CHAPTER 1. BEFORE SERVICING

[1] 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.

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

[2] WARNING MICROWAVE RADIATION

Personnel 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.

[3] 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 "*" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

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

CHAPTER 2. WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution. High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage fuse, High voltage harness.

REMEMBER TO CHECK 3D

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

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

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

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

REMEMBER TO CHECK 4R

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

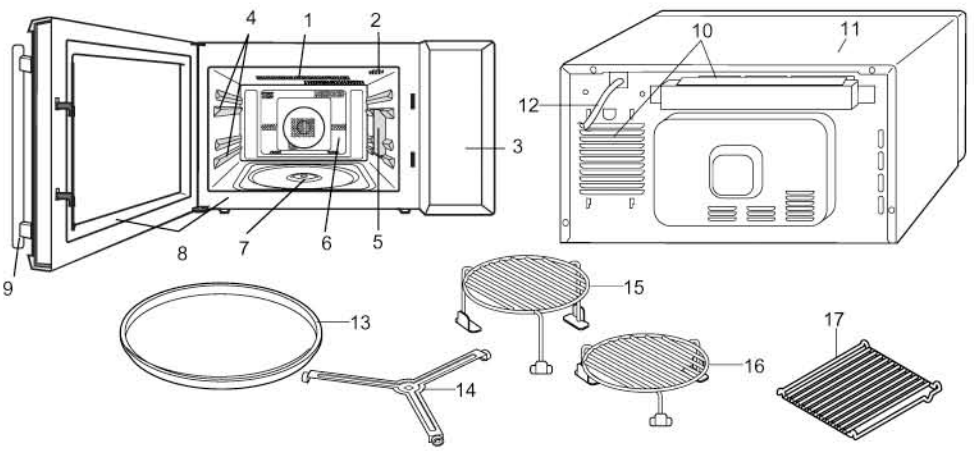
Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power level to HIGH (100%). And set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold, carry out 3D checks and re-examine the connections to the component being tested.

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

CHAPTER 4. APPEARANCE VIEW

[1] OVEN

1. Grill heating element
2. Oven lamp
3. Control panel
4. Shelf runners
5. Waveguide cover
6. Oven cavity
7. Coupling
8. Door seals and sealing surfaces
9. Door opening handle
10. Air-vent openings
11. Outer cabinet
12. Power cord
13. Turntable
14. Turntable support
15. High Rack
16. Low Rack
17. Square shelves (x2)



[2] TOUCH CONTROL PANEL

DIGITAL DISPLAY AND INDICATORS:

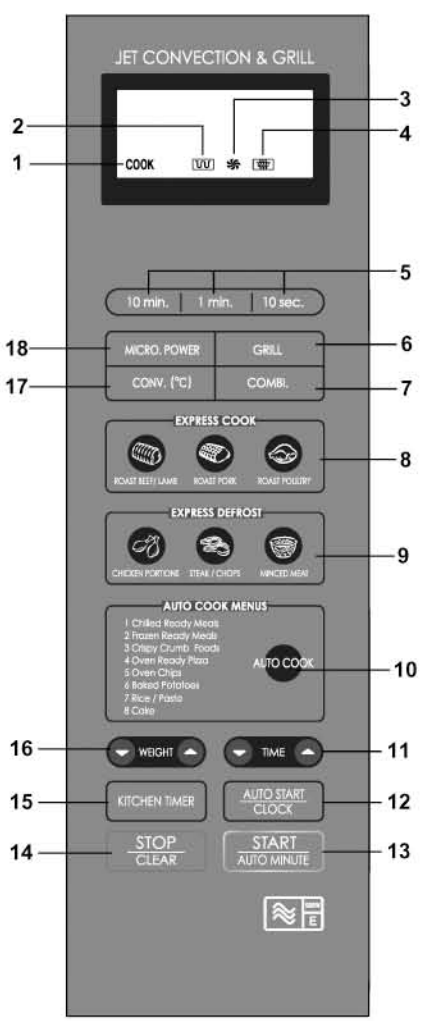
1. GRILL
2. COOK
3. CONVECTION
4. MICROWAVE

KEYS:

5. TIME
6. GRILL
7. CONBI
8. EXPRESS COOK
9. EXPRESS DEFROST
10. AUTO COOK
11. LESS/MORE
12. AUTO/START/CLOCK
13. START/AUTO MINUTE

NOTE: This features is disabled after three minutes when the oven is not in use. This feature is automatically enabled when the door is opened and closed or the STOP/CLEAR key is pressed.

14. STOP/CLEAR
15. KITCHEN TIMER
16. WEIGHT
17. CONV.(°C)
18. MICRO. POWER



CHAPTER 5. OPERATION SEQUENCE

[1] OFF CONDITION

Closing the door activates the monitored latch switch and the stop switch.

IMPORTANT

When the oven door is closed, the contacts COM-NC of the monitor switch must be open. When the microwave oven is plugged in a wall outlet (230 - 240V / 50Hz), the line voltage is supplied to the noise filter.

Figure O-1 on page 14-1

1. The control unit is not energized. The display shows nothing (Fig. O-1 (a)).
2. Open the door. The contacts (COM-NC) of the monitored latch switch are closed and the control unit is energized. Then contacts of relays RY1 and RY5 are closed, and the oven lamp will light and the display will show "ENERGY SAVE MODE" . (Fig. O-1(b)).
3. Close the door. The contacts (COM-NC) of the monitored latch switch are opened and the contacts of relay RY1 are opened and the oven lamp will be turned off. The display will show " . 0". (Fig. O-1(c)).

NOTE: Energy save mode

1) If the oven has not been used for more than 3 minutes, the contacts of the relay RY5 will be opened and the control unit will be not energized. Open and close the door, the control unit will resume.
2) If the clock is set, this energy save mode does not work.
3) If the display shows different messages from ENERGY SAVE MODE, the oven may be set in demo mode. Close the door, see operation manual to cancel demo mode.

[2] MICROWAVE COOKING CONDITION

1. HIGH COOKING

Enter a desired cooking time by touching the TIME keys and start the oven by touching START key.

Function sequence

Figure O-2 on page 14-1

CONNECTED COMPONENTS	RELAY
Oven lamp, Turntable motor	RY1
High voltage transformer	RY2
Fan motor,	RY6

1. The line voltage is supplied to the primary winding of the high voltage transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wavelength of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY1 + RY2 + RY6 go back to their home position.

   The circuits to the oven lamp, high voltage transformer, fan motor and turntable motor are cut off.
5. When the oven door is opened during a cooking cycle, the switches come to the following condition.

SWITCH	CONTACT	CONDITION DURING COOKING	CONDITION DOOR OPEN (NO COOKING)
Monitored latch switch	COM-NO	Closed	Opened
	COM-NC	Opened	Closed
Stop switch	COM-NO	Closed	Opened
Monitor switch	COM-NO	Closed	Opened
	COM-NC	Opened	Closed

The circuit to the high voltage transformer is cut off when the contacts of relay RY2, and the contacts (COM-NO) of the monitored latch switch and monitor switch are made open. The circuit to the fan motor is cut off when the relay RY6 is made open. The circuit to the turntable motor is cut off when the contacts (COM-NO) of the monitored latch switch are made open. The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is remaining time.

