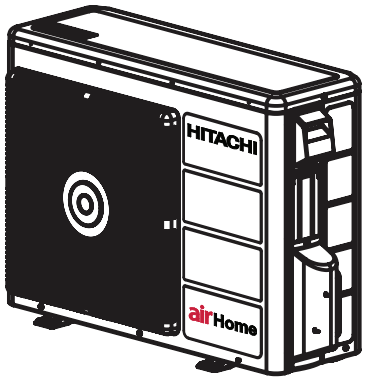
SERVICE MANUAL

TECHNICAL INFORMATION
FOR SERVICE PERSONNEL ONLY

HITACHI

airHome 400



RAC-DJ12WHAA

ROOM AIR CONDITIONER
SPLIT TYPE
DJ SERIES

MODEL
RAC-DJ12WHAA

CONTENTS

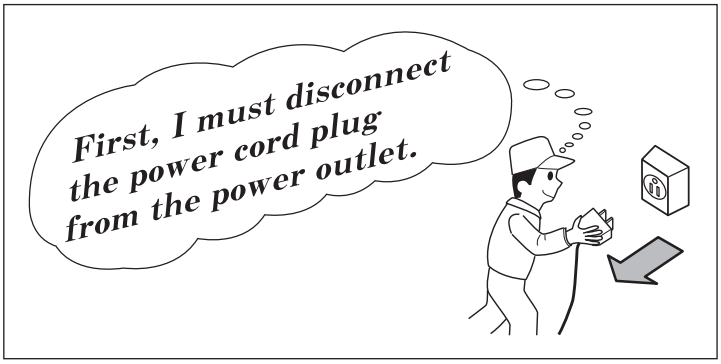
SPECIFICATIONS	Page 5
HOW TO USE	Page 7
CONSTRUCTION AND DIMENSIONAL DIAGRAM	Page 9
MAIN PARTS COMPONENT	Page 10
WIRING DIAGRAM	Page 12
CIRCUIT DIAGRAM	Page 13
PRINTED WIRING BOARD LOCATION DIAGRAM	Page 17
BLOCK DIAGRAM	Page 20
REFRIGERATING CYCLE DIAGRAM	Page 21
PROCEDURE FOR DISASSEMBLY AND REASSEMBLY	Page 22
DESCRIPTION OF MAIN CIRCUIT OPERATION	Page 24
SERVICE CALL Q & A	Page 32
TROUBLE SHOOTING	Page 36
PARTS LIST AND DIAGRAM	Page 54

Cooling & Heating

<PM NO: 0857E>

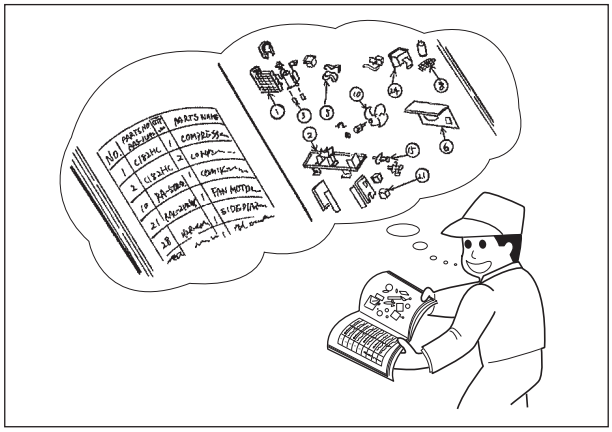
SAFETY DURING REPAIR WORK

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. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.

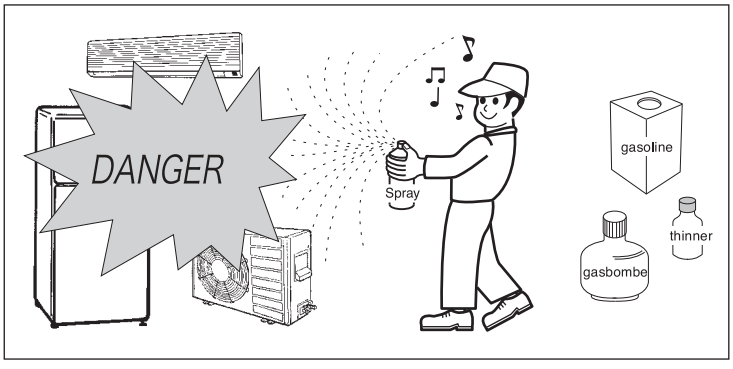
7. In installing the unit having been repaired, be careful to prevent the occurence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.

8. To 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 and 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 manufacturers during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned).

2. Object parts

   (1) Micro computer
   (2) Integrated circuits (I.C.)
   (3) Field-effective transistor (F.E.T.)
   (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).

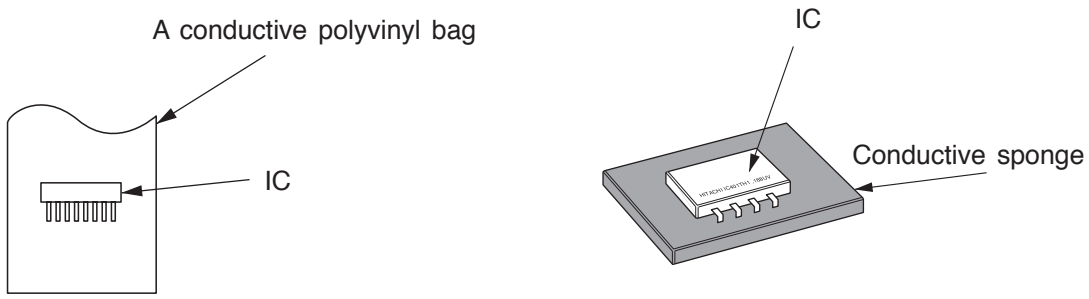


Fig. 1. Conductive container

   (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 1MΩ 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.

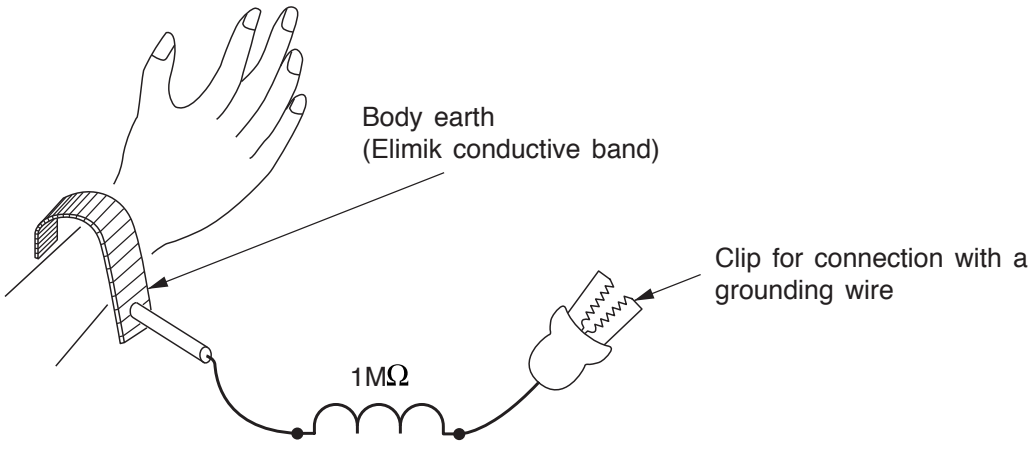


Fig. 2. Body Earth

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

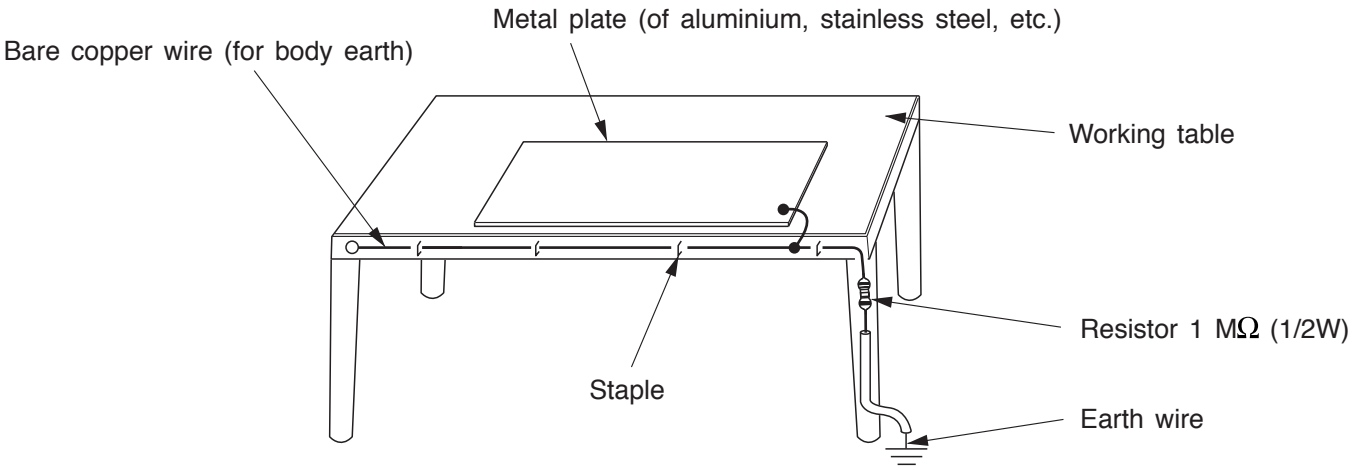


Fig. 3. Grounding of the working table

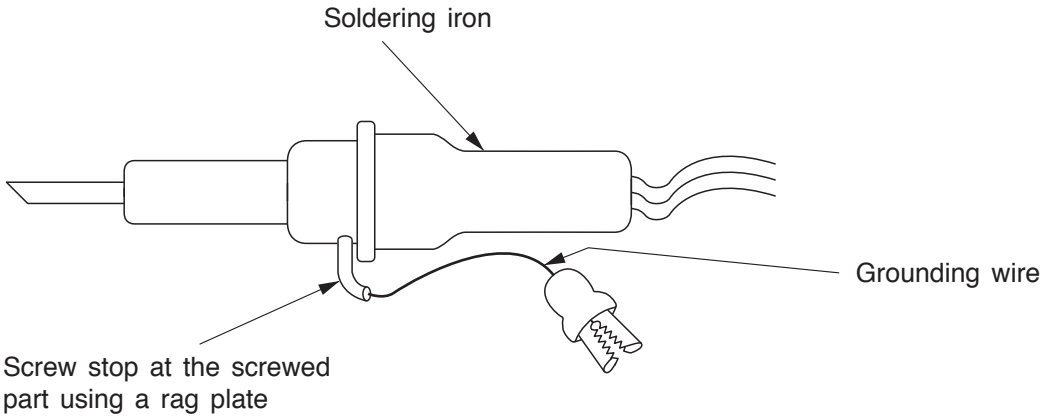


Fig. 4. Grounding a solder iron

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

1. 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 nearby, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.

3. In the event of power failure, the air conditioner will restart automatically in the previously selected mode once the power is restored. In the event of power failure during TIMER operation, the air conditioner 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 miss operation, 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 –18°C (-0.4°F).

6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below –20.55°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

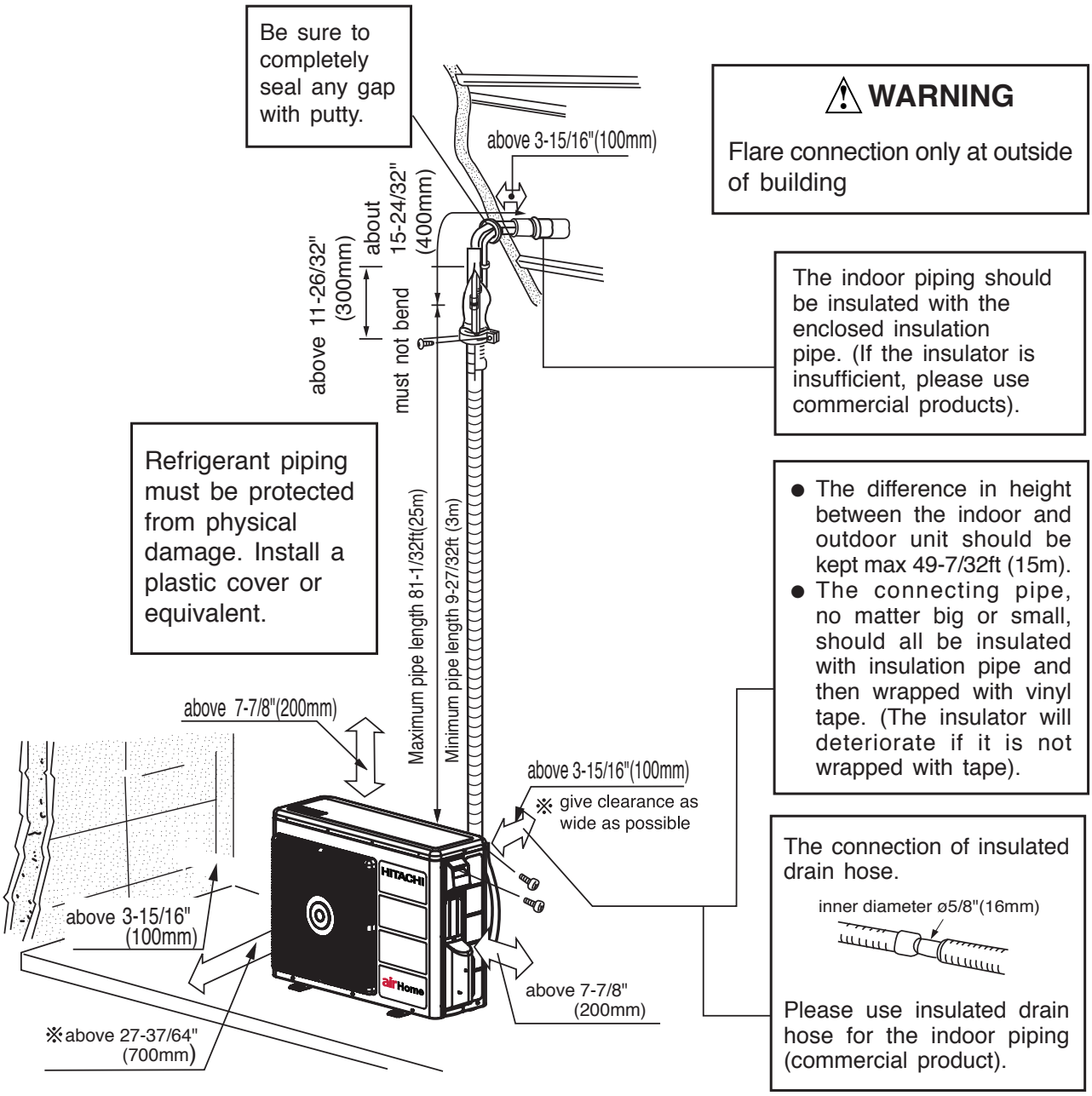
TYPE			DC INVERTER
			OUTDOOR UNIT
MODEL			RAC-DJ12WHAA
POWER SOURCE			1PHASE, 60Hz, 208 ~ 230V
COOLING	TOTAL INPUT	(W)	1000 (550-1300)
	TOTAL AMPERES	(A)	4.831
	CAPACITY	(kW)	3.52 (1.61-3.87)
		(B.T.U./h)	12,000 (5,500-13,200)
HEATING	TOTAL INPUT	(W)	1,190 (580-1,550)
	TOTAL AMPERES	(A)	5.749
	CAPACITY	(kW)	3.81 (1.3-4.25)
		(B.T.U./h)	13,000 (4,400-14,500)
DIMENSIONS inch (mm)		W	29-17/32" (750)
		H	22-14/32" (570)
		D	11-1/32" (280)
NET WEIGHT		lbs (kg)	74.96 lbs (34 kg)

※ After installation

MODEL		RAC-DJ12WHAA
FAN MOTOR		DC47W
FAN MOTOR CAPACITOR		NO
FAN MOTOR PROTECTOR		NO
COMPRESSOR		GSD102TKTA8JT6B
COMPRESSOR MOTOR CAPACITOR		NO
OVERLOAD PROTECTOR		NO
OVERHEAT PROTECTOR		YES
FUSE (for MICROPROCESSOR)		3A
POWER RELAY		G4A
POWER SWITCH		NO
TEMPORARY SWITCH		NO
SERVICE SWITCH		NO
TRANSFORMER		NO
VARISTOR		ERZE11F511
NOISE SUPPRESSOR		YES
THERMOSTAT		YES(IC)
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		NO
REFRIGERANT CHARGING VOLUME (Refrigerant R32)	UNIT	31.75oz (900g)
	PIPES MAX, (81-1/32ft (25m)) MIN, (9-27/32ft (3m))	Additional 0.35oz/ft (10g/m) after 49-7/32ft (15m) length

Figure showing the Installation of Indoor Unit

MODEL RAC-DJ12WHAA



⚠ WARNING

Flare connection only at outside of building

The indoor piping should be insulated with the enclosed insulation pipe. (If the insulator is insufficient, please use commercial products).

Refrigerant piping must be protected from physical damage. Install a plastic cover or equivalent.

- The difference in height between the indoor and outdoor unit should be kept max 49-7/32ft (15m).
- The connecting pipe, no matter big or small, should all be insulated with insulation pipe and then wrapped with vinyl tape. (The insulator will deteriorate if it is not wrapped with tape).

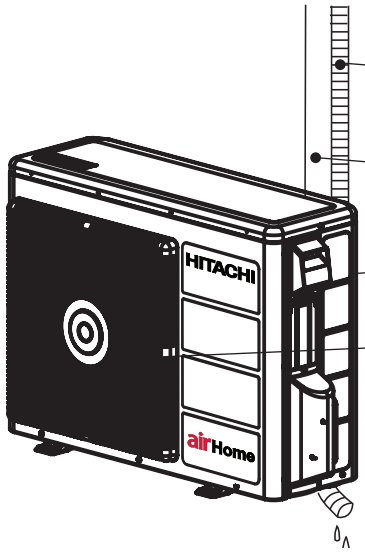
The connection of insulated drain hose.

inner diameter ø5/8"(16mm)

Please use insulated drain hose for the indoor piping (commercial product).

NAMES AND FUNCTIONS OF EACH PART

OUTDOOR UNIT



DRAIN PIPE
Condensed water drain to outside.

CONNECTING CORD

AIR INLET (BACK, LEFT SIDE)

AIR OUTLET

⚠ CAUTION

- When heating operation, drain or defrosted water flows out from outdoor unit. Don't close drain outlet portion in chilly area so as not to freeze these.

MODEL NAME AND DIMENSIONS

MODEL	WIDTH in (mm)	HEIGHT in (mm)	DEPTH in (mm)
RAC-DJ12WHAA	29-17/32" (750)	22-14/32" (570)	11-1/32" (280)

MULTI-AIR CONDITIONER

Several indoor units can be connected to one outdoor unit. You can operate only one unit or several units according to your needs.

Combination of Operations:

When operation mode is selected:

- You cannot operate the indoor units in the following combinations.

