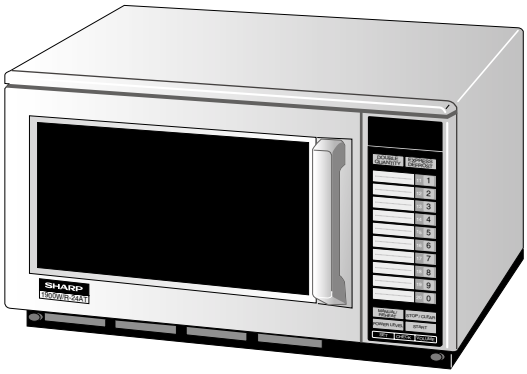
SHARP® SERVICE MANUAL

SY520R24ATK//



R-24AT

COMMERCIAL

MICROWAVE OVEN

MODELS R-22AT
R-24AT

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

This revised service manual is applied to
R-22AT from serial No. 050505509 and
R-24AT from serial No. 050508658.

Because many parts have been changed to improve quality of these models from May 2005 production.
And the changed parts are not interchangeable. Please use this service manual for above products.
For old products, please use old service manual (No.SX910R24ATK//) and technical reports.

TABLE OF CONTENTS

SHARP CORPORATION

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current. Contact with following parts will result in electrocution.
High voltage capacitors, High voltage transformers, Magnetrons, High voltage rectifier assembly, High voltage fuses, High voltage harness.

REMEMBER TO CHECK 3D

1) **D**isconnect the supply.
2) **D**oor opened, and wedged open.
3) **D**ischarge high two voltage capacitors.

WARNING: AGAINST THE CHARGE OF THE TWO HIGH-VOLTAGE CAPACITORS.

The two high-voltage capacitors remain charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the two high-voltage capacitors (that is, of the connecting lead of the high-voltage rectifier) against the chassis with 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 one (1) minut. When the one minute 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.

SERVICE MANUAL

SHARP

**COMMERCIAL
MICROWAVE OVEN**

R-22AT/ R-24AT

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 DESCRIPTION

SPECIFICATION

<table>
<tr><th>ITEM</th><th>DESCRIPTION</th></tr>
<tr><td>Power Requirements</td><td>230 - 240 Volts
50 Hertz
Single phase, 3 wire earthed</td></tr>
<tr><td>Power Comsumption</td><td>2.4 kW Approx. 11 A [R-22AT] / 2.9 kW Approx. 13 A [R-24AT]</td></tr>
<tr><td>Power Output</td><td>1500 W [R-22AT]/ 1900 W [R-24AT] nominal of RF microwave energy (measured by method of IEC 60705) Operating frequency 2450 MHz</td></tr>
<tr><td>Case Dimensions</td><td>Width 510mm   Height 335 mm   Depth 470mm</td></tr>
<tr><td>Cooking Cavity Dimensions</td><td>Width 330 mm   Height 180 mm   Depth 330mm</td></tr>
<tr><td>Control Complement for</td><td>Touch Control System
<u>The combination of cooking time and microwave power</u>
The oven can be programmed a series of up to 3 cookling stages.
The combination of microwave power and cooking time that can be input as folllows.
<table>
<tr><th>Cooking Sequence</th><th>Micrwave power levelthat can be iused.</th><th>Cooking time that can be iused.</th></tr>
<tr><td>1 Stage only</td><td>0-100%</td><td>Max. 30 minutes</td></tr>
<tr><td rowspan="4">2 or 3 Stage</td><td rowspan="3">0-40% all stages</td><td>Max. 30 minutes any stages</td></tr>
<tr><td>Max. 60 minutes for 2 stages</td></tr>
<tr><td>Max. 90 minutes for 3 stages</td></tr>
<tr><td>50-100%</td><td>Max. 30 minutes for 3 stages</td></tr>
</table>
NOTE:If the oven used with the power level above 40% on any stage, the maximum cooking time is 30 minutes in total.
Microwave Power level
100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%
MANUAL / REPEAT key, NUMBER keys
POWER LEVEL key, STOP / CLEAR key
START Key, DOUBLE QUANTITY key
EXPRESS DEFROST key, SET key
CHECK key, VOLUME key</td></tr>
<tr><td>CSet Weight</td><td>Approx. 33 kg</td></tr>
</table>

GENERAL INFORMATION

WARNING

THIS APPLIANCE MUST BE EARTHED

IMPORTANT

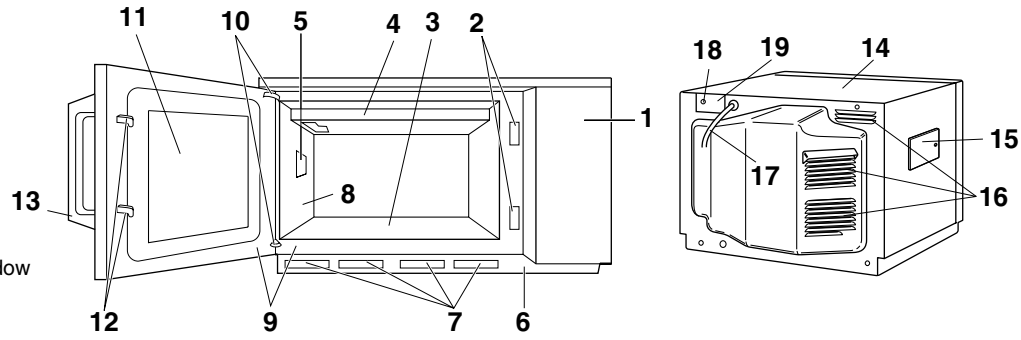
THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

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

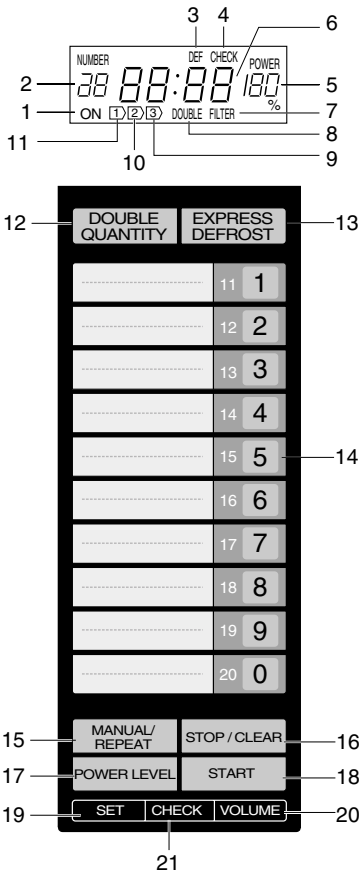
APPEARANCE VIEW

OVEN

1. Control panel
2. Hole for safety door latches
3. Ceramic floor
4. Splash cover
5. Oven light
6. Air intake filter
7. Air intake openings
8. Oven cavity
9. Door seals and sealing surfaces
10. Door hinges
11. Oven door with see-through window
12. Door safety latches
13. Door handle.
14. Outer cabinet
15. Removable cover over oven light bulb
16. Air vent openings
17. Power supply cord
18 Mounting plate
19 Screw for mounting plate



AUTO TOUCH CONTROL PANEL



DISPLAY AND INDICATORS

Check indicators after the oven starts to confirm the oven is operating as desired.

1. Heating indicator
   This indicator shows cooking in progress.
2. Memory number indicator
3. Express defrost
4. Check mode indicator
5. Power level display
6. Time display
7. Filter indicator
8. Double quantity mode indicator
9. 3rd. stage indicator
10. 2nd. stage indicator
11. 1st. stage indicator

OPERATING KEYS

12. DOUBLE QUANTITY key
13. EXPRESS DEFROST key
14. NUMBER keys
15. MANUAL/ REPEAT key
16. STOP/CLEAR key
17. POWER LEVEL key
18. START key
19. SET key
20. VOLUME key
21. CHECK key

INSTALLATION INFORMATION

When this commercial microwave oven is installed near other commercial electrical appliances, connect a lead wire to each equivalent potential terminal with equipotential marking between them (insert a lead wire between a washer and an earth angle, and screw them), as shown in Fig. A-1, to make sure that they are at equivalent potential.
If any lead wire is not connected between them, when person touch them he/she will get a electric shock.

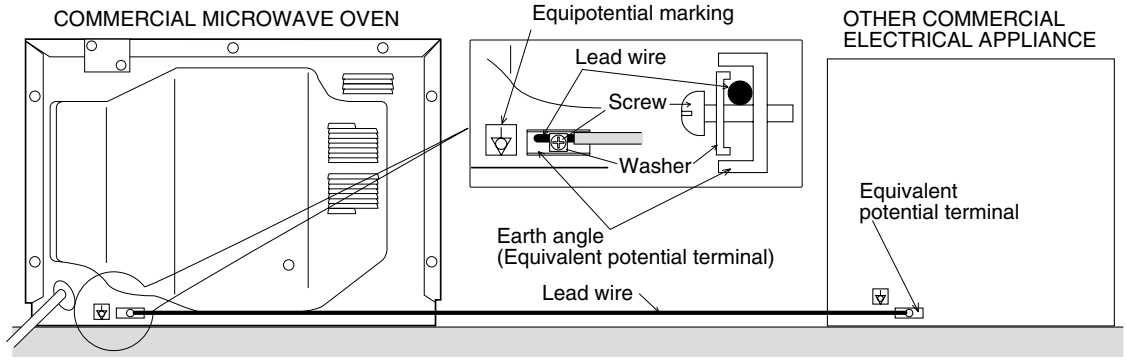


Figure A-1

OPERATION SEQUENCE

Closing the door activates all door interlock switches (interlock switches and stop 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 (230 - 240 volts, 50Hz), the line voltage is supplied to the control unit through the noise filter.

Figure O-1 on page 32

1. The digital display shows [.]

IDLE CONDITION

When the door is opened, the contacts of the interlock switches SW1+SW2 and stop switch SW5 open, initiating the following:

Figure O-2 on page 32

1. A signal is input to the control unit energizing the coil of shut-off relay RY-1.
2. The shut-off relay RY-1 contacts close completing circuits to turn on the oven lamp, blower motor and antenna motors.
3. If the door remains open, 60 seconds later the control unit de-energizes shut-off relay RY-1 turning off the oven lamp, blower motor and antenna motors.

When the door is closed, the contacts of the interlock switches SW1+SW2 and stop switch SW5 close. With the closing of the stop switch SW5 contacts, an additional circuit is provided which will permit the operation of the oven when one of the touch pads is depressed. Since the control is enabled through the stop switch SW5, the door must be closed before the touch pads will be effective. When the door is closed, a full 60 second IDLE condition is always provided for selecting and pressing the desired touch pads. A 60 second IDLE condition will also follow the end of each cook cycle.

MICROWAVE COOKING CONDITION

Touch MANUAL/REPEAT key and enter a desired cooking time with the touching NUMBER key. And then touch START key.

NOTE: The programme and the check are canceled when any keys are not touched for more than 3 minutes during programming.

Function sequence Figure O-3 on page 33

CONNECTED COMPONENTS	RELAY
Oven lamp/ Blower motor/ Antenna motors	RY1
High voltage transformer T1	RY3
High voltage transformer T2	RY4

1. The line voltage is supplied to the primary winding of the two high voltage transformers. 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 RY3+RY4 go back to their home position. The circuits to the high voltage transformers T1+T2. The relay RY1 remains and oven lamp, blower motor and antenna motors work for 1 minute.
5. When the door is opened during a cook cycle, the switches come to the following condition.

		CONDITION	
		DURING	DOOR OPEN
SWITCH	CONTACT	COOKING	(NO COOKING)
Interlock switches	COM-NO	Closed	Open
Monitor switches	COM-NC	Open	Closed
Stop switch	COM-NO	Closed	Open

The circuits to the high voltage transformers T1+T2 are cut off when the interlock and stop switches SW1+SW2+SW5 are made open. The blower motor BM, antenna motors and 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, but the program is cancelled if the oven is not started within 1 minute.

6. MONITOR SWITCH CIRCUIT
The monitor switches SW3+SW4 are mechanically controlled by oven door, and monitors the operation of the interlock switches SW1+SW2.

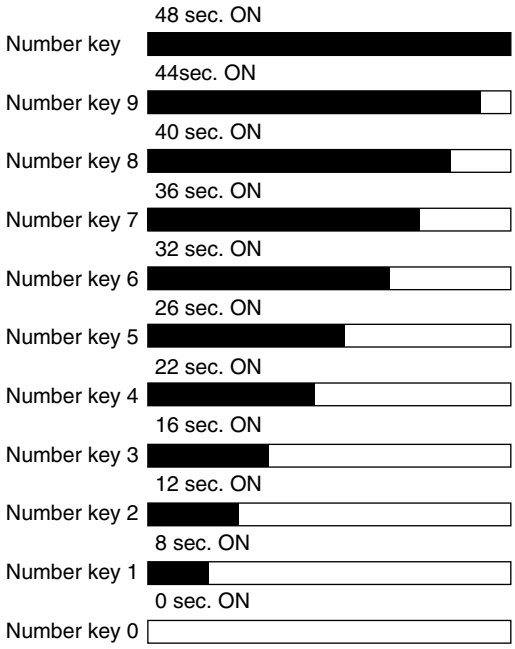
6-1. When the oven door is opened during or after the cycle of a cooking program, the interlock switches SW1+SW2 and stop switches SW5 must open their contacts first. After that the contacts (COM-NC) of the monitor switches SW3+SW4 can be closed.

6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switches SW3+SW4 must be opened first. After that the contacts (COM-NO) of the interlock switches SW1+SW2 and stop switch SW5 must be closed.

6-3. When the oven door is opened and the contacts of the interlock switch SW1 (or SW2) remain closed, remains closed, the fuse F1 F10A (or F2 F10A) will blow, because the monitor switch SW3 (or SW4) is closed and a short circuit is caused.

MICROWAVE VARIABLE COOKING

When the microwave oven is preset for variable cooking power, the line voltage is supplied to the high voltage transformers T1+T2 intermittently within a 48 second time base through the contacts of the relays RY3+RY4.
The following levels of microwaves power are given.



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.

TWO MAGNETRON OPERATION SYSTEM

Two magnetrons MG1+MG2 are equipped in order to get higher microwave power output. The primary windings of the high voltage transformers T1+T2 are connected so that each magnetron can be oscillated alternatively according to the frequency of the power supply. Refer to the Figure B-1 and B-2.

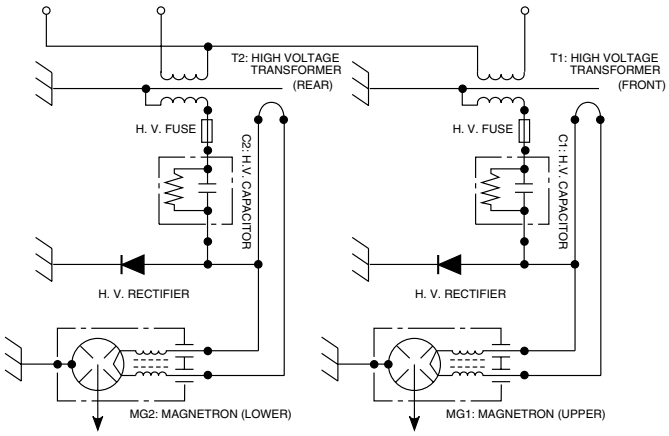


Figure B-1. High Voltage Circuit

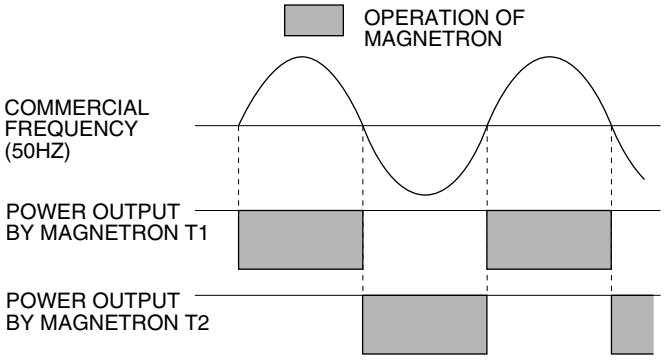


Figure B-2. Operation of Magnetron

FUNCTION OF IMPORTANT COMPONENTS

DOOR OPEN MECHANISM

1. The door release lever is pulled.
2. The upper latch head is lifted up by the linked door release lever.
3. The head lever is lifted up by the door release lever.
4. The joint lever is lifted up by the head lever.
5. The lower latch head is lifted up by the joint lever.
6. Now both latch heads are lifted up, so they can be released from the latch hook.
7. Now the door can be opened.

