

SHARP SERVICE MANUAL

S5902R210ATPH



COMMERCIAL MICROWAVE OVEN

MODELS R-1500AT R-2100AT

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

CONTENTS

CHAPTER 1. BEFORE SERVICING

CHAPTER 2. WARNING TO SERVICE PERSONNEL

CHAPTER 3. PRODUCT DESCRIPTION

CHAPTER 4. OPERATION

CHAPTER 5. TROUBLESHOOTING GUIDE

CHAPTER 6. TEST PROCEDURES

CHAPTER 7. TOUCH CONTROL PANEL ASSEMBLY

CHAPTER 8. PRECAUTIONS FOR USING LEAD-

FREE SOLDER

CHAPTER 9. COMPONENT REPLACEMENT AND
ADJUSTMENT PROCEDURE

CHAPTER 10. MICROWAVE MEASUREMENT

CHAPTER 11. TEST DATA AT A GLANCE

CHAPTER 12. CIRCUIT DIAGRAMS

Parts List

CONTENTS

CHAPTER 1. BEFORE SERVICING

- [1] GENERAL IMPORTANT INFORMATION 1-1
- [2] WARNING 1-1
- [3] CAUTION MICROWAVE RADIATION 1-2

CHAPTER 2. WARNING TO SERVICE PERSONNEL

CHAPTER 3. PRODUCT DESCRIPTION

- [1] SPECIFICATIONS 3-1
- [2] APPEARANCE VIEW 3-1
- [3] INSTALLATION INFORMATION 3-2

CHAPTER 4. OPERATION

- [1] DESCRIPTION OF OPERATING SEQUENCE 4-1
- [2] DESCRIPTION AND FUNCTION OF COMPONENTS 4-2

CHAPTER 5. TROUBLESHOOTING GUIDE

CHAPTER 6. TEST PROCEDURES

- [1] A: MAGNETRON TEST 6-1
- [2] B: POWER TRANSFORMER TEST 6-2
- [3] C: HIGH VOLTAGE RECTIFIER (1) AND/OR (2) TEST 6-2
- [4] D: HIGH VOLTAGE CAPACITOR (C1) AND/OR (C2) TEST 6-3
- [5] E: SECONDARY INTERLOCK SWITCH (SW1) AND/OR (SW2) TEST 6-3
- [6] F: PRIMARY INTERLOCK SYSTEM TEST 6-3
- [7] G: MONITOR SWITCH (SW3) AND/OR (SW4) TEST 6-3
- [8] H: FUSE F8 TEST 6-4
- [9] I: WEAK POINT (FOR FAN MOTOR OR EXHAUST FAN) TEST 6-4
- [10] J: WEAK POINT (IN NOISE FILTER) TEST 6-4
- [11] K: TEMPERATURE FUSE TEST 6-4
- [12] L: MAGNETRON THERMISTOR TEST 6-4
- [13] M: EXHAUST THERMISTOR TEST 6-4
- [14] N: NOISE FILTER TEST 6-5
- [15] O: KEY UNIT TEST 6-5
- [16] P: CONTROL UNIT TEST 6-5
- [17] Q: POWER UNIT TEST 6-6
- [18] R: RELAY UNIT TEST 6-6
- [19] S: ANTENNA SENSOR TEST 6-7
- [20] T: MICROWAVE SENSOR TEST 6-7

CHAPTER 7. TOUCH CONTROL PANEL ASSEMBLY

- [1] SPECIAL FUNCTION FOR SERVICING... 7-1
- [2] SERVICING FOR PRINTED WIRING BOARDS 7-7

CHAPTER 8. PRECAUTIONS FOR USING LEAD-FREE SOLDER

CHAPTER 9. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

- [1] WARNINGS 9-1
- [2] OUTER CASE AND REAR COVER REMOVAL 9-1
- [3] POWER TRANSFORMERS (1) AND/OR (2) REMOVAL 9-2
- [4] MAGNETRONS (1) AND/OR (2) REMOVAL 9-2
- [5] MAGNETRON THERMISTOR ASSEMBLY REPLACEMENT 9-2
- [6] HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY REMOVAL 9-2
- [7] POWER SUPPLY CORD REPLACEMENT 9-3
- [8] HOW TO RELEASE THE POSITIVE LOCK CONNECTOR. 9-3
- [9] EXHAUST FAN REMOVAL 9-3
- [10] FAN MOTORS REMOVAL 9-4
- [11] ANTENNA MOTORS (UPPER AND LOWER) REMOVAL 9-4
- [12] POWER UNIT REMOVAL 9-4
- [13] CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL 9-4
- [14] RELAY UNIT REMOVAL 9-4
- [15] DOOR SENSING SWITCH (SW5)/SECONDARY INTERLOCK SWITCHES (SW1, SW2) AND MONITOR SWITCHES (SW3, SW4) REPLACEMENT 9-5
- [16] DOOR SENSING SWITCH (SW5)/SECONDARY INTERLOCK SWITCHES (SW1, SW2) AND MONITOR SWITCHES (SW3, SW4) ADJUSTMENT 9-5
- [17] DOOR REPLACEMENT 9-5
- [18] DOOR DISASSEMBLY 9-6
- [19] OVEN LAMP AND LAMP SOCKET REMOVAL 9-8

CHAPTER 10. MICROWAVE MEASUREMENT

CHAPTER 11. TEST DATA AT A GLANCE

CHAPTER 12. CIRCUIT DIAGRAMS

- [1] Oven Schematic 12-1
- [2] Figure S-1. Pictorial Diagram 12-3
- [3] Figure S-2. Switching Power Supply Unit Circuit 12-6
- [4] Figure S-3. Relay Unit Circuit 12-7
- [5] Figure S-4. Control Unit/ Antenna sensor/ Microwave Sensor Circuit 12-8
- [6] Figure S-5. Printed Wiring Board 12-9

Parts List

CHAPTER 1. BEFORE SERVICING

[1] GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT

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

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

[2] WARNING

- Note: The parts marked "△" are used at voltage more than 250V. (Parts List)
 Anm: Delar märket med "△" har en spänning överstigande 250V.
 Huom: Huolto-ohjeeseen merkitty "△" osat joissa jännite on yli 250 V.
 Bemerk: Deler som er merket "△" er utsatt for spenninger over 250V til jord.
 Bemærk: Dele mærket med "△" benyttes med højere spænding end 250 volt.

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.

Removal of the outer wrap gives access to potentials above 250V.

All the parts marked "*" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

[3] CAUTION MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured.

Never operate the device without a microwave energy absorbing load attached.

Never look into an open waveguide or antenna while the device is energized.

VARNING MICKROVAGSSTRÅLING

Personal får inte utsättas för mikrovågsenergi som kan utstråla från magnetronen eller andre mikrovågsalstrande anordningar om dessa är felanslutna eller används på fel sätt. Alla in-och utgångsanslutningar för mikrovågor, vågledare, flänsar och packningar måste vara fast anslutna.

Mikrovågsgeneratoren får inte arbeta utan att absorberande belastning är ansluten. Titta aldrig in i en öppen vågledare eller antenn när mikrovågsgeneratoren är påkopplad eller laddad.

VAROITUS MIKROAALTOSÄTELYÄ

Käyttäjää ei saa joutua alltiiksi mikroaaltoenergialle, jota voi säteillä magnetronista tai muusta mikroaaltoja kehittävästä laitteesta, jos sitä käytetään tai jos se kytketään väärin. Kaikkien mikroaaltoliitännöiden sekä syöttö-että ulostulopuolella, aaltoputkien laippojen ja tiivisteiden tulee olla varmistettuja.

Mikroaaltouunnia ei koskaan saa käyttää ilman kuormaa jossa mikroaaltoenergiaa kuluu. Avoimeen aaltoputkeen tai antenniin ei koskaan saa katsoa virran ollessa kytkettyinä.

ADVARSEL MIKROBØLGESTRÅLING

Personell må ikke utsettes for mikrobølge-energi som kan utståles fra magnetronen eller andre mikrobølge-generende deler dersom apparatet feilbetjenes eller blir feiltilkoplet. Alle inn-og ut-tilkoplinger i forbindelse med mikrobølge-strålingen, bølgeledere, flenser og tetningsringer/pakninger må festes ordentlig.

Aldri bruk apparatet med mindre en mikrobølge-absorberende last er plassert i ovnsrommet.

Aldri se direkte inn i en åpen bølgeleder eller antenne imens apparatet er strømførende

ADVARSEL MIKROBØLGEBESTRÅLING

Man bør ikke udsætte sig for mikrobølgebestråling fra magnetronen eller andre mikrobølgefrembringende anordninger, hvilket kan ske hvis apparatet er forkert tilsluttet eller bruges forkert. Alle mikrobølgeindgange og-udgange, bølgeledere, flanger og tætningsstrimler må være forsvarligt udført.

Anvend aldrig ovnen uden en mikrobølgesabsorberende anordning. Se aldrig ind i en åben bølgeleder eller antenne, mens ovnen er i brug.

CHAPTER 2. WARNING TO SERVICE PERSONNEL

- (GB)** Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts will result in electrocution.
High voltage capacitor, High voltage transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

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 high voltage 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 high voltage transformer.

REMEMBER TO CHECK 4R

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

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

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

- (NL)** Magnetronovens bevatten circuits die een zeer hoge spanning en stroom kunnen voortbrengen. Contact met de volgende onderdelen kan elektrocutie tot gevolg hebben.
Hoogspanningscondensator, hoogspanningstransformator, magnetron, hoogspanningsgelijkrichter, hoogspanningskabelboom.

VERGEET DE VOLGENDE 3 STAPPEN NIET

- 1) Haal de stekker uit het stopcontact.
- 2) Open de deur en zorg ervoor dat hij niet dicht kan vallen.
- 3) Ontlaad de hoogspanningscondensator.

PAS OP VOOR DE ELECTRISCHE LADING VAN DE HOOGSPANNINGSCONDENSATOR

De hoogspanningscondensator blijft nog ongeveer 60 seconden lang opgeladen, nadat de oven is uitgeschakeld. Wacht 60 seconden voordat u de verbinding van de hoogspannings-condensator (m.a.w. de verbindingsdraad van de hoogspanningsgelijkrichter) met een geïsoleerde schroevendraaier kortsluit tegen het chassis.

Sharp beveelt ten sterkste aan dat, voor zover mogelijk, defecten worden opgespoord wanneer de stekker uit het stopcontact is gehaald. Soms is het nodig om de stroomtoevoer weer tot stand te brengen nadat de buitenmantel verwijderd is. Herhaal dan de bovengenoemde 3 stappen en haal de elektrische draden uit de primaire zijde van de vermogenstransformator. Zorg ervoor dat deze draden geïsoleerd blijven van andere elementen en van het chassis van de oven. (Gebruik zo nodig isolatieband.) Wanneer de test is uitgevoerd, herhaalt u de bovenstaande 3 stappen en verbindt u de elektrische draden weer aan de primaire zijde van de vermogenstransformator.

VERGEET DE VOLGENDE 4 STAPPEN NIET

- 1) Sluit de draden weer aan die zijn losgehaald voor de test.
- 2) Plaats de buitenmantel weer om het toestel heen (kabinet).
- 3) Stop de stekker weer in het stopcontact.
- 4) Zet de oven aan. Controleer alle functies.

Magnetronovens mogen niet leeg aangezet worden. Om te controleren of er microgolff-energie binnen de oven wordt geproduceerd, plaatst u een mok met koud water op de draaitafel van de oven, sluit de deur, zet de oven op HIGH en stelt de klok van de magnetron in op twee (2) minuten. Wanneer de twee minuten voorbij zijn (klok staat op nul), controleert u voorzichtig of het water heet is. Indien het water nog steeds koud is, herhaalt u de allereerste drie stappen en controleer nogmaals de aansluitingen naar de geteste onderdelen.

Wanneer alle reparaties zijn uitgevoerd en de oven weer in elkaar is gezet, moet de het magnetronvermogen worden gecontroleerd en moet worden gecontroleerd of er geen microgolfflekage is.

- (E) Los hornos de microondas contienen circuitos eléctricos capaces de producir voltajes de alta tensión y descargas eléctricas. Para evitar el riesgo de electrocución, absténgase de tocar los siguientes componentes: condensador de alta tensión, transformador de alta tensión, magnetron, dispositivo del rectificador de alta tensión y arnés de alta tensión.

RECUERDE LA COMPROBACION 3D

- 1) Desconecte la alimentación.
- 2) Deje la puerta abierta y calzada.
- 3) Descargue el condensador de alto voltaje.

ADVERTENCIA SOBRE LA CARGA DEL CONDENSADOR DE ALTOVOLTAJE

El condensador de alto voltaje permanece cargado unos 60 segundos después de haber apagado el horno. Espere 60 segundos y luego ponga en cortocircuito la conexión del condensador de alto voltaje (esto es, del conductor de conexión del rectificador de alto voltaje) al chasis con un destornillador de mango aislado.

Se recomienda encarecidamente que siempre que sea posible la localización de fallos se realice con la alimentación desconectada. Puede ser que en algunos casos sea necesario conectar la alimentación después de haber retirado la carcasa exterior. En este caso, realice las comprobaciones 3D y luego desconecte los conductores del primario del transformador de alimentación. Asegúrese de que estos conductores permanezcan aislados de otros componentes y del chasis del horno. (Use cinta aislante si es necesario). Cuando termine la prueba efectúe las comprobaciones 3D y reconecte los conductores al primario del transformador de alimentación.

RECUERDE LA COMPROBACION 4C

- 1) Conecte todos los componentes desconectados de los componentes durante la prueba.
- 2) Coloque la carcasa exterior (cabina).
- 3) Conecte la alimentación.
- 4) Compruebe todas sus funciones después de poner en marcha el horno.

Los hornos de microondas no deben funcionar vacíos. Para comprobar la presencia de energía de microondas dentro de una cavidad, coloque una taza de agua fría en el plato giratorio del horno, cierre la puerta y ponga la potencia en HIGH (alta) y coloque el temporizador en dos (2) minutos. Cuando transcurran los dos minutos (temporizador a cero) compruebe cuidadosamente que el agua se ha calentado. Si el agua permaneciese fría, efectúe las comprobaciones 3D y vuelva a examinar las conexiones de los componentes que han sido probados.

Cuando haya terminado la intervención en el equipo y el horno haya sido ensamblado de nuevo completamente, deberá comprobar la potencia de salida de microondas y realizar una prueba de fugas de microondas.

- (SV) Mikrovågsugnar innehåller kretsar som producerar mycket höga spänningar och strömmar. Kontakt med följande komponenter kan leda till dödsfall: Högsämningskondensator, transformator, magnetron, högsämnings likriktare, högsämnings kablage.

KOM IHÅG ATT KONTROLLERA 3 STEG

- 1) Koppla från strömkällan.
- 2) Öppna dörren på glänt.
- 3) Ladda ur högsämningskondensatorn.

VARNING FÖR LADDNINGEN I HÖGSPÄNNINGSKONDENSATORN

Högsämningskondensatorn är laddad i 60 sekunder efter det att ugnen stängts av. Vänta 60 sekunder och korislut sedan kondensators anslutning (dvs anslutningen till högsämningslikriktaren) till chassiet med hjälp av en isolerad skruvmejsel.

Sharp rekommenderar att felsökning sker med strömmen fränkopplad. Ibland kan det vara nödvändigt att koppla på strömmen efter det att höljet avlägsnats, utför da 3 Steg kontrollen och koppla sedan från ledarna till transformatorns primärsida. Se till att ledarna är isolerade från andra komponenter och chassiet. (Använd isoleringsband om det behövs). När Du testat färdigt utför Du 3 Steg kontrollen och ansluter ledningarna till transformatorns primärsida igen.

KOM IHÅG ATT KONTROLLERA 4 STEG

- 1) Anslut alla ledningar som använts vid testning
- 2) Sätt tillbaka ytterhöljet.
- 3) Anslut strömkällan på nytt.
- 4) Sätt på ugnen. Kontrollera alla funktioner.

Mikrovågsugnar får inte användas tomma. Kontrollera mikrovågsstrålningen i olika delar av ugnen genom att placera en kopp med kallt vatten på ugnens tallrik, stäng dörren, ställ in HIGH och ställ in 2 minuter på timern. När två minuter har gått (timern visar 0) kontrollerar du om vattnet är varmt. Om vattnet fortfarande är kallt utför Du 3 steg kontroller och kontrollerar anslutningarna till varje enskild komponent på nytt.

När all service är klar och ugnen ihopskruvad skall ugnens uteffekt och eventuellt mikrovågsläckage kontrolleras.

- I** I forni a microonde contengono un circuito elettrico in grado di generare tensioni e correnti estremamente elevate. L'eventuale contatto con i seguenti componenti può causare la folgorazione: condensatore ad alta tensione; trasformatore ad alta tensione; magnetron; rettificatore alta tensione; cablaggio ad alta tensione.

TRE OPERAZIONI IMPORTANTI PER INCOMINCIARE

- 1) Scollegare l'alimentazione elettrica.
- 2) Verificare che la porta sia bloccata in posizione aperta.
- 3) Scaricare il condensatore ad alta tensione.

ATTENZIONE AL CONDENSATORE AD ALTA TENSIONE: PUO ESSERE CARICO

Il condensatore ad alta tensione rimane carico per circa 60 secondi dopo lo spegnimento del forno. Occorre quindi aspettare 60 secondi prima di cortocircuitare, utilizzando un cacciavite con impugnatura isolata, il collegamento del condensatore ad alta tensione (cioè del conduttore di collegamento del raddrizzatore ad alta tensione) sul telaio del forno.

Sharp raccomanda, nei limiti del possibile, che la ricerca dei guasti avvenga in assenza di alimentazione elettrica. In alcuni casi tuttavia, può essere necessario alimentare l'apparecchio dopo aver rimosso la scatola esterna. In questo caso eseguire i tre controlli sopra citati e quindi scollegare i connettori dal primario del trasformatore. Assicurarsi che tali connettori non vengano a contatto con altri componenti, né con il telaio del forno (fare uso, se necessario, di nastro isolante). Al termine dell'intervento, eseguire nuovamente i tre controlli e ricollegare i conduttori al primario del trasformatore.

QUATTRO VERIFICHE IMPORTANTI DA NON DIMENTICARE

- 1) Ricollegare tutti i conduttori staccati dai vari componenti durante l'intervento.
- 2) Rimontare la scatola esterna.
- 3) Ripristinare l'alimentazione elettrica.
- 4) Rimettere in funzione il forno. Controllare tutte le funzioni.

I forni a microonde non devono mai funzionare a vuoto. Per verificare la presenza di energia da microonde all'interno di una cavità, mettere una tazza di acqua fredda sul piatto rotante del forno, chiudere la porta, regolare la potenza su HIGH ed impostare il temporizzatore su due (2) minuti. Trascorsi i due minuti (temporizzatore a zero), controllare accuratamente che ora l'acqua sia calda. Se l'acqua è rimasta fredda, eseguire i tre controlli iniziali e verificare nuovamente i collegamenti del componente in questione.

Dopo aver portato a termine le operazioni di manutenzione e rimontato il forno, è necessario controllare la potenza delle microonde emesse ed eseguire un test per verificare che non vi sia alcuna dispersione.

CHAPTER 3. PRODUCT DESCRIPTION

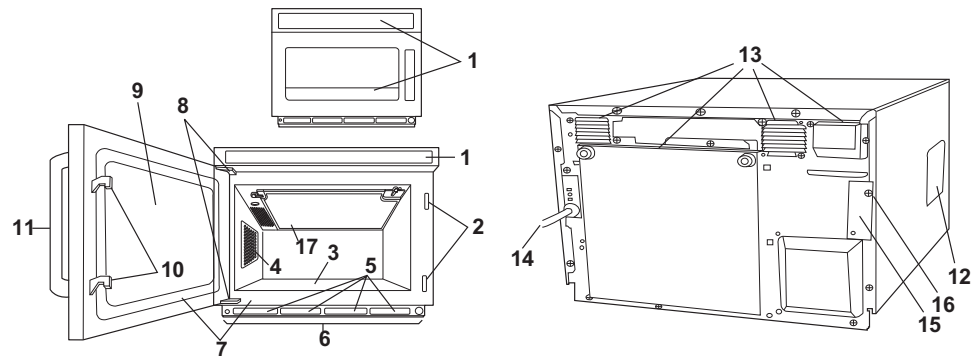
[1] SPECIFICATIONS

| ITEM | DESCRIPTION | |
|---------------------------|---|---|
| Power Requirements | Single phase 230V, 50Hz, 3 wire earthed | |
| Power Consumption | R-1500AT | 2.3kW |
| | R-2100AT | 3.0kW |
| Power Output | R-1500AT | 1500W Operating frequency 2450 MHz (IEC60705) |
| | R-2100AT | 2100W Operating frequency 2450 MHz (IEC60705) |
| Outside Dimensions | 445mm (W) x 573mm (D) x 346mm (H) (including feet) | |
| Cooking Cavity Dimensions | 356mm (W) x 326mm (D) x 177mm (H) | |
| Control Complement | Touch Control System Digital Display Ten number Pads STOP/CLEAR pad CUSTOM SETTING pad START pad POWER LEVEL pad (Power level: 0 to 100%) MANUAL/ REPEAT pad DOUBLE/ TRIPLE QUANTITY pad EXPRESS DEFROST pad SET MEMORY pad | |
| Weight | Approx. 33.5 kg | |

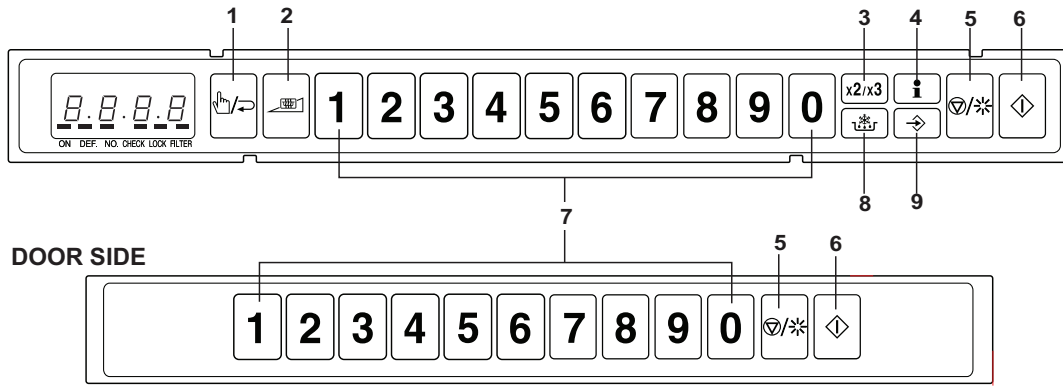
[2] APPEARANCE VIEW

1. OVEN

1. Touch control panels
2. Door latch openings
3. Ceramic shelf
4. Oven lamp
5. Air intake openings
6. Air intake filter
7. Door seals and sealing surfaces
8. Door hinges
9. Oven door with see-through window
10. Door latches
11. Door handle
12. Service window for replacing the oven light bulb
13. Ventilation openings
14. Power supply cord
15. Mounting plate
16. Screw for mounting plate
17. Splash cover



2. TOUCH CONTROL PANEL



- | | | |
|-------------------------------|-----------------------|------------------------|
| 1. MANUAL/REPEAT pad | 4. CUSTOM SETTING pad | 7. Ten number pads |
| 2. POWER LEVEL pad | 5. STOP/CLEAR pad | 8. EXPRESS DEFROST pad |
| 3. DOUBLE/TRIPLE QUANTITY pad | 6. START pad | 9. SET MEMORY pad |

[3] INSTALLATION INFORMATION

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

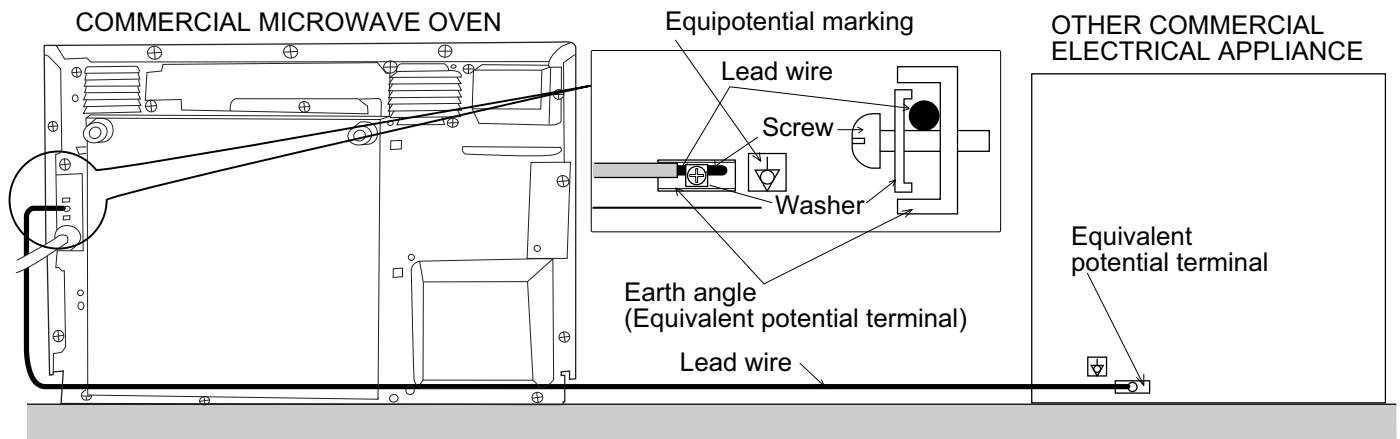


Figure A-1

CHAPTER 4. OPERATION

[1] DESCRIPTION OF OPERATING SEQUENCE

The following is a description of component functions during oven operation.

