Panasonic

MWO Training

1. Introduction
2. Installation
3. Operation
4. Parts Explanation

A Better Life,
A Better World

Steps to follow

- Installation
  - Location
  - Electrical connection

- Demonstration

- While demonstrating the Microwave oven:
  - stand towards hinged side of door
  - show in users manual what you are demonstrating
  - Demonstration is divided in 5 steps
    - Main controls
    - Auto Mode / facility available
    - Manual Mode

- Care & Maintenance

- Standard demonstration process will ensure good demonstration & no variance from engineer to engineer

Location

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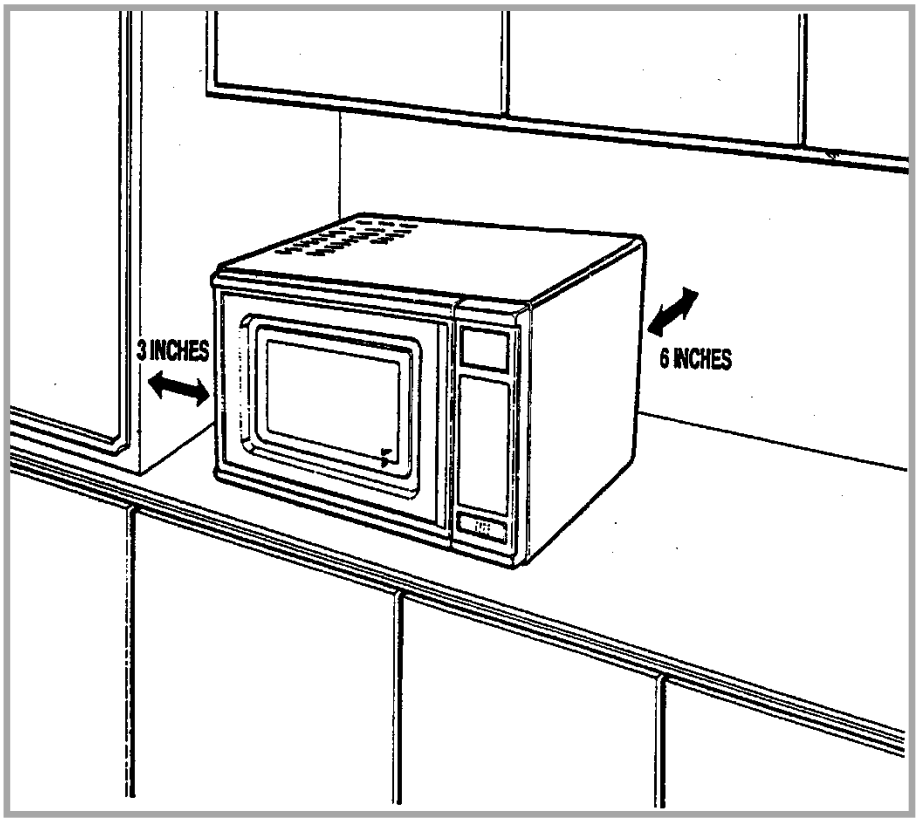
INSTALLATION REQUIREMENTS

GENERAL

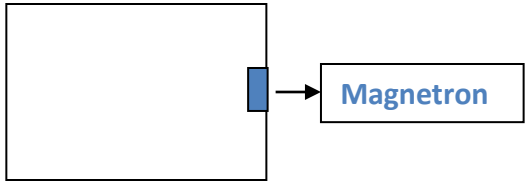
- The oven should be placed on a flat and stable surface
- Place the oven away from high temperature and steam sources.
- Clearance of at least 5cm (2”) on each side must be provided to allow adequate ventilation
- Place the Microwave oven as far away as possible from TV, Radio, Computer to prevent interface.
- The microwave oven must be plugged directly to a 3-prong wall receptacle which is properly grounded.
- The power source must be 230V 50Hz 8A single phase.
- 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.
- Do not block the vent and the air intake opening.
- Use Microwave oven in an ambient temperature less then 104 F (40 C).



Types of Microwave ovens

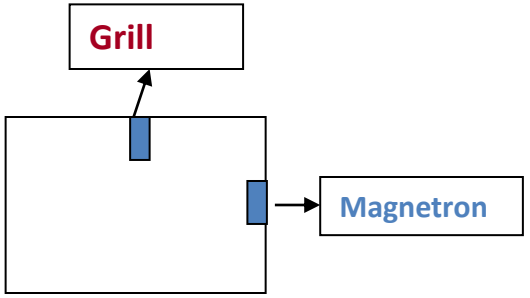
SOLO:

Magnetron is one source for generating Microwaves, which can be used for everyday tasks such as defrosting, re-heating and general cooking.



GRILL:

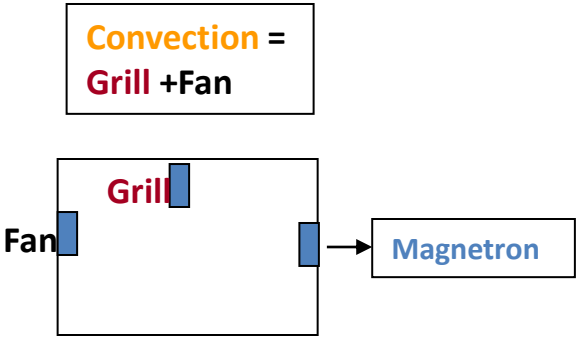
Microwave with a grilling option have two which allows you to brown and crisp food.



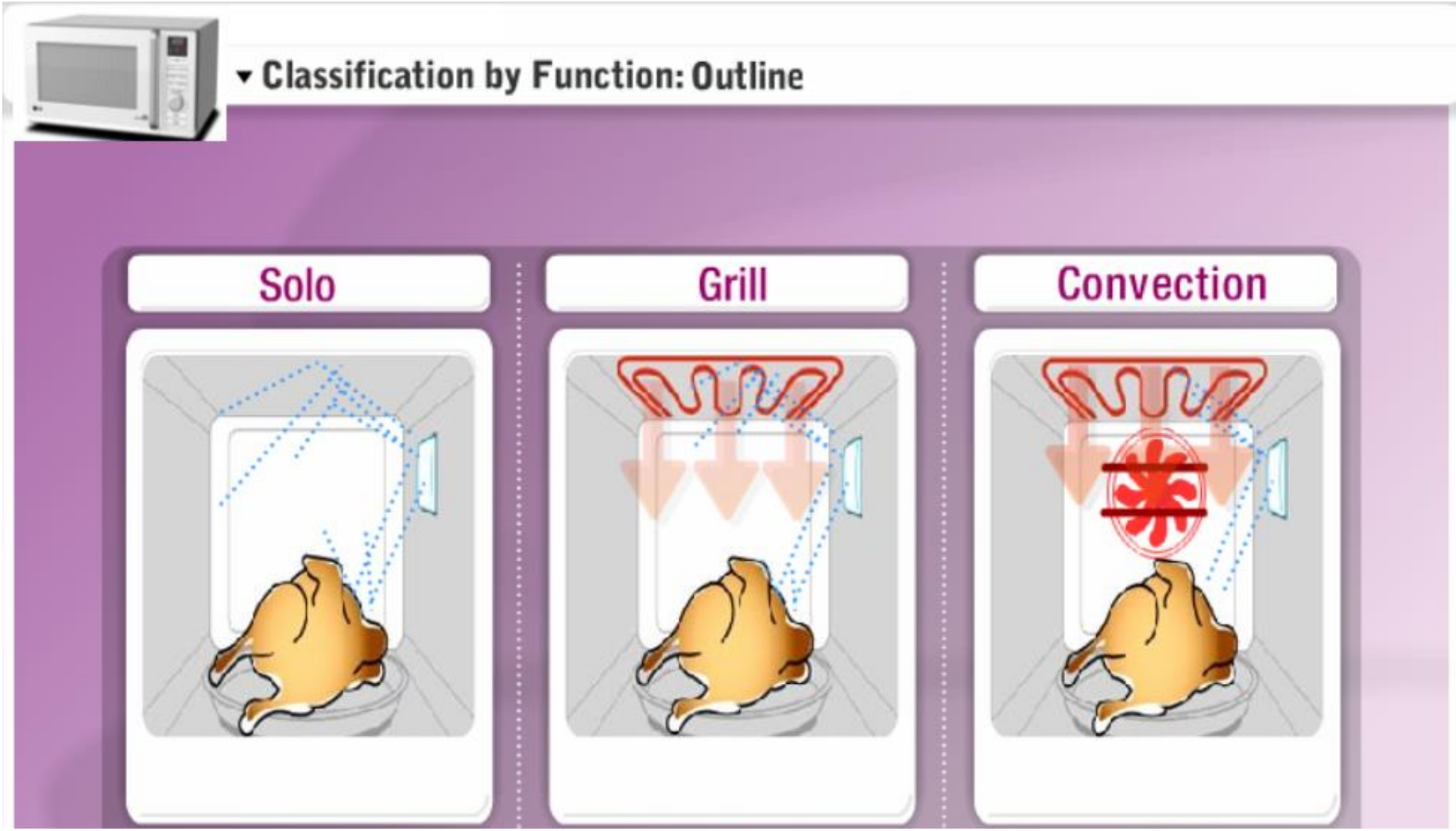
CONVECTION:

