SHARP SERVICE MANUAL

S0005AX11PHR/T

MICROWAVE OVEN WITH STEAM AND GRILL

MODELS AX-1100(IN) AX-1100(R)

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

SHARP CORPORATION

CONTENTS

CHAPTER 1. BEFORE SERVICING

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

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.

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
MICKROVAGSSTRALING

Personal får inte utsättas för mikrovågsenergi som kan ustrala från magnetronen eller andre mikrovågsalstrande anordningar om dessa är felanslutna eller används på fel sätt. Alla in-och utgångsanslutningar för mikrovågor, vagledare, flänsar och packningar måste vara fast anslutna.
Mikrovågsgeneratorn får inte arbeta utan att absorberande belastning är ansluten. Titta aldrig in i ën öppen vågledare eller antenn när mikrovågsgeneratorn är påkopplad eller laddad.

VAROITUS
MIKROAALTOSÄTELYÄ

Käyttäjä ei saa joutua alttiiksi mikroaaltoenergialle, jota voi säteillä magnetronista tai muusta mikroaaltoja kehittävästä laitteesta, jos sitä käytetään tai jos se kytketään väärin. Kaikkien mikroaaltoliitäntöjen 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 kytkettynä.

ADVARSEL
MIKROBØLGESTRÅLING

Personell må ikke utsettes for mikrobølge-energi som kan utståles fra magnetronen eller andre mikrobølge-generende deler dersom apparatet feilbetjenes eller blir feiltikoplet. Alle inn-og ut-tilkoplinger i forbindelse med mikrobølge-strålingen, bølgeledere, flenser og tetningsringer/pakninger må festes ordentlig.
Aldri bruk apparatet med mindre en mikrobålge-absorberende last er plassert i ovnsrommet.
Aldri se direkte inn i en åpen bølgeleder eller antenne imens apparatet er strømførende

ADVARSEL
MIKROBØLGEBESTRÄLING

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 econds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection ofthe high-voltage capacitor (that is, of the connectinglead of the high-voltage rectifier) against the chassiswith the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-findingis 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 leadsremain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnectthe 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 reexamine 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 carriedout.

(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, hoogspannings kabelboom.

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 schroevedraaier 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 deelectrische draden uit de primaire zijde van de vermogenstransformator. Zorg ervoor dat deze draden ge•soleerd 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 electrische draden weer aan de primaire zijde van de vermogenstransformator.

VERGEET DE VOLGENDE 4 STAPPEN NIET

1) Sluit de draden weer aan diezijn 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 microgolf-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 microgolflekkage 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, magnetrón, 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 ALTO VOLTAJE
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 despues 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, deberácomprobar la potencia de salida de microondas y realizar unaprueba de fugas de microondas.

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

KOM IHÅG ATT KONTROLLERA 3 STEG

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

VARNING FÖR LADDNINGEN I HÖGSPÄNNINGSKONDENSATORN
Högspänningskondensatorn är laddad i 60 sekunder efter det att ugnen stängts av. Vänta 60 sekunder och korislut sedan kondensatoms anslutning (dvs anslutningen till högspänningslikriktaren) till chassiet med hjälp av en isolerad skruvmejsel.

Sharp rekommenderar att felsökning sker med strömmen frånkopplad. Ibland kan det var 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 detbehövs). När Du testat färdigt utför Du 3 Steg kontrollen ochansluter 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 p å 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 (timem 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 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 posizioneta. aper
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 spettare 60 secondi prima di cortocircuitare, utilizzandoun 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'apparecchiodopo 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, ne 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 cavitá, mettere una tazza di acqua fredda sul piatto rotante del forno, chiudere la porta, regolare la potenza su HIGH ed impostate 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.

Before replacing the Printed Wiring Board

Some normal boards are found in board units that have been returned due to oven failure. So, most of board replacements may arise from poor harness connection. Accordingly, before replacing any board that was judged to require its replacement, use the following procedure to re-check that the connection terminal of a connector has been properly inserted:

1. When the connectors have been incorrectly inserted to the control unit.

PWB	CONNECTOR	Symptom
CONTROL UNIT	CN-A	The oven can not be powered on. (Fan motor, oven lamp, damper motor and /or pump motor do not operate.)
	CN-B	No heating can be done. Thermistor error EE01 or EE12 appears.
	RY1	Antenna motor, high voltage transformer, oven lamp, engine heating element, and grill heating element do not operate
	RY2	Engine heating element does not operate.
	RY3	Grill heating element does not operate.
	RY4	Antenna motor and high voltage transformer do not operate.

2. When latch switch adjustment is incorrect

   When latch switch adjustment is incorrect, symptoms such as no heating, no heating start, no activation even with start button pressed, etc. will occur.

3. Final error code is memorized in ROM (control unit). (Refer to Error list EE code on page 10-1.)
4. When the intake damper motor is locked or wire leads to it are not connected, cooking mode is stopped 1minute after starting cooking.
5. 3minutes after stopping cooking, energy save mode will work and no segment is displayed.

CHAPTER 3. 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

Indicates lead-free solder of tin, copper and nickel

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, Sn-Cu-Ni) 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 4. PRODUCT DESCRIPTION

[1] SPECIFICATIONS

<table>
<tr><th>ITEM</th><th>DESCRIPTION</th></tr>
<tr><td>Power Requirements</td><td>230 Volts
50 Hertz
Single phase, 3 wire grounded</td></tr>
<tr><td>Power Consumption</td><td>Steam cooking —- 0.91 kW Approx. 4.0A
Grill cooking -–––1.1 kW Approx. 4.8A
Combi cooking — 2.53 kW Approx. 11.4A
Microwave cooking -–- 1.51 kW Approx. 6.8A
Off mode (Energy save mode) –-- less than 0.5 W</td></tr>
<tr><td>Microwave Power Output</td><td>*900 W nominal of RF microwave energy (IEC 60705 Test procedure)
Operating frequency 2450 MHz</td></tr>
<tr><td rowspan="2">Heating Element Output</td><td>Grill heating element 1.05kW</td></tr>
<tr><td>Engine heating element 0.86kW</td></tr>
<tr><td>Outside Dimensions</td><td>Width 520mm
Height 331mm
Depth 500mm</td></tr>
<tr><td>Cooking Cavity Dimensions</td><td>Width 343mm NOTE: Internal capacity is calculated by measuring maximum width, depth and height.
Height 210mm Actual capacity for holding food is less.
Depth 381mm</td></tr>
<tr><td>Weight</td><td>Approx. 18.1kg</td></tr>
<tr><td>Control Complement</td><td>Manual cooking
<table>
<tr><th colspan="2">Cooking mode</th><th>Temp/power range</th><th>Time range</th><th>Water tank</th></tr>
<tr><td rowspan="2">Steam</td><td>High</td><td>100 °C</td><td>0 - 35 min.</td><td>YES</td></tr>
<tr><td>Low</td><td>70 - 95°C</td><td>0 - 60 min.</td><td>YES</td></tr>
<tr><td colspan="2">Grill</td><td>-</td><td>0 - 99 min. 50 sec.</td><td>NO</td></tr>
<tr><td rowspan="2">Combi</td><td>High</td><td>Grill: 100% power
Microwave: 10 - 70% power</td><td>0 - 99 min. 50 sec.</td><td>NO</td></tr>
<tr><td>Low</td><td>Grill: 50% power
Microwave: 10 - 70% power</td><td>0 - 99 min. 50 sec.</td><td>NO</td></tr>
<tr><td colspan="2">Microwave</td><td>0 - 100% power</td><td>0 - 99 min. 50 sec.</td><td>NO</td></tr>
</table>
Automatic cooking
Steam menus
Auto grill menus
Auto defrost menus</td></tr>
</table>

* The International Electrotechnical Commission's standardized method for measuring output wattage. This test method is widely recognized.

[2] TEST DATA AT A GLANCE

PARTS	SYMBOL	VALUE / DATA
Fuse	F1	20A 250V
Fuse (Noise filter)	F2	F8A
Thermal cut-out (Magnetron)	TC1	145°C Off/ -20°C On
Thermal cut-out (Oven)	TC2	170°C Off / -20°C or -35°C On
Thermal cut-out (Engine)	TC3	170°C Off / -20°C or -35°C On
Thermistor (Engine)	TH1	Approx. 200kΩ at 25°C/ Approx. 10kΩ at 100°C/ Approx. 1kΩ at 200°C,
Thermistor (Grill)	TH2	Approx. 200kΩ at 25°C/ Approx. 10kΩ at 100°C/ Approx. 1kΩ at 200°C,
Grill heating element	GH	Approx. 46.5 ~ 51.1Ω at 25°C/ Insulation resistance > 10MΩ
Engine heating element	EH	Approx. 58.0 ~ 62.9Ω at 25°C/ Insulation resistance > 10MΩ
Oven lamp	OL	240 - 250V 25W
High voltage capacitor	C	AC 2100V 1.13μF
Magnetron	MG	Filament < 1Ω / Filament - chassis ∞ ohm
High voltage transformer	T	Filament winding < 1Ω Secondary winding Approx. 159.5Ω / Primary winding Approx. 1.98Ω

WARNING: DISCONNECT THE PLUG WHEN MEASURING RESISTANCE

CHAPTER 5. APPEARANCE VIEW

[1] OVEN DIAGRAM

1. Ventilation openings

   (at the bottom of the oven)

   Be aware that hot steam or air comes out during steam or combi cooking, and keep children away from the oven.
2. Door open handle
3. LCD display
4. Control panel
5. Oven lamp
6. Upper position (position 3)
7. Lower position (position 2)
8. Water tank
9. Door seals and sealing surfaces
10. Latch
11. Oven floor (position 1)
12. Door hinges
13. Steam outlets
14. Drip tray
15. Oven cavity
16. See through door
17. Grill heating element (at the oven cavity ceiling)
18. Door lever (inside of the door open handle)

    To open, grip the door lever from the bottom and pull it towards you.

ACCESSORIES

19. Rack

    For Grill and Combi.

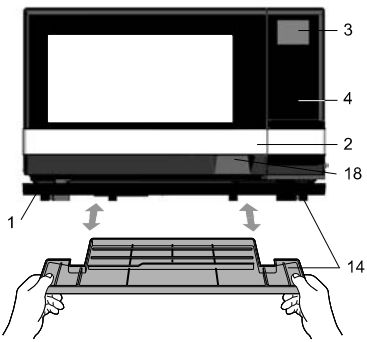
    Do not use for Steam and Microwave.

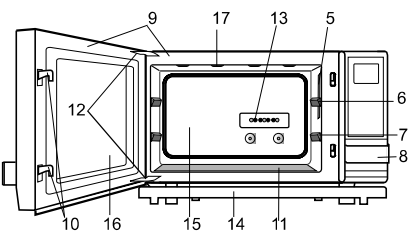
    Always place on glass tray.
20. Glass tray
21. Steam tray x2

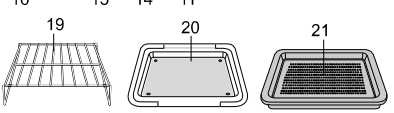
    For Steam only.

    Always place above/on glass tray.

    Do not use for Microwave, Grill and Combi.







NOTE: Place the rack on glass tray as shown in Figure 1.

WARNING: The oven cavity, door, outer cabinet, accessories and dishes will become very hot, use thick dry oven gloves when removing the food or accessories from the oven to prevent burns.

WARNING: for stacking the steam tray and glass tray:

After cooking, take out the steam tray first.

See figure 2. Be aware of excess water from the steam tray, we recommend you place it directly on a flat dish or tray to avoid spillages.

Before taking out the glass tray, make sure that it is cool. Be aware that there may be water on the glass tray, so take care when removing it.

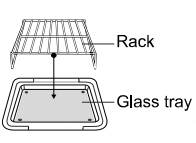


Figure 1

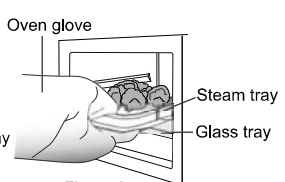
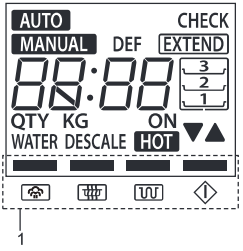


Figure 2

[2] CONTROL PANEL

1. Display information:



The display shows useful information including cooking time and cooking mode.

