

19.5.3 Installation of outdoor unit

(1) Selection of installation location

- (a) A place where air will not be stagnant.
- (b) A place where the exhaust air will not be shortcycled.
- (c) A place with enough space for air flow around the unit.
- (d) A place where the unit will not be affected by other heat sources.
(when there are multiple units installed or when units have another heat source)
- (e) A void installing the unit in places that are subject to sea air, sulfurous gas of the type found in hot springs, or any other corrosive or flammable gas.
- (f) A place where smooth drainage of rain water and water formed by defrosting is acceptable.
- (g) **In heating operation**, snow deposit on the heat-exchanger of outdoor unit must be prevented for keeping the normal performance capacity.

● **Snow-hood on outdoor unit as in drawing, will reduce the frequency of defrost operation.**

When installing the snow hood, take care so that their outlet of the snow hood will not face directly into the most windy direction.

● **Design the base higher than possible snow deposit.**

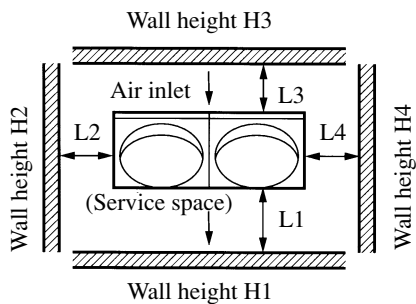
- (h) A place where air outlet port is not exposed to strong wind.)

(2) Installation space

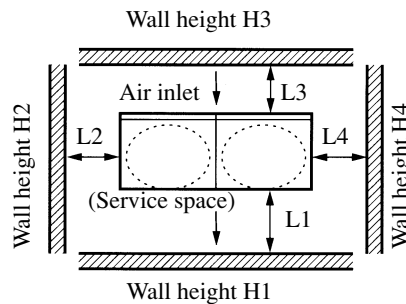
A place with enough space for air inlet, air outlet and service space.

(a) Independent installation

1) Standard oblique blow or up blow



2) Side blow



(Unit : mm)

Installation example	I	II	III
L ₁	Open	Open	500
L ₂	0	0	0
L ₃	300	300	300
L ₄	Open	500	0
H ₁	—	—	1000 or less
H ₂	Not limited	Not limited	Not limited
H ₃	Not limited	Not limited	700 or less
H ₄	—	Not limited	Not limited

Note (1) When the wall heights H1 and H3 exceed the limited value, keep dimensions for L1 and L3 as shown below.

$L_1 = H_1 - 500$ (In the case of side blow, $H_1 \leq 1,000$ irrespective of L1 dimension)

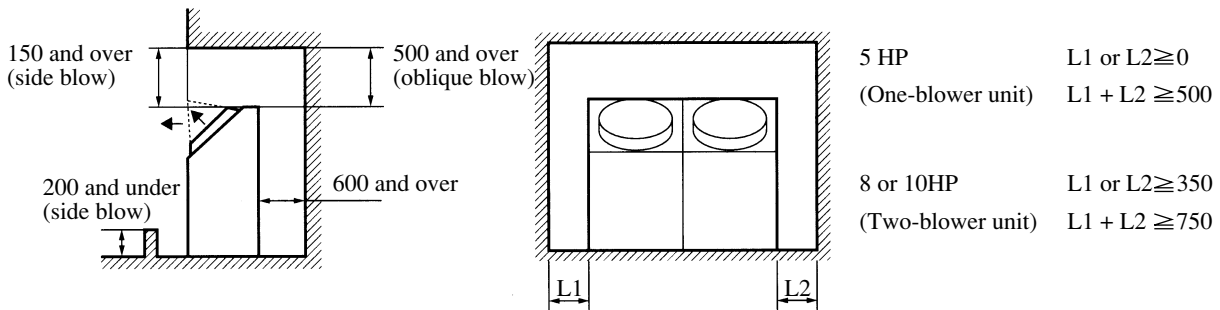
$L_3 = 300 + (H_3 - 700) / 2$

However, there is no limitation in wall height H3 if L3 exceeds 600.

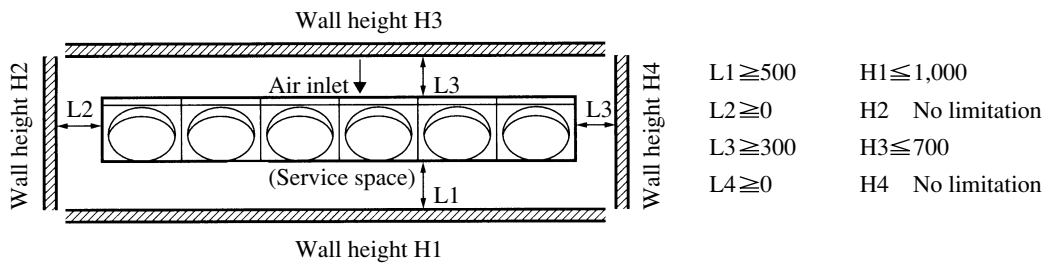
(b) In the case that there is a wall above the unit

No. of units that can be installed are limited up to 3 units.

(Example : 5HP × 3 units, 10HP × 1 units + 5HP × 1 unit)



(c) Plural units installation (Single crosswise row installation : No limitation in No. of units)



Note (1) When the wall heights H1 and H3 exceed the limited value, keep dimensions for L1 and L3 as shown below.

$$L1 = H1 - 500 \text{ (In the case of side blow, } H1 \leq 1,000 \text{ irrespective of } L1 \text{ dimension)}$$

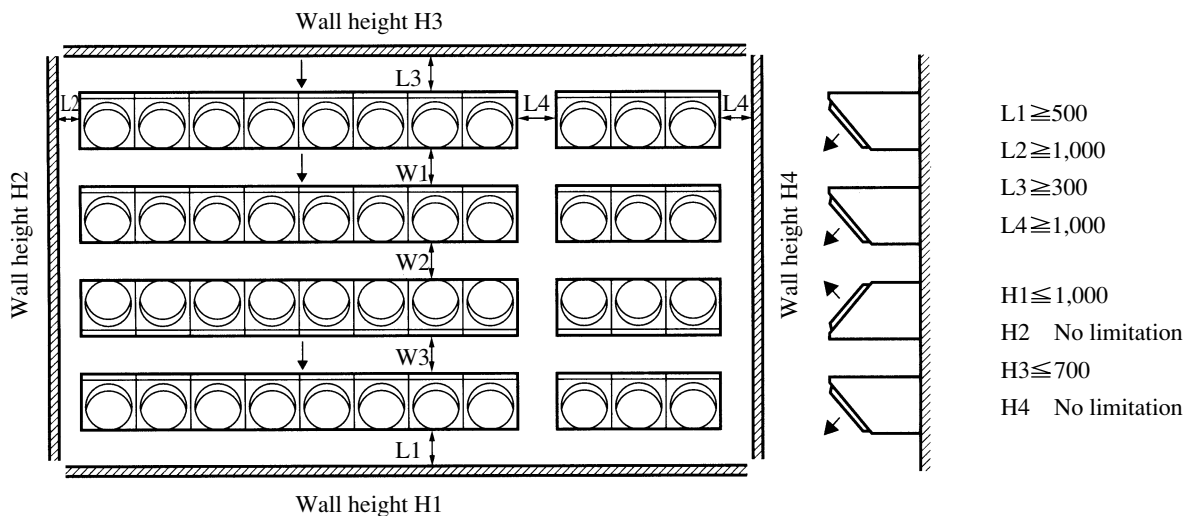
$$L3 = 300 + (H3 - 700) / 2$$

However, there is no limitation in wall height H3 if L3 exceeds 600.

(d) Plural units installation (Plural installation in lengthwise and crosswise rows)

Notes (1) Side blow is not allowed.

(2) Secure dimensions L1 and H1 at the service space side. Secure dimensions L3 and H3 at the suction side.



(3) When the wall heights H1 and H3 exceed the limited value, keep dimensions for L1 and L3 as shown below.

$$L1 = H1 - 500$$

$$L3 = 300 + (H3 - 700) / 2$$

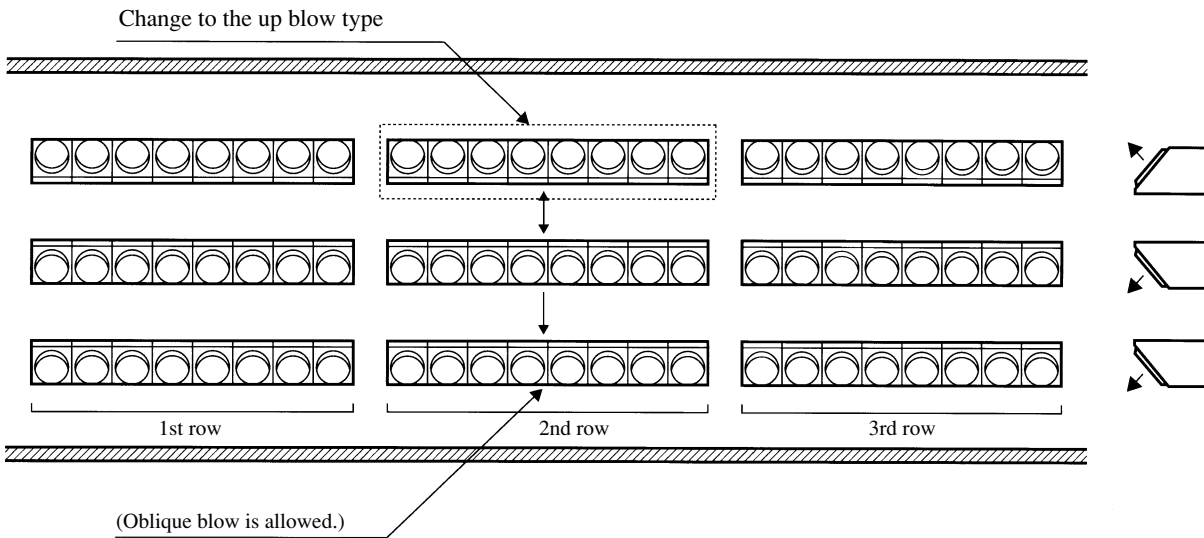
However, there is no limitation in wall height H3 if L3 exceeds 600.

	W1	W2	W3	W4
Oblique blow (standard)	1,500 and over	800 and over	1,500 and over	1,500 and over
Up blow (option)	800 and over	800 and over	1,500 and over	1,500 and over

(4) The space of 1,500 mm per a series of 8 blower units is required for W4.

(Example : 5HP × 8units in series installation, 10HP × 4 units in series installation)

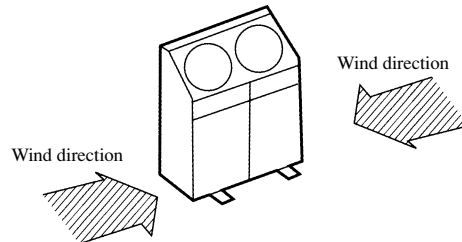
(5) When installing more than 3 rows with the oblique blow in lengthwise, change the blow direction of the group in the central row units, excluding the both end rows, to the up blow (option). This group blows to the wall and also opposes to the units at the rear in the suction face. For the example shown below, the uppermost group in the second row falls under the above notes.



(6) Install the rack that stores the piping, etc. so that it does not interfere with the airflow entering into the heat exchanger.

(3) In the case where the unit is exposed to strong wind.

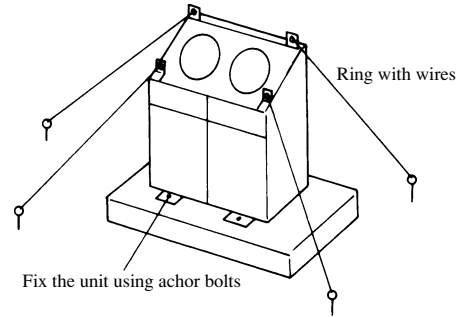
- Face the unit air outlet at a 90 °angle from the direction of the wind.



(c) Securing outdoor unit (in the case of exposure to severe weather conditions)

Fix the unit in the following way.

- Use overturning prevention brackets.
- Rig with wires.



(Use rigging wires that are resistant to corrosion and sufficient in strength. For example SUS304-W1, wire thickness 2.9 mm)

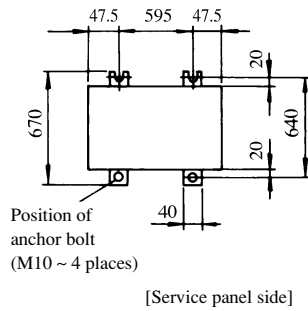
(4) Installation

Fix the unit in a proper way according to the condition of a place where it is installed by referring to the following.

(a) Fix the unit to the foundation with anchor bolts.

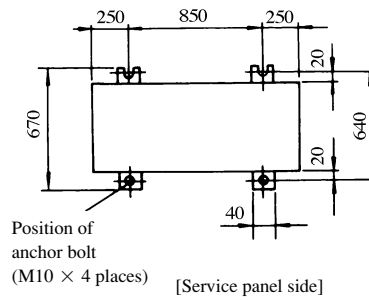
FDC140 type

unit : mm



FDC224, 280 type

unit : mm

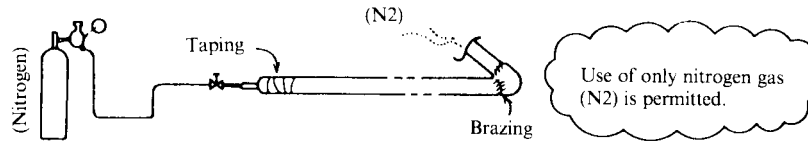


19.5.4 Refrigerant piping

(1) Precautions no refrigerant piping work for prevention against compressor lock

Compressor trouble including lock and motor burn-out is due to faulty parts but mainly concerned in installation and refrigerant piping conditions, The precautions for refrigerant piping are as follows.

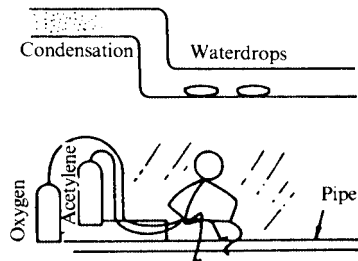
(a) Be sure to perform brazing while flowing nitrogen.



- 1) Without flowing nitrogen gas, a lot of oxide film (Cu_2O) is generated. In particular, in case of for building with many brazed portions, oxide film is so much generated that this causes a fatal failure in the air conditioning system.
- 2) A foreign material (oxide film) causes clogging of the capillary tube or expansion valve, leading to non-cooling (non-heating), abnormal discharge temperature, compressor lock due to a faulty oil return. In some cases, a lot of foreign materials block the oil return hole of the accumulator, thereby causing a compressor lock. (This lock trouble may occur repeatedly 2 or 3 times.)

(b) Don't admit water (waterdrops, condensation) into the piping.

- 1) Use a copper piping that is free from water (waterdrops, condensation).
- 2) Don't perform refrigerant piping work while it rains.
- 3) To suspend outdoor piping work, perform curing to prevent water admission.



Bad effects of water

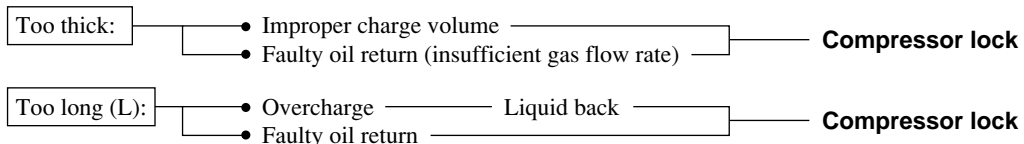
- Capillary tube and expansion valve clogging
- Refrigerant hydrolysis → "Acid" generation
→ Iron/copper corrosion
- Crystal foreign material (clathrate compound) generation resulting from reaction on refrigerating machine oil

There will be directly connected to serious trouble such as compressor lock or burn-out of the compressor motor.

(c) Don't admit dust or foreign particles in the pipe.

Various foreign particles are included in air conditioners that caused trouble. Be careful about them. (Concrete fragments, cement, sand, paint, metal powder (copper refuse after deburring, etc.), etc.)

(d) Adopt the specified dimensions for pipes.



(e) Be sure to support the refrigerant piping with support fittings.

- 1) The pipe vibrates and expands/shinks during operation. Without proper supports, a load is concentrated partially and cracks and collapse occur on the piping, thereby causing a unit failure.
- 2) A support should be provided at intervals of 2 or 3 m so as not to partially concentrate a load.

(2) Table for selection of piping size

Item	Model	FDC 140 type			FDC 224 type			FDC 280 type		
		Gas line	Liquid line	Branch used	Gas line	Liquid line	Branch used	Gas line	Liquid line	Branch used
Outdoor unit		φ19.05	φ9.52		φ25.4	φ12.7		φ28.58	φ12.7	
Main piping		φ19.05	φ9.52		φ25.4	φ12.7		φ28.58	φ12.7	
No. 1 branch		φ19.05	φ9.52	DIS-2KX20-E	φ25.4	φ12.7	DIS-2KX30-E	φ28.58	φ12.7	DIS-2KX30-E
Total indoor unit down-flow capacity after the second branch.	Less than 101	φ15.88	φ9.52	DIS-2KX10-E	φ15.88	φ9.52	DIS-2KX10-E	φ15.88	φ9.52	DIS-2KX10-E
	101 to less than 180	φ19.05		DIS-2KX20-E	φ19.05		DIS-2KX20-E	φ19.05		DIS-2KX20-E
	180 or more			DIS-2KX20-E	φ25.4	φ12.7	DIS-2KX30-E	φ25.4	φ12.7	DIS-2KX30-E

Notes (1) If adjustment is required between the branch connection and the unit port, always make the adjustment on the branch connection side.
 (2) The selection of piping size and branch piping, total all the indoor unit down flow capacity for that piping and branch piping.

● Branch pipe set shapes

Model	Item	Mark	Branch pipe	Item	Mark	Reducer
DIS-2KX30-E	Gas line	①		Gas line	⑦	
	Liquid line	②		Liquid line	—	—
DIS-2KX20-E	Gas line	③		Gas line	—	—
	Liquid line	④		Liquid line	—	—
DIS-2KX10-E	Gas line	⑤		Gas line	—	—
	Liquid line	⑥		Liquid line	—	—

Notes (1)The gas side flow divider pipe is insulated.
 (2)Cut piping in the center on site in the area it will be used.

Example of piping

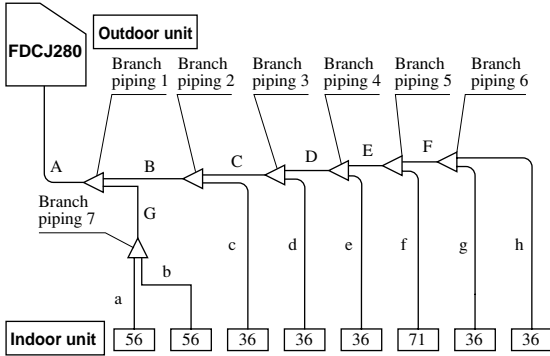
Outdoor unit: FDCJ280HKXE2B

Indoor unit: Combination of 8 units

[Branch pipe set : DIS-2KX10-E × 1 set, DIS-2KX20-EX × 3 set, DIS-2KX30-E × 3 set]

[Total capacity: 363 (36300W)]

• Selecting piping size



Item	Selection procedure	Piping size (in)	
		Gasline	Liquid line
A	Same as the outdoor unit piping size	ø28.58	ø12.7
B	Total capacity of the connected indoor units 251	ø25.4	ø12.7
C	Total capacity of the connected indoor units 215	ø19.05	ø9.52
D	Total capacity of the connected indoor units 179	ø19.05	ø9.52
E	Total capacity of the connected indoor units 143	ø19.05	ø9.52
F	Total capacity of the connected indoor units 72	ø15.88	ø9.52
G	Total capacity of the connected indoor units 112	ø19.05	ø9.52
a	Indoor unit piping size (56).	ø15.88	ø9.52
b	Indoor unit piping size (56).	ø15.88	ø9.52
c	Indoor unit piping size (36).	ø12.7	ø6.35
d	Indoor unit piping size (36).	ø12.7	ø6.35
e	Indoor unit piping size (36).	ø12.7	ø6.35
f	Indoor unit piping size (71).	ø15.88	ø9.52
g	Indoor unit piping size (36).	ø12.7	ø6.35
h	Indoor unit piping size (36).	ø12.7	ø6.35

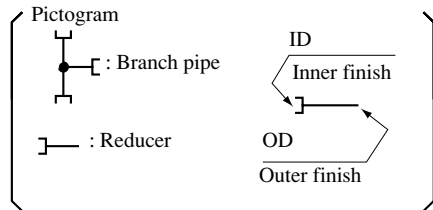
• Selection of branch piping size.

Item	Selection procedure	Branch piping set
Branch piping 1	Total capacity of the connected indoor units 363	DIS-2KX30-E
Branch piping 2	Total capacity of the connected indoor units 251	DIS-2KX30-E
Branch piping 3	Total capacity of the connected indoor units 215	DIS-2KX30-E
Branch piping 4	Total capacity of the connected indoor units 179	DIS-2KX20-E
Branch piping 5	Total capacity of the connected indoor units 143	DIS-2KX20-E
Branch piping 6	Total capacity of the connected indoor units 72	DIS-2KX10-E
Branch piping 7	Total capacity of the connected indoor units 112	DIS-2KX20-E

Notes (1) Make the selection based on the size of each piping for branch piping sets with different size connections.

(2) If diameter adjustment is need for branch connection and on the indoor unit side, always makes the adjustment at the branch connection.

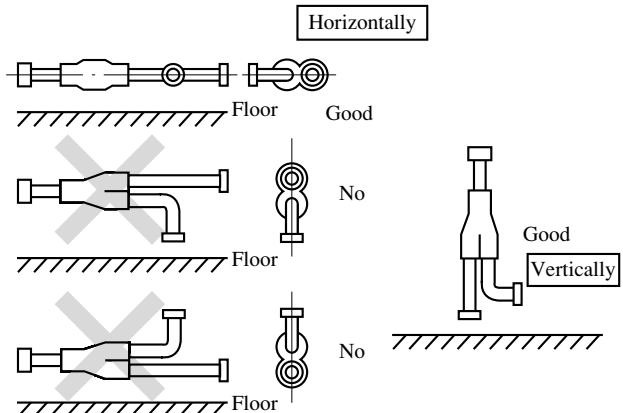
Reference: The shape of the flow divider pipe and reducer is shown on the 889 page.



Notes (1) Use the designated piping size for the piping between the outdoor unit and the first branch.

(2) Choose the appropriate sized reducer for piping between the branch pipe and the indoor unit. The size of reducer should match the piping size of the indoor unit.

(3) Locate the branch pipe horizontally or vertically as illustrated to the right.



