HITACHI

JCH-WH | NO.0146E

SERVICE MANUAL

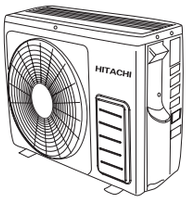
TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY

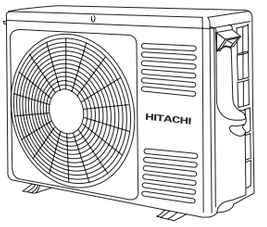
RAC-DJ18PHAE
RAC-DJ25PHAE
RAC-DJ35PHAE
RAC-DJ50PHAE

REFER TO THE FOUNDATION MANUAL

OUTDOOR UNIT



RAC-DJ18PHAE
RAC-DJ25PHAE
RAC-DJ35PHAE



RAC-DJ50PHAE

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SPECIFICATIONS

TYPE			DC INVERTER							
			INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL			RAK-DJ18PHAE	RAC-DJ18PHAE	RAK-DJ25PHAE	RAC-DJ25PHAE	RAK-DJ35PHAE	RAC-DJ35PHAE	RAK-DJ50PHAE	RAC-DJ50PHAE
POWER SOURCE			1 PHASE,50Hz,220-240V		1 PHASE,50Hz,220-240V		1 PHASE,50Hz,220-240V		1 PHASE,50Hz, 220-240V	
COOLING	TOTAL INPUT (W)		580 (250 1,010)		700 (250 1,290)		1,084 (250 1,460)		1,548 (500 2,100)	
	TOTAL AMPERES (A)		3.22-2.95		3.89-3.57		5.38-4.94		7.11-6.51	
	CAPACITY	(KW)	2.00 (0.90 2.50)		2.50 (0.90 3.10)		3.50 (0.90 4.00)		5.00 (1.90 5.20)	
		(B.T.U./h)	6,820 (3,070 8,530)		8,530 (3,070 10,580)		11,940 (3,070 13,650)		17,060 (6,480 17,740)	
HEATING	TOTAL INPUT (W		595 (250 970)		850 (250 1,250)		1,050 (250 1,700)		1,617 (500 2,750)	
	TOTAL AMPERES (A)		3.51-3.22		4.52-4.15		5.30-4.86		7.42-6.81	
	CAPACITY	(KW)	2.50 (0.90 3.20)		3.40 (0.90 4.40)		4.20 (0.90 5.00)		6.00 (2.20 7.30)	
		(B.T.U./h)	8,530 (3,070 10,920)		11,600 (3,070 15,010)		14,330 (3,070 17,060)		20,470 (7,510 24,910)	
DIMENSIONS (mm)		W	780	660(+60)	780	660(+60)※	780	660(+60)※	780	792(+91)※
		H	280	530	280	530	280	530	280	600
		D	222	278(+55)	222	278(+55)※	222	278(+55)※	222	299(+47)※
NET WEIGHT		(Kg)	7.7	23	7.7	23	7.7	24.4	8.4	39.1

・The performance tests are based on the EN14511、EN14825.

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

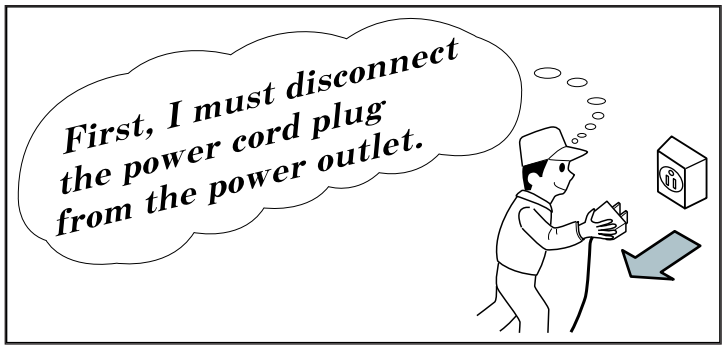
ROOM AIR CONDITIONER

OUTDOOR UNIT

Johnson Controls-Hitachi Air Conditioning Wuhu Co., Ltd.

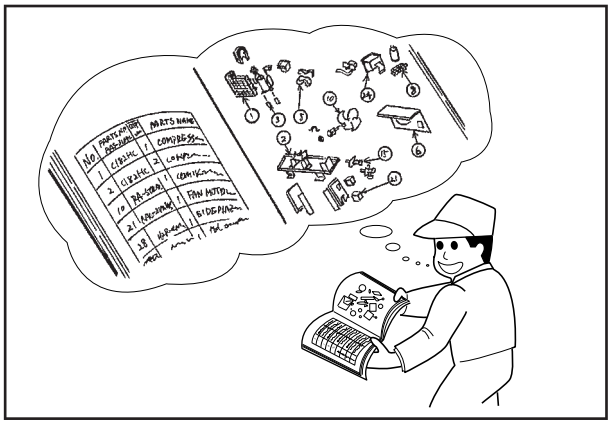
SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

> If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them



3. After completion of repairs, the initial state should be restored.

4. Lead wires should be connected and laid as in the initial state.

5. Modification of the unit by the user himself should absolutely be prohibited.

6. ' ools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.

7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.

8. ' o check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit.
   The insulation resistance should be 1MΩ or more as measured by a 500V DC megger.

9. The initial location of installation such as window, floor or the other should be checked for being safe enough to support the repaired unit again.
   If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.

10. Any inflammable object must not be placed about the location of installation.

11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.

WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope

The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufactures during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned.)

2. Object parts

(1) Microcomputer

(2) Integrated circuits (I.C.)

(3) Field effective transistor (F.... .)

(4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

(1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way.)

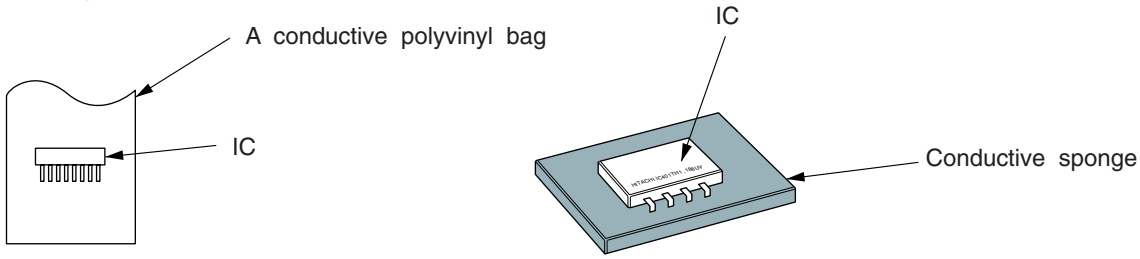


Fig. 1 Conductive container

(2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet.)

(3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.

(4) Be sure to place a part on a metal plate with grounding.

(5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

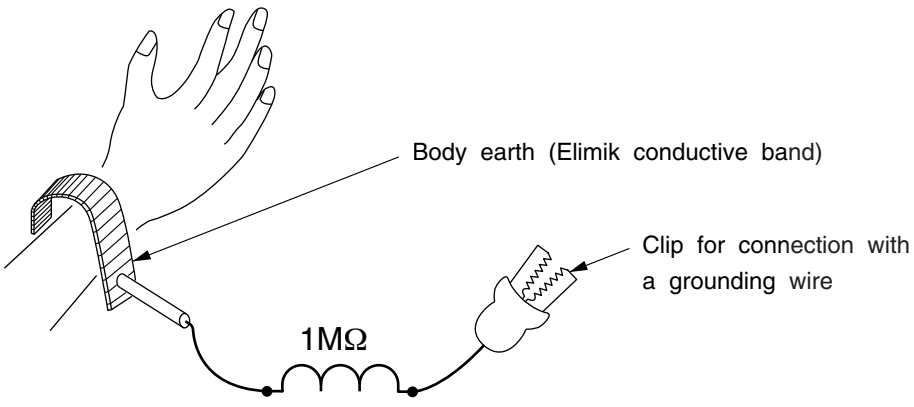


Fig. 2 Body earth

(6) Use a three wire type soldering iron including a grounding wire.

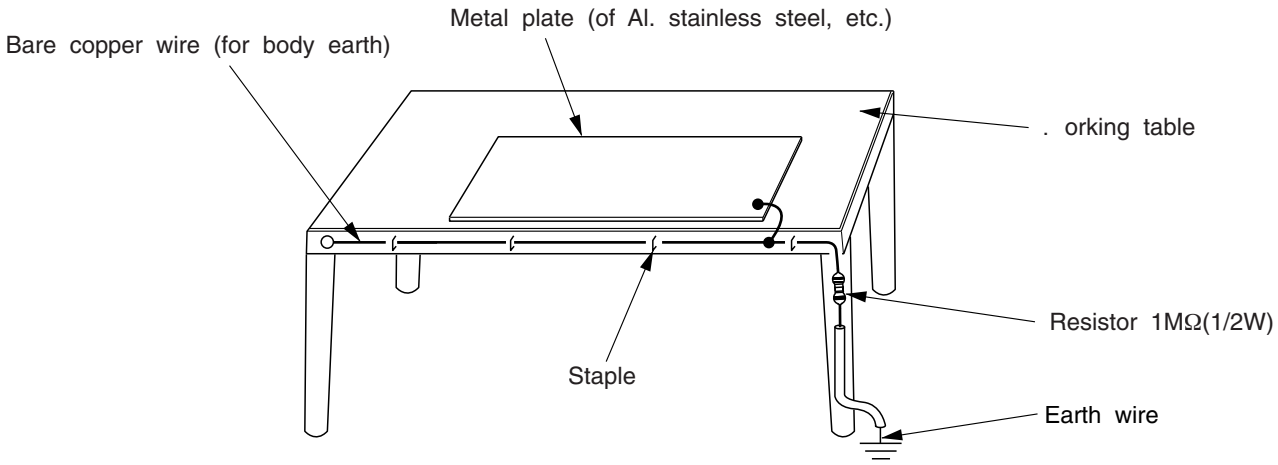


Fig.3 Grounding of the working table

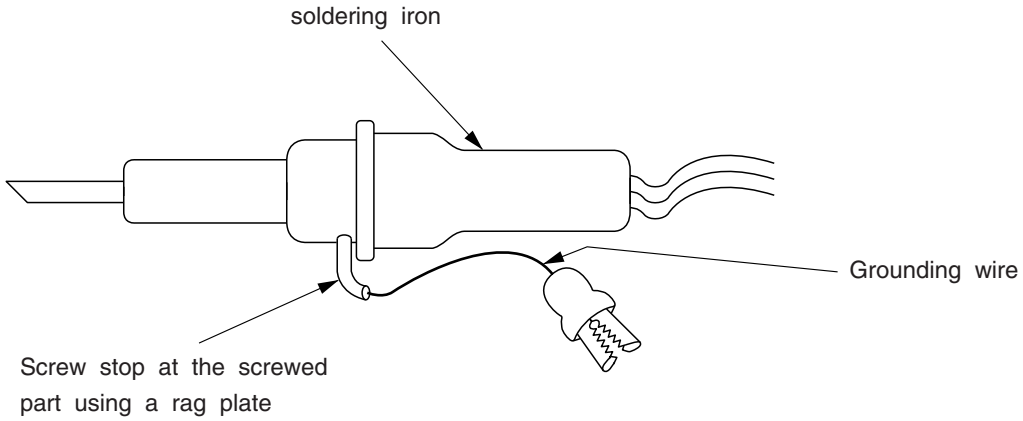


Fig.4 Grounding a solder iron

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

(7) In checking circuits for maintenance, inspection, or some others, be careful not to have the test probes of the measuring instrument short circuit a load circuit or the like.

⚠ CAUTION

.. In quiet or stop operation, slight flowing noise of refrigerant in the refrigerating cycle is heard occasionally, but this noise is not abnormal for the operation.

2. When it thunders near by, it is recommend to stop the operation and turn off the circuit breaker for safety.

3. In the event of power failure,the room air conditioner will restare automatically in the previously selected mode once the power is restored. In the event of power failure during TIMER operation, the room air comditioner will not start automatically. Re-press ON/OFF button after 3 minutes from when the unit off or power recovery.

4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.

5. This room air conditioner should not be used at the cooling operation when the outside temperature is below -10°C (14°F).

6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below –15°C (5°F).
   If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.

7. When the outside heat exchanger is frosted, the frost is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.

SPECIFICATIONS

MODEL		RAC-DJ18PHAE RAC-DJ25PHAE	RAC-DJ35PHAE	RAC-DJ50PHAE
FAN MOTOR		47W		
FAN MOTOR CAPACITOR		NO		
FAN MOTOR PROTECTOR		NO		
COMPRESSOR		ASD088CKPA71K6B		GTD130UKQA8JT6
COMPRESSOR MOTOR CAPACITOR		NO		
OVERLOAD PROTECTOR		YES(INTERNAL)		
OVERHEAT PROTECTOR		YES		
FUSE (for MICROPROCESSOR)		15A, 2A, 3.15A		25A, 2A, 3.15A
POWER RELAY		DX1U		
POWER SWITCH		NO		
TEMPORARY SWITCH		NO		
SERVICE SWITCH		YES		
TRANSFORMER		YES		
VARISTOR		ERZVA9V511,S14K320		
NOISE SUPPRESSOR		YES		
THERMOSTAT		YES(IC)		
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		NO		
REFRIGERANT CHARGING VOLUME (Refrigerant R32)	UNIT	580g	720g	930g
	PIPES (MAX. 20m) (MIN. 3m)	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE.		

Figure showing the installation of Outdoor unit

MODEL RAC-DJ18PHAE/RAC-DJ25PHAE/RAC-DJ35PHAE

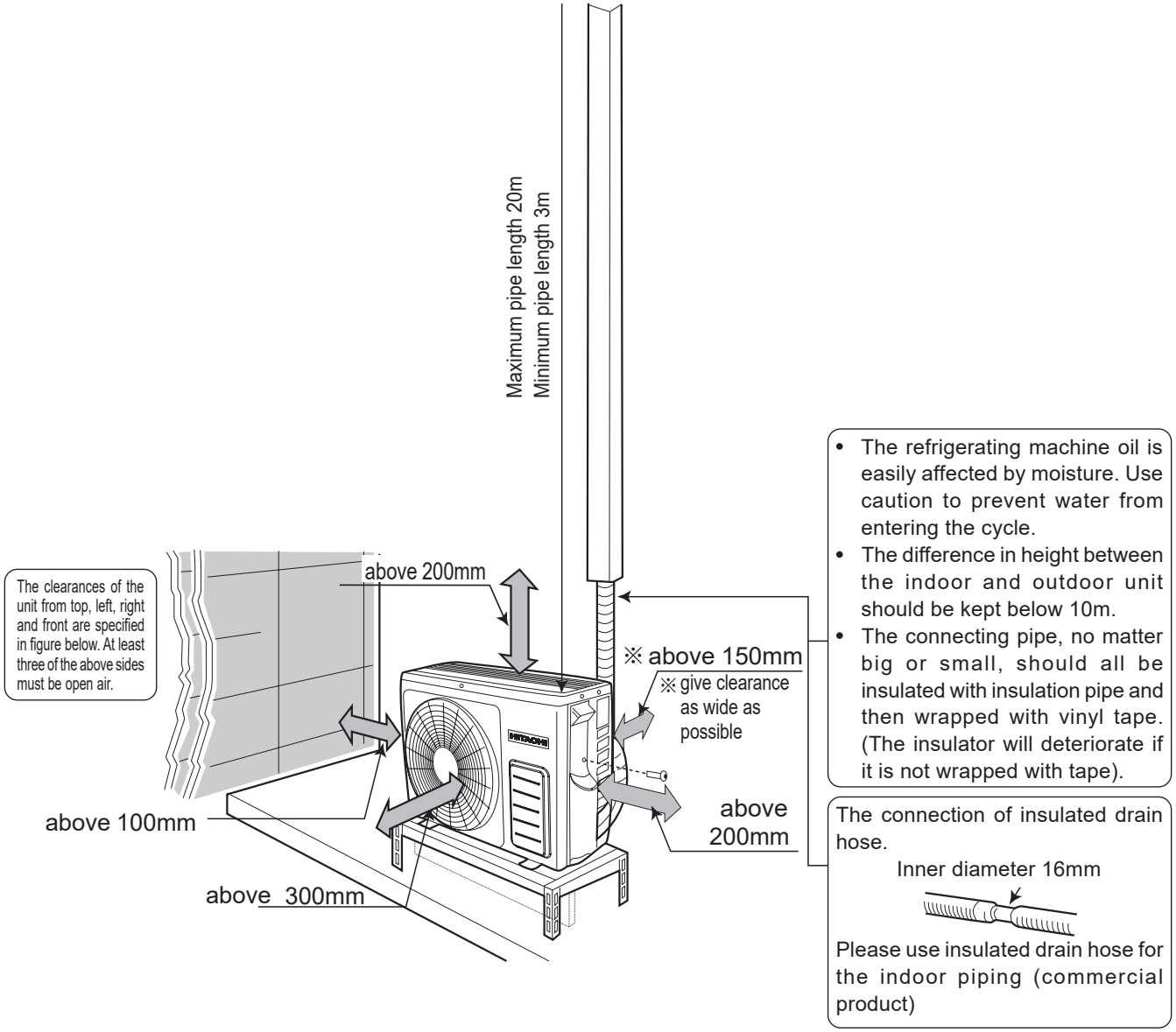
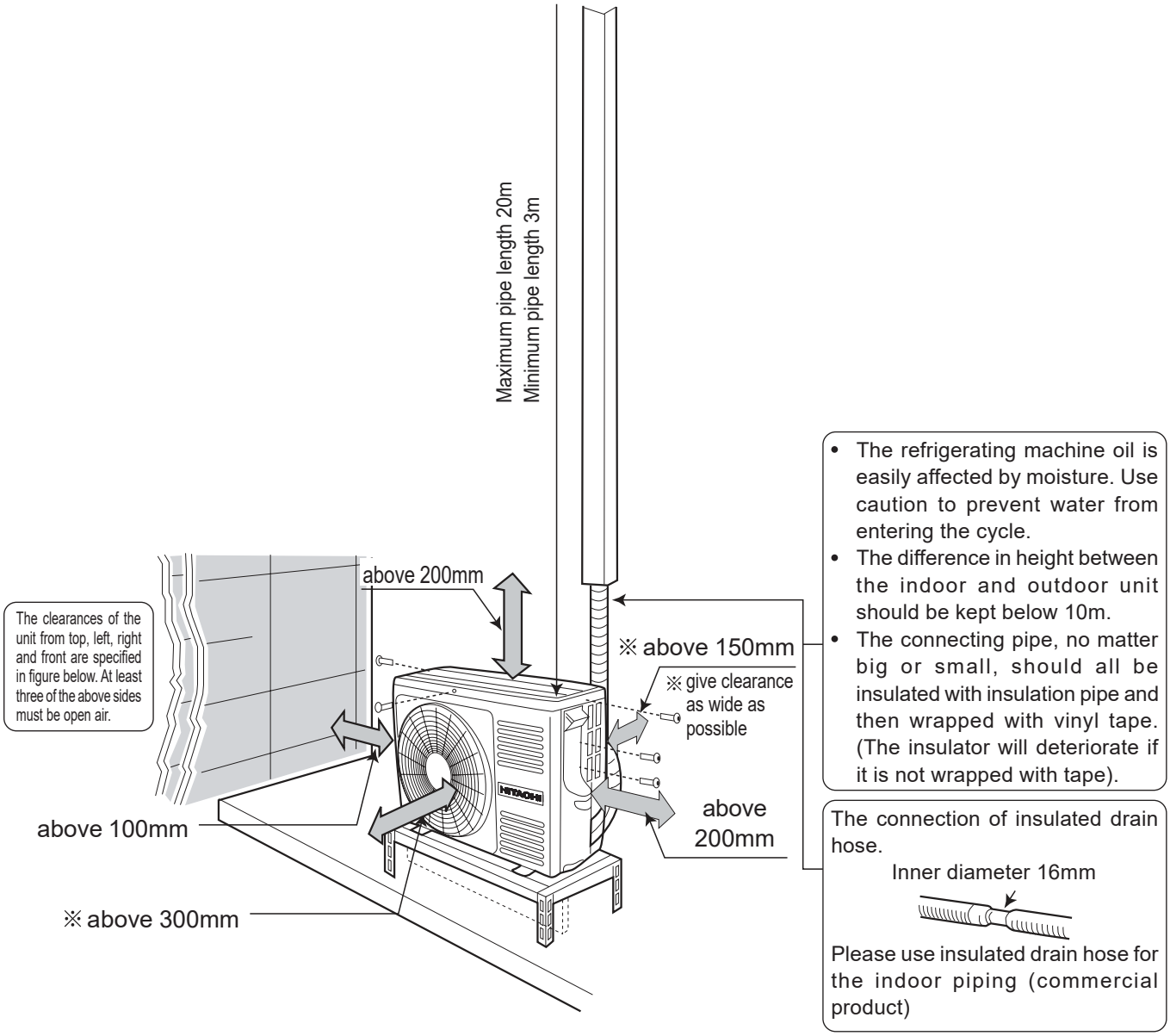


Figure showing the installation of Outdoor unit

MODEL RAC-RAC-DJ50PHAE

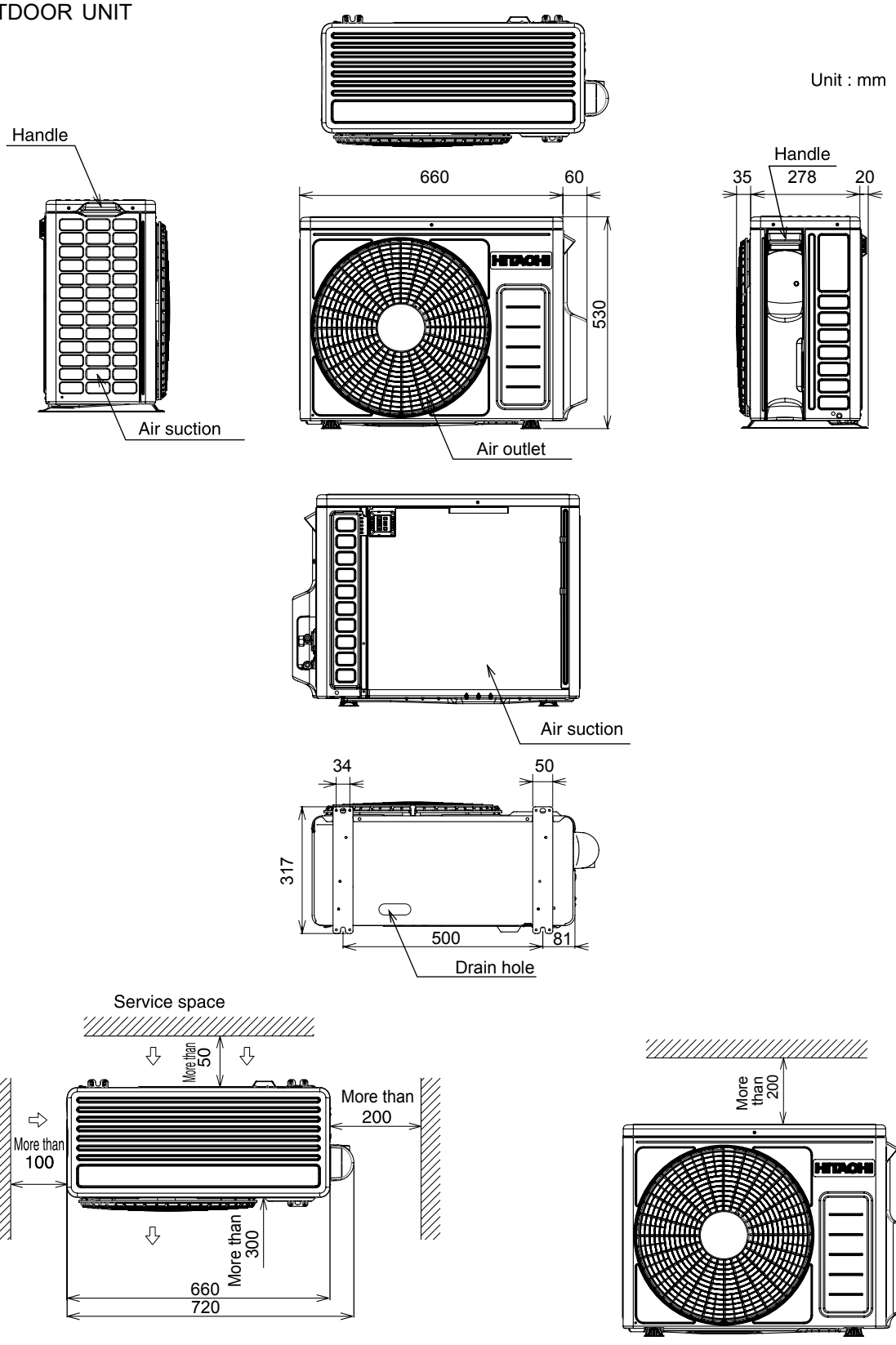


CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAC-DJ18/25/35PHAE

OUTDOOR UNIT

Unit : mm



NOTE:

1.For outdoor unit installation , allow at least 2 sides of space around the unit ensure ventilation flue.

2.The connecting pipe , should all the insulated with insulation pipe.

3.Piping length is within 20m.

