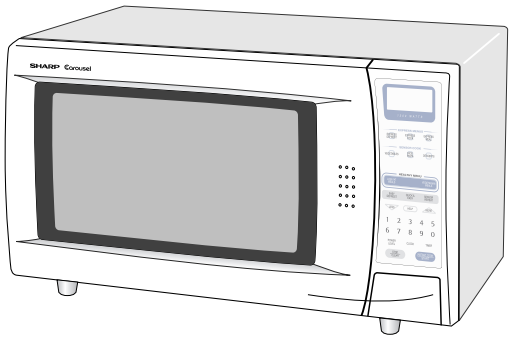
# SHARP SERVICE MANUAL

S8406R480JPJ/



## MICROWAVE OVEN

## MODEL R-480J

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

**TABLE OF CONTENTS**



SHARP CORPORATION

# SERVICE MANUAL

SHARP

**MICROWAVE OVEN**

**R-480J**

**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**

**DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.**

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.

**SHARP CORPORATION**

**OSAKA, JAPAN**

# PRODUCT SPECIFICATIONS

| ITEM | DESCRIPTION |
|---|---|
| Power Requirements | 230 - 240 Volts<br>50 Hertz<br>Single phase, 3 wire earthed |
| Power Consumption | 1.65 kW |
| Power Output | 1200 watts nominal of RF microwave energy (IEC Test Procedure)<br>Operating frequency 2450 MHz |
| Case Dimensions | Width 550 mm<br>Height 315 mm<br>Depth 446 mm |
| Turntable diameter | 360mm |
| Control Complement | Touch Control System<br>Clock ( 1:00 - 12:59)<br>Timer (0 - 99 minutes 99 seconds)<br>Microwave Power for Variable Cooking<br>Repetition Rate;<br>HIGH ..... Full power throughout the cooking time<br>MEDIUM HIGH ..... approx. 70% of Full Power<br>MEDIUM ..... approx. 50% of Full Power<br>MEDIUM LOW ..... approx. 30% of Full Power<br>LOW ..... approx. 10% of Full Power<br>HELP pad<br>SENSOR REHEAT pad<br>SENSOR COOK pads<br>HEALTHY MENU pads<br>EXPRESS MENUS pads<br>EASY DEFROST pad<br>MORE, LESS pads<br>QUICK & EASY pad<br>NUMBER pads<br>POWER LEVEL pad<br>CLOCK pad<br>TIMER pad<br>STOP/CLEAR pad<br>INSTANT COOK/START pad |
| Weight | Approx. 19 kg |

# GENERAL INFORMATION

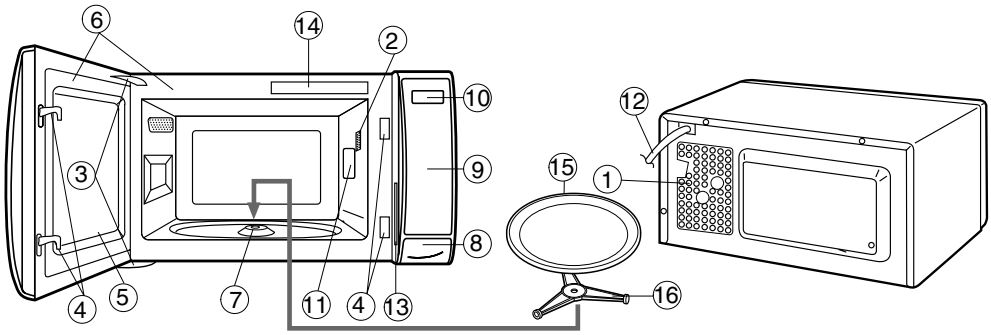
**WARNING**
**THIS APPLIANCE MUST BE EARTHED**

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

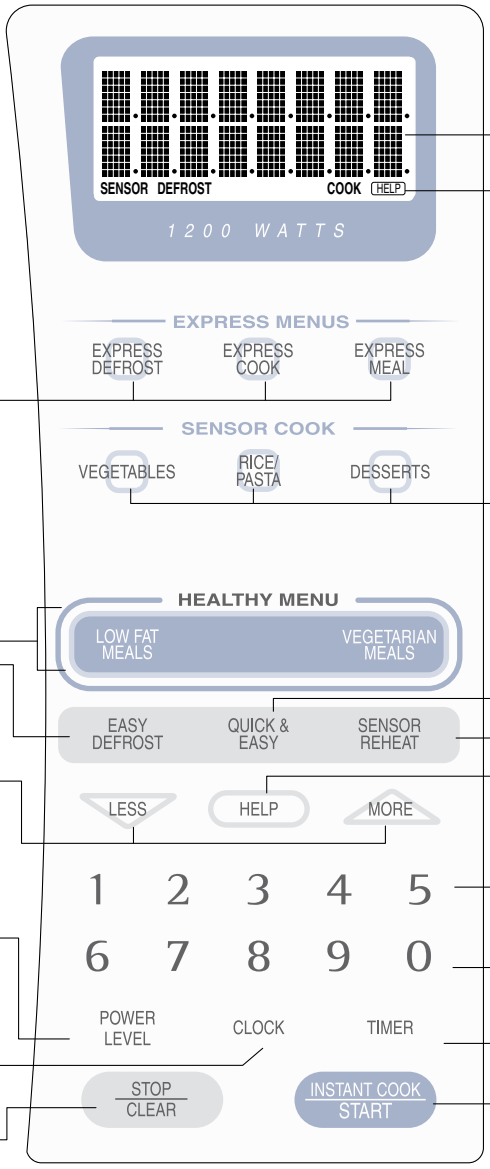
| | |
|---|---|
| GREEN-AND-YELLOW | : EARTH |
| BLUE | : NEUTRAL |
| BROWN | : LIVE |

# APPEARANCE VIEW

1. Ventilation openings
2. Oven lamp
3. Door hinges
4. Door safety latches
5. See through door
6. Door seals and sealing surfaces
7. Coupling
8. Door open button
9. Touch control panel
10. Digital readout
11. Waveguide cover
12. Power supply cord
13. Rating label
14. Menu label
15. Turntable
16. Roller stay




## TOUCH CONTROL PANEL




Display

Indicator

**EXPRESS MENUS PADS**
Press to select "Express Menus" menus.

**SENSOR COOK PADS**
Press to select Sensor Cook menus.

**HEALTHY MENU PADS**
Press to select "Healty Menu" menu.

**QUICK AND EASY PAD**
Press to select Quick and Easy menus.

**EASY DEFROST PAD**
Press to defrost frozen food by entering quantity.

**SENSOR REHEAT PAD**
Press to select reheat menu.

**MORE, LESS PADS**
Press to increase/ decrease the time in one minute increments during cooking or to alter the cooking result for automatic operations.

**HELP PAD**
Press to select auto start, child lock, demonstration modes or info on pads. Press to get cooking information.

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

**NUMBER PADS**
Press to enter cooking times, clock time, weight or quantity of food.

**CLOCK PAD**
Press to set Clock.

**TIMER PAD**
Press to set Timer

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

**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 cooking. Press to start the oven after setting programmes.

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

# OPERATION SEQUENCE

## OFF CONDITION

Closing the door activates all door interlock switches (1st. latch switch, 2nd. interlock relay control switch)

IMPORTANT

When the oven door is closed, the monitor switch contacts (COM-NC) must be open.

When the microwave oven is plugged in a wall outlet, rated voltage is supplied to the noise filter and the control unit.

**Figure O-1 on page 29**

1. The display shows SHARP, MICRO-WAVE and OVEN.
2. To set any programs or set the clock, you must first touch the STOP/CLEAR pad.
3. " : " appears in the display.

NOTE: When the oven door is opened, the oven lamp comes on at this time.

## MICROWAVE COOKING CONDITION

### HIGH COOKING

Enter a desired cooking time with the touching Number pads and start the oven with touching START pad.

**Function sequence**

**Figure O-2 on page 29**

| CONNECTED COMPONENTS | RELAY |
|---|---|
| Oven lamp, Fan motor, Turntable motor | RY1 |
| Power transformer | RY2 |

1. Rated voltage is supplied to the primary winding of the power 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 (RY1+RY2) go back to their home position (off condition)°. The circuits to the oven lamp, power transformer, fan motor and turntable motor are cut off.
5. When the door is opened during a cook cycle, the switches come to the following condition

| | | CONDITION | |
|---|---|---|---|
| SWITCH | CONTACT | DURING COOKING | DOOR OPEN (NO COOKING) |
| 1st. latch switch | COM-NO | Closed | Open |
| 2nd. interlock relay control switch | COM-NO | Closed | Open |
| Monitor switch | COM-NC | Open | Closed |

The circuits to the power transformer, fan motor and turntable motor are cut off when the 1st. latch switch and 2nd. interlock relay control switch are made open. The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay (RY1) stays closed. Shown in the display is the remaining time.

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

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.

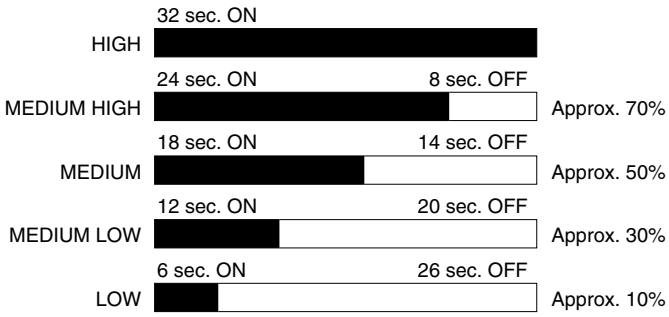
6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch must be opened first. After that the contacts of the 1st. latch switch and 2nd. interlock relay control switch are closed.

6-3. When the oven door is opened and the contacts of the 1st. latch switch and 2nd. interlock relay remain closed. The fuse F10A will blow, because the monitor switch is closed and a short circuit is caused.

## VARIABLE COOKING

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

SETTING;




NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 3 seconds are needed for heating up the magnetron filament.

## SENSOR COOKING CONDITION

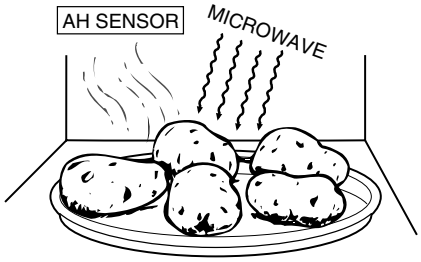
Using the SENSOR COOK or SENSOR INSTANT RE-HEAT function, the foods are cooked or reheated without figuring time, power level or quantity. When the oven senses enough steam from the food, it relays the information to its microprocessor which will calculate the remaining cooking time and power level needed for best results. When the food is cooked, water vapor is developed. The sensor "senses" the vapor and its resistance increases gradually. When the resistance reaches the value set according to the menu, supplementary cooking is started. The time of supplementary cooking is determined by experiment with each food category and inputted into the LSI.

An example of how sensor works:

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

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

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




**Cooking Sequence.**

1. Touch each SENSOR COOK or SENSOR INSTANT REHEAT function pad to operating the sensor cooking. Refer to the operation manual for the proper procedure.

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

2. The coil of shut-off relay (RY-1) is energized, the turntable motor, oven lamp and cooling fan motor are turned on, but the power transformer is not turned on.
3. After about 16 seconds, the cook relay (RY-2) is energized. The power transformer is turned on, microwave energy is produced and first stage is started. The 16 seconds is the cooling time required to remove any vapor from the oven cavity and sensor.

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

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

## POWER OUTPUT REDUCTION

After 100% power cooking mode is carried out more than 40 minutes, the power output is automatically reduced to 70%.

# FUNCTION OF IMPORTANT COMPONENTS

## DOOR OPEN MECHANISM

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

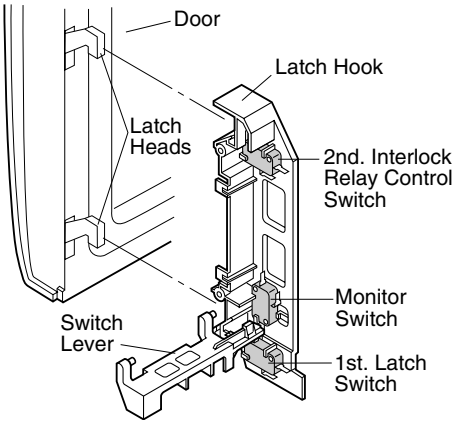



**Figure D-1. Door Open Mechanism**

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

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

## MONITOR SWITCH

1. When the oven door is closed, the contacts (COM-NC) must be opened.
2. When the oven door is opened, the contacts (COM-NC) must be closed.
3. If the oven door is opened and the contacts (COM-NO) of the 1st. latch switch and 2nd. interlock relay fail to open, the fuse (F10A) blows simultaneously with closing the contacts (COM-NC) of the monitor switch.

CAUTION: BEFORE REPLACING A BLOWN FUSE (F10A) TEST THE 1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY AND MONITOR SWITCH FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE".)

## FUSE (F10A)

1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazard.
2. The fuse also blows when 1st. latch switch and 2nd. interlock relay remains closed with the oven door open and when the monitor switch closes.

## HIGH VOLTAGE FUSE 0.75A

The high voltage fuse blows when the high voltage rectifier or magnetron is shorted.

## THERMAL CUT-OUT 145˚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 cook time or failure of control unit. Under normal operation, the oven thermal cut-out remains closed. However, when abnormally high temperature is reached within the oven cavity, the oven thermal cut-out will open at 145˚C, causing the oven to shut down. The defective thermal cut-out must be replaced with new one.

