

***Thermador***<sup>®</sup>  
**SMW**  
**Series**  
**Oven**  
**Training**  
**Program**



# **SMW Series Oven Training Program**

- Installation**
- Features and Operation**
- Model Numbers**
- Warranty**
- Component Description and Access**
- Error Codes**
- How the Oven Works....Microwave Section**
- How the Oven Works....Warming Drawer Section**
- How the Oven Works....Lower Convection Oven**
- Service Tips**

# Installation

## Electrical Power Connection

- Requires four wire supply L1, L2, Neutral and a bare ground
- 30 amp circuit breaker
- Unit is dual-rated, 120/208-240 volts

## Cut-out Dimensions

- Height 55-3/8 inches
- Width 25-1/2 inches
- Depth 24 inches
- Floor to cutout 9-3/4 inches

# Installation...continued

- **Electrical conduit box** The preferred location would be to install it 2-1/2 inches above the unit, in the center of the cabinet. However it may be placed approx. 5 inches below cabinet base.
- **Cabinet base** must be capable of supporting the weight of the unit, approx. 250 pounds.
- **Frame** of oven overlaps the cabinet by 5/8 inch.
- **Oven** should be installed in such a manner that it can be easily removed for service
- **Internal** ventilation system

# Features and Operation

- ▶ **Upper oven** features a 2.1 cubic foot microwave
- ▶ 1100 watts of power with sensor cooking & 10 power levels
- ▶ Language choice for display: English, French & Spanish
- ▶ Weight can be displayed in either Lbs...or Kgs.
- ▶ Child lock-out feature
- ▶ Demo mode on/off for retail store display
- ▶ Auto popcorn feature, can be pre-set according to weight
  
- ▶ **Middle oven** is a warming drawer keeps food at desired temperature until ready to serve: Temperature controls are from a high of 240F to a low of 140F

# Features and Operation

- ▶ **Lower oven** is a S Series convection oven with 4 modes of cooking
- ▶ Bake, Variable Broil, Convection and Convection Roast
- ▶ Sense-A-Touch glass control panel
- ▶ Halogen oven lights
- ▶ Large viewing window
- ▶ Two separate timers
- ▶ Timed cooking mode
- ▶ Six adjustable rack positions
- ▶ Oven comes with 3 racks
- ▶ Rack supports are porcelain & removable

# Features

- Oven & door liner...fine grain porcelain enamel
- Two 10W 12VAC Halogen lights per cavity
- Equivalent to a 60W incandescent bulb

# Features and Operation

- ▶ Panel Lock (child lockout)
- ▶ A 12 or 24 hour clock option
- ▶ Centigrade or fahrenheit temperature display
- ▶ 3 Specialty Modes
  - ▶ Proof
    - ▶ Cycles bake circuits at 100 degrees
  - ▶ Dehydrate...
    - ▶ Cycles convection circuits at 140 degrees



# Features and Operation

- ▶ **Sabbath....**
  - ▶ only available in bake cycle
  - ▶ element indicator light cycles with heat
  - ▶ all other keys/functions are dead except off key

# Model Numbers

- ▶ 27” Integrated Electric Oven, Warming Drawer & Microwave Oven
- ▶ 4 Models
- ▶ SMW272YB.....Black Glass
- ▶ SMW272YW.....White Glass
- ▶ SMW272YS.....Stainless Steel
- ▶ SMW272YP.....Stainless Steel with Pro Stainless steel handle

# Model Numbers ....Continued

## 27" Integrated Electric Oven & Microwave Oven

3 Models

- SM272YB.....Black Glass
- SM272YW.....White Glass
- SM272YS.....Stainless Steel

## Built-In Microwave Oven

3 Models

- MBYB.....Black
- MBYW.....White
- MBYS.....Stainless Steel

# Model Numbers

## Example....SMW272YB

- ▶ **S** = S-Series convection oven
- ▶ **M** = Microwave oven
- ▶ **W** = Warming drawer
- ▶ **27** = 27" Oven
- ▶ **2** = Double oven
- ▶ **Y** = 2000 Introduction Year
  - ▶ The Y designates a change in *form & finish* (appearance) from previous designated year
  - ▶ The serial number is used to denote a change in internal components
- ▶ **B** = Black

# Warranty

- ▶ **One full year** from date of installation or occupancy
- ▶ **Service must be performed** by an authorized service agent
- ▶ **Warranty Claim** must be submitted within 45 days of completion

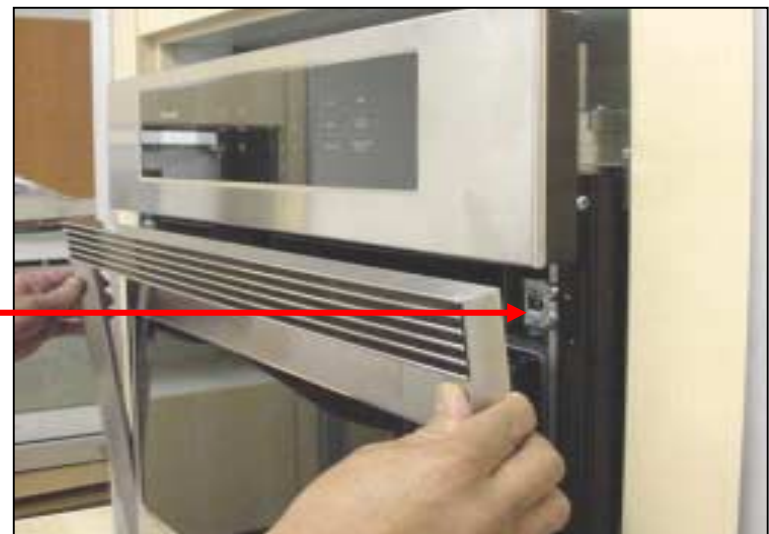
# Microwave Oven Section.....

component description & access

- Microwave section
- Microwave vent-cover
- Touch control door assembly... includes membrane switch & DPC (Digital Programmer Control)
- Inverter board
- Lamp & mag tube
- Stirrer motor
- How the microwave circuit works
- Troubleshooting

# Microwave Section...Removal

- To gain access to the microwave section
- Remove vent frame from around the microwave unit. This frame is a one piece construction
- Grasp the frame and pull the ball studs from the spring catches



# Microwave Section...Removal

- Remove the 2 screws which hold the microwave base to the oven housing
- Remove the spring catches, which are secured with two screws
- Bow out the side of outer frame slightly to allow the section to slide out easily





# Microwave Section...Removal

- Before removing section, remove warming drawer to avoid scratching
- Slide tabs on both sides of rails and drawer will pull out



# Microwave Section...Removal

- Slide section part way out leaving the right rear corner still inside housing
- While holding front of unit reach inside and unplug the section from the receptacle



# Microwave Section ...Removal

- Section can now be removed completely and set down on a solid surface
- Note the exhaust duct covers on the top of the microwave cover



# Microwave Section...Access Duct Cover

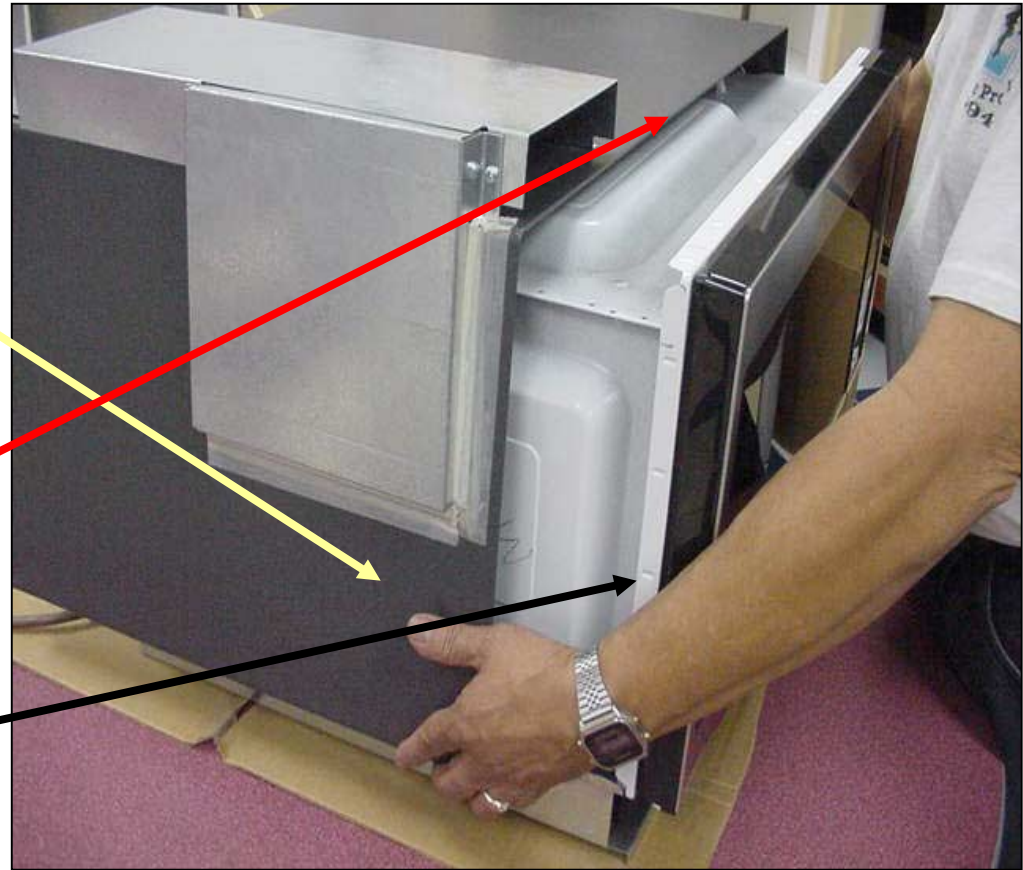
- To gain access to the microwave components the duct exhaust parts must first be removed from the microwave cover
- The microwave cover can then be removed





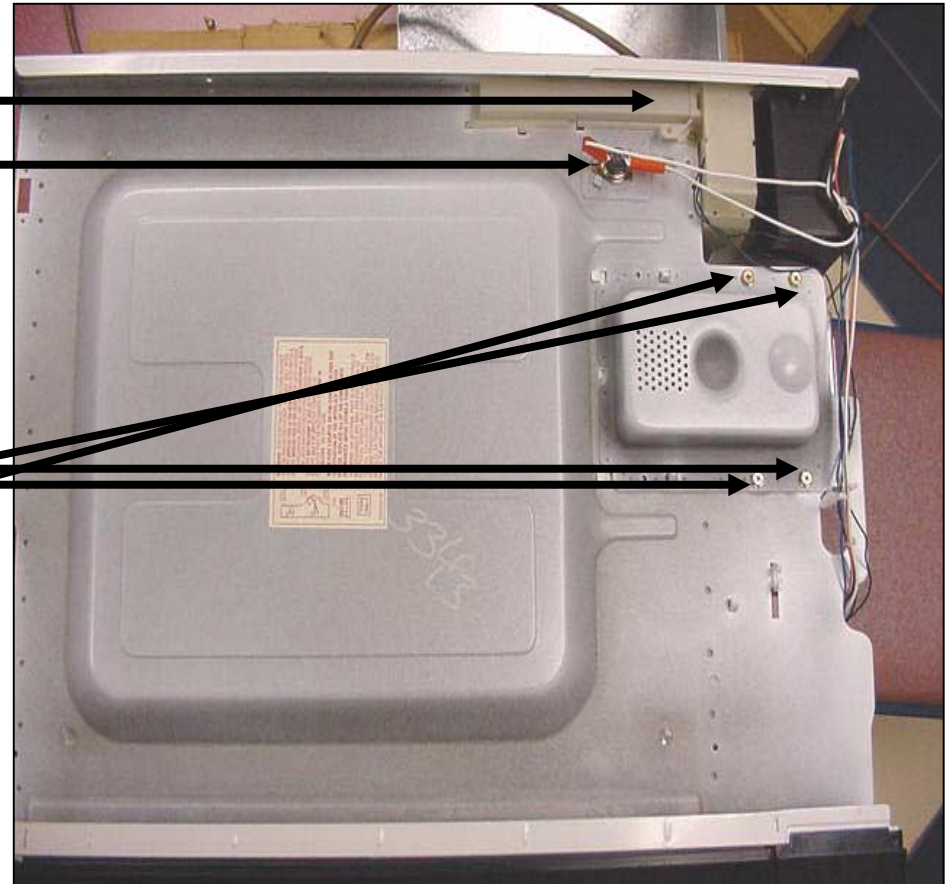
# Microwave Section...Access Outer Cover

- After removing the screws from the sides and rear, the cover slides away from the front allowing access to most of the components.
- Note the groove on the cover and the tab on the front frame



# Component Description & Access...Mag tube & Mag tube thermal cutout

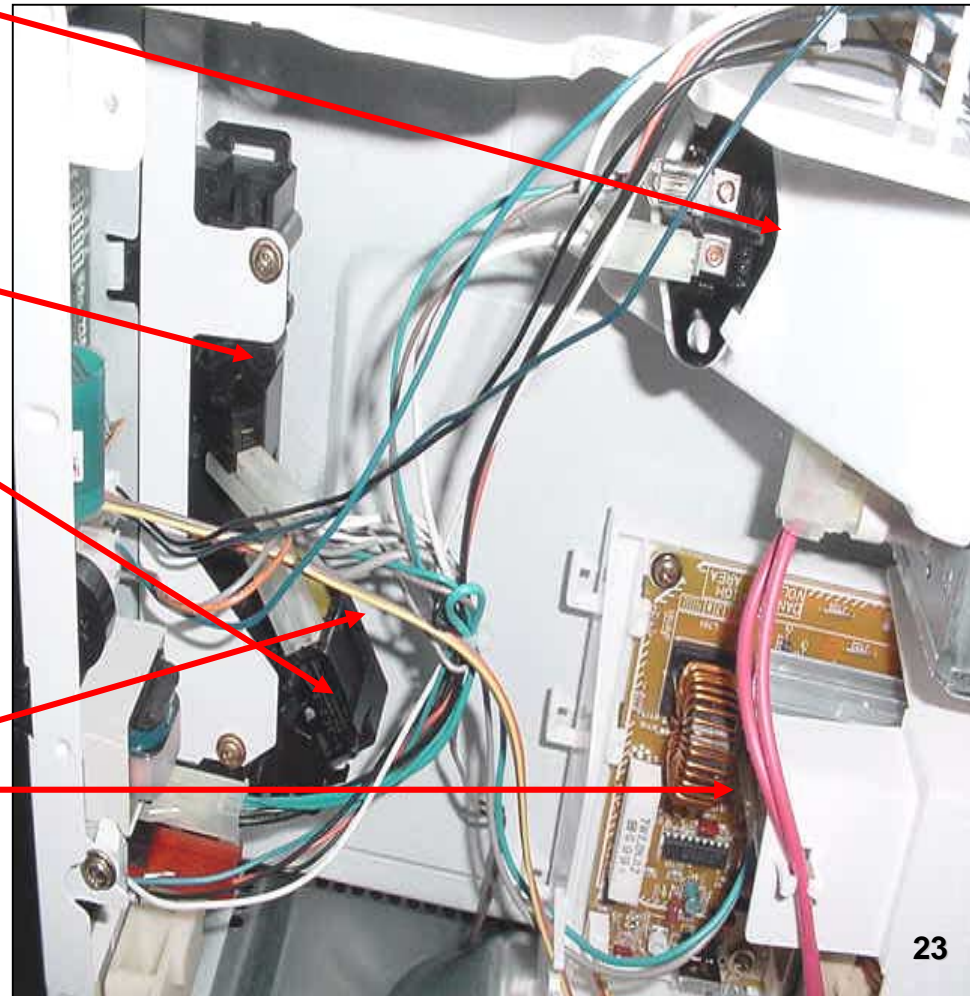
- Steam Sensor Location ( inside cover)
- Mag-tube thermal cutout N/C opens at 221 deg. F
- Mag tube is secured with four screws. Across filament terminals should read 1 Ohm or less. Between each terminal and ground should be open



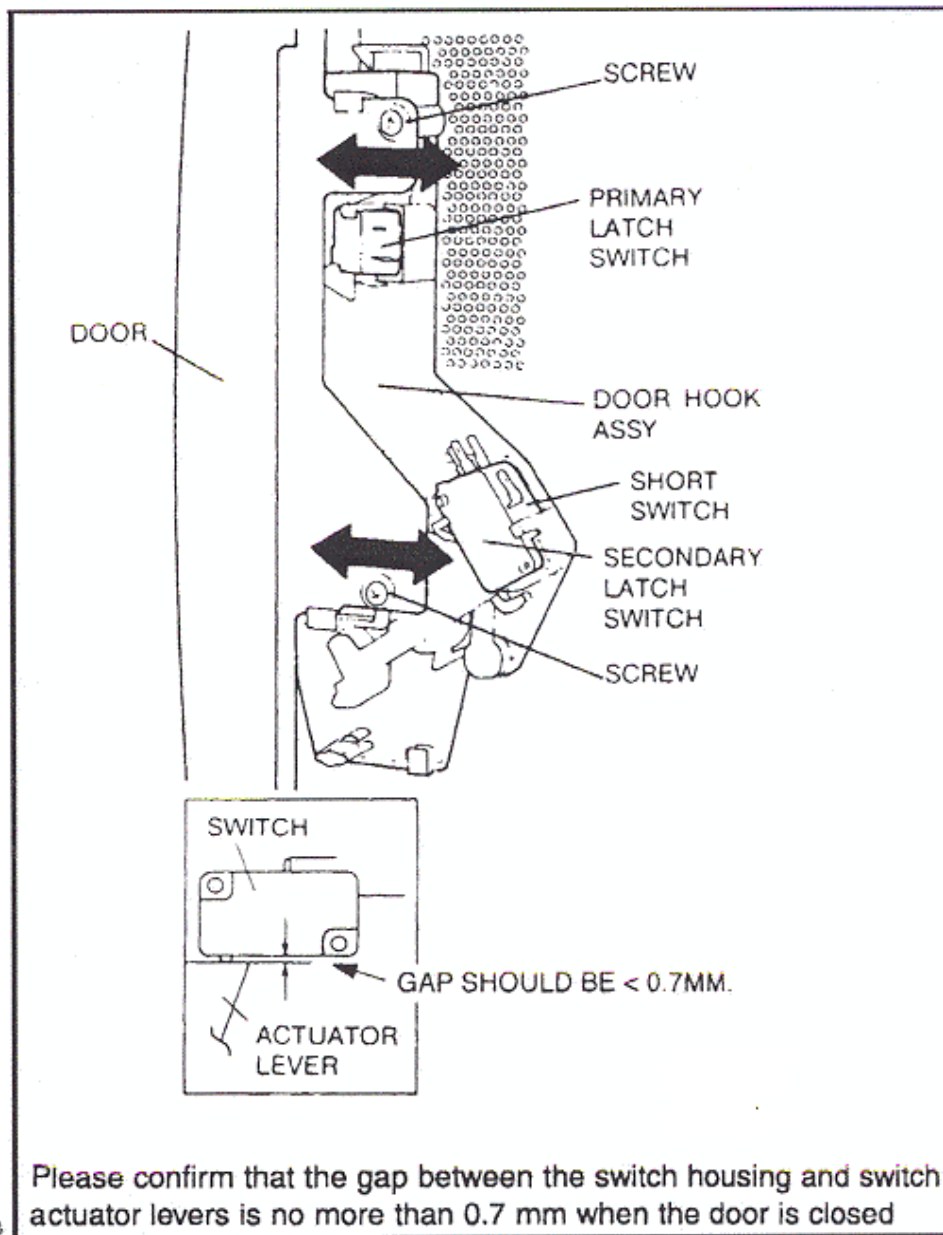
# Component Description & Access....

## Door switches and lamp assembly

- Lamp assembly  
lamp is 20watts 120V
- Primary latch switch N/O
- Secondary latch switch N/O  
& is the outside switch
- Monitor or short switch N/C  
& is the inside switch
- Inverter board



# Microwave Section... Door Switch Locations & Adjustments



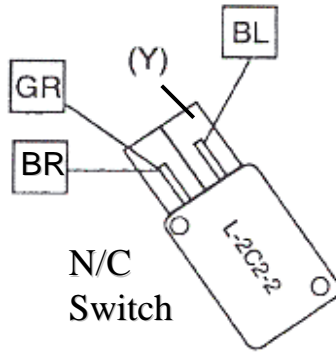
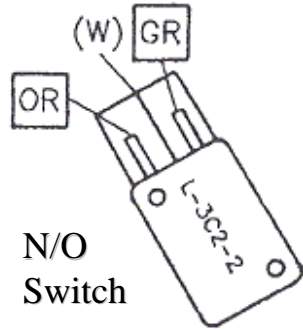
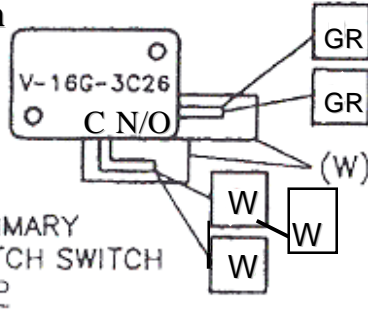


# SMW Microwave switch & relay wiring

## WIRING DIAGRAM

NOTE: \*When replacing, check the lead wire color as shown.  
 \*Colors shown by ( ) indicate colors of lead wire connector housing. (W) White (Y) Yellow (R) Red

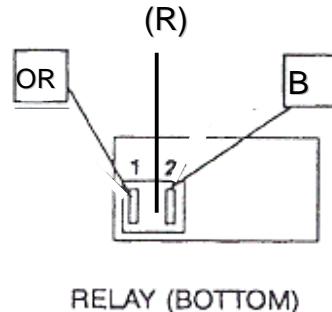
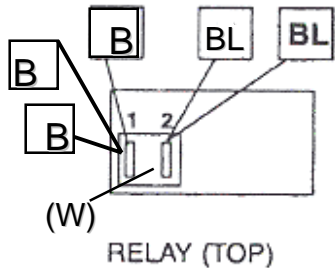
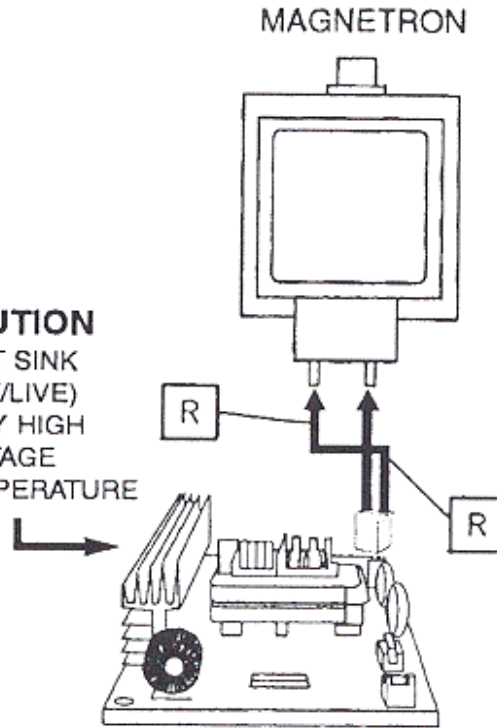
N/O Switch



SECONDARY LATCH SWITCH BOTTOM (OUTSIDE)

SHORT SWITCH BOTTOM (INSIDE)

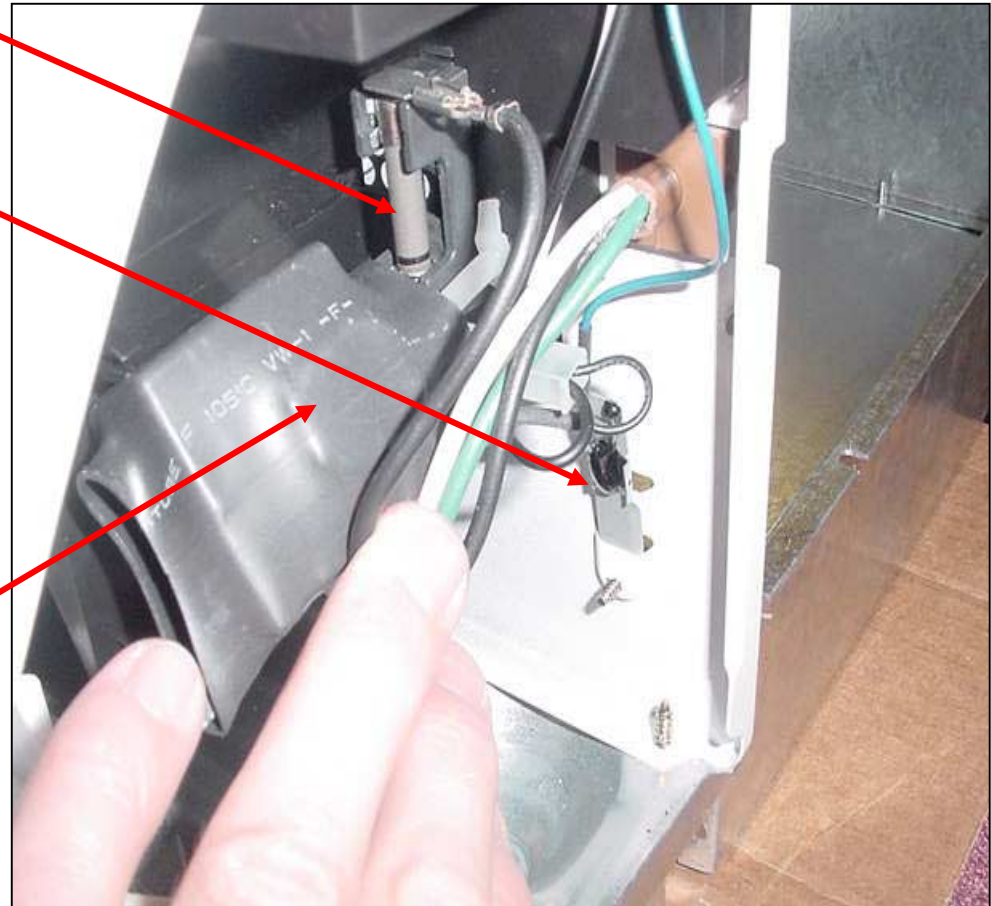
**CAUTION**  
 HEAT SINK (HOT/LIVE)  
 VERY HIGH VOLTAGE  
 TEMPERATURE



| SYMBOL | COLOR  |
|--------|--------|
| OR     | ORANGE |
| BL     | BLUE   |
| BR     | BROWN  |
| W      | WHITE  |
| Y      | YELLOW |
| R      | RED    |
| GR     | GRAY   |
| B      | BLACK  |

