



CM118

Caple BI Combi M.wave & Grill



Technical information



CM118

Microwave, grill and convection oven with frame

Features

25L easitronic built-in microwave, grill and convection oven

Auto cook menu

Auto defrost

Child lock

95 minute timer

Stainless steel front / cavity

Mark resistant finish

LED display

Stainless steel frame (W 595mm x H 460mm)

Push door, metal knob

Trim kit and unit installed in packaging

Cooking output

900W microwave power

1000W grill power

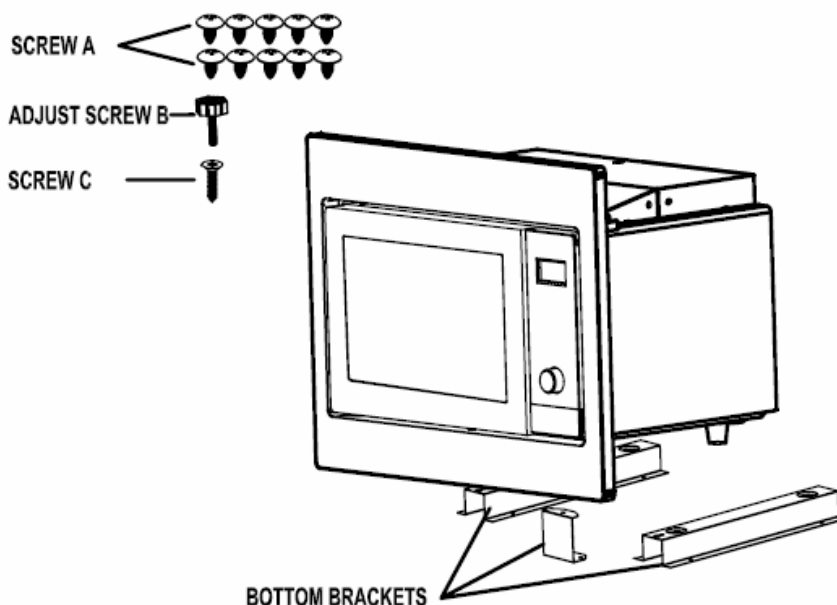
2500W convection power

Dimensions

Height 460mm, Width 595mm, Depth 486mm

Installation Instruction

Please Read the Manual Carefully Before Installation



Please Note

Electrical connection

The oven is fitted with a plug and must be only connected to a properly installed earthed socket. In accordance with the appropriate regulations, the socket must only be installed and the connecting cable must only be replaced by a qualified electrician.

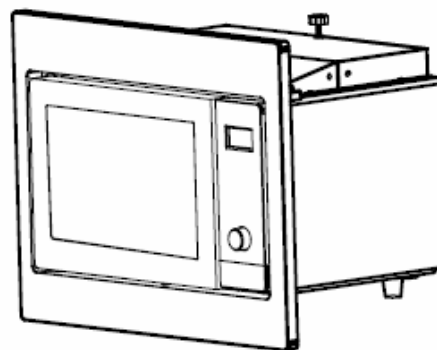
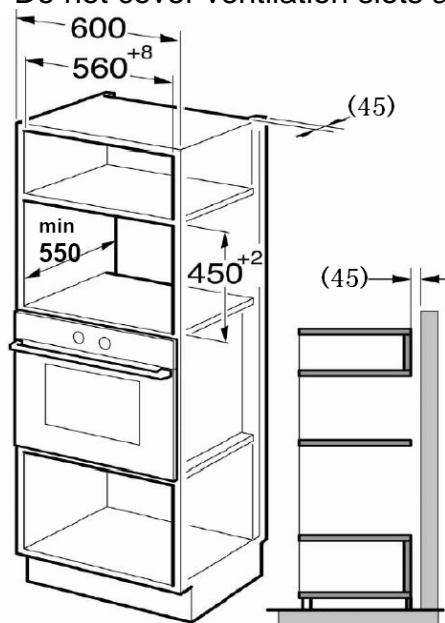
If the plug is no longer accessible following installation and all-pole isolating switch must be present on the installation side with a contact gap at least 3mm.

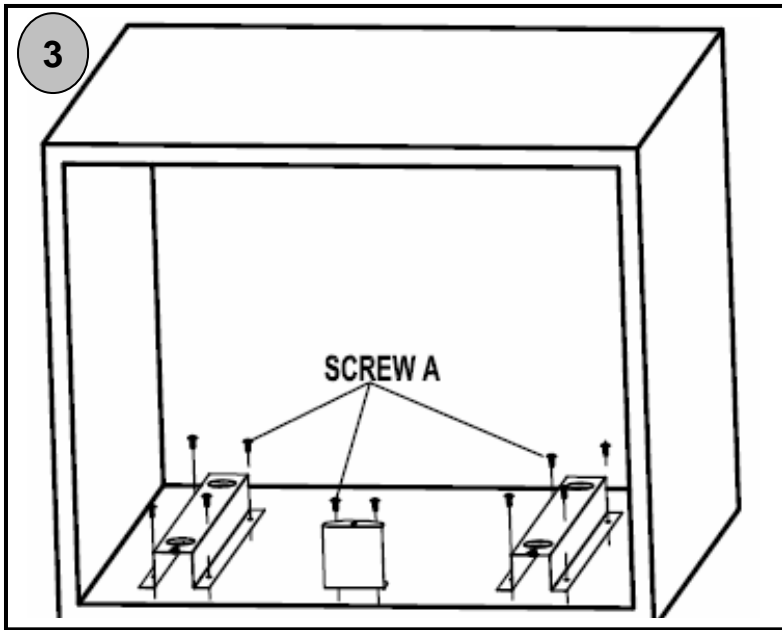
A. Built-in furniture

The built-in cabinet shall not have a rear wall behind the appliance.

Minimum installation height is 85cm.

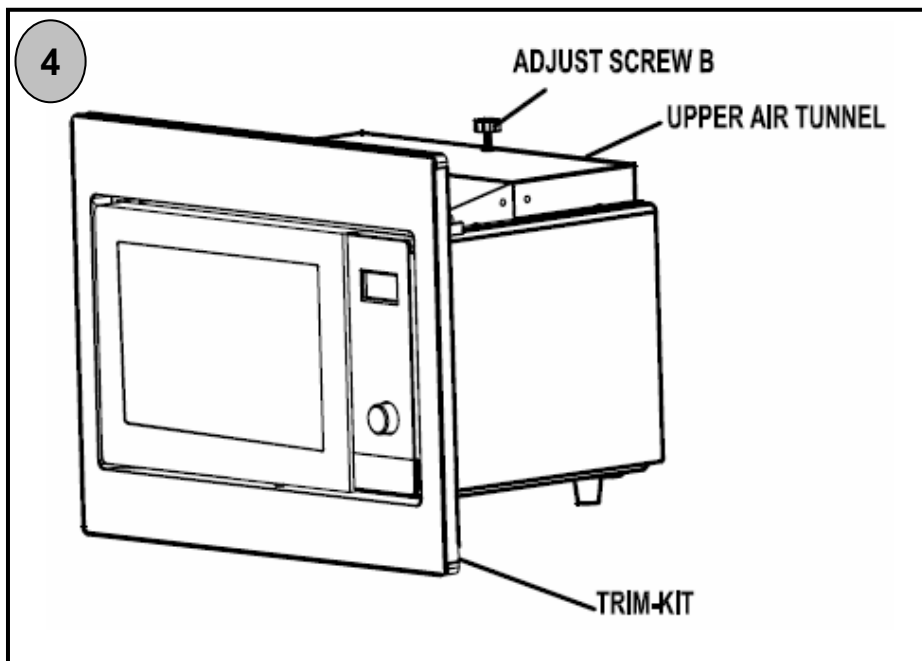
Do not cover ventilation slots and air intake points.





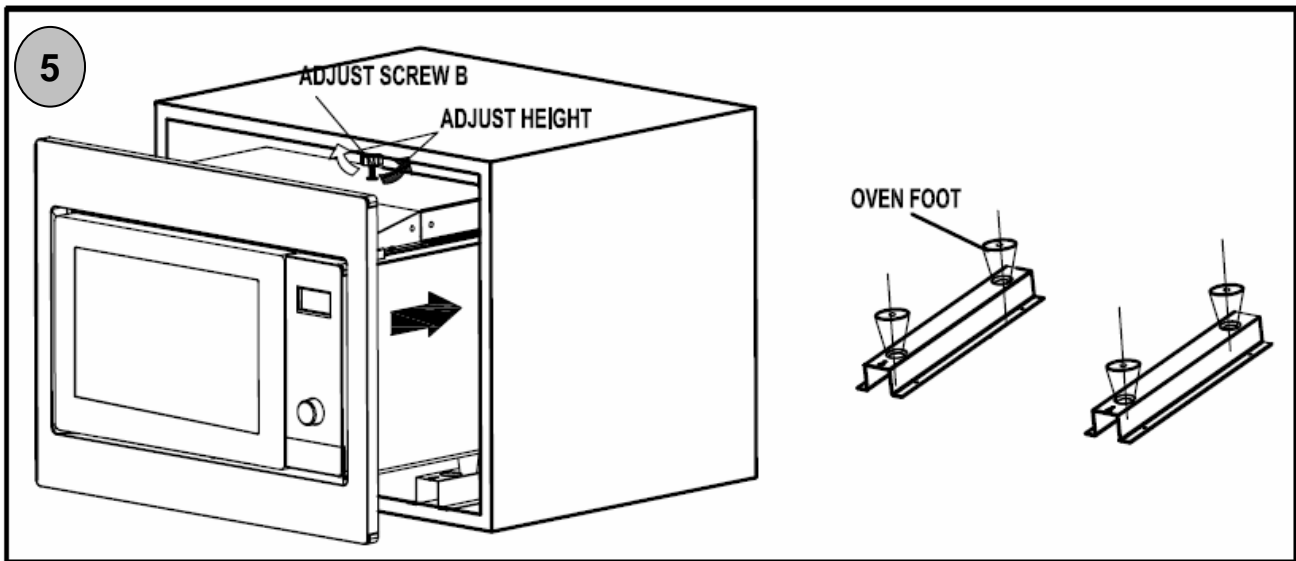
3. Remove the BOTTOM CABINET TEMPLATE, and fix the BOTTOM BRACKETS with SCREW A.

