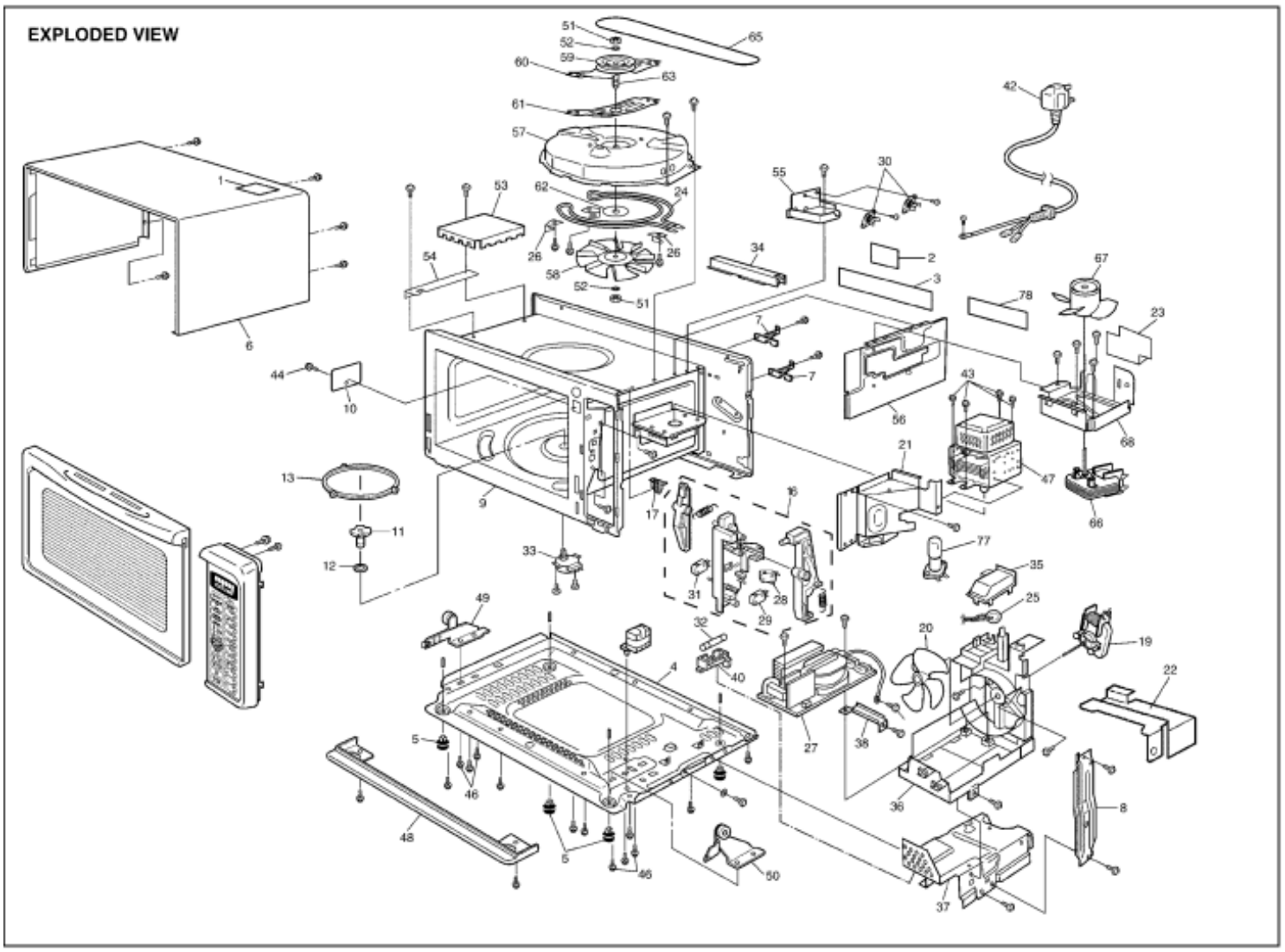
EXPLODED VIEW

ORDER NO.PHAMOS0812052C3

Service Manual

Microwave Oven

Model No. **NN-C784MF**

TUE (India)

Specification

Model		NN-C784MF
Power Source:		220V AC Single Phase, 50Hz
Power Consumption:	Microwave	1260W
	Heater	1550W
Output:	Microwave	1000W
	Heater	1515W
Microwave Frequency:		2450MHz
Timer:		30min(HIGH)/99min.59sec
Outside Dimensions:		400mm(D) x 520mm(W) x 312mm(H)
Oven Cavity Dimensions:		373mm(D) x 373mm(W) x 206mm(H)
Weight:		15.5kg
PbF		This product with PbF
Specifications subject to change without notice.		

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⚠ 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 orginal 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.

TUE ..... For India

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)

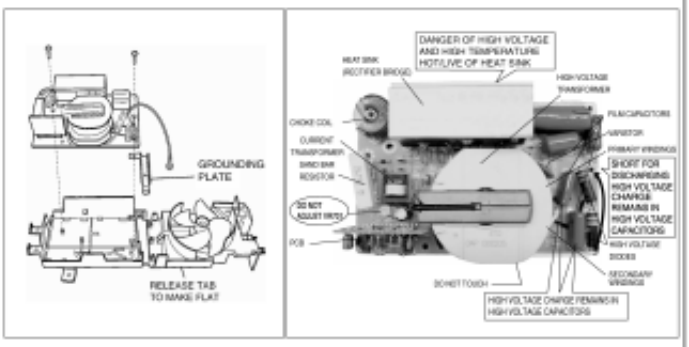
INVERTER WARNING

This Inverter board looks like a regular PCB. However, this PCB drives the magnetron tube with extremely high voltage and high current. NEW H.V.

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 SCHEMATIC DIAGRAM

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.)
HIGH	100%	22	0
MEDIUM-HIGH	70%	22	0
MEDIUM	55%	22	0
MEDIUM-LOW	30%	15	7
LOW	10%	8	14
DEFROST	30%	16	6

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 ofthe 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 button is tapped:

1. The digital programer 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	14min. 36sec.

2.4 Sensor cooking

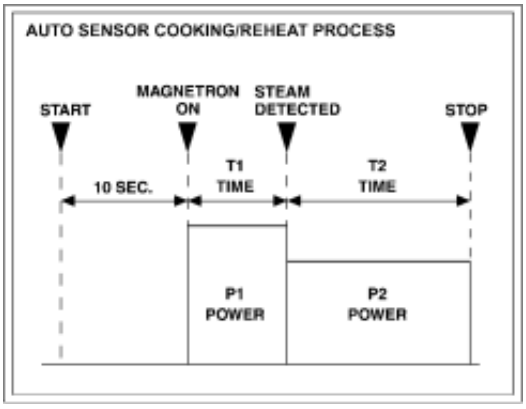
Auto sensor cooking without setting a power level or selecting a time. All that is necessary is to select an Auto Sensor Program before starting to cook.

Understanding Auto Sensor Cooking

As the food cooks, a certain amount of steam is produced. If the food is covered, this steam builds up and eventually escapes from the container. In Auto Sensor Cooking, a carefully designed instrument, called the steam sensor element, senses this escape of steam. Then, based upon the Auto Sensor Program selected, the unit will automatically determine the correct power level and the proper length of time it will take to cook the food.

