HAD0801001C2

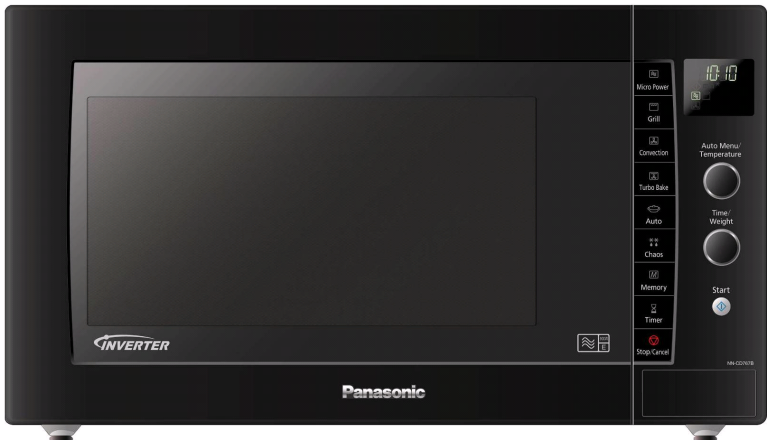
Service Manual

Microwave Oven

INVERTER

NN-CD748BBPQ

27L UK



! WARNING

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 must be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by (!) in the schematic diagrams, circuit board diagrams, exploded views and replacement parts lists. It is essential that these critical parts are replaced with parts specified by the manufacturer, preventing shock, fire or other hazards. Do not modify the original design without permission from the manufacturer.

Panasonic®

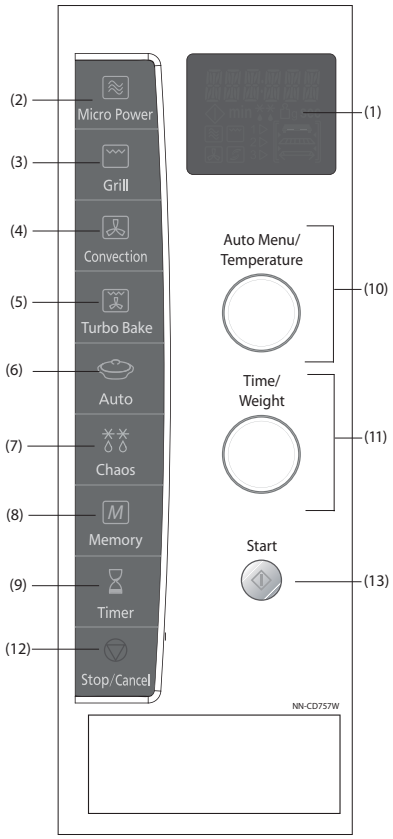
1 Contents

Power source	240V AC Single Phase 50Hz
Power requirements	Microwave 1170W
	Grill 1360W
	Convection 1470W
	Convection + Grill 2770W
	Micro + Grill Combi 2400W
	Micro + Convection Combi 2515W
	Micro + Grill + Convection Combi 2515W
Output (IEC60705)	Microwave 1000W
	Grill 1300W
	Convection 1400W
Microwave frequency	2450Mhz
Timer	99 min 99 second
Oven cavity size	27L
Outside dimensions	510mm(W) x 477mm(D) X 304MM (H)

2 Feature Chart

Function	BPQ
Microwave	6
Grill	3
Convection	17
Combi	Yes
Sensor Reheat	-
Sensor Cook	-
Sensor Combi	-
Weight Defrost	3
Weight Combi	8
Weight Reheat	4
Weight Cook	2
Memory Cook	3
Weight Crisp	-
Stage Cooking	3 stage
Delay / Stand	Yes
More / Less	No
Kg -> lb/oz	Yes
Clock	12h
Word Prompt	English
Step by Step	No

3 Control Panel



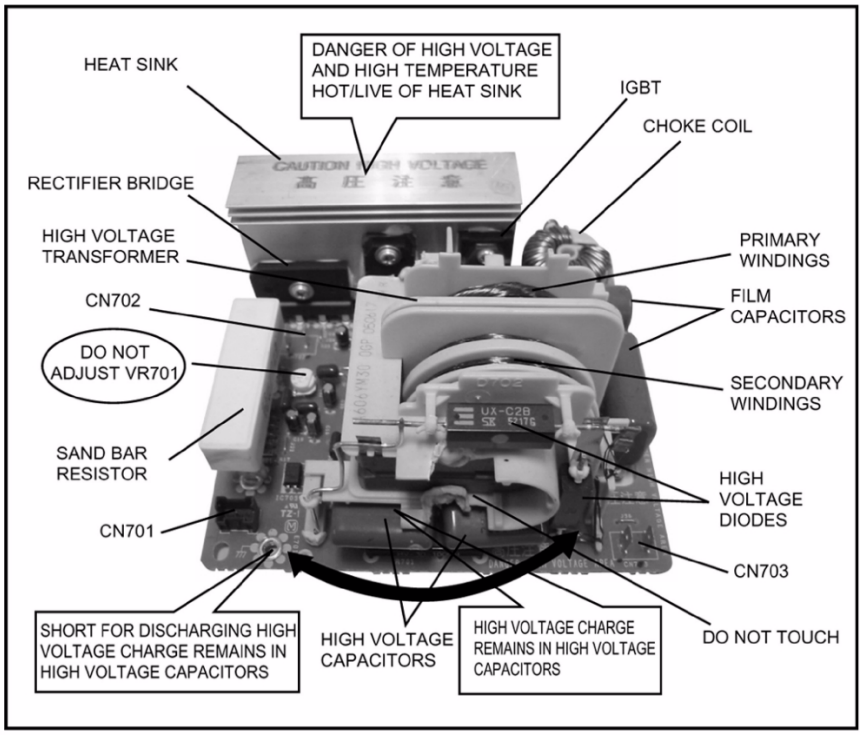
* The design of your control panel may vary from the panel displayed (depending on colour), but the words on the pads will be the same.

(1) Display Window
(2) Microwave Power Pad
(3) Grill Pad
(4) Convection Pad
(5) TURBO-BAKE Pad
(6) Auto Weight Programs Pad
(7) Auto Weight Defrost Programs (Chaos Defrost)
(8) Memory Pad
(9) Timer Pad:
This can be used to delay a cooking program for up to 9 hrs or used as a timer or for standing (non-cooking) time. It is also used to set the clock.
(10) Auto Menu/Temperature/Microwave Wattage/Grill Level/Selector Dial.
(11) Time/Weight Dial
(12) Stop/Cancel Pad:
Before Cooking:
one press clears your instructions.
During Cooking:
one press temporarily stops the cooking program. Another press cancels all your instructions and the time of day will appear in the display.
(13) Start Pad:
Press to start operating the oven.
If during cooking the door is opened or Stop/Cancel Pad is pressed once, Start Pad has to be pressed again to continue cooking.

Beep Sound:
A beep sounds when a pad is pressed. If this beep does not sound, the setting is incorrect. When the oven changes from one function to another, two beeps sound. After completion of cooking, five beeps sound.

4 Inverter Warnings

The inverter circuit board supplies the magnetron tube with a very high voltage (4000 volts).



Danger

- The inverter circuit board operates at high voltages and high temperatures.

The Inverter PCB

- Operates at a very high voltage and current.
- Has an aluminium heat sink which becomes very hot.
- Has capacitors in the circuitry that hold a high voltage charge even when the oven is not operating.

Warning

- Do not touch the high voltage circuit. When replacing the board care must be taken to avoid possible electric shock.
- Do not touch the aluminium heat sink as it is part of the high voltage circuit and becomes very hot.
- **Do not attempt to repair the inverter PCB, this can be very dangerous. Replace the high voltage inverter circuit as a complete unit.**
- Do not adjust or tamper with the pre-set volume on the inverter board. It is very dangerous to adjust this pre-set without proper test equipment.
- Do not operate the microwave oven when the inverter grounding plate and fixing screw is loose. It is very dangerous to operate the inverter circuit board without a proper ground connection.

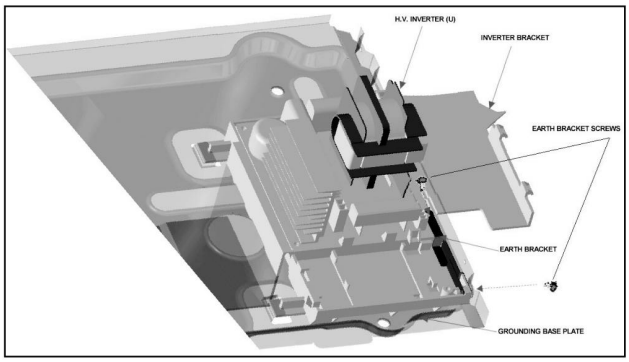
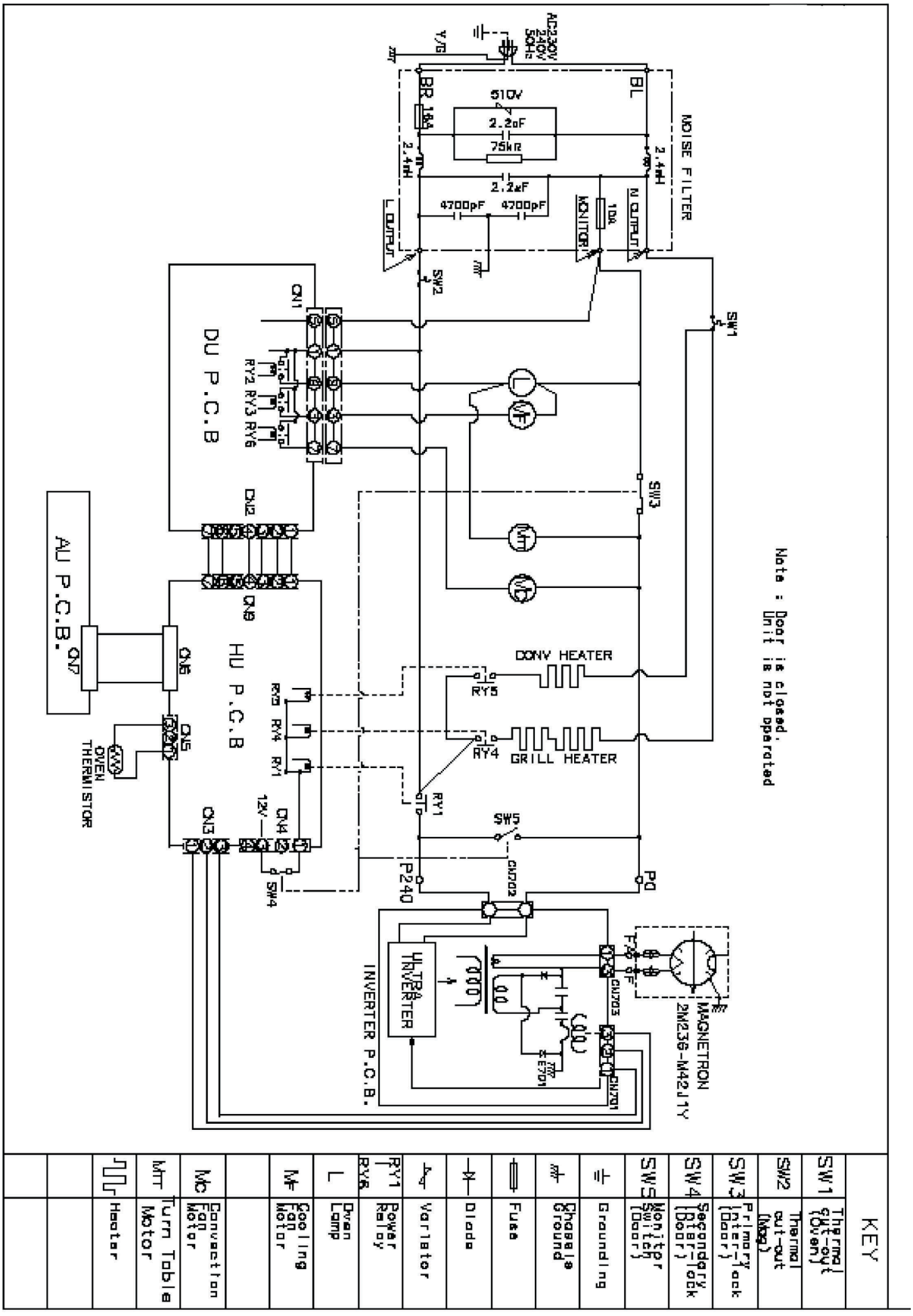
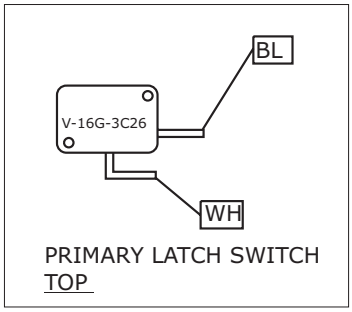


