LG

MICROWAVE OVEN

SERVICE MANUAL

MODEL : MB-319ML
MB-319MLA

CAUTION

BEFORE SERVICING THE UNIT, READ THE **SAFETY PRECAUTIONS** IN THIS MANUAL.

SAFETY PRECAUTIONS

This device is to be serviced only by properly qualified service personnel.
Consult the service manual for proper service procedures to assure continued safety operation and for precautions to be taken to avoid possible exposure to excessive microwave energy.

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

A) Do not operate or allow the oven to be operated with the door open.

B) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary; (1) interlock operation, (2) proper door closing, (3) seal and sealing surfaces (arcing, wear, and other damage), (4) damage to or loosening of hinges and latches, (5) evidence of dropping or abuse.

C) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity, and connections.

D) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.

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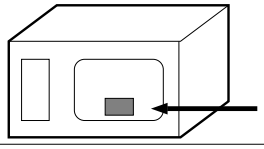
SPECIFICATIONS

ITEM	DESCRIPTION	
MODEL	**MB-319ML**	**MB-319MLA**
Power Requirement	120 Volts AC 60 Hz	220 Volts AC 60 Hz
	MICROWAVE ..... 1,400 Watts (12.0) GRILL ..... 1,050 Watts Single phase, 2-wire grounded	
Power Output	1,000 Watts full microwave power (IEC60705)	
Microwave Frequency	2,450 MHz	
Magnetron	2M246	
Timer	0 ~ 99 min. 99 sec.	
Outside Dimensions	530 (W) x 315 (H) x 394 (D)	
Cavity Dimensions	350 (W) x 240 (H) x 365 (D)	
Net Weight	16.3 kg (approx.)	
Shipping weight	18.7 kg (approx.)	
Control Complement	Touch Control System Clock : 1:00 - 12:59 Microwave Power for Variable Cooking Power level HIGH ----------Full power throughout the cooking time 9 (Saute) ----------approx. 90% of Full power, 8 (Reheat) --------approx. 80% 7 (Med.-High)----------approx. 70%, 6 (Medium) --------approx. 60% 5 (Med.-Low) ----------approx. 50%, 4 (Defrost) ---------approx. 40% 3 (Low) ----------approx. 30%, 2 (Simmer)--------approx. 20% 1 (Warm)----------approx. 10%	
Nameplate Location	 Back Side	
Accessories	Owner's manual & Cooking guide Glass turntable Rotating ring Grill Rack	

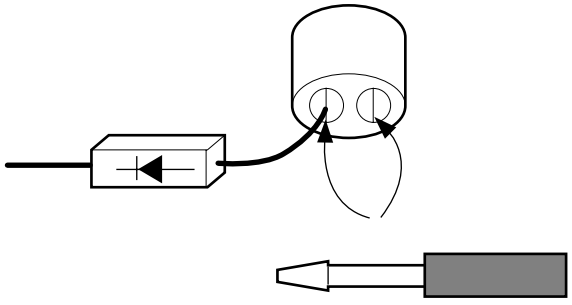
This microwave oven is designed for household use only.

It is not recommended for commercial purposes.

CAUTIONS

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

- DO NOT operate on a 2-wire extension cord during repair and use.
- NEVER TOUCH any oven components or wiring during operation.
- BEFORE TOUCHING any parts of the oven, always remove the power plug from the outlet.
- For about 30 seconds after the oven stops, an electric charge remains in the high voltage capacitor. When replacing or checking, you must discharge the high voltage capacitor by shorting across the two terminals with an insulated screwdriver.

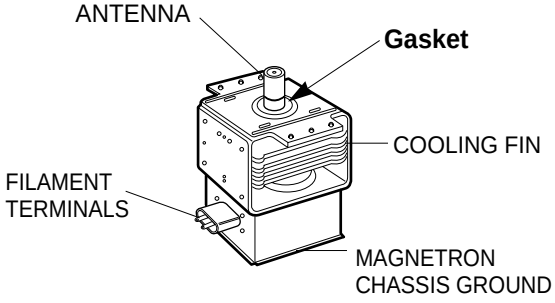


- Remove your watches whenever working close to or replacing the Magnetron.
- DO NOT touch any parts of the control panel circuit. A resulting static electric discharge may damage this P.C.B.
- NEVER operate the oven with no load.
- NEVER injure the door seal and front plate of the oven cavity.
- NEVER put iron tools on the magnetron.
- NEVER put anything into the latch hole and the interlock switches area.

MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating device if it is improperly used or connection.
All input and output microwave connections, waveguide, flange, and gasket must be secure never operate the device without a microwave energy absorbing load attached.
Never look into an open waveguide or antenna while the device is energized.

- Proper operation of the microwave oven requires that the magnetron be assembled to the waveguide and cavity. Never operate the magnetron unless it is properly installed.
- **Be sure that the magnetron gasket is properly installed around the dome of the tube whenever installing the magnetron.**



MAGNETRON

THE OVEN IS TO BE SERVICED ONLY BY PROPERLY QUALIFIED SERVICE PERSONNEL.

INSTALLATIONS

BEFORE YOU BEGIN, READ THE FOLLOWING INSTRUCTIONS COMPLETELY AND CAREFULLY.

INSTALLING

1. Empty the microwave oven and clean inside it with a soft, damp cloth. Check for damage such as misaligned door, damage around the door or dents inside the cavity or on the exterior.

2. Put the oven on a counter, table, or shelf that is strong enough to hold the oven and the food and utensils you put in it. (The control panel side of the oven is the heavy side. Use care when handling.)

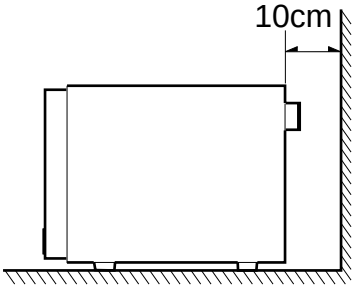
3. Do not block the vent and the air intake openings. Blocking vent or air intake openings can cause damage to the oven and poor cooking results. Make sure the microwave oven legs are in place to ensure proper air flow.

4. The oven should not be installed in any area where heat and steam are generated, because they may damage the electronic or mechanical parts of the unit.
   Do not install the oven next to a conventional surface unit or above a conventional wall oven.

5. Use microwave oven in an ambient temperature less than 104°F(40°C).

6. Place the microwave oven on a sturdy and flat surface at least 10 cm(4 inches) from the wall.

7. Place the microwave oven as far away as possible from TV, RADIO, COMPUTER, etc., to prevent interference.



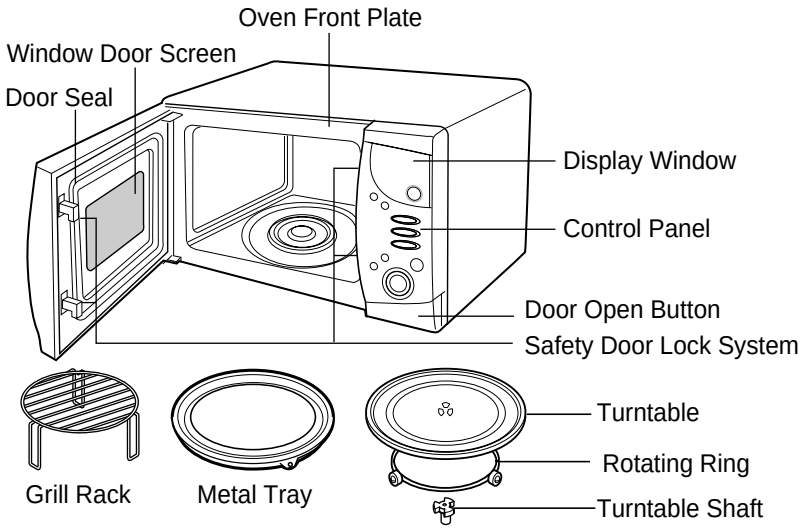
EARTHING INSTRUCTIONS

This microwave oven is designed to be used in a fully earthed condition.
It is imperative, therefore, to make sure it is properly earthed before servicing

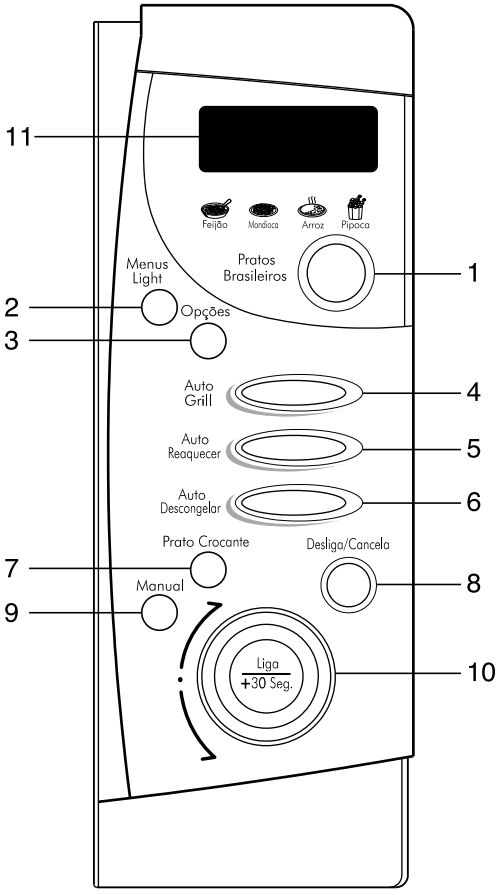
WARNING-
THIS APPLIANCE
MUST BE EARTHED

OPERATING INSTRUCTIONS

FEATURES



CONTROL PANEL

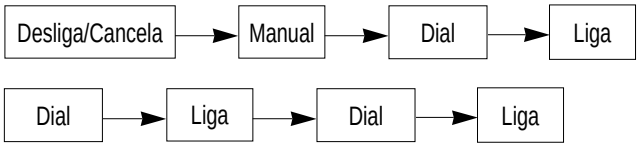


1. **BRAZILLIAN COOK :** This menu has been pre programmed to cook food automatically by one touch.
2. **MENUS LIGHT:** To let your microwave cook your selections.
3. **OPTION:** You can select on/off of beeper, scroll speed control and on/off of Demo.
4. **AUTO COOK:** This oven's menu has been preprogrammed to automatically to cook food.
5. **AUTO REHEAT:** This oven's menu has been to preprogrammed to automatically reheat food.
6. **AUTO DEFROST:** To select the desired auto weight defrost programmed with dial.
7. **AUTO CRISP**
8. **STOP/CLEAR:** To stop oven and clear all entries except time of day
9. **MANUAL.**
10. **START:** This feature allows oven to begin functioning.
11. **DISPLAY WINDOW:** Provides indications of the functions selected, normally current time displayed.

OPERATING SEQUENCE

The following is a description of component functions during oven operation.

1. SETTING THE CLOCK

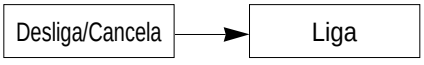


NOTE: 1) This is a 24 hour clock.
2) Clock will operate as long as power is applied to the oven.

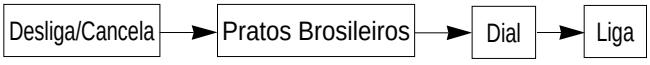
2. CANCEL FUNCTION

Touch the Desliga/Cancela pad whenever you need to cancel an entry or a function currently in use.
The display will either return to the last item entered or to the clock.

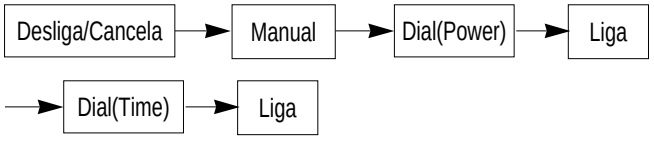
3. QUICK START



4. ONE TOUCH COOKING

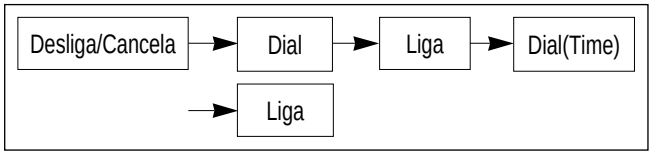


5. TIME COOKING

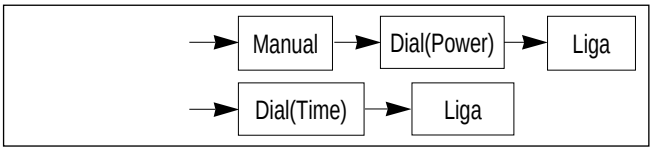


6. MULTI-STAGE COOKING

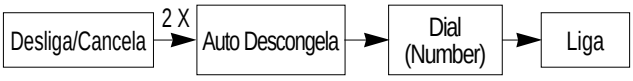
1ST STAGE



2ND STAGE



7. AUTO WEIGHT DEFROST COOKING



8. CHILD LOCK

This oven has a CHILD LOCK feature

TO SET CHILD LOCK

- Touch the Desliga/Cancela button
- Touch and hold Desliga/Cancela button
  → **DESATIVADO** appear on the display.

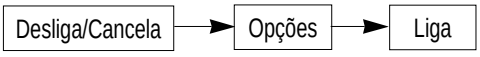
TO CANCEL CHILD LOCK

- Touch the Desliga/Cancela button
- Touch and hold Desliga/Cancela button
  → **ATIVADO** appears.

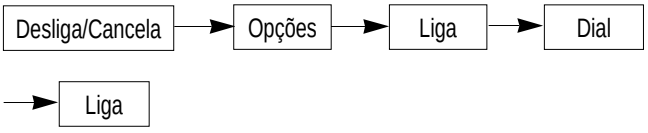
9. CUSTOM SET

You can select ON/OFF of beeper, language speed, DEMO mode.

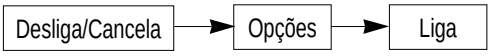
- To select sound ON/OFF



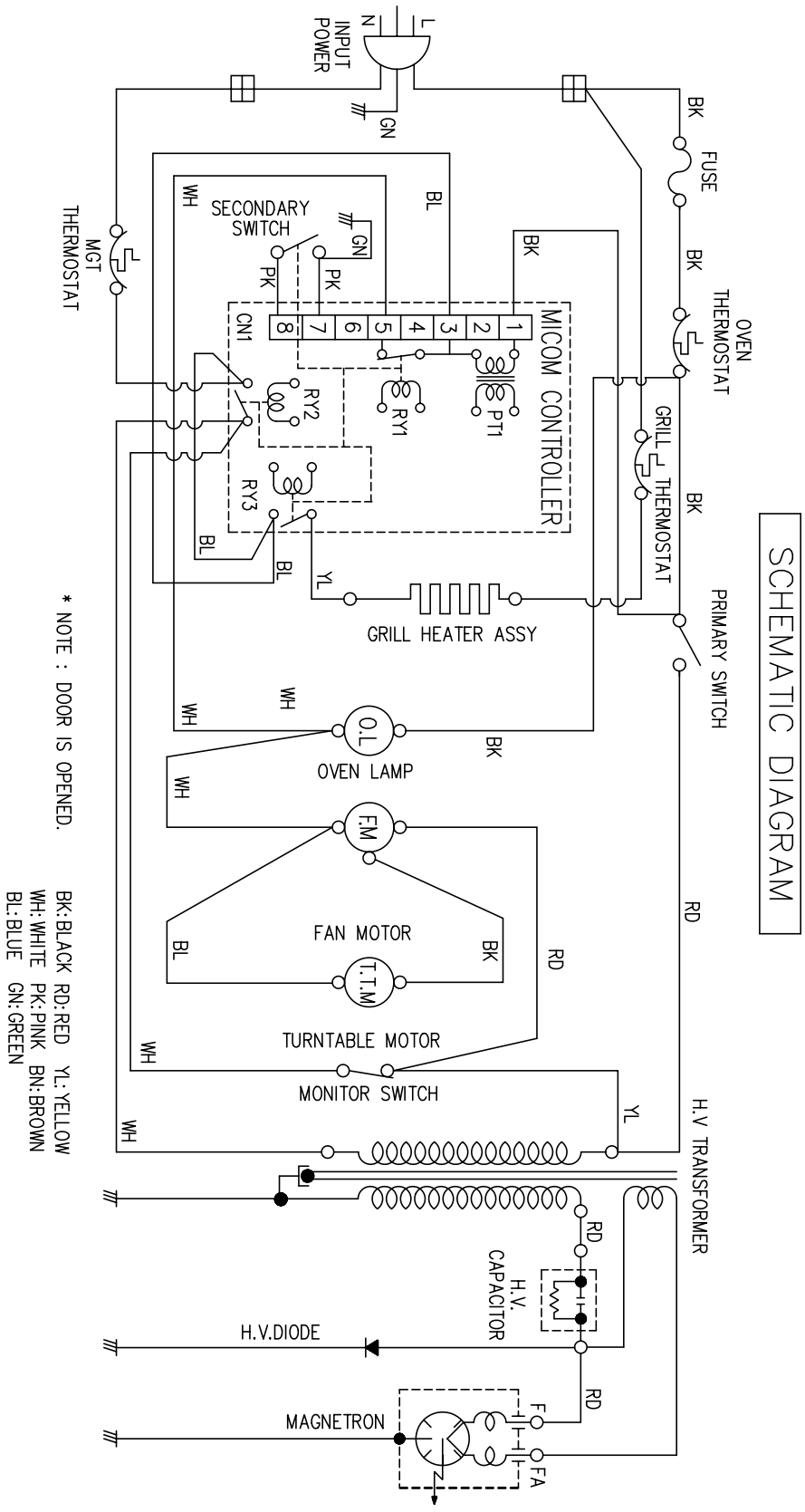
- To select language speed.