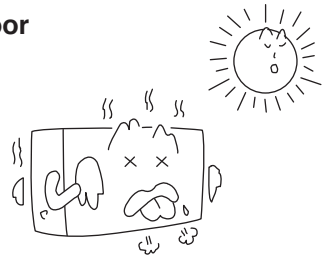
One unit	Other unit
Heating	Cooling
	Dehumidifying
	Fan

- The indoor unit which is turned on first continues to operate. Other indoor units which are turned on later go into stanby mode and the operation lamp lights.
- To operate the indoor units turned on later, set the operation mode as same as the indoor unit turned on first.

During automatic operation:

- When heating operation is automatically selected for the first indoor unit, the next indoor unit will then start to heat. Also, if cooling or dehumidifying is automatically selected for the first indoor unit, the next indoor unit will also start to cool or dehumidify.

Adjusting the Number of Indoor Units:
Decrease the number of indoor units to be operated especially when it is very hot or cold or when you want to reach the present temperature quickly.



Stopped Indoor Units:
When an indoor unit is operated in the cooling, heating or dehumidifying mode in the room, the sound of refrigerant flow may be heard from a stopped indoor unit or a stopped indoor unit may become warm. This is because the indoor unit returns refrigerant to the outdoor unit to be ready for operation.

OPERATING RANGE

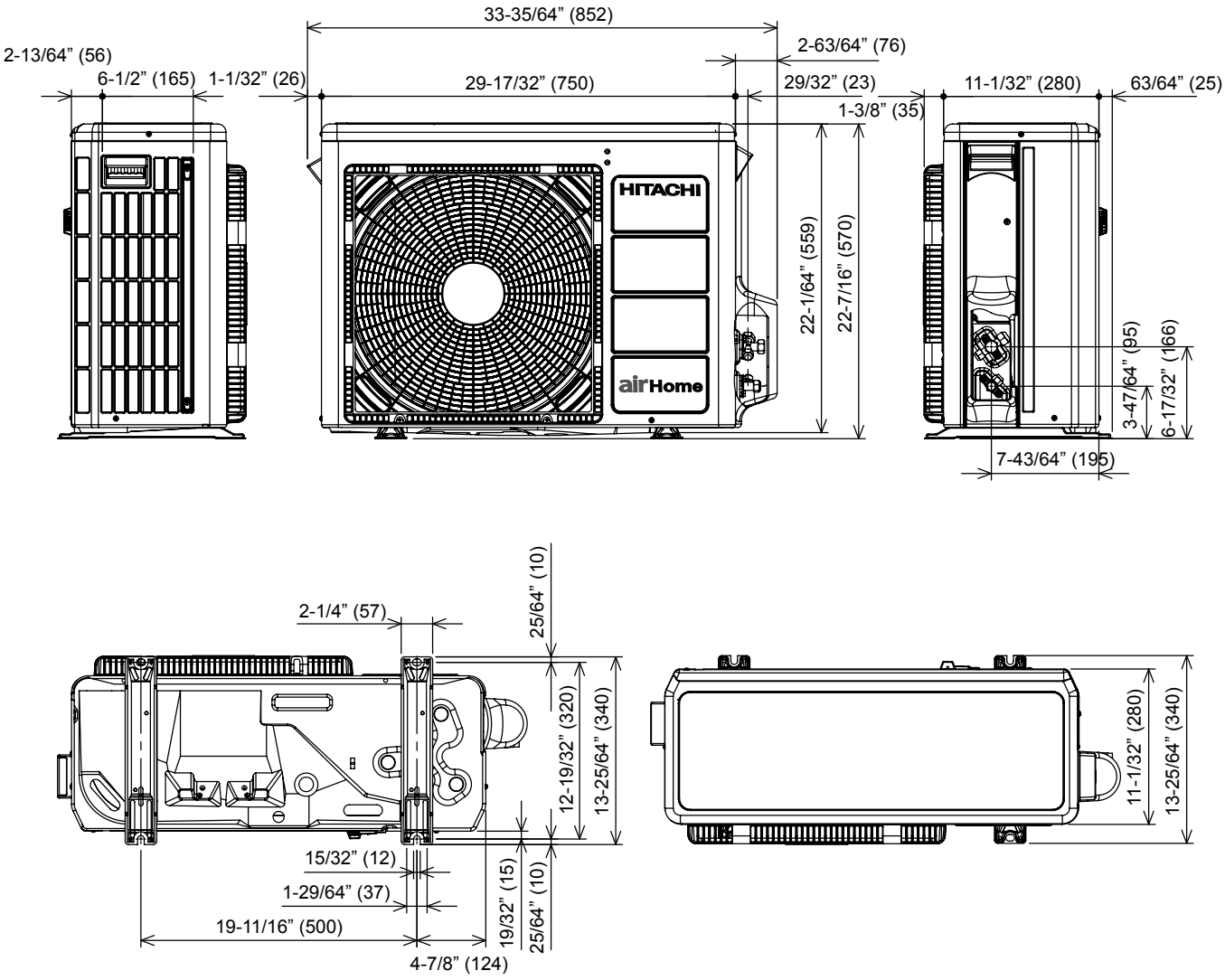
Operation mode		Cooling		Heating	
		Minimum	Maximum	Minimum	Maximum
Indoor temperature	Dry bulb	70°F (21°C)	90°F (32°C)	68°F (20°C)	81°F (27°C)
	Wet bulb	59°F (15°C)	73°F (23°C)	–	–
Outdoor temperature	Dry bulb	-0.4°F (-18°C)	114.8°F (46°C)	-5°F (-20.55°C)	75.2°F (24°C)
	Wet bulb	–	–	–	–

CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAC-DJ12WHAA

OUTDOOR UNIT

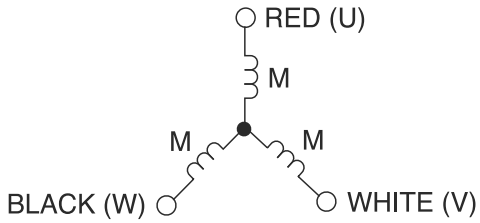
Unit: Inch (mm)



MAIN PARTS COMPONENT

OUTDOOR FAN MOTOR

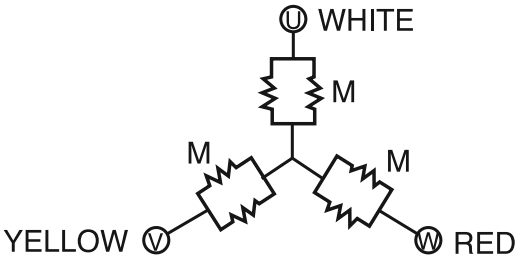
Fan Motor Specifications

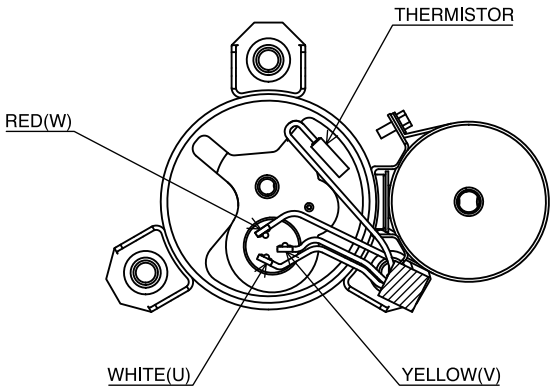
ITEM \ MODEL			RAC-DJ12WHAA
POWER SOURCE			DC: 120 ~ 380V
OUTPUT	(W) MAX		47
COIL			
RESISTANCE VALUE (Ω)	20°C (60°F)	2M	38.2 ± 3.9

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

COMPRESSOR MOTOR

Compressor Motor Specifications

MODEL		RAC-DJ12WHAA
COMPRESSOR MODEL		GSD102TKTA8JT6B
PHASE		SINGLE
RATED VOLTAGE		AC 220 ~ 240 V
RATED FREQUENCY		60Hz
POLE NUMBER		6
CONNECTION		
RESISTANCE VALUE (Ω)	20°C (68°F)	2M = 1.982
	75°C (167°F)	–



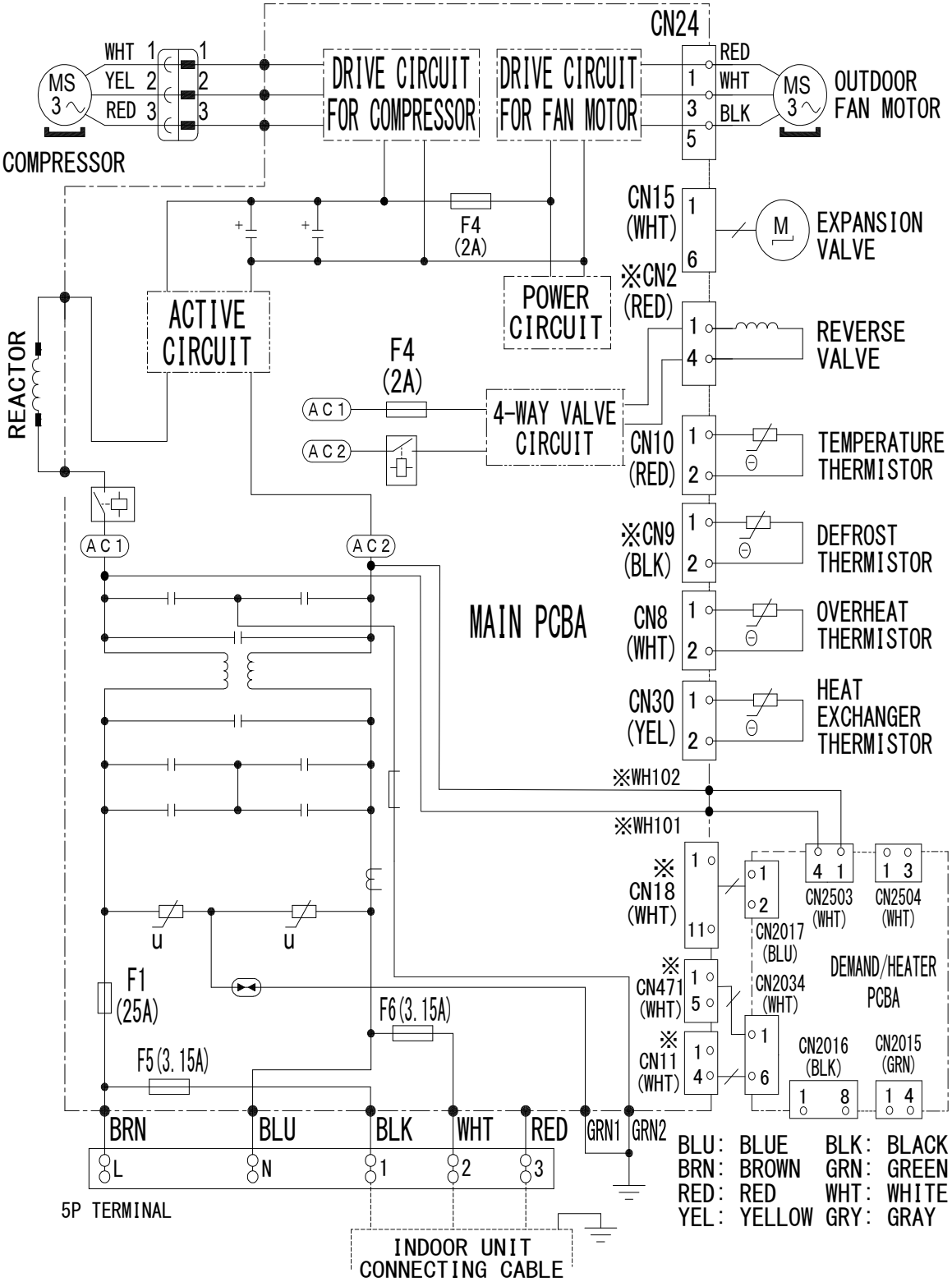
⚠ CAUTION

When the Air Conditioner has been operated for a long time with the strainer clogged or crushed or with too little refrigerant, check the color of the refrigerant oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

WIRING DIAGRAM

RAC-DJ12WHAA

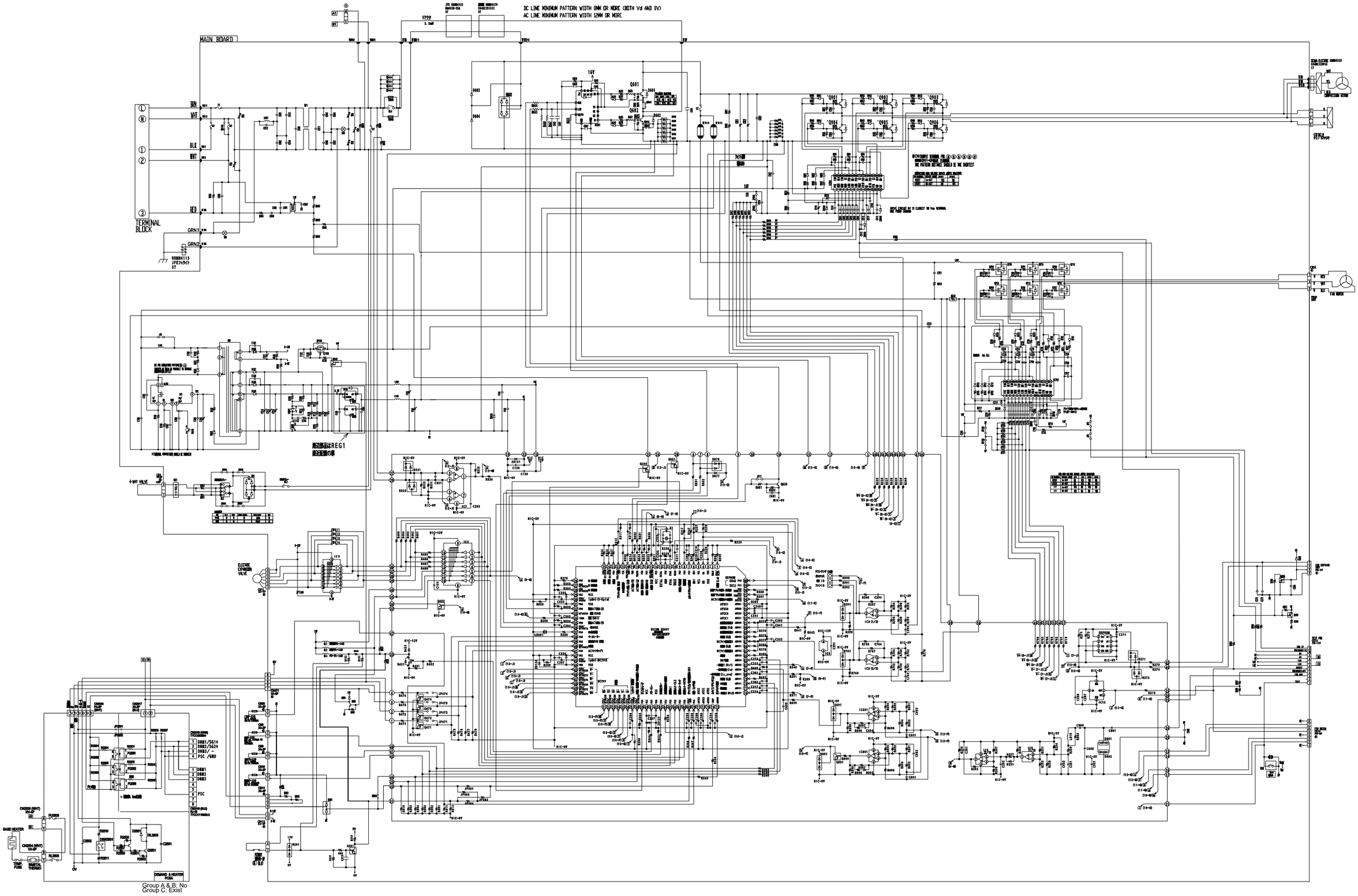
OUTDOOR UNIT



※SOME MODEL DO NOT HAVE THIS FUNCTION.

CIRCUIT DIAGRAM

RAC-DJ12WHAA



MAIN P.W.B

SYMBOL	DRAWING NO.	RATING	MANUFACTURER	MOUNT	FORM	PCB	A/B	A	B	C
C101	RRCPP462		SAMWHA	P	1608	MAIN	A	O	O	
C102	RRCPP128		MURATA	P	1608	MAIN	A	O	O	
C104	RRCPP455	22uF,50V	AISHI	R	1608	MAIN	A	O	O	
C107	A1026T050Z		WALSIN	C	1608	MAIN	B	O	O	
C108	A1036T025Z		WALSIN	C	1608	MAIN	B	O	O	
C111	RRCPP457	330uF,25V	AISHI	R	1608	MAIN	A	O	O	
C114	RRCPP371	220uF,25V	AISHI	R	1608	MAIN	A	O	O	
C115	RRCPP371	220uF,25V	AISHI	R	1608	MAIN	A	O	O	
C116	RRCPP368	330uF,16V	AISHI	R	1608	MAIN	A	O	O	
C117	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C123	RRCPP369	470uF,25V	AISHI	R	-	MAIN	A	O	O	
C150	A334AT025Z		WALSIN	C	2012	MAIN	B	O	O	
C151	A225CT025Z		WALSIN	C	2012	MAIN	B	O	O	
C272	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C273	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C286	A1046T016Z		WALSIN	C	1608	MAIN	B	O	O	
C401	RRCPP458	100uF,25V	AISHI	R	-	MAIN	A	O	O	
C661	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C662	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C663	RRCPP459		AISHI	R	-	MAIN	A	O	O	
C664	A105AT025Z		WALSIN	C	2012	MAIN	B	O	O	
C665	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C666	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C667	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C702	A105AT025Z		WALSIN	C	2012	MAIN	B	O	O	
C703	A2226T050Z		WALSIN	C	1608	MAIN	B	O	O	
C704	A1036T050Z		WALSIN	C	1608	MAIN	B	O	O	
C706	A1046T016Z		WALSIN	C	1608	MAIN	B	O	O	
C711	A3315T050Z		WALSIN	C	1608	MAIN	B	O	O	
C712	A3315T050Z		WALSIN	C	1608	MAIN	B	O	O	
C713	A3315T050Z		WALSIN	C	1608	MAIN	B	O	O	
C714	A3315T050Z		WALSIN	C	1608	MAIN	B	O	O	
C715	A3315T050Z		WALSIN	C	1608	MAIN	B	O	O	
C716	A3315T050Z		WALSIN	C	1608	MAIN	B	O	O	
C717	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C718	A1026T050Z		WALSIN	C	1608	MAIN	B	O	O	
C721	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C722	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C723	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C724	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C725	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C726	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C737	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C738	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C739	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C740	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C741	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C742	A1015T050Z		WALSIN	C	1608	MAIN	B	O	O	
C772	A1046T050Z		WALSIN	C	1608	MAIN	B	O	O	
C802	RRCPP046		TDK	P	-	MAIN	A	O	O	
C803	RRCP9901	0.018uF,50V,F-CAPA	RUBYCON	R	-	MAIN	A	O	O	
C805	A1046T016Z		WALSIN	C	1608	MAIN	B	O	O	
C807	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C901	A6815T050Z		WALSIN	C	1608	MAIN	B	O	O	
C902	A6815T050Z		WALSIN	C	1608	MAIN	B	O	O	
C903	A6815T050Z		WALSIN	C	1608	MAIN	B	O	O	
C904	A6815T050Z		WALSIN	C	1608	MAIN	B	O	O	
C905	A6815T050Z		WALSIN	C	1608	MAIN	B	O	O	
C906	A6815T050Z		WALSIN	C	1608	MAIN	B	O	O	
C910	RRCPP458	100uF,25V	AISHI	R	-	MAIN	A	O	O	
C911	A105AT025Z		WALSIN	C	2012	MAIN	B	O	O	
C912	A6836T050Z		WALSIN	C	1608	MAIN	B	O	O	
C913	A2225T050Z		WALSIN	C	1608	MAIN	B	O	O	
C914	A1046T050Z		WALSIN	C	1608	MAIN	B	O	O	
C915	A1025T050Z		WALSIN	C	1608	MAIN	B	O	O	
C917	A1026T050Z		WALSIN	C	1608	MAIN	B	O	O	
C920	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C921	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C922	RRCPP456	22uF,35V	AISHI	R	-	MAIN	A	O	O	
C923	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C924	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C925	A1046T025Z		WALSIN	C	1608	MAIN	B	O	O	
C941	A1047T050Z		WALSIN	C	1608	MAIN	B	O	O	
D101	RREB4430	800V,1.2A	SANKEN	A	-	MAIN	A	O	O	
D102	RREBT594	200V,0.75A	SHINDENGEN	C	-	MAIN	B	O	O	
D105	RREB5585	400V,0.9A	SHINDENGEN	A	-	MAIN	A	O	O	
D107 - D109	RREBT594	200V,0.75A	SHINDENGEN	C	-	MAIN	B	O	O	
D111	RREB5605	80V,100mA	ROHM	C	UMD2	MAIN	B	O	O	

