

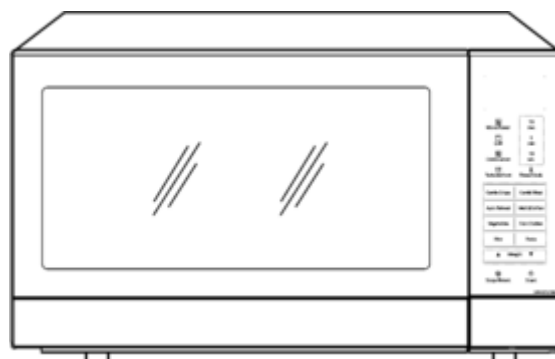
ORDER NO.PAPMOSH1410037CE

Service Manual

Microwave Oven

Model No. **NN-GF574M**

PTE(Iran)



Specifications:


Model:		NN-GF574M
Specifications:		
Power Source:		220V AC Single Phase, 50Hz
Power Consumption:	Microwave	850W
	Heater	1050W
Output:	Microwave	1000W
	Heater	1000W
Microwave Frequency:		2450MHz
Timer:		30 Min. / Stage (HIGH Power Level) ~ 3 Stage Maximum 99 Min. 59 Sec. / Stage (Other Power Level) ~ 3 Stage Maximum
Outside Dimensions:		529mm(W) x 326mm(H) x 422mm(D)
Oven Cavity Dimensions:		354mm(W) x 230mm(H) x 338mm(D)
Net Weight:		12.7 kg
PbF		This product with PbF
Specifications subject to change without notice.		

© Panasonic Appliances Microwave Oven (Shanghai) Co., Ltd. 2014.

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

WARNING

1. This product should be serviced only by trained, qualified personnel.
2. Check for radiation leakage before and after every servicing according to the "procedure for measuring radiation leakage."
3. If the unit cannot be repaired on site, advise the customer not to use until unit is repaired.
4. There are special components used in the microwave oven which are important for safety. These parts are marked with a  on the replacement parts list. It is essential that these critical parts be replaced only with the manufacture's specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the original design.

This service manual covers products for following markets.

When troubleshooting or replacing parts, please refer to the country identifications shown below for your applicable product specification.

PTEFor Iran

CAUTION

About lead free solder (PbF)

Distinction of PbF PCB: PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

- Caution:**
- Pb free solder has a higher melting point than standard solder; Typically the melting point is 30 - 40°C higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to 370 ± 10°C.
 - Pb free solder will tend to splash when heated too high (about 600°C).

Panasonic®

DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

⚠ WARNING

This Inverter board looks like a regular PCB. However, this PCB drives the magnetron tube with extremely high voltage and high current. Take cautionary measures when disassembling and troubleshooting the Inverter circuit. Improper handling can result in an electrical shock or burns, which might lead to injury or death.

IT HAS: 1. Very high voltage and high current circuits.

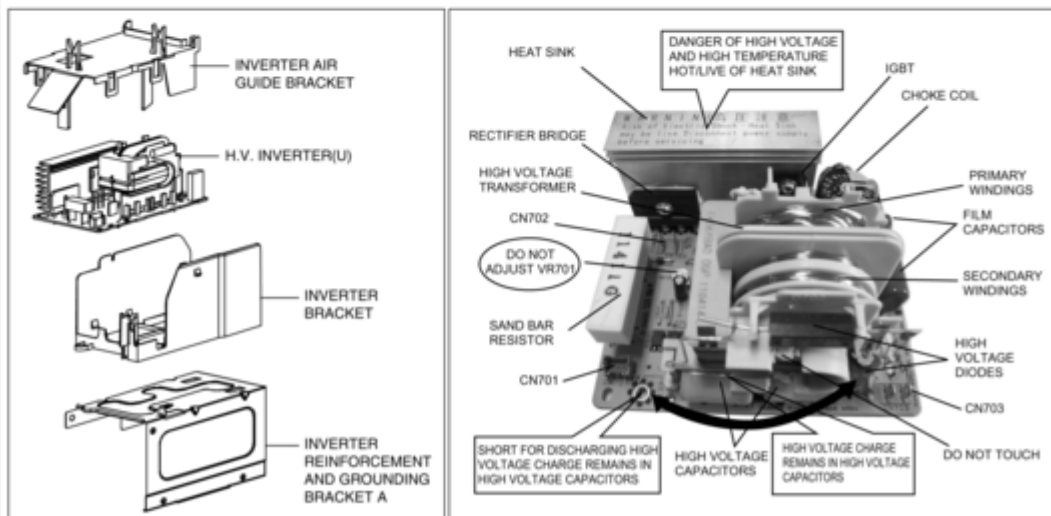
It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.

2. Aluminum heat sink that is energized with very high voltage and high heat energy.
3. Very high voltage which may remain in circuitry even when oven is off. High voltage charge may remain in the capacitors on the board.

DO NOT:

- * 1. Do not touch circuitry because it has very hot (high voltage) circuitry. Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage charge may remain in circuits.
- * 2. Do not touch aluminum heat sink because it is energized with very high voltage and is also very hot in high heat energy.
- * 3. Do not try to adjust or tamper with preset control on the Inverter board because it is very dangerous to adjust without proper test equipment.
- * 4. Do not test oven while Inverter grounding plate or screws are loose. It is very dangerous to operate H.V. Inverter Circuit (U) with loose mounting screws or if improperly grounded.

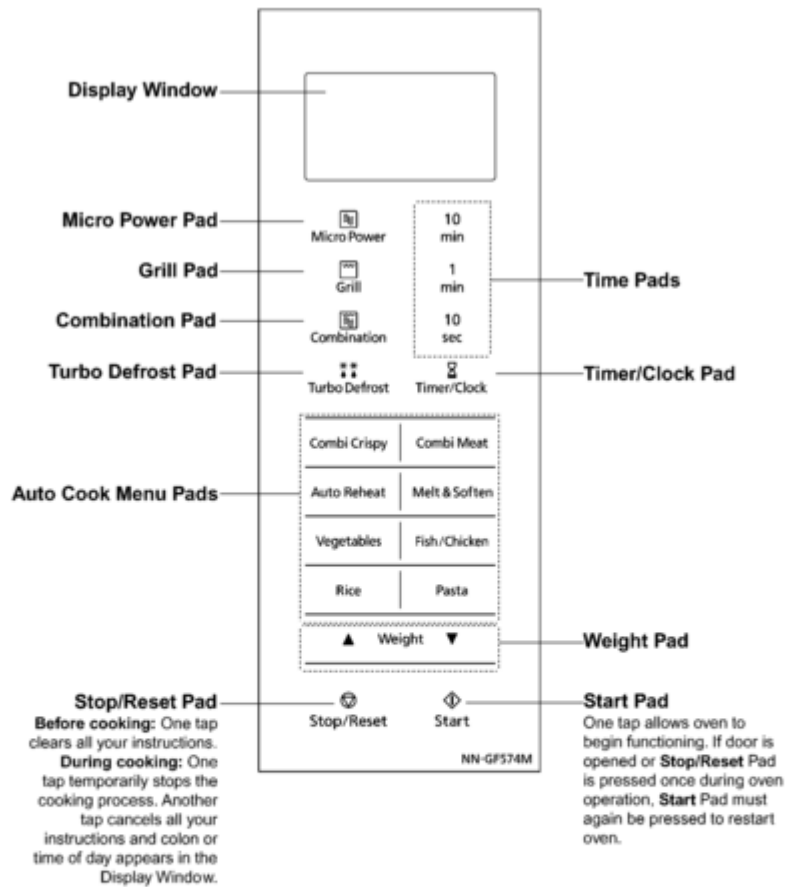
INVERTER POWER SUPPLY



1 FEATURE CHART

FEATURE \ MODEL	NN-GF574M
3 Stage Cooking	○
Microwave	○
Grill	○
Combination	○
Auto Weight Cook	○
Auto Weight Turbo Defrost	○
Timer	○
Clock	○
Child Safety Lock	○

2 CONTROL PANEL

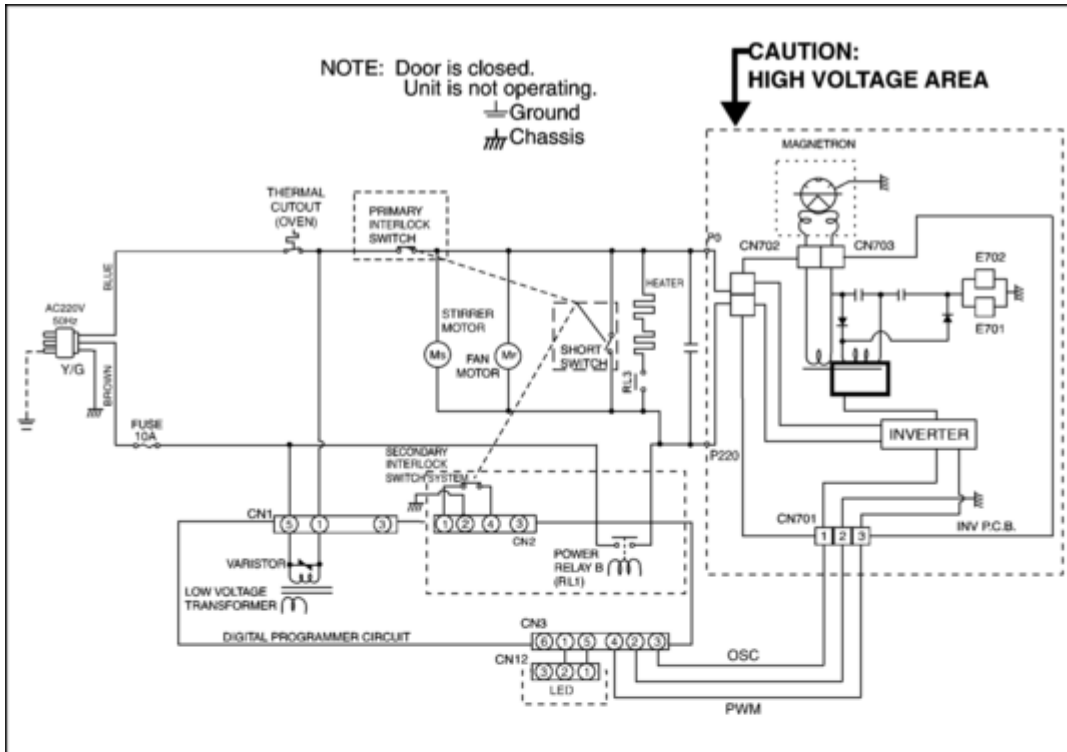


Beep Sound:

When a pad is pressed correctly, a beep will be heard. If a pad is pressed and no beep is heard, the unit did not or can not accept the instruction. The oven will beep twice between programmed stages. At the end of any complete program, the oven will beep 5 times.