- To select DEMO mode.



SCHEMATIC DIAGRAM



CIRCUIT DESCRIPTION

GENERAL DETAILS

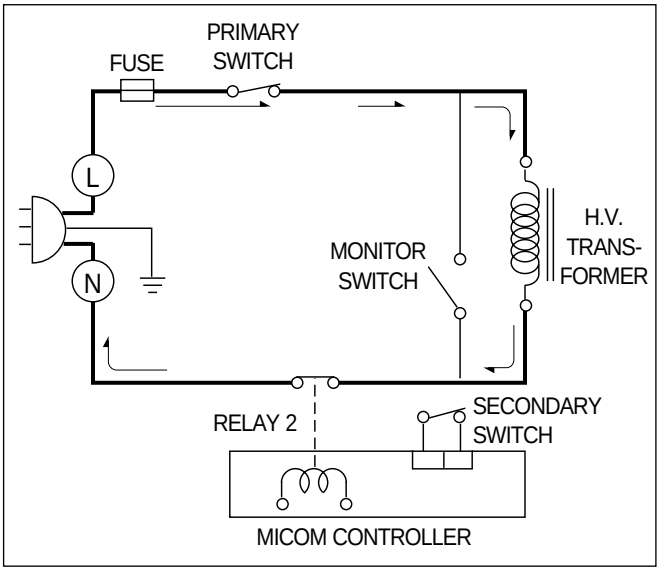
- The low voltage transformer supplies the necessary voltage to the micom controller when power cord is plugged in.
- When the door is closed, the primary switch is ON, the secondary switch is ON, and the monitor switch opens (contact COM and NO).

WHEN SELECTING COOKING POWER LEVEL AND TIME

- The micom controller memorizes the function you set.
- The time you set appears in the display window.
- Each indicator light turns on to indicate that the stage has been set.

WHEN TOUCHING THE START PAD

- The coil of the relay is energized by the micom controller.
- Power input is supplied to the high voltage transformer through the fuse to the primary switch and relay 2.
- Turntable rotates.



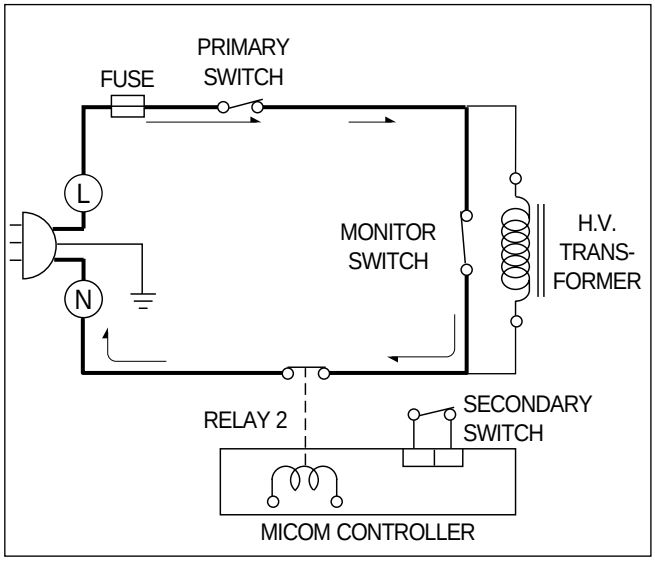
- The fan motor rotates and cools the magnetron by blowing air (coming from the intake on the base-plate).
- The air is also directed into the oven to exhaust the vapor in the oven through the upper plate.
- Cooking time starts counting down.
- 3.3 volts AC is generated from the filament winding of the high voltage transformer. This 3.3 volts is applied to the magnetron to heat the magnetron filament through two noise-preventing choke coils.
- A high voltage of approximately 2100 volts AC is generated in the secondary of the high voltage transformer which is increased by the action of the high voltage diode and charging of the high voltage capacitor.
- The negative 4,000 Volts DC is applied to the filament of the magnetron.

WHEN THE OVEN IS SET AT ANY LEVEL EXCEPT MAXIMUM.

- The micom controller controls the ON-OFF time of relay 2 by the applied signal to vary the average output power of microwave oven as POWER LEVEL. (refer to page 1-1)
- One complete cycle of the relay 2 is 22 seconds.

WHEN THE DOOR IS OPENED DURING COOKING

- Both the primary switch and relay 2 cut off the primary winding voltage of the high voltage transformer.
- ON-OFF of relay 2 is coupled electrically with opening and closing of the secondary switch.
- When the door is opened, the secondary switch is opened and when the door is closed, the secondary switch is closed.
- The cooking time stops counting down.
- Relay stops functioning.
- As the door is opened, if the contact of primary switch and relay 2 and/or secondary switch fail to open, the fuse opens due to the large current surge caused by the monitor switch activation, which, in turn, stops magnetron oscillation.



SERVICE INFORMATION

TOOLS AND MEASURING INSTRUMENTS

NECESSARY TOOLS

Tools normally used for TV servicing are sufficient.
Standard tools are listed below.

- Diagonal pliers
- Long nose pliers
- Phillips screwdriver
- Flat blade screwdriver
- Wrench (size 5mm)
- Nutdriver (size 5mm)
- Adjustable wrench
- Soldering iron
- Solder
- Vinyl insulation tape
- Polishing cloth

NECESSARY MEASURING INSTRUMENTS

- TESTER (VOLTS-DC, AC, Ohmmeter)
- Microwave survey meter
  - Holaday HI-1500
    HI-1501
  - Narda 8100
    8200
- Inch scale
- 600 cc non conductive material beaker (glass or plastic), inside diameter: approx. 8.5 cm ($3^1/_2$ in.)
- Cylindrical and made of borosilicate glass vessel.
  max. thickness: 3 mm
  outside diameter: approx. 190mm
  height: approx. 90mm
- Glass thermometer: 100°C or 212°F (1 deg scale)

MICROWAVE LEAKAGE TEST

CAUTIONS

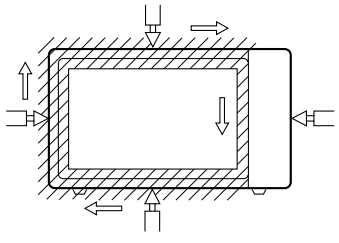
- **Be sure to check microwave leakage prior to servicing the oven if the oven is operative prior to servicing.**
- **The service personnel should inform the manufacture importer, or assembler of any certified oven unit found to have a microwave emission level in excess of 5 mW/cm²** and should repair any unit found to have excessive emission levels at no cost to the owner and should ascertain the cause of the excessive leakage. The service personnel should instruct the owner not to use the unit until the oven has been brought into compliance.
- **If the oven operates with the door open, the service personnel should:**
  - Tell the user not to operate the oven.
  - Contact the manufacturer.
- The service personnel should check all surface and vent openings for microwave leakage.
- Check for microwave leakage after every servicing. The power density of the microwave radiation leakage emitted by the microwave oven should not exceed 4 mW/cm². Always start measuring of an unknown field to assure safety for operating personnel from radiation leakage.

MEASURING MICROWAVE ENERGY LEAKAGE

- **Pour 275±15cc of 20±5°C (68±9°F) water in a beaker which is graduated to 600 cc, and place the beaker on the center of the turntable.**
- **Set the energy leakage monitor to 2,450 MHz and use it following the manufacturer's recommended test procedure to assure correct result.**
- **When measuring the leakage, always use the 2-inch (5cm) spacer supplied with the probe.**
- **Operate the oven at its maximum output.**
- **Measure the microwave radiation using and electromagnetic radiation monitor by holding the probe perpendicular to the surface being measured**

Move probe along shaded area

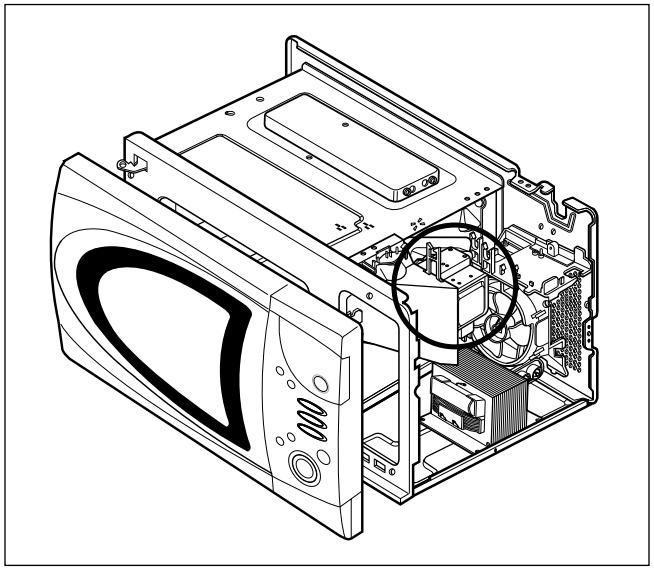
Probe scanning speed
Less than 2.5 cm/sec
(1 in/sec)



MEASUREMENT WITH OUTER CASE REMOVED

- When you replace the magnetron, measure for microwave energy leakage before the outer case is installed and after all necessary components are replaced or adjusted.
  Special care should be taken in measuring the following parts. (Circled area of Fig. below)
  - Around the magnetron
  - The waveguide

WARNING : AVOID CONTACTING ANY HIGH VOLTAGE PARTS



MEASUREMENT WITH A FULLY ASSEMBLED OVEN

- After all components, including the outer case, are fully assembled, measure for microwave energy leakage around the door viewing window, the exhaust opening, and air inlet openings.
- Microwave energy leakage must not exceed the values prescribed below.

NOTE: Leakage with the outer case removed less than 5 mW/cm.sq. Leakage for a fully assembled oven (Before the latch switch (primary) is interrupted) with the door in a slightly opened position-less than 2 mW/cm.sq.

NOTES WHEN MEASURING

- Do not exceed meter full scale deflection.
- The test probe must be removed no faster than 1 inch/sec (2.5 cm/sec) along the shaded area, otherwise a false reading may result.
- The test probe must be held with the grip portion of the handle.
  A false reading may result if the operator's hand is between the handle and the probe.
- When testing near a corner of the door, keep the probe perpendicular to the surface making sure the probe horizontally along the oven surface; this may cause probe damage.

RECORD KEEPING AND NOTIFICATION AFTER MEASUREMENT

- After adjustment and repair of any microwave energy interruption or microwave energy blocking device, record the measured values for future reference. Also enter the information on the service invoice.
- The microwave energy leakage should not be more than 4 mW/cm.sq. after determining that all parts are in good condition, functioning properly and genuine replacement parts which are listed in this manual have been used.
- At least once a year, have the electromagnetic energy leakage monitor checked for calibration by its manufacturer.

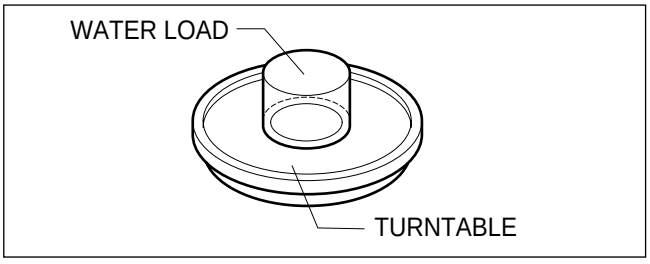
MEASUREMENT OF MICROWAVE POWER OUTPUT

- Microwave power output measurement is made with the microwave oven supplied at its rated voltage and operated at its maximum microwave power setting with a load of (1000±5) g of potable water.
- The water is contained in a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190mm.
- The oven and the empty vessel are at ambient temperature prior to the start of the test.
- The initial temperature (T1) of the water is (10±2)°C It is measured immediately before the water is added to the vessel. After addition of the water to the vessel, the load is immediately placed on the center of the turntable which is in the lowest position and the microwave power switched on.
- The time T for the temperature of the water to rise by a value Δ T of (10±2)° is measured, where T is the time in seconds and ΔT is the temperature rise. The initial and final water temperatures are selected so that the maximum difference between the final water temperature and the ambient temperature is 5°.
- The microwave power output P in watts is calculated from the following formula :

$$P = \frac{4187 \times (\Delta T)}{T}$$

is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included. (about 3 sec)

- The water is stirred to equalize temperature throughout the vessel, prior to measuring the final water temperature.
- Stirring devices and measuring instruments are selected in order to minimize addition or removal of heat.



DISASSEMBLY AND ADJUSTMENT

A. OUTER CASE REMOVAL

1) Disconnect the power supply cord from the outlet.
2) Remove the screws from the rear of the case. The outer case must be moved backward to be lifted off.

B. POWER SUPPLY CORD

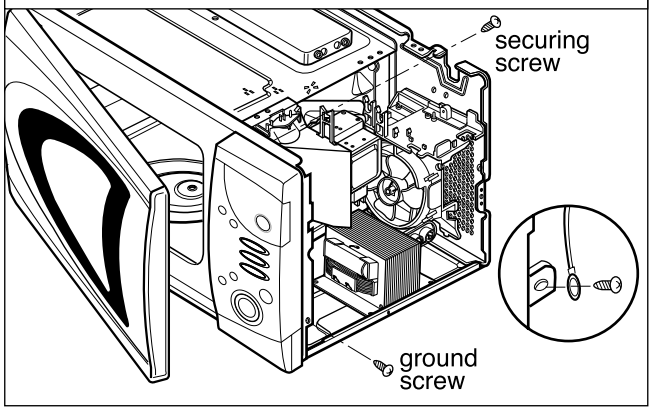
1) Remove the outer case.
2) Disconnect two terminals and remove one screw of the ground terminal.

C. CONTROL PANEL ASSEMBLY

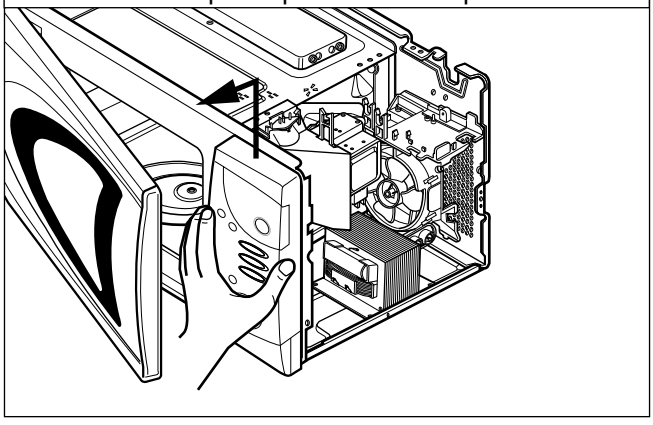
1) Open the door.
2) Disconnect the leadwire from RELAY (RY2) of the PCB SUB ASSEMBLY.
3) Disconnect the leadwire from connector (CN1) of the PCB SUB ASSEMBLY.
4) Lift up and pull out control panel assembly carefully from the cavity.

CAUTION: DISCHARGE THE HIGH VOLTAGE CAPACITOR BEFORE SERVICING
(refer to page 2-1)

Remove the screw

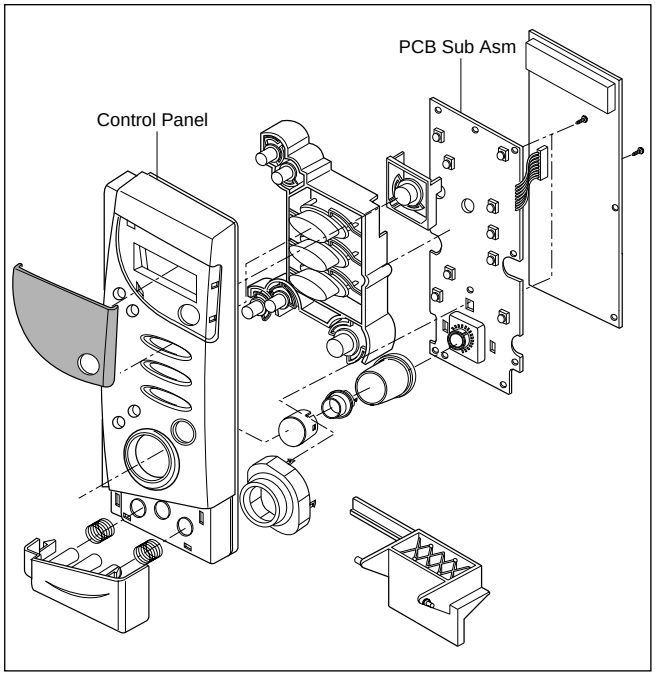


Lift up and pull out control panel



D. PCB ASSEMBLY REMOVAL

1) Remove the control panel assembly from the cavity. (Refer to control panel assembly removal on previous page.)
2) Remove screws which hold the PCB SUB ASSEMBLY to the control panel.
3) Disconnect the flat cable from the PCB SUB ASSEMBLY and take off the PCB SUB ASSEMBLY.