(3) Specification of unit piping (Pipe diameter, Connecting method)

(a) Unit

1) Outdoor unit

Unit: mm(in)

Model	Item	Gas line		Liquid line	
		Pipe diameter	Connecting method	Pipe diameter	Connecting method
FDC140 type		φ19.05 (3/4 ")	Flare	φ9.52 (3/8 ")	Flare
FDC224 type		φ25.4 (1 ")	Brazing	φ12.7 (1/2 ")	
FDC280 type		φ28.58 (1 1/8 ")		φ12.7 (1/2 ")	

Unit: mm(in)

2) Indoor unit

Model	Item	Gas line		Liquid line	
		Pipe diameter	Connecting method	Pipe diameter	Connecting method
22, 28 type		φ12.7 (1/2 ")	Flare	φ6.35 (1/4 ")	Flare
36 type		φ12.7 (1/2 ")		φ6.35 (1/4 ")	
45 type		φ12.7 (1/2 ")		φ6.35 (1/4 ")	
56,71,90 type		φ15.88 (5/8 ")		φ9.52 (3/8 ")	
112,140 type		φ19.05 (3/4 ")		φ9.52 (3/8 ")	

3) Connection piping specification: Outer diameter and wall thickness (mm)

For R22

Outer diameter (mm)	Wall thickness (mm)	Outer diameter (mm)	Wall thickness (mm)
φ6.35	0.8	φ19.05	1.0
φ9.52	0.8	φ25.4	1.2
φ12.7	1.0	φ28.58	1.4
φ15.88	1.0		

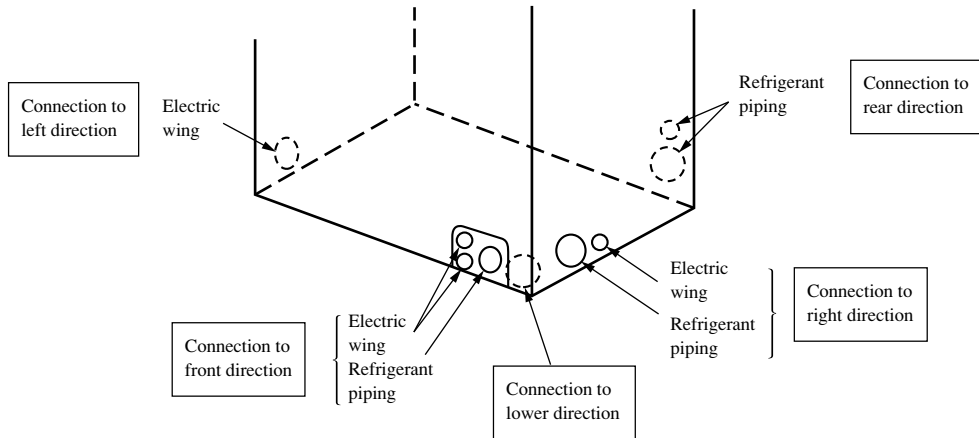
For R407C

Outer diameter (mm)	Wall thickness (mm)	Outer diameter (mm)	Wall thickness (mm)
φ6.35	0.8	φ19.05	1.2
φ9.52	0.8	φ25.4	1.4
φ12.7	1.0	φ28.58	1.4
φ15.88	1.0		

4) Tightening torque

φ 6.35(1/4 ") Flare nut	16 ~ 20 N • m (1.6 ~ 2.0 kg • m)
φ 9.52(3/8 ") Flare nut	40 ~ 50 N • m (4 ~ 5 kg • m)
φ 12.7(1/2 ") Flare nut	40 ~ 50 N • m (4 ~ 5 kg • m)
φ 15.88(5/8 ") Flare nut	90 ~ 120 N • m (9 ~ 12 kg • m)
φ 19.05(3/4 ") Flare nut	100 ~ 140 N • m (10 ~ 14 kg • m)

(b) Refrigerant connection piping.

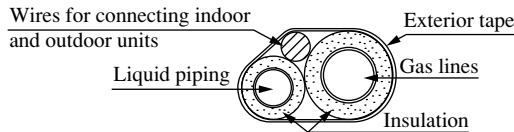


(c) Connection to rear, right and front directions.

1) See page 781 to 782 for locations of connecting holes and service valves.

(4) Heat insulation

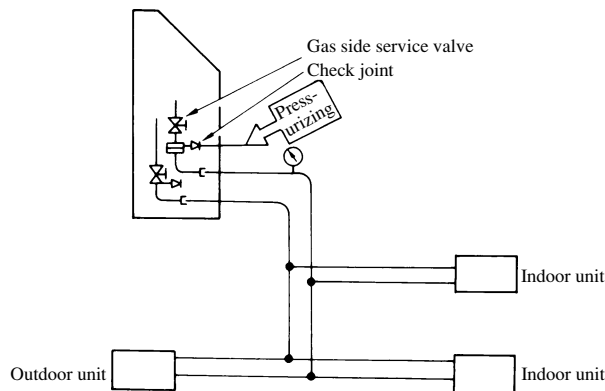
- (i) There is a need to insulate both gas and liquid piping with heat insulation for protection against heat and condensation.
 - 1) Always use heat insulation to prevent condensation on the gas piping from becoming drain water and causing leakage during cooling and to prevent people from being burned by the high temperature of the surface of the gas piping as discharge gas flows through it.
 - 2) Use heat insulation (pipe cover) on the flare connection sections of the indoor unit. (Insulate both the gas and liquid piping.)
 - 3) Insulate both the gas and liquid piping. Apply the insulation so that is tight against the piping and free of gaps. Route the connecting wires with the insulation and wrap the entire bundle with exterior tape.



(5) Air-tight test

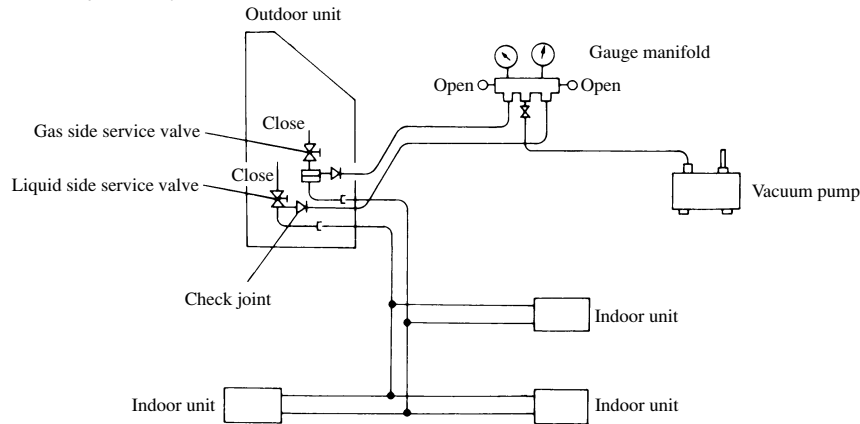
※Use insulation material with good resistance heat properties (120 °C or more).

- (a) When conducting an air-tight test of local piping, connect the piping to the check joint of the evacuating pipe connected to the gas side service valve, and keep the service valve closed. The air-tight test pressure shall be 2.94MPa [R407C : 3.23MPa]
- (b) To conduct the test, pressurize the check joint of evacuating pipe by nitrogen gas as shown below. The local piping including indoor units can be tested as for airtightness.



(6) Evacuating

Evacuating can be completed faster by evacuating both the check joint on the liquid side service valve and the check joint of the evacuating gas pipe (accessory) connected to the gas side operation valve at the same time. (Of course, evacuating is possible even through the liquid side check joint only.)



(7) Refrigerant charge amount

(a) Additional charge amount

Model	Item	Additional charge amount per 1 m of liquid pipe			Factory charge amount at time of shipment		
		φ12.7	φ9.52	φ6.35	Outdoor unit	Indoor unit	Remarks
FDC140 type					9.0 kg	Holding charged	Additional refrigerant Charge is not required
FDC224 type		0.12 kg/m	0.06 kg/m	0.03 kg/m	12.0 kg		
FDC280 type							

Notes (1) When the refrigerant piping length exceeds the length that additional refrigerant charge is not required, charge additional refrigerant based on to calculated amount of refrigerant per unit piping length.

(2) The unit is holding charge type that all of the refrigerant is charged in the outdoor unit and in the indoor unit only a small amount of refrigerant is filled for prevention of the air entry.

Calculation of amount of refrigerant to be charged in local piping

The amount refrigerant additionally charged in local piping depends on connection pipe size but not on indoor unit type.

[Amount of refrigerant to be charged in the local piping = Actual length of liquid pipe × Amount of refrigerant additionally charged per meter of liquid pipe]

[Example] Amount of refrigerant additionally charged = (1₁ × 0.12) + (1₂ × 0.06) + (1₃ × 0.03)

1₁: Overall length (m) of φ 12.7 liquid pipe

1₂: Overall length (m) of φ 9.52 liquid pipe

1₃: Overall length (m) of φ 6.35 liquid pipe

Following precautions must be observed when the model is adapted to R407C.

- (1) Tools and related components should be changed when handling a different kind of refrigerant in order to prevent mixing of different oils. Gauge manifold and charge hose, particularly, should never be used after using them for R22.
- (2) Charge cylinder should not be used. Otherwise, the refrigerant composition may change when charging R407C into the cylinder.
- (3) Refrigerant should be charged in the liquid phase from the container. Charging the refrigerant in the gaseous phase could change the refrigerant composition substantially.
- (4) Volume of refrigerant to be taken out in the liquid phase from the container should be up to 90% of necessary quantity (in weight percent) as a standard.
- (5) Refrigerant should not be replenished even if a leakage is discovered because it could change the refrigerant composition substantially. When a leakage is discovered, replace with new refrigerant in the specified volume. However, it could be replenished temporarily in case of an emergency.

19.5.5 Electric wiring

(1) Power supply wiring

(a) Outdoor unit power supply

- Use separate power supplies for the outdoor and indoor unit respectively. (Standard specification)
- The table below shows the power specification for outdoor unit only.

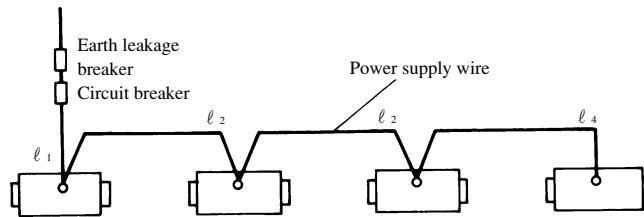
Model	Item	Power source	Power supply wire size (mm ²)	Wire length (m)	Circuit breaker			Grounding wire size (mm ²)
					Switch capacity (A)	Rated current (A)	Earth leakage breaker (A)	
FDC140 type		3 phase 380/415V 50Hz	3.5	38	30	25	30A 30mA 0.1 sec. or less	2.0
FDC224 type			5.5	46	40	30	40A 100mA 0.1 sec. or less	2.0
FDC280 type			8.0	47	60	50	60A 100mA 0.1 sec. or less	3.5

Notes (1) The above table shows the power specification of outdoor unit when separate powers are use for outdoor unit and indoor units.
 (2) The wire thickness and distance indicated above are for when voltage drop is 2%.

(b) Indoor unit power supply

Indoor unit	Item	Power supply wire size (mm ²)	Wire length (m)	Wire circuit breaker (A)		Signal wire thickness (mm)	
				Rated current	Circuit breaker (Use for both ground/overload and short-circuit production)	Outdoor · Indoor	Indoor · Outdoor
Total power supply for indoor unit	Less than 10A	2	23	20	20A100mA 0.1 sec. or less	2 core	2 core
	10A or more, less than 15A	3.5	27	30	30A100mA 0.1 sec. or less	x 0.75 · 2.0	x 0.75 · 2.0

Notes (1) The wire length covers values when necessary indoor units are connected in series with the unit power supply wire as shown below. Also, the wire thickness and distance indicated above are for when voltage drop is 2%.
 (2) These values are based on the conditions that indoor units are connected so that the total capacity becomes the mximum against each outdoor unit.



(2) Precaution in electric wiring.

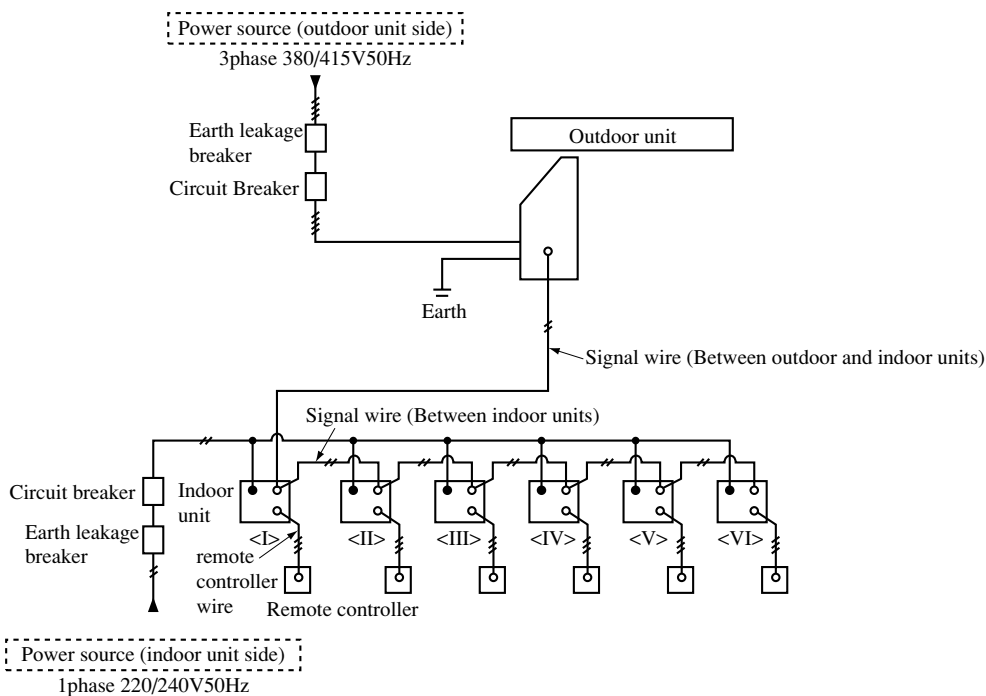
- (a) Use separate power supplies for the outdoor and indoor units respectively (Standard specification)
- (b) Signal wiring (for indoor and outdoor units)
 - Double-core cable with a diameter 0.75 to 2 mm² should be used for the signal wires.
 - **Never make the indoor and outdoor connecting signal line use “co-axial cable” or “strand” with the power wiring for indoor and outdoor unit and other ower line.**
(Never use a multiconductor wire together with power line. It may cause erroneous operation.)
 - Do not connect high voltage wires 220/240 V or 380/415 V to signal wires. as these wires are DC 5V. Signal wires should be connected so that the terminal Nos. conform with each other for between outdoor and between indoor units. However, they will work properly if different polarities are connected.
(Connect (A) and (A), (B)and (B).)
 - **Do not strand or run the remote control cord with power line, electric line, etc.**
 - The total length of the signal wires Should be 1000m or less.
 - **Recommended signal wire list**

No.	Name	Symbol
1	Vinyl cabtire round cord	VCTF double-core 0.75 to 2 mm ²
2	Vinyl cabtire round cable	VCT double-core 0.75 to 2 mm ²
3	Control vinyl insulated, vinyl sheathed cable	CVV double-core 0.75 to 2 mm ²
4	Shielding wire	MVVS double-core 0.75 to 2 mm ²

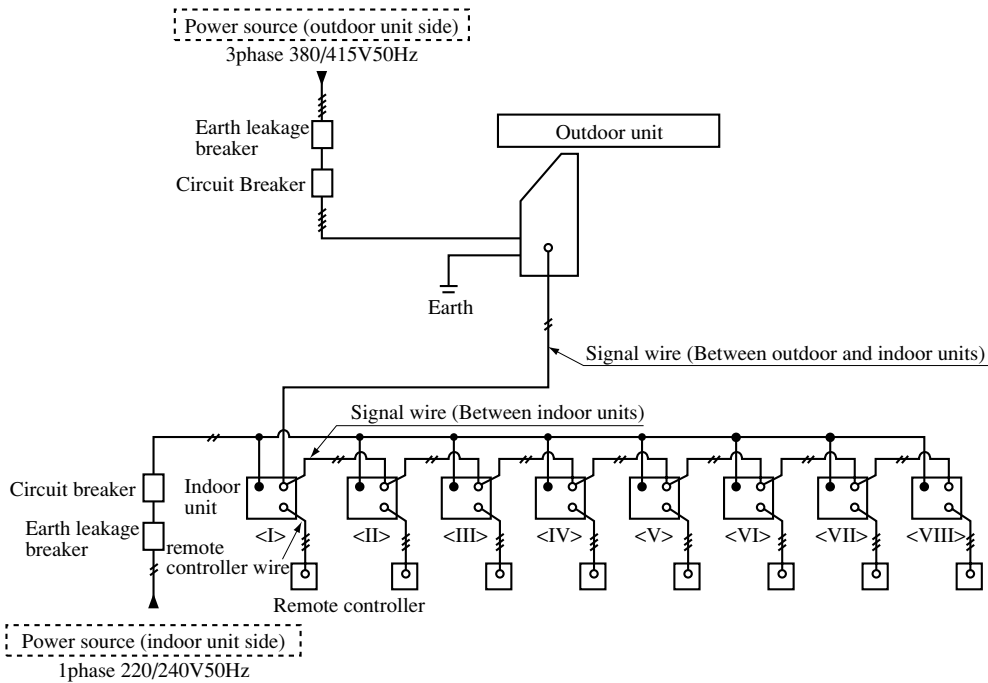
When No. 4 shielding wire is used, always ground the single wire side of the shielding wire . In addition, using the shielding wire is helpful to prevent the incorrect connection between 5V DC and 220/240V or 380/415V AC because the discrimination from the power supply wire is clear.

(3) Wiring system Diagram

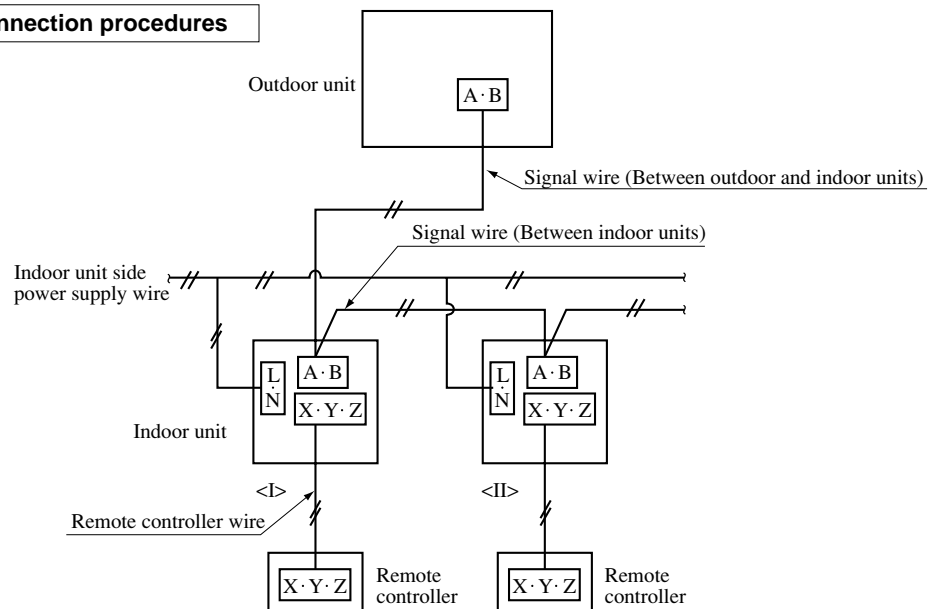
Model FDC140type



Models FDC224, 280type



Outdoor/Indoor units connection procedures

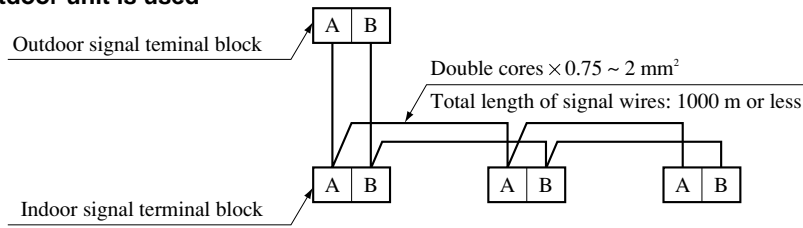


Signal wire

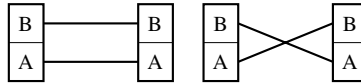
- Do not connect high voltage wire 380/415V to signal wires, as these wires are DC 5V. Signal wires should be connected so that the terminal Nos. conform with each other for between outdoor and between indoor units. However, they will work properly if different polarities are connected. (Connect (A) and (A), (B) and (B).)

(4) Indoor and outdoor signal wiring

(a) If only one Outdoor unit is used

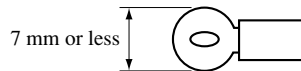


Notes (1) The indoor and outdoor signal wiring are without polarity



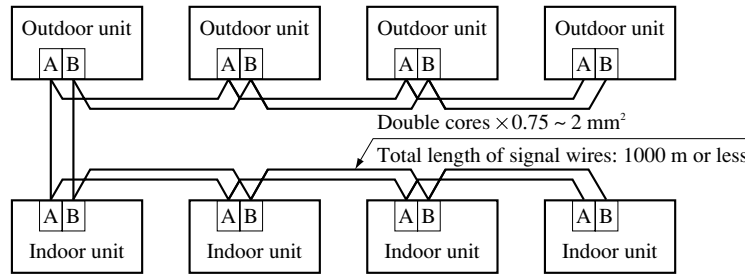
Either of the above wiring is correct.

(2) For connection to the terminal block, use as M3.5 (5/32) round eye-let terminal is shown below.

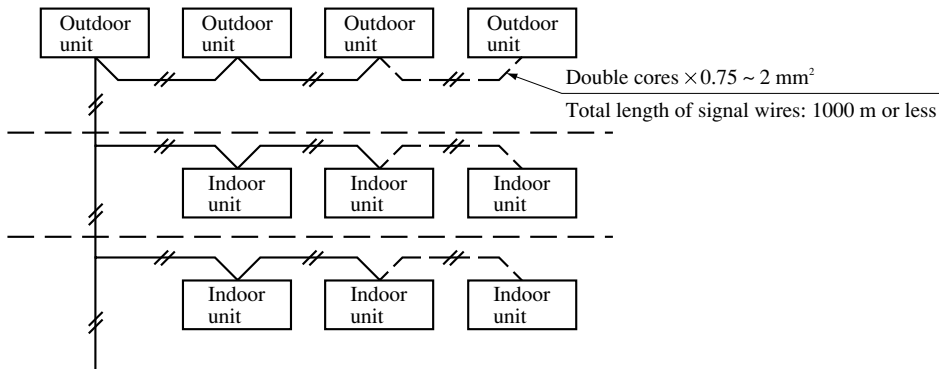


(b) If plural outdoor units are used

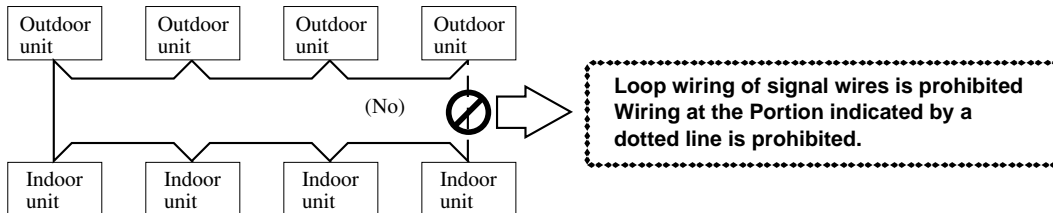
1) A maximum of 48 indoor units can be connected by using the crossover wiring method, with 2 wires for each side of the outdoor and indoor units.



2) Indoor/outdoor wiring method for multiple floors.