NOTE:

Auto Sensor Cooking is successful with the foods and recipes found in the Auto Sensor Cooking Guide. Because of the vast differences in food composition, items not mentioned in the Cooking Guide should be prepared in the microwave oven using power select and time features. Please consult Variable Power Microwave Cookbook for procedures.



Explanation of the Auto Sensor Cooking process

1. During the first 10 second period there is no microwave activity. When calculating the T2 time by using the formula below make sure this 10 seconds is subtracted from the T1 time. In other words, T1 time starts at the end of the 10 second period.
2. **T1 time** The total amount of time it takes the microwave oven to switch to T2 time after the 10second period.
3. **T2 time** When the steam escapes from the cooking container placed in the oven, the steam sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.

Balance of cooking time (T2 time)

The balance of cooking time which is called T2 time, can be calculated by the following formula.
T2 time (in sec.) = T1 time X K factor

NOTE:

Remember, the T1 time starts after the 10 second period. The coefficient K is programmed into the microprocessor memory and they are listed in the following tables along with the P1 and P2 powers.

NOTE:

When "More" or "Less" pad is selected, the K factor varies resulting in T2 time to be increased or decreased.

Example of calculating the T2 time

Example 1: If the T1 time is measured to be 2 minutes and 40 seconds after the 10 second period, and the Auto program selected is Oatmeal:

T2 = T1 × K

= 2 min. and 40 sec. × 0.1

= 160sec. × 0.1

= 16 sec.

Category	P1 Power	P2 Power	K Factor Standard
Frozen Vegetables	MEDIUM-HIGH	LOW	0.1

2.5 Sensor reheat

Auto Sensor Reheat is a quick and easy way to reheat refrigerated and room temperature foods.
Simply press the reheat pad. There is no need to select power level and cooking time.

NOTE:

The Auto Sensor Reheat process is same as Auto Sensor Cooking process.

Category	P1 Power	P2 Power	K Factor Standard
Sensor Reheat	HIGH	MEDIUM-HIGH	0.2

2.6 Steam sensor and digital programmer circuit

In order to determine if the steam sensor function of the digital programmer circuit is working, do the following test.

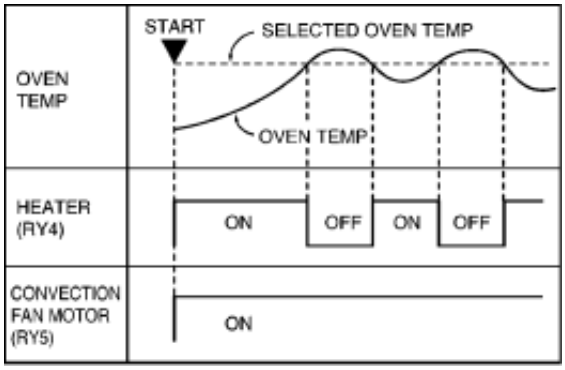
1. Place a water load (150 cc) in the oven.
2. Tap Sensor Reheat pad.
3. Tap Start pad.
4. Steam Sensor detects steam about 1.5 to 4 minutes after the Start pad is tapped.
5. T1 time cooking automatically switches to remaining time for cooking (T2).
6. The remaining cooking time (T2) appears in display window. If the following cooking time appears, Steam Sensor function is normal.

T1 TIME	T2 TIME (Remainingcooking time)
1 Min. 30 Sec. ~ 4 Min.	27 Sec. ~ 1Min.12 Sec.

2.7 Convection Cooking Control

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

1. After the [Start] pad is tapped with the desired Bake/Broil program set, an 12V DC singal comes out of the digital programmer circuit and is applied to coil of power relay (RY4).
2. When the contacts of power relay RY4 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 and 12V DC signal to the coil of power relay RY4 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 an 12V DC signal to the coil of power relay again.



2.8 Combination Cooking

Combination cooking is accomplished by microwave and convection cooking being done alternately during one combination cooking cycle. One combination cooking cycle is 22 seconds.

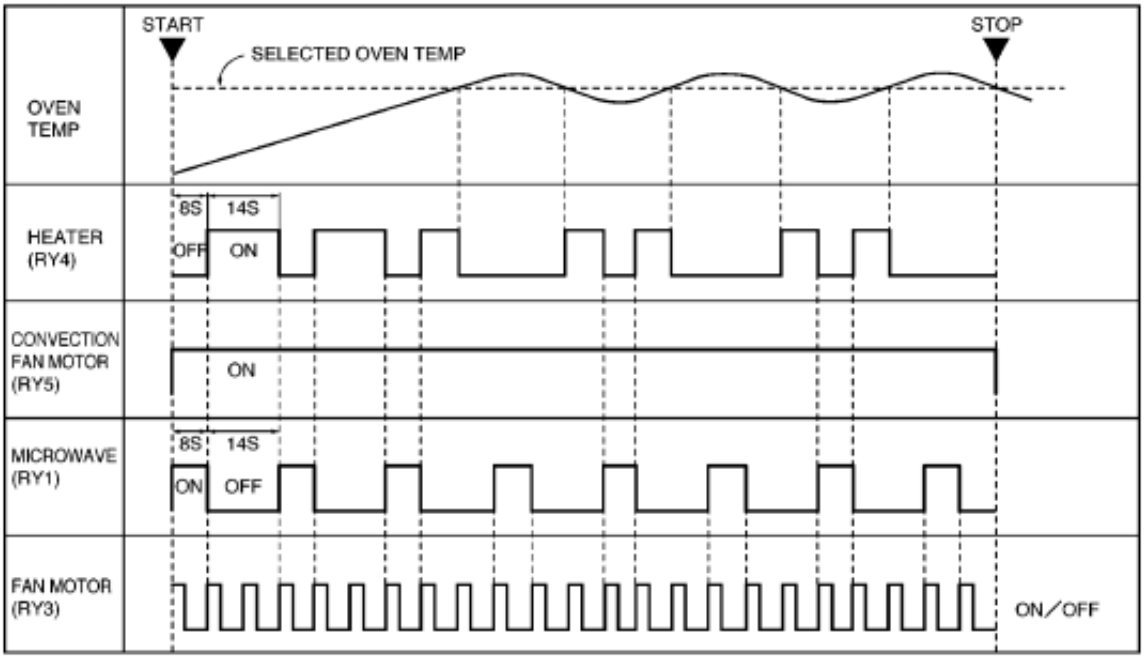
1. During combination cooking, the digital programmer circuit controls ON-OFF time of both power relay RY1 and RY4 as shown in Figure.
2. When the power relay 1 (RY1) is turned on, heater turns off and after the power relay RY1 turns off, power relay RY4 turns on.

COMBINATION CATEGORY	MICROWAVE (RY1)	
	DUTY ON (Sec.)	DUTY OFF (Sec.)
1	8	14
2	5	17
3	12	10

NOTE:

1. Note that the heater may not be on during a heater on period if the preprogrammed oven temperature has been reached. This is due to the fact that the oven is keeping the preprogrammed oven temperature constant, so of course the heater will only be on when it is needed and off when it is not needed.
2. As for temperatures of combination cooking for convection, the temperatures by each program are preprogrammed in the microprocessor as shown in Figure.

EX COMBINATION 1



3 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

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

⚠ CAUTION

Servicemen should remove their watches 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.