1. Cooking mode & START indicators

   The indicator, just above each symbol, will fl ash or light up during the operation.

   You can press a concerned key when the indicators are flashing.

   When the indicators light up on the display, they mean that each cooking mode is selected or the oven is operating in each cooking mode.

: Steam :Grill
: Microwave : Start

AUTO: Automatic cooking is selected or in progress.

MANUAL: Manual cooking is selected or in progress.

CHECK: Some action is necessary (e.g. turn over, stir).

DEF: Steam Defrost or Auto Defrost Menus is selected or in progress.

ON: The oven is in operation.

EXTEND: Cooking time can be extended.

HOT: The oven is very hot.

▲ (MORE): More time adjustment is selected for automatic cooking.

▼ (LESS): Less time adjustment is selected for automatic cooking.

DESCALE: Descaling is necessary.

WATER: Water is necessary. When this indicator is appeared on the display, the oven is operating in the menu using water.

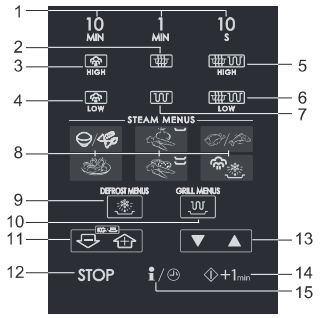
Tray position indicators: The position of the tray(s) for automatic cooking and manual steam cooking.

3: Upper position

2: Lower position

1: Oven Floor

2. Operating keys:



1.TIME keys
2.MICROWAVE POWER LEVEL* key
3.STEAM HIGH key
4.STEAM LOW key
5.COMBI HIGH* key
6.COMBI LOW* key
7.GRILL* key
8.STEAM MENUS keys
9.AUTO DEFROST MENUS* key
10.AUTO GRILL MENUS* key
11.WEIGHT DOWN/UP keys
12.STOP/CLEAR key
13.LESS/MORE keys
14.START/AUTO MINUTE key
15.INFO/KITCHEN TIMER key
* This mode does not use steam.

[3] IMPORTANT INSTRUCTIONS

Read Carefully Before Cooking with Steam

1. WATER TANK

To fill the water tank with room temperature water suitable for drinking (filtered) is a must for cooking with steam. Be sure to follow the directions below.

1. Pull the water tank toward you to remove. (Figure 1)
2. Wash the water tank and lid for the first time.
3. Fill the water tank with room temperature water suitable for drinking (filtered) through the lid to the MAX mark each time you begin to cook.
   (Figure 2) Do not fill the water tank over the MAX mark.
4. Make sure the lid is closed firmly.
5. Install the water tank by pushing firmly. (Figure 3)
6. After cooking, empty the water tank and wash the water tank and the lid.

NOTE: 1) Do not use any other liquids like distilled water, R.O water, mineral water and etc.
2) An insufficient amount of water in the water tank may cause an undesired result.
3) We recommend that you empty the water tank every time after cooking. Do not leave the water tank filled with water in the oven over a day.
4) If "Err, WATER (flashing)" is shown in the display during Steam cooking, refer to Troubleshooting Chart. The message will not appeared in Descale function.
5) Do not drop or damage the water tank. Heat may cause the water tank to change shape. Do not use a damaged water tank.
6) There may be a few water drops when removing the water tank. Wipe the oven dry with a soft cloth.
7) Do not block the air holes on the lid of the water tank. It will cause trouble during cooking.

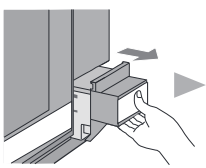


Figure 1

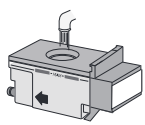


Figure 2

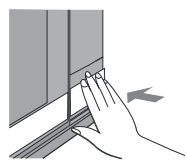


Figure 3

2. DRIP TRAY

Be sure to cook with drip tray in position and follow the directions below.

The drip tray is packed with the oven. Place the drip tray under the oven door as shown in Figure 4. This drip tray collects the condensation from the oven door.

To remove the drip tray: Pull the drip tray toward you with both hands.

* Make sure water is not dripping down before removing the drip tray.

To replace the drip tray: Place the drip tray onto the right and left hooks under the oven and push firmly as shown in Figure 4. Insert the drip tray horizontally when you attach it. Improper use may cause the damage to the hooks.

Empty the drip tray after each time you cook.

Empty, rinse thoroughly, dry and replace. Failure to empty may cause the drip tray to overflow. Cooking repeatedly without emptying the drip tray may cause it to overflow.

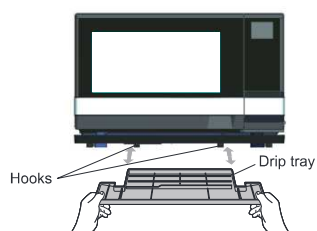


Figure 4

WARNING: 1) The oven will become very hot after cooking and draining water function.
2) Do not open the oven with your face close to the oven. Steam from the oven may cause burns.
3) Make sure that the oven has cooled before emptying the water tank and the drip tray and then wipe the oven cavity.
4) Do not touch the water directly as water in the drip tray may be hot.

3. Drain Water Function

Perform the Drain Water function at least once a day after cooking with steam. It takes up to 7 minutes.

Drain Water function is very useful to prevent scale build up and the use of stale water. It causes evaporation of the internal steam system.

PROCEDURE

1. Remove the water tank. Ensure that no food is in the oven.

   Press INFO/KITCHEN TIMER i / ⏲ once to select In F1.

2. Press START/AUTO MINUTE ◇+1min. In F1 will fl ash on and off in the display during the Drain Water function.
3. When the drain function has ended and the oven is cool, wipe oven cavity. Wait a few minutes, then empty the drip tray.

NOTE: 1) The water tank must be removed before starting this procedure.

2) If Drain Water Function is set, Energy Save Mode will be cancelled temporary.

4. Descale Function

White or gray grains, also called scale, may form in the water circuit inside the oven during steam generation, which could cause the oven to malfunction.

When “DESCALE (flashing)” is shown in the display, be sure to carry out Descale function immediately. It takes about 1 hour (for descaling using citric acid is for about 30min. The rinse time is approx. 30min.).

PROCEDURE

1. Pure citric acid, available at some drugstores, or bottled 100% lemon juice with no pulp are used for descaling. Choose one and prepare the descaling solution.

   To use pure citric acid, dissolve 1 tablespoon of pure citric acid crystals in 500ml of water in a non-porous container. Stir well and pour into

   the water tank to the MAX mark.

   To use 100% bottled lemon juice, check that there is absolutely no pulp in it. If there is pulp or you are not sure, strain through a fine strainer. Measure 70ml of the strained lemon juice and add it to 500ml of water. Stir well and pour into the water tank to the MAX mark.

   Place the water tank in the oven correctly and push firmly into place.

2. Press INFO/KITCHEN TIMER i / ⏲ twice to select In F2.
3. Place the glass tray in lower position (position 2) closely to attach to the back side of the oven wall.
4. Do not place any food in the oven. Close the door firmly.

   Press START/AUTO MINUTE ◇+1min. to begin descaling.

5. When the oven has stopped and is cool, remove water tank, empty, rinse and refill with room temperature water suitable for drinking (filtered) to the MAX mark. Replace the water tank.

   Empty the drip tray and replace it. Remove glass tray, empty, rinse and dry. Follow step 3 to replace glass tray. Close the door firmly.

   Press START/AUTO MINUTE ◇+1min. Rinsing will start.

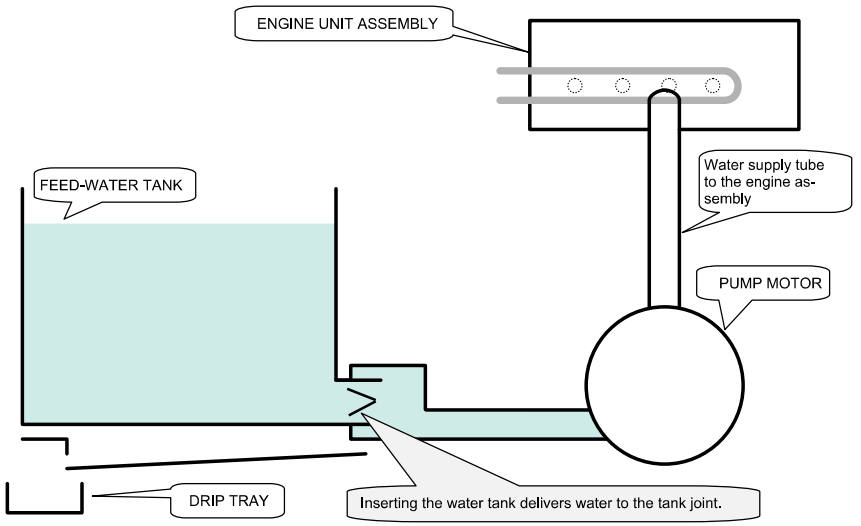
6. When rinsing has ended and the oven is cool, remove water tank and empty. Remove glass tray and empty. Wipe oven cavity to dry. Wait a few minutes and then empty the drip tray.

NOTE: If Descale Function is set, Energy Save Mode will be cancelled temporary.

