Thor Gas Fryer

Technical Service Manual

Model: GH110-P , GH110-N,GH111-P,GH111-N

IMPORTANT FOR FUTURE REFERENCE

Please complete this information and retain this manual for the life of the equipment. For Warranty Service and/or parts, this information is required.

Model Number	Serial Number	Date Purchased

WARNING: For your safety, do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliances. Keep the area free and clear of combustible.

WARNING： Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury, or death. Read the installation operating and maintenance instructions thoroughly before installing, or servicing this equipment.

WARNING： Instructions must be posted in a prominent location. All safety precautions must be taken in the event the user smells gas. Safety information can be obtained from your local gas supplier.

thor

15 Badgally Road, Campbelltown
NSW 2560

Table of Contents

Introduction

We are confident that you will be delighted with your Thor Gas Fryer, and it will become a most valued appliance in your commercial kitchen.
To ensure you receive the utmost benefit from your new Gas Fryer, there are two important things you can do.

Firstly:

Please read the instruction book carefully and follow the directions given. The time taken will be well spent.

Secondly:

If you are unsure of any aspect of the installation, instructions or performance of your appliance, contact your dealer promptly. In many cases a phone call could answer your question.

CE Only:

These instructions are only valid if the country code appears on the appliance. If the code does not appear on the appliance, refer to the supplier of this appliance to obtain the technical instructions for adapting the appliance to the conditions for use in that country.

WARNING:

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, INJURY OR DEATH.
READ THE INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS THOROUGHLY BEFORE INSTALLING OR SERVICING THIS APPLIANCE.

WARNING:

INSTRUCTIONS TO BE FOLLOWED IN THE EVENT THE USER SMELLS GAS ARE TO BE POSTED IN A PROMINENT LOCATION. THIS INFORMATION SHALL BE OBTAINED BY CONSULTING THE LOCAL GAS SUPPLIER.

WARNING:

GREAT CARE MUST BE TAKEN BY THE OPERATOR TO USE THE EQUIPMENT SAFELY TO GUARD IT AGAINST RISK OF FIRE.

- THE APPLIANCE MUST NOT BE LEFT ON UNATTENDED.
- IT IS RECOMMENDED THAT A REGULAR INSPECTION IS MADE BY A COMPETENT SERVICE PERSON TO ENSURE CORRECT AND SAFE OPERATION OF YOUR APPLIANCE IS MAINTAINED.
- DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPOURS OR LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.
- DO NOT SPRAY AEROSOLS IN THE VICINITY OF THIS APPLIANCE WHILE IT IS IN OPERATION.

CAUTION:

THIS APPLIANCE IS;

- FOR PROFESSIONAL USE AND IS TO BE USED BY QUALIFIED PERSONS ONLY.
- ONLY QUALIFIED SERVICE PERSONS ARE TO CARRY OUT INSTALLATION, SERVICING AND GAS CONVERSION OPERATIONS.
- COMPONENTS HAVING ADJUSTMENTS PROTECTED BY THE MANUFACTURER SHOULD NOT BE ADJUSTED BY THE USER/OPERATOR.
- DO NOT OPERATE THE APPLIANCE WITHOUT THE LEGS SUPPLIED FITTED.

Specifications

General

- Stainless steel enclosure
- All burner has flame safeguard
- The valve is the modulating thermostat with on/off function with temperature selecting knob
- Cast iron burner
- Thermostat with manual reset limit switch
- Three/four burner; Three/four combustion tube
  - ◆ Oil Tank size 14” X 14"

Pack Contents

The following is included:

- Gas Fryer
- Feet
- Instruction Manual

Gas Supply Requirements

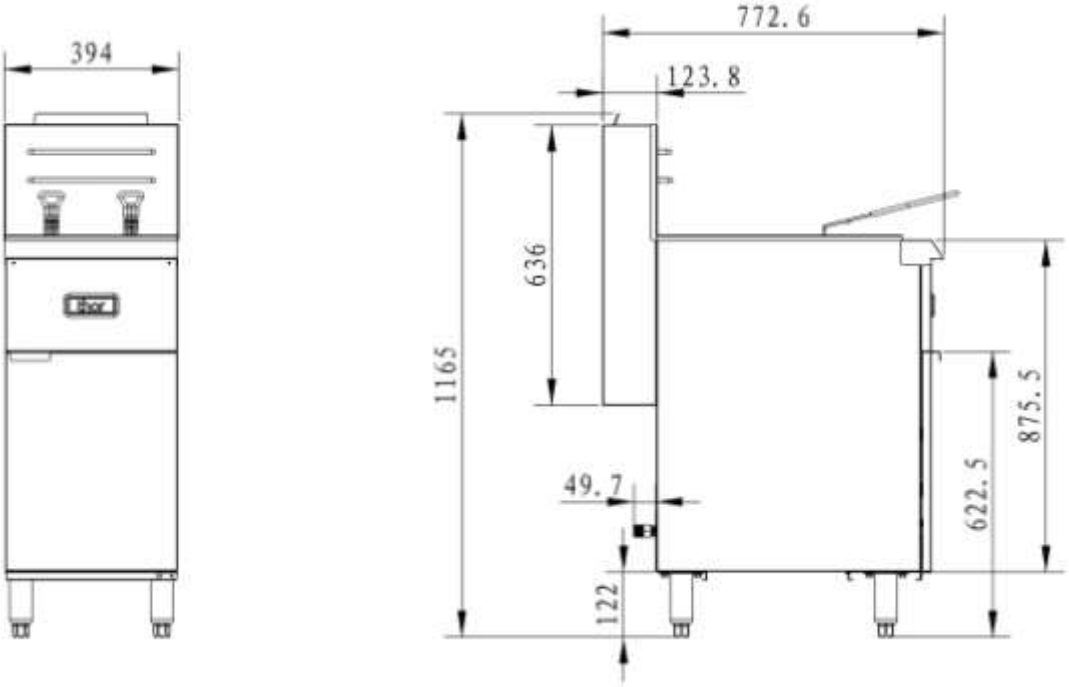
	Natural Gas		Propane	
	GH110-N	**GH111-N**	**GH110-P**	**GH111-P**
Single burner Heat Input	32.5 MJ	32.5 MJ	32.5 MJ	32.5 MJ
Heat Total	65 MJ	97.5 MJ	65 MJ	97.5 MJ
Burner Operating	1.0 kPa		2.75 kPa	
Supply Pressure	1.0 kPa		2.75 kPa	
Gas Connection	¾” BSP		¾” BSP	

The burner operating pressure is to be measured at the gas control valve outlet test point with one burner operating at ‘High’ setting. The operating pressure is ex-factory set, through the appliance regulator and not to be adjusted.

Minimum input Heat of burner: 21MJ for LPG AND NAT

Dimensions

GH110-P, GH110-N, GH111-P, GH111-N



Installation

Installation Requirements

NOTE:

- **It is most important that this appliance is installed correctly and that operation is correct before use. Installation shall comply with local gas, health and safety requirements.**

- **This appliance shall be installed with sufficient ventilation to prevent the occurrence of unacceptable concentrations of substances harmful to health.**

Our Gas Fryers are designed to provide years of satisfactory service and correct installation is essential to achieve the best performance, efficiency and trouble-free operation.

This appliance must be installed in accordance with National installation codes and in addition, in accordance with relevant National / Local codes covering gas and fire safety.

Australia:
AS 5601/AG 601 (to be AS 5601)- Gas Installations
New Zealand:
NZS 5261 - Gas Installation.
United Kingdom:
Gas Safety (Installation and Use) Regulations 1998
BS 6173-Installation of Catering Appliances.
BS 5440-1&2 Installation Flueing & Ventilation.
Ireland:
IS 820-Non Domestic Gas Installations.