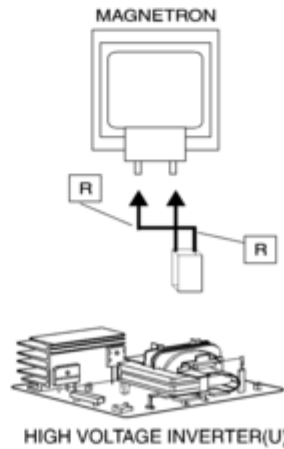
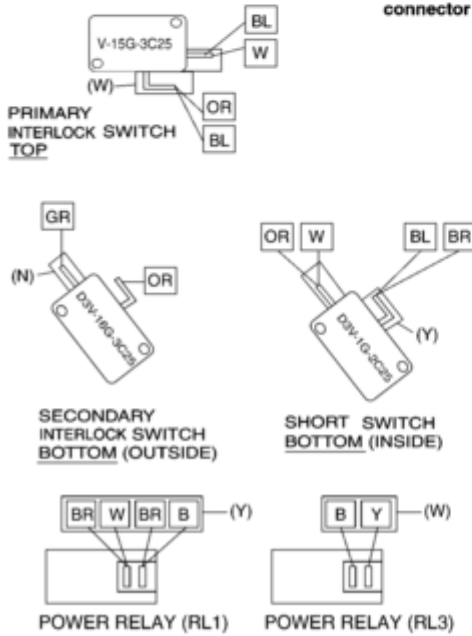
Note:

If an operation is set and Start Pad is not pressed, after 6 minutes, the oven will automatically cancel the operation. The display will revert back to clock or colon mode.



WIRING DIAGRAM

NOTE: * When replacing, check the lead wire color as shown.
* Colors shown by () indicate colors of lead wire connector housing.



WARNING: H.V.

SYMBOL	COLOR
OR	ORANGE
BL	BLUE
BR	BROWN
W	WHITE
Y	YELLOW
R	RED
GR	GRAY
B	BLACK
N	NATURAL
G	GREEN

(S-BN0)

4 DESCRIPTION OF OPERATING SEQUENCE

4.1 Variable power cooking control

High Voltage Inverter Power Supply (U) controls output power by the signal from Digital Programmer Circuit (DPC). Power relay always stay on, but PWM (Pulse Width Modulation) signal controls microwave output power.

NOTE:

The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

Variable Power Cooking

POWER SETTING	OUTPUT POWER(%)	MANUAL MICROWAVE	
		ON(Sec.)	OFF(Sec.)
HIGH	100%	22	0
MEDIUM-HIGH	70%	22	0
MEDIUM	60%	22	0
MEDIUM-LOW	45%	22	0
DEFROST	35%	22	0
LOW	25%	13	9

4.2 Inverter power supply circuit

The Inverter Power Supply circuit powered from the line voltage, 220V 50Hz AC input supplies 4,000V DC to the magnetron tube, and functions in place of the H.V. transformer, the H.V. capacitor and H.V. diode.

1. The AC input voltage 220V 50Hz is rectified to DC voltage immediately.
2. DC voltage will be supplied to the switching devices called IGBT. These devices are switched ON-OFF by the 20 to 40 kHz PWM (pulse width modulation) signal from the microcomputer in the DPC.
3. This drives the High voltage transformer to increase voltage up to 2,000V AC.
4. Then the half-wave doubler voltage rectifier circuit, consisting of the H.V. diodes and capacitors, generates the necessary 4,000V DC needed for the magnetron.
5. Output power of the magnetron tube is always monitored by the signal output from the current transformer built into the inverter circuit.
6. This signal is fed back to the microcomputer in the DPC to determine operating conditions and output necessary to control PWM signal to the Inverter Power Supply for control of the output power.

4.3 Turbo defrost, Auto cook

When the Auto Control feature is selected and the [Start] pad is tapped:

1. The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display window.
2. When cooking time in the display window has elapsed, the oven turns off automatically by a control signal from the digital programmer circuit.

Turbo Defrost

WEIGHT SELECTED	COOKING TIME
1.0kg	15min. 50sec.

Auto Cook (Reheat Meal)

WEIGHT SELECTED	COOKING TIME
-----------------	--------------

1 serv

1min. 40sec.

4.4 Grill cooking control

Grill cooking is accomplished by upper heaters only. One grill cooking cycle is 33 seconds.

- During grill cooking, the digital programmer circuit controls power relay RL3's ON-OFF time. In all three grill cooking categories, power relay RL1 always stay ON, but RL3's ON-OFF time are shown in Figure.

GRILL	GRILL (RL3)		MICROWAVE (DUTY)	
	ON (sec.)	OFF (sec.)	ON (sec.)	OFF (sec.)
1	33	0		
2	24	9	0	33
3	18	15		

4.5 Combination Cooking

Combination cooking is accomplished by microwave and grill cooking (upper heaters) being done synchronously during one combination cooking cycle. One combination cooking cycle is 33 seconds.

- During combination cooking, the digital programmer circuit controls power relay RL3 & RL1's duty ON-OFF time. In all three combination cooking categories, power relay RL3 & RL1's duty ON-OFF time are as shown in Figure.

COMBINATION CATEGORY	GRILL(RL3)		MICROWAVE(DUTY)	
	ON(sec.)	OFF(sec.)	ON(sec.)	OFF(sec.)
1	24	9		
2	21	12	27	6
3	18	15		

5 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is a high voltage, high current device. It is free from danger in ordinary use, though extreme care should be taken during repair.

CAUTION

Servicemen should remove their watches & rings whenever working close to or replacing the magnetron.

5.1 Check the grounding

Do not operate on a two wire extension cord. The microwave oven is designed to be grounded when used. It is imperative, therefore, to ensure the appliance is properly grounded before beginning repair work.

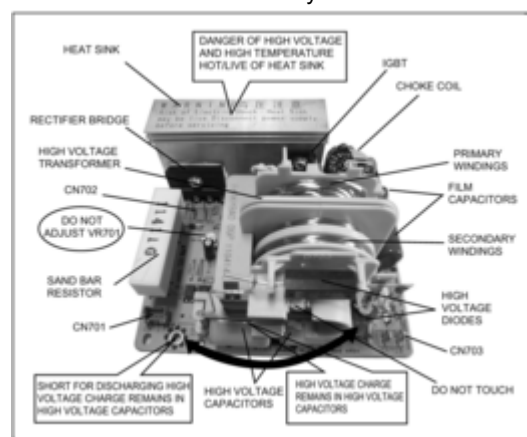
5.2 Inverter warnings

WARNING HIGH VOLTAGE AND HIGHTEMPERATURE (HOT/LIVE) OF THE INVERTERPOWER SUPPLY (U)

The High Voltage Inverter Power Supply generates very high voltage and current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair.

The aluminum heat sink is also energized with high voltage (HOT), do not touch when the AC input terminals are energized. The power device Collector is directly connected to the aluminum heat sink.

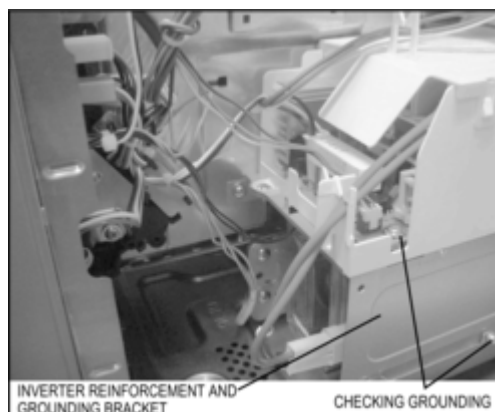
The aluminum heat sink may be HOT due to heat energy, therefore, extreme care should be taken during servicing.



H.V. Inverter warning

WARNING FOR INVERTER POWER SUPPLY (U) GROUNDING

Check the High Voltage Inverter Power Supply circuit grounding. The high voltage inverter power supply circuit board must have a proper chassis ground. The inverter grounding plate must be connected to the chassis. If the inverter board is not grounded it will expose the user to very high voltages and cause extreme DANGER! Be sure that the inverter circuit is properly grounded via the inverter grounding plate.

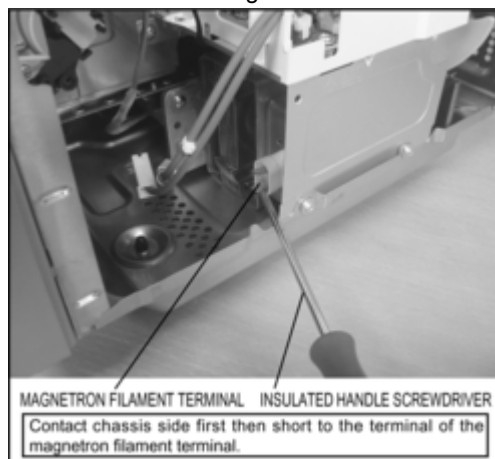


Grounding of the inverter circuit board

⚠ WARNING DISCHARGE THE HIGH VOLATGE CAPACITORS

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors of the Inverter Power Supply circuit board.

When replacing or checking parts, remove the power plug from the outlet and short the inverter output terminal of the magnetron filament terminals to the chassis ground with an insulated handle screwdriver to discharge. Please be sure to contact the chassis ground side first and then short to the output terminal.



Discharging the high voltage capacitors

⚠ WARNING

There is high voltage present with high current capabilities in the circuits of the primary and secondary windings, choke coil and heat sink of the inverter. It is extremely dangerous to work on or near these circuits with the oven energized. DO NOT measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

⚠ WARNING

Never touch any circuit wiring with your hand or with an insulated tool during operation.

5.3 Part replacement.

When troubleshooting any part or component is to be replaced, always ensure that the power cord is unplugged from the wall outlet.

5.4 When the 10A fuse is blown due to the malfunction of the short switch:

WARNING

When the 10A 250V fuse is blown due to the malfunction of the short switch, replace all of the components (primary interlock switch, short switch and power relay RL1).

1. This is mandatory. Refer to "measurements and adjustments" for the location of these switches.

2. When replacing the fuse, confirm that it has the appropriate rating for these models.
3. When replacing faulty switches, be sure the mounting tabs are not bent, broken or deficient in their ability to hold the switches.

5.5 Avoid inserting nails, wire etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any holes or gaps, because such objects may work as an antenna and cause microwave leakage.

5.6 Verification after repair

1. After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loosen or missing. Microwave energy might leak if screws are not properly tightened.
2. Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
3. Check for microwave energy leakage.

CAUTION OF MICROWAVE RADIATION LEAKAGE

USE CAUTION NOT TO BECOME EXPOSED TO RADIATION FROM THE MICROWAVE MAGNETRON OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

IMPORTANT NOTICE

1. The following components have potentials above 2000V while the appliance is operated.
 - Magnetron
 - High voltage transformer (Located on inverter (U))
 - High voltage diodes (Located on inverter (U))
 - High voltage capacitors (Located on inverter (U))
 Pay special attention to these areas.
2. When the appliance is operated with the door hinges or magnetron installed incorrectly, the microwave leakage can exceed more than $5\text{mW}/\text{cm}^2$. After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.

