SHARP SERVICE MANUAL

S9839R880BPM/

DOUBLE GRILL CONVECTION MICROWAVE OVEN

MODEL R-880B

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

SERVICE MANUAL

SHARP

DOUBLE GRILL
CONVECTION
MICROWAVE OVEN

R-880B

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

CAUTION
MICROWAVE RADIATION

Service engineers should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

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 not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

All the parts marked "*" on parts list are used at voltages more than 250V.

Removal of the outer wrap gives access to potentials above 250V.

All the parts marked "Δ" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

Never operate the Top and/ or Bottom heater with the oven outer cabinet removed. (Because air flow is eliminated, and the excess heat generated on adjacent components). **It can cause permanent damage or a fire.**

SHARP CORPORATION

OSAKA, JAPAN

PRODUCT DESCRIPTION

SPECIFICATION

ITEM	DESCRIPTION
Power Requirements	220 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	Microwave cooking 1.6 kW
	Grill cooking — Top Heater mode 1.3 kW; Bottom heater mode 0.9 kW; Top and Bottom heater mode 2.1 kW
	Convection cooking 2.1 kW
Power Output	900 W nominal of RF microwave energy (measured by method of IEC 705) Operating frequency 2450 MHz
Grill heater Power Output (Top heater)	1200 W (600 W x 2)
Bottom heater Power Output	800 W
Case Dimensions	Width 520 mm Height 309 mm including foot Depth 502 mm
Cooking Cavity Dimensions	Width 352 mm Height 189 mm Depth 368 mm
Turntable diameter	325 mm
Control Complement	Touch Control System Clock (1:00 - 12:59) / Timer (0 - 99 minutes and 99 seconds) Microwave Power for Variable Cooking Repetition Rate; 100% ..... Full power throughout the cooking time 70% ..... approx. 70% of FULL Power 50% ..... approx. 50% of FULL Power 30% ..... approx. 30% of FULL Power 10% ..... approx. 10% of FULL Power Mix cooking High Mix Top Grill ..... Top heater with 70% microwave power Low Mix Top Grill ..... Top heater with 50% microwave power High Mix Bottom Grill ..... Bottom heater with 70% microwave power Low Mix Bottom Grill ..... Bottom heater with 10% microwave power Grill Cooking ..... Top heater mode/ Buttom heater mode/ Top and Buttom heater mode Convection cooking ..... 40˚C to 250˚C temperature control HELP pad, MULTI COOK pad, CONVIENIENCE/PIZZA pad REHEAT SENSOR pad, EASY DEFROST pad SENSOR INSTANT ACTION pads, MIX pad, GRILL pad, CONVEC pad REHEAT pad, LESS (")/MORE (') pads, POWER LEVEL pad NUMBER AND TEMPERATURE pads, STOP/CLEAR pad CLOCK pad, INSTANT COOK/START pad
Set Weight	Approx. 20 kg

GENERAL INFORMATION

WARNING

THIS APPLIANCE MUST BE EARTHED

IMPORTANT

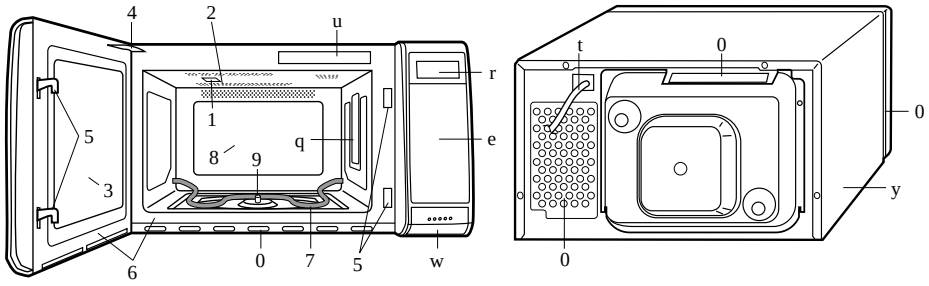
THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

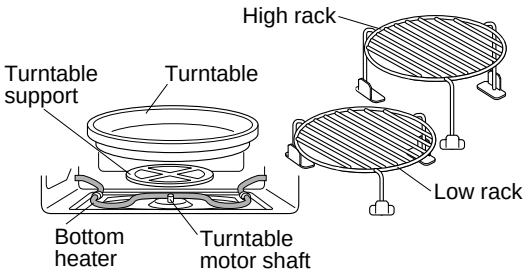
GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

APPEARANCE VIEW

OVEN

1. Oven lamp
2. Top heaters (Grill heaters)
3. See through door
4. Door hinges
5. Door safety latches
6. Door seals and sealing surfaces
7. Bottom heater
8. Oven cavity
9. Turntable motor shaft
10. Ventilation openings
11. Waveguide cover
12. Door opening button
13. Control panel
14. Digital display
15. Power supply cord
16. Outer cabinet
17. Menu label

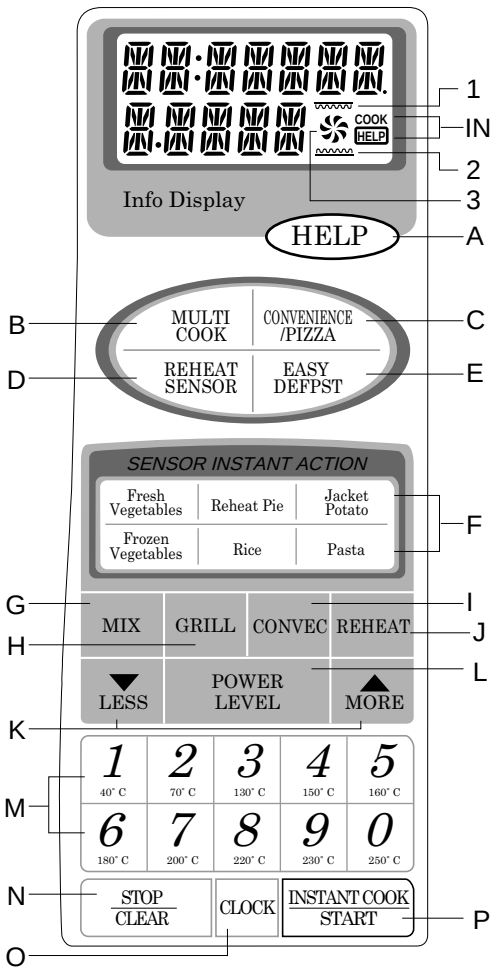




NOTE:

1. Ensure that the bottom heater is in the lowest position as shown the figure, as it is possible to move it up and down to help with cleaning.
2. Place the turntable support over the turntable motor shaft on the floor of the cavity.
3. Then place the turntable on to the turntable support.

TOUCH CONTROL PANEL



1. TOP HEATER SYMBOL
   The symbol will light when the top heater is in use.
2. BOTTOM HEATER SYMBOL
   The symbol will light when the bottom heater is in use.
3. CONVECTION SYMBOL
   The symbol will light during convection cooking.

A. HELP PAD
   Press to select auto start, information guide on/off, child lock, demonstration modes or info on pads.
   Press to obtain cooking information.

B. MULTI COOK PAD
   Press to select Multi Cook mode.

C. CONVIENIENCE/PIZZA PAD
   Press to select 6 popular menus.

D. REHEAT SENSOR PAD
   Press to select 3 popular Re-heat menus.

E. EASY DEFROST PAD
   Press to defrost meat by entering weight.

F. SENSOR INSTANT ACTION PAD
   Press once to cook or reheat 6 popular menus.

G. MIX PAD
   Press to select Mix cooking.

H. GRILL PAD
   Press to select Grill cooking.

I. CONVEC PAD
   Press to select Convection cooking.

J. REHEAT PAD
   Press to reheat the oven prior to cooking.

K. LESS (")/MORE (') pads
   Press to adjust the doneness of food in one minute increments during cooking or to increase/ decrease the time whilst programming the automatic operations.

L. POWER LEVEL PAD
   Press to select microwave power setting. If not pressed, HIGH is automatically selected.

M. NUMBER AND TEMPERATURE PADS
   Press to enter cooking times, clock time, convection temperature, weight or quantity of food.

N. STOP/CLEAR PAD
   Press to clear during programming. Press once to stop operation of oven during cooking; Press twice to cancel cooking programme.

O. CLOCK PAD
   Press to set clock time.

P. INSTANT COOK/START PAD
   Press once to cook for 1 minute on HIGH or increase by 1 minute multiples each time this pad is pressed during manual cooking. Press to start oven after setting programs.

OPERATION SEQUENCE

OFF CONDITION

Closing the door activates the 1st. latch switch and 2nd. interlock relay control switch.

IMPORTANT:

When the oven door is closed, the contacts COM-NC of the monitor switch must be open. When the microwave oven is plugged in a wall outlet (220V 50Hz), the line voltage is supplied to the noise filter and the control unit.

Figure O-1 on page 34

1. The oven display will show " SHARP MICRO- WAVE OVEN " .
2. Press the STOP/CLEAR pad. The oven display will show " : ".
3. Set the clock as follows.
   3-1. Press the CLOCK pad once.
   3-2. Enter the time of day by perssing the number pads.
   3-3. Start the clock by pressing the CLOCK pad.

NOTE:

1. If you do not set the clock, " : " will appear on the display. When the operation of the oven is finished, " : " will appear on the display instead of the time of day.
2. The oven can be also used when the clock is not set.
3. When the oven door is opened, the oven lamp does not come on.

MICROWAVE COOKING CONDITION

100% (HIGH) COOKING

Enter a desired cooking time by pressing the number pads and start the oven by pressing START pad.

Function sequence Figure O-2 on page 34

CONNECTED COMPONENTS	RELAY
Convection motor	RY1
High voltage transformer	RY2
Grill heater (Top)	RY3
Bottom heater	RY4
Fan motor,	RY5
Oven lamp, Turntable motor	RY6

1. The line voltage is supplied to the primary winding of the high voltage transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wave length of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY2 + RY5 + RY6 go back to their home position. The circuits to the oven lamp, high voltage transformer, fan motor and turntable motor are cut off.
5. When the oven door is opened during a cooking cycle, the switches come to the following condition.

Switch	Contact	Condition	
		During Cooking	Oven Door Open(No cooking)
1st. latch switch	COM-NO	Closed	Opened
2nd. interlock relay control switch	COM-NO	Closed	Opened
Monitor Switch	COM-NC	Opened	Closed

The circuit to the high voltage transformer, fan motor, oven lamp and turntable motor are cut off when the 1st. latch switch and 2nd. interlock relay control switch are made open. Shown in the display is remaining time.

6. MONITOR SWITCH CIRCUIT
   The monitor switch is mechanically controlled by the oven door, and monitors the operation of the 1st. latch switch and the 2nd. interlock relay RY2.

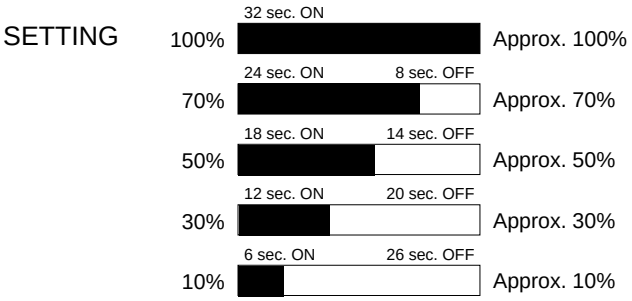
6-1. When the oven door is opened during or after the cycle of a cooking program, the 1st. latch switch and 2nd. interlock relay control switch must open their contacts first. After that the contacts (COM-NC) of the monitor switch can be closed.

6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch must be opened. After that the contacts of the 1st. latch switch and 2nd. interlock relay control switch are closed.

6-3. When the oven door is opened and the contacts of the 1st. latch switch and the 2nd. interlock relay RY2 remain closed, the fuse M10A will blow, because the monitor switch is closed and a short circuit is caused.

70% (MEDIUM HIGH), 50% (MEDIUM), 30% (MEDIUM LOW), 10% (LOW COOKING)

When the microwave oven is preset for variable cooking power, the line voltage is supplied to the high voltage transformer intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay RY2. The following levels of microwave power are given.



Note: The On/Off time ratio does not exactly correspond to the percentage of microwave power, because approx. 2 seconds are needed for heating up the magnetron filament.

GRILL COOKING CONDITIONS

The oven has three grill cooking condition. They are the TOP GRILL mode, BOTTOM GRILL mode and TOP AND BOTTOM GRILL mode.

TOP GRILL MODE

In this mode, the food is cooked by the top heaters. Press the GRILL pad once and then enter the cooking time by pressing the number pads. When the START pad is pressed, the following operations occur:

Figure O-3(a) on page 35

1. The relay RY3 + RY5 + RY6 are energized.
2. The numbers of the digital read-out start the count down to zero.
3. Then the top heaters, turntable motor, oven lamp and fan motor are energized.
4. Now, the food is grilled by the top heaters.
5. Upon completion of the selected cooking time, audible signal sounds and the contacts of relays RY3 + RY6 are opened, then the top heaters, turntable motor and oven lamp are de-energized. But the relay RY5 stays closed and the fan motor operates for 5 minutes. But if the cooking time is less than 2 minutes the relay RY5 will not stay close.

BOTTOM GRILL MODE

In this mode, the food is cooked by the bottom heater. Press the GRILL pad twice and then enter the cooking time by pressing the number pads. When the START pad is pressed, the following operations occur:

Figure O-3(b) on page 35

1. The relay RY4 + RY5 + RY6 are energized.
2. The numbers of the digital read-out start the count down to zero.
3. Then the bottom heater, turntable motor, oven lamp and fan motor are energized.
4. Now, the food is grilled by the bottom heater.
5. Upon completion of the selected cooking time, audible signal sounds and the contacts of relays RY4 + RY6 are opened, then the bottom heating elements, turntable motor and oven lamp are de-energized. But the relay RY5 stays closed and the fan motor operates for 5 minutes. But if the cooking time is less than 2 minutes the relay RY5 will not stay close.

TOP AND BOTTOM GRILL MODE

In this mode, the food is cooked by both the top heaters and bottom heater. Press the GRILL pad three times and then enter the cooking time by pressing the number pads. When the START pad is pressed, the following operations occur:

Figure O-3(c) on page 36

1. The relay RY3 + RY4 + RY5 + RY6 are energized.
2. The numbers of the digital read-out start the count down to zero.
3. Then the top heaters, bottom heater, turntable motor, oven lamp and fan motor are energized.
4. Now, the food is grilled by the top heaters and the bottom heater.
5. Upon completion of the selected cooking time, audible signal sounds and the contacts of relays RY3 + RY4 + RY6 are opened, then the top heating elements, bottom heating element, turntable motor and oven lamp are de-energized. But the relay RY5 stays closed and the fan motor operates for 5 minutes. But if the cooking time is less than 2 minutes the relay RY5 will not stay closed.

GRILL MIX COOKING CONDITION

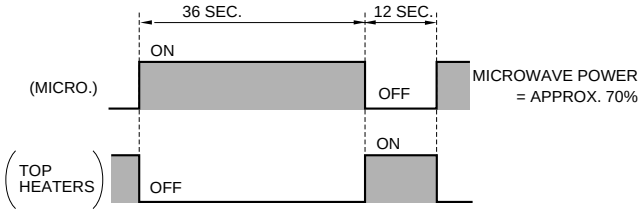
The oven will cook food by supplying grill heaters (top heaters or Bottom heater) and microwave energy alternately within a 48 seconds time base. And the oven has four programmed cooking mode.

HIGH MIX TOP GRILL MODE AND LOW MIX TOP GRILL MODE

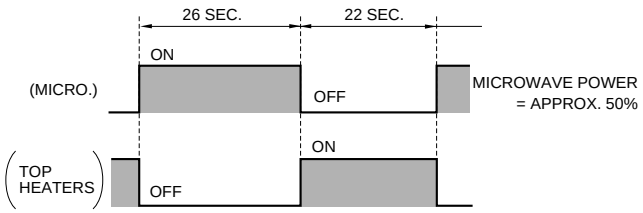
In these modes, the food is cooked by the top heaters and the microwave energy. Press the MIX pad once for HIGH MIX TOP GRILL mode. Press the MIX pad twice for LOW MIX TOP GRILL mode. And then enter the cooking time by pressing the number pads. When the START pad is pressed, the following operations occur:

Figure O-5(a) on page 37

1. The relay RY5 + RY6 are energized.
2. The numbers of the digital read-out start the count down to zero.
3. The turntable motor, oven lamp and fan motor are energized.
4. The relay RY2 + RY3 are energized alternately within a 48 seconds time base by the control unit.
5. The top heaters operate through the relay RY3 is energized. And the high voltage transformer operates through the relay RY2 is energized.
6. The relationship between the top heating elements and magnetron operations are as follows.



HIGH MIX TOP GRILL mode



LOW MIX TOP GRILL mode

Note: The On/Off time ratio does not exactly correspond to the percentage of microwave power, because approx. 2 seconds are needed for heating up the magnetron filament.

7. Upon completion of the selected cooking time, audible signal sounds and the contacts of relays RY2 + RY3 + RY6 are opened, then the top heaters, high voltage transformer, turntable motor and oven lamp are de-energized. At the end of the convection cycle, if the cavity air temperature is above 120˚C, the circuit to RY5 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 104˚C, at which time the relay will be de0energized, turning off the fan motor.

HIGH MIX BOTTOM GRILL MODE AND LOW MIX BOTTOM GRILL MODE

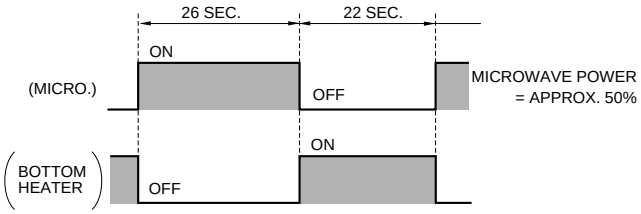
In these modes, the food is cooked by the bottom heater and the microwave energy. Press the MIX pad three (3) times for HIGH MIX BOTTOM GRILL mode. Press the MIX pad four (4) times for LOW MIX BOTTOM GRILL mode. And then enter the cooking time by pressing the number pads. When the START pad is pressed, the following operations occur:

Figure O-5(b) on page 37

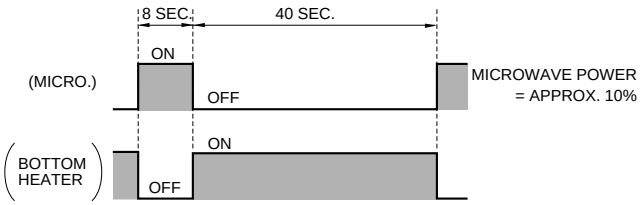
1. The relay RY5 + RY6 are energized.
2. The numbers of the digital read-out start the count down to zero.
3. The turntable motor, oven lamp and fan motor are

energized.

4. The relay RY2 + RY4 are energized alternately within a 48 seconds time base by the control unit.
5. The bottom heater operate through the relay RY4 is energized. And the high voltage transformer operates through the relay RY2 is energized.
6. The relationship between the top heating elements and magnetron operations are as follows.



HIGH MIX GRILL BOTTOM GRILL mode



LOW MIX GRILL BOTTOM GRILL mode

Note: The On/Off time ratio does not exactly correspond to the percentage of microwave power, because approx. 2 seconds are needed for heating up the magnetron filament.