C. Prepare the oven.



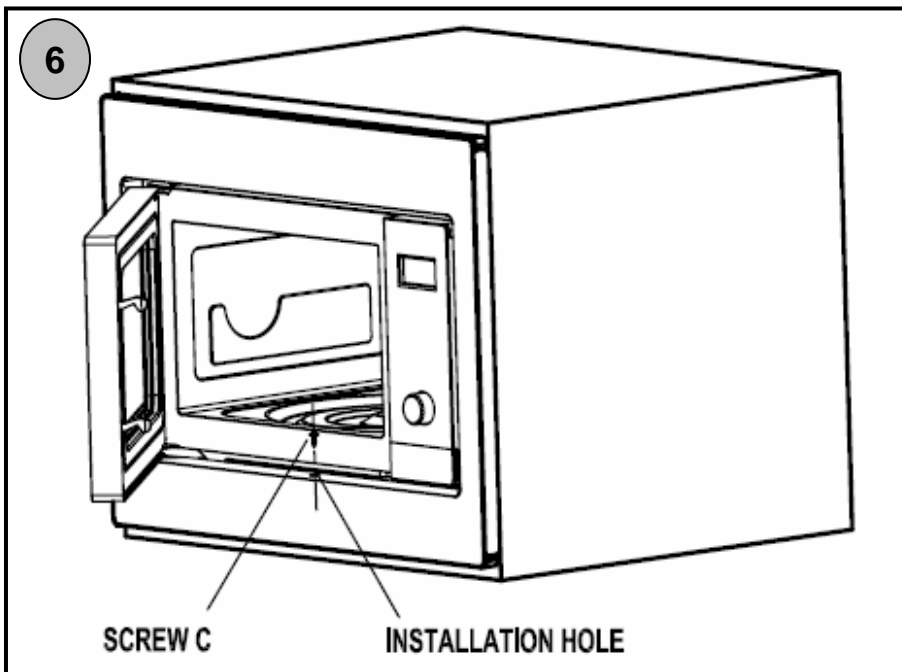
4. Fix SCREW B on the UPPER AIR TUNNEL of the oven.

D. Install the oven.

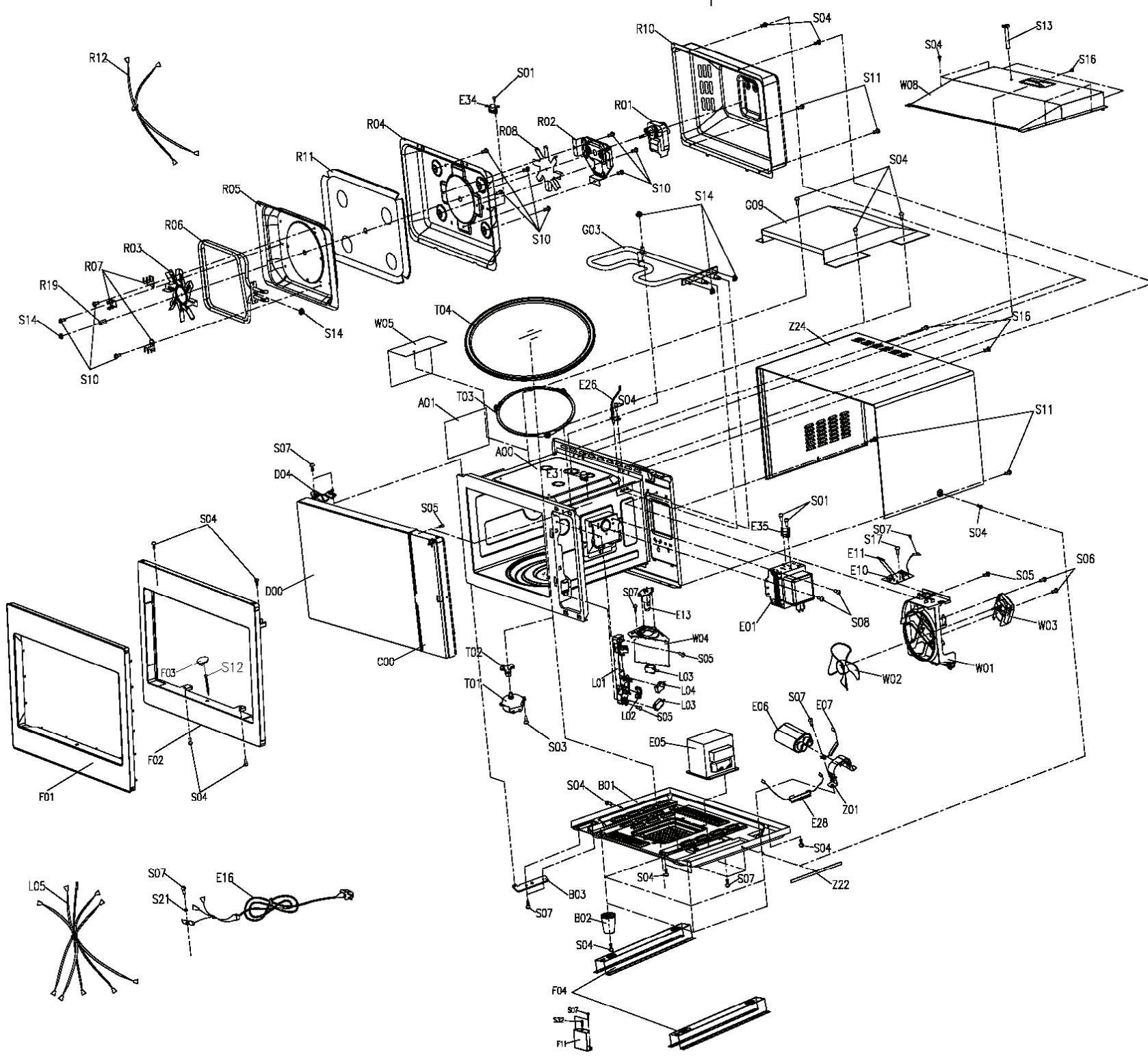


5. Install the oven into the cabinet.

- Adjust the height of SCREW B to keep 1mm gap between the SCREW B and the top plane of cabinet.
- Make sure that the OVEN FEET are aligned with the grooves of brackets when install the oven into the cabinet.
- Do not trap or kink the power cord.



- ### 6. Open the door; fix the oven to the cabinet with SCREW C at the INSTALLATION HOLE of TRIM KIT.

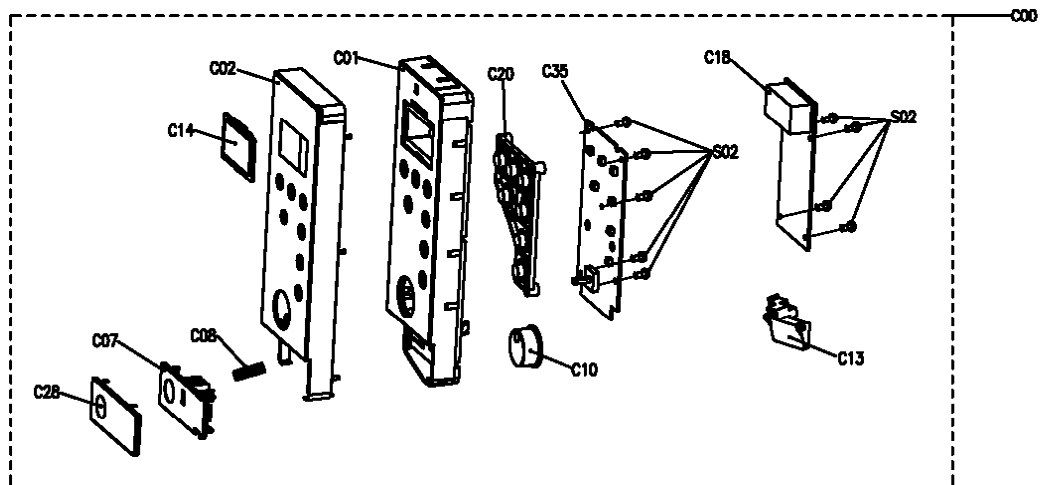
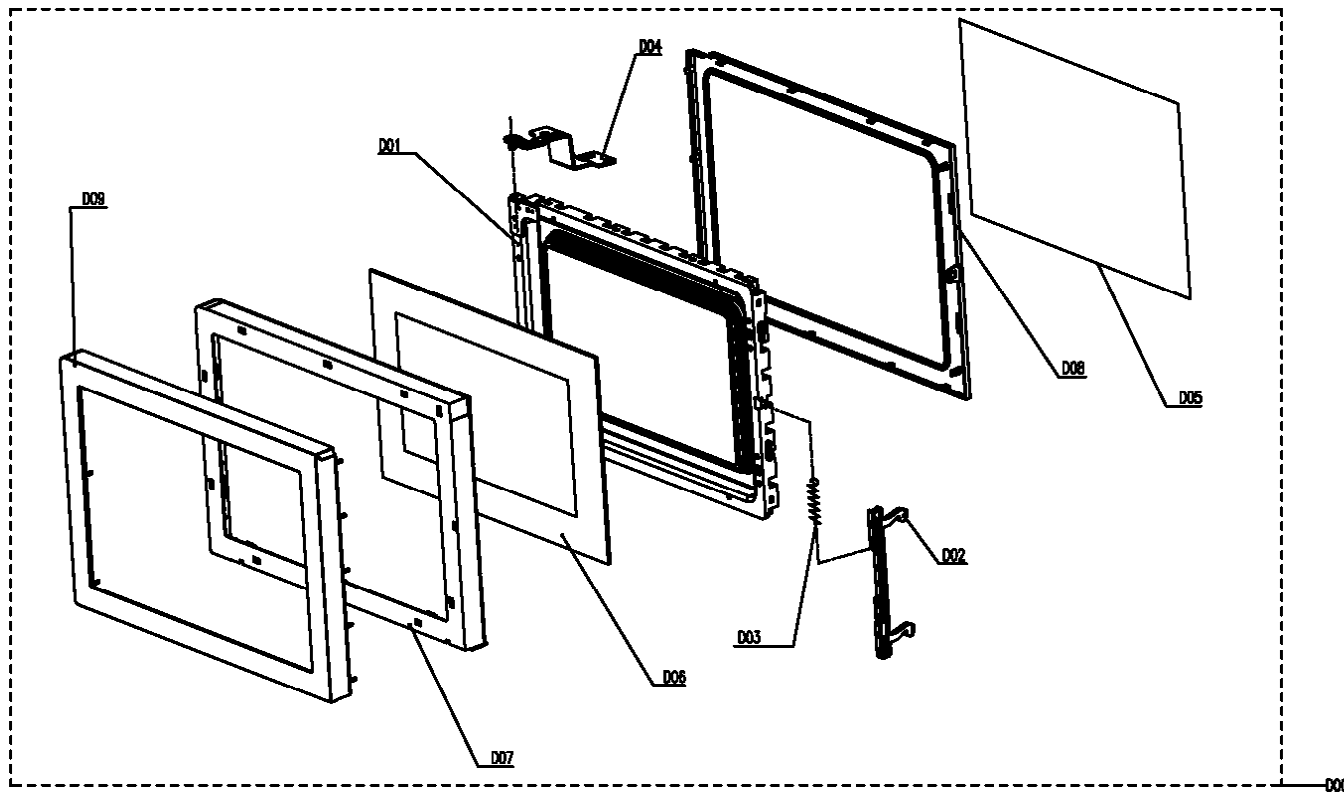