Installations must be carried out by qualified persons only. Failure to install equipment to the relevant codes and manufacturer's specifications shown in this section will void the warranty. **Components having adjustments protected by the manufacturer are only to be adjusted by an authorized service agent. They are not to be adjusted by the installation person.**

Unpacking

- Remove all packaging and transit protection from the appliance including all protective plastic coating from the exterior stainless steel panels.
- Check equipment and parts for damage. Report any damage immediately to the carrier and distributor.
- Ensure that the 4 adjustable castors are fitted with the protruding centre screw.
- Report any deficiencies to the distributor who supplied the appliance.
- Check that the available gas supply is correct to that shown on the rating plate located on the right hand panel.

Location

1. Installation must allow for a sufficient flow of fresh air for the combustion air supply.
2. Installation must include adequate ventilation means, to prevent dangerous build-up of combustion products.
3. Any gas burning appliance requires adequate clearance and ventilation for optimum and trouble-free operation. The minimum installation clearances shown below are to be adhered to.
4. Position the appliance in its approximate working position.
5. All air for burner combustion is supplied from underneath the unit. The legs must always be fitted and no obstructions placed on the underside or around the base of the unit, as obstructions will cause incorrect operation and / or failure of the appliance.
6. Components having adjustments protected by manufacturer are only allowed to be adjusted by an authorized service agent. They are not to be adjusted by the installation person.

Clearances

NOTE: Only non-combustible materials can be used in close proximity to this appliance.

	Combustible Surface	Non Combustible Surface
Left / Right Hand Side	355mm	0mm
Rear	250mm	0mm

Assembly

NOTE:

- This appliance is assembled before delivery except castors.
- This appliance is fitted with adjustable castors to enable the appliance to be positioned securely and level. This should be carried out on completion of the gas connection. Refer to the 'Gas Connection' section.
- IM will be stated that the appliance shall be installed in such a way that side body surfaces are not accessible in the installed position.

Gas Connection

NOTE: ALL GAS FITTING MUST ONLY BE CARRIED OUT BY A QUALIFIED PERSON.

A 3/4" male BSP line for the gas connection is located near the lower right rear corner of the fryer. The serial plate (located inside the front door of the fryer) indicates the type of gas the unit is equipped to burn (natural gas or propane). The fryer should be connected ONLY to the type of gas for which it is equipped.

For orifice sizes and pressure regulator settings, see the chart on page 4. If the fryer is being installed at over 2,000 feet altitude and that information was not specified when ordered, contact the appropriate authorized Thor Service Representative or the Thor Service Department. Failure to install with proper orifice sizing will result in poor performance and may void the warranty.

If applicable, the vent line from the gas appliance pressure regulator shall be installed to the outdoors in accordance with local codes or, in the absence of local codes, with the *Australia: AS 5601/AG 601 (to be AS 5601) - Gas Installations or New Zealand: NZS 5261 - Gas Installation.*

An adequate gas supply is imperative. Undersized or low pressure lines will restrict the volume of gas necessary for satisfactory performance. A combination gas valve and pressure regulator, which is provided with each unit, is set to maintain a 1.0kPa manifold pressure for natural gas or 2.75kPa manifold pressure for propane gas. Fluctuations of more than 25% on natural gas or 10% on propane gas will create problems and affect burner operating characteristics.

Purge the supply line to clean out dust, dirt, or other foreign matter before connecting the line to the unit. It is recommended that an individual manual shutoff valve be installed in the gas supply line to the unit. Use pipe joint compound that is suitable for use with both natural and LP gas on all threaded connections.

ALL PIPE JOINTS AND CONNECTIONS MUST BE TESTED THOROUGHLY FOR GAS LEAKS. USE ONLY SOAPY WATER FOR TESTING ON ALL GASES. NEVER USE AN OPEN FLAME TO CHECK FOR GAS LEAKS. ALL CONNECTIONS MUST BE CHECKED FOR LEAKS AFTER THE UNIT HAS BEEN PUT INTO OPERATION. **TEST PRESSURE SHOULD NOT EXCEED 3.45kPa**

Installation

CAUTION

THIS APPLIANCE AND ITS INDIVIDUAL COMBINATION GAS VALVE MUST BE DISCONNECTED FROM THE GAS SUPPLY PIPING SYSTEM DURING ANY PRESSURE TESTING OF THAT SYSTEM AT TEST PRESSURES IN EXCESS OF 14"WC (1/2 PSIG or 3.45 kPa).

If the incoming gas pressure is in excess of 14"WC (1/2PSI, 3.45 kPa), a proper step-down regulator will be required.

Connect the gas supply directly to the 3/4" male BSP connector located near the lower left rear corner of the fryer. When tightening the supply pipe, be sure to hold the mating connector extending from the unit securely with a wrench. This will prevent any damage or distortion to the internal piping and controls of the unit.

After connecting the gas supply, check again that the fryer is level. Use a long spirit level four ways; across the front and rear of the fryer pot, and along each edge.

Commissioning

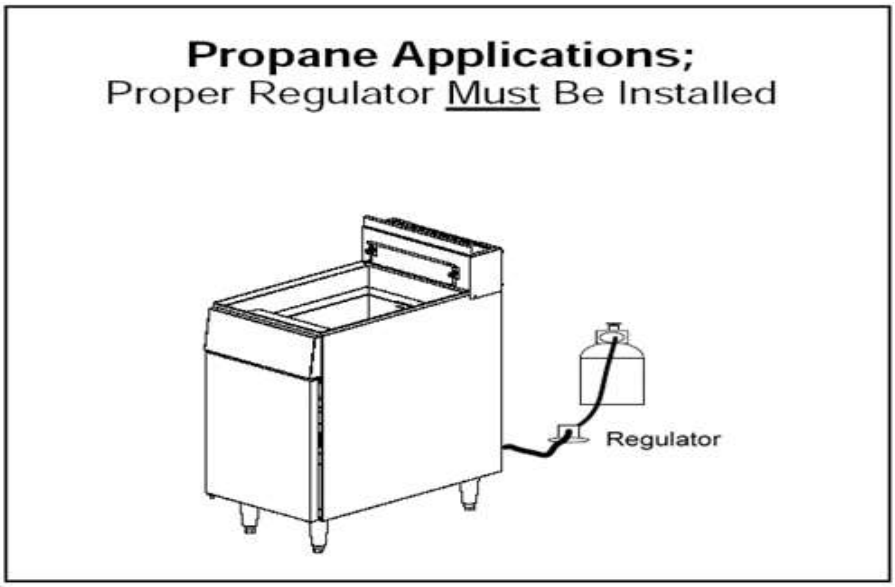
1. Before leaving the new installation;
   a. Check the following functions in accordance with the operating instructions specified in the 'Operation' section of this manual.
      - Light the Pilot Burner.
      - Light the Main Burner.
      - Turning 'Off' the Main Burner/Pilot.

   b. Ensure that the operator has been instructed in the areas of correct lighting, operation, and shutdown procedure for the appliance.

2. This manual must be kept by the owner for future reference and a record of the Date of Purchase, Date of Installation and the Serial Number of the Appliance must be recorded and kept with this manual. (These details can be found on the Rating label, refer to the 'Gas Connection' section).

NOTE: If for some reason it is not possible to get the appliance to operate correctly, shut off the gas supply and contact the supplier of this appliance.

Install the Regulator



Operation

Operation Guide

CAUTION:

• THIS APPLIANCE IS FOR PROFESSIONAL USE AND IS ONLY TO BE USED BY QUALIFIED PEOPLE.

• ONLY QUALIFIED SERVICE PERSONS ARE TO CARRY OUT INSTALLATION, SERVICING OR GAS CONVERSION OPERATIONS.

• COMPONENTS HAVING ADJUSTMENTS PROTECTED (E.G. PAINT SEALED) BY THE MANUFACTURER SHOULD NOT BE ADJUSTED BY THE USER/OPERATOR.