7. Upon completion of the selected cooking time, audible signal sounds and the contacts of relays RY2 + RY4 + RY6 are opened, then the bottom heater, high voltage transformer, turntable motor and oven lamp are de-energized. At the end of the convection cycle, if the cavity air temperature is above 120˚C, the circuit to RY5 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 104˚C, at which time the relay will be de-energized, turning off the fan motor.

AUTOMATIC OPERATIONS

This oven has the following automatic operations;

MULTI COOK
CONVIENIENCE/PIZZA
EASY DEFROST

Thease will automatically compute the cooking mode and the cooking time. And the oven will cook or defrost the food according to the special cooking sequence.

LIMITATIONS OF POWER OUTPUT IN MANUAL OPERATION

After the same cooking mode is carried out for more than the specified cooking time, the power output is automatically reduced by turning the control relays on and off intermittently, as shown in the table below. This is to protect the oven door against temperature rising.

Cooking mode	Specified cooking time (minutes)	Limited power output (%)	Time base (seconds)
Microwave 100% Power	20	70	32
Top heaters	30	50	48
Bottom heater	15	50	48
Top browner and Bottom browner or Oven cooking	10 (Top)	50	48
	10 (Bottom)	50	48

NOTE:

1. In case of Automatic operations, the limitations of power output are not carried out.
2. In case that the STOP/CLEAR pad is pressed or the oven door is opened during cooking, the limitations of power output are carried out after the total cooking time beyond the specified cooking time.
3. In case of the two or more same cooking modes are carried out, the limitations of power output are carried out after the total cooking time beyond the specified cooking time.
4. In case of the two or more different cooking modes are carried out, the specified cooking time is started to count from the point when the cooking mode is changed.
5. If the cooking mode has the power level display, the power level is also displayed when the limitations of power output are carried out.

CONVECTION COOKING CONDITION

PREHEATING CONDITION

Press the PREHEAT pad and then select preheating temperature by pressing the temperature pad. When the START pad is touched, the following operations occur:

Figure O-4 on page 36

1. The coils of shut-off relays RY1+RY5+RY6 are energized, the oven lamp, cooling fan motor, turntable motor and convection motor are turned on.
2. The coil of heater relays RY3+RY4 are energized by the CPU unit and the main supply voltage is added to the top and bottom heaters.
3. When the oven temperature reaches the selected preheat temperature, the following operations occur:

3-1. The heater relays RY3+RY4 de-energized by the CPU unit temperature circuit and thermistor, opening the circuit to the top and bottom heaters.

3-2. The oven will continue to function for 30 minutes, turning the top and bottom heaters on and off, as needed to maintain the selected preheat temperature. The oven will shut-down completely after 30 minutes.

CONVECTION COOKING CONDITION

When the preheat temperature is reached, a beep signal will sound indicating that the holding temperature has been reached in the oven cavity. Open the door and place the food to be cooked in the oven. Press the CONVECTION pad and then enter the cooking temperature by pressing the temperature pad. And then enter the cooking time by pressing the NUMBER pads. When the START pad is touched, the following operations occur:

1. The numbers of the digital read-out start the count down to zero.
2. The oven lamp, turntable motor, cooling fan motor and convection motor are energized.
3. The relays(RY3 and RY4) are energized (if the cavity temperature is lower than the selected temperature) and the main supply voltage is applied to the heating element to return to the selected cooking temperature. The top heaters and the bottom heater work in accordance with the following table while the heaters are energized.

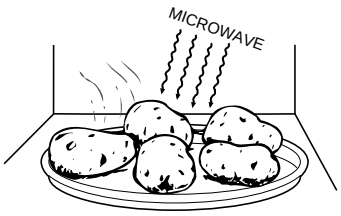
Selected Temperature (˚C)	Top Heaters Power (%)	Bottom Heater Power (%)
250	40	40
230	40	40
220	40	40
200	30	70
180	20	70
160	10	70
150	10	70
130	10	60
70	10	40
40	10	30

4. Upon completion of the cooking time, the audible signal will sound, and oven lamp, turntable motor, cooling fan motor and convection motor are de-energized. At the end of the convection cycle, if the cavity air temperature is above 120˚C, the circuit to (RY5) will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 104˚C, at which time the relay will be de-energized, turning off the fan motor. Relay (RY1) will however, open as soon as the convection cycle has ended, turning off the convection fan motor.

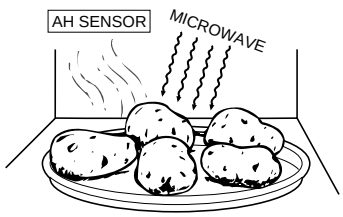
ABSOLUTE HUMIDITY SENSOR (AH SENSOR) COOKING CONDITION

In case where the AH sensor is used (REHEAT SENSOR or SENSOR INSTANT ACTION), the foods are cooked in microwave cooking mode or grill cooking mode 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 the food is cooked, water vapour is developed. The sensor “senses” the vapour 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 sensor works:

1. Potatoes at room temperature. Vapour 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.

AH SENSOR COOKING SEQUENCE

1. In case the AH sensor cooking condition is started, the coil of shut-off relays (RY5+RY6) are energized, the oven lamp and cooling fan motor are turned on, but the power transformer is not turned on.

NOTE: The oven should not be operated on AH SENSOR COOKING immediately after plugging in the unit. Wait t wo minutes before cooking on AH SENSOR COOKING CONDITION.

2. 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 vapour from the oven cavity and sensor. (Figure O-2)

NOTE: During this first stage, do not open the door or touch STOP/CLEAR pad.
There is a menu which the oven operates in grill cooking mode.

3. When the sensor detects the vapour 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 food, turn it or season, etc.

NOTE: In case where a small quantity of food is cooked, the oven will stop without displaying the remaining cooking time. In case of "Reheat Pie" of Sensor Instant Action, the relay (RY2) is turned off and power transformer is turned off. And then the relays (RY3 + RY4) are energized. The top and bottom heaters are turned on.

4. When the timer reaches zero, an audible signal sounds. The shut-off relay (RY5+RY6) and cook relay (RY2) are de-energized and the power transformer, oven lamp, etc. are turned off.

FIRE SENSING FEATURE (MICROWAVE MODE)

This model incorporates a sensing feature which will stop the oven's operation if there is a fire in the oven cavity during microwave cooking. This accomplished by the LSI repeatedly measures the voltage across the temperature measurement circuit (thermistor) during it's 32-seconds time base comparing the obtained voltage measurements. If the most recent voltage measured is 700mV grater than the previous voltage measured, the LSI judges it as a fire in the oven cavity and switches off the relays to the power transformer, fan motor turntable motor and the oven lamp. The LSI also stops counting down. Please refer to the following section for a more detailed description.

Operation

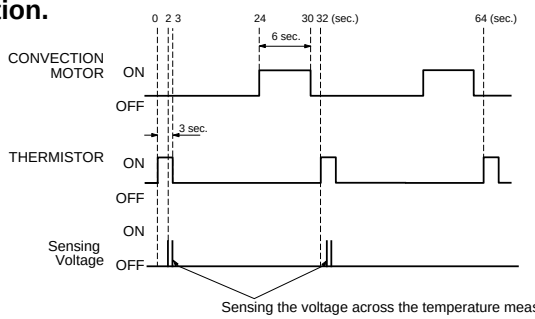
Please refer to the timing diagrams below.

1. The thermistor operates within a 32-seconds time base and it is energized for three (3) seconds and off for 29 seconds. Two (2) seconds after the thermistor is energized, the voltage across the temperature measurement circuit is sampled by the LSI and twenty one (21) seconds after the thermistor is cut off the LSI turns on the cooling fan for six (6) seconds.
2. The above procedure is repeated. If the difference between the first voltage measured (in step 1) and the voltage measured when the procedure is repeated (step 2) is greater than 700mV the LSI makes the

judgment that there is a fire in the oven cavity and will switch off the relays to the power transformer, fan motor, turntable motor and the oven lamp. The LSI also stops counting down.

3. Once the fire sensor feature has shut the unit down, the programmed cooking cycle may be resumed by pressing the "START" pad or the unit may be reset by pressing the "CLEAR" pad.

IMPORTANT:
During sensor cooking operation, the fire sensing operation sequence will not begin until the AH sensor has detected vapours and initiated a sensor cooking cycle. This is because the operation of the convection fan would interfere with the AH sensor's vapour detection.



Sensing the voltage across the temperature measurement circuit.

ON/OFF TIME RATIO

In grill cooking, convection cooking or mix cooking, the top heaters, bottom heater or magnetron operate whithin a 48 second time base. The following table is the ON / OFF time ratio at each power output of the top heaters, bottom heater or magnetron.

POWER OUTPUT	ON TIME	OFF TIME
100%	48 sec.	0 sec.
90%	44 sec.	4 sec.
80%	40 sec.	8 sec.
70%	36 sec.	12 sec.
60%	32 sec.	16 sec.
50%	26 sec.	22 sec.
40%	22 sec.	26 sec.
30%	16 sec.	32 sec.
20%	12 sec.	36 sec.
10%	8 sec.	40 sec.

FUNCTION OF IMPORTANT COMPONENTS

DOOR OPEN MECHANISM

The door can be opened by pushing the open button on the control panel. When the open button is pushed, the switch lever is moved upward, operating the latch head. The latch head is moved upward and released from the latch hook. Now, the door can be opened.

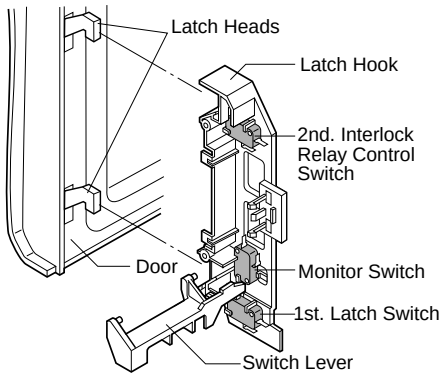


Figure D-1. Door Open Mechanism

1ST. LATCH SWITCH AND 2ND. INTERLOCK RELAY CONTROL SWITCH

1. When the oven door is closed, the contacts (COM-NO) of each switch must be closed.
2. When the oven door is opened, the contacts (COM-NO) of each switch must be opened.

MONITOR SWITCH

1. When the door is closed, the contacts (COM-NC) must be opened.
2. When the door is opened, the contacts (COM-NC) must be closed.
3. If the oven door is opened and he contacts (COM-NO) of the 1st. latch switch and 2nd. interlock relay (RY2) fail to open, the fuse M10A blows immediately after closing the contacts (COM-NC) of the monitor switch.

CAUTION: BEFORE REPLACING A BLOWN FUSE M10A TEST THE 1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY (RY2), MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION. (REFER TO CHAPTER “TEST PROCEDURE”).

FUSE M10A 250V

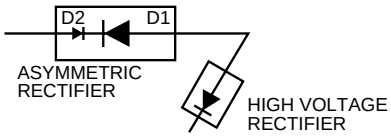
1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazard.
2. This fuse blows when the 1st. latch switch and 2nd. interlock relay (RY2) remain closed with the oven door open and when the contacts (COM-NC) of monitor switch closes.
3. The fuse also blows when asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of high voltage transformer is shorted.

FUSE 15A

If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazard.

ASYMMETRIC RECTIFIER

The asymmetric rectifier is a solid state device that prevents current flow in both directions. And it prevents the temperature rise of the high voltage transformer by blowing the fuse M10A when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV. The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of blowing the fuse M10A.)

1. The high voltage rectifier is shorted by any cause when microwave cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.7 KV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the high voltage transformer.
5. The large electric currents beyond 10A flow through the primary winding of the high voltage transformer.
6. The fuse blows by the large electric currents.
7. The power supply to the high voltage transformer is cut off.

THERMAL CUT-OUT 125˚C (MG)

This thermal cut-out protects the magnetron against overheating. If the temperature goes up higher than 125˚C because the fan motor is interrupted or the ventilation openings are blocked, the thermal cut-out will open and line voltages to the high voltage transformer will be cut off and the operation of the magnetron will be stopped.

THERMAL CUT-OUT170˚C (OVEN)

The thermal cut-out located on the top of the oven cavity is designed to prevent damage to the oven if the foods in the oven catch fire due to over heating produced by improper setting of the cooking time or failure of control unit. Under the normal operation, the oven thermal cut-out remains closed. However, when abnormally high temperature are reached within the oven cavity, oven thermal cut-out will open at 170˚C causing the oven to shut down. The thermal cut-out will cut back in at 155˚C.

THERMISTOR

The thermistor is a negative temperature coefficient type. The temperature in the oven cavity is detected through the resistance of the thermistor, and then the control unit causes the heating element relay to operate, thus the current to the heating element is turned ON/OFF.

MONITOR RESISTOR

The monitor resistor prevents the fuse M10A bursting when the fuse M10A blows due to the operation of the monitor switch.

TURNTABLE MOTOR

The turntable motor drives the turntable roller assembly to rotate the turntable.

FAN MOTOR

The fan motor drives a blade which draws 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 vapours given off from heating food. It is then exhausted through the exhausting air vents of the oven cavity.

CONVECTION MOTOR

The convection motor drives the convection fan and provides the heated air.

NOISE FILTER

The noise filter assembly prevents radio frequency interference that might flow back in the power circuit.

TOP HEATERS

The top heaters are located on the top of the oven cavity assembly. The top heaters send out heat to grill foods.

BOTTOM HEATER

The bottom heater is located on the floor of the oven cavity assembly. The bottom heater sends out heat to grill foods.

ONVECTION COOKING SYSTEM

This oven is designed with a hot air heating system where food is not directly heated by the top and bottom heaters, but is heated by forced circulation of the hot air produced by the top and bottom heaters. The air heated by the top and bottom heaters is circulated through the convection passage provided on the outer casing of the oven cavity by means of the convection fan which is driven by the convection motor. It then enters the inside of the oven through the vent holes provided on the left side of the oven. Next, the hot air heats the food on the turntable and leaves the oven cavity through the vent in the oven cavity left side wall. Without leaving the oven, this hot air is reheated by the top and bottom heaters, passes through the convection passage and enters the inside of the oven cavity again, in a continuing cycle. In this way, the hot air circulates inside the oven cavity to raise its temperature and, at the same time, comes into contact with the food being cooked. When the temperature inside the oven cavity reaches the selected temperature, the top and bottom heaters are de-energized. When the temperature inside the oven cavity drops below the selected temperature, the top and bottom heaters are energized again. In this way, the ins ide of the oven cavity is maintained at approximately the selected temperature. When the convection time reaches 0, the top and bottom heaters are de-energized and the convection fan stops operating and the oven shuts off. Upon completion of the cooking time, the audible signal will sound, and oven lamp, turntable motor, cooling fan motor and convection motor are de-energized. At the end of the convection cycle, if the cavity air temperature is above 120˚C, the circuit to RY5 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motor until the temperature drops below 104˚C, at which time the relay will be de-energized, turning off the fan motor. Relay RY1 will however, open as soon as the convection cycle has ended, turning off the convection fan motor. This will now cool.

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current. Contact with following parts will result in electrocution.
High voltage capacitor, High voltage transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

REMEMBER TO CHECK 3D

1) Disconnect the supply.
2) Door opened, and wedged open.
3) Discharge high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR.

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in, some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the high voltage transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the high voltage transformer.

REMEMBER TO CHECK 4R

1) Reconnect all leads removed from components during testing.
2) Replace the outer case (cabinet).
3) Reconnect the supply.
4) Run the oven. 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 level to HIGH (100%) and set the microwave timer for two (2) minutes. And push the start key. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks 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 microwave leakage test should be carried out.

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.

IMPORTANT: If the oven becomes inoperative because of a blown fuse M10A in the 1st. latch switch - 2nd. interlock relay(RY2)- monitor switch - monitor resistor circuit, check the 1st. latch switch, 2nd. interlock relay(RY2), monitor switch and monitor resistor before replacing the fuse M10A.

CONDITION	PROBLEM / POSSIBLE CASE AND DEFECTIVE PARTS	A MAGNETRON	B HIGH VOLTAGE TRANSFORMER	C H.V. RECTIFIER ASSEMBLY	D HIGH VOLTAGE CAPACITOR	E 1ST. LATCH SWITCH	E MONITOR SWITCH	E 2ND. INTERLOCK RELAY CONTROL SWITCH	F THERMAL CUT-OUT 125°C	F THERMAL CUT-OUT 170°C	G FUSE M10A	H FUSE 15A	I NOISE FILTER	J FAN MOTOR	J TURNTABLE MOTOR	J CONVECTION MOTOR	K TOP HEATERS	K BOTTOM HEATER	L THERMISTOR	M TOUCH CONTROL PANEL	N KEY UNIT	O RELAY RY1	O RELAY RY2	O RELAY RY3	O RELAY RY4	O RELAY RY5	O RELAY RY6	P FOIL PATTERN ON P.W.B.	Q AH SENSOR	POWER SUPPLY CORD	OVEN LAMP	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	MIS-ADJUSTMENT OF SWITCHES
OFF CONDITION	Fuse 15A blows when power cord is plugged into wall outlet.											●	●																			●		
	Fuse M10A blows when the door is opened.					●					●												●				●							●
	Home fuse blows when power cord is plugged into wall outlet.																												●		●			
	"SHARP MICRO- OVEN" does not appear in display when power cord is plugged into wall outlet.								●	●		●	●							●								●		●			●	
	Display does not operate properly when STOP/CLEAR pad is pressed.							●												●	●												●	●
COOKING CONDITION (COMMON MODE)	Oven does not start when the INSTANT COOK/ START pad is pressed. (Display operates.)							●												●	●												●	●
	Oven lamp does not light. (Turntable motor operates.)																														●		●	
	Fan motor does not operate. (Oven lamp lights.)													●												●							●	
	Turntable motor does not operate. (Oven lamp lights.)					●									●																		●	●
	Oven or electrical parts does not stop when cooking time is 0 or STOP/CLEAR pad is pressed.																			●		●	●	●	●	●	●							
	Oven goes into cook cycle but shuts down before end of cooking cycle.								●	●				●					●															
MICROWAVE COOKING CONDITION	Oven seems to be operating but little or no heat is produced in oven load.	●	●	●	●						●									●			●									●	●
	Oven does not operating properly during variable cooking condition except 100% cooking condition.																			●			●											
GRILL COOKING CONDITION	Top heaters do not operate.					●											●			●				●									●	●
	Bottom heater does not operate.					●												●		●					●								●	●
MIX COOKING CONDITION	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power does not seem to be generated properly.)	●	●	●	●						●									●			●									●	●
	Top heaters do not operate.					●											●			●				●									●	●
	Bottom heater does not operate.					●												●		●					●								●	●
CONVECTION COOKING CONDITION	Temperature is lower or higher than preset.															●	●	●	●	●		●		●	●									
	Convection motor does not operate.															●						●											●	
	Oven stops after 4 minutes 15 sec..															●	●	●	●					●	●								●	
AH. SENSOR	Oven is in sensor cooking condition but AH sensor does not end 1st. stage or does not stop cooking cycle or the oven stops soon.																			●									●			●	●	

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

A **MAGNETRON TEST**

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT 3D CHECKS.

Isolate the magnetron from high voltage circuit by removing all leads connected to filament terminal.

