



TECHNICAL FLASH



BASIC SERVICE MANUAL

FOR

MICROWAVE HOOD COMBINATION

MODEL 721. 64682/721. 64683

721. 64684/721. 64689

721. 80882/721. 80883

721. 80884/721. 80889

AUGUST, 2003

CAUTION

WARNING TO SERVICE TECHNICIANS

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.**
 - e. A Microwave leakage check to verify compliance with the Federal performance standard should be performed on each oven prior to release to the owner.**
- Proper operation of the microwave ovens requires that the magnetron be assembled to the wave guide 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.
 - Routine service safety procedures should be exercised at all times.
 - Untrained personnel should not attempt service without a thorough review of the test procedures and safety information contained in this manual.

FOREWORD

Read this Manual carefully. Failure to adhere to or observe the information in this Manual may result in exposing yourself to the Microwave Energy normally contained within the oven cavity.

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SPECIFICATIONS

| | |
|---|---|
| Rated Power Consumption | 1400W maximum (Microwave oven+Cook top lamps+Ventilation fan) |
| Microwave Output | 1200W (IEC 60705) |
| Frequency | 2,450 MHz ± 50 MHz |
| Power Supply | 120 VAC, 60 Hz |
| Rated Current | 12 Amp. (Microwave oven+Cook top lamps+Ventilation fan) |
| Magnetron Cooling | Forced Air Cooling |
| Rectification | Rectification Voltage Double Half-Wave |
| Door Sealing | Choke System |
| Safety Devices | Thermostat: Open at 110°C ± 5°C Close at 0°C ± 5°C Fuse(20A) Primary Interlock Switch Secondary Interlock Switch Interlock Monitor Switch |
| Inverter | P1-1019, 120 V |
| Magnetron | 2M261 |
| Cook top Lamp | 120 V, 20 W (Halogen) |
| Cavity Lamp | 125 V, 30 W |
| Timer | Digital, up to 99 min. 99 sec. (in each cooking stage) |
| Tray | Tempered Safety Glass |
| Overall Dimensions | 29 ^{15/16} "(W)x16 ^{7/16} "(H)x15 ^{3/8} "(D) |
| Oven Cavity Size | 23 ^{1/2} "(W)x10 ^{3/16} "(H)x14 ^{1/2} "(D) |
| Effective Capacity of Oven Cavity | 2.0 Cu.ft. |
| Accessories | Owner's Manual & Cooking Guide, Installation Manual, Exhaust Adapter, Exhaust Damper, Mounting Kit and Filter, Rotating Ring Assembly, Glass Tray, Metal Rack, Defrost Plate. |

SWITCH CHART

| SWITCH MODE | PRIMARY INTERLOCK SWITCH | SECONDARY INTERLOCK SWITCH | INTERLOCK MONITOR SWITCH |
|-------------|--------------------------|----------------------------|--------------------------|
| CONDITIONS | COM NO | COM NO | COM NC |
| DOOR OPEN | | | |
| DOOR CLOSED | | | |

NOTE: Use the above switch chart with circuit diagram on page 5-1.

CAUTIONS

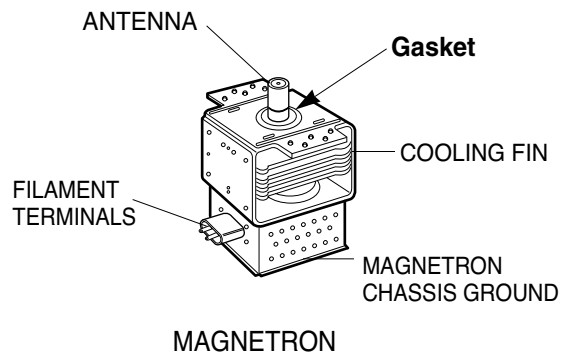
Unlike other appliances, the microwave oven is high-voltage and high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

- 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.
- 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.**



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

INSTALLATIONS

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

PRECAUTIONS ON INSTALLATION

- A. Plug the power supply cord into a 120V AC, 60Hz, single-phase power source with a capacity of at least 20 amperes.
- B. Avoid placing the unit in a location where there is direct heat or splashing water.
- C. Install the unit on the mounting plate firmly.
- D. Place the unit as far away as possible from TV, radio, etc. to prevent interference.

GROUNDING INSTRUCTIONS

For personal safety, this appliance must be fully grounded at all times.

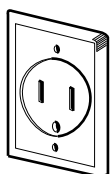
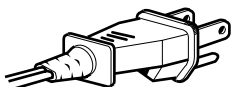
In the event of an electrical short circuit, grounding reduces the risk of electrical shock.

The plug must be plugged into an outlet that is properly installed and grounded.

CAUTION

This unit is equipped with a 3-prong plug for your safety. If the wall outlet is a grounded 3-hole type, the unit will be grounded automatically.

Plug with Ground Prong



Properly Polarized and Grounded Outlet

WARNING

Improper use of the grounding plug can result in a risk of electric shock.

Do not, under any circumstances, cut or remove the third ground prong from the power cord plug.

OPERATING INSTRUCTIONS

CONTROL PANEL



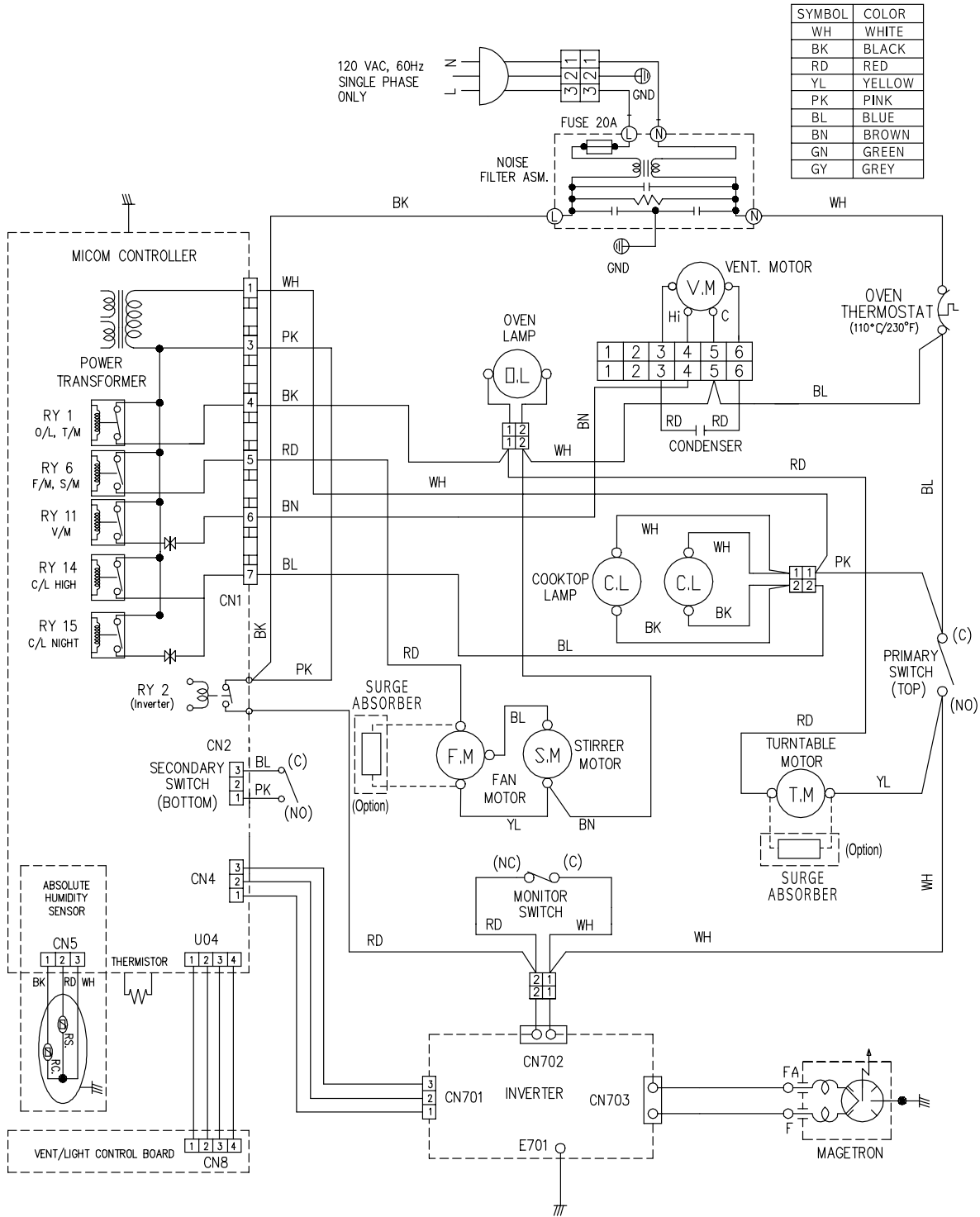
CONTROL PANEL INSTRUCTIONS

- 1. Display.** The display includes a clock and indicators to tell you time of day, cooking time settings, cook powers, quantities, weights, and cooking functions selected.
- 2. Popcorn.** Touch this pad to pop popcorn with the sensor feature. The oven's sensor will tell the oven how long to cook depending on the amount of humidity it detects from the popcorn.
- 3. Pizza.** Touch this pad to reheat one or several slices of pizza without entering a cook time or power.
- 4. Vegetable.** Touch this pad to cook without entering a cook time or power.
- 5. Potato.** Touch this pad to cook potatoes without entering a cook time or power.
- 6. Frozen Entree.** Touch this pad to cook a 10- to 21-ounce frozen entree without entering a cook time or power.
- 7. Dinner Plate.** Touch this pad to cook without entering a cook time or power.
- 8. Sure Simmer.** Touch this pad to simmer soups, casseroles, stews, and other liquid foods.
- 9. Number Pads.** Touch number pads to enter cooking times, cook powers, quantities, weights, or food categories.
- 10. Cook Time.** Touch this pad followed by Number Pads to set a cooking time.
- 11. Power.** Touch this pad after the cook time has been set, followed by a Number Pad to set the amount of microwave energy released to cook the food. The higher the number, the higher the microwave power or "cooking speed."
- 12. Add Minute.** Touch this pad to cook for 1 minute at 100% cook power, or to add extra minutes at the set cook power to your cooking cycle.
- 13. Less.** Touch this pad to subtract 10 seconds of cook time each time you press it.
- 14. More.** Touch this pad to add 10 seconds of cook time each time you press it.
- 15. Start.** Touch this pad to start a function. If you open the door after the oven begins to cook, retouch Start.
- 16. Stop/Clear.** Touch this pad to erase an incorrect command, cancel a program during cooking, or to clear the Display.
- 17. Auto Cook.** Touch this pad to cook microwavable foods without entering a cook time or power.
- 18. Auto Reheat.** Touch this pad to reheat microwavable foods without entering a cook time or power.
- 19. Hold Warm.** Touch this pad to keep hot, cooked foods safely warm in your oven for up to 99 minutes, 99 seconds. Hold Warm can be used by itself, or it can automatically follow a cooking cycle.
- 20. Clock.** Touch this pad to enter the time of day.
- 21. Auto Defrost.** Touch this pad followed by Number Pads to thaw frozen meat by weight.
- 22. Express Defrost.** Touch this pad to express defrost. "GROUND BEEF 1.0 LBS TOUCH START" will appear in the display.
- 23. Kitchen Timer.** Touch this pad to set the Kitchen Timer.
- 24. Melt.** Touch this pad to melt chocolate, cheese, butter, or marshmallows.
- 25. Soften.** Touch this pad to soften ice cream, cream cheese, butter, or frozen juice.
- 26. Vent On/Off.** Touch this button to turn the fan on or off.
- 27. Vent 5 Speed.** Touch this button to choose one of 5 fan speeds.
- 28. Light High/Night/Off.** Touch this button to turn the light on high, night, or off.

NOTE: If you try to enter incorrect instructions, you will not hear any tones. Touch STOP/CLEAR and re-enter the instructions.

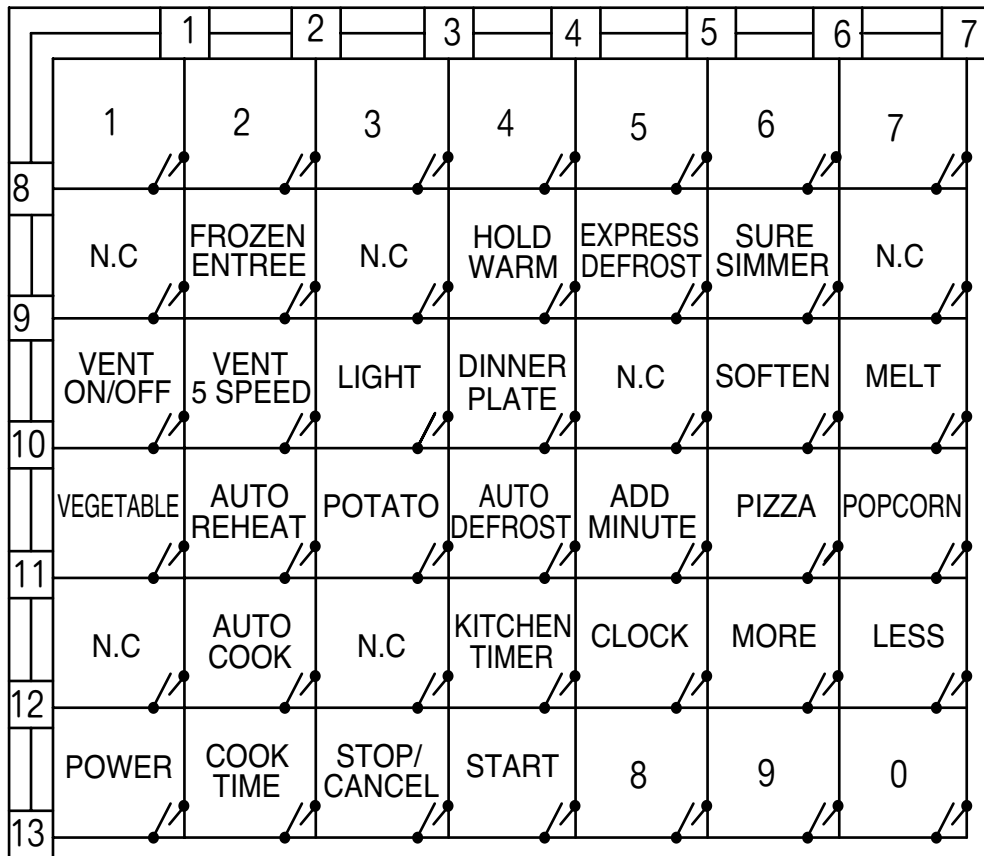
OVERALL CIRCUIT DIAGRAM

SCHEMATIC DIAGRAM



MATRIX CIRCUIT FOR TOUCH KEY BOARD

KEY MATRIX



GENERAL INFORMATION FOR SERVICE

GENERAL PRECAUTIONS IN USE

- A. **Never operate the unit when it is empty.**
Operating the oven with no load may shorten the life of the magnetron. Whenever cooking dry foods (dried fish, bread, etc.) or a small amount of food, be sure to put a glass of water into the cooking compartment. The glass turntable may become hot after operating, be careful when touching it.
- B. Aluminum foil should be avoided because it will disrupt cooking and may cause arcing. However, small pieces may be used to cover some parts of food to slow the cooking. Any aluminum foil used should never be closer than 2.5 cm to any side wall of the oven.

