

SERVICE MANUAL R410A

[Model Name]

SUZ-KA24NAHZ

SUZ-KA30NAHZ

SUZ-KA36NAHZ

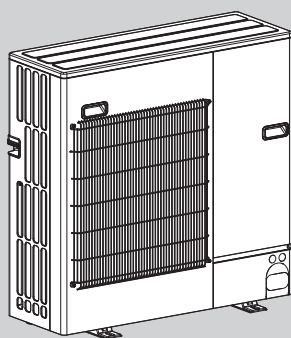
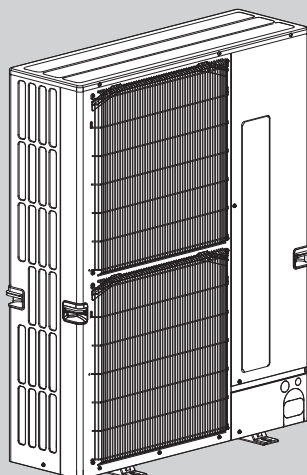
[Service Ref.]
SUZ-KA24NAHZ
SUZ-KA30NAHZ
SUZ-KA36NAHZ
Revision:

- Abnormal conditions have been added in "10. TROUBLESHOOTING" in REVISED EDITION-D.

OCH754C is void.

Note:

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


SUZ-KA24NAHZ

**SUZ-KA30NAHZ
SUZ-KA36NAHZ**

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PARTS CATALOG (OCB754)

INDOOR UNIT SERVICE MANUAL

Model Name	Service Ref.	Service Manual No. Parts Catalog No.
PEAD-A24/30/36AA7	PEAD-A24/30/36AA7	HWE1608A BWE01629A
SVZ-KP24/30/36NA	SVZ-KP24/30/36NA	MD-1404-K019 MD-1404-K018

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.

2-2. CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R410A

Use new refrigerant pipes.

In the case of using the existing pipes for R22, 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 indoors, and both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)

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

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

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

Charge refrigerant from liquid phase of gas cylinder.

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

Do not use refrigerant other than R410A.

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

Use a vacuum pump with a reverse flow check valve.

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

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

The following tools are necessary to use R410A refrigerant.

Tools for R410A	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adaptor
Torque wrench	Electronic refrigerant charging scale

Handle tools with care.

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

Do not use a charging cylinder.

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

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.

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

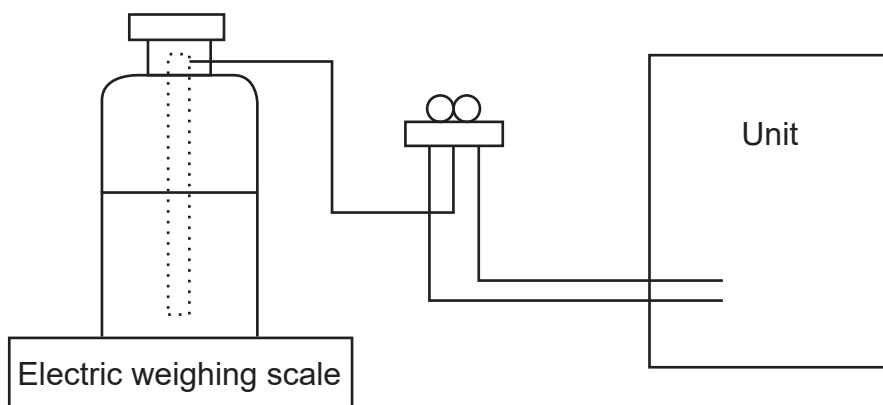
[1] Cautions for service

- (1) Perform service after recovering the refrigerant left in unit completely.
- (2) Do not release refrigerant in the air.
- (3) After completing service, charge the cycle with specified amount of refrigerant.
- (4) When performing service, install a filter drier simultaneously.
Be sure to use a filter drier for new refrigerant.

[2] Additional refrigerant charge

When charging directly from cylinder

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



[3] Service tools

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

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

2-3. CAUTIONS FOR REFRIGERANT PIPING WORK

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

① Thickness of pipes

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

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

② Dimensions of flare cutting and flare nut

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

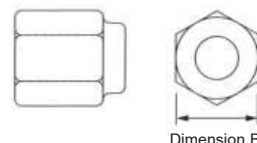
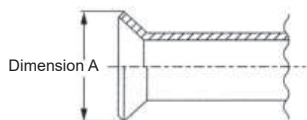


Diagram below: Piping diameter and thickness

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

Flare nut dimensions

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

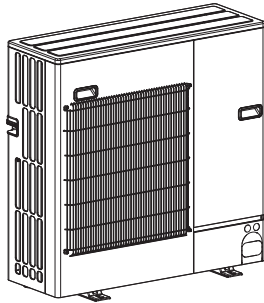
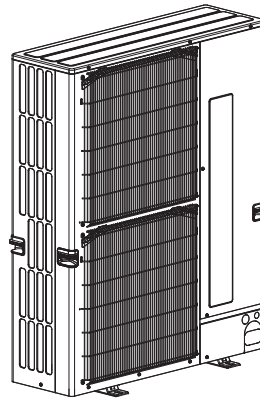
③ Tools for R410A (The following table shows whether conventional tools can be used or not.)

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

× : Prepare a new tool. (Use the new tool as the tool exclusive for R410A.)

△ : Tools for other refrigerants can be used under certain conditions.

○ : Tools for other refrigerants can be used.

**SUZ-KA24NAHZ****SUZ-KA30NAHZ
SUZ-KA36NAHZ****CHARGELESS SYSTEM****PRE-CHARGED REFRIGERANT IS SUPPLIED FOR PIPING LENGTH AT SHIPMENT.****Maximum 100 ft, 30 m (KA30/36), 70ft, 21m (KA24).**

The refrigerant circuit with LEV(Linear Expansion Valve) and power receiver always control the optimal refrigerant level regardless of the length (maximum: 100 ft [30 m] (KA30/36), 70ft [21m] (KA24) and minimum: 16 ft [5 m]) of piping. 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 done. It also helps to speed up the installation time.

Note:

Please carefully consider the indoor unit location when piping lengths are less than 16 ft. (5 m) as there could be intermittent noises during normal operation that would be noticeable in very quiet environments.

Service Ref.			SUZ-KA24NAHZ	SUZ-KA30NAHZ
Power supply	Phase		Single	
	Cycle		60 Hz	
	Voltage		208/230 V	
MCA		A	17	24
MOCP		A	27	40
Breaker size		A	25	35
External finish			Munsell 3Y 7.8/1.1	
Heat exchanger			Plate fin coil	
Defrost method			Reverse cycle	
Crankcase heater		kW	—	
Compressor			Hermetic	
	Model		DNB28FBAMT	ANB33FJMMT
	Motor output	kW	2.2	2.5
	R.L.A.		9.0	18.0
	L.R.A.		18.0	27.5
	Starter type		Inverter	
Fan	Fan(drive) × No.		Propeller fan x 1	Propeller fan x 2
	Fan motor output	kW	0.074	0.074 + 0.074
	Fan motor	F.L.A.	0.33	0.33 + 0.33
	Airflow	m3/min	58	115
		CFM	2050	4060
Sound pressure level (SPL)	Cooling	dB	52	52
	Heating	dB	53	53
Protection devices			HP switch	
			Comp. Surface thermistor	
Dimensions	W	in	37-13/32	41-11/32
	D	in	12-63/64+63/64	
	H	in	37-1/8	52-43/64
	W	mm	950	1050
	D	mm	330 + 25	
	H	mm	943	1338
Weight		lb	190	261
		kg	86	118
Refrigerant			R410A	
	Charged	lb	7.72	11.46
		kg	3.5	5.2
	Control		Linear expansion valve	
	Oil Charged	Model	FVC68D	FV50S
		oz	34	47
		L	1.0	1.4
Refrigerant piping	Pipe size O.D. Liquid	in	3/8	
		mm	9.52	
	Pipe size O.D. Gas	in	5/8	
		mm	15.88	
	Connection method Indoor		Flared	
	Connection method Outdoor		Flared	
	Height difference IU-OU	ft	Maximum 100	
		m	Maximum 30	
	Piping length	ft	Maximum 100	
		m	Maximum 30	

Service Ref.			SUZ-KA36NAHZ
Power supply	Phase		Single
	Cycle		60Hz
	Voltage		208/230 V
MCA		A	26
MOCP		A	42
Breaker size		A	35
External finish			Munsell 3Y 7.8/1.1
Heat exchanger			Plate fin coil
Defrost method			Reverse cycle
Crankcase heater		kW	—
Compressor			Hermetic
	Model		ANB33FJMMT
	Motor output	kW	2.5
	R.L.A.		18.0
	L.R.A.		27.5
	Starter type		Inverter
Fan	Fan(drive) × No.		Propeller fan x 2
	Fan motor output	kW	0.074 + 0.074
	Fan motor	F.L.A.	0.33 + 0.33
	Airflow	m3/min	115
		CFM	4060
Sound pressure level (SPL)	Cooling	dB	52
	Heating	dB	53
Protection devices			HP switch
			Comp. Surface thermistor
Dimensions	W	in	41-11/32
	D	in	12-63/64+63/64
	H	in	52-43/64
	W	mm	1050
	D	mm	330 + 25
	H	mm	1338
Weight		lb	261
		kg	118
Refrigerant			R410A
	Charged	lb	11.46
		kg	5.2
	Control		Linear expansion valve
	Oil Charged	Model	FV50S
		oz	47
		L	1.4
Refrigerant piping	Pipe size O.D. Liquid	in	3/8
		mm	9.52
	Pipe size O.D. Gas	in	5/8
		mm	15.88
	Connection method Indoor		Flared
	Connection method Outdoor		Flared
	Height difference IU-OU	ft	Maximum 100
		m	Maximum 30
	Piping length	ft	Maximum 100
		m	Maximum 30

5-1. REFILLING REFRIGERANT CHARGE (R410A: oz, kg)

Service Ref.	Piping Length (one way)				Factory Charged
	70 ft	80 ft	90 ft	100 ft	
	21 m	24 m	27 m	30 m	
SUZ-KA24NAHZ	-	7	14	21	123
	-	oz	oz	oz	oz
	-	0.2	0.4	0.6	3.5
SUZ-KA30NAHZ SUZ-KA36NAHZ	-	-	-	-	183
	-	-	-	-	oz
	-	-	-	-	5.2
					kg

For pipes longer than 70 ft, additional charge is required.

5-2. COMPRESSOR TECHNICAL DATA

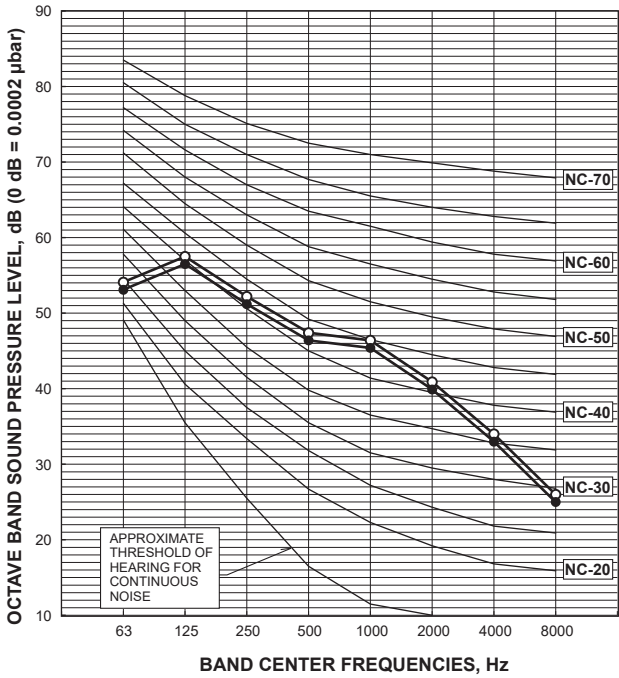
Winding temperature at 68°F [20°C]

Service Ref.		SUZ-KA24NAHZ	SUZ-KA30NAHZ	SUZ-KA36NAHZ
Compressor model		DNB28FBAMT	ANB33FJMMT	
Winding Resistance (Ω)	U - V	0.74	0.188	
	U - W	0.74	0.188	
	W - V	0.74	0.188	

5-3. NOISE CRITERION CURVES

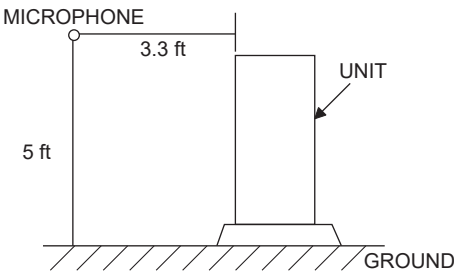
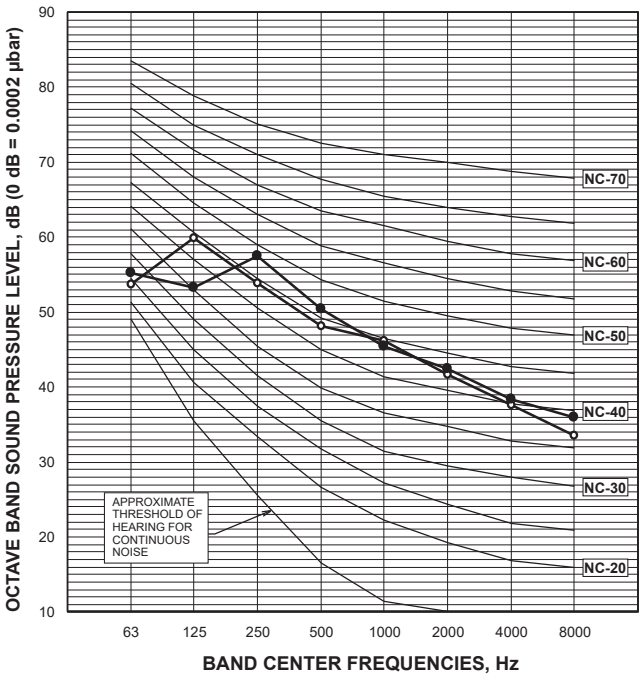
SUZ-KA24NAHZ

