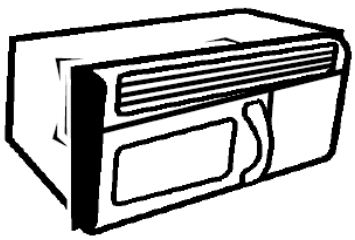
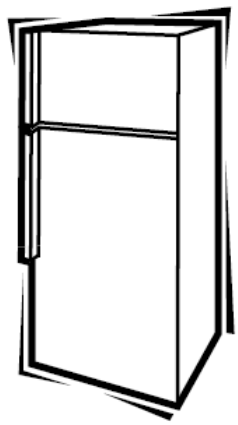
GE Consumer & Industrial

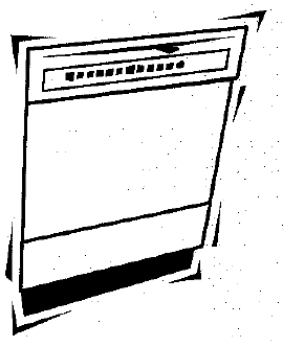
Technical Service Guide

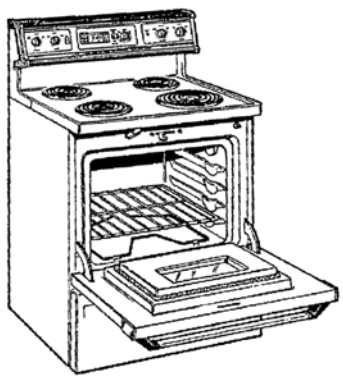
Basic Repair Manual Series I





Refrigerator
Dishwasher
Electric Range
Gas Range
Microwave





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GE Appliances
General Electric Company
Louisville, Kentucky 40225

IMPORTANT SAFETY NOTICE

The information in this service guide is intended for use by individuals possessing adequate backgrounds of electrical, electronic, and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

WARNING

To avoid personal injury, disconnect power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks.

RECONNECT ALL GROUNDING DEVICES

If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

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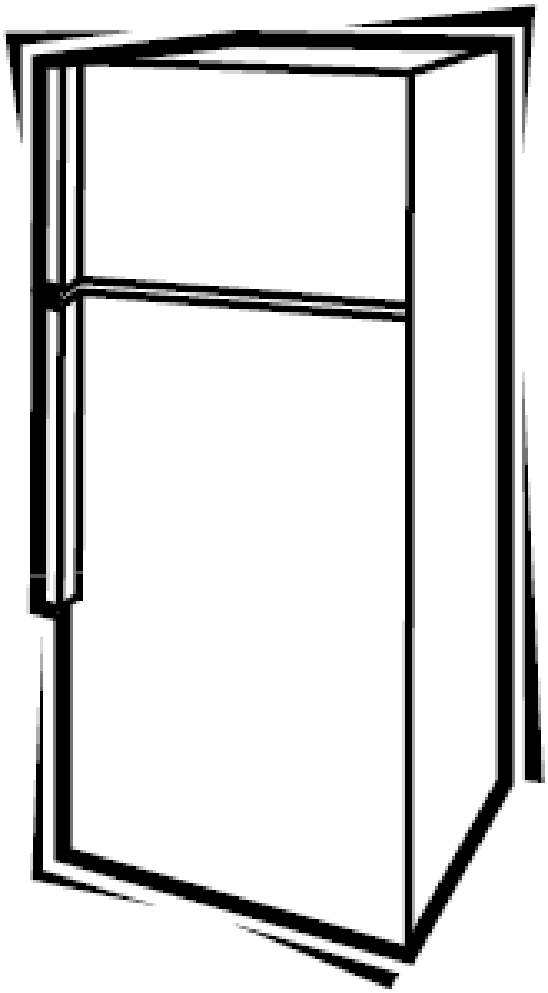
Refrigerator Section



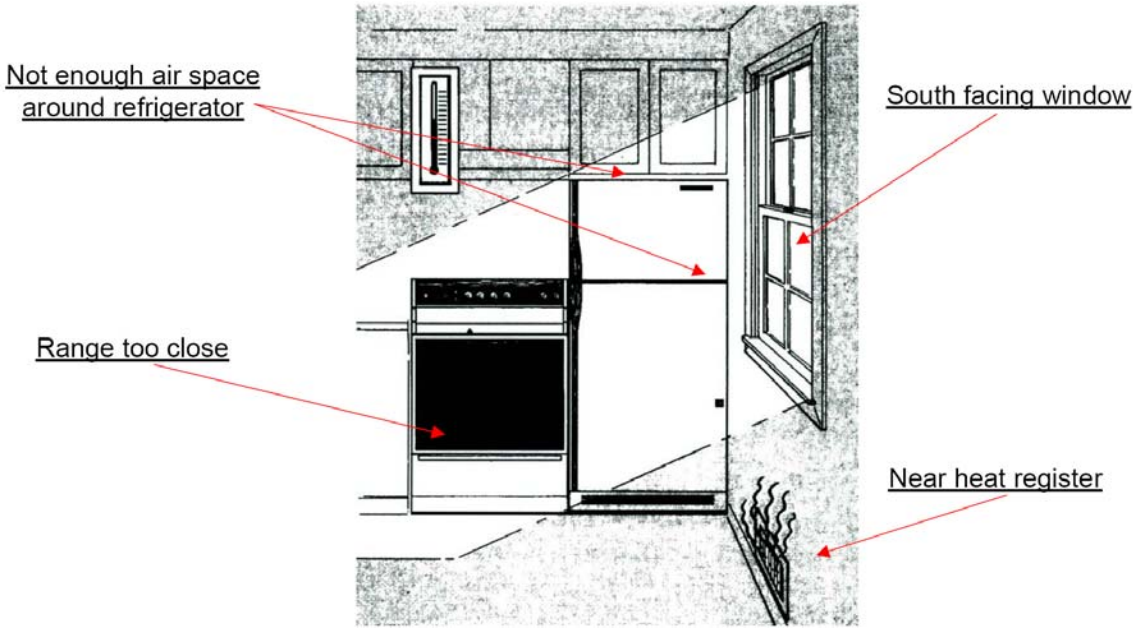
REFRIGERATION SECTION

INSTALLATION

WATER SUPPLY TO THE ICEMAKER (on some models)

If the refrigerator has an icemaker, it will have to be connected to a cold water line. A water supply kit (containing copper tubing, shutoff valve, fittings and instructions) is available at extra cost from your dealer.

REFRIGERATOR LOCATION



Do not install refrigerator too close to sources of excessive heat.

Do not install the refrigerator where the temperature will go below 60°F (l6°C) because it will not run often enough to maintain proper temperatures.

Install it on a floor strong enough to support it fully loaded.

CLEARANCES

Allow the following clearances for ease of installation, proper air circulation and plumbing and electrical connections.

· Sides 3/4" (19 mm) · Top I" (25 mm) · Back I" (25 mm)

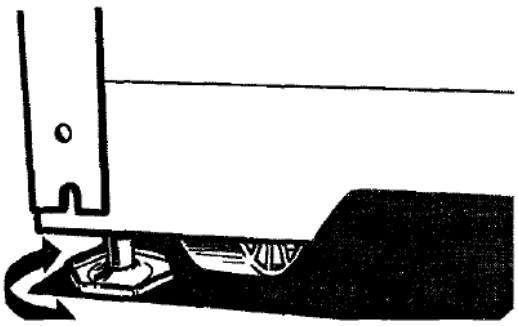
ROLLERS AND LEVELING LEGS

Leveling legs near each front corner of the refrigerator are adjustable. They firmly position the refrigerator and prevent it from moving when the doors are opened. Leveling legs should be set so the front of the refrigerator is raised just enough that the doors close easily when opened about halfway.

Turn the leveling legs clockwise to raise the refrigerator, counterclockwise to lower it.

Rollers next to the leveling legs allow you to move the refrigerator away from the wall for cleaning.

Turn the legs counterclockwise until the weight of the refrigerator is transferred from them to the rollers.
After rolling the refrigerator back into place, turn the legs clockwise until the legs again bear the weight of the refrigerator.



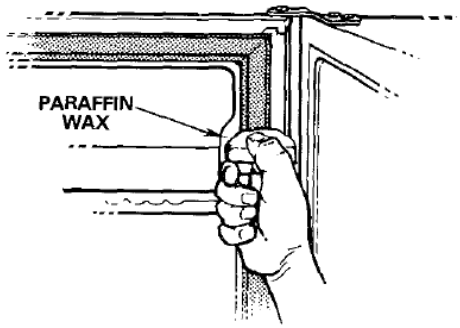
DOOR GASKETS

<u>Retainer Held Gaskets</u>
On most older models, the door gasket is press-fitted into retainers. To remove this gasket, loosen the screws around the retainer, grasp the gasket at one corner and pull it from the retainers.

To reinstall the gasket, first place it in warm water to make it more pliable. Then, place it on the inner door and position the rib of the gasket in the retainer groove. Beginning at one corner, tighten the screws around the retainer to hold gasket in place.

After installing a new door gasket, a thin film of paraffin wax should be applied along the hinge side to prevent the gasket from scrubbing the cabinet as the door is opened and closed.

Rub the sealing surface of the gasket with a piece of pure paraffin wax once or twice, from top to bottom, to uniformly coat the gasket sealing surface.



Push on Gaskets

On many newer models, the door gaskets are held in a retainer channel.

To remove the old gasket, grasp one corner and simply pull the gasket free of the retainer.

To reinstall the gasket, first soak the gasket in warm water to make it more pliable. Then, using the back of a teaspoon or your thumb, push the barbed edge of the gasket into the retaining channel.

After installing a new door gasket, a thin film of paraffin wax should be applied along the hinge side to prevent the gasket from scrubbing the cabinet as the door is opened and closed.

MAIN ELECTRICAL COMPONENTS

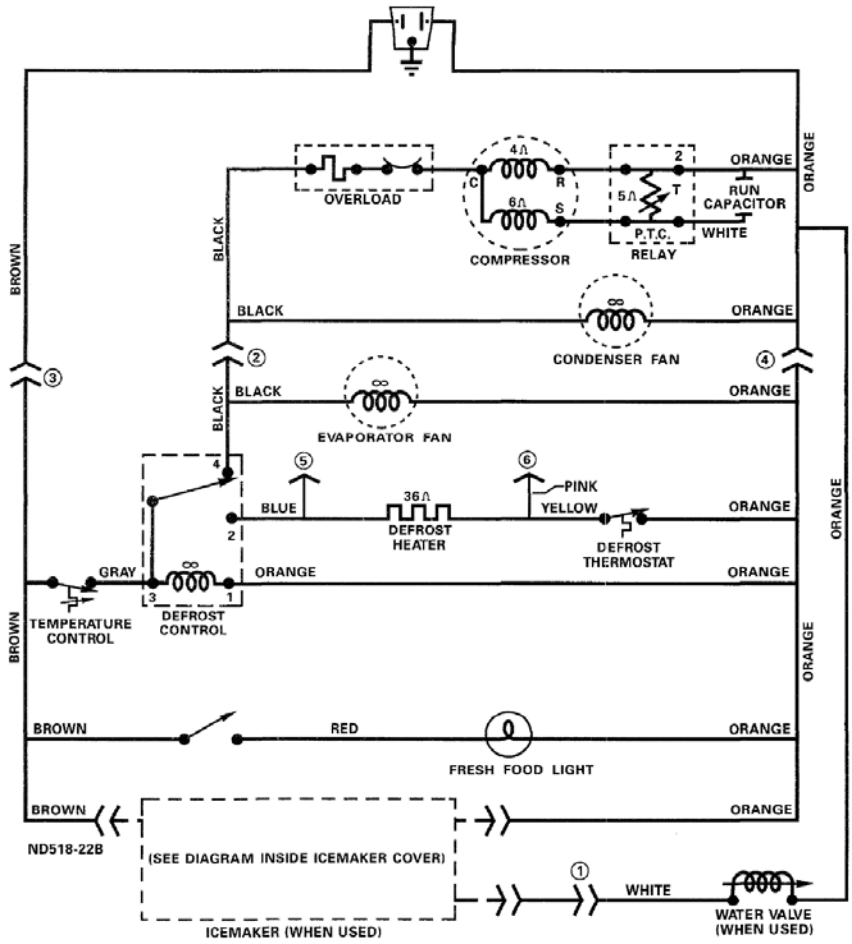
Light switch

Condenser Fan Motor
Evaporator Fan Motor

Temperature Control

Defrost Heater
Defrost Control / Timer
Defrost Termination Thermostat → Self Defrost System

Overload
Relay
Compressor → Compressor Assembly



LIGHT SWITCH

Single pole switch that switches off the fresh food light when the door is closed. If the switch becomes inoperative and the light stays on after the door is closed, complaints of poor temperatures will probably be generated.

CONDENSER FAN

On forced draft models, the condenser and condenser fan are located under the refrigerator and in the machine compartment. Room ambient air, being drawn by the fan, enters the machine compartment through the front grille at the base of the cabinet. It then circulates over and through the condenser, picking up heat. On most forced draft models, the warm air is also passed over the compressor and drain pan and expelled through the back of the unit or through the right hand portion of the front grille. The condenser fan provides a secondary benefit in aiding evaporation of water from the drain pan.

In time, condenser fan operation will deposit household lint and dust on the condenser, which will impede airflow through the condenser, unless it is cleaned periodically. Likewise, the condenser fan blade will become coated with dust, reducing its efficiency and must also be cleaned.

Evaporator Fan

The evaporator fan motor is connected electrically in parallel with the compressor. Thus, when the temperature control contacts are closed, the compressor and evaporator fan motor are energized simultaneously.
Some models have switches that are automatically operated by the doors to interrupt fan operation when the door is opened and for so long as the door is held open.

Cold air from the evaporator is drawn through the fan and discharged into the freezer and fresh food compartments. After circulating throughout both compartments, picking up heat from the food, the warmer air is returned to the evaporator.

Grilles, ducts, baffles and gaskets of various designs are used to channel and direct the airflow. These must be correctly positioned to insure proper airflow through the evaporator and within both compartments.

MOTOR TESTING

Since the condenser fan and the evaporator fan are electro-mechanical devices, they are subject to both electrical and mechanical failures. To test the motor winding on an AC power motor, use an ohmmeter and refer to the schematic wiring diagram for the resistance value. However, if the motor has been

previously replaced, its resistance may be slightly different than the value shown on the schematic wiring diagram. More modern, energy efficient refrigerators use a DC motor. These motors are difficult to test for motor operation using common electrical test equipment. If a defective motor is suspected, checked to ensure electrical current is being supplied to the motor. If it is and the motor does not operate then the motor is probably bad and should be replaced.

Fan motors, used on refrigerators and freezers; seldom fail due to an open winding. Likewise, an intermittent condition rarely occurs. But, if a winding is found to be open or if intermittent operation is isolated to the motor; the motor should be replaced.

More commonly, the motor will stall due to an obstruction of the fan blade. Because condenser fan and evaporator fan motors are designed to withstand a prolonged stalled condition, it should not be necessary to replace the motor after the obstruction is removed.

Rotate the fan blade slowly by hand with the motor shaft in the extreme positions (in and out) to check for a distorted blade or internal motor binding condition. Then, to check for worn bearings in the motor, spin the blade briskly and observe whether it turns freely or is sluggish. Also, listen for noise from the bearings and inspect for an unbalanced blade while the motor is energized. If the motor binds or the bearings are rough or noisy, replace the motor. Noisy operation can be due to a loose blade, mounting screws, or missing rubber isolators rather than the motor itself. If the blade is unbalanced, it should be replaced.

TEMPERATURE CONTROLS

A temperature control is used on all refrigerators and freezers to regulate the operation of the compressor and thus maintain desired food temperatures. The temperature control consists primarily of a capillary tube and bellows assembly, a set of normally closed contacts, and a mechanical linkage.

The temperature control is adjustable by means of a shaft, which rotates a cam to apply bias pressure against the bellows. Thus, with a knob on the shaft, the user can adjust the temperature setting as desired. Numbers on the knob indicate relative control settings that vary the temperature approximately 2° F. per number.

