RANGE

STUDY COURSE

UNDERSTANDING RANGE:

- *GAS COMPONENTS and FLAME ADJUSTMENTS*

Module 2

LIT 4314425 Rev. C

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INTRODUCTION

The material presented in this module is intended to provide you with an understanding of the fundamentals of range servicing.

Major appliances have become more sophisticated, taking them out of the screwdriver and pliers category. Their electrical circuits include several different types of automatic controls, switches, heaters, valves, etc.. Semiconductors, solid-state controls, and other components usually associated with radio and television electronic circuits, are being engineered into automatic washers, dryers, dishwashers and refrigerators.

The appliance technician is emerging into a professional status of his own. He must prepare himself now to be able to perform his duties today as well as to retain his professionalism in the future.

No longer is on-the-job training sufficient to prepare technicians for the complicated procedures required for todays sophisticated appliances. This training can best be obtained through organized classroom study and application. However, much of the knowledge necessary to service todays appliances can be obtained through study courses. Completion of this and other courses will provide you with sufficient understanding of appliances and their operation to enable you to do minor service. It will also serve as a valuable stepping stone to more advanced study and on-the-job training to improve your servicing skills.

Information contained in this module is used on WHIRLPOOL® appliances.

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TEST ..... See Test Book LIT4314428

***NOTE:** We recommend taking the TEST for MODULE 2, right after studying it.*

CHAPTER 1

GAS DESCRIPTIONS and BASICS

GAS DESCRIPTION

A simplified description of a gas range would be: an insulated metal cabinet containing four gas burners on its top and gas-heated oven cavity inside. Gas is piped to each of the burners where it is mixed with air and allowed to escape from a series of small holes. It is ignited as it flows out the burner holes. The rate of its flow is regulated so that it burns completely and cleanly with flames that can vary from match-head size up to 3/4 inches in length, depending on the application. Some adjustments necessary for proper operation are: gas input, gas pressures, air mixtures, pilot regulation and temperature control adjustments.

GAS BASICS

HEAT ENERGY

The heat energy produced when burning a gas fuel is commonly expressed in British Thermal Units, or B.T.U.'s.

1 B.T.U. = the amount of heat needed to raise one pound of water 1 degree F.

(A wooden kitchen match produces about 1 B.T.U. of heat.)

FUEL TYPES

There are four types of gas fuels and are referred to by a number.

No. 1 = natural gas

No. 2 = mixed gas

No. 3 = manufactured gas

No. 4 = liquefied petroleum gas (LP)

No. 1 NATURAL GAS: Found underground and is called “wet gas” since it contains heavy hydrocarbons such as propane, butane, and other substances.

Gas suppliers remove the heavier hydrocarbons and leave only methane and ethane. In some areas, natural gas contains hydrogen sulfide and is called “sour” gas. Sour gas corrodes copper and brass parts and aluminum orifices must be used in these supply areas.

Natural gas is lighter than air. It has a heat value between 900 and 1200 B.T.U. per cubic foot.

No. 2 MIXED GAS: Made from a mixture of natural and manufactured gas. Lighter than air, it has a heat value between 700 and 900 B.T.U. per cubic foot.

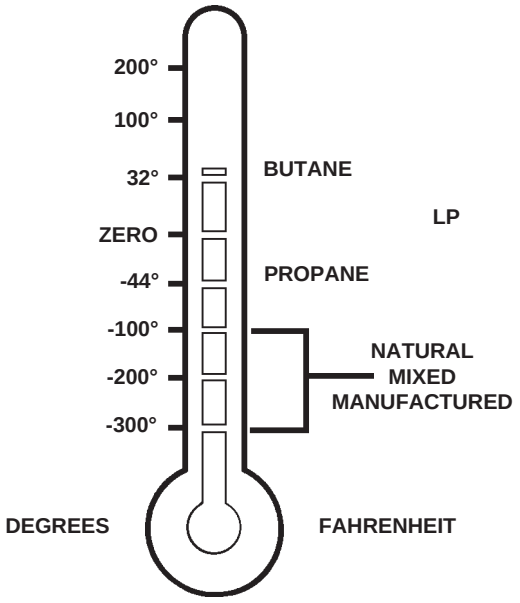
No. 3 MANUFACTURED GAS: Made from coal and petroleum and has a heat value of 500 to 700 B.T.U. per cubic foot. It is also lighter than air.

No. 4 LIQUEFIED PETROLEUM GAS (LP): Mainly propane with a heat value of 2500 B.T.U. per cubic foot or butane with a heat value of 3200 B.T.U. per cubic foot. LP gas is converted to liquid under moderate pressure and is easily transported in pressurized tanks. When released to normal atmospheric pressure and temperature the liquid returns to its gaseous form. LP gas is heavier than air and will lay in the lowest spot it can find if it is released into a room.

CHARACTERISTICS of GAS FUELS

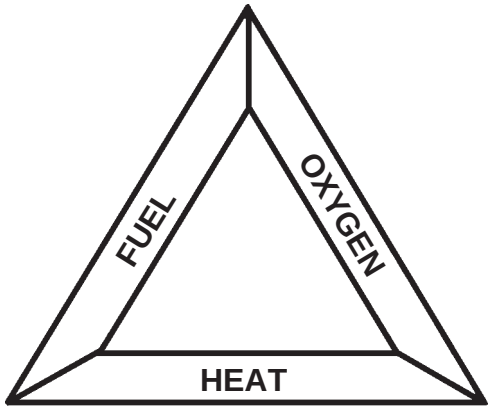
GAS FUELS	BTU VALUE/CU. FT.	SPECIFIC GRAVITY
NATURAL	1075 (MAY VARY FROM 900 TO 1200)	.65 TO .70
MIXED	800 (MAY VARY FROM 700 TO 900)	.50
MANUFACTURED	535 (MAY VARY FROM 500 TO 700)	.38 TO .40
PROPANE	2500	1.53
BUTANE	3200	2.0

BOILING POINT of GAS



This chart shows the boiling point of the four types of gases. The boiling point is the temperature at which gas will turn from its liquid state to its gaseous state. NOTE: Butane will not turn into gas at temperatures below 32 degrees.

COMBUSTION TRIANGLE

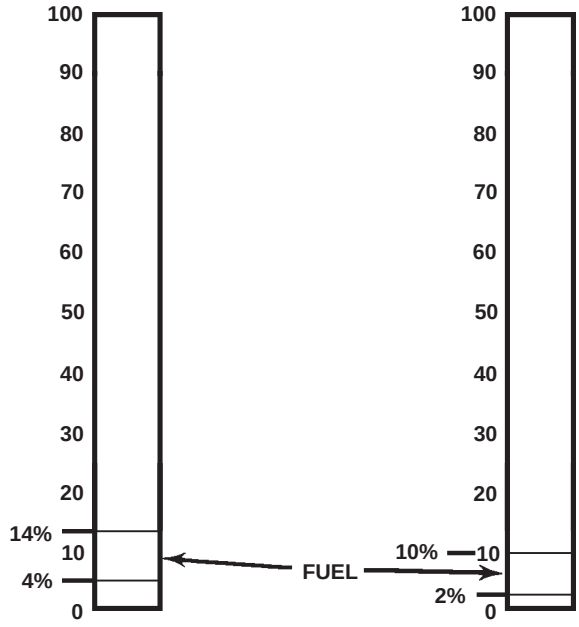


Fuel, oxygen, and heat are needed for combustion to take place. All must be present for burning to start. Remove any of the three and the burning will stop.