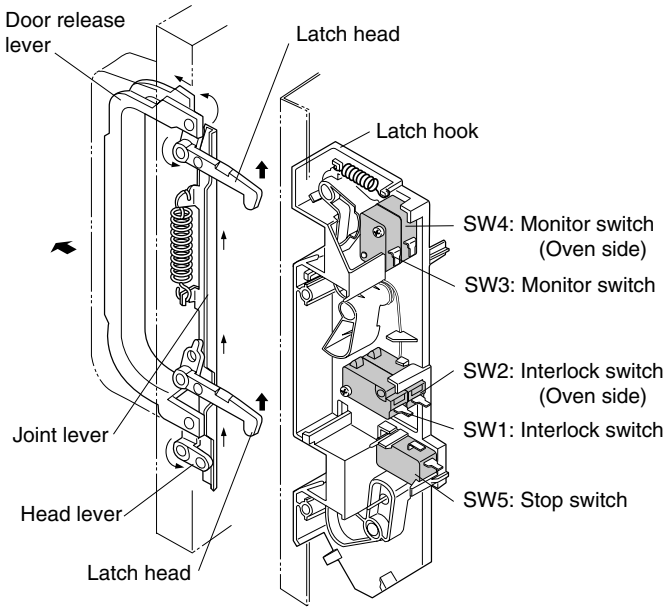


Figure D-1. Door Open Mechanism

INTERLOCK SWITCHES SW1, SW2 AND STOP SWITCH SW5

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 SWITCHES SW3, SW4

The monitor switches SW3, SW4 are activated (the contacts opened) the upper latch head and switch lever A while the door is closed. The switch SW3 (or SW4) is intended to render the oven inoperative by means of blowing the fuse F1 F10A (or F2 F10A) when the contacts of the interlock switch SW1 (or SW2) fail to open when the door is opened.

Function

1. When the door is opened, the monitor switches SW3 +SW4 contacts close (to the ON condition) due to their being normally closed. At this time the interlock switch SW1+SW2 are in the OFF condition (contacts open) due to their being normally open contact switches.
2. As the door goes to a closed position, the monitor switches SW3+SW4 contacts are opened and interlock switch SW1+SW2 contacts are closed (On opening the door, each of these switches operate inversely.)
3. If the door is opened and the interlock switch SW1 (or SW2) contacts fail to open, the fuse F1 F10A (or F2 F10A) blows simultaneously with closing of the monitor switch SW3 (or SW4) contacts.

CAUTION: BEFORE REPLACING A BLOWN FUSE F1 F10A (OR F2 F10A) TEST THE INTERLOCK SWITCH SW1 (OR SW2) AND MONITOR SWITCHE SW3 (OR SW4) FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE").

NOISE FILTER

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

FUSES F1, F2 F10A 250V

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 F1 F10A (or F2 F10A) also blows when interlock switch SW1 (or SW2) remains closed with the oven door open and when the monitor switches SW3 (or SW4) closes.

WEAK POINT F3

If the wire harness or electrical components make a short-circuit, this weak point F3 blows to prevent an electric shock or fire hazard.

HIGH VOLTAGE FUSE(S) F4, F5

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

MAGNETRON TEMPERATURE FUSES TF1, TF2

The temperature fuses TF1, TF2 located on the top of the upper and lower waveguide, are designed to prevent damage to the magnetrons MG1, MG2. If an over heated condition develops in the tube due to blower motor failure, obstructed air ducts, dirty or blocked air intake, etc., the circuit to the magnetrons are interrupted. Under normal operation, the temperature fuses remains closed. However, when abnormally high temperatures are generated within the magnetrons, the temperature fuses will open at 150˚C causing the microwave energy to stop. The defective temperature fuses must be replaced with new rated ones.

EXHAUST TEMPERATURE FUSE TF3

The temperature fuse TF3, located on the side of the exhaust duct assembly, is designed to prevent damage to the oven by fire. If the food load is overcooked, by either error in cook time or defect in the control unit, the temperature fuse will open. Under normal operation, the oven temperature fuse remains closed. However, when abnormally high temperatures are generated within the oven cavity, the oven temperature fuse will open at 120˚C, causing the oven to shut down. The defective temperature fuse must be replaced with new rated one.

EXHAUST OVEN THERMISTOR TH3

The thermistor is a negative temperature coefficient type. The temperature in the exhaust duct is detected through the resistance of the thermistor.
If the temperature is high, the control panel will display “EE7” and the oven will stop to avoid overheating and catching fire.
If the thermistor is open, the control panel will display "EE6" and the oven will stop.

MAGNETRON THERMISTORS TH1, TH2

The thermistor is a negative temperature coefficient type. The air temperature around the magnetron is detected through the resistance of the thermistor.
If the temperature is high, the control panel will display "EE17" and the oven will stop to protect the lower magnetron against overheat.
If the magnetron thermistor is open, the control panel will display "EE16" and the oven will stop.
If the magnetron thermistor is short, the control panel will display "EE19" and the oven will stop.

BLOWER MOTOR BM

The blower motor BM drives a blade which draws external cool air into the oven. This cool air is directed through the air vanes surrounding the magnetrons and cools the magnetrons. 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.

ANTENNA MOTORS SM

The upper and lower antenna motors SM drive stirrer antennas.

OVEN LAMP OL

The oven cavity light illuminates the interior of the oven so that food being cooked can be examined visually through the door window without having to open the door. The oven lamp is on during the cooking cycle and idle condition.

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 F1 F10A (or F2 F10A) in the interlock switch SW1 (or SW2) - monitor switches SW3 (or SW4) , check the interlock switch SW1 (or SW2) and monitor switches SW3 (or SW4) before replacing the fuse F1 F10A (or F2 F10A).

TESTPROCEDURE

POSSIBLE CAUSE AND DEFECTIVE PARTS

	CONDITION / PROBLEM	EEP ROM I-2	KEY UNIT	TOUCH CONTROL TRANSFORMER T3	Due to programme lock	Over the max. cooking time	No power at wall outlet	HOME FUSE or BREAKER	Mis adjustment of switches	FUSE 2.5A	RELAY RY-4	RELAY RY-3	RELAY RY-1	TOUCH CONTROL PANEL	Opened wire harness	Shorted wire harness	POWER SUPPLY CORD	NOISE FILTER	OVEN LAMP OR SOCKET	BLOWER MOTOR BM	ANTENNA MOTORS SM	EXHAUST THERMISTOR TH3	MAGNETRON THERMISTOR (Lower) TH2	MAGNETRON THERMISTOR (Upper) TH1	HIGH VOLTAGE FUSE F5	HIGH VOLTAGE FUSE F4	EXHAUST TEMPERATURE FUSE TF3	MAGNETRON TEMPERATURE FUSE TF2	MAGNETRON TEMPERATURE FUSE TF1	WEAK POINT F3	FUSE F10A F2	FUSE F10A F1	STOP SWITCH SW5	MONITOR SWITCH SW4	MONITOR SWITCH SW3	NTERLOCK SWITCH SW2	INTERLOCK SWITCH SW1	H.V. CAPACITOR C2	H.V. CAPACITOR C1	H.V. WIRE HARNESS	H.V. RECTIFIER ASSEMBLY FOR MG2	H.V. RECTIFIER ASSEMBLY FOR MG1	HIGH VOLTAGE TRANSFORMER T2 (Rear)	HIGH VOLTAGE TRANSFORMER T1 (Front)	MAGNETRON MG2 (Lower)	MAGNETRON MG1 (Upper)
		EEP ROM I-2																																											
N		KEY UNIT	●																																										
		TOUCH CONTROL TRANSFORMER T3			●																																								
		Due to programme lock	●																																									
		Over the max. cooking time																																										
		No power at wall outlet		●																																								
		HOME FUSE or BREAKER		●																																								
		Mis adjustment of switches			●	●									●																													
P		FUSE 2.5A		●																																								
O		RELAY RY-4				●									●																													
O		RELAY RY-3				●									●																													
O		RELAY RY-1												●																													
M		TOUCH CONTROL PANEL	●		●				●					●																													
		Opened wire harness	●		●									●																													
		Shorted wire harness							●																																		
		POWER SUPPLY CORD	●				●																																			
K		NOISE FILTER	●						●																																	
		OVEN LAMP OR SOCKET																																									
J		BLOWER MOTOR BM																																									
J		ANTENNA MOTORS SM																																									
I		EXHAUST THERMISTOR TH3																																									
I		MAGNETRON THERMISTOR (Lower) TH2																																									
I		MAGNETRON THERMISTOR (Upper) TH1																																									
L		HIGH VOLTAGE FUSE F5																																									
L		HIGH VOLTAGE FUSE F4																																									
H		EXHAUST TEMPERATURE FUSE TF3	●																																								
H		MAGNETRON TEMPERATURE FUSE TF2																																									
H		MAGNETRON TEMPERATURE FUSE TF1																																									
F		WEAK POINT F3	●																																								
G		FUSE F10A F2																																									
G		FUSE F10A F1																																									
E		STOP SWITCH SW5			●																																						
E		MONITOR SWITCH SW4																																									
E		MONITOR SWITCH SW3																																									
E		NTERLOCK SWITCH SW2				●																																					
D		INTERLOCK SWITCH SW1				●																																					
D		H.V. CAPACITOR C2																																									
D		H.V. CAPACITOR C1																																									
		H.V. WIRE HARNESS																																									
C		H.V. RECTIFIER ASSEMBLY FOR MG2																																									
C		H.V. RECTIFIER ASSEMBLY FOR MG1																																									
B		HIGH VOLTAGE TRANSFORMER T2 (Rear)																																									
B		HIGH VOLTAGE TRANSFORMER T1 (Front)																																									
A		MAGNETRON MG2 (Lower)																																									
A		MAGNETRON MG1 (Upper)																																									
	OFF CONDITION	“ . “ does not appear on display when power cord is plugged into wall outlet.																																								
		Control panel can not accept key in.																																								
		Fuse F1 or F2 blows when the door is opened.																																								
		Home fuse blows when power cord is plugged into wall outlet.																																								
		Weak point F3 blows when power cord is plugged into wall outlet.																																								
		Oven lamp, fan motor and antenna motors do not work for 1 minute when the door is opened or after cooking.																																								
		Fuse F1 or F2 blows when power cord is plugged into wall outlet.																																								
		Oven lamp does not light when door is opened. (Blower and antenna motors work)																																								
		Blower motor does not work when door is opened. (Oven lamp lights and antenna motors work)																																								
	ON CONDITION	“EE 1” (Magnetron MG1 failure)	●																																								
		“EE 2” (Magnetron MG2 failure)			●																																							
		“EE 3” (Magnetron MG1 and MG2 failure)	●																																								
		“EE 6” (Exhaust thermistoropen)																																									
		“EE 7” (Exhaust air temperature is high)																																									
		“EE 9” (Exceeded max. heating time)																																									
		Oven lamp, blower motor and antenna motors do not work.																																								
		Oven lamp does not work.																																								
		Blower motor does not work.																																								
		Oven does not stop after end of cooking cycle.																																								
		Home fuse blows when starting the oven.																																								
		Oven goes into cook cycle but shuts down before end of cooking cycle.																																								
		It passed more than 1 minute after cooking but oven lamp, blower motor and stirrer motors do not stop.																																								
		“EE 16” (Thermistor of magnetron are open.)																																								
		“EE 17” (Magnetron temperature is high.)																																								
		“EE 19” (Magnetron thermistor short)																																								
		“EE 10” (Fault of memory)																																								
		Antenna motors do not work.																																								

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

A **MAGNETRON TEST**

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

CARRY OUT 3D CHECKS.

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

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

To test for short 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 way of IEC 60705, i.e. it is measured by how much power the water load can absorb. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately P x t/4.187 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is V x ΔT.

The formula is as follows;
P x t / 4.187 = V x Δ T+ 0.55 x mc (T2-T0) P (W) = 4.187 x V x ΔT / t + 0.55 x 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 ..... 28 sec. [R-22AT] / 22sec. [R-24AT] Mass of container (mc) ..... 330 g
T2 ..... Final Temperature P = 150 x ΔT [R-22AT] / P = 190 x ΔT [R-24AT]

Measuring condition:
1. Container
   The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.
2. Temperature of the oven and vessel
   The oven and the empty vessel are at ambient temperature prior to the start the test.
3. Temperature of the water
   The initial temperature of the water is (10±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 be an accurate thermometer.
7. The water load must be (1000±5) g.
8. "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 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 until the temperature of the water rises by a value Δ T of (10 ± 2) K.
5. Stir the water to equalize temperature throughout the vessel.
6. Measure the final water temperature. (Example: The final temperature T2 = 21°C)
7. Calculate the microwave power output P in watts from above formula.

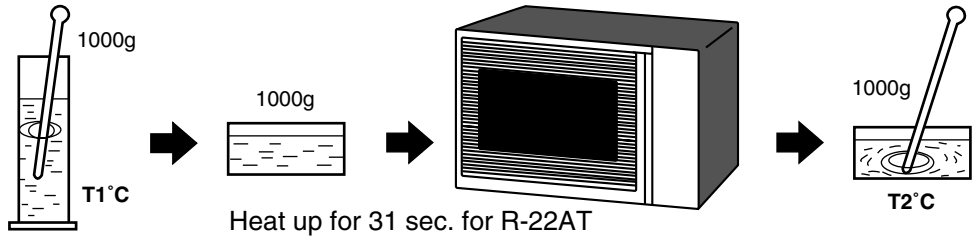
TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

Room temperature ..... T0 = 21°C
Initial temperature ..... T1 = 11°C
Temperature after (28 + 3) = 31 sec [for R-22AT]..... T2 = 21°C
Temperature after (22 + 3) = 25 sec [for R-24AT]..... T2 = 21°C
Temperature difference Cold-Warm..... ΔT1 = 10˚C
Measured output power
The equation is "P = 150 x ΔT" [for R-22AT] ..... P = 150 x 10°C = 1500 Watts
The equation is "P = 190 x ΔT" [for R-24AT] ..... P = 190 x 10°C = 1900 Watts

JUDGMENT: The measured output power should be within the range of ± 15 % of the rated output power.

CAUTION: 1°C CORRESPONDS TO 150 WATTS [R-22AT]/ 190 WATTS [R-24AT]. REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



Heat up for 31 sec. for R-22AT
Heat up for 25 sec. for R-24AT

MICROWAVE OUTPUT POWER (2000 cc alternative method)
The power output of this oven is rated using the method specified by IEC 60705. Full details of how to curry out this procedure can be found in the Sharp Technical Training notes which is available from Sharp Parts Centre (part number SERV-LITMW01).

The IEC-60705 procedure must be carried out using laboratory-type procedures and equipment. These requirements make the procedure unsuitable for routine performance checks.

NOTE: The following test method gives an indication of the output power only, it cannot be used to establish the actual/rated output power. If the true output power is required, then the IEC60705 test method must be used.

Alternative simplified method:
1. Place 2 litres of cold water (between 12°C and 20°C) in a suitable container.
2. Stir the water and measure the temperature in °C. Note temperature as T1.
3. Place the container in the microwave and heat the water for 56 sec. [R-22AT]/ 44 sec. [R-24AT] on fill power.
4. When the 56 sec. [R-22AT]/ 44 sec. [R-24AT] is completed, remove the container and stir the water. Note temperature as T2.
5. Calculate the output power using the following formula:
   R.F. Power Output = (T2 - T1) x 150 for R-22AT.
   R.F. Power Output = (T2 - T1) x 190 for R-24AT.

NOTE: The result from this test should be within the allowance of 2000cc alternative method. (±10%).

MICROWAVE LEAKAGE TEST
This oven should be tested for microwave leakage on completion of any repair or adjustment, following the procedure described in the Sharp Technical Training notes (part number SERV-LITMW01). The maximum leakage permitted in BS EN 60335-2-25 is 50W/m^2 (equivalent to 5W/m^2), however it is not normal to detect any significant leakage, therefore, any leakage which is detected should be investigated.

It is essential that only leakage detectors with current calibration traceable to National Physical Laboratories are used.

Suitable leakage detectors: CELTEC A100
APOLLO X1

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

B HIGH VOLTAGE TRANSFORMER TEST

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

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

	R-22AT	R-24AT
a. Primary winding	approximately 1.8 Ω	approximately 1.2 Ω
b. Secondary winding	approximately 75 Ω	approximately 75 Ω
c. Filament winding	less than 1 Ω	

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

C HIGH VOLTAGE RECTIFIER ASSEMBLY TEST

CARRY OUT 3D CHECKS.

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

HIGH VOLTAGE RECTIFIER

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

D HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

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

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

CARRY OUT 4R CHECKS.

E SWITCH TEST

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

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

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 WEAK POINT F3 TEST

CARRY OUT 3D CHECKS.