Pressure within the gas-charged capillary tube and bellows assembly responds to temperature sensed at the coldest point along the length of the capillary tube. Rising temperature causes the pressure to increase and expand the accordion-type bellows. The expanded bellows actuates the linkage, which allows the contacts to close. When the temperature drops, the bellows contract due to a decrease in pressure and the snap action of the linkage opens the contacts.

When the control shaft is rotated to the "off' setting, the cam manually presses the linkage against the contacts and holds them open.

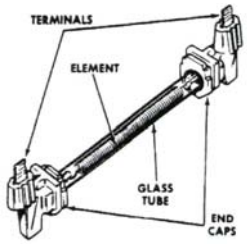
The temperature control is connected electrically in series with the compressor (see schematic on page 8). While the control contacts remain closed, the compressor is energized until the pre-selected temperature is reached. The control contacts then open the circuit to the compressor. The compressor will remain de-energized until the temperature increases sufficiently to cause the control contacts to close.

The temperature control contacts can be tested for continuity, using an ohmmeter. With one probe placed on each control terminal, turn the control to the "off' setting and back on to check for contacts opening and closing.

DEFROST COMPONENTS

DEFROST HEATER

The defrost heater, used on most models, consists of a heating element encased in a glass tube with terminals extending through insulated end caps. Most top freezer models use only a single heater.



The purpose of the defrost heater, located within and/or below the evaporator, is to melt the frost that has accumulated on the evaporator, and to warm the drain trough during the defrost cycle. While the heater is energized, the element will produce a red glow.

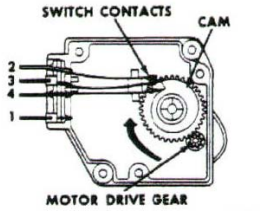
Defrost heaters are resistive loads and should be tested for proper resistance as indicated on the schematic wiring diagram, using an ohmmeter. However, a visual inspection should also be made and the heater replaced if any of the following conditions are observed:

· element is open,
· glass tube is broken,
· glass tube is opaque with green/black coating inside,
· element coils are bunched together,
· end caps or terminals are deteriorated or corroded.

When replacing a defrost heater, avoid handling the glass tube with bare hands. Even minute quantities of salt, or other contaminants from the hands, deposited on the surface of the glass will increase the brittleness, which could result in premature failure of the heater. Handle the heater by the end caps. If it should be necessary to grasp the glass tube, clean it afterward with a damp paper towel (avoid the use of a cloth).

DEFROST CONTROL / TIMER

The defrost control used on most models is a simple electro-mechanical timer. It consists of a clock motor, attached to an insulated housing that contains a cam, and a single pole, double throw switch. The terminals are clustered together at one end of the control housing.



The purpose of the defrost control is to regulate the frequency of defrost cycles and the duration of each cycle. This is accomplished by energizing the clock motor to drive a set of gears that, in turn, rotates the cam, which operates the switch. The defrost cycle begins when the cam has rotated to the position where a mark on the cam aligns with a mark on the control housing. At this position, terminal 4 switch blade drops off the edge of the cam. This opens the first set of contacts (terminals 3 and 4) and closes the second set of contacts (terminals 3 and 2). As the cam continues to rotate, terminal 3 switch blade will drop off the edge of the cam. This opens the second set of contacts (terminals 3 and 2) and closes the first set of contacts (terminals 3 and 4) thus, ending the defrost cycle. An audible "SNAP" can be heard each time a switch blade drops off the edge of the cam (at the beginning and ending of the defrost cycle).

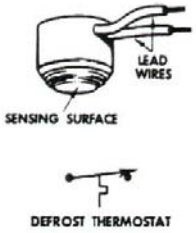
Defrost controls differ in the number of hours (frequency) between cycles and the number of minutes (duration) of each cycle depending upon design requirements for the various models. Additionally, controls located inside either of the food compartments are manufactured with special materials to meet a low-level odor requirement. Therefore, a substitute replacement control should not be used -- unless it is a factory authorized supersedure. Frequency and duration specifications are stated in the MiniManual for each respective model.

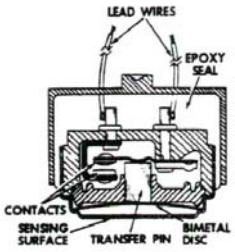
On some models, the defrost control is located behind the front grille. On other models, it is located in the top of the fresh food compartment and various other locations as indicated on the pictorial wiring diagram for each respective model. When replacing a defrost control, make sure the proper size and type screw is used to mount the control to the bracket. A larger screw will damage the plastic

control housing. Use the original screw to connect the ground wire to the cabinet in the same location as the original ground wire.

DEFROST TERMINATION THERMOSTAT

The defrost thermostat consists of a single pole switch, a bimetal disc, and a transfer pin within a metal and plastic case that is sealed with epoxy. Lead wires, welded to the internal terminals, extend through the case.





The purpose of the defrost thermostat, located on the evaporator, is to de-energize the heater, during the defrost cycle, when the frost has melted from the evaporator. After all frost has been completely removed from the evaporator, the temperature of the evaporator begins to rise rapidly. When the limit temperature of the thermostat is sensed, the bimetal disc warps and pushes the transfer pin against a switch blade which opens the switch contacts. Conversely, when the temperature of the evaporator has cooled sufficiently, the bimetal disc warps in the opposite direction. Then, the spring-loaded switch blade pushes the transfer pin out of the way and closes the contacts.

The defrost thermostat is designed to fail-safe -- it normally fails open. The only practical method for testing the thermostat is to check it for continuity with an ohmmeter while it is mounted to a cold evaporator. Since the contacts should be closed (except during the later part of the defrost cycle and for the first few minutes thereafter) if the evaporator is cold and the contacts are found to be open, the thermostat has failed.

If a defrost thermostat has failed, it should NEVER be by-passed in the circuit, not even until the proper replacement can be installed. Such action would likely cause overheating of the defrost heater which could result in severe damage to the product.

Defrost thermostats are rated with respect to the specified limit temperature -- the temperature at which the thermostat is designed to open. This limit temperature appears on the thermostat. For example; "L42-2" is an indication that the thermostat has a limit temperature of 42° F., and a 20° differential. In other words, this thermostat opens at 42° F. and closes at 22° F. Temperature limit specifications are stated in the Mini-Manual for each respective model.

When replacing a defrost thermostat, it must be mounted firmly in contact with the evaporator in order to properly sense the evaporator temperature. A clamp type bracket is used to mount the thermostat in various locations on the evaporator, depending upon the design of the product. Some are mounted directly to the evaporator tubing and others to the metal drain pan or plate. Lead wires should be spliced to the harness with closed-end or "bell" type connectors and the open end filled with RTV sealant (GE part# WX6X200) to prevent moisture from entering the connection. Replacement defrost thermostats are generally supplied as a kit which also contains mounting brackets, wire connectors and instructions.

DEFROST SYSTEM OPERATION

On most models, the defrost control motor is connected in series with the temperature control. Thus, the defrost control advances only when the temperature control contacts are closed. The defrost heater is in series with the defrost thermostat, and connected to terminal 2 on the defrost control. The compressor circuit is connected to terminal 4 on the defrost control. (See schematic on page 8)

After the appropriate number of hours of accumulated compressor operation time, a defrost cycle is initiated by the defrost control opening the contacts to the compressor and closing the contacts to the heater. This interrupts compressor operation and energizes the heater. Heater operation continues until the defrost thermostat senses the limit temperature and opens. A normal amount of frost on the evaporator will cause the thermostat to remain closed and the heater to remain energized for about half of the time allotted for the defrost cycle. With about half of the defrost cycle time remaining, melted frost is allowed to drain away from the evaporator. The defrost cycle ends and the refrigeration cycle begins when the defrost control opens the contacts to the heater and closes the contacts to the compressor. Shortly after the compressor resumes operation, the defrost thermostat will be cooled and the contacts will close in preparation for the next defrost cycle.

Under heavy usage conditions, especially when the humidity is high, a greater-than normal amount of frost will be accumulated on the evaporator, which will extend the heater operation time. Extreme or unusual circumstances, such as a door being left ajar for several hours, can occur whereby an excessive amount of frost will be accumulated to the extent that defrost heater operation may continue through the entire defrost cycle and still not completely remove all of the frost from the evaporator. If this occurs, the partially melted frost will refreeze resulting in a solid mass of "residual ice" in the evaporator. Residual ice, being denser than frost, may not be melted away -- even after repeated defrost cycles.

TESTING & REPLACEMENT

1. Examine the evaporator.

A failure of any defrost component will usually result in excessive frost accumulation on the evaporator.

Also, look for the presence of residual ice, which may be the result of some extreme or unusual circumstance and no fault of the product. A completely frosted evaporator is an indication that no defrost action has occurred. The presence of ice indicates some defrost action has occurred. Regardless of which condition is found, the evaporator must be completely defrosted to prevent a residual icing condition. If a heat gun is used, care must be taken to prevent melting foam and plastic parts adjacent to the evaporator.

2. Check the defrost control

Defrost controls are electro-mechanical devices that are subject to both electrical and mechanical failures.

An operational test can be made which will check both the mechanical and electrical aspects of the defrost control.

First, make sure the compressor is running, then manually advance the cam to the beginning of the defrost cycle. Accomplish this by turning the dial on the timer clockwise until a loud click or snap is heard. Observe that the compressor stops. Wait a few minutes, then check to see if the defrost heater is beginning to glow orange. If the heater is energized, it tells us not only is the heater good but that the defrost termination thermostat must be closed and probably also good. These results usually indicate that the timer is not advancing on it’s own and needs to be replaced.

3. Check the defrost heater & defrost thermostat

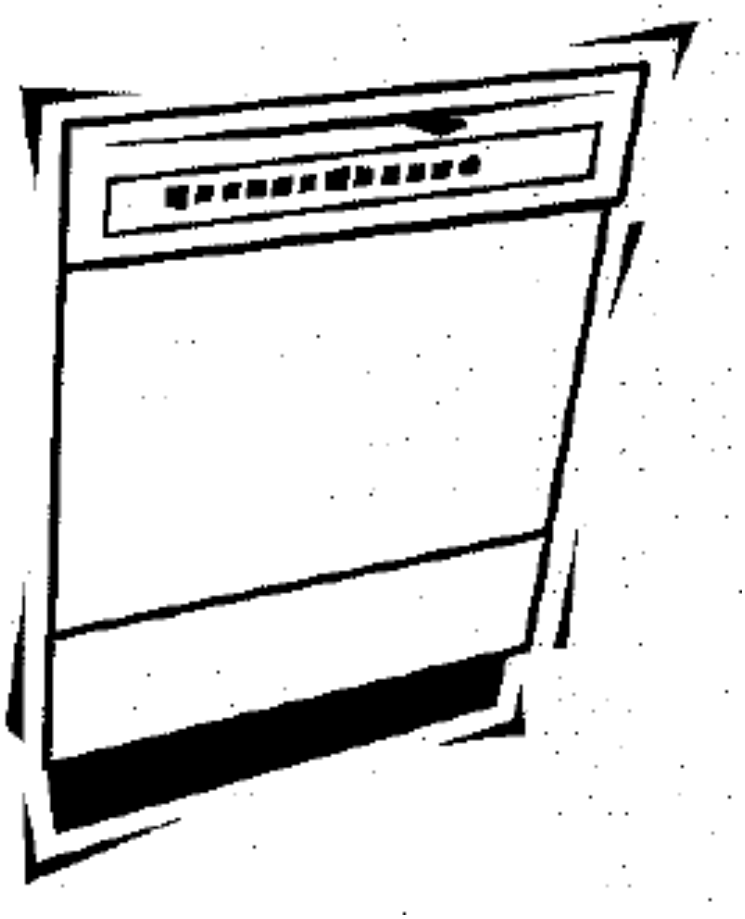
If advancing the defrost timer into the defrost mode manually did not energize the heater, it is more likely that either the defrost termination thermostat or the heater itself is at fault.

To determine which part may be defective, first remove power from the refrigerator. Then pull the leads from the defrost heater and check it for continuity or resistance with your meter. If the heater is open, then that's the bad part. If the heater has continuity, then the problem is most likely the defrost termination thermostat.

Don't forget that after the bad part has been diagnosed and replaced, the job is far from finished. ALL of the frost on the evaporator must be removed and the water from the melted frost has to be captured.

NOTE: The material contained in this section is preliminary and generic. For more detailed information on a particular model appliance, please reference the Tech Manual for that model or the Mini-Manual that comes packed with that appliance.

Dishwasher Section



DISHWASHER SECTION

Dishwasher models and features have greatly changed over the years but the main functions of a dishwasher have stayed much the same. A dishwasher provides the environment for getting dishes clean. They allow water to enter the tub for a certain amount of time. They use some type of pumping action to move that water in combination with detergent over the dishes. It pumps the dirty water down the drain and then provides for some type of drying of the dishes. These function that we just mentioned are made possible by the electrical and mechanical components engineered into the appliance. We will try to cover these components in this section.

Electrical Components

- Door Switches
- Timer
- Motor/Pump Assembly
- Drain Solenoid
- Water Valve
- Flood Switch
- Calrod Heater

Mechanical Components

- Piston & Nut Assembly
- Detergent Cup Assembly
- Rinse Aid Dispenser

Wiring Schematic / Strip Circuits

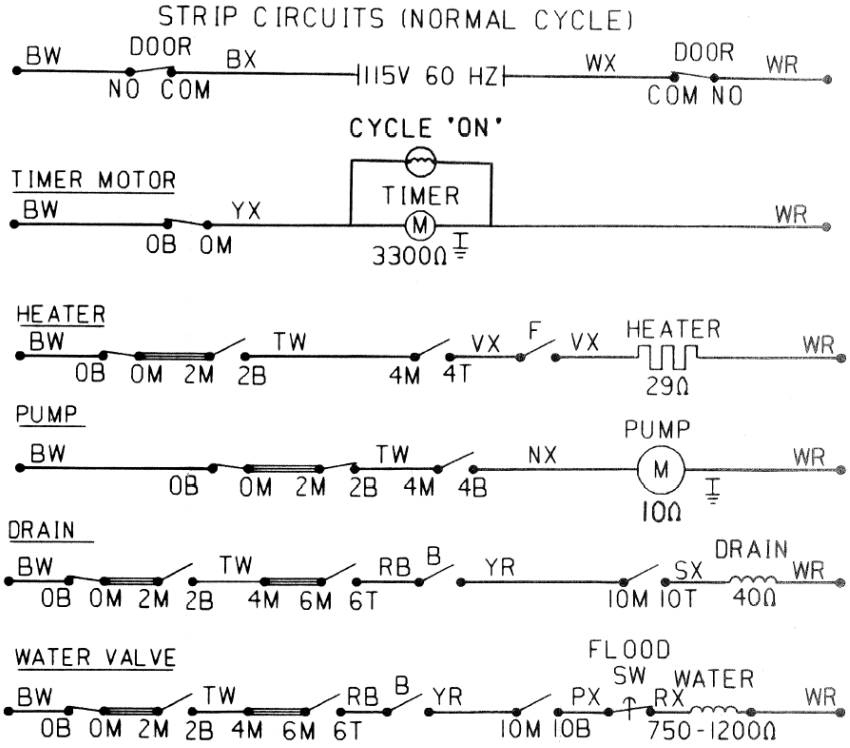
As with any appliance, a valuable diagnostic tool is the schematic and strip circuit diagrams that come on the mini-manual packed with each machine. Also refer to the mini-manual for any features or functions that may be particular to the model you are working on.

Using the schematic to determine the cause of the malfunction may save time in making a correct diagnosis of the issue your machine is having.

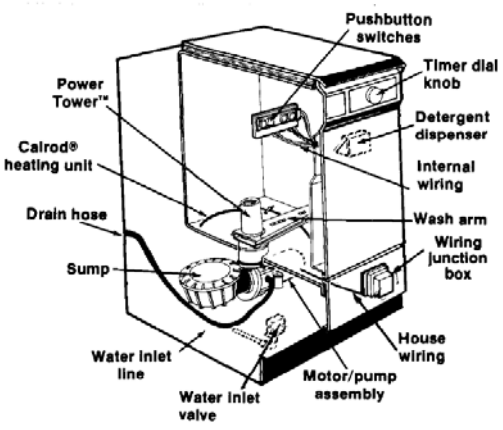
Make note of all the switches you may see in the circuits. With the exception of the two door switches and the flood switch in the water valve circuit, the switches are all in the timer assembly.