W04	Guide Wind	1	
Z24	Case Out	1	
Z22	Sponge	1	
Z01	Holder H.V.C	1	
S13	BOLT	1	
F11	SPACER BRKT	1	
W08	GUIDE AIR #1	1	
W05	Guide Air Outlet	1	
W03	Motors R&V.C	1	
W02	Fan	1	
W01	Guide Fan	1	
T04	Ring	1	
T03	Trey Rotating Assy	1	
T02	Coupler	1	
T01	Motor Trey	1	
S21	Spring Washer #4.1	1	
S20	WASHER #4	4	
S17	Screw ST3*10PWHC	1	
S16	Screw ST4*10TDB	3	
S14	Nut M4	5	
S11	Screw C14*10TBHC	5	
S10	Screw ST4*10TB SUS	13	
S08	Screw C14*10HWHHC	2	
S07	Screw C14*8TBHC	20	
S06	Screw ST4*20TBHC	2	
S05	Screw ST4*12PW8HC	8	
S04	Screw ST4*10TBHC	15	
S03	Screw ST4*8PBHC	1	
S01	Screw ST3*8PBHC	2	
R19	Motor Axle Sleeve	1	
R11	Fiber Ceramic	1	
R10	Cover #B	1	
R08	Fan Convection	1	
R07	Supporter Heater #B	1	
R06	Heater Sheath #B	1	
R05	Cover Heater#B	1	
R04	Insulator Heat#B	1	
R03	Fan Cooling	1	
R02	Blkt Convection Motor	1	
R01	Motor Convection	1	
L05	Horness Mein	1	
L04	Microswitch Monitor	1	
L03	Microswitch Interlock	2	
L02	Lever Switch	1	
L01	Board Latch	1	
G09	Insulator Heat #T	1	
G03	Heater Sheath #T	1	
F02	TRIM PANEL	1	
F04	Knighthead	1	
F01	TRIM COVER	1	
E35	Thermostat 180/95 #V	1	
E34	Thermostat 180/145 #H	1	
E31	Thermostat 100/90 #H	1	
E28	Ass'y H.V.Fuse	1	
E25	Sensor Temperature	1	
E16	Power Cord Ass'y	1	
F03	TRIM DECO	1	
E13	Lamp	1	
E11	Fuse	1	
E10	Filter Noise	1	
E07	H.V.Diode	1	
E06	H.V.Capacitor	1	
E05	H.V.Transformer	1	
E01	Magnetron	1	
D00	Ass'y Door	1	
C00	Ass'y C/Panel	1	
B03	Ass'y Blkt Hinge #U	1	
B02	Leg	4	
B01	Base Plate	1	
A01	Cover Wave Guide	1	
A00	Ass'y Cavity	1	
No.	part name	Quantity	Material or spec



CM118

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			S02	SCREW ST3*6PBHC	9
			C35	SUB PCB	1
			C2B	DECO. DOOR OPEN BUTTON	1
D05	BARRIER SCREEN #1	1	C20	BUTTON ROW	1
D09	DECO D/Panel	1	C18	PCB ASSY	1
D08	GASKET DOOR	1	C14	WINDOW DISPLAY	1
D07	PANEL DOOR	1	C13	LEVER DOOR OPEN	1
D06	BARRIER SCREEN #0	1	C10	KNOB DIAL	1
D04	ASSY BRKT HINGE #T	1	C08	SPRING BUTTON	1
D03	SPRING LATCH	1	C07	BUTTON DOOR OPEN	1
D02	LATCH	1	C02	DECO. C/Panel	1
D01	ASSY DOOR FRAME	1	C01	PANEL CONTROL	1
D00	ASSY DOOR	1	C00	ASSY C/PANEL	1
No.	Part Name	Qty.	No.	Part Name	Qty.



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Part Number	Description	Position		Qty		
251500100594	ASS'Y CAVITY	A00	set	1		
252100100016	COVER WAVE GUIDE	A01	pc	1		
261501409903	BASE PLATE	B01	pc	1		
251302000013	LEG	B02	pc	4		
251502501540	ASS'Y BRKT HINGE *U	B03	Ea	1		
251300201809	PANEL CONTROL	C01	C00	Ea	1	
261506911320	DECO. C/PANEL	C02		Ea	1	
251306003205	BUTTON DOOR OPEN	C07		Ea	1	
252010100001	SPRING BUTTON	C08		Ea	1	
251301600141	KNOB DIAL	C10		Ea	1	
251306103544	LEVER DOOR OPEN	C13		Ea	1	
251304900055	WINDOW DISPLAY	C14		Ea	1	
261400117411	PCB ASS'Y	C18		pc	1	
251301900386	BUTTON ROW	C20		Ea	1	
261516900406	DECO. DOOR OPEN BUTTON	C28		Ea	1	
261400600003	SUB PCB	C35		pc	1	
-253602100315		D01+D05		D00	set	1
251500200124	ASS'Y DOOR FRAME	D01			set	1
252101300535	BARRIER SCREEN *I	D05			pc	1
256300500035	LATCH	D02	Ea		1	
252010000012	SPRING LATCH	D03	Ea		1	
251502401799	ASS'Y BRKT HINGE *T	D04	Ea		1	
252100400788	BARRIER SCREEN *O	D06	pc		1	
251300101225	PANEL DOOR	D07	Ea		1	
256300600076	GASKET DOOR	D08	Ea		1	
261506805860	DECO. D/PANEL	D09	Ea		1	
251200100068	MAGNETRON	E01	pc	1		
261200200730	H.V.TRANSFORMER	E05	pc	1		
251200701304	H.V.CAPACITOR	E06	pc	1		
251200900861	H.V.DIODE	E07	pc	1		
256400301372	FILTER NOISE	E10	pc	1		
261201200170	FUSE	E11	pc	1		
263600500006	LAMP	E13	pc	1		
261201003790	POWER CORD ASS'Y	E16	pc	1		
263004100013	SENSOR TEMPERATURE	E26	pc	1		
251203301548	ASS'Y H.V FUSE	E28	pc	1		
251201301334	THERMOSTAT 100/90 *H	E31	pc	1		
251201300325	THERMOSTAT 180/145 *H	E34	pc	1		
251201300964	THERMOSTAT 160/95 *V	E35	pc	1		
261518910005	TRIM COVER	F01	pc	1		



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Part Number	Description	Position		Qty
-253602110803		F02+F03	set	1
261314202300	TRIM PANEL	F02	pc	1
261314300300	TRIM DECO	F03	pc	1
251514101581	KNIGHTHEAD	F04	pc	2
251201700033	HEATER *T	G03	pc	1
261502700100	INSULATOR HEAT *T	G09	pc	1
261301301500	BRKT INTERLOCK	L01	pc	1
261301101000	LEVER SWITCH	L02	pc	1
261201600180	MICROSWITCH INTERLOCK	L03	pc	2
261201600160	MICROSWITCH MONITOR	L04	pc	1
251202800573	HARNESS MAIN	L05	set	1
-258602107991	ASS'Y CONVECTION	R01+R02+R03+R04+R05+R06+R07+R08+R11+R19	set	1
251200600111	MOTOR CONVECTION	R01	pc	1
251510801151	BRKT CONVECTION MOTOR	R02	Ea	1
251508201152	FAN COOLING	R03	Ea	1
251502800636	INSULATOR HEAT *B	R04	Ea	1
251500900940	COVER HEATER *B	R05	Ea	1
251201700073	HEATER *B	R06	pc	1
251516800737	SUPPORTER HEATER *B	R07	Ea	3
251508200638	FAN CONVECTION	R08	Ea	1
262100600017	FIBER GLASS	R11	pc	1
251511000742	SLEEVE MOTOR AXLE	R19	Ea	1
251505701425	COVER *B	R10	Ea	1
251202800622	HARNESS CONVECTION	R12	set	1
251200300019	MOTOR TRAY	T01	pc	1
252200100008	COUPLER	T02	Ea	1
262200200007	RING ROTATING ASS'Y	T03	pc	1
252100500013	TRAY	T04	Ea	1
-253600400033		W01+W02+W03	set	1
261300800100	GUIDE FAN	W01		
251300900015	FAN	W02		
251200600161	MOTOR FAN	W03		
261503202100	GUIDE WIND	W04	Ea	1
251502801585	GUIDE AIR OUTLET	W05	Ea	1
251503201750	GUIDE AIR *T	W08	set	1
261501500300	HOLDER H.V.C	Z01	pc	1
261502606813	CASE OUT	Z24	pc	1
258601000103	ASS'Y SCREW		set	1