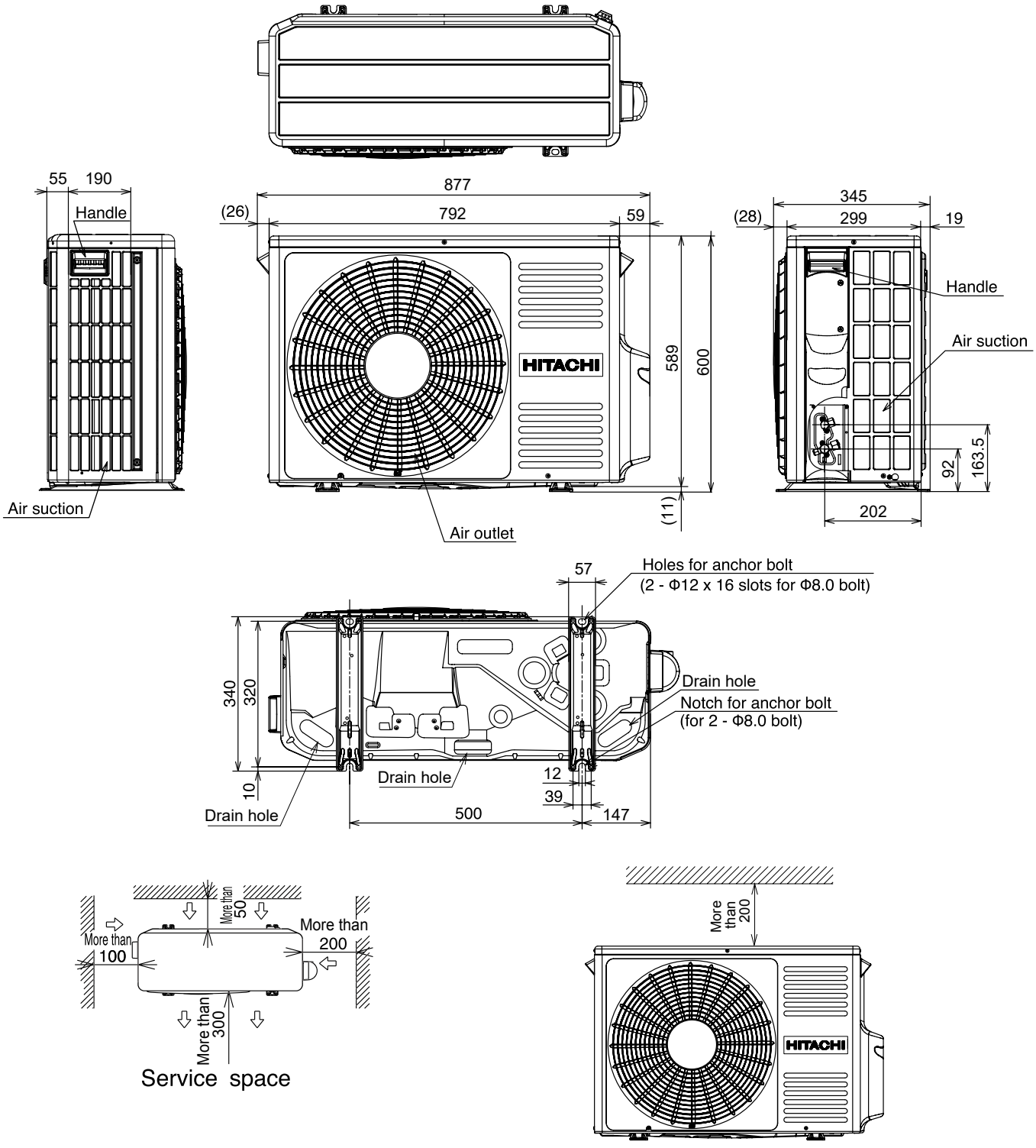
4.Height different of the piping between the indoor unit and outdoor unit should be within 10m.

CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAC-RAC-DJ50PHAE

OUTDOOR UNIT

Unit : mm



NOTE:

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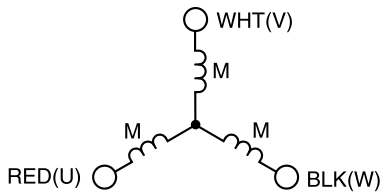
MAIN PARTS COMPONENT

THERMOSTAT (Room temperature Thermistor)

FAN MOTOR

Fan Motor Specifications

MODEL	RAC-DJ18/25/35/50PHAE
POWER SOURCE	DC : 160 - 380V
OUTPUT	47W
CONNECTION	

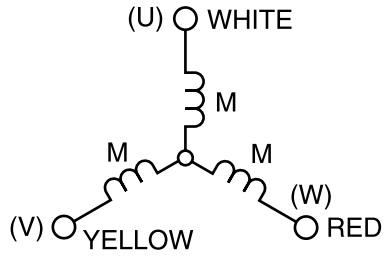
BLU : BLUE	YEL : YELLOW	BRN : BROWN	WHT : WHITE
GRY : GRAY	ORN : ORANGE	GRN : GREEN	RED : RED
BLK : BLACK	PNK : PINK	VIO : VIOLET	

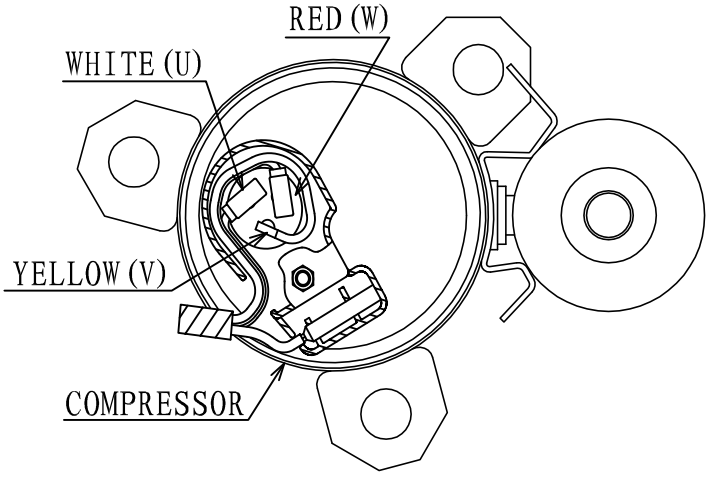
MAIN ELECTRIC COMPONENTS FOR OUTDOOR UNIT

PARTS NAME	RESISTANCE VALUE(Ω)	APPLICABLE MODELS
COIL(REVERSING VALVE)	1470±100Ω(15.20℃)	RAC-DJ18/25/35/50PHAE
COIL(EXPANSION VALVE)	46±3.7Ω(20℃)	RAC-DJ18/25/35/50PHAE
REACTOR	15 (mH) 226 mΩ MAX (20 °C)	RAC-DJ18/25/35PHAE
	5.3 (mH) 140m Ω MAX (20 °C)	RAC-DJ50PHAE

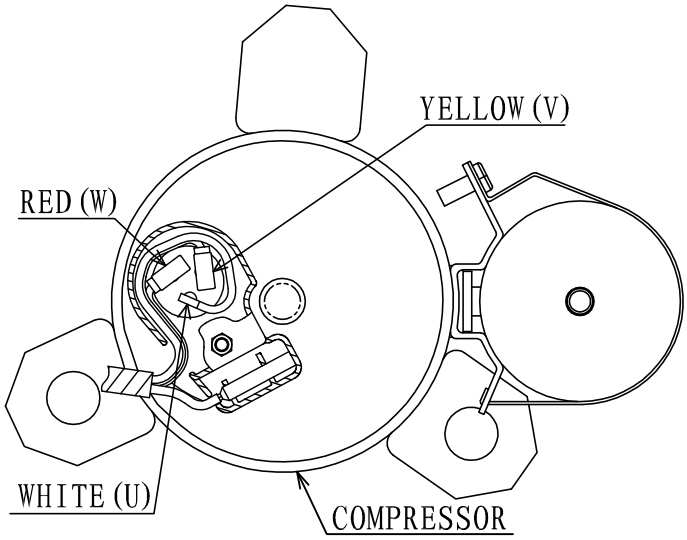
COMPRESSOR MOTOR

Compressor Motor Specifications

MODEL		RAC-DJ18/25/35PHAE	RAC-DJ50PHAE
COMPRESSOR TYPE		ASD088CKPA7JK6B	GTD130UKQA8JT6
POWER SOURCE		220 - 350 V	220 - 350 V
OUTPUT		827W	1350W
CONNECTION			
RESISTANCE VALUE (Ω)	20˚C	2M = 2.084	2M = 1.354
	75˚C	—	—



RAC-DJ18/25/35PHAE



RAC-DJ50PHAE

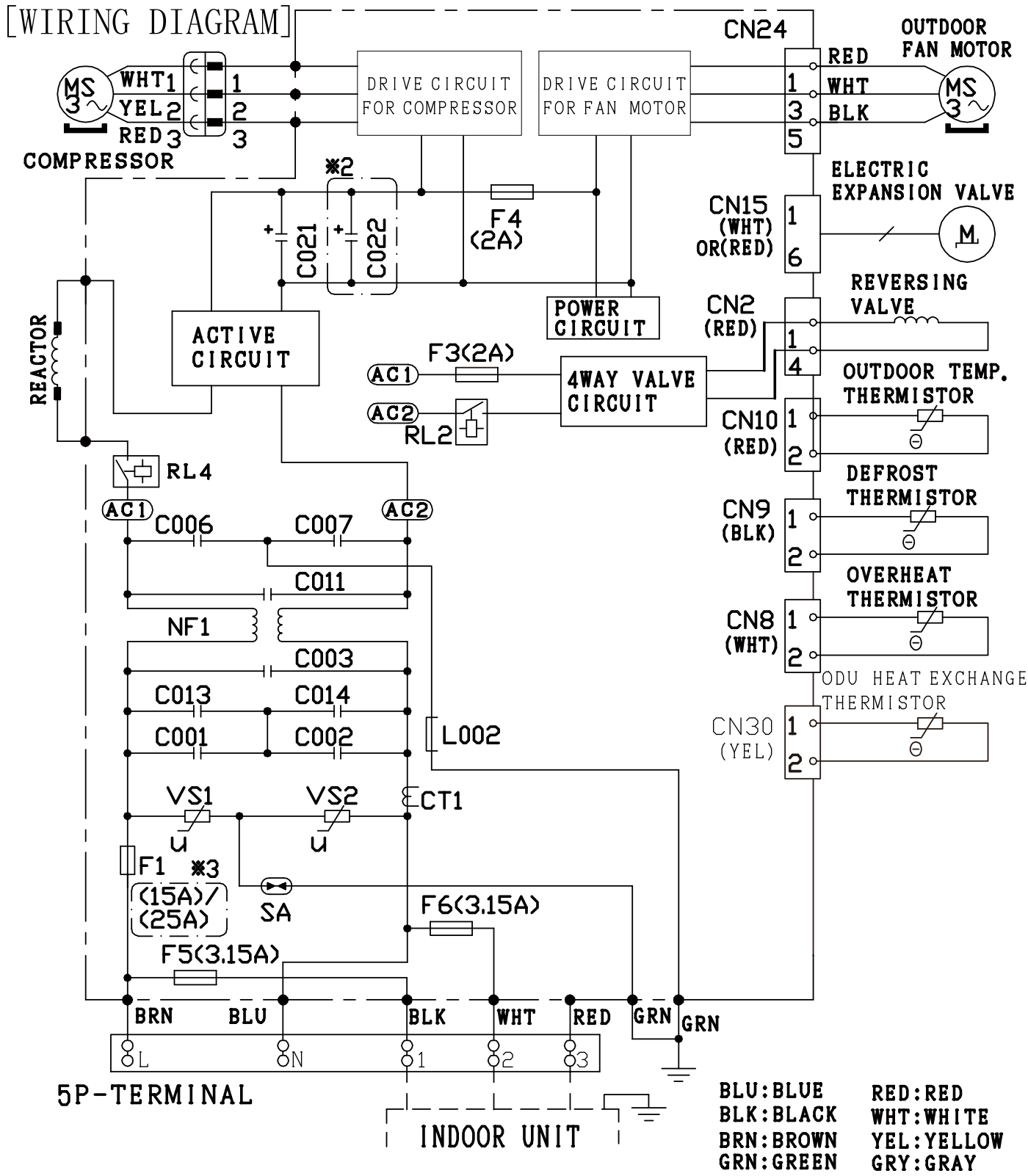
⚠CAUTION

When the refrigerating cycle has been operated for a long time with the capillary tubes clogged or crushed or with too little refrigerant, check the color of the refrigerating machine oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

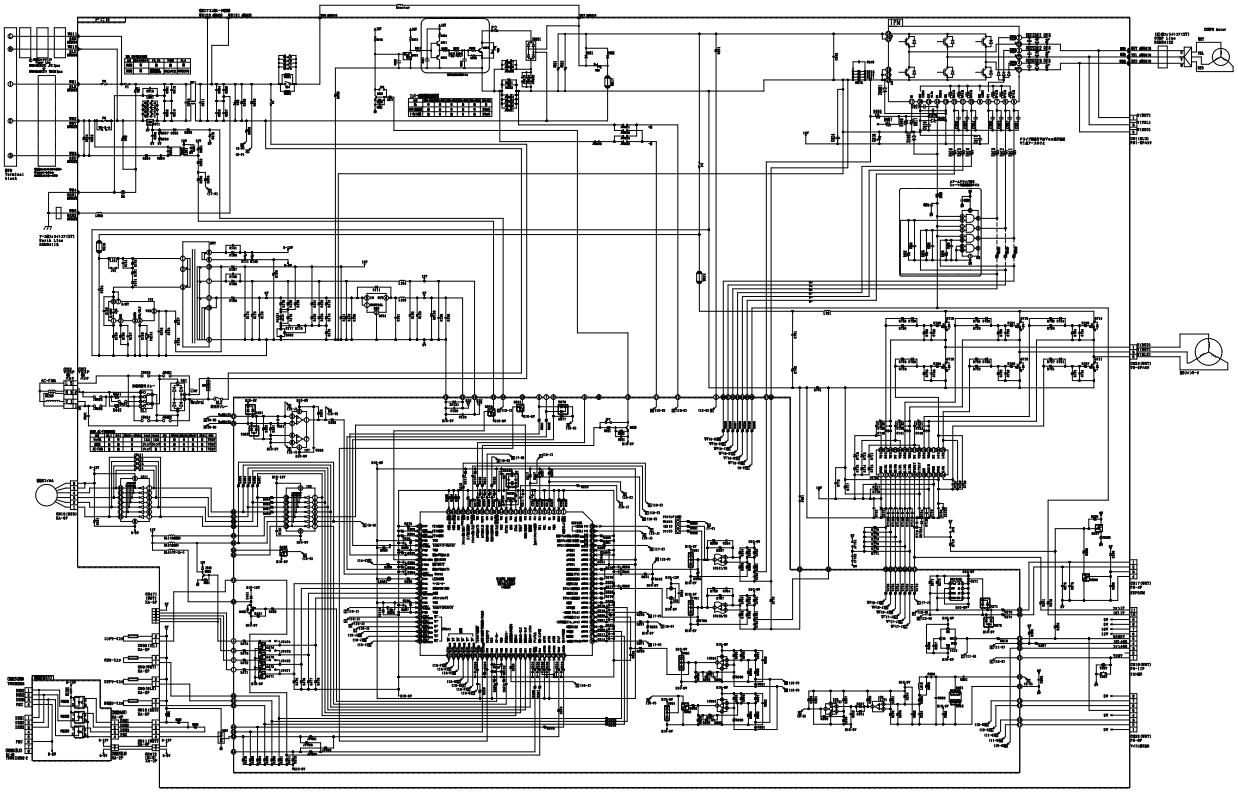
WIRING DIAGRAM

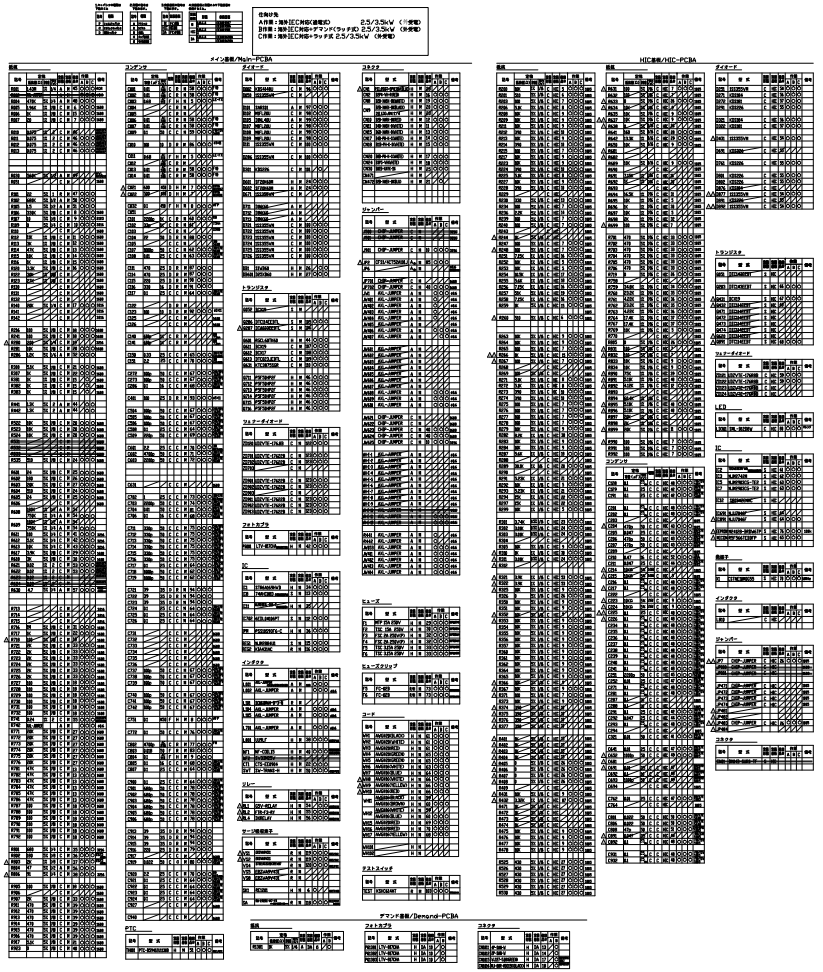
OUTDOOR UNIT

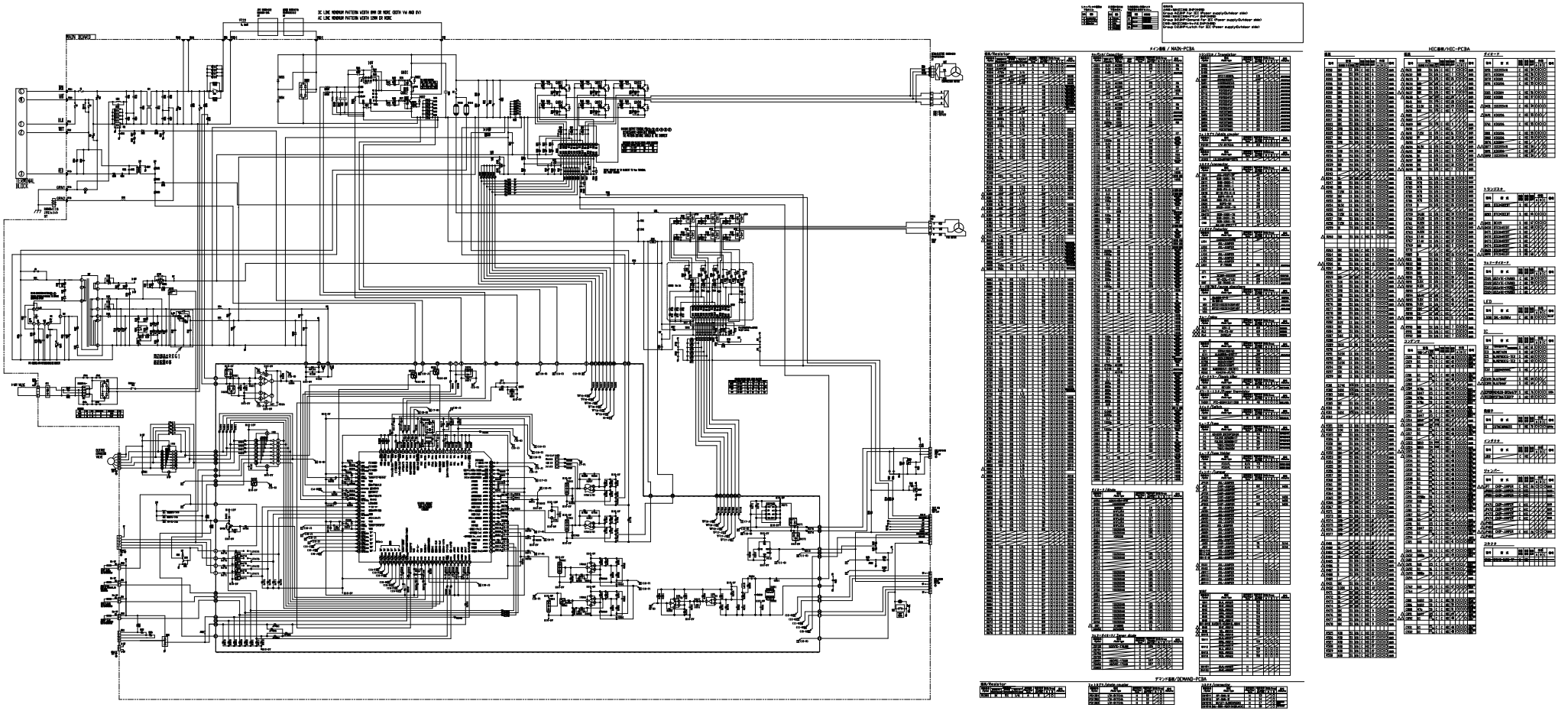
MODEL RAC-DJ18/25/35/50PHAE



※2 SOME MODELS NOT NEED TO INSTALL THE CIRCUITS IN DASH DOT.
※3 F1 CURRENT VALUE BE DIFFERENT FOR DIFFERENT MODELS.