That would lead one to believe that in cases where an individual component is not working but the rest are, it would be highly likely that the problem is either with the component itself or the timer mechanism. Turn the timer dial to activate that component and check for 120 volts at the component terminals. If the

voltage is there, the component is bad. If there is not voltage, it is likey a timer that is at fault.



HOW DISHWASHERS OPERATE

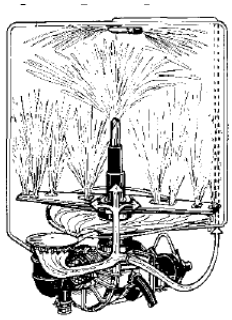


Dishwasher operation starts with electrical power and water. Built-in dishwashers are directly wired to a 15 or 20 amp circuit and also have a permanent attachment to hot water and drain lines.
From the power supply, electricity is conducted to the dishwasher components through the door latch switch and the dishwasher controls. Through a network of internal wiring and parts, the electricity is distributed from the dishwasher's timer control system. The timer's switches turn power on and off to various components of the dishwasher, allowing completely automatic washing and drying of the dishes.

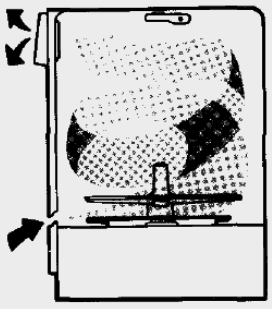
During the fill cycle, a water valve in the incoming hot water line opens for the

required length of time, which is determined by the timer. A float switch in the tub bottom prevents over-filling in the event of an electrical malfunction. During washing, the dishwasher motor drives a pump to re-circulate water mixed with detergent.

The water is forced under pressure through the revolving spray arm or arms. When the timed pre-wash period has elapsed, a solenoid coil is energized by the timer to open the drain line and allow water to pump out. The timer then closes the drain valve and opens the water inlet valve to admit water for the next portion of the cycle. During the second washing, the machine fills as before, and the timer opens the closed section of the detergent dispenser to add fresh detergent to the water.
As water re-circulates through the pump, it passes through a soft food disposer which chops up soft food particles and allows them to be flushed away down the drain


Three-level wash system

After completing all wash, rinse, and drain cycles, the timer switches on the Calrod® heating unit to dry the dishes. An energy efficient convection drying system allows air to circulate without the use of a fan in most models; cool air enters the tub at the bottom and rises naturally as it warms, venting near the top of the dishwasher. Some models also use a blower to speed drying. On some models, the energy saver dry option allows selection of a no-heat drying cycle.
When energy saver dry is chosen, the Calrod® unit is not energized and the dishes dry naturally over a longer period of time, such as overnight.


Convection drying system

WASHABILITY PROBLEMS

Many customer complaints, of the dishwasher not working properly, can be traced not to mechanical or operational problems but to issues from outside the machine which can affect the overall performance of the dishwashing process.

Where no mechanical problems exist, dishwasher performance issues generally fall into two categories:

Poor Wash Performance

Wash performance is a function of water temperature, detergent usage and loading.

Poor Dry Performance

Dry performance is a function of water temperature.

Factors Affecting Performance

- Low water temperature and or low water pressure
- Hard water
- Detergents
- Loading racks correctly
- Selecting the correct cycle
- Foreign objects in wash-arms, circulation pump, drain pump, air gap, collection chamber, hoses and check valves

Water Temperature

Water entering the dishwasher is *cooled* by the interior tub temperature of the dishwasher. Water ENTERING the dishwasher must be minimum of 120 degrees (but no more than 150 degrees).

Example: A 70 degree dishwasher interior will remove approximately 30 degrees of heat from the 120 degree water entering the dishwasher. Therefore, the water temperature circulating inside the dishwasher after the first fill will be about 90 degrees.

The water temperature will steadily increase as the cycles continue to fill and drain the dishwasher.

If The Water Temperature Is Too Low the result may be:

- Un-dissolved dishwasher detergent.
- Un-dissolved animal fats and vegetable oils.
- Food particles left on dishes.
- Poor drying / wet dishes.
- Water spots.

Detergents

- Dishwasher detergents should always be fresh and not exposed to moisture in storage.

Loading Racks Correctly

- Load racks as illustrated in the use & care or owner's manual that comes with the dishwasher.
- Don't block the detergent cup with large items that prevent water from flushing the detergent from the cup.
- Don't block the detergent cup with items that prevent the cup from opening.
- Don't let items extend below the racks that will hit the spray arm and cause the spray arm to stall.

Correct

Incorrect

COMPONENTS

Door / Latch Switches

Most dishwashers utilize two door or latch switches. One is wired in the L1 side of the line and the other is wired in the neutral side. When the door is closed and latched, both switches must close or the symptom usually is a dead machine. After removing power to the dishwasher, both can be checked for continuity with an ohmmeter.

Electro-Mechanical Timers

Timers are not repairable in the field. Some timers are "turn" to start and others are "push" to start. It is most important to be certain the timer is faulty before replacing it. Always ask yourself, when confronted with a dishwasher problem, just how or what can happen to the timer that would cause the problem.

Timer control failures are usually due to failure of the timer drive motor, the harness plug, or, in rare cases, the switches inside the timer control.

Test Procedure

A timer control can be tested very easily and quickly. This procedure follows:

1. Close latch and start dishwasher. Press normal cycle if unit has pushbuttons.

2. Observe control dial. Does it rotate? If not, remove power and check continuity of timer motor- should be approximately 5130 ohms. If timer motor is open the timer should be replaced.

3. Check the harness plug. It should fit tight. Gently pull all wires in plug to insure the terminal is seated properly in the plug.

4. Turn control dial slowly by hand. Observe the operation of the various components (water valve, pump out solenoid, main motor). If a component fails to operate, remove power and check continuity of component. Replace component if it checks "open". Restore power and check for voltage at the component.

Motor / Pump Assembly

The heart of any dishwasher is the motor / pump assembly. This assembly performs a dual function within the dishwasher system. During the wash and rinse cycles, it pumps water under pressure through the various spray arms, to wash dishes clean.

In the drain cycle, the pump pushes the dirty water in the dishwasher out of the machine through the drain hose.

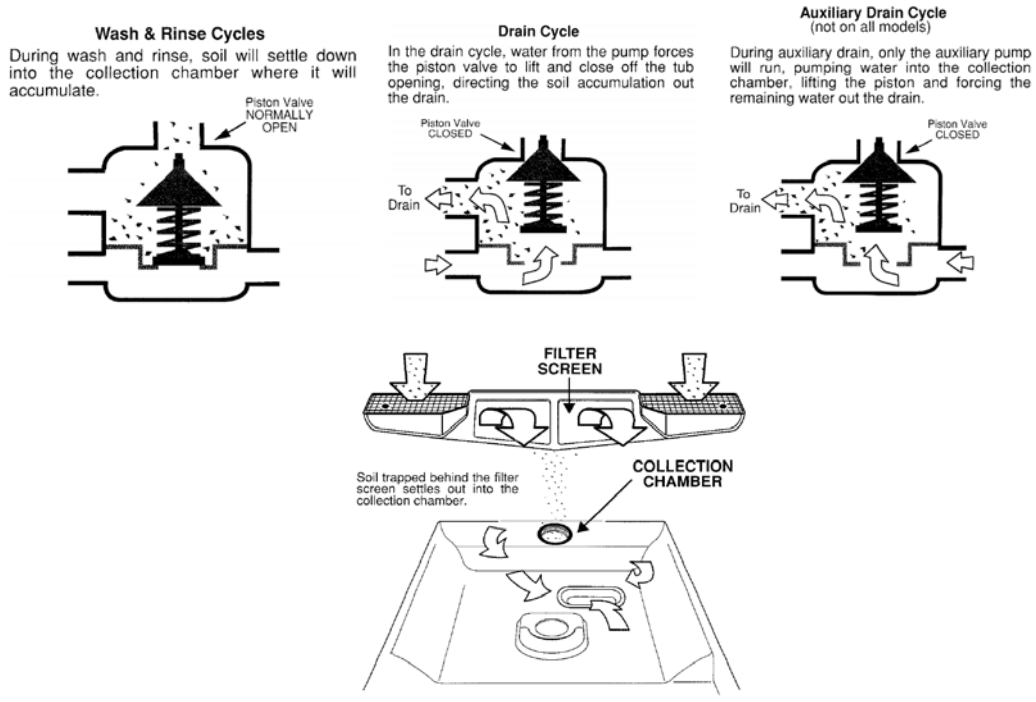
The motor pump mechanism can be checked with a voltmeter at the motor terminals with the timer in the wash cycle. There should be approximately 120vac at the motor terminals. If there is voltage at the terminals but the motor does not operate, more than likely the motor/pump assembly needs to be replaced.

If there is voltage at the motor terminals but the motor just sits there and hums, check the following:

- If DW has been idle for a while, seal could be stuck.
- Turn power off, then turn fan blade till seal becomes loose
- Mix water & citric acid WD35X151 (3 to 1) or vinegar & pour directly into bottom of DW, let soak 15-30 min. & then run normal cycle – empty tub
- Pour small amount of cooking oil in bottom of DW & run for a few seconds – will keep seal from sticking if DW not to be used for awhile

PUMP OUT

Dirty water must be removed. If this does not happen, check the easy things, first. Make sure the disposer is clean and clear. The same goes for the air gap and drain hose. Next, check the various check valves, if present, on your machine. One of the most common drain problems is with the umbrella seal in the collection chamber under the screen on the back of the tub on models so equipped. Replace it if it is worn or missing.

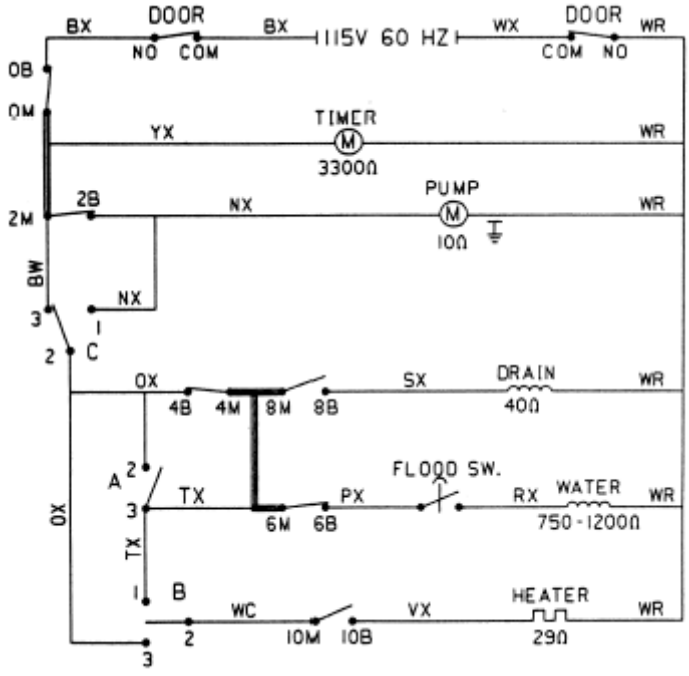


Some models have a check valve in the dual drain pump. If this is worn or missing, the dishwasher will not drain completely. A defective or missing check valve in the collection chamber outlet could also cause drain problems.

Dishwashers that incorporate a drain solenoid mounted to the pump, could fail to pump out if the drain solenoid is bad or if the “D” seal on the diverter is bad. Replace solenoid or pump as required to repair.

DISHWASHER ELECTRICAL COMPONENTS

Door Latch Switches
Timer / Electronic Control (depends on model)
Motor / Pump Assembly
Auxiliary Pump (select models only)
Drain Solenoid
Float Switch
Water Inlet Valve
Heater



MECHANICAL COMPONENTS

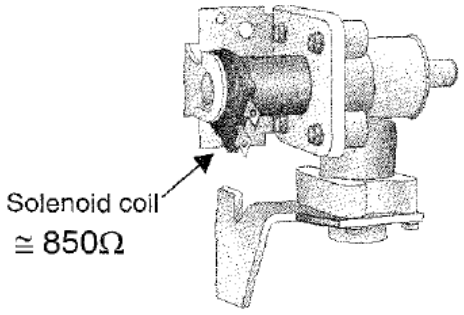
Spray Arm / Power Towers
Nut & Pinion Assembly
Detergent Cup Dispenser
Rinse Aid Dispenser
Door Latches

WATER VALVES

The standard water valve used on most models has a flow rate of approximately 1.75 gallons per minute. The coil resistance is approximately 850 ohms.

NOTE: The fill times vary by model and the type of valve used. Use only the exact replacement water valve. The wrong valve will affect the amount of water entering into the dishwasher and wash performance.

Water valve failures are traced to open coils and intermittent coils. Mechanical failures such as calcium build-up, plugged screens, broken springs and cracked valve bodies are also a cause of failure. In general, its best to change the valve rather than try to repair it. If the coil is bad the entire valve should be replaced.



A deceptive problem sometimes occurs involving the water valve. This is a valve with an intermittent coil. A water valve with an intermittent coil may provide a full first fill, half of the second fill and no more water the rest of the cycle. It may also fill normally for the first four fills before opening.

In every case the complaint where the coil is intermittent will be poor washability. The drain line should be checked first for a partial blockage.
Proceed as follows:

1. Allow dishwasher to complete first fill.

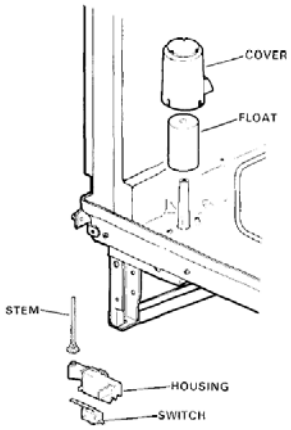
2. Turn to pump-out and listen carefully for water valve to come on for next fill.

3. Cycle the fill valve at least 10 times. By cycling, we mean to allow the water valve to complete a full fill. Time these fills (check mini-manual for fill time). If water valve short fills or fails to fill, replace valve.

FLOAT SWITCH

The float switch is in series with the water valve coil. It offers overfill protection against timer motor failure during fill and against pump motor failure. It will not prevent overfill if the water valve is struck open mechanically.

FLOAT SWITCH

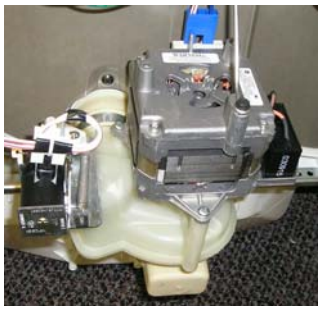


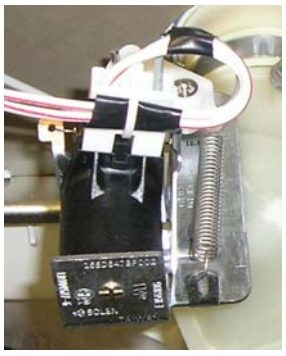
The float switch must never control the amount of water that enters the dishwasher unless it is an over fill.

The amount of water that enters the dishwasher should always be controlled by the timer control.

PUMP-OUT SOLENOID

The pump-out solenoid is a 40 ohm coil that tips the gate valve in the pump housing into the water stream. This puts the dishwasher into the drain mode. The pump-out solenoid is energized by the timer control for not over 30 seconds.





If the coil is not operating, check voltage being delivered by the timer control. Unplug coil and check at this point. Resistance can be measured. It should read 40 ohms.

The coil can also be direct tested. Be careful not to exceed 30 seconds on the direct test. Make sure plunger (armature) is seated.

CALROD® HEATERS

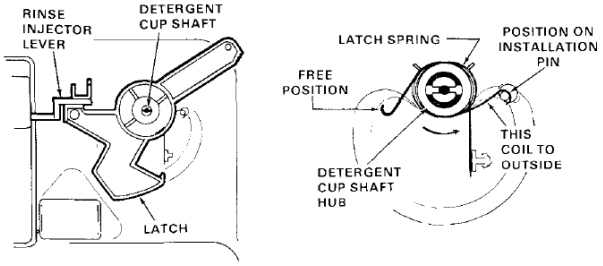
General Electric and Hotpoint dishwashers use a number of heaters with different configurations and different wattages.