MODE	SPL(dB)	LINE
COOLING	52	○—○
HEATING	53	●—●



SUZ-KA30NAHZ
SUZ-KA36NAHZ

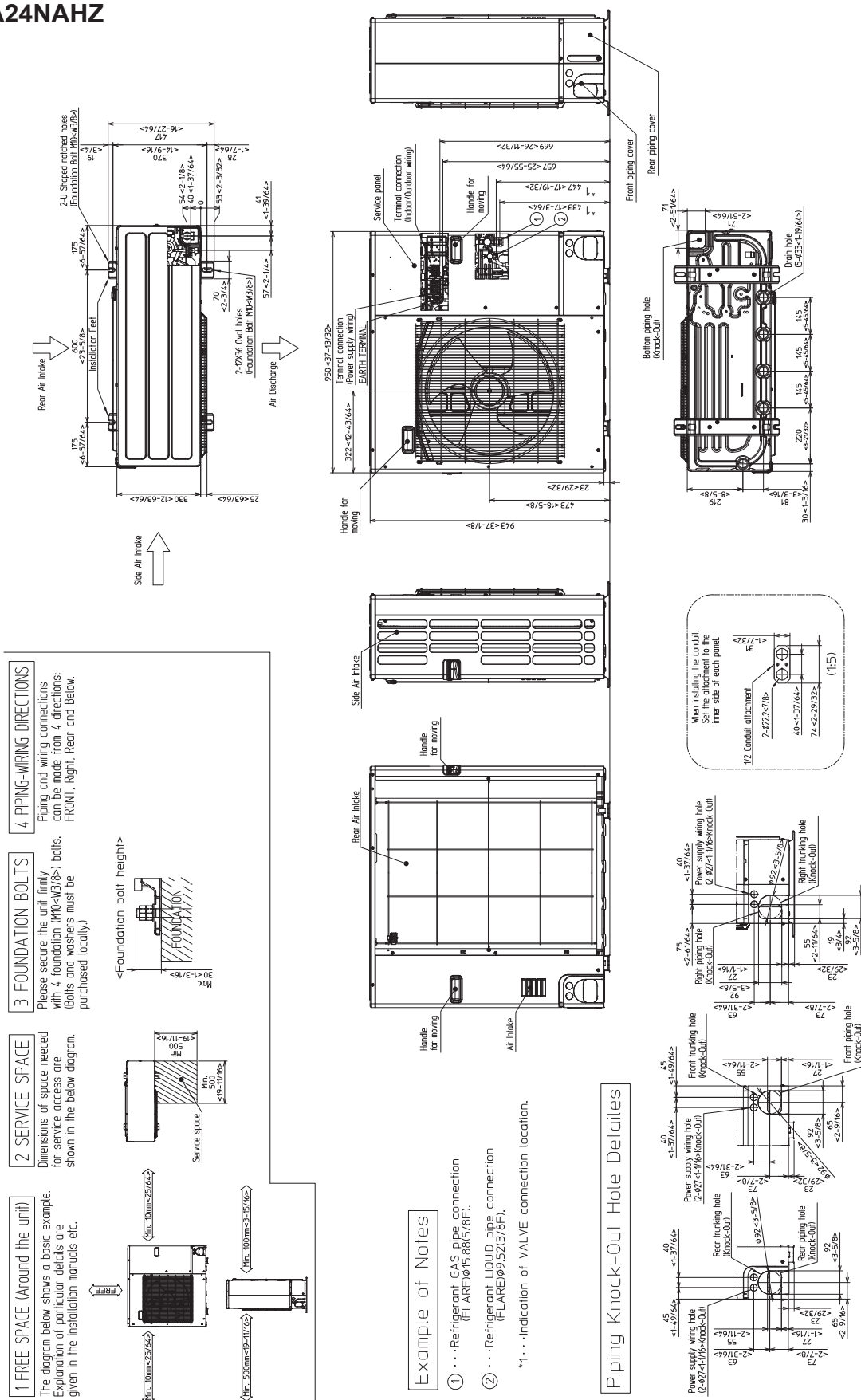
MODE	SPL(dB)	LINE
COOLING	52	○—○
HEATING	53	●—●



5-4. STANDARD OPERATION DATA

Representative matching			SVZ-KP24NA		SVZ-KP30NA	
Mode			COOLING	HEATING	COOLING	HEATING
Total	Capacity	Btu/h	24,000	23,000	27,000	32,000
	Input	W	2,420	2,410	2,160	2,400
Electrical circuit	Indoor unit model		SVZ-KP24NA		SVZ-KP30NA	
	Phase		Single			
	Cycle		60 Hz			
	Voltage		208/230 V			
	Current		1.40 A		1.70 A	
	Outdoor unit model		SUZ-KA24NAHZ		SUZ-KA30NAHZ	
	Phase		Single		Single	
	Cycle		60 Hz		60 Hz	
	Voltage		208/230 V		208/230 V	
	Current		9.12 A	9.08 A	7.69 A	8.73 A
Refrigerant circuit	Discharge pressure	PSIG	412	368	368	339
	Suction pressure	PSIG	131	106	146	111
	Discharge temperature	°F	159	152	146	149
	Condensing temperature	°F	118	109	110	104
	Suction temperature	°F	51	39	57	45
	Ref. Pipe length	ft	25	25	25	25
	Discharge pressure	Mpa	2.84	2.54	2.54	2.33
	Suction pressure	Mpa	0.90	0.73	1.01	0.77
	Discharge temperature	°C	70.6	66.9	63.4	64.8
	Condensing temperature	°C	47.9	42.5	43.6	39.8
	Suction temperature	°C	10.8	4.2	14.1	7.2
	Ref. Pipe length	m	7.6	7.6	7.6	7.6
Indoor side	Intake air temperature D.B.	°F	80	70	80	70
	Intake air temperature W.B.	°F	67	60	67	60
	Discharge air temperature D.B.	°F	59	101	59	101
Outdoor side	Intake air temperature D.B.	°F	95	47	95	47
	Intake air temperature W.B.	°F	75	44	75	43
Indoor side	Intake air temperature D.B.	°C	26.6	21.4	26.7	21.1
	Intake air temperature W.B.	°C	19.5	15.6	19.5	15.6
	Discharge air temperature D.B.	°C	14.9	38.2	14.8	38.2
Outdoor side	Intake air temperature D.B.	°C	35.1	8.5	35.0	8.3
	Intake air temperature W.B.	°C	23.9	6.6	23.9	6.1
SHF			0.78	-	0.83	-
BF			0.15	-	0.08	-

Representative matching			SVZ-KP36NA	
Mode			COOLING	HEATING
Total	Capacity	Btu/h	36,000	37,000
	Input	W	3,790	3,280
Electrical circuit	Indoor unit model		SVZ-KP36NA	
	Phase		Single	
	Cycle		60 Hz	
	Voltage		208/230 V	
	Current		2.70 A	
	Outdoor unit model		SUZ-KA36NAHZ	
	Phase		Single	
	Cycle		60 Hz	
	Voltage		208/230 V	
	Current		13.78 A	11.56 A
Refrigerant circuit	Discharge pressure	PSIG	403	376
	Suction pressure	PSIG	125	103
	Discharge temperature	°F	165	168
	Condensing temperature	°F	117	110
	Suction temperature	°F	50	45
	Ref. Pipe length	ft	25	25
	Discharge pressure	Mpa	2.78	2.59
	Suction pressure	Mpa	0.86	0.71
	Discharge temperature	°C	73.7	75.6
	Condensing temperature	°C	47.3	43.4
	Suction temperature	°C	9.9	7.4
	Ref. Pipe length	m	7.6	7.6
Indoor side	Intake air temperature D.B.	°F	80	70
	Intake air temperature W.B.	°F	67	60
	Discharge air temperature D.B.	°F	55	107
Outdoor side	Intake air temperature D.B.	°F	95	47
	Intake air temperature W.B.	°F	75	43
Indoor side	Intake air temperature D.B.	°C	26.7	21.1
	Intake air temperature W.B.	°C	19.5	15.7
	Discharge air temperature D.B.	°C	12.9	41.7
Outdoor side	Intake air temperature D.B.	°C	35.0	8.3
	Intake air temperature W.B.	°C	23.9	6.1
SHF			0.74	-
BF			0.2	-

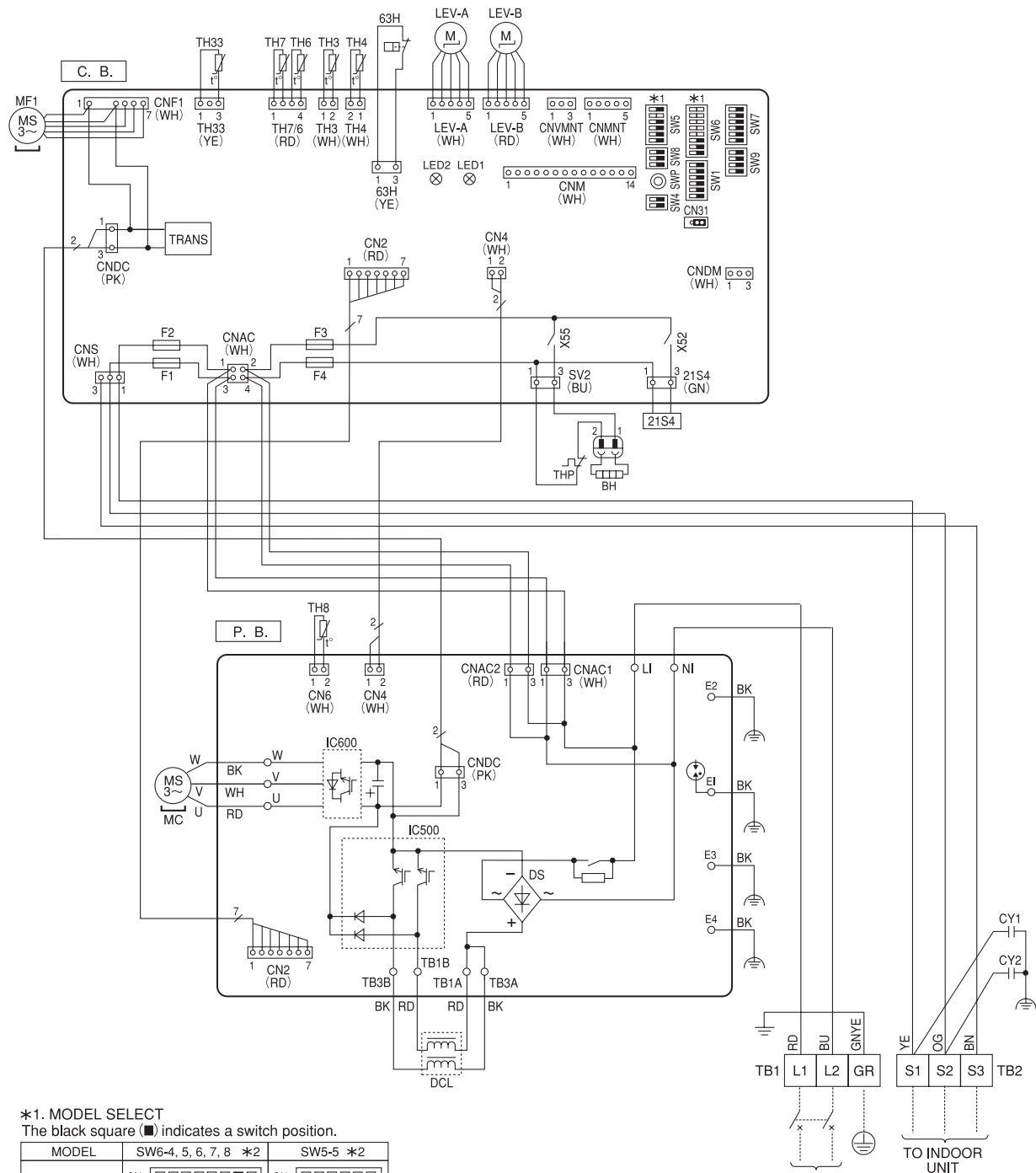


Unit: mm<in>



SUZ-KA24NAHZ

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH8	Thermistor (Heat Sink)	SW5	Switch (Function Switch, Model Select)
TB2	Terminal Block (Indoor/Outdoor)	TH33	Thermistor (Comp. Surface)	SW6	Switch (Model Select)
MC	Motor for Compressor	LEV-A, LEV-B	Linear Expansion Valve	SW7	Switch (Function Switch)
MF1	Fan Motor	DCL	Reactor	SW8	Switch (Function Switch)
21S4	Solenoid Valve (4-Way Valve)	CY1, CY2	Capacitor	SW9	Switch (Function Switch)
63H	High Pressure Switch	P. B.	Power Circuit Board	SWP	Switch (Pump Down)
BH	Base Heater	C. B.	Controller Circuit Board	CNM	Connector (Connection for Option)
THP	Thermal Protector	F1, F2	Fuse (T10AL250V)	CN31	Connector (Emergency Operation)
TH3	Thermistor (Liquid)	F3, F4	Fuse (T6.3AL250V)	CNDM	Connector (Connection for Option)
TH4	Thermistor (Discharge)	SW1	Switch (Manual Defrost, Defect History Record Reset, Refrigerant Address)	SV2	Connector
TH6	Thermistor (2-Phase Pipe)	SW4	Switch (Function Switch)	X52, X55	Relay
TH7	Thermistor (Ambient)				



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

MODEL	SW6-4, 5, 6, 7, 8 *2	SW5-5 *2
SUZ-KA24NAHZ	ON OFF ■ ■ ■ ■ ■ ■ ■ ■	ON OFF ■ ■ ■ ■ ■ ■ ■ ■
	1 2 3 4 5 6 7 8	1 2 3 4 5 6

