

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 P00 - P06. When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through AN1 and R24 - R27 to perform the function that was requested.

Control Unit

Control unit consists of LSI, power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit, temperature measurement circuit, absolute humidity sensor circuit, relay circuit and indicator circuit.

1) LSI

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

2) Power Source Circuit

This circuit generates voltages necessary for the control unit from the AC line voltage.

Symbol	Voltage	Application
VC	-5.1V	LSI(IC1)
VP	-31V	Fluorescent display tube : Grid and anode voltage
VF1	2.9Vac	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 incorporates a very small error because it works on commercial frequency.

4) ACL Circuit

A circuit to generate a signals which resetting the LSI to the initial state when power is applied.

5) Buzzer Circuit

The buzzer is responds to signals from the LSI to emit audible sounds (key touch sound and completion sound).

6) Temperature Measurement Circuit : Oven

The temperature in the oven cavity is sensed by the thermistor. The variation of resistance according to sensed temperature is detected by the temperature measurement circuit and the result applied to LSI. The LSI uses this information to control the relay and display units.

7) Absolute Humidity Sensor Circuit

This circuit detects the humidity of a food which is being cooked, to control its automatic cooking.

8) Door Sensing Switch

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

9) Relay Circuit

To drive the magnetron, heating element, fan motor, convection motor, damper motor, turntable motor, hood motor, and light the oven lamp and hood lamp.

10) Indicator Circuit

Indicator element is a Fluorescent Display.

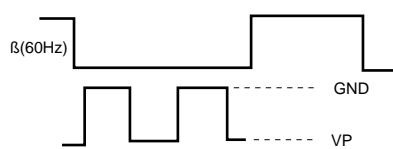
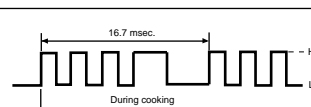
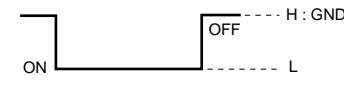
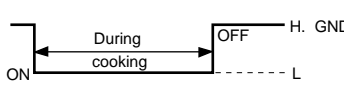

Basically, a Fluorescent Display is triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.

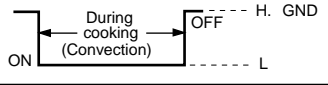
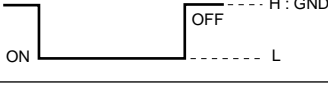

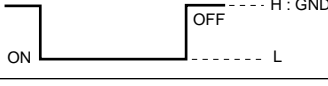
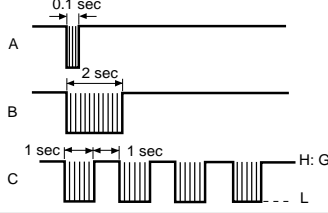
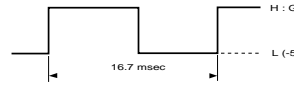
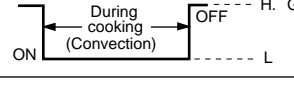
The Fluorescent Display has 8-digits, 16-segments are used for displaying figures.

DESCRIPTION OF LSI

LSI(IZA719DR)

The I/O signals of the LSI(IZA719DR) are detailed in the following table.

Pin No.	Signal	I/O	Description																																				
1	VCC	IN	Connected to GND.																																				
2	VEE	IN	Anode (segment) of Fluorescent Display illumination voltage: -31V. Vp voltage of power source circuit input.																																				
3	AVSS	IN	Power source voltage: -5V. VC voltage of power source circuit input.																																				
4	VREF	IN	Reference voltage input terminal. A reference voltage applied to the A/D converter in the LSI. Connected to GND.(0V)																																				
5	AN7	IN	Used for initial balancing of the bridge circuit (absolute humidity sensor). This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into the LSI.																																				
6	AN6	IN	AH sensor input. This input is an analog input terminal from the AH sensor circuit, and connected to the A/D converter built into the LSI.																																				
7-9	AN5-AN3	IN	Heating constant compensation terminal.																																				
10	AN2	IN	Input signal which communicates the door open/close information to LSI. Door closed; "L" level signal(0V). Door opened; "H" level signal(-5V).																																				
11	AN1	IN	Signal coming from touch key. When any one of G8 line keys on key matrix is touched, a corresponding signal will from P00 - P06 will be input into AN1. When no key is touched, the signal is held at "L" level.																																				
12	AN0	IN	Temperature measurement input: OVEN THERMISTOR. By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.																																				
13	P55	OUT	<p>Segment data signals. The relation between signals and indicators are as follows:</p> <table border="1"> <thead> <tr> <th>Signal</th> <th>Segment</th> <th>Signal</th> <th>Segment</th> </tr> </thead> <tbody> <tr> <td>P13</td> <td>P16</td> <td>P03</td> <td>P8</td> </tr> <tr> <td>P12</td> <td>P15</td> <td>P02</td> <td>P7</td> </tr> <tr> <td>P11</td> <td>P14</td> <td>P01</td> <td>P6</td> </tr> <tr> <td>P10</td> <td>P13</td> <td>P00</td> <td>P5</td> </tr> <tr> <td>P07</td> <td>P12</td> <td>P37</td> <td>P4</td> </tr> <tr> <td>P06</td> <td>P11</td> <td>P36</td> <td>P3</td> </tr> <tr> <td>P05</td> <td>P10</td> <td>P35</td> <td>P2</td> </tr> <tr> <td>P04</td> <td>P9</td> <td>P55</td> <td>P1</td> </tr> </tbody> </table> <p>(β : INTO signal)</p> <p>Refer to the touch control panel circuit about the relation between signals and indicators. Normally, one pulse is output in every synchronized signal (β) period, and input to the anode of the fluorescent display.</p> 	Signal	Segment	Signal	Segment	P13	P16	P03	P8	P12	P15	P02	P7	P11	P14	P01	P6	P10	P13	P00	P5	P07	P12	P37	P4	P06	P11	P36	P3	P05	P10	P35	P2	P04	P9	P55	P1
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P06	P11	P36	P3																																				
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P04	P9	P55	P1																																				
14	P54	OUT	<p>Oven lamp driving signal. (Square Waveform : 60Hz) To turn on and off the shut-off relay(RY1). The square waveform voltage is delivered to the relay(RY1) driving circuit.</p> 																																				
15	P53	OUT	<p>Turntable motor driving signal. To turn on and off relay(RY4). "L" level: During Turntable ON. "H" level: During Turntable OFF or during the oven is off condition.</p> 																																				
16	P52	OUT	<p>Cooling fan motor driving signal. To turn on and off shut-off relay(RY5). "L" level during both microwave and convection cooking; "H" level otherwise.</p> 																																				
17	P51	OUT	<p>Damper motor driving signal. To turn on and off shut-off relay(RY6).</p> 																																				