This is a Microwave, Grill and Convection oven combined into one. In the convection mode, hot air is uniformly circulated through the oven cavity with the help of a fan, which bakes, browns and delivers crispy food.

Recipes: Cakes ,Pizzas, Cookies



3.MWO Classification



4.Microwave Principle

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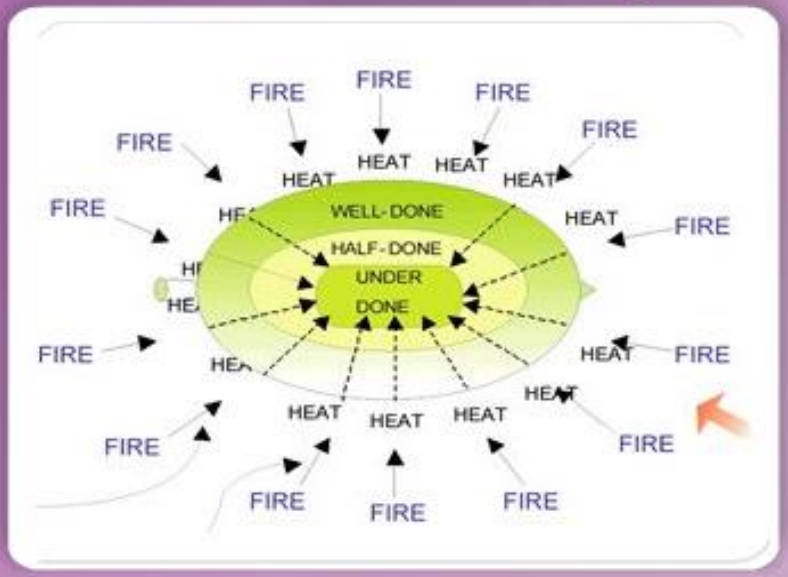
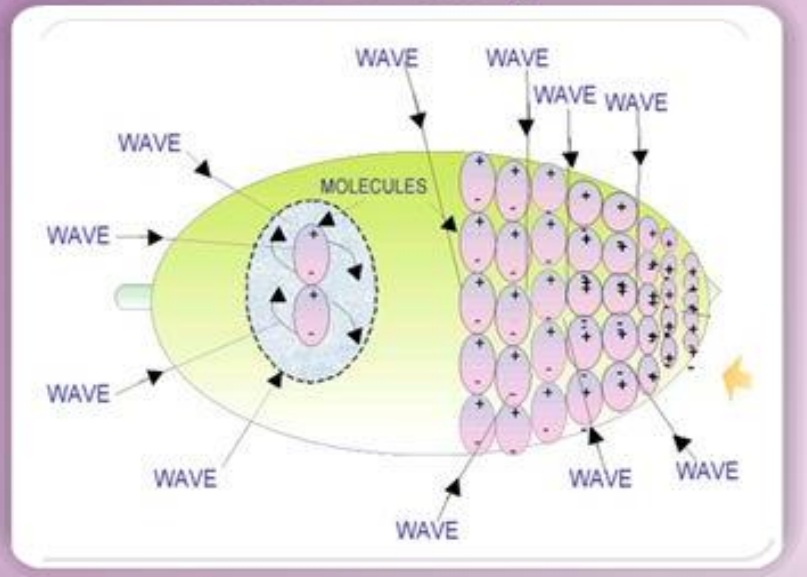
1. Principle and Structure of MWO

▾ Features

Conventional Heating



Dielectric Heating



- **Uniform Heating** : Microwaves act directly on water molecules, heating evenly the interior and exterior of the food
- **Fast temperature rise** : Directing heating, unlike the heat delivery method
- **Low damage of food surface** : Microwaves penetrate deeply into the food, thus retaining its surface state.

What all can be done in a MWO?

Cooking

Warming/ Simmering

Re-heating

Roasting

Baking

Defrosting

Difference between conventional & Microwave cooking

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Conventional	Microwave
Layer-by-layer, Outside to inside	Even cooking, inside to outside
Cooking through Oil	Cooking through Water molecules
More usage of Oil/Ghee	Less Oily food
More time consuming & tiring	Less time consuming & enjoyable
Separate utensils for cooking & serving	Same utensils can be used to cook & serve
Spoils the kitchen wall with sprinkling of oil	Non- messy , more neat & clean kitchen walls
Nutritional Value of the food is lost due to longer cooking	Nutritional Value of the food is preserved

Cookware selection

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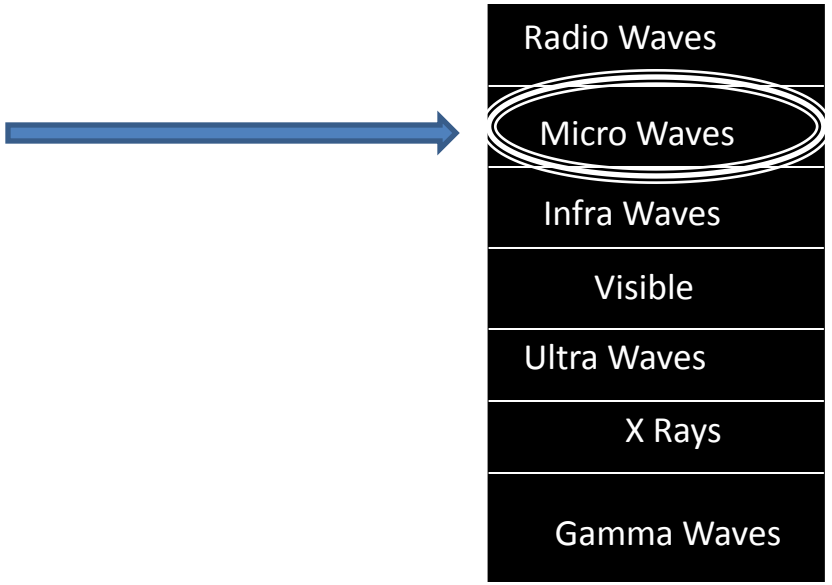
COOKWARE SELECTION TABLE			
Cookware	**Microwave**	**Grill**	**convection**
Metal,Cookware painted with metallic paints	No	Yes	Yes
Glazed / partly glazed pottery	No	No	No
Aluminium foil	For Shielding	For Shielding	For Shielding
Aluminium foil container	No	For Shielding	For Shielding
Recycled paper / glued paper product	No	No	No
Oven proof glass, Glass, Ceramic stoneware	Yes	Yes	Yes
Plastic microwave cookware	Yes(if recommended by Manufacturer)	No	No
Cling film , Butter paper	Yes	No	No

