minute increments. (This function will not be valid when the preset temperature ranges are restricted.)
		Schedule *1, *3	Set the start/stop times to operate the units in the energy saving mode for each day of the week, and set the energy saving rate. • Up to 4 energy saving operation patterns can be set for each day. • Time can be set in 5-minute increments. • Energy saving rate can be set to a value from 0% or 50 to 90% in 10% increments.
	Energy data (for unit time, month, and day)		Displays the amount of power consumption during operation. • Unit time data: Data for the last one-month period can be displayed in 30-minute units. • Monthly/daily data: Data for the last 14-month period are displayed in day-and month-units. * Data can be deleted. * Data are obtained based on the power consumption estimated from the operating state.
Initial setting	Basic setting	Main/Sub	When connecting 2 remote controllers, one of them needs to be designated as a sub controller.
		Clock	Use to set the current time.
		Daylight saving time	Set the daylight saving time.
		Administrator password	The administrator password is required to make the settings for the following items. • Timer setting • Energy saving setting • Weekly timer setting • Restriction setting • Outdoor unit silent mode setting • Night set back
	Display setting	Main display	Use to switch between ″Full″ and ″Basic″ modes for the Main display, and use to change the background colors of the display to black.
		Display details	Make the settings for the remote controller related items as necessary. Clock: The initial settings are ″Yes″ and ″24h″ format. Temperature: Set either Celsius (°C) or Fahrenheit (°F). Room temp.: Set Show or Hide. Auto mode: Set Auto mode display or Only Auto display.
		Contrast • Brightness	Use to adjust screen contrast and brightness.
		Language selection	Use to select the desired language.
	Operation setting	Auto mode	Whether or not to use Auto mode can be selected by using the button. This setting is valid only when indoor units with Auto mode function are connected.
Maintenance	Error information		Use to check error information when an error occurs. • Check code, error source, refrigerant address, model name, manufacturing number, contact information (dealer's phone number) can be displayed. (The model name, manufacturing number, and contact information need to be registered in advance to be displayed.)
	Filter information		Use to check the filter status. • The filter sign can be reset.
	Cleaning	Auto descending panel	Use to lift and lower the auto descending panel (Optional parts).
Service	Test run		Select ″Test run″ from the Service menu to bring up the Test run menu. • Test run • Drain pump test run
	Input maintenance info.		Select ″Input maintenance Info.″ from the Service menu to bring up the Maintenance information screen. The following settings can be made from the Maintenance Information screen. • Model name input • Serial No. input • Dealer information input • Initialize maintenance info.
	Settings	Function setting	Make the settings for the indoor unit functions via the remote controller as necessary.
		LOSSNAY setting	This setting is required only when the operation of CITY MULTI units is interlocked with LOSSNAY units.
	Check	Error history	Display the error history and execute ″delete error history″.
		Diagnosis	Self check: Error history of each unit can be checked via the remote controller. Remote controller check: When the remote controller does not work properly, use the remote controller checking function to troubleshoot the problem.
	Others	Maintenance password	Use to change the maintenance password.
		Initialize remote controller	Use to initialize the remote controller to the factory shipment status.
		Remote controller information	Use to display the remote controller model name, software version, and serial number.