Pin No.	Signal	I/O	Description																																				
18	P50	OUT	<p>Convection motor driving signal. To turn on and off shut-off relay(RY7). "L" level during CONVECTION; "H" level otherwise.</p> 																																				
19	P47	OUT	<p>Hood lamp driving signal. To turn on and off relay(RY8). "L" level: During Hood lamp ON. "H" level: During Hood lamp OFF.</p> 																																				
20	P46	OUT	<p>Hood motor driving signal. To turn on and off relay(RY9). "L" level: During Hood motor ON. "H" level: During Hood motor OFF.</p> 																																				
21	P45	OUT	<p>Hood motor high / low driving signal. To turn on and off relay(RY10). "L" level: During Hood motor high. "H" level: During Hood motor low.</p> 																																				
22	P44	OUT	<p>Timing signal output terminal for temperature measurement(OVEN). "L" level (GND): Thermistor OPEN timing. "H" level (-5V): Temperature measuring timing. (Convection cooking)</p>																																				
23	P43	OUT	<p>Signal to sound buzzer. A: key touch sound. B: Completion sound. C: When the temperature of the oven cavity reaches the preset temperature in the preheating mode, or when the preheating hold time (30 minutes) is elapsed.</p> 																																				
24	P42	IN	<p>Input signal which communicates the damper open/close information to LSI. Damper opened; "L" level signal(0V:GND). Damper closed; "H" level signal(-5V).</p>																																				
25	INT1	IN	<p>Signal to synchronize LSI with commercial power source frequency. This is the basic timing for all real time processing of LSI.</p> 																																				
26	P40	IN	Connected to VC.																																				
27	RST	IN	<p>Auto clear terminal. Signal is input to reset the LSI to the initial state when power is applied. Temporarily set to "L" level the moment power is applied, at this time the LSI is reset. Thereafter set at "H" level.</p>																																				
28	P71	OUT	<p>Magnetron high-voltage circuit driving signal. To turn on and off the cook relay(RY2). In P-HI operation, the signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (P-90,P-80,P-70,P-60,P-50,P-40,P-30,P-20,P-10,P-0) the signal turns to "H" level and "L" level in repetition according to the power level.</p> <table border="1" data-bbox="974 1344 1526 1732"> <thead> <tr> <th>VARI-MODE</th> <th>ON TIME</th> <th>OFF TIME</th> </tr> </thead> <tbody> <tr> <td>P-HI (100% power)</td> <td>32 sec.</td> <td>0 sec.</td> </tr> <tr> <td>P-90 (approx. 90% power)</td> <td>30 sec.</td> <td>2 sec.</td> </tr> <tr> <td>P-80 (approx. 80% power)</td> <td>26 sec.</td> <td>6 sec.</td> </tr> <tr> <td>P-70 (approx. 70% power)</td> <td>24 sec.</td> <td>8 sec.</td> </tr> <tr> <td>P-60 (approx. 60% power)</td> <td>22 sec.</td> <td>10 sec.</td> </tr> <tr> <td>P-50 (approx. 50% power)</td> <td>18 sec.</td> <td>14 sec.</td> </tr> <tr> <td>P-40 (approx. 40% power)</td> <td>16 sec.</td> <td>16 sec.</td> </tr> <tr> <td>P-30 (approx. 30% power)</td> <td>12 sec.</td> <td>20 sec.</td> </tr> <tr> <td>P-20 (approx. 20% power)</td> <td>8 sec.</td> <td>24 sec.</td> </tr> <tr> <td>P-10 (approx. 10% power)</td> <td>6 sec.</td> <td>26 sec.</td> </tr> <tr> <td>P-0 (0% power)</td> <td>0 sec.</td> <td>32 sec.</td> </tr> </tbody> </table>	VARI-MODE	ON TIME	OFF TIME	P-HI (100% power)	32 sec.	0 sec.	P-90 (approx. 90% power)	30 sec.	2 sec.	P-80 (approx. 80% power)	26 sec.	6 sec.	P-70 (approx. 70% power)	24 sec.	8 sec.	P-60 (approx. 60% power)	22 sec.	10 sec.	P-50 (approx. 50% power)	18 sec.	14 sec.	P-40 (approx. 40% power)	16 sec.	16 sec.	P-30 (approx. 30% power)	12 sec.	20 sec.	P-20 (approx. 20% power)	8 sec.	24 sec.	P-10 (approx. 10% power)	6 sec.	26 sec.	P-0 (0% power)	0 sec.	32 sec.
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29	P70	OUT	<p>Heating element driving signal. To turn on and off shut-off relay(RY3). "L" level during convection cooking; "H" level otherwise. During convection cooking, the signal becomes "H" level when the temperature of the oven cavity exceeds the predetermined temperature.</p> 																																				
30	XIN	IN	<p>Internal clock oscillation frequency setting input. The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.</p>																																				

