# Service Manual Microwave Oven



# **NN-CS599S**

HPE(Hong Kong) YPQ(Singapore) MPQ(Malaysia) TUE(India) YTE(Others) PTE(Iran)

# Specification

Models		NN-CS599S
Power Source:		240V AC Single Phase, 50HzFor MPQ, YPQ Models 220V AC Single Phase, 50HzFor HPE, YTE, TUE, PTE Models
Power	Microwave	950W (HPE, YTE, TUE, PTE), 975W (MPQ, YPQ)
Consumption:	Ceramic Heater (1pc)	450W
	Ceramic Heater (2pcs)	900W
	Convection Heater	1950W
Output:	Microwave	1000W
	Ceramic Heater (1pc)	450W
	Ceramic Heater (2pcs)	900W
	Convection Heater	1950W
Microwave Fre	equency:	2450MHz
Timer:		90 Min. 00 Sec.
Outside Dimer	nsions:	523mm(W) x 494mm(D) x 320mm(H)
Oven Cavity Dimensions:		354mm(W) x 343mm(D) x 205mm(H)
Net Weight:		21.5kg
PbF		This product with PbF
		Specifications subject to change without notice.



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This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

#### WARNING

- 1. This product should be serviced only by trained, qualified personnel.
- 2. Check for radiation leakage before and after every servicing according to the "procedure for measuring radiation leakage."
- 3. If the unit cannot be repaired on site, advise the customer not to use until unit is repaired.
- 4. There are special components used in the microwave oven which are important for safety. These parts are marked with a △ on the replacement parts list. It is essential that these critical parts be replaced only with the manufacture's specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the orginal design.

This service manual covers products for following markets.

When troubleshooting or replacing parts, please refer to the country/area identifications shown below for your applicable product specification.

- HPE ..... For Hongkong YPQ ..... For Singapore
- MPQ ......For Malaysia
- TUE ......For India
- YTE ..... For Others
- PTE ..... For Iran

#### About lead free solder (PbF)

#### CAUTION

**Distinction of PbF PCB:** PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

Caution: ● Pb free solder has a higher melting point than standard solder; Typically the melting point is 30 - 40°C higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set

- it to  $370 \pm 10^{\circ}$ C.
- Pb free solder will tend to splash when heated too high (about 600°C).

#### DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

### 🛆 WARNING

This Inverter board looks like a regular PCB. However, this PCB drives the magnetron tube with extremely high voltage and high current. Take cautionary measures when disassembling and troubleshooting the Inverter circuit. Improper handling can result in an electrical shock or burns, which might lead to injury or death.

IT HAS: 1. Very high voltage and high current circuits.

It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens. 2. Aluminum heat sink that is energized with very high voltage and high heat energy.

3. Very high voltage which may remain in circuitry even when oven is off. High voltage charge may remain in the capacitors on the board.

#### DO NOT:

- \* 1. Do not touch circuitry because it has very hot (high voltage) circuitry. Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage charge may remain in circuits.
- Do not touch aluminum heat sink because it is energized with very high voltage and is also very hot in high heat energy.
- 3. Do not try to adjust or tamper with preset control on the Inverter board because it is very dangerous to adjust without proper test equipment.
- 4. Do not test oven while Inverter grounding plate or screws are loose. It is very dangerous to operate H.V. Inverter Circuit (U) with loose mounting screws or if improperly grounded.

#### **INVERTER POWER SUPPLY**



# CONTENTS

#### Page

1	FEATU	JRE CHART 5
2	CONT	ROL PANEL ·······5
3	SCHE	MATIC DIAGRAM ·······6
4	DESC	RIPTION OF OPERATING SEQUENCE7
	4.1.	Variable power cooking control7
	4.2.	Inverter power supply circuit7
	4.3.	Steam defrost, Auto cook & Steam reheat7
	4.4.	Convection & Grill Convection cooking control7
	4.5.	Combination cooking control8
	4.6.	Grill cooking control8
	4.7.	IR reheat9
	4.8.	Steam function (micro steam) 10
5	CAUT	ONS TO BE OBSERVED WHEN TROUBLESHOOTING11
	5.1.	Check the grounding 11
	5.2.	Inverter warnings 11
	5.3.	Confirm before repair 12
	5.4.	Part replacement 12
	5.5.	When the 10A fuse is blown due to the malfunction of the
		short switch 12
	5.6.	Avoid inserting nails, wire etc. through any holes in the
		unit during operation 12
	5.7.	Verification after repair 12
	5.8.	Sharp edges 12
	5.9.	Hot surface 12
6	DISAS	SEMBLY AND PARTS REPLACEMENT PROCEDURE 13
	6.1.	Magnetron 13
	6.2.	Digital programmer circuit (D.P.C) AU, (D.P.C.) HU, key
		board membrane and power relay 14
	6.3.	Digital programmer circuit (D.P.C.) DU and low voltage
		transformer 15
	6.4.	H.V. Inverter 15
	6.5.	Fan motor 16
	6.6.	Upper heaters 16
	6.7.	Door assembly 17
	6.8.	IR sensor 18
	6.9.	Stirrer motor 18

6.10.	Pump motor	19
6.11.	Heater DU (steam heater)	20
6.12.	Convection motor and convection heater	21
7 COMP	ONENT TEST PROCEDURE	23
7.1.	Primary, Secondary Latch Switch interlocks & Power	
	Relay RY1	23
7.2.	Short Switch	23
7.3.	Magnetron	23
7.4.	Membrane key board (Membrane switch assembly)	23
7.5.	Inverter power supply (U)	24
7.6.	Temperature thermistor	24
7.7.	IR sensor	24
8 MEAS	UREMENTS AND ADJUSTMENTS	25
8.1.	Adjustment of Primary latch switch, Secondary latch	
	switch and Short switch.	25
8.2.	Measurement of microwave output	25
9 TROU	BLESHOOTING GUIDE	26
9.1.	(Troubleshooting) Oven stops operation during cooking -	27
9.2.	(Troubleshooting) Other problems	28
9.3.	Troubleshooting of inverter circuit (U) and magnetron	29
9.4.	Trouble related to Digital Programmer Circuit	30
9.5.	Simple way of H.V. Inverter/magnetron troubleshooting	30
9.6.	How to check the semiconductors using an OHM meter $\boldsymbol{\theta}$	31
9.7.	H.V. Inverter main parts list (F606YM300BP)	31
10 EXPLO	DDED VIEW AND PARTS LIST	32
10.1.	EXPLODED VIEW ······	32
10.2.	PARTS LIST	33
10.3.	WATER TANK ASSEMBLY	35
10.4.	ESCUTCHEON BASE ASSEMBLY	36
10.5.	DOOR ASSEMBLY	37
10.6.	WIRING MATERIALS	38
10.7.	PACKING AND ACCESSORIES	39
11 DIGIT	AL PROGRAMMER CIRCUIT	40
11.1.	SCHEMATIC DIAGRAM ······	40
11.2.	PARTS LIST	42

Page

# **1 FEATURE CHART**

MODEL	CS599S
FEATURE	
3 Stage Cooking	0
Microwave	0
Convection	0
Grill	0
Combination	0
Microwave with Steam	0
Steam Defrost	0
Steam Reheat	0
Steam Shot	0
Sensor Reheat	0
Auto Menu	0
Auto Reheat	0
Auto Cleaning	0
Timer	0
Clock	0
Child Safety Lock	0
Language Choice	0

# 2 CONTROL PANEL



#### Beep Sound:

When a pad is pressed correctly, a beep sound will be heard. If a pad is pressed and no beep is heard, the unit did not or could not accept the instruction. The oven will beep twice between programmed stages. At the end of any completed program, the oven will beep 5 times.

#### Note:

If no operation after cooking program setting, 6 minutes later, the oven will automatically cancel the cooking program. The display will return to clock or colon display.

# **3 SCHEMATIC DIAGRAM**



# **4 DESCRIPTION OF OPERATING SEQUENCE**

# 4.1. Variable power cooking control

High Voltage Inverter Power Supply (U) controls output power by the signal from Digital Programmer Circuit (DPC). Power relay always stays ON, but PWM (pulse width modulation) signal controls microwave output power.

#### NOTE:

The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

Valiable Power Cooking						
POWER SETTING	OUTPUT POWER(%)	MANUAL MICROWAV DUTY				
	APPROX.	ON(SEC)	OFF(SEC)			
HIGH	100%	22	0			
MEDIUM-HIGH	70%	22	0			
MEDIUM	55%	22	0			
MEDIUM-LOW	40%	22	0			
LOW	20%	13	9			
DEFROST	30%	17	5			

Variable Power Cooking

## 4.2. Inverter power supply circuit

The Inverter Power Supply circuit powered from the line voltage, 220-240V 50Hz AC input supplies 4,000V DC to the magnetron tube, and functions in place of the H.V. transformer, the H.V. capacitor and H.V. diode.