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Part Number	Description	Position		Qty
251900100147	PACKING *T		pc	1
251900200146	PACKING *U		pc	1
251511701176	RACK		Ea	1
261800304335	MANUAL USER		pc	1
261862500389	CARTON BOX		pc	1
261800200010	MIDEA MANUAL USER		pc	1
-253602100890		(ALL COMPONENTS BELOW)	set	1
252012500477	WASHER		pc	4
251517201582	SPACER BRKT	F11	Ea	1
252012800011	SCREW 4*8TA		pc	10
252012800361	SCREW ST4*16VAHNI		pc	1
251910100016	PLASTIC BAG		pc	1
251302003471	BOLT	S13	pc	1
251910100558	PLASTIC BAG(FOR SCREWS)		pc	1

SAFETY PRECAUTIONS

This device is to be serviced only by properly qualified service personnel.

Consult the service manual for proper service procedures to assure continued safety operation and for precautions to be taken to avoid possible exposure to excessive microwave energy.

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

- A) Do not operate or allow the oven to be operated with the door open.
- B) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary; (1) interlock operation, (2) proper door closing, (3) seal and sealing surfaces (arcing, wear, and other damage), (4) damage to or loosening of hinges and latches, (5) evidence of dropping or abuse.
- C) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity, and connections.
- D) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.
- E) A microwave leakage check should be performed on each oven prior to release to the owner.

CAUTION

MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

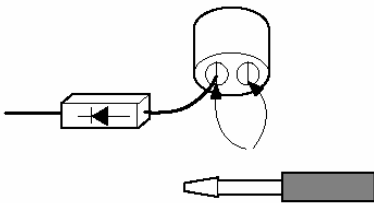
TABLE OF CONTENTS

	(page)
SAFETY PRECAUTIONS -----	Inside front cover
CAUTIONS -----	1-1
THE HEATING PRINCIPLE OF MICROWAVE -----	2-1
INSTALLATIONS -----	3-1
OPERATING INSTRUCTIONS -----	4-1
SCHEMATIC DIAGRAM-----	4-1
CIRCUIT DESCRIPTION-----	4-2
SERVICE INFORMATION -----	5-1
TOOLS AND MEASURING INSTRUMENTS-----	5-1
MICROWAVE LEAKAGE TEST-----	5-2
MEASUREMENT OF MICROWAVE POWER OUTPUT-----	5-3
TROUBLE SHOOTING PROCEDURES-----	5-4
COMMON BREAKDOWN AND MEANS OF REPAIRING-----	5-8
IMPORTANT THINGS TO DO PRIOR TO CRITICAL PART SERVICING-----	5-9
SAFETY CHECKS AND TESTS AFTER SERVING-----	5-10
EXPLODED VIEW -----	6-1
REPLACEMENT PARTS LIST -----	7-1

CAUTIONS

Unlike other appliances, the microwave oven is high-voltage and high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

- DO NOT operate on a 2-wire extension cord during repair and use.
- NEVER TOUCH any oven components or wiring during operation.
- BEFORE TOUCHING any parts of the oven, always remove the power plug from the outlet.
- For about 30 seconds after the oven stops, an electric charge remains in the high voltage capacitor. When replacing or checking, you must discharge the high voltage capacitor by shorting across the two terminals with an insulated screwdriver.

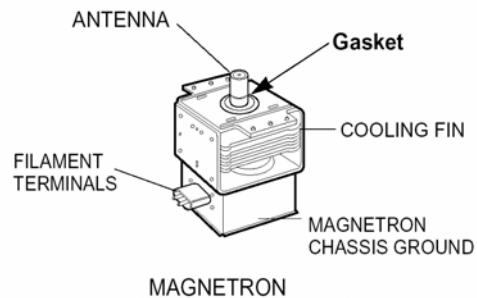


- Remove your watches whenever working close to or replacing the Magnetron.
- DO NOT touch any parts of the control panel circuit. A resulting static electric discharge may damage this P.C.B.
- NEVER operate the oven with no load.
- NEVER injure the door seal and front plate of the oven cavity.
- NEVER put iron tools on the magnetron.
- NEVER put anything into the latch hole and the interlock switches area.

MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating device if it is improperly used or connection. All input and output microwave connections, waveguide, flange and gasket must be secure never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

- Proper operation of the microwave oven requires that the magnetron be assembled to the waveguide and cavity. Never operate the magnetron unless it is properly installed.
- **Be sure that the magnetron gasket is properly installed around the dome of the tube whenever installing the magnetron.**



THE OVEN IS TO BE SERVICED ONLY BY PROPERLY QUALIFIED SERVICE PERSONNEL.

THE HEATING PRINCIPLE OF MICROWAVE

Microwave is one kind of radio wave whose wave length is very short, frequency is very high. Therefore, it is called ultrahigh frequency electromagnetic wave. Microwave can heat food mainly result in the mutual affect of the food in the microwave field and microwave field itself.

Under the affect of microwave field, the thermal effect mechanism produced from the mutual affect of the microwave and the food includes two aspects: One is Dielectric loss of polar molecule, the other is conductive loss of ion.

Usually, food is constitute of organism (plant and animal).The organism is formed by all kinds of polar water molecule, polar protein molecule, and all sorts of salt ion. The center of gravity of the positive and negative charge in the molecule is not coincide. In normal condition, the molecule is in irregular order due to its thermal action, thus the food do not appear polarity (FIG.1-1a).Under the action of outer electric field, the positive end of the polar molecule trend to the negative electric field, the negative end of polar molecule trend to the positive electric field, and somewhat arrange in order through the direction of the electric field(FIG.1-1c).This phenomenon usually be called "TORQUE POLARITY". When the outer electric field apply for the opposite polarity, the polar molecule then arrange an opposite direction order accordingly (FIG.1-1b).If the direction of the outer electric field changed repeatedly, the polar molecule would repeatedly sway accordingly. During the swaying, it understands that the polar molecule would produce heat due to somewhat similar friction among them.

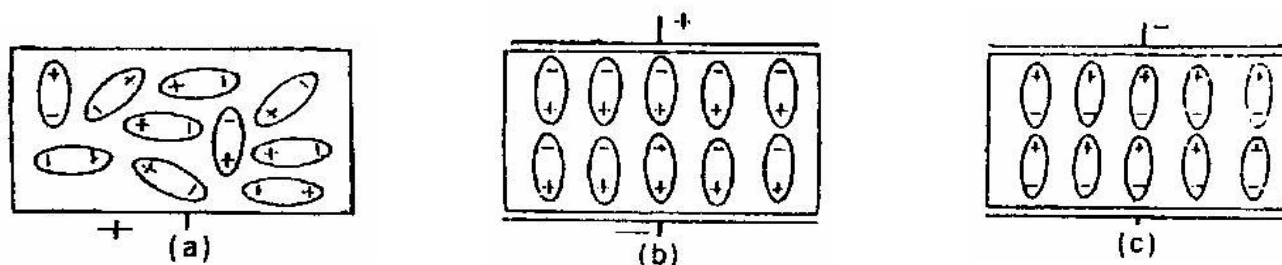


Fig1 - 1

When the electric field is applied for ultrahigh frequent microwave field from the outside, its direction would change tens billion times per second, so do the molecule. This kind of molecule swaying producing similar frictional heat from the interference and block of the action strength among the molecule, and changed to microscopic microwave heating. Microwave heating not only concerned the nature of the matter itself, but also closely connected with the electric field strength and frequency. When the frequency is low, the molecule swaying rate and the acute degree of the mutual friction among the molecule is low, and would produce much heat. When the frequency is too high, as the swing of the polar molecule is with rotating inertia, it made the swing do not in line with the changing rhythm of the electric field because of the friction drag, thus, actually lowed the polar molecule swaying speed. The friction dragging degree is concerning about the magneto electric wave frequency, polar molecule shape, and the matter's sticky degree. To different matter's molecule, there are different special frequency zone. Those ado absorb microwave energy from these zone are most capable to turn microwave energy to heat energy.

Apart from the above said action, there is another action which is electric ion under the action of microwave field, act fiercely accompanied with the acceleration of electric field. The positive ion transfer to the negative polarity of the field while the negative ion do opposite. Accompanying with the changing electric field, the electric ion changing accordingly. During the transferring, heat produced with the crash among the ion. This kind of action take the main effect to those microwave heating of high salt molecule.

No matter it is the polar molecule swaying or the ion transferring, they both are turning the microwave energy which the heating matter got from the microwave field to hear energy. From the analysis of theory, we can draw such a conclusion that the power which a unit of volume matter absorbed from the microwave field as the following formula:

$$Pa = K \cdot E \cdot F \cdot Er \cdot tg \delta$$

Pa Stands for the power the heated matter absorbed from the microwave field.

K Stands for a constant

E Stand for microwave field strength

F Stands for the microwave frequency.

Er Stands for relative dielectric constant of the heated matter.