## THERMAL CUT-OUT 145˚C (MAGNETRON)

The thermal cut-out located near the magnetron is designed to prevent damage to the magnetron if an over heated condition develops in the tube due to cooling fan failure, obstructed air guide, dirty or blocked air intake, etc. Under normal operation, the thermal cut-out remains closed. However, when abnormally high temperatures are reached within the magnetron, the thermal cut-out will open at 145˚C causing the oven to shut down. The defective thermal cut-out must be replaced with new one.

## 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 the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

## NOISE FILTER

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

# SERVICING

## WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution. High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage fuse, 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 power 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 power 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 microwave timer for two (2) minutes. Set the power level to HIGH and push the START button. 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 F10A in the 1st. latch switch - 2nd. interlock relay - monitor switch circuit, check the 1st. latch switch, 2nd. interlock relay and monitor switch before replacing the fuse F10A.

CK = Check / RE = Replace

| CONDITION | TEST PROCEDURE / POSSIBLE CAUSE AND DEFECTIVE PARTS / PROBLEM | A MAGNETRON | B POWER TRANSFORMER | C H.V. RECTIFIER ASSEMBLY | D HIGH VOLTAGE CAPACITOR | E 1ST. LATCH SWITCH | E 2ND. N.D. INTERLOCK RELAY CONTROL SWITCH | E MONITOR SWITCH | F NOISE FILTER | G THERMAL CUT-OUT (MAGNETRON) | G THERMAL CUT-OUT (OVEN) | H FAN MOTOR | H TURNTABLE MOTOR | I FUSE F10A | J HIGH VOLTAGE FUSE | K TOUCH CONTROL PANEL | L KEY UNIT | M RELAY (RY-1, RY-2) | N FOIL PATERN ON P.W.B. | RE POWER SUPPLY CORD | RE OVEN LAMP OR SOCKET | CK SHORTED WIRE HARNESS | CK OPENED WIRE HARNESS | CK WALL OUTLET | CK HOME FUSE OR BREAKER | CK WRONG OPERATION | CK MISADJUSTMENT SWITCH | CK BLOCKED COOLING FAN | CK BLOCKED VENTILATION OPENING | O AH SENSOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OFF CONDITION | Home fuse blows when power supply cord is plugged into wall outlet. | | | | | | | | ● | | | | | | | | | | | ● | | ● | | ● | ● | | | | | |
| | FUSE F10A blows when power supply cord is plugged into wall outlet. | | | | | | | ● | ● | | | | | ● | | ● | | ● | | | | ● | | | | | ● | | | |
| | Display does not show anything when power supply cord is plugged into wall outlet. | | | | | | | | ● | ● | ● | | | ● | | ● | | | ● | ● | | | ● | ● | ● | | | | | |
| | Display does not operate properly when STOP/CLEAR pad is touched. | | | | | | ● | | | | | | | | | ● | ● | | | | | | ● | | | | ● | | | |
| | Oven lamp does not light at door opened. (Display appears.) | | | | | | ● | | | | | | | | | ● | | ● | | | ● | ● | ● | | | | | | | |
| ON CONDITION | Oven does not start when the START pad is touched. (Display appears) | | | | | | ● | | | | | | | | | ● | ● | ● | | | | | ● | | | | ● | | | |
| | Oven lamp does not light (Display appears.) | | | | | | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | |
| | Fan motor does not operate. (Display appears.) | | | | | ● | | | | | | ● | | | | | | ● | | | | | ● | | | | ● | ● | | |
| | Turntable motor assembly does not operate. (Display appears.) | | | | | ● | | | | | | | ● | | | | | ● | | | | | ● | | | | ● | | | |
| | Oven or any electrical parts does not stop when cooking time is 0 or STOP/CLEAR pad is touched. | | | | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | |
| | Oven seems to be operating but little or no heat is produced in oven load. (Microwave power level is set at HIGH) | ● | ● | ● | ● | | | | | | | | | | ● | ● | | ● | | | | | ● | | | ● | | | | |
| | Oven does not seems to be operating properly when MEDIUM HIGH, MEDIUM, MEDIUM LOW or LOW is set. (Oven operates properly at HIGH and when the STOP/CLEAR pad is touched the oven stops.) | | | | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | |
| | Oven goes into cook cycle but shuts down before end of cooking cycle. | | | | | | | | | ● | ● | ● | | | | ● | | | | | | | | | | | | ● | ● | |
| | Oven stops as soon as when the START pad is touched. | | | | | | | ● | | | | | | ● | | | | | | | | | | | | | | | | |
| SENSOR COOKING CONDITION | AH sensor does not end during Sensor Cooking condition. (Oven does not shut off after a cup of water is boiling by sensor cooking.) | | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● |
| | Oven stops at 16 sec. after starting. | | | | | | | | | | | | | | | ● | | | | | | ● | ● | | | | | | | ● |

## 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 CHECK.

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 circuit 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 water 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 IEC test procedure, i.e. it can be measured by using water load how much it can be absorbed by the water load. 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;
$P \times t / 4.187 = V \times \Delta T + 0.55 \times mc\ (T2-T0)/4.187$ $P\ (W) = 4.187 \times V \times \Delta T / t + 0.55 \times mc\ (T2-T0)/t$
Our condition for water load is as follows:

| | |
|---|---|
| Room temperature (T0) ... around 20°C | Power supply Voltage ..... Rated voltage |
| Water load ..... 1000 g | Initial temperature (T1) ..... 10±1°C |
| Heating time ..... 35 sec. | Mass of container (mc) ..... 330 g |
| T2 ..... Final Temperature | $\Delta T = T2 - T1$ $P = 120 \times \Delta T + 0.55 \times mc\ (T2-T0)/35$ |

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 of the test.
3. Temperature of the water
   The initial temperature of the water is (10±1)˚C.
4. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5˚C.
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 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 + 3" sec. 3 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 ˚C.
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.

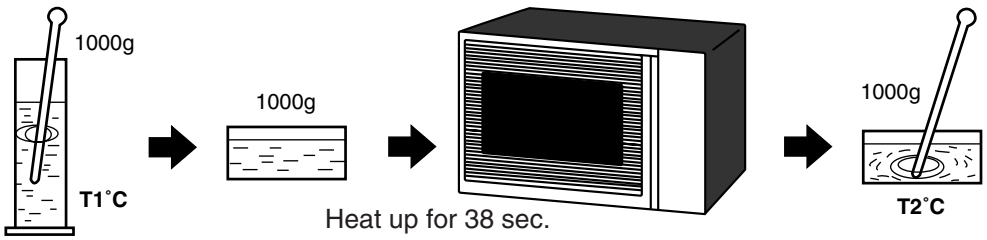
## TEST PROCEDURES

| PROCEDURE LETTER | COMPONENT TEST |
|---|---|

Room temperature ..... To = 21˚C  Initial temperature ..... T1 = 11°C
Temperature after (35 + 3) = 38 sec. ..... T2 = 21°C
Temperature difference Cold-Warm (ΔT = T2 - T1) ..... ΔT = 10°C
Measured output power
The equation is "P = 120 x ΔT" ..... P = 120 x 10°C = 1200 Watts

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

CAUTION: 1°C CORRESPONDS TO 120 WATTS REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.




**B** **POWER TRANSFORMER TEST**

**WARNING: High voltages and large currents are present at the secondary winding and filament winding of the power 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 power 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 ..... approx. 1.0 Ω
b. Secondary winding ..... approx. 84 Ω
c. Filament winding ..... less than 1Ω

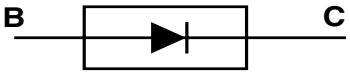
If the reading obtained are not stated as above, then the power transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

**C** **HIGH VOLTAGE RECTIFIER ASSEMBLY TEST**

HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.



**HIGH VOLTAGE RECTIFIER**

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.

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.

## TEST PROCEDURES

| PROCEDURE LETTER | COMPONENT TEST |
|---|---|

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.

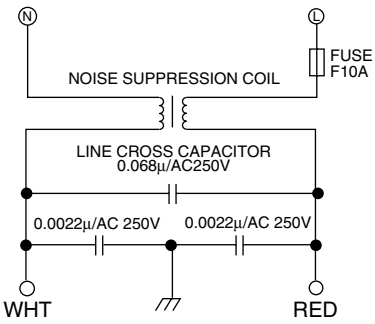
CARRY OUT 4R CHECKS.

**F** **NOISE FILTER TEST**

CARRY OUT 3D CHECKS.

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

| MEASURING POINT | INDICATION OF OHMMETER |
|---|---|
| Between N and L | Open circuit |
| Between terminal N and WHITE | Short circuit |
| Between terminal L and RED | Short circuit |




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

CARRY OUT 4R CHECKS.

**G** **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 table below.

CARRY OUT 4R CHECKS.

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 145˚C | This is not resetable type. | Above 145˚C | Closed circuit. |

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

An open circuit thermal cut-out 145˚C (MAGNETRON) indicates that the magnetron has overheated, this may be due to restricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.

An open circuit thermal cut-out 145˚C (OVEN) indicates that the foods in the oven may catch fire, this may be due to over heating produced by improper setting of the cooking time or failure of the control panel.

## TEST PROCEDURES

| PROCEDURE LETTER | COMPONENT TEST |
|---|---|

**H** **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 250 Ω |
| Turntable motor | Approximately 14.5 kΩ |

If incorrect readings are obtained, replace the motor.

CARRY OUT 4R CHECKS.

**I** **BLOWN FUSE F10A**

CARRY OUT 3D CHECKS.

1. If the fuse F10A is blown, there could be shorts or ground in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.
2. If the fuse F10A is blown when the door is opened, check the 1st. latch switch, 2nd. interlock relay and monitor switch.
   If the fuse F10A is blown by incorrect door switching replace the defective switch(s) and the fuse F10A.

CARRY OUT 4R CHECKS.

CAUTION: ONLY REPLACE FUSE F10A WITH THE CORRECT VALUE REPLACEMENT

**J** **HIGH VOLTAGE FUSE TEST**

CARRY OUT 3D CHECKS.

If the high voltage fuse is blown, there could be a short in the high voltage rectifier or the magnetron. Check them and replace the defective parts and high voltage fuse.

CARRY OUT 4R CHECKS.

CAUTION: ONLY REPLACE THE HIGH VOLTAGE FUSE WITH THE CORRECT VALUE REPLACEMENT

**K** **TOUCH 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 cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit, and also the Control Unit is divided into two units, CPU Unit and Power Unit, and troubleshooting by unit 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 Unit.
   The following symptoms indicate a defective control unit. Before replacing the control unit, perform the Key unit test (Procedure L) 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.

## TEST PROCEDURES

| PROCEDURE LETTER | COMPONENT TEST |
|---|---|

b) At a certain digit, brightness is low.
c) Only one indicator does not light.
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.

**L** **KEY UNIT TEST**

If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon cable is making good contact, verify that the door 2nd. interlock relay control switch operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the 2nd. interlock relay control switch is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the 2nd. interlock relay control switch is closed (either close the door or short the 2nd. interlock relay control switch connector). 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 making 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 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.
CARRY OUT 3D CHECKS.

| G1 | G2 | G3 | G4 | G5 | G6 | G7 | G8 | |
|---|---|---|---|---|---|---|---|---|
| LOW FAT MEALS | EASY DEFROST | | 1 | 2 | 3 | 4 | 5 | G9 |
| DESSERTS | EXPRESS MEAL | EXPRESS COOK | 6 | 7 | 8 | 9 | 0 | G10 |
| VEGETABLES | | | INSTANT COOK / START | TIMER | CLOCK | EXPRESS DEFROST | | G11 |
| | SENSOR REHEAT | VEGETARIAN MEALS | LESS | POWER LEVEL | HELP | STOP / CLEAR | MORE | G12 |
| | | | | RICE/ PASTA | QUICK & EASY | | | G13 |
| | | | | | | | | G14 |

**M** **RELAY TEST**

Remove the outer case and check voltage between Pin No 1 of the 2-pin connector (A) and the normal open terminal of the relay RY1 on the power unit with an A.C. voltmeter. The meter should indicate 230 - 240 volts, if not check oven circuit.

RY1 and RY2 Relay Test
These relays are operated by D.C. voltage.
Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation.
DC. voltage indicated ..... Defective relay.
DC. voltage not indicated ..... Check diode which is connected to the relay coil. If diode is good, control unit is defective.

| RELAY SYMBOL | OPERATIONAL VOLTAGE | CONNECTED COMPONENTS |
|---|---|---|
| RY1 | APPROX. 25.0V D.C. | Oven lamp / Turntable motor / Cooling fan motor |
| RY2 | APPROX. 24.0V D.C. | Power transformer |

CARRY OUT 4R CHECKS.

**N** **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 primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

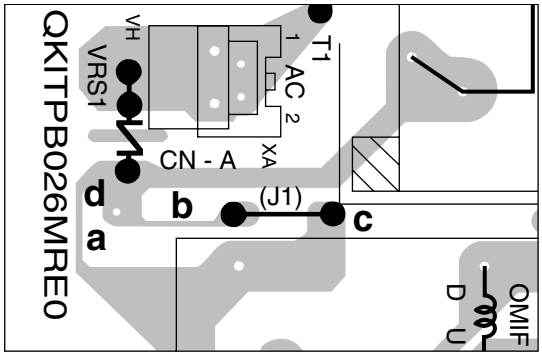
## TEST PROCEDURES

| PROCEDURE LETTER | COMPONENT TEST |
|---|---|

Problem: POWER ON, indicator does not light up.
CARRY OUT 3D CHECKS.

| STEPS | OCCURRENCE | CAUSE OR CORRECTION |
|---|---|---|
| 1 | The rated AC voltage is not present between Pin No. 1 of the 2-pin connector (A) and the normal open terminal of the relay RY1. | Check supply voltage and oven power cord. |
| 2 | The rated AC voltage is present to 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. |
| 4 | Pattern at "a" and "b" are broken. | *Insert the coil RCILF2003YAZZ between "c" and "d". |

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




CARRY OUT 4R CHECKS.