figure 1 Assembly of the inverter circuit board

5 Schematic Diagram

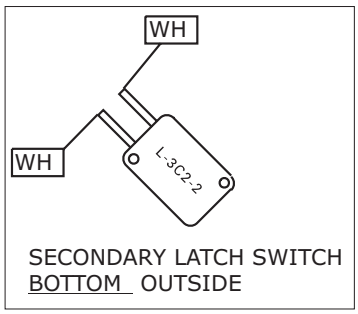


6 Wiring Diagram

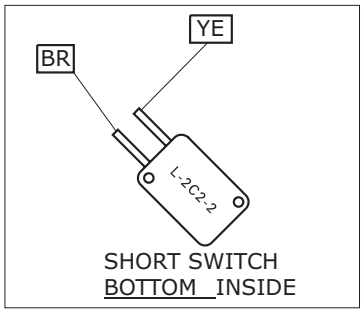


PRIMARY LATCH SWITCH
TOP

NOTE: *WHEN REPLACING ANY COMPONENTS RECONNECT THE WIRE HARNESS ACCORDING TO THE COLOURS BELOW
*COLOURS INDICATED INSIDE BRACKETS () INDICATE THE COLOUR OF THE CONNECTOR HOUSING

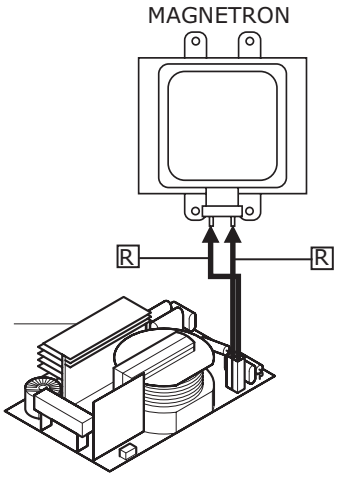


SECONDARY LATCH SWITCH
BOTTOM OUTSIDE

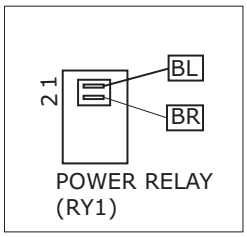


SHORT SWITCH
BOTTOM INSIDE

CAUTION:
HEAT SINK
(HOT/LIVE)
VERY HIGH VOLTAGE
AND TEMPERATURE



HIGH VOLTAGE INVERTER



POWER RELAY
(RY1)

SYMBOL	COLOUR
BL	BLUE
BK	BLACK
BR	BROWN
WH	WHITE
YE	YELLOW
N	NATURAL
R	RED

7 Description of the Operating Sequence

7.1 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..

7.2 Inverter power supply circuit [NEW HV]

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.

7.3 Auto cooking

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

7.4 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. A high level signal is output by the micro computer and applied to power relay (RY5).

2. When RY5 is switched to ON, power source voltage is applied to the convection heater & upper heater, and the heaters turn on.

3. The digital programmer circuit senses the oven cavity temperature through the oven temp sensor (thermistor). When the oven temperature reaches the set temperature, DPC stops supplying a high level signal to the power relays, and the heaters turn off.

4. After the convection heater and upper heater turn off, the oven temperature will continue increasing for a while and then decrease.

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:

After convection or grill convection cooking, the fan motor rotates for 5 minutes to cool oven and electric components.

7.5 Auto weight defrost, Auto weight Cook

When an auto control feature is selected and the start pad pressed:

1. The digital programmer circuit determines the power level and the cooking time and indicates the operating state in the display. The table shows the corresponding cooking times and weights for the selected category.
2. When the cooking time in the display window has elapsed, the oven turns off automatically via the control signal from the digital programmer circuit.

Note: After auto cooking if the oven temperature is over the predetermined temperature the fan motor rotates to cool the oven and its components.

Auto weight defrost

Category	1st Touch weight	Cooking time
Mince / Chops	200g	3 Min 40 Sec
Meat Joints	400g	6 Min 20 Sec
Frozen Bread	100g	0 Min 45 Sec

Auto Weight Cook

Category	1st Touch volume/weight	Cooking time
Fresh Fish	100g	2 Min 30 Sec
Fish & Chips	300g	7 Min 20 Sec
Whole Chicken	1000g	19 Min 20 Sec
Chicken Pieces With Bone	300g	5 Min 30 Sec
Chicken Pieces Boneless	300g	8 Min 30 Sec
Frozen Vegetables	150g	4 Min 45 Sec
Fresh Vegetables	100g	3 Min 00 Sec
Potato crispy Top	350g	9 Min 40 Sec
Boiled Potatoes	200g	4 Min 00 Sec
Jacket Potatoes	200g	12 Min 00 Sec
Frozen Potato Products	100g	9 Min 07 Sec
Chilled Pizza	100g	6 Min 34 Sec
Pasta Crispy Top	350g	8 Min 40 Sec
Frozen Pizza	100g	7 Min 36 Sec

8 Cautions to be Observed when Troubleshooting

The microwave oven is a high voltage, high current device. Although it is free from danger in ordinary use, extreme care should be taken during repair.

Caution: Servicemen should remove their watches whenever working close to or replacing the magnetron.

8.1 Check the grounding

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

8.2 Inverter Warnings

DANGER, HIGH VOLTAGE AND HIGH TEMPERATURES ON THE INVERTER POWER SUPPLY

This high voltage inverter power supply supplies very high voltage and current to the magnetron. Though it is free from danger in ordinary use, extreme care should be taken during repair. This circuit looks like a TV flyback transformer, however, the currents and voltages in this circuit are very high, this means this circuit is extremely dangerous.

The aluminium heat sink is also energized with high voltage, never touch this heat sink when the microwave oven is plugged into the mains outlet. The collector of the power device (IGBT) is directly connected to the aluminium heat sink.

The aluminium heat sink becomes very hot when the inverter circuit operates. Never touch this heat sink during operation and allow time for it to cool down before servicing the microwave oven.

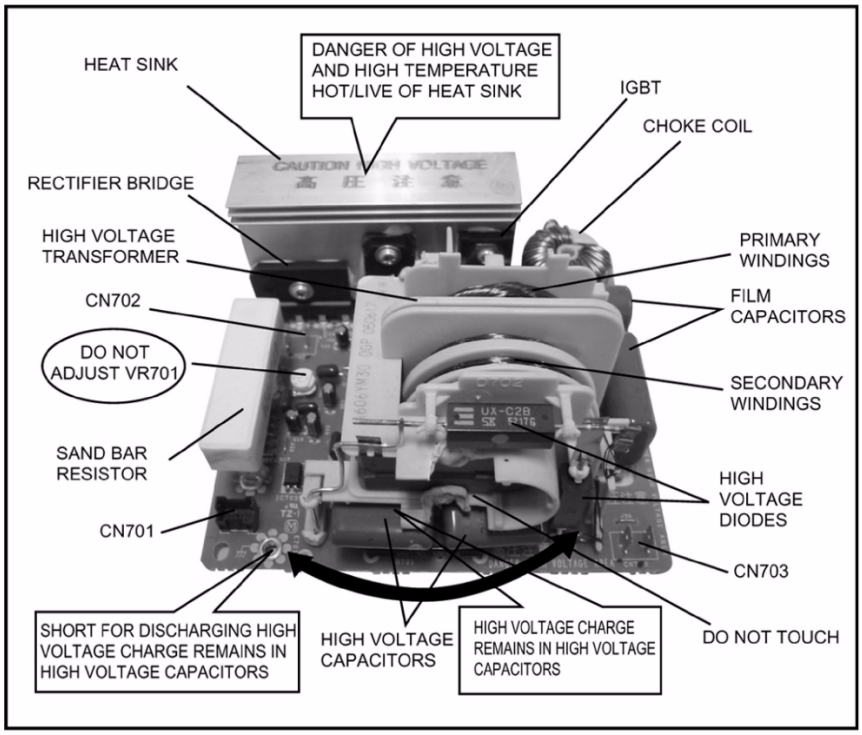


figure 3 HV Inverter warning

WARNING
INVERTER POWER SUPPLY GROUNDING

Check the high voltage inverter power supply circuit grounding. The high voltage inverter circuit board must be connected to the microwave oven chassis. If the inverter board is not grounded it exposes very high voltages and causes extreme DANGER! Ensure that the inverter circuit is properly grounded via the inverter earth bracket.

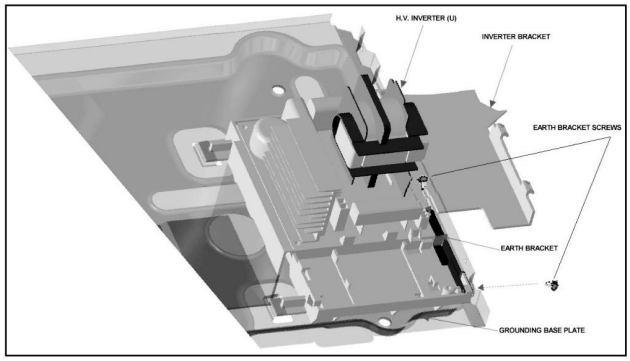


figure 4 Grounding of the inverter circuit board

WARNING! DISCHARGE THE HIGH VOLTAGE CAPACITORS

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors on the inverter circuit board.

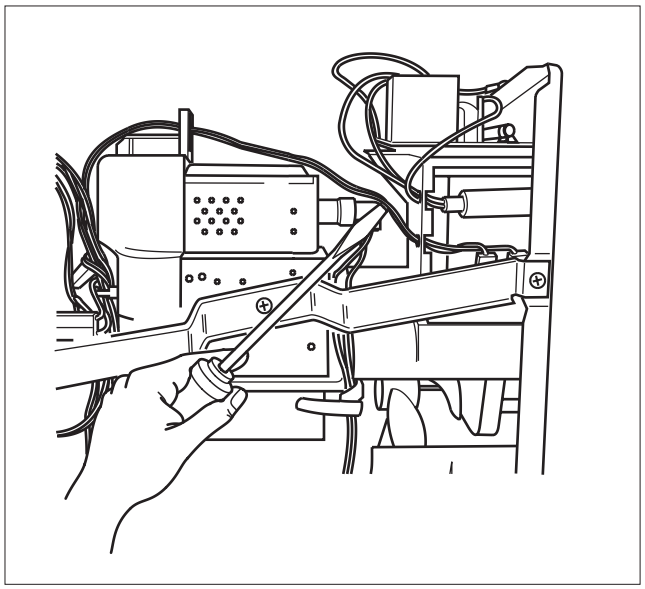


figure 5 Discharging the high voltage capacitors

1. Before replacing or testing parts discharge these high voltage capacitors by shorting the inverter output terminal to the microwave oven chassis
2. Remove the power plug from the mains outlet
3. Ensure that the high voltage lead is connected to the inverter output terminals and the magnetron input terminals.
4. Short the magnetron input terminal to the microwave oven chassis using an insulated handle screwdriver.
5. Always touch the microwave oven chassis and then the magnetron terminal.

