

# SHARP SERVICE MANUAL

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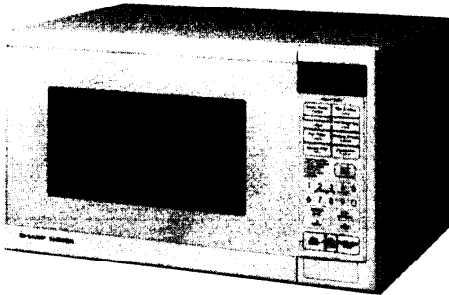


Photo R-3A54

## MICROWAVE OVEN

MODELS **R-3A54**  
**R-3E54**

In interests of user-safety the oven should be restored to its original condition and only manufacturer original spare parts must be used.  
(RD16101U)

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**SHARP CORPORATION**

R-3A54  
R-3E54

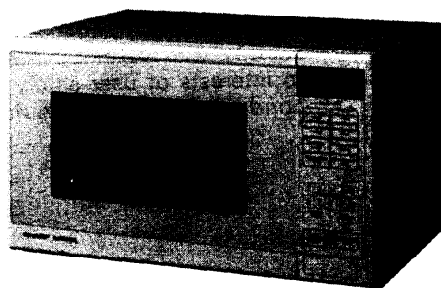


Photo R-3E54(W)

# SERVICE MANUAL

## SHARP

### MICROWAVE OVEN

R-3A54/ R-3E54

#### 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.

(RD36106U)

#### CAUTION MICROWAVE RADIATION

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

(RD36203U)

#### 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.

(RD51110u)

SHARP CORPORATION

OSAKA, JAPAN

(RD37201U)

PRODUCT SPECIFICATIONS

APPEARANCE VIEW

OPERATING SEQUENCE

FUNCTION OF IMPORTANT COMPONENTS

SERVICING AND TROUBLESHOOTING CHART

TEST PROCEDURE

TOUCH CONTROL PANEL ASSEMBLY

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

MICROWAVE MEASUREMENT

WIRING DIAGRAM

PARTS LIST

## PRODUCT SPECIFICATIONS

### SPECIFICATION

ITEM	DESCRIPTION
Power Requirements	240 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	1.3kW Approx. 6.0 A
Power Output	800W (IEC-705-1988), 650W (AS 2895-1986) Operating frequency of 2450MHz
Case Dimensions	Width 520mm Height 294mm Depth 388mm
Cooking Cavity Dimensions	Width 350 mm Height 197 mm Depth 368 mm
Turntable diameter	325mm
Control Complement	Touch Control System Clock( 1:00 - 12:59 ) Timer ( 0 - 99 minutes 99 seconds ) Microwave Power for Variable Cooking Repetition Rate; HIGH ..... Full power throughout the cooking time MEDIUM HIGH ..... approx. 70% of Full Power MEDIUM ..... approx. 50% of Full Power MEDIUM LOW ..... approx. 30% of Full Power LOW ..... approx. 10% of Full Power AUTO COOK (R-3A54 only) EASY DEFROST INSTANT COOK/START LESS/MORE (R-3A54 only) AUTO START/CLOCK POWER LEVEL INSTANT ACTION (8 menu) NUMBER STOP/CLEAR
Set Weight	Approx. 16.0 kg

(RD44101U)

## GENERAL INFORMATION

**WARNING**

**THIS APPLIANCE MUST BE EARTHED**

**IMPORTANT**

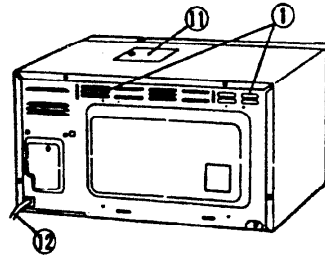
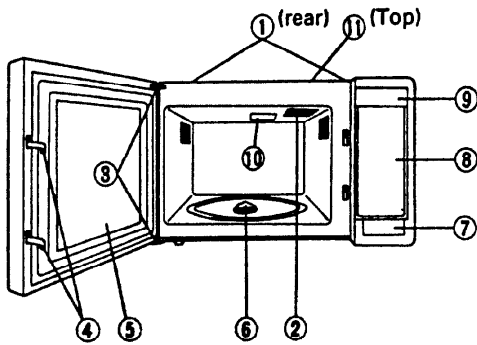
THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

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

(RD51107U)

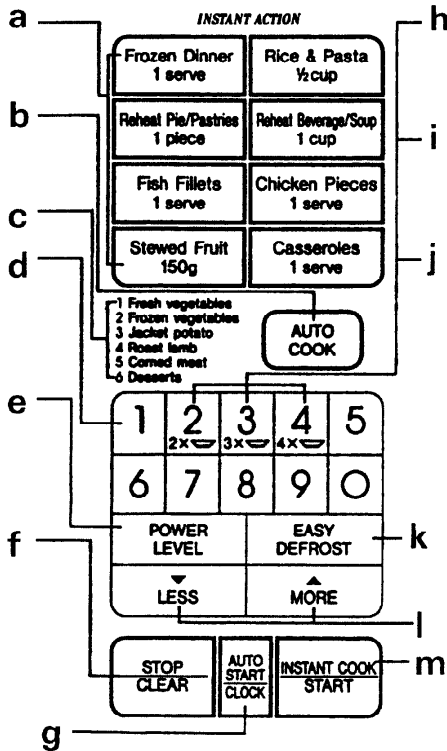
NOTE: Numbers and letters shown after sentences such as "RD44101U" are for factory use only.

## APPEARANCE VIEW

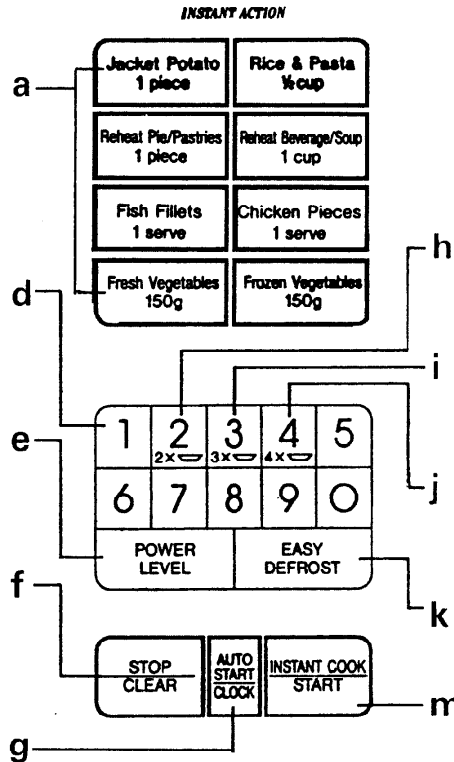


- |                         |                        |                        |  |
|-------------------------|------------------------|------------------------|--|
| 1. Ventilation openings | 4. Safety door latches | 7. Door open button    | 10. Wave guide cover                       |
| 2. Oven lamp            | 5. See through door    | 8. Touch control panel | 11. Access cover for oven lamp replacement |
| 3. Hinges               | 6. Coupling            | 9. Digital readout     | 12. Power supply cord                      |

## TOUCH CONTROL PANEL



R-3A54



R-3E54

- |   |  |   |
|---|--|---|
| <p>a. <b>INSTANT ACTION PADS</b><br/>Press once to cook or reheat 8 popular menu.</p> <p>b. <b>AUTO COOK</b><br/>Press to select Auto Cook mode.</p> <p>c. <b>AUTO COOK MENUS</b></p> <p>d. <b>NUMBER PADS</b><br/>Press to enter cooking times, clock time, weight or quantity of food, or to select the Auto Cook menus.</p> <p>e. <b>POWER LEVEL PADS</b><br/>Press to select microwave power setting. If not pressed, HIGH is automatically selected.</p> | <p>f. <b>STOP/CLEAR PAD</b><br/>Press to erase during programming. Press once to stop operation of oven during cooking; press twice to cancel cooking programme.</p> <p>g. <b>AUTO START/CLOCK PAD</b><br/>Press to set clock or Auto Start time</p> <p>h. <b>2 SERVE QUANTITY PAD</b><br/>To cook two serves, press this pad prior to pressing the INSTANT ACTION pad.</p> <p>i. <b>3 SERVE QUANTITY PAD</b><br/>To cook three serves, press this pad prior to pressing the INSTANT ACTION pad.</p> | <p>j. <b>4 SERVE QUANTITY PAD</b><br/>To cook four serves, press this pad prior to pressing the INSTANT ACTION pad.</p> <p>k. <b>EASY DEFROST PAD</b><br/>Press to defrost meat by entering weight</p> <p>l. <b>MORE(▲), LESS(▼) PADS</b><br/>Press to increase/decrease the time in one minute increments during cooking or to alter the doneness for Auto Cook, Instant Action or Easy Defrost modes.</p> <p>m. <b>INSTANT COOK/START PAD</b><br/>Press once to cook for 1 minute at HIGH or increase by 1 minute multiples each time this pad is pressed during cooking. Pressed to start oven after setting programmes.</p> |
|---|--|---|

## OPERATING SEQUENCE

### OFF CONDITION

Closing the door activates all door interlock switches (1st latch switch, 2nd latch switch 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. Rated voltage is supplied to the point A3+ A5 in the control unit.

Figure O-1 on page 29

1. The display flashes "88:88".
2. To set any programmes or set the clock, you must first touch the STOP/CLEAR key.
3. " : " appears in the display and the time counts up every minute.

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

### MICROWAVE COOKING CONDITION

#### HIGH COOKING

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

#### Function sequence

Figure O-2 on page 29

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

1. Rated voltage is supplied to the primary winding of the power transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wave length of 12.24 cm. This energy is channeled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY1 + RY2 go back to their home position. The circuits to the oven lamp, power transformer, fan motor and turntable motor are cut off.
5. When the door is opened during a cook cycle, the switches come to the following condition.

SWITCH	CONTACT	CONDITION	
		DURING COOKING	DOOR OPEN (NO COOKING)
1st latch switch	COM – NO	Closed	Open
Monitor switch	COM – NC	Open	Closed
2nd latch switch	COM – NO	Closed	Open
Stop switch	COM – NO	Closed	Open

The circuits to the power transformer, fan motor and turntable motor are cut off when the 1st latch switch, 2nd latch switch and stop switch are made open.

The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is the remaining time.