Filling the fryer pot

1. Close drain valve completely before filling the fryer pot.
2. When the fryer is new, fill the fryer pot with water and clean thoroughly (see "Weekly Cleaning" on page 14) in order to remove protective coatings and any foreign matter.
3. The recommended solid shortening capacity for the fryer pot (35, 55 or 75lbs) is described on the serial plate (which is located inside the front door).
4. Remove the basket support frame when filling the fryer pot with solid shortening.
5. When solid shortening is used, be careful not to bend, break, or twist the thin capillary wires of the sensing elements located in the fryer pot.
6. Pack solid shortening into the zone below the tubes, all spaces between the tubes, and at least an inch above the top of the tubes before lighting the fryer. If any air spaces are left around the heat tube surfaces when the heat is turned on, the tube surfaces will become red hot, burn the solid shortening, weaken the fryer pot, and could result in a fire.

 **CAUTION**

NEVER ATTEMPT TO MELT A SOLID BLOCK OF SHORTENING ON TOP OF THE HEAT TUBES. NEVER START THE BURNERS WHEN THE FRYPOT IS EMPTY.

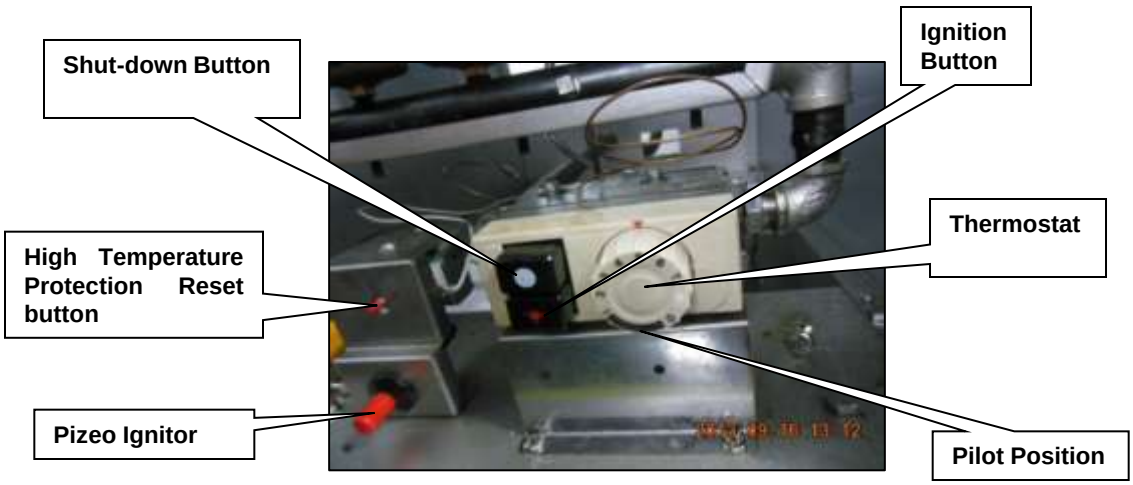
7. To prevent burning or scorching the solid shortening, keep the thermostat set at the lowest temperature until all the solid shortening between and above the tubes has been melted. Additional solid shortening can then be added until the desired frying depth has been reached.
8. Replace the basket support frame over the fryer pot heat tubes.

Operation Guide

Open the burner compartment door and do the following:

1. Turn thermostat to “0”

2. Press down the ignition button, turn the thermostat counterclockwise to the “0” position (shown), and continue to press the knob down.



3. While pressing the ignition button down, use a lit match or piezo igniter to ignite the pilot. Continue to press the knob down for about 30 seconds. If the pilot does not stay lit when the ignition button is released, repeat the lighting procedure and keep the ignition button pressed for 10-20 seconds. Adjustment of pilot flame may be necessary.
4. When the pilot stays lit, turn the knob counterclockwise to the temperature required. Do not press down on the knob in this step.
5. DO NOT turn the thermostat on until the fryer pot is filled with oil or solid shortening.
6. Once the fryer pot is filled with oil, set the thermostat to the desired temperature

Shutdown Procedure

Standby: Turn thermostat on the combination gas valve to the “0” position. At this setting, only the pilot burner will remain ignited.

Complete Shutdown: Press the shut-down button to extinguish pilot burner and main burner and turn thermostat completely off.

Relighting

In the event of a main burner ignition failure, a five minute purge period must be observed prior to re- establishing the ignition source.

1. Shut off all gas.
2. Wait five minutes.
3. Follow the “Lighting” procedure described on page 11.

Automatic Pilot Valve

The Automatic Pilot Valve provides an automatic safety shutoff for the fryer when the pilot flame is extinguished. When the pilot flame is burning, the valve is held open electromagnetically by the electrical current from a thermopile in the pilot flame. When the pilot flame goes out, generation of current ceases and the valve closes automatically.

High Limit Control

Thor Fryers are equipped with a secondary heat control that prevents the oil temperature from rising above 195° C/450° F. (Because of the accuracy tolerance of the sensor, the oil temperature may reach as high as 200° C/475° F.)

In the event the fryer shuts down due to this condition, the oil must be cooled to below 185° C/400° F before the pilot burner can be re-ignited. When the oil has cooled, use the "Lighting" procedure on page 11 to place the fryer back in operation. If the problem persists, contact your Thor Service Representative or the Technical Service Department of the manufacturer.

Main burner air supply:
1. For efficient burner operation, a proper balance of gas volume and primary air supply must be maintained which will result in complete combustion. Insufficient air supply results in a yellow streaming flame. Primary air supply is controlled by an air shutter on the front of the burner.
2. Loosen the screws on the front of the burner and adjust the air shutter to just eliminate the yellow tips of the burner flame. Lock the air shutter in place by tightening the screws.

CAUTION
The space between the legs at the bottom admits combustion air. DO NOT BLOCK THIS SPACE.

All burners are lit from constantly burning pilots. Turning the valve to the desired flame height is all that is required to put the unit in service.

Do not permit fans to blow directly at the unit. Wherever possible, avoid open windows next to the units' sides or back. Avoid wall type fans which create air cross-currents within a room.

It is also necessary that sufficient air should be allowed to enter the room to compensate for the amount of air removed by any ventilating system. Otherwise, a subnormal atmospheric pressure will occur, affecting operation and causing undesirable working conditions.

A properly designed and installed hood will act as the heart of the ventilating system for the room or area in which the unit is installed, and will leave the unit independent of changing draft conditions.

All valves must be checked and lubricated periodically. This must be done by an authorized service representative in your area.

Note:
Please wait at least 15 seconds to restart the main burners to maintain the best function of the thermostat valve after turning off the main burners.

IMPORTANT

Should any abnormal operation like;
- ignition problems,
- abnormal burner flame,
- burner control problems,
  - partial or full loss of burner flame in normal operation, be noticed, the appliance requires IMMEDIATE service by a qualified service person and should not be used until such service is carried out.

Cleaning and Maintenance

Thor equipment is constructed with the best quality materials and is designed to provide durable service when properly maintained. To expect the best performance, your equipment must be maintained in good condition and cleaned daily. Naturally, the frequency and extent of cleaning depends on the amount and degree of usage.

Following daily and more extensive periodic maintenance procedures will increase the life of your equipment. Climatic conditions (e.g., salt air) may result in the need for more thorough and more frequent cleaning in order to keep equipment performing at optimal levels.

If necessary to move the fryer for cleaning, etc., drain oil first to avoid death or serious injury.

If disconnection of the restraint is necessary to move the appliance for cleaning, etc., reconnect it when the appliance is moved to it originally installed position.

DAILY CLEANING

1. Turn thermostat knob to “0” position.
2. Place hot-oil safe container under the drain and drain the fryer pot completely.
3. Remove the basket support frame (if applicable) and flush out any sediment remaining in the fryer pot with a little hot oil.
4. Wipe off the basket support frame and the inside of the fryer pot with a clean cloth.

CAUTION

SOME AREAS OF THE FRY POT MAY BE HOT!