**O** **AH SENSOR TEST**

**Checking the initial sensor cooking condition**
**WARNING :** The oven should be fully assembled before following procedure.
(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” of the operation manual.
(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) If the sensor has not detected the vapor of the food, ERROR will appear and the oven will shut off.

**Water load cooking test**
**WARNING :** The oven should be fully assembled before following procedure.
Make sure the oven has been plugged in at least two 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 the CLOCK once, the POWER LEVEL pad twice, the START pad once, the number pad 1 once and the number pad 4 once. Now, the oven is in the sensor cooking condition, and "AH20", "SENSOR" and "COOK" will appear in the display.
(5) The oven will operate for the first 16 seconds, without generating microwave energy.
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.
If ERROR is displayed or the oven does not turn off, replace the AH sensor or check the control unit, refer to explanation below. If the oven stops after 5 minutes and ERROR is displayed, the AH sensor is normal. Check other parts except the AH sensor.

## 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.

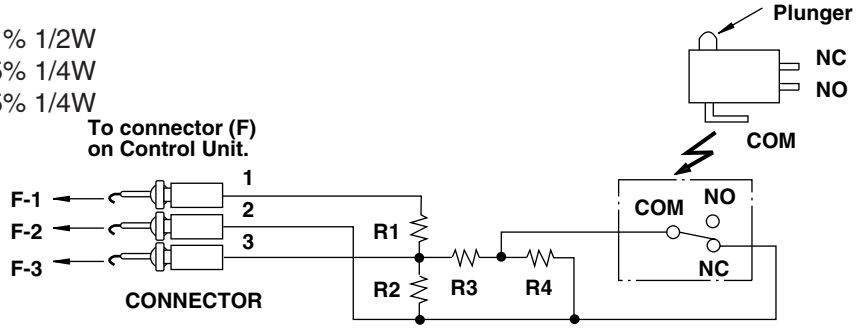
(1) Disconnect the power supply cord, and then remove outer case.
(2) Open the door and block it open.
(3) Discharge high voltage capacitor.
(4) Remove the AH sensor.
(5) Install the new AH sensor.
(6) Reconnect all leads removed from components during testing.
(7) Re-install the outer case (cabinet).
(8) Reconnect the power supply cord after the outer case is installed.
(9) Reconnect the oven to the power supply and check the sensor cook operation as follows:
  9-1. Fill approximately 200 milliliters (7.2 oz) of tap water in a 1000 milliliter measuring cup.
  9-2. Place the container on the center of tray in the oven cavity.
  9-3. Close the door.
  9-4. Touch the CLOCK pad once, the POWER LEVEL pad twice, the START pad once, the number pad 1 once and the number pad 4 once.
  9-5. The control panel is in automatic Sensor operation.
  9-6. The oven turns off automatically, and the time for detecting moisture will be displayed.

If new sensor dose not operate properly, the problem is with the control unit, and refer to explanation below.

### CHECKING CONTROL UNIT

(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 sensor connector that is mounted to control panel.
(5) Then connect the dummy resistor circuit (see fig.) to the sensor connector of control panel.
(6) Disconnect the leads to the primary of the power transformer.
(7) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
(8) After that procedure, re-connect the power supply cord.
(9) Check the sensor cook operation proceed as follows:
  9-1. Touch the CLOCK pad once, the POWER LEVEL pad twice, the START pad once and the number pad 1 once and the number pad 4 once.
  9-2. The control panel is in the sensor cooking operation.
  9-3. After approximately 25 seconds, push plunger of select switch for more than 3 seconds. This condition is same as judgement by AH sensor.
  9-4. After approximately 3 seconds, the display shows " X X . X X " which is the time for detecting moisture.
  If the above is not the case, the control unit is probably defective.
  If the above is proper, the AH sensor is probably defective.
(10) Disconnect the power supply cord, and then remove outer case.
(11) Open the door and block it open.
(12) Discharge high voltage capacitor.
(13) Disconnect the dummy resistor circuit from the sensor connector of control panel.
(14) Carry out necessary repair.
(15) Reconnect all leads removed from components during testing and repairing.
(16) Re-install the outer case (cabinet).
(17) Reconnect the power supply cord after the outer case is installed. Run the oven and check all functions.
(18) Carry out "Water load cooking test" again and ensure that the oven works properly.

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.

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

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

**Key Unit**
The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through P00-P07. When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through P14-P17, AIN6 and AIN7 to perform the function that was requested.

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

**1) Reset Circuit**
This circuit generates a signal which resets the LSI to the initial state when power is supplied.

**2) Indicator Circuit**
This circuit consists of 40 segments and 16 common electrodes using a Liquid Crystal Display.

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

| Symbol | Voltage | Application |
|---|---|---|
| VC | -5V | LSI(IC1) |

**4) Relay Circuit**
A circuit to drive the magnetron, fan motor, turntable motor and light the oven lamp.

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

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

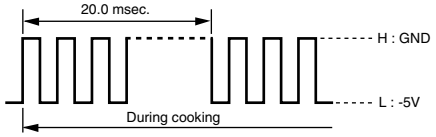
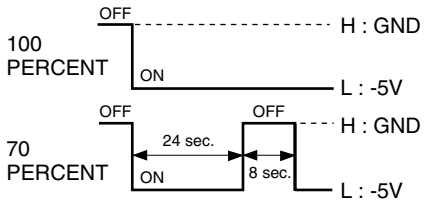
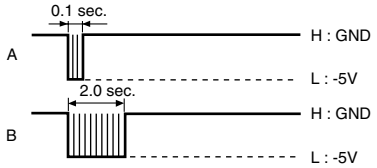
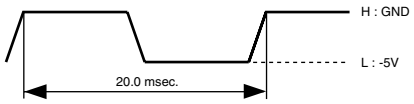
**7) 2nd. Interlock Relay Control Switch**
A switch to “tell” the LSI if the door is open or closed.

**8) Back Light Circuit**
A circuit to drive the back light (Light emitting diodes LD10-LD15).

**9) Absolute Humidity Sensor Circuit**
This circuit detects moisture of the cooking food to allow its automatic cooking.

**LSI**

The I/O signal of the LSI is detailed in the following table.

| Pin No. | Signal | I/O | Description |
|---|---|---|---|
| 1 | COM5 | OUT | **Common data signal : COM11.** Connected to LCD signal COM11. |
| 2 | COM4 | OUT | **Common data signal : COM12.** Connected to LCD signal COM12. |
| 3 | COM3 | OUT | **Common data signal : COM13.** Connected to LCD signal COM13. |
| 4 | COM2 | OUT | **Common data signal : COM14.** Connected to LCD signal COM14. |
| 5 | COM1 | OUT | **Common data signal : COM15.** Connected to LCD signal COM15. |
| 6 | COM0 | OUT | **Common data signal : COM16.** Connected to LCD signal COM16. |
| 7-10 | VL1-VL4 | IN | **Power source voltage input terminal.** Standard voltage for LCD. |
| 11 | VL5 | IN | **Power source voltage input terminal.** Standard voltage for LCD. Connected to GND. |
| 12-14 | C3-C1 | IN | Terminal not used. |
| 15 | VLIN | IN | Terminal not used. |
| 16 | VREG | OUT | Terminal not used. |
| 17 | NC | – | Terminal not used. |
| 18 | VSS | IN | **Power source voltage : -5.0V.** The power source voltage to the LSI is input to VSS terminal. Connected to VC. |
| 19-21 | P27-P25 | OUT | Terminal not used. |
| 22-26 | P24-P22 | IN | Used for initial balancing of the bridge circuit (absolute humidity sensor). |
| 27 | P47 | IN | **To input signal which communicates the door open/close information to LSI.** Door close "H" level signal (0V). Door open "L" level signal (-5V). |
| 28 | P46 | OUT | Terminal not used. |
| 29 | P45 | OUT | **Oven lamp, fan motor and turntable motor driving signal.** To turn on and off shut off relay (RY1). The square waveform voltage is delivered to the RY1 driving circuit and RY2 control circuit.   |
| 30 | P44 | OUT | **Magnetron high-voltage circuit driving signal.** To turn on and off the cook relay (RY2). The signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (variable cooking) the signal turns to "H" level and "L" level in repetition according to the power level.   (ON and OFF times for other power level.) |
| 31 | P43 | – | Terminal not used. |
| 32 | CNTR0 | OUT | **Signal to sound buzzer (2.0 kHz).** A: key touch sound. B: Completion sound.   |
| 33 | P41 | OUT | Terminal not used. |
| 34 | INT0 | IN | **Signal synchronized with commercial power source frequency.** This is the basic timing for time processing of LSI.   |
| 35 | P07 | OUT | **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G1 line keys on key matrix is touched. |
| 36 | P06 | OUT | **Key strobe signal.** Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G2 line keys on key matrix is touched. |

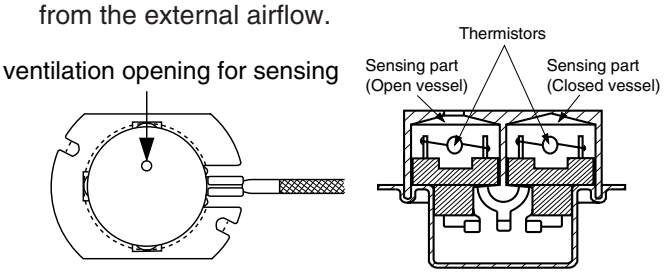
| Pin No. | Signal | I/O | Description |
|---|---|---|---|
| 37 | P05 | OUT | **Key strobe signal.**<br>Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G3 line keys on key matrix is touched. |
| 38 | P04 | OUT | **Key strobe signal.**<br>Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16, P17 and AIN6 terminal while one of G4 line keys on key matrix is touched. |
| 39 | P03 | OUT | **Key strobe signal.**<br>Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G5 line keys on key matrix is touched. |
| 40 | P02 | OUT | **Key strobe signal.**<br>Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G6 line keys on key matrix is touched. |
| 41 | P01 | OUT | **Key strobe signal.**<br>Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G7 line keys on key matrix is touched. |
| 42 | P00 | OUT | **Key strobe signal.**<br>Signal applied to touch-key section. A pulse signal is input to AIN7, P14, P15, P16 and P17 terminal while one of G8 line keys on key matrix is touched. |
| 43 | P17 | IN | **Signal coming from touch key.**<br>When either G9 line on key matrix is touched, a corresponding signal out of P00-P07 will be input into P17. When no key is touched, the signal is held at "H" level. |
| 44 | P16 | IN | **Signal similar to P17.**<br>When either G10 line on key matrix is touched, a corresponding signal will be input into P16. |
| 45 | P15 | IN | **Signal similar to P17.**<br>When either G11 line on key matrix is touched, a corresponding signal will be input into P15. |
| 46 | P14 | IN | **Signal similar to P17.**<br>When either G12 line on key matrix is touched, a corresponding signal will be input into P14. |
| 47 | AIN7 | IN | **Signal similar to P17.**<br>When either G13 line on key matrix is touched, a corresponding signal will be input into AIN7. |
| 48 | AIN6 | IN | **Input terminal to judge the model.**<br>The signal out of P04 will be input into AIN6 through G4 line on key matrix. The LSI will judge the model by this signal. |
| 49 | AIN5 | IN | **AH sensor input.**<br>This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into the LSI. |
| 50 | AIN4 | 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 the LSI. |
| 51 | RESET | IN | **Auto clear terminal.**<br>Signal is input to reset the LSI to the initial state when power is applied. Temporarily set "L" level the moment power is applied, at this time the LSI is reset. Thereafter set at "H" level |
| 52 | NC | – | Terminal not used. |
| 53 | XCOUT | OUT | Terminal not used. |
| 54 | XCIN | IN | Connected to VC. |
| 55 | NC | – | Terminal not used. |
| 56 | VCC | IN | **Power source voltage: GND(0V).**<br>The power source voltage to drive LSI is input to VCC terminal. |
| 57 | OSCSEL | IN | Connected to VC(-5V). |
| 58 | XOUT | OUT | **Internal clock oscillation output.**<br>Output to control oscillation input of XIN. |
| 59 | VSS | IN | **Power source voltage: -5.0V.**<br>The power source voltage to the LSI is input to VSS terminal. Connected to VC. |
| 60 | NC | – | Terminal not used. |
| 61 | XIN | IN | **Internal clock oscillation frequency control input setting.**<br>The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal. |
| 62 | NC | – | Terminal not used. |