IGNITION TEMPERATURE

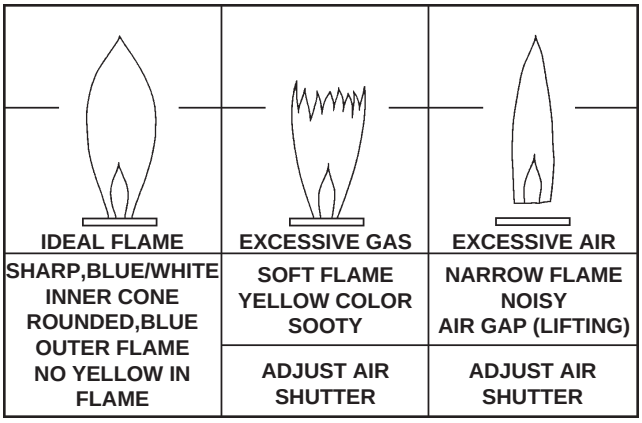
It takes between 900 to 1200 degrees FAHRENHEIT to ignite the gases used by ranges.

FLAMMABILITY RANGE



This is the proper mixture, or ratio of gas and air required for burning. Too little or too much gas in the mixture will not allow burning to take place.

FLAME CHARACTERISTICS



IDEAL FLAME	EXCESSIVE GAS	EXCESSIVE AIR
SHARP,BLUE/WHITE INNER CONE ROUNDED,BLUE OUTER FLAME NO YELLOW IN FLAME	SOFT FLAME YELLOW COLOR SOOTY	NARROW FLAME NOISY AIR GAP (LIFTING)
	ADJUST AIR SHUTTER	ADJUST AIR SHUTTER

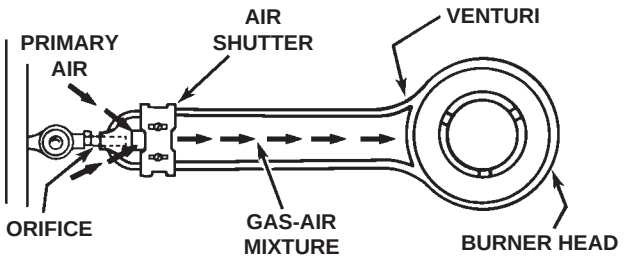
Flame characteristics can be changed by adjusting the primary air intake at the air shutter. On burners that do not have adjustable shutters, kits are available to make adjustments possible.

CHAPTER 2

BASIC PRINCIPLES of GAS COMPONENETS

BURNERS

Gas ranges make use of the fact that gas fuel, if burned in the proper mixture with air, provides a hot flame that is odorless and entirely free of dangerous gases. Air mixed with the gas as it enters the burner assembly, is called “primary air.” This air may be adjusted by the air shutter to give the flame the proper characteristics. Gas is injected into the burner through an orifice, which raises the velocity of the gas. The high velocity for the stream of gas causes a drop in pressure around the stream. Air from outside the burner flows into this region of low pressure through the air shutters or mixing shield.

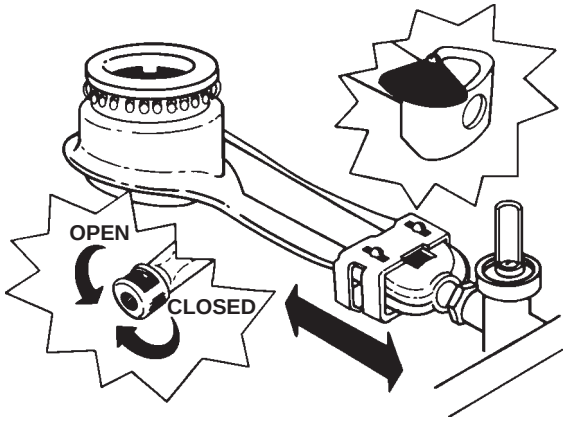


Too little primary air will produce a soft yellow flame.

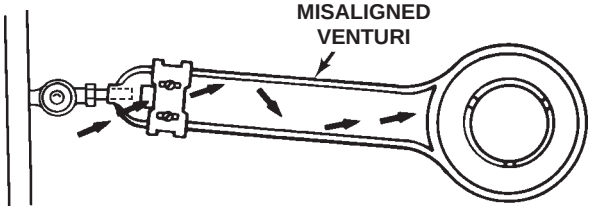
The air that is surrounding the burner head is called “secondary air.” The design of the burner head and the aeration pans provides for an adequate supply of secondary air, which makes it unnecessary for the technician to be further concerned with it.

The air and gas together pass through a narrow passageway (known as a throat) into the venturi or mixing chamber. The sides of the venturi slope outward increasing the volume of the gas and air. As the gas and air expand into the increased volume, their velocity is reduced and they become thoroughly mixed.

From the venturi, the mixture passes into the base of the burner, which is a hollow chamber from which the gas-air mixture flows to the burner ports. These ports are designed with sufficient depth and cross-section to further reduce the velocity of the mixture and provide a stream of gas of the proper size to combine with the secondary air and provide complete combustion. The head of the burner is shaped to provide unrestricted flow of secondary air to the flames.



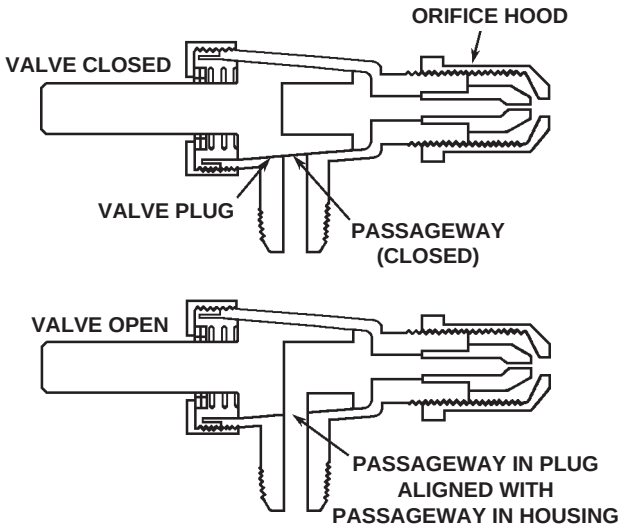
The burner throat and venturi must be in line with the gas stream leaving the orifice. If they are not in line, the velocity of the gas flow to the burner will be reduced. The gas stream will hit the sides of the venturi, bounce from side to side, slowing the flow. Without the proper gas velocity, the aspiration or suction effect needed to pull in air through the air shutter will not be sufficient. The burner will have a yellow flame that shutter adjustments may not affect or eliminate.



Incorrectly aligned venturi and orifice can be due to valve installation, poorly drilled orifice or burner installation. Dirt or cobwebs in the venturi can cause the same effect.

GAS VALVES

The purpose of a gas valve is to control the amount of gas that is admitted to the burner, thereby controlling the heat output of the burner.



The basic gas valve consists of a housing and a plug. The housing is usually threaded on one end to receive an orifice or hood.

Valves having fixed orifices will not contain a spud (needle) and cannot be adjusted. The valve shown is universal and can be adjusted by screwing the orifice hood in or out to attain the correct flame.

Threads on the other end of the valve hold a cap to retain the spring and plug in place. A stem on the plug extends through the cap and is provided with a flat surface for positive location of the valve knob or handle. A bottom-threaded extension screws into the manifold.

TOP BURNER VALVES

The top burner valves control the gas flow to the burners. These valves have a predetermined gas flow and detent settings.

ORIFICE SELECTION

The correct orifice size for any gas burner is determined by the rating of the burner, the specific gravity of the gas, the BTU heating value per cubic foot of the gas, and the water-column pressure of the gas source.

In the event the specific gravity or heat content of the gas in a particular area is unknown, contact the utility for this information. Be aware of local codes, ordinances and regulations.

PRESSURE REGULATORS

A gas pressure regulator should be used on all ranges burning Natural, Mixed, or Manufactured gas. It would be set for 4 inches, wcp (Water Column Pressure). This will insure a constant heat output and stable pilot flames, even if the gas pressure entering the house should fluctuate. If the gas supply pressure drops below the 4-inch regulator setting, the range burners will be affected.