To test for an open circuit filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for short filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER (1 litre load)

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted). Microwave output power from the magnetron can be measured by way of IEC 705, i.e. it is measured by how much power the water load can absorb. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately P x t/4.187 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is V x ΔT.

The formula is as follows;

$P \times t / 4.187 = V \times \Delta T$ $P (W) = 4.187 \times V \times \Delta T / t$

Our condition for water load is as follows:

Room temperature ..... around 20°C	Power supply Voltage ..... Rated voltage
Water load ..... 1000 g	Initial temperature ..... 10±2°C
Heating time ..... 47 sec.	
P = 90 x ΔT	

Measuring condition:

1. Container
   The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.
2. Temperature of the oven and vessel
   The oven and the empty vessel are at ambient temperature prior to the start the test.
3. Temperature of the water
   The initial temperature of the water is (10±2)°C.
4. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5K.
5. Select stirring devices and measuring instruments in order to minimize addition or removal of heat.
6. The graduation of the thermometer must be scaled by 0.1°C at minimum and be an accurate thermometer.
7. The water load must be (1000±5) g.
8. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 2" sec. (2 sec. is magnetron filament heat-up time.)

Measuring method:

1. Measure the initial temperature of the water before the water is added to the vessel.
   (Example: The initial temperature T1 = 11°C)
2. Add the 1 litre water to the vessel.
3. Place the load on the centre of the shelf.
4. Operate the microwave oven at HIGH for the temperature of the water rises by a value Δ T of (10 $\pm$ 2) K.
5. Stir the water to equalize temperature throughout the vessel.
6. Measure the final water temperature. (Example: The final temperature T2 = 21°C)
7. Calculate the microwave power output P in watts from above formula.

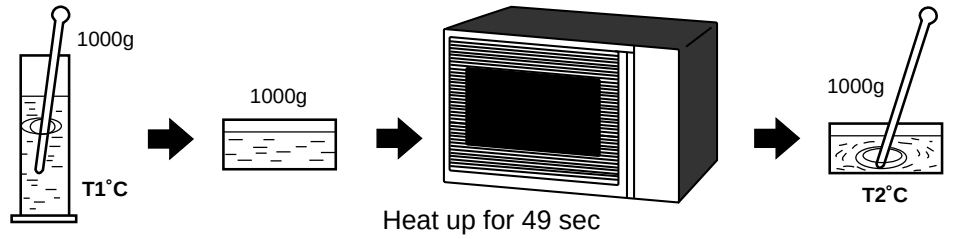
TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

Initial temperature ..... T1 = 11°C
Temperature after (47 + 2) = 49 sec ..... T2 = 21°C
Temperature difference Cold-Warm ..... ΔT1 = 10C
Measured output power
The equation is "P = 90 x ΔT" ..... P = 90 x 10°C = 900 Watts

JUDGMENT: The measured output power should be at least ± 15 % of the rated output power.

CAUTION: 1°C CORRESPONDS TO 90 WATTS. REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



B HIGH VOLTAGE TRANSFORMER TEST

WARNING: High voltage and large currents are present at the secondary winding and filament winding of the high voltage transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements of the high-voltage circuits, including the magnetron filament.

CARRY OUT 3D CHECKS.
Disconnect the leads to the primary winding of the high voltage transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three windings. The following readings should be obtained:-

a. Primary winding ..... approximately 1.5 Ω
b. Secondary winding ..... approximately 117 Ω
c. Filament winding ..... less than 1 Ω

If the readings obtained are not stated as above, then the high voltage transformer is probably faulty and should be replaced.
CARRY OUT 4R CHECKS.

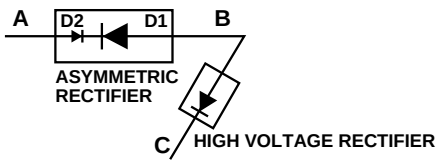
C HIGH VOLTAGE RECTIFIER ASSEMBLY TEST

HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.
Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100 kΩ in the other direction.
CARRY OUT 4R CHECKS.

ASYMMETRIC RECTIFIER TEST

CARRY OUT 3D CHECKS.



Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric can be tested using an ohmmeter set to its highest range across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both direction then the asymmetric rectifier is good. If an asymmetric rectifier is shorted in either direction, then the asymmetric rectifier is probably faulty and must be replaced with high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the high voltage transformer is shorted.

CARRY OUT 4R CHECKS.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

D HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

A. Isolate the high voltage capacitor from the circuit.
B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.
D. A short-circuited capacitor shows continuity all the time.
E. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.
F. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
G. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal.

If incorrect reading are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS.

E SWITCH TEST

CARRY OUT 3D CHECKS.
Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	Open circuit	Short circuit
Depressed	Short circuit	Open circuit

COM; Common terminal,
NO; Normally open terminal
NC; Normally close terminal

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

F THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the thermal cut-out. Then using an ohmmeter, make a continuity test across the two terminals as described in the below.

Table: Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit). (˚C)	Temperature of "OFF" condition (open circuit). (˚C)	Indication of ohmmeter (When room temperature is approx. 20˚C.)
Thermal cut-out 125˚C	This is not resetable type.	Above 125˚C	Closed circuit
Thermal cut-out 170˚C	Cuts back in at 155˚C.	Above 170˚C	Closed circuit

If incorrect readings are obtained, replace the thermal cut-out.

An open circuit thermal cut-out (MG) indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure or a fault condition within the magnetron or HV. circuit.

An open circuit thermal cut-out (OVEN) indicates that the food in the oven cavity may catch fire, this may be due to over heating produced by improper setting of the cooking timer or failure of the control panel.

CARRY OUT 4R CHECKS.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

G BLOWN FUSE M10A

CARRY OUT 3D CHECKS.
If the fuse M10A is blown when the door is opened, check the 1st. latch switch, 2nd. interlock relay, monitor switch and monitor resistor.

If the fuse M10A is blown, there could be a short or ground in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.
If the fuse M10A is blown, there could be a short in the asymmetric rectifier or there is a ground in wire harness. A short in the asymmetric rectifier may be occurred due to short or ground in H.V. rectifier, magnetron, high voltage transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

CAUTION: Only replace fuse M10A with the correct value replacement.

H BLOWN FUSE 15A

CARRY OUT 3D CHECKS.

If the fuse 15A is blown, there could be a short or ground in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

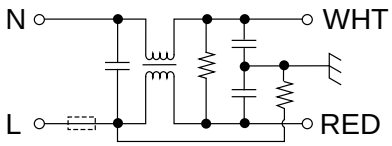
CARRY OUT 4R CHECKS.

CAUTION: Only replace fuse 15A with the correct value replacement.

I NOISE FILTER TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of noise filter. Using an ohmmeter, check between the terminals as described in the following table.



MEASURING POINTS	INDICATION OF OHMMETER
Between N and L	Approx. 680 kΩ
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit

If incorrect readings are absorbed, replace the noise filter unit.

CARRY OUT 4R CHECKS.

J MOTOR WINDING TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Fan motor	Approximately 290 Ω
Turntable motor	Approximately 14 kΩ
Convection motor	Approximately 293 Ω

If incorrect readings are obtained, replace the motor.

CARRY OUT 4R CHECKS.

K TOP HEATERS AND BOTTOM HEATER TEST

CARRY OUT 3D CHECKS.

Before carrying out the following tests make sure the heater is cool completely.

1. Resistance of heater.
   Disconnect the wire leads to the heater to be tested. Using ohmmeter with low resistance range.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

Check the resistance across the terminals of the heater as described in the following table.

Table: Resistance of heater

Parts name	Resistance
Top heaters	Approximately 20 Ω x 2 = 40 Ω
Bottom heater	Approximately 61 Ω

2. Insulation resistance.
   Disconnect the wire leads to the heater to be tested. Check the insulation resistance between the heater terminal and cavity using a 500V - 100MΩ insulation tester. The insulation resistance should be more than 10 MΩ in the cold start.

If the results of above test 1 and/or 2 are out of above specifications, the heater is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

L **THERMISTOR TEST**

1. CARRY OUT 3D CHECKS.
2. Disconnect connector-D from the control unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to Pin No's D1 and D3.

Room Temperature	Resistance
68˚F(20˚C) - 86˚F(30˚C)	Approx. 293kΩ - 184KΩ

3. If the meter does not indicate above resistance, replace the thermistor
4. CARRY OUT 4R CHECKS.

M **CONTROL PANEL ASSEMBLY TEST**

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance can not 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, CPU unit and Power unit, and troubleshooting by replacement is described according to the symptoms indicated.

1. Key Unit Note : Check key unit ribbon connection before replacement.
   The following symptoms indicate a defective key unit. Replace the key unit.
   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.
2. Control Panel
   The following symptoms indicate a defective control unit. Before replacing the control unit. perform the key unit test (Procedure N) to determine if control unit is faulty.

2-1 In connection with pads
   a) When touching the pads, a certain group of pads do not produce a signal.
   b) When touching the pads, no pads produce a signal.

2-2 In connection with indicators
   a) At a certain digit, all or some segments do not light up.
   b) At a certain digit, brightness is low.
   c) Only one indicator does not light up.
   d) The corresponding segments of all digits do not light up; or they continue to light up.
   e) Wrong figure appears.
   f) A certain group of indicators do not light up.
   g) The figure of all digits flicker.

2-3 Other possible troubles caused by defective control unit.
   a) Buzzer does not sound or continues to sound.
   b) Clock does not operate properly.
   c) Cooking is not possible.
   d) Proper temperature measurement is not obtained.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

N **KEY UNIT TEST**

If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon cable is marking good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the door sensing switch (stop switch) is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the door sensing switch connecter). Use the Key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad marking momentary contact. If the control unit responds by clearing with a beep the key unit is faulty and must be replaced. If the control unit does not respond, it is a faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.

	G 8	G 7	G 6	G 5	G 4	G 3	G 2	G 1
G 9	5 160˚C	4 150˚C	3 130˚C	2 70˚C	1 40˚C	EASY DEFROST	MULTI COOK	HELP
G10	0 250˚C	9 230˚C	8 220˚C	7 200˚C	6 180˚C	REHEAT SENSOR	Fresh Vegetables	STOP / CLEAR
G11	INSTANT COOK / START	▲ MORE	Pasta	POWER LEVEL	Jacket Potato	Rice	Frozen Vegetables	CONVENIENCE /PIZZA
G12	CONVEC	CLOCK	PREHEAT	GRILL	Reheat Pie	▼ LESS	MIX	

CARRY OUT 4R CHECKS.

O **RELAY TEST**

CARRY OUT 3D CHECKS.

Remove the outer case and check voltage between Pin No. 1 of the 3 pin connector (A) and the common terminal of the relay RY6 on the control unit with an A.C. voltmeter.
The meter should indicate 220 volts, if not check oven circuit.

Relay Test
Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation, grill operation, convection operation or mix 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.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	Approx. 24.0V D.C.	Convection motor
RY2	Approx. 24.0V D.C.	High voltage transformer
RY3	Approx. 24.0V D.C.	Grill heaters (Top)
RY4	Approx. 24.0V D.C.	Bottom heater
RY5	Approx. 24.0V D.C.	Fan motor
RY6	Approx. 24.0V D.C.	Oven lamp / Turntable motor

CARRY OUT 4R CHECKS.

P **PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN**

To protect the electronic circuits, this model is provided with a fine foil pattern added to the input circuit on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.
Problem: POWER ON, indicator does not light up.

CARRY OUT 3D CHECKS.

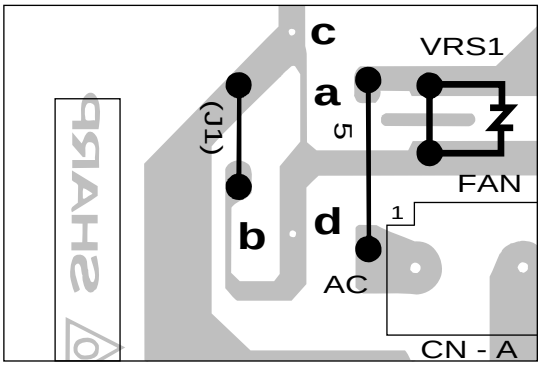
TEST PROCEDURES

PROCEDURE LETTER | **COMPONENT TEST**

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present at Power terminal of CPU connector (CN-A).	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder. (CARRY OUT 3D CHECKS BEFORE REPAIR.)
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d". (CARRY OUT 3D CHECKS BEFORE REPAIR.)

NOTE: *At the time of these repairs, make a visual inspection of the varistor for burning damage and examine the transformer with tester for the presence of layer short circuit (check primary coil resistance).
If any abnormal condition is detected, replace the defective parts.

CARRY OUT 4R CHECKS.



Q AH SENSOR TEST

Checking the initial sensor cooking condition

(1) The oven should be plugged in at least two minutes before sensor cooking.
(2) Room temperature should not exceed 35˚C.
(3) The unit should not be installed in any area where heat and steam are generated. The unit should not be installed, for example, next to a conventional surface unit. Refer to the "INSTALLATION Instructions" .
(4) Exhaust vents are provided on the back of the unit for proper cooling and air flow in the cavity. To permit adequate ventilation, be sure to install so as not to block these vents. There should be some space for air circulation.
(5) Be sure the exterior of the cooking container and the interior of the oven are dry. Wipe off any moisture with a dry cloth or paper towel.
(6) The Sensor works with food at normal storage temperature. For example, chicken pieces would be at refrigerator temperature and canned soup at room temperature.
(7) Avoid using aerosol sprays or cleaning solvents near the oven while using Sensor settings. The sensor will detect the vapor given of by the spray and turn off before food is properly cooked.
(8) After the oven is started on sensor cooking condition, if the sensor has not detected the vapor of the food, ERROR will appear and the oven will shut off.

Water load cooking test

Make sure the oven has been plugged in at least five minutes before checking sensor cook operation. The cabinet should be installed and screws tightened.
(1) Fill approximately 200 milliliters (7.2 oz) of tap water in a 1000 milliliter measuring cup.
(2) Place the container on the center of tray in the oven cavity.
(3) Close the door.
(4) Touch Fresh vegetables pad. Now, the oven is in the sensor cooking condition and "FRESH", "VEGETABLES", "SENSOR" and "COOKING" will appear in the display.
(5) The oven will operate for the first 16 seconds, without generating microwave energy.

When the AH sensor is defective (open or short), ERROR will appear in the display immediately.
If ERROR appears check sensor wire connections and/or AH sensor.
NOTE: ERROR will appear if the door is opened or STOP/CLEAR pad is touched during first stage of sensor cooking.
(6) After approximately 16 seconds, microwave energy is produced, and the display should start to count down the remaining cooking time and oven should turn off after water is boiling (bubbling). If the oven does not turn off, replace the AH sensor or check the control unit, refer to explanation below.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

TESTING METHOD FOR AH SENSOR AND/OR CONTROL UNIT

To determine if the sensor is defective, the simplest method is to replace it with a new replacement sensor.

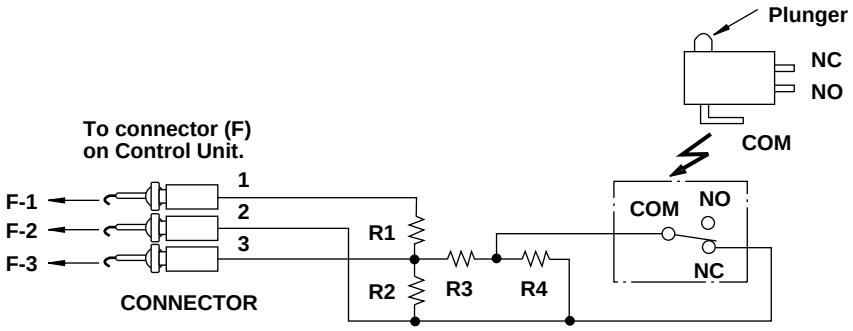
(1) Disconnect oven from power supply and then remove outer case.
(2) Discharge the high voltage capacitor.
(3) Remove the AH sensor.
(4) Install the new AH sensor.
(5) Re-install the outer case.
(6) Reconnect the oven to the power supply and check the sensor cook operation, proceed as follows:
  6-1. Fill approximately 200 milliliters (7.2 oz) of tap water in a 1000 milliliter measuring cup.
  6-2. Place the container on the center of tray in the oven cavity.
  6-3. Close the door.
  6-4. Touch Fresh Vegetables pad.
  6-5. The control panel is in automatic Sensor operation.
  6-6. The display will start to count down the remaining cooking time, and the oven will turn off automatically after the water is boiling (babbling).

If new sensor dose not operate properly, the problem is with the control unit.

CHECKING CONTROL UNIT

(1) Disconnect oven from power supply and then remove outer case.
(2) Discharge the high voltage capacitor.
(3) Disconnect the wire leads from the cook relay.
(4) Disconnect the sensor connector that is mounted to lower portion of control panel.
(5) Then connect the dummy resistor circuit (see fig.) to the sensor connector of control panel.
(6) Reconnect the oven to the power supply and check the sensor cook operation, proceed as follows:
  6-1. Touch Fresh Vegetables pad.
  6-2. The control panel is in the sensor cooking operation.
  6-3. After approximately 1 minute and 15 seconds, push plunger of select switch. This condition is same as judgement by AH sensor.
  6-4. After approximately 3 seconds, the oven stops.

If the above is not the case, the control unit is probably defective.
If the above is proper, the AH sensor is probably defective.



R1,R2 : 22Ω ± 1% 1/2W
R3 : 4.3kΩ ± 5% 1/4W
R4 : 1MΩ ± 5% 1/4W

Sensor Dummy Resistor Circuit

TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control panel circuit.

(1) Key Unit
(2) Control Unit (The Control unit consists of Power unit and CPU unit.)

The principal functions of these units and 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 from P40, P41, P72, P73 P74, P75, P76 and P77.
When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through P44 - P47 to perform the function that was requested.

Control Unit
Control unit consists of LSI, power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit, relay circuit, temperature measurement circuit, indicator circuit, absolute humidity sensor circuit and back light circuit.

1) LSI
This LSI controls the temperature measurement signal, AH sensor signal, key strobe signal, relay driving signal for oven function and indicator signal.

2) Power Source Circuit
This circuit generates voltage necessary in the control unit.

Symbol	Voltage	Application
VC	-5.2V	LSI(IC1)

3) 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.

4) ACL
A circuit to generate a signal which resets the LSI to the initial state when power is supplied.

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

6) Door Sensing Switch (Stop Switch)
A switch to "tell" the LSI if the door is open or closed.

7) Relay Circuit
To drive the magnetron, grill heaters, bottom heater, convection motor, fan motor, turntable motor, convection motor and light the oven lamp.

8) Back Light Circuit
A circuit to drive the back light (Light emitting diodes LD1 - LD10).

9) Indicator Circuit
This circuit consists of 2 line, 7-digits, 45-segments and 5-common electrodes using a Liquid Crystal Display.

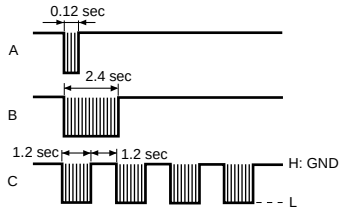
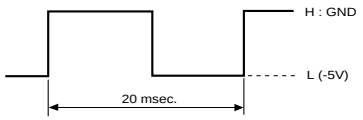
10) Temperature Measurement Circuit : (OVEN THERMISTOR)
The temperature in the oven cavity is sensed by the thermistor. The variation of resistance according to sensed temperature is detected by the temperature measurement circuit and the result applied to LSI. The LSI uses this information to control the relay and display units.