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

13-1-2. PAR-SL97A-E

Controller interface

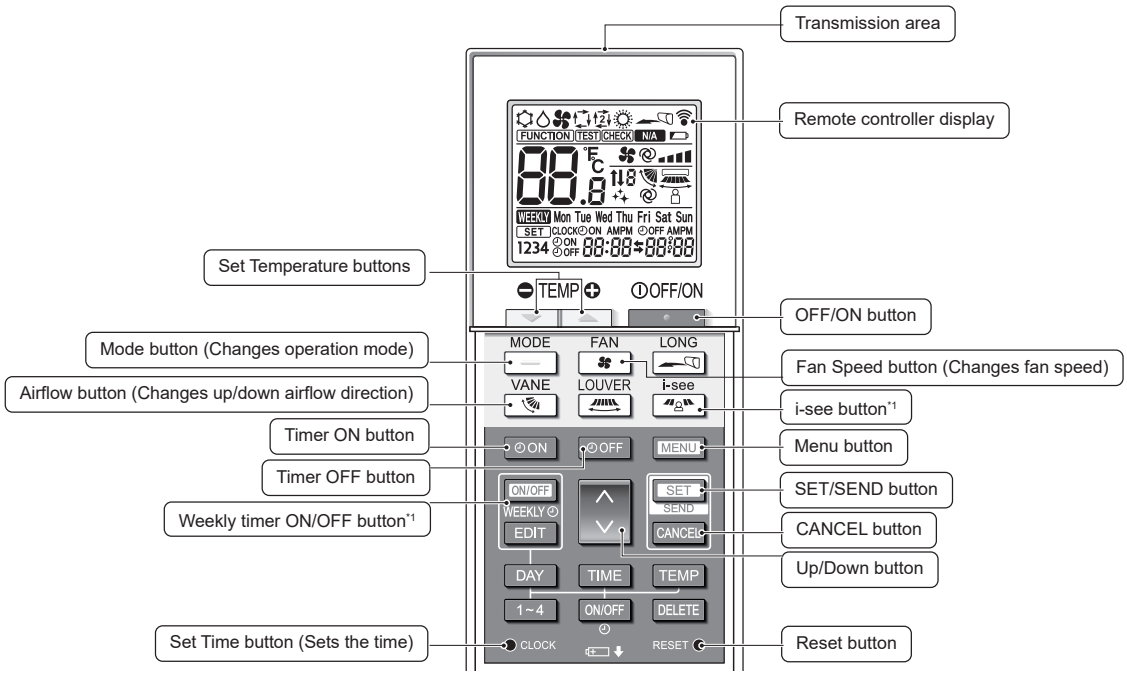


Instructions for use

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

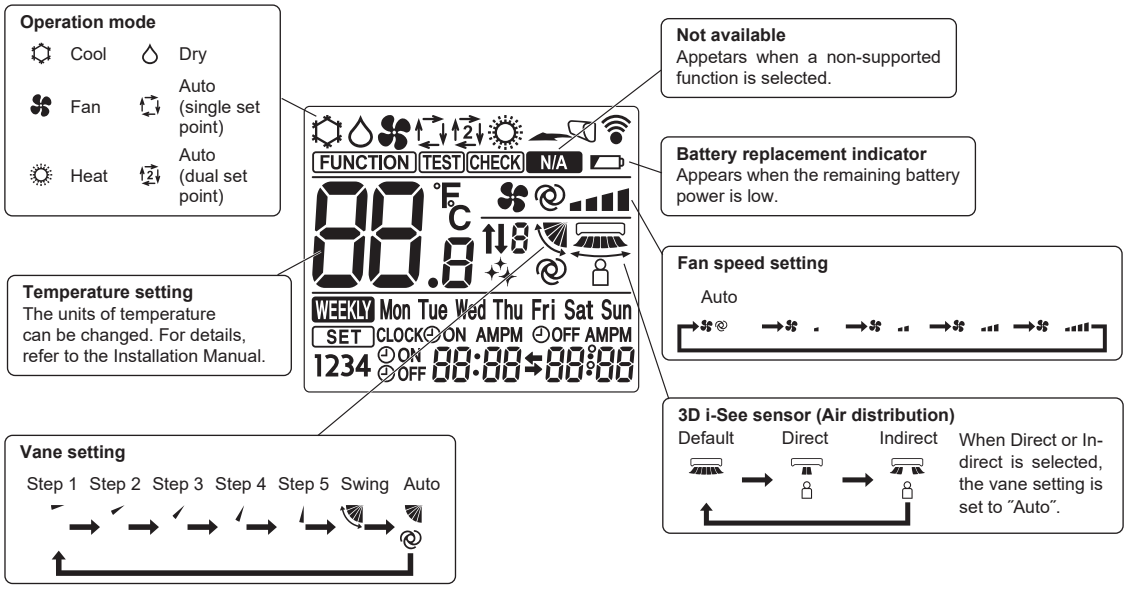
13-1-3. PAR-SL101A-E

Controller interface



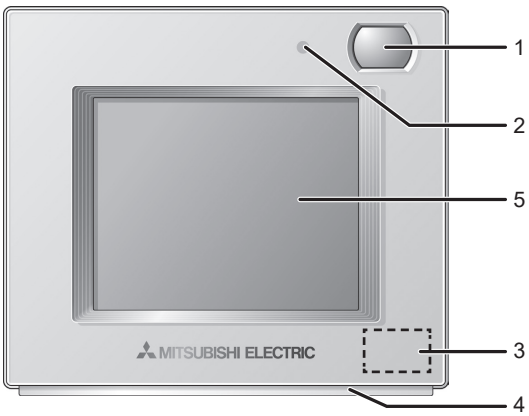
*1. This button is enabled or disabled depending on the model of the indoor unit.

Display



13-1-4. PAR-U02MEDA

Controller interface



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