- 1. The AC input voltage 220-240V 50Hz is rectified to DC voltage immediately.
- 2. DC voltage will be supplied to the switching devices called IGBT. These devices are switched ON-OFF by the 20 to 40 KHz PWM (pulse width modulation) signal from the microcomputer in the DPC.
- 3. This drives the High voltage transformer to increase voltage up to 2,000V AC.
- 4. Then the half-wave doubler voltage rectifier circuit, consisting of the H.V. diodes and capacitors, generates the necessary 4,000V DC needed for the magnetron.
- 5. Output power of the magnetron tube is always monitored by the signal output from the current transformer built into the inverter circuit.
- 6. This signal is fed back to the microcomputer in the DPC to determine operating conditions and output necessary to control PWM signal to the Inverter Power Supply for control of the output power.

# 4.3. Steam defrost, Auto cook & Steam reheat

When the Auto Control feature is selected and the [Start] pad is tapped:

1. The digital programer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display window. Table shows the corresponding cooking times for respective serving by categories.

Steam Defrost					
SELECTED WEIGHT	COOKING TIME				
1.0 kg	15 min.50 sec.				

Auto Cook (Vegetable)					
SELECTED WEIGHT	COOKING TIME				
100 g	1 min.30 sec.				

2. When cooking time in the display window has elapsed, the oven turns off automatically by a control signal from the digital programmer circuit.

# 4.4. Convection & Grill Convection cooking control

The digital programmer circuit controls the ON-OFF time of the heater in order to control oven cavity temperature.

- 1. After selecting desired oven cavity temperature of Convection/Grill Convection (the range of selected oven temp is 100°C-300°C) and pressing [Start] pad, a high level signal comes out of the micro computer and applies to power relays, RY5 and RY9.
- 2. When RY5 & RY9 are switched to ON, power source voltage is applied to the convection heater & upper heater (center one), and the heaters turn on.
- 3. The digital programmer circuit senses the oven cavity temperature through oven temp sensor (thermistor). When the oven temperature reaches the set temperature, DPC stops supplying high level signal to the power relays, and the heaters turn off.
- 4. After the convection heater and upper heater (center one) turn off, the oven temperature will continue increasing for a while and then decrease as shown in Figure.

When the oven temperature drops below the set temperature, the digital programmer circuit senses the signal and starts supplying a high level signal to RY5 again. **NOTE:** 

- For "CONVECTION" function, after preheating, RY9 would no longer be switched to ON.
- For "GRILL CONVECTION" function after preheating, RY9 would be switched ON-OFF by the signal from the digital programmer circuit.

#### CONVECTION/GRILL CONVECTION FUNCTION:

OVEN	Sta	art SELE				<u> </u>
TEMP		OVEN	TEMP			)
CONVECTION HEATER (RY5)		ON	OFF	ON	OFF	
		(CONVECTION FUNCTION)				   
UPPER HEATER		ON	OFF			
(center one)		(GRILL CONVECTION FUNCTION)				
(КТЭ)		ON	OFF	ON		
FAN MOTOR		ON				
COOLING FAN MOTOR		ON (mec	lium rot	ate spe	ed)	

CONVECTION	POWER RELAY	CONVECTION HEATER (RY5)	UPPER HEATER (CENTER ONE) (RY9)	MICROWAVE (RY1)
	During Preheating	ON	ON	OFF
CONVECTION	Keep preheating (keep the set oven Temp constant)	Temp control ON-OFF (If the oven temp exceeds the set temp, RY5 would be	OFF	OFF
	Actual cooking process	switched to OFF, If below the set temp, RY5 would be switched to ON.)	OFF	OFF
	During Preheating	ON	ON	OFF
GRILL CONVECTION	Keep preheating (keep the set oven Temp constant)	Temp control ON-OFF (If the oven temp exceeds the set temp, RY5 would be withhed to OFF If	OFF	OFF
	Actual cooking process	switched to OFF, If below the set temp, RY5 would be switched to ON.)	ON	OFF

#### NOTE:

If only convection heater or grill heater works, both convection fan moter and cooling fan moter would rotate for 5 minutes after cooking to cool down oven and electric components.

# 4.5. Combination cooking control

Combination cooking is accomplished by microwave and grill cooking (upper heater) being done during one combination cooking cycle. One combination cooking cycle is 33 seconds.

1. During combination cooking, the digital programmer circuit controls power relay RY9's ON-OFF time. In all three combination cooking categories, power relay RY1 always stay on, but RY9's ON-OFF time as shown in Figure.

COMBINATION	GRILL	MICROWAVE	
CATEGORY	ON (sec.)	OFF (sec.)	(RY1)
1	33	0	ON
2	24	9	ON
3	18	15	ON

# 4.6. Grill cooking control

Grill cooking is accomplished by upper heaters only. One grill cooking cycle is 33 seconds.

1. During grill cooking, the digital programmer circuit controls power relay RY4 & RY9's ON-OFF time (RY4 & RY9's ON-OFF state is synchronous). In all three grill cooking categories, power relay RY1 always stay OFF, but RY4 & RY9's ON-OFF time are shown in Figure.

GRILL	GRILL (R	MICROWAVE	
CATEGORY	ON (sec.)	OFF (sec.)	(RY1)
1	33	0	OFF
2	24	9	OFF
3	18	15	OFF

### 4.7. IR reheat

The temperature of food being heated is detected by an infrared (IR) sensor and you do not have to set time.

# 4.7.1. How to read temperature by IR sensor

IR sensor can read food temperature without touching, IR rays are emitted from food. IR sensor is to generate temperature related electric signal output and microcomputer is to convert actual temperature.



#### 4.7.2. Operation

IR sensor is mounted on top right of oven cavity through the hole. It scans all over cooking shelf. IR sensor has 8 eyes and can read oven shelf left to right at the time. Then IR sensor is designed to scan front to back to cover all over shelf. (19 points)





# 4.8. Steam function (micro steam)

#### 4.8.1. Water Supply

Water in water tank will be pumped out and supply to the steam generation heater located inside back bottom of oven cavity.

#### 4.8.2. Operation

When pressing [start] pad, oven preheat will start and then water supply begins. It will take 1 minute for preheating. When preheat is completed, it will turn into actual cooking process. During heating, the temperature sensor (Thermistor) located on steam heater will monitor steam heater temperature and when it exceeds 200°C, the additional water will be supplied to maintain moisture/steam within oven cavity.



# 5 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is a high voltage, high current device. It is free from danger in ordinary use, though extreme care should be taken during repair.

#### 

Servicemen should remove their watches and rings whenever working close to or replacing the magnetron.

### 5.1. Check the grounding

Do not operate on a two wire extension cord. The microwave oven is designed to be grounded when used. It is imperative, therefore, to ensure the appliance is properly grounded before beginning repair work.

#### 5.2. Inverter warnings

# ▲ WARNING HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

The High Voltage Inverter Power Supply generates very high voltage and current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair.

The aluminum heat sink is also energized with high voltage (HOT), do not touch when the AC input terminals are energized. The power device Collector is directly connected to the aluminum heat sink.

The aluminum heat sink may be HOT due to heat energy, therefore, extreme care should be taken during servicing.



#### H.V. Inverter warning

# $\underline{\land}$ warning for inverter power supply (U) grounding

Check the High Voltage Inverter Power Supply circuit grounding. The high voltage inverter power supply circuit board must have a proper chassis ground. The inverter reinforcement and grounding bracket must be connected to the chassis. If the inverter board is not grounded it will expose the user to very high voltages and cause extreme DANGER! Be sure that the inverter circuit is properly grounded via the inverter reinforcement and grounding bracket A.



#### Grounding of the inverter circuit board

# $\underline{\wedge}$ WARNING DISCHARGE THE HIGH VOLATGE CAPACITORS

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors of the Inverter Power Supply circuit board.

When replacing or checking parts, remove the power plug from the outlet and short the inverter output terminal of the magnetron filament terminals to the chassis ground with an insulated handle screwdriver to discharge. Please be sure to contact the chassis ground side first and then short to the output terminal.



#### Discharging the high voltage capacitors

#### 

There is high voltage present with high current capabilities in the circuits of the primary and secondary windings, choke coil and heat sink of the inverter. It is extremely dangerous to work on or near these circuits with the oven energized. DO NOT measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

#### 

Never touch any circuit wiring with your hand or with an insulated tool during operation.

