

Technical Service Manual

Microwave Oven



Models
E127M045GSA
E130M045GSA



Safe Servicing Practices

Avoid personal injury and/or property damage by observing important Safe Servicing Practices. Following are some limited examples of safe practices:

1. DO NOT attempt a product repair if you have any doubts as to your ability to complete the repair in a safe and satisfactory manner.
2. Always Use The Correct Replacement Parts as indicated in the parts documentation. Substitutions may defeat compliance with Safety Standards Set For Home Appliances. Do not exceed maximum recommended wattage on light bulb replacements. Doing so could blow fuses and/or damage transformers.
3. Before servicing or moving an appliance:
 - Remove power cord from the electrical outlet, trip circuit breaker to the OFF position, or remove fuse.
4. Never interfere with the proper operation of any safety device.
5. Use ONLY REPLACEMENT PARTS CATALOGED FOR THIS APPLIANCE. Substitutions may defeat compliance with Safety Standards Set For Home Appliances.
6. GROUNDING: The standard color coding for safety ground wires is GREEN, or GREEN with YELLOW STRIPES. Ground leads are not to be used as current carrying conductors. It is EXTREMELY important that the service technician reestablish all safety grounds prior to completion of service. Failure to do so will create a hazard.
7. Prior to returning the product to service, ensure that:
 - All electrical connections are correct and secure.
 - All electrical leads are properly dressed and secured away from sharp edges, high-temperature components, and moving parts.
 - All non-insulated electrical terminals, connectors, heaters, etc. are adequately spaced away from all metal parts and panels.
 - All safety grounds (both internal and external) are correctly and securely connected.
 - All panels are properly and securely reassembled.

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Basic Information

This Manual has been prepared to provide Electrolux Service Personnel with Operation and Service Information for Electrolux Microwave Ovens EI27MO45GSA and EI30MO45GSA.

Table of Contents

Section 1 Basic Information

Safe Servicing Practices.....	1-1
Table of Contents	1-2
Warnings and Safety Information	1-3
Precautions To Be Observed Before And During Servicing To Avoid Possible Exposure To Excessive Microwave Energy	1-4
Before Servicing	1-4
Danger High Voltage	1-4
Before Servicing	1-5
When Testing Is Completed	1-5
Microwave Measurement Procedure USA	1-6
Microwave Measurement Procedure Canada	1-7
Product Specification.....	1-8
Grounding Instructions	1-9
Oven Diagram	1-10

Section 2 Operation

Operating Sequence Description.....	2-1
Off Condition	2-1
Cooking Condition	2-1
Oven Schematic-Off Condition	2-2
Oven Schematic-Cooking Condition.....	2-2
Variable Cooking	2-3
Sensor Cooking Condition.....	2-3
Cooking Sequence	2-3
Touch Control Panel Assembly	2-4
Component Descriptions	2-4
Door Open Mechanism	2-4
Primary Switch, Third Door Switch & Door Sensing Switch.....	2-4
Monitor Switch.....	2-5
Cooling Fan Motor.....	2-5
Turntable Motor	2-5
Monitor Fuse	2-5
Cavity Temperature Fuse.....	2-5
C/T Temperature Fuse.....	2-5
Humidity Sensor Circuit.....	2-6

Section 3 Troubleshooting and Testing

Warnings and Cautions	3-1
Troubleshooting Guide Chart	3-2
Test Procedures	3-3
Circuit Testing Charts.....	3-12

Section 4 Component Teardown

Warnings and Cautions	4-1
Outer Case Removal.....	4-2
Power Transformer Removal.....	4-2
High Voltage Rectifier and High Voltage Capacitor Removal.....	4-3
Magnetron Removal	4-3
Oven Lamp and Lamp Socket Removal.....	4-4
Positive Lock® Connector (No-Case Type) Removal.....	4-4
Fan Motor Removal	4-5
Servicing The Touch Control Panel.....	4-6
Control Panel Assembly Removal	4-7
Key Sheet Replacement.....	4-7
Door Sensing Switch/Primary Switch/Third Door Switch And Monitor Switch Replacement.....	4-8
Door Sensing Switch/Primary Switch/Third Door Switch And Monitor Switch Adjustment.....	4-8
Door Replacement.....	4-9
Sealer Film	4-10
Turntable Motor Removal	4-10

Section 5 Wire Diagrams

Wiring Schematic Oven Off Condition	5-1
Pictorial Diagram	5-2
Wiring Diagram.....	5-3

Section 6 Parts List

Parts Listing.....	6-1
Oven And Cabinet Parts Exploded View	6-3
Control And Door Parts Exploded View.....	6-4
Packing and Accessories Exploded View.....	6-5

WARNING

CERTAIN INITIAL PARTS ARE INTENTIONALLY NOT GROUNDED AND PRESENT A RISK OF ELECTRICAL SHOCK ONLY DURING SERVICING. SERVICE PERSONNEL - DO NOT CONTACT THE FOLLOWING PARTS WHILE THE APPLIANCE IS ENERGIZED:

INVERTER UNIT, THAT INCLUDES HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE POWER TRANSFORMER, HIGH VOLTAGE RECTIFIER, HEAT SINK, ETC., AND MAGNETRON, HIGH VOLTAGE HARNESS ETC.; IF PROVIDED, FAN ASSEMBLY, COOLING FAN MOTOR.

ALL THE PARTS MARKED “*” ON PARTS LIST ARE USED AT VOLTAGES MORE THAN 250V.

REMOVAL OF THE OUTER WRAPPER GIVES ACCESS TO VOLTAGE ABOVE 250V.

ALL THE PARTS MARKED “△” ON PARTS LIST MAY CAUSE UNDUE MICROWAVE EXPOSURE, BY THEMSELVES, OR WHEN THEY ARE DAMAGED, LOOSENED OR REMOVED.

WARNING

THIS SERVICE MANUAL IS INTENDED FOR USE BY PERSONS HAVING ELECTRICAL AND MECHANICAL TRAINING AND A LEVEL OF KNOWLEDGE OF THESE SUBJECTS GENERALLY CONSIDERED ACCEPTABLE IN THE APPLIANCE REPAIR TRADE. ELECTROLUX HOME PRODUCTS CANNOT BE RESPONSIBLE, NOR ASSUME ANY LIABILITY, FOR INJURY OR DAMAGE OF ANY KIND ARISING FROM THE USE OF THIS MANUAL.

WARNING

NEVER OPERATE THE OVEN UNTIL THE FOLLOWING POINTS ARE ENSURED.

- (A) THE DOOR IS TIGHTLY CLOSED.
- (B) THE DOOR BRACKETS AND HINGES ARE NOT DEFECTIVE.
- (C) THE DOOR PACKING IS NOT DAMAGED.
- (D) THE DOOR IS NOT DEFORMED OR WARPED.
- (E) THERE IS NO OTHER VISIBLE DAMAGE WITH THE OVEN.

SERVICING AND REPAIR WORK MUST BE CARRIED OUT ONLY BY TRAINED SERVICE PERSONNEL.

Basic Information

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.

Before Servicing

Before servicing an operative unit, perform a microwave emission check as per the Microwave Measurement Procedure outlined in this service manual.

If microwave emissions level is in excess of the specified limit, contact ELECTROLUX HOME PRODUCTS, INC. immediately.

If the unit operates with the door open, service person should:

- 1) Tell the user not to operate the oven.
- 2) Contact Electrolux HOME PRODUCTS, INC. and Food and Drug Administration's Center for Devices and Radiological Health immediately.

Service personnel should inform ELECTROLUX HOME PRODUCTS, INC. of any certified unit found with emissions in excess of 4mW/cm². The owner of the unit should be instructed not to use the unit until the oven has been brought into compliance.

DANGER HIGH VOLTAGE

Do not energize a microwave oven with the outer case cabinet removed, because a microwave oven generates high voltage in the circuit.

If you intend to operate the oven employing the high frequency switching power converter circuit, you should take special precautions to avoid an electrical shock hazard.

The high voltage transformer, high voltage capacitor and high voltage diode have energized high voltage potential of approximately 8KV.

The aluminium heat sink is connected to the switching power transistor collector pole, and has an energized high voltage potential of approximately 650V peak.

DO NOT ACCESS THE HIGH VOLTAGE TRANSFORMER, HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE DIODE AND HEAT SINK WHEN THE POWER SUPPLY IS CONNECTED TO AN ELECTRICAL OUTLET.

WARNING

MICROWAVE OVENS CONTAIN CIRCUITRY CAPABLE OF PRODUCING VERY HIGH VOLTAGE AND CURRENT. CONTACT WITH THE FOLLOWING PARTS MAY RESULT IN A SEVERE, POSSIBLY FATAL, ELECTRICAL SHOCK.

INVERTER UNIT, THAT INCLUDES HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE POWER TRANSFORMER, HIGH VOLTAGE RECTIFIER, HEAT SINK ETC., AND MAGNETRON, HIGH VOLTAGE HARNESS ETC.. READ THE SERVICE MANUAL CAREFULLY AND FOLLOW ALL INSTRUCTIONS.



Before Servicing

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Whenever troubleshooting is performed, the power supply must be disconnected. It may, in some cases, be necessary to connect the power supply after the outer case has been removed, in this event:

1. Disconnect the oven power supply cord and then remove the outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Disconnect leads to the primary of the inverter unit.
5. Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
6. After that procedure, reconnect the power supply cord.

When Testing Is Completed

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Reconnect leads to the primary of the inverter unit.
5. Reinstall the outer case (cabinet).
6. Reconnect the power supply cord after the outer case is installed.
7. Run the oven and check all functions.

After repairing

1. Reconnect all leads removed from components during testing.
2. Reinstall the outer case (cabinet).
3. Reconnect the power supply cord after the outer case is installed.
4. Run the oven and check all functions.
Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power to HIGH and then set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out Before Servicing procedure and re-examine the connections to the component being tested.

Basic Information

Microwave Measurement Procedure (USA)

A. Requirements:

- 1) Microwave leakage limit (Power density limit): The power density of microwave radiation emitted by a microwave oven should not exceed 1 mW/cm^2 at any point 5 cm or more from the external surface of the oven, measured prior to acquisition by a purchaser, and thereafter (through the useful life of the oven), 5 mW/cm^2 at any point 5 cm or more from the external surface of the oven.
- 2) Safety interlock switches: Primary interlock switch shall prevent microwave radiation emission in excess of the requirement as above mentioned, secondary interlock switch shall prevent microwave radiation emission in excess of 5 mW/cm^2 at any point 5 cm or more from the external surface of the oven.

B. Preparation for testing:

Before beginning the actual measurement of leakage, proceed as follows:

- 1) Make sure that the actual instrument is operating normally as specified in its instruction booklet.
Important:
Survey instruments that comply with the requirement for instrumentation as prescribed by the performance standard for microwave ovens, 21 CFR 1030.10(c)(3)(i), must be used for testing.
- 2) Place the oven tray in the oven cavity.
- 3) Place the load of $275 \pm 15 \text{ ml}$ (9.8 oz) of tap water initially at $20 \pm 5 \text{C}$ (68F) in the center of the oven cavity. The water container shall be a low form of 600 ml (20 oz) beaker with an inside diameter of approx. 8.5 cm (3-1/2 in.) and made of an electrically nonconductive material such as glass or plastic. The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
- 4) Set the cooking control on Full Power Cooking Mode.
- 5) Close the door and select a cook cycle of several minutes. If the water begins to boil before the survey is completed, replace it with 275 ml of cool water.

C. Leakage test:

Closed-door leakage test (microwave measurement)

- 1) Grasp the probe of the survey instrument and hold it perpendicular to the gap between the door and the body of the oven.
- 2) Move the probe slowly, not faster than 1 in./sec. (2.5 cm/sec.) along the gap, watching for the maximum indication on the meter.
- 3) Check for leakage at the door screen, sheet metal seams and other accessible positions where the continuity of the metal has been breached (eg., around the switches, indicator, and vents). While testing for leakage around the door pull the door away from the front of the oven as far as is permitted by the closed latch assembly.
- 4) Measure carefully at the point of highest leakage and make sure that the highest leakage is no greater than 4 mW/cm^2 , and that the primary interlock switch and secondary interlock switch do turn the oven OFF before any door movement.

NOTE: After servicing, record data on service invoice and microwave leakage report.

Microwave Measurement Procedure (Canada)

After adjustment of the door switches are completed individually or collectively, switch test and microwave leakage test must be performed with survey instrument and test result must be confirmed to meet the requirement of the performance standard for microwave ovens as under mentioned.

A. Requirements:

Every microwave oven shall function in such a manner that when the oven is fully assembled and operating with its service controls and user controls adjusted to yield the maximum output, the leakage radiation, at all points at least 5 cm. from the external surface of the oven, does not exceed:

- 1) 1.0 mW/cm² with the test load of 275 ± 15 ml of water at an initial temperature 20 ± 5°C.
- 2) 5.0 mW/cm² when the outer enclosure is removed with a test load of 275 ± 15 ml of water at an initial temperature 20 ± 5°C.
- 3) 5.0 mW/cm² without a test load.

B. Preparation for testing:

Before beginning the actual measurement of leakage, proceed as follows:

- 1) Make sure that the actual instrument is operating normally as specified in its instruction booklet. Survey instruments that comply with the requirement for instrumentation as prescribed by CSA and NHW performance standard for microwave ovens must be used for testing recommended instruments are, NARDA 8100 and NARDA 8200.
- 2) Place the oven tray in the oven cavity.
- 3) Place the load of 275 ± 15 ml (9.8 oz) of tap water initially at 20 ± 5°C (68°F) in the center of oven cavity. The water container shall be a low form of a 600 ml (20 oz) beaker with an inside diameter of approx. 8.5 cm (3-1/2 in.) and made of an electrically nonconductive material such as glass or plastic. The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
- 4) Set the cooking control on Full Power Cooking Mode.
- 5) Close the door and select a cook cycle of several minutes. If the water begins to boil before the survey is completed, replace it with 275 ml of cool water.

C. Leakage test with enclosure installed:

- 1) Grasp probe of survey instrument and hold it perpendicular to gap between door and the body of the oven.
- 2) Move the probe slowly, not faster than 2.5 cm/sec. along the gap, watching for maximum indication on meter.
- 3) Check for leakage at the door screen, sheet metal seams and other accessible positions where the continuity of the metal has been breached (eg., around the switches, indicator, and vents). While testing for leakage around door, pull door away from the front of the oven as far as is permitted by the closed latch assembly.
- 4) Measure carefully at the point of highest leakage and make sure that the highest leakage is no greater than 4 mW/cm², and that the primary interlock switch and secondary interlock switch do turn the oven OFF before any door movement.

D. Leakage test without enclosure:

- 1) Remove the enclosure (cabinet).
- 2) Grasp the probe of the survey instrument and hold it perpendicular to all mechanical and electric parts of the oven that is accessible to the user of the oven including, but not limited to, the waveguide, cavity seams, magnetron gap between the door and the body of the oven.
- 3) Move probe slowly, not faster than 2.5 cm/sec. along the gap, watching for the maximum indication on meter.
- 4) Measure carefully at the point of highest leakage and make sure that the highest leakage is under 5 mW/cm².

CAUTION: Special attention should be given to avoid electrical shock because HIGH VOLTAGE is generated during this test.