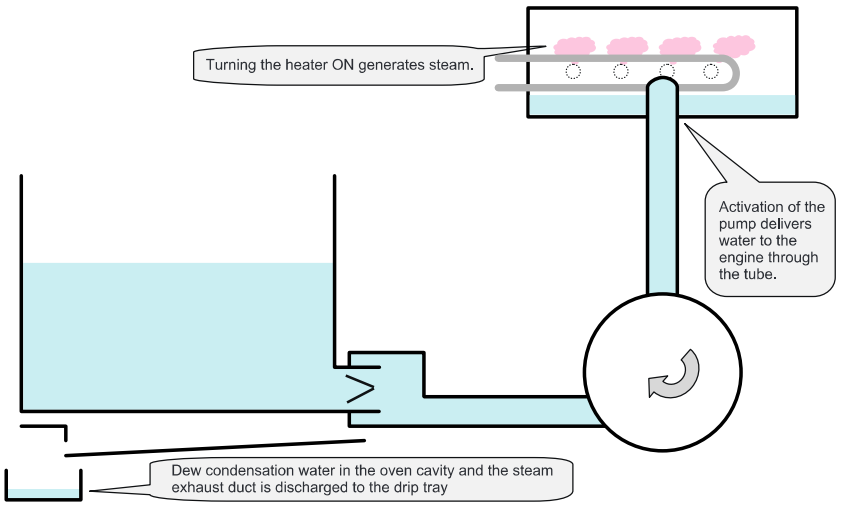
CHAPTER 6. OPERATION

[1] Water supply/drainage schematic

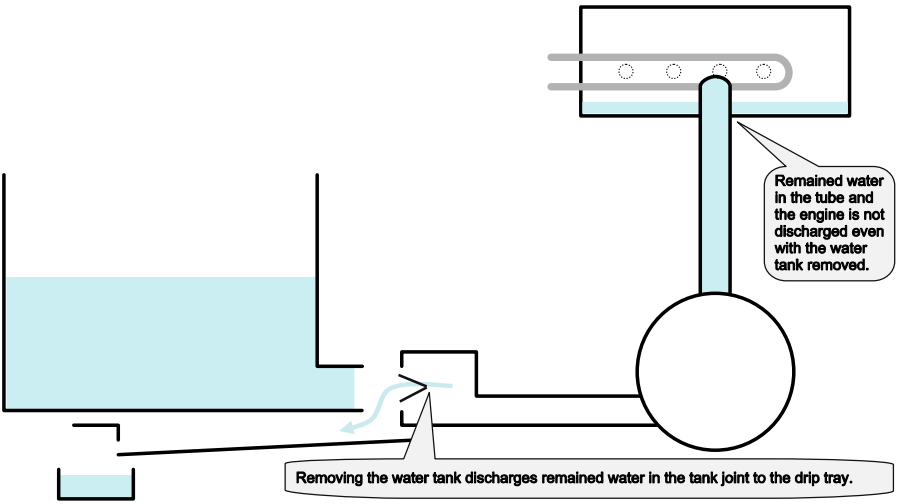
1. When installing the water tank



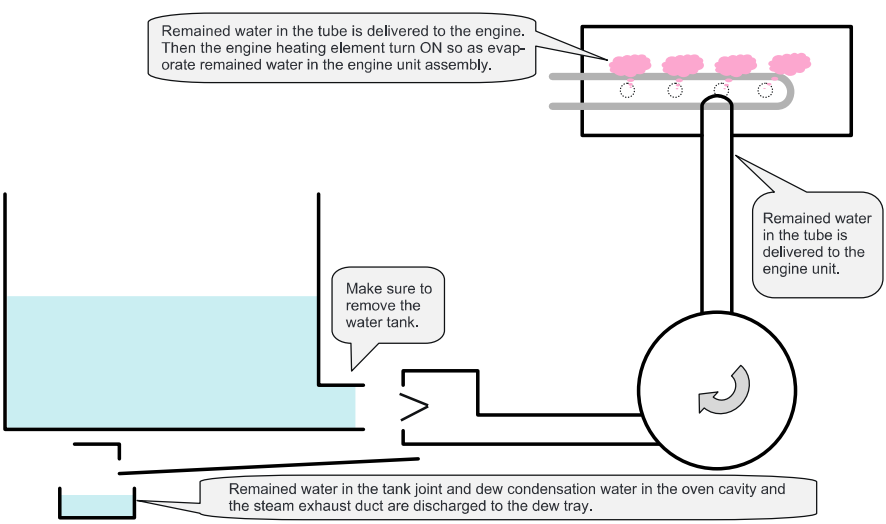
2. When steaming operations



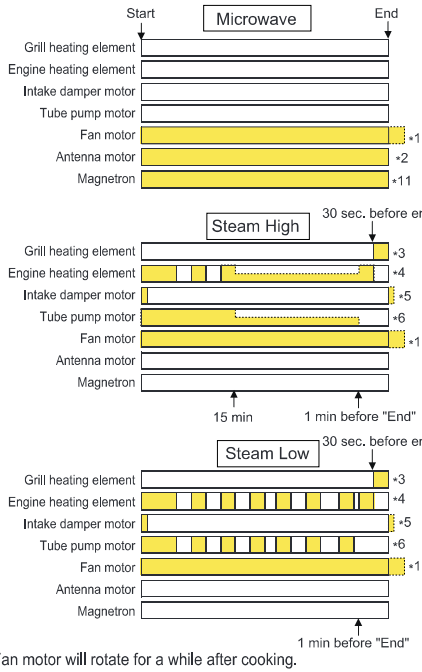
3. When removing the water tank (Only remained water in the tank joint is discharged.)



4. When operating the oven in order to discharge remained water ("Drain water" mode). (Remained water in the tank joint, tube (pump motor) and engine unit assembly are discharged.)



[2] Operation of electric parts in each heating mode



*1 Fan motor will rotate for a while after cooking.

*2 Antenna motor will rotate only when high voltage transformer is energized.

*3 Grill heating element will be energized for 30 seconds before end of cooking.

*4 Engine heating element will be turned on and off by temperature of thermistor (engine).

*5 Intake damper motor will rotate until a damper is closed when cooking is started. And intake damper motor will rotate until a damper is opened after the end of cooking.

*6 Tube pump motor will turned on and off by temperature of thermistor (engine).

*7 Grill heating element will do the intermittent driving of 50% in ten minutes.

*8 Intake damper motor will rotate until a damper is closed when cooking is started. And intake damper motor will rotate until a damper is opened after the end of cooking. Intake damper motor will rotate for a short time at 3 minutes / 2 minutes / 1 minute before end of cooking.

*9 Grill heating element will do the intermittent driving of 50%.

*10 "duty" is intermittent driving.

*11 Magnetron will do the intermittent driving of 70% power level after the magnetron is operated at 100% power level for 20 minutes.

[3] 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.
2. When the door is opened with plugged in, the contacts (COM-NC) of the monitored interlock switch is closed. And the line voltage is supplied to the T/C transformer and the control unit. Then the contacts of the relay RY-9 are closed and the contacts of the relay RY-1 are closed. And the oven lamp is turned on.The display shows "0.".
3. When the door is closed, the contacts (COM-NC) of the monitored interlock switch are opened. Because the contacts of the relay RY-9 have been closed, the line voltage is kept supplying to the T/C transformer and the control unit. But the contacts of the relay RY-1 are opened and the oven lamp is turned off.

Energy save mode

If the door is closed and any key is not pressed for more than 3 minutes except for the following 10 conditions, the contacts of the relay RY-9 will be opened and the control unit will be not energized. Open and close the door, the control unit will resume.

1. When the door is opening.
2. Pause of the automatic cooking.
3. When the cooking fan is working after cooking.
4. Demonstration mode
5. Child lock
6. Extend mode
7. Drain mode
8. Descaling mode
9. Kitchen timer mode
10. When the display shows "Err, WATER (flashing)".

CHAPTER 7. FUNCTION OF IMPORTANT COMPONENTS

[1] DOOR OPEN MECHANISM

1. The door lever is gripped and the door open handle is pulled.
2. The latch head L is lifted up by the door lever.
3. The latch head U is lifted up by the linked latch 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.

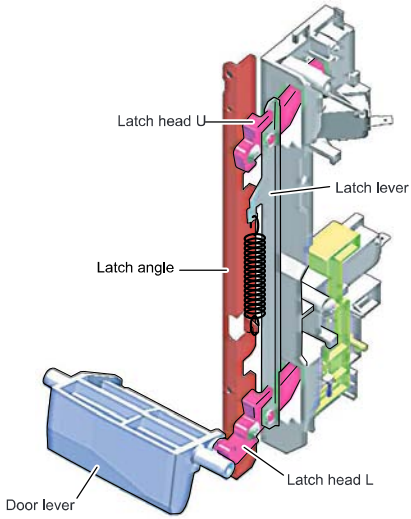


Figure D-1. Door Open Mechanism

[2] SWITCH

1. MONITORED INTERLOCK SWITCH SW1

1. When the oven door is closed, the contacts (COM-NO) of the switch must be closed. And the contacts (COM-NC) must be opened.
2. When the oven door is opened, the contacts (COM-NO) of the switch must be opened. And the contacts (COM-NC) must be closed.

2. MONITOR SWITCH SW2

The monitor switch is activated (the contacts opened) by the latch head U on the door while the door is closed. The switch is intended to render the oven inoperative by means of blowing the fuse F2 F8A when the contacts of the monitored interlock switch SW1 fail to open when the door is opened.

Function

1. When the door is opened, the contacts (COM-NC) of monitor switch SW2 close. At this time the contacts (COM-NO) of monitored interlock switch SW1 are open.
2. As the door closed, the monitor switch SW2 contacts (COM-NC) are opened.

   The contacts (COM-NO) of monitored interlock switch SW1 and door sensing switch SW3 are closed (On opening the door, each of these switches operate inversely.).
3. If the door is opened and the monitored interlock switch SW1 contacts (COM-NO) fail to open, the fuse F2 (F8A) blows immediately after closing of the monitor switch (COM-NC) contacts.

CAUTION: BEFORE REPLACING A BLOWN FUSE F2 F8A, TEST THE MONITORED LATCH SWITCH SW1 AND MONITOR SWITCH SW2 FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE").

3. DOOR SENSING SWITCH SW3

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

4. INTAKE DAMPER SWITCH SW4

The intake damper switch is turned on and off by the air damper cam which is rotated by the intake damper motor.

5. ANTENNA SWITCH SW5

The antenna switch is turned on and off by the shaft assembly which is rotated by the antenna motor.

[3] FUSE

1. FUSE F1 20A 250V

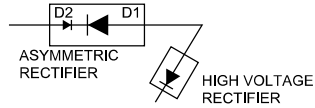
If the wire harness or electrical components are short-circuited, this fuse F1 blows to prevent an electric shock of fire hazard.

2. FUSE F2 F8A 250V

1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazard.
2. The fuse also blows when the monitored interlock switch SW1 remains closed with the oven door open and when the monitor switch SW2 contact (COM-NC) closes.
3. The fuse also blows when the asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of high voltage transformer is shorted.

[4] ASYMMETRIC RECTIFIER

The asymmetric rectifier is solid state device that prevents current flow in both directions. And it prevents the temperature rise of the high voltage transformer by blowing the fuse F2 F8A when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 kV The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.7 kV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of the blowing the fuse F2 F8A.)

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 high voltage transformer.
5. The large electric currents beyond 8A flow through the primary winding of the high voltage transformer.
6. The fuse F2 F8A blows by the large electric currents.
7. The power supplying to the high voltage transformer is cut off.

[5] THERMAL CUT-OUT

1. THERMAL CUT-OUT TC1 145°C (MG)

This thermal cut-out protects the magnetron against overheat. If the temperature goes up higher than 145°C because the fan motor is interrupted or the ventilation openings are blocked, the thermal cut-out TC1 will open and the oven will switch off. The defective thermal cut-out must be replaced with a new one.

2. THERMAL CUT-OUT TC2 170°C (OVEN)

This thermal cut-out protects the oven against overheating or fire inside the oven. If the temperature rises above 170°C the thermal cut-out opens the oven will switch off. The defective thermal cut-out must be replaced with a new one.

3. THERMAL CUT-OUT TC3 170°C (ENGINE)

This thermal cut-out protects the engine unit against overheating. If the temperature rises above 170°C the thermal cut-out opens the oven will switch off. The defective thermal cut-out must be replaced with a new one.

[6] NOISE FILTER

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

[7] HEATING ELEMENT

1. GRILL HEATING ELEMENT GH

The grill heating element is provided to brown the food and is located on the top of the oven cavity.

2. ENGINE UNIT (ENGINE HEATING ELEMENT) EH

The engine unit is provided to generate the steam.

[8] MOTOR

1. ANTENNA MOTOR AM

The antenna motor rotates the antenna located under the oven cavity.

2. FAN MOTOR FM

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

3. INTAKE DAMPER MOTOR DM

The air damper position is set automatically by the intake damper motor, intake damper switch, air damper cam and damper shaft. These components are operated by a signal that judges the selected cooking mode by the control unit.

4. PUMP MOTOR (TUBE PUMP ASSEMBLY)

The tube pump assembly consists of the pump motor, roller and tubes. The pump motor rotates the roller. The roller presses the tube. The water in the tube is pressed out from the tube pump assembly.

[9] THERMISTOR

1. THERMISTOR (ENGINE) TH1

The thermistor is a negative temperature coefficient type. The temperature in the engine unit is detected through the resistance of the thermistor, and then the control unit causes the relay to operate, thus the current to the engine heating element is turned ON/OFF.

2. THERMISTOR (GRILL) TH2

The thermistor is a negative temperature coefficient type. The temperature in the oven cavity is detected through the resistance of the thermistor, and then the control unit causes the relay to operate, thus the current to the grill heating element is turned ON/OFF.

CHAPTER 8. TROUBLESHOOTING GUIDE

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

IMPORTANT:

If the oven becomes inoperative because of a blown fuse F2 (F8A) in the monitored latch switch - monitor switch circuit, check the monitored latch switch and monitor switch before replacing the fuse F2 (F8A).