5.7 Sharp edges

CAUTION

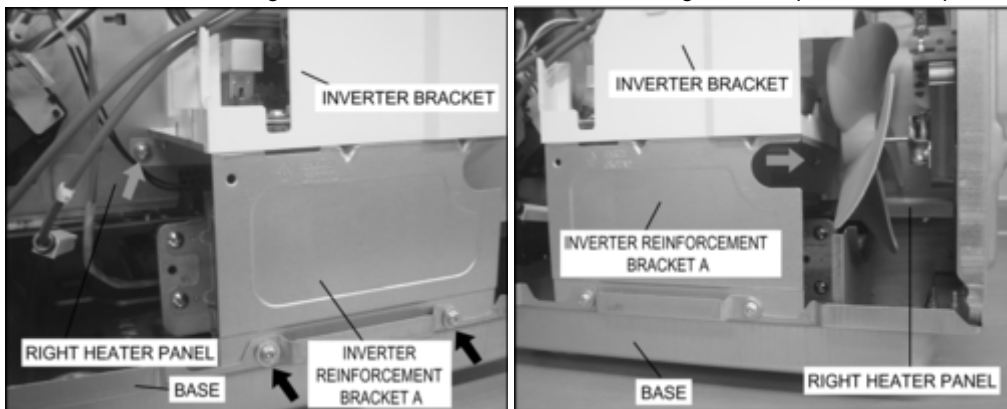
Please use caution when disassembling or reassembling internal parts. Some exposed edges may be sharp to the touch and can cause injury if not handled with care.

6 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

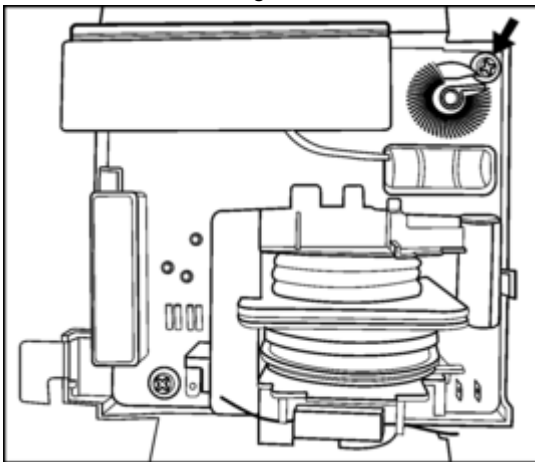
6.1 Inverter power supply

CAUTIONS

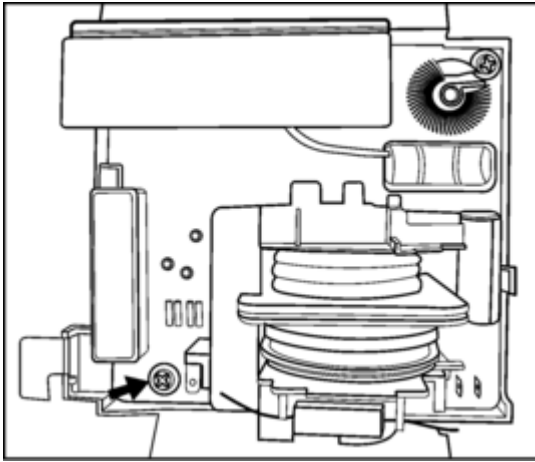
1. Always leave the grounding plate in place.
 2. Always securely tighten the ground screw through the bottom of the chassis (base).
 3. Securely connect 3 lead wire connectors.
 4. Make sure the heat sink has enough space (gap) from the oven. Take special care not to dress any lead wire over the aluminum heat sink because it is hot.
1. Discharge high voltage remaining in high voltage capacitor.
 2. Disconnect 2 high voltage lead wires from magnetron filament terminals.
 3. Disconnect connector CN701 & CN702 from H.V. Inverter board.
 4. Remove 4 screws holding inverter reinforcement bracket A on right heater panel & base plate respectively.



5. Release locking tabs connecting inverter air guide with inverter bracket.
6. Remove 1 screw holding H.V. Inverter to Inverter bracket.

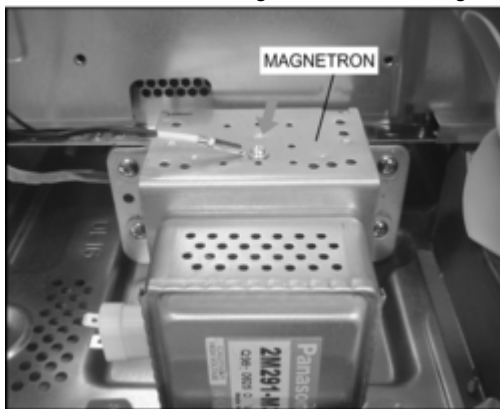


7. Remove 1 screw holding grounding plate to H.V. Inverter.

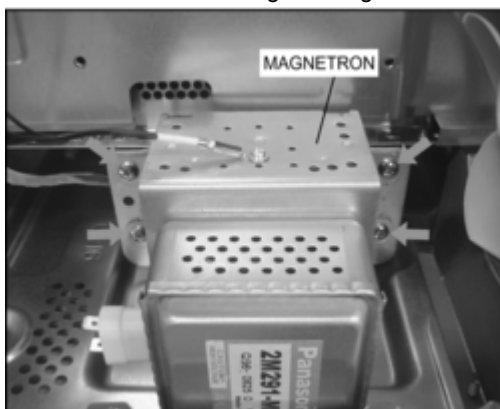


6.2 Magnetron

1. Steps same as disassembly of H.V. Inverter step 1 to step 4.
2. Remove 1 screw holding thermistor on magnetron.



3. Remove 2 screws holding air guide F on magnetron.
4. Remove 4 screws holding the magnetron.



NOTE:

After replacement of the magnetron, tighten mounting screws properly in an x pattern, making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

CAUTION

When replacing the magnetron, be sure the antenna gasket is in place.

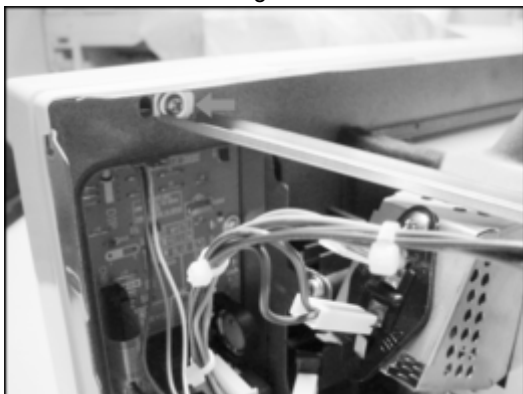
6.3 Digital programmer circuit (D.P.C) &

Membrane Switch

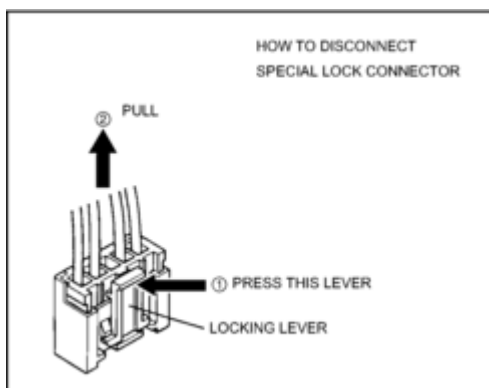
NOTE:

Be sure to ground any static electric charge built up on your body before handling the D.P.C.

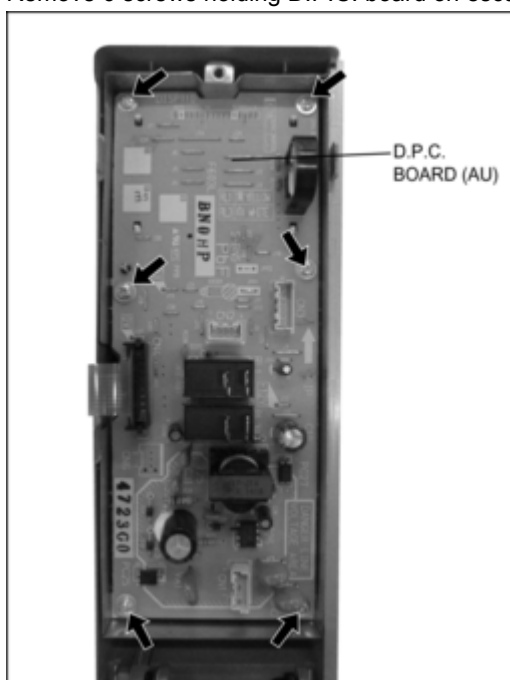
1. Remove 1 screw holding reinforcement bracket and escutcheon base on front plate.



2. Disconnect all connectors from D.P.C. board.



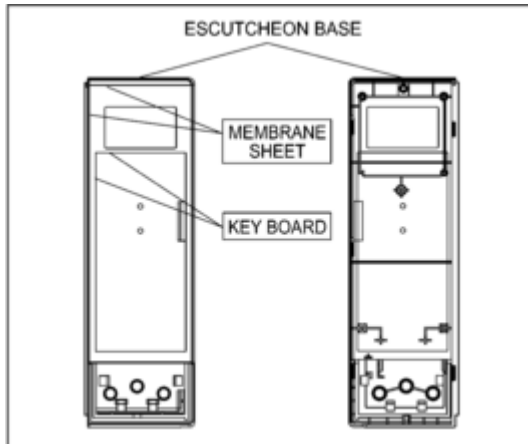
3. Disconnect connector CN701 from H.V. Inverter board.
4. Remove 6 screws holding D.P.C. board on escutcheon base.



5. Separate D.P.C board from tabs on the escutcheon base and remove D.P.C board.
To replace membrane key board
6. Use tools such as knife etc. to lift the edge of membrane sheet and peel off escutcheon sheet & key board membrane completely from escutcheon base.

NOTE:

1. The membrane key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal.
2. When installing the new key board membrane, make sure that the surface of escutcheon base is clean to prevent a malfunction or shorted contacts.



6.4 Low voltage transformer and/or power relays (RL1,RL3)

NOTE:

Be sure to ground any static electric charge built up on your body before handling the D.P.C.

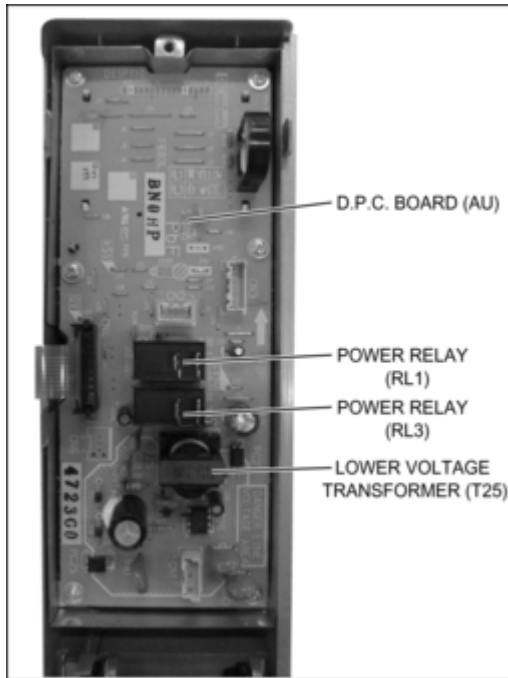
1. Disconnect all connectors from D.P.C. board.
2. Remove 6 screws holding D.P.C. board on escutcheon base.
3. Replace D.P.C. board.

(A) Using solder wick or a desoldering tool and 30W soldering iron carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.

