MITSUBISHI ELECTRIC

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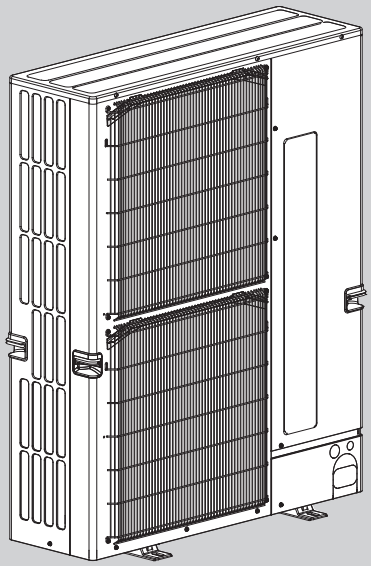
No. OCH954

SERVICE MANUAL R454B

Outdoor unit
[Model Name]
SUZ-CK48NLH2
SUZ-CK60NLH2

[Service Reference]
SUZ-CK48NLH2-U1
SUZ-CK60NLH2-U1

Note:
- This manual describes service data of the outdoor units only.



SUZ-CK48/60NLH2

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PARTS CATALOG (OCB954)

1 REFERENCE MANUAL

INDOOR UNIT

Model name	Service Reference
SVZ-AP48/60NL	SVZ-AP48/60NL-U1
RVZ-AP48/60NL-M	RVZ-AP48/60NL-M1

2 SAFETY PRECAUTION

MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

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

2-1. ALWAYS OBSERVE FOR SAFETY

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

Preparation before the repair service.

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

Precautions during the repair service.

- Do not perform the work involving the electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigerating cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.
- When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- This model is equipped with a fusible plug. The fusible plug operates when the temperature rises above 158°F [70°C], and there is a risk of accidents or disasters such as the ejection of molten metal or refrigerant leakage. When removing the refrigerant pipe, be careful not to expose the fusible plug to the braze torch flame or transfer heat to it.

2-2. CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R454B

Use new refrigerant pipes.

In the case of using the existing pipes for R22, R410A, be careful with the following:
· Be sure to clean the pipes and make sure that the insides of the pipes are clean.
· Change flare nut to the one provided with this product. Use a newly flared pipe.
· 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 to be used indoors during installation and both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)

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

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

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

Charge refrigerant from liquid phase of gas cylinder.

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

Do not use refrigerant other than R454B.

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

Use a vacuum pump with a reverse flow check valve.

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

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

The following tools are necessary to use R454B refrigerant.

Tools for R454B	
Gauge manifold	Flaring 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.

[1] Warning for service

(1) Do not alter the unit.
(2) For installation and relocation work, follow the instructions in the installation manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.
(3) Ask a dealer or an authorized technician to install, relocate and repair the unit.
(4) Refrigerant pipes connection shall be accessible for maintenance purposes.
(5) If the air conditioner is installed in a small room or closed room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.
(6) Keep gas-burning appliances, electric heaters, and other fire sources (ignition sources) away from the location where installation, repair, and other air conditioner work will be performed.
If refrigerant comes into contact with a flame, poisonous gases will be released.
(7) When installing or relocating, or servicing the air conditioner, use only the specified refrigerant (R454B) to charge the refrigerant lines.
Do not mix it with any other refrigerant and do not allow air to remain in the lines.
If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
(8) After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.
(9) Do not use low temperature solder alloy in the case of brazing the refrigerant pipes.
(10) When performing brazing work, be sure to ventilate the room sufficiently. Make sure that there are no hazardous or flammable materials nearby.
When performing the work in a closed room, small room, or similar location, make sure that there are no refrigerant leaks before performing the work.
If refrigerant leaks and accumulates, it may ignite or poisonous gases may be released.
(11) Do not install the unit in places where refrigerant may build-up or places with poor ventilation such as a semibasement or a sunken place in outdoor: Refrigerant is heavier than air, and inclined to fall away from the leak source.
(12) Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
(13) The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
(14) Do not pierce or burn.
(15) Be aware that refrigerants may not contain an odour.
(16) Pipe-work shall be protected from physical damage.
(17) The installation of pipe-work shall be kept to a minimum.
(18) Compliance with national gas regulations shall be observed.
(19) All field joints shall be accessible for inspection prior to being covered or enclosed.
(20) Keep any required ventilation openings clear of obstruction.
(21) Servicing shall be performed only as recommended by the manufacturer.
(22) The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
(23) Maintenance, service and repair operations shall be performed by authorized technician with required qualification.
(24) Be sure to have appropriate ventilation in order to prevent ignition. Furthermore, be sure to carry out fire prevention measures that there are no dangerous or flammable objects in the surrounding area.

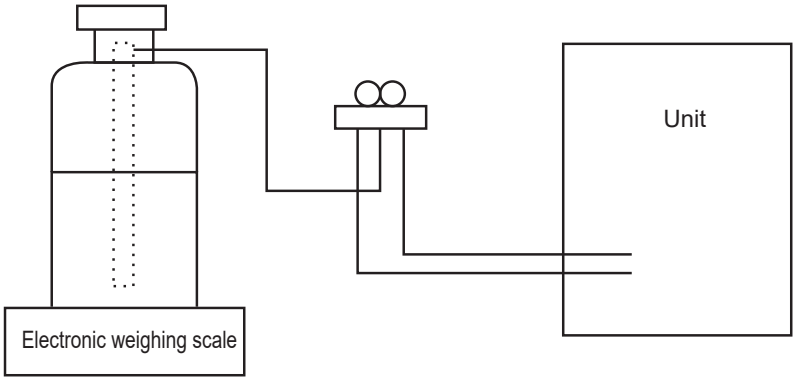
[2] Cautions for service

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

[3] Additional refrigerant charge

When charging directly from cylinder

(1) Check that cylinder for R454B on the market is a syphon type.
(2) Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



[4] Cautions for unit using R454B refrigerant

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

(1) Information on servicing

(1-1) Checks on the Area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating systems, (1-3) to (1-7) shall be completed prior to conducting work on the systems.

(1-2) Work Procedure

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

(1-3) General Work Area

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

Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

(1-4) Checking for Presence of Refrigerant

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

(1-5) Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.

Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

(1-6) No Ignition Sources

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

(1-7) Ventilated Area

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

(1-8) Checks on the Refrigeration Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

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

(1-9) Checks on Electrical Devices

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

Initial safety checks shall include:

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

(2) Repairs to Sealed Components

Sealed electrical components shall be replaced.

(3) Repair to intrinsically Safe Components

Intrinsically safe components must be replaced.

(4) Cabling

Refer to 6.1 in the installation manual.

(5) Detection of Flammable Refrigerants

Refer to 4.4 in the installation manual.

(6) Removal and Evacuation

Refer to 1.2 in the installation manual.

(7) Charging Procedures

Refer to 4.4 in the installation manual.

(8) Decommissioning

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

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

(9) Labelling

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

(10) Recovery

Refer to 1.2 in the installation manual.

[5] Service tools

Use the below service tools as exclusive tools for R454B refrigerant.

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

2-3. CAUTIONS FOR REFRIGERANT PIPING WORK

The new refrigerant R454B is adopted for replacement inverter series. Although the refrigerant piping work for R454B is the same as for R22/R410A, exclusive tools are required to avoid mixing with different types of refrigerant. Furthermore, as the working pressure of R454B is 1.6 times higher than that of R22, their sizes of flared sections and flare nuts are different.

① Thickness of pipes

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

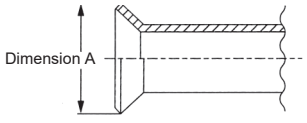
Diagram below: Piping diameter and thickness

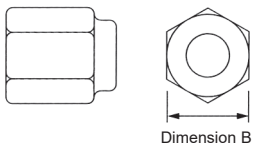
Nominal dimensions (inch)	Outside diameter (mm)	Thickness : inch [mm]	
		R454B/R410A	R22
1/4	6.35	1/32 [0.8]	1/32 [0.8]
3/8	9.52	1/32 [0.8]	1/32 [0.8]
1/2	12.70	1/32 [0.8]	1/32 [0.8]
5/8	15.88	5/128 [1.0]	5/128 [1.0]
3/4	19.05	5/128 [1.0]	5/128 [1.0]

② Dimensions of flare cutting and flare nut

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

Use torque wrench corresponding to each dimension.





Flare cutting dimensions

Nominal dimensions (inch)	Outside diameter (mm)	Dimension A $(^{+0}_{-0.4})$	
		R454B/R410A (inch [mm])	R22 (mm)
1/4	6.35	11/32-23/64 [9.1]	9.0
3/8	9.52	1/2-33/64 [13.2]	13.0
1/2	12.70	41/64-21/32 [16.6]	16.2
5/8	15.88	49/64-25/32 [19.7]	19.4
3/4	19.05	59/64-15/16 [24.0]	23.3

Flare nut dimensions

Nominal dimensions (inch)	Outside diameter (mm)	Dimension B	
		R454B/R410A (inch [mm])	R22 (mm)
1/4	6.35	43/64 [17.0]	17.0
3/8	9.52	7/8 [22.0]	22.0
1/2	12.70	1-3/64 [26.0]	24.0
5/8	15.88	1-9/64 [29.0]	27.0
3/4	19.05	1-27/64 [36.0]	36.0

③ Tools for R454B (The following table shows whether conventional tools can be used or not.)

Tools and materials	Use	R454B tools	Can R22 tools be used?	Can R22 tools be used?
Gauge manifold	Air purge, refrigerant charge and operation check	Tool exclusive for R454B	×	○
Charge hose		Tool exclusive for R454B	×	○
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R454B	×	○
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R454B	×	×
Applied oil	Apply to flared section	Ester oil, ether oil and alkylbenzene oil (minimum amount)	×	Ester oil, ether oil: ○ Alkylbenzene oil: minimum amount
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R454B	×	○
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R454B	×	○
Vacuum pump	Vacuum dry and air purge	Tools for other refrigerants can be used if equipped with adapter for reverse flow check	△(Usable if equipped with adapter for reverse flow)	△(Usable if equipped with adapter for reverse flow)
Flaring tool*	Flaring work of piping	Tools for other refrigerants can be used by adjusting flaring dimension	△(Usable if equipped with adapter for reverse flow)	△(Usable if equipped with adapter for reverse flow)
Bender	Bend the pipes	Tools for other refrigerants can be used	○	○
Pipe cutter*	Cut the pipes	Tools for other refrigerants can be used	○	○
Welder and nitrogen gas cylinder	Weld the pipes	Tools for other refrigerants can be used	○	○
Refrigerant charging scale	Refrigerant charge	Tools for other refrigerants can be used	○	○
Vacuum gauge or thermistor vacuum gauge and vacuum valve	Check the degree of vacuum. (Vacuum valve prevents back flow of oil and refrigerant to thermistor vacuum gauge)	Tools for other refrigerants can be used	○	○
Charging cylinder	Refrigerant charge	Tool exclusive for R454B	×	×

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

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

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

2-4. LOW AMBIENT COOLING

Precautions for low ambient cooling

- If the outdoor temperature is 23°F or lower during cooling operation, install an optional air guide to prevent wind from blowing into the outdoor unit.
- Install the outdoor unit in a location where wind will not blow onto the back of the unit or through the unit.
- To prevent damage to the parts, be sure to install the unit, turn on the main power, and perform service in an environment where the ambient temperature is 0°F or higher.
- In order to protect the compressor and electrical components, do not turn off the circuit breaker if the unit is installed in an environment where the ambient temperature is 0°F or lower.
- It needs at least 12 hr standby to operation in order to warm the electrical parts.

Note: During cooling operation under low ambient temperature, the bottom fan motor stops occasionally. This is an intended feature, not a malfunction.

2-5. Minimum installation area

■ Indoor units

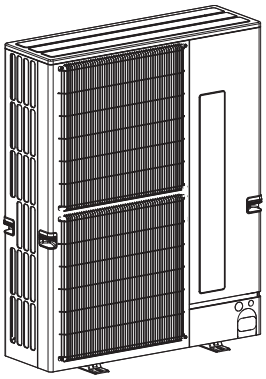
When the indoor unit is installed in a room with a floor area of Amin or more, charge an appropriate amount of refrigerant M (factory-charged refrigerant + locally added refrigerant) according to the table below.

* For the factory-charged refrigerant amount, refer to the specification nameplate or installation manual. For the amount to be added locally, refer to the installation manual.
* For ducted systems to one or more rooms, first determine the system's refrigerant amount, then refer to the indoor unit installation manual for each room's restriction for minimum area.

Refrigerant Charging Table

M			A_{min}	
[kg]	[lbs, oz]		[m^2]	[ft^2]
2.0	4	6	7.5	81
2.5	5	8	9.3	101
3.0	6	9	11.2	121
3.5	7	11	13.0	140
4.0	8	13	14.9	161
4.5	9	14	16.7	180
4.6	10	2	17.1	185
4.7	10	5	17.5	189
4.8	10	9	17.8	192
4.9	10	12	18.2	196
5.0	11	0	18.6	201
5.1	11	3	18.9	204
5.2	11	7	19.3	208
5.3	11	10	19.7	213
5.4	11	14	20.0	216
5.5	12	2	20.4	220
5.6	12	5	20.8	224
5.7	12	9	21.2	229
5.8	12	12	21.5	232
5.9	13	0	21.9	236
6.0	13	3	22.3	241
6.1	13	7	22.6	244
6.2	13	10	23.0	248
6.3	13	14	23.4	252
6.4	14	1	23.8	257
6.5	14	5	24.1	260
6.6	14	8	24.5	264
6.7	14	12	24.9	269
6.8	14	15	25.2	272
6.9	15	3	25.6	276
7.0	15	6	26.0	280
7.1	15	10	26.3	284
7.2	15	13	26.7	288
7.3	16	1	27.1	292

3 FEATURES



SUZ-CK48NLH2
SUZ-CK60NLH2

CHARGELESS SYSTEM
PRE-CHARGED REFRIGERANT IS SUPPLIED FOR PIPING LENGTH AT SHIPMENT.
(Maximum 100 ft [30 m])

The refrigerant circuit with LEV (Linear Expansion Valve) and the accumulator always control the optimal refrigerant level regardless of the piping length. The additional refrigerant charging work during installation often causes problems.
It is completely eliminated by chargeless system. This unique system improves the quality and reliability of the work performance. It also helps to speed up the installation time.

4 SPECIFICATIONS

Model name				SUZ-CK48NLH2	SUZ-CK60NLH2
Power supply	Phase			Single	
	Frequency			60 Hz	
	Voltage			208/230 V	
Inverter Input			A	30	
MCA			A	38	
MOCP			A	67	
Breaker size			A	40	
External finish				Munsell 3Y 7.8/1.1	
Heat exchanger				Plate fin coil (Ring)	
Defrost method				Reverse cycle	
Crankcase heater			kW	—	
Compressor				Hermetic	
	Model			MRB53FEJMC-L	
	Motor output		kW	3.7	
	Starter type			Inverter	
Fan	Fan (drive) × No.			Propeller fan × 2	
	Fan motor output		kW	0.200 + 0.200	
			HP	0.2682 + 0.2682	
	Airflow		CFM	4020	
			m^3/min	114	
Sound pressure level	Cooling		dB	60	
	Heating		dB	62	
Protection devices				HP switch	
				Comp. shell thermo	
Dimension	W		inch	41 - 11/32	
	D		inch	63/64 + 12-63/64	
	H		inch	52 - 43/64	
	W		mm	1050	
	D		mm	25 + 330	
	H		mm	1338	
Weight			lb	262	
			kg	119	
Refrigerant				R454B	
	Charged		lb	11 + 7/16	
			kg	5.2	
	Control			Linear expansion valve	
	Oil charged		Model	Ester (RM68EH)	
			oz	60	
			L	1.9	
Refrigerant piping	Pipe size OD liquid		inch	3/8	
			mm	9.52	
	Pipe size OD gas		inch	5/8	3/4
			mm	15.88	19.05
	Connection method - Indoor			Flared	
	Connection method - Outdoor			Flared	
	Height difference IU-OU		ft	Maximum 100	
			m	Maximum 30	
	Piping length		ft	Maximum 245	
			m	Maximum 75	

5 DATA

5-1. REFILLING REFRIGERANT CHARGE (R454B: oz, kg)

Model name	Piping length (one way)																							Factory charged
	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft	110 ft	120 ft	130 ft	140 ft	150 ft	160 ft	165 ft	170 ft	180 ft	190 ft	200 ft	210 ft	220 ft	225 ft	230 ft	240 ft	245 ft	
	15 m	18 m	21 m	24 m	27 m	30 m	33 m	37 m	40 m	43 m	46 m	49 m	50 m	52 m	55 m	58 m	61 m	64 m	67 m	69 m	70 m	73 m	75 m	
SUZ-CK48NLH2 SUZ-CK60NLH2	183 oz	183 oz	183 oz	183 oz	183 oz	183 oz	189 oz	195 oz	201 oz	207 oz	213 oz	219 oz	222 oz	225 oz	231 oz	237 oz	243 oz	249 oz	255 oz	257 oz	257 oz	257 oz	257 oz	183 oz
	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.2 kg	5.4 kg	5.5 kg	5.7 kg	5.9 kg	6.1 kg	6.2 kg	6.3 kg	6.4 kg	6.6 kg	6.7 kg	6.9 kg	7.1 kg	7.2 kg	7.3 kg	7.3 kg	7.3 kg	7.3 kg	5.2 kg

For pipes longer than 100 ft, additional charge is required.

5-2. COMPRESSOR TECHNICAL DATA

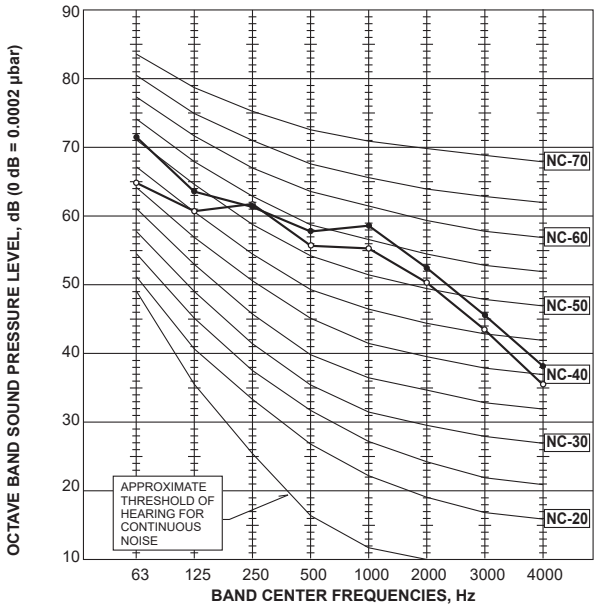
(at 68°F [20°C])

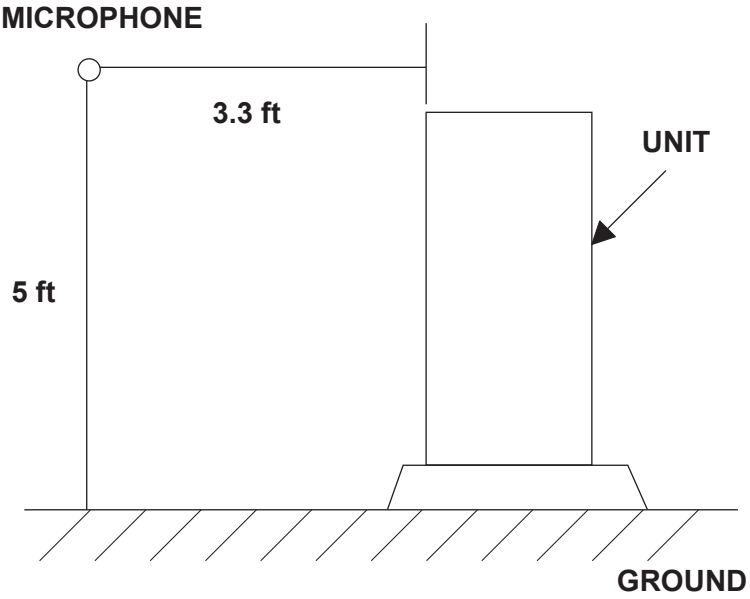
Model name		SUZ-CK48NLH2	SUZ-CK60NLH2
Compressor model		MRB53FEJMC-L	
Winding resistance (Ω)	U-V	0.49	
	U-W		
	W-V		

5-3. NOISE CRITERION CURVES

SUZ-CK48/60NLH2

MODE	SPL (dB)	LINE
COOLING	60	
HEATING	62	





5-4. STANDARD OPERATION DATA

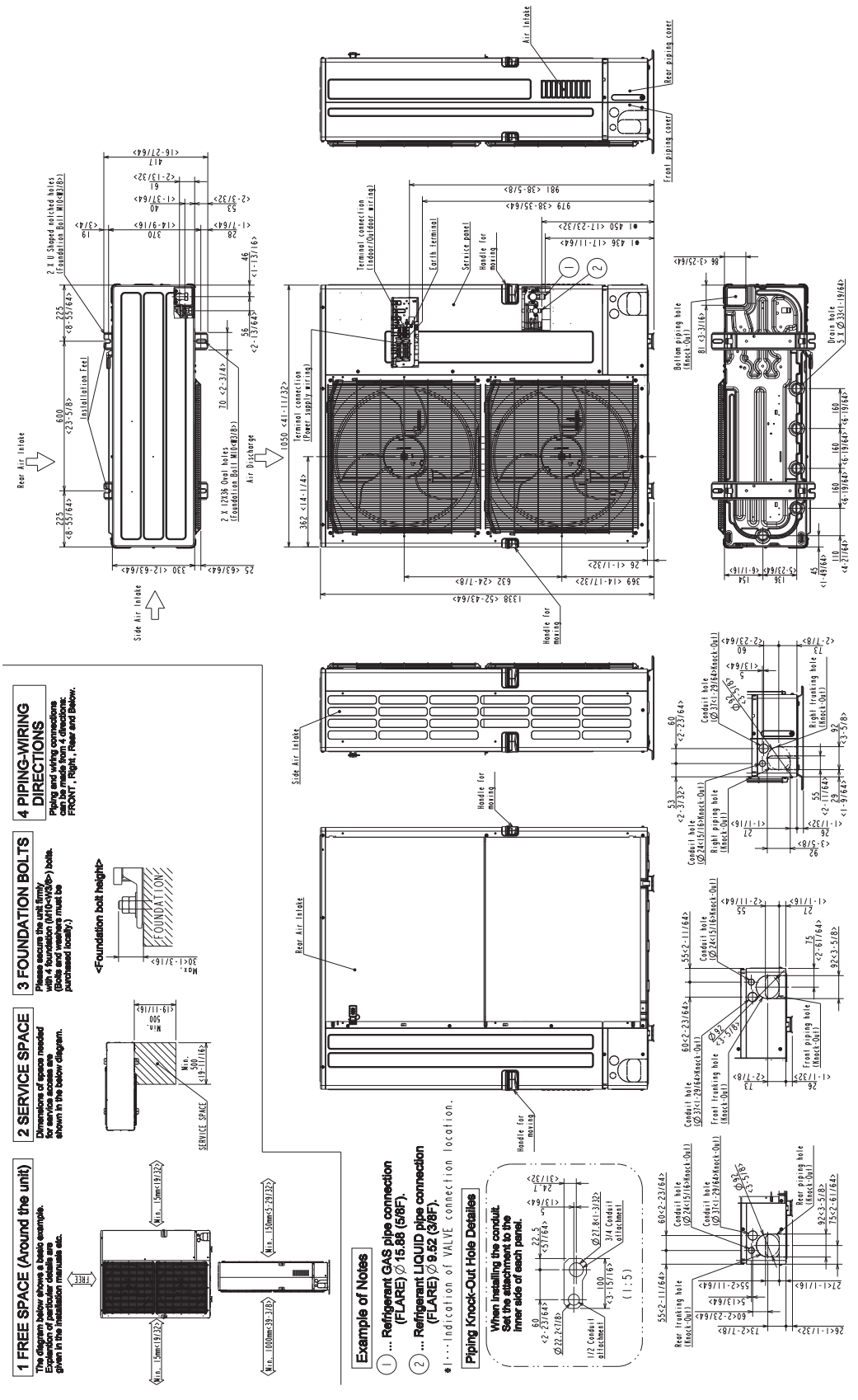
5-4-1. Heat pump

Representative matching			SVZ-AP48NL RVZ-AP48NL-M		SVZ-AP60NL RVZ-AP60NL-M	
Mode			COOLING	HEATING	COOLING	HEATING
Total	Capacity	Btu/h	48,000	60,000	56,000	66,500
	Input	W	4,450	5,620	5,490	6,590
Electrical circuit	Indoor unit model		SVZ-AP48NL RVZ-AP48NL-M		SVZ-AP60NL RVZ-AP60NL-M	
	Phase		Single		Single	
	Cycle		60 Hz		60 Hz	
	Voltage		208/230 V		208/230 V	
	Current		3.70 A		6.70 A	
	Outdoor unit model		SUZ-CK48NLH2		SUZ-CK60NLH2	
	Phase		Single		Single	
	Cycle		60 Hz		60 Hz	
	Voltage		208/230 V		208/230 V	
	Current		17.10 A	22.29 A	17.41 A	22.84 A
Refrigerant circuit	Discharge pressure	psig	351	344	360	368
	Suction pressure	psig	117	106	115	94
	Discharge temperature	°F	198	154	182	167
	Condensing temperature	°F	111	106	112	113
	Suction temperature	°F	74	38	60	34
	Ref. pipe length	ft	25	25	25	25
	Discharge pressure	MPa	2.43	2.37	2.48	2.54
	Suction pressure	MPa	0.81	0.73	0.80	0.65
	Discharge temperature	°C	92.1	67.7	83.4	74.7
	Condensing temperature	°C	44.2	41.0	44.6	45.3
	Suction temperature	°C	23.1	3.4	15.7	1.0
	Ref. pipe length	m	7.6	7.6	7.6	7.6
Indoor side	Intake air temperature DB	°F	80	70	80	70
	Intake air temperature WB	°F	67	60	67	60
	Discharge air temperature DB	°F	60	102	58	105
Outdoor side	Intake air temperature DB	°F	95	47	95	47
	Intake air temperature WB	°F	75	43	75	43
Indoor side	Intake air temperature DB	°C	26.7	21.1	26.7	21.1
	Intake air temperature WB	°C	19.4	15.6	19.4	15.6
	Discharge air temperature DB	°C	15.4	38.8	14.2	40.8
Outdoor side	Intake air temperature DB	°C	35.0	8.3	35.0	8.3
	Intake air temperature WB	°C	23.9	6.1	23.9	6.1
SHF			0.77	-	0.74	-
BF			0.28	-	0.15	-

6 OUTLINES AND DIMENSIONS

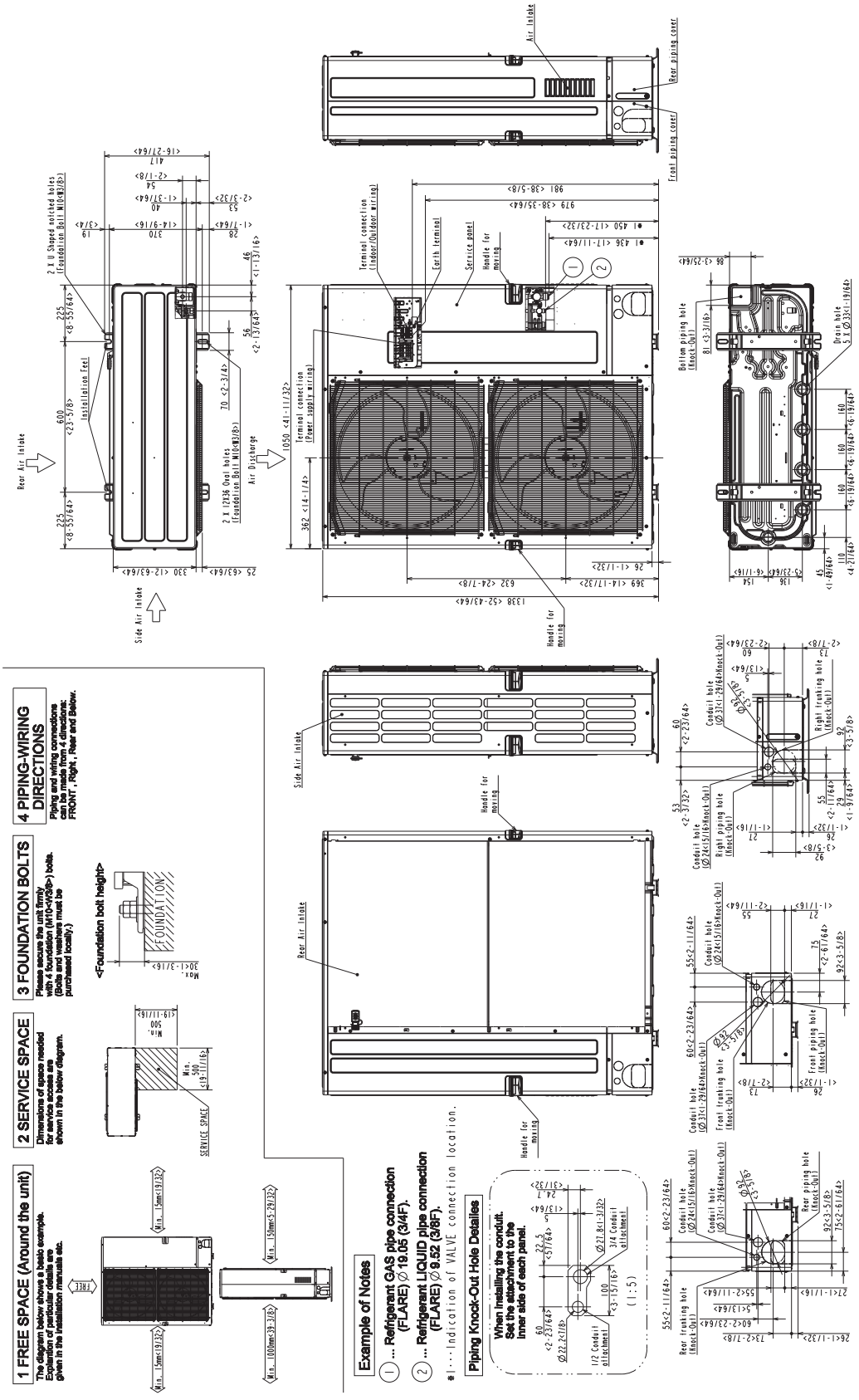
SUZ-CK48NLH2

Unit: mm<inch>



SUZ-CK60NLH2

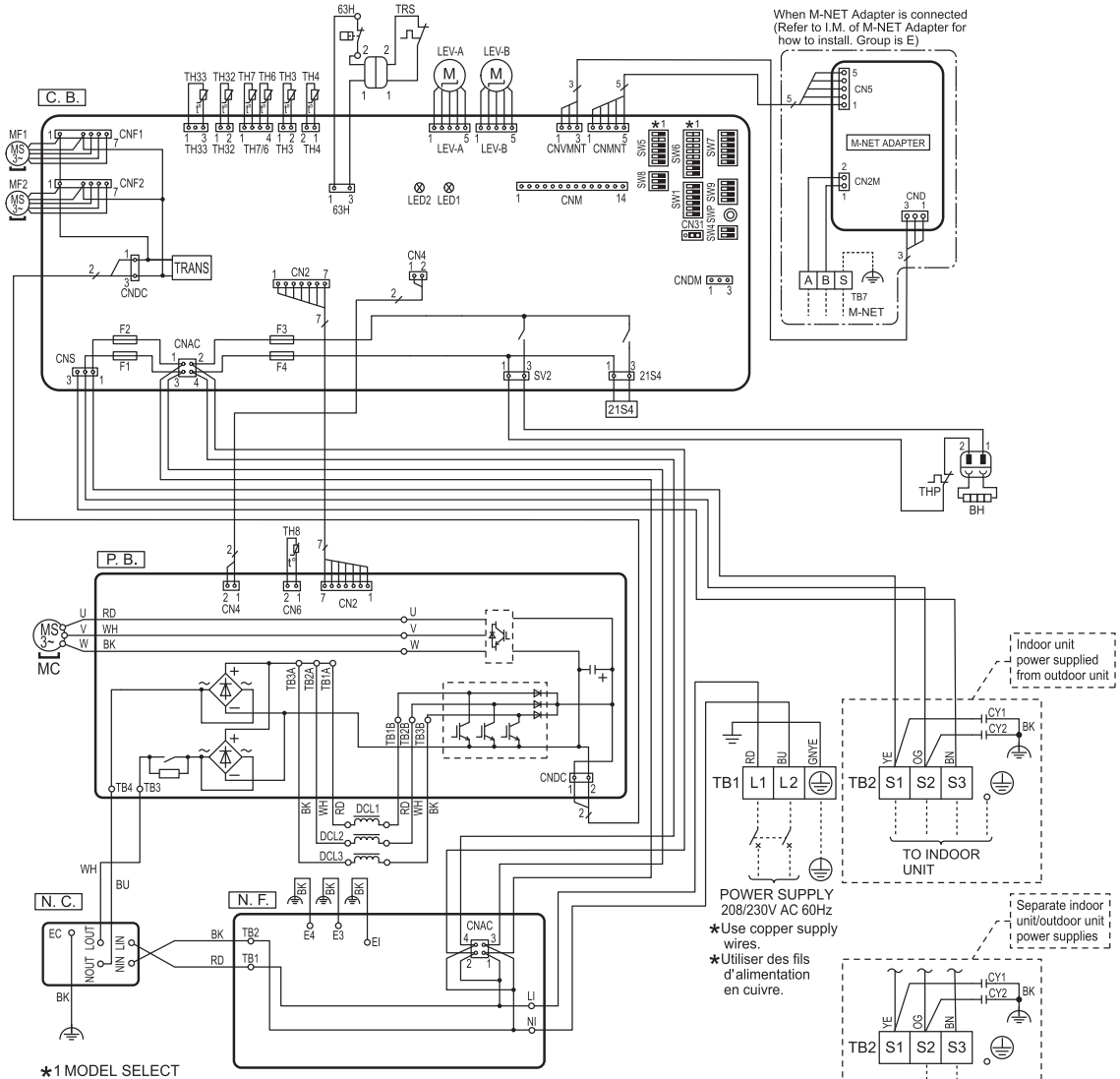
Unit: mm<inch>



7 WIRING DIAGRAM

[LEGEND]

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply>	TH8	Thermistor <Heat Sink>	SW5	Switch <Model Select>
TB2	Terminal Block <Indoor/Outdoor>	TH32	Thermistor <Suction>	SW6	Switch <Model Select>
MC	Motor for Compressor	TH33	Thermistor <Comp. Surface>	SW7	Switch <Function Switch>
MF1, MF2	Fan Motor	LEV-A, LEV-B	Linear Expansion Valve	SW8	Switch <Function Switch>
21S4	Solenoid Valve (4-Way Valve)	DCL1, DCL2, DCL3	Reactor	SW9	Switch <Function Switch>
63H	High Pressure Switch	CY1, CY2	Capacitor	SWP	Switch <Pump Down>
TRS	Thermal Protector	N. F.	Noise Filter Circuit Board	CN31	Connector <Emergency Operation>
BH	Base Heater (SUZ-CK48/60NLH2 only)	N. C.	Noise Canceller Board	CNDM	Connector <Connection for Option>
THP	Thermal Protector (SUZ-CK48/60NLH2 only)	P. B.	Power Circuit Board	CNM	Connector <Connection for Option>
TH3	Thermistor <Liquid>	C. B.	Controller Circuit Board	SV2	Base Heater
TH4	Thermistor <Discharge>	SW1	Switch <Manual Defrost, Defect History Record Reset, Refrigerant Address>	LED1, LED2	LED <Operation Inspection Indicators>
TH6	Thermistor <2-Phase Pipe>			F1, F2	Fuse <T10AL250V>
TH7	Thermistor <Ambient>	SW4	Switch <Test Operation>	F3, F4	Fuse <T6.3AL250V>



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

MODEL	SW6-4, 5, 6, 7, 8	SW5-5	MODEL	SW6-4, 5, 6, 7, 8	SW5-5
SUZ-CK48NLH2	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6	SUZ-CK60NLH2	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6

M-NET ADAPTER

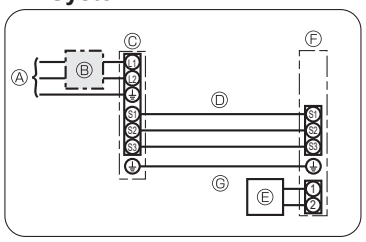
SYMBOL	NAME
TB7	Terminal Block <M-NET connection>
CN5	Connector <Transmission>
CND	Connector <Power Supply>
CN2M	Connector <M-NET communication>

8 WIRING SPECIFICATIONS

8-1. INDOOR UNIT POWER SUPPLIED FROM OUTDOOR UNIT (A-control application)

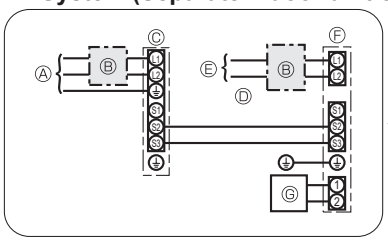
The following connection patterns are available.
The outdoor unit power supply patterns vary depending on models.

1:1 System



Ⓐ Outdoor unit power supply
Ⓑ Wiring circuit breaker or isolating switch
Ⓒ Outdoor unit
Ⓓ Indoor unit/outdoor unit connecting cords
Ⓔ Remote controller
Ⓕ Indoor unit
Ⓖ Indoor unit/outdoor unit ground

1:1 System (Separate indoor unit/outdoor unit power supplies)



Ⓐ Outdoor unit power supply
Ⓑ Wiring circuit breaker or isolating switch
Ⓒ Outdoor unit
Ⓓ Indoor unit/outdoor unit connecting cords
Ⓔ Indoor unit power supply
Ⓕ Indoor unit
Ⓖ Remote controller

In the case of "Separate indoor unit/outdoor unit power supplies",
- Set SW8-3 to ON. (Refer to "10-9. FUNCTIONS OF SWITCHES, CONNECTORS AND JUMPERS".)
- Always power on the outdoor unit first when turning on the system. Powering on the indoor unit first may cause an indoor unit error.

Note: Affix a label A that is included with the manuals near each wiring diagram for the indoor and outdoor units.

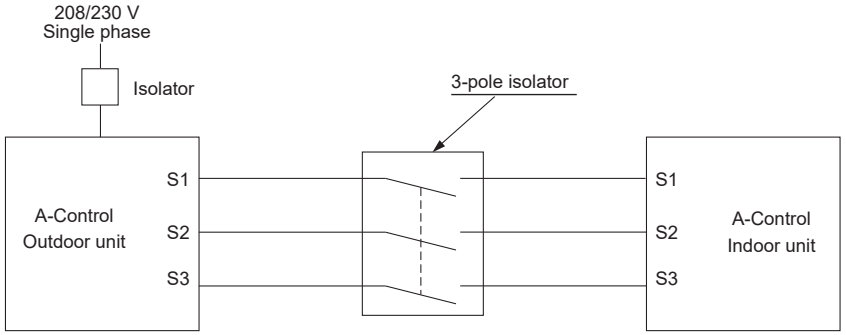
Outdoor unit capacity			48/60
Outdoor unit power supply			~/N (single), 60 Hz, 208/230 V
Breaker size *1			40 A
Minimum circuit ampacity			38 A
Maximum rating of overcurrent protective device			67 A
Wiring Wire No. × size (mm^2)	Outdoor unit power supply		2 × Min. AWG 8
	Outdoor unit power supply ground		1 × Min. AWG 10
	Indoor unit-Outdoor unit	*2	3 × AWG 14 (polar)
	Indoor unit-Outdoor unit ground	*2	1 × Min. AWG 14
	Remote controller-Indoor unit	*3	2 × AWG 22 (Non-polar)
Circuit rating	Outdoor unit L1-L2 (single)	*4	208/230 VAC
	Indoor unit-Outdoor unit S1-S2 (single)	*4	208/230 VAC
	Indoor unit-Outdoor unit S2-S3 (single)	*4	28 VDC
	Remote controller-Indoor unit	*4	12 VDC

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

IMPORTANT
If you use a ground fault circuit interrupter, it should be compatible with higher harmonics as this unit is equipped with an inverter. The use of an inadequate breaker can cause the incorrect operation of inverter.