5. Close drain valve and strain the oil back into the fryer pot through several thicknesses of cheesecloth, or filter it back using a filter machine.
6. Replace the basket support frame (if applicable)
7. Add oil or shortening to MIN oil level mark on rear of fryer pot.
8. To resume cooking, turn the thermostat on.

WEEKLY CLEANING

1. Follow steps 1 through 4 of the Daily Cleaning procedure (see previous section).
2. Close drain valve and fill fryer pot with a solution of warm water and boil-out compound
3. Relight the fryer and bring the solution to a gentle boil for at least five minutes.
4. Turn off main burners and let the solution stand until the gum deposits are softened and the carbon spots and burned grease spots can be rubbed off.
5. Scrub the fryer pot walls and heat tubes, then drain out fryer pot and rinse it with clean water.
6. Refill the fryer pot with clean water and boil again.
7. Turn off gas and drain and rinse well until clean.
8. Wipe dry with a clean cloth.
9. Refill as specified in the “Filling the Fryer pot” section

MONTHLY CLEANING

1. Perform the Weekly Cleaning procedure (see previous section).

2. Clean around burner and orifices if lint has accumulated.

3. Visually check that burner carry-over ports are unobstructed.

CLEANING STAINLESS STEEL SURFACES

To remove normal dirt, grease and product residue from stainless steel use ordinary soap and water (with or without detergent) applied with a sponge or cloth. Dry thoroughly with a clean cloth. Never use vinegar or any corrosive cleaner.

To remove grease and food splatter or condensed vapors that have baked on the equipment apply cleanser to a damp cloth or sponge and rub cleanser on the metal in the direction of the polishing lines on the metal. Rubbing cleanser, as gently as possible, in the direction of the polished lines will not mar the finish of the stainless steel. NEVER RUB WITH A CIRCULAR MOTION. Soil and burnt deposits that do not respond to the above procedure can usually be removed by rubbing the surface with SCOTCH-BRITE scouring pads or STAINLESS scouring pads. DO NOT USE ORDINARY STEEL WOOL, as any particles left on the surface will rust and further spoil the appearance of the finish. NEVER USE A WIRE BRUSH, STEEL SCOURING PADS (EXCEPT STAINLESS), SCRAPER, FILE OR OTHER STEEL TOOLS. Surfaces that are marred collect dirt more rapidly and become more difficult to clean. Marring also increases the possibility of corrosive attack. Refinishing may then be required.

Darkened areas, called “heat tint,” sometimes appear on stainless steel surfaces where the area has been subjected to excessive heat. These darkened areas are caused by thickening of the protective surface of the stainless steel and are not harmful. Heat tint can normally be removed by the above cleaning techniques, but tint which does not respond to that procedure calls for a vigorous scouring in the direction of the polish lines, using SCOTCH-BRITE scouring pads or a STAINLESS scouring pad in combination with a powered cleanser. Heat tint action may be lessened by not applying or by reducing, heat to equipment during slack periods.

Service (For Authorized Service Technician Only)

NOTICE

<u>Warranty will be void and the manufacturer is relieved of all liability if:</u>

Service work is performed by other than a qualified technician OR Other than approved Thor replacement parts are installed.

WARNING

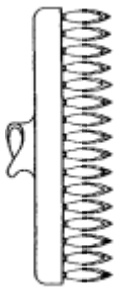
Adjustments and service work may be performed only by a qualified technician who is experienced in, and knowledgeable with, the operation of commercial gas cooking equipment. However, to assure your confidence, contact your Thor Service Representative for reliable service, dependable advice or other assistance, and for genuine factory parts.

All units are adjusted at the factory. In case of problems in operation at initial installation, check type of gas and manifold pressure and compare with information listed on the name plate.

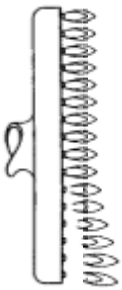
A mill voltage circuit diagram is located inside the front door of the fryer, and also on page 18.

CHECKING AND ADJUSTING MAIN BURNERS

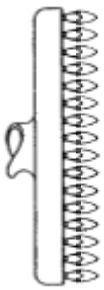
The main burners should burn with a steady blue flame, and the inner cone of the flame from each port should be about 19mm long. The flame from each main burner should enter each heat tube without touching the front of the fryer pot or the sides, top, or bottom of each tube.



Yellow Tips
(too little air or too much gas)



Blowing or Lifting Flames
(too much air)



Normal Flame

GENERAL INFORMATION

BURNING SPEED:
The velocity at which flame travels through an air-gas mixture. Burning speeds vary with types of gases, and the amount of air mixed with the gas. This air to gas ratio is very important in that it is directly related to flame stability.

PRODUCTS OF COMBUSTION:
Carbon dioxide and water vapor is formed in burning plus the nitrogen in the reactants that entered with the combustion air.

FLUE PRODUCTS:
The combination of combustion and excess air leaving the combustion area. Since water is produced as a vapor in the burning of gas it is also present in flue products. If the flue products and vent system remain hot enough this vapor is harmlessly discharged. If not, the vapor can reach the dew point and condense into water which can accumulate in the system.

INCOMPLETE COMBUSTION:
A poorly vented appliance restricts flow of air into an appliance. Lack of ventilation around an appliance may lower oxygen content in the surrounding air. This can be a result of spillage of combustion products into the room as well. These conditions can cause incomplete combustion and poor performance of an appliance. Adequate, but not excessive ventilation is a must and cannot be over emphasized.

PRIMARY AIR:
That air which is mixed with gas before the gas leaves the burner port to burn. Ideal burning condition generally is 10 cubic feet of air per cubic foot of gas.

SECONDARY AIR:
The remaining air needed for complete combustion besides primary air. This is the air surrounding the flames.

FLAME STABILITY:
Primary air, burning speed, port size and port depth are several factors affecting flame stability. Flames on a burner tend to stabilize at a point where flow velocity out and burning speed back are equal. This balance of flow velocities and burning speed explain why flames change when primary air or gas rate is adjusted.

B.T.U.:
British Thermal Units is the heat energy produced when burning a fuel gas. One BTU of heat will raise the temperature of one pound of fresh water one degree Fahrenheit.

BURNER PROBLEMS

LIFTING BURNER FLAMES:
Excessive primary air can cause flames to lift and blow off the burner ports which can be noisy as well as inefficient. More importantly however is the production of dangerous carbon monoxide under this condition. Any factor which reduces burning speed promotes lifting flames. Also, any factor which increases flow velocity from ports contributes to lifting flames. Overrating of burners is also a cause. The normal cure for lifting flames is the reduction of primary air input to the burner.

FLASHBACK:
Flashback occurs when gas-air flow velocity is less than burning speed at some point near a burner port. Flash back is a condition where gas ignites within the burner. Any factor which increases burning speed tends to promote flashback, and any factor decreasing flow velocity from the ports will contribute to flashback. Flashback is more prevalent with faster burning gases. Natural gas is relatively slow burning gas hence flashback is less likely. Reducing primary air is the usual cure for flashback.

EXTINCTION POP:
This is merely flashback occurring when a burner is turned off. It is usually instantaneous although it can occur several seconds after the burner has been turned off. What happens is that primary air continues to flow into the burner even though the gas jet has been cut off and does not inject air. The mixture in the burner changes from the normal operating mixture to all air and flow rate through the ports falls off toward zero. Under these conditions, it is possible for the flame speed to exceed flow velocity at some instant and flashback may occur. The result is a tiny explosion or pop. Since increasing primary air increases the burning speed, it is obvious that reducing primary air input will reduce the flashback tendency.

YELLOW TIPPING OF FLAMES:
Too severe a reduction in primary air also causes its problems. Yellow tipping is one of them. Flames will eventually become all yellow if no primary air is supplied. These yellow tips are caused by glowing carbon particles in the flame. Soot will form if these yellow flames impinge on cooler surfaces. Here again carbon monoxide can be produced. Yellow tipping is corrected by the injection of more primary air.