*2. SW6-1 to 3, SW5-1 to 4, 6 : Function Switch

POWER SUPPLY
208/230 V AC 60 Hz

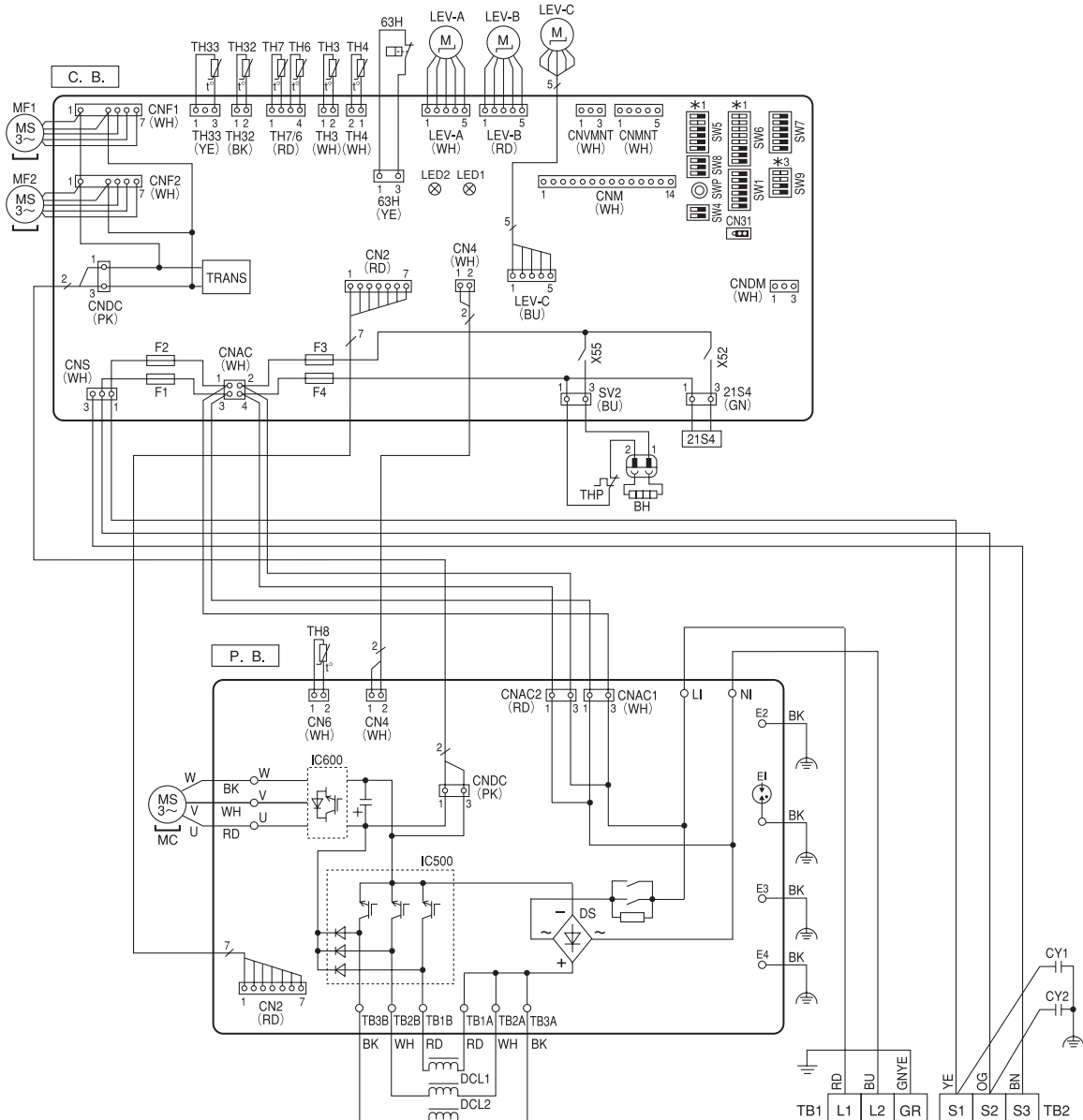
*Use copper supply wires.

*Utiliser des fils d'alimentation en cuivre.

SUZ-KA30NAHZ

SUZ-KA36NAHZ

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block (Power Supply)	TH8	Thermistor (Heat Sink)	SW4	Switch (Function Switch)
TB2	Terminal Block (Indoor/Outdoor)	TH32	Thermistor (Suction)	SW5	Switch (Function Switch, Model Select)
MC	Motor for Compressor	TH33	Thermistor (Comp. Surface)	SW6	Switch (Model Select)
MF1, MF2	Fan Motor	LEV-A, LEV-B, LEV-C	Linear Expansion Valve	SW7	Switch (Function Switch)
21S4	Solenoid Valve (4-Way Valve)	DCL1, DCL2, DCL3	Reactor	SW8	Switch (Function Switch)
63H	High Pressure Switch	CY1, CY2	Capacitor	SW9	Switch (Function Switch)
BH	Base Heater	P. B.	Power Circuit Board	SWP	Switch (Pump Down)
THP	Thermal Protector	C. B.	Controller Circuit Board	CNM	Connector (Connection for Option)
TH3	Thermistor (Liquid)	F1, F2	Fuse (T10AL250V)	CN31	Connector (Emergency Operation)
TH4	Thermistor (Discharge)	F3, F4	Fuse (T6.3AL250V)	CNDM	Connector (Connection for Option)
TH6	Thermistor (2-Phase Pipe)	SW1	Switch (Manual Defrost, Defect History Record Reset, Refrigerant Address)	SV2	Connector
TH7	Thermistor (Ambient)			X52, X55	Relay



*1. MODEL SELECT

The black square (■) indicates a switch position.

MODEL	SW6-4, 5, 6, 7, 8 *2	SW5-5 *2	MODEL	SW6-4, 5, 6, 7, 8 *2	SW5-5 *2
SUZ-KA30NAHZ	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6 7 8	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6	SUZ-KA36NAHZ	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6 7 8	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6

*2. SW6-1 to 3, SW5-1 to 4, 6 : Function Switch

*3 Ambient temp. of ZUBADAN Flash Injection becomes effective.

The black square (■) indicates a switch position.

Ambient temp.	SW9-3, 4 *4	Ambient temp.	SW9-3, 4 *4	Ambient temp.	SW9-3, 4 *4	Ambient temp.	SW9-3, 4 *4
37°F or less (Initial setting)	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4	32°F or less	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4	27°F or less	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4	21°F or less	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4

*4 SW9-1 to 2 : Function Switch

POWER SUPPLY
208/230 V AC 60 Hz

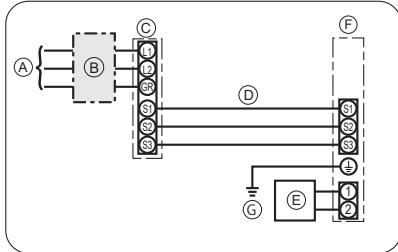
*Use copper supply wires.

*Utiliser des fils d'alimentation en cuivre.

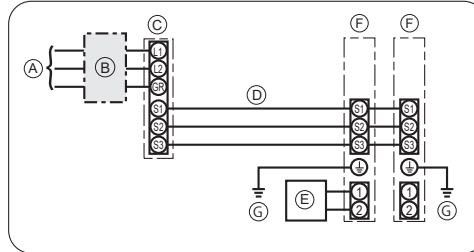
8-1. INDOOR UNIT POWER SUPPLIED FROM OUTDOOR UNIT

The following illustrations show available connection patterns.
The outdoor unit power supply patterns vary on each model.

1:1 System



Simultaneous twin 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 earth

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

Outdoor model name		KA24	KA30	KA36
Outdoor unit power supply		Single, 208/230 V, 60 Hz		
Breaker size		25 A	35 A	
Minimum circuit ampacity		17 A	24 A	26 A
Maximum rating of overcurrent protective device		27 A	40 A	42 A
Wiring Wire No. x size	Outdoor unit power supply	2 × Min AWG 12		
	Outdoor unit power supply earth	1 × Min AWG 12		
	Indoor unit-Outdoor unit *1	3 × AWG 14 (polar)		
	Indoor unit earth	1 × Min AWG 14		
	Remote controller-Indoor unit *2	2 × AWG 22 (Non-polar)		
Circuit rating	Outdoor unit L1-L2 *3	208/230 VAC		
	Indoor unit-Outdoor unit S1-S2 *3	208/230 VAC		
	Indoor unit-Outdoor unit S2-S3 *3	24 VDC		
	Remote controller-Indoor unit *3	12 VDC		

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.

*1. Maximum 147 ft [45 m].

If AWG13 used, maximum 164 ft [50 m].

If AWG13 used and S3 separated, maximum 262 ft [80 m].

*2. The 30 ft [10 m] wire is attached in the remote controller accessory. Maximum 1500 ft [500 m].

*3. The figures are NOT always against the ground.

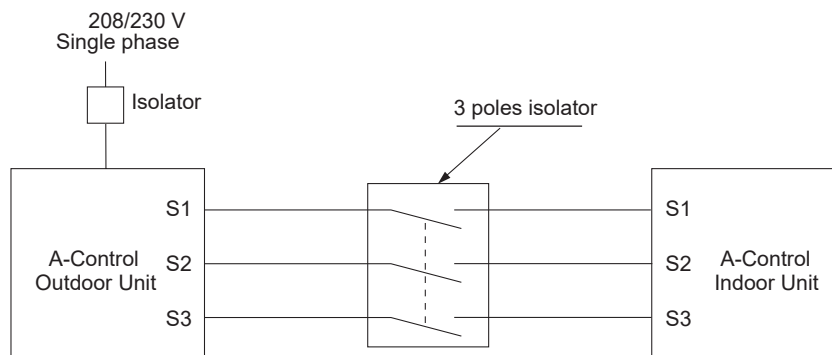
S3 terminal has 24 VDC against S2 terminal. However between S3 and S1, these terminals are NOT electrically insulated by the transformer or other device.

Notes: 1. Wiring size must comply with the applicable local and national code.

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. Install an earth line longer than power cables.



⚠ Warning:

In the case of A-control wiring, there is high voltage potential on the S3 terminal caused by electrical circuit design that has no electrical insulation between power line 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.

• Turn on the main power when the ambient temperature is, -4°F [-20°C] or higher.

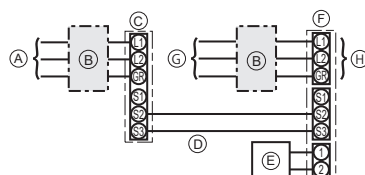
• In below, -4°F [-20°C] condition, it needs at least 4 h standby to operate in order to warm the electrical parts.

8-2. SEPARATE INDOOR UNIT/OUTDOOR UNIT POWER SUPPLIES

The following illustrations show available connection patterns.
The outdoor unit power supply patterns vary on models.

1:1 System

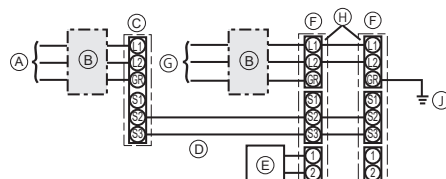
The optional indoor power supply terminal kit is required.



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

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

Simultaneous twin system



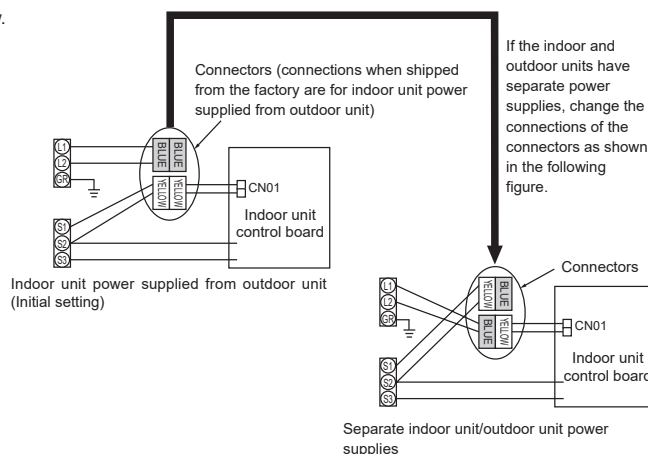
- (A) Outdoor unit power supply
- (B) Wiring circuit breaker or isolating switch
- (C) Outdoor unit
- (D) Indoor unit/outdoor unit connecting cords
- (E) Remote controller
- (F) Indoor unit
- (G) Indoor unit power supply
- (H) Option
- (J) Indoor unit earth

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

If the indoor and outdoor units have separate power supplies, refer to the table below.
Change the indoor unit electrical box wiring referring to the figure in the right and the DIP switch settings of the outdoor unit control board.

	Indoor unit specifications							
Indoor unit electrical box connector connection change	Required							
Label affixed near each wiring diagram for the indoor and outdoor units	Required							
Outdoor unit DIP switch settings (when using separate indoor unit/outdoor unit power supplies only)	ON OFF	<table><tr><td></td><td></td><td>3</td></tr><tr><td>1</td><td>2</td><td></td></tr></table> (SW8)			3	1	2	
		3						
1	2							

Note:
There are 3 types of label; A, B and C.
Affix the appropriate label(s) to the units according to the wiring method.



Indoor model name		A24	A30	A36
Indoor unit power supply		Single, 208/230 V, 60 Hz		
Minimum circuit ampacity	SVZ	3.00 A	4.13 A	4.13 A
	PEAD	2.63 A	2.73 A	3.3 A
Maximum rating of overcurrent protective device		15 A		
Wiring Wire No. x size	Indoor unit power supply	2 × Min AWG 16		
	Indoor unit power supply earth	1 × Min AWG 16		
	Indoor unit-Outdoor unit	*1	2 × AWG 22 (polar)	
	Indoor unit earth		-	
	Remote controller-Indoor unit	*2	2 × AWG 22 (Non-polar)	
Circuit rating	Outdoor unit L1-L2	*3	208/230 VAC	
	Indoor unit-Outdoor unit S1-S2	*3	-	
	Indoor unit-Outdoor unit S2-S3	*3	24 VDC	
	Remote controller-Indoor unit	*3	12 VDC	

*1. Maximum 165 ft [50 m]

*2. The 30 ft [10 m] wire is attached in the remote controller accessory. Maximum 1500 ft [500 m].

*3. The figures are NOT always against the ground.

Notes: 1. Wiring size must comply with the applicable local and national code.
2. Use copper supply wires.
3. Use wires rated 300 V or more for the power supply cables.
4. Install an earth line longer than power cables

8-3. INDOOR – OUTDOOR CONNECTING CABLE

Outdoor power supply	Wire No. × Size		
	Max. 147 ft [45 m]	Max. 164 ft [50 m]	Max. 262 ft [80 m]
Indoor unit-Outdoor unit	3 × AWG15 (polar)	3 × AWG13 (polar)	3 × AWG13 (polar) and S3 separated

Note: The maximum cable length may vary depending on the condition of installation, humidity or materials, etc.