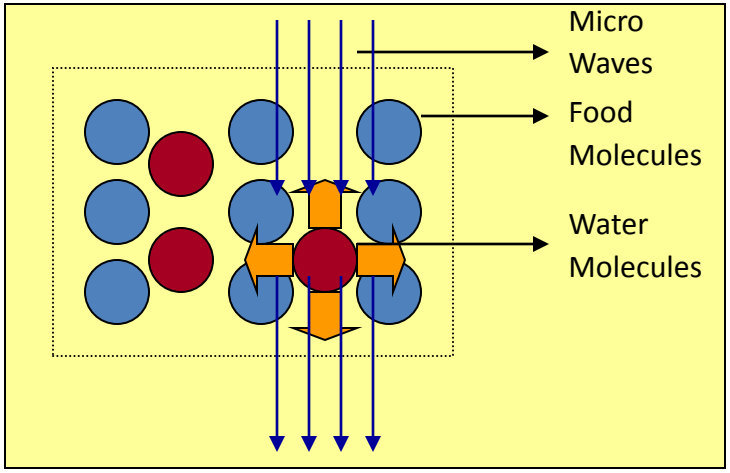
Principal of Microwave

Microwaves are high frequency (2450Mhz) electromagnetic waves.



Microwave when directed into the food filled oven cavity passes through food particles further, it vibrates water molecules (i.e. moisture content in food) (Shown Red) which in turn creates friction resulting in HEAT. This heat does the cooking of food.

Since microwaves are absorbed only by molecules inside the food, and not by the surrounding air, the cooking and baking time is greatly reduced compared to other types of ovens.



Principal of Microwave

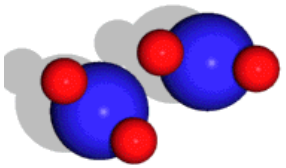
Water molecule is a ‘Polarized’ molecule with a Positive (+) charge on one end and Negative (-) charge on the other.

When exposed to a Magnetic or Electric field, the water molecule becomes responsive towards the charge

Motion

Friction

Heating



The microwave oven generates electromagnetic waves (called microwaves) which makes water move. This motion leads to friction, and friction leads to heating.

4.Microwave Principle

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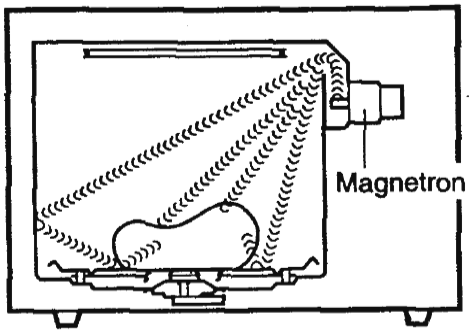
◈ Type of Microwave Oven

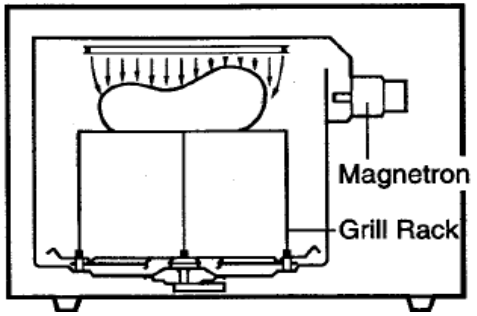
① MICROWAVE COOKING (sole model)

Using the energy of microwaves only, food is cooked quickly without altering its color and shape. Microwaves generated by a magnetron enter the oven and cook the food evenly on a rotating turntable. Power control can be adjusted in 11 steps which can enable a variety of goods to cook at a suitable power for the best results.



② GRILL COOKING

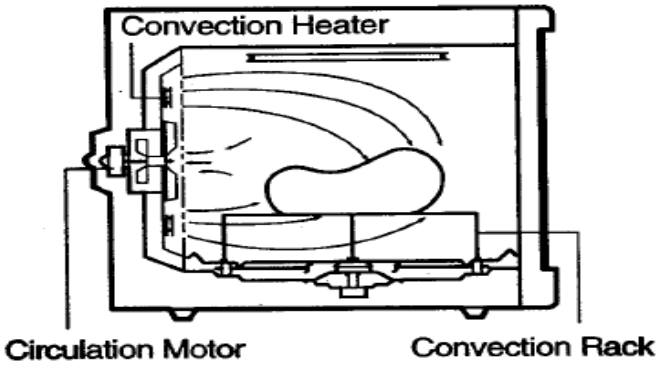
This is a method of cooking with radiant heat from the grill heater on the top of the oven. This is a traditional way of cooking which quickly seals and browns food evenly. The temperature inside the oven is fixed at 180°C, which is ideal grilling temperature for this oven.



4.Microwave Principle

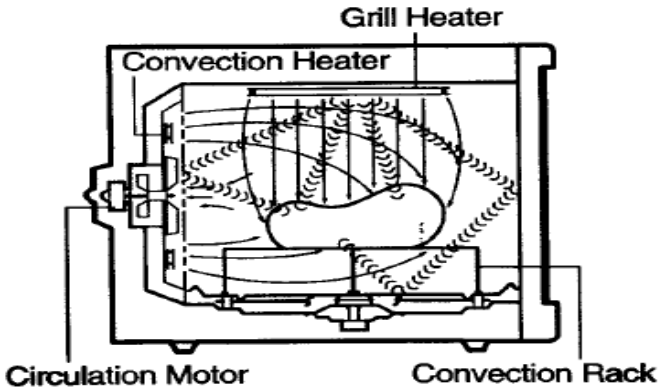
③ CONVECTION COOKING

This is a method of cooking with hot air from the convection heater situated at the rear of the oven. This method allows food to be browned evenly without losing any of the juices.
Air heated by the heater is circulated in the oven by a fan. This enables the efficient heating and cooking of food.
The temperature inside the oven can be controlled according to the type and weight of food being cooked.



④ COMBINATION COOKING

Using a combination of microwaves, hot air and radiant heat, this solid state control can cook alternately, according to the cycles programmed. This efficient method of cooking fully utilizes the advantages of all three functions, giving quick results with a traditional appearance to your cooking.



