

# Service

## International Commercial Microwave Ovens

This manual replaces RE532003, RS5320001 Rev. 0

Service Manual for  
MenuMaster®

Models and manufacturing  
numbers in this manual

DE1200D	P1189103M
DE1200D	P1300502M
DE1200I	P1189102M
DE1200I	P1300501M
DE1600D	P1189104M
DE1600D	P1300504M
DE1600I	P1189101M
DE1600I	P1300503M
DE2100I	P4020004801
DE2100ID	P4020008401
DE3100I	P4020004701
DE3100ID	P4020008501
E2100I	P4020004401
EH13A1	P4020008101
EH23A1	P4020008001
U1200I	P1194305M
U1200I	P1189801M
U1200I	P1194301M
U1600D	P1194303M
U1600D	P4020004502
U1600I	P1189901M
U1600I	P1194302M
U1600I	P1194306M
U2100I	P4020004201
U3100I	P4020004501

This manual is to be used by qualified appliance technicians only. Amana does not assume any responsibility for property damage or personal injury for improper service procedures done by an unqualified person.

**Amana**  
Raytheon Appliances

RS5320001  
Revision 1  
August 1996

# Important Information

## **WARNING**

Precautions to be observed before and during servicing to avoid possible exposure to excessive microwave energy, or electrical shock disconnect power to oven.

- (A) Do not operate or allow oven to be operated with door open.
- (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:
  - Interlock operation
  - Proper door closing
  - Seal and sealing surfaces (arcing, wear, and other damage)
  - Damage to or loosening of hinges and latches
  - Evidence of dropping or abuse
- (C) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, waveguide or transmission line, and cavity for proper alignment, integrity, and connections.
- (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 oven is released to the consumer.
- (E) Check microwave leakage to verify compliance with the federal performance standard should be performed on each oven prior to release to the consumer.

## **WIRING**

Good service practice is to never route wiring over terminals and/or sharp edges. This applies to any wiring without regard to the circuit voltage. Wire insulation material and thickness is designed and regulated for electrical spacing purpose only, but cannot always be relied upon because of possible cuts and/or abrasions, which can occur during servicing.

## **WARNING**

To avoid risk of electrical shock, injury, or death, make sure these earthing instructions are followed.

## **Earthing Instructions**

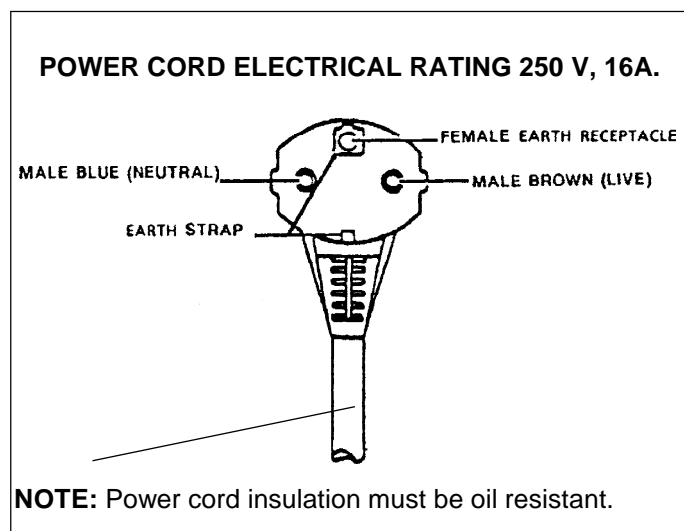
### **WARNING**

Do not remove earthing prong when installing earthed appliance in a home or business that does not have three wire earthing receptacle, under no condition is earthing prong to be cut off or removed. It is the personal responsibility of the consumer to contact a qualified electrician and have properly earthed three prong wall receptacle installed in accordance with appropriate electrical codes.

Should a two prong adapter plug be required temporarily it is the personal responsibility of the consumer to have it replaced with properly earthed three prong receptacle or the two prong adapter properly earthed by a qualified electrician in accordance with appropriate electrical codes.

## **Servicing of Earthed Products**

The standard accepted color coding for earthing wires is GREEN or GREEN WITH YELLOW STRIPE. These earth leads are NOT to be used as current carrying conductors. It is extremely important that the technician replace any and all earths prior to completion of the service call. Under no condition should earth wire be left off causing a potential hazard to technicians and consumer.



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# Important Information

Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service. Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. **REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.**

## IMPORTANT NOTICES



To avoid risk of serious injury or death, repairs should not be attempted by an unauthorized person, dangerous conditions (such as exposure to electrical shock) may result.



To avoid risk of serious injury or death, it is hazardous for anyone other than a qualified service technician to service or repair unit which involves removal of any cover that provides protection against exposure to microwave energy.



Amana® will not be responsible for any injury or property damage from improper service procedures. If performing service on your own product, assume responsibility for any personal injury or property damage which may result.

To locate an authorized servicer, please consult your telephone book or the dealer from whom you purchased this product. For further assistance, please contact:

If outside the United States contact:

AMANA  
ATTN: INTERNATIONAL DIVISION  
AMANA, IOWA 52204, USA  
Telephone: (319) 622-5511  
Facsimile: (319) 622-2180

## RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS



**DANGER** - Immediate hazards which **WILL** result in severe personal injury or death.



**WARNING** - Hazards or unsafe practices which **COULD** result in severe personal injury or death.



**CAUTION** - Hazards or unsafe practices which **COULD** result in minor personal injury or product or property damage.

# Important Safety Information



Do not become exposed to radiation from the microwave generator or other parts conducting microwave energy.

Basic design of this microwave oven makes it an inherently safe device to both use and service. However, there are some precautions which should be followed when servicing microwave oven to maintain this safety. These are as follows:

1. Always operate unit from an adequately earthed outlet. Do not operate on a two-wire extension cord.
2. Before servicing unit (if unit is operable) perform microwave leakage test.
3. Oven should never be operated if door does not fit properly against seal, hinge/hinge bearings are damaged or broken; choke is damaged, (pieces missing, etc.); or any other visible damage can be noted. Check choke area to ensure that this area is clean and free of all foreign matter. If any above problems occur take the following steps:
  - Tell the user not to operate the oven.
  - Contact Amana immediately.
4. If oven operates with door open and produces microwave energy, take the following steps:
  - Tell the user not to operate the oven.
  - Contact Amana immediately.
5. Always have power disconnected when outer case is removed except when making "live" tests called for in this manual. Do not reach into equipment area while unit is energized. Make all connections for the test and check them for tightness before plugging cord into outlet.
6. Always earth capacitors on magnetron filter box and H.V. capacitor with an insulated-handle screwdriver before working in high voltage area of equipment compartment. Some types of failures will leave a charge in capacitors and the discharge could cause a reflex action which could make you injure yourself.
7. In the area of the transformer, capacitor, diode, and magnetron there is HIGH VOLTAGE. When unit is operating, keep area clean and free of anything which could possibly cause an arc or earth, etc.
8. **DO NOT** for any reason defeat interlock switches, there is no valid reason for this action at any time; nor will it be condoned by Amana.
9. Microwave oven should never be operated with:
  - Any components removed and/or bypassed
  - Any of the safety interlocks are found to be defective
  - Any of the seal surfaces are defective, missing, or damaged
10. To ensure that unit does not emit excessive microwave leakage and to meet Department of Health and Human Services guidelines check oven for microwave leakage using Narda Model 8100, 8200, Holaday HI1500, HI1501, or Simpson 380M leakage monitor as outlined in instructions. Maximum leakage level allowed is 4mw/cm<sup>2</sup>.
11. If servicer encounters an emission reading over 4mw/cm<sup>2</sup>, servicer is to cease repair and contact Amana Service Department immediately for further direction. Amana will contact the proper Government Agency upon verification of test results.
12. Install or locate this equipment **ONLY** in accordance with the installation instructions in this manual.
13. Some products such as whole eggs and sealed containers – for example, closed glass jars – may explode and **SHOULD NOT** be **HEATED** in this equipment.
14. Use this equipment **ONLY** for its intended use as described in this manual. Do not use corrosive chemicals or vapors in this equipment. This type of equipment is specifically designed to heat or cook. It is not designed for industrial or laboratory use.
15. As with any equipment, **CLOSE SUPERVISION** is necessary when used by **CHILDREN**.
16. **DO NOT** operate this equipment if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
17. This equipment, including power cord, must be serviced **ONLY** by qualified service personnel. Special tools are required to service equipment. Contact nearest authorized service facility for examination, repair, or adjustment.
18. **DO NOT** cover or block any openings on the equipment.
19. **DO NOT** store this equipment outdoors. **DO NOT** use this product near water – for example, near a kitchen sink, in a wet basement, or near a swimming pool, and the like.
20. **DO NOT** immerse cord or plug in water.
21. Keep cord **AWAY** from **HEATED** surfaces.
22. **DO NOT** let cord hang over edge of table or counter.
23. To avoid pacemaker malfunction, consult physician or pacemaker manufacture about effects of microwave energy on pacemakers.
24. Before returning a microwave to a consumer, verify proper switch interlock action. The primary and secondary switches **MUST** open when door handle is actuated. The monitor switch **MUST** close at 1/4 inch when door is opened.
25. Before returning a microwave to consumer, be sure door spacing is reasonably uniform along top, bottom, sides, and measures 1/8 inch or less.
26. An authorized servicer must inspect equipment annually. Record all inspections and repairs for future reference.

## Important Safety Information

### **PRECAUTIONS TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY**

- (a) **DO NOT** attempt to operate this oven with the door open since open-door operation can result in harmful exposure to microwave energy. It is important not to defeat or tamper with the safety interlocks.
- (b) **DO NOT** place any object between the oven front face and the door or allow soil or cleaner residue to accumulate on sealing surfaces.
- (c) **DO NOT** operate the oven if it is damaged. It is particularly important that the oven door close properly and that there is no damage to the: (a) Door (bent), (b) hinges and latches (broken or loosened), (c) door seals and sealing surfaces.
- (d) The oven should **NOT** be adjusted or repaired by anyone except properly qualified service personnel.

### **PRECAUTIONS A PRENDRE POUR EVITER LES RISQUES D'EXPOSITION A DES QUANTITES EXCESSIVES D'ENERGIE MICRO-ONDE**

- (a) **NE PAS** essayer de faire marcher le four avec la porte ouverte car cela risque d'exposer l'utilisateur à une quantité nocive d'énergie micro-onde. Ne jamais supprimer ou altérer les verrouillages de sécurité.
- (b) **NE RIEN METTRE** entre la face avant du four et la porte et ne pas laisser de saletés ou de produits de nettoyage s'accumuler sur les surfaces d'étanchéité.
- (c) **NE JAMAIS** faire fonctionner le four s'il est endommagé. Il est tout particulièrement important que la porte du four se ferme correctement et que les éléments suivants fonctionnent sans problème : a) la porte (faussée), b) les charnières et les verrouillages (cassés ou desserrés), c) les joints et les surfaces d'étanchéité de la porte.
- (d) Le four **NE DOIT ETRE** réparé que par des réparateurs qualifiés.

### **PRECAUCIONES PARA EVITAR LA POSIBLE EXPOSICION EXCESIVA A LA ENERGIA DE MICROONDAS**

- (a) **NO** intente hacer funcionar este horno con la puerta abierta ya que podría resultar en una exposición dañina a la energía de microondas. Es muy importante no pasar por alto o averiar los interruptores de seguridad.
- (b) **NO** coloque ningún objeto entre el frente del horno y la puerta. Tampoco permita que suciedad o residuos de limpiador se acumulen en las superficies de sellado del aparato.
- (c) **NO** haga funcionar el horno si éste estuviera averiado. Es de particular importancia que la puerta del horno se cierre correctamente y que no existan daños en: (a) la puerta (dobladuras), (b) las bisagras y el pestillo (rotos o flojos), (c) los sellos de las puertas y otras superficies de sellado.
- (d) El horno **NO** deberá ser ajustado o reparado por ninguna persona excepto personal de servicio propiamente calificado.

### **VORSICHTSMASSNAHMEN ZUM SCHUTZ GEGEN MIKROWELLENSTRAHLUNG**

- (a) **NICHT** versuchen, den Herd mit offener Tür zu betreiben, da Sie dadurch schädlicher Mikrowellenstrahlung ausgesetzt werden können. Auf keinen Fall die Sicherheitsverriegelung unwirksam machen oder ändern.
- (b) **KEINE** Gegenstände zwischen Herd und Tür einklemmen oder Schmutz und Rückstände von Reinigungsmitteln auf den Dichtflächen sich ansammeln lassen.
- (c) **KEINEN** beschädigten Herd benutzen. Es ist besonders wichtig, daß die Herdtür richtig schließt und die folgenden Teile nicht beschädigt sind: (a) Tür (z.B. verbogen), (b) Scharniere und Klinken (z.B. gebrochen oder lose), (c) Türdichtungen und Dichtflächen.
- (d) Das Gerät **NUR** von qualifiziertem Kundendienstpersonal reparieren lassen.

# Important Safety Information

## **VAROITUS MIKROAALTOSÄTEILYÄ**

Käyttäjä ei saa joutua alttiiksi mikroaaltoenergialle, jota voi säteillä magnetronista tai muusta mikroaalloja kehittävästä laitteesta, jos sitä käytetään väärin tai jos se kytketään väärin. Kaikkien mikroaaltoliitäntöjen sekä syöttöettä ulostulopuolella, aaltoputkien laippojen ja tiivisteiden tulee

olla varmistettuja. Mikroaaltouunia ei saa koskaan käyttää ilman kuormaa, jossa mikroaaltoenergiaa kuluu. Avoimeen aaltoputkeen tai antenniin ei saa koskaan katsoa virran ollessa kytkettynä.

## **VARNING FÖR MIKROVÅGSSTRÅLNING**

Mikrovågsenergi kan stråla från magnetronen eller från annan mikrovågsgenererande anordning om den används eller ansluts felaktigt. Alla anslutningar för mikrovåg, såsom flänsar och tätningar måste vara betryggande ur säkerhets-

synpunkt. Starta aldrig anordningen utan mikrovågsabsorberande belastning. Mikrovågsstrålning från en öppen vågledare eller antenn har sådan strålningstäthet att uppenbar skaderisk föreligger.

## **ADVARSEL FOR MIKROBØLGESTRALING**

Mikrobølgeenergi kan stråle fra magnetronen eller annen mikrobølgeproduserende anordning ved feilkopling eller feil bruk. Alle mikrobølgeinntak og -uttaksforbindelser, flenser og pakninger, må være sikkerhetsmessig betryggende

utført. Anordningen må aldri startes uten mikrobølgeabsorberende belastning. Se aldri inn mot en åpen bølgeleder eller antenne mens apparatet er i drift.

## **FORSIGTIG MIKROBØLGESTRÅLING**

Undgå at blive udsat for stråling fra mikrobølgegeneratoren eller andre dele som fører mikrobølgeenergi.

# Important Safety Information

## **PRECAUZIONI PER EVITARE L'EVENTUALE ECCESSIVA ESPOSIZIONE ALLE MICROONDE**

- (a) **NON** cercare di far funzionare questo forno con lo sportello aperto: ciò può causare l'esposizione nociva alle microonde. È importante non danneggiare o manomettere i dispositivi di sicurezza.
- (b) **NON** porre alcun oggetto fra il lato anteriore del forno e lo sportello o permettere il depositarsi di sporcizia o residui sulle superfici di tenuta.
- (c) **NON** usare un forno danneggiato. È molto importante che lo sportello del forno si chiuda bene e che non vi siano danni a: (a) sportello (piegato); (b) cardini e dispositivi di chiusura (rotti o allentati); (c) guarnizioni dello sportello e delle superfici di tenuta.
- (d) Il forno va regolato o riparato **ESCLUSIVAMENTE** da personale d'assistenza debitamente qualificato.