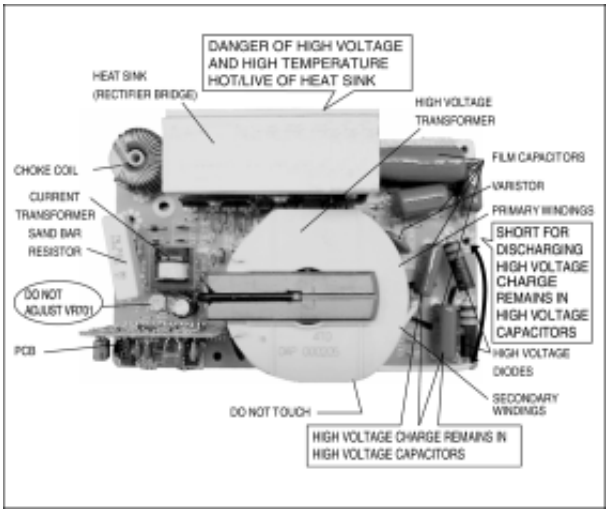
3.2 Inverter warnings

⚠ WARNING HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER 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.

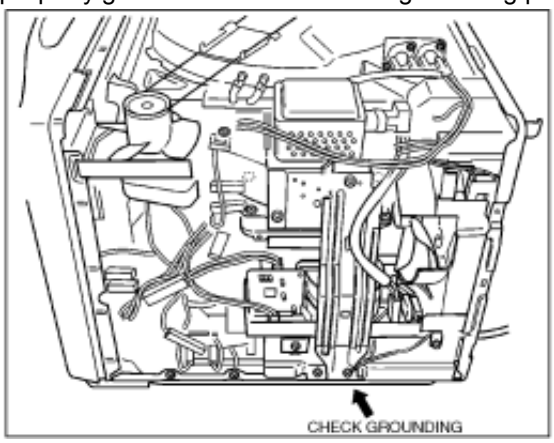
The aluminum heat sink may be HOT due to heat energy, therefore, extreme care should be taken during servicing.



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.

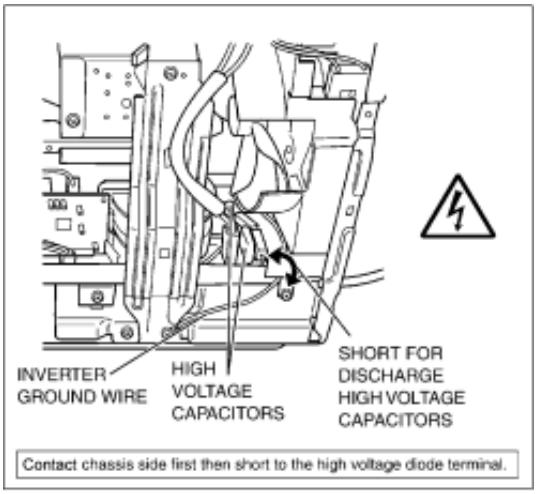


Grounding of the inverter circuit board

⚠ 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 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 latch switch, short switch and power relay RY1).

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/cm ^{2} . After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.

3.7 Sharp edges

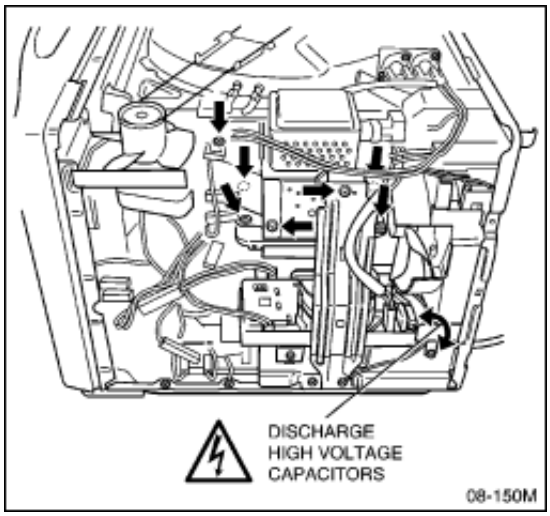
⚠ CAUTION

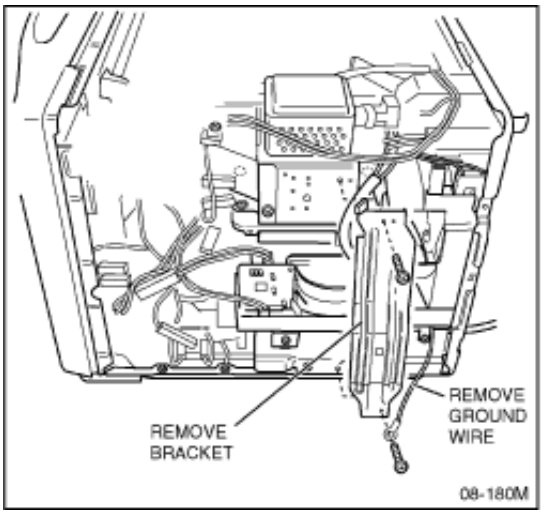
Please use caution when disassembling or reassembling internal parts. Some exposed edges may be sharp to the touch and can cause injury if not handled with care.

4 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

4.1 Magnetron

1. Discharge the high voltage capacitors.
2. Remove a screw holding magnetron on bracket.
3. Disconnect 2 high voltage lead wires from magnetron filament terminals.
4. Remove circulation fan motor bracket and belt. (2 screws)
5. Remove air guide. (2 screws)
6. Remove 4 screws holding 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.

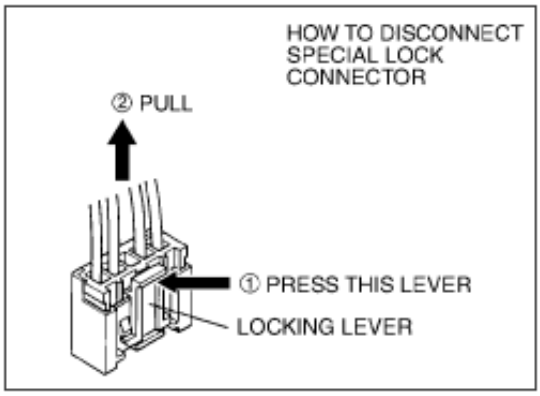
NOTE
Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

4.2 Digital Programmer Circuit (D.P.C.), membrane key board and power relay.

NOTE:

Be sure to ground any static electric charge built up in your body before handling the DPC.

1. Disconnect all connectors from D.P.C.



2. Remove 2 screws holding escutcheon base and slide the escutcheon base upward slightly with door closed.
3. Release CN5 connector's lock of DPC by pushing both levers to inside and pull them upward, and remove flat cable of membrane key board.
4. Remove 3 screws holding D.P.C.