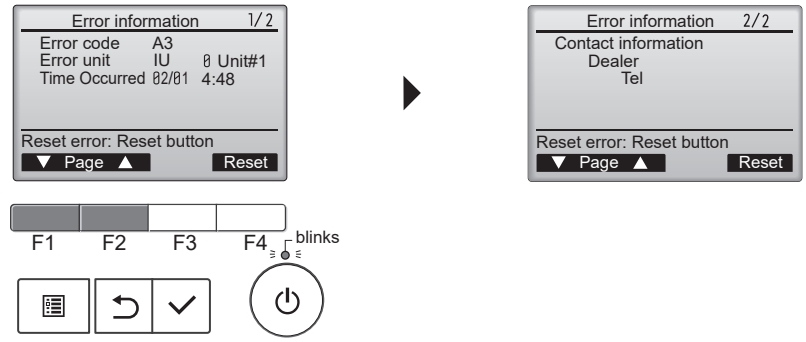
13-2. Error information

Operating instructions

■ How to check the error information when an error occurs

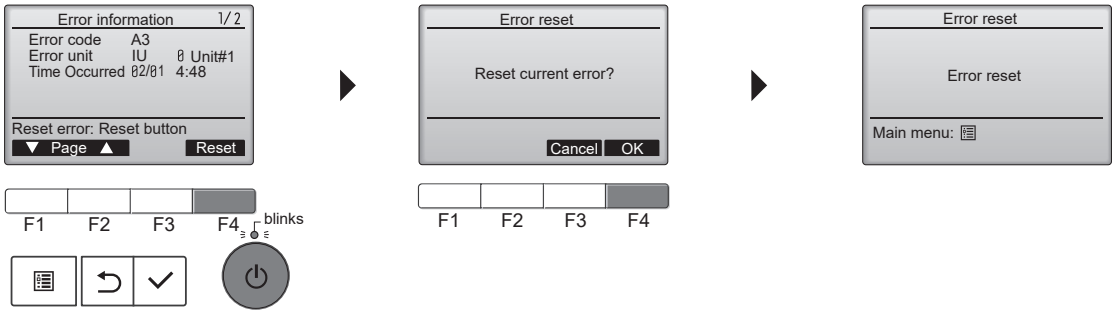
When an error occurs, the following screen will appear. Check the error status, stop the operation, and consult your dealer.

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



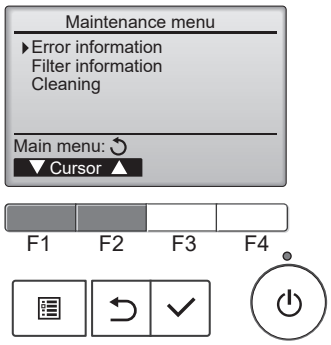
2. Reset the error
   - Press the F4 button or the [⏻] button to reset the error that is occurring.
   - Select ″OK″ with the F4 button.