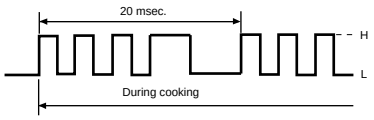
11) Absolute Humidity Sensor Circuit
This circuit detects the humidity of a food which is being cooked, to control its automatic cooking.

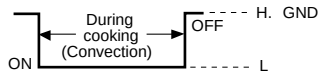
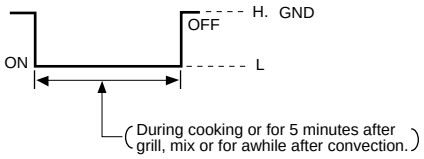
DESCRIPTION OF LSI

LSI(IZA927DR)
The I/O signal of the LSI(IZA927DR) are detailed in the following table.

Pin No.	Signal	I/O	Description
1	C1	IN	Terminal not used.
2	VL1	IN	**Power source voltage input terminal.** Standard voltage for LCD.
3-5	AN7-AN5	IN	**Heating constant compensation terminal.**
6	AN4	IN	Terminal not used.
7	AN3	IN	**Temperature measurement input: OVEN THERMISTOR.** By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.

Pin No.	Signal	I/O	Description
8	AN2	IN	**Input signal which communicates the door open/close information to LSI.** Door closed; "H" level signal. Door opened; "L" level signal.
9	AN1	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.
10	AN0	IN	Used for initial balancing of the bridge circuit (absolute humidity sensor). This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into LSI. This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into the LSI.
11	P57	OUT	**Timing signal output terminal for temperature measurement(OVEN THERMISTOR).** "H" level (GND) : Thermistor OPEN timing. "L" level (-5V) : Temperature measuring timing. (Convection cooking)
12	P56	OUT	**Signal to sound buzzer.** A: key touch sound. B: Completion sound. C: When the temperature of the oven cavity reaches the preset temperature in the preheating mode, or when the preheating hold time (30 minutes) is elapsed. 
13	P55	OUT	**Timing signal output terminal for temperature measurement(OVEN THERMISTOR).** "H" level (GND) : Thermistor OPEN timing. "L" level (-5V) : Temperature measuring timing. (Convection cooking)
14-18	P54-P50	OUT	Used for initial balancing of the bridge circuit (absolute humidity sensor).
19	P47	IN	**Signal coming from touch key.** When any one of G12 line keys on key matrix is touched, a corresponding signal from P40, P41, P72, P73, P74, P75, P76 and P77 will be input into P47. When no key is touched, the signal is held at "L" level.
20	P46	IN	**Signal similar to P47.** When any one of G11 line keys on key matrix is touched, a corresponding signal will be input into P46.
21	P45	IN	**Signal similar to P47.** When any one of G10 line keys on key matrix is touched, a corresponding signal will be input into P45.
22	P44	IN	**Signal similar to P47.** When any one of G9 line keys on key matrix is touched, a corresponding signal will be input into P44.
23	INT1	IN	Terminal not used.
24	INT0	IN	**Signal to synchronized LSI with commercial power source frequency(50Hz).** This is basic timing for time processing of LSI. 
25	P41	OUT	**Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G8 line key on matrix is touched.
26	P40	OUT	**Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G7 line key on matrix is touched.
27	P77	OUT	**Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G6 line key on matrix is touched.
28	P76	OUT	**Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G5 line key on matrix is touched.

<table>
<tr><th>Pin No.</th><th>Signal</th><th>I/O</th><th>Description</th></tr>
<tr><td>29</td><td>P75</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G4 line key on matrix is touched.</td></tr>
<tr><td>30</td><td>P74</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G3 line key on matrix is touched.</td></tr>
<tr><td>31</td><td>P73</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G2 line key on matrix is touched.</td></tr>
<tr><td>32</td><td>P72</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P44 - P47 terminal while one of G1 line key on matrix is touched.</td></tr>
<tr><td>33</td><td>P71</td><td>OUT</td><td><u>Oven lamp and turntable motor driving signal(Square Waveform : 50Hz).</u>
To turn on and off shut-off relay (RY6). The square waveform voltage is delivered to the relay (RY6) driving circuit.
 
</td></tr>
<tr><td>34</td><td>P70</td><td>IN</td><td>Connected to VC.</td></tr>
<tr><td>35</td><td>RESET</td><td>IN</td><td><u>Auto clear terminal.</u>
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.</td></tr>
<tr><td>36</td><td>P81</td><td>OUT</td><td><u>Magnetron high-voltage circuit driving signal.</u>
To turn on and off the cook relay (RY2). In 100% operation, the signals hold "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (70%, 50%, 30%, 10%) the signal turns to "H" level and "L" level in repetition according to the power level.
ON/OFF time ratio in Micro cooking (a. 32second time base)
<table>
<tr><th>MICRO COOK</th><th>ON</th><th>OFF</th></tr>
<tr><td>100%</td><td>32 sec.</td><td>0 sec.</td></tr>
<tr><td>70%</td><td>24 sec.</td><td>8 sec.</td></tr>
<tr><td>50%</td><td>18 sec.</td><td>14 sec.</td></tr>
<tr><td>30%</td><td>12 sec.</td><td>20 sec.</td></tr>
<tr><td>10%</td><td>6 sec.</td><td>26 sec.</td></tr>
</table>
ON/OFF time ratio in Micro cooking (a. 48second time base)
<table>
<tr><th>MICRO COOK</th><th>ON</th><th>OFF</th></tr>
<tr><td>100%</td><td>48 sec.</td><td>0 sec.</td></tr>
<tr><td>70%</td><td>36 sec.</td><td>12 sec.</td></tr>
<tr><td>50%</td><td>26 sec.</td><td>22 sec.</td></tr>
<tr><td>30%</td><td>16 sec.</td><td>32 sec.</td></tr>
<tr><td>10%</td><td>8 sec.</td><td>40 sec.</td></tr>
</table></td></tr>
<tr><td>37</td><td>P80</td><td>OUT</td><td><u>Grill heaters (TOP HEATER) driving signal.</u>
To turn on and off the grill heaters relay (RY3). "L" level during grill (TOP GRILL, TOP AND BOTTOM) cooking, Convection cooking or Mix top grill cooking, "H" level otherwise.
The heater relay turns on and off within a 48 second time base in accordance with the special program in LSI.
<table>
<tr><th>Power output</th><th>ON time</th><th>OFF time</th></tr>
<tr><td>100 %</td><td>48 sec.</td><td>0 sec.</td></tr>
<tr><td>90 %</td><td>44 sec.</td><td>4 sec.</td></tr>
<tr><td>80 %</td><td>40 sec.</td><td>8 sec.</td></tr>
<tr><td>70 %</td><td>36 sec.</td><td>12 sec.</td></tr>
<tr><td>60 %</td><td>32 sec.</td><td>16 sec.</td></tr>
<tr><td>50 %</td><td>26 sec.</td><td>22 sec.</td></tr>
<tr><td>40 %</td><td>22 sec.</td><td>26 sec.</td></tr>
<tr><td>30 %</td><td>16 sec.</td><td>32 sec.</td></tr>
<tr><td>20 %</td><td>12 sec.</td><td>36 sec.</td></tr>
<tr><td>10 %</td><td>8 sec.</td><td>40 sec.</td></tr>
</table></td></tr>
<tr><td>38</td><td>XIN</td><td>IN</td><td><u>Internal clock oscillation frequency input setting.</u>
The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XIN terminal.</td></tr>
<tr><td>39</td><td>XOUT</td><td>OUT</td><td><u>Internal clock oscillation frequency control output.</u>
Output to control oscillation input of XOUT.</td></tr>
<tr><td>40</td><td>VSS</td><td>IN</td><td><u>Power source voltage: -5V.</u>
VC voltage of power source circuit input.</td></tr>
<tr><td>41</td><td>P27</td><td>OUT</td><td><u>Bottom heater driving signal.</u>
To turn on and off the bottom relay (RY4). "L" level during grill (TOP AND BOTTOM) cooking, Convection cooking or Mix bottom cooking, "H" level otherwise.
The heater relay turns on and off within a 48 second time base in accordance with the special program in LSI.
<table>
<tr><th>Power output</th><th>ON time</th><th>OFF time</th></tr>
<tr><td>100 %</td><td>48 sec.</td><td>0 sec.</td></tr>
<tr><td>90 %</td><td>44 sec.</td><td>4 sec.</td></tr>
<tr><td>80 %</td><td>40 sec.</td><td>8 sec.</td></tr>
<tr><td>70 %</td><td>36 sec.</td><td>12 sec.</td></tr>
<tr><td>60 %</td><td>32 sec.</td><td>16 sec.</td></tr>
<tr><td>50 %</td><td>26 sec.</td><td>22 sec.</td></tr>
<tr><td>40 %</td><td>22 sec.</td><td>26 sec.</td></tr>
<tr><td>30 %</td><td>16 sec.</td><td>32 sec.</td></tr>
<tr><td>20 %</td><td>12 sec.</td><td>36 sec.</td></tr>
<tr><td>10 %</td><td>8 sec.</td><td>40 sec.</td></tr>
</table></td></tr>
</table>

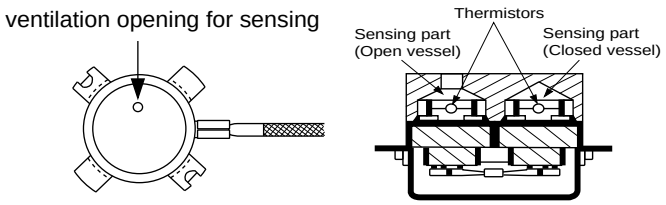
Pin No.	Signal	I/O	Description
42	P26	OUT	**Convection motor driving signal.** To turn on and off shut-off relay(RY1). "L" level during CONVECTION; "H" level otherwise. (Relay RY1 does not turn on at preheating mode.) 
43	P25	OUT	**Fan motor driving signal.** To turn on and off the fan motor relay RY5. "L" level during cooking, or for 5 minutes after grill cooking or Mix cooking for a while after convection. "H" level otherwise. 
44	P24	OUT	Terminal not used.
45	P23	OUT	**Common data signal: COM5.** Connected to LCD (Pin No. 37)
46-48	P22-P20	OUT	**Segment data signal.** Connected to LCD. No connection in LCD.
49-50	P17-P16	OUT	**Segment data signal.** Connected to LCD. No connection in LCD.
51-80	SEG39-SEG10	OUT	**Segment data signal.** Connected to LCD. The relation between signals are as follows: LSI signal (Pin No.) LCD (Pin No.) LSI signal (Pin No.) LCD (Pin No.) SEG 0 (90) ..... SEG45 (51) SEG23 (67) ..... SEG17 (17) SEG 1 (89) ..... SEG44 (50) SEG24 (66) ..... SEG16 (16) SEG 2 (88) ..... SEG43 (49) SEG25 (65) ..... SEG15 (15) SEG 3 (87) ..... SEG42 (48) SEG25 (65) ..... SEG15 (32) SEG 4 (86) ..... SEG41 (47) SEG26 (64) ..... SEG14 (14) SEG 5 (85) ..... SEG40 (46) SEG27 (63) ..... SEG13 (13) SEG 6 (84) ..... SEG39 (45) SEG28 (62) ..... SEG12 (12) SEG 7 (83) ..... SEG38 (44) SEG29 (61) ..... SEG11 (11) SEG 8 (82) ..... SEG37 (43) SEG30 (60) ..... SEG10 (10) SEG 9 (81) ..... SEG31 (31) SEG31 (59) ..... SEG 9 (9) SEG10 (80) ..... SEG30 (30) SEG32 (58) ..... SEG 8 (8) SEG11 (79) ..... SEG29 (29) SEG33 (57) ..... SEG 7 (7) SEG12 (78) ..... SEG28 (28) SEG34 (56) ..... SEG 6 (6) SEG13 (77) ..... SEG27 (27) SEG35 (55) ..... SEG 5 (5) SEG14 (76) ..... SEG26 (26) SEG36 (54) ..... SEG 4 (4) SEG15 (75) ..... SEG25 (25) SEG37 (53) ..... SEG 3 (3) SEG16 (74) ..... SEG24 (24) SEG38 (52) ..... SEG 2 (2) SEG17 (73) ..... SEG23 (23) SEG39 (51) ..... SEG 1 (1) SEG18 (72) ..... SEG22 (22) P16 (50) ..... SEG32 (38) SEG19 (71) ..... SEG21 (21) P17 (49) ..... SEG33 (39) SEG20 (70) ..... SEG20 (20) P20 (48) ..... SEG34 (40) SEG21 (69) ..... SEG19 (19) P21 (47) ..... SEG35 (41) SEG22 (68) ..... SEG18 (18) P22 (46) SEG36 (42)
81	SEG9	OUT	**Segment data signal.** Connected to LCD. No connection in LCD.
82-90	SEG8-SEG0	OUT	**Segment data signal.** Connected to LCD. Signal is similar to SEG39.
91	VCC	IN	Connected to GND.
92	VREF	IN	Connected to GND.
93	AVSS	IN	Connected to VC.
94	COM3	OUT	**Common data signal: COM4.** Connected to LCD (Pin No. 36).
95	COM2	OUT	**Common data signal: COM3.** Connected to LCD (Pin No. 35).
96	COM1	OUT	**Common data signal: COM2.** Connected to LCD (Pin No. 34).
97	COM0	OUT	**Common data signal: COM1.** Connected to LCD (Pin No. 33).

Pin No.	Signal	I/O	Description
98-99	VL3-VL2	IN	**Power source voltage input terminal.** Standard voltage for LCD.
100	C2	IN	Terminal not used.

ABSOLUTE HUMIDITY SENSOR CIRCUIT

(1) Structure of Absolute Humidity Sensor

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

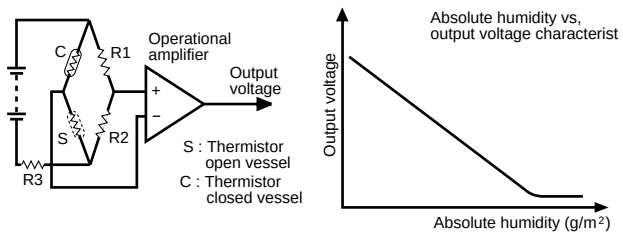


(2) Operational Principle of Absolute Humidity Sensor

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.



(3) Detector Circuit of Absolute Humidity Sensor Circuit

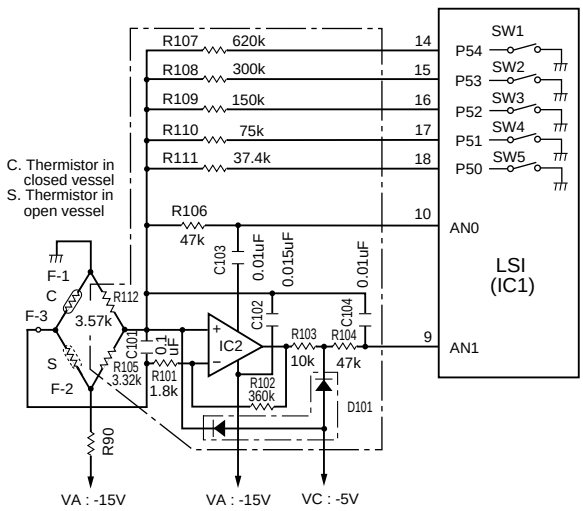
This detector circuit is used to detect the output voltage of the absolute humidity circuit to allow the LSI to control sensor cooking of the unit. When the unit is set in the sensor cooking mode, 16 seconds clearing cycle occurs than the detector circuit starts to function and the LSI observes the initial voltage available at its AN1 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 R107 ~ R111 of IC2. Changing the resistance values results in that there is the same potential at both F-3 terminal of the absolute humidity sensor and AN0 terminal of the LSI. The voltage of AN1 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 AN1 terminal of the LSI.

Then the LSI observes that voltage at AN1 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 AN1 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) Absolute humidity sensor circuit



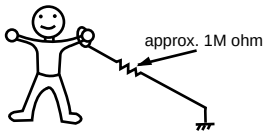
SERVICING

1. Precautions for Handling Electronic Components

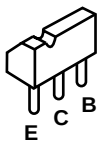
This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, 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.

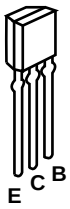
1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap PW boards containing them in aluminium foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Shapes of Electronic Components



Transistor
2SB1238



Transistor
DTD143ES

3. Servicing of Touch Control Panel

We describe the 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.

(1) Servicing the touch control panel with power supply of the oven :

CAUTION:
THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING AND PRESENTS A HAZARD .

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

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.

After checking the performance of the touch control panel,

1) Disconnect the power supply cord.
2) Open the door and block it open.
3) Re-connect the leads to the primary of the power transformer.
4) Re-install the outer case (cabinet).
5) Re-connect 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, therefore, 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 brings about 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 the dummy resistor(s) with resistance equal to that of the controls are used.

(2) 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).

4. Servicing Tools

Tools required to service the 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

5. Other Precautions

1) Before turning on the power source of the control unit, remove the aluminium foil applied for preventing static electricity.
2) Connect the connector 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.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. Disconnect the oven from power supply.
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 or 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.

Please refer to ‘OVEN PARTS, CABINET PARTS, CONTROL PANEL PARTS, DOOR PARTS’, when carrying out any of the following removal procedures:

WARNING FOR WIRING

To prevent an electric shock, take the following manners.

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. Don't let the 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, Grill heaters, Bottom heater, High voltage transformer and Oven cavity.
   3) Sharp edge:
      Bottom plate, Oven cavity, Waveguide flange, Chassis support and other metallic plate.
   4) Movable parts (to prevent a fault)
      Fan blade, Fan motor, Switch, Switch lever, Open button, Turntable motor, Convection motor.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector certainly until its pin is locked. And make sure that the wire leads should not come off even if the wire leads is pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

OUTER CASE REMOVAL

To remove the outer case proceed as follows.
1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the two (2) screws holding the back plate to the oven cavity rear plate.
4. Remove the back plate.
5. Remove the five (5) screws from rear and along the side edge of case.
6. Slide the entire case back about 3cm to free it from retaining clips on the cavity face plate.
7. Lift the entire case from the oven.
8. Discharge the H.V. capacitor before carrying out any further work.
9. Do not operate the oven with the outer case removed.

N.B.; Step 1, 2 and 8 form the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENT OR WIRING.

HIGH VOLTAGE COMPONENTS REMOVAL (HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY)

To remove the components, proceed as follows.
1. CARRY OUT 3D CHECKS.
2. Disconnect all the leads and terminals of high voltage rectifier assembly from the high voltage capacitor.
3. Remove one (1) screw holding earth side terminal of the high voltage rectifier assembly.
4. Remove one (1) screw holding capacitor holder to the oven cavity rear plate.

5. Release the capacitor holder from the fan duct.
6. Remove the capacitor from the capacitor holder.
7. Now, the capacitor should be free.
8. Release H.V. wire A from the high voltage rectifier assembly.
9. Now, the high voltage rectifier assembly should be free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER AND BASE PLATE WITH AN EARTHING SCREW.