FLUCTUATING FLAMES:
Length of burner flames may fluctuate or shorten over a period of time with no re-adjustments of the burner. This condition usually indicates a non-uniform gas pressure at the orifice. Fluctuating flames usually do not create any immediate problems, such as incomplete combustion, unless flames impinge on cool surfaces. This condition should be corrected, however, since it warns of possible future problems. Unsteady gas pressures cause flames to fluctuate. Usually this condition indicates problems with the gas pressure regulator, the gas meter or other gas supply problems. Check the orifice for blockage by dust or dirt from supply lines. Very small pilot orifices are quite prone to blockage. Occasionally, too much grease in pilot valves restricts gas flow to pilot burners. Remove any excess greases.

FLAME ROLLOUT:
When the condition known as flame rollout occurs, flames roll out of the combustion chamber openings when the burner is turned ON. Flame rollout may create a fire hazard, or scorch appliance finishes, burn wire, or damage controls. The gas in the burner mixer may be ignited, producing flashback. Flame rollout is actually a variation of floating flames, with flames reaching for air outside the combustion chamber. Again, the basic cause is a lack of combustion air. This lack of air may be due to overrating of burners, poor draft or blockage of flueways. Apply the corrections for these problems listed for floating flames. Some appliances use step-type controls. These controls limit initial gas flow to the burner to establish natural draft in the appliance before full gas rate is allowed to flow. Check the operation of this control, and replace the control if it is faulty.

BURNER PROBLEMS– cont'd.

FLOATING FLAMES:

The difference between floating flames and lifting (or blowing) flames should be clearly understood. Both conditions are undesirable, but the causes and corrective steps are different. Floating flames are lazy looking. They do not have well defined cones, and appear to be "reaching" for the air. They are long, ill-defined, quite flames which roll around in the combustion chamber sometimes completely off the ports. Usually a strong aldehyde odor is present. Floating flames almost always indicate incomplete combustion. They point to a dangerous condition which require prompt correction. If secondary air supply is reduced too far burner flames will float. Combustion products above the burner re-circulate lower in the chamber. These products contaminate the air supply, adding to the problem. A lack of combustion air causes burner flames to float. Several conditions, or a combination of these conditions can be the cause. The appliance may be overrated. If so, the flue outlet area provided for the rated input may be too small for the increase gas rate. Check appliance rate and reduce if necessary. Other conditions may cause poor venting and lead to floating flames. Soot or dust may be blocking flueways. Check flueways and clear any blockage found. Determine, if possible, the reason the flueways blocked up. Check for blockage of burners, and clean them if necessary. Adjust primary air to get rid of any yellow tipping which may have produced soot to block he flueways. Make sure secondary air inlet openings are not blocked. Reduced natural draft (venting) through an appliance may take place when it is operated from a cold start. Some floating flames may appear for a brief time until draft is established. When the appliance heats up it should operate in a normal manner.

UNSTABLE OR WAVERING FLAMES:

Drafts across burners may cause flames to waver or appear to be unstable. This condition should not be confused with lifting or floating flames. Wavering burner flames can lead to incomplete burning if flames impinge on cool surfaces. Pilot flames under drafts may go out, or they may be diverted from heating the sensing element of the automatic pilot device. In either case the automatic pilot will shut off gas supply to the appliance. Drafts affecting pilot flames may be simply external drafts, such as across the floor. Protect the pilot flames with suitable baffles. Draft-blown main burner flames may indicate a more serious problem, such as cracked heat exchanger. Replace or repair a cracked heat exchanger without delay.

GAS ODOR AT PRIMARY AIR OPENINGS:

Under normal burner operation, a negative pressure (vacuum) should exist inside the primary air openings of a burner, drawing in air. If all gas fed to the burner by the orifice does not flow to the burner head, some gas may spill from the primary air openings. If this condition is found, check the burner body for restrictions, and check the orifice to make certain it is not out of line.

CORROSION OF APPLIANCES:

Gas appliances are designed and built to give long dependable service life. In some installations recently, usually severe corrosion has occurred resulting in customer complaints. This corrosion is attributed to the extensive use of aerosol propellants, hydrocarbons which contain the elements FLOURINE AND CHLORINE. These elements are called halogens. Halogens in their free state are very corrosive. When the propellants pass through a flame, they break down and the halogen gases are released. In combination with the water vapor in the flue gases they cause corrosion in heat exchangers, flueways and other appliance parts. Some of the worst cases of this corrosion have been in beauty shops where hair sprays are used and in dry cleaning plants where halogen-containing materials are used as cleaning fluids.

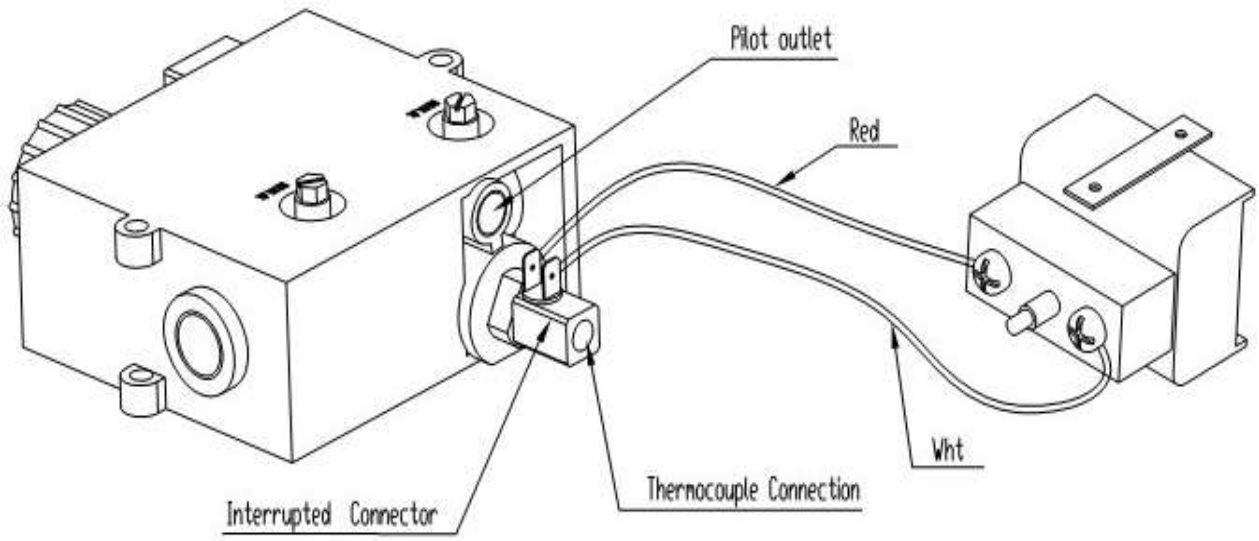
Trouble shooting

Fault	Possible Cause	Remedy
Pilot won't light.	No gas supply or gas isolation valve is OFF.	Ensure gas isolation valve is turned on, and that gas tanks are not empty.
	Pilot injector is clogged or partially blocked.	Check the pilot injector if clogged or partially blocked, and clean if necessary. Follow the pilot injector removal procedure.
	Pilot tube is kinked and gas cannot pass through.	Check if the pilot tube is kinked. Remove the kink and check for possible gas leak. If gas leak is found, turn off the main gas valve and replace the pilot tube.
Pilot goes out when gas control knob released.	Releasing the knob before the thermocouple has heated.	Hold the knob in for at least 10~20 seconds following ignition of the pilot.
	Gas pressure too low.	Check the pressure of the main line if within standard. Adjust the pressure if necessary. NG – 1.0KPa and LPG – 2.75KPa.
	Partially blocked pilot injector.	Clean the pilot injector or replace the pilot injector if necessary. Follow the pilot injector removal procedure.
	Thermocouple connection to the combination valve is loose.	Tighten the thermocouple connection.
	Faulty thermocouple.	Check if the thermocouple is producing 20~30 millivolts. Otherwise, replace the FDS. Follow the FDS removal procedure.
	Faulty combination valve.	Replace the combination valve. Follow the combination valve removal procedure.
Main burner won't light	Burner injector is clogged or partially blocked.	Check the burner injector if clogged or partially blocked, and clean if necessary. Follow the burner injector removal procedure.
	Faulty combination valve.	Replace the combination valve. Follow the combination valve removal procedure.
Main burner flame color is yellow or orange.	Insufficient air supply.	Check if there is anything blocking the air passages of the fryer.
	Wrong type of gas used.	Check the name plate and injector's orifice # used and compare with gas used on the unit.
	Partially block orifice or dirty orifice.	Clean the orifice. Follow the orifice removal procedure.
Blowing or lifting of flames	Too much primary air.	Check the primary air and reduce if necessary. When reducing primary air, make sure yellow tipping does not occur.
	Appliance input rate is lower than the supply input rate.	Check the appliance input rate and reduce if necessary.
	The orifice size of the burner not the same as the other burners and it is operating above the rated input rate.	Check the orifice size of that burner against the others to make sure the burner is not operating over the rated input.