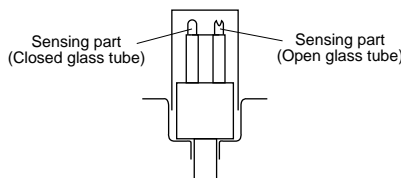
Pin No.	Signal	I/O	Description																				
31	XOUT	OUT	Internal clock oscillation frequency control output. Output to control oscillation input of XIN.																				
32	VSS	IN	Power source voltage:-5V. VC voltage of power source circuit input.																				
33	P27	IN	Signal coming from touch key. When any one of G12 line keys on key matrix is touched, a corresponding signal will be input into P27. When no key is touched, the signal is held at "L" level.																				
34	P26	IN	Signal similar to AN1. When any one of G11 line keys on key matrix is touched, a corresponding signal will be input into P26.																				
35	P25	IN	Signal similar to P27. When any one of G10 line keys on key matrix is touched, a corresponding signal will be input into P25.																				
36	P24	IN	Signal similar to P27. When any one of G9 line keys on key matrix is touched, a corresponding signal will be input into P24.																				
37-40	P23-P20	OUT	<p>Digit selection signal. The relationship between digit signal and digit are as follows;</p> <table border="0"> <tr> <td>Digit signal</td> <td>Digit</td> <td>Digit signal</td> <td>Digit</td> </tr> <tr> <td>P14</td> <td>1st.</td> <td>P20</td> <td>5th.</td> </tr> <tr> <td>P15</td> <td>2nd.</td> <td>P21</td> <td>6th.</td> </tr> <tr> <td>P16</td> <td>3rd.</td> <td>P22</td> <td>7th.</td> </tr> <tr> <td>P17</td> <td>4th.</td> <td>P23</td> <td>8th.</td> </tr> </table> <p>(β : INTO signal) Refer to the touch control panel circuit about the relation between signals and digits. Normally, one pulse is output in every synchronized signal (β) period, and input to the grid of the fluorescent display.</p>	Digit signal	Digit	Digit signal	Digit	P14	1st.	P20	5th.	P15	2nd.	P21	6th.	P16	3rd.	P22	7th.	P17	4th.	P23	8th.
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41-44	P17-P14	OUT	Digit selection signal. Signal similar to P23.																				
45-48	P13-P10	OUT	Segment data signal. Signal similar to P55.																				
49	P07	OUT	Segment data signal. Signal similar to P55.																				
50	P06	OUT	Segment data signal. Signal similar to P55. Key strobe signal.																				
			Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G7 line keys on key matrix is touched.																				
51	P05	OUT	Segment data signal. Signal similar to P55. Key strobe signal. Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G6 line keys on key matrix is touched.																				
52	P04	OUT	Segment data signal. Signal similar to P55. Key strobe signal. Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G5 line keys on key matrix is touched.																				
53	P03	OUT	Segment data signal. Signal similar to P55. Key strobe signal. Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G4 line keys on key matrix is touched.																				
54	P02	OUT	Segment data signal. Signal similar to P55. Key strobe signal. Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G3 line keys on key matrix is touched.																				
55	P01	OUT	Segment data signal. Signal similar to P55.																				

Pin No.	Signal	I/O	Description
			Key stroke signal. Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G2 line keys on key matrix is touched.
56	P00	OUT	Segment data signal. Signal similar to P55. Key stroke signal. Signal applied to touch-key section. A pulse signal is input to AN1 and P27 - P24 terminal while one of G1 line keys on key matrix is touched.
57-59	P37-P35	OUT	Segment data signal. Signal similar to P55.
60-64	P34-P30	OUT	Used for initial balancing of the bridge circuit (absolute humidity sensor).

ABSOLUTE HUMIDITY SENSOR CIRCUIT

(1) Structure of Absolute Humidity Sensor

The absolute humidity sensor includes two thermistors as shown in the illustration. One thermistor is housed in the closed glass tube filled with dry air while another in the open glass tube. Each sensor is provided with the protective cover made of metal with holes to be protected from the external airflow.

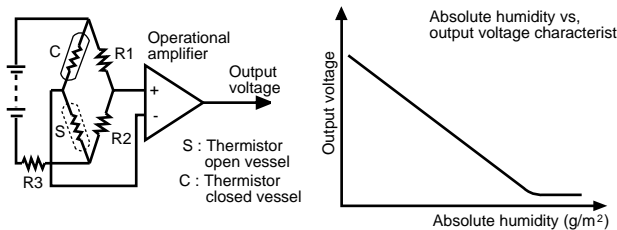


(2) Operational Principle of Absolute Humidity Sensor

The figure below shows the basic structure of an absolute humidity sensor. A bridge circuit is formed by two thermistors and two resistors (R1 and R2).

The output of the bridge circuit is to be amplified by the operational amplifier.

Each thermistor is supplied with a current to keep it heated at about 150°C (302°F), the resultant heat is dissipated in the air and if the two thermistors are placed in different humidity conditions they show different degrees of heat conductivity leading to a potential difference between them causing an output voltage from the bridge circuit, the intensity of which is increased as the absolute humidity of the air increases. Since the output is very minute, it is amplified by the operational amplifier.



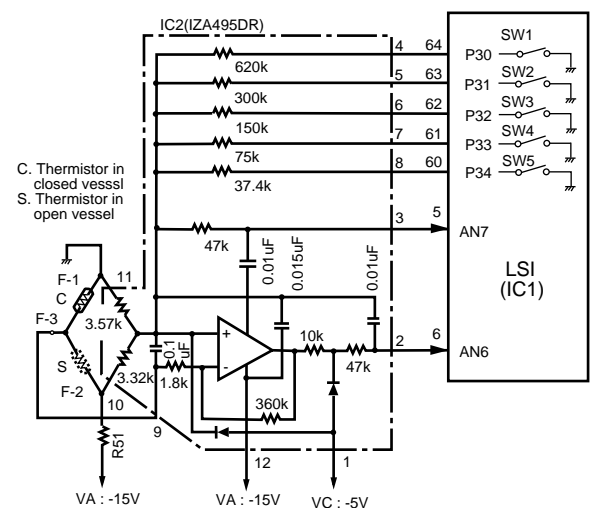
(3) Detector Circuit of Absolute Humidity Sensor Circuit

This detector circuit is used to detect the output voltage of the absolute humidity circuit to allow the LSI to control sensor cooking of the unit. When the unit is set in the sensor cooking mode, a 16 seconds clearing cycle occurs. Then the detector circuit starts to function and the LSI observes the initial voltage available at its AN6 terminal.

With this voltage given, the switches SW1 to SW5 in the LSI are turned on in such a way as to change the resistance values in parallel with R50-1. Changing the resistance values results in that there is the same potential at both F-3 terminal of the absolute humidity sensor and AN7 terminal of the LSI. The voltage of AN6 terminal will indicate about -2.5V. This initial balancing is set up about 16 seconds after the unit is put in the Sensor Cooking mode. As the sensor cooking proceeds, the food is heated to generate moisture by which the resistance balance of the bridge circuit is deviated to increase the voltage available at AN6 terminal of the LSI. Then the LSI observes that voltage at AN6 terminal and compares it with its initial value, and when the comparison rate reaches the preset value (fixed for each menu to be cooked), the LSI causes the unit to stop sensor cooking; thereafter, the unit goes in the next operation automatically.

After 16 seconds of operation in the sensor cook mode, the LSI detects the initial voltage at AN6. If the absolute humidity sensor is open or shorted, the circuit can not be balanced for initial voltage comparisons. This will result in the word "error" on the display and the cooking operation is stopped.

1) Absolute humidity sensor circuit



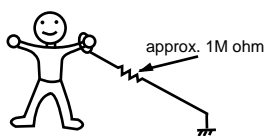
SERVICING

1. Precautions for Handling Electronic Components

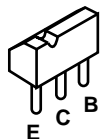
This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source,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

In order to protect CMOS LSI.