E. No Load test

- 1) Operate the oven without a load and measure the leakage by the same method as the above test procedure "Leakage test with enclosure installed"
- 2) Make sure that the highest leakage should not exceed 5 mW/cm².

NOTE: After servicing, record data on service invoice and microwave leakage report.

Basic Information

Product Specification

Item	Description
Power Requirements	(USA)120 Volts / 13.0 Amperes / 1500 Watt 60 Hertz Single phase, 3 wire grounded
Power Output	1100 watts (IEC 705 Test Procedure) Operating frequency of 2450MHz
Case Dimensions	Width 24-5/8" Height 14" Depth 19-5/16"
HSS Unit Dimensions (including handle)	Width 30" Height 20-7/8" Depth 22-7/8"
Cooking Cavity Dimensions (2.0 Cubic Feet)	Width 17-3/8" Tray Size 15-9/16" Height 10-1/2" Depth 18-5/8"
Oven Cavity Light	40 Watt
Control Complement	Touch Control System Clock (1:00 - 12:59) Timer (0 - 99 min. 99 seconds) Microwave Power for Variable Cooking Repetition Rate; P-HI Full power throughout the cooking time P-90 approx. 90% of Full Power P-80 approx. 80% of Full Power P-70 approx. 70% of Full Power P-60 approx. 60% of Full Power P-50 approx. 50% of Full Power P-40 approx. 40% of Full Power P-30 approx. 30% of Full Power P-20 approx. 20% of Full Power P-10 approx. 10% of Full Power P-0 No power throughout the cooking time Sensor modes pads, Auto cook pads, Timer on-off pad, Set clock pad, User Pref pad, Quick start pad, Number selection pads, Power Level pad, Add 30 sec pad, Stop/Clear pad, Keep warm pad, and Start pad.
Safety Standard	UL Listed FCC Authorized DHHS Rules, CFR, Title 21, Chapter 1, Subchapter J Canadian Standards Association Health CANADA, Industry Canada
Weight	Approx. 55 lbs.

Grounding Instructions

This oven is equipped with a three prong grounding plug. It must be plugged into a wall receptacle that is properly installed and grounded in accordance with the National Electrical Code, local codes and ordinances. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current.

WARNING

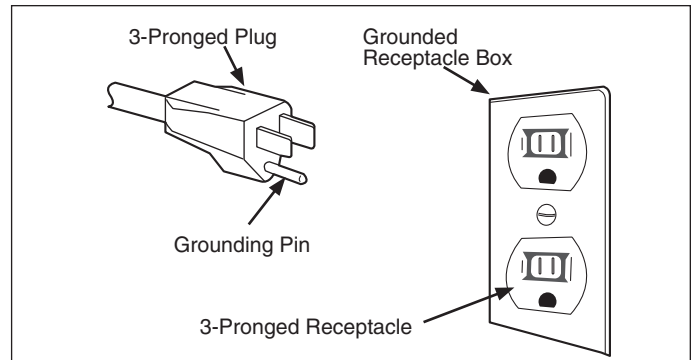
IMPROPER USE OF THE GROUNDING PLUG CAN RESULT IN A RISK OF ELECTRIC SHOCK.

Electrical Requirements

The oven is equipped with a 3-prong grounding plug. **DO NOT UNDER ANY CIRCUMSTANCES CUT OR REMOVE THE GROUNDING PIN FROM THE PLUG.**

The power supply cord and plug must be connected to a separate 120 Volt AC, 60 Hz, 15 Amp. or more dedicated line, using a grounded receptacle. When installing this appliance, observe all applicable codes and ordinances. A short power-supply cord is provided to reduce risks of becoming entangled in or tripping over a longer cord. Where a two-pronged wall-receptacle is encountered, it is the personal responsibility and obligation of the customer to contact a qualified electrician and have it replaced with a properly grounded three-pronged wall receptacle or have a grounding adapter properly grounded and polarized.

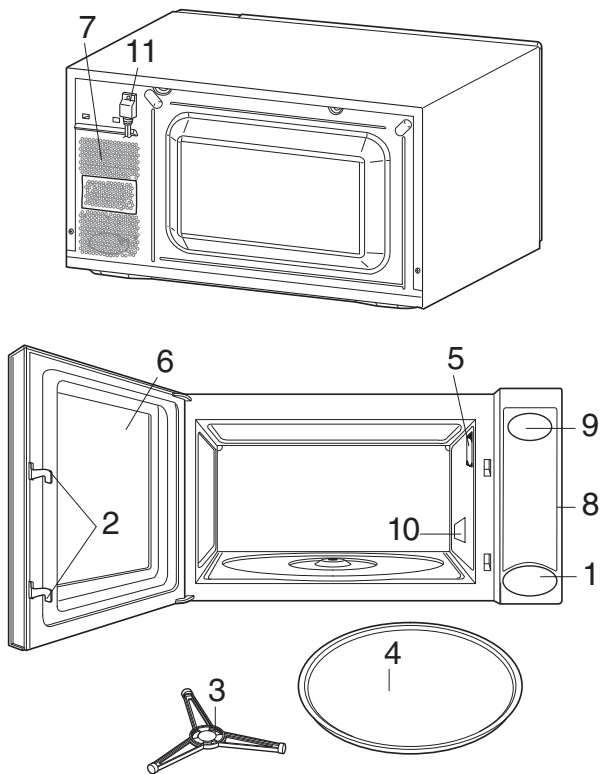
If an extension cord must be used, it should be a 3-wire, 15 amp. or more rated cord. Do not drape over a countertop or table where it can be pulled on by children or tripped over accidentally.



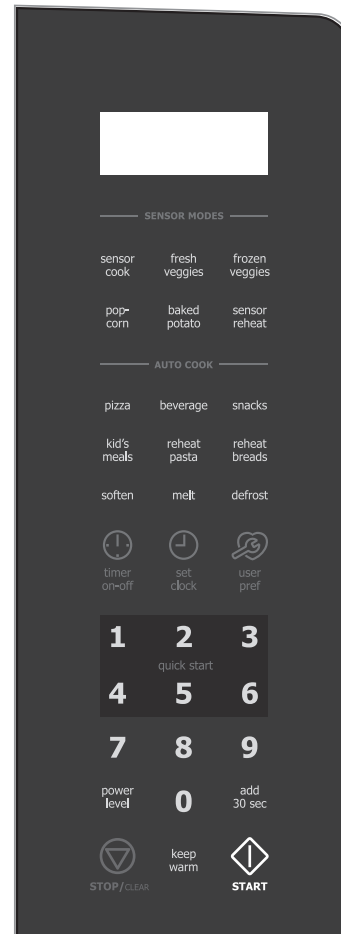
Basic Information

Oven Diagram

1. One touch door open button. Push to open door.
2. Door latches. The oven will not operate unless the door is securely closed.
3. Removable turntable support.
4. Removable turntable. The turntable will rotate clock wise or counterclockwise.
5. Oven lamp. It will light when oven is operating or door is opened.
6. Oven door with see-through window.
7. Ventilation openings. (Rear)
8. Auto-Touch control panel.
9. Time display: Digital display, 99 minutes 99 seconds.
10. Wave guide cover.
11. Power supply cord.



Touch Control Panel



NOTE

Some one-touch cooking features such as "add 30 sec" are disabled after three minutes when the oven is not in use. These features are automatically enabled when the door is opened and closed or the STOP/ CLEAR pad is pressed.

Operating Sequence Description

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

OFF CONDITION

Closing the door activates the door sensing switch and secondary interlock switch. (In this condition, the monitor switch contacts are opened.) When oven is plugged in, 120 volts AC is supplied to the control unit. (Figure 2-1).

1. The display will show "Enjoy your oven, press clear and press clock".
To set any program or set the clock, you must first touch the STOP/CLEAR button. The display will clear, and " : " appears.

COOKING CONDITION

Program desired cooking time by touching the NUMBER pads. Program the power level by touching the POWER LEVEL pad and then a Number pad.

When the START pad is touched, the following operations occur:

1. The contacts of relays are closed and components connected to the relays are turned on as follows.
(For details, refer to Figure 2-2)

RELAY CONNECTED COMPONENTS

RY1	Oven Lamp / Turntable Motor / Fan Motor
RY2	Power Transformer

2. 120 volts AC is supplied to the primary winding of the power transformer and is converted to about 3.3 volts AC output on the filament winding, and approximately 2370 volts AC on the high voltage winding.
3. The filament winding voltage heats the magnetron filament and the H.V. winding voltage is sent to a voltage doubler circuit.
4. The microwave energy produced by the magnetron is channeled through the waveguide into the cavity feedbox, and then into the cavity where the food is placed to be cooked.
5. Upon completion of the cooking time, the power transformer, oven lamp, etc. are turned off, and the generation of microwave energy is stopped. The oven will revert to the OFF condition.

6. When the door is opened during a cook cycle, the monitor switch, door sensing switch, third door switch, primary switch relay (RY1) and secondary interlock relay are activated with the following results. The circuits to the turntable motor, the cooling fan motor, and the high voltage components are de-energized, the oven lamp remains on, and the digital read-out displays the time still remaining in the cook cycle when the door was opened.

7. The monitor switch electrically monitors the operation of the primary and third door switch and is mechanically associated with the door so that it will function in the following sequence.

- (1) When the door opens from the closed position, the secondary interlock relay (RY2) secondary switch open their contacts. And contacts of the relay (RY1) remains closed. Then the monitor switch contacts close.

- (2) When the door is closed from the open position, the monitor switch contacts open first. Then the contacts of the primary switch, third door switch and door sensing switch close. And contacts of the relay (RY1) open.

If the primary interlock switch and secondary interlock relay (RY2) fail with the contacts closed when the door is opened, the closing of the monitor switch contacts will form a short circuit through the C/T fuse, primary interlock switch, relay (RY1) and secondary interlock relay (RY2), causing the C/T fuse to blow.

Operation

SCHEMATIC

NOTE: Condition Of Oven

1. Door Closed
2. Clock Appears On Display

NOTE: "*" indicates components with potential above 250V.

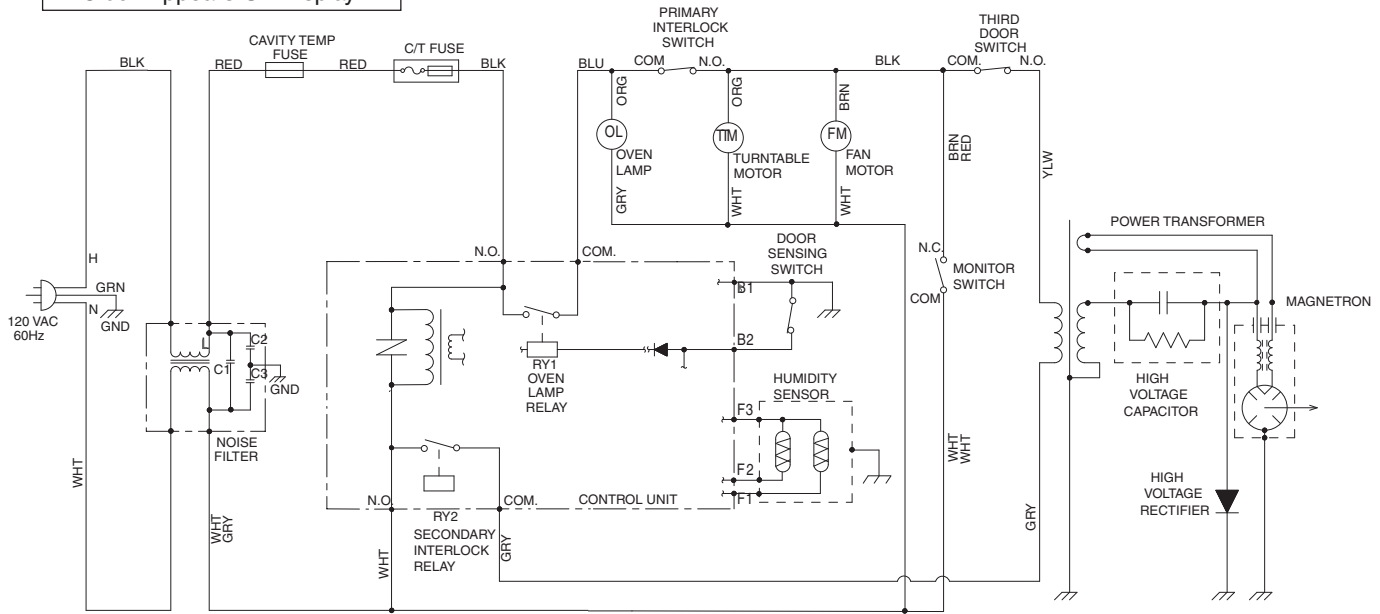


Figure 2-1. Oven Off Condition

SCHEMATIC

NOTE: Condition Of Oven

1. Door Closed
2. Cooking Time Programmed
3. Variable Cooking Control "High"
4. "Start" Pad Touched

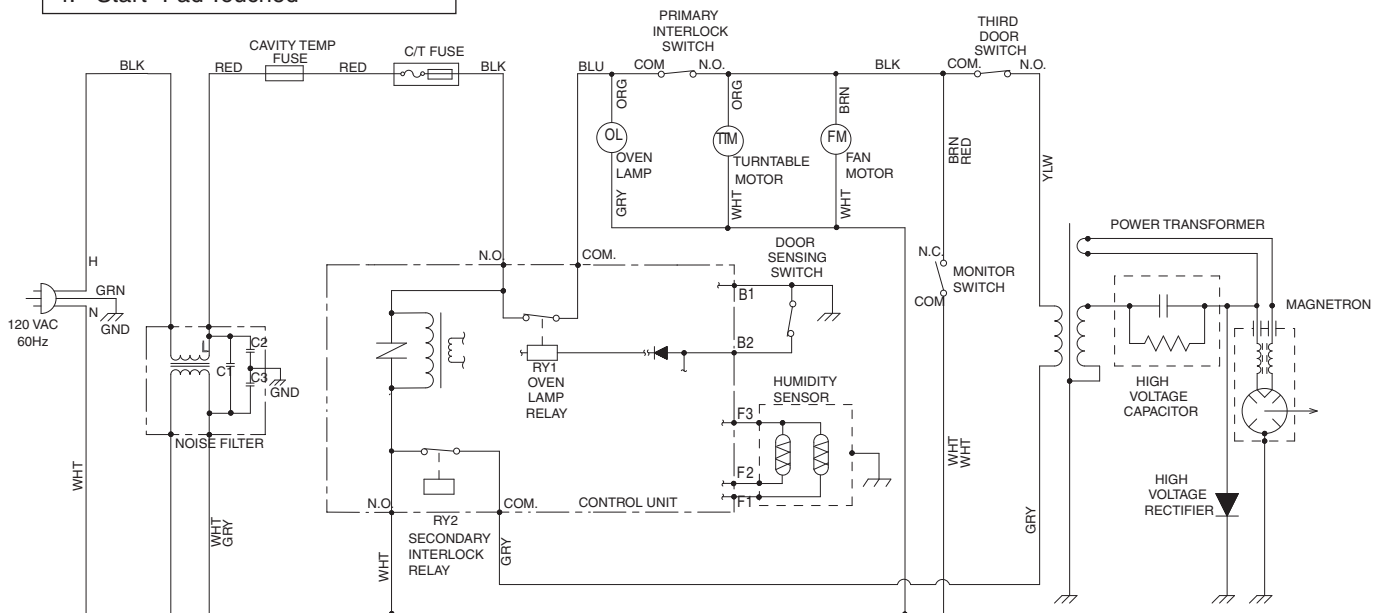


Figure 2-2. Oven ON (Cooking) Condition

Variable Cooking

When Variable Cooking Power is programmed, 120 volts AC is supplied to the power transformer intermittently through the contacts of relay (RY-2) and is operated by the control unit within a 32 second time base. Microwave power operation is as follows:

Vari-Mode	ON TIME	OFF TIME
Power 10 (High) (100% Power)	32 sec.	0 sec.
Power 9 (P-90) (Approx. 90%)	30 sec.	2 sec.
Power 8 (P-80) (Approx. 80%)	26 sec.	6 sec.
Power 7 (P-70) (Approx. 70%)	24 sec.	8 sec.
Power 6 (P-60) (Approx. 60%)	22 sec.	10 sec.
Power 5 (P-50) (Approx. 50%)	18 sec.	14 sec.
Power 4 (P-40) (Approx. 40%)	16 sec.	16 sec.
Power 3 (P-30) (Approx. 30%)	12 sec.	20 sec.
Power 2 (P-20) (Approx. 20%)	8 sec.	24 sec.
Power 1 (P-10) (Approx. 10%)	6 sec.	26 sec.
Power 0 (P-0) (0% power)	0 sec.	32 sec.