# Component Description & Access....Fuse Temp. Sensor & Noise Filter

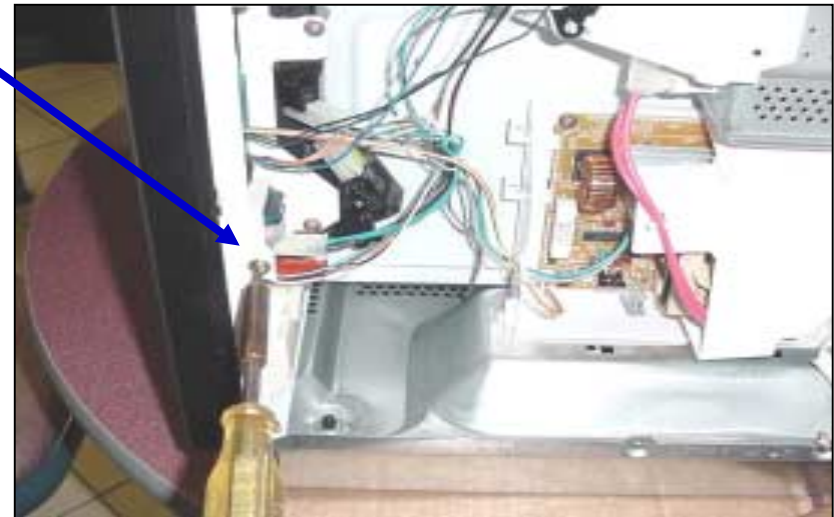
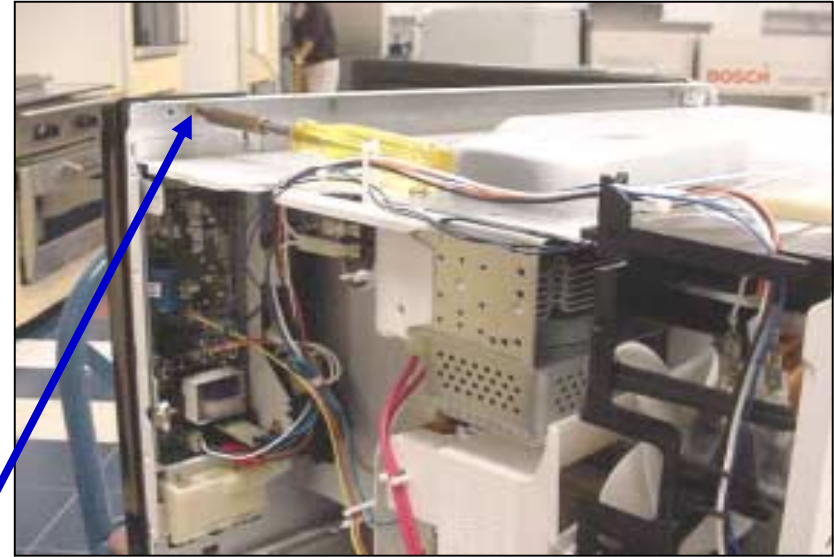
- Fuse is rated at 18 amps (Part # 35-00-787)  
( regular cartridge fuse )
- Temperature sensor measures 40,000 Ohms to ground If excessive cabinet temperature is detected cooling fan will turn on automatically until temp. drops (part # 35-00-778)
- Noise filter is across hot and neutral incoming supply (part # 35-00-786)



# Component Description & Access...

## Microwave Touch Control Door Assembly

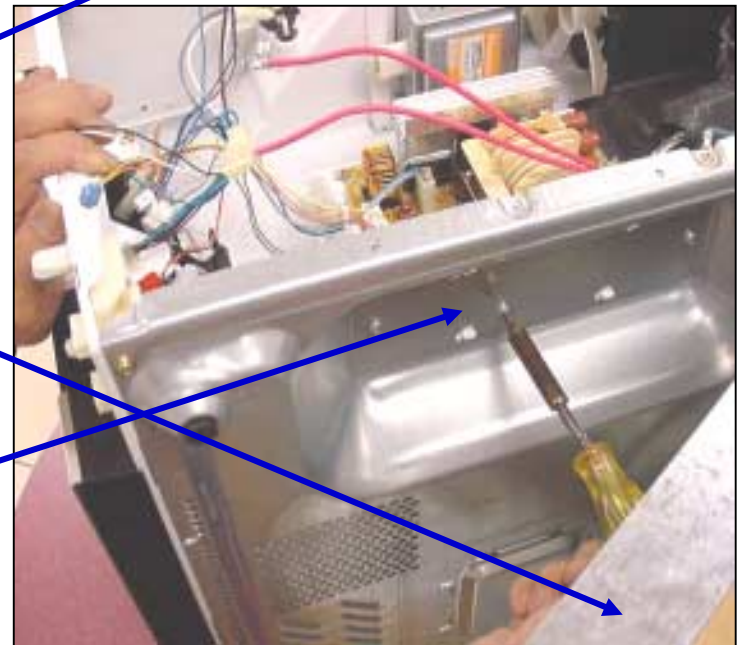
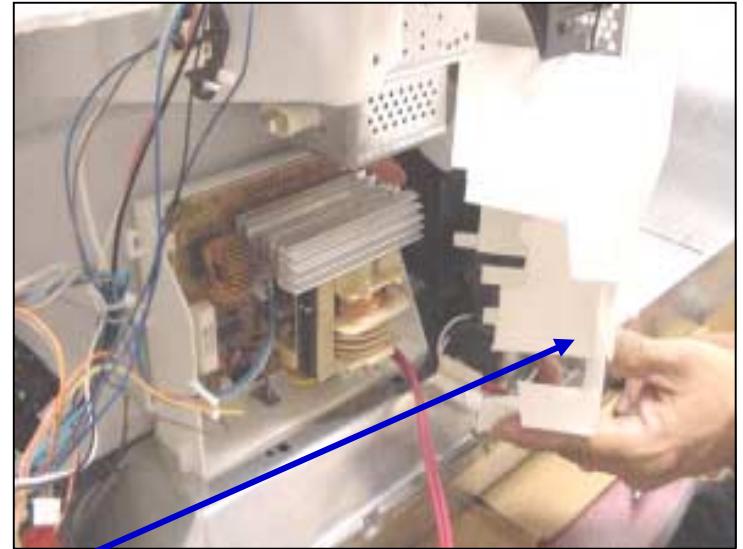
- **Before removing door assembly** disconnect the four plug connectors, the ribbon connector and the two relay plugs. (all connection plugs are color coded so that they can't be mis-wired)
- **To remove assembly** remove the two screws from the top and the single screw from the side of the frame
- **Door assembly** will then lift up and out of the slots in the frame





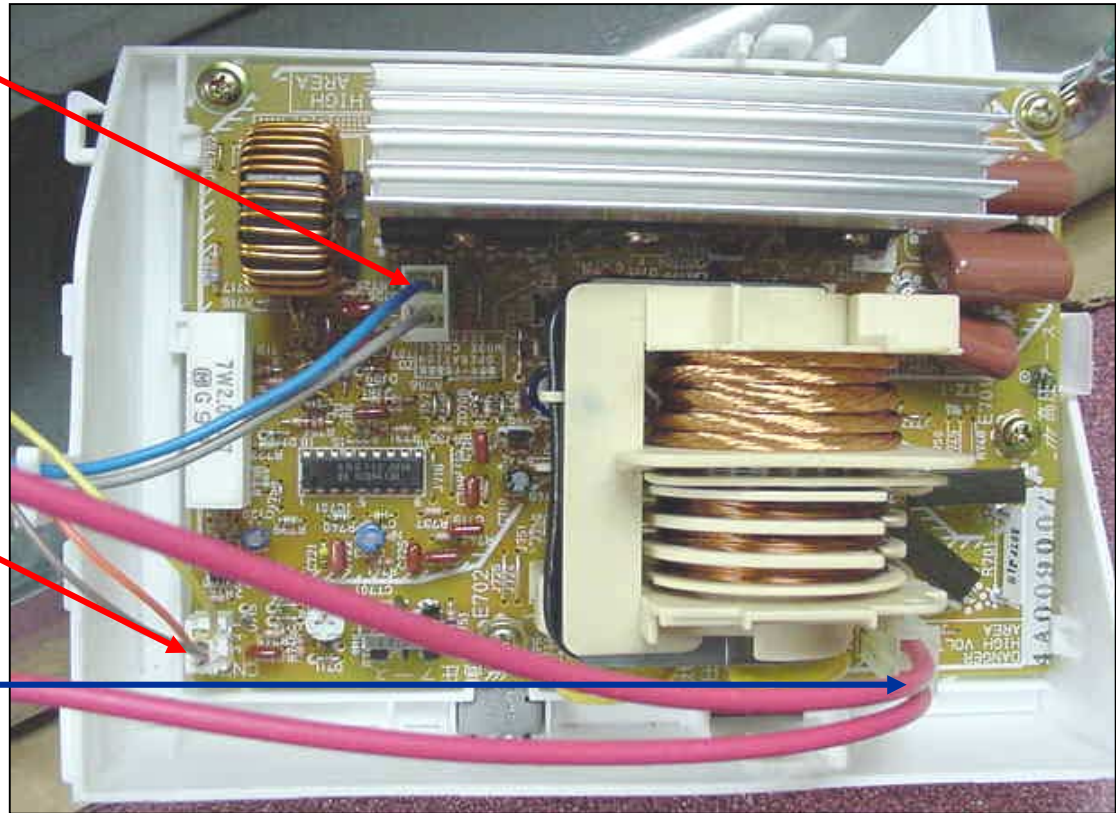
# Component Description & Access....High Voltage Inverter

- To gain access to the Inverter Power Supply Board disconnect the mag tube HV wires
- Unsnap the plastic air guide from the tabs
- To remove board remove m/w pan (4 screws at the corners & 3 across the rear) then the 3 screws which secure the board



# Component Description & Access...High Voltage Inverter Terminals

- **CN702**...120VAC input to transformer
- **CN701**...Signal voltage from DPC circuit (3 wire plug) Voltage varies from 0 volts to 2.7VAC for variable power levels
- **CN703**...4000VDC output to mag tube

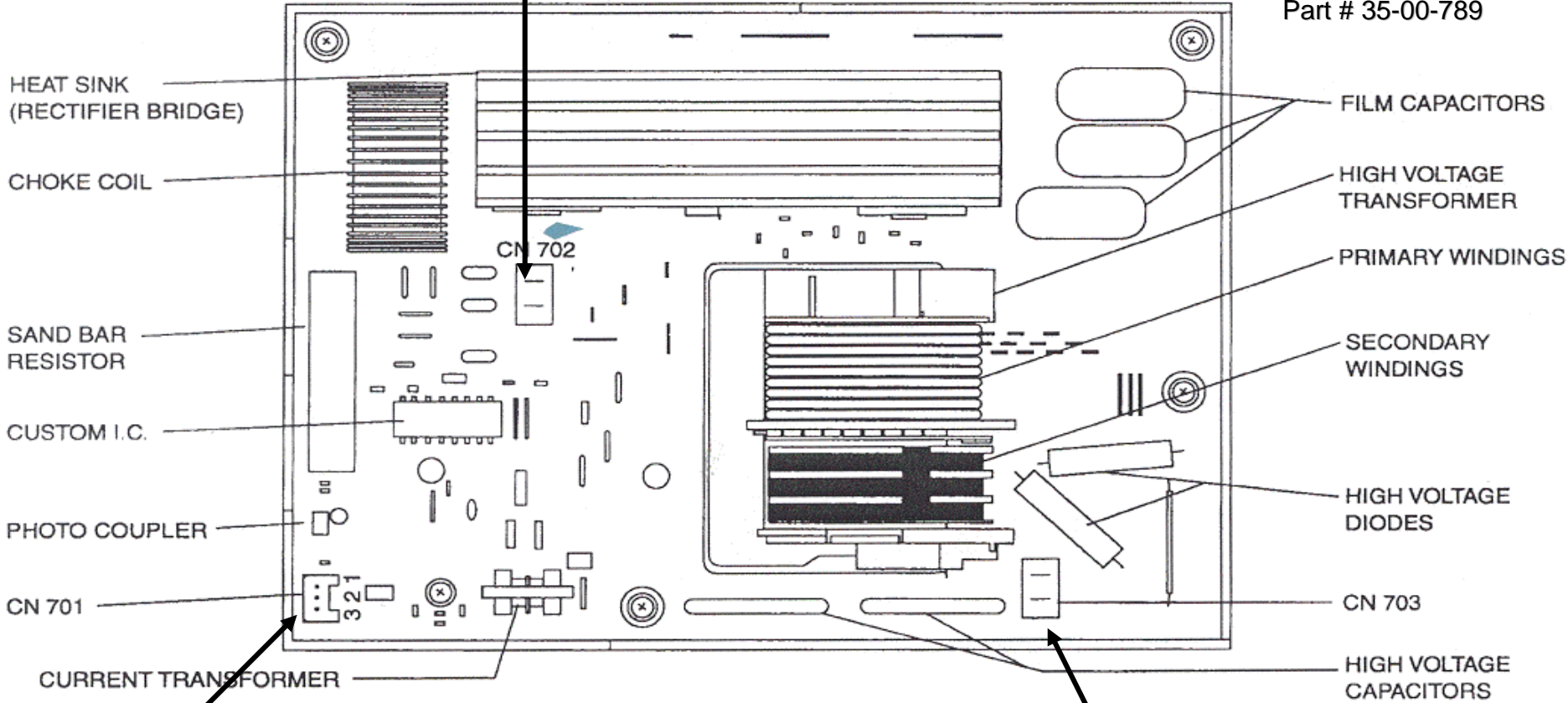


# Microwave Section...Inverter Power supply HV Area

120 VAC Input

Note Do not attempt to repair this inverter board. Replace as a complete assembly

Part # 35-00-789



Low Voltage Input from DPC 0-2.7 VAC ( see table on page 30)

High Voltage 4000 VDC Output to Mag Tube



# Variable Power & Voltage readings from DPC plug CN3

CN701 from control board to Inverter P.C. B. , Total Current draw and cycling depend of Power setting on Thermador SMW Microwave .

| Power setting | Y-BN                 | Y-OR                | BN-OR  | Current draw | ON     | OFF    | %Time ON |
|---------------|----------------------|---------------------|--------|--------------|--------|--------|----------|
| 100%          | 0-2.6V AC (Pulsing)  | 2.7V AC             | 0 V AC | 17.0 Amp     |        |        | 100      |
| 90%           | 0-2.6V AC (Pulsing)  | 2.7V AC             | 0 V AC | 14.7 Amp     |        |        | 100      |
| 80%           | 0-2.6V AC (Pulsing)  | 2.7V AC             | 0 V AC | 12.8 Amp     |        |        | 100      |
| 70%           | 0-2.6V AC (Pulsing)  | 2.7V AC             | 0 V AC | 11.1 Amp     |        |        | 100      |
| 60%           | 2.4V AC (No pulsing) | 2.7V AC             | 0 V AC | 9.4 Amp      |        |        | 100      |
| 50%           | 0-2.4V AC (Pulsing)  | 2.2V AC             | 0 V AC | 8.1 Amp      |        |        | 100      |
| 40%           | 0-2.4V AC (Pulsing)  | 1.8V AC             | 0 V AC | 6.8 Amp      |        |        | 100      |
| 30%           | 0-2.4V AC (Pulsing)  | 1.4V AC             | 0 V AC | 5.7 Amp      |        |        | 100      |
| 20%           | 0-1.4V AC (Pulsing)  | 1.6V AC             | 0 V AC | 5.7 Amp      | 12 Sec | 8 Sec  | 60       |
| 10%           | 0-1.4V AC (Pulsing)  | 0-1.7V AC (Pulsing) | 0 V AC | 5.7 Amp      | 8 Sec  | 14 Sec | 36       |

# Component Description & Access.....

## Stirrer Motor

- Remove base of unit or break off access cover and re-secure with screws
- Stirrer motor is held in place with two screws
- Motor is a synchronous type with a 'D' shaft and operates off of 120VAC. When replacing the motor ensure that the shaft locates into bearing insert. (part # 35-00-779)



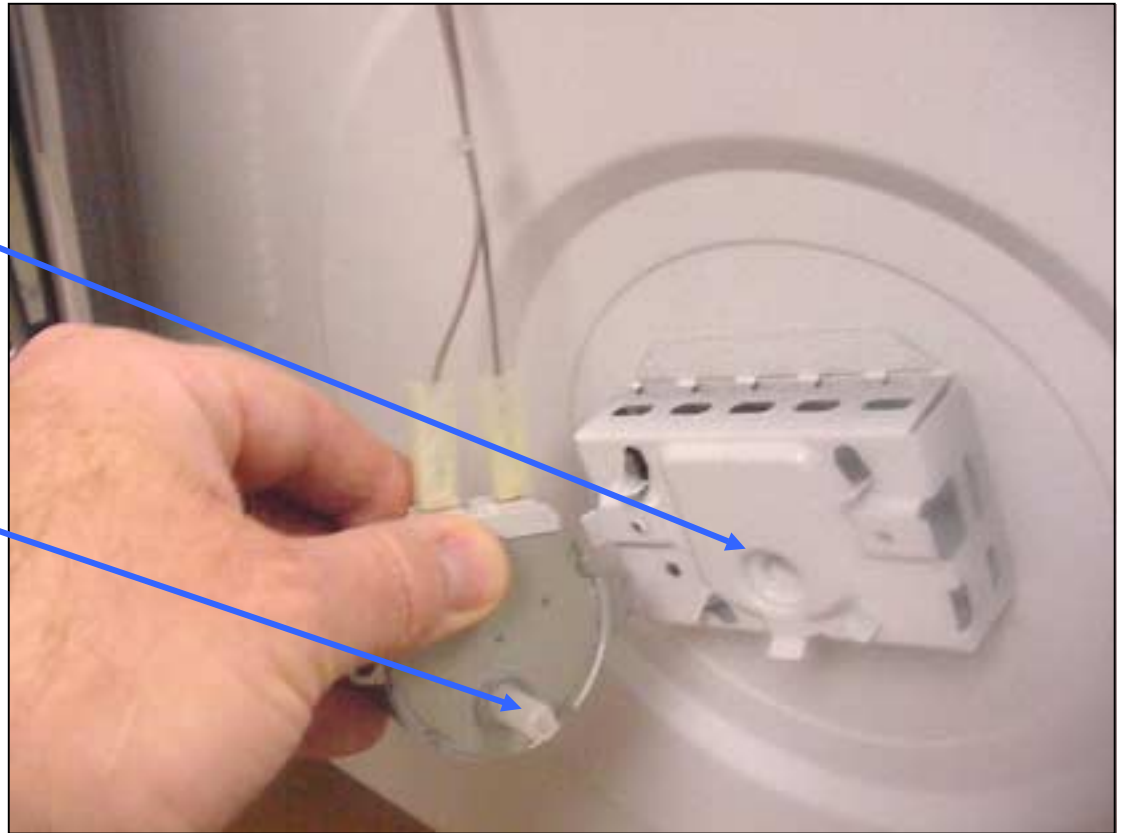


# Component Description & Access....

## Stirrer Motor

➤ 'D' Slot

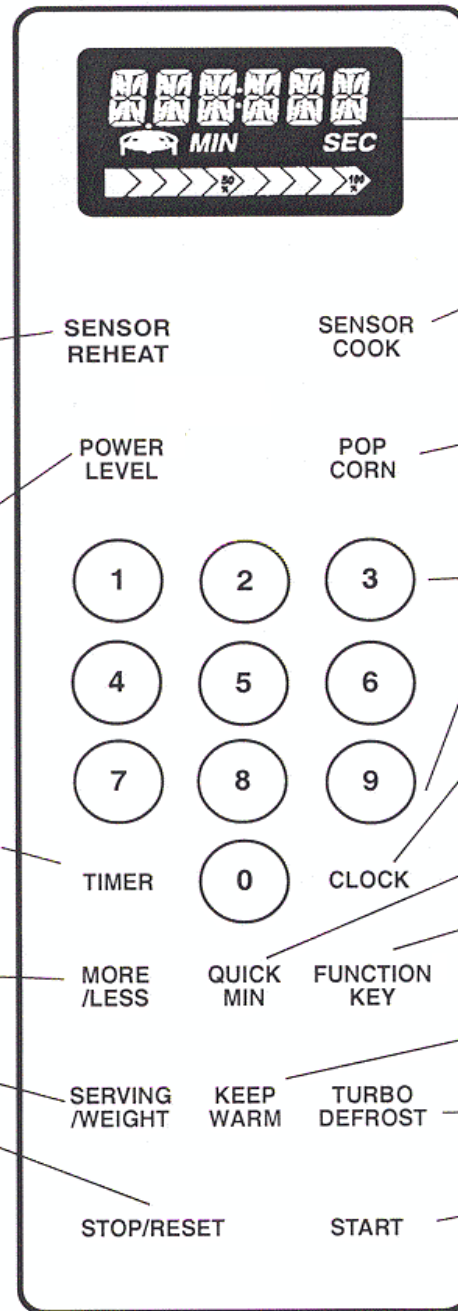
➤ 'D' Shaft



# Microwave Control Panel

## Beep Sound

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



## Sensor Reheat Pad

Automatically reheats. Three different categories.

## Power Level Pad

Manually changes Microwave power.

## Timer Pad

Counts down and signals end time. Can be used for delay or stand time.

## More/Less Pad

Increases or decreases cooking time for Sensor Cook or Sensor Reheat.

## Stop/Reset Pad

Before cooking: One tap clears your instruction. During cooking: one tap temporarily stops to cooking process. Another tap cancels all your instructions and time of day or colon appears on the Display Window.

## Display Window

## Sensor Cook Pad

Automatically calculates cooking time for six different items.

## Popcorn Pad

Automatically timed by weight.

## Number Pads

## Time of Day Clock Pad

## Quick Minute Pad

Adds or sets time in 1 minute increments, up to 10 minutes.

## Function Key Pad

Selects the noncooking features, i.e. Child Lock, etc.

## Keep Warm Pad

Three different foods can be kept warm for 30 minutes after cooking.