E. DOOR MAIN ASSEMBLY REMOVAL

1) Open the door.
2) Remove the choke cover very carefully with a flat-blade screwdriver.

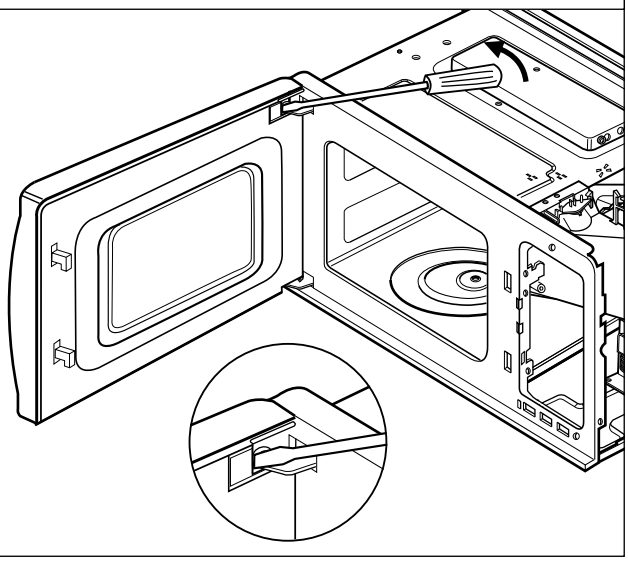
CAUTION: Be careful not to damage door seal plate by screwdriver.

3) Lift up and push the door.

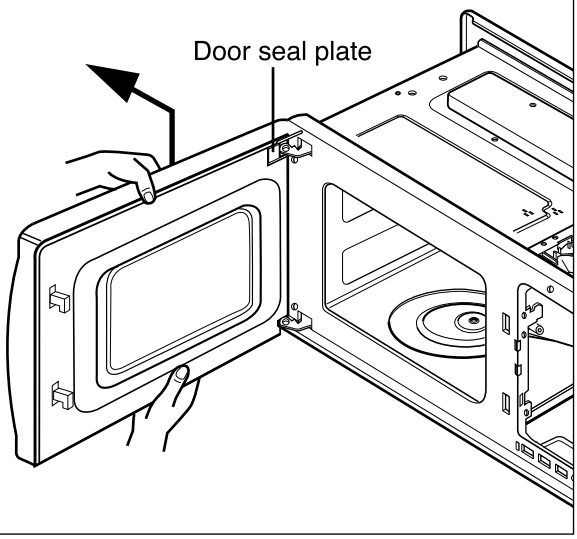
NOTE:

1. After replacing the door, be sure to check that the primary switch, monitor switch, and secondary switch operate normally.
2. After replacing the door, check for microwave energy leakage with a survey meter. Microwave energy must be below the limit of 4 mW/cm. (with a 275 ml water load)
3. When mounting the door assembly to the oven assembly, be sure to adjust the door assembly parallel to the chassis. Also, adjust so the door has no play between the inner door surface and oven frame assembly. If the door assembly is not mounted properly, microwaves may leak from the clearance between the door and the oven.

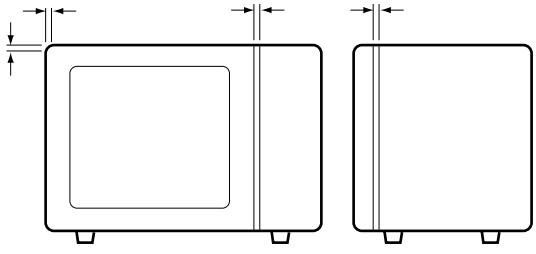
Remove choke cover



Remove door



Spacer

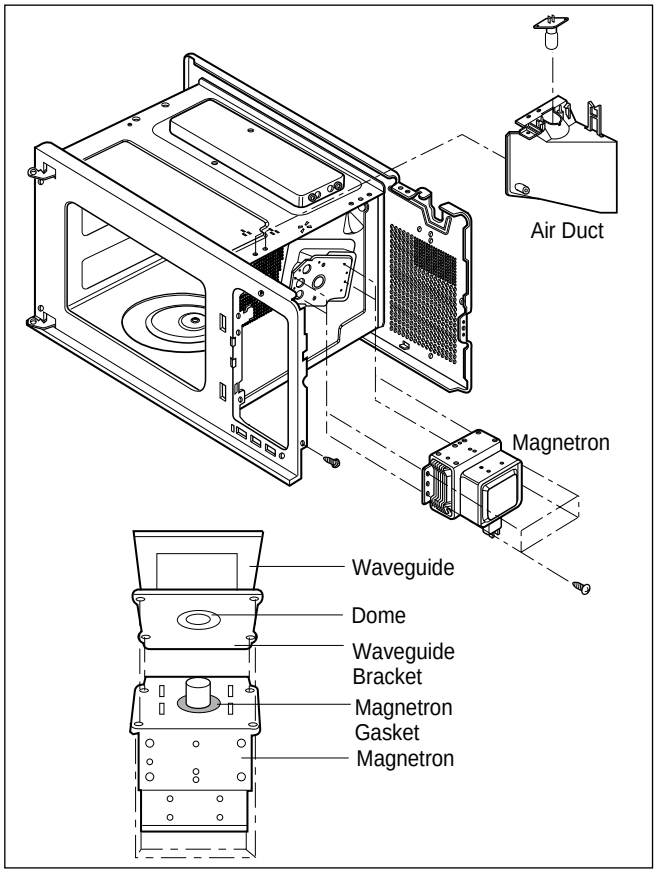


F. MAGNETRON REMOVAL

1) Disconnect the leadwire from the magnetron.
2) Carefully remove the mounting screws holding the magnetron and the waveguide.
3) Remove the magnetron ASSEMBLY until the tube is clear from the waveguide.

NOTE:

1. When removing the magnetron, make sure its dome does not hit any adjacent parts, or it may be damaged.
2. When replacing the magnetron, be sure to install the magnetron gasket in the correct position and be sure that the gasket is in good condition.
3. After replacing the magnetron, check for microwave leakage with a survey meter around the magnetron. Microwave energy must be below the limit of 5 mW/cm^2. (With a 275 ml. water load). **Make sure that gasket is rigidly attached to the magnetron.** To prevent microwave leakage, tighten the mounting screws properly, making sure there is no gap between the waveguide and the magnetron.

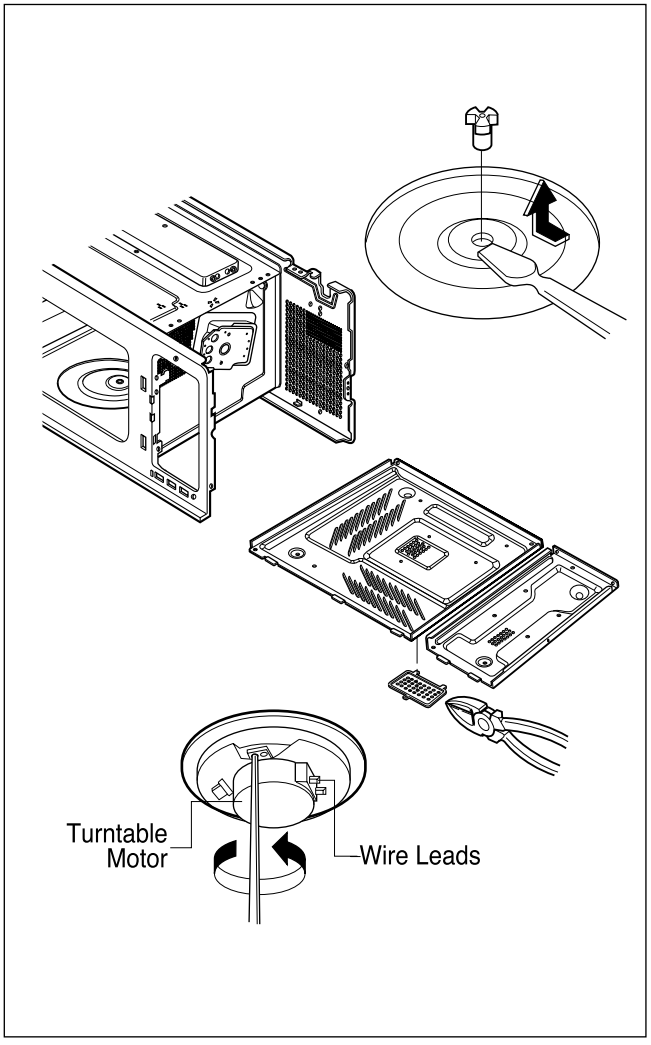


G. REMOVING THE TURNTABLE MOTOR

1) Remove the turntable and rotating ring.
2) Lay the unit down on its back.
3) Remove the turntable motor cover.
   The turntable base cover is easily removed by pinching the eight parts with a wire cutting.
4) Disconnect the leadwire from the turntable motor terminals.
5) Remove the screw securing the turntable motor to the oven cavity ASSEMBLY.
6) After repairing the motor, rotate the removed turntable motor cover.
7) Fit the turntable motor cover's projecting part to the base plate slit.

NOTE:

1. Remove the wire lead from the turntable motor VERY CAREFULLY.
2. Be sure to grasp the connector, not the wires, when removing.



H. HIGH VOLTAGE TRANSFORMER REMOVAL

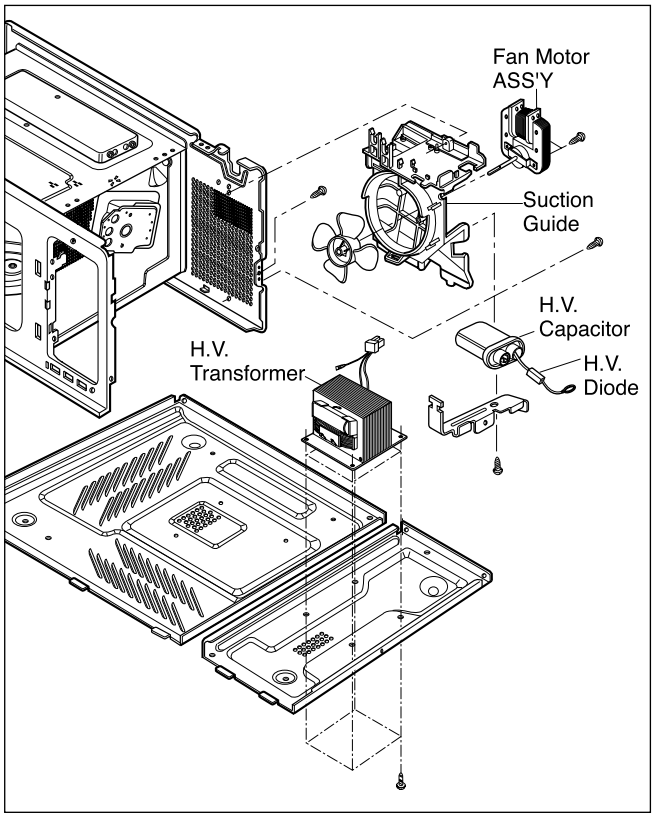
1) Discharge the high voltage capacitor.
2) Disconnect the leadwire from magnetron, high voltage transformer, and capacitor.
3) Remove the screw holding the high voltage transformer to the baseplate.

I. FAN MOTOR ASSEMBLY REMOVAL

1) Discharge the high voltage capacitor.
2) Disconnect the leadwire from fan motor and high voltage capacitor.
3) Remove the two screws holding the the suction guide ASSEMBLY to the oven cavity.
4) Remove the two screws holding the fan motor ASSEMBLY to the suction guide ASSEMBLY.

J. HIGH VOLTAGE CAPACITOR AND DIODE REMOVAL

1) Discharge the high voltage capacitor.
2) Disconnect the leadwire from fan motor and high voltage capacitor.
3) Remove the screw holding the suction guide ASSEMBLY to the oven cavity.
4) Remove the screw holding the high voltage capacitor bracket and remove the high voltage diode earth screw.



K. INTERLOCK SYSTEM

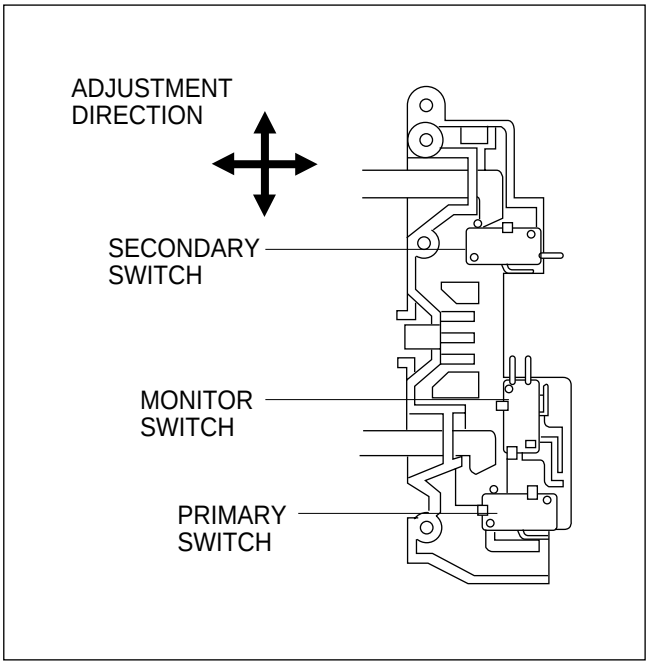
1) INTERLOCK MECHANISM

The door lock mechanism is a device which has been specially designed to eliminate completely microwave activity when the door is opened during cooking and thus to prevent the danger resulting from the microwave leakage.

2) MOUNTING OF THE PRIMARY/MONITOR/ SECONDARY SWITCHES TO THE LATCH BOARD
3) INSTALLATION AND ADJUSTMENT OF THE LATCH BOARD TO THE OVEN ASSEMBLY

- Mount the latch board to the oven assembly.
- Adjust the latch board in the arrow direction so that oven door will not have any play in it when the door is closed.
- Tighten the mounting screw.
- **Check for play in the door by pushing the door release button. Door movement should be less than 0.5 mm. (1/64 inch)**

Don't push the door release button while making this adjustment. Make sure that the latch moves smoothly after adjustment is completed and that the screws are tight. Make sure the primary, monitor, and secondary switches operate properly by following the continuity test procedure.



INTERLOCK CONTINUITY TEST

WARNING : FOR CONTINUED PROTECTION AGAINST EXCESSIVE RADIATION EMISSION, REPLACE ONLY WITH IDENTICAL REPLACEMENT PARTS. ALL THESE SWITCHES MUST BE REPLACED AT THE SAME TIME.

TYPE NO. SZM-V 16-FA-63 OR VP-533A-OF FOR PRIMARY SWITCH
TYPE NO. SZM-V 16-FA-62 OR VP-532A-OF FOR MONITOR SWITCH
TYPE NO. SZM-V 16-FA-63 OR VP-533A-OF FOR SECONDARY SWITCH

A. PRIMARY INTERLOCK SWITCH TEST

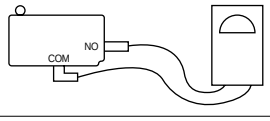
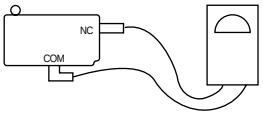
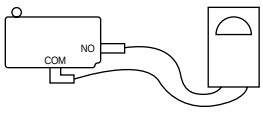
When the door release button is depressed slowly with the door closed, an audible **click** should be heard at the same time or successively at intervals. When the button is released slowly, the latches should activate the switches with an audible **click**.
If the latches do not activate the switches when the door is closed, the switches should be a adjusted in accordance with the adjustment procedure. Disconnect the wire lead from the primary switch. Connect the ohmmeter leads to the common (COM) and normally open (NO) terminal of the switch. The meter should indicate an open circuit in the door open condition.
When the door is closed, the meter should indicate a closed circuit.
When the primary switch operation is abnormal, make the necessary adjustment or replace the switch only with the same type of switch.

B. SECONDARY INTERLOCK SWITCH TEST

Disconnect the wire lead from the secondary switch.
Connect the ohmmeter leads to the common (COM) and normally open (NO) terminals of the switch. The meter should indicate a open circuit in the door open condition. When the door is closed, meter should indicate an closed circuit. When the secondary switch operation is abnormal, make the necessary adjustment or replace the switch only with the same type of switch.