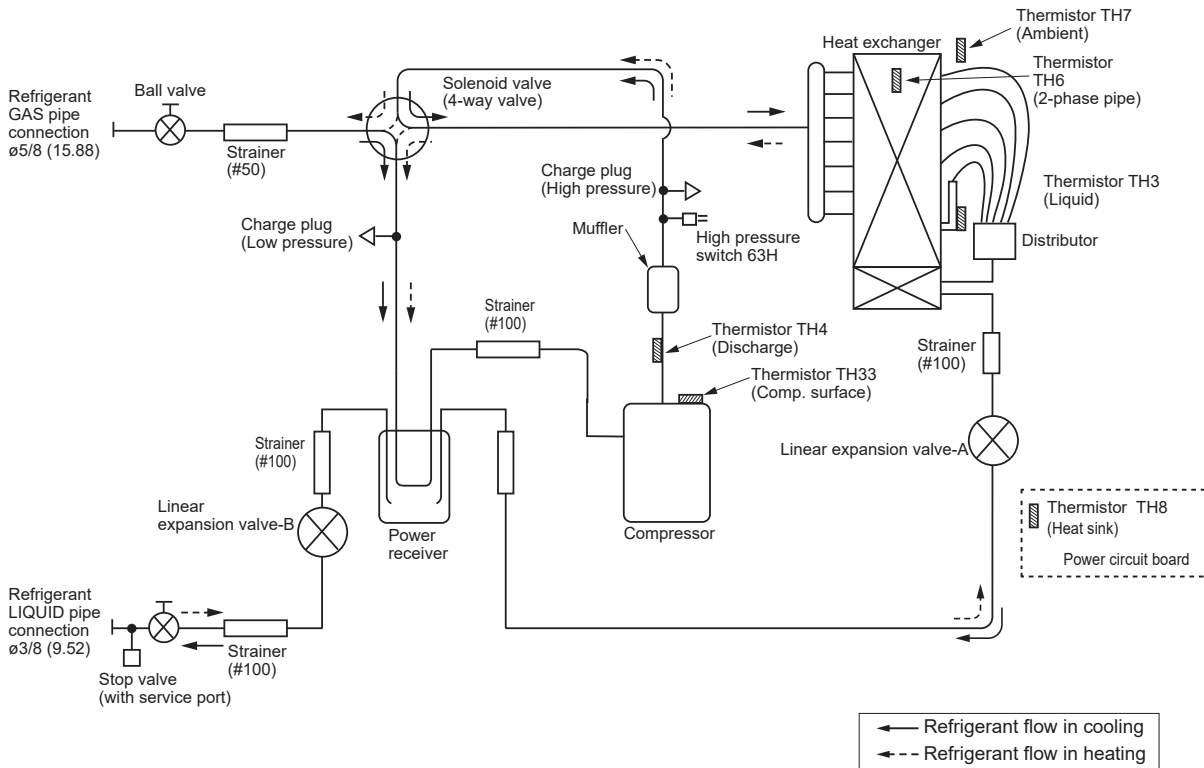
Indoor/Outdoor separate power supply	Wire No. × Size		
	Max. 393 ft [120 m]		
Indoor unit-Outdoor unit	2 × Min AWG22		

Note: The optional indoor power supply terminal kit is necessary.

Be sure to connect the indoor-outdoor connecting cables directly to the units (no intermediate connections). Intermediate connections can lead to communication errors if water enters the cables and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.

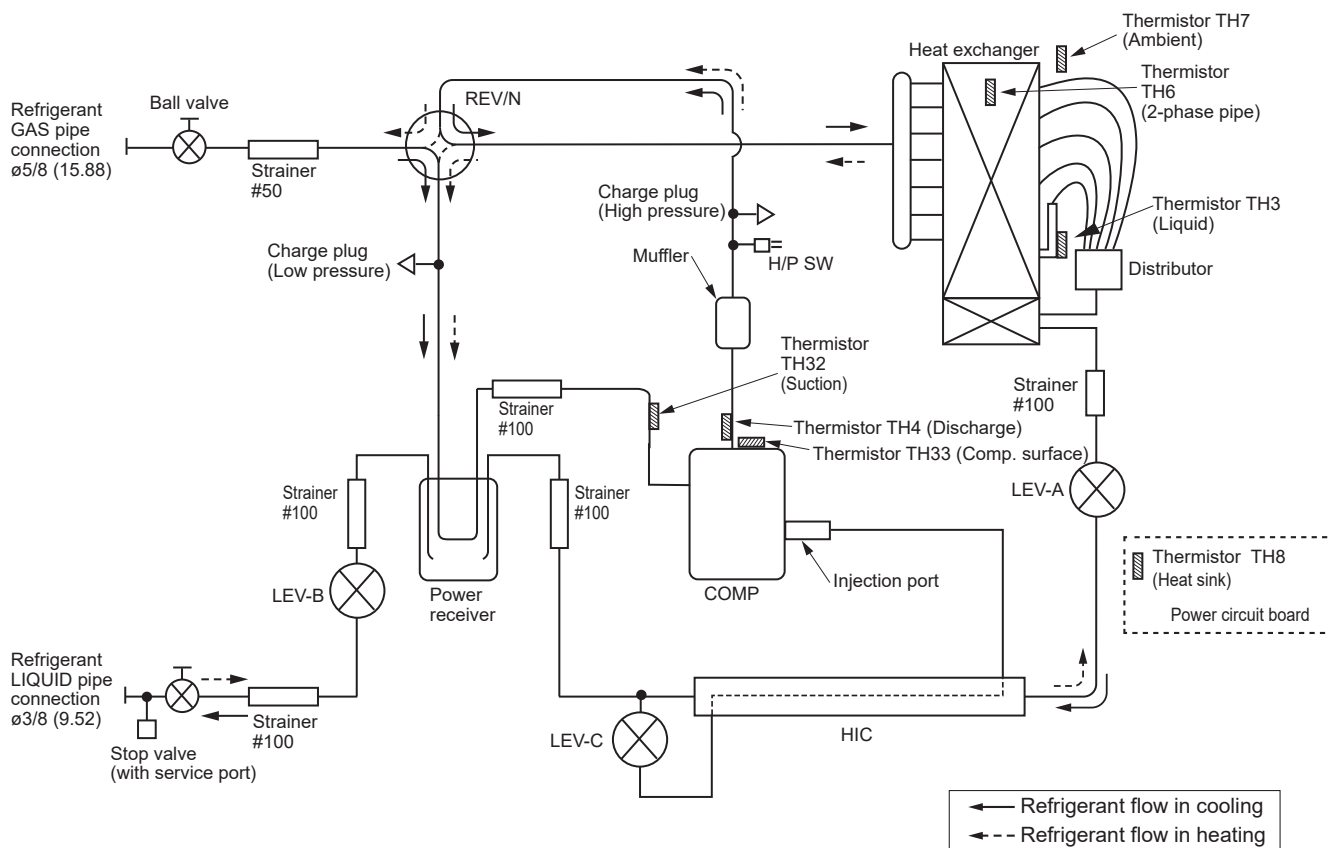
SUZ-KA24NAHZ

Unit: in (mm)



SUZ-KA30NAHZ SUZ-KA36NAHZ

Unit: in (mm)



Symbol	Parts name	Detail
COMP	Compressor	DC inverter scroll compressor (Mitsubishi Electric Corporation)
H/P SW	High pressure switch (63H)	For protection (OFF: 4.15MPa)
REV/V	Reversing (4-way) valve (21S4)	Change the refrigerant circuit (Heating / Cooling) and for Defrosting
Charge plug	Charge plug	High pressure / Low pressure / For production test use
LEV-A	Linear expansion valve -A	Heating: Secondary LEV Cooling: Primary LEV
LEV-B	Linear expansion valve -B	Heating: Primary LEV Cooling: Secondary LEV
LEV-C	Linear expansion valve -C	For HIC (heating only)
TH32	Suction temperature thermistor	For LEV control
TH3	Liquid temperature thermistor	Heating: Evaporating temperature Cooling: Sub cool liquid temperature
TH4	Discharge temperature thermistor	For LEV control and for compressor protection
TH6	2-phase pipe temperature thermistor	Outdoor 2-phase pipe temperature
TH7	Ambient temperature thermistor	For fan control and for compressor frequency control
TH33	Comp. surface temperature thermistor	For protection
Power Receiver	Power Receiver	For accumulation of refrigerant
HIC	Heat interchange circuit	For high heating capacity

9-1. REFRIGERANT COLLECTING (PUMP DOWN)

When relocating or disposing of the indoor/outdoor unit, pump down the system following the procedures below so that no refrigerant is released into the atmosphere.

- ① Turn off the power supply (circuit breaker).
- ② Connect the low pressure valve on the gauge manifold to the charge plug (low pressure side) on the outdoor unit.
- ③ Close the liquid stop valve completely.
- ④ 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.
- ⑤ Perform the refrigerant collecting operation (cooling test run).
 - Push the pump-down SWP switch (push-button type) on the control board of the outdoor unit. The compressor and ventilators (indoor and outdoor units) start operating (refrigerant collecting operation begins). (LED1 and LED2 on the control board of the outdoor unit are lit.)
 - Only push the pump-down SWP switch if the unit is stopped. However, even if the unit is stopped and the pump-down SWP switch is pushed less than 3 minutes after the compressor stops, the refrigerant collecting operation cannot be performed. Wait until the compressor has been stopped for 3 minutes and then push the pump-down SWP switch again.
- ⑥ Fully close the ball valve on the gas pipe side of the outdoor unit when the pressure gauge on the gauge manifold shows 0.05 to 0 MPa [Gauge] (approx. 0.5 to 0 kgf/cm²) and quickly stop the air conditioner.
 - Because the unit automatically stops in about 3 minutes when the refrigerant collecting operation is completed (LED1 off, LED2 lit), be sure to quickly close the gas ball valve. However, if LED1 is lit, LED2 is off, and the unit is stopped, open the liquid stop valve completely, close the valve completely after 3 minutes or more have passed, and then repeat step ⑤. (Open the gas ball valve completely.)
 - 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.
 - Note that it may not be possible to perform a pump-down operation when the extension piping is very long with a large refrigerant amount. In this case, use refrigerant recovery equipment to collect all of the refrigerant in the system.
- ⑦ Turn off the power supply (circuit breaker), remove the gauge manifold, and then disconnect the refrigerant pipes.

⚠ Warning:

When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.

- If the refrigerant pipes are disconnected while the compressor is operating and the stop valve (ball valve) is open, the pressure in the refrigeration cycle could become extremely high if air is drawn in, causing the pipes to burst, personal injury, etc.
- 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.

9-2. START AND FINISH OF TEST RUN

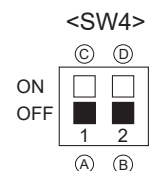
- Operation from the indoor unit
Execute the test run using the installation manual for the indoor unit.

- Operation from the outdoor unit

By using the DIP switch SW4 on the control board of outdoor unit, test run can be started and finished, and its operation mode (cooling/heating) can be set up.

- ① Set the operation mode (cooling/heating) using 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 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 it is generated by the check valve itself due to a small pressure difference in the refrigerant circuit.



- A Stop C Operation
B Cooling D Heating

Note:

The operation cannot be changed by SW4-2 during 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.)

10-1. TROUBLESHOOTING

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

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

Unit conditions at service	Check code	Actions to be taken for service (summary)
The trouble is reoccurring.	Displayed	Judge the problem and take a corrective action according to "10-3. SELF-DIAGNOSIS ACTION TABLE".
	Not displayed	Conduct troubleshooting and ascertain the cause of the trouble according to "10-4. TROUBLESHOOTING BY INFERIOR PHENOMENA".
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, matters related to wiring, etc. 2. Reset check code logs and restart the unit after finishing service. 3. There is no abnormality in electrical component, controller board, remote controller, etc.
	Not logged	1. Re-check the abnormal symptom. 2. Conduct troubleshooting and ascertain the cause of the trouble according to "10-4. TROUBLESHOOTING BY INFERIOR PHENOMENA". 3. Continue to operate unit for the time being if the cause is not ascertained. 4. There is no abnormality concerning of parts such as electrical component, controller board, remote controller, etc.

10-2. CHECK POINT UNDER TEST RUN

10-2-1. Before 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 Megger and check that it is 1.0 MΩ or over.
 - Do not use 500 V Megger to indoor/outdoor connecting wire terminal block (S1, S2, S3) and remote controller terminal block (1, 2). This may cause malfunction.
 - Make sure that test run switch (SW4) is set to OFF before turning on power supply.
 - Turn on power supply 12 hours before 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 operation manual before test run. (Especially items to secure safety.)

10-2-2. TEST RUN

Refer to "15-4. TEST RUN" for operation procedure.

10-2-3. ERROR INFORMATION

Refer to "15-2. ERROR INFORMATION" when an error occurs.

10-2-4. ERROR HISTORY

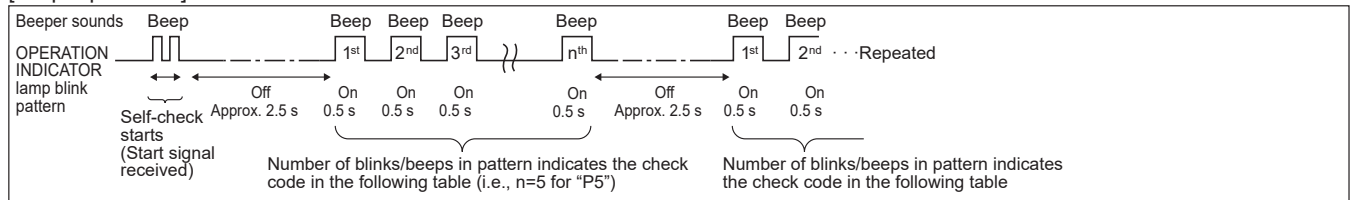
Refer to "15-6. ERROR HISTORY" to check the errors occurred in the past.