D286	RREB5605	80V,100mA	ROHM	C	UMD2	MAIN	B	O	O
D301	RREB5215	80V,100mA	KEC	C	SOT-23	MAIN	B	O	O
D671	RREB5605	80V,100mA	ROHM	C	UMD2	MAIN	B	O	O
D673	RREB5605	80V,100mA	ROHM	C	UMD2	MAIN	B	O	O
D721 - D726	RREB5605	80V,100mA	ROHM	C	UMD2	MAIN	B	O	O
D911 - D916	RREB5605	80V,100mA	ROHM	C	UMD2	MAIN	B	O	O
F5	RRPM3094		LITTELFUSE	R	-	MAIN	A	O	O
F6	RRPM3094		LITTELFUSE	R	-	MAIN	A	O	O
IC641	RREAP014	2ch MOSFET DRIVER	INFINEON	S	DSO	MAIN	B	O	O
IC702	RREAP080	6ch IGBT DRIVER	INFINEON	S	DSO	MAIN	B	O	O
IC901	RREAP080	6ch IGBT DRIVER	INFINEON	S	DSO	MAIN	B	O	O
J1 - J14	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J100 - J109	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J110 - J119	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J120 - J129	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J130 - J139	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J140 - J148	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J15 - J19	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J20 - J29	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J30 - J39	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J40 - J49	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J50 - J59	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J60 - J69	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J601 - J602	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O

J70 - J80	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J801 - J808	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J81 - J89	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J90 - J99	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
J900 - J901	M0000CT2BJ	0Ω,5%,1/4W,3216	KOA	C	3216	MAIN	B	O	O
JP101	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
JP2	M0000AT2ZJ	0Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
JP702	M0000AT2ZJ	0Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
JP902	M0000AT2ZJ	0Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
JW1	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
JW601	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
L001	RRMHP110	35Ω/100MHz	SINKA	A	-	MAIN	A	O	O
L104	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
L105	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
L701	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
Q286	RREG5603	50V,50mA,10kΩ/10kΩ	ROHM	C	-	MAIN	B	O	O
R001	RRTEP010	1.43MΩ,1%1/4W	KOA	A	-	MAIN	A	O	O
R002	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
R004	Z4703ST2EJ	470kΩ,5%,1/4W	ROYALOHM	A	-	MAIN	A	O	O
R010	RRTC2237	0.1Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R011	RRTC2237	0.1Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R012	RRTC2237	0.1Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R013	RRTC2237	0.1Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R014	RRTC2237	0.1Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R015	RRTC2237	0.1Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R101	R2209G93AJ	22Ω,5%,1W	KOA	P	-	MAIN	A	O	O
R102	T6803ST2HJ	680kΩ,5%,1/2W	KOA	A	-	MAIN	A	O	O
R105	R1508ST2HJ	1.5Ω,5%,1/2W	KOA	A	-	MAIN	A	O	O
R106	M3303AT2ZJ	330kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R107	M1009BT2AJ	10Ω,5%,1/8W,2012	KOA	C	2012	MAIN	B	O	O
R109	M0000CT2BJ	0Ω,5%,1/4W,3216	KOA	C	3216	MAIN	B	O	O
R112	M1102AT2ZF	11kΩ,1%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R113	M3001AT2ZF	3kΩ,1%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R114	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R115	M1002AT2ZF	10kΩ,1%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R116	M1001AT2ZF	1kΩ,1%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R120	M3301AT2ZJ	3.3kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R140	M2002CT2BJ	20kΩ,5%,1/4W,3216	KOA	C	3216	MAIN	B	O	O
R150	M0000AT2ZJ	0Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R216	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R241	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R281	M1002AT2ZJ	10kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R286	Z1201ST2CJ	1.2kΩ,5%,1/6W	ROYALOHM	A	-	MAIN	A	O	O

SYMBOL	DRAWING NO.	RATING	MANUFACTURER	MOUNT	FORM	PCB	A/B	A	B	C
R307	M1001AT2ZJ	1kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O	
R381	M0000AT2ZJ	0Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O	
R441	R1201ST3DJ	1.2kΩ,5%,2W	KOA	A	-	MAIN	A	O	O	
R442	R1201ST3DJ	1.2kΩ,5%,2W	KOA	A	-	MAIN	A	O	O	
R601	RRTCP002	0.02Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O	
R602	RRTCP002	0.02Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O	
R603	RRTCP002	0.02Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O	
R604	RRTCP002	0.02Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O	
R608	RRTE2211	750kΩ,1%,1/4W	KOA	A	-	MAIN	A	O	O	
R609	RRTE2211	750kΩ,1%,1/4W	KOA	A	-	MAIN	A	O	O	
R663	M5100AT2ZJ	510Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O	
R664	M3001AT2ZJ	3kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O	
R665	M3001AT2ZJ	3kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O	

R667	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R668	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R671	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R672	M1500AT2ZJ	150Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R673	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R674	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R675	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R676	M1500AT2ZJ	150Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R677	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R678	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R716	M1004AT2ZJ	1MΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R717	M1001AT2ZJ	1kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R718	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R721	M2001AT2ZJ	2kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R722	M2001AT2ZJ	2kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R723	M2001AT2ZJ	2kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R724	M2001AT2ZJ	2kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R725	M2001AT2ZJ	2kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R726	M2001AT2ZJ	2kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R727	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R728	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R729	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R730	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R731	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R732	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R741	RRTC9576	0.24Ω,1%,2W,5025	Panasonic	C	5025	MAIN	B	O	O
R742	3PUD97578A	φ0.6	NIHON	A	-	MAIN	A	O	O
R771	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R772	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R773	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R774	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R775	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R776	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R781	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R782	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R783	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R784	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R785	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R786	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R787	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R788	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R789	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R790	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R791	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R792	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R801	M6800CT2BJ	680Ω,5%,1/4W,3216	KOA	C	3216	MAIN	B	O	O
R802	M1800BT2AJ	180Ω,5%,1/8W,2012	KOA	C	2012	MAIN	B	O	O
R803	M2001BT2AJ	2kΩ,5%,1/8W,2012	KOA	C	2012	MAIN	B	O	O
R804	Z4709ST2HJ	47Ω,5%,1/2W	ROYALOHM	A	-	MAIN	A	O	O
R806	M9109CT2BF	91Ω,1%,1/4W,3216	KOA	C	3216	MAIN	B	O	O
R901	M5109AT2ZJ	51Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R902	M5109AT2ZJ	51Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R903	M5109AT2ZJ	51Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R904	M5109AT2ZJ	51Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R905	M5109AT2ZJ	51Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R906	M5109AT2ZJ	51Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R907	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R908	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R909	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R910	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R911	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R912	M2002AT2ZJ	20kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R921	M5109AT2ZF	51Ω,1%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R922	M1004AT2ZJ	1MΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R923	M0000AT2ZJ	0Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R928	M1000AT2ZJ	100Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R941	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R942	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R943	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R944	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R945	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R946	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R951	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R952	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R953	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R954	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R955	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R956	M4702AT2ZJ	47kΩ,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R961	M7509AT2ZJ	75Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R962	M7509AT2ZJ	75Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R963	M7509AT2ZJ	75Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R964	M7509AT2ZJ	75Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R965	M7509AT2ZJ	75Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R966	M7509AT2ZJ	75Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R971	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R972	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R973	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R974	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R975	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
R976	M2409AT2ZJ	24Ω,5%,1/10W,1608	KOA	C	1608	MAIN	B	O	O
REG1	RREA5965	5V REGULATOR(LOW DROP)	JRC	S	SOT-89-1	MAIN	B	O	O
REG2	RREA5935	SHUNT REGULATOR	KEC	R	-	MAIN	A	O	O
SA	RRZEP378	3600V±20%	TDK	R	-	MAIN	A	O	O
SA2	RRZEP378	3600V±20%	TDK	R	-	MAIN	A	O	O
TEST	RRSA1646	DC24V,50mA	HOKURIKU ELECTRIC	R	-	MAIN	A	O	O
VS1	RRELP311	320V,Φ15.5	TDK	P	-	MAIN	A	-	O
VS2	RRELP311	320V,Φ15.5	TDK	P	-	MAIN	A	-	O
VS6	RRELP311	320V,Φ15.5	TDK	P	-	MAIN	A	-	O
VS7	RRELP311	320V,Φ15.5	TDK	P	-	MAIN	A	-	O
VS1	RRELP222	510V	PANASONIC	P	-	MAIN	A	O	-
VS2	RRELP222	510V	PANASONIC	P	-	MAIN	A	O	-
VS6	RRELP222	510V	PANASONIC	P	-	MAIN	A	O	-
VS7	RRELP222	510V	PANASONIC	P	-	MAIN	A	O	-
ZD120	RREBT543	6.65V-6.93V,200mW	ROHM	C	UMD2	MAIN	B	O	O
ZD901	RREBT517	21.54V-22.47V,200mW	ROHM	C	UMD2	MAIN	B	O	O
ZD902	RREBT517	21.54V-22.47V,200mW	ROHM	C	UMD2	MAIN	B	O	O

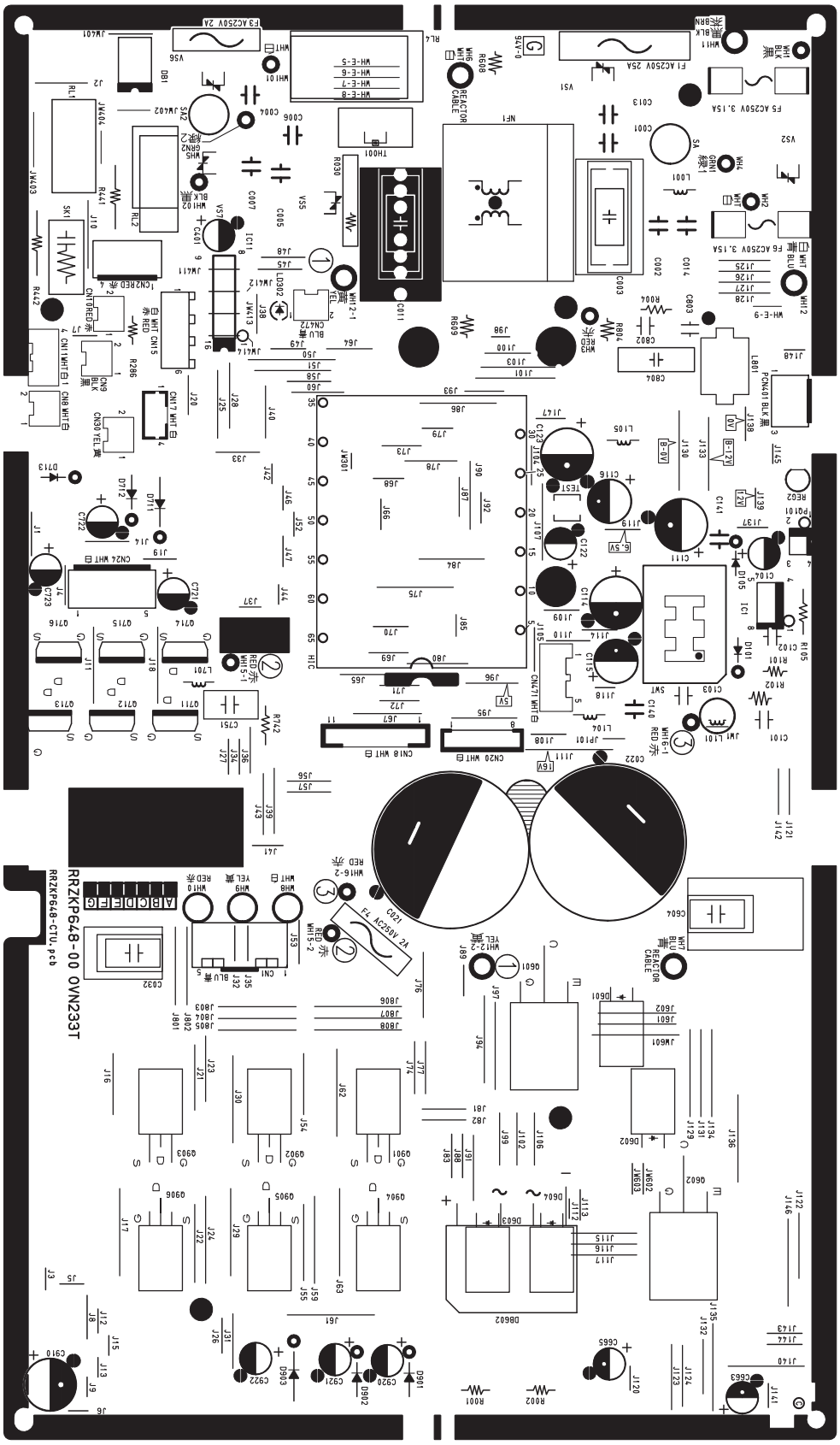
HIC P.W.B

SYMBOL	DRAWING NO.	RATING	MANUFACTURER	MOUNT	FORM	PCB	A/B	A	B	C
C003	RRCPP071	0.68uF,AC310V,F-CAPA	OKAYA	H	-	MAIN	A	O	O	O
C011	RRCP2925	3.3uF	OKAYA	H	-	MAIN	A	O	O	O
C021	RRCPP187	610uF,450V	Nichicon	H	-	MAIN	A	-	O	-
C021	RRCPP130	500uF,450V	Nippon Chemicon	H	-	MAIN	A	O	-	O
C022	RRCPP187	610uF,450V	Nichicon	H	-	MAIN	A	-	O	-
C022	RRCPP130	500uF,450V	Nippon Chemicon	H	-	MAIN	A	O	-	O
C032	RRCP9714	0.1uF,450V	OKAYA	H	-	MAIN	A	O	O	O
C604	RRCPP001	1uF,DC450V	OKAYA	H	-	MAIN	A	O	O	O
C751	RRCP9714	0.1uF,450V	OKAYA	H	-	MAIN	A	O	O	O
C804	RRCP2926	0.1uF,AC310V,F-CAPA	OKAYA	H	-	MAIN	A	O	O	O
CN10	RRPA2469	RED	JST	H	-	MAIN	A	O	O	O
CN11	RRPA2683	WHITE	JST	H	-	MAIN	A	O	O	O
CN15	RRPB2473	WHITE	JST	H	-	MAIN	A	O	O	O
CN17	RRPAP262	WHITE	CWB	H	-	MAIN	A	O	O	O
CN18	RRPBP269	WHITE	CWB	H	-	MAIN	A	O	O	O
CN2	RRPA2462	RED	JST	H	-	MAIN	A	O	O	O
CN20	RRPBP266	WHITE	CWB	H	-	MAIN	A	O	O	O
CN24	RRPA1335	WHITE	JST	H	-	MAIN	A	O	O	O
CN30	RRPAP287	YELLOW	JST	H	-	MAIN	A	O	O	O
CN471	RRPB2278	WHITE	JST	H	-	MAIN	A	-	-	O
CN8	RRPA2467	WHITE	JST	H	-	MAIN	A	O	O	O
CN9	RRPA2468	BLACK	JST	H	-	MAIN	A	O	O	O
DB1	RREBT092	600V,1A	SHINDENGEN	H	-	MAIN	A	O	O	O
DB602	RREB4831	600V,25A	SHINDENGEN	H	SIP	MAIN	A	O	O	O
F1	RRPNP145	25A,250V	WALTER	H	-	MAIN	A	O	O	O
F3	RRPNP148	2A,250V	WALTER	H	-	MAIN	A	O	O	O
F4	RRPNP148	2A,250V	WALTER	H	-	MAIN	A	O	O	O
F5	RRPNP147	3.15A,250V	WALTER	H	-	MAIN	A	O	O	O
F6	RRPNP147	3.15A,250V	WALTER	H	-	MAIN	A	O	O	O
IC1	RREAP179	SWITCHING REGULATOR	SANKEN	H	DIP	MAIN	A	O	O	O
IC11	RREAP306	7-UNIT TRANSISTOR ARRAY	KEC	H	DIP	MAIN	A	O	O	O
L801	RRMFP181	PrimarySide:1.25mH		H	-	MAIN	A	O	O	O
NF1	RRMHP103	15TS	TMP Inc.	H	-	MAIN	A	O	O	O
PQ101	RREG5766	CTR:300~600	LITE-ON	H	-	MAIN	A	O	O	O
Q601	RREGP256	650V,50A	INFINEON	H	-	MAIN	A	O	O	O
Q602	RREGP256	650V,50A	INFINEON	H	-	MAIN	A	O	O	O
Q711	RREGP210	500V,5A	JSMC	H	TO-220	MAIN	A	O	O	O
Q712	RREGP210	500V,5A	JSMC	H	TO-220	MAIN	A	O	O	O
Q713	RREGP210	500V,5A	JSMC	H	TO-220	MAIN	A	O	O	O
Q714	RREGP210	500V,5A	JSMC	H	TO-220	MAIN	A	O	O	O
Q715	RREGP210	500V,5A	JSMC	H	TO-220	MAIN	A	O	O	O
Q716	RREGP210	500V,5A	JSMC	H	TO-220	MAIN	A	O	O	O
Q901	RREGP193	650V,8A	ROHM	H	TO-220NFM	MAIN	A	O	O	O
Q902	RREGP193	650V,8A	ROHM	H	TO-220NFM	MAIN	A	O	O	O
Q903	RREGP193	650V,8A	ROHM	H	TO-220NFM	MAIN	A	O	O	O
Q904	RREGP193	650V,8A	ROHM	H	TO-220NFM	MAIN	A	O	O	O
Q905	RREGP193	650V,8A	ROHM	H	TO-220NFM	MAIN	A	O	O	O
Q906	RREGP193	650V,8A	ROHM	H	TO-220NFM	MAIN	A	O	O	O
RL1	RRRB1338	AC125V,0.5A,DC12V	OMRON	H	-	MAIN	A	O	O	O
RL2	RRRB1330	AC250V,3A,DC12V	FUJITSU	H	-	MAIN	A	O	O	O
RL4	RRRB1390	AC250V,20A,DC12V	DAIICHI	H	-	MAIN	A	O	O	O
SWT	RRMFP147	1.0mH±15%(at100kHz)	TAMURA	H	-	MAIN	A	O	O	O
TH001	RRELP251	480V		H	-	MAIN	A	O	O	O
WH1	CC0011615A	AWG20 BK,WH,RD	JOHOKU	H	-	MAIN	A	O

