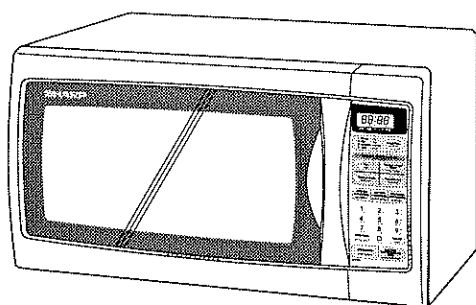


SHARP SERVICE MANUAL

S5210R247EPHR

MICROWAVE OVEN



MODEL **R-247E**

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

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SERVICE MANUAL

SHARP

MICROWAVE OVEN

R-247E

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

APPEARANCE VIEW

OPERATING SEQUENCE

FUNCTION OF IMPORTANT COMPONENTS

SERVICING AND TROUBLESHOOTING CHART

TEST PROCEDURE

TOUCH CONTROL PANEL ASSEMBLY

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

MICROWAVE MEASUREMENT

WIRING DIAGRAM

PARTS LIST

PRODUCT SPECIFICATIONS

ITEM	DESCRIPTION
Power Requirements	220 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	1.16 kW
Power Output	800 watts nominal of RF microwave energy (IEC Test Procedure) Operating frequency 2450 MHz
Case Dimensions	Width 460 mm Height 290 mm including foot Depth 372 mm
Cooking Cavity Dimensions	Width 314 mm Height 228 mm Depth 329 mm
Turntable diameter	295 mm
Control Complement	Touch Control System Timer (0 - 99 minutes 99 seconds) Microwave Power for Variable Cooking Repetition Rate; 100P Full power throughout the cooking time 70P approx. 70% of FULL Power 50P approx. 50% of FULL Power 30P approx. 30% of FULL Power 10P approx. 10% of FULL Power REHEAT pad AUTO COOK pads EASY DEFROST pad EXPRESS DEFROST pad SLOW COOK pad Number pads POWER LEVEL pad TIMER pad STOP/CLEAR pad INSTANT COOK/START pad
Set Weight (Approx.)	14 kg

GENERAL INFORMATION

WARNING

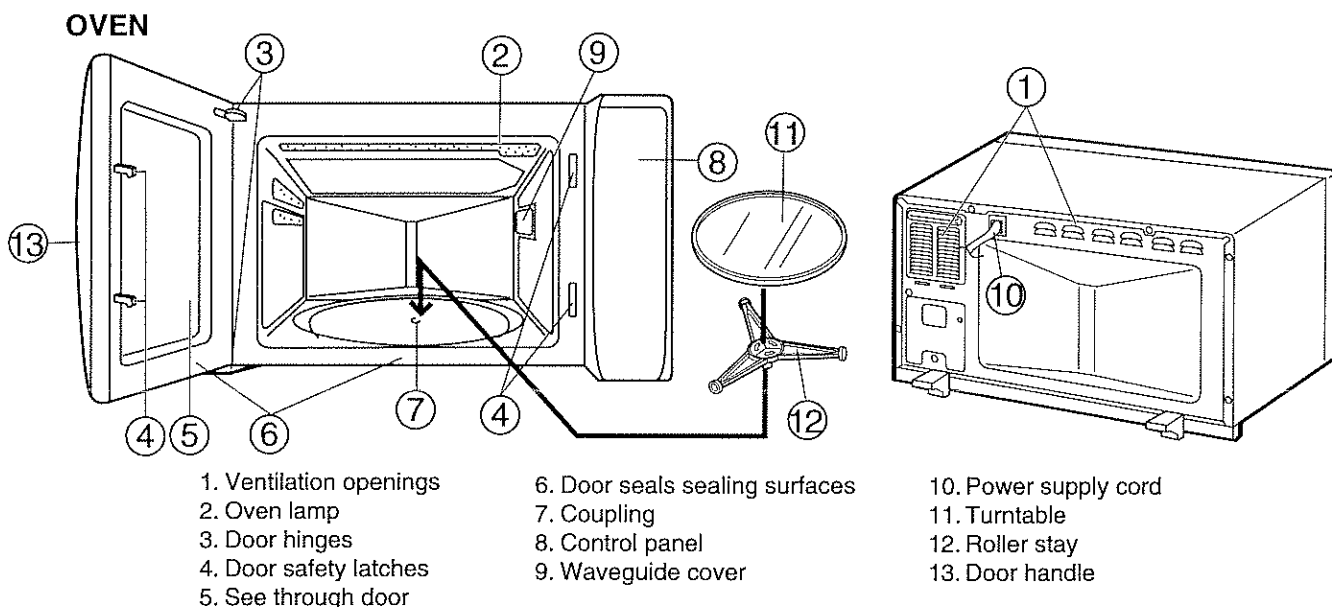
THIS APPLIANCE MUST BE EARTHED

IMPORTANT

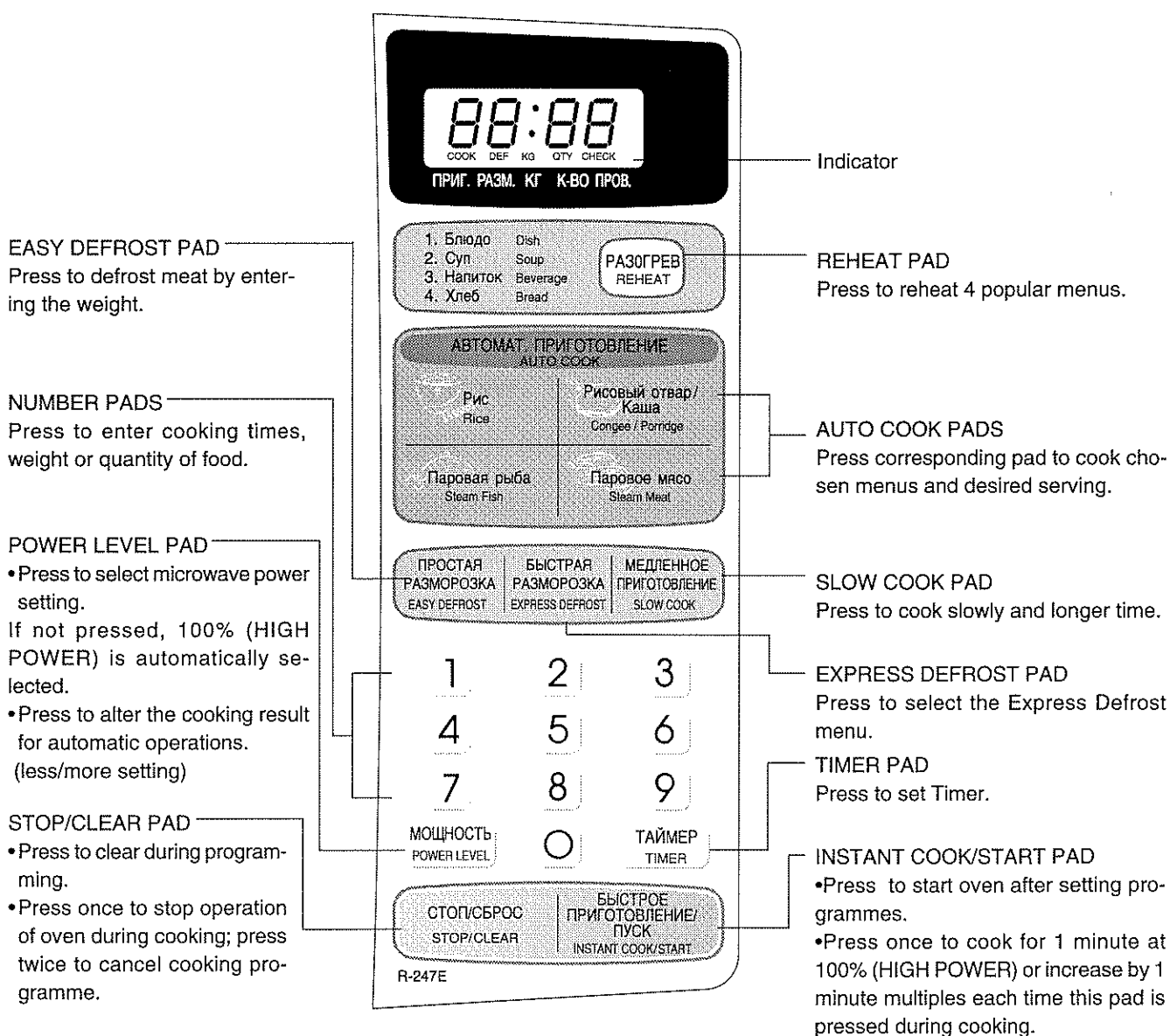
THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

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

APPEARANCE VIEW



TOUCH CONTROL PANEL



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 25

1. The display flashes "88:88".
2. To set any programmes 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 Time key and start the oven with touching START key.

Function sequence

Figure O-2 on page 25

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. 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.

SWITCH	CONTACT	CONDITION	
		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

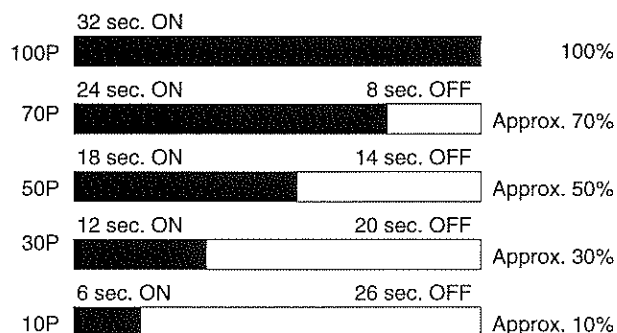
The monitor switch is mechanically controlled by oven door, and monitors the operation of the 1st. latch switch and 2nd. interlock relay.

- 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 must open their contacts first. After that the contacts (COM-NC) of the monitor switch can be closed.
- 6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch must be opened. After that the contacts of the 1st. latch switch and 2nd. interlock relay control switch are closed.
- 6-3. When the oven door is opened and the contacts of the 1st latch switch and 2nd. interlock relay control switch remain closed. The fuse M8A will blow, because the monitor switch is closed and a short circuit is caused.

POWER LEVEL 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 current-limiting relay. 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.

FUNCTION OF IMPORTANT COMPONENTS

DOOR OPEN MECHANISM

The door is opened by pulling the door, refer to the Figure D-1.

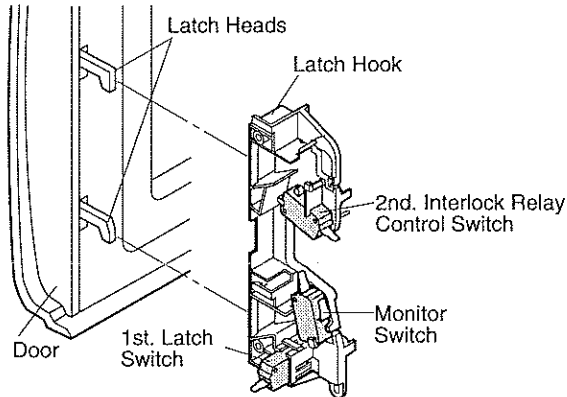


Figure D-1. Door Open Mechanism

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 blows simultaneously with closing the contacts (COM-NC) of the monitor switch.

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

MONITOR RESISTOR 0.8Ω 20W

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

FUSE

1. The fuse blows when the contacts (COM-NO) of the 1st latch switch, 2nd. interlock relay remain closed with the oven door open and when the monitor switch closes.
2. If the wire harness or electrical components are short-circuited, the fuse M8A blows to prevent an electric shock or fire hazard.