#### 6. MONITOR SWITCH CIRCUIT

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

- 6-1 When the oven door is opened during or after the cycle of a cooking program, the 1st latch, 2nd latch and stop switches must open their contacts first. After that the contacts (COM – NC) of the monitor switch can be closed.
- 6-2. When the oven door is closed, the contacts (COM – NC) of the monitor switch must be opened. After that the contacts of the 1st latch, 2nd latch and stop switches are closed.
- 6-3. When the oven door is opened and the contacts of the 1st and 2nd latch switches remain closed, the fuse M8A will blow because the monitor switch is closed and a short circuit is caused.

### MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, 240 volts A.C. power is supplied to the power transformer intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay. The following levels of microwave power are given.

#### SETTING

HIGH	32 sec. ON		
MEDIUM HIGH	24 sec. ON	8 sec. OFF	Approx. 70%
MEDIUM	18 sec. ON	14 sec. OFF	Approx. 50%
MEDIUM LOW	12 sec. ON	20 sec. OFF	Approx. 30%
LOW	6 sec. ON	26 sec. OFF	Approx. 10%

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

## FUNCTION OF IMPORTANT COMPONENTS

### DOOR OPEN MECHANISM

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

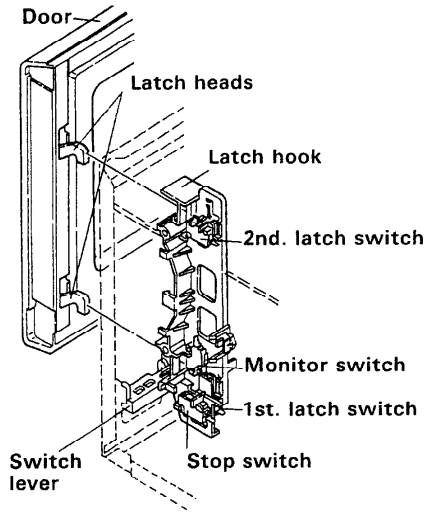


Figure D-1. Door Open Mechanism

### 1ST LATCH, 2ND LATCH AND STOP SWITCHES

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

### MONITOR SWITCH

1. When the oven door is closed, the contacts (COM – NC) must be opened.
2. When the oven door is opened, the contacts (COM – NC) must be closed.
3. If the oven door is opened and the contacts (COM – NO) of the 1st and 2nd latch switches fail to open, the fuse M8A blows simultaneously with closing the contacts (COM – NC) of the monitor switch.

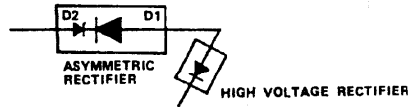
**CAUTION:** BEFORE REPLACING A BLOWN FUSE F M8A TEST THE 1ST AND 2ND LATCH SWITCHES, MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION.

### MONITOR RESISTOR R 0.8 $\Omega$ 20W

The monitor resistor prevents the fuse M8A bursting when the fuse M8A blows due to the operation of the monitor switch.

### ASYMMETRIC RECTIFIER

The asymmetric rectifier is a solid state device that prevents current flow in both directions. And it prevents the temperature rise of the power transformer by blowing the fuse M8A when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV. The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of blowing the fuse M8A.)

1. The high voltage rectifier is shorted by any causes when microwave cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.7 KV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the power transformer.
5. The large electric currents beyond 6.3A flow through the primary winding of the power transformer.
6. The fuse M8A blows by the large electric currents.
7. The power supply to the all electrical parts is cut off.

### FUSE M8A

1. The fuse M8A blows when the contacts (COM – NO) of the 1st latch switch and 2nd latch switch remain closed with the oven door open and when the monitor switch closes.
2. The fuse M8A also blows when asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of power transformer is shorted.
3. If the wire harness or electrical components are short-circuited, the fuse M8A blows to prevent an electric shock or fire hazard.

### THERMAL CUT-OUT 145°C (MG)

This thermal cut-out protects the magnetron against overheat. If this temperature goes up higher than 145°C because the fan motor is interrupted, the ventilation openings are blocked, the thermal cut-out will open and the line voltages to the power transformer will be cut off and the operation of the magnetron will be stopped. The defective thermal cut-out must be replaced with new one.

R-3A54  
R-3E54

#### **THERMAL CUT-OUT 145°C (OVEN)**

The thermal cut-out located on the top of the oven cavity is designed to prevent damage to the oven if the food in the oven catch fire due to over heating produced by upper setting of cook time or failure of control unit. Under normal operation, the oven thermal cut-out remain closed. However, when abnormally high temperatures are reached within the oven cavity, the oven thermal cut-out will open at 145°C, causing the oven to shut down. The defective thermal cut-out must be replaced with new one.

#### **TURNTABLE MOTOR**

The turntable motor drives coupling to rotate the turntable.

#### **FAN MOTOR**

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channeled through the oven cavity to remove steam and vapors given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.



## SERVICING

### WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution.

#### REMEMBER TO CHECK 3D

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

#### WARNING AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

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

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

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

#### REMEMBER TO CHECK 4R

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

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

(RD81001H)

### TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure" section.

**IMPORTANT:** If the oven becomes inoperative because of a blown fuse (M8A) in the 1st latch switch – 2nd latch switch – monitor switch – monitor resistor circuit, check the 1st latch switch, 2nd latch switch, monitor switch and monitor resistor before replacing the fuse (M8A).

RE = Replace / CK = Check

TEST PROCEDURE		A	B	CK	D	E	E	E	E	G	F	H	H	J	K	L	M	RE	CK	RE	CK	CK	CK	CK	CK		
POSSIBLE CASE AND DEFFECTIVE PARTS		MAGNETRON	POWER TRANSFORMER	RECHEIFIER ASSEMBLY	H.V. WIRE	H.V. CAPACITOR	1ST. LATCH SWITCH	2ND. LATCH SWITCH	STOP SWITCH	MONITOR SWITCH	MONITOR RESISTOR	THERMAL CUTOUT 145°C	FAN MOTOR	TURNTABLE MOTOR	FUSE M8A	TOUCH CONTROL PANEL	RELAYS RY-1, RY-2	FOIL PATTERN ON PWB.	POWER SUPPLY CORD	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	OVEN LAMP AND SOCKET	WALL OUTLET	MISADJUSTMENT SWITCH	HOMEFUSE OR BREAKER	BLOCKED COOLING FAN	BLOCKED VENTILATION
CONDITION	PROBLEM																										
OFF CONDITION	Home fuse blows when power supply cord is plugged into wall outlet.																	○	○						○		
	FUSE M8A blows when power supply cord is plugged into wall outlet.									○				○					○						○		
	"88:88" does not appear in display but power supply cord is plugged into wall outlet.										○			○	○	○	○	○				○			○		
	Display does not operate properly when STOP/CLEAR key is touched.								○					○										○			
ON CONDITION	Oven does not start when the START pad is touched. (Display appears)														○	○									○		
	Oven lamp does not light (Display appears.)														○	○					○	○					
	Fan motor does not operate. (Display appears.)					○						○												○	○		
	Turtable motor assembly does not operate. (Display appears.)					○							○												○		
	Oven or any electrical parts does not stop But cooking time is 0 or STOP/CLEAR key touched.														○	○											
	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power level is set at HIGH)	○	○	○	○		○									○	○										
	Oven does not seem to be operating properly when MEDIUM HIGH, MEDIUM, MEDIUM LOW or LOW is set. (Oven operates properly at HIGH and then the STOP/CLEAR pad is touched the oven stops.)														○	○											
	Oven goes into cook cycle but shuts down before end of cooking cycle.											○			○											○	○
Oven stops as soon as when the START pad is touched.	○	○	○	○										○													

## 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 the high voltage circuit by removing all leads connected to the 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 a short circuit filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced. (RB82A01 U)

**MICROWAVE OUTPUT POWER (2 LITRE WATER LOAD)**

The following test procedure should be carried out with the microwave oven in a fully assembled condition (with outer case fitted). Microwave output power from the magnetron can be measured by way of substitution, i.e. it can be measured by using a water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. On the other hand, if the temperature of the water with V(ml) rises  $\Delta T$  ( $^{\circ}\text{C}$ ) during this microwave heating period, the calorie of the water is  $V \times \Delta T$ .

The formula is as follows;

$$P = \frac{8330 \times \Delta T}{t}$$

Our condition for the water load is as follows:

Room temperature .....  $23 \pm 2^{\circ}\text{C}$     Power supply Voltage ..... Rated voltage  
Water load ..... 2000 ml    Initial temperature .....  $23 \pm 1^{\circ}\text{C}$     Heating time ..... 2min. 8 sec.  
 $P = 65 \times \Delta T$

## Measuring method:

- A) Use two 1 litre pyrex beakers with a diameter of approximately of 12cms.
- B) Place 1 litre of  $10^{\circ}\text{C}$  water in each beaker.
- C) Mark T1 on the one beaker and mark T2 on the other one. And stir the water and measure the temperature of water the thermometer and note them. The graduation of the thermometer must be scaled by  $0.1^{\circ}\text{C}$  at minimum and an accurate mercury thermometer is recommended.
- D) Place the two beakers as touching each other in the centre of the cavity.
- E) Set the timer to 2minute and 8 seconds at 100% power (the time required to raise the water temperature 10 degrees C.)
- F) The time must be measured with stopwatch or wristwatch.
- G) After 2minute and 8 seconds stop the oven by opening the door.
- H) Remove the two beakers from the oven and measure the temperature of the water by stirring the water with the thermometer and noting the readings.

## Example

Initial temperature ..... T1 =  $10^{\circ}\text{C}$     T2 =  $11^{\circ}\text{C}$   
Temperature after 2min. 8 sec. .... T1 =  $20^{\circ}\text{C}$     T2 =  $21^{\circ}\text{C}$   
Temperature difference Cold-Warm .....  $\Delta T1 = 10^{\circ}\text{C}$      $\Delta T2 = 10^{\circ}\text{C}$   
Mean temperature rise  $\Delta T$  .....  $\Delta T = (\Delta T1 + \Delta T2) / 2 = (10^{\circ}\text{C} + 10^{\circ}\text{C}) / 2 = 10^{\circ}\text{C}$   
Measured output power  
The equation is "P= 65 x  $\Delta T$ " .....  $P = 65 \times 10^{\circ}\text{C} = 650 \text{ Watts}$

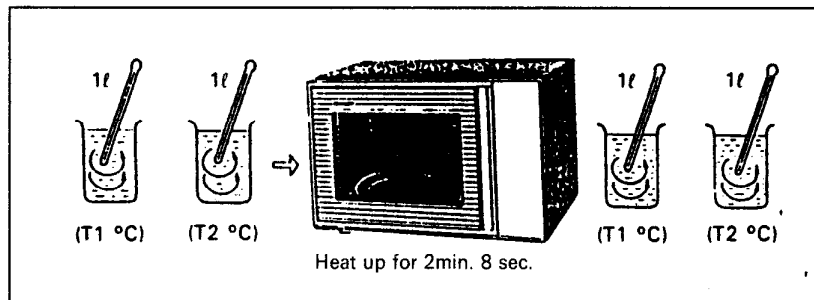
**NOTE:** The measured output power should be at least  $\pm 15\%$  of the rated output power.