TESTING

The voltage should always be checked at the Calrod if it is suspected that the Calrod is faulty. Be sure the energy saver switch is pressed to "heated dry". Turn timer control to dry portion of cycle and read voltage at the Calrod. It should read line voltage (115V.) If no voltage can be detected, check circuit back to timer control. Refer to Mini-Manual to check circuit.

DETERGENT CUPS

All General Electric and Hotpoint Dishwashers use, basically, the same detergent cup. The detergent cup must trip at the correct time and open completely. Some water leakage into the cup is normal but the detergent must not be allowed to become soaking wet or turn into a liquid state.
A cup that leaks this badly should be replaced.



If cup fails to open:

1. Spring is broken or missing.

2. Cup is warped and binding.

3. Trip wire (on some cups) loose or out of hole. Reinsert in hole and bend to take up the looseness.

If the cup is warped badly enough to bind, it should be replaced.

DISH RACKS

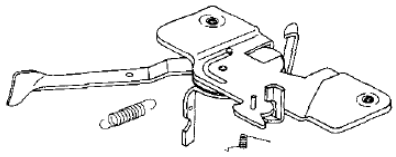
Problems concerning dish racks are as follows:

- Fingers bent or broken - Bend fingers back to correct alignment or if broken, replace rack.
- Rollers bent out of line, causing rack to fall off track - Straighten rollers to original position.
- Rust marks on dishes - Inspect rack fingers for worn or bare spots In plastisol coating.

The upper rack rollers mount on the rack in the same manner as the rollers do on the lower rack. The slides do require some special attention in order to remove the end cap.

LATCH

Figure below shows a typical latch assembly used on General Electric & Hotpoint dishwashers.



Problems associated with the latch mechanism are listed below:

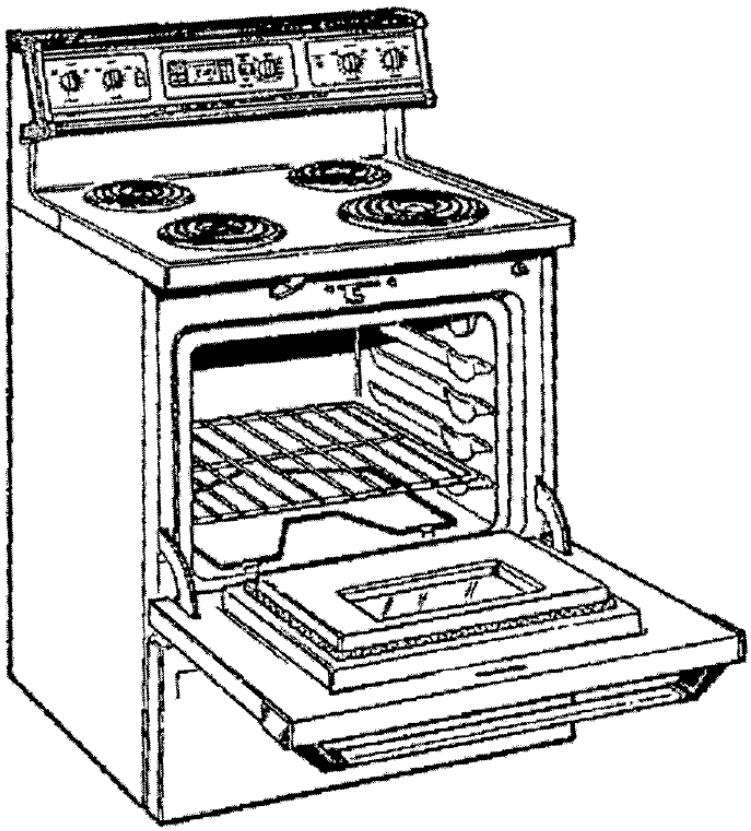
- Machine won't run - Check to see if "tang" on latch is actually closing interlocking switch. Bend to adjust if it does not close switch. Remove power and check continuity of switch.
- Door Leaks - Adjust strike to pull door in tighter. It is not necessary to remove strike mounting screws - just loosen, adjust strike, and tighten screws.
- Latch is hard to operate - Lubricate with a good grade of light grease such as Lubriplate.
- Dishwasher runs with door open - Check operation of latch - interlock switch - replace latch or interlock switch.

RINSE DISPENSER - MECHANICAL

Most GE & Hotpoint dishwashers use a non electric rinse dispenser. If it leaks or is otherwise damaged the entire assembly should be replaced. The dispenser has four fingers that hold it in place. It has no gasket, but has a lip seal built onto the tank spout. To remove the injector, remove the screws holding the door panels together, separate the door panels. Press the fingers of the assembly inward while gently pulling the rinse injector from the door. When reinstalling, simply press into place.

NOTE: The material contained in this section is preliminary and generic. For more detailed information on a particular model appliance, please reference the Tech Manual for that model or the Mini-Manual that comes packed with that appliance.

Electric Range Section



ELECTRIC RANGE

Although electric ranges have evolved over the years to become more energy efficient and to keep pace with the styles of today's kitchen areas, they have basically kept the same major components of yesterday's ranges.

Electric ranges all share the same basic function. They convert electrical energy into heat energy to warm or cook our foods. Because of the large amount of electrical power they may require at certain times, extreme care must be taken when working on one of these appliances.

If possible, consult the mini-manual that comes with all GE ranges for the specific components incorporated in the range you are working on.

Electrical components
Most electric ranges utilize the same electrical components, in one form or another, to produce the controlled heat required to cook foods properly. Some of these components listed below.

Heating Elements:
- Bake Element
- Broil Element
- Surface units

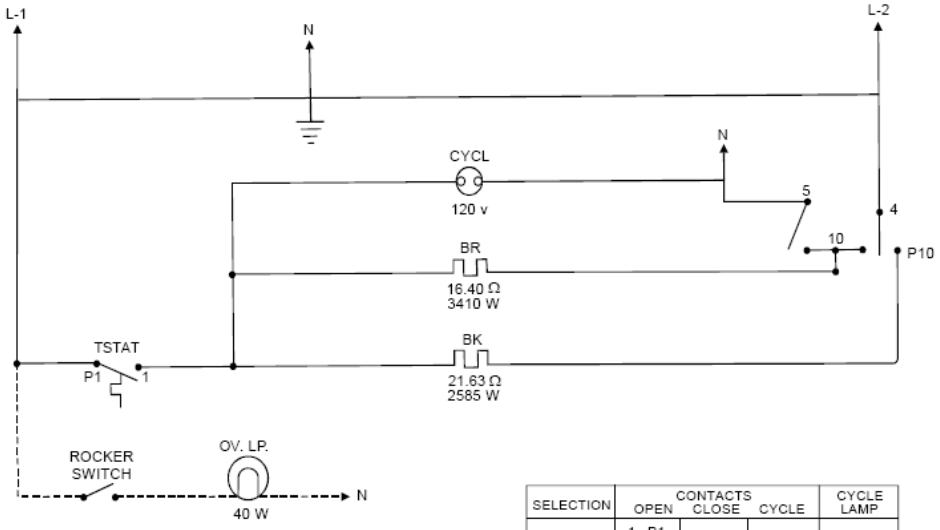
Controls:
- Oven Thermostat
- Oven Selector Switch
- Surface Unit Switches (Infinite Heat Switches)
- Oven Door Switch
- Electronic Control ERC (Used on some ranges in place of thermostat / oven selector switch)
- Oven Sensor (Used on ovens with electronic controls)

Miscellaneous:
- Oven lamp
- Cycle light
- Surface unit indicator light / lights

Range Wiring Schematic
One of the most valuable tools, at your disposal, when trying to repair an electrical range, is the wiring schematic. Being able to trace the "path of current flow" for individual components in an appliance, gives one an advantage in finding a bad component when the range is not working properly.

For ease of explanation, when we say path of current flow, what we are trying to determine is the path that electricity would take from either **L1** through the heating elements and their controls out to **L2** or the path electricity would take from **L1** though the 120volt components out to the **Neutral** leg of the circuit.

Use the schematic below as an example:



BURNER CONFIGURATION	A	B
3 + 1	2600W 21.49Ω	1500W 37.25Ω
3 + 1	2100W 26.61Ω	1250W 44.70Ω

SELECTION	CONTACTS OPEN	CONTACTS CLOSE	CONTACTS CYCLE	CYCLE LAMP
OFF	1 - P1 4 - P10 4 - 10 5 - 10			OFF
BAKE	4 - 10	4 - P10 5 - 10	1 - P1	CYCLES
BROIL	4 - P10 5 - 10	4 - 10	1 - P1	CYCLES

NOTES:
1. CONTACTS 5 - 10 REMAIN OPEN BELOW 250°F.
2. ----- THIS CIRCUIT NOT IN ALL MODELS.

In this range, if everything is working normally, and we use the thermostat / selector switch cycle chart included with the schematic, we can make the following assumptions: Can you follow them through the schematic?

Bake Mode – Current travels from L1 through thermostat contacts P1 & 1 (closed), through the bake element, through selector switch 4 & P10 (closed) then out to L2 to energize the bake element.
At the same time, current is flowing through the thermostat contacts, through the broil element, through the selector switch contacts 5 & 10 (closed) out to neutral to energize the broil element at half power.
And finally, current is flowing through the thermostat contacts, through the cycle light out to neutral to light the cycle light.

Broil Mode – Current travels from L1 through thermostat contacts P1 & 1 (closed), through the broil element, through selector switch contacts 4 & 10 (closed) and out to L2 to energize the broil element. And finally, current is flowing

through the thermostat contacts, through the cycle light out to neutral to light the cycle light.

Oven Lamp – Current travels from L1 through the closed rocker switch, through the 40-watt bulb then out to neutral to energize the bulb.

If you were able to trace the circuits with the range operating normally, how about some scenarios with the range malfunctioning? We're assuming there are no broken wires and there is power (240volts) to the range.

1. In the bake mode, the bake element is not operating but the cycle light is on and the broil element is warm. What could possibly be wrong with the range?

2. In the broil mode, the broil element is not being energized but the cycle light is on. What may be wrong with the range?

3. The customer claims that the oven does not brown on top while baking and the oven light and the cycle light do not operate. What could possibly cause these components to malfunction?

Checking Individual Components
Most components in an electric range can be checked with your ohmmeter or continuity checker with the power disconnected.

Calrod™ Surface Heating Elements – The heart of any electric range is the heating unit. Heat is generated by an electrical current passing through a resistance wire enclosed in a case, called a sheath, and insulated with magnesium oxide (MgO) between the sheath and the resistance wire.

The outside of the sheath is made of Incoloy®, an alloy composed of iron, nickel and chrome. This material has the unique property of being able to withstand oxidation and deterioration at the high operating temperatures of electric range units.

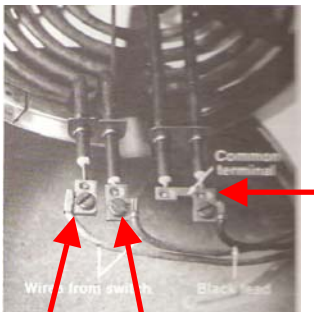
Single Element Plug-In Units

Check the resistance between the two metal tips at the end of the burner. The resistance should be approximately 27 Ohms for the 8-inch burner and

approximately 45 Ohms for the 6-inch burner. An infinite resistance reading or no continuity means the heating element is open and needs to be replaced.

Caution --- If there appears to be any deterioration, burning or arcing of the two metal tips, the receptacle for that element also needs to be replaced along with the burner.

Double or Triple, Hard Wired Element



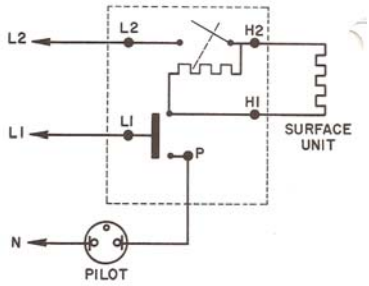
Individual Heating Elements

To check multiple element, hard wired heating units, after removing power, mark and disconnect wiring. With an ohmmeter or continuity checker, measure between the common terminal and each leg. Readings should be approximately the same as the plug-in units, 27 ohms for the 8-inch elements and 45 ohms for the 6-inch units. As with the plug-in burner, an infinite resistance reading or no continuity means the heating element is open and needs to be replaced.

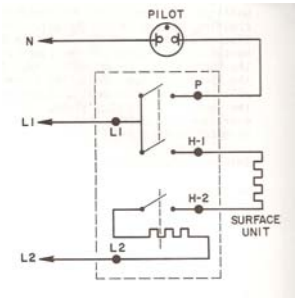
Infinite Heat Switches

The infinite heat control is essentially a timing device and its on-off time is not related to any temperature sensing element at the surface unit. The switch is provided with two specific detent positions – OFF and HIGH. Between the high and off settings, the control provides an infinite range of heats. At the high detent setting, the surface unit is energized continuously.

There are two types of infinite heat switches, voltage sensitive and current sensitive. There are also a variety of different wattage ratings. Make sure you replace the switch with the same type and same rating. Replacing with the proper GE part number will guarantee both.



Voltage Sensitive



Current Sensitive

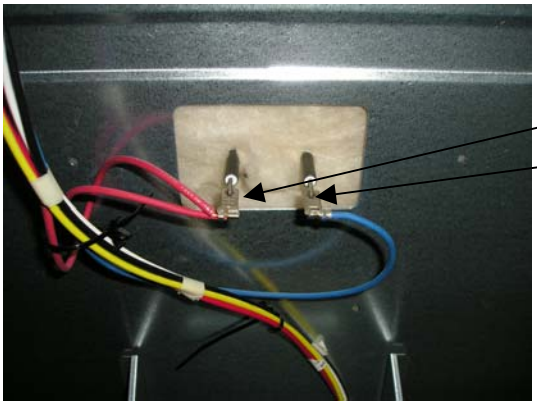
What you can see from the illustration of the two types of infinite heat switch is that with respect to the surface unit, they are wired differently and if bad, need to be replaced as such.

However, they are tested very similar to each other. If checking for continuity, remove power from range then mark and remove wires from control. Turn the control to any “on” setting. There should be continuity between the following terminals on the switch:
L2 to H2
L1 to H1
L1 to P

If there is no continuity between these points, the switch is bad and must be replaced.

If the switch is being checked “in circuit” with the power applied, you should read the following with your ac volt meter:
Between L1 & L2 on switch --- 240 volts (if not present, problem with supply).
Between H1 & H2 with switch turned on --- 240 (if not present, switch is bad).

Bake (lower element) & Broil (upper element) Elements
Both the bake and broil elements can be checked in the same manner. Both can be checked by resistance / continuity or by voltage. Both can either be removed



Check terminals for resistance and/or voltage.

from the oven or checked in place from the rear of the range.

Caution: If checking for resistance or continuity, power must be removed from the range and the wires marked and pulled off the terminals of the element in question.

Resistance between the two terminals of the bake or broil elements should be less than 100 ohms. As with the plug-in burners, an infinite resistance reading or no continuity means the heating element is open and needs to be replaced.

If checking by voltage, do not remove the wires from the terminals. Turn the element on and check for supply voltage (208/240volts) between the two terminals. If you are reading the supply voltage and the burner is not getting hot, the element is bad and needs to be replaced. If there is no supply voltage at the terminals, there is a switch or supply problem that needs to be addressed.

Oven Thermostat / Oven Selector Switch

On many newer ranges, the oven thermostat and the oven selector switch are one component. On older ranges, in most cases, they are two separate components. For ease of explanation, we'll discuss them here as if they were separate components.

Thermostat

Most hydraulic or mechanical thermostats consist of an electrical switch, a diaphragm and capillary or bulb filled with a substance that reacts to temperature change.

As the temperature in the oven changes, the substance in the bulb expands or contracts and compresses or relaxes the diaphragm, which in turn, opens or closes the switch. The thermostat switch is, in the case of our schematic shown at the beginning of this section, terminals P1 & 1. When the switch is closed, this allows a path of current flow through the oven elements. When the switch is open, the elements are turned off.