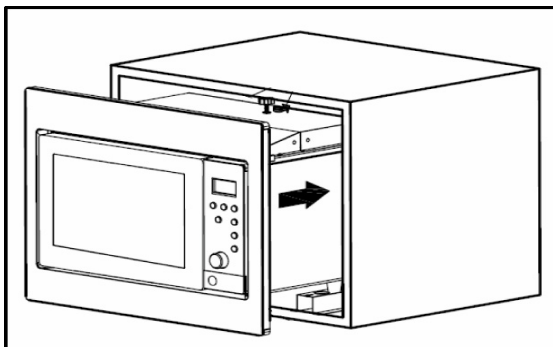
tg δ Stands for loss angle tangent of the heated matter

INSTALLATIONS

BEFORE YOU BEGIN, READ THE FOLLOWING INSTRUCTIONS COMPLETELY

INSTALLING

1. Empty the microwave oven and clean inside it with a soft, damp cloth. Check for damage such as misaligned door, damage around the door or dents inside the cavity or on the exterior.
2. Put the oven on a counter, table, or shelf that is strong enough to hold the oven and the food and utensils you put in it. (The control panel side of the oven is the heavy side. Use care when handling.)
3. Do not block the vent and the air intake openings. Blocking vent or air intake openings can cause damage to the oven and poor cooking results. Make sure the microwave oven legs are in place to ensure proper air flow.
4. The oven should not be installed in any area where heat and steam are generated, because they may damage the electronic or mechanical parts of the unit.
Do not install the oven next to a conventional surface unit or above a conventional wall oven.
5. Use microwave oven in an ambient temperature less than 104°F(40°C).
- 6 Install the oven into the cabinet
7. Place the microwave oven as far away as possible from TV, RADIO, COMPUTER, etc., to prevent interference.



EARTHING INSTRUCTIONS

This microwave oven is designed to be used in a fully earthed condition.

It is imperative, therefore, to make sure it is properly earthed before servicing

WARNING-

THIS APPLIANCE

MUST BE EARTHED


IMPORTANT

The wires in this mains lead are colored in accordance with the following code:

Green-and-yellow:	Earth
Blue:	Neutral
Brown:	Live

As the colors of the wires in the mains lead of this appliance may not correspond with the colored markings identifying the terminals in your plug, proceed as follows.

The wire which is colored **green-and-yellow** must be connected to the terminal in the plug which is marked

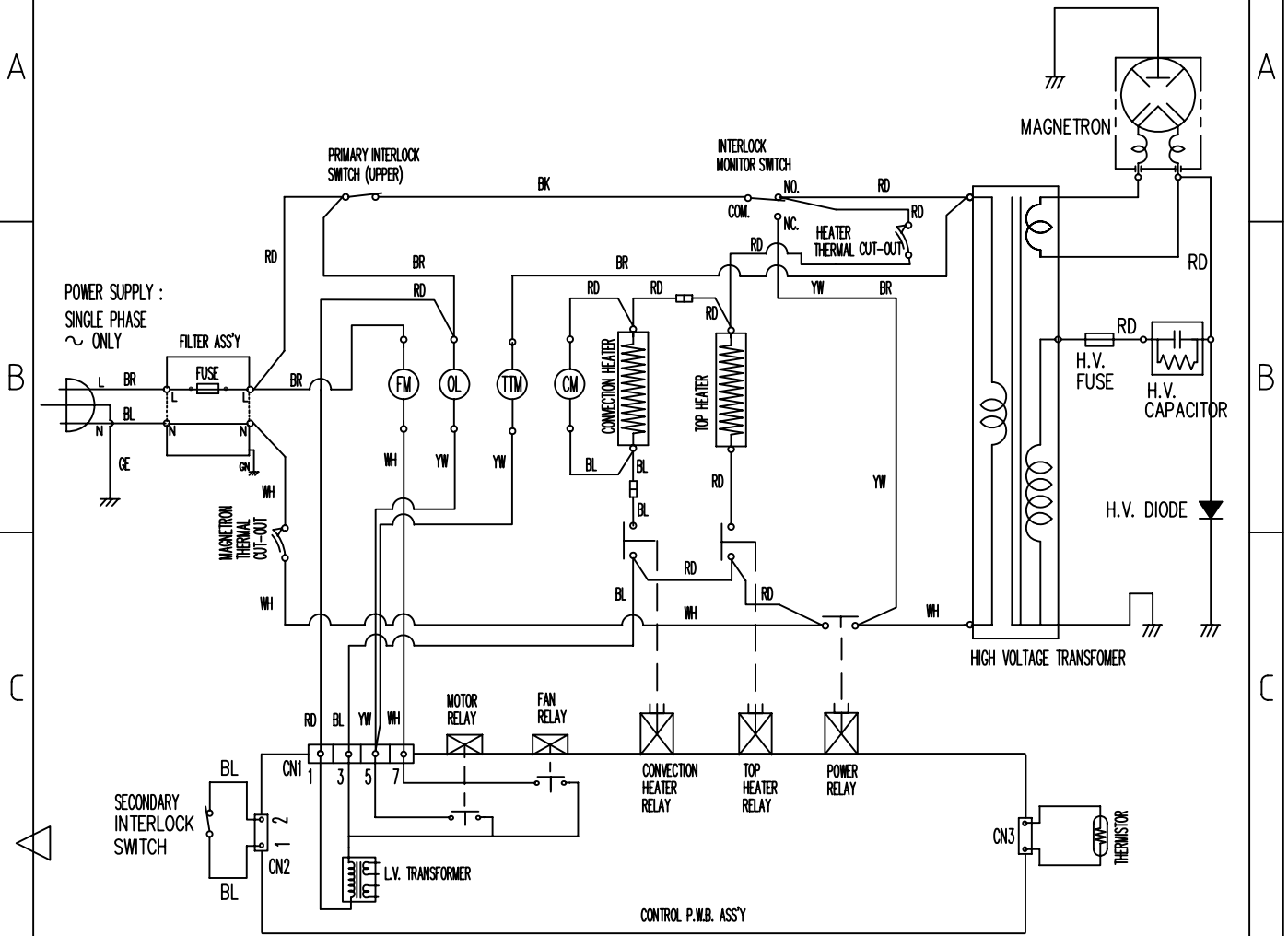
with the letter **E** or by the **earth symbol** () or

colored **green** or **green-and-yellow**.

The wire which is colored **blue** must be connected to the terminal in the plug which is marked with the letter **N** or colored **black**.

The wire which is colored **brown** must be connected to the terminal in the plug which is marked with the letter **L** or colored **red**.

图样代号:



[CONDITION]
DOOR : CLOSED
COOK : OFF

NOTE :

- ⊙ OL : OVEN LAMP
- ⊙ FM : FAN MOTOR
- ⊙ CM : CONVECTION FAN MOTOR
- ⊙ TTM : TURNTABLE MOTOR

- BK : BLACK
- RD : RED
- WH : WHITE
- YW : YELLOW
- BL : BLUE
- BR : BROWN
- GE : GREEN/YELLOW

						材料标记:				图样名称:			
标记	处数	分区	更改文件号	签名	日期	阶段标记	单位	比例	重量	图样代号:			
						S1		mm		物料编码:			
设计/日期			工艺/日期		共 1 张 第 1 张					产品型号:			
校对/日期			标准化/日期		顺德市美的微波炉 制造有限公司					AC925BBR-SACE			
审核/日期			批准/日期										

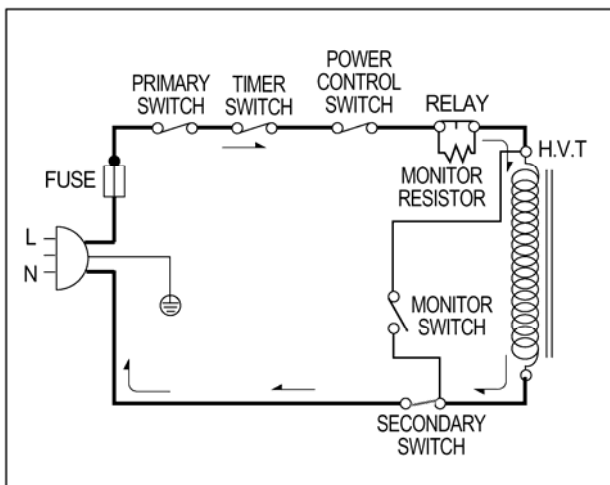
CIRCUIT DESCRIPTION

As the door is closed, the contact of MONITOR SWITCH opens. This switch creates the short circuit to blow fuse during operation under abnormal condition. (ie, should the contacts of primary and secondary switch fail to open the circuit)

- The latches are secured by latch board. The oven light turns on while the oven is in operation.

WHEN MICROWAVE POWER LEVEL AND COOKING TIME SET

- The contacts of the timer switch changes to ON position when the timer knob is rotated. (While power control knob is set)
- The contacts of primary and secondary switch close the circuit.
- Input Volts AC. is applied to the high voltage transformer through V.P.C.



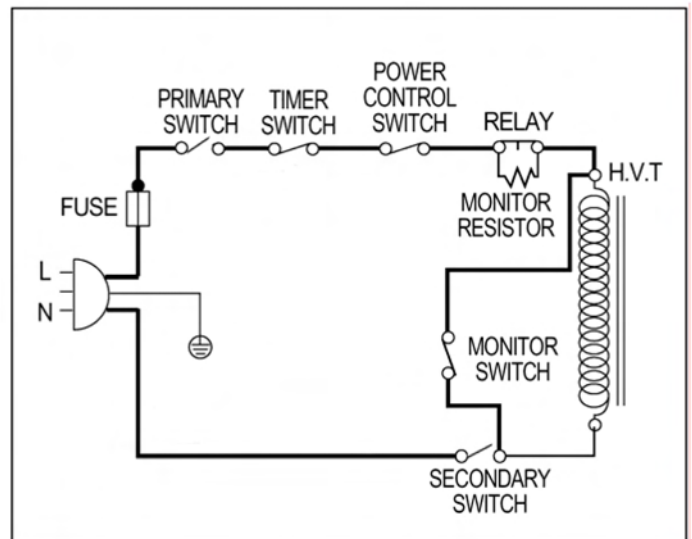
- Turntable rotates.
- The fan motor rotates and cools the magnetron by blowing the air (coming from the intake holes on the baseplate) over the magnetron.
- The air is also directed into the oven to exhaust the vapor in the oven through the upper plate.
- Timer starts rotating.