HIGH VOLTAGE FUSE

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

THERMAL CUT-OUT 125°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 thermal cut-out remains closed. However, when abnormally high temperatures are reached inside the oven cavity, the thermal cut-out will open at 125°C, causing the oven to shut down. The defective thermal cut-out must be replaced with a new one.

THERMAL CUT-OUT 95°C (MAGNETRON)

The thermal cut-out located on the top of the oven cavity 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 to the thermal cut-out, it will open at 95°C, causing the oven to shut down. When the magnetron has cooled to 75°C, the thermal cut-out closes and cook cycle will resume.

NOISE FILTER

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

TURNTABLE MOTOR

The turntable motor drives the roller stay 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 vents 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.

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 the 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.

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.

REMEMBER TO CHECK 4R

- 1) Reconnect all leads removed from components during testing.
- 2) Replace the outer case (cabinet).
- 3) Reconnect the supply.
- 4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power level to HIGH. And set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold, carry out 3D checks and re-examine the connections to the component being tested.

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 M8A in the 1st. latch switch - 2nd. interlock relay - monitor switch - monitor resistor circuit, check the 1st. latch switch, 2nd. interlock relay control switch, 2nd. interlock relay, monitor switch and monitor resistor before replacing the fuse M8A.

CK = Check / RE = Replace

TEST PROCEDURE		A	B	C	CK	D	E	E	E	F	G	G	H	H	I	L	N	O	RECK	CK	RECK	CK	CK	CK	CK	CK	J	M	K	
CONDITION	POSSIBLE CAUSE AND DEFECTIVE PARTS PROBLEM	MAGNETRON	POWER TRANSFORMER	H.V. RECTIFIER ASSEMBLY	HIGH VOLTAGE WIRE	HIGH VOLTAGE CAPACITOR	1ST. LATCH SWITCH	2ND. INTERLOCK RELAY CONTROL SWITCH	MONITOR SWITCH	MONITOR RESISTOR	THERMAL CUT-OUT 125°C (OVEN)	THERMAL CUT-OUT 95°C (MG)	FAN MOTOR	TURNABLE MOTOR	FUSE M8A	TOUCH CONTROL PANEL	RELAY (RY-1, RY-2)	FOIL PATTERN ON P.W.B.	POWER SUPPLY CORD	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	OVEN LAMP OR SOCKET	WALL OUTLET	MISADJUSTMENT SWITCH	HOME FUSE OR BREAKER	BLOCKED COOLING FAN	BLOCKED VENTILATION	NOISE FILTER	KEY UNIT	H.V. FUSE
OFF CONDITION	Home fuse blows when power supply cord is plugged into wall outlet.																		○	○					○					
	FUSE M8A blows when power supply cord is plugged into wall outlet.								○						○					○				○			○			
	"88:88" does not appear in display but 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 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 100%)	○	○	○	○	○										○	○			○				○					○	
	Oven does not seems to be operating properly when 70%, 50%, 30% or 10% is set. (Oven operates properly at 100% and then the STOP/CLEAR pad is touched the oven stops.)															○	○													
	Oven goes into cook cycle but shuts down before end of cooking cycle.											○	○			○										○	○			

TEST PROCEDURES

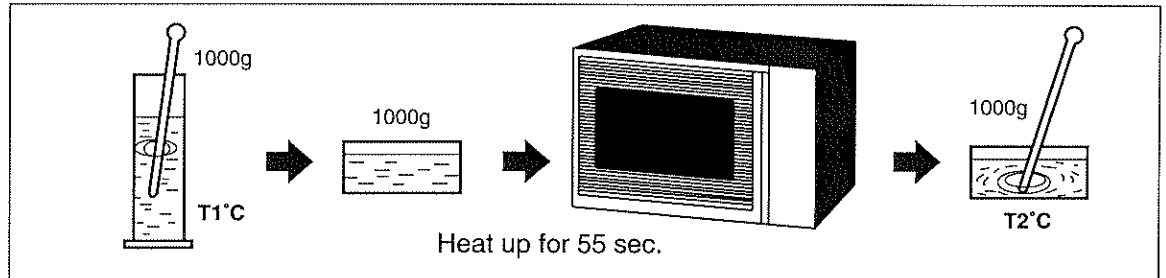
PROCEDURE LETTER	COMPONENT TEST								
A	<p>MAGNETRON TEST</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.</p> </div> <p>CARRY OUT <u>3D</u> CHECKS.</p> <p>Isolate the magnetron from the high voltage circuit by removing all leads connected to the filament terminal.</p> <p>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.</p> <p>To test for a 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.</p> <p>MICROWAVE OUTPUT POWER (1 litre water load)</p> <p>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 $P \times t/4.187$ 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 $V \times \Delta T$.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>The formula is as follows;</p> $P \times t / 4.187 = V \times \Delta T + 0.55 \times mc (T_2 - T_0) / 4.187 \quad P (W) = 4.187 \times V \times \Delta T / t + 0.55 \times mc (T_2 - T_0) / t$ <p>Our condition for water load is as follows:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Room temperature (T₀) ... around 20°C</td> <td style="width: 50%;">Power supply Voltage Rated voltage</td> </tr> <tr> <td>Water load 1000 g</td> <td>Initial temperature (T₁) 10±1°C</td> </tr> <tr> <td>Heating time 52 sec.</td> <td>Mass of container (mc) 330 g</td> </tr> <tr> <td>T₂ Final Temperature</td> <td>$P = 80 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 52$</td> </tr> </table> </div> <p>Measuring condition:</p> <ol style="list-style-type: none"> 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. Temperature of the oven and vessel The oven and the empty vessel are at ambient temperature prior to the start of the test. Temperature of the water The initial temperature of the water is (10±1)°C. Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5°C. Select stirring devices and measuring instruments in order to minimize addition or removal of heat. The graduation of the thermometer must be scaled by 0.1°C at minimum and an accurate thermometer. The water load must be (1000±5) g. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included. <p>NOTE: The operation time of the microwave oven is "t + 3" sec. 3 sec. is magnetron filament heat-up time.</p> <p>Measuring method:</p> <ol style="list-style-type: none"> Measure the initial temperature of the water before the water is added to the vessel. (Example: The initial temperature T₁ = 11°C) Add the 1 litre water to the vessel. Place the load on the centre of the shelf. Operate the microwave oven at 100% for the temperature of the water rises by a value ΔT of 10°C. Stir the water to equalize temperature throughout the vessel. Measure the final water temperature. (Example: The final temperature T₂ = 21°C) Calculate the microwave power output <u>P</u> in watts from above formula. 	Room temperature (T ₀) ... around 20°C	Power supply Voltage Rated voltage	Water load 1000 g	Initial temperature (T ₁) 10±1°C	Heating time 52 sec.	Mass of container (mc) 330 g	T ₂ Final Temperature	$P = 80 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 52$
Room temperature (T ₀) ... around 20°C	Power supply Voltage Rated voltage								
Water load 1000 g	Initial temperature (T ₁) 10±1°C								
Heating time 52 sec.	Mass of container (mc) 330 g								
T ₂ Final Temperature	$P = 80 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 52$								

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
	<p>Room temperature $T_o = 21^{\circ}\text{C}$ Initial temperature $T_1 = 11^{\circ}\text{C}$ Temperature after $(52 + 3) = 55$ sec. $T_2 = 21^{\circ}\text{C}$ Temperature difference Cold-Warm $\Delta T_1 = 10^{\circ}\text{C}$ Measured output power The equation is "$P = 80 \times \Delta T$" $P = 80 \times 10^{\circ}\text{C} = 800$ Watts</p>

JUDGEMENT: The measured output power should be at least $\pm 15\%$ of the rated output power.

CAUTION: 1°C CORRESPONDS TO 80 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 1.8 ohms approximately
- b. Secondary winding 124 ohms approximately
- c. Filament winding less than 1 ohm

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.

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 k Ω 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.

TEST PROCEDURES

**PROCEDURE
LETTER**

COMPONENT TEST

D

HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

A. Isolate the high voltage capacitor from the circuit.

B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.

C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.

D. A short-circuited capacitor shows continuity all the time.

E. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.

F. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.

G. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal.

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

CARRY OUT 4R CHECKS.

E

SWITCH TEST

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

CARRY OUT 3D CHECKS.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	O.C.	S.C.
Depressed	S.C.	O.C.

COM; Common terminal,
NO; Normally open terminal
NC; Normally close terminal
S.C.; Short circuit
O.C.; Open circuit

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

CARRY OUT 4R CHECKS.

F

MONITOR RESISTOR TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the monitor resistor. Using an ohmmeter and set on a low range. Check between the terminals of the monitor resistor.

The resistance of monitor resistor is approx. 0.8 ohms.

If incorrect readings are obtained, replace the monitor resistor.

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 below.

CARRY OUT 4R CHECKS.

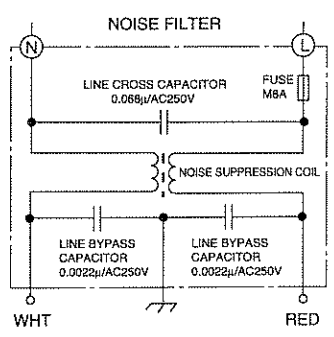
Table: Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit).	Temperature of "OFF" condition (open circuit).	Indication of ohmmeter (When room temperature is approx. 20°C.)
Thermal cut-out 125°C	This is not resetable type.	Above 125°C	Closed circuit
Thermal cut-out 95°C	Below 75°C	Above 95°C	Closed circuit.

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

An open circuit thermal cut-out (MG) indicates that the magnetron has overheated, this may be due

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST								
	<p>to restricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.</p> <p>An open circuit temperature fuse (OVEN) indicates that the food in the oven cavity may catch fire, this may be due to overheating produced by improper setting of the cooking time or failure of the control panel.</p>								
H	<p><u>MOTOR WINDING TEST</u></p> <p>CARRY OUT <u>3D</u> CHECKS.</p> <p>Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals as described in the table below.</p> <p style="text-align: center;">Table: Resistance of Motor</p> <table> <tr> <th>Motors</th><th>Resistance</th></tr> <tr> <td>Fan motor</td><td>Approximately 400 ohms</td></tr> <tr> <td>Turntable motor</td><td>Approximately 12 kohms</td></tr> </table> <p>If incorrect readings are obtained, replace the motor.</p> <p>CARRY OUT <u>4R</u> CHECKS.</p>	Motors	Resistance	Fan motor	Approximately 400 ohms	Turntable motor	Approximately 12 kohms		
Motors	Resistance								
Fan motor	Approximately 400 ohms								
Turntable motor	Approximately 12 kohms								
I	<p><u>FUSE M8A</u></p> <p>CARRY OUT <u>3D</u> CHECKS.</p> <p>If the fuse M8A is blown when the door is opened, check the 1st latch switch, 2nd. interlock relay control switch, monitor switch, 2nd. interlock relay RY2 and monitor resistor.</p> <p>If the fuse M8A is blown by incorrect door switching, replace the defective switch(es) and the fuse M8A.</p> <p>If the fuse M8A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.</p> <p>CARRY OUT <u>4R</u> CHECKS.</p> <p>CAUTION: Only replace fuse with the correct value replacement.</p>								
J	<p><u>NOISE FILTER TEST</u></p> <p>CARRY OUT <u>3D</u> CHECKS.</p> <p>Disconnect the leads from the terminals of the noise filter. Using an ohmmeter, check between the terminals as described in the following table.</p> <table> <tr> <th>MEASURING POINT</th><th>INDICATION OF OHMMETER</th></tr> <tr> <td>Between N and L</td><td>Open circuit</td></tr> <tr> <td>Between terminal N and WHITE</td><td>Short circuit</td></tr> <tr> <td>Between terminal L and RED</td><td>Short circuit</td></tr> </table> <p>If incorrect readings are obtained, replace the noise filter unit.</p> <p>CARRY OUT <u>4R</u> CHECKS.</p> 	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
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								
K	<p><u>HIGH VOLTAGE FUSE TEST</u></p> <p>CARRY OUT <u>3D</u> CHECKS.</p> <p>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 the high voltage fuse.</p> <p>CARRY OUT <u>4R</u> CHECKS.</p> <p>CAUTION: ONLY REPLACE HIGH VOLTAGE FUSE WITH THE CORRECT VALUE REPLACEMENT.</p>								

TEST PROCEDURES

PROCEDURE
LETTER

COMPONENT TEST

L 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, troubleshooting by unit replacement is described according to the symptoms indicated.