PRINTED BOARD LOCATION

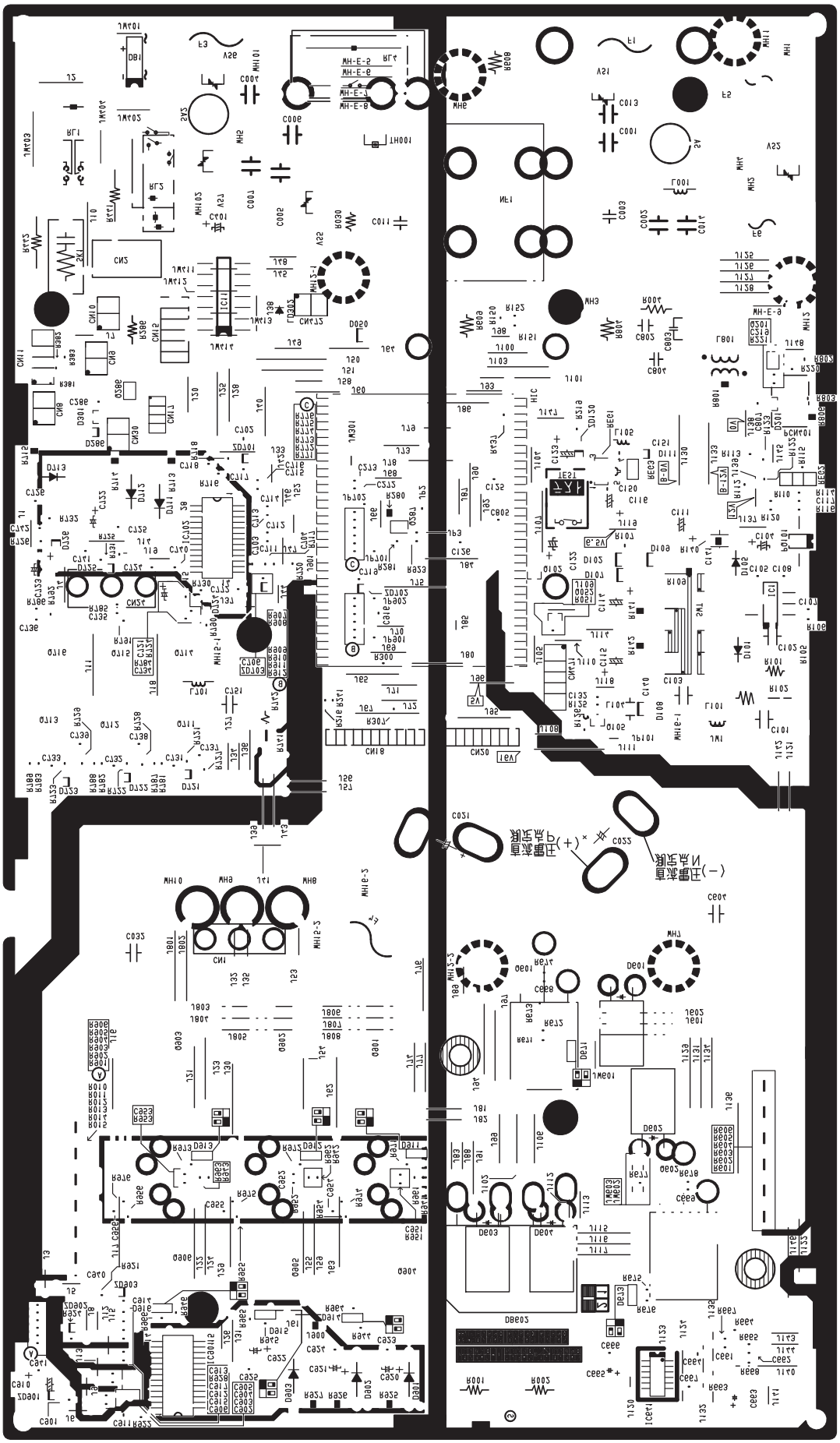
RAC-DJ12WHAA

MAIN P.W.B



A SIDE

MAIN P.W.B

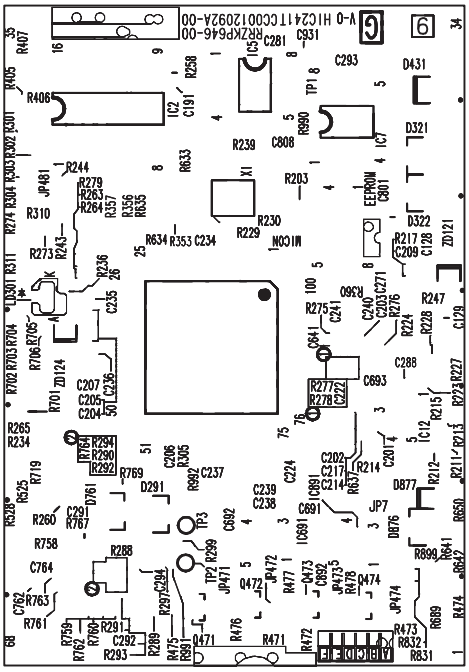


B SIDE

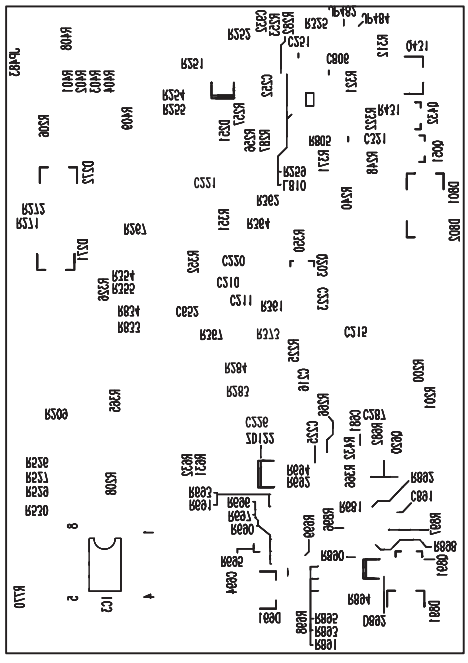
PRINTED BOARD LOCATION

RAC-DJ12WHAA

HIC P.W.B

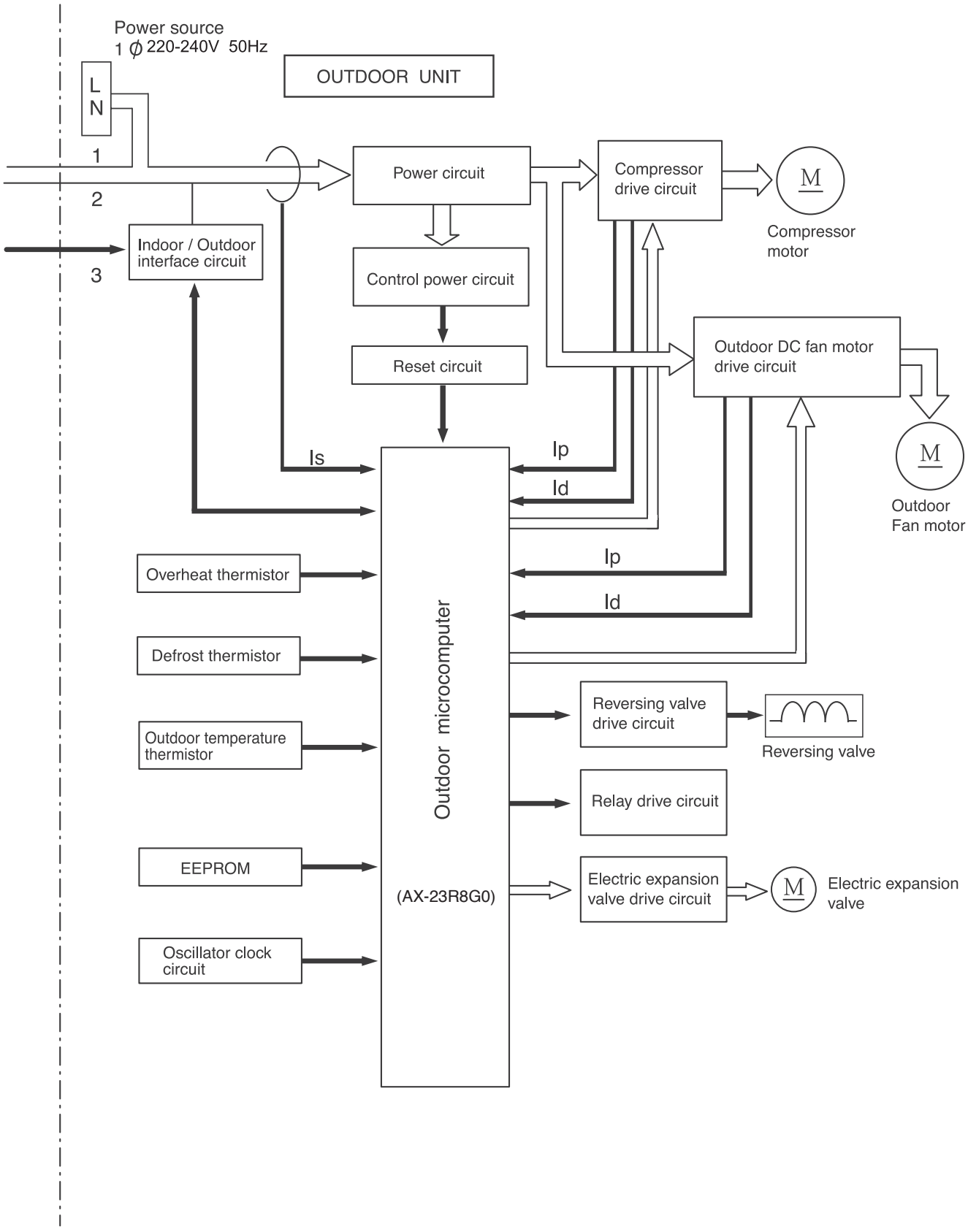


A SIDE



B SIDE

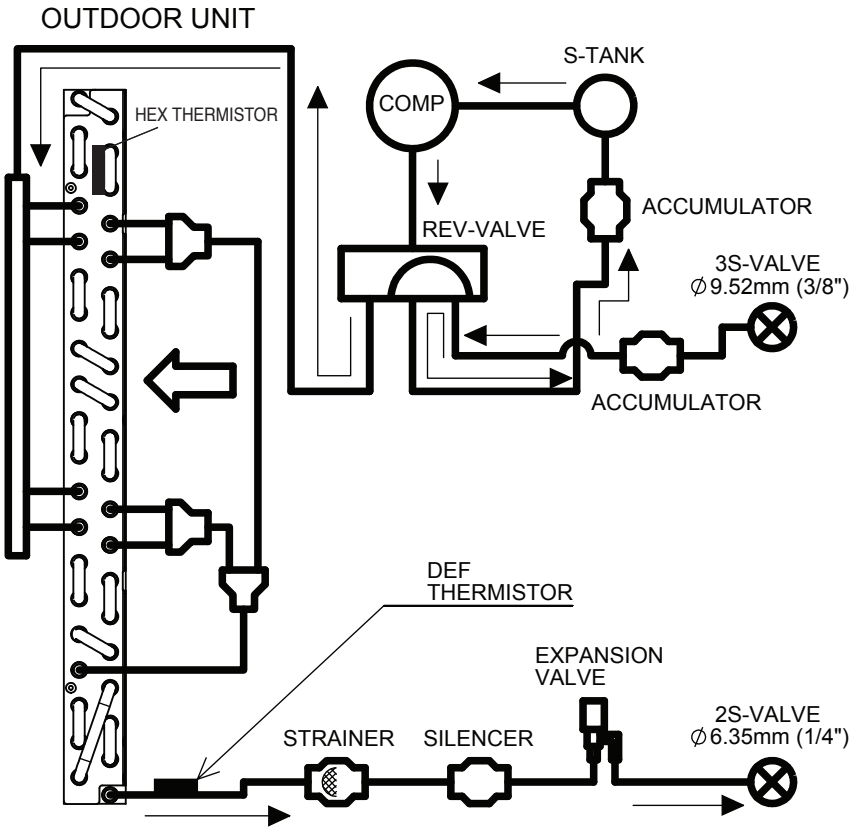
BLOCK DIAGRAM



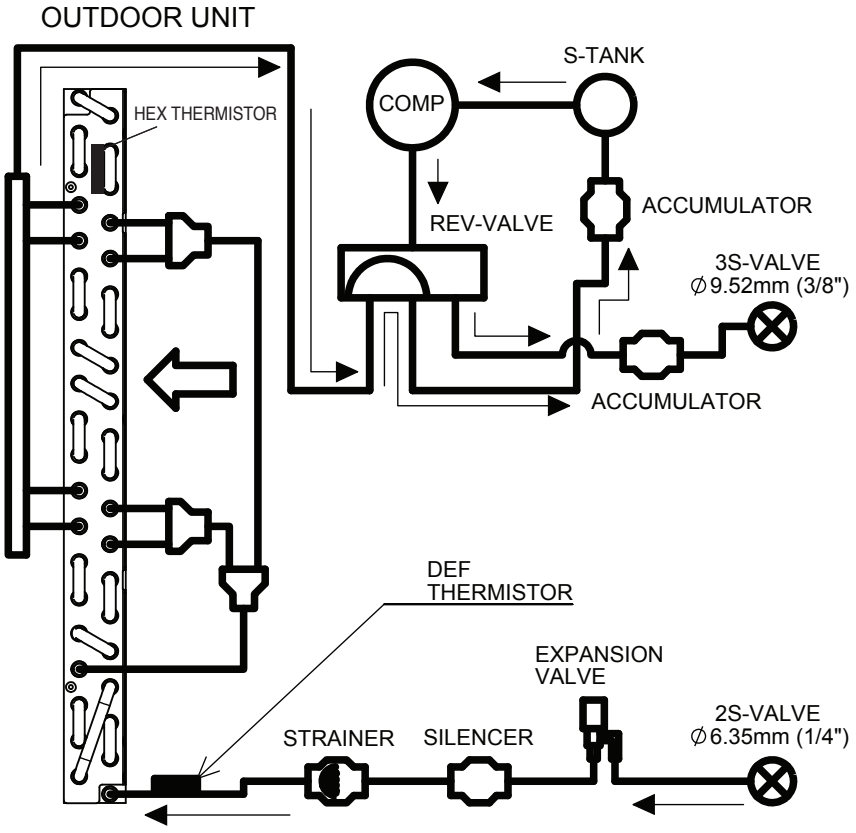
REFRIGERATING CYCLE DIAGRAM

RAC-DJ12WHAA

COOLING, DEHUMIDIFYING, DEFROSTING



HEATING



Procedure for Disassembly and Reassembly

OUTDOOR UNIT

MODEL RAC-DJ12WHAA

1. Electrical Parts

(1) Remove the top cover fixing screws and lift the cover to remove it.

(2) Remove the handle cover fixing screws and push it down to take it out.

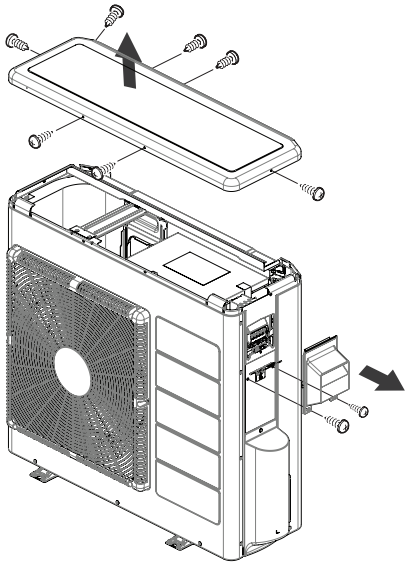


Fig.9

(3) Remove the electrical box fixing screws.

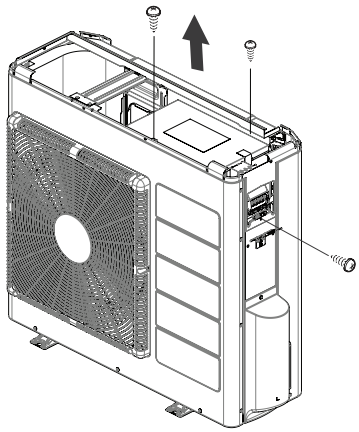
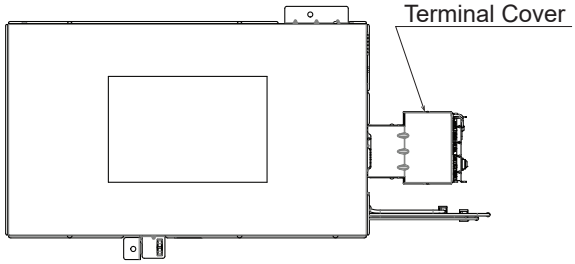


Fig.10

2. Dismantle procedure of MAIN PWB.

(1) Remove terminal cover.



(2) Remove the terminal block screw,inductance line,line clip,GRN wire,LN123 wire.

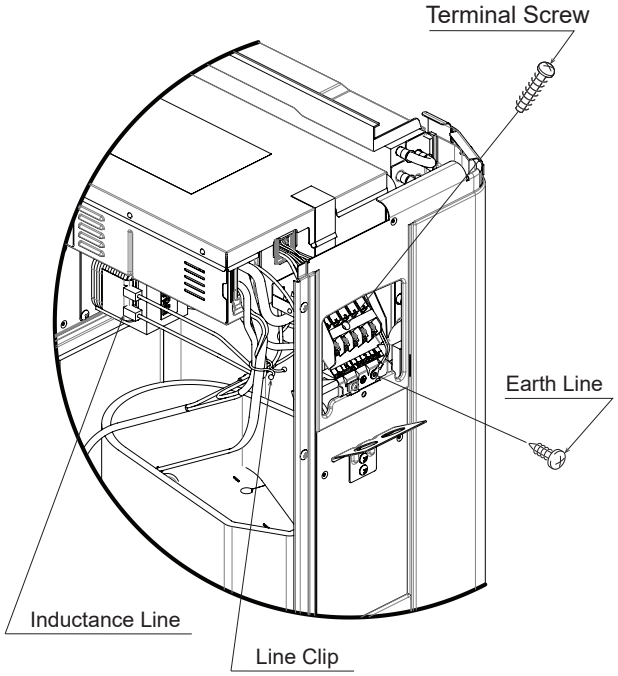


Fig.11

(3) Set the electrical box upside down.