Use of Various Power Levels

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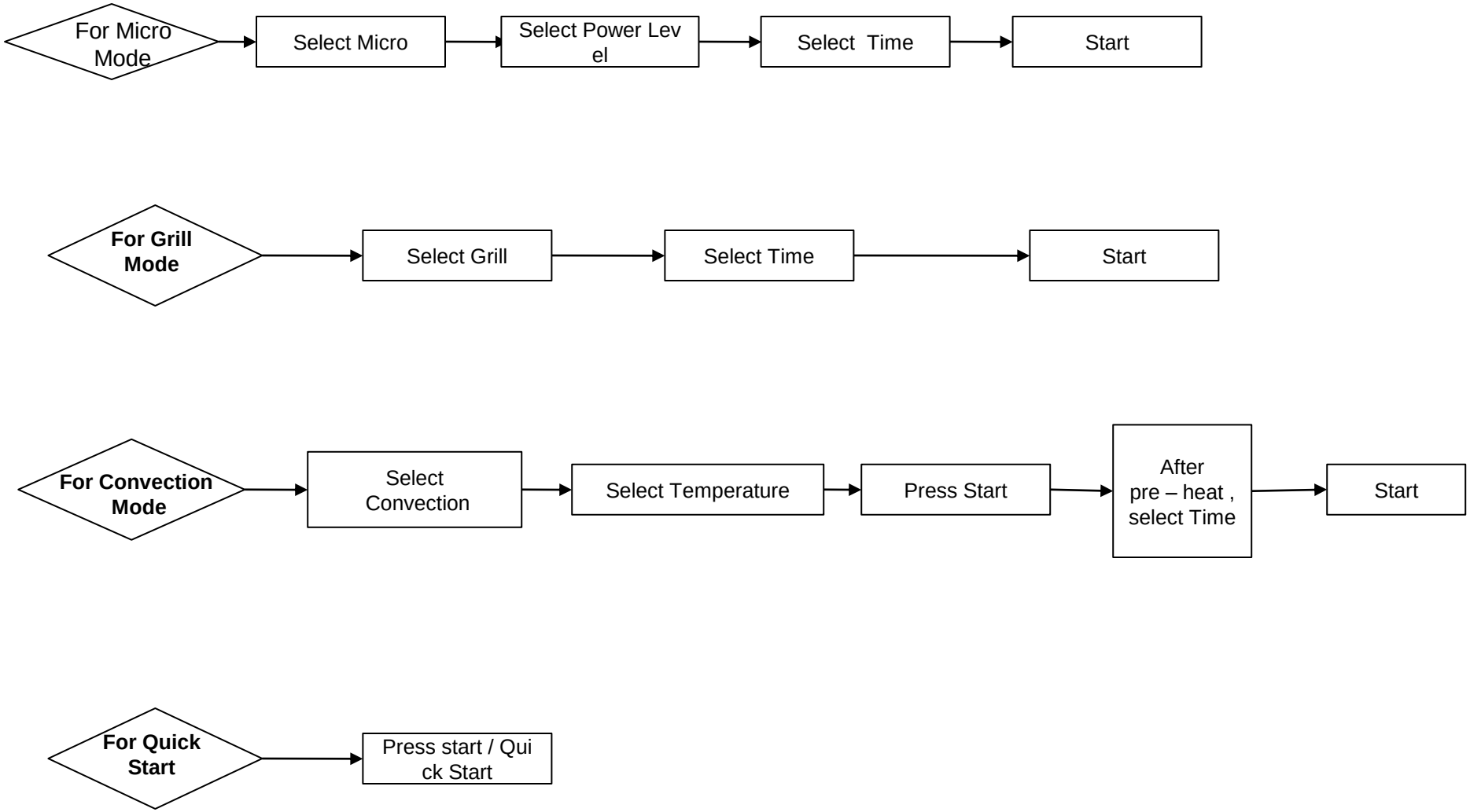
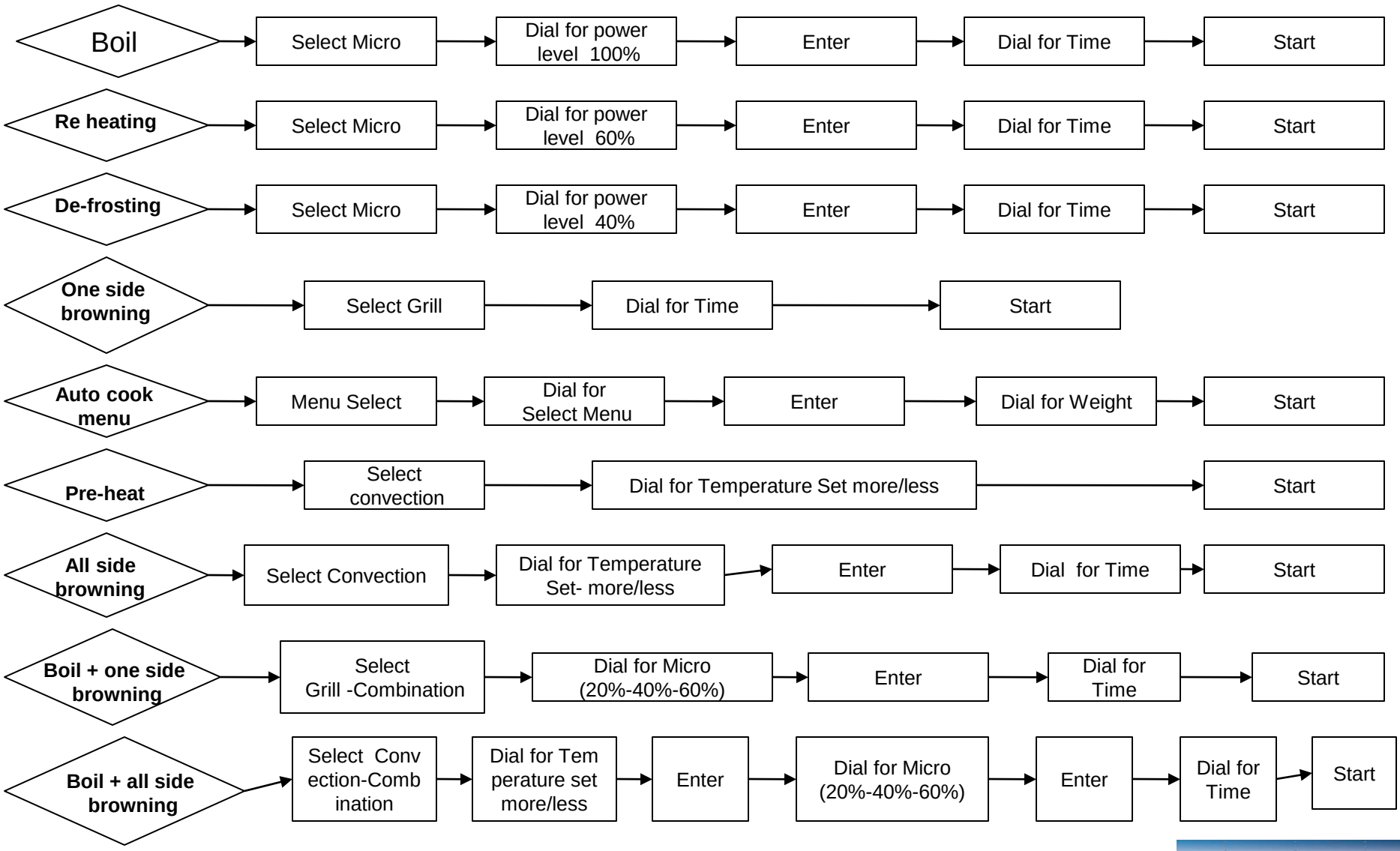
Power Level	Output	USE
HIGH	100 %	• Boil Water • Brown minced beef • Cook poultry pieces, fish, vegetables • Cook tender cuts of meat
MEDIUM HIGH	80%	• All reheating * Roast meat and poultry • Cook mushrooms and shellfish * Cook foods containing cheese and eggs
MEDIUM	60%	• Bake cakes and scones • Prepare eggs • cook custard • Prepare rice, soup
DEFROST / LOW MEDIUM	40%	•All thawing • Melt butter and chocolate • Cook less tender cuts of meat
LOW	20%	• Soften butter & cheese • Soften ice cream • Raise yeast dough

Operating Sequence



Operating Sequence – Tact Dial Knob type



Safety Precaution

Safety Tips for a Microwave

- If food catches fire turn off the oven, remove the plug out, but do not open the door of the oven.
- Keep the interior of the oven clean as small specks of food particles inside can reduce its efficiency.
- Do not cook eggs with the shells as they explode.
- Do not heat food or liquids in bottles with lids closed.
- Do not warm bottles with lids on for babies.
- Milk or any food for kids must be heated on simmer mode only.
- Pierce vegetables and fruits with tight skin to prevent them from bursting before cooking them.
- The microwave oven door should not be subject to any strain.
- It should not be used often and also a bang is to be avoided. any misalignment may cause leakage of the microwave.
- Small quantities of food with low moisture content can burn, spark, or catch fire if re-heated for long.
- Do not operate an empty oven as it can cause damage to the oven.
- Keep at least five cms space between the back of the oven and the wall immediately near it as it allows the exhaust air to escape.
- Do not install the oven near gas burners or near radios or TVs.
- Do not deep fry in the oven as it is not possible to control the temperature of the oil and it may result in catching fire easily.