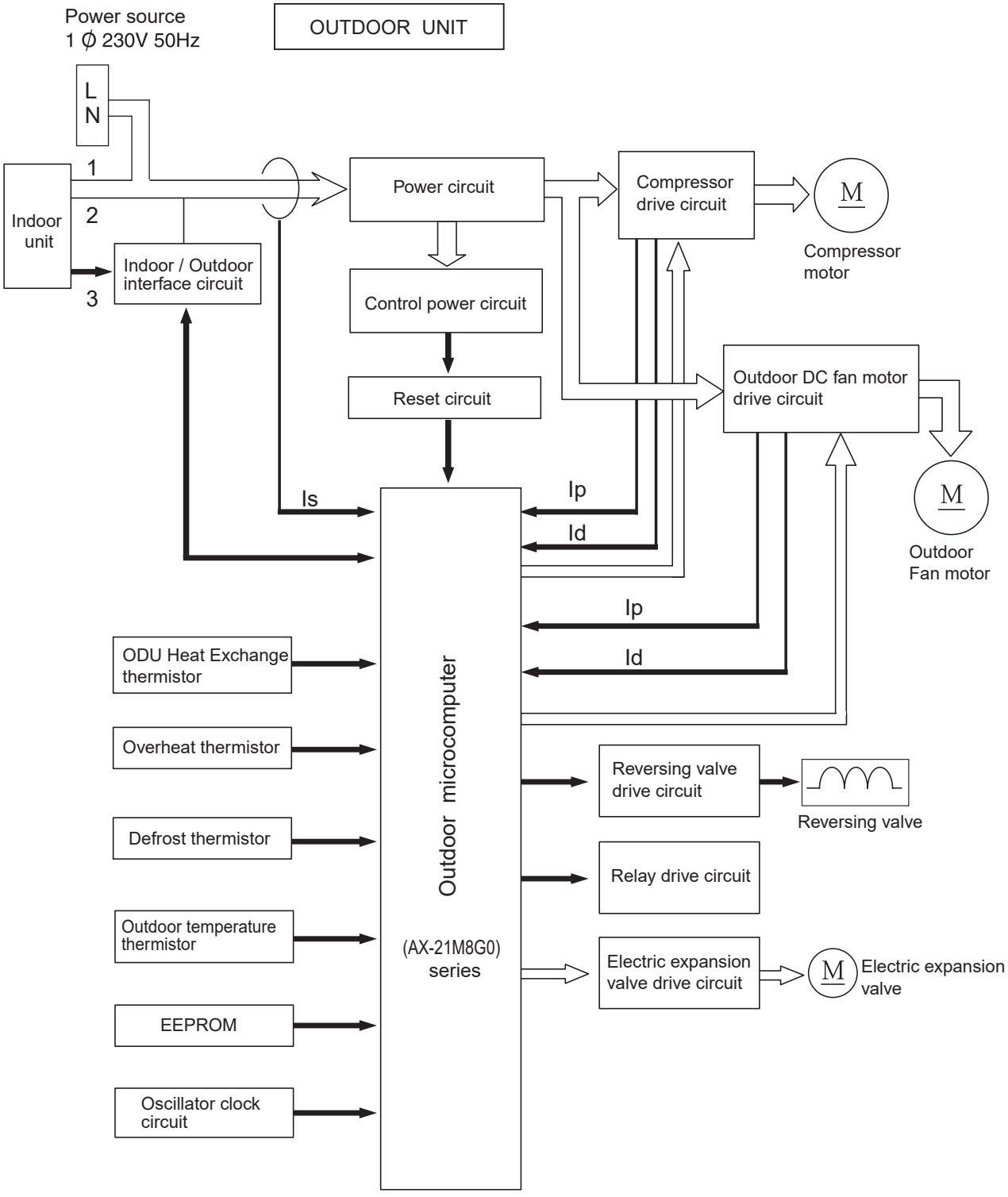






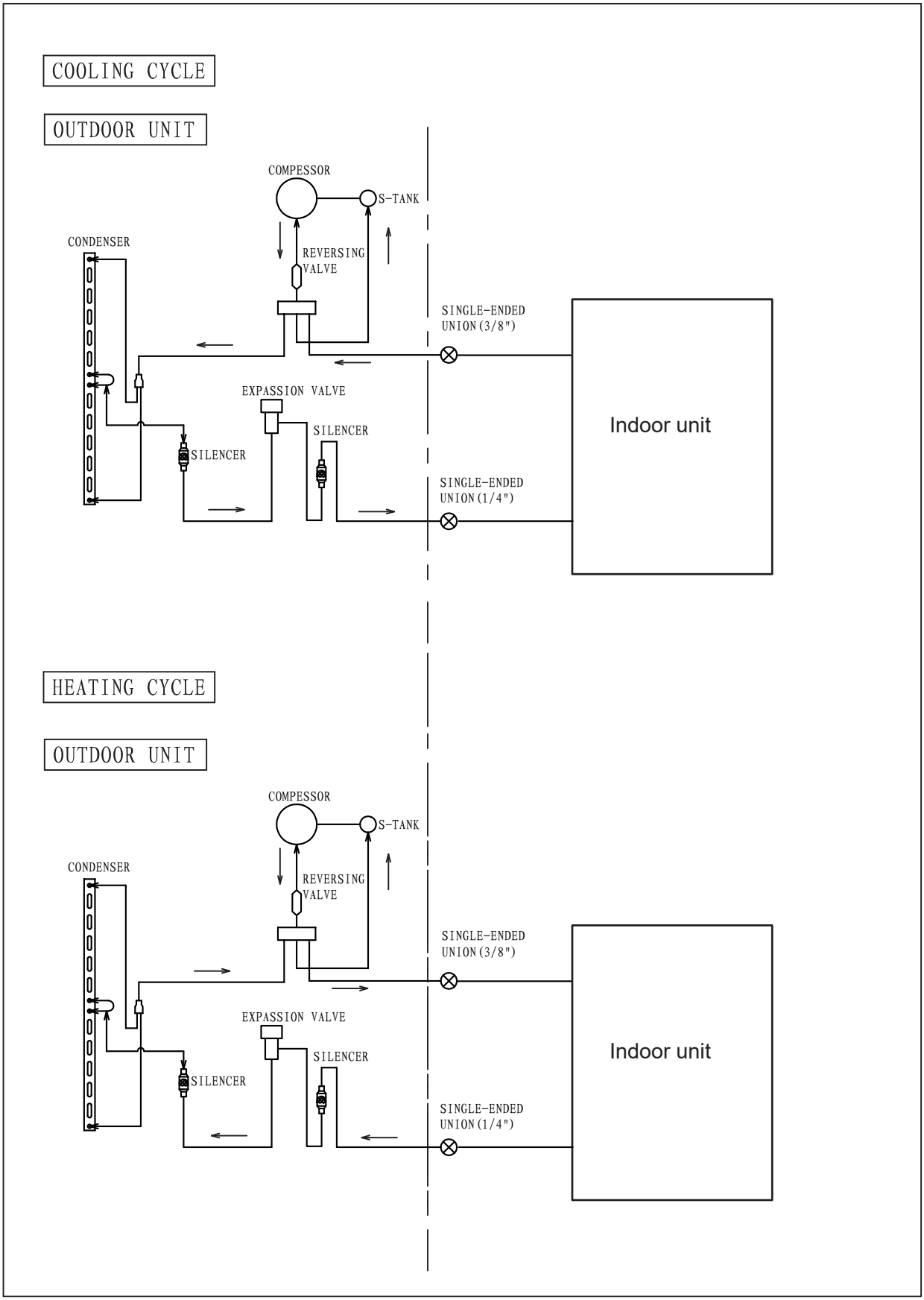
BLOCK DIAGRAM

MODEL RAC-DJ18/25/35/50PHAE



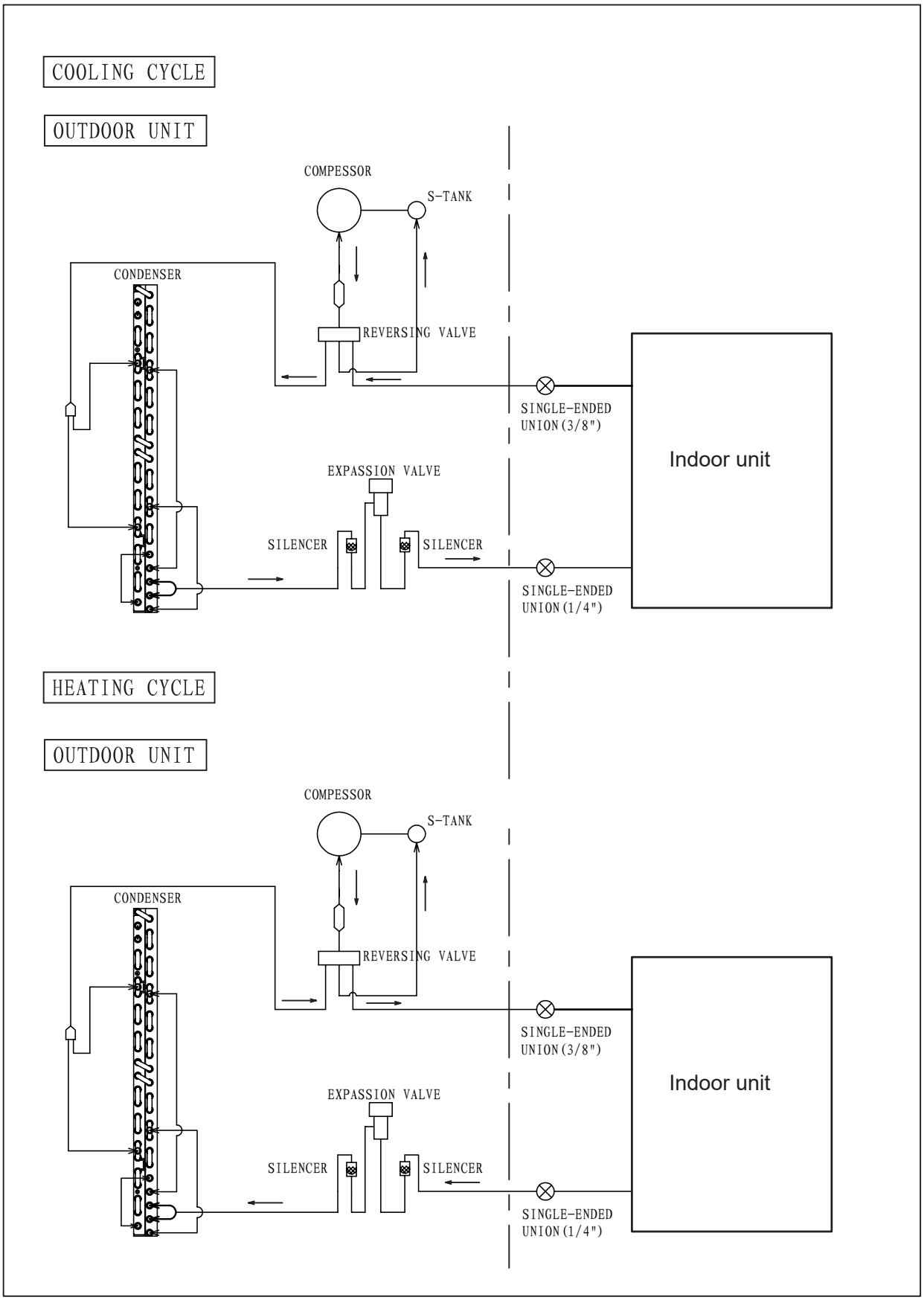
REFRIGERATING CYCLE DIAGRAM

MODEL RAC-DJ18/25PHAE



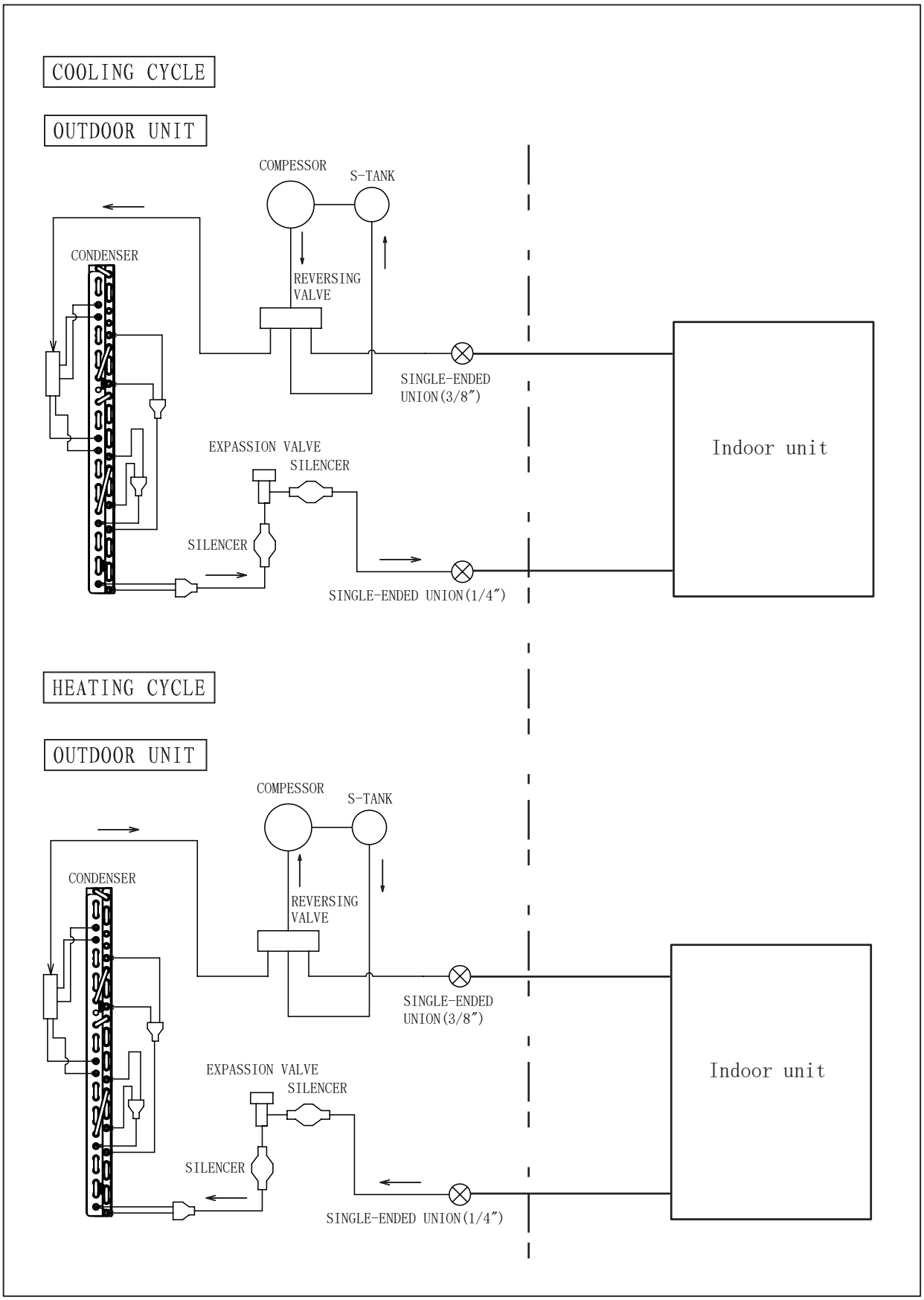
REFRIGERATING CYCLE DIAGRAM

MODEL RAC-DJ35PHAE



REFRIGERATING CYCLE DIAGRAM

MODEL RAC-DJ50PHAE



Procedure for Disassembly and Reassembly

<OUTDOOR UNIT>

MODEL RAC-DJ18/25/35PHAE

1. Electr cal Part

(1) Remove the upper cover fixing screws and lift the cover to remove it.
(2) Remove the service valve cover.
(3) Remove the terminal plate cover.
(4) Remove the right side cover.

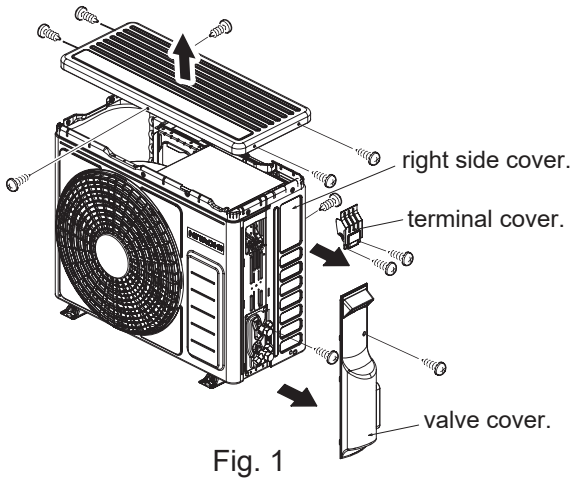


Fig. 1

(5) Remove the electrical box fixing screws and GND wire fixing screw.

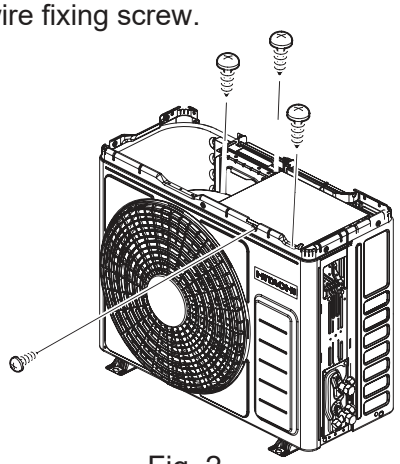


Fig. 2

(6) Remove Plock which binds lead wires.
(7) Set the electrical box upside down.

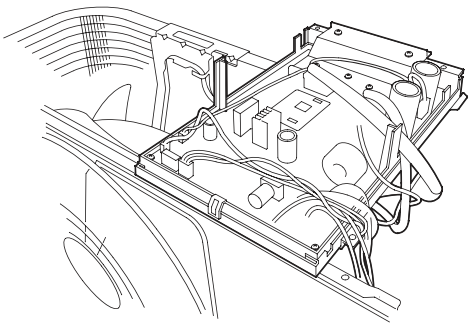


Fig. 3

(8) Remove P.W.B. fixing screws (1 locations) and radiation fin fixing screws (8 locations), and remove the P.W.B. from the support.

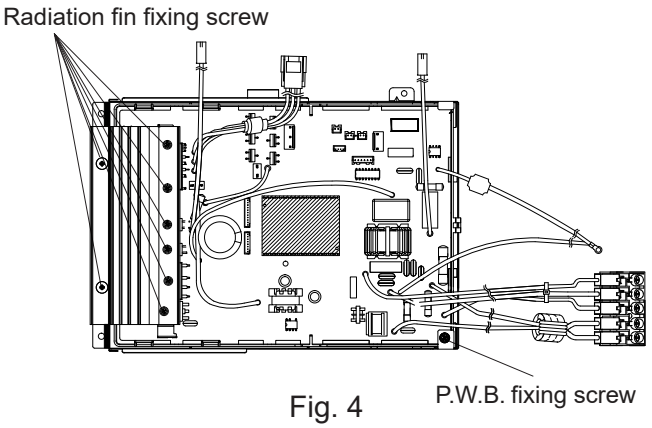


Fig. 4

<OUTDOOR UNIT>

MODEL RAC-DJ50PHAE

1. Electrical parts

(1)Remove the service value cover lock screws and lower the cover to remove it.
(2)Remove the top cover lock screw and raise the cover to remove it.

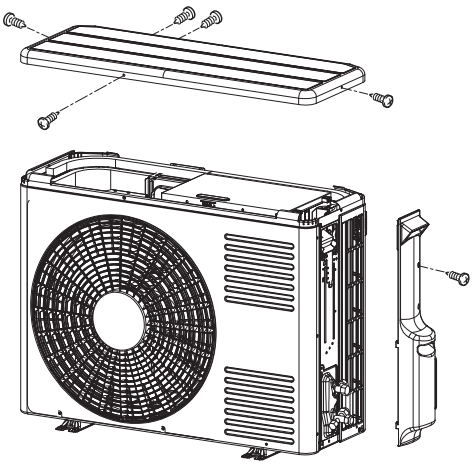


Fig. 5

(3)Remove the terminal plate cover.

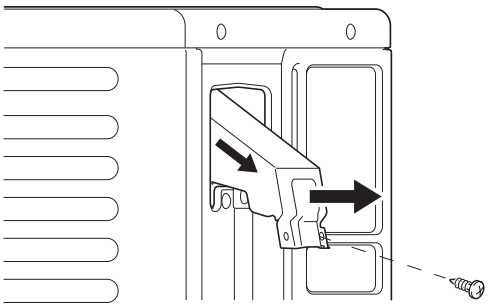


Fig. 6

(4)Lower the right side of the front cover and pull it forward. Then, remove the cover from the hook.

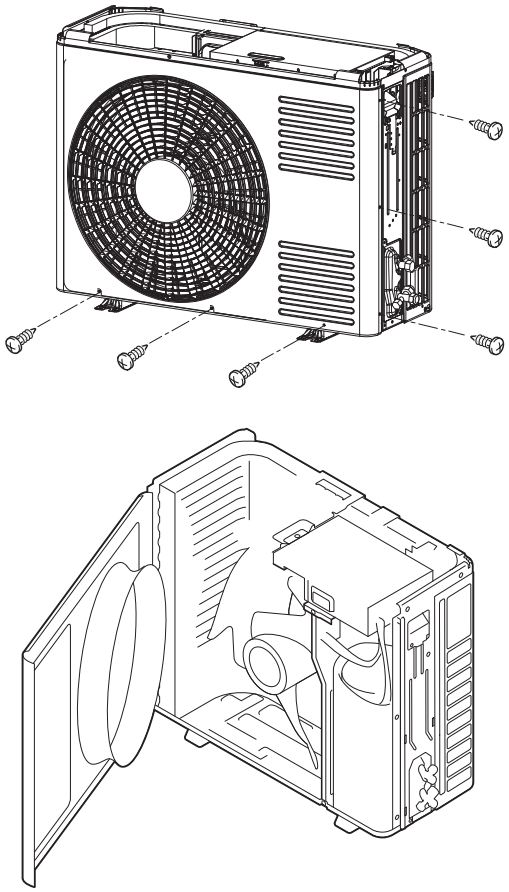


Fig. 7

(5)Remove the terminal block screw、inductance line、line clip、earth line.

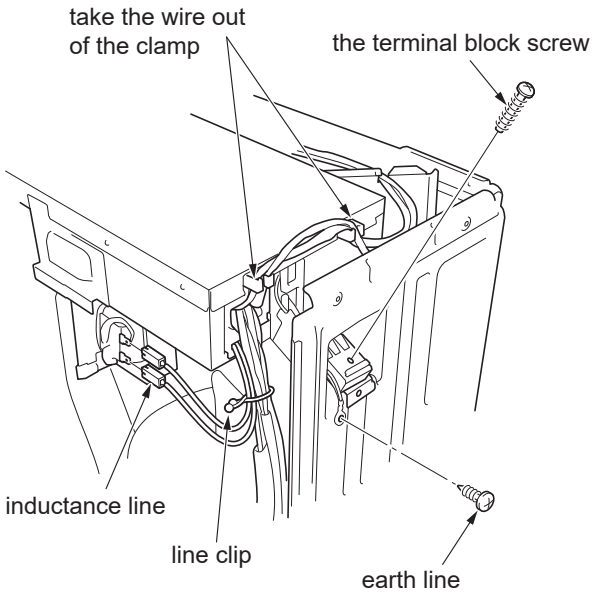


Fig. 8

(6)Set the electrical box upside down.

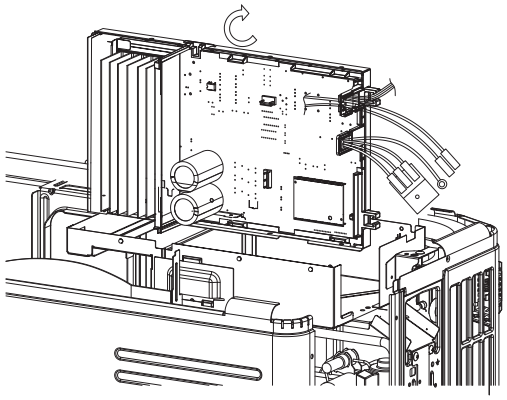


Fig. 9

(7)Remove each connector and earth cable from the lead wire. Then,remove the electrical box.

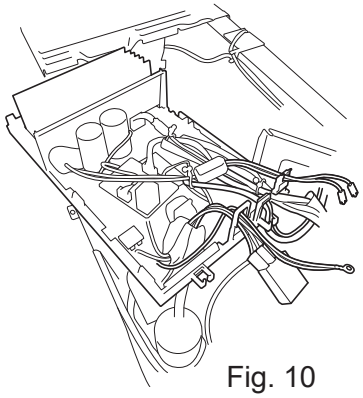


Fig. 10

2.The P.W.B.

(1)Remove the the electrical box cover.

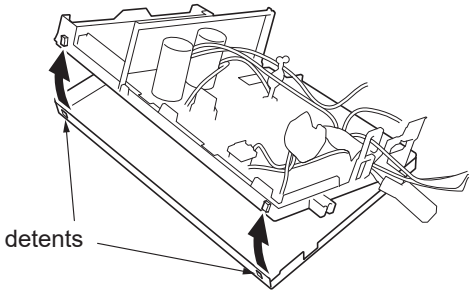


Fig. 11

(2)Remove the P.W.B. from the support.

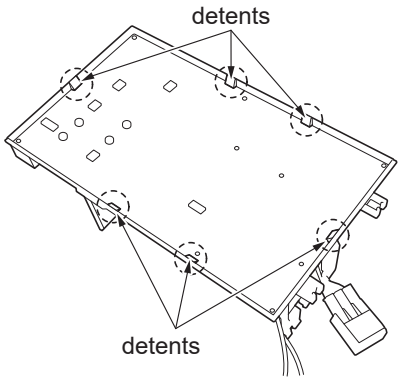


Fig. 12

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAC-DJ18/25/35PHAE

1. Power Circuit

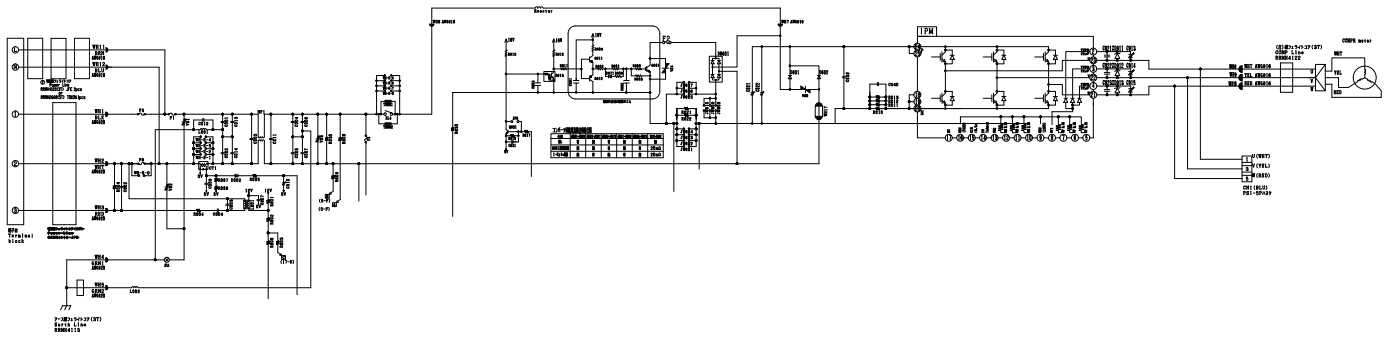


Fig 1-1

※ This circuit full-wave rectifies 230VAC applied between terminals L and N and boosts it to a required voltage with the DB601 to create a DC voltage.

The voltage become 300-330V when the compressor is operated.

※ Main parts

（1） Intelligence Power Module (IPM)

A module that constitute by an inverter part.

（2） Diode Stack （DB601）

These rectify the 230VAC from terminal L and N to a DC power supply.

<Reference>

※ In case of Intelligence Power Module malfunction or connection failure immediately after compressor starts, its may stop due to error of [abnormal low speed], [switching failure],[Ip stop] and others.

<Reference>

※ If diode stack (DB601) are faulty, DC voltage may not be generated and the compressor may not operate at all. Also be aware that the 15A fuse might have blown.

(3) Smoothing capacitor (C021, 600μF,450V)

※ This smoothes (averages) the voltage rectified by the diode stack.

(4) IGBT to improve efficiency (Q601)

※ It will improve the efficiency during compressor load become heavy when current flow thru the chopper period of Q601.