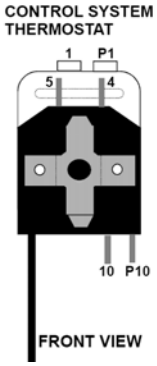
The thermostat is internally calibrated to keep the oven temperature at a constant point by turning the oven elements off and on as needed.

Oven Selector Switch

The oven selector switch setting determines which oven element is energized. In the Broil position, there is a path of current flow through the broil element at full power. The broil element should glow red. In the Bake position, there is a path for current flow through the bake element at full power and in some ranges, through

the broil element at half power. The bake element will glow red but the broil element, although very hot, will not glow red.

Checking Oven Selector Switch
To check the oven selector switch with your ohmmeter, remove power from range, mark and remove wires from selector switch. Using the chart below, check the following terminals:



SELECTION	CONTACTS OPEN	CONTACTS CLOSE	CYCLE	CYCLE LAMP
OFF	1 - P1 4 - P10 4 - 10 5 - 10			OFF
BAKE	4 - 10	4 - P10 5 - 10	1 - P1	CYCLES
BROIL	4 - P10 5 - 10	4 - 10	1 - P1	CYCLES

NOTES:
1. CONTACTS 5 - 10 REMAIN OPEN BELOW 250°F.
2. ----- THIS CIRCUIT NOT IN ALL MODELS.

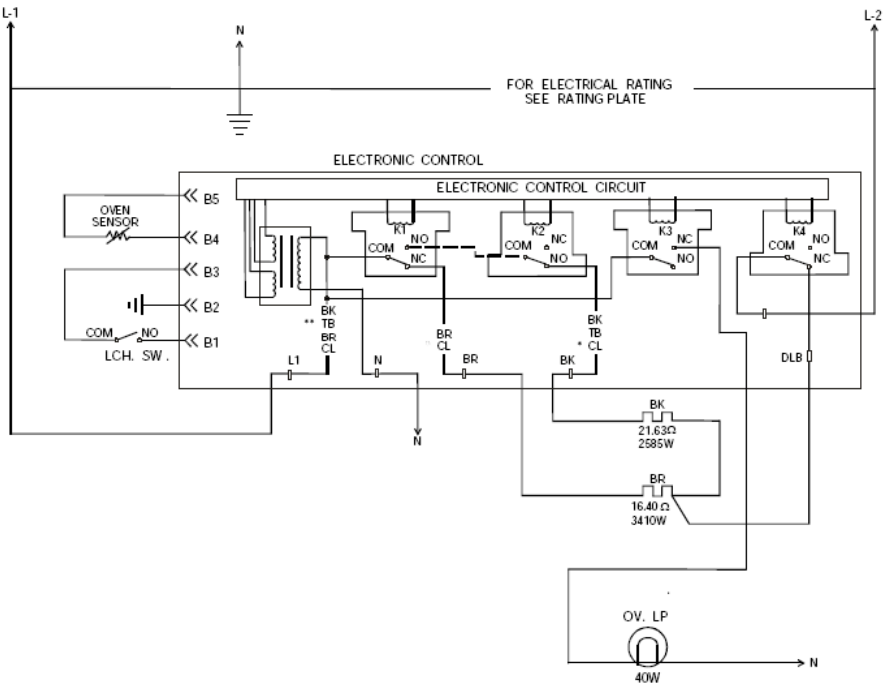
Note: The terminals on the selector switch in your range may vary slightly from the one above. Refer to the mini-manual in the range for the proper terminals to check in the different switch settings.

Adjusting Oven Bake Temperature
The bake temperature can be adjusted by the skirt on the thermostat knob.

1. Remove the thermostat know.
2. Loosen the two screws that are holding the skirt and knob together.
3. Rotate the skirt clockwise to make the oven hotter, rotate the skirt counter clockwise to make the oven cooler.
4. Each “click” represents approximately 10°F.
5. Tighten screws and re-attach the knob to the thermostat shaft.

Electronic Controlled Ovens
Some higher end range models incorporate an electronic control in place of the mechanical / hydraulic thermostat / selector switch controls. These electronic controls utilize a solid-state sensor to monitor oven temperatures instead of the bulb or capillary tube that a hydraulic thermostat uses.

Observe the following oven schematic and compare it to the one at the beginning of this section.



Make note that the bake and broil heating elements are connected directly to the electronic control. There are no mechanical switches involved in this arrangement. When powered up by the consumer touch pads on the front of the control, power comes directly from the control to the heating elements.

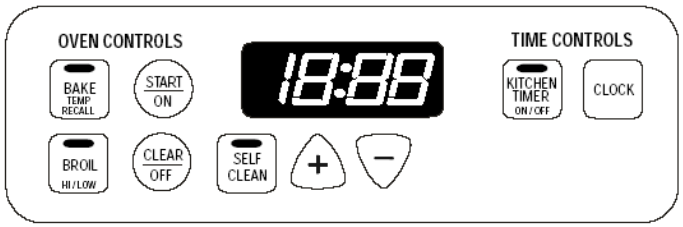
Oven Sensor

The oven sensor is a solid-state device that takes the place of the thermostat capillary bulb. Changes in temperature cause a change in resistance of the sensor. This change in resistance is feed over two wires to the electronic control. The control interprets this resistance change as temperature change inside the oven and responds accordingly by cycling the bake or broil elements off and on.

Testing Oven Sensor

The oven sensor can be checked easily with you ohmmeter. Unplug the sensor at the control. At room temperature, the sensor should read approximately 1100 ohms.

CONTROL SYSTEM



Adjusting Oven Bake Temperatures (Electronic Control)

The bake temperature can be adjusted by +/- 35°F in 1°F increments.

1. Press and hold the BAKE and BROIL pads for about 2 seconds until the display shows SF.
2. Press the BAKE pad. A two-digit number shows in the display.
3. Press the **+** pad to increase the temperature in 1 degree increments or press the **–** pad to decrease the temperature in 1 degree increments.
4. Approximately 5 seconds after the last change is made, the display will return to the time of day and the oven is ready for use.
5. Press the START pad. The control will return to the time of day.

Fault Codes

In many cases, when a problem exists with the electronic oven control system, the display will show a fault code. This alerts the Technician to the fault itself and the possible solution or fix for the problem.

FAULT CODES

FAILURE CODE	MEANING	CORRECTION
F0	SHORTED CANCEL / OFF KEY	Power down then power up the range. If the fault condition reappears within 15 minutes - REPLACE CONTROL.
F2	OVEN OVERTEMPERATURE CONDITION 1) Door unlocked — oven exceeded 620° F 2) Door locked — oven exceeded 930° F 3) Door Latch unlocked while oven in excess of 620° F.	1) If no overtemperature condition occurred: Check all contacts and connections in sensor circuit. Eliminate excessive resistance in sensor circuit due to increased contact / connector resistance. 2) If overtemperature condition ocurred: look for welded relay contacts on bake, broil, or double-line-break relays. If relay contact welding is confirmed REPLACE CONTROL. 3) Ensure Door Latch stays locked for duration of Clean cycle.
F3	OPEN OVEN SENSOR Sensor resistance > 2900 ohms.	Measure sensor circuit resistance at sensor / lock switch connector (should be 1100 ohms at room temperature). Ensure each sensor lead to chassis ground resistance is infinitely high.
F4	SHORTED OVEN SENSOR Sensor resistance < 950 ohms.	If open or short circuit is detected: 1) Look for cut or pinched sensor harness wire. 2) Look for sensor leads shorted to chassis ground. 3) Look for loss of terminal contact in the harness and at the control. 4) Check sensor resistance directly at sensor harness connector (away from the control). If reading is abnormal - REPLACE OVEN SENSOR. If sensor circuit appears to be normal: 1) Reinstall sensor / lock switch connector on the control and measure sensor resistance at solder joints on the back of the control circuit board. If abnormal resistance reading is observed - RESTORE CONTACT PRESSURE ON SENSOR / LOCK SWITCH CONNECTOR. If corrective actions above do not eliminate the problem: REPLACE CONTROL
F5	CONTROL SUPERVISORY CIRCUIT FAILURE	REPLACE CONTROL
F7	SHORTED MATRIX KEY	Power down then power up the range. If the fault condition reappears within 15 minute - REPLACE CONTROL.
F8	EEPROM ERROR	Power down then power up the range. If the fault condition reappears within 5 minute - REPLACE CONTROL.

Self-Clean Feature
Some models incorporate a feature called “self-clean”. This feature cleans by heating the oven cavity to a temperature of approximately 880°F. The results are a decomposition of oven soil. In the temperature range between 700°F and 880°F, cleaning begins by initially removing moisture and then breaking down the hydrocarbons into smoke and gases. These by-products are further heated as they pass through the oven vent system, which breaks down the smoke into a clear odorless gas, which resembles a “heat” odor.

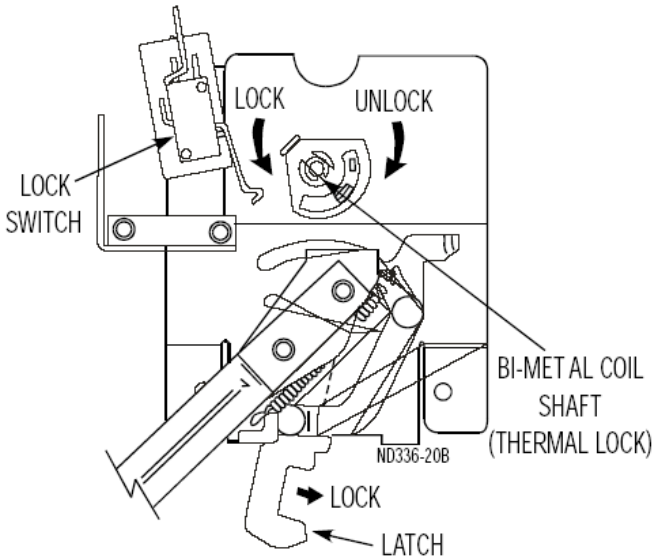
Oven Latch Mechanism
All ovens that incorporate the self-clean feature, must also have some type of oven door latch mechanism to prevent the oven door from being opened at temperatures above approximately 550°F. The latch mechanism also contains a switch that will prevent the oven from going into the clean operation unless the door is latched.

The latch mechanism is thermally operated. When the latch handle is moved to the clean position, the latch hook engages a slot in the oven door.

As the clean cycle progresses, the increase in oven temperature causes a bi-metal coil on the latch mechanism to expand. This expansion causes a cam to rotate into the path of the latch mechanism, locking it into position.

This cam will keep the door from being unlatched. This interlock will usually engage at oven temperatures between 450 and 550 degrees F. It will remain locked until the oven temperature has dropped below these temperatures (usually within 30 minutes after the clean cycle has stopped).

Note: When installing a new latch, make sure that the latch arm stop is rotated fully to the unlock position (clockwise).



NOTE: The material contained in this section is preliminary and generic. For more detailed information on a particular model appliance, please reference the Tech Manual for that model or the Mini-Manual that comes packed with that appliance.

Gas Range Section

GAS RANGE

In this section, we'll deal with two of the more common types of gas ranges, standing pilot and electronic ignition.

On all models, shut off gas supply to range when performing repairs or component replacement.

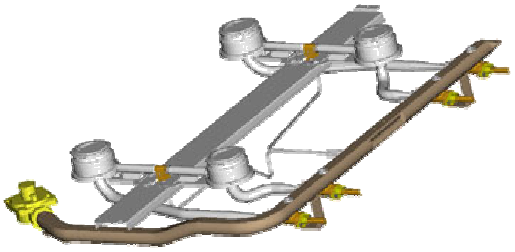
Consult the mini-manual that came with appliance for adjustments that may be particular to that model such as door adjustments, door gasket replacement, low flame setting, etc.

STANDING PILOT GAS RANGES

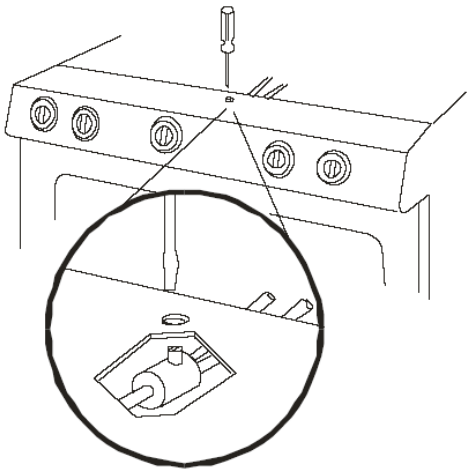
Gas Supply Shut-off
Many gas ranges are not equipped with their own shut-off valve. If properly installed, a shut-off valve will be located behind the range usually near the floor.

Gas to the oven burner supply is shut-off by the thermostat when in the off position.

Gas Cooktop Distribution Components
Pressure Regulator
Gas Manifold
Individual Gas Valves
Pilot Assembly
Burner Heads

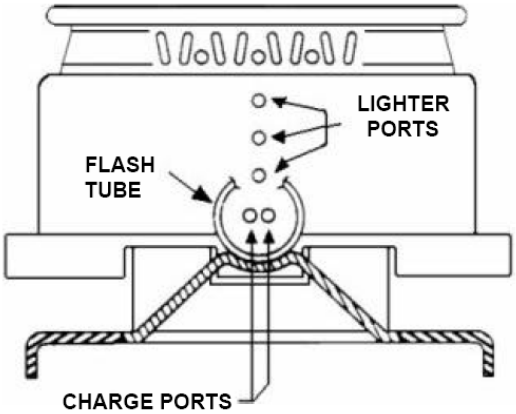


Pilot Flame Height Adjustment
The pilot height adjustment screw is accessible through a small hole in the control panel as shown.
The adjustment screw controls both top pilots. When properly adjusted, the pilot flames will be approximately 5/16 inches in height.

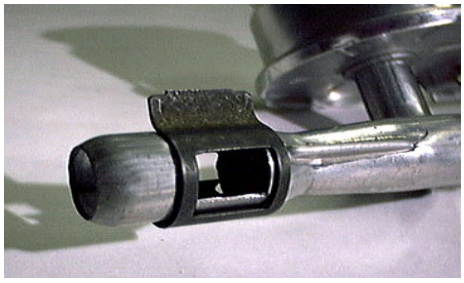


Top Burner Ignition
With the valve in any position except off, gas flows through the valve to the burner. At the base of the burner, there are charge ports or small holes that direct gas flow from the burner into a flash tube leading to the pilot flame. The pilot flame ignites the gas in the flash tube. The flame of the ignited gas flashes back through the flash tube to the charge ports.

The flame then climbs the side of the burner by way of the “lighter ports” in the side of the burner. The lighter ports carry the flame to the top of the burner where ignition occurs. Ignition problems are often caused by blockage of the charge ports or lighter ports. The ports can be cleaned by using a small piece of wire or similar instrument. **DO NOT ENLARGE THE PORT WHEN CLEANING.**



Top Burner Adjustments
On many older models, there existed an air shutter that allowed for the adjustment of the amount of primary air being mixed with the gas supply. This air shutter was moved to allow more or less air into the mix so as to achieve a steady blue flame with as little yellow tipping as possible.



On most newer models, the air shutter has been removed. Primary is mixed with the gas at the gap between the orifice and the bottom of the burner. The dimension of this gap determines the air to gas ratio. Altering the dimension of the air mixing gap is not recommended.

If there is a flame problem with an individual burner, a visual inspection may reveal the cause of the problem. Inspection of the area should include:

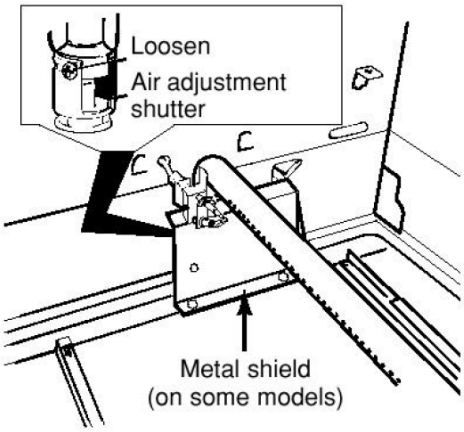
1. Inspect the area where the burner “legs” straddle the gas supply tube mounting nut. All 4 legs (2 front and 2 rear) must contact the burner box bottom.