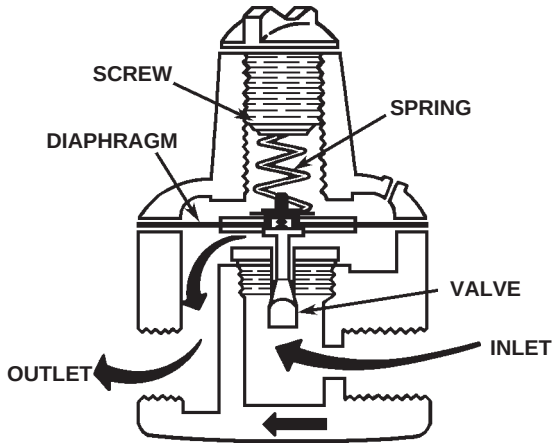
In this case, the utility should be notified that proper pressure is not being maintained.

The purpose of a gas pressure regulator is to maintain the gas pressure to the appliance at a given point below the house inlet pressure.

Regulators are already located at the tank assembly on any LP or bottle gas systems. Its pressure should be set at a minimum of 11 inches, wcp. and a maximum of 14 inches, wcp.

Pressure regulators will vary somewhat with different design and manufacturing, but all have a basic function. Most small regulators of this type will not operate efficiently if the inlet line pressure exceeds 18 inches, wcp.

Gas flow should be in the direction of the arrow. If there is a surge in line pressure, the diaphragm will flex upward, reducing the valve opening to a point where the gas pressure counteracts the spring weight above the valve and diaphragm.



House line pressure for natural gas is generally considered properly regulated at a minimum of 6 inches, wcp. and a maximum of 14 inches, wcp. This is reduced to approximately 4 inches, wcp. by the regulator on the appliance, or depending on the pressure desired or recommended by the appliance manufacturer.

GAS DISTRIBUTION

Gas in the street mains may be under one of three pressure systems: low, medium, or high.

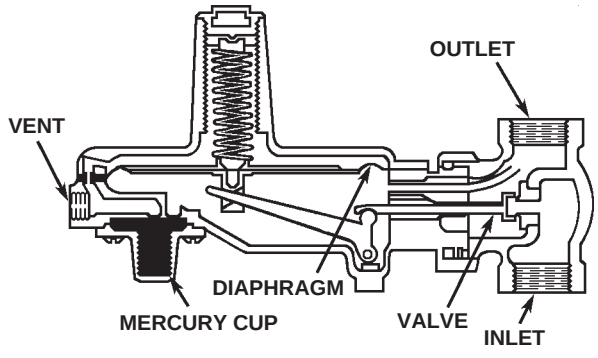
Low-pressure systems were used in the early days of the gas industry, when gas was used mainly for lighting. These mains carried pressures up to 10 inches, wcp.

As loads on low-pressure mains reached the capacity of the mains, and were still increasing, the only way of increasing the capacity was to increase the pressure.

Medium-pressure distribution systems carry from 10 inches, wcp. to 50 psi {Pounds Per Square Inch} in the street mains. Many utilities maintain an average of 15 lbs. pressure in their medium-pressure lines.

High-pressure mains carry 50 psi to 100 psi. It is obvious that high pressure must be reduced; therefore there is a need for pressure regulators. On high or medium-pressure mains the gas utility has a regulator, usually near the meter, which reduces the main pressure from psi to 6 inches wcp as it enters the house.

We have mentioned gas pressures in inches water column pressure and also in pounds per square inch. For the purposes of conversion, 27.74 inches wcp equals 1 psi. You can see that when we say the gas pressure at the range should be 4 inches wcp, this is less than .144 or a fraction over 1/8 psi in pressure. You can hardly hear it. When you are checking pipe joints with soap suds for possible leaks, you must work carefully and thoroughly.

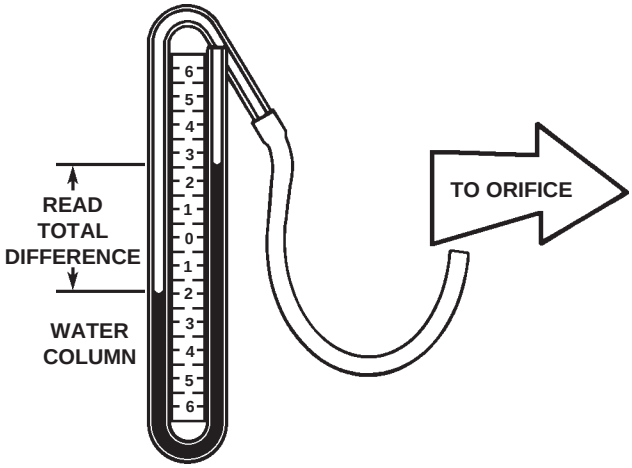


This is a cut-away view of a regulator which will reduce pressures from psi to inches wcp. It is larger than the regulator we use on an appliance and has a somewhat different action, although the principle is the same.

GAS PRESSURE TESTING

How do we test gas flow pressure in an appliance?

To test gas pressures, you can use a water-tube manometer which reads in inches wcp. It is sometimes called a "U" gauge. This essential tool is a simple, clear plastic tube with a scale marked off in inches and tenths. If used correctly, the operation is simple and the reading accurate. However, misuse can vary the reading enough to render it useless.



To use this manometer correctly, the following procedures are recommended:

1. Fill the tube with clear water to about the ZERO marking on the scale. Volume of water is not critical since the reading is the difference between the two sides.

2. Connect the hose to one of the top gas valve orifices. The other end is connected to the manometer.

3. Light one of the other burners - turn to full flame. This will allow you to read "flow" pressure. Failure to do this will only give you "static" pressure.

4. Turn on the valve leading to the manometer.

5. Hold the "U" gauge vertically and take reading. Read each side to the tenth.

6. The top of the water column in each side of the tube is not flat, but curved upward at the edges. This is called a meniscus. Always read the lower edge of the meniscus, keeping the eyes level with the bottom of the curve for accurate readings. Add the readings of the two sides for the gas pressure.

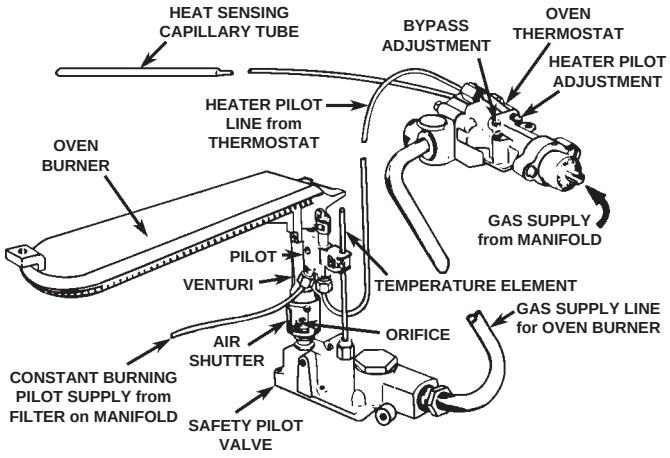
What reading do you get on this manometer?

You should read it as 4.5 inches wcp. Add the 2.4 inches above the "0" to the 2.1 inches below the "0" to find a total of 4.5 inches wcp.

THERMOSTAT (Gas Ovens)

The purpose of gas thermostats is to maintain as nearly even temperatures as possible in the oven so that the cooking can be accurately controlled.

Gas thermostats are basically the same for almost all models. When a thermostat is turned on, it allows gas from the manifold to flow to the safety pilot and then to the burner. When the thermostats sensing element in the oven cavity is heated by the ovens temperature, it signals the thermostat to restrict or shut off the gas. The thermostats response to this signal is controlled by the degree of heat selected on the thermostat dial. This signal is accomplished by temperature-sensitive fluid in the sensing element connected by a capillary tube to the thermostat. When the signal becomes stronger than the dial setting, the thermostat reacts to limit the gas flow. The fluid expands against a "bellows" in the thermostat which then mechanically restricts the gas supply. If the thermostat capillary is broken or has lost its fluid, the thermostat will act as if it was cold and will not shut the gas off.



