



ROOM AIR CONDITIONER

INDOOR UNIT

SH09BPD

SH12BPD

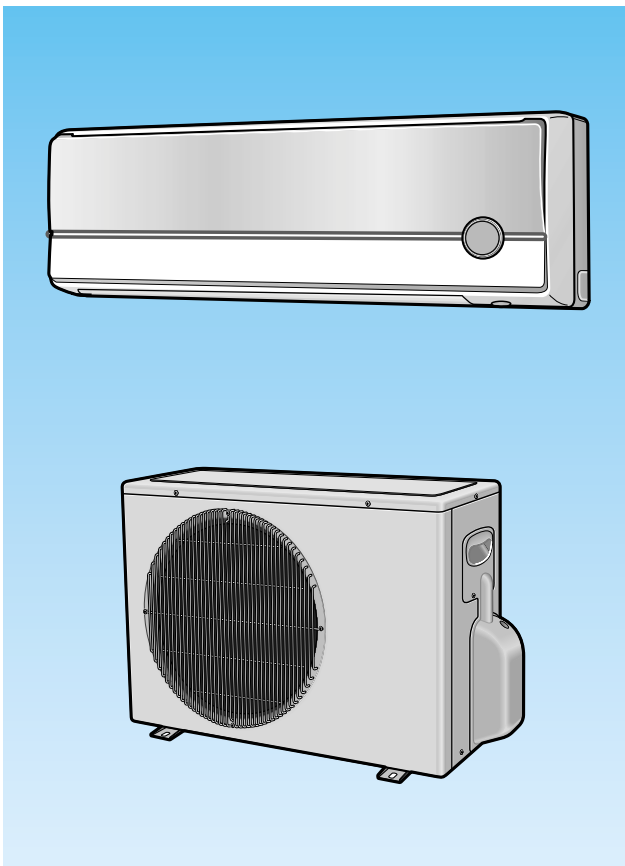
OUTDOOR UNIT

SH09BPDX

SH12BPDX

SERVICE *Manual*

AIR CONDITIONER



CONTENTS

1. Product Specifications
2. Operating Instructions
3. Disassembly and Reassembly
4. Refrigerating Cycle Diagram
5. Set Up the Model Option
6. Troubleshooting
7. Exploded Views and Parts List
8. PCB Diagram
9. Wiring Diagram

1. Product Specifications

1-1 Table

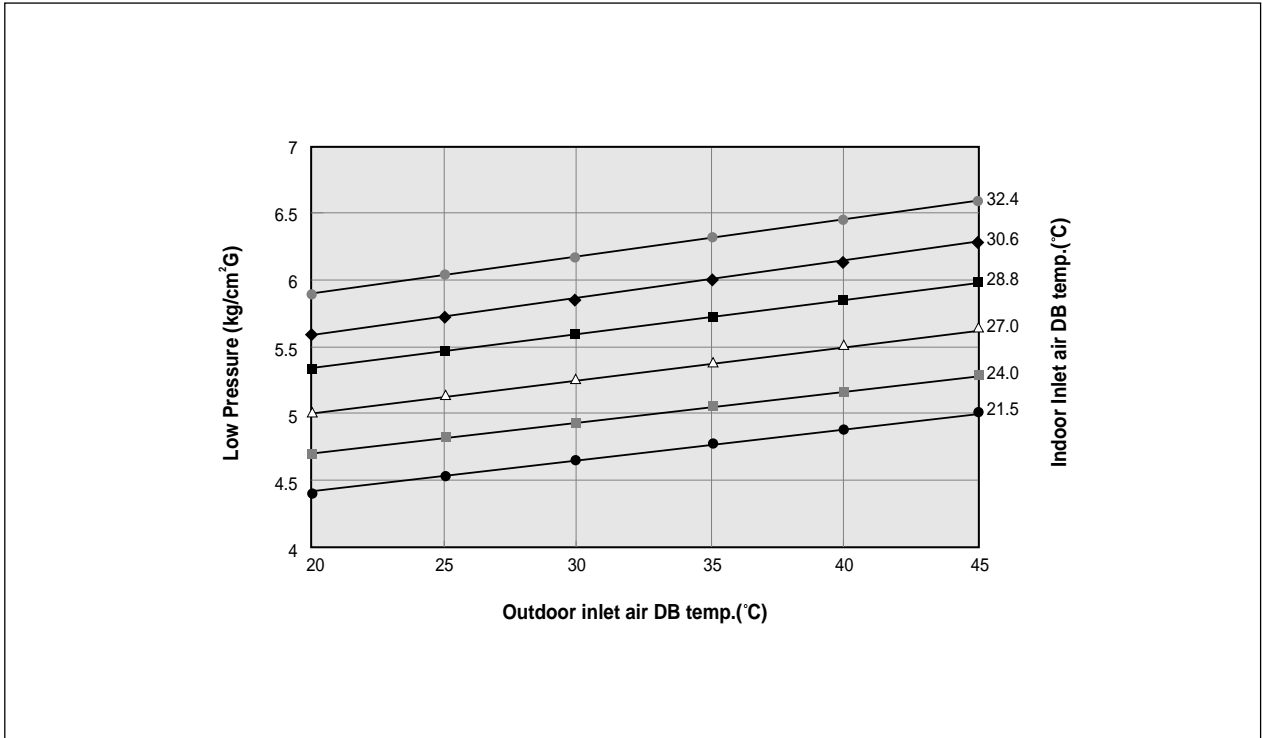
Item		Model	SH09BPD SH09BPDX	SH12BPD SH12BPDX	
Power Source		ø-V-Hz	1-220/240-50	1-220/240-50	
Performance	Cooling	Capacity	W	2,800(1,500~3,400)	3,500(1,500~4,000)
			BTU/h	9,500(5,100~11,600)	11,900(5,100~13,600)
		Energy Efficiency Ratio	BTU/wh	11.8(10.0~13.8)	10.9(10.2~13.8)
		Air Flow	m ³ /min	7.0	9.0
		Moisture Removal	ℓ/h	1.5	1.6
		Noise Level	Indoor Outdoor	dBA	34
		53			53
	Heating	Capacity	W	3,200(1,500~4,500)	4,000(1,500~5,000)
			BTU/h	10,900(5,100~15,300)	13,600(5,100~17,000)
		Energy Efficiency Ratio	BTU/wh	13.6(10.2~14.6)	11.6(10.0~14.6)
Air Flow		m ³ /min	8.2	9.3	
Noise Level		Indoor Outdoor	dBA	39	42
	53			53	
Electrical Rating	Available Voltage Range		V	187~264	187~264
	Cooling	Running Amperes	A	3.6(2.0~4.9)	4.8(2.0~5.9)
		Power Input	W	800(370~1,150)	1,090(370~1,330)
		Power Factor	%	96.6(84.5~97.6)	98.0(82.3~98.7)
	Heating	Running Amperes	A	4.0(1.8~6.5)	5.5(1.8~7.2)
		Power Input	W	800(350~1,500)	1,170(350~1,700)
		Power Factor	%	95.6(81.8~98.6)	97.8(81.8~98.4)
	Starting Current		A	10↓	10↓
	Fuse Capacity		A x V	3.15 x 250 / 20 x 250	3.15 x 250 / 20 x 250
	Power Cord		A x V	15 x 250	15 x 250
Cable-Connector		mm ³ x G	1.5 x 4	1.5 x 4	
Compressor	Type		-	Single Rotary	Single Rotary
	Model Name		-	G4C090LU2ER	G4C090LU2ER
	Safety Devices		-	204CT	204CT
Fan Motor	Indoor	Model Name	-	YDK-204F8C-1	YDK-204F8C-1
		Running Capacitor	μF x VAC	1.2μF / 450V	1.2μF / 450V
	Outdoor	Model Name	-	AMASS-020WTVB	AMASS-020WTVB
		Running Capacitor	μF x VAC	1.7μF / 450V	1.7μF / 450V
Refrigerant Tube		EEV	UKV-18D11	UKV-18D11	
Refrigerant to Charge (R410A)		g	900	950	
Dimension	Indoor unit : W x H x D		mm	890 x 285 x 179	890 x 285 x 179
	Outdoor unit : W x H x D		mm	762 x 532 x 280	762 x 532 x 280
Weight	Indoor unit		kg	8.5	8.5
	Outdoor unit		kg	39.5	39.5

Remark : Text condition

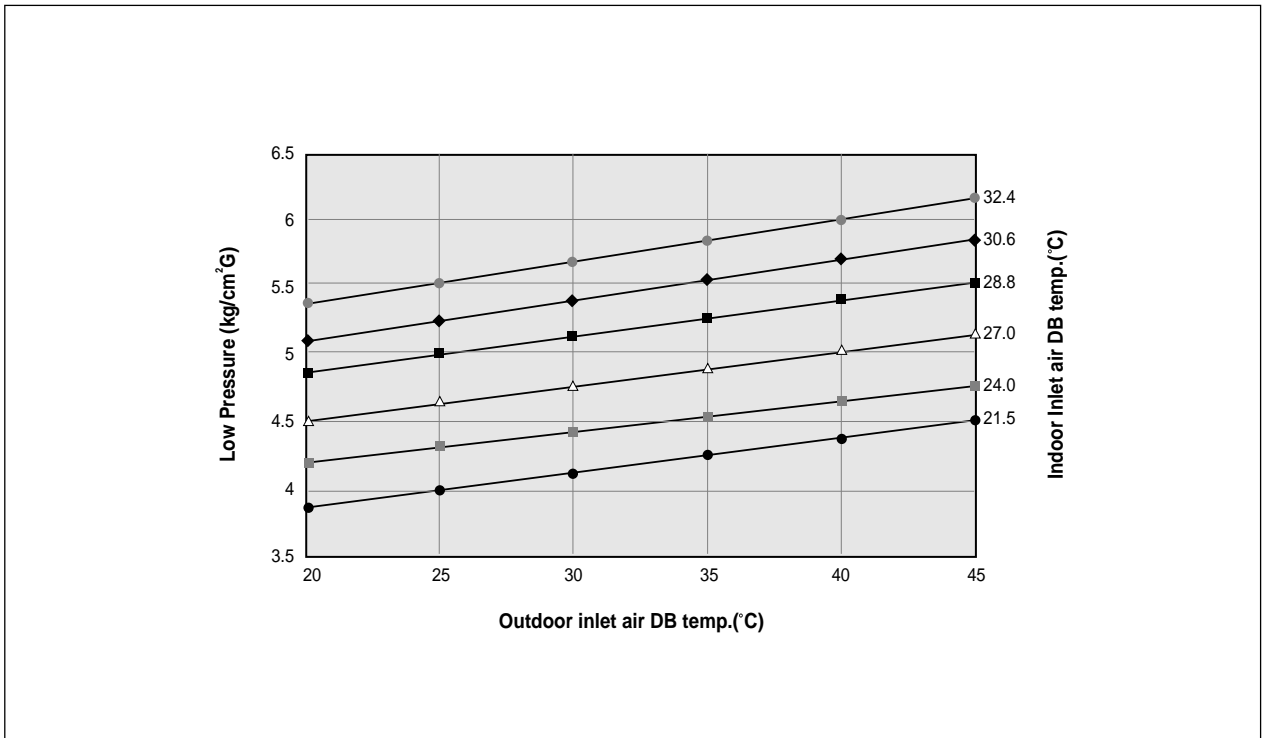
	Indoor room	Outdoor room
Cooling test	DB27°C / WB19°C	DB35°C / WB24°C
Heating test	DB20°C / WB15°C	DB 7°C / WB 6°C

1-2 Pressure Graph

■ SH09BPD











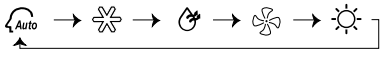

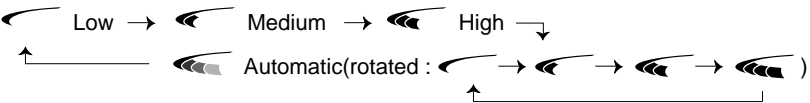
















■ SH12BPD



2. Operating Instructions

2-1 The Feature of Key in remote control

No	NAMED OF KEY	FUNCTION OF KEY
1	 (On/Off)	On/Off button. Press the  button to stop or run the air conditioner.
2	 (UP)	Temperature adjustment button(UP). To increase the temperature by the pressing the temperature button.
	 (DOWN)	Temperature adjustment button(DOWN). To decrease the temperature by the pressing the temperature button.
3	Mode 	Mode selection button. Each time you press this button Mode is changed in the following order <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  : Auto Mode  : Cool Mode  : Dry Mode </div> <div style="text-align: center;">  : Fan Only  : Heat Mode </div> </div> 
4		Fan speed adjustment button. Each time you press this button, FAN SPEED is changed in the following order. 
5		Swing button. It adjusts the airflow to upward and downward.
6		Turbo button. The air conditioner cools or heats the room as quickly as possible. After 30 minutes, the air conditioner is reset automatically to the previous mode.
7		Sleep button. The sleep timer can be used when you are cooling or heating your room to switch the air conditioner off automatically after a period of 6 hours.
8		Anion button. Press the  button to generate ion from the air conditioner.

No	NAMED OF KEY	FUNCTION OF KEY
9		<p>On Timer button. The On Timer enables you to switch on the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To set the operating time, press the  button one or more times until the required time display.</p>
10		<p>Off Timer button. The Off Timer enables you to switch off the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To set the operating time, press the  button one or more times until the required time display.</p>
11		<p>Timer Set/Cancel button. After setting On Timer or Off Timer, press the  button to set it completely. And press the  button again to cancel On Timer or Off Timer set.</p>
12		<p>Digital <i>i</i> On/Off button. If you want to turn off the display during operation press the  button.</p>

2-1-1 Name & Function of Key in remote control

1. AUTO MODE : In this mode, operation mode(COOL, HEAT) is selected automatically by the room temperature of initial operation.

Room Temp	Operation Type
$Tr \geq 21^{\circ}\text{C} + \Delta T$	Cool Operation (Set Temp: $24^{\circ}\text{C} + \Delta T$)
$21^{\circ}\text{C} + \Delta T > Tr$	Heat Operation (Set Temp: $22^{\circ}\text{C} + \Delta T$)

$\Delta T = -1^{\circ}\text{C}, -2^{\circ}\text{C}, 0^{\circ}\text{C}, +1^{\circ}\text{C}, +2^{\circ}\text{C}$

ΔT is controlled by setting temperature up/down key of remote control

2. COOL MODE : The unit operates according to the difference between the setting and room temperature. ($18^{\circ}\text{C} \sim 30^{\circ}\text{C}$)

3. HEAT MODE : The unit operates according to the difference between the setting and room temperature. ($16^{\circ}\text{C} \sim 30^{\circ}\text{C}$)

*Prevention against cold wind : In order to prevent the cool air from flowing out at the heat mode, the indoor fan does not operate or operates very slowly in the following cases. At this time, the indoor heat exchanger will be preheating.

- For 3-5 minutes after the initial operation
- For deicing operation
- The operation of an indoor fan in accordance with the temperature of an indoor heat exchanger

The temperature of indoor heat exchanger	Indoor fan speed
below 28°C	off
$28^{\circ}\text{C} \sim$ below 34°C	LL Speed
$34^{\circ}\text{C} \sim$ below 40°C	L Speed
above 40°C	Setting Speed

*High temperature release function : It is a function to detect an outdoor overload by the sensor of an indoor heat exchanger and to turn the outdoor fan or the compressor ON/OFF for safety.

*Deice : Deicing operation is controlled by indoor unit's heat exchanger temperature and accumulating time of compressor's operation.

Deice ends by sensing of the processing time by deice condition.

4. DRY MODE : Has 3 states, each determined by room temperature.

The unit operates in DRY mode.

*Compressor ON/OFF Time is controlled compulsorily (can not set up the fan speed, always breeze).

*Protective function : Low temperature release. (Prevention against freeze)

5. TURBO MODE : This mode is available in AUTO, COOL, HEAT, DRY, FAN MODE.

When this button is pressed at first, the air conditioner is operated "powerful" state for 30 minutes regardless of the set temperature, room temperature.

When this button is pressed again, or when the operating time is 30 minutes, turbo operation mode is canceled and returned to the previous mode.

*But, if you press the TURBO button in DRY or FAN mode that is changed with AUTO mode automatically.

6. SLEEP MODE : Sleep mode is available only in COOL or HEAT mode.

The operation will stop after 6 hours.

*In COOL mode : The setting temperature is automatically raised by 1°C each 1hour When the temperature has been raised by total of 2°C , that temperature is maintained.

*In HEAT mode : The setting temperature is automatically dropped by 1°C each 1hour.

When the temperature has been dropped by total of 2°C , that temperature is maintained.

7. FAN SPEED : Manual (3 step), Auto (4 step)

Fan speed automatically varies depending on both the difference between setting and the room temperature.




8. COMPULSORY OPERATION :

For operating the air conditioner without the remote control.