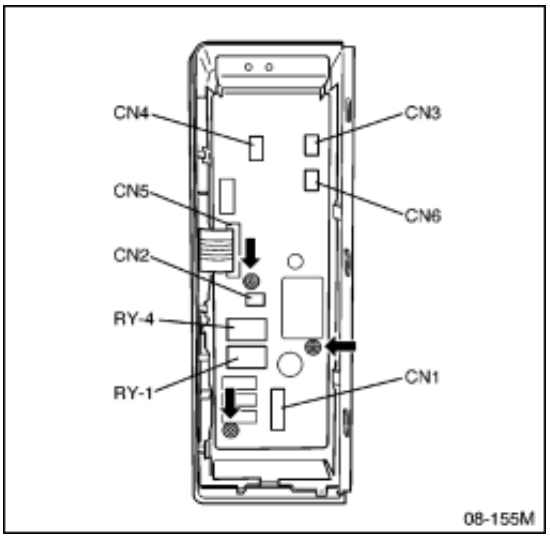
To replace membrane key board

5. Remove back panel from escutcheon base by freeing 5 catch hooks on the escutcheon base.
6. Use tools such as kinfe etc. to lift the edge of escutcheon sheet and peel off escutcheon sheet & key board membrane completely from escutcheon base.

NOTE:

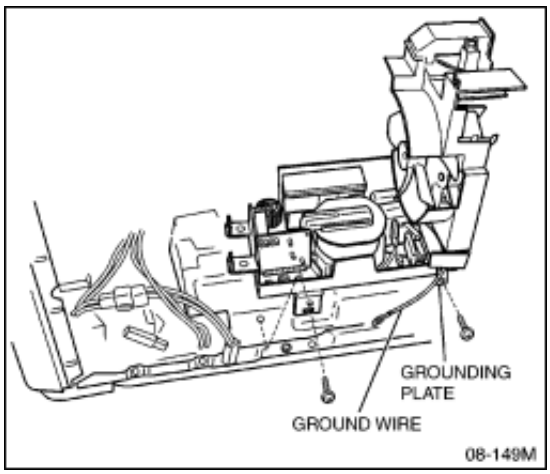
1. The membrane key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal.

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.

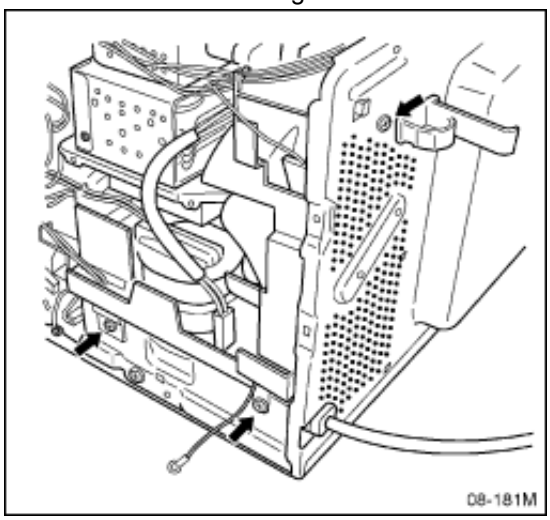


4.3 H.V. Inverter

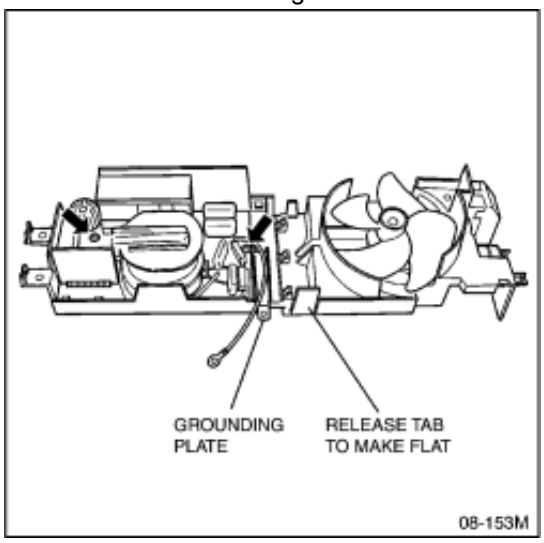
1. Discharge high voltage remaining in voltage capacitor.
2. Remove 2 screws holding reinforce bracket. (Remove grounding wire)

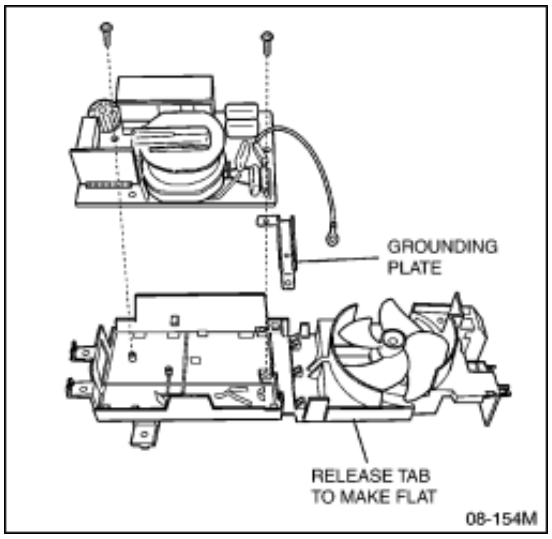


3. Remove 3 screws holding H.V. Inverter board and fan motor assembly.



4. Unplug 3 connectors of H.V. Inverter board.
5. Remove 2 screws holding H.V. Inverter board onto bracket.





NOTE:

Do not pull by lead wires but make sure to pull housing unless PCB or lead wire may break.

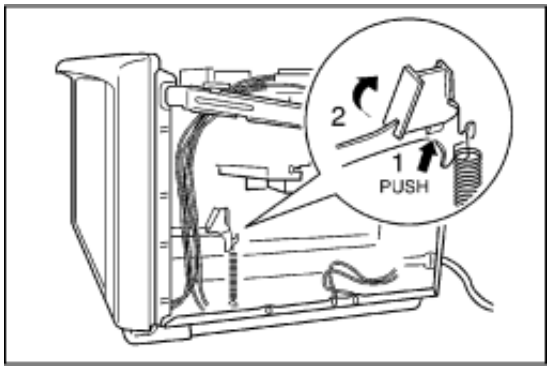
4.4 Door assembly

1. Remove left and right door key spring from door arm with plier.

NOTE:

Support door before removing door springs.

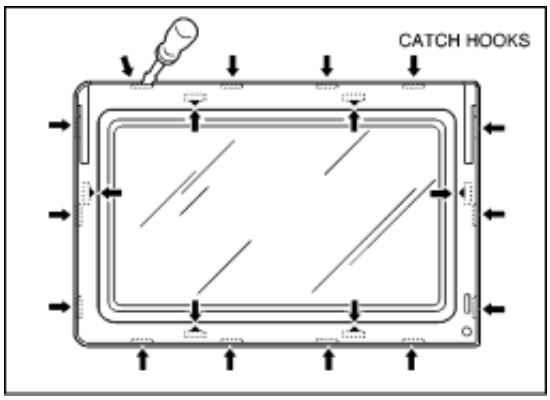
2. Remove door arm lever by pushing tab and turn clockwise.



3. Insert flat blade screwdriver to release hinge pin from left hinge.
4. Slide out left hinge pin to release the door.
5. Slide out door arms from the oven to disconnect door assembly.
6. Remove door arms from the door assembly.