C. MONITOR SWITCH TEST

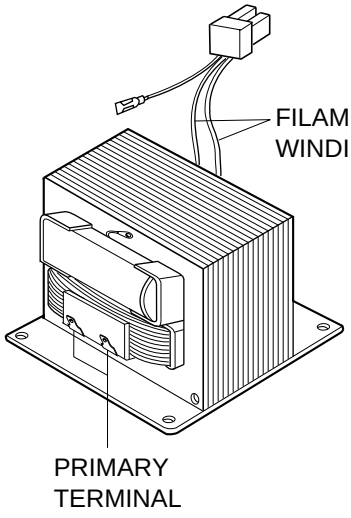
Disconnect the wire lead from the monitor switch.
Connect the ohmmeter leads to the common (COM) and normally closed (NC) terminals of the switch. The meter should indicate closed circuit in the door open condition. When the door is closed, meter should indicate an open circuit. When the monitor switch operation is abnormal, replace with the same type of switch.
NOTE: After repairing the door or the interlock system, it is necessary to do this continuity test before operating the oven.

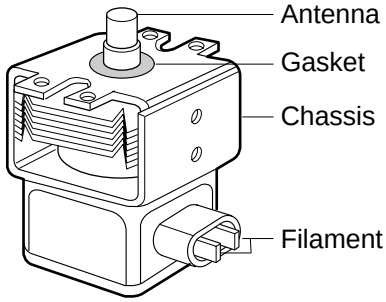
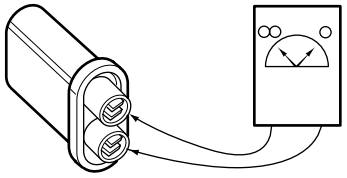
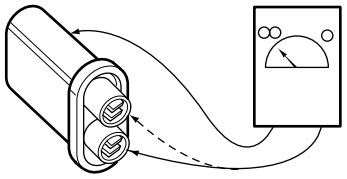
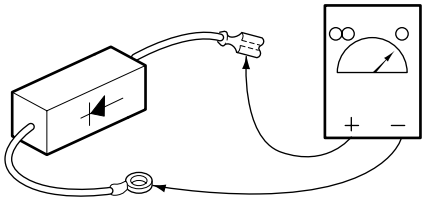
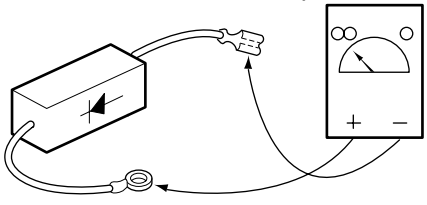
COMPONENTS	TEST PROCEDURE		RESULTS	
SWITCHES (Wire leads removed)	Check for continuity of the switch with an Ohm-meter		Door open	Door closed
	Primary Switch			
	Monitor Switch			
	Secondary Switch			
	NOTE : After checking for the continuity of switches, make sure that they are connected correctly.			

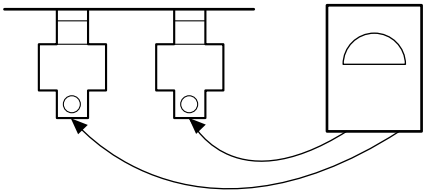
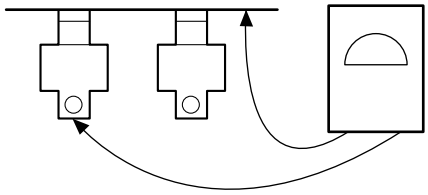
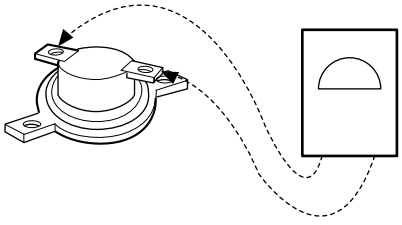
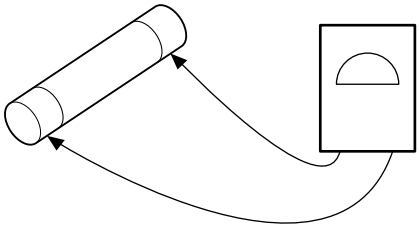
COMPONENT TEST PROCEDURE

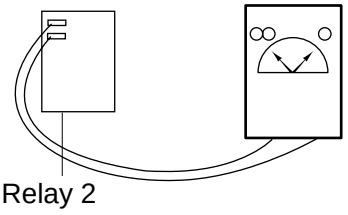
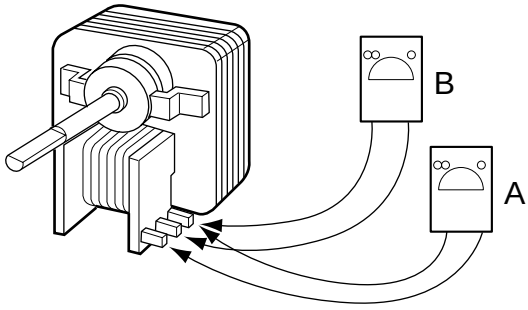
CAUTIONS

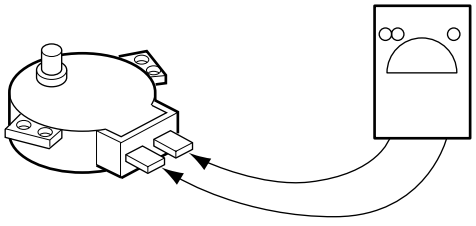
1. DISCONNECT THE POWER SUPPLY CORD FROM THE OUTLET WHENEVER REMOVING THE OUTER CASE FROM THE UNIT. PROCEED WITH THE TEST ONLY AFTER DISCHARGING THE HIGH VOLTAGE CAPACITOR AND REMOVING THE WIRE LEADS FROM THE PRIMARY WINDING OF THE HIGH VOLTAGE TRANSFORMER. (SEE PAGE 2-1)
2. ALL OPERATIONAL CHECKS WITH MICROWAVE ENERGY MUST BE DONE WITH A LOAD (1 LITER OF WATER IN CONTAINER) IN THE OVEN.

COMPONENTS	TEST PROCEDURE	RESULTS
HIGH VOLTAGE TRANSFORMER (Wire leads removed)	 1. Measure the resistance. (Ohm-meter scale: Rx1 and Rx100) • Primary winding • Secondary winding • Filament winding 2. Measure the resistance. (Ohm-meter scale: Rx1000) • Primary winding to ground • Filament winding to ground	 Approx.: 0.2 ~ 0.4 ohm Approx.: 60 ~ 90 ohm Less than: 1 ohm Normal: Infinite Normal: Infinite
MAGNETRON (Wire leads removed)	1. Measure the resistance. (Ohm-meter scale: Rx1) • Filament terminal 2. Measure the resistance. (Ohm-meter scale: Rx1000) • Filament to chassis	 Normal: Less than 1 ohm Normal: Infinite

COMPONENTS	TEST PROCEDURE	RESULTS
		
	NOTE: When testing the magnetron, be sure to install the magnetron gasket in the correct position and be sure that the gasket is in good condition.	
HIGH VOLTAGE CAPACITOR	Measure the resistance. (Ohm-meter scale: Rx1000) • Terminal to terminal. 	Normal: Momentarily indicates several ohms, and then gradually returns to infinite.
	Measure the resistance. (Ohm-meter scale: Rx1000) • Terminal to case. 	Normal: Infinite.
HIGH VOLTAGE DIODE NOTE : Some inexpensive meters may indicate infinite resistance in both direction.	Measure the continuity (Forward). (Ohm-meter scale: Rx10000) 	Normal: Continuity. Abnormal: Infinite.
	Measure the continuity (Reverse). (Ohm-meter scale: Rx10000) 	Normal: Infinite. Abnormal: Continuity.

<table>
<tr><th>COMPONENTS</th><th>TEST PROCEDURE</th><th colspan="2">RESULTS</th></tr>
<tr><td rowspan="3">HEATER ELEMENT
(Wire leads removed.)</td><td>Measure the resistance.
(Multi-meter scale:RX1)
  </td><td colspan="2">Normal:
Gill heater
Approx.15 Ω
(at 20-30˚C)</td></tr>
<tr><td>Measure the resistance with 500V-100M Ohm insulation resistance meter.
  </td><td colspan="2">Normal:
more than 1.0M Ω</td></tr>
<tr><td colspan="3">NOTE: Make sure heater is fully cooled when tested.</td></tr>
<tr><td rowspan="2">MAGNETRON
THERMOSTAT</td><td rowspan="4">  </td><td>0˚C~Approx 180˚C</td><td>Approx 180˚C</td></tr>
<tr><td>  </td><td></td></tr>
<tr><td rowspan="2">OVEN
THERMOSTAT</td><td>0˚C~Approx 145˚C</td><td>Approx 145˚C</td></tr>
<tr><td>  </td><td></td></tr>
<tr><td rowspan="3">FUSE
(Wire leads removed.)</td><td rowspan="2">Check the continuity of the switch with an Multi-meter
  </td><td>Normal</td><td>Abnormal</td></tr>
<tr><td>  </td><td></td></tr>
<tr><td colspan="3">NOTE: If the fuse is blown, check primary, the secondary, the monitor switches, H.V.D and H.V.C before replacing the fuse.
If the fuse is blown by improper switch operation replace the defective switch and the fuse at the same time.
Replace just the fuse if the switches operate normally.</td></tr>
</table>

<table>
<tr><th>COMPONENTS</th><th>TEST PROCEDURE</th><th>RESULTS</th></tr>
<tr><td>RELAY 2</td><td>Check for continuity of relay 2 with an ohm-meter.
(Remove wire leads from relay 2 and operate the unit.)
 
</td><td>
<table>
<tr><th>POWER LEVEL</th><th>  </th><th>  </th></tr>
<tr><td>1</td><td>4 sec</td><td>18 sec</td></tr>
<tr><td>2</td><td>6 sec</td><td>16 sec</td></tr>
<tr><td>3</td><td>8 sec</td><td>14 sec</td></tr>
<tr><td>4</td><td>10 sec</td><td>12 sec</td></tr>
<tr><td>5</td><td>12 sec</td><td>10 sec</td></tr>
<tr><td>6</td><td>14 sec</td><td>8 sec</td></tr>
<tr><td>7</td><td>16 sec</td><td>6 sec</td></tr>
<tr><td>8</td><td>18 sec</td><td>4 sec</td></tr>
<tr><td>9</td><td>20 sec</td><td>2 sec</td></tr>
<tr><td>10</td><td>22 sec</td><td>0 sec</td></tr>
</table>
</td></tr>
<tr><td>FAN MOTOR
(Wire leads removed)</td><td>Measure the resistance.
(Ohm-meter scale: R x 1)
 
</td><td>Normal:
A: Approx. 85 ~ 100 ohm.
B: Approx. 10 ~ 25 ohm.

Abnormal: Infinite or several ohms.</td></tr>
<tr><td>TURNTABLE MOTOR
(Wire leads removed)</td><td>Measure the resistance.
(Ohm-meter scale: R x 1)
  </td><td>Normal: Approx.100~150 ohm
Abnormal: Infinite or several ohm.</td></tr>
<tr><td colspan="3">NOTE : • A MICROWAVE LEAKAGE TEST MUST ALWAYS BE PERFORMED WHEN THE UNIT IS SERVICED FOR ANY REASON.
• MAKE SURE THE WIRE LEADS ARE IN THE CORRECT POSITION.
• WHEN REMOVING THE WIRE LEADS FROM THE PARTS, BE SURE TO GRASP THE CONNECTOR, NOT THE WIRES.</td></tr>
</table>

TROUBLESHOOTING

WHEN YOU GET A COMPLAINT FROM YOUR CUSTOMER, EVALUATE THE COMPLAINT CAREFULLY. IF THE FOLLOWING SYMPTOMS APPLY, PLEASE INSTRUCT THE CUSTOMER IN THE PROPER USE OF THE MICROWAVE OVEN. THIS CAN ELIMINATE AN UNNECESSARY SERVICE CALL.

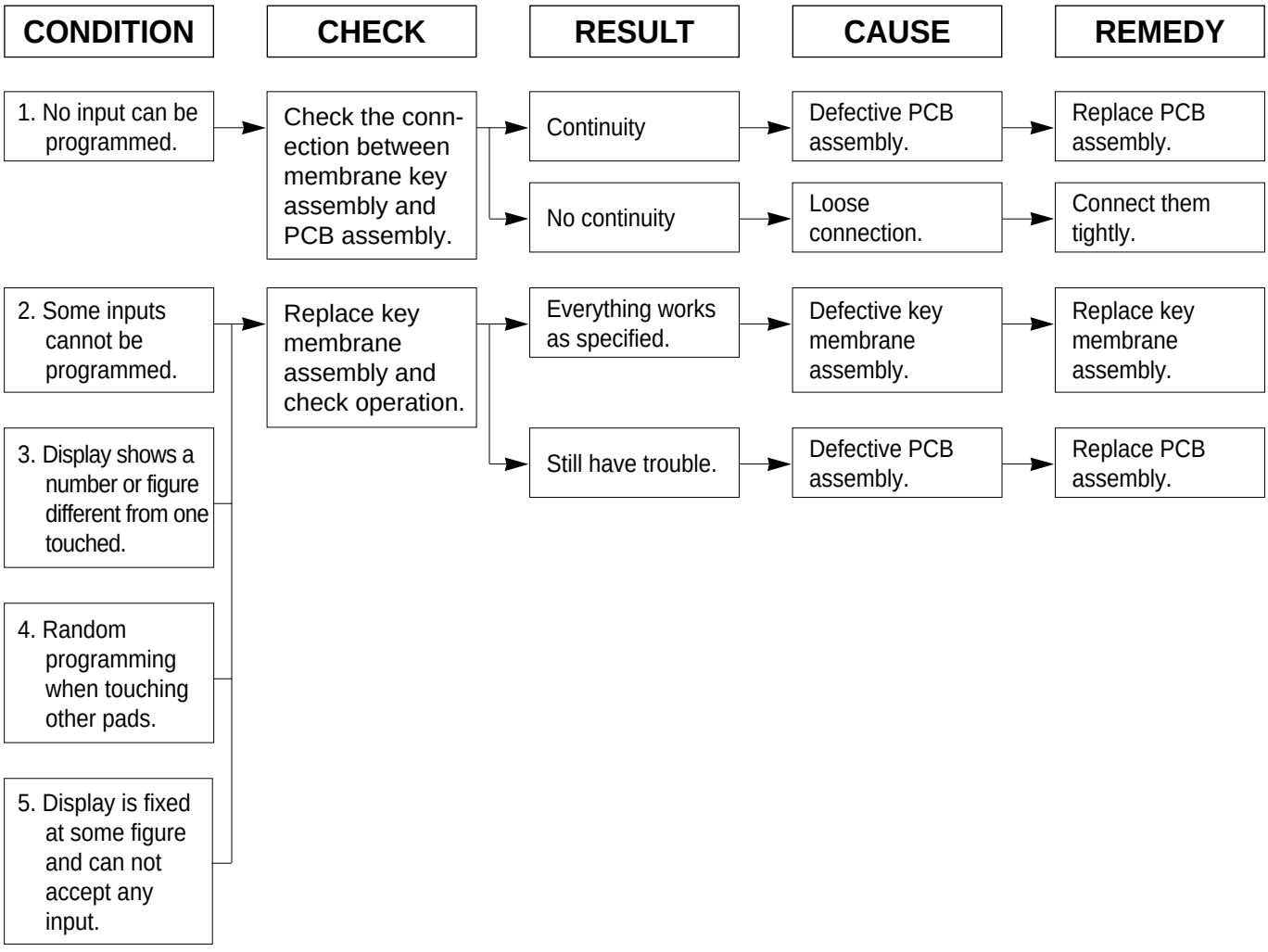
CAUTIONS

1. Check grounding before checking for trouble.
2. Be careful of the high voltage circuit.
3. Discharge the high voltage capacitor. (See page 2-1)
4. When checking the continuity of the switches or of the high voltage transformer, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter.
5. Do not touch any part of the circuit on the PCB since static electric discharge may damage this control panel.
   Always touch yourself to ground while working on this panel to discharge any static charge built up in your body. (Micom model only)