| Pin No. | Signal | I/O | Description |
|---|---|---|---|
| 63-66 | AIN3-AIN0 | IN | **Terminal to change cooking input according to the Model.**<br>By using the A/D converter contained in the LSI, DC voltage in accordance with the Model in operation is applied to set up its cooking constant. |
| 67 | COM8 | OUT | **Common data signal : COM8.** Connected to LCD signal COM8. |
| 68 | COM9 | OUT | **Common data signal : COM7.** Connected to LCD signal COM7. |
| 69 | COM10 | OUT | **Common data signal : COM6.** Connected to LCD signal COM6. |
| 70 | COM11 | OUT | **Common data signal : COM5.** Connected to LCD signal COM5. |
| 71 | COM12 | OUT | **Common data signal : COM4.** Connected to LCD signal COM4. |
| 72 | COM13 | OUT | **Common data signal : COM3.** Connected to LCD signal COM3. |
| 73 | COM14 | OUT | **Common data signal : COM2.** Connected to LCD signal COM2. |
| 74 | COM15 | OUT | **Common data signal : COM1.** Connected to LCD signal COM1. |
| 75-102 | SEG67-SEG40 | OUT | Terminal not used. |
| 103-142 | SEG39-SEG0 | OUT | **Segment data signal.**<br>Connected to LCD.<br>The relation between signals and LCD are as follows:<br>LSI signal (Pin No.) LCD segment — LSI signal (Pin No.) LCD segment<br>SEG 39 (103) ..... SEG 1 — SEG 19 (123) ..... SEG 21<br>SEG 38 (104) ..... SEG 2 — SEG 18 (124) ..... SEG 22<br>SEG 37 (105) ..... SEG 3 — SEG 17 (125) ..... SEG 23<br>SEG 36 (106) ..... SEG 4 — SEG 16 (126) ..... SEG 24<br>SEG 35 (107) ..... SEG 5 — SEG 15 (127) ..... SEG 25<br>SEG 34 (108) ..... SEG 6 — SEG 14 (128) ..... SEG 26<br>SEG 33 (109) ..... SEG 7 — SEG 13 (129) ..... SEG 27<br>SEG 32 (110) ..... SEG 8 — SEG 12 (130) ..... SEG 28<br>SEG 31 (111) ..... SEG 9 — SEG 11 (131) ..... SEG 29<br>SEG 30 (112) ..... SEG 10 — SEG 10 (132) ..... SEG 30<br>SEG 29 (113) ..... SEG 11 — SEG 9 (133) ..... SEG 31<br>SEG 28 (114) ..... SEG 12 — SEG 8 (134) ..... SEG 32<br>SEG 27 (115) ..... SEG 13 — SEG 7 (135) ..... SEG 33<br>SEG 26 (116) ..... SEG 14 — SEG 6 (136) ..... SEG 34<br>SEG 25 (117) ..... SEG 15 — SEG 5 (137) ..... SEG 35<br>SEG 24 (118) ..... SEG 16 — SEG 4 (138) ..... SEG 36<br>SEG 23 (119) ..... SEG 17 — SEG 3 (139) ..... SEG 37<br>SEG 22 (120) ..... SEG 18 — SEG 2 (140) ..... SEG 38<br>SEG 21 (121) ..... SEG 19 — SEG 1 (141) ..... SEG 39<br>SEG 20 (122) ..... SEG 20 — SEG 0 (142) ..... SEG 40 |
| 143 | COM7 | OUT | **Common data signal : COM9.** Connected to LCD signal COM9. |
| 144 | COM6 | OUT | **Common data signal : COM10.** Connected to LCD signal COM10. |

# 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.

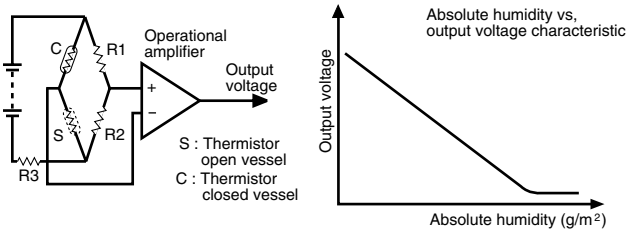



**(2) Operational Principle of Absolute Humidity Sensor**

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**

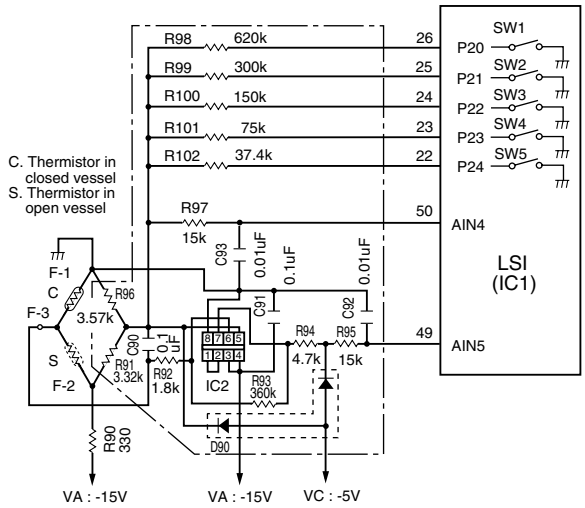
This detector circuit is used to detect the output voltage of the absolute humidity circuit to allow the LSI to control sensor cooking of the unit. When the unit is set in the sensor cooking mode, 16 seconds clearing cycle occurs than the detector circuit starts to function and the LSI observes the initial voltage available at its AIN5 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 R98 ~ R102. Changing the resistance values results in that there is the same potential at both F-3 terminal of the absolute humidity sensor and AIN4 terminal of the LSI. The voltage of AIN5 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 AIN5 terminal of the LSI.

Then the LSI observes that voltage at AIN5 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 AIN5 terminal 16 seconds after the unit has been put in the Sensor Cooking mode, if it is not possible to balance 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



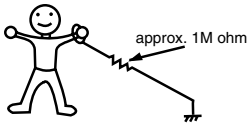
# TOUCH CONTROL PANEL SERVICING

**1. Precautions for Handling Electronic Components**

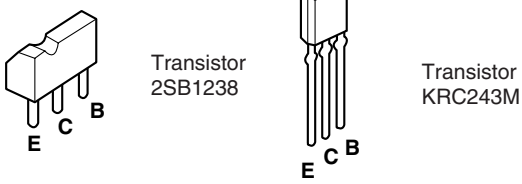
This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source,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




**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 PRESENTS A HAZARD.**

Therefore, when checking the performance of the touch control panel, put the outer cabinet on the oven to avoid touching the high voltage transformer, or unplug the primary terminal (connector) of the high voltage transformer to turn it off; the end of such connector must be insulated with an insulating tape. After servicing, be sure to replace the leads to their original locations.

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

# 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 the 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, High voltage rectifier assembly and High voltage fuse.
   2) Hot parts:
      Oven lamp, Magnetron, High voltage transformer and Oven cavity.
   3) Sharp edge:
      Bottom plate, Oven cavity, Waveguide flange, Chassis support and other metallic plate.
   4) Movable parts (to prevent a fault)
      Fan blade, Fan motor, Switch, Switch lever, Open button.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector 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 four (4) screws from rear and along the side edge of case.
4. Slide the entire case back about 1 inch (3 cm) to free it from retaining clips on the cavity face plate.
5. Lift the entire case from the oven.
6. Discharge the H.V. capacitor before carrying out any further work.
7. Do not operate the oven with the outer case removed.

N.B.; Step 1,2 and 6 from the basis of the 3D checks.
CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

## POWER TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from power transformer, magnetron and capacitor terminals.
3. Remove four (4) screws holding transformer to bottom plate.
4. Remove transformer from bottom plate.

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

## MAGNETRON REMOVAL

**Removal**

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from magnetron.
3. Remove the two (2) screws holding the magnetron air duct to magnetron. And slide magnetron air duct slightly so that two (2) screws at left hand side of magnetron appear.
4. Carefully remove the four (4) screws holding magnetron to waveguide flange.
5. Remove magnetron with care so that magnetron antenna is not hit by any metal object around antenna.
6. Now, the magnetron is free.

**Re-install**

1. Re-install the magnetron to waveguide flange with care so that magnetron antenna is not hit by any metal object.
2. Secure the magnetron with four (4) screws.
3. Hold the magnetron air duct to the magnetron and secure the magnetron air duct with two (2) screws.
4. Re-connect the wire leads to the magnetron. Refer to "PICTORIAL DIAGRAM".
5. Re-install outer case and check that the oven is operating properly.

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

## HIGH VOLTAGE RECTIFIER ASSEMBLY AND HIGH VOLTAGE CAPACITOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire lead from the fan motor.
3. Remove the fan duct from the oven cavity.
4. Remove two (2) screws holding the fan motor to the oven cavity back plate and remove it.
5. Disconnect the wire lead of high voltage rectifier assembly from the magnetron.
6. Disconnect high voltage fuse from the capacitor.
7. Disconnect filament lead of the power transformer from the capacitor.
8. Remove one (1) screw holding the capacitor holder to the bottom plate.
9. Remove one (1) screw holding high voltage rectifier assembly to the capacitor holder.
10. Remove the capacitor holder
11. Disconnect the high voltage rectifier assembly from capacitor.
12. Now, capacitor and rectifier assembly are free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER AND HIGH VOLTAGE CAPACITOR, GROUND SIDE TERMINAL OF THE HIGH VOLTAGE RECTIFIER MUST BE SECURED FIRMLY WITH A GROUNDING SCREW.

## TURNTABLE MOTOR REMOVAL

1. Disconnect oven from power supply.
2. Remove turntable and turntable support from oven cavity.
3. Lay the oven on it's backside. Remove the turntable motor cover by snipping off the material in four portions.
4. Where the portions have been snipped off bend portions flat. No sharp edge must be evident after removal of the turntable motor cover.
5. Disconnect wire leads from turntable motor. (See "Positive lock connector removal")
6. Remove two (2) screws holding turntable motor to oven cavity.
7. Remove an o-ring and a washer from the turntable motor shaft.
8. Now the turntable motor is free.

HOW TO RE-INSTALL THE TURNTABLE MOTOR COVER

1. Remove the one (1) screw which is fixed on the bottom plate left near by the turntable motor cover. This screw will be used at the following step 3.
2. Insert the two (2) tabs of the turntable motor cover into the two (2) slits of the bottom plate left.
3. Hold the turntable motor cover to the bottom plate left with the one (1) screw which is prepared at the above step 1.
4. Now the turntable motor cover is re-installed.

## POSITIVE LOCK® CONNECTOR (NO-CASE TYPE) REMOVAL

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

CAUTION: WHEN CONNECTING THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, INSTALL THE POSITIVE LOCK® SO THAT THE LEVER FACES YOU (SERVICE PERSON).

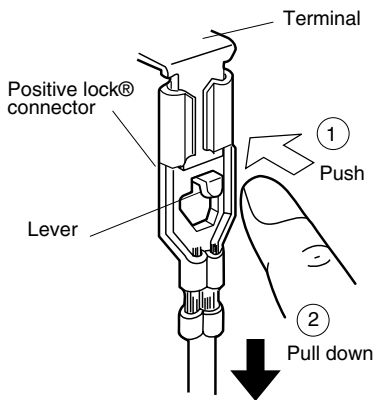



**Figure C-1 Positive lock®connector**

## OVEN LAMP AND LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove one (1) screw holding the chassis support to the magnetron and magnetron air duct.
3. Remove one (1) screw holding the chassis support to the oven cavity front plate.
4. Remove the chassis support from the oven cavity.
5. Release the magnetron air duct from the oven cavity.
6. Remove the oven lamp socket from the magnetron air duct by bending the small tab of magnetron air duct.
7. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the small flat type screw driver.
8. Remove the oven lamp from the oven lamp socket by turning the oven lamp.
9. Now, the oven lamp and lamp socket are free.

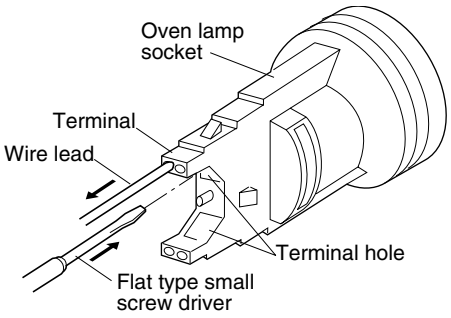



**Figure C-2. Oven lamp socket**

## CONTROL PANEL ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from panel components.
3. Release one (1) nail holding the control panel assembly to the oven flange.
4. Remove control panel assembly and slide upward.
5. Now, the control panel assembly is free.

NOTE: 1. Before attaching a new key unit, remove 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.

CPU UNIT AND POWER UNIT

NOTE: Handle the CPU unit carefully so that the ribbon cable does not come off. Because the ribbon cable is sticked on the LCD and the printed wiring board only by heated paste.

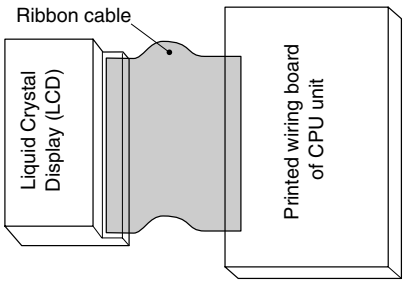



**Figure C-3 CPU unit**

## COOLING FAN MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the fan motor.
3. Remove the fan duct from the oven cavity.
4. Remove two (2) screws holding the fan motor to the back plate of the oven cavity.
5. 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 grove joint pliers.

**CAUTION:**
- *** Make sure that any pieces do not enter the gap between the rotor and the stator of the fan motor because the rotor is easily shaven by pliers and metal pieces may be produced.**
- *** Do not touch the pliers to the coil of the fan motor because the coil may be cut or injured.**
- *** Do not disfigure 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:**
- *** Do not use this removed fan blade again because the hole (for shaft) of it may become bigger than a standard one.**

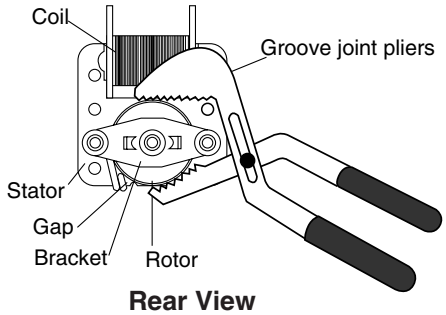
6. Now, the fan motor is free.