# 5.3. Confirm before repair

#### 

To prevent the water from invading the electric parts that can cause a short circuit or electric shock:

- 1. Before repair or replacement of parts, ensure to remove the water tank from microwave oven.
- After removing the water tank, select the "drainage" function to drain the water remaining in the water pipes and tubes into oven cavity forcibly. (Operating method: keep pressing [Steam Defrost] pad for more than 2 seconds). Then wipe up the oven cavity.
- 3. In case the Microwave Oven has no power, the technician should have a dry cloth available in advance before disassembly. When pulling out the water tube, elevate the front of the Microwave Oven at least 1.5" to minimize the amount of water that leaks out. Wipe up excess water throughly with the dry cloth.

#### 

Before beginning repair work, make sure that there is no water in microwave oven, otherwise the water might invade the electric parts and that can cause a short circuit or electric shock.

### 5.4. Part replacement

When troubleshooting any part or component is to be replaced, always ensure that the power cord is unplugged from the wall outlet.

# 5.5. When the 10A fuse is blown due to the malfunction of the short switch

#### 

When the 10A 240V fuse is blown due to the malfunction of the short switch, replace all of the components (primary latch switch, short switch and power relay RY1).

- 1. This is mandatory. Refer to "measurements and adjustments" for the location of these switches.
- 2. When replacing the fuse, confirm that it has the appropriate rating.
- 3. When replacing faulty switches, be sure the mounting tabs are not bent, broken or deficient in their ability to hold the switches.

# 5.6. Avoid inserting nails, wire etc. through any holes in the unit during operation

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any holes or gaps, because such objects may work as an antenna and cause microwave leakage.

# 5.7. Verification after repair

#### 

After repair or replacement of parts, make sure that all the water pipes and tubes are properly connected, otherwise the water might invade the electric parts and will cause a short circuit or electric shock.

- 1. After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose or missing. Microwave energy might leak if screws are not properly tightened.
- 2. Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
- 3. Check for microwave energy leakage.

#### CAUTION OF MICROWAVE RADIATION LEAKAGE

USE CAUTION NOT TO BECOME EXPOSED TO RADIATION FROM THE MICROWAVE MAGNETRON OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

#### IMPORTANT NOTICE

- 1. The following components have potentials above 2000V while the appliance is operated.
  - Magnetron
  - High voltage transformer (Located on inverter (U))
  - High voltage diodes (Located on inverter (U))
  - High voltage capacitors (Located on inverter (U))
  - Pay special attention to these areas.
- 2. When the appliance is operated with the door hinges or magnetron installed incorrectly, the microwave leakage can exceed more than 5mW/cm<sup>2</sup>. After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.
- 3. After repair or replacement of parts, make sure that all the water pipes and tubes are properly connected, otherwise the water might invade the electric parts and will cause short circuit even result in electric shock.

## 5.8. Sharp edges

#### 

Please use caution when disassembling or reassembling internal parts. Some exposed edges may be sharp to the touch and can cause injury if not handled with care.

### 5.9. Hot surface

#### 

- 1. After using steam function, the oven cavity and steam heater area becomes very hot.
- 2. After using bake function, the oven cavity and bake heater area becomes very hot.

Therefore, extreme care should be taken during servicing.

# 6 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

#### 

To prevent the water from invading the electric parts that can cause a short circuit or electric shock:

- Before repair or replacement of parts, ensure to remove the water tank from microwave oven.
- After removing the water tank, select the "drainage" function to drain the water remaining in the water pipes and tubes into oven cavity forcibly. (Operating method: keep pressing [Steam Defrost] pad for more than 2 seconds). Then wipe up the oven cavity.
- 3. In case the Microwave Oven has no power, the technician should have a dry cloth available in advance before disassembly. When pulling out the water tube, elevate the front of the Microwave Oven at least 1.5" to minimize the amount of water that leaks out. Wipe up excess water throughly with the dry cloth.

#### 

After repair or replacement of parts, make sure that all the water pipes and tubes are properly connected, otherwise the water might invade the electric parts and will cause a short circuit or electric shock.

### 6.1. Magnetron

- 1. Discharge the high voltage capacitor (see page 10 for instructions).
- 2. Remove 2 screws holding the inverter reinforcement/grounding bracket A on oven cavity.



3. Remove 2 screws holding the inverter reinforcement bracket B on oven cavity.



- 4. Remove 1 screw holding oven thermistor on cavity top plate.
- 5. Release lead wire harness from locking tabs on inverter bracket A.
- 6. Disconnect 2 high voltage lead wires from magnetron filament terminals.
- 7. Remove 1 screw holding thermistor on magnetron.



8. Remove 2 screws holding air guide A on magnetron, then remove air guide A.



9. Remove 4 screws holding air guide B on magnetron & on base plate respectively, then remove air guide B.



- 10. Disconnect 2 lead wires from fan motor terminals.
- 11. Disconnect lead wires from noise filter (U) terminals.
- Release locking tabs of inverter reinforcement/grounding bracket A hanging on both sides of oven cavity, then withdraw the inverter reinforcement/grounding bracket A outside slightly.

#### **∧** NOTE:

Pay attention to the sharp edges of inverter reinforcement/grounding bracket A.

13. Hold the inverter reinforcement/grounding bracket A, then remove 4 screws holding magnetron.

#### **∧** NOTE:

After replacement of the magnetron, tighten mounting screws properly in an x pattern, making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

When replacing the magnetron, be sure the antenna gasket is in place.

- 6.2. Digital programmer circuit (D.P.C) AU, (D.P.C.) HU, key board membrane and power relay
- **▲ CAUTION:**

Be sure to ground any static electric charge built up in your body before handling the DPC.

- 1. Remove water tank from escutcheon base.
- 2. Keep pressing [Steam Defrost] pad for more than 2 seconds to drain the water remaining in the water pipes and tubes into oven cavity.
- 3. Pull out tube A connecting to pump from copper pipe.

4. Disconnect wiring connectors CN3, CN4, CN8 and all connectors connecting to power relays from D.P.C. board HU (relay board).



- Disconnect wiring connector CN2 from D.P.C. board DU (power supply board).
- 6. Remove 1 screw holding escutcheon base on cavity front plate.
- 7. Open the door of oven, slide the escutcheon base upward and out slightly.
- 8. Disconnect connector CN6 connecting pump-LED (U) from D.P.C. board HU (relay board).
- 9. Disconnect 2 flat cables connecting between D.P.C. board HU and AU from connectors CN5 & CN15 on D.P.C. board HU by pulling upward slightly.
- 10. Remove 2 screws holding D.P.C. board HU on escutcheon base, then remove D.P.C. board HU (relay board).
- 11. Remove 2 screws holding D.P.C. board AU (display board) on escutcheon base.
- Release locking tabs holding D.P.C. board AU (display board) on escutcheon base then remove 5 screws holding D.P.C. board AU (rotary dial board) on backstop to remove D.P.C. board AU.
- Disconnect 1 flat cable connected from the key board membrane to connector CN14 on the D.P.C board AU (display board).

#### To replace membrane key board

14. Use tools such as kinfe etc. to lift the edge of escutcheon sheet and peel off escutcheon sheet & key board membrane completely from escutcheon base.

#### NOTE:

1. The membrane key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal.

2. When installing the new key board membrane, make sure that the surface of escutcheon base is clean to prevent a malfunction or shorted contacts.



### 6.3. Digital programmer circuit (D.P.C.) DU and low voltage transformer

- 1. Disconnect connectors CN1 & CN2 from D.P.C. board DU (power supply board).
- 2. Remove 1 screw holding D.P.C. board DU (power supply board) on inverter reinforcement/grounding bracket A.
- 3. Use tools such as pincers to reject the tab of plastic bracket.



- 4. Remove D.P.C. board DU (power supply board).
- 5. Using solder wick or a desoldering tool and 30W soldering iron carefully to remove all solder from the terminal pins of the low voltage transformer and/or power relays.

#### CAUTION:

Do not use a soldering iron or desoldering tool of more than 30 watts on D.P.C. contacts.

6. With all the terminal pins cleaned and separated from D.P.C. contacts, remove the defective transformer/power relays. Replace components making sure all terminal pins are inserted completely, then resolder all terminal contacts carefully.