*The air conditioner starts up in the most suitable mode for the room temperature:

Room Temperature	Operating Mode	Temperature Setting
Less than 21°C	Heat	22°C approx.
21°C or above	Cool	24°C approx.

9. SWING : BLADE-H is rotated vertically by the stepping motor.

*Swing Set : Press the  button under the remote control is displayed on LCD the  and the blades move up and down. If the one more time press the  button, blades location is stop.

10. SETTING THE ON/OFF TIMER. :

*ON TIMER : The On Timer enables you to switch on the air conditioner automatically after a given period of time. You can set the period of time from 30 minutes to 24 hours.

*OFF TIMER : The Off Timer enables you to switch off the air conditioner automatically after a given period of time. You can set the period of time from 30 minutes to 24 hours.

11. GENERATING ANION :

The air conditioner can generate anion with an ionizer in the indoor unit.

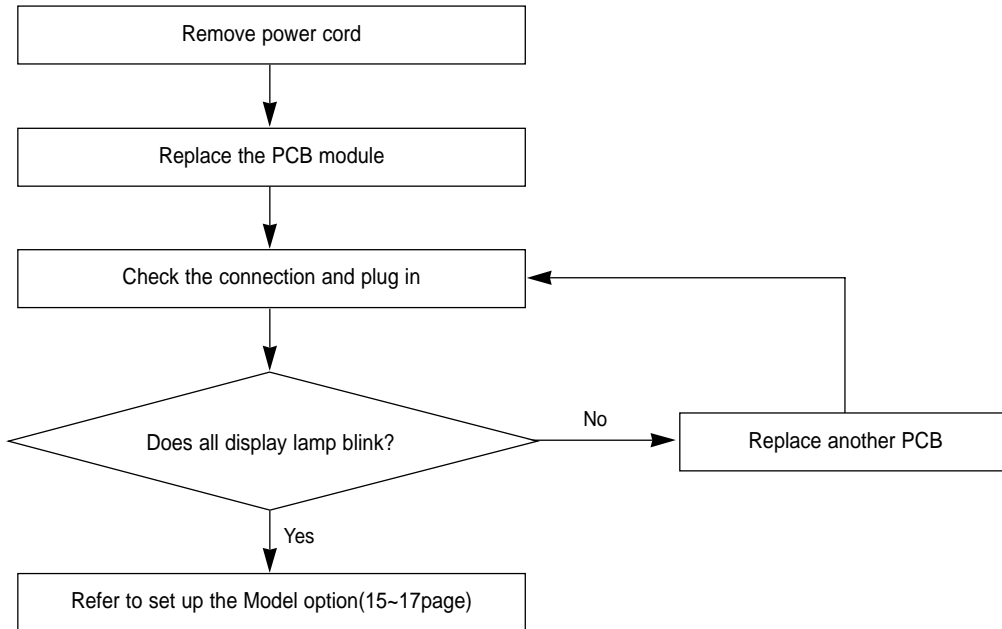
12. SELF DIAGNOSIS

Error Mode	DISPLAY 7-SEGMENT		Remark
	Operation Off	Operation On	
Indoor unit room temperature sensor error (open or short)	OFF	E1	
Indoor unit heat exchanger temperature sensor error(open or short)	OFF	E5	
Indoor FAN MOTOR error : Keep the RPM value 100 below for 15 seconds	OFF	E3_01	
EEPROM error	OFF	06	
Error in option In case of No option set-up In case of option data error	OFF	09	
Communication error	EA_01	EA_01	

13. BUZZER SOUND : Whenever the On/Off button is pressed or whenever change occurs to the condition which is set up or select, the compulsory operation mode, buzzer is sounded "beep".

2-2 Replace PCB Model option

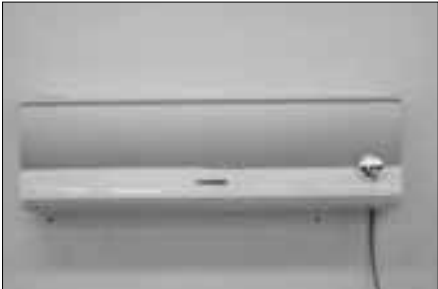
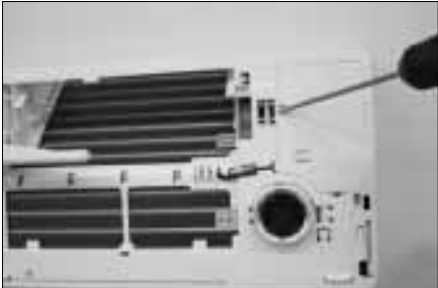

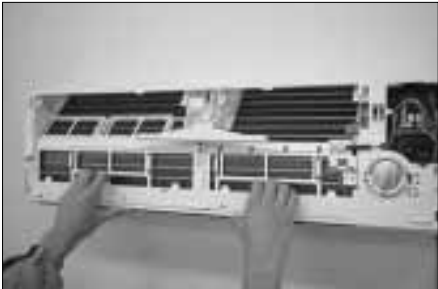
2-2-1 Replace PCB model option

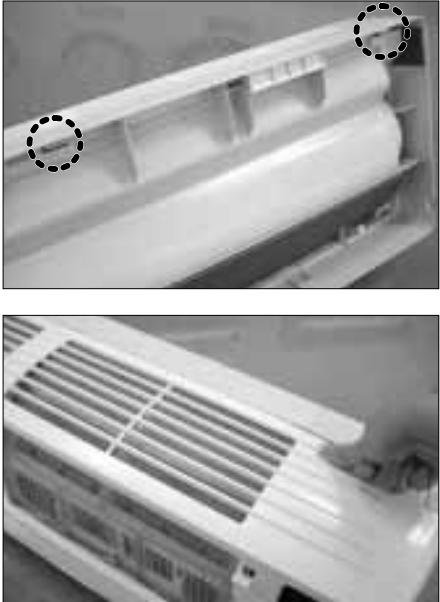




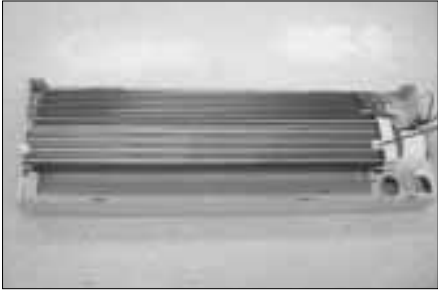


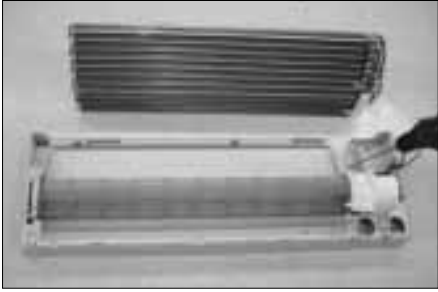
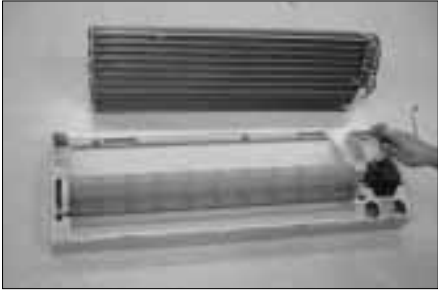
3. Disassembly and Reassembly

Stop operation of the air conditioner and remove the power cord before repairing the unit.





3-1 Indoor Unit

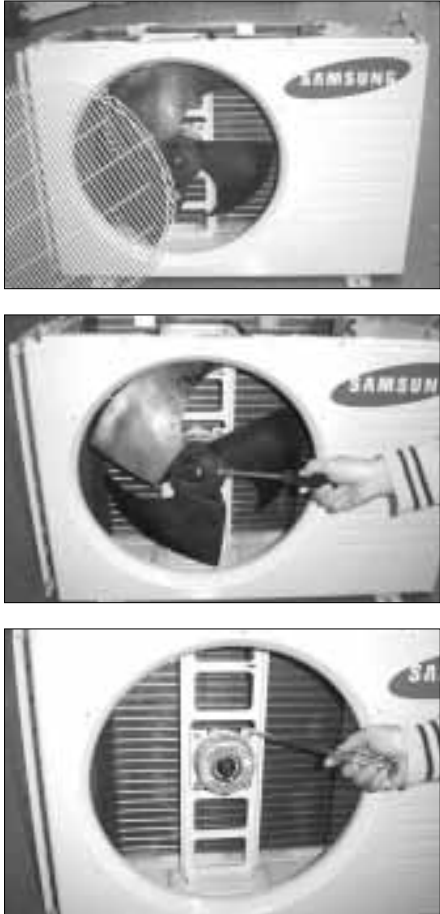

No	Parts	Procedure	Remark
1	Front Panel	<ol style="list-style-type: none"> 1) Stop the air conditioner operation and block the main power. 2) Detach tape of Front Panel upper. 3) Slide the lower Front Grille down, then disassemble it by pulling it forwards. 4) Open the upper Front Grille by pulling right and left sides of the Grille. 5) Take the left and right Filter out. 6) Loosen one of the right screw and detach the Terminal Cover. 7) Detach the thermistor from the Front Grille. 8) Loosen 5 fixing screws of Front Grille. 9) Pull the lower left and right of discharge softly for the outside cover to be pulled out. 	   

No	Parts	Procedure	Remark
		<p>10) At first, press the left and center hook of the back side of the Panel Grille with the thumb to remove the hook. And press the right of the upper side of the Panel Grille with the fingers. And then disassemble the Panel Grille.</p>	
2	Electrical Parts (Main PCB)	<p>1) Take all the connector of PCB upper side out.(Including Power Cord) 2) Detach the outdoor unit connection wire from the Terminal Block. 3) If pulling the main PCB up, it will be taken out.</p>	
3	Tray Drain	<p>1) Pull Tray Drain out from the Back Body.</p>	

No	Parts	Procedure	Remark
4	Heat Exchanger	<ol style="list-style-type: none"> 1) Loosen 2 fixing earth screws of right side. 2) Detach the Connection Pipe. 3) Detach the Holder Pipe at the rear side. 4) Loosen 3 fixing screws of right and left side. 5) Detach the Heat Exchanger from the indoor unit. 	  
5	Fan Motor & Cross Fan	<ol style="list-style-type: none"> 1) Loosen 2 fixing screws and separate the Motor Holder. 2) Loosen 1 fixing screw of Fan Motor. (with a M3 wrench) 3) Detach the Fan Motor from the Fan. 4) Detach the Fan from the left Holder Bearing. 	 

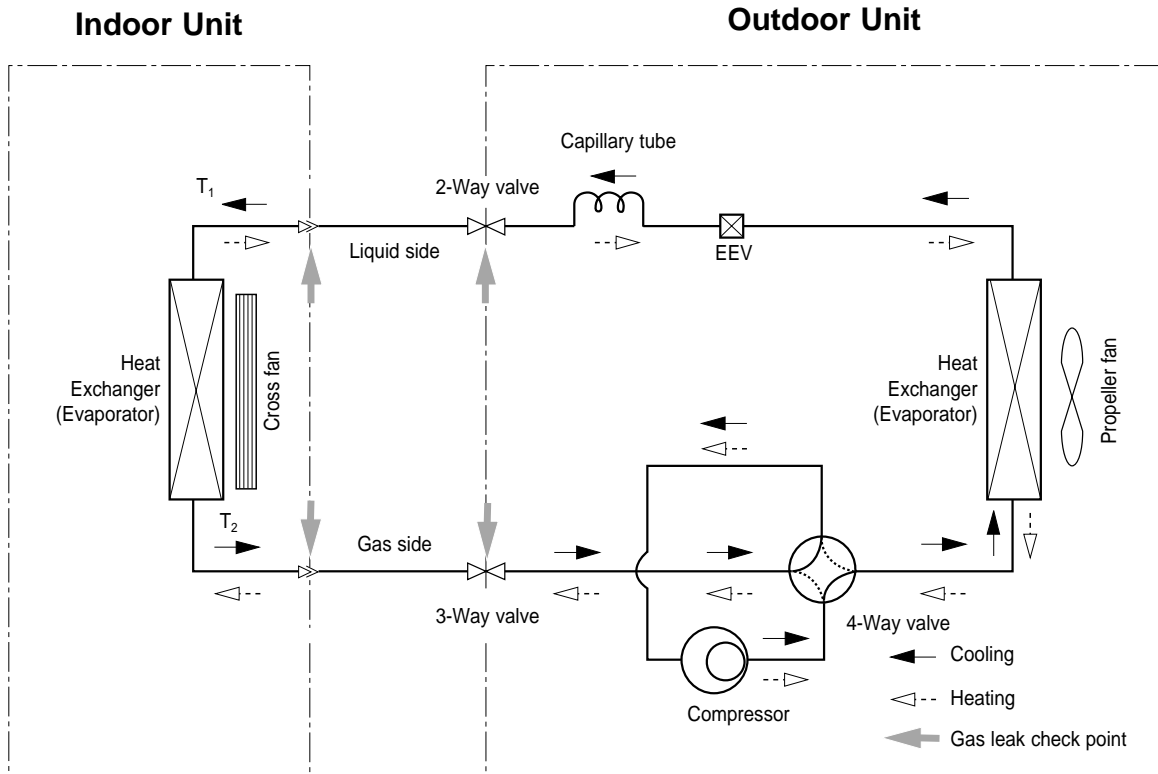
3-2 Outdoor Unit

No	Parts	Procedure	Remark
1	Common Work & Ass'y-control Out	<ol style="list-style-type: none"> 1) Loosen the fixing screw and detach the Cover-Valve. 2) Detach the Cable-Connector Wire from the Terminal-Block. 3) Loosen 5 fixing screws and detach the Cabinet-Upper. 4) Loosen 5 fixing screws from the Ass'y-Control Out. 5) Detach the Terminal-Housing from the Ass'y-Control Out. 6) Detach the Ass'y-Control Out from the outdoor unit. 7) Loosen 7 fixing screws and detach the Cabinet-Side. 	   

No	Parts	Procedure	Remark
2	Fan-Motor	<ol style="list-style-type: none"> 1) Loosen 4 fixing screws of the Guard-Fan. 2) Remove the Nut Flange. (Turn to the clockwise) 3) Detach the Fan. 4) Loosen 4 fixing screws to detach the Motor. 	
3	Heat Exchanger	<ol style="list-style-type: none"> 1) Loosen 3 fixing screws of Ass'y-Frame and Partition. 2) Disassemble the inlet and outlet pipe by welding. 3) Detach the Heat Exchanger. 	

No	Parts	Procedure	Remark
4	Compressor	<ol style="list-style-type: none">1) Open the Terminal Cover of Compressor and unscrew the Connection Terminal.2) Disassemble the inlet and outlet pipe of Compressor by welding.3) Disassemble the inlet and outlet pipe of Condenser by welding 4) Loosen the 3 bolts of the lower part.5) Detach the Compressor.	 

4. Refrigerating Cycle Diagram





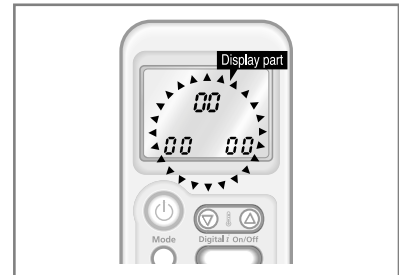
5. Set Up the Model Option

5-1 Setting Option Setup Method

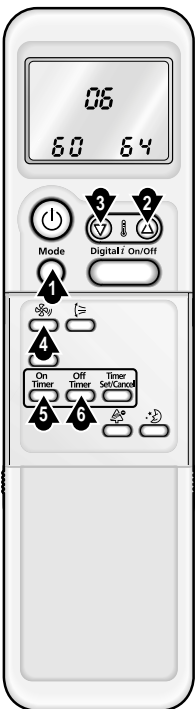






ex) Option No. : 066064-170373

Step 1 : Enter the Option Setup mode.

- 1st Take out the batteries of remote control.
- 2nd Press the temperature  button simultaneously and insert the battery again.
- 3rd Make sure the remote display shown as .



Step 2 : Enter the Option Setup mode and select your option according to the following procedure.

 <p>* Setting is not required if you must 0 a value which has a 0 default.</p>	<p>1 The default value is 00 00 . Otherwise, push the  button to 0. Every time you push the button, the display panel reads 1 or 0 repeatedly.</p>
	<p>2 Push the  button to set the display panel to 5 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.</p>
	<p>3 Push the  button to set the display panel to 5 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.</p>
	<p>4 Push the  button to set the display panel to 0 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.</p>
	<p>5 Push the  button to set the display panel to 5 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.</p>
	<p>6 Push the  button to set the display panel to 4 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.</p>

	7	Press button, then the default value is $00 \overset{10}{00}$.
	8	Push the button to set the display panel to 7. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.
	9	Push the button to set the display panel to 0. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.
	10	Push the button to set the display panel to 3. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.
	11	Push the button to set the display panel to 7. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.
	12	Push the button to set the display panel to 3. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ... 9 → A → b → c → d → E → F repeatedly.
	<p>* Setting is not required if you must a value which has a default.</p>	

Step 3 : Upon completion of the selection, check you made right selections.