1. Key Unit.

The following symptoms indicate a defective key unit. Replace the key unit.

- When touching the pads, a certain pad produces no signal at all.
- When touching a number pad, two figures or more are displayed.
- When touching the pads, sometimes a pad produces no signal.

2. Control Unit.

The following symptoms indicate a defective control unit. Replace the control unit.

2-1 Programming problems.

- When touching the pads, a certain group of pads do not produce a signal.
- When touching the pads, no pads produce a signal.

2-2 Display problems.

- For a certain digit, all or some segments do not light up.
- For a certain digit, brightness is low.
- Only one indicator does not light up.
- The corresponding segments of all digits do not light up; or they continue to light up.
- Wrong figure appears.
- A certain group of indicators do not light up.
- The figure of all digits flicker.

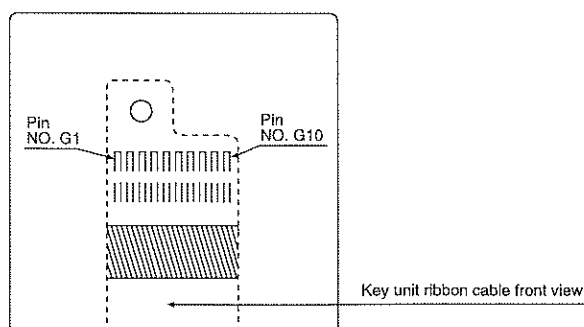
2-3 Other possible problems caused by defective control unit.

- Buzzer does not sound or continues to sound.
- Clock does not operate properly.
- Cooking is not possible.

M**KEY UNIT TEST**

- CARRY OUT 3D CHECKS.
- Isolate the key unit with the control panel frame to be tested.
- Using an ohmmeter and referring to the key unit matrix indicated on the control unit circuit, check the circuit between the pins of the key unit that correspond to the STOP/CLEAR pad. When the pad is pressed, the ohmmeter should indicate short circuit. When the pad is released, the ohmmeter should indicate open circuit. If incorrect readings are obtained, the key unit is faulty and must be replaced. About the other pads, the above method may be used.
- CARRY OUT 4R CHECKS.

	G 6	G 5	G 4	G 3	G 2	G 1
G 7	Congee / Porridge	6	2	EASY DEFROST	REHEAT	
G 8	Steam Meat	3	5	4	EXPRESS DEFROST	POWER LEVEL
G 9	SLOW COOK	TIMER	0	1	Steam Fish	STOP / CLEAR
G10		9	8	7	Rice	INSTANT COOK / START



TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST									
N	<p><u>RELAY TEST</u></p> <p>Remove the outer case and check voltage between Pin No. 3 of the 2 pin connector (A) and common terminal of the relay (RY2) on the control unit with an A.C. voltmeter. The meter should indicate 220 volts, if not check oven circuit.</p> <p>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.</p> <table><tr><th>RELAY SYMBOL</th><th>OPERATIONAL VOLTAGE</th><th>CONNECTED COMPONENTS</th></tr><tr><td>RY1</td><td>Approx. 15.0V D.C.</td><td>Oven lamp / Turntable motor / Cooling fan motor</td></tr><tr><td>RY2</td><td>Approx. 14.0V D.C.</td><td>Power transformer</td></tr></table>	RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS	RY1	Approx. 15.0V D.C.	Oven lamp / Turntable motor / Cooling fan motor	RY2	Approx. 14.0V D.C.	Power transformer
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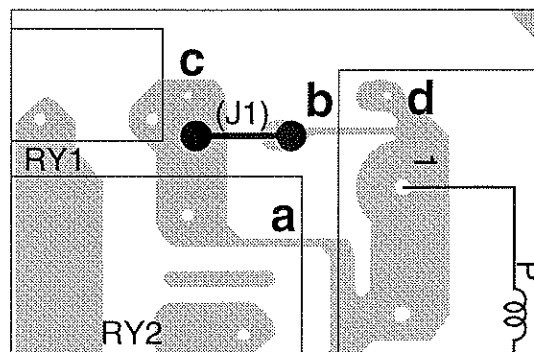
O PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN

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.

Problem: POWER ON, indicator does not light up.

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated voltage is not applied between Pin No. 3 of the 2 pin connector (A) and the common terminal of the relay RY2.	Check supply voltage and oven power cord.
2	The rated voltage is applied 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 tester for the presence of layer short-circuit (check primary coil resistance). If any abnormal condition is detected, replace the defective parts.



TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

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

- (1) Key Unit
- (2) Control Unit

The principal functions of these units and their related signals 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 R00, R01, R03, R20 and R21.

When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through R23, K00, K01 and K02 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 and synchronizing signal 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 4-digits, 12-segments and 3-common electrodes using a Liquid Crystal Display.

3) Power Source Circuit

This circuit generates voltage 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

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

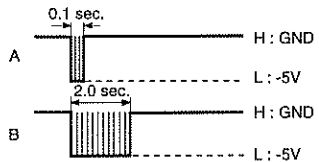
The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It accompanies a very small error because it works on commercial frequency.

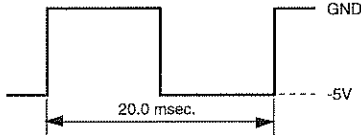
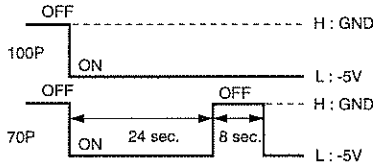
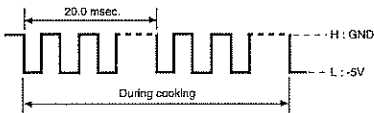
7) 2nd. Interlock Control Switch (Door Sensing Switch)

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

DESCRIPTION OF LSI

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

Pin No.	Signal	I/O	Description
1	RESET	IN	Auto clear terminal. Signal is input to reset the LSI to the initial state when power is supplied. Temporarily set to "L" level the moment power is supplied, at this time the LSI is reset. Thereafter set at "H" level.
2	TEST	IN	Connected to GND.
3	VSS	IN	Power source voltage: -5V. VSS voltage of power source circuit input. Connected to VC.
4	OCS3	IN	Internal clock oscillation frequency setting input. The internal clock frequency is set by inserting the resistor oscillation circuit with respect to OCS4 terminal.
5	OCS4	OUT	Internal clock oscillation frequency control output. Output to control oscillation input of OCS3.
6	VD1	IN	Power source for oscillation circuit.
7	VDD	IN	Power source voltage input terminal. Connected to GND.
8	AVDD	IN	A/D converter power source voltage. The power source voltage to drive the A/D converter in the LSI. Connected to GND.
9	AVREF	IN	A/D converter power source voltage. The power source voltage to drive the A/D converter in the LSI. Connected to GND.
10	AVSS	IN	Power source voltage: -5V. AVSS voltage of power source circuit input. Connected to VC.
11-13	P40-P42	IN	Terminal to change functions according to the Model. 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 function.
14	P43	IN	To input signal which communicates the door open/close information to LSI. Door close "H" level signal (0V). Door open "L" level (-5V).
15	BZ	OUT	Signal to sound buzzer (2.0 kHz). A: key touch sound. B: Completion sound. 
16	R00	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P23, K00, K01 and K02 terminal while one of G6 line keys on key matrix is touched.
17	R01	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P23, K00, K01 and K02 terminal while one of G5 line keys on key matrix is touched.
18	R02	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P23, K00, K01 and K02 terminal while one of G4 line keys on key matrix is touched.
19	R03	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P23, K00, K01 and K02 terminal while one of G3 line keys on key matrix is touched.
20	P20	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P23, K00, K01 and K02 terminal while one of G2 line keys on key matrix is touched.
21	P21	OUT	Key strobe signal. Signal applied to touch-key section. A pulse signal is input to P23, K00, K01 and K02 terminal while one of G1 line keys on key matrix is touched.
22	P22	OUT	Terminal not used.
23	P23	IN	Signal similar to K02. When either G7 line on key matrix is touched, a corresponding signal will be input into P23.

Pin No.	Signal	I/O	Description																												
24	K00	IN	Signal similar to K02. When either G8 line on key matrix is touched, a corresponding signal will be input into K00.																												
25	K01	IN	Signal similar to K02. When either G9 line on key matrix is touched, a corresponding signal will be input into K01.																												
26	K02	IN	Signal coming from touch key. When either G10 line on key matrix is touched, a corresponding signal out of R00, R01, R02, R03, P20 and P21 will be input into K02. When no key is touched, the signal is held at "H" level.																												
27	K03	IN	Signal synchronized with commercial power source frequency. This is the basic timing for time processing of LSI. 																												
28	COM0	OUT	Common data signal. Connected to LCD (Pin No. C1)																												
29	COM1	OUT	Common data signal. Connected to LCD (Pin No. C2)																												
30	COM2	OUT	Common data signal. Connected to LCD (Pin No. C3)																												
31	COM3	OUT	Terminal not used.																												
32-33	SEG0-SEG1	OUT	Terminal not used.																												
34	SEG2	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. 																												
35	SEG3	OUT	Terminal not used.																												
36	SEG4	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. 																												
37-39	SEG5-SEG7	OUT	Terminal not used.																												
40-51	SEG8-SEG19	OUT	Segment data signal. Connected to LCD. The relation between signals are as follows: <table> <thead> <tr> <th>LSI signal (Pin No.)</th><th>LCD (Segment)</th> <th>LSI signal (Pin No.)</th><th>LCD (Segment)</th> </tr> </thead> <tbody> <tr> <td>SEG 8 (40)</td><td>S12</td> <td>SEG 14 (46)</td><td>S6</td> </tr> <tr> <td>SEG 9 (41)</td><td>S11</td> <td>SEG 15 (47)</td><td>S5</td> </tr> <tr> <td>SEG 10 (42)</td><td>S10</td> <td>SEG 16 (48)</td><td>S4</td> </tr> <tr> <td>SEG 11 (43)</td><td>S9</td> <td>SEG 17 (49)</td><td>S3</td> </tr> <tr> <td>SEG 12 (44)</td><td>S8</td> <td>SEG 18 (50)</td><td>S2</td> </tr> <tr> <td>SEG 13 (45)</td><td>S7</td> <td>SEG 19 (51)</td><td>S1</td> </tr> </tbody> </table>	LSI signal (Pin No.)	LCD (Segment)	LSI signal (Pin No.)	LCD (Segment)	SEG 8 (40)	S12	SEG 14 (46)	S6	SEG 9 (41)	S11	SEG 15 (47)	S5	SEG 10 (42)	S10	SEG 16 (48)	S4	SEG 11 (43)	S9	SEG 17 (49)	S3	SEG 12 (44)	S8	SEG 18 (50)	S2	SEG 13 (45)	S7	SEG 19 (51)	S1
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SEG 12 (44)	S8	SEG 18 (50)	S2																												
SEG 13 (45)	S7	SEG 19 (51)	S1																												
52-53	VC1-VC2	IN	Power source voltage input terminal. Standard voltage for LCD.																												
54	VC3	OUT	Terminal not used.																												