### 6.4. H.V. Inverter

- 1. Discharge high voltage remaining in high voltage capacitor.
- 2. Remove 2 screws holding the inverter reinforcement/grounding bracket A on oven cavity.
- Remove 2 screws holding inverter reinforcement bracket B on cavity top plate.
- 4. Remove 1 screw holding oven thermistor on cavity top plate.
- 5. Release lead wire harness from locking tabs on Inverter bracket A.
- 6. Disconnect 2 lead wires from fan motor terminals.
- 7. Disconnect 2 lead wires from the harness of noise filter (U), which are connected to both "Netural" and "live" lead wires of oven circuit breaker (black and white housing connectors).
- 8. Disconnect 2 lead wires form oven circuit breaker harness connecting to main lead wire harness (blue and yellow housing connectors).
- 9. Disconnect 2 high voltage lead wires from magnetron filament terminals.
- 10. Unplug connector CN701 & CN702 from H.V. Inverter board.
- 11. Remove 1 screw holding inverter air guide bracket on reinforcement bracket B, then release locking tabs, detach air guide bracket.
- 12. Release locking tabs connecting Inverter bracket A with Inverter bracket B detach bracket A & B.



13. Remove 2 screws holding H.V. Inverter on Inverter bracket.



### 6.5. Fan motor

- 1. Disconnect 2 lead wires from fan motor terminals.
- 2. Remove 4 screws holding air guide B on magnetron & on base plate respectively, then remove air guide B.
- 3. Remove 2 screws holding fan motor and detach fan motor from oven assy.



4. Remove fan blade from fan motor shaft by pulling it straight out.

# 6.6. Upper heaters

There are two kinds of heater on the top of oven cavity. Both the front one & back one are 450W/110V heaters, and the center one is 450W/220V heater.

- 1. Disconnect lead wires from both sides of 3 upper heaters.
- 2. Remove 3 screws holding heater support from the left side of microwave oven.



3. Remove the heater by pulling it out.



### 6.7. Door assembly

1. Remove left and right door key springs from door arm with plier.

#### NOTE:

Support door before removing door springs.





#### To remove door C and door A (U)

- Insert flat blade screwdriver to release hinge pin from left hinge.
- Release catch hooks between door C and door A, to detach the door C.



Release catch hooks.

#### NOTE:

After replacement of the defective component parts of the door, reassemble it properly and adjustment so as to prevent an excessive microwave leakage. Adjustment of the door assembly(Refer page 25).

- When mounting the door to the oven, be sure to adjust the door parallel to the cavity front plate by moving hinges back or forward.
- 3. Adjust so that the upper portion of the door will touch firmly to the oven cavity front plate, without pushing the door.

If the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.

- 4. Be sure the gap between left or right portion of door assembly and cavity front plate will be 0.6±0.3mm.
- 5. Always perform the microwave leakage measurement test after installation and adjustment of door assembly.

### 6.8. IR sensor

- 1. Disconnect connector CN8 from D.P.C. board HU.
- 2. Remove 1 screw holding IR sensor (U) on right heater panel.



#### To replace swing motor of IR sensor

1. Release the locking lever of connector on swing motor, then remove drive line.



- Remove 2 screws holding swing motor on motor mounting plate.
- 3. Remove swing motor from IR sensor assy.

### 6.9. Stirrer motor

1. Remove the motor cover by breaking off at the 8 spots indicated by arrows with a cutter or the like.



 Use screw driver to push out the Oven Cavity Floor thru the bottom access hole.

Note: Insert the screw driver into the access hole at a 30 degree angle.

#### ▲ NOTE:

After removing the motor cover, be sure that cut portions are properly trimmed or bent to the inside so that no sharp edges will be exposed to outside.

- 2. Disconnect 2 lead wires from stirrer motor terminals.
- 3. Remove 2 screws holding stirrer motor.



NOTE:

After reinstalling the new stirrer motor and reconnecting the 2 lead wires, reinstall the motor cover by rotating it around 180, tucking the 2 tabs under the base in the 2 provided slots, then screw the single tab to the base using a screw.

## 6.10. Pump motor

- 1. Remove water tank from escutcheon base.
- 2. Keep pressing [Microwave with Steam] pad for more than 2 seconds to drain the water remaining in the water pipes and tubes into oven cavity.
- 3. Pull out tube A connecting to pump motor from copper pipe.
- 4. Disconnect all wiring connectors from D.P.C board HU (relay board).
- 5. Remove 1 grounding screw holding on cavity front plate.
- 6. Open the door of oven, slide the escutcheon base upward and out slightly.
- 7. Pull out tube B from inlet of pump motor.
- 8. Remove 2 screws holding pump motor bracket on escutcheon base.



9. Slide out pump bracket from bottom rail of escutcheon base.







11. Pull out tube A from outlet of pump motor.

To install pump motor

- 1. Insert pump motor into pump motor bracket (Inlet of pump motor must be aligned toward the harness clasp of pump motor bracket).
- 2. After installation confirm that the pump motor is properly aligned.





▲ NOTE:

To prevent tube A from slipping out after repairing, make sure that when inserting tube A into copper pipe, the inserted depth is not less than 9mm.

# 6.11. Heater DU (steam heater)

- 1. Remove water tank from escutcheon base.
- 2. Keep pressing [Microwave with Steam] pad for more than 2 seconds to drain the water remaining in the water pipes and tubes into oven cavity.
- 3. Remove tubes from both ends of copper pipe.
- 4. Remove 1 screw holding air guide B on the base.
- 5. Release catch of nozzle holding copper pipe.



6. Remove left and right door key springs from door arm.

#### ▲ NOTE:

#### Support door before removing door springs.

7. Turn over the microwave oven and remove all screws holding base on oven assy & two hinges.

#### NOTE:

# Do not remove the two screws holding the left and right hinges on the bottom of cavity front plate.



8. Remove base from oven assy.

9. Disconnect 2 lead wires from heater DU terminals.

10. Remove 1 screw holding thermistor on heater DU.



11. Remove 6 screws holding heater DU & thermal cutout bracket on the bottom of oven assy.

### To install heater DU

NOTE:

1.Spread silicon grease evenly between the interface of heater DU and bottom of oven cavity. (about 0.3mm thickness), this is for good conductibility.

2.Tighten 6 screws and make sure there is no gap between heater DU and bottom of oven cavity.

3.Do not forget to screw the thermal cutout bracket along with heater DU.

#### To install thermistor

#### NOTE:

Before installing thermistor, please fill enough silicon grease into the installation hole of heater DU for good conductibility.

# 6.12. Convection motor and convection heater

1. Remove 1 screw holding side cover on cavity back plate.



- 2. Remove 1 screw holding side cover on the side of back cover, then remove side cover & circuit breaker.
- 3. Disconnect 2 lead wires from convection heater terminals.



4. Remove 1 screw holding back cover on the lower of back plate, then remove back cover and back cover C module.



5. Release 3 metal tabs which are holding the insulated wire harness to the convection outside cover B.



- 6. Disconnect 2 lead wires from thermal cutout and convection motor terminals respectively.
- 7. Remove 4 screws holding convection outside cover B on cavity back plate.



8. Remove 4 screws shown below from the face of convection outside cover B.



- 9. Release tabs between side of convection outside cover B and cavity back plate, then remove the convection outside cover B.
- 10. Slide the convection inside cover A upward then rightward and out, then remove the module, which consists of convection inside cover A, convection motor and convection heater.



#### To replace convection heater

- 11. Remove 1 screw holding heater bracket A on convection inside cover A.
- 12. Remove 2 screws holding convection heater on convection inside cover A.





#### To replace convection motor

- 13. Remove 1 nut holding convection fan, then remove convection fan.
- 14. Remove 3 screws holding convection fan bracket on convection inside cover A.



15. Remove 2 screws holding convection motor on convection fan bracket.



# 7 COMPONENT TEST PROCEDURE

#### **▲ WARNING**

 High voltage is present at the output terminals of the High Voltage Inverter (U) including aluminum heat sink during any cook cycle.
 It is neither necessary nor advisable to attempt measurement of the high voltage.

 Before touching any oven components, or wiring, always unplug the power cord and discharge the high voltage capacitors (see page 11).

## 7.1. Primary, Secondary Latch Switch interlocks & Power Relay RY1

- 1. Unplug lead connectors to Power Relay RY1 and verify open circuit of the Power Relay RY1 (1-2) terminals.
- 2. Unplug lead connectors to Primary Latch Switch and Door Switch.
- 3. Test the continuity of switches at door opened and closed positions with ohm meter (low scale).

Normal continuity readings should be as follows.

	Door Closed	Door Opened
Primary Latch Switch	0Ω (Close)	∞Ω(Open)
Door Switch	0Ω (Close)	$\infty \Omega(Open)$
Power Relay B	$\infty \Omega$ (Open)	$\infty \Omega(Open)$

# 7.2. Short Switch

- 1. Unplug lead wires from Inverter Power Supply (U) primary terminals.
- 2. Connect test probes of ohm meter to the disconnected leads that were connected to Inverter Power Supply (U).
- 3. Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.

Normal continuity readings should be as follows.