*2. Max. 50 m, 154 ft
S3 separated, Max. 80 m, 262 ft
*3. The wire with a length of 10 m (30 ft) is attached in the remote controller accessory.
*4. The figures are NOT always against the ground.
S3 terminal has 28 VDC against S2 terminal. However between S3 and S1, these terminals are NOT electrically insulated by the transformer or other devices.

Note: 1. The wiring size must comply with the applicable local and national codes.
2. Use copper supply wires.
3. Use wires rated 600 V or more for the power supply cables and the indoor/outdoor unit connecting cables.
4. Power supply cables, the cable connecting the indoor and outdoor units (indoor-outdoor connecting cable), and the cable connecting the water heater and outdoor unit (water heater-outdoor connecting cable) shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
5. Use an ground wire which is longer than the other cords so that it will not become disconnected when tension is applied.
6. The appliance shall be installed in accordance with national wiring regulations.



⚠ **Warning:**
For A-control wiring, there is high voltage potential on the S3 terminal caused by electrical circuit design that has no electrical insulation between power supply wire and communication signal line. Therefore, please turn off the main power supply when servicing.
And do not touch the S1, S2, S3 terminals when the power is energized. If isolator should be used between indoor unit and outdoor unit, please use 3-pole type.

Never splice the power cable or the indoor-outdoor connection cable, otherwise it may result in a smoke, a fire, or communication failure.

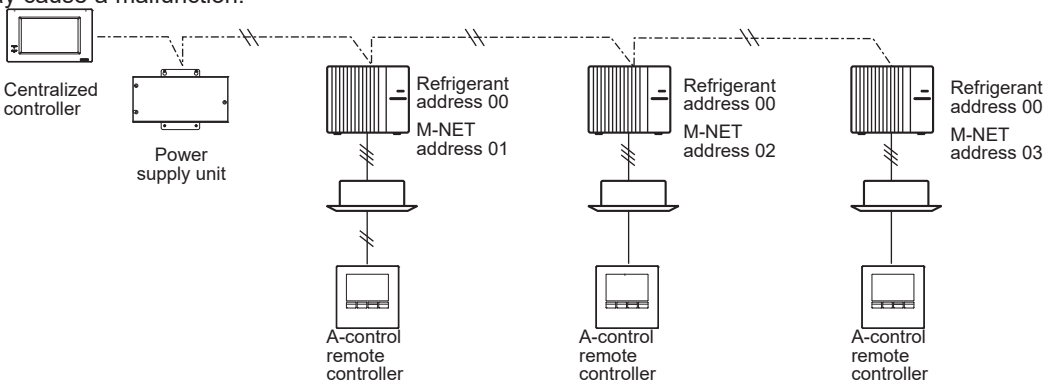
8-2. M-NET WIRING METHOD

Points to notice:

(1) Outside the unit, transmission wires should stay away from electric wires in order to prevent electromagnetic noise from making an influence on the signal communication. Place them at intervals of 5 cm [2 inch] or more. Do not put them in the same conduit tube.

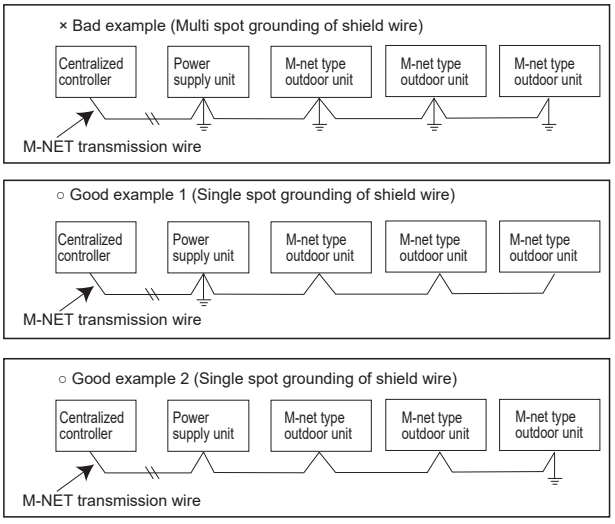
(2) Terminal block (TB7) for transmission wires should never be connected to 208/230 V power supply. If it is connected, electronic parts on M-NET P.C. board may be burnt out.

(3) Use 2-core × 1.25 mm^2 [AWG16] shield wire (CVVS, CPEVS) for the transmission wire. Transmission signals may not be sent or received normally if different types of transmission wires are put together in the same multi-conductor cable. Failure to do so may cause a malfunction.



It is acceptable if M-NET wire (non-polar, 2-core) is arranged in addition to the wiring for A-control.

(4) Ground only one of any appliances through M-NET transmission wire (shield wire). Communication error may occur due to the influence of electromagnetic noise.
"Ed" error will appear on the LED display of outdoor unit.
"0403" error will appear on the centralized remote controller.

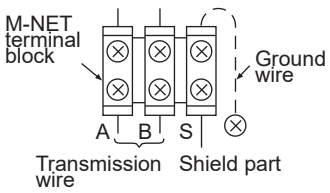


If there are more than 2 grounding spots on the shield wire, noise may enter into the shield wire because the ground wire and shield wire form one circuit and the electric potential difference occurs due to the impedance difference among grounding spots. In the case of single spot grounding, noise does not enter into the shield wire because the ground wire and shield wire do not form 1 circuit.
To avoid communication errors caused by noise, make sure to observe the single spot grounding method described in the installation manual.

● **M-NET wiring**

(1) Use 2-core × 1.25 mm^2 [AWG16] shield wire for electric wires.
(Excluding the case connecting to system controller.)

(2) Connect the wire to the M-NET terminal block. Connect one core of the transmission wire (non-polar) to A terminal and the other to B. Peel the shield wire, twist the shield part to a string and connect it to S terminal.



(3) In the system which several outdoor units are being connected, the terminal (A(M1), B(M2), S) on M-NET terminal block should be individually wired to the other outdoor unit's terminal. (i.e. A to A; B to B; and S to S) In this case, choose one of those outdoor units and drive a screw to fix an ground wire on the plate as shown on the right figure.

8-2-1. M-NET address setting

In A-control models, M-NET address and refrigerant address should be set only for the outdoor unit. Similar to City Multi series, there is no need to set the address of outdoor unit and remote controller. To construct a central control system, the setting of M-NET address should be conducted only upon the outdoor unit. The setting range should be 1 to 50 (the same as that of the indoor unit in City Multi system), and the address number should be consecutively set in a same group.

Address number can be set by using rotary switches (SW11 for ones digit and SW12 for tens digit), which is located on the M-NET board of outdoor unit.
(Initial setting: all addresses are set to “0”.)

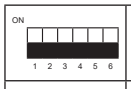
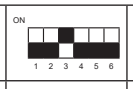
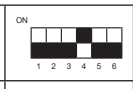
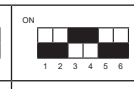
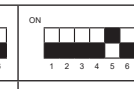
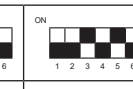
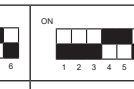
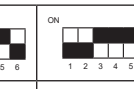
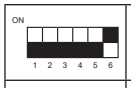
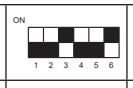
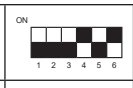
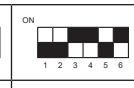
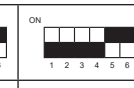
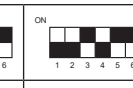
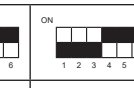
<Setting example>

M-NET Address No.		1	2	~	50
Switching setting	SW11 ones digit				
	SW12 tens digit				

8-2-2. Refrigerant address setting

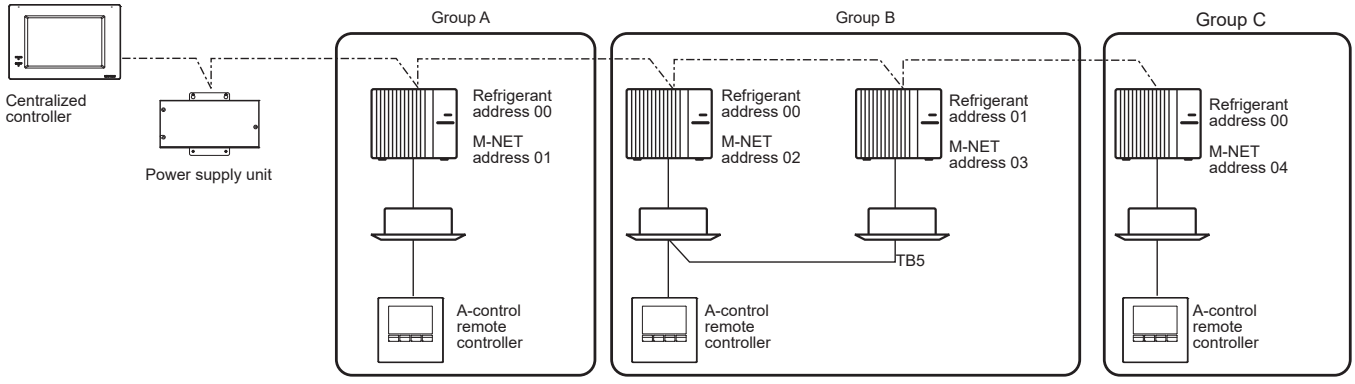
In the case of multiple grouping system (multiple refrigerant circuits in one group), indoor units should be connected by remote controller wiring (TB5) and the refrigerant address needs to be set. Leave the refrigerant addresses to “00” if the group setting is not conducted. Set the refrigerant address by using SW1-3 to 1-6 on the outdoor controller board.
Initial setting: all switches are OFF. (All refrigerant addresses are “00”.)

Refrigerant address

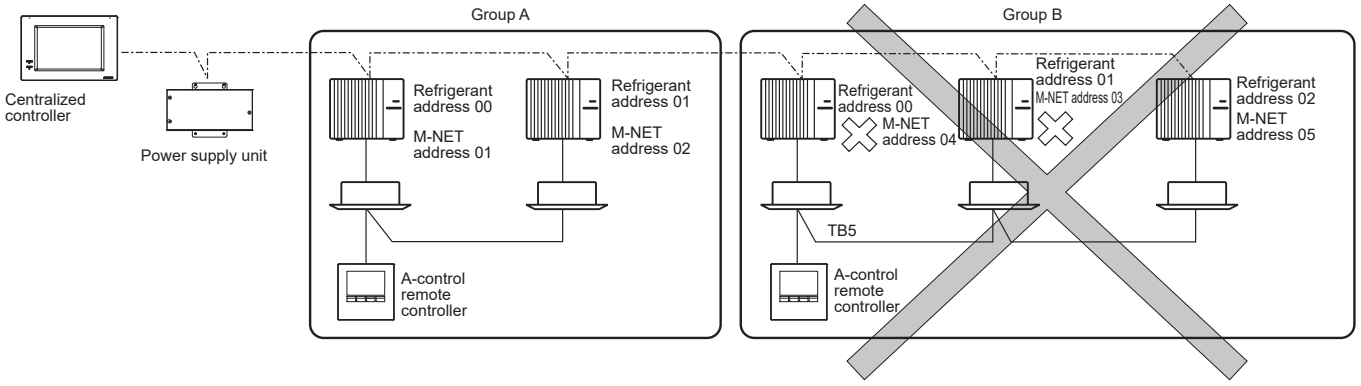
							
0	1	2	3	4	5	6	7
							
8	9	10	11	12	13	14	15

8-2-3. Regulations in address settings

In the case of multiple grouping system, M-NET and refrigerant address settings should be done as explained in the above section. Set the lowest number in the group for the outdoor unit whose refrigerant address is “00” as its M-NET address.



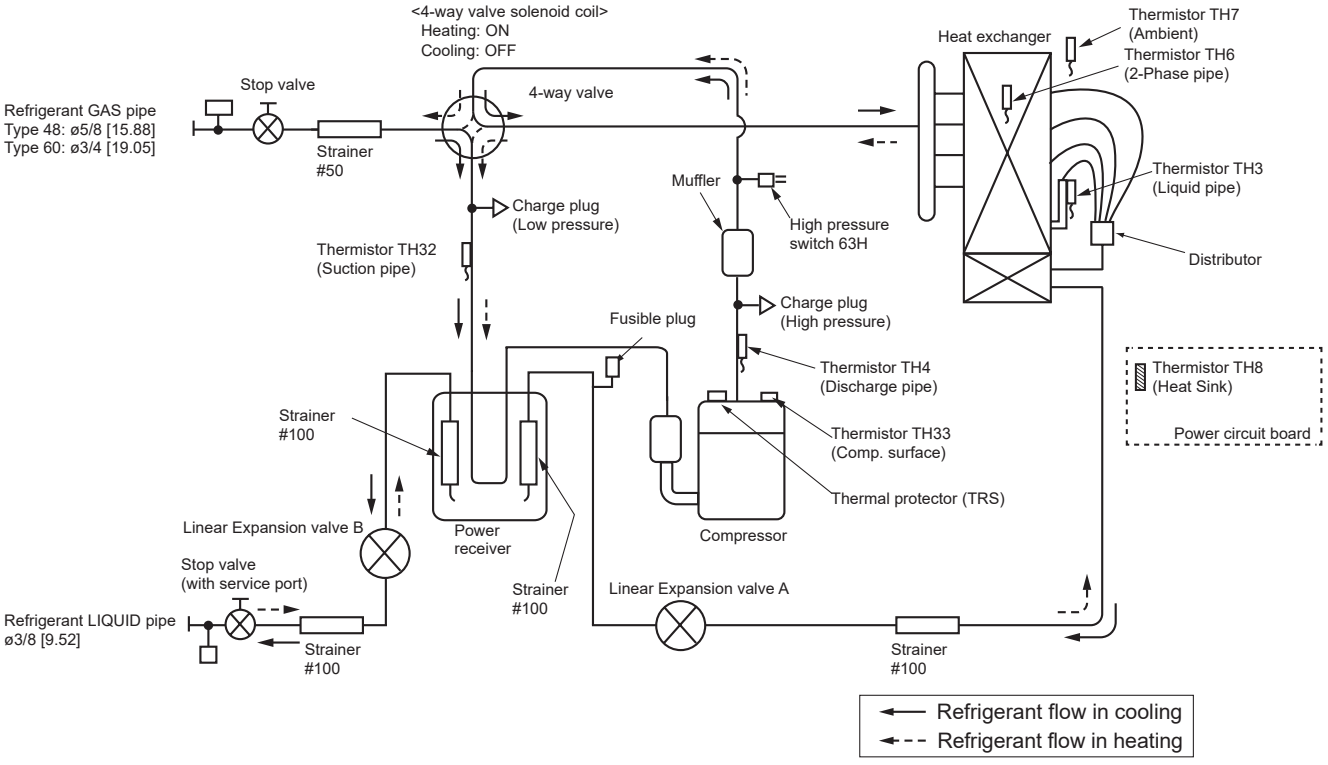
Note: Refrigerant addresses can be overlapped if they are in the different group.



In group B, M-NET address of the outdoor unit whose refrigerant address is “00” is not set to the minimum in the group. As “03” is right for this situation, the setting is wrong. Taking group A as a good sample, set the minimum M-NET address in the group for the outdoor unit whose refrigerant address is “00”.

9 REFRIGERANT SYSTEM DIAGRAM

Unit: inch [mm]



1. Refrigerant collecting (pump down)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

① Supply power (circuit breaker).
- When power is supplied, make sure that [Centrally controlled] is not displayed on the remote controller. If [Centrally controlled] is displayed, the refrigerant collecting (pump down) cannot be completed normally.
- Startup of the indoor-outdoor communication takes about 3 minutes after the power (circuit breaker) is turned on. Start the pump-down operation 3 to 4 minutes after the power (circuit breaker) is turned ON.

② After the liquid stop valve is closed, set SWP on the control board of the outdoor unit to ON. The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and refrigerant collecting operation begins. LED1 and LED2 on the control board of the outdoor unit are lit.
- Only set SWP to ON if the unit is stopped. However, even if the unit is stopped and SWP is set to ON less than 3 minutes after the compressor stops, the refrigerant collecting operation cannot be performed. Wait until compressor has been stopped for 3 minutes and then set SWP to ON again.

③ Because the unit automatically stops in about 2 to 3 minutes when the refrigerant collecting operation is completed (LED1 off, LED2 lit), be sure to quickly close the gas stop valve. If LED1 is lit and LED2 is off and the outdoor unit is stopped, refrigerant collection is not properly performed. Open the liquid stop valve completely, and then repeat step ② after 3 minutes have passed.
- If the refrigerant collecting operation has been completed normally (LED1 off, LED2 lit), the unit will remain stopped until the power supply is turned off.

④ Turn off the power supply (circuit breaker).
- Note that it may not be possible to perform a pump-down operation if the extension piping is very long with large refrigerant amount.

⚠ Warning:
- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst if air etc. get into it.**
- **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.**

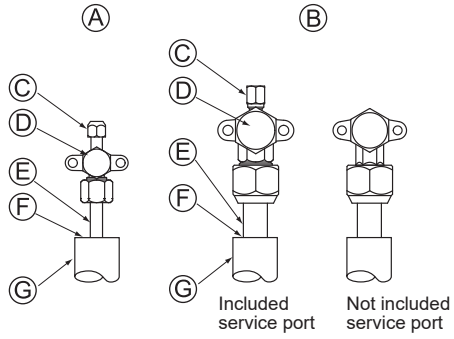
2. Refrigerant Pipe Nitrogen Pressure Test Method

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

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
① Pressurize to 0.5 MPa (73 psig, 5 kgf/cm²G), wait 5 minutes, and make sure the pressure does not decrease.
② Pressurize to 1.5 MPa (218 psig, 15 kgf/cm²G), wait 5 minutes, and make sure the pressure does not decrease.
③ Pressurize to 4.15 MPa (602 psig, 41.5 kgf/cm²G) and measure the surrounding temperature and refrigerant pressure.

(3) If the specified pressure holds for about 24 Hours and does not decrease, the pipes have passed the test and there are no leaks.
- If the surrounding temperature changes by 1°C (1.8°F), the pressure will change by about 0.01 MPa (1.45 psig, 0.1 kgf/cm²G). Make the necessary corrections.

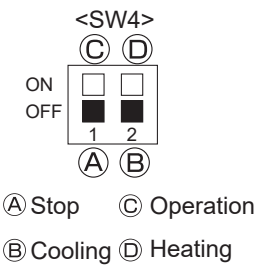
(4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.



Ⓐ Stop valve <Liquid side>
Ⓑ Stop valve <Gas side>
Ⓒ Service port
Ⓓ Open/Close section
Ⓔ Local pipe
Ⓕ Sealed, same way for gas inside
Ⓖ Pipe cover

3. Start and finish of test run

- Operation from the indoor unit
  Execute the test run using the installation manual for the indoor unit.
- Operation from the outdoor unit
  SW4, located on the control board of the outdoor unit, starts and finishes the test run. It also sets the operation mode (cooling/heating).
  ① Set the operation mode (cooling/heating) with SW4-2.
  ② Turn on SW4-1 to start test run with the operation mode set by SW4-2.
  ③ Turn off SW4-1 to finish the test run.



- There may be a faint knocking sound around the machine room after power is supplied. However, this is not a problem with the product because the linear expansion valve is just moving to adjust opening pulse.
- There may be a knocking sound around the machine room for several seconds after compressor starts operating. However, this is not a problem with product because the check valve itself generates the sound because pressure difference is small in the refrigerant circuit.

Note:
The operation mode cannot be changed by SW4-2 during the test run. (To change test run mode, stop the unit by SW4-1, change the operation mode and restart the test run by SW4-1.)

10 TROUBLESHOOTING

10-1. TROUBLESHOOTING

<Error code displayed by self-diagnosis and actions required for service (summary)>
Present and past error codes are logged, and they can be displayed on the wired remote controller and control board of outdoor unit. Actions required for service, which depends on whether or not the trouble is reoccurring in the field, are summarized in the table below. Check the contents below before investigating details.

Unit conditions at service	Error code	Actions required for service (summary)
The trouble is reoccurring.	Displayed	Judge the problem and take a corrective action according to "10-3. SELF-DIAGNOSIS ACTION TABLE".
	Not displayed	Conduct troubleshooting to identify the cause of the trouble according to "10-4. TROUBLESHOOTING OF PROBLEMS".
The trouble is not reoccurring.	Logged	① Consider the temporary defects such as the work of protection devices in the refrigerant circuit including compressor, poor connection of wiring, noise, etc. Re-check the symptom and check the installation environment, refrigerant amount, weather when the trouble occurred, and matters related to wiring, etc. ② Reset error code logs and restart the unit after finishing service. ③ There is no abnormality in electrical component, controller board, or remote controller, etc.
	Not logged	① Re-check the abnormal symptom. ② Conduct troubleshooting to identify the cause of the trouble according to "10-4. TROUBLESHOOTING OF PROBLEMS". ③ Continue to operate unit for the time being if the cause is not identified. ④ There is no abnormality concerning of parts such as electrical component, controller board, and remote controller, etc.

10-2. CHECKPOINT UNDER TEST RUN

10-2-1 Before the test run

- After installation of indoor and outdoor units, piping work, and electric wiring work, re-check that there is no refrigerant leakage, loosened connections, and incorrect polarity.
- Measure impedance between the ground and the power supply terminal block (L1, L2) on the outdoor unit by 500 V megohmmeter and check that it is 1.0 MΩ or over.
  Note: Do not use 500 V megohmmeter to the indoor/outdoor connecting wire terminal block (S1, S2, S3) and the remote controller terminal block (1, 2). This may cause malfunction.
- Make sure that the test run switch (SW4) is set to OFF before turning on power supply.
- Turn on power supply 12 hours before the test run in order to protect compressor.
- For specific models which requires higher ceiling settings or auto-recovery feature from power failure, make proper changes of settings referring to the description of "12. FUNCTION SETTING".
- Make sure to read the operation manual before test run. (Especially items to secure safety.)

10-2-2. TEST RUN
Refer to "15-4. [Test run]" for the operation procedure.

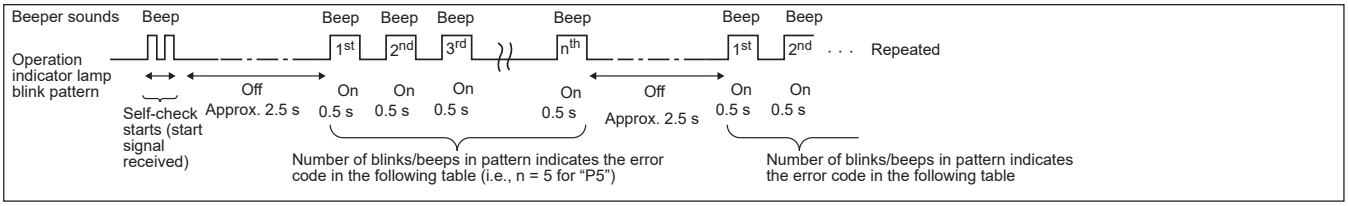
10-2-3. ERROR INFORMATION
Refer to "15-2. [Error information]" when an error occurs.

10-2-4. ERROR HISTORY
Refer to "15-6. [Error history]" to check the errors occurred in the past.

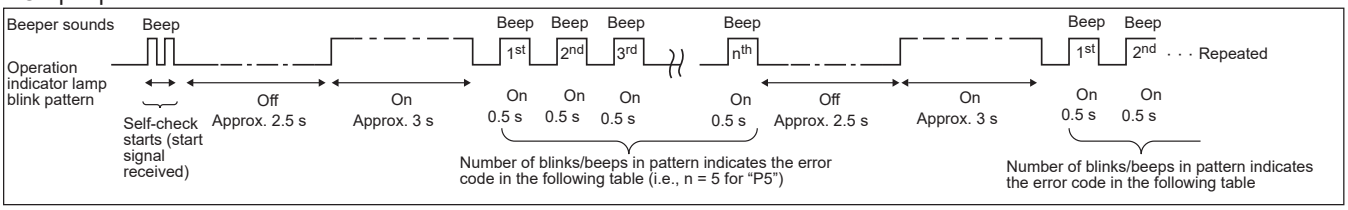
10-2-5. SELF-DIAGNOSIS
Refer to "15-7. Self-diagnosis" to search for the error history.

• Refer to the following tables for details on the error codes.

Output pattern A



Output pattern B



Output pattern A: Errors detected by indoor unit

IR wireless remote controller	Wired remote controller	Symptom	Remark
Beeper sounds/Operation indicator lamp blinks (Number of times)	1 Error code		
1	P1	Intake sensor error	As for indoor unit, refer to indoor unit's service manual.
2	P2	Pipe (TH2) sensor error	
	P9	Pipe (TH5) sensor error	
3	E6, E7	Indoor/outdoor unit communication error	
4	P4	Drain sensor error/Float switch connector open	
5	P5	Drain pump error	
	PA	Forced compressor stop (due to water leakage abnormality)	
6	P6	Freezing/Overheating protection operation	
7	EE	Combination error between indoor and outdoor units	
8	P8	Pipe temperature error	
9	E4, E5	Remote controller signal receiving error	
10	-	-	
11	-	-	
12	FB (Fb)	Indoor unit control system error (memory error, etc.)	
13	-	-	
14	PL	Abnormal refrigerant circuit	
-	E0, E3	Remote controller transmission error	
-	E1, E2	Remote controller control board error	

Output pattern B: Errors detected by unit other than indoor unit (outdoor unit, etc.)

IR wireless remote controller	Wired remote controller	Symptom	Remark
Beeper sounds/Operation indicator lamp blinks (Number of times)	1 Error code		
1	E9	Indoor/outdoor unit communication error (Transmitting error) (Outdoor unit)	For details, check the LED display of the outdoor controller board.
2	UP	Compressor overcurrent interruption	
3	U3, U4	Open/short of outdoor unit thermistors	
4	UF	Compressor overcurrent interruption (When compressor is locked)	
5	U2	Abnormal high discharge temperature/49C worked/ insufficient refrigerant	
6	U1, Ud	Abnormal high pressure (63H worked)/Overheating protection operation	
7	U5	Abnormal temperature of heatsink	
8	U8	Outdoor unit fan protection stop	
9	U6	Compressor overcurrent interruption/Abnormal of power module	
10	U7	Abnormality of super heat due to low discharge temperature	
11	U9, UH	Abnormality such as overvoltage or voltage shortage and abnormal synchronous signal to main circuit/current sensor error	
12	-	-	
13	-	-	
14	Others	Other errors	

Note:

1. If the beeper does not sound again after the initial 2 beeps to confirm the self-check start signal was received and the operation indicator lamp does not come on, there are no error records.
2. If the beeper sounds 3 times continuously "beep, beep, beep (0.4 + 0.4 + 0.4 s)" after the initial 2 beeps to confirm the self-check start signal was received, the specified refrigerant address is incorrect.

10-3. SELF-DIAGNOSIS ACTION TABLE

<Abnormalities detected when the power is turned on>

Note: Refer to the indoor unit section for the codes starting with P and E.

Error code	Abnormal points and detection method	Cause	judgment and action
None	—	① No voltage is supplied to terminal block (TB1) of outdoor unit. a) Power supply breaker is turned off. b) Contact failure or disconnection of power supply terminal c) Open phase (L1 or L2 phase)	① Check following items. a) Power supply breaker b) Connection of power supply terminal block (TB1) c) Connection of power supply terminal block (TB1)
		② Electric power is not charged to power supply terminal of outdoor power circuit board. a) Contact failure of power supply terminal b) Open phase on the outdoor power circuit board (Disconnection of terminal on outdoor power circuit board)	② Check following items. a) Connection of power supply terminal block (TB1) b) Connection of terminal on outdoor power circuit board
		③ Electric power is not supplied to outdoor controller circuit board. a) Disconnection of connector (CNDC)	③ Check connection of the connector (CNDC) on the outdoor controller circuit board. Check connection of the connector CNDC on the outdoor power circuit board. Refer to "10-8. TEST POINT DIAGRAM".
		④ Disconnection of reactor (DCL or ACL)	④ Check connection of reactor. (DCL or ACL) Refer to "7. WIRING DIAGRAM".
		⑤ Disconnection of outdoor noise filter circuit board or parts failure in outdoor noise filter circuit board.	⑤ a) Check connection of outdoor noise filter circuit board. b) Replace outdoor noise filter circuit board. Refer to "10-8. TEST POINT DIAGRAM".
		⑥ Defective outdoor power circuit board	⑥ Replace outdoor power circuit board.
		⑦ Defective outdoor noise filter circuit board	⑦ Replace outdoor noise filter circuit board
		⑧ Defective outdoor controller circuit board	⑧ Replace controller board (When items above are checked but the units cannot be repaired)
F5 (5201)	**63H or TRS connector open** Abnormal if 63H or TRS connector circuit is open for 3 minutes continuously after power supply. • 63H: High pressure switch • TRS: Thermal protector	① Disconnection or contact failure of 63H or TRS connector on outdoor controller circuit board	① Check connection of 63H and TRS connector on outdoor controller circuit board. Refer to "10-8. TEST POINT DIAGRAM".
		② Disconnection or contact failure of 63H or TRS	② Check the 63H and TRS side of connecting wire.
		③ 63H or TRS is working due to defective parts.	③ Check continuity by multimeter. Replace the parts if the parts are defective.
		④ Defective outdoor controller circuit board	④ Replace outdoor controller circuit board.

Error code	Abnormal points and detection method	Cause	judgment and action
EA (6844)	**Miswiring of indoor/outdoor unit connecting wire** (1) Outdoor controller circuit board can automatically check the number of connected indoor units. Abnormal if the number cannot be checked automatically due to miswiring of indoor/outdoor unit connecting wire, etc. after power is turned on for 4 minutes. (2) Abnormal if outdoor controller circuit board detects excessive number of indoor units.	① Contact failure or miswiring of indoor/outdoor unit connecting wire ② Diameter or length of indoor/outdoor unit connecting wire is out of specified capacity. ③ Excessive number of indoor units are connected to 1 indoor unit. (4 units or more) ④ Defective transmitting receiving circuit of outdoor controller circuit board ⑤ Defective transmitting receiving circuit of indoor controller board ⑥ Defective indoor power board ⑦ 2 or more outdoor units have refrigerant address “0”. (In the case of group control) ⑧ Noise has entered into power supply or indoor/outdoor unit connecting wire.	① Check disconnection or looseness or polarity of indoor/outdoor unit connecting wire of indoor and outdoor units. ② Check diameter and length of indoor/outdoor unit connecting wire. Total wiring length: 262 ft [80 m] (including wiring connecting each indoor unit and between indoor and outdoor unit) Also check if the connection order of flat cable is S1, S2, S3. ③ Check the number of indoor units that are connected to one outdoor unit. (If EA is detected) ④–⑥ Turn the power off once and on again to check. Replace outdoor controller circuit board, indoor controller board or indoor power board if abnormality is detected again. ⑦ Check if refrigerant addresses (SW1-3 to SW1-6 on outdoor controller circuit board) are overlapping in the case of group control system. ⑧ Check transmission path and remove the cause. Note: The descriptions above, ①–⑧, are for EA, Eb and EC.
Eb (6845)	**Miswiring of indoor/outdoor unit connecting wire (converse wiring or disconnection)** (1) Outdoor controller circuit board can automatically set the unit number of indoor units. (2) Abnormal if the indoor unit number cannot be set within 4 minutes after power on because of miswiring (converse wiring or disconnection) of indoor/outdoor unit connecting wire.	① Contact failure or miswiring of indoor/outdoor unit connecting wire ② Diameter or length of indoor/outdoor unit connecting wire is out of specified capacity. ④ Defective transmitting receiving circuit of outdoor controller circuit board ⑤ Defective transmitting receiving circuit of indoor controller board ⑥ Defective indoor power board ⑦ 2 or more outdoor units have refrigerant address “0” . (In the case of group control) ⑧ Noise has entered into power supply or indoor/outdoor unit connecting wire.	
EC (6846)	**Startup time over** The unit cannot finish Startup process within 4 minutes after power on.	① Contact failure of indoor/outdoor unit connecting wire ② Diameter or length of indoor/outdoor unit connecting wire is out of specified capacity. ⑦ 2 or more outdoor units have refrigerant address “0”. (In the case of group control) ⑧ Noise has entered into power supply or indoor/outdoor unit connecting wire.	
U1 (1302)	**High pressure (High pressure switch 63H operated) /High compressor temperature (Thermal protector TRS operated)** Abnormal if high pressure switch 63H (4.15 MPa, 602 psig) or thermal protector TRS (248˚F [120˚C]) operated during compressor operation	① Short cycle of indoor unit ② Clogged filter of indoor unit ③ Decreased airflow caused by dirt of indoor fan ④ Dirt of indoor heat exchanger ⑤ Locked indoor fan motor ⑥ Malfunction of indoor fan motor	①–⑥ Check indoor unit and repair defect.
		⑦ Defective operation of stop valve (Not full open)	⑦ Check if stop valve is fully open.
		⑧ Clogged or broken pipe	⑧ Check piping and repair defect.
		⑨ Locked outdoor fan motor ⑩ Malfunction of outdoor fan motor ⑪ Short cycle of outdoor unit ⑫ Dirt of outdoor heat exchanger	⑨–⑫ Check outdoor unit and repair defect.
		⑬ Decreased airflow caused by defective inspection of outside temperature thermistor (It detects lower temperature than actual temperature.)	⑬ Check the detected temperature of outside temperature thermistor on LED display. (SW2 on A-Control Service Tool : Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".)
		⑭ Disconnection or contact failure of connector (63H or TRS) on outdoor controller board ⑮ Disconnection or contact failure of 63H or TRS connection ⑯ Defective outdoor controller board	⑭–⑯ Turn the power off and check if F5 is displayed when the power is turned on again. When F5 is displayed, refer to “Judgment and action” for F5.
		⑰ Defective action of linear expansion valve	⑰ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS".
		⑱ Malfunction of fan driving circuit	⑱ Replace outdoor controller board.
		⑲ Overheated compressor operation caused by shortage of refrigerant	⑲ Check intake superheat. Check leakage of refrigerant. Charge additional refrigerant.
		⑳ Defective operation of stop valve	⑳ Check if stop valve is fully open.

<Abnormalities detected while unit is operating>

Error code	Abnormal points and detection method	Cause	judgment and action
U2 (TH4: 1102) (TH33: 1132) (Refrigerant shortage: 1501)	(1) High discharge temperature Abnormal if discharge temperature thermistor (TH4) exceeds 239˚F [115°C] or 221˚F [105°C] continuously for 5 minutes. Abnormal if condenser/evaporator temperature thermistor (TH5) exceeds 104˚F [40°C] during defrosting and discharge temperature thermistor (TH4) exceeds 230˚F [110°C]. (2) High discharge superheat Abnormal if discharge superheat (Cooling: [Higher temperature of TH4 or TH33] − TH6 / Heating: [Higher temperature of TH4 or TH33] − TH5) exceeds 126˚F [70˚C] continuously for 10 minutes. (3) High comp. surface temperature Abnormal if comp. surface temperature thermistor (TH33) exceeds 239˚F [115°C] or 221˚F [105°C] continuously for 5 minutes.	① Overheated compressor operation caused by shortage of refrigerant ② Defective operation of stop valve ③ Defective thermistor ④ Defective outdoor controller board ⑤ Defective action of linear expansion valve ⑥ Clogging with foreign objects in refrigerant circuit Note: Clogging occur in the parts which become below freezing point when water enters in refrigerant circuit. ⑦ In the case of the unit does not restart: Detection temp. of thermistor (TH33) ≥ 203˚F [95˚C]	① Check intake superheat. Check leakage of refrigerant. Charge additional refrigerant. ② Check if stop valve is fully open. ③④ Turn the power off and check if U3 is displayed when the power is on again. When U3 is displayed, refer to “Judgment and action” for U3. ⑤ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS" and "10-6. HOW TO CHECK THE COMPONENTS". ⑥ After recovering refrigerant, remove water from entire refrigerant circuit under vacuum more than 1 hour.
U3 (TH4: 5104) (TH33: 5132)	**Open/short circuit of outdoor unit temperature thermistor (TH4, TH33)** Abnormal if open (37˚F [3°C] or less) or short (422˚F [217°C] or more) is detected during compressor operation. (Detection is inoperative for 10 minutes of compressor starting process and for 10 minutes after and during defrosting.) • TH4: Thermistor <Discharge pipe> • TH33: Thermistor <Comp. surface>	① Disconnection or contact failure of connectors (TH4, TH33) on the outdoor controller circuit board ② Defective thermistor ③ Defective outdoor controller circuit board	① Check connection of connector (TH4, TH33) on the outdoor controller circuit board. Check breaking of the lead wire for TH4 or TH33. Refer to "10-8. TEST POINT DIAGRAM". ② Check resistance value of TH4, TH33, or temperature by microprocessor. (Thermistor/TH4, TH33: Refer to "10-5. HOW TO CHECK THE PARTS".) (SW2 on A-Control Service Tool: Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".) ③ Replace outdoor controller board.
U4 (TH3: 5105) (TH6: 5107) (TH7: 5106) (TH8: 5110) (TH32: 5105)	**Open/short of outdoor unit thermistors (TH3, TH6, TH7, TH8 and TH32)** Abnormal if open or short is detected during compressor operation. Open detection of thermistors TH3 and TH6 is inoperative for 10 seconds to 10 minutes after compressor starting and 10 minutes after and during defrosting. Note: Check which unit has abnormality in its thermistor by switching the mode of SW2. (PAC-SK52ST) (Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".)	① Disconnection or contact failure of connectors (Outdoor controller circuit board: TH3,TH6/TH7, TH32 Outdoor power circuit board: CN3) ② Defective thermistor ③ Defective outdoor controller circuit board	① Check connection of connector (TH3,TH6/TH7, TH32) on the outdoor controller circuit board. Check connection of connector (CN3) on the outdoor power circuit board. Check breaking of the lead wire for thermistor (TH3,TH6,TH7,TH8, TH32). Refer to "10-8. TEST POINT DIAGRAM". ② Check resistance value of thermistor (TH3,TH6,TH7,TH8, TH32) or check temperature by microprocessor. (Thermistor/TH3, TH6, TH7, TH8, TH32: Refer to "10-5. HOW TO CHECK THE PARTS".) (SW2 on A-Control Service Tool: Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".) ③ Replace outdoor controller circuit board. Note: Emergency operation is available in the case of abnormalities of TH3, TH6, TH7 and TH32. Refer to "10-7. EMERGENCY OPERATION".