WARNING
There is high voltage with high current capabilities in the primary, secondary windings, choke coil and heat sink on the inverter circuit. When power is connected to the microwave oven, it is extremely dangerous to work on or near these inverter circuit components. **DO NOT** measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

WARNING
Never touch any circuit wiring during operation.

8.3 Part replacement

When replacing any component in the microwave oven, always ensure that the power cord is removed from the wall outlet.

8.4 When the 10A fuse is blown due to the operation of the short switch

WARNING
Always replace both the short switch and the primary latch switch when the 10A 250V fuse is blown due to the operation of the short switch. It is also important to change the power relay 1 (RY1) when the continuity test shows shorted contacts.

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

8.5 Oven cavity apertures

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

8.6 Confirm after repair

1. After repair or replacement of parts, make sure that the screws of the oven are neither loose nor missing. Microwaves 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. (Refer to procedure for measuring microwave energy leakage).

CAUTION MICROWAVE ENERGY
Microwave energy is emitted from the magnetron antenna into the oven cavity via the wave guide. Do not operate the microwave oven if the door is defective, the magnetron is not fitted correctly or the outer panel is removed.

IMPORTANT NOTICE
When the microwave oven is operating the following components carry a potential above 240VAC.

- Magnetron
- High voltage transformer (Located on inverter)
- High voltage diodes (Located on inverter)
- High voltage capacitors (Located on inverter)

Pay special attention in these areas.

When the appliance is operated with the door hinges or magnetron fixed incorrectly, the microwave leakage can reach more than 5mW/cm^3. After repair or replacing parts, it is very important to check if the magnetron and the door hinges are correctly fixed.

8.7 Sharp edges

Please use caution when unpacking, installing or moving the unit, as some exposed edges may be sharp to touch and cause injury if not handled with care.

9 Parts Replacement Procedure

9.1 Magnetron

1. Discharge the high voltage capacitors on the inverter circuit.
2. Remove the 1 screw holding air guide A.
3. Remove the 2 screws holding the tie bar.
4. Remove the oven lamp and lead wire harness from air guide A.
5. Remove the air guide A.
6. Disconnect the 2 high voltage leads from the magnetron.
7. Remove the 4 screws holding the magnetron.

NOTE: After replacing the magnetron, tighten the mounting screws so there is no gap between the waveguide and the magnetron, this prevents microwave leakage.

Caution

When replacing the magnetron, ensure that the antenna gasket is in place.

Note

The magnetron used for this model is unique for the inverter power supply system. Only fit the magnetron listed in the service manual parts list.

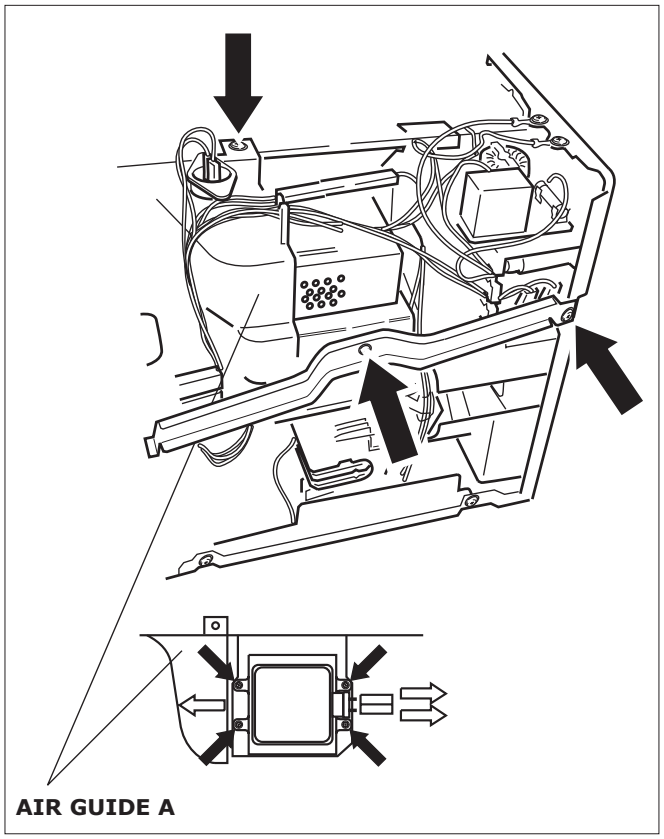


figure 6 Removal of the magnetron

9.2 Inverter circuit

1. Discharge the high voltage capacitors.
2. Remove 2 screws holding the tie bar.
3. Unplug the H.V. Lead wires from the magnetron.
4. Remove the 1 screw holding the earth wire to the magnetron.
5. Remove the connector CN701 and CN702 from the inverter PCB.figure 8
6. Remove the 2 screws holding the inverter support-base to the oven chassis.
7. Carefully remove the inverter circuit board and support base from the oven.
8. Remove the air guide E.
9. Remove the 4 screws holding the inverter circuit board to the inverter support base. Figure 7

Caution

When replacing the inverter circuit

1. Check the grounding plate is in place.
2. Securely tighten the grounding plate screw through the side of the oven chassis.
3. Connect the 3 lead wire plugs into the correct sockets.
4. Ensure there is enough space between the heat sink and other components. Check that no lead wires are touching the aluminium heat sink.

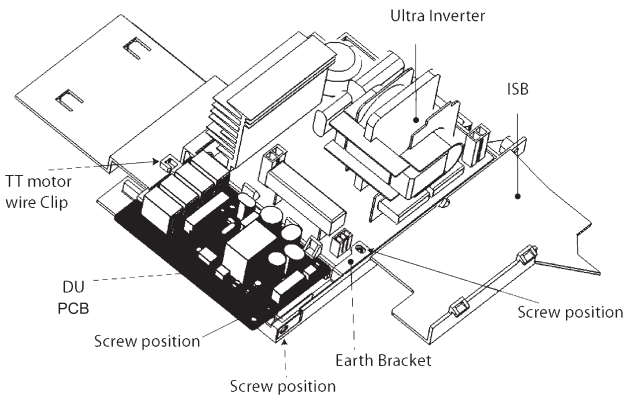


figure 7 Removal of the inverter PCB.

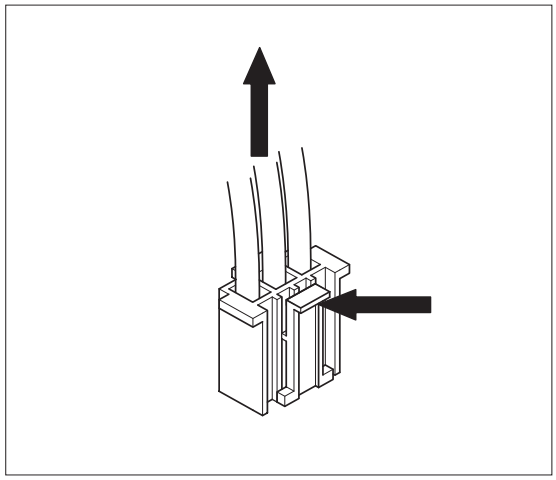
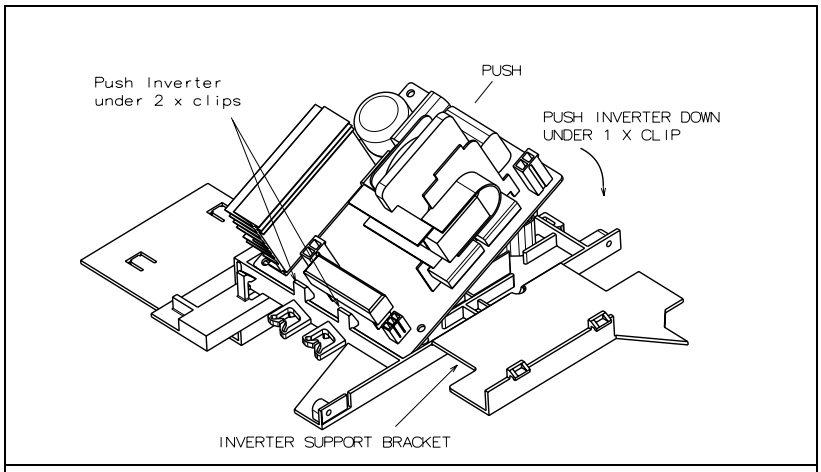


figure 8 Disconnecting the PCB locking plug.

Replacing the inverter

1



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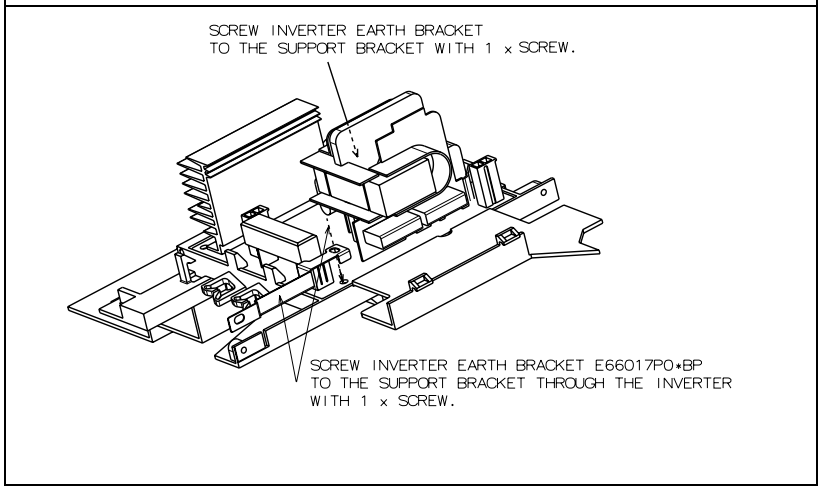

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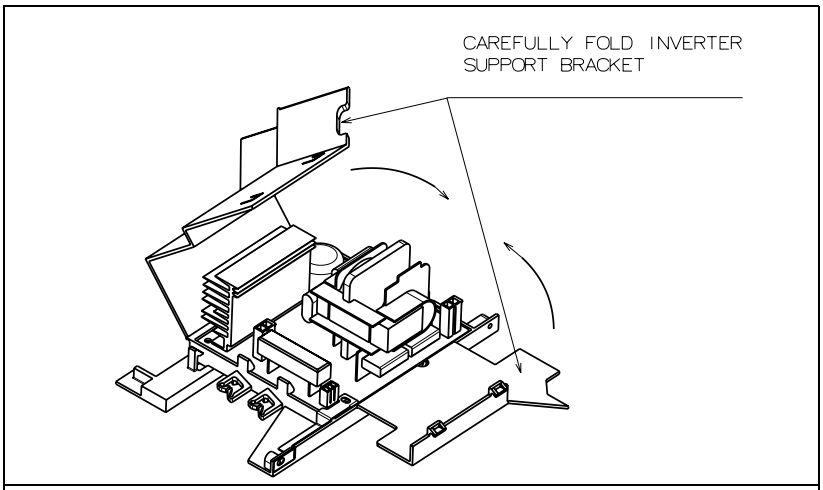

