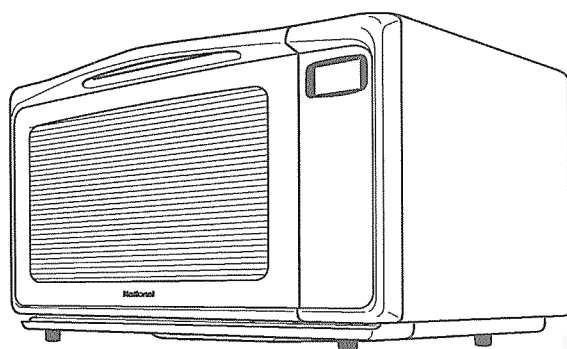


Service Manual

Microwave Oven

INVERTER

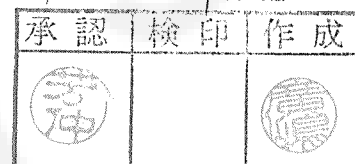
SYSTEM INSIDE



NEW H.V.

NN-V690P
NN-V690PS
NN-V680W
NN-V680WS

200 / 年 2 月 21 日 No.



Specifications

		KNQ MNQ	YNQ	SNM	HNE KKE TNE XNE ZPE	LNK
Power Source:	(V)	240V	230-240V	220V	220V	220V
	(Hz)	50 Hz	50 Hz	50/60 Hz	50 Hz	60 Hz
Power Requirement:	Microwave	1100 W				
	Heater	1340 W				
Output:	Microwave IEC-705-88	1000 W				
	Heater	1300 W				
Microwave Frequency:		2,450 MHz				
Timer:		30 MIN (HIGH) / 99 min. 99 sec.				
Outside Dimensions:		312 mm (H) X 520 mm (W) X 400 mm (D)				
Oven Cavity Dimensions:		206 mm (H) X 373 mm (W) X 373 mm (D)				
Weight:		Approx. 14.6 kg				
Specifications subject to change without notice.						

National®

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⚠ 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 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

* This product should be serviced only by trained, qualified personnel.

This service manual covers products for following markets.

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

HNE.....For Hong Kong
TNE.....For Thailand, Indonesia
MNQ.....For Malaysia
YNQ.....For Singapore
LNK.....For Philippines

KKE.....For UAE, Egypt, Iran
KNQ.....For Kuwait, Doha, Qatar, Oman,
Bahrain, Pakistan
SNM.....For Saudi Arabia
XNE.....For China
ZPE.....For CIS Countries

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

INVERTER WARNING

This Inverter board looks like a regular PCB; However, this PCB drives the magnetron tube with extremely high voltage and high current.

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

It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.

2. Aluminum heat sink is very hot in high voltages and heat energy.

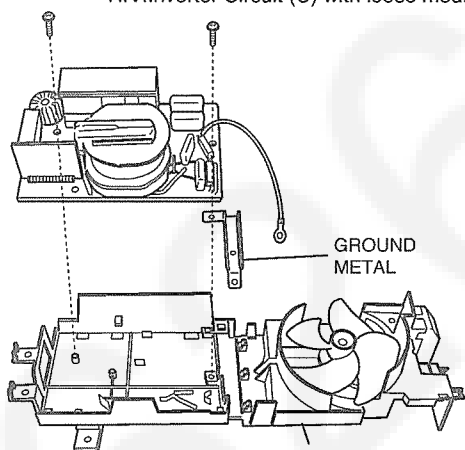
3. Very high voltage may remain in circuitry even when oven is off. High voltages may remain in the capacitors on the board.

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 may remain in circuit.

* 2. Do not touch aluminum heat sink because it is very hot in high voltage and also very hot in high heat energy.

* 3. Do not try to adjust or tamper preset volume on the Inverter board because it is very dangerous to adjust without proper test equipment.

* 4. Do not test oven while Inverter grounding strip or screws are loose. It is very dangerous to operate the H.V. Inverter Circuit (U) with loose mounting screws or if improperly grounded.



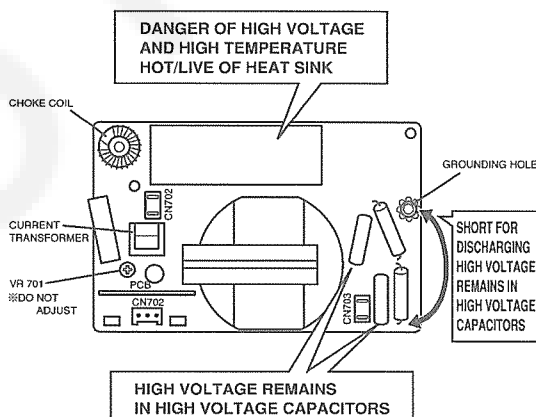
08-154M

NEW H.V.



DANGER
HIGH
VOLTAGE

INVERTER POWER SUPPLY DIAGRAM



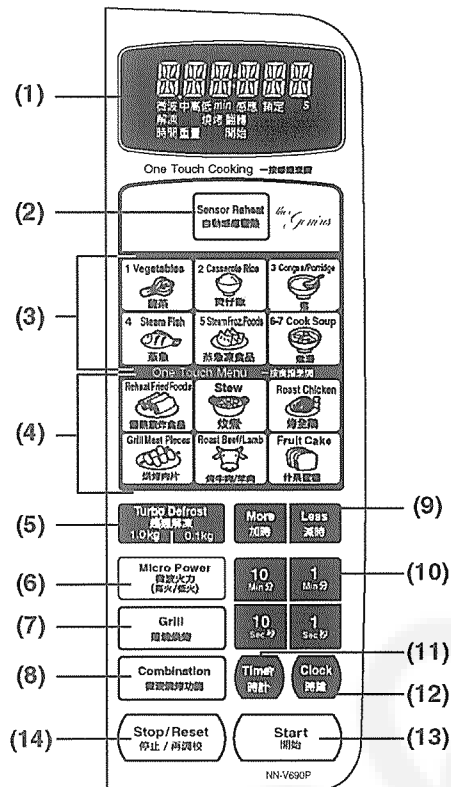
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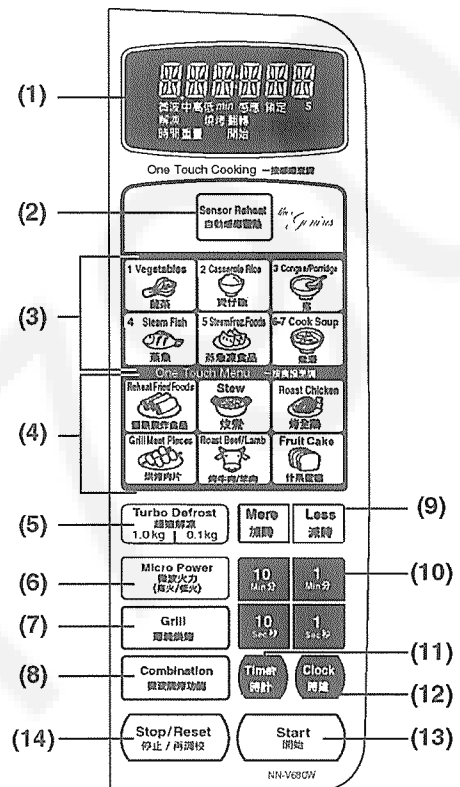
1 CONTROL PANEL

NN-V690P



- (1) Display Window
- (2) Sensor Reheat Pad
- (3) Sensor Cook Pads
- (4) One Touch Menu Pads
- (5) Turbo Defrost Pad
- (6) Micro Power Pad
- (7) Grill Pad
- (8) Combination Pad

NN-V680W



- (9) More/Less Pads
- (10) Time Pads
- (11) Timer Pad
- (12) Clock Pad

Pull Door Handle:

Pull to open the door. Opening the door during cooking will stop the cooking process without cancelling the program. Cooking resumes as soon as the door is closed and Start Pad is pressed. The oven light will turn on and stay on whenever the door is opened. It is quiet safe to open the door at any time during a cooking program and there is no risk of microwave exposure.

Beep Sound:

When a pad is pressed correctly, a beep will be heard. If a pad is pressed and no beep is heard, the unit has not accepted the instruction. The oven will beep twice between programmed stages. At the end of any complete program, the oven will beep five times.

(13) Start Pad:

One tap allows oven to begin functioning. If door is opened or **Stop/Reset** Pad is tapped once during oven operation, **Start** Pad must again be pressed to restart oven.


(14) Stop/Reset Pad:

Before cooking: One tap clears your instructions.

During cooking: One tap temporarily stops the cooking process. Another tap cancels all your instructions and time of day will appear in the display.



2 OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE

1. To Set Clock


OPERATION	SCROLL DISPLAY
1. Plug the power supply cord into wall outlet.	WELCOM TO INVERTER COOKING
2. Press Clock pad.	
3. Enter tim of day (TOD) by pressing appropriate Time pads.	1 1:25
4. Press Clock pad. TOD has now been resistered into the digital programmer circuit and will count up by minutes.	11:25

2. Time Cooking for Two Stage


OPERATION	SCROLL DISPLAY
1. Place a water load in the oven.	
2. Press Micro Power pad once to set High power. (1st stage)	HIGH
3. Set for 5 seconds by pressing 1 sec pad 5 times.	5 s HIGH

OPERATION	SCROLL DISPLAY
4. Press Micro Power pad 4 times to set Medium power. (2nd stage)	MEDIUM
5. Set for 1 minute by pressing 1 Min pad once.	1 00 MIN s MEDIUM
6. Press Start pad.	 5 s
7. When 1st stage cooking time has elapsed, oven automatically switches to 2nd stage cooking.	 1 00 MIN s
8. When 2nd stage cooking time has elapsed, oven beeps 5 times and shuts off.	

3. Turbo Defrost

OPERATION	SCROLL DISPLAY
1. Set the weight for 1 kg by pressing 1.0kg pad.	1.0kg
2. Press Start pad.	 1 4 MIN 3 6 S
3. Press Stop/Reset pad twice. Oven shuts off. Time of day or colon appears in the display.	

4. One Touch Cooking

OPERATION	SCROLL DISPLAY
1. Press STEW pad.	
2. Press Start pad.	 1 5 MIN 0 0 S
3. When cooking time has elapsed. Oven beeps 5 times and shuts off.	

5. To set Child Safety Lock

OPERATION	SCROLL DISPLAY
1. Press Start pad 3 times continuously. "LOCK" appears in the display.	*

6. To Reset Child Lock

OPERATION	SCROLL DISPLAY
1. Press Stop/Reset pad 3 times continuously. Time of day or colon appears in the display.	1 1 : 2 5




7. Demonstration Mode

The demonstration mode designed for retail store display. It is not designed for home use. Cooking will not operate during demonstration mode.
To set demonstration mode

OPERATION	SCROLL DISPLAY
1. Press Clock pad 3 times continuously. Note: To cancel demonstration mode, press Clock pad 3 times continuously.	D

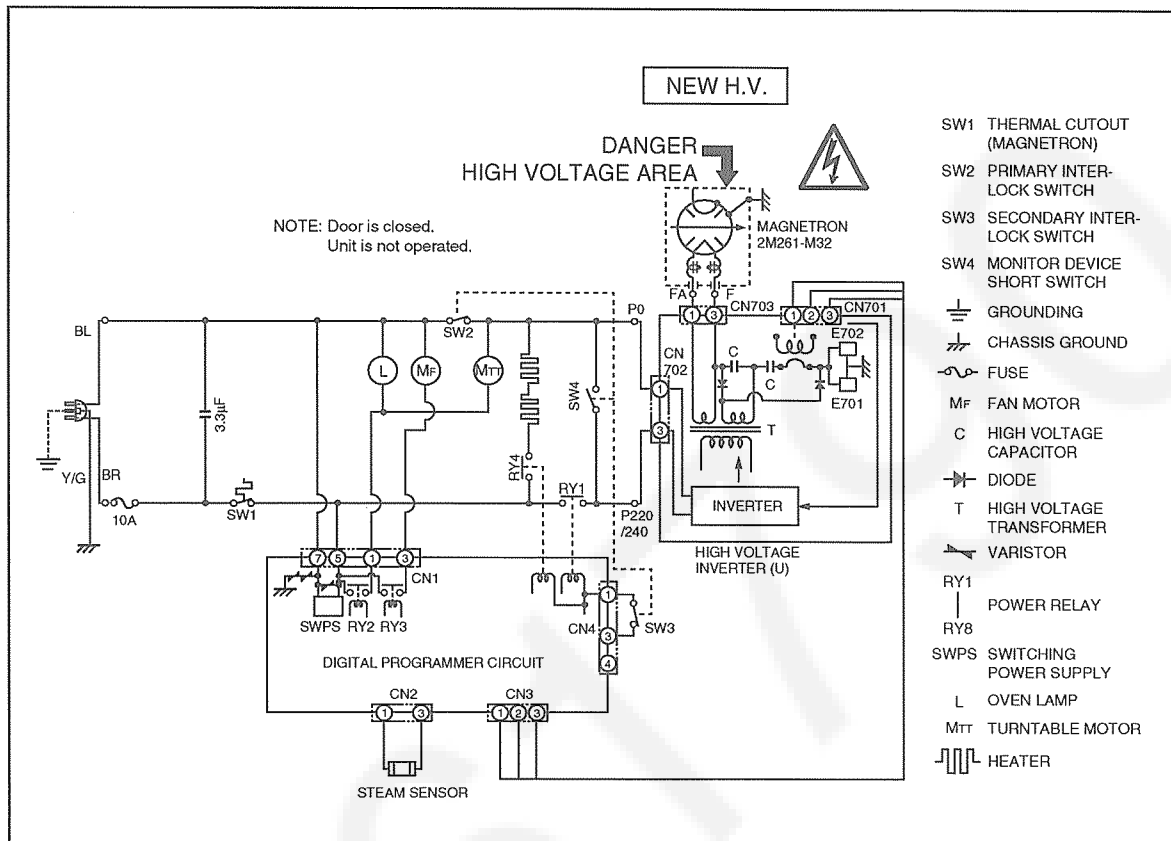
8. Sensor Cooking

NOTE: Make sure that the outer panel is installed before Sensor Cooking Test, since Auto Sensor function does not operate properly without the outer panel.

OPERATION	SCROLL DISPLAY
1. Pour 150 ± 15cc (4.5 ± 1/2 ozs) of room temperature water in a oven glassware or ceramic utensil, place the oven glassware or ceramic utensil in the center of the oven.	
2. Tap Sensor Reheat pad.	
3. Tap Start pad.	
4. The steam sensor detects steam about 1.5 to 4 minutes after the Start Pad is tapped. Sensor Brown Cooking (T1) automatically switches to time cooking (T2). "AUTO" disappears with beep sounds and the remainder of cooking time appears in display window. NOTE: Cooking time will vary depending on the water temperature, the shape of beaker or the power source voltage.	 MIN 1 8 S  MIN 4 8 S
5. When the balance of cooking time has elapsed, oven stops and beeps five times.	