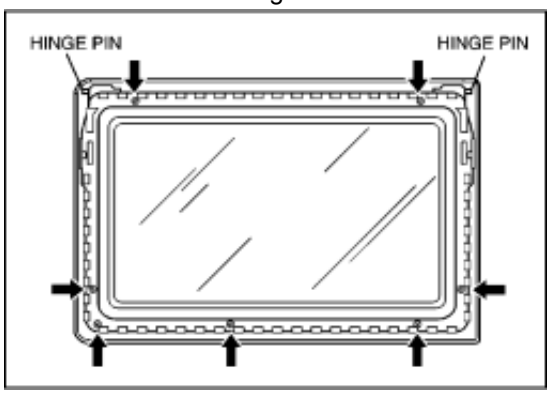
To remove door C

7. Release catch hooks between door C and door A from hinge pin side.



To remove door E

8. Remove screws holding door E to door A assembly.

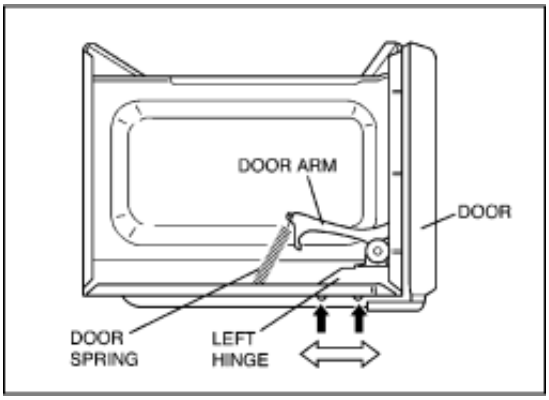


NOTE:

After replacement of the defective component parts of the door, reassemble it properly and adjustment so as to prevent an excessive microwave leakage. Adjustment of the door assembly.

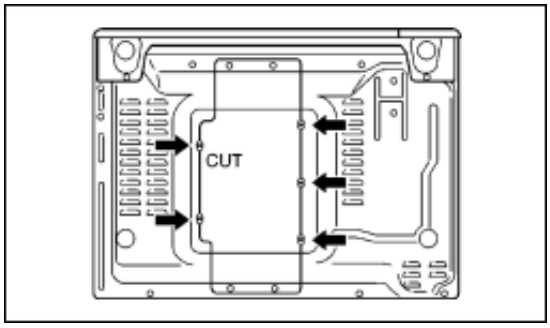
9. When mounting the door to the oven, be sure to adjust the door parallel to the cavity front plate by moving hinges back or forward.
10. Adjust so that the upper portion of the door will touch firmly to the oven cavity front plate, without pushing the door.

    If the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.
11. Always perform the microwave leakage measurement test after installation and adjustment of door assembly.



4.5 Turntable motor

1. Remove the motor cover by breaking off at the 5 spots indicated by allows with a cutter or like.

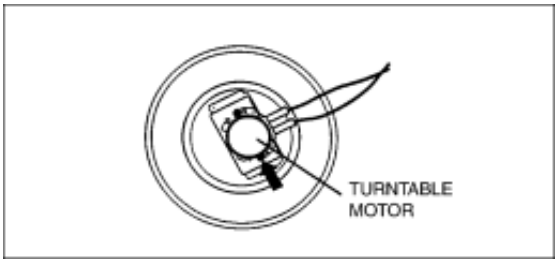


2. Remove 2 screws holding motor cover.

NOTE:

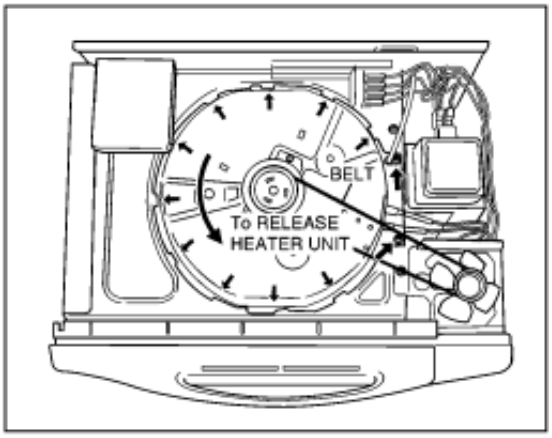
After removing the motor cover, be sure that cut portions are properly trimmed or bent to the inside so that no sharp edges will be exposed to outside.

3. Disconnect 2 lead wires from turntable motor.
4. Remove 2 screws holding turntable motor.

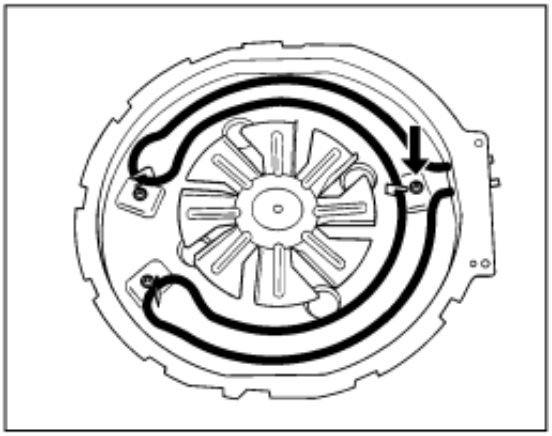


4.6 Heater

1. Remove belt.
2. Disconnect 2 lead wires from heater terminals.
3. Remove 2 screws holding heater fan case and oven temperature sensor.
4. Turn anti-clockwise to release hooks to remove heater assembly.

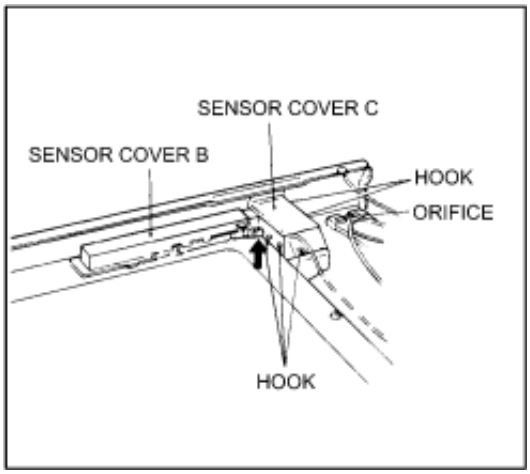


5. Remove a screw to release heater.



4.7 Steam sensor

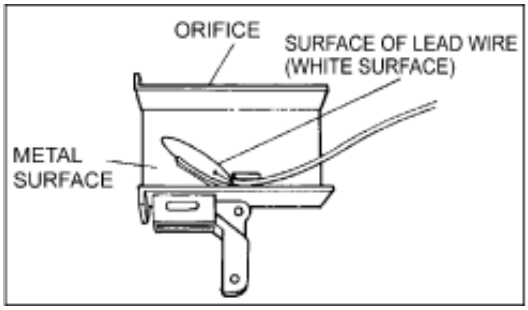
1. Remove one screw holding steam sensor unit.
2. Disconnect connector CN2 from digital programmer circuit board.
3. Disengage catch hooks on sensor cover C from orifice.



4. Remove steam sensor from orifice.

⚠ NOTE:

When installing the steam sensor, make sure that the direction of steam sensor is as shown in figure.



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.