Trouble shooting

NOTE: Vibrations or shock caused by shaking or pounding baskets on top surface or by slamming door may cause Hi-Limit Control Switch to open. If this condition persists, additional cushioning may be added to the rubber grommets supporting this control to absorb these shocks.

Wiring Diagram

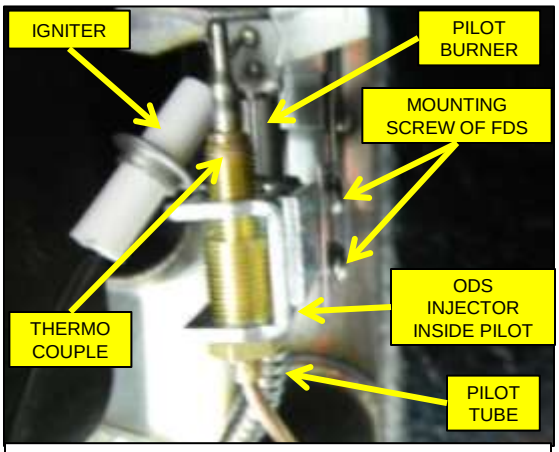


PILOT TROUBLE SHOOTING

CHECKING & CLEANING OF THE ODS INJECTOR:

1. Visually check the orifice of the pilot injector if clogged, damaged or blocked. If it cannot be checked visually, try to blow air in the injector and check if there is air coming out of the orifice.
2. If the orifice is blocked or clogged, use an air blow to remove the clogging. Never pinch the orifice with a pin as this could damage the orifice.
3. If the clogging cannot be removed from the orifice by air blow, replace the injector with a new one. Remember to check the size of the orifice and replace with the same size.
4. Follow the ODS injector removal procedure.

NOTE: When you order a Flame Device System (FDS), the ODS injector is not included. The ODS injector can be ordered separately.



FLAME DEVICE SYSTEM

FLAME DEVICE SYSTEM ODS INJECTOR REMOVAL:

1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the mounting screw of the FDS Assembly, then remove the FDS Assembly.
5. Disconnect the pilot tube from the FDS. Use 12mm spanner.
6. Pull-out the pilot tube, then remove the ODS injector.
7. Clean or replace the ODS injector if necessary.
8. Make sure to check for gas leak, using soap & water, after part installation.

Remove the mounting screw of the FDS

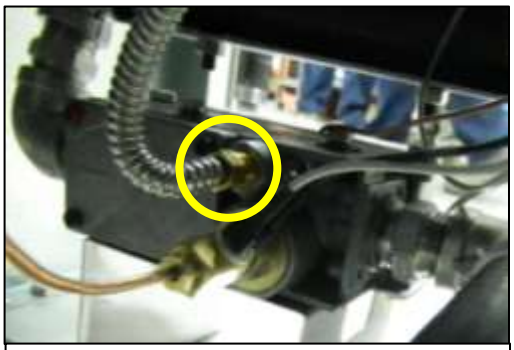
Remove the ODS injector

PILOT TROUBLE SHOOTING

PILOT TUBE REMOVAL:

1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the burner for ease of access. Follow the burner removal procedure.
5. Remove the FDS Assembly. Follow the FDS Assembly removal procedure.
6. Disconnect the pilot tube from the ODS injector. Use 12mm spanner.
7. Disconnect the other end of the pilot tube from the combination valve. The other end is accessible from the back of the fryer.
8. Replace the pilot tube if necessary.
9. Make sure to check for gas leak, using soap & water, after part installation.

Disconnect the pilot tube from the FDS assembly



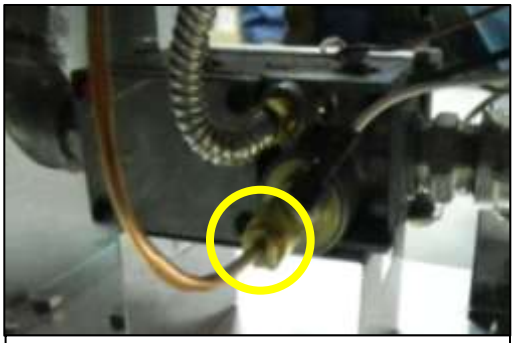
Disconnect the pilot tube from the combination valve

PILOT TROUBLE SHOOTING

FLAME DEVICE SYSTEM (FDS) REMOVAL:

1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Disconnect the pilot tube from the ODS injector. Use 12mm spanner.
5. Disconnect the thermocouple from the combination valve. Use 9mm spanner
6. Pull-out to disconnect the igniter wire from the piezo igniter.
7. Remove the FDS mounting screws.
8. Remove the Flame Device System and replace if necessary.
9. Make sure to check for gas leak, using soap & water, after part installation.

Disconnect the pilot tube from the FDS



Disconnect thermocouple from the combination valve

Disconnect the igniter wire from the piezo igniter

Remove the mounting screw of the FDS

BURNER TROUBLE SHOOTING

BURNER REMOVAL:

1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the two mounting screws of the door hinge bracket.
5. Remove the door.
6. Remove the four mounting screws of the front panel cover. Then, remove the front panel cover.
7. Loosen the two screws on the burner.
8. Slide the burner upwards until the screws are off the hook and the injector is out of the burner hole at the bottom.
9. Clean the burner or replace if necessary.
10. Make sure to thoroughly dry the burner before re-installing.

Remove the two mounting screws of the door hinge bracket

Remove the four mounting screws of the front panel cover.

Loosen the two mounting screws of the burner

BURNER INJECTOR REMOVAL:

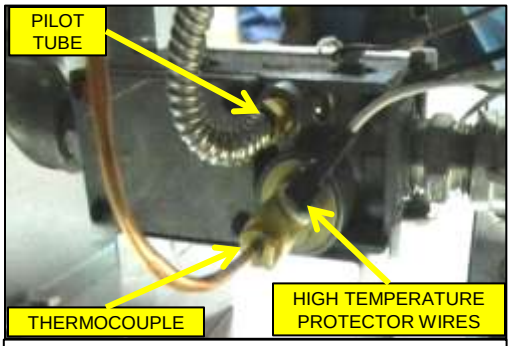
1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the burner. Follow the burner removal procedure.
5. Remove the burner injector. Use 13mm spanner.
6. Make sure to check for gas leak, using soap & water, after part installation.