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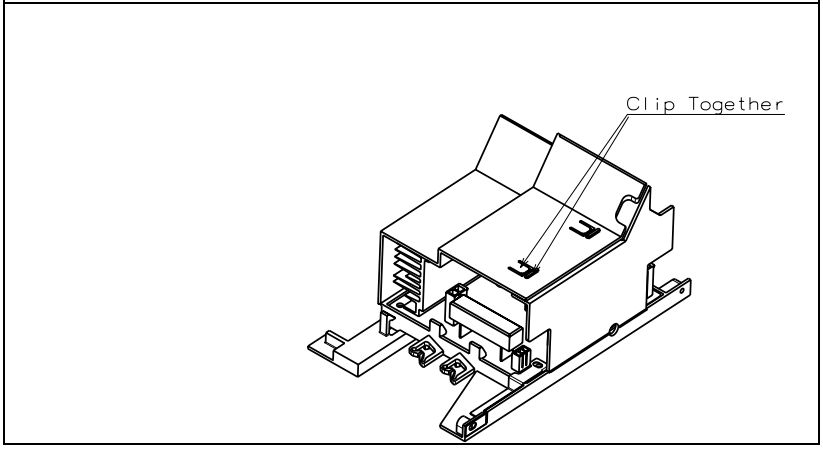


9.3 Digital Programmer Circuit (DPC) and membrane key board.

NOTE: Ground any static electric from your body before handling the digital programmer circuit (DPC).

1. Disconnect all lead wire plugs from the DPC.
2. Release the ribbon cable from the DPC.
3. Remove 1 screw holding the escutcheon base to the microwave oven chassis. To remove the escutcheon base; open the microwave oven door and slide the escutcheon base upward slightly.
4. Remove the 3 screws holding the DPC HU assembly.
5. Remove the door lever.
6. Remove the 6 screws holding the DPC AU assembly.

To remove escutcheon pad.

1. Disconnect the membrane connection from the AU PCB terminal.
2. Remove the AU PCB.
3. Remove the membrane assembly by pushing from the inside of the base and then peeling it away from the outside surface.

NOTE:

1. When installing a new escutcheon key board, make sure that the surface of the escutcheon base is cleared, avoiding problems such as shorted contacts and uneven surfaces.
2. When replacing a stainless / aluminium escutcheon assembly, ensure that the stainless facia is earthed to the escutcheon back plate via the earth spring.

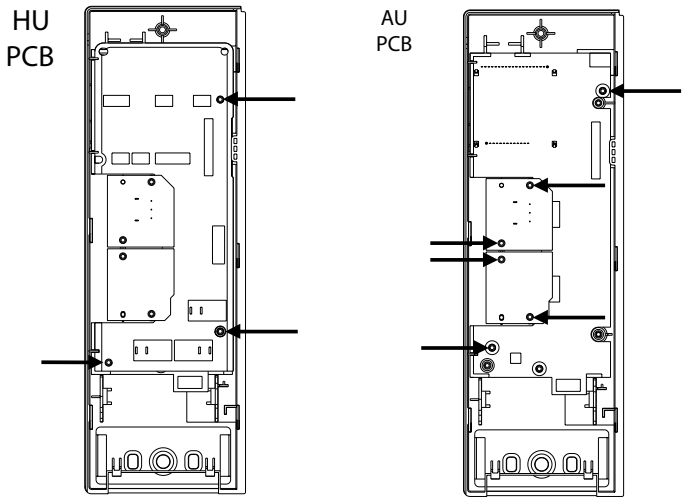


figure 9 Removal of DPC AU and DPC HU

9.4 Low voltage transformer and/or power relays (RY1)

Note
Ground your body to discharge static charges before handling the DPC.

1. Carefully remove all solder from the terminal pins of the low voltage transformer / power relays using a 30W soldering iron and a solder sucker.
2. With all of the terminal pins cleaned and separated from the DPC contacts, remove the defective transformer/power relays and install the new components making sure that the terminal pins are inserted completely. Carefully re-solder all terminal contacts carefully.

Note

Do not use a soldering iron of more than 30 watts on DPC contacts

9.5 Fan Motor

1. Remove 2 screws to remove the tie bar.
2. Disconnect the 2 lead wires from the fan motor terminals.
3. Disconnect all lead wires from the noise filter.
4. Remove the noise filter.
5. Remove 2 screws to remove cover B.
6. Remove 2 screws holding the orifice assembly.
7. Remove 2 screws holding the fan motor assembly.
8. Detach the orifice assembly and the fan motor assembly from the microwave oven.
9. Remove the fan blade from the fan motor by pulling outward.

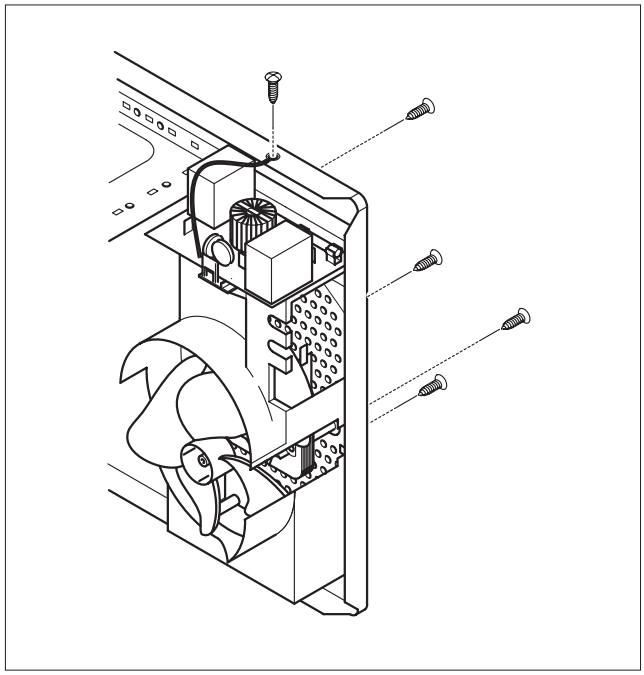


figure 10 Removing the fan motor.

9.6 Door replacement

1. Carefully lever door C away from Door E using a flat blade screwdriver.
2. Remove 4 screws holding the door E to the door A assembly.
3. Remove the door screen B by unclipping the screen B from the door A catch hooks. Take care when removing the door screen B from door A, it is possible to damage the catch hooks on the door A .
4. Remove the door key and spring from the door E.

After replacing component parts of the door, follow the instructions below for proper installation and adjustment of the door, this is to prevent microwave leakage.

1. When mounting the door to the oven, adjust the door parallel to the bottom of the oven face plate by adjusting the upper hinge.
2. Adjust the door so there is no play between the inner door surface and the front of the microwave oven. If the door assembly is not mounted properly, microwave energy may leak from the clearance between the door and microwave oven.
3. Perform the microwave leakage test.

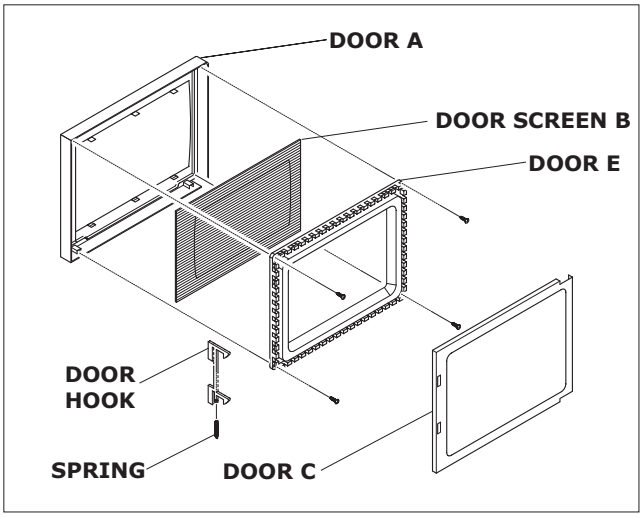


figure 11 Disassembly of the door.

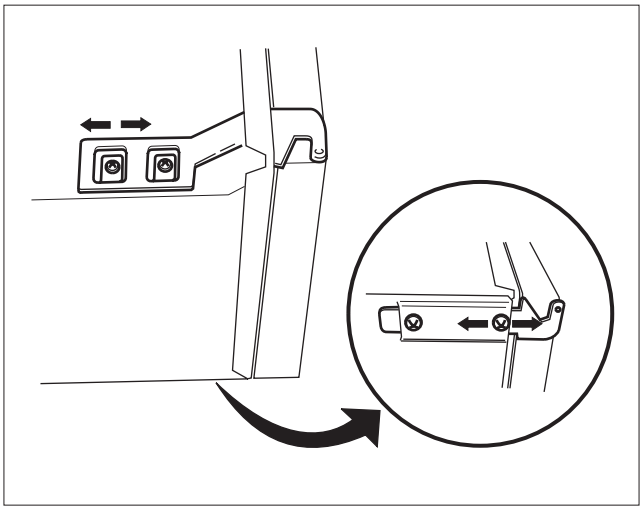


figure 12 Adjusting the door hinge.

9.7 Turntable Motor

1. Remove the motor cover by breaking it off at the 8 spots indicated by the arrows.
2. Disconnect the two lead wires connected to the turntable motor.
3. Remove the 2 screws holding the turntable motor.

Note: After breaking off the motor cover, make sure no sharp edges are exposed by trimming off the edges or bending them inside.
Note: To secure the motor cover use a 4 x 6 screw.

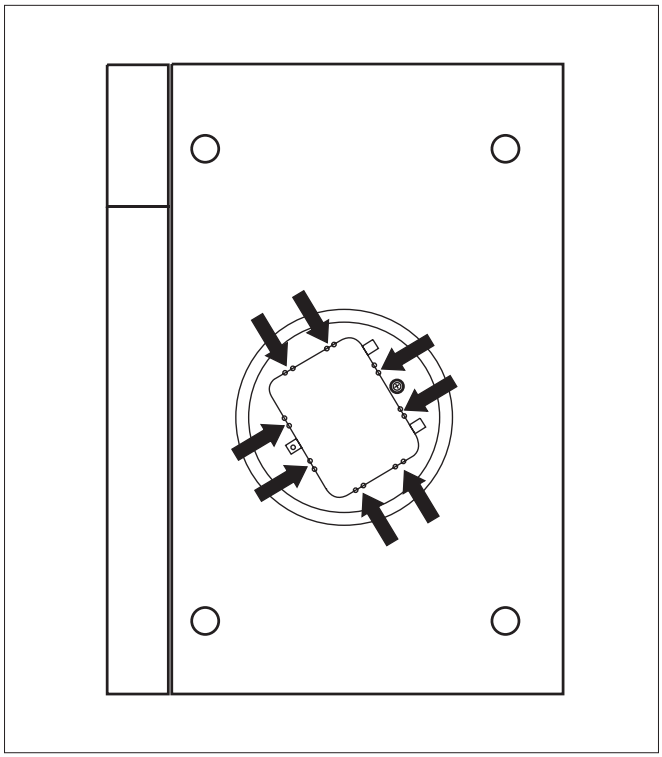


figure 13 Removing the turntable motor cover.