5.1 Primary, Secondary Latch Switch interlocks & Power Relay RY1

1. Unplug lead connectors to Power Relay RY1 and verify open circuit of the Power Relay RY1 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 RY1	∞ Ω (Open)	∞ Ω(Open)

5.2 Short switch & monitor

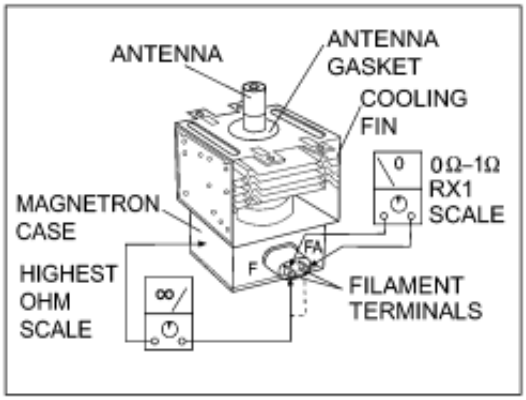
1. Unplug lead wires from Inverter Power Supply (U) primary terminals.
2. Connect test probes of ohm meter to the disconnected leads which were connected to Inverter Power Supply (U).
3. Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.
  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

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

5.3 Magnetron

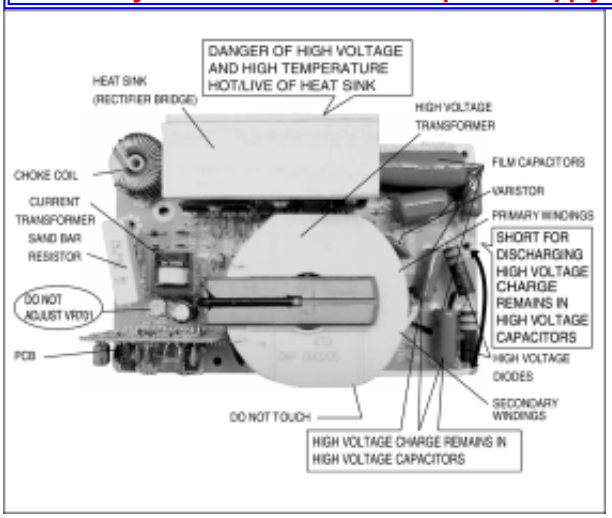
Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

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.
    1. Press Clock pad once.
    2. Press Timer pad once.
    3. Press Start pad once.
    4. Press Micro Power pad once.
5. Program oven at High power for 1 minute and press [Start] button.
    1. After approximately 23 seconds, oven stops operating.
    2. 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.
    1. Press Clock pad once.
    2. Press Timer pad once.
    3. Press Start pad once.
    4. Press Micro Power pad once.
5. Program oven at High power for 1 minute and press [Start] button.
    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	≒ 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 as follows.

TEMP	MAGNETRON THERMISTOR
100°C	30-60KΩ
25°C	700K-1.5MΩ

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

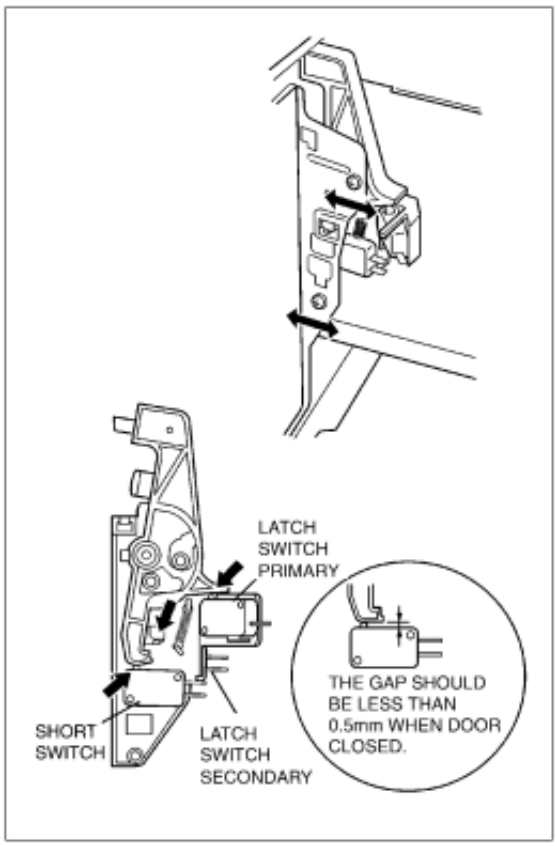
6 MEASUREMENTS AND ADJUSTMENTS

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 monitor interlock 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 stop watch

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. 8.6°C

7 TROUBLESHOOTING GUIDE

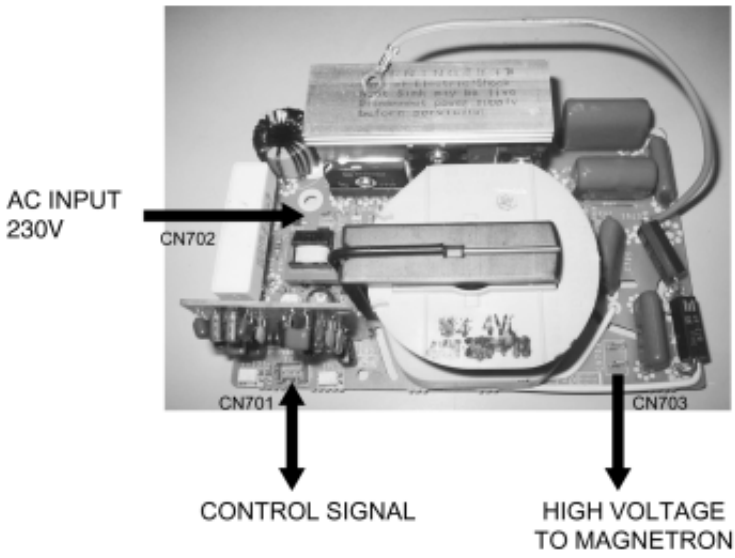
⚠ DANGER: HIGH VOLTAGES

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 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)
	Oven stops in 10 minutes after pressing [Start] pad. (Auto Sensor function)	Steam sensor circuit is not functioning	1. Steam sensor 2. Loose lead wire connector CN2 3. D.P.C
	Oven stops in 60 seconds after pressing [Start] pad	Oven temperature sensor circuit is not functioning	1. Oven temperature sensor 2. Loose lead wire connector CN5
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.	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. Fuse is blown.	1. Shorted lead wire harness	Check adjustment of primary, secondary latch switch and short switch including door.
		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 RY1 contacts (between 1 and 2) and if it has continuity, replace power relay RY1 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 D.P.C. (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 latch switch	Adjust door and latch switches.
		2. Defective secondary latch switch	
		3. Door switch CN3	
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	Adjust door and latch 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)	Check high voltage component according to component test procedure and replace if it is

			Magnetron	defective.
		4.	Open or loose wiring of power relay RY1	
		5.	Defective primary latch switch	
		6.	Defective DPC or power relay RY1	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	Consult electrician
		2.	Open or loose wiring of magnetron filament circuit.(Intermittent oscillation)	
		3.	Aging change of magnetron	
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] button 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.	Turntable motor does not rotate.	1.	Open or loose wiring of turntable motor	
		2.	Defective turntable motor	
12.	Heater does not turn on.	1.	Defective heater	
		2.	Defective power relay RY4	
		3.	Defective D.P.C.	
13.	Oven stops operation during cooking.	1.	Open or loose wiring of primary and secondary latch switch	Adjust door and latch switches.
		2.	Operation of thermal cutout	