## **VOORZORGSMATREGELEN TER VOORKOMING VAN MOGELIJKE BLOOTSTELLING AAN OVERMATIGE MICROGOLFENERGIE**

- (a) Probeer **NIET** om deze magnetron met de deur open te gebruiken. daar gebruik met open deur schadelijke blootstelling aan microgolvenenergie ten gevolge kan hebben. Het is belangrijk dat u de veiligheidssluitingen nooit onklaar maakt of ermee knoeit.
- (b) Plaats **GEEN** voorwerpen tussen de voorkant van de oven en de deur. Zorg dat geen vuil of schoonmaakmiddel op de sluitvlakken achterblijft.
- (c) Gebruik de magnetron **NIET** indien hij beschadigd is. Het is vooral belangrijk dat de deur goed sluit en dat er geen beschadigingen zijn aan: (a) de deur (verbogen), (b) de scharnieren en sloten (gebroken of los), (c) de deurdafichtingen en sluitvlakken.
- (d) De magnetron mag **UITSLUITEND** door daartoe bevoegd servicepersoneel bijgesteld en gerepareerd worden.



# Specifications

	<b>MODELS</b>	DE1200I U1200I DE2100I EH13A1 E2100I U2100I	DE2100ID DE1200D	EH23A1 DE3100I U3100I DE1600I U1600I	DE3100ID U1600D DE1600D
<b>FEATURE</b>					
Defrost Feature		X	X	X	X
Power Levels		4	4	4	4
100%/COOK Functions			X	X	X
Control System - Electomechanical			X		X
Touch		X		X	
Touch					
Oven Light					
On when Cooking & Oven Door Open		X	X	X	X
Optional End-of-Cycle Signal		X	X	X	X
Wattage		1200	1200	1600	1600
Oven Interior		STAINLESS	STAINLESS	STAINLESS	STAINLESS
Side Swing Oven Door		X	X	X	X
Usable Oven Space		0.75 cu ft 21.0 litres	0.75 cu ft 21.0 litres	0.75 cu ft 21.0 litres	0.75 cu ft 21.0 litres
Sealed in Oven Tray		X	X	X	X
Exterior Dimensions					
Width		20 1/2" 52.1 cm	20 1/2" 52.1 cm	20 1/2" 52.1 cm	20 1/2" 52.1 cm
Depth*		21" 53.3 cm	21" 53.3 cm	21" 53.3 cm	21" 53.3 cm
Height		14 7/8" 37.8 cm	14 7/8" 37.8 cm	14 7/8" 37.8 cm	14 7/8" 37.8 cm
Power Requirements					
Voltage		220-230 VAC 240 VAC	220-230 VAC 240 VAC	220-230 VAC 240 VAC	220-230 VAC 240 VAC
Frequency		50 HZ	50 HZ	50 HZ	50 HZ
Amps		13 - 15	13 - 15	13 - 15	13 - 15

# General Information and Operating Instructions

## Service Access

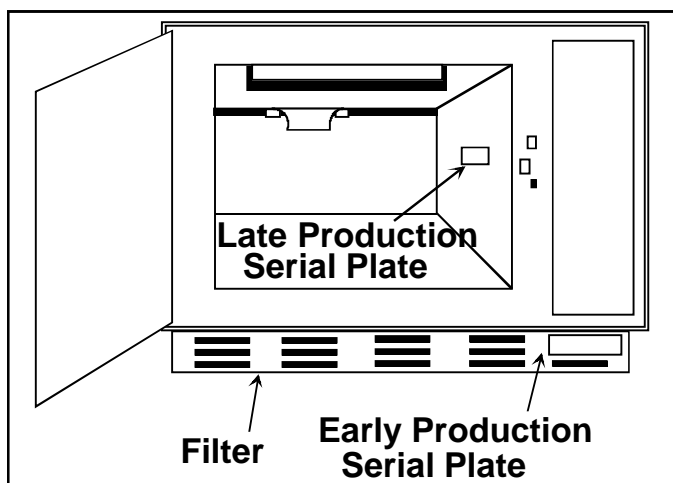
Component servicing is done by lowering the back panel, removing the control panel assembly, and component module panel. Refer to the disassembly section for specific components replacement and adjustment procedures.



## WARNING

All component mounting panels must be earthed to the oven chassis before performing any troubleshooting.

## Serial Plate Location



## Installation Instructions

1. Unpack the oven carefully and examine it for shipping damage. If damage is evident, notify the local carrier immediately and file a damage claim. Menumaster assumes no liability for damage incurred in transit.
2. If the oven has been stored in an extremely cold area, wait several hours before plugging the oven into an outlet.
3. Remove all material from the oven interior.
4. Place the oven in the chosen location. Make sure there is at least one inch of clearance on the top and side and the air intake (filter) is not close to a high temperature source. Example: A deep fat fryer.
5. Plug into a standard 240 volt UK or 220 volt Europe Outlet. Be sure the electrical outlet is rated at least 13 amp (UK) or 15 amp (Europe). The microwave oven should be the only appliance on the circuit.
6. Verify correct cooperation by performing diagnostic tests in the TROUBLESHOOTING section.

## Preventive Maintenance

**NOTE:** Do not use scouring pads, powders, or abrasive materials on any oven surfaces.

1. Regularly - During the hours of operation, these cleaning procedures should be performed as needed:
  - Wipe all spillage as it occurs.
  - Do not allow food particles or grease to collect on the plastic surfaces. A buildup of food or grease in these areas can result in damage to the surfaces as well as a loss in cooking power.
2. Daily
  - Wipe the plastic stirrer cover and oven light cover with a cloth or sponge dampened in a mild detergent solution.
  - Wipe all Surfaces in the oven cavity with the dampened cloth or sponge and then dry with a clean cloth.
  - Wipe the inner door surface and oven cavity front with a mild detergent solution, making sure to remove all food particles.
3. Weekly
  - To remove grease and dust that collects and obstructs the air flow, remove and wash the air intake filter in hot water.
  - Check the door assembly for hinge and latch tightness.
4. Semiannually
  - Perform R.F. Leakage Test. Test anytime r.f. leakage is suspected or maintenance is performed on door assembly or interlock system.

# General Information and Operating Instructions

## Oven Operation

These models can be operated two ways:

### Preprogrammed operation

1. Open oven door, place food on shelf and close door.
2. Push one of the buttons 1-0. The display will indicate the number of the button in use, the percentage of power, and the total programmed time. The time will count down in the display.

**NOTE:** If "two stage cooking" has been preprogrammed, it is normal for the % power indicator light to shift from defrost to another power level during the heating cycle.

3. When the time expires, an audible tone will sound. Open oven door and remove food. If no buttons are pushed after the last heating cycle, the oven will shut down in 60 seconds.

If the door is not completely latched and a button is pushed, an audible tone will sound, the colon may flash, but no number will appear in the display.

To change programmed items or power levels, see programming instructions.

If a button is programmed for zero time, on early models nothing will happen when that button is pushed. On newer models an audible tone may sound but no numbers will appear in the display.

### Change time operation

**NOTE:** On early models, this feature may be deactivated as part of the programming instructions.

1. Open oven door, place food on shelf and close door.
2. Push the change time button.
3. Use button 1 to 0 to enter the desired time.  
Example: Time desired is 2:40. Push button 2, then, 4, then, 0. The display will show 2:40.
4. Push the desired power level button. The heating cycle will begin, the oven will count down to zero and an audible tone will sound.

Use of the "change time" feature will not disturb the times or power levels preset on button 1-0.

### Service Perspective

All references to components are as viewed from the rear of the oven.

# Dial Timer Instructions

## Oven Operation

1. Plug oven into electrical outlet. Oven tone will sound five times and display will flash.
2. Colon (:) will remain in display when oven is connected to power.
3. Oven is in standby condition and ready to operate.

## Cook

1. Lift door handle to open oven door. Power level indicator (^) appears in display.
2. Place food product inside oven.
3. Set cook time by rotating timer dial clockwise.
4. Select power level by rotating power dial clockwise. Power level choices are "100%", "80%", "50%", "30%", and "DEF".
5. Close door.
6. Press *START* pad. If *START* pad is not pressed within 30 seconds, the oven will revert to standby condition.
7. The timer will time down. At end of cook cycle the tone will sound three times and display will flash.

**NOTE:** TIME - When door is opened and food removed from oven, the display will return to last programmed timer.

**NOTE:** POWER - When door is opened and food removed from oven, the power setting will return to last programmed timer.

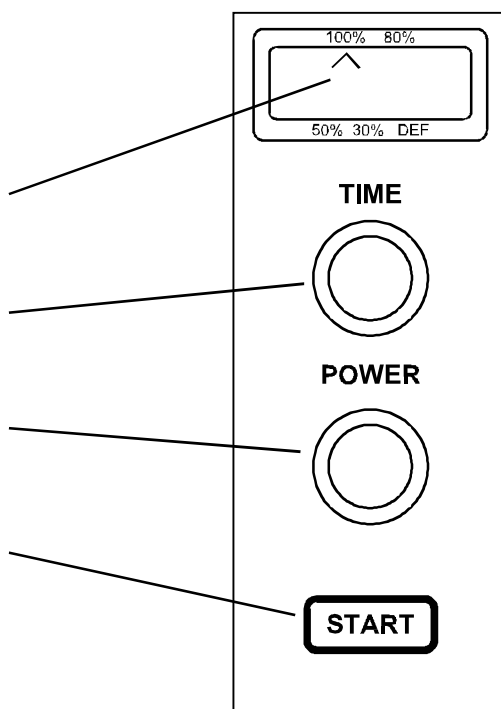
## OVEN FEATURES

**Power Level Indicator** - Appears as  $\hat{U}$  or  $\hat{U}$  to indicate power level selected for cook cycle.

**Timer Dial** - To set desired cook time, rotate timer dial clockwise.

**Power Level Dial** - To select power level, rotate the Power Level dial clockwise.

**Start Pad** - Press to begin cook cycle.



# Touch Pad Programming Instructions

## Controller Programming

As shipped from the factory, the controller in the oven is present to 100% power and standard times as shown below.

<u>Button</u>	<u>Time</u>	<u>Button</u>	<u>Time</u>
1	:10	6	1:00
2	:20	7	1:15
3	:30	8	1:30
4	:45	9	1:45
5	:50	10	2:00

(10 is shown as 0 on panel)

## Programming Times Only

Any button may be programmed for heating times from 1 second to 39 minutes and 59 seconds (:01 to 39:59).

### To Reprogram the Times

1. Open the oven door, leave open.
2. Enter the (programming code "614", push buttons 6, 1 and 4.
3. Close the oven door, note "PROG" in the display which indicate you are in the Program Entry Mode.

**NOTE:** Some flickering in the display during programming is normal.

4. Push the button to be reprogrammed. Note that the button number and programmed time appears in the display.
5. To change cook times:
  - Push and hold in button 1 to change seconds "00:01"
  - Push and hold in button 2 to change tens of seconds "00:10"
  - Push and hold in button 3 to change minutes "01:00"
  - Push and hold in button 4 to change tens of minutes "10:00"

**NOTE:** If you miss the number you want, continue to hold. Momentary pushes will advance the count one number at a time.

6. When you have entered the time you want, push buttons 5, 0, 5.
7. If you want to reprogram another button, repeat steps 4, 5 and 6.
8. When you have completed programming the buttons you wish to change, open and close the oven door to exit the programming mode and go back to normal operation.

## Programming Notes

1. If you make an error while programming push the "0" button once to clear the error. Go back to the programming step you were on.
2. If two stage heating has been previously programmed, total time for a button will be defrost time plus the time you just programmed.  
See two-stage programming instructions below.

## Programming Power Level Only

1. Open the oven door, leave open.
2. Enter the programming code "614", push buttons 6, 1 and 4.
3. Close the oven door, note "PROG" in the display which indicate you are in the programming mode.
4. Push the button to be reprogrammed. Note that the button number appears in the display and an indicator light appears near one of the power level settings (100%, 80%, 50%, 30%, or Defrost II).
5. To change to a different power level, push the desired button: 100%, 80%, 50%, 30%, or Defrost II.
6. If you want to change power level on another button, repeat steps 4 and 5.
7. When you have completed programming the buttons you wish to change, open and close the oven door to exit the programming mode and go back to normal operation.

## Programming Times, Power Levels and Two-Stage Heating

Any button may be programmed for:

Heating time from 1 second to 39 minutes and 59 seconds (:01 to 39:59).

Any of the five power levels: 100%, 80%, 50%, 30% or Defrost II.

"Two-Stage" cooking: Defrost II (up to 39:59) plus any of the other four power levels (100%, 80%, 50% or 30%; up to 39:59) combined into a single button. This allows you to defrost and reheat food to serving temperature with a single button push.

# Touch Pad Programming Instructions

## To Reprogram the Times

1. Open the oven door, leave open.
2. Enter the programming code "614", push buttons 6, 1 and 4.
3. Close the oven door, note "PROG" in the display which indicate you are in the programming mode. If you make an error while programming, push the "0" button once to clear the error. Go back to the programming step you were on.
4. Programming for each button.
  - a. Push the button to be reprogrammed. Note that the button number and the programmed time appear in the display.
  - b. To change time:
  - c. To change to a different power level, push the desired power button; 100%, 80%, 50%, 30% or Defrost II.
  - d. Push button 5 to move to the next step. The display will show the previously set second stage time and power level.
  - e. To change second stage time repeat step 4b above.
  - f. To change to a different power level, push the desired power button; 100%, 80%, 50%, or 30%. Defrost II is not a power option in second stage.
  - g. Push button 5. Programming of the button is complete.

**Example:** If you select 2:00 of "Defrost II" plus 1:00 of 80% power on a button, the total cycle time will equal 3:00 for that button. The oven will defrost for two minutes and heat for one minute to heat the food from frozen to ready, per your instructions.

5. Go back to step 4a for the next button to be programmed.
6. When you have completed programming the buttons you wish to change, open and close the oven door to exit the programming mode and go back to normal operation, or let the oven shut itself down.

Time change procedures for steps 4b and 4d:

- Push and hold in button 1 to change seconds "00:01"
- Push and hold in button 2 to change tens of seconds "00:10"
- Push and hold in button 3 to change minutes "01:00"
- Push and hold in button 4 to change tens of minutes "10:00"

**NOTE:** If you miss the number you want, continue to hold. Momentary pushes will advance the count one number at a time.

When you have entered the time you want, proceed to step 4c or 4e.

## Cook Count

To use the "Cook Count" feature

1. Open the oven door, leave open.
2. Enter the access code "613" to enter the "Cook Count" mode, push buttons 6, 1 and 3.
3. Close the oven door.
4. The oven display will show "Count" and will provide the total number of heating cycles for all ten buttons combined.
5. Push each button to obtain the count for that specific button.

**EXAMPLE:** The count for button 4 is 3,247 heating cycles.

6. After obtaining the counts, open the oven door to exit the "Cook Count" mode or let the oven shut itself down.

## Change Time Feature

1. Open the oven door, place food on shelf and close door.
2. Push the change time button.
3. Use buttons 1 through 0 to enter the desired time (up to 39:59). **EXAMPLE:** Push 2, then 4, then 0 to enter 2:40.
4. To start the cook cycle, push the desired power level button (100%, 80%, 50%, 30%, or Defrost II).
5. If the door is opened, the cooking cycle will stop. To resume cooking, close the door and press the desired power level button.