NOTE

The ON/OFF time ratio does not correspond with the percentage of microwave power, because approx. 2 seconds are needed for heating of the magnetron filament.

SENSOR COOKING CONDITION

Using the SENSOR COOK function, the foods are cooked without figuring time, power level or quantity. When the oven senses enough steam from the food, it relays the information to its microprocessor which will calculate the remaining cooking time and power level needed for best results.

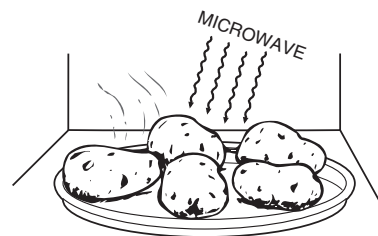
When food is cooked, water vapor is developed. The sensor "senses" the vapor and its resistance increases gradually. When the resistance reaches the value set according to the menu, supplementary cooking is started. The time of supplementary cooking is determined by experiment with each food category and inputted into the LSI.

An example of how the sensor works:
(BAKED POTATOES)

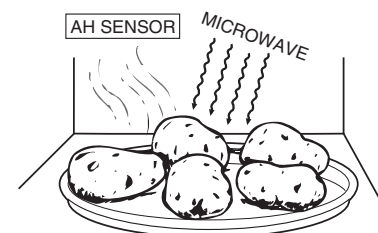
1. Potatoes at room temperature. Vapor is emitted very slowly.



2. Heat Potatoes. Moisture and humidity is emitted rapidly. You can smell the aroma as it cooks.



3. Sensor detects moisture and humidity and calculates cooking time and variable power.



COOKING SEQUENCE

1. Touch SENSOR COOK pad.

NOTE: The oven should not be operated on SENSOR immediately after plugging in the unit. Wait two minutes before cooking on SENSOR.

2. Select desired Sensor setting.
3. Touch START pad.
The coil of shut-off relay (RY1, RY6) is energized, the oven lamp and cooling fan motor are turned on, but the power transformer is not turned on.
4. After about 16 seconds, the cook relay (RY2) is energized. The power transformer is turned on, microwave energy is produced and first stage is started. The 16 seconds is the cooling time required to remove any vapor from the oven cavity and sensor.

NOTE: During this first stage, do not open the door or touch STOP/CLEAR pad.

5. When the sensor detects the vapor emitted from the food, the display switches over to the remaining cooking time and the timer counts down to zero. At this time, the door may be opened to stir, turn, or season food.
6. When the timer reaches zero, an audible signal sounds. The shut-off relay and cook relay are de-energized and the power transformer, oven lamp, etc. are turned off.
7. Opening the door or touching the STOP/CLEAR pad, the time of day will reappear on the display and the oven will revert to an OFF condition.

Operation

Touch Control Panel Assembly

The touch control section consists of the following units.

1. Key Unit
2. Control Unit (Consists of Power Unit and LSI Unit).

The principal functions of these units and the signals communicated among them are explained below.

Key Unit

The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through P53 ~ P57 & P80 ~ 87. When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through P53 ~ P57 to perform the requested function.

Control Unit

Control unit consists of LSI, reset circuit, indicator circuit, power source circuit, relay circuit, buzzer circuit, synchronizing signal circuit and back light circuit.

1. Reset Circuit

This circuit generates a signal which resets the LSI to the initial state when power is supplied.

2. Indicator Circuit

This circuit consists of VFD (Vacuum Fluorescent Display).

3. Power Source Circuit

This circuit generates voltages necessary in the control unit from the AC line voltage. In addition, the synchronizing signal is available in order to compose a basic standard time in the clock circuit.

Symbol	Voltage	Application
VSS	-5V	LSI(IC1)

4. Relay Circuit

A circuit to drive the magnetron, fan motor, turntable motor and light the oven lamp.

5. Buzzer Circuit

The buzzer is responsive to signals from the LSI to emit audible sounds (key touch sound and completion sound).

6. Synchronizing Signal Circuit

The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It accompanies a very small error because it works on commercial frequency.

7. Door Sensing Switch

A switch to "tell" the LSI if the door is open or closed.

8. Absolute Humidity Sensor Circuit

This circuit detects moisture of the cooking food to allow its automatic cooking.

Component Descriptions

DOOR OPEN MECHANISM

The door is opened by pushing the open button on the control panel, refer to the Figure D-1. When the open button is pushed, the open button pushes up the switch lever, and then the switch lever pushes up the latch head. The latch heads are moved upward and released from latch hook. Now the door will open.

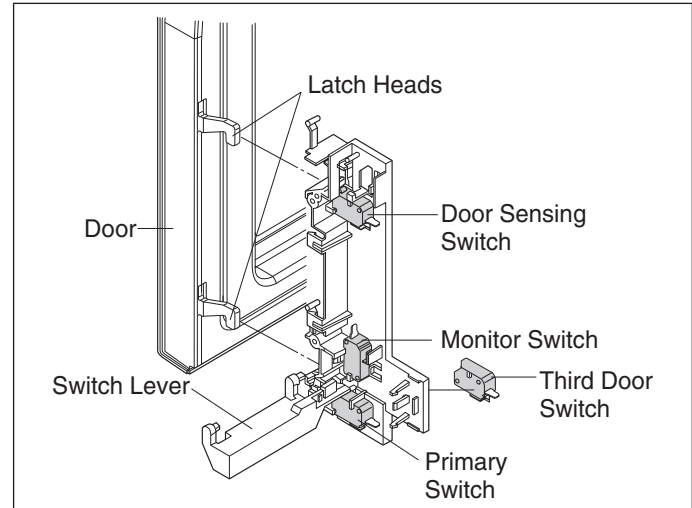


Figure 2-5 . Door Open Mechanism

PRIMARY SWITCH, THIRD DOOR SWITCH & DOOR SENSING SWITCH

The primary switch and third door switch mounted parallel to each other horizontally in the lower positions of the latch hook, the door sensing switch is mounted horizontally in the upper position of the latch hook. They are activated by the latch head on the door. When the door is opened, the switches interrupt the power to all high voltage components, except the oven lamp. A cook cycle cannot take place until the door is firmly closed thereby activating all interlock switches. The secondary interlock system consists of the door sensing switch and the secondary interlock relay located on the control circuit board.

MONITOR SWITCH

The monitor switch is activated (the contacts opened) by the latch head on the door while the door is closed. The switch is intended to render the oven inoperative, by means of blowing the C/T fuse, when the contacts of the secondary interlock relay (RY2) and primary interlock switch fail to open when the door is opened.

Functions:

1. When the door is opened, the monitor switch contact close (to the ON condition) due to their being normally closed. At this time the secondary interlock relay, primary switch and third door switch are in the OFF condition (contacts open) due to their being normally open contact switches.
2. As the door goes to a closed position, the monitor switch contacts are first opened and then the door sensing switch, primary switch and third door switch contacts close. (On opening the door, each of these switches operate inversely.)
3. If the door is opened, and the secondary interlock relay (RY2) and primary interlock switch contacts fail to open, the C/T fuse blows simultaneously with closing of the monitor switch contacts.

CAUTION

Before replacing a blown C/T fuse, test the door sensing switch, secondary interlock relay (RY2), relay (RY1), primary/third door interlock switch and monitor switch for proper operation. (Refer to Section 3 “Test procedure”).

NOTE

C/T fuse and monitor switch are replaced as an assembly.

COOLING FAN MOTOR

The cooling fan motor drives a blade which draws in external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channelled through the oven cavity to remove steam and vapors given off from the heating foods. It is then exhausted through exhausting air vents at the oven cavity.

TURNTABLE MOTOR

The turntable motor rotates the turntable located on the bottom of the oven cavity, so that foods on the turntable cook evenly during cooking. The turntable may turn in either direction.

MONITOR FUSE

1. The monitor fuse blows when the contacts (COM-NO) of the primary switch remain closed with the oven door open and when the monitor switch closes.
2. If the wire harness or electrical components are short-circuited, this monitor fuse blows to prevent an electric shock or fire hazard.

CAVITY TEMPERATURE FUSE

The cavity temperature fuse located on the top of the oven cavity, is designed to prevent damage to the oven by fire. If the food load is overcooked, by either error in cook time or defect in the control unit, the cavity temperature fuse will open. Under normal operation, the cavity temperature fuse remains closed. However, when abnormally high temperatures are reached within the oven cavity, the cavity temperature fuse will open at 302°F (150°C) causing the oven to shut down.

NOTE: The fuse must be replaced, it does not reset.

C/T TEMPERATURE FUSE

The C/T fuse, located near the magnetron, is designed to prevent damage to the magnetron if an over heated condition develops in the tube due to cooling fan failure, obstructed air guide, dirty or blocked air intake, etc. Under normal operation, the C/T fuse remains closed. However, when abnormally high temperatures are reached within the magnetron, the C/T fuse will open at 302°F (150°C) causing the oven to shut down.

1. The C/T fuse blows when the contacts (COM-NO) of the secondary interlock relay (RY2) and primary interlock switch remain closed with the oven door open and when the monitor switch closes.
2. If the wire harness or electrical components are short-circuited, this monitor fuse blows to prevent an electric shock or fire hazard.

NOTE: The fuse must be replaced, it does not reset.

Operation

Humidity Sensor Circuit

(1) Structure of Absolute Humidity Sensor:

The absolute humidity sensor includes two thermistors as shown in the illustration below. One thermistor is housed in the closed vessel filled with dry air while another in is the open vessel. Each sensor is provided with the protective cover made of metal mesh to be protected from the external airflow.

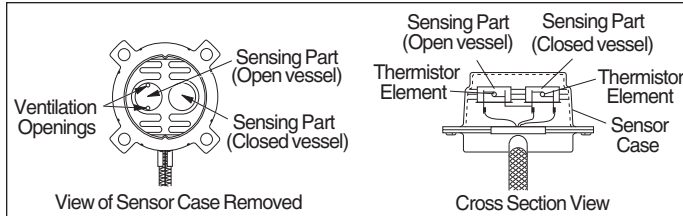


Figure 2-6. Humidity Sensor

(2) Operational Principle of Absolute Humidity Sensor:

The figure below shows the basic structure of an absolute humidity sensor. A bridge circuit is formed by two thermistors and two resistors (R1 and R2). The output of the bridge circuit is to be amplified by the operational amplifier. Each thermistor is supplied with a current to keep it heated at about 150°C (302°F), the resultant heat is dissipated in the air and if the two thermistors are placed in different humidity conditions they show different degrees of heat conductivity leading to a potential difference between them, causing an output voltage from the bridge circuit, the intensity of which is increased as the absolute humidity of the air increases. Since the output is very minute, it is amplified by the operational amplifier.

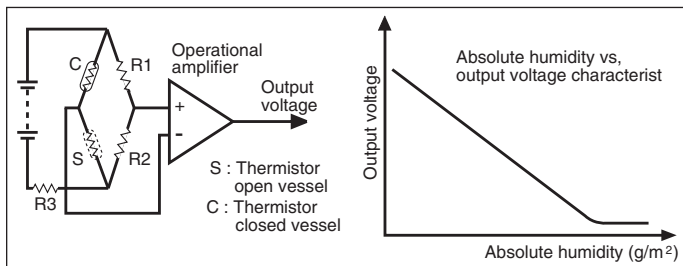


Figure 2-7. Humidity Sensor Operation

(3) Detector Circuit of Absolute Humidity Sensor Circuit:

This detector circuit is used to detect the output voltage of the absolute humidity circuit to allow the LSI to control sensor cooking of the unit. When the unit is set in the sensor cooking mode, 16 seconds clearing cycle occurs first, then the detector circuit starts to function and the LSI observes the initial voltage available at its AN6 terminal.

With this voltage given, the switches SW1 to SW5 in the LSI are turned on in such a way as to change the resistance values in parallel with R50-1. Changing the resistance values results in that there is the same potential at both F-3 terminal of the absolute humidity sensor and AN7 terminal of the LSI. The voltage of AN6 terminal will indicate about -2.5V.

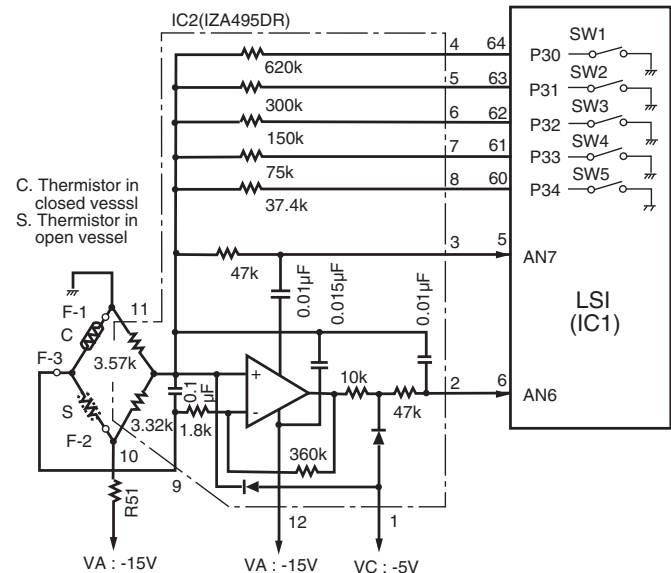
This initial balancing is set up about 16 seconds after the unit is put in the Sensor Cooking mode.

As the sensor cooking proceeds, the food is heated to generate moisture by which the resistance balance of the bridge circuit is deviated to increase the voltage available at AN6 terminal of the LSI.

Then the LSI observes that voltage at AN6 terminal and compares it with its initial value, and when the comparison rate reaches the preset value (fixed for each menu to be cooked), the LSI causes the unit to stop sensor cooking; thereafter, the unit goes in the next operation automatically.

When the LSI starts to detect the initial voltage at AN6 terminal 16 seconds after the unit has been put in the Sensor Cooking mode, if it is not possible to balance, of the bridge circuit due to disconnection of the absolute humidity sensor, ERROR will appear on the display and the cooking is stopped.