## Turbo Defrost

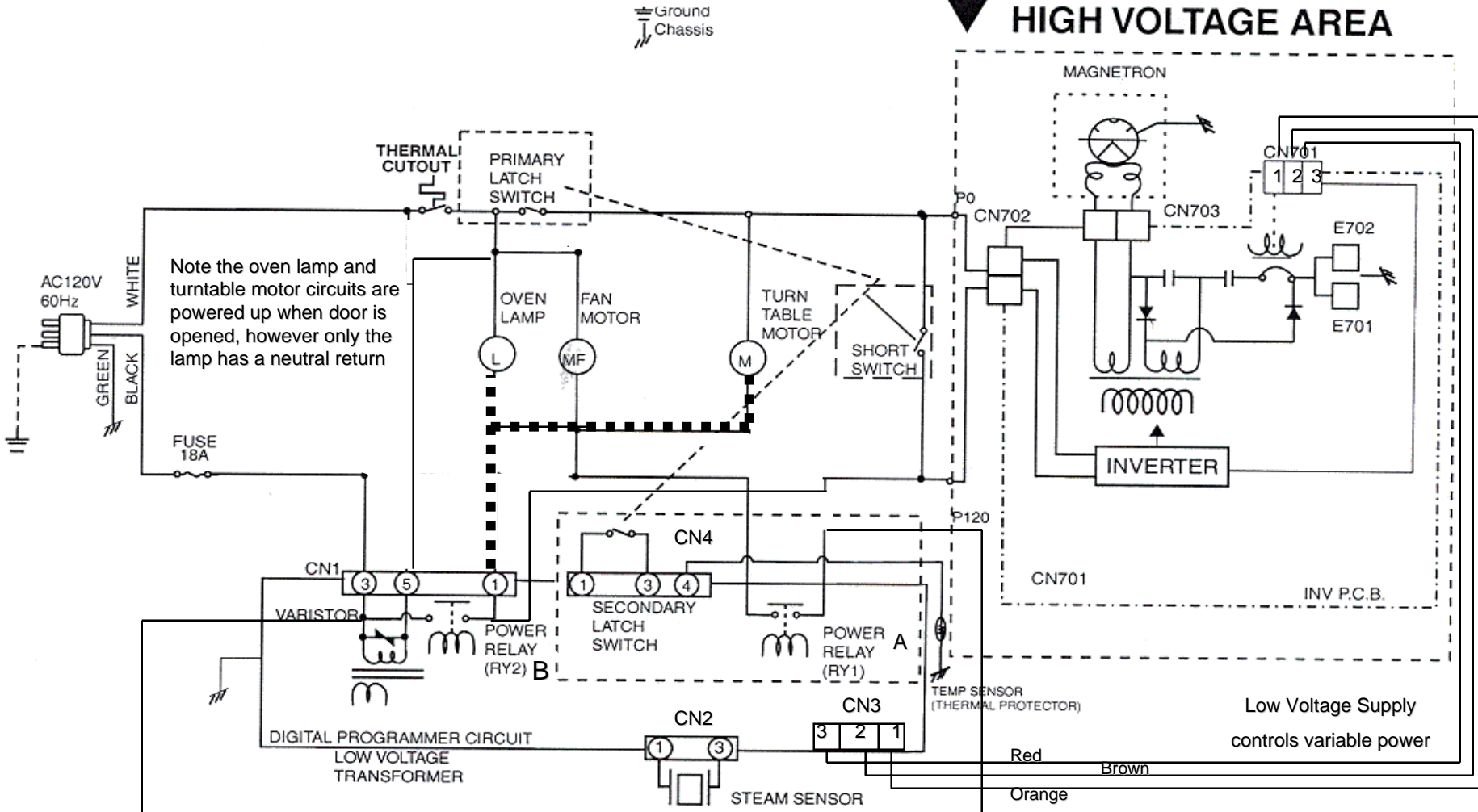
Defrosts by weight.

## Start Pad

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

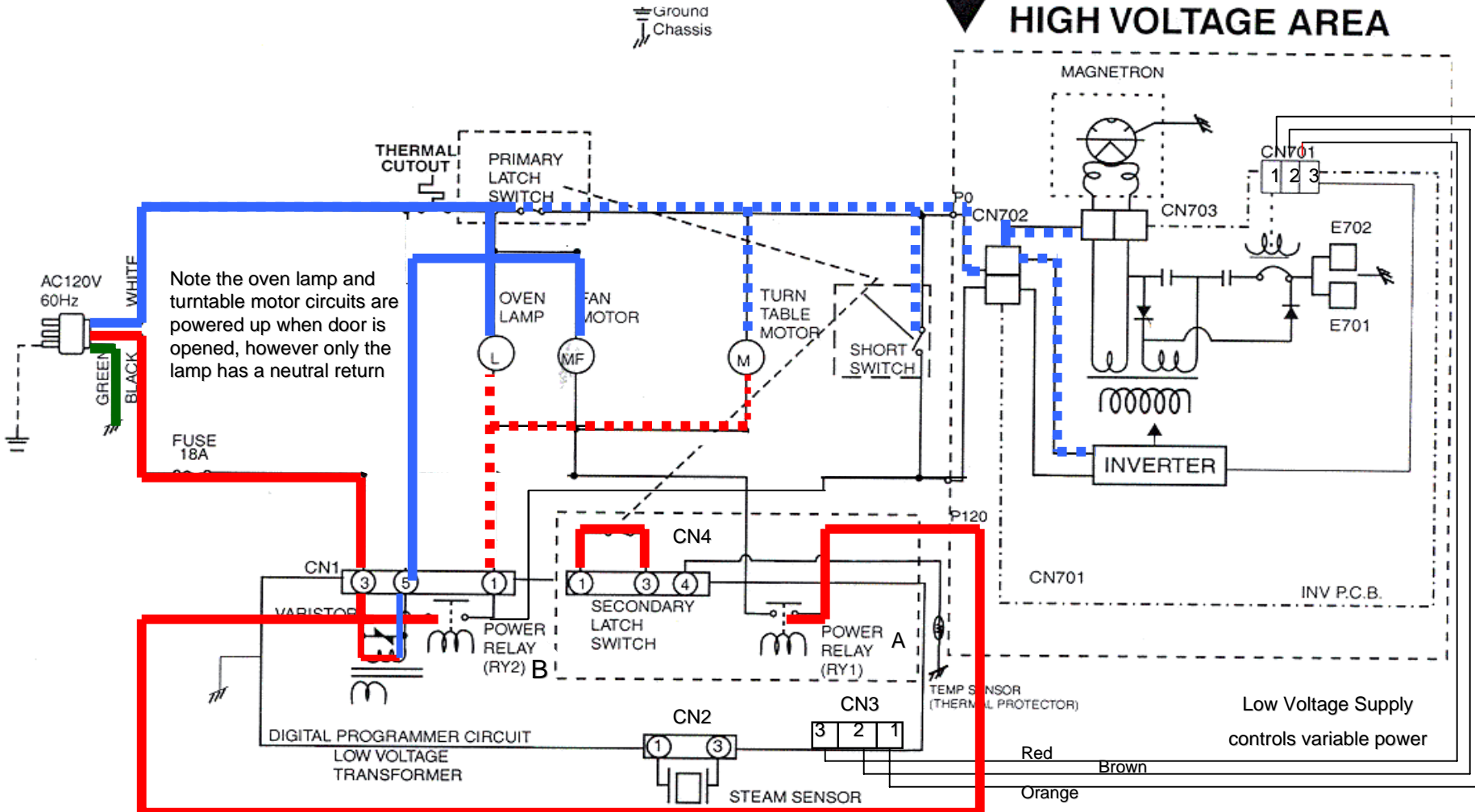
# SMW How the Oven works...Microwave section

Microwave door closed, short switch is open, primary and secondary latch switches are closed. Unit is not operating.



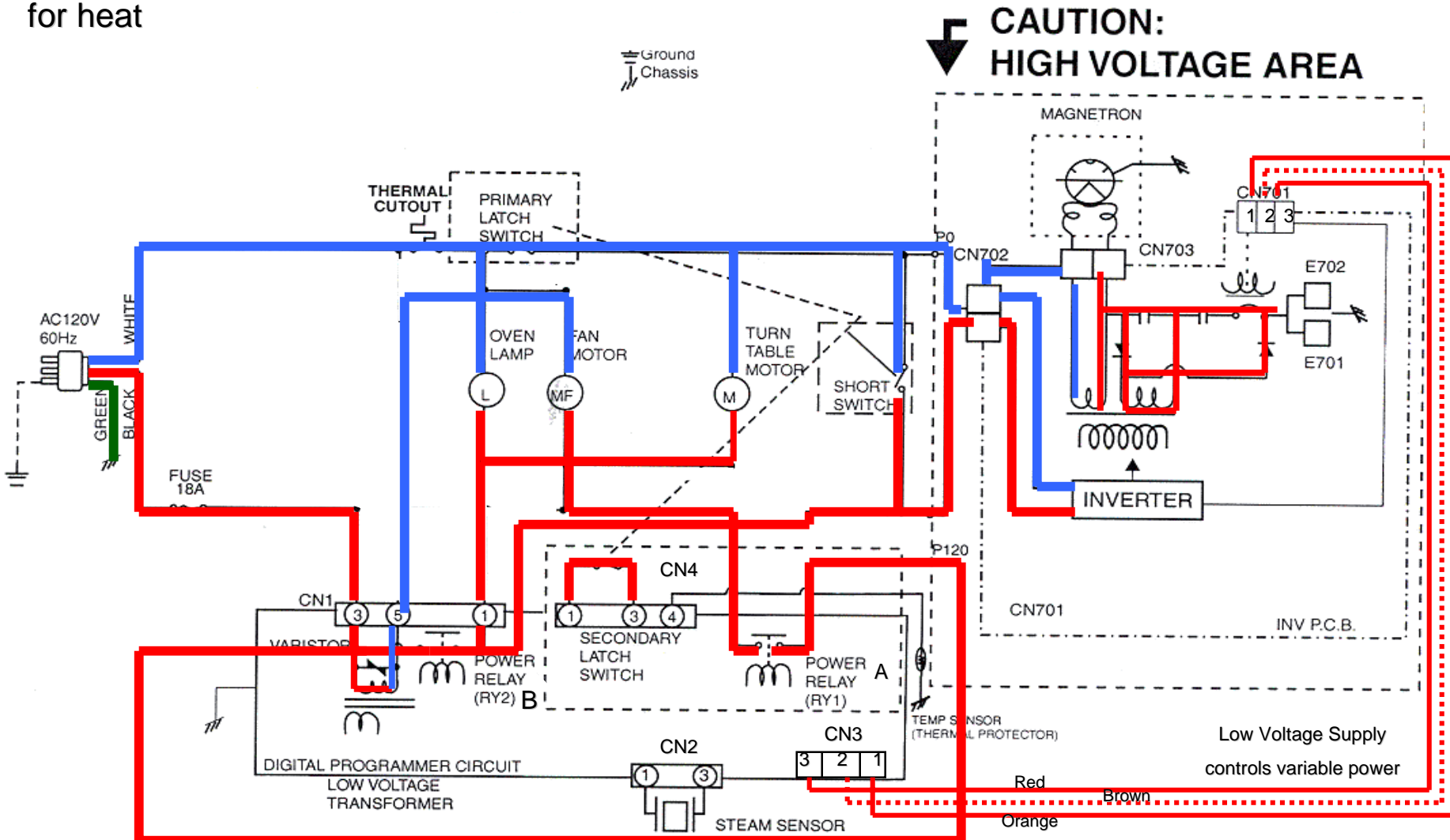
# SMW How the Oven works...Microwave section

Microwave door closed, short switch is open, primary and secondary latch switches are closed. Unit is not operating.



# SMW How the Oven works...Microwave section

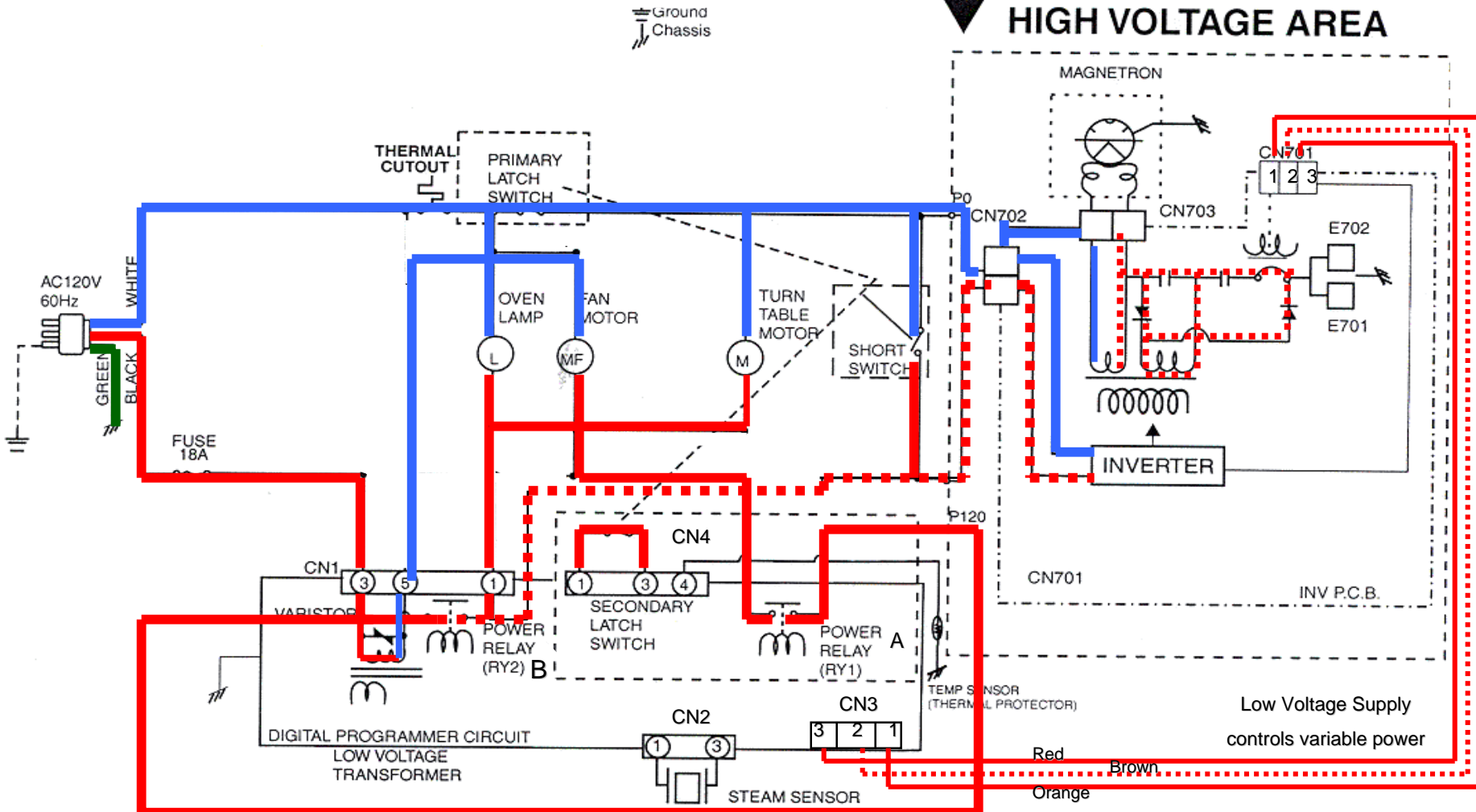
Microwave on high, power relay coil 'B' is energized constantly during each 22 second cycle while calling for heat





# SMW How the Oven works...Microwave section

Microwave on, 20% power level, relay coil 'B' is energized 15 seconds on and 7 seconds off out of each 22 second cycle while calling for heat



# Description of Operating Sequence

## 1. Variable power cooking control

The coil of power relay B (RY1) is energized intermittently by the digital programmer circuit, when the oven is set at any power selection except for High power position. The digital programmer circuit controls the ON-OFF time of power relay B contacts in order to vary the output power of the microwave oven from "Low" to "High" power. One complete ON and OFF cycle of power relay B is 22 seconds. The relation between indications on the control panel and the output of the microwave oven is as shown in table.

**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.**

## 2. Inverter Power Supply Circuit NEW H.V

This Inverter Power Supply Circuit supplies 4,000V DC to the magnetron tube from the line voltage, 120v 60Hz AC input. It functions as 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 will be 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 up to 2,000V AC and approximately 3V AC by means of transformer.
4. Then the half wave doubler voltage rectifier circuit, consisting of the HV 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. Then this signal will be fed back to the microcomputer in the DPC to determine operating conditions and output necessary to control PWM signal to the Inverter Power Supply to control output power.

## 3. Inverter Turbo Defrost

When this Auto Control feature is selected and the Start Pad is tapped:

- (A) 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.
- (B) When cooking time in the display window has elapsed, the oven turns off automatically by a control signal from the digital programmer circuit.

## Variable Power Cooking

| POWER SETTING   | OUTPUT POWER (%) APPROX. | ON-OFF TIME OF POWER RELAY B (RY1) |           |
|-----------------|--------------------------|------------------------------------|-----------|
|                 |                          | ON (SEC)                           | OFF (SEC) |
| HIGH P100       | 100%                     | 22                                 | 0         |
| P90             | 90%                      | 22                                 | 0         |
| P80             | 80%                      | 22                                 | 0         |
| MEDIUM-HIGH P70 | 70%                      | 22                                 | 0         |
| MEDIUM P60      | 60%                      | 22                                 | 0         |
| P50             | 50%                      | 22                                 | 0         |
| P40             | 40%                      | 22                                 | 0         |
| MEDIUM-LOW P30  | 30%                      | 22                                 | 0         |
| P20             | 20%                      | 15                                 | 7         |
| P10             | 10%                      | 8                                  | 14        |
| DEFROST P30     | 30%                      | 22                                 | 0         |

## Inverter Turbo Defrost

| SELECTED WEIGHT | COOKING TIME    |
|-----------------|-----------------|
|                 | 1.0 LB          |
| 6.0 LB          | 24 min. 58 sec. |

# Description of Operating Sequence...Sensor Cooking & Sensor Reheat

## 4. Sensor Cooking

Auto sensor cooking is a revolutionary way to cook by microwaves 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, and when calculating the T2 time by using the formula below make sure this 10 seconds is subtracted from the T1 time. In other words T1 time starts at the end of the 10 second period.
- 2) T1 time...The total amount of time it takes the microwave oven to switch to T2 time after the 10 second period.
- 3) T2 time...When the steam escapes from the cooking container placed in the oven, the steam sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.

Balance of cooking time (T2 time)

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

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

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

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

### Example of calculating the T2 time

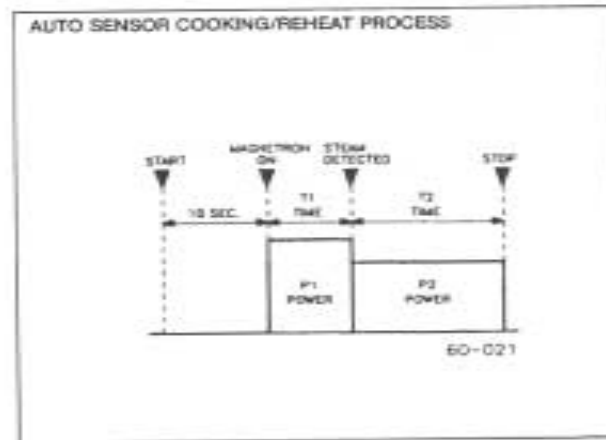
**Example 1:** If the T1 time is measured to be 2 minutes and 40 seconds after the 10 second period, and the Auto program selected is Frozen Vegetable:

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

## 5. Sensor Reheat

Auto Sensor Reheat is a quick and easy way to reheat refrigerator and room temperature foods. Simply press the reheat pad. There is no need to select power level and cooking time.

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



### Sensor Cooking

| Category          | P1 Power | P2 Power | K Factor Standard |
|-------------------|----------|----------|-------------------|
| Frozen Vegetables | HIGH     | HIGH     | 0.1               |

### Sensor Reheat (All Sensor Models)

| Category      | P1 Power | P2 Power | K Factor Standard |
|---------------|----------|----------|-------------------|
| Sensor Reheat | HIGH     | M. HIGH  | 0.1               |



# Microwave Section....Component Test Procedures

## CAUTION NEW H.V.

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

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

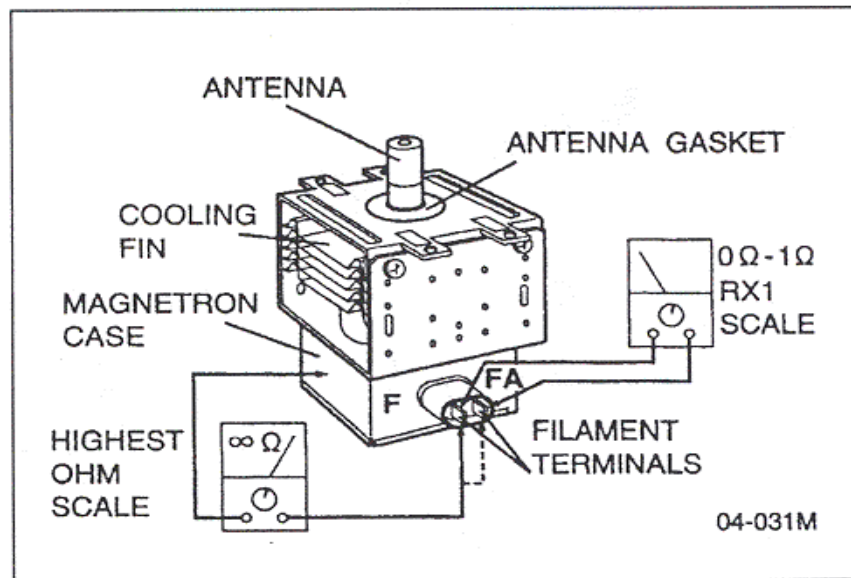
- (A) Unplug the lead connectors to Power Relay B and verify continuity of the power relay B 1-2 terminals.
- (B) Unplug lead connectors to Primary Latch Switch and Secondary Latch Switch.
- (C) Test the continuity of switches at door opened and closed positions with ohm meter (low scale).  
Normal continuity readings should be as follows.

|                        | Door Opened            | Door Closed            |
|------------------------|------------------------|------------------------|
| Primary Latch Switch   | $\infty \Omega$ (open) | 0 $\Omega$ (close)     |
| Secondary Latch Switch | $\infty \Omega$ (open) | 0 $\Omega$ (close)     |
| Power Relay B          | $\infty \Omega$ (open) | $\infty \Omega$ (open) |

### 2. Short Switch & Monitor

- (A) Unplug lead wires from H.V. Inverter primary terminals.
- (B) Connect test probes of ohm meter to the disconnected leads which were connected to H.V. Transformer.
- (C) Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.  
Normal continuity readings should be as follows.

| Door Opened | Door Closed     |
|-------------|-----------------|
| 0 $\Omega$  | $\infty \Omega$ |



### 3. Magnetron

- Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.
- (A) Isolate magnetron from the circuit by disconnecting the leads.
  - (B) A continuity check across magnetron filament terminals should indicate one ohm or less.
  - (C) A continuity check between each filament terminal and magnetron case should read open.

### 4. Membrane key board (Membrane switch assembly)

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

### 5. Inverter Power Supply (U)

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

## CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

### CAUTION

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

#### 1. Check the grounding

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

#### 2. Inverter Warnings **NEW H.V.**

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

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

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

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

### WARNING OF INVERTER POWER SUPPLY (U) GROUNDING

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

### WARNING OF DISCHARGING HIGH VOLTAGE CAPACITORS

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

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

### WARNING

There is high-voltage present, with high-current capabilities in the circuits of the primary, and secondary windings, choke coil and heat sink of the inverter. It is extremely dangerous to work on or near these circuits with oven energized.

DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

### WARNING

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

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

4. When the 18 Amp fuse is blown due to the operation of short switch:

(A) This is mandatory. Refer to "Measurements and Adjustments" for these switches.

(B) When replacing the fuse, confirm that it has the appropriate rating for these models.

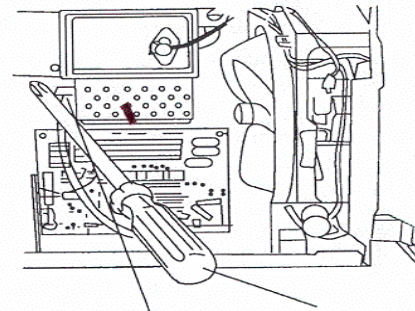
(C) When replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.

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

### WARNING

When the 18 Amp. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. Also replace power relay B (RY1) when the continuity check reads shorted contacts (1-2).

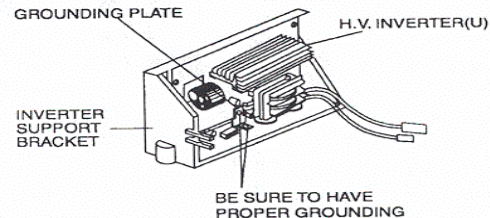
Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes or gaps, because such objects may work as an antenna and cause microwave leakage.



MAGNETRON  
FILAMENT TERMINAL

INSULATED HANDLE  
SCREWDRIVER

Touch chassis side first then short to the terminal of the magnetron filament terminal.



