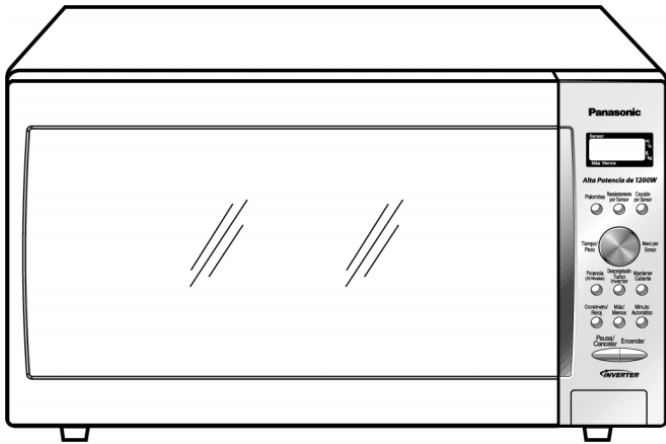


# Service Manual

## Microwave Oven



**NN-SD698S**  
**NN-ST678S**  
**NN-ST658W**

RPH (LATIN AMERICA)  
 RUH (MEXICO)

### Specifications:

Model:	SD698S	ST678S	ST658W
Specifications:			
Power Source:	120V AC Single Phase, 60Hz		
Power Consumption:	1480W	1480W	1480W
Output:	1200W	1200W	1200W
Microwave Frequency:	2450MHz		
Timer:	30 min. / Stage (HIGH Power) ~ 5 Stage Maximum 90 min. 00 sec or 99 min. 99 sec / Stage (Other Power Levels) ~ 5 Stage Maximum		
Outside Dimensions:	518mm(W) x 404mm(D) x 301mm(H)		
Oven Cavity Dimensions:	375mm(W) x 386mm(D) x 225mm(H)		
Oven Cavity Dimensions:	1.2 cu. ft.		
Weight:	Approx. 11.8 kg		
PbF	This product with PbF		
Specifications subject to change without notice.			

### **WARNING**

This Service Manual 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 Manual by anyone else could result in serious injury or death.

**Panasonic®**

© 2008 Panasonic Home Appliances Microwave Oven (Shanghai) Co., Ltd. All rights reserved. Unauthorized copying and distribution is a violation of law.

**Your safety and the safety of others are very important.**

We have provided important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol. It is used to alert you to potential hazards that can kill or hurt you and others. The safety messages will follow the safety alert symbol and either the word "DANGER", "WARNING" or "CAUTION". These words mean:



**DANGER**

You can be killed or seriously injured if you don't immediately follow instructions.



**WARNING**

You can be killed or seriously injured if you don't follow instructions.



**CAUTION**

You can be exposed to a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

The safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed.

**⚠ WARNING**

1. This product should be serviced only by trained, qualified personnel.
2. Though this product has been manufactured in compliance with:
  - “Federal Performance Standard 21 CFR Subchapter J”(D.H.H.S): U.S.A. models
  - or “Radiation Emitting Devices Act”(Health and Welfare Canada): Canadian models
 it is very important all repairs should be made in accordance with procedures described in this manual to avoid being exposed to excessive microwave radiation.
3. Check for radiation leakage before and after every servicing according to the “procedure for measuring radiation leakage.”
4. If the unit cannot be repaired on site, advise the customer not to use until unit is repaired.
5. Any serviceman who learns of any accident pertaining to microwave radiation leakage including the oven operating with open door should immediately notify the appropriate address listed below and Center for Devices and Radiological Health, DHHS.
6. There are special components used in the microwave oven which are important for safety. These parts are marked with a ⚠ on the replacement parts list. It is essential that these critical parts should be replaced only with the manufacture’s specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the original design.

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

- |  |   |
|--|---|
| <p>(A) Do not operate or allow the oven to be operated with the door open.</p> <p>(B) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:</p> <ol style="list-style-type: none"> <li>(1) Interlock operation</li> <li>(2) Proper door closing</li> <li>(3) Seal and sealing surfaces (arcing, wear, and other damage)</li> <li>(4) Damage to or loosening of hinges and latches.</li> <li>(5) Evidence of dropping or abuse</li> </ol> <p>(C) Before turning on microwave power for any service test or</p> | <p>inspection within the microwave generating compartments, check the magnetron, waveguide or transmission line, and cavity for proper alignment, integrity and connections.</p> <p>(D) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.</p> <p>(E) A microwave leakage check to verify compliance with the Federal Performance Standard should be performed on each oven prior to release to the owner.</p> |
|--|---|

**⚠ CAUTION**

**About lead free solder (PbF)**

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

- Caution:**
- Pb free solder has a higher melting point than standard solder; Typically the melting point is 30 - 40°C higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to 370 ± 10°C.
  - Pb free solder will tend to splash when heated too high (about 600°C). Use eyeware protection.

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

**⚠ WARNING**

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

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

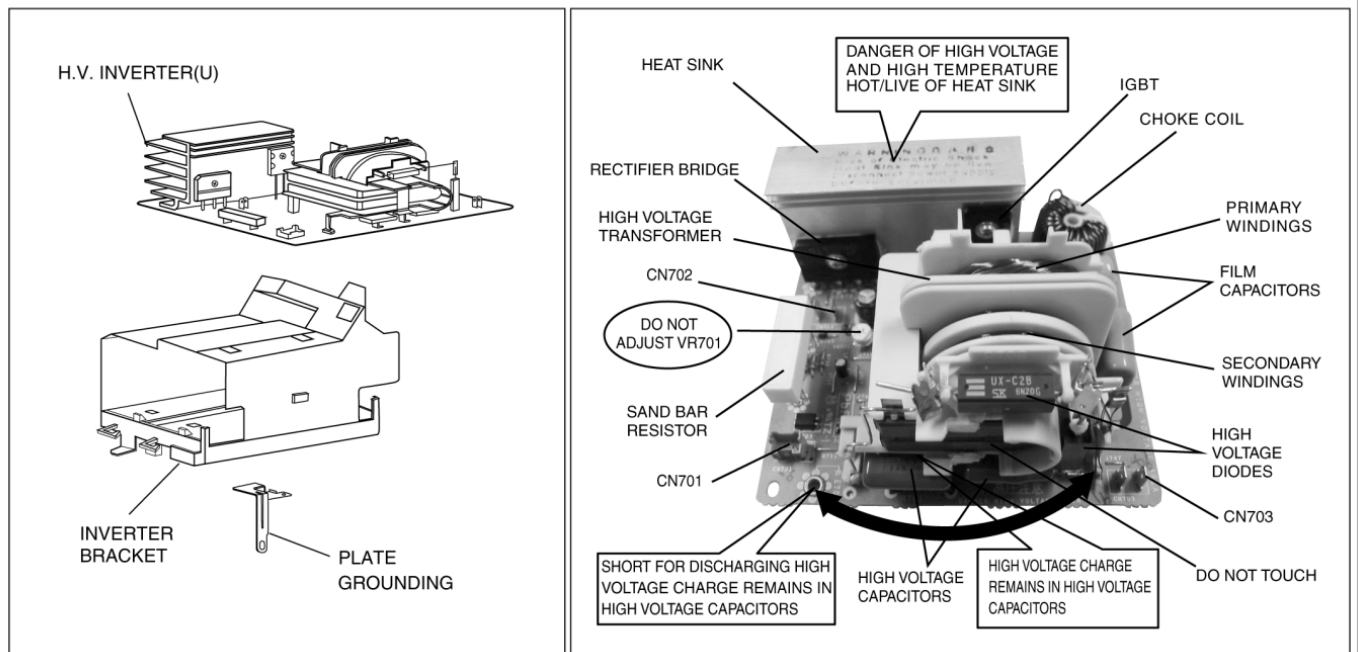
It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.

2. Aluminum heat sink that is energized with very high voltage and high heat energy.
3. Very high voltage which may remain in circuitry even when oven is off. High voltage charge may remain in the capacitors on the board.

**DO NOT:**

- \* 1. Do not touch circuitry because it has very hot (high voltage) circuitry. Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage charge may remain in circuits.
- \* 2. Do not touch aluminum heat sink because it is energized with very high voltage and is also very hot in high heat energy.
- \* 3. Do not try to adjust or tamper with preset control on the Inverter board because it is very dangerous to adjust without proper test equipment.
- \* 4. Do not test oven while Inverter grounding plate or screws are loose. It is very dangerous to operate H.V. Inverter Circuit (U) with loose mounting screws or if improperly grounded.
- \* 5. For USA only:  
Do not try to repair Inverter PCB because it is very dangerous to repair. Replace as a complete High Voltage Inverter Circuit unit and return fully re-packed in original shipping box and shipping materials.

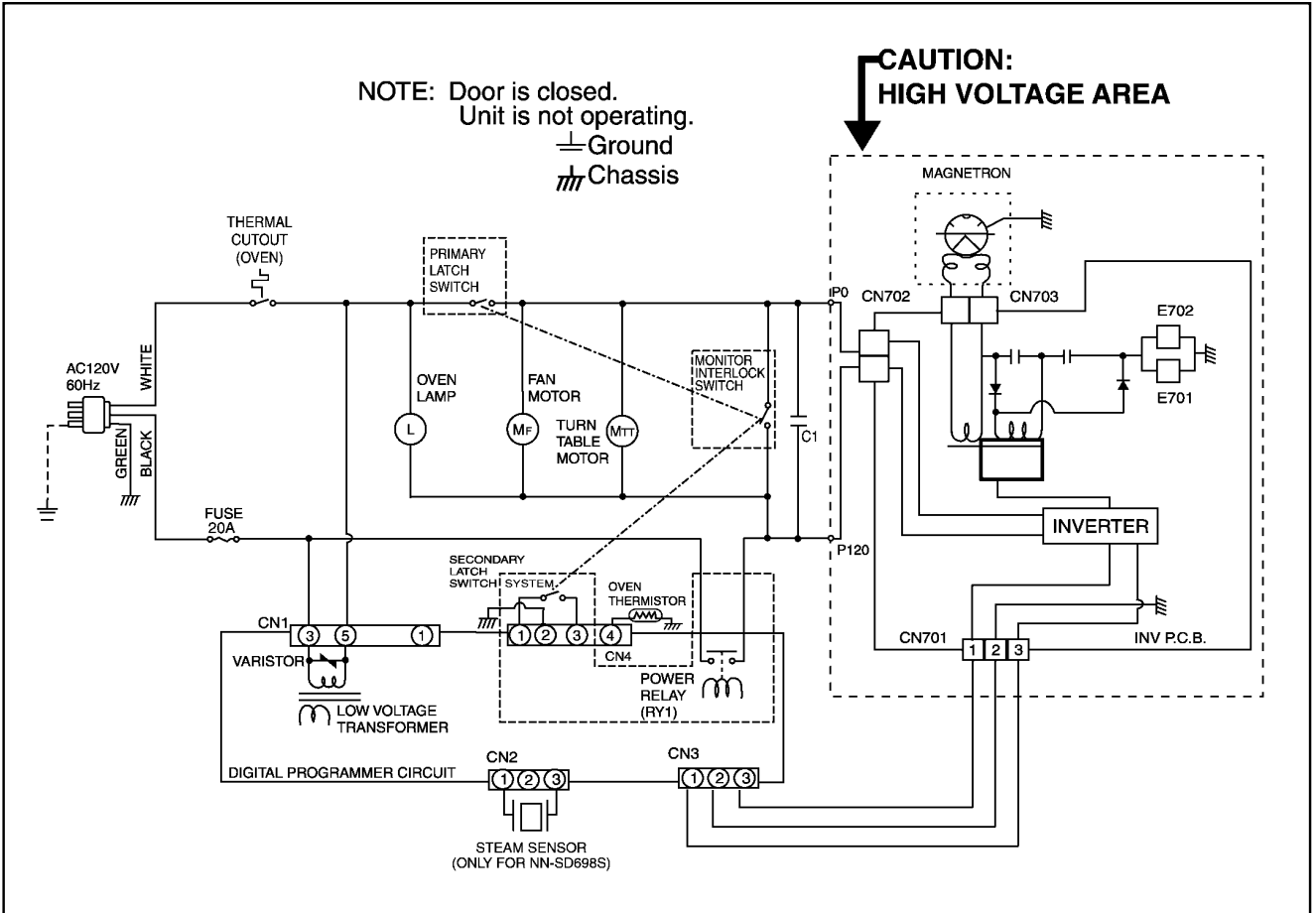
**INVERTER POWER SUPPLY**



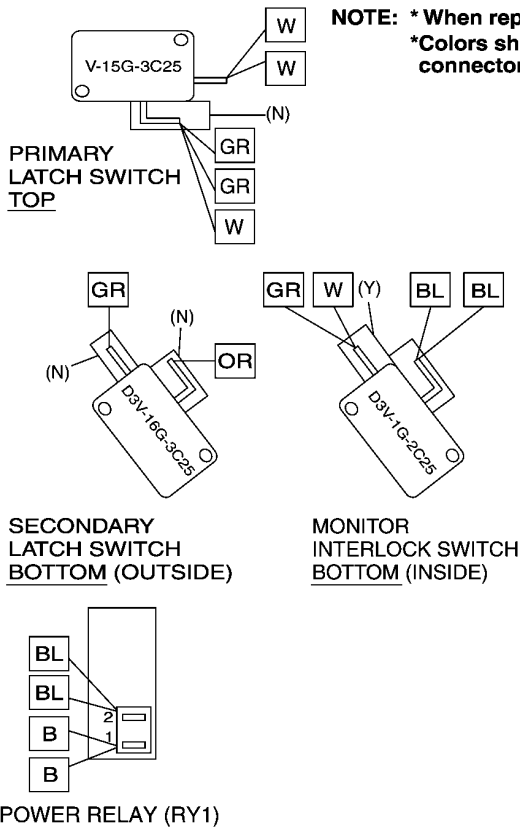
# CONTENTS

	Page		Page
<b>1 SCHEMATIC DIAGRAM</b> .....	5	5.5. Inverter power supply (U) .....	15
<b>2 DESCRIPTION OF OPERATING SEQUENCE</b> .....	6	5.6. Temperature thermistor .....	15
2.1. Variable power cooking control .....	6	<b>6 MEASUREMENTS AND ADJUSTMENTS</b> .....	<b>16</b>
2.2. Inverter power supply circuit .....	6	6.1. Adjustment of primary latch switch, secondary latch switch and monitor interlock switch. ....	16
2.3. Inverter defrost .....	6	6.2. Measurement of microwave output .....	16
2.4. Sensor cooking .....	6	<b>7 PROCEDURE FOR MEASURING MICROWAVE ENERGY</b>	
2.5. Sensor reheat .....	7	<b>LEAKAGE</b> .....	<b>17</b>
2.6. Steam sensor and digital programmer circuit .....	7	7.1. Equipment .....	17
2.7. Thermistor .....	7	7.2. Procedure for measuring radiation leakage .....	17
<b>3 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING</b> -	<b>8</b>	7.3. Record keeping and notification after measurement .....	17
3.1. Check the grounding .....	8	7.4. At least once a year, have the radiation monitor checked for calibration by its manufacturer. ....	18
3.2. Inverter warnings .....	8	<b>8 TROUBLESHOOTING GUIDE</b> .....	<b>19</b>
3.3. Part replacement. ....	9	8.1. (Troubleshooting) Oven stops operation during cooking -	19
3.4. When the 20A fuse is blown due to the malfunction of the monitor interlock switch: .....	9	8.2. (Troubleshooting) Other problems .....	20
3.5. Avoid inserting nails, wire etc. through any holes in the unit during operation. ....	9	8.3. Troubleshooting of inverter circuit (U) and magnetron ----	21
3.6. Verification after repair .....	9	8.4. SIMPLE WAY OF H.V. INVERTER/MAGNETRON TROUBLESHOOTING .....	22
3.7. Sharp edges .....	9	8.5. H.V.INVERTER BOARD MAIN PARTS LIST (F606Y8M00AP) .....	22
<b>4 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE</b> -	<b>10</b>	8.6. How to check the semiconductors using an OHM meter -	23
4.1. Magnetron .....	10	<b>9 EXPLODED VIEW AND PARTS LIST</b> .....	<b>24</b>
4.2. Digital programmer circuit (D.P.C) .....	10	9.1. EXPLODED VIEW .....	24
4.3. Low voltage transformer and/or power relays (RY1, RY2) .....	11	9.2. PARTS LIST .....	25
4.4. Fan motor .....	11	9.3. WIRING MATERIALS .....	27
4.5. Door assembly .....	11	9.4. DOOR ASSEMBLY .....	28
4.6. Turntable motor .....	12	9.5. ESCUTCHEON BASE ASSEMBLY .....	29
4.7. Steam sensor .....	12	9.6. PACKING AND ACCESSORIES .....	32
4.8. Inverter power supply .....	13	<b>10 DIGITAL PROGRAMMER CIRCUIT</b> .....	<b>33</b>
<b>5 COMPONENT TEST PROCEDURE</b> .....	<b>14</b>	10.1. NN-SD698S .....	33
5.1. Primary, Secondary Latch Switch interlocks & Power Relay RY1 .....	14	10.2. NN-ST678S .....	35
5.2. Monitor Interlock Switch .....	14	10.3. NN-ST658W .....	37
5.3. Magnetron .....	14	10.4. PARTS LIST .....	39
5.4. key board membrane (Membrane switch assembly) .....	14		