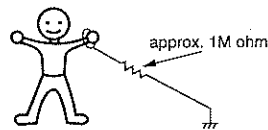
SERVICING

1. Precautions for Handling Electronic Components

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

In order to protect CMOS LSI.

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



2. Servicing of Touch Control Panel

We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so.

To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

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

CAUTION:

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

Therefore, 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 so long enough that they may be separated from each other.

For those models, therefore, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor-related

controls of the touch control panel, checking them is possible if the dummy resistor(s) with resistance equal to that of the controls are used.

(2) Servicing the touch control panel with power supply from an external power source:

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

3. 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

4. Other Precautions

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

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

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

1. Disconnect oven from power supply.
2. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.

Do not operate the oven if any of the following conditions exist;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.

4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:

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

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

WARNING FOR WIRING

To prevent an electric shock, take the following manners.

1. Before wiring,
 - 1) Disconnect the power supply.
 - 2) Open the door and wedge the door open.
 - 3) Discharge the high voltage capacitor and wait for 60 seconds.
2. Don't let the wire leads touch to the following parts;
 - 1) High voltage parts:
Magnetron, High voltage transformer, High voltage capacitor and High voltage rectifier assembly.

- 2) Hot parts:
Oven lamp, Magnetron, 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
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 the oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the eight (8) screws from rear and along the side edge of case.
4. Slide the entire case back about 3cm 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 form the basis of the 3D checks.

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

POWER TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads (main wire harness and H.V. fuse) from power transformer.
3. Disconnect the filament lead of power transformer from the magnetron.
4. Disconnect the filament lead of the power transformer

from high voltage capacitor.

5. Remove the two (2) screws holding the transformer to bottom plate from below.
6. Remove the two (2) screws holding the transformer to bottom plate from above.
7. Remove the transformer.

HIGH VOLTAGE COMPONENTS REMOVAL (HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE RECTIFIER ASSEMBLY AND H.V. FUSE)

To remove the components, proceed as follows.

1. CARRY OUT 3D CHECKS.
2. Disconnect the H.V. fuse from the power transformer.
3. Disconnect the H.V. wire of the H.V. rectifier assembly from the magnetron.
4. Remove one (1) screw holding capacitor holder to the oven cavity back plate.
5. Disconnect the filament lead of the power transformer from the H.V. capacitor.
6. Remove one (1) screw holding earth side terminal of high voltage rectifier assembly, and remove capacitor holder.
7. Disconnect all the leads and terminals of high voltage rectifier assembly from high voltage capacitor.

8. Disconnect the H.V. fuse from the high voltage capacitor.
9. Now H.V. rectifier assembly, H.V. fuse and H.V. capacitor should be free.

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

CAUTION: DO NOT REPLACE ONLY HIGH VOLTAGE RECTIFIER. WHEN REPLACING IT, REPLACE HIGH VOLTAGE RECTIFIER ASSEMBLY.

MAGNETRON REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the magnetron.
3. Carefully remove the three (3) screws holding the magnetron to the waveguide flange.
4. Lift up magnetron with care so that the magnetron antenna is not hit by any metal object around antenna.
5. Now, the magnetron is free.

Re-install

1. Re-install the magnetron to the waveguide flange with

three (3) screws.

2. Re-connect the wire leads to the magnetron. Refer to "PICTORIAL DIAGRAM".
3. Re-install the outer case and check that the oven is operating properly.

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

OVEN LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the flat type small screw driver.
3. Tear the cushion from the light mount plate.
4. Bend the tab of the light mount plate holding the oven.
5. Lift up the oven lamp socket.
6. Now, the oven lamp socket is free.

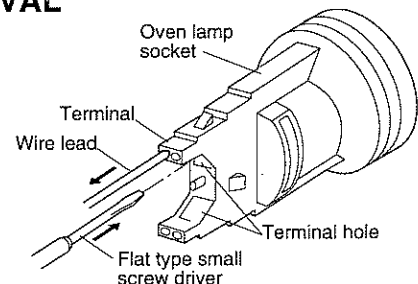


Figure C-1. Oven lamp socket

POSITIVE LOCK® CONNECTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Pushing the lever of positive lock® connector.
3. Pull out the positive lock® connector.

CAUTION: WHEN YOU (SERVICE ENGINEERS) CONNECT THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, CONNECT THE POSITIVE LOCK® SO THAT THE LEVER FACE YOU (SERVICE ENGINEERS).

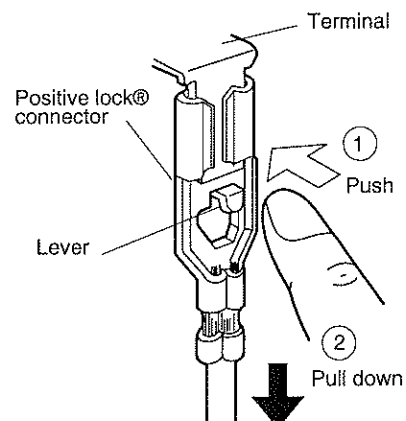


Figure C-2 Positive lock® connector

POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the single (1) screw holding the green/yellow wire to the oven cavity.
3. Disconnect the leads of the power supply cord from the noise filter, referring to the Figure C-3 (a).
4. Release the moulding cord stopper of the power supply cord from the square hole of the oven cavity back plate, referring to the Figure C-3 (b).
5. Now, the power supply cord is free.

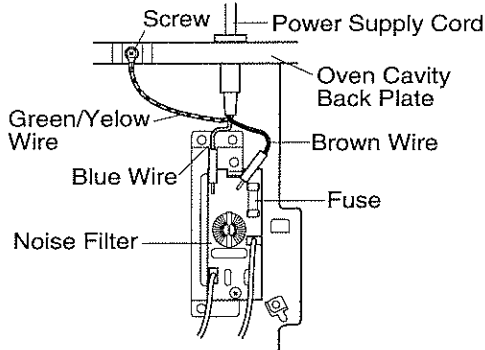


Figure C-3 (a). Power Supply Cord Replacement

Re-install

1. Insert the moulding cord stopper of power supply cord into the square hole of the rear cabinet, referring to the Figure C-3 (b).
2. Install the earth wire lead of power supply cord and the earth angle to the oven cavity with one (1) screw and tight the screw.
3. Connect the brown and blue wire leads of power supply cord to the noise filter correctly, referring to the Pictorial Diagram.

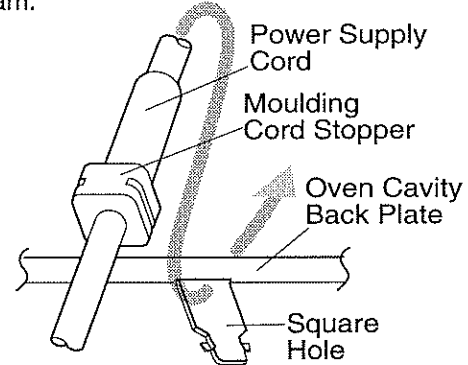


Figure C-3 (b) Power Supply Cord Replacement

TURNTABLE MOTOR REPLACEMENT

Removal

1. Disconnect the oven from the power supply.
2. Remove the turntable and turntable support from the oven cavity.
3. Turn the oven over.
4. Cut the four (4) bridges holding the turntable motor cover to the bottom plate with the cutting pliers as shown in Figure C-4.

CAUTION: DO NOT DROP THE TURNTABLE MOTOR COVER INTO THE OVEN AFTER CUTTING THE BRIDGES. BECAUSE IT WILL DAMAGE THE WIRE LEADS OF THE MOTOR AND IT IS DIFFICULT TO REMOVE IT OUT OF THE OVEN.

5. Remove the turntable motor cover from the bottom plate.
6. Disconnect the wire leads from the turntable motor.
7. Remove the single (1) screw holding the turntable motor to the oven cavity.
8. Remove the turntable motor from the oven cavity.

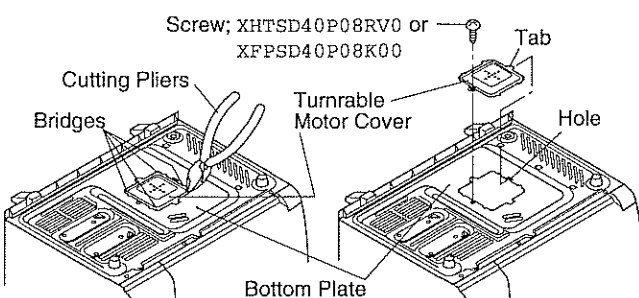


Figure C-4. Turntable Motor Cover

9. Remove the O-ring and washer from the turntable motor.
10. Now, the turntable motor is free.

Re-install

1. Remove the any sharp edges on the turntable motor cover and the bottom plate with the cutting pliers.
2. Re-install the O-ring.
3. Apply the grease (Shinetsu silicone grease G-420 of Shinetsu Chemical Co. Ltd. or Toray Silicone grease SH-14 of Toray Silicone Co., Ltd.) to the O-ring and the base of the turntable motor shaft as shown in Figure C-5.
4. Re-install the turntable motor with the O-ring and washer to the oven cavity with the single (1) screw.
5. Re-connect the wire leads to the turntable motor.
6. Insert the tab of the turntable motor cover into the hole of the bottom plate as shown in Figure C-4.
7. Re-install the turntable motor cover to the bottom plate with one (1) screw XHTSD40P08RV0 or XFPSD40P08K00 as shown in Figure C-4.

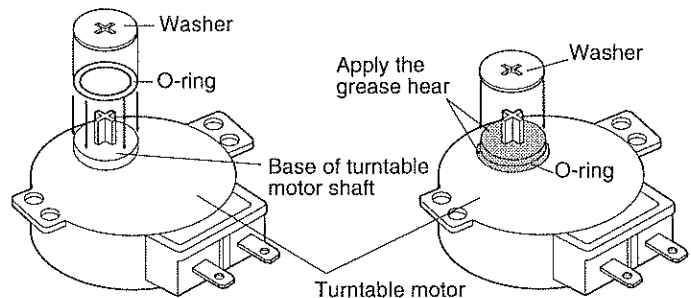


Figure C-5. Washer and O-ring Installation and Grease Applying.

FAN MOTOR REPLACEMENT

REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the fan motor.
3. Remove the one (1) screw holding the chassis support to the oven cavity front plate.
4. Remove the chassis support .
5. Release the filament lead of the power transformer and the H.V. wire from the fan duct.
6. Remove the one (1) screw holding the light mounting plate to the oven cavity.
7. Release the wire leads (to the oven lamp) from the hole of the fan duct.
8. Remove the one (1) screw holding the fan duct to the waveguide flange.
9. Release the fan motor assembly from the oven cavity.
10. Remove the fan blade from the fan motor shaft according to the following procedure.
11. Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

CAUTION:

- Make sure that any pieces do not enter the gap between the rotor and the stator of the fan motor. Because the rotor is easy to be shaven by pliers and metal pieces may be produced.
- Do not 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.