Thermistors		Open detection	Short detection
Symbol	Name		
TH3	Thermistor <Liquid pipe>	−58°F [−50°C] or below	194°F [90°C] or above
TH6	Thermistor <2-phase pipe>	−58°F [−50°C] or below	194°F [90°C] or above
TH7	Thermistor <Ambient>	−58°F [−50°C] or below	194°F [90°C] or above
TH8	Thermistor <Heat Sink>	−54°F [−48°C] or below	216°F [102°C] or above
TH32	Thermistor <Suction pipe>	−58°F [−50°C] or below	167°F [75°C] or above

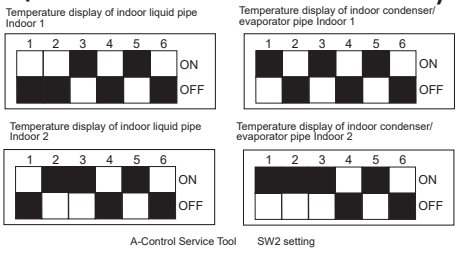
Error code	Abnormal points and detection method	Cause	judgment and action
U5 (4230)	**Temperature of heat sink** Abnormal if heat sink thermistor (TH8) detects temperature indicated 172˚F [78°C].	① The outdoor fan motor is locked.	①② Check outdoor fan.
		② Failure of outdoor fan motor	
		③ Airflow path is clogged.	③ Check airflow path for cooling.
		④ Rise of ambient temperature	④ Check if there is something which causes temperature rise around outdoor unit. (Upper limit of ambient temperature is 114˚F [46°C].) Turn off power and on again to check if U5 is displayed within 30 minutes. If U4 is displayed instead of U5, follow the action to be taken for U4.
		⑤ Defective thermistor	⑤ Check resistance value of thermistor (TH8) or temperature by microprocessor. (Thermistor/TH8: Refer to "10-5. HOW TO CHECK THE PARTS".) (SW2 on A-Control Service Tool: Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".
		⑥ Defective input circuit of outdoor power circuit board	⑥ Replace outdoor power circuit board.
		⑦ Failure of outdoor fan drive circuit	⑦ Replace outdoor controller circuit board.
U6 (4250)	**Power module** Check abnormality by driving power module if overcurrent is detected. (UF or UP error condition)	① Outdoor stop valve is closed.	① Open stop valve.
		② Decrease of power supply voltage	② Check facility of power supply.
		③ Looseness, disconnection or converse of compressor wiring connection	③ Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM" (Outdoor power circuit board).
		④ Defective compressor	④ Check compressor referring to "10-5. HOW TO CHECK THE PARTS".
		⑤ Defective outdoor power circuit board	⑤ Replace outdoor power circuit board.
U7 (1502)	**Too low superheat due to low discharge temperature** Abnormal if discharge superheat is continuously detected less than or equal to 5˚F [−15˚C] for 3 minutes even though linear expansion valve has minimum open pulse after compressor starts operating for 15 minutes.	① Disconnection or loose connection of discharge thermistor (TH4)	①②Check the installation conditions of discharge thermistor (TH4).
		② Defective holder of Discharge thermistor	
		③ Disconnection or loose connection of linear expansion valve's coil	③ Check the coil of linear expansion valve. Refer to "10-6. HOW TO CHECK THE COMPONENTS".
		④ Disconnection or loose connection of linear expansion valve's connector	④ Check the connection or contact of LEV-A and LEV-B on outdoor controller circuit board.
		⑤ Defective linear expansion valve	⑤ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS".
U8 (4400)	**Outdoor fan motor** Abnormal if the rotational frequency of fan motor is not detected during DC fan motor operation. Fan motor rotational frequency is abnormal if the following conditions are observed: • 100 rpm or below detected continuously for 15 seconds at 68˚F [20°C] or more outside air temperature. • 50 rpm or below or 1500 rpm or more detected continuously for 1 minute.	① Failure in the operation of the DC fan motor	① Failure in the operation of the DC fan motor
		② Failure in the outdoor circuit controller board	② Failure in the outdoor circuit controller board

Error code	Abnormal points and detection method		Cause	judgment and action
U9 (4220)	Detailed codes	To find out the detail history (latest) about U9 error, turn ON SW2-1, 2-2, and 2-6. Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".		
	01	**Overvoltage error** • Increase to DC bus voltage to 430 V	① Abnormal increase in power source voltage	① Check the field facility for the power supply.
			② Disconnection of compressor wiring	② Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM" (Outdoor power circuit board).
			③ Defective outdoor power circuit board	③ Replace outdoor power circuit board.
			④ Compressor has a ground fault.	④ Check compressor for electrical insulation. Replace compressor.
	02	**Undervoltage error** • Instantaneous decrease in DC bus voltage to 200 V	① Decrease in power source voltage, instantaneous stop.	① Check the field facility for the power supply.
			② Defective converter drive circuit in outdoor power circuit board	② Replace outdoor power circuit board.
			③ Defective 52C drive circuit in outdoor power circuit board	③ Replace outdoor power circuit board.
			④ Disconnection or loose connection of CN2 on the outdoor power circuit board/ controller circuit board	④ Check CN2 wiring.
			⑤ Power circuit failure on DC supply for 15 VDC output on outdoor controller circuit board	⑤ Replace outdoor controller circuit board.
	04	**Input current sensor error** • Decrease in input current through outdoor unit to 0.1 A only if operation frequency is more than or equal to 40 Hz or compressor current is more than or equal to 6 A.	① Defective input current detection circuit in outdoor power circuit board	① Replace outdoor power circuit board.
			② Defective outdoor controller circuit board	② Replace outdoor controller circuit board.
	08	**Abnormal power synchronous signal** • No input of power synchronous signal to power circuit board • Power synchronous signal of 44 Hz or less, or 65 Hz or more is detected on power circuit board.	① Distortion of power source voltage, noise superimposition	① Check the field facility for the power supply.
			② Disconnection or loose connection of ground wiring	② Check ground wiring.
			③ Disconnection or loose connection of CN2 on the outdoor power circuit board/ controller circuit board	③ Check CN2 wiring.
			④ Defective power synchronous signal in outdoor controller circuit board	④ Replace outdoor controller circuit board.
			⑤ Defective power synchronous signal circuit in outdoor power circuit board	⑤ Replace outdoor power circuit board.
	10	**PFC error (Overvoltage/ Undervoltage/Overcurrent)** • PFC detected any of the following: a) Decrease in PFC control voltage to 13 VDC or lower b) Increase in input current as 62 A peak	① Abnormal increase in power source voltage ② Decrease in power source voltage, instantaneous stop	①② Check the field facility for the power supply.
			③ Disconnection of compressor wiring	③ Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM".
			④ Misconnection of reactor (DCL)	④ Correct the wiring (U·V·W phase) or reactor (DCL).
			⑤ Defective outdoor power circuit board	⑤ Replace outdoor power circuit board.
			⑥ Defective reactor (DCL)	⑥ Replace reactor (DCL).
			⑦ Disconnection or loose connection of CN2 on the outdoor power circuit board/ controller circuit board	⑦ Check CN2 wiring.
	80	**Input voltage sensor error** a) Increase in input voltage to 290 V or higher b) Decrease in input voltage to 162 V or lower c) A short or open circuit is detected in the input voltage detection circuit	① Distortion of power source voltage, noise superimposition	① Check the field facility for the power supply.
			② Disconnection or loose connection of ground wiring	② Check ground wiring.
			③ Disconnection or loose connection of power supply wiring on the outdoor power circuit board/ controller circuit board	③ Check power supply wiring.
			④ Defective input voltage signal circuit in outdoor power circuit board judgement and action	④ Replace outdoor power circuit board.

Error code	Abnormal points and detection method	Cause	judgment and action
UF (4100)	**Compressor overcurrent interruption (When compressor is locked)** Abnormal if overcurrent of DC bus or compressor is detected within 30 seconds after compressor starts operating.	① Stop valve is closed. ② Decrease of power supply voltage ③ Looseness, disconnection or reverse of compressor wiring connection ④ Defective compressor ⑤ Defective outdoor power board ⑥ DIP switch setting for selecting model is incorrect on the outdoor power circuit board.	① Open stop valve. ② Check facility of power supply. ③ Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM".(Outdoor power circuit board). ④ Check compressor. Refer to "10-5. HOW TO CHECK THE PARTS". ⑤ Replace outdoor power circuit board. ⑥ Check that the DIP switch setting is correct on the outdoor power circuit board by referring to "Model Select" in "1) Function of switches" in "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".
UH (5300)	**Current sensor error** • It is abnormal for 44 A the input current or 10 seconds continuous 40 A or more.	① Defective circuit of current sensor on outdoor power circuit board ② Decrease of power supply voltage	① Replace outdoor power circuit board. ② Check the facility of power supply.
Ud (1504)	**Overheat protection** Abnormal if outdoor liquid pipe thermistor (TH3) detects 158˚F [70°C] or more during compressor operation.	① Defective outdoor fan (fan motor) or short cycle of outdoor unit during cooling operation ② Defective outdoor liquid pipe thermistor (TH3) ③ Defective outdoor controller board	① Check outdoor unit air passage. ②③ Turn the power off and on again to check the error code. If U4 is displayed, follow the U4 processing direction.
UL (1300)	**Low pressure** Abnormal if the following conditions are detected continuously for 3 minutes after compressor starts heating operating for 10 minutes. (1) Heating mode Detection mode 1 TH7 − TH3 ≤ 7°F [4°C] and TH5 − Indoor room temperature ≤ 4°F [2°C] Detection mode 2 TH7 − TH3 ≤ 4°F [2°C], TH5 − Indoor room temperature ≤ 7°F [4°C], and TH2 − Indoor room temperature ≤ 7°F [4°C] Detection mode 3 TH7 − TH3 ≤ 7°F [4°C], TH5 − Indoor room temperature ≤ 4°F [2°C], and TH4 − TH5 ≥ 36°F [20°C] (2) Cooling mode TH6 − TH7 ≤ 4°F [2°C], TH3 − TH7 ≤ 4°F [2°C], and Indoor room temperature - Indoor liquid pipe temperature (TH2) ≤ 9°F [5°C] Note that it applies when the compressor accumulated operating time is under 30 minutes, and 7 minutes has passed after the compressor operation. TH32 - TH4 ≥ 36°F [20°C] and TH32 > 144°F [80°C] Thermistors: TH3: Liquid pipe temperature TH33: Comp. surface temperature TH4: Discharge temperature TH5: Indoor 2-phase pipe temperature TH7: Ambient temperature Thermistor TH3: Outdoor liquid pipe temperature TH4: Discharge temperature TH5: Indoor cond./eva. temperature TH6: Outdoor 2-phase pipe temperature TH7: Outdoor ambient temperature	① Stop valve of outdoor unit is closed during operation. ② Leakage or shortage of refrigerant ③ Malfunction of linear expansion valve ④ Clogging with foreign objects in refrigerant circuit Note: If water enters in refrigerant circuit, clogging may occur where the part becomes below freezing point.	① Check stop valve. ② Check intake superheat. Check leakage of refrigerant. Check additional refrigerant. ③ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS". ④ After recovering refrigerant, remove water from entire refrigerant circuit under vacuum more than 1 hour.

Error code	Abnormal points and detection method	Cause	judgment and action
UP (4210)	**Compressor overcurrent interruption** Abnormal if overcurrent DC bus or compressor is detected after compressor starts operating for 30 seconds.	① Stop valve of outdoor unit is closed. ② Decrease of power supply voltage ③ Looseness, disconnection or reverse of compressor wiring connection ④ Defective fan of indoor/outdoor units ⑤ Short cycle of indoor/outdoor units ⑥ Defective input circuit of outdoor controller board ⑦ Defective compressor	① Open stop valve. ② Check facility of power supply. ③ Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM" (Outdoor power circuit board). ④ Check indoor/outdoor fan. ⑤ Resolve short cycle. ⑥ Replace outdoor controller circuit board. Check compressor. ⑦ Refer to "10-5. HOW TO CHECK THE PARTS". Note: Before the replacement of the outdoor controller circuit board, disconnect the wiring to compressor from the outdoor power circuit board and check the output voltage among phases, U, V, W, during test run. No defect on board if voltage among phases (U-V, V-W and W-U) is same. Make sure to perform the voltage check with same performing frequency.
E0 or E4 (6831, 6834)	**Remote controller transmission error (E0)/signal receiving error (E4)** (1) Abnormal if main or sub remote controller cannot receive any transmission normally from indoor unit of refrigerant address "0" for 3 minutes. (Error code: E0) (2) Abnormal if sub-remote controller could not receive for any signal for 2 minutes. (Error code: E0) (1) Abnormal if indoor controller board cannot receive any data normally from remote controller board or from other indoor controller boards for 3 minutes. (Error code: E4) (2) The indoor controller board cannot receive any signal from remote controller for 2 minutes. (Error code: E4)	① Contact failure at transmission wire of remote controller ② All remote controllers are set as "sub" remote controller. In this case, E0 is displayed on remote controller, and E4 is displayed at LED (LED1, LED2) on the outdoor controller circuit board. ③ Miswiring of remote controller ④ Defective transmitting receiving circuit of remote controller ⑤ Defective transmitting receiving circuit of indoor controller board of refrigerant address "0". ⑥ Noise has entered into the transmission wire of remote controller.	① Check disconnection or looseness of indoor unit or transmission wire of remote controller. ② Set one of the remote controllers "main". If there is no problem with the action above. ③ Check wiring of remote controller. • Total wiring length: max. 500 m [1640ft] (Do not use cable with 3 or more cores.) • The number of connecting indoor units: max. 16 units • The number of connecting remote controller: max. 2 units If the cause of trouble is not in above ①–③, ④ Diagnose remote controllers. a) When [OK] is displayed, remote controllers have no problem. Turn the power off, and on again to check. If abnormality occurs again, replace indoor controller board. b) When [NG] is displayed, replace remote controller. c) When [E3] or [ERC] is displayed, noise may be causing abnormality. Note: If the unit is not normal after replacing indoor controller board in group control, indoor controller board of address "0" may be abnormal.
E1 or E2 (6201, 6202)	**Remote controller control board** (1) Abnormal if data cannot be normally read from the nonvolatile memory of the remote controller control board. (Error code: E1) (2) Abnormal if the clock function of remote controller cannot be normally operated. (Error code: E2)	① Defective remote controller	① Replace remote controller.
E3 or E5 (6832, 6833)	**Remote controller transmission error (E3)/ signal receiving error (E5)** (1) Abnormal if remote controller could not find blank of transmission path for 6 seconds and could not transmit. (Error code: E3) (2) Remote controller receives and transmits data simultaneously for comparison. If different data is detected 30 times in a row, it is judged to be an error. (Error code: E3) (1) Abnormal if indoor controller board could not find blank of transmission path. (Error code: E5) (2) Indoor controller board receives and transmits data simultaneously for comparison. If different data is detected 30 times in a row, it is judged to be an error. (Error code: E5)	① 2 remote controllers are set as "main". (In the case of 2 remote controllers) ② Remote controller is connected with 2 indoor units or more. ③ Repetition of refrigerant address ④ Defective transmitting receiving circuit of remote controller ⑤ Defective transmitting receiving circuit of indoor controller board ⑥ Noise has entered into transmission wire of remote controller.	① Set a remote controller to main, and the other to sub. ② Remote controller is connected with only one indoor unit. ③ The address changes to a separate setting. ④–⑥ Diagnose remote controller. a) When [OK] is displayed, remote controllers have no problem. Turn the power off and on again to check. When becoming abnormal again, replace indoor controller board. b) When [NG] is displayed, replace remote controller. c) When [E3] or [ERC] is displayed, noise may be causing abnormality.

Error code	Abnormal points and detection method	Cause	judgment and action
E6 (6840)	**Indoor/outdoor unit communication error (Signal receiving error)** (1) Abnormal if indoor controller board could not receive any signal normally for 6 minutes after turning the power on. (2) Abnormal if indoor controller board could not receive any signal normally for 3 minutes. (3) Consider the unit as abnormal under the following conditions: When 2 or more indoor units are connected to an outdoor unit; when the indoor controller board could not receive a signal for 3 minutes from the outdoor controller circuit board; or when a signal which allows the outdoor controller circuit board to transmit signals.	① Contact failure, short circuit or miswiring (reversed wiring) of indoor/outdoor unit connecting wire ② Defective transmitting receiving circuit of outdoor controller circuit board ③ Defective transmitting receiving circuit of indoor controller board Noise has entered into indoor/outdoor unit connecting wire. ④ High pressure (High pressure switch 63H operated) ⑤ High compressor temperature (Thermal protector TRS operated) ⑥ Defective fan motor ⑦ Defective rush current resistor of outdoor power circuit board	Note: Check LED display on outdoor controller circuit board. (Connect A-Control service tool (PAC-SK52ST)) Refer to EA–EC item if LED displays EA–AC. ① Check disconnecting or looseness of indoor/outdoor unit connecting wire of indoor unit or outdoor unit. Check all the units for twin indoor unit system. ②–⑤ Turn the power off, wait 10 minutes and on again to check. If abnormality occurs again, replace indoor controller board or outdoor controller circuit board. ⑥ Turn the power off, and detach fan motor from connector (CNF1). Then turn the power on again. If abnormality is not displayed, replace fan motor. If abnormality is displayed, replace outdoor controller circuit board. ⑦ Check RS1 on outdoor noise filter board with multimeter. If open is detected, replace the board. Note: Other indoor controller boards may have defect for twin indoor unit system.
E7 (6842)	**Indoor/outdoor unit communication error (Transmitting error)** Abnormal if “1” receiving is detected 30 times continuously though indoor controller board has transmitted “0”.	① Defective transmitting receiving circuit of indoor controller board ② Noise has entered into power supply. ③ Noise has entered into outdoor control wire.	①–③ Turn the power off, and on again to check. Replace indoor controller board or outdoor controller circuit board if abnormality is displayed again.
E8 (6840)	**Indoor/outdoor unit communication error (Signal receiving error) (Outdoor unit)** (1) Abnormal if outdoor controller circuit board could not receive anything normally for 3 minutes.	① Contact failure of indoor/outdoor unit connecting wire ② Defective communication circuit of outdoor controller circuit board ③ Defective communication circuit of indoor controller board ④ Noise has entered into indoor/outdoor unit connecting wire.	① Check disconnection or looseness of indoor/outdoor unit connecting wire of indoor or outdoor units. ②–④ Turn the power off and on again to check. Replace indoor controller board or outdoor controller circuit board if abnormality is displayed again.
E9 (6841)	**Indoor/outdoor unit communication error (Transmitting error) (Outdoor unit)** (1) Abnormal if “0” receiving is detected 30 times continuously though outdoor controller circuit board has transmitted “1”. (2) Abnormal if outdoor controller circuit board could not find blank of transmission path for 3 minutes.	① Indoor/outdoor unit connecting wire has contact failure. ② Defective communication circuit of outdoor controller circuit board ③ Noise has entered power supply. ④ Noise has entered indoor/outdoor unit connecting wire.	① Check disconnection or looseness of indoor/outdoor unit connecting wire. ②–④ Turn the power off and on again to check. Replace outdoor controller circuit board if abnormality is displayed again.
EF	**Non defined error code** This code is displayed when non defined error code is received.	① Noise has entered transmission wire of remote controller. ② Noise has entered indoor/outdoor unit connecting wire. ③ Outdoor unit is not a power inverter models.	①② Turn the power off and on again to check. Replace indoor controller board or outdoor controller circuit board if abnormality is displayed again. ③ Replace outdoor unit with power-inverter type outdoor unit.
EE (7130)	Abnormal if a connection of indoor unit and outdoor unit using different refrigerant is detected.	① Unauthorized connection of indoor unit and outdoor unit The following combinations are not authorized; • Outdoor unit: Models with R454B refrigerant • Indoor unit: Models with R410A refrigerant	① Alter the connection referring to the combination as shown in the “Cause” column.

Error code	Abnormal points and detection method	Cause	judgment and action
Ed (0403)	**Serial communication error** (1) Abnormal if serial communication between outdoor controller circuit board and outdoor power circuit board is defective.	① Breaking of wire or contact failure of connector CN2 between the outdoor controller circuit board and the outdoor power circuit board ② Breaking of wire or contact failure of connector CN4 between the outdoor controller circuit board and the outdoor power circuit board ③ Defective communication circuit of outdoor power circuit board ④ Defective communication circuit of outdoor controller circuit board for outdoor power circuit board	①② Check connection of each connector CN2 and CN4 between the outdoor controller circuit board and the outdoor power circuit board. ③ Replace outdoor power circuit board. ④ Replace outdoor controller circuit board.
	(2) Abnormal if communication between outdoor controller circuit board and M-NET board is not available.	① Breaking of wire or contact failure of connector between outdoor controller circuit board and M-NET board ② Contact failure of M-NET board power supply line ③ Noise has entered into M-NET transmission wire	① Check disconnection, looseness, or breaking of connection wire between outdoor controller circuit board (CNMNT) and M-NET board (CN5). ② Check disconnection, looseness, or breaking of connection wire between outdoor controller circuit board (CNVMNT) and M-NET board (CND). ③ Check M-NET transmission wiring method.
P8	**Pipe temperature** <Cooling mode> Detected as abnormal when the pipe temperature is not in the cooling range 3 minutes after compressor start and 6 minutes after the liquid or condenser/evaporator pipe is out of cooling range. Note 1: It takes at least 9 minutes to detect. Note 2: Abnormality P8 is not detected in dry mode. Cooling range: Indoor pipe temperature (TH2 or TH5) − intake temperature (TH1) ≤ −5.4˚F [−3°C] TH: Lower temperature between liquid pipe temperature and condenser/evaporator temperature <Heating mode> When 10 seconds have passed after the compressor starts operation and the hot adjustment mode has finished, the unit is detected as abnormal when condenser/evaporator pipe temperature is not in heating range within 20 minutes. Note 3: It takes at least 27 minutes to detect abnormality. Note 4: It excludes the period of defrosting (Detection restarts when defrosting mode is over.) Heating range: 5.4˚F [3°C] ≤ (Condenser/evaporator temperature (TH5) − intake temperature (TH1))	① Slight temperature difference between indoor room temperature and pipe <liquid or condenser/evaporator> temperature thermistor • Shortage of refrigerant • Disconnected holder of pipe <liquid or condenser/evaporator> thermistor • Defective refrigerant circuit ② Reversed connection of extension pipe (on plural units connection) ③ Reversed wiring of indoor/outdoor unit connecting wire (on plural units connection) ④ Defective detection of indoor room temperature and pipe <condenser/evaporator> temperature thermistor ⑤ Stop valve is not opened completely.	①–④ Check pipe <liquid or condenser/evaporator> temperature with room temperature display on remote controller and outdoor controller circuit board. Pipe <liquid or condenser/evaporator> temperature display is indicated by setting SW2 of outdoor controller circuit board as follows. (Conduct temperature check with outdoor controller circuit board after connecting 'A-Control Service Tool (PAC-SK52ST)'.)  ②③Check reversed connection of extension pipe or reversed wiring of indoor/outdoor unit connecting wire.
PL	**Abnormal refrigerant circuit** During Cooling, Dry, or Auto Cooling operation, the following conditions are regarded as failures when they are detected for 1 second. a)The compressor continues to run for 30 or more seconds. b)The liquid pipe temperature or the condenser/evaporator temperature is 167˚F [75°C] or more. **<u>These detected errors will not be cancelled until the power source is reset.</u>**	① Abnormal operation of 4-way valve ② Disconnection of or leakage in refrigerant pipes ③ Air into refrigerant piping ④ Abnormal operation (no rotation) of indoor fan · Defective fan motor. · Defective indoor control board. ⑤ Defective refrigerant circuit (clogging)	① **<u>When this error occurs, be sure to replace the 4-way valve.</u>** ② Check refrigerant pipes for disconnection or leakage. ③ After the recovery of refrigerant, vacuum dry the whole refrigerant circuit. ④ Refer to "10-5. HOW TO CHECK THE PARTS". ⑤ Check refrigerant circuit for operation. **<u>To avoid entry of moisture or air into refrigerant circuit which could cause abnormal high pressure, purge air in refrigerant circuit or replace refrigerant.</u>**
FH	**Refrigerant sensor error** Abnormal if refrigerant sensor cannot detect errors normally.	① The refrigerant sensor mounted on the indoor unit does not work. ② The refrigerant sensor is not connected properly or the wire is broken.	①② Turn the power off, check the connection of some parts such as connectors and turn the power on again. When the error has not been cleared, replace the refrigerant sensor.

FL	**Refrigerant leakage** Abnormal if the refrigerant leakage detected by a refrigerant sensor.	① Refrigerant leaks from the piping or the heat exchanger in the indoor unit. ② The following items are used around the indoor unit. • Spray (LP gas including Freon, and whose main ingredient is propane and butane) • Aerosol insecticide (including ethanol) • Air spray painting (including dichloromethane) • Charcoal (charcoal fire) • Chemicals (such as ethanol) ③ Refrigerant leaks from piping or heat exchangers, or sensor errors in the indoor units in other rooms.	• Turn off the power after FAN operation is finished. (FAN operation continues for 8 hours.) • Check the indoor unit to detect the part where the refrigerant leaks. • Repair the part where refrigerant leaks. • Turn on the power again. • Replace the refrigerant sensor if the problem is not fixed.

<M-NET communication error>

Note: “Indoor unit” in the text indicates M-NET board in outdoor unit.

Error code	Abnormal points and detection method	Cause	judgment and action
A0 (6600)	**Address duplicate definition** This error is displayed when transmission from the units of same address is detected. Note: The address and attribute displayed at remote controller indicate the controller that detected abnormality.	① There are 2 or more same address of controller of outdoor unit, indoor unit, FRESH MASTER, or LOSSNAY. ② Noise has entered into transmission signal and signal was transformed.	Search the unit with same address as abnormality is detected. If the same address is found, turn off the power supply of outdoor unit and indoor unit and FRESH MASTER or LOSSNAY at the same time for 2 minutes or more after the address is corrected, and turn the power on again. Check transmission waveform or noise on transmission wire.
A2 (6602)	**Hardware error of transmission processor** Transmission processor intended to transmit “0”, but “1” appeared on transmission wire. Note: The address and attribute display at remote controller indicate the controller that detected abnormality.	① Error is detected if waveform is transformed when wiring works of transmission wire of outdoor unit, indoor unit, FRESH MASTER, or LOSSNAY are done, or polarity is changed with the power on and transmission data collide each other. ② Defective transmitting receiving circuit of transmission processor ③ Transmission data is changed by the noise on transmission.	① If the works of transmission wire is done with the power on, turn off the power supply of outdoor unit, indoor unit, FRESH MASTER or LOSSNAY at the same time for 2 minutes or more, and turn the power on again. ② Check transmission waveform or noise on transmission wire.
A3 (6603)	**BUS BUSY** (1) Overtime error by collision damage Abnormal if transmitting signal is not possible for 8–10 minutes continuously because of collision of transmission. (2) Data could not reach transmission wire for 8–10 minutes continuously because of noise, etc. Note: The address and attribute displayed at remote controller indicate the controller that detected abnormality.	① Transmission processor could not transmit signal because short cycle voltage of noise and the like have entered into transmission wire continuously. ② Transmission quantity has increased and transmission is not possible because there was wiring mistake of terminal block for transmission wire (TB3) and terminal block for central control (TB7) in outdoor unit. ③ Mixed transmissions due to failure of outdoor unit repeater, which is a function to connect or disconnect transmission of control and central control system, increases occupation rate on transmission wire, detecting an error.	① Check if transmission wire of indoor unit, FRESH MASTER, LOSSNAY, or remote controller is not connected to terminal block for central control (TB7) of outdoor unit. ② Check if transmission wire of indoor unit, FRESH MASTER, or LOSSNAY is not connected to terminal block for transmission wire of outdoor unit. ③ Check if terminal block for transmission wire (TB3) and terminal block for central control (TB7) are not connected. ④ Check transmission waveform or noise on transmission wire.
A6 (6606)	**Communication error with communication processor** Defective communication between unit processor and transmission processor Note: The address and attribute display at remote controller indicate the controller that detected abnormality.	① Data of transmission processor or unit processor is not transmitted normally because of accidental trouble such as noise or lightning surge. ② Address forwarding from unit processor is not transmitted normally because of defective transmission processor hardware.	Turn off the power supply of outdoor unit, indoor unit, FRESH MASTER, and LOSSNAY at the same time for 2 minutes or more, and turn the power on again. System returns to normal if abnormality was accidental malfunction. If the same abnormality occurs again, abnormality-occurred controller may be defective.

Error code	Abnormal points and detection method	Cause	judgment and action
A7 (6607)	**NO ACK signal** (1) Transmitting side controller detects abnormal if a message was transmitted but there is no reply (ACK) that a message was received. Transmitting side detects abnormality every 30 seconds, 6 times continuously. Note: The address and attribute displayed at remote controller is indicate the controller that did not reply (ACK).	Common factors that have no relation with abnormality source. ① The unit of former address does not exist as address switch has changed while the unit was energized. ② Voltage drop and weak signal causing communication error, are caused by over-range transmission wire. • Maximum distance ····· 656 ft [200 m] • Remote controller line·· 39 ft [12 m] ③ Voltage drop and weak signal causing communication error are caused by type-unmatched transmission wire. Type····· With shield wire- CVVS, CPEVS With normal wire (no shield)- VCTF, VCTFK, CVV CVS, VVR, VVF, VCT Diameter ··· 1.25 mm² [AWG16] or more ④ Voltage drop and weak signal causing communication error are caused by over-numbered units. ⑤ Accidental malfunction of abnormality-detected controller (noise, lightning surge) ⑥ Defective of abnormality occurred controller	**Always try the following when the error "A7" occurs.** ① Turn off the power supply of outdoor unit, indoor unit, FRESH MASTER, and LOSSNAY at the same time for 2 minutes or more, and turn the power on again. If malfunction was accidental, the unit returns to normal. ② Check address switch of abnormality occurred address. ③ Check disconnection or looseness of abnormality occurred or abnormality detected transmission wire (terminal block and connector) ④ Check if tolerance range of transmission wire is not exceeded. ⑤ Check if type of transmission wire is correct or not. If the cause of trouble is causing in ①–⑤ above, repair the defective, then turn off the power supply of outdoor unit, indoor unit, FRESH MASTER, and LOSSNAY at the same time for 2 minutes or more, and turn the power on again. • If the cause of trouble is not described in ①–⑤ above, in single refrigerant system (one outdoor unit), controller of displayed address or attribute is defective. • If the cause of trouble is not in ①–⑤ above in different refrigerant system (2 or more outdoor units), judge with ⑥. ⑥ If address of abnormality source is the address that should not exist, there is the unit that memorizes nonexistent address information. Delete unused address information with manual setting function of remote controller. Only the system FRESH MASTER or LOSSNAY are connected to, or the system that is equipped with group setting of different refrigerant system. If the cause of trouble is not included any of ①–⑥ above, replace the controller board of displayed address or attribute. If the unit does not return to normal, multi controller board of outdoor unit may be defective (repeater circuit). Replace multi-controller board one by one to check if the unit returns to normal.
	(2) If displayed address or attribute is outdoor unit, Indoor unit detects abnormality when indoor unit transmitted to outdoor unit and there was no reply (ACK).	① Contact failure of transmission wire of outdoor unit or indoor unit ② Disconnection of transmission connector (CN2M) of outdoor unit ③ Defective transmitting receiving circuit of outdoor unit or indoor unit	
	(3) If displayed address or attribute is indoor unit, remote controller detects abnormality when remote controller transmitted to indoor unit and there was no reply (ACK).	① During group operation with indoor unit of multi-refrigerant system, if remote controller transmit to indoor unit while outdoor unit power supply of one refrigerant system is turned off or within 2 minutes of restart, abnormality is detected. ② Contact failure of transmission wire of remote controller or indoor unit ③ Disconnection of transmission connector (CN2M) of indoor unit ④ Defective transmitting receiving circuit of indoor unit or remote controller	

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From the previous page.

Error code	Abnormal points and detection method	Cause	judgment and action
A7 (6607)	(4) If displayed address or attribute is remote controller, indoor unit detects abnormality when indoor unit transmitted to remote controller and there was no reply (ACK).	① During group operation with indoor unit of multi- refrigerant system, if indoor unit transmit to remote controller while outdoor unit power supply of one refrigerant system is turned off or within 2 minutes of restart, abnormality is detected. ② Contact failure of transmission wire of remote controller or indoor unit ③ Disconnection of transmission connector (CN2M) of indoor unit ④ Defective transmitting receiving circuit of indoor unit or remote controller	
	(5) If displayed address or attribute is FRESH MASTER, indoor unit detects abnormality when indoor unit transmitted to FRESH MASTER and there was no reply (ACK).	① During sequential operation of indoor unit and FRESH MASTER of other refrigerant system, if indoor unit transmits to FRESH MASTER while outdoor unit power supply of same refrigerant system with FRESH MASTER is turned off or within 2 minutes of restart, abnormality is detected. ② Contact failure of transmission wire of indoor unit or FRESH MASTER ③ Disconnection of transmission connector (CN2M) of indoor unit or FRESH MASTER ④ Defective transmitting receiving circuit of indoor unit or FRESH MASTER	**Same as mentioned in "A7" of the previous page.**
	(6) If displayed address or attribute is LOSSNAY. Indoor unit detects abnormality when indoor unit transmitted to LOSSNAY and there was no reply (ACK).	① If the power supply of LOSSNAY is turned off, indoor unit detects abnormality when it transmits to LOSSNAY. ② During sequential operation of indoor unit and LOSSNAY of other refrigerant system, if indoor unit transmits to LOSSNAY while outdoor unit power supply of same refrigerant system with LOSSNAY is turned off or within 2 minutes of restart, abnormality is detected. ③ Contact failure of transmission wire of indoor unit of LOSSNAY ④ Disconnection of transmission connector (CN2M) of indoor unit ⑤ Defective transmitting receiving circuit of indoor unit or LOSSNAY	
	(7) If displayed address or attribute is nonexistent.	① The unit of former address does not exist as address switch has changed while the unit was energized. ② Abnormality is detected when indoor unit transmitted because the address of FRESH MASTER and LOSSNAY are changed after sequential operation of FRESH MASTER and LOSSNAY by remote controller.	

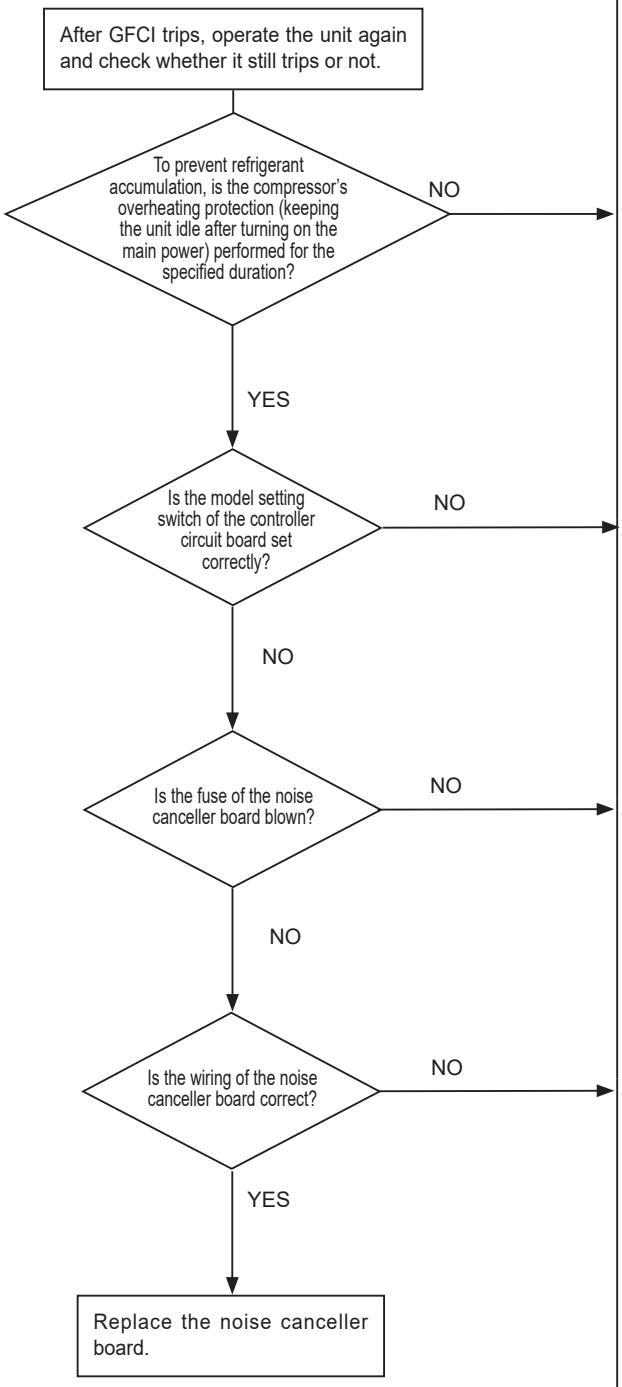
Error code	Abnormal points and detection method	Cause	judgment and action
A8 (6608)	**M-NET NO RESPONSE** Abnormal if a message was transmitted and there were reply (ACK) that message was received, but response command does not return. Transmitting side detects abnormality every 30 seconds, 6 times continuously. Note: The address and attribute displayed at remote controller indicate the controller that did not reply (ACK).	① Transmitting condition is repeated fault because of noise and the like. ② Extension of transmission wire voltage and signal is caused by over-range transmission wire. • Maximum distance ····· 656 ft [200 m] • Remote controller line ···39 ft [12 m] ③ Extension of transmission wire voltage and signal is caused by type-unmatched transmission wire. Type····· With shield wire- CVVS, CPEVS With normal wire (no shield)- VCTF, VCTFK, CVV CVS, VVR, VVF, VCT Diameter···1.25 mm^2 [AWG16] or more ④ Accidental malfunction of abnormality-occurred controller	① Check transmission waveform or noise on transmission wire. ② Turn off the power supply of the outdoor unit, indoor unit, FRESH MASTER, and LOSSNAY at the same time for 2 minutes or more, and turn the power on again. If malfunction was accidental, the unit returns to normal. If the same abnormality occurs again, controller of displayed address and attribute may be defective.