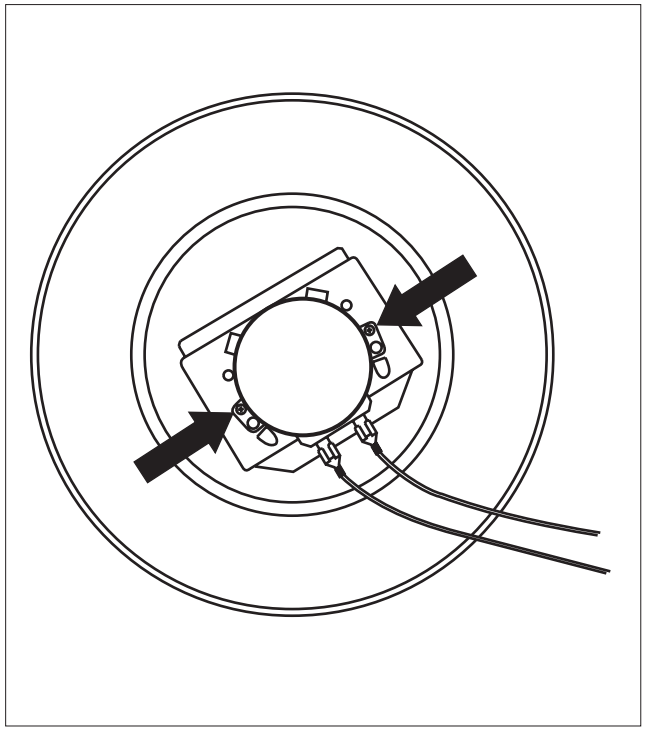


figure 14 Removing the two screws fixing the turntable motor.

10 Component Test Procedure

Caution

- The inverter circuit operates at high voltages.
- Never attempt to measure the high voltage on the inverter circuit.
- Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitors.

10.1 Primary latch switch, secondary latch switch and power relay B interlocks.

1. Unplug the lead wires from the contact terminals of RY1, check the continuity across these terminals using an ohm meter set to the lowest resistance scale.
2. Unplug the lead wires to the primary latch switch and secondary latch switch.
3. Test the continuity of each switch with an ohm meter set to the lowest resistance scale. The test must be completed with the microwave oven door open and closed.
4. Normal continuity readings should be as follows.

	Door Open	Door Closed
Primary Latch Switch	∞ Ω (Open)	0 Ω (Close)
Secondary Latch switch	∞ Ω(Open)	0 Ω (Close)
Power relay RY1	∞ Ω(Open)	0 Ω (Close)

10.2 Short switch and monitor circuit

1. Unplug the lead wires from the high voltage inverter primary terminals.
2. Connect the test probes of the ohm meter to these leads.
3. Test the continuity of the short switch with the door open and the door closed using a ohm meter set to the lowest resistance scale.

	Door Open	Door Closed
Monitor switch	0 Ω	∞ Ω

10.3 Magnetron

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

1. Disconnect the high voltage lead wires from the magnetron input terminals.
2. Check the continuity across the magnetron filament terminals, a good magnetron indicates a resistance of 1 ohm or less.
3. Check the continuity between each filament terminal and the magnetron case, a good magnetron indicates infinite ∞ resistance.

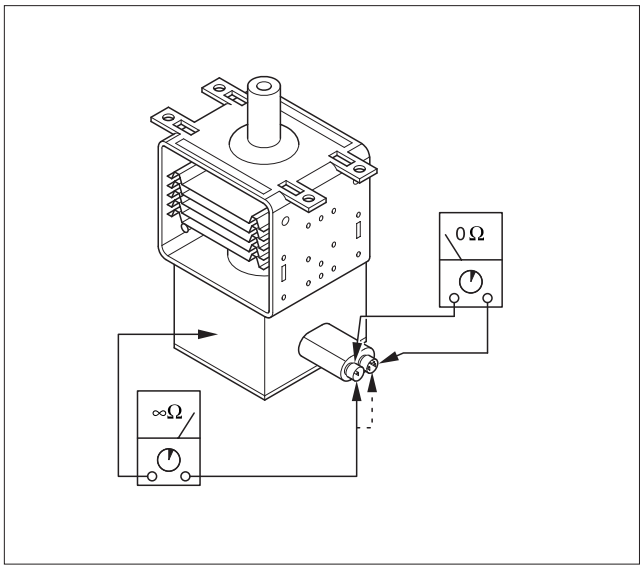


figure 15 Testing the magnetron

10.4 Push button keyboard

Check the continuity between the switch terminals on the DPC AU, by tapping an appropriate pad on the keyboard and measuring the resistance across the corresponding tracks on the ribbon cable.

10.5 Inverter power supply

Caution

DO NOT try to repair this inverter power supply. Replace this inverter power supply as a unit.

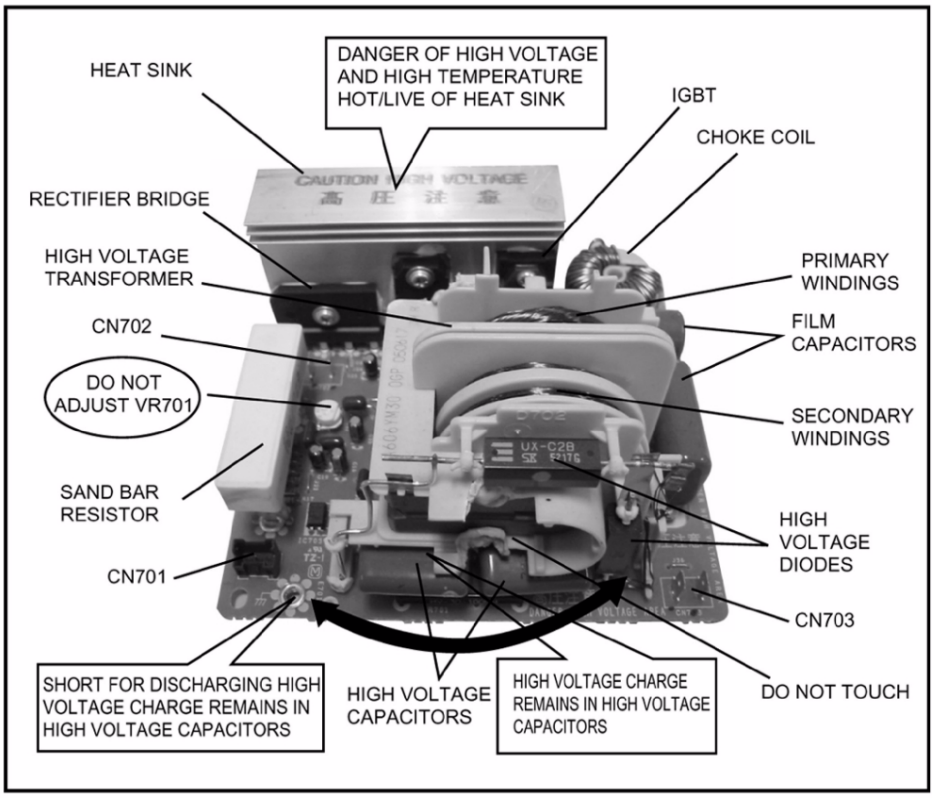


figure 16 Inverter circuit board layout

10.6 Inverter power supply unit

Warning

Do not attempt to make any measurements in the high voltage circuit of the inverter or magnetron.

See troubleshooting of the inverter circuit and magnetron on page 21 to determine if the inverter power supply is still functioning.

11 Measurements and Adjustments

Warning

- Only replace parts with parts from the original manufacturer.
- When the 10 amp fuse is blown due to the operation of the short switch, you must replace the primary latch switch and short switch. Then follow the installation procedures below.
- Interlock switch replacement - When replacing faulty switches, check the mounting tabs on the door-hook assembly are not bent, broken or deficient in their ability to hold the switches.
- Refer to the schematic and wiring diagram to ensure the plug connectors on the wire harness are connected to correct switches.

11.1 Installation of primary latch switch, secondary latch switch and short switch.

1. When mounting the primary latch-switch, secondary latch-switch and short latch-switch to the door hook assembly. Follow the instructions in <$elemtextfigure 17.
2. NOTE: No specific adjustment during the insulation of each switch into the door hook is necessary.
3. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of the arrow figure 17. Ensuring the door does not have any play in it. Check for play by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.
4. Reconnect the short switch, primary switch and secondary latch switches and check the continuity of the monitor circuit and latch switches by following the component test procedures on <$elemtext.

11.2 Measurement of microwave output

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

Necessary equipment:

- 1 litre beaker.
- Glass thermometer.
- Wrist watch or stop watch.

NOTE: Check the line voltage under load. Low line voltage lowers the magnetron output. Take the temperature readings and heating time as accurate as possible.

1. Fill the beaker with exactly one litre of tap water. Stir the water using the thermometer and record the waters temperature (Record as T1).
2. Place the beaker on the centre of the glass cook plate.
3. Operate the Microwave for 1 Minute on FULL power.
4. Stir the water again and read the temperature of the water. (Record as T2).
5. The normal temperature rise at the high power position for each model is shown in the table figure 18

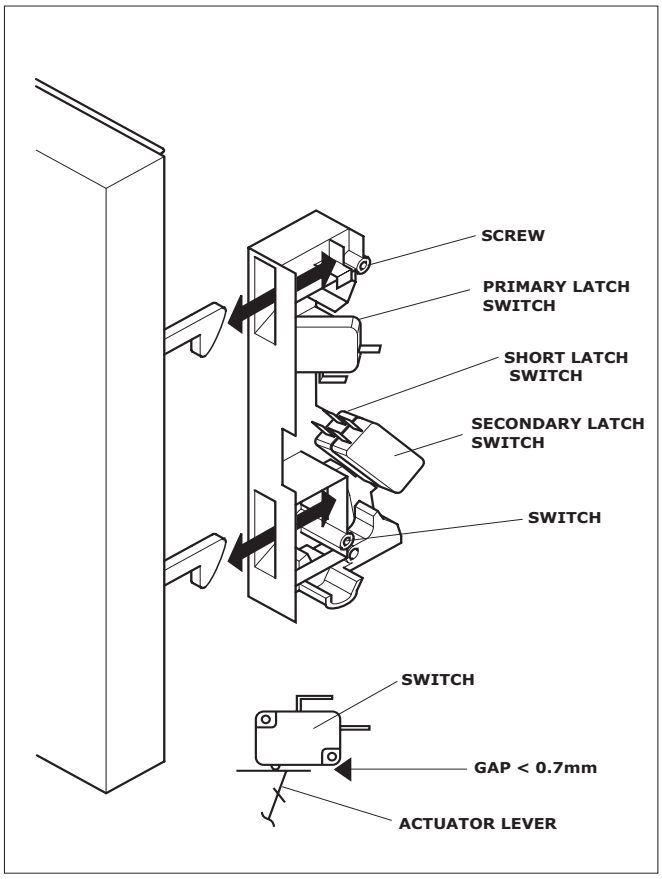


figure 17 Adjustment of latch switches

RATED OUTPUT	TEMPERATURE RISE
1000W	8°C (Degrees centigrade)

figure 18 Temperature rise

12 Troubleshooting Guide

Caution

1. Do not try to repair the H.V. Inverter power supply. Replace the inverter circuit board as a complete unit.
2. Do not adjust the preset volume on the Inverter. It is very dangerous to repair or adjust without special test equipment, the inverter handles very high voltage and current.
3. Do not attempt to measure the voltages in the microwave oven high voltage circuit.
4. Always discharge the high voltage capacitors on the inverter circuit board before troubleshooting.
5. When checking the continuity of the components on the H.V. inverter circuit, unsolder and remove one leg of the component from circuit board. Checking the continuity of these components when both legs are soldered into the board may result in a false reading or damage to your meter.
6. When disconnecting a plastic connector from a terminal, you must hold the plastic connector and not the lead wire, otherwise the lead wire may become open circuit.
7. Do not touch components on the digital programmer circuit, this circuit is sensitive to static electricity.
8. When working with the digital programmer board ensure your body is connected to ground to discharge any static charge.
9. 240 VAC is present on the digital programmer circuit. (Terminals of the power relays and the primary circuit of the low voltage transformer). When troubleshooting, be cautious of possible electric shock.