## TEST PROCEDURES (CONT'D)

PROCEDURE  
LETTER

## COMPONENT TEST

CAUTION: 1°C CORRESPONDS TO 65 WATTS.  
REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



(RD82A02.J)

**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 705, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately  $P \times t / 4.187$  calorie is generated. On the other hand, if the temperature of the water with V(ml) rises  $\Delta T$  (°C) during this microwave heating period, the calorie of the water is  $V \times \Delta T$ .

The formula is as follows;

$$P \times t / 4.187 = V \times \Delta T \quad P \text{ (W)} = 4.187 \times V \times \Delta T / t$$

Our condition for the water load is as follows:

Room temperature.....around 20°C    Power supply Voltage.....Rated voltage  
Water load.....1000 g    Initial temperature..... $10 \pm 2^\circ\text{C}$     Heating time.....52 sec.  
 $P = 80 \times \Delta T$

Measuring condition:

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

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

Measuring method:

1. Measure the initial temperature of the water before the water is added to the vessel.  
(Example: The initial temperature  $T_1 = 11^\circ\text{C}$ )
2. Add the 1 litre water to the vessel.
3. Place the load on the centre of the shelf.
4. Operate the microwave oven at HIGH for the temperature of the water rises by a value  $\Delta T$  of  $10 \pm 2^\circ\text{C}$
5. Stir the water to equalize temperature throughout the vessel.
6. Measure the final water temperature. (Example: The final temperature  $T_2 = 21^\circ\text{C}$ )
7. Calculate the microwave power output  $P$  in watts from above formula.

## TEST PROCEDURES (CONT'D)

PROCEDURE  
LETTER

## COMPONENT TEST

**F**      **THERMAL CUT-OUT TEST**CARRY OUT 3D CHECKS

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

CARRY OUT 4R CHECKS

Table: Temperature Fuse or 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 (Magnetron)	-20°C	145°C	Closed circuit
Thermal cut-out (Oven)	-20°C	145°C	Closed circuit

If incorrect readings are obtained, replace the thermal cut-out. An open circuit thermal cut-out (Magnetron) indicates that the magnetron has overheated, this may be due to restricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.

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

**G**      **MONITOR RESISTOR TEST**CARRY OUT 3D CHECKS.

Disconnect the leads from the monitor resistor or surge resistor.

Using an ohmmeter and set on a low range.

Check between the terminals of the monitor resistor or surge resistor as described in the following table.

Table: Resistance

Resistor	Resistance
Monitor resistor	Approx. 0.8 ohms

If incorrect readings are obtained, replace the monitor resistor or surge resistor

CARRY OUT 4R CHECKS.**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 326 ohms
Turntable motor	Approximately 16.08 kohms

If incorrect readings are obtained, replace the motor.  
(Also refer to test procedure I)

CARRY OUT 4R CHECKS

## TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST
I	<p data-bbox="411 304 884 331"><b><u>LIVE TEST FOR MOTOR WINDINGS</u></b></p> <p data-bbox="411 360 1528 443"><b>CAUTION:</b> The following procedure requires the oven to be connected to the supply and should only be used if the relevant "cold" checks for the motor under test are inconclusive.</p> <ol data-bbox="411 472 1528 869" style="list-style-type: none"> <li>1. CARRY OUT <u>3D</u> CHECKS</li> <li>2. Disconnect the leads from the primary of the power transformer. Make sure that the leads remain isolated from other oven components and chassis. (Use insulation tape if necessary.)</li> <li>3. Connect a voltmeter, set to 250V AC, across the motor terminals. (Refer to the relevant motor test procedure or pictorial diagram for the correct terminal numbers.)</li> <li>4. Arrange the meter in a position where it can be read during the test. (Do not touch the meter, meter leads or oven circuitry while the oven is active.)</li> <li>5. Close the oven door.</li> <li>6. Set the relevant timer for about three (3) minutes, set the power level to HIGH and push the START button.</li> <li>7. Note the reading on the meter and carefully observe the motor under test to see if it is turning.</li> <li>8. CARRY OUT <u>3D</u> CHECKS</li> <li>9. Remove test meter leads.</li> <li>10. Reconnect the leads to the primary of the power transformer.</li> </ol> <p data-bbox="411 898 1528 981">If a reading of 240 volts AC was obtained (step 7) but the motor was not turning then it is faulty and should be replaced. If the meter indicated that no supply was present then the wiring to the motor should be checked for continuity.</p>
J	<p data-bbox="411 1021 692 1048"><b><u>BLOWN FUSE F M8A</u></b></p> <p data-bbox="411 1077 715 1104">CARRY OUT <u>3D</u> CHECKS</p> <ol data-bbox="411 1133 1528 1451" style="list-style-type: none"> <li>1. If the fuse M8A is blown, there could be a shorts or ground in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.</li> <li>2. If the fuse M8A is blown when the door is opened, check the 1st latch switch, 2nd latch switch, monitor switch and monitor resistor.  If the fuse M8A is blown by incorrect door switching replace the defective switch(s) and the fuse M8A.</li> <li>3. If the fuse M8A is blown, there could be a short in the asymmetric rectier or there could be a ground in wire harness. A short in the asymmetric rectifier may have occurred due to short or ground in H.V. rectifier, magnetron, power transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.</li> </ol> <p data-bbox="443 1480 746 1507">CARRY OUT <u>4R</u> CHECKS</p> <p data-bbox="443 1525 1305 1552"><b>CAUTION:</b> Only replace fuse with the correct value replacement.</p>
K	<p data-bbox="411 1585 986 1612"><b><u>TOUCH CONTROL PANEL ASSEMBLY TEST</u></b></p> <p data-bbox="411 1641 1528 1783">The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit, and troubleshooting by unit replacement is described according to the symptoms indicated.</p> <ol data-bbox="411 1783 1528 2029" style="list-style-type: none"> <li>1. Key Unit. The following symptoms indicate a defective key unit. Replace the key unit. <ol data-bbox="411 1839 1203 1921" style="list-style-type: none"> <li>a) When touching the pads, a certain pad produces no signal at all.</li> <li>b) When touching a number pad, two figures or more are displayed.</li> <li>c) When touching the pads, sometimes a pad produces no signal.</li> </ol> </li> <li>2. Control Unit The following symptoms indicate a defective control unit. Replace the control unit. <ol data-bbox="411 1973 1310 2029" style="list-style-type: none"> <li>2-1 In connection with pads. <ol data-bbox="411 2007 1310 2029" style="list-style-type: none"> <li>a) When touching the pads, a certain group of pads do not produce a signal.</li> </ol> </li> </ol> </li> </ol>

**TEST PROCEDURES (CONT'D)**

**PROCEDURE  
LETTER**

**COMPONENT TEST**

- 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.
  - 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.

**L**

**RELAY TEST**

1. CARRY OUT 3D CHECKS
2. Disconnect the leads from the primary of the power transformer. Make sure that the leads remain isolated from other oven components and chassis. (Use insulation tape if necessary.)
3. Close the door.
4. Reconnect the supply.
5. Check the voltage between Pin Numbers 3 and 5 of 4-pin connector (A) on the control unit with an A.C. voltmeter. The meter should indicate 240 volts, if no check oven circuit.
6. RY1 AND RY2 TEST

These are operated by D.C. voltage. Check voltage at 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. 26.5V.D.C.	Oven lamp/Turntable motor/Cooling fan motor
RY2	Approx. 25.8V.D.C.	Power transformer

TEST PROCEDURES (CONT'D)

PROCEDURE  
LETTER

COMPONENT TEST

M

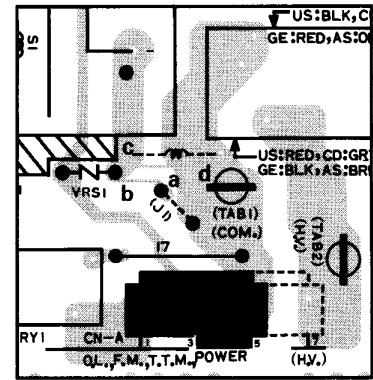
**PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN.**

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

Problem: POWER ON, indicator does not light up.

STEPS	OCCURANCE	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. Please use term "Low voltage transformer" when referring to transformer T1
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder.
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d".

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.





# TOUCH CONTROL PANEL ASSEMBLY

## OUTLINE OF TOUCH CONTROL PANEL

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

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

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

### Key Unit

The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through R0<sub>0</sub> – R0<sub>3</sub>, R1<sub>0</sub> – R1<sub>3</sub>.

When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through R2<sub>3</sub>, R3<sub>0</sub> – R3<sub>2</sub> to perform the function that was requested.

### Control Unit

Control unit consists of LSI, power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit and indicator circuit.

#### 1) LSI

This LSI controls the key strobe signal, relay driving signal for oven function and indicator signal.

#### 2) Power Source Circuit

This circuit generates voltage necessary in the control unit.

Symbol	Voltage	Application
VC	-5V	LSI (IC1)
VP	-29V	Fluorescent display tube : Grid and anode voltage
VF1	3Vac	Filament of fluorescent display tube
VF2		(VF1 to VF2 voltage)

#### 3) Synchronizing Signal Circuit

The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit.

It accompanies a very small error because it works on commercial frequency.

(RD918A2U)

#### 4) ACL Circuit

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

(RD919A4U)

#### 5) Buzzer Circuit

The buzzer responsive to signals from the LSI to emit noticing sounds (key touch sound and completion sound).

#### 6) Door Sensing Switch

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

#### 7) Relay Circuit

To drive the magnetron, fan motor, turntable motor and light the oven lamp.

#### 8) Indicator Circuit

Indicator element is a Fluorescent Display.

Basically, a Fluorescent Display is a triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.

The Fluorescent Display has 6-digits, 13-segments are used for displaying figures.

## DESCRIPTION OF LSI

**LSI(IZA415DR)**

The I/O signals of the LSI(IZA415DR) are detailed in the following table.