10-4. TROUBLESHOOTING OF PROBLEMS

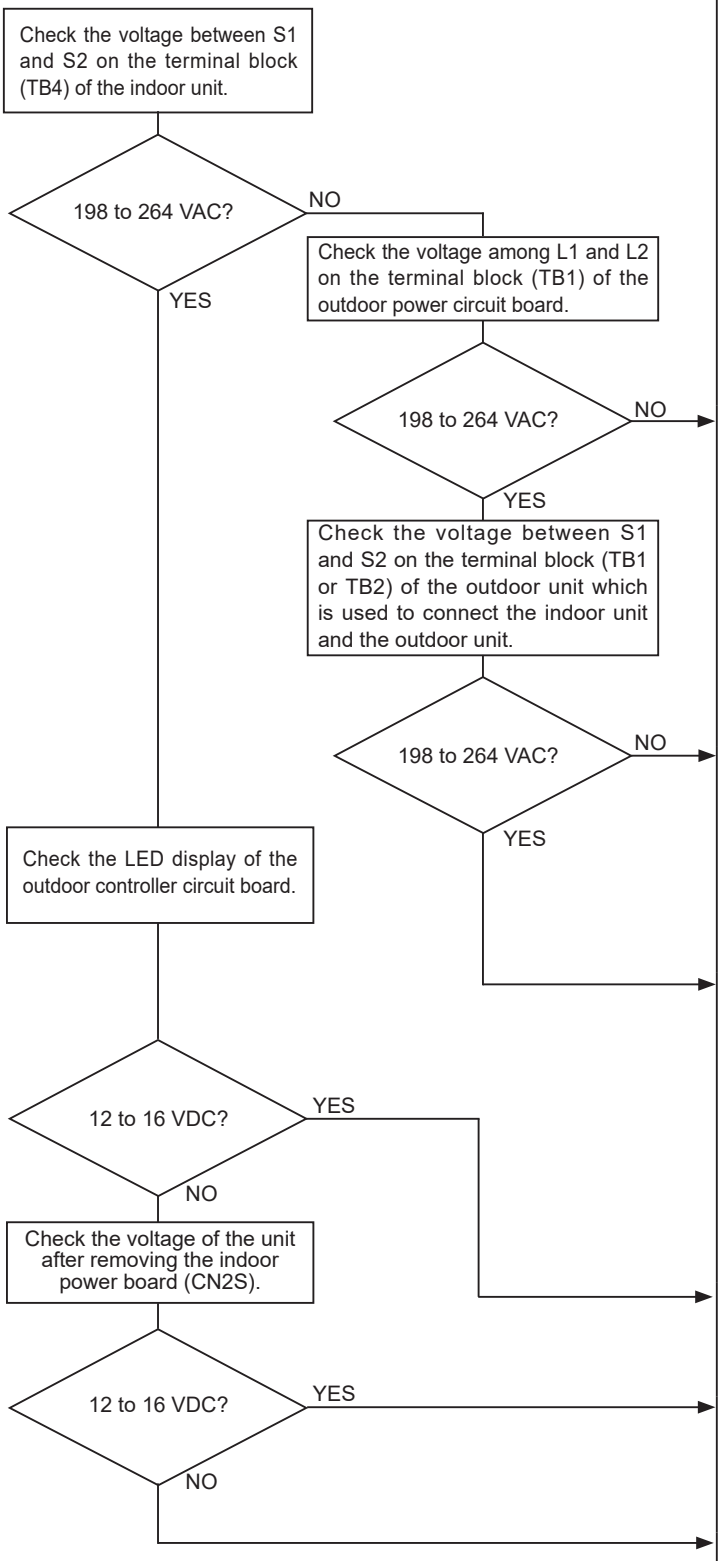
Phenomena	Factor	Countermeasure
(1) Remote controller display does not work.	① 12 VDC is not supplied to remote controller. (Power supply display ⦿ is not indicated on LCD.)	①Check LED2 on indoor controller board. (1) When LED2 is lit, check the remote controller wiring for breaking or contact failure. (2) When LED2 is blinking, check short circuit of remote controller wiring. (3) When LED2 is not lit, refer to phenomena No.3 below.
	② 12–15 VDC is supplied to remote controller, however, no display is indicated. • [Please Wait] is not displayed. • [Please Wait] is displayed.	② Check the following. • Failure of remote controller if [Please Wait] is not displayed • Refer to phenomena No.2 below if [Please Wait] is displayed.
(2) [Please Wait] display is remained on the remote controller.	① At longest 2 minutes after the power supply [Please wait] is displayed to start up.	① Normal operation
	② Communication error between the remote controller and indoor unit	② Self-diagnosis of remote controller
	③ Communication error between the indoor and outdoor unit	③ [Please wait] is displayed for 6 minutes at most in the case of indoor/outdoor unit communication error. Check LED3 on indoor controller board. (1) When LED3 is not blinking, check indoor/outdoor connecting wire for miswiring. (Reversed wiring of S1 and S2, or break of S3 wiring.) (2) When LED3 is blinking, indoor/outdoor connecting wire is normal.
	④ Outdoor unit protection device connector is open.	④ Check LED display on outdoor controller circuit board. Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS". Check protection device connector (63H and TRS) for contact failure. Refer to "10-8. TEST POINT DIAGRAM".
(3) When pressing the remote controller operation switch the OPERATION display is appeared but it will be turned off soon.	① After cancelling to select function from the remote controller, the remote controller operation switch will not be accepted for approx. 30 seconds.	① Normal operation
(4) Even controlling by the IR wireless remote controller no beep is heard and the unit does not start operating. Operation display is indicated on IR wireless remote controller.	① The pair number settings of the IR wireless remote controller and indoor controller board are mismatched.	① Check the pair number settings.

Phenomena	Factor	Countermeasure
(5) When operating by the IR wireless remote controller, beep sound is heard, however, unit does not start operating.	① No operation for 2 minutes at most after the power supply ON.	① Normal operation
	② Hand-held remote controller operation is prohibited. • Remote controlling adaptor is connected to CN32 on the indoor controller board. • Hand-held remote controller operation is prohibited by centralized controller etc. since it is connected to MELANS.	② Normal operation
	③ Refer to factor of phenomena No.2.	③ Check the details of phenomena No.2.
(6) Remote controller display works normally and the unit performs cooling operation, however, the capacity cannot be fully obtained. (The air does not cool well.)	① Refrigerant shortage	① If refrigerant leaks, discharging temperature rises and LEV opening increases. Inspect leakage by checking the temperature and opening. Check pipe connections for gas leakage.
	② Filter clogging	② Open intake grille and check the filter. Clean the filter by removing dirt or dust on it.
	③ Heat exchanger clogging	③ If the filter is clogged, indoor pipe temperature rises and discharging pressure increases. Check if heat exchanger is clogged by inspecting discharging pressure. Clean the heat exchanger.
	④ Air duct short cycle	④ Remove the blockage.
(7) Remote controller display works normally and the unit performs heating operation, however, the capacity cannot be fully obtained.	① Linear expansion valve fault Opening cannot be adjusted well due to linear expansion valve fault.	① Discharging temperature and indoor heat exchanger temperature does not rise. Inspect the failure by checking discharging pressure. Replace linear expansion valve.
	② Refrigerant shortage	② If refrigerant leaks, discharging temperature rises and LEV opening increases. Inspect leakage by checking the temperature and opening. Check pipe connections for gas leakage.
	③ Lack of insulation for refrigerant piping	③ Check the insulation.
	④ Filter clogging	④ Open intake grill and check the filter. Clean the filter by removing dirt or dust on it.
	⑤ Heat exchanger clogging	⑤ If the filter is clogged, indoor pipe temperature rises and discharging pressure increases. Check if heat exchanger is clogged by inspecting discharging pressure. Clean the heat exchanger.
	⑥ Air duct short cycle	⑥ Remove the blockage.
	⑦ Bypass circuit of outdoor unit fault	⑦ Check refrigerant system during operation.
(8) ① For 3 minutes after temperature adjuster turns off, the compressor will not start operating even if temperature adjuster is turned on. ② For 3 minutes after temperature adjuster turns on, the compressor will not stop operating even if temperature adjuster is turned off. (Compressor stops operating immediately when turning off by the remote controller.)	①② Normal operation (For protection of compressor)	①② Normal operation

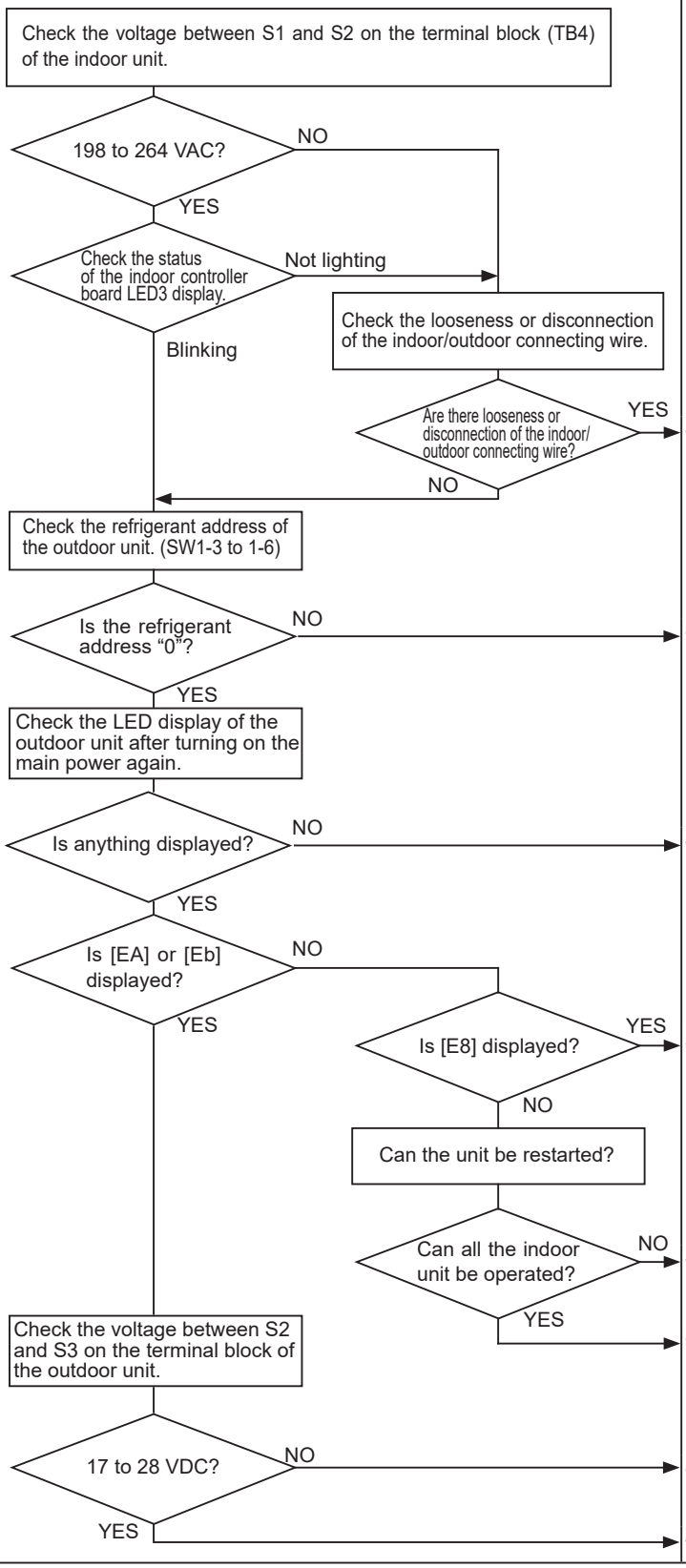
Symptoms: GFCI (Ground-Fault Circuit Interrupter) trips.

Diagnosis flow	Cause	Inspection method and troubleshooting
	• Refrigerant is accumulated. • Model setting is wrong. • Fuse is blown. • Miswiring of the noise canceller board	• Perform the compressor's overheating protection for the specified duration. • Correct the model setting switch. • Replace the fuse. • Route the wire as shown in the electrical wiring diagram.

Symptoms: Nothing is displayed on the remote controller. ①	LED display of the indoor controller board LED1: ○ LED2: ○ LED3: ○

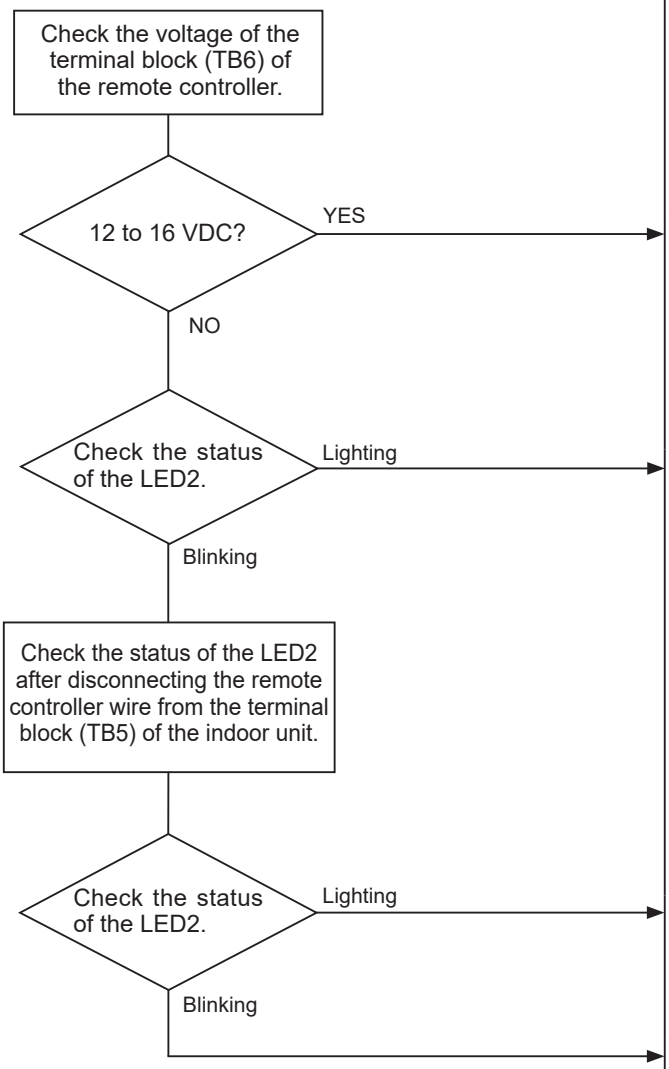
Diagnosis flow	Cause	Inspection method and troubleshooting
	• Troubles concerning power supply • Bad wiring of the outdoor controller board • The fuses on the outdoor controller circuit board are blown. • Bad wiring of the outdoor controller board • The fuses on the outdoor controller circuit board are blown • Defective indoor controller board • Miswiring, breaking or poor connection of indoor/outdoor connecting wire • Defective indoor power board	• Check the power wiring to the outdoor unit. • Check the breaker. • Check the wiring of the outdoor unit. • Check if the wiring is bad. Check if the fuses are blown. The fuses on the outdoor controller circuit board will be blown when the indoor/outdoor connecting wire short-circuits. • Check if miswiring, breaking or poor contact is causing this problem. The indoor/outdoor connecting wire is polarized 3-core type. Connect the indoor unit and the outdoor unit by wiring each pair of S1, S2 and S3 on the both side of indoor/outdoor terminal blocks. • Replace the indoor controller board. • Check if there is miswiring or breaking of wire. • Replace the indoor power board.

Symptoms: Nothing is displayed on the remote controller. ②	LED display of the indoor controller board LED1: ☀ LED2: ○ LED3: ○ or ◐



Diagnosis flow	Cause	Inspection method and troubleshooting
Are there looseness or disconnection of the indoor/ outdoor connecting wire? YES	• Breaking or poor contact of the indoor/ outdoor connecting wire	• Fix the breaking or poor contact of the indoor/outdoor connecting wire.
Is the refrigerant address "0"? NO	• Normal Only the unit which has the refrigerant address "0" supplies power to the remote controller.	• Set the refrigerant address to "0". In the case of the multiple grouping system, recheck the refrigerant address again.
Is anything displayed? NO	• Defective outdoor controller circuit board	• Replace the outdoor controller circuit board.
Is [E8] displayed? YES	• Defective outdoor controller circuit board	• Replace the outdoor controller circuit board.
Can all the indoor unit be operated? NO	• Defective indoor controller board	• Replace the indoor controller board of the indoor unit which does not operate.
YES	• Influence of electromagnetic noise	• Not abnormal. There may be the influence of electromagnetic noise. Check the transmission wire and get rid of the causes.
17 to 28 VDC? NO	• Defective outdoor power circuit board	• Replace the outdoor power circuit board.
YES	• Defective indoor power board	• Replace the indoor power board.

Symptoms: Nothing is displayed on the remote controller. ③	LED display of the indoor controller board LED1: ☀ LED2: ◐ or ☀ LED3: —

Diagnosis flow	Cause	Inspection method and troubleshooting
	• Defective remote controller • Breaking or poor contact of the remote controller wire • The remote controller wire short-circuits • Defective indoor controller board	• Replace the remote controller. • Check if there is breaking or poor contact of the remote controller wire. Check the voltage of the terminal block (TB5) connecting the remote controller wire. If it is not between 10 and 16 VDC, the indoor controller board must be defective. • Check if the remote controller wire is short-circuited. • Replace the indoor controller board.

• Before repair

Frequently Asked Questions

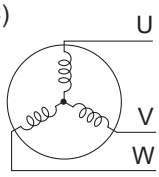
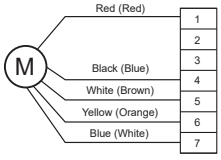
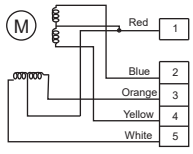
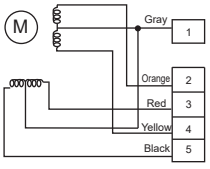
Questions from customers		Answers	Note
Unit does not operate at all.	1 The operating display of remote controller does not come on.	1 Check if power is supplied to air conditioner. Nothing appears on the display unless power is supplied.	
	2 Unit cannot be restarted for a while after it is stopped.	2 Wait around 3 minutes to restart unit. The air conditioner is in a state of being protected by the microprocessor's directive. Once the compressor is stopped, the unit cannot be restarted for 3 minutes. This control is also applied when the unit is turned on and off by remote controller or thermostat.	
	3 Error code appears and blinks on the display of remote controller.	3 Error code will be displayed if any protection devices of the air conditioner are actuated. What is error code?	Refer to "SELF-DIAGNOSIS ACTION TABLE". Check if servicing is required for the error.
Remote controller	1 [Please Wait] is displayed on the screen.	1 Wait around 2 minutes. An automatic startup test will be conducted for 2 minutes when power is supplied to the air conditioner. [Please Wait] will be kept displayed while that time.	
	2 [▦] is displayed on the screen.	2 This indicates that it is time to clean the air filters. Clean the air filters. [▦] can be cleared from the filter information of the maintenance menu. See the operation manual that came with the product for how to clean the filters.	Display time of [▦] depends on the model. Long life filter: 2500 hrs. Standard filter: 100 hrs.
	3 [Heat Standby] is displayed on the screen.	3 This is displayed when the unit starts HEAT operation, when the thermostat puts the compressor in operation mode, or when the outdoor unit ends DEFROST operation and returns to HEAT operation. The display will automatically disappear around 10 minutes later. While [Heat Standby] is displayed on the remote controller, the airflow amount will be restricted because the indoor unit's heat exchanger is not fully heated up. In addition, the up/down vane will be automatically set to horizontal blow in order to prevent cold air from directly blowing out to human body. The up/down vane will return to the setting specified by the remote controller when [Heat Standby] is released.	
	4 [Heat Defrost] is displayed on the screen. (No air comes out of the unit.)	4 The outdoor unit gets frosted when the outside temperature is low and the humidity is high. [Heat Defrost] indicates the DEFROST operation is being performed to melt this frost. The DEFROST operation ends in around 10 minutes (at most 15 minutes). During the DEFROST operation, the indoor unit's heat exchanger becomes cold, so the blower is stopped. The up/down vane will be automatically set to horizontal blow in order to prevent cold air from directly blowing out to human body. The display will turn into [Heat Standby] when DEFROST operation ends.	

Questions from customers		Answers	Note
The room cannot be cooled or heated sufficiently.		1 Check the set temperature of remote controller. The outdoor unit cannot be operated if the set temperature is not appropriate. The outdoor unit operates in the following modes. COOL: When the set temperature is lower than the room temperature. HEAT: When the set temperature is higher than the room temperature.	
		2 Check if filters are not dirty and clogged. If filters are clogged, the airflow amount will be reduced and the unit capacity will be lowered. See the instruction manual that came with the product for how to clean the filters.	
		3 Check there is enough space around the air conditioner. If there are any obstacles in the air intake or air outlet of indoor/outdoor units, they block the airflow direction so that the unit capacity will be lowered.	
Sound comes out from the air conditioner.	1 A gas escaping sound is heard sometimes.	1 This is not a malfunction. This is the sound when the flow of refrigerant in the air conditioner is switched.	
	2 A cracking sound is heard sometimes.	2 This is not a malfunction. This is the sound when internal parts of units expand or contract when the temperature changes.	
	3 A buzzing sound is heard sometimes.	3 This is not a malfunction. This is the sound when the outdoor unit starts operating.	
	4 A ticking sound is heard from the outdoor unit sometimes.	4 This is not a malfunction. This is the sound when the fan of the outdoor unit is controlling the airflow amount in order to keep the optimum operating condition.	
	5 A sound similar to water flowing is heard from the unit.	5 This is not a malfunction. This is the sound when the refrigerant is flowing inside the indoor unit.	
Something is wrong with the blower.	1 The fan speed does not match the setting of the remote controller during DRY operation. (No air comes out sometimes during DRY operation.)	1 This is not a malfunction. During the DRY operation, the blower's ON/OFF is controlled by the microprocessor to prevent overcooling and to ensure efficient dehumidification. The fan speed cannot be set by the remote controller during DRY operation.	
	2 The fan speed does not match the setting of the remote controller in HEAT operation.	2 This is not a malfunction. 1) When HEAT operation starts, to prevent the unit from blowing cold air, the fan speed is gradually increased from 0 to the set speed, in proportion to the temperature rise of the discharged air. 2) When the room temperature reaches the set temperature and the outdoor unit stops, the unit starts the LOW AIR operation. 3) During HEAT operation, the DEFROST operation is performed to defrost the outdoor unit. During the DEFROST operation, the fan is stopped to prevent cold air coming out of the indoor unit.	The up/down vane will be automatically set to horizontal blow in these cases listed up on the left <1)–3)>. After a while, the up/down vane will be automatically moved according to the setting of the remote controller.

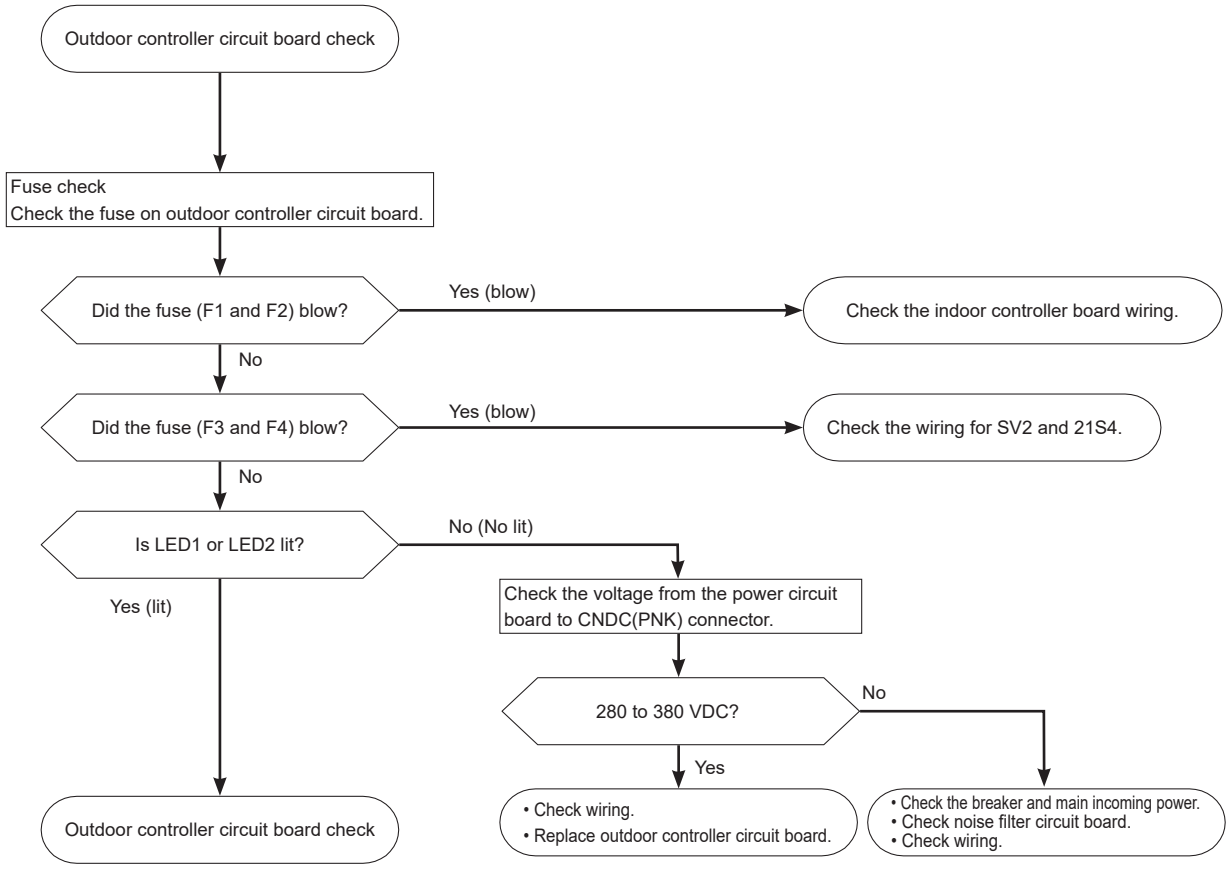
Questions from customers		Answers	Note
Something is wrong with the blower.	3 Air blows out for a while after HEAT operation is stopped.	3 This is not a malfunction. The blower is operating just for cooling down the heated-up air conditioner. This will be done within 1 minute. This control is conducted only when HEAT operation is stopped with the electric heater ON.	However, this control is also applied to the models which has no electric heater.
Something is wrong with the airflow direction.	1 The airflow direction is changed during COOL operation.	1 If the up/down vane is set to downward in COOL operation, it will be automatically set to horizontal blow by the microprocessor in order to prevent water from dropping down. [1h] will be displayed on the remote controller if the up/down vane is set to downward with the fan speed set to be less than [LOW].	
	2 The airflow direction is changed during HEAT operation. (The airflow direction cannot be set by remote controller.)	2 In HEAT operation, the up/down vane is automatically controlled according to the temperature of the indoor unit's heat exchange . In the following cases written below, the up/down vane will be set to horizontal blow, and the setting cannot be changed by remote controller. 1) At the beginning of HEAT operation 2) While the outdoor unit is being stopped by thermostat or when the outdoor unit gets started to operate. 3) During DEFROST operation The airflow direction will be back to the setting of remote controller when the above situations are released.	[Heat Standby] will be displayed on the remote controller in the case of 1) and 2). [Heat Defrost] will be displayed on the screen in the case of 3).
	3 The airflow direction does not change. (Up/down vane, left/ right louver)	3 1) Check if the vane is set to a fixed position. (Check if the vane motor connector is removed.) 2) Check if the air conditioner has a function for switching the air direction. 3) If the air conditioner does not have that function, [Unsupported function] will be displayed on the remote controller when the air direction or the louver button is pressed.	
The air conditioner starts operating even though any buttons on the remote controller are not pressed.		1 Check if you set ON/OFF timer. The air conditioner starts operating at the time designated if ON timer has been set before.	
		2 Check if any operations are ordered by distant control system or the central remote controller. While [Centrally controlled] is displayed on the remote controller, the air conditioner is under the control of external directive.	There might be a case that [Centrally controlled] will not be displayed.
		3 Check if power is recovered from power failure (black out). The units will automatically start operating when power is recovered after power failure (black out) occurs. This function is called "auto recovery feature from power ".	
The air conditioner stops even though any buttons on the remote controller are not pressed		1 Check if you set ON/OFF timer. The air conditioner stops operating at the time designated if OFF timer has been set before. 2 Check if any operations are ordered by distant control system or the central remote controller. While [Centrally controlled] is displayed on the remote controller, the air conditioner is under the control of external directive.	There might be a case that [Centrally controlled] will not be displayed.

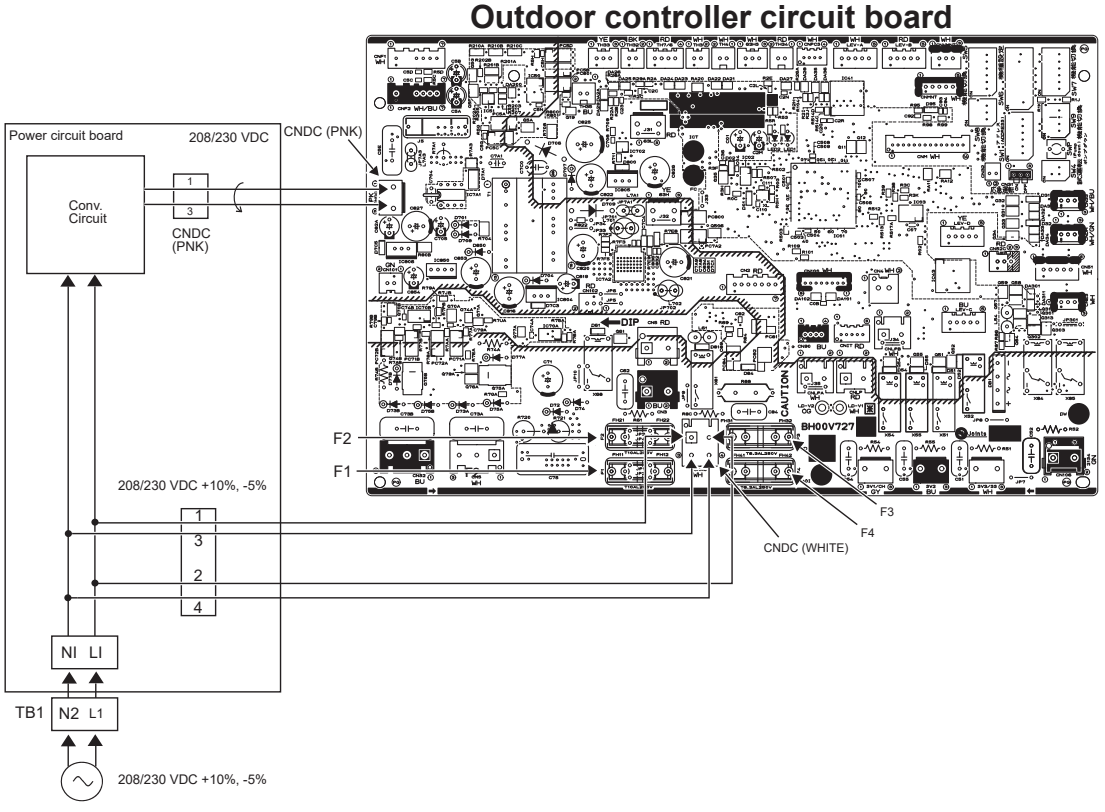
Questions from customers	Answers	Note
A white mist is expelled from the indoor unit.	This is not a malfunction. This may occur when the operation is started in the room with high humidity.	
Water or moisture is expelled from the outdoor unit.	COOL: when pipes or piping joints are cooled, they sweat and water drips down. HEAT: water drips down from the heat exchanger. Note: Use optional parts “Drain Socket” and “Drain pan” if these water needs to be collected and drained out for once.	
The display of IR wireless remote controller gets dim or does not come on. The indoor unit does not receive a signal from remote controller at a long distance.	Batteries are being exhausted. Replace them and press the reset button of remote controller.	

10-5. HOW TO CHECK THE PARTS

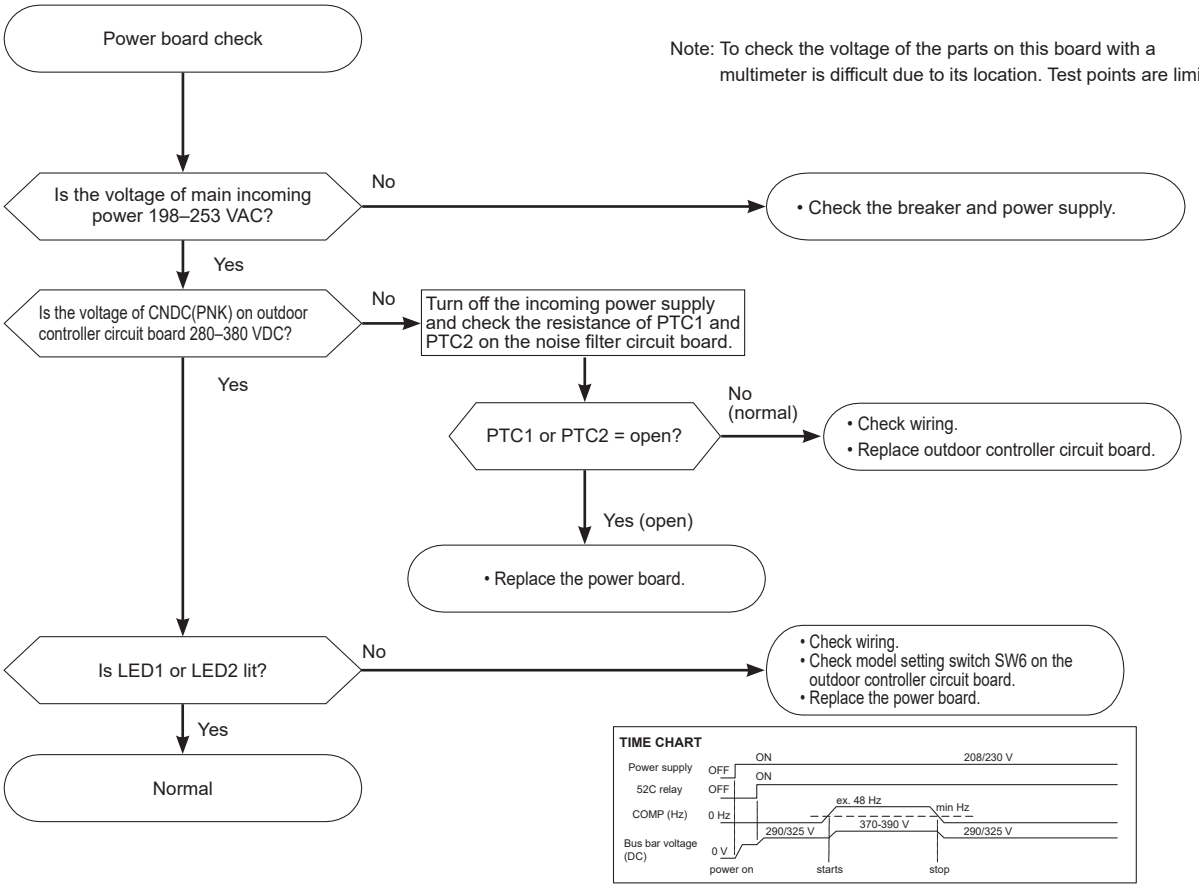
<table>
<tr><th>Parts name</th><th>Checkpoints</th></tr>
<tr><td>Thermistor (TH3)
<Liquid pipe>
Thermistor (TH4)
<Discharge pipe>
Thermistor (TH6)
< 2-phase pipe>
Thermistor (TH7)
<Ambient>
Thermistor (TH8)
<Heat Sink>
Thermistor (TH32)
<Suction pipe>
Thermistor (TH33)
<Comp. surface></td><td>Disconnect the connector then measure the resistance with a multimeter.
(At the ambient temperature 50 to 86°F [10 to 30°C])
<table><tr><th>Thermistor</th><th>Normal</th><th>Abnormal</th></tr><tr><td>TH4
TH33</td><td>160 to 410 kΩ</td><td rowspan="3">Open or short</td></tr><tr><td>TH3
TH6
TH7
TH32</td><td>4.3 to 9.6 kΩ</td></tr><tr><td>TH8</td><td>39 to 105 kΩ</td></tr></table></td></tr>
<tr><td>Solenoid valve coil
<4-way valve> (21S4)</td><td>Refer to “10-5-3. Check method of DC fan motor (fan motor/outdoor controller circuit board)”.
Measure the resistance between the terminals with a multimeter.
(At the ambient temperature 68°F [20°C])
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>1200 ± 150 Ω</td><td>Open or short</td></tr></table></td></tr>
<tr><td>Motor for compressor
(MC)
  </td><td>Measure the resistance between the terminals with a multimeter.
(Winding temperature 68°F [20°C])
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>0.49 Ω</td><td>Open or short</td></tr></table></td></tr>
<tr><td>Fan motor (MF1, MF2)
  </td><td>Measure the resistance between the connector pins with a multimeter.
(At the ambient temperature 68°F [20ºC])
Note that the resistance between the connector pins may vary depending on the ambient temperature, so use those values as reference.
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>Red - Blue
1.3 MΩ</td><td>Brown - Blue
6.1 MΩ</td><td>Orange - Blue
220 kΩ</td><td>White - Blue
OL</td><td>Open or short
(short, for White - Blue)</td></tr></table>*OL: Over Load</td></tr>
<tr><td>Linear expansion valve
(LEV-A/B)
  </td><td>Disconnect the connector then measure the resistance with a multimeter.
(Winding temperature 68°F [20°C])
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>Red - White</td><td>Red - Orange</td><td>Red - Yellow</td><td>Red - Blue</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">46 ± 4 Ω</td></tr></table></td></tr>
<tr><td>Linear expansion valve
(LEV-A/B)
  </td><td>Disconnect the connector then measure the resistance with a multimeter.
(Winding temperature 68°F [20ºC])
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>Gray - Black</td><td>Gray - Red</td><td>Gray - Yellow</td><td>Gray - Orange</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">46 ± 3 Ω</td></tr></table></td></tr>
</table>

10-5-1. Check methods of outdoor controller circuit board

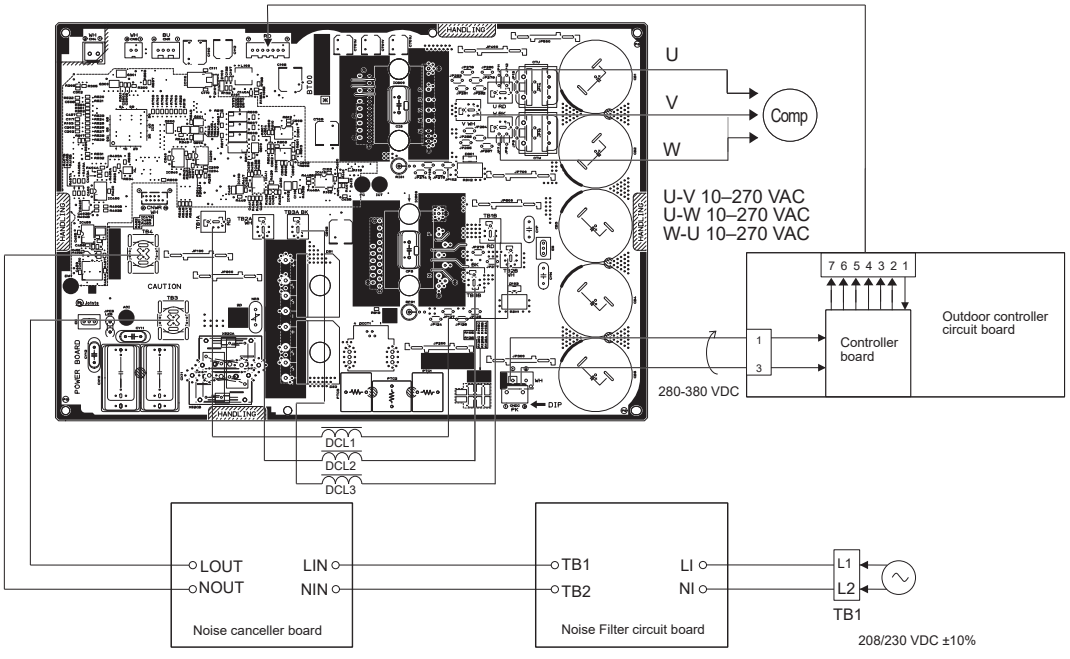




10-5-2. Check methods of power circuit board



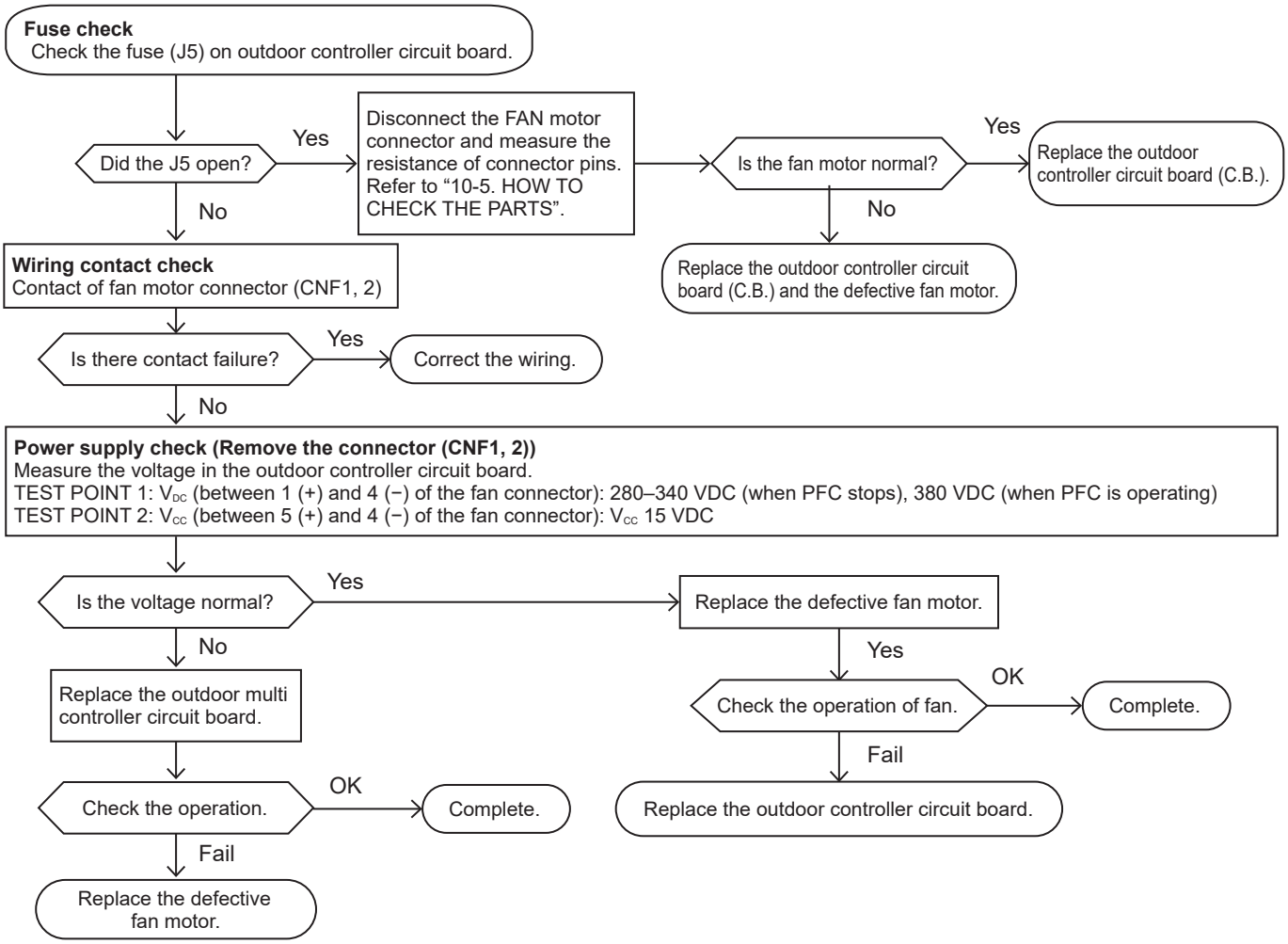
power circuit board

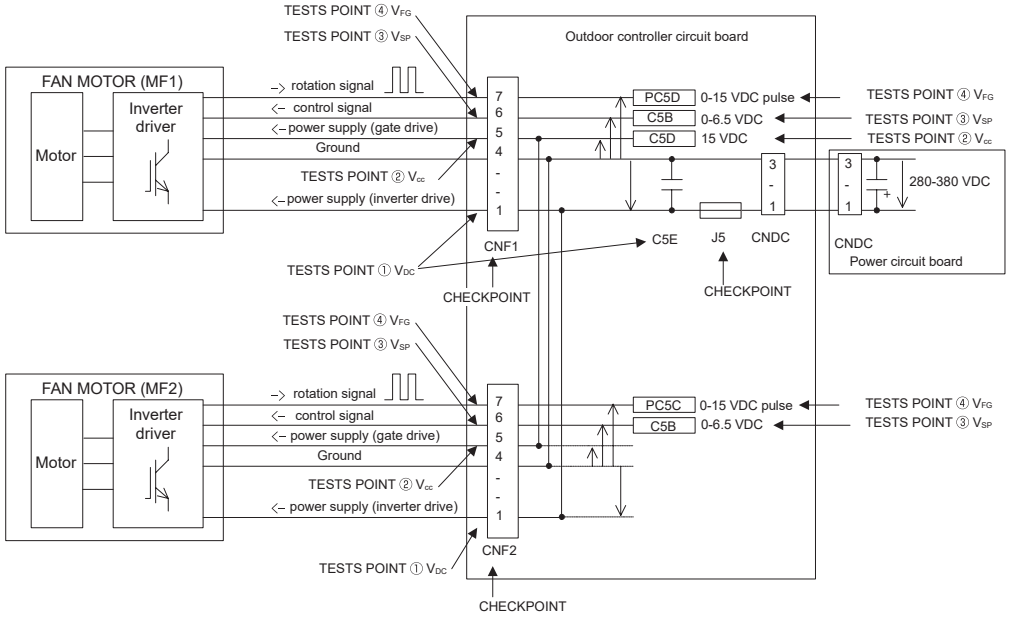


10-5-3. Check methods of DC fan motor (fan motor/outdoor controller circuit board)

① Notes
- · High voltage is applied to the connector (CNF1, 2) for the fan motor. Pay attention to the service.
- · Do not pull out the connector (CNF1, 2) for the motor with the power supply on.
  (It causes trouble of the outdoor multi controller circuit board and fan motor.)

