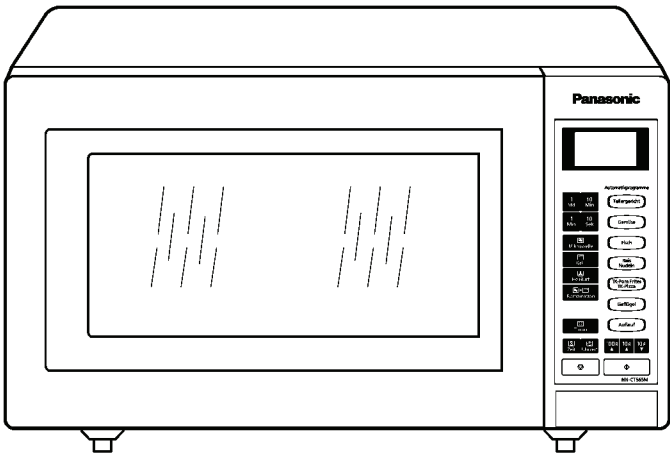


Service Manual

Microwave Oven

NN-CT565M

GPG (Germany)



Specification


Models		NN-CT565M
Power Source:		230V AC Single Phase, 50Hz
Power Consumption:	Microwave	1260W
	Heater	1360W
Output:	Microwave	1000W
	Heater	1300W
Microwave Frequency:		2450MHz
Timer:		30 min.00sec (HIGH/MAX Power Level) 99 min.50sec (Other Power Level)
Outside Dimensions:		520mm(W) x 395mm(D) x 310mm(H)
Oven Cavity Dimensions:		359mm(W) x 352mm(D) x 217mm(H)
Weight:		13.8kg
PbF		This product with PbF
Specifications subject to change without notice.		

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/area identifications shown below for your applicable product specification.

GPG For Germany

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 $370 \pm 10^{\circ}\text{C}$.

● Pb free solder will tend to splash when heated too high (about 600°C).

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.

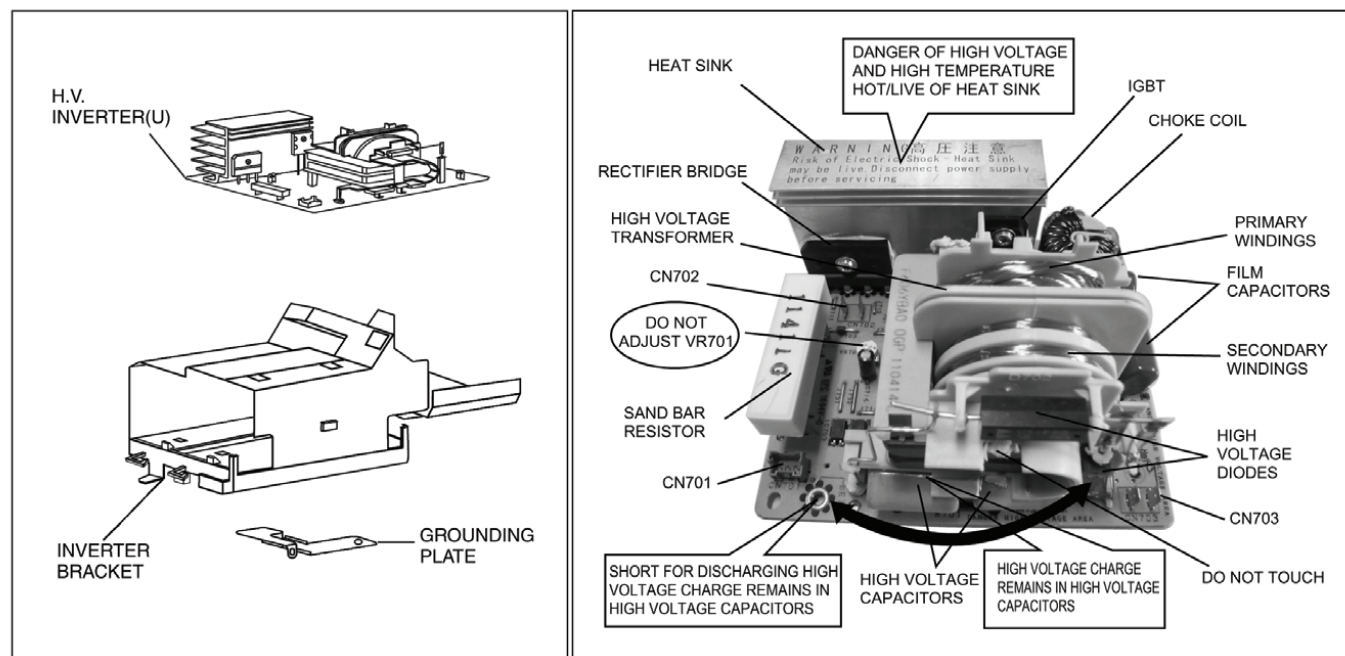
It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.

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.

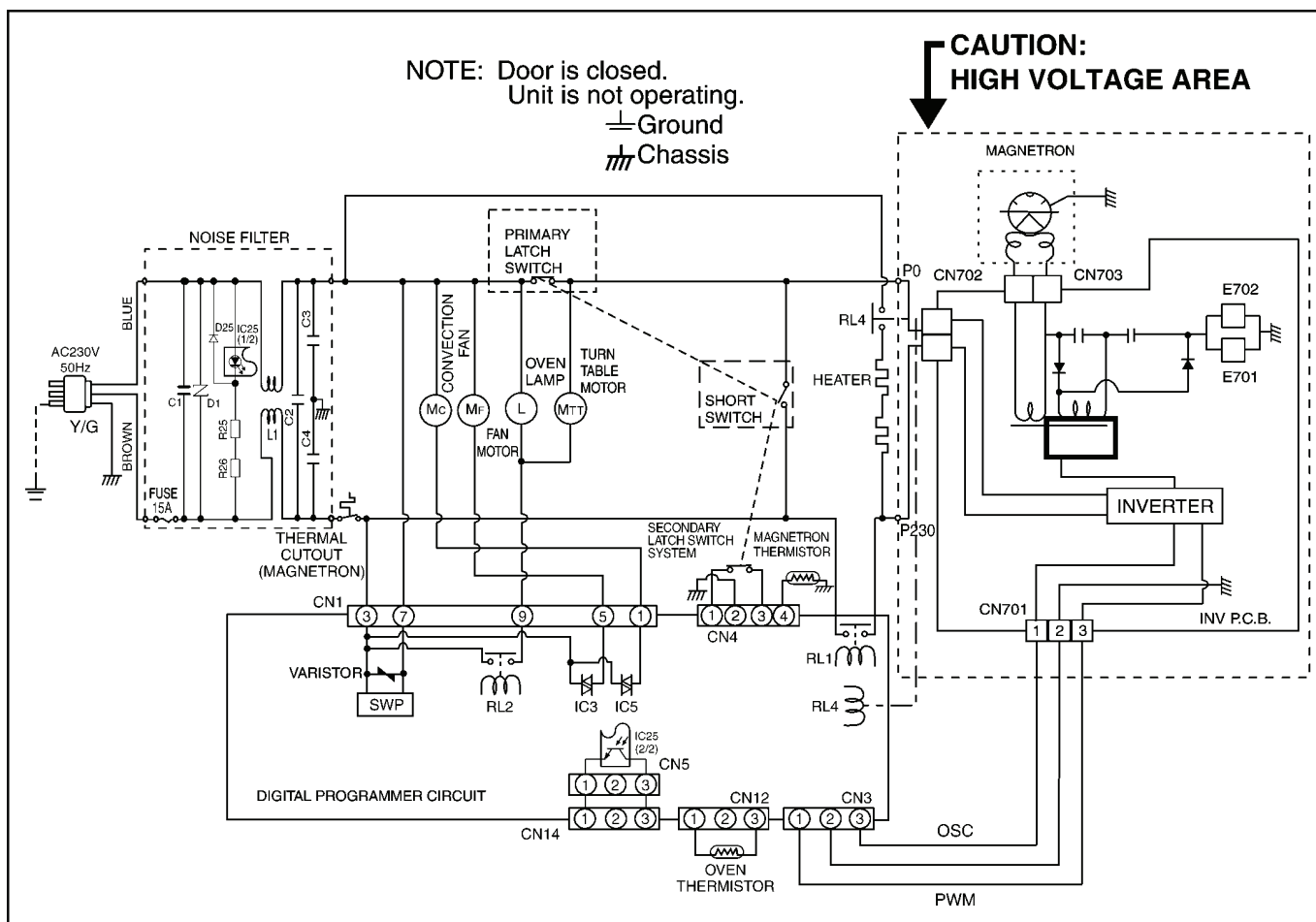
INVERTER POWER SUPPLY



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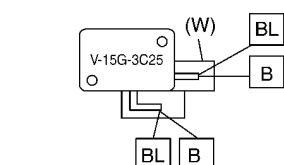
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1 SCHEMATIC DIAGRAM

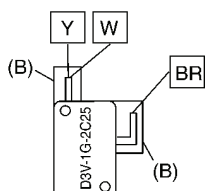


WIRING DIAGRAM

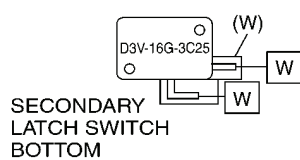
NOTE: * When replacing, check the lead wire color as shown.
*Colors shown by () indicate colors of lead wire connector housing.



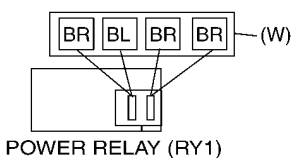
PRIMARY LATCH SWITCH TOP



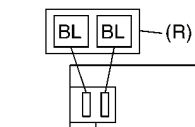
SHORT SWITCH MIDDLE



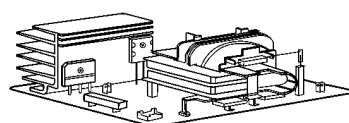
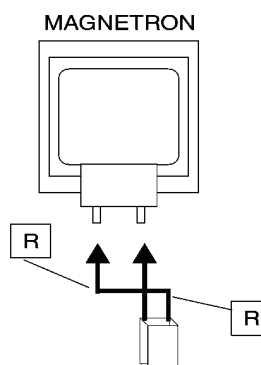
SECONDARY LATCH SWITCH BOTTOM



POWER RELAY (RY1)



POWER RELAY B (RY4)



HIGH VOLTAGE INVERTER(U)

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-BS5)

2 DESCRIPTION OF OPERATING SEQUENCE

2.1. 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(%) APPROX.	MANUAL MICROWAVE DUTY	
		ON(SEC)	OFF(SEC)
1000W	100%	22	0
270W	25%	16	6
600W	60%	22	0
440W	45%	22	0
250W	20%	15	7
100W	10%	8	14

2.2. Inverter power supply circuit

The Inverter Power Supply circuit powered from the line voltage, 230V 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 230V 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.

2.3. 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.