1. OFF CONDITION

1. When the oven is plugged in with the door closed, the line voltage is supplied to the noise filter. And the display shows nothing.

(Refer to Figure O-1(a))

2. When the door is opened with plugged in, the contacts (COM-NC) of the secondary interlock switch (1) SW1 are closed. And the line voltage is supplied to the switching power supply unit (power unit), the oven lamp and antenna motors. Then the switching power supply unit supplies D.C. voltage (approx.24V) to the relay unit. And the contacts of the relay RY-4 on the relay unit are closed. The display shows "0".

(Refer to Figure O-1(b))

3. When the door is closed, the contacts (COM-NC) of the secondary interlock switch SW1 are opened. Because the contacts of the relay RY-4 has been closed, the line voltage is kept supplying to the switching power supply unit, oven lamp and antenna motors. And the switching power supply unit keeps supplying D.C. voltage to the relay unit. The display shows "0".

(Refer to Figure o-1(c))

NOTE: The contacts of the relay RY-4 will open if the oven is not operated for 3 minutes or more. And the oven condition will go back to one of Figure O-1(a).

2. COOKING CONDITION

(For details, refer to Figure O-2)

Press MANUAL/ REPEAT pad. Enter cooking time by pressing the number pads. Press the POWER LEVEL pad. Enter power level by pressing the number pad. When the START pad is pressed, the following operations occur:

1. The contacts of relays are closed. And the oven lamp and the antenna motors connected to the relays are turned on (For details, refer to Figure O-2).
2. D.C. voltage is supplied to the fan motors, exhaust fan and exhaust motor from the control unit.
3. Rated voltage is supplied to the primary winding of the power transformer and is converted to about 3.00 volts output on the filament winding, and approximately 2320 volts on the high voltage winding.
4. The filament winding voltage heats the magnetron filament and the H.V. winding voltage is sent to a voltage doubler circuit.
5. The microwave energy produced by the magnetron is channelled through the waveguide into the cavity feed-box, and then into the cavity where the food is placed to be cooked.
6. Upon completion of the cooking time, the oven will revert to the OFF condition. The fan motors, exhaust fan and the exhaust motor will operate at least for 1 minute. Because the contacts of RY4 have been closed. And also the oven lamp and antenna motors will operated at the same time.
7. When the door is opened during a cook cycle, monitor switches SW3 & SW4, door sensing switch SW5, secondary interlock switches SW1, SW2 and primary interlock relay RY1 are activated with the following results. The circuits to the high voltage components are de-energized.

8. The monitor switch SW3 is electrically monitoring the operation of the secondary interlock switch SW1 and primary interlock relay RY1, and monitor switch SW4 is electrically monitoring the operation of the secondary interlock switch SW2 and primary interlock relay RY1, and monitor switches SW3, SW4 are mechanically associated with the door so that it will function in the following sequence.

- 1) When the door opens from a closed position, the contacts of the primary interlock relay RY1 and the contacts (COM-NO) of secondary interlock switches SW1, SW2 open. Then the monitor switches SW3, SW4 contacts close.
- 2) (When the door is closed from the open position, the monitor switches SW3, SW4 contacts first open, and then the contacts (COM-NO) of the secondary interlock switches SW1, SW2 close.

If the secondary interlock switches SW1, SW2 and primary interlock relay RY1 fail with their contacts closed when the door is opened, the closing of the monitor switches SW3, SW4 contacts will form a short circuit through the secondary interlock switches SW1, SW2 and primary interlock relay RY1, causing the fuse F8 to blow.

3. VARIABLE POWER COOKING

When Variable Cooking Power is programmed, the rated voltage A.C. is supplied to the power transformer intermittently through the contacts of relay (RY-2, RY-3). Relays RY-2 and RY-3 are operated by the control unit within an interval 54 second time base. Microwave power operation is as follows:

| VARI-MODE | ON TIME | OFF TIME |
|-----------|---------|----------|
| 100% | 54 sec. | 0 sec. |
| 90% | 49 sec. | 5 sec. |
| 80% | 45 sec. | 9 sec. |
| 70% | 40 sec. | 14 sec. |
| 60% | 36 sec. | 18 sec. |
| 50% | 29 sec. | 25 sec. |
| 40% | 24 sec. | 30 sec. |
| 30% | 18 sec. | 36 sec. |
| 20% | 13 sec. | 41 sec. |
| 10% | 9 sec. | 45 sec. |
| 0% | 0 sec. | 54 sec. |

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

4. TWO MAGNETRON OPERATION SYSTEM

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

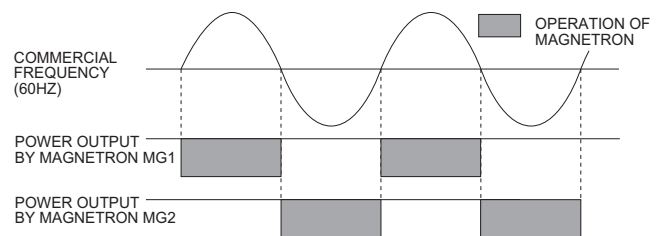


Figure B-1. Operation of Magnetron

[2] DESCRIPTION AND FUNCTION OF COMPONENTS

1. DOOR OPEN MECHANISM

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

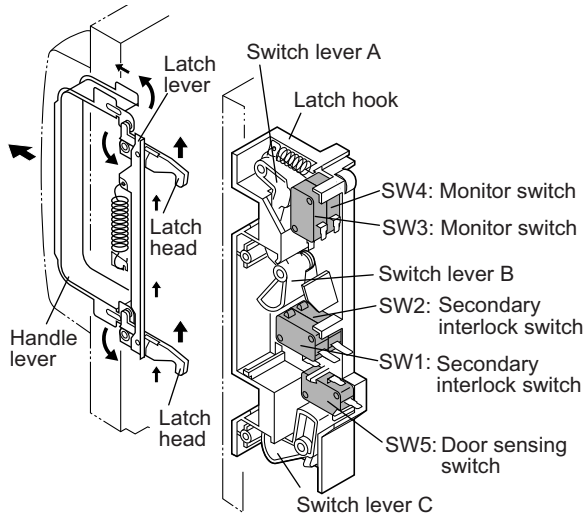


Figure D-1. Door Open Mechanism

2. DOOR SENSING SWITCH: SW5

The door sensing switch is activated by the latch head of the door and switch lever C. When the door is opened, the contacts of the switch open and interrupt the circuit to the coils of the primary interlock relay. The contacts of the primary relay then open and interrupt the circuit to the primary winding of the power transformers T1, T2.

3. SECONDARY INTERLOCK SWITCHES: SW1, SW2

The secondary interlock switches SW1, SW2 are activated by the upper latch head of the door and switch lever B. When the door is opened, the contacts (COM-NO) of the switch open and interrupt the circuit to the primary winding of the power transformers T1, T2. When the door is opened, the contacts (COM-NC) of the switch SW1 close and the line voltage is supplied to the switching power supply unit. At the same time, the contacts of relay RY4 are closed.

4. MONITOR SWITCHES: SW3, SW4

The monitor switches SW3, SW4 are mounted in the upper position of the latch hook. The monitor switches are activated by the upper latch head of the door and switch lever A. When the door is opened, the contacts of the monitor switches close. Monitor switch SW3 is intended to render the oven inoperative by means of blowing the weak point (F1), when the contacts of the primary interlock relay and secondary interlock switch SW1 fail to open when the door is opened. Monitor switch SW4 is intended to render the oven inoperative by means of blowing the weak point (F2), when the contacts of the primary interlock relay and secondary interlock switch SW2 fail to open when the door is opened.

Functions:

With the door shut, the contacts of the door sensing switch SW5 and the secondary interlock switches SW1, SW2 are closed and the contacts of the monitor switches SW3, SW4 are open.

1. When the door is opened, the contact of the door sensing switch SW5 and secondary interlock switches SW1, SW2 are opened first, then the contact of the monitor switches SW3, SW4 are closed.

2. As the door goes to a closed position, the contacts of the monitor switches SW3, SW4 are opened first, then the contacts of the door sensing switch SW5 and the secondary interlock switches SW1, SW2 close.
3. If the door is opened, and the contacts of the primary interlock relay RY1 and secondary interlock switch of the same circuit fail to open, the weak point blows simultaneously with closing of the monitor switch contacts of that circuit.

CAUTION: BEFORE REPLACING A BLOWN FUSES F8 (F1, F2) TEST THE DOOR SENSING SWITCH SW5, PRIMARY INTERLOCK RELAY RY1, SECONDARY INTERLOCK SWITCHES SW1, SW2, DOOR SENSING SWITCH SW5 AND MONITOR SWITCHES SW3, SW4 FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE").

5. WEAK POINT: F1, F2

1. The weak point blows when the contacts (COM-NO) of the primary interlock relay (RY1) and secondary interlock switch SW1 or SW2 remain closed with the oven door open and when the monitor switch (SW3 or SW4) closes.
2. If the wire harness or electrical components are short-circuited, this weak point (F1, F2) blows to prevent an electric shock or fire hazard.
3. The weak point also blows when the asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of power transformer is shorted.

6. MAGNETRON TEMPERATURE FUSES: TF1, TF2

The temperature fuses TF1, TF2 located on the top of the upper and lower waveguide, are designed to prevent damage to the magnetrons MG1, MG2. If an over heated condition develops in the tube due to blower motor failure, obstructed air ducts, dirty or blocked air intake, etc., the circuit to the magnetrons are interrupted. Under normal operation, the temperature fuses remains closed. However, when abnormally high temperatures are generated within the magnetron, the temperature fuse will open at 302°F (150°C) causing the microwave energy to stop. The defective temperature fuse must be replaced with new rated one.

7. OVEN TEMPERATURE FUSE: TF3

The temperature fuse, located on the side of the exhaust duct assembly, is designed to prevent damage to the oven by fire. If the food load is overcooked, by either error in cook time or defect in the control unit, the temperature fuse will open. Under normal operation, the oven temperature fuse remains closed. However, when abnormally high temperatures are generated within the oven cavity, the oven temperature fuse will open at 248°F (120°C), causing the oven to shut down. The defective temperature fuse must be replaced with new rated one.

8. EXHAUST THERMISTOR

The exhaust thermistor is located on the side of the exhaust duct assembly. The temperature in the exhaust duct is detected through the resistance of the thermistor. If the temperature is high, the control panel will display "EE7" and the oven will stop to avoid overheating and catching fire. If the thermistor is open, the control panel will display "EE8" and the oven will stop.

9. MAGNETRON THERMISTOR: TH

The thermistor is a negative temperature coefficient type. The air temperature around the upper and lower magnetrons is detected through the resistance of the thermistor. If the temperature is high, the control panel will display "EE7" and the oven will stop to protect the magnetrons against overheat. If the magnetron thermistor is open, the control panel will display "EE8" and the oven will stop.

10. FAN MOTORS: FM

The fan motors drive blades which draw external cool air into the oven. This cool air is directed through the air vanes surrounding the magnetrons and cools the magnetrons. This air is channelled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity. During cooking, they operate. After cooking, the fan motors will operate at least for 1 minute and the maximum operating time is 4 minutes. When the temperature of the magnetron thermistor becomes bellow 110°C, the fan motors will stop.

These two (2) fan motors are D.C. motors.

11. EXHAUST MOTOR: EM

The exhaust motor is located on the side of the exhaust duct assembly. This motor drives a blade in the exhaust duct assembly. The driven blade draws the external cool air into the oven from the intake duct assembly. Then it sends the air out of the oven through the exhaust duct assembly. During cooking, the exhaust motor operates. After cooking, it will operate at least for 1 minute and the maximum operating time is 4 minutes. When the temperature of the exhaust thermistor becomes bellow 65°C, the exhaust motor will stop. This motor is D.C. motor.

NOTE: Do not disconnect the power supply from the exhaust motor when it is turned on. Or it may be out of order.

12. ANTENNA MOTORS: AM

The upper and lower antenna motors drive antennas to radiate the microwave.

13. EXHAUST FAN: EF

The exhaust fan is located to the rear cover. It sends the air (which is at the top of the oven cavity) out of the oven. This motor is D.C. motor.

14. ANTENNA SENSOR

The antenna sensors are located to the top and bottom of the oven cavity. And they watch if the antennas are rotating or not.

15. MIROWAVE SENSOR

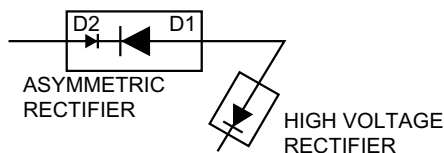
The microwave sensor is located on the top of the oven cavity. And it watch if the microwave is radiated into the oven cavity or not.

16. WEAK POINT (IN THE NOISE FILTER)

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

17. H.V. ASYMMETRIC RECTIFIER (1) (2)

The H.V.asymmetric rectifiers (1) (2) are solid state devices that prevent current flow is both directions. And they prevent the temperature rise of the power transformers (1) (2) by blowing the fuses weak point F1, F2 when the high voltage rectifiers (1) (2) are 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 the blowing the weak point.)



NOTE: The H.V.asymmetric rectifier is assembled with the high voltage rectifier actually.

1. The high voltage rectifier is shorted by some fault when microwave cooking or dual 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 8A flow through the primary winding of the power transformer.
6. The fuse 8A blows by the large electric currents.
7. The power supplying to the power transformer is cut off.

18. OVEN LAMP: OL

The oven cavity light illuminates the interior of the oven so that food being cooked can be examined visually through the door window without having to open the door.

19. NOISE FILTER

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

CHAPTER 5. TROUBLESHOOTING GUIDE

Never touch any part in the circuit with your hand or an uninsulated tool while the power supply is connected.

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 weak point F1 (or F2), check the monitor switches SW3 (or SW4), primary interlock relay RY1, door sensing switch SW5 and secondary interlock switch SW1 (or SW2), before replacing the weak point F1 (or F2).

| TEST PROCEDURE | A | B | C | D | E | F | F | G | J | K | K | O | Q | R | P | |
|--|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| <p>POSSIBLE CAUSE AND DEFECTIVE PARTS</p> | MAGNETRON MG1, MG2 | | | | | | | | ● | | | | | | | |
| | POWER TRANSFORMER T1, T2 | | | | | | | | | | | | | | | |
| | H.V. RECTIFIER ASSEMBLY (1), (2) | | | | | | | | | | | | | | | |
| | HIGH VOLTAGE CAPACITOR C1, C2 | | | | | | | | | | | | | | | |
| | SECONDARY INTERLOCK SWITCH SW1, SW2 | | | | | | | | | | | | | | | |
| | PRIMARY INTERLOCK SYSTEM | | | | | | | | | | | | | | | |
| | DOOR SENSING SWITCH SW5 | | | | | | | | | | | | | | | |
| | MONITOR SWITCH SW3, SW4 | | | | | | | | | | | | | | | |
| | WEAK POINT (in Noise filter) | | | | | | | | | | | | | | | |
| | MAGNETRON TEMP. FUSE TF1, TF2 | | | | | | | | | | | | | | | |
| | OVEN TEMPERATURE FUSE TF3 | | | | | | | | | | | | | | | |
| | OVEN LAMP OR SOCKET | | | | | | | | | | | | | | | |
| | FAN MOTORS FM | | | | | | | | | | | | | | | |
| | EXHAUST FAN EF | | | | | | | | | | | | | | | |
| | EXHAUST MOTOR EM | | | | | | | | | | | | | | | |
| FUSE F8, F1, F2 | | | | | | | | | | | | | | | | |
| WEAK POINTS (for Fan motors) | | | | | | | | | | | | | | | | |
| WEAK POINT (for Exhaust fan motor) | | | | | | | | | | | | | | | | |
| EXHAUST THERMISTOR | | | | | | | | | | | | | | | | |
| MAGNETRON THERMISTOR TH | | | | | | | | | | | | | | | | |
| NOISE FILTER | | | | | | | | | | | | | | | | |
| KEY UNITS | | | | | | | | | | | | | | | | |
| POWER UNIT | | | | | | | | | | | | | | | | |
| RELAY UNIT | | | | | | | | | | | | | | | | |
| CONTROL UNIT | | | | | | | | | | | | | | | | |
| SWITCH UNIT | | | | | | | | | | | | | | | | |
| AIR FLOW BLOCKED | | | | | | | | | | | | | | | | |
| LOOSE WIRING | | | | | | | | | | | | | | | | |
| SHORT IN POWER SUPPLY CORD | | | | | | | | | | | | | | | | |
| NO POWER AT OUTLET | | | | | | | | | | | | | | | | |
| LOW POWER SUPPLY VOLTAGE | | | | | | | | | | | | | | | | |

SPECIFICATION OF ERROR

| Outline | Operation when error occurs | Display in operation usually |
|---|-----------------------------|------------------------------|
| When a basic performance and the function are ruined | Displaying and heating stop | EE0, EE1, EE2, EE3, EE8 |
| When the dangers of the state of the high temperature and the ignition, etc. are foreseen | Displaying and heating stop | EE7 |
| When you mistake the setting of the heating time | Operation stop | EE9 |
| When neither the power supply nor the environmental condition are proper | Operation stop | EE4, EE5, EE6 |
| When informing of the exchange time of parts | Display Only | CC1, CC2, CC3, CC4 |

| Usual error display | Error history display | TEST PROCEDURE POSSIBLE CAUSE AND DEFECTIVE PARTS Content of error | A | B | D | C | E | F | H | I | K | L | M | | | | | | | | R | P | S | S | T |
|---------------------|-----------------------|--|--------------------------|---------------------------|-------------------------------------|------------------------------------|---|--------------------------|----------------------|------------------------------------|-------------------------------------|------------------------------------|--------------------|---------------|------------------|-----------------------------|------------------|----------------------------------|---------------------------------|--------------|-----------------------------------|-------------|------------|--------------|----------------------------|
| | | | Magnetron MG1 and/or MG2 | Power transformer T1 & T2 | High voltage capacitor C1 and/or C2 | H.V. rectifier assembly 1 and/or 2 | Secondary interlock switch SW1 and/or SW2 | Primary interlock system | Fuse 8A F1 and/or F2 | Weak points for Fan motors (DC24V) | Magnetron temp. fuse TF1 and/or TF2 | Magnetron thermistor 1 and/or 2 TH | Exhaust thermistor | Fan motors FM | Exhaust motor EM | Antenna motor 1 and/or 2 AM | Air flow blocked | Low or High power supply voltage | No load or small load operation | Loose wiring | Exceeding of maximum cooking time | Burned food | Relay unit | Control unit | Antenna sensor (1) (Upper) |
| EE1 | EE 1 | Failure of high voltage circuit 1 | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | |
| EE2 | EE 2 | Failure of high voltage circuit 2 | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | |
| EE3 | EE 3 | Failure of high voltage circuit 1&2 | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | |
| EE4 | EE 4 | Too high of input voltage(+13%) | | | | | | | | | | | | | | ● | | | | | | ● | ● | | |
| EE5 | EE 5 | Too low of input voltage(-13%) | | | | | | | | | | | | | | ● | | | | | | ● | ● | | |
| EE7 | EE 7 | Food burned (temp., too high) | | | | | | | | | | | ● | | | | | | | ● | | ● | ● | | |
| EE8 | EE 8 | Melted contacts of relays | | | | | | | | | | | ● | | | | | | | | ● | ● | | | |
| EE9 | EE 9 | Over maximum cooking time | | | | | | | | | | | | | | | | | ● | | | | | | |
| EE8 | EE 10 | EEPROM error | | | | | | | | | | | | | | | | | | | | | | | |
| EE1 | EE 11 | Life end of magnetron MG1 | ◎ | | | | | | | | | | | | | | | | | | | ● | ● | | |
| EE2 | EE 21 | Life end of magnetron MG2 | ◎ | | | | | | | | | | | | | | | | | | | ● | ● | | |
| EE3 | EE 31 | Life end of magnetron MG1, 2 | ◎ | | | | | | | | | | | | | | | | | | | ● | ● | | |
| EE8 | EE 81 | Life end of relays RY2/Ry3 | | | | | | | | | | | | | | | | | | | ◎ | ● | ● | | |
| EE3 | EE 83 | Over Current error | | ● | | | | | | | | | | | | | | | | | ● | ● | | | |
| EE0 | EE 14 | MG1 Cooling Fan lock judge | | | | | | | ● | | | | ● | | | | | | | | ● | ● | | | |
| EE0 | EE 24 | MG2 Cooling Fan lock judge | | | | | | | ● | | | | ● | | | | | | | | ● | ● | | | |
| EE0 | EE 44 | Exhaust motor lock judge | | | | | | | | | | | ● | | | | | | | | ● | ● | | | |
| EE0 | EE 54 | Life end of exhaust motor | | | | | | | | | | | ● | | | | | | | | ● | ● | | | |
| EE0 | EE 15 | MG1 antenna rotation error | | | | | | | | | | | ● | | | | | | | | ● | ● | ● | | |
| EE0 | EE 25 | MG2 antenna rotation error | | | | | | | | | | | ● | | | | | | | | ● | ● | ● | ● | |
| EE0 | EE 35 | MG1/2 antenna rotation error | | | | | | | | | | | ● | | | | | | | | ● | ● | ● | ● | |
| EE8 | EE 16 | MG1 thermistor open | | | | | | | | | | ● | | | | | | | | | ● | ● | | | |
| EE8 | EE 26 | MG2 thermistor open | | | | | | | | | | ● | | | | | | | | | ● | ● | | | |
| EE7 | EE 17 | MG1 temperature, too high | ● | | | | | | | | | | ● | | | | | | | | ● | ● | | | |
| EE7 | EE 27 | MG2 temperature, too high | ● | | | | | | | | | | ● | | | | | | | | ● | ● | | | |
| EE8 | EE 18 | Magnetron MG1 | ● | | | | | | | | | | ● | | | | | | | | ● | ● | | | ● |
| EE8 | EE 28 | Magnetron MG2 | ● | | | | | | | | | | ● | | | | | | | | ● | ● | | | ● |
| EE8 | EE 38 | Magnetron MG1& MG2 | ● | | | | | | | | | | ● | | | | | | | | ● | ● | | | ● |
| EE8 | EE 29 | Exhaust thermistor open/short | | | | | | | | | | | ● | | | | | | | | ● | ● | | | ● |
| EE6 | EE 19 | No food | | | | | | | | | | | | | | ● | | | | | ● | ● | | | |
| EE6 | EE 39 | Small food | | | | | | | | | | | | | | ● | | | | | ● | ● | | | |
| EE60 | EE 60 | Not correct frequency | | | | | | | | | | | | | | | | | | | | | | | ● |

NOTE 1: If the power supply voltage is higher than 240V+10% (264V), EE4 will be displayed.
If the power supply voltage is lower than 230V-12% (202V), EE5 will be displayed.

NOTE 2: "◎" means that the parts should be replaced if EE11, EE21, EE31 or EE81 is indicated on the display when error histories are checked.

NOTE 3: 1) If the magnetrons are used for more than 4000 hours, EE11, EE21 or EE31 will appear when error histories are checked.
2) If the on/off counts of the relay (RY2 or RY3) become more than 400000 times, EE81 will appear when error histories are checked.
3) Even if EE11, EE21, EE31 or EE81 appears when error histories are checked, if the oven is not operated for 3 minutes or more, or if the oven is disconnected from the power supply once and then the oven is connected to the power supply, the oven can be operated once more. But after that when the oven is going to be used again, EE1, EE2, EE3 or EE8 will appear and the oven will not operate.

| Display for maintenance | | | | Error history display | Content of maintenance | Check item | Parts to be replaced |
|-------------------------|-----|-----|-----|-----------------------|---|----------------------------------|----------------------|
| CC1 | CC2 | CC3 | CC4 | | | | |
| ○ | | | | - | MG1 exchange time information | Using time of MG1 | MG1 |
| | ○ | | | - | MG2 exchange time information | Using time of MG2 | MG2 |
| | | ○ | | - | Exhaust Fan motor exchange time information | Using time of Exhaust motor | Exhaust motor |
| | | | ○ | - | T/C unit exchange time information | Using number of times of RY2/RY3 | Relay unit |

CHAPTER 6. TEST PROCEDURES

[1] A: MAGNETRON TEST

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

SERVICE INFORMATION

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

CARRY OUT 3D CHECKS.

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

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

To test for short circuit filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

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

The formula is as follows;

$$P \times t / 4.187 = V \times \Delta T + 0.55 \times mc (T2-T0)$$

$$P (W) = 4.187 \times V \times \Delta T / t + 0.55 \times mc (T2-T0)/t$$

Our condition for water load is as follows:

Room temperature (T0) around 20 $^{\circ}\text{C}$

Water load 1000 g

Heating time 28 sec. [R-1500AT]/ 20 sec. [R-2100AT]

T2 Final Temperature

Power supply Voltage Rated voltage

Initial temperature (T1) 10 \pm 1 $^{\circ}\text{C}$

Mass of container (mc) 330 g

P = 150 x ΔT [R-1500AT] P = 210 x ΔT [R-2100AT]

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 1) $^{\circ}\text{C}$

4) Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5 $^{\circ}\text{C}$.

5) Select stirring devices and measuring instruments in order to minimize addition or removal of heat.

6) The graduation of the thermometer must be scaled by 0.1 $^{\circ}\text{C}$ 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 + 3" sec. (3 sec. is magnetron filament heat-up time.)