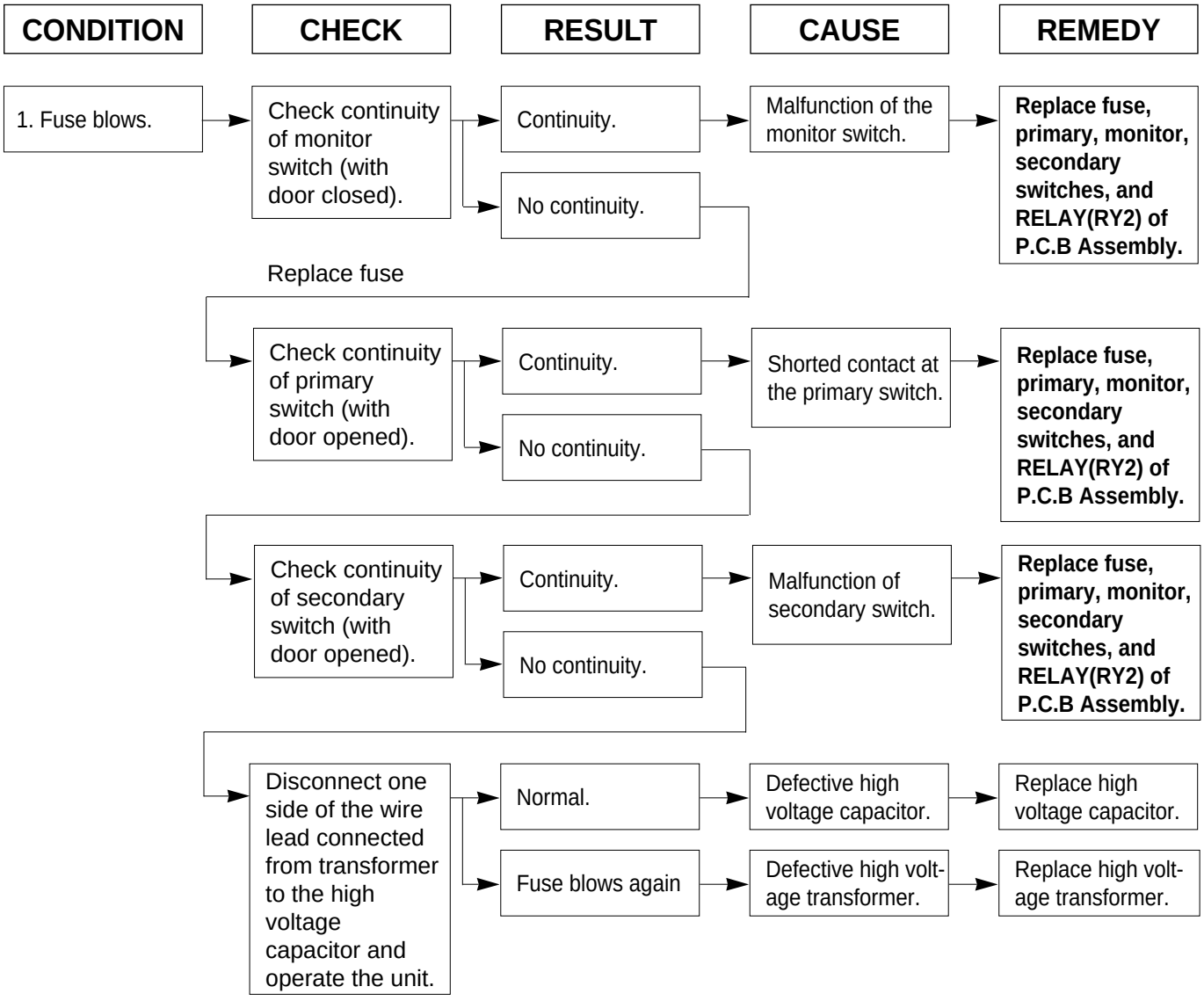
CONDITION	CAUSE	REMEDY
Microwave oven does not work.	Inserting many plugs into one outlet and using them at the same time. (blown fuse or breaker)	Avoid using other electrical appliances when you use the microwave oven.
	Microwave oven plug is not inserted tightly.	Insert microwave oven plug securely.
Output power is too low.	Low AC input voltage.	Use the microwave oven at adequate line voltage.
	Food temperature is too low.	This may not be a defect. It is possible that the food should be cooked for a longer time period.
Sparks occur.	Using metallic ware and allowing it to touch the oven wall.	Do not use metallic ware for cooking except that noted in the cooking guide.
	Ceramic ware trimmed in gold or silver powder is used.	Do not use any type of cookware with metallic trimming.
Uneven cooking.	Inconsistent intensity of microwave by their characteristics.	1. Use plastic wrap or lid. 2. Stir once or twice while cooking soup, cocoa or milk, etc.

(TROUBLE 1) The following visual conditions indicate a probable defective control circuit.

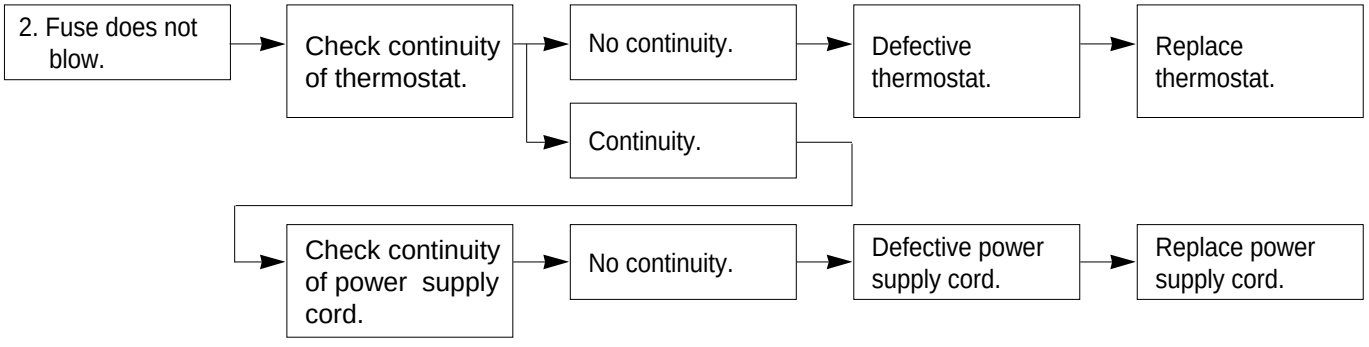
1. Incomplete segments.
   - Segment missing.
   - Partial segment missing.
   - Digit flickering (NOTE: Slight flickering is normal.)
2. Colon does not turn on or blink.
3. A distinct change in the brightness of one or more numbers in display.
4. One or more digits in the display are not lighting.
5. Display indicates a number different from one touched, for example, key in **5** and **3** appears in the display.
6. Specific numbers (for example 7 or 9) will not display when key pad is touched.
7. Display does not count down with time blinking or up with clock operation.
8. Display obviously jumps in time while counting down.
9. Display counts down too fast while cooking.
10. Each indicator light does not turn on after setting cooking cycle.
11. Display time of day does not reappear when cooking is finished.



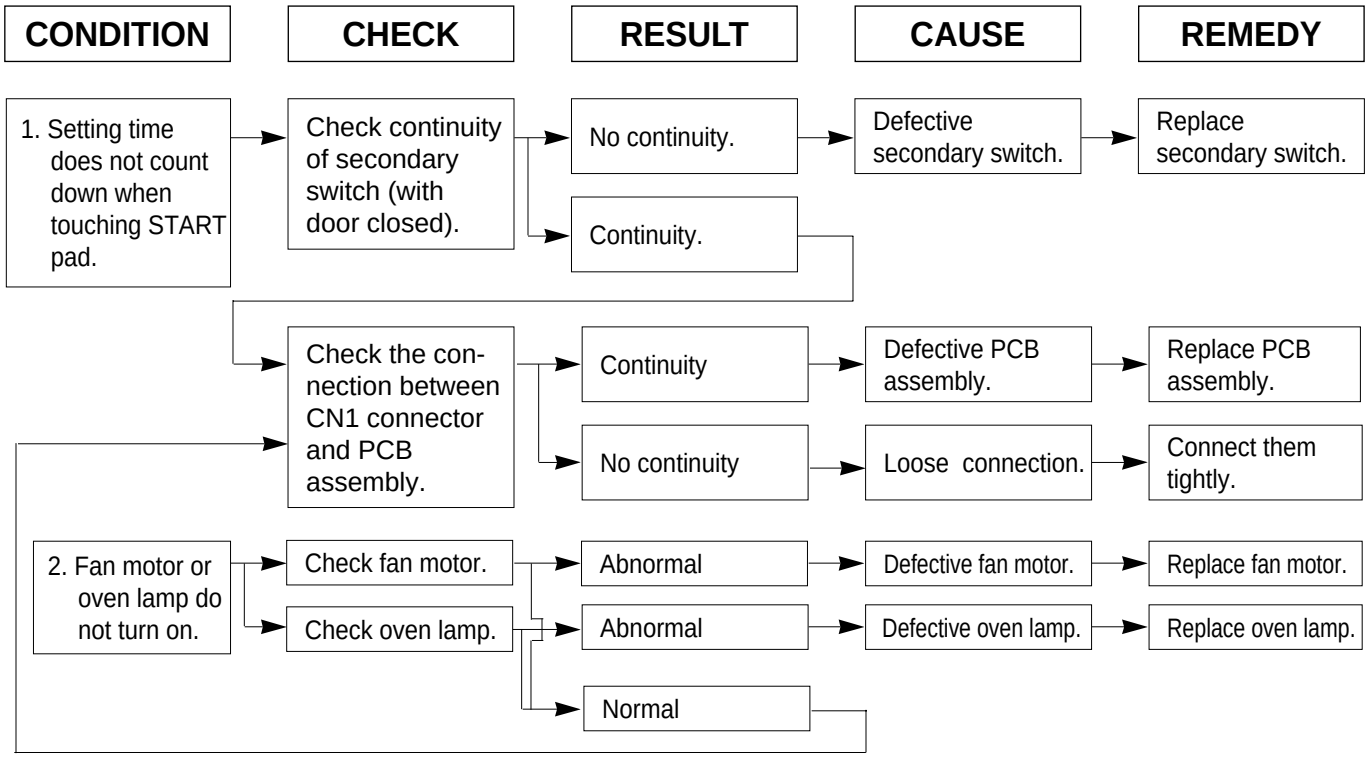
(TROUBLE 2) Oven does not operate at all, display window does not display any figures, and no input is accepted.



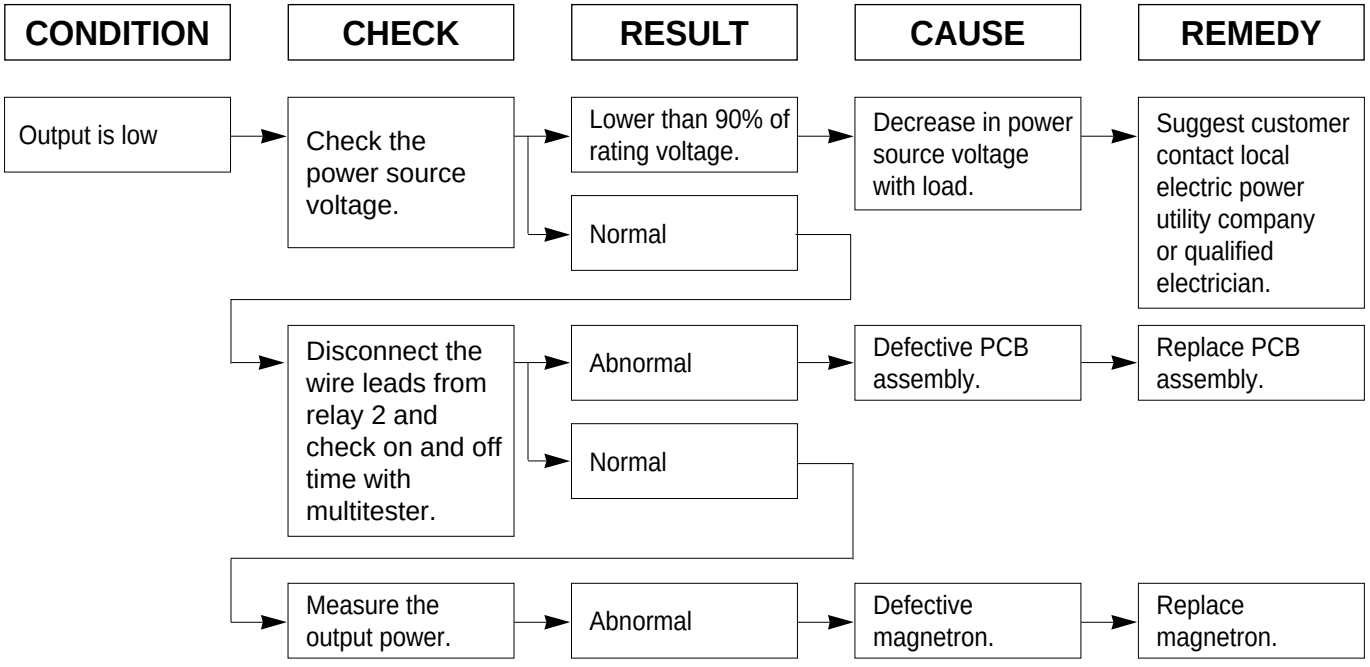
NOTE : All these switches must be replaced at the same time. Refer to page 5-7, 5-8



(TROUBLE 3) Display shows all figures set, but oven does not start cooking while desired program times are set and START pad is touched.

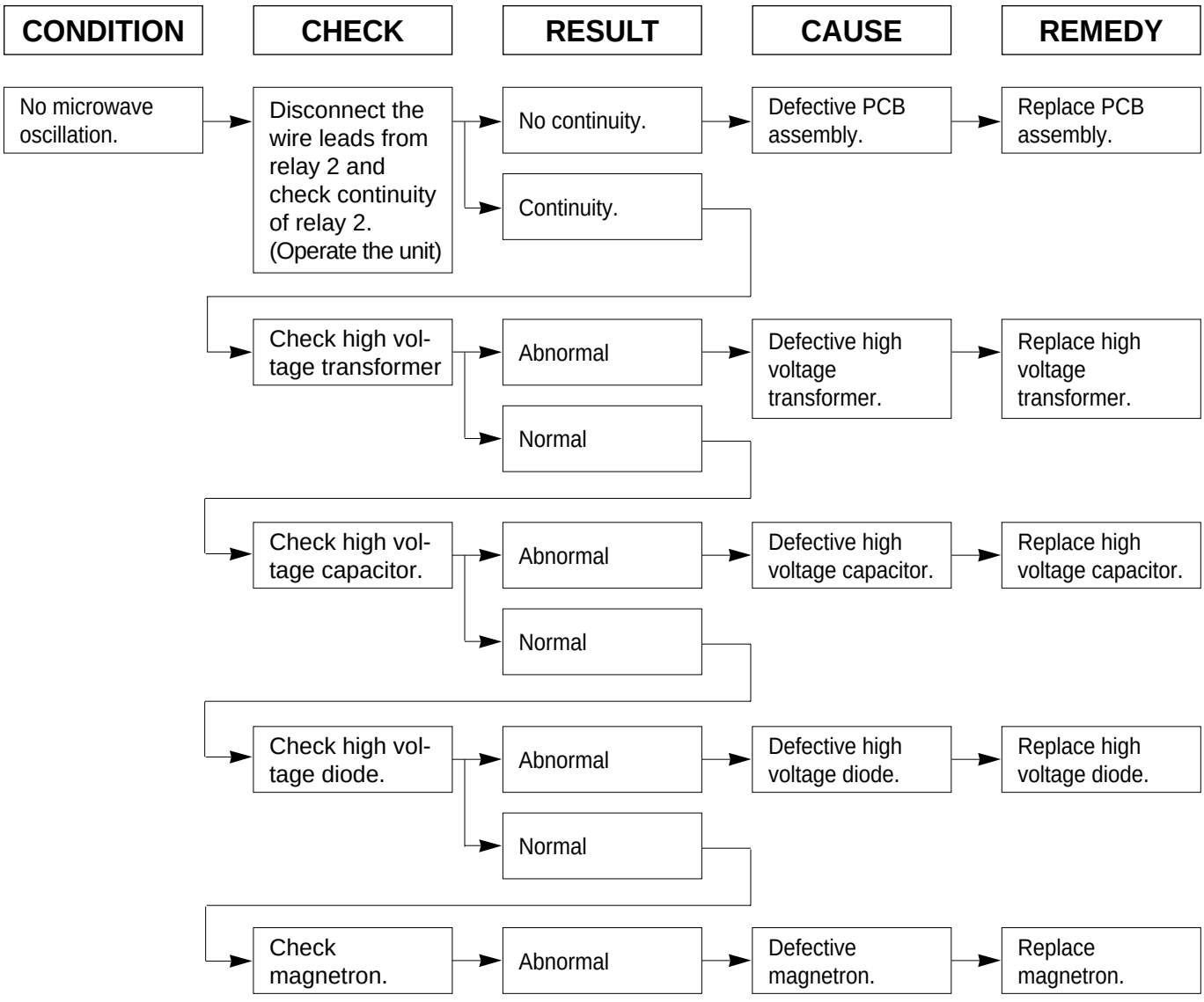


(TROUBLE 4) Oven seems to be operating but little heat is produced in oven load.



NOTE : Simple test of power output-conducted by heating one liter water for one min. if available.
Minimum 8.5°C temperature rise is normal condition.