② Self check
Symptom: The outdoor fan cannot rotate.





- · The inverter control P. C. board is built in the fan motor of this outdoor unit.
- · When J5 that is on controller board is opened, change the fan motor and outdoor controller board at the same time (J5 is impossible to change).
- · It is abnormal when the abnormality is detected from either both fan motors or only one side.

10-6. HOW TO CHECK THE COMPONENTS

<Thermistor feature chart>

Low temperature thermistors

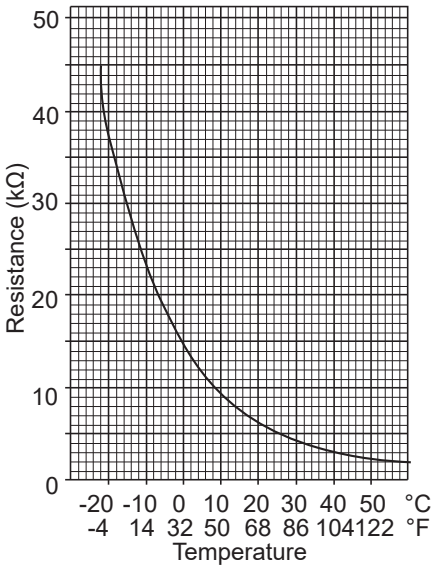
- Thermistor <Liquid pipe> (TH3)
- Thermistor <2-phase pipe> (TH6)
- Thermistor <Ambient> (TH7)
- Thermistor <Suction pipe> (TH32)

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

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

T (°F): $R_T = 15\exp\{3480(\frac{1}{273 + (T - 32)/1.8} - \frac{1}{273})\}$

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



Medium temperature thermistor

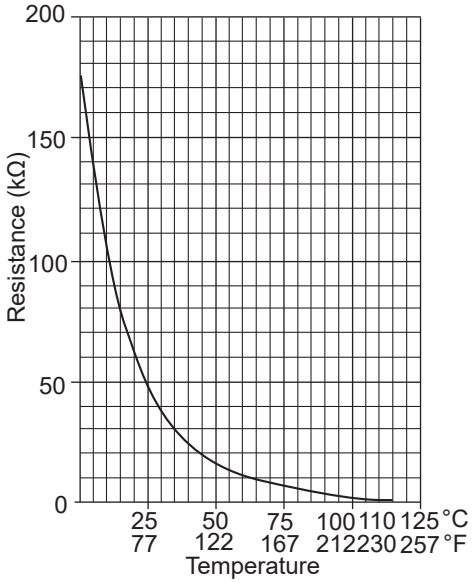
- Thermistor <Heat Sink> (TH8)

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

t (°C): $Rt = 17\exp\{4150(\frac{1}{273 + t} - \frac{1}{323})\}$

T (°F): $R_T = 17\exp\{4150(\frac{1}{273 + (T - 32)/1.8} - \frac{1}{323})\}$

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



High temperature thermistors

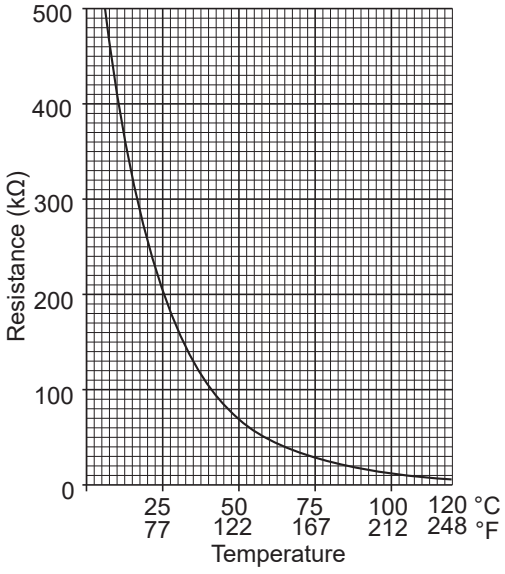
- Thermistor <Comp. surface> (TH33)
- Thermistor <Discharge pipe> (TH4)

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

t (°C): $Rt = 7.465\exp\{4057(\frac{1}{273 + t} - \frac{1}{393})\}$

T (°F): $R_T = 7.465\exp\{4057(\frac{1}{273 + (T - 32)/1.8} - \frac{1}{393})\}$

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

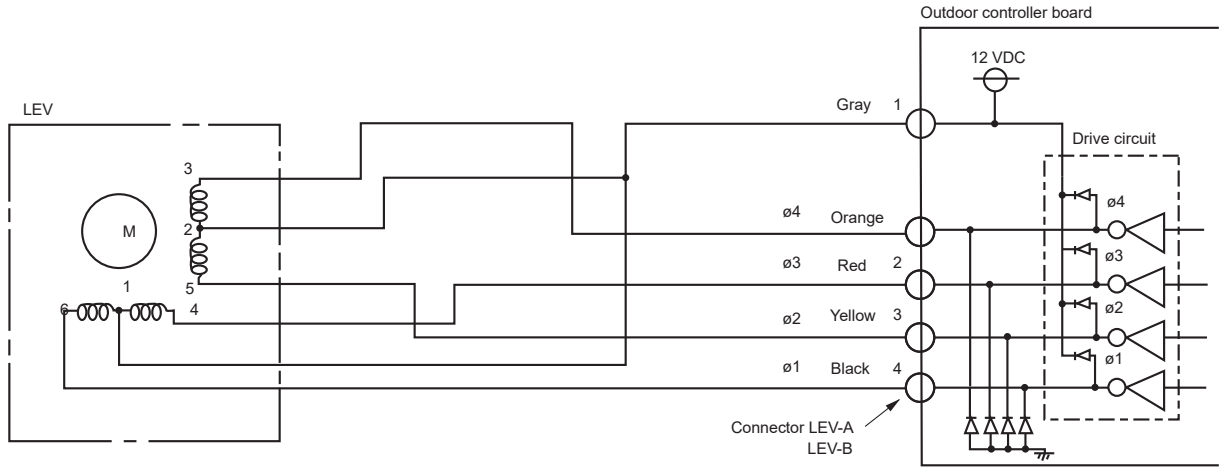


Linear expansion valve

(1) Operation summary of the linear expansion valve

- The linear expansion valve opens/closes through stepping motor after receiving the pulse signal from the outdoor controller board.
- The valve position can be changed in proportion to the number of the pulse signal.

<Connection between the outdoor controller board and the linear expansion valve>



<Output pulse signal and the valve operation>

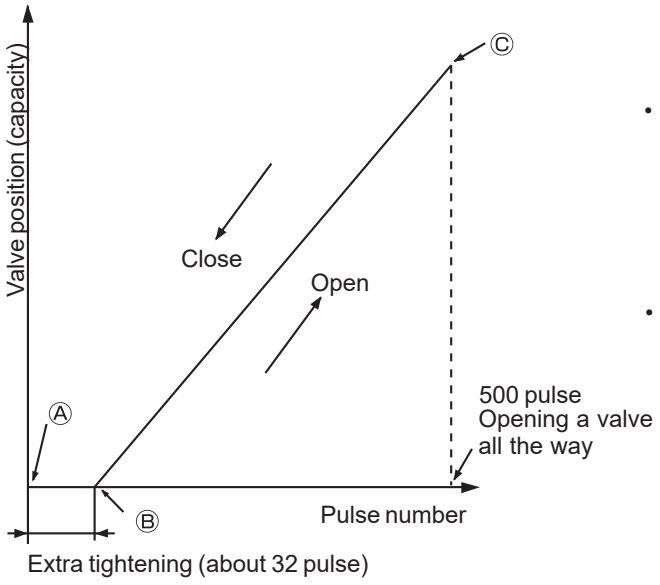
Output (Phase)	Output							
	1	2	3	4	5	6	7	8
ø1	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
ø2	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
ø3	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
ø4	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

The output pulse shifts in the following order.

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

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

(2) Linear expansion valve operation

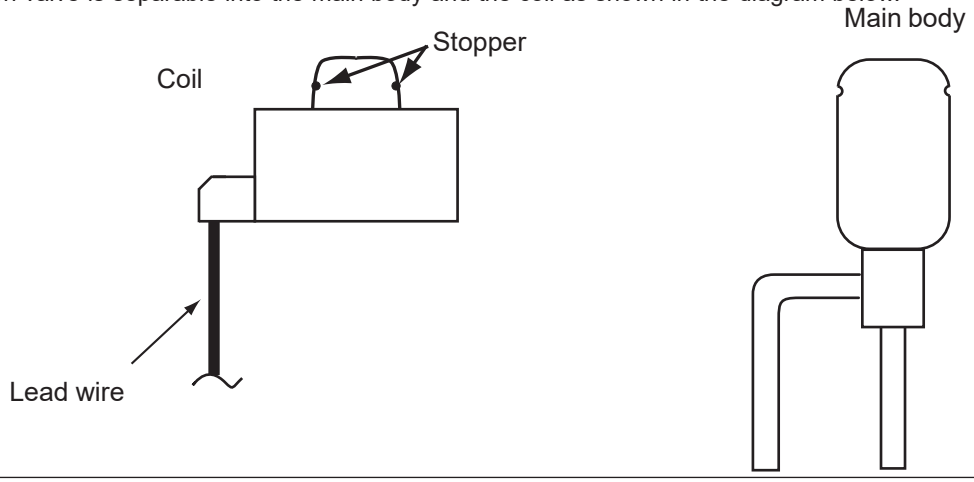


- When the power is turned on, 700 pulse closing the valve signal will be sent till it goes to Ⓐ point in order to define the valve position. (The pulse signal is being sent for about 20 seconds.)
- When the valve moves smoothly, there is no sound or vibration occurring from the linear expansion valve; however, when the pulse number moves from Ⓑ to Ⓐ or when the valve is locked, sound can be heard than the normal situation. No sound is heard when the pulse number moves from Ⓑ to Ⓐ in case coil is burn out or motor is locked by the open-phase.
- Sound can be detected by placing the ear against the screw driver handle while putting the screw driver to the linear expansion valve.

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

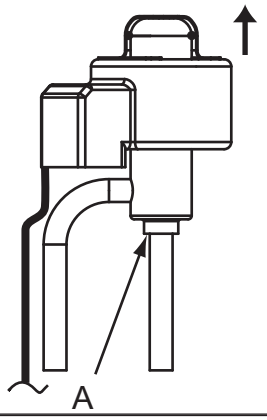
<Composition>

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



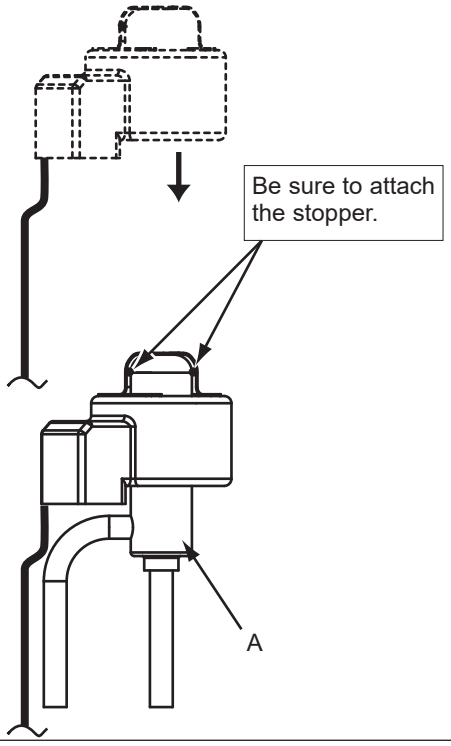
<How to detach the coil>

Hold the lower part of the main body (shown as A) firmly so that the main body does not move and detach the coil by pulling it upward.
Be sure to detach the coil holding main body firmly. Otherwise pipes can bend due to stress.



<How to attach the coil>

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



10-7. EMERGENCY OPERATION

(1) When the error codes shown below are displayed on outdoor unit or microprocessor for wired remote controller or indoor unit has a failure, but no other problems are found, emergency operation will be available by setting the emergency operation switch to ON at the indoor unit control board and short-circuiting the connector (CN31) on the outdoor controller board.

When following abnormalities occur, emergency operation will be available.

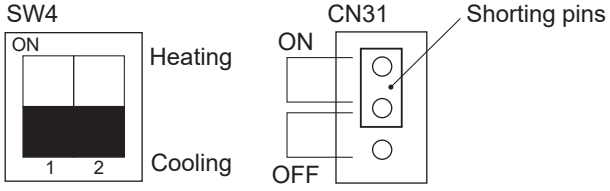
Error code	Inspected content
U4	Open/short of pipe thermistor (TH3/TH6/TH7/TH8/TH32)
E8	The indoor/outdoor unit communication error •Signal receiving error (Outdoor unit)
E9	The indoor/outdoor unit communication error •Transmitting error (Indoor unit)
E0–7	Communication error other than outdoor unit
Ed	Communication error between outdoor controller board and M-NET board (Serial communication error)

(2) Check the following items and cautions for emergency operation

① Make sure that there is no abnormality in the outdoor unit other than the above abnormalities. (Emergency operation will not be available when error codes other than the above are indicated.)
② For emergency operation, it is necessary to set the emergency operation switch on the indoor controller board. Refer to the electrical wiring diagram of the indoor unit for how to set the indoor unit.)
③ During emergency operation, the air-conditioner will continuously be operated by supplying power and stopping it: it cannot be turned on or off by the remote control, and the temperature control is not possible.
④ Do not perform emergency heating operation for an extended period of time: if the outdoor unit starts defrosting during this period, cold air will blow out from the indoor unit.
⑤ Do not perform emergency cooling operation for more than 10 hours; otherwise, it could result in freezing the heat exchanger of the indoor unit.

(3) Emergency operation procedure

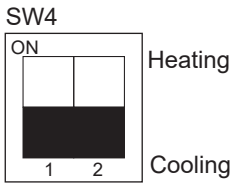
① Turn the main power supply off.
② Turn on the emergency operation switch on the indoor controller board.
③ Set the shorting pins of the emergency operation connector (CN31) on the outdoor controller board to ON.
④ Use SW4-2 on the outdoor controller board to set the operation mode (cooling or heating). (SW4-1 is not used.)
⑤ Turning the main power supply on will start the emergency operation.



(4) Releasing emergency operation

① Turn the main power supply off.
② Set the emergency operation switch on the indoor controller board to OFF.
③ Set the shorting pins of emergency operation connector (CN31) on the outdoor controller board to OFF.
④ Set SW4-2 on the outdoor controller board as shown below.

Note: If the shorting pins are not set on the emergency operation connector (CN31), the setting remains OFF.



(5) Operation data during emergency operation

During emergency operation, no communication is performed with the indoor unit, so the data items needed for operation shall be set to the following values:

Operation data	Operation mode		Remarks
	COOL	HEAT	
Intake temperature (TH1)	81°F [27°C]	69°F [20.5°C]	
Indoor fluid pipe temperature (TH2)	41°F [5°C]	113°F [45°C]	
Indoor 2-phase pipe temperature (TH5)	41°F [5°C]	122°F [50°C]	
Set temperature	77°F [25°C]	72°F [22°C]	
Outdoor liquid pipe temperature (TH3)	113°F [45°C]	41°F [5°C]	*1
Outdoor 2-phase pipe temperature (TH6)	122°F [50°C]	41°F [5°C]	*1
Outdoor ambient temperature (TH7)	95°F [35°C]	45°F [7°C]	*1
Outdoor suction (TH32)	41°F [5°C]	41°F [5°C]	*2
Temperature difference code (intake temperature−set temperature) (ΔTj)	5	5	
Discharge super heat (SHd)	54°F [30°C]	54°F [30°C]	*2
Subcooling (SC)	9°F [5°C]	9°F [5°C]	*2

*1 If the thermistor temperature data is normal (not open/short), that data is loaded into the control as valid data. When the unit enters emergency operation and TH values are mismatched, set the thermistors to open/short. And the unit runs emergency operation with the values listed above.

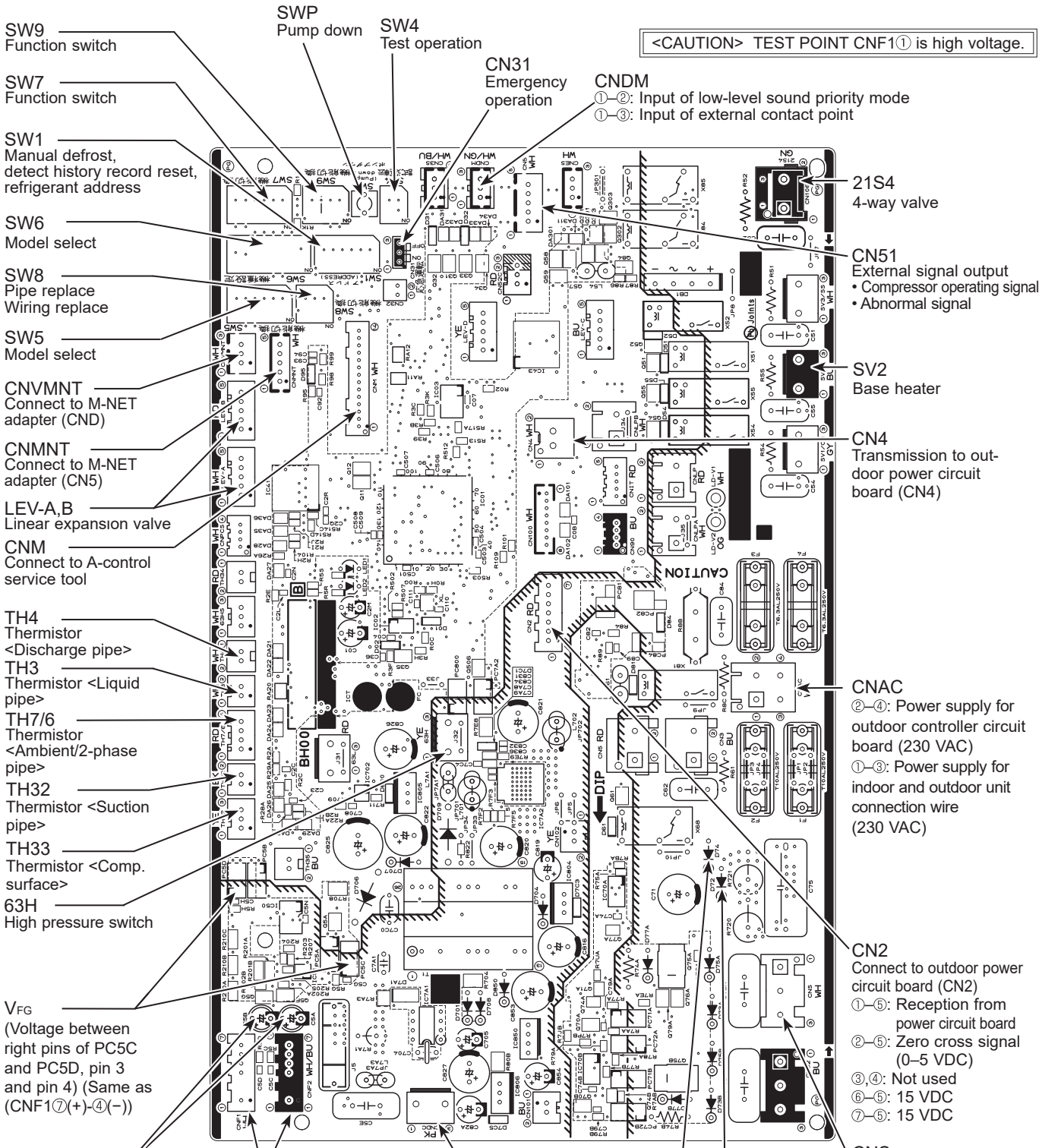
*2 If one thermistor is set to open/short, the values of SHd/SC will be different from the list above.

Example: When the liquid pipe temperature thermistor (TH3) has an open or short circuit.

Thermistor	COOL	HEAT
TH3	113°F [45°C]	41°F [5°C]
TH6	Ta	Tb
	Regard normal figure as effective data.	
TH4	Tc	Td
	Regard normal figure as effective data.	
TH5	41°F [5°C]	122°F [50°C]
TH2	41°F [5°C]	113°F [45°C]
TH33	Regard normal figure as effective data.	

Discharge superheat (SHd)
Cooling = TH4 − TH6 = Tc − Ta
Heating = TH4 − TH5 = Td − 122°F [50°C]
Degree of subcooling (SC)
Cooling = TH6 − TH3 = Ta − 113°F [45°C]
Heating = TH5 − TH2 = 50°C − 45°C = 5°C
or
= 122°F − 113°F = 9˚F

10-8. TEST POINT DIAGRAM
Outdoor controller circuit board



Outdoor power circuit board

Brief check for power module
If they are short-circuited, they are broken.
Measure the resistance at the following points (connectors, etc.).

1. Check for power module
   ① Check diode circuit

R1	P1	S1	P1	R1	N1	S1	N1
R2	P4	S2	P4	R2	N4	S2	N4

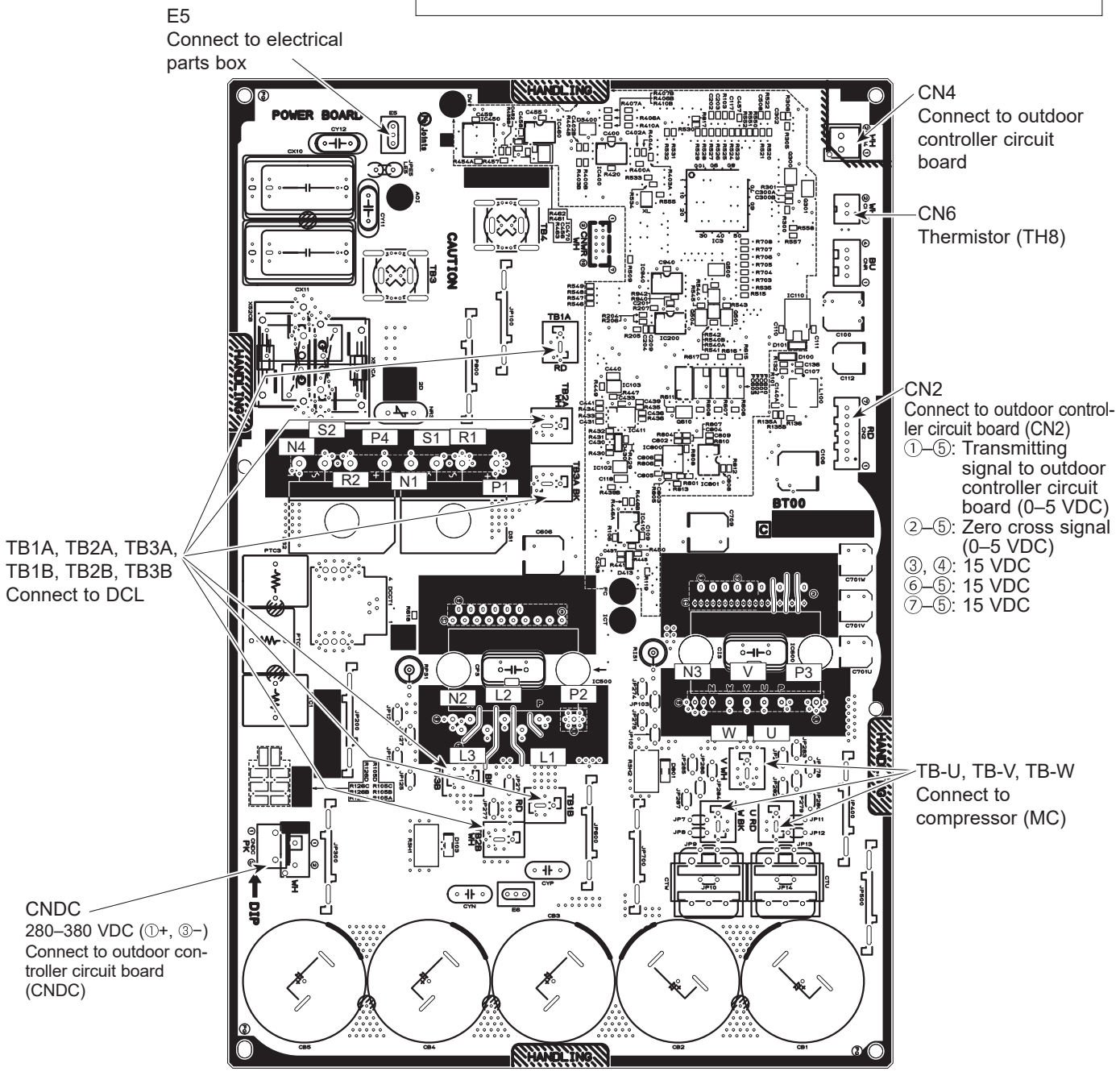
   ② Check IGBT circuit

P2	L1	P2	L2	P2	L3	N2	L1	N2	L2	N2	L3

   ③ Check inverter circuit

P3	U	P3	V	P3	W	N3	U	N3	V	N3	W

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



10-9. FUNCTIONS OF SWITCHES, CONNECTORS AND JUMPERS

(1) Switch functions

Type of switch	Switch	No.	Function	Action by switch operation		Effective timing
				ON	OFF	
DIP switch	SW1	1	Manual defrost *1	Start	Normal	When compressor is operating in heating operation. *1
		2	Abnormal history clear	Clear	Normal	Off or operating
		3	Refrigerant address setting	Refer to "7. WIRING DIAGRAM".		When power supply is ON
		4				
		5				
		6				
	SW4	1	Test run	Operating	OFF	Under suspension
		2	Test run mode setting	Heating	Cooling	
	SW8	1	Use of existing pipe	Used	Not used	Always
		2	No function	-	-	-
		3	Separate indoor/outdoor unit power supplies	Used	Not used	When power supply is ON
Push switch	SWP		Pump down	Start	Normal	Under suspension

*1 Manual defrost should be done as follows.
① Change SW1-1 on the outdoor controller board from OFF to ON.
② Manual defrost will start by the above operation ① if all of the following conditions are satisfied.
· Heat mode setting
· 10 minutes have passed since the compressor started operating or the previous manual defrost is finished.
· Pipe temperature is less than or equal to 46°F [8°C].
Manual defrost will finish if certain conditions are satisfied.
Manual defrost can be done if the above conditions are satisfied when SW1-1 is changed from OFF to ON.
After SW1-1 is changed from OFF to ON, there is no problem if SW1-1 is left ON or changed to OFF again. This depends on the service conditions.

Continue to the next page.

Type of Switch	Switch	No.	Function	Action by switch operation		Effective timing
				ON	OFF	
DIP switch	SW5	1	No function	—		
		2				
		3				
		4				
		6				
	SW7 *2	1	No function	—	—	—
		2	No function	—	—	—
		3	Max Hz setting (cooling)	Max Hz (cooling) × 0.8	Normal	Always
		4	Max Hz setting (heating)	Max Hz (heating) × 0.8	Normal	Always
		5	No function	—	—	—
		6	Defrost setting	For high humidity	Normal	Always
	SW9	1	No function	—		
		2				
		3				
		4				
	SW6	1	Model select	Refer to "7. WIRING DIAGRAM".		
		2				
		3				
		4				
		5				
		6				
		7				
		8				
	SW5	5				

*2 Please do not normally use SW7-3 through SW7-6. The conditions of use may cause problems.
Leave the switches marked "—" at their factory settings.

(2) Function of connector

Type	Connector	Function	Action by open/short operation		Effective timing
			Short	Open	
Connector	CN31	Emergency operation	Start	Normal	When power supply is ON

<Display function of inspection for outdoor unit>
The blinking patterns of both LED1 (green) and LED2 (red) indicate the types of abnormality when it occurs. Types of abnormality can be indicated in details by connecting an optional part 'A-Control Service Tool (PAC-SK52ST)' to the connector CNM on the outdoor controller board.

[Display]
(1) Normal condition

Unit condition	Outdoor controller board		A-Control Service Tool	
	LED1 (Green)	LED2 (Red)	Error code	Indication of the display
When power is turned on	Lit	Lit	— ⇔ —	Alternately blinking display
When unit stops	Lit	Not lit	00, etc.	Operation mode
When compressor is warming up	Lit	Not lit	08, etc.	
When unit operates	Lit	Lit	C5, H7, etc.	

(2) Abnormal condition

Indication		Error			
Outdoor controller board		Contents	Error code*1	Inspection method	Detailed reference page
LED (Green)	LED2 (Red)				
1 blinking	2 blinking	Connector (63H/TRS) is open.	F5	① Check if connector (63H and TRS) on the outdoor controller board is not disconnected. ② Check continuity of pressure switch (63H)/Thermal protector (TRS) by multimeter.	p.27
	4 blinking	Abnormality of indoor controller board	Fb	① Replace indoor controller board.	*2
	5 blinking	Refrigerant sensor error	FH	① Check the connectors of the refrigerant sensor.	p.36
		Refrigerant leakage	FL	① Check the indoor unit to detect the part where refrigerant leaks.	p.37
2 blinking	1 blinking	Miswiring of indoor/outdoor unit connecting wire, excessive number of indoor units (4 units or more)	—	① Check if indoor/outdoor connecting wire is connected correctly. ② Check if 4 or more indoor units are connected to outdoor unit. ③ Check if noise entered into indoor/outdoor connecting wire or power supply. ④ Re-check error by turning off power, and on again.	p.28 (EA)
		Miswiring of indoor/outdoor unit connecting wire (reversed wiring or disconnection)	—		p.28 (Eb)
		Startup time over	—		p.28 (EC)
	2 blinking	Indoor/outdoor unit communication error (signal receiving error) is detected by indoor unit.	E6	① Check if indoor/outdoor connecting wire is connected correctly. ② Check if noise entered into indoor/outdoor connecting wire or power supply. ③ Check if noise entered into indoor/outdoor controller board. ④ Re-check error by turning off power, wait 10 minutes and on again.	*2 or p.35 (E6)
		Indoor/outdoor unit communication error (transmitting error) is detected by indoor unit.	E7		*2
		Indoor/outdoor unit communication error (signal receiving error) is detected by outdoor unit.	—		p.34 (E8)
		Indoor/outdoor unit communication error (transmitting error) is detected by outdoor unit.	—		p.34 (E9)
	3 blinking	Remote controller signal receiving error is detected by remote controller.	E0	① Check if connecting wire of indoor unit or remote controller is connected correctly. ② Check if noise entered into transmission wire of remote controller. ③ Re-check error by turning off power, and on again.	p.34
		Remote controller transmitting error is detected by remote controller.	E3		p.33
		Remote controller signal receiving error is detected by indoor unit.	E4		p.34
		Remote controller transmitting error is detected by indoor unit.	E5		p.34
	4 blinking	Abnormal if a connection of indoor unit and outdoor unit using different refrigerant is detected.	EE	① Check if indoor/outdoor unit combination is authorized.	p.34
		Error code is not defined.	EF	① Check if remote controller is MA remote controller(PAR-42MAA). ② Check if noise entered into transmission wire of remote controller. ③ Check if noise entered into indoor/outdoor connecting wire. ④ Re-check error by turning off power, and on again.	p.34

*1 Error code displayed on remote controller
*2 Refer to the indoor unit service manual.

Continue to the next page

Indication		Error			
Outdoor controller board		Contents	Error code*1	Inspection method	Detailed reference page
LED (Green)	LED2 (Red)				
2 blinking	4 blinking	Abnormality of refrigerant circuit	PL	① Be sure to replace 4-way valve. ② Check refrigerant pipes for disconnection or leakage. ③ After the recovery of refrigerant, vacuum dry the whole refrigerant circuit. ④ Refer to “10-5. HOW TO CHECK THE PARTS”. ⑤ Check refrigerant circuit for operation.	p.35
		Float switch connector open (FS)	P4	① Check if connector (CN4F) on indoor controller board is not disconnected. ② Measure resistance value among terminals on drain pump using a multimeter. ③ Check if drain pump works. ④ Check drain function.	*2
	5 blinking	Serial communication error <Communication between outdoor controller board and outdoor power board> <Communication between outdoor controller board and M-NET P.C. board>	Ed	① Check if connector (CN4) on outdoor controller board and outdoor power board is not disconnected. ② Check if there is poor connection of connector on outdoor controller board (CNMNT and CNVMNT). ③ Check M-NET communication signal.	p.36
		Communication error of M-NET system	A0–A8		p.37–p.40
3 blinking	1 blinking	Abnormality of shell thermistor (TH33) and discharge temperature (TH4)	U2	① Check if stop valves are open. ② Check if connectors (TH4, TH33, LEV-A, and LEV-B) on outdoor controller board are not disconnected. ③ Check if unit is filled with specified amount of refrigerant. ④ Measure resistance values among terminals on indoor valve and outdoor linear expansion valve using a multimeter.	p.29
		Abnormality of superheat due to low discharge temperature	U7		p.31
	2 blinking	Abnormal high pressure (63H operated)/High compressor temperature (TRS operated)	U1	① Check if indoor/outdoor units have a short cycle on their air ducts. ② Check if connector (63H) (63L) on outdoor controller board is not disconnected. ③ Check if heat exchanger and filter are not dirty. ④ Measure resistance values among terminals on linear expansion valve using a multimeter. ⑤ Check if stop valves are open. ⑥ Check if unit is filled with specified amount of refrigerant.	p.28
		Abnormal low pressure (Low pressure switch 63L worked.)	UL		p.33
	3 blinking	Abnormality of outdoor fan motor rotational speed	U8	① Check the outdoor fan motor.	p.30
		Protection from overheat operation (TH3)	Ud		p.33
	4 blinking	Compressor overcurrent breaking (Startup locked)	UF	① Check if stop valves are open. ② Check looseness, disconnection, and reversed connection of compressor wiring. ③ Measure resistance values among terminals on compressor using a multimeter. ④ Check if outdoor unit has a short cycle on its air duct.	p.33
		Compressor overcurrent breaking	UP		p.34
		Abnormality of current sensor (P.B.)	UH		p.33
		Abnormality of power module	U6		p.30
	5 blinking	Open/short of discharge/Comp.surface thermistor (TH4, TH33)	U3	① Check if connectors (TH3, TH4, TH6, TH7, TH8, TH32, and TH33) on outdoor controller board and connector (CN3) on outdoor power board are not disconnected. ② Measure resistance value of outdoor thermistors	p.29
		Open/short of outdoor thermistors (TH3, TH6, TH7, TH8, and TH32)	U4		p.29
	6 blinking	Abnormality of Heat sink temperature	U5	① Check if indoor/outdoor units have a short cycle on their air ducts. ② Measure resistance value of outdoor heat sink thermistor (TH8).	p.30
	7 blinking	Abnormality of voltage	U9	① Check looseness, disconnection, and reversed connection of compressor wiring. ② Measure resistance value among terminals on compressor using a multimeter. ③ Check continuity of contactor (52C). ④ Check if power supply voltage decreases. ⑤ Check wiring of CN52C. ⑥ Check wiring of CNAF.	p.31

*1 Error code displayed on remote controller
*2 Refer to the indoor unit service manual.