Measuring method:

1) Measure the initial temperature of the water before the water is added to the vessel.

(Example: The initial temperature T1 = 11 $^{\circ}\text{C}$)

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 until the temperature of the water rises by a value ΔT of (10 \pm 2)K.

5) Stir the water to equalize temperature throughout the vessel.

6) Measure the final water temperature. (Example: The final temperature T2 = 21 $^{\circ}\text{C}$)

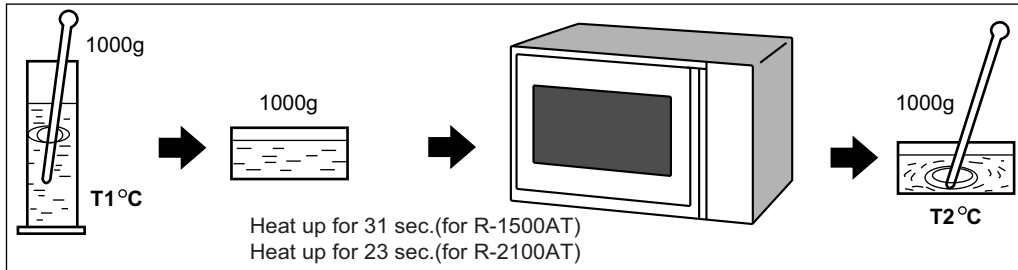
7) Calculate the microwave power output P in watts from above formula.

R1500AT

| | |
|---|--------------------------------|
| Room temperature | To = 21°C |
| Initial temperature | T1 = 11°C |
| Temperature after (28 + 3) = 31 sec. (for R-1500AT)..... | T2 = 21°C |
| Temperature after (20 + 3) = 23 sec. (for R-2100AT)..... | T2 = 21°C |
| Temperature difference Cold-Warm | $\Delta T1 = 10^\circ\text{C}$ |
| Measured output power | |
| The equation is "P = 150 x ΔT " (for R-1500AT)..... | P = 150 x 10°C = 1500 Watts |
| The equation is "P = 210 x ΔT " (for R-2100AT)..... | P = 210 x 10°C = 2100 Watts |

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

CAUTION: 1°C CORRESPONDS TO 150WATTS (for R-1500AT)/ 210WATTS (for R-2100AT). REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



[2] B: POWER TRANSFORMER TEST

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

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads to the primary winding of the power transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three winding. The following readings should be obtained:
 - a.Primary winding ----- approximately 1.3 Ω
 - b.Secondary winding ----- approximately 76 Ω
 - c.Filament winding ----- less than 1 Ω

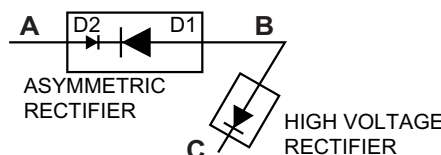
If the readings obtained are not stated as above, then the power transformer is probably faulty and should be replaced.

3. CARRY OUT 4R CHECKS.

[3] C: HIGH VOLTAGE RECTIFIER (1) AND/OR (2) TEST

1. HIGH VOLTAGE RECTIFIER TEST

1. CARRY OUT 3D CHECKS.
2. Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100k ohms in the other direction.
3. CARRY OUT 4R CHECKS.



2. ASYMMETRIC RECTIFIER TEST

1. CARRY OUT 3D CHECKS.
2. Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric rectifier can be tested using an ohmmeter set to its highest range across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both directions then the asymmetric rectifier is good. If the asymmetric rectifier is shorted in either direction, then the asymmetric rectifier is faulty and must be replaced with high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the power transformer is shorted.

3. CARRY OUT **4R** CHECKS.

NOTE: Be sure to use an ohmmeter that will supply a forward bias voltage of more than 6.3 volts.

[4] D: HIGH VOLTAGE CAPACITOR (C1) AND/OR (C2) TEST1. CARRY OUT **3D** CHECKS.

2. If the capacitor is open, no high voltage will be available to the magnetron. Disconnect input leads and check for short or open between the terminals using an ohmmeter.

Checking with a high ohm scale, if the high voltage capacitor is normal, the meter will indicate continuity for a short time and should indicate an open circuit once the capacitor is charged. If the above is not the case, check the capacitor with an ohmmeter to see if it is shorted between either of the terminals and case. If it is shorted, replace the capacitor.

3. CARRY OUT **4R** CHECKS.**[5] E: SECONDARY INTERLOCK SWITCH (SW1) AND/OR (SW2) TEST**1. CARRY OUT **3D** CHECKS.

2. Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the secondary interlock switch.

3. Isolate the switch (SW1) and connect the ohmmeter to the common (COM.) and normally close (NC) terminal of the switch (SW1). The meter should indicate a close circuit with the door open and an open circuit with the door closed. If improper operation is indicated, replace the switch (SW1).

4. CARRY OUT **4R** CHECKS.**[6] F: PRIMARY INTERLOCK SYSTEM TEST****1. DOOR SENSING SWITCH (SW5)**1. CARRY OUT **3D** CHECKS.

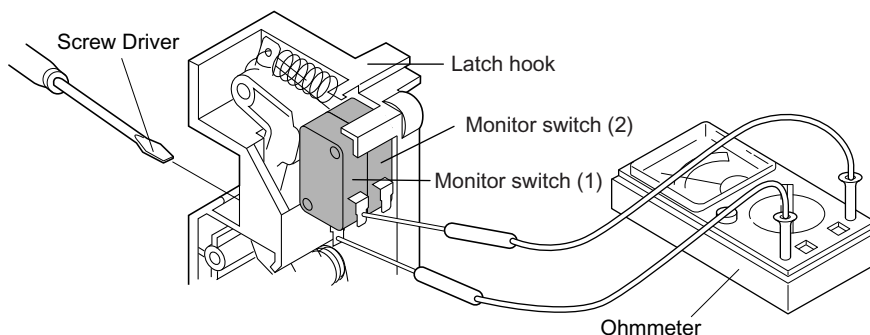
2. Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the door sensing switch.

3. CARRY OUT **4R** CHECKS.**2. PRIMARY INTERLOCK RELAY (RY1)**1. CARRY OUT **3D** CHECKS.

2. Disconnect two (2) wire leads from the male tab terminals of the Primary Interlock Relay RY1. Check the state of the relay contacts using a ohmmeter. The relay contacts should be open. If the relay contacts are closed, replace the circuit board entirely or the relay itself.

3. CARRY OUT **4R** CHECKS.**[7] G: MONITOR SWITCH (SW3) AND/OR (SW4) TEST**1. CARRY OUT **3D** CHECKS.

2. Before performing this test, make sure that the secondary interlock switches SW1, SW2 and the primary interlock relay RY1 are operating properly, according to the above Switch Test Procedure. Disconnect the wire lead from the monitor switches SW3, SW4 (COM) terminals. Check the monitor switches SW3, SW4 operation by using the ohmmeter as follows. When the door is open, the meter should indicate a closed circuit. When the monitor switch actuator is pushed by a screw driver through the upper latch hole on the front plate of the oven cavity with the door opened (in this condition the plunger of the monitor switch is pushed in), the meter should indicate an open circuit. If improper operation is indicated, the switch may be defective. After testing the monitor switches, reconnect the wire lead to the monitor switch (COM) terminals and check the continuity of the monitor circuit.

3. CARRY OUT **4R** CHECKS.

[8] H: WEAK POINT F1, F2 TEST

1. CARRY OUT **3D** CHECKS.
2. If the weak point F1 or F2 is blown when the door is opened, check the primary interlock relay RY1, secondary interlock switches SW1, SW2 and monitor switches SW3, SW4 according to the "TEST PROCEDURE" for those switches before replacing the blown weak point F1 or F2.

CAUTION: CAUTION: BEFORE REPLACING A BLOWN WEAK POINT F1 OR F2, TEST THE PRIMARY INTERLOCK RELAY RY-1, SECONDARY INTERLOCK SWITCHES SW1, SW2, DOOR SENSING SWITCH SW5 AND MONITOR SWITCHES SW3, SW4 FOR PROPER OPERATION.

3. If the weak point is blown, check the magnetron, high voltage capacitor, high voltage rectifier assembly, according to the "TEST PROCEDURE" before replacing the blown weak point. Then replace the weak point.
4. CARRY OUT **4R** CHECKS.

[9] I: WEAK POINT (FOR FAN MOTOR) TEST

CARRY OUT **3D** CHECKS.

If the weak point is blown, the fan motor or exhaust fan could be locked or there could be a shorts in the fan motor or exhaust fan. Check them and replace the defective parts.

CARRY OUT **4R** CHECKS.

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

[10] J: WEAK POINT (IN NOISE FILTER) TEST

CARRY OUT **3D** CHECKS.

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

CARRY OUT **4R** CHECKS.

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

[11] K: TEMPERATURE FUSE TEST

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

| | Open temperature | Close temperature | Display or Condition | Check point |
|-------------------------------------|------------------|--------------------|----------------------|--|
| Magnetron temperature fuse (1) | 150°C | Non resetable type | EE1 | Magnetron (MG1) Failure: Test magnetron (MG1) and fan motor. |
| Magnetron temperature fuse (2) | | | EE2 | Magnetron (MG2) Failure: Test magnetron (MG2) and fan motor. |
| Magnetron temperature fuse (1), (2) | | | EE3 | Magnetron (MG1), (MG2) Failure: Test magnetron (MG1), (MG2). Check fan motor and ventilation opening. |
| Oven temperature fuse | 120°C | Non resetable type | Oven shut off | Food has been burned in oven. Temperature of oven inside is very high. |

3. CARRY OUT **4R** CHECKS.

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

[12] L: MAGNETRON THERMISTOR TEST

1. CARRY OUT **3D** CHECKS.
2. Disconnect the connector of the magnetron thermistor from the harness. Measure the resistance of each thermistor with an ohmmeter. Connect the ohmmeter leads to the connector of each thermistor.

| Room temperature | Resistance |
|------------------|---------------|
| 20°C | Approx. 750KΩ |

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

3. CARRY OUT **4R** CHECKS.

[13] M: EXHAUST THERMISTOR TEST

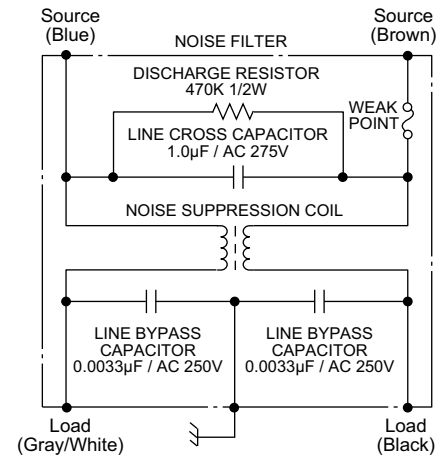
The exhaust thermistor can be checked by using the Special function (SF-6). Check the exhaust thermistor, referring to the pages of the Exhaust thermistor check (SF-6).

If the display shows "OH", the exhaust thermistor is normal. If the display shows "no", the exhaust thermistor is abnormal and it should be replaced.

[14] N: NOISE FILTER TEST

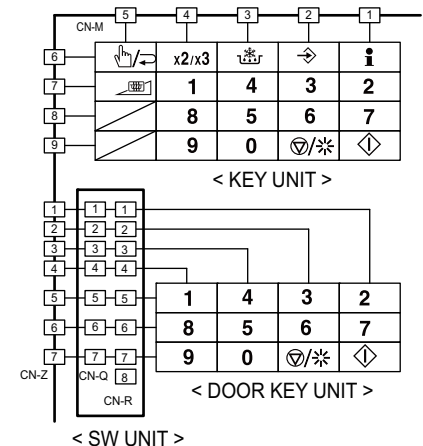
1. CARRY OUT **3D** CHECKS.
2. Disconnect the lead wires from the terminal the noise filter. Using an ohmmeter, check between the terminals as described in the following table. If incorrect reading are obtained, replace the noise filter.
3. CARRY OUT **4R** CHECKS.

| MEASURING POINT | INDICATION OF OHMMETER |
|---|------------------------|
| Between source terminals | Approx. 470K Ω |
| Between source (Black) and load (Black) terminals | Short circuit. |
| Between source (White) and load (White/Brown) terminals | Short circuit. |



[15] O: KEY UNIT TEST

1. CARRY OUT **3D** CHECKS.
2. Check Key unit ribbon connection before replacement.
3. If key unit ribbon connection is normal, carry out the following procedures.
4. Re-install the rear cover and the outer case (cabinet).
5. Reconnect the power supply cord.
6. The following symptoms indicate a defective key unit.
 - 1) When touching the pads, a certain pad produces no signal at all.
 - 2) When touching a number pad, two figures or more are displayed.
 - 3) When touching the pads, sometimes a pad produces no signal.
7. When you can not judge if the key unit is normal or not by using the item 8 above, carry out following test procedures.
 - 1) Disconnect the power supply cord, and then remove outer case and rear cover.
 - 2) Open the door and block it open.
 - 3) Discharge two high voltage capacitors.
 - 4) Disconnect the leads to the primary of the power transformer.
 - 5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
 - 6) Reconnect the power supply cord.
 - 7) If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon cable is making good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the door sensing switch (stop switch) is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the door sensing switch connector). Use the Key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad making momentary contact. If the control unit responds by clearing with a beep the key unit is faulty and must be replaced. If the control unit does not respond, it is faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.
 - 8) For the door key unit, check the open/short and/or connection of the switch unit and the harness, too.
8. If the Key unit is defective.
 - 1) Disconnect the power supply cord, and then remove outer case and rear cover.
 - 2) Open the door and block it open.
 - 3) Discharge two high voltage capacitors.
 - 4) Replace the Key unit.
 - 5) Reconnect all leads removed from components during testing.
 - 6) Re-install the rear cover and the outer case (cabinet).
 - 7) Reconnect the power supply cord after the rear cover and the outer case are installed.
 - 8) Run the oven and check all functions.



[16] P: CONTROL UNIT TEST

The following symptoms indicate a defective control unit. Before replacing the control unit, perform the Key units test (Procedure O) to determine if control unit is faulty.

Connect the power supply cord. And check for followings.

R1500AT

1. In connection with pads.
 - 1) When touching the pads, a certain group of pads do not produce a signal.
 - 2) When touching the pads, no pads produce a signal.
2. In connection with display
 - 1) At a certain digit, all or some segments do not light up.
 - 2) At a certain digit, brightness is low.
 - 3) Only one indicator does not light.
 - 4) The corresponding segments of all digits do not light up; or they continue to light up.
 - 5) Wrong figure appears.
 - 6) A certain group of indicators do not light up.
 - 7) The figure of all digits flicker.
3. Other possible problems caused by defective control unit.
 - 1) Buzzer does not sound or continues to sound.
 - 2) Cooking is not possible.
4. If the protectors F1 and/or F2 on the control unit PWB are open, the control unit is defective. To check, carry out following procedures.
 - i) Disconnect the power supply cord, and then remove outer case and rear cover.
 - ii) Open the door and block it open.
 - iii) Discharge two high voltage capacitors.
 - iv) Remove the control unit from the control panel, referring to "CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL".
 - v) Check the continuity of the protectors F1 and F2 on the control unit

[17] Q: POWER UNIT TEST

1. Check the out put voltage of power unit at CN21 as follows.
 - i) Disconnect the power supply cord, and then remove outer case and rear cover.
 - ii) Open the door and block it open.
 - iii) Discharge two high voltage capacitors.
 - iv) Disconnect the leads to the primary of the power transformer.
 - v) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
 - vi) Check the voltage between Pin No1 and No2 of CN21.
 - vii) The output voltage should be approx. 24V.
 - viii) If not so, the power unit is defective.
2. Check the continuity of the fuse F1 and protector F21 on the power unit as follows.
 - i) Disconnect the power supply cord, and then remove outer case and rear cover.
 - ii) Open the door and block it open.
 - iii) Discharge two high voltage capacitors.
 - iv) Remove the power unit from the oven, referring to "POWER UNIT REMOVAL".
 - v) Check the continuity of the fuse F1 and the protector F21.
 - vi) If they are open, the power unit is defective

[18] R: RELAY UNIT TEST

1. CARRY OUT **3D** CHECKS.
2. Remove the relay unit from the oven, referring to "RELAY UNIT REMOVAL".
3. Check the continuity of the FUSE1 on the relay unit.
 - 1) If it is open, the relay unit is defective.
4. Check the open and /or short of the transformer primary coil on the relay unit.
 - 1) If it is open and /or short, it is defective.
5. Check the state of the relays contacts RY-1, RY-2 and RY-3 using an ohmmeter.
 - 1) The relay contacts should be open. If not so, the relay unit is defective.

[19] S: ANTENNA SENSOR TEST

There is no test procedure for the antenna sensor.

When the error history display shows EE15, EE25 or EE35, if the antenna motors, control unit and wiring are normal, the antenna sensor may be defective.

[20] T: MICROWAVE SENSOR TEST

There is no test procedure for the microwave sensor.

When the error history display shows EE18, EE28 or EE38, if the magnetrons, control unit and wiring are normal, the microwave sensor may be defective.

CHAPTER 7. TOUCH CONTROL PANEL ASSEMBLY

[1] SPECIAL FUNCTION FOR SERVICING

This oven has the special functions for servicing as shown in the table 1 ~ 4.

By using the special function, service person can check the using time or the using number of times for the electrical parts. Also service person can check the AC supply voltage and /or set the standard voltage.

When "SF-2" is selected, the display will show the total cooking number of times.

Table 1. Total cooking number of times

| Set | Contents (decimal) | Max. | Data clear | New data set |
|------|-------------------------------|------------------|------------|--------------|
| SF-2 | Total cooking number of times | 9999(x100) times | ○ | ○ |

The service person can check and /or carry out the contents as shown in the table 2.

Table 2. Special function

| contents | key | Display | After plug in |
|---|-------------|---|---------------|
| Check, clear and set of using time or number of times | 2 | SF-2 | |
| Error history | 4 | SF-4 | |
| Check of AC supply voltage | 5 | SF-5 | |
| Exhaust thermistor check | 6 | SF-6 | Yes |
| Set standard voltage for production. | 7 | SF-7 | Yes |
| Model name Making date of software | CUSTOM HELP | cd XX (Model) XX XX (Date) XX XX (Time) | |

NOTE: The function marked "yes" can be used only after the oven is plugged in again.

1. Check, clear and set of using time or number of times

When the display shows "CC" and the number as shown in the table 3,

- 1) Before replacing the parts, check the using time or number of times about the parts.
- 2) If the using time or number of times go over the limit level, replace the defective parts.
- 3) After replacing the parts, clear the using time or number of times about the parts, referring to the table 4.

Table 3. CC error

| Display | Content | Limit level | Action |
|---------------------------|---|-----------------------|--------------|
| "CC", "1." repeatedly | Magnetron 1 (top) | 1250 hour | Display only |
| "CC", "2." repeatedly | Magnetron 2 (bottom) | 1250 hour | Display only |
| "CC", "3." repeatedly | Exhaust motor | 3000 hour | Display only |
| "CC", "4." repeatedly | Need to change relay unit | MG Relay 200000 times | Display only |
| "CC", "1.2.4." repeatedly | Some maintenance occurs same time Ex. Magnetron 1&2 and relay unit | | Display only |

The using time or using number of times can be checked or set by using the number pads after "SF-2" is set.

Table 4. Using time or number of times about each part

| Contents (decimal) | 10 key | Max. | Data clear | New data set | Limit of factory setting |
|--|--------|---------------------|------------|--------------|--------------------------|
| Using time of MG 1 (top) | 1 | 9999 hours | ○ | ○ | — |
| Using time of MG 2 (bottom) | 2 | 9999 hours | ○ | ○ | — |
| Using number of times of MG 1 (top) relay | 3 | 999 (x 1000) times | ○ | ○ | — |
| Using number of times of MG 2 (bottom) relay | 4 | 999 (x 1000) times | ○ | ○ | — |
| Total cooking time (hour. min.) | 5 | 99 hours 59min. | ○ | ○ | — |
| Total cooking time (hundred hour) | 6 | 9999 hundred hours | ○ | ○ | — |
| Using time of exhaust motor | 7 | 9999 hours | ○ | ○ | — |
| Exhaust motor limit time | 8 | 9999 hours | — | ○ | 3000 hours |
| Magnetron limit time | 9 | 9999 hours | — | ○ | 1250 hours |
| Relay limit ON/OFF count | 0 | 999 (x 1000) counts | — | ○ | 400 (x1000) counts |

For example: Procedure to check the total cooking number of times (example, 957700 times) and using time (example, 1260 hours) of MG 1 and set 0 hours after MG1 is replaced.

● : no sound ○ : 0.1 second sound ⊙ : 2.0 second sound ⊗ : (0.06 sec. ON, 0.06 sec. OFF) x 2 beeps
 ☆ : [(0.04 sec. ON, 0.04 sec. OFF) x 3] x 4 beeps □ : (0.1 sec. ON, 0.1 sec. OFF) x 10 beeps

| Operation | Display | Indicator | Sound |
|------------------|--|-----------|-------|
| | 0 | | |
| (within 20 sec.) | POWER LEVEL | | ● |
| | SET MEMORY | | ● |
| | START | | ● |
| | STOP/CLEAR | SF- | ○ |
| | ↓ | | |
| 2 | SF2 | | ○ |
| (after 1 sec.) | 9577 (total counter for serviced [x 100]) | CHECK | |
| | ↓ | ↓ | |
| 1 | 1260 | CHECK | ○ |
| MANUAL/ REPEAT | 0 | | ○ |
| START | SF-2 | | ⊗ |
| | ↓ | | |
| STOP/CLEAR | 0 | | |

For example: Procedure to check the total cooking number of times (example, 957700 times) and clear it and check using time (example, 1260 hours) of MG 1 and set the using time (example, 1000 hours) of MG1.

| Operation | Display | Indicator | Sound |
|------------------|--|-----------|-------|
| | 0 | | |
| (within 20 sec.) | POWER LEVEL | | ● |
| | SET MEMORY | | ● |
| | START | | ● |
| | STOP/CLEAR | SF- | ○ |
| | ↓ | | |
| 2 | SF2 | | ○ |
| (after 1 sec.) | 9577 (total counter for serviced [x 100]) | CHECK | |
| | ↓ | ↓ | |
| MANUAL/ REPEAT | 0 | | ○ |
| START | SF-2 | | ⊗ |
| | ↓ | | |
| 1 | 1260 | CHECK | ○ |
| MANUAL/ REPEAT | 0 | | ○ |
| 1,0,0,0 | 1000 | | ○x4 |
| START | SF-2 | | ⊗ |
| | ↓ | | |
| STOP/CLEAR | 0 | | |

For example : Procedure to change the limit time of magnetron from 1250 hours to 2000 hours if need. The timing that CC1 or CC2 is shown in the display can be changed.

| Operation | Display | Indicator | Sound |
|------------------|--|-----------|-------|
| | 0 | | |
| (within 20 sec.) | POWER LEVEL | | ● |
| | SET MEMORY | | ● |
| | START | | ● |
| | STOP/CLEAR | SF- | ○ |
| | ↓ | | |
| 2 | SF2 | | ○ |
| (after 1 sec.) | 9577 (total counter for serviced [x 100]) | CHECK | |
| | ↓ | ↓ | |
| 9 | 1250 | CHECK | ○ |
| MANUAL/ REPEAT | 0 | | ○ |
| 2,0,0,0 | 2000 | | ○x4 |
| START | SF-2 | | ⊗ |
| | ↓ | | |
| STOP/CLEAR | 0 | | |

2. Error history (SF-4)

You can check the most recent 10 error histories.

For example: Procedure to check the error histories that have been memorized in memory 1, memory 2 and memory 9.

| Operation | Display | Indicator | Sound |
|----------------------------|---------|-----------|-------|
| (within 20 sec.) | 0 | | |
| POWER LEVEL | 0 | | ● |
| SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 4 | SF-4 | | ○ |
| 1 (latest error No.) | #1 EE 1 | | ○ |
| 2 (1 time previous error) | EE 6 | | ○ |
| 9 (8 times previous error) | EE24 | | ○ |
| #2 POWER LEVEL | 0 | | ⊗ |

#1 If there is no error "0" will be displayed.

#2 If you touch POWER LEVEL, all history are cleared.

Detail explanation

This model have 2 setting modes below when a magnetron is failure.

- 1) EE1 or EE2 appears and the oven stops.
- 2) EE1 or EE2 appears but the oven continues to work with another magnetron.

In case of 1), EE1 or EE2 is memorized in the microwave oven as the error history.

In case of 2), EE1 or EE2 is not memorized in the microwave oven as the error history.

The case 1) is set up at the factory and delivered.

Customer can set the case 2) as shown in the operation manual.

Max.10 error codes can be memorized in the microwave oven as the error history. And you can see the error history by using the special function for servicing (SF-4).

If EE1 or EE2 is appeared and the microwave oven is used continually, the error history would be full with EE1 or EE2 and last other error code will be deleted. So EE1 or EE2 is not memorized as the error history to avoid above problem when they set up the case 2).

3. Check of AC supply voltage (SF-5)

You can check the current voltage of AC supply.