INSTALLATION

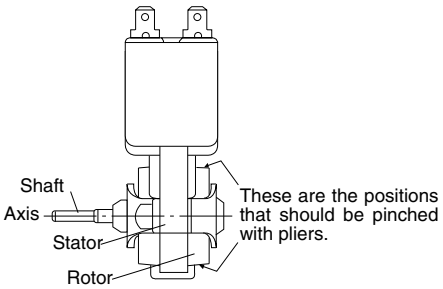
1. Install the fan blade to the fan motor shaft according to the following procedure.
   1) Hold the center of the bracket which supports the shaft of the fan motor on the flat table.
   2) Apply the screw lock tight into the hole (for shaft) of the fan blade.
   3) Install the fan blade to the shaft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

**CAUTION:**
- *** Do not hit the fan blade strongly when installed because the bracket may be disfigured.**
- *** Make sure that the fan blade rotates smooth after installation.**
- *** Make sure that the axis of the shaft is not slanted.**

2. Install the fan motor to the back plate of the oven cavity with the two (2) screws.
3. Re-install the fan duct to the oven cavity.

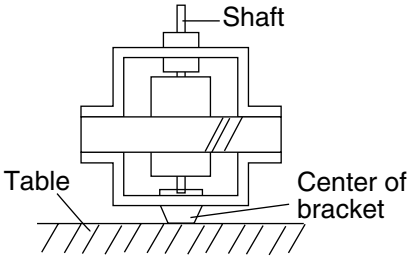



Rear View




Side View

4. Connect the wire leads to the fan motor and magnetron, referring to the pictorial diagram.




## POWER SUPPLY CORD REPLACEMENT

**Removal**

1. CARRY OUT 3D CHECKS.
2. Disconnect the brown and blue wires of the power supply cord from the noise filter.
3. Remove the single (1) screw holding the earth wire of power supply cord to the chassis support.
4. Remove the power supply cord from the rear cabinet.

**Re-install**

1. Insert the power supply cord into the oven cavity back plate.
2. Connect the brown and blue wires of power supply cord into the terminals of noise filter, referring to pictorial diagram.
3. Re-install the earth wire to chassis support with one (1) screw.
4. CARRY OUT 4R CHECKS.

**Note : Step 4 above is important, and it must be done after replacing power supply cord.**

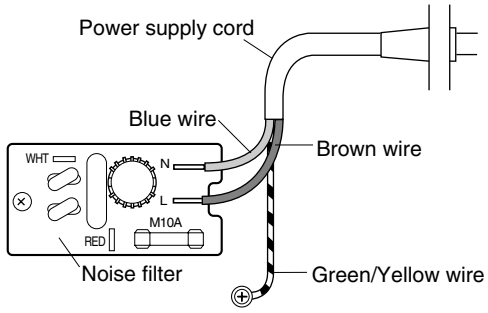



**Figure C-4. Power supply cord replacement**

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

**Removal**

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from the switches.
3. Remove two (2) screws holding latch hook to oven flange.
4. Remove latch hook assembly from oven flange.
5. Push outward on the two (2) retaining tabs holding each switch in place.
6. Switches are now free. At this time switch lever will be free, do not lose it.

**Re-install**

1. Re-install each switch and switch lever in its place. The 1st. latch switch is in the lower position and 2nd. interlock relay control switch is in the upper position. The monitor switch is in the middle position.
2. Re-connect wire leads to each switch. Refer to pictorial diagram.
3. Secure latch hook (with two (2) mounting screws) to oven flange.
4. Make sure that the monitor switch is operating properly and check continuity of the monitor circuit. Refer to chapter "Test Procedure" and Adjustment procedure.

## 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. Loosen the two (2) screws holding latch hook to the oven cavity front flange.
2. With door closed, adjust latch hook by moving it back and forth, and up and down. In and out play of the door allowed by the upper and lower position of the latch hook should be less than 0.5mm. The vertical position of the latch hook should be adjusted so that the 1st. latch switch and 2nd. interlock relay control switch are activated with the door closed. The holizontal position of the latch hook should be adjusted so that the monitor switch is activated with the door closed.
3. Secure the screws with washers firmly.
4. Check the all switch operation. If a switch has not activated with the door closed, loosen screw and adjust the latch hook position.

**After adjustment, check the following.**

1. In and out play of door remains less than 0.5mm when in the latched position. First check upper position of latch hook, pushing and pulling upper portion of door

toward the oven face. Then check lower portion of the latch hook, pushing and pulling lower portion of the door toward the oven face. Both results (play in the door) should be less than 0.5mm.
2. The 1st. latch switch and 2nd. interlock relay control switch interrupt the circuit before the door can be opened.
3. Monitor switch contacts close when door is opened.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to "Microwave Measurement Procedure".)

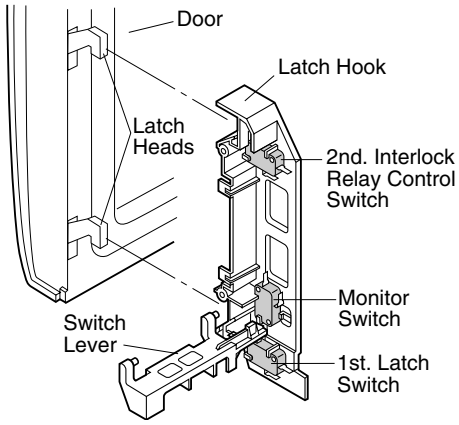



**Figure C-5. Latch Switch Adjustments**

## DOOR REPLACEMENT

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

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

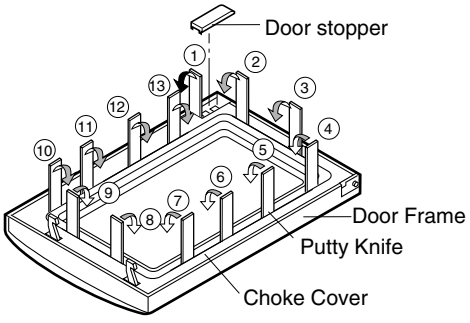
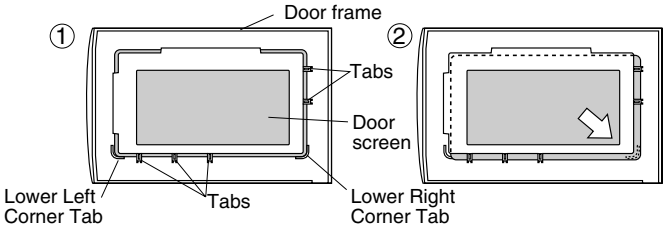


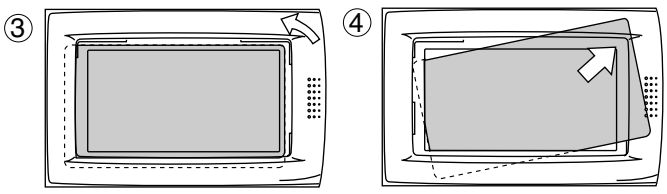

**Figure C-6. Door Disassembly**

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 three (3) screws holding the door panel to the door frame.
15. Release door panel from nine (9) tabs of door frame by sliding door panel downward.
16. Now, door panel with sealer film is free.
17. Tear sealer film from door panel.
18. Now, door panel is free.
19. Remove door screen from door frame as follows.
    1) Turn the door frame over. Refer to Figure ①.
    2) Push the lower right corner of the door screen by your finger from the front side of the door frame. And slide the door screen over the lower right corner tab until the lower and right edges of the door screen touch the tabs of the door frame. Refer to Figure ②.




**View; back side of door frame**

    3) Turn the door frame back. Refer to Figure ③.
    4) Push the upper right corner of the door screen by your finger from the back side of the door frame. And slide the door screen counter clockwise. Refer to Figure ③.
    5) Pull out the door screen toward the upper right corner of the door frame. Refer to Figure ④.




**View; front side of door frame**

20. Now, door screen is free.

**RE-INSTALL**
1. Re-install door screen to the door frame by reversing the procedure of item 19 of "REMOVAL".
2. Put sealer film on door panel. Refer to “Sealer Film” about how to handle new one.
3. Re-install door panel to door frame by fitting nine (9) tabs of door frame to nine (9) holes of door panel.
4. Hold the door panel to the door frame by sliding the

door panel upward.
5. Hold the door panel to the door frame with three (3) screws.
6. 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.
7. Re-install choke cover to door panel by pushing.
8. Catch two (2) pins of door panel on two (2) hole of upper and lower oven hinges as shown Figure C-7.
9. Re-install the door stopper to the door assembly.

**Note: After any service to the door;**

**(A) Make sure that 2nd. interlock relay control switch, 1st. latch switch and monitor 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.**

**After any service, make sure of the following :**

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

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 of themselves, indicate a leakage of microwave energy from oven cavity.

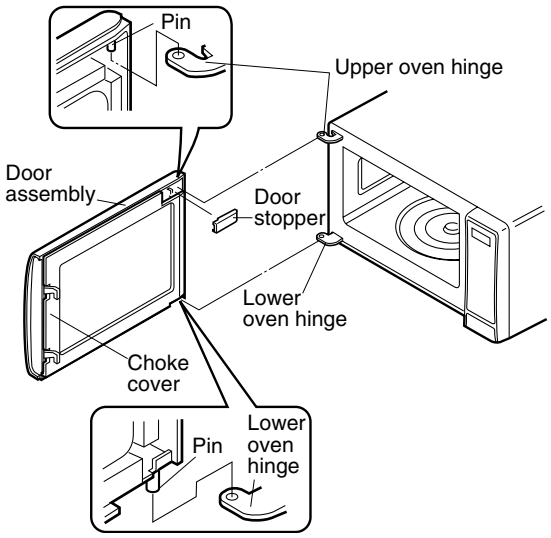



**Figure C-7. Door Replacement**

## SEALER FILM

**Installation**

1. Put the adhesive tape on the backing film of the sealer film as shown in Fig. C-8.
2. Tear the backing film by pulling the adhesive tape.
3. Put the pasted side of the sealer film on the door panel.

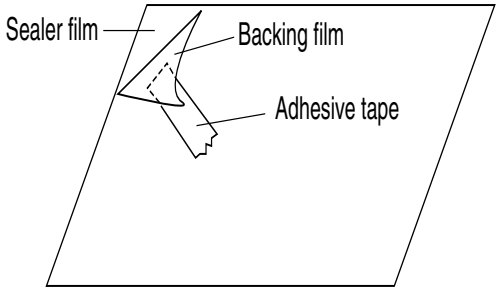



**Figure C-8. Sealer film**

# 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.

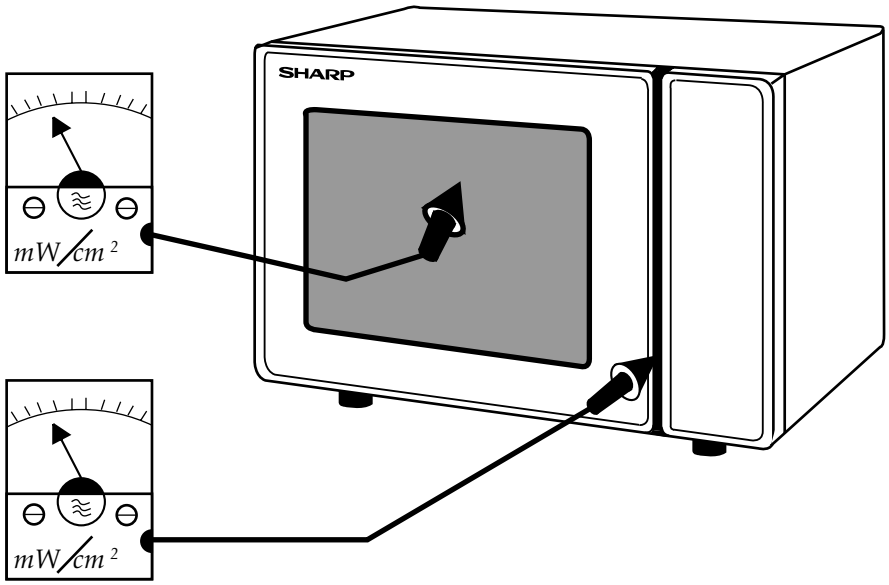
## REQUIREMENT

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. CLOCK APPEARS ON DISPLAY.

NOTE: "★" indicates components with potentials above 250V.

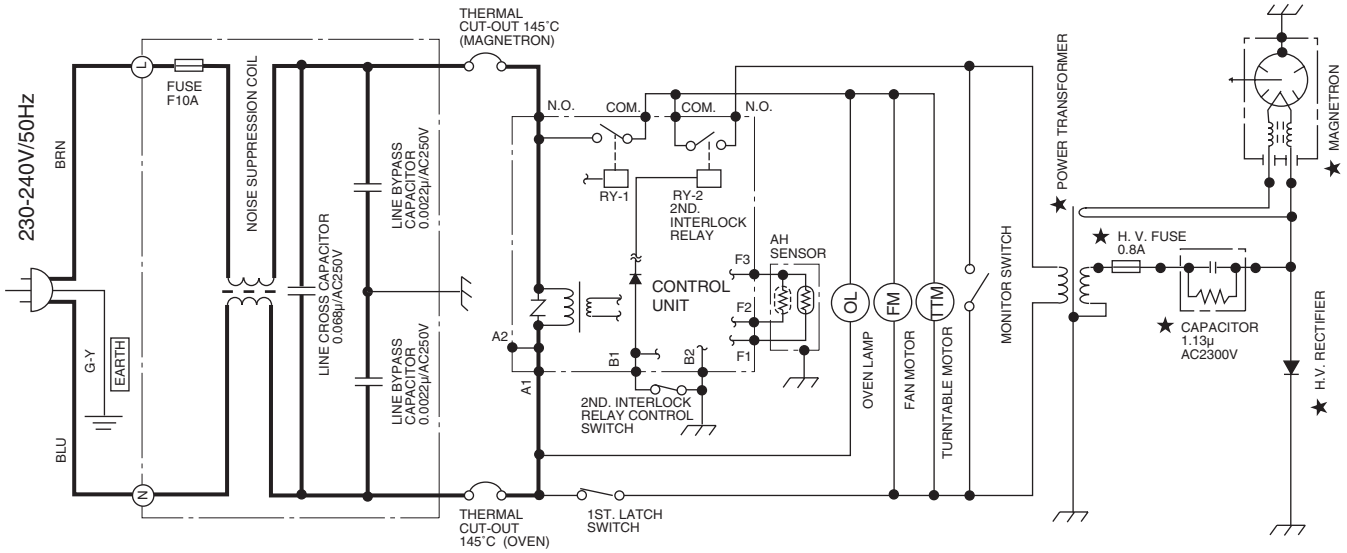



**Figure O-1. Oven Schematic-OFF Condition**

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. COOKING TIME PROGRAMMED.
3. START KEY TOUCHED.