TEST PROCEDURE	POSSIBLE CAUSE AND DEFECTIVE PARTS / PROBLEM	Home fuse or breaker blows when power supply cord is plugged into wall outlet.	Nothing appears in display when power supply cord is plugged into wall outlet and the door is open and closed.	Fuse 20A F1 blows when power supply cord is plugged into wall outlet.	Fuse 20A F2 blows when the door is opened.	Display does not operate properly when the stop key is pressed.	Oven lamp does not light when the door is opened. (Display operates.)	Oven does not start when the START key is pressed. (Display operates.)	Oven lamp does not light.	Fan motor does not operate.	Oven stops 1minute after STARTkey is pressed.	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power control is set at HIGH.)	Oven does not seem to be operating properly during variable cooking condition except HIGH cooking condition.	Oven goes into cook cycle but shuts down before end of cooking cycle.	Grill heating element does not operate.	Oven goes into cook cycle but shuts down before end of cooking cycle.	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power control is set at HIGH.)	Grill heating element does not operate.	Engine unit does not operate.	Pump motor does not operate.	Intake damper does not close.	Oven goes into cook cycle but shuts down before end of cooking cycle.	"Err" AND "HOT" is displayed.	"Err"is displayed.	"Err" AND "WATER" is displayed.	"EE01" is displayed.	"EE05"is displayed.	"EE07" is displayed.	"EE12" is displayed.	"EE14" is displayed.	"RESET" is displayed.
	CONDITION	ENERGY SAVE MODE	ENERGY SAVE MODE	ENERGY SAVE MODE	OFF CONDITION	OFF CONDITION	OFF CONDITION	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	COOKING CONDITION (COMMON MODE)	MICROWAVE COOKING	MICROWAVE COOKING	MICROWAVE COOKING	GRILL COOKING CONDITION	GRILL COOKING CONDITION	COMBI COOKING	COMBI COOKING	STEAM COOKING	STEAM COOKING	STEAM COOKING	STEAM COOKING									
	TEMPERATURE OF OVEN IS TOO HIGH IN MICROWAVE COOOKING.																														●
	TEMPERATURE OF ENGINE UNIT IS TOO HIGH.																										●				
	WATER IS FROZEN IN WATER TANK OR TUBE PUMP ASSEMBLY.																							●							
	TEMPERATURE OF OVEN IS TOO HGIH.																						●								
	INPUT TIME IS OVER MAXIMUM COOKING TIME																							●	●						
	TUBES ARE CHOKED.																														
	WATER TANK IS EMPTY.																					●			●						
	HOME FUSE OR BREAKER		●																												
	NO POWER AR WALL OUTLET		●																												
	BLOCKED COOLING FAN													●		●															
	BLOCKED VENTILATION OPENINGS													●		●															
	MIS-ADJUSTMENT OF SWITCHES					●		●																							
	OPENED WIRE HARNESS		●			●	●	●	●	●	●	●			●		●	●	●	●	●					●			●		
	SHORTED WIRE HARNESS	●		●																						●			●		
	POWER SUPPLY CORD	●	●																												
N	KEY UNIT (MEMBRANE SWITCH)					●		●																							
M	CONTROL UNIT								●	●		●	●		●		●	●	●									●		●	
L	ENGINE UNIT (ENGINE HEATING ELEMENT)																														
L	GRILL HEATING ELEMENT														●			●													
	OVEN LAMP						●		●																						
	INTAKE DAMPER MOTOR										●										●										
	FAN MOTOR									●				●		●															
	PUMP MOTOR																			●					●						
	ANTENNA MOTOR																														
K	NOISE FILTER			●																											
J	FUSE F8A F2											●																			
I	FUSE 20A F1		●																												
H	ENGINE THERMAL CUT-OUT TC3																					●									
H	OVEN THERMAL CUT-OUT TC2															●															
H	MG THERMAL CUT-OUT TC1													●																	
G	THERMISTOR (GRILL) TH2															●						●				●					
G	THERMISTOR (ENGINE) TH1																					●							●		
E	ANTENNA SWITCH SW5																														
E	INTAKE DAMPER SWITCH SW4										●										●										
E	DOOR SENSING SWITCH SW3					●																									
E	MONITOR SWITCH SW2						●	●																							
E	MONITORED INTERLOCK SWITCH SW1				●																										
D	HIGH VOLTAGE CAPACITOR											●					●														
C	H.V. RECTIFIER ASSEMBLY											●					●														
B	HIGH VOLTAGE TRANSFORMER											●					●														
A	MAGNETRON											●					●														

CHAPTER 9. 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.

CARRY OUT 3D CHECKS.

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

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

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

MICROWAVE OUTPUT POWER (IEC60705)

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 x t/4.187 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is v x ΔT.

The formula is as follows;

P x t / 4.187 = V x Δ T+ 0.55 x mc (T2-T0)/4.187 P (W) = 4.187 x V x ΔT / t + 0.55 x mc (T2-T0)/t

Our condition for water load is as follows:

Room temperature (T0) ..... around 20°C	Power supply ..... VoltageRated voltage
Water load ..... 1000 g	Initial temperature (T1) ..... 10±1°C
Heating time ..... 47 sec.	Mass of container (mc) ..... 330 g
T2 ..... Final Temperature	ΔT = T2 - T1 P = 90 x ΔT + 0.55 x mc (T2-T0)/47

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±1)°C

4) Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5°C.

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

6) The graduation of the thermometer must be scaled by 0.1°C at minimum and an accurate thermometer.

7) The water load must be (1000±5) g.

8) "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 3" sec. 3 sec. is magnetron filament heat-up time.

Measuring method:

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

   (Example: The initial temperature T1 = 11°C)

2) Add the 1 litre water to the vessel.

3) Place the load on the centre of the shelf.

4) Operate the microwave oven at 100% for the temperature of the water rises by a value ΔT of 10°C.

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

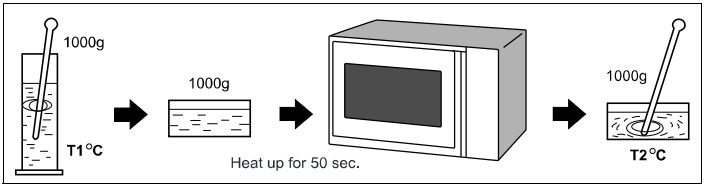
6) Measure the final water temperature. (Example: The final temperature T2 = 21°C)

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

Room temperature	To = 21°C
Initial temperature	T1 = 11°C
Temperature after (47 + 3) = 50 sec.	T2 = 21°C
Temperature difference Cold-Warm (ΔT = T2 - T1)	ΔT = 10°C
Measured output power	
The equation is "P = 90 x ΔT"	P = 90 x 10°C = 900 Watts

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

CAUTION: 1°C CORRESPONDS TO 90 WATTS. REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



[2] B: HIGH VOLTAGE TRANSFORMER TEST

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

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

   a.Primary winding ---------- approximately 1.98 Ω

   b.Secondary winding --------- approximately 159.5 Ω

   c.Filament winding ---------- less than 1 Ω

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

[3] C: HIGH VOLTAGE RECTIFIER TEST

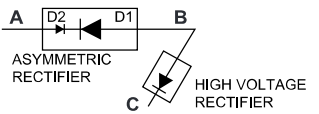
CARRY OUT 3D CHECKS.

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

CARRY OUT 4R CHECKS.

ASYMMETRIC RECTIFIER TEST

CARRY OUT 3D CHECKS.



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

CARRY OUT 4R CHECKS.

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

[4] D: HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

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

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

CARRY OUT 4R CHECKS.

[5] E: SWITCH TEST

CARRY OUT 3D CHECKS.

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

Table: Terminal Connection of Switch

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

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

CARRY OUT 4R CHECKS.

[6] F: MONITOR SWITCH TEST

CARRY OUT 3D CHECKS.

Before performing this test, make sure that the monitored interlock switch and the relay RY-4 on the control unit are operating properly, according to the above Switch Test Procedure. Disconnect the wire lead from the monitor switch (COM) terminal. Check the monitor switch 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 right 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 switch, reconnect the wire lead to the monitor switch (COM) terminal and check the continuity of the monitor circuit.

CARRY OUT 4R CHECKS.

[7] G: THERMISTOR TEST

CARRY OUT 3D CHECKS.

Disconnect the thermistor from the control unit. Measure the resistance of the thermistor with an ohmmeter.

Room Temperature	25°C	100°C	200°C
Resistance	Approximately 200 kΩ	Approximately 10 kΩ	Approximately 1 kΩ

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

CARRY OUT 4R CHECKS.

[8] H: THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS.

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

Table: Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit)	Temperature of "OFF" condition (open circuit)	Indication of ohmmeter (When room temperature is approx. 20°C.)
Thermal cut-out TC1 145°C	Bellow -20°C	Above 145°C	Closed circuit
Thermal cut-out TC2, TC3	Bellow -20 or -35°C.	Above 170°C	Closed circuit

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

An open circuit thermal cut-out (MG) TC1 indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure.

An open circuit thermal cut-out (OVEN) TC2 indicates that the oven cavity has overheated, this may be due to no load operation or fire in the oven cavity.

An open circuit thermal cut-out (Engine) TC3 indicates that the engine unit has overheated, this may be due to empty water tank or pump motor failure.

CARRY OUT 4R CHECKS.

[9] I: BLOWN FUSE (F1) 20A

CARRY OUT 3D CHECKS.

If the fuse F1 20A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

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

[10] J: BLOWN FUSE (F2) F8A (NOISE FILTER)

CARRY OUT 3D CHECKS.

1. If the fuse F2 F8A is blown when the door is opened, check the monitored interlock switch and monitor switch.
2. If the fuse F2 F8A is blown by incorrect door switching replace the defective switch(es) and the fuse F2 F8A.
3. If the fuse F2 F8A is blown, there could be shorts in the asymmetric rectifier or there is a ground in wire harness. A short in the asymmetric rectifier may be occurred due to short or ground in H.V. rectifier, magnetron, high voltage transformer or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

[11] K: NOISE FILTER TEST

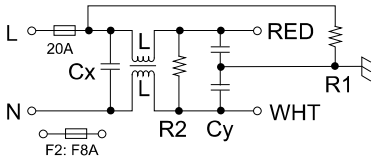
CARRY OUT 3D CHECKS.

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

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

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

CARRY OUT 4R CHECKS.



L (min)	Cx ± 20%	Cy ± 20%	R1	R2
1.0mH	0.22 uF	4700pF	10 MΩ	680k Ω

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

CARRY OUT 3D CHECKS.

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

1. Resistance of heater.

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

Table: Resistance of heater

Parts name	Resistance
Grill heating element	Approximately 46.5 ~ 51.1Ω
Engine heating element	Approximately 58.0 ~ 62.9Ω

2. Insulation resistance.

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

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

CARRY OUT 4R CHECKS.

[13] M: CONTROL UNIT TEST

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

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

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

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

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.

2. Control Unit

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

2.1. In connection with pads

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.

2.2. In connection with indicators

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 up.
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.

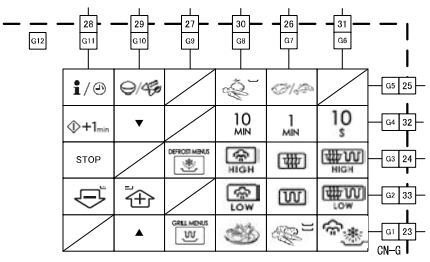
2.3. Other possible troubles caused by defective control unit.

1) Buzzer does not sound or continues to sound.
2) Clock does not operate properly.
3) Cooking is not possible.
4) Proper temperature measurement is not obtained.

[14] N: KEY UNIT (MEMBRANE SWITCH) TEST

If the display fails to clear when the STOP key is depressed, first verify the ribbon cable is making good contact, verify that the door sensing 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 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 key 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 a faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.

CARRY OUT 4R CHECKS.



CHAPTER 10. ERROR LIST

[1] Error List

Error display	EE code	Detail of error	Error condition	Application menu	Check method	Check timing	Note
Err	04	Oven temperature is high.	Oven temperature is too high	Defrost Steam Low (under 85°C)	Grill thermistor	Immediately	"HOT" is blinking in the display.
Err	0F	Water tank is frozen	Engine heater temperature is too low.	Engine menu	Grill thermistor	Always	
Err	-	Time input error	More than maximum cooking time is input	Manual steam menu	Key input	Steam High/Low key is pressed.	
Err	0A	Shortage of Water	Water in the water tank isn't enough. Tube pump assembly or pump motor is out of order.	Engine menu except Defrost menu	Engine thermistor Grill thermistor	After engine heater was from on to off once.	The cooking is stopped. Only stop/clear key is available.