NOTE:

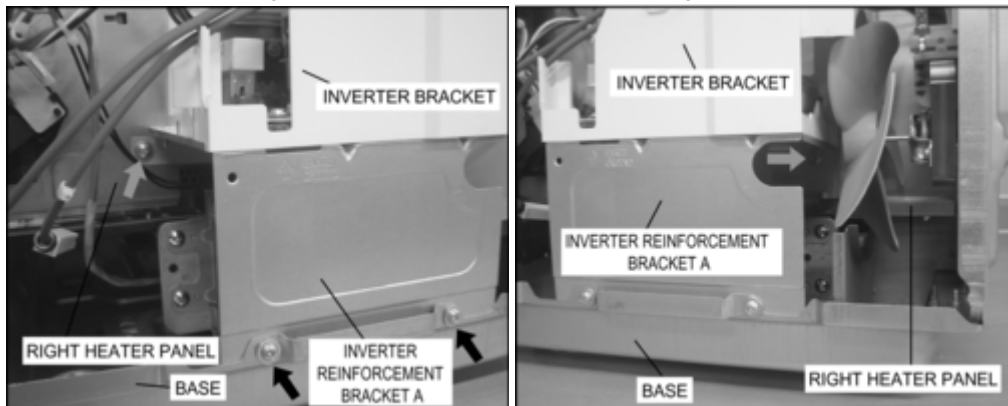
Do not use a soldering iron or desoldering tool of more than 30 watts on D.P.C. contacts.

(B) With all the terminal pins cleaned and separated from D.P.C. contacts, remove the defective transformer/power relays, Replace components making sure all terminal pins are inserted completely resolder all terminal contacts carefully.

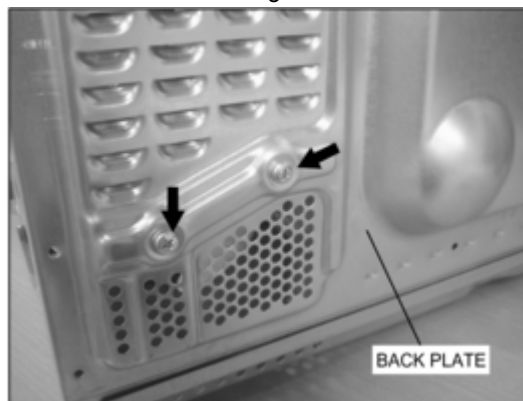


6.5 Fan motor

1. Disconnect 2 lead wires from fan motor terminals.
2. Remove 4 screws holding inverter reinforcement bracket A on right heater panel & base plate respectively.



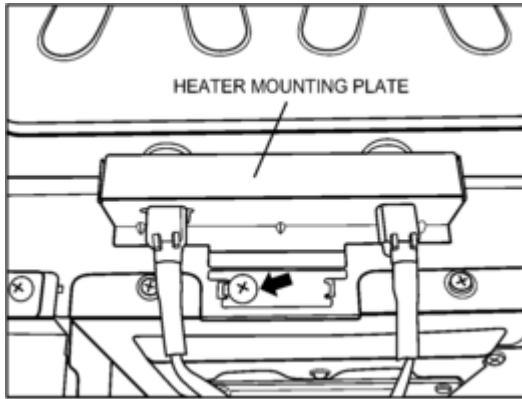
3. Remove 2 screws holding fan motor on oven assembly.



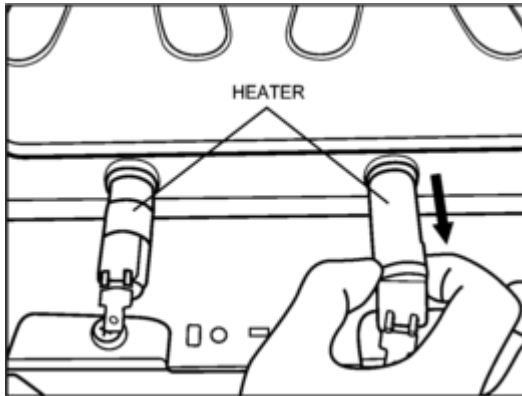
4. Remove fan blade from the fan motor shaft by pulling it straight out.

6.6 Quartz heater

1. Disconnect lead wires from heater terminals.
2. Remove 1 screw holding reinforcement bracket & heater mounting plate.



3. Remove another screw holding reinforcement bracket on front plate, then remove reinforcement bracket.
4. Remove the heater by pulling it out.



6.7 Door assembly

1. Remove door C from door E by carefully pulling outward, starting from upper right hand corner using a flat blade screwdriver.
2. Separate door E from tabs on door A and remove door A (U).
3. Open Door E at the opening angle of approximately **10°**(**Note: The door cannot be removed if the opening angle is greater than 10°**).
4. Remove the door E from its hinges by pushing the door E upward and out.
5. Remove door key and door key spring.

To re-install components:

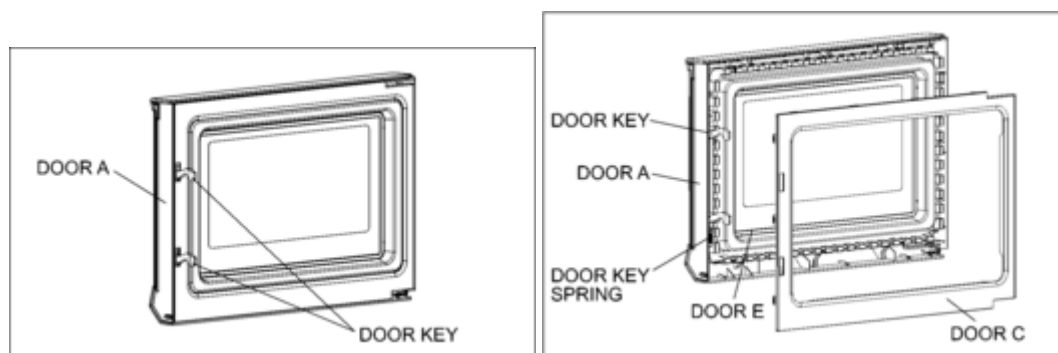
1. Place the door's lower hinge pin into the bottom hinge hole.
2. Use your left index finger to support the door's lower hinge pin while guiding the door's upper hinge pin into the top hinge hole.
3. Lower your finger to seat the door onto the hinges.
4. Replace other components.

NOTE:

Adjust so that the upper portion of the door will touch firmly to the oven cavity front plate, without pushing the door. If the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.

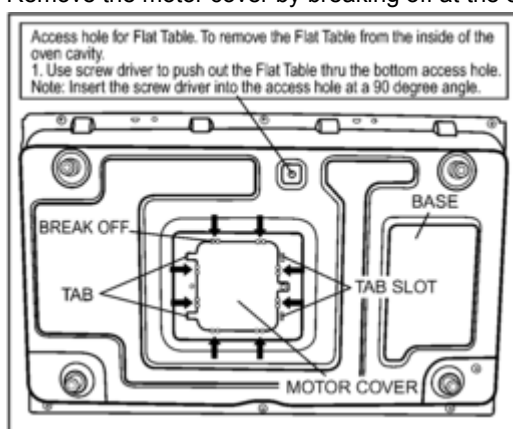
NOTE:

Always perform the microwave leakage measurement test after installation and adjustment of door assembly.



6.8 Stirrer motor

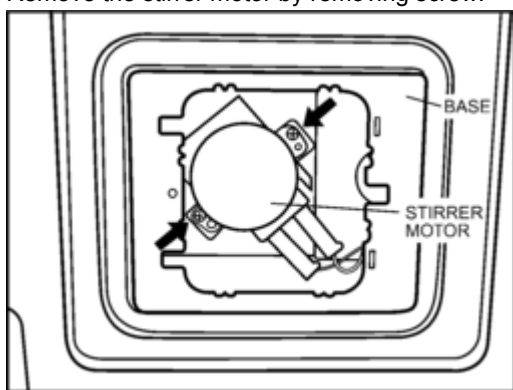
1. Remove the motor cover by breaking off at the 8 spots indicated by arrows with a cutter or the like.



NOTE:

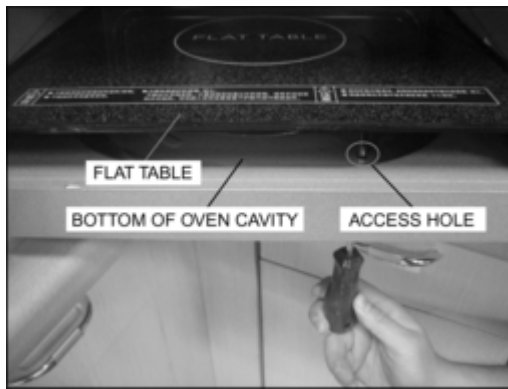
After removing the motor cover, be sure that cut portions are properly trimmed or bent to the inside so that no sharp edges will be exposed to outside.

2. Disconnect 2 lead wires connected to the stirrer motor.
3. Remove the stirrer motor by removing screw.



NOTE:

After reinstalling the new stirrer motor and reconnecting the 2 lead wires, reinstall the motor cover by rotating it around 180, tucking the 2 tabs under the base in the 2 provided slots, then screw the single tab to the base using a 4mm × 6mm screw.



7 COMPONENT TEST PROCEDURE

WARNING

1. High voltage is present at the output terminals of the High Voltage Inverter (U) including aluminum heat sink during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the power cord and discharge the high voltage capacitors (see page 8).

7.1 Primary, Secondary Interlock Switch & Power Relay RL1

1. Unplug lead connectors to Power Relay RL1 and verify open circuit of the Power Relay RL1 1-2 terminals.
2. Unplug lead connectors to Primary Interlock Switch and Secondary Interlock Switch.
3. Test the continuity of switches at door opened and closed positions with ohm meter (low scale).
Normal continuity readings should be as follows.

	Door Closed	Door Opened
Primary Interlock Switch	0Ω (Close)	∞ Ω(Open)
Secondary Interlock Switch	0Ω (Close)	∞ Ω(Open)
Power Relay RL1	∞ Ω (Open)	∞ Ω(Open)

7.2 Short Switch

1. Unplug lead wires from Inverter Power Supply (U) primary terminals.
2. Connect test probes of ohm meter to the disconnected leads that were connected to Inverter Power Supply (U).
3. Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.

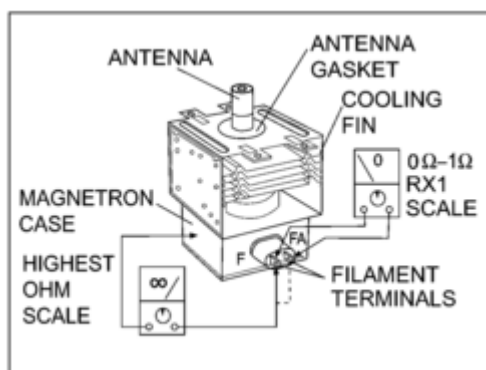
Normal continuity readings should be as follows.