TRIAL OPERATION

After installation, the following sequences and results should be checked carefully.

- A. Put a container filled with water (about 1 liter) into the oven, and close the door tightly.
- B. Set cooking time for 10 minutes by touching "1" and then "0" three times. "1, 0, 0, 0" appears in the display window.
- C. Touch the START key.
Make sure the cavity light comes on. The unit will begin cooking and the display window will show the time counting down by seconds.
- D. After about 5 minutes, make sure the primary interlock switch, the secondary interlock switch and the interlock monitor switch operate properly by opening and closing the door several times. Touch the START key each time the door is closed.
- E. Continue operating the unit. Two short and a long beep sound signal is heard when the time is up.
The unit will shut off automatically.
- F. Confirm the water is hot.
- G. Finally, measure the output power according to "POWER OUTPUT MEASUREMENT" on page 7-3.

FEATURES AND SPECIFICATIONS FEATURES

- A. The safety systems incorporated in this model are:
 - (1) Primary interlock switch
 - (2) Secondary interlock switch
 - (3) Interlock monitor switch
 - (4) Choke system
 - (5) Oven cavity thermostat
(Note: This thermostat located on the oven cavity will open and stop the unit from operation only if a high temperature is reached, such as, a fire created by overcooking food.)
- B. Any one of 10 power output levels ranging 0W to 1200W can be selected by the touch control and electronic computer system.
- C. Cooking time can be displayed on the digital readout.
- D. Three different cooking stages (Include Defrost) can be changes from one cooking stage to another. This is made possible with the memory function of the microprocessor.

SERVICE INFORMATION

PRECAUTIONS AND REPAIR SERVICE TIPS

PRELIMINARY

A. SINCE NEARLY 4000 VOLTS EXISTS IN SOME CIRCUITS OF THIS UNIT REPAIRS SHOULD BE CARRIED OUT WITH GREAT CARE.

The filament leads of magnetron carry High Voltage with respect to ground. Extreme caution must be exercised. Never plug the unit into a power source to determine which component is defective in high voltage section.

B. TO AVOID POSSIBLE EXPOSURE TO MICROWAVE ENERGY LEAKAGE, THE FOLLOWING PRECAUTIONS MUST BE TAKEN BEFORE SERVICING.

- (1) Before the power is applied:
 - (a) Make sure the primary interlock switch, the secondary interlock switch and the interlock monitor switch operate properly by opening and closing the door several by opening and closing the door several times.
 - (b) Make sure the perforated screen and the dielectric choke of the door are correctly and firmly mounted.
- (2) After power is applied:
 - (a) Make sure the interlock switch mechanism is operating properly by opening and closing the door.
 - (b) Check microwave energy leakage must be below the limit of 5 mW/cm².
(All service adjustments should be made for minimum microwave energy leakage readings).
- (3) Do not operate the unit until it is completely repaired, if any of the following conditions exist. The unit must not be operated.
 - (a) The door does not close firmly.
 - (b) The hinge is broken.
 - (c) The door seal is damaged.
 - (d) The door is bent or warped, or there is any other visible damage on the unit that may cause microwave energy leakage.

NOTE: Always keep the seal clean.

 - (e) Make sure that there are no defective parts in the interlock mechanism.
 - (f) Make sure that there are no defective parts in the microwave generating and transmission assembly (especially waveguide).
- (4) The following items should be checked after the unit is repaired:
 - (a) The interlock monitor switch is connected correctly and firmly.
 - (b) The magnetron gasket is properly positioned and mounted.
 - (c) The waveguide and the oven cavity are intact. (no microwave energy leakage)
 - (d) The door can be properly closed and the safety switches work properly.
 - (e) The unit must stop when the door is opened or the time is up.

The unit must not be operated with any of the above components removed or by-passed.

MEASUREMENT WITH THE OUTER CASE REMOVED

- (1) 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.
 - Around the magnetron
 - The waveguide

WARNING: AVOID CONTACTING ANY HIGH VOLTAGE PARTS.

MEASUREMENT WITH A FULLY ASSEMBLED OVEN

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

NOTES:

Leakage with the outer panels removed - less than 5 mW/cm².

Leakage for a fully assembled oven ("Before the latch switch (primary) is interrupted") with the door in a slightly opened position - less than 1 mW/cm².

NOTE WHEN MEASURING

- (1) Do not exceed meter full scale deflection.
- (2) The test probe must be removed no faster than 1 inch/sec (2.5cm/sec) along the shaded area, otherwise a false reading may result.
- (3) 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.
- (4) 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 possibly cause probe damage.

RECORD KEEPING AND NOTIFICATION AFTER MEASUREMENT

- (1) 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.
- (2) Should the microwave energy leakage not be more than 1 mW/cm² after determining that all parts are in good condition, functioning properly and genuine replacement parts which are listed in this manual have been used.
- (3) At least once a year, have the electromagnetic energy leakage monitor checked for calibration by its manufacturer.

POWER OUTPUT MEASUREMENT

- (1) 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.
- (2) The water is contained in a cylindrical borosilicate glass vessel having a maximum material thickness of 1/8" (3 mm) and an outside diameter of approximately 7.6" (190mm).
- (3) The oven and the empty vessel are at ambient Temperature(T₀) prior to the start of the test.
- (4) The initial temperature (T₁) of the water is (10±1)°C (50°F) 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.
- (5) The time t for the temperature of the water to rise by a value ΔT of (10±1)°K 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°K.
- (6) The microwave power output P in watts is calculated from the following formula :

$$P = \frac{4,187 Mw(T_2 - T_1) + 0.55Mc(T_2 - T_0)}{t}$$

is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included. (about 5 sec)

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

Where

P is the microwave power output, in watts:

M_w is the mass of the water, in grams:

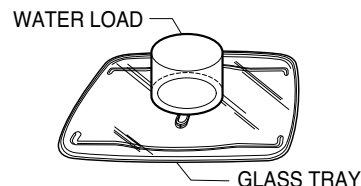
M_c is the mass of the container, in grams:

T₀ is the ambient temperature, in °C:

T₁ is the initial temperature of the water, in °C:

T₂ is the final temperature of the water, in °C:

t is the heating time in seconds, excluding the magnetron filament heat-up time.



DISASSEMBLY INSTRUCTIONS

IMPORTANT NOTES:

UNIT MUST BE DISCONNECTED FROM ELECTRICAL OUTLET WHEN MAKING REPAIRS, REPLACEMENTS, ADJUSTMENTS AND CONTINUITY CHECKS.

WHEN RECONNECTING THE WIRE LEADS TO ANY PART, MAKE SURE THE WIRING CONNECTIONS AND LEAD COLORS ARE CORRECTLY MATCHED ACCORDING TO THE OVERALL CIRCUIT DIAGRAM. (ESPECIALLY SWITCHES AND HIGH VOLTAGE CIRCUIT.)

A. REMOVING POWER AND CONTROL CIRCUIT BOARD (Figures 1, 2 and 3)

- (1) Remove a screw securing the control panel assembly to the oven cavity.
- (2) Remove the control panel with pushing it upward.
- (3) Remove the connectors (CN1), and sensor (CN5) wire leads (RY2, CN2, CN4) from the circuit board.

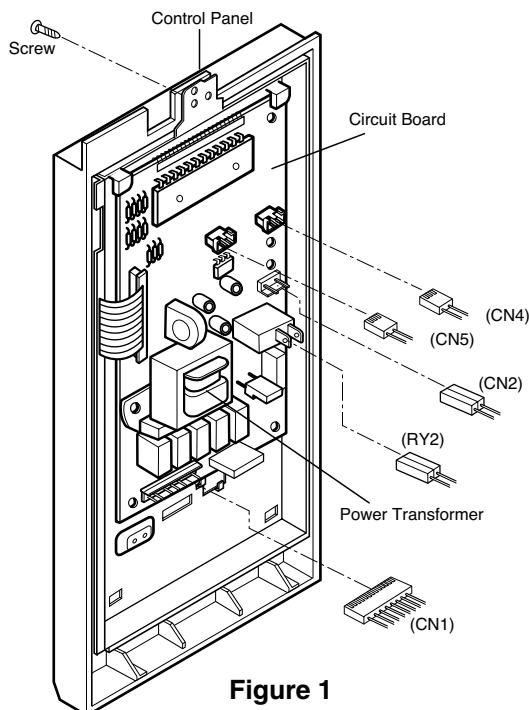


Figure 1

- (4) Remove 3 screws securing the circuit board.

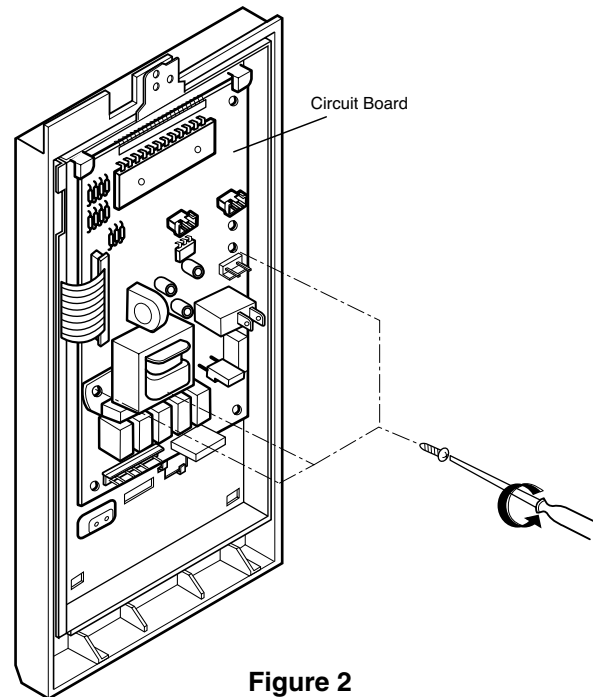


Figure 2

- (5) Remove the FPC connector from the terminal socket following "HOW TO REMOVE THE FPC CONNECTOR" on the next page.
- (6) Remove the circuit board from the control bracket carefully.

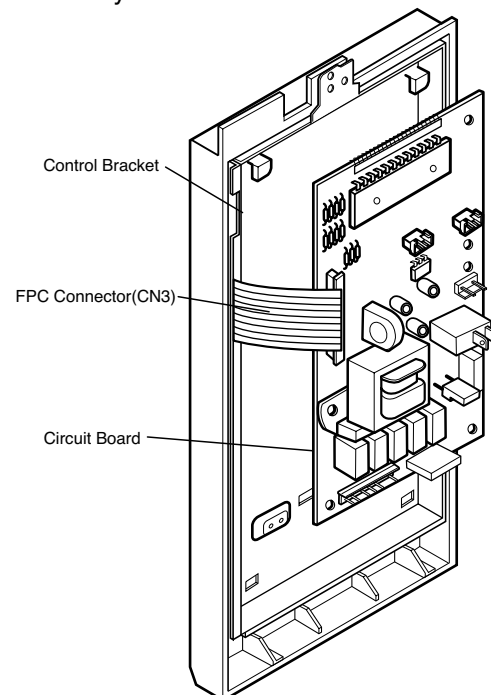


Figure 3

HOW TO REMOVE THE F.P.C. CONNECTOR

Follow the steps below as illustrated in Figures 4 and 5 to remove the F.P.C. connector.

- (1) Hold the edges of the plastic fastener with thumb and forefinger.
(Figure 4)
- (2) Lift up the lever of the plastic fastener from the terminal socket by lightly pressing the lever end with forefinger.
(Figure 5)
- (3) Remove the F.P.C. connector from the terminal socket.

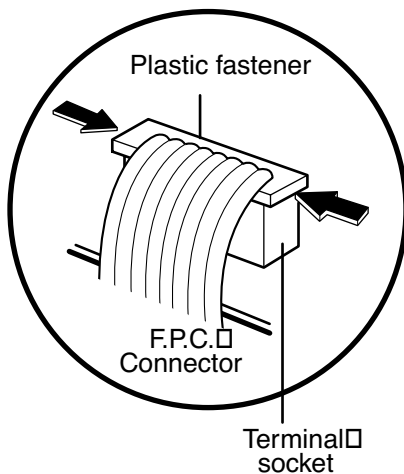


Figure 4

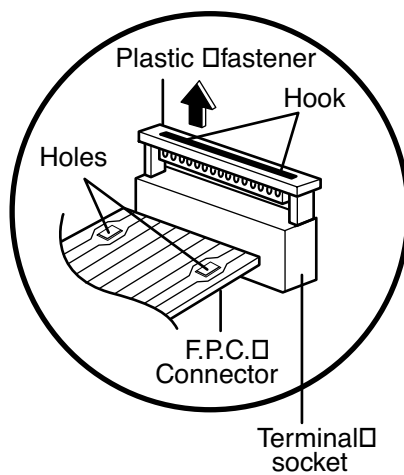


Figure 5

HOW TO INSERT THE F.P.C. CONNECTOR

Follow the steps below as illustrated in Figures 6 and 7 to insert the F.P.C. connector.

- (1) Insert the F.P.C. connector into the terminal socket securely with the fingers.
- (2) Hold the plastic fastener with thumb and forefinger of the other hand, and push it slowly into the terminal socket. (Figure 6)
NOTE: When reconnecting the F.P.C. connector make sure that the holes on the F.P.C. connector are properly engaged with the hooks on the plastic fastener
- (3) Lock the level of the plastic fastener into the hook of the terminal socket securely by releasing the fingers.
(Figure 7)

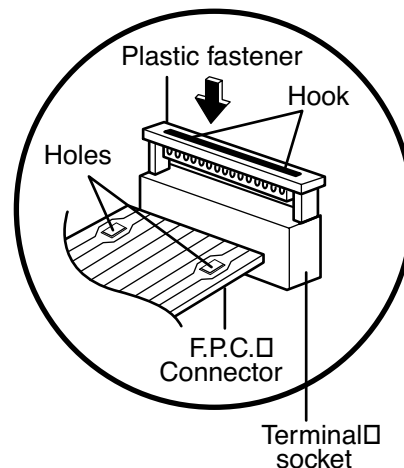


Figure 6

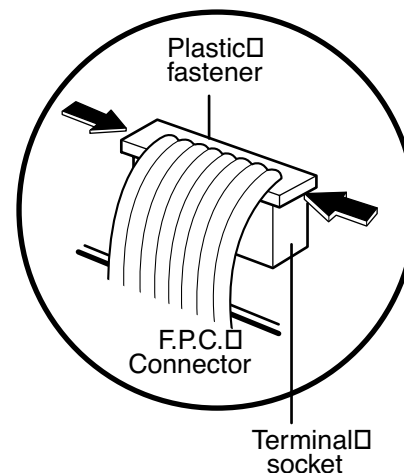


Figure 7

B. REMOVING THE OUT CASE(Figure 8)

- (1) Remove the vent grille by removing two screws securing it to the out case.
- (2) Remove two screws securing it to the air duct.
- (3) Remove the mounting plate by turning the screws (1 or 2 screws) securing it to the out case.
- (4) Remove two screws on the left central edge and two screws on the right central edge of Base plate. Remove the Mount, All from the out case by removing one screw securing it to the out case.
- (5) Remove four screws of the rear cavity.
- (6) Remove the outcase with disconnecting power cord connector.