2. The gas supply tubes must point straight into the burners.
3. The opening in the orifice spud must be open and free of debris.
4. Cooktop must be completely lowered. Adjacent countertops, cabinets, etc. should not interfere with the raising and lowering of the cooktop.

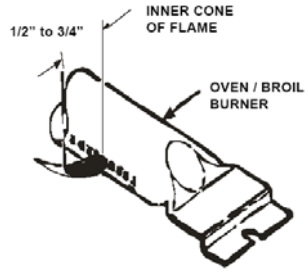
Oven Burner Adjustments

Most oven burners are equipped with an air shutter and a universal (NAT or LP) orifice hood and orifice needle.

1. **Air Shutter Adjustment**
    - Remove the oven door, oven bottom, broiler drawer and metal shield (if applicable).
    - Turn the thermostat to any BAKE temperature and observe flame:
        - Soft, yellow flames indicate too little primary air – open air shutter more. If condition cannot be corrected with air shutter wide open, see **Flame Size.**
        - Harsh, blowing flames indicate too much air. Reduce air shutter opening.



2. **Flame Size** – the inner, blue cone of the burner flame should be between ½ to ¾ inches in length with little or no yellow tipping (observe with flame spreader removed).



Flame Size Reduction – If air shutter adjustments fail to provide proper flame length or flame characteristics, the gas flow to the burner can be reduced (on Natural Gas installations only) by turning the orifice hood slightly in the LP direction. For best results, remove the flame spreader and observe the flame while turning the hood.

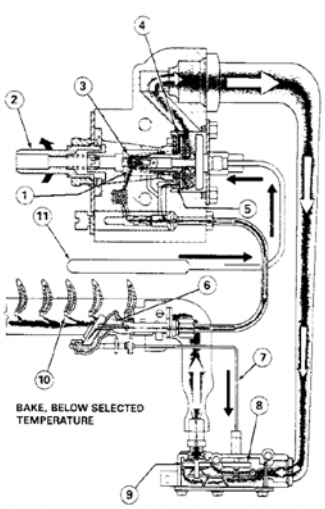
Oven Control Systems

The two standing pilot, oven control systems that we will cover here are the older system that utilizes a gas valve (safety valve) and the newer systems that do not use a gas valve assembly.

OVEN CONTROL SYSTEM USING GAS VALVE

The oven control system consists of:

1. Thermostat
2. Pilot Assembly
3. Oven Gas Valve (Safety Valve)



SYSTEM OPERATION

1. Standing pilot gas flows through the thermostat body to the pilot assembly at all times.
2. Thermostat knob is turned to a selected temperature. Turning the knob rotates the shaft and unscrews the thermostat disc from its seat.
3. Gas flows into the thermostat body from the manifold. This opening remains open except when the thermostat is turned to the OFF position.
4. Gas flows past and through the disc to the oven safety valve.
5. Additional gas is supplied to the pilot through a passage beneath the disc.
6. The size of the pilot flame increases due to the additional gas flow. The increased flame is called the Heater Pilot.
7. The heater pilot flame heats a mercury filled bulb.
8. The diaphragm inside the gas safety valve is pushed downward by the pressure of the expanding mercury in the mercury filled bulb.
9. Pressure from the diaphragm depresses the valve lever which opens the valve seat. Gas flows past the valve seat, through the orifice and into the oven burner.
10. Gas flowing from the burner is ignited by the pilot flame.

11. The increasing oven temperature is monitored by another mercury filled bulb which is suspended in the oven cavity. As the temperature increases, the expanding mercury applies pressure on the thermostat disc, forcing the disc against the disc seat, The seated disc reduces gas flow to the oven pilot allowing the mercury filled bulb from the gas safety valve to cool. As the mercury in the bulb cools, the pressure on the diaphragm of the gas valve is relieved, the gas valve closes and the burner flame goes out.

OVEN SYSTEM PROBLEM SOLVING

1. **No pilot or pilot too small**
   - Gas to range turned off.
   - Oven pilot selector in wrong position.
   - Blocked orifice at pilot assembly.
   - Burr on thermostat end of pilot tubing.
   - Blockage in pilot tubing.
   - Kink in pilot tube restricting pilot gas flow.
   - Blocked pilot passage inside thermostat.
   - Low gas pressure.

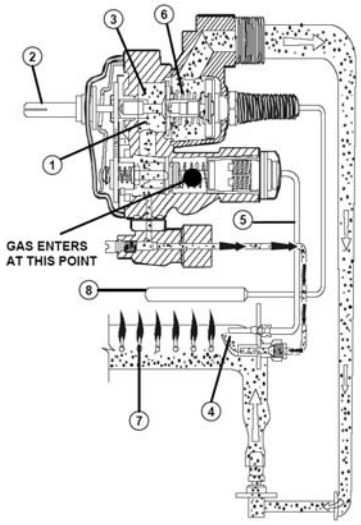
2. **Burner does not cycle off and/or burner flame size increase and decreases**
   - Normal operation in BROIL only.
   - Standing pilot too large.
   - Heater pilot too small. *
   - Mercury filled bulb from safety valve improperly positioned in pilot assembly or bent away from pilot flame.
   - Kink in pilot tube restricting gas flow.
   - Debris on thermostat disc seat preventing disc from seating. (Results in constant heater pilot.
   - Be sure oven pilot selector is set for the correct type of gas (LP or NAT)

3. **Standing pilot and heater pilot look normal. Oven valve will not open.**
   - Oven pilot selector set for wrong type of gas or not turned completely to NAT or LP setting.
   - Mercury filled bulb from safety valve Improperly positioned or bent away from heater pilot flame.
   - Faulty safety valve

OVEN CONTROL SYSTEM NO GAS VALVE

The oven control system consists of:

1. Thermostat
2. Pilot Assembly
3. Thermocouple
4. Tube valve supply



SYSTEM OPERATION

1. When the gas is first connected to the range, there is no flow to the pilot or oven burner.
2. Thermostat knob is pressed and held in the OFF.
3. Gas enters into the thermostat body from the manifold. Gas flows past the open magnetic valve and through the pilot screw to the pilot. While the knob is held in, the pilot is then ignited by a match.
4. Pilot flame provides heat to the thermocouple.
5. The thermocouple sends signal to thermostat (magnetic valve) to keep it open. The thermostat knob is released.
6. Thermostat knob is turned to a selected temperature. Turning the knob rotates the shaft and unscrews the thermostat disc from its seat.
7. Gas flows to the main burner and is ignited by the pilot flame.
8. Temperature is controlled by oil-bulb located in the oven cavity, as the temperature is reached, the bulb pushes the disc to the seat and restricts the gas to only by-pass flow. If the temperature decreases in the oven the disc opens again to increase the temperature.

OVEN SYSTEM PROBLEM SOLVING

1. **No Pilot or Pilot too small.***
   - Gas to range turned off.
   - Wrong pilot flame screw in thermostat.
   - Thermocouple has soot.
   - Thermocouple improperly positioned or bent away pilot flame.
   - Blocked orifice at pilot assembly.
   - Burr on thermostat end of pilot tubing.
   - Blockage in pilot tubing.
   - Kink in pilot tube restricting pilot gas flow.
   - Blocked pilot passage inside thermostat.
   - Low gas pressure.

3. **Burner does not cycle and/or burner flame size increases ****
    - Normal operation in BROIL only.
    - Wrong by-pass screw.
    - By-pass screw not screwed down completely.
    - Debris on thermostat disc seat preventing disc from seating.

* Be sure to hold the knob for 1 minute to ignite pilot.
** Be sure pilot screw and by-pass screw is the correct type of gas (LP or NAT) indicated by color codes.

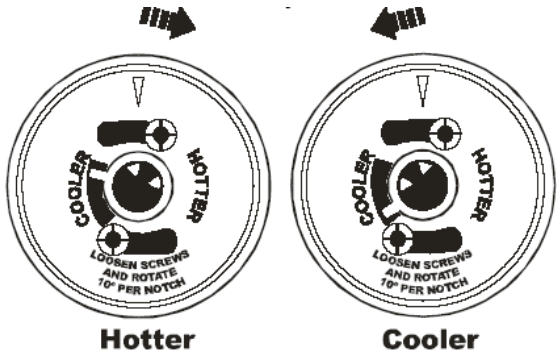
OVEN TEMPERATURE CALIBRATION

NOTE: Calibration adjustments are made by moving the knob skirt. DO NOT make any adjustments to the thermostat itself.

IMPORTANT: Before making any temperature adjustments, be sure the oven thermostat capillary bulb is properly positioned in the bulb mounting clips, If capillary bulb is out of position and contacts oven wall, calibration will be incorrect. An unusually dirty capillary bulb will also affect thermostat calibration.

TO ADJUST KNOB:

(As covered in the Use and Care Manual) Note position of pointer to screw before adjustment

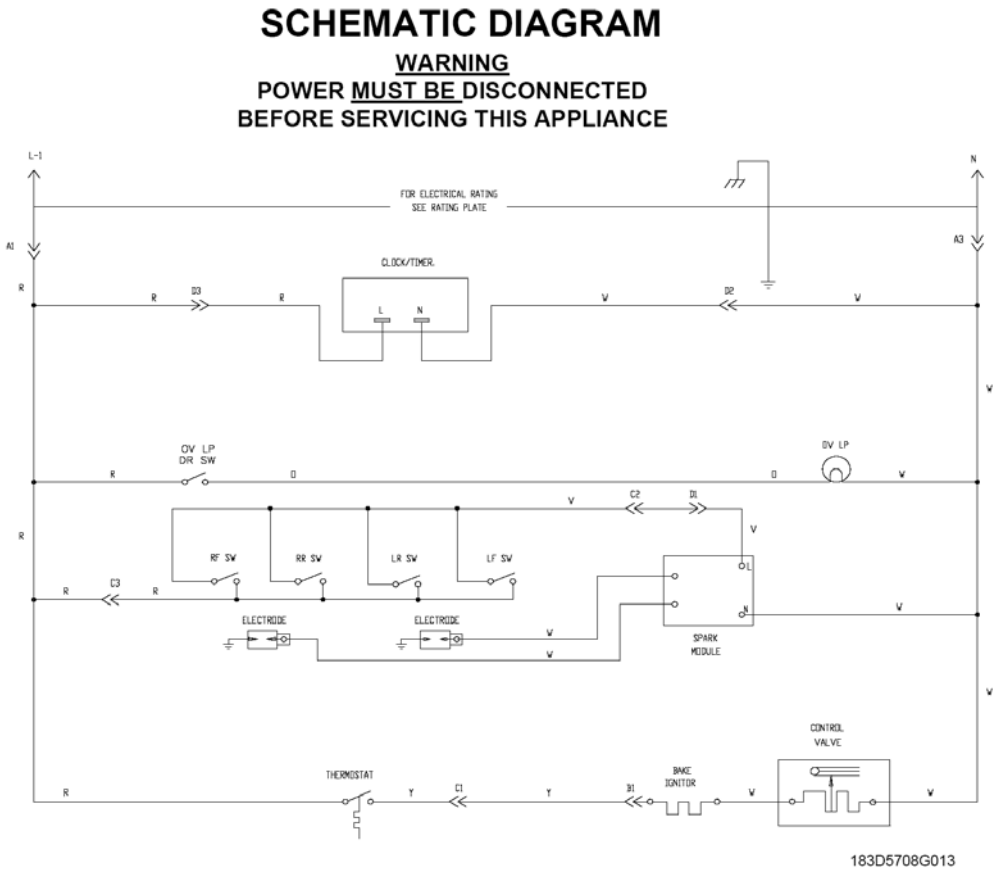


Hotter **Cooler**

ELECTRONIC IGNITION GAS RANGES

Gas ranges that incorporate electronic ignition, utilize many of the same gas distribution components (gas valves, burner heads, oven burners, etc). The only difference is in the way that the gas is ignited. We have already covered ranges that use a standing flame or pilot to ignite the gas. Now we'll discuss those

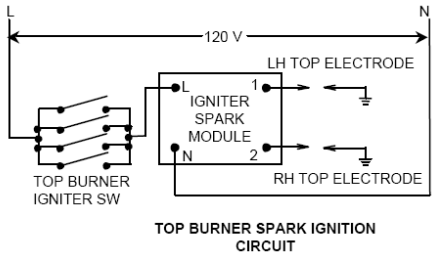
ranges that have no standing pilot but use an electronic spark or heat source for flame ignition. Unlike standing pilot ranges that usually don't have electrical components or a schematic, electronic ignitions will have a schematic of one type or another incorporated into the mini-manual that comes with the range. The schematic below is typical of this type of range.



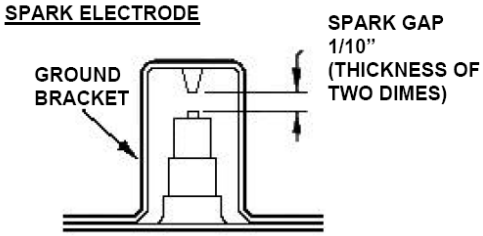
Top Burners

Spark Circuit Explanation – The top burners are ignited by a spark ignition system. The system consists of a spark module, two spark electrodes and four spark switches. The four spark switches are mounted to the four top burner valves.

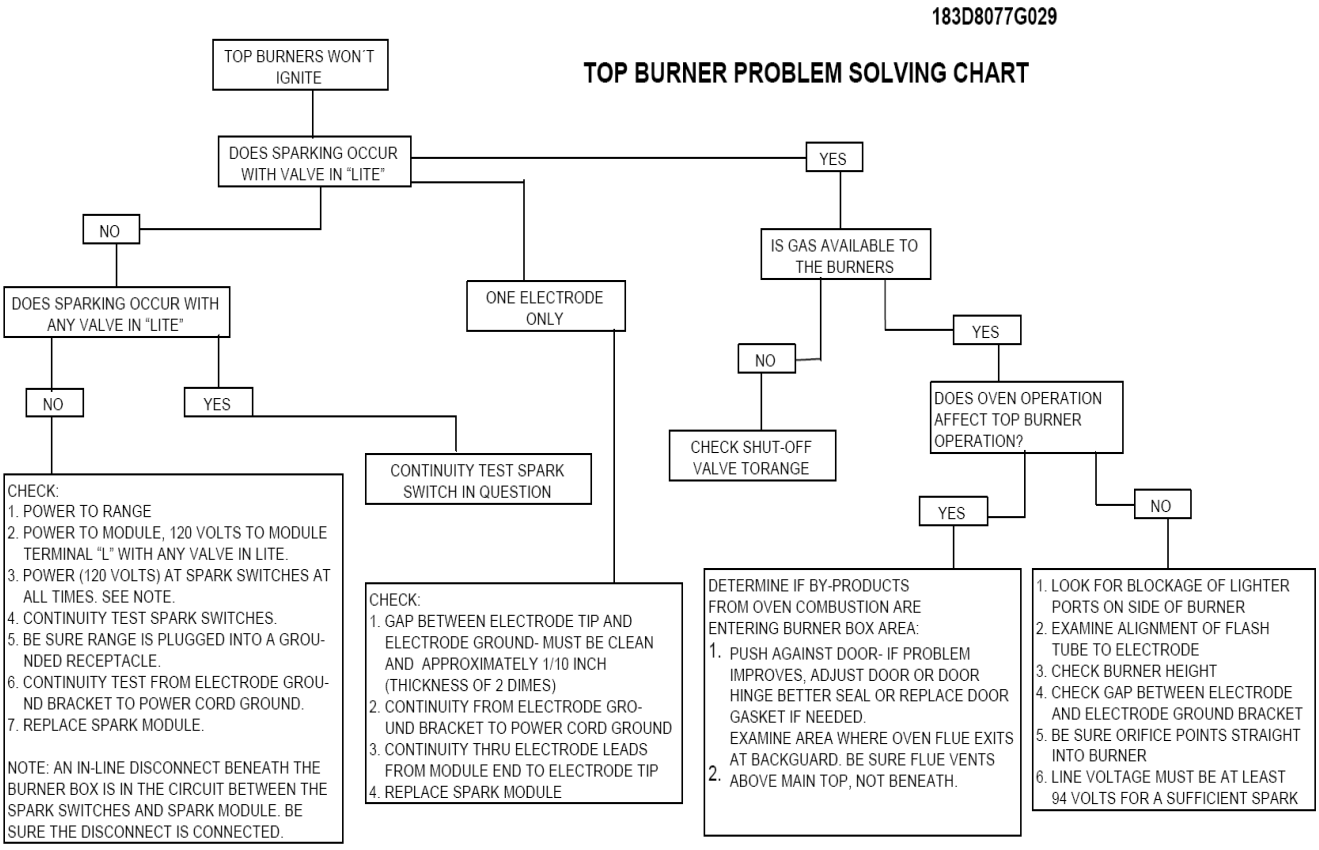
When a top burner valve is turned to the lite position, the spark switch on that valve closes, completing a 120 volt circuit to the primary of the spark module. With this circuit completed, the secondary of the spark module generates an output of approximately 15,000 VDC. The 15,000 VDC output is released from the module



TOP BURNER SPARK IGNITION CIRCUIT



to the spark electrodes in pulses at the rate of 2 pulses per second. Each pulse results in a spark jumping across a 1/10 inch gap from the tip of the electrodes to ground. Sparking will occur at both electrodes regardless of which valve is in the lite position.