GROUNDING PLATE

H.V. INVERTER(U)

INVERTER  
SUPPORT  
BRACKET

BE SURE TO HAVE  
PROPER GROUNDING



# Troubleshooting Guide

|    | SYMPTOM  | CAUSE  | CORRECTIONS   |
|----|--|--|---|
| 1. | Oven is dead.<br>Fuse is OK.<br>No display and no operation at all.  | <ol style="list-style-type: none"> <li>1. Open or loose lead wire harness.</li> <li>2. Open thermal cutout (Magnetron)</li> <li>3. Open low voltage transformer</li> <li>4. Defective DPC</li> </ol>   | Check fan motor when thermal cutout is defective.   |
| 2. | No display and no operation at all.<br>Fuse is blown.  | <ol style="list-style-type: none"> <li>1. Shorted lead wire harness</li> <li>2. Defective primary latch switch (NOTE 1)</li> <li>3. Defective short switch (NOTE 1)</li> <li>4. Defective Inverter power supply (U) <b>NEW H.V.</b><br/>Refer to component test procedure (Page 19).</li> </ol> <p>NOTE 1: All of these switches must be replaced at the same time.<br/>(Refer to adjustment instructions.)<br/>Check continuity of power relay B's contacts (between 1 and 2) and if it has continuity, replace power relay B also.</p>   | Check adjustment of primary, secondary latch switch and short switch including door.  |
| 3. | Oven does not accept key input (Program).  | <ol style="list-style-type: none"> <li>1. Key input is not in sequence</li> <li>2. Open or loose connection of membrane key pad to DPC (Flat cable)</li> <li>3. Shorted or open membrane key board</li> <li>4. Defective DPC</li> </ol>  | <p>Refer to operation procedure.</p> <p>Refer to DPC troubleshooting.</p>   |
| 4. | Oven lamp and fan motor turn on when oven is plugged in with door closed.  | <ol style="list-style-type: none"> <li>1. Misadjustment or loose wiring of secondary latch switch</li> <li>2. Defective secondary latch switch</li> </ol>  | Adjust door and latch switches.   |
| 5. | Timer starts countdown but no microwave oscillation.<br>(No heat while oven lamp and fan motor turn on)  | <ol style="list-style-type: none"> <li>1. Off-alignment of latch switches</li> <li>2. Open or loose connection of high voltage circuit especially magnetron filament circuit<br/>NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to have lower output and/or have intermittent oscillation.</li> <li>3. Defective high voltage component<br/>H.V. Inverter <b>NEW H.V.</b><br/>Magnetron</li> <li>4. Open or loose wiring of power relay B</li> <li>5. Defective primary latch switch</li> <li>6. Defective power relay B or DPC</li> </ol> | <p>Adjust door and latch switches.</p> <p>Check high voltage component according to component test procedure (pg. 16) and replace if it is defective.</p> <p>Refer to DPC troubleshooting</p> |
| 6. | <ol style="list-style-type: none"> <li>1. Open or loose wiring of secondary latch switch</li> <li>2. Off-alignment of secondary latch switch</li> <li>3. Defective secondary latch switch</li> </ol> | Oven can program but timer does not start countdown.   | Adjust door and latch switches.   |

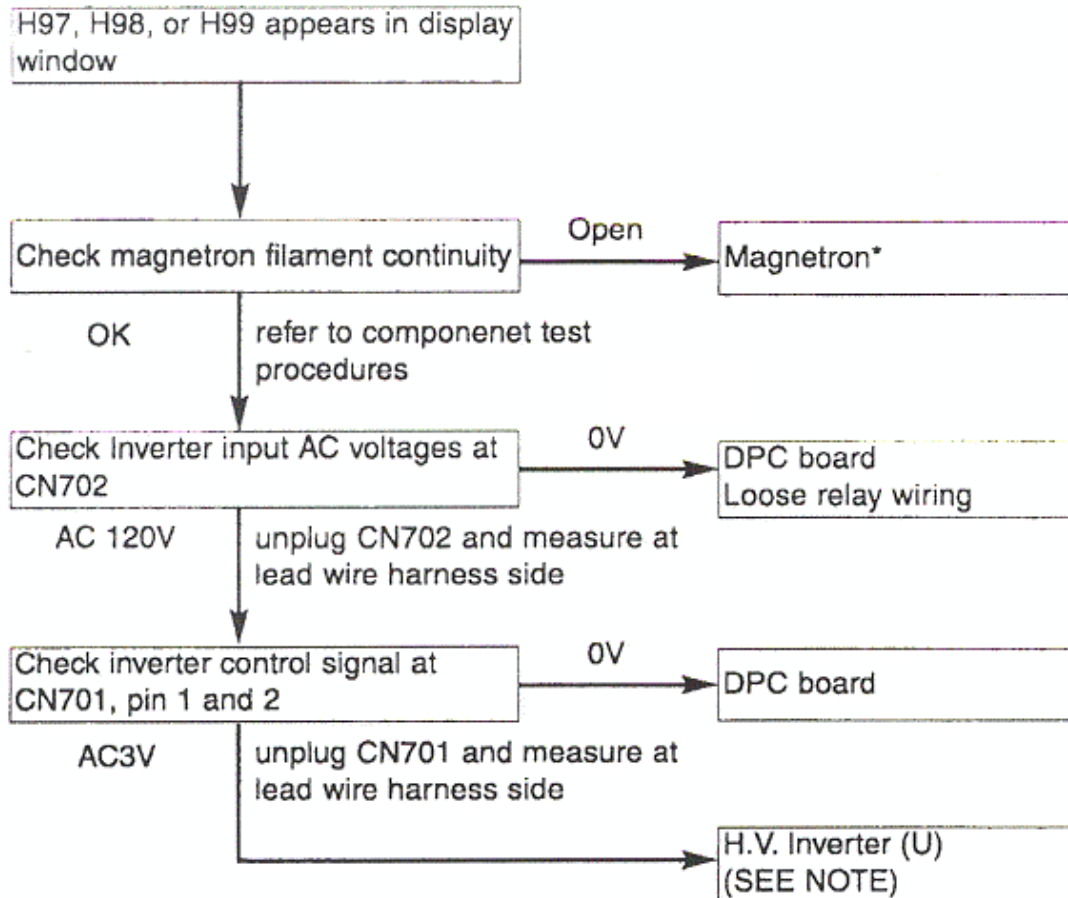
## Troubleshooting Guide.....continued

|     | SYMPTOM   | CAUSE  | CORRECTIONS  |
|-----|---|--|--|
| 7.  | Microwave output is low.<br>Oven takes longer time to cook food.                          | <ol style="list-style-type: none"> <li>1. Decrease in power source voltage</li> <li>2. Open or loose wiring of magnetron filament circuit. (Intermittent oscillation)</li> <li>3. Aging change of magnetron</li> </ol> | <p>Consult electrician</p> <p>Refer to output test procedures by water temperature raising test.</p> |
| 8.  | Fan motor and oven lamp turn on when door is opened.                                      | <ol style="list-style-type: none"> <li>1. Shorted primary latch switch</li> </ol>  |  |
| 9.  | Oven does not operate and return to plugged in mode as soon as start pad is pressed.      | <ol style="list-style-type: none"> <li>1. Defective DPC</li> </ol>   | <p>Check tighten screws on escutcheon base bracket, D.P.C. board.</p>                                |
| 10. | Loud buzzing noise can be heard.  | <ol style="list-style-type: none"> <li>1. Loose fan and fan motor</li> </ol>   |  |
| 11. | Turntable motor does not rotate.  | <ol style="list-style-type: none"> <li>1. Open or loose wiring of turntable motor</li> <li>2. Defective turntable motor</li> </ol>   |  |
| 12. | Oven stops operation during cooking.  | <ol style="list-style-type: none"> <li>1. Open or loose wiring of primary and secondary latch switch</li> <li>2. Operation of thermal cutout (Magnetron)</li> </ol>  | <p>Adjust door and latch switches.</p>   |
| 13. | Oven returns to plugged in mode after 10 seconds elapses on the Auto sensor cooking mode. | <ol style="list-style-type: none"> <li>1. Open or loose wiring of sensor terminal from DPC</li> <li>2. Open steam sensor</li> <li>3. Defective DPC</li> </ol>  |  |

# Microwave Section Troubleshooting HV Inverter

## Troubleshooting of Inverter Circuit (U) and Magnetron NEW H.V.

This oven is programmed with a self diagnostics failure code system which will help for troubleshooting. H97, H98, and H99 are the provided failure codes to indicate magnetron and inverter circuit problem areas. This section explains failure codes of H97, H98, and H99. First, you must program the DPC by pressing Clock, Timer, Start, Power Level. H97, H98, H99 appears in display window a short time after start key is pressed and there is no microwave oscillation.



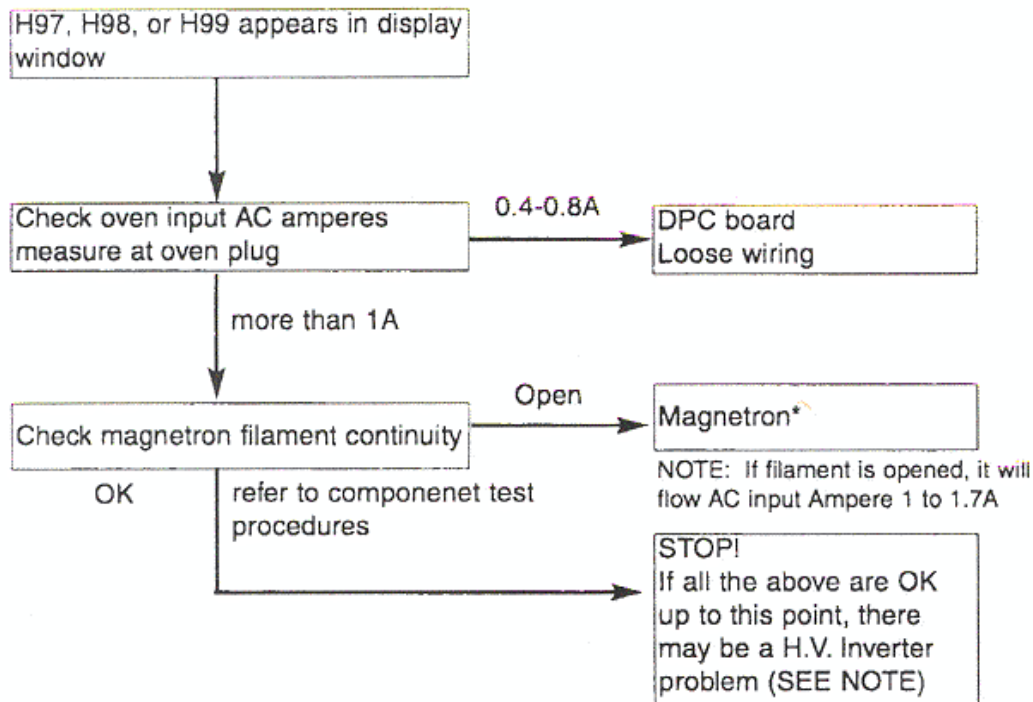
**NOTE:** DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET VOLUME on the board. It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very high voltage and very large current. Off alignment of inverter board operation 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 casing before proceeding to determine a good magnetron.

# Troubleshooting HV Inverter...continued

Alternate way to troubleshoot oven with AC Ampere meter used NEW H.V.

H97, H98, H99 appears in display window a short time after start key is pressed and no microwave oscillation with AC Ampere meter used for troubleshooting



**NOTE:** DO NOT try to repair this Inverter Power Supply (U) and also DO NOT RE-ADJUST PRESET VOLUME on the board. It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles 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 casing before proceeding to determine a good magnetron.



## Trouble Related to Digital Programmer Circuit

| SYMPTOM  | STEP | CHECK   | RESULT      | CAUSE/CORRECTIONS  |
|--|------|---|-------------|--|
| No display when oven is first plugged in.<br><br>Oven is dead. | 1    | Fuse pattern of DPC                             | Normal      | STEP 2   |
|  |      |   | Open (NOTE) | Shorted Circuit of ZNR, L.V.T., Oven Lamp etc. Replace DPC |
|  | 2    | Low voltage transformer (LVT) secondary voltage | Abnormal 0V | LVT  |
|  |      |   | Normal      | → Step 3   |
|  | 3    | IC-1 pin 15 voltage (Emitter of Q10)            | Abnormal    | ZD1, Q10   |
|  |      |   | Normal = 5V | → Step 4   |
|  | 4    | IC-1 pin 10 voltage (15 pin of IC-220)          | Abnormal    | IC-220   |
|  |      |   | Normal      | → IC-1, CX1  |

### NOTE

Procedure of fuse pattern repairing is as follows:

#### 1. When the fuse pattern (PF2) opens.

(1) Remove the jumper wire (PF1).

(2) Insert the removed jumper wire (PF1) to "(PF2)" position and solder it. If both "PF1" and "PF2" fuse patterns are open, please replace DPC.

#### 2. When the fuse pattern (PF4) opens.

(1) Remove the jumper wire (PF3).

(2) Insert the removed jumper wire (PF3) to "(PF4)" position and solder it. If both "PF3" and "PF4" fuse patterns are open, please replace DPC.

NOTE:\* At the time of these repairs, make visual inspection of the varistor for burning damage and examine the transformer with tester for the presence of layer short-circuit (check primary coil resistance).

If any abnormal condition is detected, replace the defective parts.

# Trouble Related to Digital Programmer Circuit....continued

| SYMPTOM  | STEP | CHECK   | RESULT                  | CAUSE/CORRECTIONS                     |
|--|------|---|-------------------------|---------------------------------------|
| No key input   | 1    | Membrane switch continuity  | Abnormal                | Membrane switch                       |
|  |      |   | Normal                  | IC-1                                  |
| No beep sound  | 1    | IC-1 pin 76 voltage   | Abnormal                | IC-1                                  |
|  |      |   | Normal                  | BZ,                                   |
| Power relay A(RY-2) does not turn on even though the program has been set and the start pad is tapped  | 1    | IC-1 pin 3 voltage while operation                                  | Abnormal                | IC-1,                                 |
|  |      |   | Normal = 5V             | → Step 2                              |
|  | 2    | Short circuit between pin 6 and pin 16 of IC-220                    | Still not turn on       | RY-2                                  |
|  |      |   | RY-2 turns on           | IC-220                                |
| No microwave oscillation at any power setting  | 1    | IC-1 pin 8 and pin 80 voltages while operation at high power        | Abnormal                | IC-1                                  |
|  |      |   | Normal 5---5V, 15---5V  | → Step 2                              |
|  | 2    | Q220 translator   | Abnormal                | Q220                                  |
|  |      |   | Normal                  | IC-2, RY-1                            |
| Dark or unclear display  | 1    | Replace display and check operation                                 | Normal                  | DISPLAY                               |
|  |      |   | Abnormal                | IC-1                                  |
| Missing or lighting of unnecessary segment   | 1    | Replace IC-1 and check operation                                    | Normal                  | IC-1                                  |
|  |      |   | Abnormal                | DISPLAY                               |
| H97/H98 appears in window and oven stops operation. Program High power for 1 minute and conduct following test quickly, unless H97/H98 appears and oven stops.<br><span style="border: 1px solid black; padding: 2px;">New H.V.</span> | 1    | Unplug CN702(2 pin) connector and measure voltage between terminals | 0V                      | 1. Latch switch<br>2. DPC/Power Relay |
|  |      |   | AC line voltage of 120V | → Step 2                              |
|  | 2    | Unplug CN701(3 pin) connector and measure pin 1 voltage             | 0V                      | DPC                                   |
|  |      |   | Approx. AV 3V           | Magnetron                             |

### TO BE CONTINUED FOR SENSOR MODELS

|  |   |   |                       |              |
|--|---|---|-----------------------|--------------|
| Auto sensor cooking does not operate normally.<br>(Steam Sensor cooking does not detect steam from foods.) | 1 | Steam sensor terminal voltage by using high impedance tester (20k $\Omega$ ), when breathe on metal surface of sensor | Abnormal = 0V         | Steam sensor |
|  |   |   | Normal $\geq$ 10-30mV | IC-1, IC-3   |

# PROCEDURE FOR MEASURING MICROWAVE ENERGY LEAKAGE

## WARNING

Check for radiation leakage after every servicing. Should the leakage be more than 2 mW/cm<sup>2</sup> (1mW/cm<sup>2</sup> for Canada) inform PASC, PSC, or PCI immediately. After repairing or replacing any radiation safety device, keep a written record for future reference, as required by D.H.H.S. and Health and Welfare Canada regulation. This required must be strictly observed. In addition, the leakage reading must be recorded on the service repair ticket while in the customer's home.

NOTE: The U.S. Government standard is 5 mW/cm<sup>2</sup> while in the customer's home. 2 mW/cm<sup>2</sup> stated here is our own voluntary standard. (1 mW/cm<sup>2</sup> for Canada)

## 1. Equipment

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

## 2. Procedure for measuring radiation leakage.

*Note before measuring.*

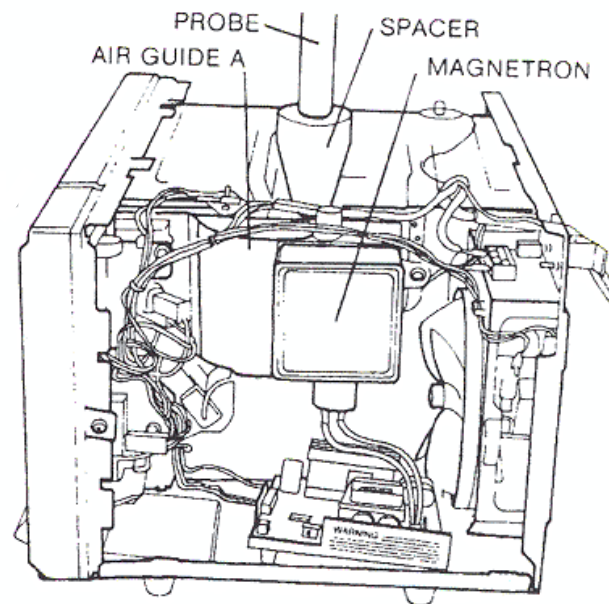
- (1) Do not exceed meter full scale deflection. Leakage monitor should initially be set to the highest scale.
- (2) To prevent false readings the test probe should be held by the grip portion of the handle only and moved along the shaded area shown in Figure no faster than 1 inch/sec (2.5 cm/sec).
- (3) Leakage with the outer panel removed ----- less than 5mW/cm<sup>2</sup>.
- (4) Leakage for a fully assembled oven with door normally closed----- less than 2mW/cm<sup>2</sup> (1mW/cm<sup>2</sup> for Canada).
- (5) Leakage for a fully assembled oven [Before the latch switch (primary) is interrupted] while pulling the door----- less than 2mW/cm<sup>2</sup>.

- (B) Should the radiation leakage be more than 2 mW/cm<sup>2</sup> (1mW/cm<sup>2</sup> for Canada) after determining that all parts are in good condition, functioning properly, and genuine replacement parts as listed in this manual have been used, immediately notify PASC, PSC or PCI.

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

## WARNING

AVOID CONTACTING ANY HIGH VOLTAGE PARTS.





# Microwave Leakage Test....continued

- (A) Pour  $275 \pm 15\text{cc}$  (9ozs  $\pm 1/2\text{oz}$ ) of  $20 \pm 5^\circ\text{C}$  ( $68 \pm 9^\circ\text{F}$ ) water in a beaker which is graduated to 600cc, and place in the center of the oven.
  - (B) Set the radiation monitor to 2450MHz and use it following the manufacturer's recommended test procedure to assure correct results.
  - (C) When measuring the leakage, always use the 2 inch (5cm) spacer supplied with the probe.
  - (D) Tap the start pad or set the timer and with the magnetron oscillating, measure the leakage by holding the probe perpendicular to the surface being measured.
- (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

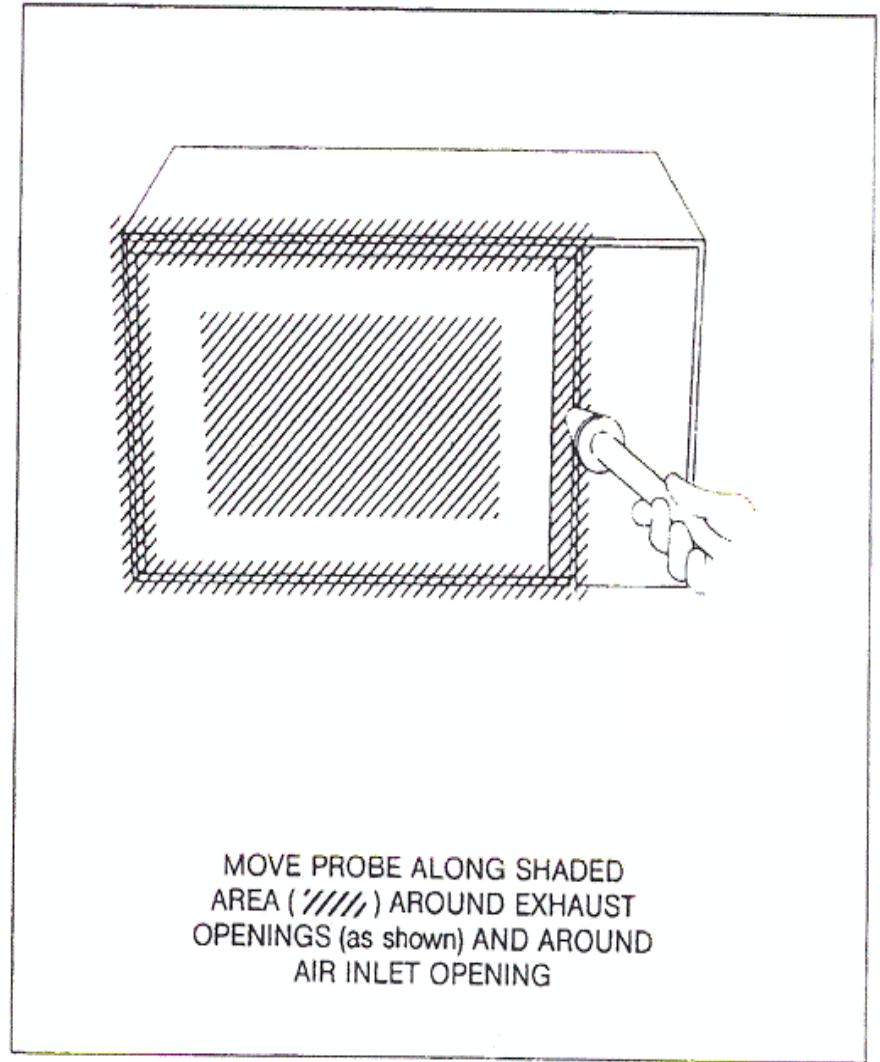
Avoid contacting any high voltage parts.

### **(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 and air inlet openings.

### **3. Record keeping and notification after measurement**

- (A) 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.



# Warming Drawer Section...Features & Benefits

- **On Indicator Light** can be viewed through drawer front
- **450 Watt Element**
- **On/Off Switch**
- **Thermostat** has low, medium & high settings. 140, 170, and 210 degrees F
- **Easy glide** drawer slides



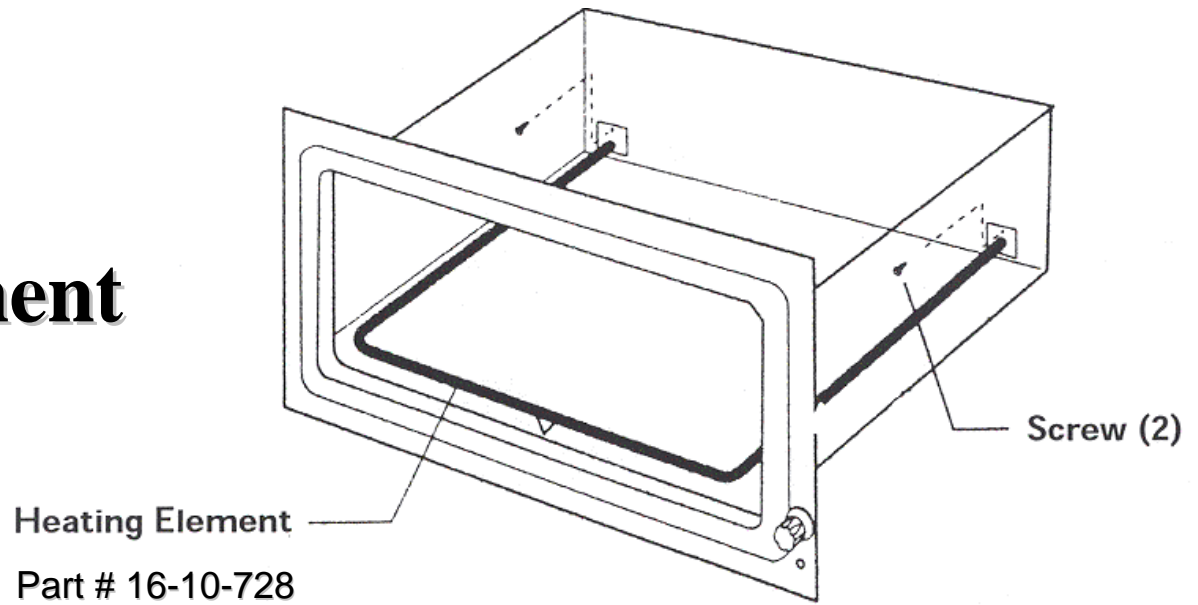


# Component Description & Access...Element & Slides



Slides are  
held in  
place with  
two screws

# Component Description & Access...Element & Slides



## 2. To replace heating element:

- Remove screws from element brackets in back of the liner.
- Disconnect the wires from the bake element.
- Connect wires to the new element.

## 3. To replace liner slides:

- Remove two screws holding slides in liner
- Reinstall new slides into liner with 2 screws.

# Component Description & Access...Thermostat & On light



Thermostat Control has three settings....