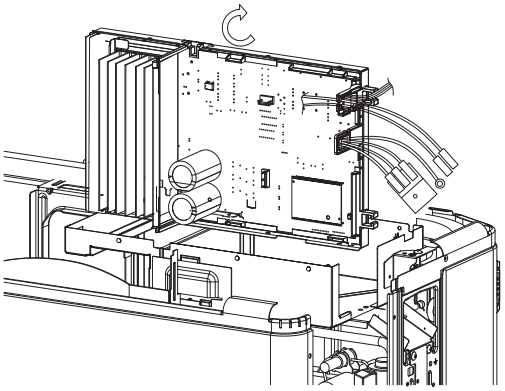


Fig.12

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

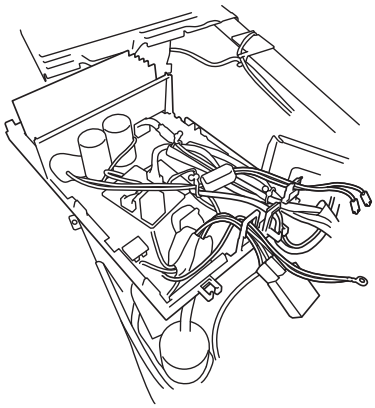


Fig.13

3. The PWB.

(1) Remove the electrical cover.

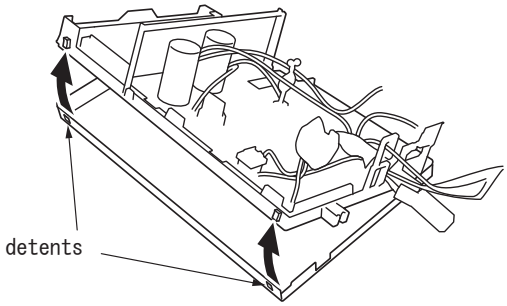


Fig.14

(2) Remove the PWB from the support.

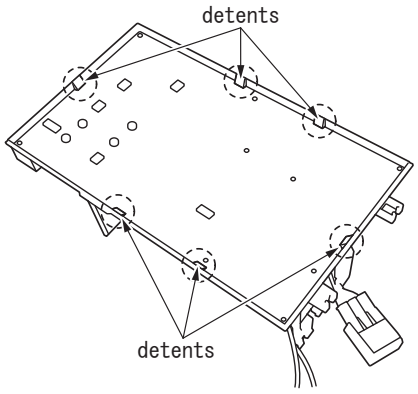


Fig.15

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL: RAC-DJ12WHAA

1. Power Circuit.

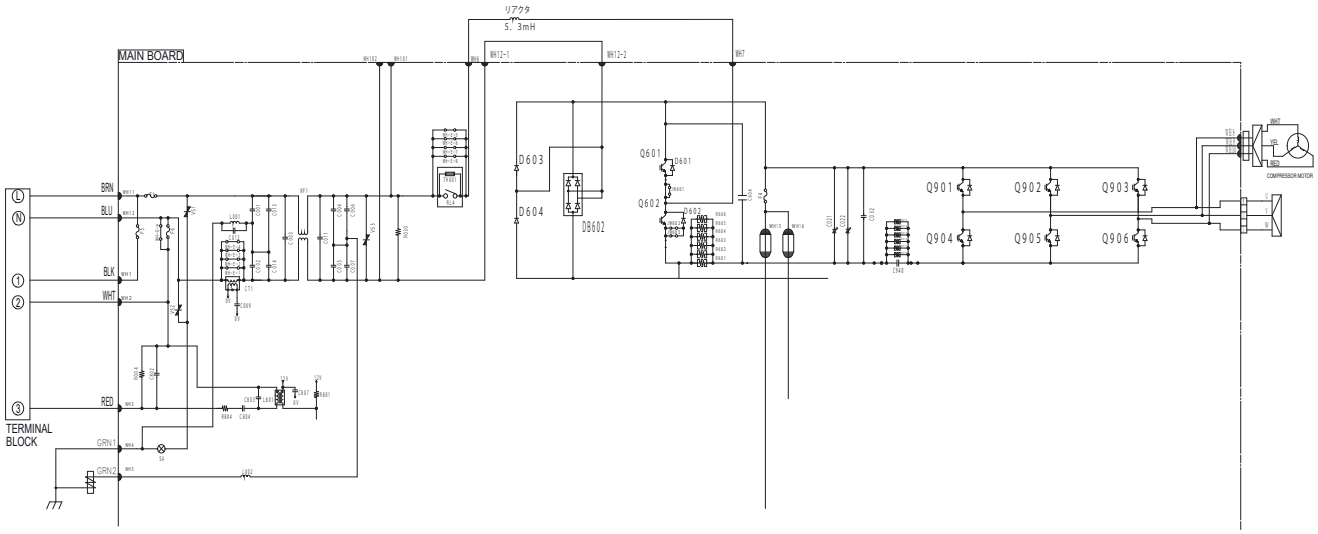


Fig.1-1

※ This circuit rectifies the AC voltage 230V applied between terminal L and N and creates a DC voltage.

The voltage become 320-360V when the compressor is operated.

※ Importance components.

(1) Inverter circuit for compressor (Q901 to Q906).
The elements constitute the inverter part.

<Reference>

※ When the inverter circuits for compressor (Q901 to Q906) have a failure or improper connection, the compressor may stop immediately after its starts, due to “Abnormal low speed”, “Switch failure”, “IP Stop”, etc.

(2) Diode stack (DB602).
The diode stack rectify AC Voltage 230V applied between the Terminal board L and N to DC Voltage.

<Reference>

※ When the diode stack (DB602) has failure, DC voltage can not be generated, completely disabling the operation of the compressor. Also note that 2A fuse may have blown.

(3) Smoothing capacitor (C021 to C022, 500uF,450V).

<Reference>

※ The smoothing capacitor smoothes (average) voltage rectifier by the diode bridge.

(4) IGBT for the power factor improvement (Q601).

<Reference>

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

(5) Surge absorber, varistor 1 and 2.
The surge absorber and varistor absorb exogenous surge, including inductive lightning.

<Reference>

※ Be sure to ground the surge absorber and varistor. without grounding, the surge absorber and varistor do not operate normally.

(6) Noise filter (C001,C002,C006,C007,C013,C014, NF Coil).The noise filter absord electrical noise generated when the compressor operates and when exogenous noiseis mixed through the power line.In order to protect electronic parts.

<Reference>

※ Without grounding, the noise filter on the left do not operated normally.

2. Power Circuit (Low Voltage)

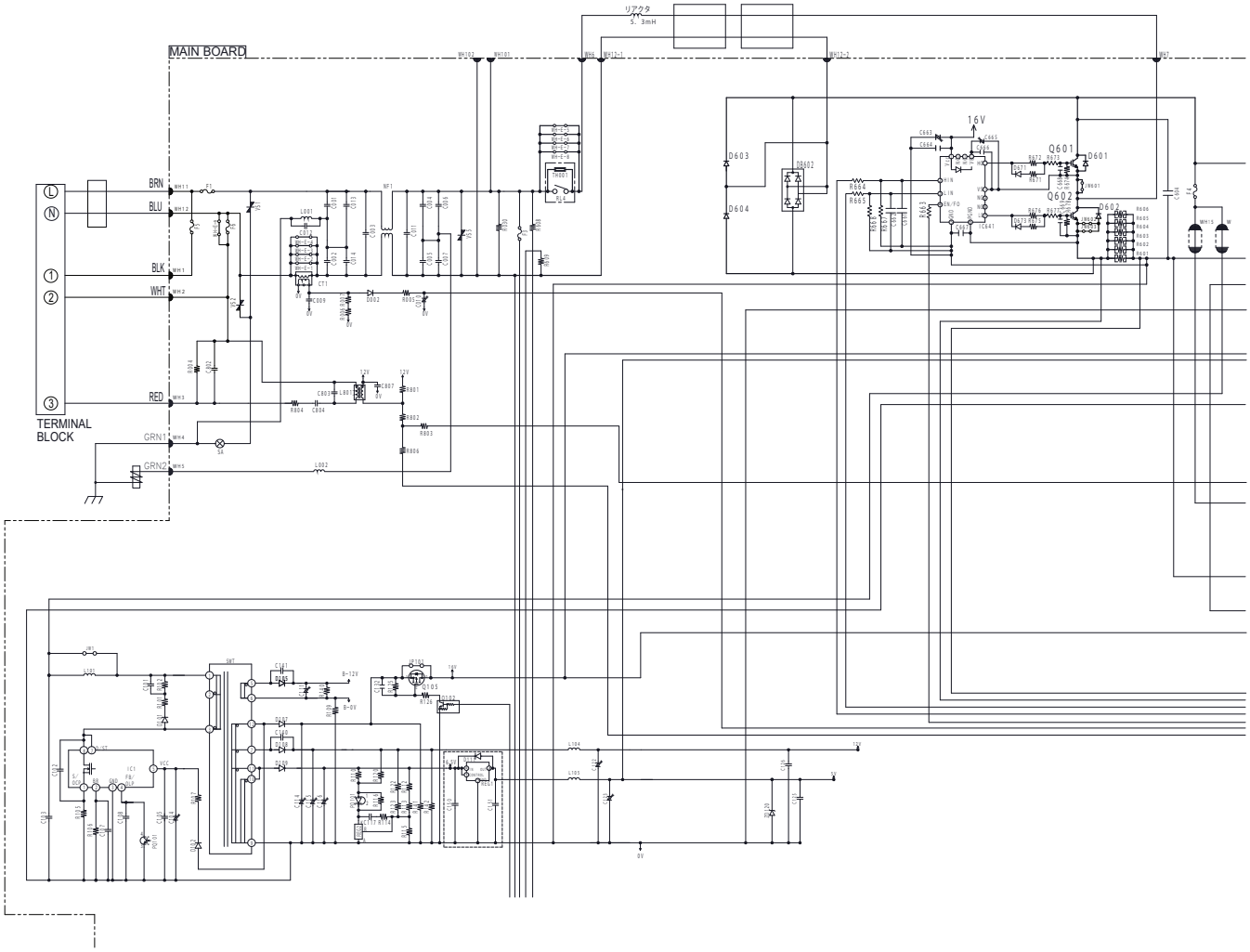
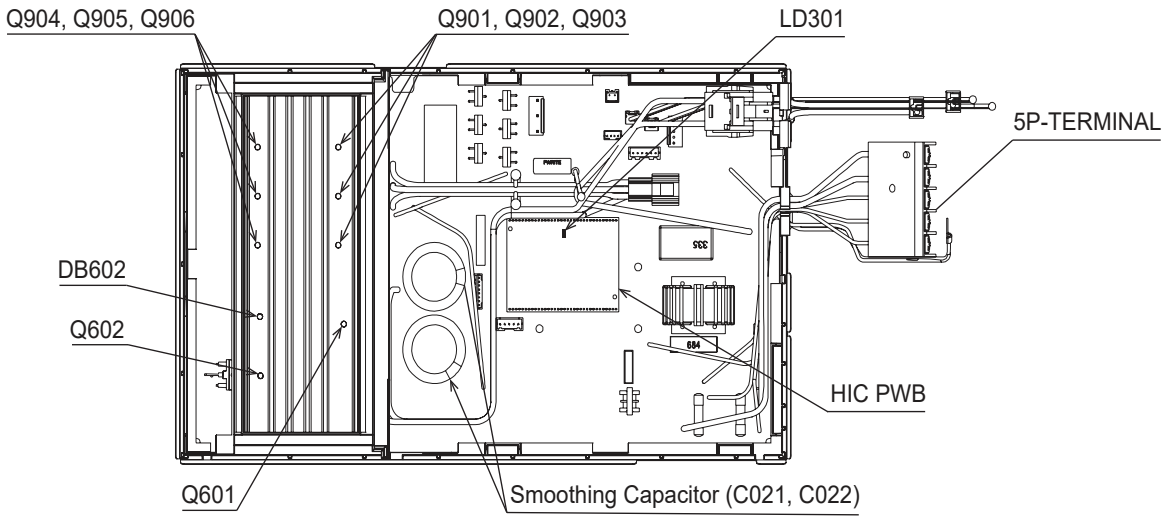


Fig. 2-1

- The 230V VAC voltage is rectified to DC voltage (B-12V, 16V, 12V, 5V) pass through switching control IC (IC1), Switching transformer.
  (1) B-12 Power supply for electrical expansion valve.
  (2) 16V Power supply for driver circuit of compressor and fan motor, IGBT action.
  (3) 12V Power supply for 4-way valve relay, power relay, motor current amplification.
  (4) 5V Power supply for microcomputer, peripheral circuit.



※ Because high voltage flows, be careful about electric shock. Also,be careful about short-circuit accidents by improper connection of measuring instruments, which can damage the board.

3. Power Supply Circuit for Board

The voltage specification of the power supply circuit are as follow.

<Checking points>

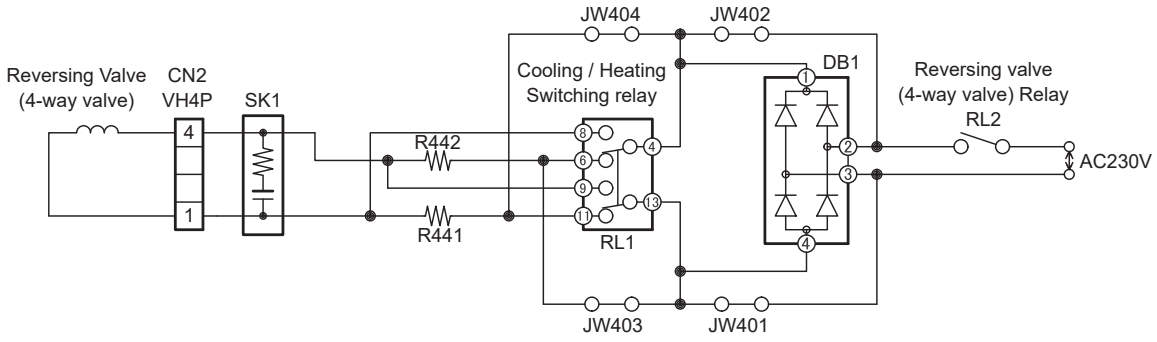
Output Name	Voltage Specifications Value	Main Load	Measurement Position	Example of failure mode for each output failure (Reference)
5V Output	5 ±0.4 V	Microcomputer Thermistor	Tester(+)terminal:J96(5V indication) Tester(-)terminal:J138(0V indication)	The troubleshooting lamp LD301 does not indicate and the outdoor unit does not operate.
12V Output	12 ±1 V	Microcomputer IC2,3 and 4 Relay Circuit	Tester(+)terminal:J139(12V indication) Tester(-)terminal:J138(0V indication)	The troubleshooting lamp LD301 does not indicate and the outdoor unit does not operate.
16V Output	15.5 ±1.5 V	Compressor Inverter Ciruit Fan Inverter Circuit	Tester(+)terminal:J111(16V indication) Tester(-)terminal:J138(0V indication)	The troubleshooting lamp LD301 blinks 3,4 or 12 times and the outdoor unit stops.
B-12V Output	$12\ ^{+3}_{-1}$ V	Expansion Valve	Tester(+)terminal:J133(B-12V indication) Tester(-)terminal:J130(B-0V indication)	The troubleshooting lamp LD301 blinks 5 times and the outdoor unit stops.

※ When checking each voltage, if the voltage specifications above are met,the power supply circuit for the board is functioning normally.

4. Reversing valve control circuit

This model reversing valve control used to control the relay ON/OFF of the reversing valve, and also control the coil of the reversing valve ON/OFF. The relay ON/OFF has different operation mode. You can see each operation mode as flows. If the reversing 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 pin ⑨ - 0V	HIC pin ㉟ - 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
Electrified type	NO	NO	YES	JUMPER	YES

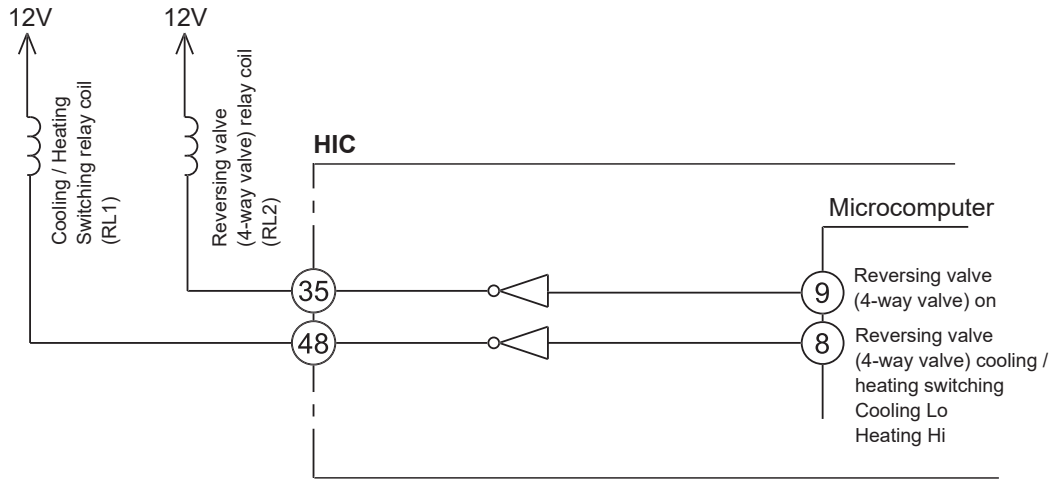


Fig. 4-1

5. Temperature Detection Circuit

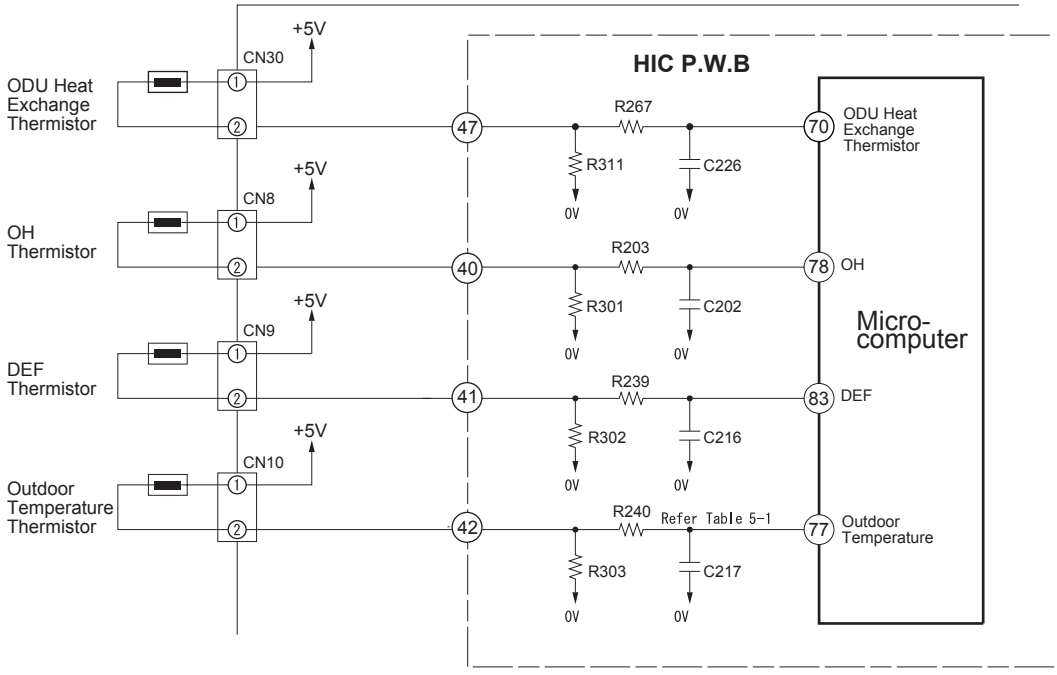


Fig. 5-1

- 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) ther resistance.
- When the compressor is heated, the resistance of the OH thermistor becomes low and +5V is devided by OH thermistor and R301 and the voltage at pin (78) of microcomputer.
- Compare the voltage at microcomputer pin (78) 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 (83) of microcomputer drops. If this voltage becomed 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 SD0 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.