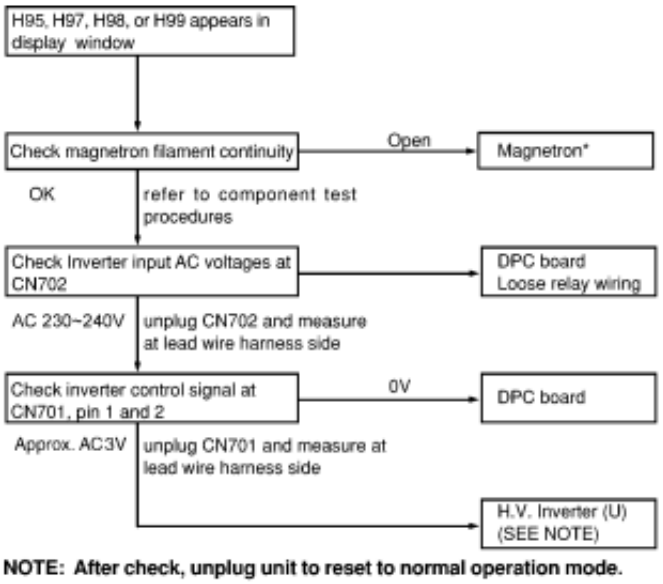
7.3 Trouble related to Digital Programmer Circuit

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	Low voltage transforment (L.V.T.) secondary voltage	Abnormal 0V	L.V.T.
			Normal	→Step3
	3	IC10 pin 9 voltage	Abnormal	IC10
			Normal=12V	IC1, CX320, Display
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC1
No beep sound	1	IC1 pin 8 voltage	Abnormal	IC1
			Normal=5V	BZ210, IC220
Power relay RY2 does not turn on even though the program had been set and the start button is tapped	1	IC1 pin 41 voltage while operation	Abnormal	IC1
			Normal=5V	→Step2
	2	IC220 pin 12 voltage	Abnormal	IC220
			Normal ≃	RY2

			0.7V	
No microwave oscillation at any power	1	IC1 pin 39 voltages while operation at high power	Abnormal	IC1
			Normal=5V	→Step2
	2	IC220 pin 15 voltage	Abnormal	IC220
			Normal ≒ 0.7V	→Step3
	3	Short circuit between collector and emitter of Q220	Still not turn on	RY1
			RY1 turns on	Q220
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. Latch Switch 2. D.P.C. /Power Relay
			Normal=120V	→Step2
	2	Unplug CN701 (3 pin) connector and measure pin3 voltage	Abnormal=0V	D.P.C.
			Approx. AC 3V	Magnetron

7.4 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] button is pressed and there is no microwave oscillation.



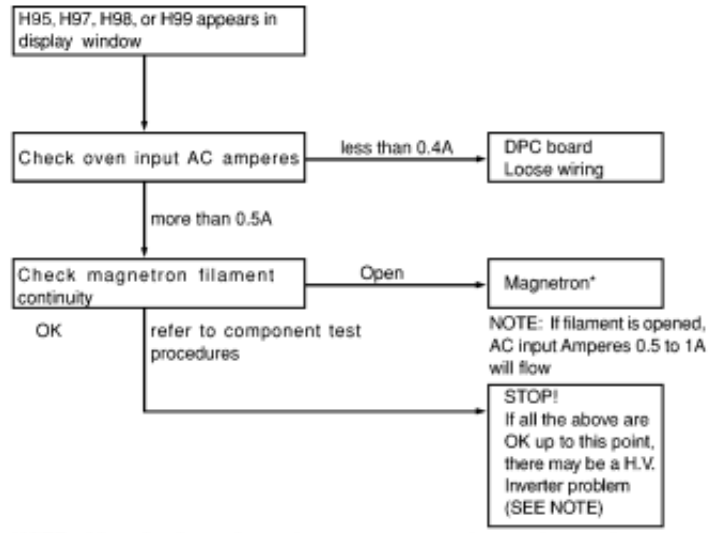
NOTE: After check, unplug unit to reset to normal operation mode.

⚠ 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.

Alternate way to troubleshoot oven with AC Ampere meter used

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



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

7.5 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.

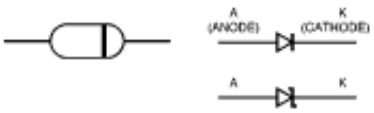
Note:

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	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** (F6064V00XN)
		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.

7.6 How to check the semiconductors using an OHM meter

Diode



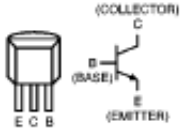
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC·····

2SD·····

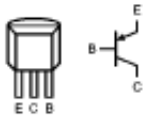


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

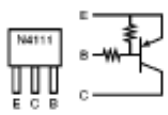
2SA·····

2SB·····



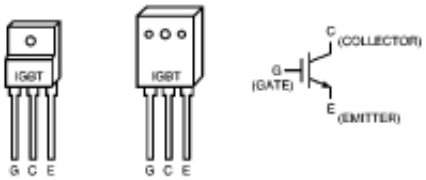
	FORWARD	REVERSE
B-E	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

Digital Transistor
PNP Transistor



	FORWARD	REVERSE
E-B	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	∞	∞

7.7 H.V. INVERTER MAIN PARTS LIST (F606Y4V00XN)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
Q701	A691E4V10GP	TRANSISTOR SI	1	
Q702		TRANSISTOR SI	1	
DB701	AESTRS2006M	DIODE SI	1	20A,600V
D701,D702	A62024V00GP	DIODE SI	2	0.3A
C704,C705	ECWH30822JUA	CAPACITOR	2	8200PF 3000VDC
T701	F609A4V00XN	H.V. TRANSFORMER	1	
	F607D4V00XN	D.P.CIRCUIT (KU)	1	
L701	F50204V00XN	CHOKE COIL	1	
CT701	F66904V00XN	CURRENT TRANSFORMER	1	

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 ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacture's specified parts.

NOTE:

- "A" parts are supplied by MOBU (Japan)
- "F" parts are supplied by PHAMOS (China)

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
1		F01506W50XP	NO TOUCHING LABEL	1	
2		F00066V00HP	CAUTION LABEL	1	
3		F00076V50STU	NAME PLATE	1	
4		F10014X80XNG	BASE	1	
5		F1008-3W0	RUBBER FOOT	4	
6		F110D6V50SHP	CABINET BODY(U)	1	
7		F11404J60XN	STOPPER	2	
8		F11614X80MNG	REINFORCE BRACKET	1	
9	⚠	F200A6V50XP	OVEN(U)	1	
10		F2011-1640	COVER	1	
11		F21315G00XN	PULLY SHAFT	1	
12		F2177-F80	WASHER	1	
13		F290D5G00XN	ROLLER RING (U)	1	
16	⚠	J300W-1830	DOOR HOOK (U)	1	
17		F3105-1830	LATCH BRACKET	1	
19		F400A6V50HP	FAN MOTOR	1	
20		F40084T00AP	FAN BLADE	1	
21		F40254X80MNG	AIR GUIDE A	1	
		F40264X80MNG	AIR GUIDE B	1	