## Volume Adjustment for End of Cook Cycle Tone

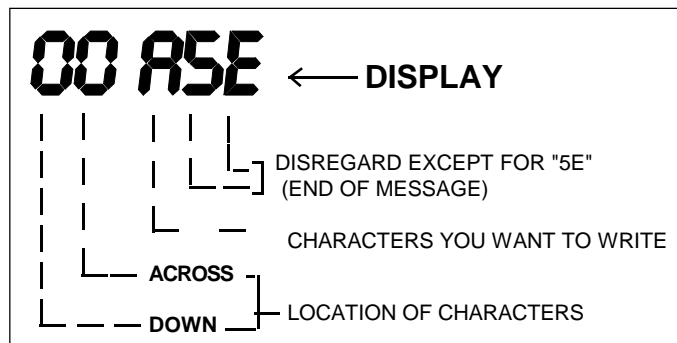
1. Open the door, leave open.
2. Press buttons 6, 1, 6.
3. Close the door and "OFF", "LOW", "MEDIUM", or "HIGH" will appear in the display.
4. To changing tone level proceed as follows:
  - To change volume to "OFF", press button 1.
  - To change volume to "LOW", press button 2.
  - To change volume to "MEDIUM", press button 3.
  - To change volume to "HIGH", press button 4.
5. Open and close the oven door to revert to normal operation.

# Touch Pad Programming Instructions

## Scrolling Message Procedure

Messages can be programmed to appear in the display during the cook cycle or after the 60 second shutdown (idle).

1. Open the oven door, leave open.



2. Press buttons 6, 1 and 5.
3. Close the oven door. Five characters (letters, numbers, etc.) will appear in the display.
4. The location of characters (lines down and spaces across have been assigned identifiers from "0" through "F" as shown:

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4F
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5F
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6F
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7F
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8F
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9F
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	AF
B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	BF
C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	CF
D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	DF
E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	EF
F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Circles = location to start writing

Squares = end of writing location

00 - 4F is the idle message location

50 - 6F is the first cook message

70 - 8F is the second cook message

90 - AF is the third cook message

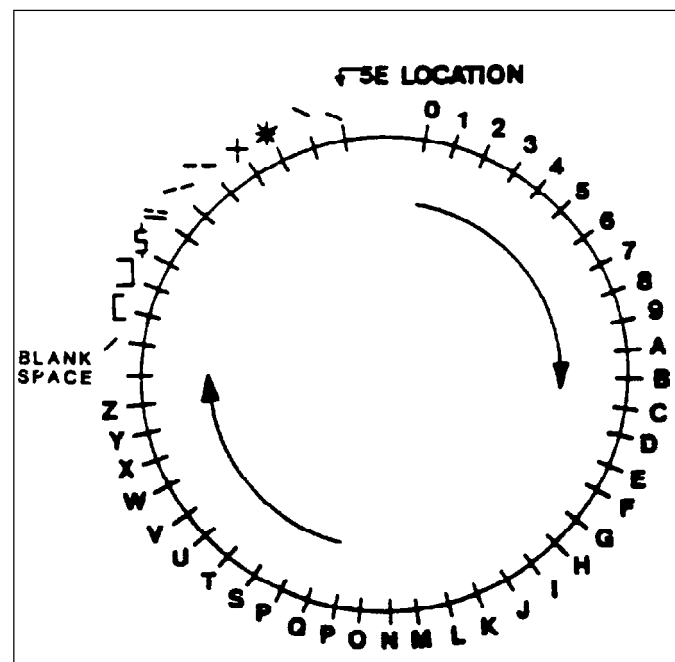
B0 - CF is the fourth cook message

D0 - EF is the fifth cook message

5. To simplify programming a scrolling message. Make a copy of the character location chart shown. Write the message on the copy in the correct location.

6. To enter the message:
  - a. Use button 4 to slew to the desired location.
  - b. Use button 3 to slew to the desired space for the character location.
  - c. Use button 1 to slew to the letter or number want to write. You can use button 2 to advance 10 letters or numbers at a time.
  - d. Again use button 3 to move to the next open character location. Repeat step c to enter the next letter or number in your message.
  - e. Repeat this process until the message has been programmed, then use button 3 to enter an end-of-message "5E" in the next location.
  - f. To delete a message, program an end-of-message "5E" as the first character in the message.

The drawing below shows the sequence of characters as they are slewed into the display by button 1.



7. Open and close the oven door to revert to normal operation.

## Cook Message Notes

No cook message will appear unless the cook time is 20 seconds or longer.

Cook message one will appear the first time the oven is started. The second time the oven is started, message two will appear, etc.

# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

### First Isolation Test - DE3100I, DE3100ID, U3100I, DE2100I, DE2100ID, EH23A1, DE1600I, U1200I, DE1200D, U1600I, DE1200I

Power output of approximately 700 watts indicates one high voltage section is functioning normally and one high voltage section is defective. The following procedures will isolate the defective high voltage section.

1. Disconnect and isolate the common wire from the primary of the left power transformer.
2. Perform power output check.
  - If the output power is normal (550 - 750 watts), go on to step 3.
  - If low or no power is indicated, the problem is in the right high voltage section. Perform high voltage component tests on components of right high voltage section.
3. Reconnect wire to left transformer.
4. Disconnect and isolate the common wire from the primary of the right power transformer.
5. Perform power output check.

If low or no power is indicated, the problem is in the left high voltage section. Perform high voltage component tests on components of left high voltage section.

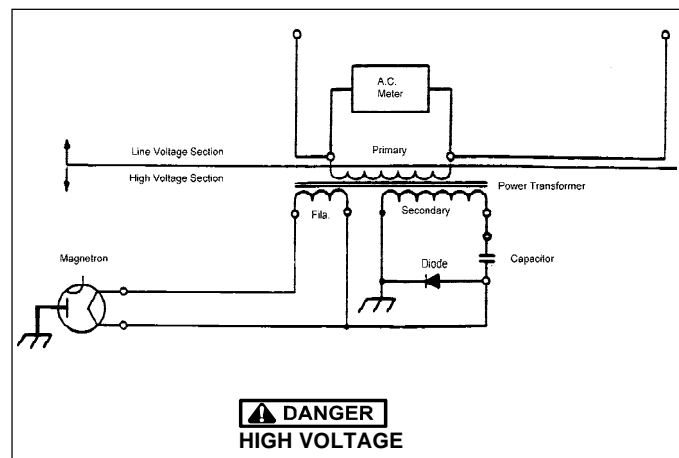
### Second Isolation Test—All Models

Perform the isolation test when little or no heat is produced by the oven, but all other operations appear normal. This test isolates the problem to either the high voltage section or the line voltage section of the oven.

1. Connect a meter capable of measuring 250 volts AC across the primary of one power transformer.
2. Put the oven into a cook cycle and observe the voltage reading. Measure the voltage across the primary of the second power transformer.
3. Measure the voltage across the primary of the second power transformer.

**Procedure A:** If the primary voltages are normal, (230 volts AC) proceed to the high voltage tests in this section.

**Procedure B:** If low or no voltage is indicated, the problem is in the line voltage portion of the oven.





# Testing Procedures

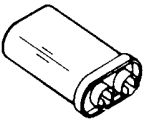


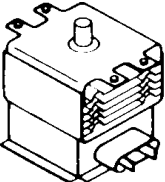
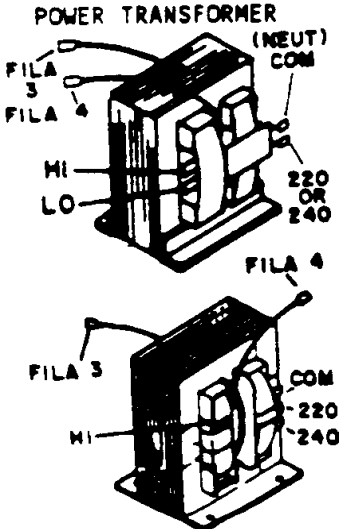


## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

### High Voltage Component Test Chart

COMPONENT	TEST SET-UP	NORMAL READING (Approximate)
<p>CAPACITOR</p> 	<p>DISCHARGE THE CAPACITOR</p> <p>Remove wires from capacitor terminals and connect ohmmeter, set on highest resistance scale to terminals.</p> <p>Also check between each terminal and the capacitor case.</p>	<p>BETWEEN TERMINALS: Analog meter should momentarily deflect toward zero then return a resistance greater than 5 meg ohms. If no deflection occurs, or if continuous deflection occurs, replace capacitor.</p> <p>TERMINAL TO CASE: Infinite resistance.</p>
<p>DIODE</p>  <p>TYPE I</p>  <p>TYPE II</p>	<p>DISCHARGE THE CAPACITOR Isolate the diode by disconnecting the wiring. On type I diodes remove both wires. On type II diodes disconnect one wire to diode.</p> <p>It is not necessary to remove the mounting screw.</p> <p>Connect ohmmeter, set on highest resistance scale, to diode terminals.</p> <p>Reverse meter leads for second testing.</p> <p>On type I diodes, test from each terminal to ground.</p>	<p>Infinite resistance should be measured in one direction and 50,000 to 200,000 ohms in the opposite direction:</p> <p>NOTE: Ohmmeter must contain a battery of 6 volts minimum and be capable of testing a diode.</p> <p>EACH TERMINAL TO GROUND: (Type I only) Infinite resistance.</p>
<p>MAGNETRON</p> 	<p>DISCHARGE THE CAPACITOR</p> <p>Remove wires from magnetron and connect ohmmeter to its terminals.</p> <p>Also check between each terminal and ground.</p>	<p>BETWEEN TERMINALS : Less than 1 ohm.</p> <p>EACH TERMINAL TO GROUND: Infinite resistance.</p> <p>NOTE: This test is not conclusive. If the oven does not heat and all other components test good replace the magnetron and retest.</p>
<p>POWER TRANSFORMER</p> 	<p>DISCHARGE THE CAPACITOR</p> <p>To check primary winding, remove wires from terminals (marked Neut. and 220 or 240). Connect ohmmeter between primary terminals.</p> <p>Also check between each terminal and ground.</p> <p>Also check high voltage winding, remove wire from either secondary terminal marked HI, LO or HV. Measure between terminal and oven chassis ground.</p> <p>To check filament windings, remove filament leads 3 &amp; 4 and measure resistance across leads.</p> <p>Also check between each terminal and ground.</p>	<p>PRIMARY: Less than 2 ohms</p> <p>EACH TERMINAL TO GROUND: Infinite resistance</p> <p>HI to EARTH: 52 to 78 ohms</p> <p>LO to EARTH: 50 to 75 ohms</p> <p>FILAMENT: Less than 1 ohm</p> <p>FILAMENT TO GROUND: Infinite resistance.</p>

# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

COMPONENT	TEST SET-UP	NORMAL READINGS (Approximately)
<p>POWER TRANSFORMER</p>	<p><b>Discharge Capacitor</b> Remove all wires from terminals.</p> <p>Measure resistance from: 230 to COM 230 to Earth Terminal 5 to 6 Terminal 4 to Earth</p>	<p>Less than 1.5 <math>\Omega</math> Infinite Less than 1 <math>\Omega</math> Approximately 115 <math>\Omega</math></p>

## Interlock Switch Module Tests

The interlock switch module is activated by the door and door latch assembly. All interlock, monitor and door sensing functions are performed by this module.

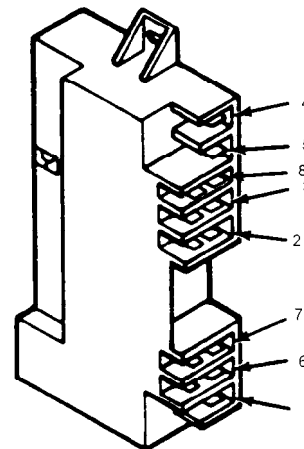
1. Unplug the oven power cord, remove the control panel assembly, and remove the interlock switch module.
2. Disconnect wire leads from the terminals to be tested and reinstall the interlock switch module.
3. With an ohmmeter, check continuity between terminals using the test chart below.
4. If improper indications are given, check the door and latch for proper activation of switches. If door activation checks OK, replace Interlock Switch Module.

X INDICATES CONTACTS CLOSED	PRIMARY	SECONDAR	MONITOR	DOOR LOGIC (SENSE)
TERMINALS FUNCTION	8 - 3	6 - 7	1 - 6	
DOOR OPEN			X	
DOOR CLOSED	X	X		X



## WARNING

For continued protection against radiation hazard, replace only with manufactures parts catalog numbered switch.



Interlock Switch Module

# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

## Touch Panel Test

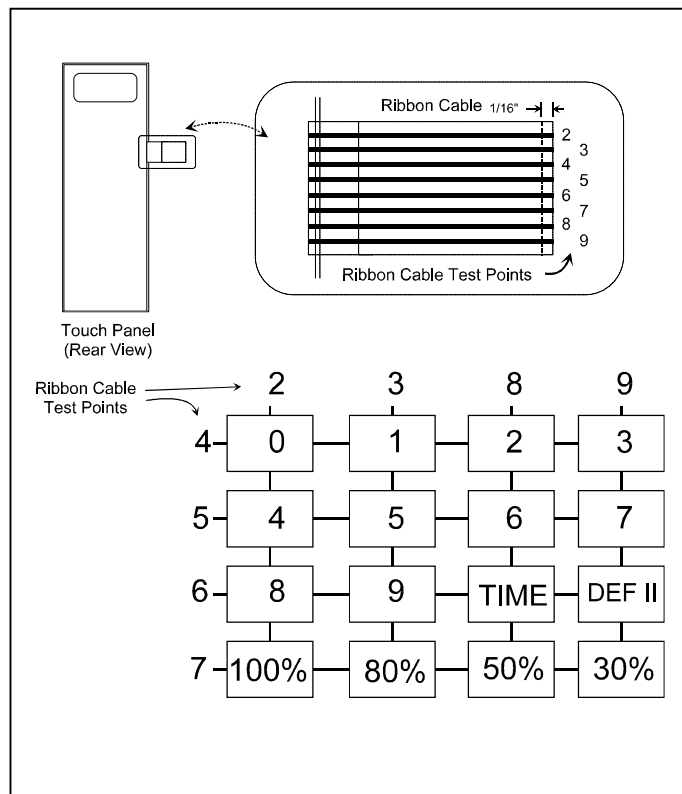
The touch panel operation can be tested with an ohmmeter on the R x 1 scale.



## CAUTION

Over-flexing the ribbon cable will damage the silver circuit. Pointed test leads cannot be used on ribbon cable silver circuit or silver circuit will be damaged. Scratching of the ribbon cable will damage the silver circuit. Static discharge can damage the controller. Avoid touching any part of the circuitry on the back of the controller. Do not bend ribbon cable forward.

1. Unplug the oven power cord and remove the control panel.
2. Disconnect ribbon cable from circuit board by applying even pressure to both sides of ribbon cable and pull outward from ribbon cable connector.
3. Touch ohmmeter test leads to ribbon cable test points indicated on appropriate test chart. Resistance should be more than 1 Meg ohms between ribbon cable test points until a touch panel pad is depressed. With a touch panel pad depressed, the resistance between connecting test points should be less than 100 ohms.
4. If improper indications are given, replace defective touch panel assembly.
5. Inspect ribbon cable silver circuit; if any silver circuit is missing from the connector end of the ribbon cable, evenly trim 1/16" off end of ribbon cable as shown to assure good electrical connection with circuit board connector.
6. Apply even pressure to both sides of ribbon cable while inserting cable into ribbon cable connector.



# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

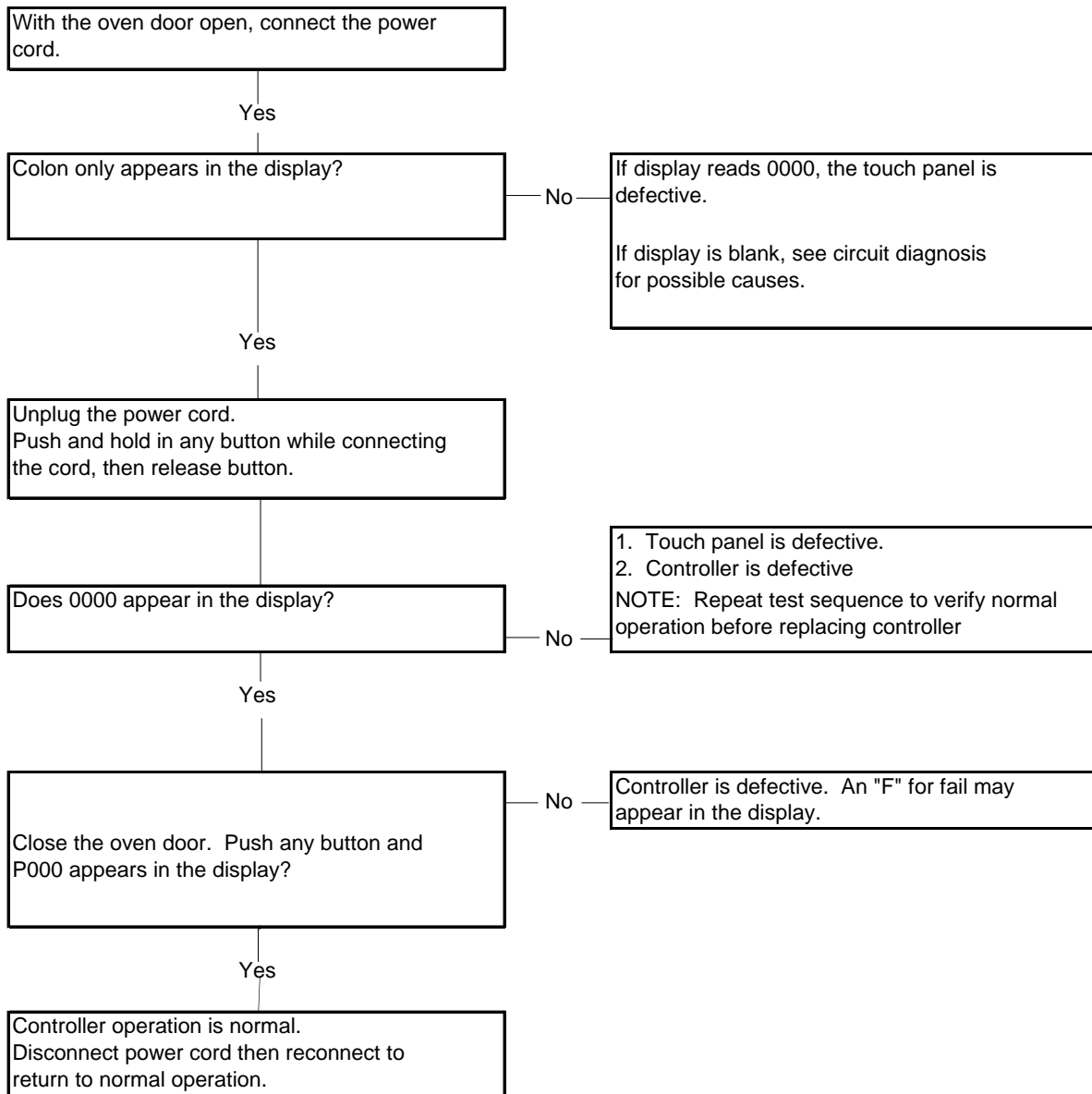
Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

## Controller Test

This controller contains a *SELF DIAGNOSTIC ROUTINE* which should be used to verify controller operation.

**NOTE:** The system diagnosis flow chart *must be used* for troubleshooting prior to performing the self diagnosis test sequence.

### SELF DIAGNOSTIC TEST SEQUENCE



# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

### Low Voltage (Controller) Transformer Test

An operational test can be performed to verify proper operation of the low voltage transformer.

1. Disconnect power to the oven and remove the control panel assembly.
2. With a voltmeter set to appropriate VAC scale, perform the following test setups, measure and record the voltage indicated on the meter.

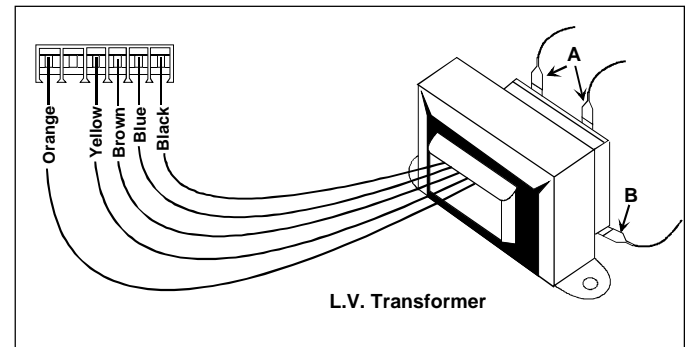


## WARNING

Do not touch any oven components or wiring during oven operation.

**Procedure A:** If the proper AC voltages were measured as shown on the test chart, the low voltage transformer operation is normal.

**Procedure B:** If abnormal reading was measured at test points 2-4, 1-6, 5-6, as indicated on the test chart but normal voltage was measure at test points A-B, replace low voltage transformer. If no voltage was measured at test points A-B, check wire connections and circuit diagnosis for other possible causes.



TEST SET-UPS	TEST POINTS	NORMAL VOLTAGE
Attach meter leads to wire harness test points A - B, apply power to oven and open oven door.	A & B	220 or 240 VAC
Disconnect power and remove L.V. transformer connector attached to the control circuit board and attach meter leads into harness side of connector at test points shown in chart. Apply power to oven and open oven door.	2 (Blue) - 4 (Brown) 1 (Black) - 6 (Orange) 5 (Yellow) - 6 (Orange)	2.6 VAC 23 VAC 46 VAC

# Testing Procedures



## WARNING

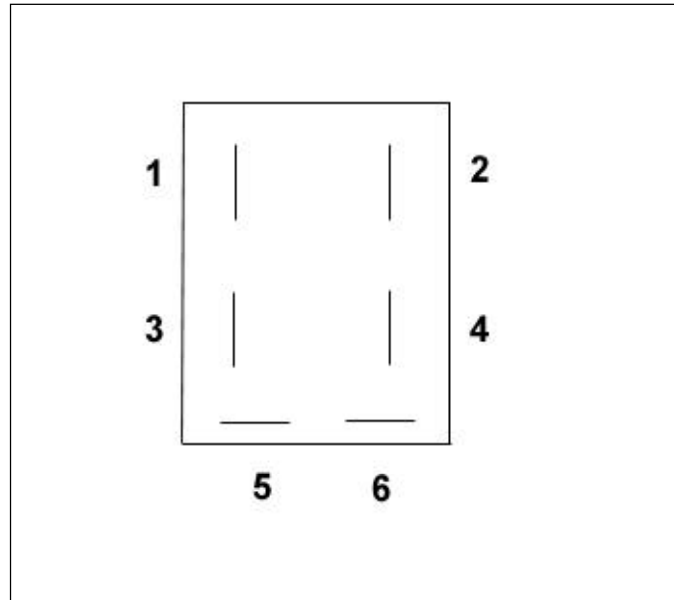
High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

### Holding Relay Test

1. Disconnect power to oven, and remove but do not disconnect the control panel assembly. Lower the back panel to the service position.
2. Perform test setups as indicated on the Test Chart below.

**NOTE:** If necessary, remove the component module panel assembly to connect test leads. Replace the module assembly prior to performing all tests except the first two resistance checks.



TEST SET-UP	TEST POINTS	NORMAL READINGS (Approximate)	CORRECTIVE ACTION.
<ol style="list-style-type: none"> <li>1. Disconnect power.</li> <li>2. Remove harness leads from relay terminals 5 &amp; 6.</li> </ol>	5 to 6	250 to 350 ohms	Replace the relay and retest.
<ol style="list-style-type: none"> <li>1. Reconnect harness leads to terminals 5 &amp; 6.</li> <li>2. Remove harness leads from terminals 1 &amp; 3, and insulate to prevent electrical short.</li> </ol>	1 to 3 2 to 4	Infinite ohms	Replace relay and retest.
<ol style="list-style-type: none"> <li>1. Reconnect power.</li> <li>2. Program oven for 15 seconds and put oven into a COOK cycle.</li> </ol>	5 to 6	22 Volts DC	Replace the controller and retest.
<ol style="list-style-type: none"> <li>1. HOLDING RELAY  Plug in oven.</li> </ol>	1 to 3 2 to 4	Less than 1 ohm for 60 seconds, then infinite ohms.	Replace the relay and retest.

# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

### Triac Module Test (Applicable models affected are on pages 37 and 38.)

1. Unplug the oven power cord, lower the back panel and *discharge the capacitor(s)*. Remove the left magnetron inlet duct.
2. **COMPLETELY REMOVE THE HIGH VOLTAGE LEAD** that connects the capacitor to the transformer high voltage terminal (marked "HI" or "LO"). Remove the lead between the second capacitor and high voltage transformer terminal (marked "HI" or "LO").



## DANGER

High voltages are present at the high voltage secondary terminals during a cook cycle.

3. With a voltmeter capable of measuring 250 VAC, attach the meter leads to triac terminal MT1 (WHT) and MT2 (RED). NOTE: Triac harness leads remain connected.



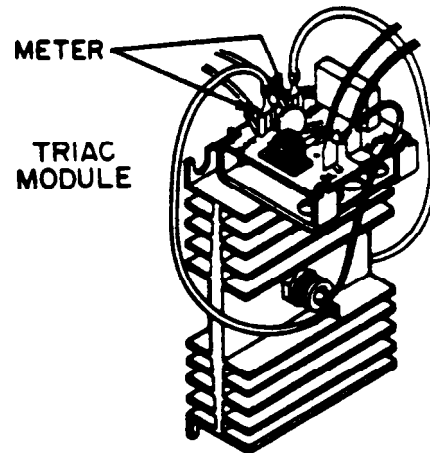
## WARNING

Do not touch any oven components or wiring during oven operation. Attach meter leads with alligator clips when making operational tests.

4. Perform the following test; measure and record the voltage indicated on the meter.
  - **Test Set Up**  
Set the oven to operate at 50% power level for one minute.
  - **Normal Output Voltage**  
Voltage alternates from 220/240 volts to less than 5 VAC.
  - **Corrective Action**  
If abnormal output voltage is measured.

If controller tests check okay, replace the triac module and retest.

### Controller Triac Drive Test



**NOTE:** This test is provided for reference only. The controller self diagnosis test is normally all that is required to verify normal controller operation.

1. Unplug the oven power cord, lower the back panel and *discharge the capacitor(s)*. Remove the left magnetron inlet duct.
2. Connect voltmeter to triac module terminals marked GRN and BLU.
3. Apply power to the oven and put the oven into a cook cycle on full (100%) power setting. The meter should indicate 1 to 6 volts AC during the cook cycle and zero volts after completion of the cook cycle.

If abnormal readings were measured, replace the controller and retest.

# Testing Procedures



## WARNING

High voltages are present during the cook cycle. Extreme caution should be observed at all times.

Before touching any oven components or wiring, always unplug oven from power source and discharge the capacitors by shorting across the terminals with an insulated handle screwdriver.

### Triac (Applicable models affected are on pages 39, 40, and 41.)

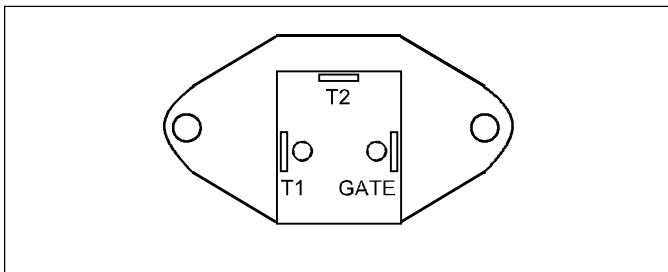
Located behind control panel

1. Zero ohmmeter on X10K ohms scale.
2. Disconnect wiring from triac.
3. Ohmmeter must indicate as per chart below.
4. A defective triac may show these checks as acceptable, for further testing refer to ELECTRONIC CONTROL TESTING.

TERMINAL	TERMINAL	OHMS*	OHMMETER LEADS REVERSED
T2	T1	INF.	INF.
T2	GATE	INF.	INF.
T1, T2, GATE	TO CHASSIS GROUND	INF.	INF.
GATE	T1	40**	40**

\* INF. - INFINITE OHMS - NO READING

\*\* MAY VARY WITH MANUFACTURER



### Stirrer Motor Test

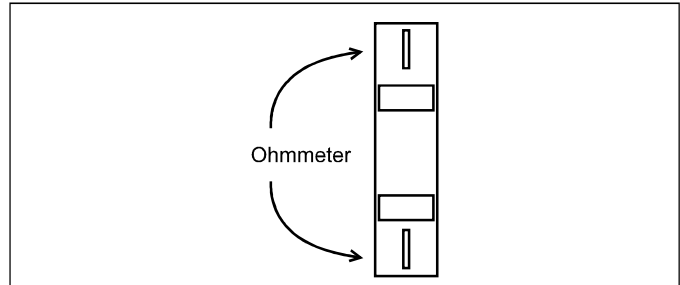
1. Unplug the oven power cord, lower the back panel, and *discharge the capacitor(s)*. Remove the left magnetron inlet duct.
2. Connect a meter capable of measuring 250 volts AC across the input leads to the stirrer motor.
3. Apply power to oven and open oven door.
4. Meter should indicate approximately 220 or 240 volts AC.

**Procedure A:** If meter indicates 220 or 240 volts AC but motor does not operate, replace the motor. (Check the stirrer blade to be sure it is not binding on stirrer cover.)

**Procedure B:** If meter indicates zero volts, check oven wiring continuity and system diagnosis.

### Current Limiting Resistor

1. Unplug the oven power cord, remove the outer case, and discharge the capacitor(s) by shorting across the terminals with an insulated screwdriver.
2. Disconnect the wires from the resistor to be tested.
3. With an ohmmeter set on R X 1, measure resistance as shown.



4. Meter should indicate approximately 1/2 ohms. If the resistance is incorrect, replace the resistor.

### Blower Motor Test

1. Unplug the oven power cord, lower the back panel, *discharge the capacitor(s)*.
2. Check the blower wheel to be sure it is not binding or frozen.
3. Connect a ohmmeter capable of measuring 250 volts AC across the input leads to the blower motor.
4. Apply power to oven and open oven door.
5. Meter should indicate approximately 220 or 240 volts AC.

**Procedure A:** If meter indicates 220 or 240 volts AC but motor does not operate, replace the motor.

**Procedure B:** If meter indicates zero volts, check oven wiring continuity and system diagnosis.



# Service Information



## **WARNING**

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before servicing, unless testing requires it.

### **Proper Handling of Magnetron Tubes**

Magnetron tube must be handled with care. When handling a tube, always handle by the housing only. Use caution not to touch or strike the ceramic portion at the top.

The carton used to ship service replacement tubes is reusable. All defective tubes must be returned to the factory in this carton.

### **Magnetron Failure Modes**

Magnetron failures that have been identified are generally grouped into the categories shown below:

#### **1. Shorted**

- Air - This is a case where the tube has had the vacuum envelope destroyed and air has entered the tube. This will cause internal arcing and high secondary circuit if high voltage is applied.
- R.F. Capacitors - May short to chassis. This condition will also cause loss of high voltage.

#### **2. Open Heater (Filament)**

- Can be determined by ohmmeter when the transformer leads are disconnected. Resistance is normally less than one ohm; the filament does not short internally. Any tube removed should be checked since usage tends to make the filament more fragile. Later handling or shipping may open the filament and thereby mask the true failure mode when checked at the factory.

#### **3. Low Power**

- Caused by "wearout" of emission characteristics of the directly heated cathode. Symptoms are: (1) the tube current will take longer to get to the operating point than a new tube (normally about 2 - 3 seconds), (2) the tube current does not get high enough to cause the tube to oscillate with normal line voltage. The current will be low, (3) the oven produces low power into a load, two-thirds or less than normal.

#### **4. Physical Damage**

- Caused by mishandling of magnetron tube.

# Measuring Microwave Energy Leakage



To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before servicing, unless testing requires it.