Press the Mode Selection key, to set the display part to and check the display part.

→ The display part shows $05 \overset{05}{05}$.

Press the Mode Selection key, to set the display part to and check the display part.

→ The display part shows $03 \overset{17}{73}$.

Step 4 : Pressing the ON/OFF button ()

When pressing the operation ON/OFF key with the direction of remote controller for unit, the sound "Ding" or "Diriring" is heard and the OPERATION ICON() lamp of the display is flickering at the same time, then the input of option is completed. (If the diriring sound isn't heard, try again pressing the ON/OFF button.)

Step 5 : Unit operation test-run

First, Remove the battery from the remote controller.

Second, Re-insert the battery into the remote controller.

Third, Press ON/OFF key with the direction of remote controller for set.

• Error Mode

1st If all lamps of indoor unit are flickering, Plug out, plug in again and press ON/OFF key to retry.

2nd If the unit is not working properly or all lamps are continuously flickering after setting the option code, see if the correct option code is set up for its model.

■ OPTION ITEMS

REMOCON MODEL	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8	SEG9	SEG10	SEG11	SEG12
SH09BPD	0	0	9	0	A	0	1	0	0	2	0	c
SH12BPD	0	0	7	0	9	0	1	1	0	3	6	2

6. Troubleshooting

Since the inverter air conditioner is equipped with Electrical control circuits at both Indoor & outdoor unit, the trouble shooting shall be performed according to the error mode.

Inside the controller of the outdoor unit (inverter), the large capacity of electrolytic condenser so that it takes the time to discharge after the power off since the electrical charge remains(the charging voltage DC 340V).

Take care of the electrical shock by contact on the charging part before the discharge after the power off. (It takes approximately 2 minutes to discharge).

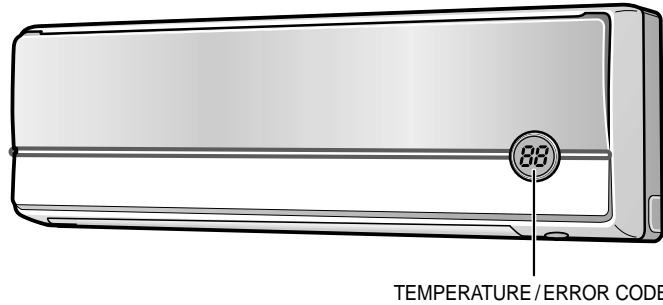
6-1 Basic items for trouble shooting

1. Is the power source proper?
The power source shall be in the range of the rated voltage $\pm 10\%$. If it is out of this range, it may cause the abnormal operation.
2. Is the connection made between the indoor and outdoor unit?
The connection between indoor and outdoor unit shall be performed with 4 wire. (connection cable of indoor and outdoor unit + ground wire).
3. The phenomena as follows are not out of order.

No	Phenomena	Cause and reason
1	The operation is not done.	<ul style="list-style-type: none"> • Is the power off or the power unplugged? • Does it stop because it is the completion time? • Unplug and plug again the power source for 2 minutes.
2	The wind comes out but the heating/cooling is not performed.	<ul style="list-style-type: none"> • Is the filter clogged with dust or dirty? • Is there any direct light on the outdoor unit or any obstacle against it? • Is the selected temperature too high? Lower the selected temperature lower than the current one (during cooling). • Is the selected temperature too low? Raise the desired temperature than the current one? (during heating) • Is the "Fan only Mode" operation?
3	The remote controller does not operate.	<ul style="list-style-type: none"> • Is the battery run out? • Is the battery inserted in the wrong way(+, -)? • Is the detection part of the indoor unit blocked? • Does it interfered with the radio of neon sign?
4	The wind volume is not adjusted.	<ul style="list-style-type: none"> • Is the operation selected among one of Auto / Dry / Turbo / Sleeping? • The temperature setting is not required since the wind volume set automatically. • Check again at the state of Cooling / Fan only / Heating.
5	The temperature is not set.	<ul style="list-style-type: none"> • Is the operation selected among the Dry / Turbo / Sleeping / Fan only Mode. Since the temperature is automatically set, the temperature setting is not required. • Check again at the cooling / heating state. • The standard temperature $\pm 2^{\circ}\text{C}$ during the automatic operation.
6	The operation lamp continues to be flickering.	<ul style="list-style-type: none"> • Push the Operation / Stop button. • Unplug and plug the power source.
7	The immediate operation starts without control of remote controller when plugged	<ul style="list-style-type: none"> • It is the case that the auto restart function works. *Auto restart function is the convenient function where the operation state is memorized in the Memory IC during the blackout and the operation restarts when the power comes back.

6-2 The first determination method of troubled part

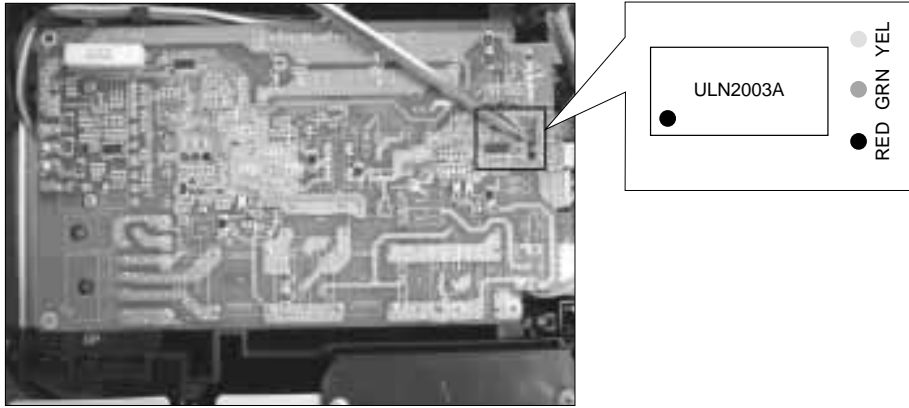
6-2-1 Error mode display of indoor unit



ERROR CODE DISPLAY	Discription	Check point	
		INDOOR	OUTDOOR
Indoor Unit			
<i>E_r→E1</i>	Indoor unit room temperature sensor error (open / short)	Temp-Sensor	
<i>E_r→E5</i>	Indoor unit heat exchanger out temperature sensor error(open / short)	Temp-Sensor	
<i>E_r→05</i>	Indoor unit heat exchanger in temperature sensor error(open / short)	Temp-Sensor	
<i>E_r→06</i>	EEPROM error	PCB	
<i>E_r→09</i>	Option code setting error	Option Code	
<i>E3→01</i>	Indoor fan motor malfunction	Fan and cable	
Communication error or miss-wiring error			
<i>EA→01</i>	Communication error between the indoor unit and outdoor unit	PCB, Cable between Indoor and outdoor unit	
Compressor protection error			
<i>E_r→11</i>	Abnormal increase of operation current		○
<i>E_r→12</i>	Abnormal increase of OLP temperature		○
<i>E_r→13</i>	Abnormal increase of discharge temperature		○
<i>E_r→14</i>	Over current of IPM circuit		Comp. Fan
<i>E_r→15</i>	Abnormal increase of heatsink temperature		Fan
<i>E_r→18</i>	BLCD compressor starting error		Comp. PCB,Comp wire
Outdoor unit sensor error (open / short)			
<i>E_r→E6</i>	deice temp-sensor		Temp-Sensor
<i>E_r→31</i>	outdoor temp-sensor		Temp-Sensor
<i>E_r→32</i>	discharge temp-sensor		Temp-Sensor
<i>E_r→33</i>	OLP temp-sensor		Temp-Sensor
Outdoor control PCB error			
<i>E_r→17</i>	Communication error between 2 micom on the outdoor PCB		PCB
<i>E_r→36</i>	current sensor error		PCB
<i>E_r→37</i>	heatsink temp-sensor error		PCB
<i>E_r→38</i>	Voltage sensor error		PCB, Outlet voltage

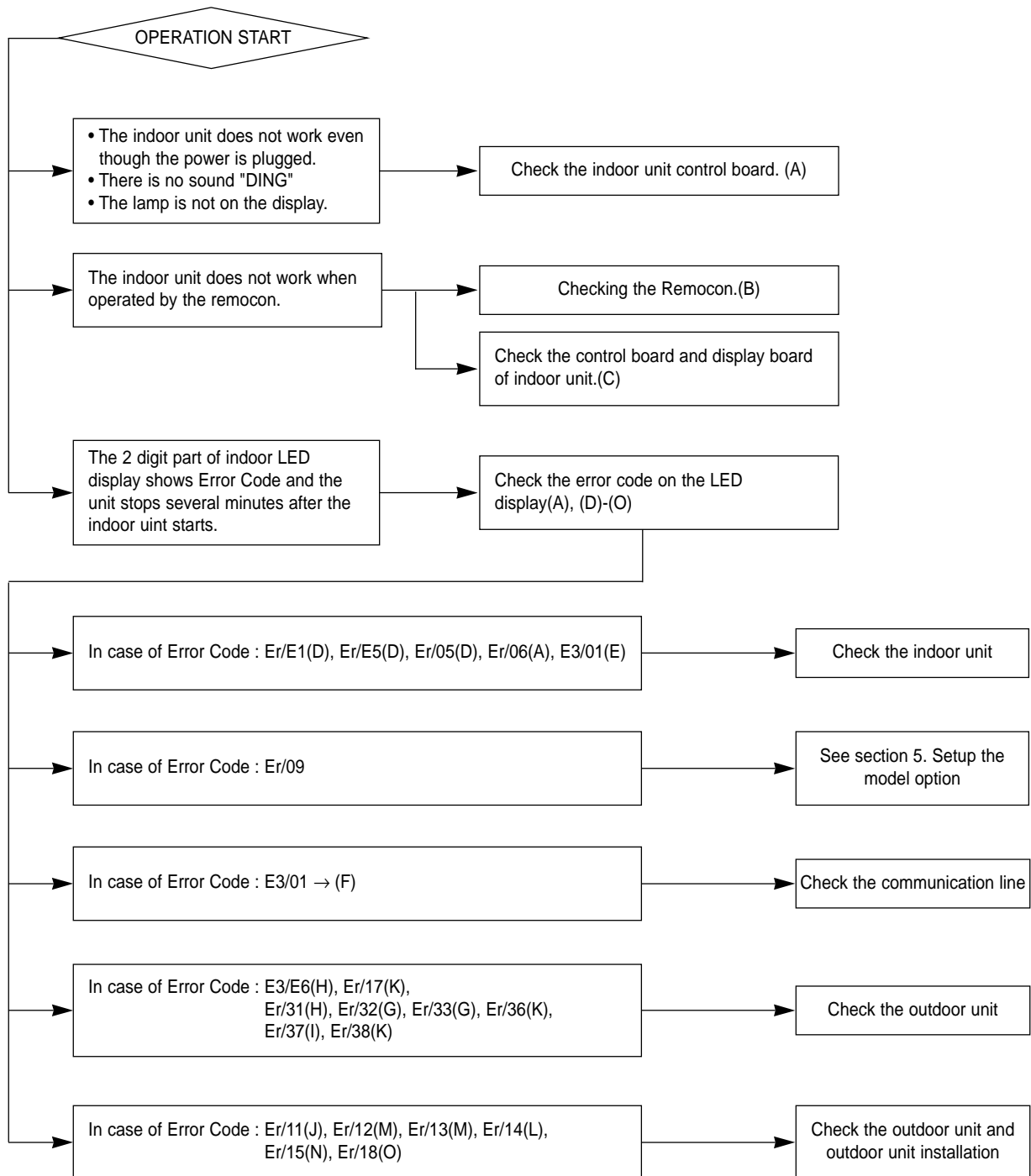
*Error display : *E_r / EA / E3* and 2-digit-number are displayed alternately

6-2-2 Error mode display of outdoor unit board



LAMP of Display Monitor			Description ● : Lamp on ◎ : Lamp flickering X : Lamp off
YELLOW	GREEN	RED	
X	◎	●	Normal operation and communication (Indoor – Outdoor unit)
◎	X	●	Normal operation and communication (2 micom on the outdoor PCB)
X	X	X	Trouble of the control power of the outdoor Trouble of communication (Indoor – Outdoor unit)
X	●	X	Communication trouble between two micoms on the outdoor PCB
X	X	◎	Over current of IPM circuit
○	●	◎	Over voltage of IPM circuit
●	◎	●	Over current or voltage of PFC circuit
◎	◎	○	Trouble of discharge temp-sensor (open / short)
◎	◎	●	Trouble of AC current temp-sensor (open / short)
◎	○	◎	Trouble of outdoor temp-sensor (open / short)
◎	●	◎	Trouble of deice temp-sensor (open / short) Deice sensor temperature is too low under minus ambient temperature operation (sensor normal)
○	◎	◎	Trouble of heatsink temp-sensor circuit (open / short)
●	◎	◎	Trouble of DC link voltage circuit
◎	◎	◎	Trouble of OLP temp-sensor (open / short)

6-3 Sequence of trouble shooting for inverter aircon



6-3-1 (A) Check of indoor unit control board

- ▶ Unplug the power cord and plug it after 5 seconds.
- ▶ Press the on/off switch located indoor unit inside to operate the air conditioner.
 - If the air conditioner operates, check the remote and indoor unit display board.
 - If the air conditioner does not operate, check according to the sequence of the followings:
- ▶ Check sequence of indoor unit control board

Step 1 : Check whether two wires of power cord (Sky-blue, brown) are connected correctly to the terminal block and Relay on the control board.

- Sky -blue : connected to "N1" of Terminal block
- Brown : connected to RY71 Tab terminal (control board outer side)

Step 2 : Check whether the wire connected to the terminal block is connected to the control board.

(Control board)		(Terminal block)
CN71	SKY-BLU	(N1)
RY71	BRN	1
CN71	BLK	2

Step 3 : Check whether the fuse (F701)(F702) on the control board is normal. (3.15[A]/250[V]:F701) (1[A]/250[V]:F702)

- If the fuse is broken, replace it with new one.

Step 4 : Check the output voltage of SMPS on the control board.

- Input power AC178 ~ AC 264V — • CN22 1-3pin : DC12V
 CN22 2-3pin : DC5V

*CN22 : As socket not mounted measure at the solder points

Step 5 : Check whether the control board gets wet with dew

- Dry the control board.

Step 6 : Check whether tiny metal objects make a short circuit on the PCB, especially between pins of the surface mount IC.

- remove the objects. Do not use spray solvent or some components may get damaged by solvent.

6-3-2 (B)(C) Display board and remote check of indoor unit

- ▶ Check whether the connection wire of Display board is correctly connected to CN53 connector.
- ▶ Check the voltage of remote battery. - the voltage of one battery shall be higher than about 1.4V, and then the remote operates normally.
- ▶ Check whether the neon sign is on and the 3 wave long fluorescent lamp is on around the indoor unit. - After putting all lamps of the indoor out and then operate it by remote. If it operates with the remote, it is the abnormality due to the interference from the light of lamps. (Aircon unit is normal).

6-3-3 (D) Check the indoor temperature sensor and indoor heat exchanger temperature sensor.

Take out the thermistor connected to the connector (CN41, CN42) of control board of indoor unit and measure the resistance between two wires and if it is same as follows: it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

6-3-4 (E) Check of indoor unit fan motor

- ▶ Check whether the wires are connected surely between control board(CN72) and running capacitor(Tab).
- ▶ Check whether the wire of fan motor is connected to the control board (CN73,CN74) of indoor unit.
- ▶ Check whether the error mode displays after the strong rotation for approximately 15 seconds since air conditioner turned on.
 - In case the error code displays after the fan motor is rotating for 15 seconds. → Defect of HALL IC of fan motor and/or control board.
 - In case that error code displays without fan motor rotating after 15 seconds. → Operate with making short circuit of AC side pins of SSR(SS71) of indoor unit control board. And then if the fan motor does not operate, it is the fan motor defect. If it rotates, it is the defect of control board(SS71,IC05,IC04).

6-3-5 (F) Check of communication line between the indoor unit and outdoor unit

■ Communication error mode

1. Check of connection

- ▶ Check whether the cable wire connecting the indoor unit with outdoor unit is correctly connected to the (N1), 1, 2 terminal. (If the wire is connected reversely, the communication error occurs)
- ▶ If the cable connecting the indoor unit and outdoor unit is longer than 20m, error mode may occur (shorten the cable length).

■ Check of indoor unit

- ▶ Check whether the connection wire of the terminal block and control board of indoor unit is correct.

(Control board)	SKY-BLU	(Terminal block)
CN71	_____	(N1)
RY71	BRN	1
CN71	BLK	2

■ Check of outdoor unit

- ▶ Check whether the connection wire of the terminal block and control board of outdoor unit is correct.

(Control board)	SKY-BLU	(Terminal block)
TB-N	_____	(N1)
TB-L	BRN	1
CN04	BLK	2

2. Check of power supply to the outdoor unit

After operation of aircon, select the turbo mode and approximately 3minutes later, check whether the red color lamp of control board (to be seen if the top cover of outdoor unit) is on.