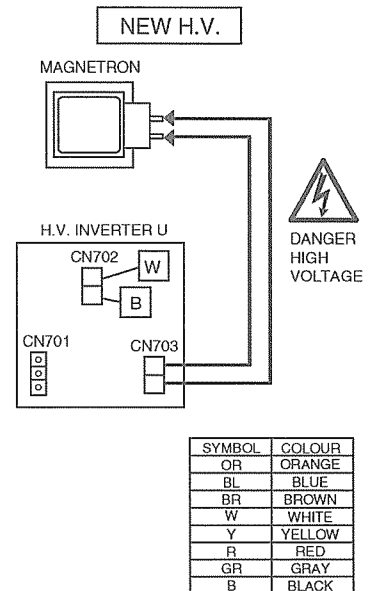
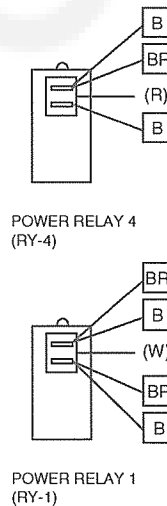
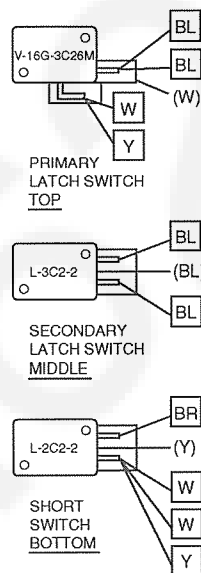
3 SCHEMATIC DIAGRAM

3.1. SCHEMATIC DIAGRAM (HNE, KNQ, KKE, LNK, MNQ, SNM, TNE, YNQ)



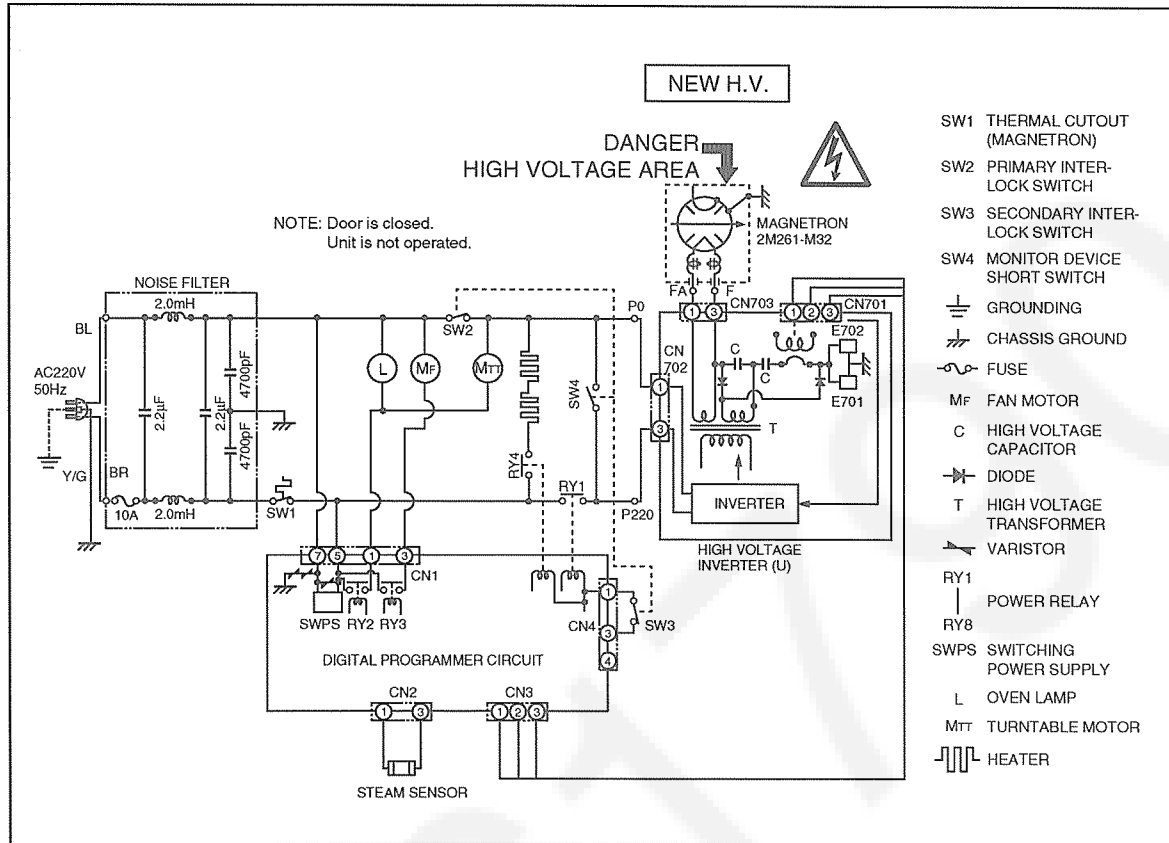
WIRING DIAGRAM

NOTE: *When replacing, check the lead wire colour as shown.
*Colours shown by () indicate colours of lead wire connector housing.

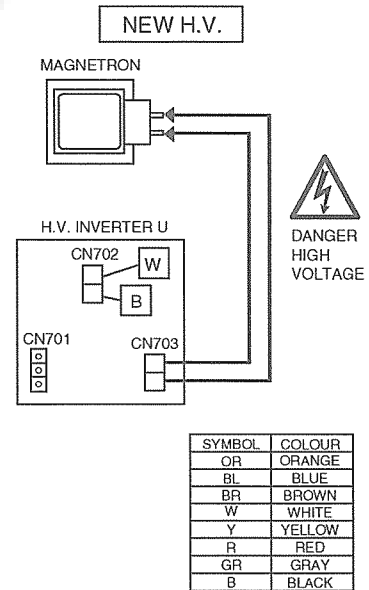
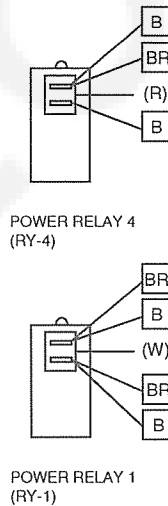
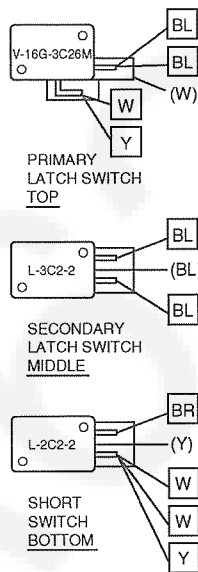


S-4Y6 HNE
M116

3.2. SCHEMATIC DIAGRAM (XNE, ZPE)



WIRING DIAGRAM



S-4Y6 XNE
M117

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 1 stays on but the inverter drive signal to control its output power.

NOTE 1: 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.

NOTE 2: If microwave cooking is over 3 minutes, fan motor rotates for 1 minute after cooking to cool oven and electric components.

4.2. Grill cooking

The digital programmer circuit generates the power relay 4 control signal at ON time during grill cooking.*

4.3. Combination cooking

Combination cooking is accomplished by microwave and grill cooking. The digital programmer circuit controls ON-OFF time of power relay 1 and 4 as shown in the table.*

***NOTE:** After grill and combination cooking, fan motor rotates for 7 minutes to cool oven and electric components.

4.4. Auto Defrost Control

When those auto control feature is selected and Start pad is pressed:

1. The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display. The table shows the corresponding cooking times for respective weight by categories.
2. When cooking time in the display window has elapsed, the oven turns off automatically by the controlled signal from the digital programmer circuit.

POWER SETTING	OUTPUT POWER(%) APPROX.	RY-1	INVERTER CONTROL SIGNAL
HIGH	100 %	stay ON	stay ON
MEDIUM-HIGH	70 %	stay ON	stay ON
MEDIUM	55 %	stay ON	stay ON
MEDIUM-LOW	30 %	15s ON/ 7s OFF	ON/OFF
LOW	10 %	8s ON/ 14s OFF	ON/OFF
DEFROST	30 %	16s ON/ 6s OFF	ON/OFF

GRILL NO.	HEATER (RY-4)	
	ON (SEC)	OFF (SEC)
1	33	0
2	26	7

Combination No.	HEATER (RY 4)		Microwave (RY 1)	
	ON (SEC)	OFF (SEC)	ON (SEC)	OFF (SEC)
1	27	6	6	27
2	21	12	12	21
3	14	19	19	14

Turbo Defrost

WEIGHT SELECTED	COOKING TIME
1.0 kg	14 min. 36 sec.

4.5. One touch cooking (Auto sensor cooking)

Auto sensor cooking is a revolutionary way to cook by microwave without setting a power level or selecting a time.

All that is necessary is to select an Auto Sensor Program before starting to cook.

Understanding Auto Sensor Cooking

As a food cooks, a certain amount of steam is produced. If the food is covered, this steam builds up and eventually escapes from the container. In Auto Sensor Cooking, a carefully designed instrument, called the steam sensor element, senses this escape of steam. Then, based upon the Auto Sensor Program selected, the unit will automatically determine the correct power level and the proper length of time it will take to cook the food.

NOTE: Auto Sensor Cooking is successful with the foods and recipes found in the Auto Sensor Cooking Guide. Because of the vast differences in food composition, items not mentioned in the Cooking Guide should be prepared in the microwave oven using power select and time features. Please consult Variable Power Microwave Cookbook for procedures.

Explanation of the Auto Sensor Cooking process

1. During the first 10 second period there is no microwave activity, and when calculating the T2 time by using the formula below make sure this 10 seconds is subtracted from the T1 time. In other words T1 time starts at the end of the 10 second period.
2. **T1 time** The total amount of time it takes the microwave oven to switch to T2 time after the 10 second period.
3. **T2 time** When the steam escapes from the cooking container placed in the oven, the steam sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.

Balance of cooking time (T2 time)

The balance of cooking time which is called T2 time, can be calculated by the following formula.

$T2 \text{ time (in sec.)} = T1 \text{ time} \times K \text{ factor}$

NOTE: Remember, the T1 time starts after the 10 second period. The coefficient K is programmed into the microprocessor memory and they are listed in the following tables along with the P1 and P2 powers.

NOTE: When "More" or "Less" pad is selected, the K factor varies resulting in T2 time to be increased or decreased.

Example of calculating the T2 time

Example 1: If the T1 time is measured to be 2 minutes and 40 seconds after the 10 second period, and the Auto program selected is Vegetables:

$$\begin{aligned} T2 &= T1 \times K \\ &= 2 \text{ min. and } 40 \text{ sec.} \times 0.1 \\ &= 160 \text{ sec.} \times 0.1 \\ &= 16 \text{ sec.} \end{aligned}$$

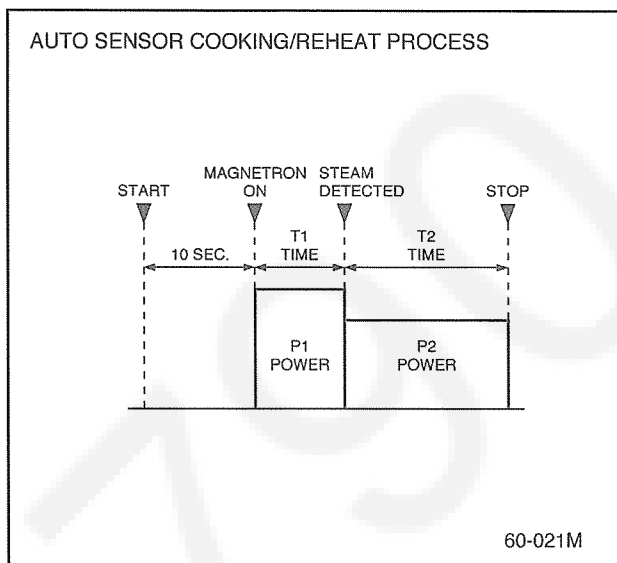
4.6. Auto Sensor Reheat

Auto Sensor Reheat is a quick and easy way to reheat

refrigerator and room temperature foods.

Simply press the reheat pad. There is no need to select power level and cooking time.

NOTE: The Auto Sensor Reheat process is same as Auto Sensor Cooking process.



Sensor Reheat

Category	P1 Power	P2 Power	K factor Standard
Sensor Reheat	HIGH	M. HIGH	0.1

5 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high-current equipment. Though 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.

5.1. Check the grounding

Do not operate on a 2-wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to make sure it is grounded properly before beginning repair work.

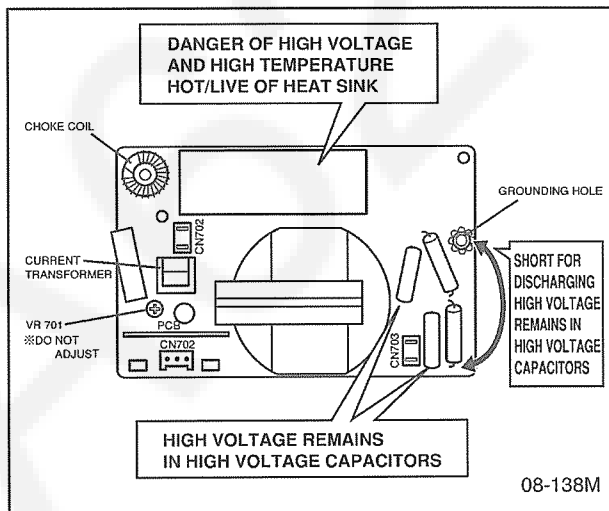
5.2. Inverter Warnings (NEW H.V.)

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

This High Voltage Inverter Power Supply circuit handles very high voltage and very high current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair. As you can see, it looks like a TV flyback transformer, however the current is extremely large and so danger exists by its high current and high voltages.

The aluminum heat sink is also energized with high voltage (HOT), so do not touch when AC input terminal is connected to the power line because one of the IGBT switching power devices (Collector) is directly connected to the Aluminum heat sink.

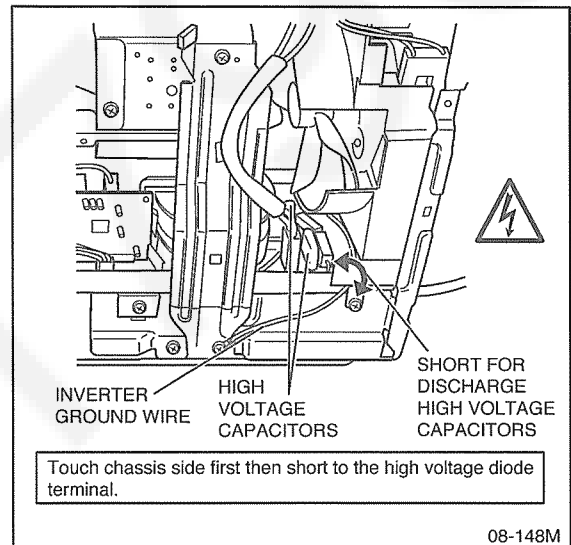
The Aluminum heat sink may be HOT by heat energy; therefore, extreme care should be taken during servicing and replacing.



WARNING OF DISCHARGING HIGH VOLTAGE CAPACITORS

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

When replacing or checking parts, remove the power plug from the outlet and remove air guide cover then short the Inverter high voltage diode terminal to the chassis ground with an insulated handle screwdriver to discharge. Please make sure to touch chassis ground side first then short to the output terminals.



WARNING

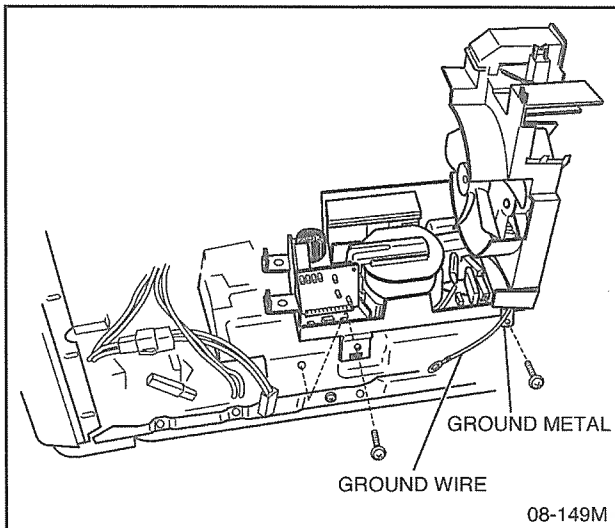
There is high-voltage present, with high-current capabilities in the circuits of the primary, and secondary windings, choke coil and heat sink of the Inverter. It is extremely dangerous to work on or near these circuits with oven energized. DO NOT measure the voltage in the high voltage circuit including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

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

WARNING OF INVERTER POWER SUPPLY (U) GROUNDING

Check the High Voltage Inverter Power Supply circuit grounding. This High Voltage Inverter Power Supply circuit board must have a proper chassis ground by the grounding bracket to the chassis ground; otherwise, this H.V.Inverter circuit board will expose very high voltage and cause extreme **DANGER!** Be sure to have proper grounding by the grounding plate and screws.



5.3. When parts must be replaced, remove the power plug from the outlet.

5.4. When the 10A 250V fuse is blown due to the operation of short switch:

WARNING

When the 10A 250V. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. Also replace power relay 1 (RY1) when the continuity check reads shorted contacts (1-2).

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

5.5. 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 other holes gaps, because such objects may work as an antenna and cause microwave leakage.

5.6. Confirm after repair

1. After repair or replacement of parts, make sure that the screws of the oven, etc. 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.

CAUTION

MICROWAVE RADIATION

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

IMPORTANT NOTICE

1. The following components have potentials above 250V while the appliance is operated.
 - * Magnetron
 - * Heat sink of H.V.INVERTER (U)
 - * High voltage transformer (H.V.INVERTER (U))
 - * High voltage diode (H.V.INVERTER (U))
 - * High voltage capacitors (H.V.INVERTER (U))
 Pay special attention on these portions.
2. When the appliance is operated with the door hinge or magnetron fixed incorrectly, the microwave leakage can reach more than 5mW/cm². After repair or exchange, it is very important to check if magnetron and the door hinge is correctly fixed.