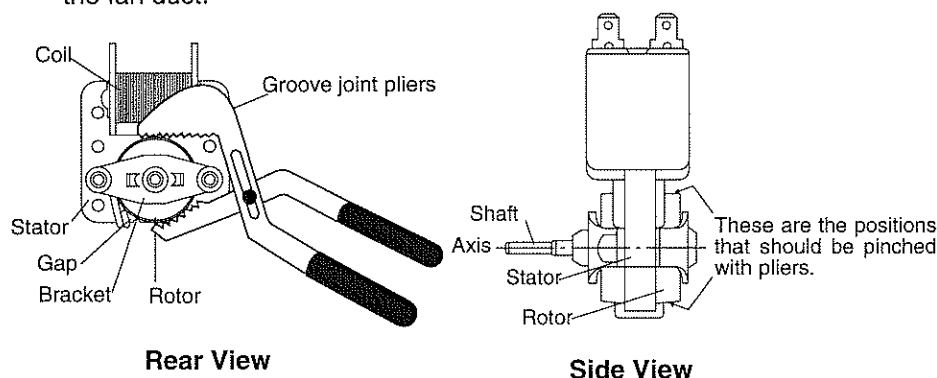
12. Remove the fan blade assembly from the shaft of the fan motor by pulling and rotating the fan blade with your hand.

13. Now, the fan blade will be free.

CAUTION:

- Do not re-use the removed fan blade because the hole (for shaft) may be larger than normal.

14. Remove the two (2) screws holding the fan motor to the fan duct.



15. Now, the fan motor is free.

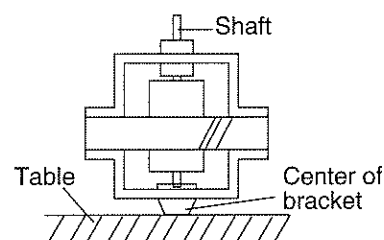
INSTALLATION

1. Install the fan motor to the fan duct with the two (2) screws.
2. Install the fan blade to the fan motor shaft according to the following procedure.
3. Hold the center of the bracket which supports the shaft of the fan motor on the flat table.
4. Apply the screw lock tight into the hole (for shaft) of the fan blade.
5. 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 transformed.
- Make sure that the fan blade rotates smooth after installed.
- Make sure that the axis of the shaft is not slanted.

6. Install the fan motor assembly to the oven cavity by fitting the tabs of the fan duct into the holes of the oven cavity and the waveguide flange.
7. Re-install the light mounting plate to the oven cavity with the one (1) screw.
8. Insert the end of the chassis support into the slit of the oven cavity rear cabinet.
9. Re-install the chassis support to the oven cavity front plate with the one (1) screw.
10. Install the filament lead and the H.V. wire into the hole of the fan duct .
11. Re-install the wire leads (to the oven lamp) to the hole of the fan duct.
12. Connect the wire leads to the fan motor, referring to the pictorial diagram.



CONTROL PANEL ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads and connectors from the control unit.
3. Remove the one (1) screw holding the chassis support to the front plate of the oven cavity.
4. Remove the chassis support from the oven.
5. Lift up the control panel and release it from the oven cavity.
6. Now, the control panel assembly is free.

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

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from the switches and control panel.
3. Remove the control panel assembly from the oven cavity front flange. Refer to chapter "CONTROL PANEL ASSEMBLY REMOVAL".
4. Remove two (2) screws holding latch hook to oven flange.
5. Remove latch hook assembly from oven flange.
6. To remove the 1st. latch switch.
- 6-1. Pull out the 1st. latch switch from the latch hook, by pushing outward on the tab that is holding the switch. But the switch will be caught by the bar of the latch hook.
- 6-2. Then pull out the switch while pushing the plunger of the switch again.
- 6-3. Now the 1st. latch switch is free.
7. To remove the monitor switch, 2nd. interlock relay control switch.
- 7-1. With pushing outward on the tab that is holding the switch, turn the switch so that the pole is an axis.
- 7-2. Pull out the switch from the latch hook. Do not break the pole or tab of the latch hook.
- 7-3. Now the switch is free.

Re-install

1. Re-install each switch in its place. The 1st. latch switch

is in the lower position and the monitor switch is in the middle position. The 2nd. interlock relay control switch is in the upper position.

2. Re-connect wire leads to each switch. Refer to chapter "Pictorial Diagram".
3. Secure latch hook (with two (2) mounting screws) to oven flange.
4. Re-install the control panel assembly to the oven cavity front flange.
5. Re-connect wire leads to the control unit. Refer to chapter "Pictorial Diagram".
6. Make sure that monitor switch is operating properly and check continuity of the monitor circuit. Refer to chapter "Test Procedure", and Adjustment Procedure below.

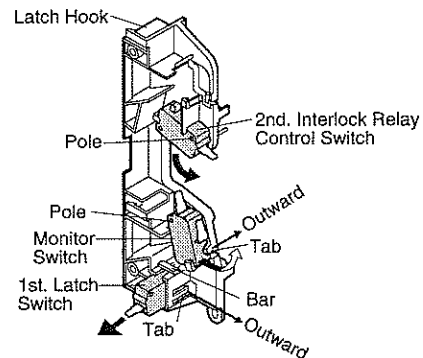


Figure C-6. Latch Switch Removal

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

1. CARRY OUT 3D CHECKS.

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.

2. Loosen the two (2) screws holding the latch hook to the flange of the oven front face.
3. With the 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 horizontal position of the latch hook should be adjusted so that the monitor switch and the 2nd. interlock relay control switch are activated with the door closed. The vertical position of the latch hook should be adjusted so that the stop switch and the 1st. latch switch are activated with the door closed.
4. Secure the screws firmly.
5. Check the operation of all switches. If each switch has not activated with the door closed, loosen screw and adjust the latch hook position.

After adjustment, make sure of the following.

1. In and out play of the 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 door toward the oven face. Both results (play in the door) should be less than 0.5mm.

2. The contacts of 1st. latch switch and 2nd. interlock relay control switch open within 1.6mm gap between right side of cavity face plate and door when door is open.
3. The monitor switch contacts close when the door is opened.
4. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

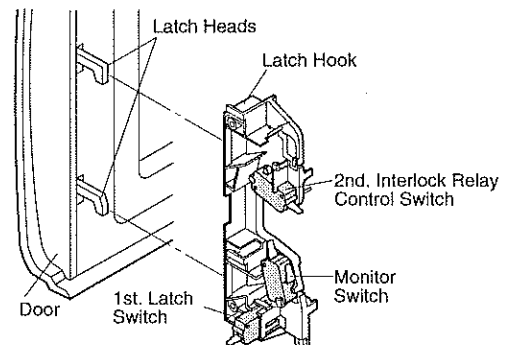


Figure C-7. Latch Switch Adjustments

DOOR REPLACEMENT

REMOVAL

1. Disconnect the power supply cord.

2. Open the door slightly.
3. Insert a putty knife (thickness of about 0.5mm) into the

gap between the choke cover and corner portion of door panel as shown in Figure C-8 to free engaging parts.

4. Pry the choke cover by inserting a putty knife in order shown in figure C-8.
5. Release choke cover from door panel.
6. 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.

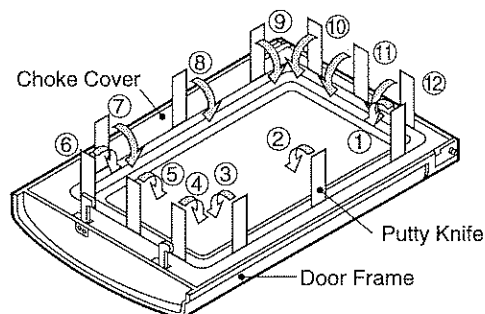


Figure C-8. Door Disassembly

7. Release two (2) pins of door panel from two (2) holes of upper and lower oven hinges by lifting up.
8. Now, door panel is free from oven cavity.
9. Remove the four (4) screws holding the door panel to door frame.
10. Release door panel from ten (10) tabs of door frame and remove door frame by sliding the door panel downward.
11. Now, door panel with sealer film is free.
12. Tear sealer film from door panel.
13. Now, door panel is free.
14. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.
15. Now, latch head and latch spring are free.
16. Remove door screen from door frame.
17. Now, door screen is free.

RE-INSTALL

1. Re-install door screen to door frame.
2. Re-install latch spring to the head. Re-install latch spring to the door frame. Re-install latch head to the door frame.
3. Re-install door panel to door frame by fitting ten (10) tabs of door frame to ten (10) holes of door panel.
4. Hold the door panel to door frame with the four (4) screws.
5. Put sealer film on door panel. Refer to "Sealer Film" and figure C-10, on how to handle the new film.
6. Catch two (2) pins of door panel on two (2) hole of upper and lower oven hinges.
7. Re-install choke cover to door panel by pushing.

Note: After any service to the door;

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

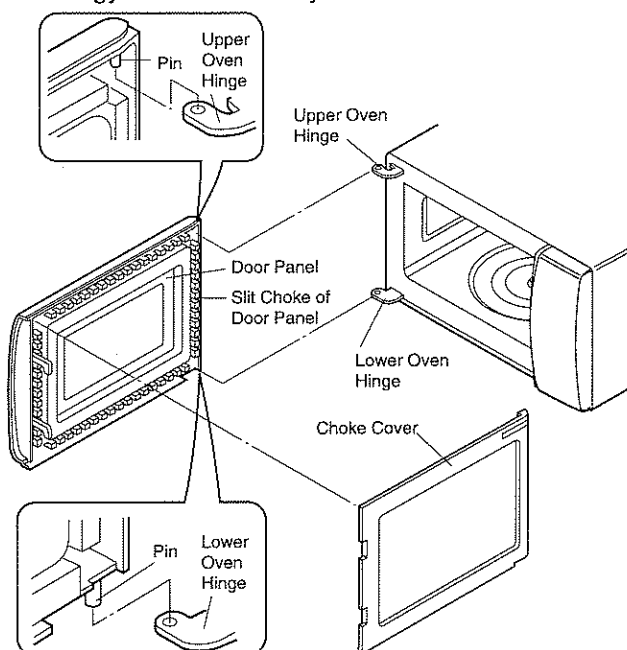


Figure C-9. Door Replacement

SEALER FILM

Installation

1. Put the adhesive tape on the backing film of the sealer film as shown in Fig. C-10.
2. Tear the backing film by pulling the adhesive tape.
3. Put the pasted side of the sealer film on the door panel

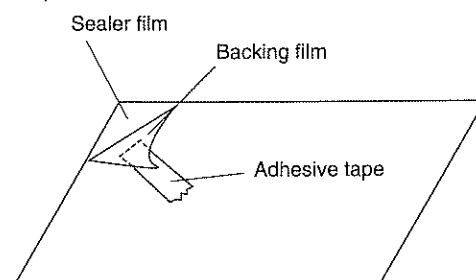


Figure C-10. Sealer film

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 $5\text{mW}/\text{cm}^2$ 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:

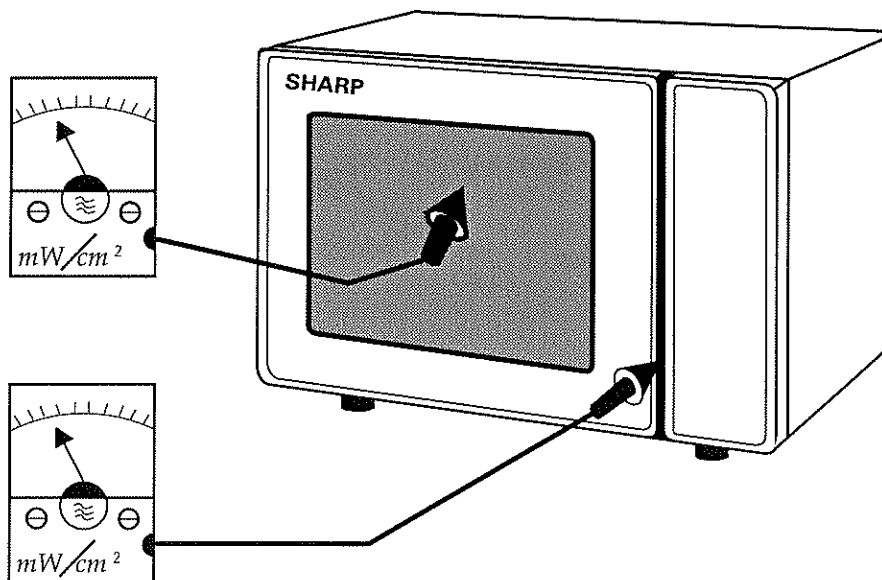
NARDA 8100

NARDA 8200

HOLADAY HI 1500

SIMPSON 380M

2. Place the oven tray into the oven cavity.
3. Place the load of $275 \pm 15\text{ml}$ of water initially at $20 \pm 5^\circ\text{C}$ 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 than $2.5\text{cm}/\text{sec.}$) 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 potential above 250V.

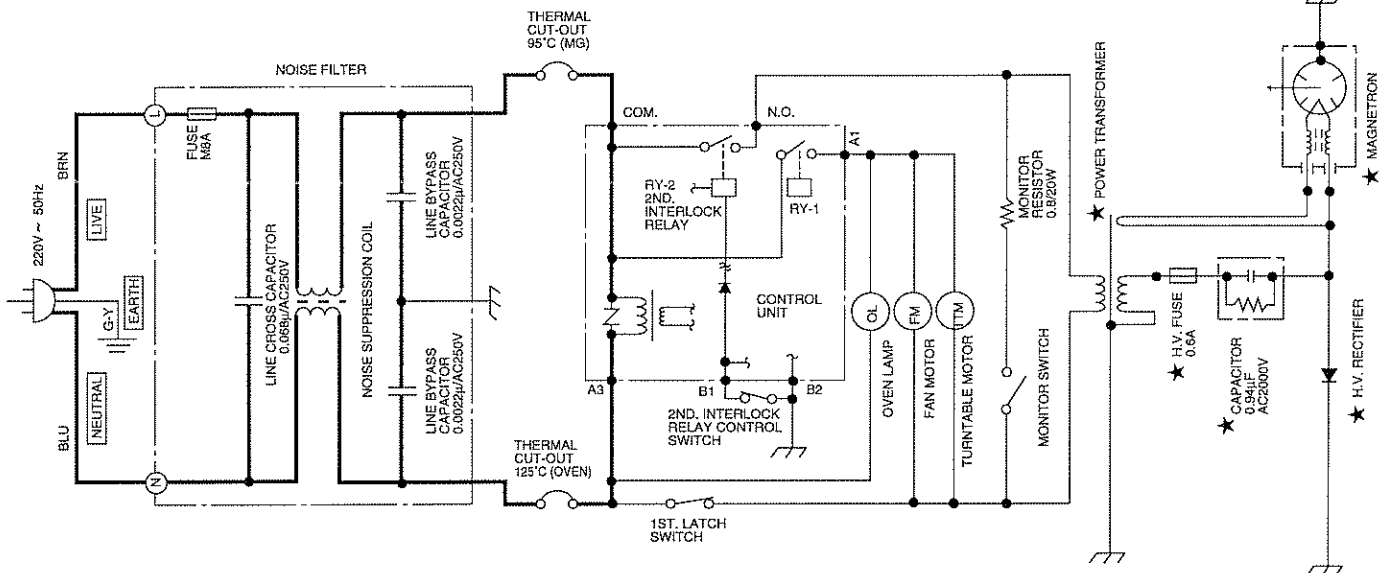


Figure O-1 Oven Schematic-OFF Condition

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED.

2. COOKING TIME PROGRAMMED.

3. START KEY TOUCHED.

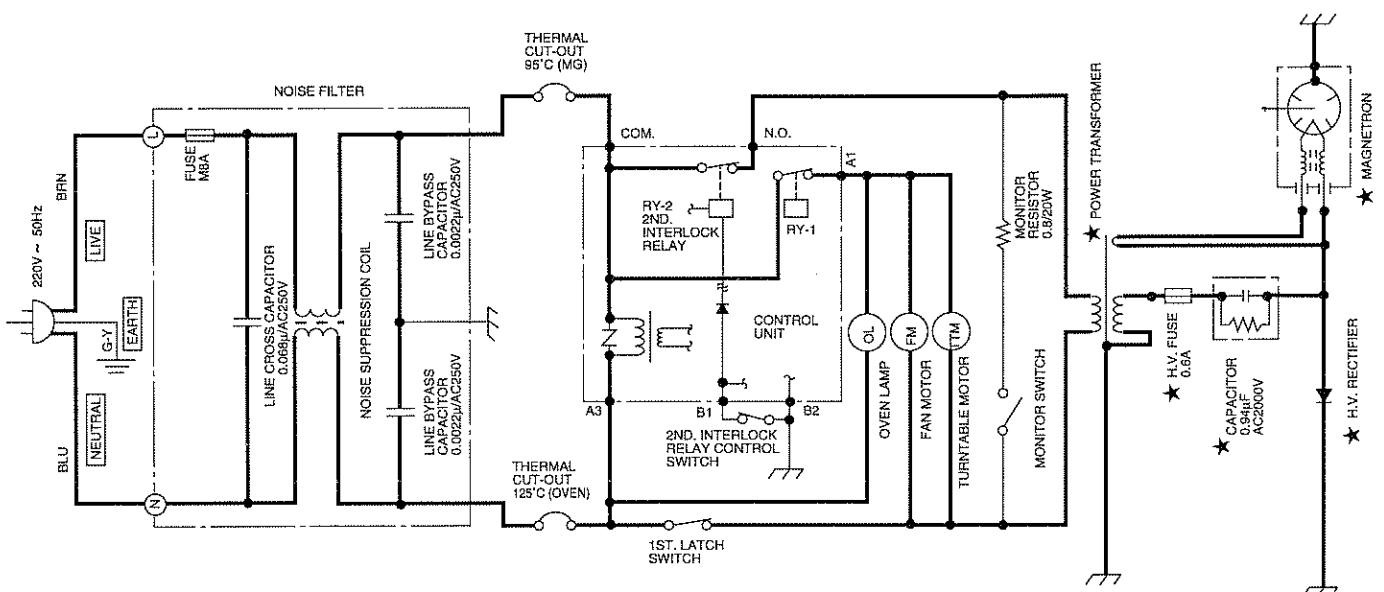
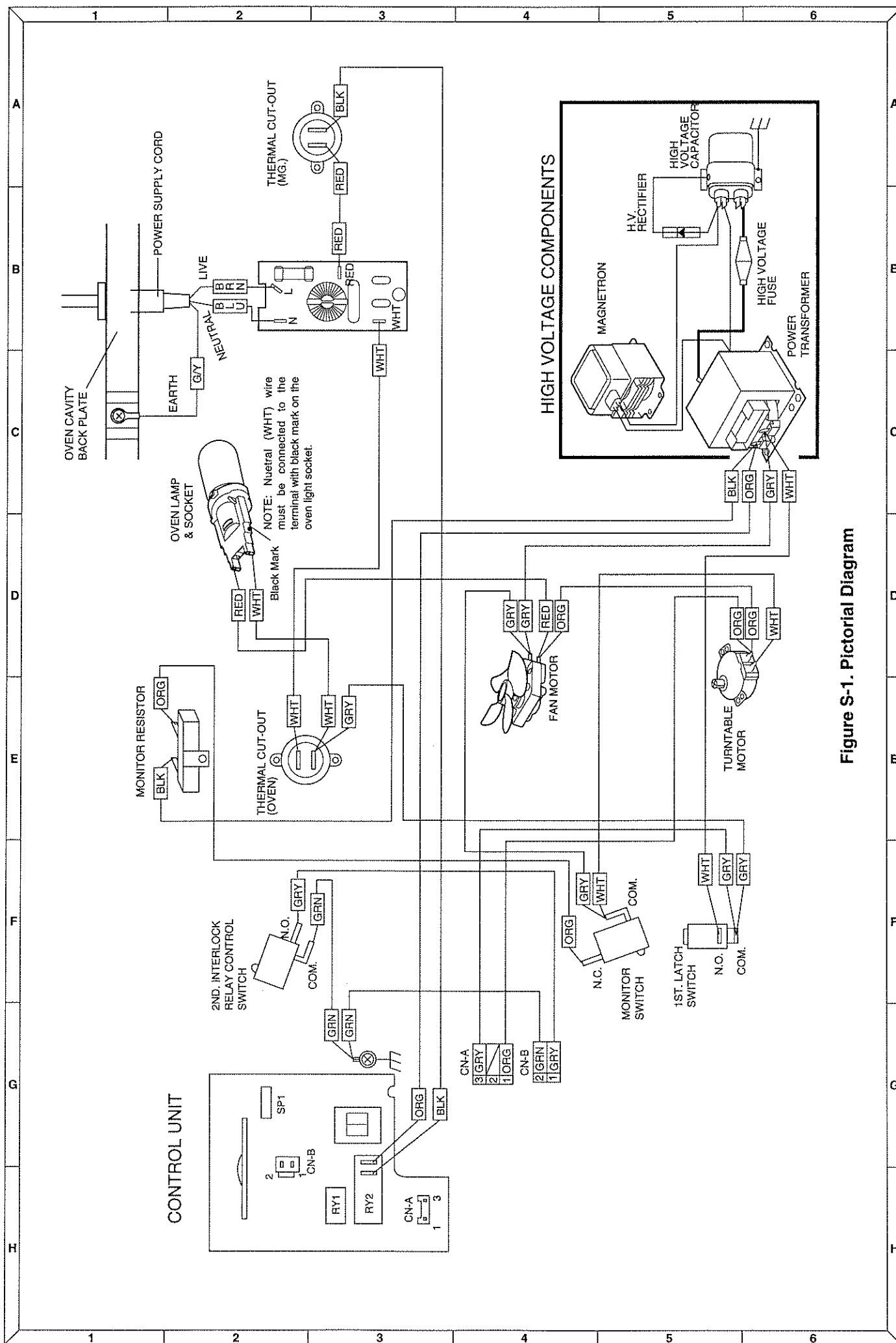