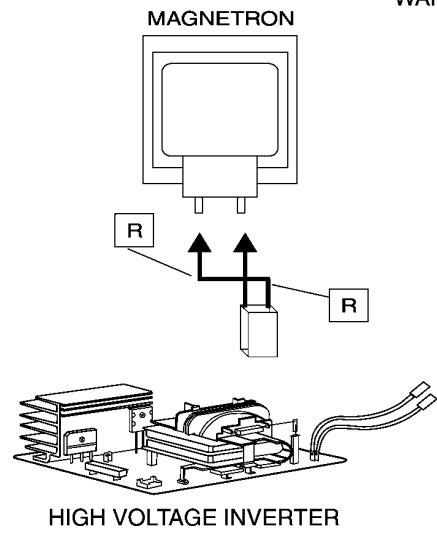
# 1 SCHEMATIC DIAGRAM



## WIRING DIAGRAM



**WARNING: H.V.**



SYMBOL	COLOR
OR	ORANGE
BL	BLUE
BR	BROWN
W	WHITE
Y	YELLOW
R	RED
GR	GRAY
B	BLACK
N	NATURAL
G	GREEN

(S-8X0)  
(S-8V6)  
(S-8V7)

## 2 DESCRIPTION OF OPERATING SEQUENCE

### 2.1. Variable power cooking control

High Voltage Inverter Power Supply (U) controls output power by the signal from Digital Programmer Circuit (DPC). Power relay always stay on, but PWM (Pulse Width Modulation) signal controls microwave output power.

**NOTE:**

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

**Variable Power Cooking**

POWER SETTING	OUTPUT POWER(%) APPROX.	MANUAL MICROWAVE DUTY	
		ON(SEC)	OFF(SEC)
HIGH P10	100%	22	0
P9	90%	22	0
P8	80%	22	0
MEDIUM-HIGH P7	70%	22	0
MEDIUM P6	60%	22	0
P5	50%	22	0
P4	40%	22	0
MEDIUM-LOW P3	30%	22	0
P2	20%	15	7
P1	10%	8	14
DEFROST P3	30%	22	0

### 2.2. Inverter power supply circuit

The Inverter Power Supply circuit powered from the line voltage, 120V 60Hz 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 120V 60Hz 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.

### 2.3. Inverter defrost

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

1. The digital programmer 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.

**Inverter Turbo Defrost**

SELECTED WEIGHT	COOKING TIME
1.0 LB	5 min.00 sec.

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

### 2.4. Sensor cooking

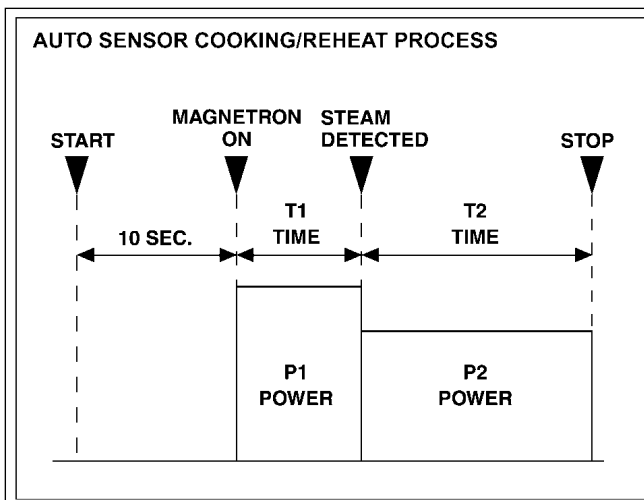
Auto sensor cooking without setting a power level or selecting a time. All that is necessary is to select an Auto Sensor Program before starting to cook.

**Understanding Auto Sensor Cooking**

As the 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. 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 themicrowave oven to switch to T2 time after the 10second 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 T2time, 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 Oatmeal:

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

Category	P1 Power	P2 Power	K Factor Standard
Oatmeal	HIGH	HIGH	0.1

**2.5. Sensor reheat**

Auto Sensor Reheat is a quick and easy way to reheat refrigerated 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.

Category	P1 Power	P2 Power	K Factor Standard
Sensor Reheat	HIGH	MEDIUM	0.3

**2.6. Steam sensor and digital programmer circuit**

In order to determine if the steam sensor function of the digital programmer circuit is working, do the following test.

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

T1 TIME	T2 TIME (Remainingcooking time)
1 Min. 30 Sec. ~ 4 Min.	27 Sec. ~ 1Min.12 Sec.

**2.7. Thermistor**

The thermistor which fixed on magnetron detects magnetron temperature and make power down when the temperature becomes abnormal high. A normal thermistor’s resistance values for temperature ranges between 75-85 degree F is from 37kΩ to 57kΩ.

### 3 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

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

**⚠ CAUTION**

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

#### 3.1. Check the grounding

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

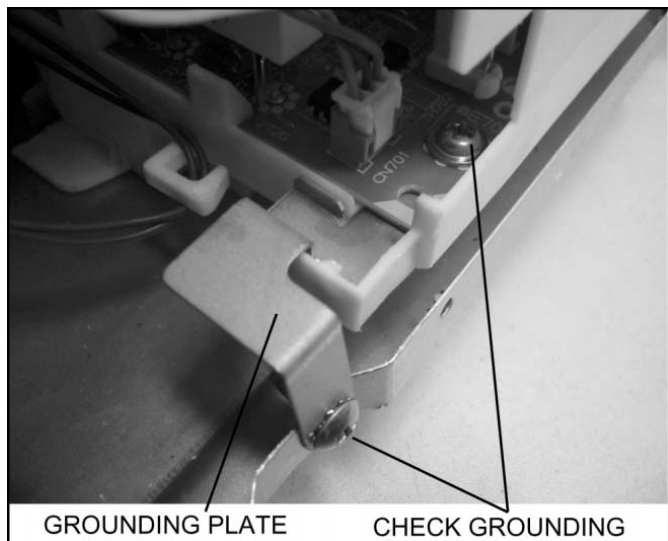
#### 3.2. Inverter warnings

**⚠ WARNING HIGH VOLTAGE AND HIGHTEMPERATURE (HOT/LIVE) OF THE INVERTERPOWER SUPPLY (U)**

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

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

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

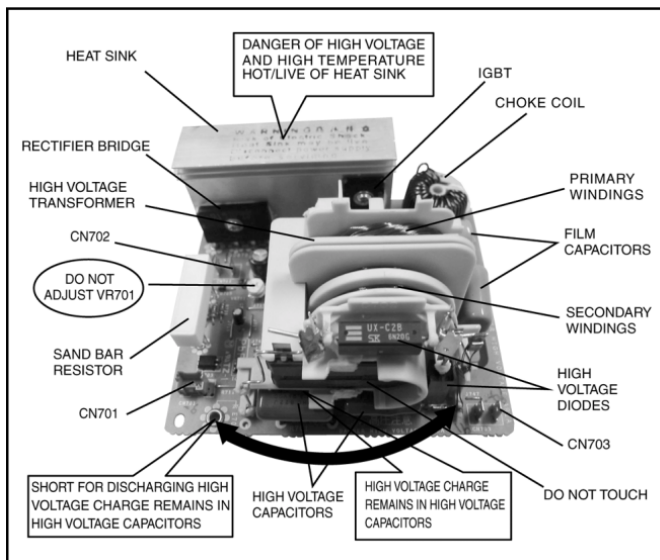
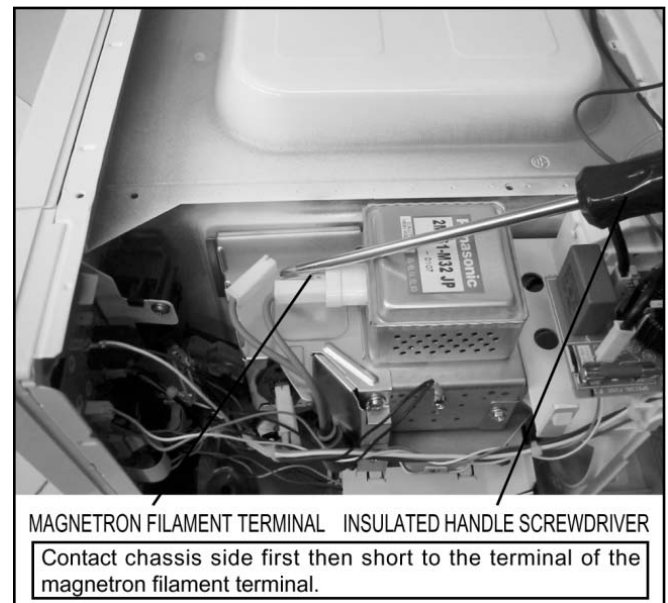


**Grounding of the inverter circuit board**

**⚠ WARNING DISCHARGE THE HIGH VOLATGE CAPACITORS**

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

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



**H.V. Inverter warning**

**⚠ WARNING FOR INVERTER POWER SUPPLY (U) GROUNDING**

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



### Discharging the high voltage capacitors

#### ⚠ 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 the oven energized. DO NOT measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

#### ⚠ WARNING

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

### 3.3. Part replacement.

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

### 3.4. When the 20A fuse is blown due to the malfunction of the monitor interlock switch:

#### ⚠ WARNING

When the 20A 120V fuse is blown due to the malfunction of the monitor interlock switch, replace all of the components (primary latch switch, monitor interlock switch and power relay RY1).

1. This is mandatory. Refer to "measurements and adjustments" for the location of these switches.
2. When replacing the fuse, confirm that it has the appropriate rating 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.

### 3.5. 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 holes or gaps, because such objects may work as an antenna and cause microwave leakage.

### 3.6. Verification after repair

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

#### CAUTION OF MICROWAVE RADIATION LEAKAGE

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

#### IMPORTANT NOTICE

1. The following components have potentials above 2000V while the appliance is operated.

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

Pay special attention to these areas.

2. When the appliance is operated with the door hinges or magnetron installed incorrectly, the microwave leakage can exceed more than  $5\text{mW}/\text{cm}^2$ . After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.

### 3.7. Sharp edges

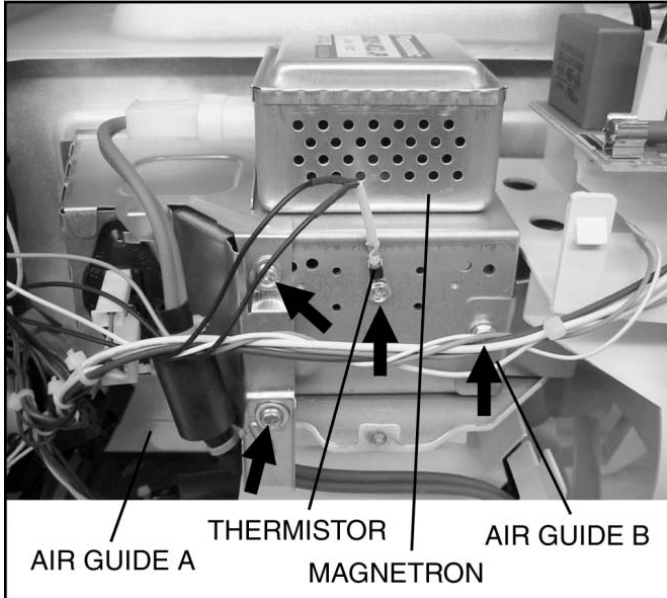
#### ⚠ CAUTION

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

# 4 DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

## 4.1. Magnetron

1. Discharge high voltage charge.
2. Remove 1 screw holding air guide A on the oven cavity.
3. Remove 1 screw holding air guide A on the magnetron.
4. Remove 1 screw holding air guide B.
5. Remove 1 screw holding themistor.



6. Disconnect 2 high voltage lead wires from magnetron filament terminals.
7. Remove 4 screws holding the magnetron.

**NOTE:**

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

**CAUTION**

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

## 4.2. Digital programmer circuit (D.P.C)

**⚠ CAUTION:**

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

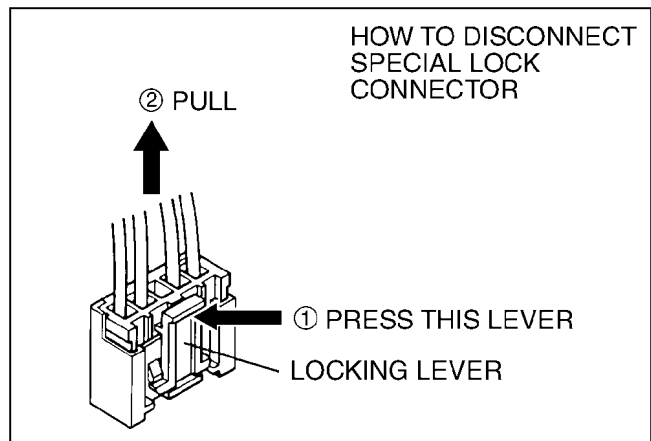
1. Disconnect all connectors from D.P.C.
2. Remove 1 grounding screw.
3. Remove 1 screw holding escutcheon base and slide the escutcheon base upward slightly.
4. Remove all screws holding D.P.C. board on escutcheon base.
5. Separate D.P.C board from tabs on the escutcheon base and remove D.P.C board.

**To replace membrane key board**

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

**NOTE:**

1. The membrane key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal.
2. When installing the new key board membrane, make sure that the surface of escutcheon base is clean to prevent a malfunction or shorted contacts.



### 4.3. Low voltage transformer and/or power relays (RY1, RY2)

**⚠ CAUTION:**

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

1. Replace D.P.C. board.

(A) Using solder wick or a desoldering tool and 30W soldering iron carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.

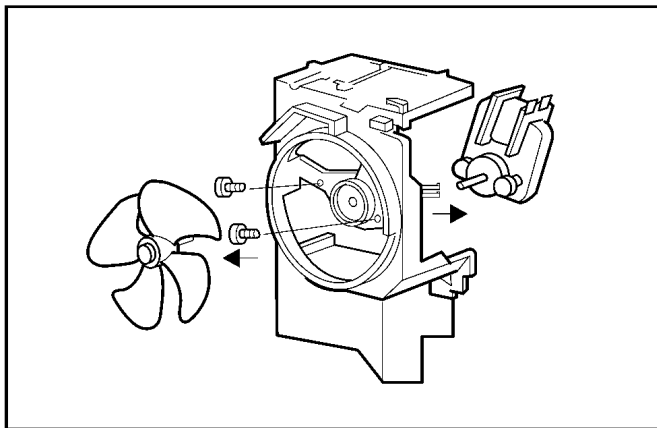
**⚠ CAUTION:**

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

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

### 4.4. Fan motor

1. Disconnect 2 lead wires from fan motor terminals.
2. Remove 2 screws at location on oven attaching orifice assembly.
3. Remove orifice assembly from oven assembly.
4. Remove fan blade from the fan motor shaft by pulling it straight out.
5. Remove 2 screws holding fan motor to orifice.