Door Opened	Door Closed
0Ω (Close)	∞ Ω (Open)

7.3 Magnetron

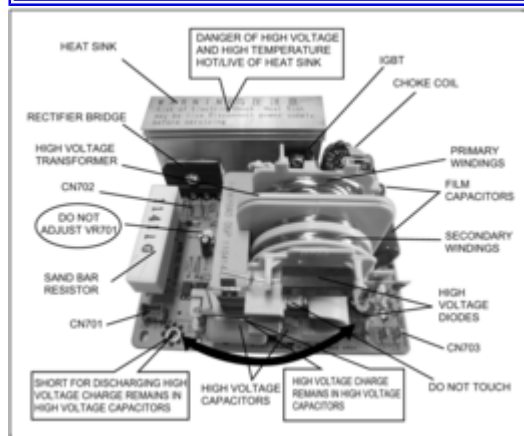
Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

1. Isolate magnetron from the circuit by disconnecting the leads.
2. A continuity check across magnetron filament terminals should indicate one ohm or less.
3. A continuity check between each filament terminal and magnetron case should read open.



7.4 Inverter power supply (U)

DO NOT try to REPAIR H.V. Inverter power supply (U). Replace complete H.V. Inverter(U) Unit.



WARNING: HIGH VOLTAGE

Test if failure codes H95, H97 or H98 appear when performing the following procedure. It is recommended to use an AC line input current ammeter for testing.

Test 1

- With the oven unit's AC power supply cord is unplugged from the wall outlet, unplug the 2 pin H.V. connector CN703 from the magnetron tube.
- Place 1 liter of water load into oven cavity.
- Plug in the oven's AC power supply cord into outlet.
- Program DPC.
 - Press **Timer/Clock** pad twice.
 - Press **Start** pad once.
 - Press **Micro Power** pad once.
- Program oven at High power for 1 minute and press [Start] pad.
 - After approximately 23 seconds, oven stops operating.
 - During oven operation, the input current is approximately 0.5 to 1A. If both a and b are OK, proceed to test 2.

	INPUT CURRENT	FAILURE CODE
Unplug CN703	0.5 to 1A	Oven stops in 23 seconds after started.

Test 2

Continued from Test 1

- Unplug the oven's AC power supply cord from outlet.
- Unplug 3 pin connector CN701. CN703 remains unplugged.
- Plug in the oven's AC power supply cord into outlet.
- Program DPC.

1. Press **Timer/Clock** pad twice.
2. Press **Start** pad once.
3. Press **Micro Power** pad once.
5. Program oven at High power for 1 minute and press [Start] pad.
 1. After approximately 3 seconds, oven stops operating.
 2. During oven operation, the input current is approximately 0.4A.

	INPUT CURRENT	FAILURE CODE
Unplug CN701	$\approx 0.4A$	Oven stops in 3 seconds after started.

If both a and b check OK, the Inverter Power Supply (U) can be determined to be OK.

7.5 Temperature thermistor

The thermistor that is attached to the magnetron detects the temperature of the magnetron and will stop magnetron operation when overheating is detected. A normal thermistor's resistance is 35K Ω to 110K Ω for an ambient temperature range of 10-30 degree C.

If the resistance reading is out of the range stated here, the thermistor is defective and must be replaced.

It is also possible to display thermistor level by taking the following steps.

1. Program the DPC into TEST MODE (Plug-in oven → press **Timer/Clock** pad twice → press **Start** pad once → press **Micro Power** pad once).
2. Program oven at Standing Time for 1 minute and press [Start] pad.
3. Press **Micro Power** once, the thermistor level reading will shown on the display.
The normal reading should be in the range of 16-230.

8 MEASUREMENTS AND ADJUSTMENTS

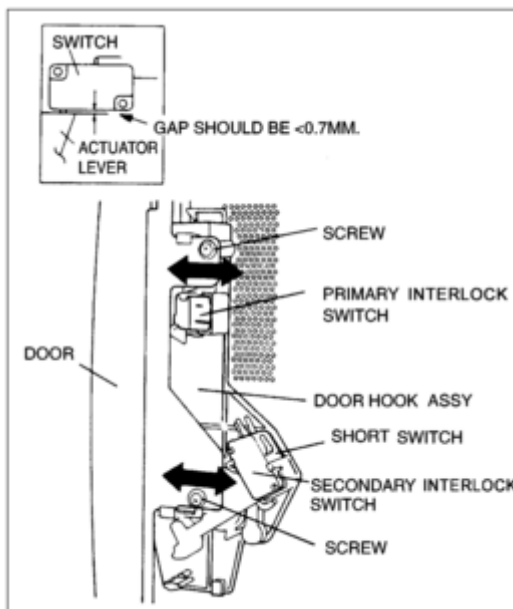
8.1 Adjustment of Primary interlock switch, Secondary interlock switch and Short switch.

1. Mount the Primary interlock switch, the Secondary interlock switch and the Short switch to the door hook assembly as shown in illustration.

NOTE:

No specific individual adjustments during installation of the Primary interlock switch, Secondary interlock switch or Short switch to the door hook are required.

2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of the arrows in the illustration so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the interlock keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.
3. Reconnect the short switch and check the continuity of the monitor circuit and all interlock switches again by following the component test procedures.



8.2 Measurement of microwave output

The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

- 1 liter beaker
- Glass thermometer
- Wrist watch or stopwatch

NOTE:

Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurately as possible.

1. Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the water's temperature. (recorded as T1).
2. Place the beaker on the center of glass tray.
Set the oven for High power and heat it for exactly one minute.
3. Stir the water again and read the temperature of the water. (recorded as T2).
4. The normal temperature rise at High power level for each model is as shown in table.

TABLE (1L-1min. test)

RATED OUTPUT	TEMPERATURE RISE
1000W	Min. 8.5°C

9 TROUBLESHOOTING GUIDE

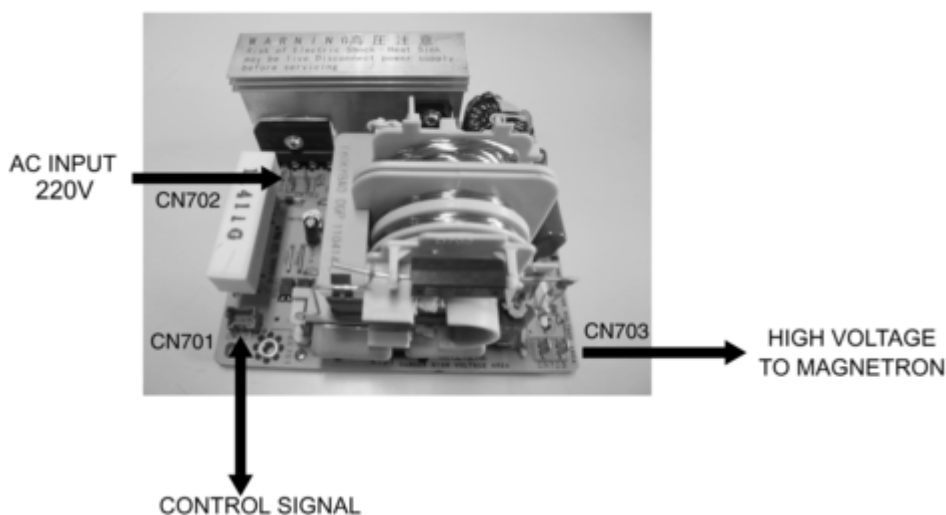
DANGER: HIGH VOLTAGES ⚠

- DO NOT RE-ADJUST PRESET CONTROL on the H.V.Inverter (U).** It is very dangerous to repair or adjust without proper test equipment because this circuit generates very large current and high voltage. Operating a misaligned inverter circuit is dangerous.
- Ensure proper grounding before troubleshooting.
- Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
- Discharge high voltage remaining in the H.V.Inverter (U).
- When checking the continuity of the switches or the H.V.Inverter, disconnect one lead wire from these parts and then check continuity with the AC plug removed. Doing otherwise may result in a false reading or damage to your meter. When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be damaged or the connector cannot be removed.
- Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel. Always touch ground while working on this panel to discharge any static charge in your body.
- 220V AC is present on the digital programmer circuit (Terminals of power relay's and primary circuit of Digital Programmer Circuit). When troubleshooting, be cautious of possible electrical shock hazard.

Before troubleshooting, operate the microwave oven following the correct operating procedures in the instruction manual in order to find the exact cause of any trouble, since operator error may be mistaken for the oven's malfunction.

9.1 (Troubleshooting) Oven stops operation during cooking

SYMPTOM	CAUSE	CORRECTIONS
1. Oven stops in 3 seconds after pressing [Start] pad.	No input AC is supplied to H.V.Inverter (U) CN702 terminals	1. Interlock Switch 2. Power relay RY1 3. Loose lead wire connector CN701, CN702 4. H.V. Inverter (U)
Oven stops in 23 seconds after pressing [Start] pad.	H.V.Inverter (U) operates by the control signals from DPC but magnetron is not oscillating	1. Magnetron 2. Loose lead wire connector CN703 3. H.V. Inverter (U)
2. No display and no operation at all. Fuse is blown.	Most probably loose connection of connectors, or door Interlock mechanism is not adjusted properly	1. Align door, Door Interlock Switches 2. Loose wiring connectors

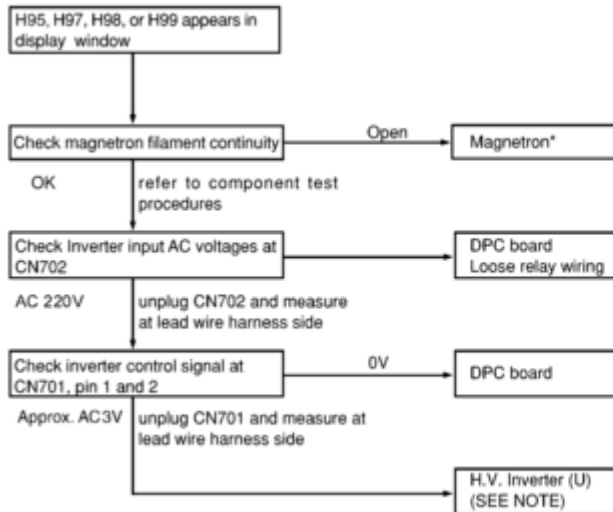


9.2 (Troubleshooting) Other problems

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead.	1. Open or loose lead wire harness	
	Fuse is OK.	2. Open thermal cutout / thermistor	Check thermal cutout is defective.
	No display and no operation at all.	3. Open low voltage transformer	
		4. Defective DPC	
2.	No display and no operation at all.	1. Shorted lead wire harness	Check adjustment of primary, secondary Interlock switch and short switch including door.
	Fuse is blown.	2. Defective primary Interlock switch (NOTE 1)	
		3. Defective short switch (NOTE 1)	
		4. Defective Inverter Power Supply (U)	
	NOTE 1: All of these switches must be replaced at the same time. Check continuity of power relay RL1 contacts (between 1 and 2) and if it has continuity, replace power relay RL1 also.		
3.	Oven does not accept key input (Program)	1. Key input is not in proper sequence	Refer to operation procedure.
		2. Open or loose connection of membrane key pad to DPC (Flat cable)	
		3. Shorted or open membrane key board	
		4. Defective DPC	Refer to DPC troubleshooting.
4.	Fan motor turns on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary Interlock switch	Adjust door and Interlock switches.
		2. Defective secondary Interlock switch	
		3. Door switch CN4	
5.	Timer starts count down but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of primary Interlock switch	Adjust door and Interlock switches.
		2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will cause lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent.	
		3. Defective high voltage component H.V. Inverter Power Supply (U) Magnetron	Check high voltage component according to component test procedure and replace if it is defective.
		4. Open or loose wiring of power relay RL1	
		5. Defective primary Interlock switch	
		6. Defective DPC or power relay RL1	Refer to DPC troubleshooting
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary Interlock switch	
		2. Off-alignment of secondary Interlock switch	
		3. Defective secondary Interlock switch	
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage	Consult electrician
		2. Open or loose wiring of magnetron filament circuit.(Intermittent oscillation)	
		3. Aging change of magnetron	
8.	Fan motor turns on and stirrer motor rotates when door is opened.	1. Low voltage transformer on DPC.	
9.	Oven does not operate and return to plugged in mode as soon as [Start] pad is pressed.	1. Defective DPC	Check grounding connector on escutcheon base.
10.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
11.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary Interlock switch	Adjust door and Interlock switches.
		2. Operation of thermal cutout	

9.3 Troubleshooting of inverter circuit (U) and magnetron

This oven is programmed with a self diagnostics failure code system which will help for troubleshooting. H95, H97, H98 and H99 are the provided failure codes to indicate magnetron and inverter circuit problem areas. This section explains failure codes of H95, H97, H98 and H99. First, you must program the DPC into TEST MODE, press **Timer/Clock** pad twice → press **Start** pad once → press **Micro Power** pad once. Program unit for operation. H95, H97, H98, H99 appears in display window a short time after [Start] pad is pressed and there is no microwave oscillation.