Figure O-2 Oven Schematic-ON Condition





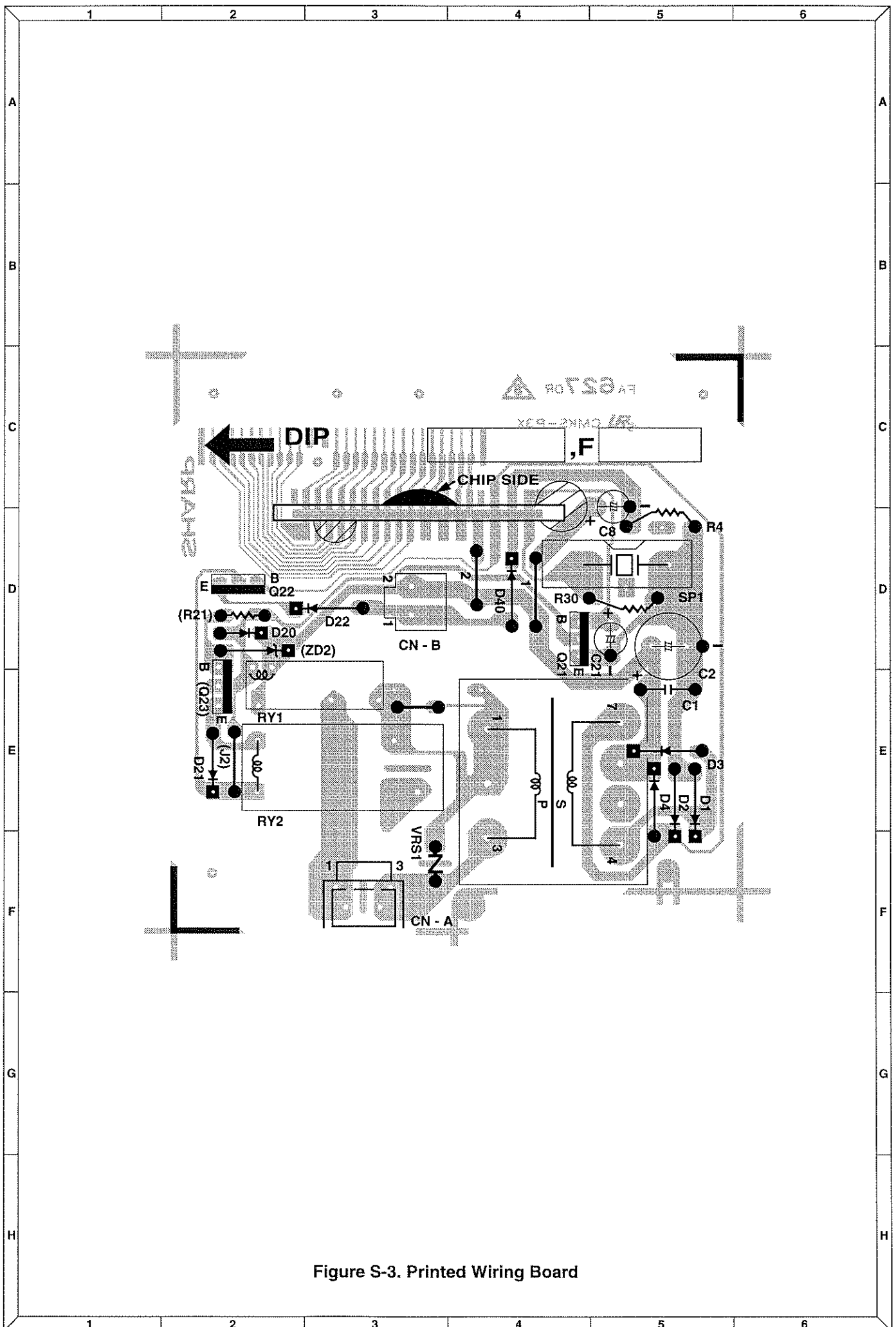


Figure S-3. Printed Wiring Board

PARTS LIST

Note: The parts marked "Δ" may cause undue microwave exposure.

The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
----------	----------	-------------	------	------

ELECTRIC PARTS

1- 1	QSW-MA137WRE0	1st. latch switch & 2nd. interlock relay control switch	2	AH
1- 2	QSW-MA138WRE0	Monitor switch	1	AH
1- 3	QACC-A075WRE0	Power supply cord	1	AW
1- 4	QSOCLA024WRE0	Oven lamp socket	1	AH
1- 4	QSOCLA022WRE0	Oven lamp socket (Interchangeable)	1	AG
* 1- 5	FH-DZA103WRKZ	High voltage rectifier	1	AS
* 1- 5	FH-DZA081WRK0	High voltage rectifier (Interchangeable)	1	AQ
* 1- 5	FH-DZA082WRK0	High voltage rectifier (Interchangeable)	1	AQ
* 1- 5	FH-DZA087WRK0	High voltage rectifier (Interchangeable)	1	AQ
* 1- 6	RC-QZA126WRE0	High voltage capacitor	1	AX
* 1- 6	RC-QZA210WRE0	High voltage capacitor (Interchangeable)	1	AX
* 1- 6	RC-QZA285WRZZ	High voltage capacitor (Interchangeable)	1	AW
1- 7	RMOTEA403WRZZ	Fan motor	1	AZ
1- 7	RMOTEA340WRE0	Fan motor (Interchangeable)	1	AX
1- 7	RMOTEA389WRE0	Fan motor (Interchangeable) for prouction use	1	AX
Δ 1- 8	RV-MZA306WRZZ	Magnetron	1	BL
1- 9	RLMPTA078WRE0	Oven lamp	1	AL
1- 9	RLMPTA069WRE0	Oven lamp (Interchangeable)	1	AK
1- 9	RLMPTA029WRE0	Oven lamp (Interchangeable)	1	AL
1-10	RMOTDA173WRE0	Turntable motor	1	AX
1-10	RMOTDA226WRE0	Turntable motor (Interchangeable)	1	AT
1-11	RTHM-A116WRE0	Thermal cut-out 125°C (OVEN)	1	AK
1-11	RTHM-A078WRE0	Thermal cut-out 125°C (OVEN) (Interchangeable)	1	AK
* 1-12	RTRN-A613WRZZ	Power transformer	1	BL
1-13	RR-WZA022WRE0	Monitor resistor 0.8Ω 20W	1	AK
* 1-14	QFS-IA004WRE0	H.V. fuse 0.6A	1	AK
1-15	FPWBFA318WRK0	Noise filter	1	AT
1-16	QFS-CA010WRE0	Fuse M8A	1	AE
1-17	RTHM-A117WRE0	Thermal cut-out 95°C (MG)	1	AK
1-17	RTHM-A079WRE0	Thermal cut-out 95°C (MG) (Interchangeable)	1	AH

CABINET PARTS

2- 1	GCABUA696WRP0	Outer case cabinet	1	AX
2- 2	GDAI-A304WRW0	Bottom plate	1	AF
2- 3	GLEGPA074WRE0	Foot	2	AC

CONTROL PANEL PARTS

3- 1	DPWBFC218WRUZ	Control unit	1	BG
3- 2	FPNLCB587WRKZ	Control panel frame with key unit	1	BA
3- 2-1	FUNTKB086WREZ	Key unit	1	AX
3- 3	QCNC-A013WRZZ	Rubber connector	1	AE
3- 4	RLCDSA062DRE0	Liquid crystal display	1	AM
3- 5	XEPSD30P08XS0	Screw; Control unit mtg.	3	AA

OVEN PARTS

Δ 4- 1	PHOK-A105WRF0	Latch hook	1	AL
4- 2	LANGQA477WRW0	Light mount plate	1	AY
4- 3	PCUSUA502WRP0	Waterproof cushion	1	AD
4- 4	LBNDKA038WRP0	Capacitor holder	1	AF
4- 5	NFANJA029WRE0	Fan blade	1	AK
Δ 4- 6	PDUC-A694WRF0	Fan duct	1	AG
Δ 4- 7	FOVN-A457WRTZ	Oven cavity	1	BD
4- 8	GLEGPA073WRP0	Leg	1	AD
4- 9	LANGTA318WRP0	Chassis support	1	AE
4-10	PCUSGA534WRP0	Cushion	1	AF
4-11	PCOVPA276WRE0	Waveguide cover	1	AM
4-12	PCUSUA500WRP0	Cushion	1	AC
4-13	PPACGA097WRE0	O-ring	1	AG
4-14	PCUSUA443WRP0	Cushion	2	AE
4-15	PCUSGA353WRP0	Cushion	1	AH

DOOR PARTS

Δ 5- 1	FDORFA321WRT0	Door panel	1	AT
Δ 5- 2	GWAKPA773WRFZ	Door frame	1	AR
5- 3	HPNL-A765WRRZ	Door screen	1	AR
Δ 5- 4	LSTPPA175WRF0	Latch head	1	AE
5- 5	MSPRTA084WRE0	Latch spring	1	AB
5- 6	PSHEPA622WRE0	Sealer film	1	AG
5- 7	GCOVHA390WRF0	Choke cover	1	AK
5- 8	XCPSD40P08000	Screw : 4mm x 8mm	4	AA

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
MISCLANEOUS				
6- 1	FROLPA090WRK0	Turntable support	1	AQ
6- 2	NTNT-A094WRE0	Turntable	1	AN
6- 3	TINSZA050WRRZ	Instruction book	1	AN
6- 4	FW-VZB762WRE0	Switch harness	1	AG
6- 5	FW-VZB720WRE0	Main wire harness	1	AU
6- 6	TCAUHA214WRR0	K caution label	1	AC
6- 7	TSPCND132WRRZ	Rating label	1	AF
6- 8	TCADCA753WRRZ	Cookbook	1	AN