Error display	EE code	Detail of error	Error condition	Application menu	Check timing	Note
EE01	11	Grill thermistor error SHORT	Grill thermistor is short.	Oven mode	Immediately from heating start	
	12	Grill thermistor error OPEN	Grill thermistor is open.	Fermentation mode	Always from heating start	
EE05	15	Engine heater error	Engine heater temperature is too high.	Engine menu	Always from heating start	
	18	Intake Damper error	Damper or Damper switch doesn't work. Damper is stopped if on and off at damper switch port is not detected within 1 min. When Damper error is detected, the cooking is stopped.		Every mode that damper works.	Error isn't displayed. EE code is memorized in the FLASH address 04h, if other error has not occurred.
	01	Antenna error	Antenna or antenna switch doesn't work. When antenna error is detected, output of microwave is stopped.		Microwave mode	Error isn't displayed. EE code is memorized in the FLASH address 05h.
EE12	1C	Engine thermistor error OPEN	Engine thermistor is open.	Engine menu	Always operate more than 30sec. under 5 bit.	
EE14	1E	FLASH error (FLASH data verification error)	FLASH Read data is not same as FLASH write data.	PWB short check program	Short check program	
RESET	-	Something is burning in the oven by MICRO heating.	Rapid changes in oven thermistor level.	All cooking mode or stop state, check oven thermistor level continuously.	After 5min.	When the error detected, power is cut off.

How to operate test mode

(Power on and door closed)→STOP→STEAM HIGH→MICRO→Door open→Select Test No. 2 by [WEIGHT UP/ DOWN]→START→Select Address 04h (or 05h)→START

EE code: EE code is memorized in the FLASH address 04h as error history. (Only antenna error code is memorized in the FLASH address 05h.)

NOTE: When an error mode occurs except for shortage of water error and the oven stopping state continues for more than 3 minutes, the oven will be powered off by Energy save mode function.

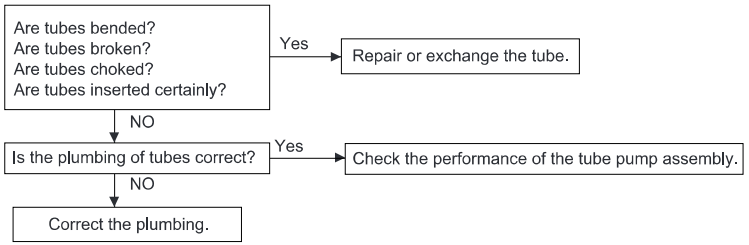
[2] How to check in the event of an error

1. How to check water supply performance

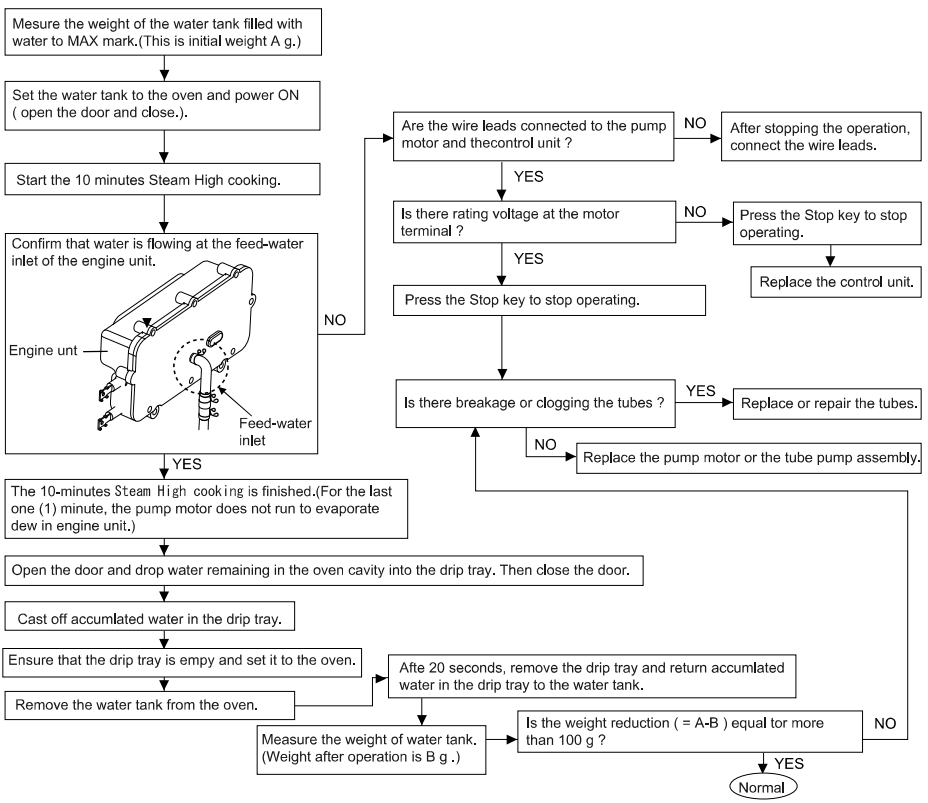
Check the plumbing of the tubes.

If the plumbing is normal, check the performance of the tube pump assembly.

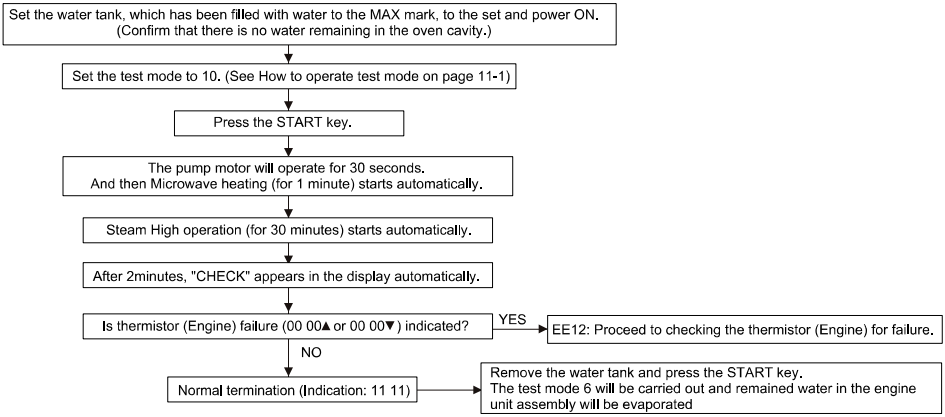
1) Check of plumbing



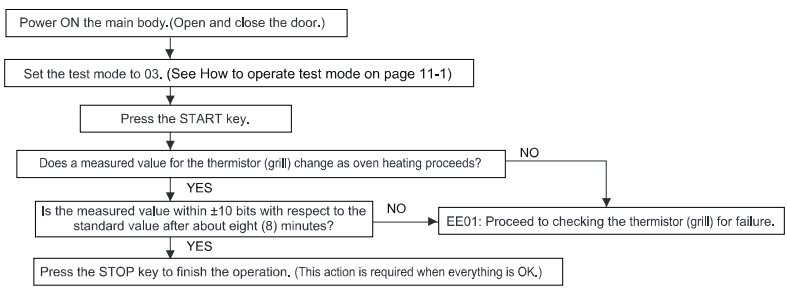
2) Check of tube pump performance



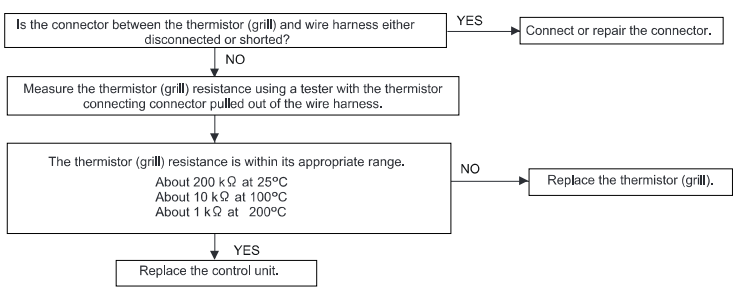
2. How to check performance of thermistor (Engine)



3. How to check thermistor (Grill) performance

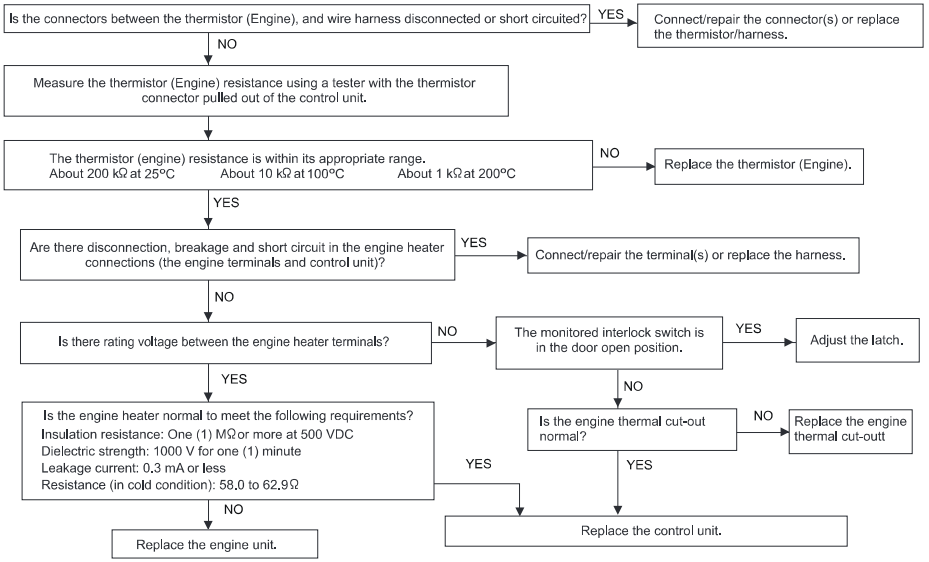


4. EE01 thermistor (Grill) failure



☆ Before starting the P.W.B. unit replacement, make sure to refer to “Before replacing the Printed Wiring Board” in page 2-3.

5. EE12 Engine thermistor failure



☆ Before starting the P.W.B. unit replacement, make sure to refer to “Before replacing the Printed Wiring Board” in page 2-3.

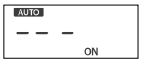
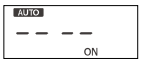
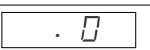
How to operate test mode

(power on and door closed)→[STOP/CLEAR]→[STEAM HIGH]→ [MICRO]→[door open](show ROM version)→([test number is selected by [WEIGHT UP/DOWN] [initial number: 04])→[START]

within 3 sec

[or push direct select key]

N.o	test name	detail of test	output	example of display
00	A/D data monitor	Following A/D data is displayed. The display of A/D data is changed by pushing [MICRO] key. (1) Oven thermister (oven mode and fermentation mode) ↓ (2) Engine thermister ↓ Return to (1)	OFF I. DAMPER: OPEN	Y XX Oven thermister level Oven mode XXBit Fermentation mode Y*Bit 4 XX Engine thermister level Measurement data XXBit
01	Frequency of power supply	Frequency of power supply is displayed. Buzzer beeps for 2 sec after checking frequency. (The display is kept.)	OFF I. DAMPER: OPEN	50 Frequency of power supply 50Hz
02	FLASH ROM data	**Address setup mode** by pushing [WEIGHT UP] address is incresed.(+1) by pushing [WEIGHT DOWN] address is decresed.(-1). *Reference address range is 00h to 1FFh. *by pushing [info] the figure of address number is chosen in turn. by pushing [START] setup moves FLASH ROOM data edit mode	OFF I. DAMPER: OPEN	A002 Address 02 A means Address
		FLASH ROM data edit mode by pushing [WEIGHT UP] address is incresed.(+1) by pushing [WEIGHT DOWN] address is decresed.(-1). *by pushing [info] the figure of address number is chosen in turn. by pushing [START] data is written into EEPROM and return address setup mode *To validate setting , reset power without pushing [STOP/CANCEL].	OFF I. DAMPER: OPEN	d E0 data EO d means data.
03	GRILL thermister check	The GRILL heating at 250°C start and the display shows standard data and measurement data of oven thermister at 250°C.	RY-1, GH, FM I. DAMPER: CLOSE	XX YY ON Standard data X*Bit Measurement data YYBit
04	Safety check For Insulation resistance inspection and withstanding voltage test for Jun./17. and later version 0021	Cook relay and fan work for 60sec.	RY-1, FM I. DAMPER: OPEN	00 00 ON
05	Software version	Software version is displayed.	OFF I. DAMPER: OPEN	01 XX Software version 01XX