6. MONITOR SWITCH CIRCUIT

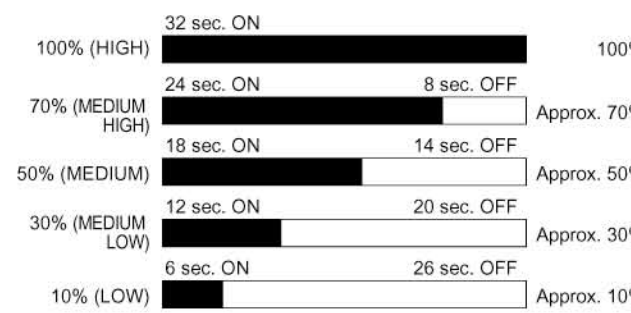
   The monitor switch is mechanically controlled by the oven door, and monitors the operation of the monitored latch switch.

   1) When the oven door is opened during or after the cycle of a cooking program, the monitored latch switch and stop switch must open their contacts (COM-NO) first. And the contacts (COM-NC) of the monitored latch switch are made closed. After that the contacts (COM-NC) of the monitor switch can be closed and the contacts (COM-NO) of monitor switch are made open.
   2) When the oven door is closed, the contacts (COMNC) of the monitor switch must be opened and the contacts (COM-NO) of monitor switch must be closed. After that the contacts (COM-NO) of the monitored latch switch and the stop switch are made closed. And the contacts (COM-NC) of the monitored latch switch are made open.
   3) 6-3. When the oven door is opened and the contacts (COM-NO) of the monitored latch switch remain closed, the fuse F8A will blow. Because the relay RY1 and monitor switch are closed and a short circuit is caused.

2. MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

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

SETTING;



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

[3] GRILL COOKING CONDITION

1. TOP GRILL (Figure O-3)

In this condition the food is cooked by the grill heating element . Programme the desired cooking time by touching the TIME keys and touch the GRILL key once. When the START key is touched, the following operations occur:

1. The numbers on the digital readout start the count down to zero.
2. The oven lamp, cooling fan motor and turntable motor are energized.
3. The relay RY3 is energized and the main supply voltage is applied to the top grill heating elements.
4. Now, the food is cooked by the top grill heating elements.

NOTE: The convection cooking condition will be carried out simultaneously until the temperature of the oven cavity rise to 220°C.

[4] CONVECTION COOKING CONDITION

1. PRE-HEATING (by 40°C - 130°C)

Programme the desired convection temperature of 40°C - 130°C by touching CONVECTION key. When the START key is touched, the following operations occur:

1. The relays RY1, RY6 and RY7 are energized, the oven lamp, turntable motor, fan motor and convection motor are turned on.
2. The relay RY4 is energized and the main supply voltage is applied to the convection heating element.
3. After the temperature of oven cavity rises to the selected one, the oven will continue to turned the convection heating element on and off to maintain the temperature for 30 minutes.:

2. PRE-HEATING (by 160°C - 250°C)

Programme the desired convection temperature of 160°C - 250°C by touching CONVECTION key. When the START key is touched, the following operations occur:

1. The relays RY1, RY6 and RY7 are energized, the oven lamp, turntable motor, fan motor and convection motor are turned on.
2. The relay RY4 and RY3 are is energized and the main supply voltage is applied to the convection heating element and the grill heating elements.
3. After the temperature of oven cavity rises to the selected one, the oven will continue to turned the convection heating element on and off to maintain the temperature for 30 minutes. And simultaneously the grill heating element will be operated at 10% power output.

3. CONVECTION COOKING (by 250°C)

Programme the cooking time by touching TIME keys. And then programme the convection temperature of 250°C by touching CONVECTION key. When the START key is touched, the following operations occur:

1. The relays RY1, RY6 and RY7 are energized, the oven lamp, turntable motor, fan motor and convection motor are turned on.
2. The relay RY4 and RY3 are energized and the main supply voltage is applied to the convection heating element and the grill heating elements.
3. The oven will continue to turn the convection heating element on and off to maintain the temperature for the programmed cooking time. And simultaneously the grill heating elements will be operated at 10% power output.

4. CONVECTION COOKING (by 40°C - 230°C)

Programme the cooking time by touching TIME keys. And then programme the desired convection temperature of 40°C 230°C by touching CONVECTION key. When the START key is touched, the following operations occur:

1. The relays RY1, RY6 and RY7 are energized, the oven lamp, turntable motor, fan motor and convection motor are turned on.
2. The relay RY4 is energized and the main supply voltage is applied to the convection heating element.
3. The oven will continue to turn the convection heating element on and off to maintain the temperature for the programmed cooking time.

[5] COMBI COOKING CONDITION

1. MICROWAVE AND CONVECTION (Figure O-5a)

Programme the desired cooking time by touching the TIME keys. Touch the COMBI. key once. Select the microwave power level by touching the MICRO. POWER key. And select the convection temperature by touching the CONVECTION key.

NOTE: The 100% microwave power level can not be selected.

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

1. The numbers on the digital read-out start the count down to zero.
2. The oven lamp, fan motor, turntable motor and convection motor are energized.
3. The relay RY4 will be energized and the main supply voltage is applied to the convection heating element.
4. The relay RY2 is energized and the microwave energy is generated by magnetron.
5. Now, the food is cooked by microwave and convection energy simultaneously.

2. MICROWAVE AND TOP GRILL (Figure O-5b)

Programme the desired cooking time by touching the TIME keys. Touch the COMBI. key twice. Select the microwave power level by touching the MICRO. POWER key. When the START key is touched, the following operations occur:

1. The numbers on the digital read-out start the count down to zero.
2. The oven lamp, fan motor and turntable motor are energized.
3. The relay RY3 is energized and the main supply voltage is applied to the grill heating elements.
4. The relay RY2 is energized and the microwave energy is generated by magnetron.
5. Now, the food is cooked by microwave and grill simultaneously.

[6] ON/OFF TIME RATIO

In grill cooking, convection cooking or dual cooking, the grill heating elements or magnetron operate within a 48 second time base. The following table is the ON / OFF time ratio at each power output of the grill heating element or magnetron.

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

[7] AUTOMATIC COOKING

Auto Cook functions automatically work out the correct cooking mode and cooking time and/or cooking temperature. They will cook according to the special cooking sequence.

[8] POWER OUTPUT REDUCTION

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

Cooking mode		Basis cooking time (minutes)	Reduced power output (%)	Time base (seconds)
Microwave (100%)		20	70	32
Grill		15	70	48
Convection		No reduction		
DUAL	Micro. (70%) + Grill	40 (Micro.)	50	48
		15 (Grill)	50	48
	Micro. (100%) + Grill	15 (Micro.)	50	48
		15 (Grill)	50	48
	Micro. (70%) + Conv.	40 (Micro.)	50	48
		No reduction		

NOTE: 1) If the multiple sequence cooking is carried out in the same mode, the basis cooking time is calculated from the first.