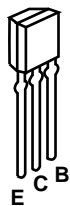
- 1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap all PW boards containing them in aluminium foil.
- 2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Shapes of Electronic Components



Transistor
2SB1238



Transistor
DTA123ES
KRA101M
KRC101M
KRC243M

3. Servicing of Touch Control Panel

We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

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

CAUTION:

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

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

- A. On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated.

For those models, check and repair all the controls (sensor-related ones included) of the touch control panel while keeping it connected to the oven.

- B. On some models, the power supply cord between the touch control panel and the oven proper is long enough that they may be separated from each other. For those models, therefore, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

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

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

4. Servicing Tools

Tools required to service the touch control panel assembly.

- 1) Soldering iron: 30W
(It is recommended to use a soldering iron with a grounding terminal.)
- 2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
- 3) Others: Hand tools

5. Other Precautions

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

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

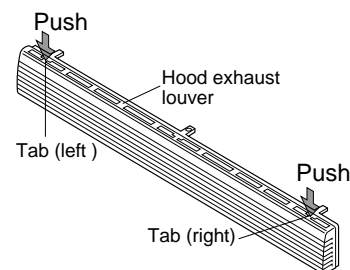
CAUTION: DISCONNECT OVEN FROM POWER SUPPLY BEFORE REMOVING OUTER CASE.
DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING AFTER REMOVING OUTER CASE.

THE FOLLOWING ADJUSTMENTS OR COMPONENT REPLACEMENT CAN BE PERFORMED WITHOUT REMOVING THE OVEN FROM THE WALL

1. Hood lamps, sockets and grease filter.
2. Oven lamp, base cover and hood lamp glass assembly.
3. Turntable motor and coupling.
4. Hood exhaust louver.
5. Control panel assembly or components
6. Stirrer cover and stirrer fan.

HOOD EXHAUST LOUVER REMOVAL

1. Unplug the oven from outlet.
2. Remove the one (1) screw holding the hood exhaust louver to the oven cavity with the outer case cabinet.
3. Pull the hood exhaust louver from the oven cavity by pushing the right and left tabs of the hood exhaust louver to remove.
4. Now, the hood exhaust louver is free.



REMOVAL OF OVEN FROM WALL (Two persons recommended to remove the oven)

1. Unplug the oven from outlet, and uncoil the power supply cord.
2. Remove the turntable tray and support from the oven cavity.
3. Remove the two (2) screws holding the oven (outer case cabinet) to the top cabinet.
4. Remove the two (2) grease filters from the base cover.
5. While supporting the front of the oven, unfasten the two (2) unit mounting screws holding the oven to the unit mounting plate.
6. Lower the front of the oven and pull the power cord out of the wall cabinet.
7. Lift the oven up off the hooks at the bottom of the mounting plate.
8. The oven is now free and can be placed on the work surface selected for servicing the oven.
9. Installation is the reverse of this procedure.

OUTER CASE REMOVAL

Remove the oven from the wall and proceed as follows;

1. Remove one (1) screw holding the hood exhaust louver to the oven, and pull it forward to remove by pushing the right and left tabs of the hood exhaust louver. (Refer to procedure of "HOOD EXHAUST LOUVER REMOVAL".)
2. Remove four (4) screws holding the rear stay to the hood fan motor or the oven, and remove it.
3. Remove the four (4) screws from the rear of the outer case cabinet.
4. Slide the outer case cabinet back about 1 inch (3 cm) to free it from retaining clips on the cavity face plate.
5. Disconnect the three (3) pin connector of the power supply cord from the wiring harness and remove the power supply cord together with the outer case.

UNIT MOUNTING SCREW AND HOOD INTAKE DUCT R REMOVAL

1. Remove the oven from the wall and remove the outer case of the oven.
2. Bend the tab of the oven cavity back plate.
3. Lift the unit mounting screw off the tab.
4. Slide down it from the base plate right. Now, the unit mounting screw is free.
5. Remove the three (3) screws holding the hood intake duct R to the base plate right, fan duct and the oven cavity.
6. Slide the hood intake duct R out of the right side of the oven.
7. Now the hood intake duct R is free
8. Discharge the high voltage capacitor.

POWER TRANSFORMER REMOVAL

1. Unplug the oven from power outlet, remove the oven from wall, remove outer case, remove the unit mounting screw and hood intake duct R. (Refer to procedure of "Removal of Oven from Wall", "Outer Case Removal" and "Unit Mounting Screw and Hood Intake Duct R Removal".)
2. Discharge high voltage capacitor.
3. Disconnect filament leads of transformer from the magnetron and capacitor.
4. Disconnect high voltage leads of capacitor from the

transformer.

5. Disconnect wire leads from transformer.
6. Remove two (2) screws holding the transformer to base plate right.

Re-install

1. Rest the transformer on the base plate right with its primary terminals toward the control panel.
2. Secure the transformer with two (2) screws to base plate right.

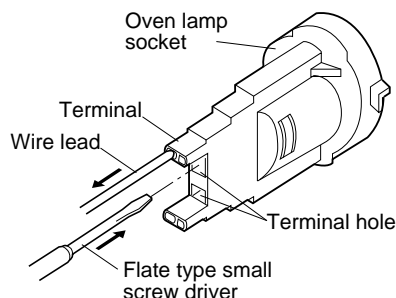
HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH. SENSOR REMOVAL

1. Unplug the oven from power outlet and remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and "Outer case Removal")
2. Disconnect the 6-pin connector of the hood fan motor from the main wire harness located at the right edge of the hood exhaust duct.
3. Disconnect the connector CN-F from the control unit.
4. Remove three (3) screws holding the hood exhaust duct to the oven cavity.
5. Remove two (2) screws holding the hood exhaust duct to the exhaust duct.
6. Release the 6-pin connector and the 3-pin connector of the main harness A from the hood exhaust duct.
7. Release the one (1) snap band of the main harness A from the left edge of the hood exhaust duct.
8. Release the snap band of the wire cord of the hood fan motor from the hood exhaust duct.
9. Remove the hood fan motor from the hood exhaust duct by lifting it up.
10. Now, the hood fan motor is free.
11. Remove the hood exhaust duct from the oven cavity by lifting it up
12. Screw the oven lamp off from the lamp socket.
13. Remove the lamp socket from the lamp angle of the top

3. Re-connect wire leads (primary and high voltage) to the transformer and filament leads of transformer to magnetron and high voltage capacitor. Refer to "PICTORIAL DIAGRAM".
4. Re-install the hood intake duct R, and the outer case and check that oven is operating properly.