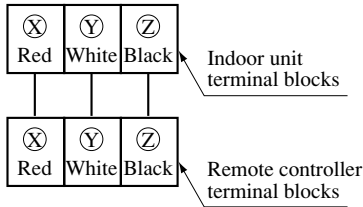


3) Loop wiring is prohibited



(5) Remote controller wiring

(a) Wiring for controlling only one indoor unit.



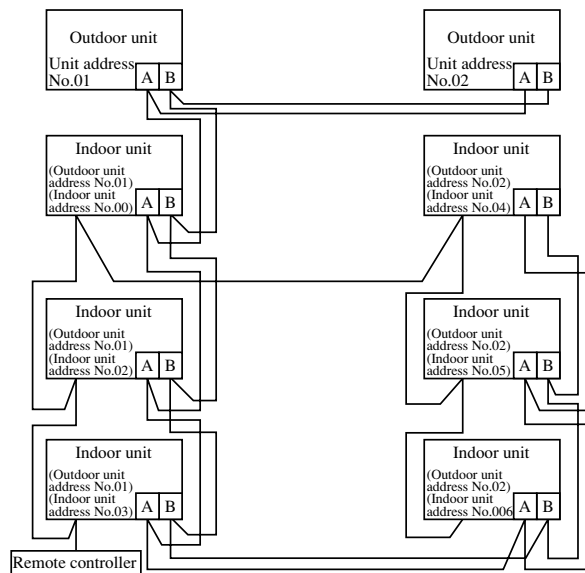
Note (1) Cables for the remote controller have polarity. Be sure to connect terminal blocks with the same numbers. If mis wiring occurs, E1 is displayed and disables the unit from operating.

(b) When controlling plural units.

- 1) Use the same procedure shown in the drawing above for the wiring of the power supply, both indoor and outdoor units and remote controller
 When the wiring length for the remote controller exceeds 100 m, use the wiring procedure shown in the drawing below.
- 2) Connect each of the indoor units for group controlling (3 cables)
 - a) Connect the cables to the terminal blocks of X, Y, and Z for the indoor unit remote controller. Since the cables have polarity, be sure to connect them to terminal blocks with the same numbers.
 - b) Use cables of more than 0.5 mm² (Flexible and easily moved)
 - c) The total length of cables for crossover connection and the remote controller should be less than 600 m.

Note (1) Refer to the wire size chart on page 851 for any wiring exceeding 100 meters.

- 3) When there is more than one outdoor unit, they can be controlled by one remote controller.
 - 4) One remote controller is capable of controlling up to 16 units in group.
- Note (1) Use shielded cables, when wiring in parallel with cables for other power supply or when there is a possibility of being affected by outer noise such as noise from a high-frequency unit.

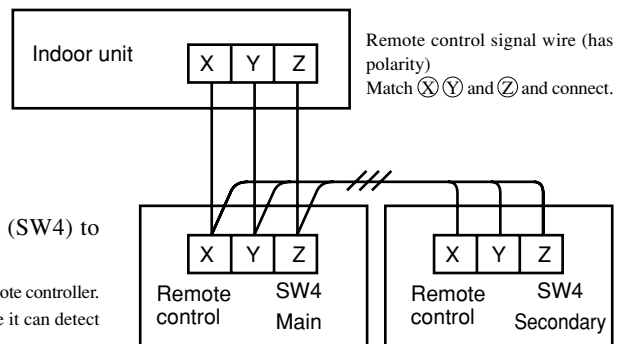


(c) Settings for main and secondary units when multiple remote controllers are used.

Up to two remote controllers can be used for each indoor unit (or each group of indoor units).

- 1) There are two methods for arranging this. One method is to take a remote control connection wire (3-strand) from the indoor unit for the secondary remote control. The other method is to use a jumper wire from the main remote control.
- 2) Set the remote control switch for the secondary unit (SW4) to secondary unit. (It was set to main unit at the factory.)

Note (1) The remote controller sensor setting is only enabled on the main remote controller. Be sure to position the main remote controller in a location where it can detect the room temperature.



(6) Setting of unit address

Addresses can be set either with the automatic address setting, remote control address setting or manual address setting depending on the combinations of address switches (see table) of the indoor and outdoor units. Operate the address switches before turning power on.

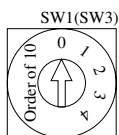
Address setting method	Outdoor unit	Indoor unit	
	Outdoor No.	Outdoor No.	Indoor No.
Auto address	49	49	49
Remote control address	00 ~ 47	49	49
Manual address	00 ~ 47	00 ~ 47	00 ~ 47

At the shipment from factory, outdoor Nos. of the outdoor unit are set at 49, both the output and indoor Nos. of the indoor units are set at 49 and the setting method is set for the automatic addressing.

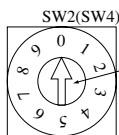
Address No. setting

Set the setting SW1 - 4 on the indoor PCB and the setting SW1 and 2 on the outdoor PCB as listed below.

On indoor PCB	SW1, 2 (blue)	For setting of indoor No. (orders of 10 and 1)
	SW3, 4 (green)	For setting of outdoor No. (orders of 10 and 1)
On outdoor PCB	SW1, 2 (green)	For setting of outdoor No. (orders of 10 and 1)



Order of 10



Order of 1

Insert the tip of flat head (precision) screwdriver here and point the arrow at a desired No.

		SW2 (SW4) Order of 1									
		0	1	2	3	4	5	6	7	8	9
SW1 (SW3) order of 10	0	00	01	02	03	04	05	06	07	08	09
	1	10	11	12	13	14	15	16	17	18	19
	2	20	21	22	23	24	25	26	27	28	29
	3	30	31	32	33	34	35	36	37	38	39
	4	40	41	42	43	44	45	46	47	48	49

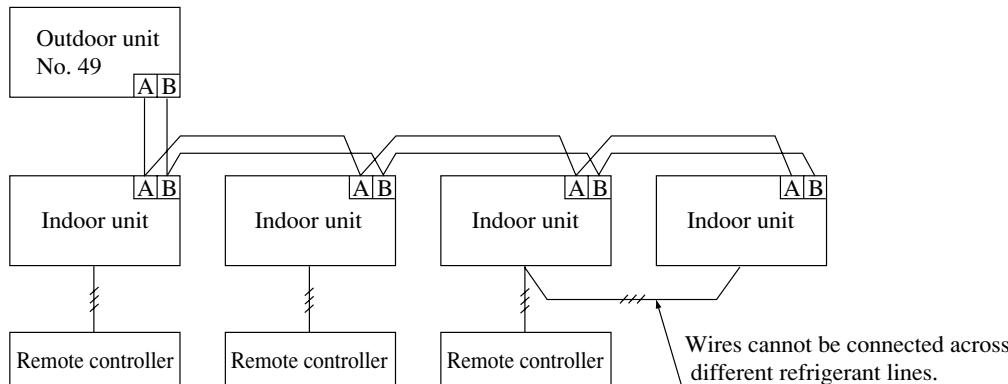
Use 48 and 49 for setting the auto or remote control address.

Notes (1) Outdoor No. is provided on the outdoor and indoor PCB's and indicates which outdoor unit is connected with which indoor unit via a refrigerant pipe. Indoor and outdoor units connected with a refrigerant pipe must have the same No.

(2) Indoor No. is used to identify a particular indoor unit. The No. should never be duplicated.

(a) Auto address setting

This setting is used when wiring on the basis of outdoor unit.



- 1) Set the address switch of outdoor unit at 49. (This is set at 49 at shipment from factory.)
- 2) Set the address switch of indoor unit at 49. (This is set at 49 at shipment from factory)
- 3) Turn power on for the indoor and outdoor units. Addresses are set automatically. (No. in a range of 0 - 7 is set for J140H or No. in a range of 0 - 11 for J224 and 280H.)

For the auto address setting, power must be ON for both the indoor and outdoor units. If power is supplied to the indoor unit only, "Outdoor No." is indicated on the remote controller. In such occasion, turn power ON also for the outdoor unit.

- 4) No. will be set within approx. 1 minute after turning power on.
- 5) If you press the inspection switch of the remote controller after setting the No., the address of indoor unit will be displayed. The outdoor unit No. 49 will also be displayed.
- 6) Auto address setting is allowed also when controlling plural number of units with single remote controller. However, the connection cannot be made across different refrigeration lines.

Information 1) Once addresses are set, they are retained on the microcomputer even after turning power off.

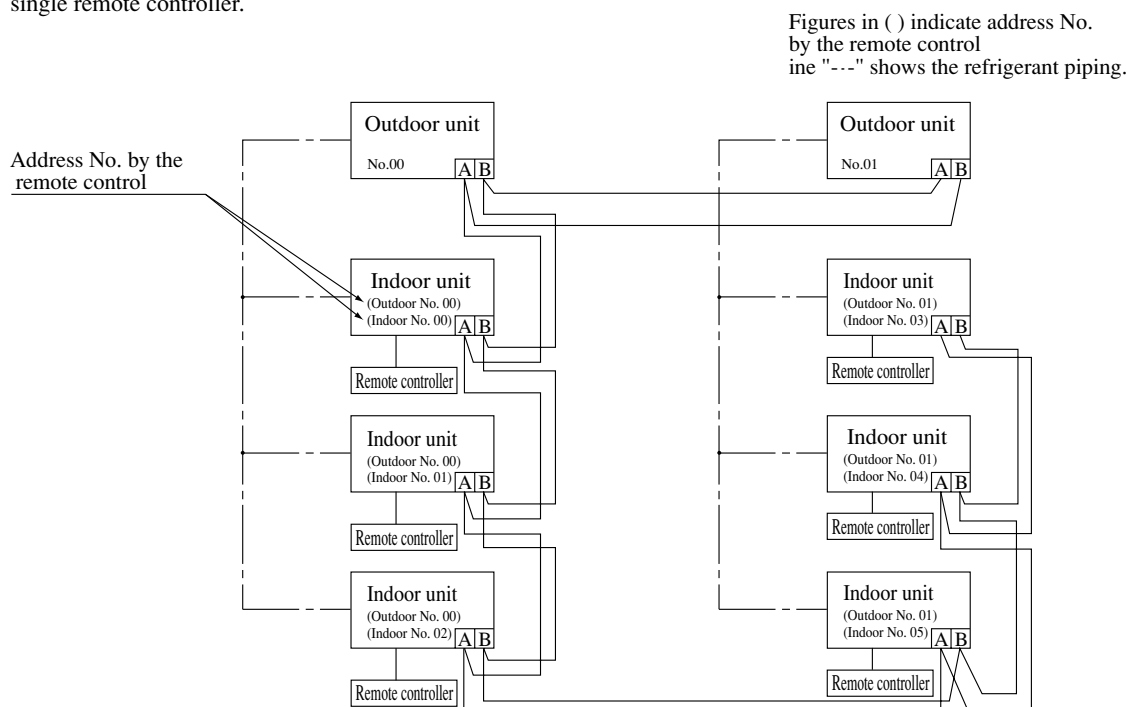
- 2) Even if the wiring is arranged on the basis of outdoor units, (2) remote control address setting and (3) manual address setting can be used.

○ **Erasing of addresses set with the automatic address setting**

On the remote controller, press the "Fan speed" switch while holding down both the switches "Check" and "Timer". Memory of address is erased. If the power supply to the indoor and outdoor units is turned off later, the system returns to the state of no address setting. Then one of the three address setting methods can be selected by changing combinations of the address switches.

(b) Setting of remote control addresses

This setting is used when connecting a plural number of indoor and outdoor units with the super link. This is applicable when using single remote controller.



- 1) Set the address of outdoor unit with a number in a range of 0 - 47 avoiding duplication with any other outdoor unit.
- 2) Leave intact the address switch on the indoor unit PCB at 49 as set at the shipment from factory.
- 3) Turn power on. Then you can proceed the remote control address setting.
- 4) Set the outdoor No. corresponding to each indoor unit, using the remote controller. Set next the indoor No. of indoor unit in a range or 0 - 47 avoiding duplication with any other unit connected in the group.

○ **Detail of setting from the remote controller**

- 1) If the power switch is turned on, the outdoor No. on the display flashes, and "--" on the return air temperature display section and "U--" on the time display section are lit.
If power is not supplied to the outdoor unit, the outdoor No. only lights and you cannot set the address. In such occasion, to turn power on also for the outdoor unit.
- 2) Indoor No. increases 0, 1, 2, ... and up at each push on the room temperature setting ▲ switch. Press the room temperature setting ▼ to reduce the outdoor No. 0, 47, 46, 45 ... and down. Stop to press the switches when a desired No. is indicated.
- 3) Press the Set switch so that the outdoor unit display changes from flashing to firm lighting and the outdoor No. is set. Simultaneously, "U" indicating the indoor unit No. starts to flash.
- 4) Set the indoor No. in the same way with the room temperature setting switches ▲ and ▼.
- 5) After completing the setting, press the Set switch so that the "U" display changes from flashing to firm lighting and the figures of outdoor No. and indoor No. on display start to flash.
- 6) Confirming the outdoor No. and indoor No. being correct, press the Set switch again.
If you like to change these Nos., press the "Check" switch so that it returns to the state of the step 2) and you can resume the address setting.
- 7) This is all for the address setting. The address display will go off 5 seconds later.

Note (1) Once the addresses are set, they are retained on the microcomputer even after turning power off. If you need to change the address, proceed as follows.

○ **Change of address**

Hold down the "Check" switch on the remote controller for more than 5 seconds. Outdoor No. on display flashes and you can set new addresses. Set the outdoor and indoor address Nos. same as described above. New addresses can be set.

○ **Erasing the addresses set by the remote control address setting**

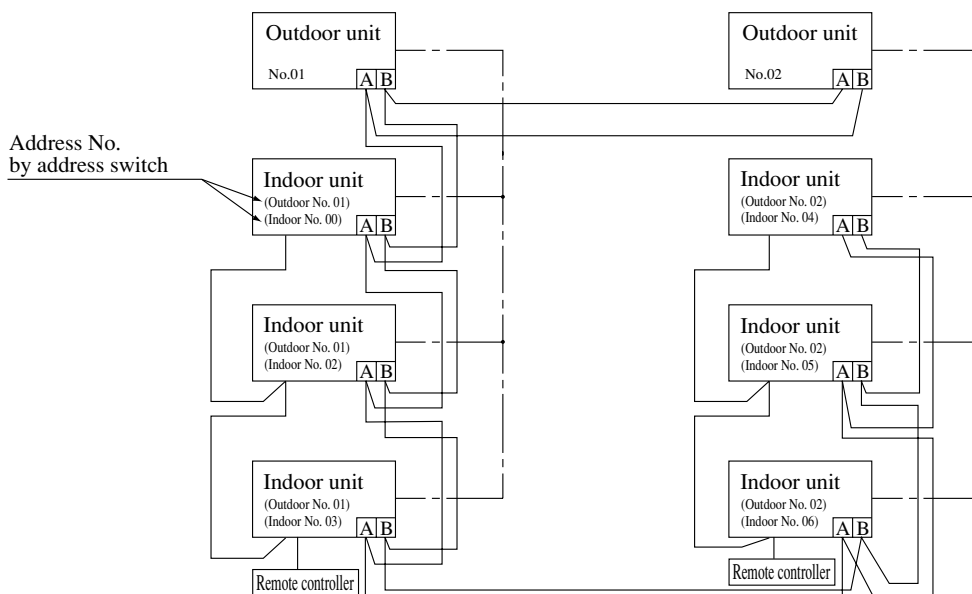
Holding down both the switches "Check" and "Timer", press the "Fan speed" switch. Addresses in the memory are erased. Turn power off on the indoor and outdoor units so that it returns to the no address setting condition and you can set the addresses with one of the three methods of address setting by changing combinations of the address switches.

(c) Manual address setting

This setting is used when connecting plural number of outdoor and indoor units with the super link, and is applicable when controlling with more than one remote controller. (You can use only one remote controller of course.)

- Turn power off before operating the address switches. Change of address is disabled when power is supplied.

Line "---" indicates the refrigerant piping. Figure in the figure indicates the address number determined with the address switch.



- 1) Using the address switch (green) on the outdoor unit PCB, set the address of the outdoor unit in a range of 00 - 47 avoiding duplication with any other outdoor unit.
- 2) Using the address switch (green) on the indoor unit PCB, set the outdoor No. at the same No. as the outdoor unit which is connected with a refrigerant pipe.
- 3) Using the address switch (blue), set the indoor No. of indoor unit in a range of 00 - 47 avoiding duplication with any other unit on the connection.

(7) Change of control

Details of control for outdoor units are selectable with the methods as listed below.

Selecting method of control	Detail of selected control
PCB (SW-3) No. 2 ON	Backup operation with inverter compressor only
PCB (SW-3) No. 3 ON	Cancel of compressor dilution protection control
PCB (SW-3) No. 4 ON	Mismatch check of indoor-outdoor connection (Only when No. 5 and No. 6 of SW-3 are ON.)
PCB (SW-3) No. 5 ON	Test run from outdoor unit
PCB (SW-3) No. 6 ON	Cooling or heating selection at test run from outdoor unit
PCB (SW-3) No. 7 ON	Forced cooling/heating mode (Allows to fixe at cooling or heating by a signal from CnG.)
PCB (J1) OFF	Selection of external input (CnS1) Pulse input with the level input at-shipment-from-factory off
PCB (J5) OFF	Defrosting off (makes easier to start defrosting)
PCB (J6) OFF	Countermeasure for snow (Turns the outdoor fan ON for 10 sec. at every 10-min. at outdoor temperature 3°C or under.)

19.5.6 Test run

(1) Before starting operation

- (a) Measure resistances between the electrical parts terminal block and ground grounded area using a 500V Megger, insulator. Resistance must be higher than 1M Ω.
- (b) Confirm whether the power source breaker (main switch) of the unit has been turned on for over 12 hours to energize the crankcase heater in advance of operation.**
- (c) Make sure that the compressor bottom has been warmed.
- (d) Be sure to fully open the service valves (on both the gas and liquid sides) of the outdoor unit. if being operated without opening, the valve may be got out of order.**

Note (1) When the service valve is closed, be sure to check that evacuation is completed or a refrigerant is charged.

(2) Test run

- (a) If it is impossible, a test run of indoor units can be conducted by using the switches No.5 and No.6 of [SW-3] on the outdoor unit circuit board irrespective of ON/OFF conditions of CnS and the remote controller.

No.5 of [SW3] Test run (ON) ↑↓ Normal (OFF)	<ul style="list-style-type: none"> • All connected indoor units operate when the switch is set to ON. • Indoor units request the maximum frequency and the outdoor unit operates with the maximum frequency shown in the table below according to requests from indoor units. • Select cooling or heating according to input to No.6 of [SW3]. 	<ul style="list-style-type: none"> • When the switch is set to OFF, these units can be operated with the remote controller or by external input.
No.6 of [SW3]	<ul style="list-style-type: none"> • When No.5 of [SW3] is ON when No.6 of [SW3] is set to ON, a cooling operation starts. 	<ul style="list-style-type: none"> • When No.5 of [SW3] is on when No.6 of [SW3] is set to OFF, a heating operation starts.

[Remark]

This operation has priority over other option commands with the center console.

At the time of trial operation, the maximum frequencies are follows. Protective devices are effectively controlled, and frequencies are controlled to become smaller.

(3) Cooling test run operation (Cooling test run can be performed in winter.)

- (a) Operating method
 - In the normal cooling mode, while holding down the ∇ Temperature set” switch, press the “Set” switch.
 - Setting temperature is changed at 5°C and the cooling test run is operated for 30 minutes. It stops after 30 minutes.
- (b) During cooling test run operation
 - If ON/OFF switch is pressed or a mode other than the cooling is selected by the “Mode” switch, the cooling test run operation is released or returns to the specified operation mode.
 - If the “Temperature set Δ switch is pressed, the setting temperature changed at 18°C and the cooling test run operation is released but the cooling operation continues.
 - It is effective when any switches other than the above are pressed.
- (c) During the cooling test run operation, the setting temperature changes at 5°C but any other control and protective functions are operable just like in the normal operation.
 - If any error occurs, the location of error is indicated on the remote controller display or with the condition of flashing of inspection lamp (red) on the main unit controller. Remove the cause of trouble before starting operation again.

(4) Delivery

- (a) Explain how to operate the indoor unit to your customer according to the accessory owner’s manual.
- (b) Persuade the customer not to turn off the power switch even if the unit is not used for along time. The air conditioner can start operation any time when your customer want to heating or cooling his room. (The bottom of the compressor is heated with the crank case heater, and compressor troubles can be prevented when the cooling or heating season sets in.)**

19.6 MAINTENANCE DATA

(1) Before starting troubleshooting

(a) Confirmation of the error code on the remote controller (by pressing the inspection switch) and the inspection display and normal display lamps on PCBs (Printed circuit board) of indoor/outdoor units

The microcomputer detects errors on electrical components, which include the microcomputer itself, errors on the power supply line and errors (overload, etc.) on the refrigerant circuit and the location of trouble is displayed (with the combination of error symbols of remote controller, normal (green) and inspection (red) display LED on PCBs of indoor/outdoor units). When any error occurs, check first the inspection display. It will guide you to trouble point and assist you to complete the repair work quickly.

Error code of the remote controller is recorded on microcomputer after the trouble has been reset automatically so that, if you press the inspection switch of remote controller, the error code and the number of unit in trouble are displayed for 10sec.. The inspection display lamp on the indoor/outdoor unit PCB keeps flashing (glowing) even after the trouble was reset automatically. Inspection lamp on the indoor unit PCB is turned off if the remote controller is reset.