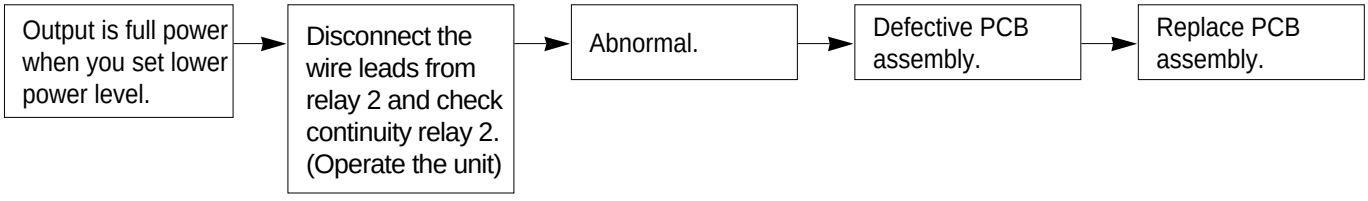
(TROUBLE 5) No microwave oscillation even though oven lamp and fan motor run. (Display operates properly)



NOTE : • Make sure the wire leads are in the correct position.

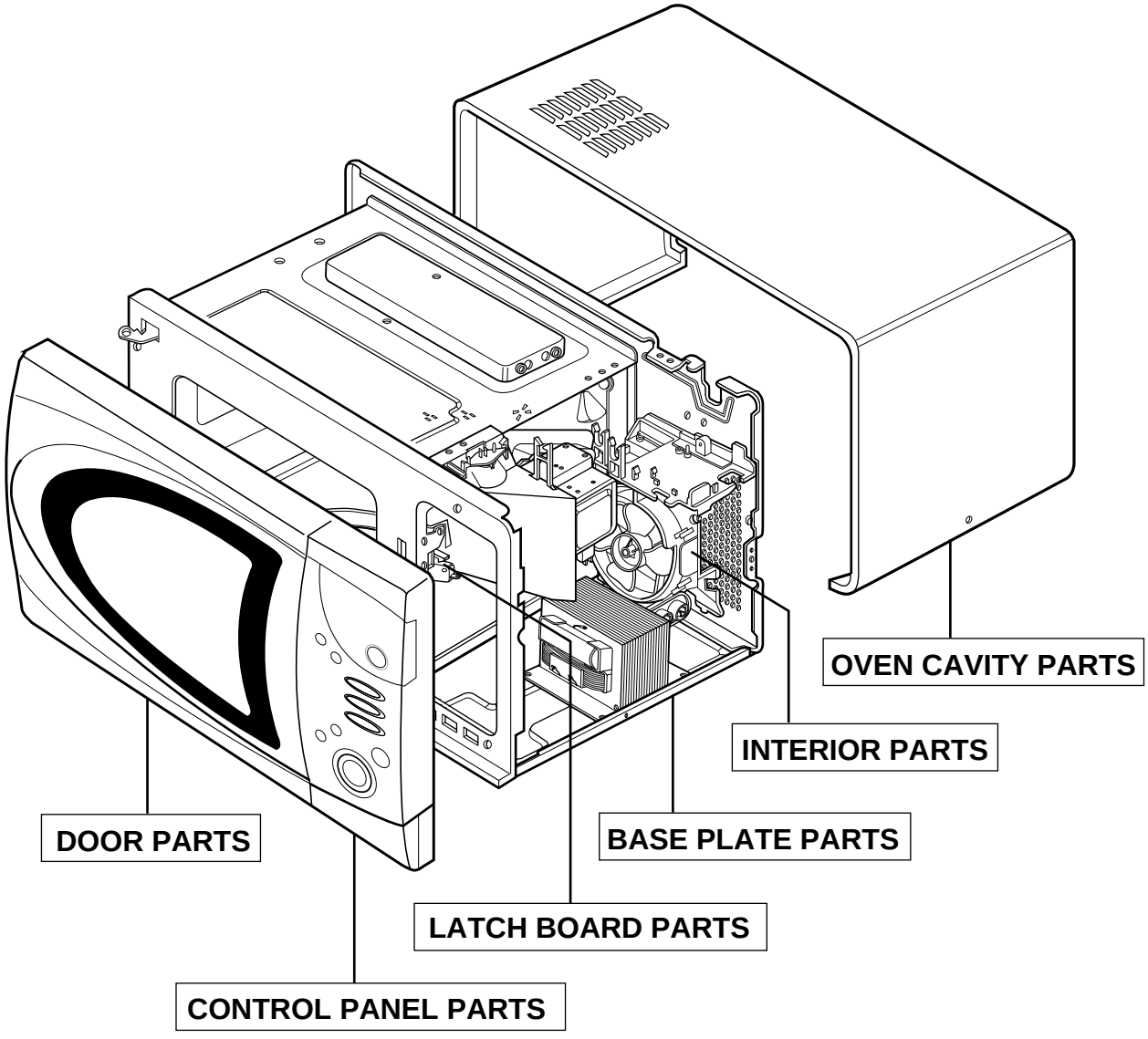
• When removing the wire leads from the parts, be sure to grasp the connector, not the wires.

• When removing the magnetron, be sure to install the magnetron gasket in the correct position and in good condition.