Remove the burner injector from the manifold

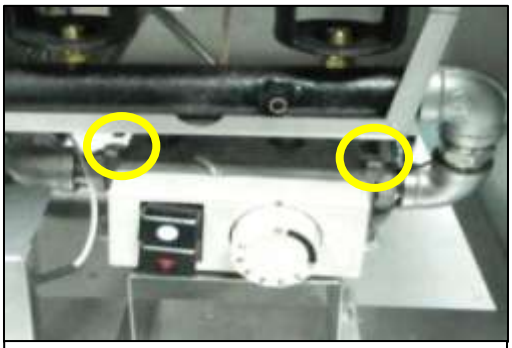
BURNER TROUBLE SHOOTING

COMBINATION VALVE REMOVAL:

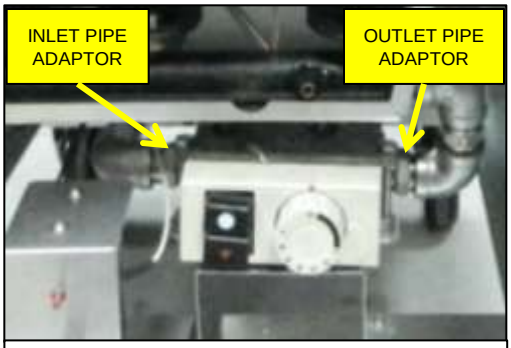
1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the sensor probe. Follow the sensor probe removal procedure.
5. Disconnect the thermocouple, pilot tube and High Temp. Protector wires from the combination valve.
6. Remove the two mounting screws of the combination valve.
7. Disconnect the inlet pipe adaptor from the combination valve.
8. Disconnect the outlet pipe adaptor from the combination valve.
9. Remove the sensor probe from the fryer pot thru the bottom.
10. Make sure to thoroughly dry the burner before re-installing.



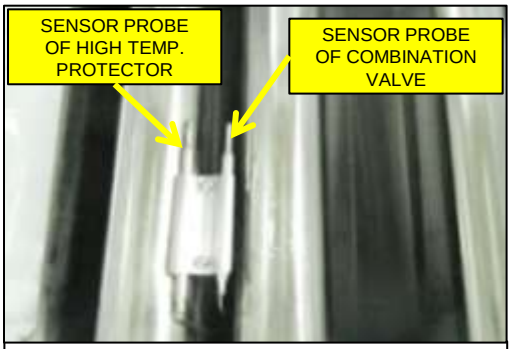
Remove the pilot tube, thermocouple and High Temperature Protector wire from the combination valve.



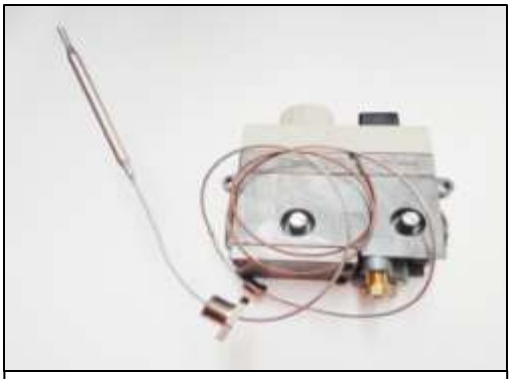
Remove the two mounting screws of the combination valve



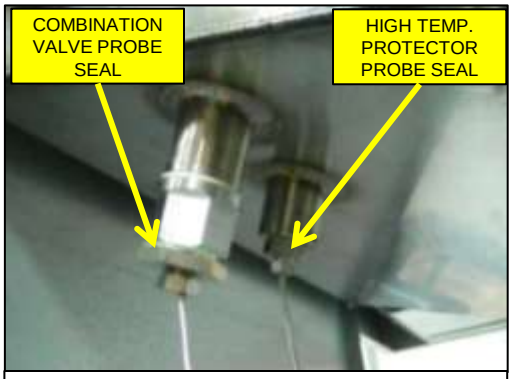
Disconnect the inlet and outlet pipe adaptors from the combination valve



Remove the sensor probe of combination valve



Remove the combination valve

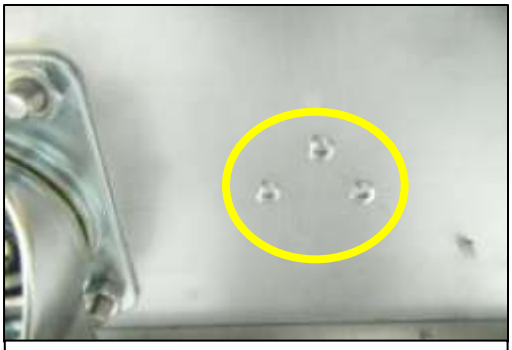


Remove the sensor probe thru the bottom of the fryer

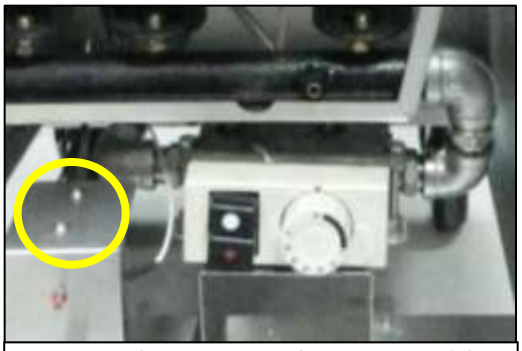
BURNER TROUBLE SHOOTING

HIGH TEMPERATURE PROTECTOR REMOVAL:

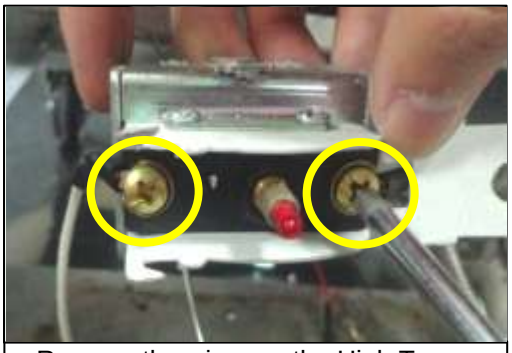
1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the three mounting screws of the bracket at the bottom of the fryer.
5. Remove the two mounting screws of the High Temp. Protector on the bracket.
6. Remove the High Temp. Protector from the bracket.
7. Remove the wires on the High Temp. Protector.
8. Remove the burners on the side covering the sensor probe. Follow the burner removal procedure.
9. Remove the sensor probe from the fryer pot thru the bottom.
10. Replace the High Temp. Protector if necessary.
11. Make sure to check for oil leaks after installing the sensor probe.



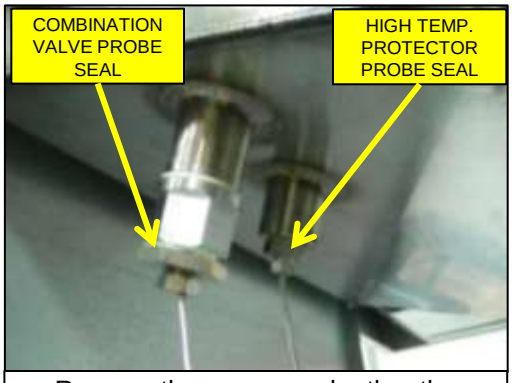
Remove the three screws at the bottom of the fryer to remove the bracket



Remove the two mounting screws of the High Temp. Protector on the bracket



Remove the wires on the High Temp. Protector

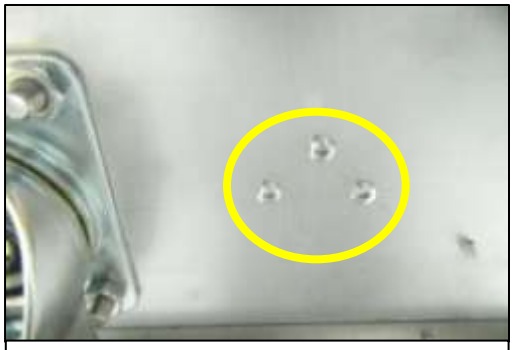


Remove the sensor probe thru the bottom of the fryer

BURNER TROUBLE SHOOTING

PIEZO IGNITER REMOVAL:

1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Let the fryer cool down for a few minutes before starting your work.
4. Remove the three mounting screws of the bracket at the bottom of the fryer.
5. Disconnect the igniter wire from the piezo igniter.
6. Remove the piezo igniter lock nut, then pull-out the piezo igniter for replacement.
7. Make sure to check for sparks ignition after installing a new igniter.