→ If the red lamp (LED 3) is not on, check the power part of control board of outdoor unit.

- Check the connection of reactor.

→ If the red lamp (LED 3) is on and green lamp is flickering, it is normal.

6-3-6 (G) Check of discharge temperature sensor and comp top OLP temperature sensor.

- ▶ Connector of outdoor unit control board

(PIN#3,4 of CN51 - discharge temperature sensor), (PIN#1,2 of CN52-OLP Temperature sensor)

Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace.

Ambient temperature (°C)	0°C	10°C	20°C	30°C	40°C	50°C	
Resistance of thermistor [KΩ]	553	362	242	166	165	82	

6-3-7 (H) Check the defrost temperature sensor and outdoor temperature sensor.

- ▶ Connector of outdoor unit control board

(PIN#1,2 of CN51 - outdoor temperature sensor),(PIN#3,4 of CN52-deice Temperature sensor)

Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

6-3-8 (I) Check the heatsink temperature sensor of IPM

- ▶ This sensor is inside of the IPM module and PIN#24,25 of IPM module are the sensor terminal.

Usually PIN solder crack or short circuit with small metal object cause sensor error.

Check the object to make short circuit and solder condition of these pins.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	77.4	61.4	49.1	39.5	31.9	26	

6-3-9 (J) Check of operation current abnormal increase mode

- ▶ The operation abnormal current mode is the protection control for the safe operation by detecting the operation current of inverter aircon by the current sensor on the control board.
- ▶ If the operation current abnormal increase occurs,
 - The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 °C)
 - Reinstall the outdoor unit so that the good ventilation can be made.
 - If the Refrigerant is overcharged.
 - Check the amount of Refrigerant.
 - If the comp is locked.
 - Replace the comp.
 - If the comp is operating without the revolution of fan motor.
 - Check the fan motor connector, replace the fan motor.
 - If the protection cover is operating with bending to the outdoor.
 - Take out the protection cover.
 - If two outdoor units are operating face to face. (the bad ventilation is made)
 - Reinstall the outdoor unit for the good ventilation.
 - The air circulation is bad due to the attachment of falling leaves
 - Take away the leaves for the good ventilation.
- ▶ Check and clean the dirt of current sensor block of outdoor control board.
 - especially
 - IC83 pin solder
 - C437 47uF
 - R459 33K
 - R461 4.7K

6-3-10 (K) Check of Current sensor, Voltage sensor and Communication between 2 micom on the board.

- ▶ These errors are from component trouble on the outdoor control board.
 - Replace the outdoor control board

6-3-11 (L) Check of instantaneous over-current protection of IPM circuit.

- ▶ Inverter instantaneous over-current protection mode is the mode to be actuated in order to prevent the damage of elements from the peak current of IPM circuit elements.
- ▶ In case that the inverter circuit instantaneous over-current protection mode actuates.

■ condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
→ Reinstall the outdoor unit so that the good ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
→ Take out the cover.
- If two outdoor units are operating face to face, (the bad ventilation is made)
→ Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves.
→ Take away the leaves for the good ventilation.
- If the Refrigerant is overcharged.
→ Check the amount of Refrigerant.

■ Unit defect

- If the comp is locked.
→ Replace the comp.
- If the comp is operating without the revolution of fan motor.
→ Check the fan motor connector and replace the fan motor.
- In case the parts of the control board is damaged.
→ Replace the outdoor control board.

6-3-12 (M) Check of the comp discharge gas temperature and OLP temperature abnormal rise.

- ▶ If the comp discharge gas temperature and OLP temperature rises higher than a certain level, it protects the circuit.
- ▶ If the comp discharge gas temperature and OLP temperature rises abnormally,

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
→ Reinstall the outdoor unit so that the good ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
→ Take out the cover.
- If two outdoor units are operating face to face, (the bad ventilation is made)
→ Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves
→ Take away the leaves for the good ventilation.
- If the refrigerant is insufficient.
→ Fill up the amount of refrigerant.

■ Unit defect

- If the comp is locked.
→ Replace the comp.
- If the comp is operating without the revolution of fan motor
→ Take out the protection cover.
→ Check the fan motor connector and replace the fan motor.

6-3-13 (N) Check of the heatsink temperature abnormal rise

- ▶ If the air flow around the heatsink on the control box is not good, heatsink temperature will go up and the control box will have damage. So controller check the heatsink temperature and protect at the certain limit.
Possible troubles are fan motor trouble, fan motor drive circuit trouble and air flow blocking.

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50(°C)).
→ Reinstall the outdoor unit so that the ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
→ Take out the cover.
- If two outdoor unit are operating face to face,(the bad ventilation is made)
→ Reinstall the outdoorunit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves.
→ Take away the leaves for the good ventilation.
- If the refrigerant is insufficient.
→ Fill up the amount of refrigerant.

■ Unit defect

- If the fan is locked with some object.
→ Remove the object.
- If the comp is operating without the revolution of fan motor.
→ Take out the protection cover
→ Check the fan motor connector(CN54), running capacitor, relay(RY503) and replace the fan motor.

6-3-14 (O) Check BLDC compressor starting error

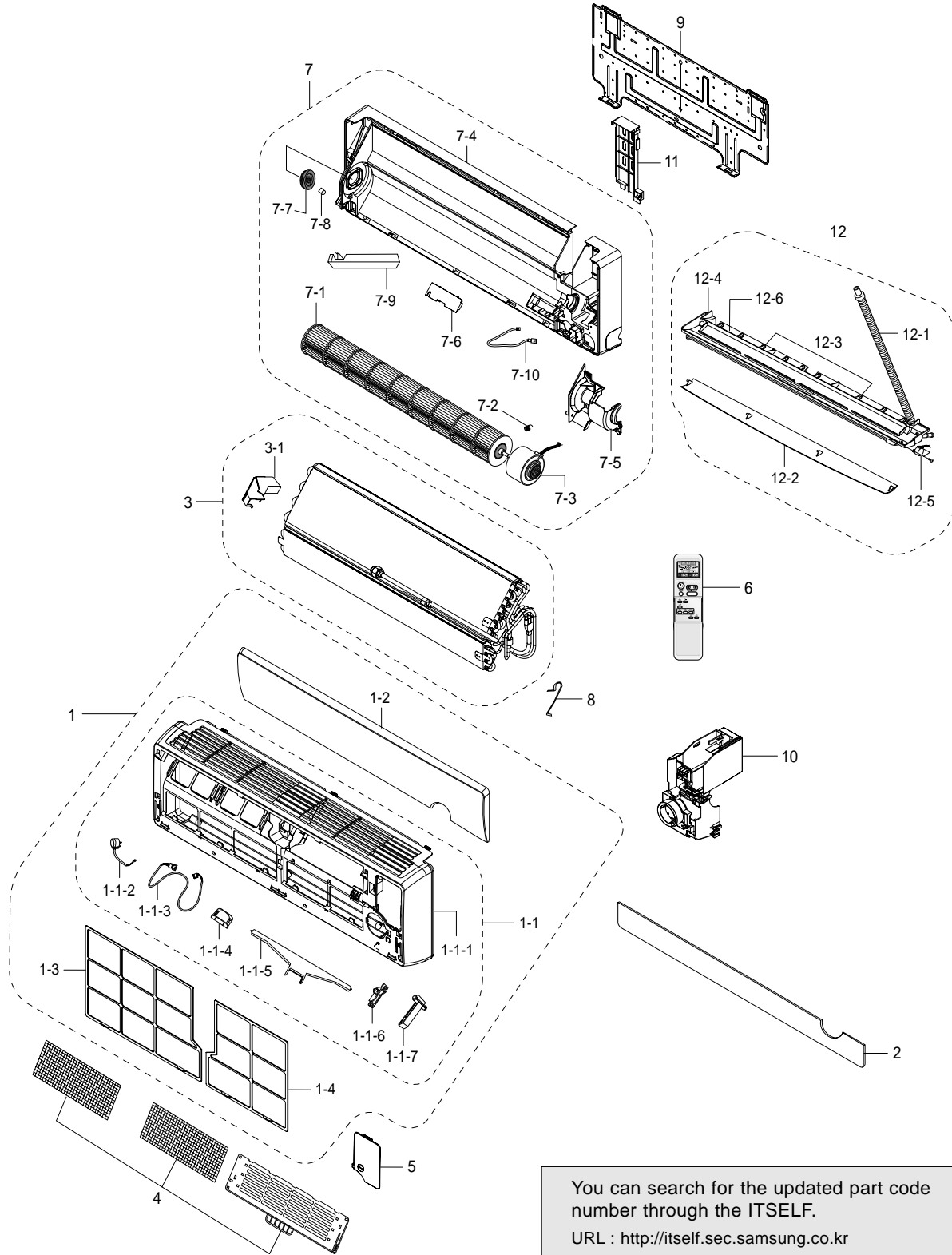
- ▶ If the compressor have some trouble inside like locking or gas pressure of suction and discharge pipe is not balanced, Inverter system will give up compressor rotation control to protect itself from overcurrent.
- ▶ In case of compressor rotation starting trouble without overcurrent condition, controller detect the compressor rotation error and stop.
 - Compressor wire connection is not good.
→ Check Compressor TAB terminal connection of the wire and connector to control box.
 - Gas pressure balance is not good at stop condition.
→ Check service valve open.
→ Check EEV motor attachment and connector.
 - Compressor is locked or have some mechanical damage.
→ Replace the compressor.

6-4 Fault Diagnosis of Major Parts

Part	Diagnosis															
<ul style="list-style-type: none"> Indoor "Temp.Sensor" Indoor "Heat ex. Sensor" Outdoor "Temp.Sensor" Outdoor "Deice Temp. Sensor" 	Measure resistance with a tester.															
	Normal	<table border="1"> <thead> <tr> <th>Ambient temperature</th> <th>15°C</th> <th>20°C</th> <th>25°C</th> <th>30°C</th> <th>35°C</th> <th>40°C</th> </tr> </thead> <tbody> <tr> <td>Resistance of thermistor[KΩ]</td> <td>14.68</td> <td>12.09</td> <td>10</td> <td>8.31</td> <td>6.94</td> <td>5.83</td> </tr> </tbody> </table>	Ambient temperature	15°C	20°C	25°C	30°C	35°C	40°C	Resistance of thermistor[KΩ]	14.68	12.09	10	8.31	6.94	5.83
	Ambient temperature	15°C	20°C	25°C	30°C	35°C	40°C									
Resistance of thermistor[KΩ]	14.68	12.09	10	8.31	6.94	5.83										
Abnormal	∞, 0Ω ... open or short															
<ul style="list-style-type: none"> Outdoor "Discharge Temp.Sensor" Outdoor "OLP Temp.Sensor" 	Measure resistance with a tester.															
	Normal	<table border="1"> <thead> <tr> <th>Ambient temperature</th> <th>0°C</th> <th>10°C</th> <th>20°C</th> <th>30°C</th> <th>40°C</th> <th>50°C</th> </tr> </thead> <tbody> <tr> <td>Resistance of thermistor[KΩ]</td> <td>553</td> <td>362</td> <td>242</td> <td>166</td> <td>165</td> <td>82</td> </tr> </tbody> </table>	Ambient temperature	0°C	10°C	20°C	30°C	40°C	50°C	Resistance of thermistor[KΩ]	553	362	242	166	165	82
	Ambient temperature	0°C	10°C	20°C	30°C	40°C	50°C									
Resistance of thermistor[KΩ]	553	362	242	166	165	82										
Abnormal	∞, 0Ω ... open or short															
Indoor Fan Motor	Measure the voltage between terminals (CN72) with a tester															
	Normal	At ambient temperature (10°C ~ 30°C) <table border="1"> <thead> <tr> <th>between</th> <th>Voltage[V]</th> <th></th> </tr> </thead> <tbody> <tr> <td>Red, Blue</td> <td>410±10%</td> <td>Main</td> </tr> <tr> <td>Red, Yellow</td> <td>325±10%</td> <td>Sub</td> </tr> </tbody> </table>	between	Voltage[V]		Red, Blue	410±10%	Main	Red, Yellow	325±10%	Sub					
	between	Voltage[V]														
	Red, Blue	410±10%	Main													
	Red, Yellow	325±10%	Sub													
	Abnormal															
Measure the voltage between ground and signal wire of the fan motor																
Normal	<table border="1"> <thead> <tr> <th>between</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Gray, Orange</td> <td>0.5V~4.5V</td> </tr> <tr> <td>Yellow, Orange</td> <td>5V</td> </tr> </tbody> </table>	between	Voltage	Gray, Orange	0.5V~4.5V	Yellow, Orange	5V									
between	Voltage															
Gray, Orange	0.5V~4.5V															
Yellow, Orange	5V															
Abnormal	Abnormal if voltage does not change from 0V to 5V.															
Outdoor Fan Motor	Measure resistance with a tester.															
	Normal	At ambient temperature (10°C ~ 30°C) <table border="1"> <thead> <tr> <th>between</th> <th>Resistance[Ω]</th> <th></th> </tr> </thead> <tbody> <tr> <td>Black, Red</td> <td>275±10%</td> <td>Main</td> </tr> <tr> <td>Black, Yellow</td> <td>350±10%</td> <td>Sub</td> </tr> </tbody> </table>	between	Resistance[Ω]		Black, Red	275±10%	Main	Black, Yellow	350±10%	Sub					
	between	Resistance[Ω]														
Black, Red	275±10%	Main														
Black, Yellow	350±10%	Sub														
Abnormal	∞, 0Ω ... open or short															
Stepping Motor (UP/DOWN swing motor)	Measure resistance between red wire and each terminal.															
	Normal	Approx. 290Ω at ambient temperature (20°C ~30°C)														
	Abnormal	∞, 0Ω ... open or short														
Stepping Motor (FRONT GRILLE motor)	Measure resistance between red wire and each terminal.															
	Normal	Approx. 110Ω at ambient temperature (20°C ~30°C)														
	Abnormal	∞, 0Ω ... open or short														

7. Exploded Views and Parts List

7-1 Indoor Unit

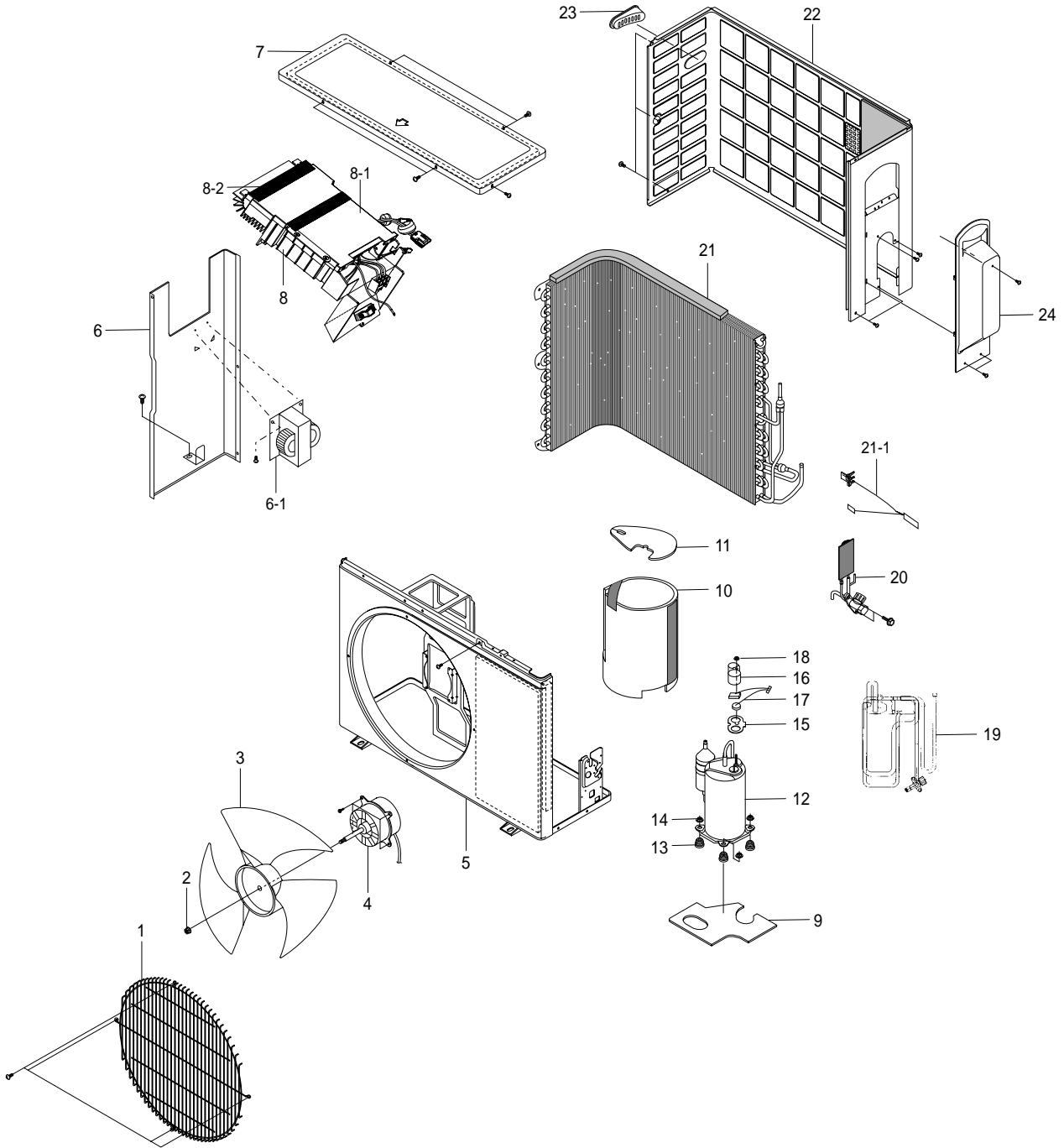


You can search for the updated part code number through the ITSELF.
 URL : <http://itself.sec.samsung.co.kr>