2) Even if the cooking is stopped by the STOP key or opening the door, the basis cooking time is calculated from the first.

3) If the same cooking mode is repeated within 1 minute and 15 seconds, the basis cooking time is calculated from the first.

4) If the same menu of Automatic Cooking is repeated within 1 minute and 15 seconds, the power output of the microwave or the grill will be reduced to 70% after 20 minutes when the oven is started at first.

[9] FAN MOTOR OPERATION

(in Grill, Convection and COMBI. mode)

When oven is stopped during cooking, or after the cooking is completed, the fan motor will operate if the oven cavity temperature is above 120°C, and the fan motor will stop if the oven cavity temperature is below 105°C.

[10] CONVECTION MOTOR OPERATION

If the temperature of oven cavity is higher than 120°C after and when operated by 250°C convection cooking, 250°C combi. convection cooking or 250°C preheating, the convection motor will operate for maximum 1 minute until the oven cavity temperature drops below 105°C.

CHAPTER 7. TROUBLESHOOTING GUIDE

[1] FOREWORD

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 F8A in the monitored latch switch - monitor switch circuit, check the monitored latch switch and monitor switch before replacing the noise filter (fuse F8A).

[2] CHART

TEST PROCEDURE	POSSIBLE CAUSE AND DEFECTIVE PARTS	Fuse F8A blows when the door is opened.	Home fuse blows when power cord is plugged into wall outlet.	Fuse 20A blows when power cord is plugged into wall outlet.	Nothing appears in display when power cord is plugged into wall outlet and the door is opened and closed.	Display does not operate properly when STOP/CLEAR key is touched.	Oven lamp does not light when door is opened. (Display operates.)	Oven does not start when the START key is touched. (Display operates.)	Oven lamp does not light and turntable motor does not operate.	Fan motor does not operate. (Oven lamp lights.)	Convection fan motor does not operate. (Fan motor operates.)	Turntable motor does not operate. (Oven lamp lights.)	Oven or any electrical parts (except fan motor) does not stop when cooking time is 0 or STOP/CLEAR key is touched.	Oven stops after 4 minutes and 15 seconds since START key is touched. (Except Microwave mode and Dual cook mode)	Display operates properly but all electrical parts do not operate.	Oven goes into cook cycle but shuts down before end of cooking cycle.	After cooking, the temperature of oven cavity is higher than 120°C but fan motor does not operate.	The oven stops 1 minute after starting.	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power control is set at 100%)	Oven does not seem to be operating properly during variable cooking condition except 100% cooking condition.	Oven goes into cook cycle but shuts down before end of cooking cycle.	Convection cooking mode does not heat.	Oven seems to be operating but the temperature in the oven cavity is lower or higher than preset one.	Grill heating element does not operate.	Oven goes into cook cycle but shuts down before end of cooking cycle.	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power does not seem to be generated properly)	Oven seems to be operating but the temperature in the oven cavity is lower or higher than preset one.	Convection heating elements do not heat.	Grill heating element does not heat.
	CONDITION	OFF CONDITION	OFF CONDITION	OFF CONDITION	OFF CONDITION	OFF CONDITION	OFF CONDITION	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	MICROWAVE COOKING CONDITION	MICROWAVE COOKING CONDITION	MICROWAVE COOKING CONDITION	CONVECTION COOKING CONDITION	CONVECTION COOKING CONDITION	GRILL COOKING CONDITION	COMBI. COOKING CONDITION (COMMON MODE)	COMBI. COOKING CONDITION (COMMON MODE)	COMBI. COOKING CONDITION (MICRO./CONV.)	COMBI. COOKING CONDITION (MICRO./CONV.)	COMBI. COOKING CONDITION (MICRO./GRILL)
	BLOCKED COOLING FAN									○						○					○				○				
	BLOCKED CONVECTION FAN										○					○							○				○		
	NO POWER AT WALL OUTLET				○																								
	HOME FUSE OR BREAKER		○																						○				
	MIS-ADJUSTMENT OF SWITCHES					○		○				○							○			○		○		○		○	○
	BLOCKED VENTILATION OPENINGS															○					○				○				
	OPENED WIRE HARNESS				○	○	○	○	○	○	○	○		○	○			○	○		○	○		○	○	○		○	○
	SHORTED WIRE HARNESS			○			○											○	○			○			○	○			
	OVEN LAMP OR SOCKET						○		○																				
	POWER SUPPLY CORD		○		○																								
P	FOIL PATTERN ON P.W.B.				○																								
O	RELAY RY8																	○			○				○				
O	RELAY RY7										○		○		○														
O	RELAY RY6									○			○		○														
O	RELAY RY5				○																								
O	RELAY RY4												○		○							○	○				○	○	
O	RELAY RY3												○		○									○					○
O	RELAY RY2												○		○				○	○						○			
O	RELAY RY1	○					○		○				○		○														
N	KEY UNIT					○		○					○																
M	TOUCH CONTROL PANEL				○	○	○	○					○	○			○		○	○		○	○		○	○	○		
	TC TRANSFORMER				○																								
L	CONVECTION HEATING ELEMENT																					○	○				○	○	
L	GRILL HEATING ELEMENT																							○					○
K	NOISE FILTER (FUSE F8A)	○																	○							○			
J	FUSE 20A			○	○																								
I	NOISE FILTER			○	○																								
H	DAMPER MOTOR																	○			○				○				
H	CONVECTION FAN MOTOR										○					○							○				○		
H	FAN MOTOR									○						○					○				○				
H	TURNTABLE MOTOR								○			○																	
G	THERMAL CUT-OUT 170ºC (CONV.)								○						○														
G	THERMAL CUT-OUT 170ºC (GRILL)				○											○									○				
G	THERMAL CUT-OUT 125ºC				○											○					○				○				
F	THERMISTOR													○		○	○				○	○	○		○		○		
E	DAMPER SWITCH																	○											
E	MONITOR SWITCH																		○			○		○		○		○	○
E	STOP SWITCH					○	○	○																					
E	MONITORED LATCH SWITCH	○			○							○														○			
D	HIGH VOLTAGE CAPACITOR																		○							○			
	H.V. HARNESS																		○							○			
C	H.V. RECTIFIER ASSEMBLY																		○							○			
B	HIGH VOLTAGE TRANSFORMER																		○							○			
A	MAGNETRON																		○							○			

CHAPTER 8. TEST PROCEDURES

[1] Procedure A: MAGNETRON TEST

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

1. CARRY OUT 3D CHECKS.
2. To test for an open filament, isolate the magnetron from the high voltage circuit. A continuity check across the magnetron filament leads should indicate less than 1 ohm.
3. To test for a shorted magnetron, connect the ohmmeter leads between the magnetron filament leads and chassis ground. This test should indicate an infinite resistance. If there is little or no resistance the magnetron is grounded and must be replaced.
4. Reconnect all leads removed from components during testing.
5. Reinstall the outer case (cabinet).
6. Reconnect the power supply cord after the outer case is installed.
7. Run the oven and check all functions.