For example: Procedure to check current voltage (In case of over 230V)

| Operation | Display | Indicator | Sound |
|------------------|--------------------|-----------|-------|
| (within 20 sec.) | 0 | | |
| POWER LEVEL | 0 | | ● |
| SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 5 | HIGH (over230V) | | ○ |
| STOP/CLEAR | 0 | | ○ |

For example: Procedure to check current voltage (In case of under 230V)

| Operation | Display | Indicator | Sound |
|------------------|--------------------|-----------|-------|
| (within 20 sec.) | 0 | | |
| POWER LEVEL | 0 | | ● |
| SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 5 | LO (under 230V) | | ○ |
| STOP/CLEAR | 0 | | ○ |

For example: Procedure to check current voltage (In case of over 264V(240 +10%))

| Operation | Display | Indicator | Sound |
|------------------|---------|-----------|-------|
| (within 20 sec.) | 0 | | |
| POWER LEVEL | 0 | | ● |
| SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 5 | EE4 | | ○ |
| STOP/CLEAR | 0 | | ○ |

For example: Procedure to check current voltage (In case of under 202V(230V--12%))

| Operation | Display | Indicator | Sound |
|------------------|---------|-----------|-------|
| (within 20 sec.) | 0 | | |
| POWER LEVEL | 0 | | ● |
| SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 5 | EE5 | | ○ |
| STOP/CLEAR | 0 | | ○ |

4. Exhaust thermistor check (SF-6)

You can check if the exhaust thermistor works correctly or not by using this function.

For example: In case the exhaust thermistor works correctly (275ml water load is necessary.), the display will show "OH" as follows.

| Operation | Display | Indicator | Sound |
|-----------------------------|--------------|-----------|--------|
| (within 20 sec.) plug in | 0 | | |
| POWER LEVEL | 0 | | ● |
| (within 20 sec.) SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 6 | SF-6 | | ○ |
| START | 5.00 | ON | ○ |
| | (count down) | | |
| | OH | | ◎ or ☆ |
| (after 5 min.) | | | ◎ or ☆ |
| STOP/CLEAR | SF-1 | | ○ |
| STOP/CLEAR | 0 | | ○ |

For example: In case the exhaust thermistor works incorrectly (275ml water load is necessary), the display will show "no" as follows. In that case, the exhaust thermistor should be checked or replaced.

| Operation | Display | Indicator | Sound |
|-----------------------------|--------------|-----------|--------|
| (within 20 sec.) plug in | 0 | | |
| POWER LEVEL | 0 | | ● |
| (within 20 sec.) SET MEMORY | 0 | | ● |
| START | 0 | | ● |
| STOP/CLEAR | SF- | | ○ |
| 6 | SF-6 | | ○ |
| START | 5.00 | ON | ○ |
| | (count down) | | |
| | no | | □ |
| (after 5 min.) | | | ◎ or ☆ |
| STOP/CLEAR | SF-1 | | ○ |
| STOP/CLEAR | 0 | | ○ |

5. Set of standard voltage (SF-7)

When the control unit or the relay unit is replaced, set the standard voltage, referring to following procedure. Because the control unit judges if the AC supply voltage is 240V+10% or 230V-12% by comparing with the standard voltage. The temporary standard voltage is set when the oven is shipped from the factory. But when the control unit is replaced to new one, it does not have the standard voltage. When the relay unit is replaced to new one, set the standard voltage too. Because the signal from the relay unit to detect the AC supply voltage has error of ±5%.

The standard voltage can be set by using this function. For this model's standard voltage is 230V.

For example: Procedure to set the standard voltage (in case input voltage is 230V ±1V)

| Operation | Display | Indicator | Sound |
|------------------------------|---------|-----------|----------|
| (within 20 sec.) plug in | 0 | | Flashing |
| (within 20 sec.) POWER LEVEL | 0 | ● | |
| (within 20 sec.) SET MEMORY | 0 | ● | |
| (within 20 sec.) START | 0 | ● | |
| (within 20 sec.) STOP/CLEAR | SF- | ○ | |
| 7 | 230U | ○ | |
| START (after 1 sec.) | 230U | ⊗ | |
| STOP/CLEAR | SF- | ○ | |
| | 0 | ○ | |

For example: In case that AC supply voltage is out of range from tentative memorized voltage (240V +10% ~ 230V-12%), the display will show "----" as follows.

At that time, the voltage of AC power may be not suitable or the control unit and /or the relay unit may be out of order.

| Operation | Display | Indicator | Sound |
|------------------------------|---------|-----------|-------|
| (within 20 sec.) plug in | 0 | | |
| (within 20 sec.) POWER LEVEL | 0 | ● | |
| (within 20 sec.) SET MEMORY | 0 | ● | |
| (within 20 sec.) START | 0 | ● | |
| (within 20 sec.) STOP/CLEAR | SF- | ○ | |
| 7 | ---- | ○ | |
| START | ---- | □ | |
| STOP/CLEAR | 0 | ○ | |

For example: Procedure to set standard voltage at 230V(230V±1V) area.

| Operation | Display | Indicator | Sound |
|------------------------------|---------|-----------|----------|
| (within 20 sec.) plug in | 0 | | Flashing |
| (within 20 sec.) POWER LEVEL | 0 | ● | |
| (within 20 sec.) SET MEMORY | 0 | ● | |
| (within 20 sec.) START | 0 | ● | |
| (within 20 sec.) STOP/CLEAR | SF- | ○ | |
| 7 | 230U | ○ | |
| START (after 1 sec.) | 230U | ⊗ | |
| STOP/CLEAR | SF- | ○ | |
| | 0 | ○ | |

6. CUSTOM HELP

You can check if the correct control unit is installed or not by using this function.

Procedure to check the model name and making date of software.

| Operation | Display | Indicator | Sound |
|--------------------------------|-------------------------|-----------|-------|
| (within 20 sec.) → plug in | 0 | | |
| (within 20 sec.) → POWER LEVEL | ↓ 0 | | ● |
| → SET MEMORY | 0 | | ● |
| → START | 0 | | ● |
| → STOP/CLEAR | SF- | | ○ |
| CUSTOM | #1 cXXH (model name) | | ○ |
| | ↓ XXXX (date) | | |
| | ↓ XXXX (time) | | |
| STOP/CLEAR | 0 | | ○ |

#1: The display will show "c21H" or "c15H".

"c21H" means model R-2100AT. "c15H" means model R-1500AT.

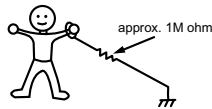
[2] SERVICING FOR BRINTED WIRING BOARDS

1. Precautions for Handling Electronic Components

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

In order to protect CMOS LSI.

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



2. Servicing of Printed Wiring Boards

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

1. Servicing the printed wiring boards with power supply of the oven:

CAUTION: THE POWER TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING AND PRESENTS A HAZARD.

Therefore, before checking the performance of the printed wiring boards,

- 1) Disconnect the power supply cord and then remove outer case and rear cover.
- 2) Open the door and block it open.
- 3) Discharge two high voltage capacitors.
- 4) Disconnect the leads to the primary of the two power transformers.
- 5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
- 6) After that procedure, re-connect the power supply cord.

After checking the performance of the printed wiring boards,

- 1) Disconnect the power supply cord.
- 2) Open the door and block it open.
- 3) Re-connect the leads to the primary of the two power transformers.
- 4) Re-install the rear cover and the outer case (cabinet).
- 5) Re-connect the power supply cord after the rear cover and the outer case is installed.
- 6) Run the oven and check all functions.
 - a) On some models, the power supply cord between the printed wiring boards and the oven itself is so short that they can't be separated. For those models, check and repair all the printed wiring boards (sensor-related ones included) of the printed wiring boards while keeping it connected to the oven.

- b) On some models, the power supply cord between the printed wiring boards and the oven proper is long enough that they may be separated from each other. For those models, it is possible to check and repair the controls of the printed wiring boards 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 printed wiring boards with a jumper, which activates an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the printed wiring boards, checking them is possible if dummy resistor(s) with resistance equal to that of the controls are used.

2. Servicing the printed wiring boards with power supply from an external power source:

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

3. Servicing Tools

Tools required to service the printed wiring boards assembly.

- 1) Soldering iron: 60W
(It is recommended to use a soldering iron with a grounding terminal.)
- 2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
- 3) Others: Hand tools

4. Other Precautions

- 1) Before turning on the power source of the printed wiring boards, remove the aluminium foil applied for preventing static electricity.
- 2) Connect the connector of the key unit to the printed wiring boards 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.

CHAPTER 8. PRECAUTIONS FOR USING LEAD-FREE SOLDER

Employing lead-free solder

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

Example:



Indicates lead-free solder of tin, silver and copper

Using lead-free wire solder

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

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

Soldering

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

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

CHAPTER 9. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

[1] WARNINGS

WARNING AGAINST HIGH VOLTAGE:

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

(Example)

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

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

1. Disconnect the power supply cord.
 2. 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 pull the door handle lever with the other, this causes the latch leads to rise, it is then possible to hear a "click" as the door switches operate.)
 3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).
- Carry out any remedial work that is necessary before operating the oven.
- Do not operate the oven if any of the following conditions exist;
1. Door does not close firmly.
 2. Door hinge, support or latch hook is damaged.
 3. The door gasket or seal is damaged.
 4. The door is bent or warped.
 5. There are defective parts in the door interlock system.
 6. There are defective parts in the microwave generating and transmission assembly.
 7. There is visible damage to the oven.
- Do not operate the oven:
1. Without the RF gasket (Magnetron).
 2. If the wave guide or oven cavity are not intact.
 3. If the door is not closed.
 4. If the outer case (cabinet) is not fitted.

WARNING FOR WIRING

To prevent an electric shock, take the following precautions.

1. Before wiring,
 - 1) Disconnect the power supply cord.
 - 2) Open the door block it open.
 - 3) Discharge the two high voltage capacitor and wait for 60 seconds.
2. Don't let the wire leads touch to the following parts;
 - 1) High voltage parts:
Magnetron, Power transformer, High voltage capacitor, High voltage rectifier assembly and High voltage wire.
 - 2) Hot parts:
Oven lamp, Magnetron, Power transformer and
- 3) Sharp edge:
Oven cavity,
Bottom plate, Oven cavity, Waveguide flange Chassis support and other metallic plate.
- 4) Movable parts (to prevent a fault)
Blower fan blade, Blower fan motor, Switches, Switch levers, Antenna motor and Stirrer antennas.
3. Do not catch the wire leads in the outer case cabinet.
4. Insert the positive lock connector until its pin is locked and make sure that the wire leads do not come off even if the wire leads are pulled.
5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram.

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

[2] OUTER CASE AND REAR COVER REMOVAL

To remove the components, procedure as follows.

1. Disconnect the oven from the power supply.
2. Open the door and wedge it open.
3. Remove the eleven (11) screws from the rear and along side the edge of the outer case.

NOTE: Do not lose the support angle at this time.

4. Slide the case back about 1 inch (3 cm) to free it from the oven cavity.
5. Lift entire case from the unit.

6. **DISCHARGE TWO HIGH VOLTAGE CAPACITORS BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.**

7. Now, outer case is free.

NOTE: Step 1, 2 and 6 form the basis of the **3D** checks.

To remove rear cover:

8. Remove the four (4) screws holding the magnetron exhaust cover to the rear cover.

NOTE: The magnetron exhaust cover can not be removed from the rear cover.

9. Disconnect the connector of the fan motor from the connector of harness.

10. Remove the six (6) screws holding the rear cover and exhaust cover to the bottom plate, power supply cord angle, intake duct and exhaust duct.
11. Remove the rear cover with the fan motor and exhaust cover from the oven cavity.

[3] POWER TRANSFORMERS (1) AND/OR (2) REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Disconnect the main wire harness from power transformers (1) and/or (2).
4. Disconnect wire leads of power transformers (1) and/or (2) from magnetrons (1) and/or (2).

[4] MAGNETRONS (1) AND/OR (2) REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Disconnect the connector of the magnetron thermistor assembly from the connector of the harness.
4. Remove the magnetron thermistor assembly from magnetrons.
5. Disconnect wire leads from magnetrons (1) and/or (2).
6. Remove the two (2) screws holding the bottom cover to the bottom plate assembly.
7. Remove the bottom cover from the bottom plate assembly.
8. Remove the four (4) screws holding each magnetron (1) and/or (2) to upper and/or lower waveguide. When removing the screws, hold the magnetron to prevent it from falling.

12. Now, the rear cover with the fan motor and exhaust cover is free.

NOTE: Do not forget to re-connect the wire leads to the exhaust fan when the rear cover and outer case cabinet are reinstalled.

5. Disconnect wire leads of power transformers (1) and/or (2) from high voltage capacitors (1) and/or (2).
6. Remove two (2) screws holding each power transformer (1) and/or (2) to base plate.
7. Remove the power transformers (1) and/or (2) from base plate.
8. Now, power transformers (1) and/or (2) are free.

9. Remove the magnetrons (1) and/or (2) from upper and/or lower waveguide with care so magnetron antenna is not hit by any metal object around antenna.

10. Remove the two (2) screws holding the partition plate S to each magnetron (1) and/or (2).

11. Remove the two (2) partition plate S from each magnetron (1) and/or (2).

12. Now, the magnetrons (1) and/or (2) are free.

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

NOTE: Whenever the magnetron is replaced, replace the weak point for fan motor, too.

[5] MAGNETRON THERMISTOR ASSEMBLY REPLACEMENT

1. REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Disconnect the connector of the magnetron thermistor assembly from the capacitor of the harness.
4. Remove the snap band of magnetron thermistor assembly from the hole of the partition cover by pulling out.
5. Remove the magnetron thermistor assembly from the two (2) magnetrons.
6. Now, the magnetron thermistor assembly is free.

2. REINSTALLATION

1. Insert the magnetron thermistor assembly to the magnetron as shown in Figure C-1 and push it until the thermistor assembly stops.
 - i) The tabs of the magnetron thermistor assembly should be inserted between the 2nd. fin and 3rd. fin.
 - ii) The thermistor should be inserted between the 1st. fin and 2nd. fin.

iii) And also the thermistor should be inserted center of the right and left walls of the magnetron.

2. Re-install the rear cover and outer case cabinet to the oven by reversing the procedures of "OUTER CASE AND REAR COVER REMOVAL".

NOTE: Do not forget to re-connect the wire leads to the fan motor.

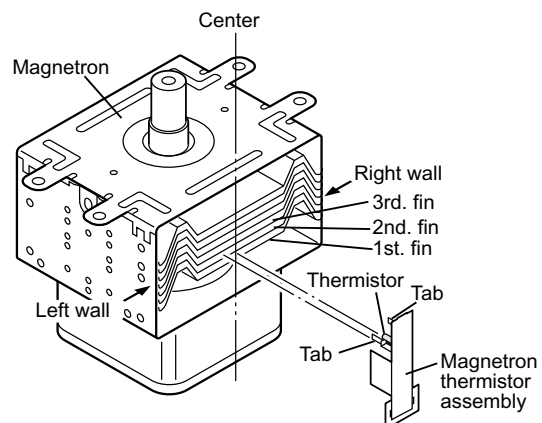


Figure C-1. Magnetron thermistor installation

[6] HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Remove the two (2) screws holding the capacitor unit angle to the intake duct assembly or the exhaust duct assembly.

4. Remove one (1) screw holding the capacitor band to capacitor unit angle.

5. Remove one (1) screw holding earth side terminals of high voltage rectifier assembly to the capacitor band.

R1500AT

6. Remove the capacitor band from the high voltage capacitor.
7. Disconnect all wire leads from the high voltage capacitor.
8. Now, the capacitor (1) or (2) and the high voltage rectifier assembly are free.

CAUTION: 1) DISCHARGE THE TWO HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

[7] POWER SUPPLY CORD REPLACEMENT

1. REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Remove the one (1) screw holding the earth wire of the power supply cord to the oven cavity.
4. Disconnect the wire leads of the power supply cord from the noise filter.
5. Remove the one (1) screw holding the power supply cord angle to the capacitor unit angle.
6. Remove the power supply cord angle with the power supply cord from the capacitor unit angle.
7. Nip the cord bushing with the bushing pliers and release it from the power supply cord angle.
8. Remove the cord bushing with the power supply cord from the power supply cord angle.
9. Remove the cord bushing from the power supply cord.
10. Now, the power supply cord is free.

2. INSTALLATION

1. Install the cord bushing to the power supply cord so that the lock tie on the power supply cord surface comes to the end of the cord bushing as shown in the Figure C-2.
2. Install the cord bushing (with the power supply cord) into the hole of the power supply cord angle with the bushing pliers.
3. Reinstall the power supply cord angle to the capacitor unit angle with the one (1) screw.
4. Install the earth wire of the power supply cord to the oven cavity with the one (1) screw.

2) DO NOT REPLACE ONLY THE HIGH VOLTAGE RECTIFIER. IF IT IS DEFECTIVE, REPLACE THE HIGH VOLTAGE RECTIFIER ASSEMBLY.

3) WHEN REPLACING THE HIGH VOLTAGE RECTIFIER ASSEMBLY AND THE HIGH VOLTAGE CAPACITOR, THE EARTH SIDE TERMINAL OF THE HIGH VOLTAGE RECTIFIER MUST BE SECURED FIRMLY WITH A EARTHING SCREW.

5. Connect the brown wire lead of the power supply cord to the source side upper terminal of the noise filter.
6. Connect the blue wire lead of the power supply cord to the source side lower terminal of the noise filter.
7. Reinstall the rear cover, the magnetron exhaust cover and the outer case cabinet and check that the oven is operating properly.

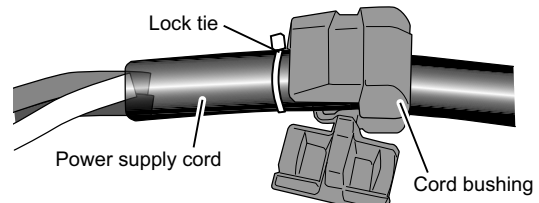


Figure C-2(a) Cord bushing position

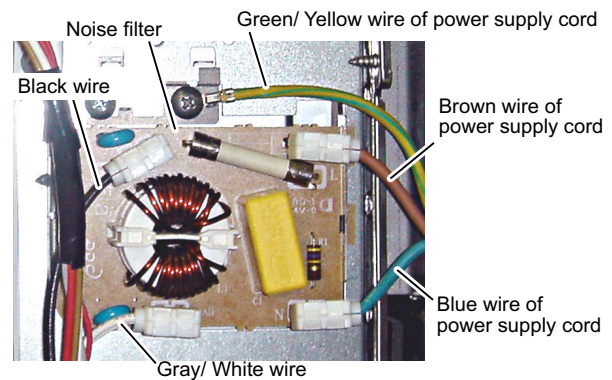


Figure C-2(b) Wiring to the noise filter

[8] HOW TO RELEASE THE POSITIVE LOCK CONNECTOR.

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

CAUTION: THE POSITIVE LOCKR TERMINAL CAN NOT BE REMOVED BY JUST PULLING ON IT. THE LOCK LEVER MUST BE RELEASED TO REMOVE THE CONNECTOR FROM THE TERMINAL.

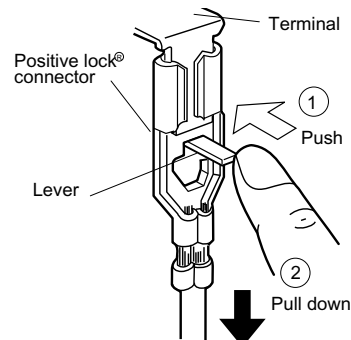


Figure C-3. How to release the positive lock® connector

[9] EXHAUST FAN REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Make sure that the connector of the exhaust fan has been disconnected from the wire harness.
4. Remove the four (4) screws and the two (2) nuts holding the exhaust fan.
5. Now, the exhaust fan is free.

[10] FAN MOTORS REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the rear cover.
3. Disconnect the connector of the fan motor from the connector of the wire harness.
4. Remove the three (3) screws holding the fan motor to the motor fixing angle and magnetron cool duct A.
5. Release the wire leads of the fan motor from the wire holder.
6. Remove the fan motor from the oven cavity.
7. Now, the fan motor is free.

[11] ANTENNA MOTORS (UPPER AND LOWER) REMOVAL

1. UPPER

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

2. LOWER

1. Disconnect the oven from the power supply.
2. Remove the two (2) screws holding the motor protect cover to the bottom plate assembly.
3. Remove the motor protect cover from the bottom plate assembly.
4. Disconnect the wire leads from the antenna motor (lower).
5. Remove the one (1) screw holding the antenna motor (Lower) to the oven cavity.
6. Now, the antenna motor (lower) is free.

[12] POWER UNIT REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Disconnect all wire leads and connectors from the power unit.
3. Remove the four (4) screws holding the power unit to the PWB holder.
4. Now, the power unit is free.

[13] CONTROL PANEL ASSEMBLY AND CONTROL UNIT REMOVAL

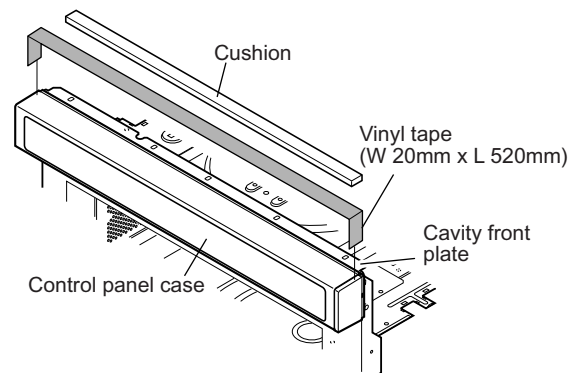
1. CARRY OUT **3D** CHECKS.
2. Disconnect all connectors from the control unit.
3. Remove the vinyl tape with a cushion attached to the oven cavity face plate and the control panel case.
4. Remove three (3) screws holding the control panel to the oven cavity face plate.
5. Now the control panel assembly is free.
6. Remove five (5) screws holding the control unit to the panel fixing plate.
7. Remove the CPU protect sheet from the control unit.
8. Now, the control unit is free.

CAUTION: When installing the control unit into the control panel frame:

- 1) Be careful not to damage any of the components on the control unit.
- 2) When inserting key units ribbon cable through the frame, ensure it is not pinched or bent.

NOTE: 1) Before attaching a new key unit, remove remaining adhesive on the panel fixing plate surfaces completely with a soft cloth soaked in alcohol.

- 2) When attaching the key unit to the panel fixing plate, adjust the lower edge and left edge of the key unit to the correct position of panel fixing plate.
- 3) Stick the key unit firmly to the panel fixing plate by rubbing with soft cloth to prevent scratching.
- 4) When the control unit is replaced, set the standard voltage referring to Special function pages.
- 5) Attach the vinyl tape and the cushion to the oven cavity face plate and the control panel case after the control panel assembly is installed.



[14] RELAY UNIT REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Disconnect all wire leads and connectors from the power unit and the relay unit.
3. Remove the four (4) screws holding the PWB holder to the oven cavity top plate and the noise filter angle.
4. Remove the PWB holder with the power unit and the relay unit from the oven cavity.
5. Remove the six (6) screws holding the relay unit to the PWB holder.
6. Remove the relay unit from the PWB holder.
7. Now, the relay unit is free.

NOTE: When the relay unit is replaced, set the standard voltage referring to Special Function pages.

[15] DOOR SENSING SWITCH (SW5)/SECONDARY INTERLOCK SWITCHES (SW1, SW2) AND MONITOR SWITCHES (SW3, SW4) REPLACEMENT

1. REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Disconnect all wire leads from the all switches.
3. Remove two (2) screws holding latch hook to oven flange.
4. Remove latch hook assembly from oven flange.
5. Remove the switch(es) in accordance with following procedure.

DOOR SENSING SWITCH

Push the two (2) tabs outward and pull switch forwards to release switch.

MONITOR SWITCHES OR SECONDARY INTERLOCK SWITCHES

Remove one (1) screw and nut holding two switches together to latch hook.

6. Now, switch(es) is now free.

2. REINSTALLATION

1. Re-install the switch(es) in accordance with following procedure.

DOOR SENSING SWITCH

Mount the door sensing switch in the lower position of latch hook.

MONITOR SWITCHES

- 1) Mount the two (2) switches side by side in the top position of the latch hook.
- 2) Fasten both switches together to latch hook with one (1) screw and nut.

SECONDARY INTERLOCK SWITCHES

- 1) Mount the two (2) switches side by side in the middle position of the latch hook.
- 2) Fasten both switches together to latch hook with one (1) screw and nut.
2. Re-install latch hook assembly and fasten it to oven flange with two (2) screws.
3. Re-connect all wire leads to all switches, referring to pictorial diagram. Be careful to ensure proper connection of the wire leads.
4. Make sure that the monitor switches (SW3, SW4) and all other switches are operating properly. And check continuity of the monitor circuit. Refer to chapter "Test Procedure" and Adjustment procedure.

[16] DOOR SENSING SWITCH (SW5)/SECONDARY INTERLOCK SWITCHES (SW1, SW2) AND MONITOR SWITCHES (SW3, SW4) ADJUSTMENT

1. Adjustment procedure

1. CARRY OUT **3D** CHECKS.

If the door sensing switch, secondary interlock switches (SW1, SW2) and monitor switches (SW3, SW4) do not operate properly due to a misadjustment, the following adjustment should be made.

2. Loosen the two (2) screws holding latch hook to the oven cavity front flange.
3. 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 switches (SW1, SW2) are activated with the door closed. The horizontal position of the latch hook should be adjusted so that the monitor switches (SW3, SW4) are activated with the door closed.
4. Secure the screws with washers firmly.
5. Check the operation of all switches. If all switches have not activated with the door closed, loosen two (2) screws and adjust the latch hook position.

2. After adjustment, check the following.

1. In and out play of door remains less than 0.5mm when in the latched position.
2. The door sensing switch and secondary interlock switches (SW1, SW2) interrupt the circuit before the door can be opened.