10-2-5. SELF-DIAGNOSIS

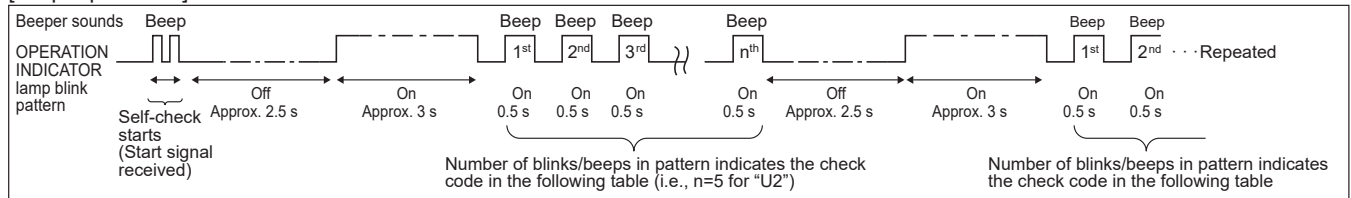
Refer to "15-7. SELF-DIAGNOSIS" to search for the error history.

- Refer to the following tables for details on the check 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 Check 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.)	
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 Beeper sounds/OPERATION INDICATOR lamp blinks (Number of times)	Wired remote controller Check code	Symptom	Remark
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 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	

Notes:

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 indoor unit section for the codes starting with P and E.

Check Code	Abnormal point 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) 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 connector LI or NI ③ Electric power is not supplied to outdoor controller circuit board. a) Disconnection of connector (CNDC) ④ Disconnection of reactor (DCL) ⑤ Defective outdoor power circuit board ⑥ Defective outdoor controller circuit board	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 Check following items. a) Connection of power supply terminal block (TB1) b) Connection of terminal on outdoor power circuit board Disconnection of connector LI or NI Refer to "10-8. TEST POINT DIAGRAM". 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 Check connection of reactor. (DCL) Refer to "7. WIRING DIAGRAM". ⑤ Replace outdoor power circuit board. ⑥ Replace controller board (When items above are checked but the units cannot be repaired).

Check Code	Abnormal point and detection method	Cause	Judgment and action
F5 (5201)	63H connector open Abnormal if 63H connector circuit is open for 3 minutes continuously after power supply. 63H: High pressure switch	① Disconnection or contact failure of 63H connector on outdoor controller circuit board ② Disconnection or contact failure of 63H ③ 63H is working due to defective parts. ④ Defective outdoor controller circuit board	① Check connection of 63H connector on outdoor controller circuit board. Refer to "10-8. TEST POINT DIAGRAM". ② Check the 63H side of connecting wire. ③ Check continuity by multimeter. Replace the parts if the parts are defective. ④ Replace outdoor controller circuit board.
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 recognizes 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 outdoor 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: 80m (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 occurs again.
Eb (6845)	Miswiring of indoor/outdoor unit connecting wire (converse wiring or disconnection) Outdoor controller circuit board can automatically set the unit number of indoor units. 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.	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.
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.	

<Abnormalities detected while unit is operating>

Check Code	Abnormal point and detection method	Cause	Judgment and action
U1 (1302)	High pressure (High pressure switch 63H worked) Abnormal if high pressure switch 63H worked (*) during compressor operation. *4.15 MPa [602PSIG] 63H: High pressure switch	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 ⑦ Defective operation of stop valve (Not full open) ⑧ Clogged or broken pipe ⑨ Locked outdoor fan motor ⑩ Malfunction of outdoor fan motor ⑪ Short cycle of outdoor unit ⑫ Dirt of outdoor heat exchanger ⑬ Decreased airflow caused by defective inspection of outside temperature thermistor (It detects lower temperature than actual temperature.) ⑭ Disconnection or contact failure of connector (63H) on outdoor controller board ⑮ Disconnection or contact failure of 63H connection ⑯ Defective outdoor controller board ⑰ Defective action of linear expansion valve ⑱ Malfunction of fan driving circuit	①—⑥ Check indoor unit and repair defect. ⑦ Check if stop valve is fully open. ⑧ Check piping and repair defect. ⑨—⑫ Check outdoor unit and repair defect. 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—⑯ Turn the power off and check F5 is displayed when the power is on again. When F5 is displayed, refer to "Judgment and action" for F5. ⑰ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS". ⑱ Replace outdoor controller board.
U2 (TH4: 1102) (TH33: 1132)	High discharge temperature (1) Abnormal if TH4 exceeds 257°F [125°C] or 230°F [110°C] continuously for 5 minutes. Abnormal if TH4 exceeds 230°F [110°C] or more continuously for 30 seconds after 90 seconds have passed since the defrosting operation started. (2) Abnormal if discharge superheat (Cooling: TH4-T_{63HS} / Heating: TH4-T_{63HS}) exceeds 126°F [70°C] continuously for 10 minutes. TH4: Thermistor <Discharge> High comp. surface temperature Abnormal if TH33 exceeds 257°F [125°C]. In the case of high comp. surface temperature error, compressor does not restart unless the thermistor (TH33) becomes less than 203°F [95°C]. TH33: Thermistor <Comp. surface>	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 turned on again. When U3 is displayed, refer to "Judgement and action" for U3. ⑤ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS". ⑥ After recovering refrigerant, remove water from entire refrigerant circuit under vacuum more than 1 hour.

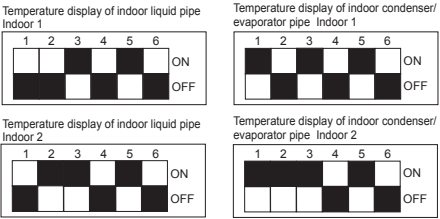
Check Code	Abnormal point and detection method	Cause	Judgment and action																						
U3 (TH4: 5104) (TH33: 5132)	Open/short circuit of outdoor unit temperature thermistor (TH4, TH33) Abnormal if open (37°F [3°C] or less) or short (422°F [217°C] or more) is detected during compressor operation. (Detection is inoperative for 10 minutes of compressor starting process and for 10 minutes after and during defrosting.) TH4: Thermistor <Discharge> 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, 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, TH32, TH6, TH7, and TH8) Abnormal if open or short is detected during compressor operation. Open detection of TH3, TH32 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, TH32, TH7/6 Outdoor power circuit board: CN6 ② Defective thermistor ③ Defective outdoor controller circuit board	① Check connection of connector (TH3, TH32, TH7/6) on the outdoor controller circuit board. Check connection of connector (CN6) on the outdoor power circuit board. Check breaking of the lead wire for TH3, TH32, TH6, TH7, TH8. Refer to "10-8. TEST POINT DIAGRAM". ② Check resistance value of TH3, TH32, TH6, TH7, TH8 or check temperature by microprocessor. (TH3, TH6, TH7, 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".) ③ Replace outdoor controller circuit board. Note: Emergency operation is available in the case of abnormalities of TH3, TH32, TH6 and TH7. Refer to "10-7. EMERGENCY OPERATION".																						
<table border="1"> <thead> <tr> <th colspan="2">Thermistors</th><th rowspan="2">Open detection</th><th rowspan="2">Short detection</th></tr> <tr> <th>Symbol</th><th>Name</th></tr> </thead> <tbody> <tr> <td>TH3, TH32</td><td>Thermistor <Liquid>, <Suction></td><td>-54°F [-48°C] or below</td><td>194°F [90°C] or above</td></tr> <tr> <td>TH6</td><td>Thermistor <2-phase pipe></td><td>-54°F [-48°C] or below</td><td>194°F [90°C] or above</td></tr> <tr> <td>TH7</td><td>Thermistor <Ambient></td><td>-54°F [-48°C] or below</td><td>194°F [90°C] or above</td></tr> <tr> <td>TH8</td><td>Thermistor <Heatsink></td><td>-54°F [-48°C] or below</td><td>216°F [102°C] or above</td></tr> </tbody> </table>				Thermistors		Open detection	Short detection	Symbol	Name	TH3, TH32	Thermistor <Liquid>, <Suction>	-54°F [-48°C] or below	194°F [90°C] or above	TH6	Thermistor <2-phase pipe>	-54°F [-48°C] or below	194°F [90°C] or above	TH7	Thermistor <Ambient>	-54°F [-48°C] or below	194°F [90°C] or above	TH8	Thermistor <Heatsink>	-54°F [-48°C] or below	216°F [102°C] or above
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TH8	Thermistor <Heatsink>	-54°F [-48°C] or below	216°F [102°C] or above																						
U5 (4230)	Temperature of heatsink Abnormal if heat sink thermistor (TH8) detects temperature indicated below. KA24 170°F [77°C] KA30/36 177°F [81°C]	① The outdoor fan motor is locked. ② Failure of outdoor fan motor ③ Airflow path is clogged. ④ Rise of ambient temperature ⑤ Defective thermistor ⑥ Defective input circuit of outdoor power circuit board ⑦ Failure of outdoor fan drive circuit	①② Check outdoor fan. ③ Check airflow path for cooling. 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 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 Replace outdoor power circuit board. ⑦ Replace outdoor controller circuit board.																						
U6 (4250)	Power module Check abnormality by driving power module in case overcurrent is detected. (UF or UP error condition)	① Outdoor stop valve is closed. ② Decrease of power supply voltage ③ Looseness, disconnection or converse of compressor wiring connection ④ Defective compressor ⑤ Defective 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 referring to "10-5. HOW TO CHECK THE PARTS". ⑤ Replace outdoor power circuit board.																						

Check Code	Abnormal point and detection method		Cause	Judgment and action
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 10 minutes.		① Disconnection or loose connection of discharge temperature thermistor (TH4) ② Defective holder of discharge temperature thermistor ③ Disconnection or loose connection of linear expansion valve's coil ④ Disconnection or loose connection of linear expansion valve's connector ⑤ Defective linear expansion valve	①② Check the installation conditions of discharge temperature thermistor (TH4). ③ Check the coil of linear expansion valve. Refer to "10-6. HOW TO CHECK THE COMPONENTS". ④ Check the connection or contact of LEV-A and LEV-B on outdoor controller circuit board. ⑤ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS".
U8 (4400)	Outdoor fan motor Abnormal if rotational frequency of the fan motor is not detected during DC fan motor operation. Fan motor rotational frequency is abnormal if; • 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 ② Failure in the outdoor circuit controller board	① Check or replace the DC fan motor. ② Check the voltage of the outdoor circuit controller board during operation. ③ Replace the outdoor circuit controller board. (when the failure is still indicated even after performing the remedy ① above.)
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 in DC bus voltage to 430 V	① Abnormal increase in power source voltage ② Disconnection of compressor wiring ③ Defective outdoor power circuit board ④ Compressor has a ground fault.	① Check the field facility for the power supply. ② Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM" (Outdoor power circuit board). ③ Replace outdoor power circuit board. 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. ② Defective converter drive circuit in outdoor power circuit board ③ Defective 52C drive circuit in outdoor power circuit board ④ Disconnection or loose connection of CN2 on the outdoor power circuit board / controller circuit board ⑤ Power circuit failure on DC supply for 15 VDC output on outdoor controller circuit board	① Check the field facility for the power supply. ② Replace outdoor power circuit board. ③ Replace outdoor power circuit board. ④ Check CN2 wiring. ⑤ Replace outdoor controller circuit board.
	04	Input current sensor error • Decrease in input current through outdoor unit to 0.5 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 ② Defective outdoor controller circuit board	① Replace outdoor power circuit board. ② Replace outdoor controller circuit board.

Check Code	Abnormal point and detection method		Cause	Judgment and action
U9 (4220)	Detailed codes	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 ② Disconnection or loose connection of earth wiring ③ Disconnection or loose connection of CN2 on the outdoor power circuit board / controller circuit board ④ Defective power synchronous signal circuit in outdoor controller circuit board ⑤ Defective power synchronous signal circuit in outdoor power circuit board	① Check the field facility for the power supply. ② Check earth wiring. ③ Check CN2 wiring. ④ Replace outdoor controller circuit board. ⑤ Replace outdoor power circuit board.
	08			
	10	PFC error (Overvoltage/Undervoltage/Overcurrent) • PFC detected any of the following: a) Increase of DC bus voltage as follows: 430 V b) Decrease in PFC control voltage to 13 VDC or lower c) Increase in input current as follows. KA24: 42 A peak KA30/36: 62 A peak	① Abnormal increase in power source voltage ② Decrease in power source voltage, instantaneous stop ③ Disconnection of compressor wiring ④ Misconnection of reactor (DCL) ⑤ Defective outdoor power circuit board ⑥ Defective reactor (DCL) ⑦ Disconnection or loose connection of CN2 on the outdoor power circuit board / controller circuit board	①② Check the field facility for the power supply. ③ Correct the wiring (U·V·W phase) to compressor. Refer to "10-8. TEST POINT DIAGRAM". ④ Correct the wiring (U·V·W phase) or reactor (DCL). ⑤ Replace outdoor power circuit board. ⑥ Replace reactor (DCL). ⑦ Check CN2 wiring.
UF (4100)	Compressor overcurrent interruption (When compressor 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 converse of compressor wiring connection ④ Defective compressor ⑤ Defective outdoor power board ⑥ DIP switch setting difference of outdoor controller 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 the dip switch setting of outdoor controller circuit board. Refer 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 38 A the input current or 10 seconds continuous 34 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 pipe thermistor (TH3), condensing temperature T _{63HS} 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 pipe thermistor (TH3), condensing temperature T _{63HS} ③ Defective outdoor controller board	① Check outdoor unit air passage. ②③ Turn the power off and on again to check the check code. If U4 is displayed, follow the U4 processing direction.
UE (1302)	Abnormal pressure of 63HS Abnormal if 63HS detects 14.5 PSIG [0.1 MPa] or less. Detection is inoperative for 3 minutes after compressor starting and 3 minutes after and during defrosting. 63HS: High pressure sensor		① Disconnection or contact failure of connector (63HS) on the outdoor controller circuit board ② Defective pressure sensor ③ Defective outdoor controller circuit board	① Check connection of connector (63HS) on the outdoor controller circuit board. Check breaking of the lead wire for 63HS. ② Check pressure by microprocessor. (Pressure sensor/ 63HS) (SW2: Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS".) ③ Replace outdoor controller board.