1) Inspection/normal: List of power display

Section	Display Section	Display	Contents of display
Remote controller	Power supply display	LCD	At power ON : Displays always the return air temperature and Center/Remote.
	Error code	LCD	At error : Displays E1 ~ E46 or blank depending on the kinds of error.
	Inspection display	Red-LED	At error : Flash continuously (indicates the occurrence of error).
Indoor/outdoor unit	Normal display	Green-LED	At power ON (normal) : Flash continuously. At error : Off or continuous glowing or irregular illumination.
	Error display	Red-LED	At error : Flash 1 ~ 3 times/5 sec for indoor unit depending on the kinds of error, continuous flash, irregular illumination or off. At error : Flash 1 ~ 9 times/10 sec for outdoor unit depending on the kinds of error, continuous flash, irregular illumination or off.
Inverters	Normaly display	Green-LED1	At power ON (normal) : Flash continuously. At error : Off or continuous glowing or irregular illumination.
	Error display	Red-LED2	1 time flash : Power transistor overheat • Stop operation and wait till temperature drops. 2 time flash : Current cut (Over-current on power transistor) • Short circuit on compressor wiring • Trouble on inverter PCB • Trouble on power transistor Keeps flashing : Transmission error between inverter and outdoor unit • Connector CN11 or CN12 is disconnected, or broken wire between connectors. • Error on outdoor unit control PCB • Error on inverter PCB

2) Check Indicator Table

Whether a failure exists or not on the indoor unit and outdoor unit can be know by the contents of remote controller error code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
No-indication	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Normal
	Stays OFF	Stays OFF	Stays OFF	Stays OFF	Power OFF, T phase wiring is open, power source failure
E1	Keeps flashing	*3 time flash	Keeps flashing	Stays OFF	Remote controller wires X and Y are reversely connected. *For wire breaking at power ON, the LED is OFF; Remote controller wire is open. (X wire breaking : A beep is produced and no indication is made. Z wire breaking : No beep and no indication) The remote controller wires Y and Z are reversely connected.
	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	The remote controller wires are connected to A and B on the terminal block. The indoor/outdoor signal wire are connected in loop form. The indoor unit micro-computer runs away.
E2	Stay OFF or Lights continuously	Stay OFF or Lights continuously	Keeps flashing	Stays OFF	Indoor unit PCB fault
	Keeps flashing	⁽¹⁾ 3 time flash	Keeps flashing	Stays OFF	The PAC remote controller is connected to the KX. The remote controller wire Y is open. The remote controller wires X and Y are reversely connected. (The LED flash twice a second.) Two remote controllers are provided. *For wire breaking at power ON, the LED is OFF.
E3	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	No. duplication at indoor unit addressing. More than 49 indoor unit are connected.
	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor unit power supply OFF (detected only during operation)
E5	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	The corresponding outdoor unit address No. is not found. (Detected only during operation)
	Keeps flashing	2 time flash	Stay OFF	Stay OFF	Outdoor unit power OFF (Detected only during operation)
E6	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	Indoor / outdoor transmission error. Wire A and B swapping after power ON.
	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor power unit failure (when the indoor power supply is different from the outdoor one).
E7	Keeps flashing	2 time flash	Stays OFF or Keeps flashing	Stays OFF or Lights continuously	Outdoor unit microcomputer failure
	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	Indoor unit heat exchanger thermistor failure
E9	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit return air thermi stor failure
	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	The float SW operates (with FS only). Drain up kit wiring fault.
E10	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	When multi-unit control by remote controller is performed, the number of units is over (more than 17 units). Two remote controller are provided for one controller is performed.
E11	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote control addresses have been set while more than one units of remote controller are connected.

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
E12	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Address No. combination error or addressing is performed with the following combinations. Indoor No., 0 ~ 47 48, 49 0 ~ 47
E28	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote controller thermistor failure
E30	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Indoor/outdoor unit connected error
E31	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor unit No. duplication. Outdoor unit address No. is not set for super lynk wiring. Outdoor unit address No. is changed in the power ON status.
E32	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	52C1 primary side L2-phase wiring is open or reversal phase
E33	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	Abnormal current cut of compressor (CM2) Locking of compressor motor (CM1)
E34	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	52C1, or 52C2 secondary side L3-phase wiring is open. Inverters error.
E36	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	Discharge temperature abnormality.
E37	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor unit heat exchanger thermistor failure
E38	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outside temperature sensor failure
E39	Keeps flashing	Stays OFF	Keeps flashing	(2) 1 time flash	Discharge temperature thermistor failure
E40	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	63H1 operation
E41	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Power transistor overheat
E42	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Abnormal current cut of compressor (CM1)
E43	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	The number of connectable units is exceeded.
E45	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Transmission error between inverter and outdoor unit PCB
E46	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Automatic address setting and remote controller address setting or manual address setting coexists in the same network.

Notes (1) Lamp is off if wires are broken at power ON.

(2) When plural numbers of compressor and discharge sensor are installed, single flashing of outdoor unit LED (red) indicates CM₁ (Th₀-D₁) and double flashing indicates CM₂ (Th₀-D₂).

3) Display sequence of error, inspection display lamp

a) One kind error

Display corresponding to the error is shown.

b) More than one errors.

Section	Display section
Error code of remote controller	• Displays the error of higher priority (When plural errors are persisting)
Inspection LED (red) of indoor unit PCB	<i>E1>E10>E11>E2>E3>E5>E7>E9>E12.....E46</i>
Inspection LED (red) of outdoor unit PCB	• Displays the present errors. (When a new error has occurred after the former error was reset.)

c) Timing of error detection

• **Indoor unit side.**

Error detail	Error code	Timing of error detection
Transmission error of remote controller indoor unit	<i>E1</i>	When the transmission error continuously for 2 min.
CPU is out of control		Resetting was performed at the rate of 1 time per second. An abnormal stop occurred 32-sec time flash.
Transmission error between indoor/outdoor units	<i>E5</i>	A check was made once every 20 second. An abnormal stop occurred 7 time running.
Broken wire of heat exchanger thermistor	<i>E6</i>	After a compressor ON command, this failure was detected for 5 second in the period of 2 minutes to 2 minutes and 20 seconds.
Broken wire of indoor unit return air thermistor	<i>E7</i>	This failure was detected continuously for 5 seconds.
Drain error (float switch motion)	<i>E9</i>	At the thermostat ON state, an abnormal stop occurred immediately after the float switch operated. - At a stop or the thermostat OFF state, the condensate motor was turned on for 3 minutes after the float switch operated. After that, an abnormal stop occurred when the float switch operated in 10 seconds.

• **Outdoor unit side.**

Error detail	Error code	Timing of error detection
CM1 motor lock protection	<i>E33</i>	When the compressor has been operating at 25 Hz and a current in excess of 10A is detected for 0.5 continuous seconds. • 5detectins in 60 minutes • After compressor has stopped and current had not fallen below 2A for 10 minutes.
Compressor (CM2) over-current protection		When the L3 phase current on the secondary side of 52C2 exceeds the setting for 0.5 seconds continuously 2 times in 40 minutes.
52C1, or 52C2 secondary side L3-phase wiring is open.	<i>E34</i>	When CM1 is on and there is L3-phase current of 0.5 A or less for 10 continuous seconds. When the CM2 L3-phase current is 2 A or less for 5 continuous sections after CM2 has gone on.
Discharge temperature abnormality	<i>E36</i>	A stop occurs when this abnormality occurs for 2 seconds running at 130°C. After a stop for 3 minutes, an recovery is automatically made. An abnormal stop occurs when this abnormality occurs twice for 60 minutes. (The abnormal state is held for 45 minutes.)
Broken wire of heat exchanger thermister	<i>E37</i>	This failure is detected when it occurs for 5 seconds running in the period of 2 minutes to 2 minutes and 20 seconds with the compressor ON. An abnormal stop occurs when this failure occurs 3 times for 40 minutes.
Broken wire of outdoor temperature thermistor	<i>E38</i>	
Broken wire of discharge thermistor	<i>E39</i>	This failure is detected when it occurs for 5 seconds running in the period of 10 minutes to 10 minutes and 20 seconds with the compressor ON. An abnormal stop occurs when this failure occurs 3 times for 40 minutes.
High pressure cut	<i>E40</i>	An abnormal stop occurs when this abnormality occurs 2 times for 40 minutes.
Power transistor overheat	<i>E41</i>	A stop occurs at 118°C or more. After 3 minutes, a recovery was automatically made at 100°C or less. Abnormal stop occurs when this abnormality occurs 2 times for 2 hours.
Current cut	<i>E42</i>	An abnormal stop occurs when this abnormality occurs 4 times for 15 minutes.
Excessive number of indoor and outdoor units	<i>E43</i>	This error is detected when the number of connectable units is set over the specified value at remote control addressing.
Transmission error between inverter and outdoor unit PCB	<i>E45</i>	When an transmission error continues for 10 seconds, the 52C is turned off. With a delay of 3 minutes, a recovery is automatically made. An abnormal stop occurs when this errors occurs 4 times for 15 minutes.

d) Recording and reset of error

Error display	Memory	Reset
Error code	• Saves in memory the mode ⁽¹⁾ of higher priority	<ul style="list-style-type: none"> • Stop the unit operation by pressing the ON/OFF switch of remote controller. • Operation can be started again if the error has been reset.⁽²⁾
Indoor unit inspection lamp (red)	• Cannot save in memory	
Outdoor unit inspection lamp (red)	• Saves in memory the mode ⁽¹⁾ of higher priority	

Notes (1) Priority is in the order of E1 > ... > E10 > ... > 45.

(2) Reset is disabled for 45min. at the error of outdoor unit or compressor overcurrent or the discharge gas temperature error.

e) Reset of error code in memory (when the error has been reset.)

Indoor unit: Press the Timer switch and the Stop switch while the Inspection switch of wired remote controller is held down or detach the power supply connector (CnW2) of indoor unit PCB and connect again or turn OFF the power.

Outdoor unit: Detach the power supply connector (CNA2) of outdoor unit PCB and connect again or turn OFF the power supply or turn on and off the SW3-1.

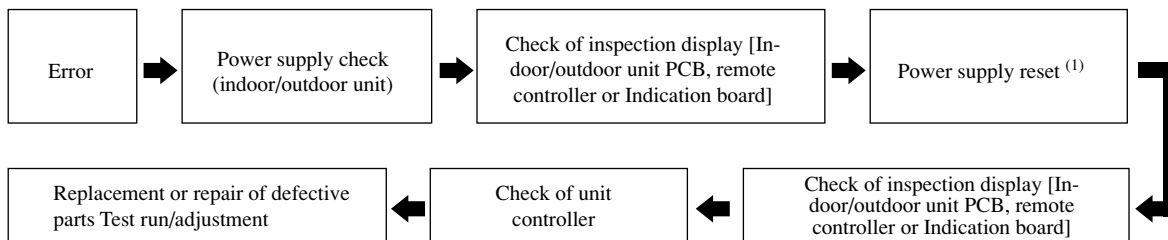
4) Indications with 7-segement indicator

Following data are indicated by changing the setting of selector switches.

SW-4	Indication data	Description
0	Inverter operation frequency or error code	Normally frequency (Hz) is indicated. When it is abnormal E?? is indicated.
1	Heat exchanger temperature	[L] is indicated when the temperature is -26°C or below and the actual temperature is indicated when it is higher than -26°C and up to 73°C.
2	Outdoor temperature	[L] is indicated when the temperature is -21°C or below and the actual temperature is indicated when it is higher than -21°C and up to 43°C.
3	Dome lower (CM1) temperature	[L] is indicated when the temperature is 6°C or below and the actual temperature is indicated when it is higher than 6°C and up to 80°C.
4	Discharge pipe (CM1) temperature	[L] is indicated when the temperature is 30°C or below and the actual temperature is indicated when it is higher than 30°C and up to 136°C.
5	Discharge pipe (CM2) temperature	[L] is indicated when the temperature is 30°C or below and the actual temperature is indicated when it is higher than 30°C and up to 136°C. No indication for 140 type.
6	CT (CM1) current	Indicates 0 to 47A.
7	CT (CM2) current	Indicates 0 to 40A. (No indication for 140 type)
8	SV1	0 : OFF 1 : ON
9	SV2	0 : OFF 1 : ON (No indication for 140 type)
10	63H1	0 : Close 1 : Open
11	63H2	0 : Open 1 : Close
13	Number of connected indoor units	Indicates 0 to 16 units.
14	Compressor operation Hz (full load conversion value) Fk	Indicates frequency [Hz].
15	Indicates 0 ~ 14 orderly	Channels 0 ~ 14 are indicated sequentially as follows. CXX : Channel indication for 1 second. XXX : Data indication for 3 seconds.

(2) Procedures of trouble diagnosis

When any error occurs, inspect in following sequence. Detailed explanation on each step is given later in this text.

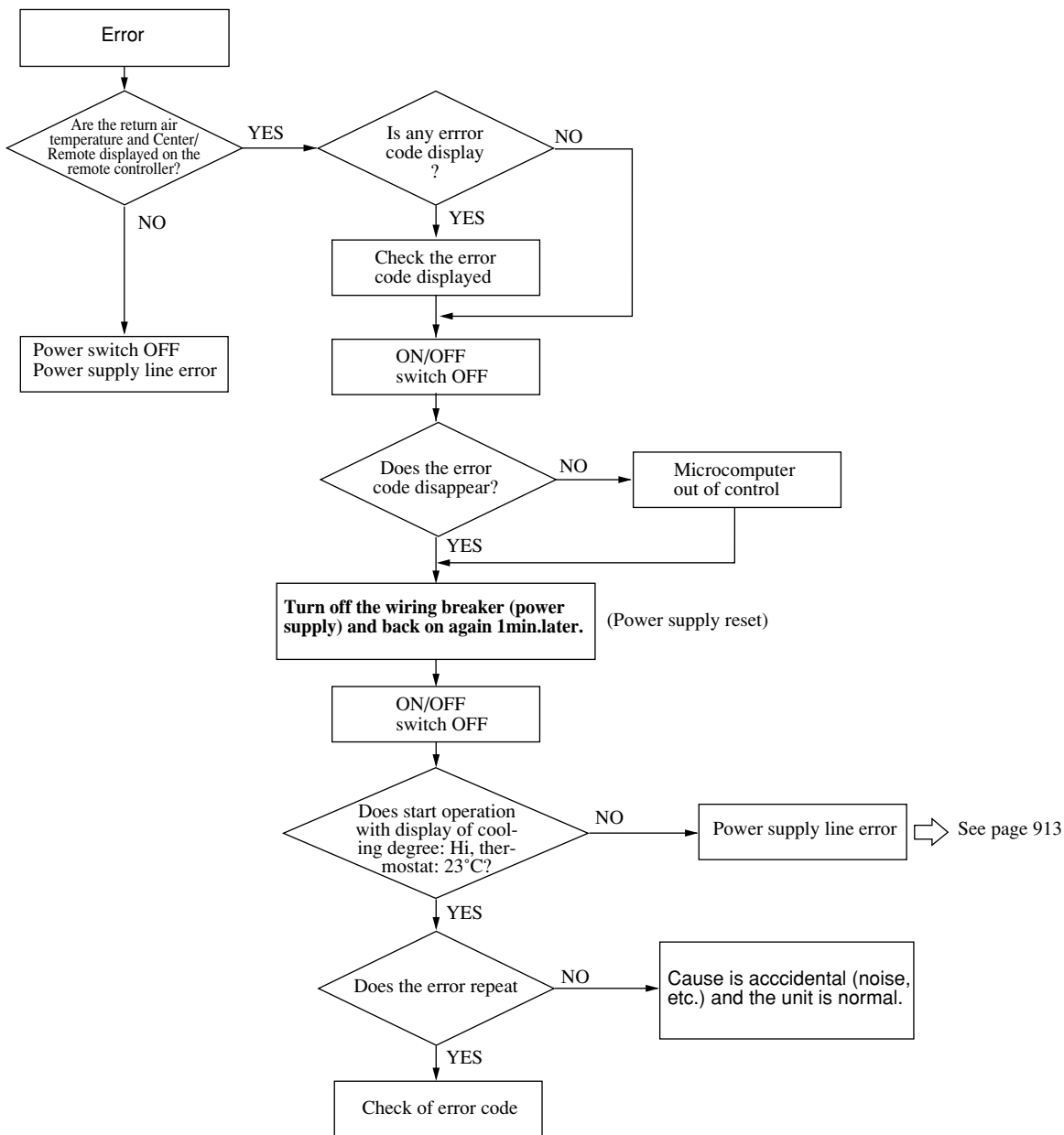


Note (1) It means the operation to turn off the power and back on again more than 1 min. later in order to reset the malfunction of microcomputer due to the effect of power supply conditions or accidental noise.

(a) Diagnosis by the power supply reset

When any error occurs, reset the power supply as described below to see if it is the result of accidental noise, etc.

Check at the indoor unit side.



Errors due to external noise, etc.

Error code may be displayed or the error may not be displayed normally even if the controller is normal because of external noise source⁽¹⁾ or joined or parallel arrangement of power cables and signal wires. It is because the wire of remote controller, wired remote controller signal wires for multiple units or the network signal wires may be influenced by external noises which are judged as signals by the microcomputer which reacts mistakenly.

When there is any noise source, it is necessary to shield the wire for the remote controller and signal wires.

Note (1) High frequency medical machine, rectifier motor application device, thyristor, broadcast transmission tower, power transmission line, power line of electric train, automatic door motor, elevator (voltage drop), wireless telephone, high voltage power distribution line, computer, personal computer and their cables.

These do not necessarily always cause problems but they can be a source of electrical noise.

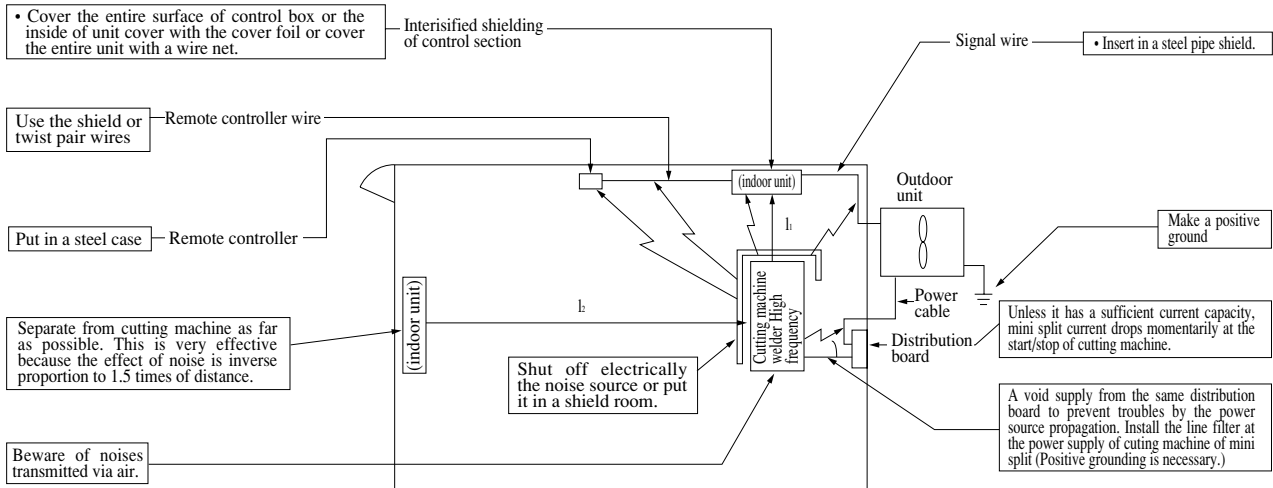
(2) Reference Effect of noise

- When noises intrude into remote controller.

Abnormal or irregular display such as the flashing of irrelevant display (lamp) (for example, LEDs of cooling and heating illuminated simultaneously or the like) is observed even if the remote controller is not operated or the remote or the remote controller and, as the result, the operation of units may be disabled or similar abnormal phenomena are observed.

- When noises intruded into the microcomputer of printed circuit board; State of operation becomes abnormal such as the units perform irregular operation while the remote controller is not operated, the operation cannot be stopped with the remote controller, etc.

Electro magnetic noise prevention (example)



(b) Error diagnosis procedures at the indoor unit side

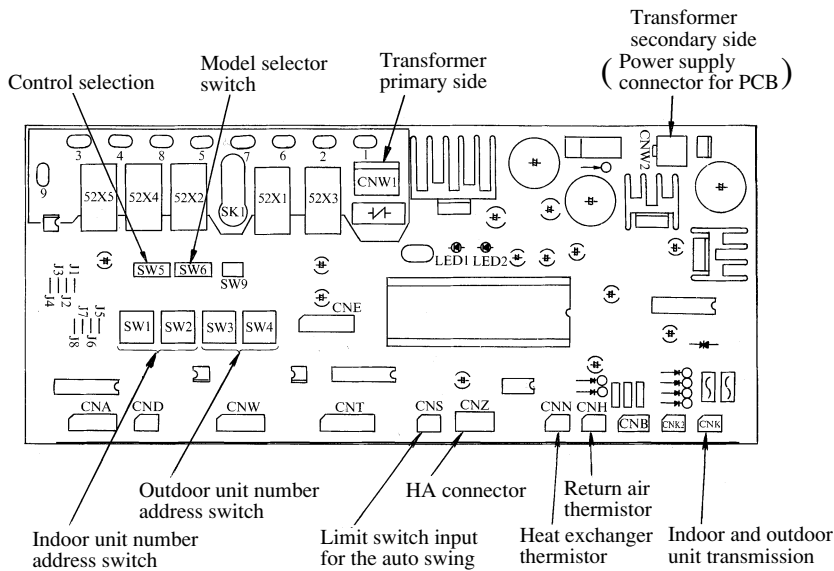
To diagnose the error, measure the voltage (AC,DC), resistance, etc. at each connector around the printed circuit board of indoor unit PCB on the inspection display or the operation state of unit (no operation of compressor or blower, no switching of 4-way valve, etc.). If any defective parts are discovered, replace with the assembly of parts as shown below.

- (i) **Unit of replacement parts related to indoor unit printed circuit board** (Electric components on and around the microcomputer)

Indoor unit printed circuit board, thermistor (Return air, heat exchanger), remote controller switch, limit switch, transformer, fuse

Note (1) Judges the troubles on the parts of driving power circuit or cooling cycle with the ordinary check method.

(ii) Parts layout on the indoor unit printed circuit board



● Function of jumper wires

Name	Function	
J1	With	Setting of 4 position angle of louver
	None ⁽¹⁾	Setting of 4 position angle of louver
J2	With	4 position louver control : Valid
	None ⁽¹⁾	4 position louver control : Invalid
J3	With	Heating thermostat OFF - Intermittent operation
	None ⁽¹⁾	Heating thermostat OFF - Stop
J4	With	Filter sign : Valid
	None ⁽¹⁾	Filter sign : Invalid
J5	With	Normal operation operable
	None ⁽¹⁾	Operation permission prohibited
J6 ⁽²⁾	With	Expansion valve aperture - Fixed at current aperture.
	None ⁽¹⁾	Expansion valve aperture - Fixed at new aperture.
J6 ⁽²⁾	With	Automatic detection of expansion valve aperture opening (only for J71, 90)
	None ⁽¹⁾	Expansion valve aperture - Fixed at new aperture.(except J71, 90)
J7	With	Expansion valve aperture - Normal
	None ⁽¹⁾	Impossibility
J8	With	Spare
	None ⁽¹⁾	Spare

Note (1) "None" means that jumper wire is not provided on the PCB or the connection is cut.
 (2) Only FDT series has the following control.

● Replacement procedure of indoor unit microcomputer printed circuit board

Microcomputer printed circuit board can be replaced with the following procedure.

1) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

Parts No.	Model
PJA505A073ZA	FDTS, FDR, FDUM, FDE, FDK, FDFL, FDFU
PJA505A074ZA	FDT, FDTW

● Model select switch (SW6)

Model	Switch								
	22	28	36	45	56	71	90	112	140
SW6-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW6-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF
SW6-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF
SW6-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

● Function of DIP switches

Switch	Function		Reference page
	ON	OFF	
SW5-1	ON	Input Signal	837
	OFF	Reverse Invalid Rus stop	
SW5-2	ON	Heating temp. shift + 3°C	832
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	835
	OFF	Normal	

(iii) Check method when the error code is displayed

Remote controller or Indication board: Inspection LED, error code

Indoor unit PCB: Red LED (inspection display), Green LED (CPU normal display)

Outdoor unit PCB: Red LED (inspection display), Green LED (CPU normal display)

(iv) Check procedure depending on indication lamps (For the indoor unit)

The next page error diagnosis is applicable to cases where only 1 unit is installed in a network unless stated otherwise but the check method is the same even if there are multiple units on the network. Except for the network occupation state due to out of control indoor unit CPU, the error display indicates the state of respective units. Check each unit specified by the error display as explained on the next page.