Low..140 degrees F

Medium...170 degrees F

High...210 degrees F

Indicator light remains illuminated the whole time the unit is turned on, it does not turn on and off with the cycles of the thermostat

# Component Description & Access...

## Thermostat Switch and on lamp



To access controls front frame of warming drawer has to be removed. Peel back drawer gasket and remove the 14 countersunk Phillips screws. Pull off thermostat knob and remove frame



# Component Description & Access...

Thermostat switch on lamp & gasket

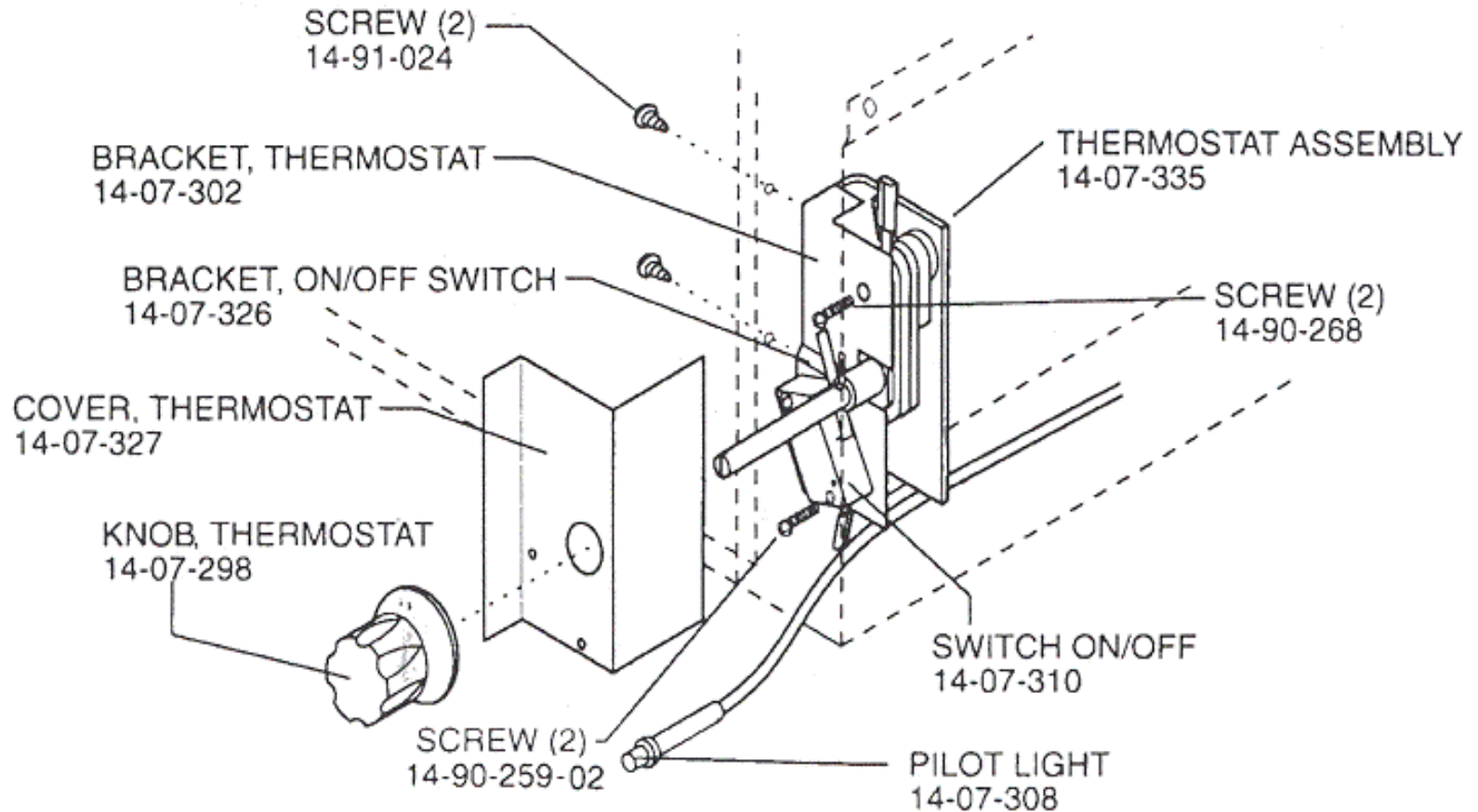


Thermostat, switch, and the 'on' indicator light can now be accessed from right side of unit. This procedure is also necessary to replace drawer gasket (part # 14-07-381)

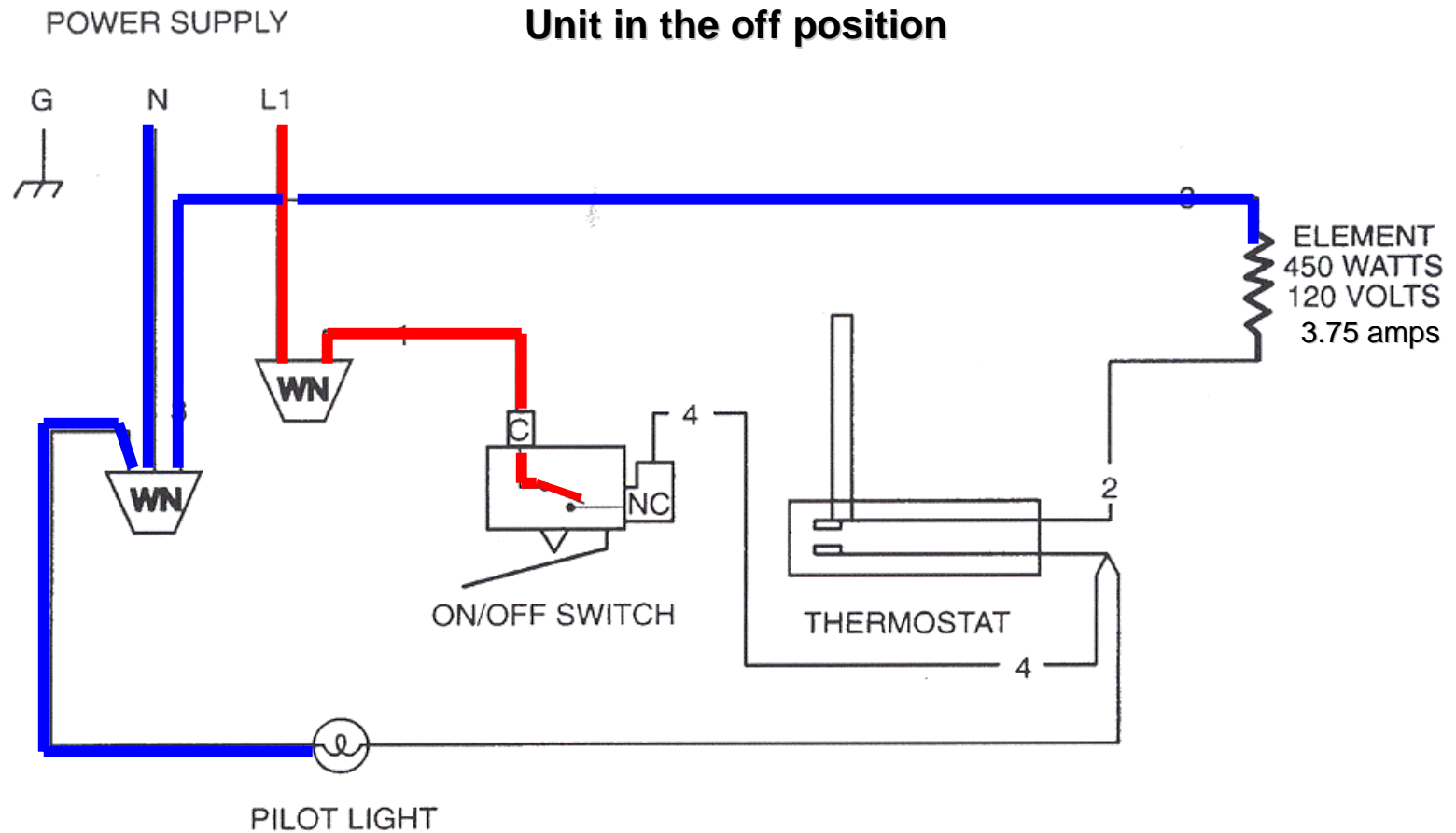


# Component Description & Access Switch & Thermostat

## Control Assembly



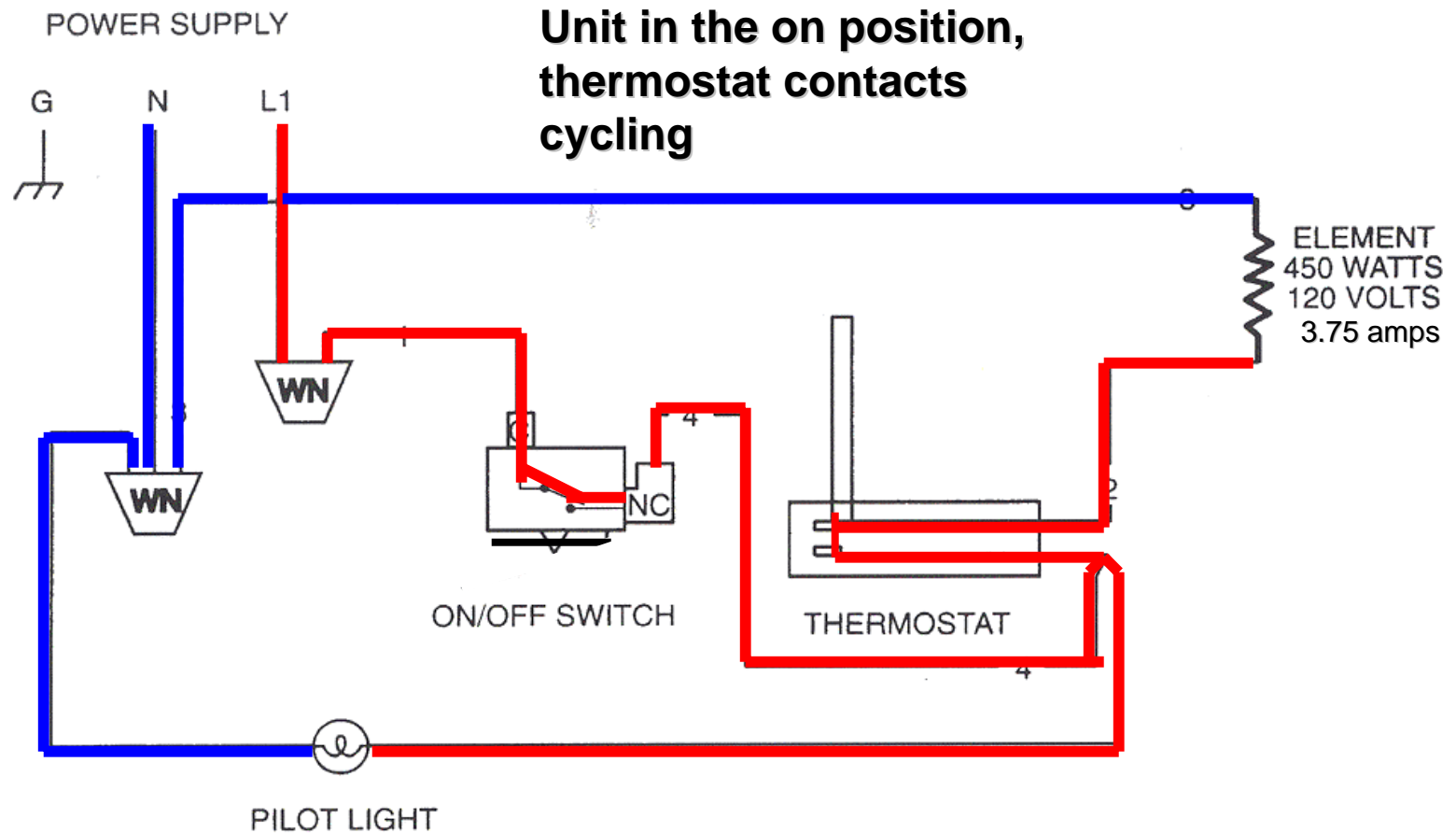
# How the Oven works...Warming Drawer



## Temperature Heat Settings

LOW (140°F) MED (170°F) HIGH (210°F)

# How the Oven works...Warming Drawer



## Temperature Heat Settings

LOW (140°F) MED (170°F) HIGH (210°F)

# Lower Oven Features

- “Field Sensor” touch control
- Digi-pad numeric control panel
- Centigrade or Fahrenheit temperature display
- A 12 or 24 hour clock
- Child lock-out feature
- Bread proofing and Dehydration modes
- Large viewing door window

# Features

- Third Element Convection
- Convection Roast mode
- Recessed 8 wrap broil element
- Internal ventilation system
- End of cycle chime
  - To restore: Touch Upper oven “OFF” pad for 10 seconds, until you hear the chime



# .....and Operation

- Window Display
- Cook Time
- Timer 1
- Clock
- Stop Time
- Timer 2
- Oven Light
- Number Pads
- Bake
- Broil
- Convection
- Off
- Self Clean
- Convection Roast

# .....and Operation **Test Mode**

- **Electronic oven control test mode**
- Power up unit
- Do the following within 5 minutes, before any other programming
- **Hold the STOP TIME pad key for 10 seconds**
- Unit will enter test mode
- Test the function key pads

# .....and Operation **Calibration**

## ➤ **Oven Temperature Calibration**

- Touch BAKE pad
- Set Temperature between 500 and 550
- Hold BAKE pad for 4 seconds
- 0 or last calibrated Temperature will display
- Touch BROIL pad to toggle between + and -
- From zero + or - 35 degrees calibration possible

# Component Description

- Lower Oven Relay Board
- Control Panel
- Display Head
- Sensor
- Halogen Light
- Halogen Light Transformer
- Cooling Fans

# Component Description & Access....Plenum Components



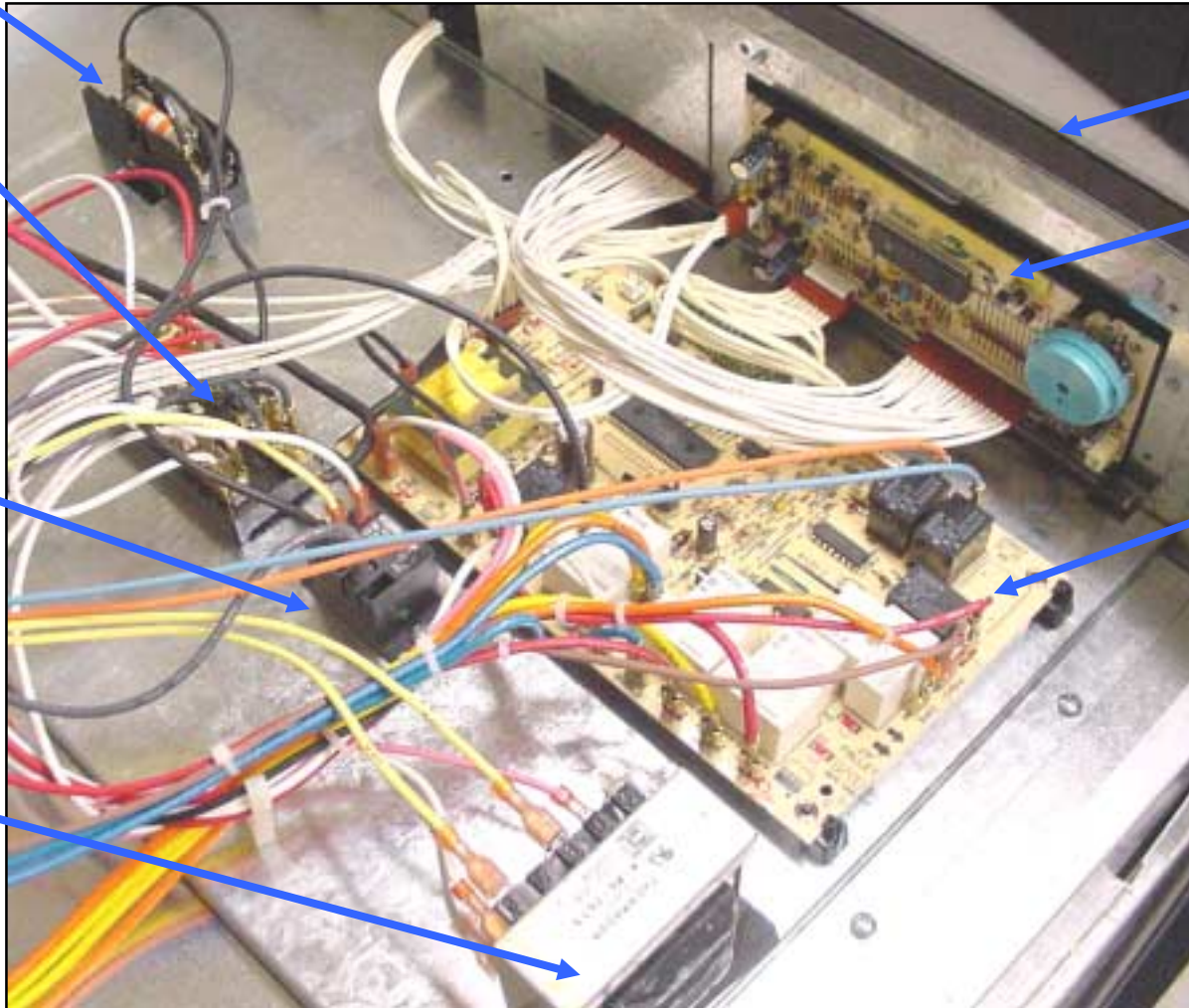
(part # 16-20-101)  
Time delay fuse  
rated at 20amp

Terminal Block

Stalled Fan Relay  
coil is energized  
by 120volts AC  
from air switch.  
Contacts transfer  
120VAC from HTC  
to DLB relay on  
board (K8)

(Part # 14-38-608)

Halogen Light  
Transformer.  
Primary  
Input 120VAC  
Secondary Output  
12VAC



Control Panel

Display Head  
(Clock)

Relay Board



# Component Description...Relay Board

(Part # 16-10-660)

J5 Pin Connector  
Transfers signal voltage through the latch switches

J10 Pin Connector  
Transfers signal voltage to sensor

J2 Pin Connector Transfers data between board, touch panel & display head

K6 Cooling Motor Relay

K7 Light Relay Powers Light Transformer

K9 Latch Motor Relay

K4 Convection Motor Relay

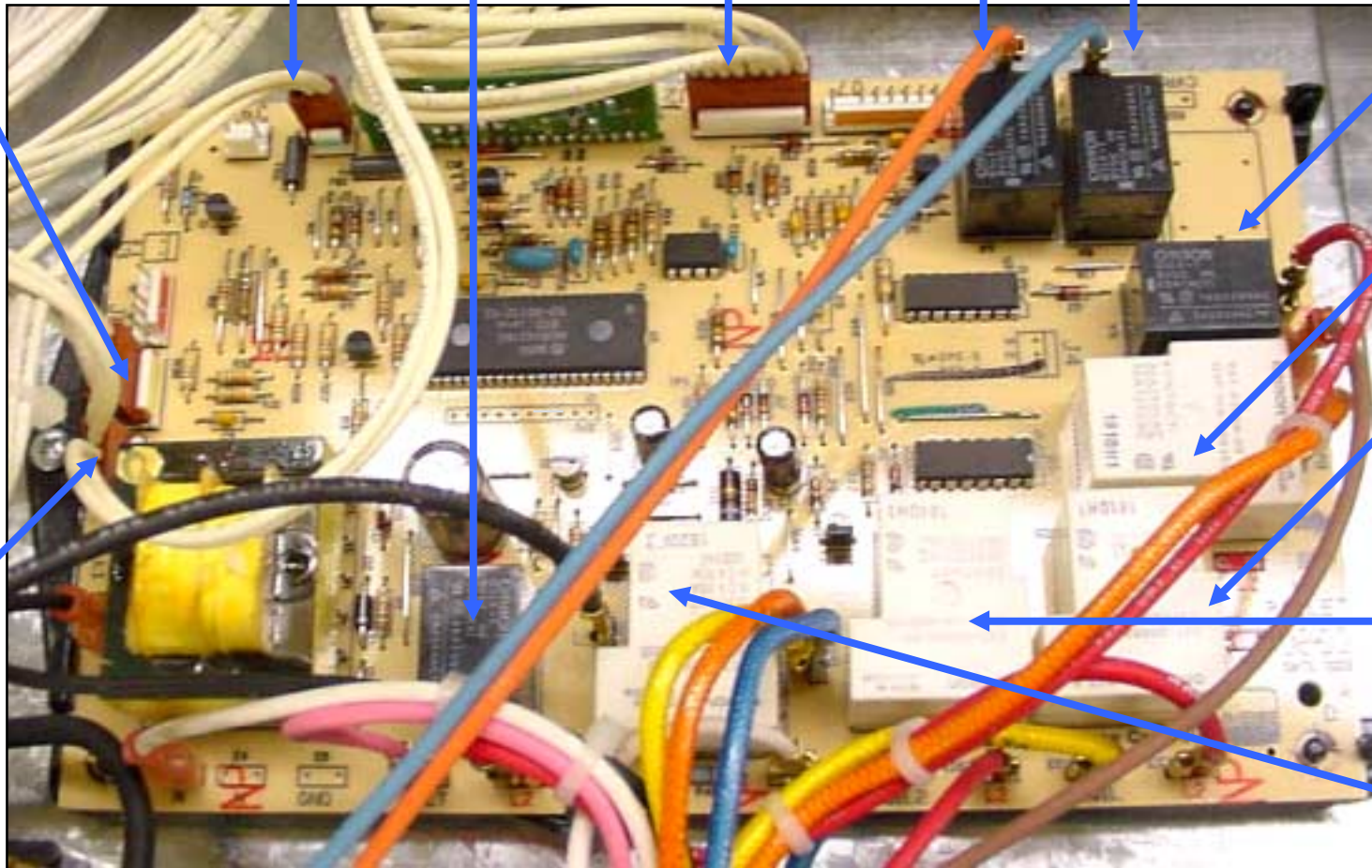
K1 Bake Element Relay

K2 Broil Element Relay

K3 Convection Element Relay

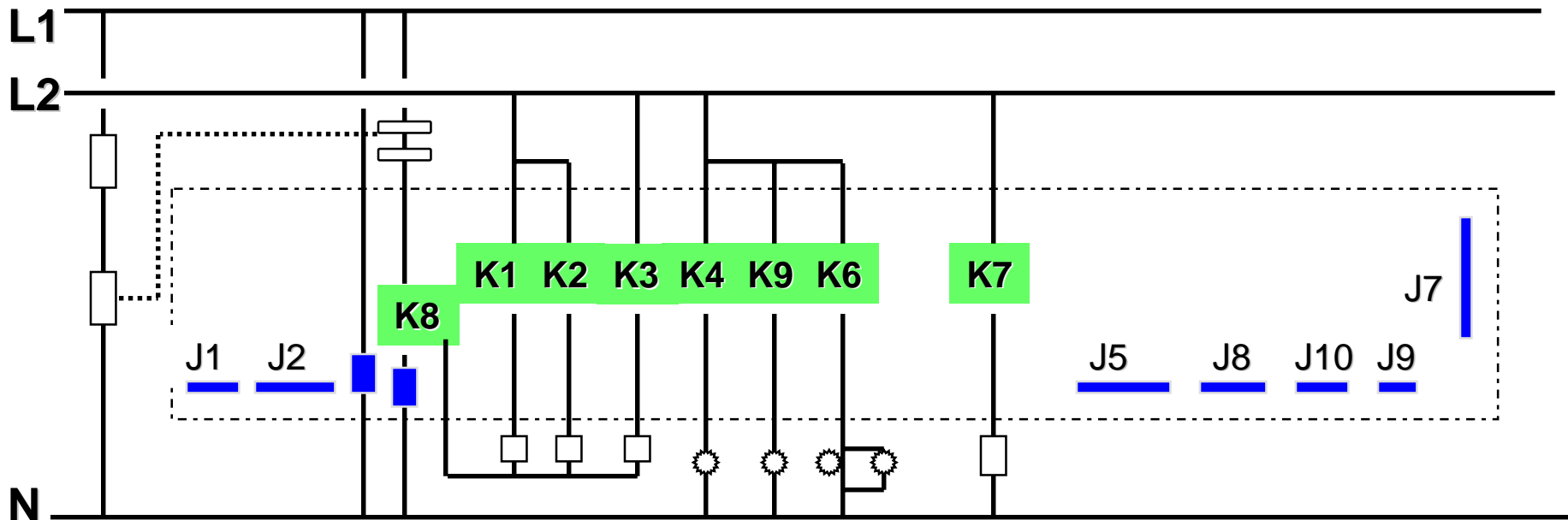
K8 Double Line Break Relay

J1 Pin Connector  
Power Supply from the board to the display head  
20VAC to illuminate it and 12VDC logic power