If the weak point F3 is blown, there could be a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

CAUTION: Only replace weak point F3 with the correct value replacement.

G FUSE F1, F2 F10A TEST

CARRY OUT 3D CHECKS.

If the fuse F1 F10A (or F2 F10A) is blown when the door is opened, check the interlock switch SW1 (or SW2) and monitor switch SW3 (or SW4).
If thefuse F1 F10A (or F2 F10A) is blown by incorrect door switching replace the defective switch(s) and the fuse F1 F10A (or F2 F10A).

CARRY OUT 4R CHECKS.

CAUTION: Only replace fuse F1 F10A (or F2 F10A) with the correct value replacement.

H TEMPERATURE FUSE TF1, TF2, TF3 TEST

1. CARRY OUT 3D CHECKS.
2. A continuity check across the temperature fuse terminals should indicate a closed circuit unless the temperature of the temperature fuse reaches specfied temperature as shown below.

	Open temperature	Close temperature	Display or Condition	Check point
Magnetron temperature fuse (Upper) TF1	150˚C	Non resetable type	EE1	Magnetron MG1 Failure: Test magnetron MG1 and Blower motor.
Magnetron temperature fuse (Lower) TF2			EE3	Magnetron MG1, MG2 Failure: Test magnetron MG1, MG2. Check blower motor and ventilation opening.
			EE2	Magnetron MG2 Failure: Test magnetron MG2 and Blower motor.
Exhaust temperature fuse TF3	120˚C	Non resetable type	Oven shut off	Food has been burned in oven. Temperature of oven inside is very high.

3. CARRY OUT 4R CHECKS.

CAUTION: IF THE temperature fuse INDICATES AN OPEN CIRCUIT AT ROOM TEMPERATURE, REPLACE temperature fuse.

I THERMISTOR TH1, TH2, TH3 TEST

1. CARRY OUT 3D CHECKS.
2. Follow the procedures below for each thermistor.

2-1. THERMISTOR TEST
Disconnect the connector of the thermistor from the switch harness. Measure the resistance of the magnetron thermistor with an ohmmeter. Connect the ohmmeter leads to the leads of the thermistor.

Resistance: Approx. 500 kΩ -- 1 MΩ

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

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

J MOTOR WINDING TEST

CARRY OUT 3D CHECKS.
Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals.

Resistance of Blower motor should be approximately 60Ω.
Resistance of Antenna motor should be approximately 8.8 kΩ.

If incorrect readings are obtained, replace the motor.

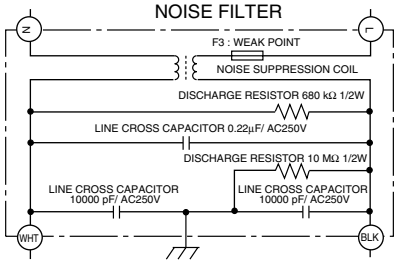
CARRY OUT 4R CHECKS.

K NOISE FILTER TEST

CARRY OUT 3D CHECKS.

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

MEASURING POINT	INDICATION OF OHMMETER
Between N and L	Approx. 680 kΩ
Between terminal N and WHIT	Short circuit
Between terminal L and BLK	Short circuit



If incorrect readings are absorbed, replace the noise filter.

CARRY OUT 4R CHECKS.

L HIGH VOLTAGE FUSE F4, F5 TEST

CARRY OUT 3D CHECKS.

If the high voltage fuse F4 (or F5) is blown, there could be a short in the high voltage rectifier or the magnetron MG1 (or MG2). Check them and replace the defective parts and the high voltage fuse F4 (or F5).

CARRY OUT 4R CHECKS.

CAUTION: Only replace high voltage fuse with the correct value replacement.

M TOUCH CONTROL PANEL ASSEMBLY TEST

The touch control panel consists of circuits including semiconductors such as LSI, IC, 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 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 the pads, sometimes a pad produces no signal.
2. Control Unit
   The following symptoms may indicate a defective control unit. Replacing the control unit. Before replacing the control unit, perform the key unit test (Procedure N) to determine if control unit is faulty.

2-1 Programming problems.
   a) When touching the pads, a certain group of pads do not produce a signal.

2-2 Display problems.
   a) For a certain digit, all or some segments do not light up.
   b) For 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.

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST

f) A certain group of indicators do not light up.
g) The figure of all digits flicker.

2-3 Other possible problems caused by defective control unit.
a) Buzzer does not sound or continues to sound.
b) Cooking is not possible.

N KEY UNIT TEST

CARRY OUT 3D CHECKS.

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 stop switch operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the stop switch is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the stop switch is closed (either close the door or short the stop 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 4R CHECKS.

	G1	G2	G3	G4	G5	G6	G7	G8
G9				17 7	POWER LEVEL	DOUBLE QUANTITY	START	SET
G10				18 8	MANUAL/REPEAT	EXPRESS DEFROST	STOP/ CLEAR	CHECK
G11				19 9	15 5	13 3	11 1	VOLUME
G12				20 0	16 6	14 4	12 2	

O RELAY TEST

CARRY OUT 3D CHECKS.

Remove the outer case and check voltage between Pin Nos. 3 and 5 of the connector (A) on the control unit with an A.C. voltmeter. The meter should indicate 230 - 240 volts, if not check control unit circuity.

RY1, RY3 and RY4 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. 25.9V D.C.	Oven lamp, Blower motor and Antenna motors
RY3	APPROX. 25.0V D.C.	High voltage transformer (MG1)
RY4	APPROX. 25.0V D.C.	High voltage transformer (MG2)

CARRY OUT 4R CHECKS.

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

To protect the electronic circuits, this model is provided with a fine fuse added to the primary on the PWB. If the fuse is open, follow the troubleshooting guide given below for repair.

Problem: POWER ON, indicator does not light up.

CARRY OUT 3D CHECKS.

TEST PROCEDURES

PROCEDURE LETTER | **COMPONENT TEST**

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present at POWER terminal of CPU connector (CN-A).	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of touch control transformer.	Touch control transformer or secondary circuit defective. Check and repair.
3	Fuse on the PWB is open.	Replace the fuse with new one. (CARRY OUT 3D CHECKS BEFORE REPAIR)

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

CARRY OUT 4R CHECKS.

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) Control Unit
(2) Key Unit

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

1. Control Unit

Signal of key touch and oven function control are all processed by one microcomputer.

1) Power Supply Circuit

This circuit changes output voltage at the secondary side of the touch control transformer to voltages required at each part by full wave rectifying circuit, constant voltage circuit, etc..

2) Reset Circuit

This is an Auto-clear Circuit, i.e., a reset circuit, which enables IC1 to be activated from initial state.

3) Power Synchronizing Signal Generating Circuit

This is a circuit for generating power synchronizing signal by virtue of the secondary side output of touch control transformer.
This signal is used for a basic frequency to time processing and so on.

4) Clock Circuit

This is a circuit for controlling clock frequency required for operating I-1.

5) I-1 (Main Processor)

This is a one-chip microcomputer, responsible for controlling the entire control unit.

6) I-2 (Memory Processor)

This is a memory IC, responsible for memory function.

7) Display Circuit

This is a circuit for driving display tubes by I-1 output.

8) Key Input Circuit

This is a circuit for transmitting key input information to I-1.

9) Sound-body Driving Circuit

This is a circuit for driving sound body by I-1 output.

10) Relay Driving Circuit

This is a circuit for driving output relay by I-1 output.

11) Stop Switch Circuit

This is a circuit for driving I-1 to detect door opening/closing.

12) Exhaust Air Temperature Detecting Circuit

This is a circuit for transmitting output change of thermistor (Exhaust thermistor) to I-1.

13) Magnetron Temperature Circuit.

(Detect Noload or Fan Lock)
This is a circuit for transmitting output change of thermistor (Magnetron thermistor) to I-1.

2. Key Unit

The key unit is composed of a matrix circuit in which when a key it touched, one of signals P33 - P34 generated by the LSI, is passed through the key and returned to the LSI as one of signals P24 - P27. This model has 20 Memory pads. When the oven is shipped, Memory pad 1 to 10 are set as follows: fig.1.

Memory No.	Cook Time	Output Power
1	5 sec.	100%
2	10 sec.	100%
3	20 sec.	100%
4	30 sec.	100%
5	40 sec.	100%
6	50 sec.	100%
7	1 min.	100%
8	1 min. 15 sec.	100%
9	1 min.30 sec.	100%
0	2 mins.	100%

(fig. 1)

This model has a double quantity pad. When the oven is shipped, Magnification "1.8" is preset in the double quantity pad. This model has an defrost pad. When the oven is shipped, defrost is set as follows: fig.2.

	1STAGE	2STAGE	3STAGE
POWER	40%	30%	20%
DEFROSTING TIME	0.2T+20sec	0.13T+30sec.	0.67T-50sec.

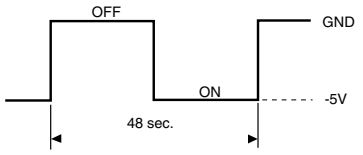
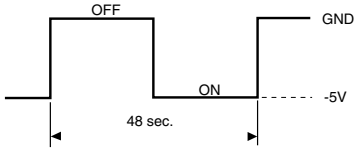
(fig. 2)

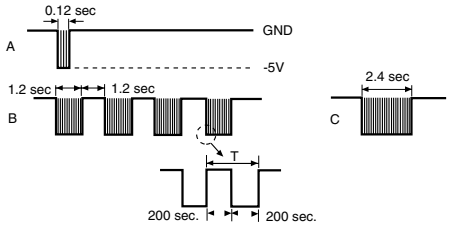
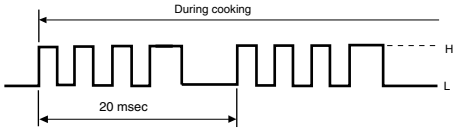
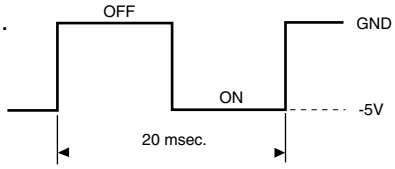
NOTE :
"CHECK" indicator will flash at half of defrosting time.

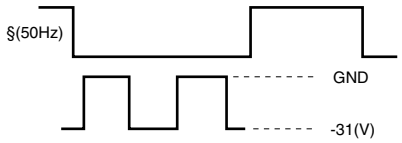
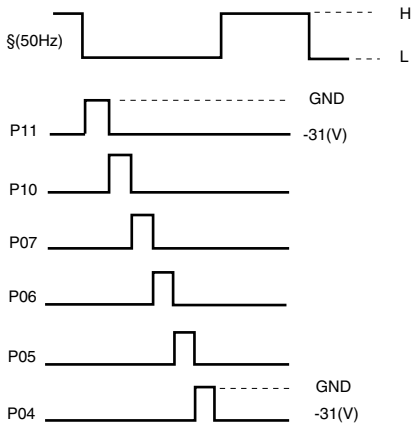
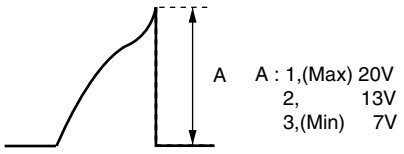
DESCRIPTION OF LSI

LSI(IXA222DR)

The I/O signal of the LSI(IXA222DR) is detailed in the following table.

<table>
<tr><th>Pin No.</th><th>Signal</th><th>I/O</th><th>Description</th></tr>
<tr><td>1</td><td>VCC</td><td>IN</td><td><u>Power source voltage: GND.</u>
VC voltage of power source circuit input. Connected to GND.</td></tr>
<tr><td>2</td><td>VEE</td><td>IN</td><td><u>Anode (segment) of Fluorescent Display light-up voltage: -35V.</u>
Vp voltage of power source circuit input.</td></tr>
<tr><td>3</td><td>AVSS</td><td>IN</td><td><u>Reference voltage input terminal.</u>
A reference voltage applied to the A/D converter in the LSI. Connected to DC. (-5V)</td></tr>
<tr><td>4</td><td>VREF</td><td>IN</td><td><u>Reference voltage input terminal.</u>
A reference voltage applied to the A/D converter in the LSI. Connected to GND.</td></tr>
<tr><td>5-6</td><td>AN7-AN6</td><td>IN</td><td>Terminal to switch the specification.</td></tr>
<tr><td>7</td><td>AN5</td><td>IN</td><td><u>Temperature measurement input: EXHAUST THERMISTOR</u>
By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.</td></tr>
<tr><td>8</td><td>AN4</td><td>IN</td><td><u>Input signal which communicates the door open/close information to LSI.</u>
Door closed; "H" level signal (0V).
Door opened; "L" level signal (-5.0V).</td></tr>
<tr><td>9</td><td>AN3</td><td>-</td><td>Terminal not used.</td></tr>
<tr><td>10</td><td>AN2</td><td>IN</td><td><u>Temperature measurement input: MAGNETRON THERMISTOR TH2.</u>
By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.</td></tr>
<tr><td>11</td><td>AN1</td><td>IN</td><td><u>Temperature measurement input: MAGNETRON THERMISTOR TH1.</u>
By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.</td></tr>
<tr><td>12</td><td>AN0</td><td>-</td><td>Terminal not used.</td></tr>
<tr><td>13-14</td><td>P55-P54</td><td>-</td><td>Terminal not used.</td></tr>
<tr><td>15</td><td>P53</td><td>OUT</td><td><u>Magnetron (MG1) high-voltage circuit driving signal.</u>
To turn on and off the cook relay. In 100% power level operation, "L" level during cooking; "H" level otherwise. In other power level operation (90, 80, 70, 60, 50, 40, 30, 20, 10 or 0%), "H" and "L" level is repeated according to power level.
<table>
<tr><th>Power level</th><th>ON</th><th>OFF</th><th>Power level</th><th>ON</th><th>OFF</th></tr>
<tr><td>100%</td><td>48sec.</td><td>0sec.</td><td>40%</td><td>22sec.</td><td>26sec.</td></tr>
<tr><td>90%</td><td>44sec.</td><td>4sec.</td><td>30%</td><td>16sec.</td><td>32sec.</td></tr>
<tr><td>80%</td><td>40sec.</td><td>8sec.</td><td>20%</td><td>12sec.</td><td>36sec.</td></tr>
<tr><td>70%</td><td>36sec.</td><td>12sec.</td><td>10%</td><td>8sec.</td><td>40sec.</td></tr>
<tr><td>60%</td><td>32sec.</td><td>16sec.</td><td>0%</td><td>0sec.</td><td>48sec.</td></tr>
<tr><td>50%</td><td>26sec.</td><td>22sec.</td><td></td><td></td><td></td></tr>
</table>

</td></tr>
<tr><td>16</td><td>P52</td><td>-</td><td>Terminal not used.</td></tr>
<tr><td>17</td><td>P51</td><td>OUT</td><td><u>Magnetron (MG2) high-voltage circuit driving signal.</u>
To turn on and off the cook relay. In 100% power level operation, "L" level during cooking; "H" level otherwise. In other power level operation (90, 80, 70, 60, 50, 40, 30, 20, 10 or 0%), "H" and "L" level is repeated according to power level.
<table>
<tr><th>Power level</th><th>ON</th><th>OFF</th><th>Power level</th><th>ON</th><th>OFF</th></tr>
<tr><td>100%</td><td>48sec.</td><td>0sec.</td><td>40%</td><td>22sec.</td><td>26sec.</td></tr>
<tr><td>90%</td><td>44sec.</td><td>4sec.</td><td>30%</td><td>16sec.</td><td>32sec.</td></tr>
<tr><td>80%</td><td>40sec.</td><td>8sec.</td><td>20%</td><td>12sec.</td><td>36sec.</td></tr>
<tr><td>70%</td><td>36sec.</td><td>12sec.</td><td>10%</td><td>8sec.</td><td>40sec.</td></tr>
<tr><td>60%</td><td>32sec.</td><td>16sec.</td><td>0%</td><td>0sec.</td><td>48sec.</td></tr>
<tr><td>50%</td><td>26sec.</td><td>22sec.</td><td></td><td></td><td></td></tr>
</table>

</td></tr>
<tr><td>18</td><td>P50</td><td>-</td><td>Terminal not used.</td></tr>
</table>