To ensure the complaint is not due to operator error, check the operation of the oven by following the procedures explained in the operating instruction book.

Self diagnostic display

The oven has self diagnostic function which can be activated as follows:
To show self diagnostic result, please take the following steps.
1. Firstly, you must program the DPC into TEST MODE (Plug-in oven - press Timer pad twice - press Start pad once -press Timer pad once - press Micro Power pad once.)
2. Keep pressing Timer pad for more than 2 seconds until buzzer beeps.
3. Press Start pad twice, oven will show error code.

NOTE:
1. The last 3 consecutive errors are stored in memory.
2. Press Start pad again, the previously stored error code will be displayed.
3. If the oven is ok, it will show "000" and blink.
4. Error code list

H** Hardware problem, oven itself has problem.
U** Usage problem such as no load operation 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
H44	Key board switch failure
H32	Magnetron thermistor failure
H30	Oven thermistor failure
	Usage problem
U40	No load operation
U65	Power down controlled by magnetron thermistor

12.1 Troubleshooting (no operation)

	Symptom	Cause	Correction
1.	Oven is dead. Fuse is OK No display and no operation at all.	1. Open or loose lead wire harness. 2. Open low voltage transformer. 3. Defective DPC AU or DPC DU	
2.	Oven does not accept key input (Program).	1. Key input is not in sequence. 2. Shorted push button on DPC AU 3. Defective DPC AU.	Refer to operation procedure. Refer to DPC troubleshooting
3.	Timer starts to countdown but no microwave oscillation.	1. Maladjusted latch switches. 2. Open or loose connection of high voltage circuit, including the magnetron filament circuit. NOTE: A large contact resistance lowers the magnetron filament voltage reducing the magnetron output or causing intermittent operation. 3. Defective high voltage component Inverter circuit or Magnetron. 4. Open or loose wiring of power relay (RY1) 5. Defective primary latch switch. 6. Defective power relay RY1 or DPC AU or DPC DU.	Adjust door and latch switches. Check high voltage components according to the component test procedure.
4.	Oven does not operate & return to plugged in mode as soon as Start Pad is pressed	1. Defective DPC	Check grounding connector on esctcheon base.
5.	No display and no operation at all. Fuse is Blown	1. Shorted lead wire harness 2. Defective primary latch switch (note1) 3. Defective short switch (note1) 4. Defective Inverter power supply. (Refer to inverter circuit test procedure page)	Check adjustment of the Door, Primary, secondary and short latch switches.
		NOTE 1: All of these switches must be replaced at the same time. (Refer to adjustment instructions page) Check continuity of power relay RY1 Replace this relay if it is short circuit.	

12.2 Troubleshooting (Oven stops operation during cooking)

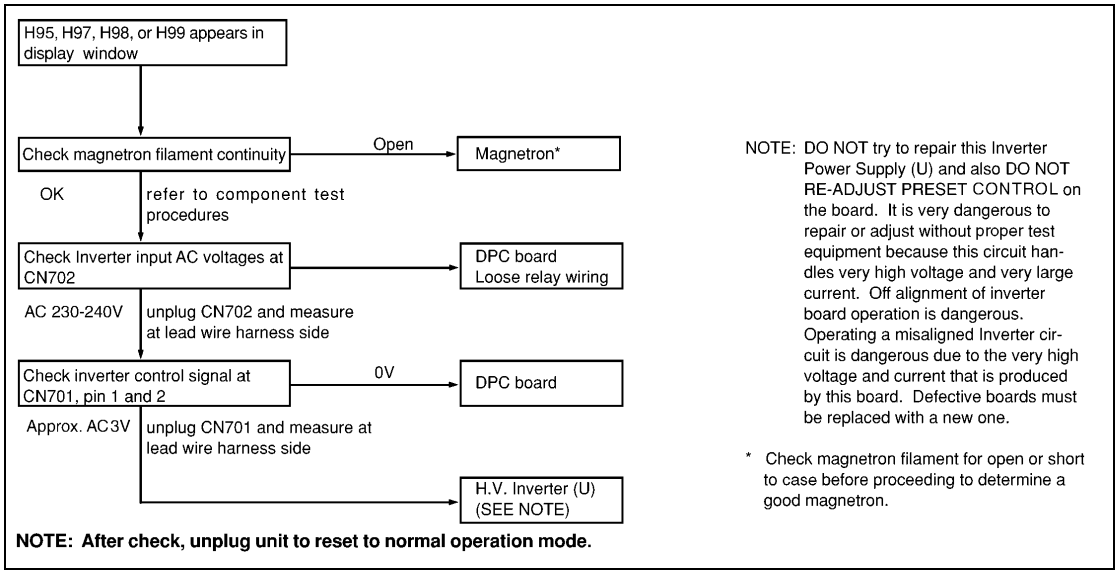
	Symptom	Cause	Correction
1.	**Oven stops in 3 seconds** after pressing start pad.	No input AC is supplied to H.V.Inverter (U) CN702 terminals	1. Latch Switch 2. Power relay RY1 3. Loose lead wire connector CN701, CN702
2.	**Oven stops in 23 seconds** after pressing start pad.	H.V.Inverter (U) operates by the control signalsfrom DPC but magnetron is not oscillating	1. Magnetron 2. Loose lead wire connector CN703
3.	**Oven stops in 1 minute** after pressing start pad. (Convection/Grill convection cooking)	Oven thermistor circuit is not functioning	1. Oven thermistor 2. Loose wiring

12.3 Troubleshooting other problems

	Symptom	Cause	Correction
1.	Microwave output is low. Oven takes a long time to cook food.	1. Decrease in power source voltage. 2. Open or loose wiring of magnetron filament circuit causing intermittent oscillation. 3. Ageing of magnetron	Consult electrician. Refer to output test procedures. Change magnetron
2.	Loud Buzzing noise can be heard.	1. Loose fan or fan motor	
3.	Turntable motor does not rotate.	. Open or loose wiring of turntable motor. 2. Defective turntable motor	
4.	Oven stops operation during cooking cycle.	1. Open or loose wiring of primary and secondary latch switch.	Adjust door and latch switches.
5.	Oven returns to “plug in” state 9 seconds after the start pad is pressed in sensor cooking mode.	1. Open steam sensor circuit. 2. Defective steam sensor.	
6.	Oven lamp and turntable motor turn-on when the microwave oven is plugged in with the door closed.	1. Maladjusted or loose wiring of secondary latch switch. 2. Defective secondary latch switch.	Adjust door and latch switches.

12.4 Troubleshooting the inverter (U) & magnetron

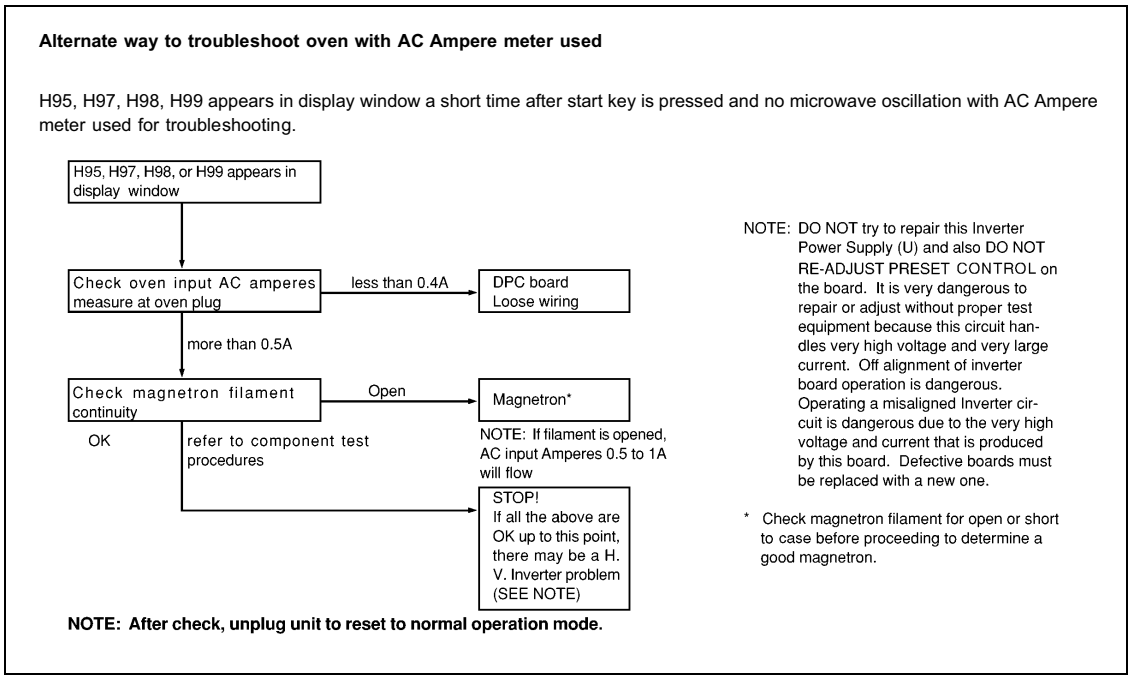
This oven is programmed with a self diagnostics failure code system which will help for troubleshooting. H95, H97, H98 and H99 are the provided failure codes to indicate magnetron and inverter circuit problem areas. This section explains failure codes of H95, H97, H98 and H99. First, you must program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



Troubleshooting inverter by microwave oven input current

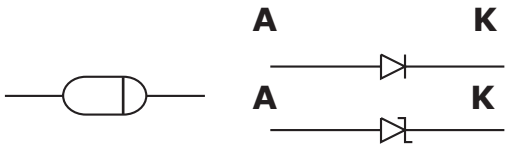
This is an alternative way to test the inverter circuit by monitoring the input current to the microwave oven.

The microwave oven must be set in self test mode to activate the self diagnostic failure code system.