■ Parts List

No.	Code No.	Description	Specification	Q'TY		Remark
				SH09BPD	SH12BPD	
1	DB92-00383A	ASS'Y PANEL FRONT TOTAL	ASS'Y	1	1	
1-1	DB92-00392A	ASS'Y PANEL FRONT SUB	ASS'Y	1	1	
1-1-1	DB92-00346A	ASS'Y PANEL FRONT	ASS'Y	1	1	
1-1-2	DB31-00166A	MOTOR STEPPING	-	1	1	
1-1-3	DB39-00780A	CONNECT WIRE-STEP MOTOR	-	1	1	
1-1-4	DB61-01114A	HOLDER MOTOR DC	HIPS	1	1	
1-1-5	DB61-01115A	HINGE GRILLE	HIPS	1	1	
1-1-6	DB61-01116A	GUIDE LINK	HIPS	1	1	
1-1-7	DB66-00364A	LINK MOTOR	ABS	1	1	
1-2	DB64-00640A	GRILLE UP	ABS	1	1	
1-3	DB63-00585A	FILTER-AIR LF	PP	1	1	
1-4	DB63-00586A	FILTER-AIR RH	PP	1	1	
2	DB92-00388A	ASS'Y GRILLE LOW SUB	ASS'Y	1	1	
3	DB96-02092B	ASS'Y EVAPORATOR	ASS'Y	1	1	
3-1	DB63-00667A	COVER DRAIN	PP	1	1	
4	DB95-00367C	ASS'Y FILTER BIO	ASS'Y	1	1	
5	DB63-00581A	COVER TERMINAL	HIPS	1	1	
6	DB93-01452G	ASS'Y REMOCON	ASS'Y	1	1	
7	DB94-00256B	ASS'Y BACK BODY TOTAL	ASS'Y	1	1	
7-1	DB94-00040R	ASS'Y CROSS FAN	ASS'Y	1	1	
7-2	DB60-20011A	BOLT SPECIAL	-	1	1	
7-3	DB31-00152B	MOTOR-FAN IN	-	1	1	
7-4	DB94-00261B	ASS'Y BACK BODY SUB	ASS'Y	1	1	
7-5	DB61-01099A	HOLDER-MOTOR	PP	1	1	
7-6	DB63-00580A	COVER-IONIZER	HIPS	1	1	
7-7	DB73-00128A	BEARING MOLD	-	1	1	
7-8	DB94-40007A	BEARING	-	1	1	
7-9	DB93-01629A	ASS'Y IONIZER	ASS'Y	1	1	
7-10	DB93-01383D	ASS'Y CONNECTOR WIRE ION	-	1	1	
8	DB67-60030A	SPRING SENSOR	-	1	1	
9	DB70-00276A	HANGER PLATE	SGCC-M	1	1	
10	DB93-02583A	ASS'Y CONTROL IN	ASS'Y	1	1	Refer to 32 page
11	DB90-00992A	ASS'Y HOLDER-PIPE	ASS'Y	1	1	
12	DB94-00259A	ASS'Y TRAY DRAIN	ASS'Y	-	1	Option
	DB94-00259E	ASS'Y TRAY DRAIN	ASS'Y	-	1	
	DB94-00259B	ASS'Y TRAY DRAIN	ASS'Y	1	-	
12-1	DB94-00062E	ASS'Y HOSE DRAIN	ASS'Y	1	1	
12-2	DB61-01103A	BLADE-H	HIPS	1	1	
12-3	DB61-01104A	BLADE-V	PP	1	1	
12-4	DB63-00587A	TRAY DRAIN	HIPS	1	1	
12-5	DB95-20138A	ASS'Y STEPPING MOTOR	ASS'Y	1	1	
12-6	DB63-00634A	GUARD-SAFETY WIRE	-	1	1	Option

7-2 Outdoor Unit

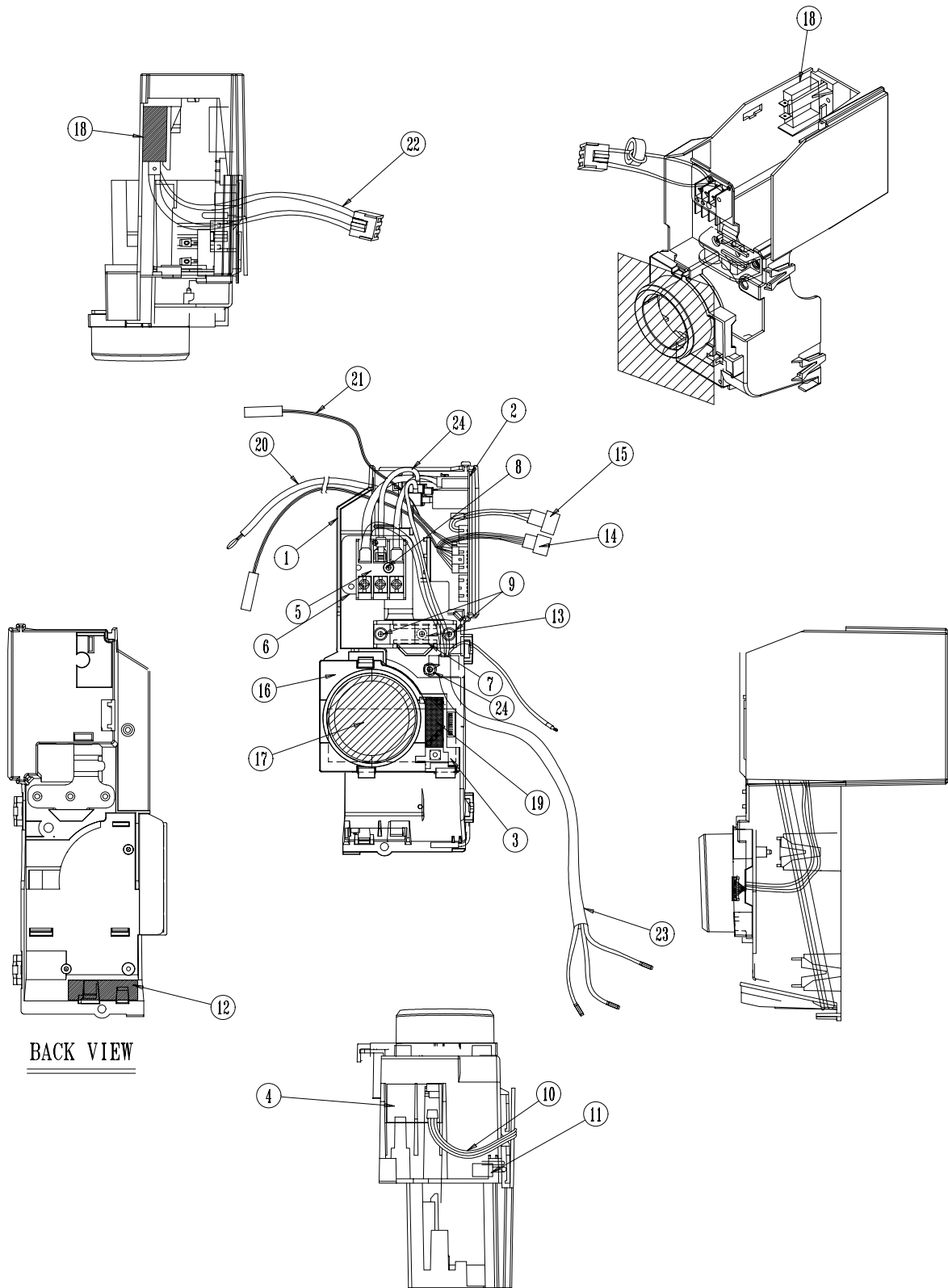


■ Parts List

No.	Code No.	Description	Specification	Q'TY		Remark
				SH09BPDx	SH12BPDx	
1	DB90-00071A	GUARD-FAN	HSER	1	1	
2	DB60-30004A	NUT-FLANGE	2C SM20C M6 NTR	1	1	
3	DB67-50063A	PROPELLER-FAN	AS+G/F, ø405	1	1	
4	DB31-10058E	MOTOR-FAN OUT	AMASS-020WTVB	1	1	
5	DB90-00147B	ASS'Y-FRAME	ASS'Y	1	1	
6	DB94-00043H	ASS'Y-PARTITION	ASS'Y	1	1	
6-1	DB27-10037A	REACTOR	12A, 21mH	1	1	
7	DB90-00150C	CABI-UPPER	SECC-P	1	1	
8	DB93-02582A	ASS'Y-CONTROL OUT	ASS'Y	1	1	
8-1	DB93-02581A	ASS'Y-MAIN PCB-OUT	ASS'Y	1	1	
8-2	DB93-02515A	HEATSINK	-	1	1	
9	DB72-00196A	CLOTH-COMP BOTTOM	FELT	1	1	
10	DB72-00211A	CLOTH-COMP SIDE	FELT	1	1	
11	DB72-00231A	CLOTH-COMP UPPER	FELT	1	1	
12	G4C090LU2ER	COMPRESSOR	G4C090LU2ER	1	1	
13	DB73-10004B	GROMMET-ISOLATOR	Silicon	3	1	
14	DB60-30029A	NUT-WASHER	HEX 2C MB ZPC	3	3	
15	DB63-20003A	GASKET	EPDM	1	3	
16	DB63-10034A	COVER-TERMINAL	NORYL	1	1	
17	DB32-10043B	THERMISTOR-OLP	204CT / 103AT	1	1	
18	DB60-30018A	NUT-FLANGE	M5, SM20C	1	1	
19	DB99-00026B	ASS'Y-4WAY VALVE	25kg/cm2G	1	1	
20	DB99-00041A	ASS'Y-CHECK VALVE	ASS'Y	1	1	
21	DB96-00279A	ASS'Y-CONDENSER	ASS'Y	1	1	
21-1	DB32-10040A	THERMISTOR-OUT	204CT / 103AT	1	1	
22	DB64-00186A	CABI-SIDE	SECC-P	1	1	
23	DB67-90024A	HANDLE-CABI, LF	ABS	1	1	
24	DB63-00070A	COVER-VALVE	ABS	1	1	
					1	

7-3 Ass'y Control In (Indoor Unit)

■ SH09BPD / SH12BPD : DB93-02583A



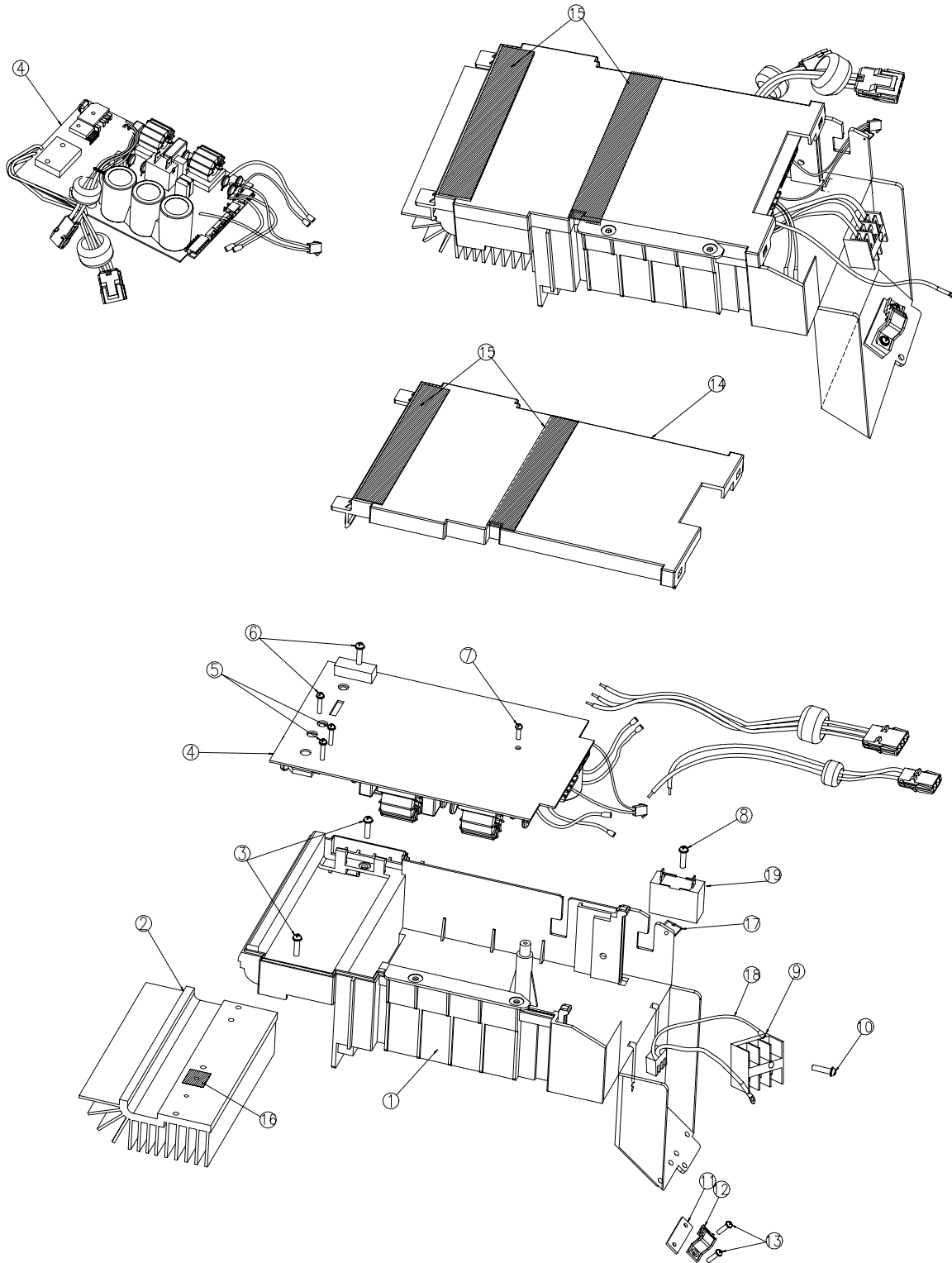
BACK VIEW

■ Parts List

No.	Code No.	Description	Specification	Q'TY	Remark
1	DB61-01631A	CASE-CONTROL	ABS	1	
2	DB93-02584A	ASS'Y MAIN PCB	ASS'Y	1	
3	DB93-01368G	ASS'Y S/W & DISPLAY PCB	ASS'Y	1	
4	DB93-01369A	ASS'Y-MODULE PCB	ASS'Y	1	
5	DB65-00149A	ASS'Y TERMINAL BLOCK	ASS'Y	1	
6	DB70-00289A	PLATE TERMINAL LOW	SGCC-M,T1.2	1	
7	DB61-00171A	HOLDER WIRE CLAMP	HIPS	1	
8	6001-000929	SCREW-MACHINE	PH M3xL22	1	SNA
9	6001-000725	SCREW-MACHINE	TH M4xL16	2	SNA
10	DB93-01380B	C/W MODULE	ASS'Y	1	
11	DB39-00643F	C/W STEP MOTOR UP/DOWN	ASS'Y	1	SNA
12	DB62-01368X	SEAL	61x40x3,30FOAM-PE,GRAY	1	SNA
13	-	SCREW-MACHINE	PH M4x10	1	
14	DB39-00780B	C/W STEPPING MOTOR	ASS'Y(AUTO GRILLE)	1	
15	DB39-00820A	C/W ION-PCB	ASS'Y	1	
16	DB61-01110A	HOLDER-DISPLAY	ABS	1	
17	DB64-00763A	HALF MIRROR	95,T1.5	1	
18	2301-001339	FAN CAPACITOR	1.2 μ F/450V	1	
19	DB72-00126N	SEAL	T3, FOAM-PE,GRAY	1	
20	DB32-00084B	THERMISTOR	OUT, ϕ 6,220	1	
21	DB32-00054B	THERMISTOR	IN, ϕ 5,200	1	
22	DB39-00183A	C/W FAN_CAP	UL1015 AWG #22	1	
23	DB93-01549C	POWER CORD	15A	1	
24	6001-001054	SCREW-MACHINE	TH M4xL10	1	