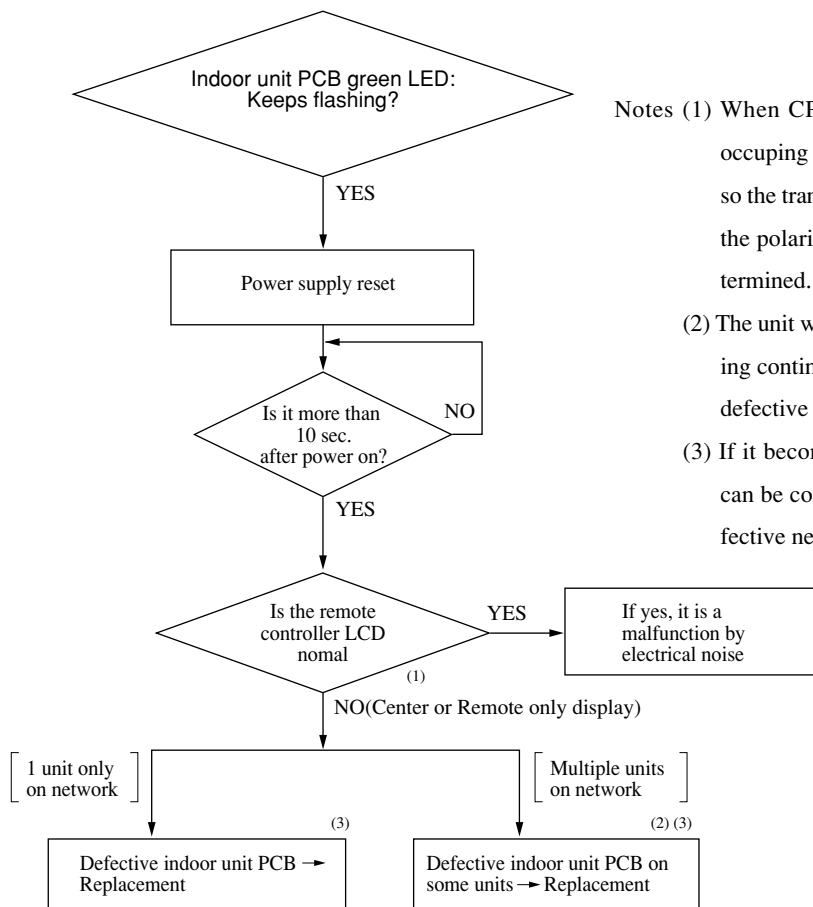
1

Error display : No display
LCD display : No display

[Polarity determination trouble]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Lights continuously	Green LED	Lights continuously

- When the LCD display (Center/Remote, temperature display, etc.) of remote controller flashes, it means the polarity on the unit is not yet determined. Polarity determination is completed within a few seconds after the power on. If it is not completed in time, CPU out of control, etc. is suspected.



Notes (1) When CPU of one unit goes out of control, it occupying the transmission section of the network, so the transmission of other units are not done and the polarity of the whole network will not be determined.

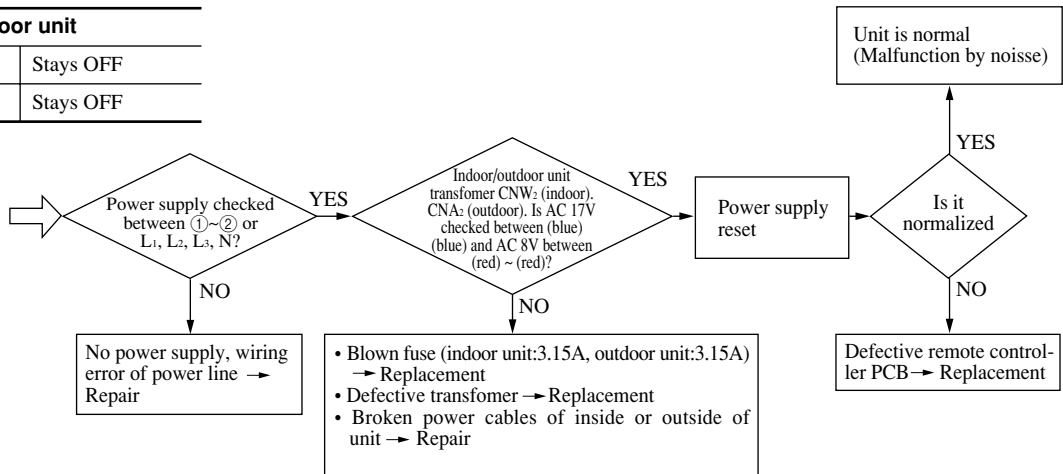
(2) The unit which has its indoor and green LED lighting continuously (or no lighting) is the one with a defective indoor unit PCB.

(3) If it becomes normal after replacing the PCB, it can be considered that the PCB. is defective (defective network transmission circuit).

2 Error display : No display
LCD display : No display [Power supply line error]

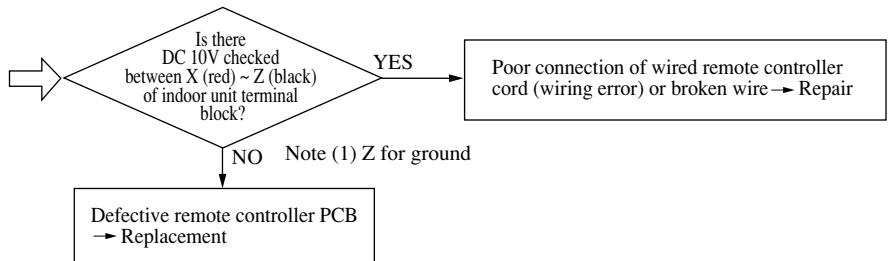
Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF

Indoor unit	
Red LED	Stays OFF
Green LED	Stays OFF



Indoor unit	
Red LED	*3 time flash (During unit operation)
Green LED	Keeps flashing

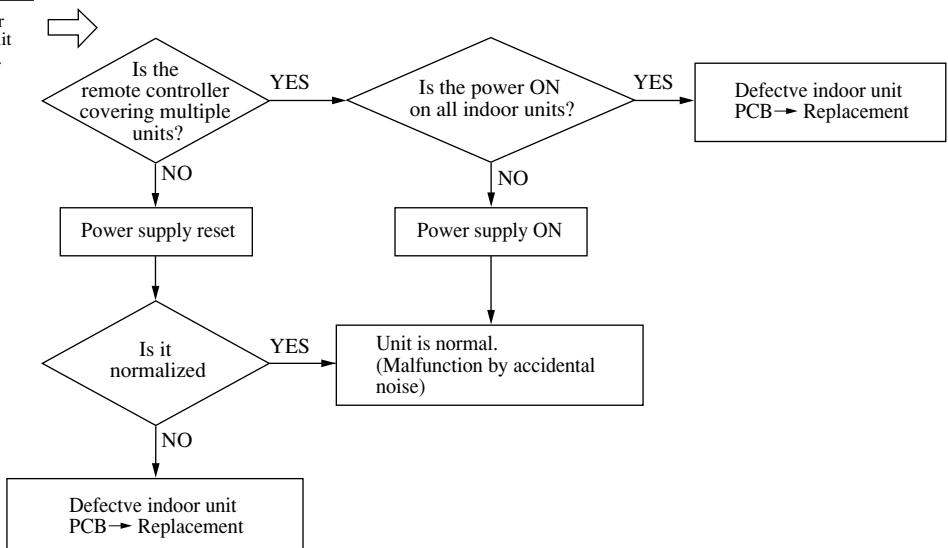
Flash of green LED means CPU is normal.
* If the remote controller wire is broken at the power ON, it does not illuminate.



3 Error display : E1 [Communication error between remote controller~Indoor unit]

Indoor and outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing ⁽¹⁾

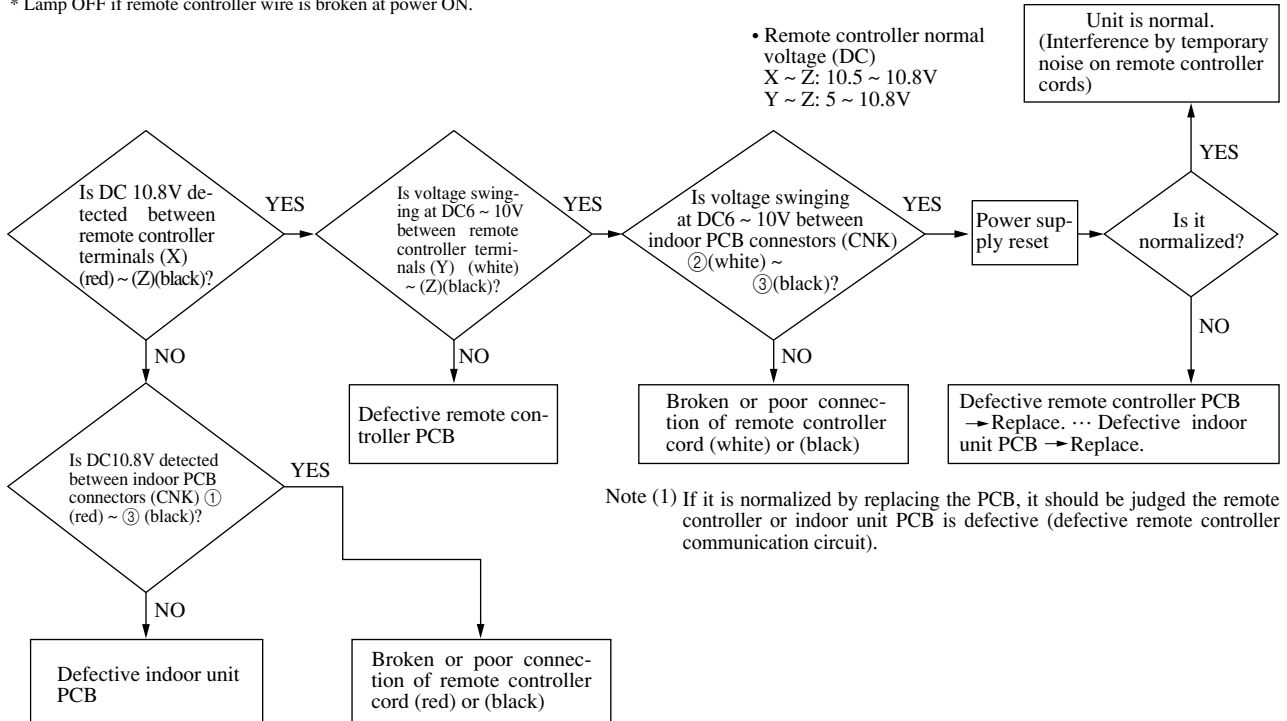
Note (1) With the separate power supplies for indoor/outdoor units, the outdoor unit green LED may flash in some cases.



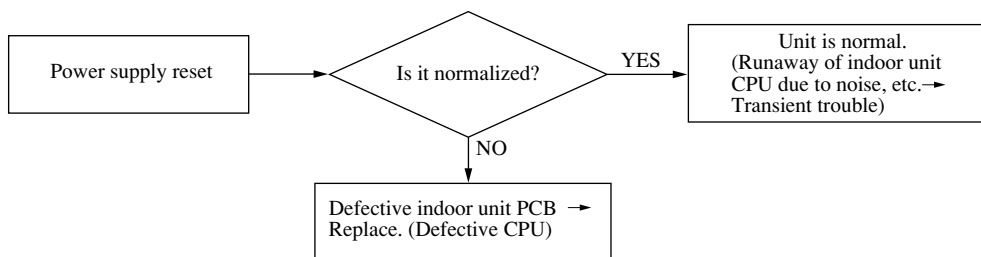
FDC-HKX

Indoor unit		Outdoor unit	
Red LED	*3 times flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

* Lamp OFF if remote controller wire is broken at power ON.

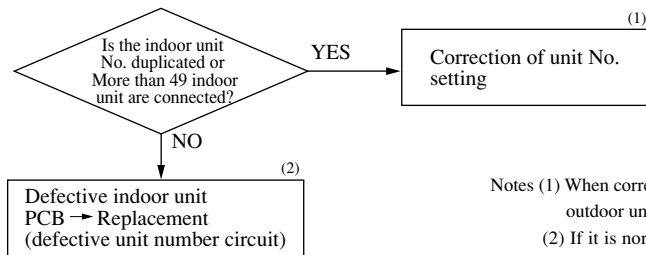


Indoor unit		Outdoor unit	
Red LED	Stays OFF or Lights continuously	Red LED	Stays OFF
Green LED	Stays OFF or Lights continuously	Green LED	Keeps flashing



4 Error display : **E2** [Duplicated indoor unit No. or More than 49 indoor unit are connected.]

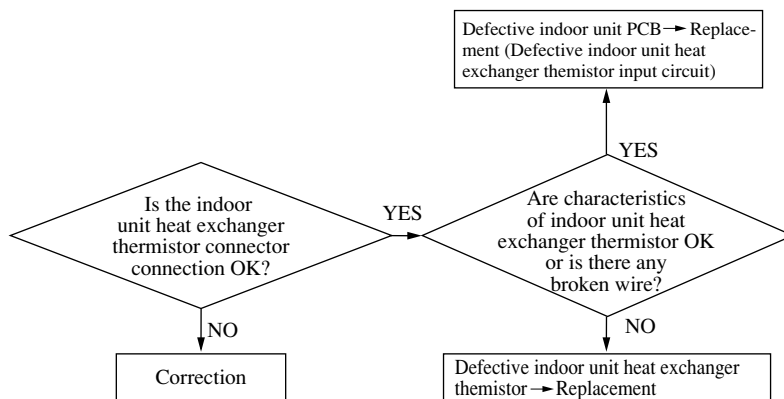
Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



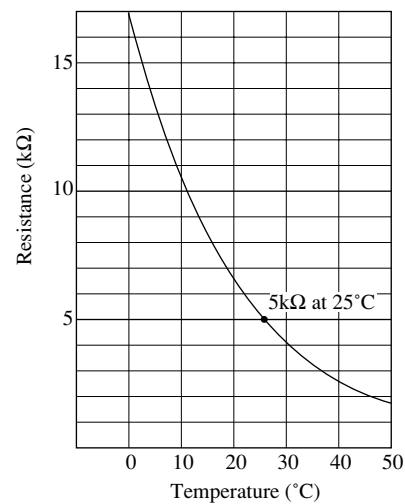
Notes (1) When correcting the unit number, check again the pairing of indoor/outdoor units (same Number assigned to coupled units) is correct.
 (2) If it is normalized by changing PCB, judge the unit number input circuit is defective.

5 Error display : **E6** [Defective indoor unit heat exchanger thermistor]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



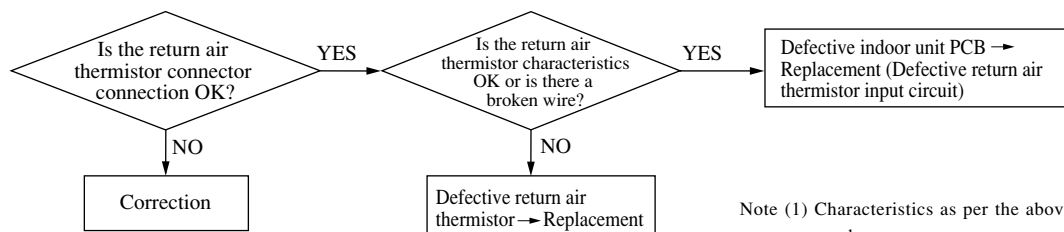
Return air thermistor (Th:A)
 Indoor unit heat exchanger thermistor (Th:R)
 Resistance temperature characteristics



Note (1) 22.5 kΩ at -6°C

6 Error display : **E7** [Detective Return air thermistor]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



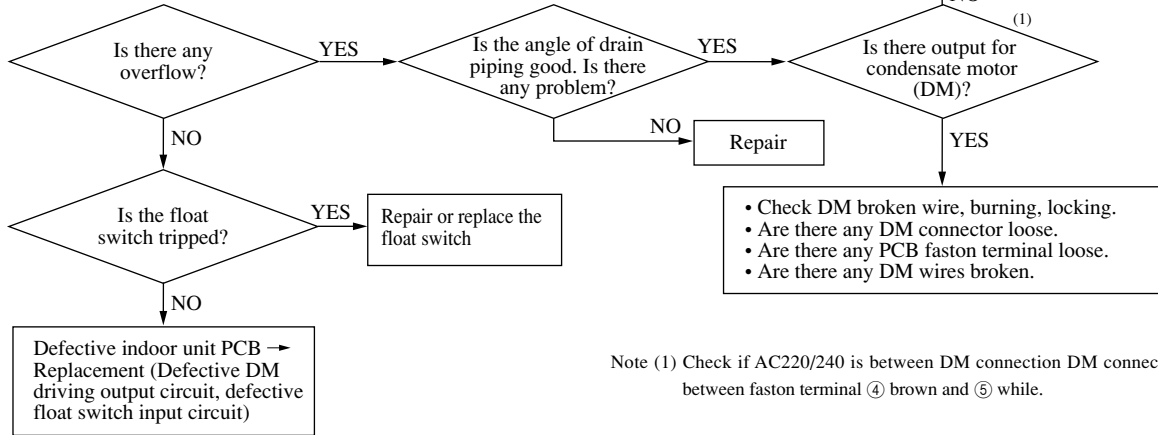
Note (1) Characteristics as per the above graph.

7

Error display : E9

[Drain trouble]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



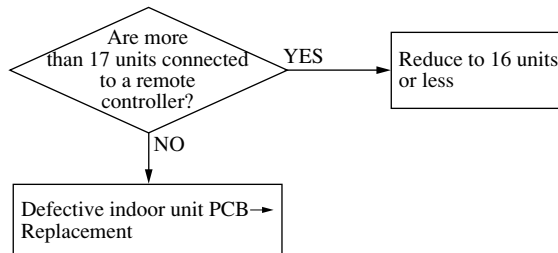
Remark (1) If an indoor unit is stopped due to the drain error (E9), the outdoor unit for this stopped unit will come to a normal stop immediately. Other normal indoor units of the same refrigerant system will also come to a normal stop. Even if the switches of remote controllers for normal indoor units are pressed, these units will come to normal stop automatically within tens of seconds.

8

Error display : E10

[Control of 1 remote controller VS multiple units – Excessive number of units (more than 17 units)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

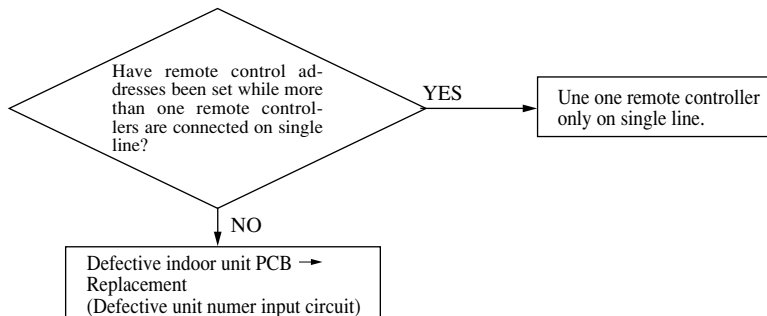


9

Error display : E11

Remote control addresses have been set while more than one units of remote controller are connected.

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

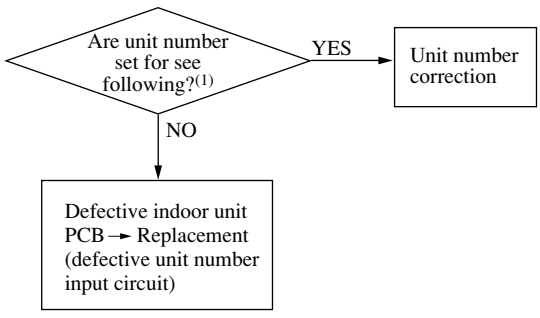


10

Error display : E12

[Address No. combination error or addressing is preformed with the following combinations.]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1)

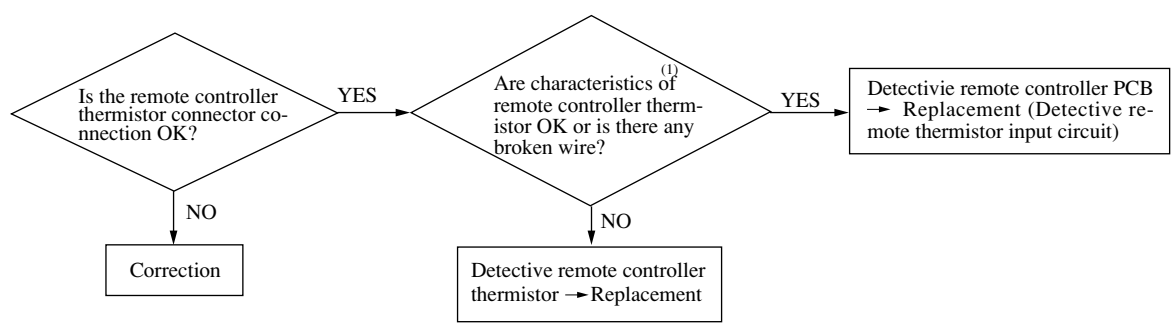
Outdoor unit address No.	Indoor unit address No.
00 ~ 47	48, 49
48, 49	00 ~ 47

11

Error display : E28

[Directive remote controller thermistor.]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



(c) Error diagnosis procedures at the outdoor unit side

At the error diagnosis related to the outdoor unit, check at first the error code of remote controller and the illumination patterns of normal and inspection display lamps in the same manner as the case of indoor unit.

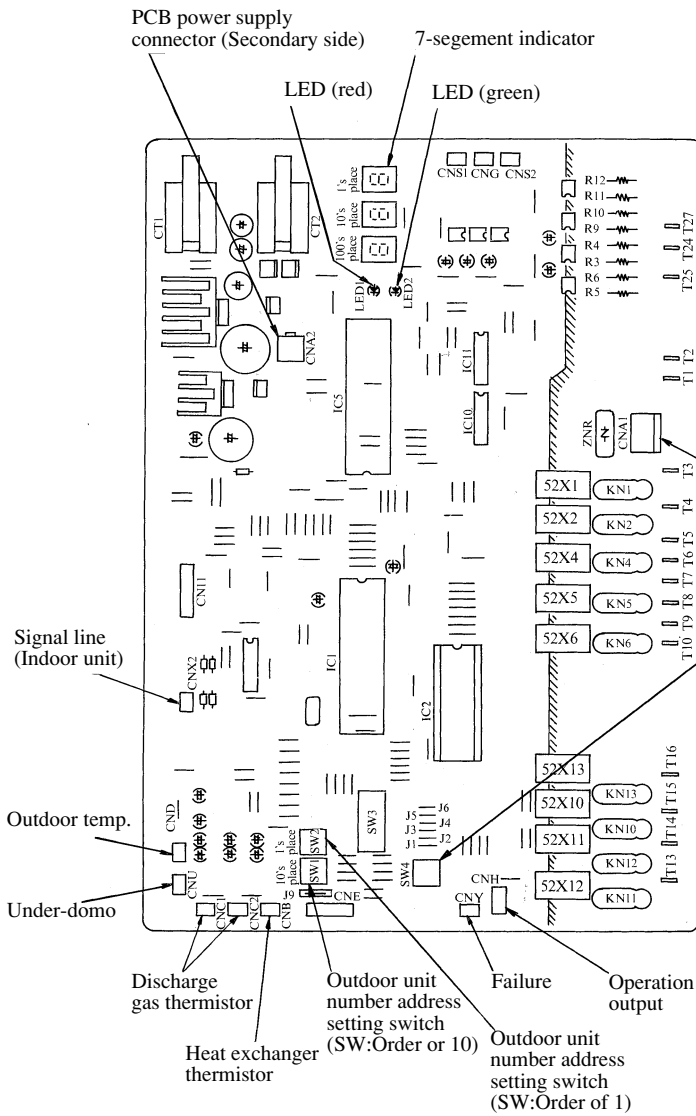
Then estimate the outline, the cause and the location of error based on the pattern and proceed to the inspection and repair. Since the self diagnosis function by means of the microcomputers of indoor/outdoor units provide the judgement of error of microcomputers themselves irregularity power supply line, overload, etc. caused by the installation space, inadequate volume of refrigerant etc., the location and cause of trouble will be discovered without difficulty.