2.4. Thermistor

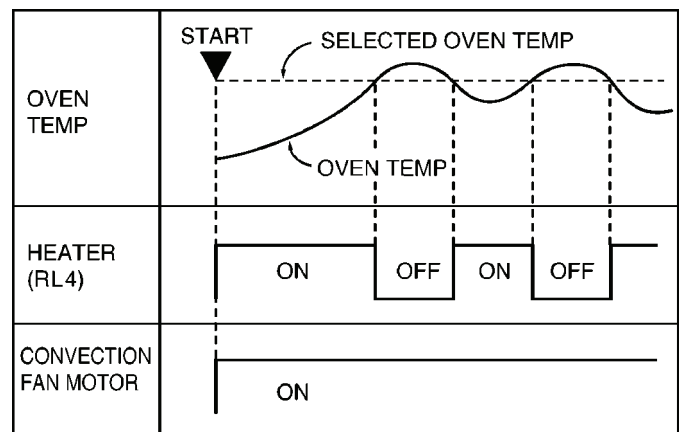
The thermistor which fixed on magnetron detects magnetron temperature and make power down when the temperature becomes abnormal high. A normal thermistor's resistance values for temperature ranges between 10-30 degree C is from 35K Ω to 110K Ω .

2.5. Convection Cooking Control

The digital programmer circuit controls the ON-OFF time of the heater in order to control oven cavity temperature.

1. After selecting desired oven cavity temperature of Convection (the range of selected oven temp is 100°C-220°C) and pressing [Start] pad, a high level out of the digital programmer circuit and is applied to coil of power relay (RL4).
2. When the contacts of power relay RL4 close, power source voltage is applied to the heater and the heater turns on.
3. When the oven temperature reaches the set temperature, the digital programmer circuit senses the temperature through oven temp sensor and stops supplying high level signal to the coil of power relay RL4 and the heater turns off.
4. After the heater turns off, the oven temperature will continue increasing a while and then decrease as shown in Figure.

When the oven temperature drops below the set temperature, the digital programmer circuit senses the signal and starts supplying high level signal to the coil of power relay again.



2.6. Grill cooking

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

1. During grill cooking, the digital programmer circuit controls power relay RL4's ON-OFF time. In all three grill cooking categories, RL4's ON-OFF time are shown in Figure.

GRILL CATEGORY	GRILL (RY4)	
	ON (sec.)	OFF (sec.)
1	33	0
2	24	9
3	18	15

3 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.

3.1. 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.

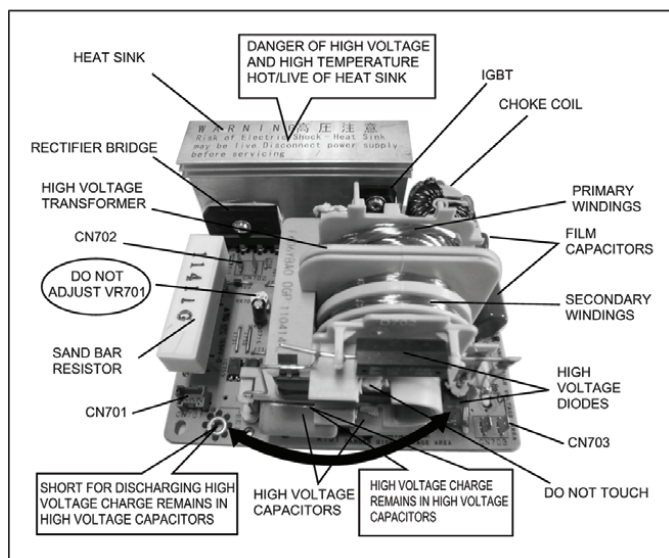
3.2. Inverter warnings

⚠ 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.

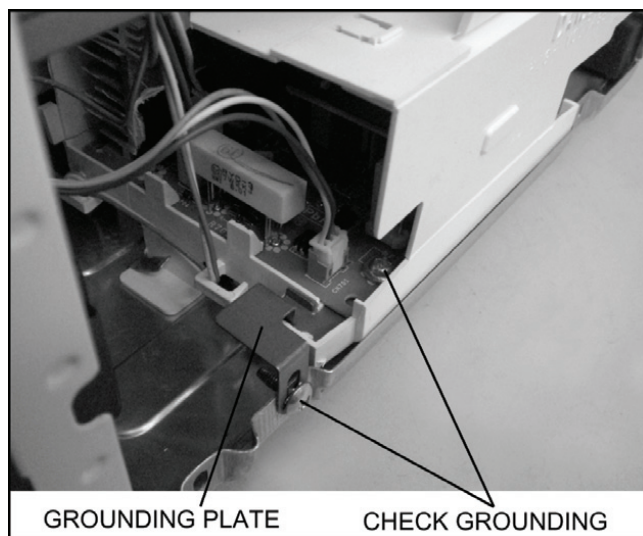
The aluminum heat sink may be HOT due to heat energy, therefore, extreme care should be taken during servicing.



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.

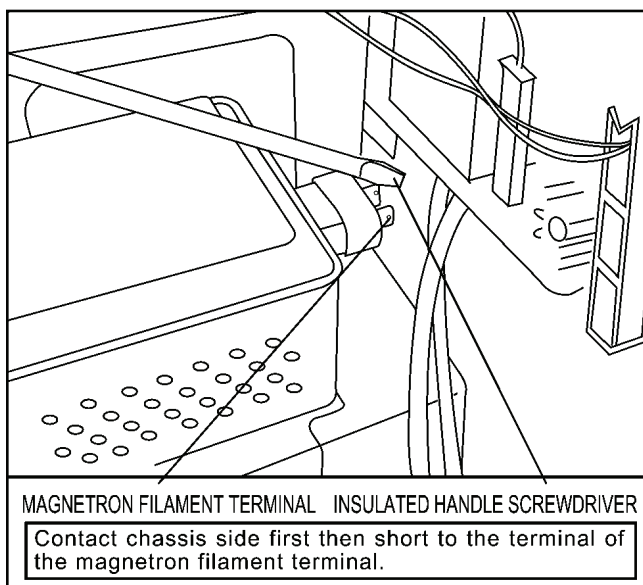


Grounding of the inverter circuit board

⚠ 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.

3.3. Part replacement.

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

3.4. When the 15A fuse is blown due to the malfunction of the short switch:

WARNING

When the 15A 250V fuse is blown due to the malfunction of the short switch, replace all of the components (primary latch 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.

3.5. 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.

3.6. 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 5mW/cm². After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.

3.7. Sharp edges

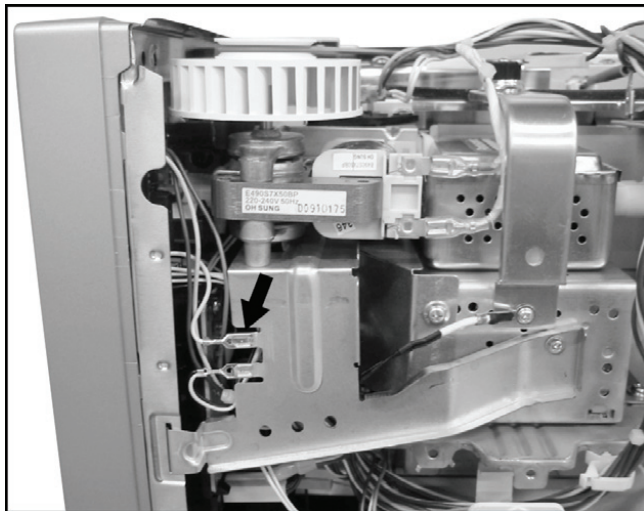
⚠ CAUTION

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.

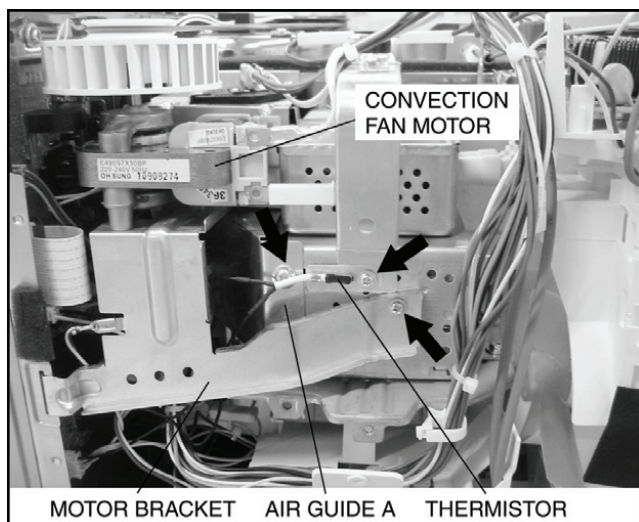
4 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

4.1. Magnetron

1. Discharge high voltage charge.
2. Disconnect 1 grounding connector.

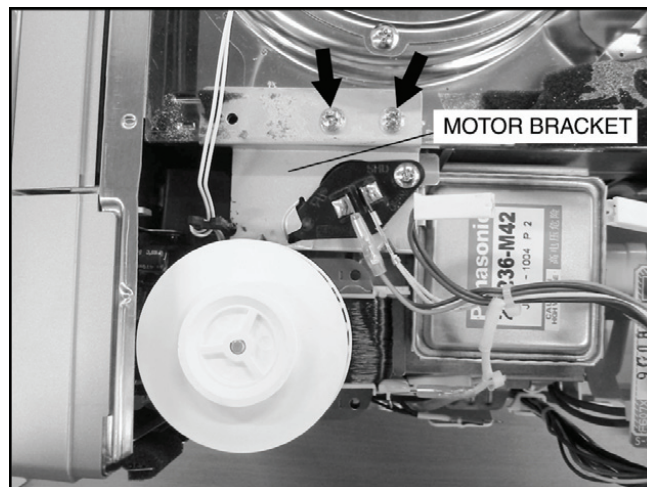


3. Remove 1 screw holding air guide A on the magnetron.



4. Remove 1 screw holding both thermistor and thermal cutout bracket on the magnetron.
5. Disconnect 2 connectors from convection fan motor terminals.
6. Remove 1 screw holding convection fan motor bracket on the magnetron.

7. Remove another 2 screws holding convection fan motor bracket on the top plate of the oven.



8. Disconnect 2 connectors from oven lamp terminals.
9. Remove convection fan motor assembly & air guide A.
10. Disconnect 2 high voltage lead wires from magnetron filament terminals.
11. 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

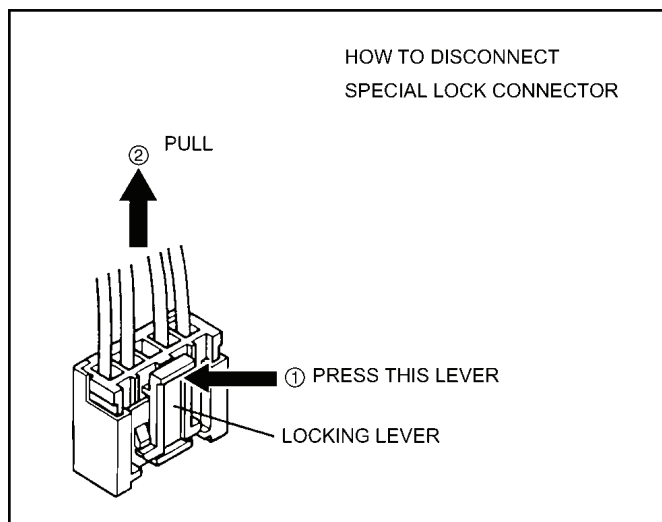
When replacing the magnetron, be sure the antenna gasket is in place.