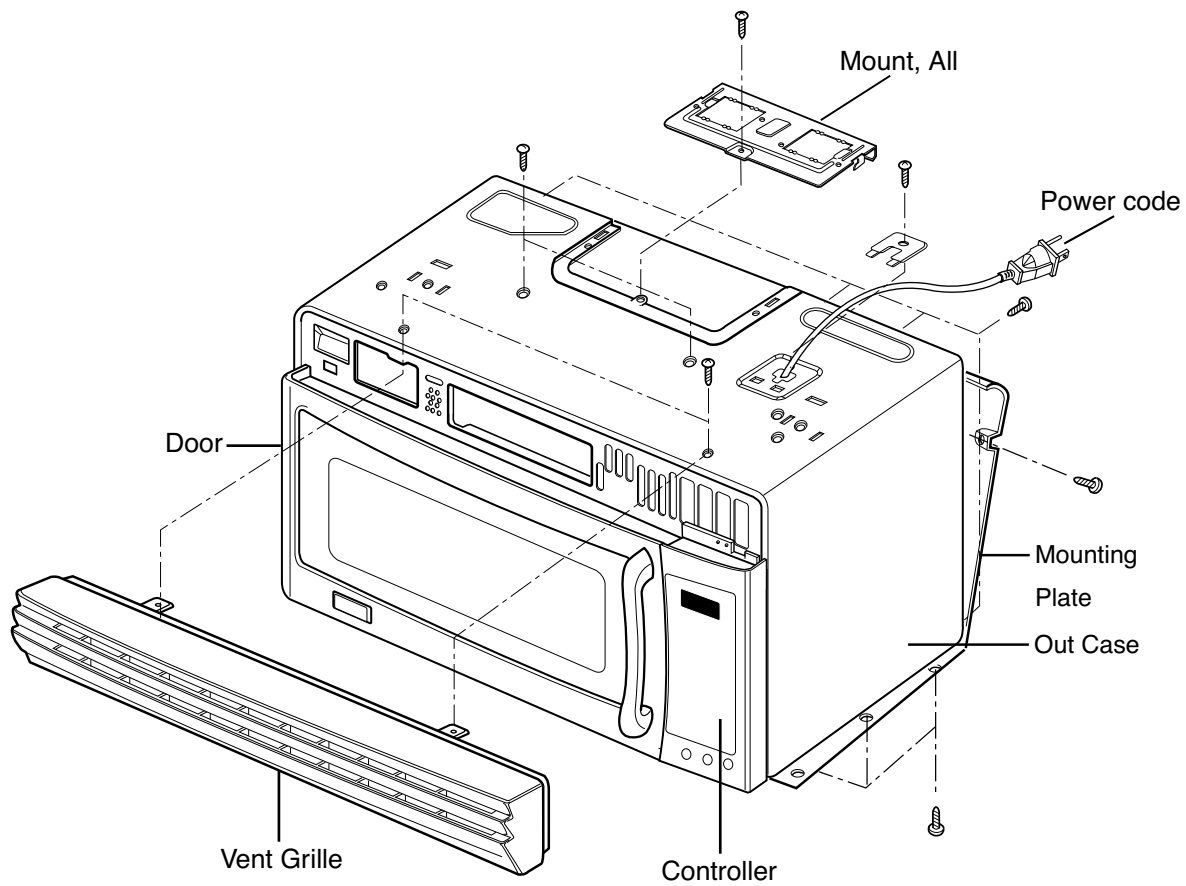


Figure 8

C REMOVING THE DOOR INTERLOCK SWITCHES (Figures 9,10)

- (1) Disconnect the wire leads from the interlock switches.
- (2) Remove two screws securing the Latch Board.
- (3) Make necessary replacements and check microwave energy leakage according to "ADJUSTMENT PROCEDURES" on page 7-12.

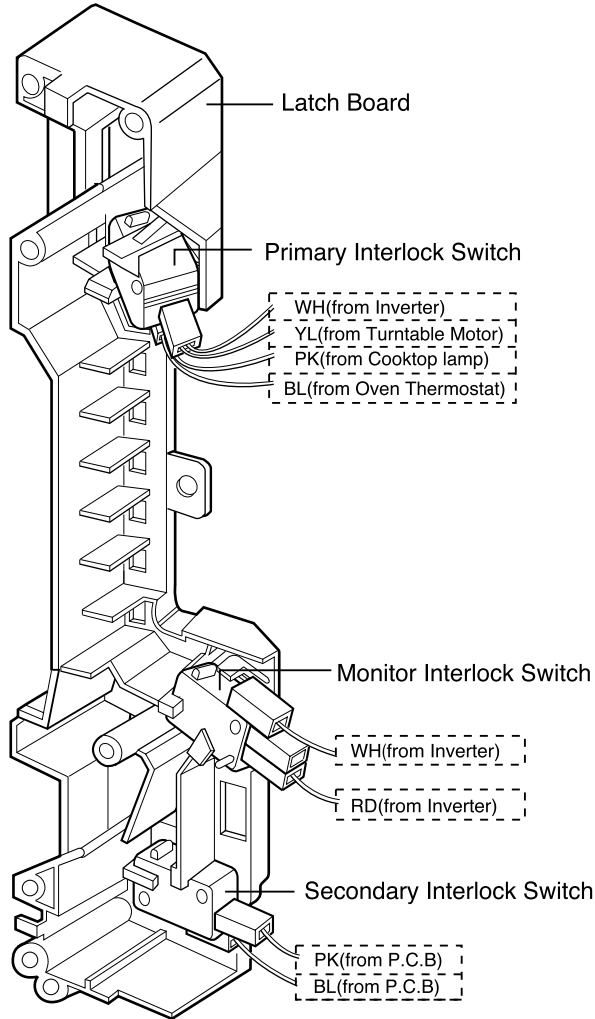


Figure 9

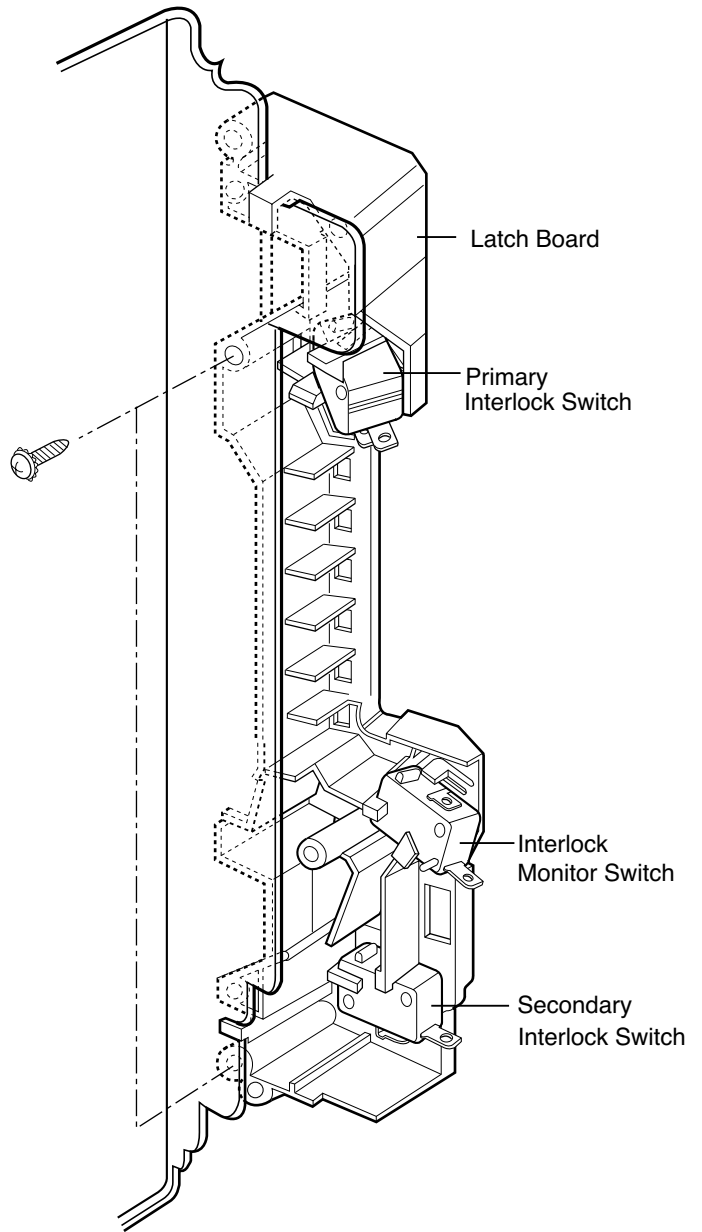


Figure 10

WIRE COLOR

| SYMBOL | COLOR |
|--------|--------------|
| WH | WHITE |
| BK | BLACK |
| BR | BROWN |
| RD | RED |
| YL | YELLOW |
| PK | PINK |
| BL | BLUE |
| GY | GREY |
| GN | GREEN |
| N.P. | Not Provided |

D. REMOVING MAGNETRON

(Figures 11 Through 12)

- (1) Remove the vent grille by loosening two screws. (Figure 11)
- (2) Remove the outcase. See page 7-6.
- (3) Remove four tap tite screws securing the magnetron to the wave guide.
- (4) Remove the magnetron VERY CAREFULLY.

NOTES:

- When removing the magnetron, make sure that its dome does not hit any adjacent parts, or it may be damaged.
- 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.
- After replacing the magnetron, check for microwave energy leakage with a survey meter. Check microwave energy leakage must be below the limit of 5 mW/cm². (All service adjustments should be made for minimum microwave energy leakage readings.)

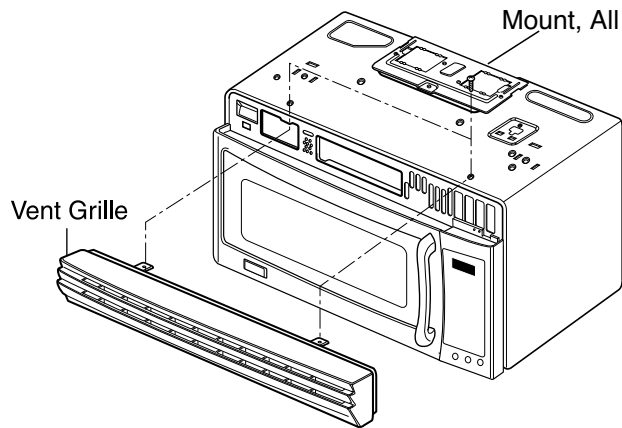


Figure 11

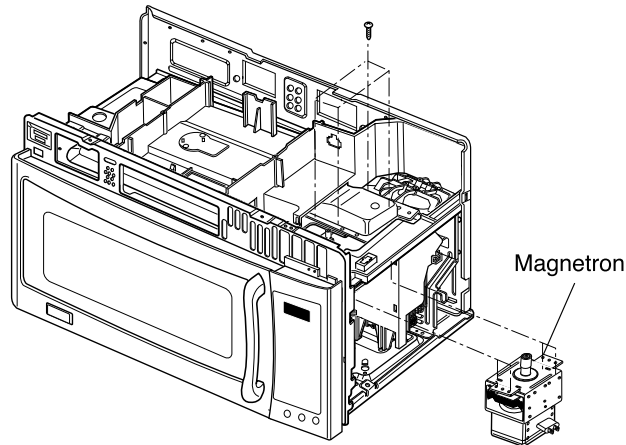


Figure 12

E. REMOVING THE INVERTER MODULE

(Figures 13 Through 15)

- (1) Remove the vent grille by loosening two screws. (Figure 11)
- (2) Remove the outcase. See page 7-6.
- (3) Remove the base plate by loosening four screws. (Figure 13)
- (4) Disconnect two leadwires of the fan motor assembly.
- (5) Disconnect the leadwire of the inverter PCB and H.V. cable of the magnetron.
- (6) Remove the earth wire screw.
- (7) Remove three screws securing to duct assembly and two screws securing to fan guide. (Figure 14)
- (8) Remove the screw securing to inverter module assembly.
- (9) Push the inverter guide hook and out the inverter module assembly lifting up duct assembly.
- (10) Open the upper inverter guide.
- (11) Remove three screws securing to PCB and pull out PCB. (Figure 15)

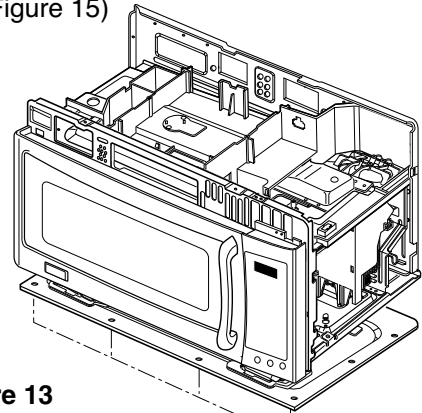


Figure 13

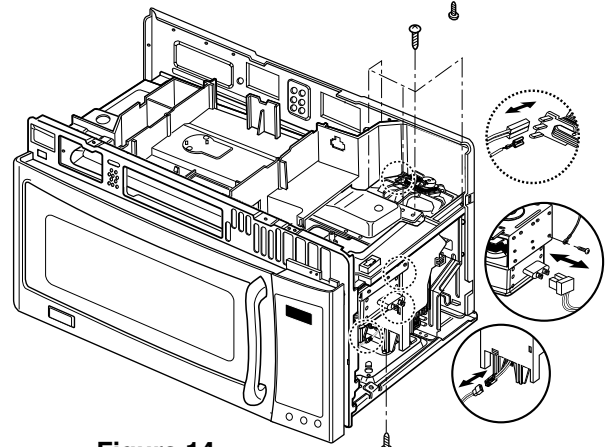


Figure 14

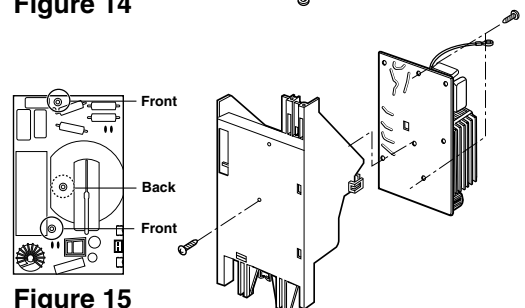


Figure 15

F. REMOVING STIRRER FAN

(Figures 16 and 17)

- (1) Remove one rivet ASS'Y securing it to the oven upper plate by using knife blade.
- (2) Pull out the stirrer fan cover.
- (3) Remove two rivets ASS'Y securing it to the oven upper plate by using knife blade.
- (4) Remove the stirrer fan.