Indication		Error			
Outdoor controller board		Contents	Error code*1	Inspection method	Detailed reference page
LED (Green)	LED2 (Red)				
4 blinking	1 blinking	Abnormality of room temperature thermistor (TH1)	P1	① Check if connectors (CN20, CN21, CN29, and CN44) on indoor controller board are not disconnected. ② Measure resistance value of indoor thermistors.	*2
		Abnormality of pipe temperature thermistor/Liquid (TH2)	P2		*2
		Abnormality of pipe temperature thermistor/Condenser-Evaporator (TH5)	P9		*2
	2 blinking	Abnormality of drain sensor (DS)	P4	① Check if connector (CN31) on indoor controller board is not disconnected.	*2
		Indoor drain overflow protection	P5	② Measure resistance value of indoor thermistors. ③ Measure resistance value among terminals on drain pump using a multimeter. ④ Check if drain pump works. ⑤ Check drain function.	*2
	3 blinking	Freezing (cooling)/overheating (heating) protection	P6	① Check if indoor unit has a short cycle on its air duct. ② Check if heat exchanger and filter are not dirty. ③ Measure resistance value on indoor and outdoor fan motors. ④ Check if the inside of refrigerant piping is not clogged.	*2
	4 blinking	Abnormality of pipe temperature	P8	① Check if indoor thermistors (TH2 and TH5) are not disconnected from holder. ② Check if stop valve is open. ③ Check reversed connection of extension pipe. (for plural unit connection) ④ Check if indoor/outdoor connecting wire is connected correctly. (for plural unit connection)	*2
	5 blinking	Indoor fan motor trouble	Pb	① Check the winding of an indoor unit fan motor.	*2
—	—	Abnormality of remote controller board	E1 E2	① Replace remote controller.	p.34

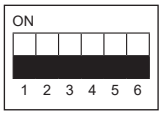
*1 Error code displayed on remote controller
*2 Refer to the indoor unit service manual.

<Outdoor unit operation monitor function>

When optional part 'A-Control Service Tool (PAC-SK52ST)' is connected to outdoor controller board (CNM)

By controlling SW2 on the 'A-Control Service Tool', a 2-digit number or code is displayed on the digital indicator LED1 to indicate the operating status and the meaning of the error code.

Operation indicator SW2: Change self-diagnostic indicators The black square (■) indicates a switch position.

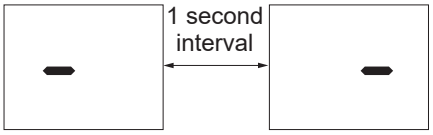
SW2 setting	Display detail	Explanation for display	Unit
			

<Digital indicator LED1 working details>

(Be sure that 1 to 6 on SW2 are set to OFF.)

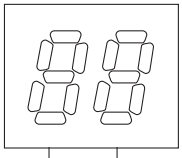
(1) When the power supply turns ON

The displays blink alternately. Wait for 4 minutes at the longest.

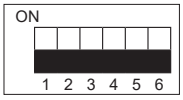


(2) When the display lights (Normal operation)

① Operation mode display

LED1  (Lighting)

SW2



(Initial setting)

The tens digit: Operation mode

Display	Operation mode
O	OFF/FAN
C	COOLING/DRY
H	HEATING
d	DEFROSTING

The ones digit: Relay output

Display	Warming-up compressor	compressor	4-way valve	Base heater
0	-	-	-	-
1	-	-	-	ON
2	-	-	ON	-
3	-	-	ON	ON
4	-	ON	-	-
5	-	ON	-	ON
6	-	ON	ON	-
7	-	ON	ON	ON
8	ON	-	-	-
A	ON	-	ON	-

② Display during error postponement

Postponement code is displayed when compressor stops due to the work of protection device.

Postponement code is displayed while error is being postponed.

(3) When the display blinks

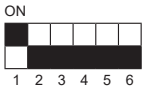
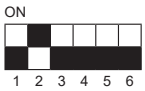
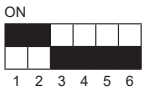
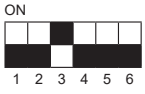
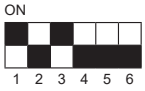
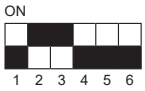
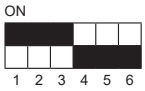
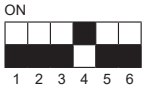
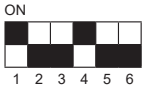
Inspection code is displayed when compressor stops due to the work of protection devices.

Display	Inspection unit
0	Outdoor unit
1	Indoor unit 1
2	Indoor unit 2

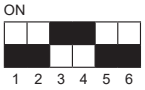
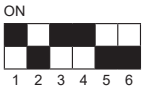
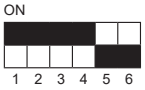
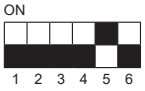
Display	Contents to be inspected (During operation)
U1	Abnormal high pressure (63H operated)/High compressor temperature (TRS operated)
U2	Abnormal high discharge temperature, shortage of refrigerant
U3	Open/short circuit of comp. surface thermistor (TH33) and discharge temperature thermistor (TH4)
U4	Open/short of outdoor unit thermistors (TH3, TH6, TH7, TH8, and TH32)
U5	Abnormal temperature of heat sink
U6	Abnormality of power module
U8	Abnormality in outdoor fan motor
UF	Compressor overcurrent interruption (When Comp. locked)
UH	Current sensor error
UL	Abnormal low pressure
UP	Compressor overcurrent interruption
P1-P8	Abnormality of indoor units
A0-A7	Communication error of M-NET system

Display	Contents to be inspected (During operation)
F5	63H connector (yellow) is open. /TRS connector is open.
E8	Indoor/outdoor communication error (Signal receiving error) (Outdoor unit)
E9	Indoor/outdoor error (Transmitting error) (Outdoor unit)
EA	Miswiring of indoor/outdoor unit connecting wire, excessive number of indoor units (4 units or more)
Eb	Miswiring of indoor/outdoor unit connecting wire (reversed wiring or disconnection)
EC	Startup time over
E0-E7	Communication error except for outdoor unit

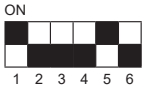
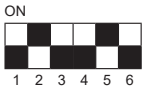
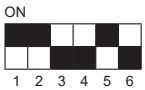
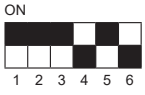
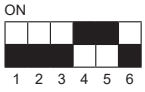
The black square (■) indicates a switch position.

SW2 setting	Display detail	Explanation for display	Unit
	Pipe temperature/Liquid (TH3) −58 to 194	−58 to 194˚F [−50 to 90˚C] (When the coil thermistor detects 0˚F [-17°C] or below, "–" and temperature are displayed alternately.) (Example) When −10˚F [-23°C]; 0.5 s 0.5 s 2 s -□ →10 →□□	˚F [˚C]
	Discharge temperature (TH4) −4 to 422	−4 to 422˚F [−20 to 217˚C] (When the discharge thermistor detects 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 105˚F [40°C]; 0.5 s 0.5 s 2 s □1 →05 →□□	˚F [˚C]
	Output step of outdoor FAN 0 to 25	0 to 25	Step
	Number of ON/OFF times of compressor 0 to 9999	0 to 9999 (When the number of times is 100 or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 42500 times (425 × 100 times); 0.5 s 0.5 s 2 s □4 →25 →□□	100 times
	Compressor integrating operation times 0 to 9999	0 to 9999 (When it is 100 hours or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 2450 hours (245 × 10 hours); 0.5 s 0.5 s 2 s □2 →45 →□□	10 hours
	Compressor operating current 0 to 50	0 to 50 Note: Omit the figures after the decimal fractions.	A
	Compressor operating frequency 0 to 9999	0 to 9999 (When it is 100 Hz or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 125 Hz; 0.5 s 0.5 s 2 s 12 → 50 →□□	0.1 Hz
	LEV-A opening pulse 0 to 500	0 to 500 (When it is 100 pulse or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 150 pulse; 0.5 s 0.5 s 2 s □1 →50 →□□	Pulse
	Error postponement code history (1) of outdoor unit	Postponement code display Blinking: During postponement Lighting: Cancellation of postponement "00" is displayed in the case of no postponement.	Code display

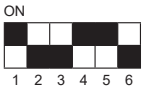
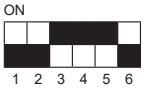
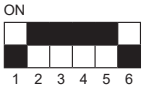
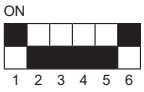
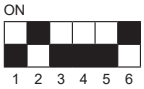
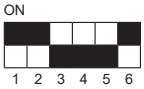
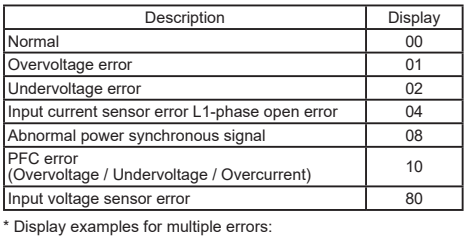
The black square (■) indicates a switch position.

SW2 setting	Display detail	Explanation for display	Unit
	Operation mode on error occurring	Operation mode of when operation stops due to error is displayed by setting SW2 as below. (SW2) 	Code display
	Pipe temperature/Liquid (TH3) on error occurring −58 to 194	−58 to 194˚F [−50 to 90˚C] (When the coil thermistor detects 0˚F [-17°C] or below, "–" and temperature are displayed alternately.) (Example) When −15˚F [-26°C]; 0.5 s 0.5 s 2 s –□ →15 →□□	˚F [˚C]
	Discharge temperature (TH4) on error occurring −4 to 422	−4 to 422˚F [−20 to 217˚C] (When the temperature is 100˚F [37°C] or more, the hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 130˚F [54°C]; 0.5 s 0.5 s 2 s □1 →30 →□□	˚F [˚C]
	Compressor operating current on error occurring 0 to 50	Compressor operating current on error occurring 0 to 50	A
	Error history (1) (latest) Alternate display of abnormal unit number and code	When no error history, " 0 " and "– –" are displayed alternately.	Code display
	Error history (2) Alternate display of error unit number and code	When no error history, " 0 " and "– –" are displayed alternately.	Code display
	Thermostat ON time 0 to 999	0 to 999 (When it is 100 minutes or more, the hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 245 minutes; 0.5 s 0.5 s 2 s □2 →45 →□□	Minute
	Test run elapsed time 0 to 120	0 to 120 (When it is 100 minutes or more, the hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 105 minutes; 0.5 s 0.5 s 2 s □1 →05 →□□	

The black square (■) indicates a switch position.

SW2 setting	Display detail	Explanation for display	Unit
	The number of connected indoor units	0 to 4 (The number of connected indoor units are displayed.)	Unit
	Capacity setting display	Displayed as an outdoor capacity code Capacity / Code: 48 / 28; 60 / 34	Code display
	Outdoor unit setting information	• The tens digit (Total display for applied setting) Setting details: H·P/Cooling only — Display details: 0: H·P 1: Cooling only Setting details: Single phase/3-phase — Display details: 0: Single phase 2: 3-phase • The ones digit Setting details: Defrosting switch — Display details: 0: Normal 1: For high humidity (Example) When heat pump, 3-phase and defrosting (normal) are set up, “20” is displayed.	Code display
	Indoor pipe temperature/Liquid (TH2 [1]) Indoor 1 −38 to 190	−38 to 190˚F [−39 to 88˚C] (When the temperature is 0ºF [-17°C] or less, “–” and temperature are displayed alternately.)	˚F [˚C]
	Indoor pipe temperature/Cond./Eva. (TH5 [1]) Indoor 1 −38 to 190	−38 to 190˚F [−39 to 88˚C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.)	˚F [˚C]
	Indoor pipe temperature/Liquid (TH2 [2]) Indoor 2 −38 to 190	−38 to 190˚F [−39 to 88˚C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.)	˚F [˚C]
	Indoor pipe temperature/Cond./Eva. (TH5 [2]) Indoor 2 −38 to 190	−38 to 190˚F [−39 to 88˚C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.)	˚F [˚C]
	Indoor room temperature (TH1) 46 to 102	Indoor room temperature (TH1) 46 to 102˚F [8 to 39°C]	˚F [˚C]

The black square (■) indicates a switch position.

SW2 setting	Display detail	Explanation for display	Unit
	Indoor setting temperature 62 to 86	62 to 86˚F [17 to 30˚C]	˚F [˚C]
	Outdoor pipe temperature/2-phase pipe (TH6) −58 to 194	−58 to 194˚F [−50 to 90˚C] (When the temperature is 0˚F [-17°C] or less, "–" and temperature are displayed alternately.)	˚F [˚C]
	Outdoor ambient temperature (TH7) −58 to 194	−58 to 194˚F [−50 to 90˚C] (When the temperature is 0˚F [-17°C] or less, "–" and temperature are displayed alternately.)	˚F [˚C]
	Outdoor heat sink temperature (TH8) −40 to 392	−40 to 392˚F [−40 to 200˚C] (When the temperature is 0˚F [-17°C] or less, "–" and temperature are displayed alternately.) (When the thermistor detects 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.)	˚F [˚C]
	Discharge superheat. SHd 32 to 491 [Cooling = TH4 or TH33 − TH6 Heating = TH4 or TH33 − TH5]	32 to 491˚F [0 to 255˚C] (When the temperature is 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.)	˚F [˚C]
	Number of defrost cycles 0 to FFFE	0 to FFFE (in hexadecimal notation) (When more than FF in hex (255 in decimal), the number is displayed in order of 16^3's and 16^2's, and 16^1's and 16^0's places. (Example) When 5000 cycles; 0.5 s 0.5 s 2 s □9 → C4 → □□	2 cycles
	Input current of outdoor unit	0 to 500 (When it is 100 or more, hundreds digit, tens digit, and ones digit are displayed alternately.)	0.1 A
	LEV-B opening pulse	0 to 500 (When it is 100 pulse or more, hundreds digit, tens digit, and ones digit are displayed alternately.)	Pulse
	U9 error detail history (latest)		Code display

Description	Display
Normal	00
Overvoltage error	01
Undervoltage error	02
Input current sensor error L1-phase open error	04
Abnormal power synchronous signal	08
PFC error (Overvoltage / Undervoltage / Overcurrent)	10
Input voltage sensor error	80

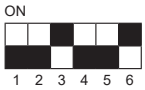
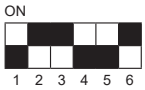
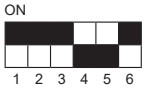
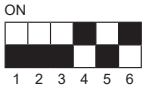
* Display examples for multiple errors:

Overvoltage (01) + Undervoltage (02) = 03

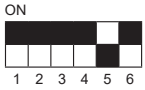
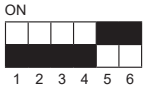
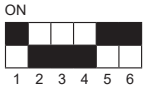
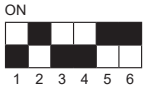
Undervoltage (02) + Power-sync. signal error (08) = 0A

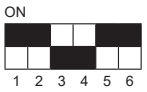
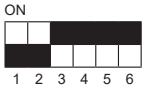
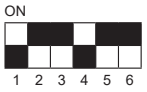
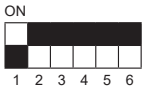
L1 phase open error (04) + PFC error (10) = 14

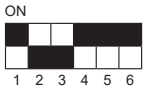
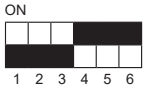
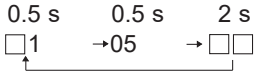
The black square (■) indicates a switch position.

SW2 setting	Display detail	Explanation for display	Unit
	DC bus voltage 180 to 500	180 to 500 (When it is 100 V or more, hundreds digit, tens digit, and ones digit are displayed alternately.)	V
	Capacity save 0 to 100 When air conditioner is connected to M-NET and capacity save mode is demanded, a value from “0” to ”100” is displayed. [When there is no setting of capacity save, “100” is displayed.]	0 to 100 (When the capacity is 100%, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 100%; 0.5 s 0.5 s 2 s □1 →00 →□□	%
	Error postponement code history (2) of outdoor unit	Postponement code display Blinking: During postponement Lighting: Cancellation of postponement “00” is displayed in the case of no postponement.	Code display
	Error postponement code history (3) of outdoor unit	Postponement code display Blinking: During postponement Lighting: Cancellation of postponement “00” is displayed in the case of no postponement.	Code display
	Error history (3) (Oldest) Alternate display of abnormal unit number and code.	When no error history, “0” and “– –“ are displayed alternately.	Code display
	Error thermistor display [When there is no error thermistor, “–“ is displayed.]	3: Liquid/Suction pipe temperature (TH3, TH32) 4: Discharge pipe temperature (TH4) 6: 2-phase pipe temperature (TH6) 7: Ambient temperature (TH7) 8: Heat sink temperature (TH8) 33: Comp. surface temperature (TH33)	Code display
	Operation frequency on error occurring 0 to 255	0 to 255 (When it is 100 Hz or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 125 Hz; 0.5 s 0.5 s 2 s □1 →25 →□□	Hz
	Fan step on error occurring 0 to 25	0 to 25	Step

The black square (■) indicates a switch position.

SW2 setting	Display detail	Explanation for display	Unit
	Indoor room temperature (TH1) on error occurring 46 to 102	46 to 102˚F [8 to 39°C]	˚F [˚C]
	Indoor pipe temperature/Liquid (TH2) on error occurring −38 to 190	−38 to 190˚F [−39 to 88°C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.) (Example) When –15˚F [-26°C]; 0.5 s 0.5 s 2 s -□ →15 →□□	˚F [˚C]
	Indoor pipe temperature/Cond./ Eva. (TH5) on error occurring −38 to 190	−38 to 190˚F [−39 to 88°C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.) (Example) When –15˚F [-26°C]; 0.5 s 0.5 s 2 s -□ →15 →□□	˚F [˚C]
	Outdoor pipe temperature/2-phase (TH6) on error occurring −58 to 194	−58 to 194˚F [−50 to 90°C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.) (Example) When –15˚F [-26°C]; 0.5 s 0.5 s 2 s -□ →15 →□□	˚F [˚C]
	Outdoor ambient temperature (TH7) on error occurring −58 to 194	−58 to 194˚F [−50 to 90°C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.) (Example) When –15˚F [-26°C]; 0.5 s 0.5 s 2 s -□ →15 →□□	˚F [˚C]
	Outdoor heat sink temperature (TH8) on error occurring −40 to 392	−40 to 392˚F [−40 to 200°C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.) (When the temperature is 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.)	˚F [˚C]

SW2 setting	Display detail	Explanation for display	Unit
	Discharge superheat on error occurring SHd 32 to 491 [Cooling = TH4−TH6 Heating = TH4−TH5]	32 to 491˚F [0 to 255˚C] (When the temperature is 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 150˚F [65°C]; 0.5 s 0.5 s 2 s □1 → 50 → □□	˚F [˚C]
	Subcooling on error occurring. SC 32 to 266 [Cooling = TH6-TH3 Heating = TH5-TH2]	32 to 266˚F [0 to 130˚C] (When the temperature is 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 115˚F [46°C]; 0.5 s 0.5 s 2 s □1 → 15 → □□	˚F [˚C]
	Thermostat-on time until error stops 0 to 999	0 to 999 (When it is 100 minutes or more, hundreds digit, tens digit, and ones digit are displayed alternately.) (Example) When 415 minutes; 0.5 s 0.5 s 2 s □4 → 15 → □□	Minute
	Pipe temperature/Suction (TH32) −58 to 194	−58 to194˚F [−50 to 90˚C] (When the coil thermistor detects 0˚F [-17°C] or below, “–” and temperature are displayed alternately.) (Example) When -10˚F [-23°C]; 0.5 s 0.5 s 2 s -□ →10 → □□	˚F [˚C]
	Indoor pipe temperature/Liquid (TH2 (3)) Indoor 3 −38 to 190	−38 to 190˚F [−39 to 88°C] (When the temperature is 0°F [-17°C] or less, “–” and temperature are displayed alternately.)	˚F [˚C]
	Indoor pipe temperature/Cond./ Eva. (TH5 (3)) Indoor 3 −38 to 190	−38 to 190˚F [−39 to 88°C] (When the temperature is 0°F [-17°C] or less, “–” and temperature are displayed alternately.) When there is no indoor unit, “00” is displayed.	˚F [˚C]
	Indoor pipe temperature/Liquid (TH2 (4)) Indoor 4 −38 to 190	−38 to 190˚F [−39 to 88°C] (When the temperature is 0˚F [-17°C] or less, “–” and temperature are displayed alternately.)	˚F [˚C]

<table>
<tr><th>SW2 setting</th><th>Display detail</th><th>Explanation for display</th><th>Unit</th></tr>
<tr>
<td> 
</td>
<td>Controlling status of compressor operating frequency</td>
<td>The following code will be a help to know the operating status of unit.
• The tens digit
<table>
<tr><th>Display</th><th>Compressor operating frequency control</th></tr>
<tr><td>1</td><td>Primary current control</td></tr>
<tr><td>2</td><td>Secondary current control</td></tr>
</table>
• The ones digit (In this digit, the total number of activated control is displayed.)
<table>
<tr><th>Display</th><th>Compressor operating frequency control</th></tr>
<tr><td>1</td><td>Preventive control for excessive temperature rise of discharge temperature</td></tr>
<tr><td>2</td><td>Preventive control for excessive temperature rise of condensing temperature</td></tr>
<tr><td>4</td><td>Frost prevention control</td></tr>
<tr><td>8</td><td>Preventive control for excessive temperature rise of heatsink</td></tr>
</table>
(Example)
The following controls are activated.
• Primary current control
• Preventive control for excessive temperature rise of condensing temperature
• Preventive control for excessive temperature rise of heatsink
LED
  </td>
<td>Code display</td>
</tr>
<tr>
<td> 
</td>
<td>Comp. surface temperature (TH33)
−4 to 422</td>
<td>−4 to 422˚F [−20 to 217˚C]
(When the comp. surface thermistor detects 100˚F [37°C] or more, hundreds digit, tens digit, and ones digit are displayed alternately.)
(Example) When 105˚F [40°C];
 
</td>
<td>˚F
[˚C]</td>
</tr>
</table>

11 EASY MAINTENANCE FUNCTION

11-1. SMOOTH MAINTENANCE

Refer to "15-9. [Smooth Maintenance]" for operation procedure.

11-2. GUIDE FOR OPERATION CONDITION

Checkpoints

Enter the temperature differences between 5, 4, 7, and 8 into the graph given below.
Operation state is determined according to the plotted areas on the graph.
For data measurements, set the fan speed to "Hi" before activating maintenance mode.

Inspection item				Result	
Power supply	Loose connection	Terminal block	Breaker	Good	Retightened
			Outdoor Unit	Good	Retightened
			Indoor Unit	Good	Retightened
		(Insulation resistance)			MΩ
		(Voltage)			V
Compressor		1 Accumulated operating time			Time
		2 Number of ON/OFF times			Times
		3 Current			A
Outdoor unit	Temperature	4 Refrigerant/heat exchanger temperature		COOL °F	HEAT °F
		5 Refrigerant/discharge temperature		COOL °F	HEAT °F
		6 Air/outside air temperature		COOL °F	HEAT °F
		(Air/discharge air temperature)		COOL °F	HEAT °F
	Cleanliness	Appearance		Good	Cleaning required
		Heat exchanger		Good	Cleaning required
		Sound/vibration		None	Present
Indoor unit	Temperature	7 Air/intake air temperature		COOL °F	HEAT °F
		(Air/discharge air temperature)		COOL °F	HEAT °F
		8 Refrigerant/heat exchanger temperature		COOL °F	HEAT °F
		9 Filter operating time *			Time
	Cleanliness	Decorative panel		Good	Cleaning required
		Filter		Good	Cleaning required
		Fan		Good	Cleaning required
		Heat exchanger		Good	Cleaning required
		Sound/vibration		None	Present

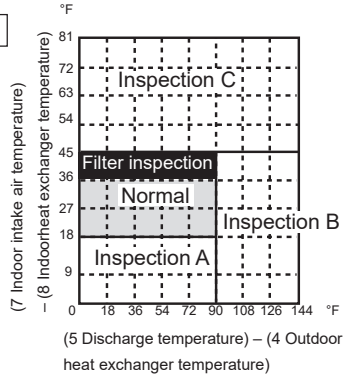
* The filter operating time is the time that has elapsed since the filter was reset.

Classification		Item	Result	
Cool	Inspection	Is "000" displayed stably in Display D on the remote controller?	Stable	Unstable
	Temperature difference	(5 Discharge temperature) – (4 Outdoor heat exchanger temperature)	°F	
		(7 Indoor intake air temperature) – (8 Indoor heat exchanger temperature)	°F	
Heat	Inspection	Is "000" displayed stably in Display D on the remote controller?	Stable	Unstable
	Temperature difference	(5 Discharge temperature) – (8 Indoor heat exchanger temperature)	°F	
		(8 Indoor heat exchanger temperature) – (7 Indoor intake air temperature)	°F	

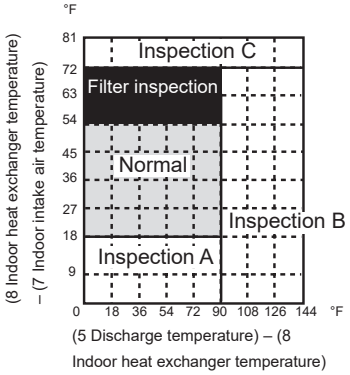
Note:

1. Fixed Hz operation may not be possible under the following temperature ranges
   A) In cool mode, outdoor intake air temperature is 104 °For higher or indoor intake air temperature is 73 °F or lower.
   B) In heat mode, outdoor intake air temperature is 68 °F or higher or indoor intake air temperature is 77 °F or lower.
2. If the air conditioner is operated at a temperature range other than the ones above but operation is not stabilized after 30 minutes or more have elapsed, carry out inspection.
3. In heat mode, the operation state may vary due to frost forming on the outdoor heat exchanger.

Cool mode



Heat mode



Result

Area	Check item	Judgement Cool	Judgement Heat
Normal	Normal operation state		
Filter inspection	Filter may be clogged.*		
Inspection A	Performance has dropped. Detailed inspection is necessary.		
Inspection B	Refrigerant amount is dropping.		
Inspection C	Filter or indoor heat exchanger may be clogged.		

Note: The above judgment is just guide based on Japanese standard conditions. It may be changed depending on the indoor and outdoor temperature.

* It may be judged as "filter inspection" due to the outdoor and indoor temperature, even though it is not clogged.

12 FUNCTION SETTING

12-1. UNIT FUNCTION SETTING BY THE REMOTE CONTROLLER

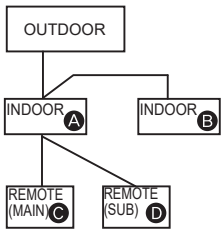
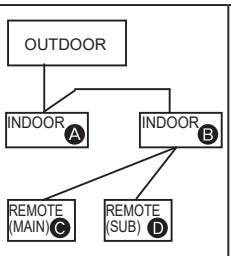
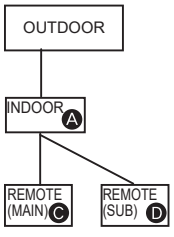
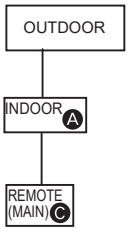
Each function can be set as necessary using the remote controller. The setting of function for each unit can only be done by the remote controller. Select function available from the table 1.

(1) Functions available when setting the unit number to 00 (Select 00 referring to ④ setting the indoor unit number.)

<Table 1> Function selections

Function	Settings	Mode No. Wired remote controller (RF thermistor)	Setting No.	●: Initial setting (when sent from the factory)	Remarks
Power failure automatic recovery	Not available	01	1		The setting is applied to all the units in the same refrigerant system.
	Available		2	●	
Indoor temperature detection	Average data from each indoor unit	02	1	●	
	Data from the indoor unit with remote controllers		2		
	Data from main remote controllers		3	(● RVZ)	
LOSSNAY connectivity	Not supported	03	1	●	
	Supported (indoor unit does not intake outdoor air through LOSSNAY)		2		
	Supported (indoor unit intakes outdoor air through LOSSNAY)		3		
Power supply voltage	230 V	04	1	●	
	208 V		2		
Frost prevention temperature	2°C [36°F] (Normal)	15	1	●	
	3°C [37°F]		2		
Humidifier control	When the compressor operates, the humidifier also operates.	16	1		
	When the fan operates, the humidifier also operates.		2	●	
Change of defrosting control	Standard	17	1	●	
	For high humidity		2		

Meaning of "Function setting"
Mode02: indoor temperature detecting

No.	Indoor temperature(ta)=					
No.1	Average data of sensor on all indoor units	Initial setting	ta = (A+B)/2	ta = (A+B)/2	ta = A	ta = A
No.2	Data of sensor on indoor unit that connected with remote controller	Initial setting	ta = A	ta = B	ta = A	ta = A
No.3	Data of sensor on main remote controller	Initial setting	ta = C	ta = C	ta = C	ta = C

(2) Functions available when setting the unit number to 01–02 or AL (07 in the case of wireless remote controller). Refer to the service manual that comes with each indoor unit.

12-2. SELECTING FUNCTIONS USING THE REMOTE CONTROLLER

Refer to "15-3. [Service menu]" and "15-5. [Function setting]" when selecting functions.

13 MONITORING THE OPERATION DATA BY THE REMOTE CONTROLLER

13-1. HOW TO "MONITOR THE OPERATION DATA"

Refer to "15-10. [Request code]" when monitoring the operation data.

13-2. REQUEST CODE LIST

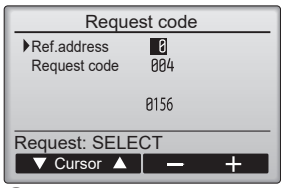
Request code	Request content	Description (Display range)	Unit	Remarks
0	Operation state	Refer to 13-2-1. Detail Contents in Request Code.	-	
1	Compressor-Operating current (rms)	0-50	A	
2	Compressor-Accumulated operating time	0–9999	10 hours	
3	Compressor-Number of operation times	0–9999	100 times	
4	Discharge temperature (TH4)	-4-422	°F	
5	Outdoor unit-Liquid pipe 1 temperature (TH3)	-58-194	°F	
6				
7	Outdoor unit-2-phase pipe temperature (TH6)	-58-194	°F	
8	Suction temperature (TH32)	-58-194	°F	
9	Outdoor unit-Ambient temperature (TH7)	-58-194	°F	
10	Outdoor unit-Heat sink temperature (TH8)	-40-392	°F	
11				
12	Discharge super heat (SHd)	0-327	°F	
13	Subcooling (SC)	0-234	°F	
14				
15				
16	Compressor-Operating frequency	0-255	Hz	
17	Compressor-Target operating frequency	0-255	Hz	
18	Outdoor unit-Fan output step	0-25	Step	
19	Outdoor unit-Fan 1 speed (Only for air conditioners with DC fan motor)	0-9999	rpm	
20	Outdoor unit-Fan 2 speed (Only for air conditioners with DC fan motor)	0-9999	rpm	"0" is displayed if air conditioner is a single-fan type.
21				
22	LEV-A opening	0-500	Pulses	
23	LEV-B opening	0-500	Pulses	
24				
25	Primary current	0–50	A	
26	DC bus voltage	180-370	V	
27				
28				
29	Number of connected indoor units	0-1	Units	
30	Indoor unit-Setting temperature	62-86	°F	
31	Indoor unit-Intake air temperature <Measured by thermostat>	46-102	°F	
32	Indoor unit-Intake air temperature (Unit No. 1) <Heat mode-4-degree correction>	46-102	°F	"0" is displayed if target unit is not present.
33	Indoor unit-Intake air temperature (Unit No. 2) <Heat mode-4-degree correction>	46-102	°F	↑
34	Indoor unit-Intake air temperature (Unit No. 3) <Heat mode-4-degree correction>	46-102	°F	↑
35	Indoor unit-Intake air temperature (Unit No. 4) <Heat mode-4-degree correction>	46-102	°F	↑
36				
37	Indoor unit-Liquid pipe temperature (Unit No. 1)	-38-190	°F	"0" is displayed if target unit is not present.
38	Indoor unit-Liquid pipe temperature (Unit No. 2)	-38-190	°F	↑
39	Indoor unit-Liquid pipe temperature (Unit No. 3)	-38-190	°F	↑
40	Indoor unit-Liquid pipe temperature (Unit No. 4)	-38-190	°F	↑
41				
42	Indoor unit-Cond./Eva. pipe temperature (Unit No. 1)	-38-190	°F	"0" is displayed if target unit is not present.
43	Indoor unit-Cond./Eva. pipe temperature (Unit No. 2)	-38-190	°F	↑
44	Indoor unit-Cond./Eva. pipe temperature (Unit No. 3)	-38-190	°F	↑
45	Indoor unit-Cond./Eva. pipe temperature (Unit No. 4)	-38-190	°F	↑
46				
47				
48	Thermo ON operating time	0-999	Minutes	
49	Test run elapsed time	0-120	Minutes	← Not possible to activate maintenance mode during test run.

Request code	Request content	Description (Display range)	Unit	Remarks
50	Indoor unit-Control state	Refer to 13-2-1. Detail Contents in Request Code.	-	
51	Outdoor unit-Control state	Refer to 13-2-1. Detail Contents in Request Code.	-	
52	Compressor-Frequency control state	Refer to 13-2-1. Detail Contents in Request Code.	-	
53	Outdoor unit-Fan control state	Refer to 13-2-1. Detail Contents in Request Code.	-	
54	Actuator output state	Refer to 13-2-1. Detail Contents in Request Code.	-	
55	Error content (U9)	Refer to 13-2-1. Detail Contents in Request Code.	-	
56				
57				
58				
59				
60	Signal transmission demand capacity	0-255	%	
61	Contact demand capacity	Refer to 13-2-1.Detail Contents in Request Code.	-	
62	External input state	Refer to 13-2-1.Detail Contents in Request Code.	-	
63				
64				
65				
66				
67				
68				
69				
70	Outdoor unit-Capacity setting display	Refer to 13-2-1.Detail Contents in Request Code.	-	
71	Outdoor unit-Setting information	Refer to 13-2-1.Detail Contents in Request Code.	-	
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84	M-NET adapter connection (presence/absence)	"0000": Not connected "0001": Connected	-	
85				
86				
87				
88				
89	Display of execution of replace/wash operation	"0000": Not connected "0001": Connected	-	
90	Outdoor unit-Microprocessor version information	Examples) Ver 5.01 ➔ "0501"	Ver	
91	Outdoor unit-Microprocessor version information (sub No.)	Auxiliary information (displayed after version information) Examples) Ver 5.01 A000 ➔ "A000"	-	
92				
93				
94				
95				
96				
97				
98				
99				
100	Outdoor unit-Error postponement history 1 (latest)	Displays postponement code. (" - - " is displayed if no postponement code is present)	Code	
101	Outdoor unit-Error postponement history 2 (previous)	Displays postponement code. (" - - " is displayed if no postponement code is present)	Code	
102	Outdoor unit-Error postponement history 3 (second to last)	Displays postponement code. (" - - " is displayed if no postponement code is present)	Code	

Request code	Request content	Description (Display range)	Unit	Remarks
103	Error history 1 (latest)	Displays error history. (" - - " is displayed if no history is present.)	Code	
104	Error history 2 (second to last)	Displays error history. (" - - " is displayed if no history is present.)	Code	
105	Error history 3 (third to last)	Displays error history. (" - - " is displayed if no history is present.)	Code	
106	Abnormal thermistor display (TH3/TH6/TH7/TH8)	3: TH3 6: TH6 7: TH7 8: TH8 0: No thermistor error	Sensor number	
107	Operation mode at time of error	Displayed in the same way as request code "0".	-	
108	Compressor-Operating current at time of error	0-50	A	
109	Compressor-Accumulated operating time at time of error	0-9999	10 hours	
110	Compressor-Number of operation times at time of error	0-9999	100 times	
111	Discharge temperature at time of error	-4-422	°F	
112	Outdoor unit - Liquid pipe 1 temperature (TH3) at time of error	-58-194	°F	
113				
114	Outdoor unit-2-phase pipe temperature (TH6) at time of error	-58-194	°F	
115	Outdoor suction pipe temperature (TH32) at time of error	-58-194	°F	
116	Outdoor unit-Ambient temperature (TH7) at time of error	-58-194	°F	
117	Outdoor unit-Heat sink temperature (TH8) at time of error	-40-392	°F	
118	Discharge super heat (SHd) at time of error	0-327	°F	
119	Subcooling (SC) at time of error	0-255	°F	
120	Compressor-Operating frequency at time of error	0–255	Hz	
121	Outdoor unit at time of error • Fan output step	0-10	Step	
122	Outdoor unit at time of error • Fan 1 speed (Only for air conditioners with DC fan)	0-9999	rpm	
123	Outdoor unit at time of error • Fan 2 speed (Only for air conditioners with DC fan)	0-9999	rpm	"0" is displayed if air conditioner is a single-fan type.
124				
125	LEV-A opening at time of error	0-500	Pulses	
126	LEV-B opening at time of error	0-500	Pulses	
127				
128				
129				
130	Thermo ON time until operation stops due to error	0–999	Minutes	
131				
132	Indoor - Liquid pipe temperature at time of error	-38-190	°F	Average value of all indoor units is displayed if air conditioner consists of two or more indoor units (twin, triple, quad).
133	Indoor-Cond./Eva. pipe temperature at time of error	-38-190	°F	Average value of all indoor units is displayed if air conditioner consists of two or more indoor units (twin, triple, quad).
134	Indoor at time of error • Intake air temperature <Thermostat judge temperature>	-38-190	°F	
135				
136				
137				
138				
139				
140				
~				
146				
147				
148				
149				
150	Indoor-Actual intake air temperature	-38-190	°F	↑
151	Indoor - Liquid pipe temperature	-38-190	°F	↑
152	Indoor-Cond./Eva. pipe temperature	-38-190		

Request code	Request content	Description (Display range)	Unit	Remarks
153				
154	Indoor-Fan operating time (After filter is reset)	0–9999	1 hour	
155	Indoor-Total operating time (Fan motor ON time)	0–9999	10 hours	
156				
157	Indoor fan output value (Sj value)	0–255 Fan control data	-	For indoor fan phase control
158	Indoor fan output value (Pulsation ON/OFF)	"00 **" ** indicates fan control data.	-	For indoor fan pulsation control
159	Indoor fan output value (duty value)	"00 **" ** indicates fan control data.	-	For indoor DC brushless motor control
160				
161				
162	Indoor unit-Model setting information	Refer to 13-2-1. Detail Contents in Request Code.	-	
163	Indoor unit-Capacity setting information	Refer to 13-2-1. Detail Contents in Request Code.	-	
164	Indoor unit-SW3 information	Undefined	-	
165	Wireless pair No. (indoor control board side) setting	Refer to 13-2-1. Detail Contents in Request Code.	-	
166	Indoor unit-SW5 information	Undefined	-	
167				
~				
189				
190	Indoor unit-Microprocessor version information	Examples) Ver 5.01 ➔ "0501"	Ver	
191	Indoor unit-Microprocessor version information (sub No.)	Auxiliary information (displayed after version information) Examples) Ver 5.01 A000 ➔ "A000"	-	
192				

13-2-1. Detail Content in Request Code



[Example) Request code "004"
Discharge temperature 156°F
Refrigerant address "00"]

Operation state (Request code: "0")

Data display

		C	4

Relay output state

Operation mode

Operation mode

Display	Operation mode
0	STOP • FAN
C	COOL • DRY
H	HEAT
d	DEFROST

Relay output state

Display	Power currently supplied to compressor	Compressor	4-way valve	Solenoid valve
0	-	-	-	-
1				ON
2			ON	
3			ON	ON
4		ON		
5		ON		ON
6		ON	ON	
7		ON	ON	ON
8	ON			
A	ON		ON	

Indoor unit-Control state (Request code: "50")

Data display

*	*	*	*

Unit No. 4 state
Unit No. 3 state
Unit No. 2 state
Unit No. 1 state

Operation mode

Display	State
0	Normal
1	Preparing for heat operation.
2	-
3	-
4	Heater is ON.
5	Anti-freeze protection is ON.
6	Overheat protection is ON.
7	Requesting compressor to turn OFF.
F	There are no corresponding units.

Outdoor unit-Control state (Request code: "51")

Data display				State
0	0	0	0	Normal
0	0	0	1	Preparing for heat operation.
0	0	0	2	Defrost

Compressor-Frequency control state (Request code: "52")

Data display

0	0	*	*

Frequency control state 2
Frequency control state 1

Frequency control state 1

Display	State
0	No current limit
1	Primary current limit control is ON.
2	Secondary current limit control is ON.