4.2. Digital programmer circuit (D.P.C)

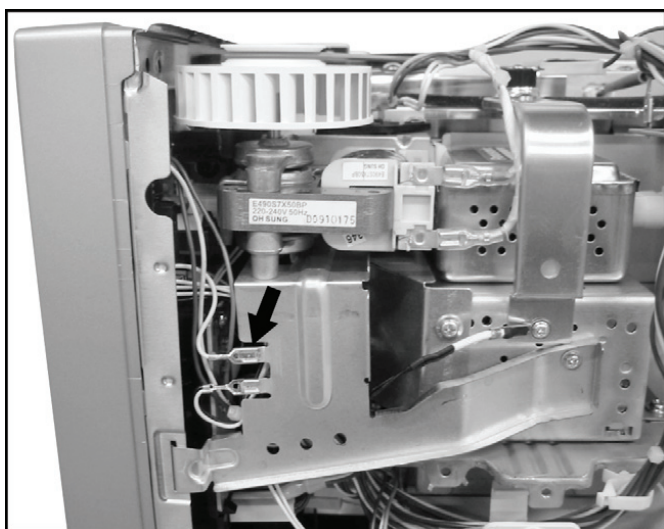
NOTE:

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 DU.

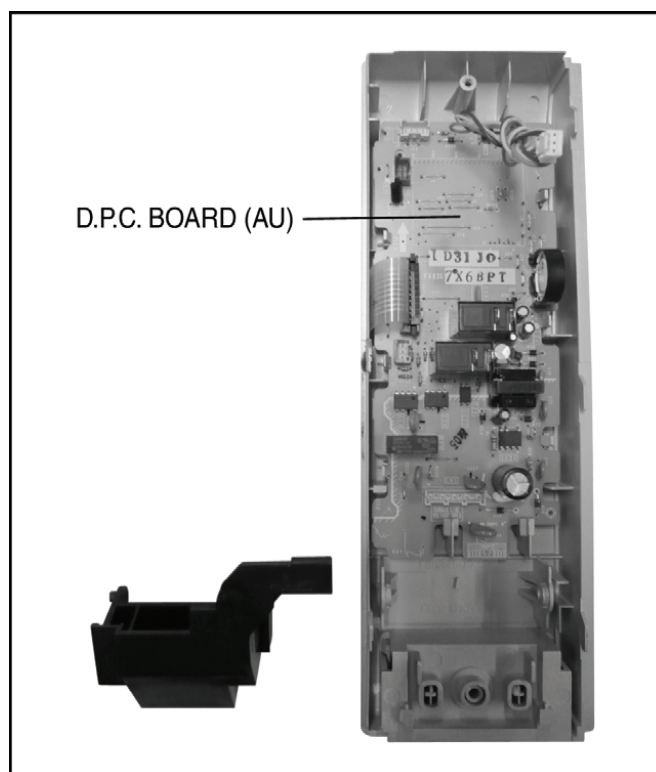


2. Disconnect 1 grounding connector.



3. Remove 1 screw holding escutcheon base and slide the escutcheon base upward slightly.

4. Remove door opening lever.



5. Disconnect flat cable CN11 from D.P.C. board AU.
6. Release catch hooks on escutcheon base to move over the D.P.C. board AU.

4.3. Low voltage transformer and/or power relays (RL1)

NOTE:

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

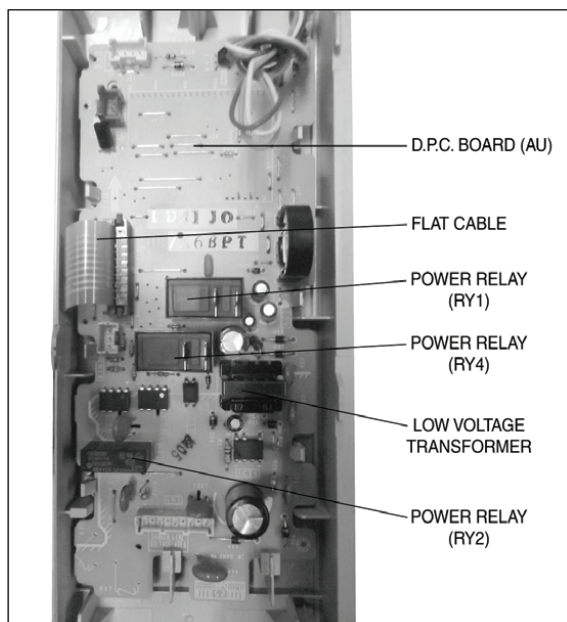
1. Replace D.P.C. board.

(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:

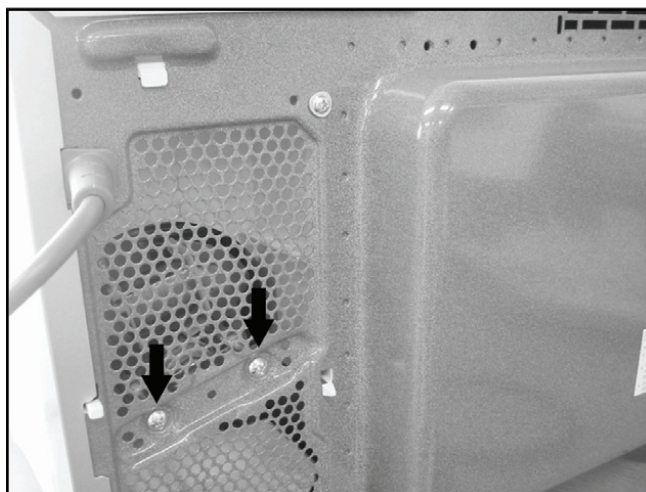
Do not use a soldering iron or desoldering tool of more than 30 watts on D.P.C. contacts.

(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.

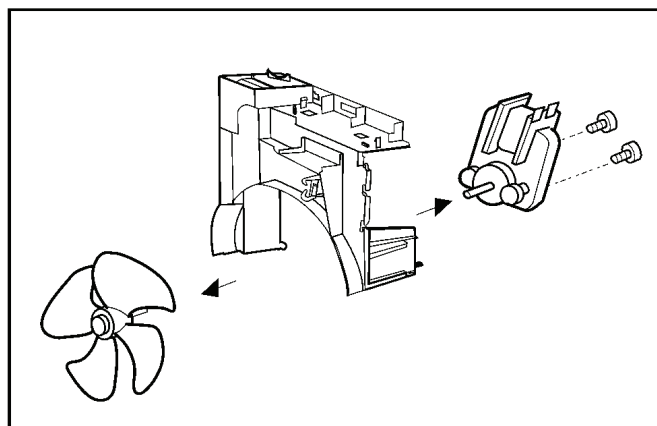


4.4. Fan motor

1. Disconnect 2 lead wires from fan motor terminals.
2. Remove 1 screw at location on oven attaching orifice assembly.
3. Remove orifice assembly from oven assembly.
4. Remove 2 screws holding fan motor to oven.



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



4.5. 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:

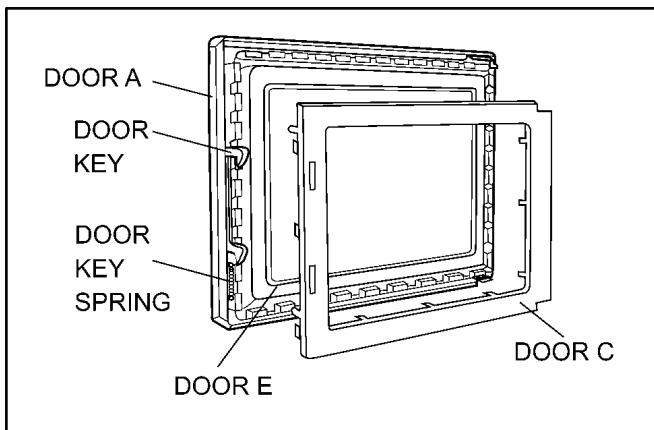
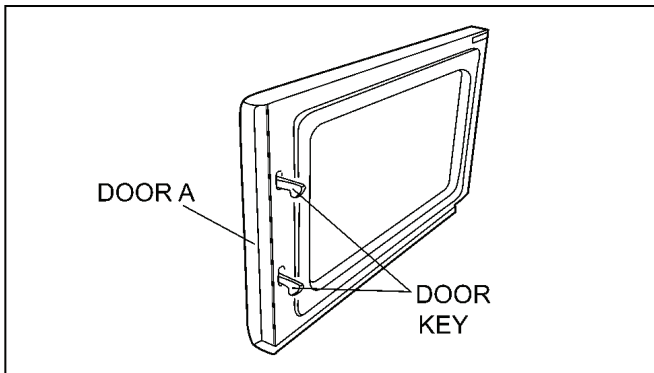
1. Place the door's lower hinge pin into the bottom hinge hole.
2. Use your left index finger to support the door's lower hinge pin while guiding the door's upper hinge pin into the top hinge hole.
3. Lower your finger to seat the door onto the hinges.
4. Replace other components.

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.

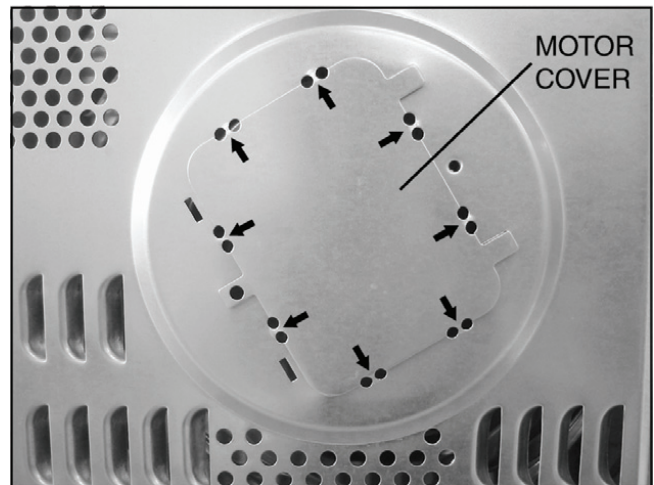
NOTE:

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



4.6. Turntable motor

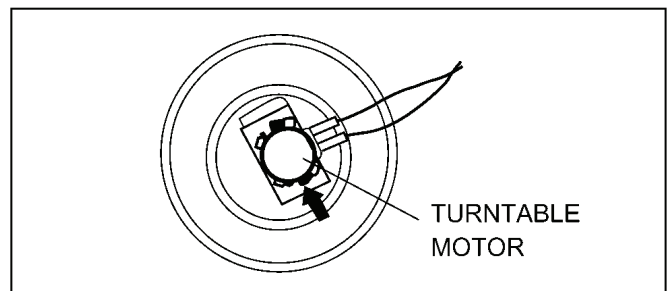
1. Remove the motor cover by breaking off at the 8 spots indicated by arrows with a cutter or the like.