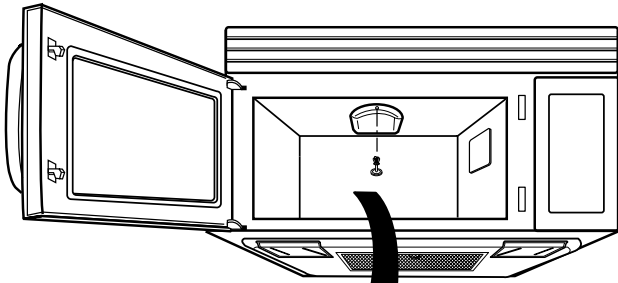


Figure 16

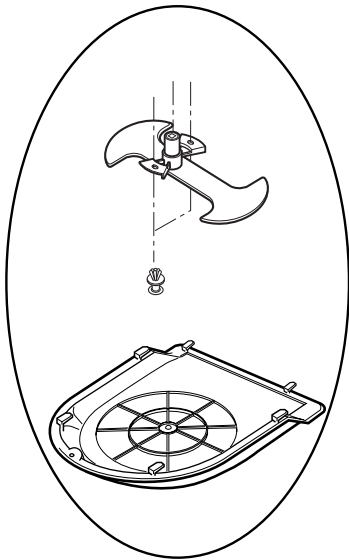


Figure 17

G. REMOVING DOOR (Figure 18)

- (1) Remove the vent grille by two screws securing it to the outcase loosening.
- (2) Lift up and draw the door.

NOTES:

- After replacing the door, be sure to check that the primary interlock switch, the secondary interlock switch and the interlock monitor switch is in good operating normally.
- After replacing the door, check for microwave energy leakage with a survey meter. Microwave energy leakage must be below the limit of $5\text{mW}/\text{cm}^2$. (With a 275 ml water load)

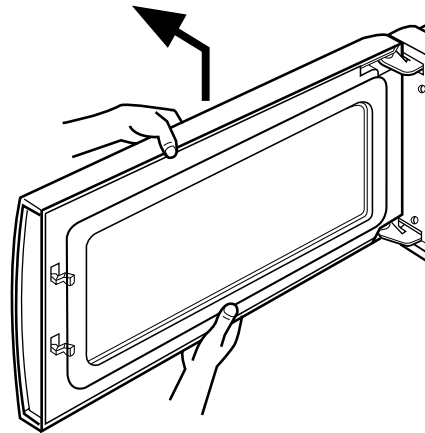


Figure 18

H. DISASSEMBLING DOOR (Figure 19)

- (1) Remove the dielectric choke by using knife blade or small screw driver, etc.
- (2) Remove two screws securing it to the door handle.

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

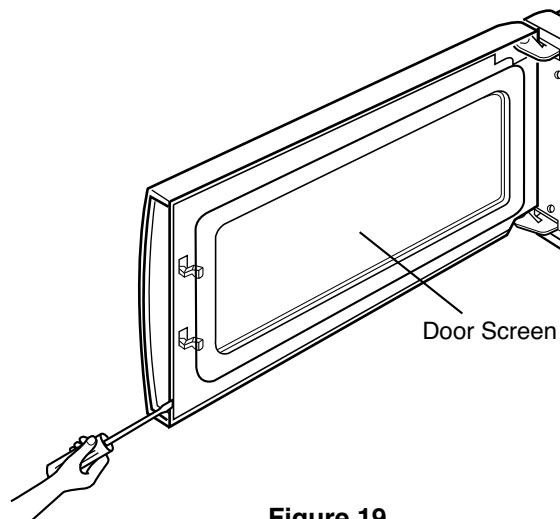
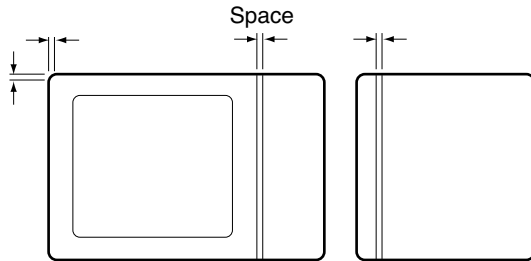


Figure 19

I. ASSEMBLING DOOR

- (1) 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.



- (3) Carefully pull the ventilation motor ASS'Y out of the microwave oven. (See Figure 21-b)

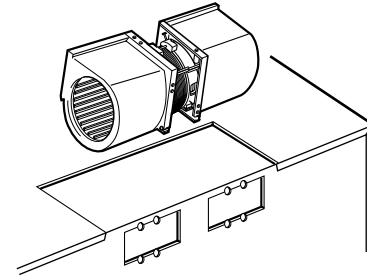


Figure 21-b

J. REMOVING THE VENTILATION MOTOR

- (1) Remove the mounting plate by loosening mounting plate screws (1 or 2 screws) securing it to the back plate. (See Figure 20)
- (2) Remove MOUNT ALL loosening one screw loosening one screw securing the ventilation Motor and back plate. (See Figure 21-a)

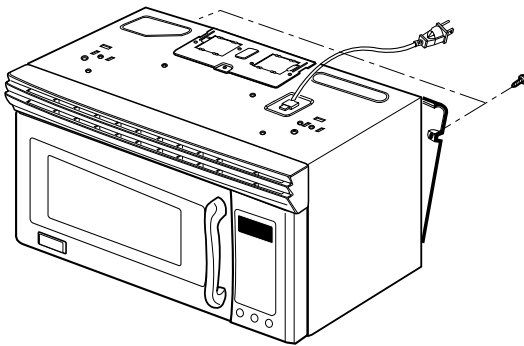


Figure 20

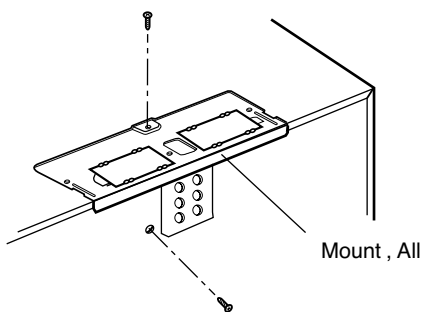


Figure 21-a

K. REMOVING THE TURNTABLE MOTOR

- (1) Remove the glass tray and rotating ring.
- (2) Remove the turntable shaft VERY CAREFULLY with a hand. (Figure 22)
- (3) Remove the base plate by removing 8 screws securing it to the oven cavity. (Figure 23)
- (4) Disconnect the leadwire from the turntable motor terminals.
- (5) Remove the 1 screws securing the turntable motor to the oven cavity ASS'Y. (Figure 24)

NOTES:

- Remove the leadwire from the turntable motor VERY CAREFULLY.
- Be sure to grasp the connector not the wires when removing.

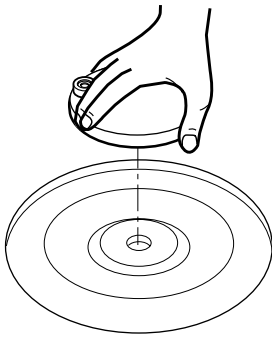


Figure 22

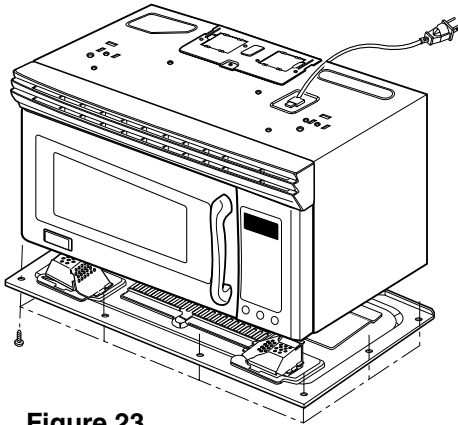


Figure 23

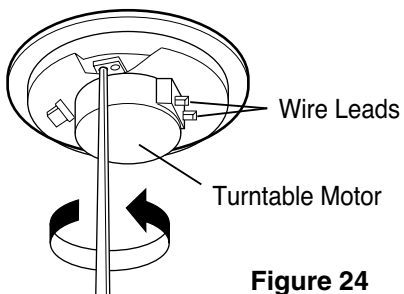


Figure 24

INTERLOCK SYSTEM

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.

ADJUSTMENT PROCEDURES

To avoid possible exposure to microwave energy leakage, adjust the door latches and interlock switches, using the following procedure.

The Interlock Monitor and Primary Interlock Switch act as the final safety switch protecting the user from microwave energy. The terminals between "COM" and "NC" of the Interlock Monitor must close when the door is opened. After adjusting the Interlock Monitor Switch, make sure that it is correctly connected.

Mounting of the primary/monitor/secondary switches to the latch board.

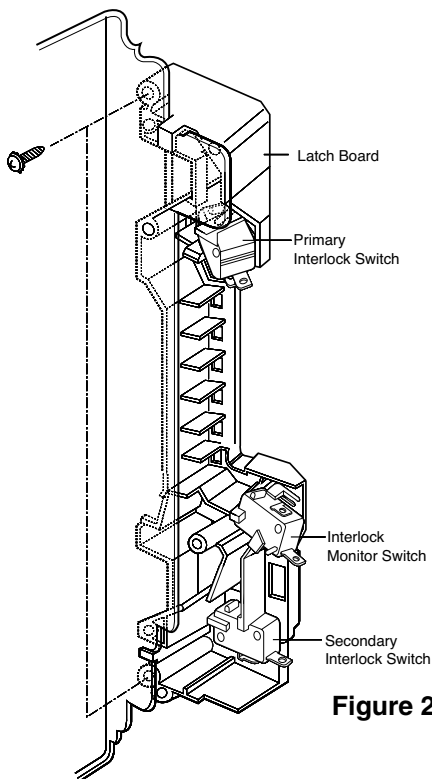


Figure 25-a

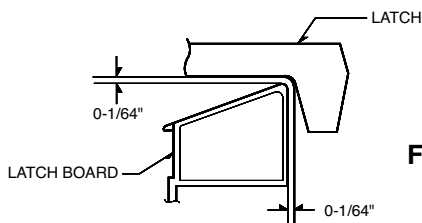


Figure 25-b

CHECK THE DOOR LATCH AND SWITCH CLOSING.

NOTE:

The outer cover of the microwave oven is removed.

- (1) Set the microwave oven on its side so that you can see the latch board and the switches, as shown in Figure 25-a.
- (2) Close the door tightly and check gaps A and B to be sure they are no more than 1/64" (0.5 mm). See Figure 25-b for close-up view of gaps A and B (door latches). If all gaps are less than 1/64" (0.5 mm), adjustment of the latch board may not be necessary. Go to Steps 5 and 6 to check the sequence of the switches.

NOTE:

To correct sequence of the Primary Interlock Switch, Secondary Interlock Switch and the Interlock Monitor Switch is very important.

If any gap is larger than 1/64" (0.5 mm), you will need to adjust the latch board". Go to step 3 and follow all steps in order.

ADJUST THE LATCH AND SWITCH CLOSING

- (3) Loosen the two screws holding the plastic latch board as shown.
- (4) With the oven door closed tightly, move the latch board upward toward the top of the oven and/or away from the door latch until the gaps are less than 1/64" (0.5 mm). Hold the latch board tightly in this position until you check the sequence of the switches in steps 5 and 6.

TEST THE LATCH AND SWITCH SEQUENCE

(5) Open the oven door slowly. Watch the door latch, the Secondary Switch. Release Rod and Lever on the switches to make sure they are zero to the body of the switches in the following sequence:

- Primary Interlock Switch
- Secondary Interlock Switch
- Interlock Monitor Switch

Adjust the latch board until the switches operate in this sequence. See Steps 3 and 4.

(6) Close the oven door slowly and be sure it is tightly closed. Watch the three switches to make sure they are zero to the body of the switches in the following sequence:

- Interlock Monitor Switch
- Primary Interlock Switch
- Secondary Interlock Switch

NOTE: The Interlock Monitor Switch is an added safety check on the Primary and Secondary Interlock Switches. If the Primary and Secondary Interlock Switches allow the oven to operate with the door open, the Monitor Switch will blow the fuse.

(7) When you achieve the proper sequence of switches in Steps 5 and 6, tighten the latch board screws at that point.

TEST THE MICROWAVE ENERGY LEAKAGE

Make sure the microwave energy leakage is below the limit of $1\text{mW}/\text{cm}^2$ (with a 275 ml water load) and $5\text{mW}/\text{cm}^2$ (with a 275 ml water load without the cabinet) when measured with a survey meter.

INTERLOCK CONTINUITY TEST

A. PRIMARY INTERLOCK SWITCH TEST

When the door is opened slowly, an audible **click** should be heard at the same time or successively at intervals and 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 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

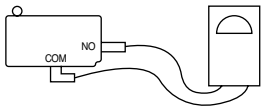


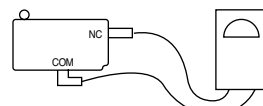


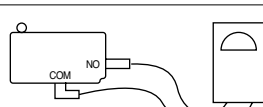


Disconnect the wire lead from the secondary switch.

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

WARNING : FOR CONTINUED PROTECTION AGAINST EXCESSIVE RADIATION EMISSION, REPLACE ONLY WITH IDENTICAL REPLACEMENT PARTS.

TYPE NO. SZM-V16-FA-63 OR VP-533A-OF OR V-5230Q FOR PRIMARY SWITCH

TYPE NO. SZM-V16-FA-62 OR VP-532A-OF OR V-5220Q FOR MONITOR SWITCH

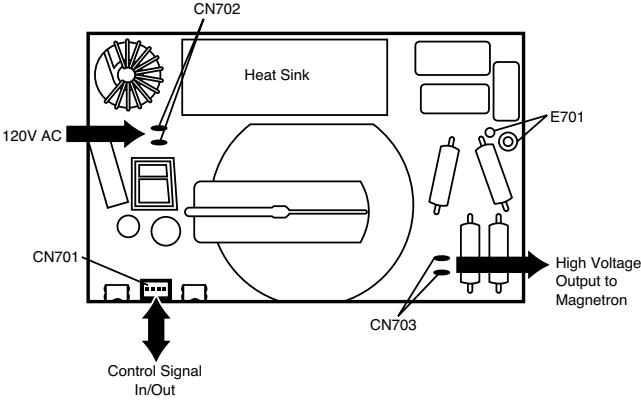
TYPE NO. SZM-V16-FA-63 OR VP-533A-OF OR V-5230Q FOR SECONDARY SWITCH

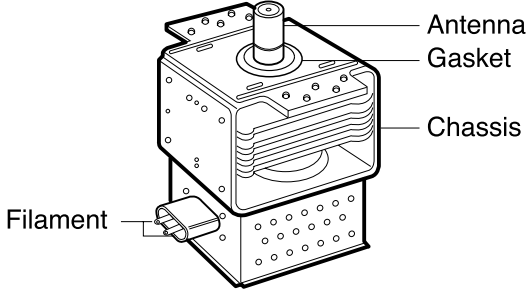
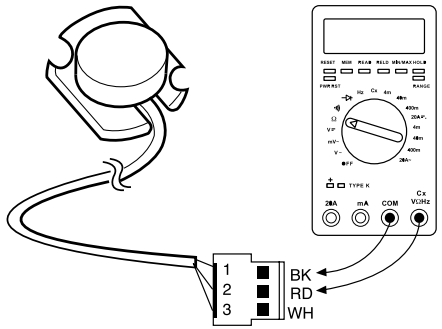
TEST AND CHECKOUT PROCEDURES AND TROUBLESHOOTING

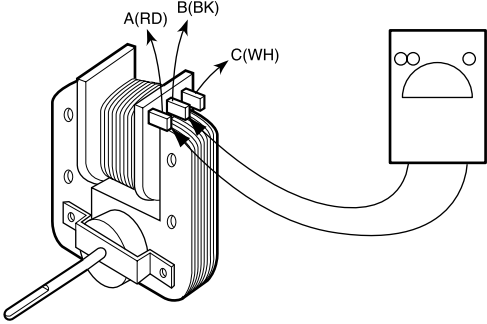
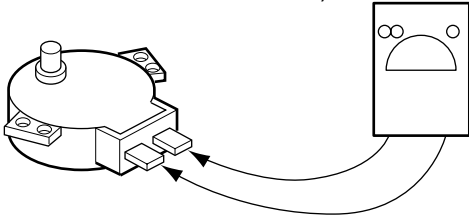
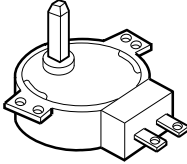
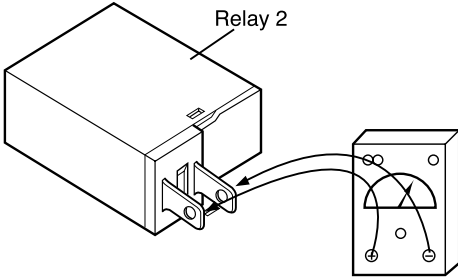
CAUTIONS

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 LEAD WIRES FROM THE INVERTER MODULE.
2. ALL OPERATIONAL CHECKS WITH MICROWAVE ENERGY MUST BE DONE WITH A LOAD (1 LITER OF WATER IN CONTAINER) IN THE OVEN.