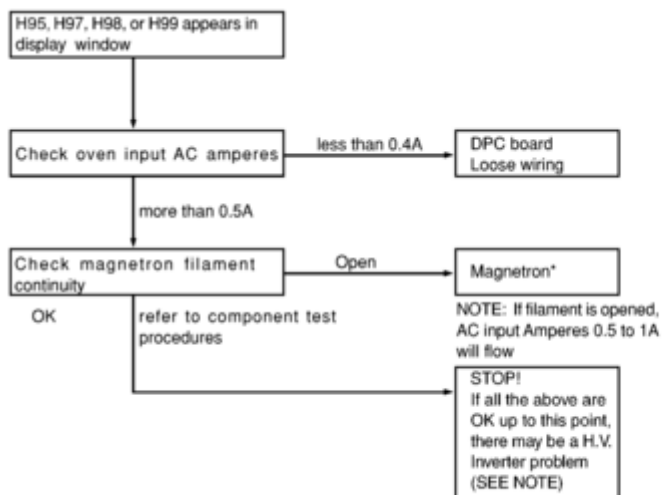
WARNING: DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET CONTROL on the board. It is very dangerous to repair or adjust without proper test equipment because this circuit generates very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

* Check magnetron filament for open or short to case before proceeding to determine a good magnetron.

NOTE: After check, unplug unit to reset to normal operation mode.

Alternate way to troubleshoot oven with AC Ampere meter used

H95, H97, H98, H99 appears in display window a short time after [Start] pad is pressed and no microwave oscillation with AC Ampere meter used for troubleshooting.



NOTE: After check, unplug unit to reset to normal operation mode.

9.4 Trouble related to Digital Programmer Circuit

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Fuse pattern of D.P.C.	Normal	→Step2
			Open	Replace D.P.C. or Fuse Pattern
	2	IC10 pin4 voltage	Abnormal 0V	IC26
			Normal=12V	→Step3
	3	IC10 pin5 voltage	Abnormal	IC10

			Normal=5V	IC1, CX320, Display
No key input	1	Touch switch continuity	Abnormal	Touch switch
			Normal	IC1
No beep sound	1	IC1 pin 1 voltage	Abnormal	IC1
			Normal=5V	BZ210, Q210
No microwave oscillation at any power	1	IC1 pin 12 voltages while operation at high power	Abnormal	IC1
			Normal=5V	→Step2
	2	Collector of Q227	Abnormal	Q222 and/or Q225, Q227
			Normal \approx 0.7V	RL1
Dark or unclear display	1	Replace display and check operation	Normal	Display
			Abnormal	IC1
Missing or lighting of unnecessary segment	1	Replace IC1 and check operation	Normal	IC1
			Abnormal	Display
H95/H97/H98 appears in window and oven stops operation. Program High power for 1 minute and conduct following test quickly, unless H95/H97/H98 appears and oven stops	1	Unplug CN702 (2 pin) connector and measure voltage between terminals	Abnormal=0V	1. Interlock Switch 2. D.P.C. /Power Relay
			Normal=220V	→Step2
	2	Unplug CN701 (3 pin) connector and measure pin1 voltage of D.P.C. CN3	Abnormal=0V	D.P.C.
			Approx. AC 3V	Magnetron

9.5 SIMPLE WAY OF H.V. INVERTER/MAGNETRON TROUBLESHOOTING

Purpose:

Simple way (3/23 seconds rule) of identifying whether it's Magnetron, Inverter or others.

Set-up:

The unit under question is connected through the Ammeter as shown below.



Procedure:

Follow the matrix table below to identify the problem source.

Note:

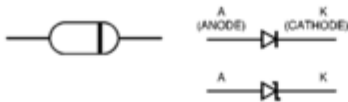
Do not replace both Inverter board and Magnetron simultaneously and automatically without going through this procedure.

Power will:	Ammeter reading is:	To do:	Remedy:
Shut off in 23 seconds after "Start".	1. Between 0.5A and 1.0A.	Check and repair open magnetron circuit CN703.	Open magnetron wiring between Inverter and magnetron terminal.
	2. Between 1.0A and 2.0A.	Check continuity of D702 in Inverter PCB.	
		↓	
		1. D702 shorted	Replace H.V.Inverter (F606YBH20GP)
		2. D702 is OK	Replace magnetron
Shut off in 3 seconds after "Start".	1. Less than 0.5A	Check open circuit: Interlock Switch, DPC, Power Relay, CN701 and CN702.	Replace defective component(s), or correct switch, cables and connectors.

9.6 How to check the semiconductors using an

OHM meter

Diode



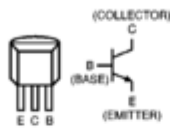
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC.....

2SD.....

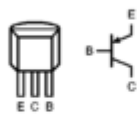


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

2SA.....

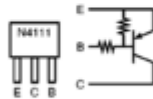
2SB.....



	FORWARD	REVERSE
B-E	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

Digital Transistor

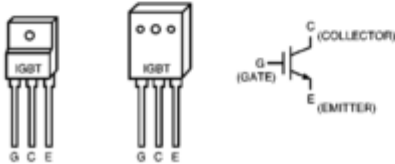
PNP Transistor



	FORWARD	REVERSE
E-B	10k Ω ~ 30k Ω	10k Ω ~ 30k Ω
C-B	50k Ω ~ 90k Ω	∞
C-E	40k Ω ~ 80k Ω	∞

IGBT

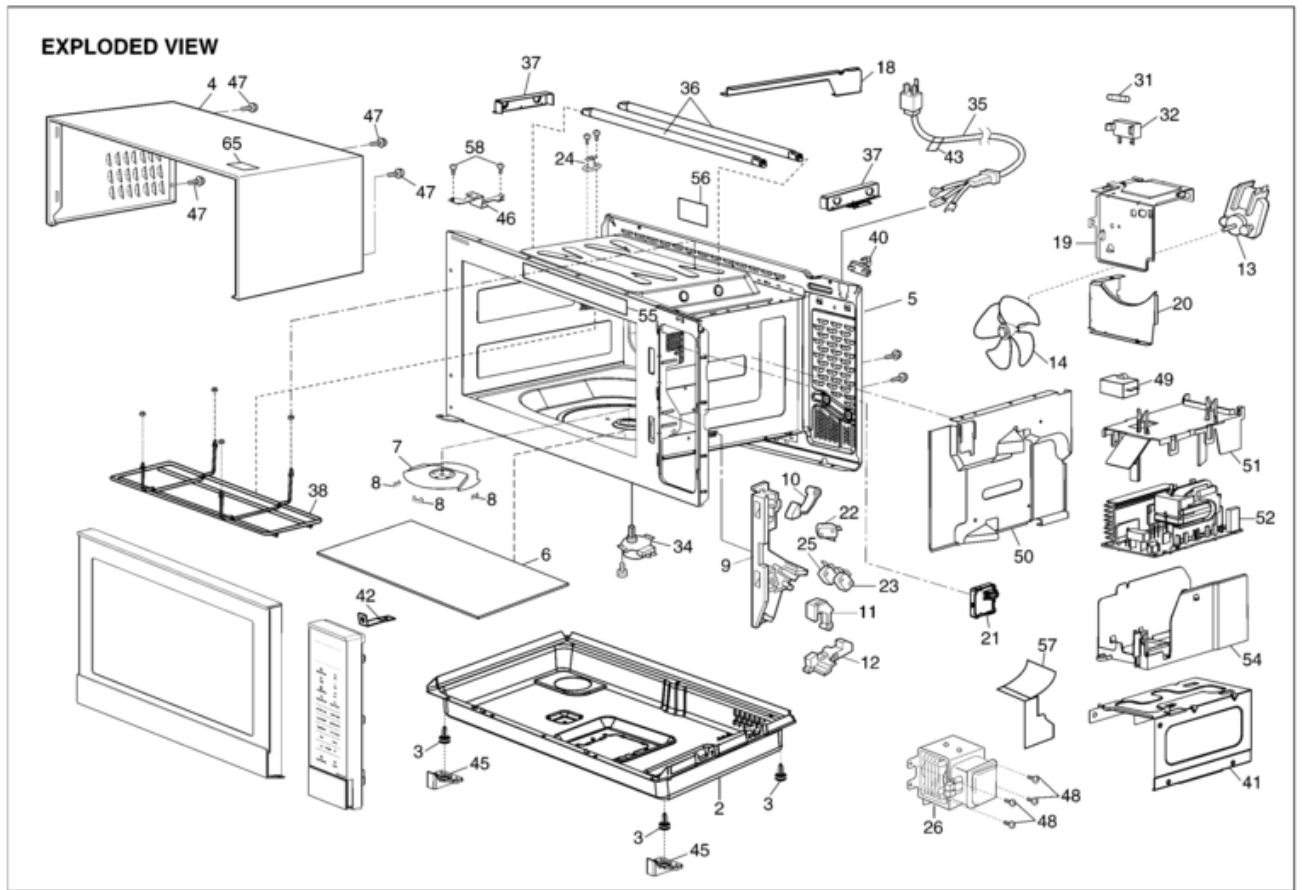
(INSULATED GATE BIPOLAR TRANSISTOR)



	FORWARD	REVERSE
E-C	SMALL	∞
E-G	∞	∞
C-G	∞	∞

9.7 H.V. Inverter main parts list (F606YBH20GP)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
Q701	B1JAEV000003	IGBT	1	
C701	ECWHC3B104JA	FILM CAPACITOR	1	0.1 μ F,1000VDC
C702	ECWF4305N851	FILM CAPACITOR	1	3 μ F,250VDC
DB701	B0FBBQ000006	RECTIFIER BRIDGE	1	
L701	F5020W100AP	CHOKE COIL	1	
R702	D0CM562JA002	SAND BAR RESISTOR	1	5.6K Ω ,15W
T701	F609ABA00GP	TRANSFORMER	1	(INCLUDING D701,D702,C706,C707)
D701,D702	B0FBAZ000006	DIODE	2	
C706	F0C3F562A002	FILM CAPACITOR	1	5600PF/3KV
C707	F0C3F822A002	FILM CAPACITOR	1	8200PF/3KV




10 EXPLODED VIEW AND PARTS LIST










10.1 EXPLODED VIEW



10.2 PARTS LIST

NOTE:

1. When ordering replacement part(s), please use part number(s) shown in this part list.
Do not use description of the part.
2. Important safety notice:
Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use only manufacture's specified parts.