HIGH VOLTAGE TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the filament leads of high voltage transformer from high voltage capacitor and the magnetron.
3. Disconnect the high voltage wire of high voltage rectifier assembly from the high voltage transformer.
4. Disconnect the main wire harness from the high voltage transformer.
5. Remove the four (4) screws holding the transformer to base plate.
6. Remove the transformer.
7. Now the high voltage transformer is free.

MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Release the tabs of air intake duct from the chassis support and the oven cavity.
3. Disconnect the high voltage wire of the high voltage rectifier assembly and filament lead of the transformer from the magnetron.
4. Remove the one (1) screw holding the chassis support to the magnetron.
5. Move the air intake duct to left.
6. Carefully remove four (4) screws holding magnetron to waveguide, when removing the screws hold the magnetron to prevent it from falling.
7. Remove the magnetron from the waveguide with care so the magnetron antenna is not hit by any metal object around the antenna.

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

POSITIVE LOCK® CONNECTOR (NO-CASE TYPE) REMOVAL

1. CARRY OUT 3D CHECKS.
2. Push the lever of positive lock® connector.
3. Pull down on the positive lock® connector.

CAUTION: WHEN CONNECTING THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, CONNECT THE POSITIVE LOCK® CONNECTOR SO THAT THE LEVER FACES YOU

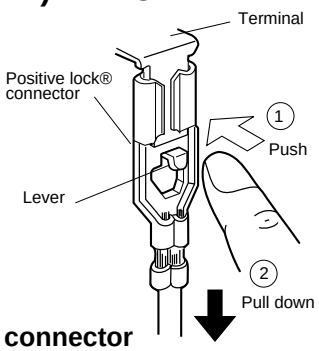


Figure C-1 Positive lock® connector

CONTROL PANEL ASSEMBLY REMOVAL

CONTROL PANEL ASSEMBLY

1. CARRY OUT 3D CHECKS.
2. Disconnect the main wire harness, thermistor harness, AH sensor harness and the switch harness from the power unit and control unit.
3. Straighten the tab of the oven cavity front flange holding the tab of the control panel frame.
4. Lift up the control panel assembly.
5. Now, the control panel assembly is free.

CONTROL UNIT

6. Disconnect the flat ribbon cable from the connector CN-G.
7. Remove the two (2) screws holding the CPU unit to the control panel frame.
8. Release the four (4) tabs of the control panel frame holding the CPU unit to the control panel frame.
9. Release the liquid crystal display (LCD) from the LCD holder.
10. Now, the LCD sheet is free.
11. Release the two (2) tabs of the LCD holder holding the CPU unit to the LCD holder.
12. Remove the LCD holder from the CPU unit.
13. Remove the two (2) screws holding the power unit to the control panel frame.
14. Release the four (4) tabs of the control panel frame holding the power unit to the control panel frame.

1 5. Now, the control unit (CPU unit + Power unit) is free.

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 the key unit to the control panel frame, adjust the upper edge and right edge of the key unit to the correct position of control panel frame.
3. Stick the key unit firmly to the control panel frame by rubbing with soft cloth not to scratch.

THERMISTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Now, the back plate with the sub back plate should be removed.
3. Disconnect the connector CN-D from the control unit.
4. Remove the one (1) screw holding the air duct to the oven cavity rear plate.
5. Remove the air duct assembly from the oven cavity rear plate.
6. Remove the one (1) screw holding the thermistor angle to the oven cavity rear plate.
7. Remove the thermistor angle together with thermistor from the oven.
8. Straighten the tab of the thermistor angle holding the thermistor to the thermistor angle.
9. Remove the thermistor from the thermistor angle.

AH SENSOR ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Now, the back plate with the sub back plate should be removed.
3. Disconnect the connector CN-F from the control unit.
4. Remove the two (2) screws holding the AH sensor assembly to air duct assembly.
5. Now, the AH sensor assembly is free.

CONVECTION MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Now, the back plate with the sub back plate should be removed.
3. Disconnect the wire leads from the convection motor.
4. Remove the two (2) screws holding the conv. thermal cover to the oven cavity rear plate.
5. Remove the four (4) screws holding the convection duct to the oven cavity rear plate.
6. Remove the convection duct assembly from the oven cavity rear plate.
7. Remove the one (1) nut and the two (2) washers holding the convection fan to the convection motor shaft.
8. Remove the convection fan.
9. Remove the three (3) screws holding the convection duct to the conv. thermal cover.
10. Remove the convection duct with the conv. air angles from the conv. thermal cover.
11. Remove the thermal insulation.
12. Remove the one (1) pipe holding the cooling fan to the convection motor shaft.
13. Remove the cooling fan and the one (1) washer from the convection motor shaft.
14. Remove the two (2) screws holding the convection motor to the conv. thermal cover.
15. Remove the convection motor from the conv. thermal cover.
16. Remove the one (1) ring from the convection motor shaft.
17. Now, the convection motor is free.

FAN MOTOR REPLACEMENT

REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the noise filter to the chassis support.
3. Release the noise filter from the tab on the fan duct.
4. Disconnect the wire leads from the fan motor.
5. Remove the one (1) screw holding the capacitor holder to the oven cavity rear plate.
6. Remove the one (1) screw holding the fan duct to the oven cavity rear plate.
7. Release the tabs of the capacitor holder from fan duct.
8. Remove the fan duct from the oven.
9. Remove the fan blade from the fan motor shaft according to the following procedure.
   1) 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 easy to be shaven by pliers and metal pieces may be produced.**
   - **Do not let the pliers touch the coil of the fan motor because the coil may be cut or damaged.**
   - **Do not distort the bracket by touching with the pliers.**

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

   CAUTION:
   - **Once the fan blade has been removed, it must be replaced with a new one.**
10. Remove the two (2) screws holding the fan motor to the fan duct.
11. Now, the fan motor is free.

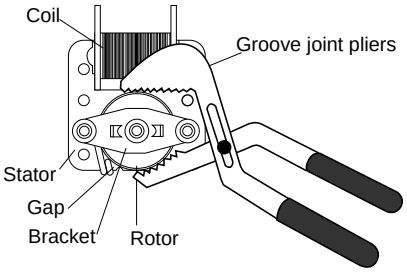
INSTALLATION

1. Install the fan motor to the fan duct with the two (2) screws.
2. Fix the fan blade to the fan motor shaft according to the following procedure.
   1) Hold the centre of the bracket which supports the shaft of the fan motor on a flat table.
   2) 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.

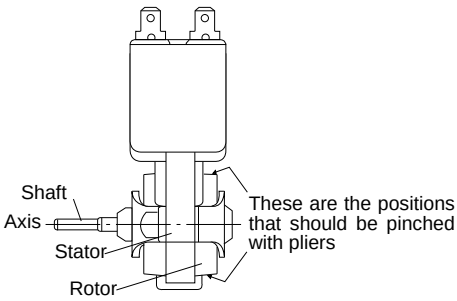
   CAUTION:
   - **Do not hit the fan blade when installing it because the bracket may be deformed.**
   - **Make sure that the fan blade rotates smoothly after installation.**

- **Make sure that the axis of the shaft is not slanted.**

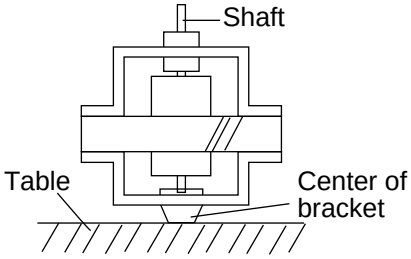
3. Install the fan duct to the oven cavity rear plate with the one (1) screw.
4. Insert the tabs of the capacitor holder to the fan duct.
5. Install the capacitor holder to the oven cavity rear plate with the one (1) screw.
6. Install the noise filter to the fan duct and the chassis support with the one (1) screw.
7. Re-connect the wire leads to the fan motor.



Rear view



Side view



TURNTABLE MOTOR REPLACEMENT

1. Disconnect the oven from the power supply.
2. Remove the turntable motor cover by snipping of material in four corners.
3. Where the corners have been snipped off, bend corner areas flat. No sharp edge must be evident after removal of turntable motor cover.
4. Disconnect the wire leads from the turntable motor and remove the two (2) screws holding the turntable motor.
5. Now, the turntable motor is free.
6. After replacement use the one (1) screw provided with the turntable motor assembly to fit turntable motor cover.

NOTE: The one (1) screw to fit the turntable motor cover should be XHTSD40P08RV0.

OVEN LAMP REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the two (2) screws holding the air guide to the top of the oven cavity.
3. Straighten the tab holding the lamp cover to the top of the oven cavity.
4. Remove the lamp cover.
5. Disconnect the wire leads from the oven lamp.
6. Straighten the tab holding the oven lamp.
7. Remove the oven lamp from the top of the oven cavity.

WARNING: Do not touch the oven lamp right after it is turned off or during it is turned on. Because the oven lamp is halogen type and it is very hot then.

AC PLUG AND POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the one screw holding the plug body to the plug cover.
3. Remove the plug cover from the plug body.
4. Loosen the three (3) screws holding the three wire leads of the power supply cord to the three (3) terminals of AC plug.
5. Remove the power supply cord from the AC plug.
6. Now the AC plug is free.
7. Disconnect the brown wire and blue wire of the power supply cord from the noise filter.
8. Remove the one (1) screw holding green/yellow wire lead of the power supply cord to the oven cavity rear plate.
9. Release the moulding cord stopper of the power supply cord from the square hole of the oven cavity back plate, referring to figure C-2(d).
10. Now the power supply cord is free.

Re-install

1. Insert the moulding cord stopper of the power supply cord to the square hole of the oven cavity back plate, referring to figure C-2(d).
2. Install the green/yellow wire lead of the power supply cord to the chassis support with one (1) screw and tight the screw.
3. Connect the brown and blue wire leads of power supply cord into the terminals of noise filter, referring to pictorial diagram.
4. Now the power supply cord is installed.
5. Connect the power supply cord to the AC plug, referring to figure C-2(b).

5-1. Connect the green/yellow wire lead of the power supply cord to the AC plug terminal which is marked with the earth symbol ∞ or letter YELLOW GREEN. And tight the screw.

5-2. Connect the blue wire lead of the power supply cord to the AC plug terminal which is marked with letter N or BLUE. And tight the screw.

5-3. Connect the brown wire lead of the power supply cord to the AC plug terminal which is marked with letter L or BROWN. And tight the screw.

6. Re-install the power supply cord to the AC plug body, referring to figure C-2(b).
7. Re-install the AC plug cover to the AC plug body with one (1) screw and tight screw.
8. Now the AC plug is installed.

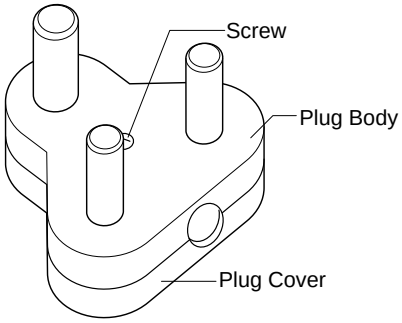


Figure C-2(a). AC Plug

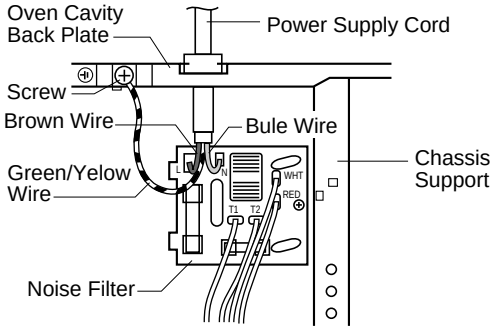


Figure C-2(c). Wiring to Noise filter

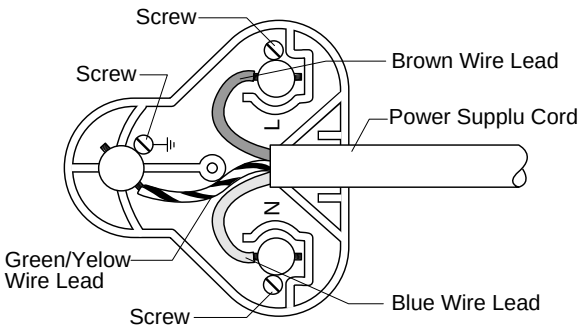


Figure C-2(b). AC Plug Wiring

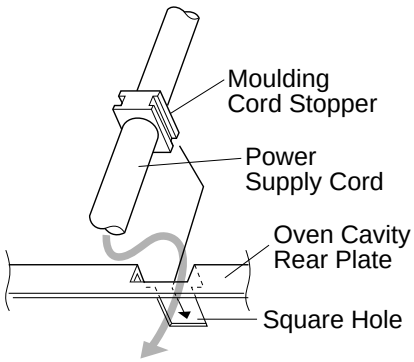


Figure C-2(d). Power supply cord position

GRILL HEATERS (TOP HEATERS) REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the exhaust duct to the oven cavity.
2. Remove the exhaust duct from the oven cavity.
4. Disconnect the wire leads from the grill heaters.
5. Lay down the two (2) tabs holding the reflector to the oven cavity.
6. Remove the reflector from the oven cavity by sliding it leftward.
7. Remove the grill heaters and the short terminal together from the oven cavity top plate.
8. Remove the two (2) screws holding the short terminal to the grill heaters.
9. Now the individual grill heaters are free.

BOTTOM HEATER REMOVAL

1. CARRY OUT 3D CHECKS
2. Remove the fan duct from the oven cavity, referring to "FAN MOTOR REPLACEMENT".
3. Disconnect the wire leads from the bottom heater.
4. Remove the two (2) nuts holding the bottom heater with the bottom heater angle and the heat seal spring to the oven cavity right wall.
5. Remove the two (2) nuts holding the bottom heater with the bottom heater angle and the heat seal spring to the oven cavity left wall.
6. Remove the bottom heater from the oven cavity .

1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY CONTROL SWITCH, AND MONITOR SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly referring to "CONTROL PANEL ASSEMBLY REMOVAL".
3. Remove the switch lever.
4. Disconnect the leads from all switches.
5. Remove the two (2) screws holding the latch hook to the oven cavity.
6. Remove the latch hook.
7. Push the retaining tab slightly and remove the switch.

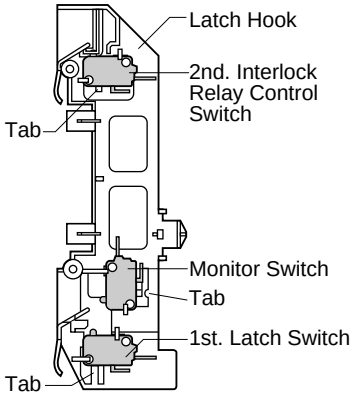


Figure C-3. Switches

1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY CONTROL SWITCH AND MONITOR SWITCH ADJUSTMENT

If the 1st. latch switch, 2nd. interlock relay control switch and monitor switch do not operate properly due to a misadjustment, the following adjustment should be made.

1. CARRY OUT 3D CHECKS.
2. Loosen the two (2) screws holding the latch hook to the oven cavity front flange.
3. With the door closed, adjust the latch hook by moving it back and forward or up and down. In and out play of the door allowed by the latch hook should be less than 0.5 mm. The horizontal position of the latch hook should be placed where the monitor switch has activated with the door closed. The vertical position of the latch hook should be placed where the 1st. latch switch and 2nd. interlock relay control switch have activated with the door closed.
4. Secure the screws with washers firmly.
5. Make sure of the 1st. latch switch, 2nd. interlock relay control switch and monitor switch operation. If those switches have not activated with the door closed, two (2) screw holding latch hook to oven cavity front flange and adjust the latch hook position.

After adjustment, make sure of following:

1. In and out play of door remains less than 0.5 mm when latched position. First check latch hook position, pushing and pulling the door toward the oven face. The results (play of the door) should be less than 0.5mm.
2. The contacts (COM-NO) of the 1st. latch switch and 2nd. interlock relay control switch interrupt the circuit before the door can be opened.
3. The contacts (COM-NC) of the monitor switch close when the door is opened.
4. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

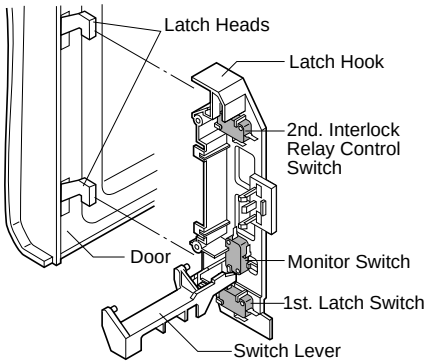


Figure C-4 Latch Switches Adjustment

DOOR REPLACEMENT

REMOVAL

1. Disconnect the oven from power supply.
2. Push the open button and open the door slightly.
3. Insert an putty knife (thickness of about 0.5mm) into the gap between the choke cover and door frame as shown in Figure C-5 to free engaging parts.
4. Pry the choke cover by inserting a putty knife as shown in Figure C-5.
5. Release choke cover from door panel.
6. Now choke cover is free.

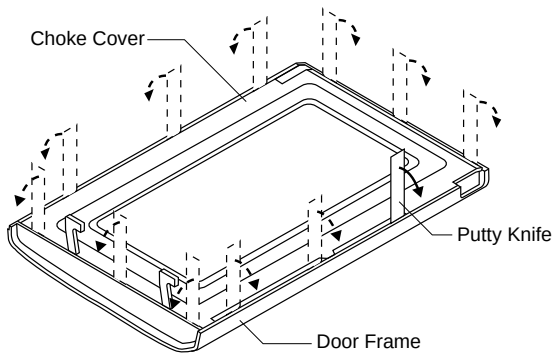


Figure C-5. Door Disassembly

7. Release two (2) pins of door panel from two (2) holes of upper and lower oven hinges by lifting up.
8. Now, door sub assembly is free from oven cavity.
9. Remove the four (4) screws holding the door panel to the door frame.
10. Release door panel from seven (7) tabs of door frame by sliding door panel downward.
11. Now, door panel is free.
12. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.
13. Now, latch head and latch spring are free.
14. Remove the two (2) screws holding the glass stopper to the door frame.
15. Remove the glass stopper from the door frame.
16. Slide the front door glass left and then slide upwards to release the tabs holding it.
17. Now, the front door glass is free

RE-INSTALL

1. Re-install the front door glass to the door frame as follows.

1) Insert the lower edge of the front door glass into the six (6) tabs of the door frame.
2) Slide the front door glass upwards and insert the upper edge of the front door glass into the five (5) tabs of the door frame.
3) Slide the front door glass righ and insert the right edge of the front door glass into the two (2) tabs of the door frame.

2. Re-install the glass stopper to the door frame as follows.

1) Re-install the glass stopper to the door frame so that the two (2) holes of the glass stopper meet the two (2) pins of the door frame.
2) Hold the glass stopper to the door frame with the two (2) screws.

3. 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.
4. Re-install door panel to door frame by fitting seven (7) tabs of door frame to seven (7) holes of door panel.
5. Hold the door panel to the door frame with four (4)

screws.

6. Catch two (2) pins of door panel on two (2) hole of upper and lower oven hinges.
7. Re-install choke cover to door panel by pushing.

Note: After any service to the door;

(A) Make sure that door sensing switch and primary latch switch are operating properly. (Refer to chapter "Test Procedures".).

(B) An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards. (Refer to Microwave Measurement Procedure.)