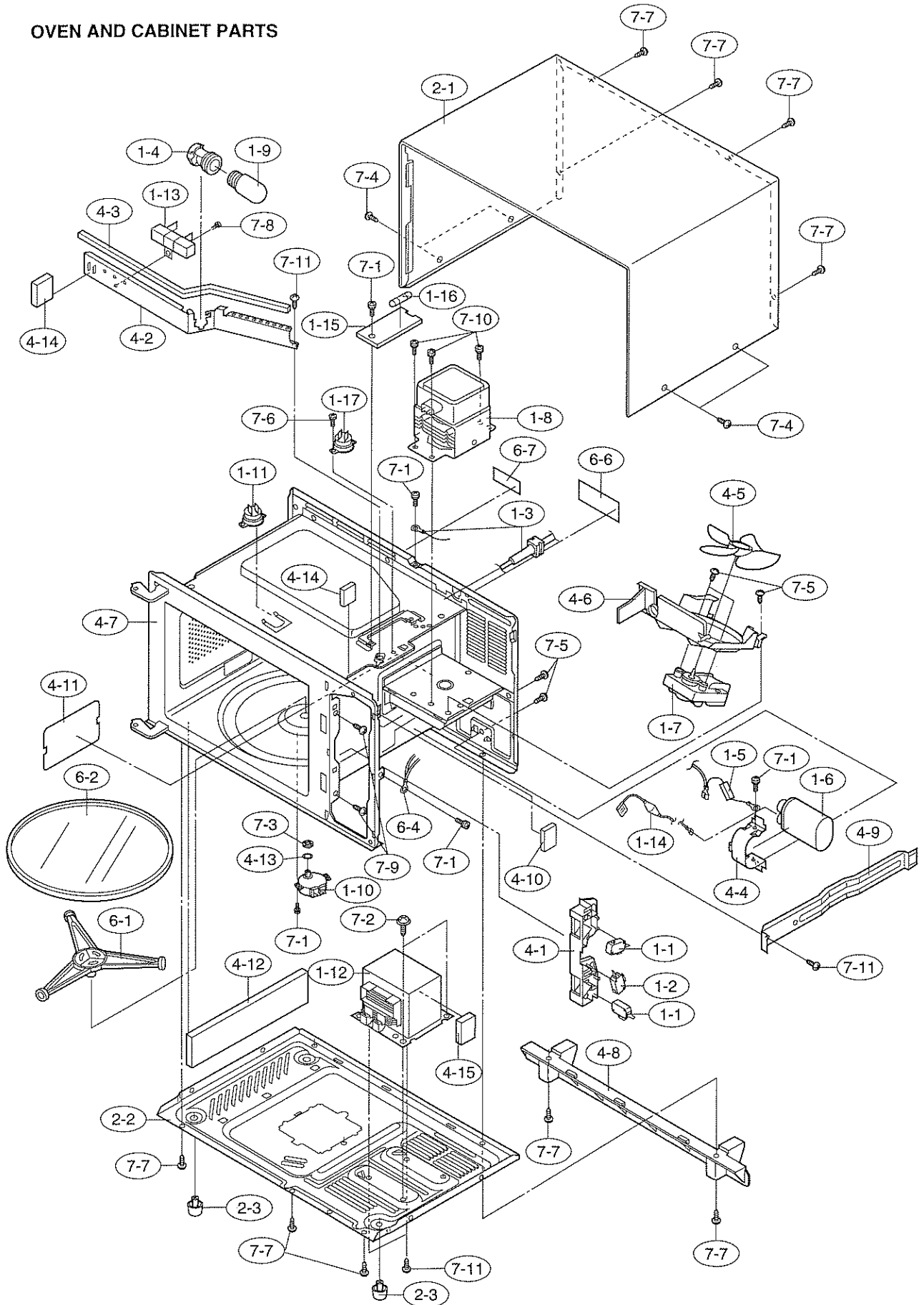
SCREWS AND WASHERS				
7- 1	XHPD40P08K00	Screw : 4mm x 8mm	5	AC
7- 2	LX-EZA042WRE0	Special screw	2	AB
7- 3	LX-WZA028WRE0	Special washer	1	AB
7- 4	XOTSE40P08000	Screw : 4mm x 8mm	4	AA
7- 5	XHTSD40P08RV0	Screw : 4mm x 8mm	5	AA
7- 6	XHPD30P06000	Screw : 3mm x 6mm	1	AA
7- 7	XOTSD40P12RV0	Screw : 4mm x 12mm	9	AA
7- 8	XOTSD40P12000	Screw : 4mm x 12mm	1	AA
7- 9	LX-CZ0052WRE0	Special screw	2	AA
7-10	XHPD40P08000	Screw : 4mm x 8mm	3	AA
7-11	XOTSD40P08000	Screw : 4mm x 8mm	4	AA

HOW TO ORDER REPLACEMENT PARTS

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

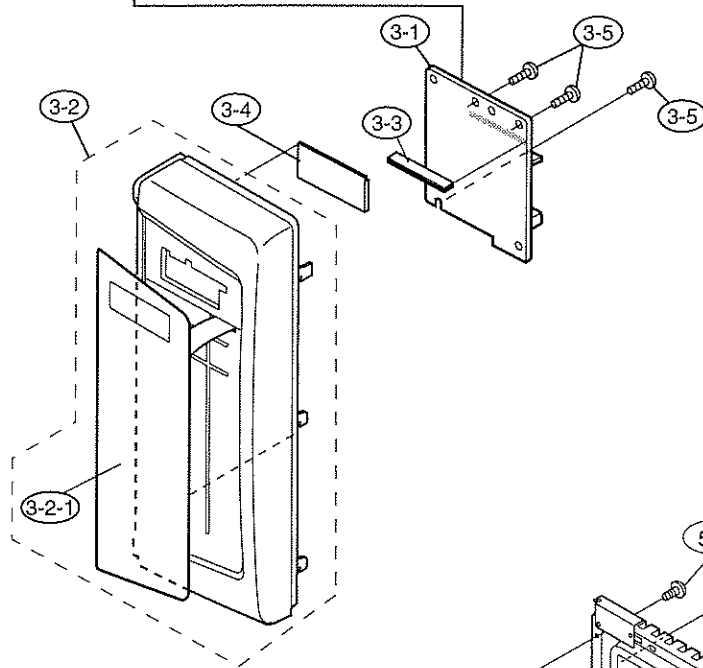
1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

OVEN AND CABINET PARTS

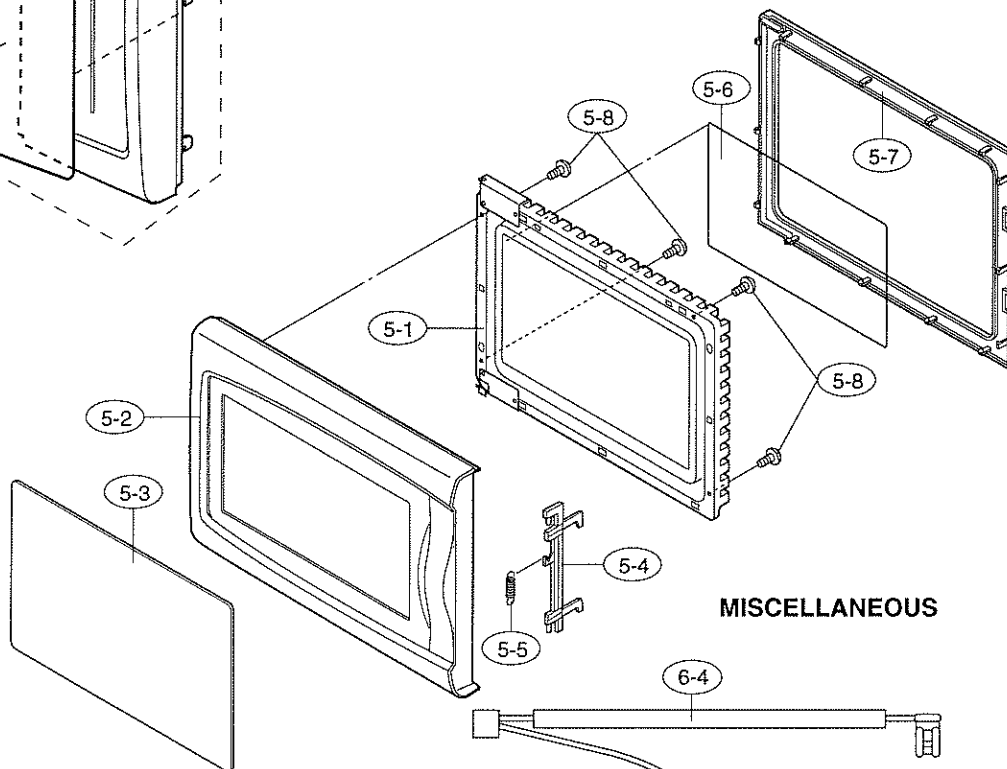


CONTROL PANEL PARTS

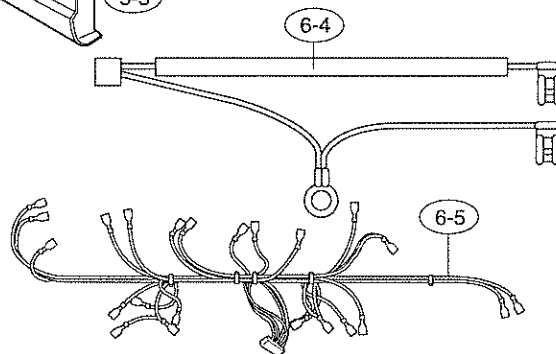
Before attaching Control unit to Control panel, foil side of Control unit must be cleaned by ethyl-alcohol.



DOOR PARTS

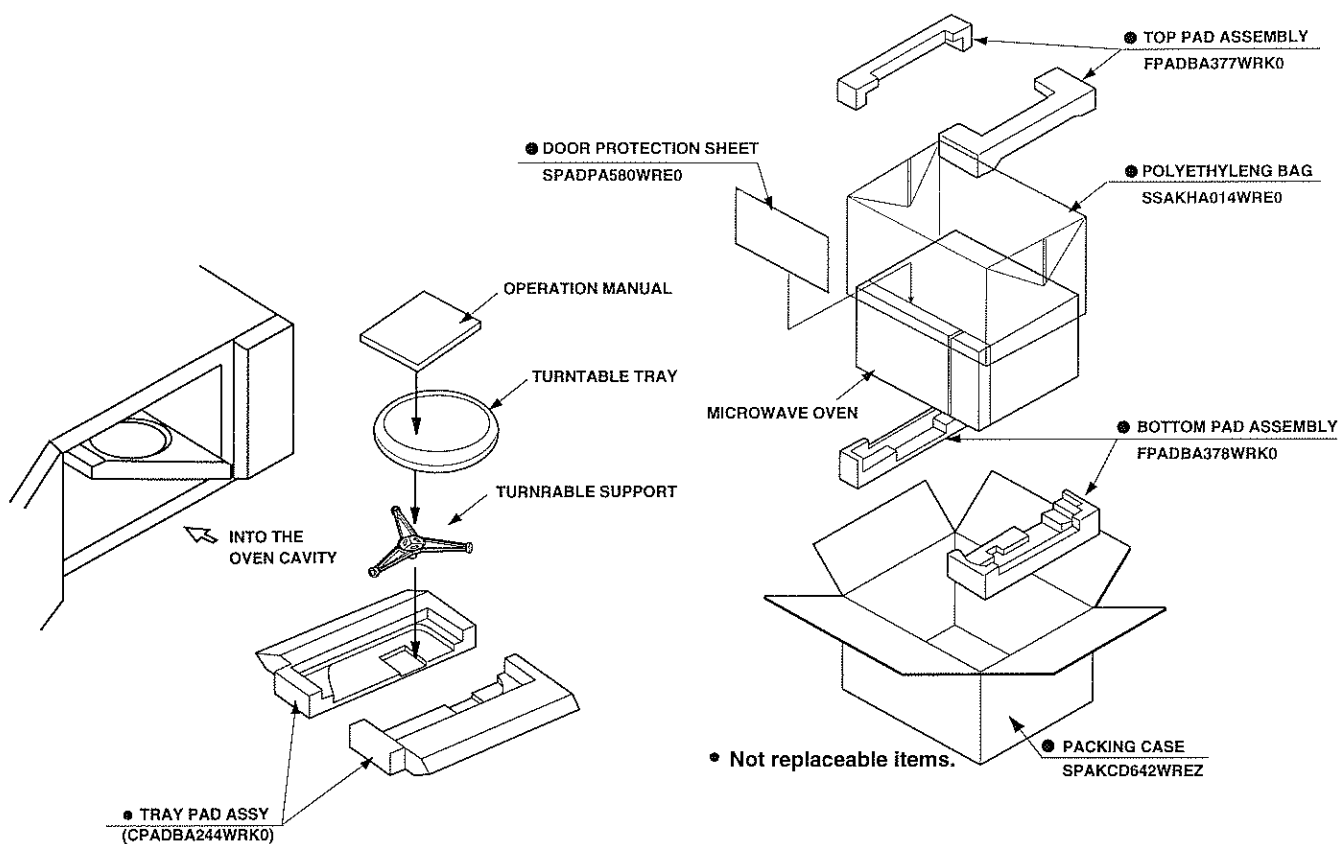


MISCELLANEOUS



Actual wire harness may be different than illustration.

PACKING AND ACCESSORIES



SHARP

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