Outside Air Temperature (ºC)	14°F (-10°C)	32°F (0°C)	50°F (10°C)	68°F (20°C)	30°F (86°C)	104°F (40°C)
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

Table 5-1

- The ODU heat exchanger thermistor circuit measure the heat echanger intermediate temperature of the outdoor unit, and microcomputer estimate the pressure of compressor according to the temperature data. When the pressure reach the internal set value of the microcomputer, the microcomputer 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) (78) (83) 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

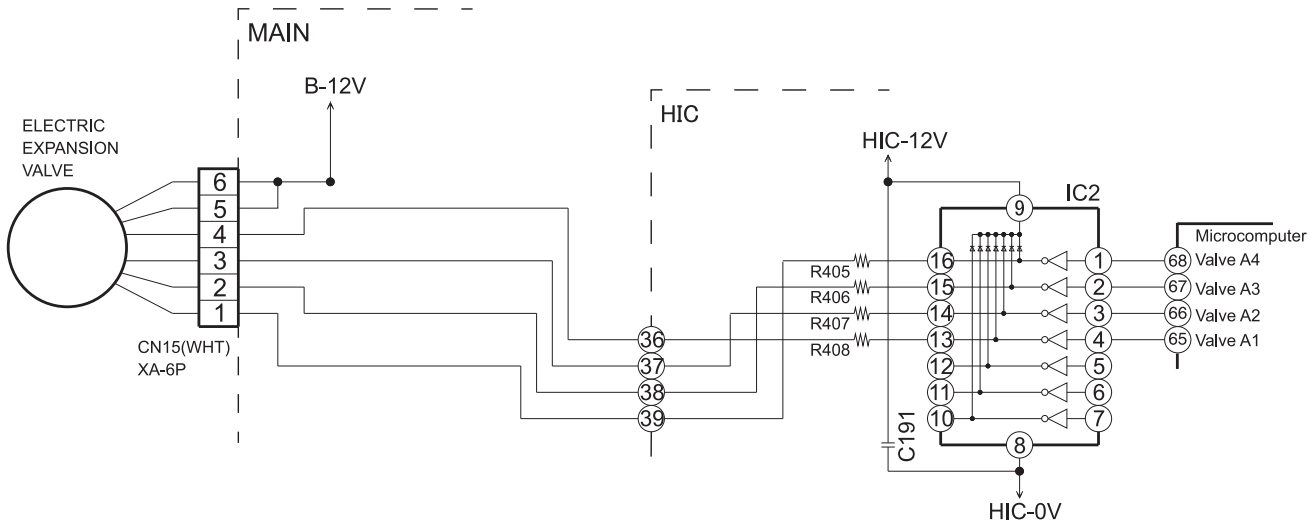


Fig.6-1

- 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 pin④ 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, meaure all voltages at pin④ 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	ORN	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

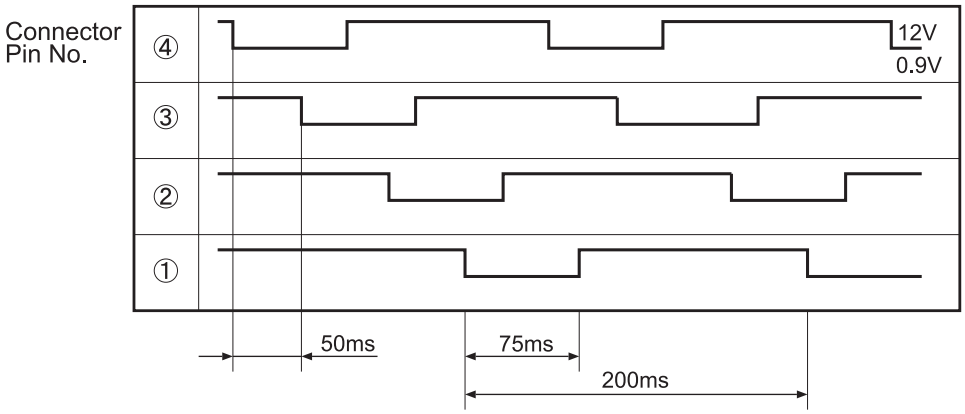


Fig. 6-2

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.

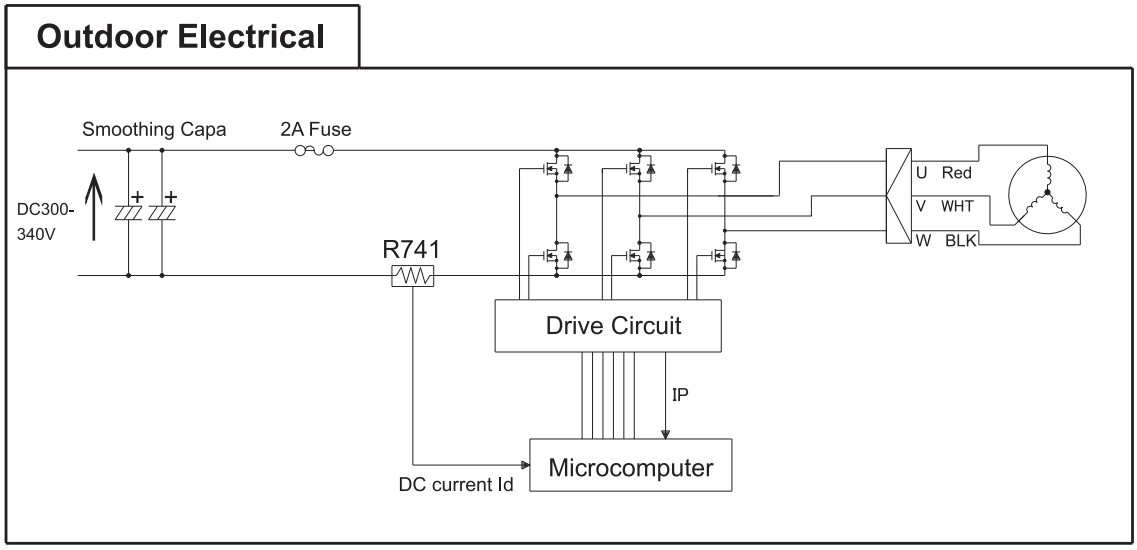


Fig 7-1

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 Mounth 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 reversel 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)

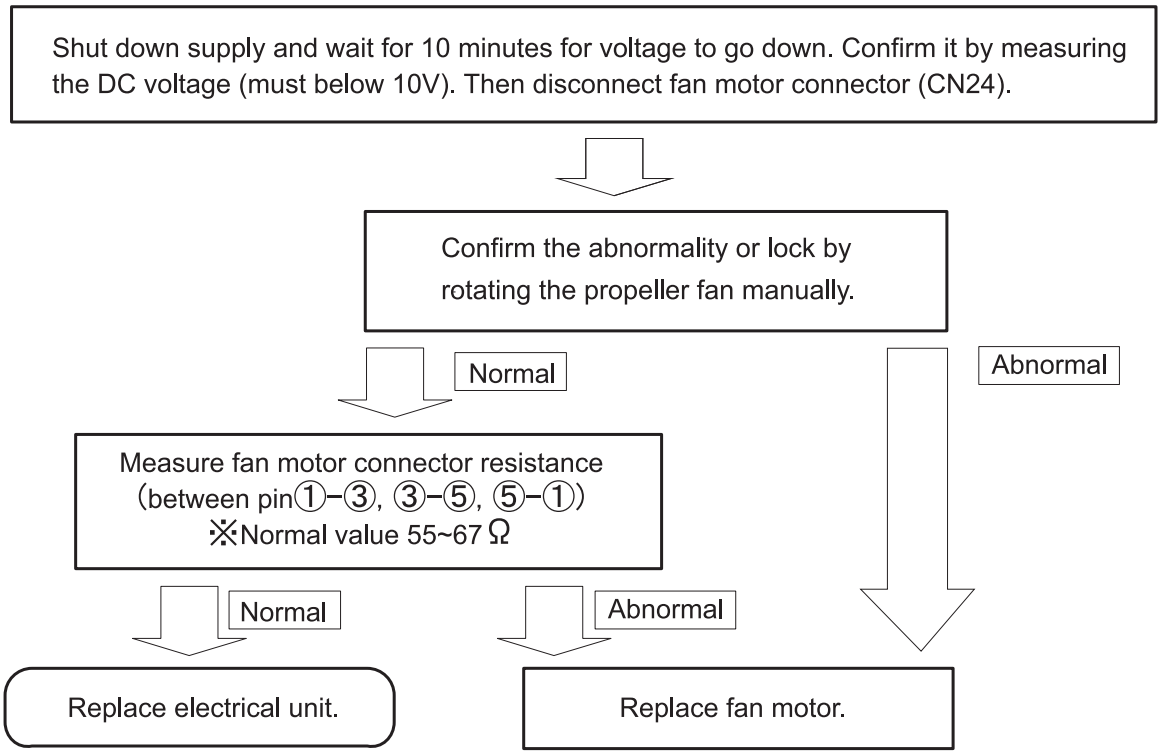
The unit will restart according to control as per during start (1).

(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.
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 the motor condition as below prcedure.

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).
   ※ Please confirm above checking procedure if found 2A fuse blown.
   If fan motor is broken, replace both electrical unit and fan motor.

   Caution
   ※ Beware of electrical shock due to high voltage when conducting and operation check.
   Power supply for DC fan motor and compressor is common (DC260-360V).

SERVICE CALL Q & A

COOLING MODE

Q1 The compressor has stopped suddenly during cooling operation.

A1 Check if indoor heat exchanger is frosted. Wait for 3-4 minutes until it is defrosted.

If the air conditioner operates in cooling mode when it is cold, the evaporator may get frosted.

DEHUMIDIFYING MODE

Q1 Sound of running water is heard from indoor unit during dehumidifying.

A1 Normal sound when refrigerant flows in pipe.

Q2 Compressor occasionally does not operate during dehumidifying.

A2 Compressor may not operate when room temperature is 50°F (10°C) or less. It also stops when the humidity is preset humidity or less.

Q3 Cold air comes out during a dehumidifying operation.

A3 To improve the dehumidification efficiency performs quiet fan operation. Therefore the air is cold and it is not a malfunction.

Q4 The operation does not stop even by setting the temperature higher than room temperature on the remote controller.

A4 It sets to perform dehumidifying operation by setting the temperature slightly lower than remote controller setting.

HEATING MODE

Q1 The circulation stops occasionally during Heating mode.

A1 It occurs during defrosting Wait for 5 -10 minutes until the condenser is defrosted.

Q2 The product begins with a weak wind during heating even though set to “HI” or “MEDIUM”

A2 At the begining of heating, the fan speed will run at weak wind about 30 seconds, after that the wind will then increase to be required fan speed.

Q3 Heating operation stops while the temperature is preset at "30".

A3 If temperature is high in the outdoor, heating operation may stop to protect internal devices.

AUTO FRESH DEFROSTING

Q1 After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp blinking.

A1 Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

AUTO OPERATION

Q1 How is the automatic operation mode determined?

A1 According to the room temperature heating or cooling operation is automatically selected. Refer to the basic operation section.

Q2 Can I set the room temperature at automatic operation.

A2 The room temperature setting can be set between 60°F (16°C) - 90°F (32°C).

NICE TEMPERATURE RESERVATION

Q1 When on-timer has been programmed, operation starts before the preset time has been reached.

A1 This is because "Nice temperature reservation"function is operating. This function start operation earlier so the preset temperature is reached at the preset time. Operation may start maximum 60 minutes before the preset time.

Q2 Does "Nice temperature reservation" function operate during dehumidifying?

A2 It does not work. It works only during cooling and heating.

Q3 Even if the same time is preset, the operation start time varies.

A3 This is because "Nice temperature reservation"function is operating. The start time varies according to the load of room. Since load varies greatly during heating,the operation start time is corrected, so it will varies each day.

AT STARTING OPERATION

Q1 When only the power switch is turned on, the deflector at the air outlet moves even if the START/STOP button is not pressed.

A1 To ensure correct opening and closing of the deflector, the deflector will move when power is turned on or the unit is to be operated in order to check its fully opened and closed positions.

Q2 When the heating operation is started, the indoor fan does not start immediately and the deflector at the air outlet occasionally does not fully open.

A2 This is because the preheating device is working. It will not start to drive the fan until the refrigerating cycle warms up and warm air blows. Wait for a while. The deflector does not open either during preheating or for one minute after preheating is finished.

Q3 When the unit built behind the gallery (lattice door) is to be started immediately after it has stopped, the unit occasionally will not start.

A3 Such a phenomenon may occur with built-in installation where heat is likely to be stuffy. Install the unit as near to the lattice door as possible so that air is not short-circuited, or provide a partition between the unit and lattice door.

OTHERS

Q1 The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)

A1 This is because the cool wind prevention function is operating, and does not indicate a fault.

The heat exchanger temperature is sensed in the auto fan speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

Q2 Loud noise from the outdoor unit is heard when operation is started.

A2 When operation is started, the compressor rotation speed goes to maximum to increase the heating or cooling capability, so noise becomes slightly louder. This does not indicate a fault.

Q3 Noise from the outdoor unit occasionally changes.

A3 The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature. This does not indicate a fault.

Q4 There is a difference between the set temperature and room temperature.

A4 There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable level for the space.

Q5 Air does not flow immediately after operation is started.

A5 Preliminary operation is performed for one minute when the power switch is turned on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

Q6 Mold in the room cannot be inhibited even after performing the air conditioner drying operation.

A6 Air conditioner drying operation is to dry the interior of the indoor unit to inhibit the growth of mold. It is not to inhibit the mold growth in the room.

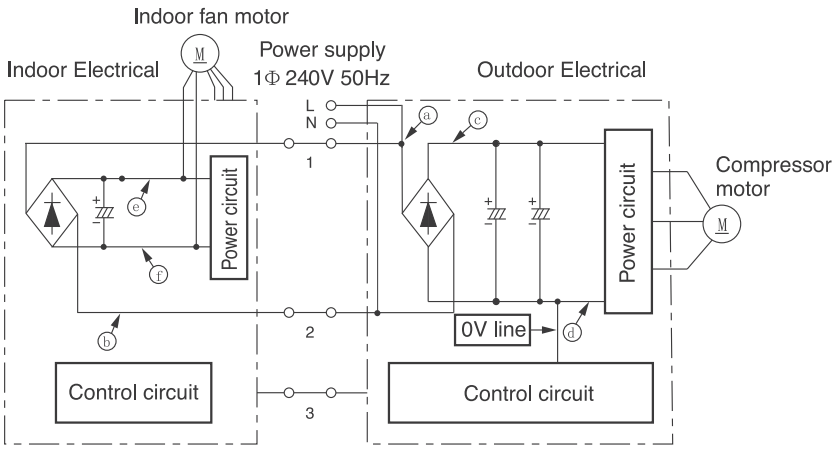
Q7 The interior of the indoor unit seems to be still damp even after performing the air conditioner drying operation.

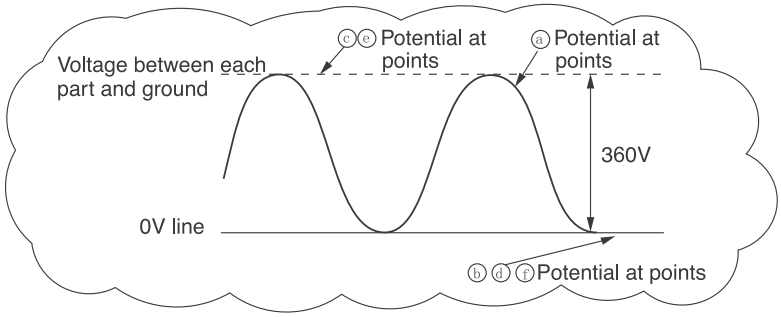
A7 Condition of the interior of the indoor unit varies depending on usage of the unit and condition of the indoor unit. If it is not dried after the first try, perform the drying more than one time for better effect.

Inspection instructions

Warning

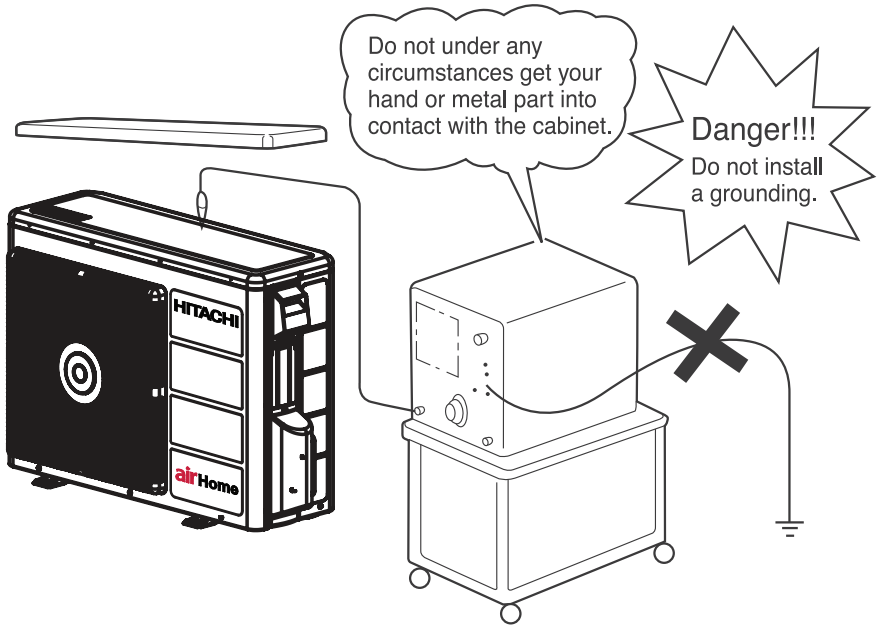
Note that the 0 V line of the outdoor electrical parts and the primary power circuit of the indoor electrical parts have voltages to ground as illustrated in the right-hand figure.