PIN NO.		SIGNAL		I/O	OUT
1		D10			
<b>Digit selection signal.</b>					
Refer to the touch control panel circuit about the relation between signals and digits.					
Normally, one pulse is output in every synchronized signal period, and input to the grid of the fluorescent display.					
2		D11			
<b>Segment data signals.</b>					
Refer to the touch control panel circuit for the relationship between signals and indicators.					
Normally, one pulse is output in every synchronized signal period, and input to the anode of the fluorescent display.					
3		TG1			
<b>Signal to sound buzzer.</b>					
A: Key touch sound (0.12 sec.).					
B: Completion sound (2.4 sec.).					
4		Vdisp			IN
<b>Anode (segment) of Fluorescent Display illumination voltage: -29V</b>					
Vp voltage of power source circuit input.					
5		R0 <sub>0</sub>			OUT
<b>Segment data signal.</b>		<b>Key strobe signal.</b>			
Signal similar to D11.		Signal applied to touch-key section. A pulse signal is input to R2 <sub>3</sub> , R3 <sub>0</sub> – R3 <sub>2</sub> terminal while one of G1 line keys on key matrix is touched.			
6		R0 <sub>1</sub>			OUT
<b>Segment data signal.</b>		<b>Key strobe signal.</b>			
Signal similar to D11.		Signal applied to touch-key section. A pulse signal is input to R2 <sub>3</sub> , R3 <sub>0</sub> – R3 <sub>2</sub> terminal while one of G2 line keys on key matrix is touched.			
7		R0 <sub>2</sub>			OUT
<b>Segment data signal.</b>		<b>Key strobe signal.</b>			
Signal similar to D11.		Signal applied to touch-key section. A pulse signal is input to R2 <sub>3</sub> , R3 <sub>0</sub> – R3 <sub>2</sub> terminal while one of G3 line keys on key matrix is touched.			
8		R0 <sub>3</sub>			OUT
<b>Segment data signal.</b>		<b>Key strobe signal.</b>			
Signal similar to D11.		Signal applied to touch-key section. A pulse signal is input to R2 <sub>3</sub> , R3 <sub>0</sub> – R3 <sub>2</sub> terminal while one of G4 line keys on key matrix is touched.			
9		R1 <sub>0</sub>			OUT
<b>Segment data signal.</b>		<b>Key strobe signal.</b>			
Signal similar to D11.		Signal applied to touch-key section. A pulse signal is input to R2 <sub>3</sub> , R3 <sub>0</sub> – R3 <sub>2</sub> terminal while one of G5 line keys on key matrix is touched.			
10		R1 <sub>1</sub>			OUT
<b>Segment data signal.</b>		<b>Key strobe signal.</b>			
Signal similar to D11.		Signal applied to touch-key section. A pulse signal is input to R2 <sub>3</sub> , R3 <sub>0</sub> – R3 <sub>2</sub> terminal while one of G6 line keys on key matrix is touched.			

PIN NO.	11	SIGNAL	R1 <sub>2</sub>	I/O	OUT
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**Segment data signal.**

Signal similar to D11.

**Key strobe signal.**Signal applied to touch-key section. A pulse signal is input to R2<sub>3</sub>, R3<sub>0</sub> – R3<sub>2</sub> terminal while one of G7 line keys on key matrix is touched.

PIN NO.	12	SIGNAL	R1 <sub>3</sub>	I/O	OUT
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**Segment data signal.**

Signal similar to D11.

**Key strobe signal.**Signal applied to touch-key section. A pulse signal is input to R2<sub>3</sub>, R3<sub>0</sub> – R3<sub>2</sub> terminal while one of G8 line keys on key matrix is touched.

PIN NO.	13-15	SIGNAL	R2 <sub>0</sub> -R2 <sub>2</sub>	I/O	OUT
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**Segment data signal.** Signal similar to D11.

(RD939A2U)

PIN NO.	16	SIGNAL	R2 <sub>3</sub>	I/O	IN
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**Signal coming from touch key.**When either one of G9 line keys on key matrix is touched, a corresponding signal out of R0<sub>0</sub> – R0<sub>3</sub>, R1<sub>0</sub> – R1<sub>3</sub> will be input into R2<sub>3</sub>.

When no key is touched, the signal is held at "L" level.

PIN NO.	17	SIGNAL	R3 <sub>0</sub>	I/O	IN
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**Signal coming from touch key.**When either one of G10 line keys on key matrix is touched, a corresponding signal will be input into R3<sub>0</sub>.

PIN NO.	18	SIGNAL	R3 <sub>1</sub>	I/O	IN
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**Signal coming from touch key.**When either one of G11 line keys on key matrix is touched, a corresponding signal will be input into R3<sub>1</sub>.

PIN NO.	19	SIGNAL	R3 <sub>2</sub>	I/O	IN
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**Signal coming from touch key.**When either one of G12 line keys on key matrix is touched, a corresponding signal will be input into R3<sub>2</sub>.

PIN NO.	20	SIGNAL	INT 1	I/O	IN
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**Signal synchronized with commercial source frequency(50Hz).**

This is the basic timing for time processing of LSI.

PIN NO.	21	SIGNAL	GND	I/O	IN
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**Power source voltage: -5V**V<sub>c</sub> voltage of power source circuit input.

PIN NO.	22	SIGNAL	AVCC	I/O	IN
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Connected to GND.

PIN NO.	23,24	SIGNAL	AN0,AN1	I/O	IN
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Connected to V<sub>c</sub>.

PIN NO.	25	SIGNAL	AN2	I/O	IN
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Terminal not used.

PIN NO.	26	SIGNAL	AN3	I/O	IN
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**Input signal which communicates the door open/close information to LSI.**

Door closed; "H" level signal.

Door opened; "L" level signal.

PIN NO.	27	SIGNAL	AVSS	I/O	IN
Connected to Vc.					
PIN NO.	28	SIGNAL	RESET	I/O	IN
<b>Auto clear terminal.</b> Signal is input to reset the LSI to the initial state when power is supplied. Temporarily set to "H" level the moment power is supplied, at this time the LSI is set. Thereafter set at "L" level.					
PIN NO.	29	SIGNAL	TEST	I/O	IN
Connected to GND.					
PIN NO.	30	SIGNAL	OSC1	I/O	IN
<b>Internal clock oscillation frequency input setting.</b> The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to OSC1 terminal.					
PIN NO.	31	SIGNAL	OSC2	I/O	OUT
<b>Internal clock oscillation frequency control output.</b> Output to control oscillation input of OSC2.					
PIN NO.	32	SIGNAL	VCC	I/O	IN
<b>Power source voltage input terminal.</b> Connected to GND.					
PIN NO.	33	SIGNAL	D0	I/O	OUT
Terminal not used.					
PIN NO.	34	SIGNAL	D1	I/O	OUT
<b>Magnetron High-voltage circuit driving signal.</b> To turn on and off the cook relay. In high operation, the signals holds "H" level during microwave cooking and "L" level while not cooking. In other cooking modes (MED. HIGH, MED., MED. LOW, LOW) the signal turns to "H" level and "L" level in repetition according to the power level. <span style="float: right;">(RD933A1U)</span>					
PIN NO.	35	SIGNAL	D2	I/O	OUT
Terminal not used.					
PIN NO.	36	SIGNAL	D3	I/O	OUT
<b>Oven lamp, turntable motor and cooling fan motor driving signal. (Square Waveform: 45Hz)</b> To turn on and off the control relay. The pulse signal (45Hz) is delivered to the control relay driving circuit and cook relay control circuit.					
PIN NO.	37	SIGNAL	D4	I/O	OUT
<b>Segment data signal.</b> Signal similar to D11. <span style="float: right;">(RD939A2U)</span>					
PIN NO.	38-42	SIGNAL	D5-D9	I/O	OUT
<b>Digit selection signal.</b> Signal similar to D10. <span style="float: right;">(RD938A2U)</span>					

## SERVICING

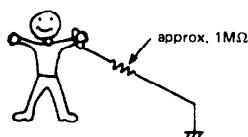
### 1. Precautions for Handling Electronic Components

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



### 2. Shapes of Electronic Components



Transistor  
DTA114ES  
DTA143ES  
DTC143ES  
DTD143ES

### 3. Servicing of Touch Control Panel

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

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

#### (1) Servicing the touch control panel with power supply from the oven proper:

##### CAUTION:

**THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL ALIVE TO GIVE YOU DANGER DURING SERVICING.**

Therefore, when checking the performance of the touch control panel, put the outer cabinet on the oven proper to keep from touching the high voltage transformer, or unplug the primary terminal (connector) of the high voltage transformer to turn it off; and the end of such connector shall 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 proper is so short that they can't be separated from each other.

For those models, therefore, check and repair all the controls (with the sensor-related ones included) of the touch control panel while keeping it in contact with the oven proper.

- B. On some models, on the other hand, the power supply cord between the touch control panel and the oven proper is so long that they may be separated from each other. For those models, therefore, it is allowed 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 stop switch (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to that with the oven door being closed.

As to the sensor-related controls of the touch control panel, their checking is allowed if the dummy resistor(s) whose resistance is equal to that of those controls is 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 stop switch (on PWB) of the touch control panel, which brings about an operational state that is equivalent with the oven door being closed. And connect an external power source to the power input terminal of the touch control panel, and then it is allowed to check and repair the controls of the touch control panel; as in the case of (1)-B above, it is here also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

### 4. Servicing Tools

Tools required when servicing the touch control panel assembly.

- 1) Soldering iron: 30W (To prevent leaking current, 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 aluminum foil applied for preventing static electricity.
- 2) Connect the connectors of the indicator and key units to the control unit taking care that the lead wires are not twisted.
- 3) After aluminum foil is removed, take extra care 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, taking care that all connections are tight.
- 5) Be sure to use specified components where high precision is required.

## COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

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

1. CARRY OUT 3D CHECKS.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then push the door open button with the other, this causes the latch heads 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.).
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.

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.

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, DOOR PARTS', when carrying out any of the following removal procedures:

(RDA0001E)

### OUTER CASE REMOVAL

To remove the outer case, proceed as follows.

1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the screws from rear and along the side edge of case.
4. Slide the entire case back about 1 inch (3cm) to free it from retaining clips on the cavity face plate.
5. Lift the entire case from the oven.

6. Discharge the H.V. capacitor before carrying out any further work.
7. Do not operate the oven with the outer case removed.

N.B.; Step 1,2 and 6 form the basis of the 3D checks.

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

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

1. CARRY OUT 3D CHECKS.
2. Disconnect the H.V. wire A with the filament lead of the power transformer from the high voltage capacitor.
3. Disconnect the H.V. wire of the H.V. rectifier assembly from the power transformer.
4. Remove the single(1) screw holding the capacitor holder to the back plate of the oven cavity.
5. Remove the single(1) screw holding the earth side terminal of the high voltage rectifier assembly to the capacitor holder.