1) Humidity sensor circuit:



Troubleshooting Guide

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the “Test Procedure” section.

CAUTION

If the oven becomes inoperative because of a blown C/T fuse, check the monitor switch, relay (RY1) secondary interlock relay (RY2), door sensing switch and primary interlock switch before replacing the C/T fuse. If the C/T fuse is replaced, the monitor switch must also be replaced.

WARNING

WHENEVER TROUBLESHOOTING IS PERFORMED WITH THE POWER SUPPLY CORD DISCONNECTED. IT MAY IN, SOME CASES, BE NECESSARY TO CONNECT THE POWER SUPPLY CORD AFTER THE OUTER CASE HAS BEEN REMOVED, IN THIS EVENT:

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. To discharge high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.
4. Disconnect the leads to the primary of the power transformer.
5. Ensure that the leads remain isolated from other components and oven chassis by using insulation tape.
6. After that procedure, reconnect the power supply cord.

WARNING

WHEN THE TESTING IS COMPLETED:

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. To discharge high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.
4. Reconnect the leads to the primary of the power transformer.
5. Reinstall the outer case (cabinet).
6. Reconnect the power supply cord after the outer case is installed.
7. Run the oven and check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power to HIGH and then set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out Before Servicing procedure and re-examine the connections to the component being tested.

When all service work is completed and the oven is fully assembled, the microwave power output should be checked and a microwave leakage test should be carried out.

Troubleshooting and Testing


CK = Check / RE = Replace

CONDITION	TEST PROCEDURE POSSIBLE CAUSE AND DEFECTIVE PARTS PROBLEM	RE	RE	A	B	C	D	E	E	F	F	G	H	RE	RE	CK	I	CK	CK	CK	J	K	L	M	N	O		
		SHORT IN POWER CORD	SHORT OR OPENED WIRING	MAGNETRON	POWER TRANSFORMER	H.V. RECTIFIER ASSEMBLY	HIGH VOLTAGE CAPACITOR	CAVITY TEMPERATURE FUSE	MAGNETRON TEMP FUSE	SECONDARY INTERLOCK SYSTEM	PRIMARY INTERLOCK SWITCH	MONITOR SWITCH	MONITOR FUSE	OVEN LAMP OR SOCKET	COOLING FAN MOTOR	TURNTABLE MOTOR	TOUCH CONTROL PANEL	WRONG OPERATION	LOW VOLTAGE	DIRTY OVEN CAVITY	KEY UNIT	RELAY (RY1)	COMPU DEFROST	FOIL PATTERN ON PWB.	AH SENSOR	NOISE FILTER		
OFF CONDITION	Home fuse or circuit breaker blows when power cord is plugged into wall receptacle	<input type="radio"/>	<input type="radio"/>																									
	C/T fuse blows when power cord is plugged into wall receptacle.		<input type="radio"/>							<input type="radio"/>		<input type="radio"/>					<input type="radio"/>										<input type="radio"/>	
	All letters and indicators do not appear in display when power cord is first plugged into wall outlet.		<input type="radio"/>					<input type="radio"/>					<input type="radio"/>				<input type="radio"/>		<input type="radio"/>					<input type="radio"/>			<input type="radio"/>	
	Display does not operate properly when STOP/CLEAR key is touched. (Buzzer should sound and ":" or time of day should appear in display.)		<input type="radio"/>							<input type="radio"/>							<input type="radio"/>		<input type="radio"/>		<input type="radio"/>							
	Oven lamp does not light when door is opened.		<input type="radio"/>					<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>			<input type="radio"/>						<input type="radio"/>				<input type="radio"/>	
COOKING CONDITION	Oven lamp does not go out when door is closed.								<input type="radio"/>														<input type="radio"/>					
	Oven lamp lights but fan motor and turntable motor do not operate.		<input type="radio"/>							<input type="radio"/>				<input type="radio"/>	<input type="radio"/>													
	Oven does not go into cook cycle when START pad is touched		<input type="radio"/>							<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>						
	Oven seems to be operating but little or no heat is produced in oven load. (Food incompletely cooked or not cooked at all at end of cook cycle.)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>						<input type="radio"/>		<input type="radio"/>										
	Oven goes into a cook cycle but extremely uneven heating is produced in oven load (food).		<input type="radio"/>												<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>									
	Oven does not cook properly when programmed for Cooking Power P-50 mode. (Operates properly on Cooking P-HI (HIGH) mode.)									<input type="radio"/>							<input type="radio"/>											
	Oven goes into COMPU DEFROST but food is not defrosted well.																<input type="radio"/>	<input type="radio"/>						<input type="radio"/>				
SENSOR COOKING CONDITION	AH sensor does not end during sensor cooking condition. (Oven does not shut off after a cup of water is boiling by sensor cooking)																								<input type="radio"/>			
	Oven stops at 16 sec. after starting.																								<input type="radio"/>			

Test Procedures

Procedure Letter	Component Test
A	<p>MAGNETRON ASSEMBLY TEST</p> <p>⚠ WARNING</p> <p>HIGH VOLTAGES ARE PRESENT DURING THE COOK CYCLE, SO EXTREME CAUTION SHOULD BE OBSERVED. DISCHARGE THE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1) 4. To test for an open filament, isolate the magnetron from the high voltage circuit. A continuity check across the magnetron filament leads should indicate less than 1 ohm. 5. To test for a shorted magnetron, connect the ohmmeter leads between the magnetron filament leads and chassis ground. This test should indicate an infinite resistance. If there is little or no resistance the magnetron is grounded and must be replaced. 6. Reconnect all leads removed from components during testing. 7. Reinstall the outer case (cabinet). 8. Reconnect the power supply cord after the outer case is installed. 9. Run the oven and check all functions. <p>The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted).</p> <p>Power output of the magnetron can be measured by performing a water temperature rise test. This test should only be used if above tests do not indicate a faulty magnetron and there is no defect in the following components or wiring: silicon rectifier, high voltage capacitor and power transformer. This test will require a 16 ounce (453 cc.) measuring cup and an accurate mercury thermometer or thermocouple type temperature tester. For accurate results, the following procedure must be followed carefully:</p> <ol style="list-style-type: none"> 1. Fill the measuring cup with 16 oz. (453 cc.) of tap water and measure the temperature of the water with a thermometer or thermocouple temperature tester. Stir the thermometer or thermocouple through the water until the temperature stabilizes. Record the temperature of the water. 2. Place the cup of water in the oven. Operate oven at POWER 10(HIGH) selecting more than 60 seconds cook time. Allow the water to heat for 60 seconds, measuring with a stop watch, second hand of a watch or the digital read-out countdown. 3. Remove the cup from the oven and again measure the temperature, making sure to stir the thermometer or thermocouple through the water until the maximum temperature is recorded. 4. Subtract the cold water temperature from the hot water temperature. The normal result should be 38 to 78°F (21 to 42.6°C) rise in temperature. If the water temperatures are accurately measured and tested for the required time period the test results will indicate if the magnetron tube has low power output (low rise in water temperature) which would extend cooking time or high power output (high rise in water temperature) which would reduce cooking time. Because cooking time can be adjusted to compensate for power output, the magnetron tube assembly should be replaced only if the water temperature rise test indicates a power output well beyond the normal limits. The test is only accurate if the power supply line voltage is 120 volts and the oven cavity is clean.

Troubleshooting and Testing

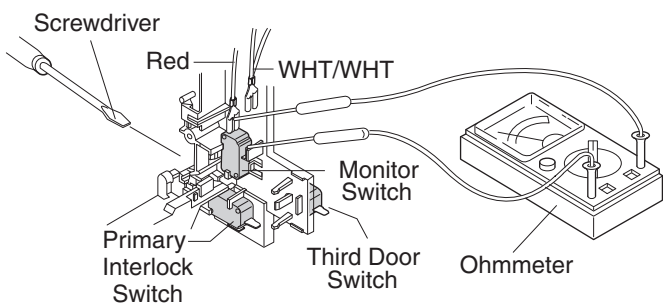
Procedure Letter	Component Test
B	<p>POWER TRANSFORMER TEST</p> <p> WARNING</p> <p>DO NOT TOUCH THE COMPONENTS OF THE POWER TRANSFORMER WHILE POWER TRANSFORMER IS ENERGIZED. IT IS DANGEROUS BECAUSE THIS HAS HIGH VOLTAGE COMPONENTS. (HIGH VOLTAGES ARE PRESENT AT THE HIGH VOLTAGE TERMINAL, SO DO NOT ATTEMPT TO MEASURE THE FILAMENT AND HIGH VOLTAGE.)</p> <ol style="list-style-type: none">1. Disconnect the power supply cord, and then remove outer case.2. Open the door and block it open.3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1)4. Disconnect the primary input terminals and measure the resistance of the transformer with an ohmmeter. Check for continuity of coils with an ohmmeter. On the R x 1 scale, the resistance of the primary coil should be less than 1 ohm and the resistance of the high voltage coil should be approximately 90 ohms; the resistance of the filament coil should be less than 1 ohm.5. Reconnect all leads removed from components during testing.6. Reinstall the outer case (cabinet).7. Reconnect the power supply cord after the outer case is installed.8. Run the oven and check all functions.
C	<p>HIGH VOLTAGE RECTIFIER TEST</p> <ol style="list-style-type: none">1. Disconnect the power supply cord, and then remove outer case.2. Open the door and block it open.3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1)4. Isolate the rectifier from the circuit. Using the highest ohm scale of the meter, read the resistance across the terminals and observe, reverse the leads to the rectifier terminals and observe meter reading. If a short is indicated in both directions, or if an infinite resistance is read in both directions, the rectifier is probably defective and should be replaced.5. Reconnect all leads removed from components during testing.6. Reinstall the outer case (cabinet).7. Reconnect the power supply cord after the outer case is installed.8. Run the oven and check all functions. <p>NOTE: Be sure to use an ohmmeter that will supply a forward bias voltage of more than 6.3 volts.</p>

Procedure Letter	Component Test
D	<p>HIGH VOLTAGE CAPACITOR TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1) 4. If the capacitor is open, no high voltage will be available to the magnetron. Disconnect input leads and check for short or open between the terminals using an ohmmeter. Checking with a high ohm scale, if the high voltage capacitor is normal, the meter will indicate continuity for a short time and should indicate an open circuit once the capacitor is charged. If the above is not the case, check the capacitor with an ohmmeter to see if it is shorted between either of the terminals and case. If it is shorted, replace the capacitor. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions.
E	<p>CAVITY TEMPERATURE FUSE TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1) 4. A continuity check across the cavity temperature fuse terminals should indicate a closed circuit unless the temperature of the cavity temperature fuse reaches approximately 302°F(150°C). An open cavity temperature fuse indicates overheating of the oven, exchange the cavity temperature fuse and check inside of oven cavity and for improper setting of cooking time or operation of control unit. Check for restricted air flow through the vent holes of the oven cavity, especially the cooling fan and air guide. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions. <p>C/T FUSE TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1) 4. A continuity check across the C/T fuse terminals should indicate a closed circuit unless the temperature of the C/T fuse reaches approximately 302°F (150°C). An open C/T fuse indicates overheating of the magnetron. Check for restricted air flow to the magnetron, especially the cooling fan air guide. <div style="background-color: #e6f2ff; padding: 5px; margin-top: 10px;"> <p> CAUTION</p> <p>If temperature fuse indicates an open circuit at room temperature, replace fuse.</p> </div> <p>(continued next page)</p>

Troubleshooting and Testing

Procedure Letter	Component Test
	<p>5. If the C/T fuse is blown when the door is opened, check the secondary interlock relay, primary interlock switch and monitor switch according to the “TEST PROCEDURE” for those switches before replacing the blown monitor fuse.</p> <p>⚠ CAUTION</p> <p>Before replacing a blown CT fuse, test the secondary interlock relay, primary interlock switch, door sensing switch and monitor switch for proper operation.</p> <p>If the C/T fuse is blown by improper switch operation, the C/T fuse and monitor switch must be replaced with “C/T fuse and monitor switch assembly”, even if the monitor switch operates normally. The C/T fuse and monitor switch assembly is comprised of a 20 ampere fuse and switch.</p> <p>6. Reconnect all leads removed from components during testing.</p> <p>7. Reinstall the outer case (cabinet).</p> <p>8. Reconnect the power supply cord after the outer case is installed.</p> <p>9. Run the oven and check all functions.</p>
F	<p>PRIMARY AND THIRD DOOR SWITCH TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1) 4. Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the third door interlock switch. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions. <p>SECONDARY INTERLOCK SYSTEM TEST DOOR SENSING SWITCH</p> <p>DOOR SENSING SWITCH</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. 4. Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the door sensing switch. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions. <p>⚠ CAUTION</p> <p>If the door sensing switch contacts fail in the open position and the door is closed, the cooling fan, turntable and oven light will be activated by RY1.</p>

Troubleshooting and Testing

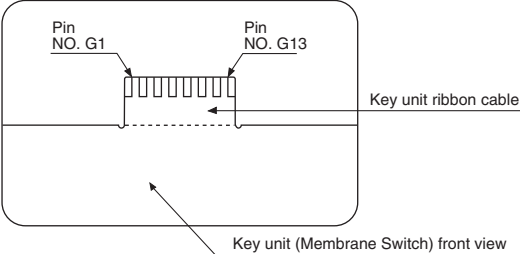
Procedure Letter	Component Test
	<p>SECONDARY INTERLOCK RELAY (RY2)</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. 4. Disconnect two (2) wire leads from the male tab terminals of the Secondary Interlock Relay. Check the state of the relay contacts using a ohmmeter. The relay contacts should be open. If the relay contacts are closed, replace the circuit board entirely or the relay itself. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions.
<p>G</p>	<p>MONITOR SWITCH TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. (See Warnings and Instructions on page 3-1) 4. Before performing this test, make sure that the primary switch is operating properly, according to the above Switch Test Procedure. Disconnect the wire lead from the monitor switch (COM) terminal. Check the monitor switch operation by using the ohmmeter as follows. When the door is open, the meter should indicate a closed circuit. When the monitor switch actuator is pushed by a screwdriver through the lower latch hole on the front plate of the oven cavity with the door opened (in this condition the plunger of the monitor switch is pushed in), the meter should indicate an open circuit. If improper operation is indicated, the switch may be defective. After testing the monitor switch, reconnect the wire lead to the monitor switch (COM) terminal and check the continuity of the monitor circuit. 5. Reconnect all leads removed from components during testing. 6. Reinstall the outer case (cabinet). 7. Reconnect the power supply cord after the outer case is installed. 8. Run the oven and check all functions. 