7-4 Ass'y Control Out (Outdoor Unit)

■ SH09BPDX / SH12BPDX : DB93-02582A



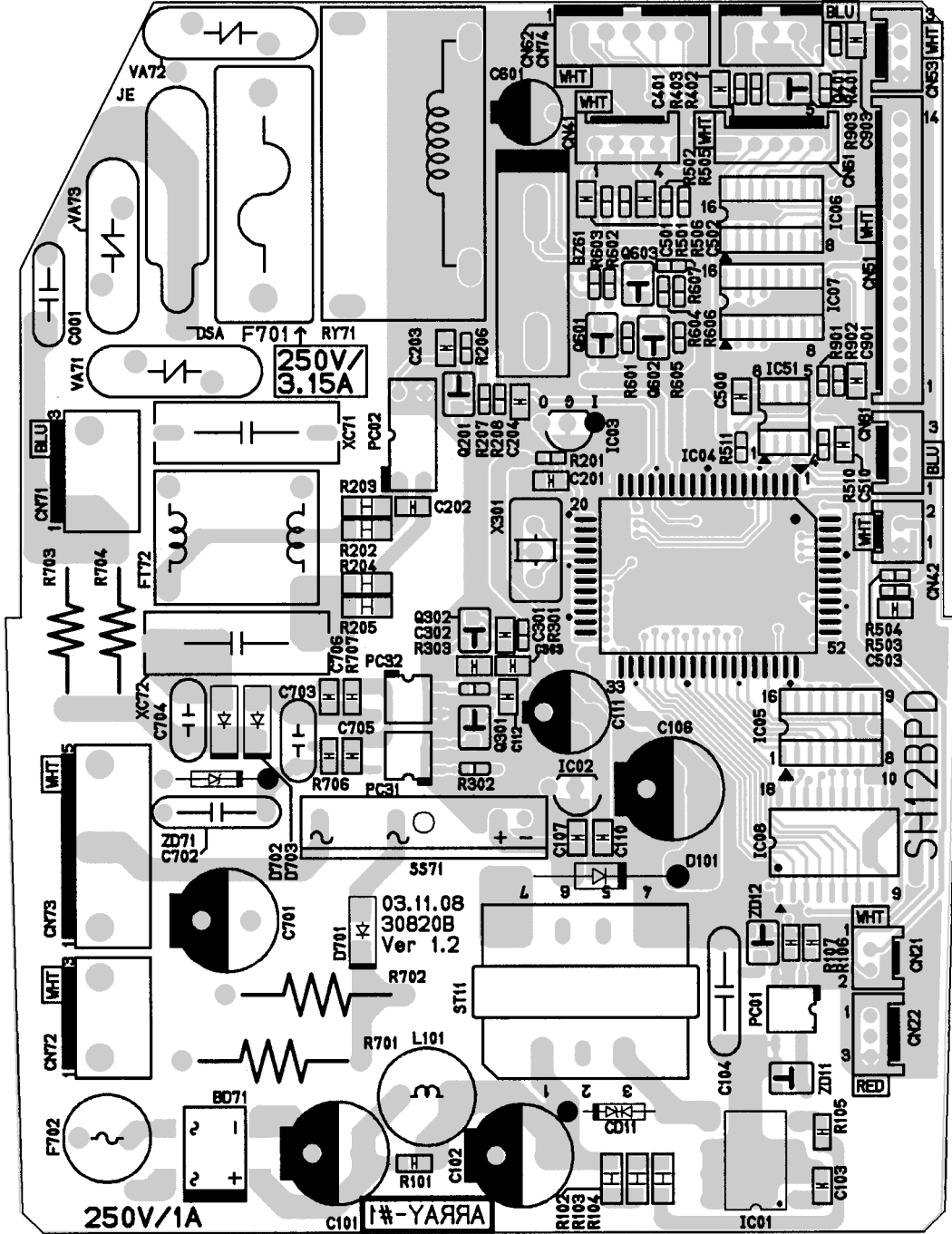
■ Parts List

No.	Code No.	Description	Specification	Q'TY	Remark
1	DB61-00744A	CASE CONTROL BASE	RESIN-ABS	1	
2	DB62-02515A	HEAT SINK	105x160x43.5	1	
3	6006-001051	SCREW-MACHINE	M4x16 WSP PH+	2	
4	DB93-02581A	ASS'Y PCB OUT		1	
5	6006-000160	SCREW-MACHINE	M3x16 WSP PH+	2	
6	6006-001051	SCREW-MACHINE	M4x16 WSP PH+	2	
7	-	SCREW-TAPPING	M3x8 2S PH+	1	
8	-	SCREW-TAPPING	M3x14 WSP PH+	1	
9	DB65-00086C	ASS'Y TERMINAL BLOCK	CBF-HARNESS	1	
10	6006-001023	SCREW-MACHINE	M4x25 WSP PH+	1	
11	-	RUBBER CLAMP	NBR	1	
12	DB61-40249A	HOLDER WIRE	RESIN-ABS	1	
13	6006-001051	SCREW-MACHINE	M4x16 WSP PH+	2	
14	DB61-00745A	COVER CASE CONTROL UP	RESIN-ABS	1	
15	-	FOAMLEX	165x30xT2	2	
16	-	HEATPROOF MICA	17.4x22.3xT0.5	1	
17	-	WIRE SADDLE	ST750294-3/MG620023	1	31x25,6NB
18	DB39-00609C	CONNECTOR WIRE AC	UL1015 AWG#20	1	
19	DB93-00963A	RUN CAPACITOR	1.7 μ F/450V	1	

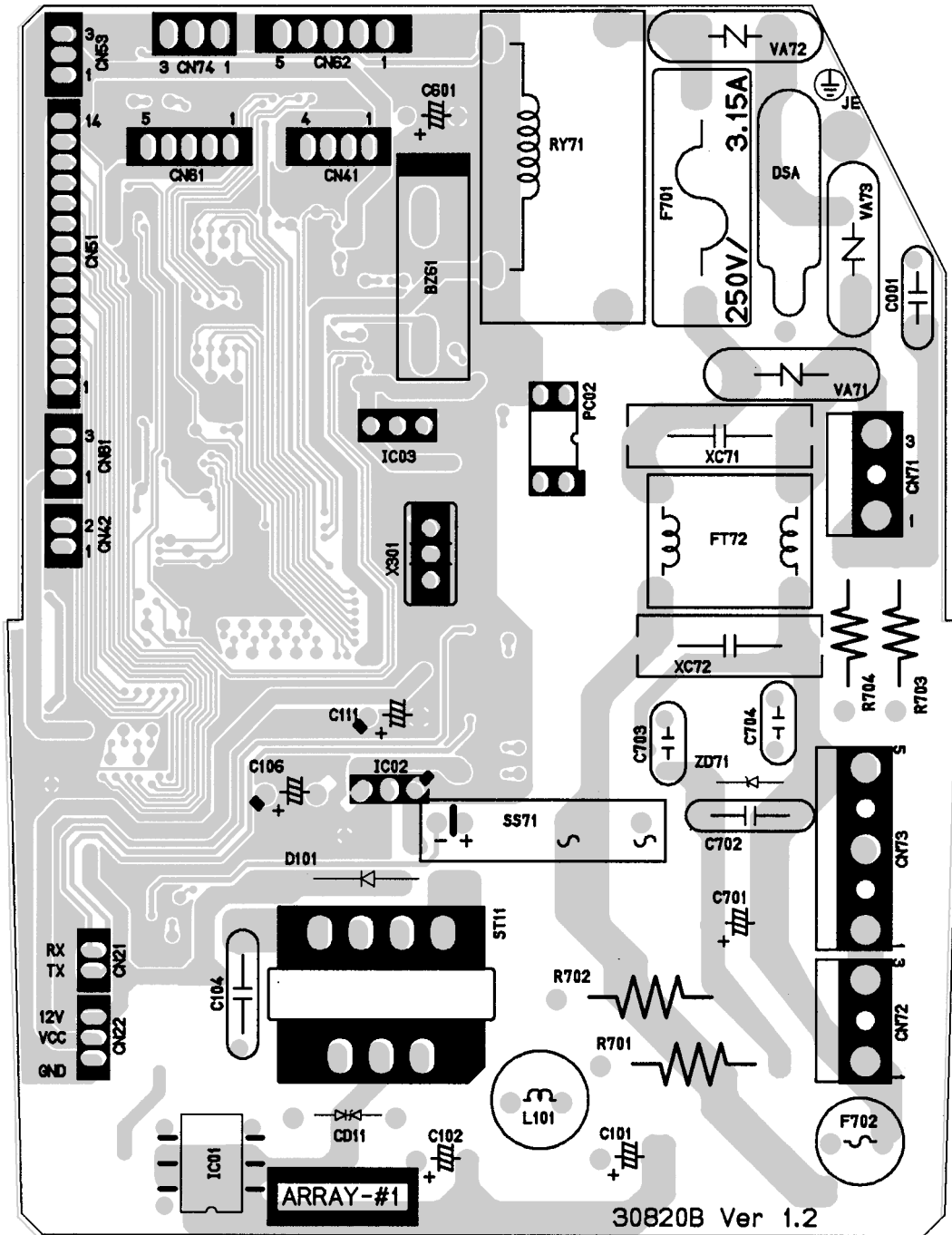
8. PCB Diagram

8-1 ASS'Y PCB Indoor Unit : DB93-02584A

■ TOP



■ BOTTOM



■ Parts List

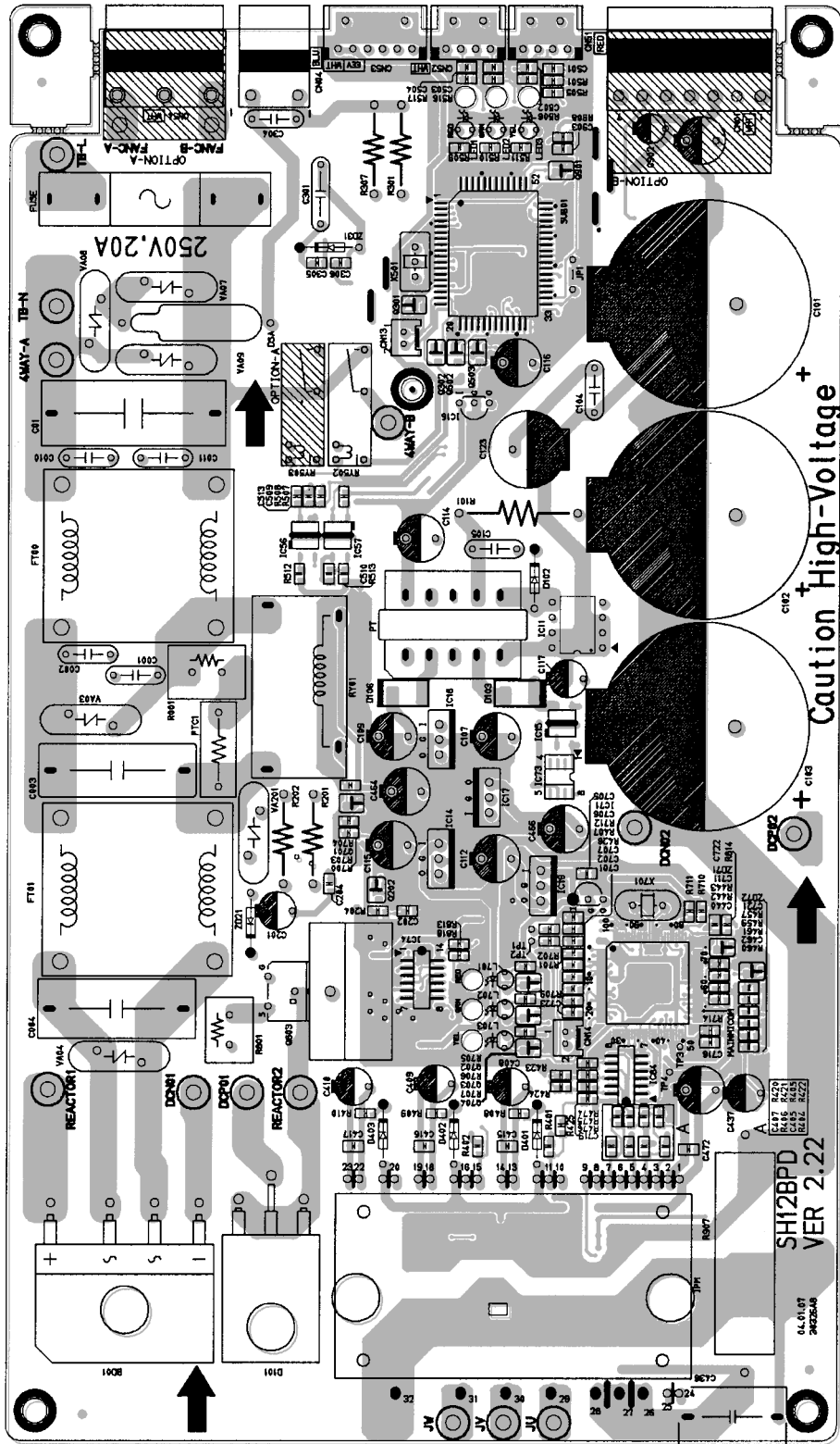
Location No.	Description	Specification	Q'TY	Remark
D101	DIODE-RECTIFIER	UG2D,200V,2A,DO-204AC,TP	1	
D701,D702,D703	DIODE-RECTIFIER	MRA4005,600V,1A,SMA,TP	3	
BD71	DIODE-BRIDGE	DF06S,600V,1A,SMD-4,TP	1	
ZD11	DIODE-ZENER	BZX84C3V6,3.6,350mW,SOT-23,TP	1	
ZD71	DIODE-ZENER	1N4749A,24V,5%,1W,DO-41,TP	1	
ZD12	DIODE-ZENER	BZX84-C11,10.4-11.6V,350MW,SOT-23,TP	1	
CD11	DIODE-TVS	ST02D-200,185/200/215V,200W,DO-214	1	
Q201,Q401,Q602	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	3	
Q603	TR-SMALL SIGNAL	MMST2907A,PNP,200mW,SOT-23,TP,100-	1	
Q301,Q302,Q601	TR-DIGITAL	DTC114EKA,NPN,200mW,10K/A0K,SOT-23,TP	3	
IC05,IC06,IC07	TR-ARRAY	2003,NPN,7,1W,SOP-16,ST,1000	3	
PC02	PHOTO-COUPLER	TR,50-150%,200mW,DIP-4,ST	1	
PC01,PC31,PC32	PHOTO-COUPLER	TR-100-300,200mW,SOP,TP	3	
IC08	IC-SOURCE DRIVER	TD62783AFW,SOL,18P,-,8,-500MA,TP	1	
IC51	IC-EEPROM	93LC56,128x16Bit,SOP,8P,150MIL,-,2.5V,-	1	
IC03	IC-VOLTAGE COMP.	7533,TO-92,3P,-,SINGLE,-,-,PLASTIC	1	
IC01	IC-PWM CONTROLLER	255,DIP,8P,300MIL,PLASTIC,-0.3/7	1	
VA71,VA72,VA73	VARISTOR	INP14D561K	3	
R703,R704	R-METAL OXIDE(S)	4.7Kohm,5%,2W,AA,TP,4x12mm	2	
R701,R702	R-METAL OXIDE(S)	47Kohm,5%,3W,AA,TP,6x16mm	2	
R601,R602	R-CHIP	10Kohm,1%,1/10W,TP,1068	2	
R504,R505,R506	R-CHIP	330ohm,5%,1/10W,TP,1068	3	
R302,R604,R605	R-CHIP	470ohm,5%,1/10W,TP,1068	1	
R201,R207,R208,R301	R-CHIP	1Kohm,5%,1/10W,TP,1068	8	
R401,R403,R607,R903				
R603,R901	R-CHIP	4.7Kohm,5%,1/10W,TP,1068	2	
R206,R902	R-CHIP	10Kohm,5%,1/10W,TP,1068	2	
R510,R511	R-CHIP	47Kohm,5%,1/10W,TP,1068	2	
R606	R-CHIP	560ohm,5%,1/10W,TP,1068	1	
R706	R-CHIP	100Kohm,5%,1/8W,TP,2012	1	
R202,R203,R304,R205	R-CHIP	100Kohm,5%,1/4W,TP,3216	4	
R707	R-CHIP	1Kohm,5%,1/8W,TP,2012	1	
R102,R103,R104	R-CHIP	220Kohm,5%,1/4W,TP,3216	3	
R106,R407	R-CHIP	220ohm,5%,1/8W,TP,2012	2	
R101	R-CHIP	4.7Kohm,5%,1/8W,TP,2012	1	
R105	R-CHIP	470ohm,5%,1/8W,TP,2012	1	
R402,R501,R502,R503	R-CHIP	6.8Kohm,1%,1/10W,TP,1068	4	
R303	R-CHIP	8.2Kohm,1%,1/10W,TP,1068	1	
C104	C-CERAMIC,DISC	2.2NF,20%,400V,Y5U,BK,12.5x6mm,10	1	
C103,C107,C110,C112,C201	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	11	
C202,C500,C501,C502,C503				
C901				

■ Parts List (cont.)