2. Power circuit (Low voltage)

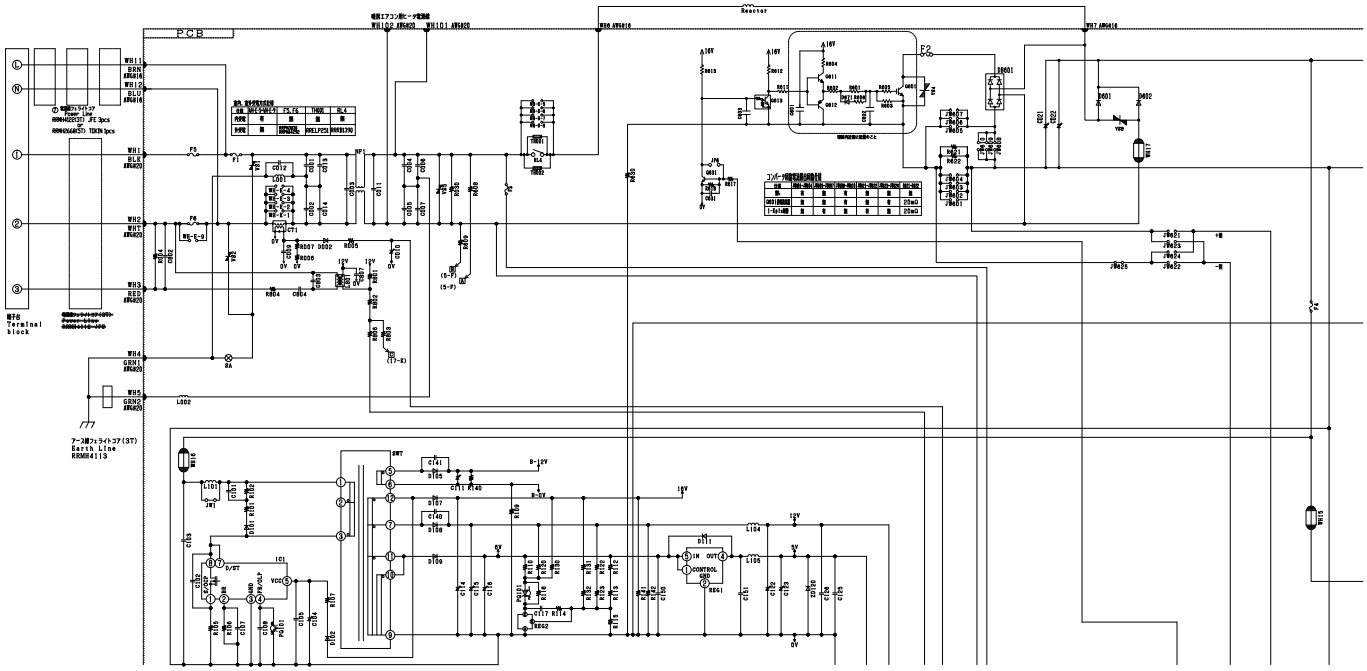


Fig. 2-1

- The 230V AC voltage is rectified to DC voltage (B-12V,16V,12V,5V) pass through switching control IC (ICI), switching transformer.
  (1) B-12V Power supply for electrical expansion valve.
  (2) 16V Power supply for IPM driver circuit of compressor and fan motor, IGBT action.
  (3) 12V Power supply for 4 way valve relay, power relay.
  (4) 5V Power supply for microcomputer, peripheral circuits.

Main parts

(1) C001,C002,C003,C006,C007,C011,C013,C014, NF1

These absorb electrical noise generated during operation of compressor and also absorb external noise entering from power line to protect electronic parts.

(2) Surge Absorber, Varistor1,2,4.

These absorbs external power surge.

(2) REG1
DC/DC convertor IC (DC6.5V → DC5V).

3. P.W.B. for power circuit

Voltage specification of power circuit as shown in below table.

〈Checking point〉

Output	Spec	Main load	Measuring point	Example of possible failure mode.
5V O/P	5 ± 0.4V	Micon, Thermistor	Tester⊕ : J6 (JUMPER) Tester⊖ : J32 (JUMPER)	Outdoor not operate, no blinking indication
12V O/P	12 ± 0.5V	Micon, IC2,3 Relay circuit	Tester⊕ : J32 (JUMPER) Tester⊖ : J20 (JUMPER)	Outdoor not operate, no blinking indication
16V O/P	$15.5^{+1.5V}_{-1.0V}$	IPM for Comp IPM for DC fan	Tester⊕ : J71 (JUMPER) Tester⊖ : J20 (JUMPER)	Stop : LD301 3,4 or 12 times blinking
B-12V O/P	$13^{+2.5V}_{-1.0V}$	Expansion valve	Tester⊕ : J26 (B-12V) Tester⊖ : J25 (B-0V)	Stop : LD301 5 times blinking

※ Power circuit for P.W.B. can consider normal if the result is satisfied with above specification.

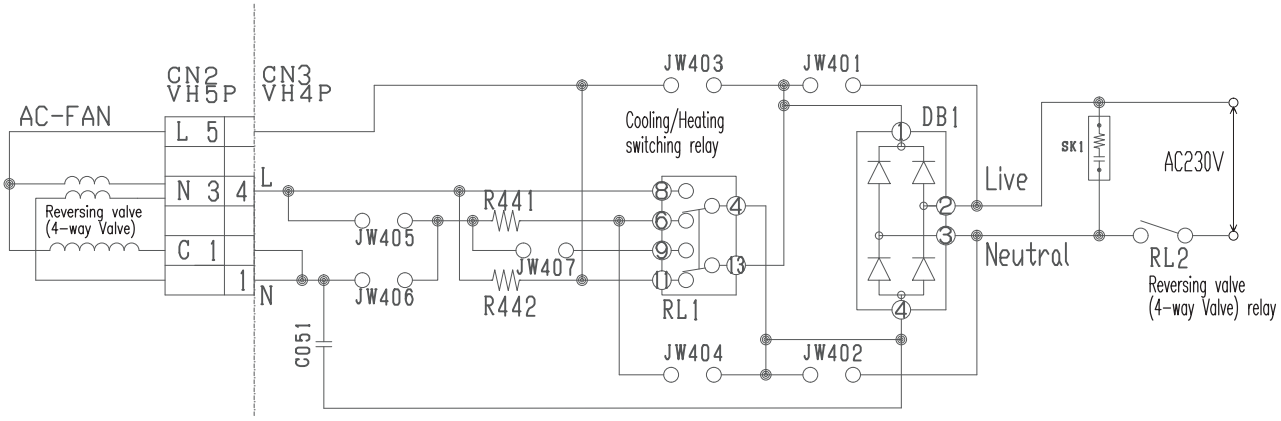
4.Reversing valve control circuit

This model reversing valve control used to control the relay ON/OFF of the revesing valve, and also control the coil of the reversing valve ON/OFF.

The relay ON/OFF has different type when in the different operation mode.

You can see each operation mode as fllows. If the reaversing valve not connected or all the condition not the same as follow, it may be something wrong with the reversing valve circuit.

operation mode \ Point		micon ⑨pin - 0V	HIC㉟ pin - 0V	CN2①- CN2④
Cooling	Usual cooling	Hi	0V	AC230V
Heating	Usual heating	Lo	12V	0V
	Defrost	Hi	0V	AC230V



TYPE	RL1	DB1	JW401~JW404	R441	R442	SK1	JW405	JW406	JW407	C051	CN2
Electrified type	NO	NO	YES	JUMPER	JUMPER	YES	NO	YES	NO	NO	VH4P

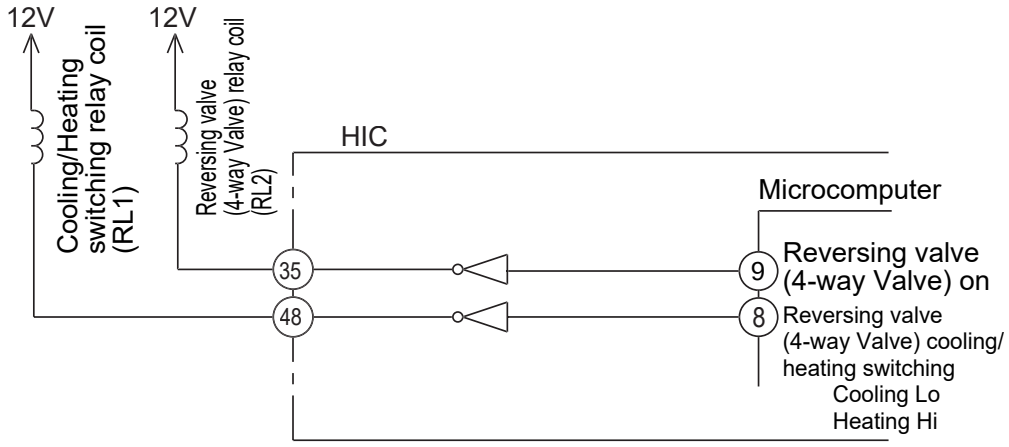


Fig. 4-1

5. Temperature Detection Circuit

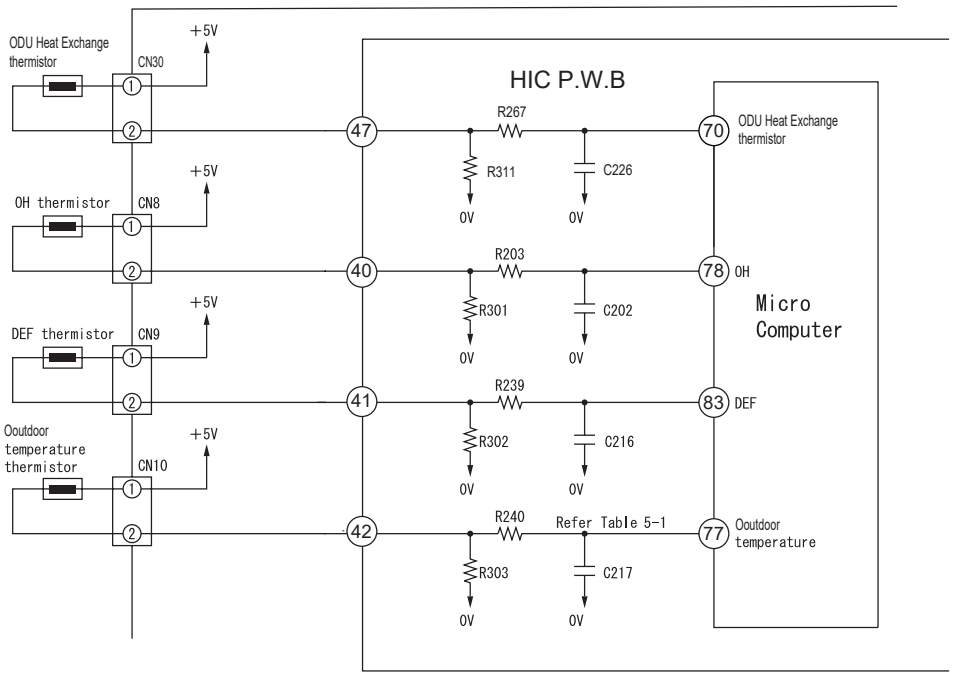


Fig. 5-1

- OH thermistor circuit detect the temperature at the surface of compressor head, DEF thermistor circuit detect the defrosting operation temperature.
- A thermistor is a negative resistor element which has characteristics that the higher(lower) the temperature, the lower(higher) the resistance.
- When the compressor is heated, the resistance of the OH thermistor becomes low and ⊕ 5V is divided by OH thermistor and R301 and the voltage at pin ⑱ of microcomputer.
- Compare the voltage at microcomputer pin ⑱ and setting value stored inside. If the value exceed the set value, microcomputer will judge that the compressor is overheated and stop the operation.
- When frost is formed on the outdoor heat exchanger, the temperature at the exchanger drops abruptly. Therefore the resistance of the DEF thermistor becomes high and the voltage at pin ㉓ of micro computer drops. If this voltage becomes lower than the set value stored inside, microcomputer will enter the defrost control.
- During defrost operation, the microcomputer will transfer the defrosting condition command to indoor unit via SDO pin of interface of IF transmission output.
- The microcomputer read the outdoor temperature by Outside Air thermistor and transfer it to the indoor unit, thus controlling the compressor rotation speed according to the set value in the EEPROM of indoor unit and switching the operation mode (outdoor fan on/off etc.) to DRY mode.
  Below table show the typical values of outdoor temperature in relation to the voltage.

Table 5-1

Outside Air Temperature (℃)	−10	0	10	20	30	40
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

- The ODU heat exchanger thermistor circuit measure the heat exchanger intermediate temperature of the outdoor unit, and micro computer estimate the pressure of compressor according to the temperature data.
  When the pressure reach the internal set value of the micro computer, the micro computer will adjust the speed of the compressor to protect the pressure of compressor.

<Reference>

When the thermistor is open, open condition or disconnect, microcomputer pin ⑦⓪ ⑦⑦ ⑱ ㉓ are approx. 0V;
When thermistor is shorted, they are approx. 5V and LD301 will blink 7 times.
However, an error is detected when only the OH thermistor is shorted and will enter blinking mode after 12 minutes start the compressor operation.

6. Electric expansion valve circuit

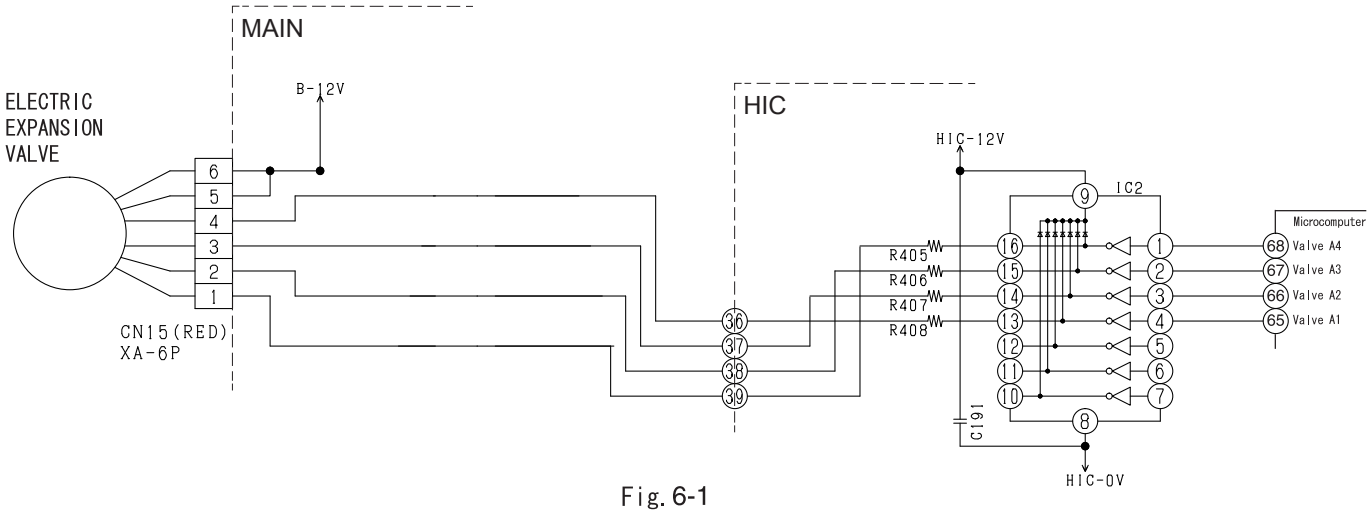


Fig. 6-1

- The electric expansion valve is driven by DC12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control the opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below. When power is supplied, voltages at pins ④ to ① of CN15 are about 0.9V and 12V when no power is supplied. When power is reset, initial operation is performed for 10 or 20 seconds. During initial operation, measure all voltages at pin ④ to ① of CN15 by using a multimeter. If there is any pin with voltage that has not changed from 0.9V or 12V, expansion valve or microcomputer is broken.
- Fig. 6-2 shows logic waveform when expansion valve is operating.

Table 6-1

CN15 pin no.	Wire	Drive status							
		1	2	3	4	5	6	7	8
①	WHT	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
②	YEL	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
③	ORG	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
④	BLU	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

Operation mode
1→2→3→4→5→6→7→8 VALVE CLOSE
8→7→6→5→4→3→2→1 VALVE OPEN

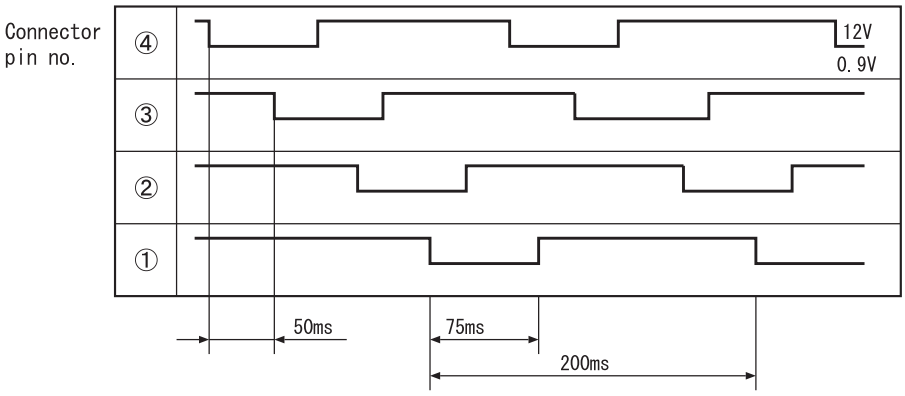


Fig. 6-2

With expansion valve control, opening degree is adjusted to stabilize target temperature by detecting compressor head temperature. The period of control is about once per 20 seconds and output a few pulse.

7. Outdoor DC fan motor control circuit

- This model is built with DC fan motor control circuit inside outdoor electrical unit.

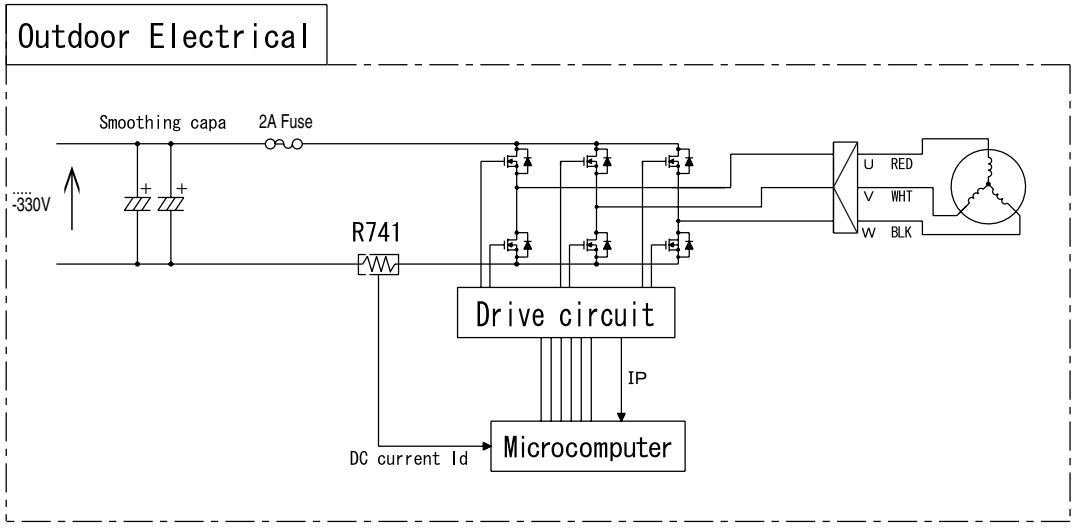


Fig 7-1

This DC fan motor is control by outdoor microcomputer that follow the operating instruction received from indoor microcomputer. The DC current that flow from R741 will presume actual operation speed and control the rotation to follow the operating instruction. Based on this DC current it will detect a over current and other fan motor failure.

（1）Fan motor speed controller during starting

Due to the interference of strong wind etc., operation movement is changed based on fan direction and rotation speed as shown below during starting of operation.

In addition, the fair wind is define as wind that blow to outside direction using Mouth Ring part.

At strong and contrary wind ...The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

At contrary wind ...The rotational speed is controlled in fair wind direction after it slowly reduce the speed and finally stop.

At fair wind ...The rotational speed is controlled as it is.

At strong fair wind ...The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

（2）Fan motor speed controller during unit operating

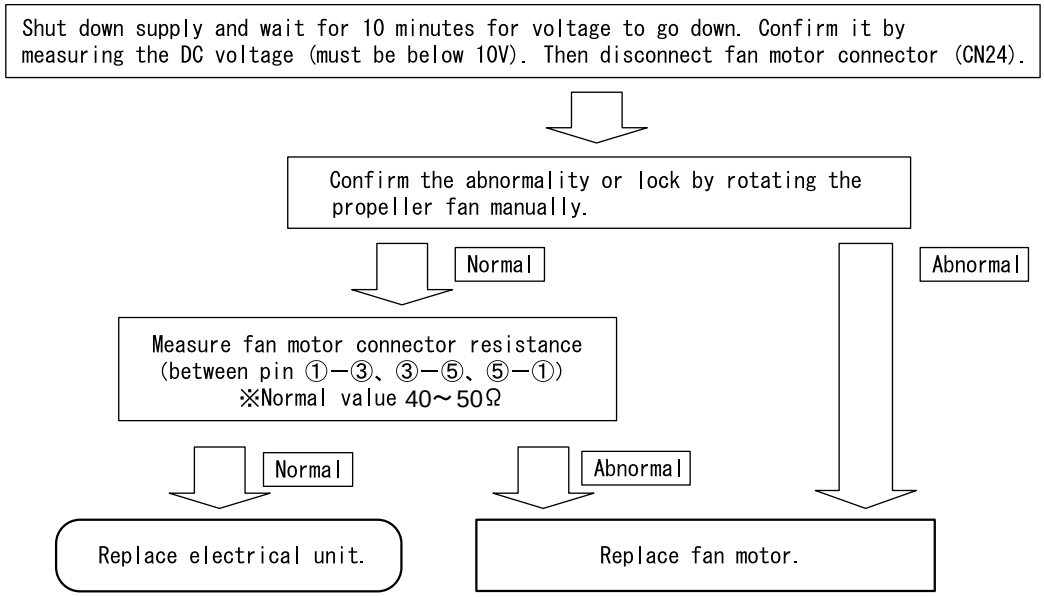
There is a case where fan rpm is reducing during rotating caused by interference of strong wind If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking) The unit will restart according to control as per during start (1).

(3) Method of confirming self diagnosis LD301 lamp : 12 times blinking

If the unit stop and LD301 on the pwb blinking 12 times [fan lock stop is detected], follow below steps to confirm it.

1. Fan lock stop is detected when something has disturb the fan rotation by inserting material into propeller fan or ice has growing inside outdoor unit caused by snow.
   Remove it if found something is bloking the fan.
2. Confirmed that CN24 connector is securely inserted. Fan lock stop is detected also when connector is not properly inserted. Please securely insert if found any disconnection.
3. Fan lock stop also can be detected where strong wind blown surrounding the unit.
   Please confirm after restart the unit.(It may take few minutes to operate the compressor)
   It is not a malfunction of electrical unit or fan motor if the unit run continuesly after restart the unit.
4. Check fan motor condition as below procedure.

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found /> fuse blown.
If fan motor is broken, replace both electrical unit and fan motor.

Caution

※Beware of electric shock due to high voltage when conducting an operation check.
Power supply for DC fan motor and compressor is common %A@0--*00-S&

MODEL RAC-DJ50PHAE

1. Power Circuit

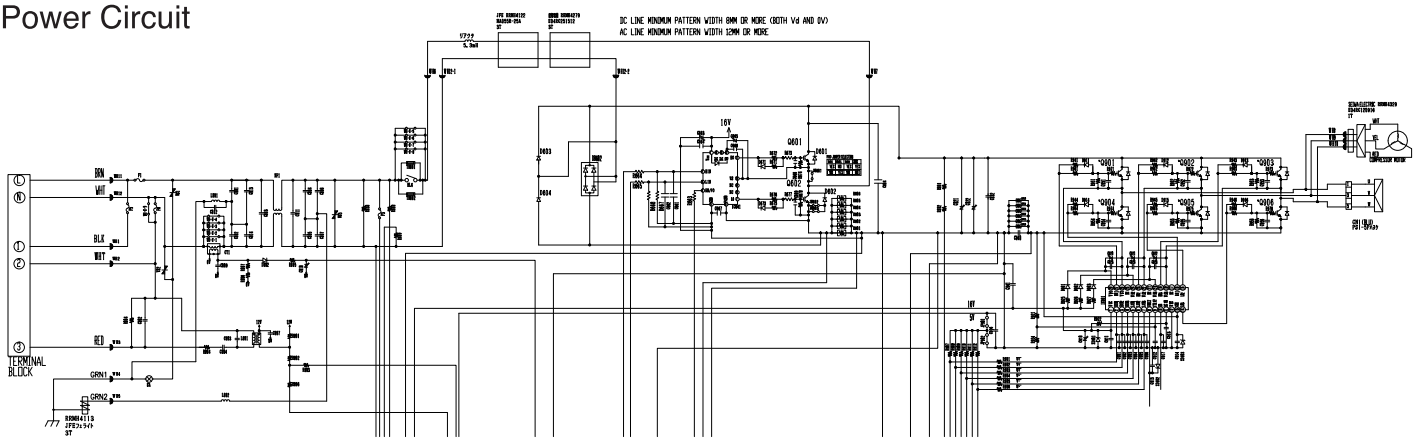


Fig 1-1

※ This circuit full-wave rectifies 230VAC applied between terminals L and N and boosts it to a required voltage with the DB602 to create a DC voltage.

The voltage become 300-330V when the compressor is operated.

※ Importance component

（1） Compressor inverter circuit (Q901~Q906)
Constitute by some inverter parts.

（2） Diode Stack（DB602）
These rectify the 230VAC from terminal L and N to a DC power supply.

<Reference>

※ In case of compressor inverter circuit (Q901~Q906) malfunction or connection failure immediately after compressor starts, its may stop due to error of [abnormal low speed], [switching failure],[Ip stop] and others.

<Reference>

※ If diode stack (DB602) are faulty, DC voltage may not be generated and the compressor may not operate at all. Also be aware that the 25A fuse might have blown.

(3) Smoothing capacitors (C021-C022,610μF,450V)

This smoothes (averages) the voltage rectified by the diode stack.