### 4.5. Door assembly

1. Remove door C from door E by carefully pulling outward, starting from upper right hand corner using a flat blade screwdriver.
2. Separate door E from tabs on door A and remove door A.
3. Open Door E at the opening angle of approximately 10°(Note: The door cannot be removed if the opening angle is greater than 10°).
4. Remove the door E from its hinges by pushing the door E upward and out.
5. Remove door screen B from door A.
6. Remove door key and door key spring.
7. Replace other components.

**To re-install components:**

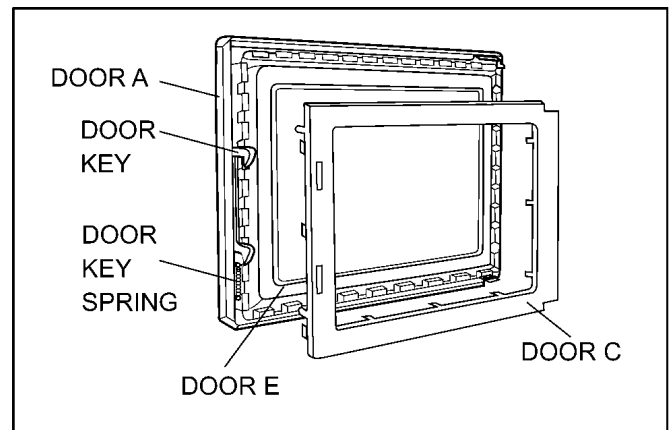
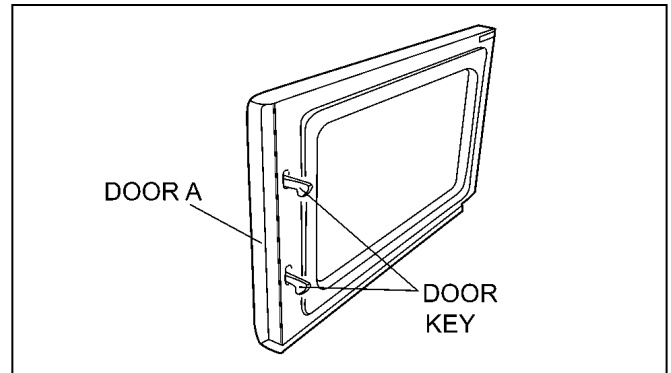
1. Place the door's lower hinge pin into the bottom hinge hole.
2. Use your left index finger to support the door's lower hinge pin while guiding the door's upper hinge pin into the top hinge hole.
3. Lower your finger to seat the door onto the hinges.

**NOTE:**

**Adjust so that the upper portion of the door will touch firmly to the oven cavity front plate, without pushing the door. If the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.**

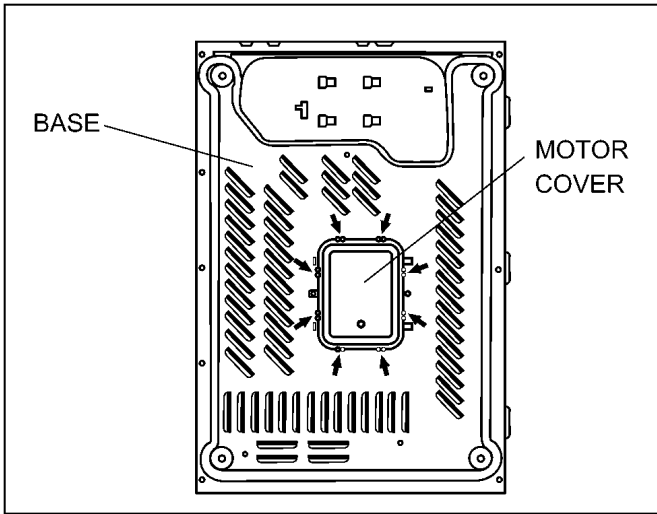
**NOTE:**

**Always perform the microwave leakage measurement test after installation and adjustment of door assembly.**



## 4.6. Turntable motor

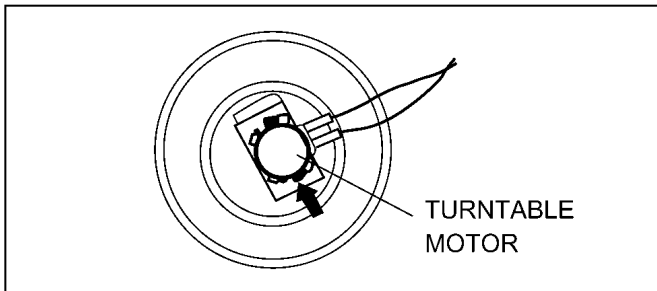
1. Remove the motor cover by breaking off at the 8 spots indicated by arrows with a cutter or the like.



**△ NOTE:**

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

2. Disconnect 2 lead wires connected to the turntable motor.
3. Remove the turntable motor by removing screw.

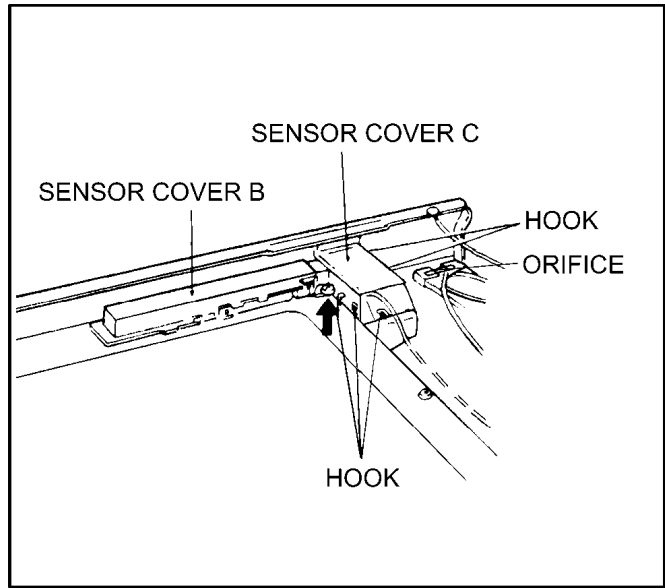


**△ NOTE:**

After reinstalling the new turntable motor and reconnecting the 2 lead wires, reinstall the motor cover by rotating it around 180, tucking the 2 tabs under the base in the 2 provided slots, then screw the single tab to the base using a 4mm x 6mm screw.

## 4.7. Steam sensor

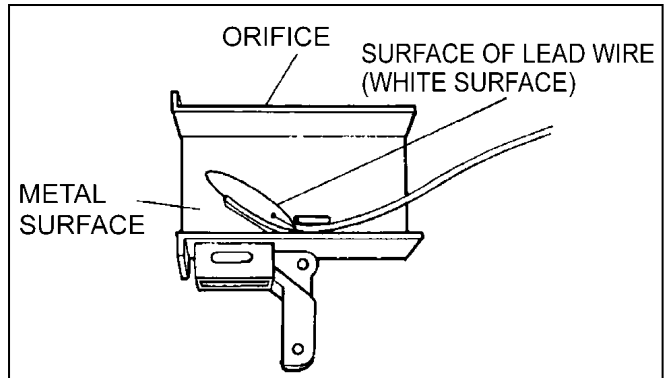
1. Disconnect connector CN2 from digital programmer circuit board.
2. Disengage catch hooks on sensor cover C from orifice.



3. Remove steam sensor from orifice.

**△ NOTE:**

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

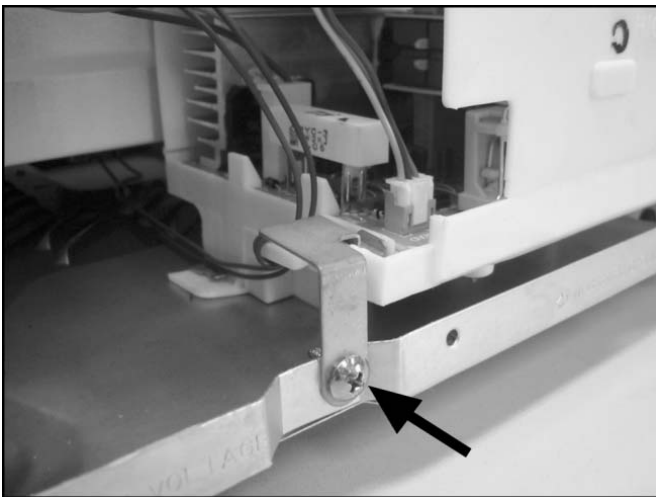


## 4.8. Inverter power supply

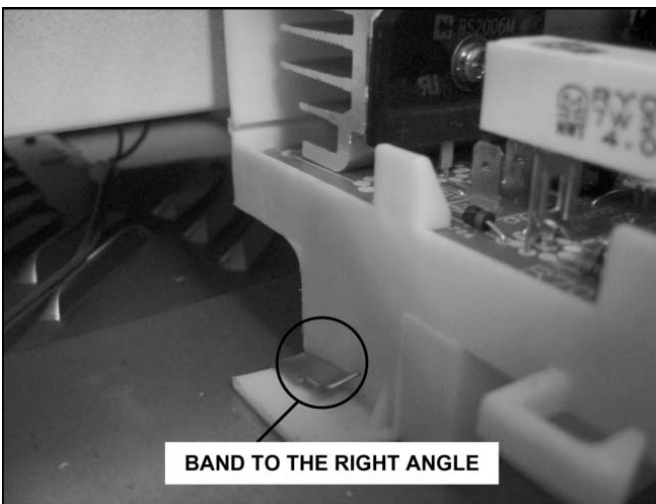
### CAUTIONS

1. Always leave the grounding plate in place.
2. Always securely tighten the ground screw through the bottom of the chassis (base).
3. Securely connect 3 lead wire connectors.
4. Make sure the heat sink has enough space (gap) from the oven. Take special care not to dress any lead wire over the aluminum heat sink because it is hot.

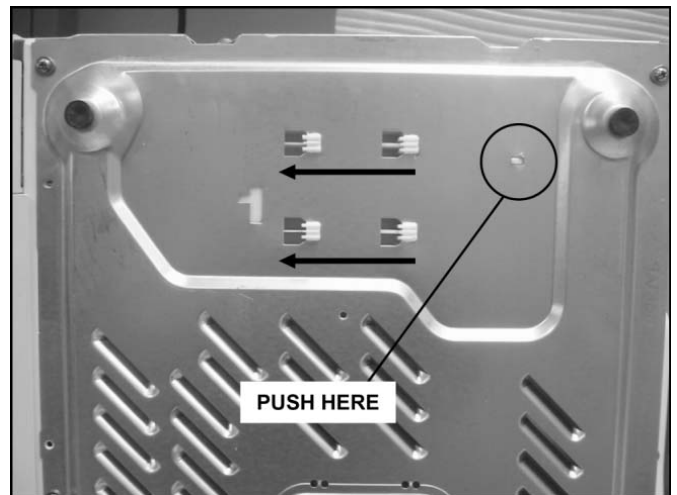
1. Discharge high voltage charge.
2. Remove the H.V.lead wire from magnetron terminals.
3. Disconnect 2 connectors from CN701 & CN702 on H.V.Inverter(U).
4. Remove 1 screw holding grounding plate to the base.



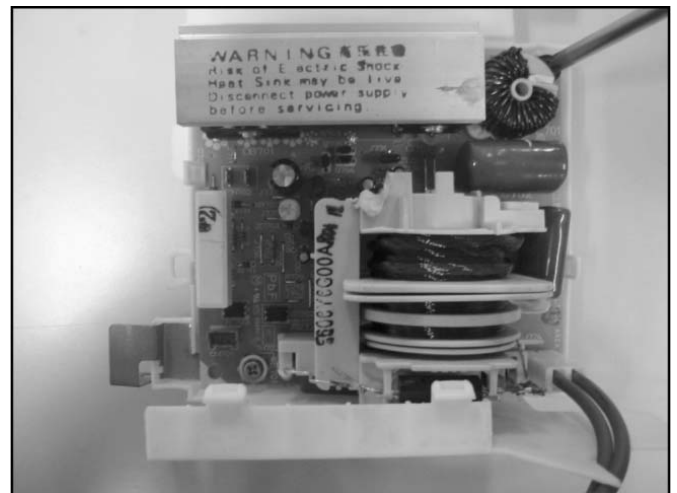
5. Bend back 1 locking metal tab on the base.



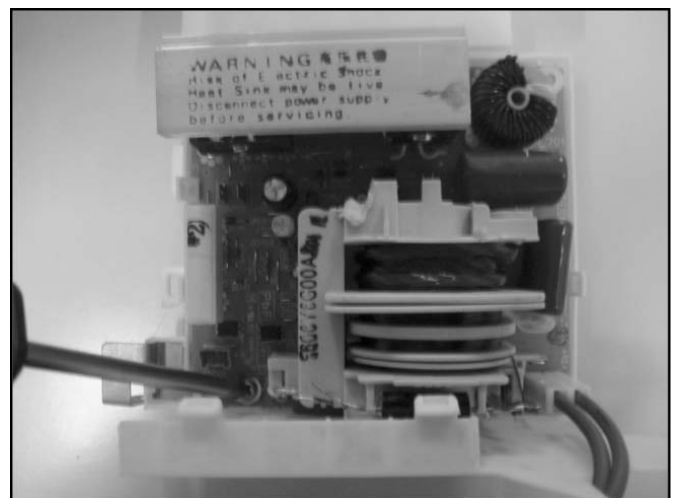
6. Press 1 encircled locking tab and then slide 4 locking tabs of Inverter bracket at the bottom of the base in direction of arrows.



7. Remove 1 screw holding H.V.Inverter to Inverter bracket.



8. Remove 1 screw holding grounding plate to H.V. Inverter.



9. Separate H.V. Inverter from Inverter bracket by freeing 3 catch hooks on the Inverter bracket.

# 5 COMPONENT TEST PROCEDURE

**⚠ WARNING**

1. High voltage is present at the output terminals 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 power cord and discharge the high voltage capacitors (see page 8).

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

1. Unplug lead connectors to Power Relay RY1 and verify open circuit of the Power Relay RY1 1-2 terminals.
  2. Unplug lead connectors to Primary Latch Switch and 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 Closed	Door Opened
Primary Latch Switch	0Ω (Close)	∞Ω (Open)
Secondary Latch Switch	0Ω (Close)	∞Ω (Open)
Power Relay RY1	∞Ω (Open)	∞Ω (Open)

## 5.2. Monitor Interlock Switch

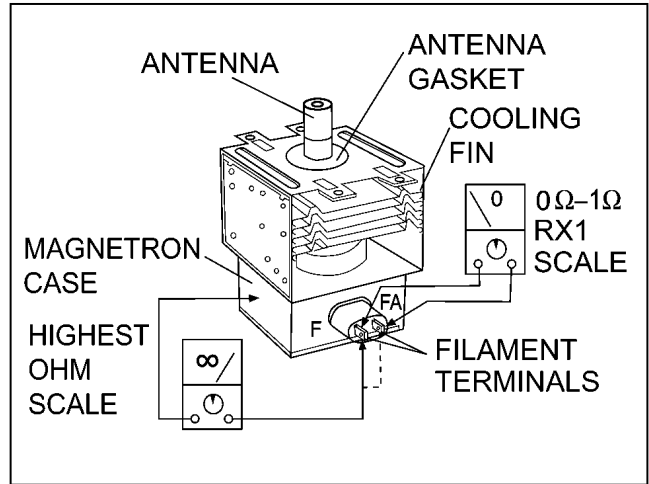
1. Unplug lead wires from Inverter Power Supply (U) primary terminals.
  2. Connect test probes of ohm meter to the disconnected leads that were connected to Inverter Power Supply (U).
  3. Test the continuity of Monitor Interlock Switch with door opened and closed positions using lowest scale of the ohm meter.
- Normal continuity readings should be as follows.