The safety pilot is considered part of the oven control and must be studied to understand how the thermostat works. The constant-burning pilot, at the burner, is supplied gas from the manifold, *not* from the thermostat. *This pilot does not ignite the main burner.* When the thermostat is turned on, it immediately supplies gas to another, larger heater pilot. This large heater pilot is ignited by the constant pilot. The thermostat may cycle the burner flame but this large pilot is on whenever the thermostat is on. When the thermostat is turned off, the lack of the large pilot flame causes the safety pilot to shut off the gas supply. Thus, the gas is turned off at two points; at the thermostat and at the safety pilot

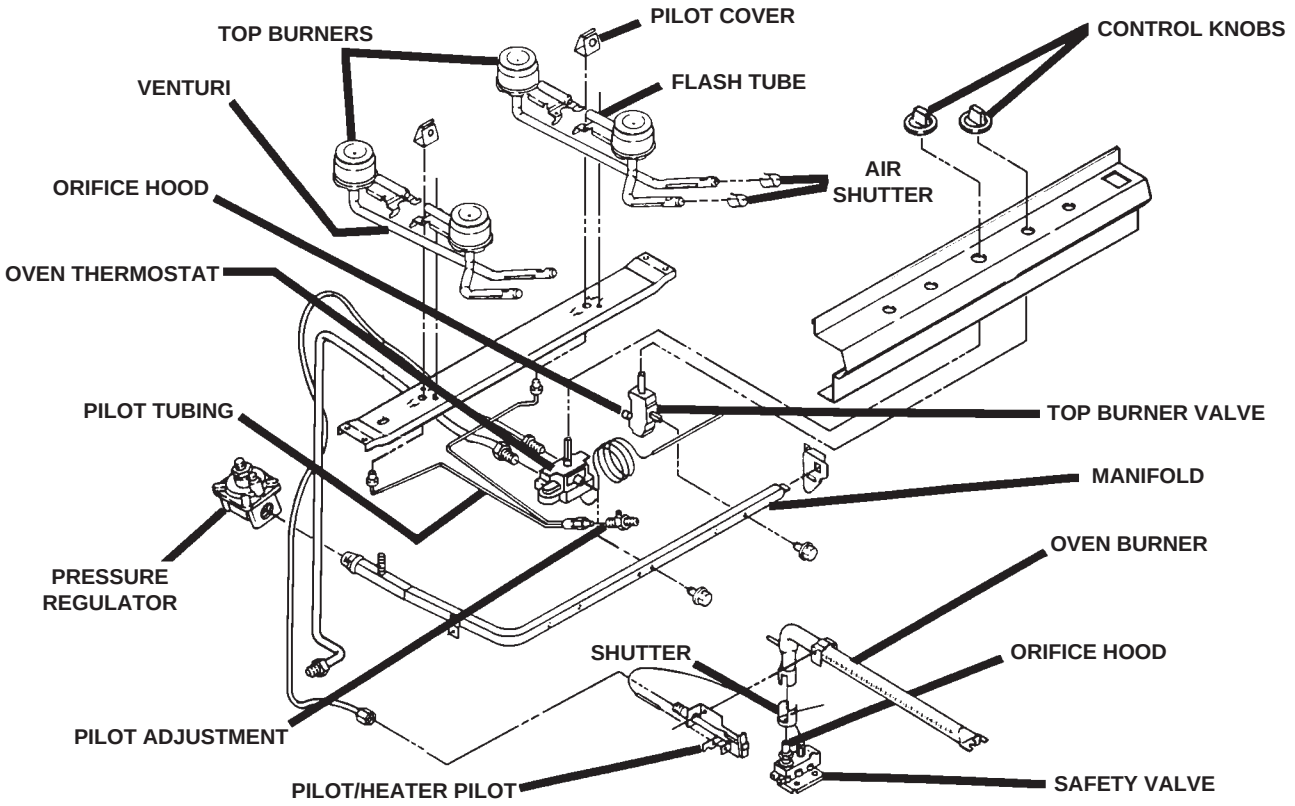
Some ranges are equipped with a Lo-Temperature thermostat. This new system gives precise control of gas oven temperatures down to 140°F, instead of the minimum of 200°F, which usually is the lower limit of standard controls.

At temperatures above 325°F, the oven thermostat operates in the same way as the standard oven control. Below 325°F, the operation is somewhat different. At these lower temperatures, the bypass flame tends to override the temperature setting so the *oven burner shuts off completely*. When the temperature drops to a point where more heat is called for, the oven burner automatically relights. It then stays on until the oven reaches the desired temperature, then shuts off again. To accomplish this on-off cycling, which is necessary for low-temperature control, the thermostat shuts off the gas to the large heater pilot. This, in turn, shuts off the gas flow to the oven burner. When oven temperature drops below the set point, gas again flows to the burner pilot, which is promptly relighted by the stand-by pilot. The flame of the burner pilot actuates the temperature-responsive element, opening the automatic pilot valve and allowing gas to flow again to the burner.

In this way, low oven temperatures are controlled as accurately as high temperatures, there are no wide temperature swings.

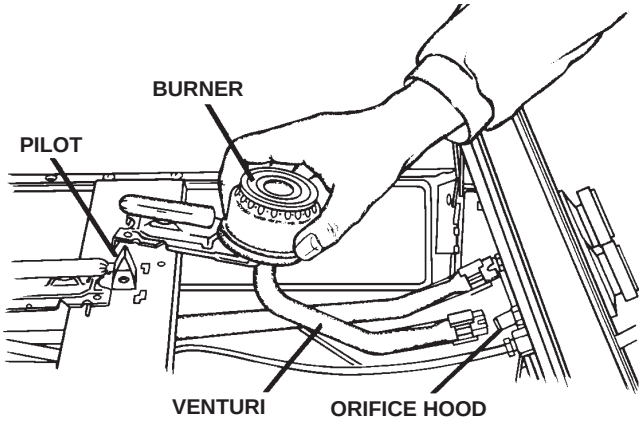
CHAPTER 3

STANDING PILOT IGNITION SYSTEMS

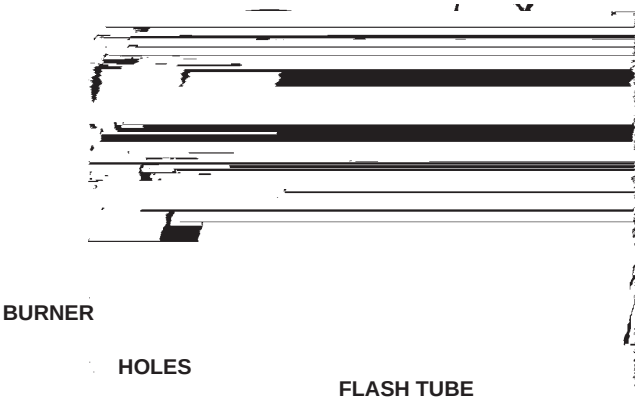


BURNER ASSEMBLY

Gas enters the range and is regulated by the pressure regulator. From the regulator the gas enters the manifold. The manifold then distributes gas from the regulator to the burner valves.



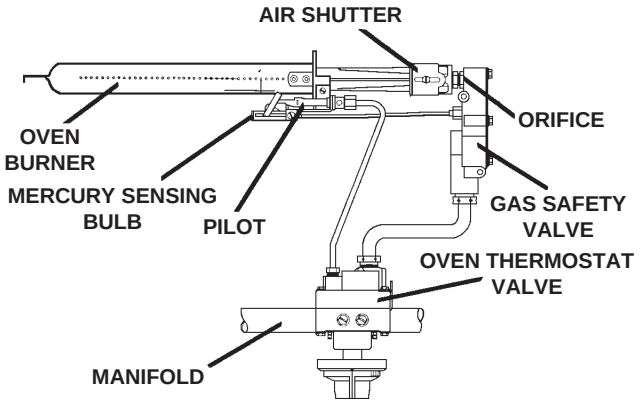
Once a valve is turned on, gas flows through the orifice into the venturi and on to the burner, this assembly simply slides over the orifice hood.