Door Opened	Door Closed
0Ω (Close)	∞Ω(Open)

### 7.3. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

- 1. Isolate magnetron from the circuit by disconnecting the leads.
- 2. A continuity check across magnetron filament terminals should indicate one ohm or less.
- 3. A continuity check between each filament terminal and magnetron case should read open.



# 7.4. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

### 7.5. Inverter power supply (U)

DO NOT try to REPAIR H.V. Inverter power supply (U). Replace complete H.V. Inverter(U) Unit.



#### WARNING: HIGH VOLTAGE

Test if failure codes H95, H97 or H98 appear when performing the following procedure. It is recommended to use an AC line input current ammeter for testing.

#### Test 1

- 1. With the oven unit's AC power supply cord is unplugged from the wall outlet, unplug the 2 pin H.V. connector CN703 from the magnetron tube.
- 2. Place 1 liter of water load into oven cavity.
- 3. Plug in the oven's AC power supply cord into outlet.
- 4. Program DPC.
  - a. Press Timer/Clock pad twice.
  - b. Press Start button once.
  - c. Press Micro Power pad once.
- 5. Program oven at High power for 1 minute and press [Start] button.
  - a. After approximately 23 seconds, oven stops operating.
  - b. During oven operation, the input current is approximately 0.5 to 1A. If both a and b are OK, proceed to test 2.

	INPUT CURRENT	FAILURE CODE
Unplug CN703	0.5 to 1A	Oven stops in 23 seconds after started.

#### Test 2

Continued from Test 1

- 1. Unplug the oven's AC power supply cord from outlet.
- 2. Unplug 3 pin connector CN701. CN703 remains unplugged.
- 3. Plug in the oven's AC power supply cord into outlet.
- 4. Program DPC.
  - a. Press Timer/Clock pad twice.
  - b. Press Start button once.
  - c. Press Micro Power pad once.
- 5. Program oven at High power for 1 minute and press [Start] button.

- a. After approximately 3 seconds, oven stops operating.
- b. During oven operation, the input current is approximately 0.4A.

	INPUT CURRENT	FAILURE CODE
Unplug CN701	<b>≈</b> 0.4A	Oven stops in 3 seconds after started.

If both a and b check OK, the Inverter Power Supply (U) can be determined to be OK.

### 7.6. Temperature thermistor

These sensor monitors the heat produced by the heater circuit and maintains the magnetron temperature which user had selected. Normal room temperature 10°C to 30°C, the reading across the temperature thermistor should be as follows.

TEMP	IP MAGNETRON STEAM HEATER		OVEN
	THERMISTOR	THERMISTOR	THERMISTOR
100°C	<b>30-60K</b> Ω	<b>10-20K</b> Ω	<b>10-20K</b> Ω
25°C	<b>700K-1.5M</b> Ω	100K-300KΩ	100K-300KΩ

If the resistance reading is out of the range stated here, the thermistor is detective and must be replaced.

### 7.7. IR sensor

To test if IR sensor is ok by doing the following procedures. **Test** 

- 1. Program DPC.
  - a. Press Timer/Clock pad twice.
  - b. Press Start pad once.
  - c. Press Micro Power pad once.
- 2. Press Stop/Reset pad twice, and colon appears on the display.
- 3. Open the door, then keep pressing Start pad for more than 2 seconds until buzzer beeps.
- 4. Remain door opening and press Start pad twice, then "°C" will be shown on the display.
- 5. Close the door.
- 6. Press Start pad, IR sensor will swing. After 6 seconds, it will stop and show max and minimum temperature readings of 8 eyes IR sensor on display.
- 7. If the reading is within the limited range of oven temperature, and all above is ok, you may decide IR sensor functions properly.
- 8. Press Stop/Reset pad to finish the test.

# 8 MEASUREMENTS AND ADJUSTMENTS

# 8.1. Adjustment of Primary latch switch, Secondary latch switch and Short switch.

1. Mount the Primary latch switch, the Secondary latch switch and the Short switch to the door hook assembly as shown in illustration.

#### NOTE:

No specific individual adjustments during installation of the Primary latch switch, Secondary latch switch or Short switch to the door hook are required.

- 2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of the arrows in the illustration so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.
- Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the component test procedures.



4. The Primary latch switch must be ON when the space between upper portion of door A and cavity front plate is 2~4mm, if the door gap is greater than 4mm, the Primary latch switch must be OFF.



If alignment is poor, oven may not operate after convection/grill use.

# 8.2. Measurement of microwave output

The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

- 1 litre beaker
- Glass thermometer
- Wrist watch or stopwatch

NOTE:

Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurately as possible.

- 1. Fill the beaker with exactly one litre of tap water. Stir the water using the thermometer and record the water's temperature. (recorded as T1).
- Place the beaker on the center of glass tray. Set the oven for High power and heat it for exactly one minute.
- 3. Stir the water again and read the temperature of the water. (recorded as T2).
- 4. The normal temperature rise at High power level for each model is as shown in table.

TABLE (1L-1min.test)				
RATED OUTPUT	TEMPERATURE RISE			
1000W	Min.8.5°C			

# **9 TROUBLESHOOTING GUIDE**

#### DANGER: HIGH VOLTAGES 🗥

- 1. DO NOT RE-ADJUST PRESET CONTROL on the H.V.Inverter (U). It is very dangerous to repair or adjust without proper test equipment because this circuit generates very large current and high voltage. Operating a misaligned inverter circuit is dangerous.
- 2. Ensure proper grounding before troubleshooting.
- 3. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
- 4. Discharge high voltage remaining in the H.V.Inverter (U).
- 5. When checking the continuity of the switches or the H.V.Inverter, disconnect one lead wire from these parts and then check continuity with the AC plug removed. Doing otherwise may result in a false reading or damage to your meter. When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be damaged or the connector cannot be removed.
- 6. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel. Always touch ground while working on this panel to discharge any static charge in your body.
- 7. 220/240V AC is present on the digital programmer circuit (Terminals of power relay's and primary circuit of Digital Programmer Circuit). When troubleshooting, be cautious of possible electrical shock hazard.

Before troubleshooting, operate the microwave oven following the correct operating procedures in the instruction manual in order to find the exact cause of any trouble, since operator error may be mistaken for the oven's malfunction.

#### Self diagnostic display

Oven has self diagnostic function but it will not be activated in normal operation mode.

To show self diagnostic result, please take the following steps.

- 1. Firstly, you must program the DPC into TEST MODE (Plug-in oven → press <u>Timer/Clock</u> pad twice → press <u>Start</u> pad once → press <u>Micro Power</u> pad once.)
- 2. Keep pressing Timer/Clock pad for more than 2 seconds until buzzer beeps.
- 3. Press Start pad twice, oven will show error code.

#### NOTE:

1. If any error was observed, it will be kept in memory up to 3 errors in the past. If there are more than 4 cases, the memory will renew the latest 3 errors codes.

#### 2. Press Start pad again, one more older error code will be displayed.

- 3. If the oven is ok, it will show "000".
- 4. Error cod list
  - H\*\* Hardware problem, oven itself has problem.
  - U\*\* Usage problem such as run out of water and oven itself works well.

Error code	Cause for error
H99	Inverter on/off control error
H98	Magnetron no oscillation error
H97	Inverter input error
H96	Inverter custom IC error
H95	Inverter input failure
H90	Power down controlled by Inverter thermistor
H68	IR sensor failure
H61	IR thermistor open/short
H60	IR sensor error
H39	Steam heater thermistor failure
H32	Magnetron thermistor failure
H30	Oven thermistor failure
H02	Memory IC error (It is able to show up both in test mode and cooking mode)
H00	RAM failure (It is able to show up both in test mode and cooking mode)
H20	Steam heater open error
	Usage problem
U14	No water during steam cooking (It is able to show up both in test mode and
1140	No load operation, controlled by magnetron thermister
U65	Power down controlled by Inverter thermistor
	Power down controlled by inverter mentilistor
HUI	oven is not (it is able to snow up both in test mode and cooking mode)

# 9.1. (Troubleshooting) Oven stops operation during cooking

Γ	SYMPTOM	CAUSE	CORRECTIONS
1	Oven stops in 3 seconds after pressing start pad.	No input AC is supplied to H.V.Inverter (U) CN702 terminals	1. Latch Switch 2. Power relay RY1 3. Loose lead wire connector CN701, CN702
	Oven stops in 23 seconds after pressing start pad.	H.V.Inverter (U) operates by the control signals from DPC but magnetron is not oscillating	1. Magnetron 2. Loose lead wire connector CN703
	Oven stops in 1 minute after pressing start pad. (Convection/Grill convection cooking)	Oven thermistor circuit is not functioning.	<ol> <li>Oven thermistor</li> <li>Loose wiring</li> </ol>
	Oven stops in 30 seconds after pressing start pad. (Steam cooking)	Steam heater thermistor circuit is not functioning.	<ol> <li>Steam heater thermistor</li> <li>Loose wiring</li> <li>bad conductibility between thermistor and steam heater</li> </ol>
2	No display and no operation at all. Fuse is blown.	Most probably loose connection of connectors, or door latch mechanism is not adjusted properly	1. Align door, Door Latch Switches 2. Loose wiring connectors