Do’s & Don'ts

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Do’s

For aluminum foil or metal, **use only** those approved by the manufacturer for use in microwave oven;

For plastic wrap, bags, covers, dinnerware or containers, **use only** those approved by the manufacturer for use in microwave oven;

Ensure cooking times are correctly set as over cooking may result in the food catching fire and subsequent damage to your oven;

Always let the halogen lamp of the Light Oven being replaced by a service person.

Dont’s

Do not use the microwave oven when the door doesn’t close properly, and that there is no damage to door bents, hinges and latches (broken or loosened), door seals and sealing surfaces;

Do not use the oven when it is empty;

Do not touch the front glass during or after cooking in the Grill, Convection, and Combination mode. This glass is very hot;

Do not operate the oven in Microwave and Combination mode with the Grill rack placed in the cavity when the oven is empty;

Never use metal objects in the oven, to prevent reflection of the microwaves;

Do not use Styrofoam in your microwave;

Do not use straw, wicker or wooden containers in your microwave.

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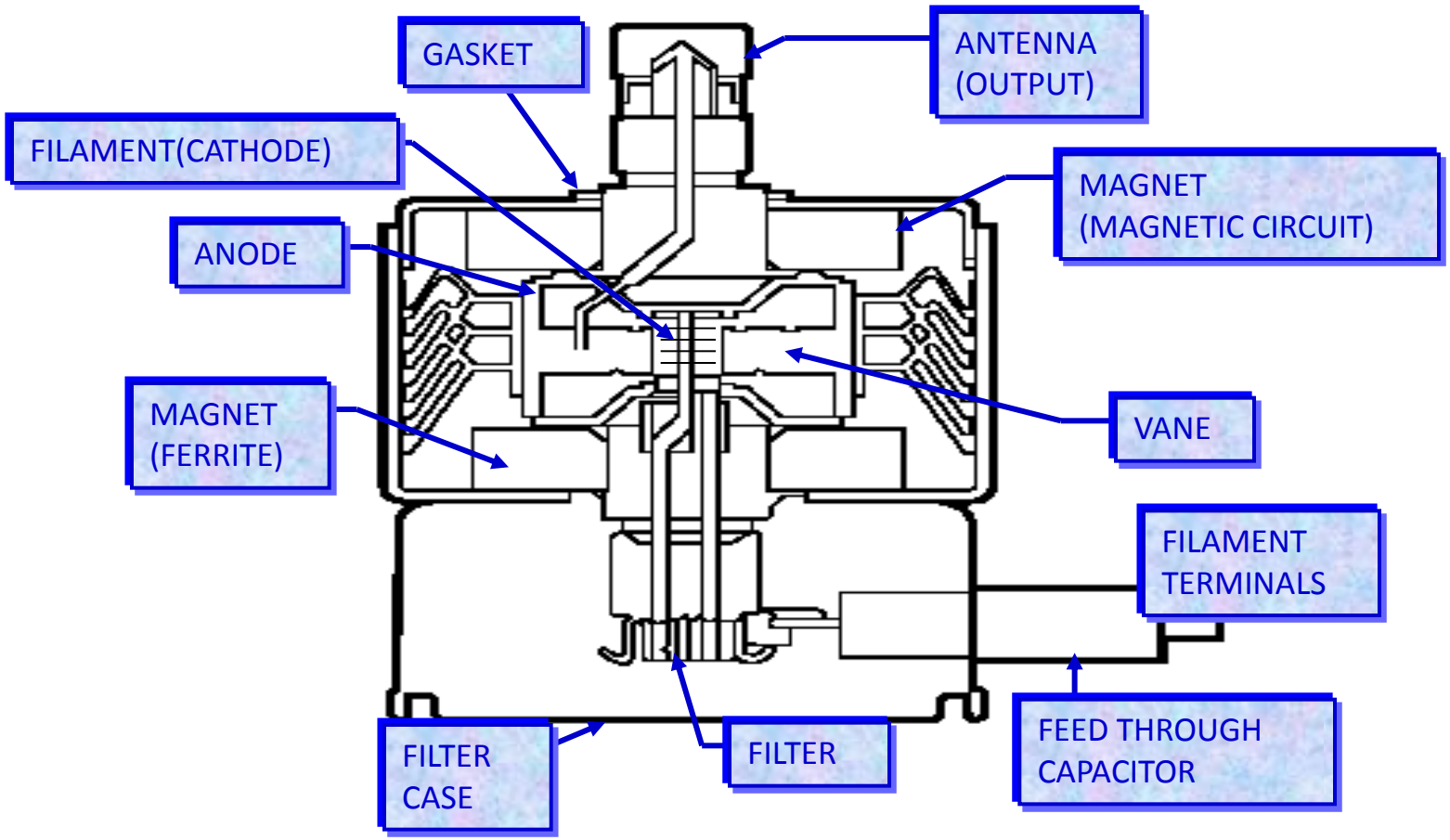
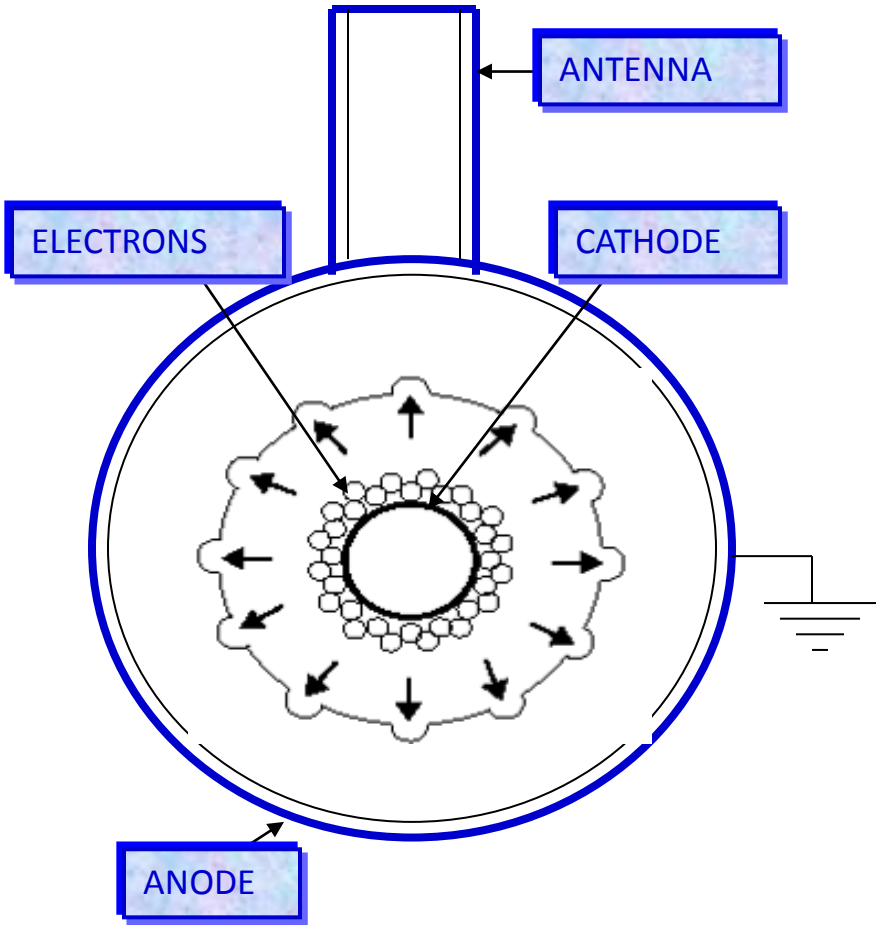
2. Microwave generation system(Magnetron)