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 centre 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.)

Note: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from oven cavity during cook cycle. This function does not require that door be air-tight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around oven door is not abnormal and do not in themselves indicate a leakage of microwave energy from oven cavity.

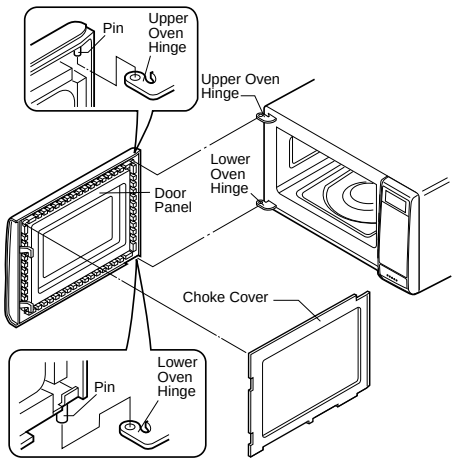


Figure C-6. Door Replacement

MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

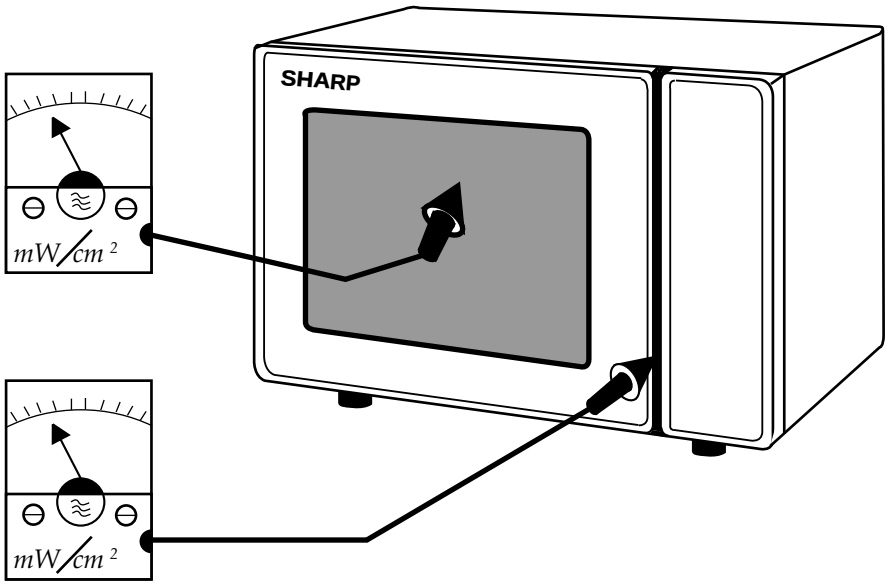
REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of 5mW/cm^2 at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.
   Important:
   Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.
   Recommended instruments are:
   NARDA 8100
   NARDA 8200
   HOLADAY HI 1500
   SIMPSON 380M
2. Place the oven tray into the oven cavity.
3. Place the load of 275 ± 15ml of water initially at 20 ± 5˚C in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive 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. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster that 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. [:] OR CLOCK APPEAR ON DISPLAY.

NOTE: ★Indicates components with potential above 250 V.

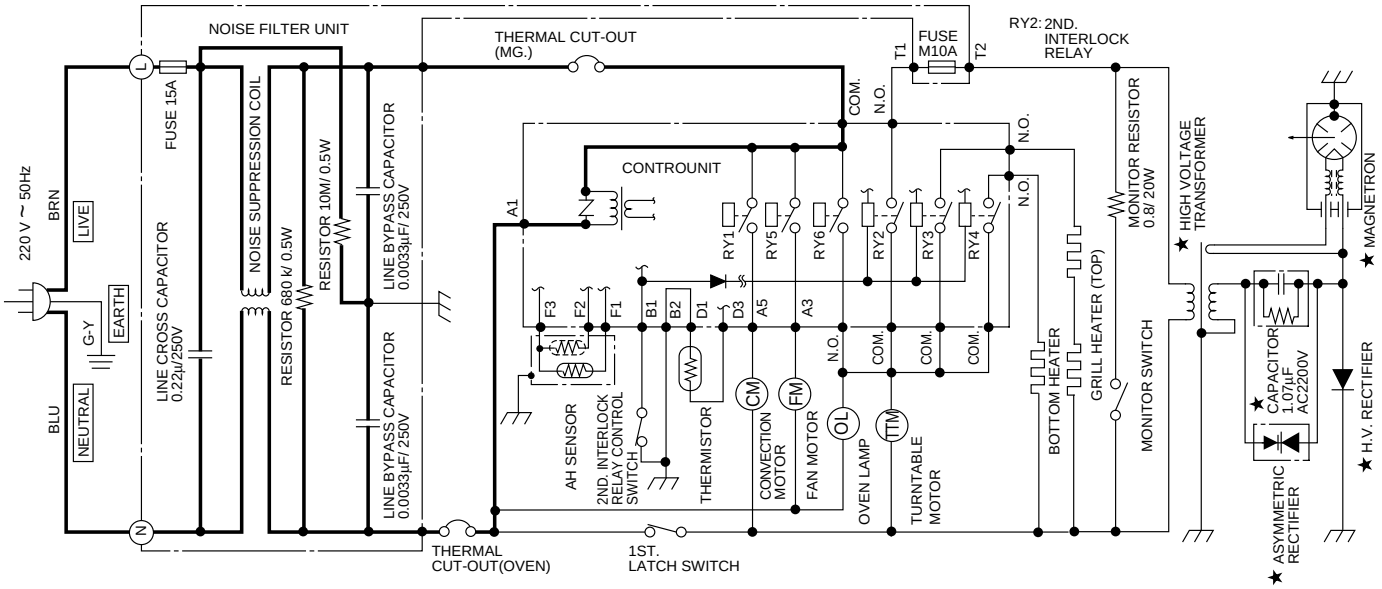


Figure O-1 Oven Schematic-OFF Condition

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. MICROWAVE POWER LEVEL PAD PRESSED ONCE(100%).
3. COOKING TIME PROGRAMMED.
4. START PAD TOUCHED.

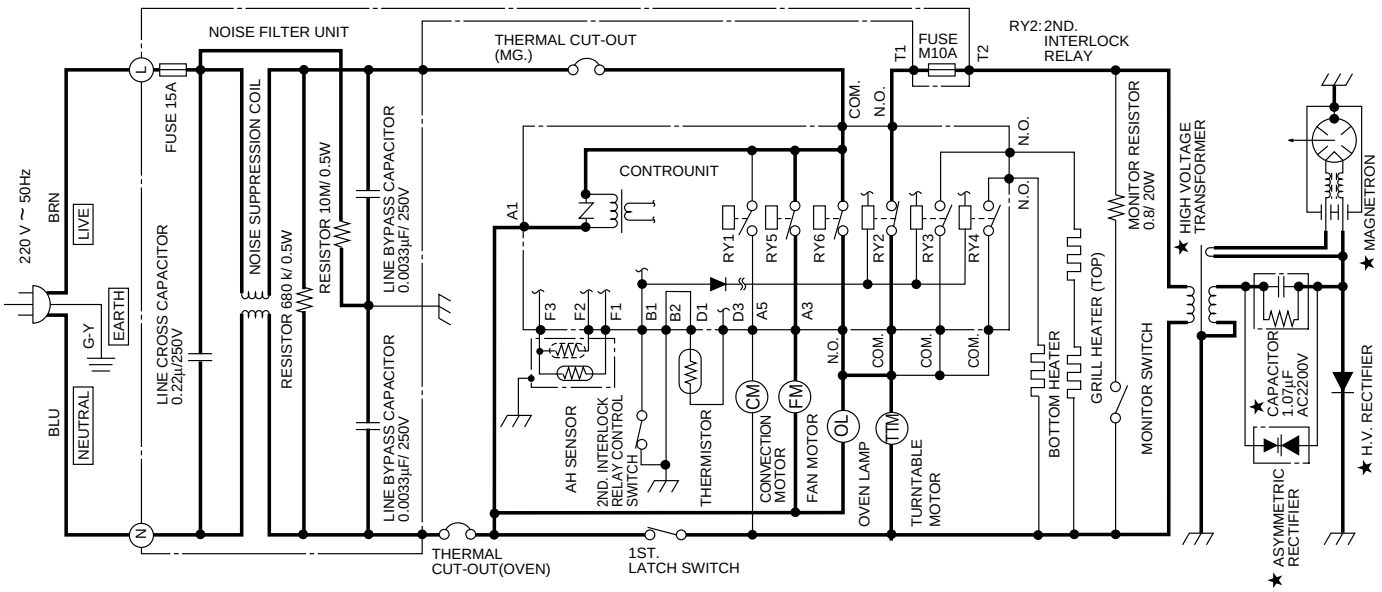


Figure O-2 Oven Schematic-Microwave cooking Condition

NOTE: ★Indicates components with potential above 250 V.

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. GRILL PAD TOUCHED ONCE.
3. COOKING TIME PROGRAMMED.
4. STRAT PAD TOUCHED.

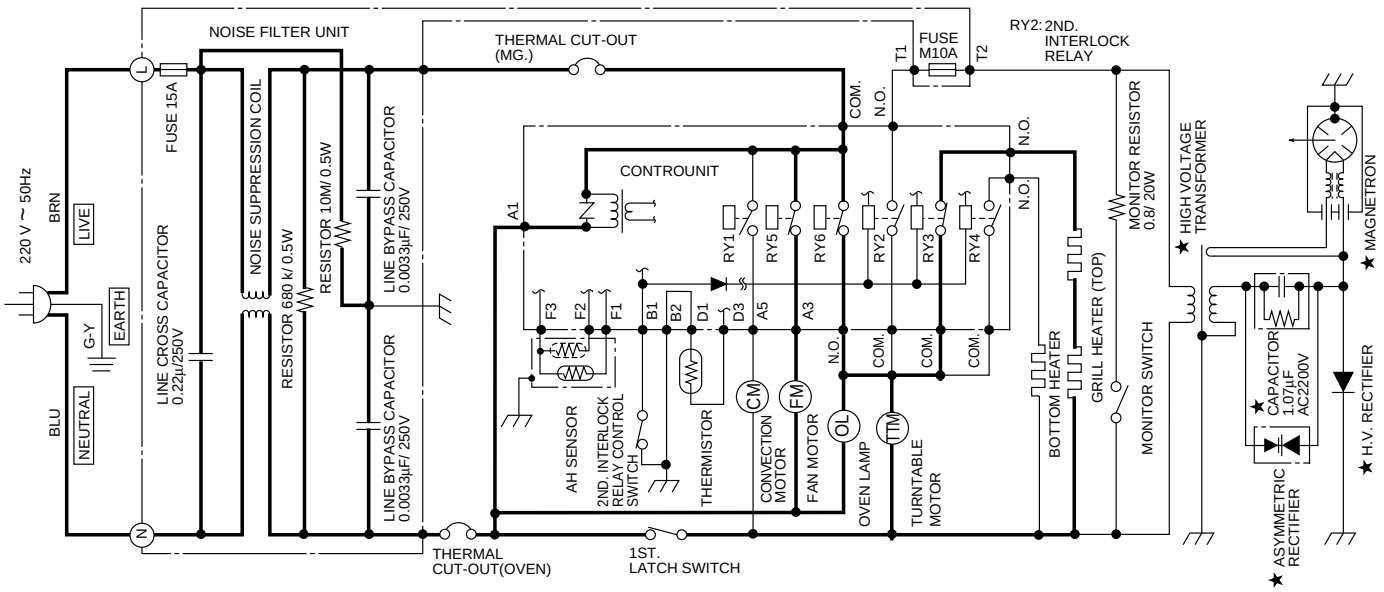


Figure O-3(a) Oven Schematic-Grill cooking Condition (TOP HEATER mode)

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. GRILL PAD TOUCHED TWICE.
3. COOKING TIME PROGRAMMED.
4. STRAT PAD TOUCHED.

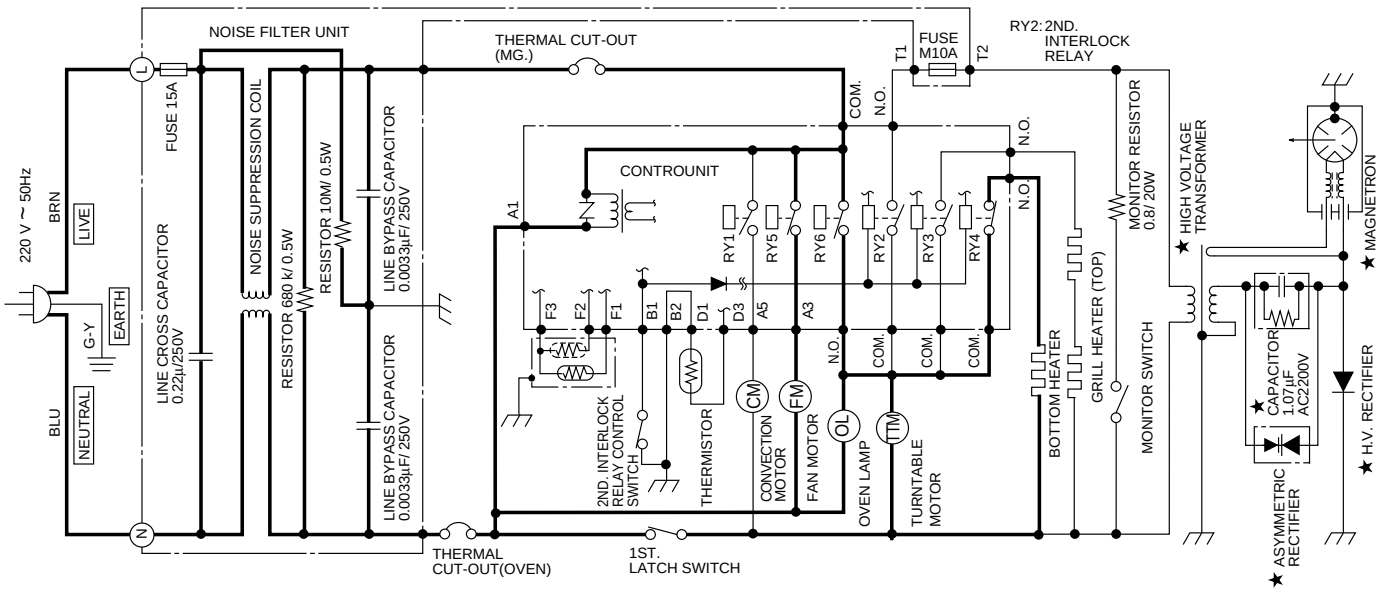


Figure O-3(b) Oven Schematic-Grill cooking Condition (BOTTOM HEATER mode)

SCHEMATIC
NOTE: CONDITION OF OVEN FOR GRILL COOKING
1. DOOR CLOSED.
2. GRILL PAD THREE TIMES.
3. COOKING TIME PROGRAMMED.
4. STRAT PAD TOUCHED.

NOTE: ★Indicates components with potential above 250 V.

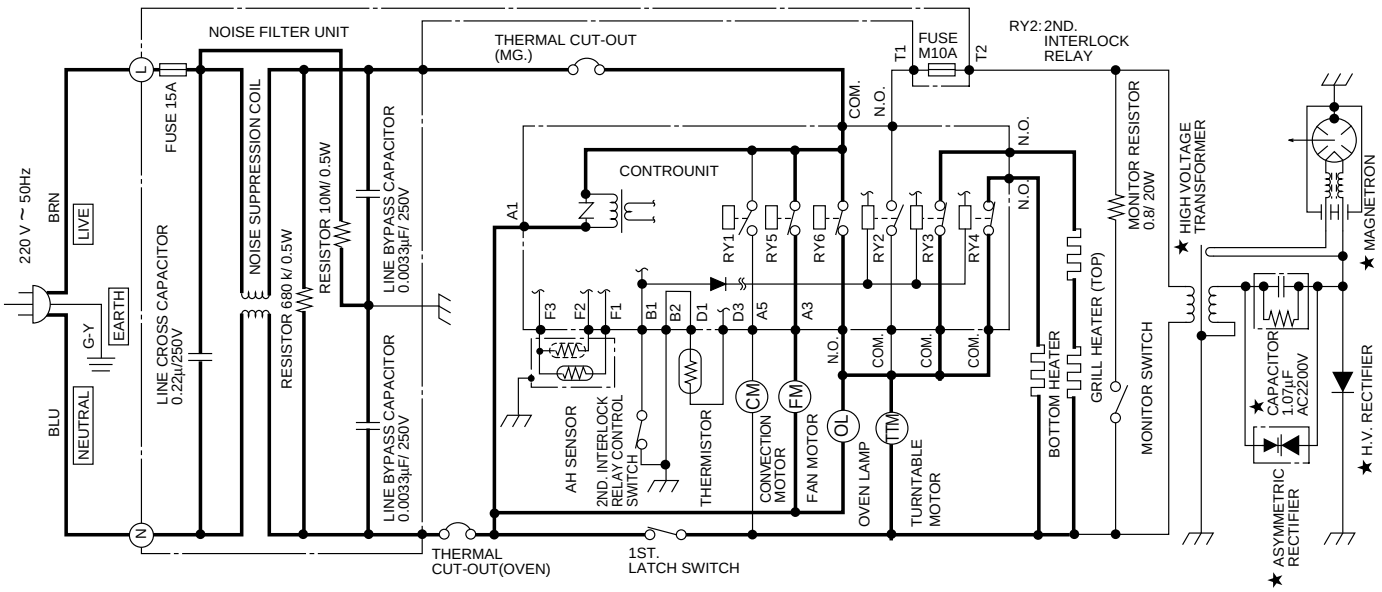


Figure O-3(c) Oven Schematic-Grill cooking Condition (TOP AND BOTTOM GRILL mode)

SCHEMATIC
NOTE: CONDITION OF OVEN FOR GRILL COOKING
1. DOOR CLOSED.
2. CONVECTION PAD TOUCHED.
3. TEMPERATURE PAD TOUCHED.
4. COOKING TIME PROGRAMMED.
5. STRAT PAD TOUCHED.