OVEN BURNER IGNITION SYSTEM

The oven burner is ignited by a glowbar ignition system. The igniter is either a "Norton" (rectangular shape) or "Carborundum" (round shape) type of glowbar. **NEVER** try to interchange a round for a rectangular or a rectangular for a round type glowbar.

The ignition circuit consist of the thermostat, the igniter and the oven safety valve (gas valve). The three components are wired in series.

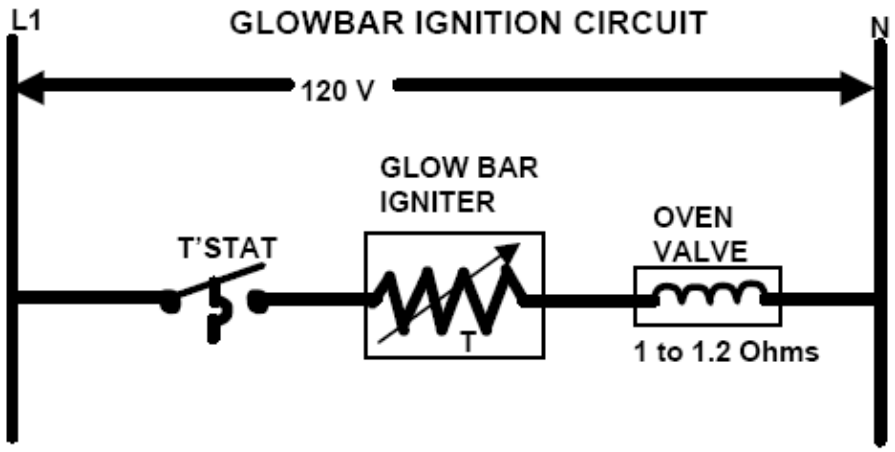
The most important points to know about the ignition system are:
1. THE IGNITER RESISTANCE DECREASES AS THE IGNITER SURFACE TEMPERATURE INCREASES.

2. THE SAFETY VALVE OPERATES BY CURRENT NOT VOLTAGE.

From a cold start, the Norton globar igniter needs 30-60 seconds, with voltage applied, to reduce its electrical resistance enough to provide a minimum of 2.9 amps of current flow in the series circuit. This is the required current flow needed for the safety valve to open to supply gas to the burner. The glowbar should provide a steady current flow of between 3.2 to 3.6 amps flowing in the circuit. At that point, the igniter temperature is between 1800 to 2500 degrees F. The igniter will remain energized at all times during burner operation. If the igniter glows red but does not draw at least 2.9 amps, the fault is usually with the igniter not the valve.

NOTE: The Carborundum globar systems works exactly the same. The only difference is that the current draw values are lower, 2.5 to 3.0 amps.

Always check the oven shut-off valve for a "No Oven" condition.



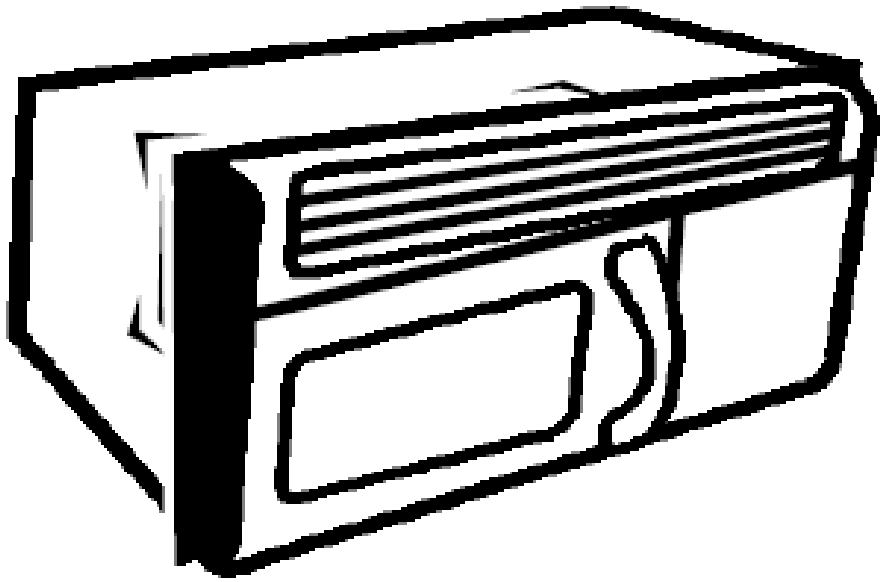
IMPORTANT: Do not place 120 volts directly across the safety valve when testing. The resulting current through the valve would destroy the internal heater circuit

NOTE: An open gas valve heater circuit usually indicates excessive current flow in the ignition circuit.
Replacement of the ignitor and valve is recommended.

Oven Burner Adjustments would be the same as for burners with standing pilot systems.

NOTE: The material contained in this section is preliminary and generic. For more detailed information on a particular model appliance, please reference the Tech Manual for that model or the Mini-Manual that comes packed with that appliance.

Microwave Section



MICROWAVE SECTION

MICROWAVE --- SAFETY

- A Microwave's high voltage doubler circuit can generate voltages in excess of 4000 volts.
- This voltage can be present even if the microwave is unplugged.
- Extreme care must be taken when servicing the high voltage section of a microwave oven.

Although there are many different microwave configurations on the market, experience has shown the JVM/RVM models to be most common in today's new housing markets. These are the microwaves that are installed under the cabinets and usually mounted over the range. The material in this section is geared to those models but can be applied with minor variations to just about any microwave available today.

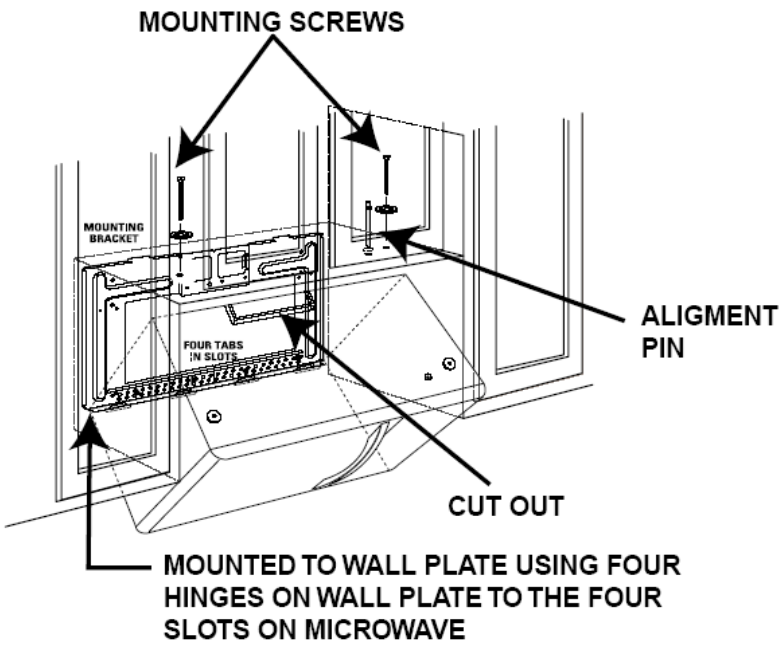
INSTALLATION

The Spacemaker microwave is supported by a special bracket assembly (mounting system) supplied with the oven. The bracket assembly must be mounted to the wall with toggle bolts through the wall, and a lag screw into a wall stud. The unit is mounted to four tabs on lower mounting plate. Four bolts are run down through the kitchen cabinet bottom and into the oven case to pull the oven up against the bottom of the kitchen cabinet.

NOTE: For easier removal and personal safety it is recommended that two people remove this product.

CAUTION!

The mounting surface must be capable of supporting the cabinet load, in addition to the72 pound product, plus additional loads of up to 50 pounds or a total weight of 122 pounds. This product cannot be installed to cabinet arrangements such as an island or peninsula. It must be mounted to both a top cabinet and wall.



CAVITY LIGHT

A special 40-watt screw base incandescent bulb (GE part# WB02X4235) is located in the top of the *oven* cavity at the front. It is user replaceable by *removing* the top grill (2 screws). The bulb is then accessible by *removing* a metal *cover* (2 screws).

GREASE FILTERS

Grease filters should be cleaned once a month. Soak the filter in a solution of hot water and detergent. Use of ammonia products will darken the metal. Rinse, shake and *remove* moisture before replacing. To *remove:* grasp the "finger hold" and slide to the rear. Pull filter downward to release. To replace: slide filter into the frame slot on the back of the opening, then lift up until it locks in place.

GRILLE REMOVAL

The top full-width grille is removable for service to some components, such as: humidity sensor, oven light, door removal, stirrer motor and flame sensor.
To Remove Grille:
Disconnect oven power.
Remove Phillips-head screws (2) from grille.
Lift bottom of grille and push top of grille down to remove.

CONTROL PANEL

The touch control panel is made up of the key panel and control housing trim (1-piece) and the smart board. Touch control panels are usually not available as one complete assembly. If necessary the key panels can be checked by a continuity test.

To Remove Touch Control:

Disconnect power and remove grille.
2. Remove 1 screw at top of control panel. Lift up on control to release tabs. Disconnect grounding screw and connectors.
Lift up on control to release hinge from mounting screw (Some GE Models, others remove mounting screw).

CONTROL SMART BOARD (PCB)
Note: Most connectors are positive lock; check before pulling wire the control smart board is located on the back of the control panel.

To Remove Smart Board:
1. Disconnect power, put control in service position (open door, remove 1 screw at top), and discharge capacitor.
2. Remove and mark connectors and leads from board.
3. Unscrew the 4 smart board-mounting screws. Slide board down to free from the 2 mounting tabs.
NOTE: Do not flex board.

TOUCH CONTROL PANEL ASSEMBLY TEST
The touch control panel assembly is divided into two components, the Touch Control Pad and the Smart Board. Troubleshooting by component replacement is described according to the symptoms indicated.

1. Touch Control Pad.
The following symptoms indicate a defective touch control pad:
a) When touching the pads, a certain pad produces no signal at all.
b) When touching a number pad, two figures or more are displayed.
c) When touching the pads, sometimes a pad produces no signal.
NOTE: *If necessary touch control pad can be checked with ohmmeter.*

2. Smart Board
The following symptoms indicate a defective smart board:
a) When touching the pads, a certain group of pads do not produce a signal
b) When touching the pads, no pad produces a signal.
c) At a certain digit, all or some segments do not light up.
d) At a certain digit, brightness is low.
e) Only one indicator does not light.
f) The corresponding segments of all digits do not light up, or they continue to light up.
g) Wrong figure appears.
h) A certain group of indicators do not light up.
i) The figure of all digits flicker.
j) Buzzer does not sound or continues to sound.
k) Clock does not operate properly.
l) Cooking is not possible.

m) Proper temperature measurement is not obtained.

KEY PANEL

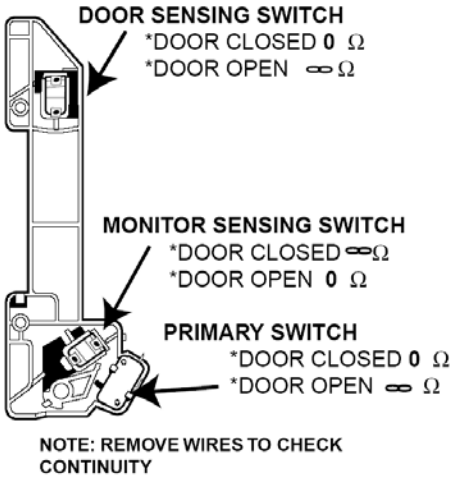
The key panel has 1 ribbon connector on smart board. If necessary, the key panel pads can be checked by a continuity test.
For ease of handling, the key panel or control should be removed and placed on a flat surface.
Part of the ribbon connections *are* on one side and the remainder on the other side. Pad operation can be checked between connections at end of ribbon (use high Ohms scale). Use mini-manual to identify connectors.

To Replace Key Panel:

Separate smart board and control trim/key panel assembly.
Replace with new control trim/key panel assembly.

DOOR SENSING AND PRIMARY INTERLOCK SWITCHES

The primary interlock switch is mounted to the plastic switch bracket on the bottom, the monitor is in the middle and the door sensing switch is mounted to the upper portion of the plastic switch bracket.
The power relay is mounted on the smart board.
They are activated by the latch heads on the door. When the door is opened, the switches interrupt the circuit to all components except the oven lamp. A cook cycle cannot take place until the door is firmly closed thereby activating both interlock switches. The primary interlock system consists of the door sensing switch, primary interlock switch and power relay.



MONITOR SWITCH

The monitor switch is operated (the contacts opened) indirectly by the bottom latch pawl. The pawl operates a cam switch, which in turn, actuates the monitor switch. The switch is intended to render the oven inoperative by means of blowing the monitor fuse when the contacts of the primary interlock switch and power relay fail to open when the door is opened.

Functions:

1. When the door is opened, the monitor switch contact closes (to the ON condition). At this time the primary interlock switch and power relay are in the OFF condition (contacts open).

2. As the door goes to a closed position, the monitor switch contacts are first opened and then the door sensing switch and the primary interlock switch contacts close. (On opening the door, each of these switches operate inversely.)
3. If the door is opened, and the primary interlock switch and power relay contacts fail to open, the monitor fuse blows simultaneously with closing of the monitor switch contacts. *CAUTION: Before replacing* a *blown monitor fuse, test the primary interlock switch, door sensing switch, monitor switch and power relay contacts for proper operation.*

MONITOR/LINE FUSE
The fuse is an internal 15A or 20A fuse. (see mini manual for test procedure). *CAUTION: Before replacing* a *blown monitor fuse, test the primary interlock switch, door sensing switch, monitor switch and power relay contacts for proper operation. If the monitor fuse* is *blown by improper switch operation, monitor fuse and switch must he replaced even if the monitor switch operates normally.*

PRIMARY INTERLOCK SYSTEM TEST
Disconnect the oven from power supply.

Door Sensing Switch
Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch, the meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the door sensing switch.

Power Relay
Disconnect two (2) wire leads (plastic - squeeze) from the male tab terminals on the printed wiring circuit board provided in the control panel assembly. The tab terminals are located in the area of the circuit board on the component side, and are connected to the contacts of the power relay. Check the state of the relay contacts using an ohmmeter. The relay contacts should be open. If the relay contacts are closed, replace the circuit board entirely.

Primary Interlock Switch Test
Isolate the switch and connect the ohmmeter to the common (COM.) and normally open (NO) terminal of the switch. The meter should indicate an open circuit with the door open and a closed circuit with the door closed. If improper operation is indicated, replace the primary interlock switch.

MONITOR SWITCH TEST
Disconnect the oven from power supply. Before performing this test, make sure that the primary interlock switch and the power relay are operating properly.

The monitor switch is located between the top and bottom interlocks. The monitor switch is operated indirectly by the bottom latch pawl.

HOW TO TEST MONITOR:

1. Disconnect power, open control panel, and discharge capacitor.
2. Disconnect monitor switch leads, and test at terminals:
    Door closed --- Infinite Ohms / no continuity.
    Door open --- zero Ohms / continuity.
3. Reconnect switch wiring.
4. Test Circuit Operation:

A) Connect temporary jumper across relay contacts and primary switch to simulate shorted switch contacts. Locate convenient connections in circuit to be certain COM and N.O. terminals are used.