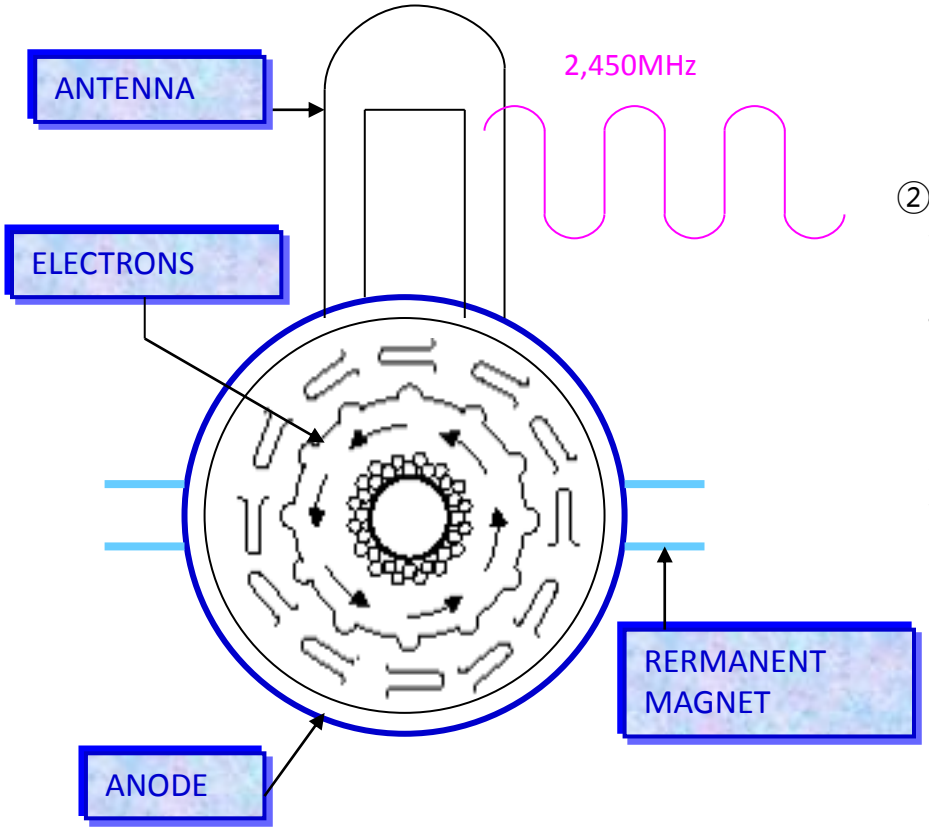


Principles



① The magnetron is the energy source for the microwave oven.
The magnetron is a vacuum tube of special construction. It is basically a diode with addition of a magnetic field. It consists of a small, coiled heating element (filament) made of tungsten which readily emits electrons when heated. This element serves as the cathode (negative element)within the tube.
The anode (positive element of the tube) consists of a thick walled copper cylinder with vertical vanes extending inward which surround but do not touch the cathode.To complete the magnetron, and make it operate distinctly different from other vacuum tubes, two permanent magnets are mounted over each end of the tube.

Principles



② In order to create an electron flow from cathode to anode, the cathode must be heated and a potential difference must exist between the two. This is accomplished by heating the cathode with 3, 4 to 3,5 V AC. (from the filament winding of the high voltage transformer) and applying a negative 4000 V DC (from the voltage doubler circuit) to the cathode.

Principles

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③ Originally the electrons would travel in a straight line from the cathode to the anode. However, with the addition of a permanent magnet surrounding the anode creating a magnetic field, the electrons travel an orbital path between the cathode and anode. As the electrons approach the anode, their orbital path takes them past small resonant cavities that are part of the anode.The passing notion of the electrons induces electron current to oscillate in the resonant cavities at the very high frequency or 2,450 MHz.
This RF (Radio frequency) energy is then transferred to the antenna.

◈ TESTING MAGENTRON TUBE

☞ Disconnect power, remove the wrapper, and discharge the capacitor.

☞ Remove the two leads from the magnetron terminals.

☞ Connect the ohmmeter between one terminal of the magnetron and the outer case of the magnetron. If the ohmmeter reads infinity, go to below. If the ohmmeter reads less than infinity, the magnetron is shorted.

☞ Connect an ohmmeter across the terminals of the magnetron. The ohmmeter should read less than one ohmmeter if the ohmmeter reads over one ohm or infinity, the tube is defective.

Trouble Shooting Procedure

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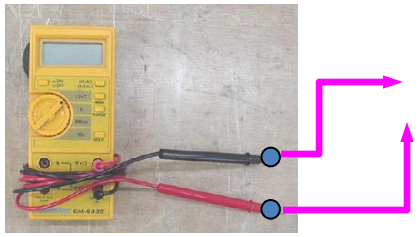
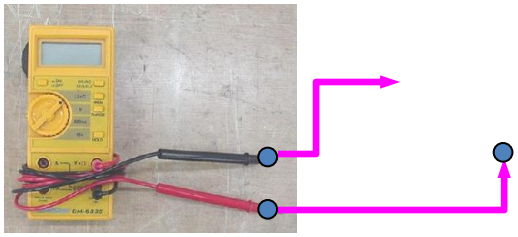
Magnetron

1)Measure the resistance of filament terminal (Normal=less than 1Ω)



2.Measure the resistance of Filament & Case (Normal= ∞Ω)

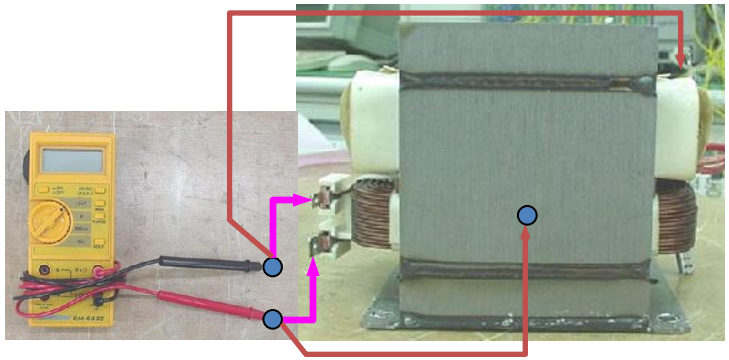


H.V.T

=>measure In normal temperature

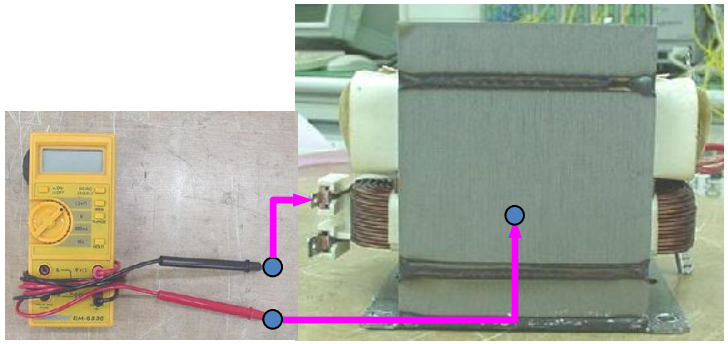
1)Measure resistance of primary terminal. (Normal=about 2Ω)

2)Measure resistance of secondary terminal (Normal=about 95Ω)



3)Measure the resistance of Primary & Core (Normal= ∞Ω)

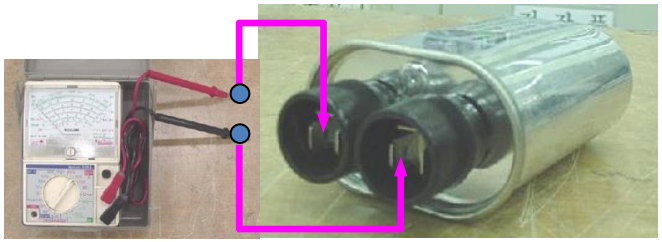
4) 2.Measure the resistance of Filament & Core (Normal= ∞Ω)