⚠ 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 turntable motor.
3. Remove the turntable motor by removing screw.

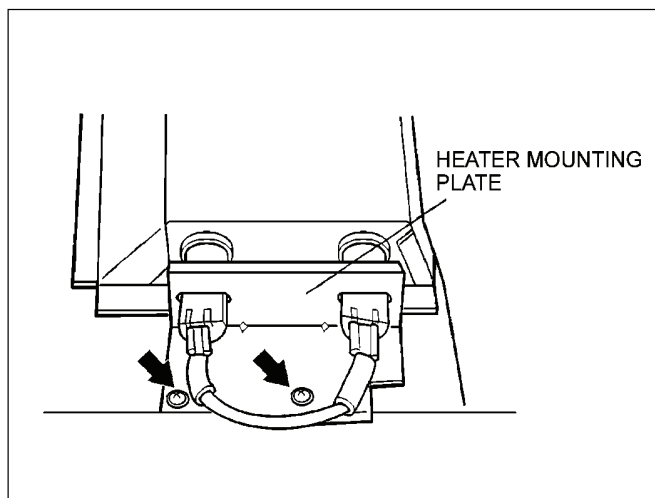


⚠ NOTE:

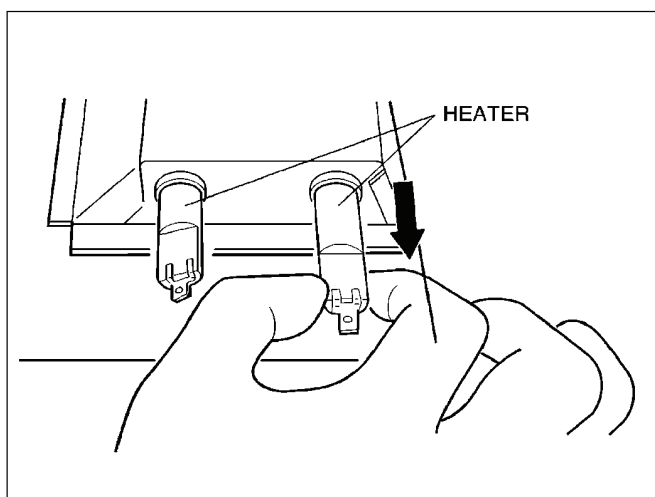
After reinstalling the new turntable motor and reconnecting the 2 lead wires, reinstall the motor cover by rotating it around 180, tucking the 2 tabs under the base in the 2 provided slots, then screw the single tab to the base using a 4mm × 6mm screw.

4.7. Quartz heater

1. Disconnect lead wires from heater terminals.
2. Remove heater fixing plate.
3. Remove 2 screws holding heater link on the heater terminals.
4. Remove 2 screws holding heater mounting plate.

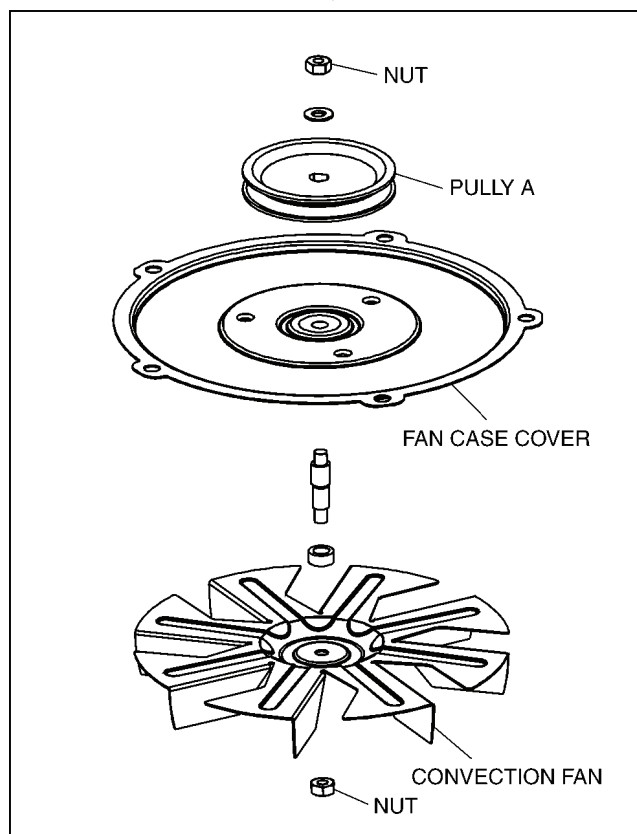
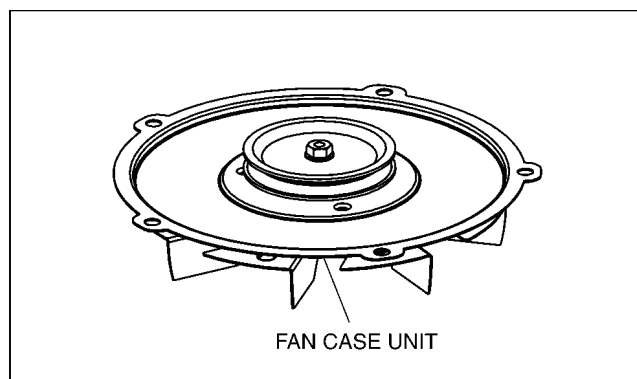
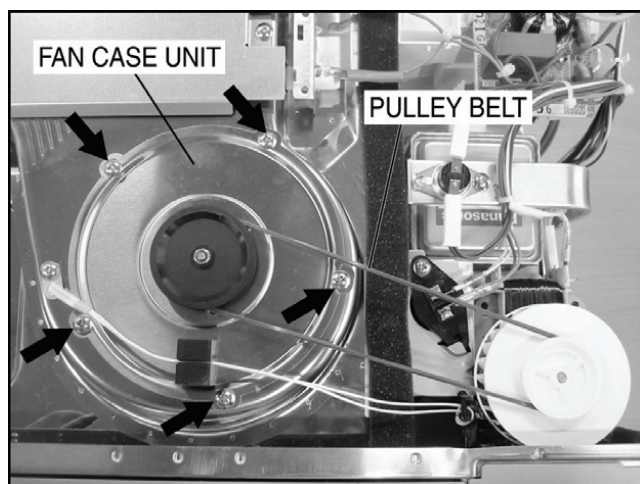


5. Remove the heater by pulling it out.



4.8. Convection fan assembly

1. Remove pulley belt.
2. Remove 5 screws holding fan case unit on the oven.



NOTE:

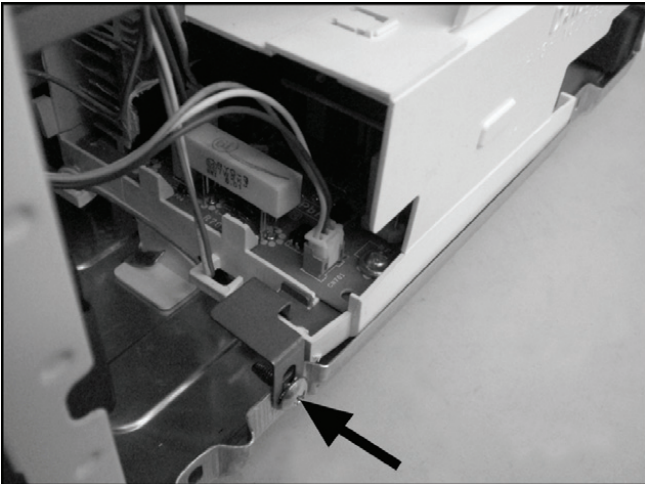
After replacement/repair of the fan case unit, tighten mounting screws properly in an x pattern.

4.9. Inverter power supply

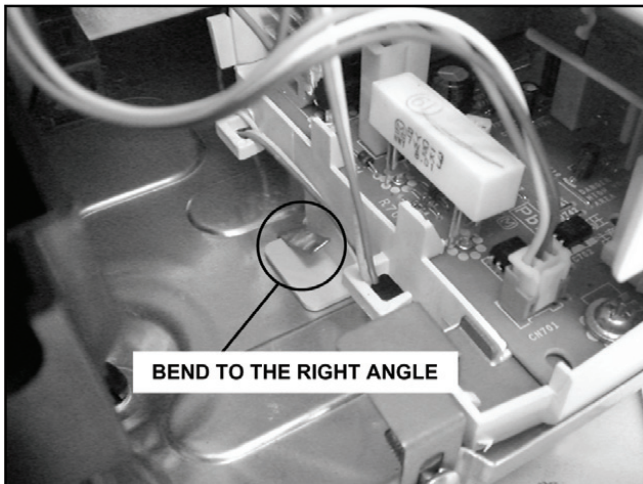
CAUTIONS

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.

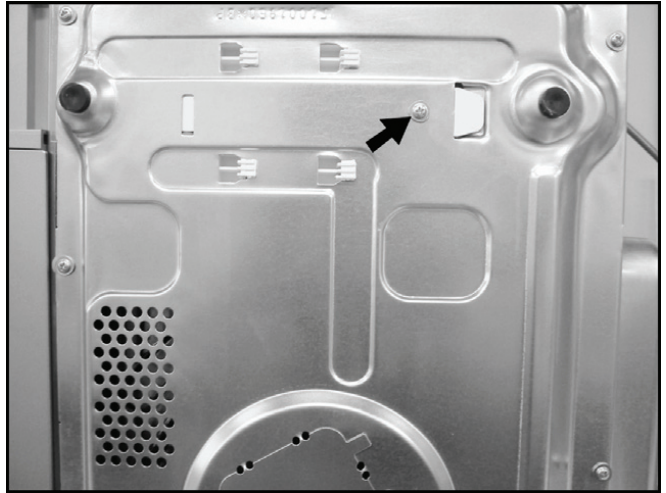
1. Discharge high voltage charge.
2. Remove the H.V.lead wire from magnetron terminals.
3. Disconnect 2 connectors from CN701 & CN702 on H.V.Inverter(U).
4. Remove 1 screw holding grounding plate to the base.