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
<u>2</u>	F10019L10XPG	BASE	1	
<u>3</u>	F1008BN00HPS	RUBBER FOOT	4	
<u>4</u>	F1009BN00SMP	CABINET BODY	1	
<u>5</u>	 F200ABN00HP	OVEN	1	
<u>6</u>	F010TBN00HP	FLAT TABLE (U)	1	
<u>7</u>	F202KBN00HP	ANTENNA STIRRER (U)	1	
<u>8</u>	F20197J70XP	ANTENNA BRACKET	3	
<u>9</u>	 F30206G30AP	DOOR HOOK	1	
<u>10</u>	F31366G30AP	HOOK LEVER A	1	
<u>11</u>	F3137BN00HP	HOOK LEVER B	1	
<u>12</u>	F31386G30AP	HOOK LEVER C	1	
<u>13</u>	F400A9L00XP	FAN MOTOR	1	
<u>14</u>	F4008-1L70	FAN BLADE	1	
<u>18</u>	F40479L60XP	AIR GUIDE E	1	
<u>19</u>	F41449L00XP	UPPER ORIFICE	1	
<u>20</u>	F4146-1P00	LOWER ORIFICE	1	
<u>21</u>	F612EBN50QP	LAMP (U)	1	LED LAMP INSIDE
<u>22</u>	 F61425U30XN	MICRO SWITCH	1	(PRIMARY INTERLOCK SWITCH)
<u>23</u>	 F61415U30XN	MICRO SWITCH	1	(SECONDARY INTERLOCK SWITCH)
<u>24</u>	 F61459L00XP	THERMAL CUTOUT	1	
<u>25</u>	 F61785U30XN	MICRO SWITCH	1	(SHORT SWITCH)
<u>26</u>	 2M261-M32KLP	MAGNETRON	1	
<u>31</u>	 F62306V60BP	FUSE	1	10A,250V
<u>32</u>	F62315G10XN	FUSE HOLDER	1	
<u>34</u>	F61449L00XP	STIRRER MOTOR	1	
<u>35</u>	 F900C9L40ZP	AC CORD W/PLUG	1	
<u>36</u>	F630GBN00HP	HEATER	2	

37	F6460BN00HP	HEATER MOUNTING PLATE	2	
38	F6735BN00HP	HEATER PROTECTOR	1	
40	F11409W00XP	STOPPER	1	
41	F1161-1P00	INVERTER REINFORCEMENT BRACKET A	1	
42	F11651P00V	INVERTER REINFORCEMENT BRACKET B	1	
43	F02395E20KN	CORD CAUTION LABEL	1	
45	F10529L10XP	STOPPER	2	
46	F3006BN00HP	HINGE A	1	
47	XTWBFE4+8D	SCREW	4	FOR CABINET BODY
48	XTT4+8RDN	SCREW	4	FOR MAGNETRON
49	MKPX2335K	CAPACITOR	1	
50	F22369Q30AP	RIGHT HEATER PANEL	1	
51	F40279L00XP	INVERTER AIR GUIDE	1	
52	F606YBH20GP	H.V.INVERTER (U)	1	
54	F65859L00XP	INVERTER BRACKET	1	
55	F0334BN00PT	MENU LABEL	1	
56	F00066V00HP	CAUTION LABEL	1	
57	F40429L20CP	AIR GUIDE F	1	
58	XTWFA38+12LR	SCREW	2	FOR HINGE A
65	F0150BH20BP	NO TOUCHING LABEL	1	

10.3 ESCUTCHEON BASE ASSEMBLY



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E1	F603LBN00PT	D.P.CIRCUIT(AU)	1	
E4	F630YBN00BPT	MEMBRANE SWITCH (U)	1	
E5	F8034BN00SHP	ESCUTCHEON BASE	1	
E6	F8072BN00SHP	DOOR OPENING BUTTON	1	
E7	F80375K00AP	COOK BUTTON SPRING	1	
E8	F82569M60BP	DOOR OPENING LEVER	1	
E9	F66139L60XP	D.P.C. BOARD SUPPORT	1	
E10	F8127BN00HP	GROUNDING PLATE	1	
E15	F0007BN00SPT	NAME PLATE	1	

10.4 DOOR ASSEMBLY



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
D1	F30186P40AG	DOOR KEY A	1	
D2	F302ABN00SHP	DOOR A(U)	1	
D3	F301P9L30RE	DOOR E(U)	1	
D4	F30216P40AG	DOOR KEY SPRING	1	
D5	F30859Q30AP	DOOR C	1	

10.5 WIRING MATERIALS



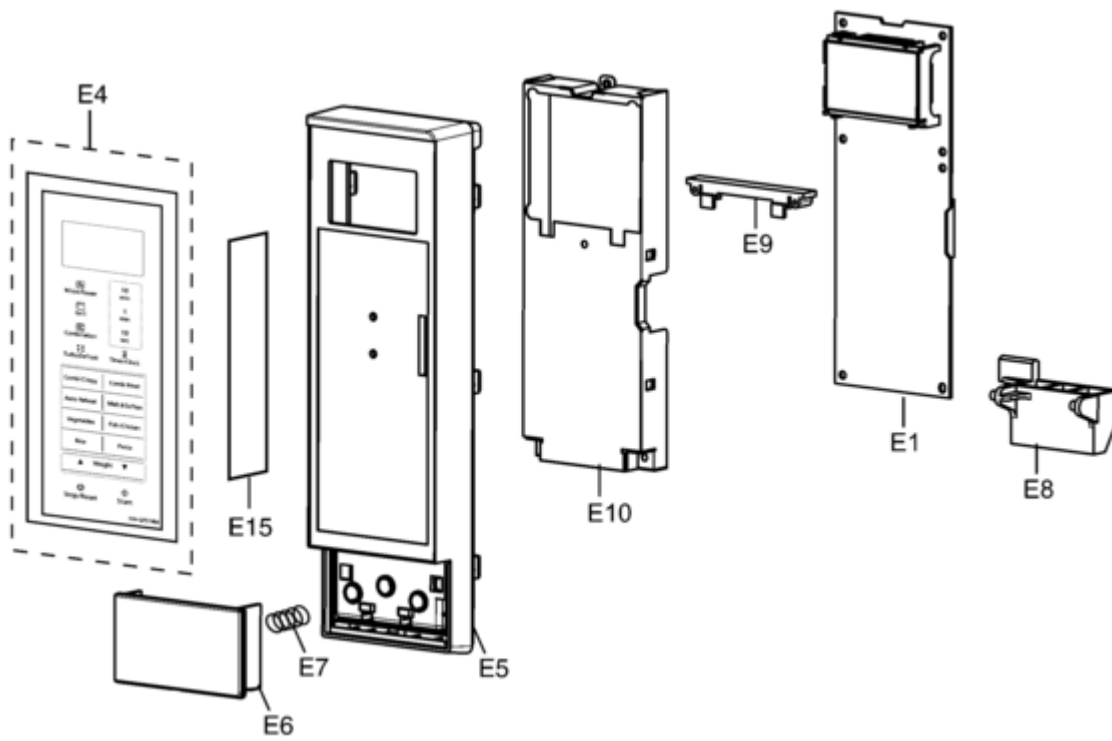
--	--	--	--	--

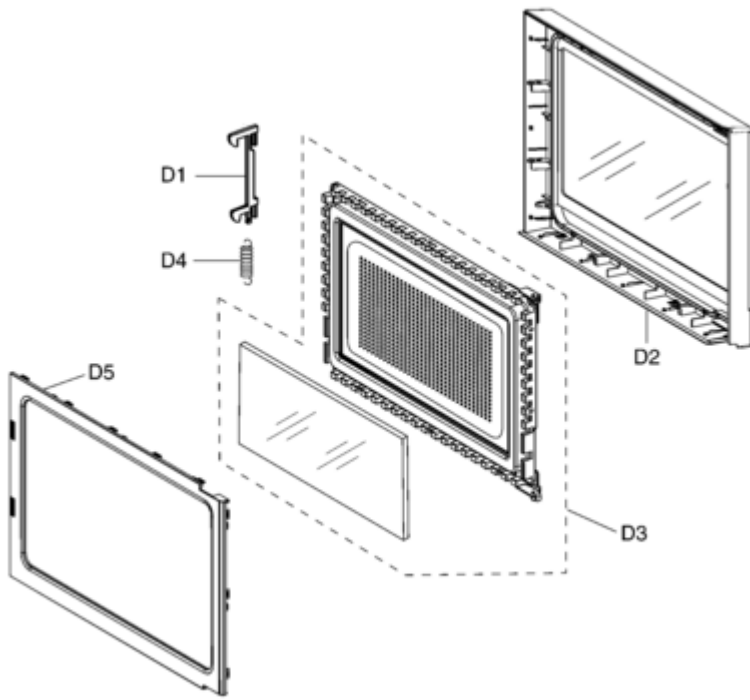
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	F030ABN00HP	LEAD WIRE HARNESS	1	
W2	F030E-1R90	H.V.LEAD WIRE	1	
W3	F0353BN00HP	THERMISTOR HARNESS	1	