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



■ How to check the error information later

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

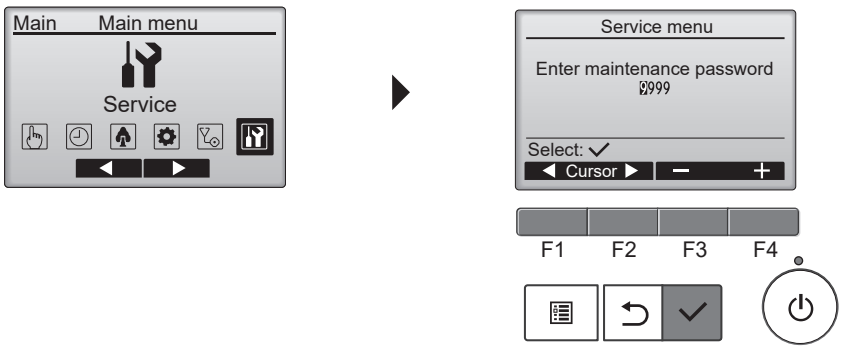


13-3. Service menu

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

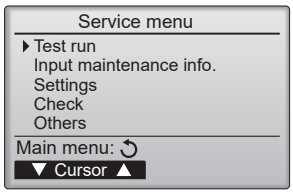
Operating instructions

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



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

Service menu will appear if the password matches.



Notes:

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

Notes:

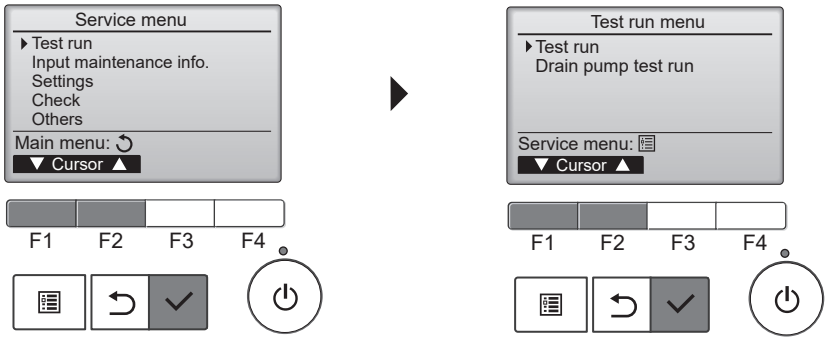
- To go back to the service menu, press [ ] button.
- To return to the previous screen, press [ ] button.

13-4. Test run

13-4-1. PAR-41MAA

Operating instructions

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

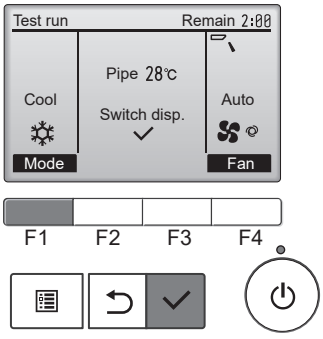


■ Test run operation

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

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

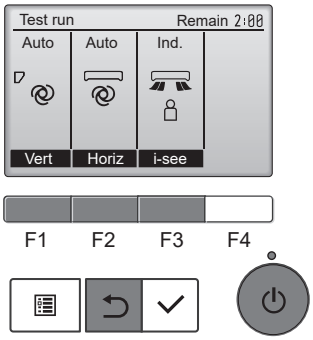
2. Check the operation of the outdoor unit's fan.
3. Press the [✓] button and open the vane setting screen.