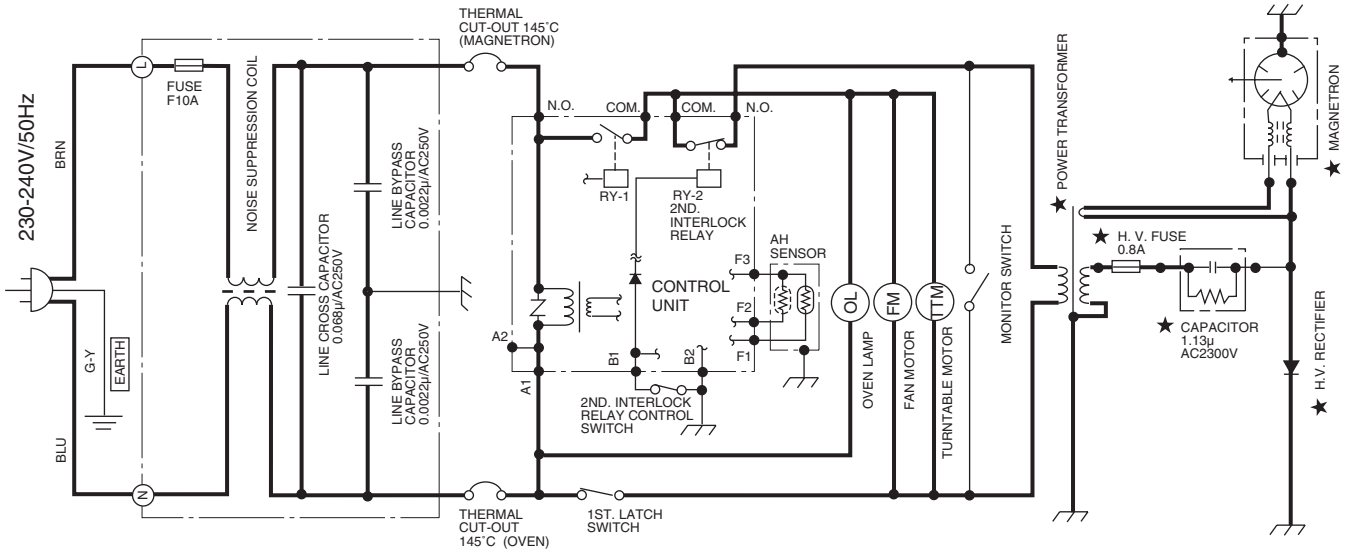



**Figure O-2. Oven Schematic-Cooking Condition**

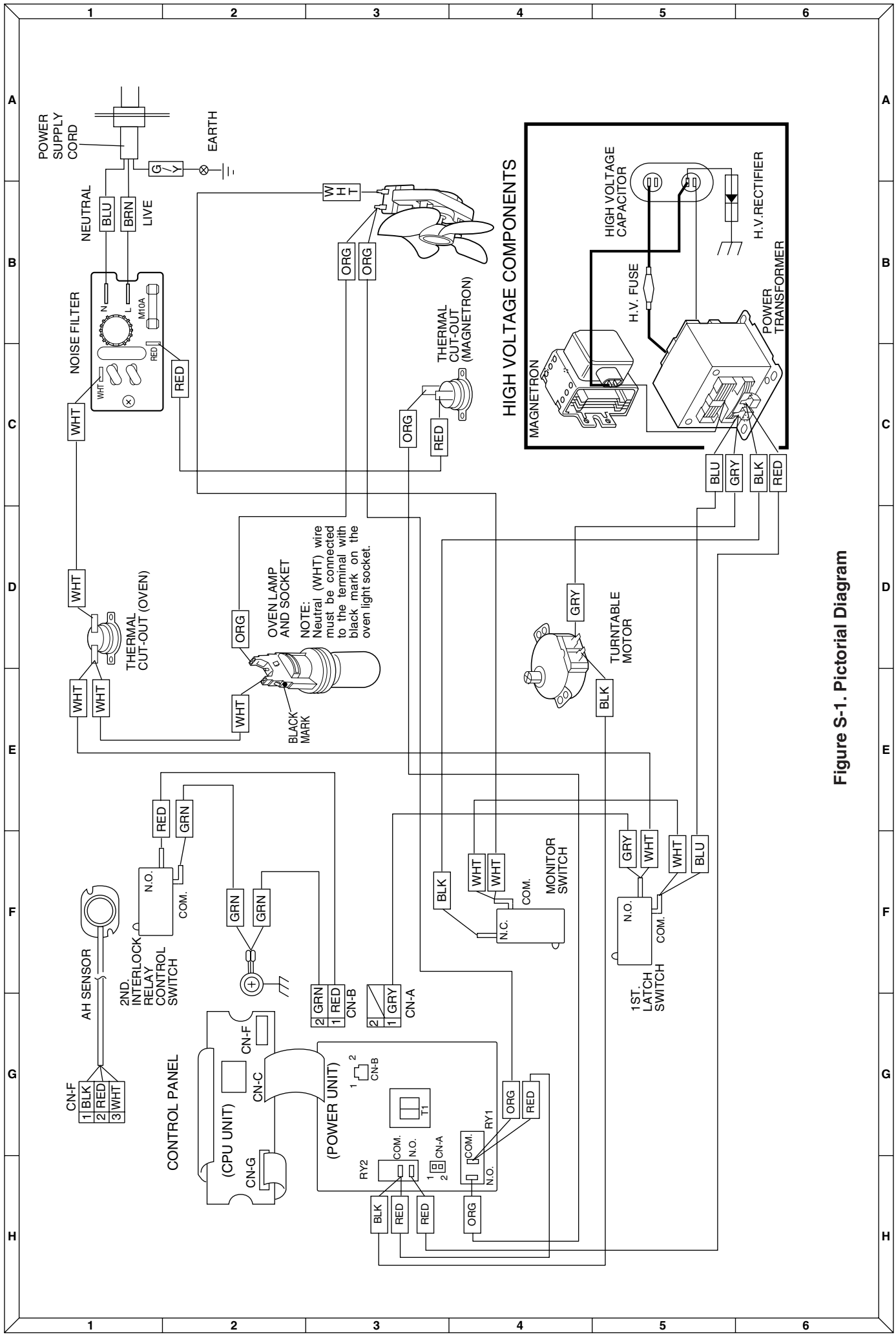



**Figure S-1. Pictorial Diagram**

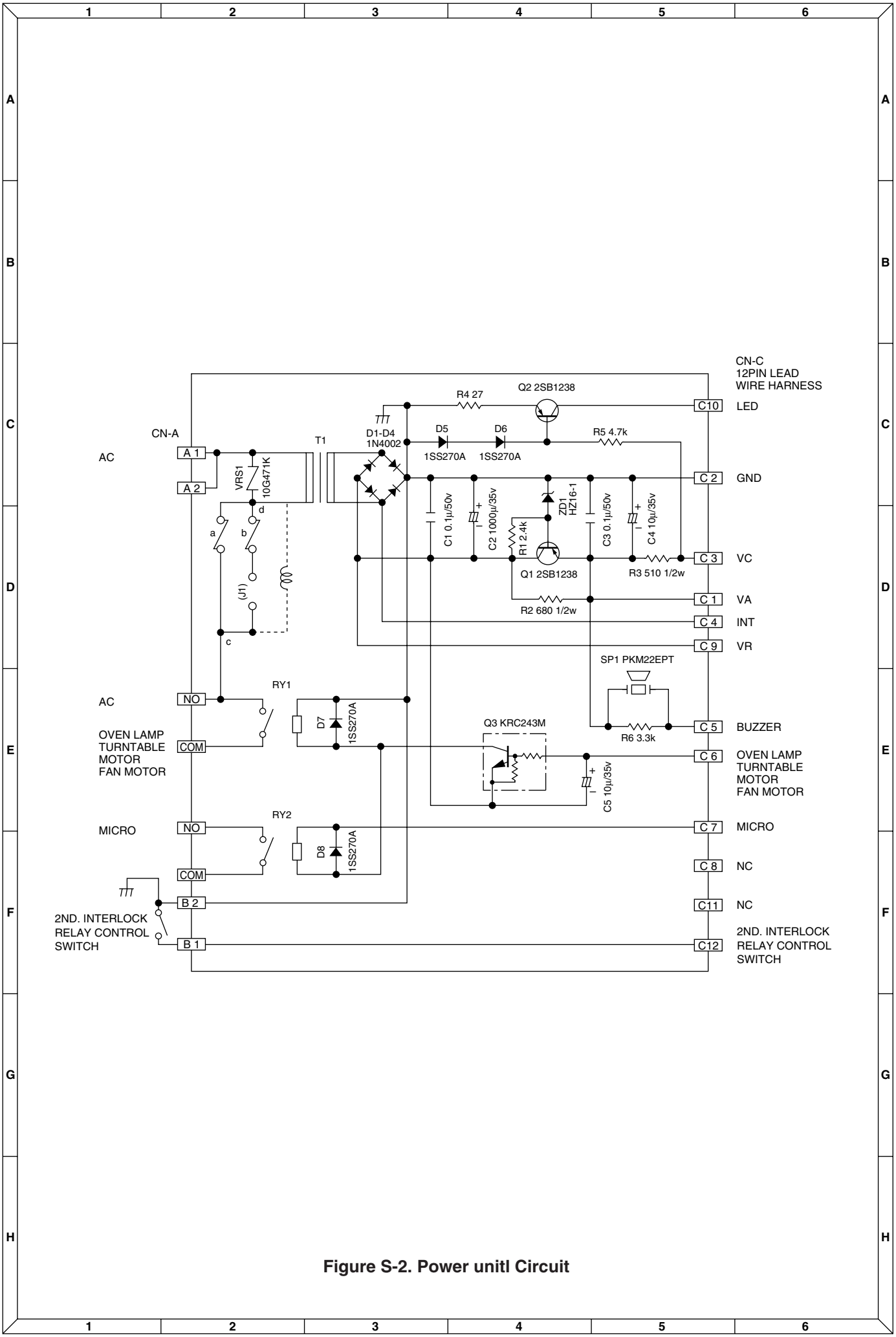



**Figure S-2. Power unitl Circuit**

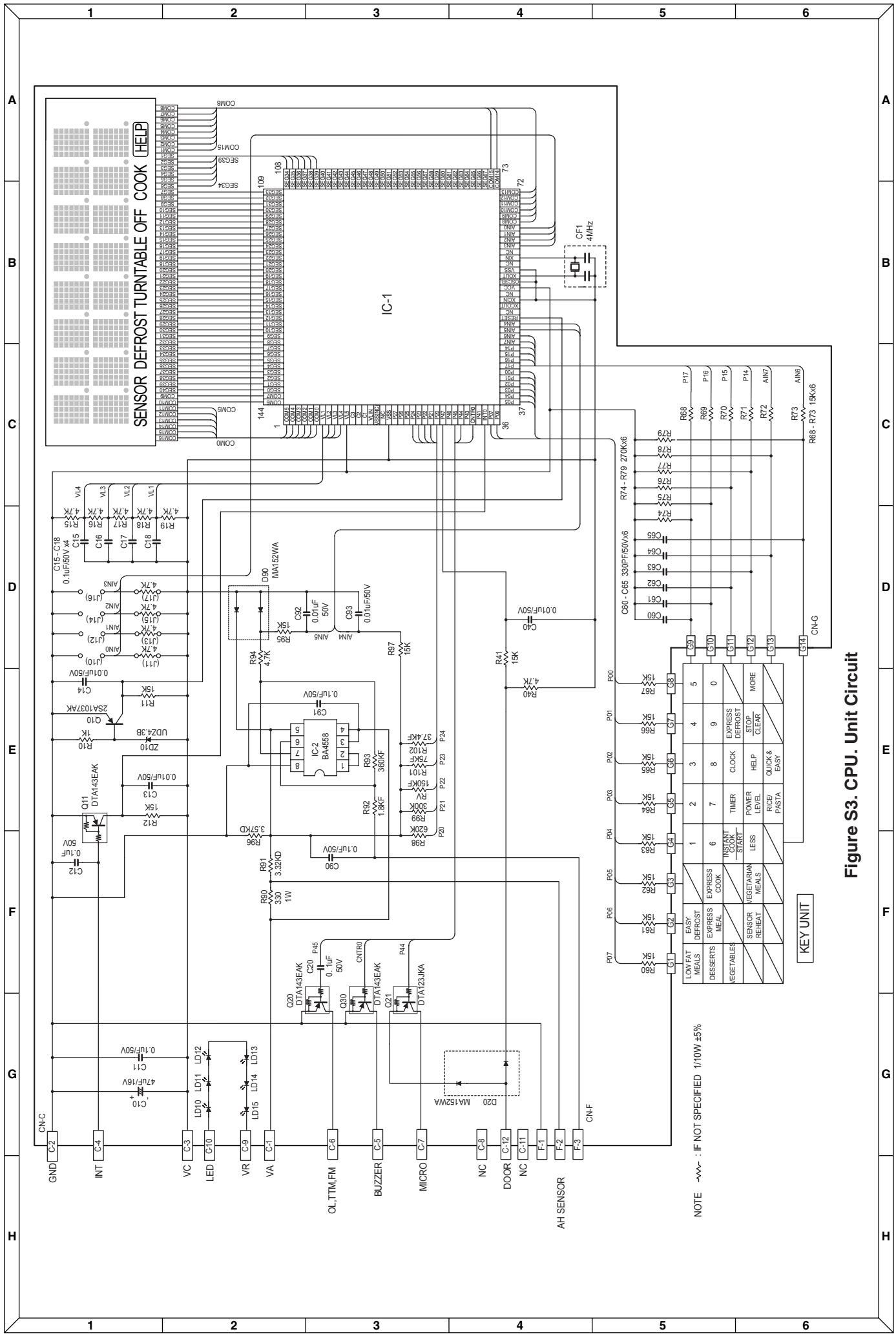



**Figure S3. CPU. Unit Circuit**

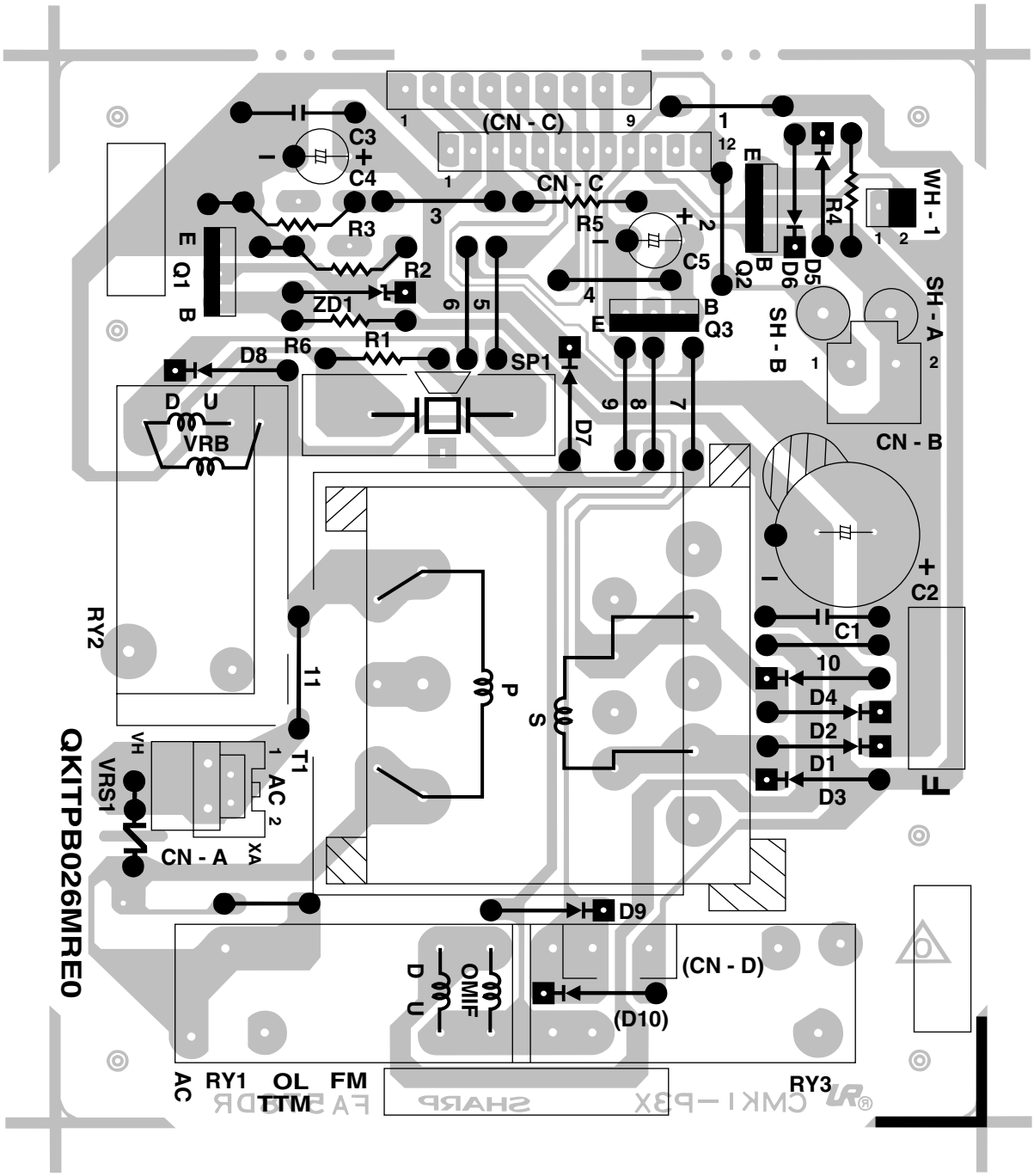



**Figure S-4. Printed Wiring Board**

# 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 |
|---|---|---|---|---|---|
| | | | **ELECTRICAL PARTS** | | |
| | 1- 1 | RTHM-A120WRE0 | Thermal cut-out 145 deg.C (Magnetron) | 1 | AH |
| | 1- 1 | RTHM-A080WRE0 | Thermal cut-out 145 deg.C (Magnetron) (Interchangeable) | 1 | AP |
| | 1- 1 | RTHM-A112WRE0 | Thermal cut-out 145 deg.C (Magnetron) (Interchangeable) | 1 | AG |
| | 1- 2 | FPWBFA353WRKZ | Noise filter | 1 | AS |
| | 1- 3 | QSW-MA137WRE0 | 1st. latch switch, 2nd. interlock relay control switch | 2 | AH |
| | 1- 4 | QSW-MA138WRE0 | Monitor switch | 1 | AH |
| | 1- 5 | RTHM-A119WRE0 | Thermal cut-out 145 deg.C (Oven) | 1 | AK |
| | 1- 5 | RTHM-A075WRE0 | Thermal cut-out 145 deg.C (Oven) (Interchangeable) | 1 | AN |
| | 1- 6 | QACC-A142WRZZ | Power supply cord | 1 | AQ |
| * | 1- 7 | FH-DZA067WRK0 | H.V. rectifier assembly | 1 | AQ |
| * | 1- 7 | FH-DZA069WRK0 | H.V. rectifier assembly (Interchangeable) | 1 | AP |
| * | 1- 8 | RC-QZA293WRZZ | High Voltage capacitor | 1 | AV |
| | 1- 9 | RMOTEA405WRZZ | Fan motor | 1 | AX |
| | 1- 9 | RMOTEA390WRE0 | Fan motor (Interchangeable) | 1 | AW |
| | 1-10 | QFS-CA026WRZZ | Fuse F10A | 1 | AE |
| | 1-11 | QSOCLA024WRE0 | Oven lamp socket | 1 | AH |
| | 1-12 | RLMPTA078WRE0 | Oven lamp | 1 | AL |
| | 1-12 | RLMPTA069WRE0 | Oven lamp (Interchangeable) | 1 | AK |
| | 1-13 | RMOTDA253WRZZ | Turntable motor | 1 | AV |
| | 1-13 | RMOTDA173WRE0 | Turntable motor (Interchangeable) | 1 | AX |
| * | 1-14 | RTRN-A685WRZZ | Power transformer | 1 | BN |
| Δ* | 1-15 | RV-MZA295WRE0 | Magnetron | 1 | BF |
| * | 1-16 | QFS-IA010WRZZ | H.V. fuse 0.80A | 1 | AQ |
| * | 1-17 | FDTCTA214WRKZ | AH sensor assembly | 1 | AX |
| | | | **CABINET PARTS** | | |
| | 2- 1 | GCABUA711WRP0 | Outer case cabinet | 1 | BC |
| | 2- 2 | FDAI-A225WRYZ | Bottom plate | 1 | BB |
| | 2- 3 | GLEGPA074WRE0 | Foot | 4 | AC |
| | | | **CONTROL PANEL PARTS** | | |
| | 3- 1 | DPWBFC436WRKZ | Control unit assembly | 1 | BG |
| | 3- 2 | DPNLCB907WRKZ | Control panel frame with key unit | 1 | BB |