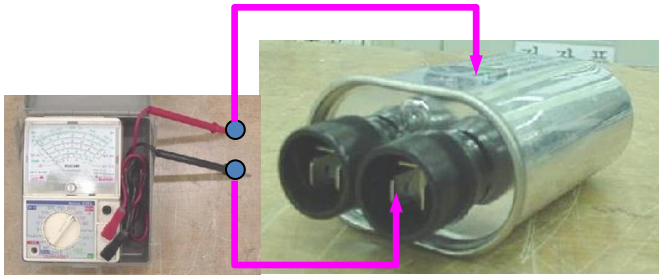
Trouble Shooting Procedure

H.V.C

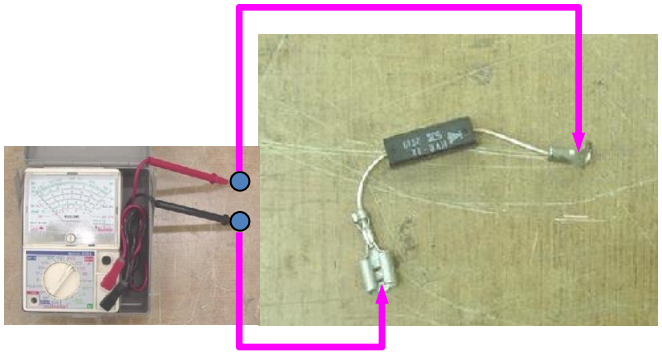
1)Measure resistance of terminals
*Normal =Momentarily indicates several ohms and then gradually return to infinite
*Abnormal= 0 Ω



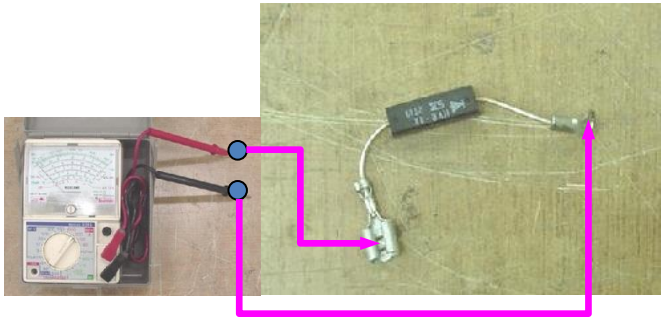
2)Measure resistance of Terminal & Case
*Normal = ∞Ω
*Abnormal = 0 Ω



1)Measure forward resistance
*Normal = hundreds KΩ
*Abnormal = ∞Ω



2)Measure backward resistance
*Normal = ∞Ω
*Abnormal = 0 Ω



Trouble Shooting Procedure

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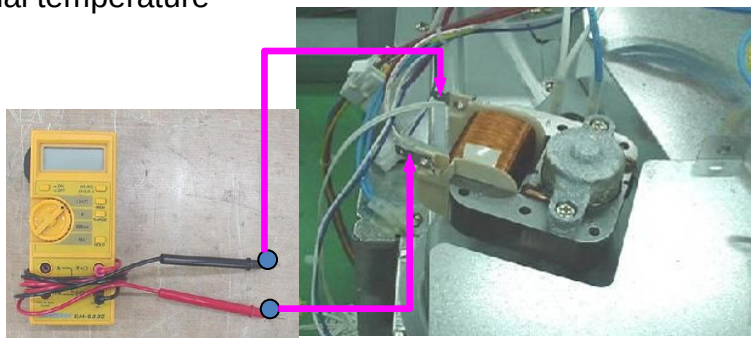
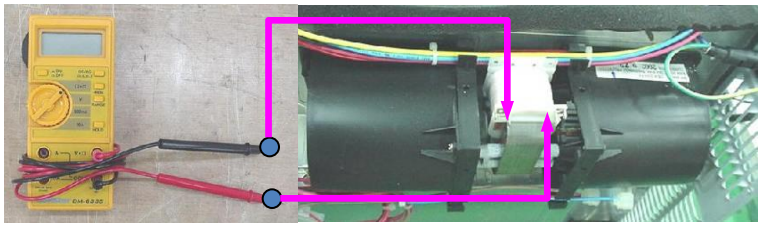
Convection Motor /
Vent Motor
=>measure
In normal temperature

1)Measure the terminals of Motor
*Normal = About 175 Ω
*Abnormal = ∞Ω or 0Ω

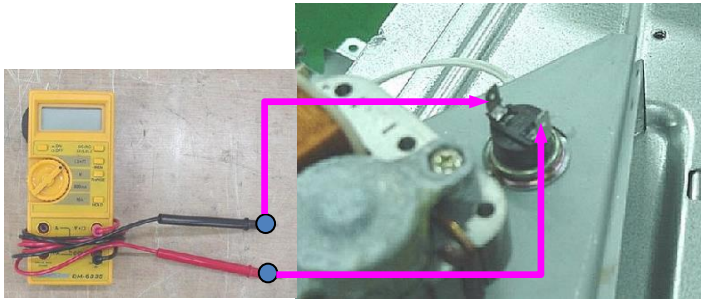


2)Measure the terminals of Vent Motor
*Normal = About 45 Ω
*Abnormal = ∞Ω or 0Ω

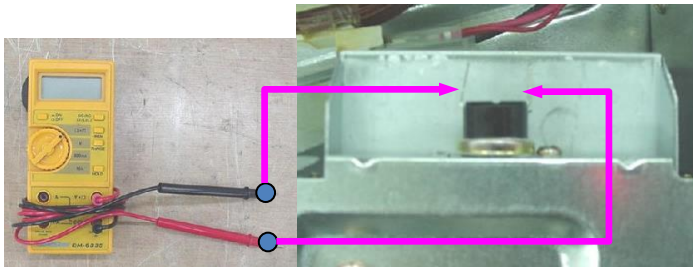


Thermostate
(For Magnetron / Oven)

1)Measure Terminals
*Normal = 0Ω
*Abnormal = ∞Ω



2)Measure Terminals
*Normal = 0Ω
*Abnormal = ∞Ω



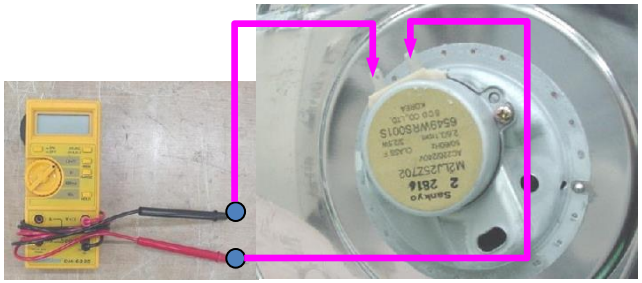
Trouble Shooting Procedure

Thermistor
=>measure
In normal temperature

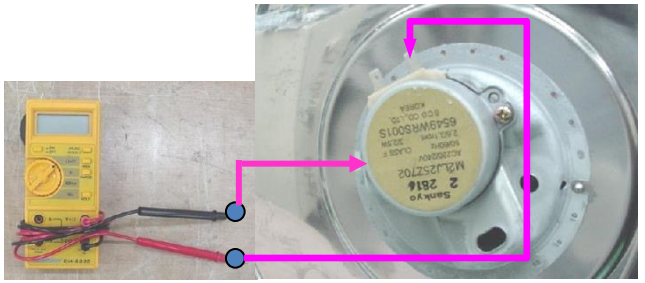
1)Measure Terminals
*Normal = About 214KΩ
*Abnormal = ∞Ω or 0Ω