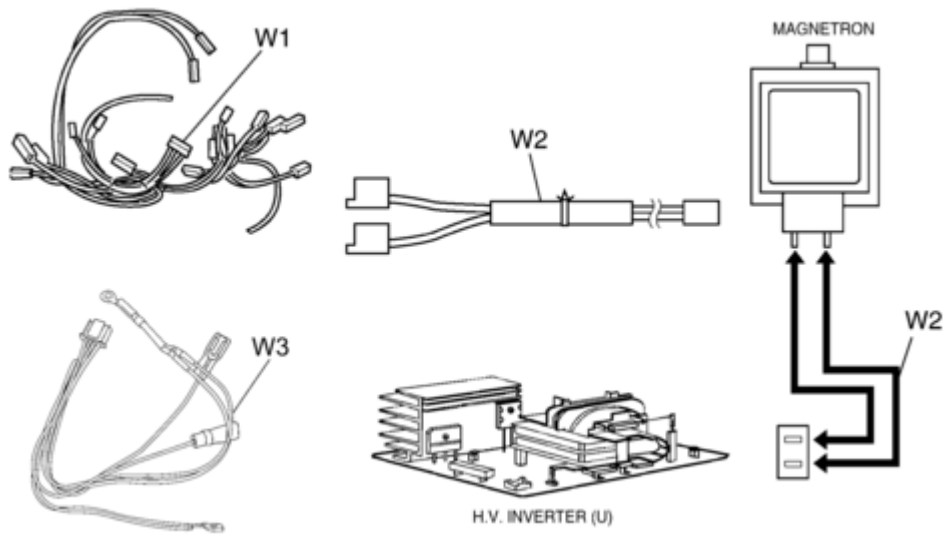
10.6 PACKING AND ACCESSORIES

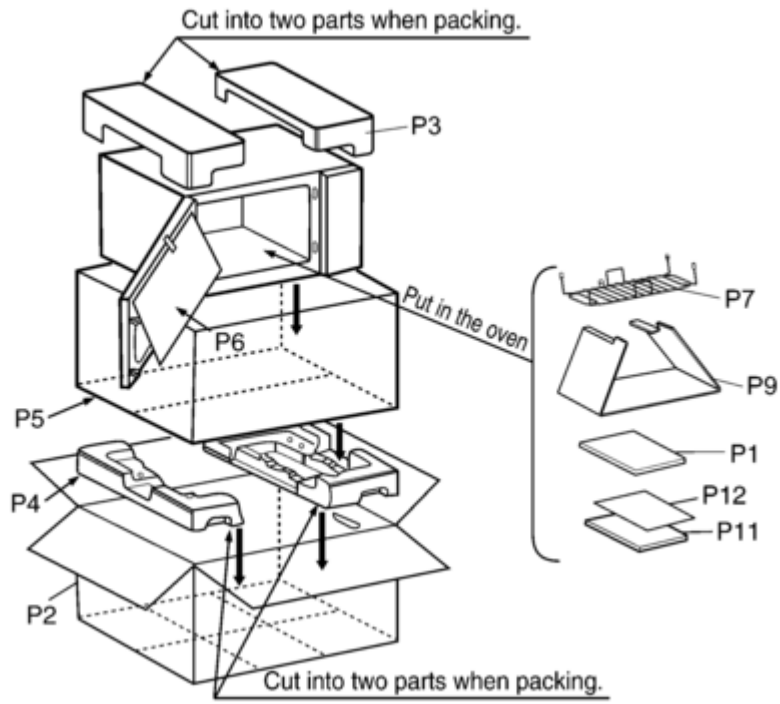


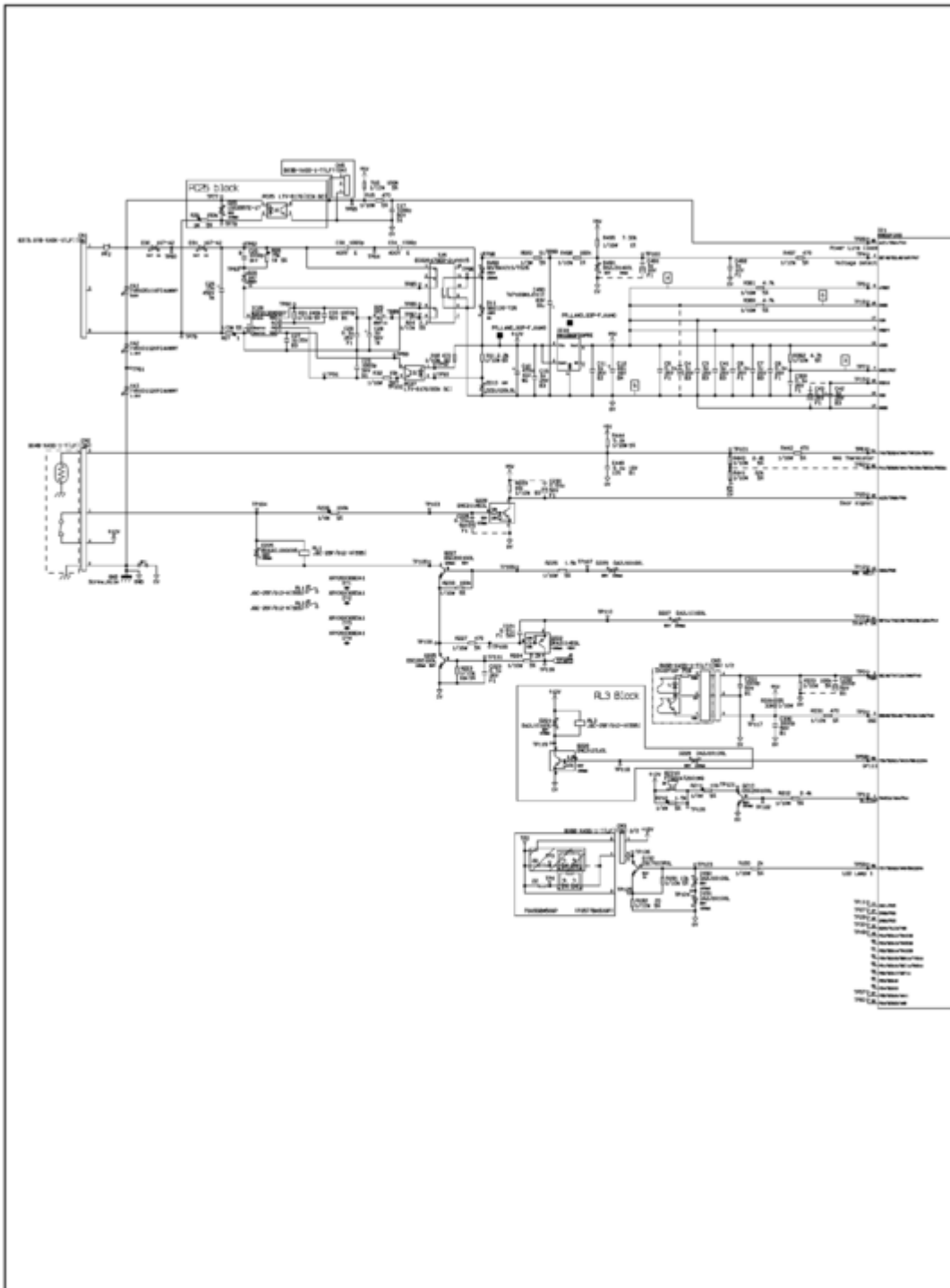
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	F0003BN00PT	INSTRUCTION MANUAL	1	
P2	F0102BN00SHP	PACKING CASE,PAPER	1	
P3	F01049Q30AP	UPPER FILLER	1	
P4	F01059Q30AP	LOWER FILLER	1	
P5	F01064W00AP	P.E.BAG	1	
P6	F01078100XN	DOOR SHEET	1	
P7	F060VBG00XP	OVEN RACK	1	
P9	F01089L00XP	RACK PACKING	1	
P11	F000BBN00PT	COOK BOOK	1	
P12	F0445BN00BPT	OVERLAY	1	

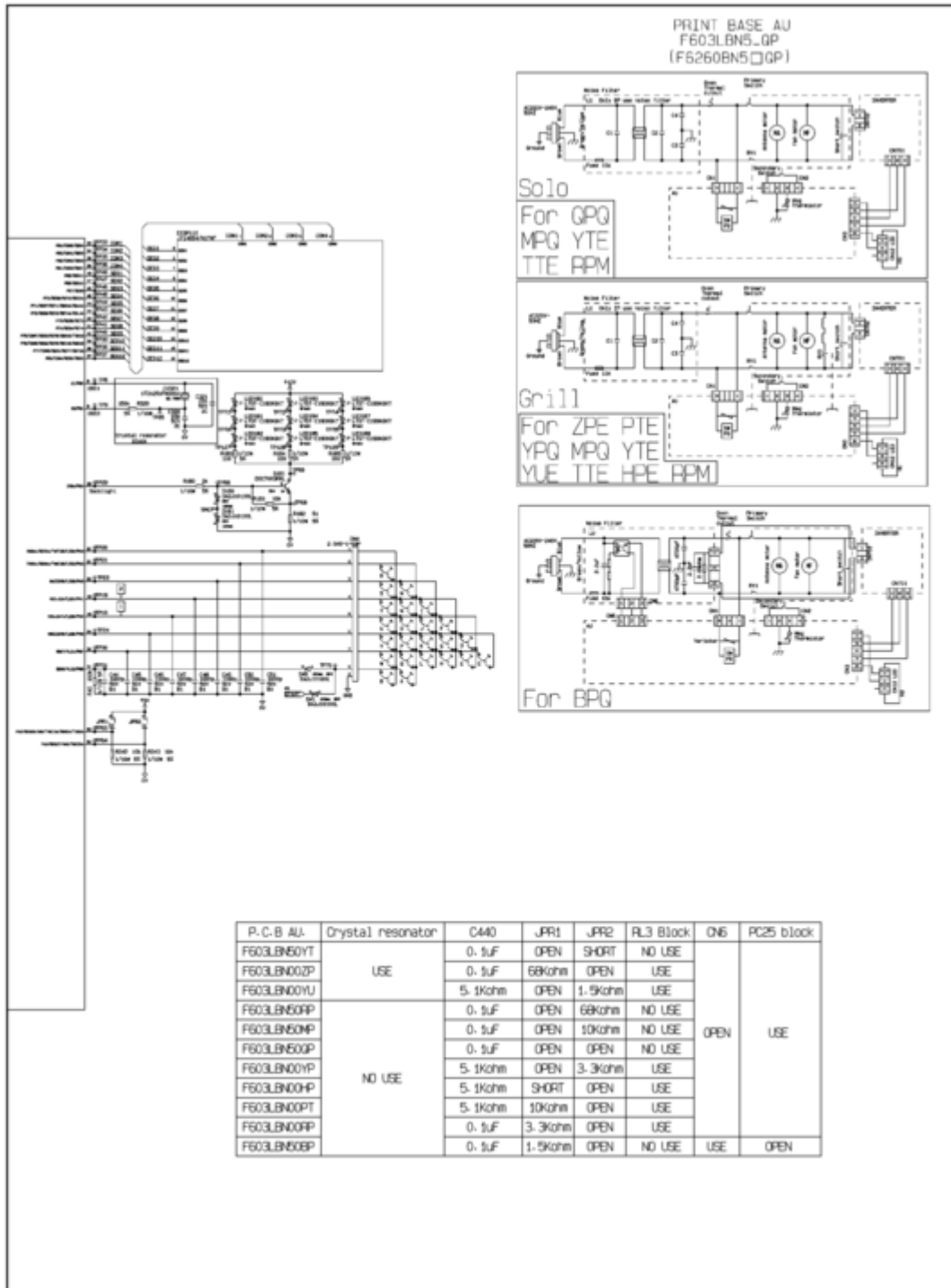












11 DIGITAL PROGRAMMER CIRCUIT

11.1 SCHEMATIC DIAGRAM



11.2 PARTS LIST

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ210	L0DDEA000014	BUZZER	1	2.0KHz
DISP110	L5AYAYY00291	LCD	1	
	F67529L60XP	DIFFUSION SHEET	1	
DISP1 HOLDER	F66179L60XP	LCD HOLDER	1	
VA1	D4EAY5110002	ZENER RESISTOR	1	510V
VA2,VA3	D4EAY112A148	ZENER RESISTOR	2	1100V
IC1	MN69F009CP1	L.S.I.	1	
PC25,PC27	B3PAA0000302	IC	2	
IC10	C0DBGYY03746	IC	1	
IC26	MIP2K30MSSCF	IC	1	
RL1,RL3	K6B1AYY00129	POWER RELAY	2	
T25	G4D2A0000320	LOW VOLTAGE TRANSFORMER	1	

10/14

S-BN0

Printed in China