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

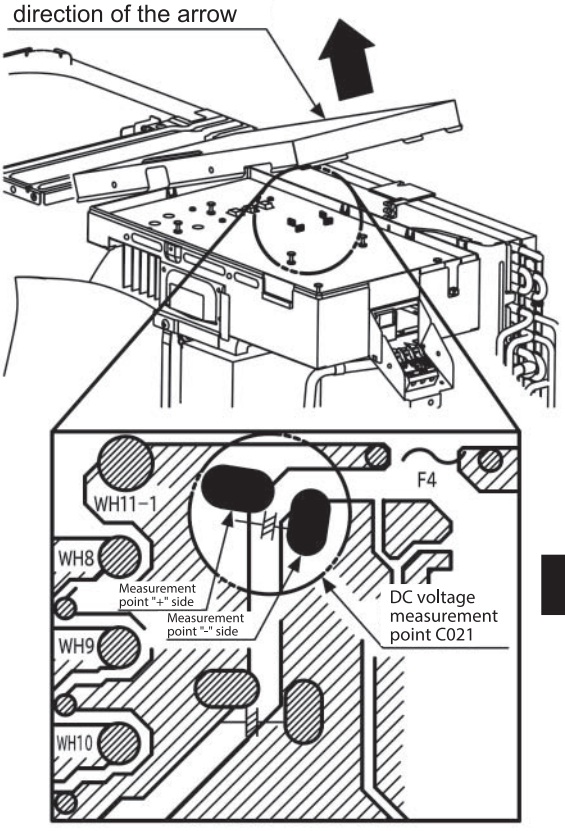
- Voltage of about 325V is charged between the terminal of smoothing capacitor.
- During continuity check for each circuit part of the outdoor unit, be sure to discharge the smoothing capacitors.

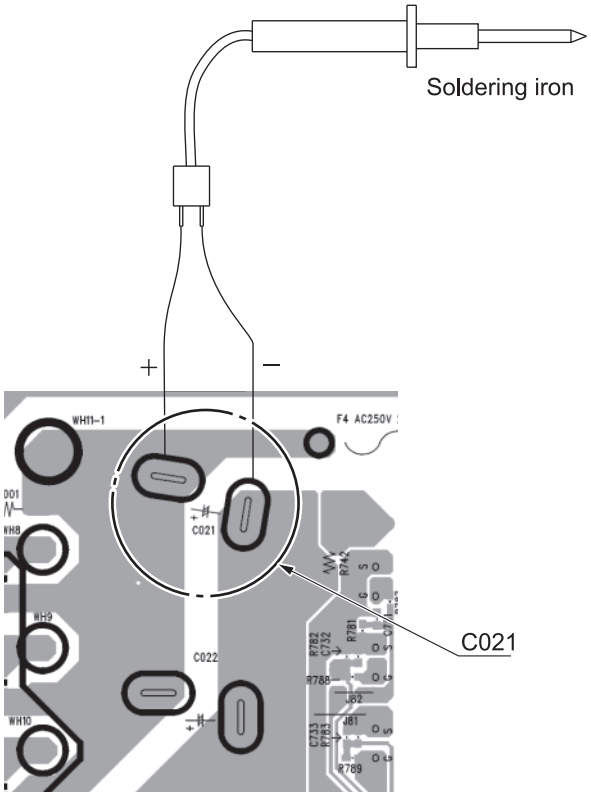
Discharge Procedure

1. Turn of the power.
2. After power turned OFF, wait for 10 minutes or more. Then, remove electrical parts cover and apply soldering iron of 30 to 75W for 15 seconds or more to (+) Positive (-) Negative terminals on the Main PWB 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.

Open the cover of the electrical part in the direction of the arrow



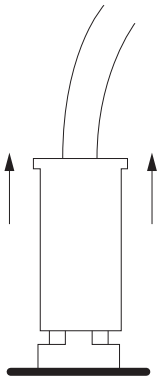


As shown in the figure above, apply the soldering iron to the“+” and “-” terminals of C021 to dicharge the charging voltage of the smoothing capacitor.

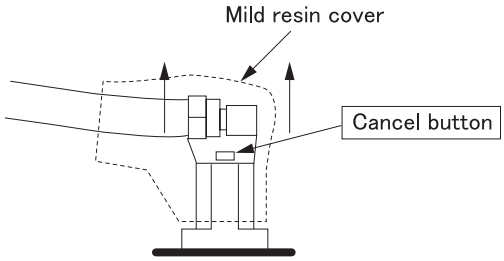
Other instructions

(1) Detaching and reattaching the receptacles for tab terminal.
All the receptacles for connecting tab terminal 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 type and how to unlock them..



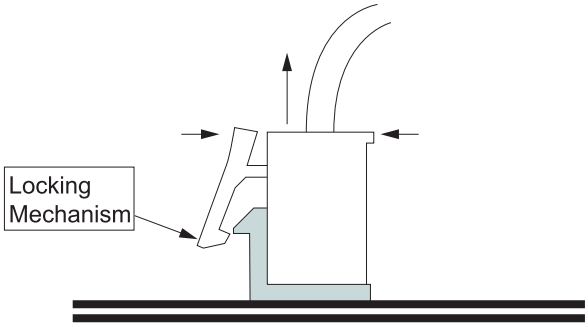
Vertical (with a resin case)
Hold the resin case and pull it out.



Horizontal (with a mild resin cover)
Hold the cancel button down on the mild resin cover while pulling 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 connecting it, insert it securely all the way home.

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



(3) Do not detach or reattach the connector 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.

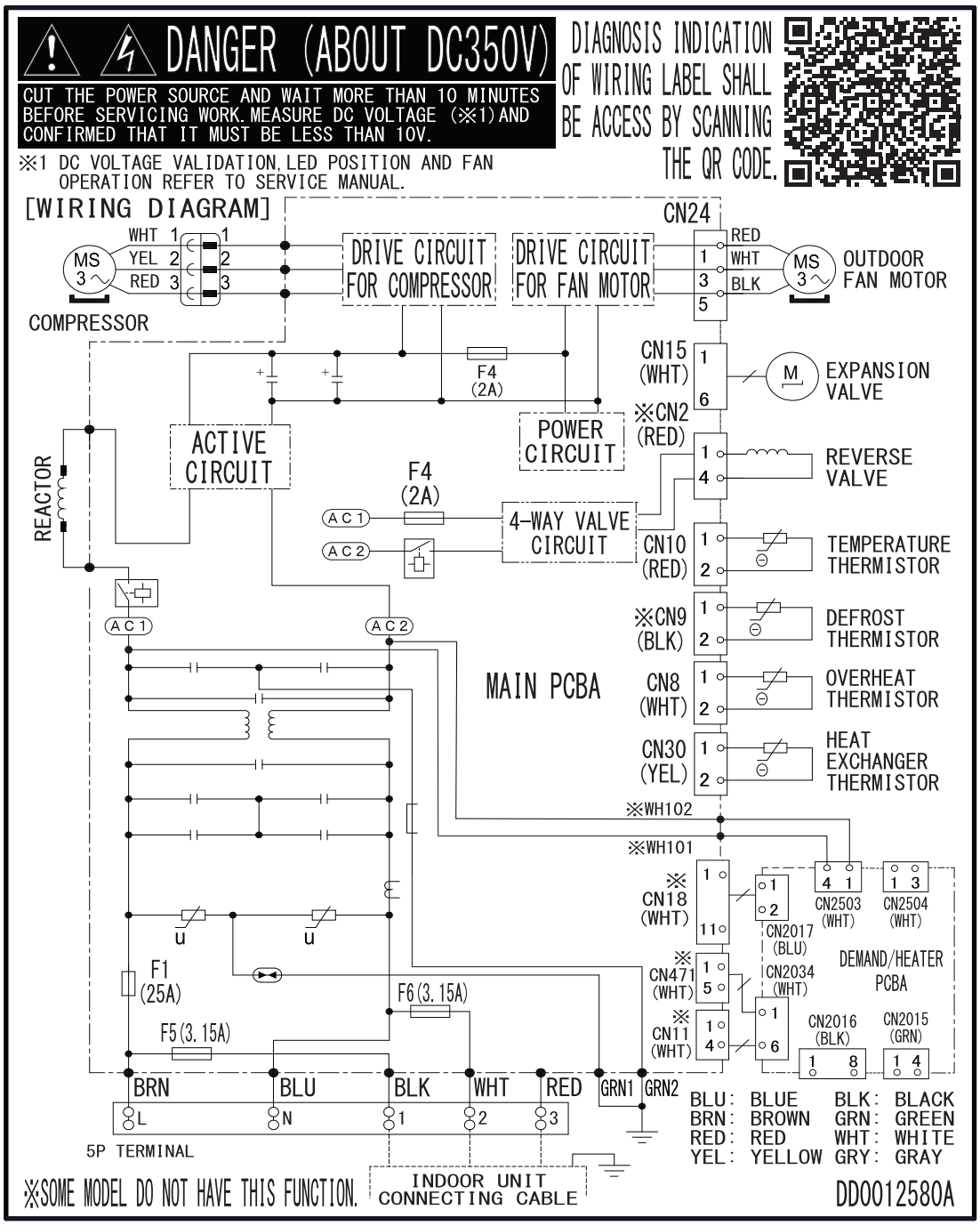
Troubleshooting support

No.	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 re-established).
2	Self-diagnosis memory	● The failure modes detected on the indoor and outdoor unit sides are restored in the non volatile memory of the indoor unit 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 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 operations can be automatically devided into 3 blinking operations and 12 blinking operationsof the timer lamp. However, a strong external noise may have resulted in 12 times of blinking.

WIRING LABEL

RAC-DJ12WHAA



SELF-DIAGNOSIS LIGHTING MODE

RAC-DJ12WHAA

Self-diagnosis display function (Outdoor side display)

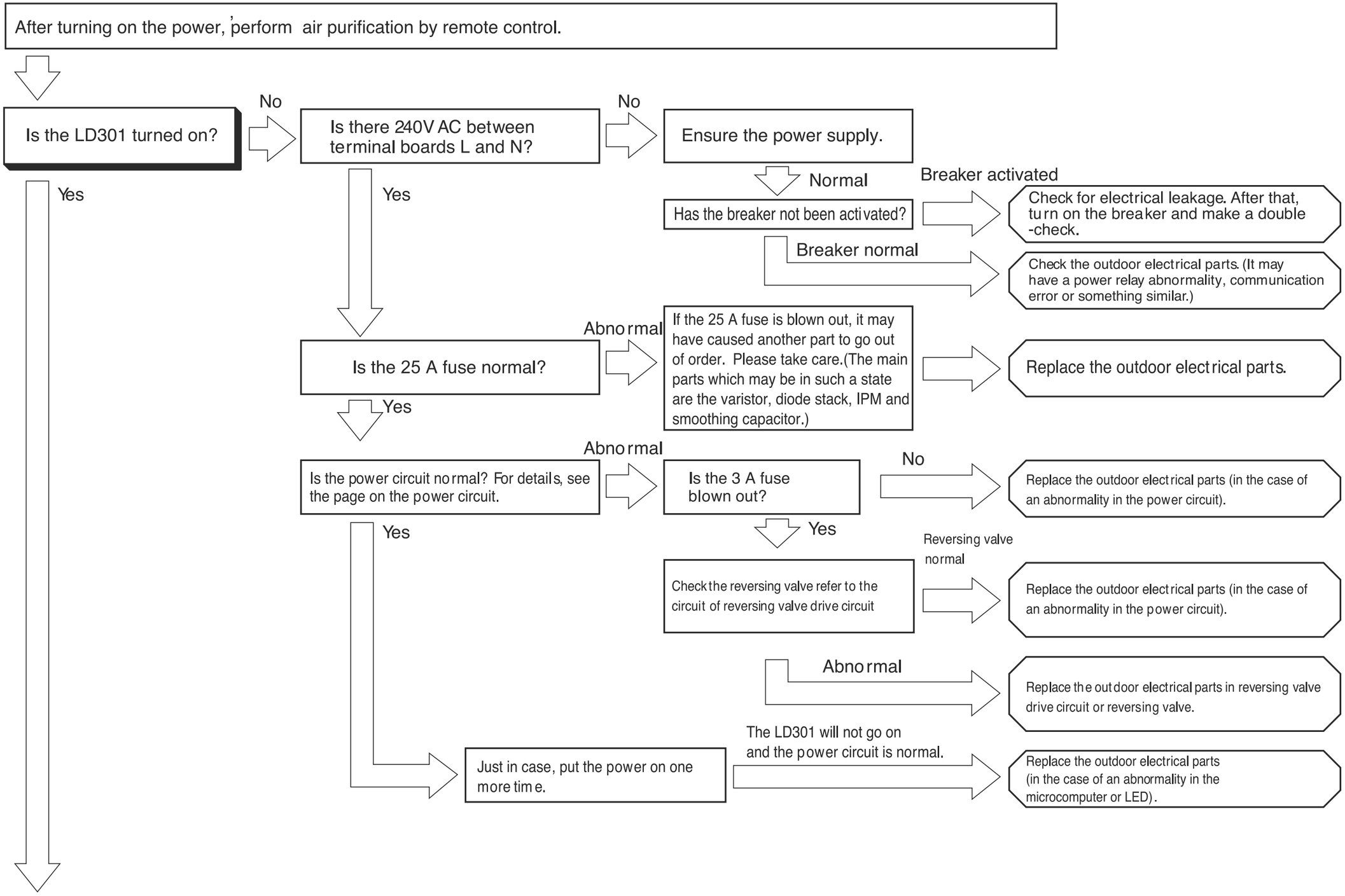
LED (※1) INDICATION DURING COMPRESSOR OPERATE	
LD301	OPERATION STATUS
LIT	NORMAL
BLINK REPEATINGLY WITH 2 SEC LIT - 0.3 SEC OFF	OVERLOAD (NORMAL)

LED INDICATION DURING STOP		
LD301 (BLINK)	SELF-DIAGNOSE CONTENT	CHECKING POINT AND REPAIR METHOD
OFF	NO POWER SUPPLY	ABNORMAL INPUT VOLTAGE AT BETWEEN TERMINAL L AND N ⇒ CHECK POWER CABLE CONNECTING CABLE MISCONNECTION ⇒ CHECK POWER CABLE REACTOR CONNECTOR HALF INSERTION ⇒ CHECK REACTOR CONNECTOR F4 (2A FUSE) BLOWN ⇒ REPLACE FUSE AND CHECK OUTDOOR FAN MOTOR
	NORMAL STOP	NOT MALFUNCTION
1 TIME	RESET STOP	FAN OPERATION ※1, WAITING COMPRESSOR TO START ⇒ NORMAL OTHER ⇒ IF STILL NOT SOLVE AFTER CHECK THE CONNECTION CABLE, CHANGE ODU CONTROLLER
2 TIMES	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	ABNORMAL LOW SPEED ROTATION	
4 TIMES	SWITCHING FAILURE	
5 TIMES	OVERLOAD LOWER LIMIT CUT	
6 TIMES	COMPRESSOR TEMPERATURE RISE	SERVICE VALVE NOT OPEN, REFRIGERANT LEAK ⇒ CHECK SERVICE VALVE, RECHARGE THE REFRIGERANT BAD CONNECTOR INSERTION, CIRCUIT DEFECT ⇒ CHECK THE CONNECTOR, CHANGE ODU CONTROLLER
7 TIMES	THERMISTOR ABNORMAL	THERMISTOR CONNECTOR HALF INSERT ⇒ INSERT CONNECTOR SECURELY THERMISTOR WIRE SHORTED OR CUT, CIRCUIT DEFECT ⇒ CHANGE THERMISTOR, ODU CONTROLLER
9 TIMES	COMMUNICATION ERROR	CABLE MISCONNECTION, DISCONNECTING ⇒ CHECK THE F CABLE COMMUNICATION CIRCUIT ABNORMAL ⇒ CHANGE ODU CONTROLLER
10 TIMES	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	FAN STOP BY STRONG WIND	TEMPORARY STOP DUE TO STRONG WIND ⇒ FAN WILL START AFTER WIND BECOME WEAK
12 TIMES	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	EEPROM READING ERROR	CHANGE ODU CONTROLLER
14 TIMES	DC VOLTAGE ABNORMAL	CONFIRM AC POWER SUPPLY & DC VOLTAGE IS NORMAL ⇒ CHANGE ODU CONTROLLER COMPRESSOR LOAD ABNORMAL ⇒ INSPECT THE COMPRESSOR
15 TIMES	CIRCUIT ABNORMAL	CHANGE ODU CONTROLLER (SOME MODELS HAVE NOT 15 TIMES BLINK)
16 TIMES	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/CN2. 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. [REVERSE VALVE NOT OPERATE ERROR] ⇒ UN-INSERT THE CONNECTION 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.

※1 DC VOLTAGE VALIDATION, LED POSITION AND FAN OPERATION REFER TO THE SERVICE MANUAL.
※4 ODU = OUTDOOR UNIT

Checking the electrical parts of 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 connecting 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 connecting cable connection.

Normal

Check that the indoor timer lamp blinks.

Blinks 3 times → Replace the indoor P.W.B

Blinks 12 times → Replace the outdoor P.W.B

Abnormal → Replace the indoor P.W.B

No

The LD301 blinks once.
Reset stopped

No → If the LD301 is on, It is performing cooling or heating mode operation.
If the LD301 is on 2 second and off 0.3 second, the product is running with a heavy load. (This is not malfunction)
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 temporary switch button.

Compressor stop

LD301 blinking frequency each 0.25 second, please check it carefully.

Abnormality other than compressor stop → 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.

The LD301 blinks once.
Reset stopped

Yes → Turn the power back on, run the product either by remote control or by using the indoor temporary switch, and check the blinking frequency of the LD301.

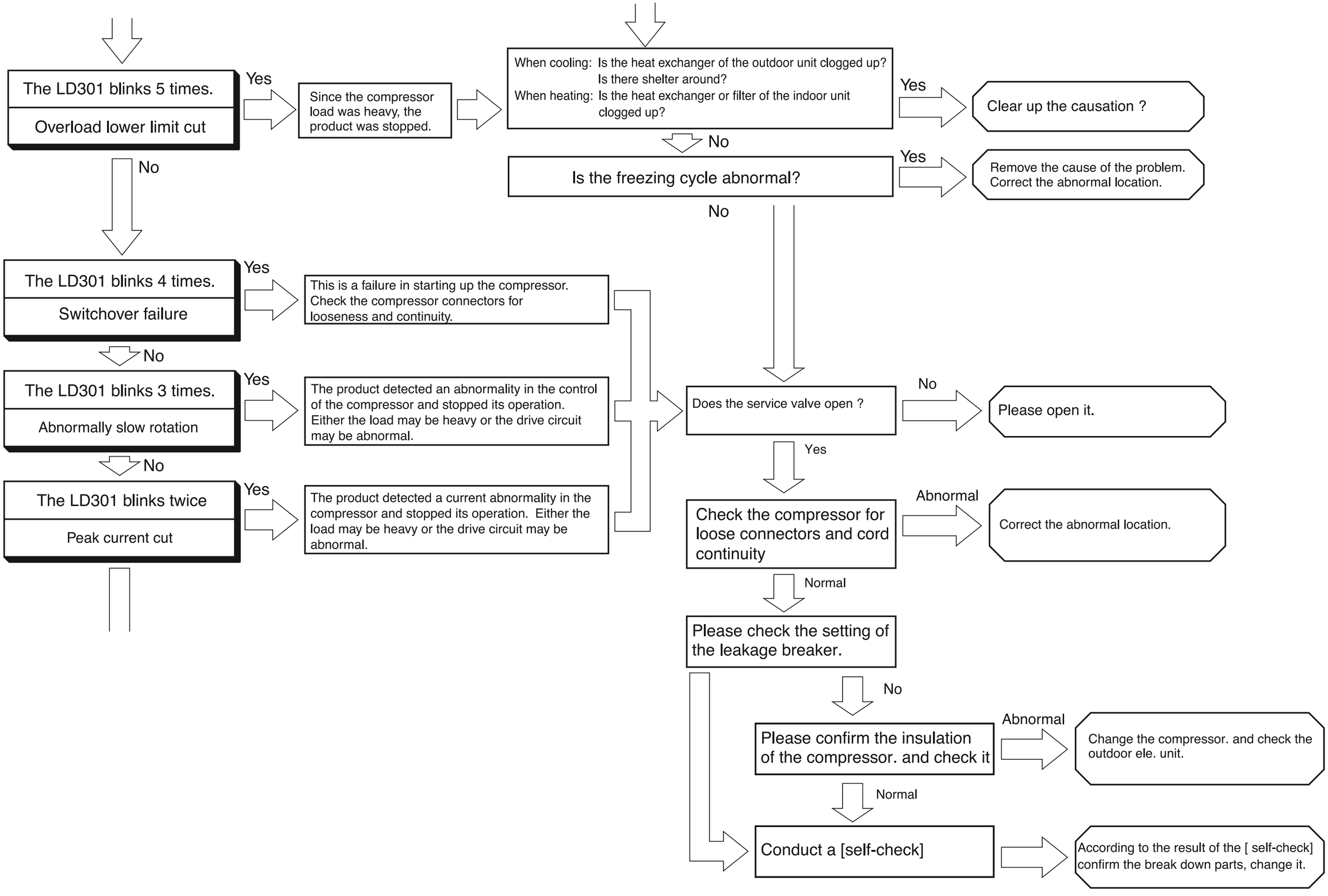
Blinking once → Replace the outdoor electrical parts (in the case of an abnormality in the reset circuit or microcomputer).