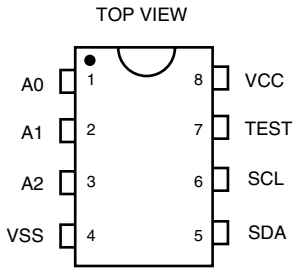
Pin No.	Signal	I/O	Description
19	P47	OUT	**Signal to sound buzzer.** This signal is to control the 2.5kHz continuous signal. A: Switch touch sound. B: Guidance sound. C: Completion sound. 
20-21	P46-P45	-	Terminal not used.
22	P44	OUT	**Oven lamp, Blower motor and Antenna motor driving signal (Square Waveform : 50Hz).** To turn on and off the shut-off relay (RY1). The Square waveform voltage is delivered to the RY1 relay driving circuit and relays (RY3, RY4, COOK RELAY) control circuit. 
23-24	P43-P42	-	Terminal not used.
25	INT1	IN	**Signal synchronized with commercial power source frequency.** This is basic timing for all time processing of LSI. 
26	INT0	IN	Connected to VC(-5) through pull-down resistor.
27	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.
28	P71	OUT	Memory (EEPROM) clock output.
29	P70	IN/OUT	Memory (EEPROM) data input/output.
30	XIN	IN	**Internal clock oscillation frequency setting input.** The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.
31	XOUT	OUT	**Internal clock oscillation frequency control output.** Output to control oscillation input of XIN.
32	VSS	IN	**Power source voltage: -5V.** VC voltage of power source circuit input.
33	P27	IN	**Signal coming from touch key.** When either one of G-12 line keys on key matrix is touched, a corresponding signal out of P30 - P34 will be input into P27. When no key is touched, the signal is held at "L" level.
34	P26	IN	**Signal similar to P27.** When either one of G-11 line keys on key matrix is touched, a corresponding signal will be input into P26.
35	P25	IN	**Signal similar to P27.** When either one of G-10 line keys on key matrix is touched, a corresponding signal will be input into P25.
36	P24	IN	**Signal similar to P27.** When either one of G-9 line keys on key matrix is touched, a corresponding signal will be input into P24.
37-40	P23-P20	OUT	**Segment data signal.** The relation between signals and indicators are as follows: Signal Segment Signal Segment Signal Segment P01 ..... k P21 ..... h P15 ..... d P02 ..... j P20 ..... g P14 ..... c P03 ..... i P17 ..... f P13 ..... b P23 ..... LB P16 ..... e P12 ..... a P22 ..... UB

<table>
<tr><th>Pin No.</th><th>Signal</th><th>I/O</th><th>Description</th></tr>
<tr><td></td><td></td><td></td><td> 
</td></tr>
<tr><td>41-46</td><td>P17-P12</td><td>OUT</td><td><u>Segment data signal.</u>
Signal similar to P23..</td></tr>
<tr><td>47-48</td><td>P11-P10</td><td>OUT</td><td><u>Digit selection signal.</u>
The relation between digit signal and digit are as follows:
Digit signal Digit
P11 ..... 1st.
P10 ..... 2nd.
P07 ..... 3rd.
P06 ..... 4th.
P05 ..... 5th.
P04 ..... 6th.
Normally, one pulse is output in every ß period, and input to the grid of the Fluorescent Display.
 
</td></tr>
<tr><td>49-52</td><td>P07-P04</td><td>OUT</td><td><u>Digit selection signal.</u>
Signal similar to P11.</td></tr>
<tr><td>53-55</td><td>P03-P01</td><td>OUT</td><td><u>Segment data signal.</u>
Signal similar to P23.</td></tr>
<tr><td>56</td><td>P00</td><td>-</td><td>Terminal not used.</td></tr>
<tr><td>57-58</td><td>P37-P36</td><td>OUT</td><td><u>(Sound) Voltage level control terminal.</u>
This terminal (P37) is to control volume level of buzzer sound with terminals P36. Since the volume level of buzzer sound depends on voltage energized, it is control level in 3 steps by combining signal levels for P37 and P36. Relationship of signal level combination to sound volume level is shown in the following table, 1~3 in the table, however, are indicated in the descending order from the maximum level of sound volume through the minimum level.
<table>
<tr><th>Sound Volume</th><th>P36</th><th>P37</th></tr>
<tr><td>1, (Max.)</td><td>L</td><td>L</td></tr>
<tr><td>2,</td><td>H</td><td>L</td></tr>
<tr><td>3, (Min.)</td><td>L</td><td>H</td></tr>
</table>


*At Output terminal P47, rectangular wave signal of 2.5kHz is output.</td></tr>
<tr><td>59</td><td>P35</td><td>-</td><td>Terminal not used.</td></tr>
<tr><td>60</td><td>P34</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P24 - P27 terminal while one of G-4 line keys on key matrix is touched.</td></tr>
<tr><td>61</td><td>P33</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P24 - P27 terminal while one of G-5 line keys on key matrix is touched.</td></tr>
<tr><td>62</td><td>P32</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P24 - P27 terminal while one of G-6 line keys on key matrix is touched.</td></tr>
<tr><td>63</td><td>P31</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P24 - P27 terminal while one of G-7 line keys on key matrix is touched.</td></tr>
<tr><td>64</td><td>P30</td><td>OUT</td><td><u>Key strobe signal.</u>
Signal applied to touch-key section. A pulse signal is input to P24 - P27 terminal while one of G-8 line keys on key matrix is touched.</td></tr>
</table>

2-2 Memory IC (I-2)

CAT24WC16PI is a 4K-bit, serial memory, enabling CMOS to be erased/written electrically. This memory is constructed with 512 registers x 8bits, enabling individual access, read and write operations to be performed. Details of input/output signal for IC2 are as shown in the following diagram.



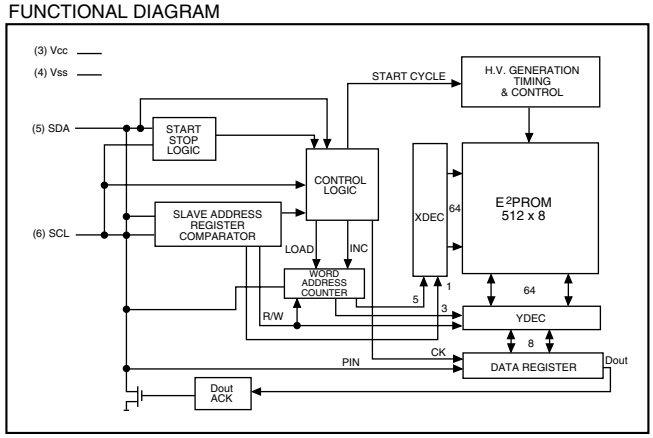


Figure T-2. Relation between Pin Nos, and Signals

Pin No.	Signal	I/O	Description
1-3	A0-A2	IN	Connected to GND.
4	VSS	IN	Connected to VC(-5V).
5	SDA	IN/OUT	Serial data input/output : input/outputs data to I-1.
6	SCL	IN	Clock signal input : input/outputs serial data at every one pulse.
7	TEST	IN	Connected to VC(-5V).
8	VCC	IN	Connected to GND.

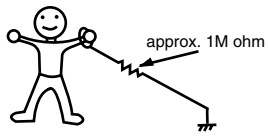
SERVICING

1. Precautions for Handling Electronic Components

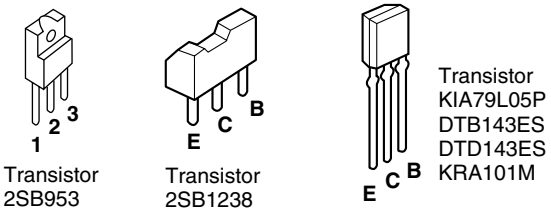
This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, 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: 60W
(It is recommended to use a soldering iron with a grounding terminal.)
2) Oscilloscope: Single beam, frequency range: DC-10MHz type or more advanced model.
3) Others: Hand tools

5. Other Precautions

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

PROCEDURE FOR CHECKING/CLEARING SERVICE COUNTS OF MICROWAVE OVEN

The following procedure enables the servicer to obtain the total service counts (cook cycles) for memory cooking, manual, repeat, double quantity cooking and defrost. The maximum capacity of the counter is 999,999 counts, above which the counter will reset to "0". The counter will retain the total counts (will not clear) in the event of a power disruption.

1) Practice for checking total service counts
(eg; 234,567 Counts).

▒ --- flashing / ○ ---0.1sec. BUZZER

PAD	DISPLAY	INDICATOR	LED	PHONE
(door close)	•			
	•			
CHECK	NUMBER •	CHECK		○
CHECK	#1 82 68 (user total count)	CHECK		○
#2 VOLUME VOLUME DOUBLE QUANTITY	↓ 2 34 56 7 (service total count)			○
1	↓ NUMBER 1			○
	↓ (after 1 sec.)			
	45 (filter used time)			
2	NUMBER 2 ↓ (after 1 sec.)			○
	2 00 (filter lim. time)			
0 (No 10)	NUMBER 10 ↓ (after 1 sec.)			○
	35 43 2 (service total cook time)	↓		
CHECK	•			○

#1: Denotes total service counts within the reach of user, of which checking and clearing practices are described in this instruction manual.

#2: Denotes the procedure for the servicer to disable checking/clearing. This procedure is instructed to service personnel only and is excluded from the operation manual.

2) Practice for clearing Service's counts

" " : Flicker / ○: 0.1 sec BUZZER

PAD ORDER	DISPLAY	PHONE
(Door close)	•	
CHECK	"NUMBER" • CHECK	○
CHECK	82 68 "CHECK" (User's Total Counts)	○
#1 VOLUME	82 68 "CHECK"	
VOLUME	82 68 "CHECK"	
DOUBLE QUANTITY	2 34 56 7 "CHECK" (Total Counts Service)	○
SET	0 "CHECK"	○
0	0 "CHECK"	○
SET	0 "CHECK"	○
CHECK	•	○

#1: Denotes the procedure for the servicer to disable clearing. This procedure is instructed to service personnel only and is excluded from the operation manual.

PROCEDURE FOR ENTERING TO I-2

When the control unit or I-2 is exchanged, re-enter the constants of EXPRESS DEFROST, the memory information and the EEPROM data, referring to the following procedures. If not so, the oven will not operate correctly.

1) How to enter the contents of EXPRESS DEFROST

Constants of EXPRESS DEFROST
- T = STG1 + STG2 + STG3
- STG = A x T + B
- STG1 = 0.20 x T + 20 Power level 50%
- STG2 = 0.13 x T + 30 Power level 30%
- STG3 = 0.67 x T - 50 Power level 20%

Suppose above constants are entered.

" " : Flicker / ○: 0.1 sec BUZZER

PAD ORDER	DISPLAY	PHONE
(Door close)	•	
SET	•	
SET (within 2 sec.)	"NUMBER" •	○
#1 START	"NUMBER" •	
EXPRESS DEFROST	1 0.00 DEF	○
2,0	1 0.20 DEF (A)	○ x 2
MANUAL/ REPEAT	1 0 DEF #2 (+ - B)	○
2	1 20 DEF	○
POWER LEVEL	DEF "POWER" 1 20 100%	○
5	DEF POWER 1 20 50%	○
MANUAL/ REPEAT	2 0.00 DEF	
1, 3	2 0.13 DEF (A)	○ x 2
MANUAL/ REPEAT	2 0 DEF	○
3	2 30 DEF (+ - B)	○
POWER LEVEL	DEF "POWER" 2 30 100%	○
3	DEF POWER 2 30 30%	○
MANUAL/ REPEAT	3 0 DEF	○
#3 5	3 5 DEF	○
POWER LEVEL	DEF "POWER" 3 5 100%	○
2	DEF POWER 3 5 20%	○
SET	4 • DEF	○
SET	•	○

#1: No key entry signal.
#2: To set-B, touch the MANUAL/REPEAT key.
#3: Ex. "CHECK" will flash and the oven will beep after 50% of EXPRESS DEFROST time has lapsed when 5 key is entered during actual cooking.

2) How to enter the memory information

Example : Suppose cooking time 5 sec. and output power 100% are entered into the memory pad 1.

PAD ORDER	DISPLAY	PHONE
(Door close)	•	
SET	•	
SET (within 2 sec.)	"NUMBER" •	○
1	NUMBER 1 • ①	○
MANUAL/ REPEAT	NUMBER 1 • 0 ①	○
5	NUMBER 1 • 5 ①	○
SET	"NUMBER" •	○
SET	•	○

Enter the memory information into the memory pads 1 ~ 10 referring to above example. The memory information are given below.

Memory No.	Cook Time	Output Power
1	5 sec.	100%
2	10 sec.	100%
3	20 sec.	100%
4	30 sec.	100%
5	40 sec.	100%
6	50 sec.	100%
7	1 min.	100%
8	1 min.15 sec.	100%
9	1 min.30 sec.	100%
10	2 min.	100%
11-20	0 sec.	

OTHER CHECKING AND CLEARING PROCEDURE FOR

1) To check the contents of EXPRESS DEFROST.

" " : Flicker / ○ : 0.1 sec BUZZER

PAD ORDER	DISPLAY	PHONE
(Door close)	•	
CHECK	"NUMBER" • CHECK	○
EXPRESS DEFROST	1 0.20 DEF (A) CHECK	○
	DEF CHECK 1 20 POWER (+ - B) 50%	
	2 0.13 DEF (A) CHECK	
	DEF CHECK 2 30 POWER (+ - B) 30%	
	DEF CHECK 3 5 POWER 20%	
	(Repeat)	
CHECK	•	○

#1: No key entry signal.

2) How to clear all counter(user and service) and total cooking time and used time of filter.

PAD ORDER	DISPLAY	PHONE
(Door close)	•	
SET	•	
SET	"NUMBER" •	○
DOUBLE QUANTITY	"NUMBER" • DOUBLE	○
CHECK	"NUMBER" • DOUBLE	
SIGNAL	"NUMBER" • DOUBLE	
SET	•	○

PRECAUTIONS FOR USING LEAD-FREE SOLDER

1. Employing lead-free solder

The "Main PWB" of this model employs lead-free solder. This is indicated by the "LF" symbol printed on the PWB and in the service manual. The suffix letter indicates the alloy type of the solder.

Example:

Indicates lead-free solder of tin, silver and copper.

2. Using lead-free wire solder

When repairing a PWB with the "LF" symbol, only lead-free solder should be used. (Using normal tin/lead alloy solder may result in cold soldered joints and damage to printed patterns.)

As the melting point of lead-free solder is approximately 40˚C higher than tin/lead alloy solder, it is recommend that a dedicated bit is used, and that the iron temperature is adjusted accordingly.

3. Soldering

As the melting point of lead-free solder (Sn-Ag-Cu) is higher and has poorer wettability, (flow), to prevent damage to the land of the PWB, extreme care should be taken not to leave the bit in contact with the PWB for an extended period of time. Remove the bit as soon as a good flow is achieved. The high content of tin in lead free solder will cause premature corrosion of the bit. To reduce wear on the bit, reduce the temperature or turn off the iron when it is not required.

Leaving different types of solder on the bit will cause contamination of the different alloys, which will alter their characteristics, making good soldering more difficult. It will be necessary to clean and replace bits more often when using lead-free solder. To reduce bit wear, care should be taken to clean the bit thoroughly after each use.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

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

1. Disconnect the oven from power supply.
2. Make sure that a definite “click” can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then grip the door handle and the door lever assembly with the other, this causes the latch leads to rise, it is then possible to hear a “click” as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.
Do not operate the oven if any of the following conditions exist;

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

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

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 precautions.
1. Before wiring,
   1) Disconnect the power supply cord.
   2) Open the door and block it open.
   3) Discharge the two high voltage capacitors and wait for 60 seconds.
2. Don’t let the wire leads touch to the followiong 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)
      Blower fan blade, Blower fan motor, Switches, Switch levers, Antenna motors and Sirrer antennas.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector until its pin is locked and make sure that the wire leads do not come off even if the wire leads are pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

OUTER CASE, REAR CABINET AND POWER SUPPLY CORD REMOVAL

To remove the components, procedure as follows.
1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the screws from the rear and along side the edge of the outer case.
4. Slide the case back about 1 inch (3 cm) to free it from the oven cavity.
5. Lift entire case from the unit.
6. **DISCHARGE TWO HIGH VOLTAGE CAPACITORS BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.**
7. Now, outer case is free.

N.B.; Step 1,2 and 9 form the basis of the 3D checks.

CAUTION: DISCHARGE TWO HIGH VOLTAGE CAPACITORS BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

To remove rear cabinet and power supply cord:
8. Disconnect the power supply cord from the noise filter.
9. Remove the one (1) screws holding the grounding wire of power supply cord to the oven cavity.
10. Remove the screws holding the rear cabinet to the oven cavity and blower motor.
11. Remove the rear cabinet with the power supply cord from the oven cavity.
12. Loosen the tab of the cord bushing, and remove the power supply cord with the cord bushing from the rear cabinet.
13. Remove the cord bushing from the power supply cord,
14. Now, the power supply cord and rear cabinet are free.

HIGH VOLTAGE TRANSFORMER(S) REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the rear cabinet, too.
3. Disconnect wire lead(s) of high voltage transformer(s) from magnetron(s).
4. Remove the wire lead(s) of high voltage transformer(s) from the wire holder.