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

## 5.3. Magnetron

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

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

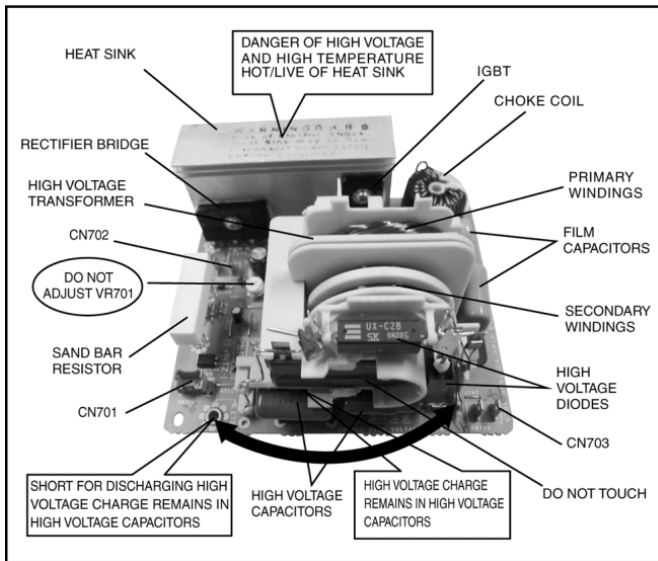


## 5.4. key board membrane (Membrane switch assembly)

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.

## 5.5. Inverter power supply (U)

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



### WARNING: HIGH VOLTAGE

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

#### Test 1

1. With the oven unit's AC power supply cord is unplugged from the wall outlet, unplug the 2 pin H.V. connector CN703 from the magnetron tube.
2. Place 1 liter of water load into oven cavity.
3. Plug in the oven's AC power supply cord into outlet.
4. Program DPC.
  - a. Press **Timer/Clock** pad twice.
  - b. Press **Start** pad once.
  - c. Press **Power Level** pad once.
5. Program oven at High power for 1 minute and press [Start] pad.
  - a. After approximately 37 seconds, oven stops operating.
  - b. During oven operation, the input current is approximately 0.5 to 1A. If both a and b are OK, proceed to test 2.

	INPUT CURRENT	FAILURE CODE
Unplug CN703	0.5 to 1A	Oven stops in 37 seconds after started.

#### Test 2

Continued from Test 1

1. Unplug the oven's AC power supply cord from outlet.
2. Unplug 3 pin connector CN701. CN703 remains unplugged.
3. Plug in the oven's AC power supply cord into outlet.
4. Program DPC.
  - a. Press **Timer/Clock** pad twice.
  - b. Press **Start** pad once.
  - c. Press **Power Level** pad once.

5. Program oven at High power for 1 minute and press [Start] pad.

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

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

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

## 5.6. Temperature thermistor

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

TEMP	MAGNETRON THERMISTOR
100°C	30-60KΩ
25°C	700K-1.5MΩ

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

## 6 MEASUREMENTS AND ADJUSTMENTS

### ⚠ WARNING

- \* For continued protection against radiation hazard, replace only with identical replacement parts (For touch models part No. J61415G10XN, Type No. V-15G-3C25 for primary latch switch; Part No. J61414T00AP, Type No. D3V-16G-3C25 for secondary latch switch and Part No. J61784T00AP, Type No. D3V-1G-2C25 for monitor interlock switch.)
- \* When the 20 Amp. fuse is blown due to the operation of the monitor interlock switch, you must replace power relay RY1 (part No. AEBGJQC25F18, Type No. G5G-1A18VDC), the primary latch switch and the monitor interlock switch. Then follow the installation procedures below.
- \* Interlock switch replacement: In replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.
- \* Refer to schematic diagram to ensure proper connection.

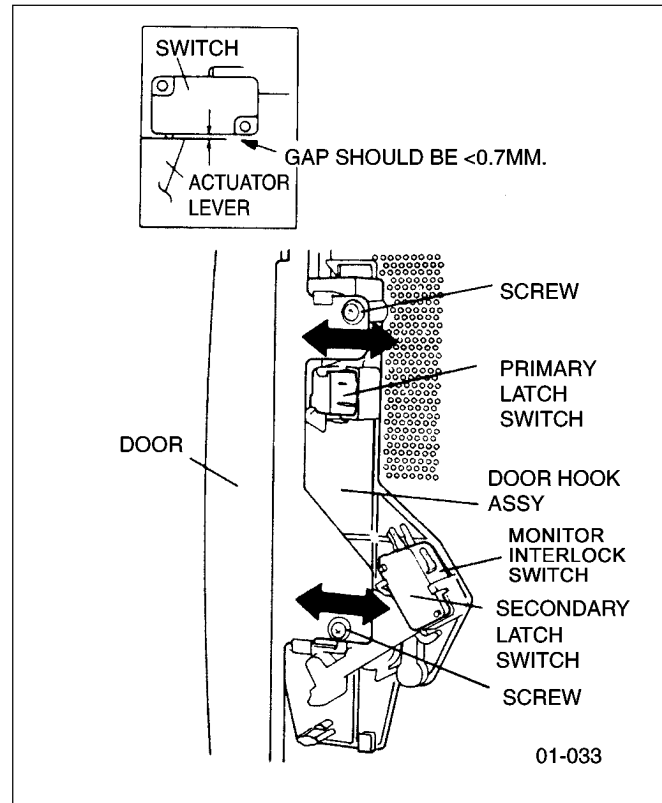
### 6.1. Adjustment of primary latch switch, secondary latch switch and monitor interlock switch.

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

#### NOTE:

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

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



### 6.2. Measurement of microwave output

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

Necessary Equipment:

- \*1 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 accurately as possible.**

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

**TABLE (1L-1min. test)**

RATED OUTPUT	TEMPERATURE RISE
1200W	Min. 18.5°F(10.3°C)
1300W	Min. 19.8°F(11.1°C)



# 7 PROCEDURE FOR MEASURING MICROWAVE ENERGY LEAKAGE

## ⚠ WARNING

Check for radiation leakage after every servicing. After repairing or replacing any radiation safety device, keep a written record for future reference. This requirement must be strictly observed. In addition, the leakage reading must be recorded on the service repair ticket while in the customer's home.

## 7.1. Equipment

- Electromagnetic radiation monitor
- Glass thermometer 212°F or 100°C
- 600cc glass beaker

## 7.2. Procedure for measuring radiation leakage

Note before measuring:

- Do not exceed meter full scale deflection. Leakage monitor should initially be set to the highest scale.
  - To prevent false readings, the test probe should be held by the grip portion of the handle only and moved along the shaded area in Figure no faster than 1 inch/sec (2.5cm/sec).
  - Leakage with the outer panel removed: less than 5mW/cm<sup>2</sup>.
  - Leakage for a fully assembled oven with door normally closed: less than 2mW/cm<sup>2</sup>.
  - Leakage for a fully assembled oven [Before the latch switch (primary) is interrupted] while pulling the door: less than 2mW/cm<sup>2</sup>.
1. Pour 275 ± 15cc (9ozs<sup>s</sup> ± 1/2oz) of 20°C ± 5°C (68° ± 9°F) water in a beaker which is graduated to 600cc, and place in the center of the oven.
  2. Set the radiation monitor to 2450MHz and use it following the manufacturer's recommended test procedure to assure correct results.
  3. When measuring the leakage, always use the 2 inch (5cm) spacer supplied with the probe.
  4. Tap the start button or set the timer and with the magnetron oscillating, measure the leakage by holding the probe perpendicular to the surface being measured.

### 7.2.1. Measurement with the outer panel removed.

Whenever you replace the magnetron, measure for radiation leakage before the outer panel is installed and after all necessary components are replaced or adjusted. Special care should be taken in measuring around the magnetron.

## ⚠ WARNING

Do not touch any high voltage parts. Doing so can lead to personal injury or death.

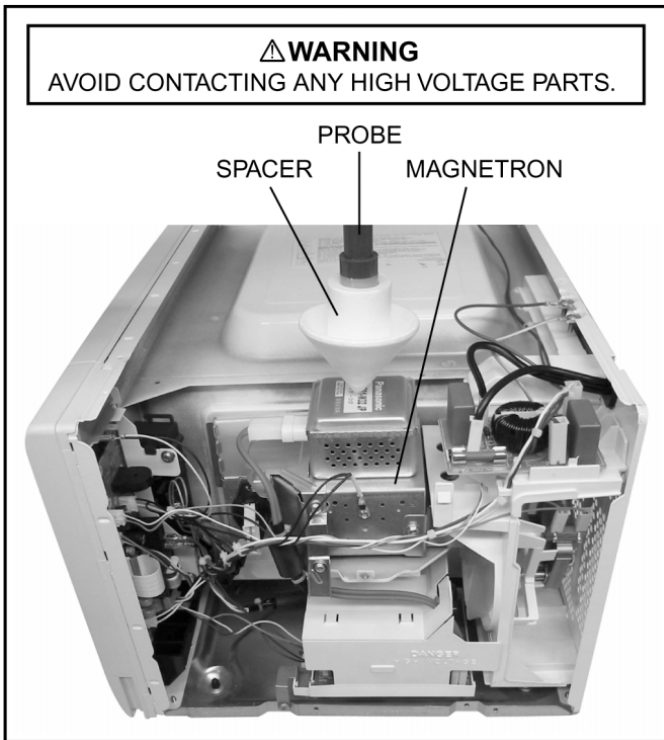
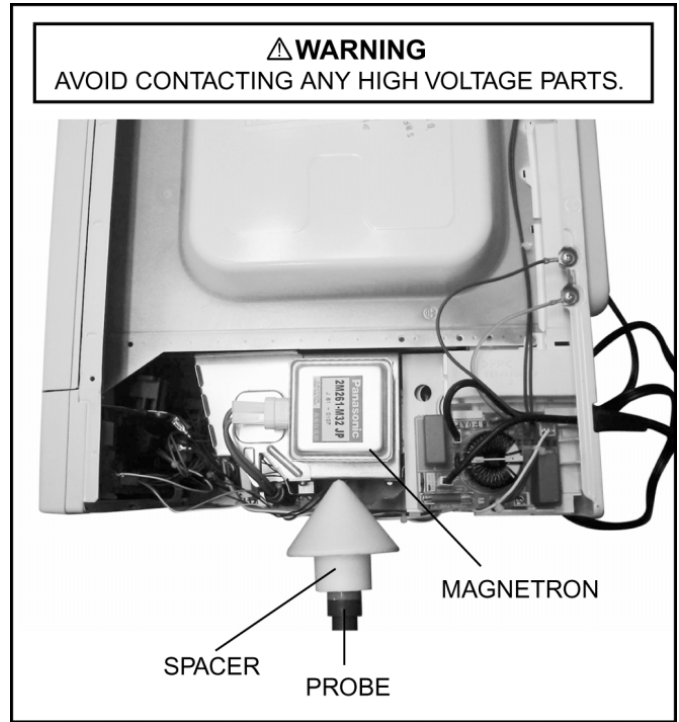
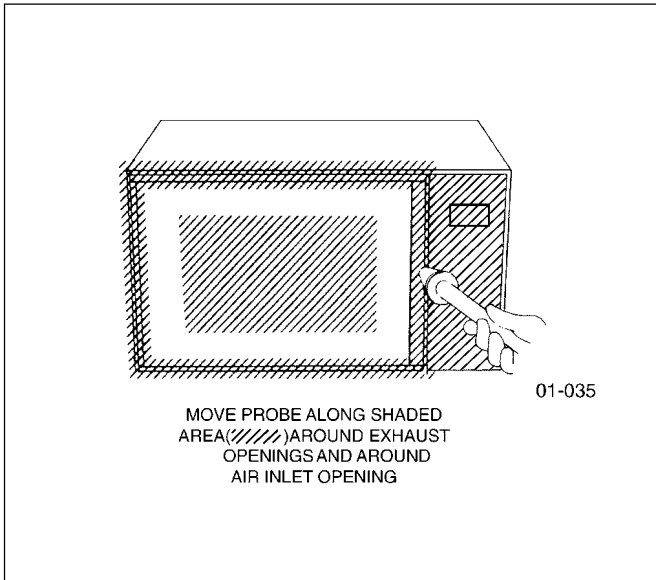
### 7.2.2. Measurements with a fully assembled oven.

After all components, including outer panel are fully assembled, measure for radiation leakage around the door periphery, the door viewing window, the exhaust opening, control panel and air inlet openings.

## 7.3. Record keeping and notification after measurement

- After any adjustment or repair to a microwave oven, a leakage reading must be taken. Record this leakage reading on the repair ticket even if it is zero. A copy of this repair ticket and the microwave leakage reading should be kept by repair facility.
- Should the radiation leakage be more than 2 mW/cm<sup>2</sup> after determining that all parts are in good condition, functioning properly, and genuine replacement parts as listed in this manual have been used.

**7.4. At least once a year, have the radiation monitor checked for calibration by its manufacturer.**



# 8 TROUBLESHOOTING GUIDE

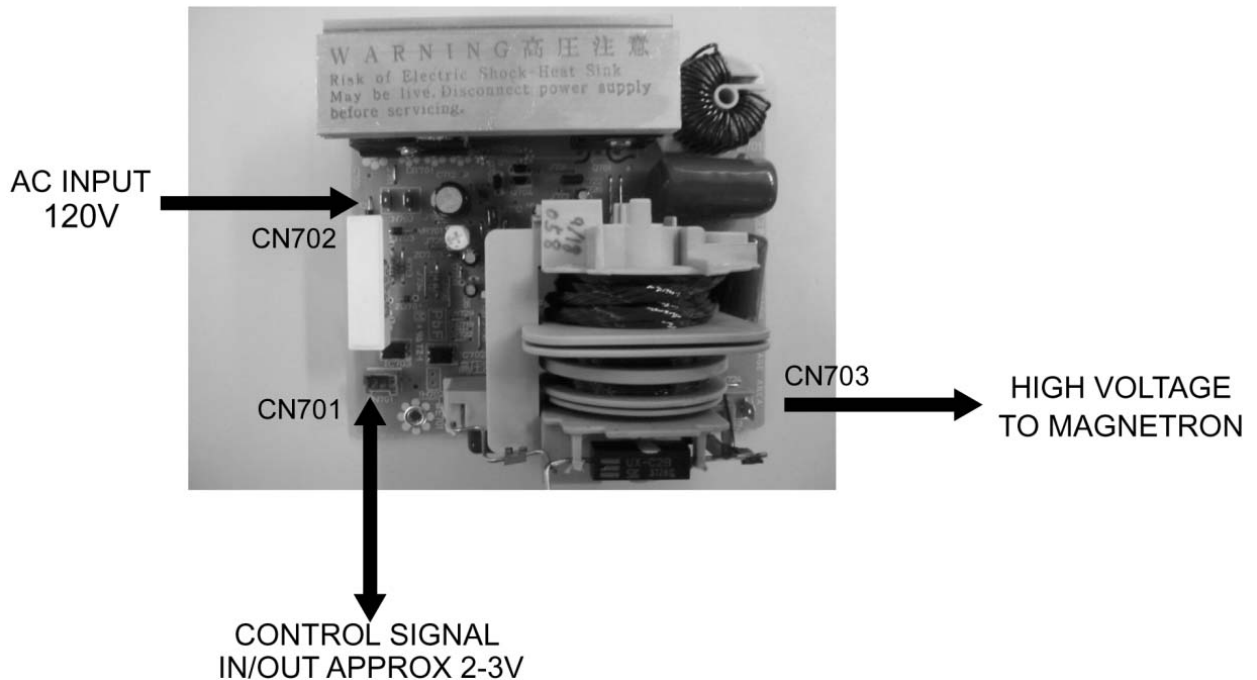
**DANGER: HIGH VOLTAGES ⚠**

1. **DO NOT RE-ADJUST PRESET CONTROL on the H.V.Inverter (U).** It is very dangerous to repair or adjust without proper test equipment because this circuit generates very large current and high voltage. Operating a misaligned inverter circuit is dangerous.
2. Ensure proper grounding before troubleshooting.
3. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
4. Discharge high voltage remaining in the H.V.Inverter (U).
5. When checking the continuity of the switches or the H.V.Inverter, disconnect one lead wire from these parts and then check continuity with the AC plug removed. Doing otherwise may result in a false reading or damage to your meter. When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be damaged or the connector cannot be removed.
6. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel. Always touch ground while working on this panel to discharge any static charge in your body.
7. 120V 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.