# 9.2. (Troubleshooting) Other problems

	SYMPTOM		CAUSE	CORRECTIONS
1.	Oven is dead.	1.	Open or loose lead wire harness	
	Fuse is OK.	2.	Open thermal cutout / thermistor	Check fan motor if thermal cutout is defective.
	No display and no operation at all.	3.	Open low voltage transformer	
		4.	Defective DPC	
2.	No display and no operation at all.	1.	Shorted lead wire harness	Check adjustment of primary, secondary latch
	Fuse is blown.	2.	Defective primary latch switch (NOTE 1)	switch and short switch including door.
		3.	Defective short switch (NOTE 1)	
		4.	Defective Inverter Power Supply (U)	
			NOTE 1:	
			All of these switches must be replaced at the s	ame time.
			Check continuity of power relay RY1's contacts	(between 1 and 2) and if it has continuity,
3	Oven dees not accent key input	1	Key input is not in proper sequence	Pofer to operation procedure
5.	(Program)	2	Open or loose connection of membrane key	
	(	2.	pad to DPC (Flat cable)	
		3.	Shorted or open membrane key board	
		4.	Defective DPC	Refer to DPC troubleshooting.
4.	Fan motor turns on when oven is	1.	Misadjustment or loose wiring of secondary	Adjust door and latch switches.
		2	Defective secondary latch switch	
5	Timer starts count down but no	1	Off-alignment of latch switches	Adjust door and latch switches
	microwave oscillation.	2	Open or loose connection of high voltage	
	(No heat while oven lamp and fan	<u> </u>	circuit especially magnetron filament circuit	
	motor turn on)		NOTE:	
			Large contact resistance will cause lower	
			magnetron to have lower output and/or be	
			intermittent.	
		3.	Defective high voltage component	Check high voltage component according to
			H.V. Inverter Power Supply (U)	component test procedure and replace if it is
			Magnetron	defective.
		4.	Open or loose wiring of power relay RY1	
		5.	Defective primary latch switch	
_		6.	Defective DPC or power relay RY1 & RY11	Refer to DPC troubleshooting
6.	Oven can program but timer does not	1.	Open or loose wiring of secondary latch switch	
		2.	Off-alignment of secondary latch switch	
7	Misseyers subsut is law. Over takes	3.	Defective secondary latch switch	Concult destricion
1.	longer time to cook food	1.	Open or lesse wiring of magnetice filement	
		2 <sup>.</sup>	circuit.(Intermittent oscillation)	
		3.	Aging change of magnetron	
8.	Fan motor turns on and stirrer rotates	1.	Shorted primary latch switch	
	when door is opened.			
9.	Oven does not operate and return to	1.	Defective DPC	Check grounding connector on escutcheon
	is pressed.			base.
10.	Loud buzzing noise can be heard.	1.	Loose fan and fan motor	
11.	Heater does not turn on.	1.	Open or loose wiring of heater	
		2.	Defective heater	
		3.	Defective power relay	
		4.	Defective DPC	
12.	Oven stops operation during cooking.	1.	Open or loose wiring of primary and	Adjust door and latch switches.
			secondary latch switch	
1		2.	Operation of thermal cutout	

# 9.3. Troubleshooting of inverter circuit (U) and magnetron

This oven is programmed with a self diagnostics failure code system which will help for troubleshooting. H95, H97, H98 and H99 are the provided failure codes to indicate magnetron and inverter circuit problem areas. This section explains failure codes of H95, H97, H98 and H99. First, you must program the DPC into TEST MODE, press Timer/Clock pad twice  $\rightarrow$  Press Start button once  $\rightarrow$  press Micro Power pad once. Program unit for operation. H95, H97, H98, H99 appears in display window a short time after start button is pressed and there is no microwave oscillation.



NOTE: After check, unplug unit to reset to normal operation mode.

#### Alternate way to troubleshoot oven with AC Ampere meter used

H95, H97, H98, H99 appears in display window a short time after [Start] button is pressed and no microwave oscillation with AC Ampere meter used for troubleshooting.





# 9.4. Trouble related to Digital Programmer Circuit

SYMPTOM	STEP	СНЕСК	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Fuse pattern of D.P.C.	Normal	→Step2
			Open	Replace D.P.C. or Fuse Pattern
	2	Low voltage transforment (L.V.T.)	Abnormal 0V	L.V.T.
		secondary voltage	Normal	→Step3
	3	IC10 pin5 voltage	Abnormal	IC10
			Normal=5V	IC1, CX320, Display
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC1
No beep sound	1	IC1 pin 8 voltage	Abnormal	IC1
			Normal=5V	BZ210, Q210
Power relay A(RY2) does not turn on	1	IC1 pin 22 voltage while operation	Abnormal	IC1
even though the program had been set			Normal=5V	→Step2
and the start pad is tapped	2	IC220 pin13 voltage	Abnormal	IC220
			Normal <u></u> 20.7V	RY2
No microwave oscillation at any power	1	IC1 pin 24 voltages while operation at high power	Abnormal	IC1
			Normal=5V	→Step2
	2	IC220 pin11 voltage	Abnormal	IC220
			Normal <sub>≈</sub> 0.7V	→Step3
	3	Short circuit between collector and emittes	Still not turn on	RY1
		of Q227	RY1 turns on	Q227, Q224,Q225,Q226
Dark or unclear display	1	Replace display and check operation	Normal	Display
			Abnormal	IC1
Missing or lighting of unnecessary	1	Replace IC1 and check operation	Normal	IC1
segment			Abnormal	Display
H95/H97/H98 appears in window and oven stops operation.Program High	1	Unplug CN702 (2 pin) connector and measure voltage between terminals	Abnormal=0V	1. Latch Switch 2. D.P.C. /Power Relay
power for 1 minute and conduct			Normal=220~240V	→Step2
tollowing test quickly, unless	2	Unplug CN701 (3 pin) connector and	Abnormal=0V	D.P.C.
neo/ner/neo appears and oven stops		measure pin3 voltage	Approx. AC 3V	Magnetron

# 9.5. Simple way of H.V. Inverter/magnetron troubleshooting

#### Purpose:

Simple way (3/23 seconds rule) of identifying whether it's Magnetron, Inverter or others.

#### Set-up:

The unit under question is connected through the Ammeter as shown below.



#### Procedure:

Follow the matrix table below to identify the problem source.

#### Note:

Do not replace both Inverter board and Magnetron simultaneously and automatically without going through this procedure.

Power will:	Ammeter reading is:	To do:	Remedy:
Shut off in 23 seconds after "Start".	1. Between 0.5A and 1.0A.	Check and repair open magnetron circuit CN703	Open magnetron wiring between Inverter and magnetron terminal.
	2. Between 1.0A and 2.0A.	Check continuity of D702 in Inverter PCB.	
		4	
		1. D702 shorted	Replace <b>H.V.Inverter</b> (F606YM300BP)
		2. D702 is OK	Replace magnetron
Shut off in 3 seconds after "Start"	1. Less than 0.5A	Check open circuit: Latch Switch, DPC, Power Relay, CN701 and CN702	Replace defective component(s), or correct switch, cables and connectors.

## 9.6. How to check the semiconductors using an OHM meter



IGBT

(INSULATED GATE BIPOLAR TRANSISTOR)



	FORWARD	REVERSE
E-C	SMALL	8
E-G	×	8
C-G	×	œ

# 9.7. H.V. Inverter main parts list (F606YM300BP)

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
Q701		A691EM300BP	IGBT	1	
Q702		1	IGBT	1	
C701		ECWF5184N300	FILM CAPACITOR	1	
C702		ECQE2505T869	FILM CAPACITOR	1	
C703		ECWF2395N632	FILM CAPACITOR	1	
DB701		B0FBBS000001	RECTIFIER BRIDGE	1	
L701		F5020M300XN	CHOKE COIL	1	
R702		D0CM352JA002	SAND BAR RESISTOR	1	
T701		A609A7F40QP	TRANSFORMER	1	(INCLUDING D701, D702, C706, C707)
D701,D702	$\triangle$	B0FBAZ000002	DIODE	2	
C706		F0C3F562A002	FILM CAPACITOR	1	5600PF, 3KV
C707		F0C3F432A002	FILM CAPACITOR	1	4300PF, 3KV

C (COLLECTOR)

E (EMITTER)

# **10 EXPLODED VIEW AND PARTS LIST**

# 10.1. EXPLODED VIEW



# 10.2. PARTS LIST

#### NOTE:

- 1. When ordering replacement part(s), please use part number(s) shown in this part list. Do not use description of the part.
- 2. Important safety notice:

Components identified by  $\underline{\wedge}$  mark have special characteristics important for safety.