- 3.2 volts AC is generated from the filament winding of the high voltage transformer. This 3.2 volts is applied to the magnetron to heat the magnetron filament through two noise-preventing choke coils.

A high voltage of approximately 2100 volts AC is generated in the secondary of the high voltage transformer which is increased by the action of the diode and charging of the high voltage capacitor. The negative DC voltage is then applied to the filament

WHEN THE DOOR IS OPENED DURING COOKING

- Both primary switch and secondary switch open to cut off the primary winding voltage to the high voltage transformer to stop microwave oscillation.
- Timer, turntable and fan motor stop.
- As the door is opened, if the contact of primary switch fail to open, the fuse opens due to the large current surge caused by the monitor switch activation which in turn stops magnetron, oscillation.



SERVICE INFORMATION

TOOLS AND MEASURING INSTRUMENTS

NECESSARY TOOLS

Tools normally used for TV servicing are sufficient.

Standard tools are listed below.

- Diagonal pliers
- Long nose pliers
- Phillips screwdriver
- Flat blade screwdriver
- Wrench (size 5mm)
- Nutdriver (size 5mm)
- Adjustable wrench
- Soldering iron
- Solder
- Vinyl insulation tape
- Polishing cloth

NECESSARY MEASURING INSTRUMENTS

- TESTER(VOLTS-DC, AC., Ohmmeter)
- Microwave survey meter
 - Holaday HI-1710(A)
 - Narda 8100
8200
- Inch scale
- 600 cc non conductive material beaker (glass or plastic), inside diameter: approx. 8.5 cm(3 1/2 in.)
- Cylindrical and made of borosilicate glass vessel.
max. thickness: 3 mm
outside diameter: approx. 190mm
height: approx. 90mm
- Glass thermometer: 100°C or 212°F (1 deg scale)

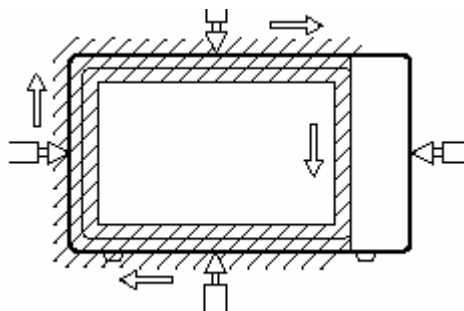
MICROWAVE LEAKAGE TEST

CAUTIONS

- **Be sure to check microwave leakage prior to servicing the oven if the oven is operative prior to servicing.**
- **The service personnel should inform the manufacture importer, or assembler of any certified oven unit found to have a microwave emission level in excess of 5 mW/cm² and should repair any unit found to have excessive emission levels at no cost to the owner and should ascertain the cause of the excessive leakage. The service personnel should instruct the owner not to use the unit until the oven has been brought into compliance.**
- **If the oven operates with the door open, the service personnel should:**
 - **Tell the user not to operate the oven.**
 - **Contact the manufacturer.**
- The service personnel should check all surface and vent openings for microwave leakage.
- Check for microwave leakage after every servicing. The power density of the microwave radiation leakage emitted by the microwave oven should not exceed 5 mW/cm². Always start measuring of an unknown field to assure safety for operating personnel from radiation leakage.

MEASURING MICROWAVE ENERGY LEAKAGE

- **Pour 275±15 cc of 20±5°C(68±9°F) water in a beaker**
which is graduated to 600 cc, and place the beaker on the center of the turntable.
- **Set the energy leakage monitor to 2,450 MHz and use it following the manufacturer's recommended test procedure to assure correct result.**
- **When measuring the leakage, always use the 2-inch (5 cm) spacer supplied with the probe.**
- **Operate the oven at its maximum output.**
- **Measure the microwave radiation using and electromagnetic radiation monitor by holding the probe perpendicular to the surface being measured**
Move probe along shaded area
Probe scanning speed: Less than 2.5 cm/sec



MEASUREMENT WITH OUTER CASE REMOVED

• When you replace the magnetron, measure for microwave energy leakage before the outer case is installed and after all necessary components are replaced or adjusted.

Special care should be taken in measuring the following parts.

- Around the magnetron
- The waveguide

WARNING : AVOID CONTACTING ANY HIGH VOLTAGE PARTS (Magnetron, H.V. Transformer, H.V. Capacitor, H.V. Cable Ass'y, H.V. Fuse)

MEASUREMENT WITH A FULLY ASSEMBLED OVEN

• After all components, including the outer case, are fully assembled, measure for microwave energy leakage around the door viewing window, the exhaust opening, and air inlet openings.

• Microwave energy leakage must not exceed the values prescribed below.

NOTE: Leakage with the outer case removed less than 3 mW/cm². Leakage for a fully assembled oven (Before the latch switch (primary) is interrupted) with the door in a slightly opened position-less than 1 mW/cm²

NOTES WHEN MEASURING

- Do not exceed meter full scale deflection.
- The test probe must be removed no faster than 1 inch/sec (2.5 cm/sec) along the shaded area, otherwise a false reading may result.
- The test probe must be held with the grip portion of the handle.

A false reading may result if the operator's hand is between the handle and the probe.

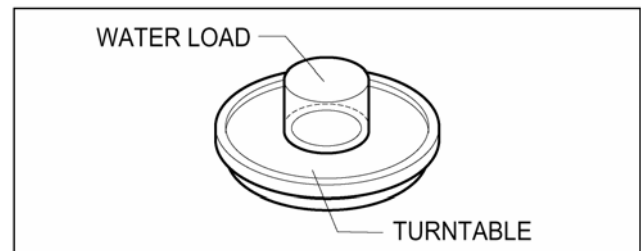
- When testing near a corner of the door, keep the probe perpendicular to the surface making sure the probe horizontally along the oven surface, this may possibly cause probe damage.

RECORD KEEPING AND NOTIFICATION AFTER MEASUREMENT

- After adjustment and repair of any microwave energy interruption or microwave energy blocking device, record the measured values for future reference. Also enter the information on the service invoice.
- The microwave energy leakage should not be more than 1.0 mW/cm². after determining that all parts are in good condition, functioning properly and genuine replacement parts which are listed in this manual have been used.
- At least once a year, have the electromagnetic energy leakage monitor checked for calibration by its

MEASUREMENT OF MICROWAVE POWER OUTPUT

- Microwave power output measurement is made with the microwave oven supplied at its rated voltage and operated at its maximum microwave power setting with a load of (1000 ± 5) g of potable water.
- The water is contained in a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190mm.
- The oven and the empty vessel are at ambient temperature prior to the start of the test.
- The initial temperature (T_1) of the water is $(10 \pm 2)^\circ\text{C}$ It is measured immediately before the water is added to the vessel. After addition of the water to the vessel, the load is immediately placed on the center of the turntable which is in the lowest position and the microwave power switched on.
- The time T for the temperature of the water to rise by a value ΔT of $(10 \pm 2)^\circ\text{K}$ is measured, where T is the time in seconds and ΔT is the temperature rise. The initial and final water temperatures are selected so that the maximum difference between the final water temperature and the ambient temperature is 2°K .
- The microwave power output P in watts is calculated approximately from the following formula :
$$P = 4187 \times (\Delta T) / T$$
is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included. (about 3 sec)
- The water is stirred to equalize temperature throughout the vessel, prior to measuring the final water temperature.
- Stirring devices and measuring instruments are selected in order to minimize addition or removal of heat.



TROUBLE SHOOTING PROCEDURES

Before overhauling a microwave oven, you should judge the breakdown and the cause correctly, then you can repair it with corresponding ways. The overhauling must be proceed in order, any hasty conclusion is not recommendable, otherwise overworking would be done when repair. The microwave oven may occur compound breakdown due to all kinds of different reasons, thus, when overhaul, they all should be taken into consideration. Special attention must be given to the microwave leakage and the electric insulation when examine because they may do harmful to the repairing staff.

I .MEANS OF THE BREAKDOWN EXAMINING

How to examine a microwave oven with breakdown? A better means which demonstrated in practical operating are through inspecting and listening. On the basis of large amounts of perceptual knowledge, you can judge and analysis the breakdown quickly and correctly.

1. Inspection.

Inspect whether the oven shape is disordered and where is the disordered position, if any. It is normal if the outer case disordered a little, but abnormal if the oven, the door disordered, the door hook broken, the door crooked, or there are too much looseness between the door and the oven after the door is closed.

2. Listening.

Listening to the voice of the oven operating and the noise of the fan after it conducted. Minor “wen wen” noise, cycling “kala” noise and “shishi” noise should be consider as normal. But it is abnormal if the following noise occurred:

- (1) Sound “wenwen” noise.
- (2) Long time “shishi” noise.
- (3) Strike voice like “pipa pipa”.

II .SPOT EXAMINING STEPS OF THE MICROWAVE OVEN.

1. Examine the microwave insulating resistance.

Measure the insulating resistance with a multi meter or a mega ohmmeter. The value should not less than 2 mega ohm. Otherwise, part examination should be taken at once. Such as checking whether the motor, the thermal cutout, the transformer or the capacitor are electricity leaking.

2. Examination of the resistance value of the microwave oven.

Close the door, set the time (the oven is at operating condition but the power plug haven't been plugged in), measure the two feet(L-N)of the power plug with Rx1 grade of a multimeter, the resistance value should be about 22 ohm.

If open circuit occurred, then you must check whether the 10 A fuse is broken、 the primary winding of the transformer is open circuit、 the thermal cutout is open circuit or not, you must check whether the interlock device is put through or all the plugs are connected well. If short circuit occurred, you should check whether the primary winding of the power transformer is short-circuited or part short-circuited.