N.o	test name	detail of test	output	example of display
06	Water drain	Pushing [START] key water draining works. *To empty the water of the tank. *After work for 60 sec. (FLASH: EP_MN_PO), the next stage start. *Flashing the right-side bar.	RY-1, EH, PM, FM I. DAMPER: OPEN	
		If temperature adjustment (by ETH) acts or 6 minutes pass, the next stage starts. *Temperature adjustment Flash: (EP_T6EH_H) *Many a little amount of water is left to the Engine. *Flashing the right-side bar.		
		Pump motor stop for 0 sec (Flash: EP_T6_TT) to delete water by engine heating. *Flashing the right-side bar. *Work end with alarm.	RY-1, EH, FM I. DAMPER: OPEN	
		Water draining finishes for 60sec.. (max. working time is 7min.)	OFF I. DAMPER: OPEN	
07	CONSUMPTION CHECK direct select key: [STEAM-HIGH]	Output switches by key operation. If no key operation continues for 60sec, output turns off.	OFF I. DAMPER: OPEN	 Waiting condition
		[STEAM HIGH] key *Engine heater mode with temperature control by ETH	EH, RY-1(OL) FM, PM I. DAMPER: CLOSE	
		[DUAL HIGH] key *Top heater mode with temperature control at 250ºC. *Microwave mode at 70%. *EE01 is displayed when oven thermister is defect.	MICRO(100%) RY-1, GH, FM I. DAMPER: CLOSE	
		[GRILL] key *Top heater mode with temperature control at 250ºC. *EE01 is displayed when oven thermister is defect.	RY-1, GH, FM I. DAMPER: CLOSE	  Oven thermister error
		[MICRO] key *Microwave mode at 100%.	MICRO(100%) RY-1, FM I. DAMPER: OPEN	
08	Monitor mode	Monitor key, 60 times speed key and stage cancel key are available until power turn off.	OFF I. DAMPER : OPEN	

No	test name	detail of test	output	example of display
10	TOTAL TEST direct select key: [info] how to operate at production line power on ↓ [STOP/CLEAR] ↓ [info] ↓ [MICRO] ↓ [MICRO] ↓ [START] ↓ [info] →	(1) Push "START". PM starts.	RY-1, FM, PM I. DAMPER: OPEN	1000 ON
		After 30 sec. ↓ " 01" appears when Antenna is defect. And test mode doesn't continue. After 1min. judgment Test mode doesn't continue.	MICRO (0%) MICRO (100%) FM, COOK (OL) PM I. DAMPER: OPEN	SENSOR 1000 ON
		(2) steam mode Steam mode (high) works for 30 min. *Check the engine thermistor works correctly. (open / short check) *"CHECK" display appears after FLASH (2) min.	RY-1, EH, PM, FM I. DAMPER: CLOSE	SENSOR 1101 WATER ON
		(3) Judgment OK 11 11 ETH is OK. NG XX XX see next page		Judgment SENSOR CHECK 1111 WATER ON OK
		(4) Shortcut to the test mode 06 When OK display (1111) and "CHECK" display appears, test mode 06 starts by pushing [START] key. Before pushing [START] key, water tank should be removed. (Refer to test mode 06) You don't have open the door.		

The detail of judgment (test no. 10)

Display	Error timing	ETH	OTH	Antenna	Damper	
01	During microwave mode	Not judged	Not judged	NG	Not judged	Antenna ERROR
0 11	After 18 sec from start	Not judged	Not judged	Not judged	NG	Damper ERROR
– –0	Right after starting	Not judged	Not judged	Not judged	NG	Damper ERROR
00 00▼	During steam heating mode	NG	Not judged	OK	OK	Engine thermistor is defect (short).
00 00▲	During steam heating mode	NG	Not judged	OK	OK	Engine thermistor is defect (open) or Engine heating element does not work when error appears after 30 sec.
00 10▼	During microwave mode	Not judged	NG	OK	OK	Oven thermistor is defect (short)
00 10▲	During microwave mode	Not judged	NG	OK	OK	Oven thermistor is defect (open)
11 11		OK	OK	OK	OK	

CHAPTER 12. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

[1] BEFORE OPERATING

WARNING AGAINST HIGH VOLTAGE:

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

(Example)

High Voltage Capacitor, High Voltage Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage 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 grip the door lever in door handle 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 manners.

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

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

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

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

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

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

[2] OUTER CASE CABINET REMOVAL

To remove the outer case cabinet, procedure as follows.

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

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

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

[3] HIGH VOLTAGE COMPONENTS REMOVAL

(HIGH VOLTAGE CAPACITOR AND HIGH VOLTAGE RECTIFIER ASSEMBLY)

To remove the components, proceed as follows.

1. CARRY OUT 3D CHECKS.
2. Disconnect the filament lead of the high voltage transformer and the high voltage transformer secondary wire from the high voltage capacitor.
3. Remove one (1) screw holding the capacitor holder to the bottom plate.
4. Remove the high voltage capacitor with the capacitor band from the bottom plate.
5. Remove one (1) screw holding earth side terminal of the high voltage rectifier assembly.
6. Remove the capacitor holder from the high voltage capacitor.
7. Disconnect the high voltage rectifier assembly from the high voltage capacitor.
8. Now, the high voltage rectifier assembly and the high voltage capacitor should be free.

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

[4] HIGH VOLTAGE TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the main wire harness from the high voltage transformer.
3. Disconnect the two (2) filament leads from the magnetron.
4. Disconnect the high voltage transformer secondary wire from the high voltage capacitor.
5. Disconnect the filament lead with the high voltage wire from the high voltage capacitor.
6. Remove the two (2) screws holding the transformer to the bottom plate.
7. Remove the transformer from the bottom plate.
8. Now, the high voltage transformer is free.

[5] MAGNETRON REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the two (2) filament leads from the magnetron.
3. Remove the one (1) screw holding the air duct to the magnetron.
4. Carefully remove the four (4) screws holding the magnetron to the waveguide. When removing the screws hold the magnetron to prevent it from falling.
5. Remove the magnetron from the waveguide with care so the magnetron antenna is not hit by any metal object around the antenna.

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

[6] ANTENNA MOTOR REPLACEMENT

1. REMOVAL

1. Disconnect the oven from the power supply.
2. Wait for 60 seconds to discharge the high voltage capacitor.
3. Remove the drip tray and the water tank.
4. Turn the oven over.
5. Remove the two (2) screws holding the bottom plate cover to the bottom plate.
6. Remove the bottom plate cover from the bottom plate.
7. Disconnect the wire leads from the antenna motor.
8. Remove the two (2) screws holding the antenna motor to the TT motor mount angle.
9. Now, the antenna motor is free.

2. REINSTALLATION

1. Reinstall the antenna motor by locating shaft onto the shaft assembly to the TT mount angle with the two (2) screws.
2. Reconnect the wire leads to the antenna motor.
3. Insert the three (3) tabs of the bottom plate cover into the slits of the bottom plate as shown.
4. Reinstall the bottom plate cover to the bottom plate with the two (2) screws.
5. Reinstall the water tank and the drip tray.

[7] FAN MOTOR REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the fan motor.
3. Remove the two (2) screws holding the fan motor to the back plate.
4. Remove the fan blade from the fan motor shaft according to the following procedure.
   i) Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

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

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

CAUTION: Do not reuse the removed fan blade as the fixing hole may be oversize.

5. Now, the fan motor is free.

2. INSTALLATION

1. Install the fan blade to the fan motor shaft according to the following procedure.

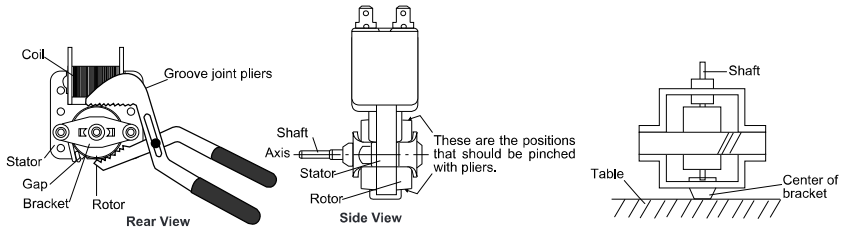
i) Hold the centre of the bracket which supports the shaft of the fan motor on a flat table.

ii) Apply the screw lock tight into the hole (for shaft) of the fan blade.

iii) Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.

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

2. Install the fan motor to the back plate with the two (2) screws.
3. Reconnect the wire leads to the fan motor.



[8] PUMP MOTOR REMOVAL

1. Disconnect the power supply cord.
2. Wait for 60 seconds to discharge the high voltage capacitor.
3. Remove the water tank and the drip tray from the oven.
4. Turn the oven over.
5. Remove the two (2) screws holding the bottom plate cover to the bottom plate.
6. Remove the bottom plate cover from the bottom plate.
7. Disconnect the wire leads from the pump motor.
8. Remove the one (1) screw holding the tube pump assembly to the bottom plate.
9. Release the two (2) tabs of the tube pump assembly from the holes of the bottom plate.
10. Move the tube pump assembly toward the control panel side and then release other two (2) tabs of the tube pump assembly from the slots of the bottom plate.
11. Remove the tube pump assembly from the bottom plate.
12. Turn the tube pump assembly over so that the pump motor can be seen.
13. Remove the two (2) screws holding the pump motor to the tube pump assembly.
14. Now, the pump motor is free.

[9] INTAKE DAMPER MOTOR AND INTAKE DAMPER SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the intake damper motor and the intake damper switch.
3. Remove the two (2) screws holding the support angle to the oven cavity top plate.
4. Remove the two (2) screws holding the separate angle to the oven cavity top plate.
5. Remove the separate angle.
6. Remove the two (2) screws holding the air damper motor angle to the oven cavity right side.
7. Remove the one (1) screw holding the air duct to the magnetron.
8. Remove the air duct with the intake damper motor and the switch from the oven cavity right side.
9. Remove the two (2) screws holding the intake damper motor to the air damper motor angle.
10. Now, the intake damper motor is free.
11. Remove the one (1) screw holding the intake damper switch to the air damper motor angle.
12. Now, the intake damper switch is free.

[10] BACK PLATE REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the noise filter and the fan motor.
3. Remove the one (1) screw holding the chassis support to the back plate.
4. Remove the one (1) screw holding the fan duct to the thermal cover right.
5. Remove the two (2) screws holding the back plate to the bottom plate.
6. Remove the two (2) screws holding the back plate to the oven cavity.
7. Now, the back plate is free. But the back plate still has the power supply cord, fan motor and noise filter in it.

[11] BOTTOM PLATE REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the water tank and the drip tray.
3. Remove the door assembly from the oven cavity, referring to the "DOOR REPLACEMENT".
4. Remove the high voltage transformer, referring to "HIGH VOLTAGE TRANSFORMER REMOVAL".
5. Remove the back plate, referring to "BACK PLATE REMOVAL".
6. Remove the joint tube from the engine unit.

7. Remove the one (1) screw holding the tank joint to the tank cover.
8. Remove the tank joint from the tank cover.

CAUTION: When the joint tube or pump tube L is removed from the engine unit or tank joint, remained water may bleed from the engine unit.

9. Loosen the pin band and remove the steam exhaust tube from the oven cavity.
10. Turn the oven over.
11. Remove the bottom plate cover by removing the two (2) screws.
12. Disconnect the wire leads from the pump motor.
13. Remove the two (2) screws holding the lower hinge to the bottom plate, and remove the lower hinge.
14. Remove the one (1) screw holding the tank cover to the bottom plate (right side).
15. Remove the four (4) screws holding the bottom plate to the oven cavity.
16. Lift up the bottom plate from the oven.
17. Now, bottom plate is free. But the bottom plate still has the high voltage capacitor, tube pump assembly, dew tray guide left, dew tray guide right, steam exhaust duct and back dew guide in it.