| | 3- 2-1 | FUNTKB154WREZ | Key unit | 1 | AX |
| | 3- 2-2 | JBTN-B104WRF0 | Open button | 1 | AE |
| | 3- 2-3 | MSPRCA050WRE0 | Open button spring | 1 | AB |
| | 3- 3 | LHLD-A185WRF0 | LCD holder | 1 | AL |
| | 3- 4 | PSHEPA672WRE0 | LED sheet | 1 | AK |
| | 3- 5 | XEPSD30P08XS0 | Screw ; 3mm x 8mm | 4 | AA |
| | | | **OVEN PARTS** | | |
| Δ | 4- 1 | PHOK-A130WRFZ | Latch hook | 1 | AK |
| | 4- 2 | LBNDKA132WRP0 | Capacitor holder | 1 | AD |
| | 4- 3 | PCOVPA374WRPZ | High voltage cover | 1 | AG |
| | 4- 4 | NFANJA020WRE0 | Fan blade | 1 | AG |
| Δ | 4- 5 | FOVN-A475WRTZ | Oven cavity | 1 | BH |
| | 4- 6 | LANGTA316WRP0 | Chassis support | 1 | AH |
| | 4- 7 | MLEVPA244WRFZ | Switch lever | 1 | AG |
| | 4- 8 | PCUSGA536WRP0 | Cushion | 1 | AE |
| | 4- 9 | PCOVPA311WRE0 | Waveguide cover | 1 | AG |
| | 4-10 | PCUSUA191WRP0 | Cushion | 1 | AC |
| | 4-11 | PDUC-A610WRF0 | Fan duct | 1 | AR |
| | 4-12 | PDUC-A611WRW0 | Magnetron air duct | 1 | AC |
| | 4-13 | PPACGA176WREZ | Turntable motor packing | 1 | AC |
| | 4-14 | PCUSUA410WRP0 | Cushion | 1 | AB |
| | 4-15 | PCUSUA455WRP0 | Cushion | 1 | AD |
| | 4-16 | PPACGA073WRE0 | Cushion | 1 | AP |
| | 4-17 | PCUSUA452WRP0 | Cushion | 1 | AB |
| | 4-18 | LSTPPA167WRF0 | Door stopper | 1 | AG |
| | 4-19 | PCUSUA237WRP0 | Cushion | 1 | AF |
| | 4-20 | PDUC-A778WRPZ | AH sensor duct | 1 | BC |
| | 4-21 | PCUSGA531WRP0 | Cushion | 1 | AF |
| | 4-22 | PCUSGA532WRP0 | Cushion | 1 | AF |
| | | | **DOOR PARTS** | | |
| Δ | 5 | CDORFA927WRKZ | Door assembly | 1 | BK |
| Δ | 5- 1 | FDORFA290WRT0 | Door panel | 1 | BA |
| | 5- 2 | HPNL-A692WRR0 | Door screen | 1 | AX |

**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 |
|---|---|---|---|---|---|
| Δ | 5- 3 | GWAKPA813WRRZ | Door frame | 1 | AX |
| Δ | 5- 4 | GCOVHA382WRF0 | Choke cover | 1 | AM |
| | 5- 5 | PSHEPA336WRP0 | Sealer film | 1 | AF |
| Δ | 5- 6 | LSTPPA139WRF0 | Latch head | 1 | AF |
| | 5- 7 | MSPRTA084WRE0 | Latch spring | 1 | AD |
| | 5- 8 | XEPSD40P06000 | Screw; M4 x 6 | 3 | AA |

**MISCELLANEOUS**

| | | | | |
|---|---|---|---|---|
| 6- 1 | FW-VZB752WRE0 | Switch harness | 1 | AG |
| 6- 2 | FW-VZB936WREZ | Main wire harness | 1 | AU |
| 6- 3 | FROLPA097WRKZ | Turntable support | 1 | AN |
| 6- 4 | TLABMB009WRRZ | Menu label | 1 | AK |
| 6- 5 | TCAUHA214WRR0 | K caution label | 1 | AC |
| 6- 6 | TINSEB062WRRZ | Operation manual | 1 | AP |
| 6- 7 | NTNT-A108WREZ | Turntable tray | 1 | AW |