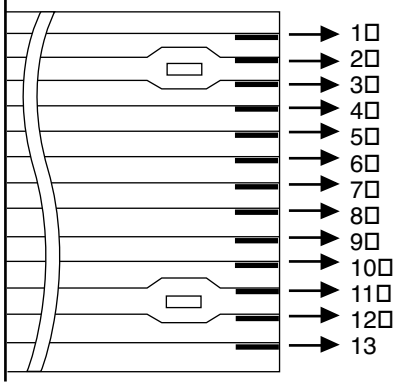
A. TEST PROCEDURES

| COMPONENTS | TEST PROCEDURE | RESULTS |
|--|---|--|
| <p>INVERTER (Lead wires removed)</p> |  <p>Note: Do not try to repair the inverter board, nor try to make any adjustments to the board.</p> <p>Check wiring to the inverter:</p> <ol style="list-style-type: none"> 1. Unplug the oven's main power supply. 2. Visually inspect 4 connectors on the inverter board: CN701, CN702, CN703, E701 to see whether there are any signs of failure due to loose wires, bad crimping, sign of overheating, etc. | |
| <p>MAGNETRON (Lead wires removed)</p> | <ol style="list-style-type: none"> 1. Measure the resistance. (Ohm-meter scale: Rx1) • Filament terminal 2. Measure the resistance. (Ohm-meter scale: Rx1000) • Filament to chassis | <p>Normal: Less than 1 ohm</p> <p>Normal: Infinite</p> |

| COMPONENTS | TEST PROCEDURE | RESULTS |
|------------|---|--|
| |  <p data-bbox="527 570 1453 634">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.</p> | |
| SENSOR | <ol data-bbox="544 680 1039 808" style="list-style-type: none"> 1. Disconnect sensor connector from micom computer board. 2. Measure resistance terminal to terminal (Select the ohm scale on the meter)  <p data-bbox="544 1191 1055 1383">NOTE: MAKE SURE THE LEAD WIRES ARE IN THE CORRECT POSITION. WHEN REMOVING THE LEAD WIRES FROM THE PARTS, BE SURE TO GRASP THE CONNECTOR, NOT THE WIRES.</p> | <p data-bbox="1136 680 1396 776">Normal: Approximately BK-RD: 5.6 Kohms RD-WH: 2.8 Kohms BK-WH: 2.8 Kohms</p> <p data-bbox="1136 808 1331 861">Abnormal: Infinite or several</p> <p data-bbox="1136 904 1429 936">*Sensor cooking condition</p> <ol data-bbox="1136 936 1510 1319" style="list-style-type: none"> 1. Oven should be plugged in at least 5 minutes before sensor cooking. 2. Room temperature should not exceed 95° F. 3. Be sure the exterior of the cooking container and the interior of the oven are dry. 4. The oven will not generate microwave energy for the first 28 seconds of the sensor cooking cycle. |

| COMPONENTS | TEST PROCEDURE | RESULTS |
|---|---|--|
| <p>FAN MOTOR (Wire leads removed)</p> | <p>Measure the resistance. (Ohm-meter scale: R x 100)</p>  | <p>Normal: Approx. 50 ~ 150 ohms Abnormal: Infinite or several ohms.</p> <p>A-B: 76 ohms B-C: 22 ohms A-C: 96 ohms</p> |
| <p>TURNTABLE MOTOR (Wire leads removed)</p> | <p>Measure the resistance. (Ohm-meter scale: R x 1000)</p>  | <p>Normal: Approx. 2 ~ 4K ohms Abnormal: Infinite or several ohms.</p> |
| <p>STIRRER MOTOR (Wire leads removed)</p> | <p>Measure the resistance. (Ohm meter scale: Rx100)</p>  | <p>Normal: Approx. 125 to 135 ohms Abnormal: Infinite or several ohms.</p> |
| <p>RELAY2</p> | <p>Check for continuity of relay 2 with an ohm-meter. (Remove wire leads from relay 2 and operate the unit.)</p>  | <p>Normal: ON: 0 ohm OFF: Infinite ohms Abnormal: Infinite or several ohms.</p> |

KEY MATRIX

| COMPONENTS | TEST PROCEDURES | RESULTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|----------------------|-------------|---------------|-----------------|-------------|---------|---|---|---|---|---|---|---|---|---|---|---|-----|---------------|-----|-----------|-----------------|-------------|-----|----|-----|-----|-----|--------------|-----|--------|------|----|-----------|-------------|--------|--------------|------------|-------|---------|----|-----|-----------|-----|---------------|-------|------|------|----|-------|-----------|-------------|-------|---|---|---|--|--|------------------|--------------|------------------|--------------------|----------------------|
| <p style="text-align: center;">TOUCH KEY BOARD</p> | <p>Measure the resistance between terminal pins of connector KEY CONNECTOR.</p> <p>NOTE: When reconnecting the FPC connector, make sure that the holes on the FPC connector are properly engaged with hooks on the plastic fastener.</p> <p style="text-align: center;">MATRIX CIRCUIT FOR TOUCH KEY BOARD</p> <p style="text-align: center;">CONNECTOR(KEY CON)</p> <p>(For detail matrix circuit of each model, refer to page 5-2.)</p> <table border="1" data-bbox="467 776 938 1187"> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>8</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>9</td> <td>N.C</td> <td>FROZEN ENTREE</td> <td>N.C</td> <td>HOLD WARM</td> <td>EXPRESS DEFROST</td> <td>SURE SIMMER</td> <td>N.C</td> </tr> <tr> <td>10</td> <td>N.C</td> <td>N.C</td> <td>N.C</td> <td>DINNER PLATE</td> <td>N.C</td> <td>SOFTEN</td> <td>MELT</td> </tr> <tr> <td>11</td> <td>VEGETABLE</td> <td>AUTO REHEAT</td> <td>POTATO</td> <td>AUTO DEFROST</td> <td>ADD MINUTE</td> <td>PIZZA</td> <td>POPCORN</td> </tr> <tr> <td>12</td> <td>N.C</td> <td>AUTO COOK</td> <td>N.C</td> <td>KITCHEN TIMER</td> <td>CLOCK</td> <td>MORE</td> <td>LESS</td> </tr> <tr> <td>13</td> <td>POWER</td> <td>COOK TIME</td> <td>STOP/CANCEL</td> <td>START</td> <td>8</td> <td>9</td> <td>0</td> </tr> </table> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | N.C | FROZEN ENTREE | N.C | HOLD WARM | EXPRESS DEFROST | SURE SIMMER | N.C | 10 | N.C | N.C | N.C | DINNER PLATE | N.C | SOFTEN | MELT | 11 | VEGETABLE | AUTO REHEAT | POTATO | AUTO DEFROST | ADD MINUTE | PIZZA | POPCORN | 12 | N.C | AUTO COOK | N.C | KITCHEN TIMER | CLOCK | MORE | LESS | 13 | POWER | COOK TIME | STOP/CANCEL | START | 8 | 9 | 0 | <table border="1"> <thead> <tr> <th data-bbox="992 310 1154 474" rowspan="2">Resistance value</th> <th data-bbox="1154 310 1300 395">When touched</th> <th data-bbox="1300 310 1474 395">When not touched</th> </tr> </thead> <tbody> <tr> <td data-bbox="1154 395 1300 474">Less than 400 ohms</td> <td data-bbox="1300 395 1474 474">More than 1 mega ohm</td> </tr> </tbody> </table> | | Resistance value | When touched | When not touched | Less than 400 ohms | More than 1 mega ohm |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | N.C | FROZEN ENTREE | N.C | HOLD WARM | EXPRESS DEFROST | SURE SIMMER | N.C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | N.C | N.C | N.C | DINNER PLATE | N.C | SOFTEN | MELT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | VEGETABLE | AUTO REHEAT | POTATO | AUTO DEFROST | ADD MINUTE | PIZZA | POPCORN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | N.C | AUTO COOK | N.C | KITCHEN TIMER | CLOCK | MORE | LESS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | POWER | COOK TIME | STOP/CANCEL | START | 8 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance value | When touched | When not touched | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Less than 400 ohms | More than 1 mega ohm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">FPC CONNECTOR Top</p>  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

NOTES:

- A MICROWAVE ENERGY 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.

B. CHECKOUT PROCEDURES

(1) CHECKOUT PROCEDURES FOR FUSE BLOWING

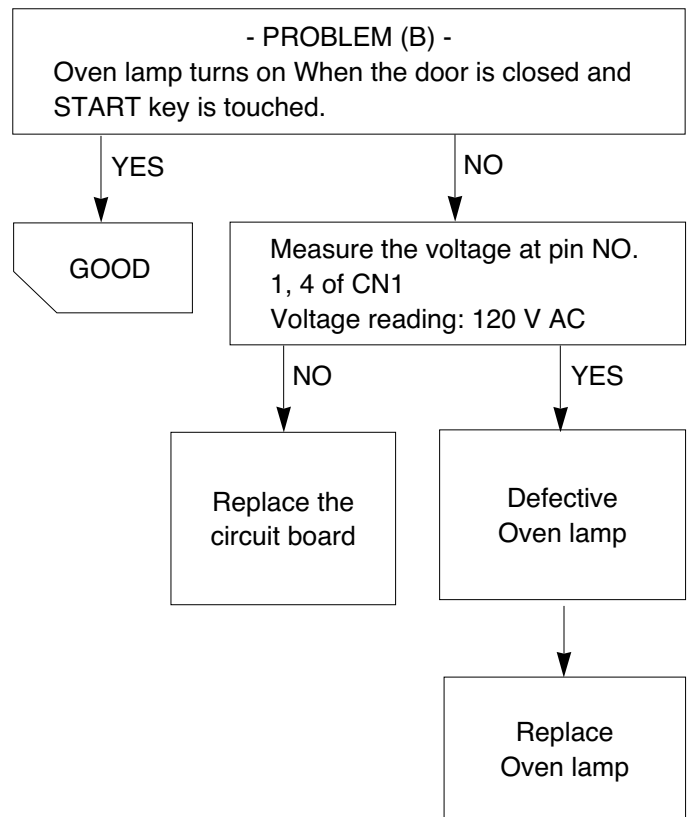
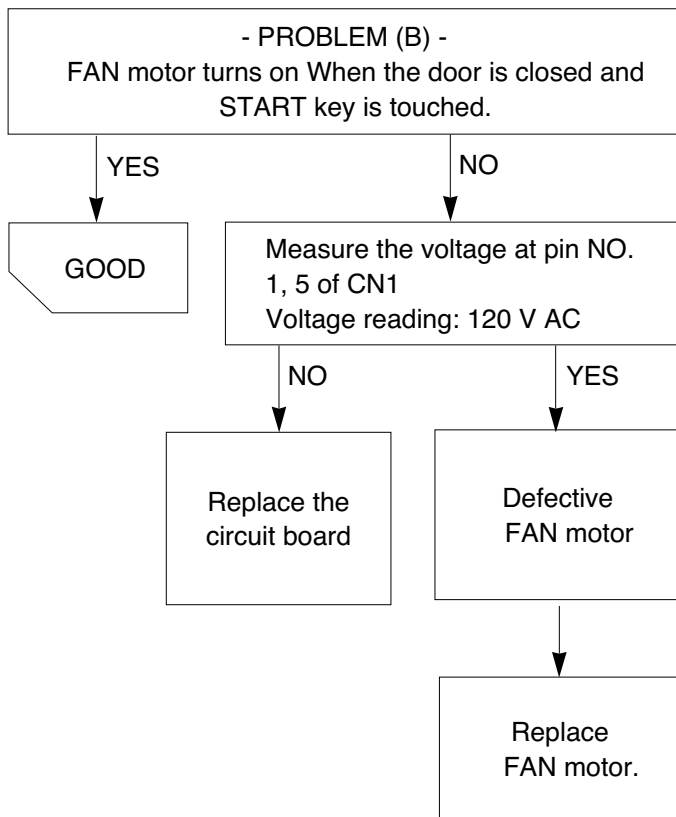
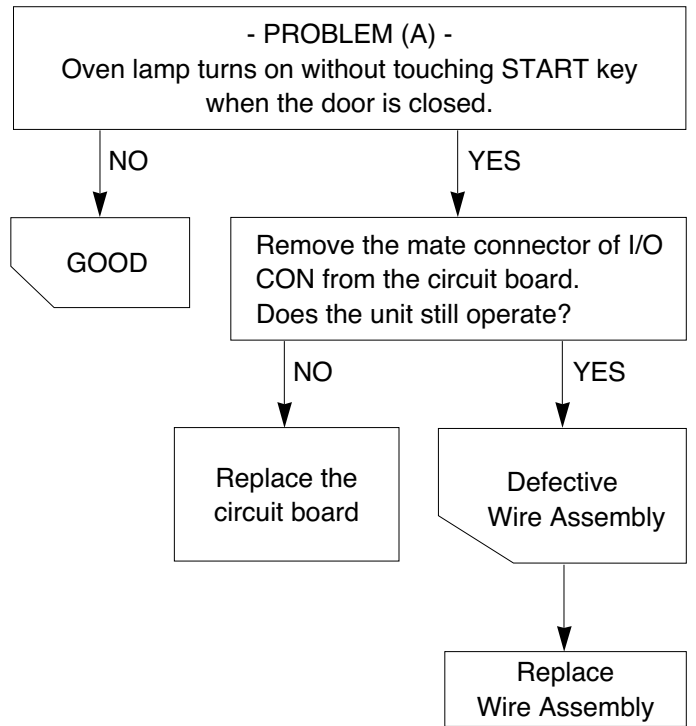
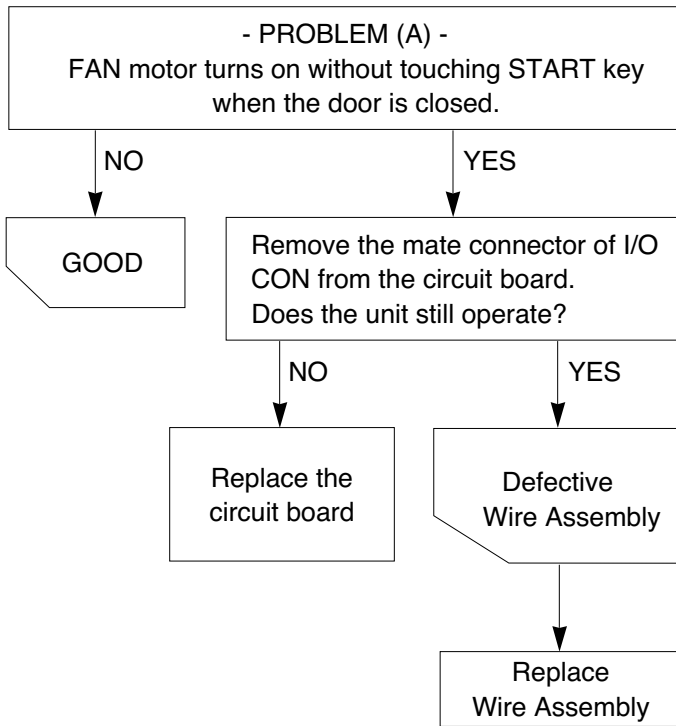
CAUTION: REPLACE BLOWN FUSE WITH 20 AMPERE FUSE.

| PROBLEMS | CAUSES |
|--|--|
| Fuse blows immediately after the door is closed. | Improper operation of the primary interlock, secondary interlock switches and/or the interlock monitor switch. |
| Fuse blows immediately after the door is opened. | |
| Fuse blows when the door is closed and START key is touched. | Malfunction of the high voltage transformer; the high voltage capacitor including the diode, the magnetron, the blower motor or the circuit board. |

NOTES:

- If the fuse is blown by an improper switch operation, replace all switches and the fuse at the same time. After replacing the defective switches with new ones, make sure that they are correctly connected.
- Check for microwave energy leakage according to INTERLOCK ADJUSTMENT PROCEDURES on page 7-12 when the primary interlock, secondary interlock switches and/or the interlock monitor switches are adjusted or replaced.