CAUTION: MAKE SURE THE WIRE LEADS NEVER TOUCH THE FAN BLADE.

14. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the small flat type screw driver.
15. Now, the oven lamp socket is free.
16. Release the one (1) snap band of the AH sensor assembly from the oven cavity.
17. Release the one (1) tab of the top duct from the AH sensor assembly.
18. Remove two (2) screws holding the AH sensor assembly to the exhaust duct.
19. Now, the AH sensor assembly and the exhaust duct are free.



MAGNETRON REMOVAL

1. Unplug the oven from power outlet, remove the oven from wall, remove outer case, remove the unit mounting screw and hood intake duct R. (Refer to procedure of "Removal of Oven from Wall", "Outer case Removal" and "Unit Mounting Screw and Hood Intake Duct R Removal".)
2. Discharge high voltage capacitor.
3. Remove the hood fan motor and the hood exhaust duct from the oven cavity, referring to the procedure of "HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH SENSOR REMOVAL".
4. Disconnect the high voltage wire leads of the high

5. voltage rectifier assembly from the magnetron.
5. Disconnect the filament lead of the transformer from the magnetron.
6. Carefully remove the four (4) mounting screws holding the magnetron to waveguide. When removing the screws hold the magnetron to prevent it from falling.
7. Remove the magnetron from the unit with care so the magnetron tube should not hit by any metal object around the tube.

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

HIGH VOLTAGE RECTIFIER AND HIGH VOLTAGE CAPACITOR REMOVAL

1. Unplug the oven from power outlet, remove the oven from wall, remove outer case, remove the unit mounting screw and hood intake duct R. (Refer to procedure of "Removal of Oven from Wall", "Outer case Removal" and "Unit Mounting Screw and Hood Intake Duct R Removal".)
2. Discharge high voltage capacitor.
3. Disconnect the high voltage wire leads with high voltage

- rectifier from the magnetron.
4. Disconnect filament lead of the transformer from high voltage capacitor.
5. Disconnect high voltage wire lead of capacitor from the transformer.
6. Remove one (1) screw holding capacitor holder to the back plate.
7. Remove one (1) screw holding high voltage rectifier from the capacitor holder.

8. Disconnect the high voltage rectifier assembly from the high voltage capacitor.
9. Now, the high voltage rectifier assembly is free.
10. Remove capacitor from the holder.
11. Now, the high voltage capacitor is free.

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

HOOD FAN THERMAL CUT-OUT REMOVAL

1. Unplug the oven from power outlet and remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and "Outer case Removal")
2. Disconnect the wire leads from the hood fan thermal cut-out.
3. Remove the hood fan thermal cut-out from the base plate right.
4. Now, the hood fan thermal cut-out is free.

TEMPERATURE FUSE (MAGNETRON) REMOVAL

1. Unplug the oven from power outlet and remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and "Outer case Removal")
2. Remove the hood fan motor and the hood exhaust duct from the oven cavity, referring to the procedure of "HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH SENSOR REMOVAL".
3. Disconnect the wire leads from the temperature fuse (Magnetron).
4. Remove the one (1) screw holding the temperature fuse (Magnetron) to the oven cavity.
5. Now, the temperature fuse (Magnetron) is free.

COOLING FAN MOTOR REMOVAL

1. Unplug the oven from power outlet, remove the oven from wall, remove outer case, remove the unit mounting screw and hood intake duct R. (Refer to procedure of "Removal of Oven from Wall", "Outer case Removal" and "Unit Mounting Screw and Hood Intake Duct R Removal".)
2. Remove the hood fan motor and the hood exhaust duct from the oven cavity, referring to the procedure of "HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH SENSOR REMOVAL".
3. Discharge high voltage capacitor.
4. Release the two (2) snaps of the magnetron duct from the oven cavity. And remove the two (2) tabs of the magnetron duct from the fan duct.
5. Release snap bands of the main harness A installed to the fan duct and nearest the fan duct.
6. Disconnect the wire leads from the fan motor.
7. Remove one (1) screw holding the fan duct assembly to oven cavity.
8. Release the fan duct assembly from the oven cavity.
9. Remove the fan blade from the fan motor shaft according the following procedure.
 - 1) Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

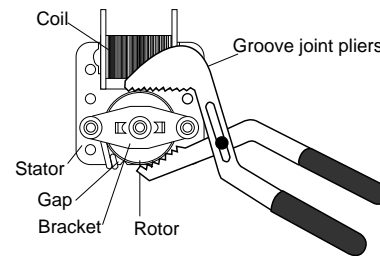
CAUTION:

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

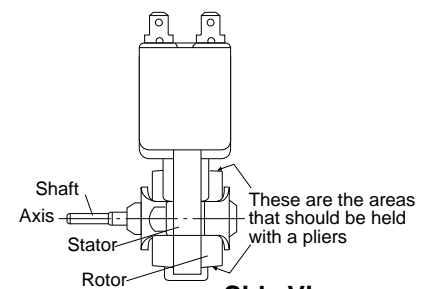
CAUTION:

- * **Do not reuse the removed fan blade because the hole (for shaft) may be larger than normal.**
10. Remove the two (2) screws holding the fan motor to the

- fan duct.
11. Now, the fan motor is free.



Rear View



Side View

INSTALLATION

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

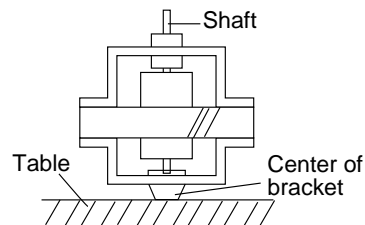
CAUTION:

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

3. Install the fan duct assembly to the oven cavity with the one (1) screw.
4. Install the magnetron duct to the fan duct and oven cavity.
5. Connect the wire leads to the fan motor, referring to the pictorial diagram.
6. Reinstall the released snap bands of the main harness A to the fan duct and nearest the fan duct.
7. Refer to procedure of "HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH SENSOR REMOVAL" and "Unit Mounting Screw and Hood Intake Duct R Removal" and "Outer case Removal".

And reverse their procedure.

And install the hood intake duct R, hood exhaust duct and outer case.