6. Disconnect the H.V. rectifier assembly from the high voltage capacitor.
7. Now, high voltage capacitor and H.V. rectifier are free.

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

### POWER TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS
2. Disconnect the main harness from the power transformer
3. Disconnect the H.V. wire of the H.V. rectifier assembly from the power transformer.
4. Disconnect the filament lead of the power transformer from the H.V. wire A.

5. Disconnect the filament lead of the power transformer from the magnetron.
6. Remove the four(4) screws holding the power transformer to the bottom plate.
7. Remove the trans cushion from the power transformer.
8. Remove the power transformer from the bottom plate. Now, it is free.

## MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS
2. Disconnect leads from magnetron.
3. Remove the two(2) screws holding air guide to the magnetron and oven cavity. And remove the air guide.
4. Carefully remove four(4) screws holding magnetron to waveguide, when removing the screws hold the magnetron to prevent it from falling.

5. Remove the magnetron from the waveguide with care so the magnetron antenna is not hit by any metal object around the antenna

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

## CONTROL PANEL REPLACEMENT

### Removal

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads from the control panel.
3. Remove the single screw holding the control panel to the oven cavity.
4. Lift up the control panel assembly.
5. Release the control panel from the oven cavity.
6. Now, the control panel assembly is free.

### Installation

1. Put the tabs of the control panel into the holes of the oven cavity.
2. Push down the control panel.
3. Hold the control panel to the oven cavity with the single(1) screw.
4. Connect the leads to the control panel.

## OVEN LAMP SOCKET REMOVAL

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

**CAUTION:** When replacing the oven lamp socket, replace it so that the side where the black dot is put faces upward.

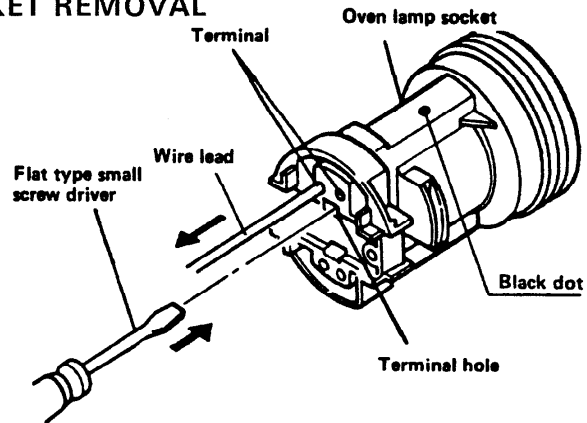


Figure C-1. Oven Lamp Socket

## POSITIVE LOCK® CONNECTOR REMOVAL

1. Push the lever of positive lock® connector.
2. Pull down the connector from the terminal.
3. Now, the connector is free.

Note: If the positive lock® has a insulation sleeve, first remove it. If you do not so, you can not push the lever of positive lock®

**CAUTION:** THE POSITIVE LOCK® TERMINAL CAN NOT BE DISCONNECTED BY ONLY PULLING. BECAUSE ONCE YOU (SERVICE PERSONAL) HAVE CONNECTED THE POSITIVE LOCK® CONNECTOR TO THE TERMINAL, THE POSITIVE LOCK® CONNECTOR HAS BEEN LOCKED.

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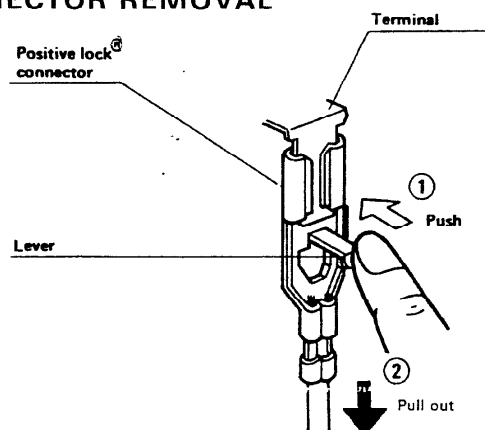


Figure C-2. How to release the Positive lock® connector

## FAN MOTOR REPLACEMENT

## REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the fan motor.
3. Remove the two(2) screws (rear side) and the single(1) screw (top side) holding the fan duct assembly.
4. Remove the fan blade assembly from the fan motor shaft according to the following procedure.
  - 1) Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers as shown Figure C-1(a)

**CAUTION:**

- Make sure that any pieces do not enter the gap between the rotor and the stator of the fan motor. Because the rotor is easy to be shaven by pliers and metal pieces may be produced.
  - Do not touch the pliers to the coil of the fan motor. because the coil may be cut or injured.
  - Do not transform the bracket by touching with the pliers.
2. Remove the fan blade from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
  3. Now, the fan blade will be free.

**CAUTION:**

- Do not use this removed fan blade again. Because the hole(for shaft) of it may become bigger than a standard one.
5. Remove the two(2) screws holding the fan motor to the fan duct assembly.
  6. Now, the fan motor is free.

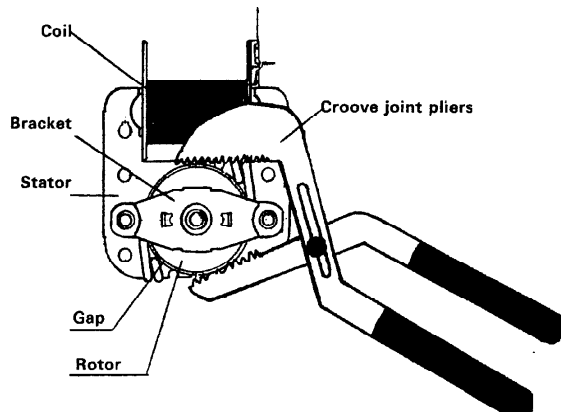


Figure C-3(a) Rear view

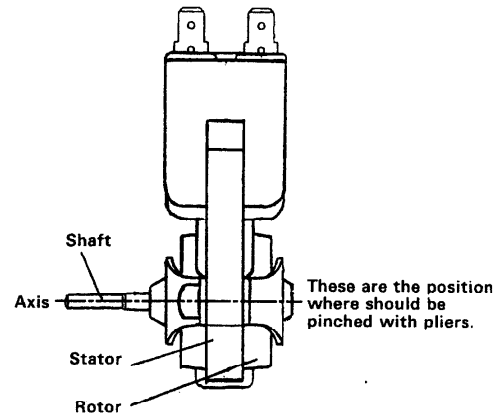


Figure C-3(b) Side view

## INSTALLATION

1. Install the fan motor to the fan duct assembly with the two(2) screws.
2. Install the fan blade assembly to the fan motor shaft according to the following procedure.
  - 1) Hold the center of the bracket which supports the shaft of the fan motor on the flat table as shown in Figure C-4.
  - 2) Apply the screw lock tight into the hole(for shaft) of the fan blade.
  - 3) Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.

**CAUTION:**

- Do not hit the fan blade strongly when installed because the bracket may be transformed.
  - Make sure that the fan blade rotates smooth after installed.
  - Make sure that the axis of the shaft is not slanted.
3. Install the fan duct assembly to the oven cavity with the two(2) screws (rear side) and single(1) screw (top side).
  4. Connect the wire leads to the fan motor, referring to the pictorial diagram.

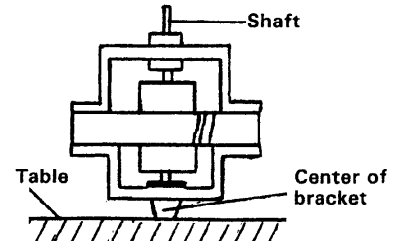


Figure C-4.



4. Shut the door (close the contacts of latch switches).
5. Make sure upper and lower oven hinges are inserted into the upper and lower door hinge pins.
6. Make sure the door is parallel with oven face lines (left and upper side lines) and door latch heads pass through latch holes correctly.
7. Secure three (3) screws holding the lower oven hinge and the base plate (Left) to the bottom side of oven cavity.
8. Secure two (2) screws holding the upper oven hinge to the top of the oven cavity.

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

(A) Make sure that all switches are operating properly. (Refer to chapter "Switches Adjustment".)

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

### DOOR ADJUSTMENT

The door can be adjusted by keeping screws of each hinge loose.

**After adjustment, make sure of the following :**

1. Door latch heads smoothly catch latch hook through latch holes and that latch head goes through center of latch hole.
2. Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. Door is positioned with its face pressed toward cavity face plate.
4. 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.

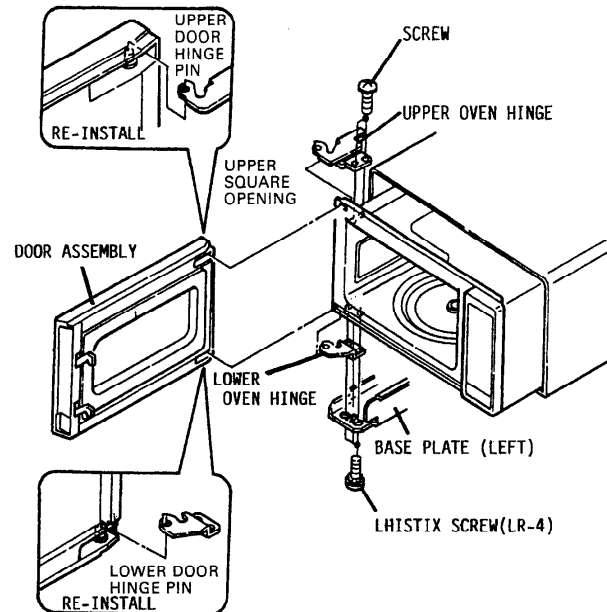


Figure C-10. Door Replacement and adjustment

### DOOR DISASSEMBLY

Remove door assembly, refer to "Door Replacement". Replacement of door components are as follows:

1. Place door assembly on a soft cloth with latches facing up.

**Note:**As the engaging part of choke cover and door panel are provided at 18 places, do not force any particular part.

2. Insert an putty knife (thickness of about 0.5mm) into the gap between the choke cover and corner portion of door panel as shown Figure C-11 to free engaging parts.
3. Lift up choke cover.
4. Now choke cover is free from door panel.
5. Remove four (4) screws holding the door frame to the gutter for choke cover.
6. Remove the door frame with pulling the upper door hinge pin.
7. Release the latch spring from the door panel.