5. Pull out the wire lead(s) of high voltage transformer(s) from the tube.
6. Disconnect wire lead(s) of high voltage transformer(s) from high voltage capacitor(s).
7. Disconnect the high voltage fuse(s) from high voltage transformer(s).
8. Disconnect the main wire harness from high voltage transformer(s).
9. Remove two (2) screws holding each power transformer to base plate.
10. Remove the high voltage transformer(s) from base plate.
12. Now, high voltage transformer(s) are free.

MAGNETRON(S) REMOVAL

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the rear cabinet, too.
3. Remove the two (2) screws holding magnetron exhaust duct to upper and lower waveguide.
4. Remove the magnetron exhaust duct from oven cavity.
5. Disconnect wire leads from magnetron(s).
6. Disconnect magnetron thermistor from the connector of the stop switch harness.
7. Remove the one (1) screw holding the thermistor angle to the upper magnetron.
8. Remove the four (4) screws holding each magnetron to upper and/or lower waveguide. When removing the screws, hold the magnetron to prevent it from falling.
9. Remove the magnetron(s) from upper and/or lower waveguide with care so magnetron antenna is not hit by any metal object around antenna.
10. Pull out the thermistor angle from the upper magnetron.
11. Now, the magnetron(s) is (are) free.

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

MAGNETRON THERMISTOR REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the rear cabinet, too.
3. Remove the magnetron from the waveguide flange, referring to "MAGNETRON(S) REMOVAL".
4. Now, the magnetron with the magnetron thermistor should be free.
5. Remove the thermistor angle from the magnetron by pulling out.
6. Straighten the tab of the magnetron thermistor angle holding the magnetron thermistor.
7. Remove the magnetron thermistor from the thermistor angle.
8. Now, the magnetron thermistor is free.

Re-install

1. Install the magnetron thermistor to the thermistor angle as shown in Figure C-1.
2. Hold the magnetron thermistor to the thermistor angle by bending the tab of the thermistor angle.
3. Insert the thermistor angle between the 2nd. fin and 3rd. fin from the upper fin of the magnetron and push it until the thermistor angle stops.

NOTE: The magnetron thermistor should be between the upper fin and the 2nd. fin.

4. Re-install the magnetron to the waveguide flange with four (4) screws.
5. Re-install the thermistor angle to the waveguide flange with one (1) screw.
6. Re-install the magnetron exhaust duct to the upper and lower waveguide flanges with two (2) screws.
7. Route the thermistor harness under the magnetron temperature fuse.
8. Connect the thermistor harness to the stop switch harness.
9. Connect the wire leads to the upper magnetron, referring to the pictorial diagram.
10. Re-install the power supply cord, rear cabinet and outer case cabinet to the oven by reversing the procedures of "OUTER CASE, REAR CABINET AND POWER SUPPLY CORD REMOVAL".

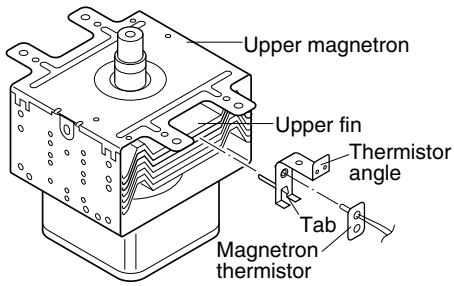


Figure C-1. Magnetron thermistor installation

HIGH VOLTAGE CAPACITOR, HIGH VOLTAGE FUSE AND HIGH VOLTAGE RECTIFIER ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the rear cabinet, too.
3. Remove two (2) screws holding earth side terminals of high voltage rectifier assembly to the capacitor holder and oven cavity.
4. Disconnect all wire leads from the high voltage capacitor.
5. Disconnect high voltage fuse(s) from the high voltage transformer(s). Now, high voltage fuse(s) is(are) free.
6. Remove the three (3) screws holding the blower motor to the top of oven cavity, the chassis support and air duct.
7. Disconnect high voltage wire lead(s) of the high voltage rectifier assembly from the magnetron(s).
   Now, the the high voltage rectifier assembly is free.
8. Remove two (2) screws holding the capacitor holder to oven cavity.
   Now, the capacitors are free.

CAUTION:
1. DISCHARGE THE TWO HIGH VOLTAGE CAPACITORS BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.
2. DO NOT REPLACE ONLY THE HIGH VOLTAGE RECTIFIER. IF IT IS DEFECTIVE, REPLACE THE HIGH VOLTAGE RECTIFIER ASSEMBLY.
3. WHEN REPLACING THE HIGH VOLTAGE RECTIFIER ASSEMBLY AND THE HIGH VOLTAGE CAPACITOR, THE CATHODE (EARTH) SIDE TERMINAL OF THE HIGH VOLTAGE RECTIFIER MUST BE SECURED FIRMLY WITH A EARTHING SCREW.

BLOWER MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the rear cabinet, too.
3. Disconnect the wire leads from the blower motor and noise filter.
4. Remove the one (1) screw holding the blower motor angle to the oven cavity.
5. Remove the one (1) screw holding the blower motor angle to the chassis support.
6. Remove the one (1) screw holding the air duct to the blower motor.
7. Remove the four (4) screws holding the blower motor angle to the blower motor.
8. Now, the blower motor is free.

STIRRER MOTORS (UPPER AND LOWER) REMOVAL

UPPER
1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the stirrer motor (upper).
3. Remove the one (1) screw holding the stirrer motor (upper) to the oven cavity.
4. Turn and lift up the stirrer motor (upper).
5. Now, the stirrer motor (upper) is free.

LOWER
1. Disconnect oven from the power supply.
2. Remove the stirrer motor cover by snipping off the material in four portions.
3. Where the portions have been snipped off bend the portions flat. No sharp edge must be evident after removal of the stirrer motor cover.
4. Disconnect the wire leads from the stirrer motor (lower).
5. Remove the one (1) screw holding the stirrer motor (Lower) to the oven cavity.
6. Now, the stirrer motor (lower) is free.
7. After replacement use one (1) screw (XOTWW40P08000) to fit the stirrer motor cover.

HOW TO RELEASE THE POSITIVE LOCK® CONNECTOR.

Procedure
1. CARRY OUT 3D CHECKS.
2. Pushing the lever of positive lock® connector, pull down the connector from the terminal.
3. Now, the connector is free.

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

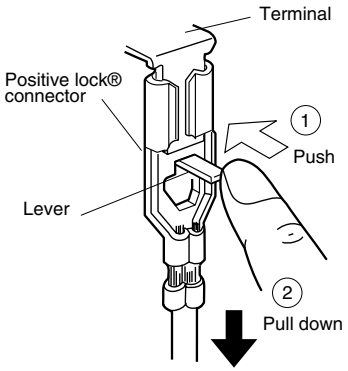


Figure C-2. How to release the positive lock connector.

OVEN LAMP AND LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the oven lamp.
3. 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.
4. Lift up the oven lamp socket .
5. Now, the oven lamp socket is free.

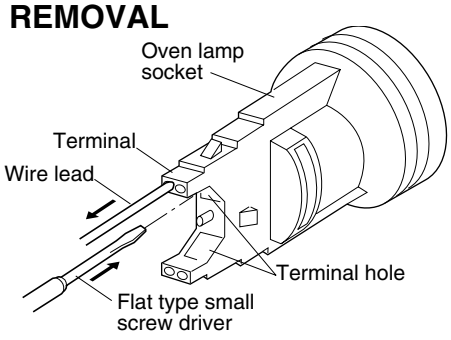


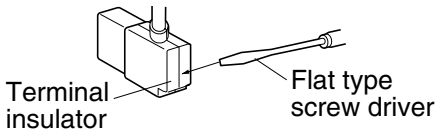
Figure C-3. Oven lamp socket

TERMINAL INSULATOR REPLACEMENT

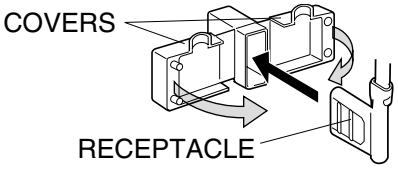
1. Open covers of the terminal insulator by using small flat type screw driver.
2. Remove the receptacle from the terminal insulator.
3. Now, the terminal insulator is free.

Installation

1. Insert the receptacle into terminal insulator.



2. Close covers of the terminal insulator, as shown illustlated below.



CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL

CONTROL PANEL ASSEMBLY REMOVAL

The complete control panel should be removed for replacement of components. To remove the control panel, proceed as follows:

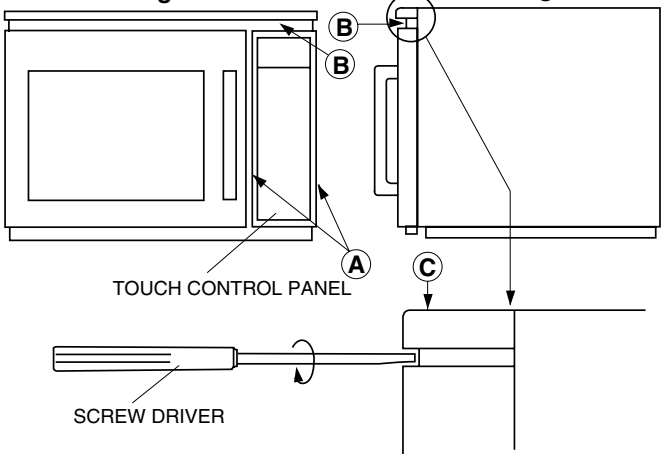
1. Disconnect the oven from power supply.
2. Wait for 60 seconds to discharge the high voltage capacitor.
3. Remove the air intake filter assembly from the base plate.
4. Remove two (2) screws holding the control panel to the base plate.
5. Pull down the control panel and remove it forward.
6. Disconnect connectors and wire leads from the control unit.
7. Now the control panel assembly is free.

CAUTION FOR TOUCH CONTROL PANEL REMOVAL

1) Hold the lower end (Position A, Fig. 1) of the touch control panel assembly firmly while sliding it down and toward you.
2) If the Touch Control Panel is hard to remove;
(1) Insert a flat head screw driver into space B . (Fig. 1)
(2) Rotate the screwdriver clockwise while holding position C of the Touch Control Panel. (Fig. 2)

TO AVOID DAMAGE TO TOUCH CONTROL PANEL, COVER THE TIP OF SCREWDRIVER WITH TAPE.

Fig. 1 **Fig. 2**



Replacement of individual component is as follows:

CONTROL UNIT AND CONTROL PANEL FRAME (WITH KEY)

8. Remove three (3) screws holding the control panel mounting angle to the panel frame.
9. Lift up the control panel mounting angle from the panel frame.
10. Disconnect connector (G) from the control unit by pushing the hooks of cable holder inwardly.
11. Remove four (4) screws holding the control unit to the panel frame assembly.
12. Now, the control unit and control panel frame (with key) are free.

CAUTION:
At installing control panel unit assembly to main body set:

1. **Ensure the installation of wiring-related parts without negligence.**
2. **When inserting key cable to main body set, ensure them free from caught-in trouble. In addition, when installing the control panel assembly to base plate with screws, be sure of pushing the control panel unit upward to fix with screws firmly.**
3. **Do not allow any wire leads to come near the varistor works, because it will explode and the wire leads near by the varistor will be damaged.**

HOW TO ATTACH MEMBRANE SWITCH AND GRAPHIC SHEET

1. Before attaching a new membrane switch and graphic sheet, remove remaining adhesive on the control panel frame surfaces completely with a soft cloth soaked in alcohol.
2. Attach the graphic sheet to the membrane switch, with adjusting their upper edges and right edges. (This assembly part is called key unit in the following.)

NOTE : When attaching the graphic sheet, make sure that air does not come between the membrane switch and the graphic sheet.

3. Then, adjust the upper edge and right edge of the key unit to the lower edge of the display window and the right flange of the control panel frame.
4. Stick the key unit firmly to the control panel frame by rubbing with soft cloth to prevent scratching.

POWER SUPPLY CORD REPLACEMENT

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

5. Remove the power supply cord.

Re-install

1. Insert the power supply cord into the cord bushing.
2. Connect the brown and blue wires of power supply cord into the terminals of noise filter, referring to pictorial diagram.
3. Install the green/yellow wire of power supply cord with the one (1) screw.
4. Re-install the cord bushing to the rear cabinet.
5. CARRY OUT 4R CHECKS.

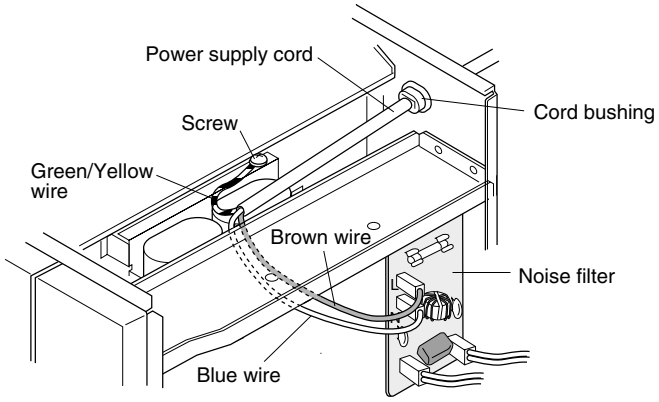


Figure C-4. Power supply cord replacement

INTERLOCK SWITCHES, MONITOR SWITCHES, AND STOP SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel from the oven cavity referring to "CONTROL PANEL REMOVAL".
3. Remove the two (2) screws holding the latch hook to the oven cavity.
4. Open the door and pull the latch hook out of the oven cavity.
5. For stop switch removal
   5-1. Disconnect the wire leads from the switch.
   5-2. Push the retaining tabs outward slightly and then pull the switch forwards and remove it from the latch hook.
6. For interlock or monitor switches removal
   6-1. Disconnect the wire leads from the interlock or monitor switches.
   6-2. Remove the single (1) screw and nut holding the interlock or monitor switches to the latch hook.

CAUTION: IF THE LATCH HOOK IS NEW, WHEN THE INTERLOCK SWITCHES OR MONITOR SWITCHES ARE INSTALLED, THE TWO (2) TABS OF THE LATCH HOOK SHOULD BE BROKEN.

INTERLOCK SWITCHES, MONITOR SWITCHES, AND STOP SWITCH ADJUSTMENT

In case interlock switches, stop switch and monitor switches do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. Loosen the two (2) screws holding the latch hook.
2. With the door closed, adjust the latch hook by moving it back and forward, or up and down. In and out play of the door allowed by the latch hook should be less than 0.5mm. The vertical position of the latch hook should be placed where the stop switch and interlock switches have activated with the door closed.
   The horizontal position of the latch hook should be placed where the monitor switches have activated with the door closed.
3. Secure the screws with washers firmly.
4. Make sure of the interlock switches, stop switch, and monitor switches operation. If those switches have not activated with the door closed, loose two (2) screws holding latch hook and adjust the latch hook position.

After adjustment, make sure of the following:

1. In and out play of door remains less than 0.5mm when in the latched position.
2. The stop switch and interlock switches interrupt the circuit before the door open when the door release lever is pulled, and then and monitor switch close the circuit when the door is opened.
3. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

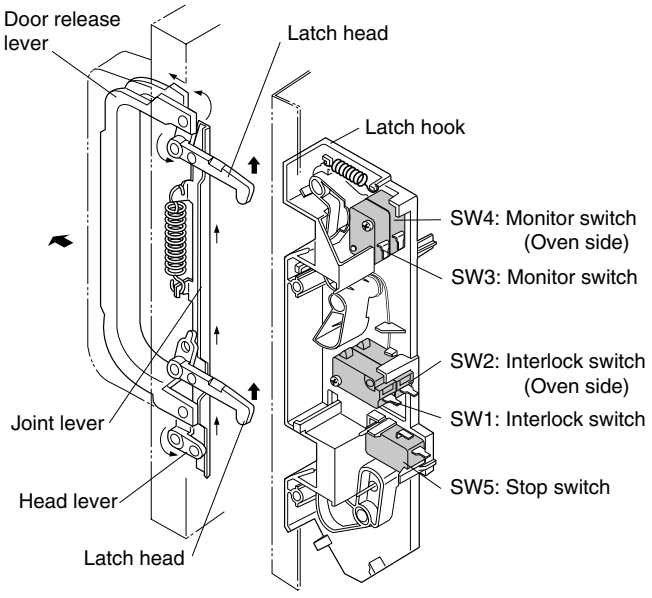


Figure C-5 Latch Switch Adjustments

DOOR REPLACEMENT AND ADJUSTMENT

REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the two (2) screws holding each of the upper and lower oven hinges to the oven cavity.
3. Remove door assembly with upper and lower oven hinges by pulling it forward.
4. Release upper and lower oven hinges from door assembly.