6 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

6.1. Magnetron

1. Discharge high voltage capacitors.
2. Remove A screw holding magnetron on bracket.
3. Remove 2 high voltage lead wires.
4. Remove circulation fan motor bracket and belt. (2 screws)
5. Remove air guide. (2 screws)
6. Remove 4 screws holding magnetron.

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

CAUTION

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

NOTE

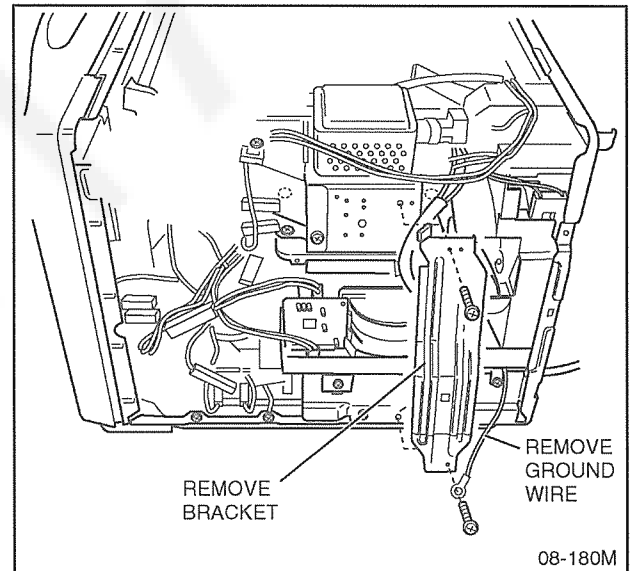
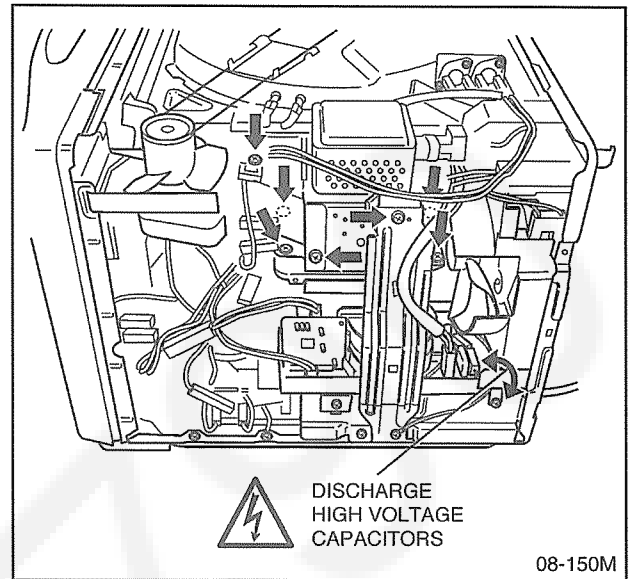
Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

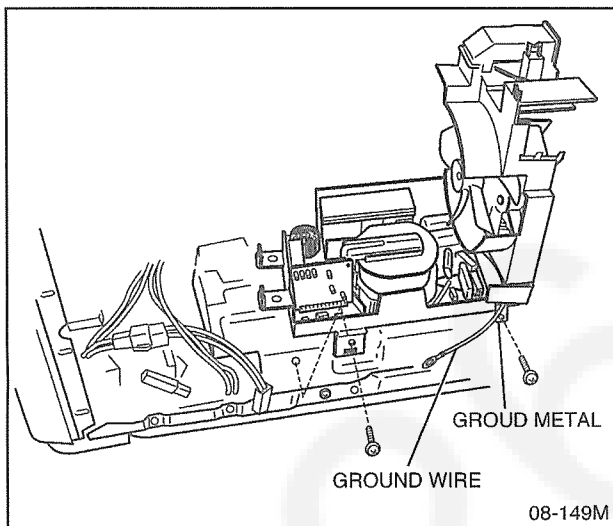
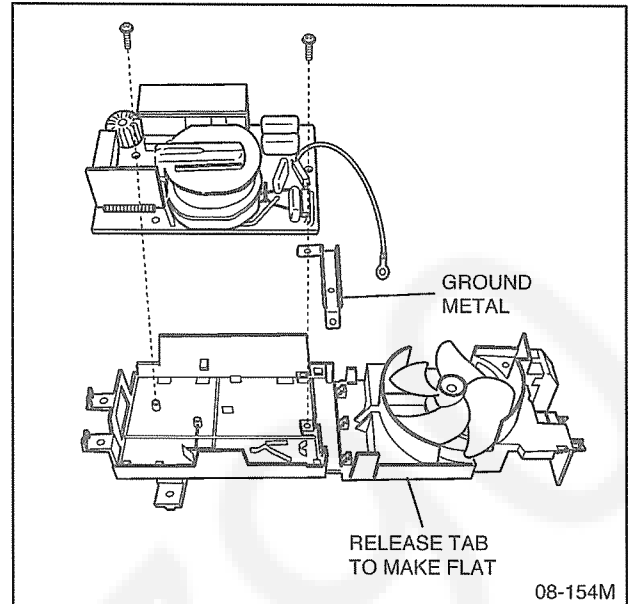
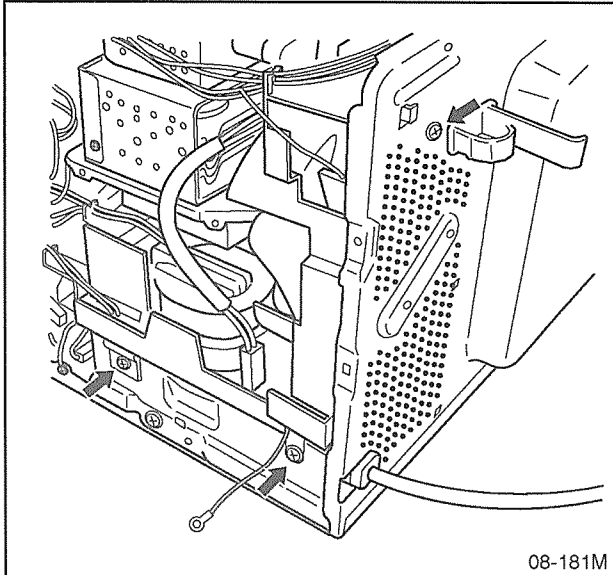
NOTE: Magnetron used for this modes is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

6.2. High Voltage Inverter Power Supply (U) (NEW H.V.)

1. Discharge high voltage capacitors.
2. Remove 2 screws holding magnetron bracket. (Remove grounding wire)
3. Remove 3 screws holding inverter and fan motor assembly.
4. Unplug 3 connectors of inverter PCB.
5. Remove 2 screws holding inverter PCB on to bracket.

NOTE: Do not pull by lead wires but make sure to pull housing unless PCB or lead wire may break.





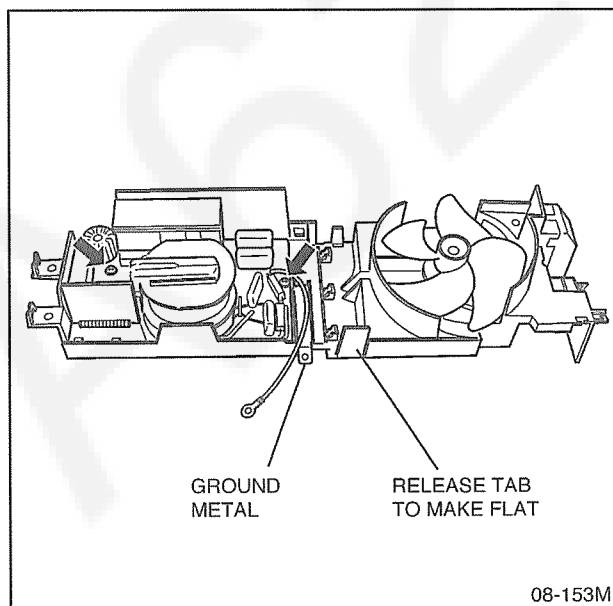
6.3. Digital programmer circuit (DPC) and membrane key board.

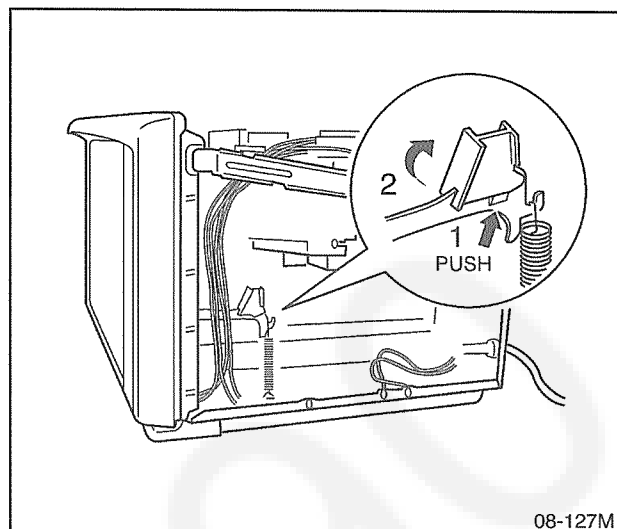
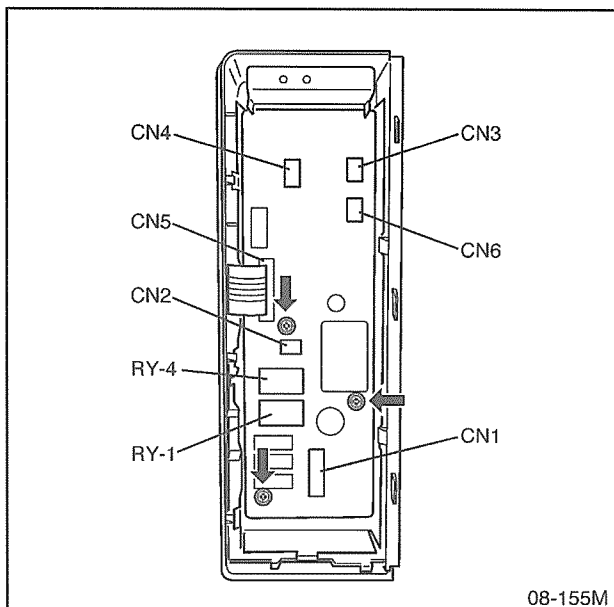
NOTE: Be sure to ground any static electric charge built up on your body, before handling the DPC.

1. Disconnect all connectors from D.P.C.
2. Remove 2 screws holding escutcheon base and slide the escutcheon base upward slightly with door closed.
3. Release CN5 connector's lock of DPC by pushing both levers to inside and pull them upward, and remove flat cable of membrane key board.
4. Remove 3 screws holding DPC.

To replace membrane key board

5. Remove escutcheon bracket from escutcheon base by freeing 5 catch hooks on the escutcheon base.
6. On some models, the key board is not replaced with individual parts. Instead, the entire escutcheon base assembly must be replaced. Refer to parts list.





6.4. Door assembly

1. Remove door spring right side.

NOTE: Please hold door unless door become fall down.

2. Remove door arm lever by pushing tab and turn clock wise.
3. Remove door spring left.
4. Insert flat blade screw driver to release hinge pin from left hinge.
5. Slide out left hinge pin to release the door.
6. Slide out door arms from the oven to disconnect door assembly.
7. Remove door arms from the door assembly.

To remove door C

8. Release catch hooks from hinge pin side.

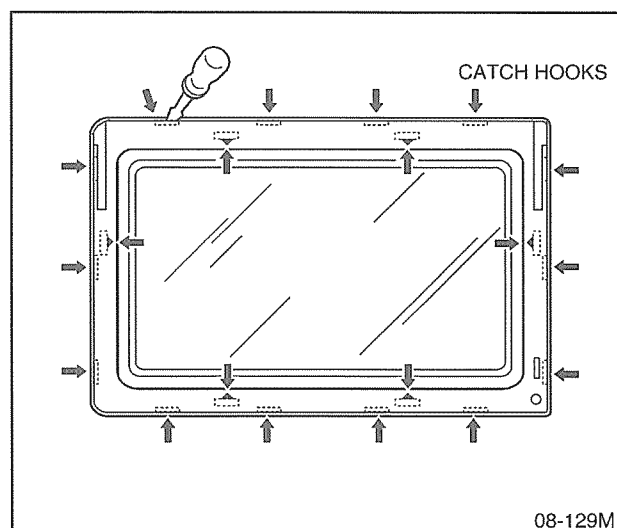
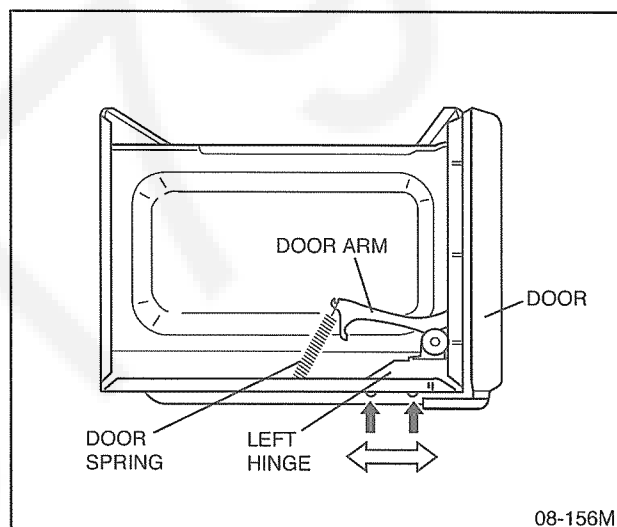
To remove door E

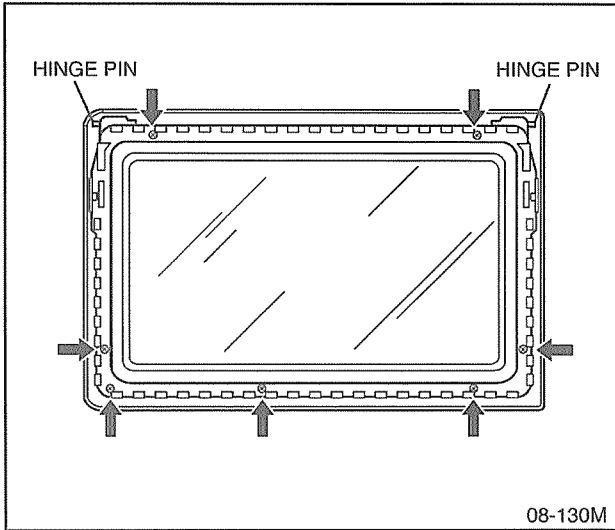
9. Remove screws holding door E to door A assembly.

After replacement of the defective component parts of the door, reassemble it and follow the instructions below for proper installation and adjustment so as to prevent an excessive microwave leakage. Adjustment of the door assembly.

10. When mounting the door to the oven, be sure to adjust the door parallel to the oven face plate by moving hinges back or front.

NOTE: Upper portion of door A should firmly touch to oven face plate without pushing.

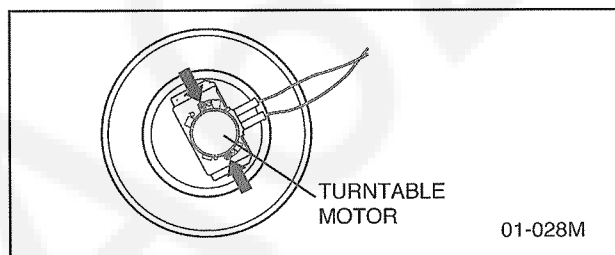
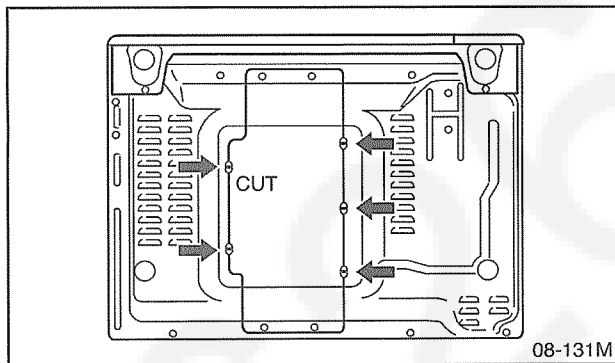




6.5. Turntable motor

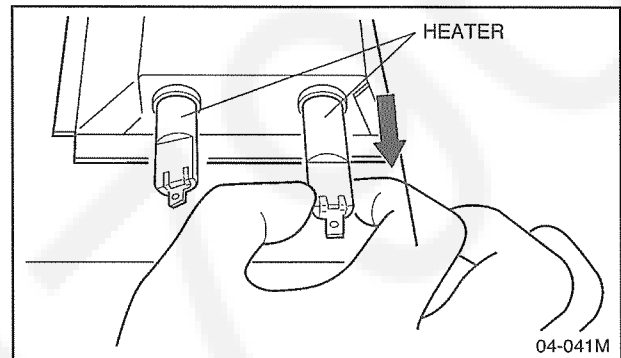
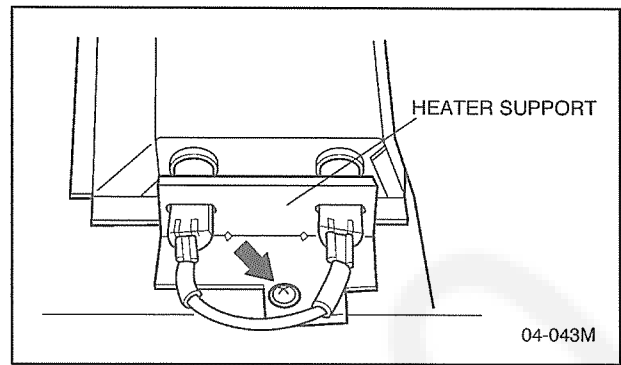
1. Breaking off at 5 spots indicated by allow with a cutter or like.
2. Remove 2 screws holding motor cover.
3. Disconnect 2 lead wires from turntable motor.
4. Remove 2 screws holding turntable motor.