When replacing any of these components, use only manufacture's specified parts.

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
1		F00066V00HP	CAUTION LABEL	1	
2		F10016Y40XPG	BASE	1	
3		F1008-1L40	RUBBER FOOT	3	
4		F1008-1L40B	RUBBER FOOT	1	
6		F110D6Y40SHP	CABINET BODY	1	HPE
6		F110D6Y40SXP	CABINET BODY	1	YPQ, MPQ, TUE, YTE, PTE
7	∧	F200A9K10HP	OVEN	1	
9		2M261-M32JYP	MAGNETRON	1	
10		F400A7J70MP	FAN MOTOR	1	
-					
11		F40085G10XN	FAN BLADE	1	
12		F40257J70XPG	AIR GUIDE A	1	
13		F40267J70XPG	AIR GUIDE B	1	
14		F30977J70XP	SPRING	2	
15		F31027.T70XP	LATCH SWITCH LEVER	1	
				-	
16	Â	F31037.T70XP	DOOB HOOK	1	
17	2:3	F31057.T70XP	LATCH BRACKET	1	
10		E32497 T70XP	LATCH SHITCH LEVED	1	
10		F612E9K10HD	INCANDESCENT LAMP (II)	1	
20		F612ESKIOHF	INCANDESCENT LAMP (0)	1	
- 20		2 30 / 7 / 0 / 0APG	INGINDEGGENI DANE BRACKEI	-	
01		EC4277 770VD	GT 3 99	1	
21		F64377J70XP	GLASS	1	
22		AUIUT6140HP	CERAMIC PLATE (U)	1	HPE, IPQ, MPQ, ITE
22		AUIUT6Y40BP	CERAMIC PLATE (U)	1	TOE, PTE
23		F202K6Y40XPG	ANTENNA STIRRER (U)	1	
24		F6144/J/0XP	STIRRER MOTOR	1	
25		F2019/J/0XP	ANTENNA BRACKET	3	
	A				
26		F61425030XN	MICRO SWITCH	1	(V-15G-3C25) (PRIMARY LATCH SWITCH)
27		A61425180AP	MICRO SWITCH	1	(D3V-16G-3C25) (SECONDARY LATCH SWITCH)
28	<u> </u>	A61785180AP	MICRO SWITCH	1	(D3V-1G-2C25) (SHORT SWITCH)
29	•	F603Y6Y40XP	D.P.CIRCUIT (DU)	1	
30		F62306V60BP	FUSE	1	104/250V
31		F692Y6Y40XP	NOISE FILTER (U)	1	
32		F45006Y40XP	JACKET	1	
33		F900C6Y40YK	AC CORD W/PLUG	1	HPE, MPQ, YTE
33		F900C6Y40YP	AC CORD W/PLUG	1	YPQ
33		F900C9K10TU	AC CORD W/PLUG	1	TUE
33		F900C6Y40PT	AC CORD W/PLUG	1	PTE
34		F20347J70XPG	INVERTER REINFORCEMENT BRACKET A	1	
35		F2036-1K00	INVERTER REINFORCEMENT BRACKET B	1	
36	Δ	F606YM300BP	H.V.INVERTER (U)	1	
37		F80236Y40BP	DRIP TRAY	1	
38		F6585-1K00	INVERTER BRACKET A	1	
39		F67637J70XP	INVERTER BRACKET B	1	
40		F630G6Y40XP	HEATER	2	HPE, TUE, YTE, PTE
40		F630G6Y40MP	HEATER	2	YPQ, MPQ
41		F630F6Y40HP	HEATER	1	HPE, TUE, YTE, PTE
41		F630F6Y40MP	HEATER	1	YPQ, MPQ
42		F61456V50HP	THERMAL CUTOUT	1	
43		F611E6Y40HP	HEATER (DU)	1	HPE , TUE , YTE , PTE
43		F611E6Y40MP	HEATER (DU)	1	YPQ, MPQ
44		F61457J70XP	THERMAL CUTOUT	2	
45		F66268S80HPG	THERMAL CUTOUT BRACKET	1	

				-
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
46	F01505R00BP	NO TOUCHING LABEL	1	
48	F01508G60HP	NO TOUCHING LABEL	1	
40	F00077770VD0		-	
49	F22377370XPG	LEFT HEATER PANEL	1	
50	F22367J70XPG	RIGHT HEATER PANEL	1	
51	F300B-1L40	LEFT HINGE (U)	1	
52	F300U-1L40	PICHT HINCE (II)	1	
52				
53	F601L7J70XP	IR SENSOR (U)	1	
54	A6760-1E20	SWING MOTOR	1	
55	F44966Y40XP	NOZZLE A	1	
56	F4513-1M60	TTE-TN C	1	
57	E02017 170VD		-	
57	F 92017070XF		1	
58	F46507J70XP	TUBE C	1	
59	F92047J70XP	TUBE D	1	
60	F03346Y40HP	MENU LABEL	1	HPE, YPQ, MPQ
60	F03349K10YT	MENU LABEL	1	TUE, YTE
60	F03346Y40KT	MENU LABEL	1	PTF
			-	
	T00717 770			
61	F.A0.11.12.10Xb	SUPPORTER	L	
62	XTWFL4+12T	SCREW	4	FOR MAGNETRON
63	XTWFA4+12D	SCREW	4	FOR CABINET BODY
65	F202Q6Y40BP	UPPER HEATER PANEL	1	
			1	
67	F22776Y40YP	LOWED HEATER DANEL	1	
67	F1050CW40DD		-	
68	F10596140BP	BACK COVER	1	
69	F10586Y40BP	SIDE COVER	1	
70	F10576Y40XP	BACK COVER C	1	
71	F40306Y40BP	EXHAUST GUIDE D	1	
72	F41706Y40BP	HEATER MOUNTING DLATE	1	
72	F417001405F	CONTRACTION FON DIADE	1	
/4	F22394V00BP	CONVECTION FAN BLADE	1	
75	F41594V00BP	COOLING FAN BLADE	1	
77	F50579A50BP	COVER	1	
79	F41806Y40BP	CONVECTION FAN BRACKET	1	
80	F490S6Y40XP	CONVECTION FAN MOTOR	1	
	1490501408		-	
81	F631D6Y40XP	CONVECTION HEATER	1	HPE, TUE, YTE, PTE
81	F631D6Y40BP	CONVECTION HEATER	1	YPQ, MPQ
82	F64174V00BP	HEATER BRACKET A	1	
83	F66796Y40BP	CONVECTION INSIDE COVER A	1	
85	F607.T6Y40BP	CONVECTION ASSEMBLY (BII)	1	(INCLUDING IN CONVECTION OUTSIDE COVER B &
00	10070014021		-	ADIABATIC MATERIAL)
				,
0.0	<b>BC725CW40WD</b>		1	
86	F.0/356Y4UXP	HEATER PROTECTOR	L	
87	F02395E20KN	CORD CAUTION LABEL	1	PTE
89	F40276Y40BP	INVERTER AIR GUIDE	1	
94	F66286Y40BP	THERMAL CUTOUT BRACKET	2	
95	F61458580XP	THERMAL CUTOUT	2	
99	F40289A00WT	HEAT INSULATION PLATE	1	
100	F01579K10HP	NAME PLATE	1	HPE
100	F01579K10YP	NAME PLATE	1	YPQ
100	F01579K10MP	NAME PLATE	1	мро
100	F01579K10TU	NAME PLATE	1	TUE
100	F01579K10VT	NAME DLATE	1	YTE
100	E0157911011	NAME DIAME	-	
100	FUIS/9K00PT	NAME PLATE	L	PTE
101	F00066W10MP	CAUTION LABEL	1	YPQ
101	F00068H00YT	CAUTION LABEL	1	YTE
102	F02849K10YP	NO. LABEL	1	YPQ
103	F11656Y40KT	REINFORCE BRACKET E	1	~

# 10.3. WATER TANK ASSEMBLY



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
т1	F060Q6Y40XP	WATER TANK (U)	1	(INCLUDING TANK COVER & SEAL)
т2	F061A6Y40XP	WATER TANK	1	
т3	F06116Y40XP	TANK COVER	1	
т4	F44247J70XP	SEAL	1	