8. Remove the latch head from the door panel.
9. Now the door panel is free.

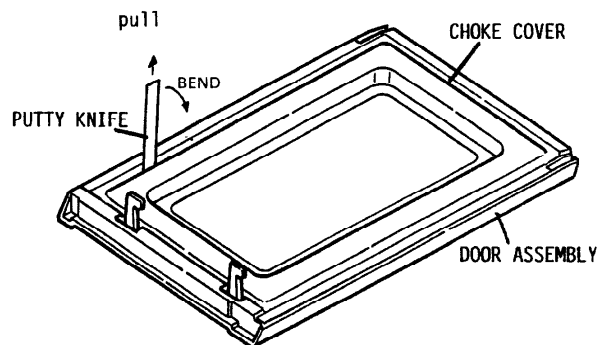


Figure C-11. Door Disassembly'

## MICROWAVE MEASUREMENT

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

### REQUIREMENT

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

### PREPARATION FOR TESTING:

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

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.

Important:

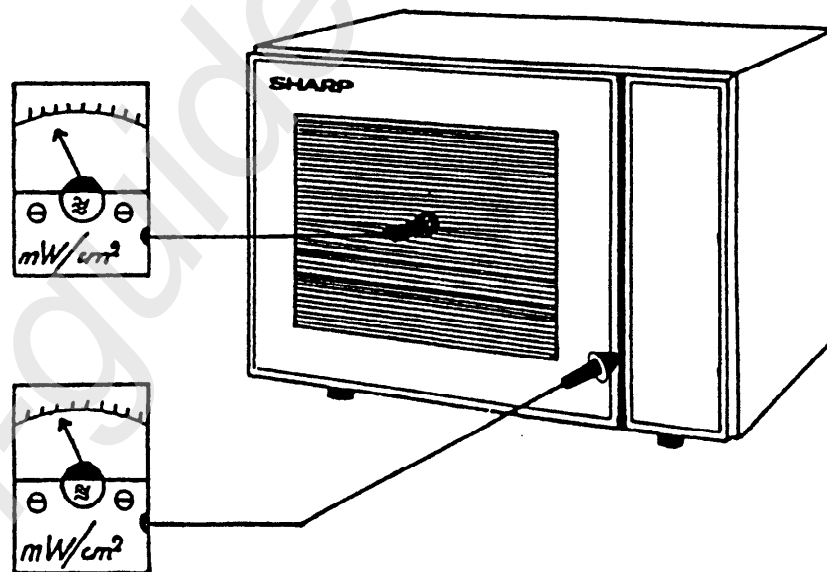
Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.

Recommended instruments are:

NARDA 8100  
NARDA 8200  
HOLADAY HI 1500  
SIMPSON 380M

2. Place the oven tray into the oven cavity.
3. Place the load of  $275 \pm 15\text{ml}$  of water initially at  $20 \pm 5^\circ\text{C}$  in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.  
The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster than 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.

(RDB1109U)