Check Code	Abnormal point and detection method	Cause	Judgment and action
UL (1300)	Abnormal low pressure (63L worked) Abnormal if 63L is worked (under -4 PSIG [-0.03 MPa]) during compressor operation. 63L: Low pressure switch	① Stop valve of outdoor unit is closed during operation. ② Disconnection or loose connection of connector (63L) on outdoor controller board ③ Disconnection or loose connection of 63L ④ Defective outdoor controller board ⑤ Leakage or shortage of refrigerant ⑥ Malfunction of linear expansion valve	① Check stop valve. ②-④ Turn the power off and on again to check if F3 is displayed on restarting. If F3 is displayed, follow the F3 processing direction. ⑤ Correct to proper amount of refrigerant. ⑥ Check linear expansion valve. Refer to "10-5. HOW TO CHECK THE PARTS".
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 converse 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 ⑧ Defective outdoor power circuit board ⑨ Dip switch setting difference of outdoor controller 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 indoor/outdoor fan. ⑤ Solve short cycle. ⑥ Replace outdoor controller circuit board. ⑦ Check compressor. Refer to "10-5. HOW TO CHECK THE PARTS". 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. ⑧ Replace outdoor power circuit board ⑨ Check the dip switch setting of outdoor controller circuit board
E0 or E4	Remote controller transmission error(E0)/signal receiving error(E4) ① Abnormal if main or sub remote controller cannot receive normally any transmission from indoor unit of refrigerant address "0" for 3 minutes. (Check code: E0) ② Abnormal if sub-remote controller could not receive any signal for 2 minutes. (Check code: E0) ① Abnormal if indoor controller board can not receive any data normally from remote controller board or from other indoor controller board for 3 minutes. (Check code: E4) ② Indoor controller board cannot receive any signal from remote controller for 2 minutes. (Check 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. 1640 ft [500 m] (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 any of ①-③ above, diagnose ④-⑥ by 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	Remote controller control board ① Abnormal if data cannot be read normally from the nonvolatile memory of the remote controller control board. (Check code: E1) ② Abnormal if the clock function of remote controller cannot be operated normally. (Check code: E2)	① Defective remote controller	① Replace remote controller.

Check Code	Abnormal point and detection method	Cause	Judgment and action
E3 or E5	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. (Check code: E3) ② Remote controller receives transmitted data at the same time, compares the data, and when detecting it, judges different data to be abnormal 30 continuous times. (Check code: E3) ① Abnormal if indoor controller board could not find blank of transmission path. (Check code: E5) ② Indoor controller board receives transmitted data at the same time, compares the data, and when detecting it, judges different data to be abnormal 30 continuous times. (Check 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.
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 condition When 2 or more indoor units are connected to an outdoor unit, indoor controller board could not receive a signal for 3 minutes from outdoor controller circuit board, a signal which allows outdoor controller circuit board to transmit signals.	① Contact failure, short circuit or miswiring (converse 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. ④ Noise has entered into indoor/outdoor unit connecting wire. ⑤ Defective fan motor ⑥ Defective rush current resistor of outdoor power circuit board.	Note: Check LED display on outdoor controller circuit board. (Connect A-Control service tool (PAC-SG50ST)) 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 in the case of twin indoor unit system. ②-④ Turn the power off, and on again to check. If abnormality occurs again, replace indoor controller board or outdoor controller circuit board. ⑤ Turn the power off, and detach fan motor from connector (CNF1,2). Then turn the power on again. If abnormality is not displayed, replace fan motor. If abnormality is displayed, replace outdoor controller circuit board. ⑥ Check the rush current resistor on outdoor noise filter board with a multimeter. If open is detected, replace the power board. Note: Other indoor controller board may have defect in the case of twin indoor unit system.
E7	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 if abnormality is displayed again.
E8 (6840)	Indoor/outdoor unit communication error (Signal receiving error) (Outdoor unit) 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.

Check Code	Abnormal point and detection method	Cause	Judgment and action
EF (6607 or 6608)	Non defined check code This code is displayed when non-defined check 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 inverter model.	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.
Ed (0403)	Serial communication error 1. Abnormal if serial communication between outdoor controller circuit board and outdoor power circuit board is defective. 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 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 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.	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. 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 drying mode. Cooling range: Indoor pipe temperature (TH2 or TH5)-room temperature (TH1) $\leq -5.4^{\circ}\text{F}$ [-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] $\leq$ (Condenser/Evaporator temperature(TH5)-room 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 Converse connection of extension pipe (on plural units connection) ③ Converse 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)')  A-Control Service Tool SW2 setting ②③ Check converse connection of extension pipe or converse wiring of indoor/outdoor unit connecting wire. ⑤ Check the stop valve is opened completely.

Check Code	Abnormal point and detection method	Cause	Judgment and action
PL	Abnormal refrigerant circuit During Cooling, Dry, or Auto Cooling operation, the following conditions are regarded as failures when 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 section "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>

<M-NET communication error>

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

Check Code	Abnormal point 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 occurred. 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 and indoor unit and 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 Transmission are mixed with others and occupation rate on transmission wire rose because of defective repeater (a function to connector or disconnect transmission of control and central control system) of outdoor unit, then abnormality is detected.	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) is 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 thunder 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 and indoor unit and FRESH MASTER or 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-detected controller may be defective.

Check Code	Abnormal point 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 factor that has 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 which lead communication error are caused by over-range transmission wire. • Maximum distance... 656 ft [200 m] • Remote controller line (39 ft [12m]) ③ Voltage drop and weak signal which lead 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... 1.25mm ² [AWG16] or more ④ Voltage drop and weak signal which lead communication error are caused by over-numbered units. ⑤ Accidental malfunction of abnormality-detected controller (noise, thunder surge) ⑥ Defective of abnormality-detected controller	Always try the following when the error "A7" occurs. ① 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, and turn the power on again. If malfunction was accidental, the unit returns to normal. ② Check address switch of abnormality-detected address. ③ Check disconnection or looseness of 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 there were some troubles of ①—⑤ above, repair the defective, then 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, and turn the power on again. • If there was no trouble with ①—⑤ above in single refrigerant system (one outdoor unit), controller of displayed address or attribute is defective. • If there was no trouble with 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.
	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	If there was no trouble with 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.
	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	If there was no trouble with 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.

Continued to the next page.

From the previous page.

Check Code	Abnormal point 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	Same as mentioned in “A7” of the previous page.
	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	
	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 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 non-existent,	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.	

Check Code	Abnormal point 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 Voltage drop and weak signal which lead communication error are caused by over-range transmission wire. • Maximum distance... 656 ft [200 m] • Remote controller line(39 ft [12m]) ③ Voltage drop and weak signal which lead communication error are caused by over-range 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-detected controller	① Check transmission waveform or noise on transmission wire. ② 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, 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 BY INFERIOR PHENOMENA

Phenomena	Factor	Countermeasure
1. Remote controller display does not work.	① 12 VDC is not supplied to remote controller. ② 12–15 VDC is supplied to remote controller, however, no display is indicated. • "Please Wait" is not displayed. • "Please Wait" is displayed.	① Check 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 No.3 below. ② Check the following. • Failure of remote controller if "Please Wait" is not displayed • Refer to 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. ② Communication error between the remote controller and indoor unit ③ Communication error between the indoor and outdoor unit ④ Outdoor unit protection device connector is open.	① Normal operation ② Self-diagnosis of remote controller 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. (Converse wiring of S1 and S2, or break of S3 wiring.) (2)When LED3 is blinking: indoor/outdoor connecting wire is normal. ④ Check LED display on outdoor controller circuit board. Refer to "10-9. FUNCTION OF SWITCHES, CONNECTORS AND JUMPERS". Check protection device connector (63L and 63H) 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

Phenomena	Factor	Countermeasure
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 the 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.
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. 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. ③ Refer to factor of No.2 on previous page.	① Normal operation ② Normal operation ③ Check phenomena of 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 ② Filter clogging ③ Heat exchanger clogging ④ Air duct short cycle	① If refrigerant leaks, discharge temperature rises and LEV opening increases. Inspect leakage by checking the temperature and opening. Check pipe connections for gas leakage. ② Open intake grille and check the filter. Clean the filter by removing dirt or dust on it. ③ If the filter is clogged, indoor pipe temperature rises and discharging pressure increases. Check if heat exchanger is clogged by inspecting discharging pressure. Clean the heat exchanger. ④ Remove the shield.
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. ② Refrigerant shortage ③ Lack of insulation for refrigerant piping ④ Filter clogging ⑤ Heat exchanger clogging ⑥ Air duct short cycle ⑦ Bypass circuit of outdoor unit fault	① Discharge temperature and indoor heat exchanger temperature does not rise. Inspect the failure by checking discharge pressure. Replace linear expansion valve. ② If refrigerant leaks, discharge temperature rises and LEV opening increases. Inspect leakage by checking the temperature and opening. Check pipe connections for gas leakage. ③ Check the insulation. ④ Open intake grill and check the filter. Clean the filter by removing dirt or dust on it. ⑤ If the filter is clogged, indoor pipe temperature rises and discharge pressure increases. Check if heat exchanger is clogged by inspecting discharge pressure. Clean the heat exchanger. ⑥ Remove the shield. ⑦ Check refrigerant system during operation.
8. ①For 3 minutes after temperature adjuster turns off, the compressor will not start operating even if temperature adjuster is turned on. ②For 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: “Please Wait” is kept being displayed on the remote controller.

Diagnosis flow	Cause	Inspection method and troubleshooting
<pre> graph TD Start([Check the display time of "Please Wait" after turning on the main power.]) --> D1{How long is "Please Wait" kept being displayed on the remote controller?} D1 -- "2 minutes or less" --> C1[• "Please Wait" will be displayed during the startup diagnosis after turning on the main power.] D1 -- "6 minutes or more" --> D2{Are any check codes displayed on the remote controller?} D2 -- NO --> C1 D2 -- YES --> P1[Check the LED display of the outdoor controller circuit board.] P1 --> D3{Are any check codes displayed on the LED?} D3 -- YES --> C2[• Miswiring of indoor/outdoor connecting wire • Breaking of indoor/outdoor connecting wire (S3) • Defective indoor controller board • Defective outdoor controller circuit board] D3 -- NO --> C3[• Defective indoor controller board • Defective remote controller] </pre>	• “Please Wait” will be displayed during the startup diagnosis after turning on the main power. • Miswiring of indoor/outdoor connecting wire • Breaking of indoor/outdoor connecting wire (S3) • Defective indoor controller board • Defective outdoor controller circuit board • Defective indoor controller board • Defective remote controller	• Normal The startup diagnosis will be over in around 2 minutes. • Refer to “Self-diagnosis action table” in order to solve the trouble. • In the case of communication errors, the display of remote controller may not match the LED display of the outdoor unit.

Symptoms: Nothing is displayed on the remote controller①

LED display of the indoor controller board

LED1: ○
LED2: ○
LED3: ○

Diagnosis flow	Cause	Inspection method and troubleshooting
Check the voltage between S1 and S2 on the terminal block (TB4) of the indoor unit. 198 to 253 VAC? NO Check the voltage among L1 and L2 on the terminal block (TB1) of the outdoor power circuit board. 198 to 253 VAC? NO Check the voltage between S1 and S2 on the terminal block (TB1) of the outdoor unit which is used to connect the indoor unit and the outdoor unit. 198 to 253 VAC? NO Check the voltage of indoor controller board (CN2D). 12 to 16 VDC? YES Check the voltage of the unit after removing the indoor power board (CN2S). 12 to 16 VDC? YES NO	• 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. 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
Check the voltage between S1 and S2 on the terminal block (TB4) of the indoor unit. 198 to 253 VAC? NO YES Check the status of the indoor controller board LED3 display. Not lighting. Blinking Check the looseness or disconnection of the indoor/outdoor connecting wire. Are there looseness or disconnection of the indoor/outdoor connecting wire? YES NO Check the refrigerant address of the outdoor unit. (SW1-3 to 1-6) Is the refrigerant address "0"? NO YES Check the LED display of the outdoor unit after turning on the main power again. Is anything displayed? NO YES Is "EA" or "Eb" displayed? NO YES Is "E8" displayed? YES NO Can the unit be restarted? Can all the indoor unit be operated? NO YES Check the voltage between S2 and S3 on the terminal block of the outdoor unit. 17 to 28 VDC? NO YES	• Breaking or poor contact of the indoor/outdoor connecting wire • Normal Only the unit which has the refrigerant address "0" supplies power to the remote controller. • Defective outdoor controller circuit board • Defective outdoor controller circuit board • Defective indoor controller board • Influence of electromagnetic noise • Defective outdoor power circuit board • Defective indoor power board	• Fix the breaking or poor contact of the indoor/outdoor connecting wire. • Set the refrigerant address to "0". In the case of the multiple grouping system, recheck the refrigerant address again. • Replace the outdoor controller circuit board. • Replace the outdoor controller circuit board. • Replace the indoor controller board of the indoor unit which does not operate. • Not abnormal. There may be the influence of electromagnetic noise. Check the transmission wire and get rid of the causes. • Replace the outdoor power circuit 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
Check the voltage of the terminal block (TB6) of the indoor unit. 10 to 16 VDC? YES NO Check the status of the LED2. Lighting Blinking Check the status of the LED2 after disconnecting the remote controller wire from the terminal block (TB5) of the indoor unit. Check the status of the LED2. Lighting Blinking	- 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 VDC 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
Frequent calls from customers

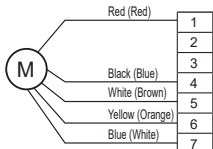
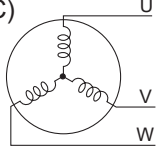
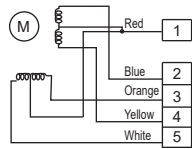
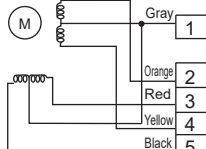
Phone Calls From Customers		How to Respond	Note
Unit does not operate at all.	① The operating display of remote controller does not come on.	① Check if power is supplied to air conditioner. Nothing appears on the display unless power is supplied.	_____
	② Unit cannot be restarted for a while after it's 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.	_____
	③ Check code appears and blinks on the display of remote controller.	③ Check code will be displayed if any protection devices of the air conditioner are actuated. What is check 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 h. Standard filter: 100 h.
	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 to that, 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 fan 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.	_____

Phone Calls From Customers		How to Respond	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 An 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 blower 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 the HEAT operation starts, to prevent the unit from blowing cold air, the fan speed is gradually increased from zero 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 the HEAT operation, the DEFROST operation is performed to defrost the outdoor unit. During the DEFROST operation, the blower 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.

