

## Product Bulletin Advisement

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I have enclosed a small training section on flame failure technology. Commercial gas ranges equipped with flame failure technology are extra featured models that have safety devices so if pilot flames go out it will shut down the main flow of gas to the burner. When the main flow of gas is shut down it will prevent the opportunity of large amounts of gas to build up which could ignite and cause an explosion.

There are many types of safety devices and many models of equipment with different variations of safety features available on them. In this training session I will cover the main models that Garland offers with flame failure features. You will note depending on the country you do business in some of the models listed in this training session are not shown in your price list and that is because they are not applicable to that specific market.

If you are having any problems opening the document or if you have questions please feel to contact me.



# Gas Flame Failure Devices & How They Work

## **What is it?**

Basically flame failure technology is designed to prevent the build up of large amounts of unignited gas if the pilot system goes out. Every commercial gas oven has some sort of flame failure protection built into it. When gas is allowed to build up in a closed cavity such as in an oven and does not have the opportunity to escape it becomes dangerous if it ignites. Therefore generally a safety device is installed so that if the pilot goes out the gas flow is not permitted to build up in the oven.

Flame failure devices can be used on gas appliances for other burners not just the oven, such as open tops, concealed hot tops and griddle burners. The practice of using flame failure devices has been around for many years. In Europe and Australia it is mandatory on all gas equipment. Slowly flame failure technology is being introduced to all parts of the world and Garland has been an industry leader using this technology.

## **How does it work?**

There are three principles at work in a flame failure valve.

- One is the thermocouple which generates millivoltage.
- The other is the electric magnetic coil within the valve, which holds the valve open or allows it to shut if there is no millivoltage.
- Third component is the valve itself

The thermocouple is two dissimilar metals which form a junction which when heated generates millivoltage. This millivoltage is used to power the magnetic coil.

The thermocouple is connected to a coil, which is at most times at the back of the valve. The coil operates on very low voltage to create a magnetic field, which holds a plunger open inside the valve. If there is no millivoltage the plunger is released shutting off gas flow to the pilot and main burner.

The valve itself allows you to bypass the plunger by pushing it in. This allows gas flow to the pilot only, which then must be ignited. The valve must be held depressed for approximately 30 seconds in order to sufficiently heat the thermocouple and generate a millivoltage. If the valve is not depressed for 30 seconds it shuts down the gas flow.

Once the pilot is lit and the millivoltage is generated, the magnetic coil takes over and holds the valve open (no heat, the valve won't stay open). The same coil controls the burner flow, therefore, if you have ignited the pilot and heated the thermocouple, you can go ahead and turn on the burner and the pilot will light the burner.

The particular pilot we use on most of our burners is a fishtail design, which throws flames in two directions (one to ignite the burners and the other to keep the thermocouple junction hot). In between the pilot and the thermocouple is an electrode, which can be used to ignite the pilot. This can either be from a piezo igniter or from an electric spark.

## Applications on Garland equipment

I have enclosed a general breakdown of models where Garland utilizes flame failure devices on gas appliances that go beyond the traditional North American products. Equipment such as our fryers, convection ovens and gas air decks have a form of flame failure protection.

### GD Designer counter equipment

These models have a piezo spark igniter for the pilot with total flame failure protection.

- **Hotplates**

GD-15HFF, GD-304HFF

- **Griddles**

GD-15GFF, GD-24GFF, GD-36GFF

- **Broilers**

GD-18RBFF, GD-24RBFF, GD-30RBFF, GD-36RBFF

### G24 Heavy Duty counter equipment

These models have a piezo spark igniter for the pilot with total flame failure protection.

- **Griddles**

G24-24GFSD, G24-36GFSD, G24-48GFSD, G24-72GFSD

\*Specifically design and approved for export market only.

### S280 Starfire Sentry Series Restaurant Ranges

On these models we offer ranges with different types of configurations for flame failure protection.

- **Models with the prefix “S”**

“S” Models have:

- On-off pilot control valves for the open top burners
- Open top burners have NO piezo or electric spark ignition system for the pilots
- Piezo spark ignition for all pilots on all concealed burners for griddles, hot tops and ovens.
- Flame failure protection on all concealed burners for griddles, hot tops and ovens.

This is the basic model, which includes – manual master pilot valve

- piezo spark for oven pilot
- flame failure protection on all concealed burners  
e.g. griddles and hot top sections.

The manual pilot valve shuts down all open burner pilots simultaneously.

To lit the pilots for open tops:

1. Turn the main pilot valve to the on position and by using an separate ignition source (BBQ lighter) – light the pilot(s). The pilot assembly is exposed and can be lit without removing the ring grates or cast tops. This may take a couple of attempts depending on air in the lines.
2. Gas will still flow through the burner without the pilot lit if the burner knob is pushed in and turned on.

Ranges with concealed griddle top and hot top sections pilots are lit by:

1. Push and turn the combination valve for the individual burner counter clockwise and press the ignition (piezo) to spark the pilot.
2. Then turn the value to the desire main burner setting.

Range with oven sections, the oven pilots are lit by:

1. Turning the oven valve to lit the pilot position
2. Push on the valve and press the piezo spark igniter while holding the valve in. Hold for 30 seconds – pilot should remain lit. If not repeat once un-lit gas has escaped.  
“If the oven valve is turned past the spark, the gas to the oven will cease to flow.”
3. Once pilot flame has been lit turn oven thermostat to desired temperature.