5. Bend back 1 locking metal tab on the base.



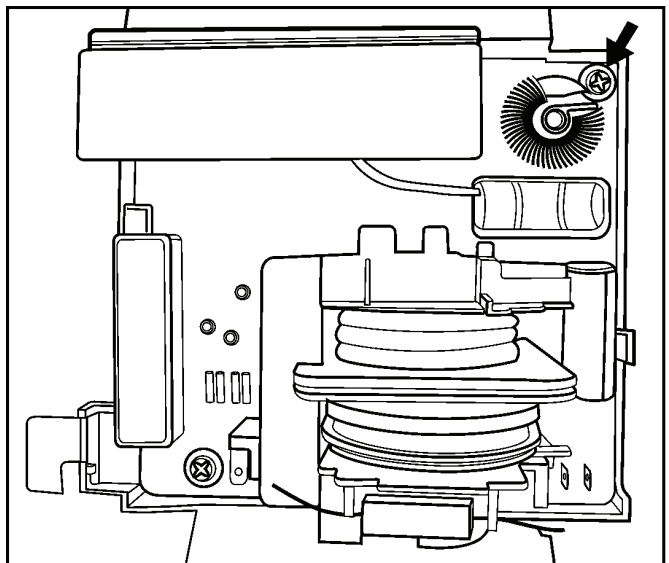
6. Remove 1 screw holding Inverter bracket on the bottom of the base.



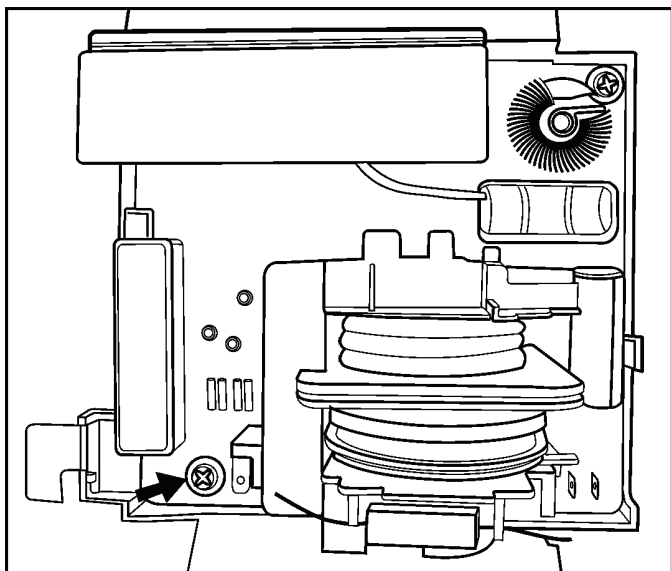
7. Slide 5 locking tabs of Inverter bracket at the bottom of the base in direction of arrows.



8. Remove 1 screw holding H.V.Inverter to Inverter bracket.



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



10. Separate H.V. Inverter from Inverter bracket by freeing 3 catch hooks on the Inverter bracket.

5 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 7).

5.1. Primary, Secondary Latch Switch interlocks & 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 Latch Switch and Secondary Latch 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 Latch Switch	0Ω (Close)	∞Ω (Open)
Secondary Latch Switch	0Ω (Close)	∞Ω (Open)
Power Relay RL1	∞Ω (Open)	∞Ω (Open)

5.2. 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.

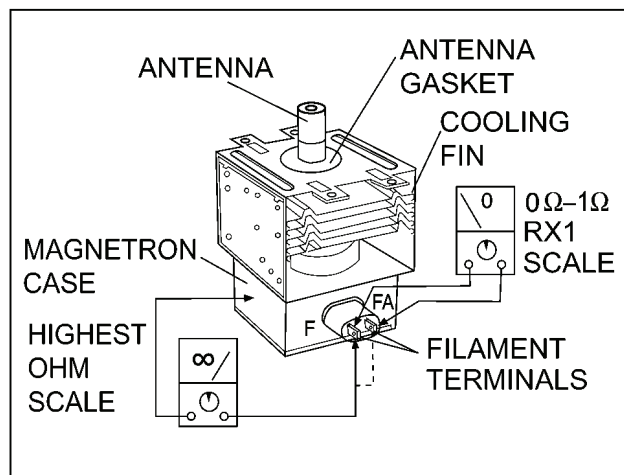
Normal continuity readings should be as follows.

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

5.3. Magnetron

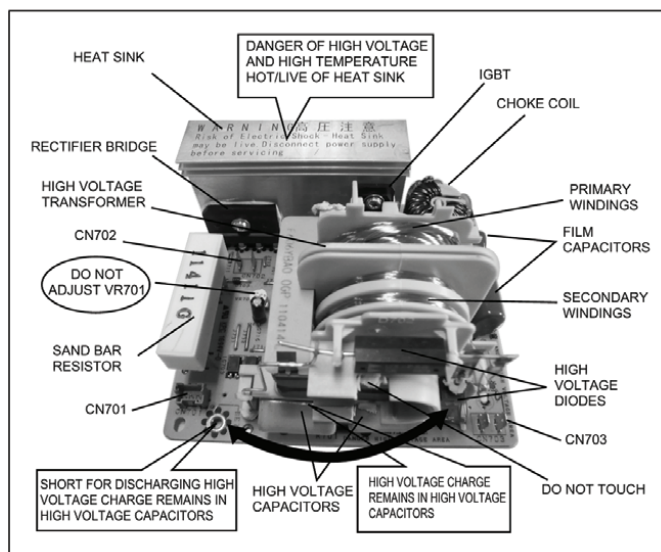
Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

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.



5.4. 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

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.
2. Place 1 liter of water load into oven cavity.
3. Plug in the oven's AC power supply cord into outlet.
4. Program DPC.
 - a. Press **Clock** pad once.
 - b. Press **Timer** pad once.
 - c. Press **Start** pad once.
 - d. Press **Micro Power** pad once.
5. Program oven at High power for 1 minute and press [Start] pad.
 - a. After approximately 23 seconds, oven stops operating.
 - b. 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

1. Unplug the oven's AC power supply cord from outlet.
2. Unplug 3 pin connector CN701. CN703 remains unplugged.
3. Plug in the oven's AC power supply cord into outlet.
4. Program DPC.
 - a. Press **Clock** pad once.
 - b. Press **Timer** pad once.
 - c. Press **Start** pad once.
 - d. Press **Micro Power** pad once.

5. Program oven at High power for 1 minute and press [Start] pad.

- a. After approximately 3 seconds, oven stops operating.
- b. During oven operation, the input current is approximately 0.4A.

	INPUT CURRENT	FAILURE CODE
Unplug CN701	≈ 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.

5.5. Temperature thermistor

These sensor monitors the heat produced by the heater circuit and maintains the magnetron temperature which user had selected. Normal room temperature 10°C to 30°C, the reading across the temperature thermistor should be from 35KΩ to 110 KΩ.

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

6 MEASUREMENTS AND ADJUSTMENTS

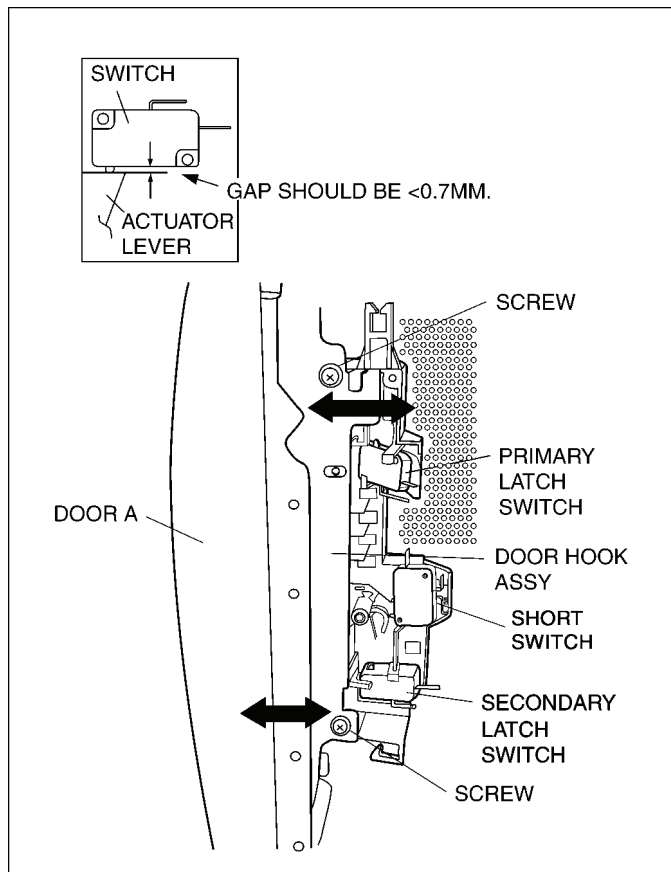
6.1. Adjustment of primary latch switch, secondary latch switch and short switch.

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

NOTE:

No specific individual adjustments during installation of the Primary latch switch, Secondary latch 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 latch 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 latch switches again by following the component test procedures.



6.2. 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

7 TROUBLESHOOTING GUIDE

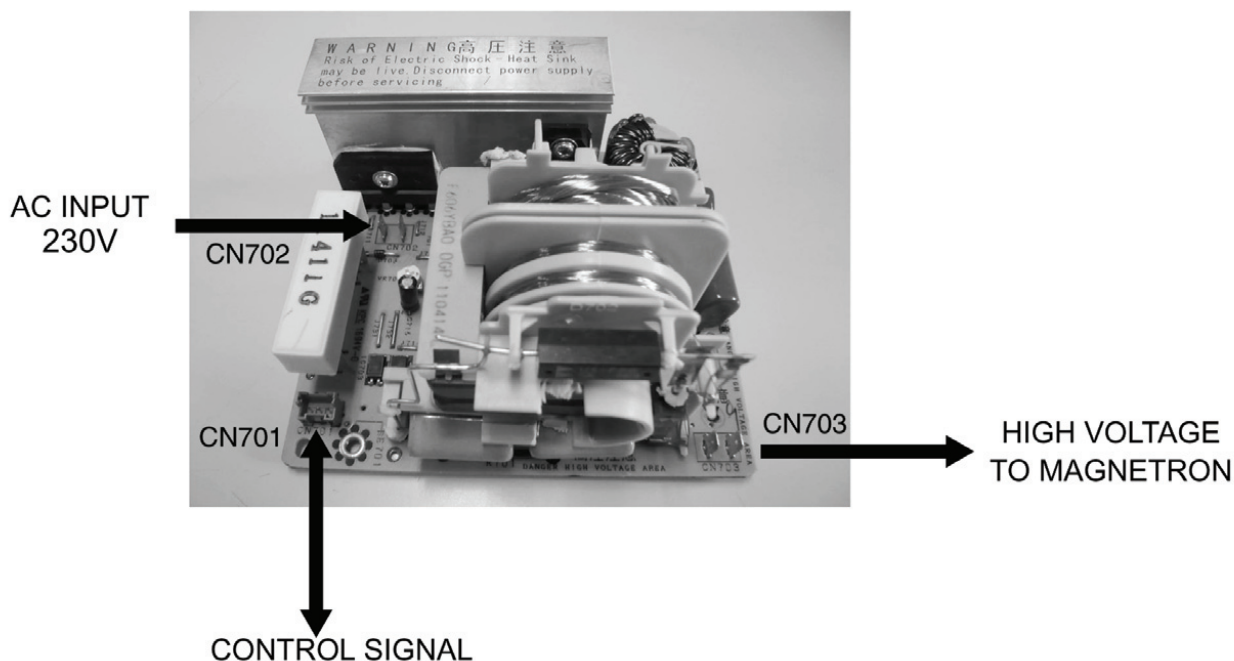
DANGER: HIGH VOLTAGES ⚠

1. **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.
2. Ensure proper grounding before troubleshooting.
3. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
4. Discharge high voltage remaining in the H.V.Inverter (U).
5. 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.
6. 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.
7. 230V 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.