TURNTABLE MOTOR AND COUPLING REMOVAL

1. Remove the three (3) screws holding the base cover to the oven cavity
2. Remove the base cover from the oven cavity by pulling down and moving to the left slightly.
3. Disconnect the wire leads from the turntable motor.
4. Remove two (2) screws holding turntable motor to the

oven cavity.

5. Now the turntable motor is free.
6. Pull the coupling out of the turntable motor packing which is installed on the oven cavity floor.
7. Now the coupling is free.

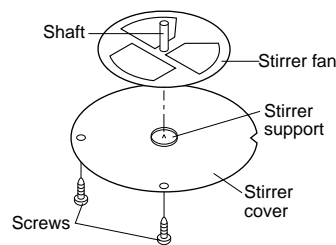
STIRRER MOTOR REMOVAL

1. Unplug the oven from power outlet and remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and Outer case Removal")
2. Remove the hood fan motor and the hood exhaust duct from the oven cavity, referring to the procedure of "HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH SENSOR REMOVAL".
3. Disconnect the wire leads from the stirrer motor.

4. Remove the two (2) screws holding the stirrer motor to the waveguide of the oven cavity.
5. Remove the stirrer motor from the waveguide.
6. Now, the stirrer motor is free.
7. When install the stirrer motor, the shaft of stirrer motor must be inserted to the stirrer fan shaft. Refer to the procedure of "STIRRER COVER AND STIRRER FAN INSTALLATION".

STIRRER COVER AND STIRRER FAN INSTALLATION

1. Insert the shaft of stirrer fan to the shaft of stirrer motor.
2. Hold the stirrer fan not to come out from the shaft of stirrer motor.
3. Insert the cutout of stirrer cover to the tabs on the ceiling.
4. Put the stirrer fan on the stirrer cover to match the stirrer fan shaft to the center of the stirrer support.
5. Hold the stirrer cover to the oven cavity with the two (2) screws.



OVEN LAMP REMOVAL

1. Unplug the oven from power outlet.
2. Remove one (1) screw holding the hood exhaust louver to oven cavity front flange.
3. Remove the hood exhaust louver from the oven by pushing the right and left tabs of the hood exhaust louver. (Refer to procedure of "HOOD EXHAUST LOUVER REMOVAL")

4. Lift the oven lamp cover up.
5. Now, the oven lamp and the socket are found.
6. Screw the oven lamp off from the lamp socket.
7. Now, the oven lamp is free.

NOTE: HOT (YELLOW) WIRE MUST BE CONNECTED TO THE TERMINAL WITH BLUE MARKING ON LAMP SOCKET.

CONTROL PANEL ASSEMBLY, CONTROL UNIT AND KEY UNIT REMOVAL

1. Unplug the oven from power outlet.
2. Remove one (1) screw holding the hood exhaust louver to oven cavity front flange.
3. Remove the hood exhaust louver from the oven by pushing the right and left tabs of the hood exhaust louver.

(Refer to procedure of "HOOD EXHAUST LOUVER REMOVAL")

4. Open the oven door.
5. Remove one (1) screw holding the control panel to the oven cavity front face plate.

6. Release the control panel from the oven cavity front face plate by lifting it up.
7. Disconnect the wire leads from the relays RY1, RY2 and RY3.
8. Disconnect the connectors CN-A, CN-B CN-C, CN-E and CN-F from the control unit.
9. Remove the control panel assembly from the oven.
10. Now, the control panel assembly is free.
11. Disconnect the connector CN-G from the control unit.
12. Remove four (4) screws holding the control unit to the control panel.
13. Release the two (2) tabs holding the control unit to the control panel.
14. Now, the control unit is free.
15. Remove the one (1) screw holding the key fixing plate to the control panel.
16. Release the four (4) tabs holding the key fixing plate to the control panel.
17. Remove the key fixing plate from the control panel.
18. Tear the key unit from the key fixing plate.
19. Now, the key unit is free

NOTES FOR KEY UNIT REPLACEMENT

1. Do not reuse the torn key unit because the performance of the adhesive become weak.
2. Before attaching a new key unit, wipe off remaining adhesive on the key fixing plate surfaces completely with a soft cloth soaked in alcohol.
3. When attaching the key unit to the key fixing plate, adjust the upper edge and right edge of the key unit to the correct position of key fixing plate.
4. Stick the key unit firmly to the key fixing plate by rubbing with soft cloth not to scratch.

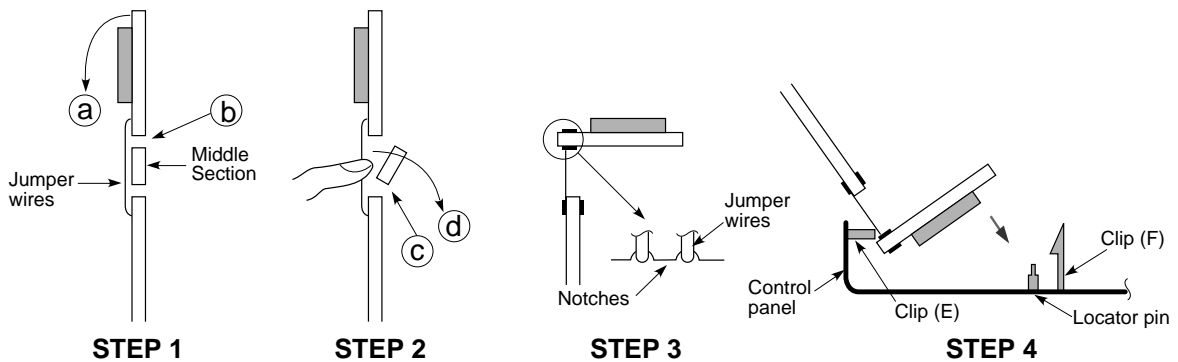
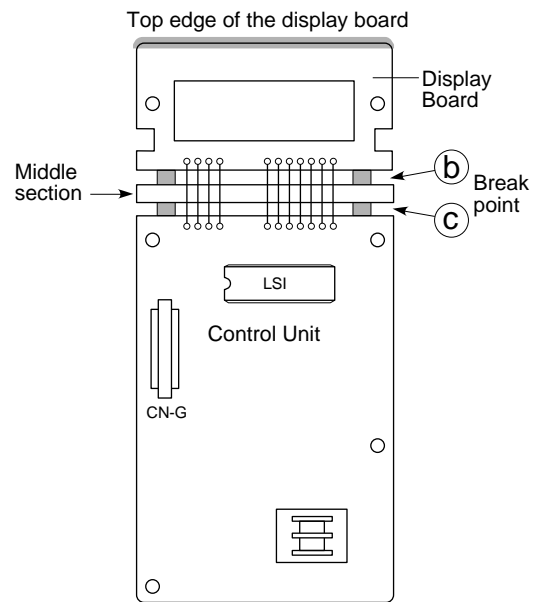
NOTES FOR NEW CONTROL UNIT REPLACEMENT

1. Before installation of the new CPU into the control panel, grasp the middle section between thumb and finger, bend the display board forward (a) until (b) breaks as shown in step 1.