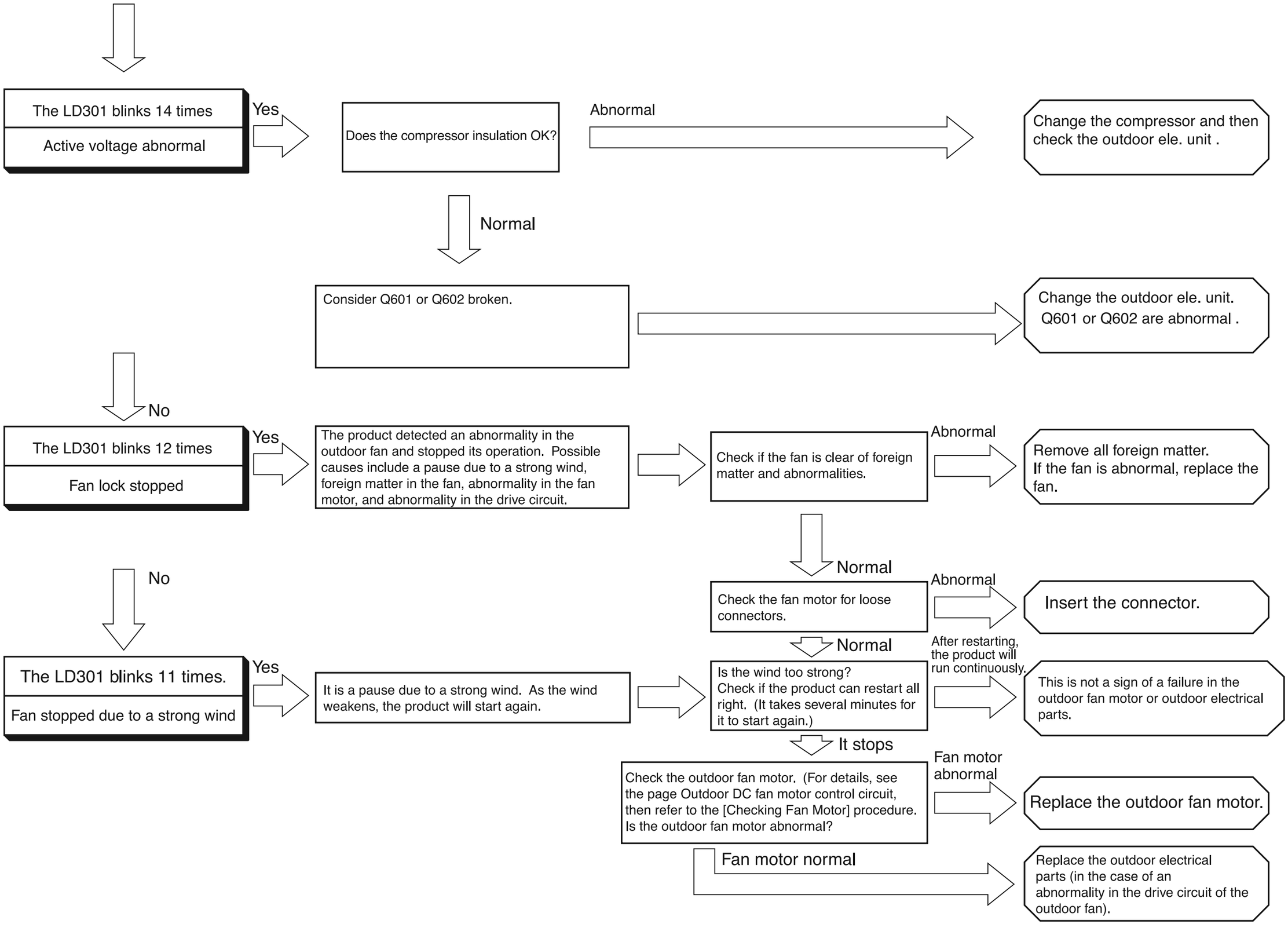
No

Other

The LD301 blinks 9 times.
Communication error

Yes → Conduct a check according to the description of the LED blinking 9 times given above.


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.
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
Does the compressor insulation OK?
Abnormal
Change the compressor and then check the outdoor ele. unit .
Normal
Consider Q601 or Q602 broken.
Change the outdoor ele. unit.
Q601 or Q602 are 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.
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.
Normal
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 Outdoor DC fan motor control circuit, then refer to the [Checking Fan Motor] procedure. 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).

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.

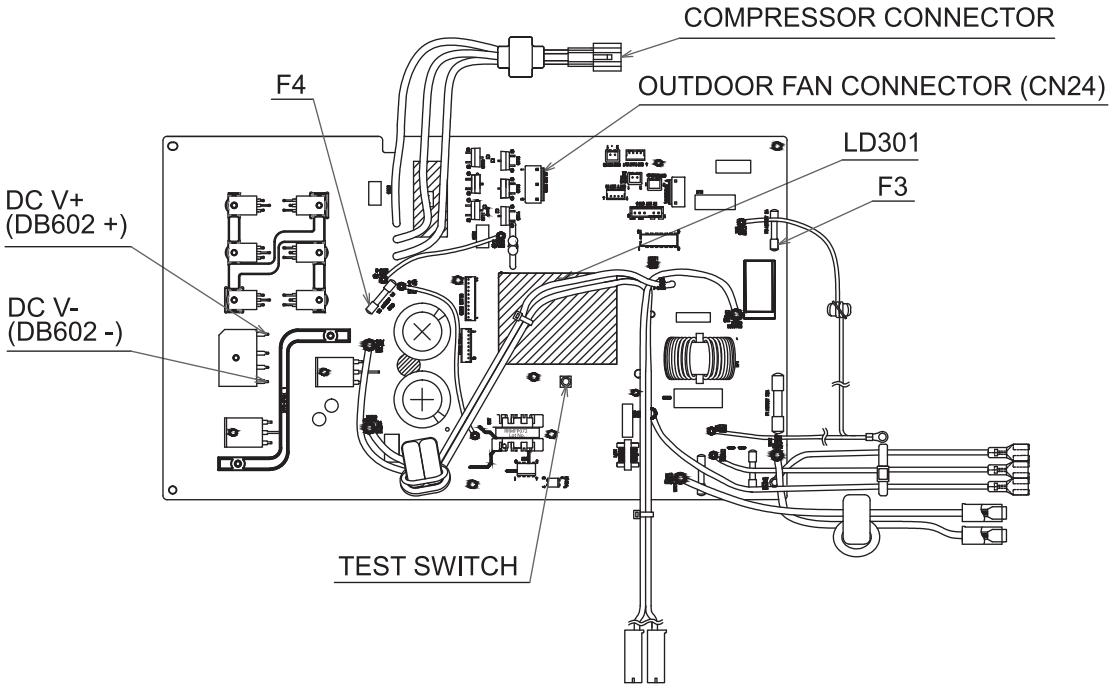
1. Turn ON the outdoor terminal board L and N (220 - 240V).
2. Confirm that the “LD301” blinks once from the terminal side of the outdoor unit. Afterwards (when about 30 sec elapses after the power turns ON), confirm that the “LD301” changes to blinking 9 times (communication error).
3. When the “LD301” 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 force cooling operation starts.

※ (If you press the test switch for 5 sec or longer, the self-diagnosis starts. In this case, turn the power OFF and starts teh 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.



※ Caution

1. Applying power directly to the outdoor unit will cause a rush current to stree the outdoor unit. Therefore, if the indoor unit is not out of order, do not use the method described in 3.
2. Before making the connection, 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 removed will cause the LD301 to blink 4 times. It will not to 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.

Self-check

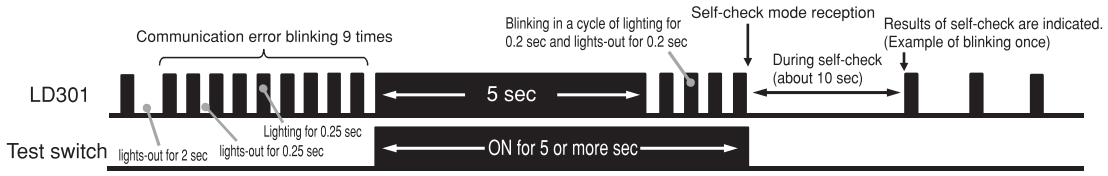
If you cannot judge if it is an abnormality on the electrical part or the compressor by the “Blinking twice,3 times, 4 times or 5 times”of the self-diagnosis indicator, perform the megger check to check the isolation of the compressor has no problems, perform the following [self-check].
(The inverter should be checked).

How to make the self-check diagnosis

1. Turn the power OFF and wait for 10 min or longer.
2. Disconnect communication wire indoor outdoor (Terminal pin no.3).
3. Insert external service switch at CN18.
4. Turn ON power supply (wait until LD301 9 times blinking).
5. Press service switch 5 sec or longer until LD301 blink fast and then release the switch.
6. Self-check result will display by LD301 blinking times.

While the test switch has been pressed, the LD301 lights up and, if it is pressed for 5 sec or longer, the LD301 repeats a cycle of “Lighting for 0.2 sec and lights-out for 0.2 sec”. When blinking starts, remove your finger from the test switch.

If you release your finger from the switch below 5 sec, the forced cooling operation starts.

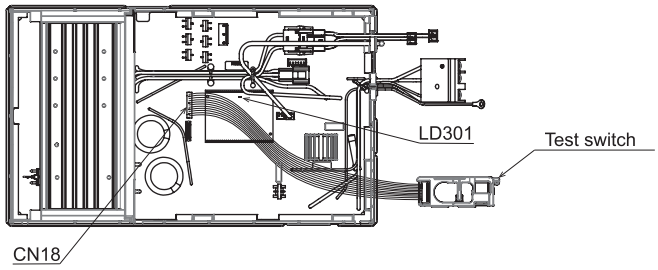


7. The result of self-check diagnosis are indicated. The contents of the result of diagnosis are shown in the table below.
8. The self-check complete.

Result of the self-check diagnosis

SELF-CHECK DIAGNOSIS RESULTS		
LD301	Self-diagnosis description	Solution
Blink 1 time	No problem with electrical parts.	Replace compressor.
Blink 2 times	Peak current cut signal.	Replace electrical parts.
Blink 7 times	Motor current error.	Compressor connector become disconnected. ⇒Adjust connector. Compressor connector properly connected. ⇒Check compressor,then replace electrical parts.
Blink 10 times	DC voltage error.	Abnormal AC input power supply (outside range of rated voltage ±10%). ➥Connect to proper power supply. Normal AC input power supply (inside range of rated voltage ±10%). ➥Replace electrical parts.
Blink 13 times	EEPROM read error.	Replace electrical parts.

Location of the test switch and LD301



If the judgement result shows abnormality, check the connecting wire and, if it is not disconnected, replace the failed parts according to the correcting method.

Cautions

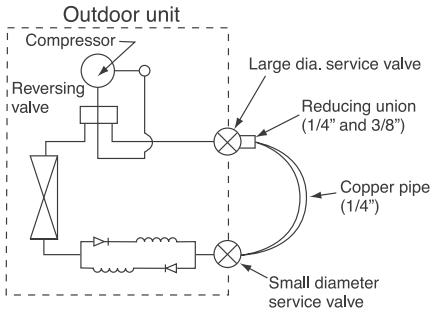
1. The self-check is effective only when the power is turned on for the first time. If the LD301 does not lights up, even if the test switch is pressed, turn the power off and wait for 10 min and start the procedure from beginning.
2. After the self-check mode is complete, it is not necessary to turn the power off (normal operation is restored). However, note that the self-check results continue blinking until the compressor start operating.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

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

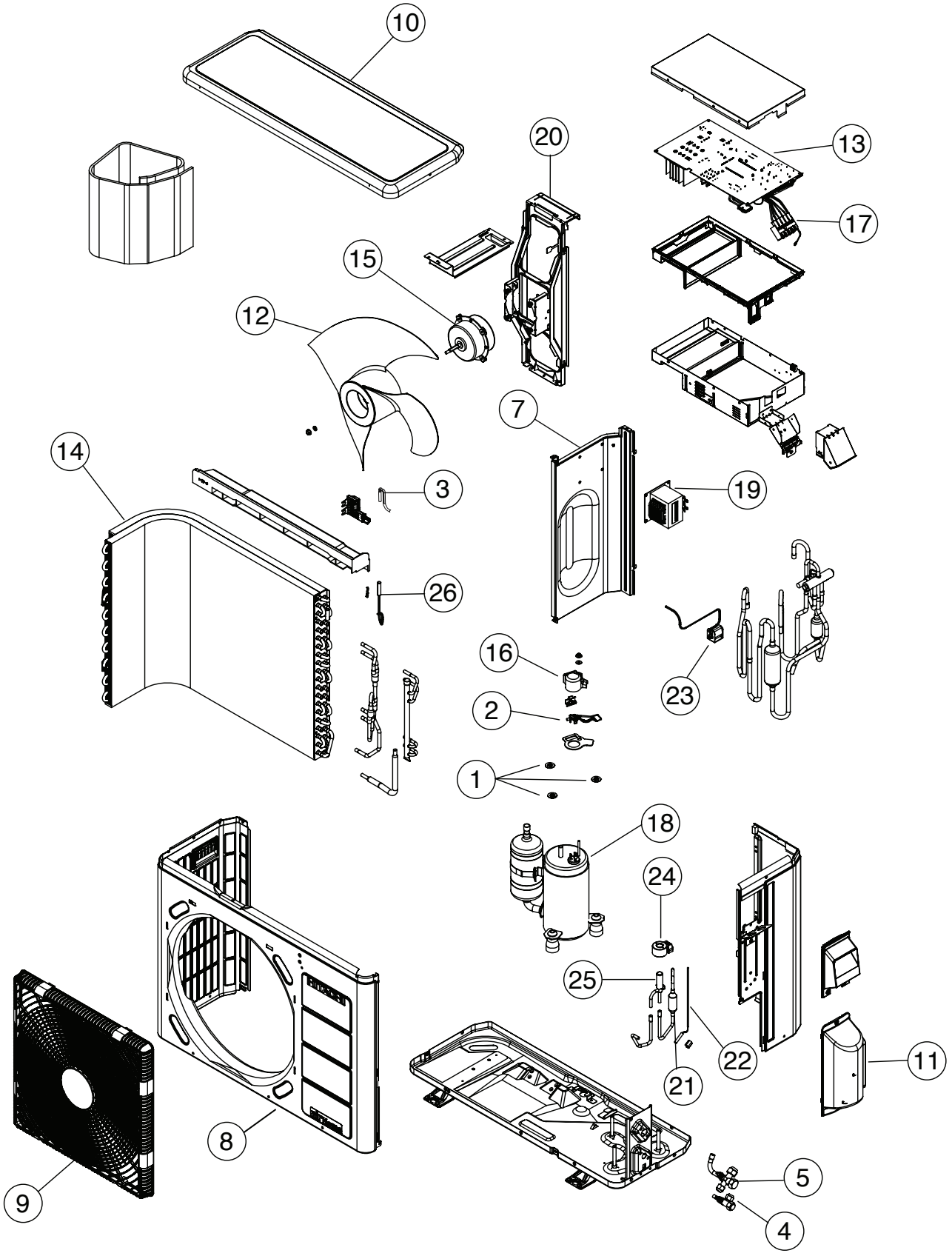
The operation method is the same as "How to operate using the connector to servicing the outdoor unit".

※1 The charging amount of 300g is equivalent to the load in normal operation.

PARTS LIST AND DIAGRAM

OUTDOOR UNIT

MODEL : RAC-DJ12WHAA



MODEL RAC-DJ12WHAA

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
1	KPNT1	001	3	PUSH NUT
2	PMRAC-80YHA	S14	1	THERMISTOR (OH)
3	PMC-DJ60PHAE	S07	1	THERMISTOR (OUTSIDE TEMPERATURE)
4	PMRAC-X13CX	902	1	VALVE 2S
5	PMRAC-X10CZ	S17	1	VALVE 3S
7	PMC-SH09WHLAE	S06	1	SIDE PLATE (R)
8	PMC-VH10PCAST	S03	1	CABINET
9	PMRAC-VX10CJ	S04	1	D-GRILL
10	PMC-SH09WHLAE	S04	1	TOP COVER
11	PMC-SH09WHLAE	S03	1	SV-COVER
12	PMRAC-X10CZ	S05	1	PROPELLER FAN
13	PMC-DJ12WHAA	S01	1	PWB MAIN
14	PMC-DJ12WHAA	S03	1	CONDENSER
15	PMRAC-10MH1	S02	1	FAN MOTOR
16	PMRAC-PH10CMT	S05	1	OVERLOAD RELAY COVER
17	PMC-EH09WHLAB	S03	1	TERMINAL BOARD (5P)
18	PMC-DJ12WHAA	S02	1	COMPRESSOR
19	PMRAC-X18CD	S04	1	REACTOR
20	PMRAC-25NH4	S14	1	SUPPORT (FAN MOTOR)
21	PMC-SH09WHLAE	S05	1	STRAINER
22	PMC-EH09WHLAB	S11	1	THERMISTOR (DEFROST)
23	PMC-EH09WHLAE	S02	1	MG-COIL-SH
24	PMRAC-25NPA	S02	1	ELECTRICAL EXPANSION COIL
25	PMRAC-X10CGT	S05	1	EXPANSION VALVE
26	PMC-DJ60PHAE	S17	1	THERMISTOR (HEX)

HITACHI

RAC-DJ12WHAA

PM NO. 0857E

Printed in Malaysia

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

Johnson Control-Hitachi Air Conditioning Malaysia Sdn. Bhd.

AUGUST 2024