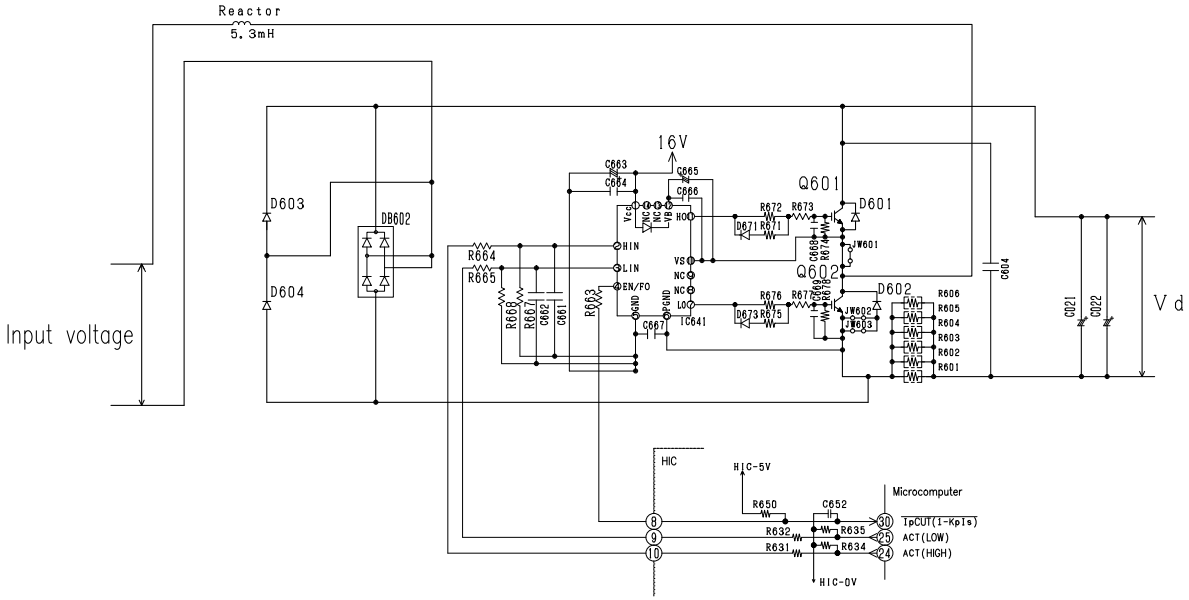


Fig.1−2

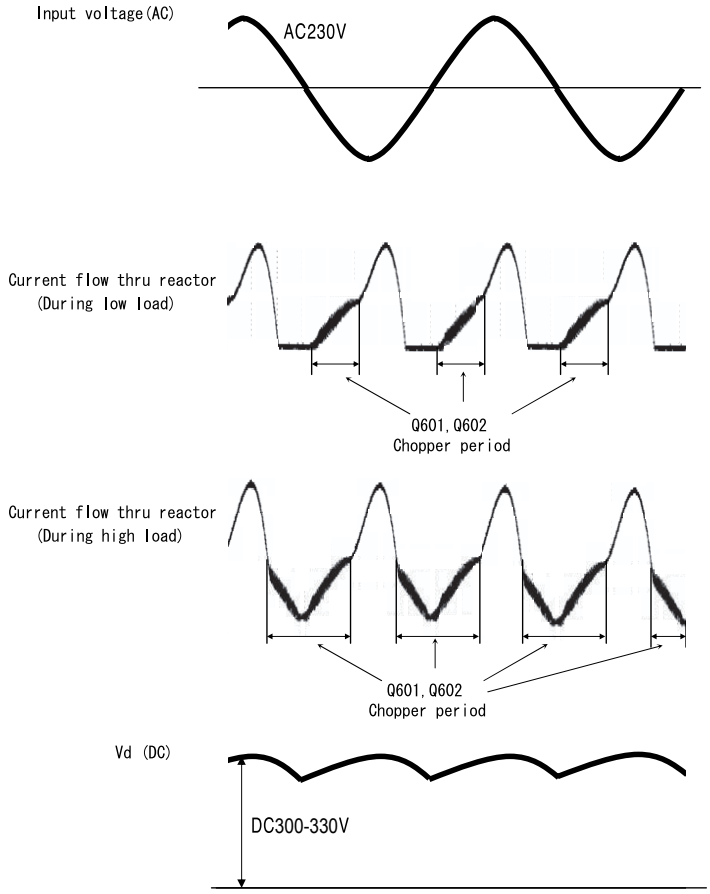


Fig.1−3

(4) IGBT to improve efficiency (Q601,Q602)

It will improve the efficiency during compressor load become heavy when current flow thru the chopper period of Q601,Q602.

2. Power circuit (Low voltage)

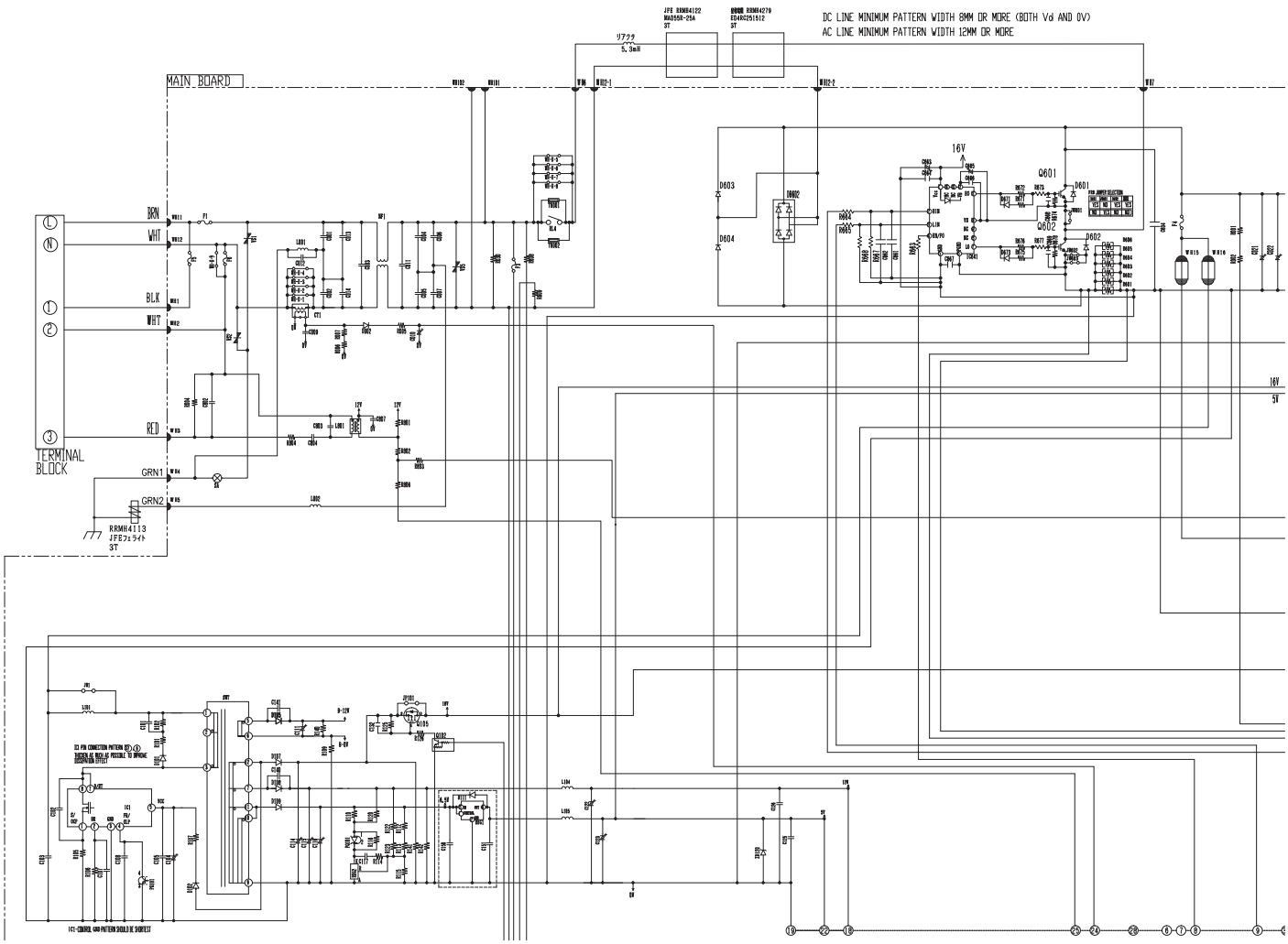


Fig. 2-1

- The 230V AC voltage is rectified to DC voltage (B-12V,16V,12V,5V) pass through switching control IC (ICI), switching transformer.
  (1) B-12V Power supply for electrical expansion valve.
  (2) 16V Power supply for Comp· driver circuit of compressor and fan motor, IGBT action.
  (3) 12V Power supply for 4 way valve relay, power relay.
  (4) 5V Power supply for microcomputer, peripheral circuits.

Main parts

(1) C001,C002,C003,C006,C007,C011,C013,C014, NF1

These absorb electrical noise generated during operation of compressor and also absorb external noise entering from power line to protect electronic parts.

(2) Surge Absorber, Varistor1,2.

These absorbs external power surge.

(2) REG1

DC/DC convertor IC (DC6.5V → DC5V).

3. P.W.B. for power circuit

Voltage specification of power circuit as shown in below table.

〈Checking point〉

Output	Spec	Main load	Measuring point	Example of possible failure mode.
5V O/P	$5^{\pm 0.4}$V	Micon, Thermistor	Tester⊕ : J96 (JUMPER) Tester⊖ : J138 (JUMPER)	Outdoor not operate, no blinking indication
12V O/P	$12^{\pm 0.5V}$	Micon, IC2, 3 Relay circuit	Tester⊕ : J139 (JUMPER) Tester⊖ : J138 (JUMPER)	Outdoor not operate, no blinking indication
16V O/P	$15.5^{+1.5V}_{-1.0V}$	IPM for Comp IPM for DC fan	Tester⊕ : J111 (JUMPER) Tester⊖ : J138 (JUMPER)	Stop : LD301 3, 4 or 12 times blinking
B-12V O/P	$13^{+2.5V}_{-1.0V}$	Expansion valve	Tester⊕ : J133 (B-12V) Tester⊖ : J130 (B-0V)	Stop : LD301 5 times blinking

※ Power circuit for P.W.B can consider normal if the result is satisfied with above specification.

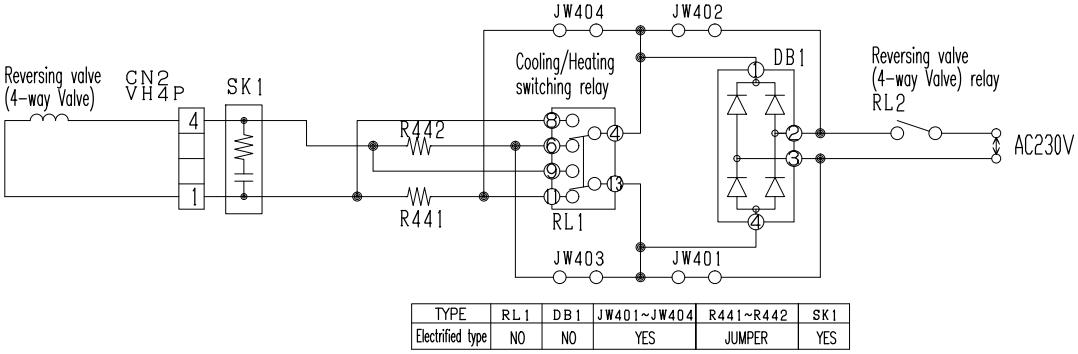
4.Reversing valve control circuit

This model reversing valve control used to control the relay ON/OFF of the revesing valve, and also control the coil of the reversing valve ON/OFF.

The relay ON/OFF has different type when in the different operation mode.

You can see each operation mode as fllows. If the reaversing valve not connected or all the condition not the same as follow, it may be something wrong with the reversing valve circuit.

Point / operation mode		micon ⑨ pin - 0V	HIC ㉟ pin - 0V	CN2①- CN2④
Cooling	Usual cooling	Hi	0V	AC230V
Heating	Usual heating	Lo	12V	0V
	Defrost	Hi	0V	AC230V



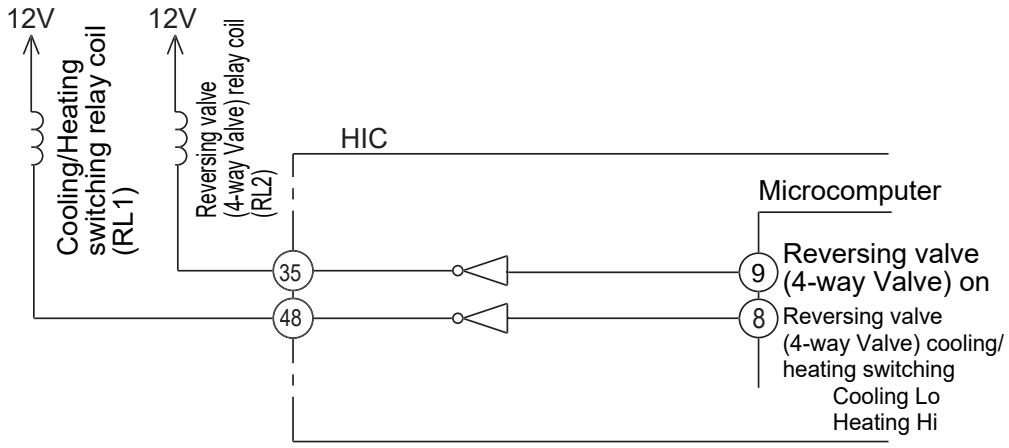


Fig. 4-1

5. Temperature Detection Circuit

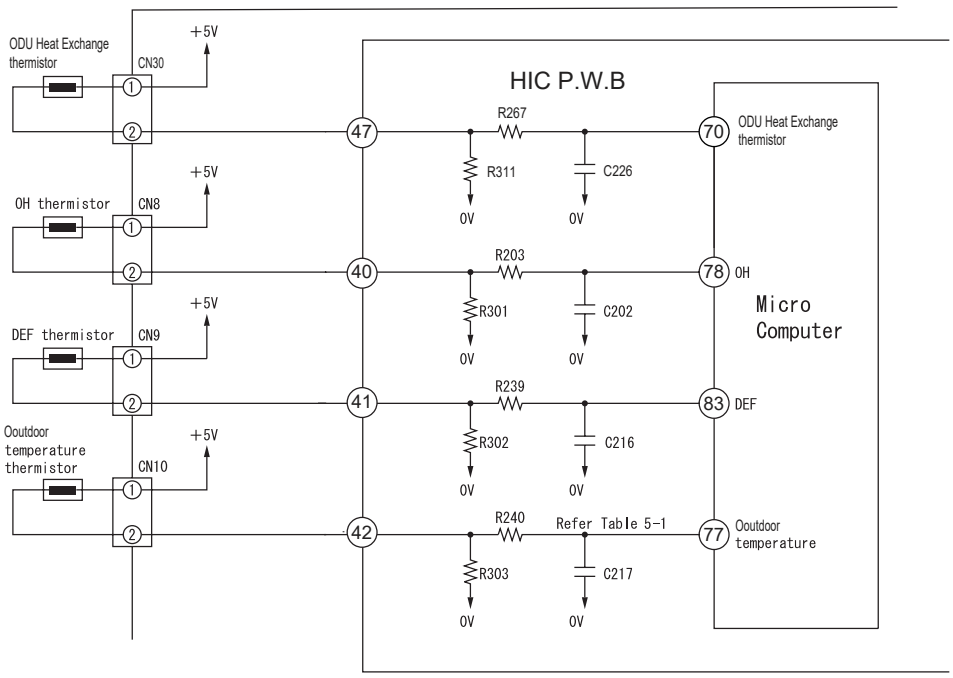


Fig.5-1

- OH thermistor circuit detect the temperature at the surface of compressor head, DEF thermistor circuit detect the defrosting operation temperature.
- A thermistor is a negative resistor element which has characteristics that the higher(lower) the temperature, the lower(higher) the resistance.
- When the compressor is heated, the resistance of the OH thermistor becomes low and ⊕ 5V is divided by OH thermistor and R301 and the voltage at pin ⑱ of microcomputer.
- Compare the voltage at microcomputer pin ⑱ and setting value stored inside. If the value exceed the set value, microcomputer will judge that the compressor is overheated and stop the operation.
- When frost is formed on the outdoor heat exchanger, the temperature at the exchanger drops abruptly. Therefore the resistance of the DEF thermistor becomes high and the voltage at pin ㉓ of micro computer drops. If this voltage becomes lower than the set value stored inside, microcomputer will enter the defrost control.
- During defrost operation, the microcomputer will transfer the defrosting condition command to indoor unit via SDO pin of interface of IF transmission output.
- The microcomputer read the outdoor temperature by Outside Air thermistor and transfer it to the indoor unit, thus controlling the compressor rotation speed according to the set value in the EEPROM of indoor unit and switching the operation mode (outdoor fan on/off etc.) to DRY mode.
  Below table show the typical values of outdoor temperature in relation to the voltage.

Table 5-1

Outside Air Temperature (℃)	−10	0	10	20	30	40
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

- The ODU heat exchanger thermistor circuit measure the heat exchanger intermediate temperature of the outdoor unit, and micro computer estimate the pressure of compressor according to the temperature data.
  When the pressure reach the internal set value of the micro computer, the micro computer will adjust the speed of the compressor to protect the pressure of compressor.

<Reference>

When the thermistor is open, open condition or disconnect, microcomputer pin ⑦⓪ ⑦⑦ ⑱ ㉓ are approx. 0V;
When thermistor is shorted, they are approx. 5V and LD301 will blink 7 times.
However, an error is detected when only the OH thermistor is shorted and will enter blinking mode after 12 minutes start the compressor operation.

.. Electric expansion valve circuit

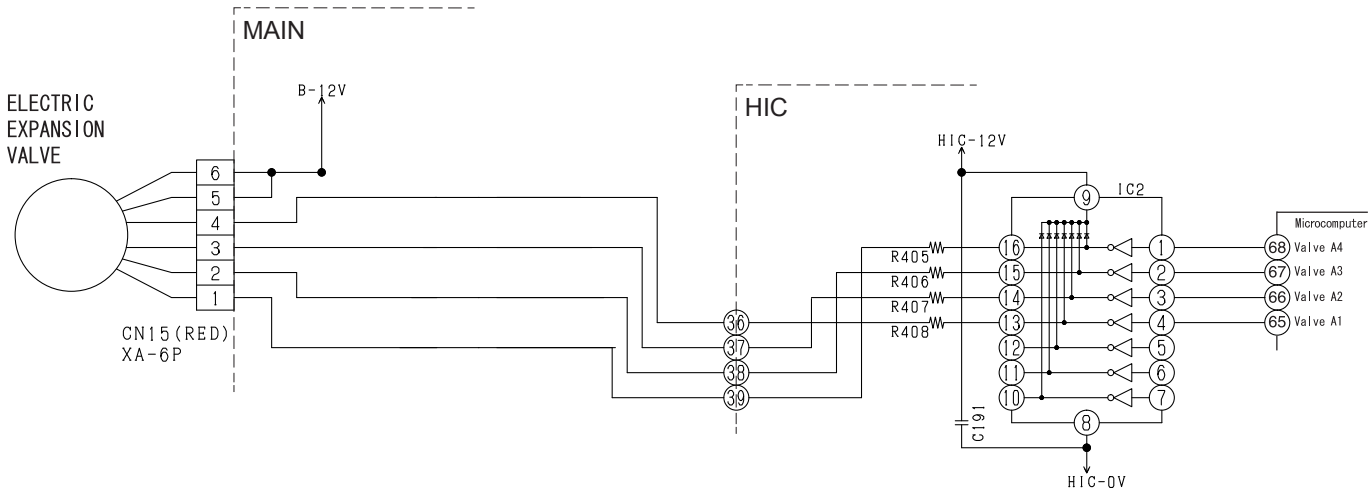


Fig.6-1

- The electric expansion valve is driven by DC12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control the opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below. When power is supplied, voltages at pins ④ to ① of CN15 are about 0.9V and 12V when no power is supplied. When power is reset, initial operation is performed for 10 or 20 seconds. During initial operation, measure all voltages at pin ④ to ① of CN15 by using a multimeter. If there is any pin with voltage that has not changed from 0.9V or 12V, expansion valve or microcomputer is broken.
- Fig.5-2 shows logic waveform when expansion valve is operating.

Table 6-1

CN15 pin no.	Wire	Drive status							
		1	2	3	4	5	6	7	8
①	WHT	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
②	YEL	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
③	ORG	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
④	BLU	OFF	OFF	OFF	OFF	OFF	ON	ON	ON

Operation mode
1→2→3→4→5→6→7→8 VALVE CLOSE
8→7→6→5→4→3→2→1 VALVE OPEN

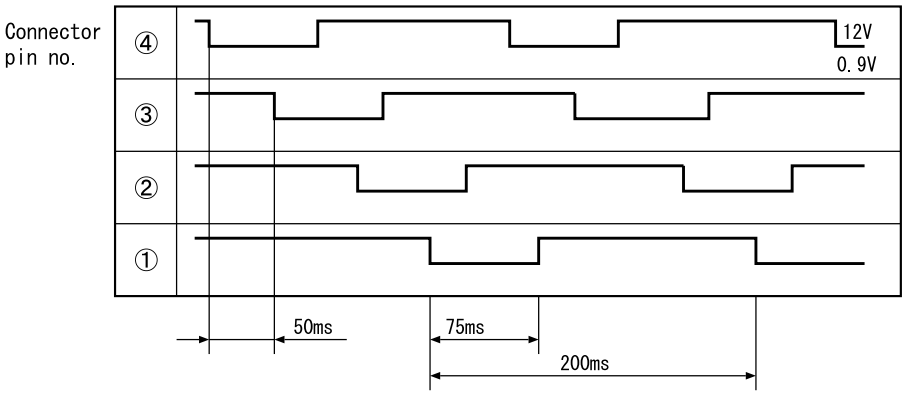


Fig.6-2

With expansion valve control, opening degree is adjusted to stabilize target temperature by detecting compressor head temperature. The period of control is about once per 20 seconds and output a few pulse.

7. Outdoor DC fan motor control circuit

- This model is built with DC fan motor control circuit inside outdoor electrical unit.

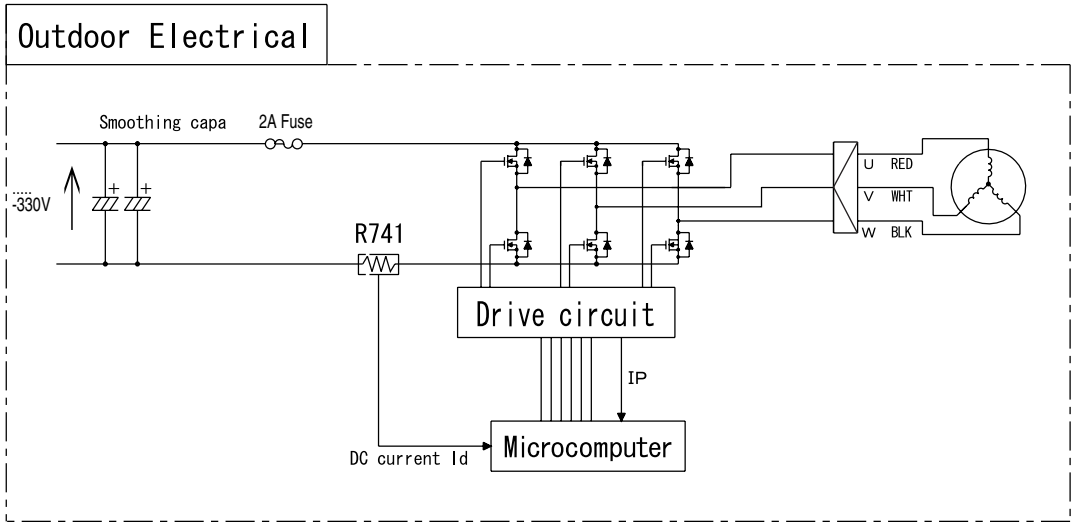


Fig 7-1

This DC fan motor is control by outdoor microcomputer that follow the operating instruction received from indoor microcomputer. The DC current that flow from R741 will presume actual operation speed and control the rotation to follow the operating instruction. Based on this DC current it will detect a over current and other fan motor failure.

（1）Fan motor speed controller during starting

Due to the interference of strong wind etc., operation movement is changed based on fan direction and rotation speed as shown below during starting of operation.

In addition, the fair wind is define as wind that blow to outside direction using Mouth Ring part.

At strong and contrary wind ...The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

At contrary wind ...The rotational speed is controlled in fair wind direction after it slowly reduce the speed and finally stop.

At fair wind ...The rotational speed is controlled as it is.

At strong fair wind ...The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

（2）Fan motor speed controller during unit operating

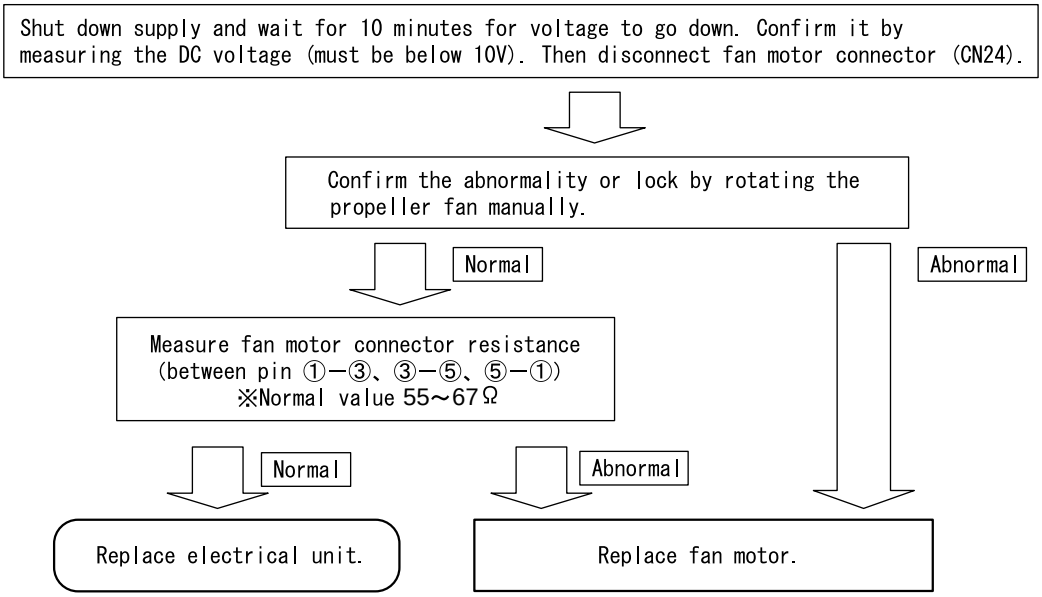
There is a case where fan rpm is reducing during rotating caused by interference of strong wind If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking) The unit will restart according to control as per during start (1).