Phone Calls From Customers		How to Respond	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 the 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. “1 h” 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 exchanger. 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 the 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 “AIR DIRECTION” or “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.

Phone Calls From Customers	How to Respond	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: Make use of optional parts "Drain Socket" and "Drain pan" if these water needs to be collected and drained out for once.	_____
The display of 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

Parts name	Checkpoints														
Thermistor (TH3) <Liquid pipe> Thermistor (TH4) <Discharge> Thermistor (TH6) <2-phase pipe> Thermistor (TH7) <Ambient> Thermistor (TH8) <Heat sink> Thermistor (TH32) <Suction pipe> Thermistor (TH33) <Comp. surface>	Disconnect the connector then measure the resistance with a multimeter. (Ambient temperature 50 to 86°F [10 to 30°C]) <table><tr><td></td><td>Normal</td><td>Abnormal</td></tr><tr><td>TH4 TH33</td><td>160 to 410 kΩ</td><td rowspan="4">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>		Normal	Abnormal	TH4 TH33	160 to 410 kΩ	Open or short	TH3 TH6 TH7 TH32	4.3 to 9.6 kΩ	TH8	39 to 105 kΩ				
	Normal	Abnormal													
TH4 TH33	160 to 410 kΩ	Open or short													
TH3 TH6 TH7 TH32	4.3 to 9.6 kΩ														
TH8	39 to 105 kΩ														
Fan motor(MF1, MF2) 	Measure the resistance between the connector pins with a multimeter. (At the ambient temperature 20°C) Note that the resistance between the connector pins may vary depending on the ambient temperature, so use those values as reference. <table><tr><td></td><td colspan="4">Normal</td><td>Abnormal</td></tr><tr><td>KA24/30/36</td><td>Red - Blue 1.1 ± 0.6 MΩ</td><td>Brown - Blue 40 ± 20 kΩ</td><td>Orange - Blue 220 ± 110 kΩ</td><td>White - Blue Open</td><td>Open or short (short, for White - Blue)</td></tr></table> *OL : Over Load			Normal				Abnormal	KA24/30/36	Red - Blue 1.1 ± 0.6 MΩ	Brown - Blue 40 ± 20 kΩ	Orange - Blue 220 ± 110 kΩ	White - Blue Open	Open or short (short, for White - Blue)	
	Normal				Abnormal										
KA24/30/36	Red - Blue 1.1 ± 0.6 MΩ	Brown - Blue 40 ± 20 kΩ	Orange - Blue 220 ± 110 kΩ	White - Blue Open	Open or short (short, for White - Blue)										
Solenoid valve coil <Four-way valve> (21S4)	Measure the resistance between the terminals with a multimeter. (Ambient temperature 68°F [20°C]) <table><tr><td>Model</td><td>Normal</td><td>Abnormal</td></tr><tr><td>KA24</td><td>1190.3 ± 119 Ω</td><td rowspan="2">Open or short</td></tr><tr><td>KA30, 36</td><td>1567.5 ± 156.8 Ω</td></tr></table>	Model	Normal	Abnormal	KA24	1190.3 ± 119 Ω	Open or short	KA30, 36	1567.5 ± 156.8 Ω						
Model	Normal	Abnormal													
KA24	1190.3 ± 119 Ω	Open or short													
KA30, 36	1567.5 ± 156.8 Ω														
Motor for compressor (MC) 	Measure the resistance between the terminals with a multimeter. (Winding temperature 68°F [20°C]) <table><tr><td>Model</td><td>Normal</td><td>Abnormal</td></tr><tr><td>KA24</td><td>0.74 Ω</td><td rowspan="2">Open or short</td></tr><tr><td>KA30, 36</td><td>0.188 Ω</td></tr></table>	Model	Normal	Abnormal	KA24	0.74 Ω	Open or short	KA30, 36	0.188 Ω						
Model	Normal	Abnormal													
KA24	0.74 Ω	Open or short													
KA30, 36	0.188 Ω														
Linear expansion valve (LEV-A/B) For KA24 	Disconnect the connector then measure the resistance with a multimeter. (Winding temperature 68°F [20°C]) <table><tr><td colspan="4">Normal</td><td>Abnormal</td></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>	Normal				Abnormal	Red - White	Red - Orange	Red - Yellow	Red - Blue	Open or short	46 ± 4 Ω			
Normal				Abnormal											
Red - White	Red - Orange	Red - Yellow	Red - Blue	Open or short											
46 ± 4 Ω															
Linear expansion valve (LEV-A/B/C) For KA30/36 	Disconnect the connector then measure the resistance with a multimeter. (Winding temperature 68°F [20°C]) <table><tr><td colspan="4">Normal</td><td>Abnormal</td></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>	Normal				Abnormal	Gray - Black	Gray - Red	Gray - Yellow	Gray - Orange	Open or short	46 ± 3 Ω			
Normal				Abnormal											
Gray - Black	Gray - Red	Gray - Yellow	Gray - Orange	Open or short											
46 ± 3 Ω															

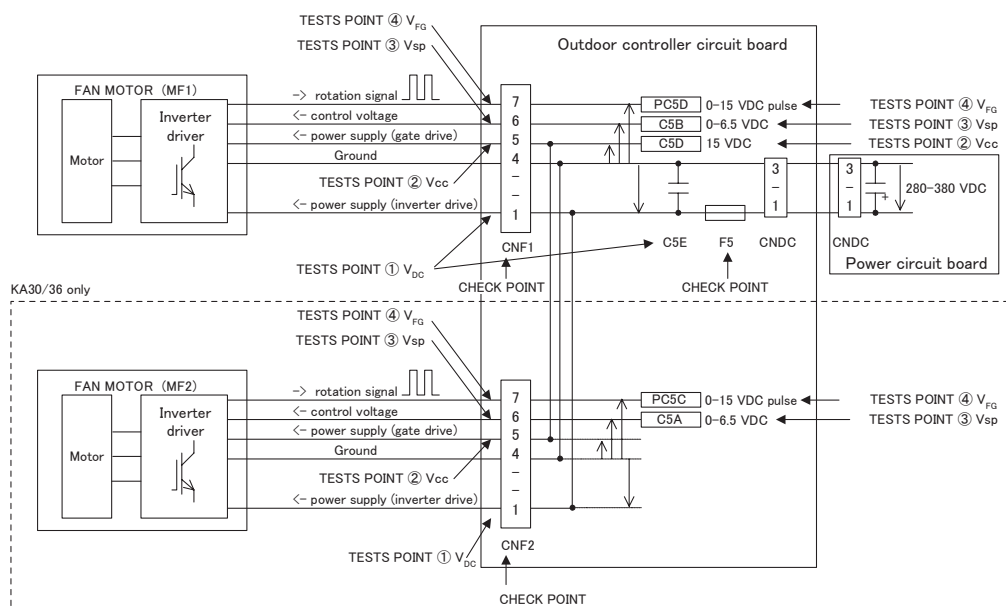
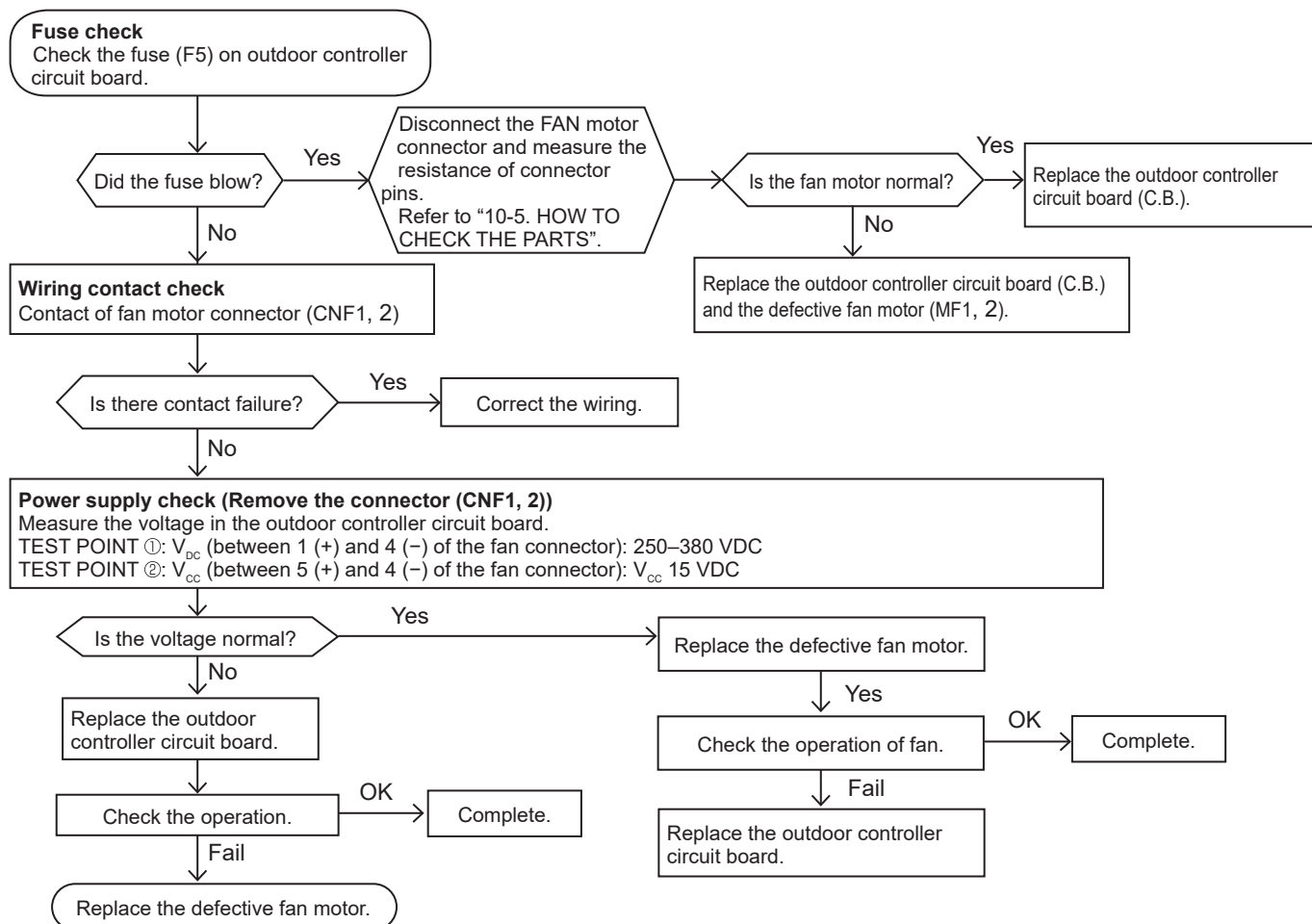
Check method of DC fan motor (fan motor/outdoor controller circuit board)

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 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 F5 that is on controller board is opened, change the fan motor and outdoor controller board at the same time (F5 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)

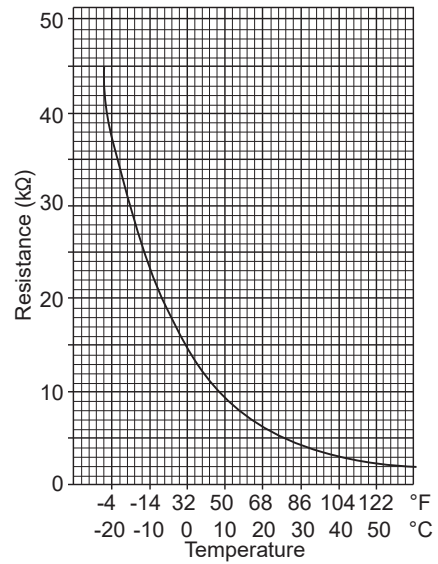
Thermistor R0 = 15 kΩ ± 3%

B constant = 3480 ± 1%

$$t (^{\circ}\text{C}): R_t = 15 \exp\left\{3480 \left(\frac{1}{273+t} - \frac{1}{273} \right)\right\}$$

$$T (^{\circ}\text{F}): R_T = 15 \exp\left\{3480 \left(\frac{1}{273+(T-32)/1.8} - \frac{1}{273} \right)\right\}$$

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



Medium temperature thermistor

- Thermistor <Heat sink> (TH8)

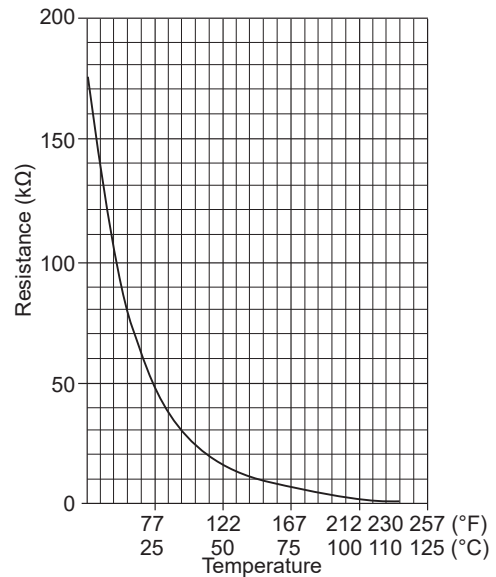
Thermistor R50 = 17 kΩ ± 2%

B constant = 4150 ± 3%

$$t (^{\circ}\text{C}): R_t = 17 \exp\left\{4150 \left(\frac{1}{273+t} - \frac{1}{323} \right)\right\}$$

$$T (^{\circ}\text{F}): R_T = 17 \exp\left\{4150 \left(\frac{1}{273+(T-32)/1.8} - \frac{1}{323} \right)\right\}$$

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



High temperature thermistors

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

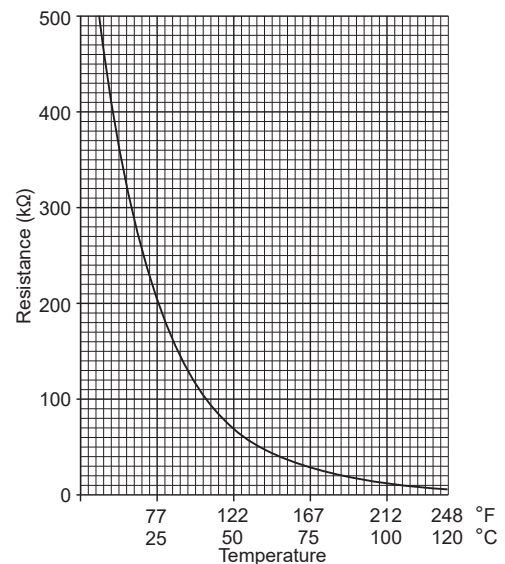
Thermistor R120 = 7.465 kΩ ± 2%

B constant = 4057 ± 2%

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

$$T (^{\circ}\text{F}): R_T = 7.465 \exp\left\{4057 \left(\frac{1}{273+(T-32)/1.8} - \frac{1}{393} \right)\right\}$$