Check for radiation leakage before and during every servicing. Should leakage be more than  $4\text{mw}/\text{cm}^2$  (to allow for measurement uncertainty) inform Amana immediately. After repairing or replacing any radiation safety device, keep a written record for future reference. The leakage reading must be recorded on service repair ticket while in customer's location.

1. Pour  $275 \pm 15$  cc (9 oz.  $\pm 1/2$  oz) or  $20 \pm 5^\circ\text{C}$  ( $68^\circ\text{F} \pm 9^\circ\text{F}$ ) water in beaker which is graduated to 600 cc and place beaker in center of oven.
2. Set radiation monitor to 2450 Mhz and use it following manufacturer's recommended test procedures to assure correct results.
3. While measuring leakage, always use two inch (5 cm) spacer supplied with probe.
4. Press start pad or turn on timer and with magnetron oscillating, measure leakage by holding probe perpendicular to the surface being measured.

## Equipment

- Electromagnetic radiation monitor
- Glass thermometer  $212^\circ\text{F}$  or  $100^\circ\text{C}$ .
- 600 cc glass beaker

## Procedure for Measuring Microwave Energy Leakage

### Note before measuring:

- Do not exceed meter full scale deflection. Leakage monitor should initially be set to highest scale.
- To prevent false readings test probe should be held by grip portion of handle only. The scan speed is equal to one inch per antenna revolution of one inch per second if antenna speed is unknown. Areas to be checked are all seal areas, window, and any venting parts.
- Leakage with the outer panel removed  $4\text{mw}/\text{cm}^2$  or less.
- Leakage for a fully assembled oven with door normally closed  $4\text{mw}/\text{cm}^2$  or less.
- Leakage for fully assembled oven (before latch switch (primary) is interrupted) while pulling door  $4\text{mw}/\text{cm}^2$  or less.

## Measurement with Outer Case Removed

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



To avoid risk of severe personal injury or death, avoid contacting any high voltage parts.

## Measurement with Fully Assembled Oven

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

## Record Keeping and Notification

- After any adjustment or repair to a microwave oven, a leakage reading must be taken. Record this leakage reading on repair ticket even if it is zero.

A copy of the repair ticket and the microwave leakage reading should be kept by repair facility.

# Troubleshooting



## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before servicing, unless testing requires it.

### DIRECTIONS FOR SYSTEM DIAGNOSIS FLOW CHART

A test set-up is described at the beginning of each test sequence. Directly below the test set-up is a description of the normal oven operation(s) (identified by a question mark).

If oven operation is normal, follow the YES sequence down the left side of the page.

If oven operation is abnormal, follow the NO sequence to the right side of the page.

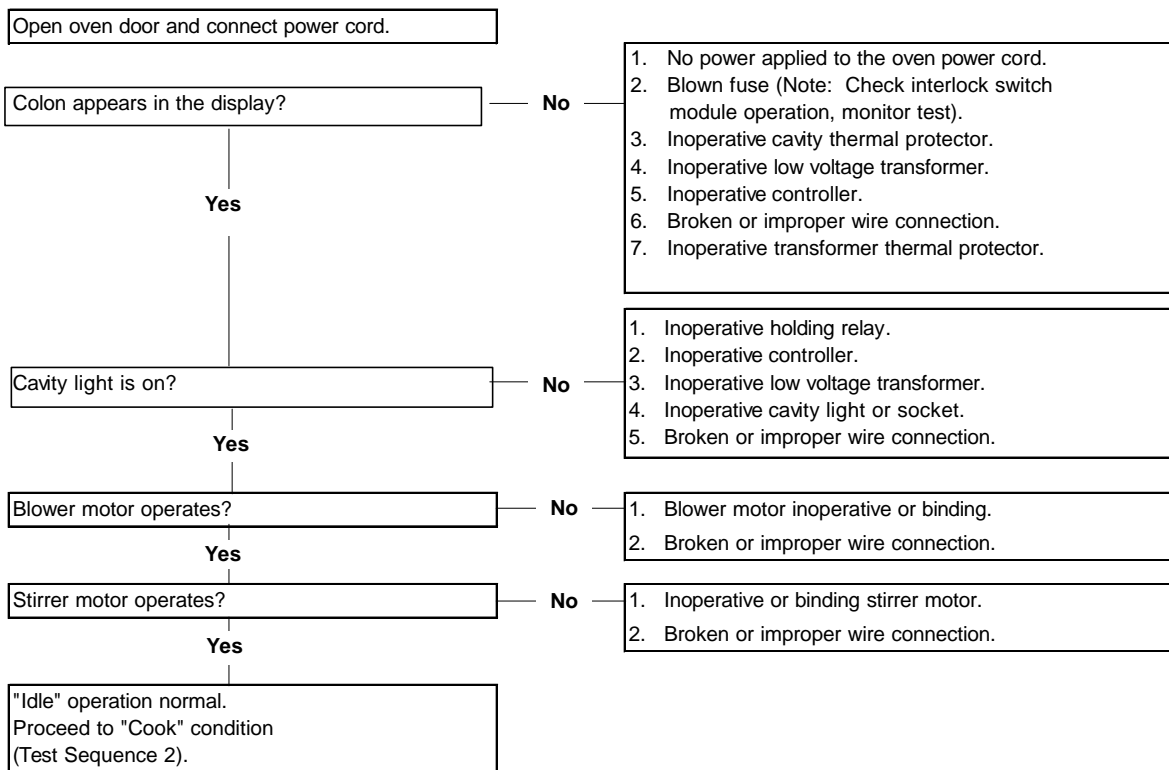
To effectively use this flow chart, the directions below must be followed:

- Always start at test sequence 1, perform each test set-up, do not skip test sequences.
- Verify normal operation(s) following each test set-up before going on to the next test sequence or set-up.
- When abnormal operation is identified, disconnect power to the oven, *DISCHARGE CAPACITOR(S)*, determine cause *starting with the first possible cause*, correct the defect, then start over at test sequence one to verify normal operation.

**NOTE:** Always check for defective or improper wiring before servicing.

### DIAGNOSIS FLOW CHART

#### Test Sequence 1: Idle Condition (Electronic Models)



# Troubleshooting

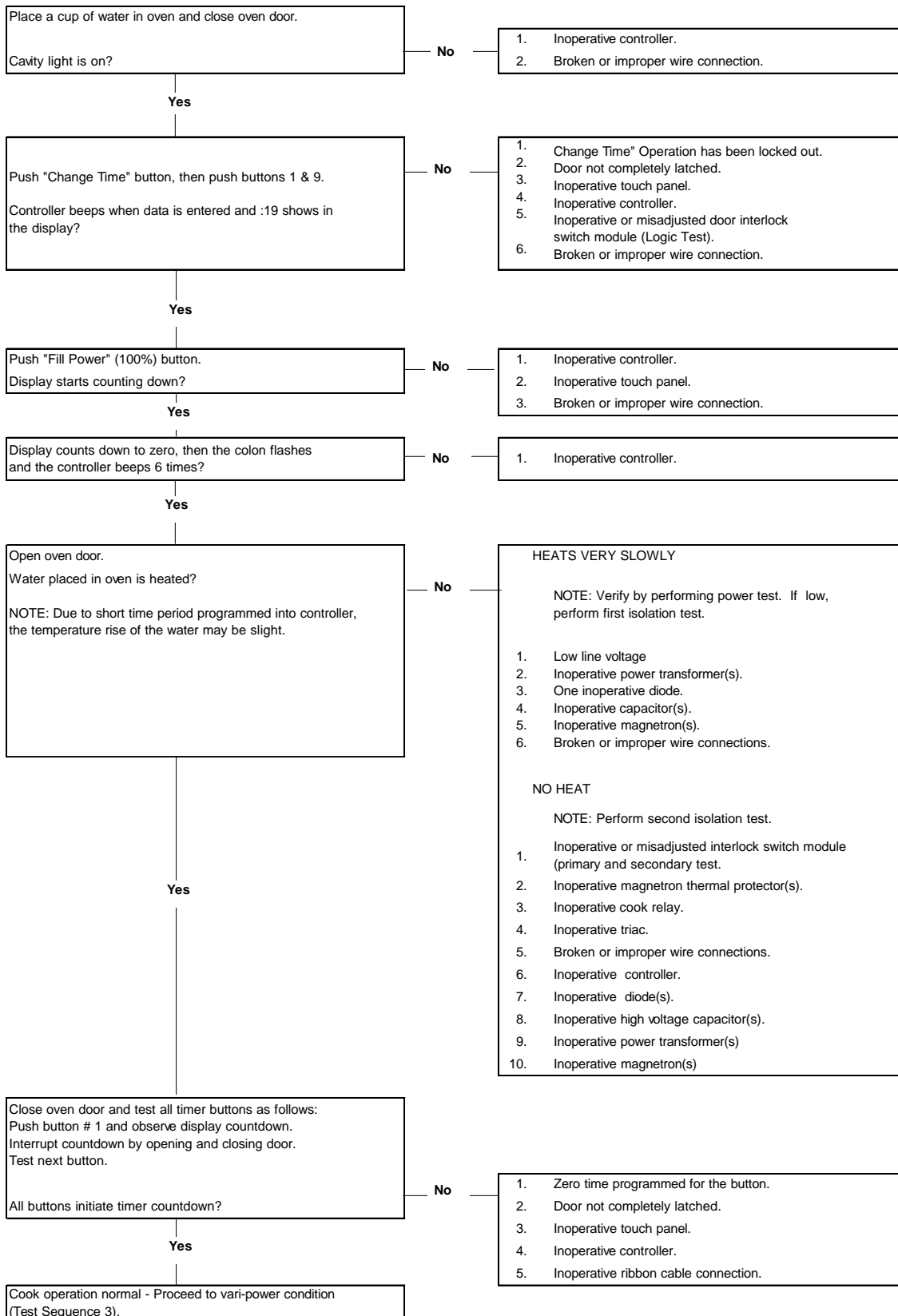


**WARNING**

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before servicing, unless testing requires it.

## DIAGNOSIS FLOW CHART

### Test Sequence 2: Cook Condition (Electronic Models)



# Troubleshooting

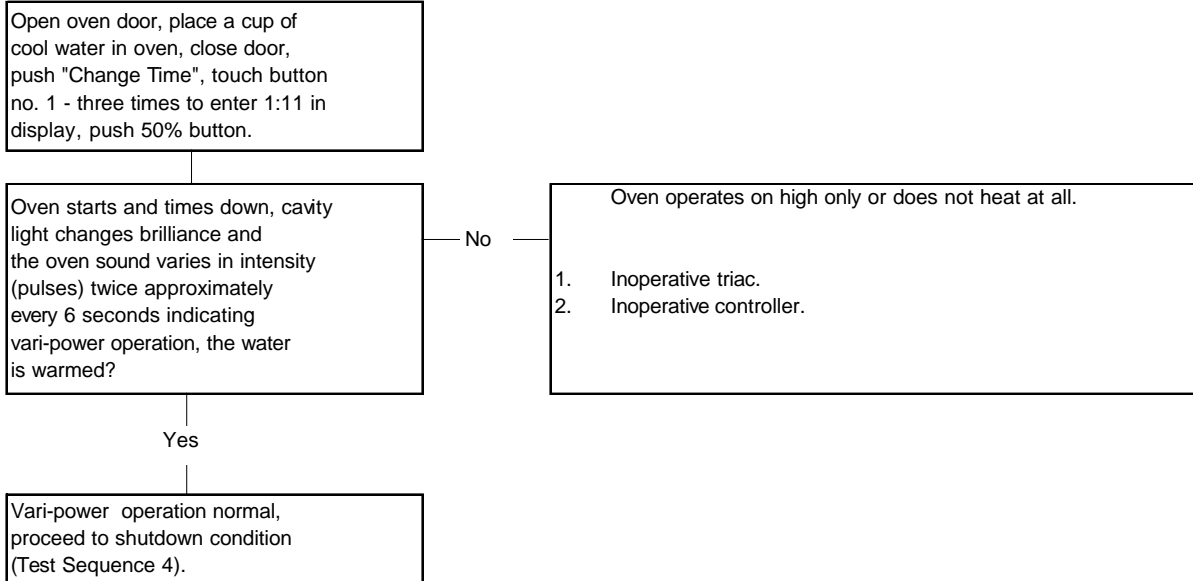


## WARNING

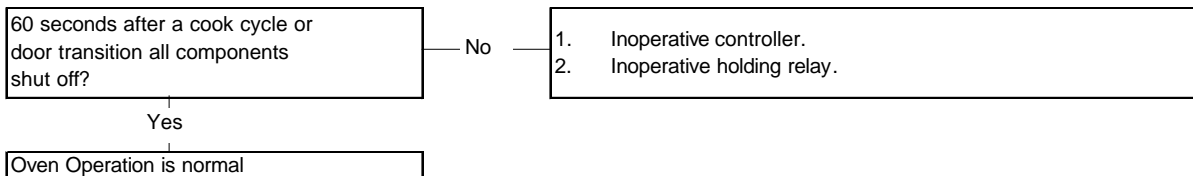
To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before servicing, unless testing requires it.

### DIAGNOSIS FLOW CHART

#### Test Sequence 3: Vari-Power Condition (Electronic Models)



#### Test Sequence 4: Shutdown Condition (Electronic Models)



# Disassembly Procedures



## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

### Back Panel Removal/Service Position

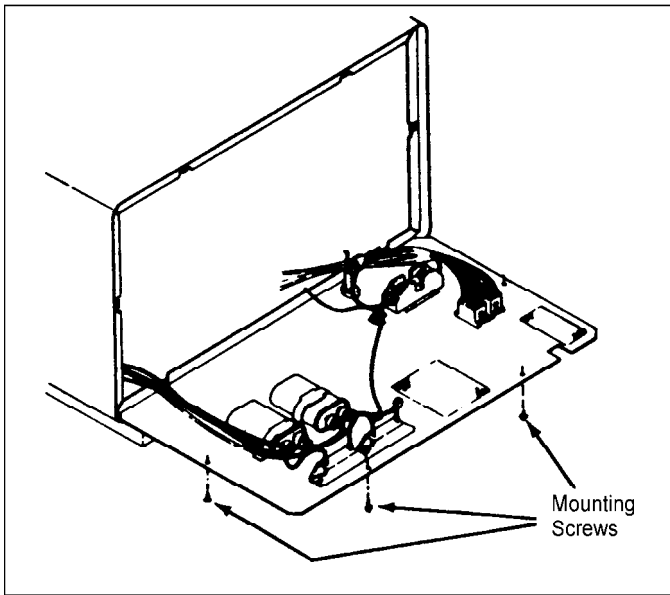
1. Place the oven so there is something to support the back panel when it is lowered.
2. Using special tool (Amana part number 92670P01) remove four screws and lower back panel to an approximate horizontal position. The back panel is now in the service position.
3. To remove back panel:
  - Disconnect panel to chassis ground wire.
  - Remove both voltage adjusting connector assemblies.



## CAUTION

To prevent possible electrical shock, this wire must be reconnected when the back panel is replaced.

- Power cord.

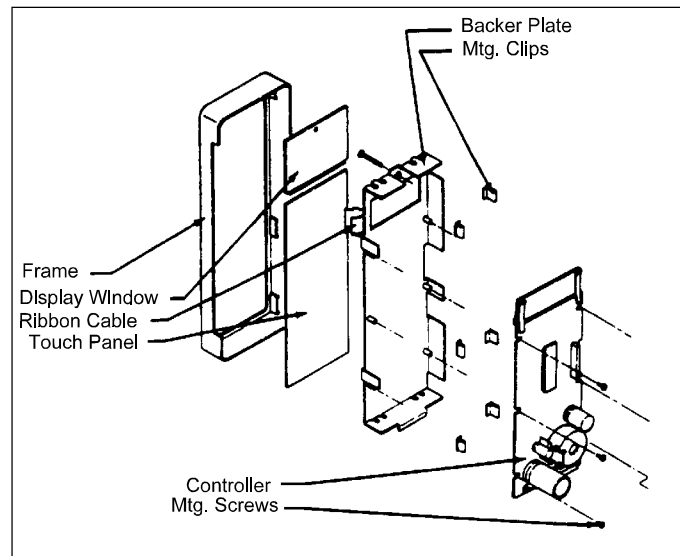


### Control Panel Assembly Removal

1. Loosen the 3/32" allen-head screw located near the top of the control panel assembly.
2. Pull the control panel assembly forward and disconnect the two wire connectors from the control panel assembly.