# 10.4. ESCUTCHEON BASE ASSEMBLY



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E1	F603L9K10HP	D.P.CIRCUIT (AU)	1	HPE
E1	F603L9K10MP	D.P.CIRCUIT (AU)	1	MPQ
E1	F603L9K10YP	D.P.CIRCUIT (AU)	1	YPQ
E1	F603L9K10YT	D.P.CIRCUIT (AU)	1	TUE , YTE
E1	F603L9K00PT	D.P.CIRCUIT (AU)	1	PTE
E2	F605S6Y40XP	D.P.CIRCUIT (HU)	1	
E3	F630Y9K10SHP	MEMBRANE SWITCH (U)	1	HPE, YPQ, MPQ, YTE
E3	F630Y9K00SPT	MEMBRANE SWITCH (U)	1	TUE , PTE
E4	F800A9K10SHP	ESCUTCHEON BASE (U)	1	HPE, YPQ, MPQ, YTE (INCLUDING MEMBRANE SWITCH(U))
E4	F800A9K00SPT	ESCUTCHEON BASE (U)	1	TUE, PTE (INCLUDING MEMBRANE SWITCH(U))
E5	F800B9K00SPT	ESCUTCHEON BASE (BU)	1	
E6	F803G8J00SXP	POP-UP DIAL (U)	2	
E10	F400L-1M60	PUMP-LED (U)	1	(INCLUDING PUMP & LED PCB)
E11	F83876Y40QP	BUTTON	1	
E12	F06397J70XP	PUMP BRACKET	1	
E13	F66166Y40BP	FLAT CABLE	1	(WIDE ONE)
E14	F66166Y40XP	FLAT CABLE	1	(NARROW ONE)
E15	F44266Y40BP	SEAL B	1	
E16	F46487J70XP	TUBE A	1	
E17	F46497J70XP	TUBE B	1	
E18	F45126Y40BP	TIE-IN B	1	
E19	F80876Y40BP	GROUNDING PANEL	1	

# 10.5. DOOR ASSEMBLY



Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
D1	⚠	F390L9A50SEP	DOOR (U)	1	(INCLUDING DOOR C & SEAL)
D2	⚠	F30859A00WT	DOOR C	1	
D3		A3334-1L40	SEAL	1	
D4		F3054-1M60	DOOR ARM (LEFT)	1	
D5		F3044-1L40	DOOR ARM (RIGHT)	1	
D6		F32309A50BP	DOOR KEY SPRING B	1	
D7		A3230-1K20	DOOR KEY SPRING B	1	
D8	$\land$	F302A9A50SEP	DOOR B (U)	1	

# **10.6. WIRING MATERIALS**



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	F030A9K00PT	LEAD WIRE HARNESS	1	
W2	F030E-1L40	H.V.LEAD WIRE	1	

# **10.7. PACKING AND ACCESSORIES**



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	F00039K10HP	INSTRUCTION MANUAL	1	HPE, YPQ, MPQ, TUE
P1	F00039K10YT	INSTRUCTION MANUAL	1	YTE
P1	F00039K00PT	INSTRUCTION MANUAL	1	PTE
P2	F01029K00PT	PACKING CASE, PAPER	1	
P3	F01046Y40BP	UPPER FILLER	1	
P4	F01056Y40BP	LOWER FILLER	1	
P5	F01066Y40XP	P.E BAG	1	
P6	F01078100XN	DOOR SHEET	1	
P7	F06217J70XP	QUADRATE COOKING TRAY	1	
P8	F01126Y40XP	FOAM	1	
P9	F01136Y40XP	FOAM	1	
P10	F06027J70XP	OVEN RACK	1	
P11	F60037J70XP	CERAMIC COVER	1	
P12	F01126Y40BP	FOAM	1	
P13	F06038S80HP	CRISPY PAN	1	HPE, YPQ
P13	F06037J70XP	CRISPY PAN	1	MPQ, TUE, YTE, PTE
P14	F000B6Y40HP	COOKING GUIDE	1	HPE, YPQ, MPQ, TUE, YTE
P14	F000B6Y40KT	COOKING GUIDE	1	PTE
P15	F01926Y40XP	SHEET	1	
P17	F01096Y40XP	SHEET	1	
P18	F01896Y40XP	PROTECT CORNER	2	
P20	F00166Y40HP	NOTE	1	HPE, YPQ, MPQ, TUE, YTE
P23	F0731-1450	MITTEN	1	
P26	F01567J70HP	PRECAUTION	1	YPQ, MPQ, TUE, YTE
P26	F01569K00HP	PRECAUTION	1	HPE
P27	F04459K10MP	OVERLAY	1	MPQ, YPQ
P28	F04459K10YP	OVERLAY	1	MPQ, YPQ
P29	F04459K00KT	OVERLAY	1	PTE
P30	F04459K00PT	OVERLAY	1	PTE

# **11 DIGITAL PROGRAMMER CIRCUIT**

# 11.1. SCHEMATIC DIAGRAM





# 11.2. PARTS LIST

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ210	LODDEA000014	BUZZER	1	2.0KHz
C11	F2A1C471B626	AL CHEM CAPACITOR	1	470µF/16V
C12,C15	F2A1C220B624	AL CHEM CAPACITOR	2	22µF/16V
C29	F2A2W100A177	AL CHEM CAPACITOR	1	10µF/450V
C27	AESCT08F104M	AL CHEM CAPACITOR	1	0.1µF/25V
C224	AECT81F102K	CERAMIC CAPACITOR	1	1000PF/1000V
C26	ECKN3A222KBP	CERAMIC CAPACITOR	1	2200PF/1000V
CX320	H0D100500017	CRYSTAL RESONATOR	1	8.00MHz (TUE,YTE)
CX320	H2B100500011	CERAMIC RESONATOR	1	8.00MHz (HPE, YPQ, MPQ, PTE)
D220	B0EAKT000025	DIODE	1	
D221,D225-D227,D493	MA2C19600E	DIODE	5	
D10	B0JANJ000001	DIODE	1	
D25	D4EAY511A036	VARSITOR	1	510V
D28	B0EAJV000004	DIODE	1	
D33	B0AAMT000012	DIODE	1	
D100	MA2C19600E	DIODE	1	
DISP1	L5AAAFE00014	LCD	1	
DISPL1 HOLD	F66176Y40BP	LCD HOLDER	1	
	E80936Y40BP	DIFFUSION SHEET	1	
IC1	MN101C57DDT	L.S.I.	1	
IC10	C0DBAHD00013	IC	1	
1C220,1C221	B1HBGFF00007	IC	2	
IC350	C0EBH0000264	IC	1	
IC26,IC100	B3PAA0000387	IC	2	
IC28	MIP0255SPSCF	IC	1	
1C220	B3PAC0000060	IC (SSR)	2	
Q492	B1BAAJ000003	TRANSISTOR	1	
Q493	UNR211600L	TRANSISTOR	1	
Q227	B1ACGF000004	AUDION	1	
R10	D0AE470JA155	CARBON FILM RESISTOR	1	47Ω,1/4W,5%
R210,R220,R221	D0AE391JA155	CARBON FILM RESISTOR	3	390Ω,1/4₩,5%
R240	D0AE751JA155	CARBON FILM RESISTOR	1	750 <b>Ω,1/4₩,5</b> %
R231	D0AE102JA155	CARBON FILM RESISTOR	1	1K,1/4W,5%
R13	D0AE222JA155	CARBON FILM RESISTOR	1	2.2K,1/4W,5%
R211	D0AE512JA155	CARBON FILM RESISTOR	1	5.1K,1/4W,5%
R232	D0AE103JA155	CARBON FILM RESISTOR	1	10K,1/4W,5%
R100,R101	D0AF393JA061	CARBON FILM RESISTOR	2	39K,1/2W,5%
R28	D0C1753JA062	RESISTOR	1	75K,1/2W,5%
R11,R223	D0AE104JA155	CARBON FILM RESISTOR	2	100K,1/4W,5%
R27	D0CF1R0JA022	RESISTOR	1	1 <b>Ω</b> ,1/2W,5%
RY1, RY4, RY5, RY7, RY9	K6B1AGA00212	POWER RELAY	5	
RY2, RY6	K6B1AGA00180	POWER RELAY	2	
T10	ETS19AA2B1AC	SWITCHING POWER SUPPLY	1	
ZD10	B0BA01100053	ZENER DIODE	1	
SW1	EVQ11L05R	SWITCH	1	
RE81, RE82	EVEJ1HF2224B	REVOLVING ENCODER	2	