In addition, the display lamps error code of indoor/outdoor unit is kept flashing, (except when the power supply is interrupted) after the irregularity is automatically recovered to give irregularity information to the service personnel. If any mode of higher priority than the error retained in memory occurs after the reset of error, it is switched to that mode and saved in the memory.

(i) Replacement parts assembly related to the outdoor unit PCB

Outdoor unit PCB, outdoor unit inverter PCB, power transistor module, diode module, capacitor, reactor, noise filter, thermistor, (heat exchanger, discharge pipe, outdoor temperature), fuse, transformer, etc.

(ii) Parts layout on the outdoor unit PCB



• Function of DIP switch

Name	Function	
SW3-1	ON	Inspection LED reset
	OFF	Normal
SW3-2	ON	Backup operation - With
	OFF	Backup operation - None
SW3-3	ON	Service
	OFF	Normal
SW3-4	ON	Unmatch check
	OFF	Normal
SW3-5	ON	Test run operation
	OFF	Normal
SW3-6	ON	Test run operation - Cooling
	OFF	Test run operation - Heating
SW3-7	ON	Forced cooling/heating
	OFF	Normal
SW3-8	ON	Test mode
	OFF	None

PCB power supply connector (Secondary side)

Selector switch (SW4) OF 7-segment indicator

Name	Function	
J1	With	External input level
	None ⁽¹⁾	External input pulse
J5	With	Defrosting - Normal
	None ⁽¹⁾	Defrosting - Cold weather region
J6	With	Snow protection control - None
	None ⁽¹⁾	Snow protection control - With

Model	Jumper wire		
	J2	J3	J4
FDCJ140HKXE2B	None ⁽¹⁾	None ⁽¹⁾	With
FDCJ224HKXE2B	None ⁽¹⁾	With	
FDCJ280HKXE2B	With	With	None ⁽¹⁾
FDCP140HKXE2B	None ⁽¹⁾	None ⁽¹⁾	
FDCP224HKXE2B	None ⁽¹⁾	With	
FDCP280HKXE2B	With	With	

Note (1) "None" means that jumper wire is not provided on the PCB or the connection is cut.

• Replacement procedure of outdoor unit microcomputer printed circuit board.

Microcomputer printed circuit board can replaced with following procedure.

- 1) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

Parts No.	Model
PCB505A026BN	All models

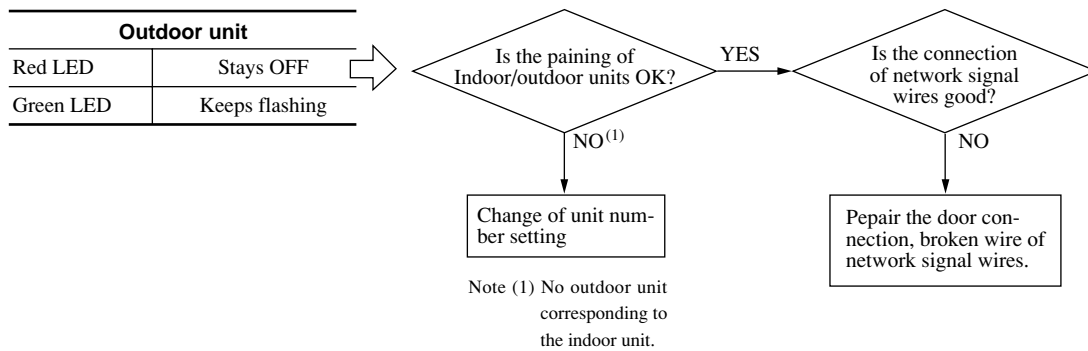
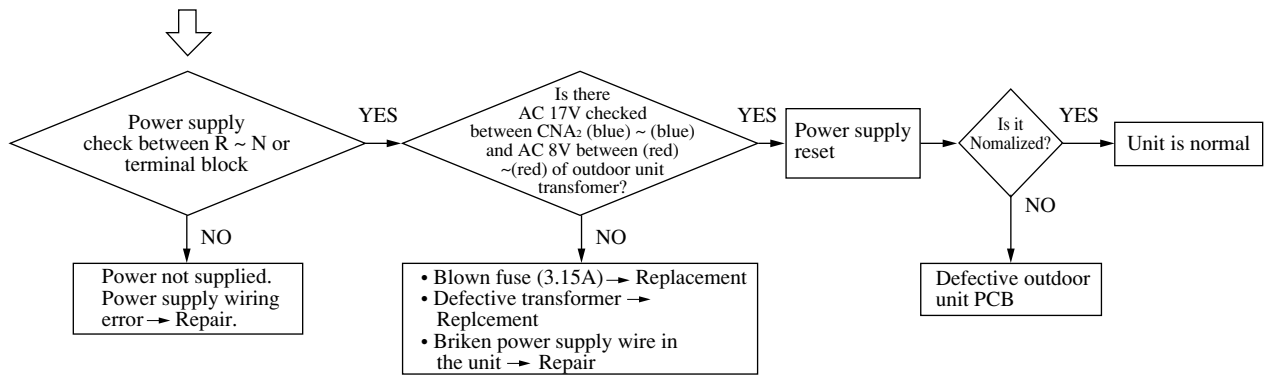
(iv) Check procedure depending on indication lamps (For the outdoor unit)

1 Error display : E3 [Error on the outdoor unit signal line]

(Detected during operation only)

Indoor unit	
Red LED	2 time flash
Green LED	Keeps flashing

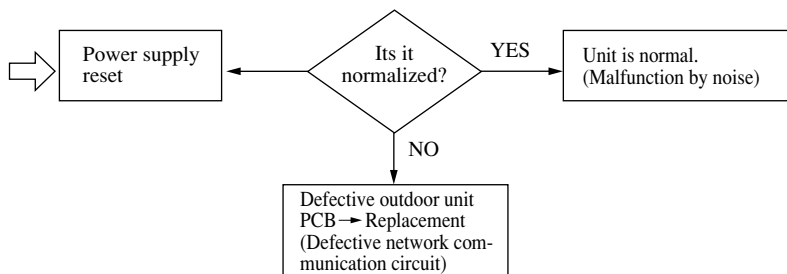
Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF



Error display : E3 [Error on the outdoor unit signal line]

(Detection at the power on)

Outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing

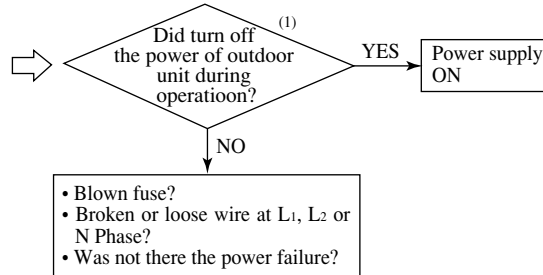


2

Error display : E5 [Outdoor unit signal line error, power supply error]

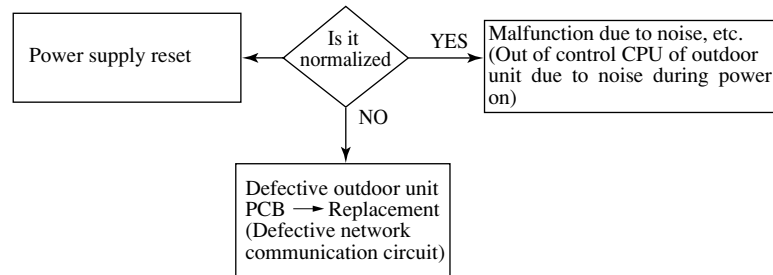
Indoor unit	
Red LED	2 time flash
Green LED	Keeps flashing

Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF

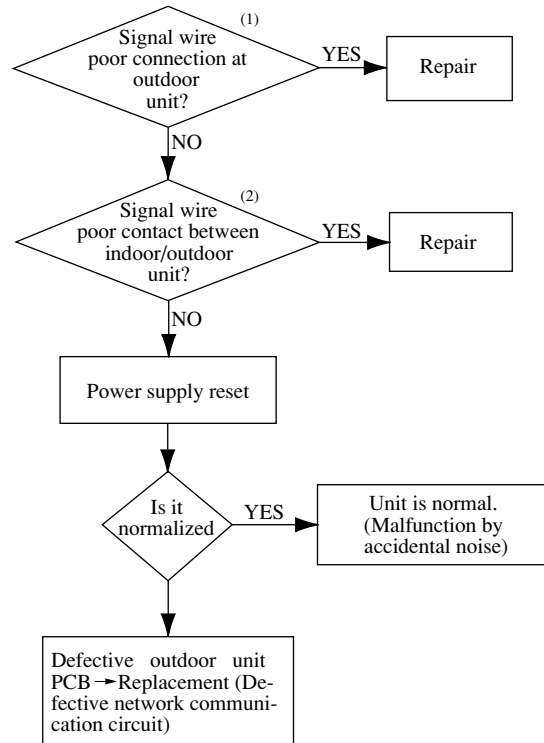


Note (1) This case is limited to the separate power supplies to indoor/outdoor units. (Combination of (indoor unit) red LED 2 time flash and (outdoor unit) green LED stays off means that the power supply to the outdoor unit has been interrupted during operation.)

Outdoor unit	
Red LED	Stays OFF or Keeps flashing
Green LED	Stays OFF or Lights continuously



Outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing

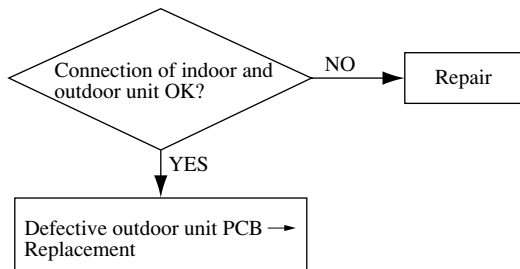


Notes (1) Check for poor connection (looseness, misconnection) at outdoor unit terminal block and broken signal wires between outdoor units.

(2) Check the poor connection or broken signal wires between indoor/outdoor units.

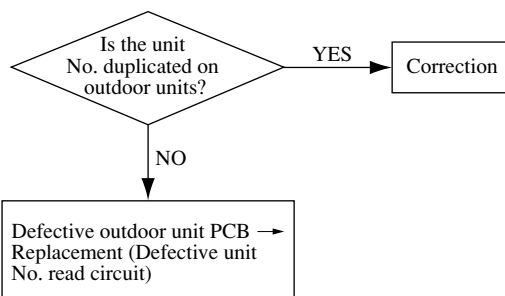
3 Error display : *E30* [Connection error indoor and outdoor unit]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



4 Error display : *E31* [Duplicated unit No. of outdoor units]

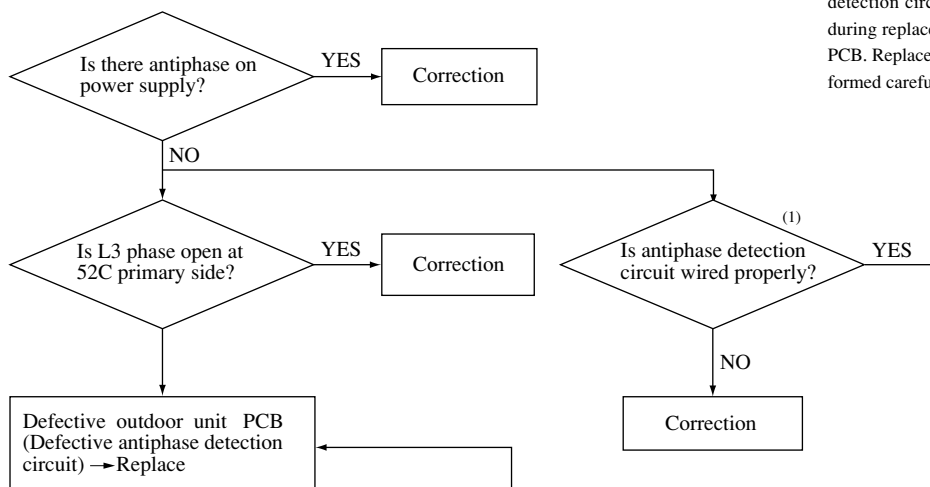
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) When the PCB is defective, the flash patterns of outdoor unit red LED, green LED may become irregular.

5 Error display : *E32* [Antiphase on power supply or open 52C L3 phase (primary side) on power supply]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



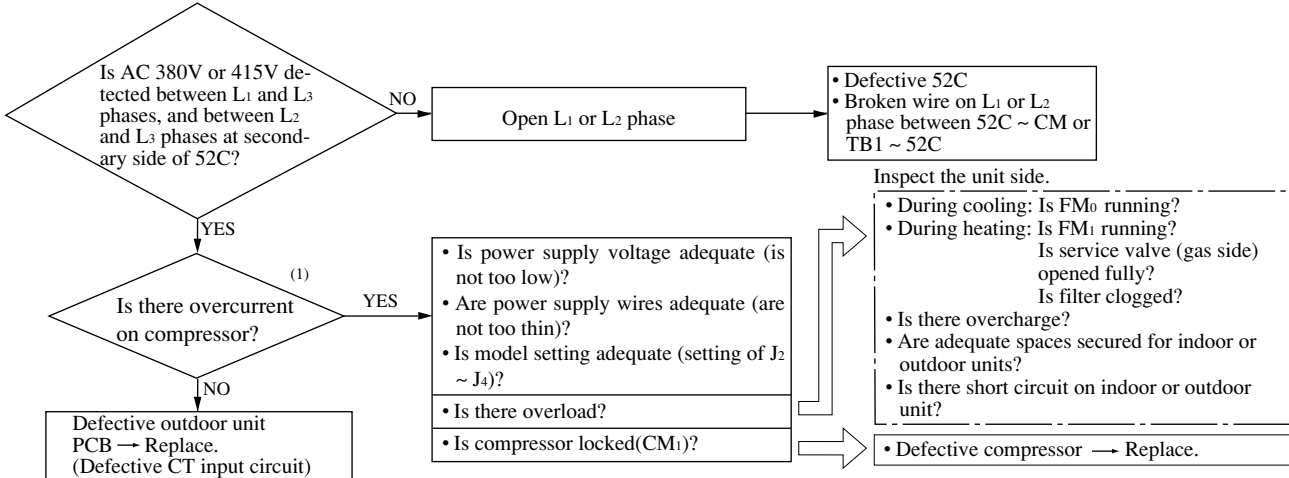
Note (1) Wrong wire connection of the antiphase detection circuit is suspected occurred during replacement of the outdoor unit PCB. Replacement work should be performed carefully.

6

Error display : E33 [Or overcurrent error (CM₂), motor lock (CM₁)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash ⁽¹⁾
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Single flashing of outdoor unit LED indicates CM₁ and double flashing indicates CM₂.



Note (1) Measure the current value for confirmation.

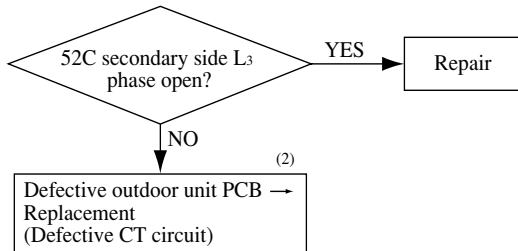
Confirm that there is no mistake in the setting of J₂~ J₄ on the outdoor unit PCB.

7

Error display : E34 [Open phase at L₃ phase of 52C1, 52C2 secondary side (CM₁, CM₂)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash ⁽¹⁾
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Single flashing of outdoor unit LED indicates CM₁ and double flashing indicates CM₂.



Notes (1) When voltage is detected at 52C primary side but not at the secondary side, check also 52C (broken coil, poor contact).

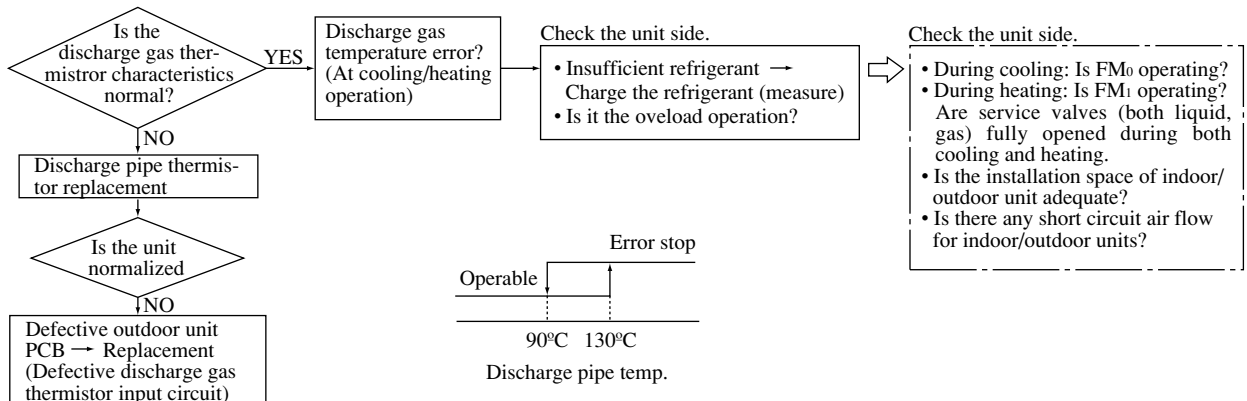
(2) When voltage is detected at 52C primary side L₃ phase and there is no error at 52C, the outdoor unit PCB (defective 52X₀₁ circuit or 52X₀₁) or indoor unit PCB (defective thermostat circuit) is defective.

8

Error display : E36 [Discharge temperature error]

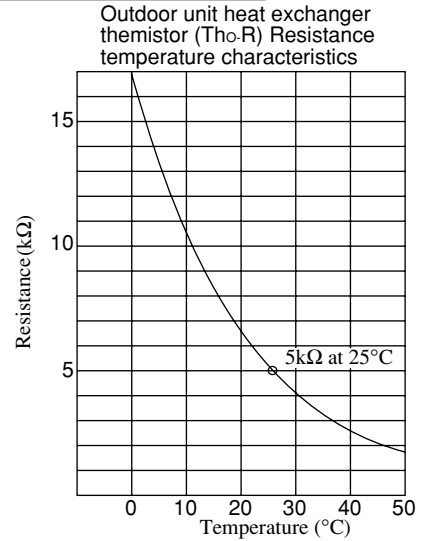
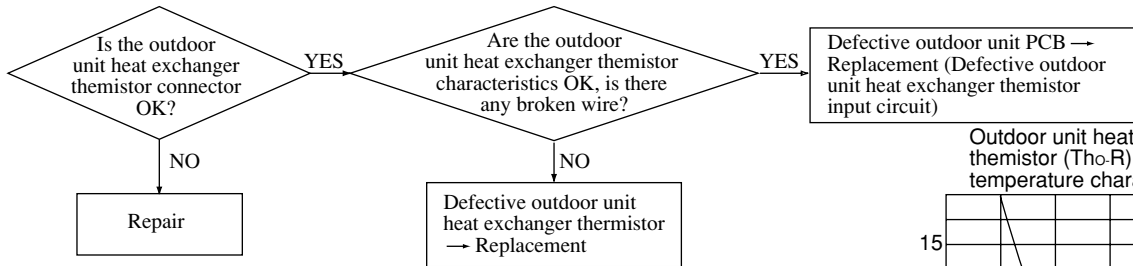
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash ⁽¹⁾
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Single flashing of outdoor unit LED indicates Th₀-1 and double flashing indicates Th₀-2.



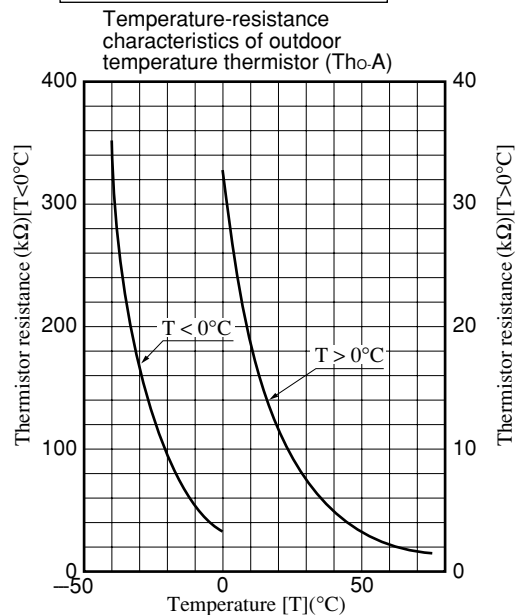
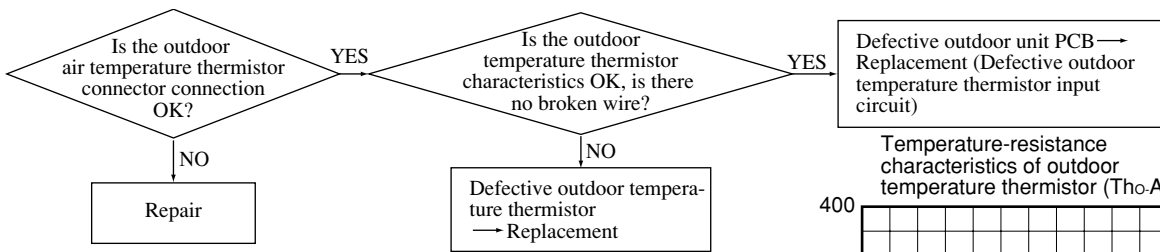
9 Error display : *E37* [Defective outdoor unit heat exchanger thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



10 Error display : *E38* [Defective outdoor temperature thermistor]

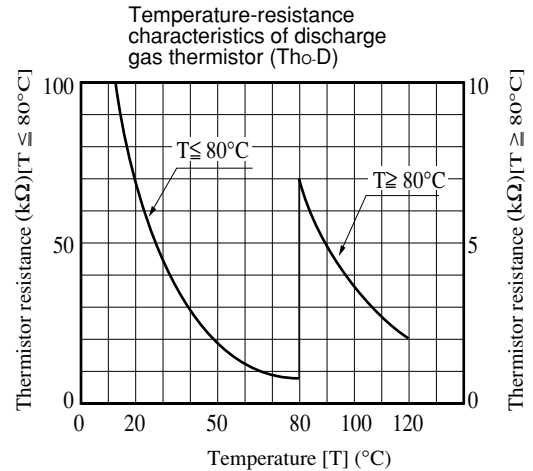
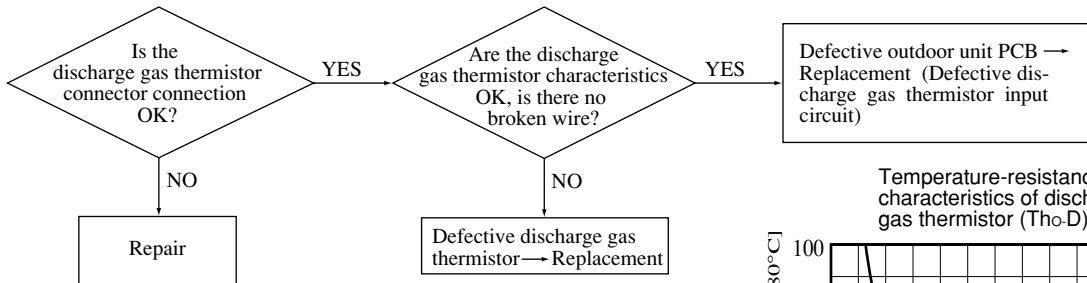
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



11 Error display : E39 [Defective discharge gas thermistor]

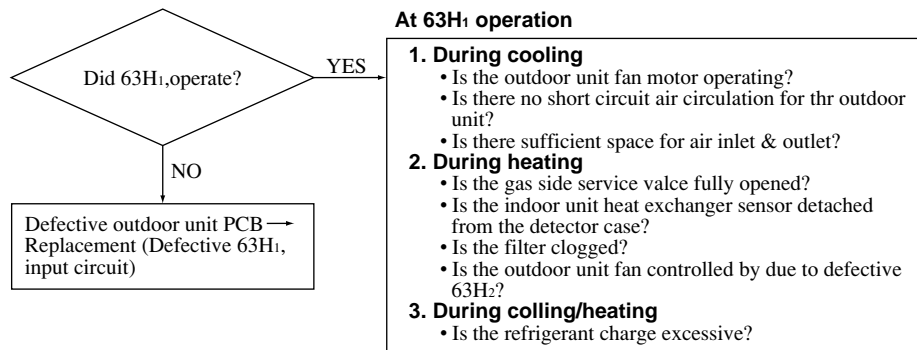
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash ⁽¹⁾
Green LED	Keeps flashing	Green LED	Keeps flashing

Note (1) Single flashing of outdoor unit LED indicates Th₀-1 and double flashing indicates Th₀-2.