NOTE: Make sure to remove sharp barrs at 5 spots to avoid possible injury.



6.6. Quartz heater

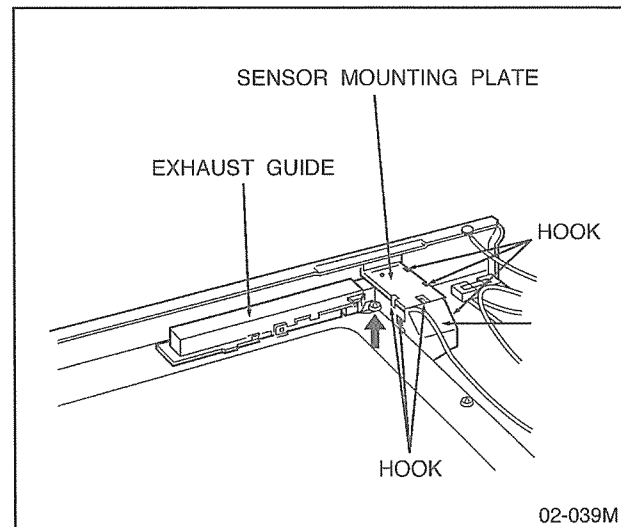
1. Disconnect lead wires from heater terminals.
2. Remove 1 screw holding heater supports.
3. Remove the heater by pulling it out.

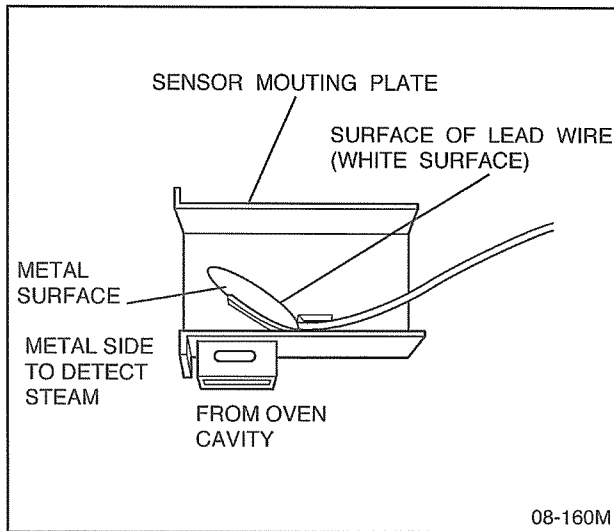


6.7. Steam sensor

1. Remove 1 screw holding steam sensor unit.
2. Disconnect CN2 connector from digital programmer circuit board.
3. Remove exhaust guide from steam sensor unit.
4. Remove catch hooks on sensor mounting plate and air guide.
5. Remove steam sensor from sensor mounting plate.

NOTE: When installing the steam sensor, make sure that the direction of steam sensor is as shown in figure.





7 COMPONENT TEST PROCEDURE

DANGER **NEW H.V.**

1. High voltage is present at the high voltage terminal of the High Voltage Inverter (U) including aluminum heat sink during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

7.1. Primary Latch Switch, Secondary (Secondary Latch Switch and Power Relay 1) Interlocks.

1. Unplug the lead connectors to Power Relay 1 and verify continuity of the power relay 1 1-2 terminals.
2. Unplug lead connectors to Primary Latch Switch and Secondary Latch 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.

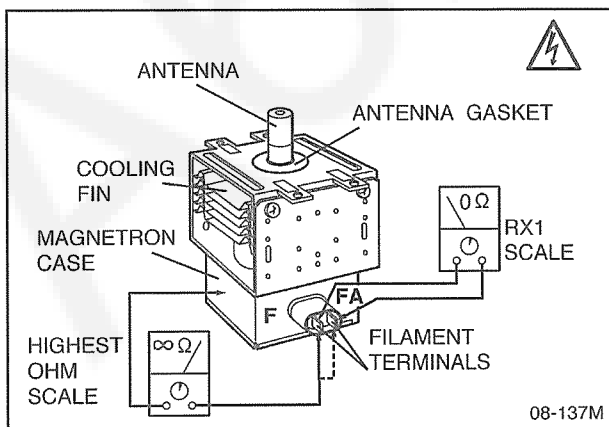
	Door Opened	Door Closed
Primary Latch Switch	$\infty \Omega$ (open)	0 Ω (close)
Secondary Latch Switch	$\infty \Omega$ (open)	0 Ω (close)
Power Relay 1	$\infty \Omega$ (open)	$\infty \Omega$ (open)

7.2. Short Switch / Monitor Circuit

1. Unplug lead wires from H. V. Inverter primary terminals.
2. Connect test probes of ohm meter to the disconnected leads which were connected to H. V. Inverter.
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
0 Ω	$\infty \Omega$



7.3. Magnetron (NEW H.V.)

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.

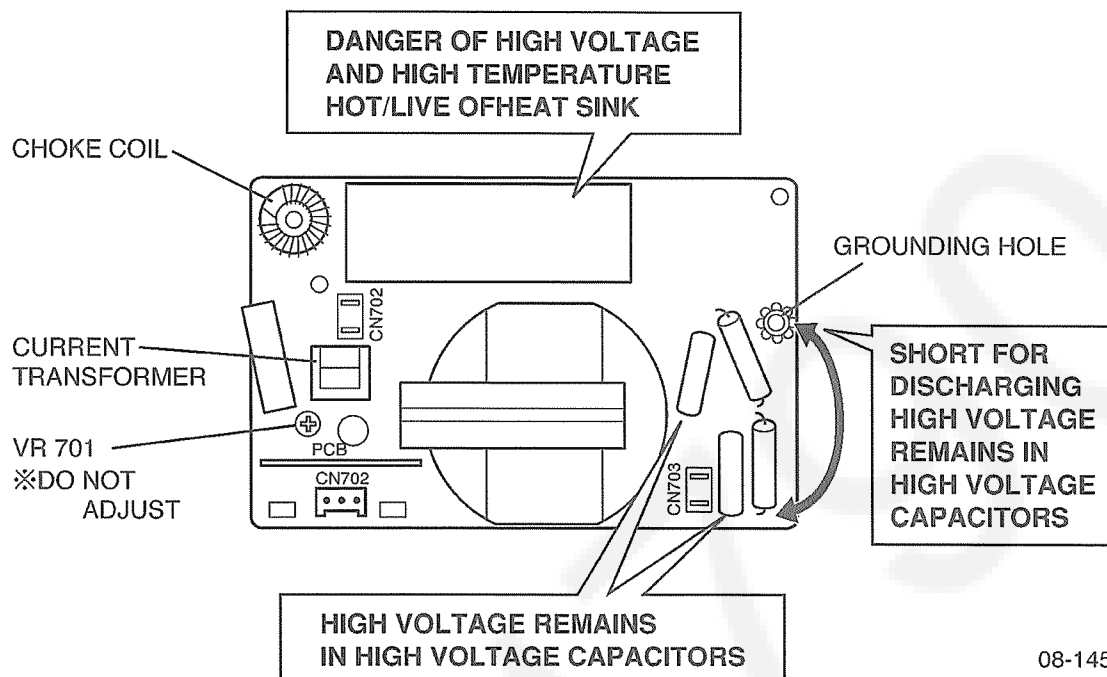
NOTE

Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

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) (NEW H.V.)



08-145M

7.6. Inverter Power Supply (U) (NEW H,V,)

DANGER HIGH VOLTAGE

Test 1

- Place 1 liter of water load into oven cavity.
- Unplug 2 pin H. V. lead wire connector CN703 from magnetron tube.
- Program oven at High power for 1 minute and press start.
 - After approx. 23 seconds, oven stops.
 - During oven operation, input current is approx. at 0.5 to 1.0A . If input current is OK, please proceed to test 2.

	INPUT AMPARE	SYMPTOM
Unplug CN703	0.5 to 1A	Oven stops in 23 seconds after started.

Test 2

Continued from Test 1

- Unplug 3 pin connector, CN701 CN703 remain unplug.
- Set oven at High power for 1 minute and start.
 - After approx. 3 seconds, oven.
 - During oven operation, input current should be less than 0.4A.

	INPUT AMPARE	SYMPTOM
Unplug CN701	less than 0.4A	Oven stops in 3 seconds after started.

If both 1 and 2 are OK, the Inverter Power Supply (U) can be determined OK.

7.7. Steam Sensor and Digital Programmer Circuit

In order to determine if the steam sensor function of the digital programmer circuit is in working order or not, do the following test.

- Place a water load (150 cc) in the oven.
- Tap Sensor Reheat pad.
- Tap Start Pad.
- Steam Sensor detects steam about 1.5 to 4 minutes after the Start Pad is tapped.
- T1 time cooking automatically switches to remaining time cooking (T2).
- The remaining cooking time (T2) appears in display window. If the following cooking time appears, Steam Sensor function is normal.

T1 TIME	T2 TIME (Remaining cooking time)
1 Min. 30 Sec. ~ 4 Min.	18 Sec. ~ 48 Sec.

7.8. Oven temp sensor thermistor

This sensor monitors the heat produced by the heater circuit and maintains the oven temperature the user had selected. Normal room 10°C to 30°C. The reading across the oven sensor thermistor should be within 100K ohm to 300K ohm when reading in an area with the 50°F to 90°F room temperature range.

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

NOTE 1: When measuring resistance disconnect the 3-pin

connector (CN6) from the DPC otherwise a false reading may be indicated.

NOTE 2: If checking an oven sensor thermistor just after the microwave oven has been operating, the sensor of course won't be room temperature. In this case the sensor must be removed and allowed to cool down to the 10°C to 30°C range.

8 MEASUREMENTS AND ADJUSTMENTS

8.1. Adjustment of Primary latch switch, Secondary latch switch and short switch

1. When mounting Primary latch switch, Secondary latch switch and short switch to door hook assembly, mount the Primary latch switch, the Secondary latch switch and the short switch to the door hook assembly as shown in table.

NOTE: No specific adjustment during installation of Primary latch switch, Secondary latch switch and short switch to the door hook is necessary.

2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table 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.
3. Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.

8.2. Measurement of microwave output

The output power of 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 liter 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 accurate as possible.

1. Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beaker's temperature (recorded as T1)
2. Place the beaker on the center of glass cook plate. Set the oven for High power and heat it for exactly one minute.
3. When one minute is elapsed, open the door and take out beaker.
4. Stir the water again and read the temperature of the beaker (recorded as T2).
5. The normal temperature rise at High power position for each models is as shown in table.

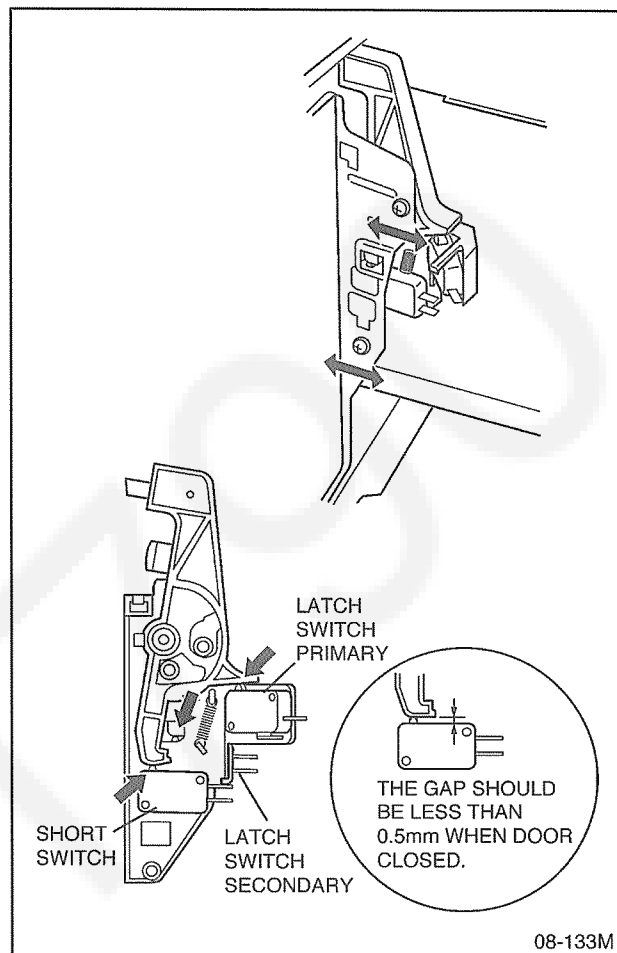


TABLE (1 l -1 min. test)

OUTPUT	TEMPERATURE RISE
1000W	Min. 8.6°C

9 TROUBLESHOOTING GUIDE (NEW H.V.)

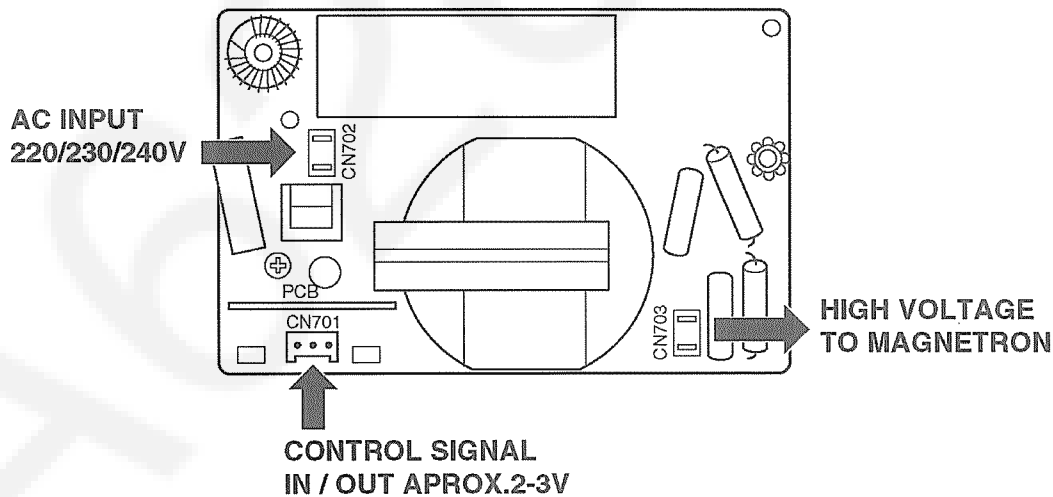
DANGER HIGH VOLTAGES

1. **DO NOT RE-ADJUST PRESET VOLUME on the H.V.Inverter (U).** It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very large current with very high voltage. Off alignment of inverter board operation will be dangerous.
2. Ensure proper grounding before checking for trouble.
3. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
4. Discharge high voltage remains 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. To do 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 open 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 yourself to ground while working on this panel to discharge any static charge in your body.
7. 220/230/240V 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.