(2) CHECKOUT PROCEDURES FOR RELAY.



(3) CHECKOUT PROCEDURES FOR CIRCUIT BOARD

The following symptoms indicate a defective circuit board.

- 1) Check the input current. If the input current is more than 20A, check the magnetron and wiring. If the input current is less than 0.5 A, there is no input to the inverter.
- 2) The start function fails to operate but the high voltage Systems, the interlock switches, the door sensing and the relay check good.
- 3) The unit with a normal relay continuously operates.
- 4) The buzzer does not sound or continues to sound.
- 5) Some segments of one or more digits do not light up, or they continue to light up, or segments light when they should not.
- 6) Wrong figures appear.
- 7) The figures of all digits.
- 8) The clock does not keep time properly.

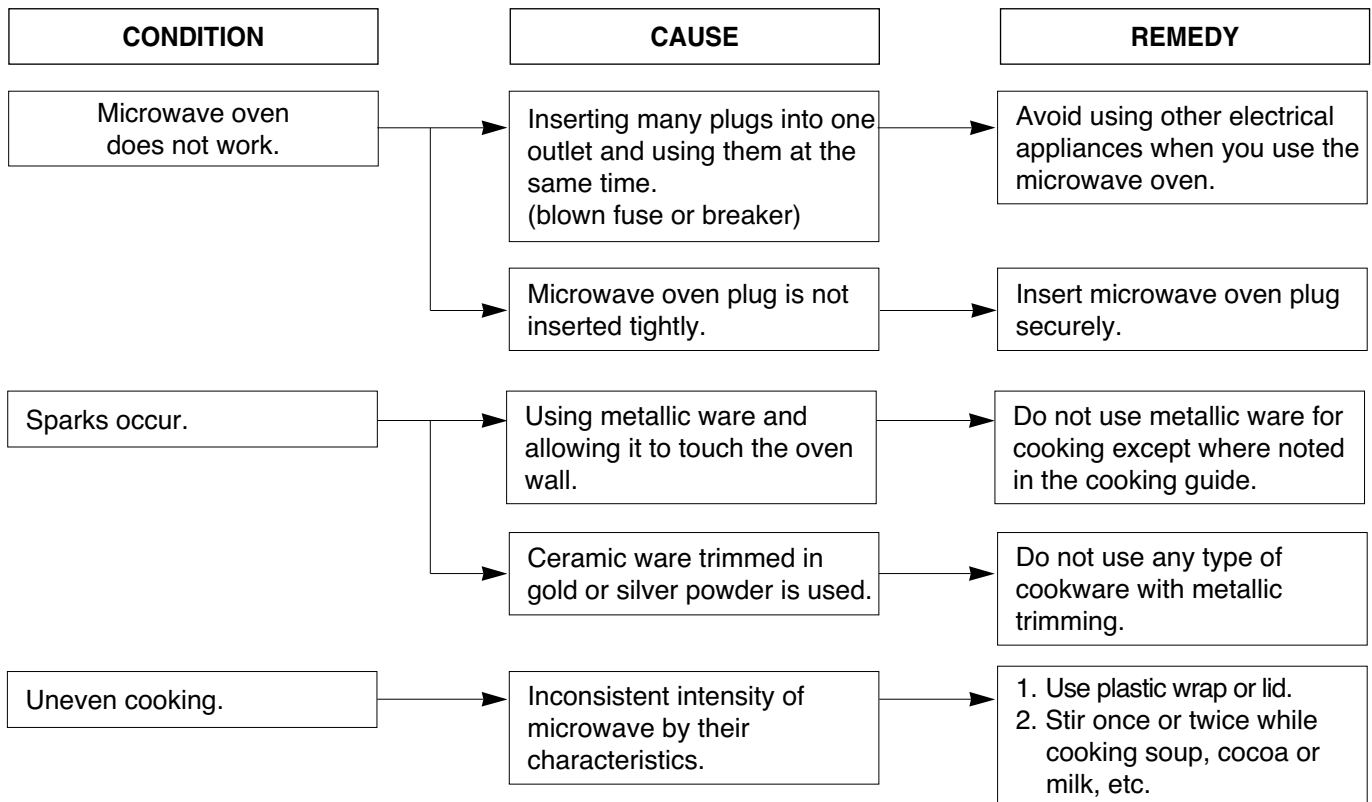
NOTE: A MICROWAVE ENERGY LEAKAGE TEST MUST ALWAYS BE PERFORMED WHEN THE UNIT IS SERVICED FOR ANY REASON.

C. TROUBLE SHOOTING

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.

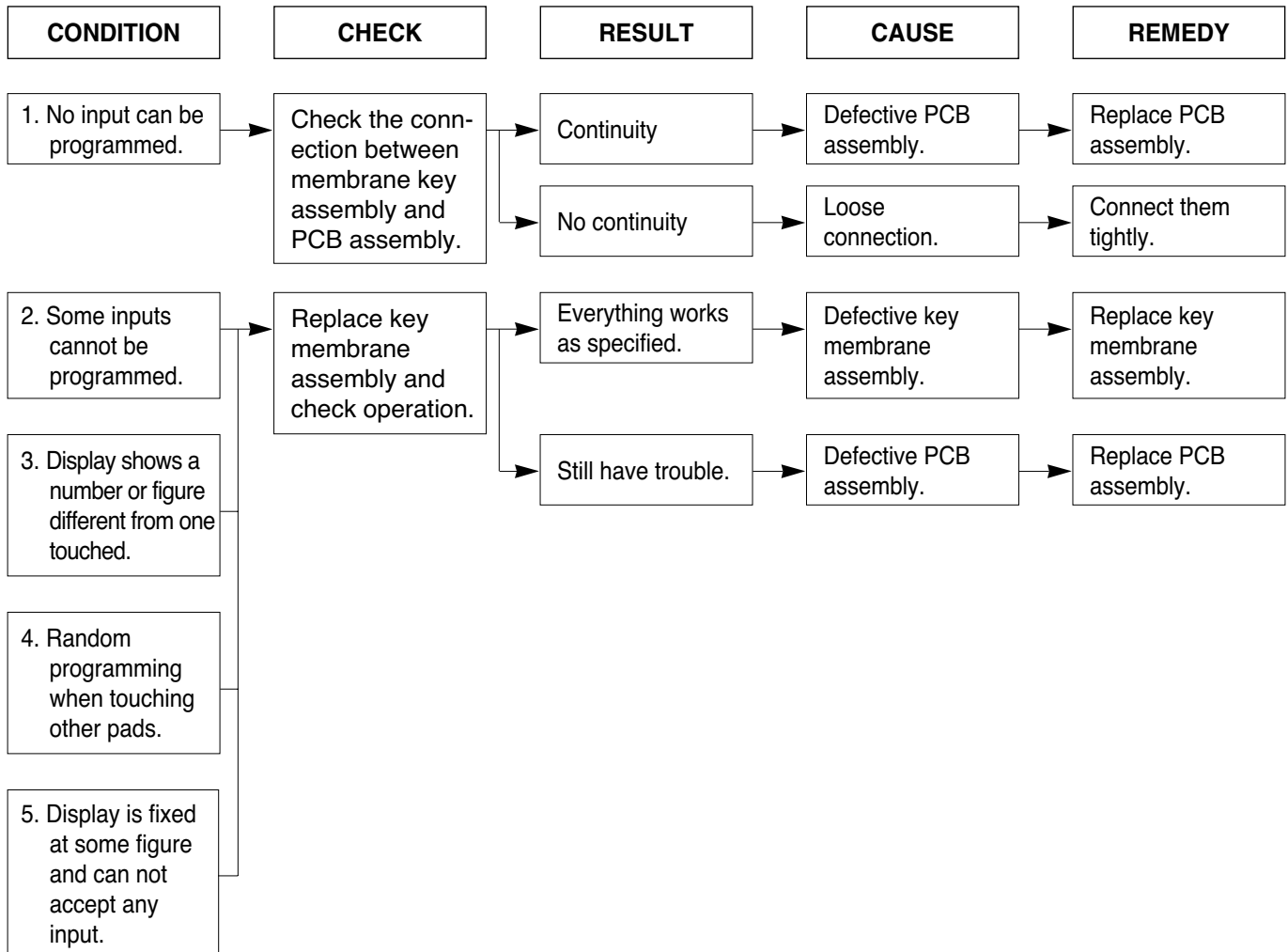
CAUTIONS

1. Check grounding before checking for trouble.
2. Be careful of the Inverter.
3. When checking the continuity of the switches or the inverter, disconnect lead wires 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.
4. 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)

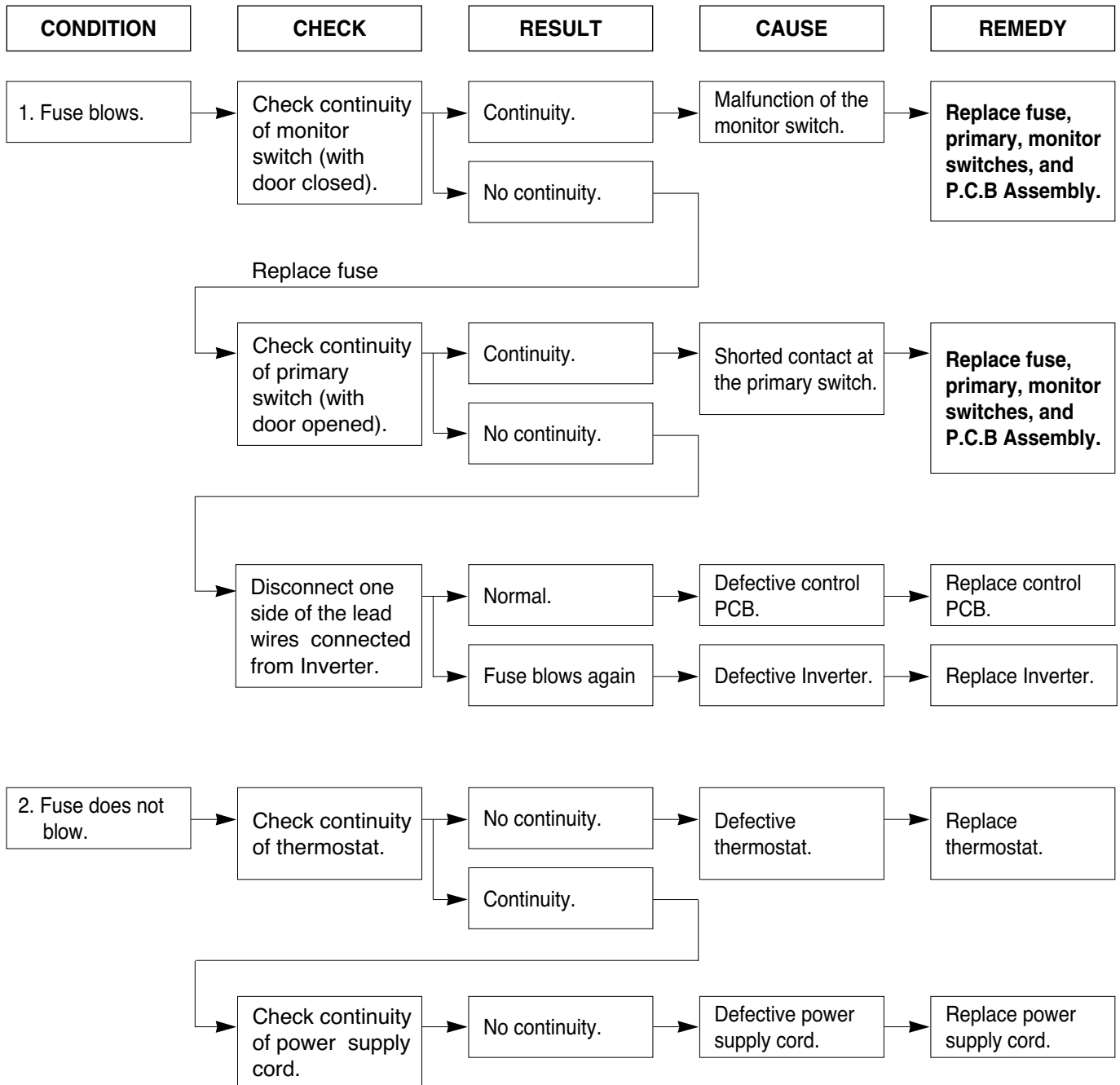


(TROUBLE 1) The following visual conditions indicate a probable defective control circuit.

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 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.