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

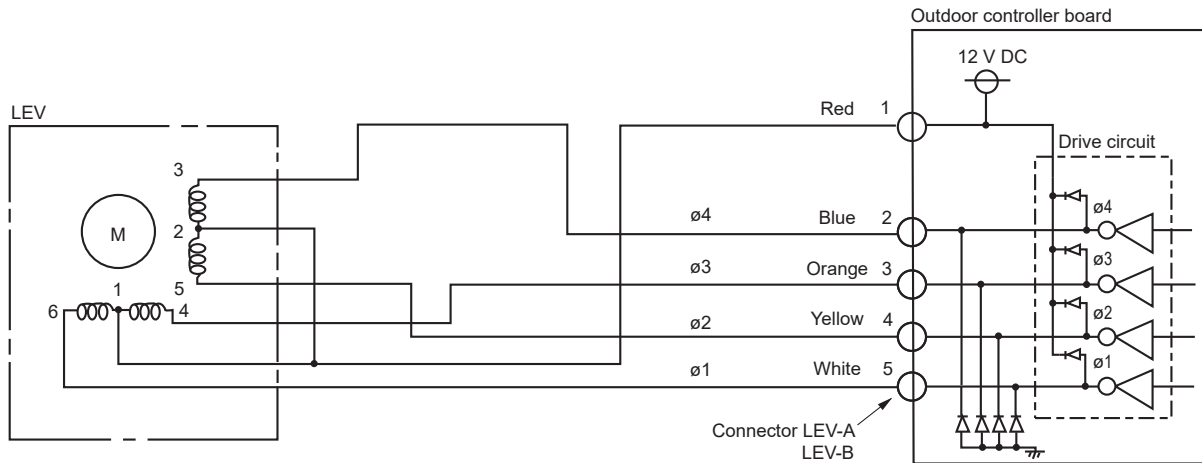


Linear expansion valve (KA24)

(1) Operation summary of the linear expansion valve

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

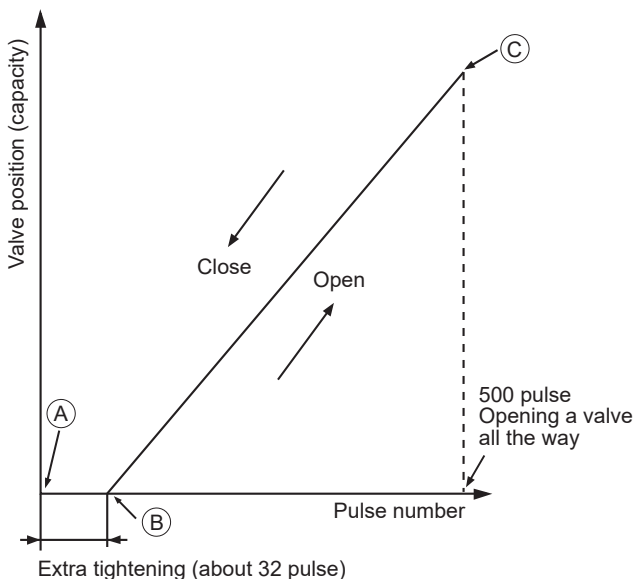
The output pulse shifts in the following order.

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

(2) Linear expansion valve operation



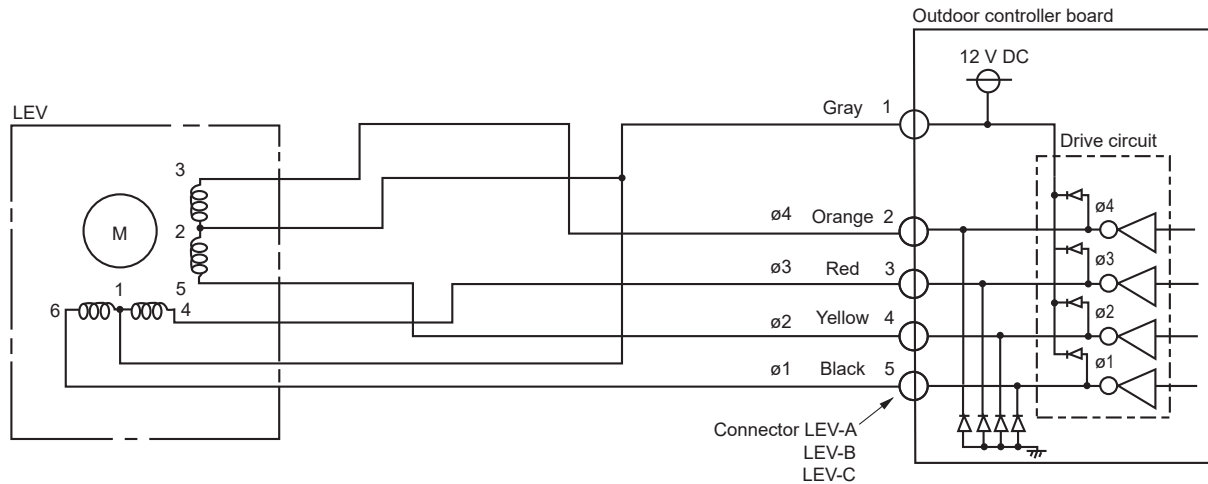
- When the power is turned on, 700 pulse closing valve signal will be sent till it goes to ① point in order to define the valve position.
(The pulse signal is being sent for about 20 seconds.)
- When the valve moves smoothly, there is no sound or vibration occurring from the linear expansion valve; however, when the pulse number moves from ② to ① or when the valve is locked, sound can be heard than normal situation.
No sound is heard when the pulse number moves from ② to ① in case coil is burn out or motor is locked by open-phase.
- Sound can be detected by placing the ear against the screw driver handle while putting the screw driver to the linear expansion valve.

Linear expansion valve (KA30/36)

(1) Operation summary of the linear expansion valve

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

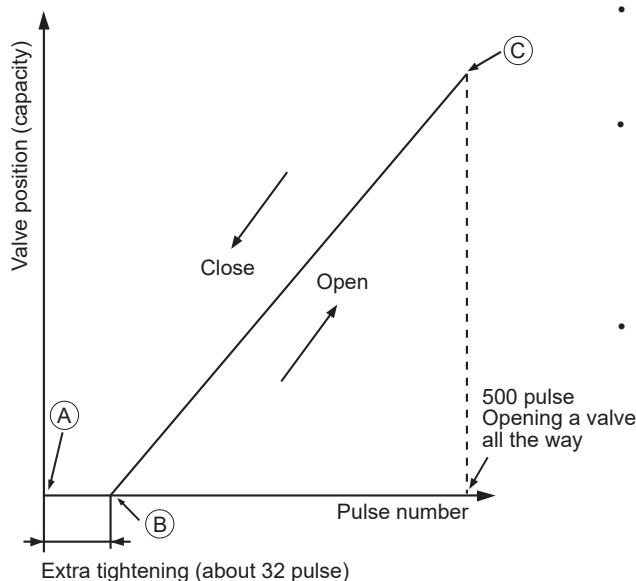
The output pulse shifts in the following order.

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

(2) Linear expansion valve operation

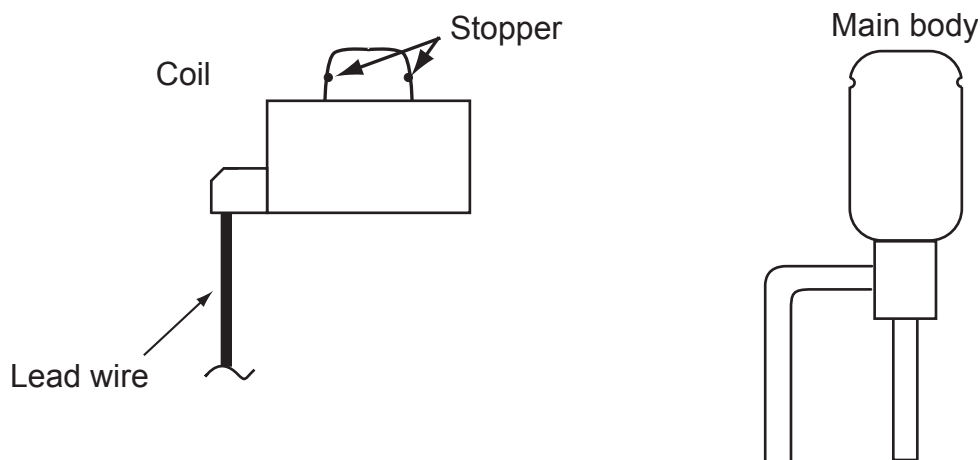


- When the power is turned on, 700 pulse closing valve signal will be sent till it goes to ① point in order to define the valve position. (The pulse signal is being sent for about 20 seconds.)
- When the valve moves smoothly, there is no sound or vibration occurring from the linear expansion valve; however, when the pulse number moves from ② to ① or when the valve is locked, sound can be heard than normal situation. No sound is heard when the pulse number moves from ② to ① in case coil is burn out or motor is locked by open-phase.
- Sound can be detected by placing the ear against the screw driver handle while putting the screw driver to the linear expansion valve.

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

<Composition>

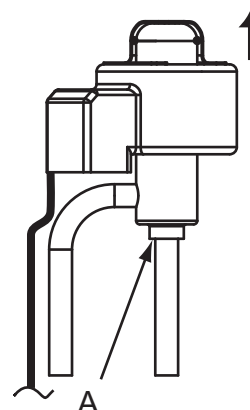
Linear expansion valve is separable into the main body and the coil as shown in the diagram below.



<How to detach the coil>

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

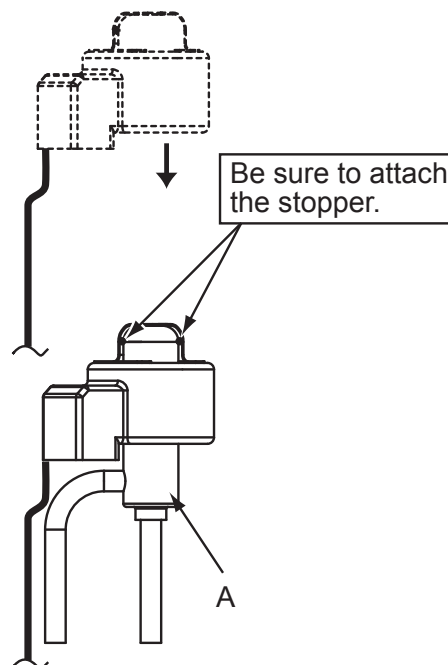
Be sure to detach the coil holding main body firmly. Otherwise pipes can bend due to stress.



<How to attach the coil>

Hold the lower part of the main body (shown as A) firmly so that the main body does not move and attach the coil by inserting it downward into the main body. Then securely attach the coil stopper to 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 any check codes shown below is displayed on outdoor unit, or microprocessor for wired remote controller or indoor unit has a failure while no other problems are found, emergency operation will be available by setting the emergency operation switch (SWE) ON and short-circuiting the connector (CN31) on outdoor controller board.

●When following abnormalities occur, emergency operation will be available.

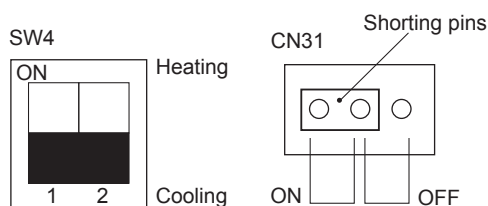
Check code	Inspected content
U4	Open/short of thermistor (TH3/TH6/TH7/TH32/TH8)
UE	Open of pressure sensor (T _{63HS})
E8	Indoor/outdoor unit communication error •Signal receiving error (Outdoor unit)
E9	Indoor/outdoor unit communication error •Transmitting error (Indoor unit)
E0 – E7	Communication error 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 outdoor unit other than the above abnormalities. (Emergency operation will not be available when check codes other than the above are indicated.)
- ② For emergency operation, it is necessary to set the emergency operation switch (SWE) on indoor controller board. (Refer to the electrical wiring diagram of 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 can not be turned on or off by remote control, and 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. Neglecting this could result in freezing the heat exchanger in indoor unit.

(3) Emergency operation procedure

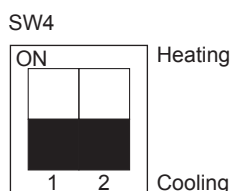
- ① Turn the main power supply off.
- ② Turn on the emergency operation switch (SWE) on indoor controller board.
- ③ Set the shorting pins of emergency operation connector (CN31) on outdoor controller board to ON.
- ④ Use SW4-2 on outdoor controller board to set the operation mode (cooling or heating). (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 (SWE) on indoor controller board to OFF.
- ③ Set the shorting pins of emergency operation connector (CN31) on outdoor controller board to OFF.
- ④ Set SW4-2 on outdoor controller board as shown in the right.

Note: If shorting pins are not set on 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 are 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 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 air temperature (TH7)	95°F [35°C]	45°F [7°C]	*1
Temperature difference code (intake temperature - set temperature) (Tj)	5	5	*1
Discharge superheat (SHd)	54°F [30°C]	54°F [30°C]	
Sub-cool (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.
If the unit enters emergency operation because TH values have become mismatched, setting the thermistors to open/short corrects the settings.

*2: If one thermistor is set to open/short, the values for each will be different.
[Example] When 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]
T _{63HS}	Te	Tf
	Regard normal figure as effective data.	

Discharge superheat (SHd)

Cooling = TH4 - T_{63HS} = Tc - Te

Heating = TH4 - T_{63HS} = Tf

Degree of subcooling (SC)

Cooling = T_{63HS} - TH3 = Te - 113°F [45°C]

Heating = T_{63HS} - TH2 = Tf - 113°F [45°C]