5. Now, door assembly is free.

NOTE: When individual parts are replaced, refer to "Door Disassembly".

RE-INSTALL

1. Insert the upper and lower oven hinges into door hinge pins.
2. Insert the upper and lower oven hinges with door assembly into rectangular holes of oven cavity front plate.
3. Make sure that the door is parallel with oven face lines (left and upper side line) and door latch heads pass through the latch holes correctly.
4. Fasten upper and lower oven hinges firmly to oven cavity with two (2) screws on each hinge.

Note: After any service to the door;

(A) Make sure that interlock switches, stop switch and monitor switches 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.

DOOR ADJUSTMENT

When removing and/or loosening hinges such as in door replacement, the following adjustment criteria are taken. Door adjustment is performed with the door properly installed and closed and while the oven hinges are loose.

1. Loosen upper and lower oven hinges with phillips head screw driver.
2. Adjust the door by moving it vertically so that the top right hand corner of the door is in line with the top of the control panel frame assembly.
3. Tighten the upper and lower oven hinge screws.

After adjustment, make sure of the following:

1. Door latch heads smoothly catch the latch hook through the latch holes, and the latch head goes through the center of the latch hole.
2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Re-install outer case and 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. If such were the case, your oven could not be equipped with a vent, the very purpose of which is to exhaust the vapor-laden air from the oven cavity.

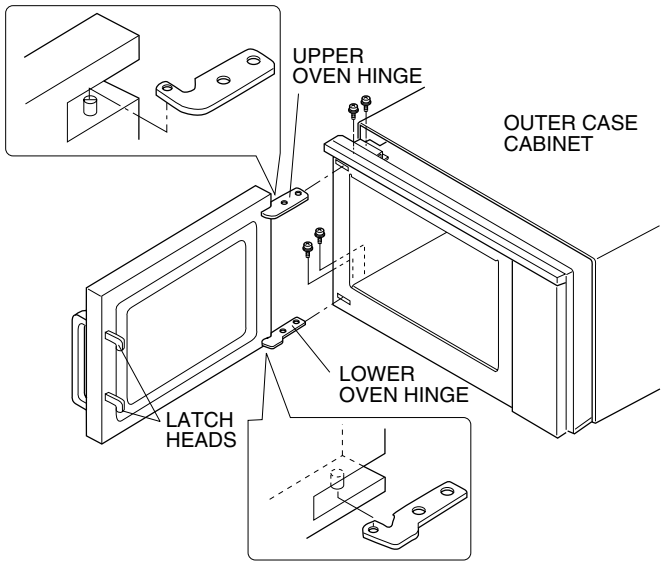


Figure C-6. Door Replacement

DOOR DISASSEMBLY

CHOKE COVER REMOVAL

1. Open the door and insert a putty knife (thickness of about 0.5mm) in gap between the choke cover and corner portion of door panel to free engaging parts. Refer to Fig. C-7.

NOTE: As the choke cover and door panel are engage at 16 places, do not force any perticular part.

2. Remove the choke cover carefully. (If choke cover is broken, replace with a new one.)

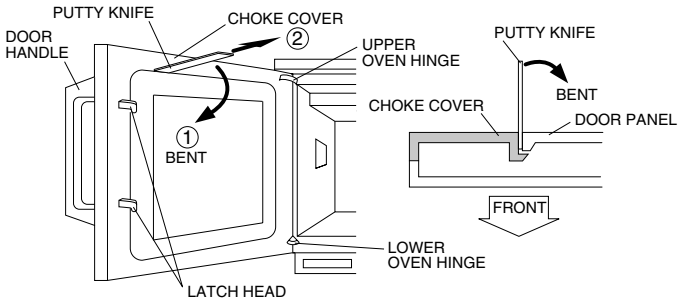


Figure C-7. Choke cover

DOOR COMPONENTS REMOVAL

UPPER AND LOWER OVEN HINGES REMOVAL

1. Remove the door assembly from oven cavity, referring to "REMOVAL" of "DOOR REPLACEMENT AND ADJUSTMENT".
2. Remove choke cover, referring to "CHOKE COVER REMOVAL".
3. Release the oven hinges from the door panel.
4. Now, the oven hinges are free.

DOOR HANDLE REMOVAL

1. Remove the door assembly from oven cavity, "REMOVAL" of "DOOR REPLACEMENT AND ADJUSTMENT".
2. Place door assembly on a soft cloth with latches facing up.
3. Remove choke cover from door panel, referring to "CHOKE COVER REMOVAL".
4. Remove two (2) screws holding the door handle to door.
5. Remove the door handle from door panel.
6. Now, door handle is free.

UPPER AND LOWER LATCH HEADS REMOVAL

7. Remove the door release lever from the door assembly.
8. Remove the three (3) screws holding the joint plate to the door panel.
9. Release the latch spring from the tab of the joint lever and joint plate.
10. Release the latch heads from joint lever and joint plate.
11. Now, the latch heads are free.

DOOR CASE REMOVAL

1. Remove the door assembly from oven cavity, referring to "REMOVAL" of "DOOR REPLACEMENT AND ADJUSTMENT".
2. Remove choke cover from door panel, referring to "CHOKE COVER REMOVAL".
3. Remove door handle from door panel, referring to "DOOR HANDLE REMOVAL".
4. Bend up four (4) nails of door case.
5. Remove door case from door panel.
6. Now, the door case is free.

DOOR GLASS REMOVAL

7. Remove the four (4) screws holding two (2) outside window fixing plates to door panel.
8. Now, the door glass is free.

SERVICE INFORMATION

IMPORTANT: When the magnetron MG1 and/or MG2 is replacing, the relays (RY3 and RY4) on control unit must be replaced at the same time. Because if the magnetron's life has been over, the relay's life may also be over.

MICROWAVE MEASUREMENT

After any repair, the microwave oven must be checked for microwave leakage to ensure continued safe operation. BS EN 60335-2-25 specifies that the maximum permitted leakage with a load of 275 ml is 50 W/m^2 (equivalent to 5 mW/cm^2) at a distance of 5 cm from the oven.

PREPARATION

The following items are required to carry out this test:-

1. A low form of 600 ml beaker made from an electrically non-conductive material, such as glass or plastic, with an inside diameter of approximately 8.5 cm. This must contain 275 ± 15 ml of water, at an initial temperature of 20 ± 2˚C.
2. A leakage detector which has been calibrated within the preceding 12 months to a stand whose accuracy can be traced to National Physical Laboratory Standards.

   Recommended instruments are:

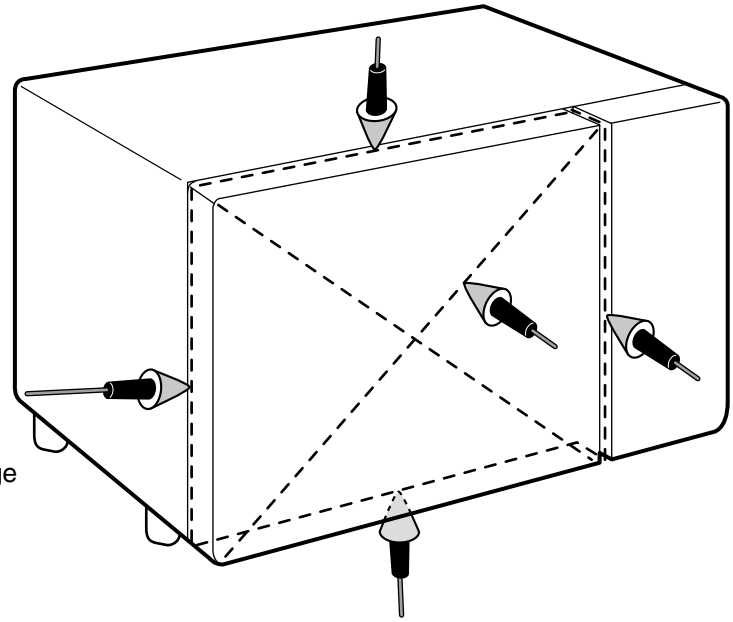
   Apollo "XI"
   Celtec "A100"

Before commencing the test, check that the leakage detector is functioning and adjusted according to the manufacturer's instructions, and any spacers are fitted to ensure that measurement is taken 5cm from the surface of the oven.

PROCEDURE

1. Place the beaker containing the water load in the oven cavity at the centre of the turntable. The placing of this standard load in the oven is important, not only to protect the oven, but also to ensure that any leakage it is not disguised by too large a load absorbing energy.
2. Close the oven door, and with the power level set to FULL, turn the oven ON with the timer set for a few minutes operation. Should the water begin to boil before the test has been completed, it should be replaced.
3. As shown in the diagram below, move the probe slowly (not faster than 2.5 cm/sec.);-

a) around the edge of the door following the gap
b) across the face of the door
c) across any vents in the oven's sides, rear or top



Dotted line indicates the path taken by the leakage detector.

Whilst the maximum leakage permitted in BS EN 60335-2-25 is 50 W/m^2 (equivalent to 5 mW/cm^2), it is not normal to detect any significant leakage, and therefore any detected leakage should be investigated.

SCHEMATIC
NOTE: CONDITION OF OVEN
1. POWER SUPPLY CONNECTED AND/OR 1MINUTE AFTER DOOR CLOSED OR COOK OFF.
2. [.] APPEAR ON DISPLAY.

NOTE: ★Indicates components with potential above 250 V.

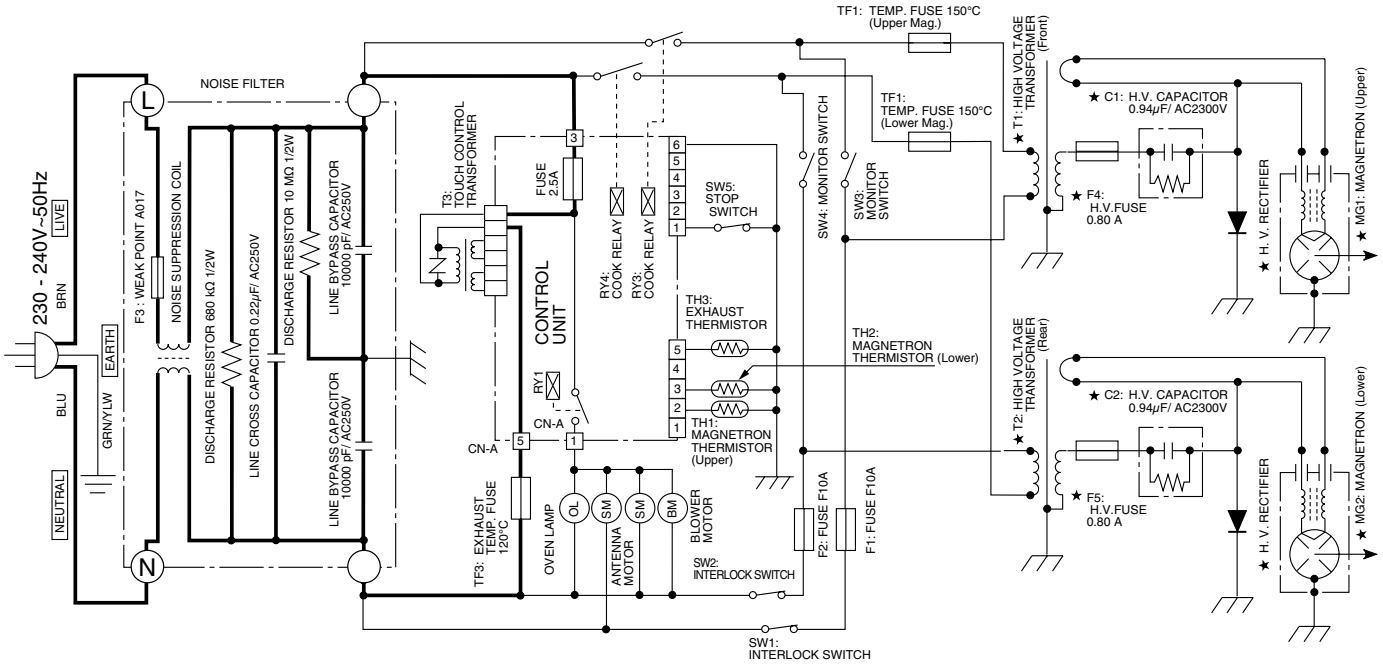


Figure O-1 Oven Schematic-OFF Condition

SCHEMATIC
NOTE: CONDITION OF OVEN
1. FOR 1MINUTE AFTER DOOR CLOSED.
2. [.] APPEAR ON DISPLAY.

NOTE: ★Indicates components with potential above 250 V.

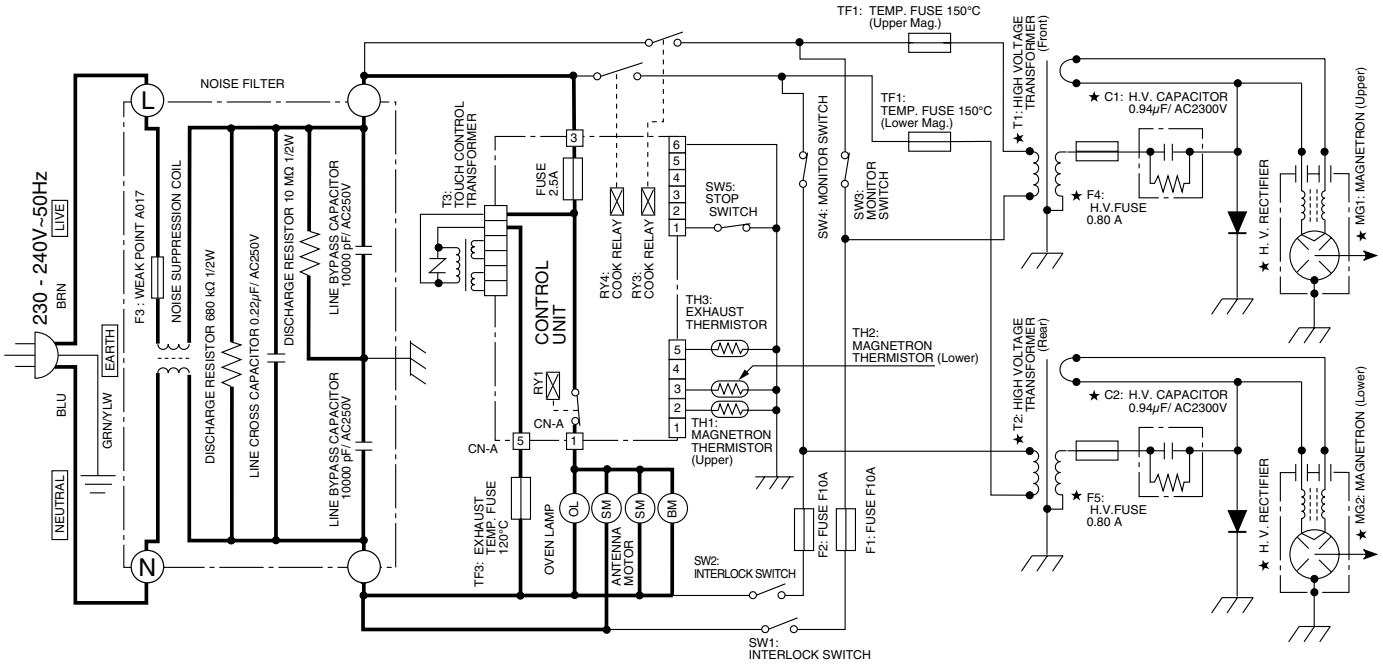


Figure O-2 Oven Schematic-IDLE Condition (Door opened condition)

SCHEMATIC
NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. MANUAL REPEAT KEY TOUCHED.
3. COOKING TIME PROGREMMED.
4. START PAD TOUCHED.