1. MICROWAVE OUTPUT POWER

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted).

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 IEC60705 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 1 minute and 40 seconds on full power.
4. When the 1 minute and 40 seconds is completed, remove the container and stir the water. Note the water temperature as T2.
5. Calculate the output power using the following formula:

   R.F. Power Output = (T2 - T1) x 90.

NOTE: **The result from this test should be within the allowance of 2000cc alternative method. (±15%).**

2. 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

[2] Procedure B: HIGH VOLTAGE TRANSFORMER TEST

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

1. CARRY OUT 3D CHECKS.
2. 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 winding. The following readings should be obtained:

   a.Primary winding ---------- approximately 1.9 Ω

   b.Secondary winding ---------- approximately 123 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.

3. Also, the high voltage transformer has the thermal cut-out in the primary coil. The thermal cut-out will open when the temperature of the thermal cut-out in the primary coil reaches approximately 150°C. The thermal cut-out resets automatically at 130°C. If an ohmmeter indicates an open circuit under normal condition, replace the high voltage transformer because the primary coil (thermal cut-out) has opened. An open primary coil (thermal cut-out) indicates overheating of the high voltage transformer. Check for restricted air flow to the high voltage transformer, especially the ventilation opening.
4. CARRY OUT 4R CHECKS.

[3] Procedure C: HIGH VOLTAGE RECTIFIER TEST

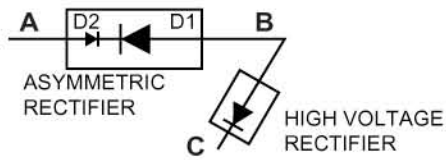
CARRY OUT 3D CHECKS.

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

CARRY OUT 4R CHECKS.

ASYMMETRIC RECTIFIER TEST

CARRY OUT 3D CHECKS.



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

CARRY OUT 4R CHECKS.

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.

[4] Procedure D: HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

1. Isolate the high voltage capacitor from the circuit.
2. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
3. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.
4. A short-circuited capacitor shows continuity all the time.
5. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.
6. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
7. 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.

[5] Procedure E: SWITCH TEST

CARRY OUT 3D CHECKS.

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

Table: Terminal Connection of Switch

Plunger Operation	Common terminal to Normally open terminal	Common terminal to Normally close terminal
Released	Open circuit	Short circuit
Depressed	Short circuit	Open circuit.

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

CARRY OUT 4R CHECKS.

[6] Procedure F: THERMISTOR TEST

CARRY OUT 3D CHECKS.

Disconnect the connector B from CPU unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to Pin No's C1 and C3 of the thermistor harness.

Room Temperature	Resistance
20°C - 30°C	Approximately 359.9 kΩ - 152 kΩ

If the meter does not indicate above resistance, replace the thermistor.

CARRY OUT 4R CHECKS.

[7] Procedure G: THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS.

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

Table: Thermal Cut-out Test

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

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

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

An open circuit thermal cut-out (GRILL) indicates that the oven cavity has overheated, this may be due to no load operation.

An open circuit thermal cut-out (CONV.) indicates that the convection fan winding has overheated, this may be due to resistricted ventilation or locked cooling fan or locked convection fan motor.

CARRY OUT 4R CHECKS.

[8] Procedure H: MOTOR WINDING TEST

CARRY OUT 3D CHECKS.

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

Table: Resistance of Motor

Motors	Resistance
Fan motor	Approximately 398.9 Ω
Turntable motor	Approximately 14.7 kΩ
Convection fan motor	Approximately 183.7 kΩ
Dumper motor	Approximately 14.7 kΩ

If incorrect readings are obtained, replace the motor.

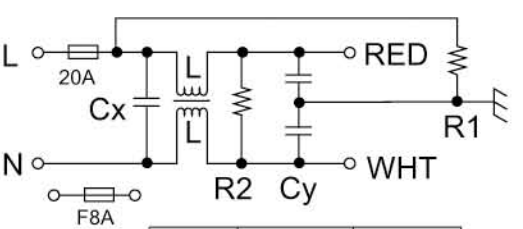
CARRY OUT 4R CHECKS.

[9] Procedure I: NOISE FILTER TEST

CARRY OUT 3D CHECKS.

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

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



L (min)	Cx ± 20%	Cy ± 20%
1.0mH	0.22 uF	4700pF

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

CARRY OUT 4R CHECKS.

[10] Procedure J: BLOWN FUSE 20A

CARRY OUT 3D CHECKS.

If the fuse 20A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

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

[11] Procedure K: BLOWN FUSE F8A (NOISE FILTER)

CARRY OUT 3D CHECKS.

1. If the fuse F8A is blown when the door is opened, check the monitored latch switch SW1 and monitor switch.
2. If the fuse F8A is blown by incorrect door switching replace the defective switch(es) and the noise filter.

3. If the fuse F8A is blown, there could be shorts in the asymmetric rectifier or there is a ground in wire harness. A short in the asymmetric rectifier may be occurred due to short or ground in H.V. rectifier, magnetron, high voltage transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

CAUTION: REPLACE NOISE FILTER.

[12] Procedure L: GRILL HEATING ELEMENTS (TOP) AND CONVECTION HEATING ELEMENT TEST

CARRY OUT 3D CHECKS.

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

1. Resistance of heater.

   Disconnect the wire leads to the heating element to be tested. Using ohmmeter with low resistance range. Check the resistance across the terminals of the heating element as described in the following table.

Table: Resistance of heater

Parts name	Resistance
Grill heating elements (Top)	Approximately 37.4 Ω -39.7Ω [(18.7Ω - 19.85Ω) x 2]
Convection heating elements	Approximately 38.02 Ω - 40.95Ω

2. Insulation resistance.

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

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

CARRY OUT 4R CHECKS.

[13] Procedure M: CONTROL PANEL ASSEMBLY TEST

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance can not be performed with only a voltmeter and ohmmeter.

In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit, and also the Control unit is divided into two units, CPU unit and Power unit, and troubleshooting by replacement is described according to the symptoms indicated.

1. Key Unit Note: Check key unit ribbon connection before replacement.

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

a) When touching the pads, a certain pad produces no signal at all.

b) When touching a number pad, two figures or more are displayed.

c) When touching the pads, sometimes a pad produces no signal.

2. Control Panel

The following symptoms indicate a defective control unit. Before replacing the control unit perform the key unit test (Procedure N) to determine if control unit is faulty.

2.1. In connection with pads

a) When touching the pads, a certain group of pads do not produce a signal.

b) When touching the pads, no pads produce a signal.

2.2. In connection with indicators

a) At a certain digit, all or some segments do not light up.

b) At a certain digit, brightness is low.

c) Only one indicator does not light up.

d) The corresponding segments of all digits do not light up; or they continue to light up.

e) Wrong figure appears.

f) A certain group of indicators do not light up.

g) The figure of all digits flicker.

2.3. Other possible troubles caused by defective control unit.

a) Buzzer does not sound or continues to sound.

b) Clock does not operate properly.

c) Cooking is not possible.

d) Proper temperature measurement is not obtained.