3. Examination of microwave leakage

Measure the microwave leakage with a microwave leakage Measure. Place a graduate of 275ml water at the middle of the glass tray of the oven (FIG.5-1). Close the door, power set high, time set to 3 minutes, press the starting button to operate the oven. After rectified the microwave leakage measure, measure around the door crack, those hole position of the window and the air vent at four sides of the oven with the probe of the measure. When measure, the moving speed of the probe should not exceed 2.5cm per second, and the measuring direction should be the same with the outing direction of the microwave leakage (FIG.5-2).

When measuring, the ultimate value of microwave leakage of all the measured position should not exceed 1.0 mili watt/cm², or should be considered as abnormal.

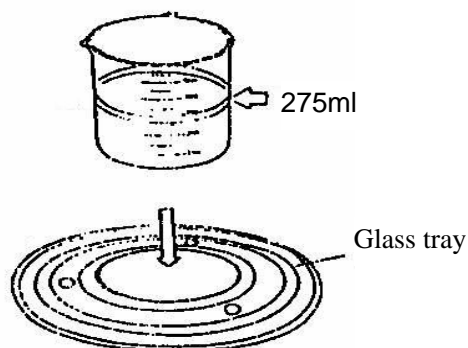


FIG.5-1

Probe scanning speed
Less than 2.5 cm/sec
(1in/sec)

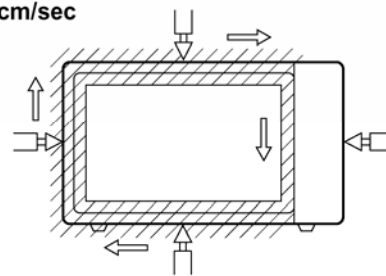


FIG.5-2

4. Examine when the oven at operating, but the food can't be heated

Pull out the power plug, take off the outer case, discharge the capacitor, measure the resistance value of the primary winding and the secondary winding of the transformer with a multi meter (FIG.5-3 and FIG.5-4). The resistance value of the primary winding should be about 2.2 ohm, the secondary winding should be about 130 ohm, otherwise, it indicates the transformer has broken, and should be replaced by a new one.

If the transformer is normal, then the high voltage capacitor should be checked. Pull out the connecting plug of the capacitor, and measure it with Rx1 grade of a multi meter, the two rod of the multi meter connect the two polarity of the capacitor. When they just connected, the reading of the multi meter should be zero, then enlarge to nine mega ohm slowly. Change the rod to different polarity, the reading repeat from zero to 9 mega ohm (FIG.5-5),it means the capacitor is normal. If the indicator of the multi meter can't point out from zero to 9 mega ohm, it indicates the high voltage capacitor has broken, and should be replaced by a new one.

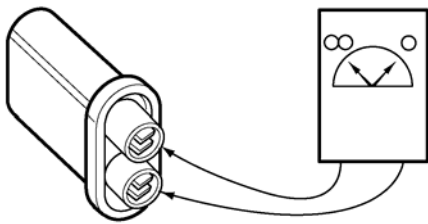


FIG5-5

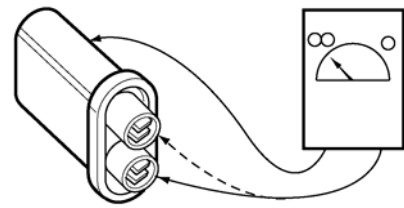


FIG5-6

If it is normal between the two pole of the capacitor, then the insulation between the capacitor pole and the cabinet (FIG.5-6) should be checked.

If the resistance value between the capacitor pole and the cabinet is "∞",the capacitor is normal. Then check the earth of the magnetron's two filament to see whether they are short-circuited (FIG.5-7).If they are short-circuited and the filament strikes the shell of the magnetron, it indicates the magnetron has broken, and should be replaced by a new, same model one.

If there is no problem with the magnetron, check the high voltage diode then. Measure the diode with Rx10k grade of a multi meter, the "-" rod end of the multi meter connect the cathode of diode, the "+" rod end of the multi meter connect the anode of the diode(FIG.5-8).The multi meter reading should be about 150 thousand ohm. Then change the rod to different electrode(FIG.5-9), the reading should be "∞".If the reading is very small, and near to short circuit, it indicates the high voltage diode has been punctured, and should be replaced by a new one.

If high voltage diode is also normal, then test the pilot switch(FIG.5-10). Pull out the two plugs of the switch, Measure it with the Rx1 grade of a multi meter, the two rod connect the plug of the switch, the resistance value should be "∞".Then press down the pilot switch with a screwdriver, if the reading of the multi meter pointed to zero, it indicates the pilot switch has broken, and should replace it with a new, same model one.

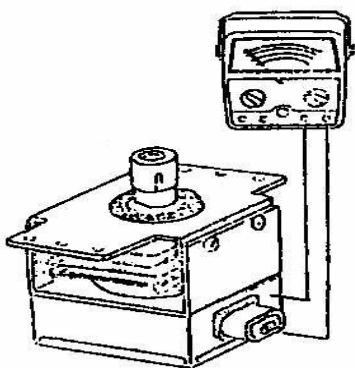


FIG.5-7

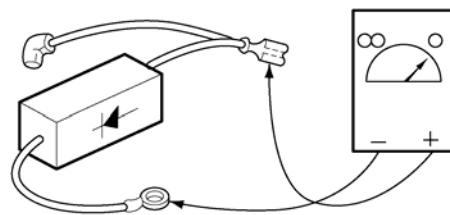


FIG.5-8

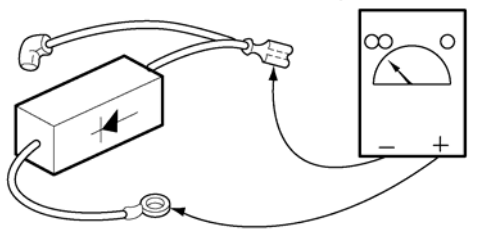


FIG.5-9

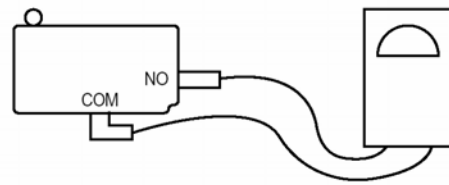


FIG.5.10

III.REPAIRING METHOD OF SEVERAL BREAKDOWN

1. Repair when there occurred large amounts microwave leakage. There are many factors, which may cause microwave leaking. Following mentioned may be the main cause of microwave leakage:

- (1) The door deformed, the hinge loosed or damaged that caused the door can not close tightly.
- (2) The door pressing cover or the embed piece damaged or come off.
- (3) Obvious damage or uneven of the oven.
- (4) There are filth between the door and the oven.
- (5) The door and the oven are serious loosed after the door closed.
- (6) The crack of the door shielding net cover.

Before repairing, check whether the above listed point are existed, if not, you can start the microwave oven. Place a graduate of about 275ml water at the middle of the glass tray, close the door, time set at 3 minutes, power at high, makes the oven operating in normal. Rectify the microwave leakage measure, measure the amount of the microwave leakage around the oven with its probe. If there are places which the leakage exceed the standard requirement, then repair them accordingly. If the leakage amount exceed 1.0 mW/cm^2 at the left door crack, then pull out the power plug, take down the outer case, adjust the screws of the hinge to less the gap between the door and the oven. Then measure again, the leakage amount should less than 1.0 mW/cm^2 . Generally, it should be controlled below $0.8 \text{ mill watt/cm}^2$ with some allowance.

If the leakage occurred at the right door crack, adjust the screws that fix the interlock holder and the hook. If the leakage is on the larger side at the right-above of the oven, then adjust the upper screw. Loosen out the screw, push the door close to the oven to hook the door hook with the plastic parts, then tighten the screw again. If the leakage is larger at the right-below, then adjust the lower screw. Loosen the screw, push the door close to the oven to hook the door hook with the switch holder tightly, then tighten the screw again, and open and close the door repeatedly to check whether the door can operate flexibly, whether the hook and the switch are in their normal position. If it is not in position, then adjust the door hook and the switch holder the loose between the door and the oven, then measure the leakage with microwave leakage measure again.

If there still exist microwave leakage, measure near the magnetron with the probe of the microwave leakage measure. If the leakage is larger, the oven should be turned off and check whether the 2 or 4 screws which fix the magnetron have been loosed, if loosed, twist them tightly with socket wrench. If the screws are fixedly, then the magnetron should be take down to check the copper filament weaved washer of the magnetron has been placed well or whether the wave guide housing coupling has been oxidized or have lacquer on it. If do have, scrape the oxidized layer or the lacquer off, when fix the magnetron, the copper filament weaved washer must be placed well, the screws must be twist tightly. Then turn on the oven and measure again until it complies with the requirement. If the microwave leakage is larger at those hole position of the window board, the oven should be turned off to inspect whether there are crack among them. If several holes formed a crack, it would enlarge the microwave leakage. If that is the case, it indicates the door has broken, and should be replaced with a new door.

2. Means of repair when the oven can heat, but the turntable glass can't move

Firstly, check whether the turntable holder is placed correctly. If it is correct, then pull out the power plug and take down the turntable combination, measure the resistance value of the turntable motor with Rx1k grade of a multi meter. If it is open-circuited, it indicates the turntable motor has broken, and should be replaced by a new, same model one. If the resistance value is between 15-22k, it indicates the turntable motor is normal, then check the connecting shaft weave. If the plastic that the shaft insert in has broken, a new shaft weave should replace it.

3. Repair when the oven can heat, but the lamp is not on.

Pull out the power plug, take down the outer case and discharge the capacitor.