2. To remove the middle section push both sides of the middle section towards (d) until (c) breaks as shown in step 2.

NOTE: Discard the middle section.

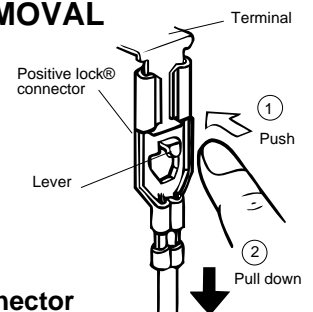
3. After removing the middle section, bend the display board 90°, positioning the jumper wires into the notches of the display board as shown in step 3.
4. Insert the bottom edge of the display board under the tab of control panel as shown in step 4.
5. Place the top edge of the display board on the clip (F). And press the display board downward as shown in step 4. (Holes in middle of display board should be positioned into locator pins.)
6. After installing display board, press the CPU downward 90° until CPU is locked into place by the clips.
7. Hold the CPU with the four (4) screws.
8. After installing CPU, make sure jumper wires are not bent, touching or broken.



POSITIVE LOCK® CONNECTOR (NO-CASE TYPE) REMOVAL

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

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



Positive lock® connector

CONVECTION DUCT ASSEMBLY REMOVAL

1. Unplug the oven from power outlet, remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and Outer case Removal")
2. Lift the left mounting screw off the tab and slide it down from the base plate left.
3. Remove the one (1) screw holding the exhaust duct to the top duct.
4. Remove the exhaust duct from the oven cavity.
5. Remove the heat protect top sheet from the top duct.
6. Remove the two (2) screws holding the hood intake duct L to the heater cover L and the oven cavity front flange.
7. Disconnect the wire leads from the convection motor and heater element.
8. Disconnect the connector of the main wire harness A from the connector of the thermistor.

THERMISTOR REMOVAL

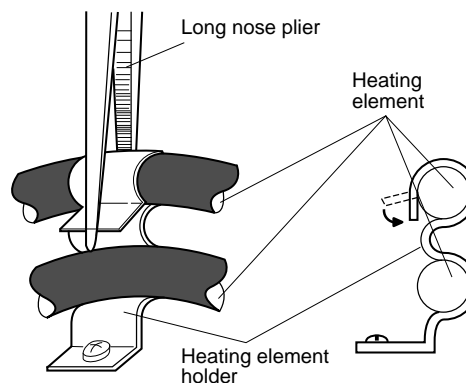
9. Remove one (1) screw holding the thermistor to the convection duct.
10. Now, the thermistor is now free.

CONVECTION HEATER REMOVAL

11. Remove six (6) oven side screws holding the convection duct to the oven cavity.
12. Remove two (2) screws holding the convection duct to the oven cavity top side.
13. Remove two (2) screws holding the two heater mounting holders to the convection duct.
14. Remove two (2) screws holding the convection heater to the convection duct.
15. Now, the convection heater is now free.

NOTE: After installed the heating element completely, bent top of the heating element holder to inside

using by long nose pliers as shown following illustration.



CONVECTION FAN AND MOTOR REMOVAL

16. Remove one (1) nut (turn to clockwise), spring washer and washer holding the convection fan to the convection motor shaft.
17. Now, the convection fan is now free.
18. Remove two (2) washers and pipe holding the convection motor fan to convection motor shaft.
19. Remove two (2) screws holding the convection motor mounting plate to convection duct.
20. Remove the convection motor assembly, convection motor fan and one (1) washer from the convection duct.
21. Remove the convection motor fan and one (1) washer holding the fan to convection motor shaft.
22. Remove the E-ring from the convection motor shaft.
23. Remove two (2) screws holding the convection motor to convection motor mounting plate.
24. Now, the convection motor is free.

DAMPER MOTOR AND DAMPER SWITCH REMOVAL

1. Unplug the oven from power outlet, remove the oven from wall, remove outer case, remove the unit mounting screw and hood intake duct R. (Refer to procedure of "Removal of Oven from Wall", "Outer case Removal" and "Unit Mounting Screw and Hood Intake Duct R Removal".)
2. Discharge the high voltage capacitor.
3. Disconnect wire leads from damper motor and damper switch.
4. Remove one (1) screw holding damper motor to damper motor angle and bend the tab holding damper switch to damper motor angle.
5. Damper motor and switch are free.

DOOR SENSING SWITCH, SECONDARY INTERLOCK SWITCH AND MONITOR SWITCH REMOVAL

1. Unplug the oven from power outlet and remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and "Outer case Removal")
 2. Remove the hood fan motor and the hood exhaust duct from the oven cavity, referring to the procedure of "HOOD FAN MOTOR, HOOD EXHAUST DUCT, OVEN LAMP SOCKET AND AH SENSOR REMOVAL".
 3. Remove the control panel assembly, referring to the procedure of "CONTROL PANEL ASSEMBLY, CONTROL UNIT AND KEY UNIT REMOVAL".
 4. Bend the tab of the oven cavity face plate which prevent the open lever from coming out.
 5. Remove the open lever from to the oven cavity.
 6. Remove the two (2) screws holding the latch hook to the oven cavity front flange.
 7. Remove the latch hook from the oven cavity front flange.
 8. Disconnect the wire reads of each switch.
 9. Remove each switch from the latch hook with pushing the one (1) stopper tub holding each switch.
 10. Now, each switch is free.
- Re-install**
1. Re-install open lever and each switch in its place. The secondary interlock switch in the lower position, door sensing switch is in the upper position and the monitor switch is in the middle position.
 2. Re-connect wire leads to each switch. Refer to pictorial

diagram.

- Secure the latch hook (with two (2) mounting screws) to oven cavity front flange.

- Make sure that the monitor switch is operating properly and check continuity of the monitor circuit. Refer to chapter "Test Procedure" and "Adjustment procedure".

DOOR SENSING SWITCH, SECONDARY INTERLOCK SWITCH AND MONITOR SWITCH ADJUSTMENT

If the door sensing switch, secondary interlock switch and monitor switch do not operate properly due to a misadjustment, the following adjustment should be made.