(Trouble 1) Oven stops operation during cooking

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven stops in <u>3 seconds</u> after pressing start pad	No 220/230/240V AC is supplied to H.V.Inverter (U) CN702 terminals	1. Latch Switch 2. Power relay RY-1 3. Loose lead wire connector CN701,CN702
	Oven stops in <u>23 seconds</u> 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 10 seconds after pressing start pad (Auto sensor cooking)	Steam sensor circuit is not functions	1. Steam sensor 2. DPC 3. Loose wiring connector CN2
2.	Oven stops in random time after pressing start pad	Most probably loose connection of connectors or door latch mechanism is not adjusted properly	1. Align door, Door Latch Switches 2. Loose wiring connectors



08-182M

(Trouble 2) Other troubles

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness 2. Open thermal cutout 3. Defective DPC	Check fan motor when thermal cutout is defective.
2.	No display and no operation at all. Fuse is blown.	1. Shorted lead wire harness 2. Defective primary latch switch (NOTE 1) 3. Defective short switch (NOTE 1) 4. Defective H.V. Inverter power supply (U)  Refer to component test procedure	Check adjustment of primary, secondary latch switch and short switch including door. Refer to inverter PCB Troubleshooting
		NOTE 1: All of these switches must be replaced at the same time. (Refer to adjustment instructions.) Check continuity of power relay 1's contacts (between 1 and 2) and if it has continuity, replace power relay 1 also.	
3.	Oven does not accept key input (Program).	1. Key input is not in sequence 2. Open or loose connection of membrane key pad to DPC (Flat cable) 3. Shorted or open membrane key board 4. Defective DPC	Refer to operation procedure. Refer to DPC troubleshooting.
4.	Oven lamp and fan motor turn on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch	Adjust door and latch switches.
5.	Timer starts countdown but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of latch switches 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent. 3. Defective high voltage component  H.V. Inverter (U)  Magnetron 4. Open or loose wiring of power relay 1 5. Defective primary latch switch 6. Defective power relay 1 or DPC	Adjust door and latch switches. Check high voltage component according to component test procedure and replace if it is defective. Refer to DPC troubleshooting.
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary latch switch 2. Off-alignment of secondary latch switch 3. Defective secondary latch switch	Adjust door and latch switches.
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit (Intermittent oscillation) 3. Aging change of magnetron	Consult electrician.
8.	Turntable motor turns on when door is opened.	1. Shorted primary latch switch	
9.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
10.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
11.	Heater does not turn on.	1. Defective heater 2. Defective power relay 4 (RY4) 3. Defective DPC	

(Trouble 3) Trouble related Digital programmer circuit

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Fuse resistor R28 1Ω	Normal	STEP 2
			Open	Shorted circuit of IC-10
	2	Q10 emitter (Output terminal)	Abnormal	Q10
			Normal $\approx 5V$	→ IC-1, CX320, DISPLAY
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC-1
No beep sound	1	IC-1 pin 8 voltage	Abnormal	IC-1
			Normal	BZ, IC-220
Power relay A (RY-2) does not turn on even though the program has been set and the start pad is tapped	1	IC-1 pin 41 voltage while operation	Abnormal	IC-1
			Normal $\approx 5V$	→ Step 2
	2	Short circuit between pin 8 and pin 12 of IC-220	Still not turn on	RY-2
			RY-2 turns on	IC-220
No microwave oscillation at any power setting	1	IC-1 pin 9 voltages while operation at high power	Abnormal	IC-1
			Normal 5... $\approx 5V$	→ Step 2
	2	Q220 transistor	Abnormal	Q220
			Normal	IC-220, RY-1
Dark or unclear display	1	Replace display and check operation	Normal	DISPLAY
			Abnormal	IC-1
Missing or lighting of unnecessary segment	1	Replace IC-1 and check operation	Normal	IC-1
			Abnormal	DISPLAY

(Trouble 4) Inverter circuit

Inverter PCB Repair Procedures

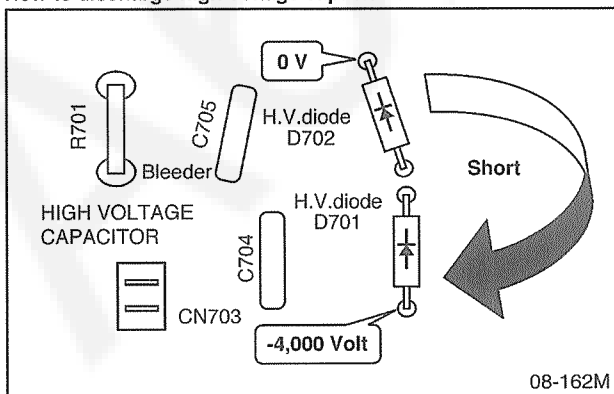
Warning for High Voltages!

1. Unplug oven when removing outer cabinet
2. Never touch inverter PCB with oven plugged in inverter PCB handling over 7,000V and it is very danger!
3. Heat sink is also energized with High Voltages!
4. Discharge high voltage before touching circuitry
5. When testing inverter PCB, completely install it into oven, put outer cabinet and make proper ground.

1. Discharge high voltage before touching Inverter PCB.

1. Unplug oven and leave it for more than 30 seconds before removing outer cabinet.
2. Use insulated lead wire to short across D701 Anode to D702 Cathode or short across magnetron filament terminals to the chassis ground. Please refer to service manual for detail of the specified model.

How to discharge high voltage capacitors



2. Remove inverter PCB from oven before troubleshooting. Refer to related service manual for inverter PCB removal.

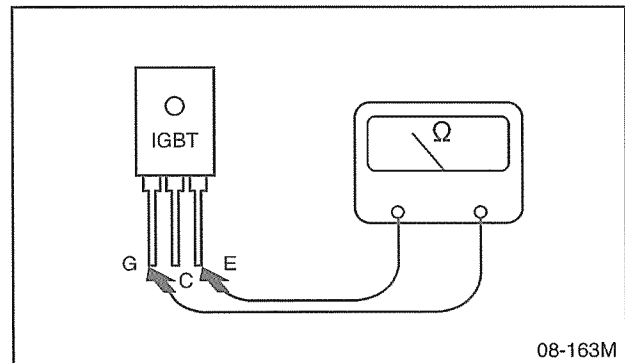
1. Visual check:

- a. PCB board: Any crack on board, burnt printed copper foil pattern? Any cockroach, bugs excrements, any mark of wet?
- b. Components: Any damaged components? Any burnt, broken or missing?

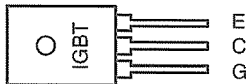
3. Check component by circuit tester.

**Make sure remove inverter PCB when continuity check
Do not test component when inverter PCB is installed**

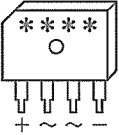
How to check semi conductor IGBT

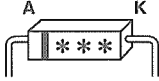
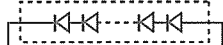


1. How to check power transistors (Q701, Q702). To measure, suck a solder from its legs completely unless false reading may observe and mislead a troubleshooting. Measure across pins between E-C, E-G, C-G, E-black lead, C-red lead of tester should be infinite and may have some reading in reverse, it is normal. Refer to attached table for normal reading.
2. DB701 Diode Bridge
3. C704, C705 High voltage Capacitors. D702 and C705, D701 and C704 are parallel connected therefore, remove component to measure when diode is shorted.
4. D701, D702 High voltage Diodes

		
	FORWARD	REVERSE
E-C	Some Ω	∞
E-G	∞	∞
C-G	∞	∞

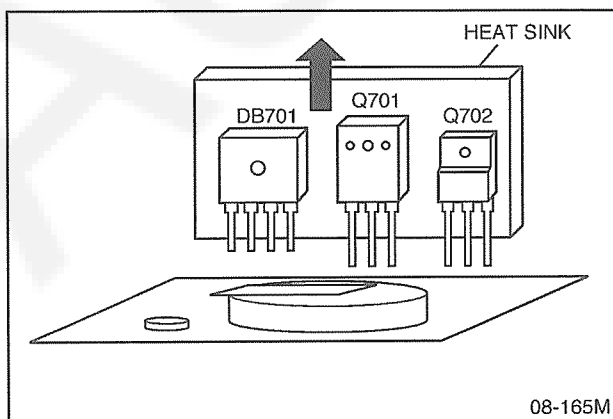
08-164M

		FORWARD	REVERSE
	~ - +	Some Ω	∞
	~ - -	Some Ω	∞
	~ - ~	∞	∞
	+ - -	Some Ω	∞

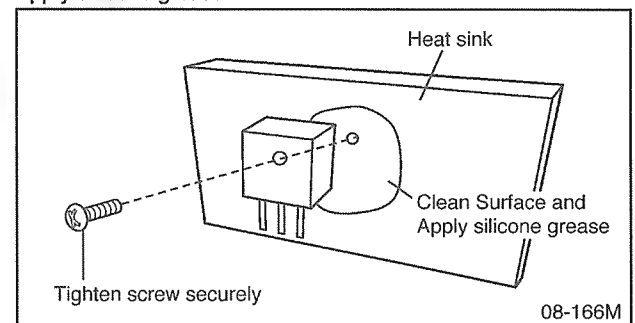
BETWEEN TERMINALS	FORWARD	REVERSE
<p>A-K</p>  <p>INSIDE OF HV. DIODE</p> 	<p>∞ infinite Circuit tester employed lower voltage battery</p> <p>Several k ohm to several hundred k ohm will be observed Circuit tester should employed more than 9V battery</p>	<p>∞ infinite It does not matter by internal battery voltage</p>

4. How to replace power transistors Q701, Q702 and Bridge Diode DB701.

1. To remove Q701, Q702 and DB701 unsolder their legs first, next remove a screw that holding the heatsink onto the PCB then detach the heatsink as shown below.
Service Hints: For easy solder removal, use one soldering iron to heat a solder and use solder sucker iron to suck solder.
2. Make sure to replace both Q701 and Q702 at a time with the same maker.
3. Make sure to apply heat conduction grease between transistor and heat sink.
4. NO DUST SHOULD CAUGHT between heat sink and power transistor unless it causes looseness of heat conduction and insufficient cooling to blow components.



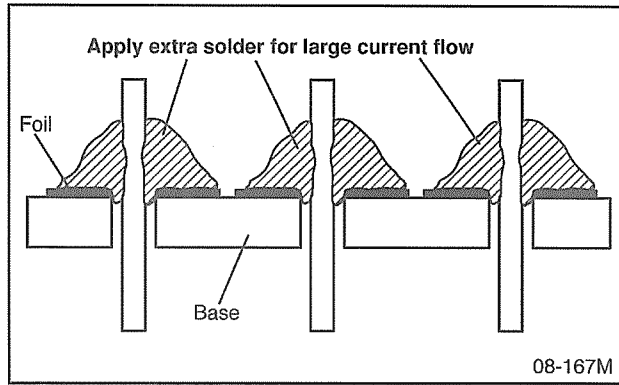
Apply silicone grease



5. Screw must be tighten securely.

6. Install the heatsink onto the PCB by a screw and make sure to apply extra solder between legs and PCB pattern so that it's able to flow 15A or more main current.

Applying extra solder



7. Apply extra solder onto Q701 and Q702 legs and printed foil pattern to be able to hold main large current of more than 15A.

Service hint:

For easy removal of solder, apply some solder first than suck it all.

8. How to test repaired Inverter PCB.

WARNING:

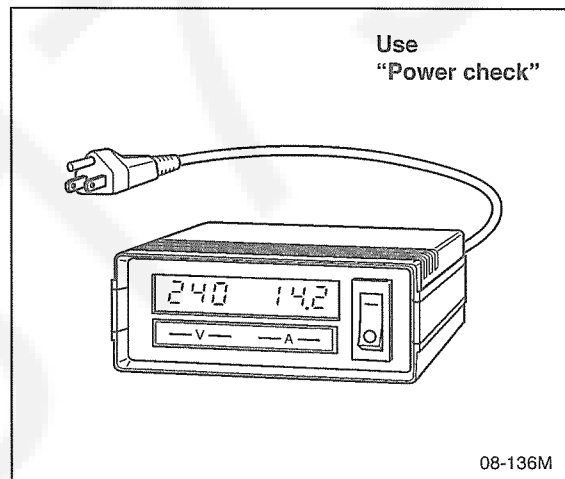
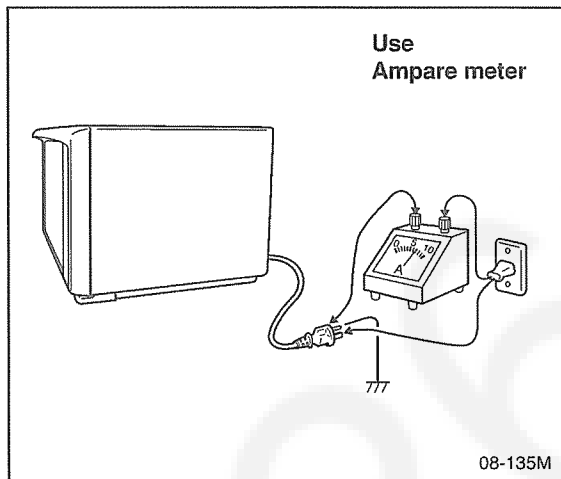
1. Do not test Inverter PCB with using any extension cable
Open grounding of inverter PCB is so DANGER.
2. Make sure to check no Bridge solder nor cold solder joint.
1. Install Inverter PCB into oven with screws securely, plug in CN701, CN702 and CN703.
2. Insert AC plug through the Amper meter with specified voltage.

NOTE: Current will be changed by the input AC voltage.

3. Operate the oven at High power setting for 1 minute.
4. Read input current which should be within oven specification.

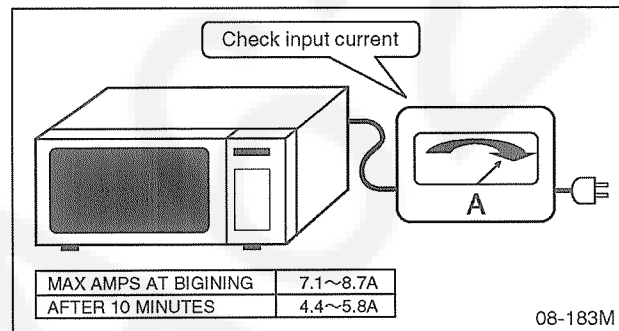
NOTE: Input current will be decreased after a certain cooking period.

5. Adjustment is not necessary when replacing transistors
You may adjust the preset volume control VR701 to meet the specified input current when Transformer is replaced.



OR

How to test oven



VR701



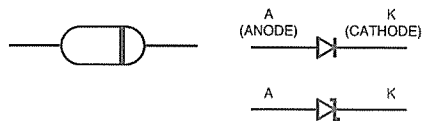
No adjustment is necessary when IGBT Diodes, capacitors are replaced.

Preset Volume control

NOTE: WHEN TRANSFORMERS OR IC WAS REPLACED MAKE SURE ADJUST VOLUME FOR PROPER INPUT AMPARES.

10 HOW TO CHECK THE SEMICONDUCTORS USING AN OHM METER

Diode



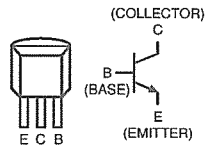
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC.....

2SD.....

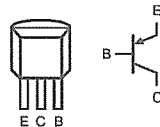


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

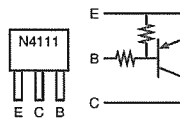
2SA.....

2SB.....



	FORWARD	REVERSE
B-E	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

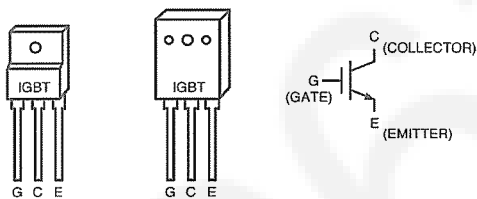
Digital Transistor PNP Transistor



	FORWARD	REVERSE
E-B	10k Ω ~ 30k Ω	10k Ω ~ 30k Ω
C-B	50k Ω ~ 90k Ω	∞
C-E	40k Ω ~ 80k Ω	∞

IGBT

(INSULATED GATE BIPOLAR TRANSISTOR)

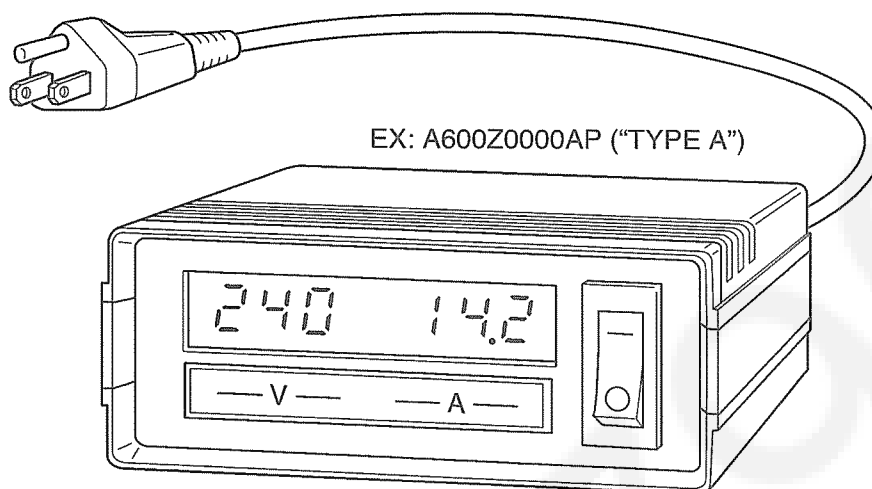


	FORWARD	REVERSE
E-C	SMALL	∞
E-G	∞	∞
C-G	∞	∞

11 INTRODUCING OF TEST JIGS

1. "Power Check" (Microwave Oven Tester)

This tester can be measure both line voltage and ampares at a time for easy and quick testing microwave oven.