B) Connect OHM meter (LOW scale) across the two line terminals of appliance power cord.

    Continuity must show:
    Door Closed --- infinite Ohms
    Door open --- zero Ohms

C) Remove 15 / 20 Amp. Fuse --Circuit must open (Ohms). If not, check wiring of monitor and interlock circuits.

5. WARNING: After test, remove temporary jumpers and reconnect monitor switch leads.

How To Adjust Interlocks:

The switch housing is adjustable for door fit and switch operation.

1. Disconnect power, open control panel, and discharge capacitor.
2. Loosen both switch housing mounting screws at enlarged holes in vertical flange.
3. Adjust switch housing for proper switch operation, and door fit. Re-tighten screws.

STIRRER BLADE

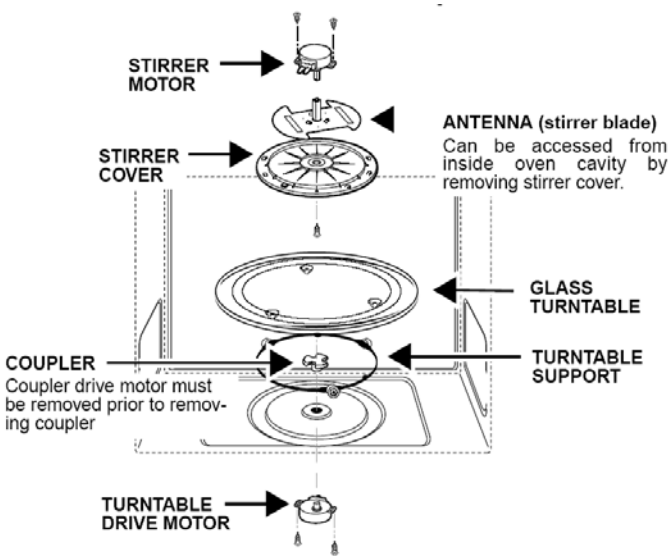
A motor drives the stirrer blade assembly and is located at the top of the cavity. This oven uses a top feed wave guide. The stirrer blade rests on a depression inside the stirrer cover. An stirrer motor shaft fits into the assembly to drive it. When the stirrer cover is removed the stirrer blade slides off the stirrer motor shaft.

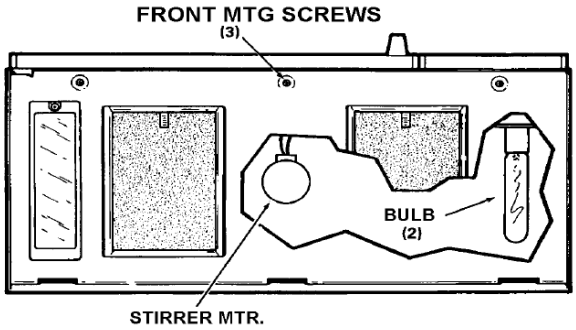
To Remove the Stirrer Blade Cover:

1. Carefully pry down, using a very small (pocket) flat blade screwdriver, the push pin (fastener) located in the Stirrer blade cover.
2. Turn the stirrer blade cover counterclockwise, this will free the tabs that are captured by the spaces built into the ceiling.

To Remove Stirrer Motor:

1. Disconnect power and remove grille.
2. Remove stirrer/light cover.
3. Release wiring to motor.
4. Remove two screws (stubby screwdriver) holding motor to waveguide.
5. Lift and remove motor.





TURNTABLE

The turntable shelf is made of a ceramic type material and the supporter ring that it rests on is plastic. The shelf also sits on and is turned by the motor coupling, which can turn in either direction. The turntable shelf must be used when using oven. The turntable motor is mounted to the bottom of the cavity. The bottom plate of the microwave covers the motor and has to be lowered to gain access to the two screws that secure motor.

To Remove Turntable:

1. Disconnect oven from power supply.
2. Remove ceramic shelf and supporter from cavity.
3. Remove 3 screws securing bottom plate to unit and rotate down.
4. Disconnect motor leads, two screws holding motor, motor coupler will stay in oven.
5. When reinstalling motor it will have a "D" shaft on it that will match the coupling.

NOTE: On some models, the turntable motor is 23V, and is NOT interchangeable with the stirrer motor.

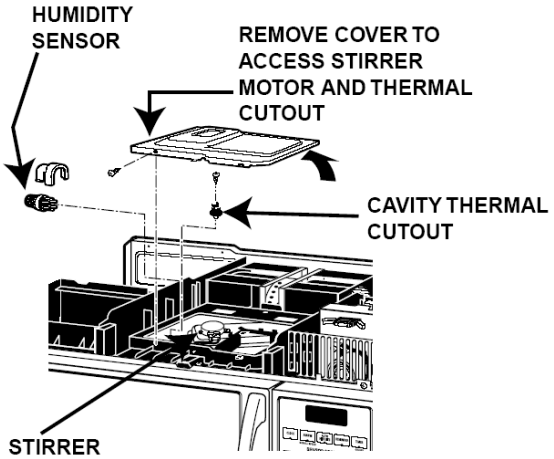
THERMAL CUTOUTS (TCO'S)
There are 4 different thermal cutouts in this unit with 4 different purposes. They are:

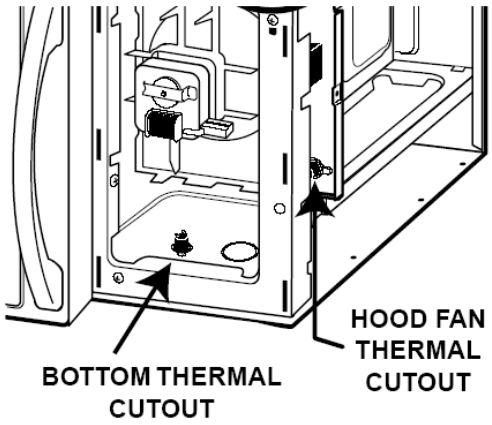
1. Oven thermal cutout (flame sensor), on cavity top.
2. Hood thermal cutout, inside control area on duct.
3. Bottom thermal cutout, on floor of control area.
4. Magnetron thermal cutout, on magnetron.

OVEN THERMAL CUTOUT (FLAME SENSOR)
The *Oven* Thermal cutout *(Cavity* TCO) is located on the top side of the *oven cavity,* to the left of the humidity sensor by the *cavity* exhaust. The thermal cutout is rated at 212°F. (100°C) and is nonresettable. If thermal cutout opens, look for cause. If there was a fire in the *cavity* all wiring must be inspected to insure that insulation from the wires was not burned or melted away.

1. Remove screw holding cover and remove cover.
2. Slide cutout from retaining clip and remove wiring.

NOTE: if this cutout opened there would only be power up to lead from the fuse. Everything behind it would be dead.





HOOD THERMAL CUTOUT
This cutout will protect the touch control from excessive heat by turning the vent fan on at low speed. If the surface units of the range are used for long periods of time heat will build up and could damage the microwave control. In order to prevent this a thermal cut out is installed on the duct behind the control. This cutout will close (158° F - vent fan energized) and open (104°F - vent fan de-energized) depending on temperatures it senses.

To Remove Hood Cutout:

1. Disconnect power and put touch control in service position.
2. Remove two wire leads and unscrew two screws capturing cutout on duct.

NOTE: If this cutout were to open it would be difficult to detect. The only time it functions is during an overheat condition. It will be normally open when checked with an ohmmeter.

BOTTOM THERMAL CUTOUT

During a fire on the stove the heat could be intense enough to close the Hood Thermal Cutout and force the fan to run. While at moderate high temperatures we do want it to run, however during a fire it is advantageous to NOT have the vent fan running. So if a fire were to start on the stove top the Bottom Thermostat would open (248° F) and remove all power to the microwave oven. This cutout is designed to not be resettable.

To Remove Bottom Thermal Cutout:

1. Disconnect power and put touch control in service position.
2. Remove two wire leads and unscrew two screws holding cutout to floor behind touch control.

NOTE: If this cutout were to open the microwave oven would be totally dead. It is a *normally closed cutout when checked with an ohmmeter for continuity.*

MAGNETRON THERMAL CUTOUT

The magnetron thermal cutout is located above the leads to the magnetron. It is designed to prevent damage to the magnetron if an overheated condition develops in the tube due to cooling fan failure, obstructed air ducts, dirty or blocked air intake.

Under normal operation, the magnetron thermal cutout remains closed. However, when abnormally high temperatures are reached within the magnetron, the magnetron thermal cutout will open at 320° F causing the oven to shut down. After the temperature drops to 140°F it will reset and cooking will be able to resume.

To Remove Magnetron Thermal Cutout: 1. See Removing Magnetron.

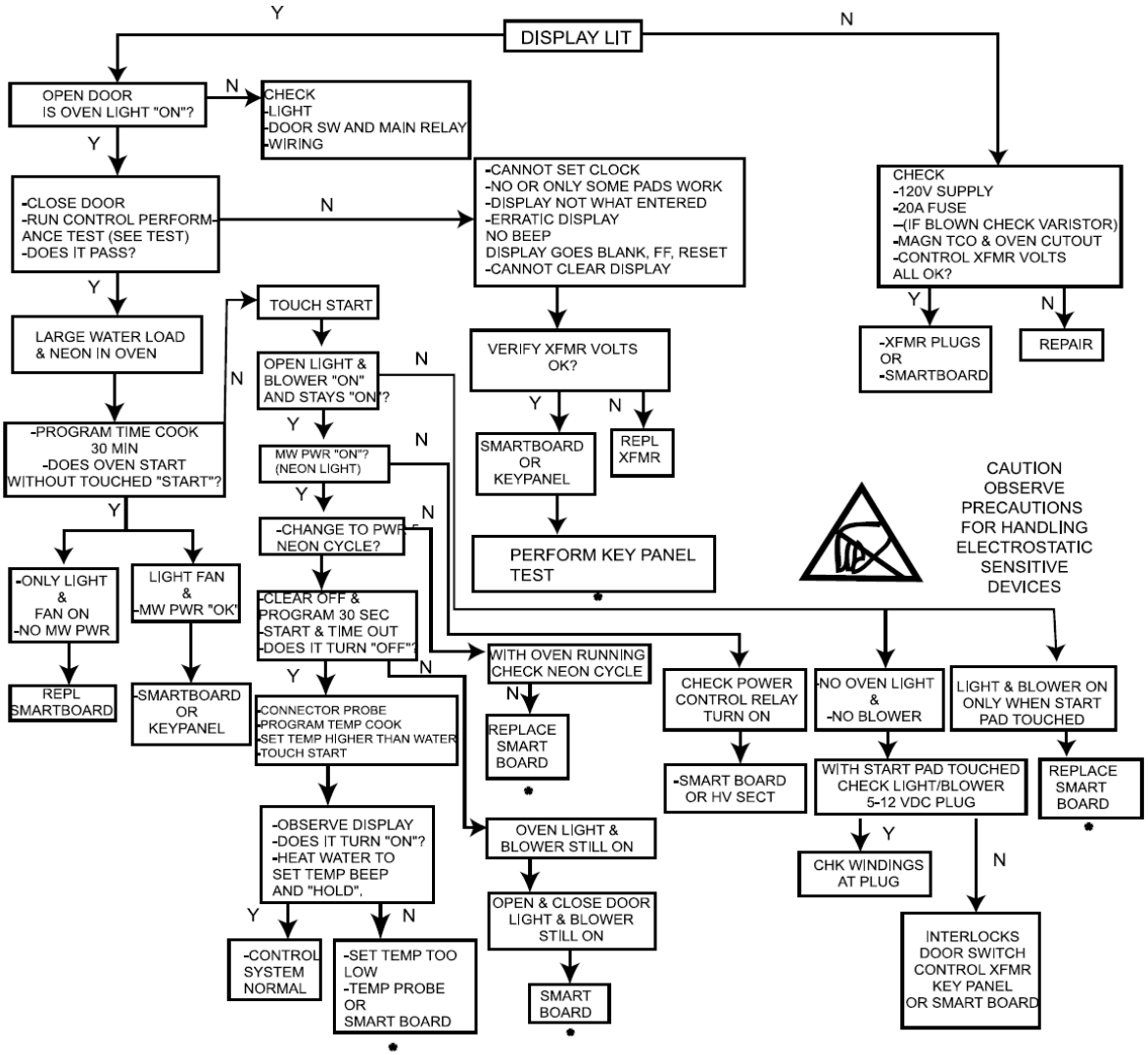
NOTE: On most models, the Mag TCO is wired across the neutral (return) leg of *the power to the board connector. Therefore, the board will go dead but the vent fan and cooktop lights would still operate if the TCO were to open.*

MICROWAVE PERFORMANCE TEST

To determine if the magnetron is performing up to specs and supplying the proper amount of cooking power, one may want to perform a magnetron performance test. To do so, follow the steps listed below:

1. Measure the loaded down line voltage. (outlet that the microwave is plugged into with the microwave running). This test is based on normal voltage variations of 105vac to 130vac. Low voltage will affect power & temperature rise.
2. Place a beaker (GE Part# WB64X73) containing exactly 1 Liter (1000ml) of water between 59° F & 75° F in the center of the shelf. Record the starting temperature with an accurate thermometer.
3. Set unit for high power.
4. Set timer for exactly 2 minutes and 3 seconds.
5. Start microwave.
6. After the time has run out, carefully remove the beaker and record the water temperature. A normal temperature rise should be at least 28° F at 120vac and 25° F at 105vac.
7. If the water did not rise in temperature to the minimums mentioned above, there is good probability that the mag tube is becoming weak.

Diagnostic Flowchart



SERVICE TROUBLESHOOTING GUIDE

IMPORTANT: If the oven becomes inoperative because of a blown monitor fuse, check the monitor switch, primary interlock relay, door sensing switch and secondary interlock switch before replacing the monitor fuse,

CONDITION	TEST PROCEDURE / POSSIBLE CAUSE AND DEFECTIVE PARTS	Short in Power Cord	Short or Open Wiring	Magnetron	Power Transformer	Rectifier Assembly	H.V. Capacitor	Primary Interlock Switch	2nd Interlock Switch	Monitor Switvch	Monitor Fuse	Temp. Fuse or Thermal Cut-out	Control Unit	Oven Lamp or Socket	Cooling Fan Motor	Stirrer Fan	Wrong Operation	Low Voltage	Dirty Oven Cavity	Sensor Assembly	Turntable Motor
OFF CONDITION	Home fuse blows when power cord is plugged into wall receptacle.	●	●																		
	Microwave fuse blows when power cord is plugged into wall receptacle.		●								●										
	All letter and indicator lights do not appear in display when power cord is first plugged into wall outlet.		●								●	●	●	●							
	Display does not operate properly when CLEAR/OFF key is touched. (Buzzer should sound and time of day should appear in display.													●							
	Oven lamp doesn't light with door opened		●								●	●	●	●							
COOKING CONDITION	Door closed, oven lamp and cooling fan motor on can not clear.							●													
	Oven lamp does not light in cool cycle or when door is opened.												●								
	Oven lamp doesn't light at all.		●										●	●							
	Oven lamp lights but fan motor or turn-table motor does not operate.		●												●						●
	Oven does not go into cook cycle when START pad is touched.		●					●	●		●	●	●								
	Oven seems to be operating but little or no heat is produced in oven load. (Food is in-completely cooked or not at all at end of cyc.		●	●	●	●	●	●													
	Oven produces extremely uneven heating in cook cycle		●												●	●	●	●	●		●
	Oven seems to be operating but little or no heat is produced in oven load. (Food is in-completely cooked or not at all at end of cyc.		●									●									
SENSOR COOKING CONDITION	Oven is in the sensor cooking condition but sensor does not end, or sensor turns off about max 30 min. after start. When a cup of water is heated by sensor, the oven does not shut off when water is boiling.											●								●	

NOTE: The material contained in this section is preliminary and generic. For more detailed information on a particular model appliance, please reference the Tech Manual for that model or the Mini-Manual that comes packed with that appliance.

******* Notes *******

******* Notes *******