Troubleshooting and Testing

Procedure Letter	Component Test
I	<p data-bbox="300 275 862 300">TOUCH CONTROL PANEL ASSEMBLY TEST</p> <p data-bbox="300 323 1469 520">The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit, and also the Control Unit is divided into two units, LSI Unit and Power Unit, and troubleshooting by unit replacement is described according to the symptoms indicated.</p> <p data-bbox="300 533 488 558">Before testing,</p> <ol data-bbox="300 581 1414 814" style="list-style-type: none">1. Disconnect the power supply cord, and then remove outer case.2. Open the door and block it open.3. Discharge high voltage capacitor.4. Disconnect the leads to the primary of the power transformer.5. Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.6. After that procedure, re-connect the power supply cord. <p data-bbox="300 856 444 882">1. Key Unit.</p> <ol data-bbox="300 905 1117 1171" style="list-style-type: none">1. Disconnect the power supply cord, and then remove outer case.2. Open the door and block it open.3. Discharge high voltage capacitor.4. Check Key unit ribbon connection before replacement.5. Reconnect all leads removed from components during testing.6. Re-install the outer case (cabinet).7. Reconnect the power supply cord after the outer case is installed.8. Run the oven and check all functions. <p data-bbox="300 1194 927 1220">The following symptoms indicate a defective key unit.</p> <ol data-bbox="349 1232 1159 1329" style="list-style-type: none">a) When touching the pads, a certain pad produces no signal at all.b) When touching a number pad, two figures or more are displayed.c) When touching the pads, sometimes a pad produces no signal. <p data-bbox="300 1352 610 1377">If the Key unit is defective.</p> <ol data-bbox="300 1390 1117 1656" style="list-style-type: none">1. Disconnect the power supply cord, and then remove outer case.2. Open the door and block it open.3. Discharge high voltage capacitor.4. Replace the Key unit.5. Reconnect all leads removed from components during testing.6. Re-install the outer case (cabinet).7. Reconnect the power supply cord after the outer case is installed.8. Run the oven and check all functions.

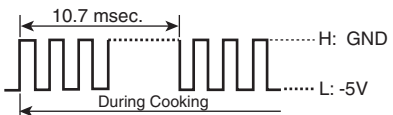
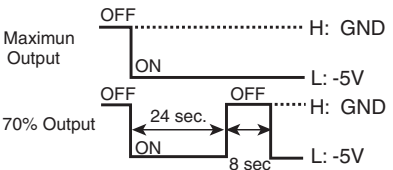
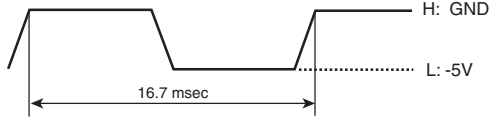
Procedure Letter	Component Test
	<p>2. Control Unit</p> <p>The following symptoms indicate a defective control unit. Before replacing the control unit, perform the Key unit test (Procedure J) to determine if control unit is faulty.</p> <p>2-1 In connection with pads.</p> <ol style="list-style-type: none"> 1. When touching the pads, a certain group of pads do not produce a signal. 2. When touching the pads, no pads produce a signal. <p>2-2 In connection with indicators.</p> <ol style="list-style-type: none"> 1. At a certain digit, all or some segments do not light up. 2. At a certain digit, brightness is low. 3. Only one indicator does not light. 4. The corresponding segments of all digits do not light up; or they continue to light up. 5. Wrong figure appears. 6. A certain group of indicators do not light up. 7. The figure of all digits flicker. 8. The following symptoms indicate a defective LSI unit. <ul style="list-style-type: none"> • When touching the keys on the touch screen, a certain key produces no signal at all. • When touching a number key on the touch screen, two figures or more are displayed. • When touching the keys on the touch screen, sometimes a key produces no signal. <p>2-3 Other possible problems caused by defective control unit.</p> <ol style="list-style-type: none"> a) Buzzer does not sound or continues to sound. b) Clock does not operate properly. c) Cooking is not possible. <p>When testing is completed,</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. 4. Reconnect all leads removed from components during testing. 5. Re-install the outer case (cabinet). 6. Reconnect the power supply cord after the outer case is installed. 7. Run the oven and check all functions.
J	<p>KEY UNIT TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. 4. Isolate the key unit with the control panel frame to be tested. 5. Using an ohmmeter and referring to the key unit matrix indicated on the control unit circuit, check the circuit between the pins of the key unit that correspond to the STOP/CLEAR pad. When the pad is pressed, the ohmmeter should indicate short circuit. When the pad is released, the ohmmeter should indicate open circuit. If incorrect readings are obtained, the key unit is faulty and must be replaced. About the other pads, the above method may be used. 6. Reconnect all leads removed from components during testing. 7. Re-install the outer case (cabinet). 8. Reconnect the power supply cord after the outer case is installed. 9. Run the oven and check all functions. <p>(See illustration on next page)</p>

Troubleshooting and Testing

Procedure Letter	Component Test																																																						
	<p>Key Unit Test</p>  <table border="1" data-bbox="477 569 1273 877"> <tr> <td></td> <td>G6</td> <td>G7</td> <td>G8</td> <td>G9</td> <td>G10</td> <td>G11</td> <td>G12</td> <td>G13</td> </tr> <tr> <td>-G5</td> <td></td> <td>baked potato</td> <td>beverage</td> <td>reheat pasta</td> <td>melt</td> <td>defrost</td> <td>reheat breads</td> <td>snacks</td> </tr> <tr> <td>-G4</td> <td>6</td> <td>set clock</td> <td>5</td> <td>2</td> <td>3</td> <td>user pref</td> <td>add 30 sec</td> <td>9</td> </tr> <tr> <td>-G3</td> <td></td> <td>power level</td> <td>STOP/CLEAR</td> <td>keep warm</td> <td>8</td> <td>0</td> <td>START</td> <td>sensor reheat</td> </tr> <tr> <td>-G2</td> <td>pop-corn</td> <td>pizza</td> <td>kid's meals</td> <td>soften</td> <td>timer on-off</td> <td>7</td> <td>1</td> <td>4</td> </tr> <tr> <td>-G1</td> <td>frozen veggies</td> <td>fresh veggies</td> <td>sensor cook</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		G6	G7	G8	G9	G10	G11	G12	G13	-G5		baked potato	beverage	reheat pasta	melt	defrost	reheat breads	snacks	-G4	6	set clock	5	2	3	user pref	add 30 sec	9	-G3		power level	STOP/CLEAR	keep warm	8	0	START	sensor reheat	-G2	pop-corn	pizza	kid's meals	soften	timer on-off	7	1	4	-G1	frozen veggies	fresh veggies	sensor cook					
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K	<p>RELAY TEST</p> <ol style="list-style-type: none"> Disconnect the power supply cord, and then remove outer case. Open the door and block it open. Discharge high voltage capacitor. Disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and oven chassis by using insulation tape. After that procedure, re-connect the power supply cord. Remove the outer case and check voltage between Pin No. 1 of the 2 pin connector (A) and the common terminal of the relay RY1 on the control unit with an A.C. voltmeter. The meter should indicate 120 volts, if not check oven circuit. <p>RY1 and RY2 Relay Test</p> <p>These relays are operated by D.C. voltage Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation. DC. voltage indicated Defective relay. DC. voltage not indicated Check diode which is connected to the relay coil. If diode is good, control unit is defective.</p> <table border="1" data-bbox="334 1556 1442 1650"> <thead> <tr> <th>RELAY SYMBOL</th> <th>OPERATIONAL VOLTAGE</th> <th>CONNECTED COMPONENTS</th> </tr> </thead> <tbody> <tr> <td>RY1</td> <td>Approx. 12.0V D.C.</td> <td>Oven lamp / Turntable motor / Cooling fan motor</td> </tr> <tr> <td>RY2</td> <td>Approx. 11.0V D.C.</td> <td>Power transformer</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Disconnect the power supply cord, and then remove outer case. Open the door and block it open. Discharge high voltage capacitor. Reconnect all leads removed from components during testing. Re-install the outer case (cabinet). Reconnect the power supply cord after the outer case is installed. Run the oven and check all functions. 	RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS	RY1	Approx. 12.0V D.C.	Oven lamp / Turntable motor / Cooling fan motor	RY2	Approx. 11.0V D.C.	Power transformer																																													
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Procedure Letter	Component Test															
L	<p>DEFROST TEST</p> <p>WARNING : The oven should be fully assembled before following procedure.</p> <ol style="list-style-type: none"> 1. Place one cup of water in the center of the turntable tray in the oven cavity. 2. Close the door. 3. Touch the “ DEFROST “ pad, then number 2. 4. The oven is in Defrost Center cooking condition. 5. The oven will operate as follows: <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 5px;">MENU</td> <td colspan="2" style="padding: 5px;">1ST STAGE</td> <td colspan="2" style="padding: 5px;">2ND STAGE</td> </tr> <tr> <td style="padding: 5px;">STEAKS/CHOPS/FISH</td> <td style="padding: 5px;">LEVEL</td> <td style="padding: 5px;">TIME</td> <td style="padding: 5px;">LEVEL</td> <td style="padding: 5px;">TIME</td> </tr> <tr> <td style="padding: 5px;">0.5lb</td> <td style="padding: 5px;">60%</td> <td style="padding: 5px;">57sec.</td> <td style="padding: 5px;">40%</td> <td style="padding: 5px;">22sec.</td> </tr> </table>	MENU	1ST STAGE		2ND STAGE		STEAKS/CHOPS/FISH	LEVEL	TIME	LEVEL	TIME	0.5lb	60%	57sec.	40%	22sec.
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0.5lb	60%	57sec.	40%	22sec.												
N	<p>NOISE FILTER TEST</p> <ol style="list-style-type: none"> 1. Disconnect the power supply cord, and then remove outer case. 2. Open the door and block it open. 3. Discharge high voltage capacitor. 4. Disconnect the leads to the primary of the power transformer. 5. Using an ohm-meter, check between the terminals as described in the following table: <div style="text-align: center; margin: 10px 0;"> </div> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">MEASURING POINT</th> <th style="padding: 5px;">INDICATION OF OHM-METER</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Between N and H</td> <td style="padding: 5px;">Open Circuit</td> </tr> <tr> <td style="padding: 5px;">Between terminal N and GRY</td> <td style="padding: 5px;">Short Circuit</td> </tr> <tr> <td style="padding: 5px;">Between terminal H and RED</td> <td style="padding: 5px;">Short Circuit</td> </tr> </tbody> </table> <p style="margin-top: 10px;">If incorrect readings are obtained, replace the noise filter.</p> <ol style="list-style-type: none"> 6. Reconnect all leads removed from components during testing. 7. Re-install the outer case (cabinet). 8. Reconnect the power supply cord after the outer case is installed. 9. Run the oven and check all functions. 	MEASURING POINT	INDICATION OF OHM-METER	Between N and H	Open Circuit	Between terminal N and GRY	Short Circuit	Between terminal H and RED	Short Circuit							
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Troubleshooting and Testing

Pin#	Signal	I/O	Description
1	VSS	IN	Power source voltage : -5.0 Volts. The power source voltage to the drive LSI is input to VSS terminal.
2	XIN	IN	Internal clock oscillation frequency control input setting. The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.
3	XOUT	OUT	Internal clock oscillation output. Output to control oscillation input to XIN.
4	TEST	IN	Terminal to input the program to LSI
5	VDD	IN	Power source voltage : GND (0 Volts)
6	P21	OUT	Not Used
7	RXD	IN	Terminal to input the program to LSI.
8	RESET	IN	Auto clear terminal. Signal is input to reset the LSI to the initial state when power is applied. Temporarily set to "L" level the moment power is applied, at this time the LSI is reset. Thereafter set at "H" level.
9	P20	OUT	Not Used
10	P00	OUT	Not Used
11	P01	OUT	Not Used
12	P02	OUT	Not Used
13	AVDD	IN	A/D converter power source voltage: GND (0 Volts) The power source voltage to drive the A/D converter. Connected to GND.
14	VREF	IN	Reference Voltage input terminal. A reference voltage applied to the A/D converter in the LSI. Connected to GND. (0 Volts)
15	P10	OUT	Oven lamp, fan motor and turntable motor driving signal. To turn on and off shut off relay. The square waveform voltage is delivered to the RY1 driving circuit and RY2 control circuit. 
16	P11	OUT	Magnetron high-voltage circuit driving signal. To turn on and off the cook relay (RY2). The signals holds" L-level during microwave cooking and "H" level while not cooking. In other cooking modes (variable cooking) the signal turns to "H" level and "L" level in repetition according to the power level. 
17	P12	OUT	Not Used
18	AJN3	IN	To input signal which communicates the door open/close information to LSI. Door close "H" level signal (0V). Door Open "L" level -5V.
19	AJN4	IN	Not Used
20	AJN5	IN	AH sensor input. This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into the LSI.
21	AJN6	IN	Used for initial balancing of bridge circuit (absolute humidity sensor). This input is an analog input terminal from AH sensor circuit, and connected to the A/D converter built into the LSI.
22	AVSS	IN	A/D converter power source voltage : -5.0V. The power source voltage to drive the A/D converter.
23	INTO	IN	Signal synchronized with commercial power source frequency. This is the basic timing for time processing of LSI. 
24	P31	OUT	Used for initial balancing of the bridge circuit absolute humidity sensor.
25	P32	OUT	Used for initial balancing of the bridge circuit absolute humidity sensor.
26	P33	OUT	Used for initial balancing of the bridge circuit absolute humidity sensor.
27	TXD	IN	Terminal to input the program to LSI.
28	P36	OUT	Used for initial balancing of the bridge circuit absolute humidity sensor.
29	P37	OUT	Used for initial balancing of the bridge circuit absolute humidity sensor.

Troubleshooting and Testing

Pin#	Signal	I/O	Description
30	P51	OUT	Signal to Buzzer: Duration
31	P52	OUT	Signal to sound buzzer: PWM
			<p>The diagram shows three signals over time: Buzzer, PWM, and Duration. The Buzzer signal is ON when the Duration signal is ON. The PWM signal is ON when the Buzzer signal is ON. A 'Lingering' period is shown where the PWM signal is still ON while the Duration signal is OFF.</p>
32	P53	OUT	Signal coming from touch key. When G1 line on key matrix is touched, a corresponding signal out of P80-P87 is input into P53. When no key is touched, signal is held at "H" level.
33	P54	OUT	Signal coming from touch key. When G2 line on key matrix is touched, a corresponding signal out of P80-P87 is input into P54. When no key is touched, signal is held at "H" level.
34	P55	OUT	Signal coming from touch key. When G3 line on key matrix is touched, a corresponding signal out of P80-P87 is input into P55. When no key is touched, signal is held at "H" level.
35	P56	OUT	Signal coming from touch key. When G4 line on key matrix is touched, a corresponding signal out of P80-P87 is input into P56. When no key is touched, signal is held at "H" level.
36	P57	OUT	Signal coming from touch key. When G5 line on key matrix is touched, a corresponding signal out of P80-P87 is input into P57. When no key is touched, signal is held at "H" level.
37	P80	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P80 terminal while one of G6 line keys on key matrix is touched.
38	P81	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P81 terminal while one of G7 line keys on key matrix is touched.
39	P82	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P82 terminal while one of G8 line keys on key matrix is touched.
40	P83	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P83 terminal while one of G9 line keys on key matrix is touched.
41	P84	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P84 terminal while one of G10 line keys on key matrix is touched.
42	P85	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P85 terminal while one of G11 line keys on key matrix is touched.
43	P86	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P86 terminal while one of G12 line keys on key matrix is touched.
44	P87	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P53-P57 and P87 terminal while one of G13 line keys on key matrix is touched.
45	P22	OUT	Not Used
46	AIN7	IN	Not Used
47	P50	OUT	Not Used
48	VEP		Not Used
49	COM3	OUT	Not Used
50	COM2	OUT	Not Used
51	COM1	OUT	Not Used
52	COM0	OUT	Not Used
53	V3	IN	Not Used
54	V2	IN	Not Used
55	V1	IN	Not Used
56	C1		Not Used
57	C0		Not Used

WARNING

TO PREVENT AN ELECTRIC SHOCK, TAKE THE FOLLOWING PRECAUTIONS:

- 1. BEFORE WIRING:**
 - 1) Disconnect the power supply.
 - 2) Open the door and wedge the door open.
 - 3) Discharge the high voltage capacitor and wait for 60 seconds.
- 2. DO NOT LET WIRE LEADS TOUCH TO THE FOLLOWING PARTS:**
 - 1) High voltage parts:
Magnetron, High voltage transformer, High voltage capacitor and High voltage rectifier assembly.
 - 2) Hot parts:
Oven lamp, Magnetron, High voltage transformer and Oven cavity.
 - 3) Sharp edge:
Bottom plate, Oven cavity, Waveguide flange, Chassis support and other metallic plates.
 - 4) Movable parts (to prevent a fault)
Fan blade, Fan motor, Switch, Switch lever, Open button.
- 3. Do not catch the wire leads in the outer case cabinet.**
- 4. Insert the positive lock connector completely until its pin is locked. Make sure that the wire leads should not come off even if the wire leads are pulled.**
- 5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.**

WARNING

AVOID POSSIBLE EXPOSURE TO MICROWAVE ENERGY. PLEASE FOLLOW INSTRUCTIONS BELOW BEFORE OPERATING THE OVEN.