■ Auto vane check

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

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



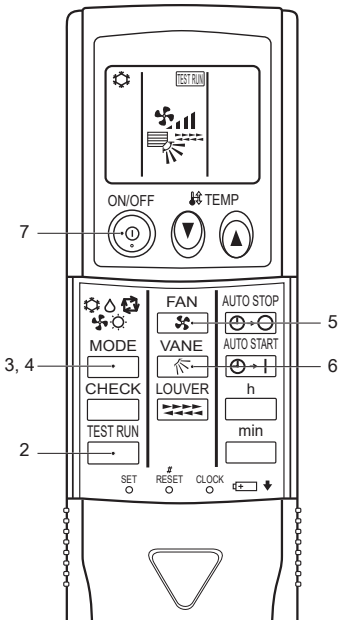
13-4-2. PAR-SL97A-E

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

Operating instructions

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

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



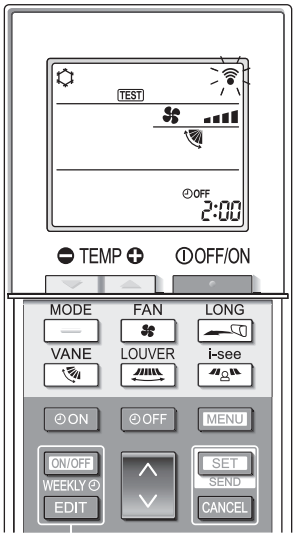
13-4-3. PAR-SL101A-E

Operating instructions

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

: Switch the airflow direction and start the test run.
: Switch the louver and start the test run.
SET : Start the test run.

3. Stop the test run.
   • Press the button to stop the test run.
   • After 2 hours, the stop signal is transmitted.



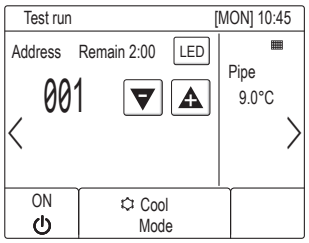
13-4-4. PAR-U02MEDA

Operating instructions

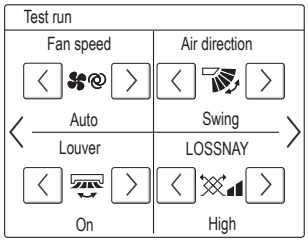
- Read the section about Test run in the indoor unit Installation Manual before performing a test run.
- During the test run, indoor units will be forced to operate in the Thermo-ON status.
  Except the set temperature, normal operation functions are accessible during test run.
- By selecting the address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

Notes:

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



[Test run screen]



[Indoor unit setting screen]

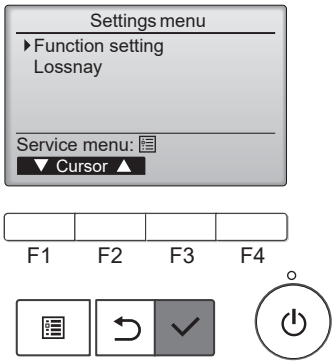
13-5. Function setting

13-5-1. PAR-41MAA

Operating instructions

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

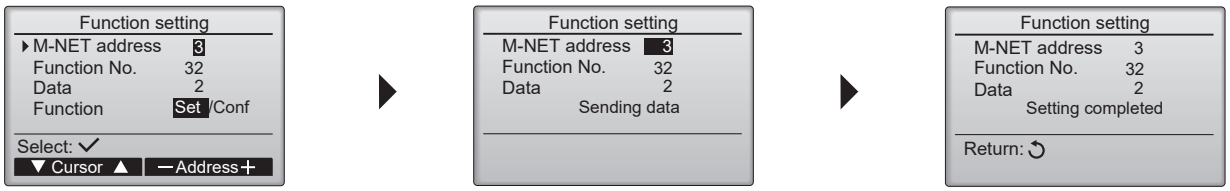
   Function setting screen will appear.



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

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

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



13-5-2. PAR-SL97A-E

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

Operating instructions

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

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

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

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

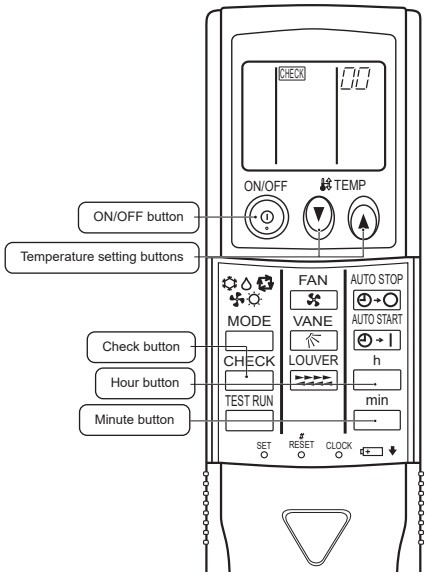
4. Select the setting number.