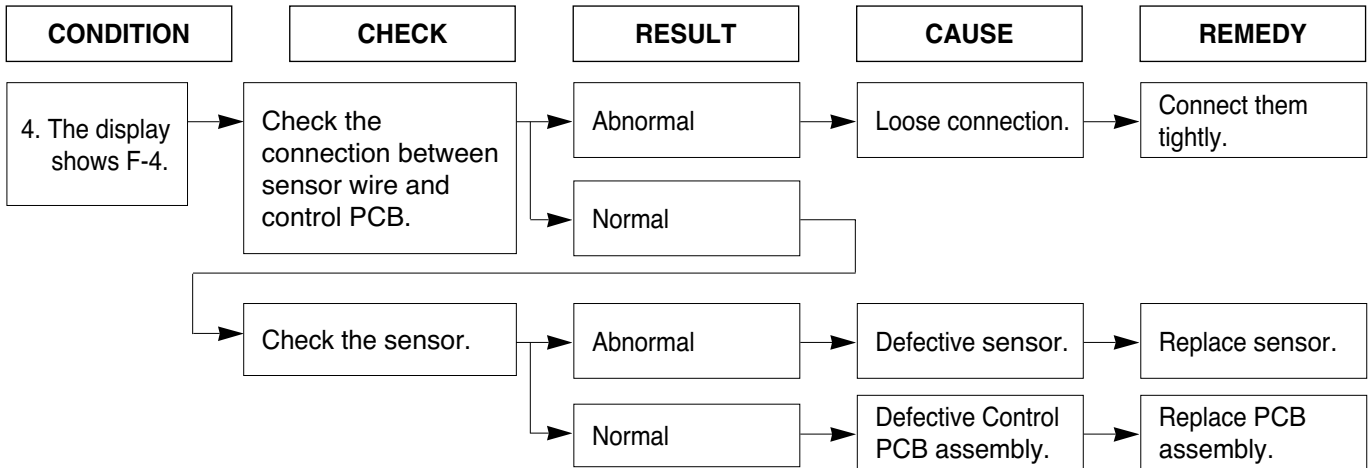


(TROUBLE 2) Oven does not operate at all, Display window does not display any figures, and no input is accepted.

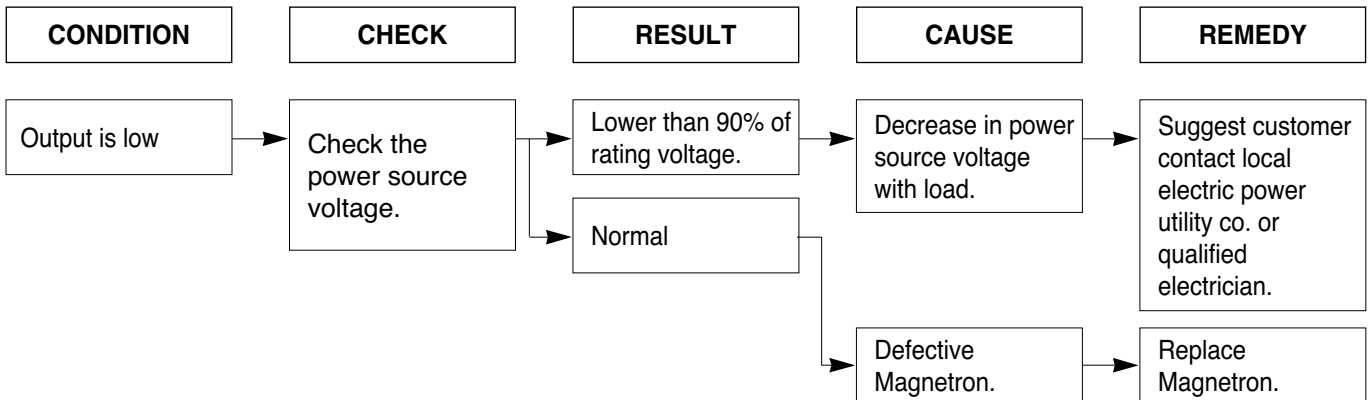


(TROUBLE 3) Display shows all figures set, but oven does not start cooking while desired program times are set and START pad is touched.

| CONDITION | CHECK | RESULT | CAUSE | REMEDY |
|--|--|--------------------------|---|---------------------------|
| 1. Setting time does not count down when touching START pad. | Check continuity of secondary switch (with door closed). | No continuity. | Defective secondary switch. | Replace secondary switch. |
| | | Continuity. | | |
| | Check the connection between CN1 connector and PCB assembly. | Continuity | Defective PCB assembly. | Replace PCB assembly. |
| No continuity | | Loose connection. | Connect them tightly. | |
| 2. Fan motor or oven lamp do not turn on. | Check fan motor. | Abnormal | Defective fan motor. | Replace fan motor. |
| | | Abnormal | Defective oven lamp. | Replace oven lamp. |
| | Check oven lamp. | Normal | | |
| 3. The display shows F-9. | Check the connection between magnetron, control PCB and inverter module. | No continuity. | Loose connection. | Connect them tightly. |
| | | Continuity. | | |
| | Check the Relay 2 of PCB assembly. | Abnormal | Defective Relay2. | Replace PCB assembly. |
| | | Normal | | |
| | Check the inverter module. | Abnormal | Defective inverter module. | Replace inverter module. |
| | | Normal | | |
| Check the Magnetron. | Abnormal | Defective Magnetron. | Replace Magnetron. | |
| | Normal | | | |
| Check the power source voltage. | Abnormal | Unsafe AC input voltage. | Suggest customer contact local electric power utility co. or qualified electrician. | |



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

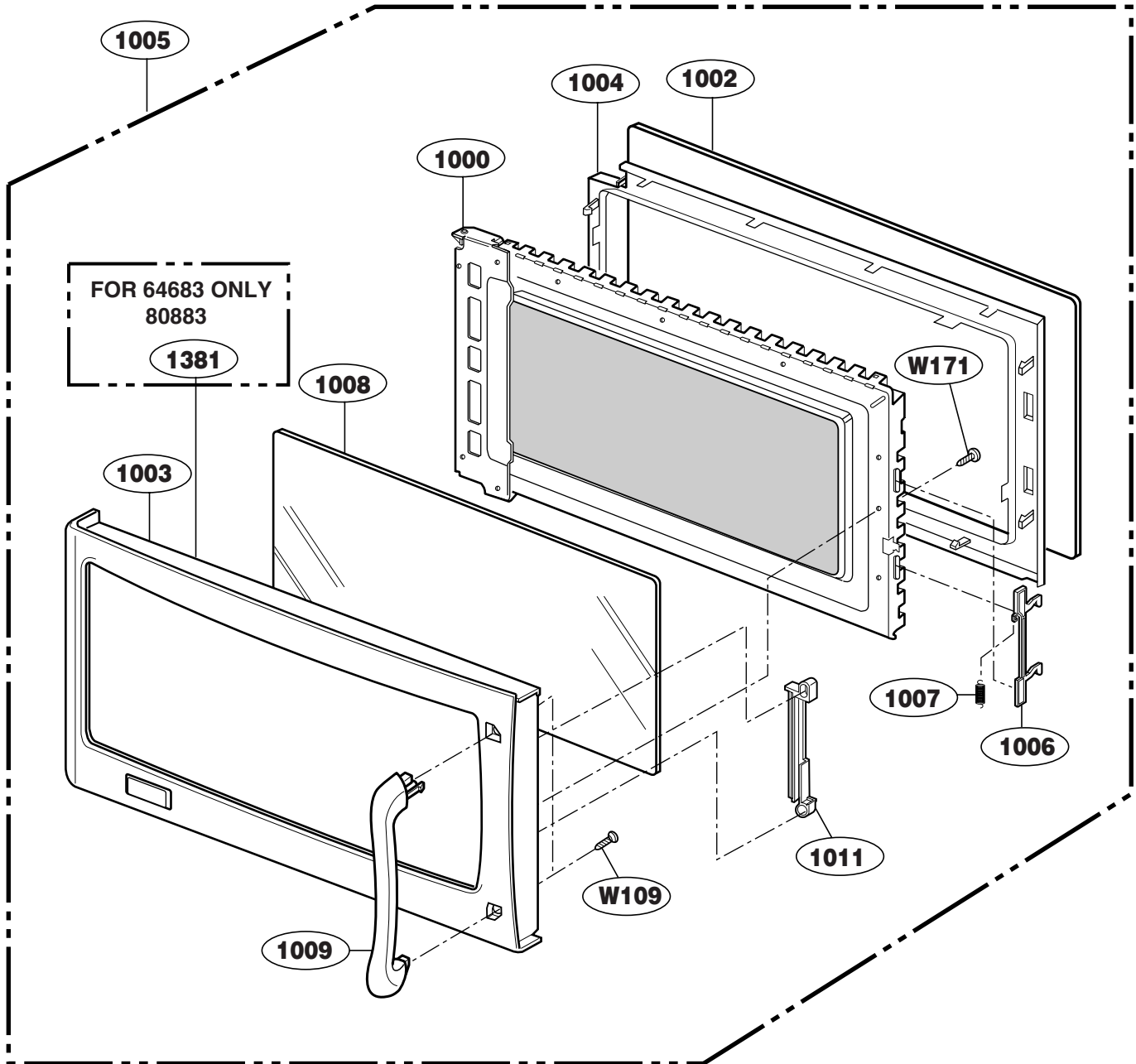


NOTE : Simple test of power output-conducted by heating one liter water for one min. if available.
Minimum 8.5°C temperature rise is normal condition.