**SCREWS, NUTS AND WASHERS**

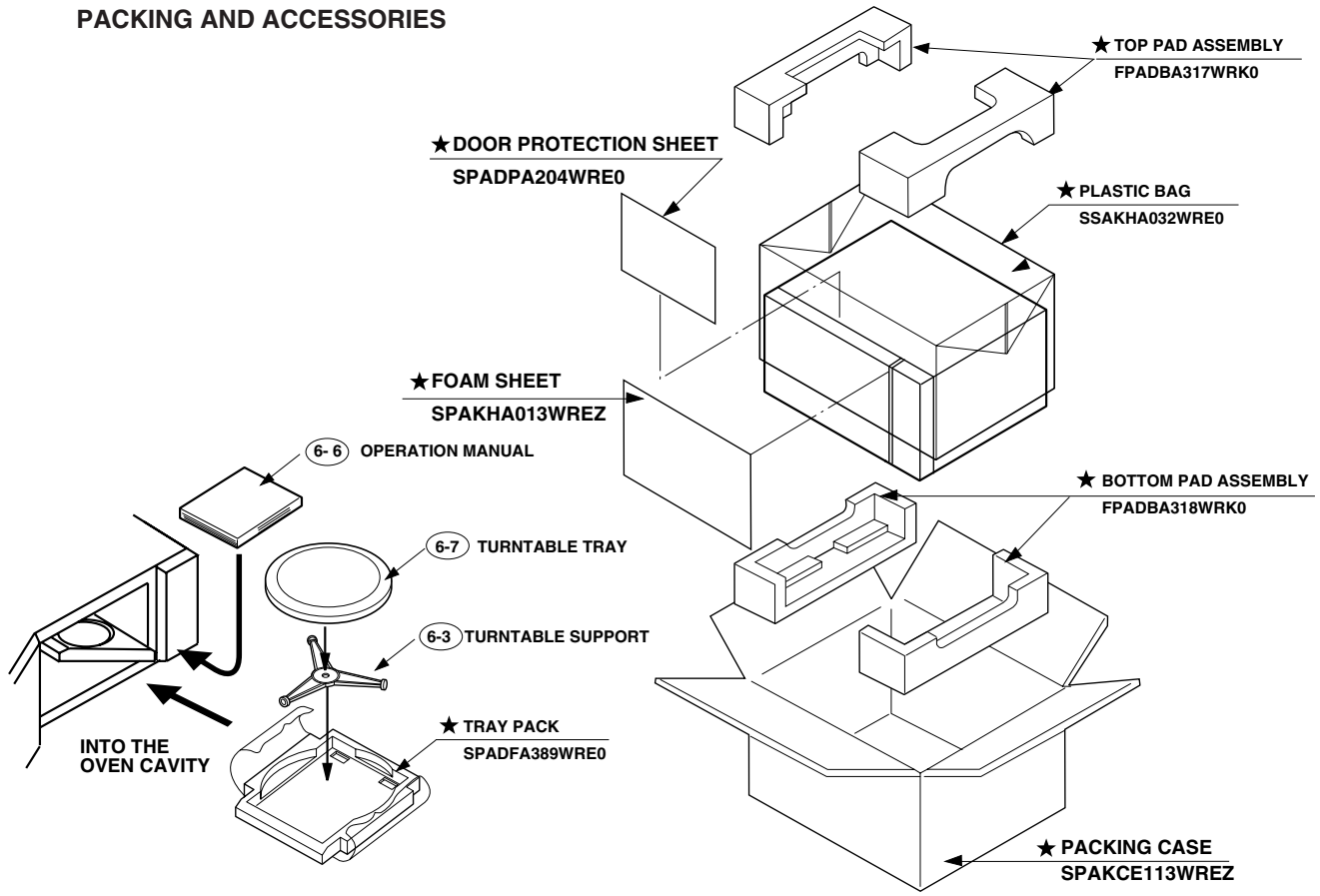
| | | | | |
|---|---|---|---|---|
| 7- 1 | XHTSD40P08RV0 | Screw; M4 x 8 | 9 | AA |
| 7- 2 | LX-CZ0052WRE0 | Special screw | 2 | AA |
| 7- 3 | LX-EZA042WRE0 | Special screw | 2 | AB |
| 7- 4 | XHPSD30P06000 | Screw; M3 x 6 | 4 | AA |
| 7- 5 | XHPSD40P08K00 | Screw; M4 x 8 | 5 | AA |
| 7- 6 | XHPSD40P08000 | Screw; M4 x 8 | 4 | AA |
| 7- 7 | LX-EZA050WRE0 | Special screw; | 1 | AB |
| 7- 8 | XOTSD40P12RV0 | Screw; M4 x 12 | 12 | AB |
| 7- 9 | XOTSD40P08000 | Screw; M4 x 8 | 2 | AA |

HOW TO ORDER REPLACEMENT PARTS

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

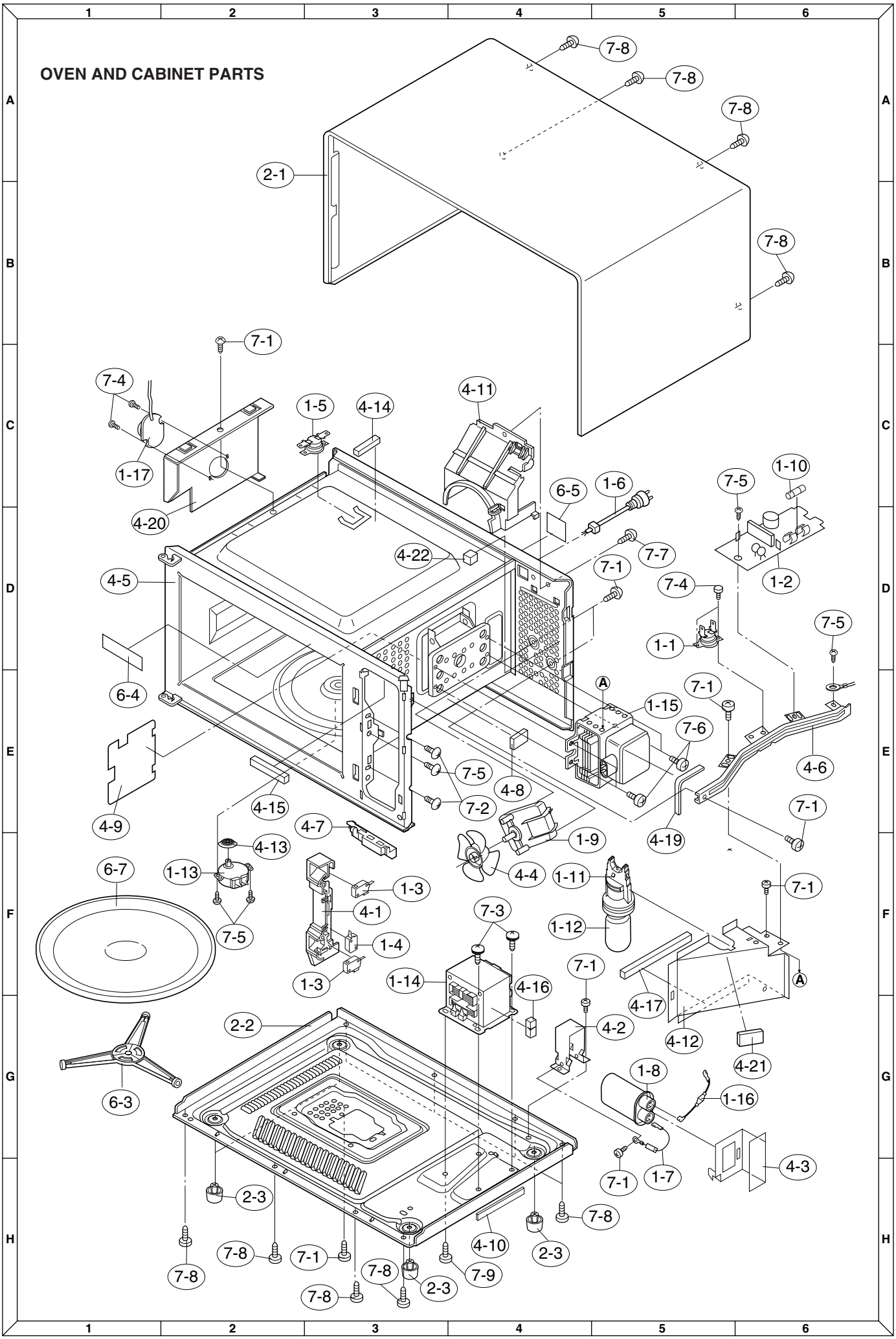
1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

**PACKING AND ACCESSORIES**

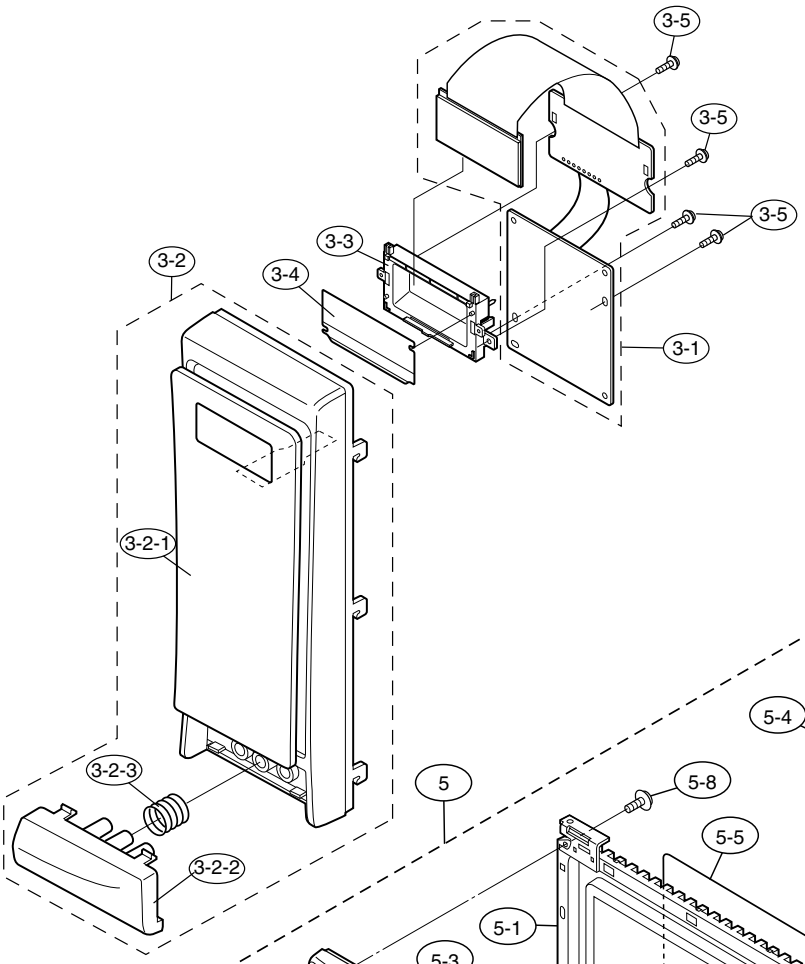



**★ Not replaceable items.**

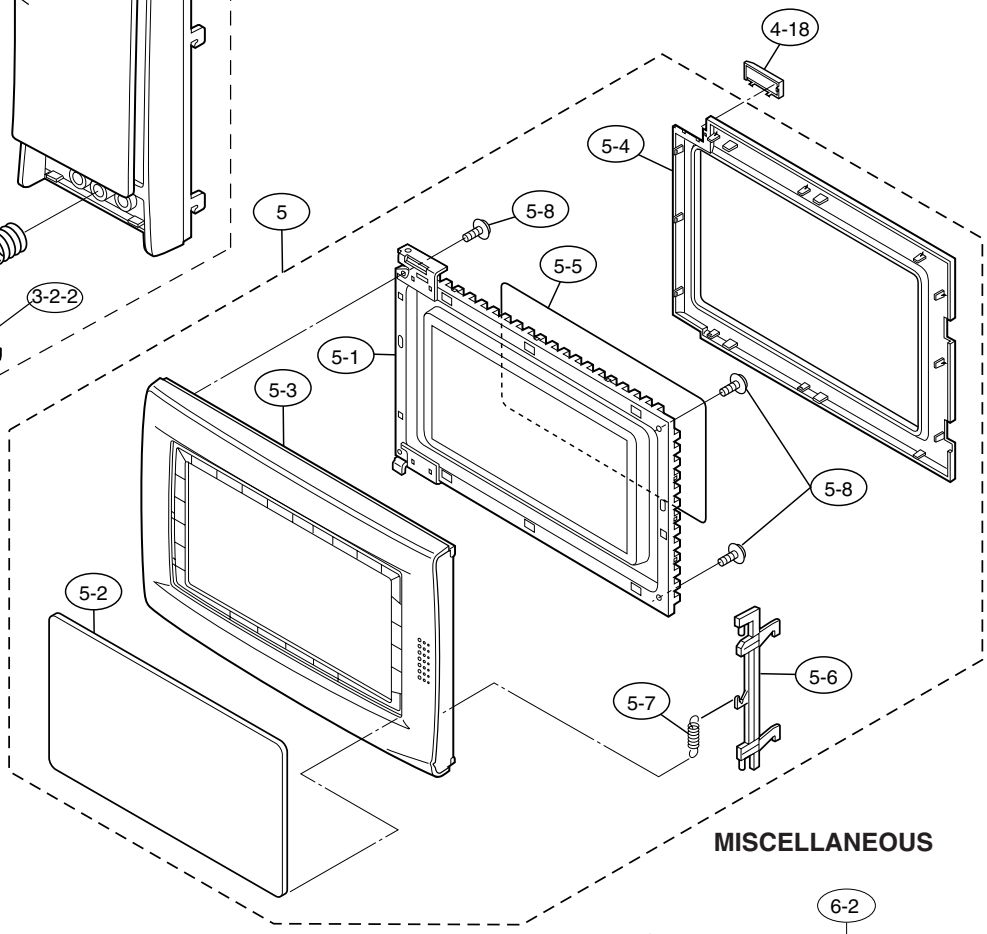
## OVEN AND CABINET PARTS



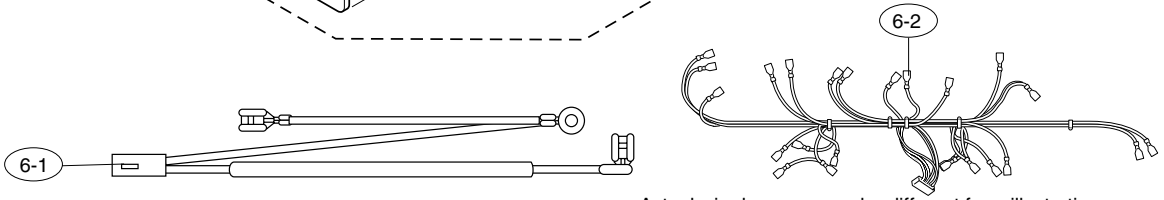
## CONTROL PANEL PARTS




## DOOR PARTS




## MISCELLANEOUS




Actual wire harness may be different from illustration.

SHARP



'04SHARP CORP. (08S0.CD_E)