- **Models with the prefix “ST”**

“ST” Models have:

- Total flame failure protection for all burners open tops, griddle, hot top and oven sections
- Open top burners have NO piezo or electric spark ignition system for the pilots
- Piezo spark ignition for all pilots on all concealed burners for griddles, hot tops and ovens.

These models have total flame failure protection on all burners, which include open burners that the “S” models do not.

“ST” units have combination valves for every burner.

To ignite the open top burners pilot:

1. Push in and turn the valve knob counter clockwise to the ignition position.
2. While holding in the burner valve in this position use a BBQ lighter to ignite the pilots
3. If the pilot goes out no gas will be allowed to go to the open top burner.

Ranges with concealed griddle top and hot top sections pilots are lit by:

1. Push and turn the combination valve for the individual burner counter clockwise and press the ignition (piezo) to spark the pilot.
2. Then turn the value to the desire main burner setting.

Range with oven sections, the oven pilots are lit by:

1. Turning the oven valve to lit the pilot position
2. Push on the valve and press the piezo spark igniter while holding the valve in. Hold 30 seconds – pilot should remain lit. If not repeat once un-lit gas has escaped.  
“If the oven valve is turned past the spark, the gas to the oven will cease to flow.”
3. Once pilot flame has been lit turn oven thermostat to desired temperature.

- **Models with the suffix “E”**

**S\_E** - Electric spark ignition for concealed pilots which replaces the piezo on “S” version of these models.

“S E” Models have:

- On-off pilot control valves for the open top burners
- Open top burners have NO piezo or electric spark ignition system for the pilots
- Electric spark ignition for all pilots on all concealed burners for griddles, hot tops and ovens.
- Flame failure protection on all concealed burners for griddles, hot tops and ovens.

**ST\_E** – Electric spark ignition for all burners open top burners and concealed burners.

“ST\_E” Models have:

- Total flame failure protection for all burners open tops, griddle, hot top and oven sections
- Electric spark ignition for all pilots open top burners, concealed burners for griddles, hot tops and ovens.

On the “**ST\_E**” models the ranges with open top burners pilots have an added featured. The pilots are lit by:

1. Push and turn the combination valve for the individual burner counter clockwise and press the ignition to spark the pilot.
2. Turn the value to the desire main burner setting

All other sections of the “**ST\_E**” for operation would be the same as the “**ST**” version except everywhere a piezo was used it would be replaced by the electric spark ignition system.

- **Sentry Range Mount Salamanders**

There are two types of gas range mount salamanders, models with just an on-off pilot valve and models with flame failure protection.

MSSR16-280 – these models just have a manual on-off pilot control

MSTSR16-280 – these models have a manual on-off pilot control and flame failure protection.

- **Sentry Range Match Broilers**

There are two broiler model types.

S280- B with pilot shut off valves and piezo ignition.

ST280- B with combination valve (controls pilot gas flow and main burner), piezo ignition and total flame failure protection.

### **Master Sentry Series Heavy Duty Ranges**

The MST and MST\_E models are similar to the ST280 ranges with total flame failure protection.

**\*\*\*Recently Discontinued Options On The Master Series have been MS featured models which were similar to S280 models with only flame failure protection to concealed burners\*\*\***

- **Models with the prefix “MST” (this can be range, storage or modular units)**

These models have total flame failure protection on all burners, which include open top burners.

Open top burners pilots are lit by:

1. Push and turn the combination valve for the individual burner counter clockwise and press the ignition to spark the pilot.
2. Turn the value to the desire main burner setting.

Ranges with concealed griddle top and hot top sections pilots are lit by:

1. Push and turn the combination valve for the individual burner counter clockwise and press the ignition (piezo) to spark the pilot.
2. Then turn the valve to the desired main burner setting.

Range with oven sections, the oven pilots are lit by:

1. Turning the oven valve to lit the pilot position
2. Push on the valve and press the piezo spark igniter while holding the valve in. Hold 30 seconds – pilot should remain lit. If not repeat once un-lit gas has escaped.  
“If the oven valve is turned past the spark, the gas to the oven will cease to flow.”
3. Once pilot flame has been lit turn oven thermostat to desired temperature.

- **Models with the suffix “E”**

**MST-E** - Electric spark – replaces piezo to electric spark to all pilots.

These models have total flame failure protection on all burners, which include open top burners. These systems are very much the same as the “ST280E” models and the ignition and operation processes are very similar.

- **Master Sentry Range Mount Salamanders**

There are two types of gas range mount salamanders, models with just an on-off pilot valve and models with flame failure protection.

MSSR16, MSSRC – these models just have a manual on-off pilot control

MSTSR16, MSTSRC – these models have manual pilot ignition, flame failure protection valves.

\*There is no piezo or electric ignition offered on these models.

- **Master Series Sentry Range Match Broilers**

There are three broiler model types.

MST\_B with pilot shut off valves, piezo ignition and total flame failure protection.

MST\_BE electric spark ignition.

\*Note we are unable to offer Master Series Range Match Modular Broilers with electric spark ignition systems.

\*General foot note all Sentry or Master Series Sentry Ranges are only available at this time with valve controlled griddle plate sections.