12 Error display : E40 [63H, motion]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

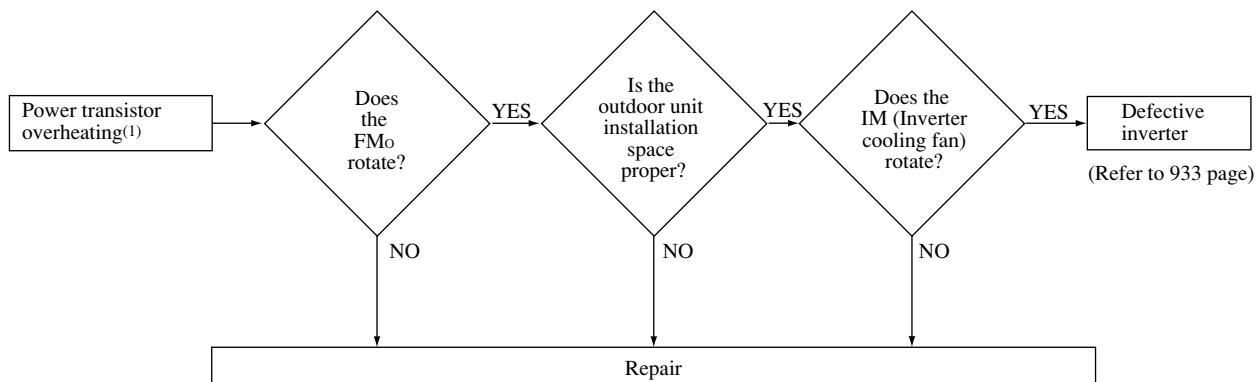


Note (1) When the wire of 63H₁ is broken from the moment of power on, the error E40 is displayed 40 minutes later.

If the operation is started in this period of time, the operation changes to the thermostat OFF state during cooling, and cool wind blow stops during heating operation.

13 Error display : *E41* [Power transistor overheating]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

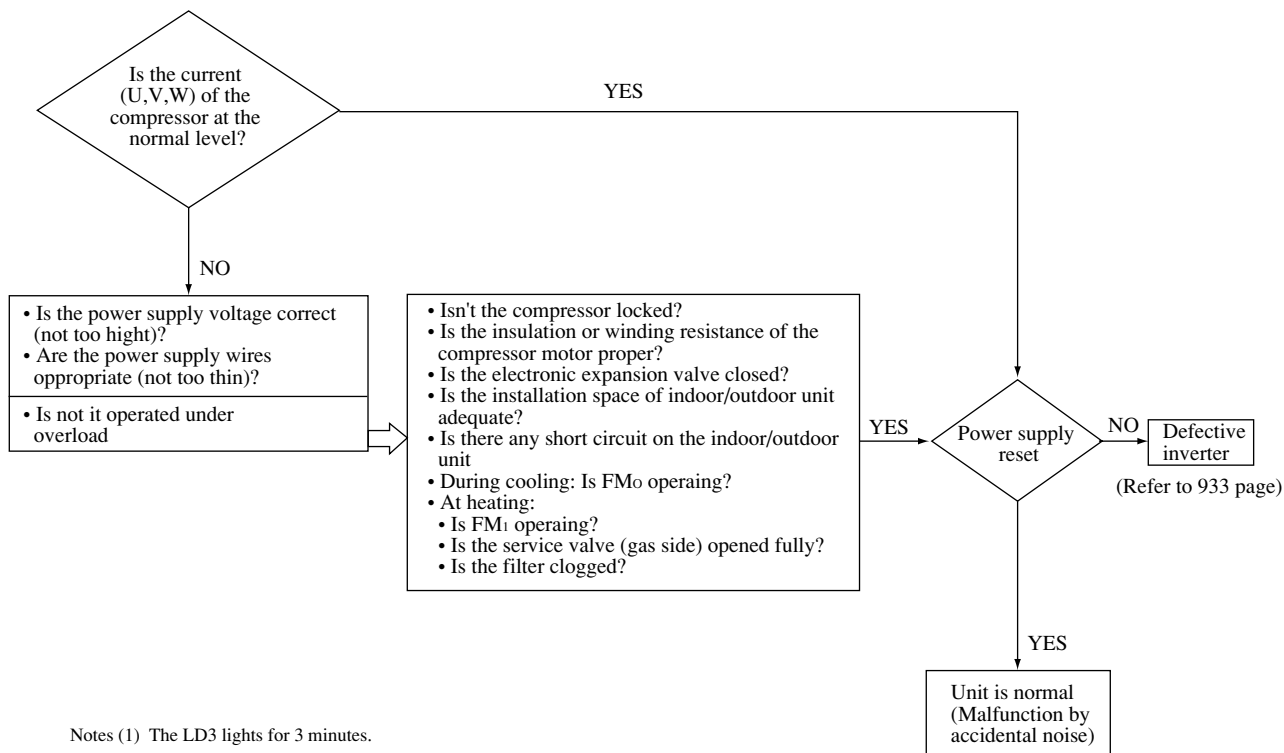


Note (1) The LD2 on the inverter control PCB lights for 3 minutes. Fin thermostat set value : 118°C open

14 Error display : *E42* [Current cut (CM₁)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

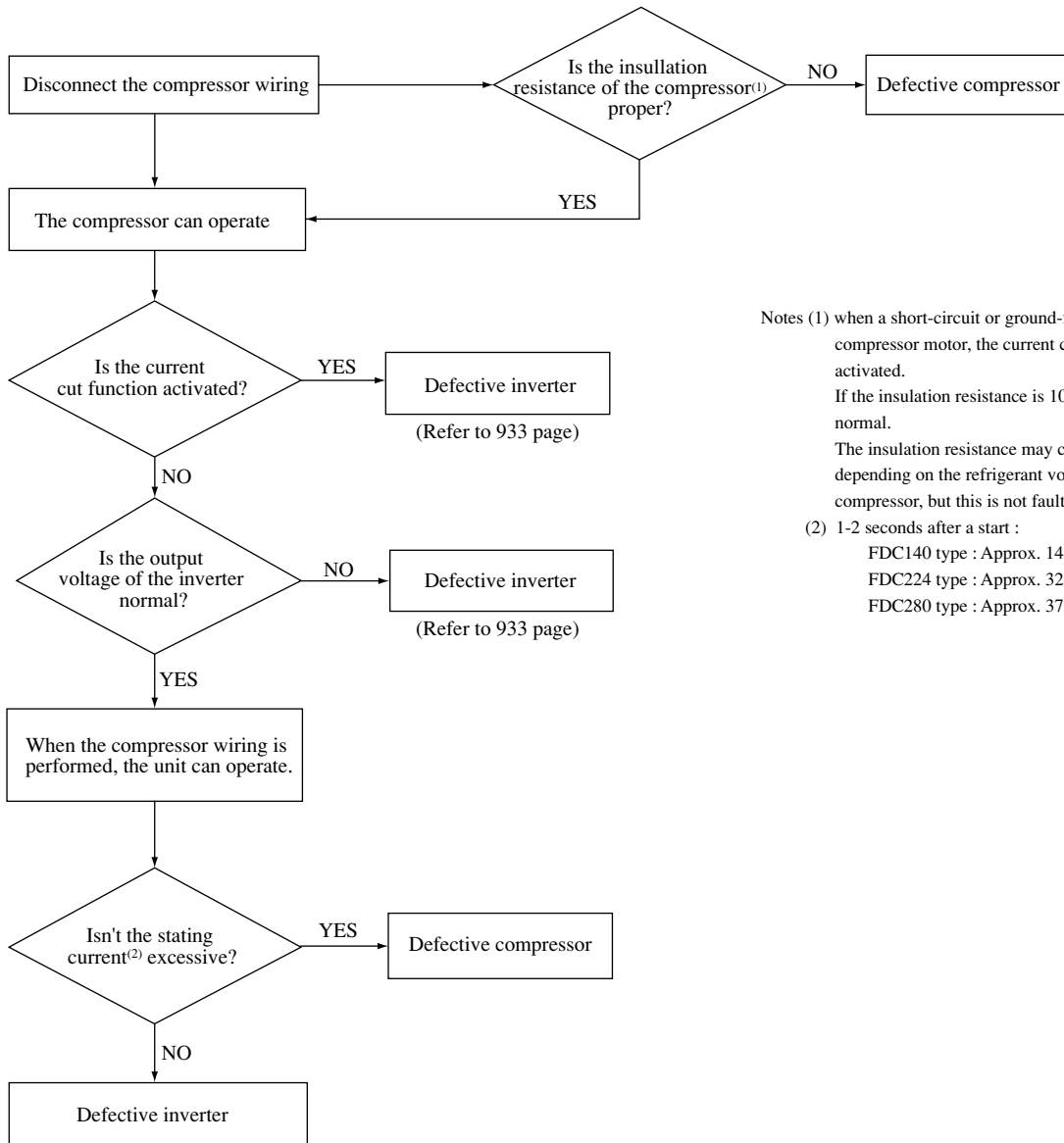
Remarks : When current-cut occurs immediately after start (the Hz value does not increase), check the LD3 on the inverter PCB if an error code is not indicated on the remote controller and the compressor does not operate. When this LD3 is ON, see the next page.



Notes (1) The LD3 lights for 3 minutes.

(2) For details of the check procedure, see the next page.

Current cut is indicated and the compressor cannot operate



Notes (1) when a short-circuit or ground-fault occurs in the compressor motor, the current cut function is also activated.

If the insulation resistance is 10MΩ or more, it is normal.

The insulation resistance may considerably drop depending on the refrigerant volume in the compressor, but this is not faulty.

(2) 1-2 seconds after a start :

FDC140 type : Approx. 14A

FDC224 type : Approx. 32A

FDC280 type : Approx. 37A

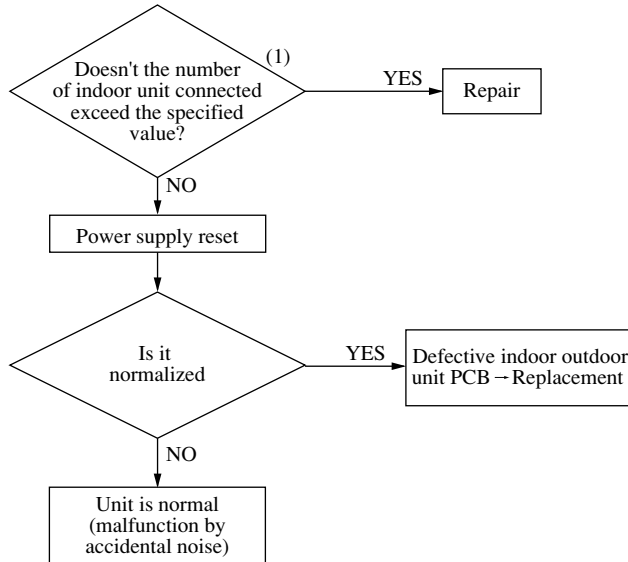
Inverter output voltage		Unit : V (AC)				
Model	Frequency	35Hz	40Hz	65Hz	75Hz	95Hz
All models (outdoor unit)		160 ~ 180	180 ~ 210	290 ~ 320	330 ~ 360	380 ~ 410

15

Error display : E43

[Excessive number of indoor units connected]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



- Notes (1) The maximum number of connectable units of each model is as follows :
 FDC140 type : 10, FDC224, 280 type 16.
 (2) Outdoor No. setting check for indoor units (to see if outdoor No. is of other system)
 (3) In case of auto addressing erase the addresses stored in memory and perform re-setting

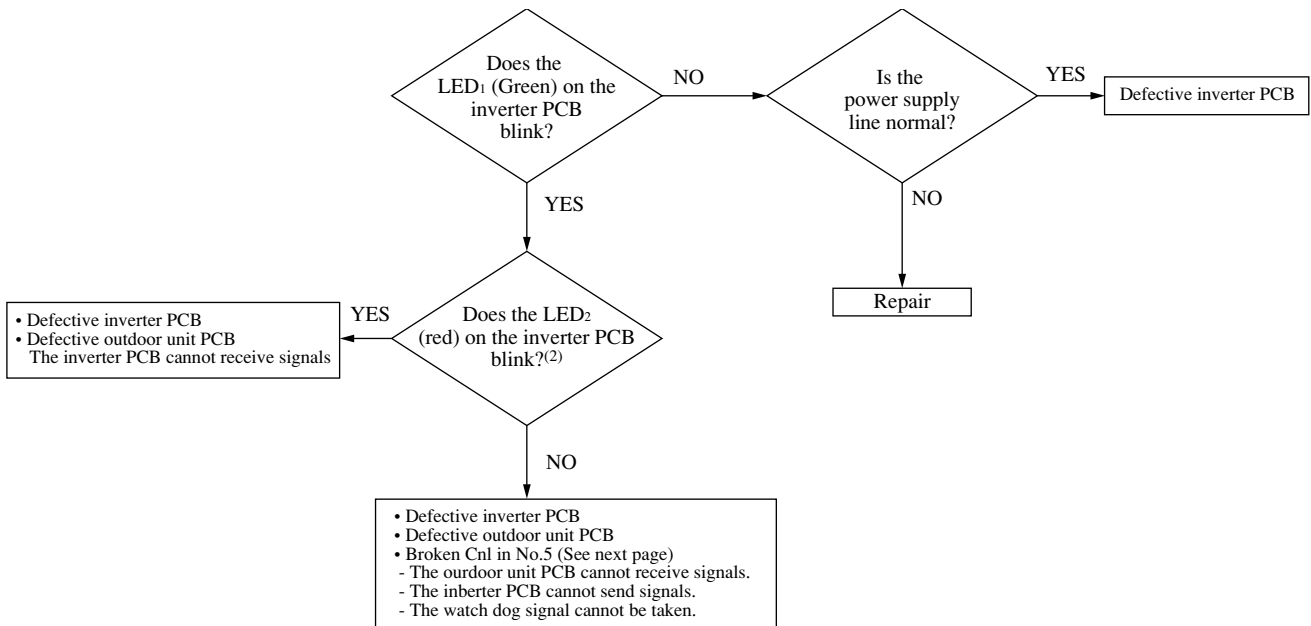
16

Error display : E45

[Transmission error between inverter and Outdoor unit PCB]

Check that the 52C is ON. With the 52C ON, power is supplied to the inverter PCB.

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

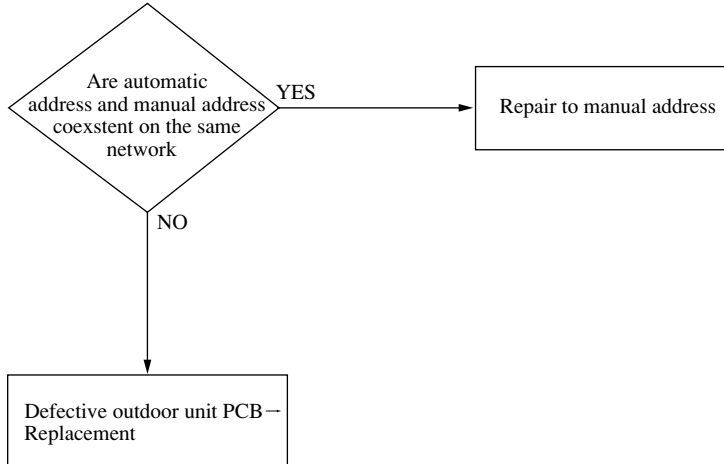


Notes (1) Make a check referring to Troubleshooting for Inverter (page 933.)

(2) When receiving fails, the LED2 comes on at once. If the outdoor unit cannot receive signals for 10 seconds, the 52C is turned OFF. Accordingly, the ON state can be checked only in this period of 10 seconds.

17 Error display : *E46* (Automatic address setting and manual address setting coexist in the same network)

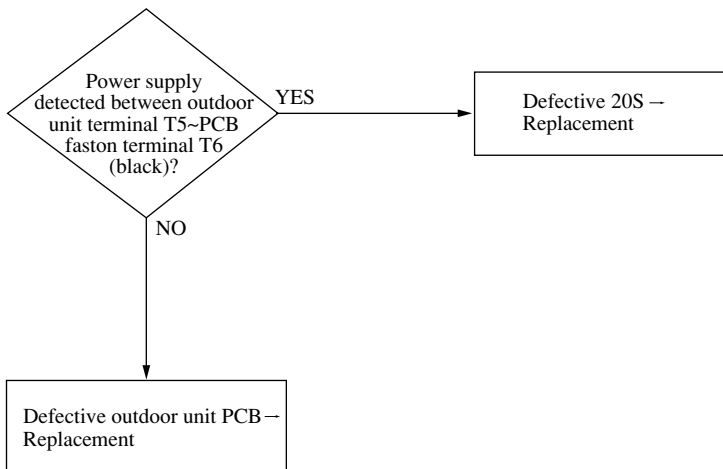
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



(d) How to advance checks for each faulty symptom

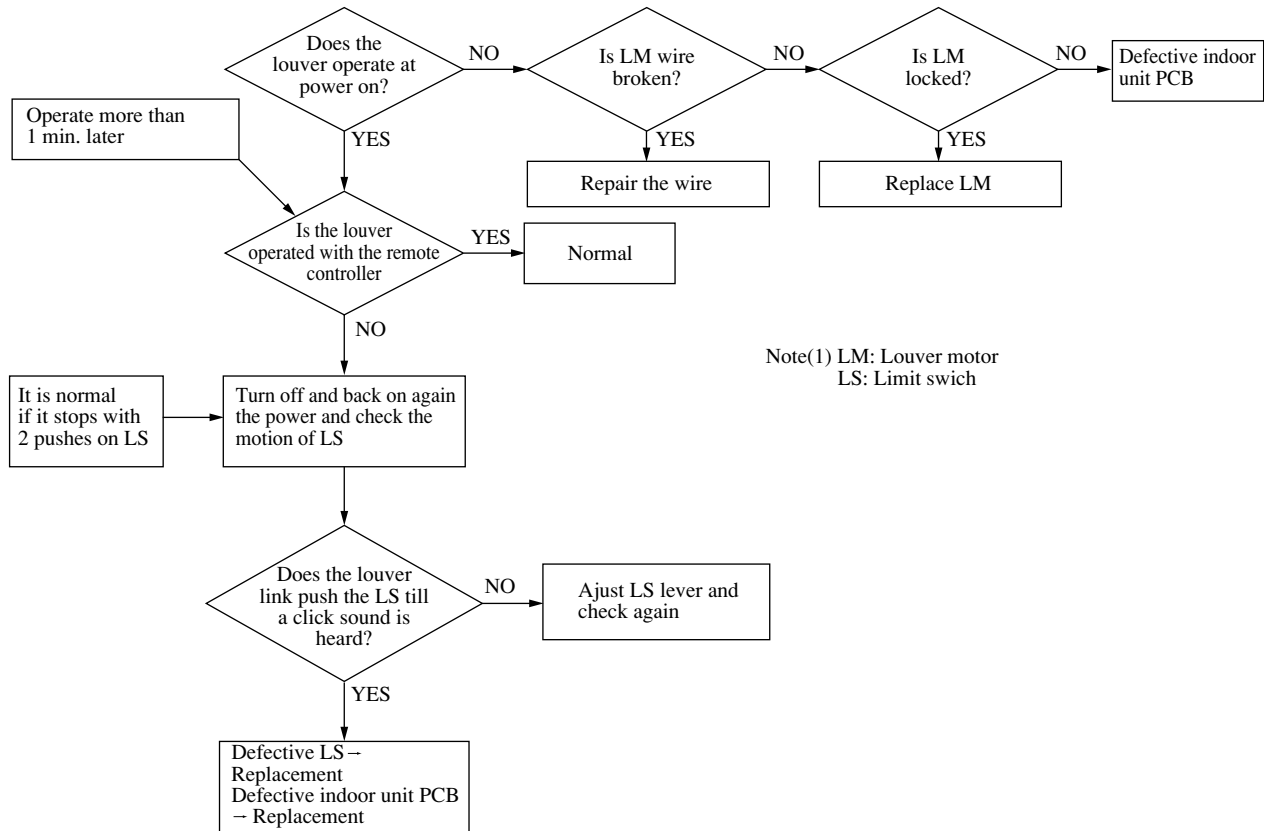
(i) Inspection method when there is no error display

1) Four way valve does not switch during heating operation



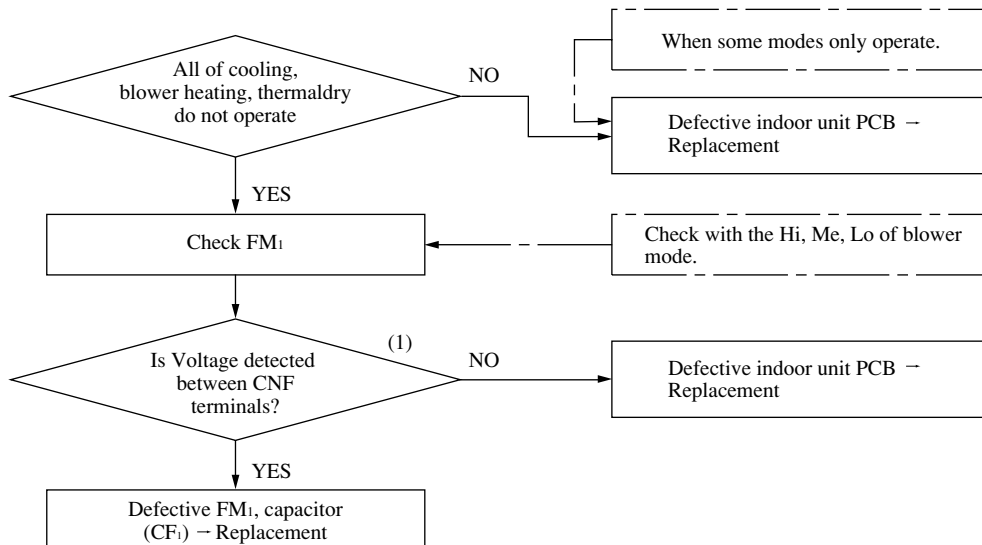
2) Louver motor does not operate

► Inspect at the indoor unit side.