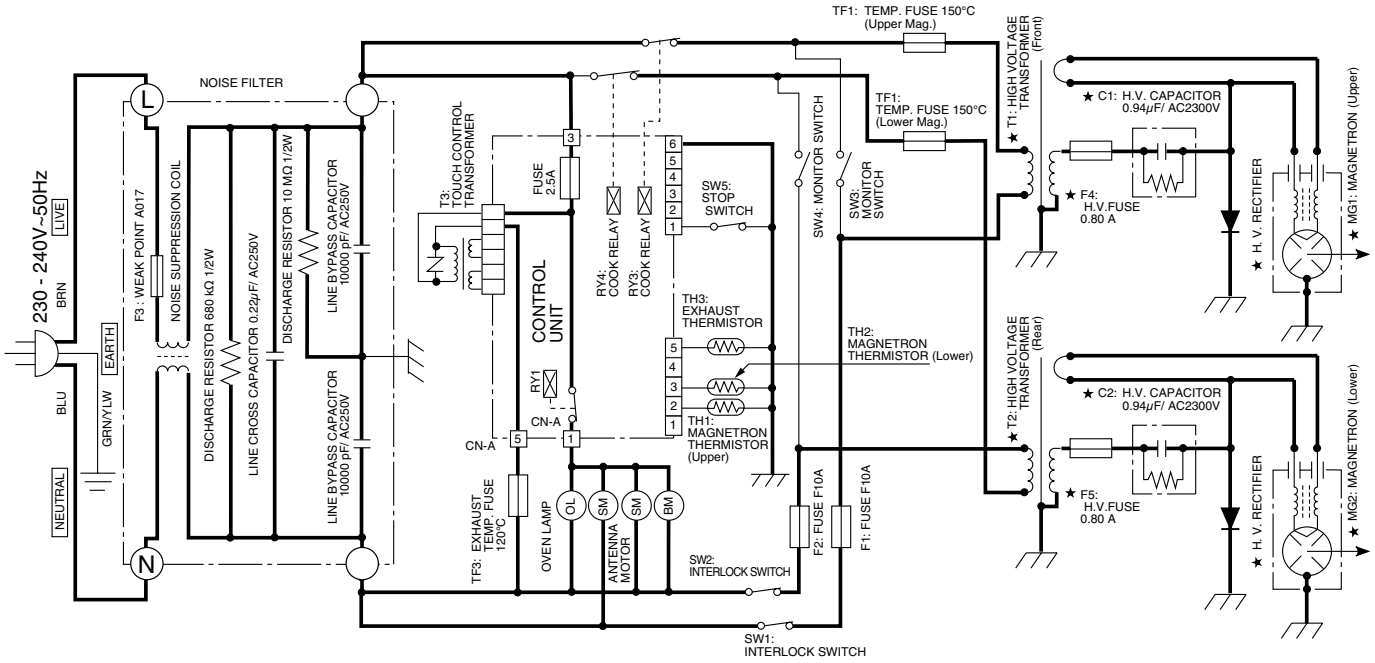


Figure O-3 Oven Schematic-Cooking Condition

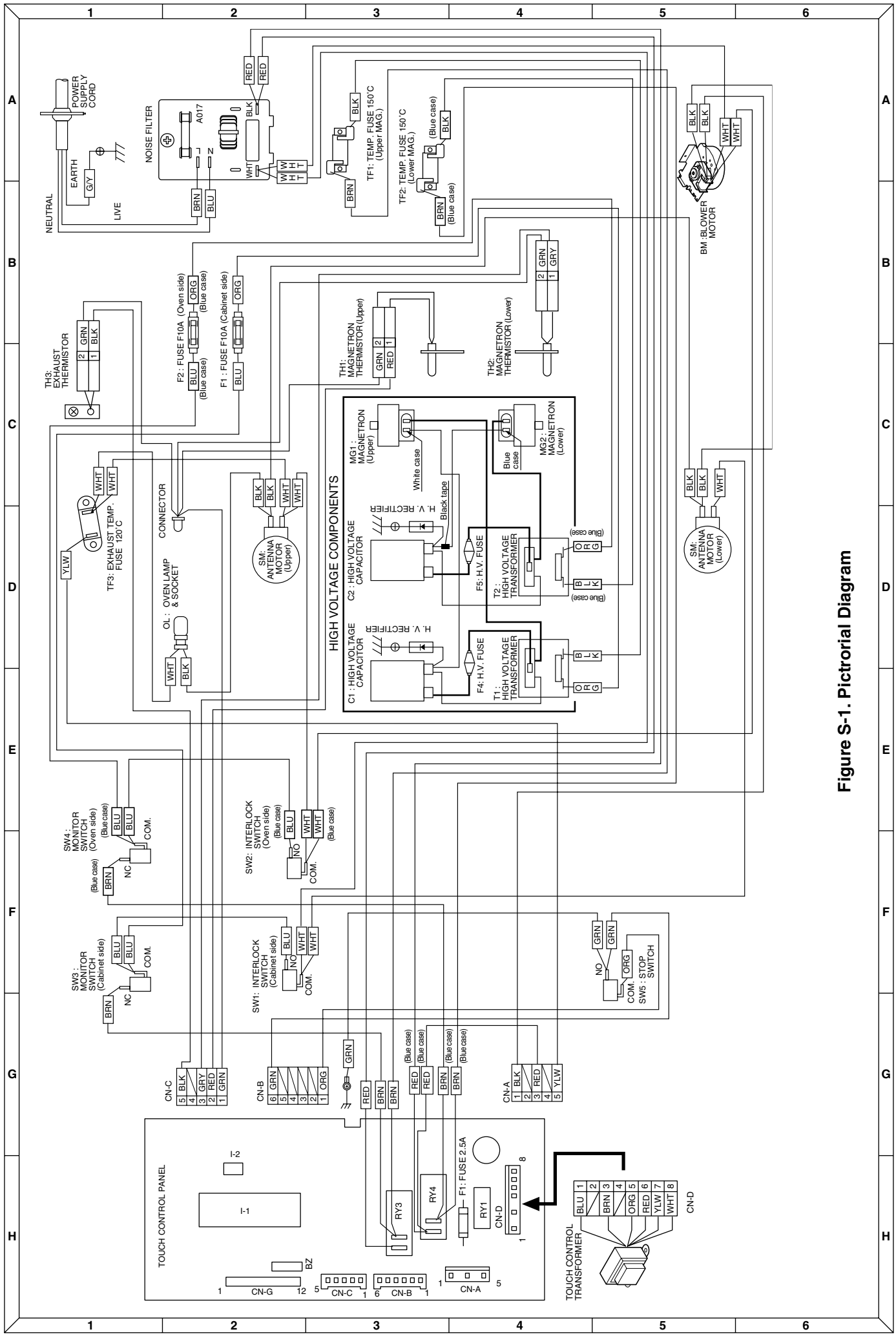


Figure S-1. Pictorial Diagram

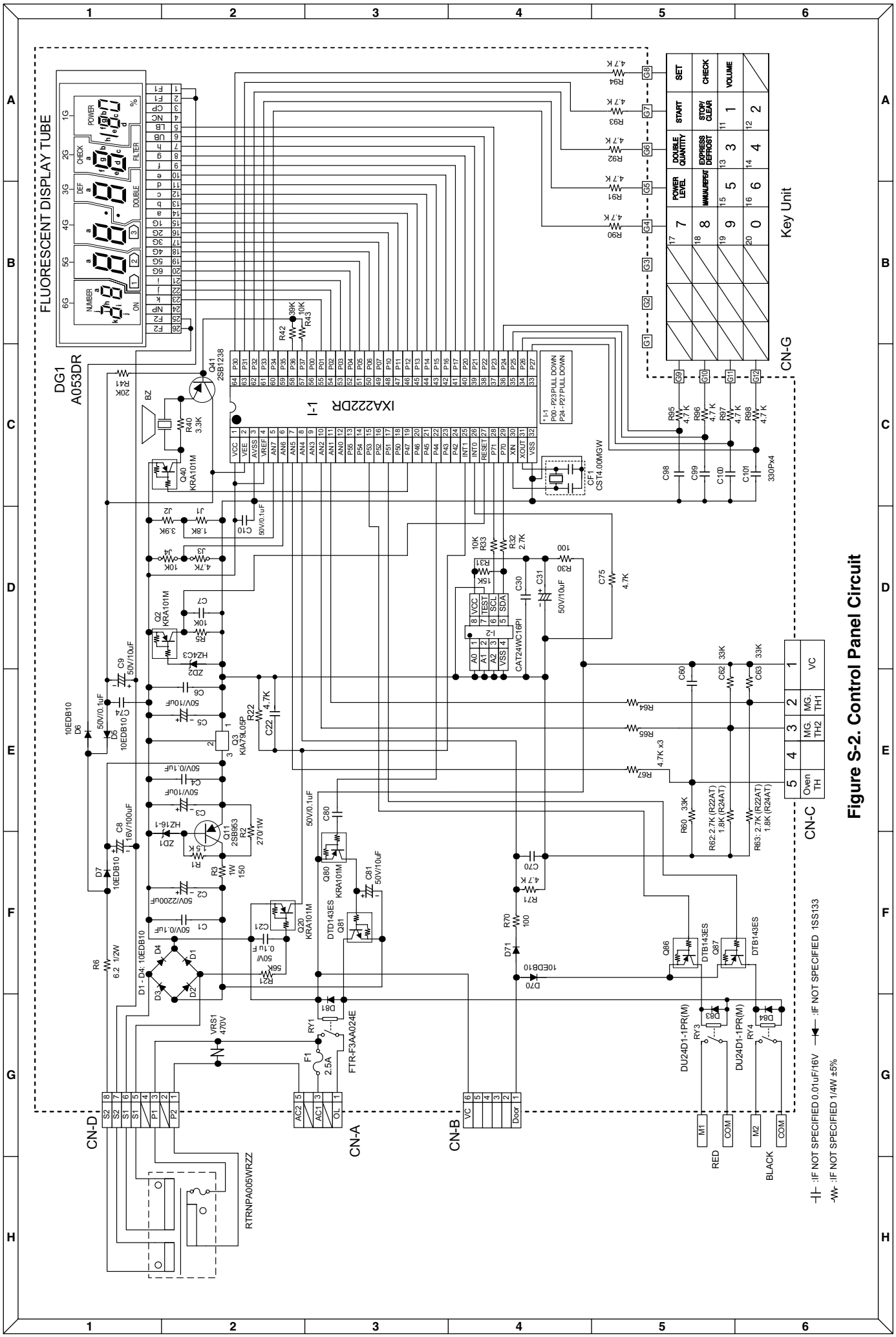


Figure S-2. Control Panel Circuit

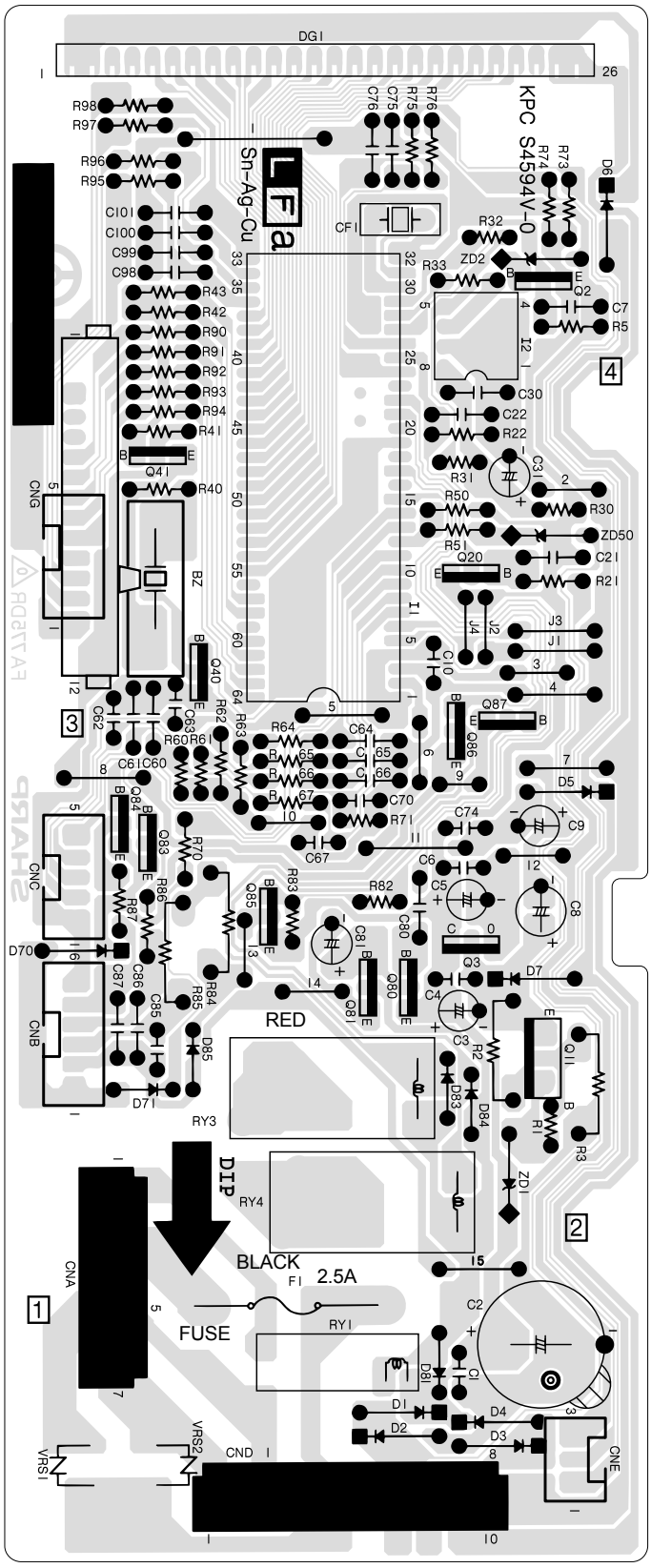


Figure S-3. Printed Wiring Board

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
			ELECTORIC PARTS		
	1- 1	FACCBA013WRKZ	Power supply cord	1	AR
	1- 2	QSOCLA024WRE0	Oven lamp socket	1	AH
*	1- 3	FW-QZA117WRK0	High voltage rectifier assembly	1	AU
	1- 4	FPWBFA335WRE0	Noise filter	1	AX
	1- 5	QFSHDA019WRE0	Fuse holder	2	AH
	1- 6	FMOTEA482WRKZ	Blower motor	1	BH
*	1- 7	RC-QZA264WRE0	High voltage capacitor	2	BA
	1- 8	QFS-CA026WRZZ	Fuse F10A	2	AH
	1- 9	QFS-CA017WRE0	Weak point A017	1	AF
*	1-10	QFS-IA010WRZZ	High voltage fuse 0.80A	2	AQ
Δ*	1-11	RV-MZA335WRZZ	Magnetron	2	BA
	1-12	RLMPTA028WRE0	Oven lamp	1	AK
	1-13	RMOTDA238WRZZ	Antenna motor	2	AR
	1-14	QSW-MA085WRE0	Interlock switch	2	AF
	1-15	QSW-MA086WRE0	Monitor switch	2	AF
	1-16	QSW-MA085WRE0	Stop switch	1	AF
*	1-17	RTRN-A742WRZZ	High voltage transformer [R-22AT]	2	BK
*	1-17	RTRN-A741WRZZ	High voltage transformer [R-24AT]	2	BL
	1-18	RTRNPA005WRZZ	Touch control transformer	1	AQ
	1-19	QFS-TA014WRE0	Temperature fuse 150C	2	AG
	1-20	QFS-TA015WRE0	Temperature fuse 120C (Exhaust)	1	AG
	1-21	FH-HZA070WRE0	Magnetron thermistor	2	AM
	1-22	FH-HZA070WRE0	Exhaust thermistor	1	AM
			CABINET PARTS		
	2- 1	FDAI-A275WRTZ	Base plate	1	BC
	2- 2	GCABUA860WRPZ	Outer case cabinet	1	BD
	2- 3	GCOVAA283WRW0	Rear cabinet	1	AX
	2- 4	FFTASA064WRY0	Oven lamp access cover assembly	1	AN
	2- 4-1	PCUSUA585WRPZ	Cushion	1	AF
	2- 4-2	PREFHA059WRP0	Reflector	1	AF
	2- 5	FFPF-A016WRK0	Vibration-proof sheet	1	AU
	2- 6	PSHEGA007WRE0	Rubber sheet B	2	AE
			CONTROL PANEL PARTS		
	3- 1	DPWBFC483WRKZ	Control unit [R-22AT]	1	BN
	3- 1	DPWBFC488WRKZ	Control unit [R-24AT]	1	BN
	3- 1A	QCNCMA314DRE0	5-pin connector (CN-A)	1	AC
	3- 1B	QCNCMA413DRE0	6-pin connector (CN-B)	1	AC
	3- 1C	QCNCMA420DRE0	5-pin connector (CN-C)	1	AK
	3- 1D	QCNCMA493DRZZ	6-pin connector (CN-D)	1	AE
	3- 1E	QCNCWA057DRE0	12-pin connector (CN-G)	1	AF
	3- 1F	RV-KXA053DRE0	Fluorescent display tube	1	AW
	3- 1G	PCUSGA359WRP0	Cushion	2	AC
	BZ	RALM-A014DRE0	Buzzer (PKM22EPT)	1	AG
	C1	VCKYD11HF104Z	Capacitor 0.1uF 50V	1	AB
	C2	VCEAG51HW228M	Capacitor 2200uF 50V	1	AH
	C3	VCEAG31HW106M	Capacitor 10uF 50V	1	AB
	C4	VCKYD11HF104Z	Capacitor 0.1uF 50V	1	AB
	C5	VCEAG31HW106M	Capacitor 10uF 50V	1	AB
	C6-7	VCKYD11CY103N	Capacitor 0.01uF 16V	2	AA
	C8	VCEAG31CW107M	Capacitor 100uF 16V	1	AC
	C9	VCEAG31HW106M	Capacitor 10uF 50V	1	AB
	C10	VCKYD11HF104Z	Capacitor 0.1uF 50V	1	AB
	C21	VCKYD11HF104Z	Capacitor 0.1uF 50V	1	AB
	C22	VCKYD11CY103N	Capacitor 0.01uF 16V	1	AA
	C30	VCKYD11CY103N	Capacitor 0.01uF 16V	1	AA
	C31	VCEAG31HW106M	Capacitor 10uF 50V	1	AB
	C60	VCKYD11CY103N	Capacitor 0.01uF 16V	1	AA
	C62-63	VRD-B12EF333J	Resistor 33k ohm 1/4W	2	AA
	C70	VCKYD11CY103N	Capacitor 0.01uF 16V	1	AA
	C74	VCKYD11HF104Z	Capacitor 0.1uF 50V	1	AB
	C75	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
	C80	VCKYD11HF104Z	Capacitor 0.1uF 50V	1	AB
	C81	VCEAG31HW106M	Capacitor 10uF 50V	1	AB
	C98-101	VCKYD11HB331K	Capacitor 330pF 50V	4	AA
	CF1	RCRS-A010DRE0	Ceramic resonator (CST4.00MGW)	1	AD
	D1-7	VHD10EDB10+-1T	Diode (10EDB10)	7	AB
	D70	VHD10EDB10+-1T	Diode (10EDB10)	1	AB
	D71	VHD1SS133//-2	Diode (1SS133)	1	AA
	D81	VHD1SS133//-2	Diode (1SS133)	1	AA
	D83-84	VHD1SS133//-2	Diode (1SS133)	2	AA