22					
23		F40315G00XN	AIR GUIDE C	1	
24		F630G4X80HN	HEATER(AU)	1	
25		J607S-1450	SENSOR	1	
26		F64174X80MN	HEATER MOUNTING PLATE	3	
27	⚠	F606Y4V00XN	H.V.INVERTER(U)	1	
28	⚠	J6142-1450	MICRO SWITCH	1	(V-16G-3C26-M) (PRIMARY LATCH SWITCH)
29	⚠	A61425180AP	MICRO SWITCH	1	(L-3C2-2) (SECONDARY LATCH SWITCH)
30	⚠	F61456V50HP	THERMAL CUTOUT	2	
31	⚠	A61785180AP	MICRO SWITCH	1	(L-2C2-2) (SHORT SWITCH)
32	⚠	F62306V60BP	FUSE	1	10A,250V
33		F63265U00XN	TURNTABLE MOTOR	1	
34		F64504J00XNG	SENSOR COVER B	1	
35		F65434X80MN	SENSOR COVER C	1	
36		F65854Y60XN	INVERTER BRACKET	1	
37		F67634X80MNG	INVERTER BRACKET B	1	
38		F66624X80MNG	GROUNDING PLATE	1	
40		F62315G10XN	FUSE HOLDER	1	
42	⚠	F900C6V50TU	AC CORD W/PLUG	1	
43		XTWAFE4+10RU	SCREW	4	FOR MAGNETRON
44		XTTFL4+6BN	SCREW	1	FOR COVER
46		XTWFA4+12LR	SCREW	4	FOR LEFT HINGE 2?RIGHT HINGE 2
47	⚠	2M261-M32KLP	MAGNETRON	1	
48		F80234J00XN	ESCUTCHEON SASH	1	
49	⚠	F300B-1640	LEFT HINGE	1	
50	⚠	F300U-1640	RIGHT HINGE	1	
51		XNG4EVS	NUT	2	
52		XWS4VL	SPRING WASHER	2	
53		F40244X80MNG	EXHAUST GUIDE A	1	

54		F41074X80MNG	EXHAUST GUIDE B	1	
55		F48804X80MNG	INSULATION PLATE	1	
56		F22364X80MNG	RIGHT HEATER PANEL	1	
57		F203M4X80MN	HEATER FAN CASE	1	
58		F22395850AP	HEATER FAN	1	
59		F41325850AP	PULLEY B	1	
60		F41575850AP	FAN BRACKET A	1	
61		F41585850AP	FAN BRACKET B	1	
62		F41635850AP	FAN SPACER C	1	
63		A420P5850AP	HEATER FAN AXLETREE (U)	1	
65		A40604X80MN	BELT A	1	
66		F41795G00XN	HEATER FAN MOTOR	1	
67		F40085020AQ	FAN BLADE	1	
68		F41805G00XNG	HEATER FAN MOTOR BRACKET	1	
77		F612E4Y00XP	INCANDESCENT LAMP(U)	1	
78		F00068H00YT	CAUTION LABEL	1	

8.3 WIRING MATERIALS

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	F030A5G00XN	LEAD WIRE HARNESS	1	
W2	F030E4X80MN	H.V. LEAD WIRE	1	

8.4 DOOR ASSEMBLY

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
D1	⚠	F301P4J00XN	DOOR E (U)	1	
		F3044-1640	RIGHT DOOR ARM	1	

D3					
D4	⚠	F30854J00XN	DOOR C	1	
D5		F3252-1450	DOOR ARM SPACER	1	
D6		XTNFA3+7Q	SCREW	8	
D7		F3054-1640	LEFT DOOR ARM	1	
D8		F3230-1600	DOOR KEY SPRING B	2	
D9	⚠	F302A6V50SHP	DOOR A (U)	1	

8.5 ESCUTCHEON BASE ASSEMBLY

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E1	F603L5G00TN	D.P. CIRCUIT	1	
E2	F630Y6V50STU	MEMBRANE SWITCH	1	
E3	F80346V50SHP	ESCUTCHEON BASE	1	
E4	F81274J00XN	BACK PANEL	1	
E5	F80025G00XN	ESCUTCHEON B	1	
E6	F82844J00XN	CUSHION RUBBER	1	

8.6 PACKING AND ACCESSORIES

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	F00036V50HP	INSTRUCTION MANUAL	1	
P2	F000B6V50HP	COOKING GUIDE	1	
P5	F01026V50SHP	PACKING CASE,PAPER	1	
P6	F01044J00XN	UPPER FILLER	1	
P7	F01054J00XN	LOWER FILLER	1	
P8	F01064W00AP	P.E. BAG	1	
P9	F01078100XN	DOOR SHEET	1	
P10	F01084J00XN	TRAY PACKING	1	

P13	A06014J00XN	COOKING TRAY	1	
P14	F06024X80MN	OVEN RACK	1	
P16	F01134J00XN	TRAY STYROL	1	
P18	F01925E60XN	SHEET	1	
P21	F01565G00HP	OPERATION PRECAUTION	1	

9 DIGITAL PROGRAMMER CIRCUIT

9.1 SCHEMATIC DIAGRAM

9.2 PARTS LIST

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ310	AEFBAT2001	BUZZER	1	2.0KHz
C10	F2A1V471B281	AL CHEM CAPACITOR	1	470µF/16V
C11	F2A1C220B624	AL CHEM CAPACITOR	1	22µF/16V
C25	F2A2W100A177	AL CHEM CAPACITOR	1	10µF/450V/105°C
C481	F2A1H1R0B574	AL CHEM CAPACITOR	1	1µF/50V
C482	F2A1HR47B574	AL CHEM CAPACITOR	1	0.047µF/50V
C483	F2A1H2R2B574	AL CHEM CAPACITOR	1	2.2µF/50V
CX320	H2B800400007	CERAMIC RESONATOR	1	8.00MHz
D28,D220	B0EAKT000025	DIODE	2	
D40,D41,D222,D223,D224	MA2C19600E	DIODE	5	
D180-D182	B3ABA0000580	LED	3	
D25	AERZ511KD10A	VARISROR	1	510V
D26,D27	AERZ102KD10A	VARISROR	2	1000V
DISP1 HOLD	A611A4J00XN	LCD HOLDER	1	
DISP 110	L5AAAFD00024	DISPLAY	1	
IC1	MN101C54CDE2	L.S.I.	1	
IC25	B3PAA0000387	IC	1	
IC220	B1HBGGF00007	IC	1	
IC480	C0ABBA000230	IC	1	
IC10	ETXMJ197X1BG	SWITCHING POWER SUPPLY	1	
Q10	B1BAAJ000003	TRANSISTOR	1	
Q220	B1ACGF000004	TRANSISTOR	1	

R10	D0AE821JA155	CARBON RESISTOR	1	820Ω,1/4W,5%
R222	D0AE104JA155	CARBON RESISTOR	1	100K,1/4W,5%
R482,R483	D0AE105JA155	CARBON RESISTOR	2	1MΩ,1/4W,5%
R182	D0AE361JA155	CARBON RESISTOR	1	360Ω,1/4W,5%
R221	D0AE392JA155	CARBON RESISTOR	1	3.9K,1/4W,5%
R25,R26	D0AE393JA155	CARBON RESISTOR	2	39K,1/2W,5%
R28	ERX12SJ1R0E	RESISTOR	1	1Ω,1/2W,5%
RY1,RY4	AEBGJQC25F12	POWER RELAY	2	
RY2,RY3,RY5	K6B1AGA00141	POWER RELAY	3	
ZD10	B0BA5R600016	ZENER DIODE	1	
D29	AESTS1WBA60B	BRIDGE DIODE	1	600V

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