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

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

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

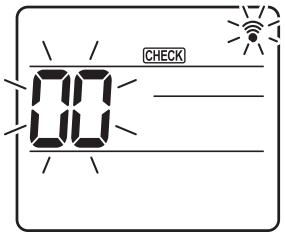
Note:
- Do not use the wireless remote controller for 30 seconds after completing the function setting.



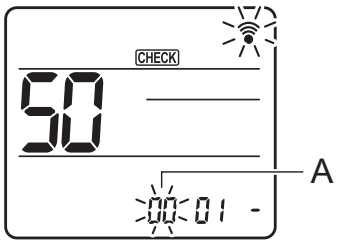
13-5-3. PAR-SL101A-E

Operating instructions

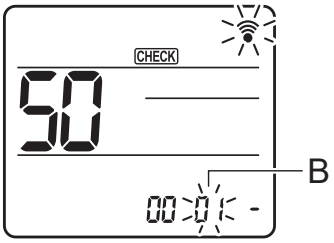
1. Go to the function select mode.
   - Press the MENU button for 5 seconds. (Start this operation from the status of remote controller display turned off.)
     CHECK appears on the display and ″00″ blinks.
   - Press the ▲ button to enter ″50″.
   - Direct the wireless remote controller toward the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



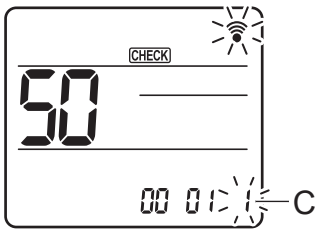
2. Set the unit number.
   - Press the ▲ button to set unit number A.
   - Direct the wireless remote controller toward the receiver of the indoor unit and press the SET button.



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



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



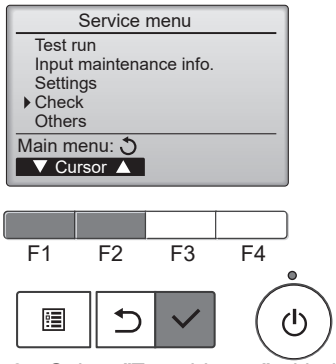
5. Select multiple functions continuously
   • Repeat the steps 3 and 4 to change multiple function settings continuously.
6. Complete function selection
   • Direct the wireless remote controller toward the sensor of the indoor unit and press the button.

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

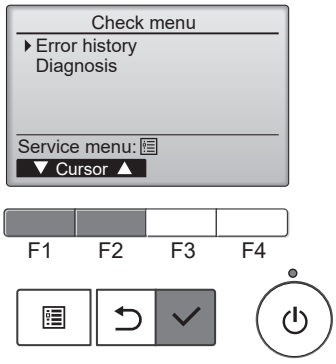
13-6. Error history

Operating instructions

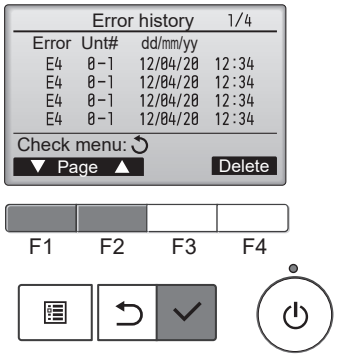
1. Open the Service menu and select “Check”.
   • Select ″Service″ from the main menu, and press the [✓] button.
   • Select ″Check″ with the F1 or F2 button, and press the [✓] button.



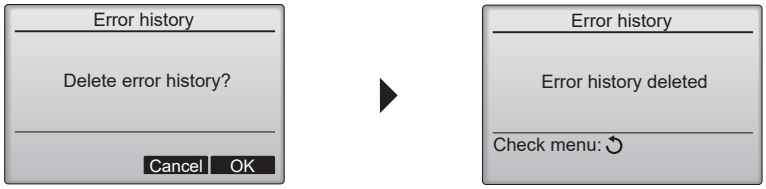
2. Select ″Error history″ with the F1 or F2 button, and press the [✓] button.