Location No.	Description	Specification	Q'TY	Remark
C301,C510,C706,C903	C-CER,CHIP	1nF,10%,50V,X7R,TP,2012,-	4	
C203,C204,C302,C303	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	6	
C401,C705				
C702	C-FILM,LEAD-PEF	10nF,10%,630V,TP,16x11x7.5mm,5	1	
C703,C704	C-FILM,LEAD-PEF	4.7nF,10%,100V,TP,10x8.5x5.0mm	2	
XC71,XC72	C-FILM,MPPF	100nF,10%,275V,BK,18x6x12,15	2	
C111	C-AL	470uF,20%,16V,GP,TP,8x11.5,5	1	
C106	C-AL	1000uF,20%,25V,GP,TP,13x20,5	1	
C701	C-AL	470uF,20%,50V,GP,TP,13x20,5	1	
C601	C-AL	47uF,20%,50V,GP,TP,6.3x11,5	1	
C101,C102	C-AL	6.8uF,20%,450V,GP,TP,10x16mm,5	2	
L101	INDUCTOR-RADIAL	5000uH,10%,8.0x11.0mm	1	
X301	RESONATOR-CERAMIC	10MHz,0.5%,TP,10.0x5.0x10.0mm	1	
BZ61	BUZZER-PIEZO	70dB,3V,-,2KHz,BK	1	
RY71	RELAY-POWER	12VDC,0,9W,20000MA,SPST,20MS,10MS	1	
SS71	SSR	12Vdc,-,2A,1mS,1mS	1	
F701	FUSE-CARTRIDGE	250V,3.15A,FAST-ACTING,CERAMIC,5.2x20mm	1	
F702	FUSE-RADIAL LEAD	250V,1A,TIME-LAG,-,8.5x8mm	1	
CN72	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,WH	1	
CN73	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,WH	1	
CN74	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN,BLU	1	
CN62	CONNECTOR-HEADER	BOX,5P,1R,2.5mm,STRAIGHT,SN	1	
CN71	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,BLU	1	
CN42	CONNECTOR-HEADER	BOX,2P,1R,2mm,STRAIGHT,SN,WHT	1	
CN51	CONNECTOR-HEADER	BOX,14P,1R,2mm,STRAIGHT,SN	1	
CN53	CONNECTOR-HEADER	BOX,3P,1R,2mm,STRAIGHT,SN	1	
CN61	CONNECTOR-HEADER	BOX,5P,1R,2mm,STRAIGHT,SN	1	
CN41	CONNECTOR-HEADER	BOX,4P,1R,2mm,STRAIGHT,SN,WHT	1	
CN81	CONNECTOR-HEADER	BOX,3P,1R,2mm,STRAIGHT,SN,BLU	1	
IC02		KA78L05AZTA(0.1A,Positive,Vol,Reg)	1	
IC04	IC MICOM	MB89538APF-101,MB89538APF-101,64P,+5V,10M	1	
ST11	TRANS SWITCHING	DC12V,-,-,-,-,12V,0.01A,-,E119	1	
DSA	POSISTOR	DSA-332MA,2pF MAX,100Mohm,ASM-3	1	
JE	LEAD-WIRE	UL1015 AWG#20 GRN/YEL	1	
PCB			1	
FT72		LS403110	1	
C001		SC102M Y-CAP 7.5mm	1	

8-2 ASS'Y PCB Outdoor Unit : DB93-02581A

■ TOP



■ Parts List

Location No.	Description	Specification	Q'TY	Remark
ZD21	DIODE-ZENER	AXIAL;1N4749 24V,5% 1W DO-41 TP	1	
IC55	IC-LOGIC	ULN2003ADR,NPN,7,1W,SOP-16,ST,1000	1	
L701,LED1	DIPLAY-LED	ROUND,RED,TLPR5600	2	
L702,LED2	DIPLAY-LED	ROUND,GRN,TLPG5600	2	
L703,LED3	DIPLAY-LED	ROUND,YEL,TLPY5600	2	
IC71	IC-RESET	VOLTAGE DECTECTOR,7533,TO-92,3P	1	
IC17	IC-REG	7805,TO-220,3P,KA7805	1	
VA03,VA04,VA07,VA08 VA09,VA201	VARISTOR	560V,50A,0.6W,14mm,INR14D561K	6	
R202	R-METAL OXIDE	AXIAL;MOR 2TSJ,100Kohm,5%,2W,AA,TP,6x16mm	1	
R306	R-CHIP	MCR10EZH;J561,560ohm,5%,1/8W,DA,TP,2012	1	
R420,R421,R422,R423,R424 R425,426	R-CHIP	MCR10EZH;J101,100ohm,5%,1/8W,TP,2012	7	
R420,R421,R422,R423,R424 R425,426	R-CHIP	MCR10EZH;J101,100ohm,5%,1/8W,TP,2012	7	
R442,R443,R701,R702,R703 R704,R710,R711,R712,R714 R814,R818,R908	R-CHIP	MCR10EZH;J103,10Kohm,5%,1/8W,DA,TP,2012	13	
R501	R-CHIP	MCR10EZH;J1802,18Kohm,1%,1/8W,DA,TP,2012	1	
R474,R475,R476,R508,R509 R510,R511,R513,R700	R-CHIP	MCR10EZH;J102,1Kohm,5%,1/8W,DA,TP,2012	9	
R204,R460	R-CHIP	MCR10EZH;J203,20Kohm,5%,1/8W,DA,TP,2012	2	
R512,R705,R706,R707	R-CHIP	MCR10EZH;J221,220ohm,5%,1/8W,DA,TP,2012	4	
R507,R813	R-CHIP	MCR10EZH;J331,330ohm,5%,1/8W,DA,TP,2012	2	
R401,R402,R404,R405 R406,R407	R-CHIP	MCR10EZH;J472,4.7Kohm,5%,1/8W,DA,TP,2012	6	
C202,C472,C501,C502,C503 C504,C505,C706,C711,C719 C721,C722,C903	C-CERAMIC	CHIP;CL21F104ZANC,100nF,+80-20%,50V,Y5V,TP,2012	13	
C407,C707	C-CERAMIC	CHIP;CL21F102ZANC,1nF,10%,50V,X7R,TP,2012,-	2	
C701	C-CERAMIC	CHIP;CL21B223KBNC,22nF,10%,50V,X7R,TP,2012	1	
C204,C305,C306,C509,C510 C513,C723	C-CERAMIC	CHIP;CL21F103ZANC,10nF,+80-20%,50V,Y5V,TP,2012	7	
C405	C-CERAMIC	CHIP;CL21B471KBNC,470pF,5%,50V,UJ,TP,2012,-	1	
SUB01	S3C848A	S3C848A	1	
MAIN MICOM	TMS320LF2406A	TMS320LF2406A	1	
C301	C-FILM	MPP;PC2J103K,10nF,10%,630V,TP,16x11x7.5mm	1	
C123	C-AL	RADIAL;10uF,20%,450V,RG,12.5x20mm	1	
RY502,RY503	RELAY-MINIATURE	F3AA012E	2	
RY01	RELAY-POWER	12VDC,UKH-125	1	

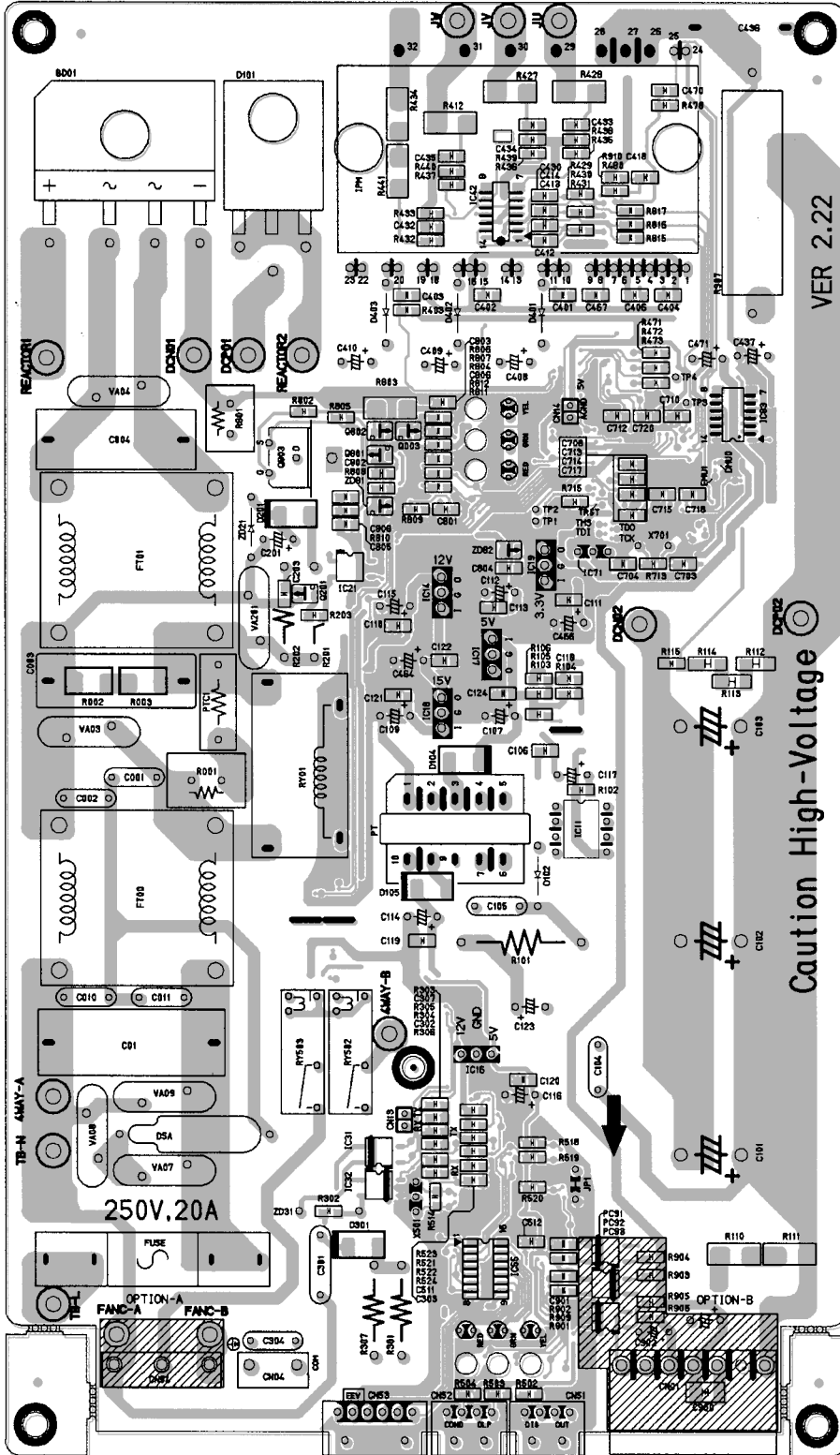
■ Parts List (cont.)

Location No.	Description	Specification	Q'TY	Remark
CN13,CN14	CONNECTOR-HEADER	BOXZ,2P,1R,2mmSTRAIGHT,SN,WHT	2	
DSA2	SURGE-ABSORBER	POSISTOR;DAS-332MA,2pF MAX,100Mohm,ASM-3,3300V	1	
PCB	PCB-BOARD		1	
C001,C002,C010,C011	C-CERAMIC	SCF1032(7.5mm picth)	4	
C003,C004	C-FILM	MPPF;RADIAL,330nF 10% 275V	2	
C01	C-FILM	MPPF;RADIAL,680nF 10% 275V	1	
C101,C102,C103	C-AL	RADIAL,560uF 105° 20% 2P 400V	3	
C408,C409,C410	C-AL	EC-DIP;RX,105° 47uF 50V 20% 6.3x11	3	
D101	DUAL DIODE	FEP30JP	1	
FT00,FT01	FILTER	LS615044	2	
IC19	IC-REG	KA78RM33,3.3V,0.5A,DPAK	1	
Q803	IC-TR-IGRT	IRG4BC30F,TO-220AB,1R	1	
R201	R-METAL OXIDE	AXIA;MOR 2TSJ,47Kohm 5% 2W	1	
R301,R307	R-METAL OXIDE	AXIA;MOR 2TSJ,4.7Kohm 5% 2W	2	
R801	R-CEMENT	0.045ohm 5% 3W CB 12x8x25	1	
X701	RESONATOR-CERAMIC	7.3728MHz	1	
X501		CST,10MHZ,3P	1	
IC11	IC-IPM CON	TOP222P,100KHz,DIP,8P	1	
IC16	KA78L05AZTA	KA78L05AZTA(0.1A,Positive,Vol,Reg)	1	
IC18	IC-REG	KA78M15TU(0.1A,Positive,Vol,Reg)	1	
R001	R-CEMENT	5RJ,200ohm(5%,5W,CB,BK,13x9x25.5mm)	1	
R101	R-METAL OXIDE	MOR,3TSJ,47Kohm,5%,3W,AA,TP)	1	
PTC01	J512Q24E270M265	J512Q24E270M265	1	
PT	PT-G	PT-G	1	
ZD31	DIODE-ZENER	AXIAL;1N4751A	1	
D102,D401,D402,D403	AXIAL	1N4937	4	
C117,C201,C437	C-AL	READIAL;RZ,35V,47uF,6.3x11,TP	3	
C107,C109,C112,C114,C115	C-AL	EC-DIP;WD,25V,220uF,8x11.5,TP	9	
C116,C464,C466,C471				
BD01	BRIGDE-DIODE	GS1B2560	1	
CN04	CONNECTOR-HEADER	YAW396-03AV/WHT	1	
CN51	CONNECTOR-HEADER	SMAW250A-04/RED	1	
CN52	CONNECTOR-HEADER	SMAW250A-04/WHT	1	
CN53	CONNECTOR-HEADER	SMAW250-06/WHT	1	
CN54	CONNECTOR-HEADER	YAW396-05AV/WHT	1	
FUSE	FUSE-CARTRIDGE	250V,20A,65TL,SLOW-BLOW,CERAMIC,6.35x31.	1	
IC14	IC-REG	KA7812,1A,TO-220,3P	1	
IPM	TR-IGBT	FSAM155M60A	1	
C415,C416,C417	C-CERAMIC	CHIP;CL21F104ZANC,100nF,+80,-20%,50V,Y5V,TP,2012	3	
C440,C462,C702,C716	C-CERAMIC	CHIP;CL21F105ZANC,1uF 2012	3	

■ Parts List (cont.)