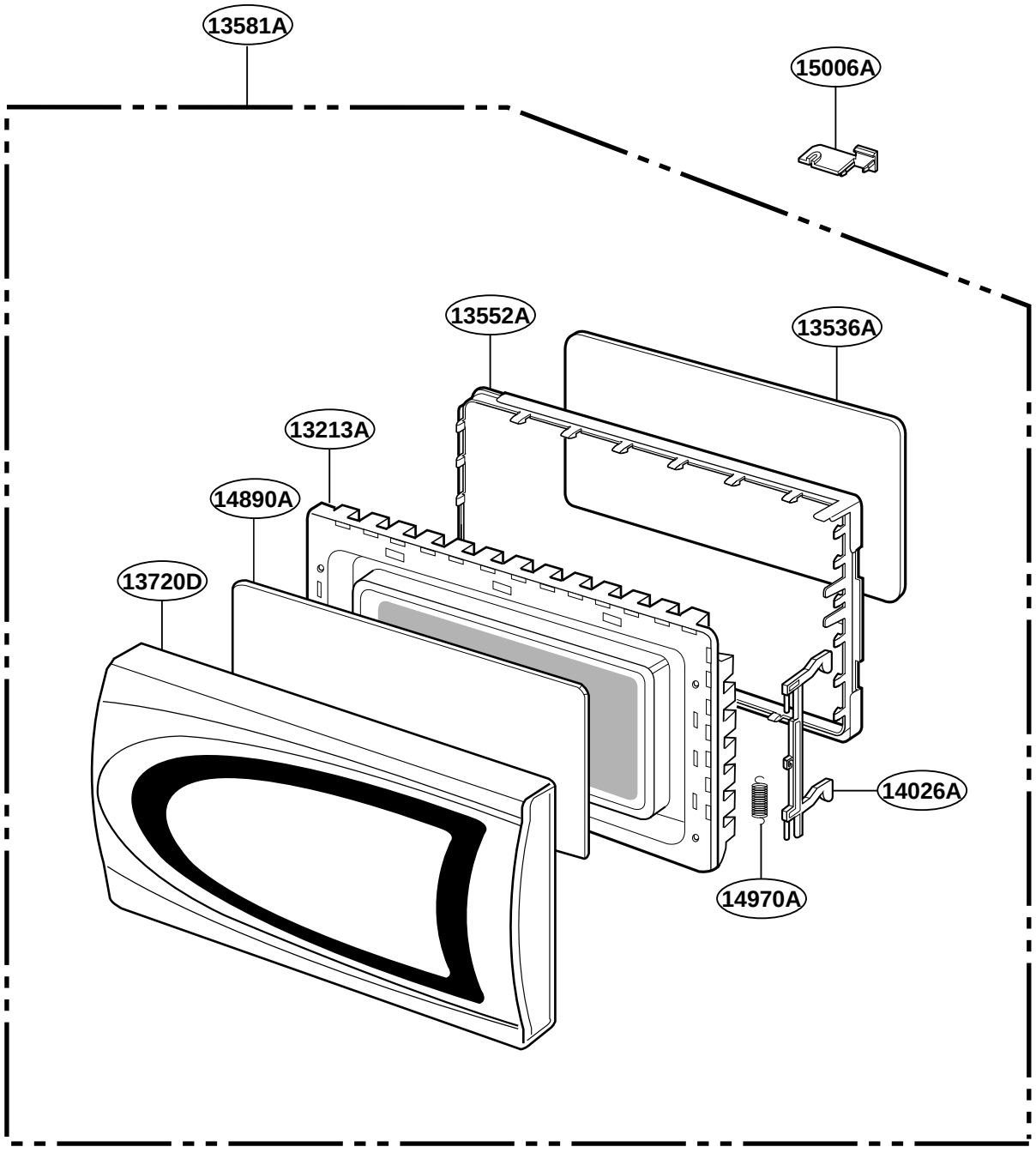


EXPLODED VIEW

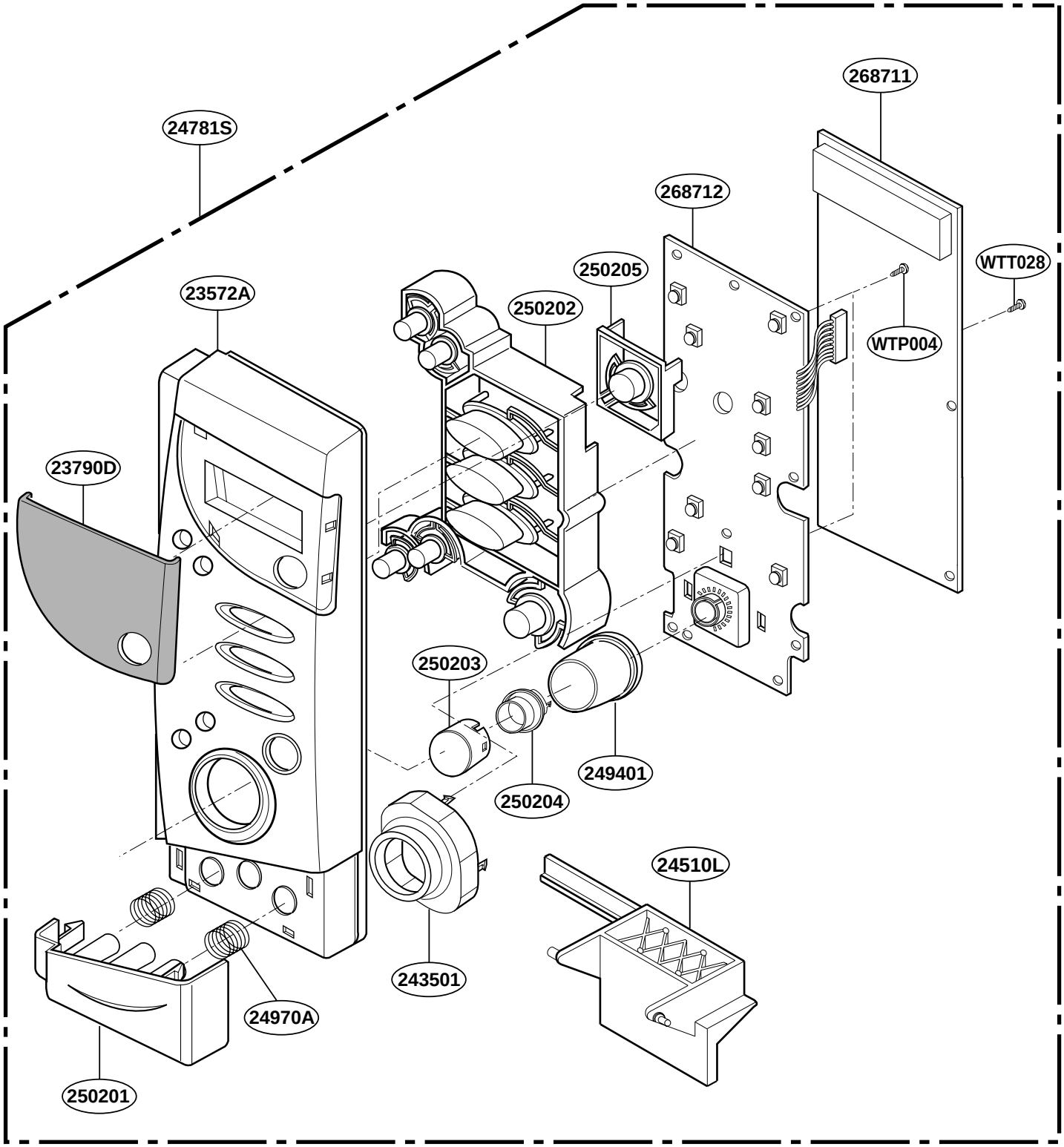
INTRODUCTION



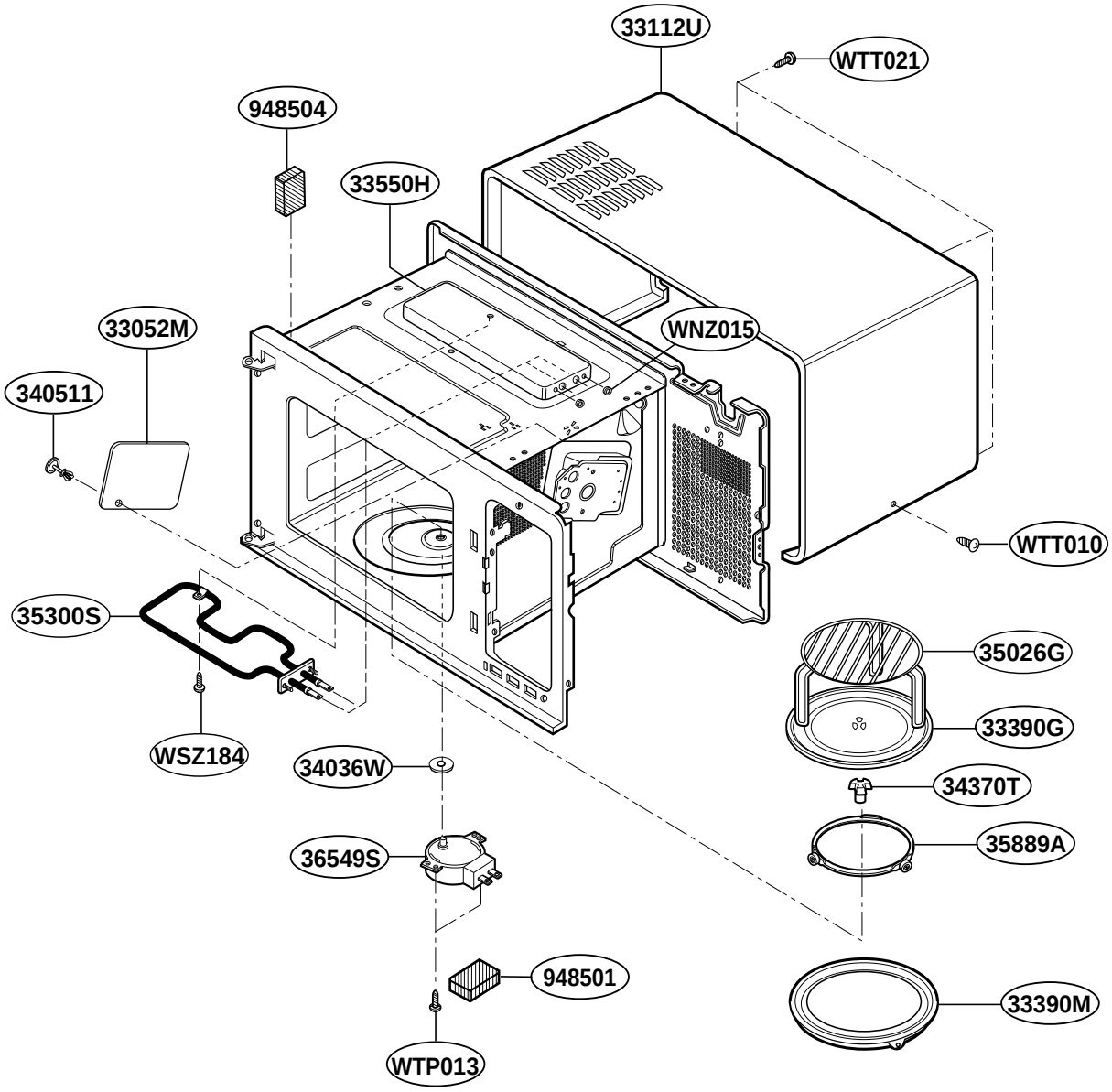
DOOR PARTS


13581A
15006A
13552A
13536A
13213A
14890A
13720D
14026A
14970A

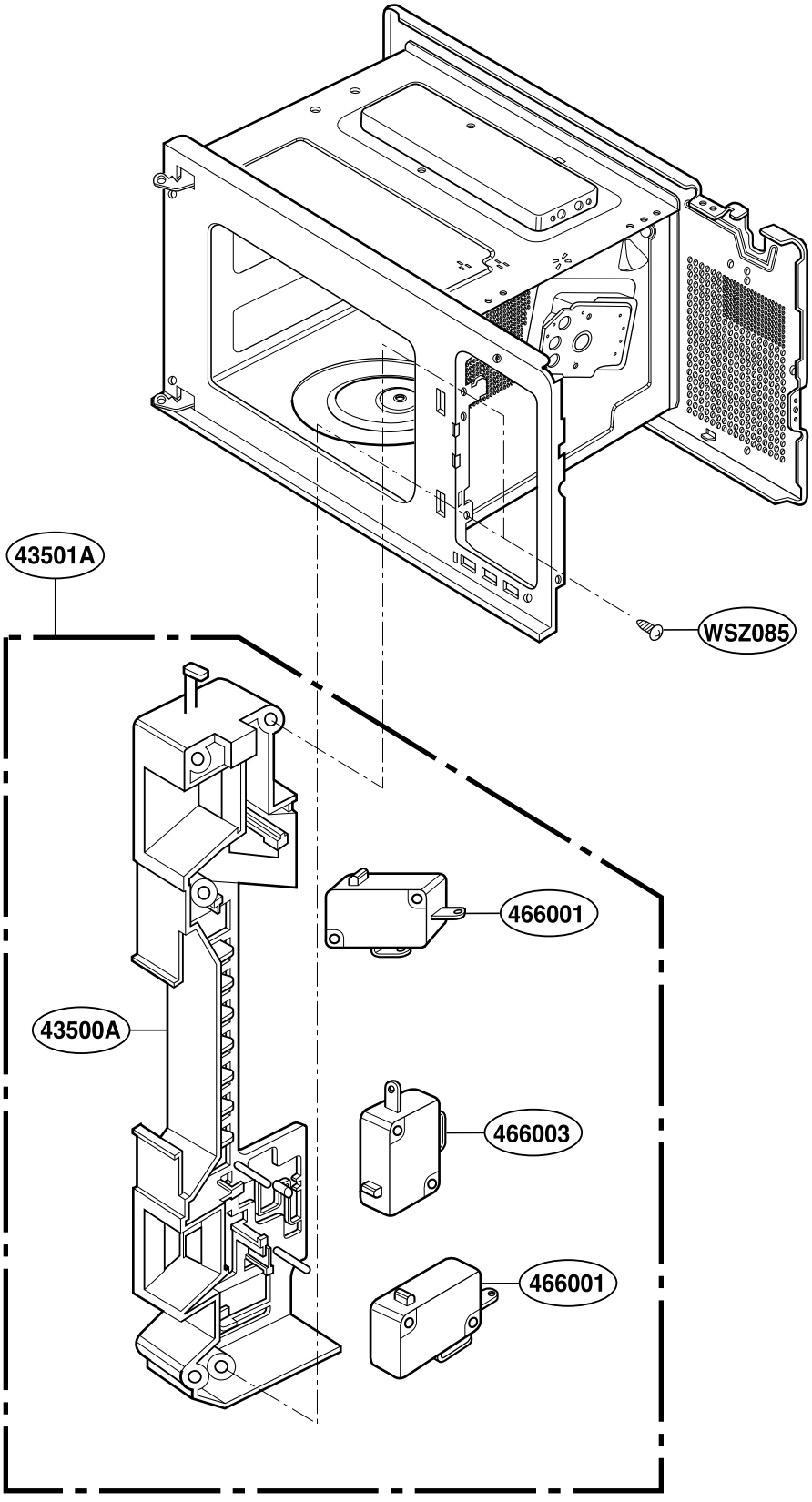
CONTROLLER PARTS



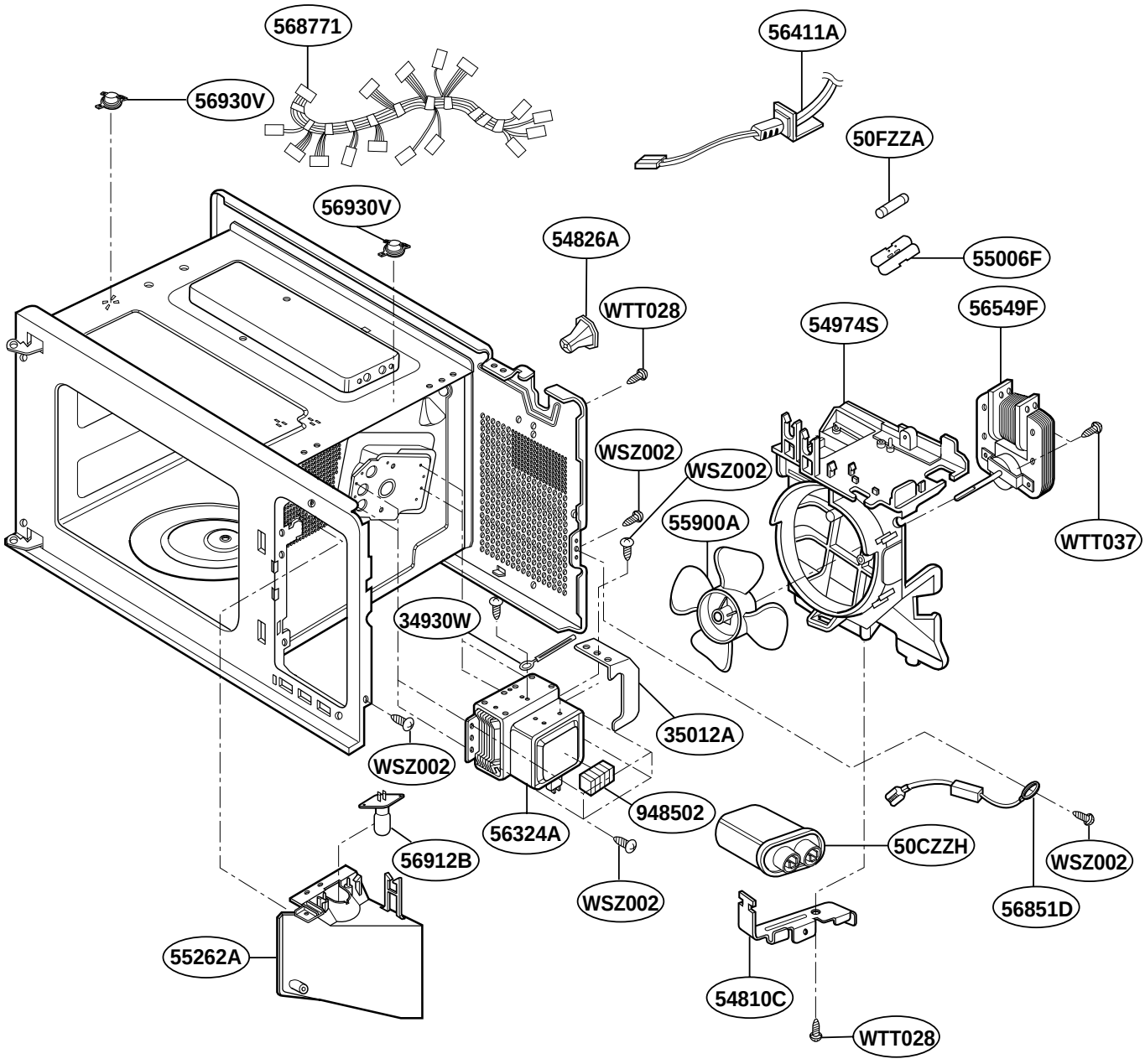
OVEN CAVITY PARTS



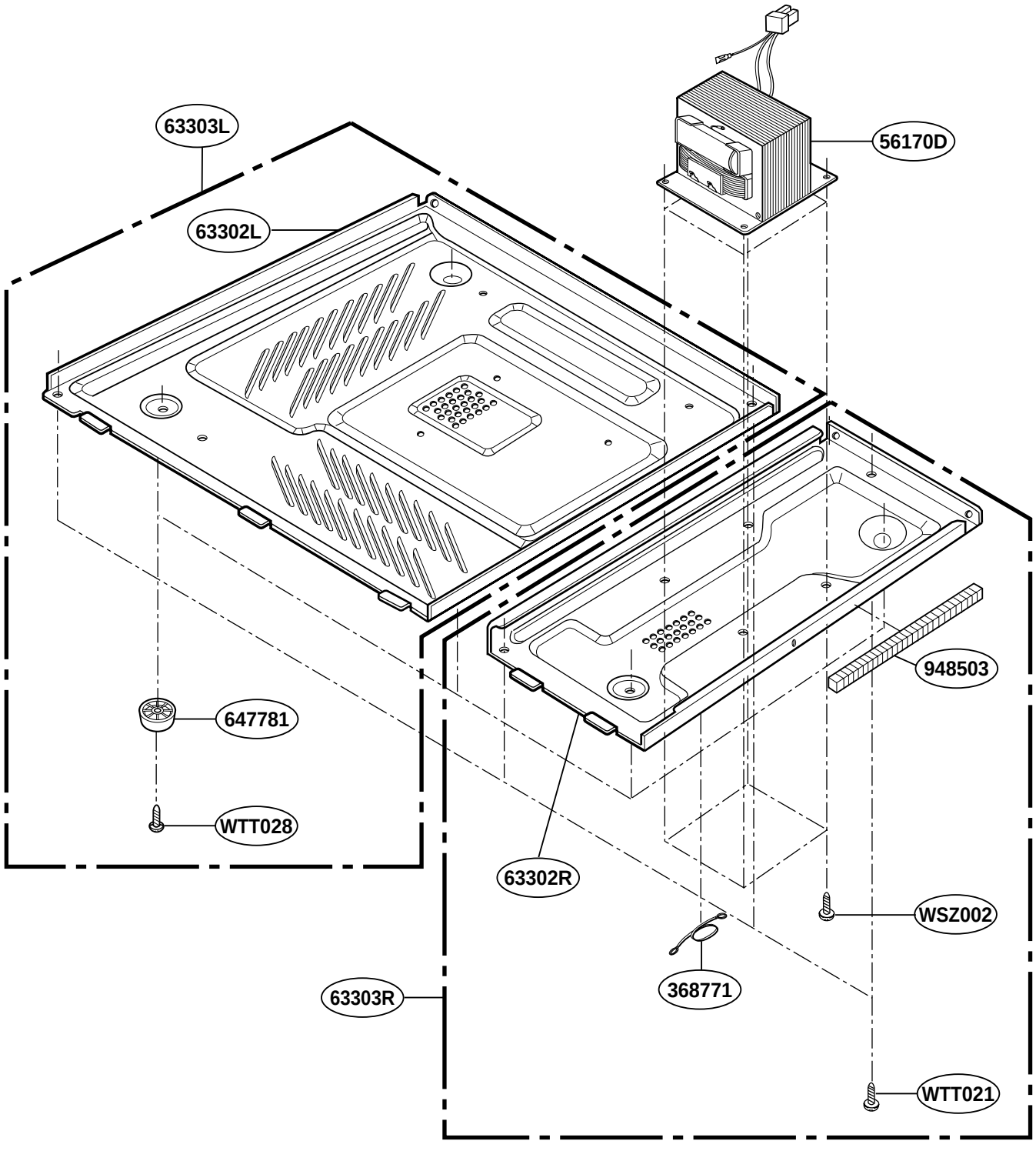
LATCH BOARD PARTS



INTERIOR PARTS



BASE PLATE PARTS



REPLACEMENT PARTS LIST

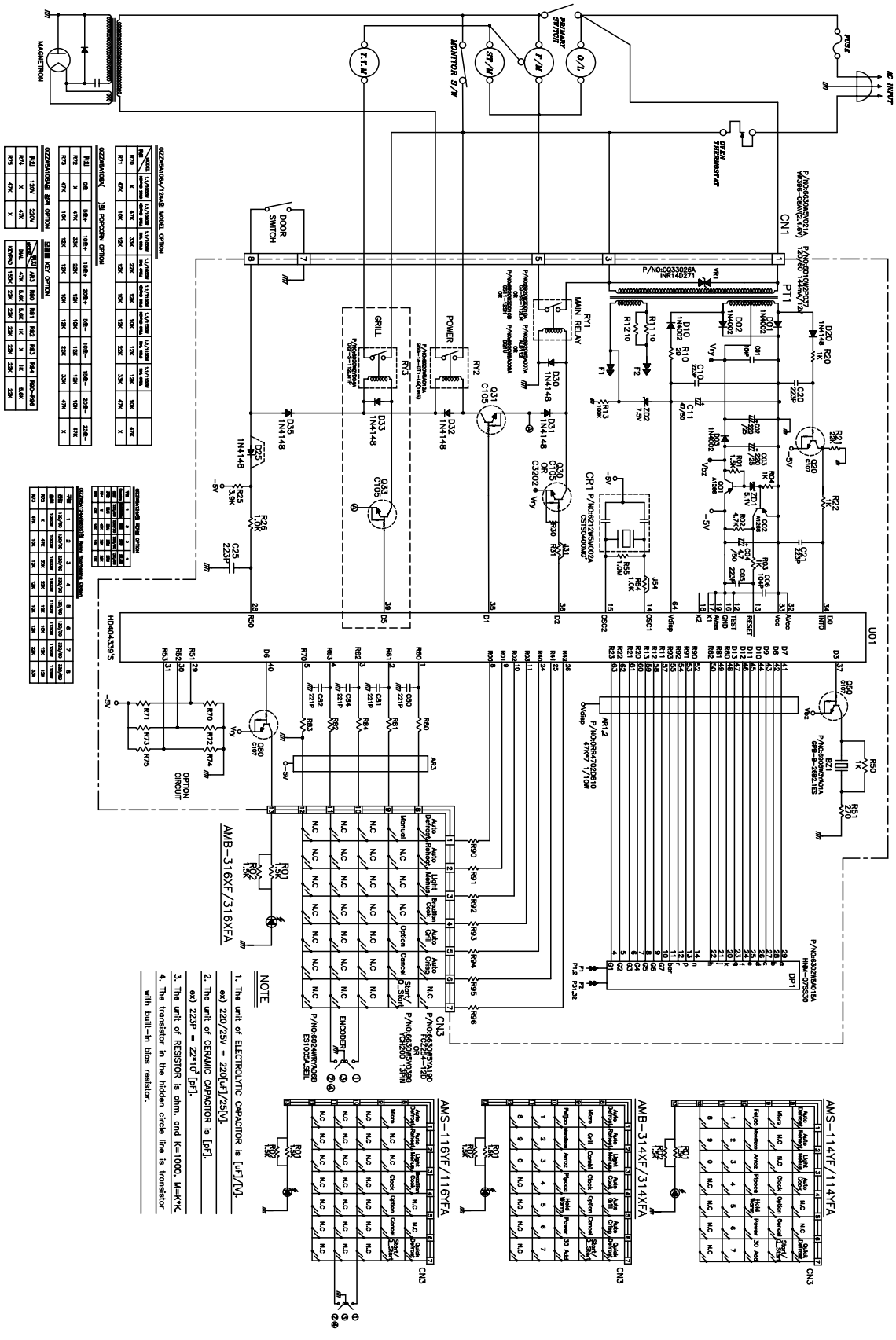
LOC. NO.	PART NO.	DESCRIPTION	SVC	ALTER
*01	3828W5A1811	MANUAL,OWNERS	R	
*02	3828W5S1726	MANUAL,SERVICE	R	
*05	3850W3D065A	LABEL,COOKING GUIDE	R	
13213A	3213W1A028B	DOOR FRAME ASSEMBLY	R	
13536A	3536WRA001L	SEAL TAPE	R	
13552A	3552W1A037A	CHOKE COVER	R	
13581A	3581W1A250B	DOOR ASSEMBLY	R	
13720D	3720W0D180C	PANEL,DOOR	R	
14026A	4026W2A012A	LATCH	R	
14890A	4890W1D039W	GLASS	R	
14970A	4970WRA001C	SPRING	R	
15006A	5006W3A017A	CAP,CHOKE COVER	R	
23572A	3572W0A221C	PANEL,CONTROL	R	
23790D	3790W2A001B	WINDOW,DIGITRON	R	
243501	4350W3A022A	RING	R	
24510L	4510W3L004A	LEVER	R	
24781S	4781W1S086H	CONTROLLER ASSEMBLY,SEMI MICOM	R	
249401	4940W3A020A	KNOB	R	
24970A	4B72023A	SPRING	R	
250201	5020W2A159A	BUTTON	B	8ABS0160958
250202	5020W2A158A	BUTTON	R	
250203	5020W3A141A	BUTTON	B	
250204	5020W2A084A	BUTTON	R	
250205	5020W3A140A	BUTTON	B	
268711	6871W2S234B	PWB(PCB) ASSEMBLY,SUB	R	
268712	6871W2S233A	PWB(PCB) ASSEMBLY,SUB	R	
33052M	3052W3M011C	CANOPY,MICA	R	
33112U	3112W1U015S	OUT CASE,U-BENDING	R	
33390G	3390W1G010A	TRAY,GLASS	R	
33390M	3390W1A011A	TRAY,METAL	R	
33550H	3550W1A084B	COVER,HEATER	R	
34036W	4036W3W001A	SEAL	R	
340511	4051W3A001A	RIVET ASSEMBLY	R	
34370T	4370W3A003A	SHAFT,TURN TABLE	R	
34930W	4B72510F	HOLDER,WIRE	R	
35012A	5012W3A020A	INSULATOR	R	
35026G	5026W1A037E	SHELF	R	
35300S	5300W1S002C	HEATER,SHEATH	R	
35889A	5889W2A005J	ROTATING RING ASSEMBLY	R	
36549S	6549W1S002A	MOTOR(CIRC),SYNCHRONOUS	R	6549W1S016A
368771	4B75297B	HARNESS	R	
43500A	3500W1A004A	BOARD,LATCH	R	
43501A	3501W1A003H	BOARD ASSEMBLY,LATCH	R	
466001	3B73362F	SWITCH,MICRO	R	6600W1K004C
466001	3B73362F	SWITCH,MICRO	R	3B73362E