# Component Description

## Lower Oven Relay Board....Relays



K8...Line Break

K1...Bake Element

K2...Broil Element

K3...Convection Element

K4...Convection Motor

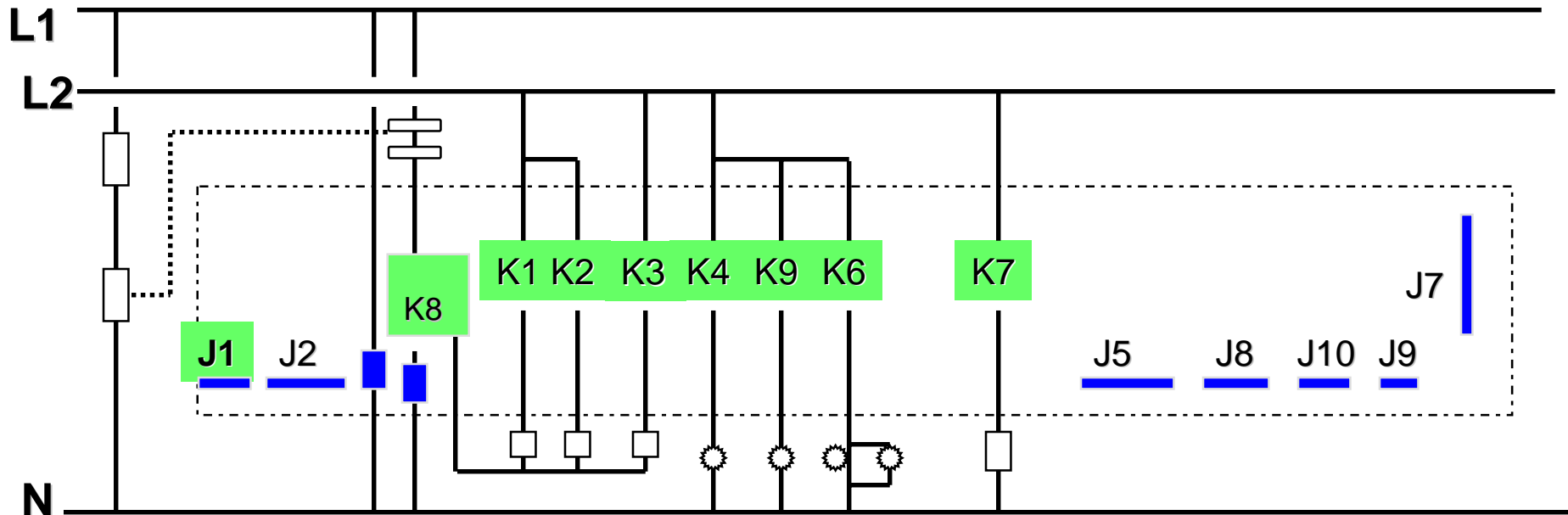
K9...Latch Motor

K6...Cooling Motor

K7...Light Transformer

# Component Description

## Lower Oven Relay Board...Pin connectors



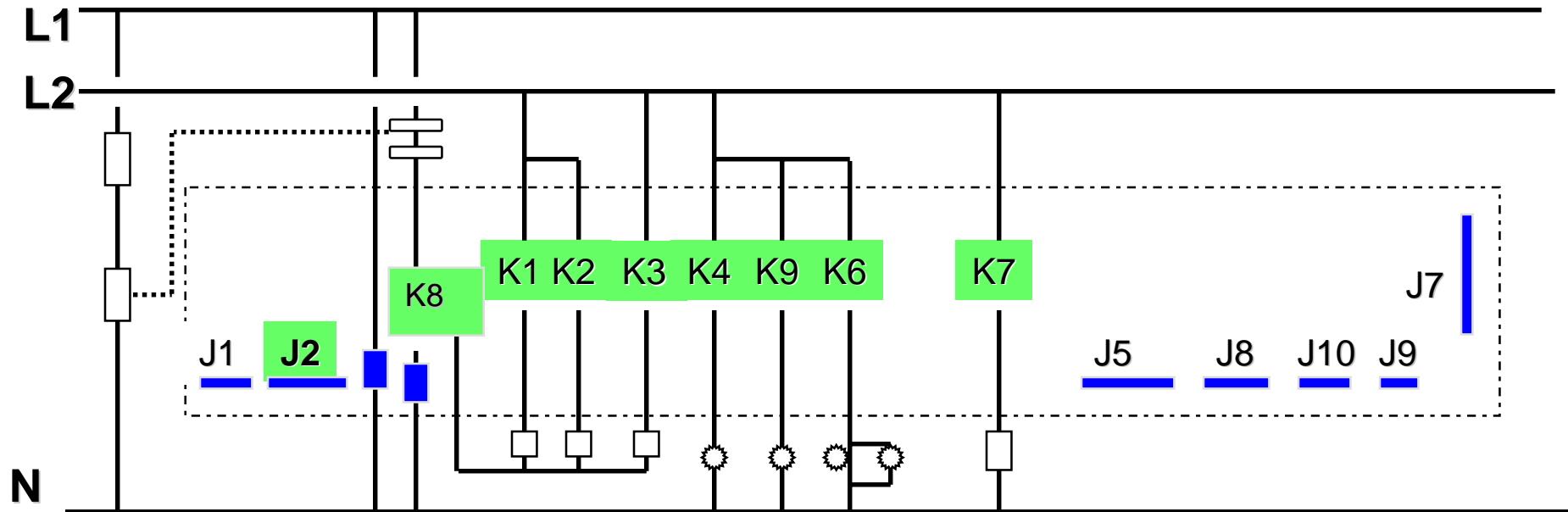
J1 is the power supply from the main relay board

**20 VAC** to the display head to light it up (**contacts 3-4**)

**12 VDC** for logic power from relay board (**contacts 1-2**) into touch control (**contacts 3-4**) & then out from touch control (**contacts 1-2**) to the display head (**contacts 1-2**)

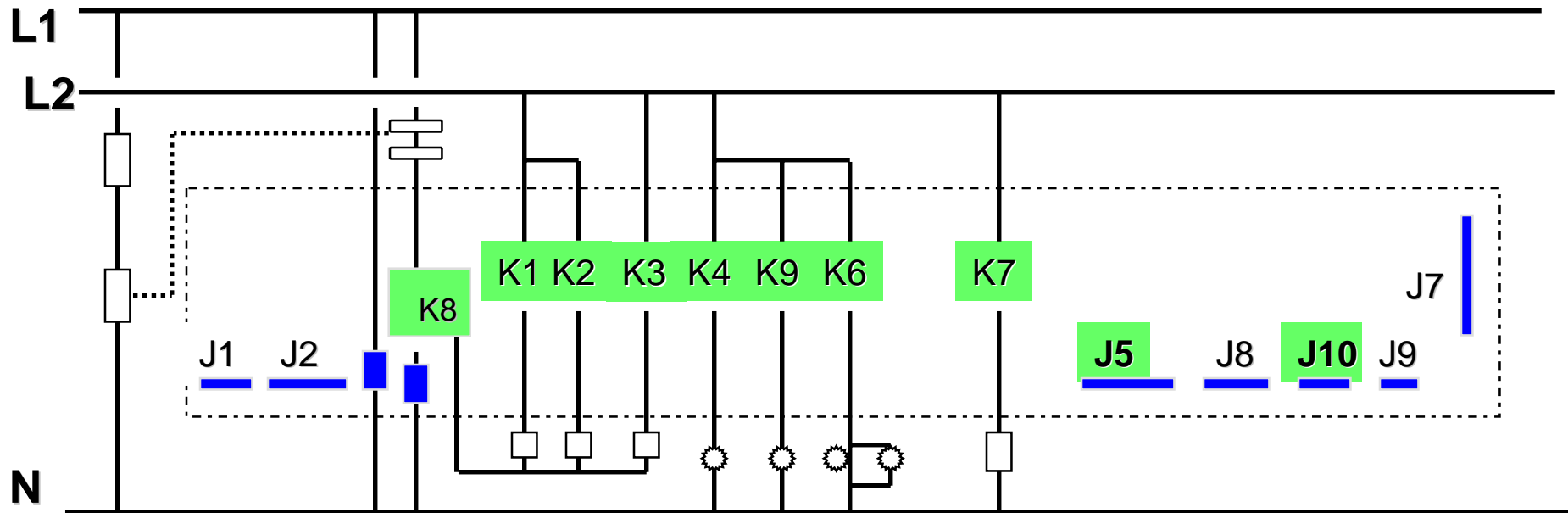
# Component Description

## Lower Oven Relay Board...Pin connectors



J2...transfers data between relay board, touch control & display head

# Component Description...Lower Oven Relay Board...Pin connectors



J5 ... Transfers signal voltage through the latch switches

J10 ... Transfers signal voltage to sensor

**Note** Since this is a single S oven pin connectors J7, J8 and J9 are not used



# Component Description

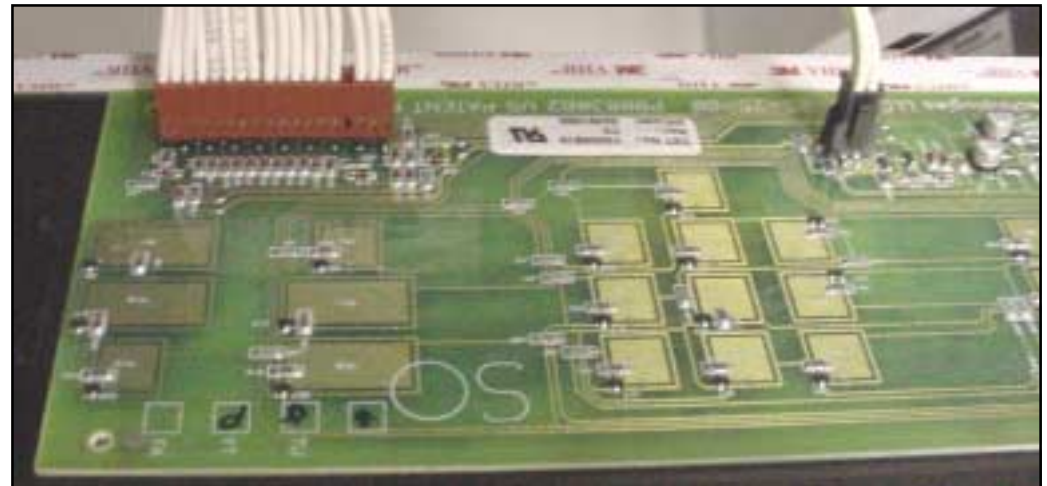
## Touch Control Panel

- ▶ Contains 22 touch control pads →
- ▶ Touching the glass disturbs the electromagnetic field
- ▶ Touching the glass programs the oven



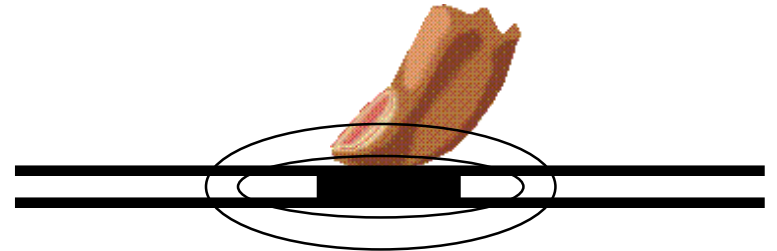
17 Pin Connector to the Display Head

Four pin plug contacts 1-2 & 3-4 read 12 VDC

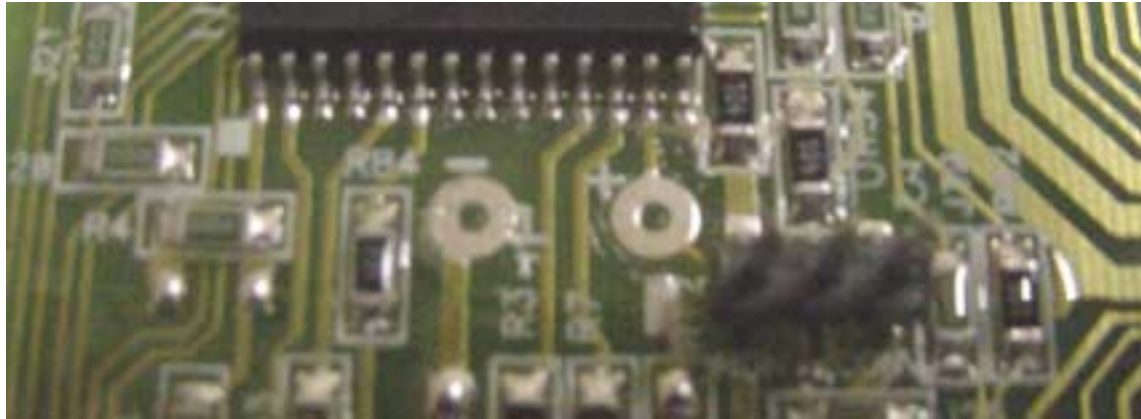


# Touch Control Panel

- Electromagnetic field effect
- NOT membrane
- NOT capacitive
- 22 control pads
- Programmable



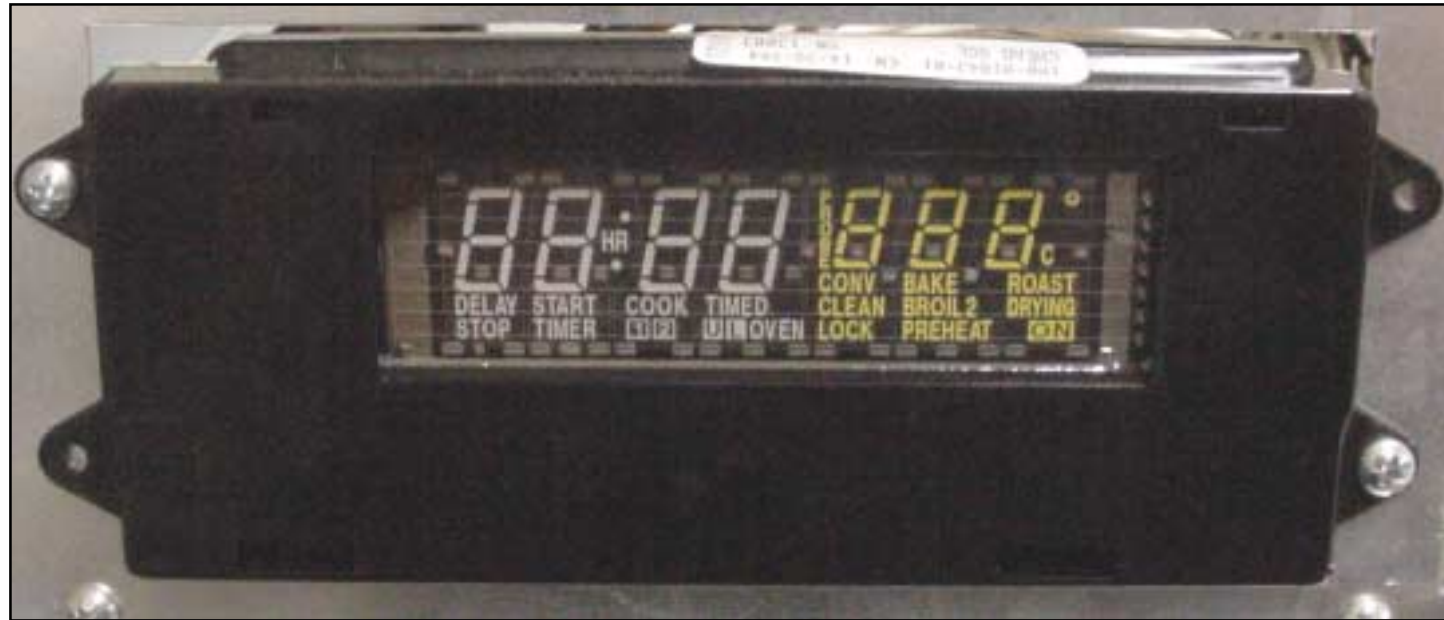
# Testing the touch control panel



- **Test points on touch control panel**
  - **One point is marked with a minus**
  - **Other point is marked with a plus**
  - **Remove conforming coating on surface of pads**
- **Test for voltage between points**
  - **0VDC when pad not being touched**
  - **5VDC when pad is being touched**

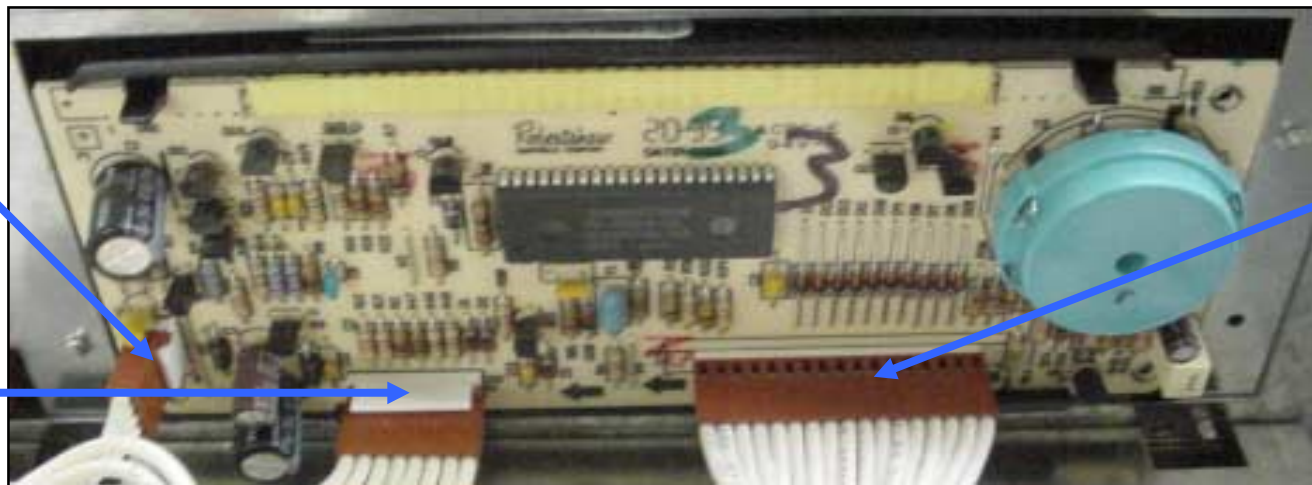
# Component Description...Display Head

Displays  
the  
program  
function  
selected



4 Pin plug is  
the 12 VDC &  
20 VAC  
power supply

8 Pin plug  
data transfer  
between  
Display  
Head &  
Relay Board

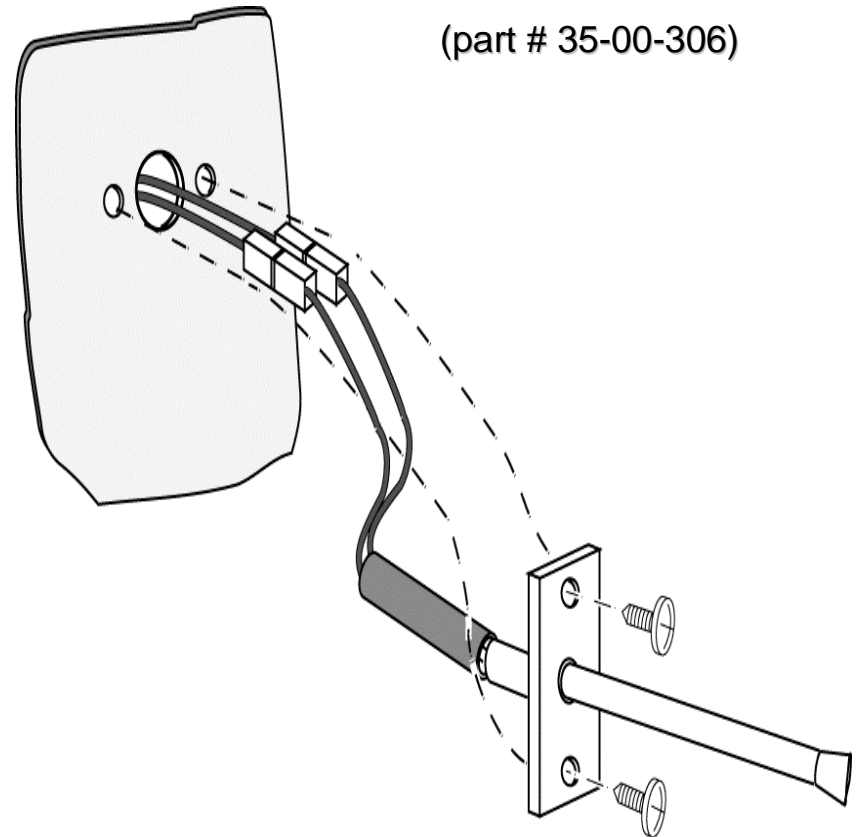


17 Pin  
Connector  
to the  
Touch  
Control  
Panel

# Component Description

## Sensor

- ▶ 1050 OHMS at room temperature
- ▶ Ohm out leads at relay board
- ▶ F3 = open sensor circuit
- ▶ F4 = short in sensor circuit

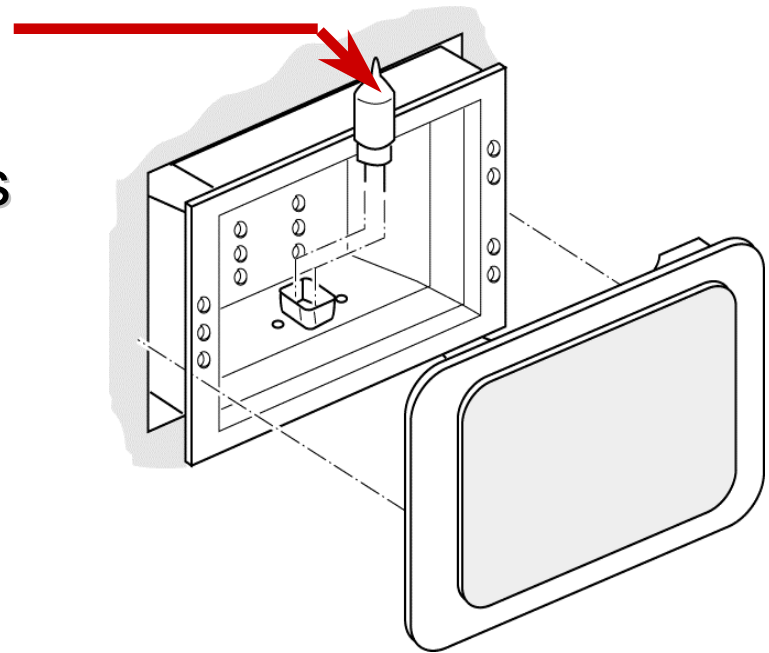




# Component Description

## Halogen Lights

- ▶ Activated by 12VAC from transformer
- ▶ Comes on when light pad is selected
- ▶ Comes on when door is opened
- ▶ Don't touch bulb with fingers use a tissue as grease from fingers can shorten the life of the bulb



**10 Watt bulb**

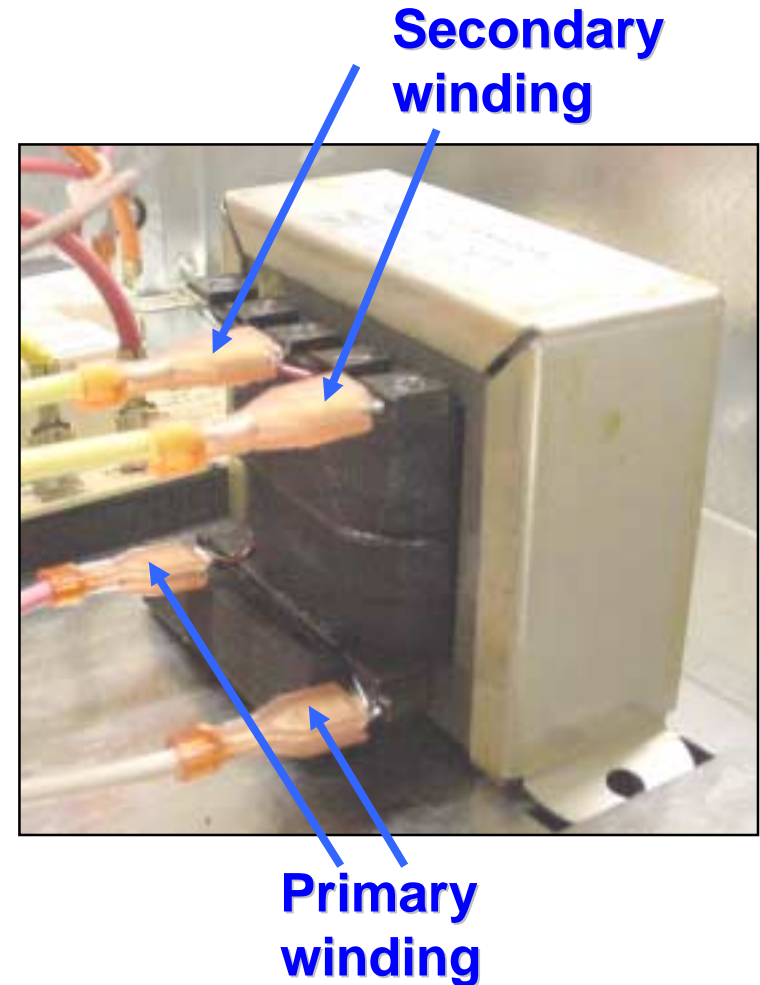
(part # 14-38-551)