7.1. (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. Latch Switch 2. Power relay RL1 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 latch mechanism is not adjusted properly	1. Align door, Door Latch Switches 2. Loose wiring connectors

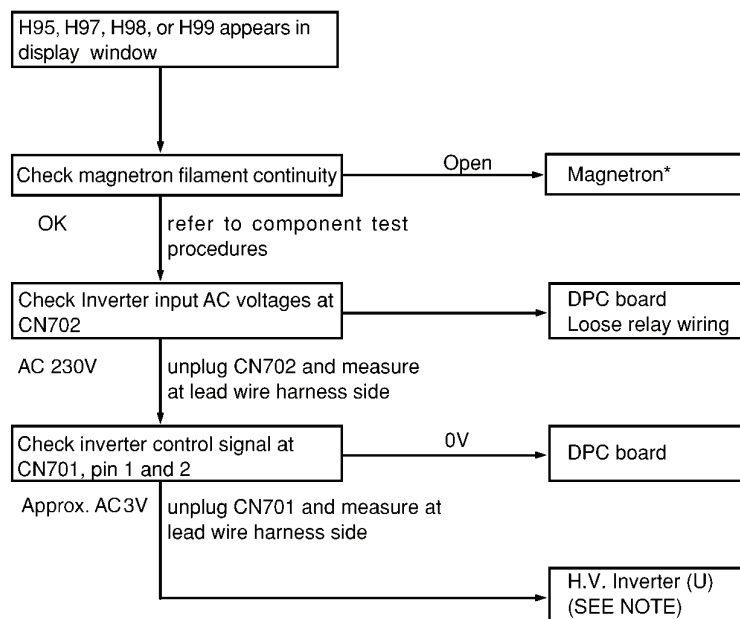


7.2. (Troubleshooting) Other problems

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness 2. Open thermal cutout / thermistor 3. Open low voltage transformer 4. Defective DPC	Check thermal cutout is defective.
2.	No display and no operation at all. Fuse is blown.	1. Shorted lead wire harness 2. Defective primary latch 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.	Check adjustment of primary, secondary latch switch and short switch including door.
3.	Oven does not accept key input (Program)	1. Key input is not in proper sequence 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 operation procedure. Refer to DPC troubleshooting.
4.	Fan motor turns on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch 3. Door switch CN4	Adjust door and latch switches.
5.	Timer starts count down but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of primary latch switch 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 4. Open or loose wiring of power relay RL1 5. Defective primary latch switch 6. Defective DPC or power relay RL1	Adjust door and latch switches. Check high voltage component according to component test procedure and replace if it is defective. Refer to DPC troubleshooting
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary latch switch 2. Off-alignment of secondary latch switch 3. Defective secondary latch switch	
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit.(Intermittent oscillation) 3. Aging change of magnetron	Consult electrician
8.	Fan motor turns on and turntable 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.	Heater does not turn on.	1. Open or loose wiring of heater 2. Defective heater 3. Defective power relay 4. Defective DPC	
12.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary latch switch 2. Operation of thermal cutout	Adjust door and latch switches.

7.3. 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 **[Clock]** pad once → press **[Timer]** pad once → 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.



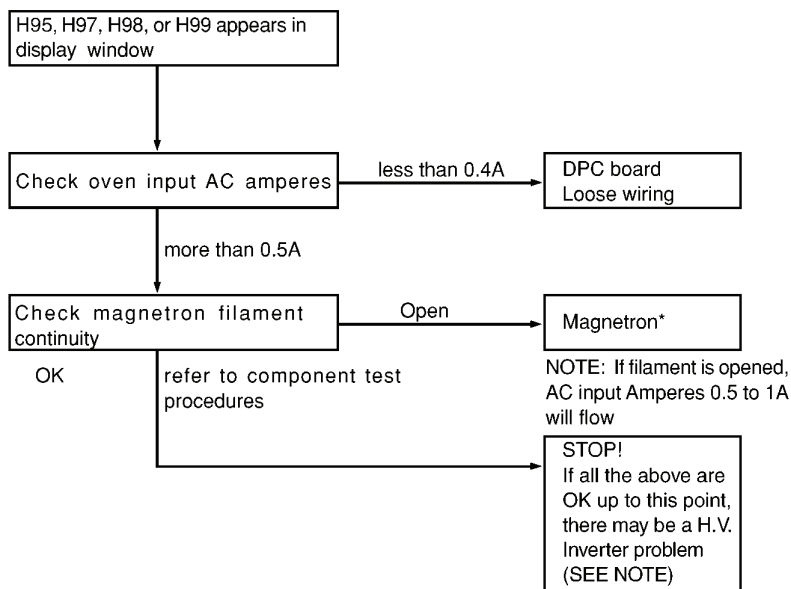
⚠ WARNING: DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET CONTROL on the board. It is very dangerous to repair or adjust without proper test equipment because this circuit generates very high voltage and very large current. Off alignment of inverter board operation 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.

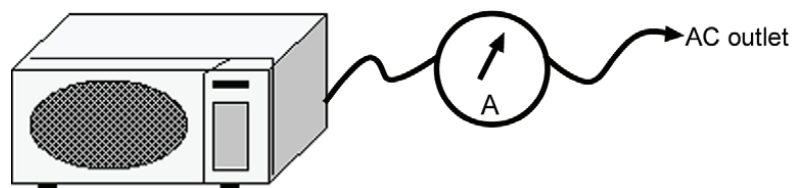
7.4. Simple way of H.V. Inverter/magnetron troubleshooting

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.

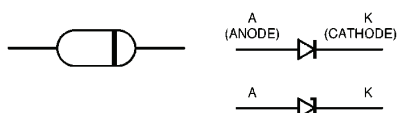
Note:

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	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 (Z606YBH20GP)
		2. D702 is OK	Replace magnetron
Shut off in 3 seconds after "Start"	1. Less than 0.5A	Check open circuit: Latch Switch, DPC, Power Relay and CN701	Replace defective component(s), or correct switch, cables and connectors.

7.5. How to check the semiconductors using an OHM meter

Diode



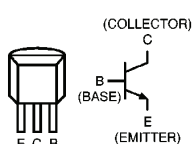
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC.....

2SD.....

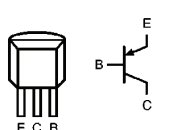


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

2SA.....

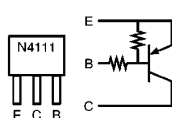
2SB.....



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

Digital Transistor

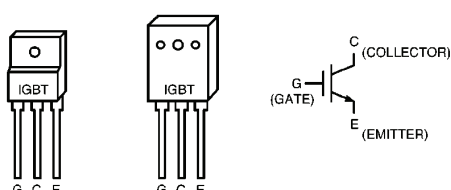
PNP Transistor



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

IGBT

(INSULATED GATE BIPOLAR TRANSISTOR)



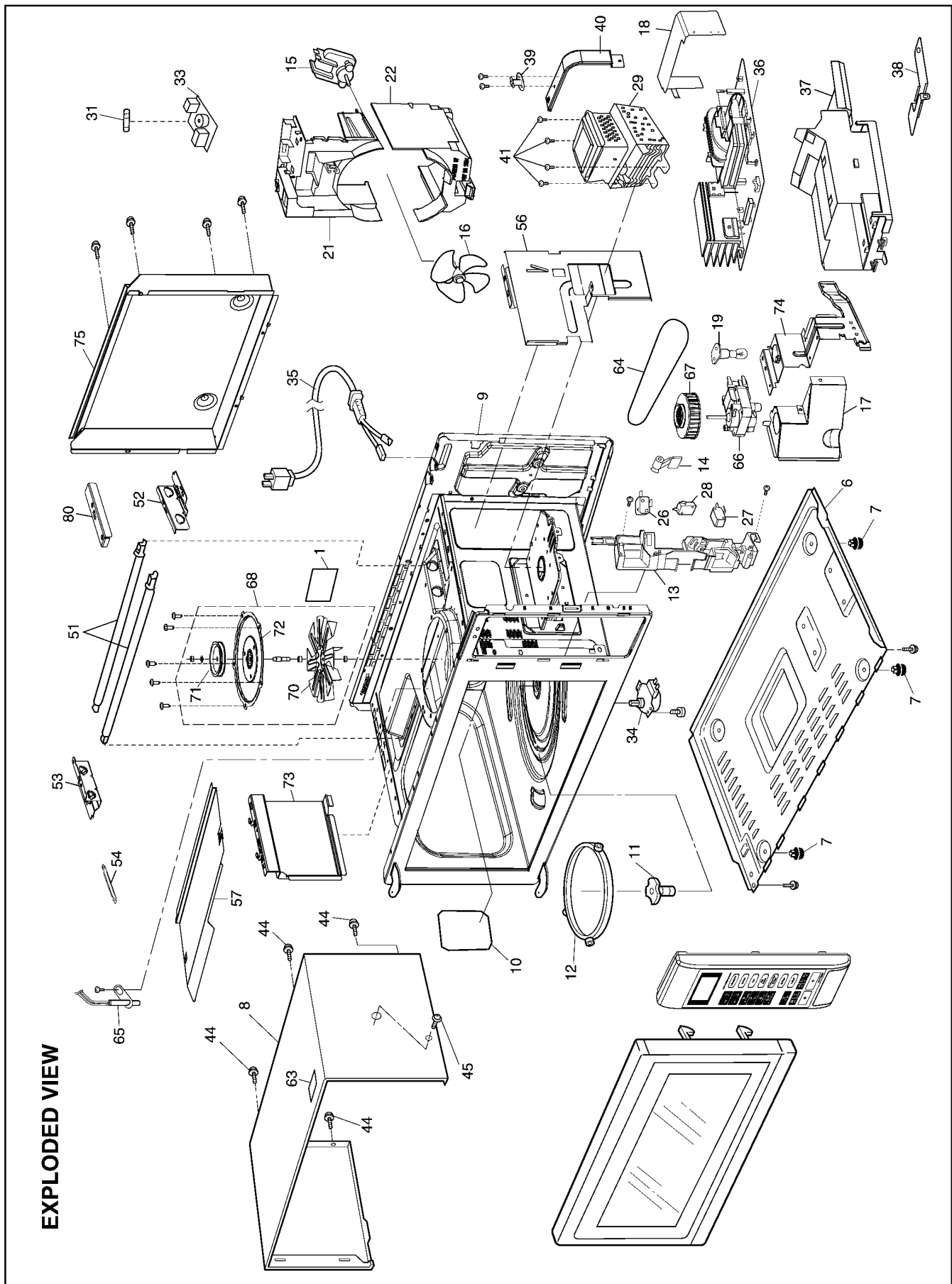
	FORWARD	REVERSE
E-C	SMALL	∞
E-G	∞	∞
C-G	∞	∞