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



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

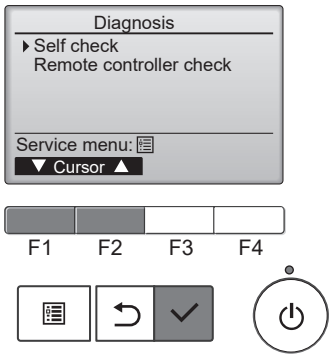


13-7. SELF-DIAGNOSIS

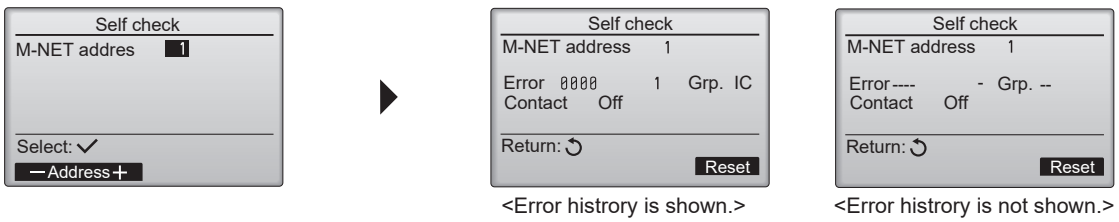
13-7-1. PAR-41MAA

Operating instructions

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

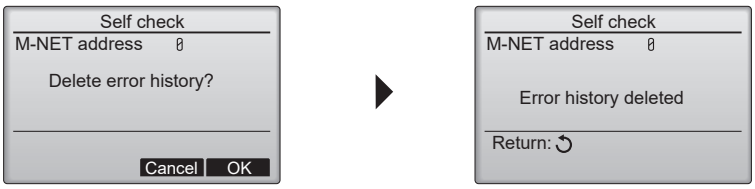


2. Enter the M-NET address with the F1 or F2 button, and press the [✓] button.
   - Check code, unit number, attribute, and indoor unit demand signal ON/OFF status at the contact will appear.
     ″-″ will appear when there is no error history.



<Error histrory is shown.> <Error histrory is not shown.>

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

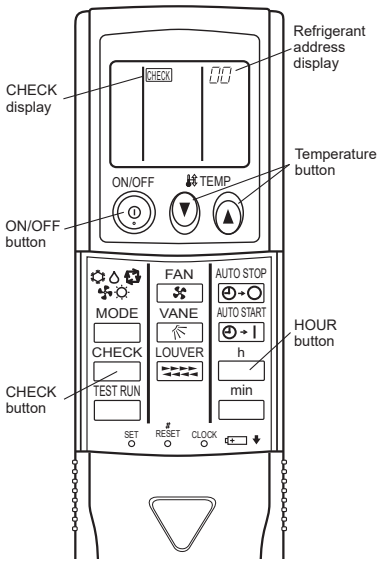


13-7-2. PAR-SL97A-E

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

Operating instructions

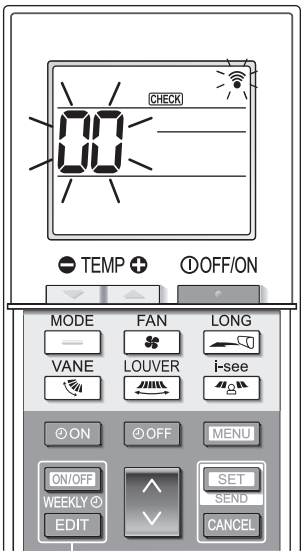
1. Press the CHECK button twice.
   CHECK appears, and the refrigerant address ″00″ blinks.
   Make sure that the remote controller's display has stopped before continuing.
2. Press the buttons to select the refrigerant address of the indoor unit for self-diagnosis.
   Set refrigerant address using the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