[14] Procedure N: KEY UNIT TEST

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

	G8	G7	G6	G5	G4	G3	G2	G1
G9	ROAST POULTRY	ROAST PORK	STEAK/ CHOPS	CHICKEN PORTIONS	ROAST BEEF/ LAMB	10sec.	1min.	10min.
G10	MINCED MEAT		AUTO COOK				GRILL	
G11		△ (TIME)	▽ (TIME)	AUTO START CLOCK	START AUTO MINUTE	△ (WEIGHT)	MICRO. POWER	▽ (WEIGHT)
G12		COMBI.				KITCHEN TIMER	CONV. (°C)	STOP / CLEAR

CARRY OUT 4R CHECKS.

[15] Procedure O: RELAY TEST

CARRY OUT 3D CHECKS.

Remove the outer case and check voltage between Pin Nos. 1 and 3 of the 4 pin connector (E) on the control unit with an A.C. voltmeter. The meter should indicate 230 - 240 volts, if not check oven circuit.

Relay Test

Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation, grill operation, convection operation or dual 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. 18.0V D.C.	Oven lamp / Turntable motor
RY2	APPROX. 18.0V D.C.	High voltage transformer
RY3	APPROX. 24.0V D.C.	Grill (Top) heating element
RY4	APPROX. 24.0V D.C.	Convection heating element
RY5	APPROX. 24.0V D.C.	Fan motor
RY6	APPROX. 24.0V D.C.	Touch control transformer
RY7	APPROX. 24.0V D.C.	Convection motor
RY8	APPROX. 24.0V D.C.	Damper motor

CARRY OUT 4R CHECKS.

[16] Procedure P: PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN

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

Problem: POWER ON, indicator does not light up.

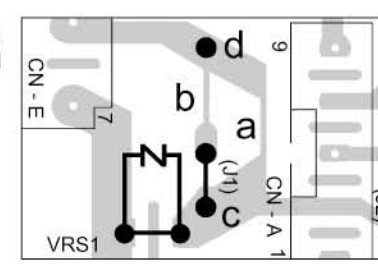
CARRY OUT 3D CHECKS.

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present between Pin No. 1 and 3 of the 4-pin connector (E).	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and replace power unit.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder.
4	Pattern at "a" and "b" are broken.	Replace power unit. (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 power unit.

CARRY OUT 4R CHECKS.



CHAPTER 10. 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.

CHAPTER 11. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

[1] BEFORE OPERATING

WARNING AGAINST HIGH VOLTAGE:

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in severe, possibly fatal, electric shock.

(Example)

High Voltage Capacitor, High Voltage Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage fuse, High Voltage Harness etc..

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

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

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

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

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

Do not operate the oven:

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

WARNING FOR WIRING

To prevent an electric shock, take the following manners.

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

      Magnetron, High voltage transformer, High voltage capacitor and High voltage rectifier assembly.
   2) Hot parts:

      Grill heating element, Convection heating element, Oven lamp, Magnetron, High voltage transformer and Oven cavity.
   3) Sharp edge:

      Bottom plate, Oven cavity, Waveguide flange, Chassis support and other metallic plate.
   4) Movable parts (to prevent a fault)

      Fan blade, Fan motor, Switch, Turntable motor, Convection motor, convection fan and cooling fan.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector certainly until its pin is locked. And make sure that the wire leads should not come off even if the wire leads is pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

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

[2] OUTER CASE REMOVAL

To remove the outer case, procedure as follows.

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

NOTE: Step 1, 2 and 8 form the basis of the 3D checks.

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

[3] HIGH VOLTAGE COMPONENTS REMOVAL

(HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY)

To remove the components, proceed as follows.

1. CARRY OUT 3D CHECKS.
2. Disconnect the filament lead of the high voltage transformer and the high voltage wire of the high voltage transformer from the high voltage capacitor.
3. Disconnect the high voltage wire from the magnetron.

4. Remove one (1) screw holding earth side terminal of the high voltage rectifier assembly to the base plate through the capacitor holder.
5. Release the capacitor holder from the base plate.
6. Remove the high voltage capacitor from the capacitor holder.
7. Disconnect the high voltage rectifier assembly from the high voltage capacitor.
8. Now, the high voltage rectifier assembly and the high voltage capacitor should be free.

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

[4] HIGH VOLTAGE TRANSFORMER REMOVAL

To remove the components, proceed as follows.

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

[5] MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the H.V. wire and filament lead of the transformer from the magnetron.
3. Carefully remove two (2) screws holding the magnetron to the waveguide, when removing the screws hold the magnetron to prevent it from falling.
4. Remove the one (1) screw holding the magnetron to the chassis support.
5. Remove the magnetron from the waveguide with care so the magnetron antenna is not hit by any metal object around the antenna.
6. Now, the magnetron is free.

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

[6] CONTROL PANEL ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads and the connectors from the CPU unit and power unit.
3. Remove the one (1) screw holding the control panel to the oven cavity face plate.
4. Remove the one (1) screw holding the earth wire to the oven cavity face plate.
5. Lift up the control panel assembly and pull it forward.

   Now the control panel assembly is free.

[7] GRAPHIC SHEET AND MEMBRANE SWITCH REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly, referring to chapter of CONTROL PANEL ASSEMBLY REMOVAL.
3. Disconnect the ribbon cable of the membrane switch from the connector (CN-G) on the control unit.
4. Remove the five (5) screws holding the control unit to the control panel frame. And remove the control unit and the power unit.
5. Tear away the graphic sheet from the control panel frame.
6. Tear away the membrane switch from the control panel frame.

2. REINSTALL

1. Remove remaining adhesive on the control panel frame surfaces with a soft cloth soaked in alcohol.
2. Tear the backing paper from the new membrane switch.
3. Insert the ribbon cable of the membrane switch into the slit of the control panel frame.
4. Adjust the upper edge and right edge of the membrane switch to the small depression on the surface of the control panel frame.
5. Attach the membrane switch to the control panel frame by rubbing with a soft cloth not to scratch.
6. Tear the backing paper from the new graphic sheet.
7. Adjust the upper edge and right edge of the graphic sheet to the large depression on the surface of the control panel frame.
8. Attach the graphic sheet to the control panel frame by rubbing with a soft cloth not to scratch.
9. Reinstall control unit to the control panel frame with the five (5) screws.
10. Connect the ribbon cable of the membrane switch to the connector (CN-G) on the control unit.