[12] ENGINE UNIT ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the back plate, referring to "BACK PLATE REMOVAL".
3. The joint tube should be removed from the engine unit assembly now.

CAUTION: When the joint tube is removed from the engine unit, remained water may bleed from the engine unit.

4. Remove the wire harness from the heater terminal of engine unit assembly by removing the tow (2) screws.
5. Disconnect the wire leads from the engine thermal cut-out.
6. Remove the three (3) screws which are holding the engine unit assembly from inside of the oven cavity.

NOTE: Hold the engine unit with your hand when removing, otherwise the engine unit will fall.

7. Remove the engine packing B from the engine unit.
8. Remove the one (1) screw holding the thermistor (engine) to the engine unit assembly.
9. Remove the one (1) screw and the one (1) nut holding the engine thermo angle to the engine unit assembly.
10. Now, the engine unit assembly is free.

CAUTION: CAUTION: When the new engine unit assembly is installed, carry out a shakedown operation, referring to "SHAKEDOWN OPERATION OF NEW ENGINE UNIT ASSEMBLY".

NOTE: NOTE: When the new engine unit is installed, the thermistor (engine) and engine packing B should be reinstalled.

[13] SHAKEDOWN OPERATION OF NEW ENGINE UNIT ASSEMBLY

After the new engine unit assembly is installed, carry out the following three procedures to avoid the error operation.

1. Remove the two (2) screws holding the back plate cover and remove the back plate cover. This is to cool the engine unit.
2. Fill the water tank with water and carry out the 1st. stage of "DESCALE" function, referring to "Descale Function" on page 5-4. (citric acid or lemon juice is not necessary.)
3. Then, carry out Drain water function (refer to "Drain Water Function" on page 5-4).
4. At last, fill the water tank with water and carry out Steam high cooking again for about ten (10) minutes. And check that the error does not appear on the display.
5. If the error is appeared and the oven stops at above step 4, carry out step 2, step 3 and step 4.
6. After shakedown operation, reinstall the back plate cover with the two (2) screws.

REASON

Inside walls of the engine unit assembly have been painted to protect the engine unit assembly with special paint. And special paint will shed water initially. By carrying out Steam cooking, paint can be accustomed to water. If this operation is not carried out, the oven will judge that there is no water in the tank assembly.

And the display will show the error and then the oven will stop.

Because this oven judges that there is water or not by checking on/off time ratio of the engine unit assembly.

If paint is not accustomed to water, off time will become longer than on time. At this time, the oven will judge no water.

[14] THERMISTOR (ENGINE) REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the engine unit, referring to "ENGIEN UNIT REMOVAL".
3. Remove the bottom plate, referring to "BOTTOM PLATE REMOVAL".
4. Disconnect the connector of the thermistor (engine) from the connector of the main wire harness.
5. Now, the thermistor (engine) is free.

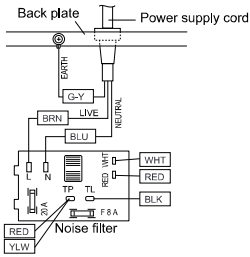
[15] OVEN LAMP REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the oven lamp.
3. Remove the one (1) screw holding the oven lamp to the air duct.
4. Remove the oven lamp from the air duct.
5. Now, the oven lamp is free.

[16] POWER SUPPLY CORD REPLACEMENT

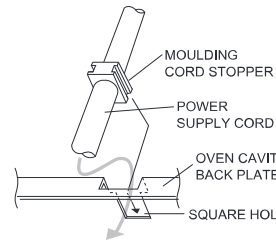
1. REMOVAL

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



2. REINSTALLATION

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



[17] CONTROL UNIT REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads and the connectors from the control unit.
3. Remove the one (1) screw holding the control panel assembly to the oven cavity front plate.
4. Lift up the control panel assembly and pull it forward.
5. Now the control panel assembly is free.
6. Remove the five (5) screws holding the control unit to the control panel.
7. Now, the control unit is free.

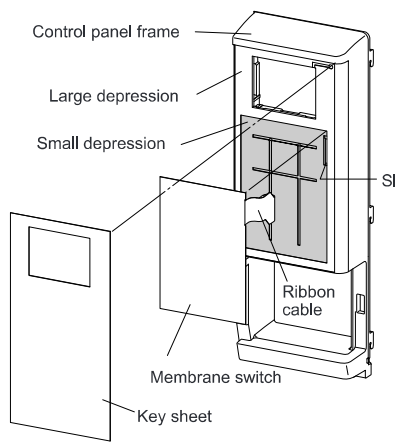
[18] KEY SHEET AND MEMBRANE SWITCH REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly, referring to chapter of CONTROL UNIT REMOVAL.
3. Disconnect the ribbon cable of the membrane switch from the connector (CN-G) on the control unit.
4. Tear away the key sheet from the control panel frame.
5. Tear away the membrane switch from the control panel frame.

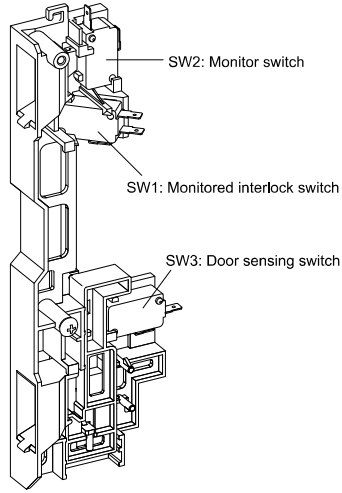
2. REINSTALL

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



[19] MONITORED INTERLOCK SWITCH, MONITOR SWITCH AND DOOR SENSING SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the water tank.
3. Remove the control panel assembly, referring to "CONTROL UNIT REMOVAL".
4. Remove the one (1) screw holding the tank cover to the bottom plate (right side).
5. Remove the one (1) screw holding the tank cover to the oven cavity front plate.
6. Remove the tank cover form the oven.
7. Remove the air duct form the oven, referring to "INTAKE DAMPER MOTOR AND INTAKE DAMPER SWITCH REMOVAL".
8. Disconnect the leads from all switches.
9. Remove the two (2) screws holding the latch hook to the oven cavity.
10. Remove the latch hook.
11. Remove the switch(es) from the latch hook by pushing the retaining tab backwards slightly and turning the switch(es) on the post.
12. Now, the switch(es) is free.



[20] MONITORED INTERLOCK SWITCH, DOOR SENSING SWITCH AND MONITOR SWITCH ADJUSTMENT

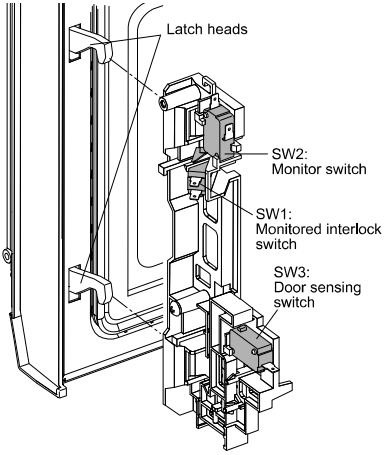
If the monitored interlock switch, door sensing switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. Adjustment

1. CARRY OUT 3D CHECKS.
2. Loosen the two (2) screws holding the latch hook to the oven cavity front flange.
3. With the door closed, adjust the latch hook by moving it back and forward or up and down. In and out play of the door allowed by the latch hook should be less than 0.5mm. The horizontal position of the latch hook should be placed where the monitor switch has activated with the door closed. The vertical position of the latch hook should be placed where the monitored interlock switch and door sensing switch have activated with the door closed.
4. Secure the screws with washers firmly.
5. Make sure of the all switches operation. If the latch head has not pushed the plungers of the monitor switch with door closed, adjust the latch hook position. At that time, the latch head should have pushed the plungers of the monitored interlock switch and door sensing switch. If the latch head has not pushed the plungers of the monitored interlock switch and door sensing switch with door closed, loose two (2) screws holding latch hook to oven cavity front flange and adjust the latch hook position.

2. After adjustment, make sure of following:

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

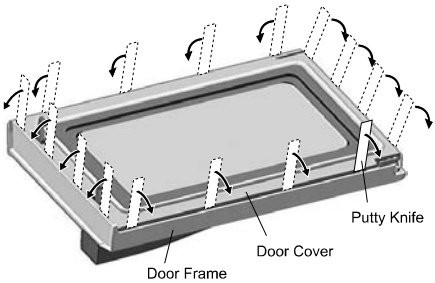


[21] DOOR REPLACEMENT

1. REMOVAL

DOOR FRAME ASSEMBLY AND DOOR COVER

1. Disconnect the oven from the power supply.
2. Grip the door lever and pull it towards you and open the door slightly.
3. Insert a putty knife (thickness of about 0.5mm) into the gap between the door cover and door frame as shown in figure to free engaging parts.



4. Release the door cover with the door packing from the door panel.
5. Now the door cover with the door packing is free.

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.

6. Lift the door upwards.
7. Now, the door frame assembly is free from oven cavity.

DOOR PACKING

6. Remove the door packing from the door cover.
7. Now, the door packing is free.

DOOR PANEL AND DOOR SASH

8. Remove the seven (7) screws holding the door panel to the door frame.
9. Now, the door panel is free.
10. Pull out the door sash from the door frame.
11. Now, the door sash is free.

DOOR OPEN HANDLE AND DOOR LEVER

10. Remove the six (6) screws holding the door open handle to the door frame.
11. Release the two (2) tabs of the door open handle from the two (2) holes of the door frame.
12. Now, the door open handle is free.
13. By sliding the door lever leftward, release the hole of the door lever from the pin of the latch head L.
14. Now, the door lever is free.

DOOR GLASS

15. Remove the two (2) screws holding the two (2) glass stoppers to the door frame.
16. Release the two (2) glass stoppers from the tabs of the door frame.
17. Now, the glass stoppers are free.
18. By sliding the door glass downwards, remove it from the door frame.
19. Now, the door glass is free.

LATCH HEAD U, LATCH HEAD L, SPRING AND DOOR FRAME

15. Remove the two (2) screws holding the latch angle to the door frame.
16. Remove the latch angle with the latch head U, latch head L, latch lever and spring from the door frame.
17. Now, the door frame is free.
18. Release the spring from the tabs of the latch angle and latch lever.
19. Now, the spring is free.
20. Remove each one (1) screw holding the latch head U and latch head L to the latch angle.
21. Remove the latch angle from the latch head U and latch head L.
22. Remove the latch head U and latch head L from the latch lever.
23. Now, the latch head U and latch head L are free.

2. REINSTALLATION

1. Reinstall the latch head U and latch head L to the latch lever.
2. Reinstall the latch head U and latch head L to the latch angle with the two (2) screws.
3. Reinstall the spring between the tabs of the latch angle and the latch lever.
4. Reinstall the latch angle to the door frame with the two (2) screws.
5. Reinsert the upper edge of the door glass into the groove of the door frame.
6. Reinstall the two (2) door stoppers to the door frame.
7. Hold the lower edge of the door glass with the two (2) door stoppers.
8. Hold the two (2) door stoppers with the two (2) screws.
9. Reinstall the door lever to the door frame. At this time, first, insert the hole of the door lever to the pin of the latch head L.
10. Reinstall the door open handle to the door frame by catching the two (2) tabs of the door open handle into the holes of the door frame.
11. Hold the door open handle to the door frame with the six (6) screws.
12. Reinstall the door sash to the lower side of the door frame, by inserting the two (2) tabs of the door sash into the two (2) grooves of the door frame.
13. Reinstall the door panel to the door frame with the seven (7) screws.
14. Reinstall the door packing to the door cover.

    Refer to "INSTALLATION OF DOOR PACKING".

15. Locate the door panel hinge pins into the upper and lower oven hinge holes.
16. Reinstall the door cover to the door frame.