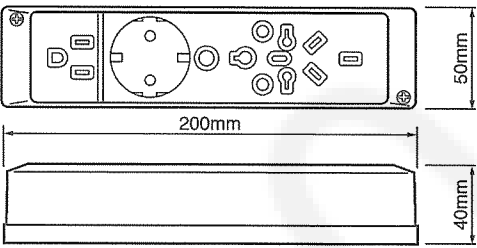
Specifications

Dimensions	133 mm (W) X 150 mm (D) X 57 mm (H)
Operating/ Measuring Voltage	100 -240 V 50/60 Hz
Measuring Ampares	0.1 -15.0 A (up to 20 A for short time operation)
Plug and Outlet type	See below
Specifications subject to change without notice.	

Part number/Plug and Outlet type

Part No.	Plug	Outlet
A600Z0000AP	TYPE "A"	TYPE "A"
A600Z0000GP	TYPE "C"	TYPE "C"
A600Z0000QP	TYPE "S"	TYPE "S"

2. Universal outlet

Part No.	Available Outlet Type
WCF5901H	<p>TYPE A, B, C, S (A1, A2, B, BF, B1, C1, C2, C3, C5, C6, S)</p> 

3. Stainless steel ruler (150mm) Part No. A130005-150

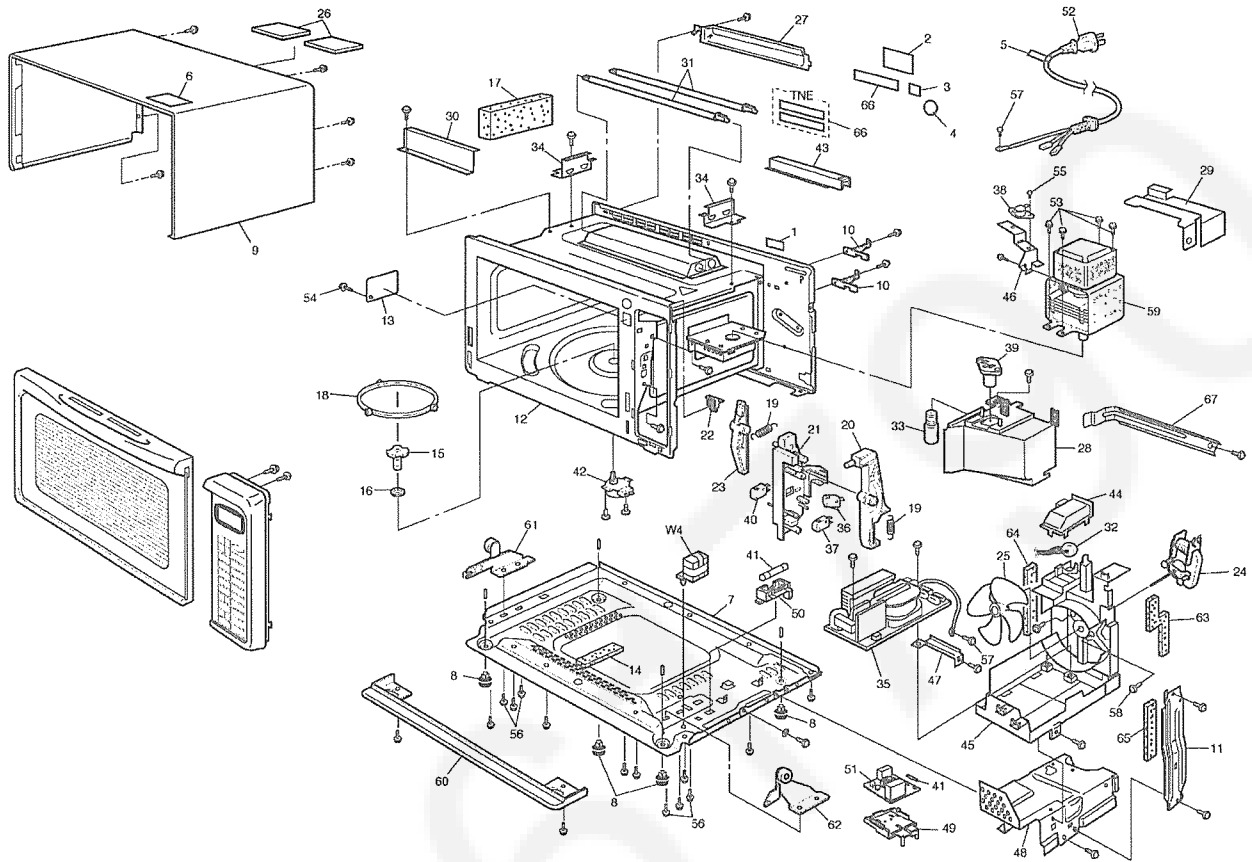
It is convenient to use for adjustment of door. Also it is convenient to use for removing door C.

4. Flourescent light bulb (4W) Part No. A600Z-FL4W

This is convenient for check whether microwave is oscillate or not in a second.

WARNING: Use it with full one litter of water load and make sure less than 10 seconds oscillation on each time. Longer operation will cause over heat and burn the light bulb shortly.

12 EXPLODED VIEW AND PARTS LIST



(S-4Y6 HNE)

13 PARTS LIST

When ordering replacement part(s), please use number(s) shown in this parts list.

Do not use description of the part.

Important safety notice:

Components identified by Δ mark have special characteristics important for safety.

When replacing any of these components, (l. e. HNE etc.) indicate parts applicable to only specified country models as follows.

HNE: For Hong Kong, **KKE:** For U.A.E., Egypt, Iran, **KNQ:** For Kuwait, Doha, Qatar, Oman, Bahrain, Pakistan,

MNQ: For Malaysia, **SNM:** For Saudi Arabia, **XNE:** For China, **TNE:** For Thailand, Indonesia,

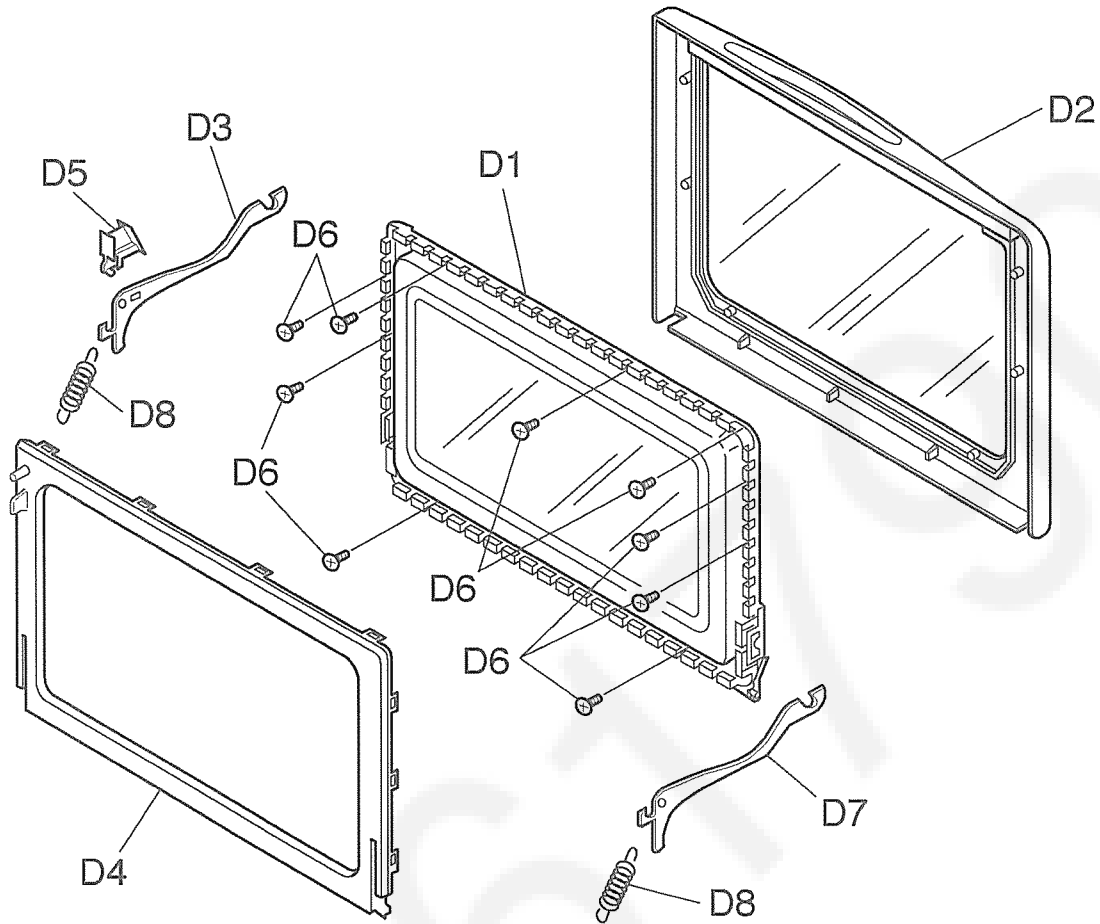
YNQ: For Singapore, **ZPE:** For CIS countries.

Parts without these marks can be used for all models.

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
1	ANE00057J0XN	EARTH LABEL	1	NN-V690P TNE
2	A00065460JP	CAUTION LABEL	1	NN-V690P HNE/KKE/KNQ/MNQ/SNM/TNE/ZPE/YNQ NN-V680W
2	A00067680XN	CAUTION LABEL	1	NN-V690PS
2	A00065540MN	CAUTION LABEL	1	NN-V690P YNQ
2	A00065460ZP	CAUTION LABEL	1	NN-V690P ZPE
3	A02840000MK	NUMBER LABEL	1	NN-V690P YNQ
4	A02357530XN	CCIB LABEL	1	NN-V690PS NN-V680WS
5	ANE0239L00XN	CORD CAUTION LABEL	1	NN-V690P KKE/KNQ/SNM
6	A02444X70QP	BODY CAUTION LABEL	1	
7	A10014X80MN	BASE	1	
8	ANE1008-3W0	RUBBER FOOT	4	
8	ANE1008-3W0	RUBBER FOOT	4	
8	ANE1008-3W0	RUBBER FOOT	4	
9	A10094Y60GXN	CABINET BODY	1	NN-V690P NN-V690PS
9	A10094Y70HXN	CABINET BODY	1	NN-V680W NN-V680WS
10	A11404J60AP	STOPPER	2	
10	A11404J60AP	STOPPER	2	
11	A11614X80MN	REINFORCE BRACKET	1	
12	A200A4Y60XN	OVEN	1	Δ
13	A2011-1640	COVER	1	Δ
14	ANE0929000AH	CUSHION RUBBER C	1	
15	A21315870GP	PULLEY SHAFT	1	
16	ANE2177-F80	WASHER		
17	ANE0928000AL	CUSHION RUBBER C	1	
18	A290D4J00XN	ROLLER RING (U)	1	
19	A3097-1660	SPRING	2	
19	A3097-1660	SPRING	2	
20	A3102-1830	LATCH SWITCH LEVER	1	
21	A3103-1830	LATCH SWITCH BRACKET	1	
22	A3105-1830	LATCH BRACKET	1	
23	A3249-1830	LATCH SWITCH LEVER	1	
24	A400A4X80MN	FAN MOTOR	1	
25	A4008-1640	FAN	1	
26	A12214J00XN	CUSHION RUBBER A	2	
27	A40244J00XN	EXHAUST GUIDE A	1	
28	A40254J00XN	AIR GUIDE A	1	
29	A40264X80MN	AIR GUIDE B	1	
30	A41074J00XN	EXHAUST GUIDE	1	
31	A630G6520HN	HEATER	2	NN-V690P HNE/LNK/TNE/SNM/KKE/ZPE NN-V690PS NN-V680W NN-V680WS
31	A630G6520BP	HEATER	2	NN-V690P MNQ/YNQ/KNQ
32	A607S-1450	STEAM SENSOR	1	
33	A60304080BP	INCANDESCENT LAMP	1	20W/240V
34	A64604J00XN	HEATER MOUNT PLATE	2	
34	A64604J00XN	HEATER MOUNT PLATE	2	
35	A606Y4V00GP	H. V. INVERTER (U)	1	
36	A6142-1450	MICRO SWITCH	1	Δ (V-16G-3C26) PRIMARY LATCH SWITCH
37	A61425180AP	MICRO SWITCH	1	Δ (L-3C2-2S) SECONDARY LATCH SWITCH
38	A61458020BP	THERMAL CUTOUT	1	Δ
39	A61524000AP	SOCKET	1	Δ EXCEPT HNE
39	A61524650AP	SOCKET	1	Δ NN-V690P HNE NN-V680W
40	A61785180AP	MICRO SWITCH	1	Δ (L-2C2-2S) SHORT SWITCH
41	A62304210BP	FUSE	1	Δ 10A

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
41	A62304210BP	FUSE	1	△10A
42	A63268960JP	TURNTABLE MOTOR	1	
43	A64504J00XN	EXHAUST GUIDE B	1	
44	A65434X80MN	EXHAUST GUIDE C	1	
45	A65854X80MN	P. C. B. HOLDER A	1	
46	A66264J00XN	THERMAL CUTOOUT MOUNT	1	
47	A66624X80MN	GROUND PLATE	1	
48	A67634X80MN	P. C. B. HOLDER B	1	
49	A67974X00CP	P. C. B. HOLDER C	1	NN-V690P ZPE NN-V690PS NN-V680WS
50	A62314000AP	FUSE HOLDER	1	EXCEPT ZPE/XNE
51	A692Y4T00QP	NOISE FILTER (U)	1	NN-V690P ZPE NN-V690PS NN-V680WS
52	A900C4X80HN	AC CORD W/PLUG	1	△NN-V690P HNE/KKE/KNQ/MNQ NN-V680W (220-240V)
52	A900C4X80SN	AC CORD W/PLUG	1	△NN-V690P SNM (220V)
52	A900C4X80XN	AC CORD W/PLUG	1	△NN-V690PS NN-V680WS (220V)
52	A900C4X80TN	AC CORD W/PLUG	1	△NN-V690P TNE (220V)
52	A900C4X80YN	AC CORD W/PLUG	1	△NN-V690P YNQ (230-240V)
52	A900C4X80ZP	AC CORD W/PLUG	1	NN-V690P ZPE (220V)
52	A900C4Y60LN	AC CORD W/PLUG	1	NN-V690P LNK (220-230V)
53	XTWANE4+12B	SCREW	4	(4X12) FOR MAGNETRON
54	XTTANE4+6SX	SCREW	1	(4X6) FOR COVER
55	XTEANE3+6B	SCREW	1	(3X6) FOR THERMAL CUTOOUT
56	XTWANE4+12LR	SCREW	4	(4X12) FOR HINGE
56	XTWANE4+12LR	SCREW	4	(4X12) FOR HINGE
57	XTWA4+8CF	SCREW	2	(4X8) FOR EARTH (INVERTER, CABLE)
57	XTWA4+8CF	SCREW	2	(4X8) FOR EARTH (INVERTER, CABLE)
58	XTW4+8T	SCREW	2	(4X8) FOR FAN MOTOR
59	2M236-M42G	MAGNETRON	1	△
60	A80234J00XN	ESCUTCHEON SASH	1	
61	A300B-1640	LEFT HINGE	1	
62	A300U-1640	RIGHT HINGE	1	
63	ANE0923000AM	CUSHION RUBBER C	1	
64	ANE0924000AL	CUSHION RUBBER C	1	
65	ANE0924000AJ	CUSHION RUBBER C	1	
66	A01574Y60HN	NAME LABEL	1	NN-V690P HNE
66	A01574Y60MN	NAME LABEL	1	NN-V690P MNQ
66	A01574Y60LN	NAME LABEL	1	NN-V690P LNK
66	A01574Y60YN	NAME LABEL	1	NN-V690P YNQ
66	A01574Y60TN	NAME LABEL	1	NN-V690P TNE (THAI & ENGLISH)
66	A01574Y60KN	NAME LABEL	1	NN-V690P KNQ
66	A01574Y60SN	NAME LABEL	1	NN-V690P SNM
66	A01574Y60KK	NAME LABEL	1	NN-V690P KKE
66	A01574Y60ZP	NAME LABEL	1	NN-V690P ZPE
66	A01574Y60XN	NAME LABEL	1	NN-V690PS
66	A01574Y70HN	NAME LABEL	1	NN-V680W
66	A01574Y70XN	NAME LABEL	1	NN-V680WS
67	A20344Y60XN	OVEN REINFORCE BRACKET	1	