Frequency control state 2

Display	Discharge temperature overheat prevention	Condensation temperature overheat prevention	Anti-freeze protection control	Heat sink temperature overheat prevention
0				
1	Controlled			
2		Controlled		
3	Controlled	Controlled		
4			Controlled	
5	Controlled		Controlled	
6		Controlled	Controlled	
7	Controlled	Controlled	Controlled	
8				Controlled
9	Controlled			Controlled
A		Controlled		Controlled
b	Controlled	Controlled		Controlled
C			Controlled	Controlled
d	Controlled		Controlled	Controlled
E		Controlled	Controlled	Controlled
F	Controlled	Controlled	Controlled	Controlled

Fan control state (Request code: "53")

Data display

0	0	*	*

Fan step correction value by heatsink temperature overheat prevention control
Fan step correction value by cool condensation temperature overheat prevention control

Display	Correction valve
- (minus)	-1
0	0
1	+1
2	+2

Actuator output state (Request code: "54")

Data display

0	0	*	*

Actuator output state 1
Actuator output state 2

Actuator output state 1

Display	SV1	4-way valve	Compressor	Compressor is warming up
0				
1	ON			
2		ON		
3	ON	ON		
4			ON	
5	ON		ON	
6		ON	ON	
7	ON	ON	ON	
8				ON
9	ON			ON
A		ON		ON
b	ON	ON		ON
C			ON	ON
d	ON		ON	ON
E		ON	ON	ON
F	ON	ON	ON	ON

Actuator output state 2

Display	52C	SV2	SS
0			
1	ON		
2		ON	
3	ON	ON	
4			ON
5	ON		ON
6		ON	ON
7	ON	ON	ON

Error content (U9) (Request code: "55")

Data display

0	0	*	*

Error content 1
Error content 2

Error content 1 ●: Detected

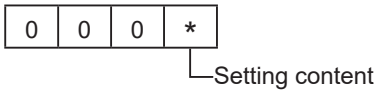
Display	Overvoltage error	Undervoltage error	L_1-phase open error	Power synchronizing signal error
0				
1	●			
2		●		
3	●	●		
4			●	
5	●		●	
6		●	●	
7	●	●	●	
8				●
9	●			●
A		●		●
b	●	●		●
C			●	●
d	●		●	●
E		●	●	●
F	●	●	●	●

Error content 2 ●: Detected

Display	Converter Fo error	PAM error	Input voltage sensor error
0			
1	●		
2		●	
3	●	●	
8			●
9	●		●
A		●	●
b	●	●	●

Contact demand capacity (Request code: "61")

Data display

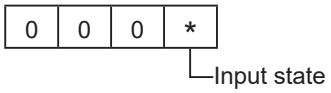


Setting content

Display	Setting value	Setting	
		SW7-1	SW7-2
0	0%		
1	50%	ON	
2	75%		ON
3	100%	ON	ON

External input state (Request code: "62")

Data display



Input state ●: Input position

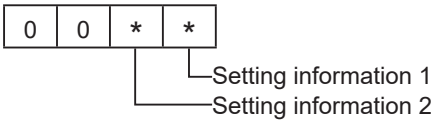
Display	Contact demand input	Spare 1 input	Spare 2 input
0			
1	●		
2			
3	●		
4		●	
5	●	●	
6		●	
7	●	●	
8			●
9	●		●
A			●
b	●		●
C		●	●
d	●	●	●
E		●	●
F	●	●	●

Outdoor unit-Capacity setting display (Request code: "70")

Data Display	Capacity
9	12
10	18
11	24
14	30
20	36
25	42
28	48
34	60

Outdoor unit-Setting information (Request code: "71")

Data display



Setting information 1

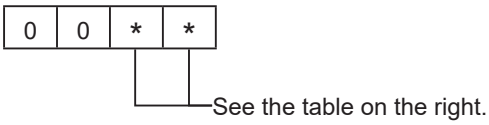
Display	Defrost mode
0	Standard
1	For high humidity

Setting information 2

Display	Single-/ 3-phase	Heat pump/ cooling only
0	Single-phase	Heat pump
1		Cooling only
2	3-phase	Heat pump
3		Cooling only

Indoor unit-Capacity setting information (Request code: "163")

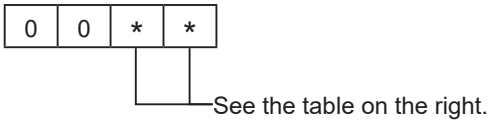
Data display



Display	Capacity setting state	Display	Capacity setting state
00		10	42
01		11	
02		12	48
03		13	60
04		14	
05		15	
06	12	16	
07		17	
08		18	
09	18	19	
0A		1A	
0b	24	1b	
0C		1C	
0d	30	1d	
0E		1E	
0F	36	1F	

Wireless pair No. (indoor control board side) setting (Request code: "165")

Data display



Display	Pair No. setting state
00	No. 0
01	No. 1 J41 disconnected
02	No. 2 J42 disconnected
03	No. 3 J41, J42 disconnected

14 DISASSEMBLY PROCEDURE

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

Note: The red markings indicate that flammable refrigerant is charged. If you remove the markings, put them back to the original position after the work is completed.

PROCEDURE

1. Removing the service panel, top panel, ice guard, and propeller

(1) Remove the 4 service panel fixing screws (5 × 12) and slide the hook on the right downward to remove the service panel. (See Photo 1.)
(2) Remove the screws (2 for front, 3 for rear/5 × 12) of the top panel and remove it. (See Photo 1.)
(3) Remove the 4 grille fixing screws (5 × 12) from each grille and remove it. (See Photo 1)
(4) Pull down the ice guard and remove it.
(5) Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2.)

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 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 the controller circuit board in electrical parts box.
(6) Remove the 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3.)
(7) When attaching the fan motor, make sure to route the cable through the hook below the fan motor and fix firmly with the clamp.

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

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 indoor/outdoor connecting wire from terminal block.
(4) Remove all the following connectors from controller circuit board; fan motor, linear expansion valve, thermistor <Liquid pipe>, thermistor <Discharge pipe>, thermistor <2-phase pipe>, thermistor <Ambient>, high pressure switch, 4-way valve coil, and base heater. Then remove the screw (4 × 8) from the valve bed to remove the lead wire.
Pull out the disconnected wire from the electrical parts box.
<Diagram symbol in the connector housing>
• Fan motor (CNF1, CNF2)
• The linear expansion valve (LEV-A, B)
• Thermistor <Liquid pipe> (TH3)
• Thermistor <Discharge pipe> (TH4)
• Thermistor <Comp. surface> (TH33)
• Thermistor <2-phase pipe, Ambient> (TH6/7)
• Thermistor <Suction pipe> (TH32)
• Thermal protector (TRS)
• High pressure switch (63H)
• 4-way valve coil (21S4)
• Base heater (SV2)
(5) Remove the terminal cover and disconnect the compressor lead wire.
(6) Loosen the clamp for lead wires on the separator.
(7) Remove an electrical parts box fixing screw (2 for front /4 × 10) and detach the electrical parts box by pulling it upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.

PHOTOS/FIGURES

Photo 1

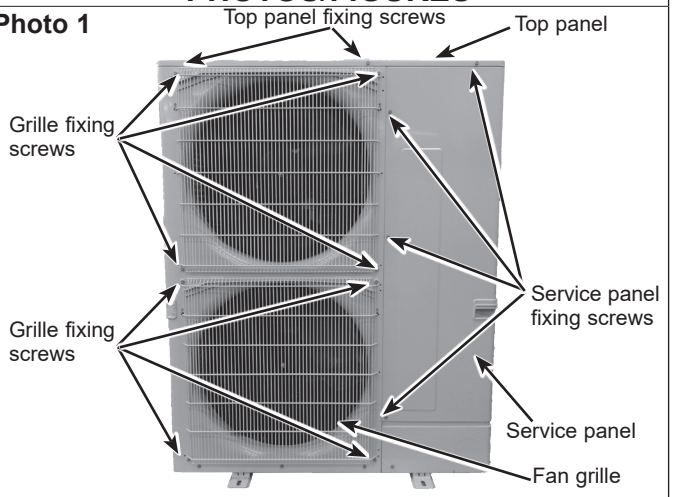


Photo 2

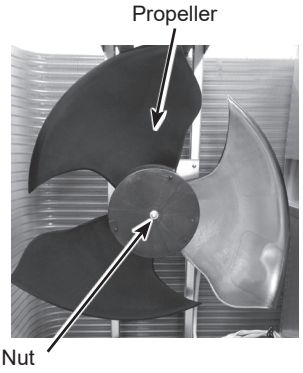


Photo 3

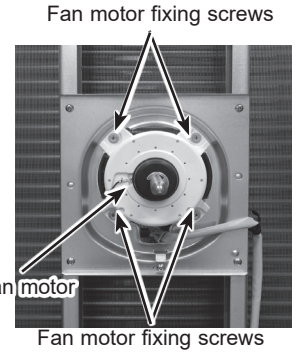
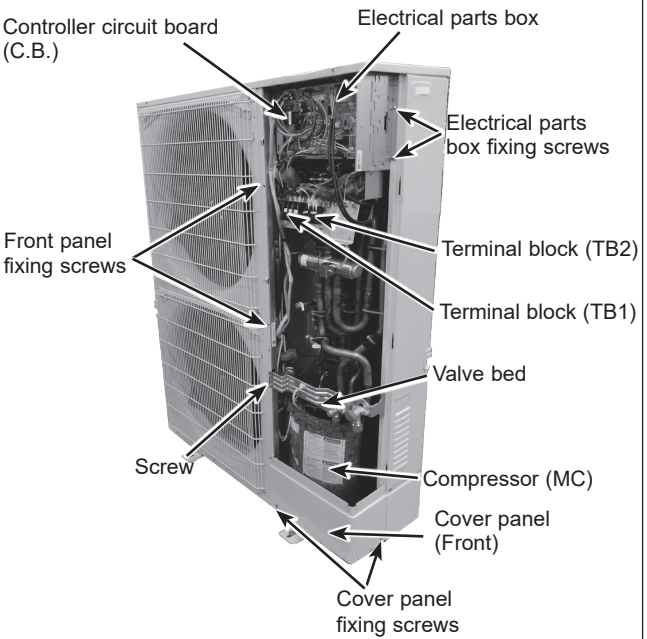
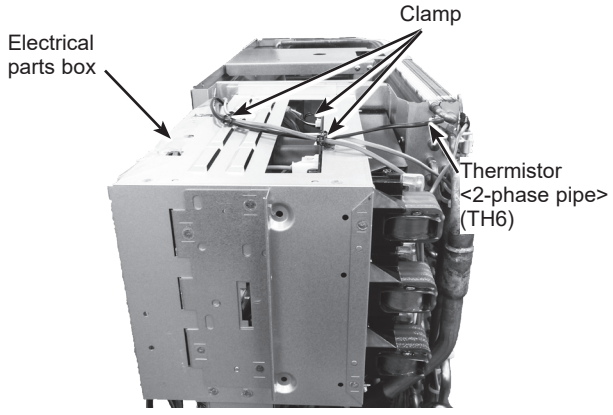
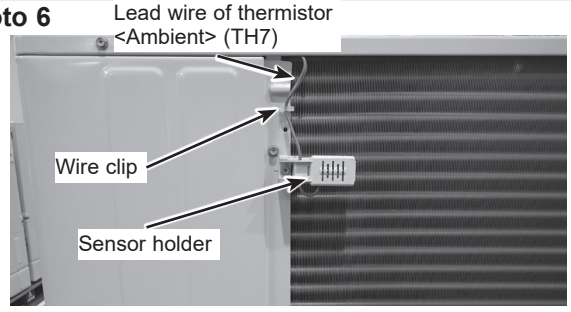
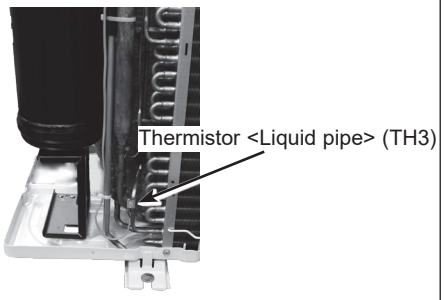
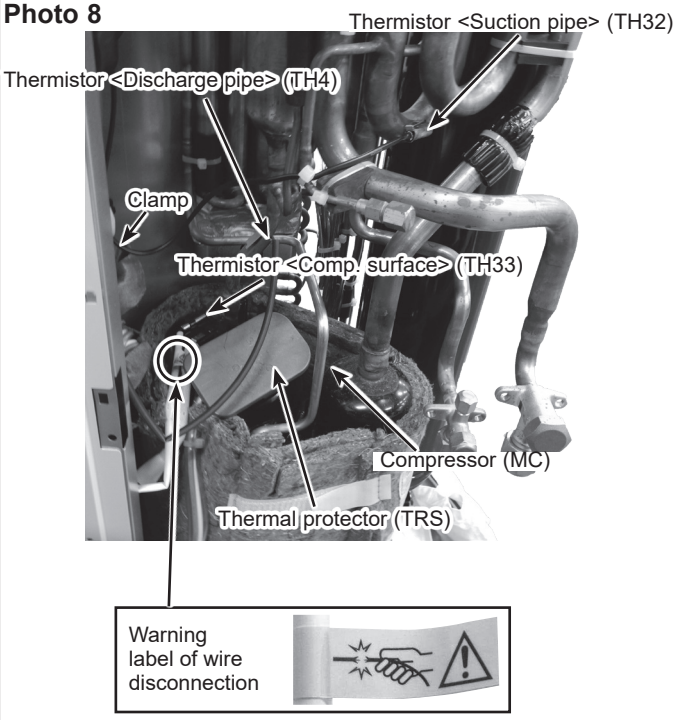
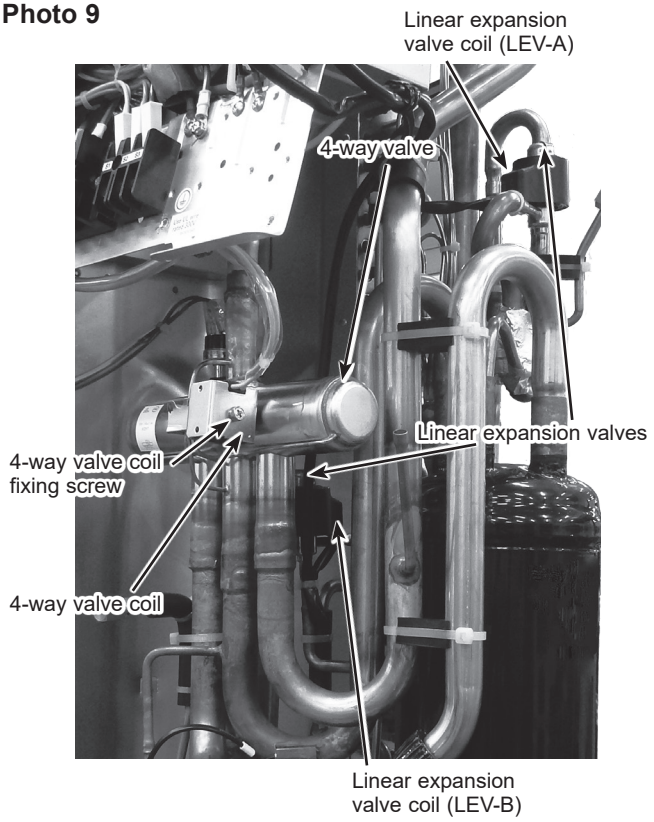
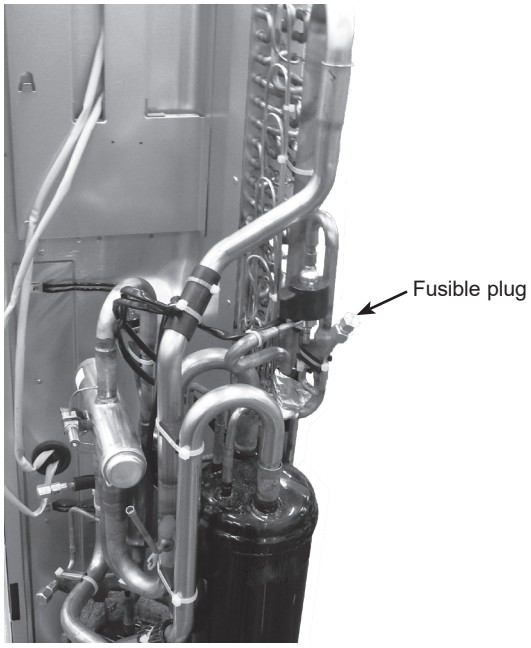


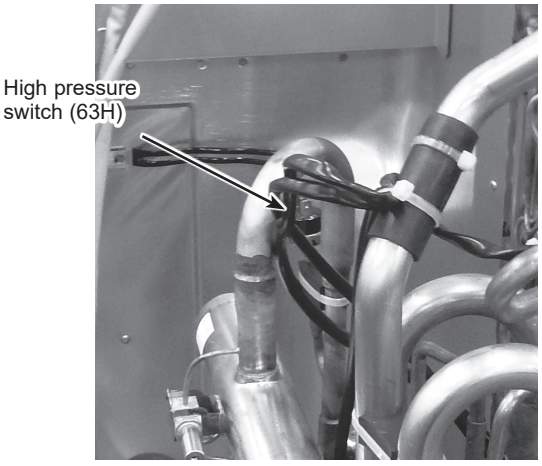
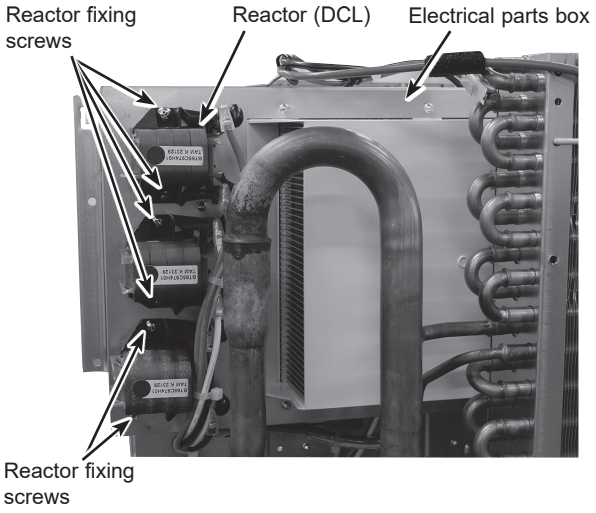
Photo 4



PROCEDURE	PHOTOS/FIGURES
4. Removing the thermistor <2-phase pipe> (TH6) (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Disconnect the connectors TH6 (red) on the controller circuit board in the electrical parts box. (4) Loosen the clamp for the lead wire in the rear of the electrical parts box. (5) Pull out the thermistor <2-phase pipe> (TH6) from the sensor holder. **Note: When replacing the thermistor <2-phase pipe> (TH6), replace it together with thermistor <Ambient> (TH7) and thermistor <Liquid pipe> (TH3) because they are combined together. Refer to No.5 below to remove the thermistor <Ambient> (TH7).**	**Photo 5** 
5. Removing the thermistor <Liquid pipe> (TH3) and 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 controller circuit board in the electrical parts box. (4) Loosen the clamp for the lead wire in the rear of the electrical parts box. (See Photo 5.) (5) Pull out the thermistor <Ambient> (TH7) from the sensor holder. (6) Pull out the thermistor <Liquid pipe> (TH3) from the sensor holder. (See Photo 7.) **Note 1: Attach the band to the same position when loosening it (5 pieces).** **Note 2: In the case of replacing thermistor <Ambient> (TH7) or thermistor <Liquid pipe> (TH3), replace it together with thermistor <2-phase pipe> (TH6) thermistor <Liquid pipe> (TH3), since they are combined together. Refer to No. 4 above to remove thermistor <2-phase pipe> (TH6).**	**Photo 6**  **Photo 7** 
6. Removing the thermistor <Discharge pipe> (TH4), thermistor <Comp. surface> (TH33), thermistor <Suction pipe> (TH32) and thermal protector (TRS) (1) Remove the service panel. (See Photo 1.) (2) Disconnect the connectors, TH32 (black), TH4 (white), and TH33 (yellow), on the controller circuit board in the electrical parts box. (3) Loosen fasteners for lead wires in the electrical parts box. Cut the band connecting the 63H lead wire and the lead wire of the thermal protector in the electrical parts box, and disconnect the relay connector of the thermal protector (TRS). (4) Loosen clamps for the lead wires on the separator. (See Photo 8) Loosen the clamp and the cable strap for lead wires on the bottom of the electrical parts box. (5) Loosen the clamp for the lead wire for TH32. (6) Pull out the thermistor <Comp. surface> (TH33) and thermistor <Suction pipe> (TH32) and thermal protector (TRS) from the sensor holder. Instead of holding the lead wires, hold the thermistor body when removing and installing the shell thermistor. See "Warning label of wire disconnection". (See Photo 8.) (7) Remove the damper and pull out the thermal protector (TRS) from the holder. (See Photo 8.)	**Photo 8** 

PROCEDURE	PHOTOS/FIGURES
7. Removing the 4-way valve coil (21S4) and linear expansion valve coil (LEV-A, B) (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) **Removing the 4-way valve coil** (3) Remove the 4-way valve coil fixing screw (M5 × 7). (4) Remove the 4-way valve coil by sliding the coil toward you. (5) Disconnect the connector 21S4 (green) on the controller circuit board in the electrical parts box. **Removing the linear expansion valve coil** (3) Remove the linear expansion valve coil by sliding the coil upward. (4) Disconnect the connectors LEV-A (white) and LEV-B (red) on the controller circuit board in the electrical parts box.	**Photo 9** 
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 4.) (4) Remove the 2 cover panel front fixing screws (5 × 12) and remove the cover panel front. (See Photo 4.) (5) Remove the 4 cover panel rear fixing screws (5 × 12) and remove the cover panel rear. (6) Remove the 3 valve bed fixing screws (5 × 12) and 4 stop valve fixing screws (5 × 20), then remove the valve bed. (7) Remove the 3 side panel (R) fixing screws (5 × 12) in the rear of the unit and then remove the side panel (R). (8) Remove the 4-way valve coil. (See Photo 9.) (9) Recover refrigerant. (10) Remove the welded part of 4-way valve. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: The welded part can be removed easily by removing the side panel (R).** **Note 3: When installing the 4-way valve, cover it with a wet cloth to prevent it from heating (250˚F [120°C] or more), then braze the pipes so that the inside of pipes are not oxidized.** **Note 4: Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it; protect the fusible plug with a wet cloth when necessary (fusible plug breaks at 158°F [70°C]).**	

PROCEDURE	PHOTOS/FIGURES
9. Removing linear expansion 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 4.) (4) Remove the cover panel front. (Refer to procedure 8.) (5) Remove the cover panel rear. (Refer to procedure 8.) (6) Remove the 3 valve bed fixing screws (5 × 12) and the 4 stop valve fixing screws (5 × 20), then remove the valve bed. (7) Remove the 3 side panel (R) fixing screws (5 × 12) in the rear of the unit and then remove the side panel (R). (8) Remove the linear expansion valve. (See Photo 9.) (9) Recover refrigerant. (10) Remove the welded part of linear expansion valve. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: The welded part can be removed easily by removing the side panel (R).** **Note 3: When installing the linear expansion valve, cover it with a wet cloth to prevent it from heating (250˚F or more), then braze the pipes so that the inside of pipes are not oxidized.** **Note 4: Be careful not to expose the fusible plug to the braze torch flame or transfer heat to it; protect the fusible plug with a wet cloth when necessary (fusible plug breaks at 158°F [70°C]).**	**Photo 10** 

PROCEDURE	PHOTOS/FIGURES
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 4.) (4) Remove the cover panel front. (Refer to procedure 8.) (5) Remove the cover panel rear. (Refer to procedure 8.) (6) Remove the valve bed. (Refer to procedure 8.) (7) Remove the side panel (R). (Refer to procedure 8.) (8) Pull out the lead wire of high pressure switch (63H). (9) Recover refrigerant. (10) Remove the welded part of high pressure switch (63H). **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: The welded part can be removed easily by removing the side panel (R).** **Note 3: When installing the high pressure switch, cover it with a wet cloth to prevent it from heating (210°F[100°C] or more), then braze the pipes so that the inside of pipes are not oxidized.**	**Photo 11** 
11. Removing the reactor (DCL) (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the electrical parts box. (See Photo 4.) <Removing the reactor> (4) Remove the reactor fixing screws (6 places, 4 × 10) and remove the reactor. **Note 1: The reactor is attached to the rear of the electrical parts box.** **Note 2: The 3 pieces of reactors to be replaced must have the same color of sticker. (Green, Orange, or Blue)**	**Photo 12** 

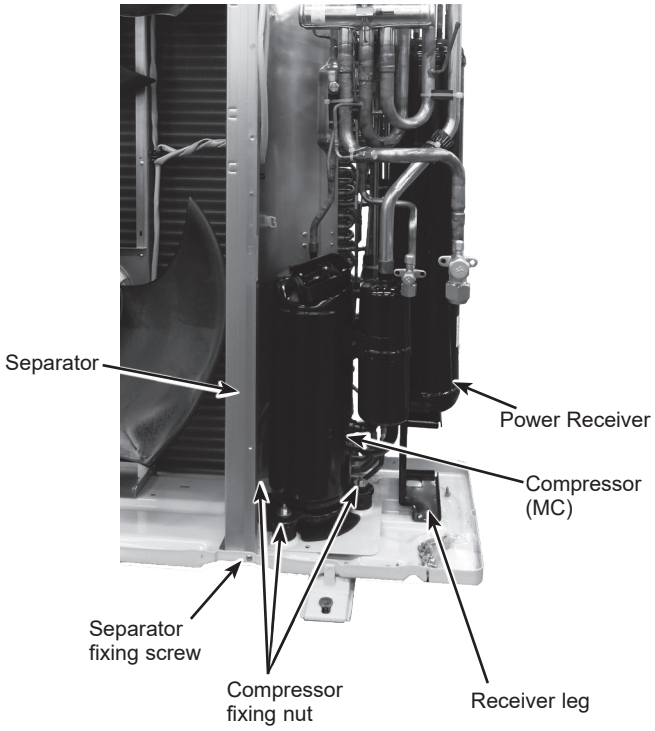
PROCEDURE	PHOTOS/FIGURES
12. Removing the compressor (MC) (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the screws on the front panel (2 screws on the top, 3 screws on the bottom, and 2 screws on the right). Then slide the front panel upward for removal. (4) Remove the electrical parts box. (See Photo 4.) (5) Remove the cover panel front. (Refer to procedure 8.) (6) Remove the cover panel rear. (Refer to procedure 8.) (7) Remove the valve bed. (Refer to procedure 8.) (8) Remove the side panel (R). (Refer to procedure 8.) (9) Remove 1 separator fixing screw (4 × 10) and move the separator to the fan side. Make sure that the separator is not in contact with the fan. (See Photo 14.) (10) Remove the comp felt for the compressor. (11) Recover refrigerant. (12) Remove the welded pipe of compressor inlet and outlet then remove the compressor. (See Photo 15.) (To install the compressor, tilt the outdoor unit backward so that the inlet and outlet pipes are facing upward. This allows you to easily connect the unit to the compressor.) (13) Remove the 3 points of the compressor fixing nut using a spanner or an adjustable wrench. **Note: Recover refrigerant without spreading it in the air.**	**Photo 13** 

Photo 14

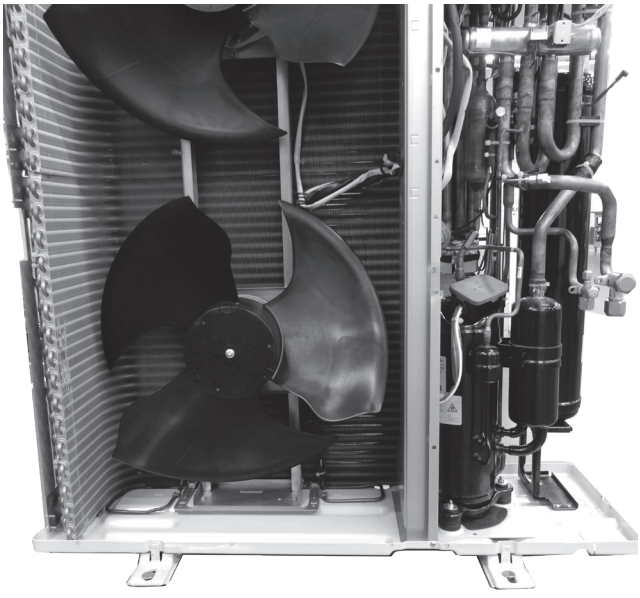
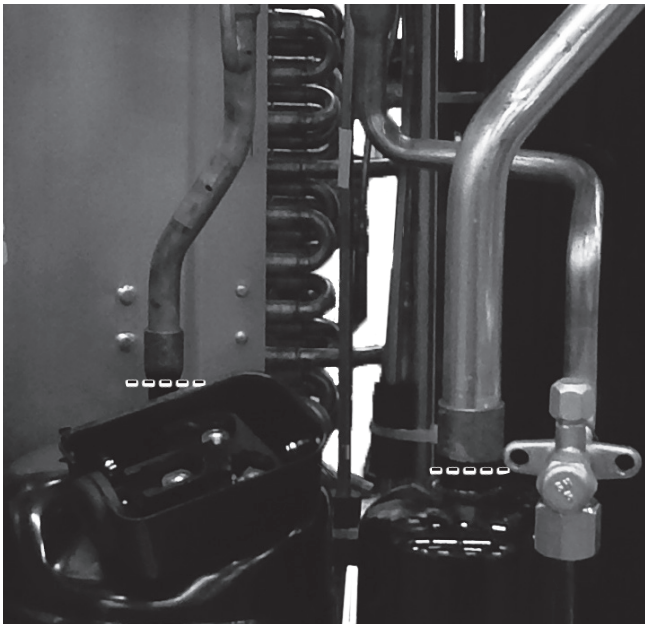
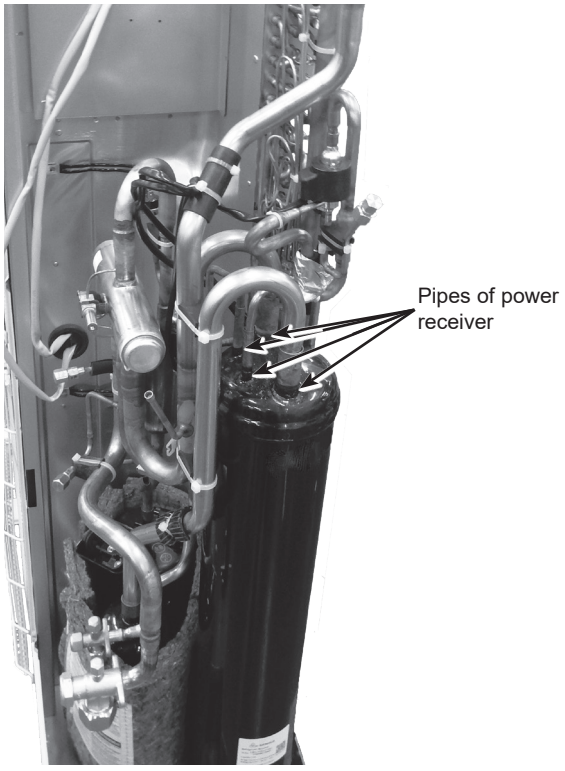
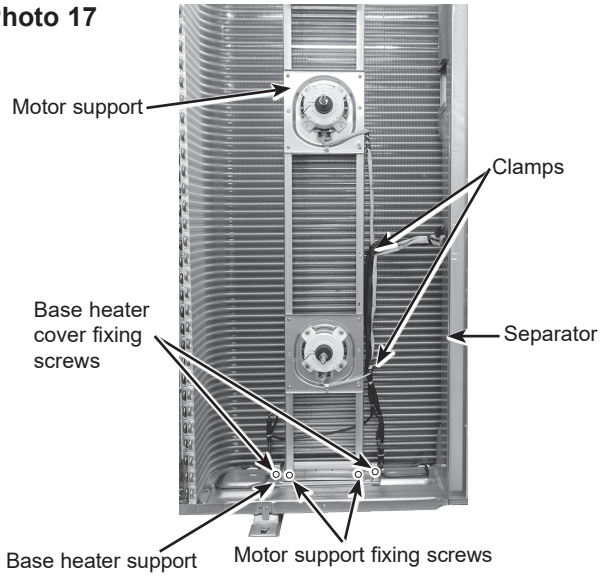
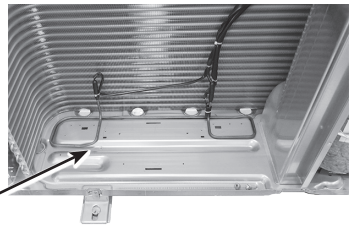


Photo 15



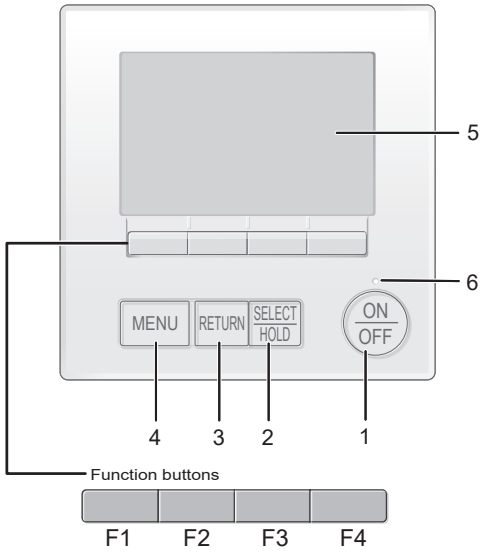
PROCEDURE	PHOTOS/FIGURES
13. Removing the power receiver (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the 2 front cover panel fixing screws (5 × 12) and remove the front cover panel. (See Photo 4.) (4) Remove the 4 rear cover panel fixing screws (5 × 12) and remove the rear cover panel. (5) Remove the electrical parts box. (See Photo 4.) (6) Remove the 3 valve bed fixing screws (5 × 12) and the 4 stop valve fixing screws (5 × 20), then remove the valve bed. (7) Remove the side panel (R) fixing screws (3 for the rear) and then remove the side panel (R). (See Photo 1.) (8) Recover refrigerant. (9) Remove 4 welded pipes of receiver inlet and outlet. (10) Remove 2 receiver leg fixing screws (4 × 10). **Note: Recover refrigerant without spreading it in the air.**	**Photo 16** 
14. Removing the base heater (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the upper 2 screws (5 × 12) fixing the motor support, the lower 3 screws (5 × 12) fixing the base and the 2 screws (4 × 10) fixing the separator to detach the front panel. (See Photo 4.) (4) Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2.) (5) Remove all of the following connectors from controller circuit board; <Diagram symbol in the connector housing> • Fan motor (CNF1, CNF2) • Base heater (SV2) Pull out the disconnected wire from the electrical parts box. (See Photo 4.) (6) Loosen the wire clamps on the side of the motor support and separator. (7) Remove the 2 motor support fixing screws (5 × 12), then remove the motor support with fan motor still attached. (See Photo 17.) (8) Remove the 2 base heater support fixing screws (4 × 10), then remove the base heater support. (9) Remove the base heater. (See Photo 18.) **Note:** **1. Tighten the propeller fan with a torque of 5.7 ± 0.3 N•m [4.2 ± 0.2 ft = lbs]** **2. Rotate the propeller fan and make sure that the base heater and the lead wires do not interfere with the movement of the propeller fan.**	**Photo 17**  **Photo 18** 

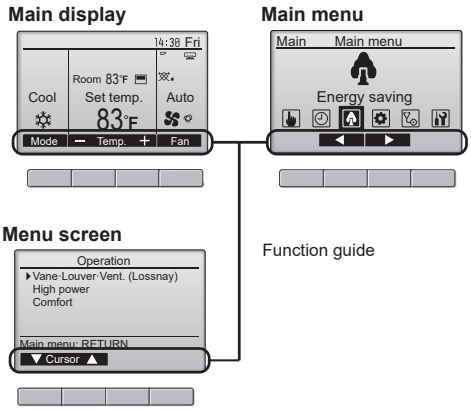
15 REMOTE CONTROLLER

15-1. Remote controller functions

15-1-1. PAR-42MAAUB

Controller interface





Note:

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

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

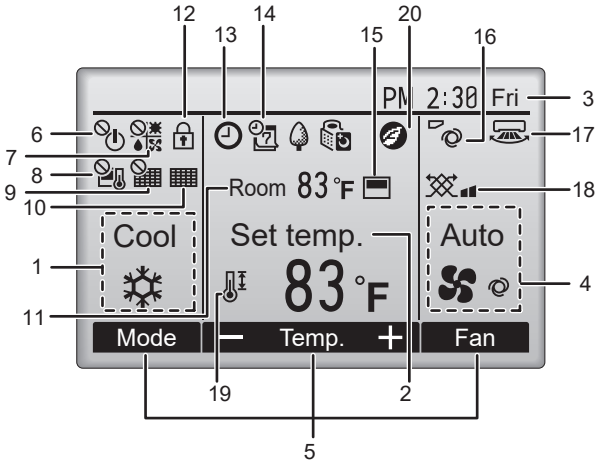
F1: Function button 1
Main display: Press to change the operation mode.
Menu screen: The button function varies depending on the screen.
F2: Function button 2
Main display: Press to decrease temperature.
Main menu: Press to move the cursor left.
Menu screen: The button function varies depending on the screen.
F3: Function button 3
Main display: Press to increase temperature.
Main menu: Press to move the cursor right.
Menu screen: The button function varies depending on the screen.
F4: Function button 4
Main display: Press to change the fan speed.
Menu screen: The button function varies depending on the screen.

Display

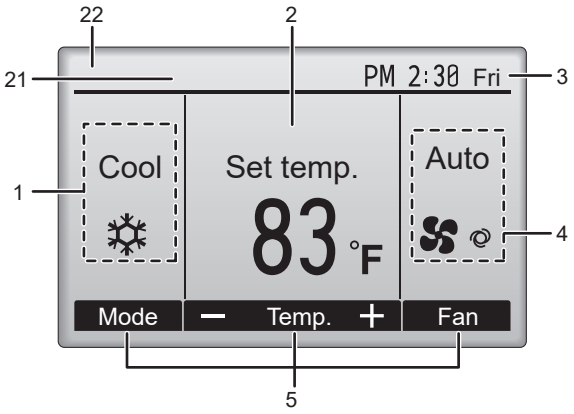
The main display can be displayed in 2 different modes: [Full] and [Basic]. The initial setting is [Full]. To switch to [Basic] mode, change the setting on the [Main display] setting. (Refer to operation manual included with remote controller.)

■ [Full] mode

All icons are displayed for explanation.



■ [Basic] mode



Note:

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

1. Operation mode
2. Preset temperature
3. Clock
4. Fan speed
5. Button function guide: Functions of the corresponding buttons appear here.
6. : Appears when the ON/OFF operation is centrally controlled.
7. : Appears when the operation mode is centrally controlled.
8. : Appears when the preset temperature is centrally controlled.
9. : Appears when the filter reset function is centrally controlled.
10. : Appears when filter needs maintenance.
11. Room temperature
12. : Appears when the buttons are locked.
13. : Appears when [On/Off timer] or [Auto-off] function is enabled.
    : Appears when the timer is disabled by the centralized control system.
14. : Appears when [Weekly timer] is enabled.
15. : Appears 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.
16. : Indicates the vane setting.
17. : Indicates the louver setting.*1
18. : Indicates the ventilation setting.
19. : Appears when the preset temperature range is restricted.
20. : Appears when an energy saving operation is performed using [3D i-See sensor] function.*1
21. Centrally controlled: Appears for a certain period of time when a centrally-controlled item is operated.
22. Preliminary error display: An error code appears during the preliminary error.