1. Disconnect the power supply cord.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then push the door open button with the other, this causes the latch leads to rise, it is then possible to hear a "click" as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.). Carry out any remedial work that is necessary before operating the oven.

DO NOT OPERATE THE OVEN IF ANY OF THE FOLLOWING CONDITIONS EXIST;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

DO NOT OPERATE THE OVEN:

1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

CAUTION

Disconnect oven from power supply before removing outer case.

Discharge high voltage capacitor before touching any oven components or wiring after removing outer case.

Component Teardown

Outer Case Removal

⚠ CAUTION

1. **Disconnect oven from power supply before removing outer case.**
2. **Discharge the high voltage capacitor before touching any oven components or wiring.**

To remove the outer case, proceed as follows;

1. Disconnect the power supply cord.
2. Open the oven door and block it open.
3. Remove the two (2) screws from the lower portion of rear cabinet using a T20H Torx type or GTXH20-100 screwdriver.
4. Remove the remaining two (2) screws from rear and four (4) screws along the right side of outer case.
5. Slide the entire outer case back out about 1 inch (3 cm) to free it from retaining clips on the cavity face plate.
6. Lift entire outer case from the unit.

☰ NOTE

When replacing outer case, the two (2) special Torx screws must be reinstalled in the same locations.

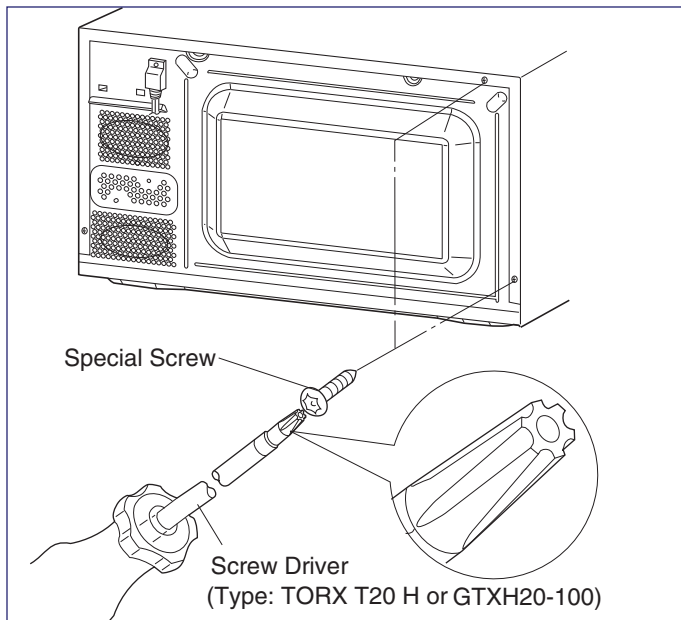


Figure 4-1. Outer Case Removal

Power Transformer Removal

Removal

1. Disconnect the oven power supply cord and remove outer case.
2. Open the oven door and block it open.
3. Discharge high voltage capacitor.

⚠ CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Disconnect wire leads (primary and high voltage) from power transformer and the filament leads from the magnetron and capacitor terminals.
5. Remove four (4) screws holding transformer to bottom plate.
6. Remove transformer from bottom plate.

Re-Install

1. Rest transformer on the bottom plate with its primary terminals toward the oven face plate.
2. Secure transformer with four screws to bottom plate.
3. Re-connect wire leads (primary and high voltage) to power transformer and filament leads of transformer to magnetron and high voltage capacitor. Refer to Wiring Diagram.
4. Re-install outer case and check that oven is operating properly.

High Voltage Rectifier and High Voltage Capacitor Removal

1. Disconnect the power supply cord and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Disconnect the high voltage wire A from the high voltage capacitor. See Wiring Diagram.
5. Disconnect the high voltage wire of high voltage rectifier assembly from the magnetron.
6. Disconnect the filament lead (short one) of the power transformer from the high voltage capacitor.
7. Remove one (1) screw holding capacitor holder with the high voltage rectifier to the base plate.
8. Disconnect rectifier terminal from capacitor. High voltage rectifier assembly is now free.
9. Remove capacitor holder. Capacitor is now free.

CAUTION

When replacing high voltage rectifier and high voltage capacitor, ground side terminal of the high voltage rectifier must be secured firmly with a grounding screw.

Magnetron Removal

Removal

1. Disconnect the power supply cord and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Disconnect wire leads from magnetron.
5. Remove the two (2) screws holding the chassis support to the magnetron and the oven cavity front flange.
6. Slide the magnetron duct slightly so that the two (2) screws at left hand side of the magnetron appear.
7. Carefully remove the four (4) screws holding magnetron to waveguide flange.
8. Remove the magnetron with care so that the magnetron antenna is not hit by any metal object around the antenna.
9. Now, the magnetron is free.

Re-Install

1. Re-install the magnetron to waveguide flange with care to prevent damage to the magnetron antenna.
2. Secure the magnetron with the four (4) screws.
3. Hold the chassis support to the oven cavity front plate and the magnetron with the two (2) screws.
4. Reconnect the wire leads to the magnetron. Refer to Wiring Diagram.
5. Re-install outer case and check that the oven is operating properly.

CAUTION

When replacing the magnetron, be sure the R.F. Gasket is in place and mounting screws are tightened securely.

Component Teardown

Oven Lamp and Lamp Socket Removal

1. Disconnect oven from power supply and remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

⚠ CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Pull the wire leads from the oven lamp socket.
5. Remove support bracket and the magnetron duct.
6. Unscrew the oven lamp from the lamp socket.
7. Remove socket from magnetron duct.
8. Now, the oven lamp and socket are free.

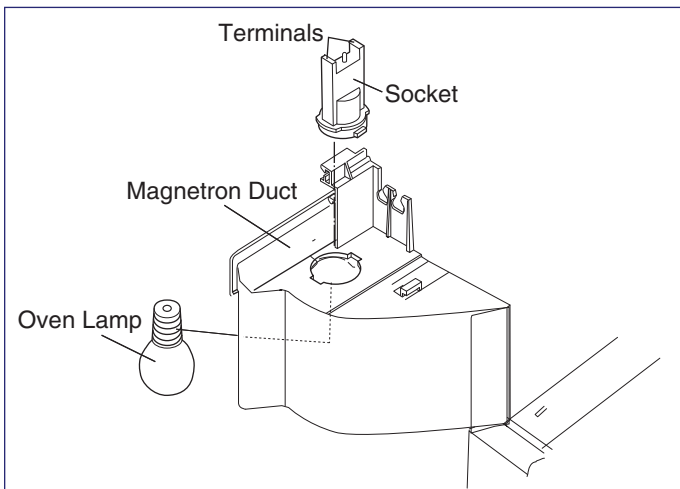


Figure 4-2. Oven Lamp Socket

Positive Lock® Connector (No-Case Type) Removal

1. Disconnect oven from power supply and remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

⚠ CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Push the lever of positive lock® connector.
5. Pull down on the positive lock® connector.

⚠ CAUTION

When connecting the positive lock® connectors to the terminals, connect the positive lock® so that the lever faces you.

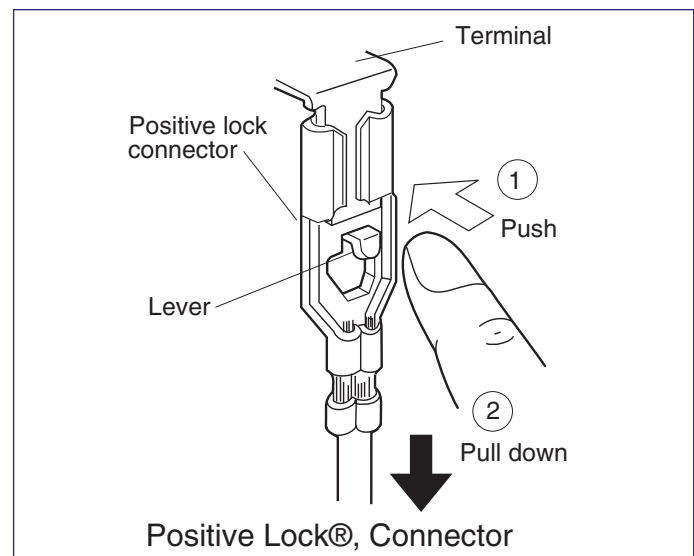


Figure 4-3. Positive Lock® Connector

Fan Motor Removal

Removal

1. Disconnect the oven power supply cord and remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

⚠ CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Disconnect the wire leads from the fan motor.
5. Remove the two (2) screws holding the fan motor to the oven cavity back plate.
6. Remove the fan blade from the fan motor shaft according to the following procedure.
7. Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

⚠ CAUTION

Make sure that any pieces do not enter the gap between the rotor and the stator of the fan motor because the rotor is easily shaven by pliers and metal pieces may be produced.

- * Do not touch the pliers to the coil of the fan motor because the coil may be cut or damaged.
 - * Do not disfigure bracket by touching with pliers.
- Do not reuse the removed fan blade because the hole (for shaft) may be larger than normal.

8. Remove the fan blade from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
9. Now, the fan blade and the fan motor will be free.

Installation

Install the fan blade to the fan motor shaft according to the following procedure:

1. Hold the center of the bracket which supports the shaft of the fan motor on the flat table.
2. Apply the screw lock tight into the hole (for shaft) of the fan blade.
3. Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.
3. Reset the fan duct assembly to its install position.

⚠ CAUTION

- * Do not hit fan blade with excessive force when installing because the bracket may be disfigured.
- * Make sure that the fan blade rotates smooth after installation.
- * Make sure the axis of the shaft is not slanted.

5. Install the fan motor to the oven cavity back plate with the two (2) screws.
6. Connect the wire leads to the fan motor, referring to the wiring diagram.

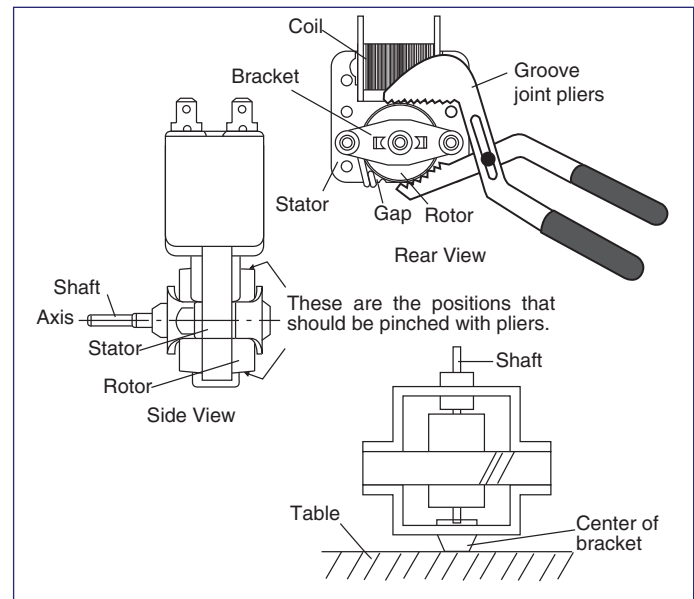


Figure 4-4. Fan Motor Components

Component Teardown

Servicing The Touch Control Panel

Precautions For Handling Electronic Components

This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc. and sometimes it is not fully protected by the built-in protection circuit.

In order to protect CMOS LSI.

1. When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap all PW boards in aluminium foil.
2. When soldering, ground the technician and use a grounded soldering iron and work table.

Servicing of Touch Control Panel

The following are procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

A. Servicing the touch control panel with power supply of the oven:

Therefore, before checking the performance of the touch control panel:

1. Disconnect the power supply cord and then remove the outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.
4. Disconnect leads to the primary of power transformer.
5. Ensure leads remain isolated from other components and oven chassis by using insulation tape.
6. Re-connect the power supply cord.

After checking performance of the touch control panel:

1. Disconnect the power supply cord.
2. Open the door and block it open.
3. Reconnect leads to the primary of power transformer.
4. Reinstall the outer case (cabinet).
5. Reconnect the power supply cord after the outer case is installed.
6. Run the oven and check all functions.
 - a) On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated. For those models, check and repair all the controls (sensor related ones included) of the touch control panel

while keeping it connected to the oven.

- b) On some models, the power supply cord between the touch control panel and the oven proper is long enough that they may be separated from each other. For those models, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which activates an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

B. Servicing the touch control panel with power supply from an external power source:

Disconnect the touch control panel completely from the oven proper, and short both ends of the door sensing switch (on PWB) of the touch control panel, which brings about an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the touch control panel, then it is possible to check and repair the controls of the touch control panel; it is also possible to check the sensor related controls of the touch control panel by using the dummy resistor(s).

Servicing Tools

Tools required to service touch control panel assembly.

1. Soldering iron: 30W (It is recommended to use a soldering iron with a grounding terminal.)
2. Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
3. Others: Hand tools

Other Precautions

1. Before turning on power source of the control unit, remove the aluminium foil applied for preventing static electricity.
2. Connect the connectors of the key unit to the control unit, being sure that the lead wires are not twisted.
3. After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4. Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
5. Be sure to use specified components where high precision is required.

Control Panel Assembly Removal

1. Disconnect the oven power supply cord and remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

⚠ CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Disconnect the wire leads from panel components.
5. Remove the one (1) screw holding the control panel assembly to the oven cavity front plate.
6. Slide control panel assembly upward and remove.
7. Now, individual components can be removed.

☰ NOTE

1. Before attaching a new key unit, wipe off remaining adhesive on the control panel frame surfaces completely with a soft cloth soaked in alcohol.
2. When attaching key unit to control panel frame, adjust upper edge and right edge of the key unit to the correct position of control panel frame.
3. Place the key unit firmly to the control panel frame by rubbing with soft cloth not to scratch.