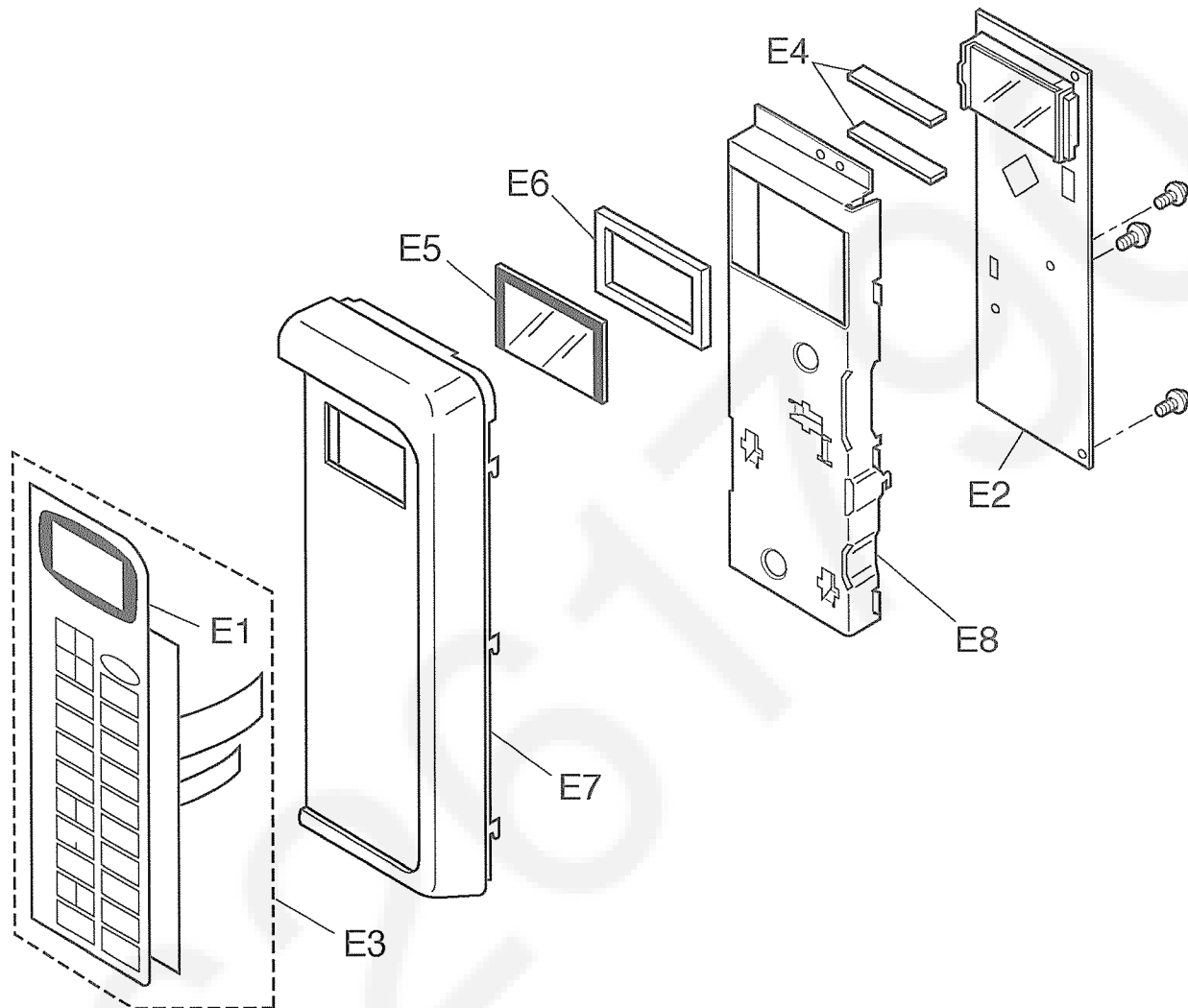
14 DOOR ASSEMBLY



(S-4Y6 HNE)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
D1	A302K4J00XN	DOOR E (U)	1	⚠
D2	A302A4Y60GHN	DOOR A (U)	1	NN-V690P HNE/KKE/KNQ/MNQ/SNM/TNE/YNQ/LNK NN-V690PS
D2	A302A4Y60GZP	DOOR A (U)	1	NN-V690P ZPE
D2	A302A4Y70HHN	DOOR A (U)	1	NN-V680W NN-V680WS
D3	A3044-1640	RIGHT DOOR ARM	1	
D4	A30854J00XN	DOOR C	1	⚠
D5	A3252-1450	DOOR ARM SPACER	1	
D6	XTN3+7Q	SCREW	8	
D6	XTN3+7Q	SCREW	8	
D6	XTN3+7Q	SCREW	8	
D6	XTN3+7Q	SCREW	8	
D7	A3054-1640	LEFT DOOR ARM	1	
D8	A3230-1600	SPRING	2	
D8	A3230-1600	SPRING	2	

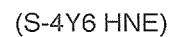
15 ESCUTCHEON BASE ASSEMBLY



(S-4Y6 HNE)

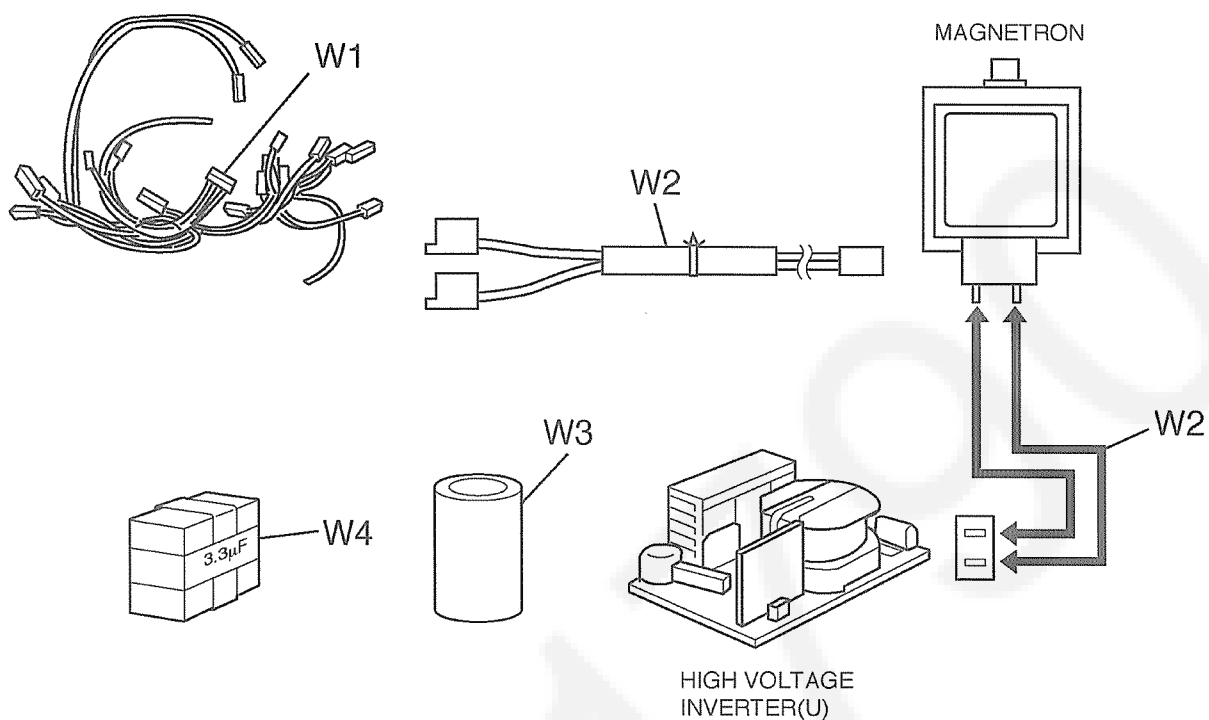
Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
E1	A83374Y60GMN	ESCUTCHEON SHEET	1	NN-V690P HNE/MNQ/TNE/YNQ/LNK
E1	A83374Y60GKN	ESCUTCHEON SHEET	1	NN-V690P KKE/KNQ/SNM
E1	A83374Y60GXN	ESCUTCHEON SHEET	1	NN-V690PS
E1	A83374Y60GZP	ESCUTCHEON SHEET	1	NN-V690P ZPE
E1	A83374Y70GMN	ESCUTCHEON SHEET	1	NN-V680W
E1	A83374Y70GXN	ESCUTCHEON SHEET	1	NN-V680WS
E2	A603L4Y60HN	D.P.CIRCUIT (U)	1	NN-V690P HNE NN-V680W RTL(W/COMPONENT)
E2	A603L4Y60KN	D.P.CIRCUIT (U)	1	NN-V690P KNQ RTL(W/COMPONENT)
E2	A603L4Y60MN	D.P.CIRCUIT (U)	1	NN-V690P MNQ RTL(W/COMPONENT)
E2	A603L4Y60SN	D.P.CIRCUIT (U)	1	NN-V690P SNM/KKE RTL(W/COMPONENT)
E2	A603L4Y60ZP	D.P.CIRCUIT (U)	1	NN-V690P ZPE RTL(W/COMPONENT)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
E2	A603L4Y60TN	D.P.CIRCUIT (U)	1	NN-V690P TNE RTL (W/COMPONENT)
E2	A603L4Y60YN	D.P.CIRCUIT (U)	1	NN-V690P YNQ RTL (W/COMPONENT)
E2	A603L4Y60XN	D.P.CIRCUIT (U)	1	NN-V690PS NN-V680WS RTL (W/COMPONENT)
E2	A603L4Y60LN	D.P.CIRCUIT (U)	1	NN-V690P LNK RTL (W/COMPONENT)
E3	A630Y4Y60GMN	MEMBRANE SWITCH (U)	1	NN-V690P HNE/MNQ/TNE/YNQ/LNK
E3	A630Y4Y60GKN	MEMBRANE SWITCH (U)	1	NN-V690P KKE/KNQ/SNM
E3	A630Y4Y60GXN	MEMBRANE SWITCH (U)	1	NN-V690PS
E3	A630Y4Y60GZP	MEMBRANE SWITCH (U)	1	NN-V690P ZPE
E3	A630Y4Y70GMN	MEMBRANE SWITCH (U)	1	NN-V680W
E3	A630Y4Y70GXN	MEMBRANE SWITCH (U)	1	NN-V680WS
E4	A64584J00XN	DISPLAY FILTER	2	
E5	A80024J00XN	ESCUTCHEON B	1	
E6	A82844J00XN	CUSHION RUBBER	1	
E7	A80344X80GMN	ESCUTCHEON BASE	1	
E8	A81274J00XN	BACK PANEL	1	

36

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
P16	A01134J00XN	TRAY STYROL	1	
P17	A0192-1100	PACKING	1	
P18	A01174J00KN	TRAY PACKING	1	NN-V690P KNQ/KKE/SNM
P19	A01264J00XN	REINFORCE MATERIAL	1	NN-V690P KNQ/KKE/SNM/ZPE NN-V690PS NN-V680WS