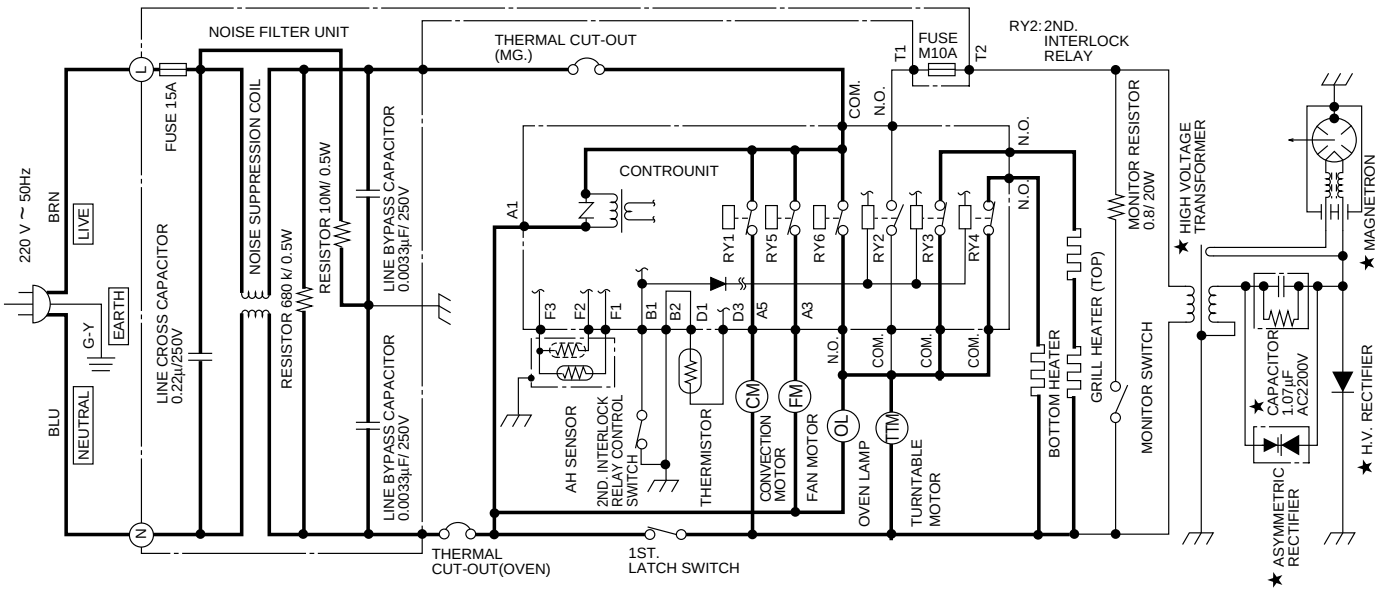


Figure O-4 Oven Schematic-Convection cooking Condition

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. MIX PAD TOUCHED ONCE/TWICE.
3. COOKING TIME PROGRAMMED.
4. STRAT PAD TOUCHED.

NOTE: ★Indicates components with potential above 250 V.

NOTE: The microwave relay RY2 and heater relay RY3 could not turn on simultaneously.

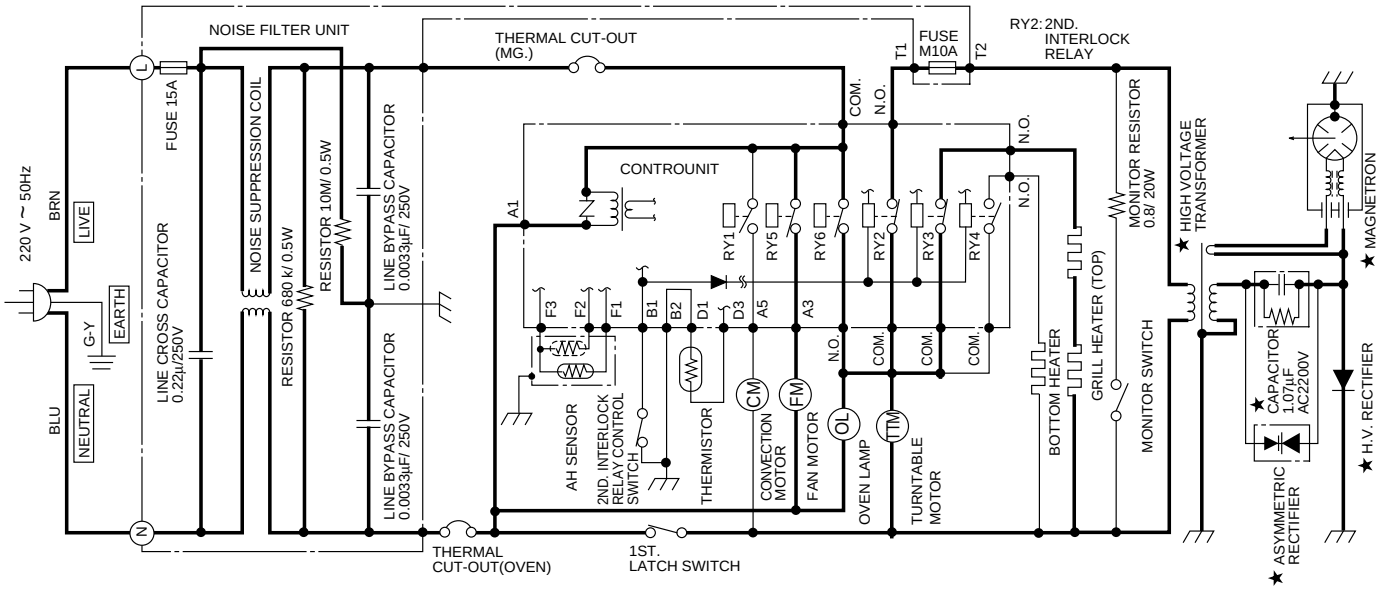


Figure O-5(a) Oven Schematic-Mix cooking Condition (High Mix Top Grill mode / Low Mix Top Grill mode)

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. MIX PAD TOUCHED THREE TIMES/FOUR TIMES.
3. COOKING TIME PROGRAMMED.
4. STRAT PAD TOUCHED.

NOTE: The microwave relay RY2 and heater relay RY4 could not turn on simultaneously.

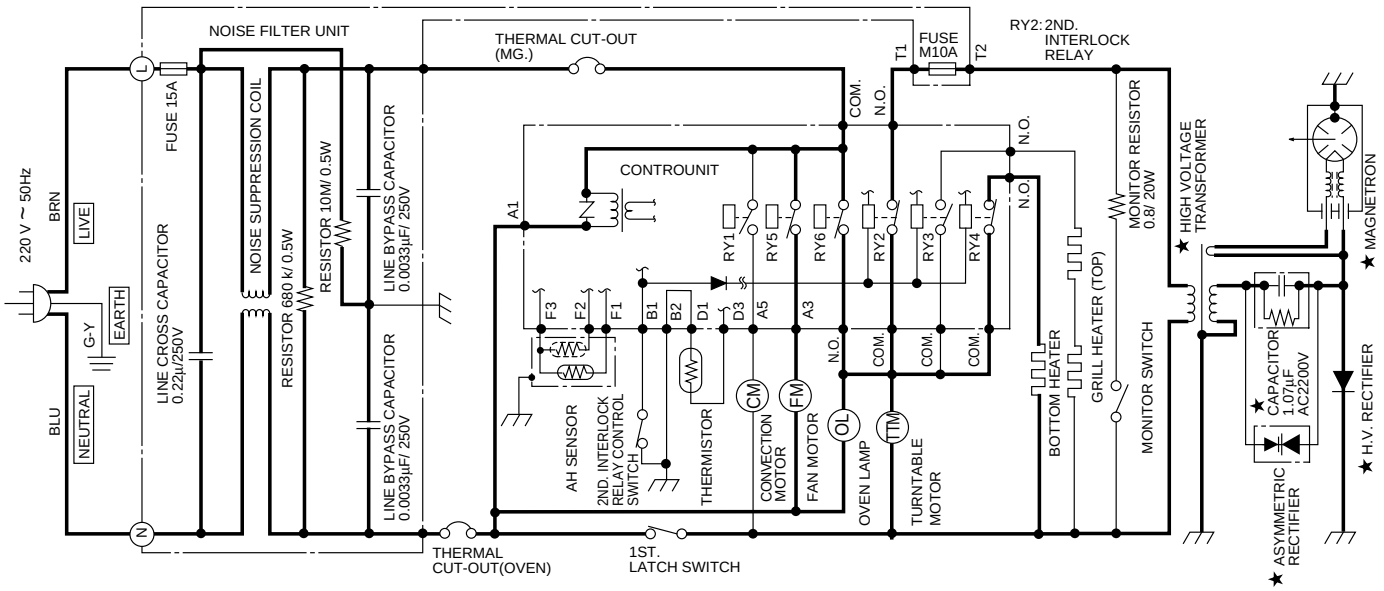


Figure O-5(b) Oven Schematic-Mix cooking Condition (High Mix Bottom Grill mode / Low Mix Bottom Grill mode)

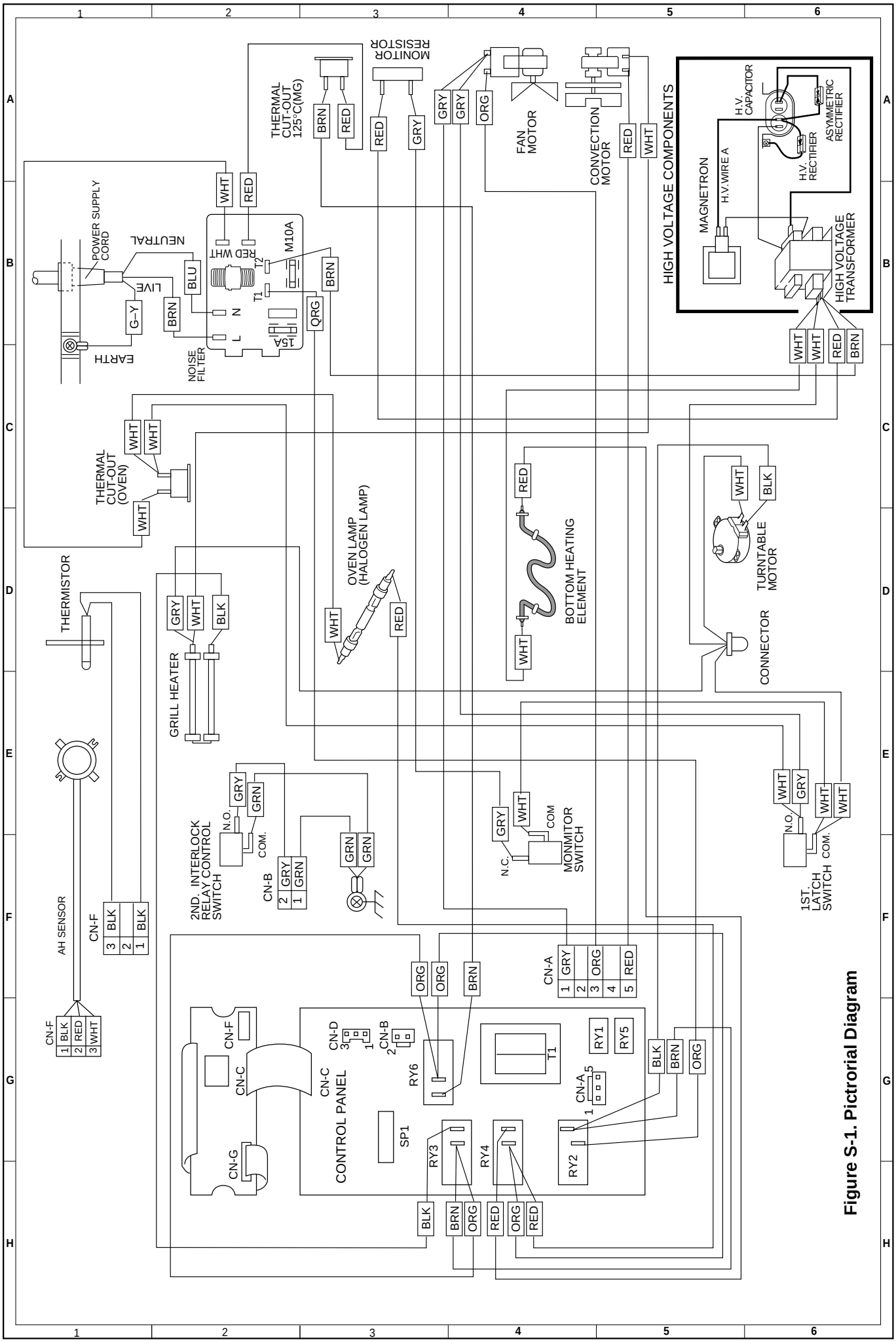
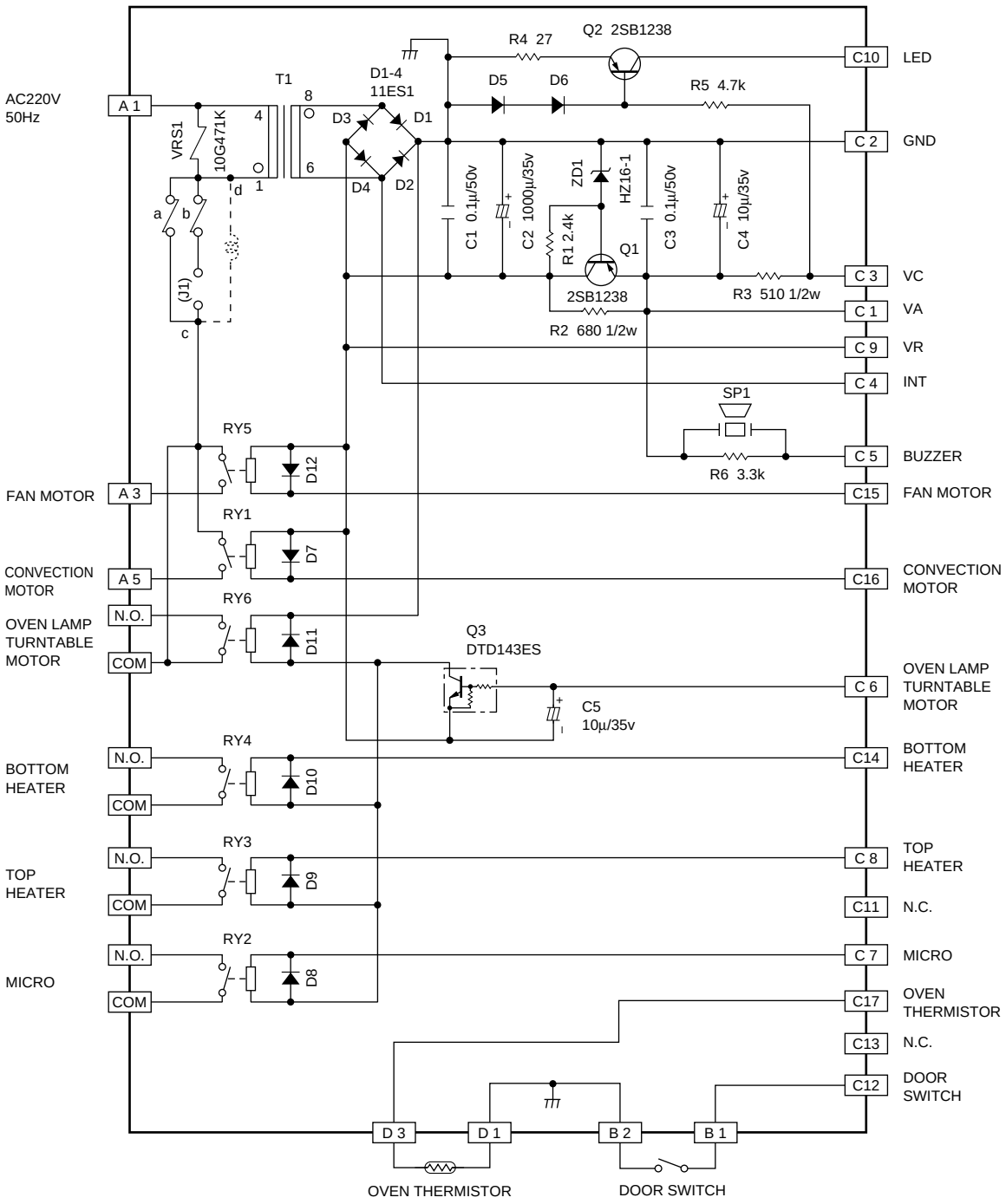