(3) Method of confirming self diagnosis LD301 lamp : 12 times blinking

If the unit stop and LD301 on the pwb blinking 12 times [fan lock stop is detected], follow below steps to confirm it.

1. Fan lock stop is detected when something has disturb the fan rotation by inserting material into propeller fan or ice has growing inside outdoor unit caused by snow.
   Remove it if found something is bloking the fan.
2. Confirmed that CN24 connector is securely inserted. Fan lock stop is detected also when connector is not properly inserted. Please securely insert if found any disconnection.
3. Fan lock stop also can be detected where strong wind blown surrounding the unit.
   Please confirm after restart the unit.(It may take few minutes to operate the compressor)
   It is not a malfunction of electrical unit or fan motor if the unit run continuesly after restart the unit.
4. Check fan motor condition as below procedure.

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found /> fuse blown.
If fan motor is broken, replace both electrical unit and fan motor.

Caution

※Beware of electric shock due to high voltage when conducting an operation check.
Power supply for DC fan motor and compressor is common %A@0--*00-S&

SERVICE CALL Q&A

Cooling operation

Q1 The compressor sometimes stops during cooling.

A1 Check if the heat exchanger of the indoor unit is covered with dew. Wait for 3 to 4 minutes until the dew disappears.

Cooling when the room temperature is low may cause the heat exchanger of the indoor unit to gather dew.

Dehumidification

Q1 The indoor unit produces a noise that goes "shaaahhh" during dehumidification.

A1 That is a noise produced by refrigerant flowing through the pipe.

Q2 Cold air comes out during a dehumidifying operation.

A2 To improve the dehumidification efficiency performs quiet fan operation. Therefore the air is cold and it is not a malfunction.

Heating operation

Q1 The product sometimes fails to produce a wind during heating.

A1 Defrosting is in progress. Wait 5 to 10 minutes until the dew on the outdoor unit disappears.

Q2 The product begins with a slight wind during heating even though set to "strong wind" or "weak wind."

A2 At the first of the heating, the product will run for 30 seconds with a slight wind. When set to strong wind, the product will begin with a slight wind operation, producing a weak wind for 30 seconds, and then switch to strong wind.

Q3 The product stops during heating even though it is set to "30℃."

A3 When heating is conducted despite the high outdoor temperature, the product may stop to protect its equipment.

Auto-fresh defrost

Q1 During heating, I turned off the product by using the START/STOP button. But the "operation lamp" is blinking and the outdoor unit is running.

A1 The "auto-fresh defrost" should be working. When stopped, the product will check its outdoor unit for dew and, if there is any dew, conduct defrosting and then stop operating.

Automatic operation

Q1 During an automatic run, switching the wind speed selector will not change the wind speed.

A1 The product will switch automatically to automatic wind speed. You cannot select strong or weak wind by remote control but you can select wind and quiet.

Q2 How is the automatic operation mode determined?

A2 According to the room temperature, heating or cooling operation is automatically selected. Refer to the basic operation section.

Common, etc.

Q1 In "automatic wind speed" mode, the indoor fan changes from strong wind to weak wind to slight wind.

A1 This does not abnormal. It is because the cold wind prevention is working.

In wind speed "automatic" mode, the product will sense the heat exchange temperature and, when the temperature goes down, the product will automatically switch to strong wind to weak wind to slight wind.

Q2 At operation startup, the outdoor unit becomes noisy.

A2 At operation startup, the product will set the rotation speed of the compressor to full power and increase its heating and cooling capacity, resulting in a slightly higher noise level. This is not a sign of a breakdown.

Q3 The outdoor unit sometimes changes in its noise.

A3 The difference between the thermometer temperature setting and room temperature will change the rotation speed of the compressor. This is not a sign of a breakdown.

Q4 There is a difference between the temperature setting and room temperature in room temperature control.

A4 The room structure, air stream, or other factor may cause a gap between the room temperature setting and actual room temperature. If there is any difference between the setting and the room temperature, adjust the temperature setting to match the living space to a comfortable temperature.

Q5 The product will not produce wind right after startup.

A5 After turning ON the power switch or breaker, setting the product to heating or dehumidification will activate a preliminary operation for 1 minute. At that time, heating will cause the operation lamp to blink. This is not a sign of a breakdown.

Q6 I performed Frost Wash, but didn't succeed in controlling the mold in the room.

A6 Internal cleaning will clean the inside of the indoor unit of the air-conditioner, thereby controlling mold generation. This will not control the mold in the room.

Wireless remote Control

Q1 The temperature setting field on the remote control unit displays +1℃ or -1℃.

A1 The product will give a display when you operate the product in "auto" using the operation switch button. This can be controlled within the range of±3 ℃.
The product will display +1℃ if the temperature is 1℃ higher than the room temperature in automatic setting.
The product will display -1℃ if the temperature is 1℃ lower than the room temperature in automatic setting.

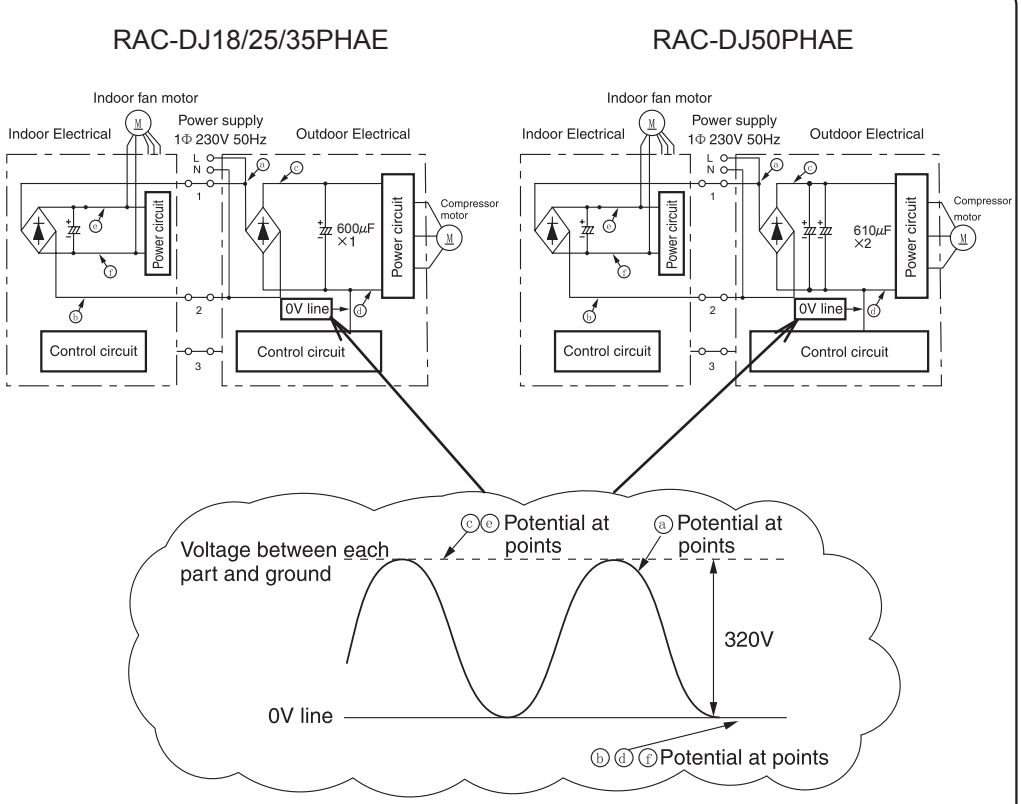
Q2 The remote control unit will give no display in response to a push of the "vertical vane" button.

A2 The remote control unit displays nothing.

Inspection instructions

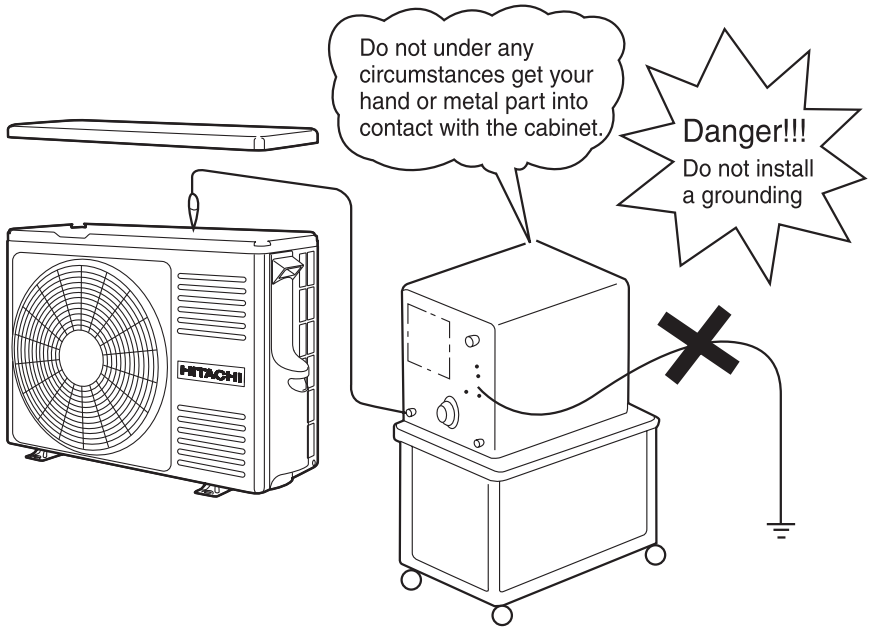
Warning

Note that the 0 V line of the outdoor electrical parts and the primary power circuit of the indoor electrical parts have voltages to ground as illustrated in the right-hand figure.



Warning

When conducting a check with an oscilloscope or something similar, do not ground the oscilloscope. Note that the oscilloscope will be subjected to voltages as illustrated in the figure above.



DISCHARGE, PROCEDURE AND POWER SHUT OFF METHOD FOR POWER CIRCUIT

⚠ WARNING ⚠

Caution

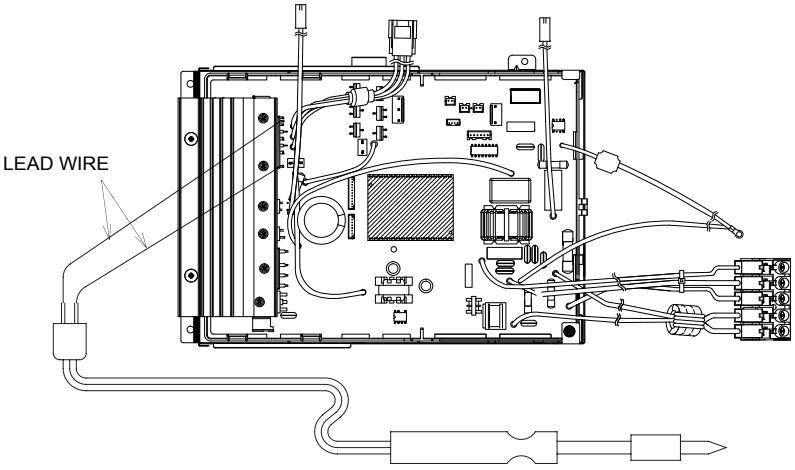
- Voltage of about 320 V is charged between the terminal of smoothing capacitors.
- During continuity check for each circuit part of the outdoor unit, be sure to discharge the smoothing capacitors.

Discharge Procedure

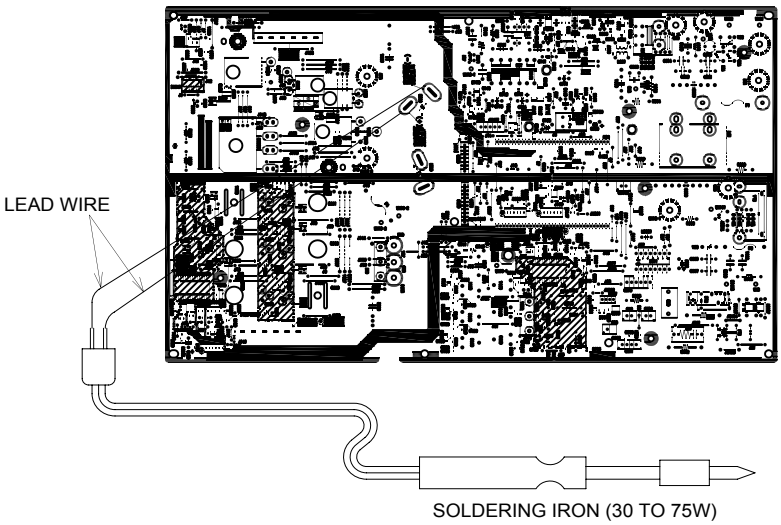
1. Turn off the power.
2. After power is turned off, wait for 10 minutes or more. Then, remove electrical parts cover and apply soldering iron of 30 to 75 W for 15 seconds or more to IPM (24) and IPM (20) terminals on the main P.W.B. as shown in the figure below, in order to discharge voltage in smoothing capacitor.

Do not use a soldering iron with transformer: Otherwise, thermal fuse inside transformer will be blown.

RAC-DJ18/25/35PHAE



RAC-DJ50PHAE

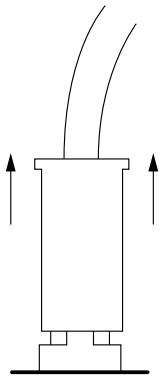


Other instructions

(1) Detaching and reattaching the receptacles for tab terminal

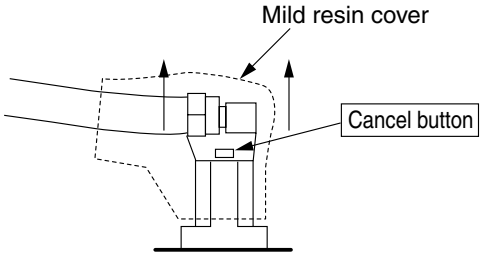
All the receptacles for connecting tab terminals are with a locking mechanism. Forcibly pulling any such receptacle without unlocking it will destroy it. Be on guard.
When reconnecting it, insert it securely all the way home.

· Receptacle types and how to unlock them



Vertical (with a resin case)

Hold the resin case and pull it out.



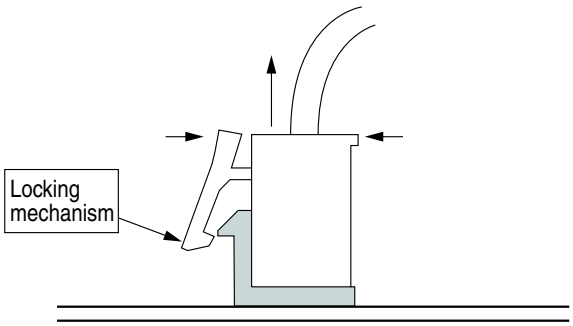
Horizontal (with a mild resin cover)

Hold the cancel button down on the mild resin cover while pulling it out.

(2) Detaching and reattaching the board connector

The product comes equipped with many board connectors provided with lock mechanism. Forcibly pulling any such part without unlocking it will destroy it. Be on guard. When reconnecting it, insert it securely all the way home.

Pinch the locking mechanism with your fingers and pull it out unlocked.



... Do not detach or reattach the connectors while energized

Do not under any circumstances detach or reattach the connectors while energized. That would destroy the board components and fan motor. For both the indoor and outdoor boards, ensure that the smoothing capacitor has discharged its electricity fully before you do your work.

Troubleshooting support

№	Function	Description
1	[Display on the outdoor unit side]	· The failure mode detected on the outdoor unit side is displayed by blinking the "LD301". Detecting a failure will stop the outdoor unit and keep blinking the LD301 until it is restarted. (The communication error will persist until the communication is reestablished.)
2	Self-diagnosis memory	· The failure modes detected on the indoor and outdoor unit sides are stored in the non. olatile memory of the indoor unit and can be read later on. (The memory will remain even after power-off.) · The failure modes detected on the outdoor unit side are written in memory every time any such mode occurs. The failure mode can therefore be detected on the indoor unit side without waiting for the retry frequency to reach the display of the indoor unit lamp. Moreover, the normal self-diagnosis display function which rarely occurs will store and display failure modes that do not end up displaying the indoor unit lamp. (Any such mode may be unable to be stored if indoor or outdoor communications is in a failure.) · The product stores 5 last-stored failure modes. · There is a function for deleting memory. Once you clear the memory and run the product for several days, you can read the failure modes and check them, thereby detecting the less frequent failure phenomena. · Failure modes can be checked by both the blinking of the lamp of the indoor unit and the display of the remote control liquid crystal display.

※The "self-diagnosis function of the communication circuit" available in our conventional models is now incorporated as part of the normal self-diagnosis function. In the case of a failure in the communication circuit, you do not have to conduct a special operation and the operations can be automatically divided into 3 blinking operations and 12 blinking operations of the timer lamp. However, a strong external noise may have resulted in 12 times of blinking.

SELF-DIAGNOSIS LIGHTING MODE

MODEL RAC-DJ18/25/35/50PHAE

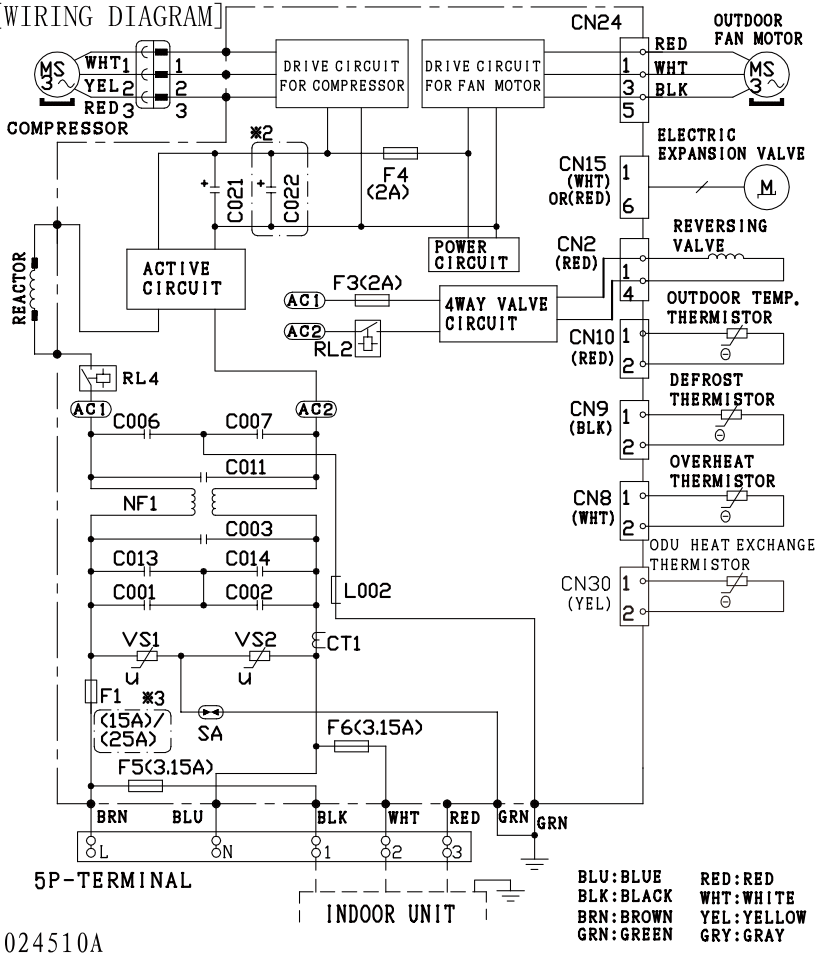
⚠ ⚠ DANGER (DC350V)

CUT THE POWER SOURCE AND WAIT MORE THAN 10 MINUTES BEFORE SERVICING WORK.
MEASURE DC VOLTAGE(※1) AND CONFIRMED THAT IT IS MUST BE LESS THAN 10V.

LED(※1) INDICATION DURING COMPRESSOR OPERATE	
LD301	OPERATION STATUS
LIT	NORMAL
BLINK REPEATINGLY WITH 2 SECONDS LIT - 0.3 SECONDS OFF	OVERLOAD (NORMAL)

※1 DC VOLTAGE VALIDATION, LED POSITION AND FAN OPERATION REFER TO THE SERVICE MANUAL.

[WIRING DIAGRAM]