17 WIRING MATERIAL

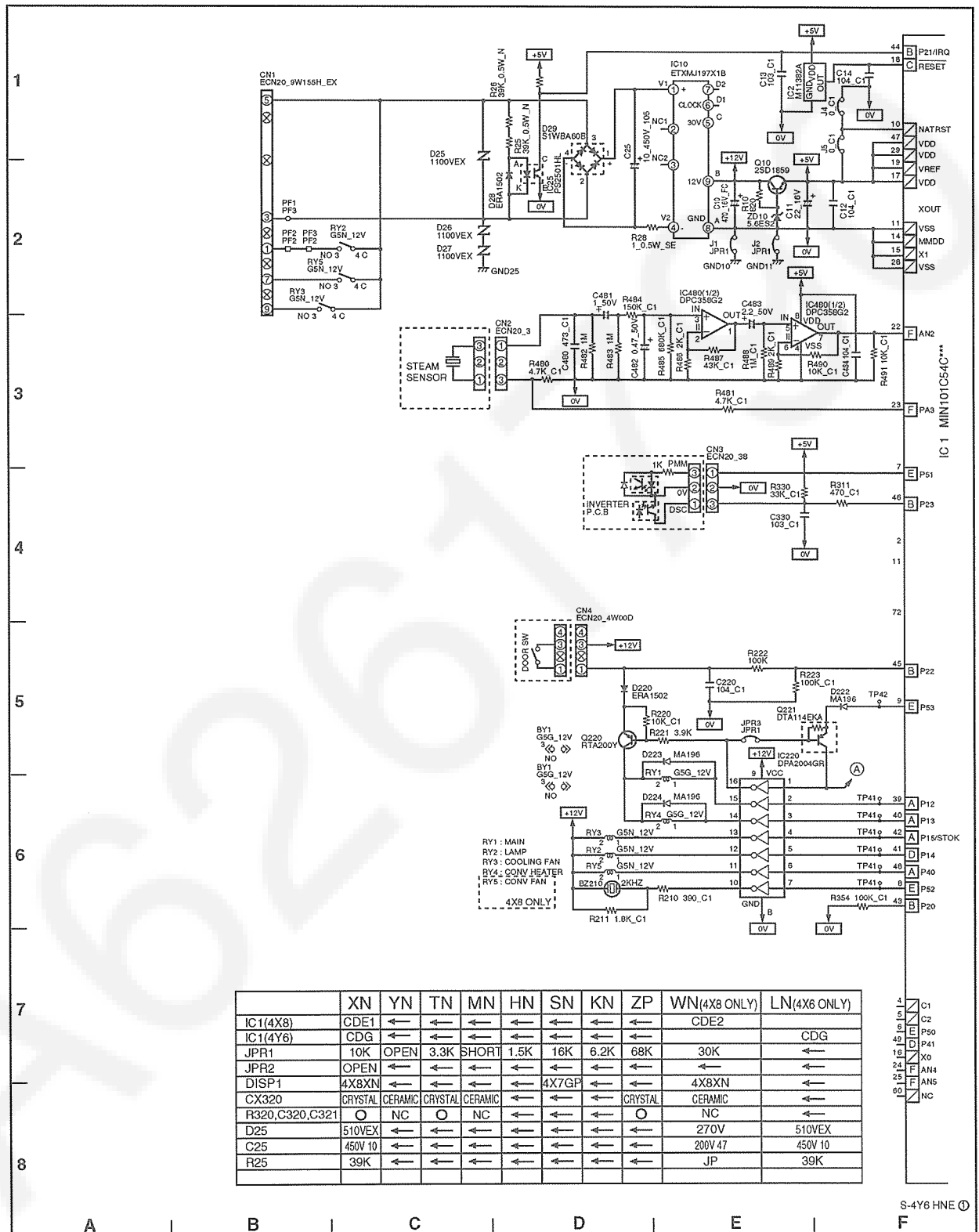


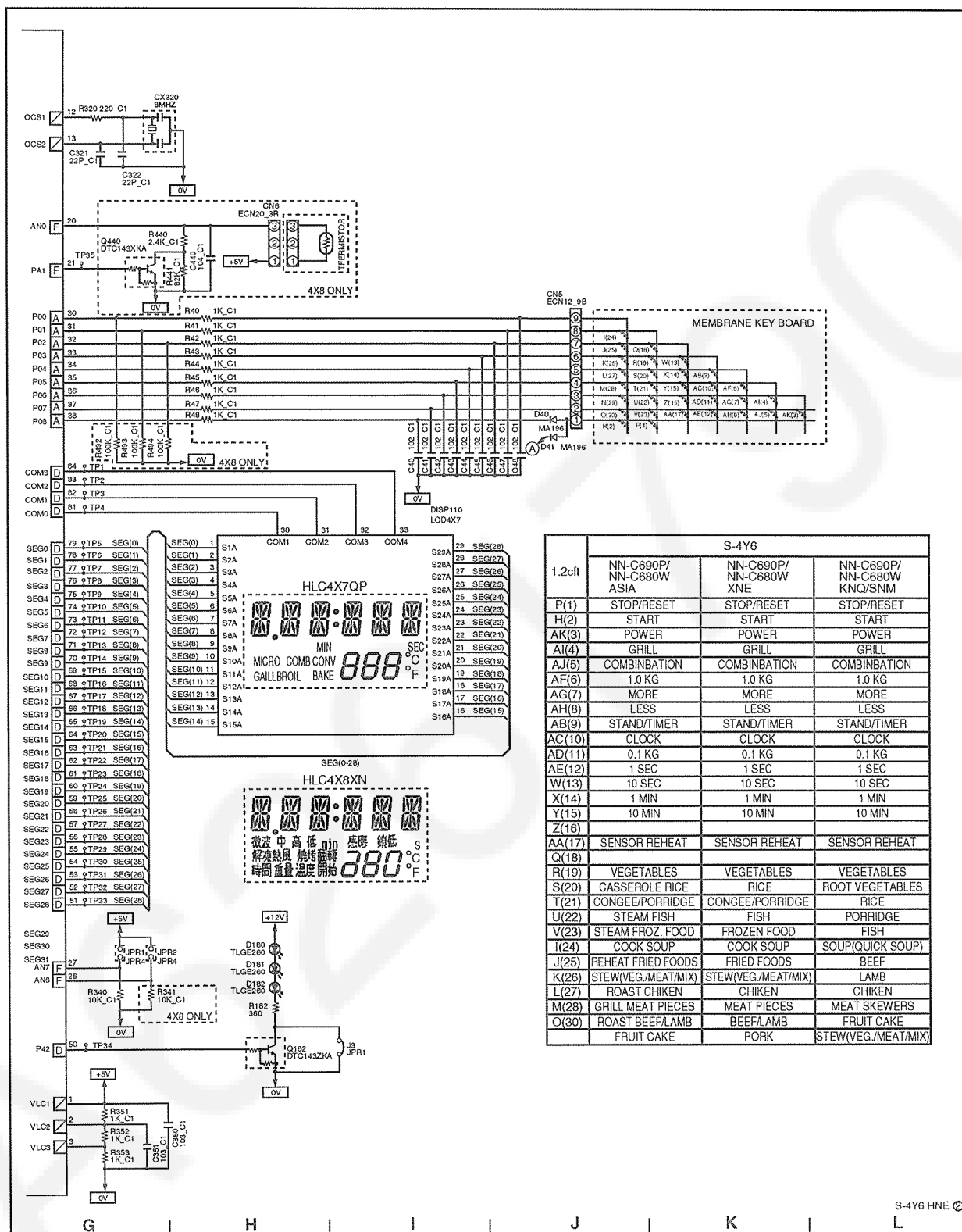
(S-4Y6 HNE)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	A030A4Y60MN	LEAD WIRE HARNESS	1	NN-V690P HNE/MNQ/YNQ/TNE/KNQ/KKE/SNM/LNK
W1	A030A4Y60XN	LEAD WIRE HARNESS	1	NN-V690P ZPE NN-V690PS NN-V680WS
W2	A030E4X80MN	LEAD WIRE	1	
W2	A030E4X80MN	LEAD WIRE	1	
W3	A6901-1170	FERRITE CORE	2	NN-V690P ZPE NN-V690PS NN-V680WS
W4	AECQJ5335KRP	CAPACITOR	1	EXCEPT ZPE/XNE 3.3MF

18 DIGITAL PROGRAMMER CIRCUIT

SCHEMATIC DIAGRAM





19 DIGITAL PROGRAMMER CIRCUIT

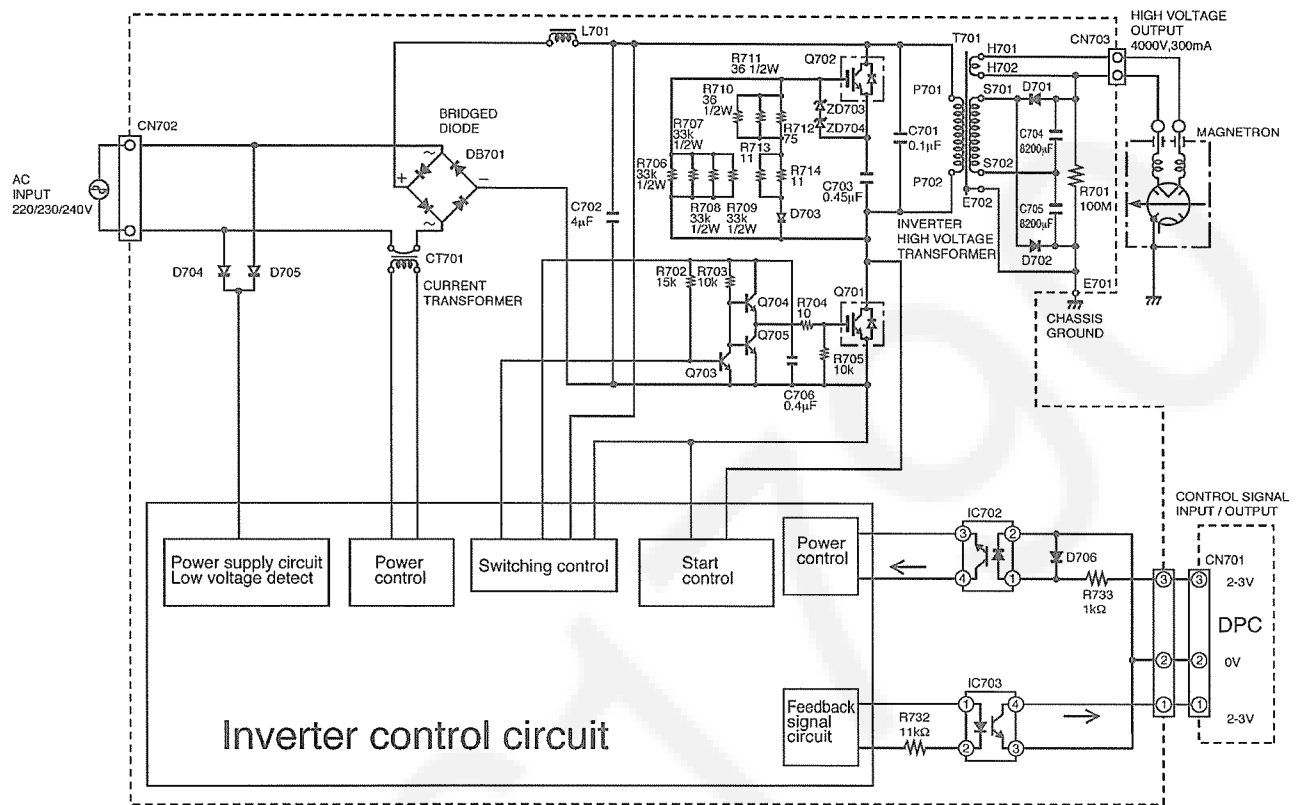
PARTS LIST

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
BZ210	AEFB22EP20TL	BUZZER	1	2.0KHZ
C10	EEUFC1C471B	ELECTROLYTIC CAPACITOR AL	1	470MF/16V/FC
C11	AECESS1C220A	ELECTROLYTIC CAPACITOR AL	1	22MF/16V
C12 14 484 220	AECU1F104Z25	CERAMIC CAPACITOR	4	0.1MF/25V
C13 330 350 351	AECU1F103Z50	CERAMIC CAPACITOR	4	0.01MF/50V
C25	ECA2WHG100E	ELECTROLYTIC CAPACITOR AL	1	10MF/450V/
C40 41 42 43 44 45 46 47 48	AECU1B102K50	CERAMIC CAPACITOR	9	0.001MF/50V
C320 321	AECU1C220J50	CERAMIC CAPACITOR	2	NN-V690P ZPE/TNE NN-V690PS NN-V680WS
C480	AECU1F473Z50	CERAMIC CAPACITOR	1	0.047MF/50V
C481	AECESS1H010A	ELECTROLYTIC CAPACITOR AL	1	1MF/50V
C482	AECESS1HR47A	ELECTROLYTIC CAPACITOR AL	1	0.47MF/50V
C483	AECESS1H2R2A	ELECTROLYTIC CAPACITOR AL	1	2.2MF/50V
CN1	AEEMMD15509W	CONNECTOR	1	
CN2	AEEMMF00703W	CONNECTOR	1	
CN3	AEEMXH00703B	CONNECTOR	1	3 PIN BLUE
CN4	AEEMMF00D04W	CONNECTOR	1	
CN5	AEEM09FDZBTM	CONNECTOR	1	9 PIN
CX320	AEF0S800MG06	RESONATOR	1	NN-V690P HNE/KKE/KNQ/MNQ/SNM/ YNQ/LNK NN-V680W
CX320	AEYXAT49-8MA	RESONATOR	1	NN-V690P TNE/ZPE NN-V690PS NN-V680WS 8MHZ
D25	ERZV10D511CS	VARISTOR	1	V10511U
D26 27	ERZV10D112C1	VARISTOR	2	V10112U
D28 220	AEDNERA1502	DIODE SI 1A	2	ERA1502
D29	AESTS1WBA60B	DIODE SI 1A	1	WBA60B
D40 41 222 223 224	AESS133T-77	DIODE SI 0.1A	5	1SS133T
D180 181 182	AESQTLGE260	LED	3	
DISP11 0	AEDDHL4X8XN	DISPLAY	1	NN-V690P HNE/MNQ/TNE/YNQ NN-V690PS NN-V680WS NN-V680W
DISP11 0	AEDDHL4X7QP	DISPLAY	1	NN-V690P KKE/KNQ/SNM/ZPE/LNK
HOLDER	A611A4J00XN	DISPLAY HOLDER	1	
IC1	MN101C54CDG	IC	1	MN101C54C
IC10	ETXMJ197X1BG	IC	1	
IC25	AEICP25011HL	IC	1	PS2501-1 HL 4P
IC220	AEICU2004GR2	IC	1	A2004G
IC480	AEICUPC358G2	IC	1	UPC358G2
JPR1	ERDS2TJ332T	CARBON FILM RESISTOR	1	NN-V690P TNE 3.3KΩ 1/4W 5%
JPR1	ERDS2TJ622T	CARBON FILM RESISTOR	1	NN-V690P KNQ 6.2KΩ 1/4W 5%
JPR1	ERDS2TJ163T	CARBON FILM RESISTOR	1	NN-V690P SNM/KKE 16KΩ 1/4W 5%
JPR1	ERDS2TJ103T	CARBON FILM RESISTOR	1	NN-V690PS NN-V680WS 10KΩ 1/4W 5%
JPR1	ERDS2TJ152T	CARBON FILM RESISTOR	1	NN-V690P HNE NN-V680W 1.5KΩ 1/4W 5%
JPR1	ERDS2TJ683T	CARBON FILM RESISTOR	1	NN-V690P ZPE 68KΩ 1/4W 5%
JPR1	ERDS2TJ303T	CARBON FILM RESISTOR	1	NN-V690P LNK 30KΩ 1/4W 5%
Q10	2SD1859TV2Q	TRANSISTOR SI 1W	1	2SD1859TV QR 120MHZ
Q182	AESC43ZKE	TRANSISTOR SI 0.3W	1	DTC143ZKA/E23 100MHZ

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
Q220	AESA2TA200Y	TRANSISTOR SI 0.6W	1	KTA200Y
Q221	AESA14EKE	TRANSISTOR SI 0.2W	1	DTA114EKA/14
R10	ERDS2TJ821T	CARBON FILM RESISTOR	1	820K Ω 1/4W 5%
R25 26	ERDS1FJ393T	CARBON FILM RESISTOR	2	39K Ω 1/2W 5%
R27 220 340 341 490 491	AERJ3GSYJ103	RESISTOR	6	10K Ω 1/6W 5%
R28	ERX12SJ1R0E	RESISTOR	1	1 Ω 1/2W 5%
R40 41 42 43 44 45 46 47 48	AERJ3GSYJ102	RESISTOR	9	1K Ω 1/16W 5%
R182	ERDS2TJ361T	CARBON FILM RESISTOR	1	360 Ω 1/4W 5%
R210	AERJ3GSYJ391	RESISTOR	1	390 Ω 1/16W 5%
R211	AERJ3GSYJ182	RESISTOR	1	1.8K Ω 1/16W 5%
R221	ERDS2TJ392T	RESISTOR	1	3.9K Ω 1/4W 5%
R222	ERDS2TJ104T	CARBON FILM RESISTOR	1	100K Ω 1/4W 5%
R223 354	AERJ3GSYJ104	RESISTOR	2	100K Ω 1/16W 5%
R482 483	ERDS2TJ105T	RESISTOR	2	1M Ω 1/16W 5%
R320 J5	AERJ3GSYJ000	RESISTOR	2	0 Ω 1/16W 5%
R330	AERJ3GSYJ333	RESISTOR	1	33K Ω 1/16W 5%
R331	AERJ3GSYJ471	RESISTOR	1	470 Ω 1/16W 5%
R480 481	AERJ3GSYJ472	RESISTOR	2	4.7K Ω 1/16W 5%
R488	AERJ3GSYJ105	RESISTOR	1	1M Ω 1/16W 5%
R484	AERJ3GSYJ154	RESISTOR	1	150K Ω 1/16W 5%
R485	AERJ3GSYJ684	RESISTOR	1	680K Ω 1/16W 5%
R486 489	AERJ3GSYJ202	RESISTOR	2	2K Ω 1/16W 5%
R487	AERJ3GSYJ433	RESISTOR	1	43K Ω 1/16W 5%
RY1 4	AEGBG5G1A12	POWER RELAY	2	Δ G5G-1A
RY2 3 5	AEGBG5N1A12	POWER RELAY	3	Δ G5N-1A12V
ZD10	AEDZ5R6ES2T1	ZENNER DIODE SI	1	RD5.6ES2

20 INVERTER CIRCUIT

SCHEMATIC DIAGRAM



21 REF. NO. 35 INVERTER (U)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
	A697X4V00GP		1	
	2SA1175TFK	TRANSISTOR SI 0.25W	1	
	2SA1175TFEK			
	2SC2785TFK	TRANSISTOR SI 0.25W	2	
	2SC2785TFEK			
C701	ECWF5104N300	FILM CAPACITOR	1	0.1MF 500VDC
C702	ECQE2405T847	POLYESTER CAPACITOR	1	4MF 250VDC
C703	ECWF5454N300	FILM CAPACITOR	1	0.45MF 500VDC
C704	ECWH30822JUA	FILM CAPACITOR	2	8200PF 3KVDC
705				
CN701	A6EMXH00703G	CONNECTOR	1	3PIN
CT701	A66904T00AP	TRANSFORMER	1	
D701	A6202-4N10T	DIODE SI 0.3A	2	ΔUX-C2BMV1
702				
D703	AEDNERA3806	DIODE SI 0.5A	1	ERA38-06
D704	AEDNERA1506	DIODE SI 1A	2	ERA1506
705				
D706	MA196-(TA5)	DIODE SI 0.1A	1	MA196
DB701	AESTRBV6206	DIODE SI 15A	1	15A 600V
H.S.	A66914T00AP	HEAT SINK	1	
IC702	AEICP25011HL	IC	2	PS2501-1 HL 4P
703				
IC801	AN9DB07SB	IC	1	
L701	A50204T00AP	COIL	1	
Q701	AESGGL60N90	TRANSISTOR SI 170W	1	
Q701	XTW3+12B	SCREW	2	3X12
Q702	AESFGT30J322	TRANSISTOR SI 75W	1	GT30J322
Q702	XTN3+12B	SCREW	1	3X12
Q703	2SC3311AQSTA	TRANSISTOR SI	2	2SC3311AQRS
704				
Q705	2SA1309AQSTA	TRANSISTOR SI	1	2SA1309AQRS
R701	AERG419S107M	RESISTOR	1	
R715	AERGS215J452	RESISTOR	1	4.5KΩ15W
VR701	AEVTZ6TLT102	VARIABLE RESISTOR	1	1KΩ30%
ZD701	AEDZ10ES2T1	ZENNER DIODE SI	4	RD10ES2T1
703				
704				
705				
ZD702	AESZ12JS2T1	ZENNER DIODE SI	1	RD12JS2