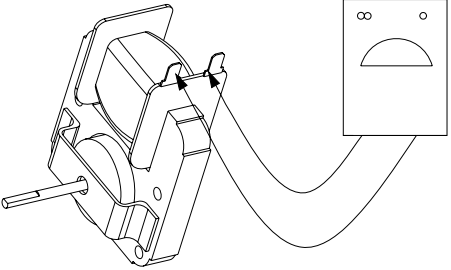
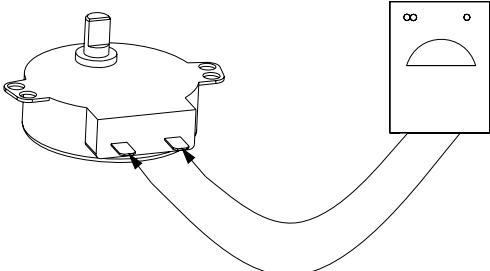
Pull out the two terminal plugs of the lamp, measure the two plugs of the lamp with the Rx100 grade of a multi meter. If it is open-circuited, it indicates the lamp has broken, and should be replaced by a same model one.

4. Means of repair when the oven stop working after several minutes operating

The phenomenon indicated the thermal cutout is playing its protective role, and you should check whether the fan is working in normal. Turn off the oven, pull out the power plug, take down the outer case, discharge the capacitor, then turn the fan with hand to see whether it is moving flexibly. If not, it indicates that the oil bearing of the fan motor has run off the oil, and should take down the fan combination to repair the motor. Loosen the two screws which fix the bearing out the shaft and the bearing, and rinse them with kerosene (ATTENTION: The bearing can only be wiped with a silk which moistened with kerosene rather than be washed in the kerosene because there are felt on it. If the felt are soaked with kerosene, then the engine oil can not be sucked up.). After the bearing being cleaned, the felt should be refueled fully with engine oil (for when the oven is operating, the engine oil empty into the oil bearing slowly). Fix the bearing cover with two screws, turn the fan around till it can move flexibly. Then install them to the oven, and plug in the two terminal plugs.

If the fan can move flexibly, then the winding of the fan motor should be examined. Measure the winding with Rx100 grade of a multi meter, if it is open-circuited, it indicates the winding of the fan motor has broken, and should be replaced by a new, same model one.

MOTOR TEST PROCEDURE

COMPONENTS	TEST PROCEDURE	RESULTS
<p>Fan Motor (Wire leads removed)</p>	<p>Measure the resistance. (Ohm-meter scale:R×100)</p> 	<p>Normal:Approx. 47Ω Abnormal:∞ or Several Ω</p>
<p>Turntable Motor (Wire leads removed)</p>	<p>Measure the resistance. (Ohm-meter scale:R×1000)</p> 	<p>Normal:Approx. 3.2kΩ Abnormal:∞ or Several Ω</p>
<p>NOTE:</p> <ul style="list-style-type: none"> ● A MICROWAVE LEAKGE TEST MUST ALWAYS BE PERFORMED WHEN THE UNIT IS SERVICED FOR ANY REASON. ● MAKE SURE THE WIRE LEADS ARE IN THE CORRECT POSITION. ● WHEN REMOVING THE WIRE LEADS FROM THE PARTS, BE SURE TO GRASP THE CONNECTOR ,NOT THE WIRES. 		

COMMON BREAKDOWN AND MEANS OF REPAIRING

PHENOMENON	CAUSE	REPAIRING MEANS
1. When starting the oven, the lamp is not on, the turntable tray can't rotate and the food can't be heated	<ol style="list-style-type: none"> 1. fuse broken 2. The primary and secondary winding of the transformer are short-circuited. 3. The earthing or the polarity of the capacitor is punctured. 4. The pilot switch can't cut off. 5. The interlock switch hasn't closed. 6. The power plug and the socket are not in good connection. 7. The door hook broken. 	<ol style="list-style-type: none"> 1. Change a new fuse. 2. Change a new transformer. 3. Change a new capacitor. 4. Change a new pilot switch. 5. Change a new interlock switch. 6. Adjust the connection or replace it by a new one. 7. Change a new book.
2. When starting the oven, the lamp is on, the turntable rotating, the fan cycling but the food can't be heated.	<ol style="list-style-type: none"> 1. The primary and secondary winding, the filament of the transformer are open-circuited. 2. The magnetron filament is open-circuited, the magnetic steel of the magnetron broken or the magnetron is air leaking. 3. Time and power distributor broken.. 4. The plugs of the magnetron of the capacitor loosed. 	<ol style="list-style-type: none"> 1. Change a new transformer. 2. Change the magnetron. 3. Change the time power distributor or the micro-switch. 4. Fix them.
3. The food can be heated, but the lamp is not on.	<ol style="list-style-type: none"> 1. The lamp broken. 2. The plug fall off. 	<ol style="list-style-type: none"> 1. Change a new lamp 2. Insert the plug again
4. The food can be heated but the turntable tray is not rotating.	<ol style="list-style-type: none"> 1. The turntable motor broken 2. The plug fall off 3. Connecting shaft weave broken 	<ol style="list-style-type: none"> 1. Change the turntable motor 2. Insert the plug securely 3. Change the weave
5. The oven can heat within 2-3 minutes, but can not heat from the fourth minutes.	<ol style="list-style-type: none"> 1. The winding of the fan motor in open-circuited. 2. The fan falls off 3. The plug of the fan motor falls off 4. The turntable shaft is griped with the motor bearing. 5. The cooling vent blocked 	<ol style="list-style-type: none"> 1. Change the fan motor 2. Change the fan 3. Insert the plug 4. Overhauling them 5. Repairing it
6. When starting the oven, it can't heat, and with "wenwen" noise	The high voltage diode was punctured	Change a new diode
7. The oven can heat, but with sound "shishi" noise	The iron core of the transformer loosed	Change a new transformer
8. Large amount of microwave leakage	<ol style="list-style-type: none"> 1. The door deformed 2. The door metal net cracked 3. The gap of the door crack is too large 4. The welding point of the oven fall off 5. The screws which fix the magnetron loosed 6. The wave guide connection oxidized 7. The magnetron copper filament washer is too thin cause the wave guide opening not in good earth. 	<ol style="list-style-type: none"> 1. Mend the door 2. Change the door 3. Adjust the gap 4. Change the oven 5. Tighten the screws 6. Scrape the oxidized and tighten the screws 7. Thick the copper filament washer
9. The door can't open	<ol style="list-style-type: none"> 1. After long time using, the wear and the rust-eaten enlarged the gap of the door shaft and the shaft hole, thus cause the door crooked. 2. The door hook broken 	<ol style="list-style-type: none"> 1. Adjust the hinge to rectify the position of the door. 2. Change the hook
10. The door release button fall off	Wore aged after long time operating	Overhaul it or renew it
11. Electricity leaking	The earthing insulation resistances of all the motors or the transformer are less than 2 mega ohm.	Test where is the leaking place, then repair it or change those damaged components.

IMPORTANT THINGS TO DO PRIOR TO CRITICAL PART SERVICING

The following instructions are CRITICAL to the owner's safety. Be sure to follow all the instructions. Contact the manufacturer of distributor if you have any question.

- 1.1 If the oven is operative prior to servicing a Microwave Leakage Test (Microwave Emission Check) should be performed prior to servicing the oven.
 - 1.2 in the event that any microwave oven found to have microwave emission level in excess of 1 mW/cm^2 . The following procedures should be followed:
 - a. Inform the distributor, importer, or manufacture the finding. Record it in the logbooks well.
 - b. Repair the unit at no cost to the owner.
 - c. Investigate the oven and ascertain the cause of the excessive leakage.
 - d. Hold the oven in your facility and instruct the owner not to use the unit until the oven has been brought into compliance.
 - 1.3 In the event that the oven operates with the door open. The following procedures should be followed:
 - a. Tell the user not to operate the oven.
 - b. Hold the oven in your facility until it is investigated and repaired.
 - c. Contact the manufacturer immediately.
2. Interlock Assembly Replacement and Adjustment
- 2.1 If you suspect defective primary, secondary or monitor interlock switches, use your ohmmeter(digital or analog type) to check the electrical continuity.
 - 2.2 Make sure the power cord is pulled out and the high-voltage capacitor is discharged before the electrical continuity check.
 - 2.3 Set the ohmmeter to "Low Resistance" range and connect both leads (alligator clips) to the switch terminals.
 - 2.4 Open the door and notice the meter reading. The primary or secondary interlock switch should show an "infinite" resistance when the door is open. Replace it when it is defective. The monitor interlock should show a "zero or near zero" resistance when the door is open. When the door is closed, the readings will be opposite.
 - 2.5 If the oven has been received inoperative due to the failure of the monitored safety(primary and/or secondary) interlock(s), you should replace all of the monitored safety interlock switches and the monitor switch.
3. Door and Hinge Replacement and Adjustment
- 3.1 Pull the power cord from the outlet. Check the door for warped or damaged areas. Check the hinges for broken or worn areas. Check other areas such as cracked front glass, broken door latch, worn/cracked viewing screen and etc.
 - 3.2 After determining the door assembly should be replaced, check the parts list for the correct part number. All oven door components must be ordered directly from the manufacturer or its authorized distributor.
4. Magnetron Replacement
- 4.1 Check for the presence of the wire mesh gasket before installation.
 - 4.2 Conduct a Microwave Leakage Test at the magnetron area prior to installing the top cover.

SAFETY CHECKS AND TESTS AFTER SERVING

Constructional Checks

If mechanical or electrical(electronic) parts have been replaced be sure to follow the following steps.

- 1.1 Check for correct wiring, adequate mechanical decrements of parts, and firm connectors.
- 1.2 Check for adequate grounding.
- 1.3 Check the following items before turning the oven ON.
 - 1) Proper door closing, seal/choke surfaces, and hinges.
 - 2) No outer case damage.
 - 3) Proper interlock and monitor operations.

Insulation Resistance Test

If the low voltage power supply has been repaired, use a 500 V Mega ohmmeter to measure the resistance between the primary(Line and Neutral)of the power plug and operator accessible metal parts. The resistance should be no less than 2 Mega Ohms. Repair the oven again when necessary.