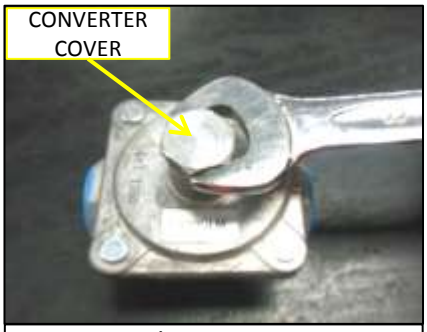
Remove the three screws at the bottom of the fryer to remove the bracket

Disconnect the igniter wire from the piezo igniter

Remove the piezo igniter lock nut

CONVERTING FROM LPG TO NG AND VICE-VERSA:

1. Shutdown the fryer. Follow the complete shutdown procedure.
2. Shut-off the main isolation valve and follow the lock-out/tag-out procedure.
3. Remove the gas regulator.
4. Remove the converter cover from the regulator. Use a 22mm spanner.
5. Pull-out the converter and position it to your desired gas type.
6. Install the converter cover to the regulator.
7. Re-install the regulator to the unit. Follow the direction of the arrow on the regulator when installing.
8. Replace the main burner injector Follow the main burner injector removal procedure. See table below for injector orifice size.
9. Replace the pilot injector. Follow the pilot injector removal procedure. See table below for injector orifice size.



Remove the converter cover from the regulator


Pull-out the converter from the cover

INJECTOR	ORIFICE SIZES	
	LPG	NG
PILOT INJECTOR	0.01 inch	0.26 inch
MAIN BURNER (F35 MODEL)	#52	#36
MAIN BURNER (F45 MODEL)	#52	#31

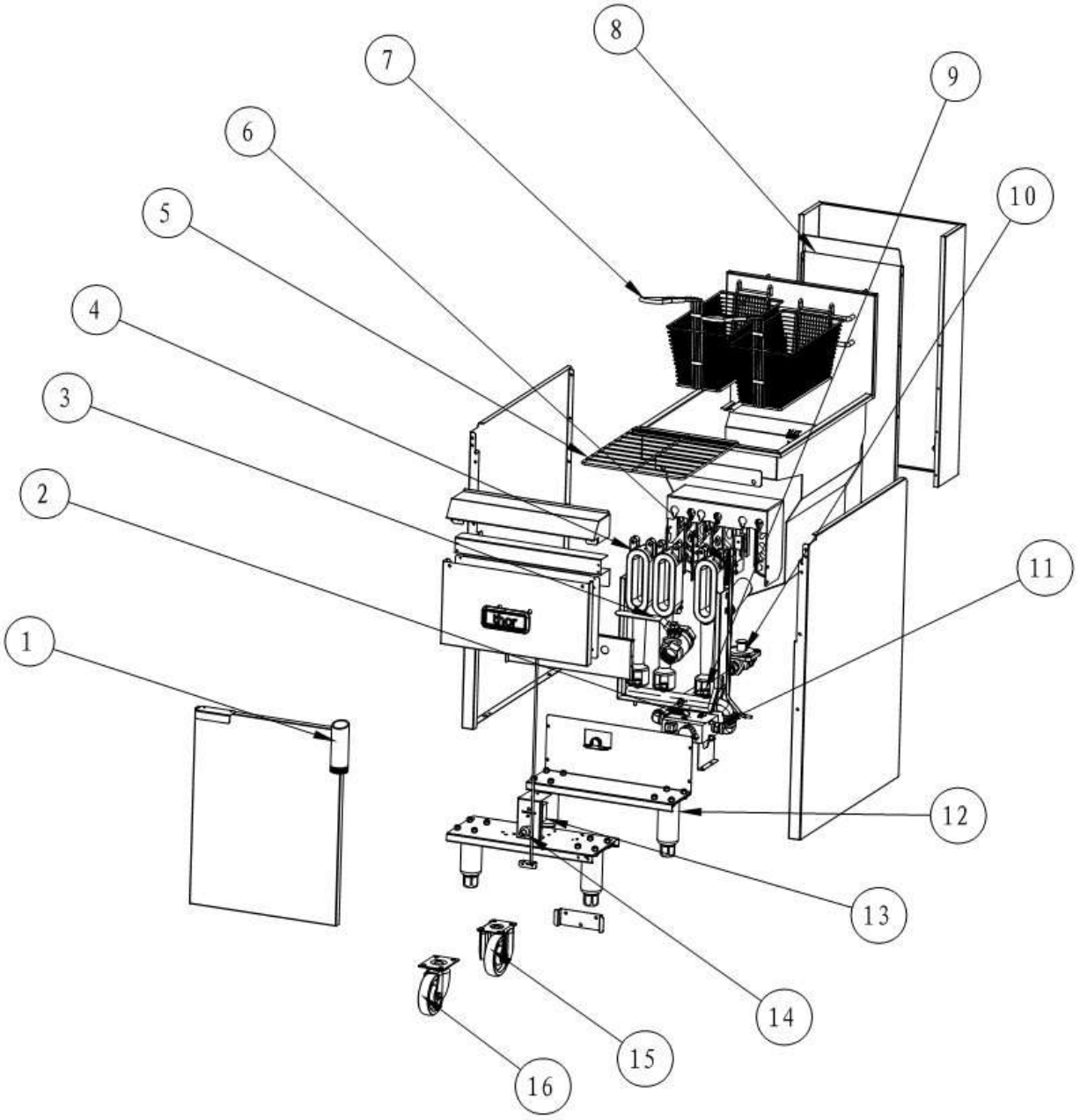

Position of converter when using **LPG**


Position of converter when using **NG**

CAUTION: Please replace the corresponding nameplate or label that shows the gas type operated, after a qualified person converted to another gas type, in order to prevent injury, death and damage to property.

Explosion drawing

GH110-P, GH110-N, GH111-P, GH111-N



Spare Parts List

NO.	DESCRIPTION	MODEL	CODE	QTY
1	Drain Extension	GH110-P / GH110-N GH111-P / GH111-N	01.02.1005325	2
2	Combination Valve	GH110-P / GH110-N GH111-P / GH111-N	01.20.1068561	1
3	Valve, Ball	GH110-P / GH110-N GH111-P / GH111-N	01.20.1068560	1
4	Burner	GH110-P / GH110-N GH111-P / GH111-N	01.03.1015095	3 4
5	Crumb Screen	GH110-P / GH110-N GH111-P / GH111-N	01.11.1062050	1
6	Flame Device System (Does not include injector)	GH111-N / GH110-N GH110-P / GH111-P	01.22.1069545	1
	ODS injector-0.01”	GH110-P / GH111-P	01.20.1068567	1
	ODS injector-0.026”	GH111-N / GH110-N	01.20.1068571	1
7	Basket	GH110-P / GH110-N GH111-P / GH111-N	01.10.1061027	2
8	Flue Rear	GH110-P / GH110-N GH111-P / GH111-N	01.15.1066336 01.15.1066411	1
9	Injector (Orifice)	GH110-N GH111-N	01.20.1068636 01.20.1068631	3 4
		GH110-P GH111-P	01.20.1068652	3 4
10	Regulator	GH110-P / GH110-N GH111-P / GH111-N	01.22.1069526	1
11	Valve Connection	GH110-P / GH110-N GH111-P / GH111-N	01.18.1067440	1
12	Foot(optional)	GH110-P / GH110-N GH111-P / GH111-N	01.02.1005382	4
13	High Temperature Protector	GH110-P / GH110-N GH111-P / GH111-N	03.99.1290101	1
14	Piezo Igniter	GH110-P / GH110-N GH111-P / GH111-N	03.99.1290085	1
15	Fixed Caster	GH110-P / GH110-N GH111-P / GH111-N	01.02.1005320	2
16	Universal Caster	GH110-P / GH111-P GH110-N / GH111-N	01.02.1005319	2