## 8.1. (Troubleshooting) Oven stops operation during cooking

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven stops in 3 seconds after pressing [Start] pad	No 120V AC is supplied to H.V.Inverter (U) CN702 terminals	1. Latch Switch 2. Power relay RY1 3. Loose lead wire connector CN701, CN702 4. H.V. Inverter (U)
	Oven stops in 37 seconds after pressing [Start] pad	H.V.Inverter (U) operates by the control signals from DPC but magnetron is not oscillating	1. Magnetron 2. Loose lead wire connector CN703 3. H.V. Inverter (U)
	Oven stops in 10 seconds after pressing [Start] pad (Auto sensor cooking)	Steam sensor circuit is not functioning	1. Steam sensor 2. DPC 3. Open or loose wiring of sensor terminal from connector CN2 on DPC
2.	No display and no operation at all. Fuse is blown.	Most probably loose connection of connectors, or door latch mechanism is not adjusted properly	1. Align door, Door Latch Switches 2. Loose wiring connectors

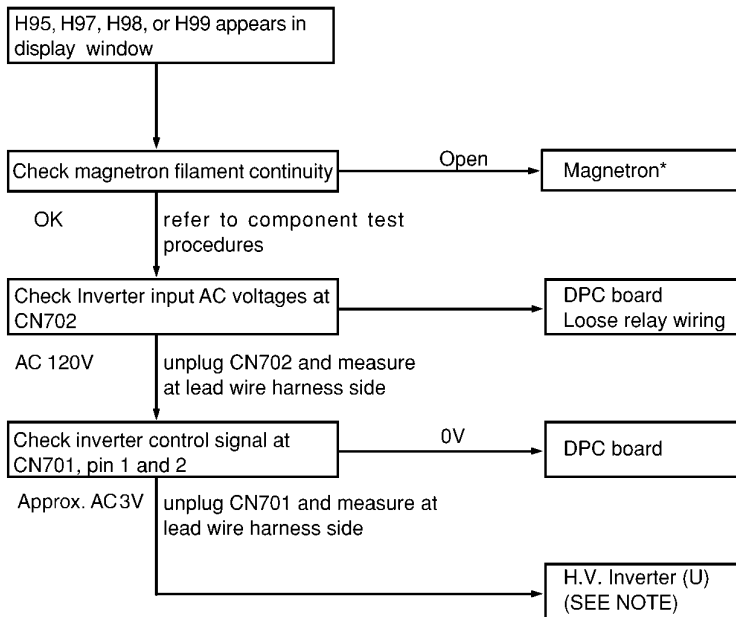


## 8.2. (Troubleshooting) Other problems

	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 / thermistor 3. Open low voltage transformer 4. Defective DPC	Check 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 monitor interlock switch (NOTE 1) 4. Defective Inverter Power Supply (U)  NOTE 1: All of these switches must be replaced at the same time. Check continuity of power relay RY1 contacts (between 1 and 2) and if it has continuity, replace power relay RY1 also.	Check adjustment of primary, secondary latch switch and monitor interlock switch including door.
3.	Oven does not accept key input (Program)	1. Key input is not in proper 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.	Fan motor turns on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch 3. Door switch CN3	Adjust door and latch switches.
5.	Timer starts count down but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of primary latch switch 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will cause lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent. 3. Defective high voltage component H.V. Inverter Power Supply (U) Magnetron 4. Open or loose wiring of power relay RY1 5. Defective primary latch switch 6. Defective DPC or power relay RY1	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	
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.	Fan motor turns on and turntable motor rotates when door is opened.	1. Low voltage transformer on DPC.	
9.	Oven does not operate and return to plugged in mode as soon as [Start] pad is pressed.	1. Defective DPC	Check grounding connector on escutcheon base.
10.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
11.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
12.	Oven stops operation during cooking.	1. Open or loose wiring of primary and secondary latch switch 2. Operation of thermal cutout	Adjust door and latch switches.

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

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



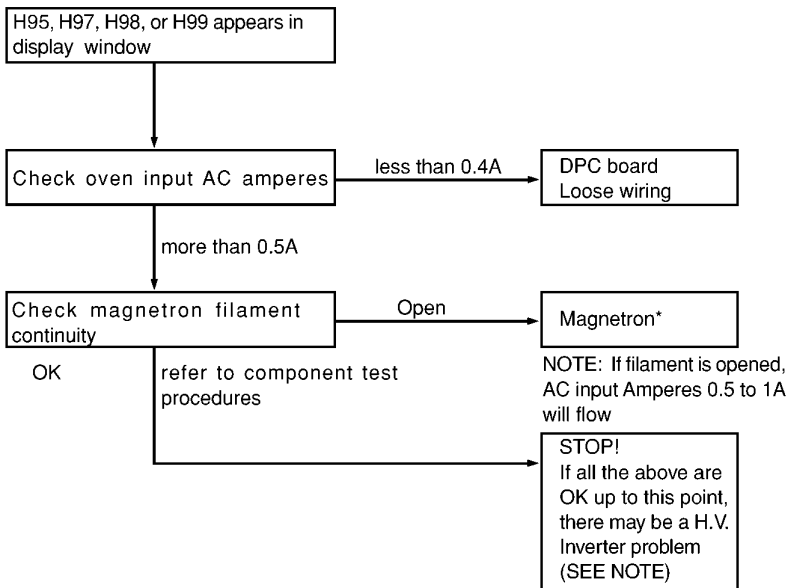
**⚠ WARNING:** DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET CONTROL on the board. It is very dangerous to repair or adjust without proper test equipment because this circuit generates very high voltage and very large current. Off alignment of inverter board operation is dangerous. Operating a misaligned Inverter circuit is dangerous due to the very high voltage and current that is produced by this board. Defective boards must be replaced with a new one.

\* Check magnetron filament for open or short to case before proceeding to determine a good magnetron.

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

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

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



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

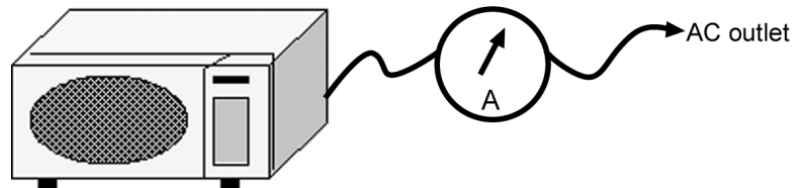
## 8.4. SIMPLE WAY OF H.V. INVERTER/MAGNETRON TROUBLESHOOTING

### Purpose:

Simple way (**3/37 seconds rule**) of identifying whether it's Magnetron, Inverter or others.

### Set-up:

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



### Procedure:

Follow the matrix table below to identify the problem source.

### Note:

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

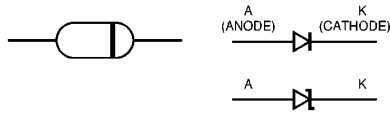
Power will:	Ammeter reading is:	To do:	Remedy:
Shut off in 37 seconds after "Start".	1. Between 0.5A and 1.0A.	Check and repair open magnetron circuit	Open magnetron wiring between Inverter and magnetron terminal.
	2. Between 1.0A and 2.0A.	Check continuity of D702 in Inverter PCB.	
		↓	
		1. D702 shorted	
	2. D702 is OK	Replace <b>magnetron</b>	
Shut off in 3 seconds after "Start"	1. Less than 0.5A	Check open circuit: Latch Switch, DPC, Power Relay and CN701	Replace defective component(s), or correct switch, cables and connectors.

## 8.5. H.V.INVERTER BOARD MAIN PARTS LIST (F606Y8M00AP)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
DB701	B0FBBS000001	BRIDGE DIODE	1	20A, 600V
L701	F50206G00AP	CHOKE COIL	1	
Q701	BLJAGV000015	TRANSISTOR SI	1	1000V
T701	⚠ A609A8M00AP	H.V. TRANSFORMER	1	( INCLUDING D701, D702, C706, C707 )
C701	ECWF5284N300	CAPACITOR	1	0.28µF/500V
C702	ECWF2455N644	CAPACITOR	1	4.5µF/250V

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

### Diode



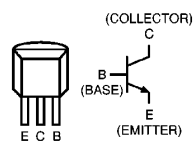
	FORWARD	REVERSE
A-K	SMALL	$\infty$

### Transistor

#### NPN Transistor

2SC.....

2SD.....

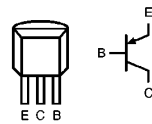


	FORWARD	REVERSE
B-E	SMALL	$\infty$
B-C	SMALL	$\infty$
C-E	$\infty$	$\infty$

#### PNP Transistor

2SA.....

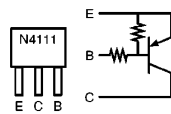
2SB.....



	FORWARD	REVERSE
B-E	SMALL	$\infty$
C-B	SMALL	$\infty$
C-E	$\infty$	$\infty$

### Digital Transistor

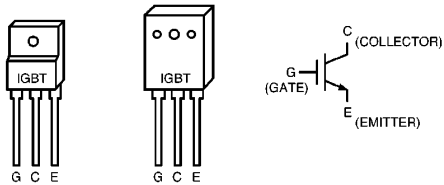
#### PNP Transistor



	FORWARD	REVERSE
E-B	10k $\Omega$ ~ 30k $\Omega$	10k $\Omega$ ~ 30k $\Omega$
C-B	50k $\Omega$ ~ 90k $\Omega$	$\infty$
C-E	40k $\Omega$ ~ 80k $\Omega$	$\infty$

### IGBT

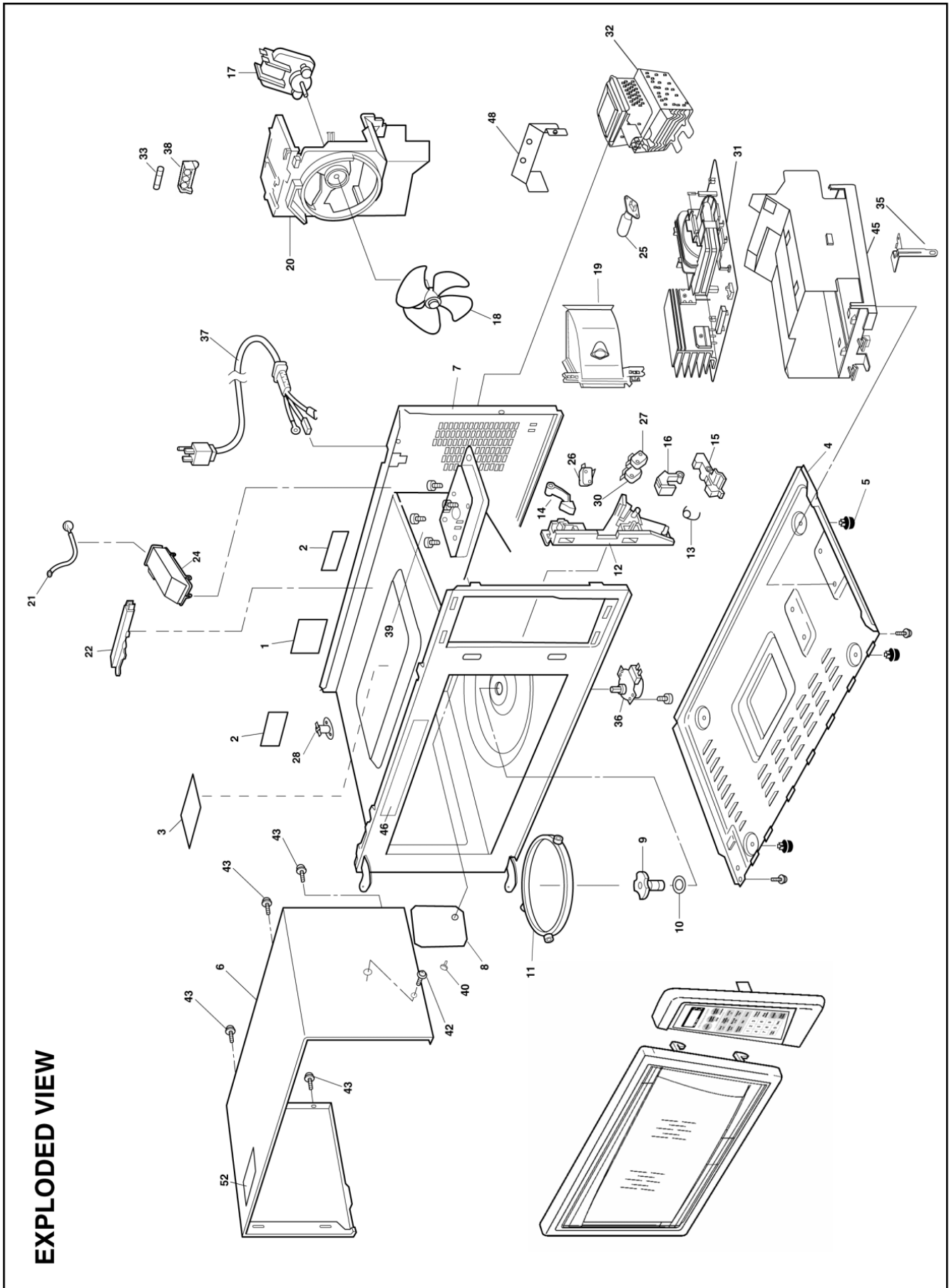
#### (INSULATED GATE BIPOLAR TRANSISTOR)



	FORWARD	REVERSE
E-C	SMALL	$\infty$
E-G	$\infty$	$\infty$
C-G	$\infty$	$\infty$

# 9 EXPLODED VIEW AND PARTS LIST

## 9.1. EXPLODED VIEW





## 9.2. PARTS LIST

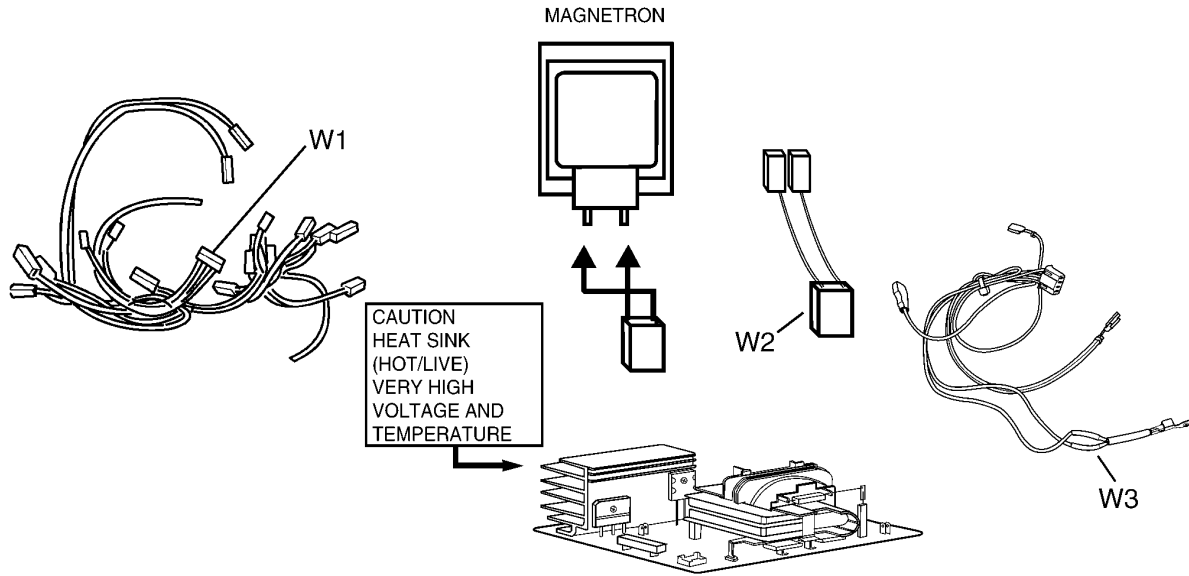
**NOTE:**

1. When ordering replacement part(s), please use part number(s) shown in this part list.  
Do not use description of the part.
2. Important safety notice:  
Components identified by  $\triangle$  mark have special characteristics important for safety.  
When replacing any of these components, use only manufacture's specified parts.