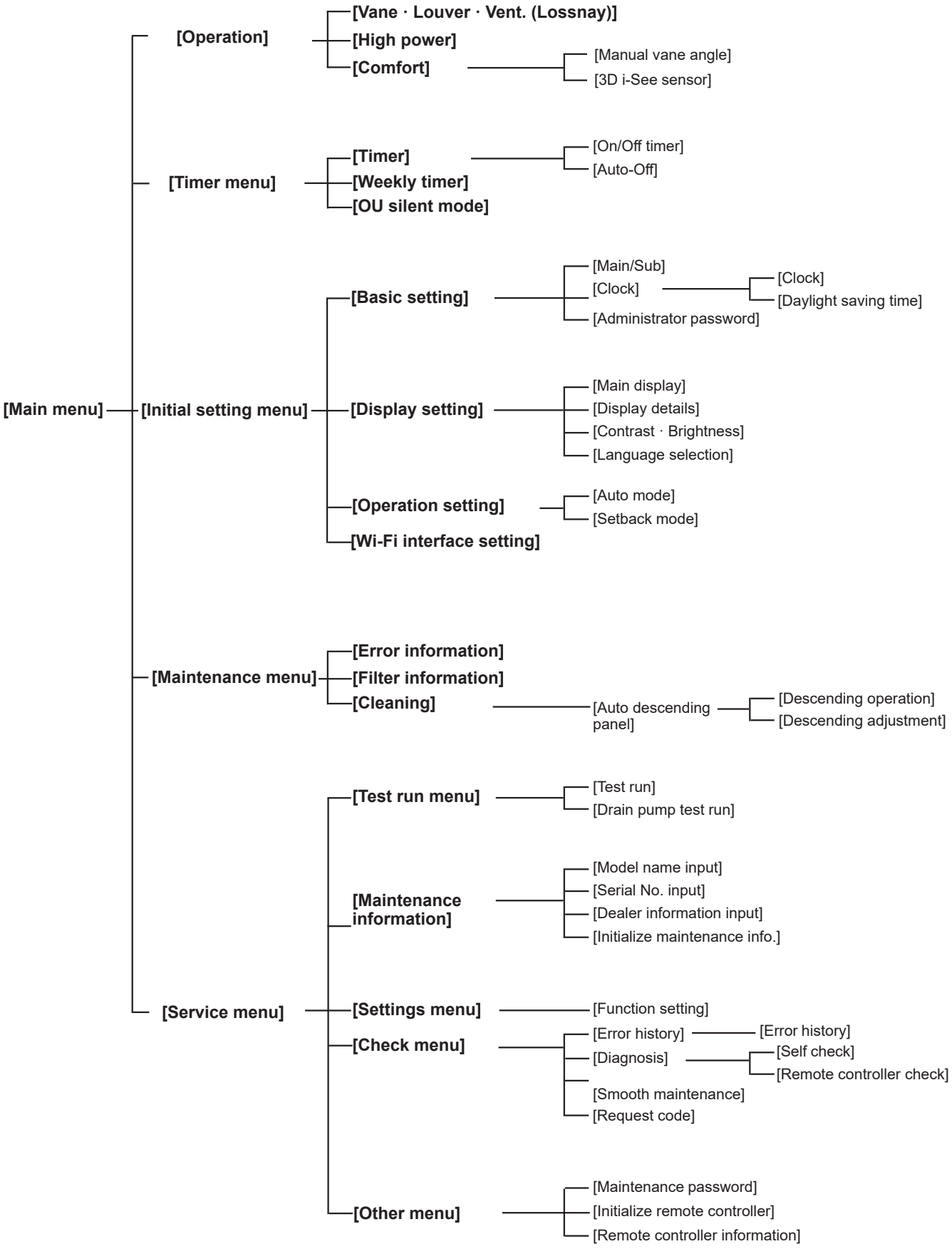
*1. These functions are not applied to the floor standing models.

Menu structure

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

Note:

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



Main menu list

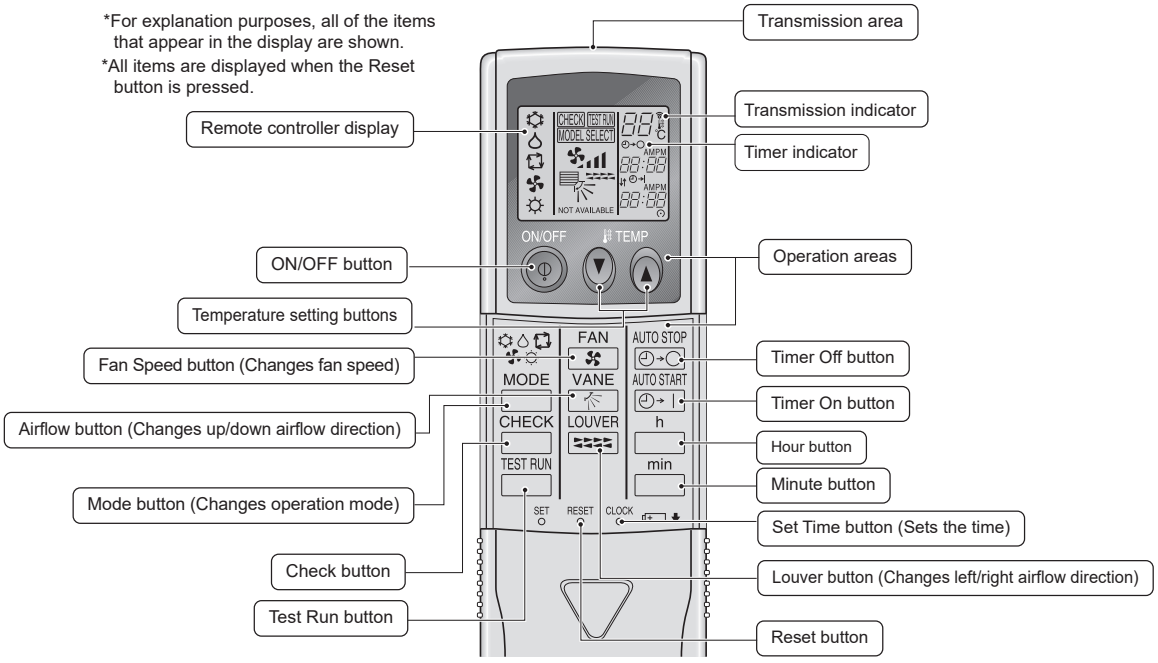
[Main menu]	Setting and display items		Setting details
[Operation]	[Vane · Louver · Vent. (Lossnay)]		Use to set the vane angle. • Select a desired vane setting. Use to turn on/off the louver. • Select a desired setting from [On] and [Off]. Use to set the amount of ventilation. • Select a desired setting from [Off], [Low], and [High].
	[High power] *3		Use to reach the comfortable room temperature quickly. • Units can be operated in the High-power mode for up to 30 minutes.
	[Comfort]	[Manual vane angle]	• Use to fix each vane angle.
			Horizontal air direction • Sets the horizontal airflow direction (vane) of each unit.
		[3D i-See sensor]	Use to set the following functions for 3D i-See sensor. • Air distribution • Energy saving option • Seasonal airflow
[Timer]	[Timer]	[On/Off timer] *1	Use to set the operation ON/OFF time. • Time can be set in 5-minute increments.
		[Auto-Off]	Use to set the Auto-Off time. • Time can be set to a value from 30 to 240 in 10-minute increments.
	[Weekly timer] *1, *2		Use to set the weekly operation ON/OFF time. • Up to 8 operation patterns can be set for each day. (Not valid when [On/Off timer] is enabled.)
[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
	[Display setting]	[Main display]	Use to switch between [Full] and [Basic] modes for the main display, and use to change the background colors of the display to black.
		[Display details]	Make the settings for the remote controller related items as necessary. [Clock]: The initial settings are [Yes] and [24h] format. [Temperature]: Set to either celsius (°C) or fahrenheit (°F). [Room temp.]: Set to Show or Hide. Auto mode: Set Auto mode display or Only Auto display.
		[Contrast • Brightness]	Use to adjust screen contrast and brightness.
		[Language selection]	Use to select the desired language.
	[Operation setting]	[Auto mode]	Whether or not to use [Auto mode] can be selected by using the button. This setting is valid only when indoor units with [Auto mode] function are connected.
		[Setback mode]	Whether or not to use [Setback mode] can be selected by using the button. This setting is valid only when indoor units with [Setback mode] function are connected.
[Maintenance]	[Error information]		Use to check error information when an error occurs. • Error code, error source, refrigerant address, model name, manufacturing number, contact information (dealer's phone number) can be displayed. (The model name, manufacturing number, and contact information need to be registered in advance to be displayed.)
	[Filter information]		Use to check the filter status. • The filter sign can be reset.
	[Cleaning]	[Auto descending panel]	Use to lift and lower the auto descending panel (Optional parts).

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

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

15-1-2. PAR-FL32MA

Controller interface

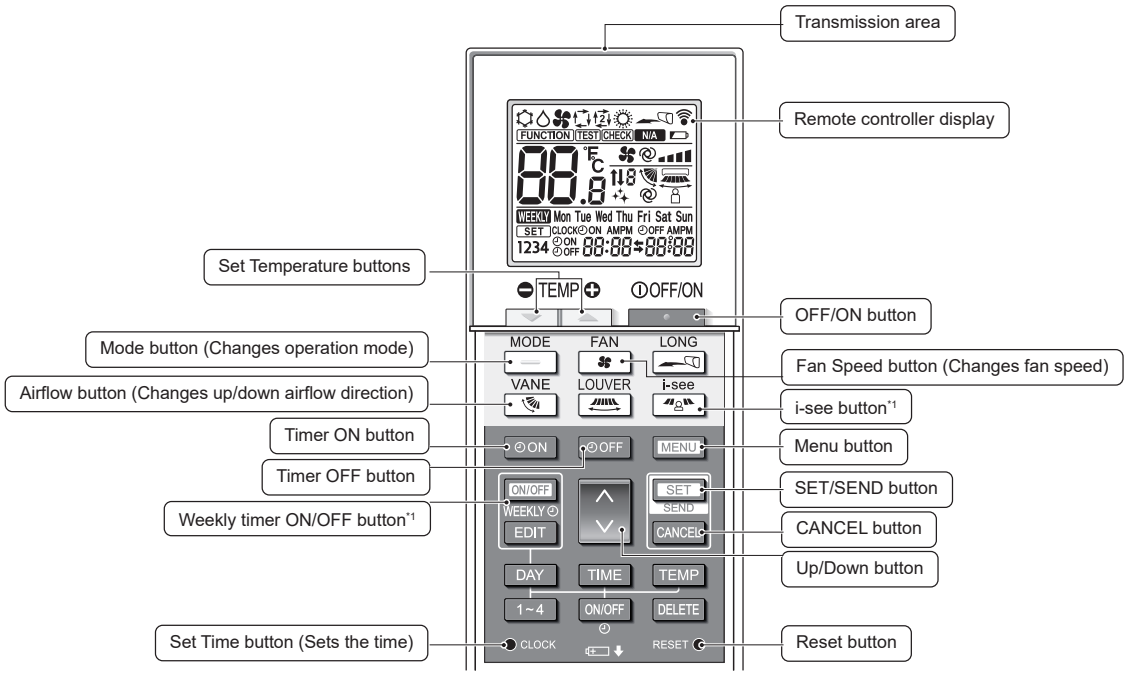


Instructions for use

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

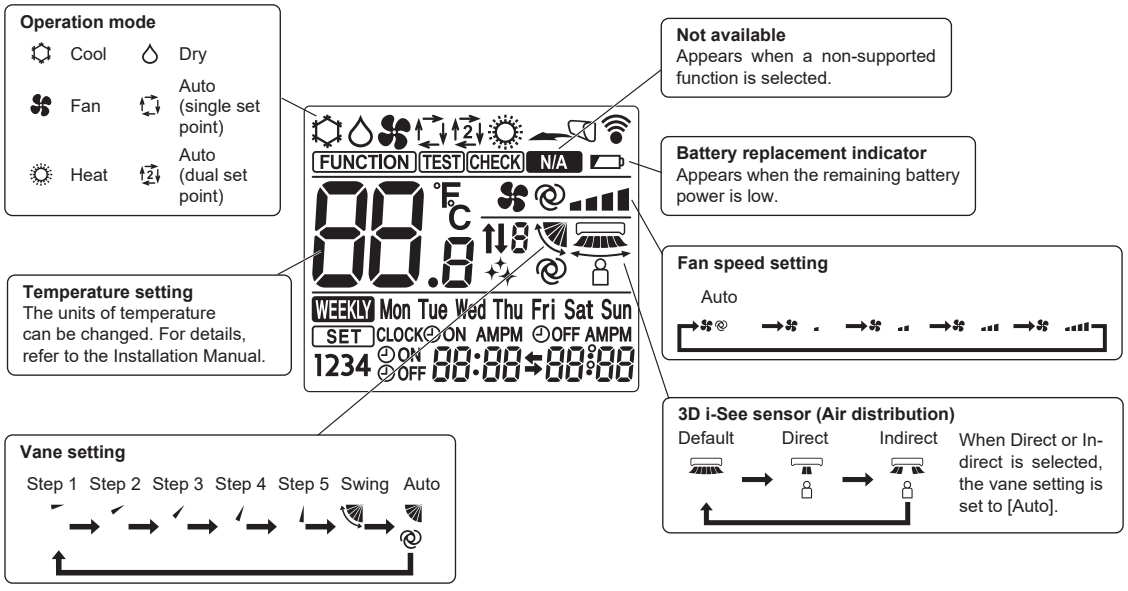
15-1-3. PAR-SL101A-E

Controller interface



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

Display



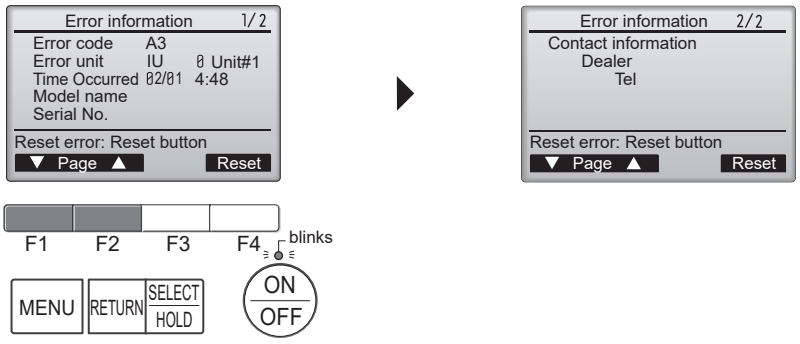
15-2. [Error information]

Operating instructions

■ How to check the error information when an error occurs

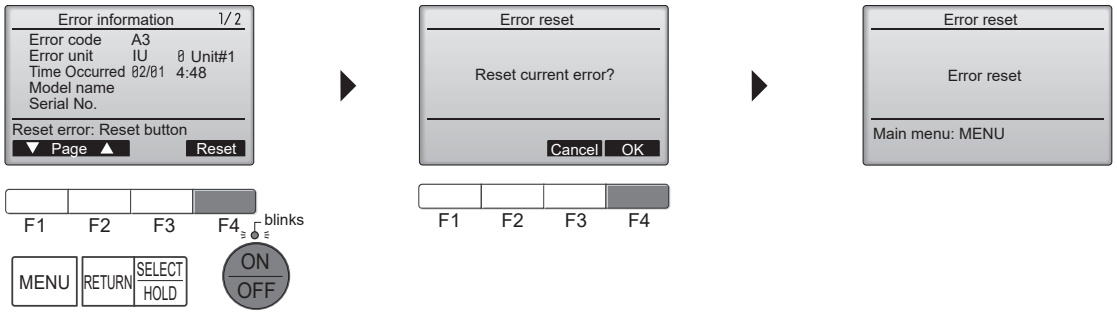
When an error occurs, the following screen will appear. Check the error status, stop the operation, and consult your dealer.

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



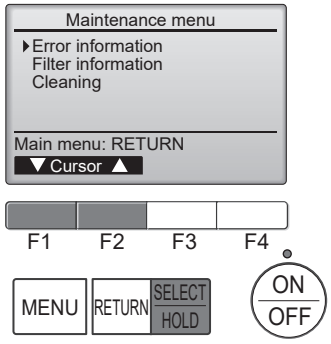
2. Reset the error
   - Press F4 button or [ON/OFF] button to reset the error that is occurring.
   - Select [OK] with F4 button.

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



■ How to check the error information later

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

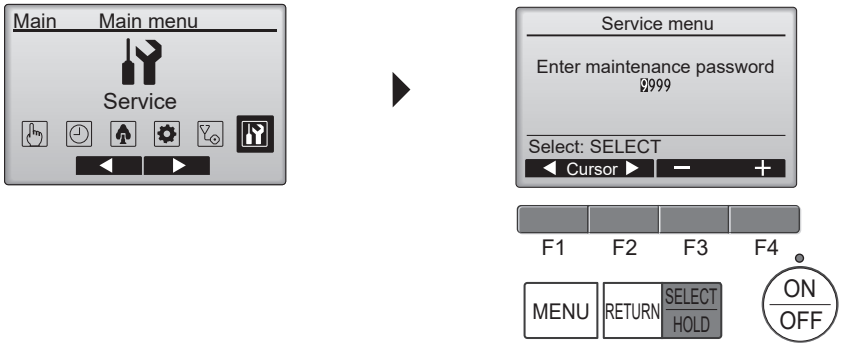


15-3. [Service menu]

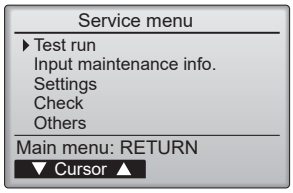
Note:
- Maintenance password is required to set each item in the service menu.

Operating instructions

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



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



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



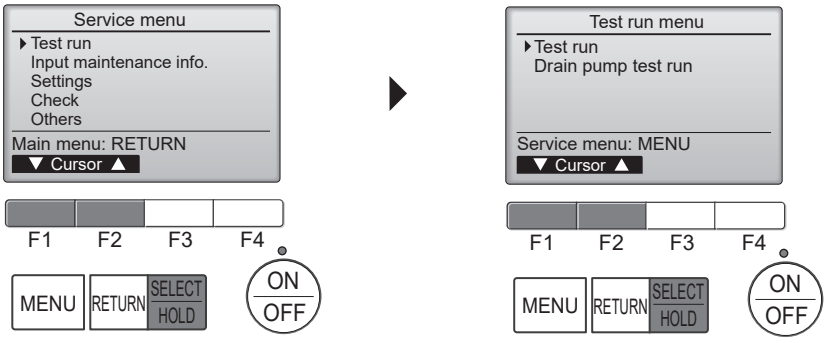
Notes:
- To go back to [Service menu], press [MENU] button.
- To return to the previous screen, press [RETURN] button.

15-4. [Test run]

15-4-1. PAR-42MAAUB

Operating instructions

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

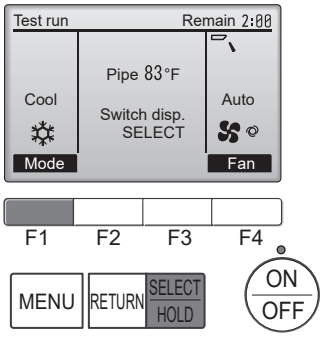


■ Test run operation

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

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

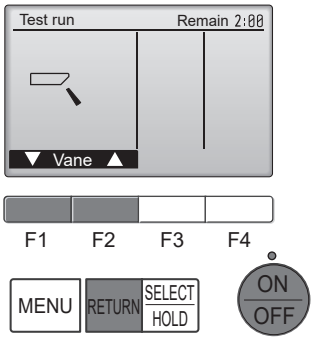
2. Check the operation of the outdoor unit's fan.
3. Press [SELECT] button and open the vane setting screen.



■ Auto vane check

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

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



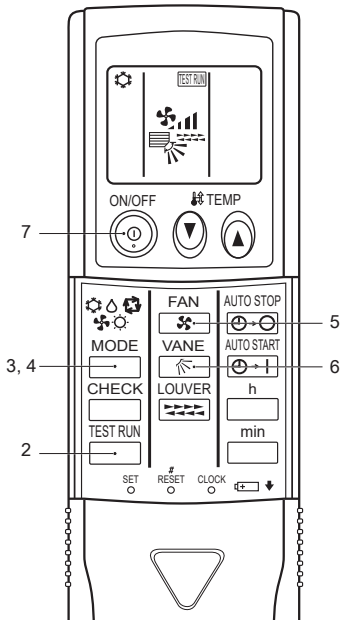
15-4-2. PAR-FL32MA

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

Operating instructions

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

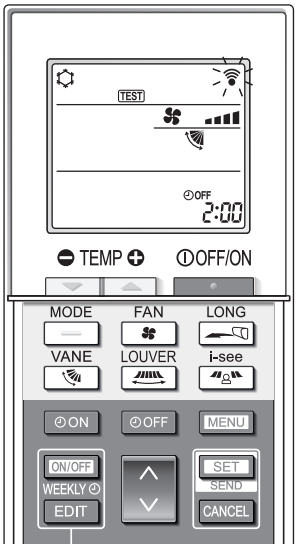
Notes:
- Point the remote controller towards the indoor unit receiver to perform steps 2 to 7.
- It is not possible to run in the fan, the dry or the auto mode.



15-4-3. PAR-SL101A-E

Operating instructions

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



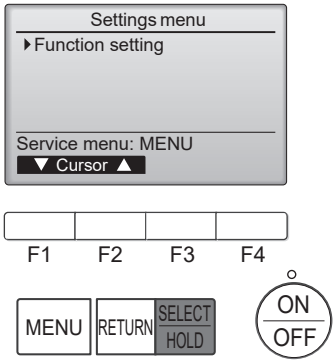
15-5. [Function setting]

15-5-1. PAR-42MAAUB

Operating instructions

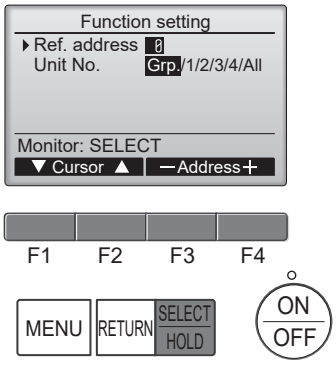
1. Open the [Function setting] screen.
   - Select [Service] from [Main menu], and press [SELECT] button.
   - Select [Setting] from [Service menu], and press [SELECT] button.
   - Select [Function setting] and press [SELECT] button.

   [Function setting] screen will appear.

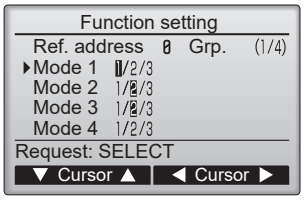


2. Set the indoor unit refrigerant addresses and indoor numbers
   - Enter the indoor unit refrigerant addresses and indoor numbers with F1 - F4 buttons, and then press [SELECT] button to confirm the current setting.

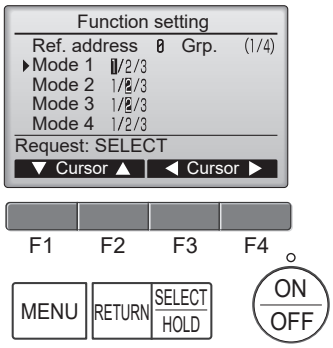
Note: Checking the indoor unit No.
- When [SELECT] button is pressed, the target indoor unit will start fan operation. If the unit is common or when running all units, all indoor units for the selected refrigerant address will start fan operation.



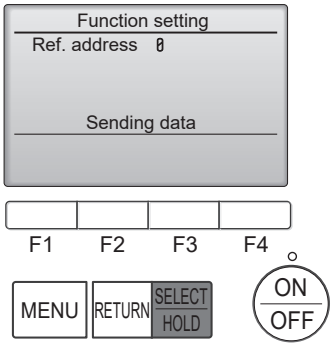
3. Check the current settings
   - When data collection from the indoor units is completed, the current settings appears highlighted. Non-highlighted items indicate that no function settings are made.
     Screen appearance varies depending on [Unit No.] setting.



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



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

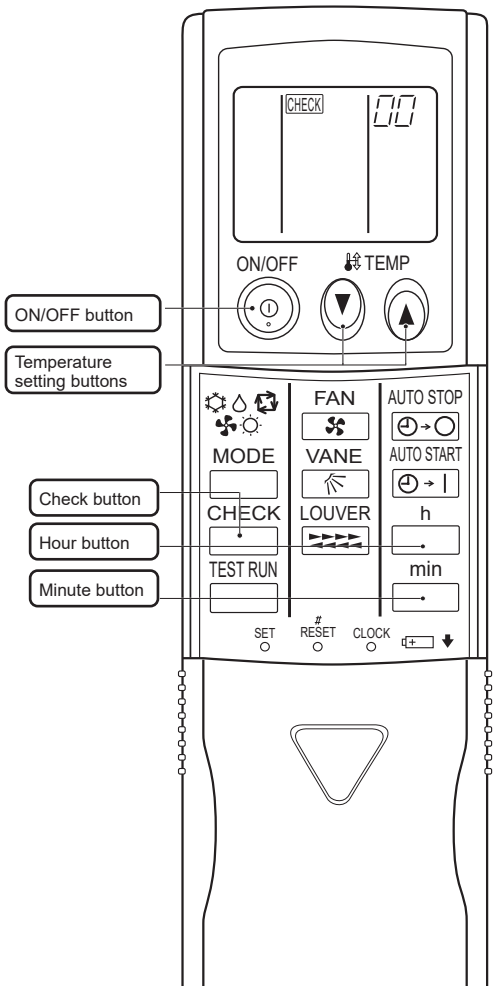


Notes:
- Make the above settings only on Mr. Slim units as necessary.
- The above function settings are not available for City Multi units.
- Refer to the installation manual of the indoor unit for the information about initial settings, mode numbers, and setting numbers of indoor units.
- Be sure to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

15-5-2. PAR-FL32MA

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

An example of function selection flow



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

Function setting

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

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

Finished? No → Change the unit No. (6. Yes) / (5. No)

7. End the function selection.
   (End the check mode.)

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

Operating instructions

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

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

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

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

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

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

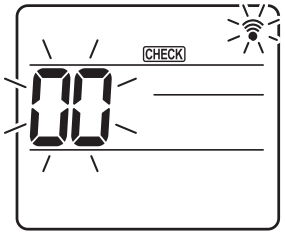
5. Repeat steps 3 and 4 to make other function setting on the same unit.
6. Repeat steps 2 to 4 to change the unit and make function settings on it.
7. Complete the function settings
   - Press ◎ button.

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

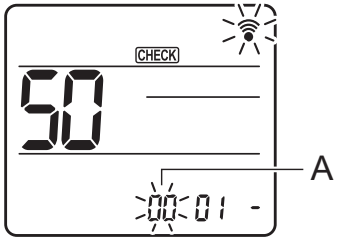
15-5-3. PAR-SL101A-E

Operating instructions

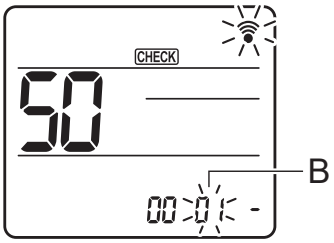
1. Go to the function select mode.
   - Press MENU button for 5 seconds. (Start this operation from the status of remote controller display turned off.) CHECK appears on the display and ″00″ blinks.
   - Press ▽ △ button to enter ″50″.
   - Direct the wireless remote controller toward the receiver of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



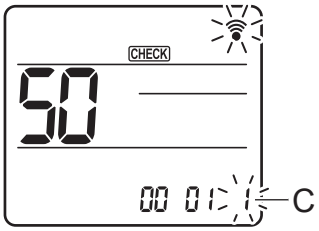
2. Set the unit number.
   - Press ▽ △ button to set unit number A.
   - Direct the wireless remote controller toward the receiver of the indoor unit and press SET button.



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



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



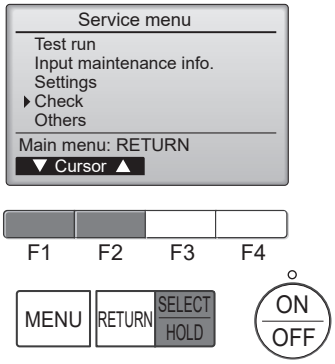
5. Select multiple functions continuously.
   • Repeat the steps 3 and 4 to change multiple function settings continuously.
6. Complete function selections.
   • Direct the wireless remote controller toward the sensor of the indoor unit and press button.

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

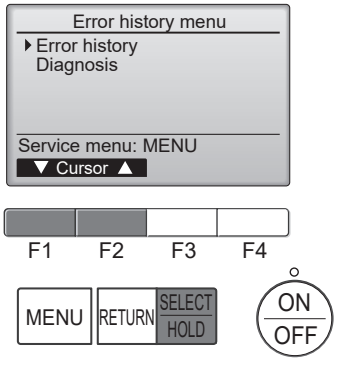
15-6. [Error history]

Operating instructions

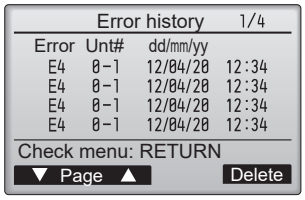
1. Open [Service menu] and select [Check].
   • Select [Service] from [Main menu], and press [SELECT] button.
   • Select [Check] with F1 or F2 button, and press [SELECT] button.



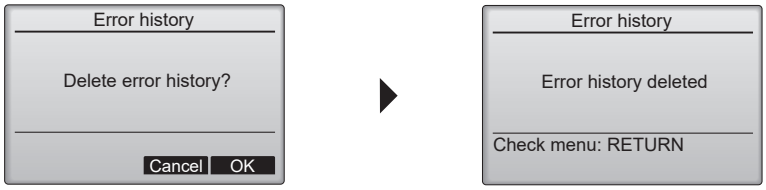
2. Select [Error history] with F1 or F2 button, and press [SELECT] button.



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



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

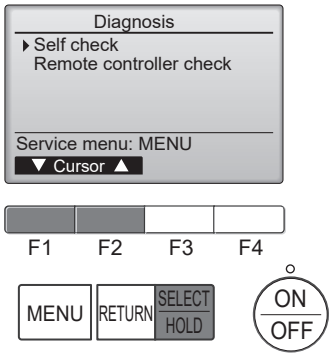


15-7. Self-diagnosis

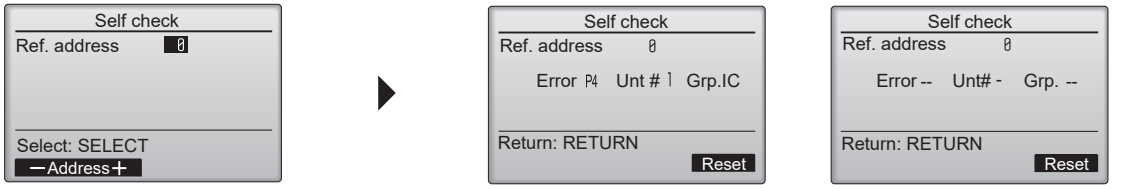
15-7-1. PAR-42MAAUB

Operating instructions

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



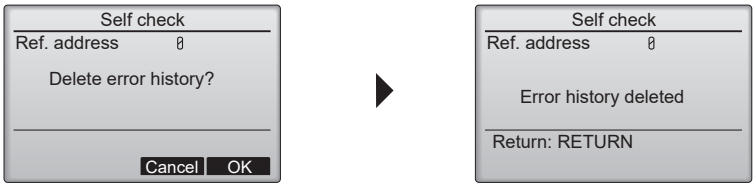
2. Enter the refrigerant address with F1 or F2 button, and press [SELECT] button.
   • Error code, unit number, attribute, and indoor unit demand signal ON/OFF status at the contact will appear.
     [-] will appear when there is no error history.



<Error history is shown.>

<When there is no error history.>

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



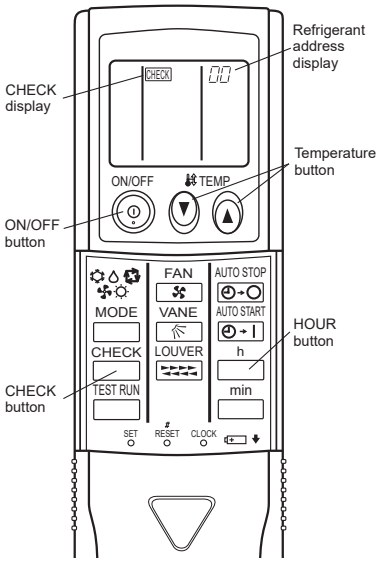
Notes:
- To go back to [Service menu], press [MENU] button
- To return to the previous screen, press [RETURN] button

15-7-2. PAR-FL32MA

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

Operating instructions

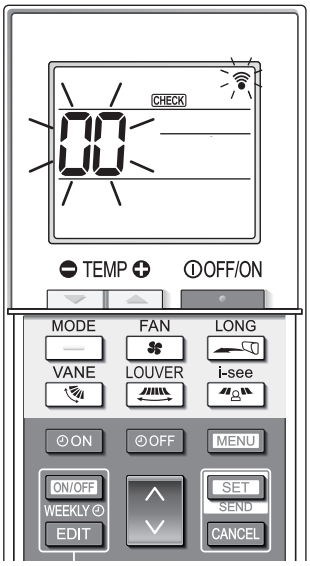
1. Press CHECK button twice.
   CHECK appears, and the refrigerant address ″00″ blinks.
   Make sure that the remote controller's display has stopped before continuing.
2. Press ▼ ▲ buttons to select the refrigerant address of the indoor unit for self-diagnosis.
   Set the address of the indoor unit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



15-7-3. PAR-SL101A-E

Operating instructions

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

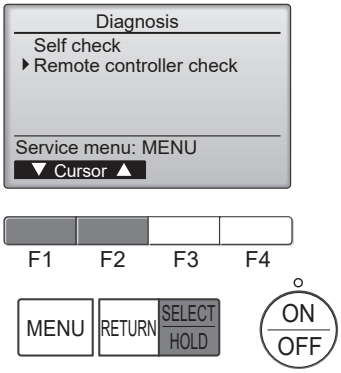


15-8. [Remote controller check]

Operating instructions

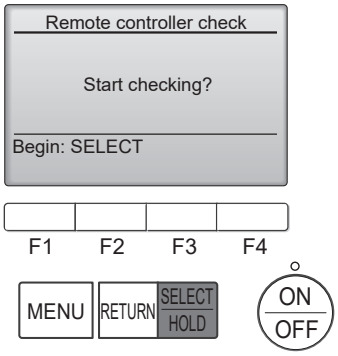
If operations cannot be completed with the remote controller, diagnose the remote controller with this function.

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



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

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



3. Check the result of the remote controller check.
See the following descriptions for each result:

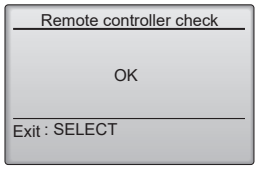
[OK]:
- The remote controller has no problem. Check other parts to find problems.

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

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

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

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



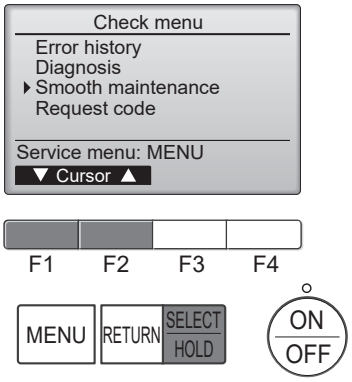
Remote controller check results screen

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

15-9. [Smooth Maintenance]

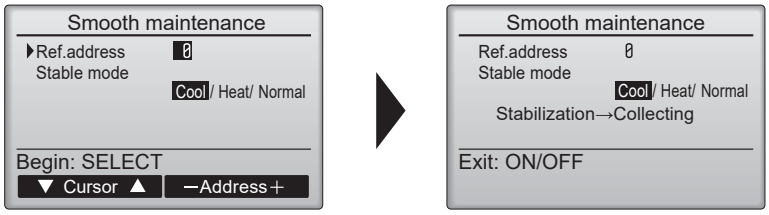
Operating instructions

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



2. Set the refrigerant address and the stable mode.
   - Select the item to be changed with F1 or F2 button.
   - Select the required setting with F3 or F4 button.
     [Ref.address] setting: 0 - 15
     [Stable mode] setting: [Cool/Heat/Normal]
   - Press [SELECT] button, Fixed operation will start.

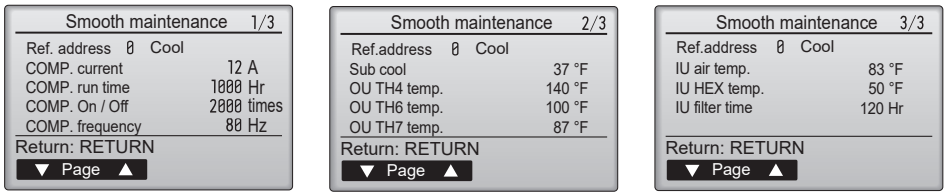
Note:
- Stable mode will take approx. 20 minutes.



3. The operation data will appear.

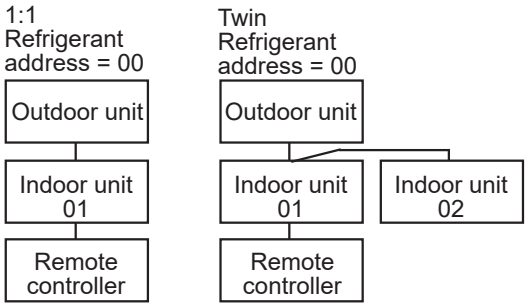
The compressor-accumulated operating (COMP. run) time is 10-hour unit, and the compressor-number of operation times (COMP. ON/OFF) is a 100-time unit (fractions discarded).

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

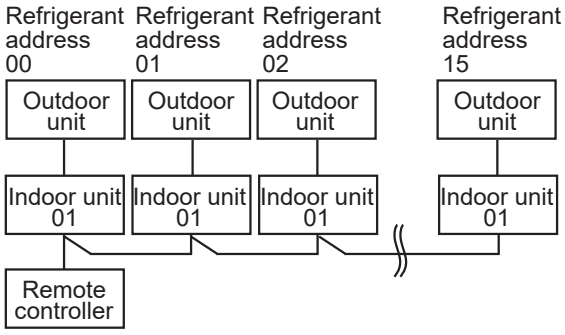


■ Refrigerant address

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



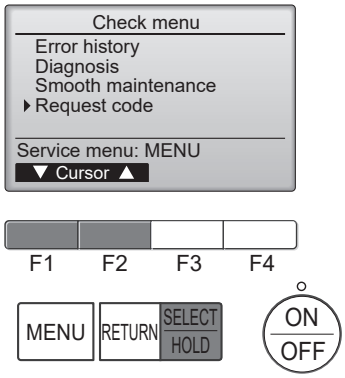
- Multi refrigerant system (group control)
  Up to 16 refrigerant systems (16 outdoor units) can be connected as a group by 1 remote controller. To check or set the refrigerant addresses.



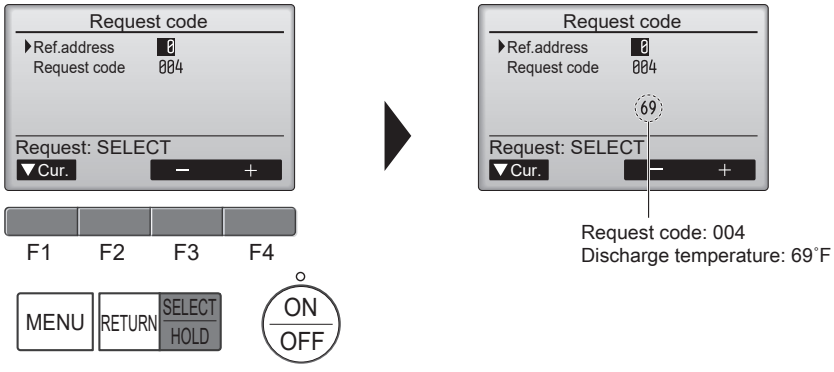
15-10. [Request code]

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

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



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



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