13-7-3. PAR-SL101A-E

Operating instructions

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

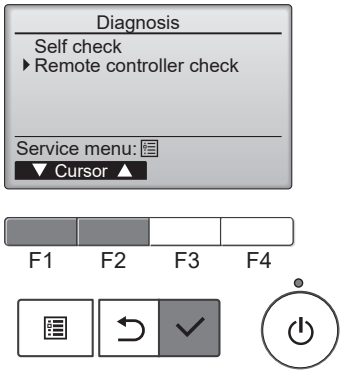


13-8. Remote controller check

Operating instructions

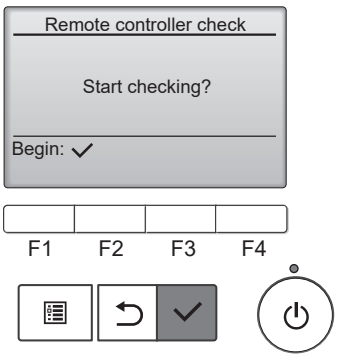
If operations cannot be completed with the remote controller, diagnose the remote controller with this function.

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



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

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



3. Check the result of the remote controller check.

See the following discriptions for each result:

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

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

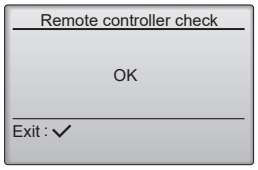
NG (ALL0, ALL1):

• Send-receive circuit fault. The remote controller needs to be replaced.

ERC:

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

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



Remote controller check results screen

Note:

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

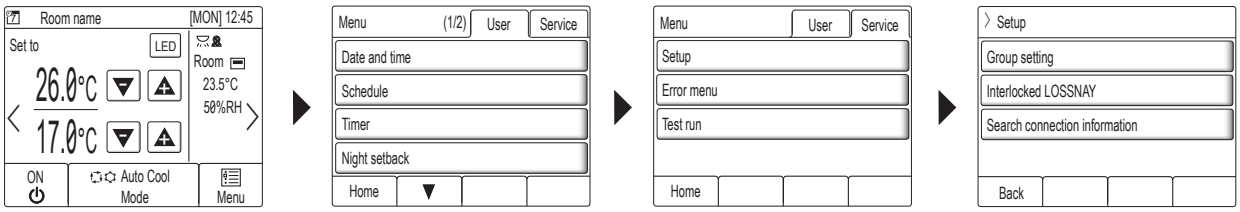
13-9. Special function operation setting

13-9-1. PAR-U02MEDA

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

Operating instructions

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



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

■ Group settings

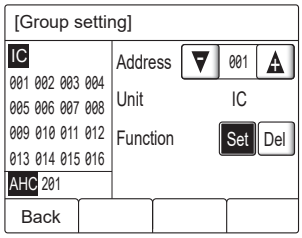
Enter the indoor unit controlled by the remote controller, check the content of entries, and clear entries, etc.
Use the following screen to register the indoor units and the AHC to be controlled from the controller.

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

Note:

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

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



■ Interlocked LOSSNAY:

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

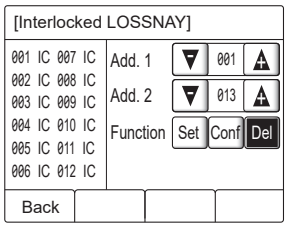
1. To register LOSSNAY units
   • Select the indoor unit address in the Add. 1 section.
   • Select the interlocked LOSSNAY address in the Add. 2 section.

Touch the [Set] button to save the setting.

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

Note:

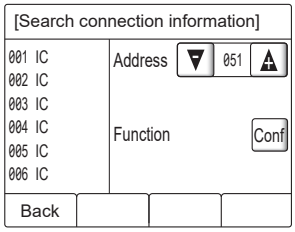
• When the setting or deletion is successfully completed, “Completed” will appear below [Function] field on the screen. If setting or deletion fails, “Request denied” will appear below [Function] field on the screen.



■ Search connection information

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

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



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

CITY MULTI

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