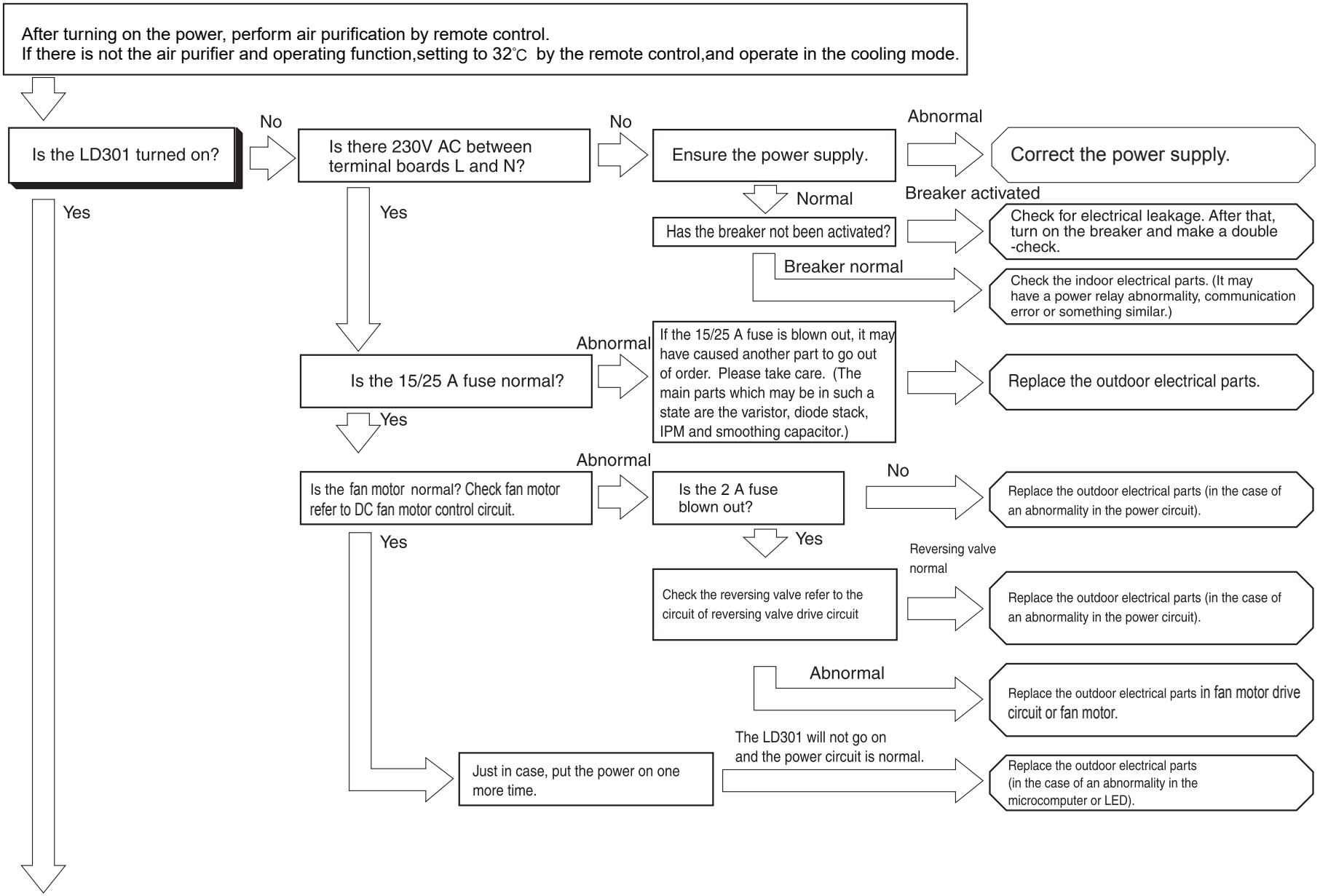
0024510A

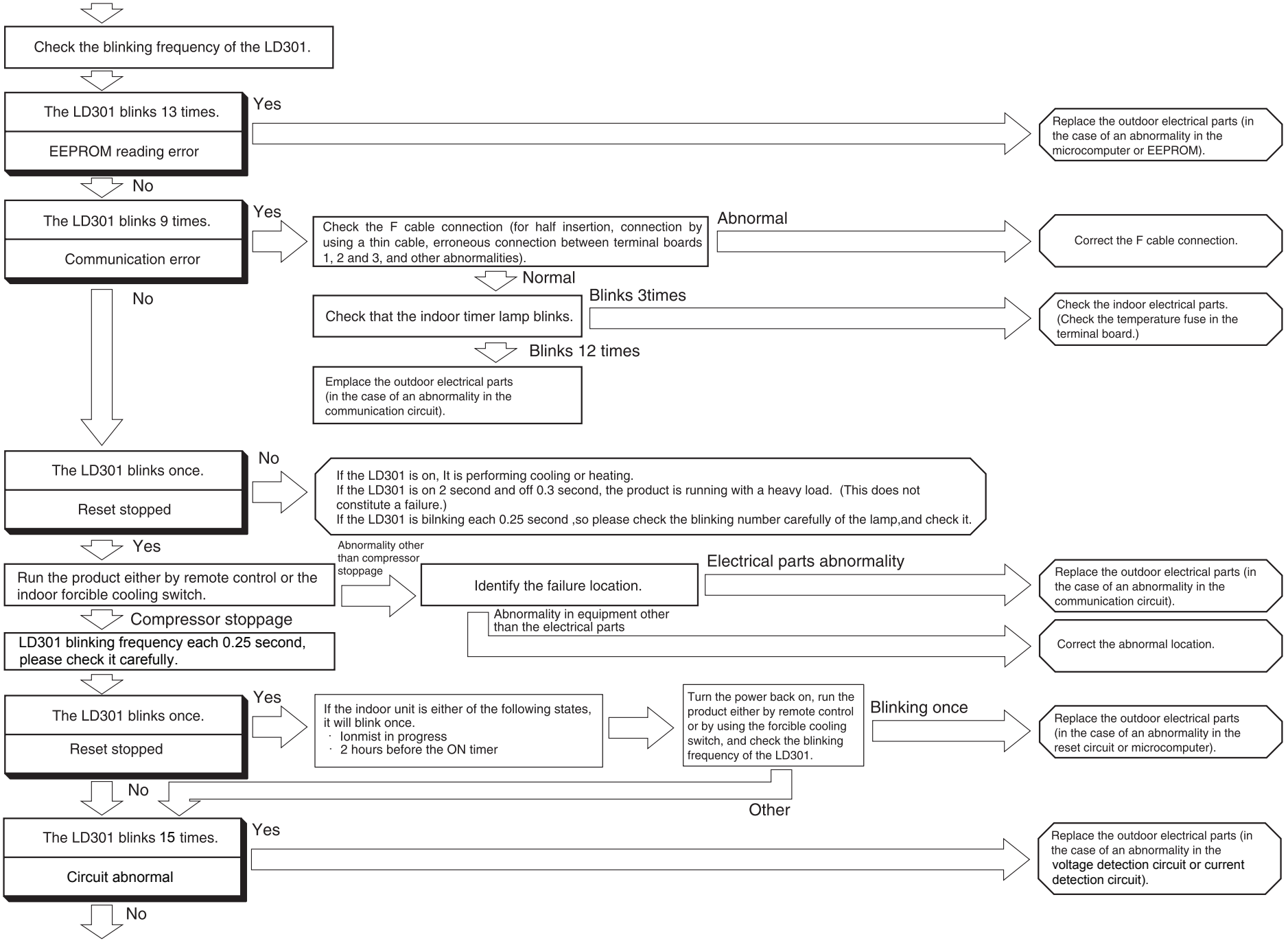
LED INDICATION DURING STOP		
LD301	SELF-DIAGNOSE CONTENT	CHECKING POINT&REPAIR METHOD
OFF	NO POWER SUPPLY	NO POWER SUPPLY AT TERMINAL "L - N" → CHECK POWER CABLE CONNECTING CABLE MISCONNECTION → CHECK CONNECTING CABLE REACTOR CONNECTOR HALF INSERTION → CHECK REACTOR CONNECTOR F4 (2A FUSE) BLOWN → CHECK OUTDOOR FAN MOTOR
	NORMAL STOP	NOT MALFUNCTION
1 TIME BLINK	RESET STOP	FAN OPERATION※1, WAITING COMPRESSOR TO START → NORMAL OTHER → IF STILL NOT SOLVE AFTER CHECK THE CONNECTING CABLE, CHANGE ODU CONTROLLER
2 TIMES BLINK	PEAK CURRENT CUT	SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE COMPRESSOR CONNECTOR NOT CONNECTED → CHECK CONNECTOR OUTDOOR UNIT SURROUNDING IS BLOCKED → REMOVE THE CAUSE OF BLOCKING. THE CYCLE PIPE ABNORMAL → CHECK THE CYCLE PIPE (ODU(※4) CONTROLLER IS ABNORMAL OR COMPRESSOR IS ABNORMAL REFER TO THE SERVICE MANUAL [SELF-CHECK])
3 TIMES BLINK	ABNORMAL LOW SPEED ROTATION	
4 TIMES BLINK	SWITCHING FAILURE	
5 TIMES BLINK	OVERLOAD LOWER LIMIT CUT	
6 TIMES BLINK	COMPRESSOR TEMPERATURE RISE	SERVICE VALVE NOT OPEN, REFRIGERANT LEAK → CHECK SERVICE VALVE, RE-CHARGE THE REFRIGERANT BAD CONNECTOR INSERTION, CIRCUIT DEFECT → CHECK THE CONNECTOR, CHANGE ODU CONTROLLER
7 TIMES BLINK	THERMISTOR ABNOMAL	THERMISTOR CONNECTOR HALF INSERT → INSERT CONNECTOR SECURELY THERMISTOR WIRE SHORTED OR CUT, CIRCUIT DEFECT → CHANGE THERMISTOR, CHANGE ODU CONTROLLER
9 TIMES BLINK	COMMUNICATION ERROR	F CABLE MISS CONNECTION, DISCONNECTIN → CHECK THE F CABLE COMMUNICATION CIRCUIT ABNORMAL → CHANGE ODU CONTROLLER
10 TIMES BLINK	POWER SUPPLY VOLTAGE ERROR	AC VOLTAGE ABNORMAL(BEYOND RATED VOLTAGE ±10%) → SUPPLY CORRECT VOLTAGE AC VOLTAGE NORMAL(WITHIN RATED VOLTAGE ±10%) → CHANGE ODU CONTROLLER
11 TIMES BLINK	FAN STOP BY STRONG WIND	TEMPORARY STOP DUE TO STRONG WIND → FAN WILL RE-START AFTER WIND BECOME WEAK
12 TIMES BLINK	FAN LOCK STOP	TEMPORARY STOP DUE TO STRONG WIND. → FAN WILL RE-START MOVING LATER SOMETHING BLOCKED SURROUND OUTDOOR UNIT → REMOVE THE OBSTRUCTION CONDUCT OUTDOOR FAN MOTOR CHECK → REPLACE THE DEFECT PART
13 TIMES BLINK	EEPROM READING ERROR	CHANGE ODU CONTROLLER
14 TIMES BLINK	DC VOLTAGE ABNORMAL	CONFIRM AC POWER SUPPLY & DC VOLTAGE IS NORMAL. → CHANGE ODU CONTROLLER COMPRESSOR LOAD ABNORMAL → INSPECT THE COMPRESSOR
15 TIMES BLINK	CIRCUIT ABNORMAL	CHANGE ODU CONTROLLER (SOME MODELS HAVE NOT 15 TIMES BLINK)
16 TIMES BLINK	HIGH LOAD DURING STOP	SERVICE VALVE NOT OPEN → CHECK SERVICE VALVE SOMETHING BLOCKED SURROUND OUTDOOR UNIT → REMOVE THE CAUSE OF BLOCKING DUST ON INDOOR UNIT FILTER → CLEAN UP THE FILTER

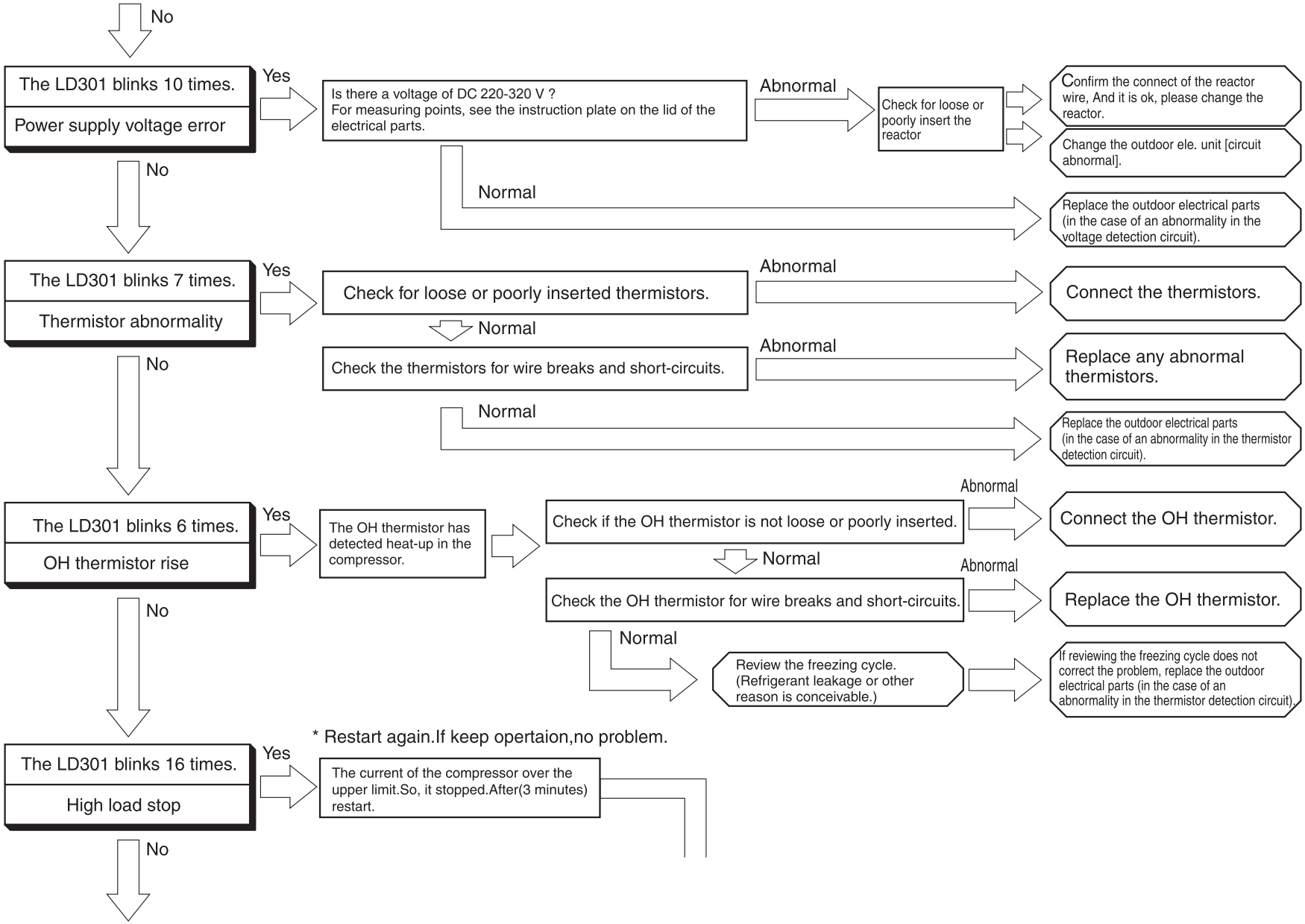
[OUTDOOR FAN MOTOR CHECK] DIAGNOSIS METHOD	OTHERS CHECKING POINT
1. SWITCH OFF MAIN POWER SUPPLY. 2. UN-INSERT OUTDOOR FAN MOTOR CONNECTOR CN24. 3. MAKE SURE NO ABNORMALITIES AT THE FAN SHAFT. 4. MEASURE RESISTANCE AT FAN MOTOR CONNECTOR CONTACT. NORMAL RESISTANCE BETWEEN EACH TERMINAL REFER TO THE SERVICE MANUAL. 5. IF NO ABNORMAL AND FAN MOTOR NORMAL, CHANGE ODU CONTROLLER.	1. [REVERSING VALVE NOT OPERATE ERROR] →UN-INSERT THE CONNECTOR AND CHECK CHECK THE LEAD WIRE. →IF OK CHECK F3(2A) FUSE, IF BROKEN REPLACE THE FUSE OR ODU CONTROLLER. 2. [COMMUNICATION ERROR] OR OUTDOOR UNIT NO OPERATION →CHECK CONNECTING CABLE BETWEEN INDOOR UNIT AND OUTDOOR UNIT.

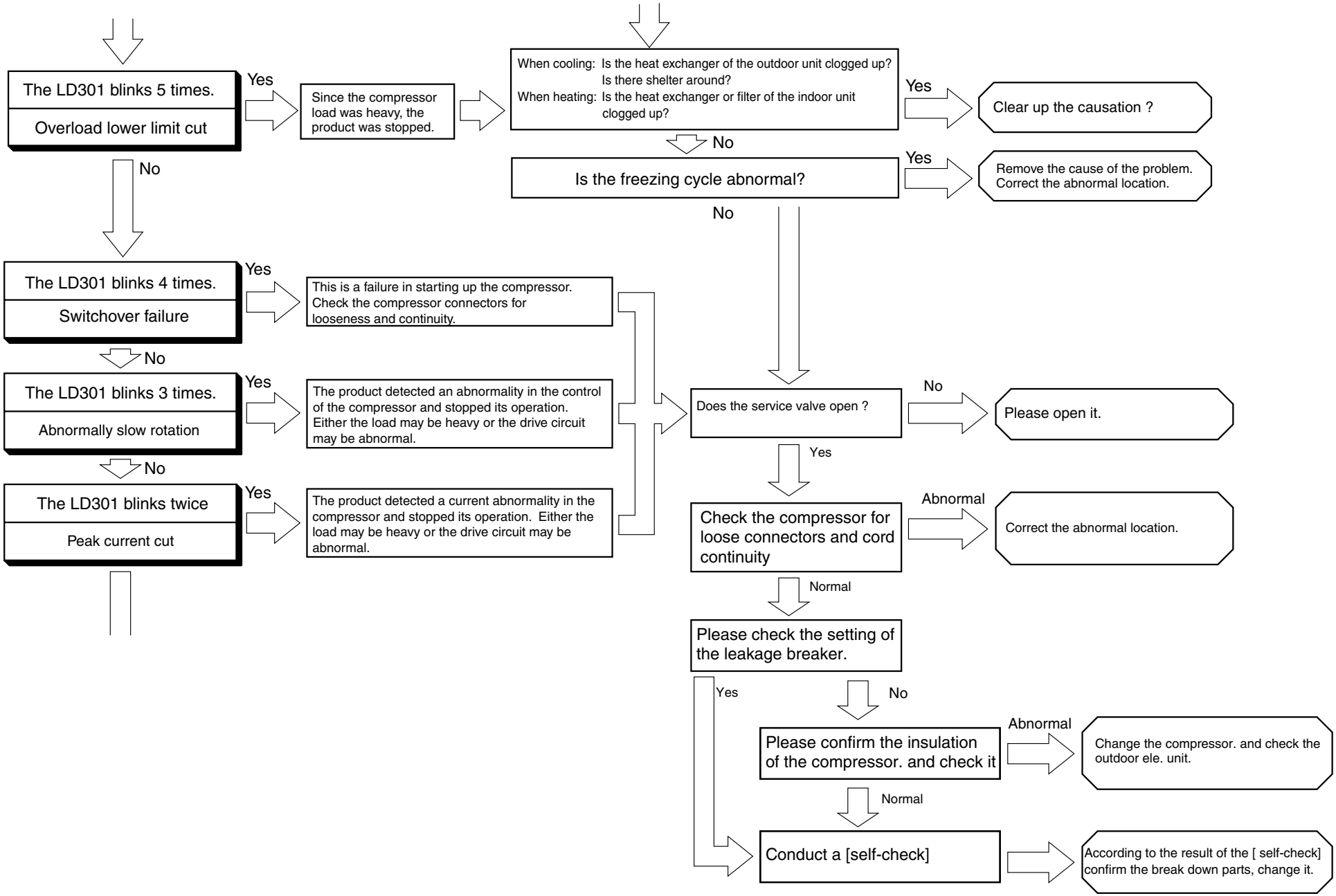
※2 SOME MODELS NOT NEED TO INSTALL THE CIRCUITS IN DASH DOT.
※3 F1 CURRENT VALUE BE DIFFERENT FOR DIFFERENT MODELS.
※4 ODU = OUTDOOR UNIT.

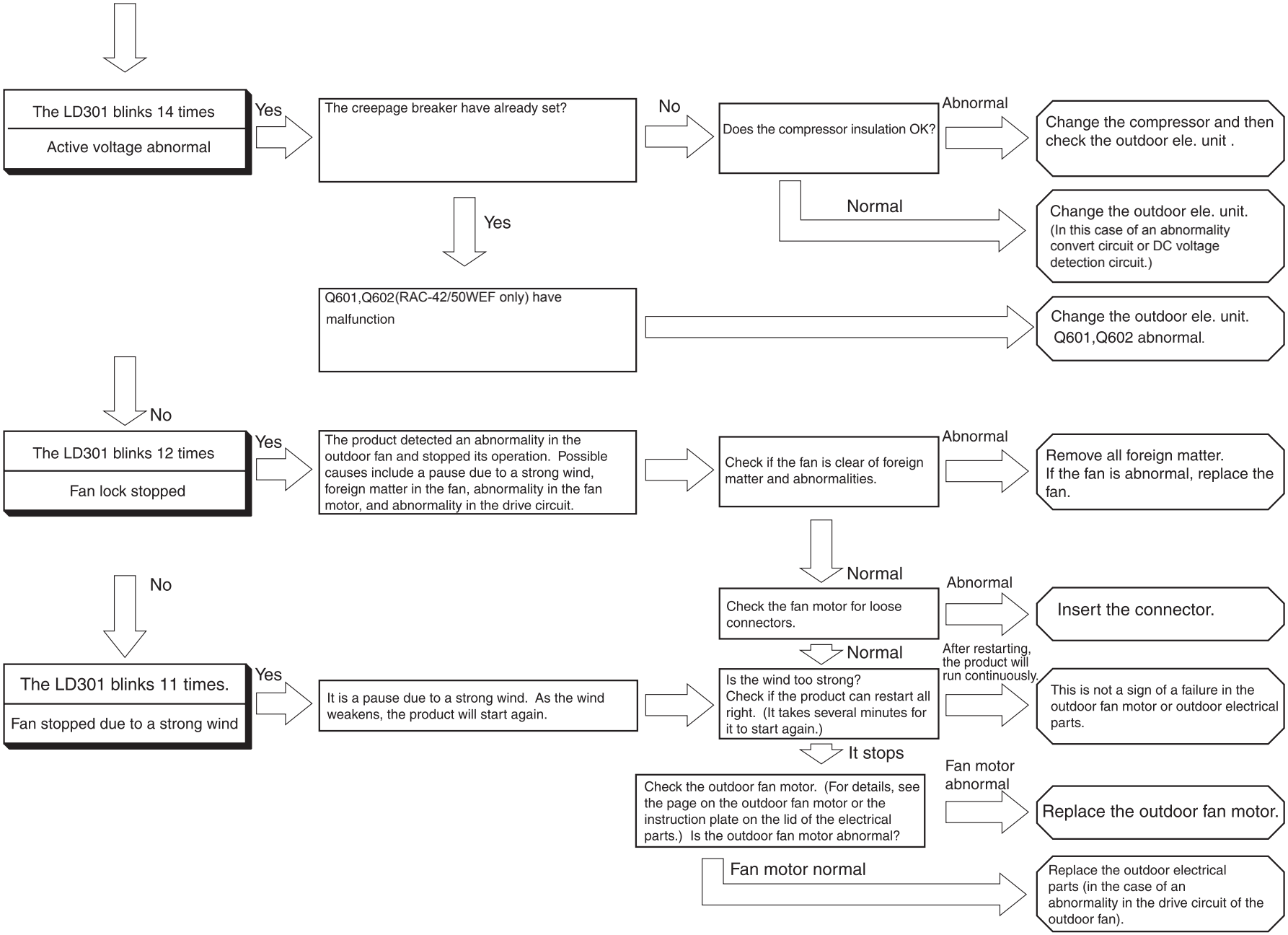
Checking the electrical parts of the outdoor unit




Check the blinking frequency of the LD301.
The LD301 blinks 13 times.
EEPROM reading error
Yes
Replace the outdoor electrical parts (in the case of an abnormality in the microcomputer or EEPROM).
No
The LD301 blinks 9 times.
Communication error
Yes
Check the F cable connection (for half insertion, connection by using a thin cable, erroneous connection between terminal boards 1, 2 and 3, and other abnormalities).
Abnormal
Correct the F cable connection.
Normal
No
Check that the indoor timer lamp blinks.
Blinks 3times
Check the indoor electrical parts. (Check the temperature fuse in the terminal board.)
Blinks 12 times
Emplace the outdoor electrical parts (in the case of an abnormality in the communication circuit).
The LD301 blinks once.
Reset stopped
No
If the LD301 is on, It is performing cooling or heating.
If the LD301 is on 2 second and off 0.3 second, the product is running with a heavy load. (This does not constitute a failure.)
If the LD301 is bilnking each 0.25 second ,so please check the blinking number carefully of the lamp,and check it.
Yes
Run the product either by remote control or the indoor forcible cooling switch.
Abnormality other than compressor stoppage
Identify the failure location.
Electrical parts abnormality
Replace the outdoor electrical parts (in the case of an abnormality in the communication circuit).
Abnormality in equipment other than the electrical parts
Correct the abnormal location.
Compressor stoppage
LD301 blinking frequency each 0.25 second, please check it carefully.
The LD301 blinks once.
Reset stopped
Yes
If the indoor unit is either of the following states, it will blink once.
· Ionmist in progress
· 2 hours before the ON timer
Turn the power back on, run the product either by remote control or by using the forcible cooling switch, and check the blinking frequency of the LD301.
Blinking once
Replace the outdoor electrical parts (in the case of an abnormality in the reset circuit or microcomputer).
No
Other
The LD301 blinks 15 times.
Circuit abnormal
Yes
Replace the outdoor electrical parts (in the case of an abnormality in the voltage detection circuit or current detection circuit).
No


No
The LD301 blinks 10 times.
Power supply voltage error
Yes
Is there a voltage of DC 220-320 V ?
For measuring points, see the instruction plate on the lid of the electrical parts.
Abnormal
Check for loose or poorly insert the reactor
Confirm the connect of the reactor wire, And it is ok, please change the reactor.
Change the outdoor ele. unit [circuit abnormal].
Normal
Replace the outdoor electrical parts (in the case of an abnormality in the voltage detection circuit).
No
The LD301 blinks 7 times.
Thermistor abnormality
Yes
Check for loose or poorly inserted thermistors.
Abnormal
Connect the thermistors.
Normal
Check the thermistors for wire breaks and short-circuits.
Abnormal
Replace any abnormal thermistors.
Normal
Replace the outdoor electrical parts (in the case of an abnormality in the thermistor detection circuit).
No
The LD301 blinks 6 times.
OH thermistor rise
Yes
The OH thermistor has detected heat-up in the compressor.
Check if the OH thermistor is not loose or poorly inserted.
Abnormal
Connect the OH thermistor.
Normal
Check the OH thermistor for wire breaks and short-circuits.
Abnormal
Replace the OH thermistor.
Normal
Review the freezing cycle. (Refrigerant leakage or other reason is conceivable.)
If reviewing the freezing cycle does not correct the problem, replace the outdoor electrical parts (in the case of an abnormality in the thermistor detection circuit).
No
* Restart again.If keep opertaion,no problem.
The LD301 blinks 16 times.
High load stop
Yes
The current of the compressor over the upper limit.So, it stopped.After(3 minutes) restart.
No


The LD301 blinks 5 times.
Overload lower limit cut
Yes
Since the compressor load was heavy, the product was stopped.
When cooling: Is the heat exchanger of the outdoor unit clogged up? Is there shelter around?
When heating: Is the heat exchanger or filter of the indoor unit clogged up?
Yes
Clear up the causation ?
No
Is the freezing cycle abnormal?
Yes
Remove the cause of the problem. Correct the abnormal location.
No
No
The LD301 blinks 4 times.
Switchover failure
Yes
This is a failure in starting up the compressor. Check the compressor connectors for looseness and continuity.
No
The LD301 blinks 3 times.
Abnormally slow rotation
Yes
The product detected an abnormality in the control of the compressor and stopped its operation. Either the load may be heavy or the drive circuit may be abnormal.
No
The LD301 blinks twice
Peak current cut
Yes
The product detected a current abnormality in the compressor and stopped its operation. Either the load may be heavy or the drive circuit may be abnormal.
Does the service valve open ?
No
Please open it.
Yes
Check the compressor for loose connectors and cord continuity
Abnormal
Correct the abnormal location.
Normal
Please check the setting of the leakage breaker.
Yes
No
Please confirm the insulation of the compressor. and check it
Abnormal
Change the compressor. and check the outdoor ele. unit.
Normal
Conduct a [self-check]
According to the result of the [self-check] confirm the break down parts, change it.