Microwave leakage measurement at 5 cm distance

**SCHEMATIC**  
NOTE: CONDITION OF OVEN.  
1. DOOR CLOSED.  
2. CLOCK APPEARS ON DISPLAY.

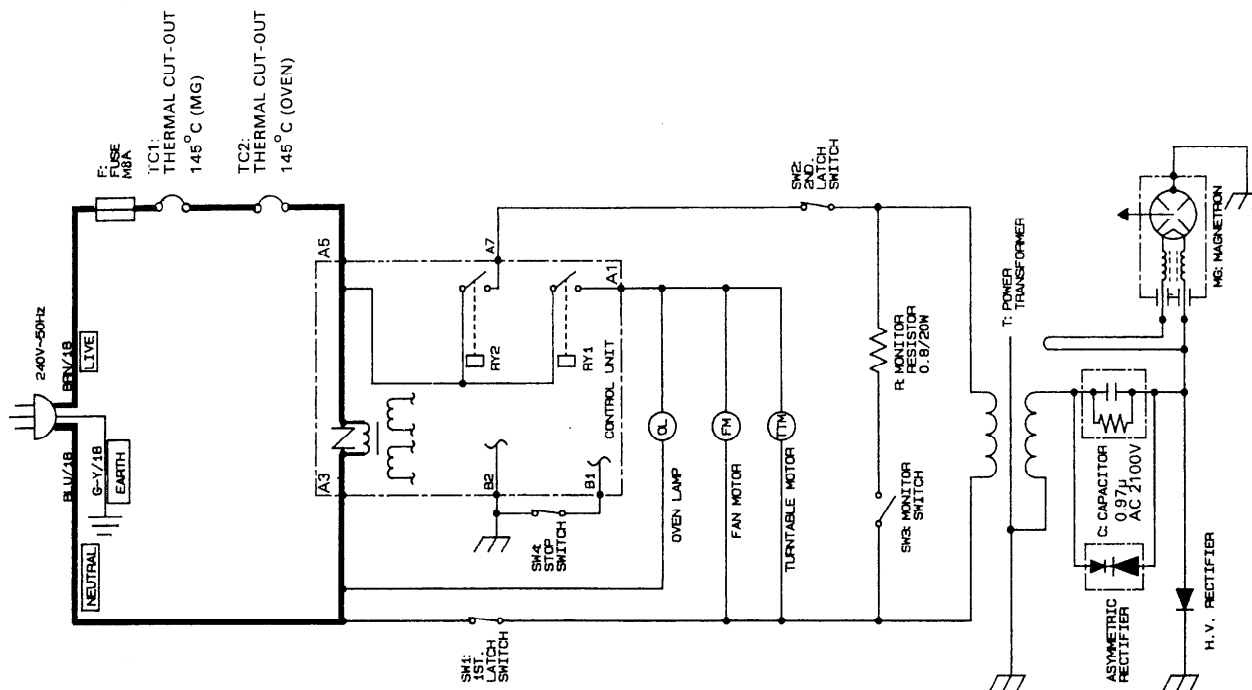


Figure O-1. Oven Schematic-Off Condition

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

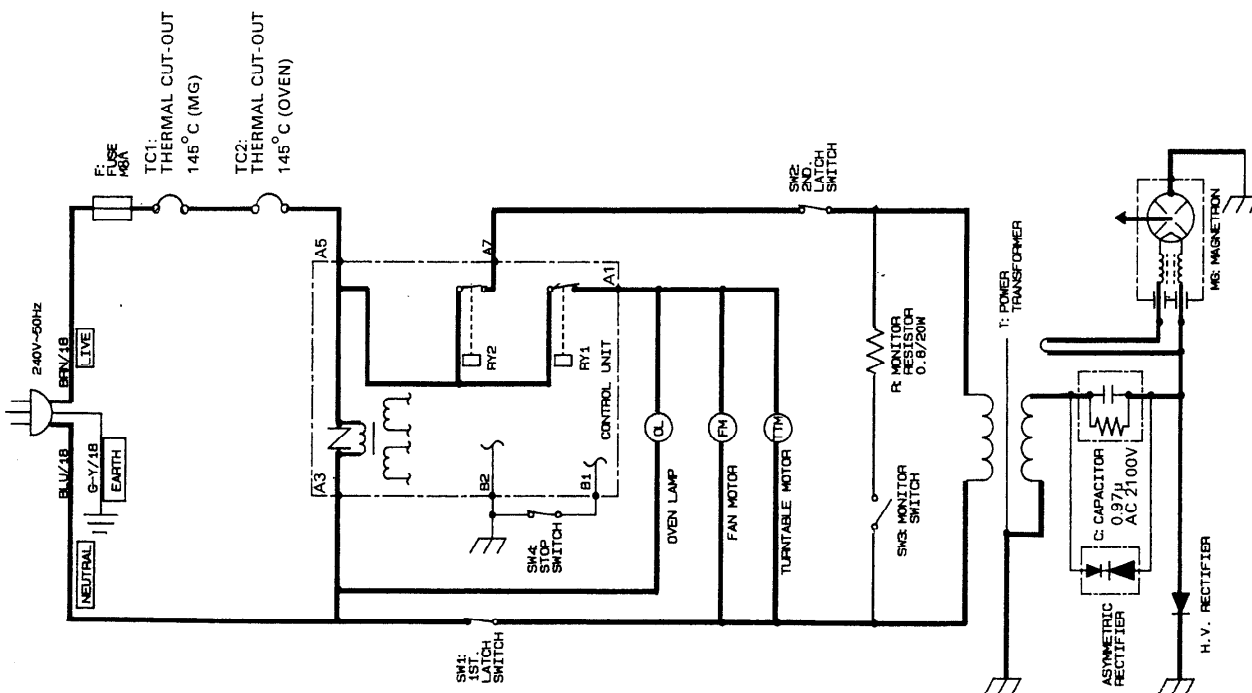


Figure O-2. Oven Schematic-ON Condition

R-3A54  
R-3E54

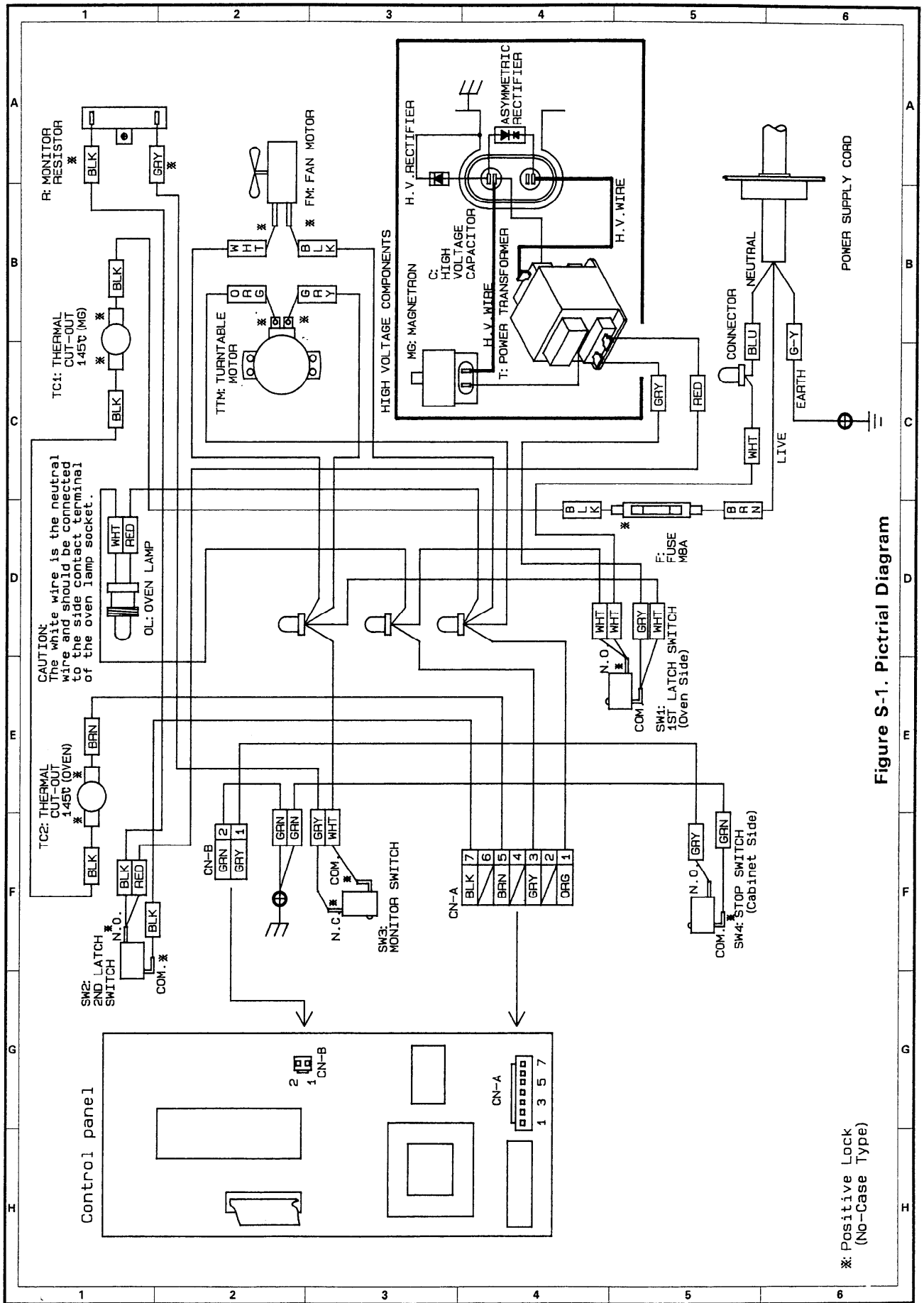


Figure S-1. Pictorial Diagram

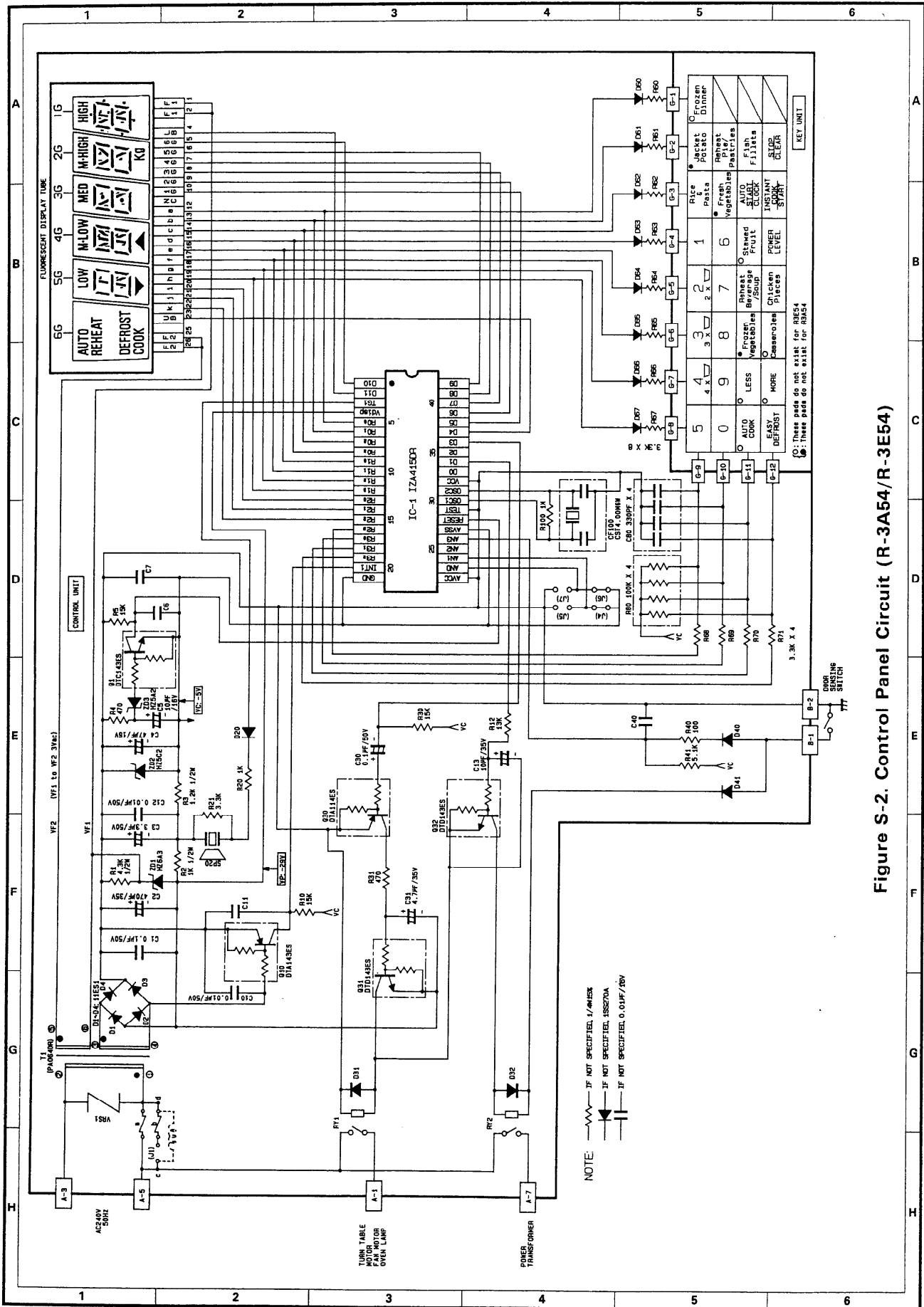


Figure S-2. Control Panel Circuit (R-3A54/R-3E54)

R-3A54  
R-3E54

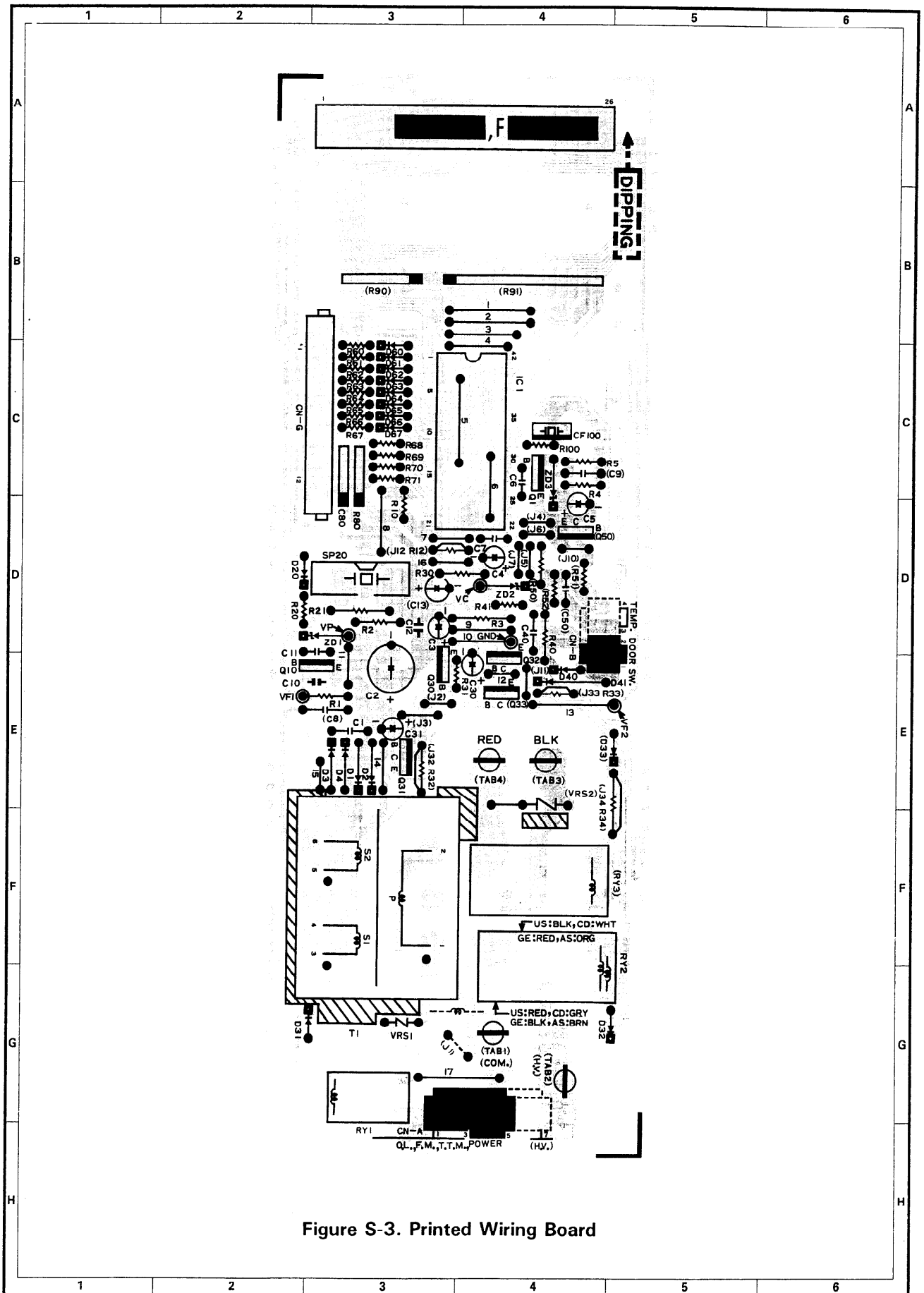


Figure S-3. Printed Wiring Board

## PARTS LIST

Note : The voltage supplied to the parts "\*" are greater than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
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## ELECTRICAL PARTS

1- 1	QFS-CA010WRE0	Fuse M8A	1	AE
1- 2	QFSHDA002WRE0	Fuse holder	1	AE
1- 3	QSW-MA009WRE0	Monitor switch (V-5220D-070)	1	AF
1- 4	QSW-MA051WRE0	1st. 2nd. latch and stop switches (V-5230D-600)	3	AF
1- 5	RTHM-A075WRE0	Thermal cut-out 145°C	2	AQ
1- 6	QACCAA011WRE0	Power supply cord	1	AQ
1- 7	FW-QZA070WRKO	H.V. rectifier assembly	1	AY
1- 8	RC-QZA148WRE0	H.V. capacitor	1	AX
1- 9	RMOTEA258WRE0	Fan motor	1	BB
1-10	RV-MZA162WRE0	Magnetron 17L	1	BL
1-11	QSOCLA011WRE0	Oven lamp socket	1	AH
1-12	RLMPTA029WRE0	Oven lamp	1	AK
1-13	RMOTDA169WRE0	Turtable motor	1	AW
1-14	RTRN-A347WRE0	Power transformer	1	BR
1-15	RR-WZA003WRE0	Monitor resistor 0.8Ω/20W	1	AG