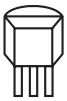
Checking the semiconductors using a resistance meter

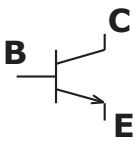
Diode



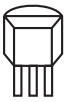
	Forward	Reverse
A - K	Low Ω	∞

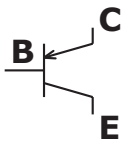
Transistor





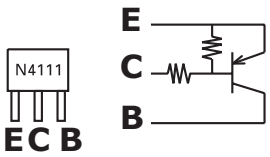
	Forward	Reverse
B - E	Low Ω	∞
B - C	Low Ω	∞
C - E	∞	∞





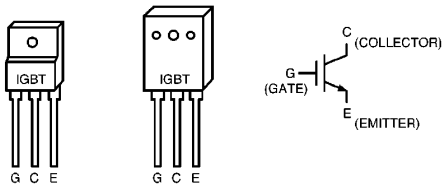
	Forward	Reverse
E - B	Low Ω	∞
C - B	Low Ω	∞
C - E	∞	∞

Digital transistor



	Forward	Reverse
E - B	10 -30 kΩ	10 -30 kΩ
C - B	50 -90 kΩ	∞
C - E	40 -60 kΩ	∞

IGBT
(INSULATED GATE BIPOLAR TRANSISTOR)



	FORWARD	REVERSE
E-C	SMALL	∞
E-G	∞	∞
C-G	∞	∞

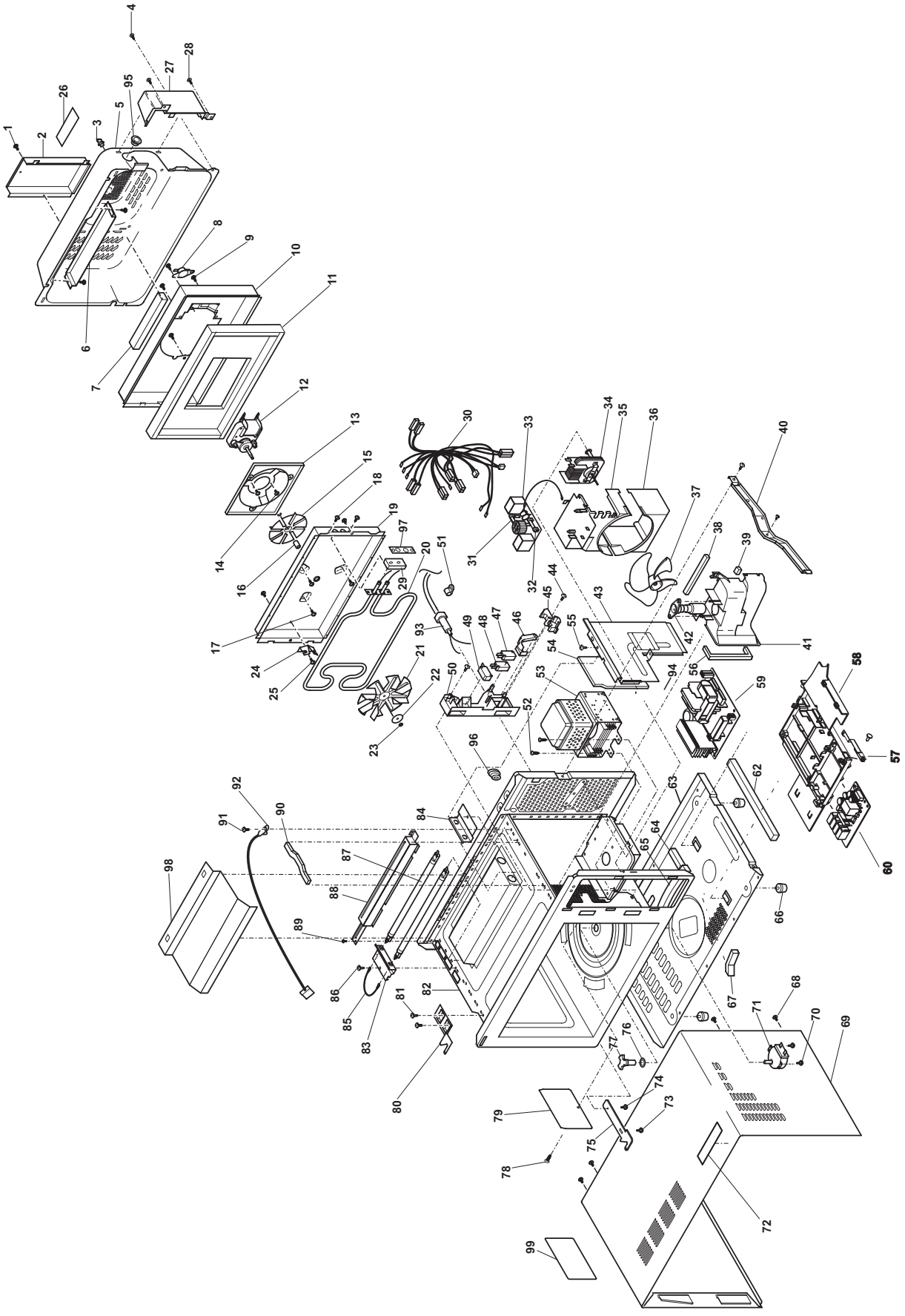
13 Parts List

- When ordering parts quote the part number, do not use the description of the part.
- Components identified by the following symbol (!) have special safety characteristics. Only replace these parts with parts supplied by the original manufacturer.

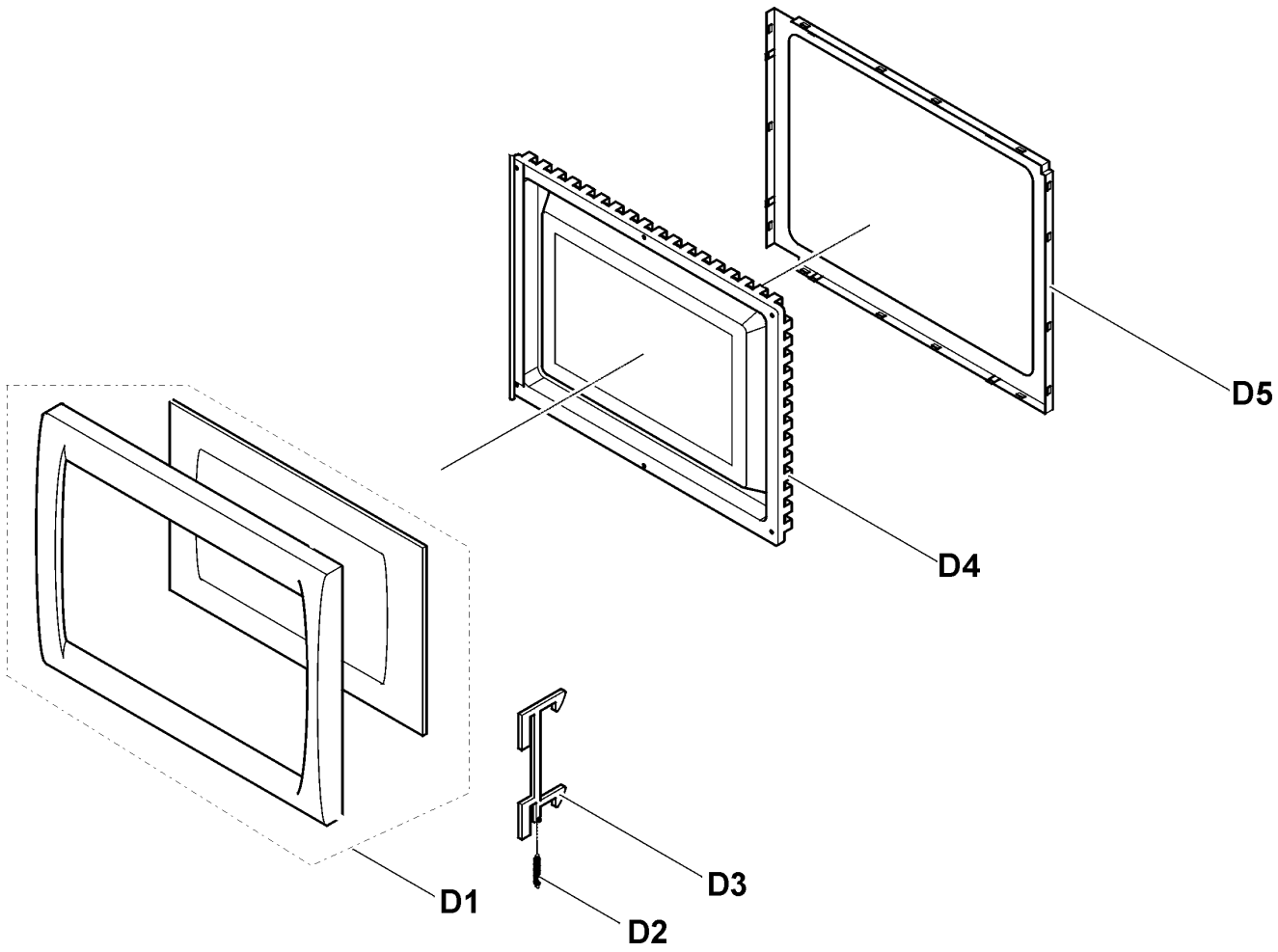
Ref. No.		Part No.	Part Description		Comments
1		XTWANE 4 + 8BN	Screw	1	
2		E41194V00GP	Exhaust Guide D	1	
3		E6061002	Strike	1	
4		XTWANE 4+8BN	Screw	1	
5		E10584V11SUP	Back Plate Cover A	1	
6		E41074V00GP	Exhaust Guide B	1	
7		E096400TBBK	Cushion Rubber	1	
8	(!)	E61454V20BP	Thermal Cut-Out	1	
9		XTWANE 4+8BN	Screws	3	
10		E66804V00BP	Heater Cover B	1	
11		E22436R00BP	Adiabatic Material	1	
12	(!)	E400A4760JP	Circulation Fan Motor	1	
13		E41804V00BP	Motor Bracket	1	
14		XTBANE 4+8BN	Screws	3	
15		E41594V00BP	Cooling Fan	1	
16		E41614V00BP	Fan Spacer A	1	
17		XTWANE 4+8BN	Screws	3	
18		XTBANE 4 + 8BN	Screws	2	
19		E66794V00BP	Heater Cover A	1	
20	(!)	E630H8000BP	Convection Heater Unit	1	
21	(!)	E22394V00BP	Circulation Fan	1	
22		E41634V00BP	Fan Spacer C	1	
23		XNG4EVSL	Nut	1	
24		E64174V00BP	Heater Bracket A	1	
25		XTWANE 4 + 8BN	Screw	1	
26		E00069000EP	Warning Label	1	
27		E10594V00BP	Back Plate Cover B	1	
28		XTWANE 4+8BN	Screws	2	
29		E22594V00BP	Adiabatic Material D	1	
30	(!)	E030A7P20BP	Lead Wire Harness	1	
31	(!)	E67597550GP	10A Fuse	1	
32	(!)	ANE6230P10GN	16A Fuse	1	
33	(!)	E607X4N30BP	Noise Filter	1	
34	(!)	E400A4760JP	Fan Motor	1	
35		E41444N30BP	Upper Orifice	1	
36		E42094N30BP	Lower Orifice	1	
37		E4008-1640	Fan Blade	1	
38		E09020000AF	Cushion Rubber	1	
39		E09020000AA	Cushion Rubber	1	
40		E20994N30UP	Reinforcement Bracket A	1	
41		E40254N40GS	Air Guide A	1	
42	(!)	E610T5D0SBP	Lamp Assembly	1	
43		E22364V10BP	Right Hand Heater Panel	1	
44		XTW4 +12T	Screw	1	
45		E31374830AP	Hook Spacer B	1	
46		E31384830AP	Hook Spacer C	1	
47	(!)	E61425180AP	Secondary Latch Switch	1	
48	(!)	E61785180AP	Short Switch	1	