Key Sheet Replacement

1. Disconnect the oven power supply cord and remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

⚠ CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Remove the control panel assembly, referring to Control Panel Assembly Removal.
5. Remove the five (5) screws holding the control unit to the control panel frame. And remove the control unit by releasing from tabs.
6. Remove the key sheet from the control panel frame. (Heat gun will soften adhesive)

Installation

1. Remove remaining adhesive on the control panel frame surfaces with a soft cloth soaked in alcohol.
2. Make sure that the VFD (Vacuum Fluorescent Display) is in good condition.
3. Remove the backing paper from the new graphic sheet.
4. Adjust the upper edge and left edge of the graphic sheet to the large depression on the surface of the control panel frame.
5. Attach the graphic sheet to the control panel frame by rubbing with a soft cloth not to scratch.
6. Reinstall the control panel frame to the oven.

☰ NOTE

Do not touch contact surface of ribbon cable (edge).

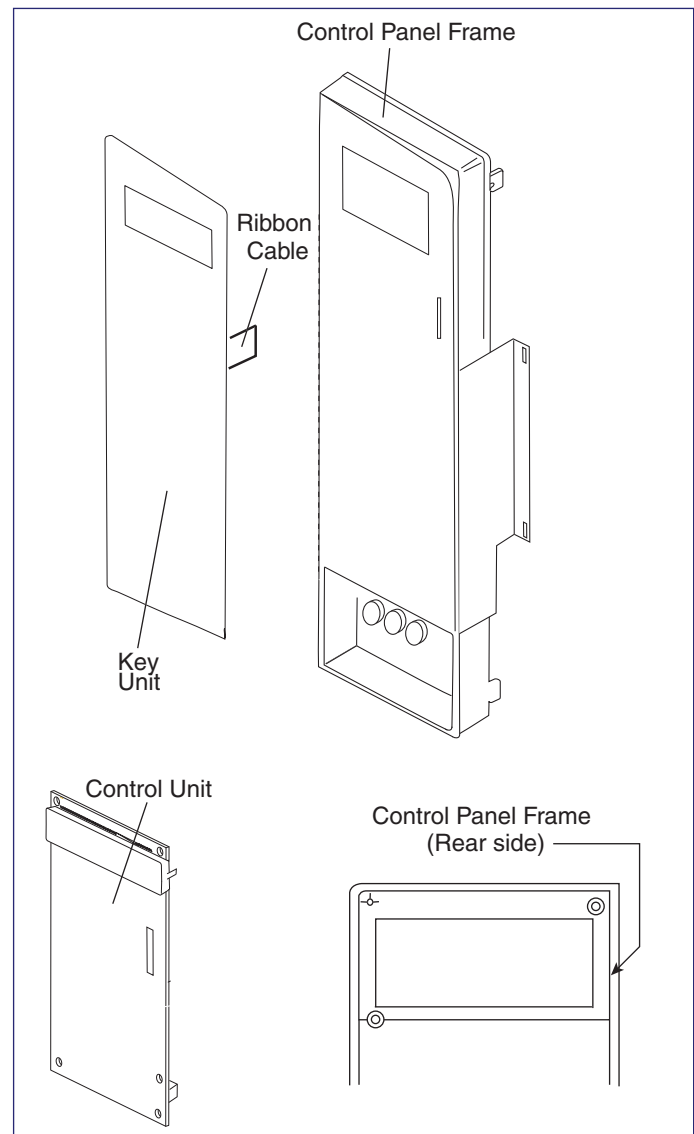


Figure 4-5. Control Panel Assembly

Component Teardown

Door Sensing Switch/Primary Switch/ Third Door Switch And Monitor Switch Removal

Removal

1. Disconnect the oven power supply cord and remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

4. Disconnect the wire leads from the switch.
5. Remove two (2) screws holding latch hook to oven flange.
6. Remove latch hook assembly from oven flange.
7. Push outward on the two (2) retaining tabs holding switch in place.
8. Switch is now free. At this time switch lever will be free, do not lose it.

Reinstall

1. Re-install each switch in its place. The third door interlock/ monitor switches are in the lower position and the door sensing switch is in the upper position.
2. Re-connect wire leads to each switch. Refer to wiring diagram.
3. Secure latch hook (with two (2) mounting screws) to oven flange.
4. Make sure that the monitor switch is operating properly and check continuity of the monitor circuit. Refer to "Test Procedure and Adjustment Procedure"

Door Sensing Switch/Primary Switch/ Third Door Switch And Monitor Switch Adjustment

1. Disconnect the power supply cord, and then remove outer case.
2. Open the door and block it open.
3. Discharge high voltage capacitor.

CAUTION

To discharge the high voltage capacitor, wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

If the door sensing switch, primary switch, secondary switch and monitor switch do not operate properly due to a misadjustment, the following adjustment should be made.

4. Loosen the two (2) screws holding latch hook to the oven cavity front flange.
5. With door closed, adjust latch hook by moving it back and forth, and up and down. In and out play of the door allowed by the upper and lower position of the latch hook should be less than 0.5mm. The vertical position of the latch hook should be adjusted so that the door sensing switch, primary switch and third door switch are activated with the door closed. The horizontal position of the latch hook should be adjusted so that the plunger of the monitor switch is pressed with the door closed.
6. Secure the screws with washers firmly.
7. Check the operation of all switches. If each switch has not activated with the door closed, loosen screw and adjust the latch hook position.
(continued next page)

After adjustment, check the following.

1. In and out play of door remains less than 0.5mm when in the latched position. First check upper position of latch hook, pushing and pulling upper portion of door toward the oven face. Then check lower portion of the latch hook, pushing and pulling lower portion of the door toward the oven face. Both results (play in the door) should be less than 0.5mm.
2. The door sensing switch, primary switch and third door switch interrupt the circuit before the door can be opened.
3. Monitor switch contacts close when door is opened.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter.

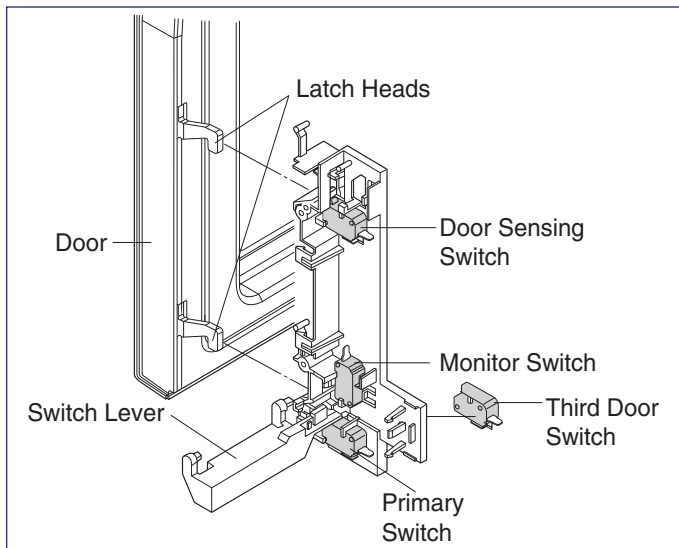


Figure 4-6. Door Switch Components

Door Replacement

1. Disconnect the power supply cord.
2. Push the open button and open the door slightly.
3. Insert a putty knife (thickness of about 0.5mm) into the gap between the choke cover and door frame as shown in Figure 4-7 to free engaging parts.
4. Pry the choke cover by inserting a putty knife as shown Figure 4-7.
5. Release choke cover from door panel.
6. Now choke cover is free.
7. Release two (2) pins of door panel from two (2) holes of upper and lower oven hinges by lifting up.
8. Now, door panel with door frame is free from oven cavity.

NOTE

When carrying out any repair to the door, do not bend or warp the slit choke (tabs on the door panel assembly) to prevent microwave leakage.

9. Release the door panel from twelve (12) tabs of door frame.
10. Remove the door panel from the door frame.
11. Now, door panel with sealer film is free.
12. Tear sealer film from door panel.
13. Now, door panel is free.
14. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.
15. Now, latch head and latch spring are free.
16. Remove door screen from door frame
17. Now, door frame is free.

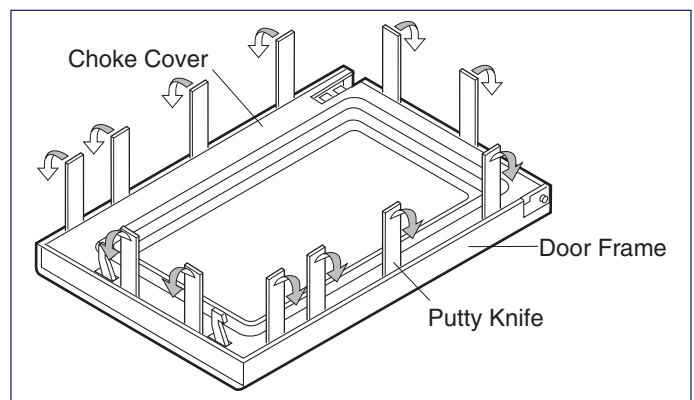


Figure 4-7. Door Components

Component Teardown

Re-Install

1. Re-install door screen to door frame.
2. Re-install the latch spring to the latch head. Re-install the latch spring to the door frame. Re-install latch head to door frame.
3. Re-install door panel to door frame by fitting twelve (12) tabs of door frame to twelve (12) holes of door panel.
4. Put sealer film on door panel. Refer to “Sealer Film” about how to handle new sealer film.
5. Catch two (2) pins of door panel on two (2) holes of upper door frame.
6. Re-install choke cover to door panel by pushing.

After any service to the door:

- (A) Make sure that door sensing switch, primary switch and secondary switch are operating properly. (Refer to Section 3 “Test Procedures”).
- (B) An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.

After any service, make sure of the following:

1. Door latch heads smoothly catch latch hook through latch holes and that latch head goes through center of latch hole.
2. Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. Door is positioned with its face pressed toward cavity face plate.
4. Check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

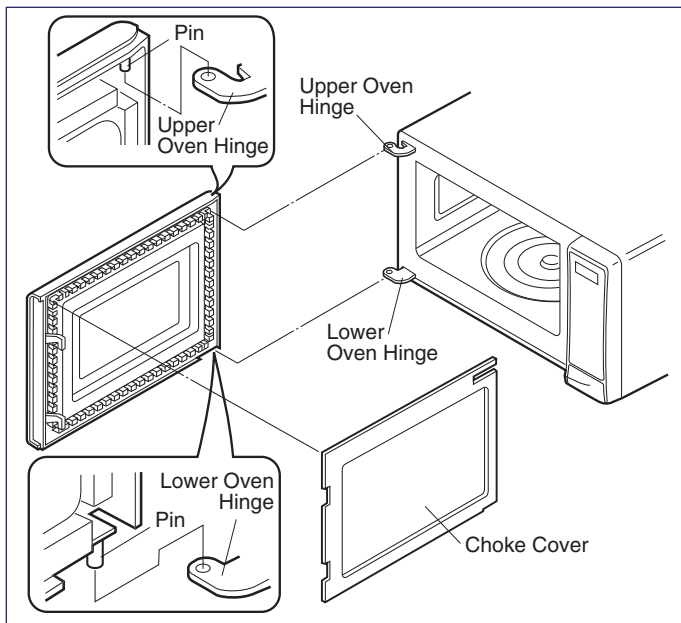


Figure 4-8. Door Replacement and Adjustment

NOTE

The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from the oven cavity during the cook cycle. This function does not require that the door be airtight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around the oven door is not abnormal and do not of themselves indicate a leakage of microwave energy from the oven cavity. If such were the case, the oven could not be equipped with a vent, the very purpose of which is to exhaust the vapor-laden air from the oven cavity.

Sealer Film

1. Put the adhesive tape on the backing film of the sealer film as shown in Fig. 4-9.
2. Tear the backing film by pulling the adhesive tape.
3. Put the pasted side of the sealer film on the door panel.

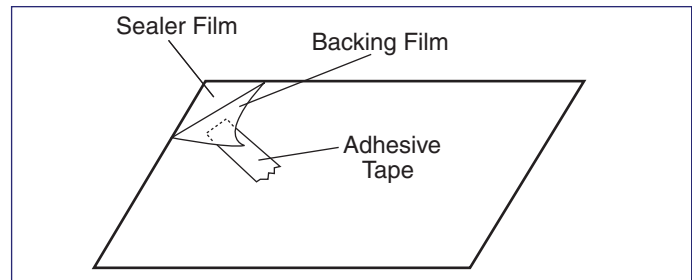


Figure 4-9. Sealer Film

Turtable Motor Removal

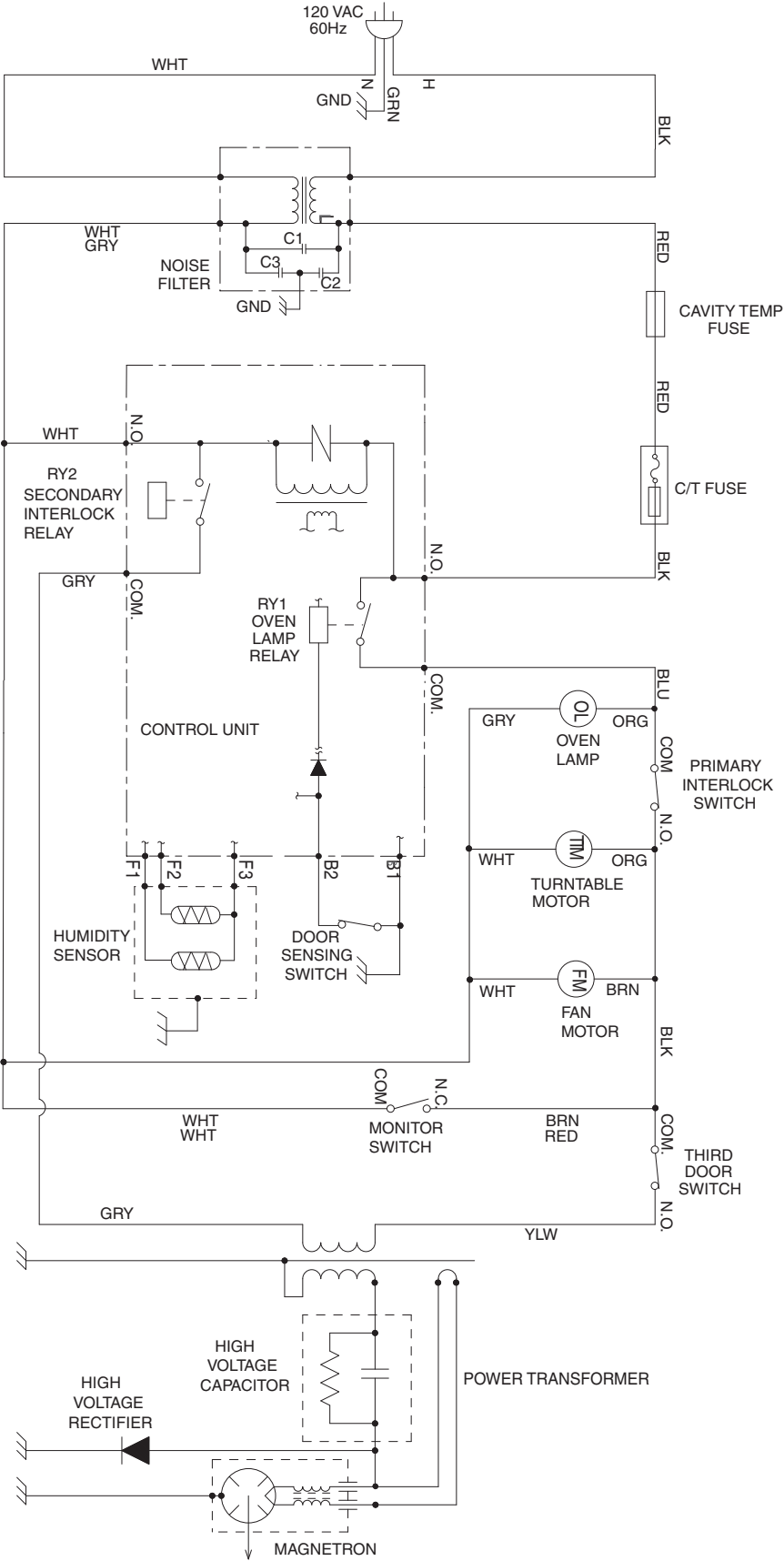
1. Disconnect the power supply cord.
2. Remove the turntable tray, and the turntable support out of the oven cavity.
3. Lay oven on its backside. Remove turntable motor cover by snipping off the material in four corners.
4. Where the corners have been snipped off bend corner areas flat. No sharp edges must be evident after removal of the turntable motor cover.
5. Disconnect wire leads from turntable motor. (See “Positive Lock Connector Removal”)
6. Remove one (1) screw holding turntable motor to oven cavity.
7. Now the turntable motor is free.
8. After replacement use the one (1) screw to fit the turntable motor cover.