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
1		F00069660AP	CAUTION LABEL	1	
2		F00078X00SRP	NAME PLATE	1	SD698S RPH
2		F00078X00SRU	NAME PLATE	1	SD698S RUH
2		F00078V60SRP	NAME PLATE	1	ST678S RPH
2		F00078V60SRU	NAME PLATE	1	ST678S RUH
2		F00078V70HRP	NAME PLATE	1	ST658W RPH
2		F00078V70HRU	NAME PLATE	1	ST658W RUH
3		F00338F00RP	FUSE LABEL	1	
4		F10016K10APG	BASE	1	
5		F10084T00AP	RUBBER FOOT	4	
6		F110D5Y00SAP	CABINET BODY(U)	1	SD698S
6		F110D5Y30SAP	CABINET BODY(U)	1	ST678S
6		F110D5Y30HAP	CABINET BODY(U)	1	ST658W
7	$\triangle$	F200A8F00AP	OVEN(U)	1	SD698S
7	$\triangle$	F200A8F40AP	OVEN(U)	1	ST678S,ST658W
8		F20555L00AP	COVER	1	
9		F21315Y00AP	PULLY SHAFT	1	
10		F2177-F80	WASHER	1	
11		F290D9330AP	ROLLER RING(U)	1	
12	$\triangle$	F30206G30AP	DOOR HOOK	1	SD698S,ST678S
12	$\triangle$	F30206K50AP	DOOR HOOK	1	ST658W
13		F3097-5L00	LATCH SPRING	1	ST658W
14		F31366G30AP	HOOK LEVER A	1	SD698S,ST678S
14		F31366K50AP	HOOK LEVER A	1	ST658W
15		F31376G30AP	HOOK LEVER B	1	SD698S,ST678S
15		F31376K50AP	HOOK LEVER B	1	ST658W
16		F31386G30AP	HOOK LEVER C	1	SD698S,ST678S
16		F31386K50AP	HOOK LEVER C	1	ST658W
17		F400A5Y00AP	FAN MOTOR	1	AC120V,SINGLE PHASE,60Hz
18		F40084T00AP	FAN BLADE	1	
19		F40257D00APG	AIR GUIDE A	1	
20		F41445Y00AP	ORIFICE	1	
21		J607S4T00AP	STEAM SENSOR	1	SD698S
22		F64508660AP	SENSOR COVER B	1	SD698S
24		F65434W00AP	SENSOR COVER C	1	SD698S
25		F612E5U40AP	INCANDESCENT LAMP (U)	1	
26	$\triangle$	J61415G10XN	MICRO SWITCH	1	(PRIMARY LATCH SWITCH) (V-15G-3C25)
27	$\triangle$	J61414T00AP	MICRO SWITCH	1	(SECONDARY LATCH SWITCH) (D3V-16G-3C25)
28	$\triangle$	F61456N60AP	THERMAL CUTOUT	1	
30	$\triangle$	F61785U30XN	MICRO SWITCH	1	(MONITOR INTERLOCK SWITCH) (D3V-1G-2C25)
31	$\triangle$	F606Y8M00AP	H.V.INVERTER (U)	1	
32	$\triangle$	2M261-M32KLP	MAGNETRON	1	
33	$\triangle$	F62308F20AP	FUSE	1	
35		F66626K50AP	GROUNDING PLATE	1	
36		F63265G60AP	TURNTABLE MOTOR	1	
37	$\triangle$	F900C4T00AP	AC CORD W/PLUG	1	
38		F62315G10XN	FUSE HOLDER	1	
39		XTWFL4+12T	SCREW	4	FOR MAGNETRON
40		XTTFL4+6BN	SCREW	1	FOR COVER
42		XTCAFA4+12AFM	SCREW	1	FOR CABINET BODY SIDE (SD698S)
42		XTCAFA4+12AFS	SCREW	1	FOR CABINET BODY SIDE (ST678S)
42		XTCAFA4+12AFW	SCREW	1	FOR CABINET BODY SIDE (ST658W)
43		XTTBFE4T12A0	SCREW	4	FOR CABINET BODY

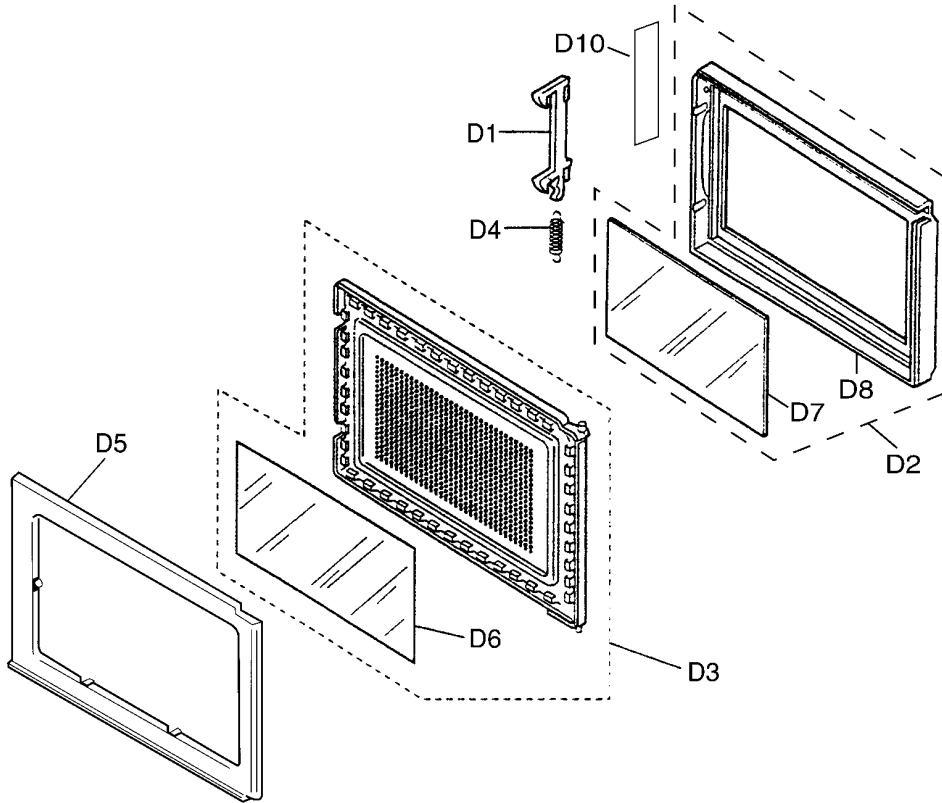
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
45	F65856K50AP	INVERTER BRACKET	1	
46	F03347D00RP	MENU LABEL	1	SD698S
46	F03347G50RP	MENU LABEL	1	ST678S,ST658W
48	F40264T60APG	AIR GUIDE B	1	
52	F00066G00RP	CAUTION LABEL	1	SD698S RPH,ST678S RPH

### 9.3. WIRING MATERIALS



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
W1	F030A7D00RP	LEAD WIRE HARNESS	1	
W2	F030E5L00AP	H.V.LEAD WIRE	1	
W3	F03537D00AP	LEAD WIRE HARNESS U	1	(INCLUDING THERMISTOR)

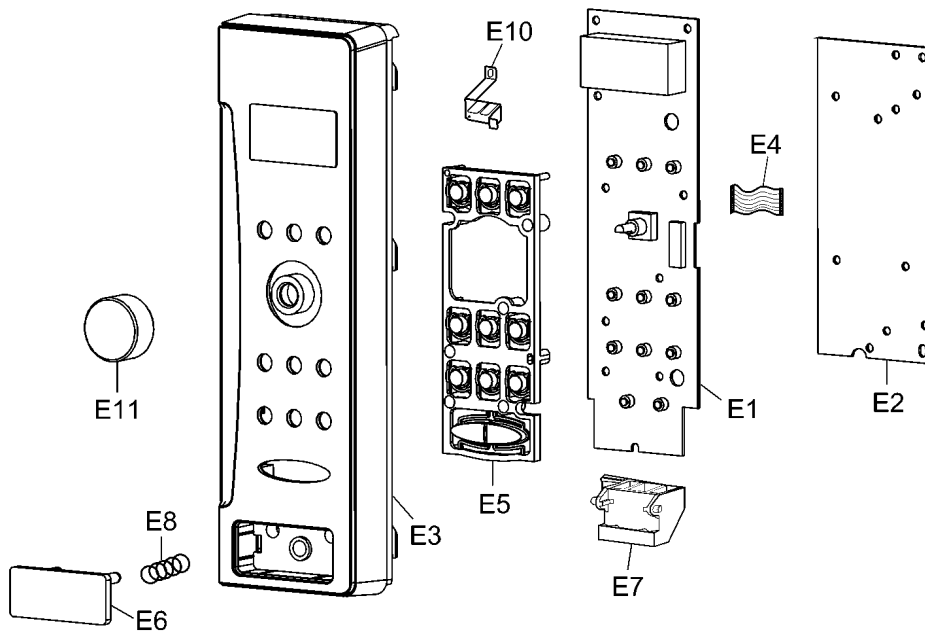
## 9.4. DOOR ASSEMBLY



Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
D1		F30186P40AG	DOOR KEY A	1	SD698S,ST678S
D1		F30184Y30XN	DOOR KEY A	1	ST658W
D2	△	F301A8X00SCP	DOOR A (U)	1	SD698S
D2	△	F301A8M00SAP	DOOR A (U)	1	ST678S
D3	△	F302K5L00AP	DOOR E (U)	1	
D4		F30215G10XN	DOOR KEY SPRING	1	
D5	△	F30854T00AP	DOOR C	1	
D6	△	F31454T00AP	DOOR SCREEN A	1	
D7		F31468F50HCP	DOOR SCREEN B	1	ST658W
D8	△	F30016K50HAP	DOOR A	1	ST658W
D10		F02459660AP	DHHS LABEL	1	SD698S,ST678S

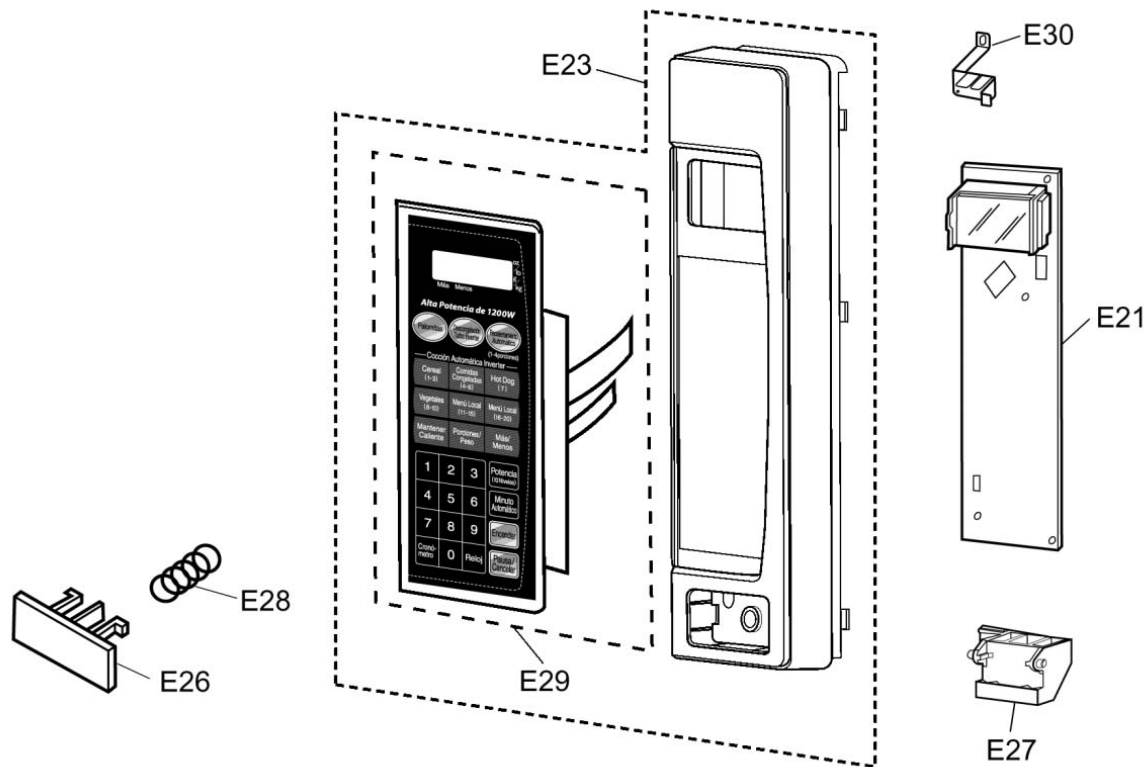
## 9.5. ESCUTCHEON BASE ASSEMBLY

### 9.5.1. NN-SD698S



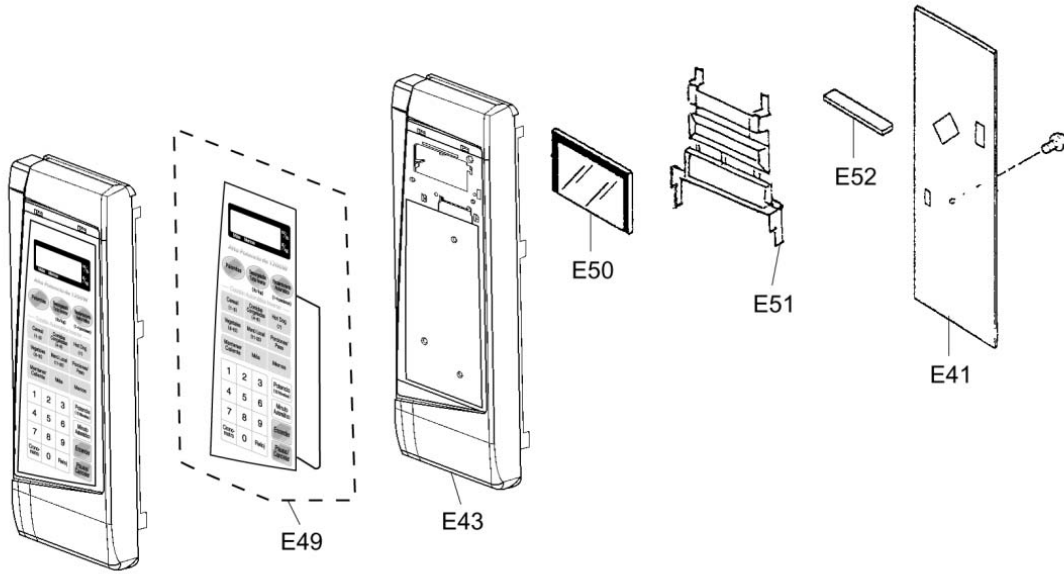
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E1	F603L8X00RP	D.P.CIRCUIT (AU)	1	SD698S
E2	F603Y8X00RP	D.P.CIRCUIT (DU)	1	SD698S
E3	F800L8X00SRP	ESCUTCHEON BASE (U)	1	SD698S
E4	F66164W20AP	FLAT CABLE	1	SD698S
E5	F82988X00SAP	BUTTON	1	SD698S
E6	F80725Y00SAP	DOOR OPENING BUTTON (U)	1	SD698S
E7	F82566K10AP	DOOR OPENING LEVER	1	SD698S
E8	F80375K00AP	COOK BUTTON SPRING	1	SD699S
E10	F90095X00AP	GROUNDING PANEL	1	SD698S
E11	F83928P00KAP	DIAL	1	SD698S