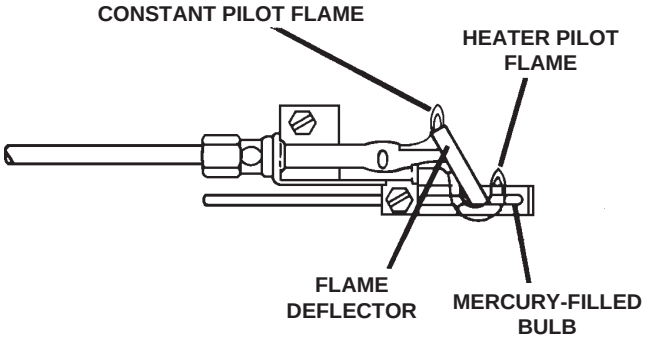
As gas flows into the burner, air is drawn into the shutter to provide primary air for the proper air/gas combustion ratio as explained in basics. As the gas reaches the burner head, it will begin to flow through the holes in the side of the burner head and into the flash tube. Gas flows through the flash tube and is then ignited by the standing pilot or ignitor. As this gas is ignited, it flashes back through the tube and ignites the burner.

OVEN SYSTEM

The oven is controlled by the thermostat valve. The valve is mounted to the manifold. From the valve are gas lines to the oven burner and one line to the pilot. A small amount of gas flows through this valve constantly for the oven standing pilot.



When the thermostat is set two things happen. First, gas flows through the thermostat to the safety valve at the burner. Secondly, whenever the thermostat is set and the thermostat bulb is calling for heat, the gas flow will increase to the pilot, causing a heater pilot.



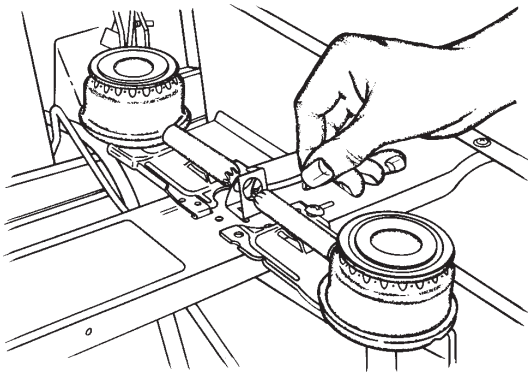
A flame deflector spreads the heater pilot flame over a mercury-filled bulb. After this bulb is heated, it will cause the safety valve to open. The safety valve will then open and allow gas to flow to the oven burner. The burner is then ignited by the heater pilot.

The burner continues to operate until the preset temperature in the oven is reached. Once temperature is reached the heater pilot is reduced to the regular standing pilot flame until the thermostat again calls for heat.

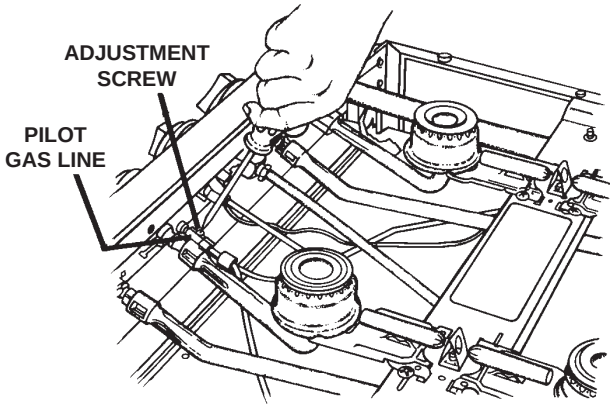
LIGHTING the RANGE

To light and adjust standing pilot ranges, follow these simple steps.

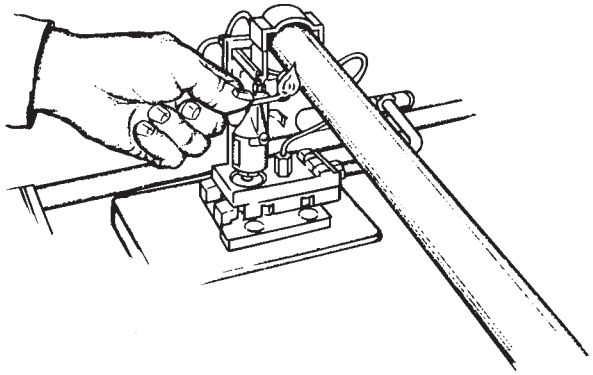
1. Be sure all control knobs are in the OFF position and raise the cooktop.



2. Place a lighted match near the opening of the pilot between the two burners.



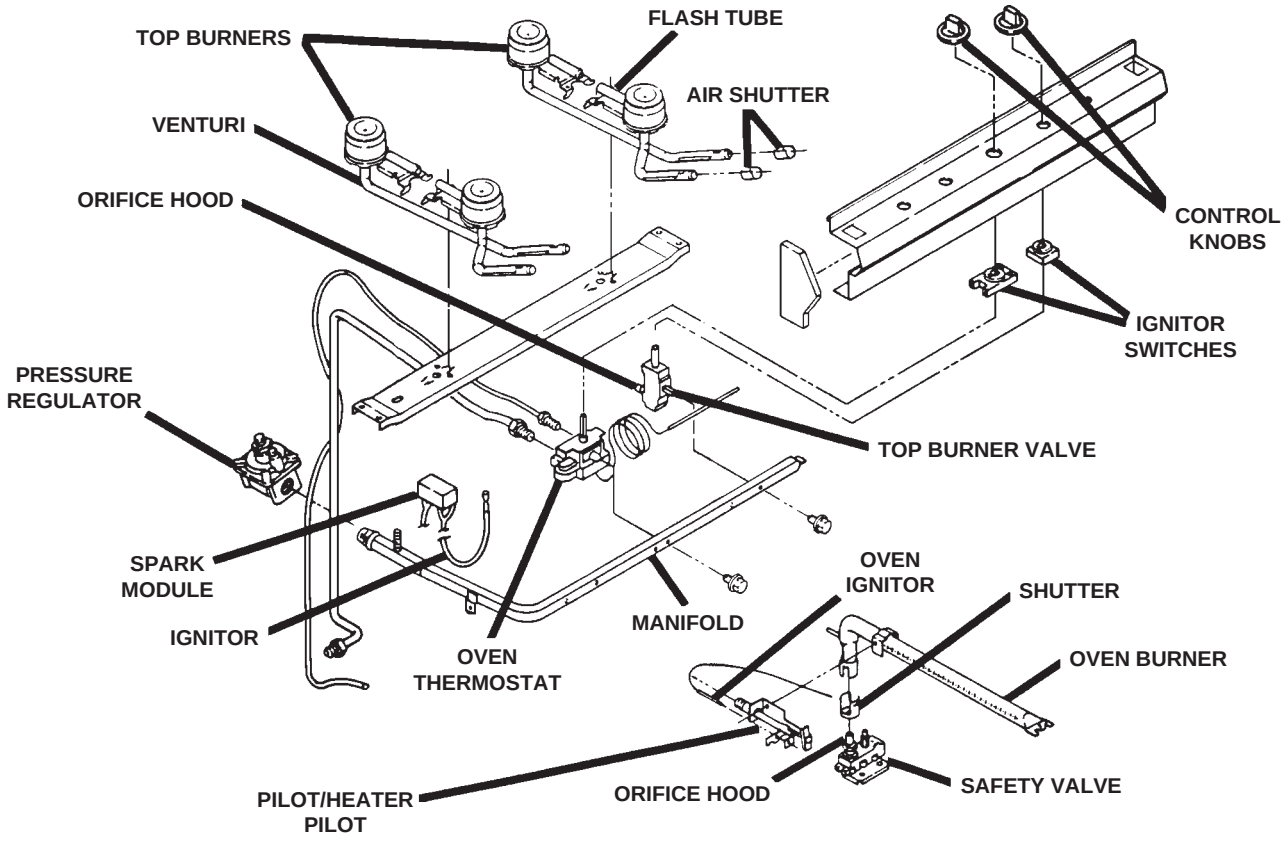
3. Adjust the pilot adjustment screw so the pilot flame tip is 1/4" to 3/8" high and centered in the hole in the pilot housing.