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

After adjustment, check the following.

- In and out play of door remains less than 0.5mm when in the latched position. First check upper position of latch hook, pushing and pulling upper portion of door toward the oven face. Then check lower portion of the latch hook, pushing and pulling lower portion of the door toward the oven face. Both results (play in the door) should be less than 0.5mm.

- The door sensing switch and secondary interlock switch interrupt the circuit before the door can be opened.
- Monitor switch contacts close when door is opened.
- Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

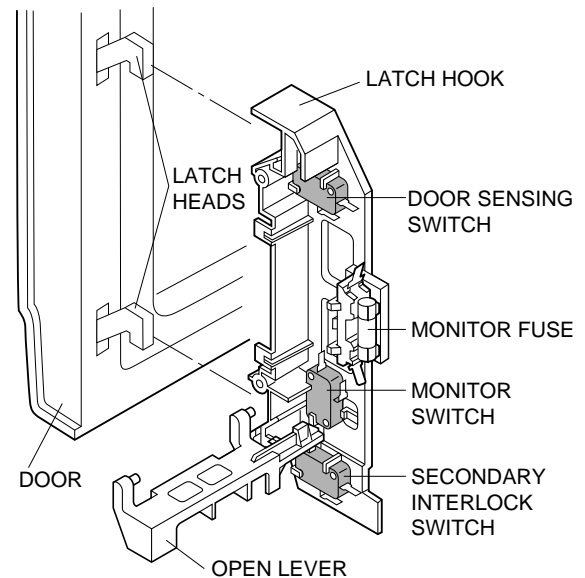


Figure C-1. Latch Switch Adjustments

DOOR REPLACEMENT

DOOR ASSEMBLY REMOVAL

- Unplug the oven from power outlet and remove the oven from wall and remove outer case. (Refer to procedure of "Removal of Oven from Wall" and "Outer case Removal")
- Remove one (1) screw holding the hood exhaust louver to the oven cavity with outer case cabinet, as shown in Figure C-2.
- Remove the hood exhaust louver from the oven cavity by pushing right and left tabs of the hood exhaust louver, as shown in Figure C-2.
- Remove the sash left from the oven cavity from face plate by lifting it up.
- Push the door open button and open the door slightly.
- Insert a putty knife (thickness of about 0.5mm) into the gap (A) between the door stopper and the choke cover as shown in Figure C-3 to free engaging parts.
- Lift up the door stopper.
- Now, the door stopper is free from the door assembly.
- Lift up the door assembly to release the upper and lower door hinge pins from the upper and lower oven hinges.
- Now, the door assembly is free.

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

DOOR ASSEMBLY RE-INSTALL

- On re-installing door, insert the lower oven hinge to lower door hinge pin.

- Insert the upper oven hinge to the upper door hinge pin.
- Shut the door (close the contacts of interlock switches).
- Make sure upper and lower oven hinges are inserted into the upper and lower door hinge pins.
- Make sure the door is parallel with oven face lines (left and upper side lines) and door latch heads pass through latch holes correctly.
- Re-install the door stopper to the door assembly.
- Re-install the sash left to the oven cavity front face plate.
- Re-install the hood exhaust louver to the oven cavity front face plate.

Note: After any service to the door;

- Make sure that door sensing switch and secondary interlock switch are operating properly. (Refer to chapter "Test Procedures".)
- An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.

After any servicing, make sure of the following :

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

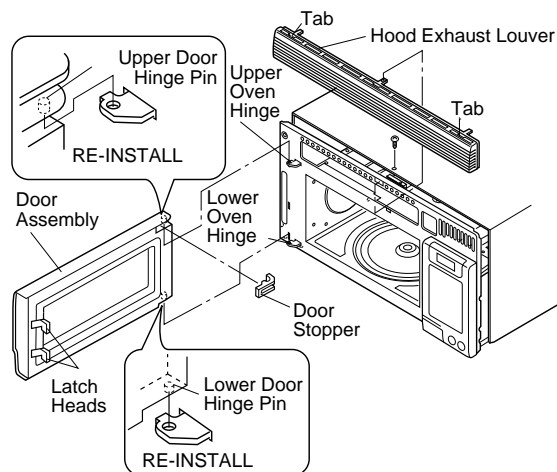


Figure C-2. Door Replacement and adjustment

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 17 places, do not force any particular part.

CHOKE COVER

2. Insert an putty knife (thickness of about 0.5mm) into the gap between the choke cover and door panel and between the choke cover and the door frame as shown Figure C-3 to free engaging parts.
3. Try the principles of the lever and lift up the choke cover by inserting a putty knife in order shown in Figure C-3.
4. Now choke cover is free from door panel and door frame.

DOOR FRAME

5. Remove six (6) screws holding the door panel to the door frame assembly.
6. Release the door frame assembly from the door panel.
7. Now, door frame assembly is free.

LATCH SPRING, LATCH HEAD AND DOOR PANEL

8. Release the latch spring from the tab of the latch head and tab of the door panel.
9. Release the latch head from the door panel.
10. Now, the latch spring, latch head and door panel are free.

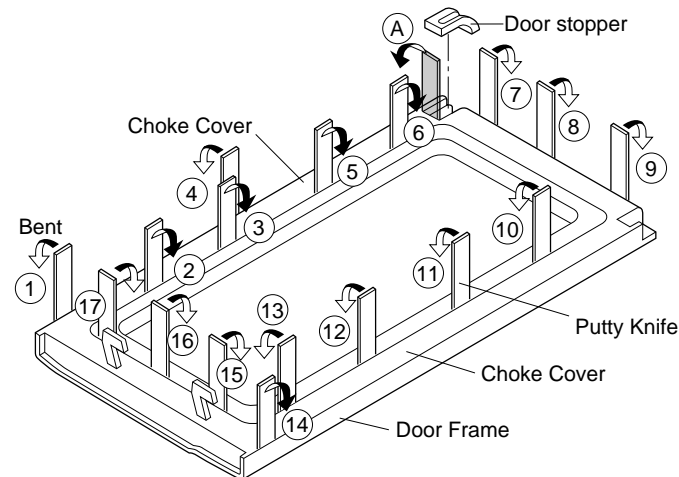


Figure C-3. Door Disassembly

DOOR GLASS FRONT

11. Remove the glass stopper from the door frame.
12. Release the door glass front from the long tab of the door frame.
13. Now, the door glass front is free.