7.6. H.V. INVERTER MAIN PARTS LIST (Z606YBH20GP)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
Q701	Z1JAEV000003	IGBT	1	
C701	ZCWHC3B104JA	FILM CAPACITOR	1	0.1 μ F, 1000VDC
C702	ZCWF4305N851	FILM CAPACITOR	1	3 μ F, 250VDC
DB701	Z0FBBQ000006	RECTIFIER BRIDGE	1	
L701	Z5020W100AP	CHOKE COIL	1	
R702	Z0CM562JA002	SAND BAR RESISTOR	1	5.6K Ω , 15W
T701	Z609ABA00GP	TRANSFORMER	1	(INCLUDING D701, D702, C706, C707)
D701, D702	Z0FBAZ000006	DIODE	2	
C706	Z0C3F562A002	FILM CAPACITOR	1	5600PF/3KV
C707	Z0C3F822A002	FILM CAPACITOR	1	8200PF/3KV

8 EXPLODED VIEW AND PARTS LIST

8.1. EXPLODED VIEW



8.2. 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:

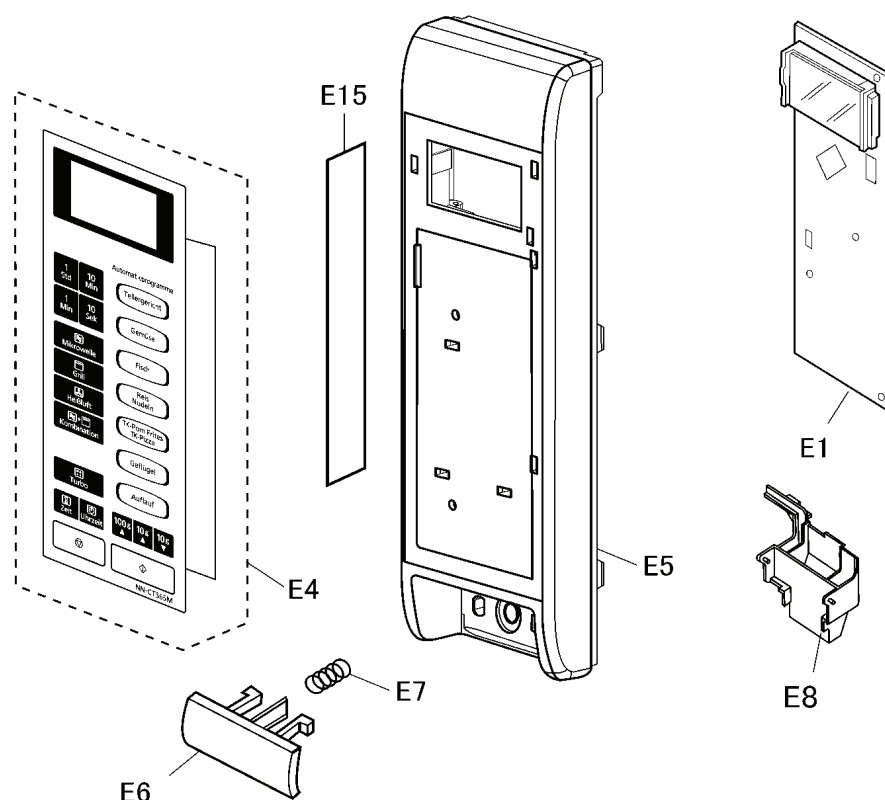
Components identified by \triangle mark have special characteristics important for safety.

When replacing any of these components, use only manufacture's specified parts.

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
1		Z00069000EP	CAUTION LABEL	1	
6		Z10017X50BP	BASE	1	
7		Z10084T00APS	RUBBER FOOT	4	
8		Z1009BS20SBP	CABINET BODY	1	
9	\triangle	Z200ABS20BP	OVEN	1	
10		Z20556W50XP	COVER	1	
11		Z21317X50BP	PULLY SHAFT	1	
12		Z290D7X50BP	ROLLER RING (U)	1	
13	\triangle	Z30205Q00AP	DOOR HOOK	1	
14		Z31365Q00AP	HOOK LEVER A	1	
15		Z400A5U00XN	FAN MOTOR	1	
16		Z40085G10XN	FAN BLADE	1	
17		Z40257X50BP	AIR GUIDE A	1	
18		Z40425Q00APG	AIR GUIDE F	1	
19		Z612E7X50BP	INCANDESCENT LAMP (U)	1	
21		Z41445Q00AP	UPPER ORIFICE	1	
22		Z41467X50BP	LOWER ORIFICE	1	
26	\triangle	Z61425U30XN	MICRO SWITCH	1	(PRIMARY LATCH SWITCH)
27	\triangle	Z61415U30XN	MICRO SWITCH	1	(SECONDARY LATCH SWITCH)
28	\triangle	Z61785U30XN	MICRO SWITCH	1	(SHORT SWITCH)
29	\triangle	Z2M236-M42JP	MAGNETRON	1	
31	\triangle	Z62309V60AP	FUSE	1	(15A)
33		Z607XBS30EP	NOISE FILTER (U)	1	
34		Z6326BS20BP	TURNTABLE MOTOR	1	
35	\triangle	Z900C8W00EP	AC CORD W/PLUG	1	
36		Z606YBH20GP	H.V. INVERTER (U)	1	
37		Z65857X50BP	INVERTER BRACKET	1	
38		Z66626H60AP	GROUNDING PLATE	1	
39		Z61457X50BP	THERMAL CUTOFF	1	
40		Z66267X50BP	THERMAL CUTOFF BRACKET	1	
41		ZTWFL4+12T	SCREW	4	FOR MAGNETRON
44		ZTWFA4+12D	SCREW	4	FOR CABINET BODY
45		ZTCAFL4+12AFS	SCREW	1	FOR CABINET BODY SIDE
51		Z630GBS30EP	HEATER (AU)	2	
52		Z64607X50BP	HEATER MOUNTING PLATE	1	
53		Z64607X60BP	HEATER MOUNTING PLATE	1	
54		Z64217X50BP	HEATER LINK	1	
56		Z22367X50BP	RIGHT HAND HEATER PANEL	1	
57		Z22177X50BP	INSULATION PLATE	1	
63		Z0150BH20BP	NO TOUCHING LABEL	1	
64		Z40606660QP	PULLEY BELT	1	
65		Z605A7X50BP	THERMISTOR U	1	OVEN THERMISTOR
66		Z490SBS20BP	CONVECTION FAN MOTOR	1	
67		Z40087X50BP	PULLEY B	1	
68		Z402L7X50BP	FAN CASE UNIT	1	
70		Z22397X50BP	CONVECTION FAN	1	
71		Z41327X50BP	PULLEY A	1	
72		Z22787X50BP	FAN CASE COVER	1	
73		Z41457X50BP	LEFT AIR GUIDE	1	
74		Z41807X50BP	MOTOR BRACKET	1	

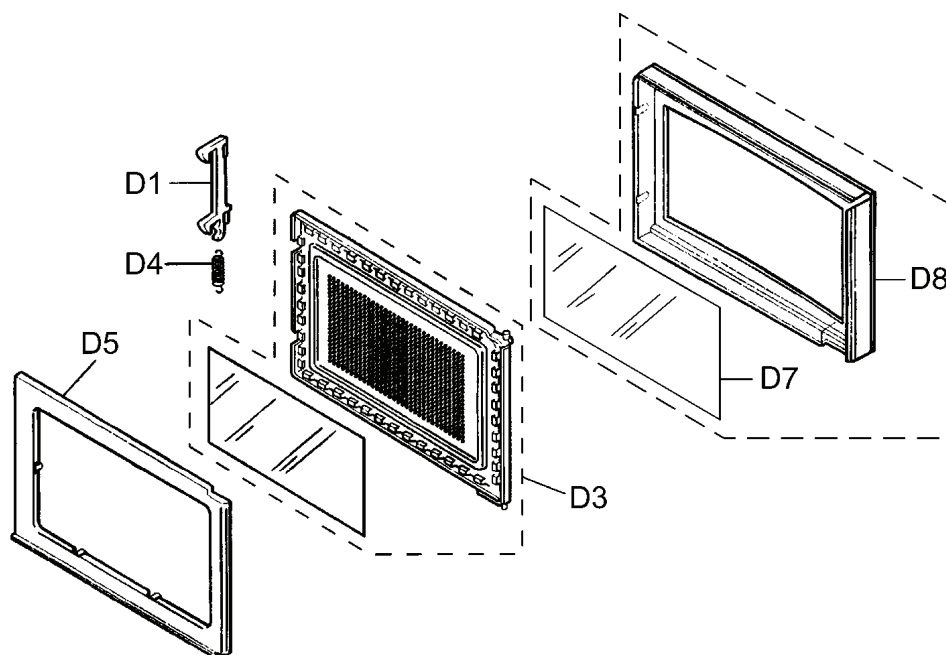
Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
75		Z10587X50BP	REAR COVER	1	
80		Z64619X10BP	HEATER FIXING PLATE	1	