To light the oven burner, make sure the oven is OFF. Remove the oven racks. Hold a lighted match to the opening in the top of the pilot at the rear of the oven burner. No pilot adjustments are required.

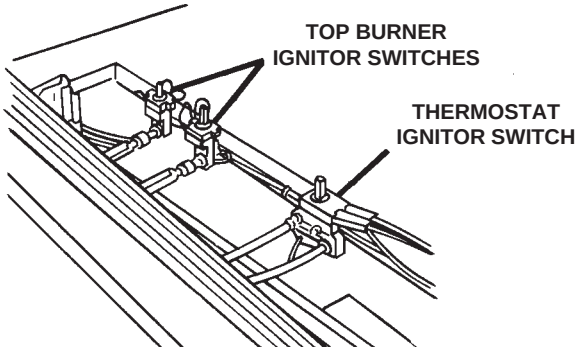
CHAPTER 4

SPARK IGNITION SYSTEMS



IGNITORS

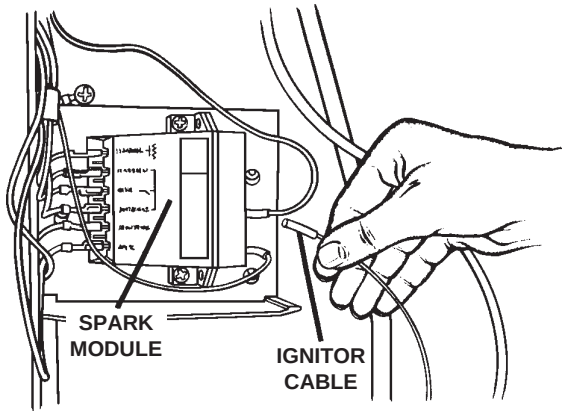
Instead of standing pilots to ignite the top and oven burners you have ignitors.



These ignitors are controlled by switches that are on each burner valve and the thermostat valve. These switches are rotary actuated and simply slide over the valve stem and snap on the valve. Turning on a burner valve to lite or setting the thermostat closes the switch, making a circuit to the spark module. They are normally open switches and are wired in parallel.

SPARK MODULE

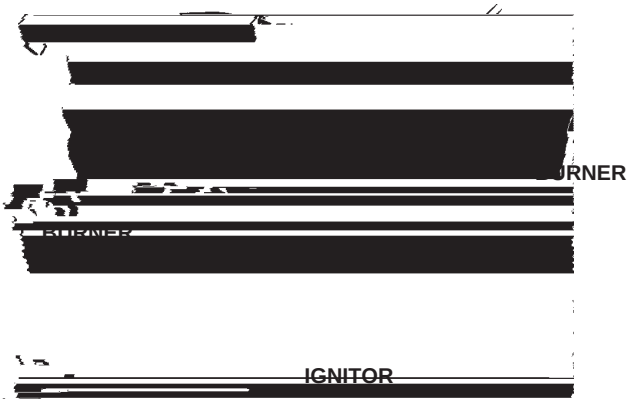
The Spark module is mounted on the rear of the range.



Whenever the spark module is energized by one of the switches through an ignitor cable, a solid-state circuit and pulse transformer within the module electronically sends pulses to “ALL” of the ignitor electrodes at the same time. No adjustments can be made to the module and it is serviced only as an assembly.

TOP BURNER IGNITORS

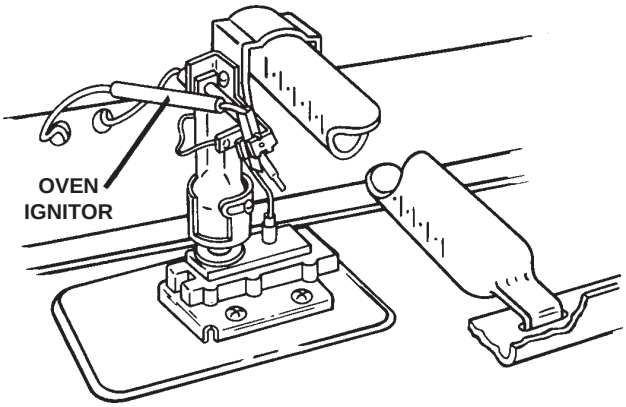
The burner ignitors are basically a metal rod with a ceramic insulating body which is wired directly to the spark module.



Pulses from the spark module cause the ignitors to arc to the ground strap above the ignitor. These pulses or sparks light the top burners through the flash tube.

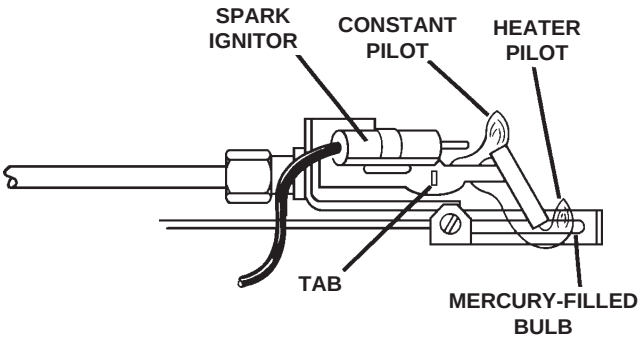
OVEN IGNITORS

The oven burner ignitor has a larger electrode and sparks to the tab on the pilot.



Unlike the surface burners which are manual, the oven ignition system is an automatic or a re-ignition system. When the thermostat knob is set, the ignitor switch activates the spark module and ignitors, and gas flows to the pilot burner. The ignitor will spark until the pilot is ignited and then stop. The pilot will continue to burn until the thermostat is turned off.

The ignitor stops sparking because the module is sending a sensing current through the ignitor along with the high-voltage pulses. There is about 1/10" of an inch gap between the ignitor electrode and the tab on the pilot flame. The high-voltage pulses "jump the gap" to ground, creating the spark, but the low voltage current cannot bridge the gap.



When the pilot does light, the flame fills the gap between the ignitor electrode and the ground tab on the pilot. The flame is actually a conductor due to its carbon content. Therefore, the sensing current will pass through the pilot flame to ground, completing a circuit back to the spark module. When this sensing circuit is completed, the ignitor module is deactivated and stops sending high-voltage pulses to the ignitors.