3. Monitor switches (SW3, SW4) contacts close when door is opened.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

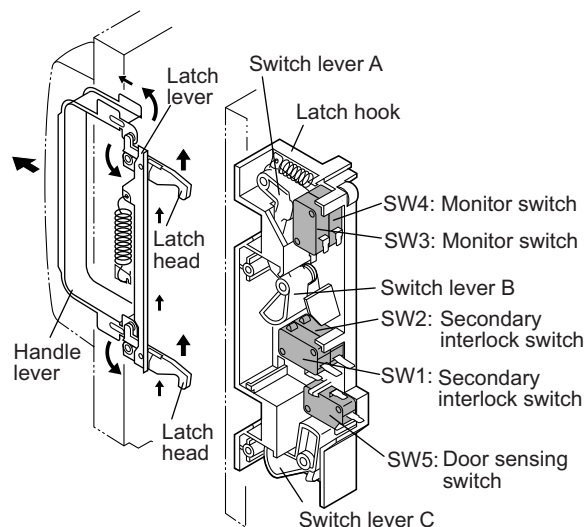


Figure C-4. Latch Switch Adjustments

[17] DOOR REPLACEMENT

1. REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Disconnect the harness of the door assembly from the control unit.

3. Remove the two (2) screws holding each of the upper and lower hinges to the oven cavity.
4. Remove door assembly with upper and lower hinges by pulling it forward.

5. Release upper and lower hinges and the hinge cover from door assembly.
6. Now, door assembly is free.

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

2. REINSTALLATION

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

NOTE: After any service to the door;

- 1) Make sure that door sensing switch, secondary interlock switches (1), (2) and monitor switches (1), (2) are operating properly. (Refer to chapter "Test Procedures".)
- 2) An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.

3. DOOR ADJUSTMENT

Door adjustment is performed with the door properly installed and closed and while the oven hinges are loose.

1. Loosen upper and lower hinges with phillips head screw driver.
2. Adjust the door by moving it vertically so that the top of the door is parallel to the bottom of the control panel assembly.
3. Tighten the upper and lower oven hinge screws.

3.1. After adjustment, make sure of the following:

1. Door latch heads smoothly catch the latch hook through the latch holes, and the latch head goes through the center of the latch hole.

[18] DOOR DISASSEMBLY

1. CHOKE COVER REMOVAL

1. Remove the door assembly from oven cavity, referring to "DOOR REMOVAL".
2. Insert a putty knife (thickness of about 0.5mm) at the three (3) positions in gap between the choke cover and the door panel of the latch heads side as shown in the fig.C-6, to free engaging parts.
3. Push the each four (4) positions of the upper side and lower side of chock cover by your finger as shown in the Fig.C-6, to free engaging parts.
4. Pull the chock cover rightward as shown in the fig.C-6, to free engaging parts.

NOTE: As the choke cover and door panel are engage at 14 places, do not force any particular part.

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

NOTE: When carrying out any repair to the door, do not bend or warp the slit choke (tabs on the door panel assembly) to prevent microwave leakage.

2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

NOTE: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from oven cavity during cook cycle.

This function does not require that door be air-tight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around oven door is not abnormal and do not of themselves, indicate a leakage of microwave energy from oven cavity. If such were the case, your oven could not be equipped with a vent, the very purpose of which is to exhaust the vapor-laden air from the oven cavity.

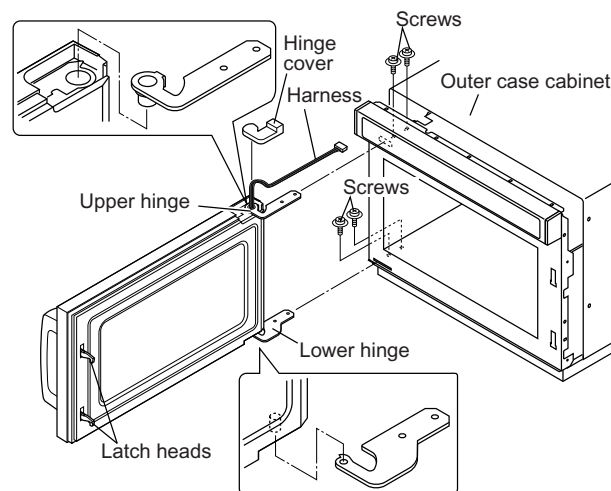


Figure C-5. Door Replacement

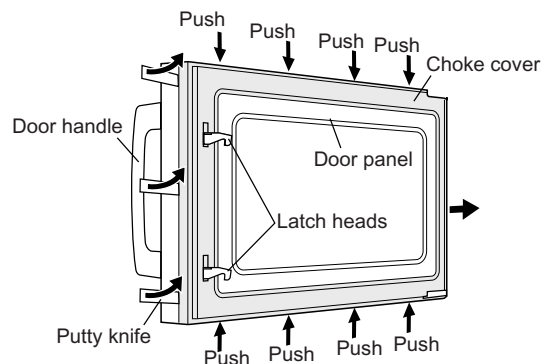


Figure C-6. Choke cover

2. DOOR PANEL REMOVAL

After removing choke cover;

1. Remove the six (6) screws holding the door panel to the door frame.
2. Release the harness from the hole of the door panel.
3. Remove the door panel from the door frame by releasing the six (6) tabs of the door frame.

3. KEY UNIT (IN DOOR ASSEMBLY) REMOVAL

After removing door panel;

1. Remove the five (5) screws holding the key fixing plate to the door frame.
2. Remove the key fixing plate from the door frame.
3. Remove the board cover from the key fixing plate.
4. Disconnect the flat ribbon cable of the key unit from the connector of the switch unit.
5. Remove the connectors installed at the edge of the key unit ribbon cable.
6. Tear the key unit from the key fixing plate.
7. Now, the key unit is free.

NOTE: 1) Before attaching a new key unit, remove remaining adhesive on the key fixing plate surfaces completely with a soft cloth soaked in alcohol.

2) When attaching the key unit to the key fixing plate, adjust the upper edge and left edge of the key unit to the correct position of key fixing plate.

3) Stick the key unit firmly to the key fixing plate by rubbing with soft cloth to prevent scratching.

4. SWITCH UNIT REMOVAL

After removing door panel;

1. Remove the five (5) screws holding the key fixing plate to the door frame.
2. Remove the key fixing plate from the door frame.
3. Remove the board cover from the key fixing plate.
4. Disconnect the flat ribbon cable of the key unit from the connector of the switch unit.
5. Disconnect the harness from the connector of the switch unit.
6. Remove the one (1) screw holding the switch unit to the key fixing plate.
7. Now, the switch unit is free.

5. FRONT DOOR GLASS REMOVAL

After removing door panel;

1. Remove the one (1) screw holding the glass stopper to the door frame.
2. Slide the front door glass leftward (latch heads side) and then slide it upward.
3. Release the upper edge of the front door glass from the tabs of the door frame.
4. Now, the front door glass is free.

6. DOOR HANDLE, DOOR LEVER AND HANDLE COVER REMOVAL

After removing door panel;

1. Remove the latch spring from the latch angle assembly and the latch lever.
2. Remove the one (1) screw holding the latch angle assembly to the door frame.
3. Remove the four (4) screws holding the latch angle assembly to the door handle.
4. Now, the door handle is free.
5. Remove the door lever from the latch heads.
6. Remove the door lever from the handle cover by releasing the tabs.
7. Now, the door lever and the handle cover are free.

7. UPPER AND LOWER LATCH HEADS REMOVAL

After removing door panel;

1. Remove the latch spring from the latch angle assembly and the latch lever.
2. Remove the one (1) screw holding the latch angle assembly to the door frame.
3. Remove the four (4) screws holding the latch angle assembly to the door handle.
4. Now, the door handle is free.
5. Remove the door lever from the latch heads.
6. Remove the two (2) latch heads and the latch lever from the latch angle assembly together.
7. Remove the latch heads from the latch lever.
8. Now, the latch heads are free.

8. DOOR CASE REMOVAL

After removing door panel;

1. Remove the five (5) screws holding the key fixing plate to the door frame.
2. Remove the key fixing plate from the door frame.
3. Remove the front door glass from the door frame, referring to "FRONT DOOR GLASS REMOVAL".
4. Remove the door handle, the door lever with the handle cover from the door frame, referring to "DOOR HANDLE, DOOR LEVER AND HANDLE COVER REMOVAL".
5. Remove the one (1) screw holding the latch angle assembly to the door frame.
6. Remove the latch angle assembly with the door latches from the door frame.
7. Bend up all nails of the door case.
8. Remove door case from the door frame.
9. Now, the door case is free

9. NOTE FOR POSITION OF HARNESS AND PIPE

Before the door panel is reinstalled, make sure that the pipe should be positioned at the correct place. And the harness should pass through the holder of the door frame and the pipe, as shown in Fig.C-7.

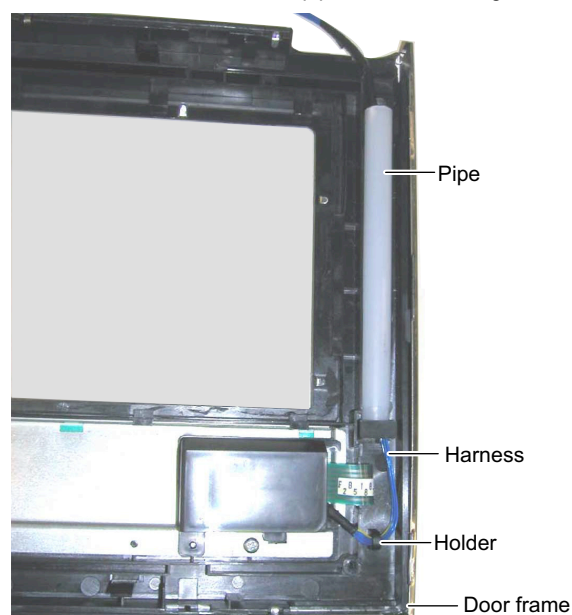


Figure C-7. Inside of door

[19] OVEN LAMP AND LAMP SOCKET REMOVAL

1. CARRY OUT **3D** CHECKS.
2. Remove the oven lamp.
3. By pushing the tab, remove the lamp spacer with the lamp socket from the lamp angle assembly.
4. Remove the lamp spacer from the lamp socket.
5. 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.
6. Now, the oven lamp socket is free.

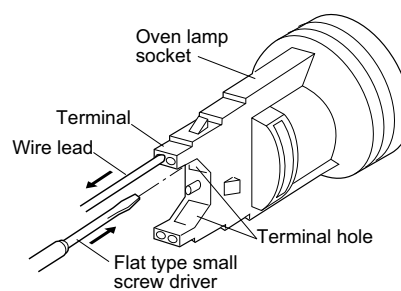


Figure C-8. Oven lamp socket

CHAPTER 10. MICROWAVE MEASUREMENT

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

REQUIREMENT

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

PREPARATION FOR TESTING

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

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

Important:

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

Recommended instruments are:

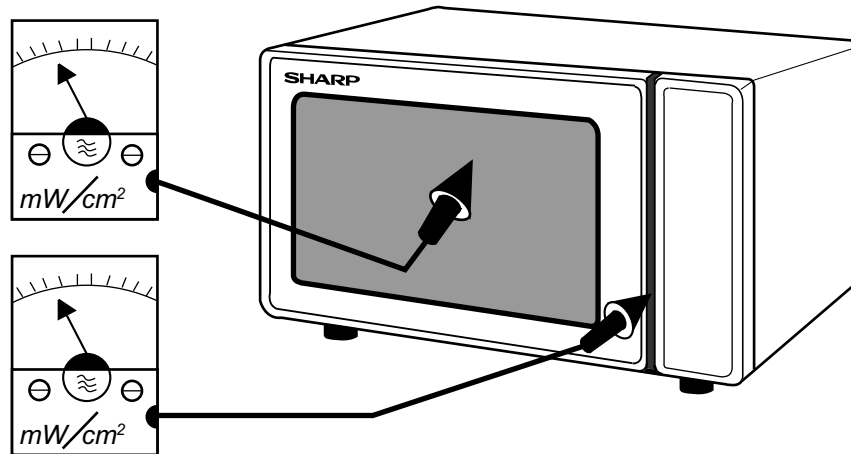
NARDA 8100

NARDA 8200

HOLADAY HI 1500

SIMPSON 380M

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



Microwave leakage measurement at 5 cm distance

CHAPTER 11. TEST DATA AT A GLANCE

| PARTS | SYMBOL | VALUE / DATA |
|-------------------------------------|----------|--|
| Temperature fuse (Upper Mag.) | TF1 | 150°C |
| Temperature fuse (Lower Mag.) | TF2 | 150°C |
| Temperature fuse (Oven) | TF3 | 120°C |
| Magnetron thermistor (Upper) | TH | Approx. 750k Ω at the room temperature |
| Magnetron thermistor (Lower) | TH | Approx. 750k Ω at the room temperature |
| Oven lamp | OL | 240V 25W |
| High voltage capacitor for R-1500AT | C1, C2 | 0.82 μ F AC 2300V |
| High voltage capacitor for R-2100AT | C1, C2 | 1.13 μ F AC 2300V |
| Power transformer | T1, T2 | Filament winding < 1 Ω Secondary winding Approx. 76 Ω Primary winding Approx. 1.3 Ω |
| Magnetron | MG1, MG2 | Filament < 1 Ω Filament - chassis ∞ Ω |

WARNING: DISCONNECT THE PLUG WHEN MEASURING RESISTANCE

CHAPTER 12. CIRCUIT DIAGRAMS

[1] Oven Schematic

SCHEMATIC

NOTE: CONDITION OF OVEN
 1. DOOR CLOSED.
 2. PLUGGED IN OVEN.
 3. NOTHING APPEAR ON DISPLAY.

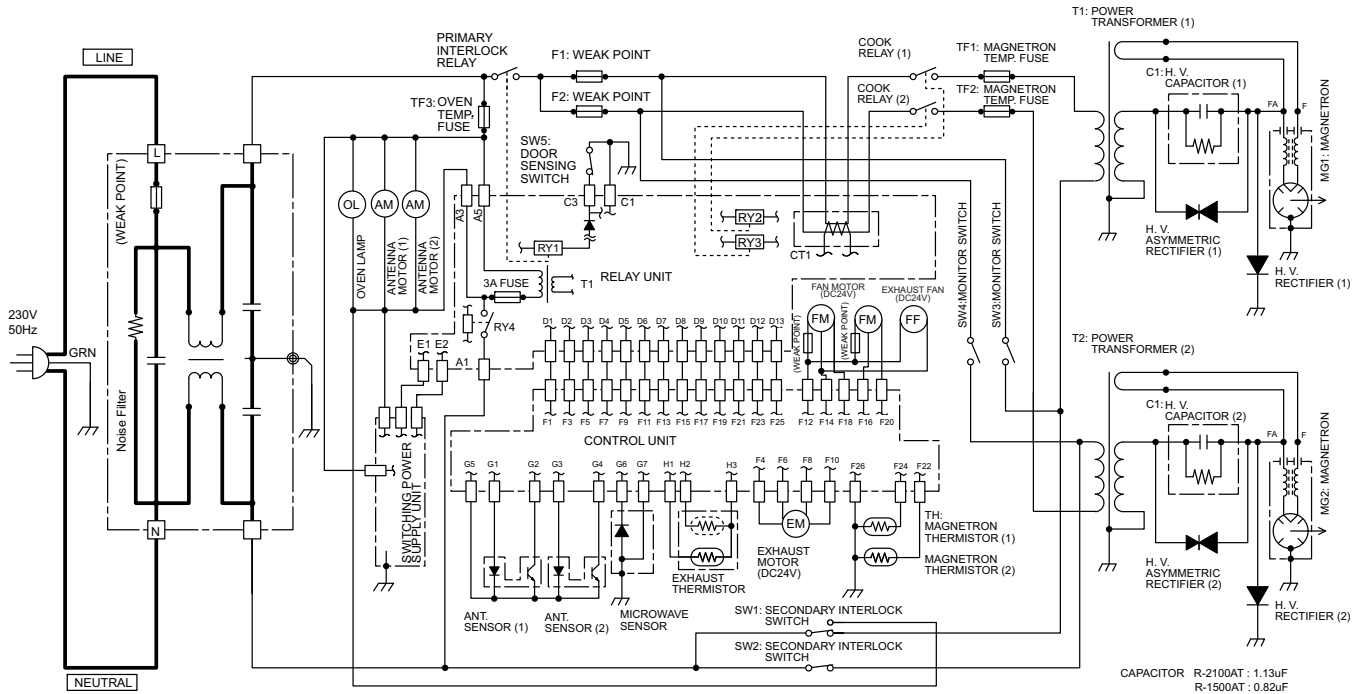


Figure O-1a Oven Schematic-OFF condition right after the oven is plugged in.

SCHEMATIC

NOTE: CONDITION OF OVEN
 4. DOOR OPENED.
 5. "0" APPEAR ON DISPLAY.

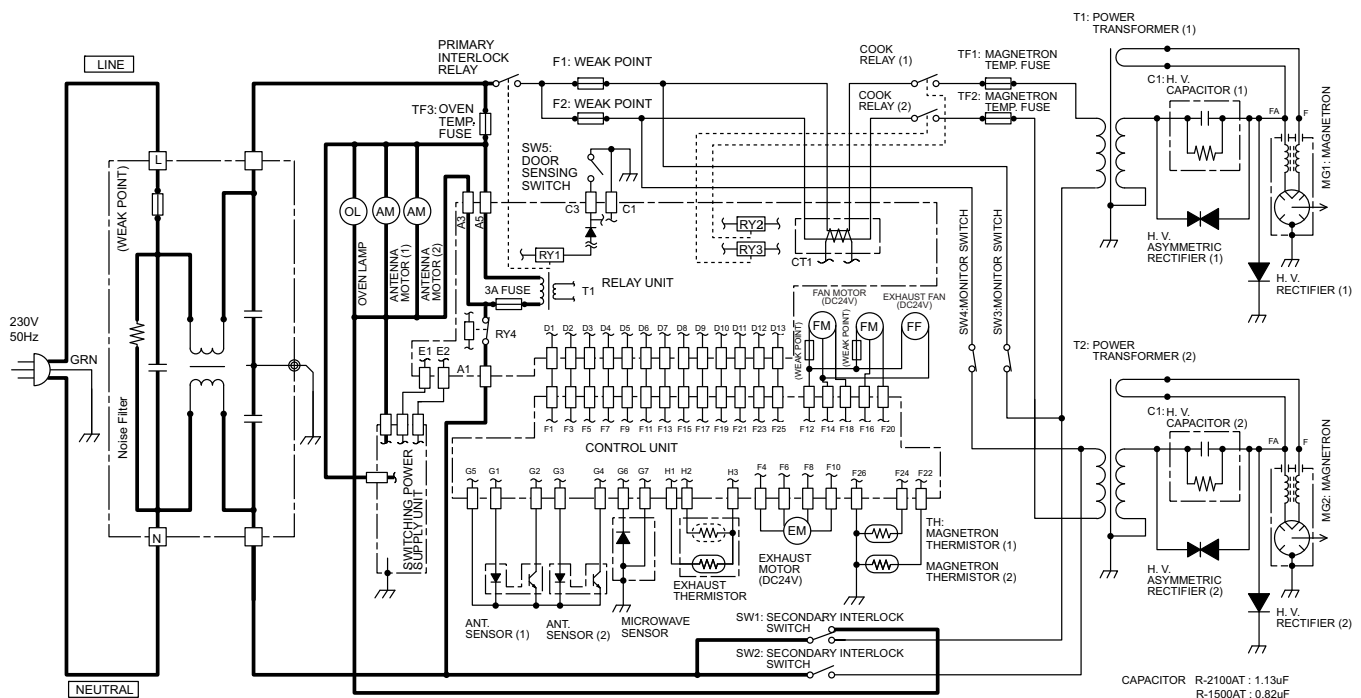


Figure O-1b Oven Schematic-OFF condition when the oven door is opened.

SCHEMATIC

NOTE: CONDITION OF OVEN
 6. DOOR CLOSED.
 7. "0" APPEAR ON DISPLAY.

NOTE: The relay RY4 will open if the oven is not operated for 3 minutes or more. And the oven condition will go back to one of Figure O-1(a).

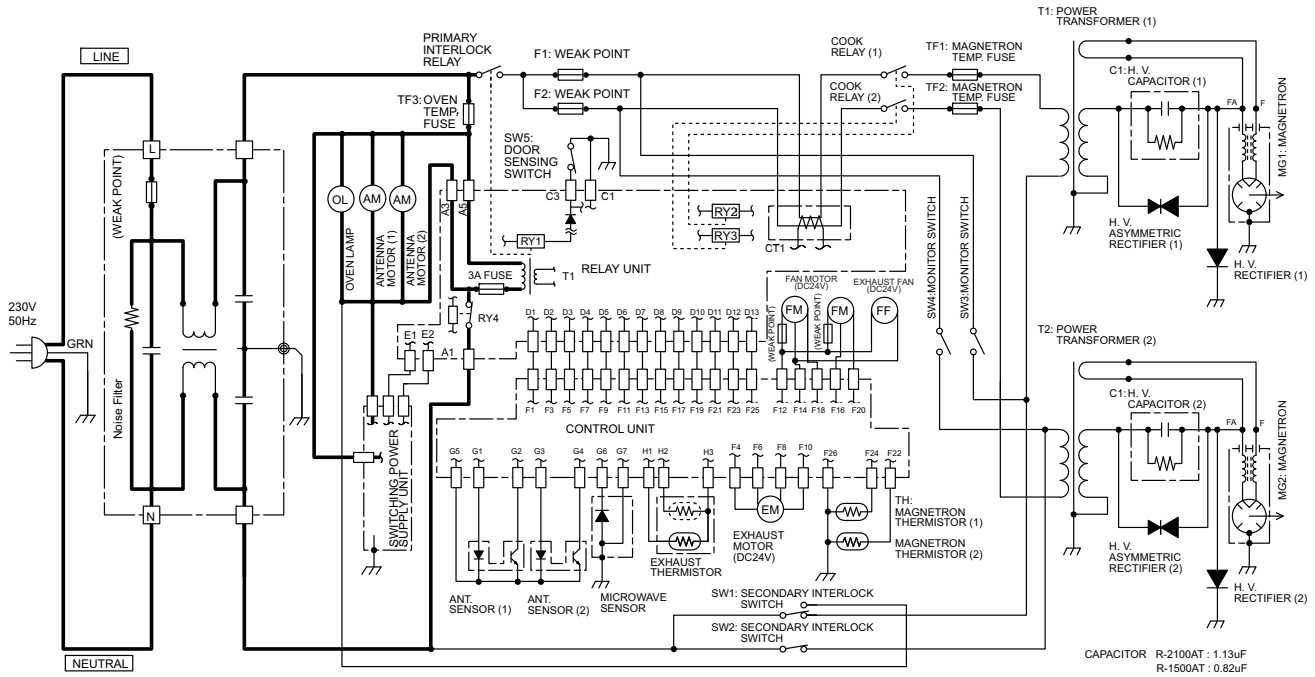


Figure O-1c Oven Schematic-OFF condition after the oven door is closed.

SCHEMATIC

NOTE: CONDITION OF OVEN
 1. DOOR CLOSED.
 2. MANUAL/ REPEAT PAD TOUCHED.
 3. COOKING TIME PROGRAMMED.
 4. STRAT PAD TOUCHED.