8.3. ESCUTCHEON BASE ASSEMBLY



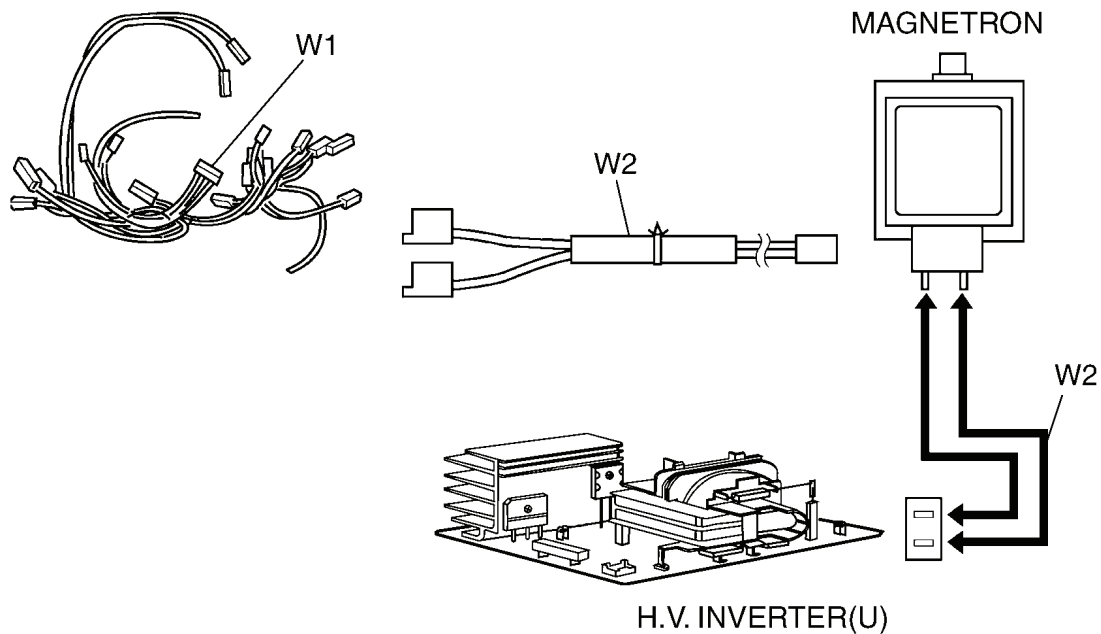
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E1	Z603LBS20GP	D.P. CIRCUIT (AU)	1	
E4	Z630YBS50SGP	MEMBRANE SWITCH (U)	1	
E5	Z80345Q00SBP	ESCUTCHEON BASE	1	
E6	Z80725Q00SAP	DOOR OPENING BUTTON	1	
E7	Z80375K00AP	COOK BUTTON SPRING	1	
E8	Z82565Q00AP	DOOR OPENING LEVER	1	
E15	Z0007BS50SGP	NAME PLATE	1	

8.4. DOOR ASSEMBLY



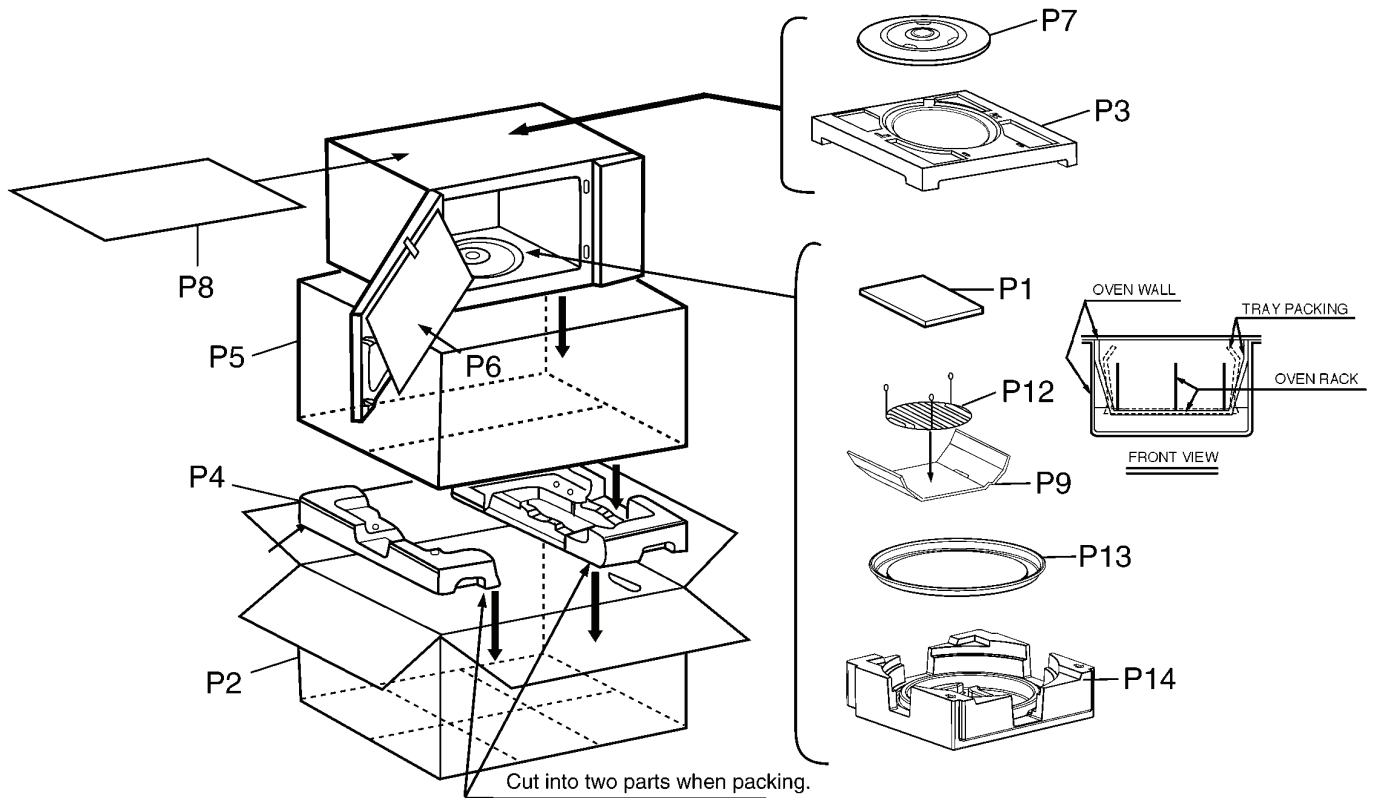
Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
D1		Z30185Q00AP	DOOR KEY A	1	
D3	⚠	Z301P5R00XP	DOOR E (U)	1	
D4		Z30215G10XN	DOOR KEY SPRING	1	
D5	⚠	Z30855Q00AP	DOOR C	1	
D7		Z3146BS50GP	DOOR SCREEN B	1	
D8	⚠	Z3001BS20SBP	DOOR A	1	

8.5. WIRING MATERIALS



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	Z030ABS10BP	LEAD WIRE HARNESS	1	
W2	Z030E6W50XP	H.V. LEAD WIRE	1	
W3	Z030FBS30EP	LEAD WIRE HARNESS U	1	(INCLUDING MAGNETRON THERMISTOR)

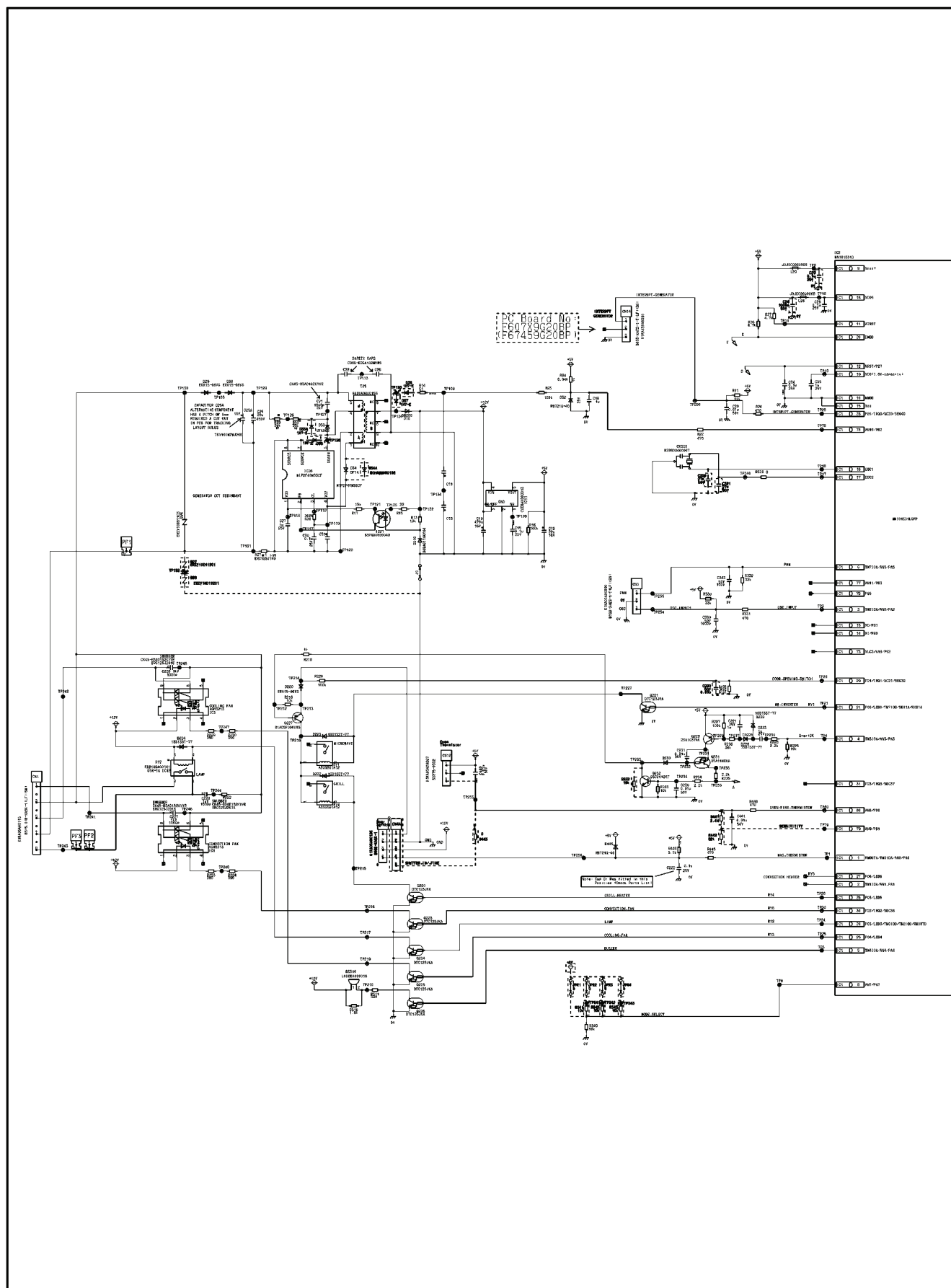
8.6. PACKING AND ACCESSORIES

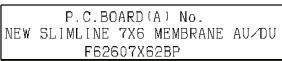


Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	Z0003BS50GP	OPERATING INSTRUCTION	1	
P2	Z0102BS50SGP	PACKING CASE, PAPER	1	
P3	Z01047X50BP	UPPER FILLER	1	
P4	Z01057X50BP	LOWER FILLER	1	
P5	Z01067F00AP	P.E.BAG	1	
P6	Z01078J00XN	DOOR SHEET	1	
P7	Z06015Q00AP	COOKING TRAY	1	
P8	Z01099Y00AP	SHEET	1	
P9	Z01087X60BP	RACK PACKING	1	
P12	Z060V7X50BP	WIRE RACK	1	
P13	Z06017X50BP	METAL TRAY	1	
P14	Z01137X60BP	METAL TRAY FOAM	1	

9 DIGITAL PROGRAMMER CIRCUIT

9.1. SCHEMATIC DIAGRAM





P.C.B. AU	JPR1	JPR2	JPR3
F603LBS20BP	OPEN	OPEN	OPEN
F603LBS20GP	OPEN	OPEN	OPEN
F603LBS50PT	OPEN	OPEN	OPEN