Wiring Schematic Oven Off Condition

SCHEMATIC

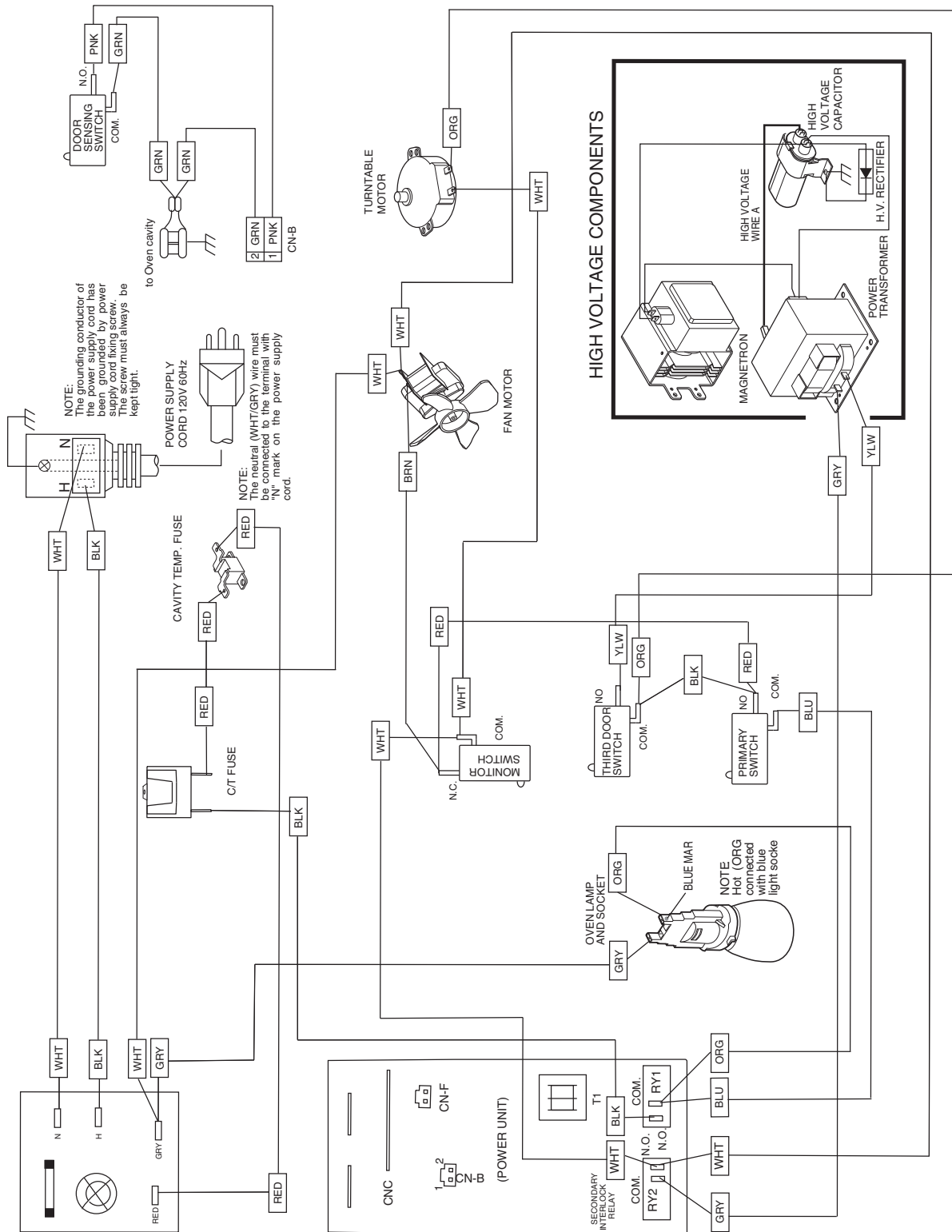
NOTE: Condition Of Oven

1. Door Closed
2. Clock Appears On Display



Wiring Diagrams

Pictorial Diagram



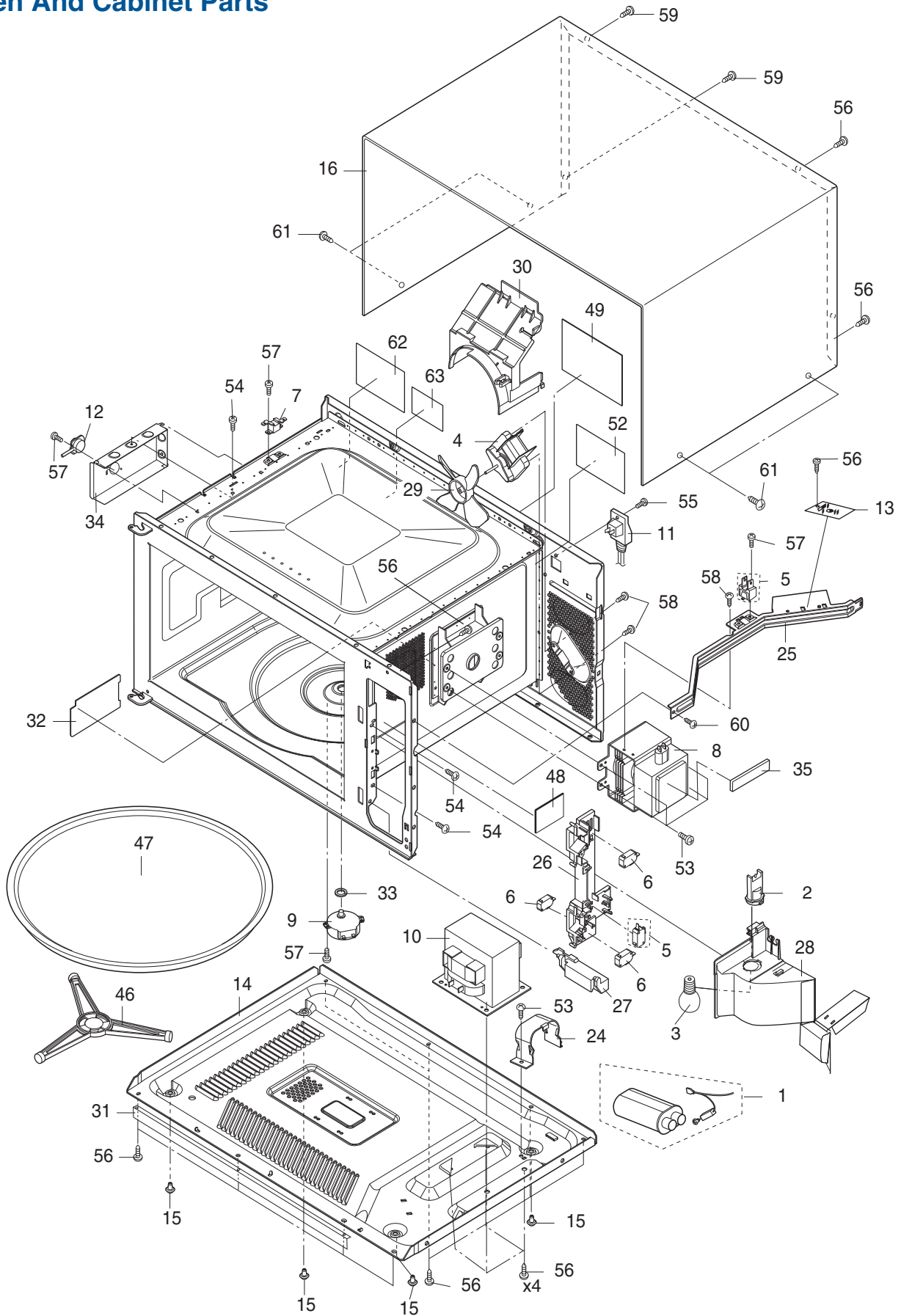
NOTE: The parts marked "Δ" may cause undue microwave exposure.
The parts marked "*" are used in voltage more than 250V.

REF. NO.	DESCRIPTION	Q'TY
ELECTRICAL PARTS		
* 1	High voltage assembly	1
2	Lamp socket	1
3	Oven lamp	1
4	Fan motor	1
5	Monitor switch (V-16G-2C25), C/T fuse (20A 250V AC) & Inst.	1
6	Primary interlock switch and door sensing switch (V-5230Q)	3
7	Cavity temperature fuse 150°C	1
Δ 8	Magnetron	1
9	Turntable motor	1
10	Power transformer	1
11	Power supply cord	1
12	AH Sensor	1
13	Noise filter	1
CABINET PARTS		
14	Base plate	1
15	Foot	4
16	Outer case cabinet	1
CONTROL PANEL PARTS		
17	CPU assy	1
18	Control panel sub assembly	1
19	Key unit	1
20	Open button	1
21	Open button spring	1
22	Screw; 3mm x 6mm	5
23	User caution label	1
OVEN PARTS		
24	H.V. Capacitor band	1
25	Chassis support	1
26	Latch hook	1
27	Switch lever	1
28	Magnetron duct	1
29	Fan blade	1
30	Fan duct	1
31	Bottom filler	1
32	Waveguide cover	1
33	Turntable motor packing	1
34	Sensor duct	1
35	Mag cushion	1
DOOR PARTS		
36	Door assembly	1
37	Door frame assembly	1
38	Latch head	1
39	Latch spring	1
40	Door panel	1
41	Sealer film	1
42	Choke cover	1
43	Door stopper	1
44	Screw NOTE: Supplied on higher level assembly	1

Parts List

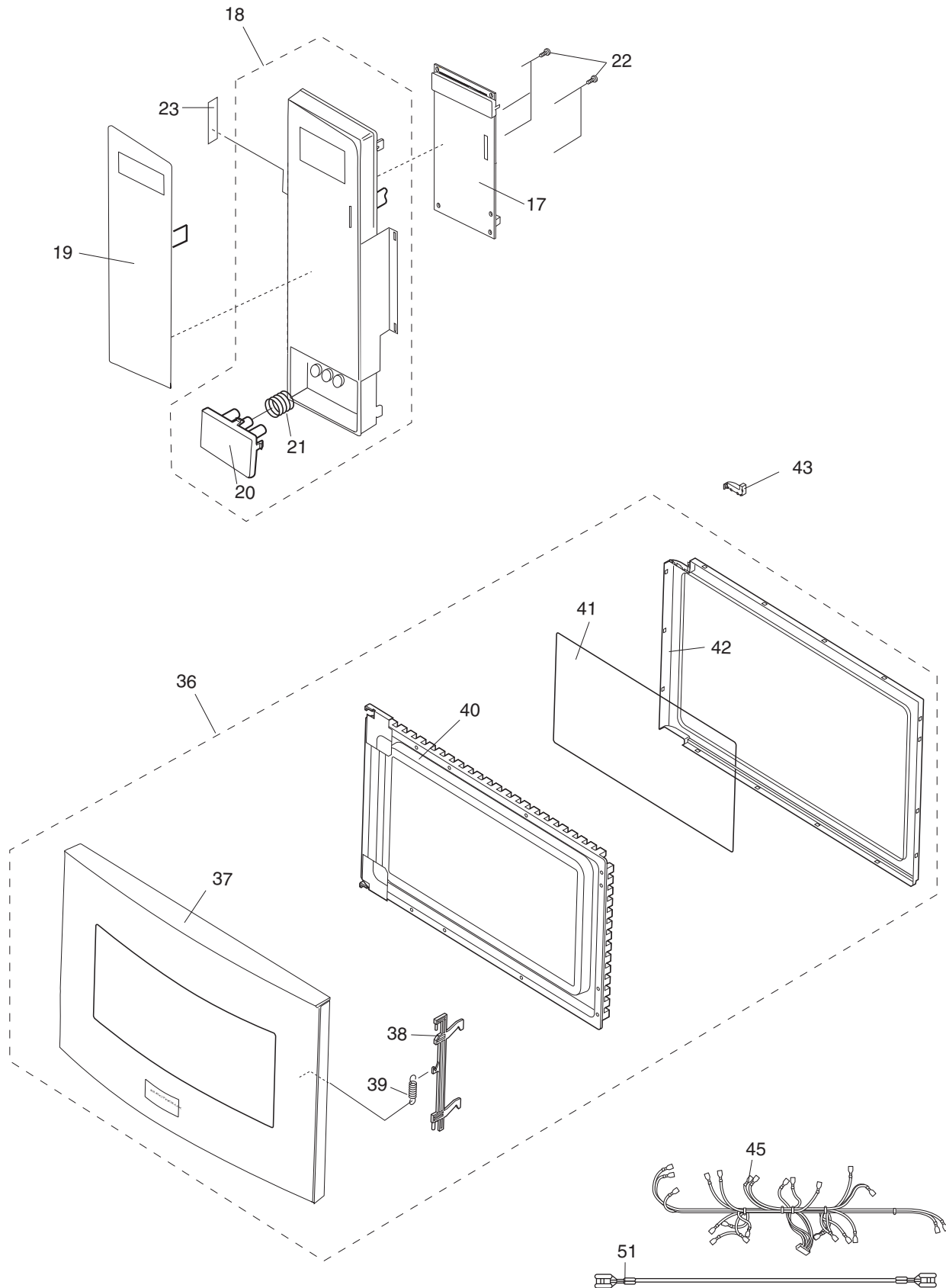
REF. NO.	DESCRIPTION	Q'TY
ELECTRICAL PARTS		
45	Main wire harness	1
46	Turntable support	1
47	Turntable tray	1
48	Monitor caution label	1
49	DHHS/Screw caution label	1
50	Operation manual	1
51	High voltage wire A	1
52	NHW caution label	1
SCREWS, NUTS AND WASHERS		
53	Special screw	5
54	Special screw	3
55	Screw : 4mm x 12mm	1
56	Screw : 4mm x 12mm	17
57	Screw : 3mm x 8mm	5
58	Screw : 4mm x 8mm	4
59	Special screw (Torx tamper proof screw)	2
60	Screw	1
61	Screw : Outercase screws	1
62	UL screw label	1
63	Built-in height label	1

Oven And Cabinet Parts



Parts List

Control And Door Parts



Actual wire harness may be different from illustration.

Packing and Accessories