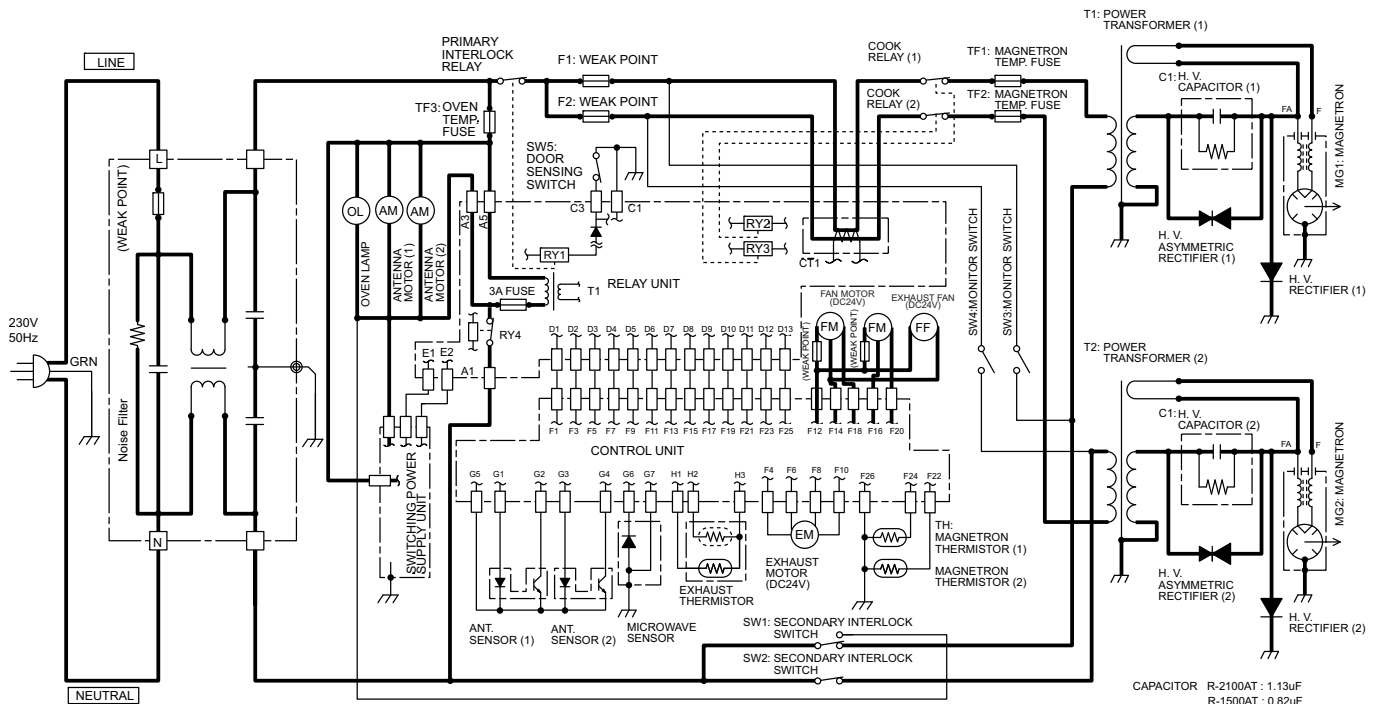
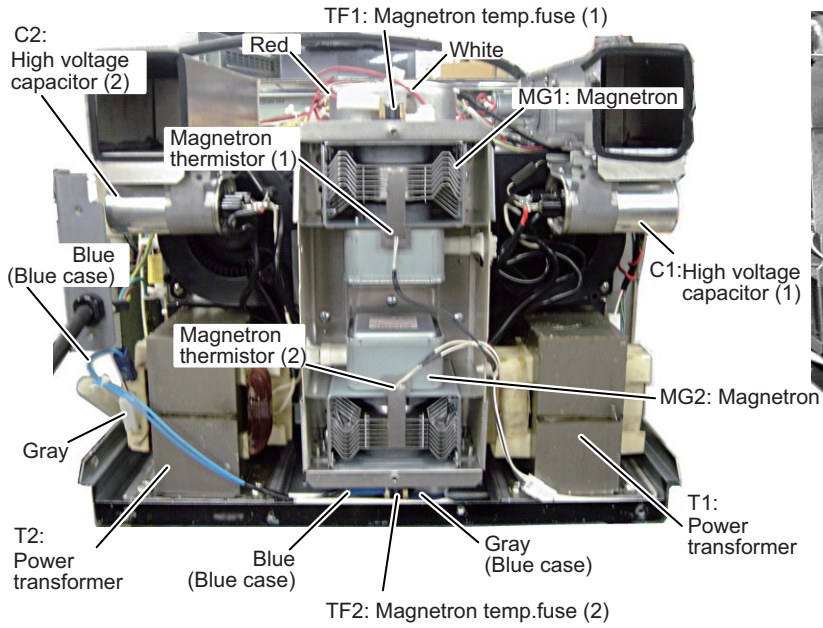
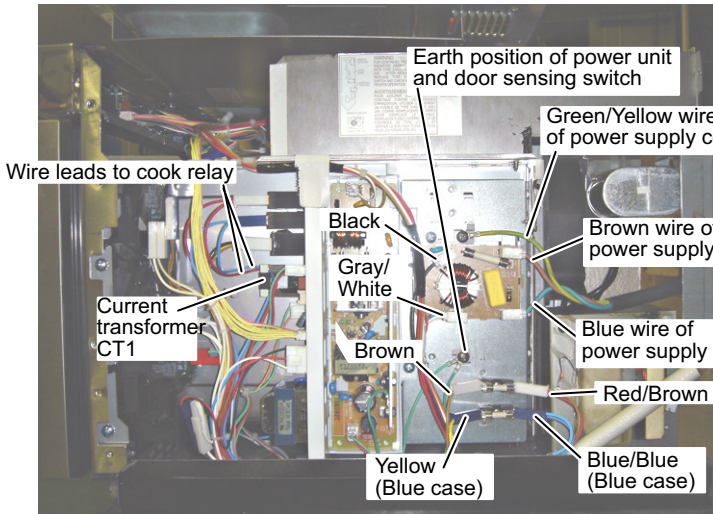
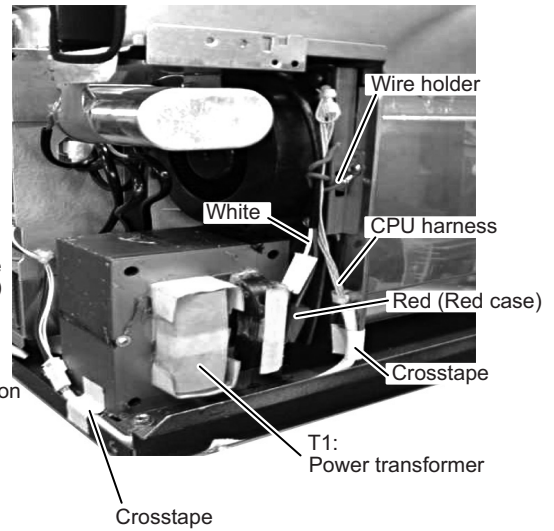


Figure O-2 Oven Schematic-Cooking Condition

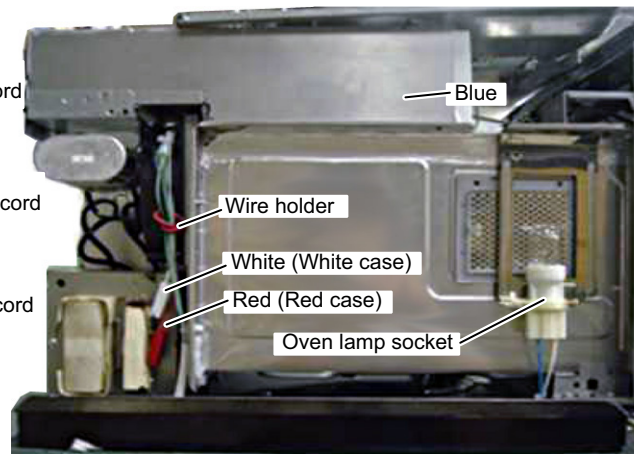
[2] Figure S-1. Pictorial Diagram



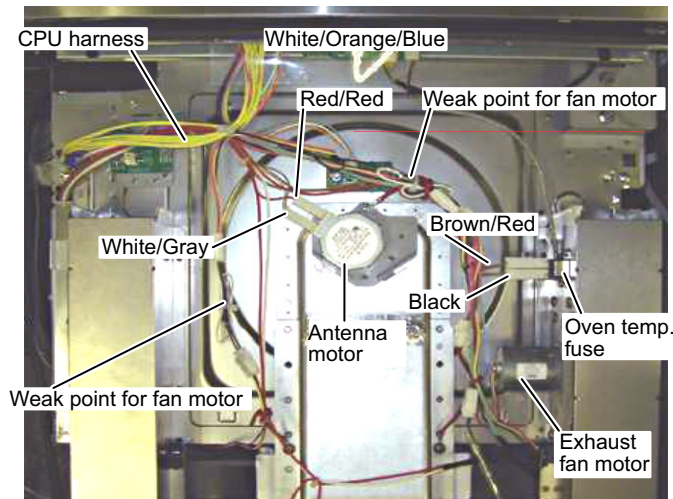
REAR VIEW



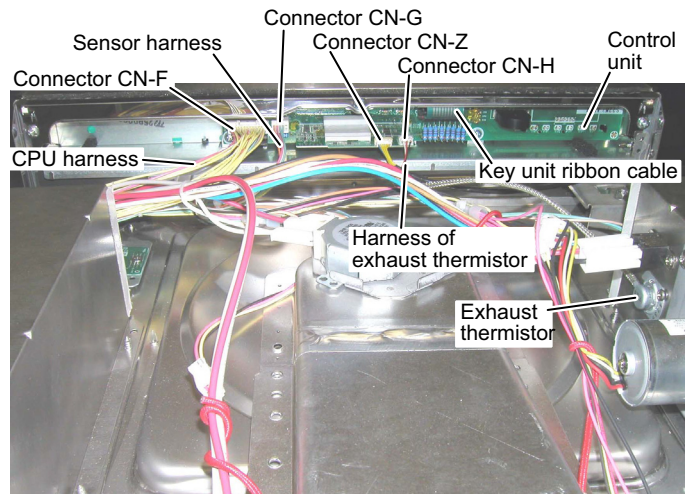
RIGHT SIDE VIEW



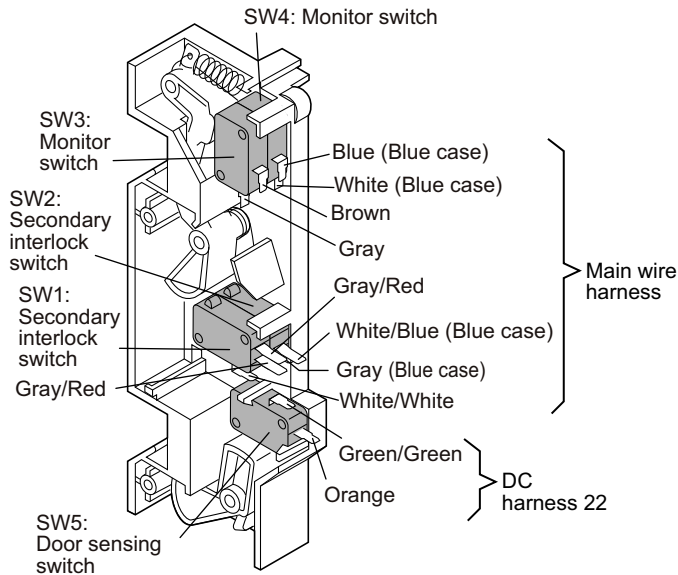
LEFT SIDE VIEW



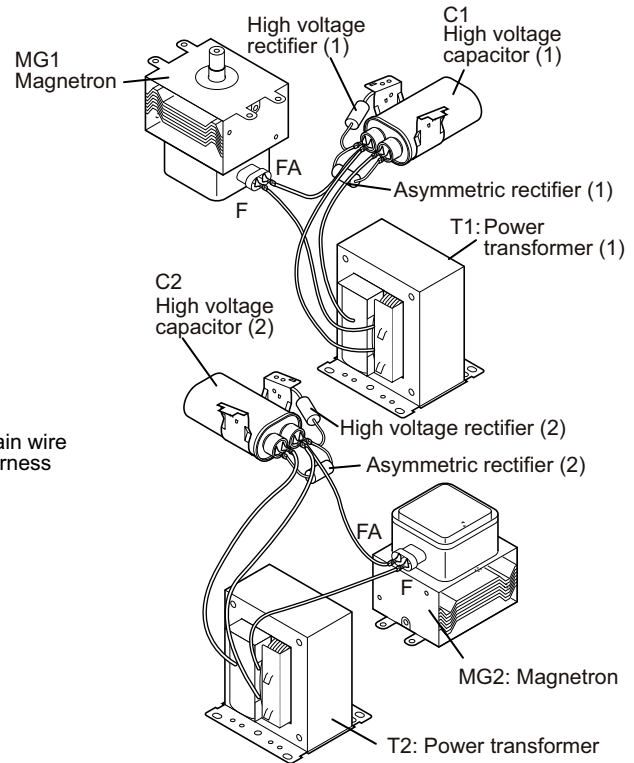
TOP VIEW



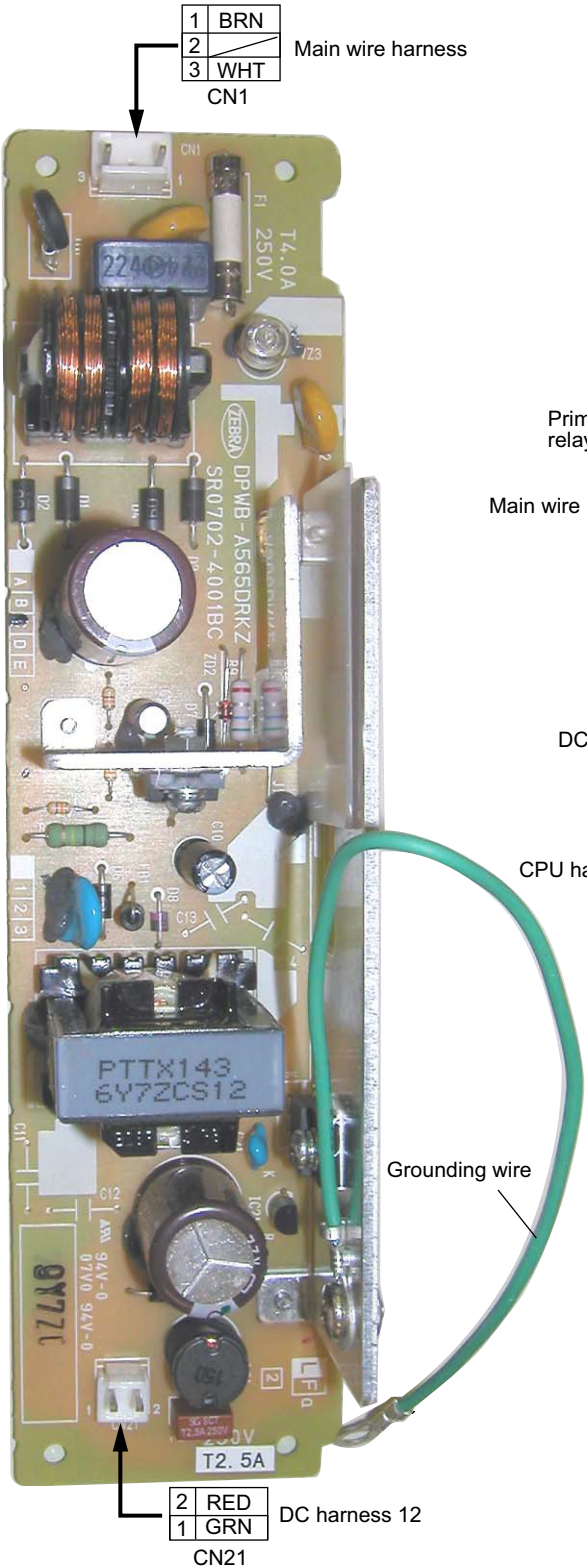
CONTROL UNIT



LATCH SWITCHES



Wiring of high voltage components



| | |
|---|-----|
| 1 | BRN |
| 2 | WHT |
| 3 | WHT |

CN1

Main wire harness

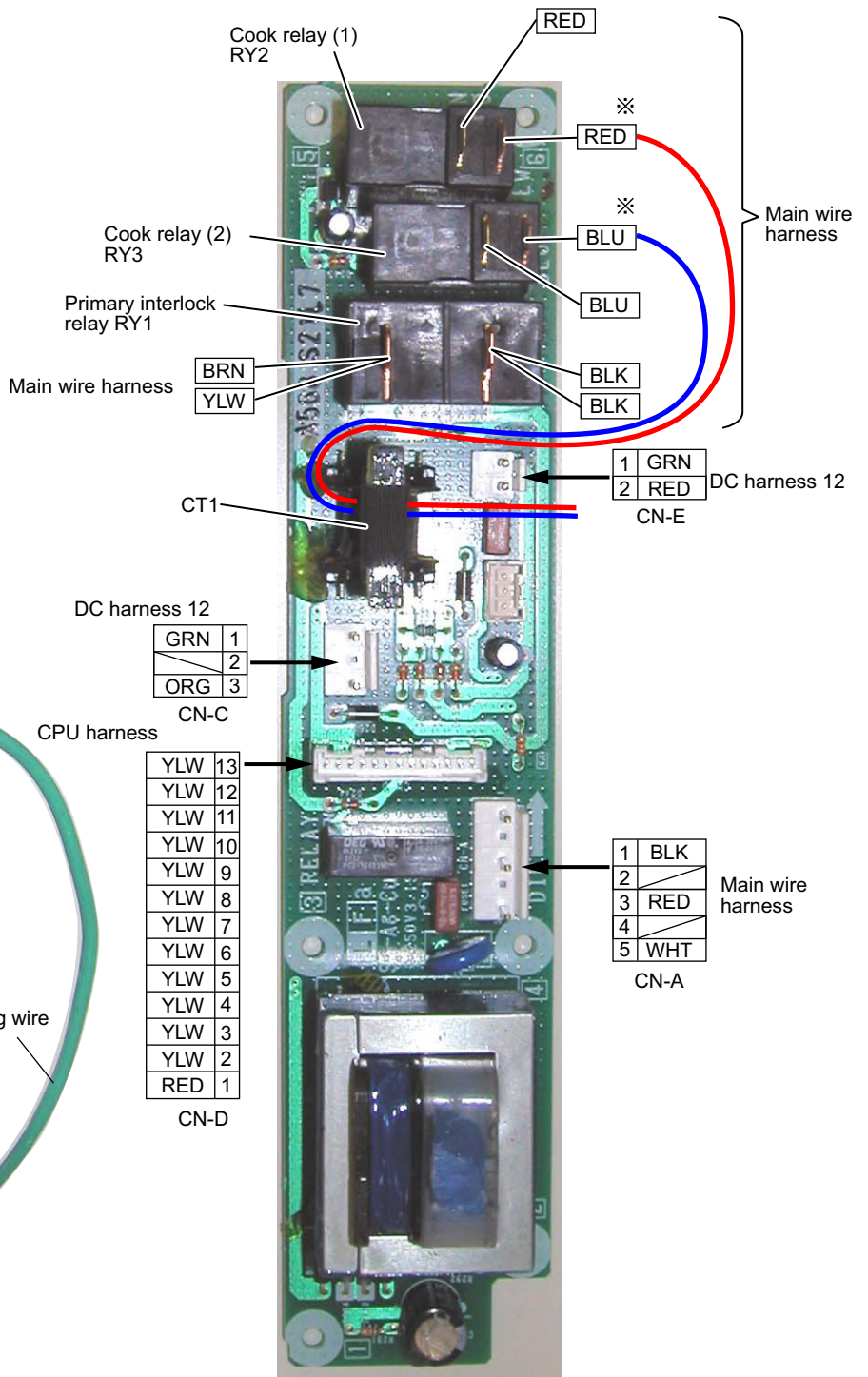
| | |
|---|-----|
| 2 | RED |
| 1 | GRN |

CN21

DC harness 12

SWITCHING POWER SUPPLY UNIT

※ **NOTE:**
The red and blue wire leads to the cabinet side terminals of RY2 and RY3 should go through inside the core of CT1



Cook relay (1)
RY2

Cook relay (2)
RY3

Primary interlock
relay RY1

Main wire harness

CT1

DC harness 12

| | |
|-----|---|
| GRN | 1 |
| 2 | |
| ORG | 3 |

CN-C

CPU harness

| | |
|-----|----|
| YLV | 13 |
| YLV | 12 |
| YLV | 11 |
| YLV | 10 |
| YLV | 9 |
| YLV | 8 |
| YLV | 7 |
| YLV | 6 |
| YLV | 5 |
| YLV | 4 |
| YLV | 3 |
| YLV | 2 |
| RED | 1 |

CN-D

| | |
|---|-----|
| 1 | GRN |
| 2 | RED |

CN-E

DC harness 12

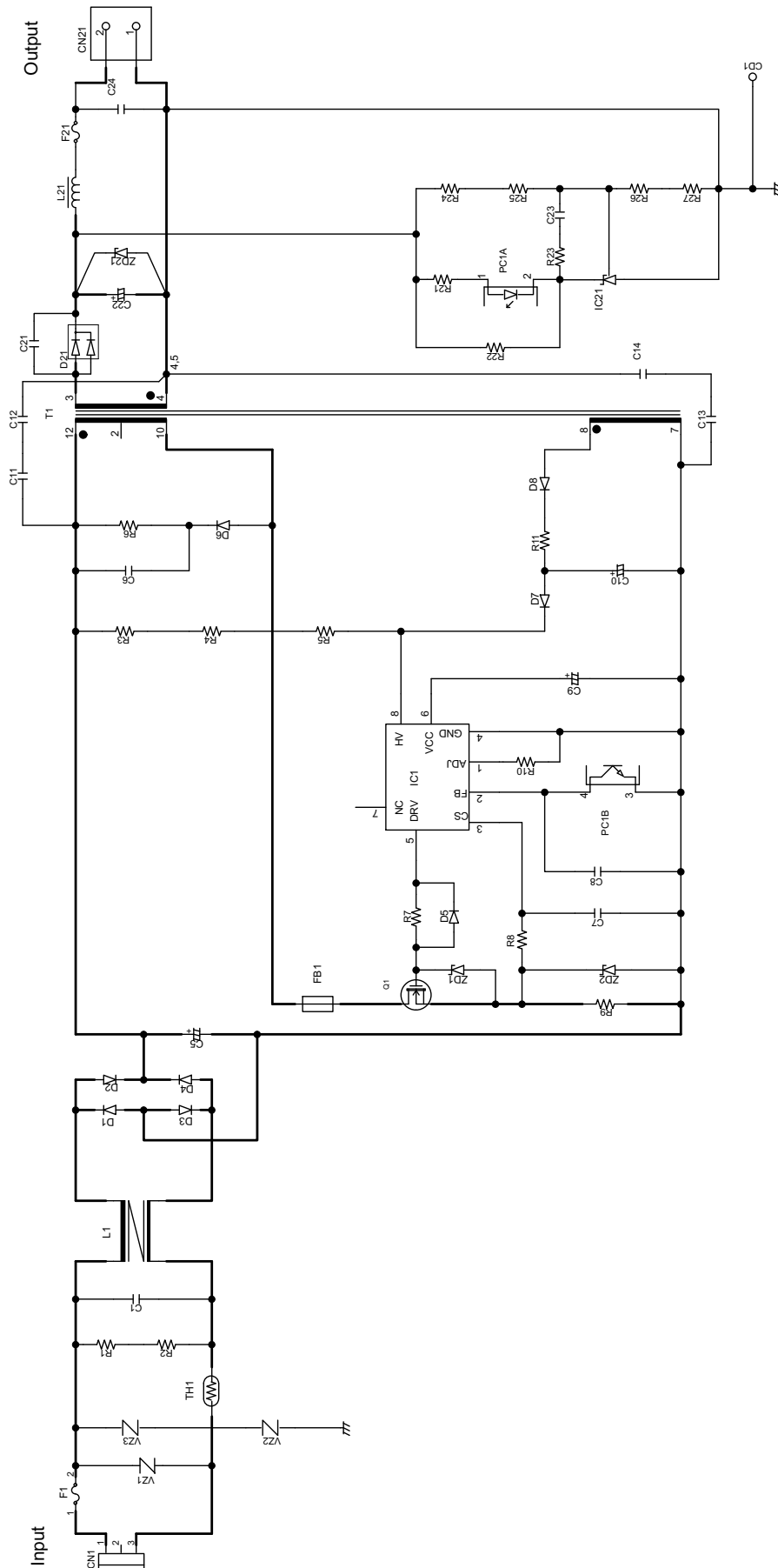
| | |
|---|-----|
| 1 | BLK |
| 2 | |
| 3 | RED |
| 4 | |
| 5 | WHT |