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
F1	QFS-IA001KKZZ	Fuse 2.5A 50V	1	AD
I- 1	RH-IXA222DRZZ	LSI	1	AU
I- 2	RH-IXA298DRZZ	EEPROM	1	AK
Q2	VSKRA101M//-3	Transistor (KRA101M)	1	AB
Q3	VHIKIA79L05-3	Transistor (KIA79L05P)	1	AE
Q11	VS2SB953-PQ-4	Transistor (2SB953)	1	AG
Q20	VSKRA101M//-3	Transistor (KRA101M)	1	AB
Q40	VSKRA101M//-3	Transistor (KRA101M)	1	AB
Q41	VS2SB1238//-3	Transistor (2SB1238)	1	AA
Q80	VSKRA101M//-3	Transistor (KRA101M)	1	AB
Q81	VSDTD143ES/-3	Transistor (DTD143ES)	1	AC
Q86-87	VSDTB143ES/-3	Transistor (DTB143)	2	AC
R1	VRD-B12EF152J	Resistor 1.5k ohm 1/4W	1	AA
R2	VRS-B13AA271J	Resistor 270 ohm 1W	1	AA
R3	VRS-B13AA151J	Resistor 150 ohm 1W	1	AA
R5	VRD-B12EF103J	Resistor 10k ohm 1/4W	1	AA
R6	VRD-B12HF6R2J	Resistor 6.2 ohm 1/2W	1	AA
R21	VRD-B12EF563J	Resistor 56k ohm 1/4W	1	AA
R22	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R30	VRD-B12EF101J	Resistor 100 ohm 1/4W	1	AA
R31	VRD-B12EF153J	Resistor 15k ohm 1/4W	1	AA
R32	VRD-B12EF272J	Resistor 2.7k ohm 1/4W	1	AA
R33	VRD-B12EF103J	Resistor 10k ohm 1/4W	1	AA
R40	VRD-B12EF332J	Resistor 3.3k ohm 1/4W	1	AA
R41	VRD-B12EF203J	Resistor 20k ohm 1/4W	1	AA
R42	VRD-B12EF393J	Resistor 39k ohm 1/4W	1	AA
R43	VRD-B12EF103J	Resistor 10k ohm 1/4W	1	AA
R60	VRD-B12EF333J	Resistor 33k ohm 1/4W	1	AA
R62-63	VRD-B12EF272J	Resistor 2.7k ohm 1/4W [R-22AT]	2	AA
R62-63	VRD-B12EF182J	Resistor 1.8k ohm 1/4W [R-24AT]	2	AA
R64-65	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	2	AA
R67	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R70	VRD-B12EF101J	Resistor 100 ohm 1/4W	1	AA
R71	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
R90-98	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	9	AA
J1	VRD-B12EF182J	Resistor 1.8k ohm 1/4W	1	AA
J2	VRD-B12EF392J	Resistor 3.9k ohm 1/4W	1	AA
J3	VRD-B12EF472J	Resistor 4.7k ohm 1/4W	1	AA
J4	VRD-B12EF103J	Resistor 10k ohm 1/4W	1	AA
RY1	RRLY-B004MRE0	Relay (FTR-F3AA024E)	1	AF
RY3-4	RRLY-A113DRE0	Relay (DU24D1-1PR(M))	2	AM
VRS1	VHV10V471K+-1	Varistor (TNR10V471K)	1	AD
ZD1	VHEHZ161///-1	Zener diode (HZ16-1)	1	AA
ZD2	VHEHZ4C3///-1	Zener diode (HZ4C3)	1	AA
3- 2	FPNLCB469WRK0	Control panel frame with key unit assembly	1	BA
3- 2-1	PSHEPB154WREZ	Graphic sheet	1	
3- 2-2	QSW-KA041DRZZ	Membrane switch	1	AV
3- 2-3	HDECAA195WRP0	Decoration metal fittings	1	AP
3- 2-4	PCUSUA417WRP0	Cushion	1	AB
3- 2-5	PCUSGA618WREZ	Cushion	1	AD
3- 3	LANGTA243WRW0	Control panel mounting angle	1	AF
3- 4	XEPS730P10XS0	Screw : 3mm x 10mm	4	AA
3- 5	XEPS740P12000	Screw : 4mm x 12mm	2	AA
3- 6	LX-BZA138WREZ	Special screw	1	AB

OVEN PARTS

	4- 1	PCLICA042WREZ	Chassis clip	4	AC
	4- 2	FDUC-A345WRY0	Exhaust duct assembly	1	AP
Δ	4- 3	FOVN-A444WRY0	Oven cavity	1	BS
	4- 4	PFILWA053WRP0	Oven light screen (Inside)	1	AE
	4- 5	MLEVPA153WRF0	Switch lever A	1	AC
	4- 6	MLEVPA154WRF0	Switch lever B	1	AC
	4- 7	MLEVPA155WRF0	Switch lever C	1	AC
	4- 8	MSPRCA075WRE0	Switch spring A	1	AB
	4- 9	MSPRCA076WRE0	Switch spring B	2	AB
Δ	4-10	PHOK-A081WRF0	Latch hook	1	AP
Δ	4-11	MHNG-A216WRM0	Lower oven hinge	1	AG
	4-12	PCUSUA268WRP0	Cushion	1	AA
	4-13	PCUSU0407WRP0	Cushion	2	AA
	4-14	FGLSPA063WRY0	Ceramic shelf	1	BF
	4-15	FPLT-A008WRY0	Stirrer antenna upper assembly	1	AV
	4-16	FPLT-A009WRY0	Stirrer antenna lower assembly	1	AV
	4-17	PCUSUA538WRPZ	Cushion	1	AD
	4-18	LANGQA370WRP0	Oven lamp mounting plate	1	AD
	4-19	LBNDKA068WRP0	Capacitor holder	1	AD
	4-20	PGIDHA054WRW0	Water-proof cover	1	AF
	4-21	NSFTPA031WRF0	Antenna motor shaft	2	AH
	4-22	PZETEA087WRPZ	Insulater	1	AE
	4-23	PCUSUA417WRP0	Cushion	1	AB

	REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
Δ	4-24	MHNG-A215WRM0	Upper oven hinge	1	AG
	4-25	PCUSUA413WRP0	Cushion	1	AG
	4-26	PCUSUA415WRP0	Cushion	1	AC
	4-27	PDUC-A729WRF0	Air duct	1	AL
	4-28	PDUC-A564WRW0	Mg exhaust duct	1	AP
	4-29	PCUSUA414WRP0	Cushion	1	AD
	4-30	LANGKA679WRPZ	Fixing angle S	1	AD
	4-31	HDECQA147WRM0	Corner cap right	1	AE
	4-32	LANGFA195WRW0	Chassis support	1	AH
	4-33	LBSHC0006YBE0	Cord bushing	1	AD
	4-34	PCOVPA363WRFZ	Stirrer cover	1	BA
	4-35	FFIL-A003WRK0	Air intake filter assembly	1	AV
	4-36	HDECEA001WRP0	Decoration sash	1	AR
	4-37	HDECQA146WRM0	Corner cap left	1	AE
	4-38	PCUSGA409WRP0	Cushion	2	AE
	4-39	LANGQA440WRM0	Earth angle	1	AE
	4-40	LANGQA512WRP0	Thermistor angle	2	AE
	4-41	LANGQA593WRPZ	Blower motor angle	1	AH
	4-42	MSPRCA101WRE0	Switch lever spring C	1	AC

DOOR PARTS

Δ	5	CDORFA996WRKZ	Door assembly	1	BV
Δ	5- 1	DDORFB101WRKZ	Door panel assembly	1	BM
	5- 2	GCOVAA242WRY0	Door case	1	BD
	5- 3	FHNDMA011WRY0	Door lever assembly	1	AP
Δ	5- 4	GCOVHA350WRF0	Choke cover	1	AR
	5- 5	JHNDMA039WRM0	Door handle	1	AX
	5- 6	LANGKA766WRP0	Outside window fixing plate	2	AF
	5- 7	PCUSGA430WRP0	Cushion	2	AM
	5- 8	PGLSPA457WRE0	Door glass	1	AV
	5- 9	PPACGA142WRP0	Door case packing	2	AF
	5-10	PSPA-A102WRE0	Door case spacer	2	AE
	5-11	PGID-0024WRF0	Handle guide	4	AC
	5-12	PCUSGA486WRP0	Cushion	1	AM
	5-13	XHTS740P08RV0	Screw : 4mm x 8mm	9	AG
	5-14	FANGKA200WRY0	Latch fixing angle	1	AQ
	5-15	FLEVFA019WRY0	Joint lever	1	AP
Δ	5-16	LSTPCA002WRM0	Latch head	2	AM
	5-17	MLEVPA220WRF0	Head lever	1	AM
	5-18	MSPRCA097WRE0	Latch spring	1	AG
	5-19	HBDGCA094WRE0	Door badge [R-22AT]	1	AF
	5-19	HBDGCA091WRE0	Door badge [R-24AT]	1	AF
	5-20	PGID-0025WRF0	Handel spacer	1	AC

MISCELLANEOUS

6- 1	TINSEB094WRRZ	Operation manual	1	AH
6- 2	TLABHA029WRR0	Menu sticker	1	AC
6- 3	FW-VZB999WREZ	Switch harness	1	AP
6- 4	FW-VZC001WREZ	Main wire harness	1	BC
6- 5	LHLDWA040WRE0	Wire holder A	1	AB
6- 6	LBNDKA079WRE0	Wire holder	2	AB
6- 7	TCAUH0057YBR0	Lamp caution	1	AD
6- 8	TCAUHA257WRR0	S caution sheet	1	AE
6- 9	PZET-A018WRE0	Terminal insulator	2	AC
6-10	TLABSA064WRR0	A017 label	1	AC
6-11	TLABSA055WRR0	Fuse label F10A	2	AE
6-12	TCAUH0114WRR0	Caution label	1	AC
6-13	LHLDWQ004YBE0	Purse lock L	2	AA
6-14	TCAUAA205WRR0	Cord caution	1	AE

SCRE,NUTS AND WASHERS

7- 1	LX-BZA169WREZ	Special screw	4	AC
7- 2	LX-BZA138WREZ	Special screw	13	AB
7- 3	LX-BZA139WREZ	Special screw	1	AA
7- 4	LX-CZA095WREZ	Special screw	3	AB
7- 5	LX-BZA164WREZ	Special screw	12	AC
7- 6	XOTWW40P08000	Screw : 4mm x 8mm	28	AB
7- 7	LX-BZA116WRE0	Special screw	2	AD
7- 8	LX-BZA152WREZ	Special screw	1	AB
7- 9	XOTS740P08000	Screw : 4mm x 8mm	4	AA
7-10	LX-BZA132WREZ	Special screw	4	AB
7-11	LX-EZA004WRE0	Special screw	2	AA
7-12	LX-BZA041WRE0	Special screw	2	AA
7-13	XJPS740P10000	Screw : 4mm x 10mm	2	AA
7-14	XCBWW30P08000	Screw : 3mm x 8mm	2	AA
7-15	XOTS740P10RV0	Screw : 4mm x 10mm	3	AB
7-16	XNES730-24000	Nut : 3mm x 2.4mm	2	AE
7-17	LX-WZA035WRE0	Special washer	1	AB

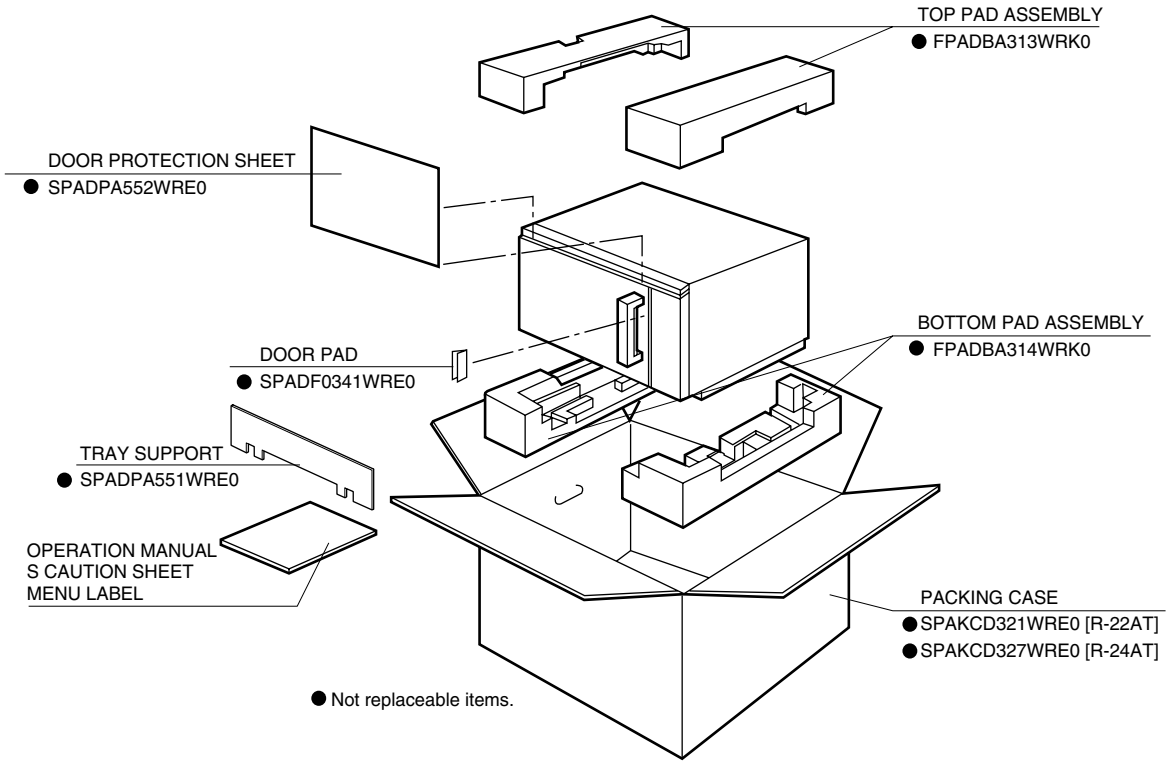
REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
7-18	XWSS740-10000	Washer: 4mm x 1mm	1	AA
7-19	XFTS740P12000	Screw : 4mm x 12mm	1	
7-20	LX-BZA150WREZ	Special screw	1	AB
7-21	XCHWW40P08000	Screw : 4mm x 8mm	2	AB
7-22	XCPS730P10000	Screw : 3mm x 10mm	2	AA
7-23	XBPS730P28KS0	Screw : 3mm x 28mm	2	AB

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



OVEN AND CABINET PARTS