The LD301 blinks 14 times
Active voltage abnormal
Yes
The creepage breaker have already set?
No
Does the compressor insulation OK?
Abnormal
Change the compressor and then check the outdoor ele. unit .
Normal
Change the outdoor ele. unit.
(In this case of an abnormality convert circuit or DC voltage detection circuit.)
Yes
Q601,Q602(RAC-42/50WEF only) have malfunction
Change the outdoor ele. unit.
Q601,Q602 abnormal.
No
The LD301 blinks 12 times
Fan lock stopped
Yes
The product detected an abnormality in the outdoor fan and stopped its operation. Possible causes include a pause due to a strong wind, foreign matter in the fan, abnormality in the fan motor, and abnormality in the drive circuit.
Check if the fan is clear of foreign matter and abnormalities.
Abnormal
Remove all foreign matter.
If the fan is abnormal, replace the fan.
Normal
No
The LD301 blinks 11 times.
Fan stopped due to a strong wind
Yes
It is a pause due to a strong wind. As the wind weakens, the product will start again.
Check the fan motor for loose connectors.
Abnormal
Insert the connector.
Normal
Is the wind too strong?
Check if the product can restart all right. (It takes several minutes for it to start again.)
After restarting, the product will run continuously.
This is not a sign of a failure in the outdoor fan motor or outdoor electrical parts.
It stops
Check the outdoor fan motor. (For details, see the page on the outdoor fan motor or the instruction plate on the lid of the electrical parts.) Is the outdoor fan motor abnormal?
Fan motor abnormal
Replace the outdoor fan motor.
Fan motor normal
Replace the outdoor electrical parts (in the case of an abnormality in the drive circuit of the outdoor fan).

CHECKING THE REFRIGERATING CYCLE (JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

.. Troubleshooting procedure (No operation, No heating, No cooling)

Connect U,V,W phase leads to the power module again and operate the air conditioner.

Is the self-diagnosis lamp mode as shown on the right?

Lighting mode / Self-diagnosis lamp	Blinks 2 times	Blinks 3 times	Blinks 4 times	Blinks 5 times	Blinks 6 times	Blinks 8times
LD301	▨	▨	▨	▨	▨	▨
Time until the lamp lights	Approx. 10 seconds			Approx. 10 seconds	Within Approx. 30 seconds	Approx. 10 seconds
Possible malfunctioning part	Compressor				Gas leakage	Compressor

▨ Blinking □ off

YES

Outdoor air temperature (℃)	Charge port pressure MPa(G) {kgf/cm²(G)}
50	2.96 {30.14}
45	2.62 {26.72}
40	2.31 {23.58}
35	2.03 {20.73}
30	1.78 {18.14}
25	1.55 {15.79}
20	1.34 {13.66}
15	1.15 {11.74}
10	0.98 {10.02}
5	0.83 { 8.48}
0	0.70 { 7.10}
−5	0.58 { 5.89}
−10	0.47 { 4.81}

(R32)
The values above are the theoretical ones.

Stop to operate and check the gas pressure in balancing mode.

Normal

- Checking the IPM (main P.W.B.)

When the self-diagnosis lamp lights in the same condition as above.

Error (Gas leaking)

Gas leaks.
Repair and seal refrigerant.

The compressor is defective. Replace it and seal refrigerant.
(If the compressor checker for an inverter type air conditioner is available, re-check using it.)

Perform a final check of operation.

How to run the product with the outdoor unit test switch

If the indoor electrical parts is out of order and if you wish to run the outdoor unit

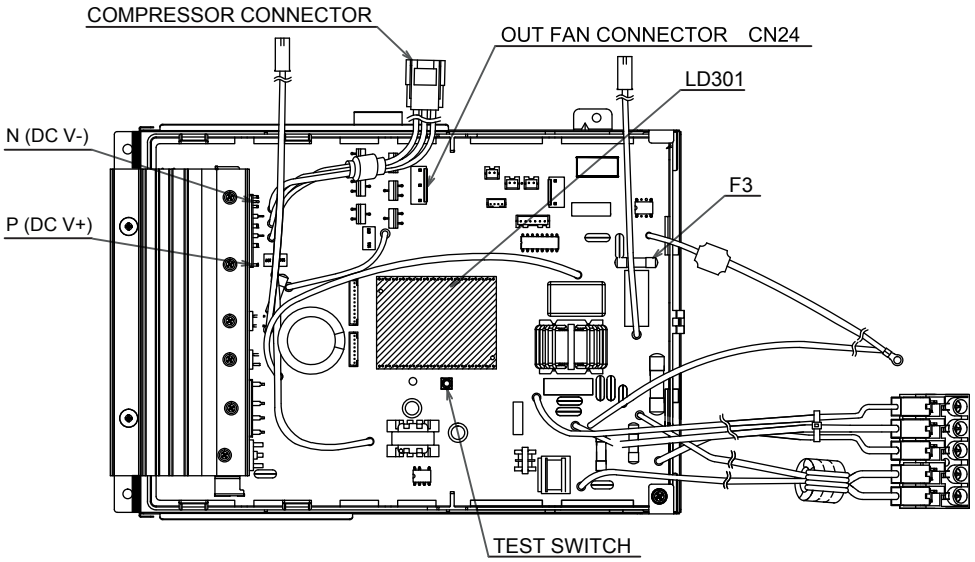
1. Turn on the outdoor terminal boards L and N (220-230 V AC).
2. Confirm that the "LD301" blinks once from the terminal side of the outdoor unit. Afterwards (when about 30 sec elapses after the power turns on), confirm that the "LD301" changes to blinking 9 times (communication error).
3. When the "LD301" is blinks 9 times, if you press the test switch, the "LD301" lights up.

If you release your finger from the test switch within 1 sec to 4 sec after pressing the switch, the forced cooling operation starts.
※(If you press the test switch for 5 sec or longer, the self-check diagnosis starts. In this case, turn the power off and start the procedure from 1 again.)

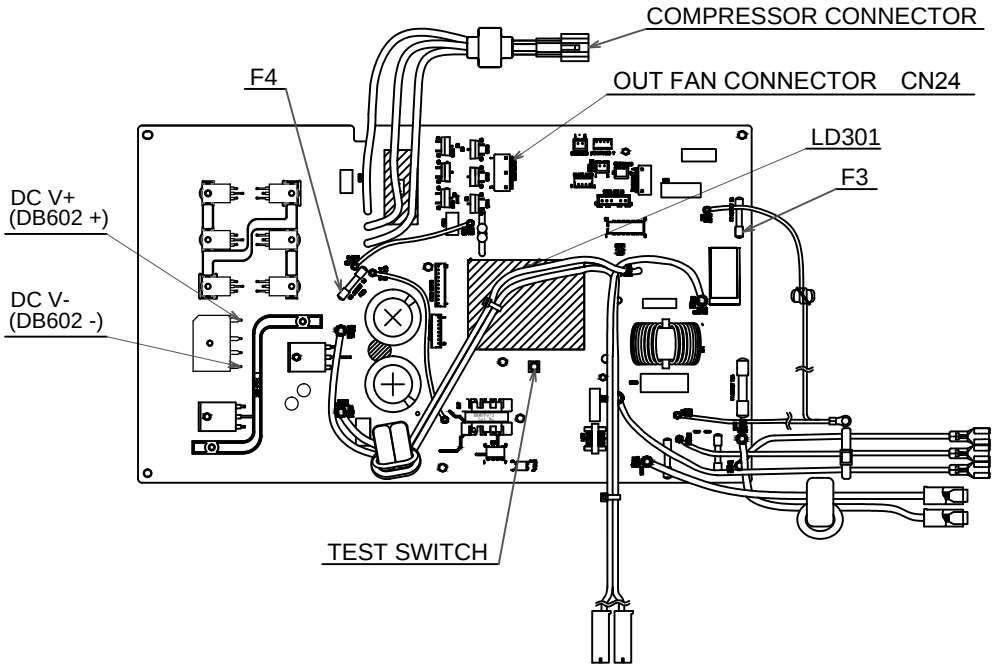
※(For the initialization of the expansion valve, it may take 1 min until the operation starts.)

4. When you press the test switch again for 1 sec or longer, the unit stops the operation.

RAC-DJ18/25/35PHAE



RAC-DJ50PHAE



※Cautions

1. Applying power directly to the outdoor unit will cause a rush current to stress the outdoor unit. Therefore, if the indoor unit is not out of order, do not use the method descried in 2).
2. Before making the connections, be sure to turn off the breaker.
3. Do not under any circumstances run the product for more than 5 minutes.
4. Doing work with the compressor connector removed will cause the LD301 to blink 4 times. It will not start.
5. For another test run, turn off the breaker and turn it back on. (The test switch is accepted only once after power-on. After operation by remote control, it is not accepted.)
6. When the operation with the test switch is over, turn off the breaker and set the connectors back.

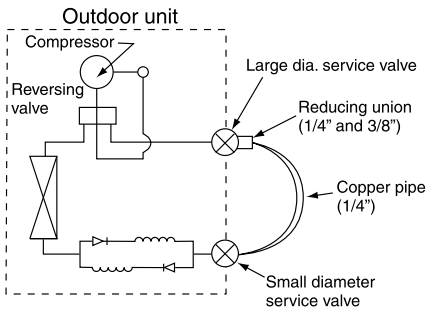
HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

RAC-DJ18/25/35PHAE

1. Connect the large dia. pipe side and small dia. pipe side service valve using a pipe.

Connect the small diameter service valve and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming (※1)



Parts to be prepared

(1) Reducing union
1/4" (6.35 mm)
3/8" (9.52 mm)
(2) Copper pipe (1/4" and 3/8")

Do not operate for more than 5 minutes

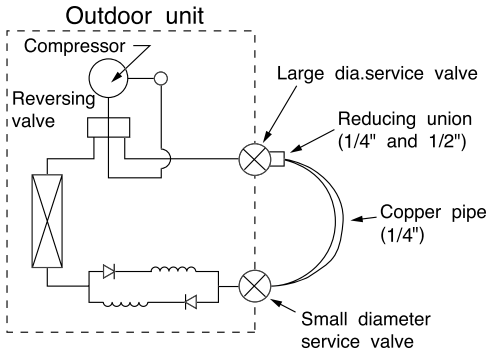
The operation method is the same as "How to operate using the connector to servicing the outdoor unit".
※1 The charging amount of 300g is equivalent to the load in normal operation.

RAC-DJ50PHAE

1. Connect the large dia. pipe side and small dia. pipe side service valves using a pipe.

Connect the small diameter service value and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming (※1)



Parts to be prepared

(1) Reducing union
1/4" (6.35mm)
1/2" (12.7mm)
(2) Copper pipe (1/4" and 1/2")
(3) Shorting leads
2 leads approx. 10 cm long with alligator clip or IC clip

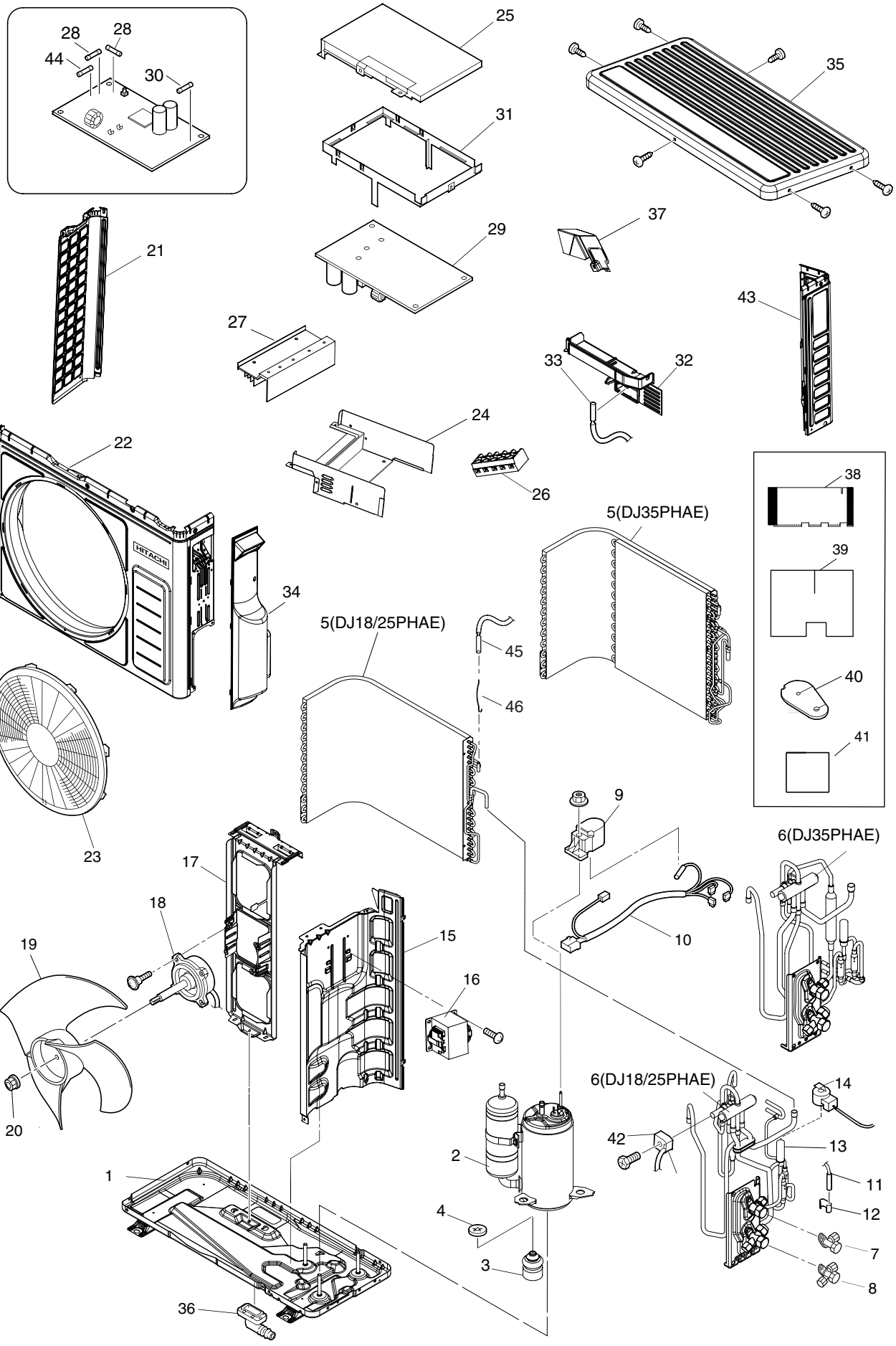
Do not operate for 5 minutes or more.

The operation method is the same as "How to operate using the connector to servicing the outdoor unit".
※1 The charging amount of 300g is equivalent to the load in normal operation.

PARTS LIST AND DIAGRAM

OUTDOOR UNIT

MODEL RAC-DJ18PHAE、RAC-DJ25PHAE、RAC-DJ35PHAE



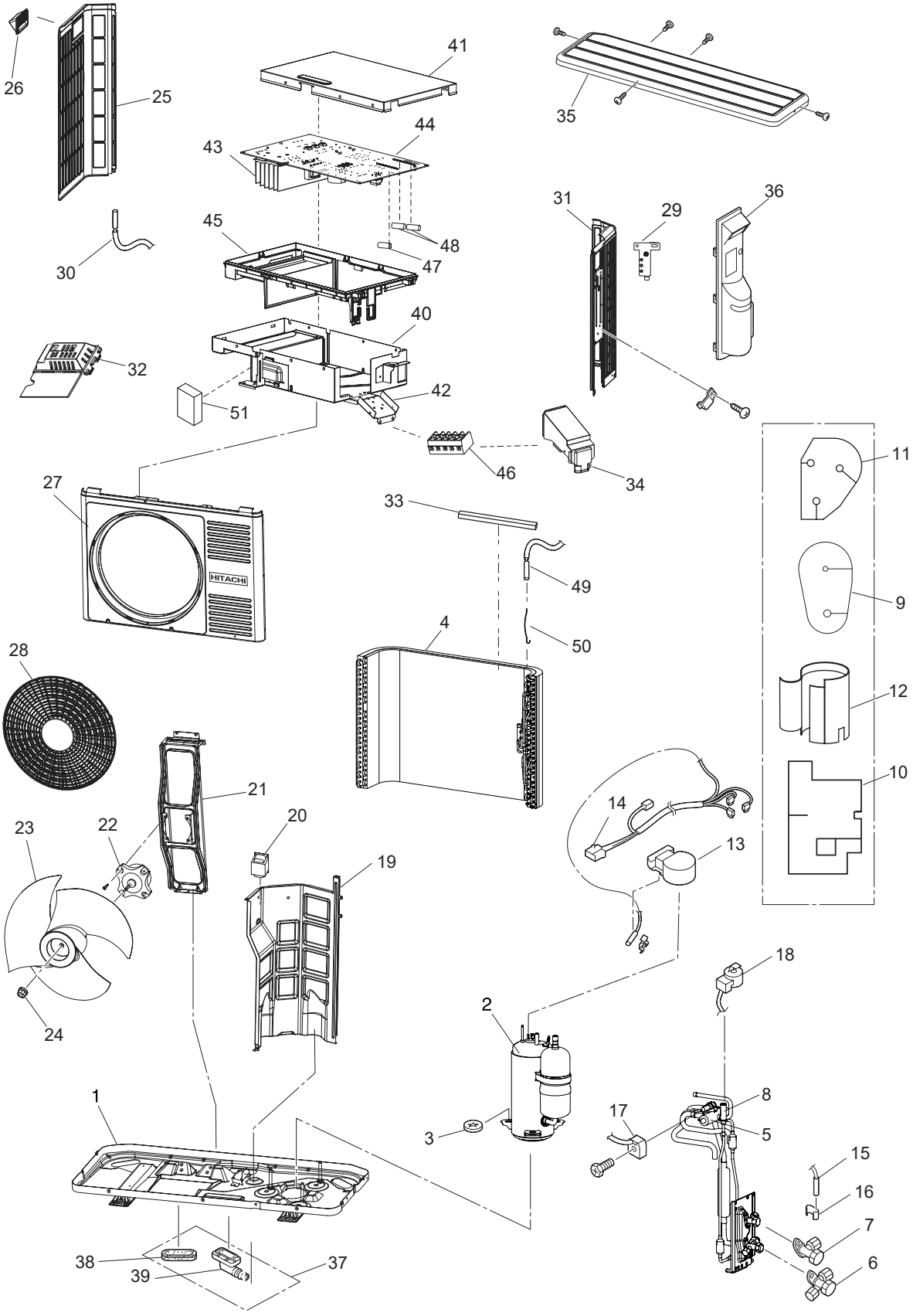
INDOOR UNIT

NO	HHAW PARTS NO	Q'TY/UNIT	PARTS NAME
1	HWRAC-18WED	1	BASE
2	HWRAC-DJ18PHAE 2	1	COMPRESSOR
3	HWRAC-18WED	3	COMPRESSOR RUBBER
4	HWRAC-18WEB	3	PUSH NUT
5	HWRAC-DJ18PHAE 3	1	CONDENSER
	HWRAC-DJ35PHAE 2	1	CONDENSER
6	HWRAC-DJ18PHAE 4	1	REVERSING VALVE
	HWRAC-DJ35PHAE 3	1	REVERSING VALVE
7	HWRAC-50WEA	1	2S-VALVE
8	HWRAC-10GH5	1	3S-VALVE
9	HWRAC-50WPC A05	1	O.L.R COVER
10	HWRAC-DJ18PHAE 5	1	CONNECTING CORD(COMP)
11	HWRAC-DJ18PHAE 6	1	THERMISTOR (DEFROST)
12	HWRAC-25YH4	1	THERMISTOR SUPPORT
	HWRAC-X18HAK	1	THERMISTOR SUPPORT
13	HWRAC-50WED	1	ELECTRIC EXPANSION VALVE
14	HWRAC-50WED	1	COIL(EXPAN. VALVE)
15	HWRAC-18WEB	1	PARTITION
16	HWRAC-18WED	1	REACTOR
17	HWRAC-18WED	1	FAN MOTOR SUPPORT
	HWRAC-35WED	1	FAN MOTOR SUPPORT
18	HWRAC-25YHA5	1	FAN MOTOR
	HWRAC-42WPD A03	1	FAN MOTOR
19	HWRAC-18WED	1	PROPELLER FAN
20	HWRAC-DX10HNK A06	1	NUT (PROPELLER.FAN)
21	HWRAC-18WED	1	SIDE COVER (L)
22	HWRAC-18WED	1	FRONT COVER
23	HWRAC-18WED	1	DISCHARGE GRILL
24	HWRAC-DJ18PHAE 7	1	ELECTRIC PARTS PLATE
25	HWRAC-DJ18PHAE 8	1	ELECTRIC PARTS COVER
26	HWRAC-50WED	1	TERMINAL BOARD (5P)
27	HWRAC-18WEF	1	HEAT SINK
28	HWRAC-25WXD	2	FUSE(3.15A)
29	HWRAC-DJ18PHAE	1	P.W.B.(MAIN)
	HWRAC-DJ25PHAE	1	P.W.B.(MAIN)
	HWRAC-DJ35PHAE	1	P.W.B.(MAIN)
30	HWRAC-18WEF	1	FUSE (15A)
31	HWRAC-18WEF	1	SUPPORT (P.W.B.)
32	HWRAC-18WED	1	COVER(OUTDOOR THERMISTOR)
33	HWRAC-DJ18PHAE 9	1	THERMISTOR(OUTDOOR TEMP.)
34	HWRAC-DJ18PHAE 10	1	EV-COV-ZU
35	HWRAC-18WED	1	T-COVERZU
36	HWRAC-25YHA4	1	DRAIN PIPE
37	HWRAC-18WED	1	TERMINAL COVER
38	HWRAC-DJ18PHAE 1	1	SOUND PROOF COVER ASS'Y
39	HWRAC-35WEF	1	SOUND PROOF COVER ASS'Y
40	HWRAC-DJ18PHAE 2	1	SOUND PROOF COVER ASS'Y
41	HWRAC-18WEB	1	SOUND PROOF COVER ASS'Y
42	HWRAC-18WPC	1	COIL(REVERSING VALVE)
43	HWRAC-18WED	1	SIDE COVER (R)
44	HWRAC-18WEF	1	FUSE (15A)
45	HWRAC-DJ18PHAE 3	1	THERMISTOR
46	HWRAC-DJ18PHAE	1	THERMISTOR SUPPORT

PARTS LIST AND DIAGRAM

OUTDOOR UNIT

MODEL RAC-DJ50PHAE



OUTDOOR UNIT

NO	HHAW PARTS NO	Q'TY/UNIT	PARTS NAME
1	HWRAC-18WED	1	BASE
2	HWRAC-DJ18PHAE 2	1	COMPRESSOR
3	HWRAC-18WED	3	COMPRESSOR RUBBER
4	HWRAC-18WEB	3	PUSH NUT
5	HWRAC-DJ18PHAE 3	1	CONDENSER
	HWRAC-DJ35PHAE 2	1	CONDENSER
6	HWRAC-DJ18PHAE 4	1	REVERSING VALVE
	HWRAC-DJ35PHAE 3	1	REVERSING VALVE
7	HWRAC-50WEA	1	2S-VALVE
8	HWRAC-10GH5	1	3S-VALVE
9	HWRAC-50WPC A05	1	O.L.R COVER
10	HWRAC-DJ18PHAE 5	1	CONNECTING CORD(COMP)
11	HWRAC-DJ18PHAE 6	1	THERMISTOR (DEFROST)
12	HWRAC-25YH4	1	THERMISTOR SUPPORT
	HWRAC-X18HAK	1	THERMISTOR SUPPORT
13	HWRAC-50WED	1	ELECTRIC EXPANSION VALVE
14	HWRAC-50WED	1	COIL(EXPAN. VALVE)
15	HWRAC-18WEB	1	PARTITION
16	HWRAC-18WED	1	REACTOR
17	HWRAC-18WED	1	FAN MOTOR SUPPORT
	HWRAC-35WED	1	FAN MOTOR SUPPORT
18	HWRAC-25YHA5	1	FAN MOTOR
	HWRAC-42WPD A03	1	FAN MOTOR
19	HWRAC-18WED	1	PROPELLER FAN
20	HWRAC-DX10HNK A06	1	NUT (PROPELLER.FAN)
21	HWRAC-18WED	1	SIDE COVER (L)
22	HWRAC-18WED	1	FRONT COVER
23	HWRAC-18WED	1	DISCHARGE GRILL
24	HWRAC-DJ18PHAE 7	1	ELECTRIC PARTS PLATE
25	HWRAC-DJ18PHAE 8	1	ELECTRIC PARTS COVER
26	HWRAC-50WED	1	TERMINAL BOARD (5P)
27	HWRAC-18WEF	1	HEAT SINK
28	HWRAC-25WXD	2	FUSE(3.15A)
29	HWRAC-DJ18PHAE	1	P.W.B.(MAIN)
	HWRAC-DJ25PHAE	1	P.W.B.(MAIN)
	HWRAC-DJ35PHAE	1	P.W.B.(MAIN)
30	HWRAC-18WEF	1	FUSE (15A)
31	HWRAC-18WEF	1	SUPPORT (P.W.B.)
32	HWRAC-18WED	1	COVER(OUTDOOR THERMISTOR)
33	HWRAC-DJ18PHAE 9	1	THERMISTOR(OUTDOOR TEMP.)
34	HWRAC-DJ18PHAE 10	1	EV-COV-ZU
35	HWRAC-18WED	1	T-COVERZU
36	HWRAC-25YHA4	1	DRAIN PIPE
37	HWRAC-18WED	1	TERMINAL COVER
38	HWRAC-DJ18PHAE 1	1	SOUND PROOF COVER ASS'Y
39	HWRAC-35WEF	1	SOUND PROOF COVER ASS'Y
40	HWRAC-DJ18PHAE 2	1	SOUND PROOF COVER ASS'Y
41	HWRAC-18WEB	1	SOUND PROOF COVER ASS'Y
42	HWRAC-18WPC	1	COIL(REVERSING VALVE)
43	HWRAC-18WED	1	SIDE COVER (R)
44	HWRAC-18WEF	1	FUSE (15A)
45	HWRAC-DJ18PHAE 3	1	THERMISTOR
46	HWRAC-DJ18PHAE	1	THERMISTOR SUPPORT

HITACHI

RAC-DJ18PHAE
RAC-DJ25PHAE
RAC-DJ35PHAE
RAC-DJ50PHAE

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