EXPLODED VIEW

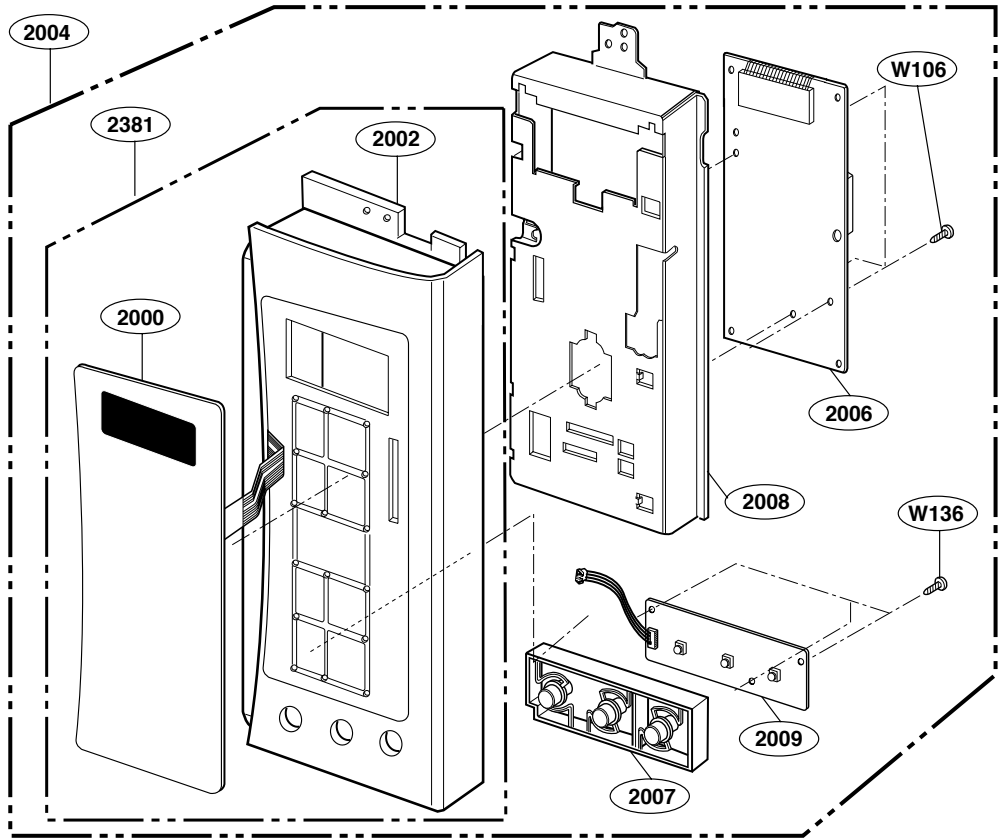
DOOR PARTS

MODEL: 721. 64682/721. 64683
721. 64684/721. 64689
721. 80882/721. 80883
721. 80884/721. 80889

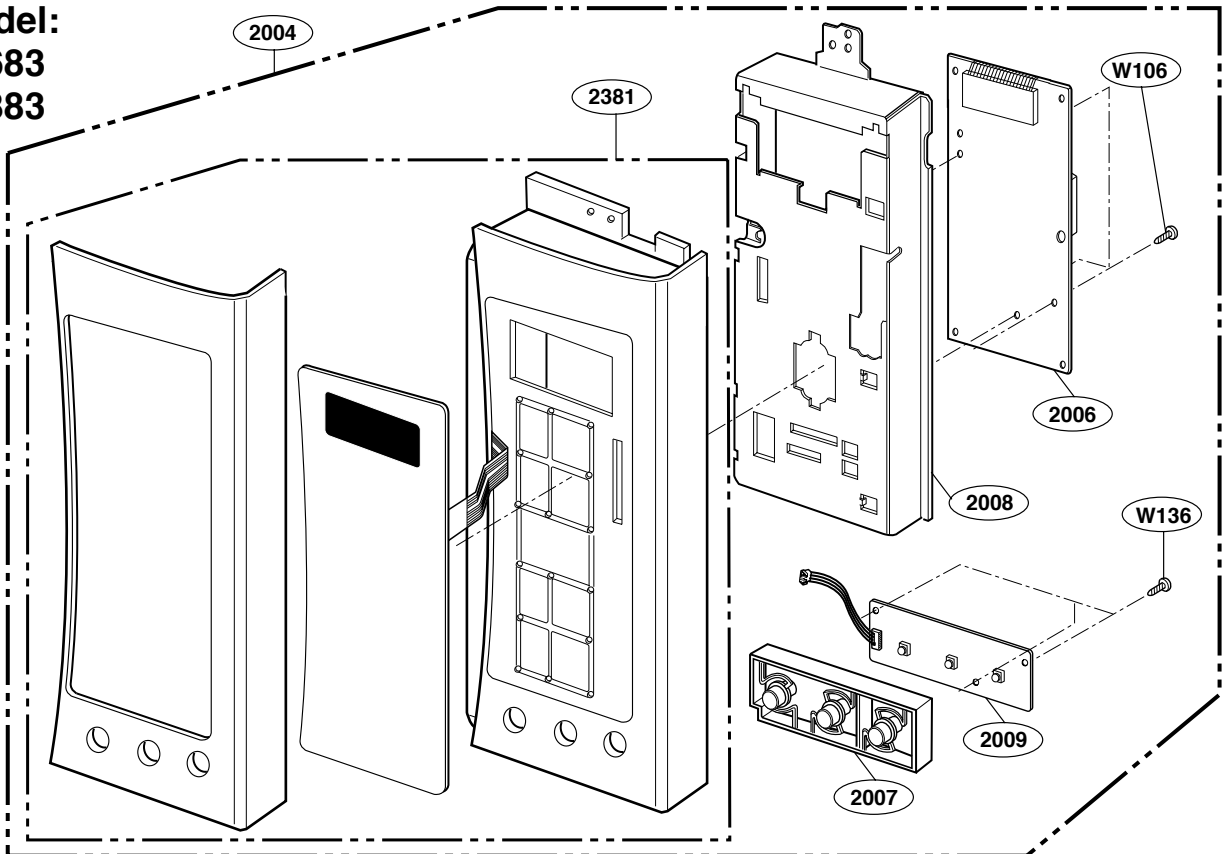


CONTROLLER PARTS

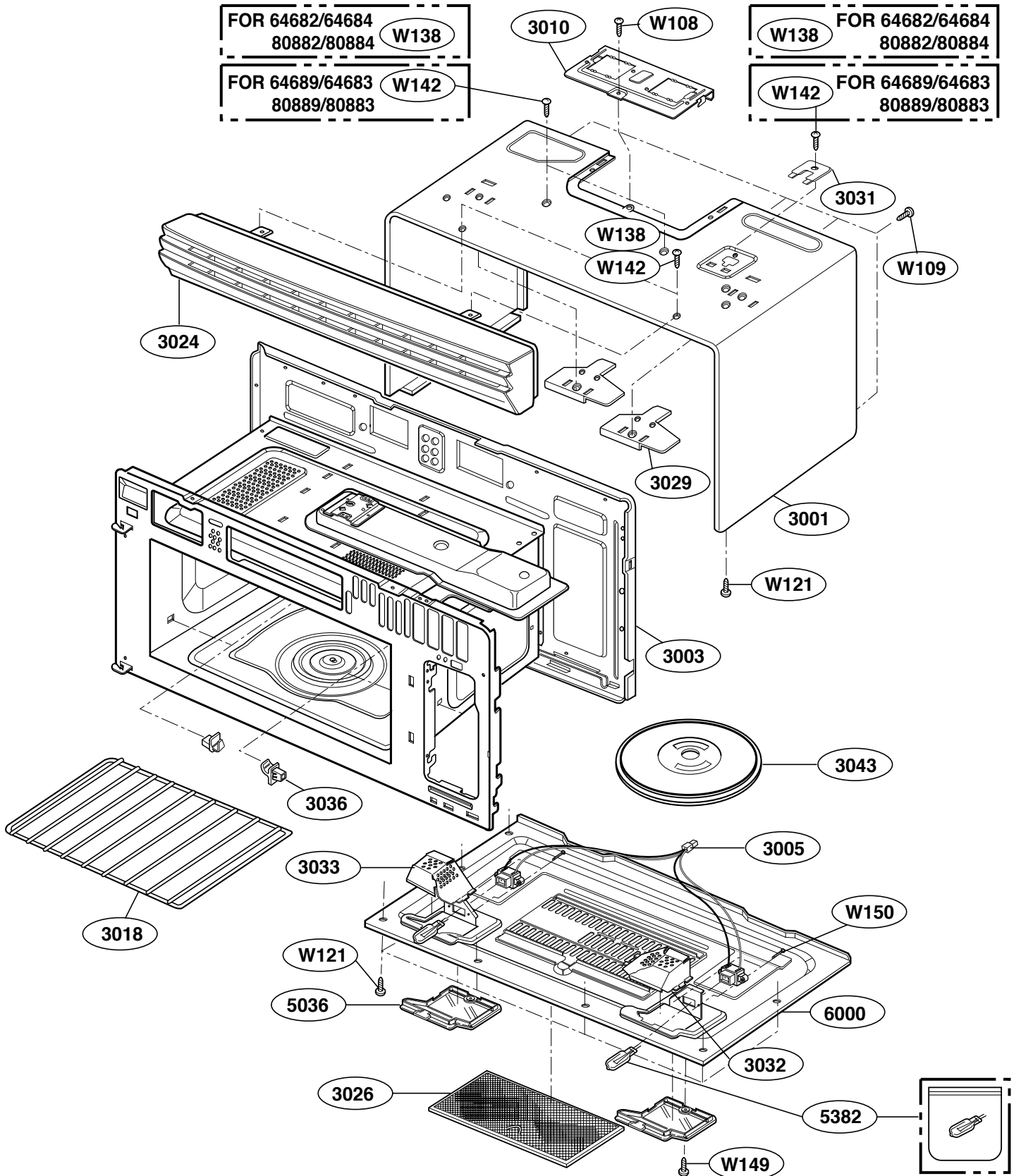
For Model:
721.64682
721.64684
721.64689
721.80882
721.80884
721.80889



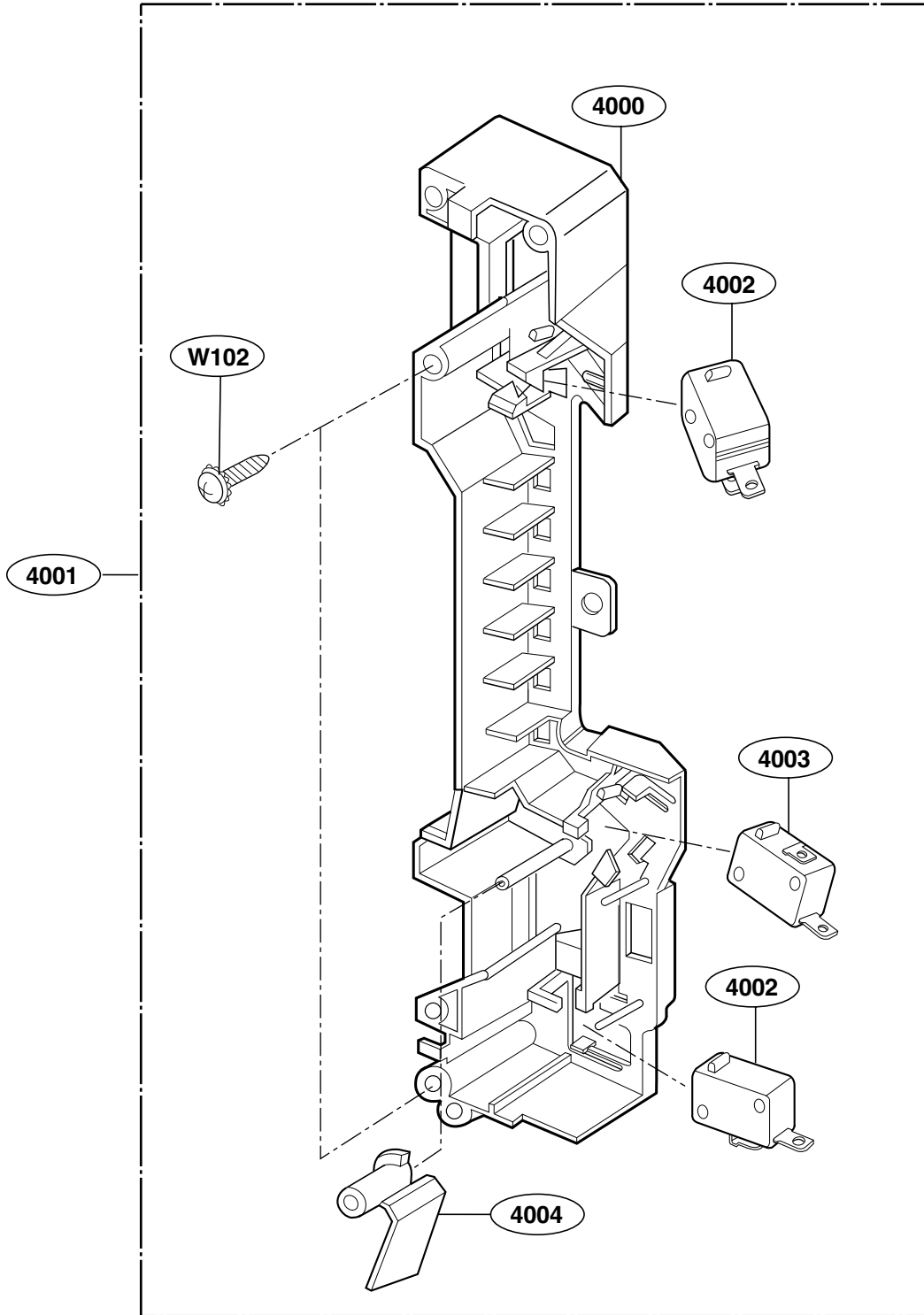
For Model:
721.64683
721.80883



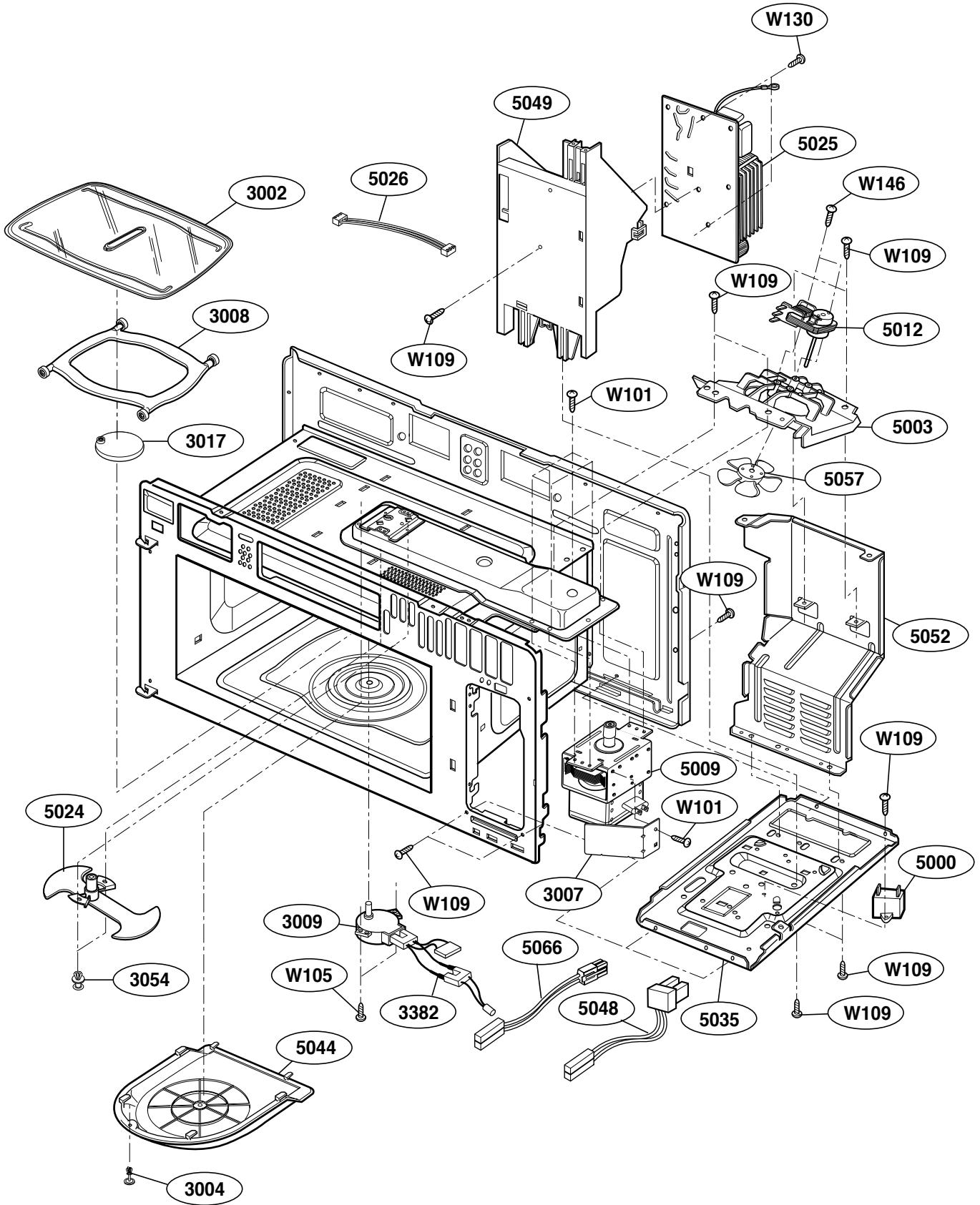
OVEN CAVITY PARTS



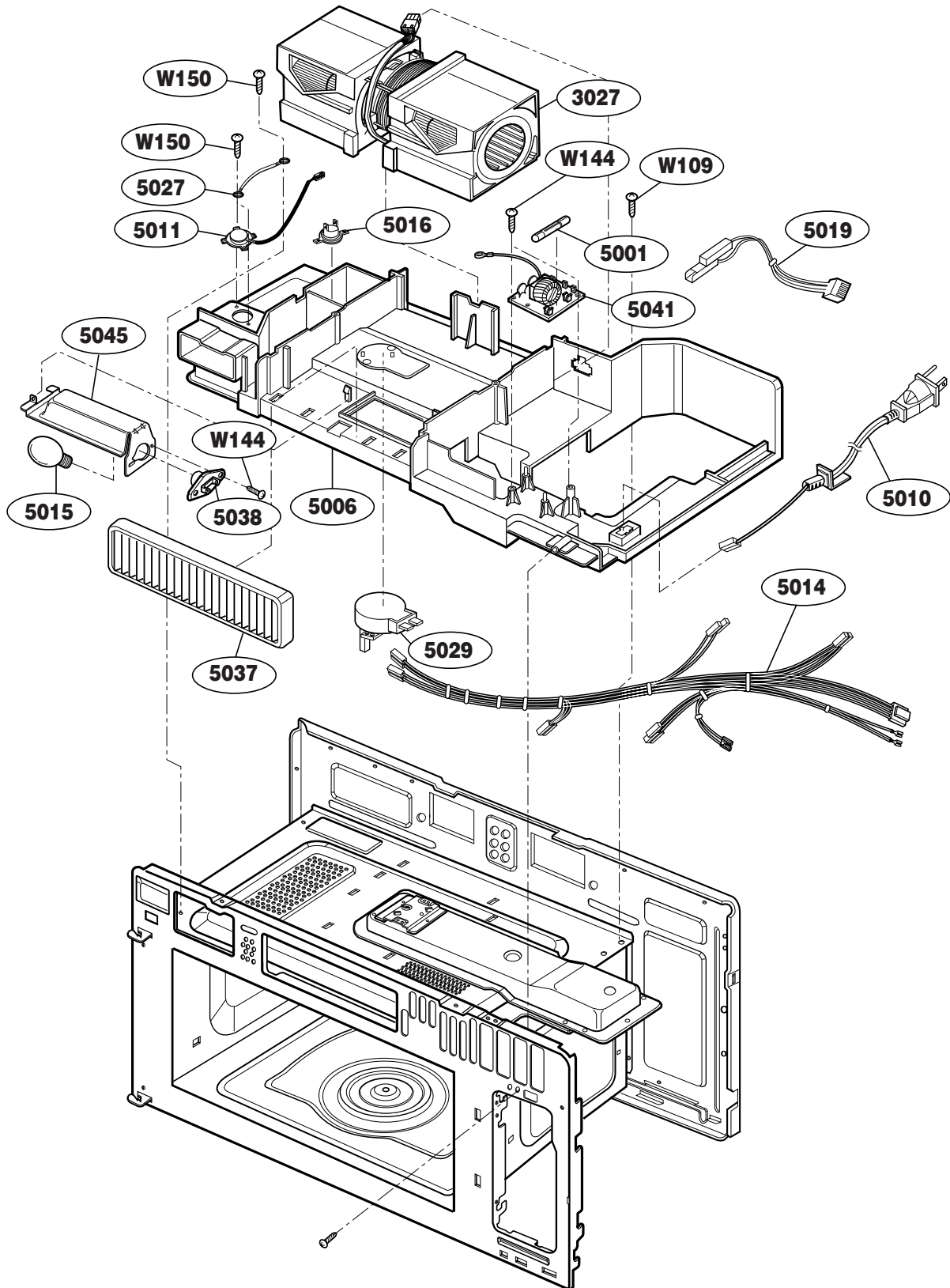
LATCH BOARD PARTS



INTERIOR PARTS (I)



INTERIOR PARTS (II) □



INSTALLATION PARTS □