### Control Panel Disassembly (Electronic)

1. Remove the control panel assembly by loosening the 3/32 allen screw located in the middle top of the control panel.
2. Disconnect the ribbon cable by applying even pressure to both sides of the ribbon cable and pulling outward from the ribbon cable connector.
3. Remove the wire connectors and ground connector from PC board.
4. Remove six screws and remove controller.
5. On certain models it may be necessary to pry off six clips and remove panel and display window.



### Cavity Lamp Replacement

1. Unplug the oven.
2. Remove screw and open the lamp access cover.
3. Replace the cavity lamp. Do not overtighten the lamp.



## CAUTION

Static discharge can damage the controller. Avoid touching any part of the circuitry on the back of the controller.

# Disassembly Procedures

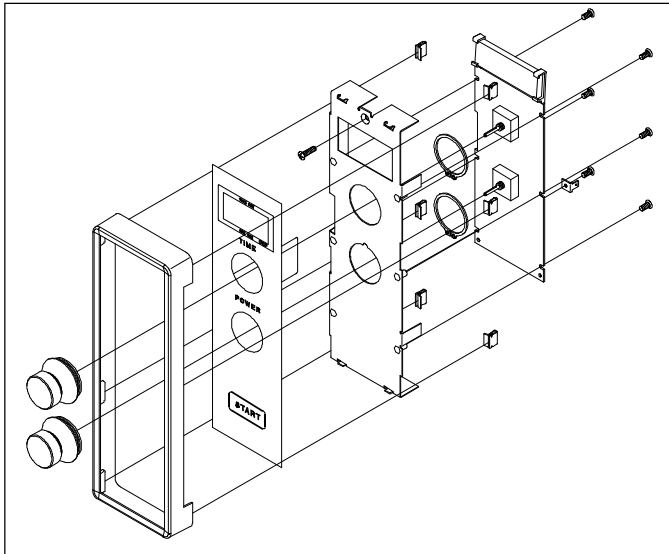


## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

### Controller Panel Disassembly (Dial)

1. Remove the control panel assembly by loosening the 3/32 allen screw located in the middle top of the control panel.
2. Disconnect the ribbon cable by applying even pressure to both sides of the ribbon cable and pulling outward from the ribbon cable connector.
3. Remove the wire connectors and ground connector from PC board.
4. Remove six screws and remove controller.
5. On certain models it may be necessary to pry off six clips and remove panel and display window.
6. On timers with dial controls, the knobs may be removed by releasing the snap ring holding the knob in place.



## CAUTION

Static discharge can damage the controller. Avoid touching any part of the circuitry on the back of the controller.

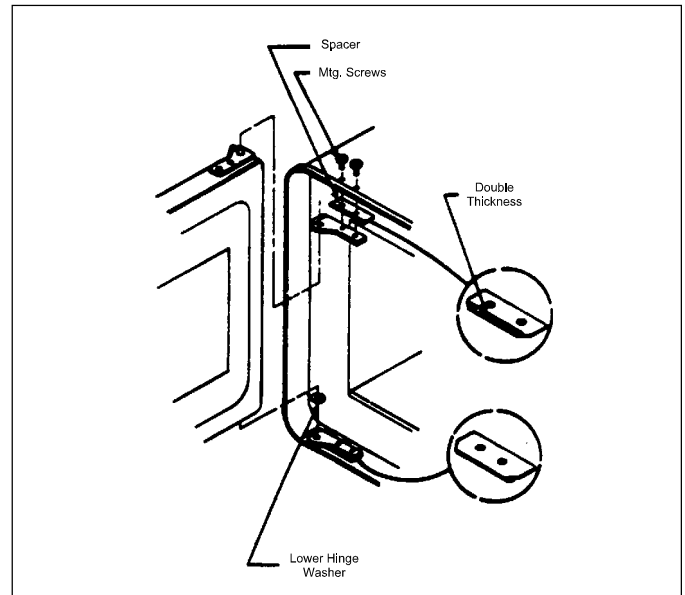
### Installation

1. Visually inspect ribbon cable silver circuit; if any silver circuit is missing from the connector end of the ribbon cable, evenly trim 1/16" off end of ribbon cable to assure good electrical connection with ribbon cable connector.
2. Apply even pressure to both sides of ribbon cable while inserting cable into ribbon cable connector. Visually inspect for proper alignment of silver circuit to connector tabs.

### Door Assembly Replacement and Adjustment

The following door replacement and adjustment procedures will normally limit radio frequency leakage to less than 1 mw/cm<sup>2</sup> at 5 cm. Although the maximum allowable leakage is 4 mw/cm<sup>2</sup> at 5 cm, effort should be made to ensure that leakage levels are well below the 4 mw/cm<sup>2</sup> at 5 cm.

1. Unplug the power cord.
2. Remove two upper hinge mounting screws using T-20 Torx® wrench (Amana part number 92670P01).
3. Tilt top of door away from oven and remove door from oven.
4. Remove lower hinge washer from old door and install onto new door.



5. Install new door into lower hinge, leaving the door 1/2 way open. Place upper hinge and spacer on the top door pin. Spacer must be installed with the double thickness toward the oven front and toward the cavity overhang as shown. Install upper hinge mounting screws. Leave screws loose.
6. Close oven door.
7. Press the door against the cavity faceplate near the hinges and tighten upper hinge mounting screws.
8. If necessary, adjust the interlock switch module as described under the Interlock Switch Module Adjustment in this section.
9. Check the oven for proper operation. Check the oven door operation for radio frequency leakage around the door with an approved radio frequency measuring device to ensure less than 5 mw/cm<sup>2</sup> emissions at 5 cm. in compliance with U.S. Government Department of Health and Human Services 21 CFR, Subchapter J, Performance Standard for Microwave Ovens.

# Disassembly Procedures

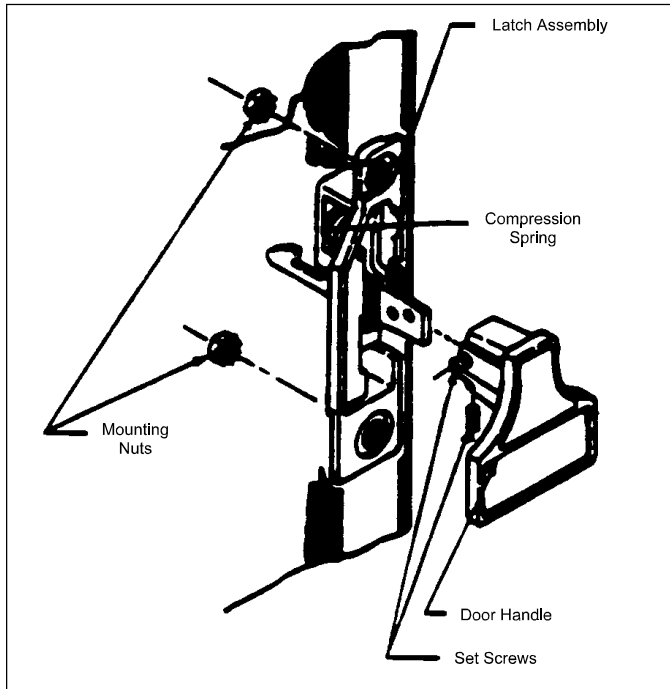


## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

### Door Latch Assembly Replacement

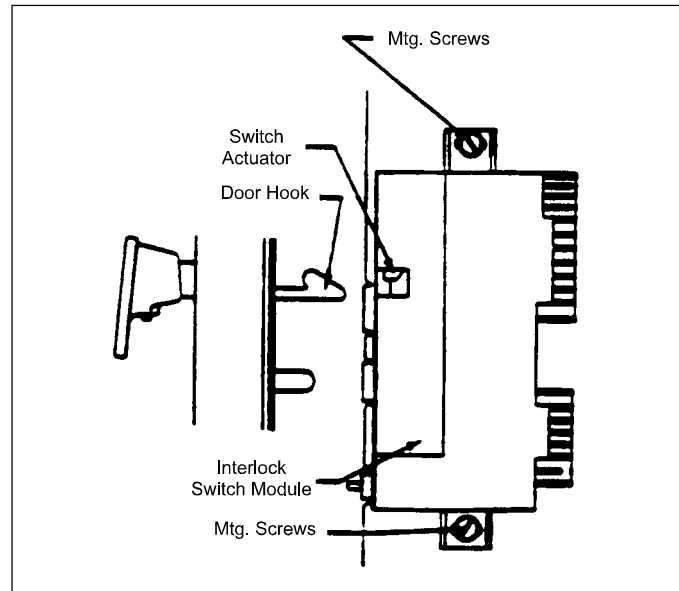
1. Remove door from oven as described in Door Assembly Replacement and Adjustment.
2. Disassemble door as described in Door Disassembly.
3. Using a 3/32 inch allen wrench loosen two set screws and remove door handle.
4. Remove two nuts and remove the door latch assembly.



5. Install door latch assembly and reassemble door using new plastic inner window.
6. Install door on hinges as described under Door Assembly Replacement and Adjustment.
7. Check the oven for proper operation. Check for radio frequency leakage around the door.

### Interlock Switch Module Adjustment

1. Remove the control panel assembly.
2. Loosen the two screws that mount the interlock switch module to the cavity assembly.
3. With the oven door closed, align the switch module to the door hook to provide maximum activation of the switch actuator.



4. Retighten module mounting screws.
5. Check the oven for proper door closure and switch operation.
6. Check the oven for proper operation and radio frequency leakage around the door.

### Door Disassembly

1. Remove door from oven as described in Door Assembly Replacement and Adjustment in this section.
2. Place door front down on a flat protected surface with the door handle extending over the edge of the surface.
3. Peel off the adhesive mounted inner window.
4. Remove door screen mounting screws and remove door screen.
5. Separate door screen from outer door and door filler.



# Disassembly Procedures

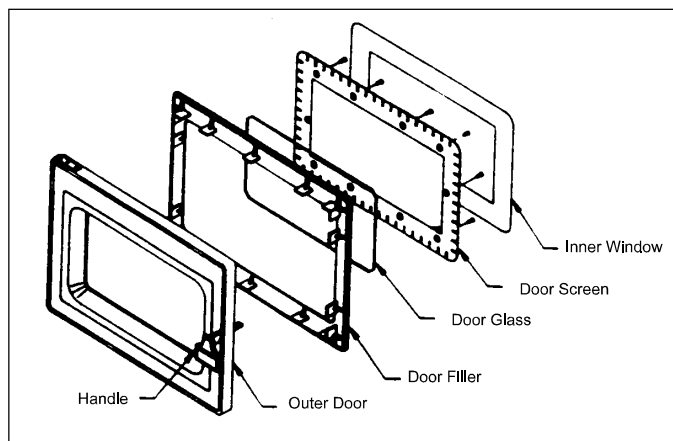


## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

### Door Assembly

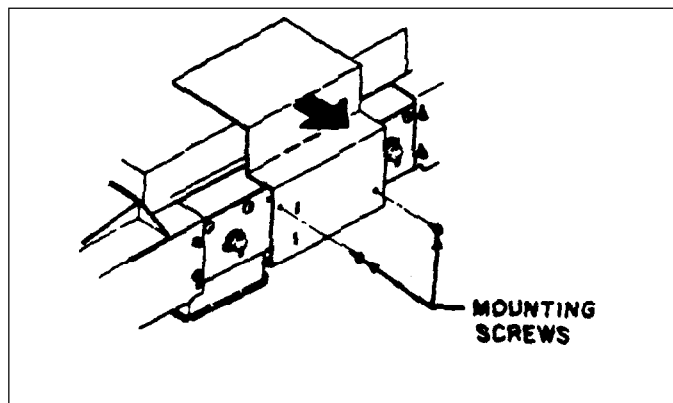
1. Place door, front down, on a flat protected surface with the door handle extending over edge of surface.
2. Mount door screen and door filler on outer door.
3. Install door screen mounting screws keeping outer door as flat as possible.
4. Install adhesive mounted inner window.



5. Install door on hinges as described under Door Assembly Replacement and Adjustment in this section.
6. Check the oven for proper operation. Check for radio frequency leakage around the door.

### Magnetron Exhaust Duct Replacement

1. Lower the back panel to the service position.
2. Remove 2 duct mounting screws.
3. Pull duct toward oven rear to remove.
4. Replace duct and screws.



### Exhaust Transition Duct Replacement

1. Lower the back panel to the service position.
2. Pull the duct toward the oven rear.
3. Rotate the bottom of the duct clockwise to remove.
4. To replace, insert rib on wrap into slot on top of duct. Lift up on bottom tabs on duct and rotate bottom of duct counterclockwise to secure tabs to lower rail on wrap.
5. Slide duct toward oven front.

### Right Blower Air Duct Replacement

1. Lower the back panel to the service position.
2. Remove the exhaust transition duct.
3. Remove the air diverter by removing the two plastic push rivets and disconnecting the rear tab from the slot on the blower air duct.
4. Remove two duct mounting screws from magnetron.
5. Firmly grasp the bottom of the duct and pull it out (considerable force is required).
6. To replace, start the top of the duct into the oven at about a 45° angle. Rotate the bottom of the duct into position (force is required). When correctly positioned, the duct fits down over the blower housing and the mounting holes align with the magnetron.
7. Replace mounting screws, air diverter, and exhaust transition duct.

### Left Blower Air Duct Replacement

1. Lower back panel to the service position.
2. Remove 2 duct mounting screws from magnetron.
3. Lift duct about 1" and rotate duct counter clockwise to remove.
4. To replace, tilt back of the duct slightly downward, insert top of duct near top of wrap and rotate duct clockwise into place.
5. Place the locating tabs into the blower housing and install 2 screws into magnetron.

# Disassembly Procedures

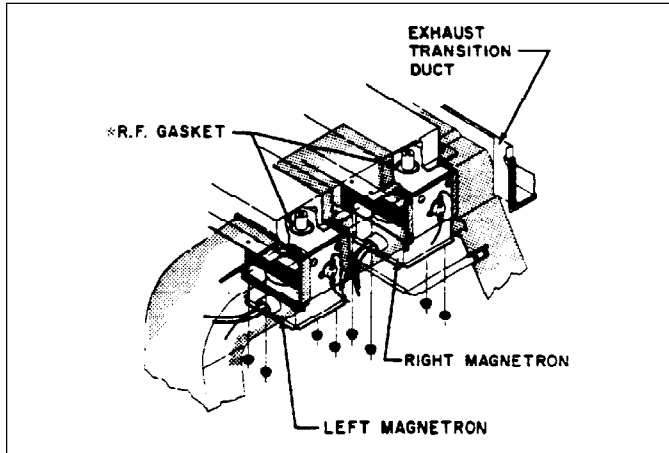


## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

### Magnetron Replacement

1. Remove magnetron inlet and exhaust duct.
2. Disconnect the wires to the magnetron thermal protector.
3. Disconnect the wires to the magnetron terminals.
4. Remove the blower assembly.



5. Remove four magnetron mounting nuts.
6. Lower the magnetron. Rotate bottom of the right magnetron toward the oven rear. Rotate bottom of left magnetron toward the left side of the oven.
7. Put foam tape on replacement magnetron.