### 9.5.2. NN-ST678S



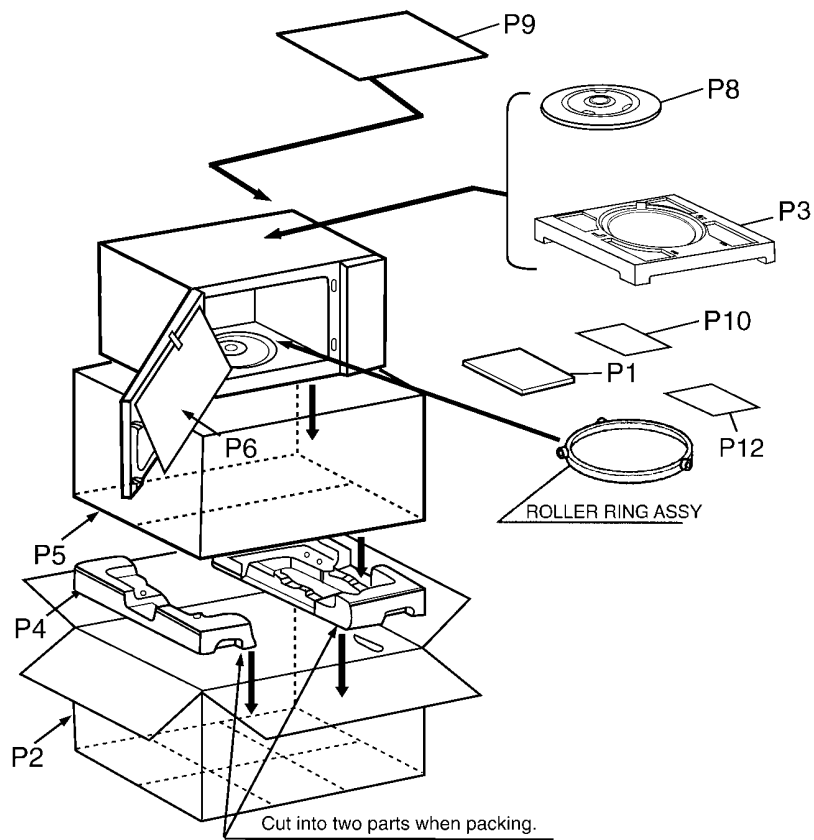
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E21	F603L8V60RP	D.P.CIRCUIT (AU)	1	ST678S
E23	F800L8V60SRP	ESCUTCHEON BASE (U)	1	ST678S
E26	F80725Y00SAP	DOOR OPENING BUTTON (U)	1	ST678S
E27	F82565Y00AP	DOOR OPENING LEVER	1	ST678S
E28	F80375K00AP	COOK BUTTON SPRING	1	ST678S
E29	F630Y8V60BRP	MEMBRANE SWITCH (U)	1	ST678S
E30	F90095X00AP	GROUNDING PANEL	1	ST678S

9.5.3. NN-ST658W



Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
E41	F603L7G50RP	D.P.CIRCUIT (AU)	1	ST658W
E43	F80346K50HAP	ESCUTCHEON BASE	1	ST658W
E49	F630Y8V70HRP	MEMBRANE SWITCH (U)	1	ST658W
E50	L5AAAEC00056	DISPLAY	1	ST658W
E51	F66175L00AP	DISPLAY TUBE COVER	1	ST658W
E52	F67005U40XN	RUBBER CONNECTOR	1	ST658W

## 9.6. PACKING AND ACCESSORIES

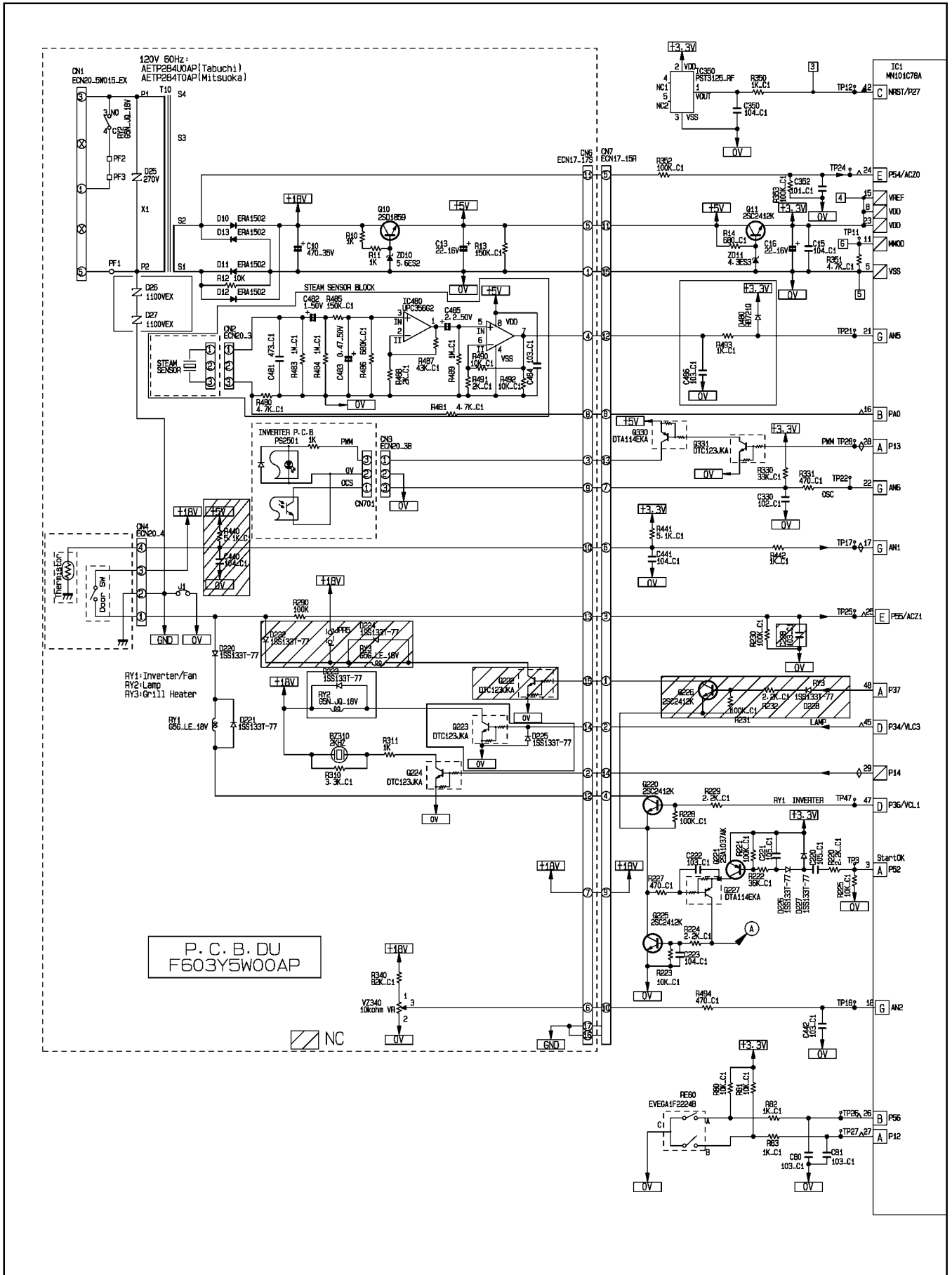


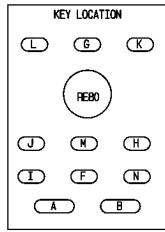
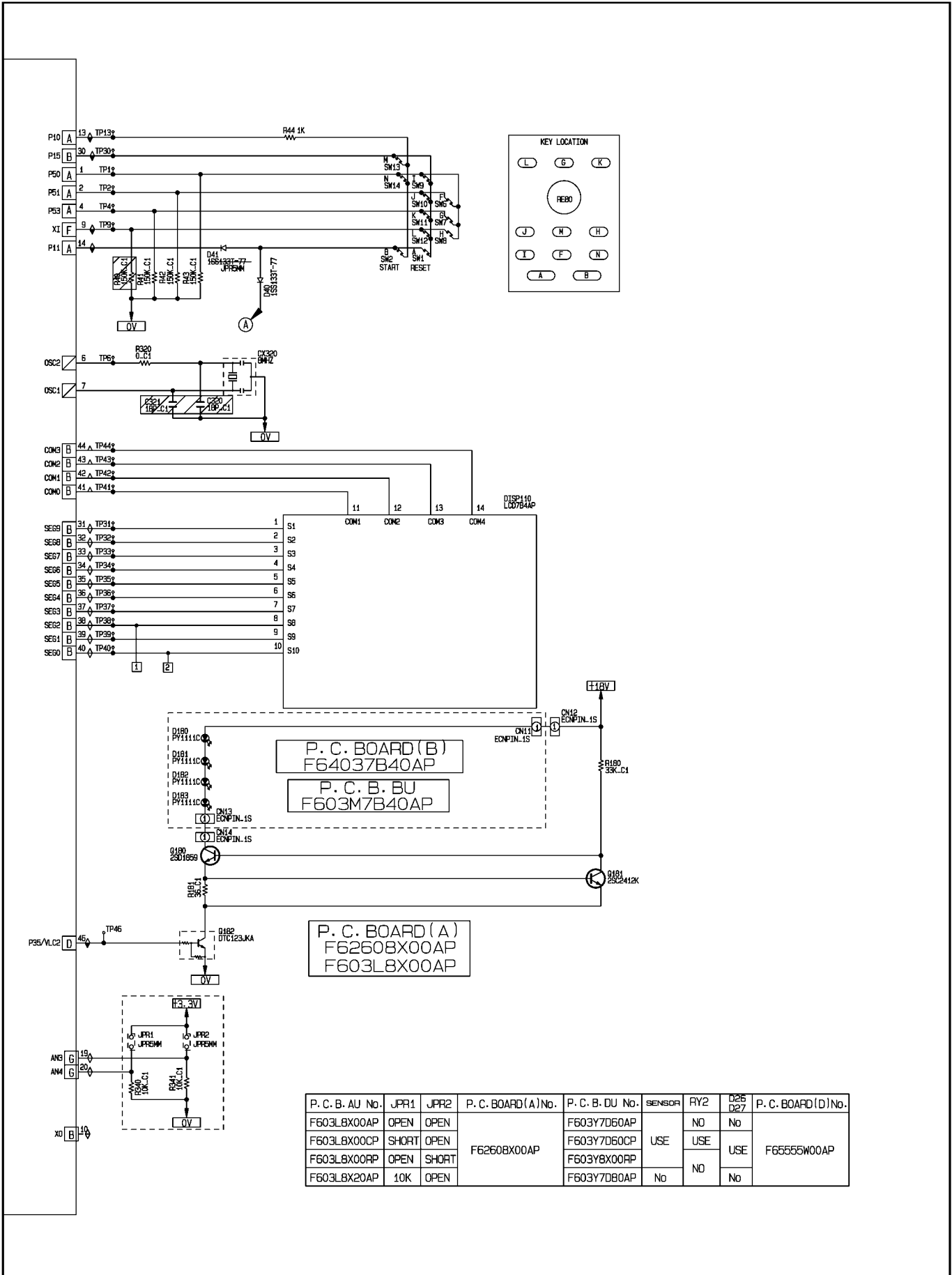
Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	F00038X00RP	INSTRUCTION MANUAL	1	SD698S
P1	F00038V60RP	INSTRUCTION MANUAL	1	ST678S,ST658W
P2	F01028X00SRP	PACKING CASE,PAPER	1	SD698S RPH
P2	F01028V60SRP	PACKING CASE,PAPER	1	ST678S RPH
P2	F01028V70HRP	PACKING CASE,PAPER	1	ST658W RPH
P3	F01046K50AP	UPPER FILLER	1	
P4	F01055L00AP	LOWER FILLER	1	
P5	F01067F00AP	P.E.BAG	1	SD698S,ST678S
P5	F01068100XN	P.E.BAG	1	ST658W
P6	F01078J00XN	DOOR SHEET	1	
P8	F06014T00AP	COOKING TRAY	1	
P9	F01924T00AP	SHEET	1	
P10	F00065G40AP	CAUTION LABEL	1	
P12	F00166H70RP	NOTICE	1	SD698S,ST678S