CN-A

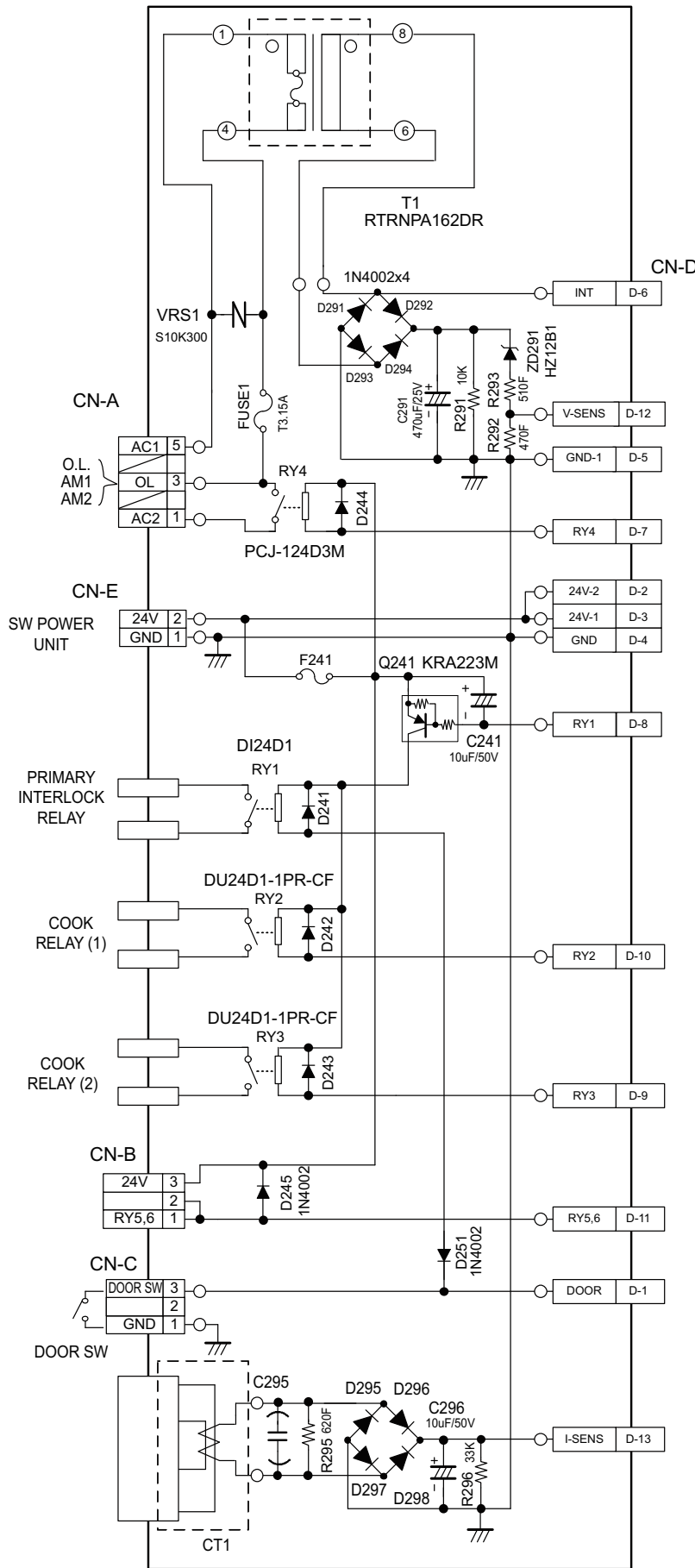
Main wire harness

RELAY UNIT

[3] Figure S-2. Switching Power Supply Unit Circuit



[4] Figure S-3. Relay Unit Circuit



NOTE:
IF NOT SPECIFIED

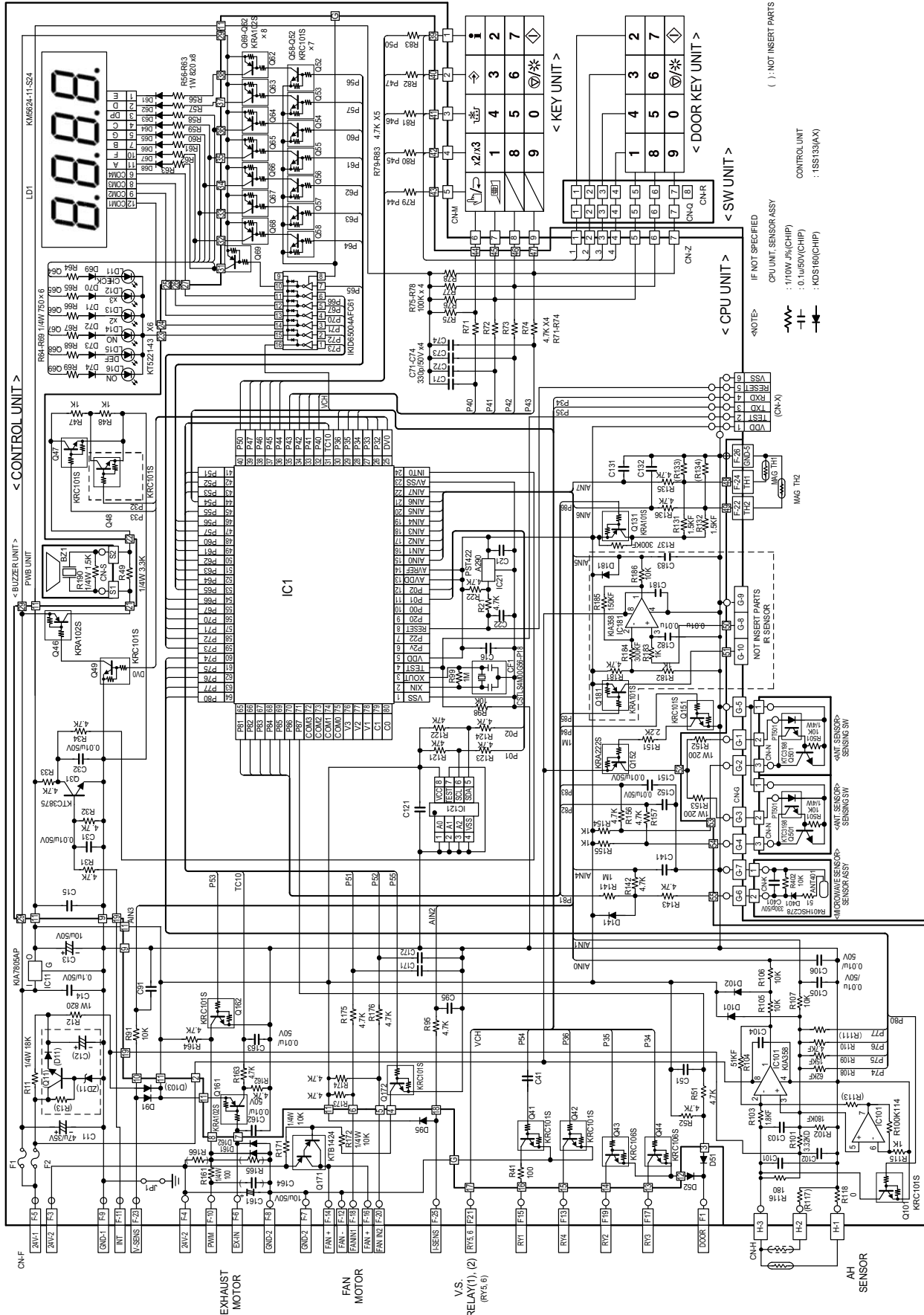
⎓ : 1/4W J%

⎓ : 1SS133

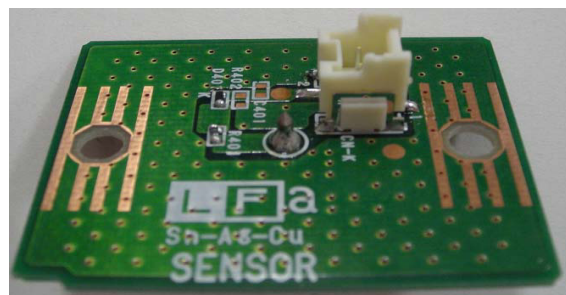
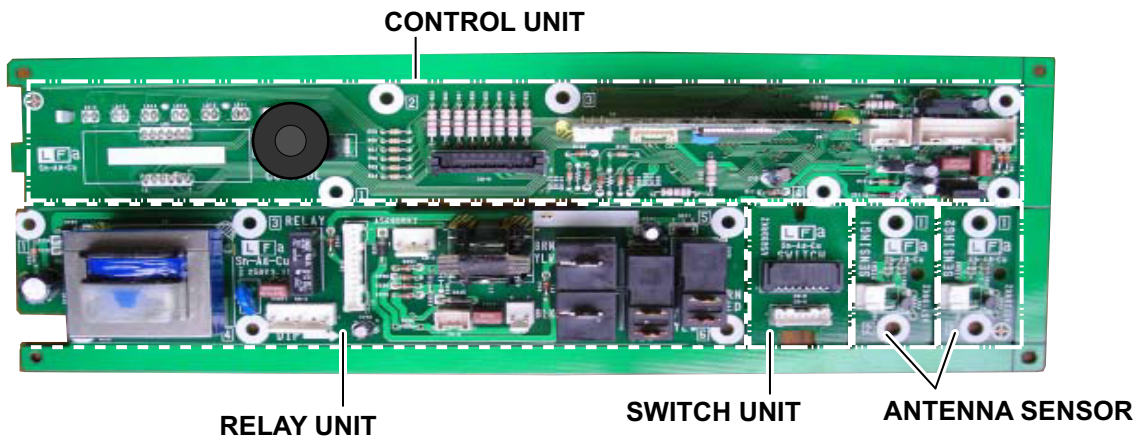
() : NOT INSERT PARTS

○ : CHECK POINT

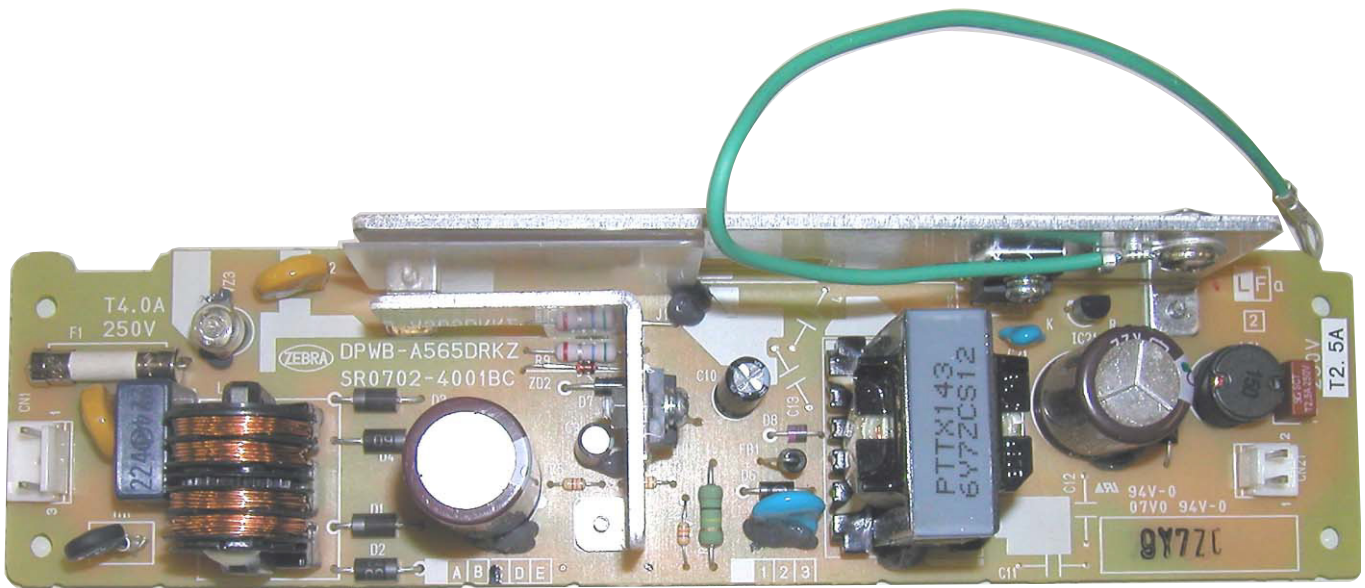
[5] Figure S-4. Control Unit/ Antenna sensor/ Microwave Sensor Circuit



[6] Figure S-5. Printed Wiring Board



MICROWAVE SENSOR



SWITCHING POWER SUPPLY UNIT

SHARP PARTS LIST

COMMERCIAL MICROWAVE OVEN

MODELS R-1500AT R-2100AT

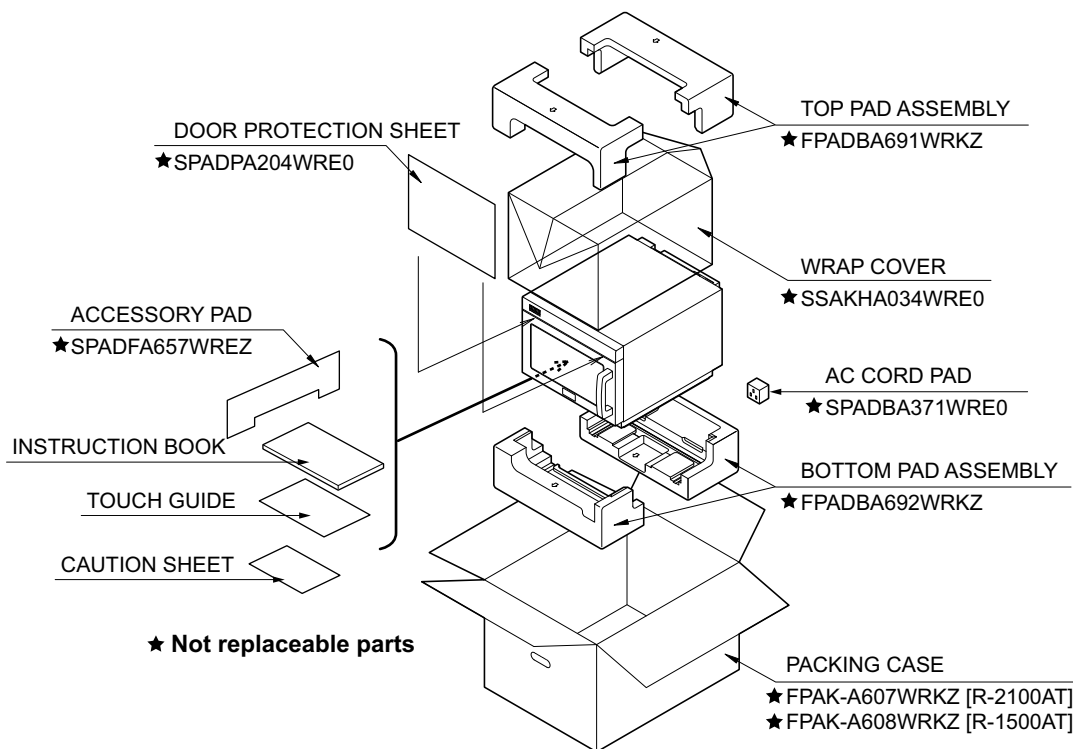
HOW TO ORDER REPLACEMENT PARTS
To have your order filled promptly and correctly, please furnish the following information.

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

Parts marked "*" may cause undue microwave exposure.
Parts marked "▲" are used in voltage more than 250V.

CONTENTS

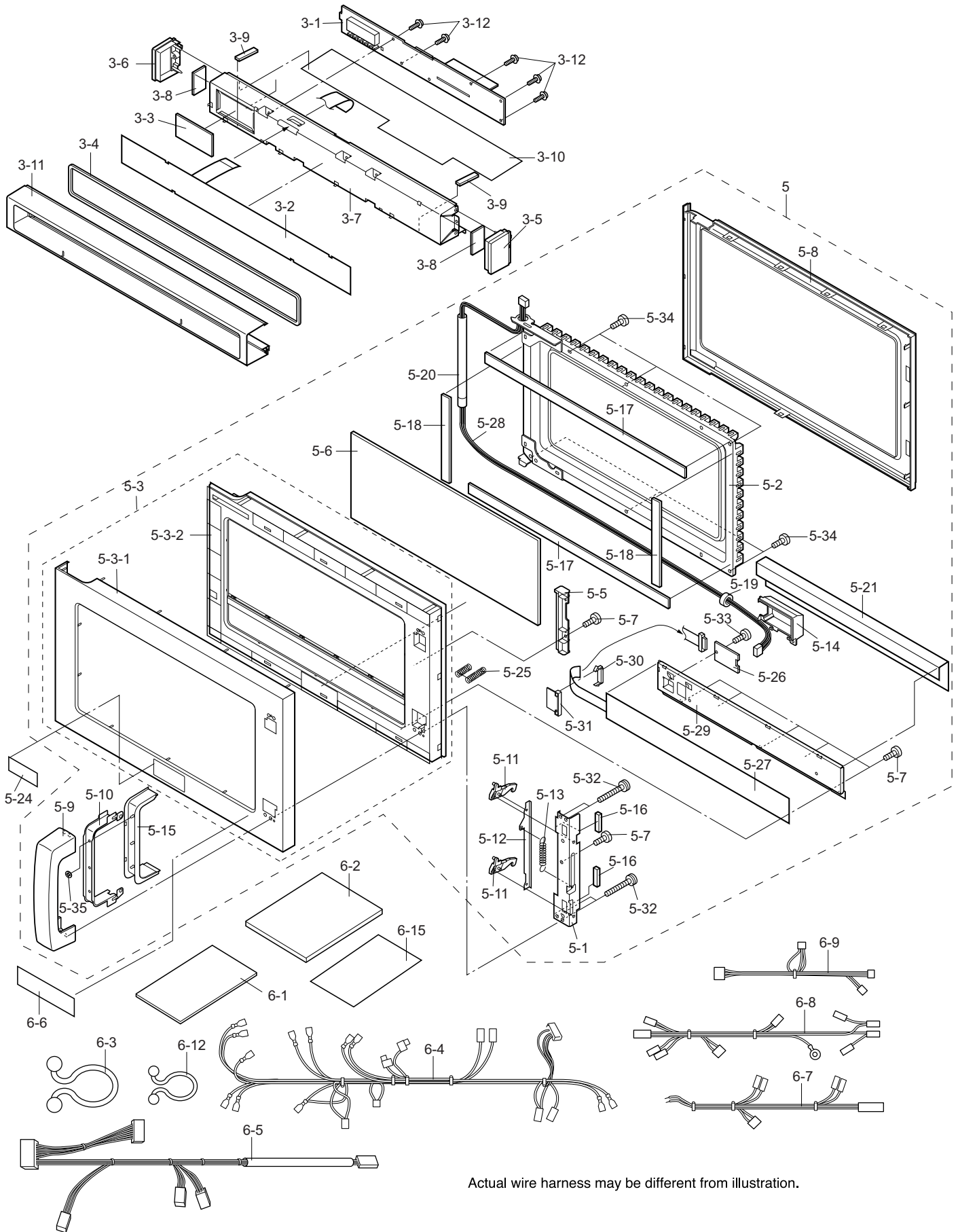
- | | |
|----------------------------|---------|
| [1] OVEN PARTS | PARTS |
| [2] DOOR AND CONTROL PANEL | ■ INDEX |



| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|-----------------------|------------|----------------|----------|-----------|--|
| [1] OVEN PARTS | | | | | |
| ELECTRIC PARTS | | | | | |
| | 1-1 | FDTCTA239WRKZ | AV | | Sensor assembly (Exhaust thermistor) |
| | 1-2 | DPWB-A568DRKZ | BH | | Relay Unit |
| | 1-3 | DPWB-A565DRKZ | BF | | Power Unit (Switching Power Supply Unit) |
| | 1-4 | DPWB-A571DRKZ | BA | | Sensing SW (Antenna sensor) |
| | 1-5 | FACCV A019WRKZ | BF | | Power Supply Cord |
| | 1-6 | FPWBFA445WRKZ | AS | | Noise Filter |
| | 1-7 | DPWB-A570DRKZ | BA | | Sensor assembly (Microwave Sensor) |
| | 1-8 | QSOCLA024WRE0 | AH | | Oven Lamp Socket |
| | 1-9 | QFSHDA019WRE0 | AH | | Fuse Holder |
| △ | 1-10 | FH-DZA145WRZZ | AP | | High Voltage Rectifier assembly |
| | AM | RMOTDA238WRZZ | AS | | Antenna Motor |
| △ | C1 | RC-QZA315WRZZ | AZ | | High Voltage Capacitor [R-2100AT] |
| △ | C1 | RC-QZA363WRZZ | AS | | High Voltage Capacitor [R-1500AT] |
| △ | C2 | RC-QZA315WRZZ | AZ | | High Voltage Capacitor [R-2100AT] |
| △ | C2 | RC-QZA363WRZZ | AS | | High Voltage Capacitor [R-1500AT] |
| | EF | RMOT-A037WRZZ | BF | | Exhaust Fan Motor (DC24V) |
| | EM | FMOT-A031WRKZ | BP | | Exhaust Motor assembly (DC24V) |
| | F1 | QFS-CA024WRE0 | AH | | Fuse F8A |
| | F2 | QFS-CA024WRE0 | AH | | Fuse F8A |
| | FM | RMOT-A036WRZZ | BD | | Fan Motor (DC24V) |
| △ | MG1 | RV-MZA369WRZZ | BG | | Magnetron |
| △ | MG2 | RV-MZA369WRZZ | BG | | Magnetron |
| | OL | RLMPTA078WRE0 | AL | | Oven Lamp |
| | SW1 | QSW-MA087WRE0 | AF | | Secondary Interlock Switch (1) |
| | SW2 | QSW-MA085WRE0 | AF | | Secondary Interlock Switches (2) |
| | SW5 | QSW-MA085WRE0 | AF | | Door Sensing Switches |
| | SW3 | QSW-MA086WRE0 | AF | | Monitor Switch |
| | SW4 | QSW-MA086WRE0 | AF | | Monitor Switch |
| △ | T1 | RTRN-A788WRZZ | BU | | Power Transformer |
| △ | T2 | RTRN-A788WRZZ | BU | | Power Transformer |
| | TF1 | QFS-TA014WRE0 | AG | | Magnetron Temp. Fuse 150C |
| | TF2 | QFS-TA014WRE0 | AG | | Magnetron Temp. Fuse 150C |
| | TF3 | QFS-TA015WRE0 | AG | | DM 120V Fuse (Oven Temp. Fuse) |
| | TH | DH-HZA017WRKZ | AY | | Thermistor assembly (Magnetron thermistor) |
| CABINET PARTS | | | | | |
| | 2-1 | DDAi-A217WRKZ | BP | | Bottom plate assembly |
| | 2-1-1 | LX-NZ0061WRE0 | AA | | Special Nut |
| | 2-1-2 | LX-BZA179WREZ | AL | | Special screw (Filter Stopper L) |
| | 2-2 | FFTASA076WRYZ | AM | | Oven Lamp Access Cover |
| | 2-2-1 | PCUSUA651WRPZ | AD | | Cushion |
| | 2-3 | GCABUB125WRPZ | BN | | Outer Case Cabinet |
| | 2-4 | GCOVHA526WRPZ | AH | | Motor Protect Cover |
| | 2-5 | LANGKB285WRPZ | AG | | Cavity Fixing Plate |
| | 2-6 | PSHEGA011WREZ | AM | | Rubber Sheet L |
| | 2-9 | PFPF-A299WREZ | AL | | Damper Sheet |
| | 2-10 | PCUSGA756WRPZ | AD | | Cabinet Cushion |
| OVEN PARTS | | | | | |
| | 4-1 | FCAS-A026WRYZ | AR | | Fan Case assembly |
| | 4-2 | DDUC-A071WRKZ | AV | | Exhaust Duct assembly |
| | 4-3 | PCUSGA721WRPZ | AG | | Cushion |
| | 4-4 | LHLD-A314WRFZ | AN | | PWB Holder |
| | 4-5 | LANGQA755WRWZ | AM | | AC Cord Angle |
| | 4-6 | LBSHC0006YBE0 | AD | | Cord Bushing |
| | 4-7 | LANGQA738WRWZ | AL | | Noise Filter Angle |
| | 4-8 | LANGQA556WRMZ | AL | | Earth Angle |
| | 4-9 | LBNDKA182WRPZ | AK | | Hv Capacitor Band |
| | 4-10 | FCOVAA093WRYZ | BB | | Rear Cover assembly [R-1500AT] |
| | 4-10 | FCOVAA097WRYZ | BB | | Rear Cover assembly [R-2100AT] |
| | 4-12 | PGiDHA069WRPZ | AF | | Exhaust Cover |
| | 4-13 | PCUSGA740WRPZ | AE | | Bottom Cushion B |
| | 4-14 | PCUSGA768WRPZ | AC | | Lamp Cushion |
| | 4-15 | GCOVPA026WRPZ | BH | | Cover |
| | 4-16 | PCOVPA515WRFZ | AY | | Frame |
| | 4-17 | DDUC-A072WRKZ | AV | | Intake Duct assembly |
| | 4-18 | FFiL-A014WRKZ | BA | | Air Filter Unit |
| | 4-18-1 | LX-BZA178WREZ | AM | | Filter Stopper R |
| | 4-18-2 | FFiL-A040WRYZ | AW | | Air Filter |
| | 4-18-3 | XREUW40-06000 | AA | | Ring |
| | 4-19 | FGLSPA069WRFZ | BT | | Oven Tray assembly |
| * | 4-20 | FHNG-A370WRYZ | AT | | Upper Hinge assembly |
| * | 4-21 | FOVN-A602WRWZ | BX | | Cavity assembly |
| | 4-22 | FPLT-A025WRYZ | AZ | | Upper Antenna assembly |
| | 4-23 | FPLT-A026WRYZ | BA | | Lower Antenna assembly |
| | 4-24 | MLEVCA001WRFZ | AG | | Switch Lever C |
| | 4-25 | MLEVPA279WRFZ | AG | | Switch Lever A |
| | 4-26 | MLEVPA280WRFZ | AG | | Switch Lever B |
| | 4-27 | MSPRCA165WREZ | AC | | Latch Spring A |
| | 4-28 | MSPRCA166WREZ | AC | | Latch Spring B |
| | 4-29 | PSHEPB353WREZ | AH | | Sus Sheet |
| * | 4-30 | PHOK-A164WRFZ | AM | | Latch Hook |
| | 4-31 | GCOVHA527WRPZ | AG | | Bottom Cover |