3) When the indoor unit blower does not operate

► Inspect at the indoor unit side.



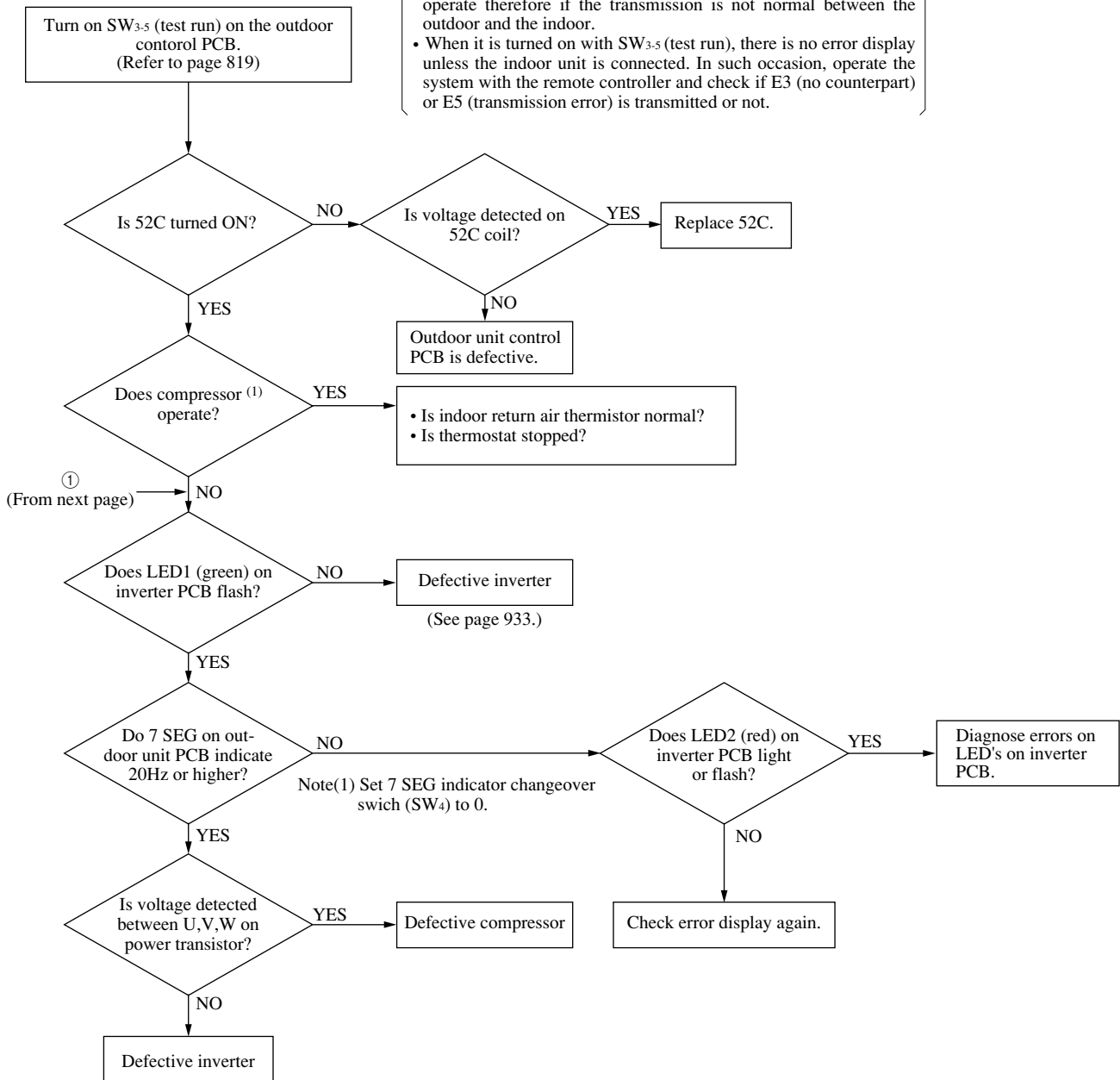
(ii) When the compressor does not operate although the remote controller display is normal (Without the check display)

Take following steps first before confirming the following items:

- Confirm that it is normal at the indoor unit side, LED1 (green) keeps flashing on the outdoor unit control PCB and LED2 (red) is not lit.
- When LED1 (red) is flashing while the remote controller display is normal, LED2 (red) can be turned off if SW₃₋₁ is turned ON and turned OFF again.

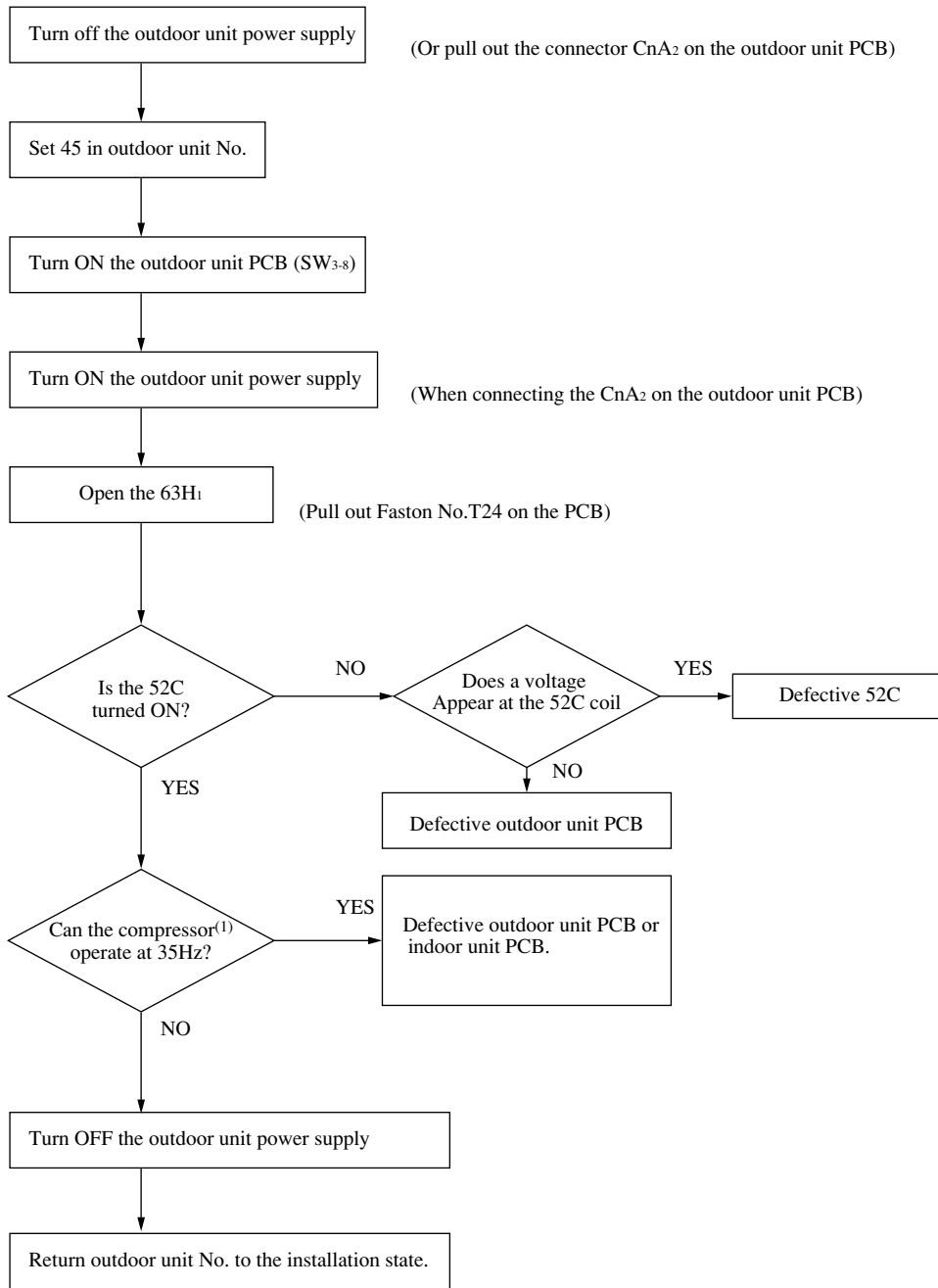
Note (1) Be sure to turn the SW₃₋₅ off after the confirmation.

It is designed to transmit the highest request frequency from the outdoor to the indoor regardless the state of thermostat. It will not operate therefore if the transmission is not normal between the outdoor and the indoor.
 When it is turned on with SW₃₋₅ (test run), there is no error display unless the indoor unit is connected. In such occasion, operate the system with the remote controller and check if E3 (no counterpart) or E5 (transmission error) is transmitted or not.



Notes (1) Expansion valve of the indoor unit may be closed or the indoor fan may be stopped. Stop the compressor no sooner than it has started. Neglecting this caution could result in compressor trouble.
 (2) Method to check with the outdoor unit only is described on the next page.

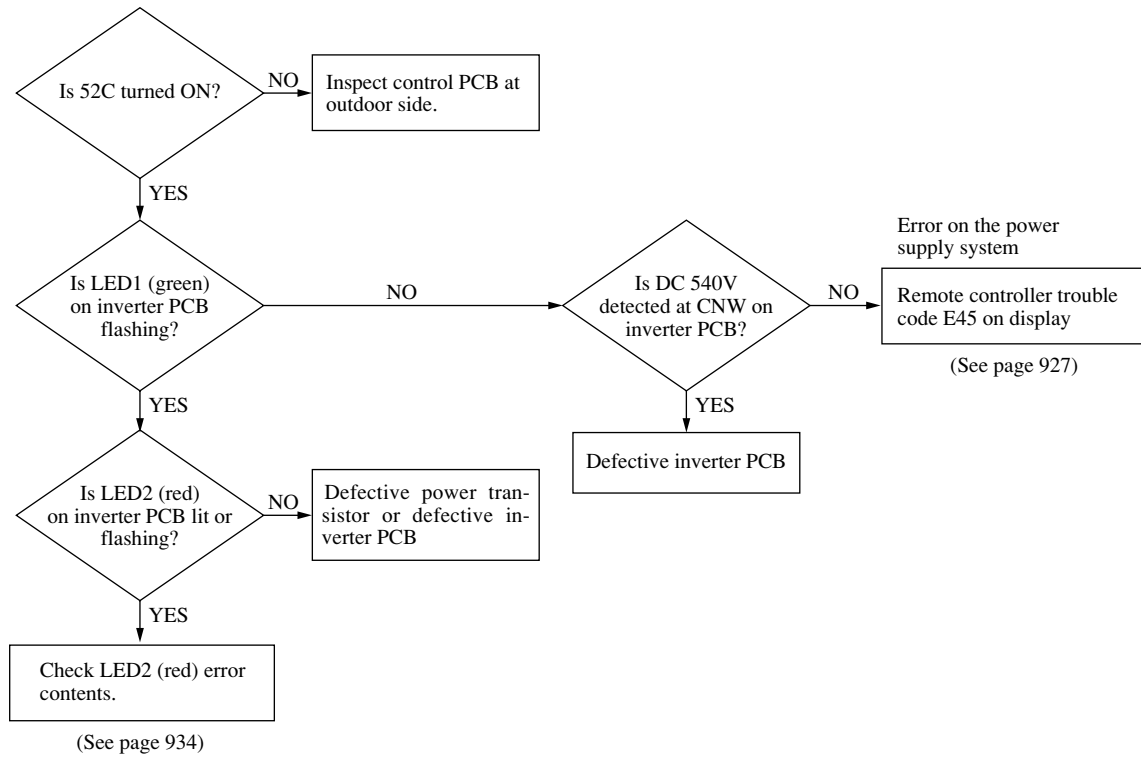
2) Procedure for checking the outdoor unit irrespective of indoor/outdoor transmission



①
(Continued to the previous page)

Note (1) When using this procedure, the indoor unit enters a transmission error state. In the indoor unit the expansion valve may be closed or the fan may stop.
After the compressor is operated, stop it at once.
Otherwise, it will cause a failure to the compressor.

3) Inverter inspection procedures (There is no output on the compressor (U,V,W).)



(iii) When the cooling (heating) effect is felt insufficient. (Check also the refrigeration cycle for the refrigerant quantity, etc. in addition to the following.)

1) When the cooling effect is insufficient.

- Check if the protective function has tripped and, as a result, the compressor operation frequency has dropped below the specified frequency
- Does the indoor expansion valve operate properly? Is it clogged?
- Is the frosting prevention function operated?

Check method of the indoor unit electronic expansion valve

Check the indoor controller output to the expansion valve with the following procedures.

- | | | | | | | |
|---|---|---|--|--|---|---|
| <p>▶ Check how much volt is detected at the expansion valve (SM) connector and at the pin at control side of the connector CnA (white, 6P (5 cores)), and measure also how many seconds the voltages are applied.</p> | <table border="0"> <tr> <td style="font-size: 2em; vertical-align: middle;">}</td> <td style="vertical-align: middle;"> Orange~Gray
 Red~Gray
 Yellow~Gray
 Black~Gray </td> </tr> <tr> <td></td> <td style="vertical-align: middle;"> Approx. DC 5V⁽²⁾ is detected for approx. 15 seconds⁽¹⁾ at the power on. </td> </tr> </table> | } | Orange~Gray
Red~Gray
Yellow~Gray
Black~Gray | | Approx. DC 5V ⁽²⁾ is detected for approx. 15 seconds ⁽¹⁾ at the power on. | <p>▶ The indoor controller is normal if the seconds and voltages as indicated at left are confirmed. When the expansion valve does not operate while the voltages are detected (operating sound is not heard), the expansion valve is defective.</p> <p>▶ If the thermostat setting is changed, the expansion valve will operate approx. 20 seconds later. Then, approx. 5V will be confirmed at the CnA same as above.</p> |
| } | Orange~Gray
Red~Gray
Yellow~Gray
Black~Gray | | | | | |
| | Approx. DC 5V ⁽²⁾ is detected for approx. 15 seconds ⁽¹⁾ at the power on. | | | | | |

Notes (1) 5V is maintained for 8 seconds after the power on, then it drops momentarily and recovers 5V for approx. 7 seconds.

(2) When measured with a digital multi-tester, voltages of approx. 6~3V are output one after another.

2) When the heating effect is insufficient

- Check if the protective function (1) has operated and, as a result, the compressor operation frequency has dropped below the specified frequency.

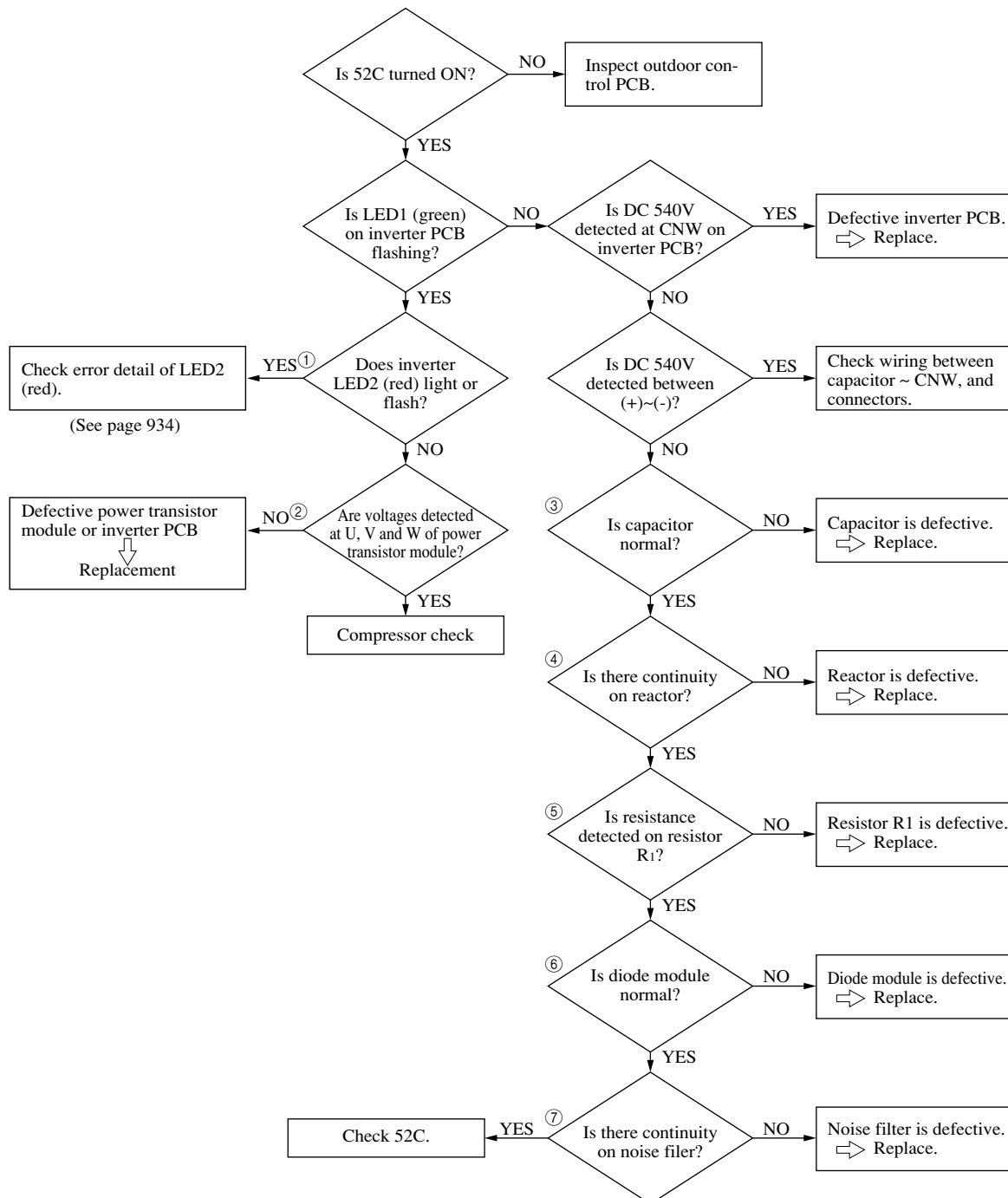
Note (1) The frequency drops when the high pressure control (Operated at 63Hz:2.50 open/2.06 close, Mpa (25.5 open/21close kgf/cm²)[FDCP:2.79open/2.26 clope, MPa(28.5open/23 cloes kgf/cm²)], current safe control or discharge temperature control is operated.

- Does the indoor expansion valve operate normally? Is the valve clogged?

(3) Trouble diagnosis at the inverter side

When any defect is found at the inverter side as a result of the trouble diagnosis of (2), (c), inspect with the following procedures.

(a) Diagnosis procedures (Regarding the details of ①~⑦, refer to the inspection points of indoor unit on the next page.)



- * Check points of outdoor unit
- ▷ Check with power ON at the points marked with *.
- ▷ Turn power OFF before starting inspection.
- ▷ Also remove each part before starting inspection.
- ▷ Inspection of power cables: There must be continuity on the cables. Cables must be connected properly.

⑦ Noise filter check: There must be a continuity.

Fuse check: There must be a continuity.

- * Check of power supply
- Check the power supply on L1, L2 and L3 of terminal block TB. (It is normal if AC 380V is detected.)

Transformer check: There must be continuity at the primary side after disconnecting the connector CN1.

⑥ Diode module check

Tester probe	If good
+	-
~	5
6	~

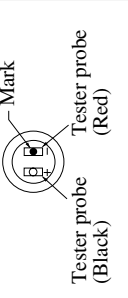
If tester probes are inverted, the connection becomes open.

⑤ Resistor R1 check: Measure the resistance value.

FDC140	30Ω
FDC224	30Ω
FDC280	30Ω

Capacitor check
Check for abnormality in appearance such as damage, swell, etc. Check the charging characteristics with a tester.

It is normal if the needle swings followed by a gradual return and, when tested again after changing the polarity, the needle returns again.



②

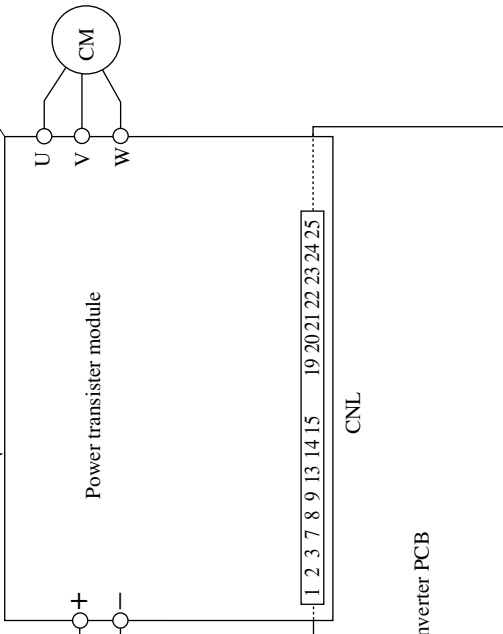
* Power transistor output check

Measure the output voltage after disconnecting the fasten terminal from the compressor. (Values of output voltage indicate those obtained when no load is applied to the inverter.) Unit: V(AC)

Type	35Hz	40Hz	65Hz	75Hz	95Hz
All types (outdoor)	160~180	180~210	290~320	330~360	380~410

Notes (1) Confirm that all voltages measured between U-K, V-W and W-U are same.
(2) Values listed above are those obtained using a digital tester after disconnecting the terminals on the compressor. The values vary depending on the kinds of measuring instrument.

Are there any abnormality such as crack, burn, etc. in appearance?



* Normal LED2 check: If it flashes, the microcomputer operates normally.

• Communication checked at the CN11 will show the following values.

Connector	Detail of communication	V (Analog tester)
1	Common	0V
2	12V power supply	12V
3	Transmission to inverter	Swings between 11 ~ 11.5V
4	Receiving from inverter	Swings between 4.5 ~ 5V
5	Watchdog (Communication from invert PCB to outdoor PCB)	Swings between 2 ~ 4V
6	Inverter overheat	It is normal if 5V or abnormal if 0V
7	Current cut	It is normal 5V or abnormal if 0V

* LED1 (Green)
It is normal if it flashes at each 0.5-second.

LED2 (red) check
1 time flash : Power transistor overheat
• Stop operation and wait till temperature drops.
2 time flashes : Current cut (power transistor over-current)
• Short-circuited compressor wiring
• Trouble on inverter PCB
• Trouble on power transistor
Keeps flashing: Transmission error between inverter and outdoor unit
• Connector CN11 or CN12 is disconnected or broken wire between connectors.
• Error on outdoor control PCB
• Error on inverter PCB