# 10 DIGITAL PROGRAMMER CIRCUIT

## 10.1. NN-SD698S





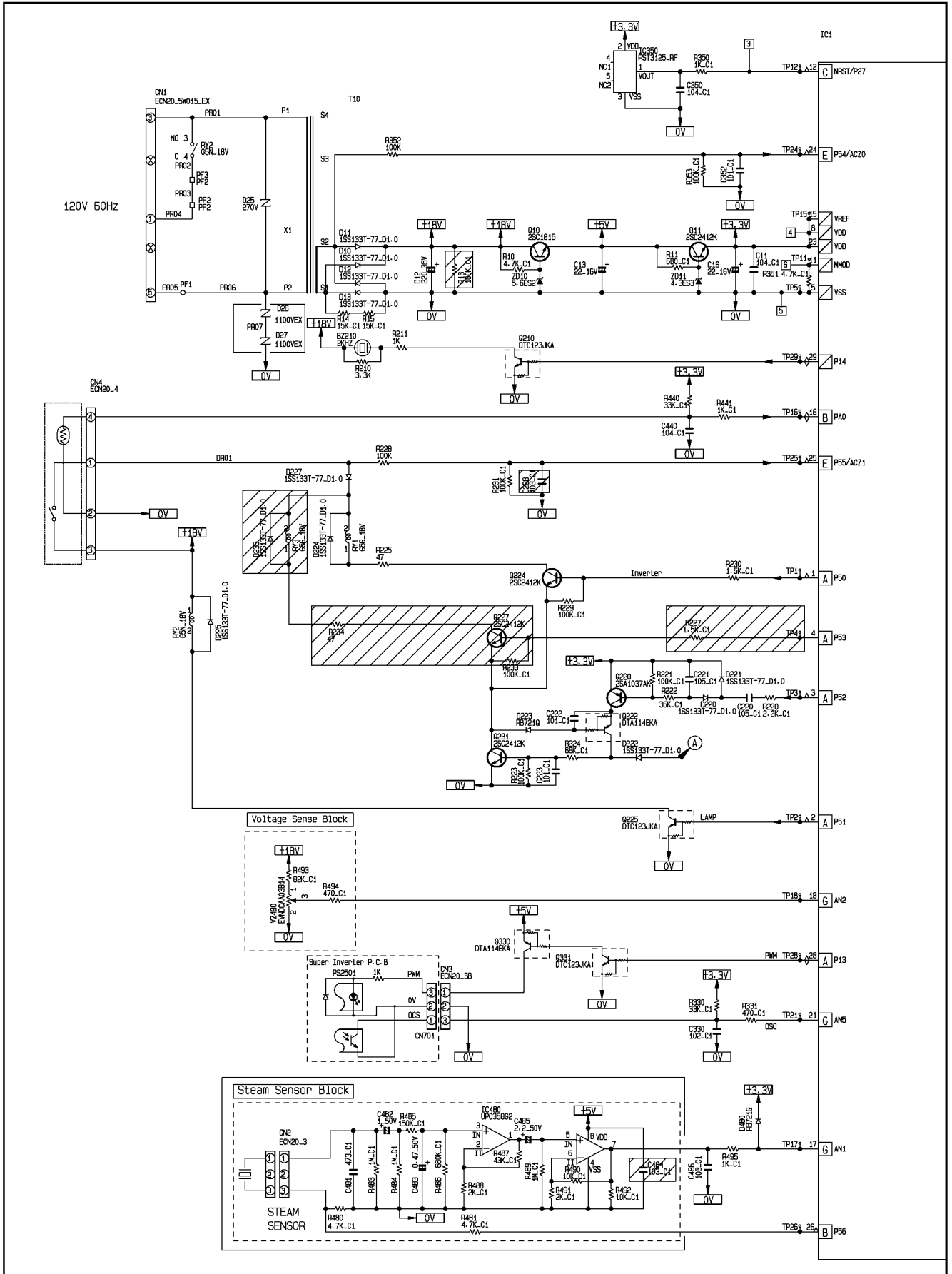
P. C. BOARD (B)  
F64037B40AP

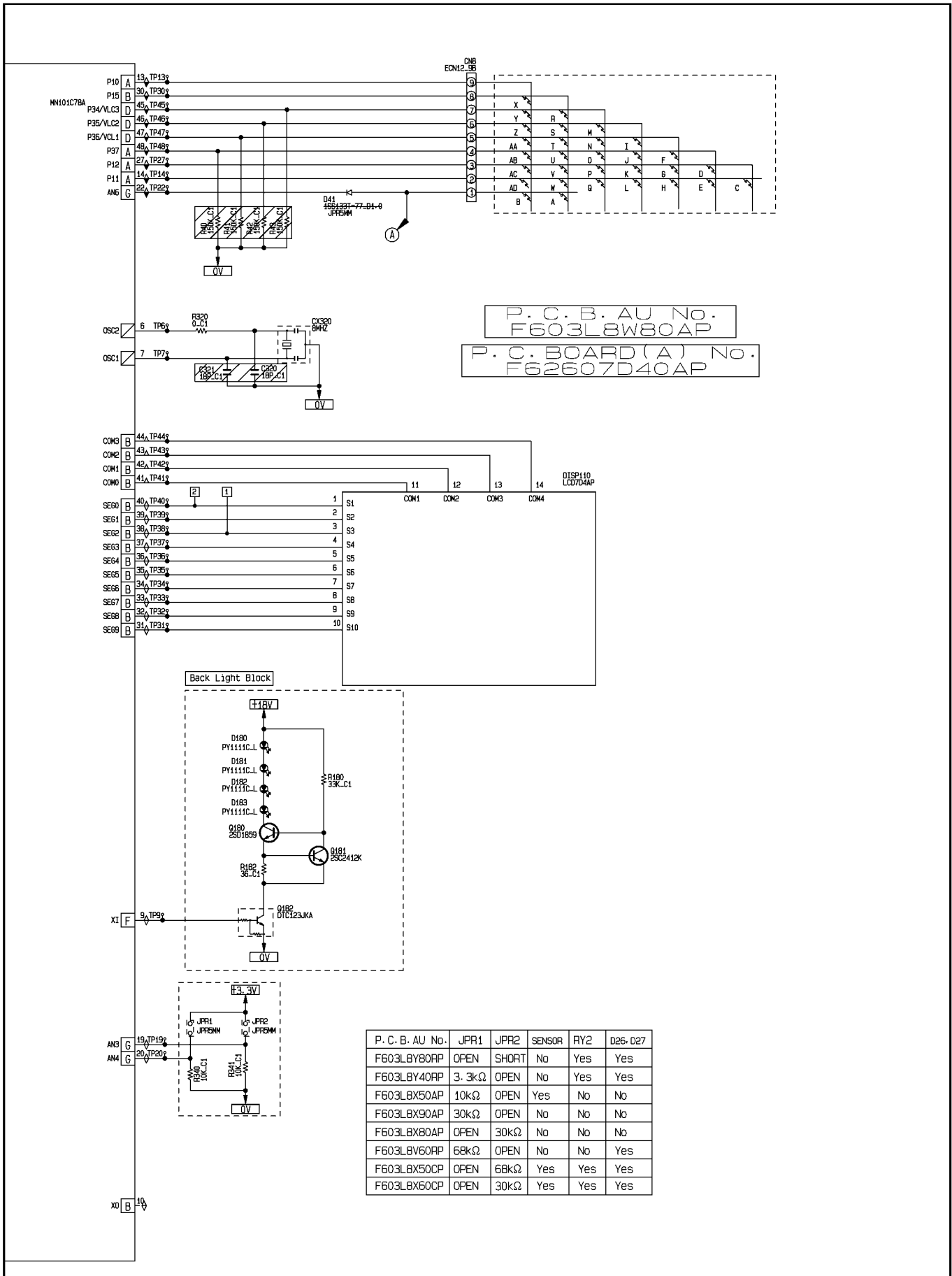
P. C. B. BU  
F603M7B40AP

P. C. BOARD (A)  
F62608X00AP  
F603L8X00AP

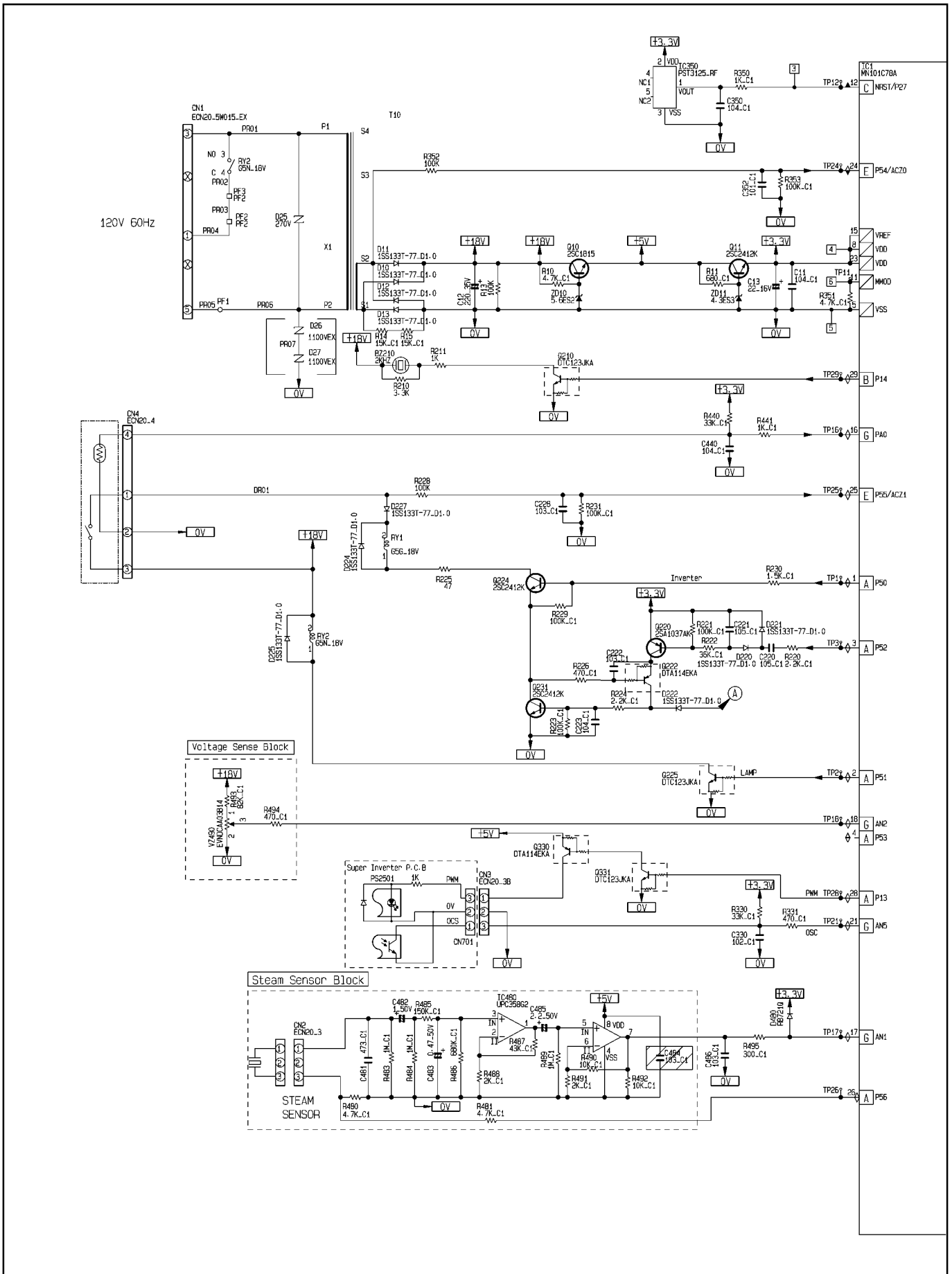
P. C. B. AU No.	JPR1	JPR2	P. C. BOARD (A) No.	P. C. B. DU No.	SENSOR	RY2	D25 D27	P. C. BOARD (D) No.
F603LBX00AP	OPEN	OPEN	F62608X00AP	F603Y7D60AP	USE	NO	NO	F65555W00AP
F603LBX00CP	SHORT	OPEN		F603Y7D60CP	USE	USE	USE	
F603LBX00RP	OPEN	SHORT		F603Y8X00RP		NO	NO	
F603LBX20AP	10K	OPEN		F603Y7D80AP	No			

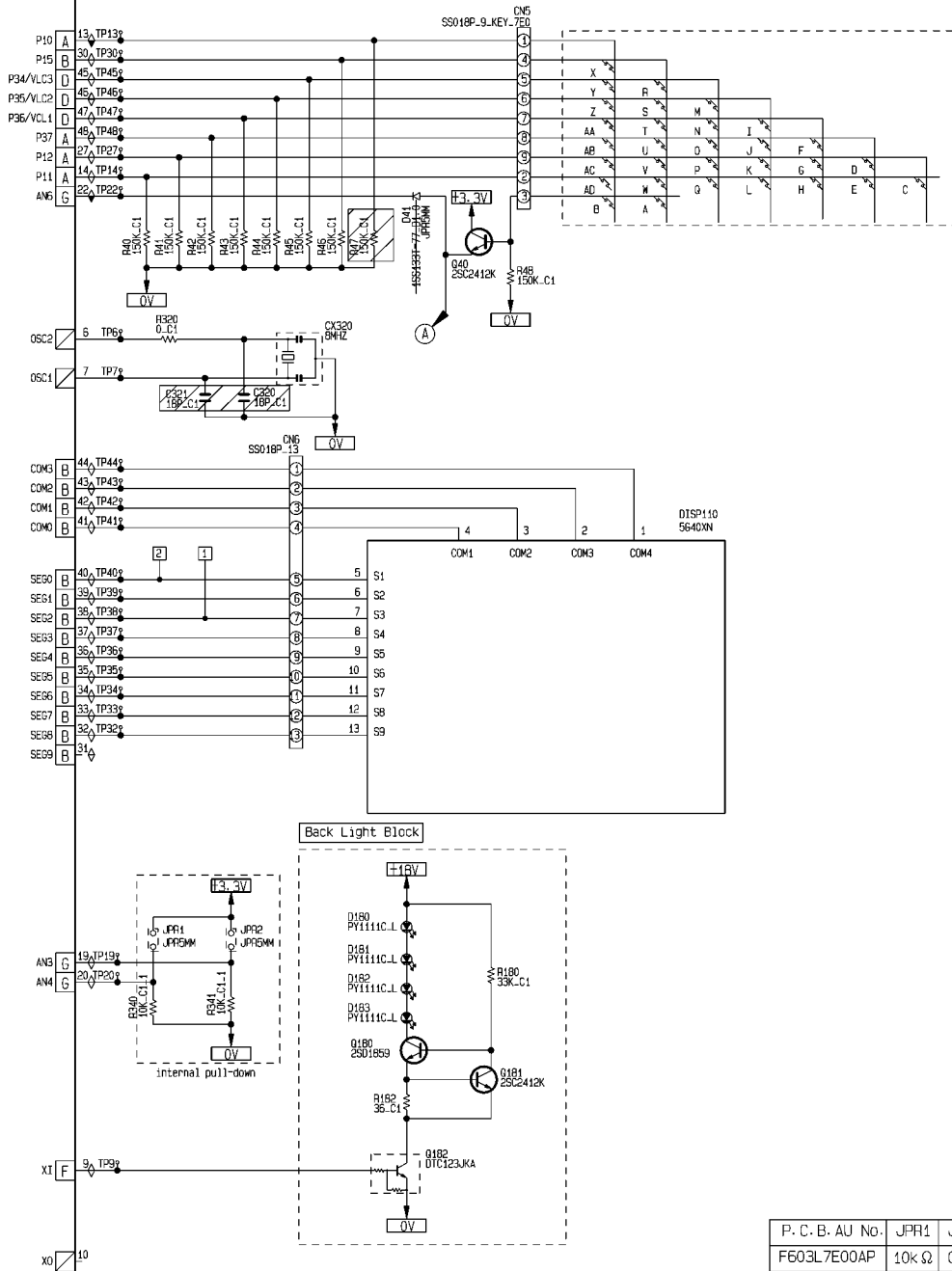
# 10.2. NN-ST678S





### 10.3. NN-ST658W





P. C. B. AU No.	JPR1	JPR2	SENSOR	RY2	D25 D27
F603L7E00AP	10k Ω	OPEN	No	No	No
F603L7E10AP	16k Ω	OPEN	Yes	No	No
F603L7E50AP	68k Ω	OPEN	Yes	No	No
F603L7E70CP	OPEN	10k Ω	No	Yes	Yes
F603L7E80CP	OPEN	16k Ω	No	Yes	Yes
F603L7E90CP	OPEN	30k Ω	No	Yes	Yes
F603L7F00AP	OPEN	6.2k Ω	Yes	No	No
F603L7F10CP	OPEN	68k Ω	No	Yes	Yes
F603L7G50RP	OPEN	OPEN	No	No	Yes
F603L7F10AP	OPEN	1.5k	No	No	No

## 10.4. PARTS LIST

### 10.4.1. NN-SD698S

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ310	L0DDEA000014	BUZZER	1	2.0KHz
C10	AECETK1V471B	AL CHEM CAPACITOR	1	470µF/35V
C13,C16	AECETS1C220B	AL CHEM CAPACITOR	2	22µF/16V
C482	AECETS1H010B	AL CHEM CAPACITOR	1	1µF/50V
C483	AECETS1HR47B	AL CHEM CAPACITOR	1	0.47µF/50V
C485	AECETS1H2R2B	AL CHEM CAPACITOR	1	2.2µF/16V
CX320	H2B800400007	CERAMIC RESONATOR	1	8.0MHz
DISP110	L5AAAEC00061	LCD	1	
DISP HOLDER	F66177D60AP	LCD HOLDER	1	
D40,D220,D221,D226,D227	MA2C19600E	DIODE	5	
D10-D13	B0EAKT000025	DIODE	4	
D480	MA2C700A0F	DIODE	1	
IC1	MN101C78AEG	L.S.I.	1	
IC350	C0EBE0000401	IC	1	
IC480	C0ABBA000230	IC	1	
Q10,Q180	B1BAAJ000003	TRANSISTOR	2	
D25	D4EAY271A036	ZENER RESISTOR	1	270V
D26,D27	D4EAY112A036	ZENER RESISTOR	2	1100V
RY1	AEBGJQC25F18	POWER RELAY	1	
T10	G4C2AAD00005	LOW VOLTAGE TRANSFORMER	1	120V
SW1,SW2,SW6,SW7,SW8,SW9,SW10,SW11,SW12,SW13,SW14	EVQ11L05R	SWITCH	11	
RE80	EVEJ1HF2224B	REVOLVING ENCODER	1	
ZD10	B0BA5R600016	ZENER DIODE	1	
ZD11	B0BA4R400002	ZENER DIODE	1	

### 10.4.2. NN-ST678S

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ210	L0DDEA000014	BUZZER	1	2.0KHz
C12	AECETK1V471B	AL CHEM CAPACITOR	1	470µF/35V
C13,C16	AECETS1C220B	AL CHEM CAPACITOR	2	22µF/16V
CX320	H2B800400007	CERAMIC RESONATOR	1	8.0MHz
DISP110	L5AAAEC00057	LCD	1	
DISP HOLDER	F66174U20AP	LCD HOLDER	1	
D220-D222,D224,D227	MA2C19600E	DIODE	5	
D10-D13	B0EAKT000025	DIODE	4	
IC1	MN101C78AEH	L.S.I.	1	
IC350	C0EBE0000401	IC	1	
Q10,Q180	B1BAAJ000003	TRANSISTOR	2	
D25	D4EAY271A036	ZENER RESISTOR	1	270V
D26,D27	D4EAY112A036	ZENER RESISTOR	2	1100V
RY1	AEBGJQC25F18	POWER RELAY	1	
T10	G4C2AAD00006	LOW VOLTAGE TRANSFORMER	1	120V
VZ1	D3CA6103A017	VARISTOR	1	10KΩ
ZD10	B0BA5R600016	ZENER DIODE	1	
ZD11	B0BA4R400002	ZENER DIODE	1	

### 10.4.3. NN-ST658W

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
BZ310	LODDEA000014	BUZZER	1	2.0KHz
C12	AECETK1V471B	AL CHEM CAPACITOR	1	470µF/35V
C13	AECETS1C220B	AL CHEM CAPACITOR	2	22µF/16V
CX320	H2B800400007	CERAMIC RESONATOR	1	8.0MHz
D220-D222,D224,D227	MA2C19600E	DIODE	5	
D10-D13	BOEAKT000025	DIODE	4	
IC1	MN101C78ADD	L.S.I.	1	
IC350	C0EBE0000401	IC	1	
Q10,Q180	B1BAAJ000003	TRANSISTOR	2	
D25	D4EAY271A036	ZENER RESISTOR	1	270V
D26,D27	D4EAY112A036	ZENER RESISTOR	2	1100V
RY1	AEBGJQC25F18	POWER RELAY	1	
T10	G4C2AAD00006	LOW VOLTAGE TRANSFORMER	1	120V
VZ1	D3CA6103A017	VARISTOR	1	10KΩ
ZD10	B0BA5R600016	ZENER DIODE	1	
ZD11	B0BA4R400002	ZENER DIODE	1	