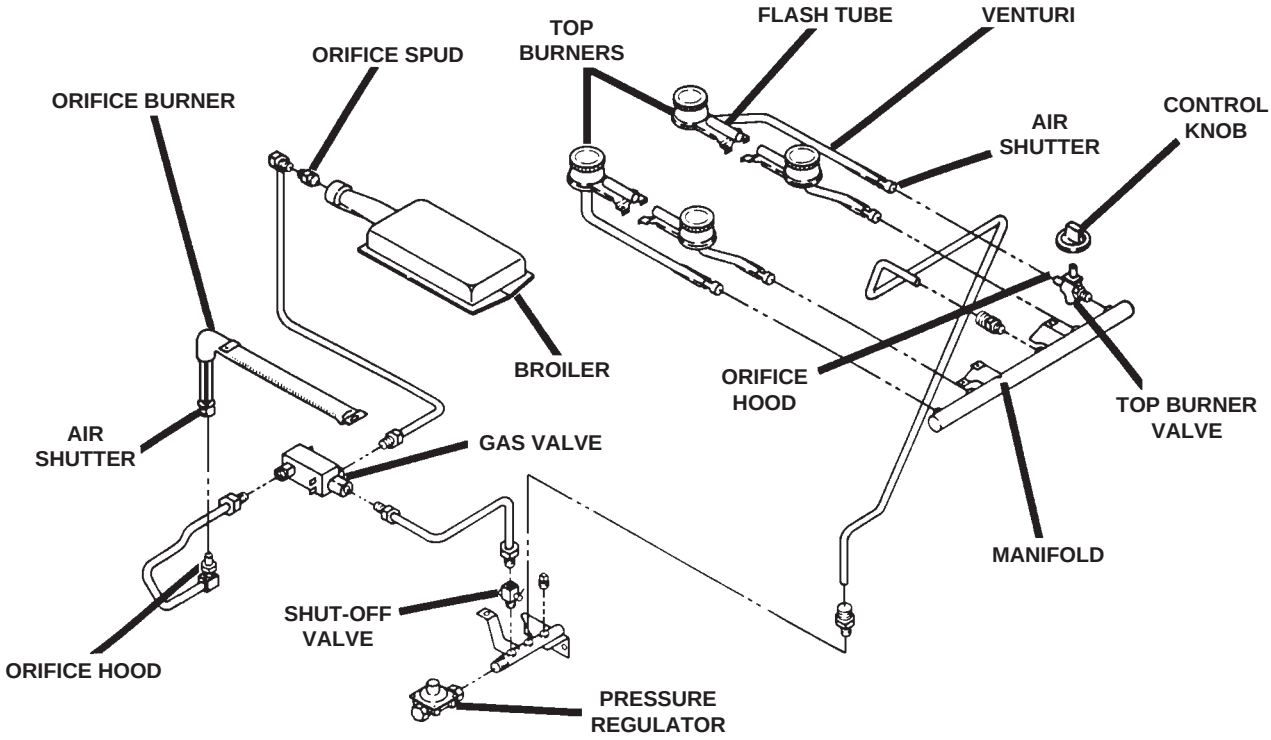
RE-IGNITION

If the pilot should go out, the sensing current circuit is interrupted by the loss of the flame, and the spark module will begin sending pulses to the ignitors which will continue sparking until the pilot lights. This is called re-ignition.

The rest of the oven burner system is the same as the standing pilot models. Remember in this system, the pilot will continue to burn until the thermostat is turned off, which shuts off gas to the pilot.

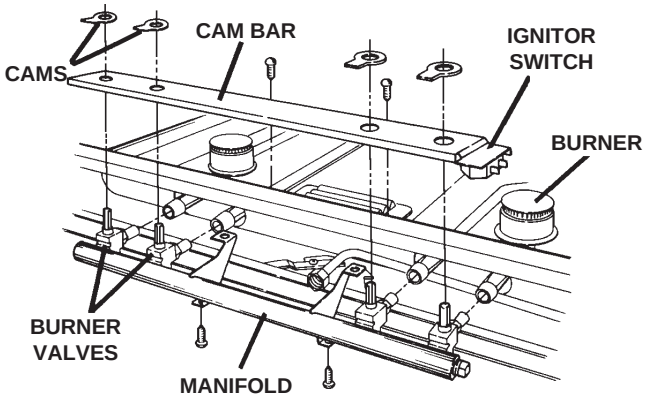
CHAPTER 5

GLO IGNITION SYSTEMS



TOP BURNER IGNITION

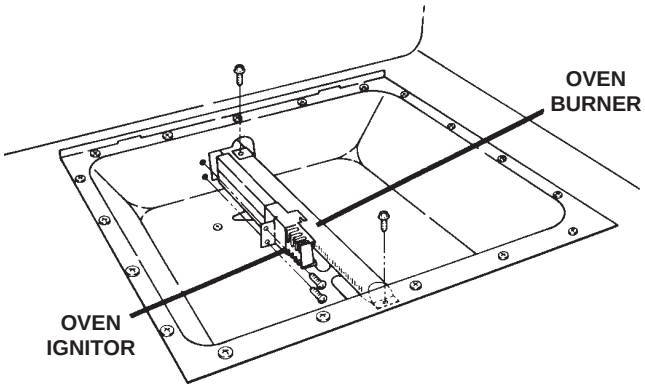
The ignition switch is connected to a cam bar which sits on top of the burner valves and manifold.



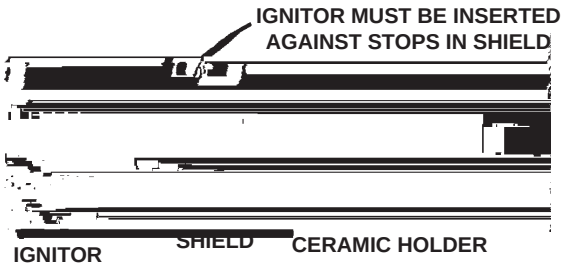
On each burner valve shaft, there is a cam. When the control knob is turned the cam rotates with the shaft of the burner valve. Once the control knob is turned to the lite position, the cam will slide the cam bar actuating the ignitor switch and then completing the circuit to the ignitor module. This system functions just like most gas ranges with top burner spark ignition, except it only has one ignitor switch instead of four.

OVEN BURNER IGNITION

The oven burner system is slightly different than the previous oven discussed.



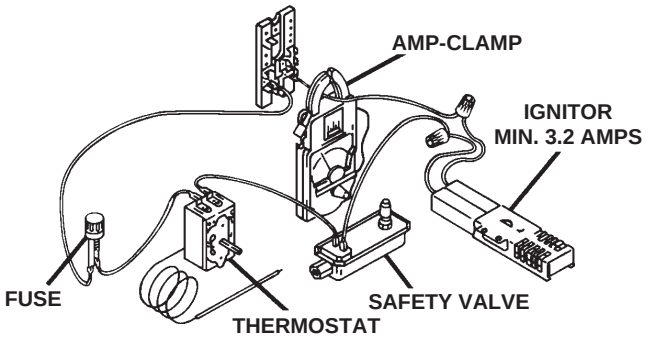
Instead of a standing pilot or spark ignition system this system uses a carbide glo type ignitor. This glo ignitor, when voltage is applied, heats to a high temperature to ignite the gas in the main burner.



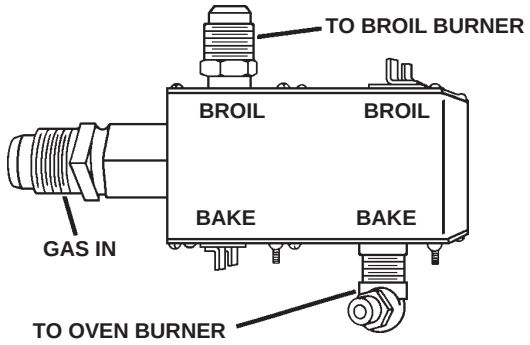
The ignitor is quite brittle so care must be used when servicing it.

SAFETY VALVE

In series with the ignitor is the safety valve which is located behind the storage drawer.



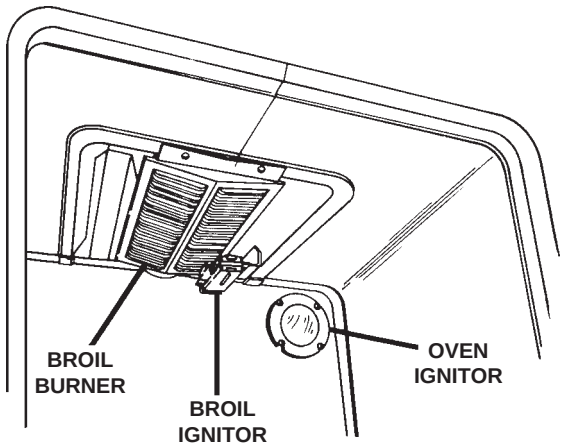
The valve is a bimetal type valve that opens and closes electrically. When the ignitor is energized it will draw 3.2 amps. This 3.2 amperage draw is enough to cause a bimetal, inside the valve, to warp open and allow gas to flow to the burner being operated.



The safety valve supplies gas to both the broil and bake burners.

BROILER BURNER

The broiler burner or blanket-of-flame burner is an infrared burner.



This burner has no gas input adjustment since the infrared burner is equipped with a fixed orifice. There is no air shutter to adjust. The burner may have a hazy or fuzzy appearance when in operation. This haze may be 3/8" thick, maximum and is normal for this type burner.

CHAPTER 6

GAS CONVERSION

NATURAL to LP GAS CONVERSION

Input ratings shown on the rating plate (serial tag) are for elevations up to 2,000 feet. For elevations above 2,000 feet, ratings should be reduced at a rate of 4% for each 1,000 feet above sea level.