## CABINET PARTS

2- 1	FFTASA035WRKO	Oven lamp access cover assembly	1	AN
2-1-1	PCUSGA306WRPO	Cushion	1	AA
2-1-2	PSLDPA005WRPO	Lamp reflector	1	AD
2- 2	GCABUA373WRPO	Outer case cabinet	1	BG

## CONTROL PANEL PARTS

3- 1	CPWBFA493WRKO	Control unit(Not Replacement Item)	1	BP
3- 1A	QCNCMA230DRE0	4-pin connector (A)	1	AC
3- 1B	QCNCMA275DRE0	2-pin connector (B)	1	AB
3- 1C	QCNCWA030DRE0	12-pin connector (G)	1	AE
3- 1D	RV-KXA037DRE0	Fluorescent display tube	1	AU
C1	RC-KZA087DRE0	Capacitor 0.1μF 50V	1	AB
C2	VCEAB31VW477M	Capacitor 470μF 35V	1	AC
C3	VCEAB31HW335M	Capacitor 3.3μF 50V	1	AA
C4	VCEAB31CW476M	Capacitor 47μF 16V	1	AA
C5	VCEAB31CW106M	Capacitor 10μF 16V	1	AA
C6, 7, 11, C40	VCKYD11CY103N	Capacitor 0.01μF 16V	4	AH
C10, 12	VCTYF31HF103Z	Capacitor 0.01μF 50V	2	AB
C13	VCEAB31VW106M	Capacitor 10μF 35V	1	AB
C30	VCEAB31HW104M	Capacitor 0.1μF 50V	1	AM
C31	VCEAB31VW475M	Capacitor 4.7μF 35V	1	AA
C80	RMPTEA009DRE0	Capacitor array B5RC0122-33N (330μFx4)	1	AE
CF100	RCRS-A012DRE0	Ceramic resonator (CST4.00MGW)	1	AD
D1-4	VHD11ES1///-1	Diode (11ES1)	4	AB
D20, 31, D32, 40, D41, 60- D67	VHD1SS270A/-1	Diode (1SS270A)	13	AA
IC1	RH-IZA415DRE0	LSI	1	AS
Q1	VSDTTC143ES/-3	Transistor (DTC143ES)	1	AB
Q10	VSDTA143ES/-3	Transistor (DTA143ES)	1	AB
Q30	VSDTA114ES/-3	Transistor (DTA114ES)	1	AB
Q31, 32	VSDTD143ES/-3	Transistor (DTD143ES)	2	AC
R1	VRD-B12HF432J	Resistor 4.3kΩ 1/2W	1	AH
R2	VRD-B12HF102J	Resistor 1kΩ 1/2W	1	AA
R3	VRD-B12HF122J	Resistor 1.2kΩ 1/2W	1	AA
R4, 31	VRD-B12EF471J	Resistor 470Ω 1/4W	2	AA
R5, 10, 30	VRD-B12EF153J	Resistor 15kΩ 1/4W	3	AA
R12	VRD-B12EF133J	Resistor 13kΩ 1/4W	1	AA
R20	VRD-B12EF102J	Resistor 1kΩ 1/4W	1	AA
R21, R60-71	VRD-B12EF332J	Resistor 3.3kΩ 1/4W	13	AA

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R-3E54

Note : The voltage supplied to the parts "\*" are greater than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
R40	VRD-B12EF101J	Resistor 100Ω 1/4W	1	AA
R41	VRD-B12EF512J	Resistor 5.1kΩ 1/4W	1	AA
R80	RR-DZA089DRE0	Resistor array (RGLD4X104J)	1	AB
R100	VRD-B12EF105J	Resistor 1MΩ 1/4W	1	AA
RY1	RRLY-A080DRE0	Relay (OJ-SH-124LM)	1	AG
RY2	RRLY-A079DRE0	Relay (OMI-SH-124LM)	1	AH
SP20	RALM-A014DRE0	Buzzer (PKM22EPT-CA)	1	AG
T1	RTRNPA064DRE0	Transformer	1	AS
VRS1	RH-VZA010DRE0	Varistor (TNR15G471K)	1	AE
ZD1	VHEHZ6A3///-1	Zener diode (HZ6A3)	1	AA
ZD2	VHEHZ5C2///-1	Zener diode (HZ5C-2)	1	AA
ZD3	VHEHZ5A2///-1	Zener diode (HZ5A-2)	1	AH
3- 2	FPNLCA931WRK0	Control panel frame with key unit (R-3A54)	1	BD
	FPNLCA930WRK0	Control panel frame with key unit (R-3E54)	1	BD
3- 3	JBTN-A763WRF0	Open button	1	AH
3- 4	MSPRCA050WRE0	Open button spring	1	AB
3- 5	XEPSD30P10XS0	Screw; Control unit mtg.	3	AA

## OVEN PARTS

4- 1	PHOK-A065WRF0	Latch hook	1	AL
4- 2	LBNDKA087WRP0	Capacitor holder	1	AM
4- 3	PFILWAO41WRE0	Lamp filter	1	AA
4- 4	PPACGA084WRF0	Turntable packing	1	AB
4- 5	PCUSUA292WRP0	Cushion	1	AF
4- 6	PDUC-A459WRW0	Air guide	1	AM
4- 7	FOVN-A252WRT0	Oven cavity	1	BN
4- 8	FDAI-A154WRY0	Bottom plate (Right) assembly	1	AY
4- 9	GDAI-A208WRW0	Bottom plate (Left)	1	AP
4-10	GLEGPA035WRE0	Foot	4	AF
4-11	LSUB-A066WRP0	Magnetron angle	1	AL
4-12	MHNG-A290WRT0	Lower oven hinge	1	AM
4-13	MHNG-A270WRT0	Upper oven hinge	1	AM
4-14	MLEVPA194WRF0	Switch lever	1	AK
4-15	NCPL-A039WRF0	Coupling	1	AM
4-17	PCOVPA245WRT0	Motor cover	1	AP
4-18	PCOVPA271WRE0	Waveguide cover	1	AS
4-19	PCUSUA166WRP0	Cushion	1	AG
4-20	PCUSUA329WRP0	Cushion	1	AH
4-21	PPACGA073WRE0	Rubber cushion B	1	AD
4-22	FFANJA018WRK0	Fan blade assembly	1	AE
4-22-1	MSPRP0038YBEO	Fan retainer clip	1	AB
4-23	FDUC-A235WRT0	Fan duct assembly	1	AU
4-24	LANGFA154WRP0	L support angle	1	AK
4-25	LANGQA327WRP0	Lamp angle	1	AN
4-26	LSTPPA069WRF0	Cord anchorage (Upper)	1	AD
4-27	LSTPPA070WRF0	Cord anchorage (Lower)	1	AC
4-28	PCUSGA312WRP0	Cushion	1	AB
4-29	PCUSGA345WRP0	Cushion	1	AK
4-30	PCUSGA351WRP0	Cushion	1	AG
4-31	PCUSGA353WRP0	Cushion	1	AH
4-32	PCUSUA173WRP0	Cushion	1	AC

## DOOR PARTS

5	DDORFA544WRK0	Door assembly complete. (Not Replacement Item)	1	BP
5- 1	FDORFA224WRT0	Door panel	1	BG
5- 2	GCOVHA268WRF0	Choke cover	1	AQ
5- 3	GWAKPA224WRR0	Door frame	1	AW
5- 4	HPNL-A398WRR0	Door screen	1	BA
5- 5	LSTPPA107WRF0	Latch head	1	AK
5- 6	MSPRTA081WRE0	Latch spring	1	AA
5- 7	PSHEPA382WRE0	Sealer film	1	AH
5- 8	XUPSD30P04000	Sscrew; 3mm x 4mm	1	AB



Note : The voltage supplied to the parts "\*" are greater than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
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## MISCELLANEOUS

6- 1	FROLPA059WRK0	Roller stay	1	AS
6- 2	NTNT-A046WRF0	Turntable tray	1	AW
6- 3	TINS-A307WRR0	Operation manual (R-3A54)	1	AN
	TINS-A305WRR0	Operation manual (R-3E54)	1	AN
6- 4	TCADCA422WRR0	Cookbook	1	AS
6- 5	FW-VZB121WRE0	Main wire harness	1	AZ
6- 6	FW-VZB122WRE0	Switch harness	1	AP
6- 7	TCAUHA055WRR0	Caution label	1	AF
6- 8	PZET-A013WRE0	Terminal insulator	1	AC
6- 9	QW-QZA169WRE0	High voltage wire A	1	AM
6-10	TSPCNB652WRR0	Name plate (R-3E54)	1	AH
	TSPCNB653WRR0	Name plate (R-3A54)	1	AH
6-11	QTANP0020YBE0	Connector CE-230	1	AA
6-12	PTUBUA003WRE0	Tube	1	AG

## SCREWS AND WASHERS

7- 1	XHTSD40P08RV0	Screw; 4mm x 8mm	7	AA
7- 2	LX-CZA038WRE0	Special screw	4	AA
7- 3	LX-CZ0052WRE0	Special screw	2	AA
7- 4	XFPSD30P10000	Screw; 3mm x 10mm	1	AA
7- 5	XFPSD40P08K00	Screw; 4mm x 8mm	3	AA
7- 6	XFPSD40P08000	Screw; 4mm x 8mm	5	AA
7- 7	XHPSD30P10XS0	Screw; 3mm x 10mm	1	AA
7- 8	XHTSD40R12RV0	Screw (LHSTIX LR-4)	3	AA
7- 9	XOTSD40P12RV0	Screw; 4mm x 12mm	8	AA
7-10	XOTSD40P12000	Screw; 4mm x 12mm	9	AA
7-11	XBBWW30P06000	Screw; 3mm x 6mm	2	AA
7-12	XHSSE40P08000	Screw; 4mm x 8mm	1	AA
7-13	XBTUW40P08000	Screw; 4mm x 8mm	2	AA
7-14	XFPSD30P06000	Screw; 3mm x 6mm	5	AA
7-15	XFPSD40P06000	Screw; 4mm x 6mm	2	AA
7-16	XFTSD40P30000	Screw; 4mm x 30mm	1	AA
7-17	LX-NZ0024YBE0	Nut	2	AA

## HOW TO ORDER REPLACEMENT PARTS

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

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

(RDP1303U)

R-3A54  
R-3E54