Location No.	Description	Specification	Q'TY	Remark
IC74	IC-LOGIC	74ALVCOM,14-SOIC	1	
IC84	IC-TTL	DM74ALS1034,14-SOIC	1	
Q701,Q801	IC-TR	BC847B,NPN,SOT-23	2	
R505,R506,R516,R517	R-CHIP	MCR10EZH;F331,330ohm 1/8W 1% 2012	4	
ZD71,ZD72	DIODE-ZENER	MMBZ52266B	2	
IC73	KA431DTF	KA431DTF(3-Terminal,Adjustable,Reg)	1	
D103,D106		CHIP,ES1D,DO-214AC,200V	2	
IC15,IC56,IC57		TLP181(GRH-TLP),SOP,TP,11-4C	3	
Q202,Q301,Q302,Q502,Q503	TR-DIGITAL	KRC102S,NPN,200mW,10K-10K.SOT	9	
Q702				
Q703,Q704,Q901				
R408,R409,R410	R-CHIP	MCR10EZH;J331,33ohm,1/8W,2012	3	
R457	R-CHIP	MCR10EZH;J1021Kohm,5%,1/8W,DA,TP,2012	1	
R459	R-CHIP	30Kohm,1%,1/10W,DA,TP,2012	1	
R907	R-CEMENT	0.020ohm 5% MPR 7W	1	
C436	C-FILM	MPP,RADIAL,PC2J104K 100nF 630V 1.5U	1	
R461	R-CHIP	MCR10EZH;J472,4.7Kohm,5%,1/8W,DA,TP,2012	1	
R709	R-CHIP	MCR10EZH;J10R0,10ohm,5%,1/8W,DA,TP,2012	1	

■ BOTTOM



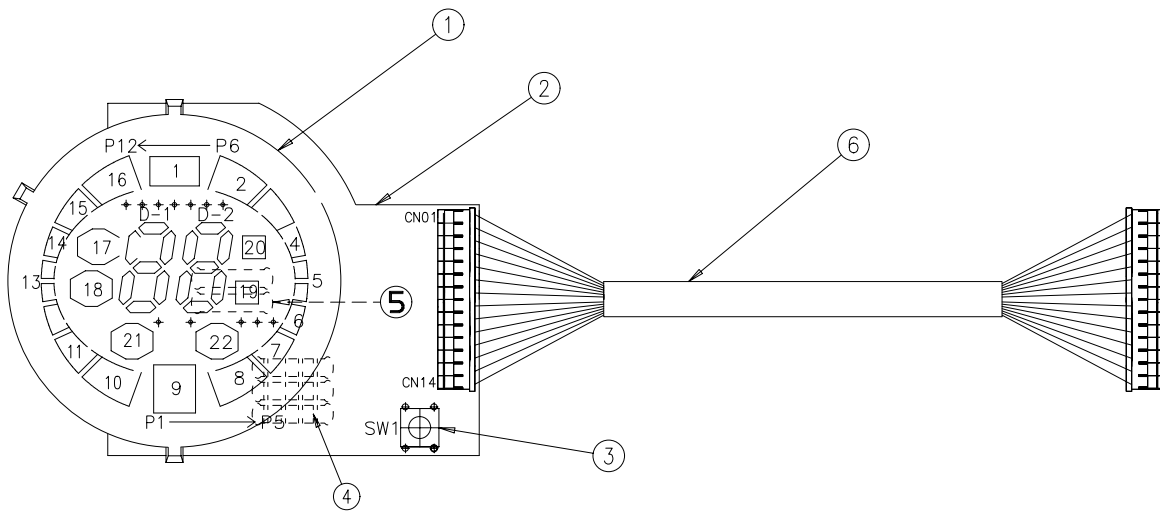
■ Parts List

Location No.	Description	Specification	Q'TY	Remark
R115,R432,R433,R438,R439 R440,R520,R521,R522,R523 R524,R808,R809,R810,R909 R806	R-CHIP	MCR10EZH;F1002,10Kohm,1%,1/8W,DA,TP,2012	15	
R504	R-CHIP	MCR10EZH;J103,10Kohm,5%,1/8W,DA,TP,2012	1	
R429,R430,R431,R435,R436 R437,R471,R472,R473,R518 R519,R815,R816,R817	R-CHIP	MCR10EZH;J1802,18Kohm,1%,1/8W,DA,TP,2012	1	
R807	R-CHIP	MCR10EZH;J102,1Kohm,5%,1/8W,DA,TP,2012	14	
R514,R713	R-CHIP	MCR10EZH;J102,1Kohm,5%,1/8W,DA,TP,2012	1	
R802	R-CHIP	MCR10EZH;105,1Mohm,5%,1/8W,DA,TP,2012	2	
R502,R503	R-CHIP	MCR10EZH;J221,220ohm,5%,1/8W,DA,TP,2012	1	
R715	R-CHIP	MCR10EZH;J2402,24Kohm,1%,1/8W,DA,TP,2012	2	
R811,R812	R-CHIP	MCR10EZH;J202,2Kohm,5%,1/8W,DA,TP,2012	1	
R203,R302,R305,R403,R804 R902	R-CHIP	MCR10EZH;J331,330ohm,5%,1/8W,DA,TP,2012	2	
R303,R304	R-CHIP	MCR10EZH;J472,4.7Kohm,5%,1/8W,DA,TP,2012	6	
R102,R105	R-CHIP	MCR10EZH;J470ohm,5%,1/10W,2012	1	
C106,C110,C118,C119,C120 C121,C122,C124,C430,C432 C470,C511,C512,C708,C710 C713,C714,C717,C720,C802 C803	C-CERAMIC	CHIP;CL21F104ZANC,100nF,+80-20%,50V,Y5V,TP,2012	3	
C203,C303,C433,C434,C435 C302,C307,C804,C805,C806 C901	C-CERAMIC	CHIP;CL21F102ZANC,1nF,10%,50V,X7R,TP,2012,-	21	
C404,C406,C808	C-CERAMIC	CHIP;CL21F103ZANC,10nF,+80-20%,50V,Y5V,TP,2012	5	
C703,C704	C-CERAMIC	CHIP;CL21B471KBNC,470pF,5%,50V,UJ,TP,2012,-	3	
D104,D105,D301	PHOTO-COUPLER	CHIP;CL21C220JBNC 220pF	2	
IC21,IC31,IC32	TR-DIGITAL	CHIP;ES1D,DO-214AC,200V	3	
Q201,Q802	IC-LOGIC	TLP181(GRH-TLP),SOP,TP,11-4C	3	
IC83	IC-TR	KRC102S,NPN,200mW,10K-10K,SOT	2	
Q003	IC-LOGIC	LM324D	1	
R103	R-CHIP	BC847B,NPN,SOT-23	1	
R104	R-CHIP	620ohm,5%,1/10W,DA,TP,2012	1	
R106	R-CHIP	MCR10EZH;J222,2.2Kohm,1/8W,5%,2012	1	
R478	R-CHIP	3.3Kohm,1/8W,1%,2012	1	
R480	R-CHIP	MCR10EZH;J103,10Kohm,5%,1/8W,DA,TP,2012	1	
R910	R-CHIP	390ohm,1%,1/10W,DA,TP,2012	1	
C111,C113,C712,C715,C718	C-CERAMIC	3.3Kohm,1%,1/8W,DA,TP,2012	1	
		CHIP;CL21F105ZANC,1uF,2012	5	

■ Parts List (cont.)

Location No.	Description	Specification	Q'TY	Remark
C401,C402,C403	C-CERAMIC	CHIP;CL21B122KBNC,1.2uF,2012	3	
C412,C413,C414	C-CERAMIC	CHIP;CL21B222KBNC,2.2nF,50V,2012	3	
C418,C801	C-CERAMIC	CHIP;1uF,50V,2012	2	
C467	C-CERAMIC	CHIP;CL21B333KBNC 33nF 50V,2012	1	
D201	DIODE-RECTIFIER	US1G,DO-214AC,400V	1	
IC42	IC-Compare	KA239D,14-SOP,TP	1	
R110,R111	R-CHIP	MCR100EZH;J184,180Kohm,5%,1W,6432	2	
R412,R427,R428,R434,R441	R-CHIP	MCR100EZH;F3003,300Kohm,1%,1W,6432	5	
R803	R-CHIP	2.2Kohm,1%,1W,6432	1	
R805	R-CHIP	3.3Kohm,1%,1/8W,2012	1	
R901	R-CHIP	RC2012J681CS;680ohm,5%,2012	1	
ZD81,ZD82	DIODE-ZENER	BZX84C3V6SOT-23T,3.6V,350M	2	
R112,R113,R114	R-CHIP	MCR18EZH;F4703,470Kohm,1/4W,1%,3216	3	
R002,R003	MCR50EZH	F4703,470Kohm,1/2W,40,5025	2	
C104,C105,C304	C-CERAMIC	DISC;RADIAL,SCE,222M,10FF7	3	

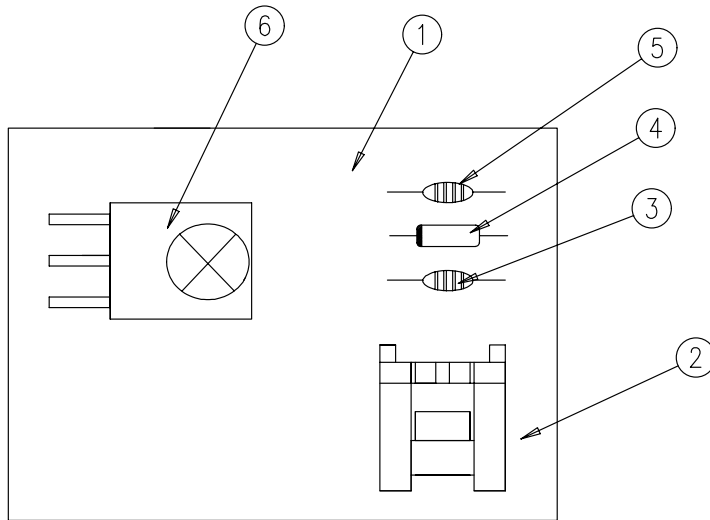
8-3 ASS'Y DISPLAY PCB(9K/12K) : DB93-01368G



■ Parts List

No	Description	Specification	Q'TY	Remark
1	ASS'Y LED MODULE		1	SNA
2	PCB-DISPLAY	FR-1 T1.6	1	SNA
3	TACT SWITCH	KPT-1105A TSTA-2	1	SNA
4	RESISTOR	200ohm, 2W	2	SNA
5	RESISTOR	100ohm, 2W	3	SNA
6	CONNECTOR WIRE	14P	1	SNA

8-4 ASS'Y MODULE PCB(9K / 12K) : DB93-01369A

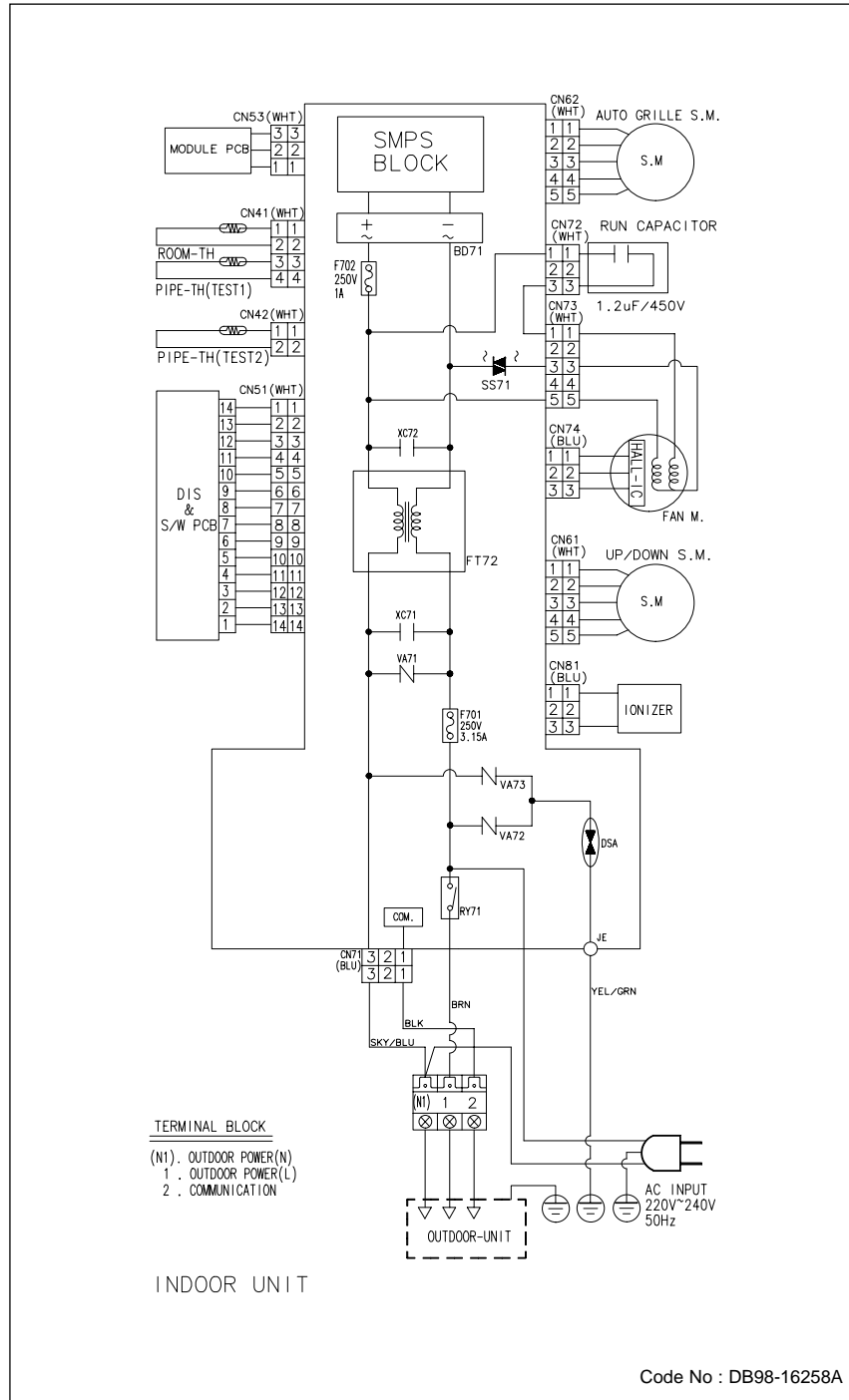


■ Parts List

No	Description	Specification	Q'TY	Remark
1	PCB-DISPLAY	FR-1 T1.6	1	SNA
2	CONNECTOR	SMAW200-03P(WHT)	1	SNA
3	C-CERAMIC	CA OA 50V 102K	1	SNA
4	DIODE SWITCHING	1N4148	1	SNA
5	C-CERAMIC	CA OA 50V 104Z	1	SNA
6	MODULE REMOCON	FRP4021-H7(7mm)	1	SNA

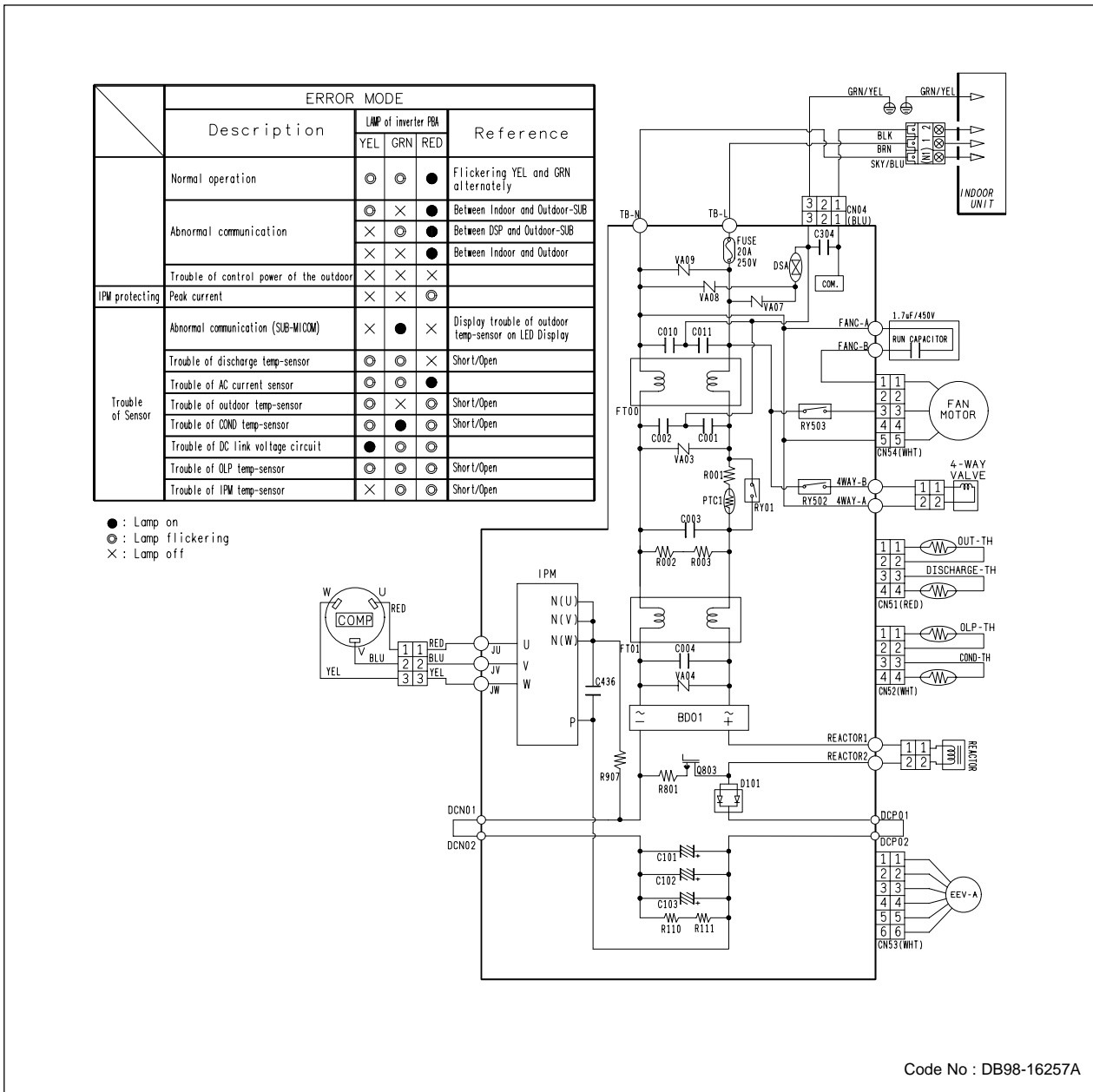
9. Wiring Diagram

9-1 Indoor Unit(9K / 12K)



This Document can not be used without Samsung's authorization.

9-2 Outdoor Unit(9K/12K)



This Document can not be used without Samsung's authorization.

MEMO

MEMO

MEMO

MEMO



This Service Manual is a property of Samsung Electronics Co., Ltd.
Any unauthorized use of Manual can be punished under applicable
International and/or domestic law.

© Samsung Electronics Co., Ltd. Feb. 2004.
Printed in Korea.
Code No. DB98-00000A(1)