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|-------------------------------|----------------|------------|----------|-----------|----------------------|
| [1] OVEN PARTS | | | | | |
| 4-32 | GCOVPA027WRPZ | AN | | | Antenna Cover |
| 4-33 | JKNBKA800WRFZ | AM | | | Antenna Cover Knob |
| 4-34 | LANGKB292WRPZ | AM | | | Support Angle |
| 4-35 | FANGQA180WRYZ | AS | | | Lamp Angle assembly |
| 4-36 | LANGQA752WRPZ | AF | | | Capacitor Unit Angle |
| 4-37 | LANGQA702WRPZ | AM | | | Motor Fixing Angle |
| 4-38 | LSUB-A137WRPZ | AE | | | Face Support Angle |
| 4-39 | MHNG-A592WRPZ | AP | | | Lower Hinge |
| 4-40 | NSFTPA045WRFZ | AN | | | Stirrer Shaft |
| 4-41 | PCL iC0018WRE0 | AB | | | Clip L |
| 4-42 | PCOVPA480WRFZ | AG | | | Hinge Cover |
| 4-43 | PCOVPA496WRFZ | AK | | | Sensor Cover |
| 4-44 | PF iLWA064WRPZ | AF | | | Lamp Filter |
| 4-45 | PGLSPA720WREZ | AH | | | Lamp Glass |
| 4-46 | PCUSGA761WRPZ | AE | | | Fan Duct Cushion |
| 4-47 | PSKR-A462WRPZ | AF | | | Partition Angle S |
| 4-48 | GLEGPA033WRE0 | AA | | | Leg |
| 4-49 | GCOVPA022WRPZ | AG | | | Partition Cover |
| 4-50 | PCUSGA745WRPZ | AD | | | Cushion B |
| 4-51 | PCUSGA750WRPZ | AC | | | Lamp Cushion |
| 4-52 | PCUSGA751WRPZ | AC | | | Cavity Top Cushion |
| 4-53 | PCUSGA752WRPZ | AD | | | Cavity Face Cushion |
| 4-55 | PSKR-A464WRPZ | AK | | | Partition Angle L |
| 4-56 | PDUC-B056WRFZ | AN | | | Mg Cool Duct A |
| 4-57 | PCUSGA757WRPZ | AF | | | Filter Cushion |
| 4-58 | PDUC-B046WRFZ | AK | | | Mg Cool Duct B |
| 4-59 | PCUSGA742WRPZ | AF | | | Rear Cushion A |
| 4-60 | PCUSGA743WRPZ | AF | | | Rear Cushion B |
| 4-61 | PCUSGA744WRPZ | AF | | | Rear Cushion C |
| 4-62 | PCUSGA746WRPZ | AG | | | Rear Cushion D |
| 4-63 | PCUSGA747WRPZ | AD | | | Rear Cushion E |
| 4-64 | PCUSGA748WRPZ | AF | | | Rear Cushion F |
| 4-65 | PCUSGA758WRPZ | AN | | | Cavity Back Sheet |
| 4-67 | PCUSGA766WRPZ | AC | | | Magnetron Cushion |
| 4-68 | PCUSGA767WRPZ | AC | | | Rear Cushion G |
| 4-69 | PSHEPB323WREZ | AF | | | Insertion Barrer |
| 4-70 | PCOVPA523WRFZ | AF | | | Edge Protect Cap R |
| 4-71 | PCOVPA522WRFZ | AF | | | Edge Protect Cap L |
| 4-72 | PSPASA027WRFZ | AF | | | Lamp Spacer |
| 4-73 | PSKR-A500WRPZ | AK | | | Wind plate |
| 4-74 | PSHEPB455WREZ | AF | | | Water protect film |
| MISCELLANEOUS | | | | | |
| 6-10 | LBNDKA166WREZ | AD | | | Wire Holder |
| 6-11 | LHLDWA063WREZ | AF | | | Wire Holder |
| 6-14 | TCAUHA168WRR0 | AH | | | H caution label |
| 6-17 | TLABSA105WRRZ | AF | | | F8 Fuse Label |
| SCREWS, NUTS AND WASHE | | | | | |
| 7-1 | LX-NZ0061WRE0 | AA | | | Special Nut |
| 7-2 | LX-BZA199WREZ | AE | | | Special Screw |
| 7-3 | XEPS730P08XS0 | AB | | | Screw: 3mm x 8mm |
| 7-4 | XHPS740P08K00 | AB | | | Screw: 4mm x 8mm |
| 7-5 | XBTUW40P12000 | AB | | | Screw: 4mm x 12mm |
| 7-6 | XOTS740P08000 | AA | | | Screw: 4mm x 8mm |
| 7-7 | XHTS740P08000 | AC | | | Screw: 4mm x 8mm |
| 7-8 | XBPS730P28KS0 | AB | | | Screw: 3mm x 28mm |
| 7-9 | XNES730-24000 | AE | | | Nut |
| 7-10 | LX-BZA164WREZ | AC | | | Special Screw |
| 7-11 | LX-BZA181WREZ | AH | | | Special Screw |
| 7-13 | XHPS730P06000 | AB | | | Screw: 3mm x 6mm |
| 7-14 | LX-CZ0052WRE0 | AA | | | Special Screw |
| 7-15 | XNGUW40-24000 | AE | | | Nut |
| 7-16 | LX-BZA132WREZ | AB | | | Special Screw |
| 7-17 | LX-BZA138WREZ | AB | | | Special Screw |
| 7-18 | XETS740P10000 | AA | | | Screw: 4mm x 10mm |
| 7-19 | LX-CZA085WREZ | AB | | | Special Screw |
| 7-20 | XHTWW40P08000 | AC | | | Screw: 4mm x 8mm |
| 7-21 | XOTWW40P08000 | AB | | | Screw: 4mm x 8mm |
| 7-22 | XFPWW30P06000 | AD | | | Screw: 3mm x 6mm |
| 7-23 | XCBWW30P08000 | AB | | | Screw: 3mm x 8mm |
| 7-24 | LX-WZA035WRE0 | AB | | | Special Washer |
| 7-25 | XBPS740P35000 | AD | | | Screw: 4mm x 35mm |
| 7-26 | XCPS730P10000 | AA | | | Screw: 3mm x 10mm |
| 7-27 | LX-BZA169WREZ | AC | | | Special Screw |
| 7-28 | XOTWW40P10000 | AA | | | Screw: 4mm x 10mm |
| 7-29 | XCHWW40P08000 | AB | | | Screw: 4mm x 8mm |
| 7-30 | XHTS740P12RV0 | AC | | | Screw: 4mm x 12mm |
| 7-31 | XTPWW40P08000 | AD | | | Screw: 4mm x 8mm |
| 7-32 | XETS740P12000 | AC | | | Screw: 4mm x 12mm |

[2] DOOR AND CONTROL PANEL PARTS



Actual wire harness may be different from illustration.

| NO. | PARTS CODE | PRICE RANK | NEW MARK | PART RANK | DESCRIPTION |
|---|-----------------|------------|----------|-----------|------------------------------|
| [2] DOOR AND CONTROL PANEL PARTS | | | | | |
| CONTROL PANEL PARTS | | | | | |
| 3-1 | DPWB-A763DRKZ | BR | | | Control Unit [R2100AT] |
| 3-1 | DPWB-A765DRKZ | BR | | | Control Unit [R1500AT] |
| 3-2 | FUNTKB195WREZ | AV | | | Key Unit |
| 3-3 | GMAD i A189WRFZ | AL | | | Display Window |
| 3-4 | GWAKPB142WRFZ | AK | | | Panel Grill |
| 3-5 | HDECQA372WRMZ | AL | | | Panel Cap R |
| 3-6 | HDECQA373WRMZ | AL | | | Panel Cap L |
| 3-7 | LANGQA676WRWZ | AP | | | Panel Fixed Plate |
| 3-8 | PCUSGA753WRPZ | AF | | | Cp Cushion A |
| 3-9 | PCUSGA754WRPZ | AC | | | Cp Cushion B |
| 3-10 | PSHEPB332WREZ | AN | | | CPU Protect Sheet |
| 3-11 | GCOVAA389WRPZ | AR | | | C/P Case |
| 3-12 | XCPS730P08XS0 | AC | | | Screw |
| DOOR PARTS | | | | | |
| * 5 | CDORFB149WRKZ | BY | | | Door assembly |
| * 5-1 | FANGKA225WRYZ | AN | | | Latch Angle assembly |
| * 5-2 | FDORFA436WRYZ | BB | | | Door Panel Sub assembly |
| * 5-3 | FCOV-A018WRKZ | BE | | | Door Case assembly |
| * 5-3-1 | GCOVAA392WRYZ | BA | | | Door Case |
| * 5-3-2 | GWAK-A012WRFZ | AX | | | Door Frame |
| * 5-5 | LSTPPA261WRFZ | AG | | | Glass Stopper |
| * 5-6 | PGLSPA767WREZ | AN | | | Front Door Glass |
| * 5-7 | XEPS740P08000 | AB | | | Screw: 4mm x 8mm |
| * 5-8 | GCOVHA525WRFZ | AS | | | Choke Cover |
| * 5-9 | JHNDMA058WRMZ | BD | | | Door Handle |
| * 5-10 | JHNDMA062WRPZ | AK | | | Handle Lever |
| * 5-11 | LSTPPA288WRMZ | AP | | | Latch Head |
| * 5-12 | MLEVFA091WRWZ | AG | | | Latch Lever |
| * 5-13 | MSPRTA190WRE0 | AD | | | Latch Spring |
| * 5-14 | PCOVPA476WRFZ | AG | | | Board Cover |
| * 5-15 | PCOVPA477WRFZ | AM | | | Handle Cover |
| * 5-16 | PCUSGA720WRPZ | AG | | | Latch Angle Cushion |
| * 5-17 | PCUSGA736WRPZ | AE | | | Door Cushion L |
| * 5-18 | PCUSGA737WRPZ | AF | | | Door Cushion R |
| * 5-19 | PCUSGA738WRPZ | AC | | | Harness Cushion |
| * 5-20 | PP i PPA017WRFZ | AF | | | Pipe |
| * 5-21 | PSHEPB325WREZ | AK | | | Key Protect Cover |
| * 5-24 | HBDGCA135WRRZ | AG | | | Door Badge [R-2100AT] |
| * 5-24 | HBDGCA136WRRZ | AG | | | Door Badge [R-1500AT] |
| * 5-25 | MSPRCA174WREZ | AF | | | Earth Spring |
| * 5-26 | DPWB-A569DRKZ | BA | | | Switch Unit |
| * 5-27 | FUNTKB197WREZ | AV | | | Key Unit |
| * 5-28 | FW-VZC153WREZ | AS | | | Door Key harness |
| * 5-29 | LANGTA440WRPZ | AN | | | Key Fixing Plate |
| * 5-30 | LRTNPA001DRZZ | AF | | | Connector |
| * 5-31 | LRTNPA002DRZZ | AF | | | Connector |
| * 5-32 | XBPS740P25K00 | AC | | | Screw: 4mm x 25mm |
| * 5-33 | XCPS730P08XS0 | AC | | | Screw: 3mm x 8mm |
| * 5-34 | XEPS740P10000 | AA | | | Screw: 4mm x 10mm |
| * 5-35 | LX-RZ180AKRE0 | AA | | | Special Ring |
| MISCELLANEOUS | | | | | |
| 6-1 | TCADRA036WRRZ | AG | | | Key-Gaidance (Touch Guide) |
| 6-2 | T i NSMA029WRRZ | AN | | | Inst Book (Operation Manual) |
| 6-3 | LHLDWA013WRE0 | AC | | | Purse Lock LL |
| 6-4 | FW-VZC228WREZ | AZ | | | Main Harness |
| 6-5 | FW-VZC160WREZ | AZ | | | CPU Harness |
| 6-6 | TCAUAA249WRR0 | AE | | | Caution Label |
| 6-7 | FW-VZC203WREZ | AZ | | | Oven harness |
| 6-8 | FW-VZC168WREZ | AS | | | DC harness |
| 6-9 | FW-VZC157WREZ | AR | | | Sensor harness |
| 6-12 | LHLDWA011WRE0 | AB | | | Purse Lock M |
| 6-15 | TCAUHA276WRRZ | AH | | | Caution Sheet |

INDEX

| PARTS CODE | No. | PRICE RANK | NEW MARK | PART RANK |
|---------------|---------|------------|----------|-----------|
| [C] | | | | |
| CDORFB149WRKZ | 2-5 | BY | | |
| [D] | | | | |
| DDAi-A217WRKZ | 1-2-1 | BP | | |
| DDUC-A071WRKZ | 1-4-2 | AV | | |
| DDUC-A072WRKZ | 1-4-17 | AV | | |
| DH-HZA017WRKZ | 1-TH | AY | | |
| DPWB-A565DRKZ | 1-1-3 | BF | | |
| DPWB-A568DRKZ | 1-1-2 | BH | | |
| DPWB-A569DRKZ | 2-5-26 | BA | | |
| DPWB-A570DRKZ | 1-1-7 | BA | | |
| DPWB-A571DRKZ | 1-1-4 | BA | | |
| DPWB-A763DRKZ | 2-3-1 | BR | | |
| DPWB-A765DRKZ | 2-3-1 | BR | | |
| [F] | | | | |
| FACVA019WRKZ | 1-1-5 | BF | | |
| FANGKA225WRYZ | 2-5-1 | AN | | |
| FANGQA180WRYZ | 1-4-35 | AS | | |
| FCAS-A026WRYZ | 1-4-1 | AR | | |
| FCOV-A018WRKZ | 2-5-3 | BE | | |
| FCOVAA093WRYZ | 1-4-10 | BB | | |
| FCOVAA097WRYZ | 1-4-10 | BB | | |
| FDORFA436WRYZ | 2-5-2 | BB | | |
| FDTCTA239WRKZ | 1-1-1 | AV | | |
| FFiL-A014WRKZ | 1-4-18 | BA | | |
| FFTASA076WRYZ | 1-2-2 | AM | | |
| FGLSPA069WRFZ | 1-4-19 | BT | | |
| FH-DZA145WRZ | 1-1-10 | AP | | |
| FHNG-A370WRYZ | 1-4-20 | AT | | |
| FMOT-A031WRKZ | 1-EM | BP | | |
| FOVN-A602WRWZ | 1-4-21 | BX | | |
| FPLT-A025WRYZ | 1-4-22 | AZ | | |
| FPLT-A026WRYZ | 1-4-23 | BA | | |
| FPWBFA445WRKZ | 1-1-6 | AS | | |
| FUNTKB195WREZ | 2-3-2 | AV | | |
| FUNTKB197WREZ | 2-5-27 | AV | | |
| FW-VZC153WREZ | 2-5-28 | AS | | |
| FW-VZC157WREZ | 2-6-9 | AR | | |
| FW-VZC160WREZ | 2-6-5 | AZ | | |
| FW-VZC168WREZ | 2-6-8 | AS | | |
| FW-VZC203WREZ | 2-6-7 | AZ | | |
| FW-VZC228WREZ | 2-6-4 | AZ | | |
| [G] | | | | |
| GCABUB125WRPZ | 1-2-3 | BN | | |
| GCOVAA389WRPZ | 2-3-11 | AR | | |
| GCOVAA392WRYZ | 2-5-3-1 | BA | | |
| GCOVHA525WRFZ | 2-5-8 | AS | | |
| GCOVHA526WRPZ | 1-2-4 | AH | | |
| GCOVHA527WRPZ | 1-4-31 | AG | | |
| GCOVPA022WRPZ | 1-4-49 | AG | | |
| GCOVPA026WRPZ | 1-4-15 | BH | | |
| GCOVPA027WRPZ | 1-4-32 | AN | | |
| GLEGPA033WRE0 | 1-4-48 | AA | | |
| GMADiA189WRFZ | 2-3-3 | AL | | |
| GWAK-A012WRFZ | 2-5-3-2 | AX | | |
| GWAKPB142WRFZ | 2-3-4 | AK | | |
| [H] | | | | |
| HBDGCA135WRRZ | 2-5-24 | AG | | |
| HBDGCA136WRRZ | 2-5-24 | AG | | |
| HDECQA372WRMZ | 2-3-5 | AL | | |
| HDECQA373WRMZ | 2-3-6 | AL | | |
| [J] | | | | |
| JHNDMA058WRMZ | 2-5-9 | BD | | |
| JHNDMA062WRPZ | 2-5-10 | AK | | |
| JKNBKA800WRFZ | 1-4-33 | AM | | |
| [L] | | | | |
| LANGKB285WRPZ | 1-2-5 | AG | | |
| LANGKB292WRPZ | 1-4-34 | AM | | |
| LANGQA556WRMZ | 1-4-8 | AL | | |
| LANGQA676WRWZ | 2-3-7 | AP | | |
| LANGQA702WRPZ | 1-4-37 | AM | | |
| LANGQA738WRWZ | 1-4-7 | AL | | |
| LANGQA752WRPZ | 1-4-36 | AF | | |
| LANGQA755WRWZ | 1-4-5 | AM | | |
| LANGTA440WRPZ | 2-5-29 | AN | | |
| LBNDKA166WREZ | 1-6-10 | AD | | |
| LBNDKA182WRPZ | 1-4-9 | AK | | |
| LBSHC0006YBE0 | 1-4-6 | AD | | |
| LHLD-A314WRFZ | 1-4-4 | AN | | |

| PARTS CODE | No. | PRICE RANK | NEW MARK | PART RANK |
|----------------|----------|------------|----------|-----------|
| LHLDWA011WRE0 | 2-6-12 | AB | | |
| LHLDWA013WRE0 | 2-6-3 | AC | | |
| LHLDWA063WREZ | 1-6-11 | AF | | |
| LRTNPA001DRZZ | 2-5-30 | AF | | |
| LRTNPA002DRZZ | 2-5-31 | AF | | |
| LSTPPA261WRFZ | 2-5-5 | AG | | |
| LSTPPA288WRMZ | 2-5-11 | AP | | |
| LSUB-A137WRPZ | 1-4-38 | AE | | |
| LX-BZA132WREZ | 1-7-16 | AB | | |
| LX-BZA138WREZ | 1-7-17 | AB | | |
| LX-BZA164WREZ | 1-7-10 | AC | | |
| LX-BZA169WREZ | 1-7-27 | AC | | |
| LX-BZA178WREZ | 1-4-18-1 | AM | | |
| LX-BZA179WREZ | 1-2-1-2 | AL | | |
| LX-BZA181WREZ | 1-7-11 | AH | | |
| LX-BZA199WREZ | 1-7-2 | AE | | |
| LX-CZ0052WRE0 | 1-7-14 | AA | | |
| LX-CZA085WREZ | 1-7-19 | AB | | |
| LX-NZ0061WRE0 | 1-7-1 | AA | | |
| "/ | 1-2-1-1 | AA | | |
| LX-RZ180AKRE0 | 2-5-35 | AA | | |
| LX-WZA035WRE0 | 1-7-24 | AB | | |
| [M] | | | | |
| MHNG-A592WRPZ | 1-4-39 | AP | | |
| MLEVCA001WRFZ | 1-4-24 | AG | | |
| MLEVFA091WRWZ | 2-5-12 | AG | | |
| MLEVPA279WRFZ | 1-4-25 | AG | | |
| MLEVPA280WRFZ | 1-4-26 | AG | | |
| MSPRCA165WREZ | 1-4-27 | AC | | |
| MSPRCA166WREZ | 1-4-28 | AC | | |
| MSPRCA174WREZ | 2-5-25 | AF | | |
| MSPRTA190WRE0 | 2-5-13 | AD | | |
| [N] | | | | |
| NSF TPA045WRFZ | 1-4-40 | AN | | |
| [P] | | | | |
| PCLiC0018WRE0 | 1-4-41 | AB | | |
| PCOVPA476WRFZ | 2-5-14 | AG | | |
| PCOVPA477WRFZ | 2-5-15 | AM | | |
| PCOVPA480WRFZ | 1-4-42 | AG | | |
| PCOVPA496WRFZ | 1-4-43 | AK | | |
| PCOVPA515WRFZ | 1-4-16 | AY | | |
| PCOVPA522WRFZ | 1-4-71 | AF | | |
| PCOVPA523WRFZ | 1-4-70 | AF | | |
| PCUSGA720WRPZ | 2-5-16 | AG | | |
| PCUSGA721WRPZ | 1-4-3 | AG | | |
| PCUSGA736WRPZ | 2-5-17 | AE | | |
| PCUSGA737WRPZ | 2-5-18 | AF | | |
| PCUSGA738WRPZ | 2-5-19 | AC | | |
| PCUSGA740WRPZ | 1-4-13 | AE | | |
| PCUSGA742WRPZ | 1-4-59 | AF | | |
| PCUSGA743WRPZ | 1-4-60 | AF | | |
| PCUSGA744WRPZ | 1-4-61 | AF | | |
| PCUSGA745WRPZ | 1-4-50 | AD | | |
| PCUSGA746WRPZ | 1-4-62 | AG | | |
| PCUSGA747WRPZ | 1-4-63 | AD | | |
| PCUSGA748WRPZ | 1-4-64 | AF | | |
| PCUSGA750WRPZ | 1-4-51 | AC | | |
| PCUSGA751WRPZ | 1-4-52 | AC | | |
| PCUSGA752WRPZ | 1-4-53 | AD | | |
| PCUSGA753WRPZ | 2-3-8 | AF | | |
| PCUSGA754WRPZ | 2-3-9 | AC | | |
| PCUSGA756WRPZ | 1-2-10 | AD | | |
| PCUSGA757WRPZ | 1-4-57 | AF | | |
| PCUSGA758WRPZ | 1-4-65 | AN | | |
| PCUSGA761WRPZ | 1-4-46 | AE | | |
| PCUSGA766WRPZ | 1-4-67 | AC | | |
| PCUSGA767WRPZ | 1-4-68 | AC | | |
| PCUSGA768WRPZ | 1-4-14 | AC | | |
| PCUSUA651WRPZ | 1-2-2-1 | AD | | |
| PDUC-B046WRPZ | 1-4-58 | AK | | |
| PDUC-B056WRFZ | 1-4-56 | AN | | |
| PFiL-A040WRYZ | 1-4-18-2 | AW | | |
| PFiLWA064WRPZ | 1-4-44 | AF | | |
| PFFP-A299WREZ | 1-2-9 | AL | | |
| PGiDHA069WRPZ | 1-4-12 | AF | | |
| PGLSPA720WREZ | 1-4-45 | AH | | |
| PGLSPA767WREZ | 2-5-6 | AN | | |
| PHOK-A164WRFZ | 1-4-30 | AM | | |
| PPiPPA017WRFZ | 2-5-20 | AF | | |

R1500AT

| PARTS CODE | No. | PRICE RANK | NEW MARK | PART RANK |
|---------------|----------|------------|----------|-----------|
| PSHEGA011WREZ | 1-2-6 | AM | | |
| PSHEPB323WREZ | 1-4-69 | AF | | |
| PSHEPB325WREZ | 2-5-21 | AK | | |
| PSHEPB332WREZ | 2-3-10 | AN | | |
| PSHEPB353WREZ | 1-4-29 | AH | | |
| PSHEPB455WREZ | 1-4-74 | AF | | |
| PSKR-A462WRPZ | 1-4-47 | AF | | |
| PSKR-A464WRPZ | 1-4-55 | AK | | |
| PSKR-A500WRPZ | 1-4-73 | AK | | |
| PSPASA027WRFZ | 1-4-72 | AF | | |
| 【 Q 】 | | | | |
| QFS-CA024WRE0 | 1-F1 | AH | | |
| " | 1-F2 | AH | | |
| QFSHDA019WRE0 | 1-1-9 | AH | | |
| QFS-TA014WRE0 | 1-TF1 | AG | | |
| " | 1-TF2 | AG | | |
| QFS-TA015WRE0 | 1-TF3 | AG | | |
| QSOCLA024WRE0 | 1-1-8 | AH | | |
| QSW-MA085WRE0 | 1-SW2 | AF | | |
| " | 1-SW5 | AF | | |
| QSW-MA086WRE0 | 1-SW3 | AF | | |
| " | 1-SW4 | AF | | |
| QSW-MA087WRE0 | 1-SW1 | AF | | |
| 【 R 】 | | | | |
| RC-QZA315WRZZ | 1-C1 | AZ | | |
| " | 1-C2 | AZ | | |
| RC-QZA363WRZZ | 1-C1 | AS | | |
| " | 1-C2 | AS | | |
| RLMPTA078WRE0 | 1-OL | AL | | |
| RMOT-A036WRZZ | 1-FM | BD | | |
| RMOT-A037WRZZ | 1-EF | BF | | |
| RMOTDA238WRZZ | 1-AM | AS | | |
| RTRN-A788WRZZ | 1-T1 | BU | | |
| " | 1-T2 | BU | | |
| RV-MZA369WRZZ | 1-MG1 | BG | | |
| " | 1-MG2 | BG | | |
| 【 T 】 | | | | |
| TCADRA036WRRZ | 2-6-1 | AG | | |
| TCAUAA249WRR0 | 2-6-6 | AE | | |
| TCAUHA168WRR0 | 1-6-14 | AH | | |
| TCAUHA276WRRZ | 2-6-15 | AH | | |
| TINSMA029WRRZ | 2-6-2 | AN | | |
| TLABSA105WRRZ | 1-6-17 | AF | | |
| 【 X 】 | | | | |
| XBPS730P28KS0 | 1-7-8 | AB | | |
| XBPS740P25K00 | 2-5-32 | AC | | |
| XBPS740P35000 | 1-7-25 | AD | | |
| XBTUW40P12000 | 1-7-5 | AB | | |
| XCBWW30P08000 | 1-7-23 | AB | | |
| XCHWW40P08000 | 1-7-29 | AB | | |
| XCPS730P08XS0 | 2-3-12 | AC | | |
| " | 2-5-33 | AC | | |
| XCPS730P10000 | 1-7-26 | AA | | |
| XEPS730P08XS0 | 1-7-3 | AB | | |
| XEPS740P08000 | 2-5-7 | AB | | |
| XEPS740P10000 | 2-5-34 | AA | | |
| XETS740P10000 | 1-7-18 | AA | | |
| XETS740P12000 | 1-7-32 | AC | | |
| XFPWW30P06000 | 1-7-22 | AD | | |
| XHPS730P06000 | 1-7-13 | AB | | |
| XHPS740P08K00 | 1-7-4 | AB | | |
| XHTS740P08000 | 1-7-7 | AC | | |
| XHTS740P12RV0 | 1-7-30 | AC | | |
| XHTWW40P08000 | 1-7-20 | AC | | |
| XNES730-24000 | 1-7-9 | AE | | |
| XNGUW40-24000 | 1-7-15 | AE | | |
| XOTS740P08000 | 1-7-6 | AA | | |
| XOTWW40P08000 | 1-7-21 | AB | | |
| XOTWW40P10000 | 1-7-28 | AA | | |
| XREUW40-06000 | 1-4-18-3 | AA | | |
| XTPWW40P08000 | 1-7-31 | AD | | |