R: SERVICE PARTS

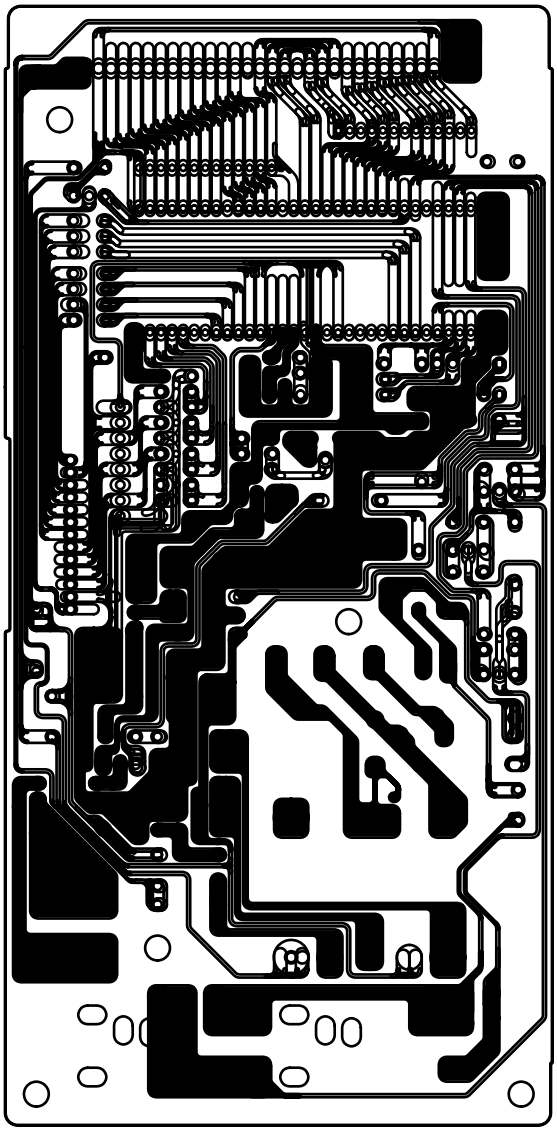
LOC. NO.	PART NO.	DESCRIPTION	SVC	ALTER
466003	3B73361E	SWITCH,MICRO	R	6600W1K004B
466003	3B73361E	SWITCH,MICRO	R	3B73361D
50CZZH	6120W3H003F	CAPACITOR,DRAWING[HIGH VOLTAGE]	R	0CZZW1H002F
50FZZA	3B74133K	FUSE,DRAWING	R	
54810C	4810W4C003C	BRACKET,CAPACITOR	R	
54826A	4B70774A	SPACER	R	
54974S	4974W1S010A	GUIDE,SUCTION	R	
55006F	5006WRA002A	CAP,FUSE	R	
55262A	5262W2A041A	DUCT	R	
55900A	2B72125B	FAN	R	
56170D	6170W1D061A	TRANSFORMER,HIGH VOLTAGE	R	6170W1D023B
56170D	6170W1D061A	TRANSFORMER,HIGH VOLTAGE	R	6170W1D050A
56324A	6324W1A001B	MAGNETRON	R	
56411A	6411W1A022B	POWER CORD ASSEMBLY	R	
56549F	6549W1F005B	MOTOR(CIRC),FAN	R	6549W1F007B
56851D	6021W3B001M	CABLE ASSEMBLY	R	6021W3B001K
568771	6877W1A283B	HARNESS	R	
56912B	6912W3B002G	LAMP,DRAWING	R	
56930V	6930WRT001B	THERMOSTAT	R	
63302L	3302W1A036G	BASE PLATE	R	
63302R	3302W1A035G	BASE PLATE	R	
63303L	3303W1A028M	BASE PLATE ASSEMBLY	R	
63303R	3303W2A004K	BASE PLATE ASSEMBLY	R	
647781	4B73900A	LEG	R	
948501	4850W4C001D	CUSHION	R	
948502	4850W4C001J	CUSHION	R	
948503	3B72244G	CUSHION	R	
948504	3B72244C	CUSHION	R	
WNZ015	4B71028B	NUT,DRAWING	R	
WSZ002	1SBF0402418	SCREW TAP TITE(S),BINDING HEAD	R	
WSZ085	4B70188C	SCREW,DRAWING	R	
WSZ184	1SZZW2Z001E	SCREW,DRAWING	R	
WTP004	1TPL0302418	SCREW TAPPING,PAN HEAD	R	
WTP013	1TPL0402418	SCREW TAPPING,PAN HEAD	R	
WTT010	1TTG0402422	SCREW TAPPING,TRUSS HEAD	R	
WTT021	1TTL0402418	SCREW TAPPING,TRUSS HEAD	R	
WTT028	1TTL0402818	SCREW TAPPING,TRUSS HEAD	R	
WTT037	1TTL0403818	SCREW TAPPING,TRUSS HEAD	R	

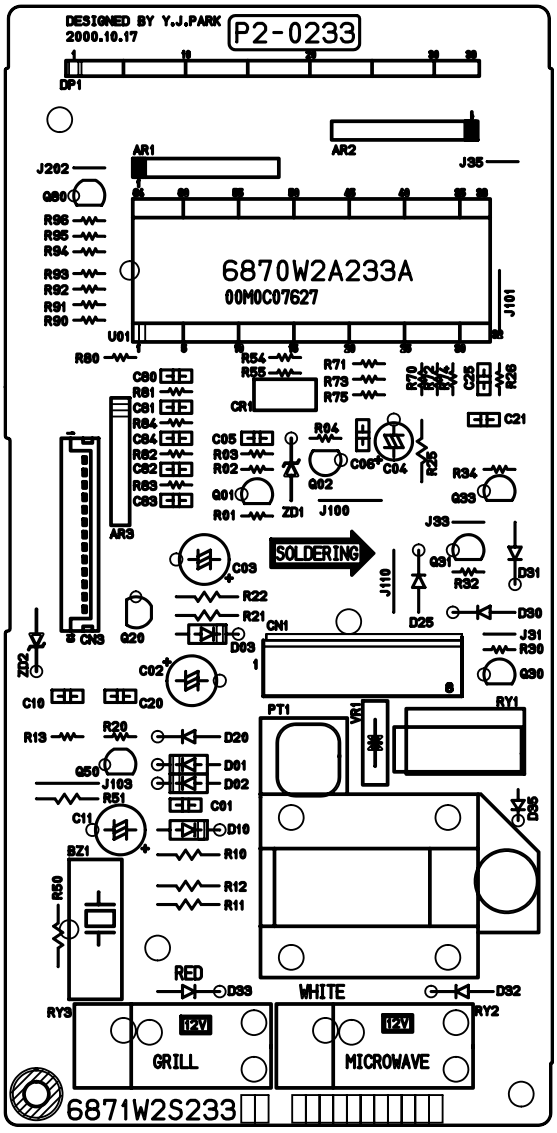
R: SERVICE PARTS

SCHEMATIC DIAGRAM OF P.C.B.



PRINTED CIRCUIT BOARD





P.C.B PARTS LIST

LOC. NO.	PART NO.	DESCRIPTION	SPECIFICATION	SVC	ALTER
AR3	0RZ4702G610	RESISTOR,DRAWING	47KOHM 1/4W 5% 3216 BULK 8 PIN	R	
C01	0CK1040K949	CAPACITOR,FIXED CERAMIC	0.1UF D 50V 80%,-20% F(Y5V) TA52	R	
C02	0CE2276H638	CAPACITOR,FIXED ELECTROLYTIC	220UF SMS,SG 25V 20% FM5 TP 5	R	
C03	0CE2276H638	CAPACITOR,FIXED ELECTROLYTIC	220UF SMS,SG 25V 20% FM5 TP 5	R	
C03	0CE2276H638	CAPACITOR,FIXED ELECTROLYTIC	220UF SMS,SG 25V 20% FM5 TP 5	R	
C04	0CE4756K638	CAPACITOR,FIXED ELECTROLYTIC	4.7UF SMS,SG(HR) 50V 20% FM5 TP 5	R	
C05	0CK2230K949	CAPACITOR,FIXED CERAMIC	22NF D 50V 80%,-20% F(Y5V) TA52	R	
C06	0CK1040K949	CAPACITOR,FIXED CERAMIC	0.1UF D 50V 80%,-20% F(Y5V) TA52	R	
C10	0CK2230K949	CAPACITOR,FIXED CERAMIC	22NF D 50V 80%,-20% F(Y5V) TA52	R	
C11	0CE4766K638	CAPACITOR,FIXED ELECTROLYTIC	47UF SMS,SG 50V 20% FM5 TP 5	R	
C20	0CK2230K949	CAPACITOR,FIXED CERAMIC	22NF D 50V 80%,-20% F(Y5V) TA52	R	
C21	0CK2230K949	CAPACITOR,FIXED CERAMIC	22NF D 50V 80%,-20% F(Y5V) TA52	R	
C25	0CK2230K949	CAPACITOR,FIXED CERAMIC	22NF D 50V 80%,-20% F(Y5V) TA52	R	
C80	0CK2210K519	CAPACITOR,FIXED CERAMIC	220PF D 50V 10% B(Y5P) TA52	R	
C81	0CK2210K519	CAPACITOR,FIXED CERAMIC	220PF D 50V 10% B(Y5P) TA52	R	
C82	0CK2210K519	CAPACITOR,FIXED CERAMIC	220PF D 50V 10% B(Y5P) TA52	R	
C84	0CK2210K519	CAPACITOR,FIXED CERAMIC	220PF D 50V 10% B(Y5P) TA52	R	
CU4	4850W4C001D	CUSHION	9T 15W 40L RUBBER	R	
D01	0DD400209AD	DIODE,SWITCHING	1N4002 PYUNG CHANG TP52 DO41	R	
D02	0DD400209AD	DIODE,SWITCHING	1N4002 PYUNG CHANG TP52 DO41	R	
D03	0DD400209AD	DIODE,SWITCHING	1N4002 PYUNG CHANG TP52 DO41	R	
D10	0DD400209AD	DIODE,SWITCHING	1N4002 PYUNG CHANG TP52 DO41	R	
D20	0DD414809AD	DIODE,SWITCHING	1N4148 PYUNG CHANG TP52 DO35	R	
D30	0DD414809AD	DIODE,SWITCHING	1N4148 PYUNG CHANG TP52 DO35	R	
D31	0DD414809AD	DIODE,SWITCHING	1N4148 PYUNG CHANG TP52 DO35	R	
D32	0DD414809AD	DIODE,SWITCHING	1N4148 PYUNG CHANG TP52 DO35	R	
D33	0DD414809AD	DIODE,SWITCHING	1N4148 PYUNG CHANG TP52 DO35	R	
DP1	6302W5A015A	DIGITRON	HNM-07SS30 7 AMB-314XF W/POOL	R	
EN01	6024WRYA06B	VOLUME,ROTARY	ES1005A SEIL 24CLICK LGEAZ	R	
LED1	0DLZW5A003A	LED	LITEON LTL-12BGE-1 BK GREEN NA	R	
Q01	0TR126609AA	TRANSISTOR,BIPOLARS	KEC KTA1266-Y(KTA1015) TP TO92	R	
Q02	0TR126609AA	TRANSISTOR,BIPOLARS	KEC KTA1266-Y(KTA1015) TP TO92	R	
Q20	0TR107009AD	TRANSISTOR,BIPOLARS	KEC KRC 107M TP TO92M 50V 100MA	R	
Q30	0TR105009AB	TRANSISTOR,BIPOLARS	KEC KRC105M(KRC1205) TP TO92	R	
Q31	0TR105009AB	TRANSISTOR,BIPOLARS	KEC KRC105M(KRC1205) TP TO92	R	
Q33	0TR105009AB	TRANSISTOR,BIPOLARS	KEC KRC105M(KRC1205) TP TO92	R	
Q50	0TR107009AD	TRANSISTOR,BIPOLARS	KEC KRC 107M TP TO92M 50V 100MA	R	
Q80	0TR107009AD	TRANSISTOR,BIPOLARS	KEC KRC 107M TP TO92M 50V 100MA	R	
R01	0RD1501G609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/4 W 5% TA52	R	
R01	0RD1501F609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/6 W 5% TA52	R	
R02	0RD1501G609	RESISTOR,FIXED CARBON FILM	1.5K OHM 1/4 W 5% TA52	R	
R02	0RD4701F609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/6 W 5% TA52	R	
R03	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R04	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R10	0RD0202F609	RESISTOR,FIXED CARBON FILM	20 OHM 1/6 W 5% TA52	R	
R11	0RD0102F609	RESISTOR,FIXED CARBON FILM	10 OHM 1/6 W 5% TA52	R	
R12	0RD0102F609	RESISTOR,FIXED CARBON FILM	10 OHM 1/6 W 5% TA52	R	
R13	0RD1003F609	RESISTOR,FIXED CARBON FILM	100K OHM 1/6 W 5% TA52	R	
R20	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R21	0RD2202F609	RESISTOR,FIXED CARBON FILM	22K OHM 1/6 W 5% TA52	R	
R22	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R25	0RD3901F609	RESISTOR,FIXED CARBON FILM	3.9K OHM 1/6 W 5% TA52	R	

R: SERVICE PARTS

LOC. NO.	PART NO.	DESCRIPTION	SPECIFICATION	SVC	ALTER
R26	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R50	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R51	0RD2700F609	RESISTOR,FIXED CARBON FILM	270 OHM 1/6 W 5% TA52	R	
R55	0RD1004F609	RESISTOR,FIXED CARBON FILM	1M OHM 1/6 W 5% TA52	R	
R70	0RD2202F609	RESISTOR,FIXED CARBON FILM	22K OHM 1/6 W 5% TA52	R	
R71	0RD1202F609	RESISTOR,FIXED CARBON FILM	12K OHM 1/6 W 5% TA52	R	
R73	0RD4702F609	RESISTOR,FIXED CARBON FILM	47K OHM 1/6 W 5% TA52	R	
R75	0RD4702F609	RESISTOR,FIXED CARBON FILM	47K OHM 1/6 W 5% TA52	R	
R80	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R81	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R82	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R83	0RD4701F609	RESISTOR,FIXED CARBON FILM	4.7K OHM 1/6 W 5% TA52	R	
R84	0RD1001F609	RESISTOR,FIXED CARBON FILM	1K OHM 1/6 W 5% TA52	R	
R90	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R91	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R92	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R93	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R94	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R95	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
R96	0RD5601F609	RESISTOR,FIXED CARBON FILM	5.6K OHM 1/6 W 5% TA52	R	
RY1	6920W5A008A	RELAY	DQ1U DAIICHI 250VAC 3A 12VDC	R	6920W5A007A
RY1	6920W5A008A	RELAY	DQ1U DAIICHI 250VAC 3A 12VDC	R	6920W2D010B
RY1	6920W5A008A	RELAY	DQ1U DAIICHI 250VAC 3A 12VDC	R	6920W2D010A
RY3	6920W2YD04A	RELAY	OZF-S-112LM1P OEG 240VAC 16A	R	6920W5A012A
SW01	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW02	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW03	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW04	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW05	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW06	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW07	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW08	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW09	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
SW10	6600W5R004A	SWITCH,TACT	IT-1102AH-T 200 IN SUNG 15V 20MA	R	
U01	0IZZW5A106A	IC,DRAWING	HITACHI 64 DIP BK BRAZIL	R	
ZD1	0DZ510009AF	DIODE,ZENERS	UZ-5.1BS PYUNG CHANG TP52 DO34	R	
ZD2	0DZ750009BB	DIODE,ZENERS	UZ-7.5BS PYUNG CHANG TP52 DO34	R	

R: SERVICE PARTS

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