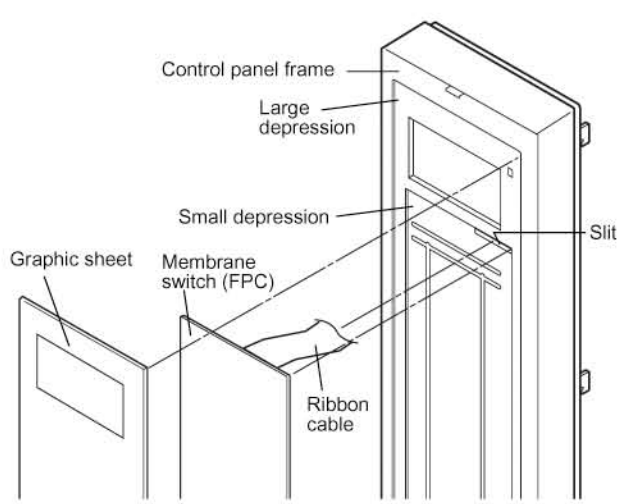


Figure C-1. Graphic Sheet and Membrane Switch Replacement

[8] FAN MOTOR REREPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the noise filter to the chassis support.
3. Release the noise filter from the tabs of the fan duct.
4. Remove the three(3) screw holding the chassis support to the oven cavity front flange, back plate, and the magnetron.
5. Remove the chassis support from the oven cavity.
6. Disconnect the wire leads from the fan duct.
7. Remove the one (1) screw holding the fan duct to the back plate.
8. Release the tabs of the fan duct from back plate.
9. Remove the fan duct from the oven.
10. Remove the fan blade from the fan motor shaft according to the following procedure.
    i) Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

CAUTION:
- Make sure that no swarf from the rotor enters the gap between the rotor & stator of the fan motor.
- Avoid touch the coil of the fan motor with the pliers as the coil may become cut or damaged.
- Avoid deforming the bracket whilst using the pliers.

    ii) Remove the fan blade assembly from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
    iii) Now, the fan blade is free.

CAUTION: Do not re-use the removed fan blade as the fixing hole may be oversize.

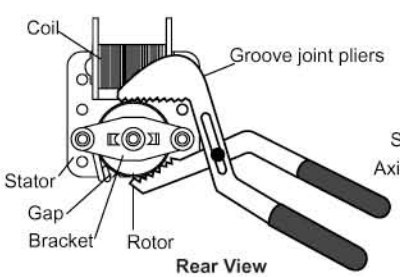
11. Remove the two (2) screws holding the fan motor to the fan duct.
12. Now, the fan motor is free.

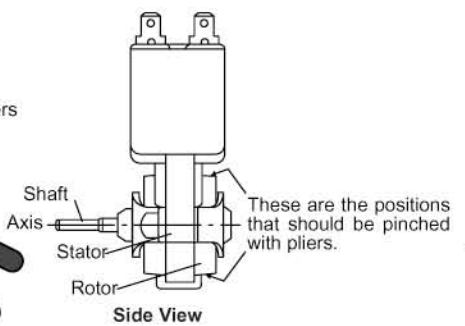
2. INSTALLATION

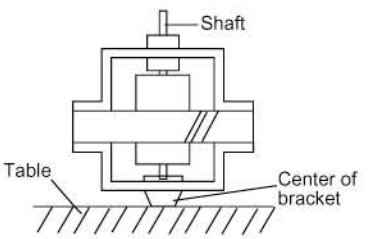
1. Install the fan motor to the fan duct with the two (2) screws and nuts.
2. Install the fan blade to the fan motor shaft according to the following procedure.
    i) Hold the centre of the bracket which supports the shaft of the fan motor on a flat table.
    ii) Apply the screw lock tight into the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

CAUTION:
- Do not hit the fan blade when installing because the bracket may be deformed.
- Make sure that the fan blade rotates smoothly after installation.
- Make sure that the axis of the shaft is not slanted.

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







[9] TURNTABLE MOTOR REPLACEMENT

1. REMOVAL

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

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

5. Remove the turntable motor cover from the base plate.
6. Disconnect the wire leads from the tu Figure C-2(b)rntable motor.
7. Remove the two (2) screws holding the turntable motor to the oven cavity back plate.
8. Remove the turntable motor from the turntable motor angle. Now, the turntable motor is free.

2. REINSTALL

1. Remove the any sharp edges on the turntable motor cover and the base plate with the cutting pliers.
2. Re-install turntable motor by locating shaft onto coupling to the oven cavity base plate with the two (2) screws.
3. Re-connect the wire leads to the turntable motor.
4. Insert the one (1) tab of the turntable motor cover into the slit of the base plate as shown in Figure C-2(b).
5. Re-install the turntable motor cover to the base plate with the screw (XHPS740P08K00) as shown in Figure C-2(b).

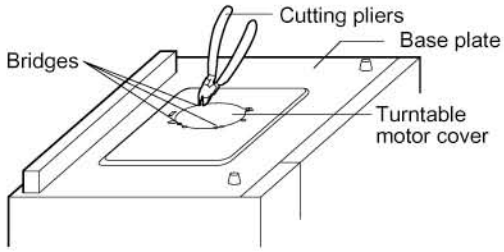


Figure C-2(a) Turntable Motor Cover Replacement

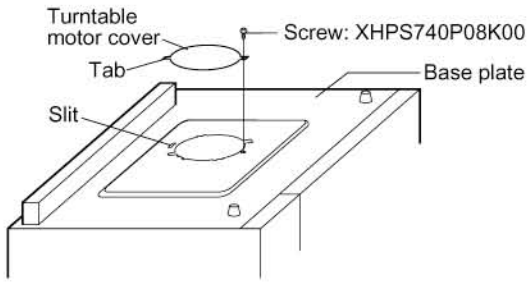


Figure C-2(b) Turntable Motor Cover Reinstall

[10] CONVECTION MOTOR AND CONVECTION HEATING ELEMENT REMOVAL

1. CONVECTION UNIT ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.

   Now, the outer case cabinet and the air duct should have been removed.
2. Remove the one (1) screw holding the earth wire of the power supply cord to the back plate.
3. Release the power supply cord from the back plate.
4. Remove the two (2) screws holding the rear barrier to the base plate.
5. Release the three (3) tabs of rear barrier from the base plate. And remove the rear barrier.
6. Remove the one (1) screw holding the back plate to the base plate.
7. Remove the one (1) screw holding the chassis support to the back plate.
8. Remove the one (1) screw holding the back plate to the air intake duct.
9. Remove the two (2) screws holding the back plate to the convection duct.
10. Remove the back plate from the oven cavity.
11. Disconnect the wire leads from the convection heating elements, convection motor and thermal cut-out.
12. Remove the one (1) screw holding the convection duct to the oven cavity back plate from outside of the oven cavity.
13. Remove the seven (7) screws holding the convection duct to the oven cavity back plate from inside of the oven cavity.
14. Lift up the convection duct and release the three (3) tabs of the oven cavity back plate from the convection duct.
15. Now, the convection unit assembly is free.

2. CONVECTION HEATING ELEMENT REMOVAL

1. Remove the convection unit assembly refer to the "CONVECTION UNIT ASSEMBLY REMOVAL".
2. Remove the two (2) screws holding the convection heating element to the convection duct.
3. Remove the one (1) screw holding the convection heater angle to the convection duct.
4. Remove the one (1) screw holding the convection heater angle and the air separate angle D to the convection duct.
5. Remove the one (1) screw holding the convection heater angle A to the convection duct.
6. Remove the convection heating element from the convection duct.
7. Now, the convection heating element is free.