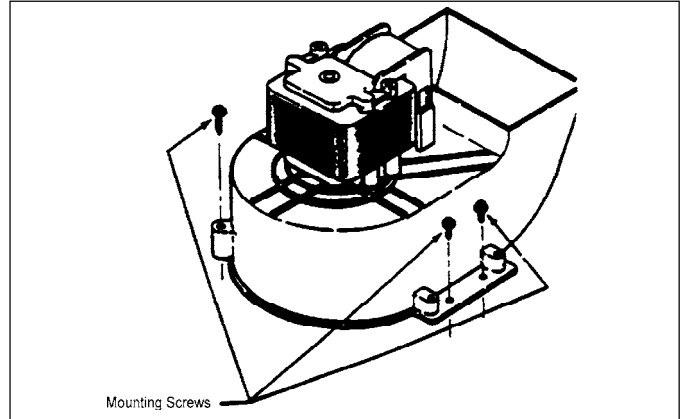
**NOTE:** When connecting wires to magnetron terminals, observe polarity per the wiring schematic/diagram.

**NOTE:** Radio frequency gasket must be installed before magnetron is installed.

**NOTE:** Check oven for leakage to ensure 4 mw/cm<sup>2</sup> leakage at 5 cm.

### Blower Replacement

1. Remove magnetron inlet duct.
2. Remove blower motor ground lead screw from the oven base.



3. Disconnect two blower motor wires.
4. Remove mounting screws and lift out blower assembly. The left blower assembly has two mounting screws located toward the rear of the oven. The right blower assembly has two mounting screws toward the rear of the oven and one mounting screw near the high voltage transformer.

### Right (Rear) High Voltage Transformer Replacement

1. Lower the back panel to the service position.
2. Remove the right blower air duct and the magnetron exhaust duct.
3. Disconnect the transformer leads.
4. Remove four transformer mounting screws.

### Left (Side) High Voltage Transformer Replacement

1. Lower the back panel to the service position.
2. Remove the left blower air duct and left blower assembly.
3. Disconnect the transformer leads.
4. Remove two transformer mounting screws.

# Disassembly Procedures



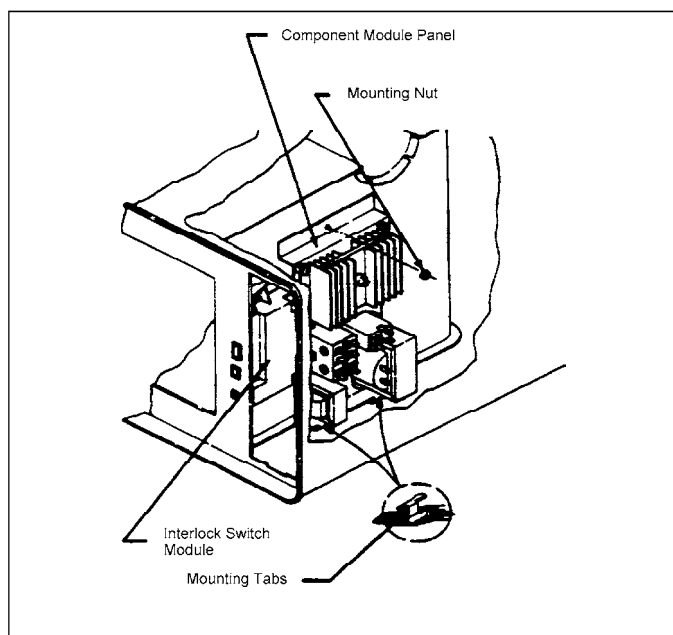
## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

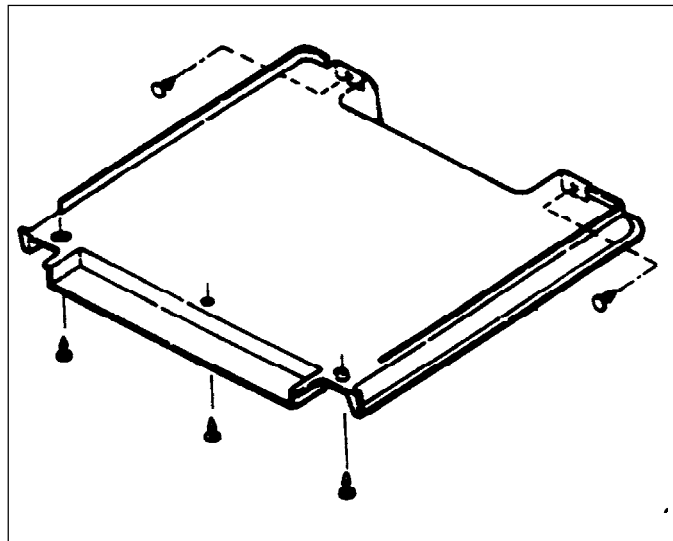
### Component Module Panel Removal

1. Remove the control panel assembly.
2. Remove two interlock switch module screws and remove the switch module. Do not disconnect wires to the switch module.
3. Remove the nut at the top of the component module panel. Pull the top of the panel away from the cavity wall until it clears the stud.
4. Pull the component module panel toward the front of the oven and lift up to separate the two tabs from slots in the oven base.
5. Slowly pull the interlock switch module and component module panel through the control panel opening. Move wires around as required to clear the opening.

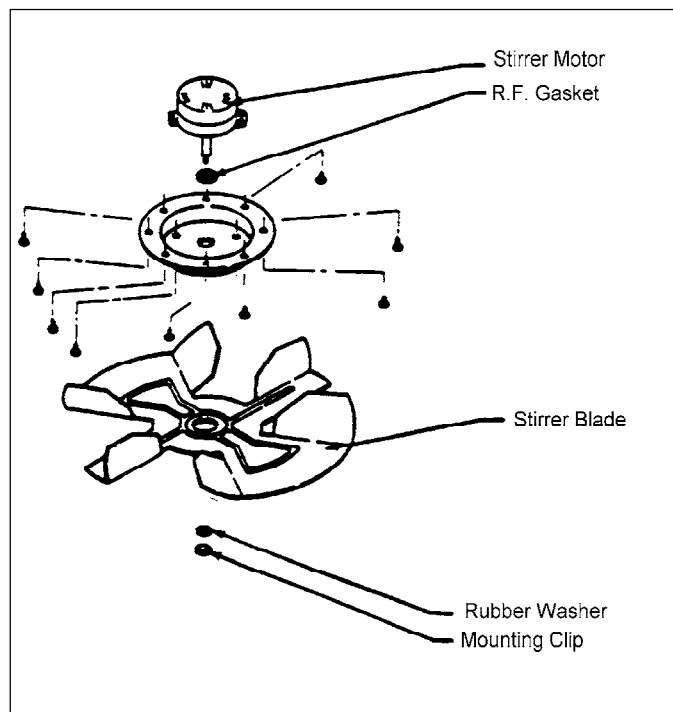
**NOTE:** After replacement, perform interlock switch module adjustment. Perform Microwave Energy Leakage test.



### Stirrer Cover Removal



### Stirrer Assembly Removal



**NOTE:** Check oven for leakage to ensure less than 4  $\text{mw/cm}^2$  leakage at 5 cm.

**NOTE:** Radio Frequency gasket must be installed as shown.

# Disassembly Procedures

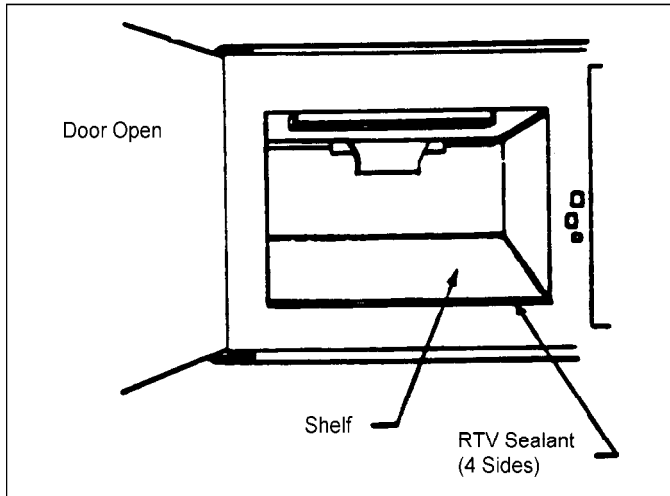


## WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitors before following any disassembly procedures.

### Shelf Replacement

1. Carefully cut through the sealant bead around the perimeter of the shelf with a single edge razor blade or a strong, thin knife.
2. Using a thin knife blade or small screwdriver, begin to pry the shelf SLOWLY upward at the front edge.



3. Insert a second screwdriver and slowly break the seal completely until the shelf is free.
4. Clean the old sealant from the cavity base and install the new shelf.
5. Lay a bead of new sealant around the shelf perimeter.

**NOTE:** For even seam, spray RTV with water before removing excess.

6. Clean excess sealant off the shelf with a single edge razor blade. Allow 24 hours of curing time before using the oven.

### Cavity Thermal Protector Replacement

1. Lower the back panel to the service position.
2. Remove the screw and open lamp access cover.
3. Remove cavity lamp bulb.
4. Remove screw located above cavity lamp.
5. Pull down on cavity thermal protector.
6. Disconnect cavity thermal protector leads at the connector near the back panel.

### Cavity Replacement

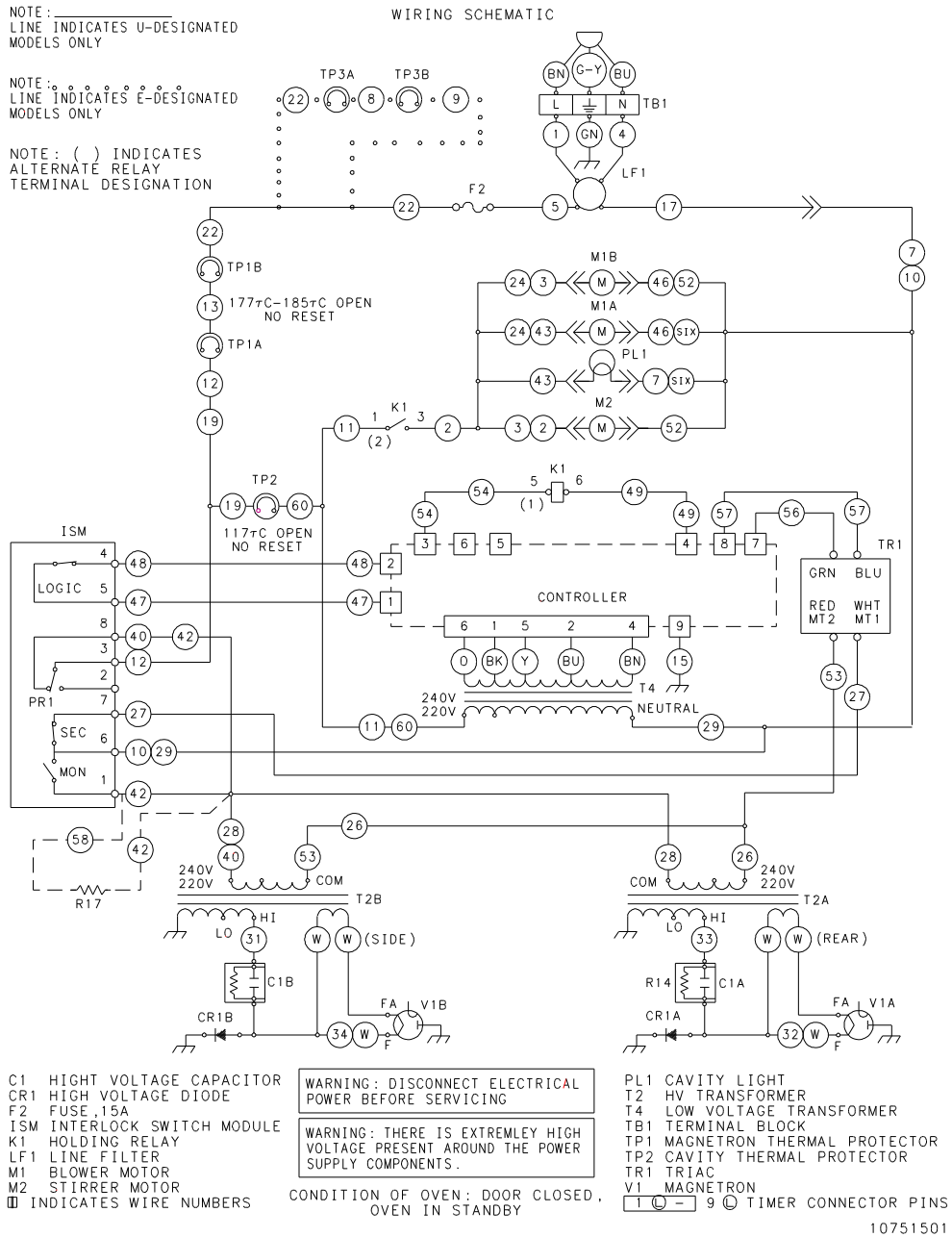
1. Remove the following components of subassemblies (refer to individual replacement procedures if necessary):
  - Control panel assembly.
  - Complete door assembly and hinges.
  - Interlock switch module and component module panel.
  - Stirrer cover, stirrer blade, stirrer motor and light lens.
  - Air ducts.
  - Back panel assembly; disconnect wire bundle near left transformer.
  - Cavity lamp socket and cavity thermal protector.
2. Drill out five pop rivets that secure the base to the cavity. (One rivet at each front corner, one rivet just behind the back of the air filter, and one rivet near each blower assembly.)
3. Remove cavity assembly from oven base.
4. Remove control panel mounting nut, interlock switch module mounting clips and back panel mounting clips from the old cavity and install on the new cavity.
5. Rivet new cavity assembly to base.
6. Install all components or assemblies that were removed.
7. Adjust door per door adjustment procedure.
8. Check all wire connections for correct location and tightness.
9. Plug in oven. Run operational check, power test and Radio Frequency Leakage test.

### Triac and Triac Module Replacement

1. Remove the control panel assembly by loosening the 3/32 allen screw located in the middle top of the control panel.
2. Disconnect the ribbon cable by applying even pressure to both sides of the ribbon cable and pulling outward from the ribbon cable connector.
3. Remove the wire connectors and ground connector from PC board.
4. Locate triac and remove.
5. Reassemble in reverse order.

# Wiring Diagram and Schematic

**WARNING** To avoid risk of electrical shock, personal injury or death, disconnect power to oven and discharge capacitor before servicing unit.