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

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

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

1. Door latch heads smoothly catch latch hook through latch holes and that latch head goes through centre of latch hole.

   Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.

2. Door is positioned with its face pressed toward cavity face plate.
3. Check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.

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

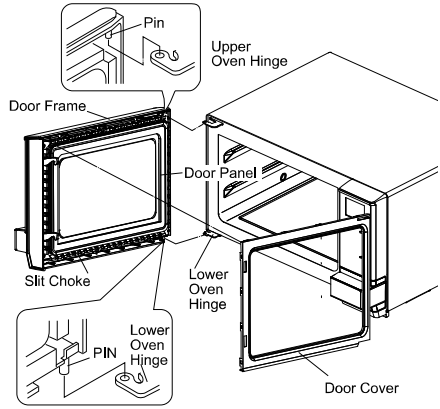


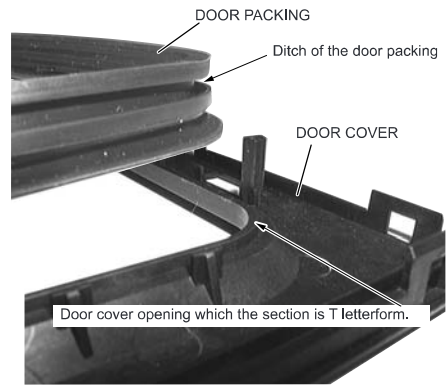
Figure C-9. Door Replacement

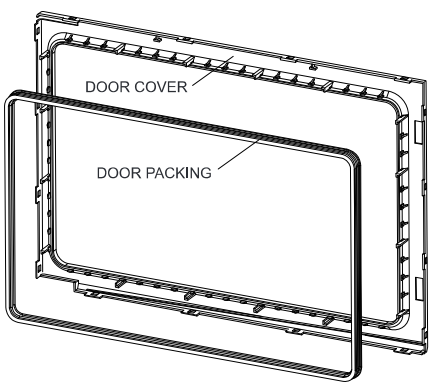
[22] INSTALLATION OF DOOR PACKING

1. Turn the door cover to the back side.
2. First, cover the four corners of the door cover opening with four corners of the door packing.
3. Cover all surroundings of the door cover opening with the ditch of the door packing surely because the section of the door cover opening is T letter form. Refer to the expansion photograph of the door packing and the door cover.
4. Turn the door cover to the face side.
5. Cover surely if there is a part where the door packing doesn't cover the door cover.
6. It is confirmed for the door packing not to stretch over all surroundings, not to remain, and to cling uniformly.

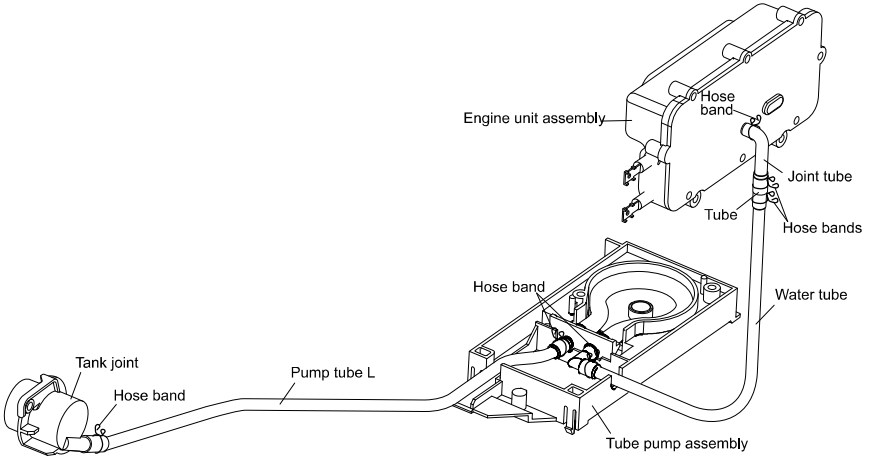
Attention:

- **Do not damage the surface of the door packing.**
- **Confirm there is neither microwave leakage from the door nor a steam leak after assembly.**





[23] PLUMBING


Engine unit assembly
Hose band
Joint tube
Tube
Hose bands
Hose band
Water tube
Tank joint
Hose band
Pump tube L
Tube pump assembly

CHAPTER 13. 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 5mW/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:

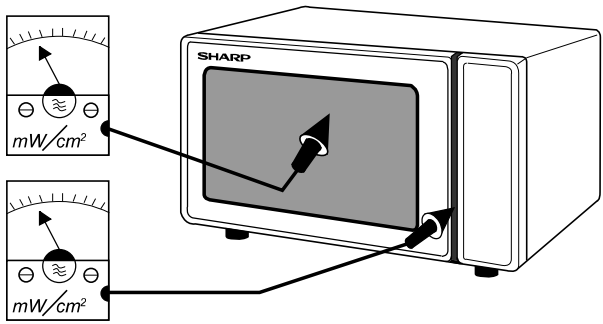
   NARDA 8100

   NARDA 8200

   HOLADAY HI 1500

   SIMPSON 380M
2. Place the oven tray into the oven cavity.
3. Place the load of 275 ±15ml of water initially at 20 ±5°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 that 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.

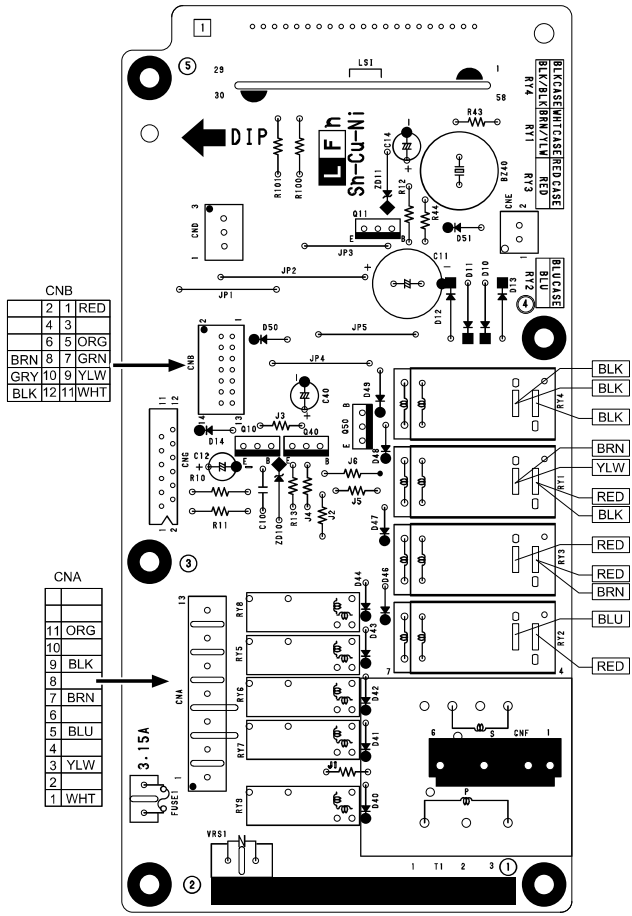


Microwave leakage measurement at 5 cm distance

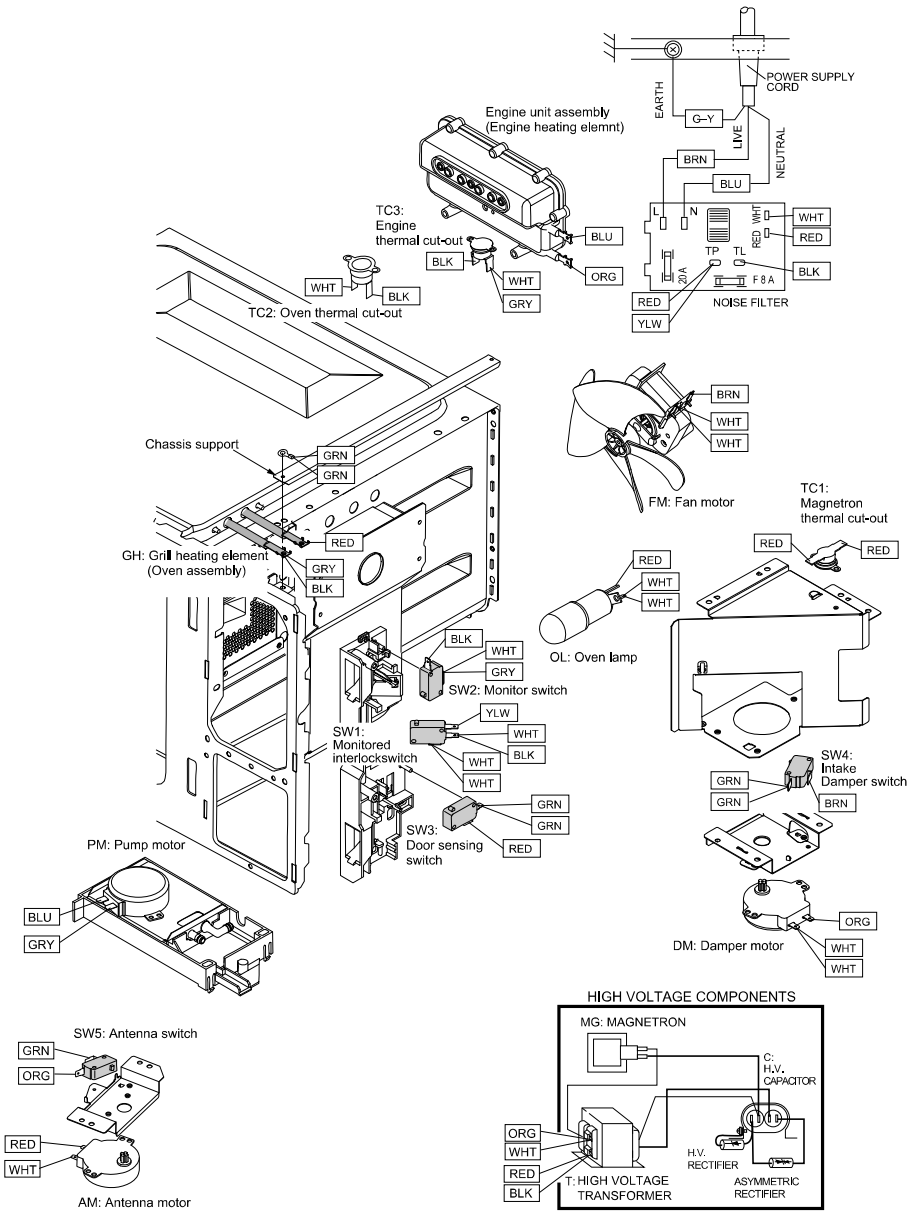
CHAPTER 14. CIRCUIT DIAGRAMS

[1] PICTORIAL DIAGRAM

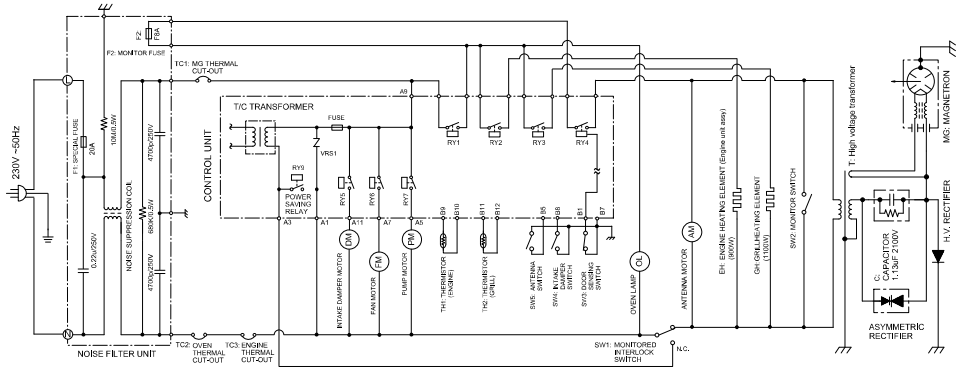
1. CONTROL UNIT



2. OTHER COMPONENTS



[2] MAIN CIRCUIT



[3] CONTROL UNIT CIRCUIT