Turntable Motor
=>measure
In normal temperature

1)Measure Terminals
*Normal = About 12.2KΩ
*Abnormal = ∞Ω or 0Ω



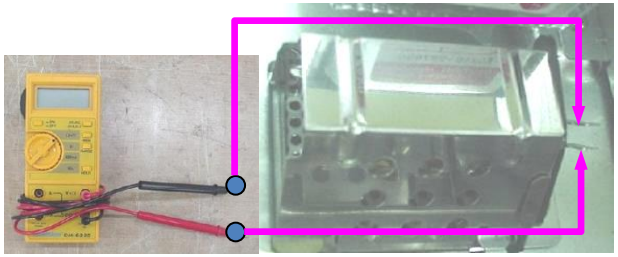
2)Measure Terminals & Case
*Normal = ∞Ω
*Abnormal = 0Ω



Trouble Shooting Procedure

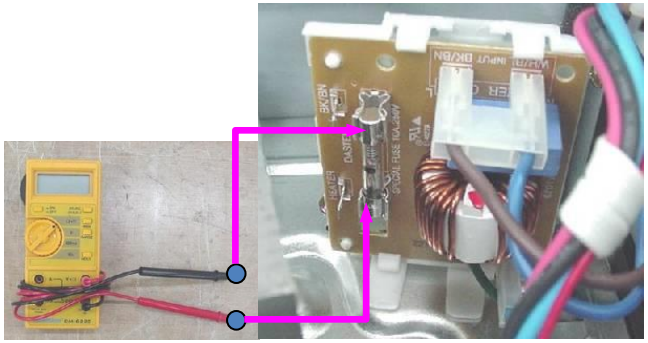
Oven Lamp
=>measure
In normal temperature

1)Measure Terminals
*Normal = About 232Ω
*Abnormal = ∞Ω or 0Ω



Fuse

1)Check for continuity of the fuse
*Normal = 0Ω
*Abnormal = ∞Ω



Component used in Microwave

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• Filter PCB	Contains terminal for input supply and fuse
• Thermostat	Themostatic switch for Protection
• Main PCB	Operated through micro switches. Contains relays to operate various functions. Customer
• Micro switches	Gives command for circuit operation if door is closed properly
• HV Transformer	Gets command from PCB to generate HV
• Capacitor & Diode	Help in doubling the voltage
• Magnetron	Gets supply from HVT and generates electromagnetic waves, microwaves at 2450 Mhz
• Grill Heater	Gets command from PCB, is controlled basis of time
• Convection Heater	Gets command from PCB, controlled by
• Convection. Fan	Works when conv. Heater is on , for even dispersal of heat
• Thermistor Sensor	Senses temprature and gives feed back to Main PCB
• Sync. Motor	Helps in turning the glass tray
• Door Choke Seal	It helps in preventing Microwaves from coming out, keeping heat inside and start the circuit
• Door Switches	Activated by Door open or close for safety and Protection

Symptom and cause

Panasonic

SR. NO.	SYMPTOM	TEST FLOW	CHECK POSSIBLE CAUSES	REMEDY
1	Micro Low Heating	1	Low Line Voltage	Must be 230V +/- 10%
		2	HV Capacitor Leak	Replace HV Capacitor
2	Micro No Heating	1	Micro Relay Faulty	Replace PCB
		2	HV Diode Open	Replace HV Diode
		3	Faulty Magnetron	Replace Magnetron
3	Fuse Blows	1	Micro Switch(Monitor) NG	Replace Micro Switches
		2	HV Capacitor Short Circuit	Replace HV Capacitor
		3	HV Transformer Faulty	Replace HV Transformer
4	Grill Not work	1	Heater NG	Replace Heater
		2	Grill Relay NG	Replace PCB
		3	Grill Thermostat NG	Replace Thermostat
5	Glass Tray Not Rotate	1	Food particles in rotating ring area obstructing the movement	Clean Rotating ring area
		2	Rotating Ring - Roller not cleaned	Clean Roller
		3	Coupling between TT Shaft & Motor NG	Fix the TT Shaft properly
		4	Motor NG	Replace Motor
6	MWO Dead	1	Fuse Blown	Replace Fuse
		2	Thermostat Open due to Over Heating	Cool Down
		3	Low Voltage Transformer on PCB NG due to high mains voltage	Replace PCB
7	Conv. Not work	1	Heater NG	Replace Heater
		2	Conv. Relay Faulty	Replace PCB
8	Abnormal Display	1	Excess Moisture Problem (Incase of VFD & LCD Displays)	Remove Moisture
		2	Display pins broken (Incase of LED)	Replace PCB
9	Start button not work	1	Door not closed properly	Check Door/Latch alignment
		2	Micro Switch setting with latch not proper	Check Door/Latch alignment
		3	Key Pad NG	Replace Keypad
10	PCB Trip	1	Excess of Microwave Leakage	Check MGT Fixing
		2	Magnetron Gasket absent / Not fixed properly	Fix gasket properly
		3	Magnetron not fixed / Tightned properly	Fix magnetron properly

1. Baking Problem with MWO Model NN-CD671

Panasonic

SVC Complaint Received: Switch Off Unit Within 8 Minutes During Operation

Solution:

Issue Happen due to the improper usage of the operation. Please follow below steps for the baking operation.

Step1→ Turn on and Press button Cake/Desert, Auto Menu select program 122 & then press start (Preheat)

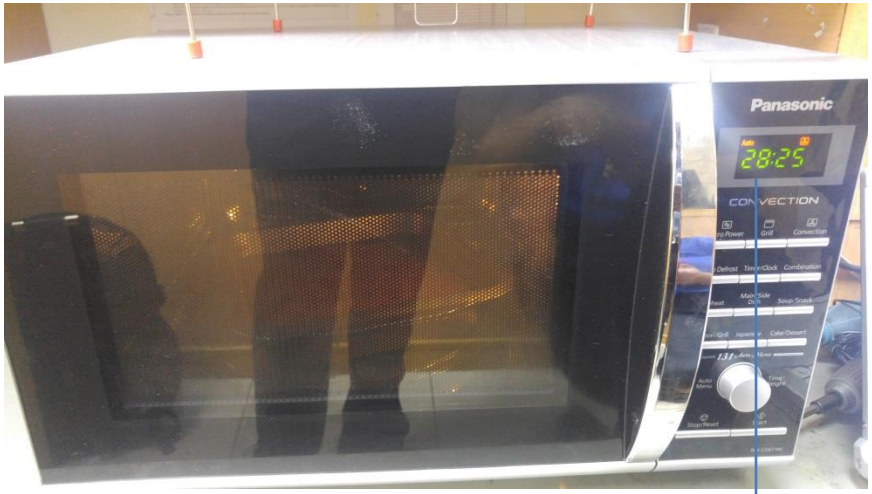
Step2→ Wait for beep sound come (shows 180 degree).

Step3→ Open the oven and place the tin with cake mix in the lower rack,(close the door) and press start.

Will Display time around 35 minutes for complete the operation cooking.

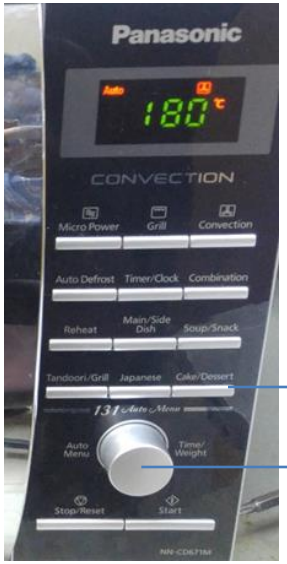
Pictures

Panasonic

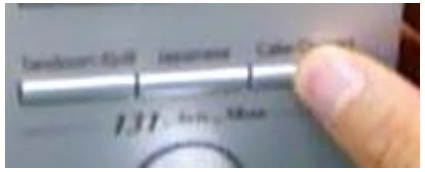


Time Showing on Baking starts
Total 35 Minutes.

Temperature Automatically Taken
During Preheat Time



Select Cake/Desert Button



Auto menu Selection knob for
Selecting Program 122(rotate and select)

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A Better World