Ref. No.		Part No.	Part Description		Comments
49	(!)	AEE6142-1450	Primary Latch Switch	1	
50		E30208000BP	Door Hook	1	
51		AEE9108A20GN	Holder	1	
52		XTWANE 4+ 12B	Screws	4	For Magnetron
53	(!)	2M236-M42J1Y	Magnetron	1	
54		E22436R00BP	Adiabatic Material	1	
55		XTWANE 4 + 8BN	Screw	1	
56		AEE0926000AN	Cushion Rubber	1	
57		E66017P20BP	Inverter Earth Bracket	1	
58		E65857H81BP	Inverter Support Bracket	1	
59	(!)	E606Y300XN	Inverter	1	
60	(!)	E603Y7P20BP	DU PCB	1	
62		E09020000AA	Cushion Rubber	1	
63		E10016R20BP	Base Plate	1	
64		E09270000AH	Cushion Rubber	1	
65		E09270000AM	Cushion Rubber	1	
66		RIF018-BLK-T	Rubber Foot	4	
67		E09270000AM	Cushion Rubber	1	
68		XTWA 4+12CF	Screws	6	
69		E110D7P20KBP	Outer Panel	1	
70		XTW 3+6B	Screws	2	
71	(!)	E63268960JP	Turntable Motor	1	
72		E01507560BP	Outer Panel Warning Label	1	
73		XTWA 4 + 12CF	Screw	1	
74		XTWA 4 + 12DF	Screw	1	
75		E30074L00GP	Lower Hinge	1	
76		AEE2177-F80	Pulley Shaft Washer	1	
77		E21315870GP	Pulley Shaft	1	
78		XST4 + W5V	Screw	1	
79		E20554L00GS	Cover A	1	
80		E30064N30BP	Upper Hinge	1	
81		XTWA 4+12CF	Screws	2	
82	(!)	E200A6R00BP	Oven cavity	1	
83		E64604N70UP	Heater Support Bracket	1	
84		E64604N30BP	Heater Support Bracket	1	
86		XTWANE4 + 8BN	Screw	1	
87	(!)	E630G6R10BP	Quartz Heater	2	
88		E40244V00GP	Exhaust Guide A	1	
89		XTWANE 4+8BN	Screw	1	
90		E09230000AL	Cushion Rubber	1	
91		XTWANE 4+8BN	Screw	1	
92	(!)	E605A-1960	Temperature Sensor	1	
93	(!)	E901C6520BP	Power cord	1	
94	(!)	E030E4N30BP	H.V Lead Wire	1	
95		E90314V00BP	Holder	1	
96		E90314VOOBP	Holder	1	
97		E67579000BP	Heater bracket D	1	
98		E22784V01SUP	Upper Heater Cover	1	
99		E00064080BP	Warning Label	1	
100		RIF018-BLK-T	Rubber Foot	4	

14 Exploded View



15 Door Assembly

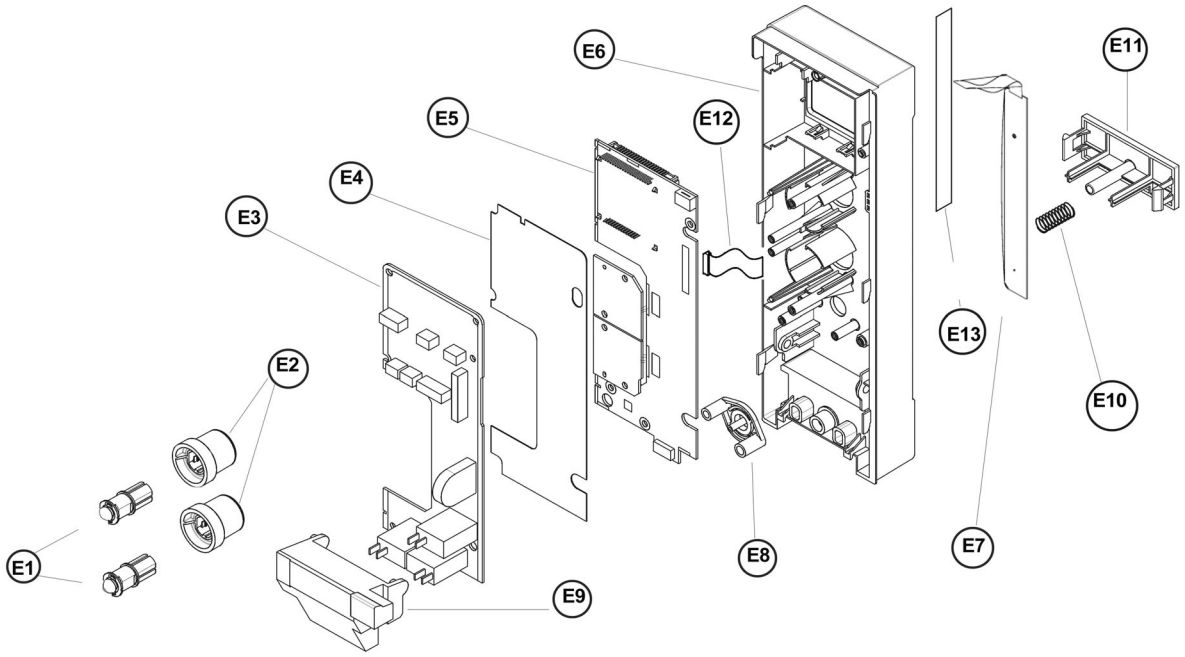


Ref no		Part Number	Part name & description	Qty	Remarks
D1		E302A7P20KBP	DOOR A ASSEMBLY	1	
D2		E30214000AP	DOOR KEY SPRING	1	
D3		E30184L00GS	DOOR KEY	1	
D4	(!)	E302K4V00BP	DOOR E ASSEMBLY	1	
D5		E30854V00BP	DOOR C	1	

NOTE: When ordering any Door component also order door C as this part may become damaged during disassembly

NOTE: When ordering any Door component also order door C as this part may become damaged during disassembly.

16 Escutcheon Base

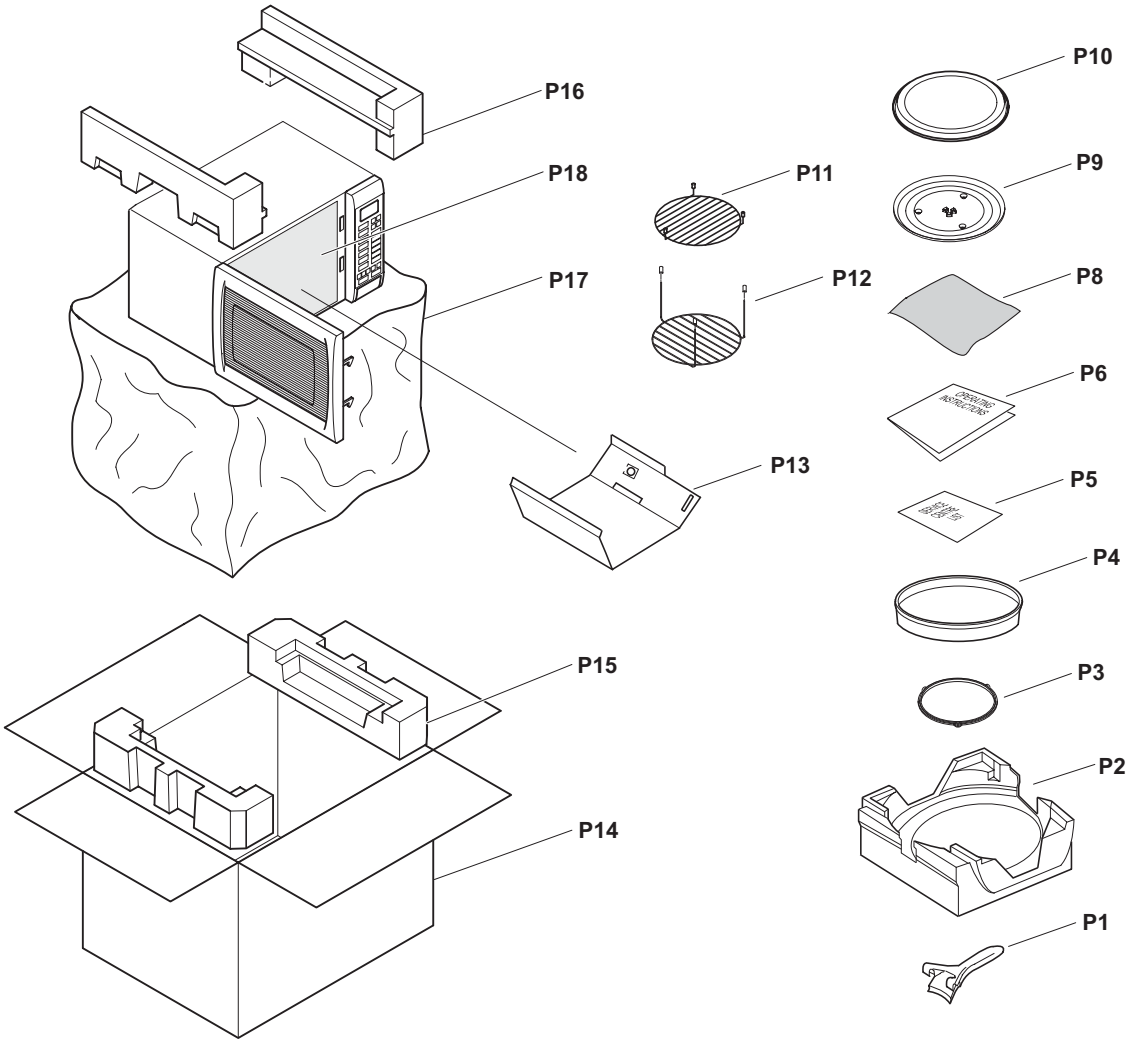


Ref no		Part Number	Part name & description	Qty	Remarks
E1		E892E6X60GS	POP UP MECHANISM	2	
E2		E892E7P20KBP	POP UP KNOB	2	
E3	(!)	E605S7P20BP	PCB HU	1	
E4		E60707P20BP	INSULATION SHEET	1	
E5	(!)	E603L7P20BP	PCB AU	1	
E6		E80347P20KBP	ESCUTCHEON BASE	1	
E7		E63837P21BP	DISPLAY SHEET	1	
E8		E80247P20KBP	OPERATION BUTTON	1	
E9		E82566R20BP	DOOR OPENING LEVER	1	
E10		E80378A0AG	SPRING	1	
E11		E80727P20KBP	DOOR OPENING BUTTON	1	
E12		E66167P20BP	RIBBON CABLE	1	
E13	(!)	E00077P20KBP	MODEL LABEL	1	

NOTE:
When replacing the escutcheon base, you must transfer the serial number of the microwave oven to the new base.
Therefore, when ordering an escutcheon base, also order the blank name plate for your model. Write the model number and serial number on this nameplate and fix the nameplate to the new escutcheon base.

NOTE: When replacing the stainless escutcheon assembly, check the fascia is earthed to the back plate with the earth spring.

17 Packing and Accessories



Ref. No.		Part No.	Part Name & Description	Qty	Remarks
P1		E10859040BP	Pan Handle	1	
P2		E01134N80EP	Tray Styrol	1	
P3		E290D4N00BP	Roller Ring	1	
P4		E060W9040ET	Crispy Pan	1	
P5		E01695750BP	Service Centre List	1	
P6		E00037P20BP	Operating Instruction	1	
P8		E02146A60KT	Foam Sheet	1	
P9		E06014N30BP	Glass Tray	1	
P10		E06015020VP	Enamel Tray	1	
P11		E060T6R30BP	Wire Rack (med)	1	
P12		E060T6R30SP	Wire Rack	1	
P13		E01087N20BP	Tray Packing	1	
P14		E01027N00BP	Carton Box	1	
P15		E01054V00BP	Lower Filler	1	
P16		E01044V00BP	Upper Filler	1	
P17		E01109010GS	Vinyl Bag	1	
P18		E02146700BP	Door Sheet	1	

18 Digital Programmer Circuit