# Component Description

## Halogen Light Transformer

- ▶ Step down Transformer
- ▶ 120VAC to 12VAC
- ▶ Activated by relay K7 on main relay board
- ▶ Supplies voltage for halogen lights

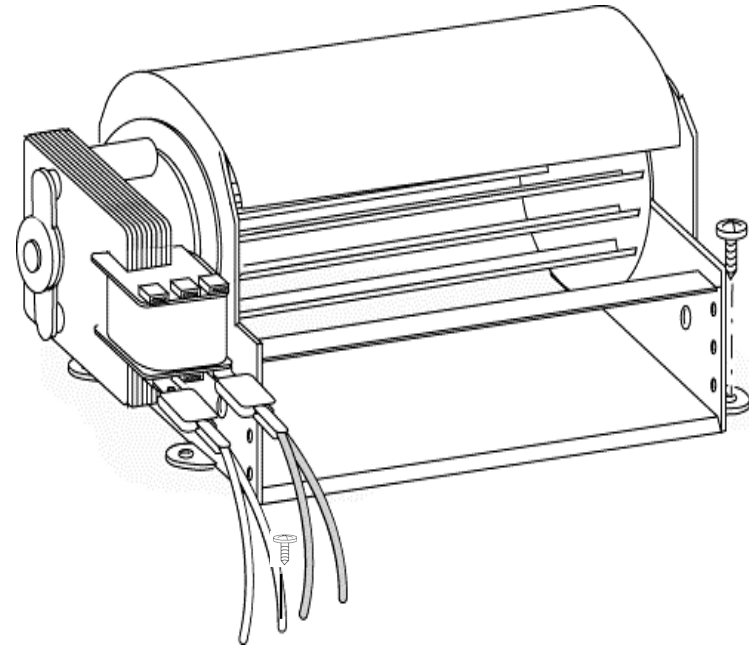
(part # 14-38-517)



# Component Description

## Cooling Fan

- **Is energized by K6 relay** when ever a cooking mode or self-clean is selected. Continues to run after oven is turned off until cavity temperature drops below 200 degrees F for a cooking mode & 538 degrees F for self-clean mode. This auto-run feature is controlled by the sensor
- **Oven Blower...is 80 CFM at outlet** (part # 14-38-515)



# Air flow pattern

- Natural air enters oven frame at vent holes on both sides as well as through front grills on oven frame
- Action of blower
  - Moves air across halogen light housings
  - Pulls air up through doors into plenum area
- Air exits out rear of oven into channel
- Air exhausted out front at bottom of oven on left side

# Lower Oven...any questions at this point?

- Oven Relay Board
  - Control Panel
- Display Head
- Sensor
- Halogen Light
- Halogen Light Transformer
- Cooling Fans



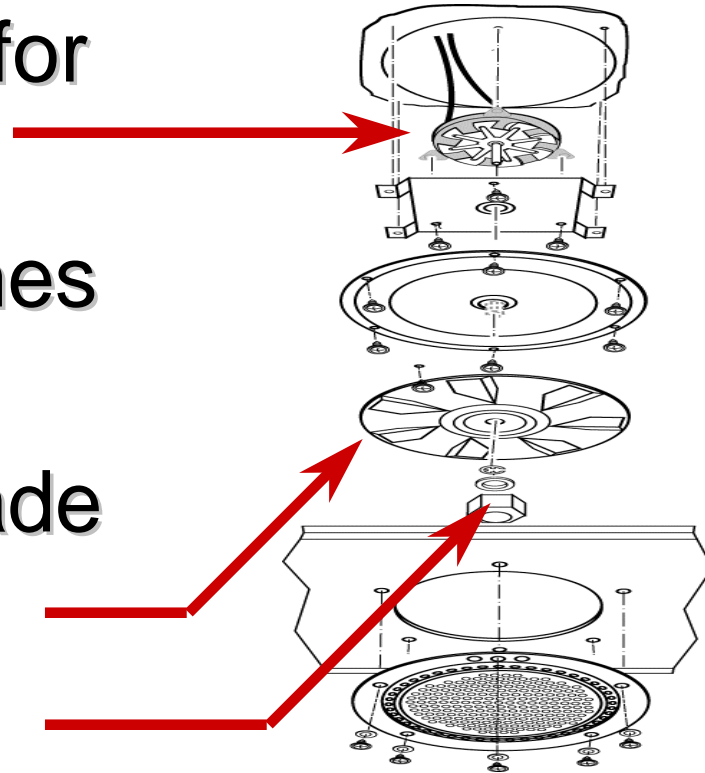
# Component Description

- Convection motor
- Bake element
- Broil element
- Convection element
- Door Latch Assembly
- High temp cutout
- Door switch
- Air switch

# Component Description

## Convection Fan Assembly

- Cooling fan blade for cooling the motor
- Cooling blade comes with motor
- Convection fan blade (turns CW)
- LH thread on nut

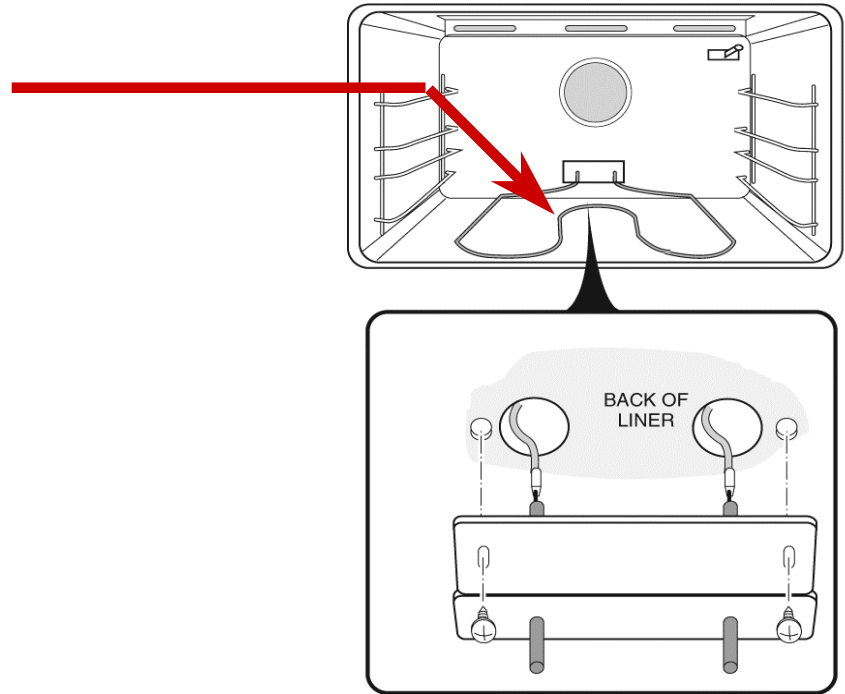


# Component Description

## Bake Element

- ▶ Bake element is rated at 2600W

(Part # 14-38-444)

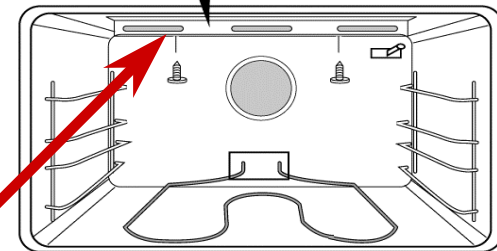
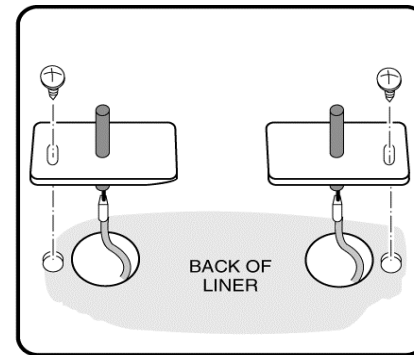


# Component Description

## Broil Element

- Rated at 3600 W
- Heats the oven to 840 degrees in clean cycle

(part # 14-38-442)

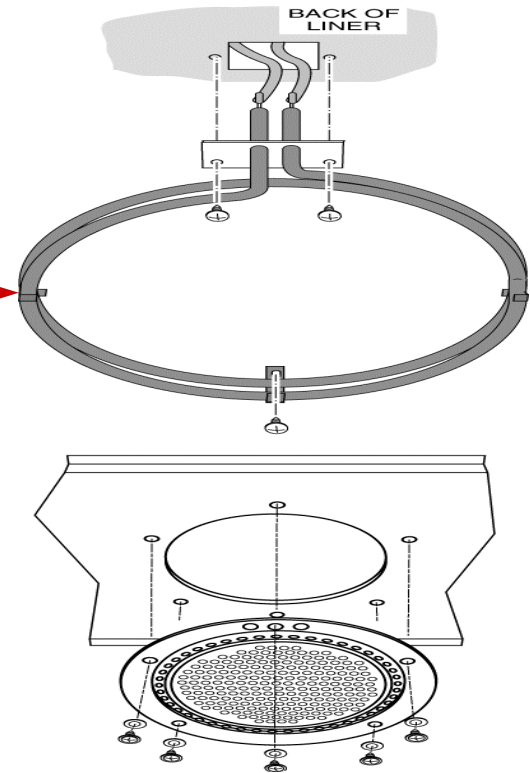


# Component Description

## Convection Element

- Rated at 2750 W
- Located on rear wall of oven

(part # 14-38-445)

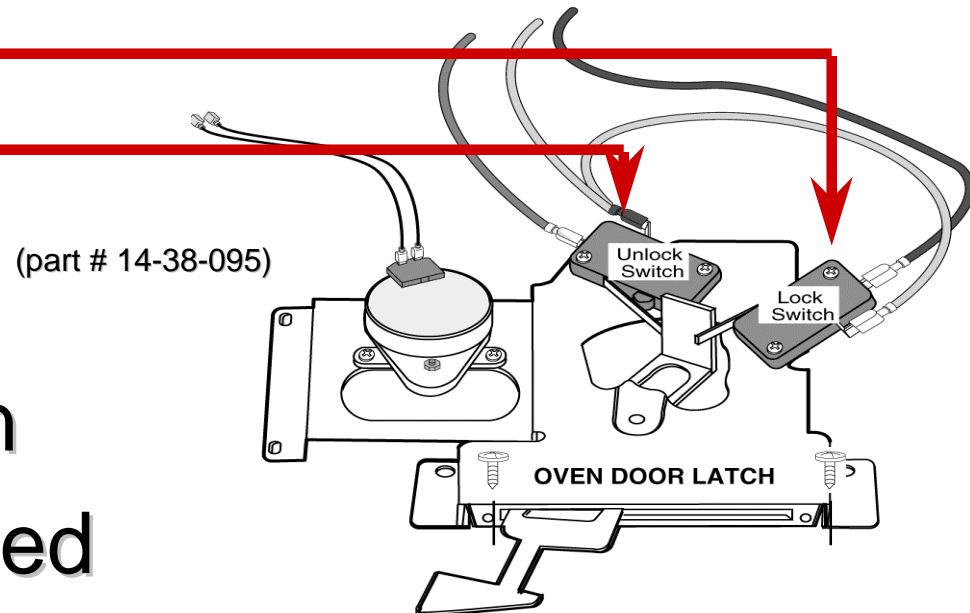




# Component Description

## Door Latch Assembly

- Lock Switch
- Unlock Switch
- Normal use:
  - Lock switch....open
  - Unlock switch..closed
- During clean:
  - Lock switch...closed
  - Unlock switch...open

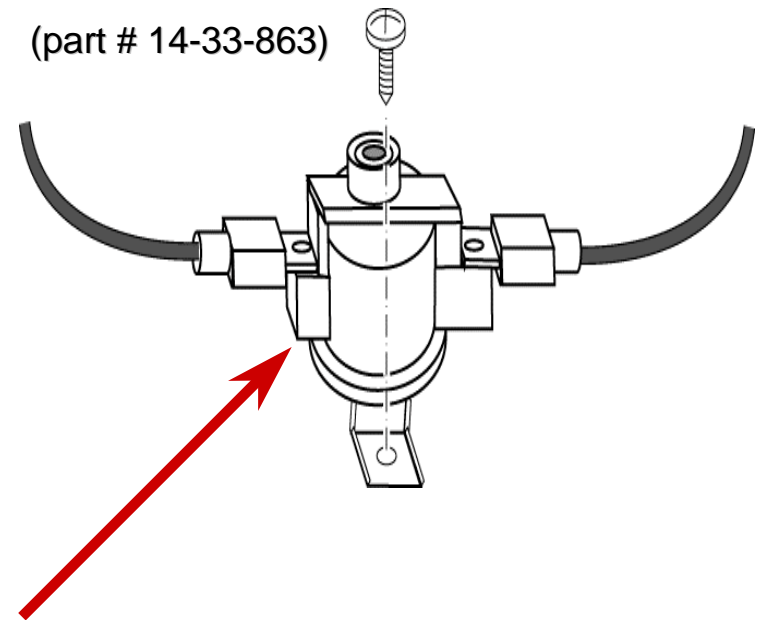


Latch switches & wiring  
utilize 12VDC circuit  
However Latch motor  
runs on 120 VAC

# Component Description

## High Temp Cutout

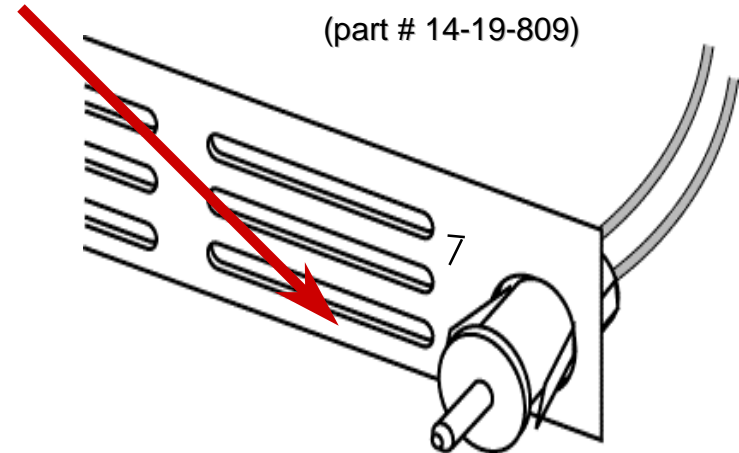
- Trips at 350 degrees
- Will trip if oven interior exceeds 975 degrees
- Disables L1 to stalled fan relay contacts
- HTC is serviceable from the front of the oven



# Component Description

## Door Switch

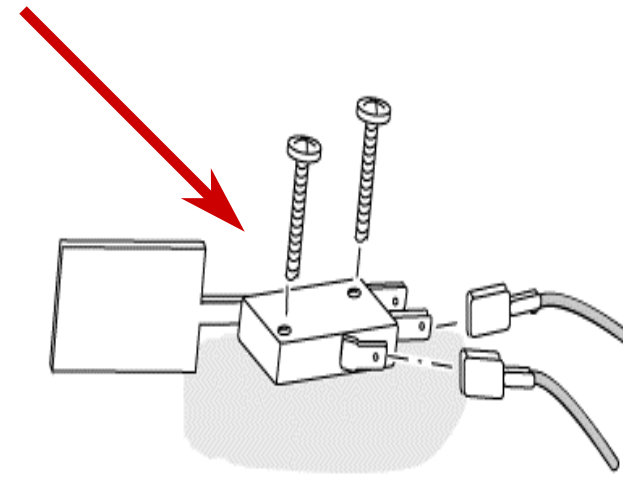
- Serves three functions
  - Door open signals board to close K7.... turning on lights
  - In clean monitors the fact that the door is closed & signals board to power latch motor
  - When the door is opened, it shuts off the convection fan by de-energizing the K4 relay



# Component Description

## Air Switch

- Mounted in air path of cooling fan
- When closed, it allows for the activation of the stalled fan relay
- Cover must be on back of oven for correct air flow over switches
- Conveys 120 VAC



(part # 14-38-606)

# Component Description

## Oven Module

(part # 35-00-661)

- A replacement oven cell will include the following items as a single unit:
  - Bake element
  - Broil element
  - Halogen lights & cover
  - Sensor
  - Insulation
  - Outer panels



# Lower Oven....any questions at this point?

- Convection motor
- Bake element
- Broil element
- Convection element
- Door Latch Assembly
- High temp cutout
- Door switch
- Air switch

## S, SM, and SMW Oven error code messages

| Error code displayed         | Possible cause  | Example   | Corrective Action  |
|------------------------------|---|---|--|
| <b>F1</b>                    | Element supervisor enabled                                  | Bad relay board                                     | Replace main relay board.  |
| <b>F1, F7</b><br>alternating | Poor connection between display head and touch panel        | Old membrane ribbon cable                           | Replace display head kit & main relay board (see note 1).  |
| <b>F2</b>                    | Over temperature detected                                   | Intermittent sensor or bad main relay board         | Check sensor and connectors. If out of spec, replace sensor. If <b>F2</b> still displays, replace main relay board (see note 2). |
| <b>F3</b>                    | Open oven sensor  | Open sensor or circuit wiring                       | Check oven sensor from Molex plug on relay board – should read 1050 $\Omega$ at room temperature (see note 3).                   |
| <b>F4</b>                    | Shorted oven sensor or sensor temperature below 40°F        | Shorted oven sensor wiring                          | Check oven sensor wiring – should read 1050 $\Omega$ at room temperature (see note 3).   |
| <b>F5</b>                    | Element supervisor is disabled (single or upper oven)       | Intermittent sensor or bad relay board              | Check oven sensor wiring (see note 3). If new sensor still displays <b>F5</b> , replace main relay board.                        |
| <b>F7</b>                    | Display head detected a stuck key (on electronic touch pad) | Bad connection between display head and touch panel | Replace display head kit. If problem persists, replace touch panel (see notes 1 & 4).  |

## S, SM, and SMW Oven error code messages

| Error code displayed | Possible cause  | Example  | Corrective Action  |
|----------------------|---|--|--|
| <b>F8</b>            | Shorted meat probe ( <u>NOTE</u> : no meat probe is used on these models) | Bad relay board  | Replace main relay board.  |
| <b>F9</b>            | Invalid door switch status (single or upper oven)                         | Bad or stuck latch switches                              | Check latch for proper operation. Replace if necessary.  |
| <b>FC</b>            | Communication error detected by display head                              | Lower oven relay board not powered up                    | Check cables and harnesses between main and lower relay boards. If they're OK, replace lower oven relay board. |
| <b>FF</b>            | Bad analog/digital converter  | Intermittent sensor or main relay board                  | Check sensor and replace if necessary. If new sensor displays <b>FF</b> , replace main relay board.            |
| <b>Fr</b>            | (1) Invalid door latch switch status for lower oven                       | Check lower door latch switches                          | Replace latch if necessary.  |
|                      | (2) Communications error at display head                                  | Check display head                                       | Replace display head (see note 1).   |
|                      | (3) Element supervisor disabled lower oven                                | Intermittent lower oven sensor or lower oven relay board | Check sensor and replace if necessary. If new sensor displays <b>Fr</b> , replace lower oven relay board.      |

## S, SM, and SMW Oven error code messages

| Note | Description  | Additional notes  |
|------|--|---|
| 1    | <b>F1 &amp; F7</b> errors are caused by a loss of communication between the display head and the touch panel. Heat migrates to affect the connector on the display head. The new relay board # <b>35-00-760</b> has been reprogrammed to keep the cooking fan on until internal oven temperature reaches 300°F.                                  | <ul style="list-style-type: none"><li>• Single oven display head # <b>35-00-703</b></li><li>• Double oven display head # <b>35-00-704</b></li><li>• Main relay board # <b>35-00-760</b></li></ul>   |
| 2, 3 | Check sensor by taking resistance reading from Molex plug on main relay board. A good sensor will read ~ 1050 $\Omega$ at room temperature (75°F). Replace sensor if out of tolerance by $\pm 100 \Omega$ or more. Make sure butt splices are in the air channel and not stuck in the insulation or against the oven liner.                      | When checking sensor, also check each lead to chassis ground and to each phase of power line. If grounded or if voltage is present, sensor may read a correct resistance as a loop, but still produce error codes. Check lead dress very carefully. |
| 4    | The touch panel is an electronic switching device, so it doesn't have actual keys to stick. It constantly checks touch pads for inputs. If its cable has a poor or intermittent connection, the microprocessor will electronically switch all keys on. This will produce an <b>F7</b> error code that the display head will show as a stuck key. | The display head was designed for use with either membrane switches or electronic inputs.   |

Lower Oven...any questions at this point?

Any questions or comments regarding error codes?



# HOW THE LOWER OVEN WORKS

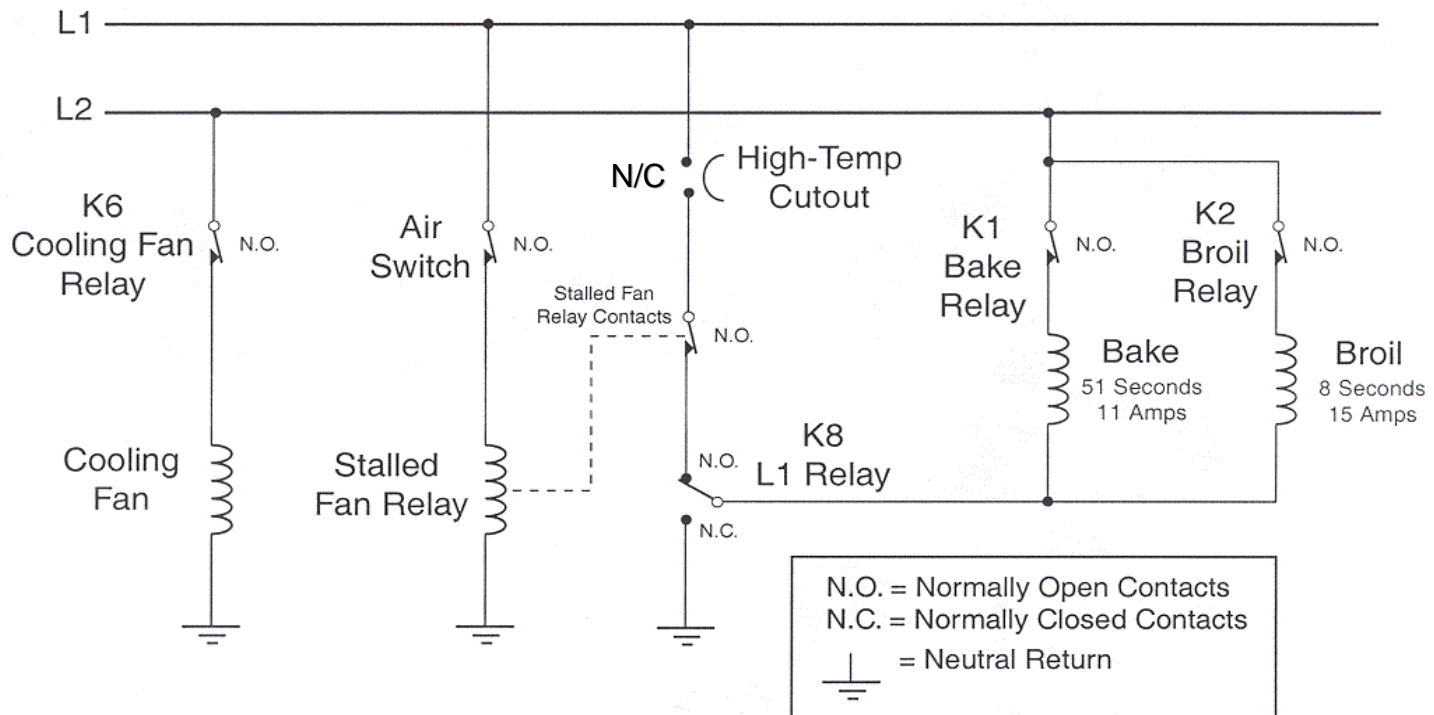
- BAKE CYCLE
- BROIL CYCLE
- CONVECTION BAKE
- CONVECTION ROAST
- CLEAN CYCLE

# Lower Oven

## Bake Cycle — Bake Preheat & Bake Mode

Press the BAKE keypad and select an oven temperature and the following events will occur on the relay board:

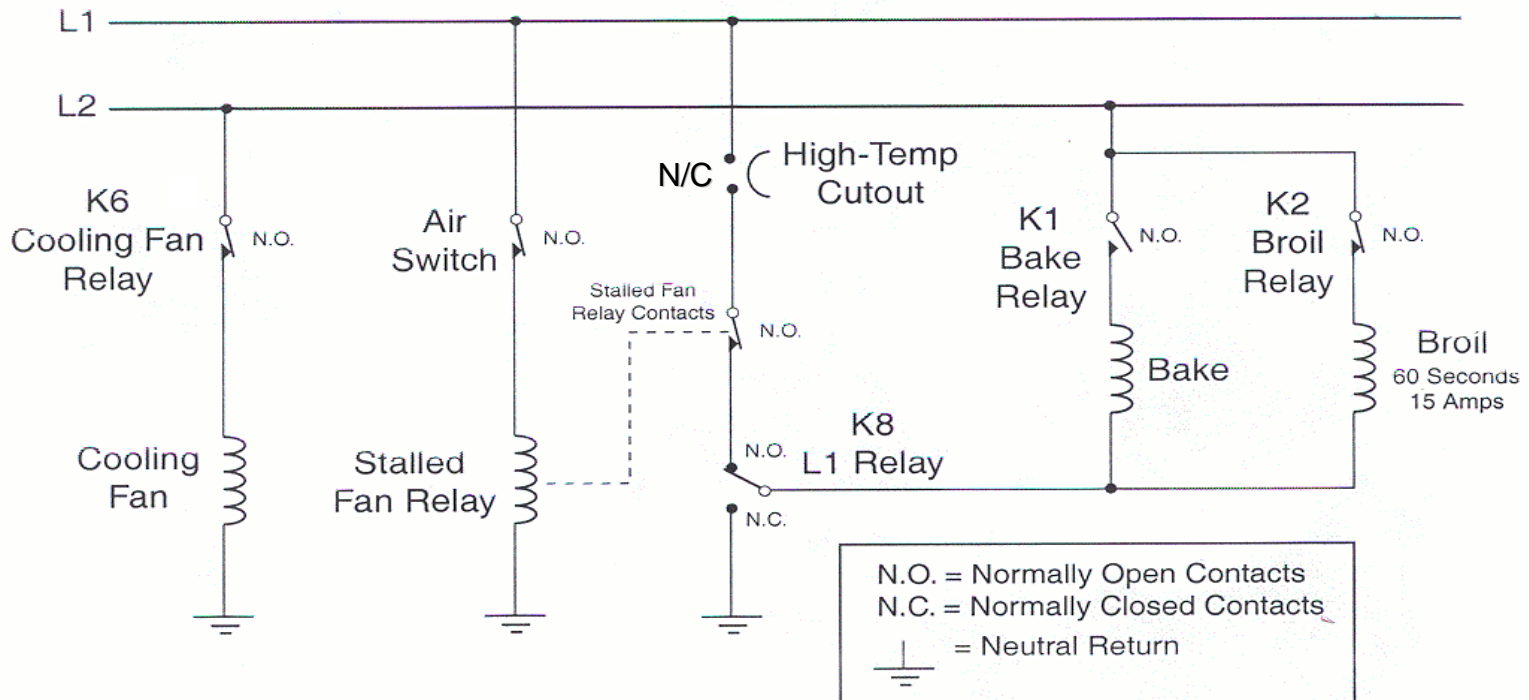
- Line Relay **K8** closes.
- Cooling Fan Relay **K6** closes and turns the Cooling Fan on.
- Cooling Fan air flow closes the Air Switch and activates the Stalled Fan Relay.
- The Stalled Fan Relay contacts close and supply L1 to one side of Relay **K8** (**already activated**).
- The **L1** Relay connects L1 line voltage to the Bake and Broil Elements.
- Bake Relay **K1** and Broil Relay **K2** alternately open and close, and connect the L2 (120-volt) line to the Bake and Broil elements. NOTE: The Bake Element is on for 51-seconds, and draws 11-amperes during each 1-minute cycle. The Broil Element is on for 8-seconds and draws 15-amperes during each 1-minute cycle.