3. CONVECTION MOTOR REMOVAL

1. Remove the convection unit assembly refer to the "CONVECTION UNIT ASSEMBLY REMOVAL".
2. Remove the one (1) nut and washer from the convection motor shaft.
3. Remove the convection fan from the convection motor shaft.
4. Remove the pipe from the convection motor shaft.
5. Remove the two (2) screws holding the convection motor angle to the convection duct.
6. Remove the cooling fan from the convection motor shaft.
7. Remove the two (2) screws holding the convection motor to the convection motor angle.
8. Remove the one (1) ring from the convection motor shaft.
9. Now, the convection motor is free.

[11] POSITIVE LOCK CONNECTOR REMOVAL

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

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

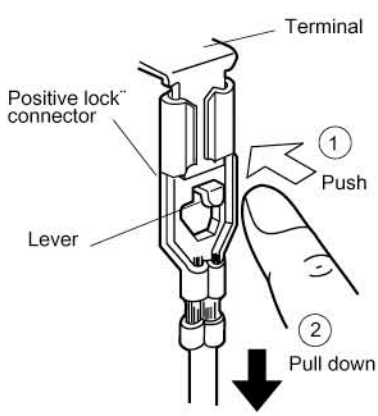


Figure C-3. Positive lock®, connector

[12] OVEN LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the wire leads as Positive lock® connector removal above.
3. Lift up the oven lamp from its retaining clips by pushing the tab of the air intake duct.
4. Now, the oven lamp is free.

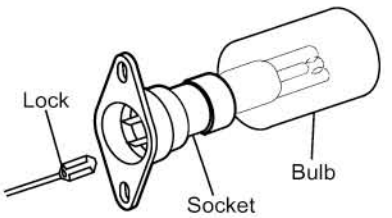


Figure C-4. Oven lamp

[13] POWER SUPPLY CORD REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the green/yellow wire to the back plate.
3. Disconnect the leads of the power supply cord from the noise filter, referring to the Figure C-5(a).
4. Release the power supply cord from the rear cabinet.
5. Now, the power supply cord is free.

2. REINSTALL

1. Insert the moulding cord stopper of power supply cord into the square hole of the power angle, referring to the Figure C-5(b).
2. Install the earth wire lead of power supply cord to the back plate with one (1) screw and tight the screw.
3. Connect the brown and blue wire leads of power supply cord to the noise filter correctly, referring to the Pictorial Diagram.

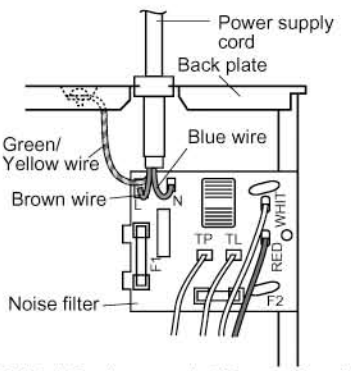


Figure C-5 (a) Replacement of Power Supply Cord

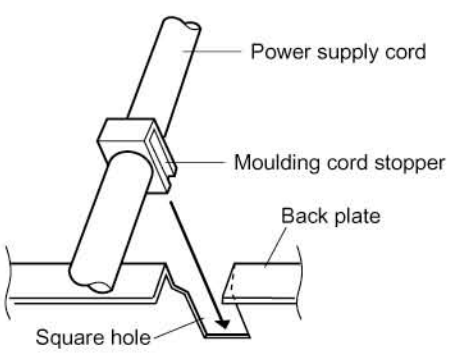


Figure C-5(b). Power Supply Cord Replacement

[14] GRILL HEATING ELEMENTS REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from the thermal cut-out (GRILL).
3. Remove the two (2)screws holding the two (2) terminals of the main wire harness to the two (2) grill heating elements.
4. Remove the one (1) screw holding the exhaust duct to the oven cavity top plate.
5. Remove the exhaust duct from the oven cavity top plate.
6. By pushing the two (2) tabs holding the grill reflector to the oven cavity top plate, slide the grill reflector toward the magnetron. And then lift up the grill reflector and remove it.
7. Remove the one (1) screw holding the grill heater angle to the grill heater reflector.
8. Straighten the two (2) tabs of the grill heater angle and remove the grill heater angle from the grill reflector.
9. Remove the two (2) screws holding the earth plate to the two (2) grill heating elements.
10. Remove the two (2) grill heating elements from the grill reflector.
11. Now, the grill heating elements are free.

[15] MONITORED LATCH SWITCH, MONITOR SWITCH AND STOP SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly referring to "CONTROL PANEL ASSEMBLY REMOVAL".
3. Disconnect the leads from all switches.
4. Remove the two (2) screws holding the latch hook to the oven cavity.
5. Remove the latch hook.
6. Remove the switch(es) from the latch hook by pushing the retaining tab backwards slightly and turning the switch(es) on the post.
7. Now the switch(es) is free

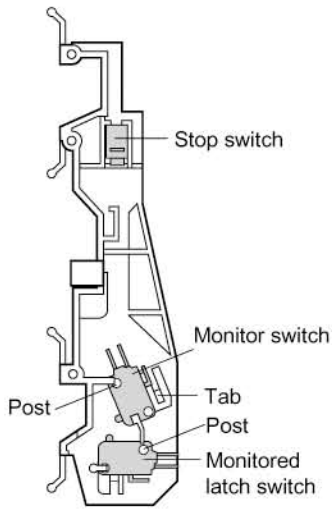


Figure C-6. Switches

[16] MONITORED LATCH SWITCH, STOP SWITCH AND MONITOR SWITCH ADJUSTMENT

1. Adjustment

If the monitored latch switch, stop switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. CARRY OUT 3D CHECKS.
2. Loosen the two (2) screws holding the latch hook to the oven cavity front flange.
3. With the door closed, adjust the latch hook by moving it back and forward or up and down. In and out play of the door allowed by the latch hook should be less than 0.5 mm.

   The horizontal position of the latch hook should be placed where the monitor switch has activated with the door closed. The vertical position of the latch hook should be placed where the monitored latch switch and stop switch have activated with the door closed.
4. Secure the screws with washers firmly.
5. Make sure of the all switches operation. If the latch head has not pushed the plungers of the monitor switch with door closed, adjust the latch hook position. At that time, the latch head should have pushed the plungers of the monitored latch switch and stop switch. If the latch head has not pushed the plungers of the monitored latch switch and stop switch with door closed, loose two (2) screws holding latch hook to oven cavity front flange and adjust the latch hook position.