Figure S-1. Pictorial Diagram



NOTE : IF NOT SPECIFIED, 1/4W ± 5%

: IF NOT SPECIFIED, 1SS270A

Figure S-2. Power Unit Circuit

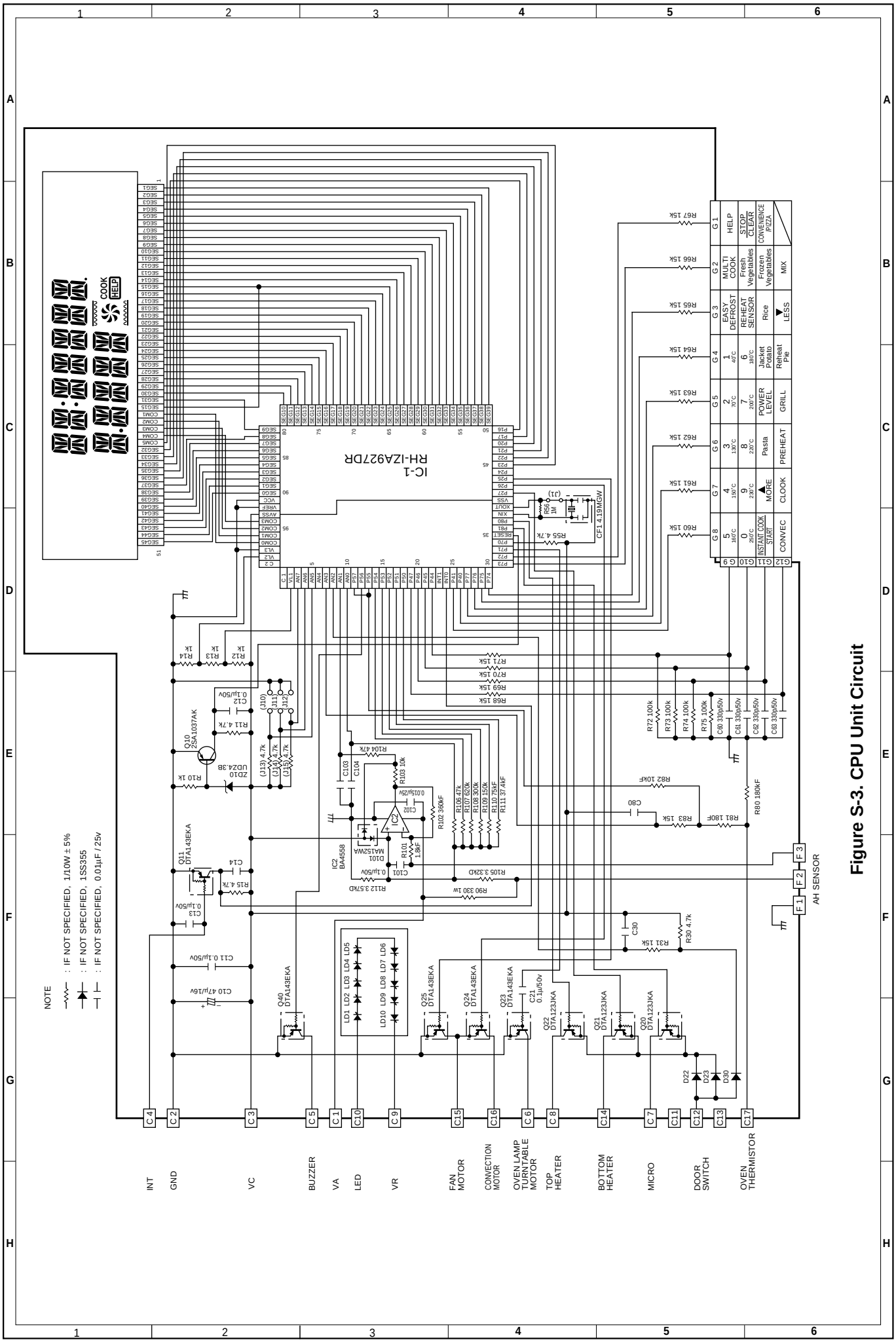


Figure S-3. CPU Unit Circuit

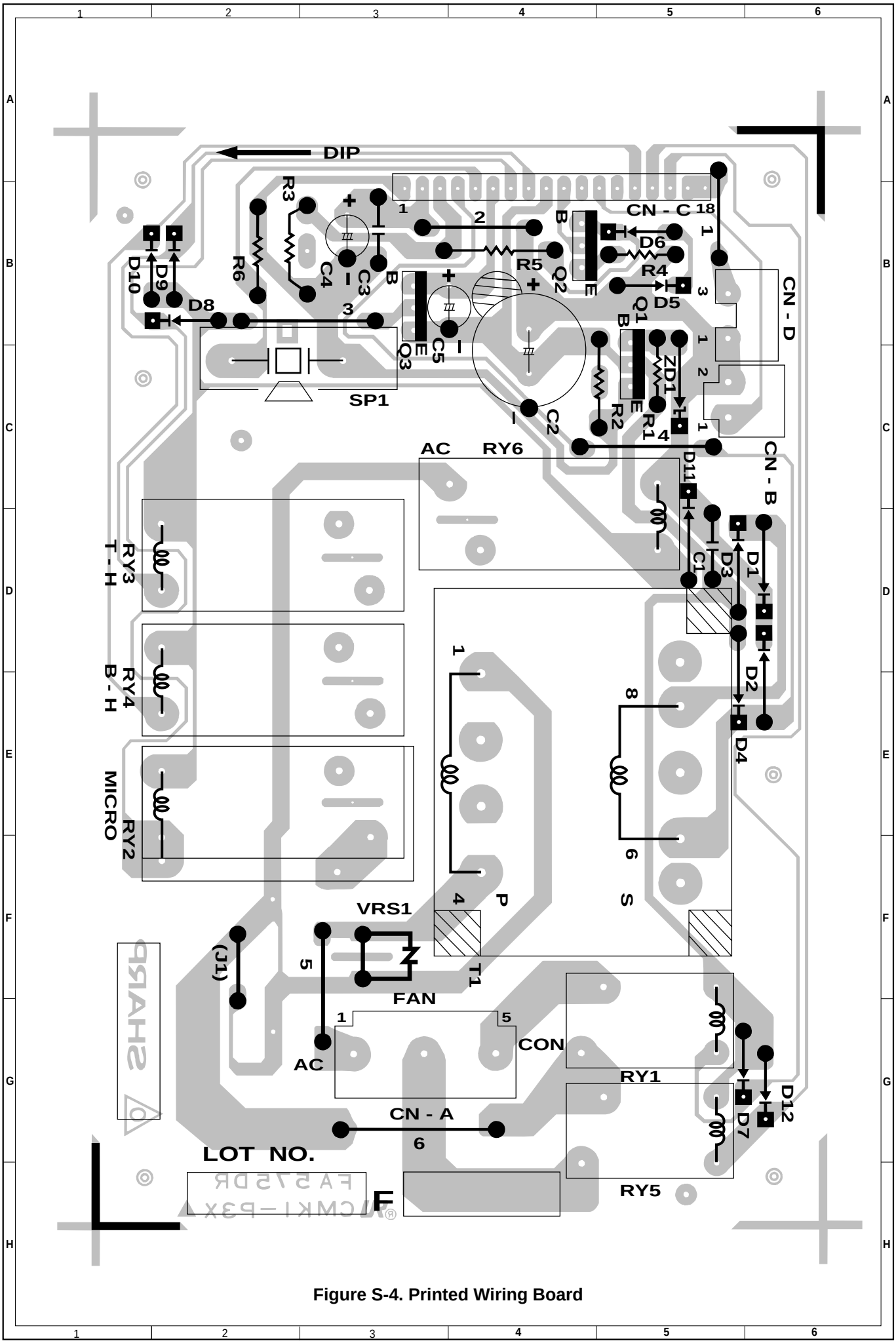


Figure S-4. Printed Wiring Board

PARTS LIST

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

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
		ELECTRIC PARTS		
1- 1	QSW-MA131WRE0	1st. latch switch, 2nd. interlock relay control switch	2	AG
1- 1	QSW-MA110WRE0	1st. latch switch, 2nd. interlock relay control switch (Interchangeable)	2	AH
1- 2	QSW-MA132WRE0	Monitor switch	1	AH
1- 2	QSW-MA111WRE0	Monitor switch (Interchangeable)	1	AH
1- 3	RMOTDA228WRE0	Turntable motor	1	AU
1- 3	RMOTDA207WRE0	Turntable motor (Interchangeable)	1	AT
* 1- 4	FH-DZA046WRK0	High voltage rectifier assembly	1	AW
* 1- 5	RC-QZA215WRE0	High voltage capacitor	1	AY
* 1- 5	RC-QZA182WRE0	High voltage capacitor (Interchangeable)	1	AY
1- 6	RMOTEA361WRE0	Fan motor	1	AW
1- 7	FPWBFA317WRK0	Noise filter	1	AW
1- 8	QACC-A071WRE0	Power supply cord	1	AP
1- 9	QFS-BA007WRE0	Fuse 15A	1	AF
1-10	QFS-CQ001YBE0	Fuse 10A	1	AE
1-11	QTANNA017WRW0	Short terminal	1	AD
1-12	RHET-A200WRE0	Grill heater (Top heater)	2	AX
1-13	RHET-A201WRE0	Bottom heater	1	BD
1-14	RLMPUA001WRE0	Oven lamp (Halogen lamp)	1	BB
1-15	RR-WZA022WRE0	Monitor resistor 0.8 ohm 20W	1	AK
1-16	RTHM-A048WRE0	Thermal cut out 170˚C OFF / 155˚C ON	1	AH
1-17	RTHM-A078WRE0	Thermal cut-out 125˚C	1	AK
* 1-18	RTRN-A555WRE0	High voltage transformer	1	BR
Δ* 1-19	RV-MZA222WRE0	Magnetron	1	BN
Δ* 1-19	RV-MZA197WRE0	Magnetron (Interchangeable)	1	BN
1-20	FDTCTA192WRK0	AH sensor assembly	1	AN
1-21	FH-HZA063WRE0	Thermistor	1	AP
1-22	RMOTEA373WRE0	Convection motor	1	AW
1-23	QPLGAA022WRE0	AC plug	1	AX
		CABINET PARTS		
2- 1	GCABDA097WRW0	Back plate	1	AW
2- 2	GCABUA649WRP0	Outer case cabinet	1	AZ
2- 3	GDAI-A305WRW0	Base plate	1	AX
2- 4	GLEGPA074WRE0	Leg	2	AC
		CONTROL PANEL PARTS		
3- 1	CPWBFA808WRK0	Power unit	1	BE
3- 1A	QCNCMA234DRE0	3-pin connector (CN-A)	1	AC
3- 1B	QCNCMA275DRE0	2-pin connector (CN-B)	1	AB
3- 1C	FW-VZA238DRE0	9pin wire harness (WH-1, WH-2)	2	AK
3- 1D	QCNCMA410DRE0	2-pin connector (CN-D)	1	AB
C1	RC-KZA087DRE0	Capacitor 0.1 uF 50V	1	AA
C2	VCEAB31VW108M	Capacitor 1000 uF 35V	1	AF
C3	RC-KZA087DRE0	Capacitor 0.1 uF 50V	1	AA
C4-5	VCEAB31VW106M	Capacitor 10 uF 35V	2	AA
D1-4	VHD11ES1///-1	Diode (11ES1)	4	AB
D5-12	VHD1SS270A/-1	Diode (1SS270A)	8	AA
Q1-2	VS2SB1238//-3	Transistor (2SB1238)	2	AA
Q3	VSDTD143ES/-3	Transistor (DTD143ES)	1	AC
R1	VRD-B12EF242J	Resistor 2.4k ohm 1/4W	1	AA
R2	VRD-B12HF681J	Resistor 680 ohm 1/2W	1	AA
R3	VRD-B12HF511J	Resistor 510 ohm 1/2W	1	AB
R4	VRD-B12EF270J	Resistor 27 ohm 1/4W	1	AB
R5	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R6	VRD-B12EF332J	Resistor 3.3k ohm 1/4W	1	AA
RY1	RRLY-A080DRE0	Relay (OJ-SH-124LM)	1	AG
RY2	RRLY-A081DRE0	Relay (VRB24)	1	AL
RY3-4	RRLY-A076DRE0	Relay (OMIF-S-124LM)	2	AK
RY5	RRLY-A080DRE0	Relay (OJ-SH-124LM)	1	AG
RY6	RRLY-A076DRE0	Relay (OMIF-S-124LM)	1	AK
SP1	RALM-A014DRE0	Buzzer (PKM22EPT-THAI)	1	AG
T1	RTRNPA105DRE0	Transformer	1	AS
VRS1	RH-VZA032DRE0	Varistor (10G471K)	1	AE
ZD1	VHEHZ161///-1	Zener diode (HZ16-1)	1	AA
3- 2	DPWBFB871WRK0	CPU unit	1	BE
3- 3	DPNLCB516WRK0	Control panel frame with key unit	1	BB
3- 3-1	JBTN-B086WRF0	Open button	1	AF
3- 3-2	MSPRCA050WRE0	Open button spring	1	AB
3- 3-3	FUNTKA895WRE0	Key unit	1	AU
3- 4	LHLD-A185WRF0	LCD holder	1	AL
3- 5	PSHEPA626WRE0	LED sheet	1	AF
3- 6	XEPSD30P08XS0	Screw; 3mm x 8mm	4	AA

	REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
			OVEN PARTS		
Δ	4- 1	DOVN-A513WRY0	Oven cavity	1	BR
Δ	4- 2	PHOK-A106WRF0	Latch hook	1	AL
	4- 3	FDUC-A338WRK0	Air duct assembly	1	BF
	4- 4	PCUSGA389WRP0	Cushion	1	AG
	4- 5	LANGQA478WRP0	Turntable motor angle	1	AP
	4- 6	MSPRTA186WRE0	Plate spring	1	AE
	4- 7	NCPL-A051WRE0	Turntable motor shaft	1	AN
	4- 8	PSPA-A109WRE0	Spacer	1	AB
	4- 9	LBNDKA136WRP0	HV capacitor holder	1	AQ
	4-10	NFANJA041WRE0	Fan blade	1	AF
	4-11	PDUC-A697WRF0	Fan duct	1	AM
	4-12	GCOVHA388WRW0	Bottom heater cover	1	AF
	4-13	GLEGPA071WRF0	Leg	1	AG
	4-14	LANGFA191WRW0	Chassis support	1	AN
	4-15	LANGQA480WRP0	Lamp cover	1	AX
	4-16	LFLG-A025WRE0	Bearing	1	AM
	4-17	MLEVPA226WRF0	Switch lever	1	AF
	4-18	MSPR-A004WRE0	Heat seal spring	2	AF
	4-19	PCOV-A011WRP0	Bottom heater angle	2	AM
	4-20	PCOVPA339WRE0	Waveguide cover	1	AF
	4-21	PCUSGA385WRP0	Cushion	1	AH
	4-22	PCUSUA190WRP0	Cushion	1	AC
	4-23	PCUSUA191WRP0	Cushion	1	AC
	4-24	PDUC-A691WRF0	Air intake duct	1	AG
	4-25	PDUC-A692WRP0	Exhaust duct	1	AS
	4-26	PDUC-A696WRP0	Air guide	1	AT
	4-27	PGLSPA506WRE0	Light glass	1	AN
	4-28	PCUSGA399WRE0	Cushion	1	AF
	4-29	PREFHA061WRW0	Reflector	1	BE
	4-30	PSHEPA487WRE0	Heater film	1	AA
	4-31	PSKR-A358WRP0	Air separate angle	1	AX
	4-32	MSPRCA113WRE0	H-spring	2	AC
	4-33	PCUSGA420WRP0	Cushion	1	AE
	4-34	LANGQA489WRP0	Thermistor angle	1	AW
	4-35	NFANMA047WRP0	Convection fan	1	AX
	4-36	NFANMA048WRP0	Cooling fan	1	AX
	4-37	PCUSUA499WRP0	Cushion	1	AC
	4-38	PDUC-A707WRW0	Convection duct	1	AR
	4-39	PFPF-A210WRE0	Thermal insulation	1	AM
	4-40	PPIPFA030WRE0	Pipe	1	AK
	4-41	PSKR-A339WRP0	Convection air angle	2	AX
	4-42	PSKR-A345WRW0	Convection motor guide A	1	AU
	4-43	PSKR-A346WRW0	Convection motor guide B	1	AR
	4-44	PSLDHA140WRW0	Convection thermal cover	1	AQ
	4-45	PCOVPA340WRW0	Sub back plate	1	AQ
			DOOR PARTS		
Δ	5- 1	DDORFA857WRK0	Door panel assembly	1	BB
Δ	5- 2	GWAKPA603WRR0	Door frame	1	AZ
Δ	5- 3	LSTPPA176WRF0	Latch head	1	AN
	5- 4	LSTPPA177WRF0	Glass stopper	1	AF
	5- 5	MSPRTA187WRE0	Latch spring	1	AC
	5- 6	PGLSPA513WRE0	Front door glass	1	AV
	5- 7	XCPSD40P06000	Screw : 4mm x 6mm	2	AA
	5- 8	XCPSD40P08000	Screw : 4mm x 8mm	4	AA
	5- 9	GCOVHA387WRF0	Choke cover	1	AS
			MISCELLANEOUS		
	6- 1	FAMI-A099WRM0	High rack	1	AS
	6- 2	FAMI-A100WRM0	Low rack	1	AS
	6- 3	FSRAHA062WRY0	Turntable support	1	BC
	6- 4	NTNT-A092WRH0	Turntable	1	AZ
	6- 5	TLABMA584WRR0	Menu label	1	AF
	6- 6	TINSEA779WRR0	Instruction book	1	AS
	6- 7	FW-VZB045WRE0	Switch harness	1	AG
	6- 8	FW-VZB710WRE0	Main wire harness	1	BB
*	6- 9	QW-QZA231WRE0	High voltage wire A	1	AF
	6-10	LHLDWA011WRE0	Purse lock M	1	AB
	6-11	TCAUHA214WRR0	K caution label	1	AC
	6-12	TSPCNC697WRR0	Rating label	1	AC
	6-13	TCAUHA244WRR0	Lamp caution	1	AD
	6-14	TCAUHA054WRR0	AC cord caution	1	AE
			SCREWS,NUTS AND WASHERS		
	7- 1	XFPSD40P08K00	Screw : 4mm x 8mm	14	AA
	7- 2	XEPSD40P25000	Screw : 4mm x 25mm	2	AA

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
7- 3	LX-EZA042WRE0	Special screw	2	AB
7- 4	LX-NZ0061WRE0	Flange nut	4	AA
7- 5	XBPWW30P05K00	Screw : 3mm x 5mm	2	AA
7- 6	XCTWW40P08000	Screw : 4mm x 8mm	8	AB
7- 7	XHPSD30P06000	Screw : 3mm x 6mm	3	AA
7- 8	XHTSD40P08RV0	Screw : 4mm x 8mm	4	AA
7- 9	XOTSD40P12RV0	Screw : 4mm x 12mm	15	AA
7-10	XOTSD40P12000	Screw : 4mm x 12mm	10	AA
7-11	XWSUW40-10000	Washer : 4mm x 1mm	1	AA
7-12	XOTSE40P08000	Screw : 4mm x 8mm	1	AA
7-13	XBTSD40P05000	Screw : 4mm x 5mm	2	AA
7-14	XNEUW40-32000	Nut : 4mm x 3.2mm	1	AA
7-15	XRESE40-06000	Ring : 4mm x 0.6mm	1	AA
7-16	XWHUW40-08000	Washer : 4mm x 0.8mm	1	AA
7-17	XWHUW48-08120	Washer : 4.8mm x 0.8mm	1	AA

HOW TO ORDER REPLACEMENT PARTS

To have your order filled prompty and correctly, please furnish the following information.

1. MODEL NUMBER 2. REF. NO. 3. PART NO. 4. DESCRIPTION

INFORMATION FOR PARTS CHANGE

The power supply cord and AC plug will be changed as follows, and new part will be used for products from serial number 9812xxxxx.

Interchangeability A. OLD ⇔ NEW B. OLD ⇨ NEW C. OLD ⇦ NEW D. OLD × NEW

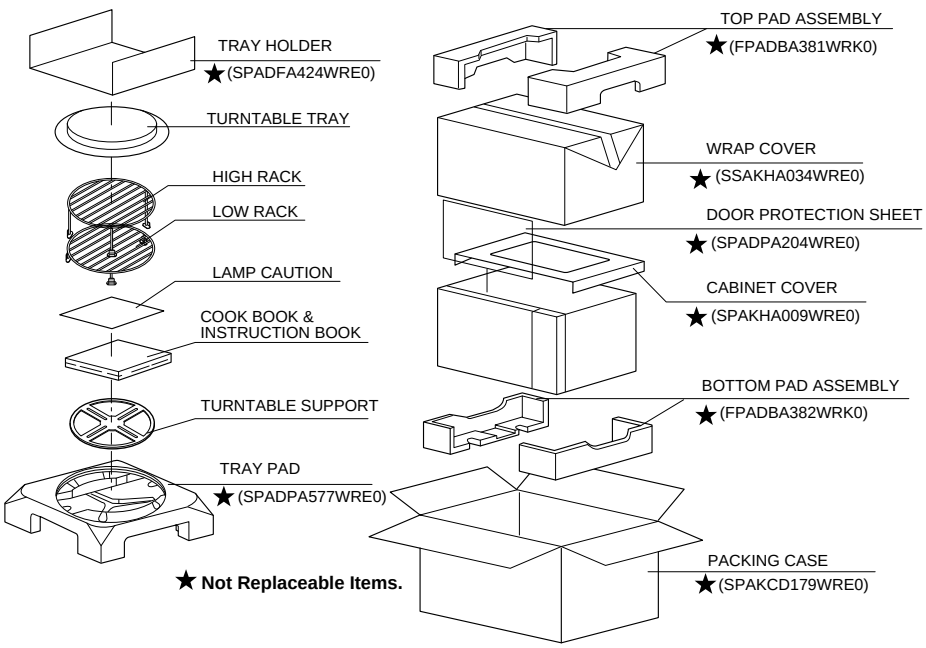
REF.NO.	DESCRIPTION	REPLACEMENT PART NO.				Inter-change-ability	EFFEC-TIVE FROM	CODE
		OLD No.	Q'ty	NEW No.	Q'ty			
1- 8	Power supply cord	QACC-A071WRE0	1	Delete	-	-	Dec./'98	
1-23	AC plug	QPLGAA022WRE0	1	Delete	-	-	Dec./'98	
1-24	Power supply cord	Not listed	1	QACC-A104WRE0	1	C	Dec./'98	

NOTE: The power supply cord (Ref.: 1- 8) and AC plug (Ref.: 1-23) will be deleted and change to the new power supply cord (Ref.: 1-24) which has the AC plug from serial number 9812xxxxx.

For old ovens (until serial number 9811xxxxx), after the power supply cord (Ref.: 1- 8) or the AC plug (Ref.: 1-23) is out of order, please use new power supply cord (Ref.: 1-24).

For new ovens (from serial number 9812xxxxx), please use new power supply cord (Ref.: 1-24).

PACKING AND ACCESSORIES



OVEN AND CABINET PARTS