# Broil Cycle — Broil Preheat & Broil Mode

Press the BROIL keypad and select an oven temperature and the following events will occur on the relay board:

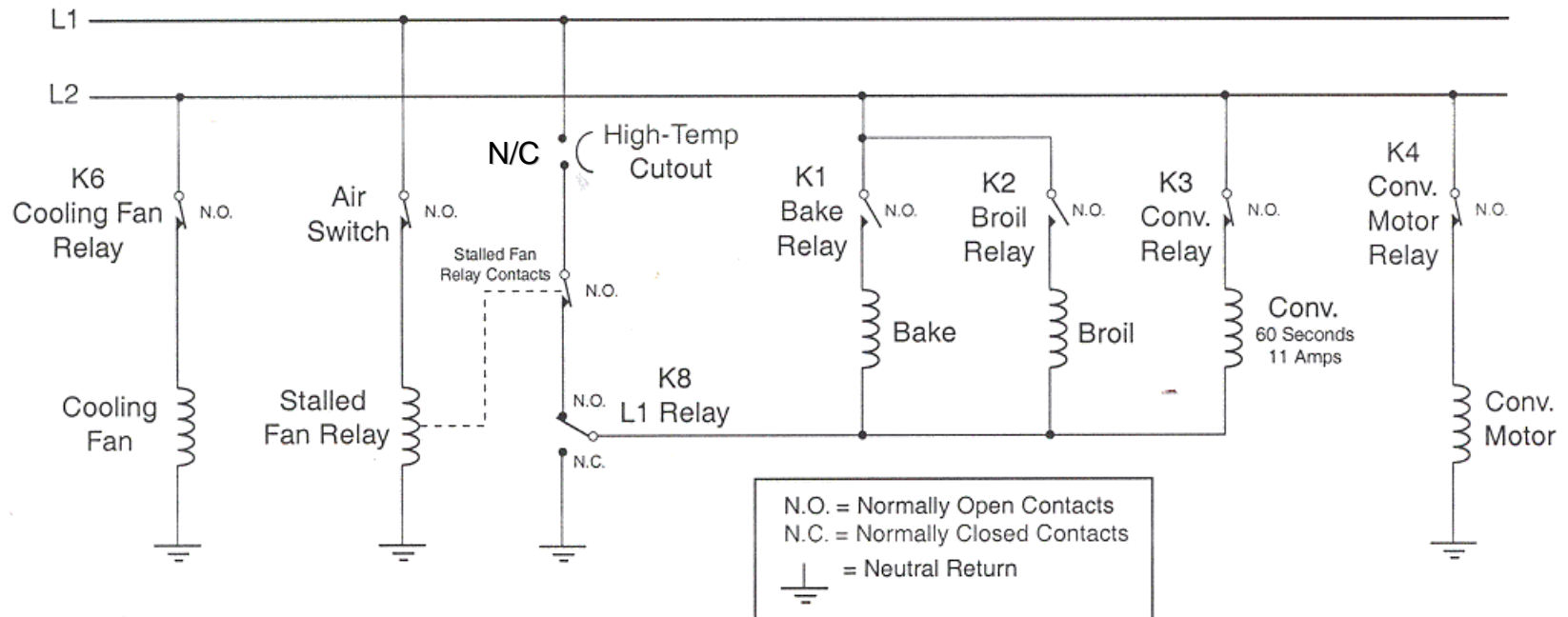
- Line Relay **K8** closes.
- Cooling Fan Relay **K6** closes and turns the Cooling Fan on.
- Cooling Fan air flow closes the Air Switch and activates the Stalled Fan Relay.
- The Stalled Fan Relay contacts close and supply L1 to one side of Relay **K8** (**already activated**).
- The **L1** Relay connects L1 line voltage to the Broil Element.
- Broil Relay **K2** closes and connects the L2 (120-volt) line to the Broil element. NOTE: The Broil Element is on for 60-seconds and draws 15-amperes during each 1-minute cycle.



# Convection Cycle – Convection Preheat & Convection Mode

Press the CONVECTION keypad and select an oven temperature and the following events will occur on the relay board:

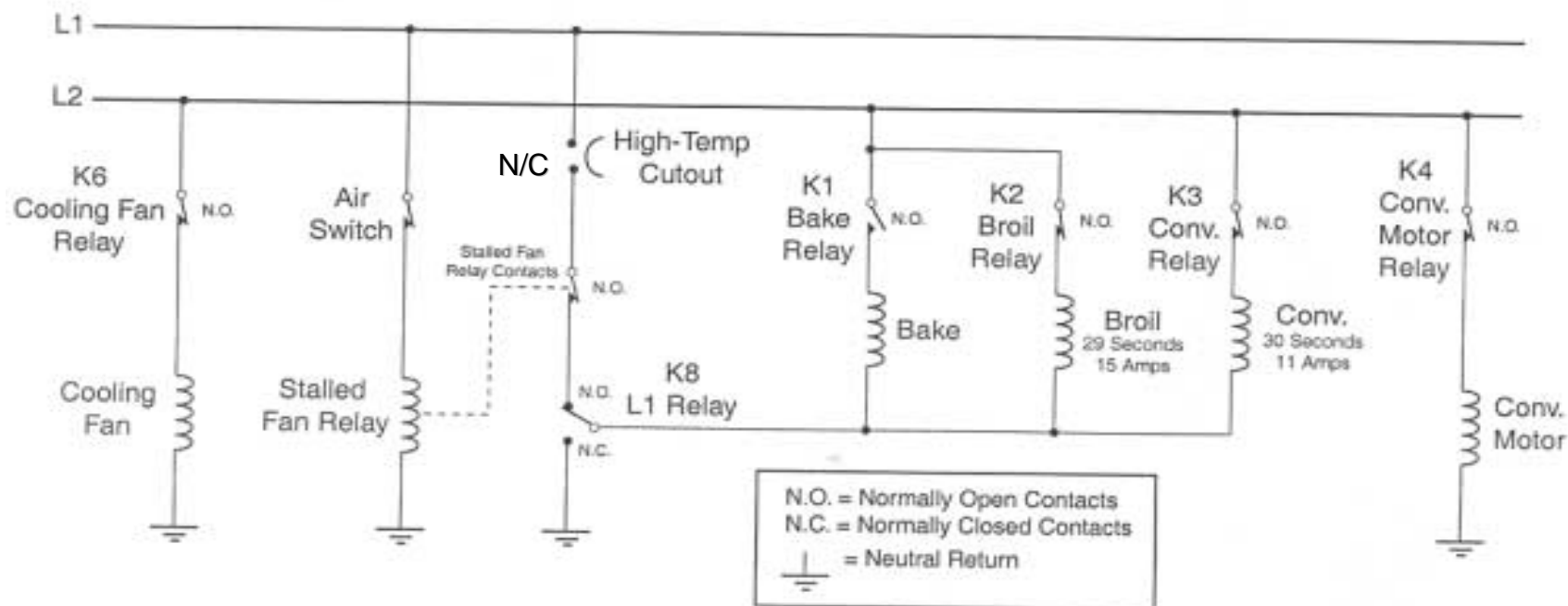
- Line Relay **K8** closes.
- Cooling Fan Relay **K6** closes and turns the Cooling Fan on.
- Cooling Fan air flow closes the Air Switch and activates the Stalled Fan Relay.
- The Stalled Fan Relay contacts close and supply L1 to one side of Relay **K8** (already activated).
- The **L1** Relay connects L1 line voltage to the Convection Element.
- Convection Relay **K3** closes and connects the L2 (120-volt) line to the Convection element. NOTE: The Convection Element is on for 60-seconds, and draws 11-amperes during each 1-minute cycle.
- Convection Motor Relay **K4** closes and activates the Convection Motor.



# Convection Roast Cycle — Convection Roast Preheat

Press the CONVECTION ROAST keypad and select an oven temperature and the following events will occur on the relay board:

- Line Relay **K8** closes.
- Cooling Fan Relay **K6** closes and turns the Cooling Fan on.
- Cooling Fan air flow closes the Air Switch and activates the Stalled Fan Relay.
- The Stalled Fan Relay contacts close and supply L1 to one side of Relay **K8** (already activated).
- The **L1** Relay connects L1 line voltage to the Convection and Broil Elements.
- Broil Relay **K2** and Convection Relay **K3** alternately open and close, and connect the L2 (120-volt) line to the Convection and Broil elements. NOTE: The Convection Element is on for 30-seconds, and draws 11-amperes during each 1-minute cycle. The Broil Element is on for 29-seconds and draws 15-amperes during each 1-minute cycle.
- Convection Motor Relay **K4** closes and activates the Convection Motor.



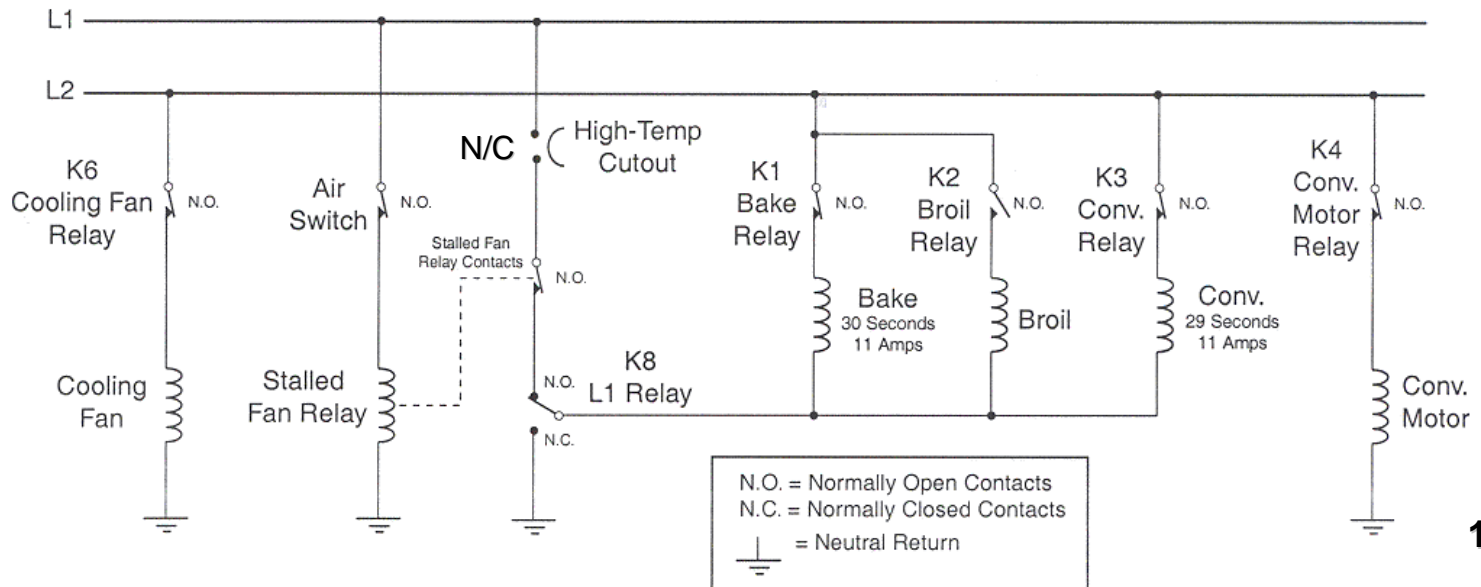


# Convection Roast Cycle

NOTE: The Convection Roast cycle is a continuation of the Convection Roast Preheat cycle.

Press the CONVECTION ROAST keypad and the following events will occur on the relay board:

- The **L1** Relay connects L1 line voltage to the Convection and Bake Elements.
- Bake Relay **K1** and Convection Relay **K3** alternately open and close and connect the L2 (120-volt) line to the Bake and Convection elements. NOTE: The Convection Element is on for 29-seconds, and draws 11-amperes during each 1-minute cycle. The Bake Element is on for 30-seconds, and draws 11-amperes during each 1-minute cycle.
- Convection Motor Relay **K4** closes and activates the Convection Motor.
- After the Convection Roast Preheat temperature has been reached, Relays K2 and K3 cycle off (open). When the thermostat cycles back on, the circuit switches from Relays K2 and K3, to Relays K1 and K3, for the rest of the selected temperature and cooking time. Relays K1 and K3 will cycle on and off to maintain the selected temperature.





# How The Oven Works

## Door Switch Circuit.....Door Locked

Moly plugs are keyed

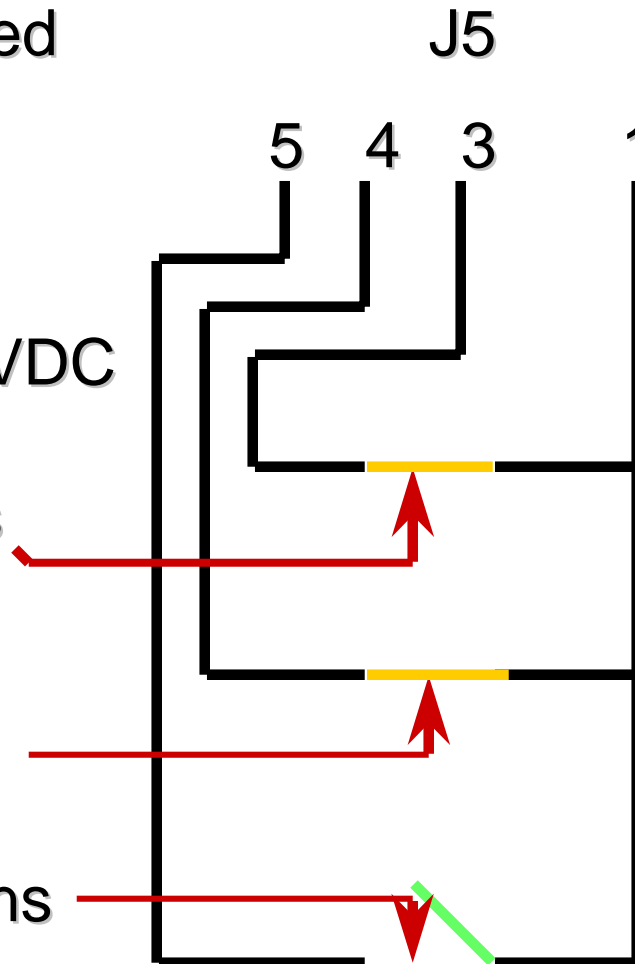
J5....latch

Latch circuit is 12 VDC

Door switch closes

Lock switch closes

Unlock switch opens



Latch motor  
is activated  
by K9 relay

This is the frame  
switch

These two switches  
are mounted on the  
latch assembly

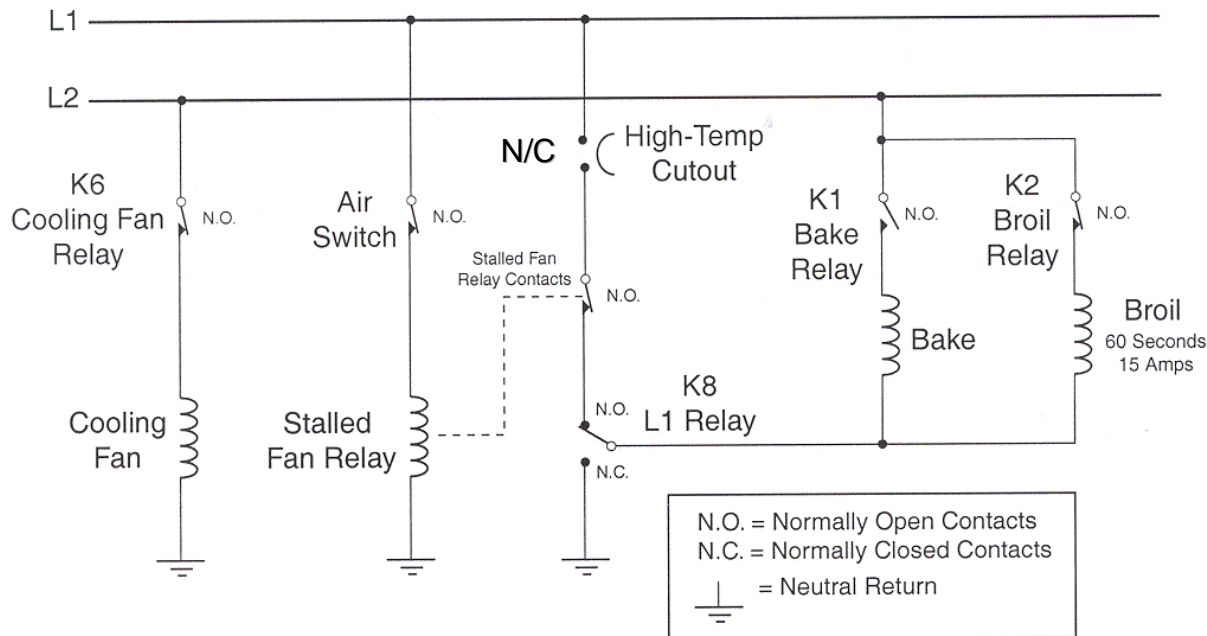
# How the Oven

## works...

### Self-Clean Cycle — Preheat Below 840°

Press the SELF-CLEAN keypad and select a self-clean time period and the following events will occur on the relay board:

- Line Relay **K8** closes.
- Cooling Fan Relay **K6** closes and turns the Cooling Fan on.
- Cooling Fan air flow closes the Air Switch and activates the Stalled Fan Relay.
- The Stalled Fan Relay contacts close and supply L1 to one side of Relay **K8** (already activated).
- The **L1** Relay connects L1 line voltage to the Broil Element.
- Broil Relay **K2** closes and connects the L2 (120-volt) line to the Broil element. NOTE: The Broil Element is on for 60-seconds, and draws 15-amperes during each 1-minute cycle. It is also continuously for the first 55-minutes of the Self-Clean cycle, or until the oven reaches 850°F.

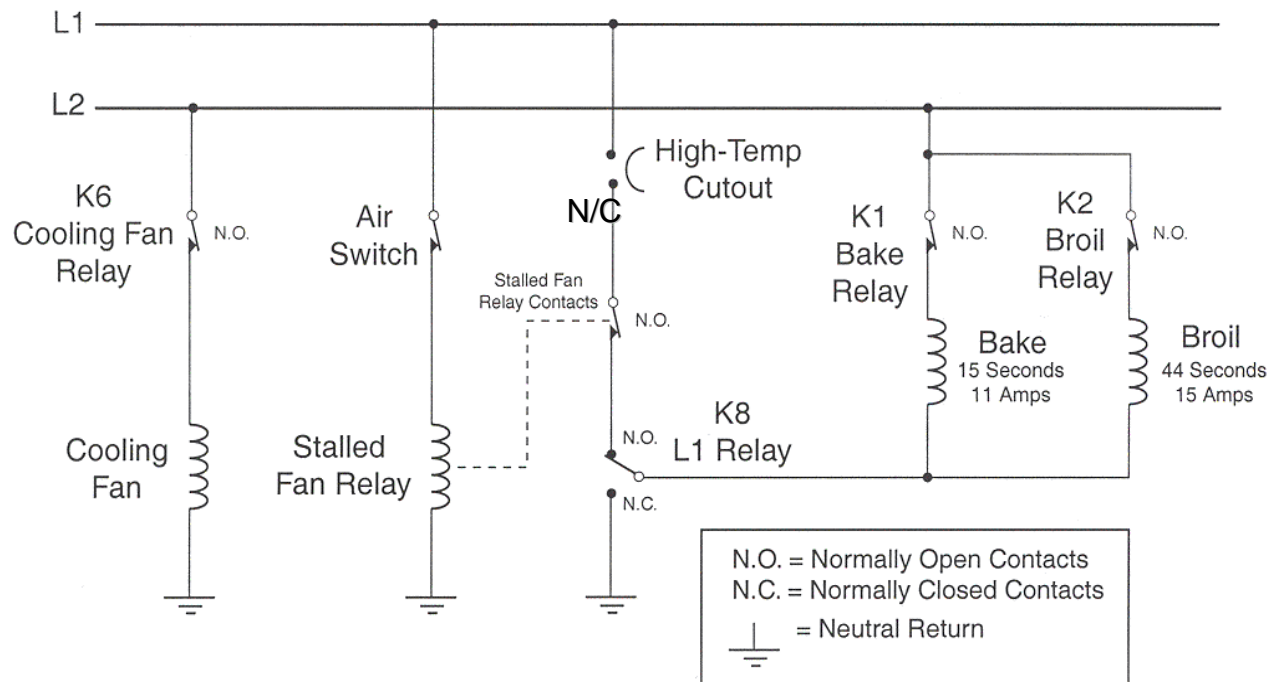


# How the Oven works...Self-Clean Cycle

NOTE: The Self-Clean cycle is a continuation of the Self-Clean Preheat cycle.

Press the SELF-CLEAN keypad and the following events will occur on the relay board:

- The **L1** Relay connects L1 line voltage to the Bake and Broil Elements.
- Bake Relay **K1** and Broil Relay **K2** close and connect the L2 (120-volt) line to the Bake and Broil elements. NOTE: The Broil Element is on for 44-seconds, and draws 15-amperes during each 1-minute cycle. The Bake Element is on for 15-seconds, and draws 11-amperes during each 1-minute cycle.
- After Self-Clean Preheat, Relay K2 cycles off, via the thermostat. When the thermostat cycles back on, (to maintain the 850°F self-clean temperature), Relays K1 and K2 are alternately used to maintain the self-clean temperature until its time has expired, at which point, the oven turns off.



# HINTS & TIPS

- If the air switch circuit is open, the oven will look as though it is heating, including temperature display and the words pre-heat, it just won't heat
- F3 fail code means open sensor circuit. This will display only when oven is in heat mode, if oven is off, the cooling fan will continue to run. Must correct problem or trip oven circuit to shut off cooling fans

# SMW Series Ovens

That's all folks