2. After adjustment, make sure of following.

1. 1. In and out play of door remains less than 0.5 mm when latched position. First check the latch hook position, pushing and pulling upper portion of the door toward the oven face. Then check the lower latch hook position, pushing and pulling lower portion of the door toward the oven face. Both results (play of the door) should be less than 0.5mm.
2. The contacts (COM-NO) of the stop switch and the monitored latch switch open within 1.8mm gap between right side of cavity face plate and door when door is opened.
3. When the door is closed, the contacts (COM-NO) of the stop switch close.
4. When the door is closed the contacts (COM-NC) of the monitor switch and monitored latch switch open. And the contacts (COM-NO) of their switches close.
5. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

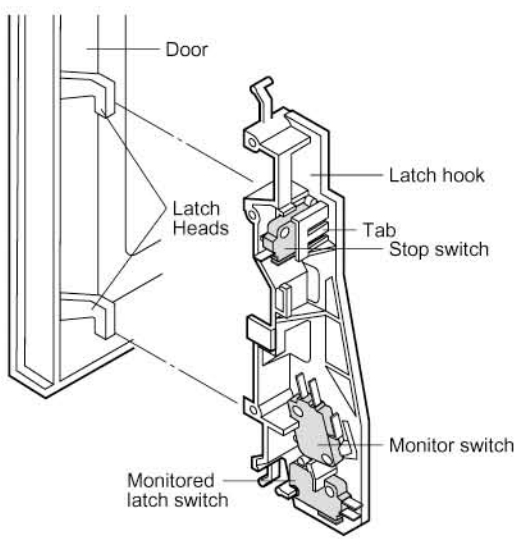


Figure C-7 Latch Switches Adjustment

[17] DOOR REPLACEMENT

1. REMOVAL

1. Disconnect the oven from the power supply.
2. Push the door slightly.
3. Remove the door stopper from the choke cover.
4. Lift the door upwards.
5. Now, door assembly is free from oven cavity.
6. Insert an putty knife (thickness of about 0.5mm) into the gap between the choke cover and door frame as shown in Figure C-7 to free engaging parts.
7. Release choke cover from door panel.
8. Now choke cover is free.

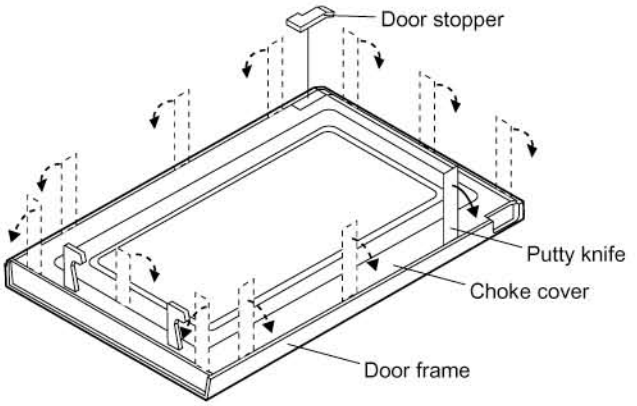


Figure C-8. Door Disassembly

DOOR PANEL

9. Remove the eight (8) screws holding the door panel to the door frame.

10. Now, door panel is free.

CAUTION: DO NOT DEFORM OR WARP THE TEETH OF COMB OF THE DOOR PANEL TO PREVENT MICROWAVE RADIATION EMISSION FROM THE DOOR.

LATCH HEAD AND SPRING

11. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.

12. Now, latch head and latch spring are free.

DOOR HANDLE AND FRONT DOOR GLASS

13. Remove the two (2) screws holding the door handle and the two (2) handle bases to the door frame.

14. Remove the door handle and the two (2) handle bases from the door frame.

15. Remove the one (1) screw holding the handle cover to the door frame.

16. Remove the handle cover from the door frame.

17. Slide the front door glass rightwards and remove from the door frame.

18. Now, the front door glass is free

2. REINSTALLATION

1. Re-install the front door glass to the door frame by sliding it leftwards.
2. Reinstall the handle cover to the door frame with one (1) screw.
3. Re-install the door handle and the two (2) handle bases to the door frame with two (2) screws.
4. Re-install the latch spring to the latch head. Re-install the latch spring to the door frame. Re-install latch head to door frame.
5. Re-install door panel to door frame.
6. Hold the door panel to the door frame with eight (8) screws.
7. Re-install choke cover to door panel by clipping into position.
8. Locate door panel hinge pins into cavity hinge location holes.
9. Re-install the door stopper to the chock cover.

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

1) **Make sure that the monitor switch, monitored latch switch and stop switch are operating properly. (Refer to chapter "Test Procedures".).**

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

3. After any service, make sure of the following:

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

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

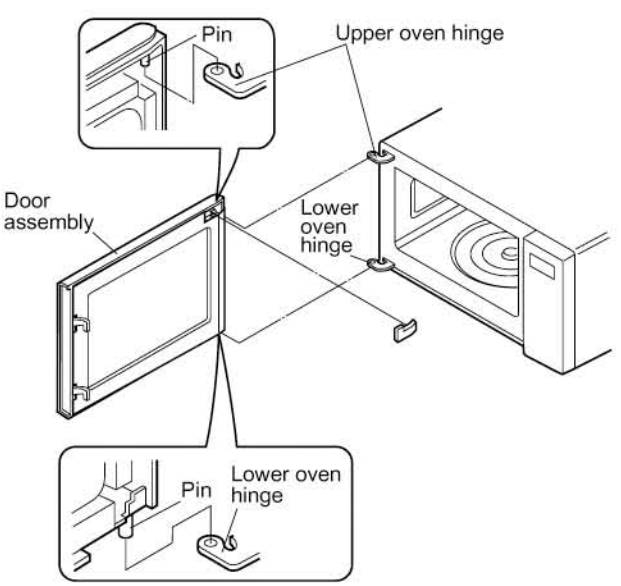


Figure C-9. Door Replacement

CHAPTER 12. 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.

[1] 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:-

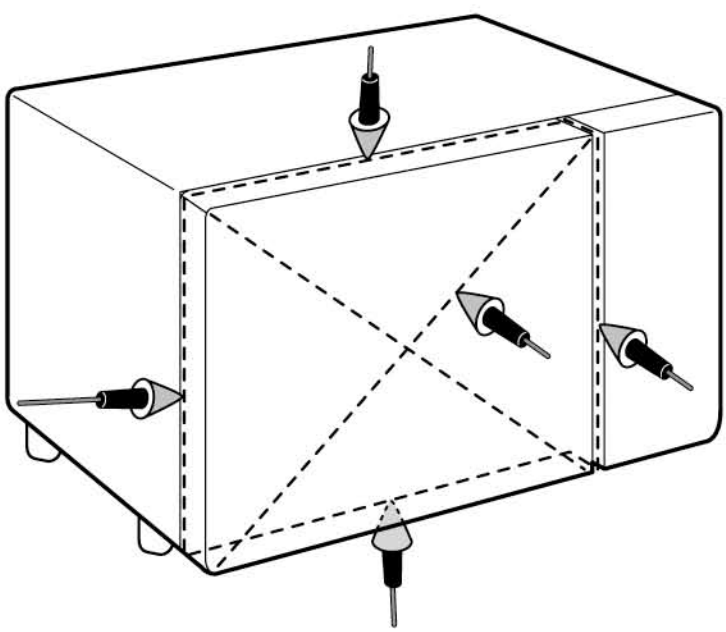
Apollo "XI"

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.

[2] 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. 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. 3.As shown in the diagram below, move the probe slowly (not faster than 2.5 cm/sec.);-
   1) around the edge of the door following the gap
   2) across the face of the door
   3) 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.