Most all ranges are pre-adjusted from the factory for operation on *"NATURAL"* gas. To use the appliance on *"LIQUEFIED PETROLEUM" (LP)*gas, the following four things must be done.

1. Change the pressure regulator setting from *"NATURAL"* to *"LP"*.

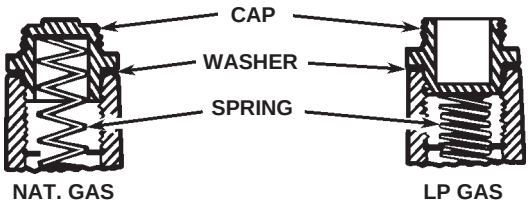
2. Readjust the burner orifice hoods.

3. Change the select-a-gas screw which is on the oven thermostat control.

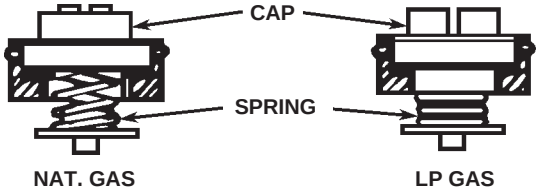
4. Change the broil burner orifice spud (SELF-CLEANING MODELS ONLY).

PRESSURE REGULATOR CHANGE

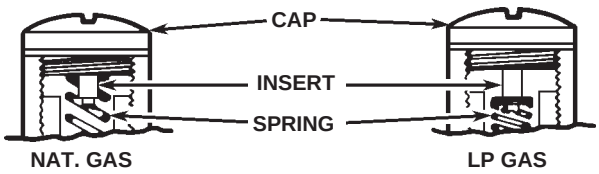
There are five different types of pressure regulators that are used on ranges. Use the following as a guide to convert your pressure regulator over to *"LP"* gas. IN ANY CONVERSIONS, DO NOT REMOVE THE PRESSURE REGULATOR.



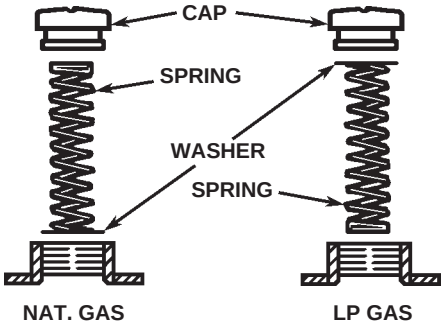
1. Remove the cap marked *"NAT."* and reverse it to read *"LP."* Be sure not to disturb or remove the spring beneath the cap. Also make sure the fiber washer is between the cap and the body of the regulator. Insert the cap in the body of the regulator and tighten.



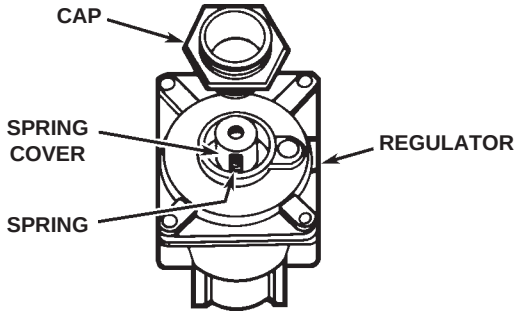
2. Remove the cap with the screwdriver slot and turn it upside down. This cap will have the marking "LPG10" shown. Be sure not to disturb or remove the spring beneath this cap. Insert the cap in the body of the regulator and tighten.



3. Remove the cap with the screwdriver slot. Now remove the black insert marked *"NAT."* from the cap. Reverse this insert and carefully push it firmly into the hole in the cap. The marking *"LP"* will now be showing on the insert. Also, be sure not to disturb the spring in the body of the regulator. Insert the cap in the body of the regulator and tighten.



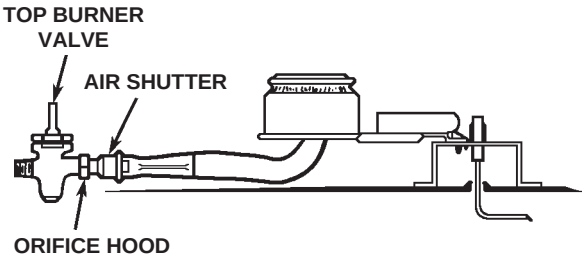
4. Remove the cap with the screwdriver slot. Now remove the spring and washer (washer will be at bottom of spring). Reverse these so that the washer is now at the top of the spring, then reinstall. Insert the cap over the washer and spring in the body of the regulator and tighten.



5. Use a wrench to unscrew the aluminum cap by turning counterclockwise. Turn the cap over so the hole end is up. Place the gasket between the cap and regulator. Then place the cap and *gasket* on the regulator and tighten. DO NOT OVERTIGHTEN.

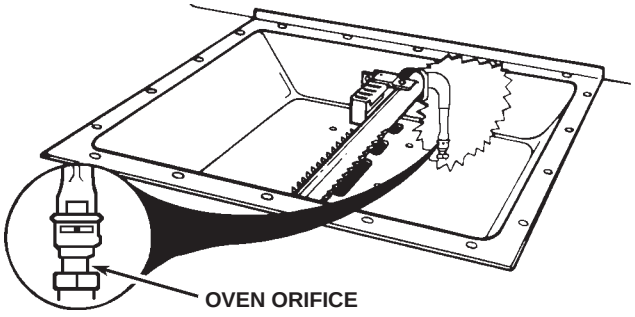
BURNER ORIFICE HOOD ADJUSTMENT

TOP BURNERS



Remove the four top burner mounting screws, then lift the burners off the brackets. Then screw the four burner orifice hoods down till snug, approximately 2 to 2-1/2 turns. DO NOT OVERTIGHTEN. Burner flames cannot be properly adjusted if this conversion is not made.

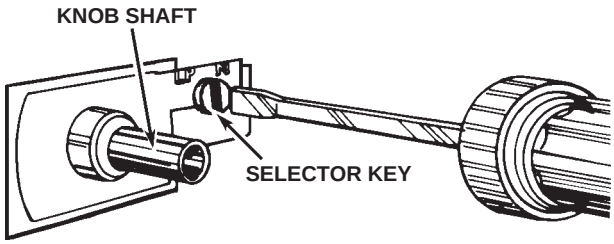
OVEN BURNER



Screw the oven orifice hood down till snug, approximately 2 to 2 1/2 turns. DO NOT OVERTIGHTEN. Burner flames cannot be properly adjusted if this conversion is not made.

SELECT-A-GAS SCREW

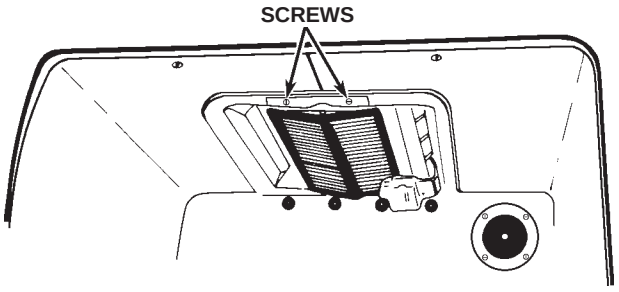
Remove the oven thermostat knob to be sure *select-a-gas* adjusting screw is in the proper position for the type of gas being used. The select-a-gas screw is located on the left side of the Robertshaw thermostat and on the right side of the Harper thermostat.



Turn the screw clockwise to stop, for *LP*, and counter-clockwise to stop, for *NAT*.

BROIL BURNER ORIFICE SPUD (SELF-CLEANING MODELS ONLY)

1. Be sure the proper burner spud is selected for the type of gas being used.



2. Remove the two screws fastening the broil burner assembly to the oven. Carefully pull the burner towards you, then downward to access the burner orifice spud in the rear wall. Extra care is needed to avoid breaking the ignitor coil. Place burner, screen-side up, in a safe area.

3. Use a nutdriver or wrench to remove the *"NAT"* gas burner orifice spud. Install the selected *"LP"* burner orifice spud.

4. Replace the burner assembly cover, making sure the louvers are facing toward the rear of the range.

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