10751501



**High Voltage**

DE1200I  
DE1200I  
U1600D  
U1600I

P4020004801  
P1189102M  
P4020004502  
P1189901M

U1300I  
EH23A1  
DE1600D  
DE3100ID

P4020004501  
P4020008001  
P1189104M  
P4020008501

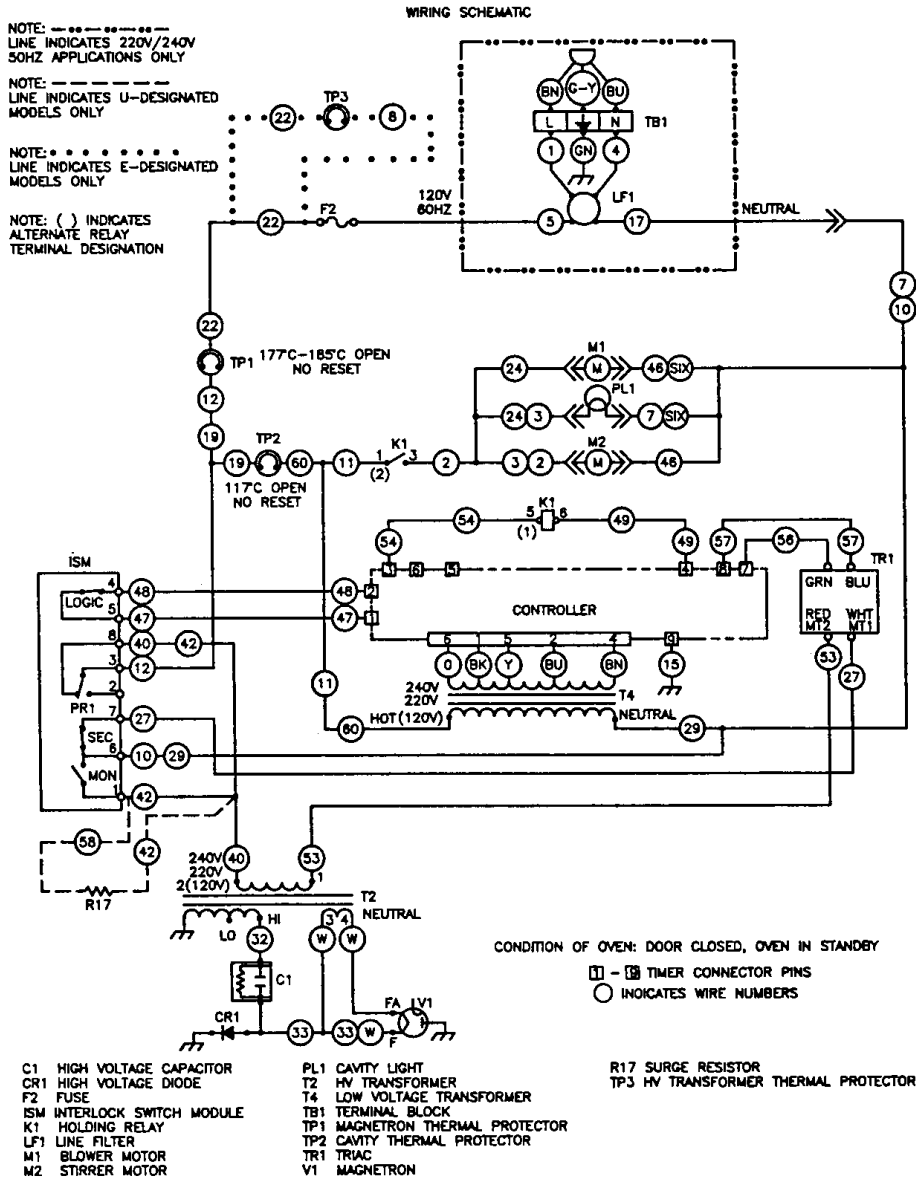
DE2100ID  
DE1200D  
DE3100I  
DE1600I

P4020008401  
P1189103M  
P4020004701  
P1189101M

# Wiring Diagram and Schematic



To avoid risk of electrical shock, personal injury or death, disconnect power to oven and discharge capacitor before servicing unit.



050000298

050000298



High Voltage

E21001  
 U21001

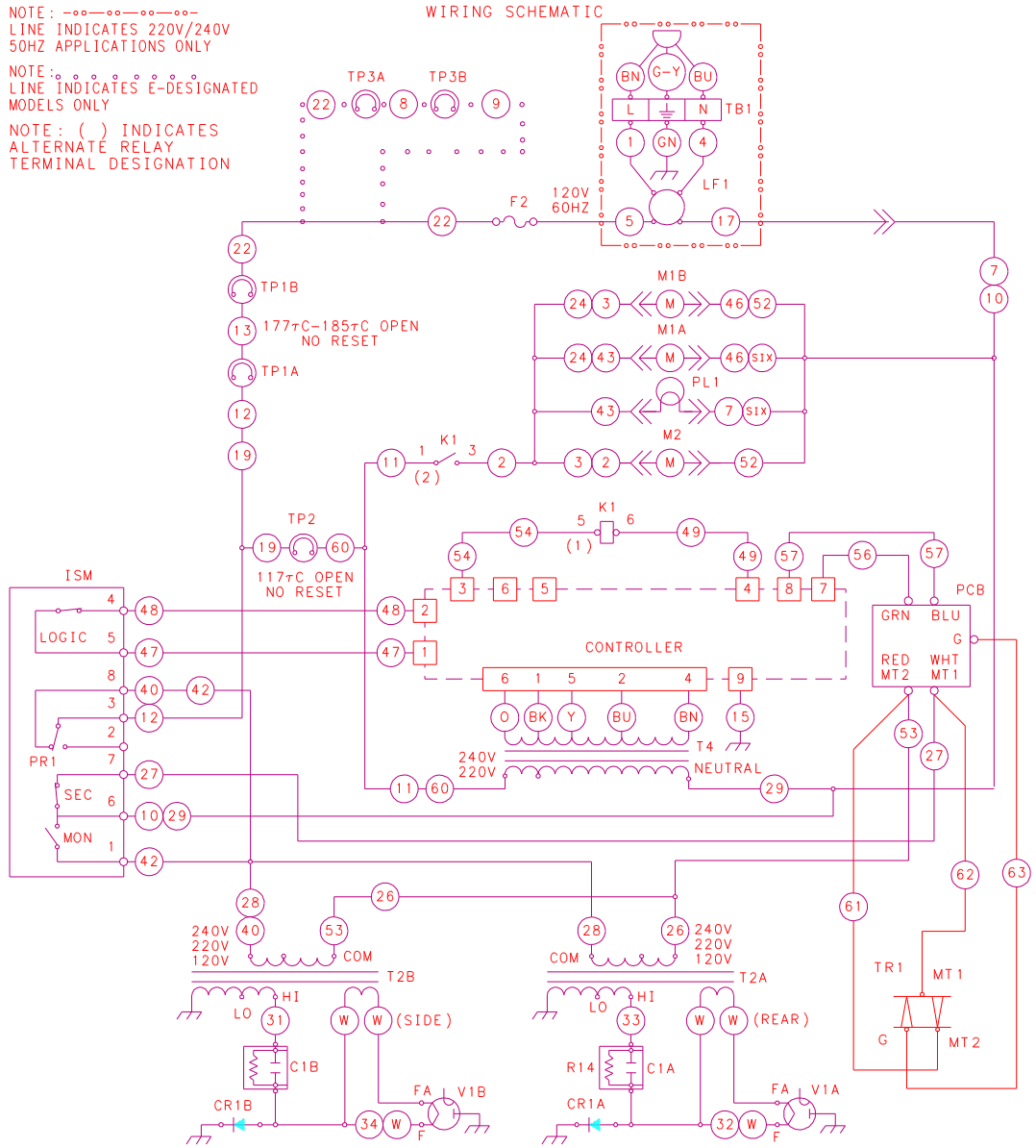
P402004401  
 P402004201

EH13A1  
 U12001

402008101  
 P1189801M

# Wiring Diagram and Schematic

**WARNING** To avoid risk of electrical shock, personal injury or death, disconnect power to oven and discharge capacitor before servicing unit.



C1 HIGH VOLTAGE CAPACITOR  
 CR1 HIGH VOLTAGE DIODE  
 F2 FUSE, 15A  
 ISM INTERLOCK SWITCH MODULE  
 K1 HOLDING RELAY  
 LF1 LINE FILTER  
 M1 BLOWER MOTOR  
 M2 STIRRER MOTOR  
 PCB PRINTED CIRCUIT BOARD  
 □ INDICATES WIRE NUMBERS

**WARNING: DISCONNECT ELECTRICAL POWER BEFORE SERVICING**

**WARNING: THERE IS EXTREMELY HIGH VOLTAGE PRESENT AROUND THE POWER SUPPLY COMPONENTS.**

CONDITION OF OVEN: DOOR CLOSED, OVEN IN STANDBY

PL1 CAVITY LIGHT  
 T2 HV TRANSFORMER  
 T4 LOW VOLTAGE TRANSFORMER  
 TB1 TERMINAL BLOCK  
 TP1 MAGNETRON THERMAL PROTECTOR  
 TP2 CAVITY THERMAL PROTECTOR  
 TR1 TRIAC  
 V1 MAGNETRON  
 1 9 9 TIMER CONNECTOR PINS  
 10957301 REV 00

10957301



High Voltage

U1200I

P1194301M

U1600I

P1194302M

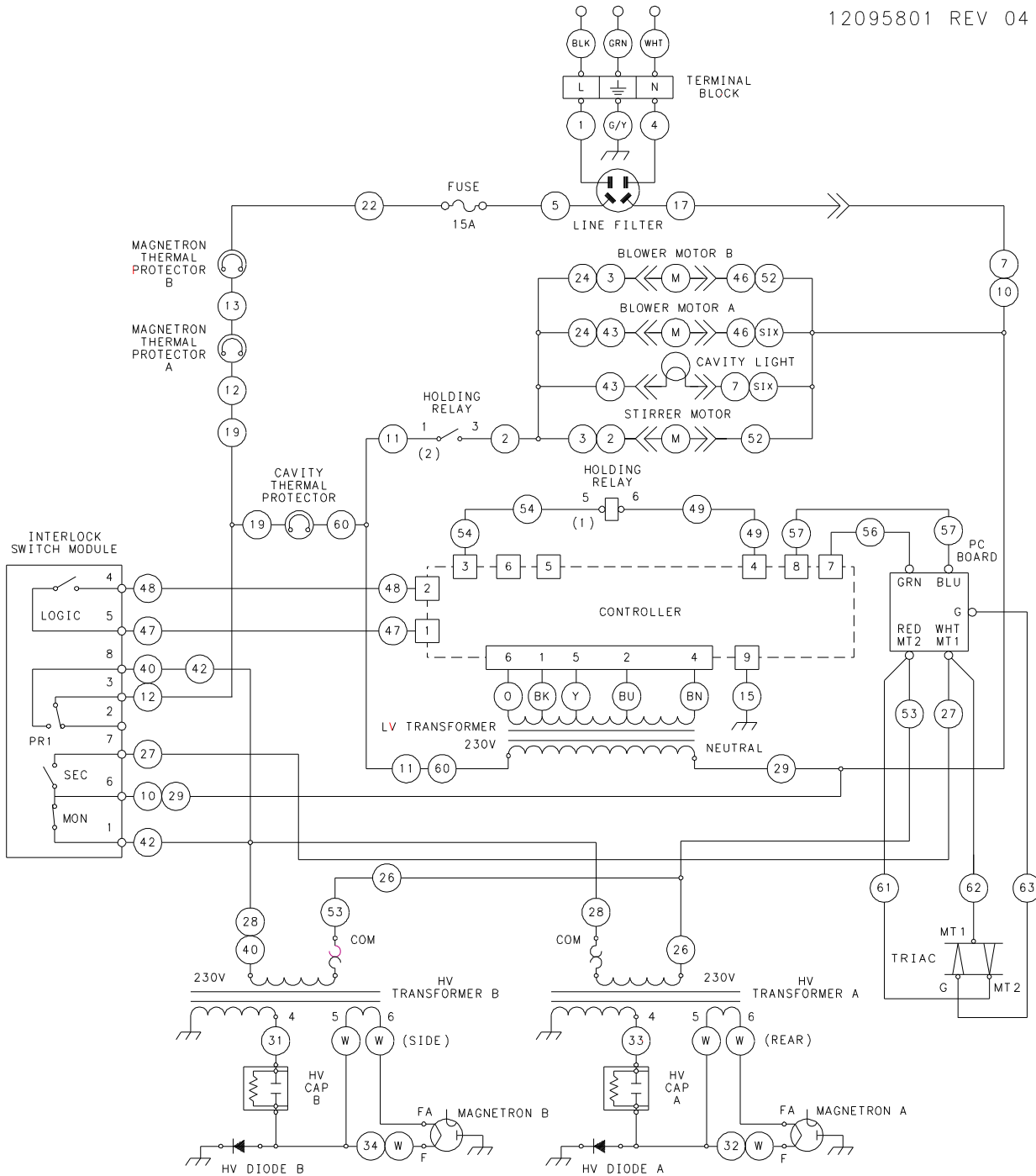
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RS5320001 Rev. 1

# Wiring Diagram and Schematic

**WARNING** To avoid risk of electrical shock, personal injury or death, disconnect power to oven and discharge capacitor before servicing unit.

12095801 REV 04



12095801



**High Voltage**

DE1200D

P1300502M

DE1600D

P1300504M

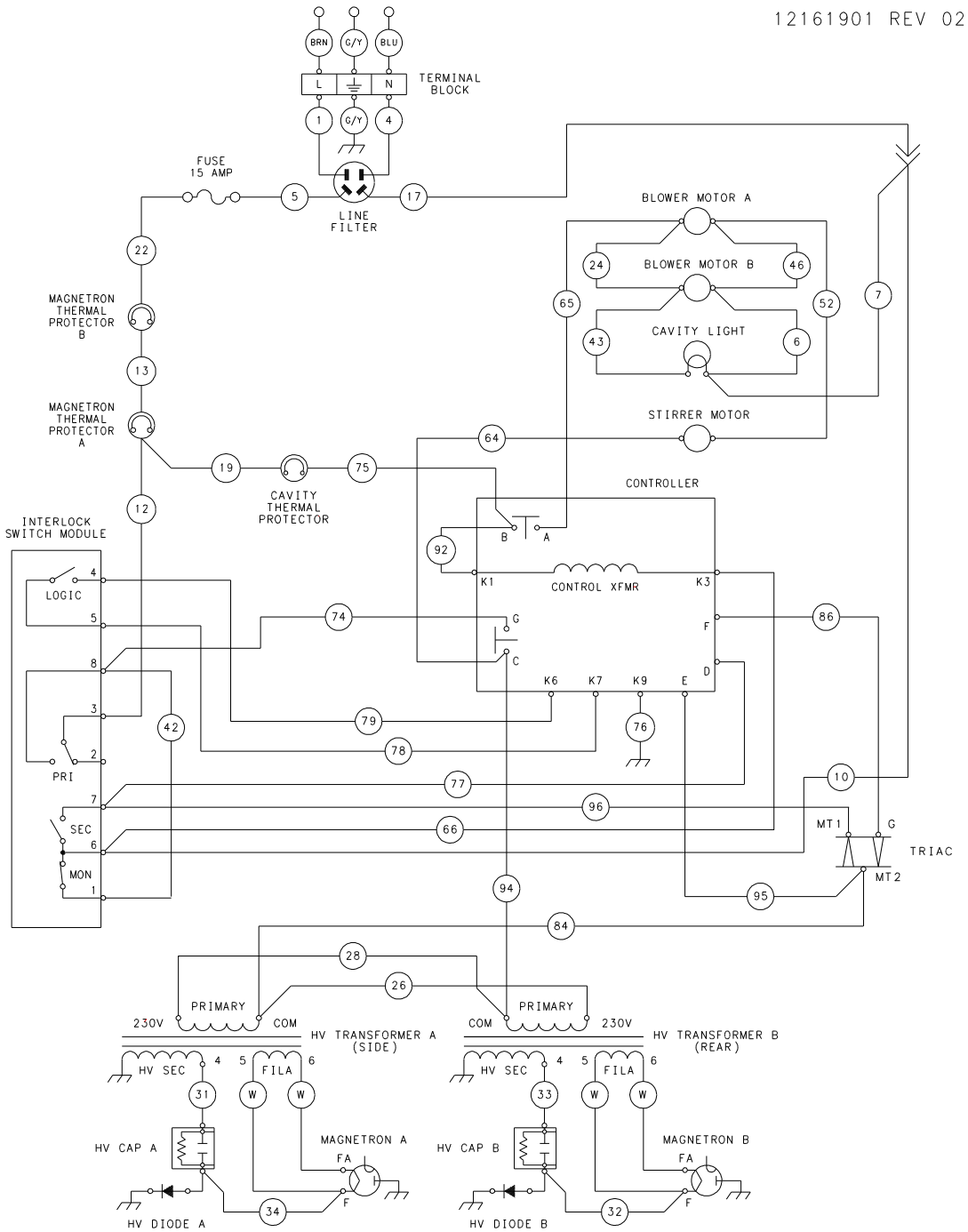
U1600D

P1194303M



# Wiring Diagram and Schematic

**WARNING** To avoid risk of electrical shock, personal injury or death, disconnect power to oven and discharge capacitor before servicing unit.



12161901 REV 02

1216901



High Voltage

DE1200I P1300501M DE1600I P1300503M U1200I P1194305M U1600I P1194306M