SURE MARINE SERVICE INC.

This oven troubleshooting guide was written specifically for Seaward/Princess/Hillerange stoves *manufactured prior to September 2007* It is also applicable to many other early models of RV & marine ovens including many Magic Chef, Wedgewood, Kenyon, & early Gas Systems ovens.

Starting in mid 2007, Seaward redesigned their oven controls, eliminating the mercury control valve and making this troubleshooting guide not applicable to models built after mid 2007.

READ ME!

THE MAJORITY OF OVEN THERMOSTATS & CONTROLS ARE NO LONGER MADE, AND MUST BE REBUILT IF DEFECTIVE. THERE IS CURRENTLY A SEVERE SHORTAGE OF REBUILDABLE CORES AND YOU MUST PROVIDE A REBUILDABLE CORE IN ORDER TO GET A WORKING PART BACK. IF YOU SUSPECT YOU HAVE A DEFECTIVE PART, PLEASE DO NOT DISASSEMBLE IT. >>> THIS CAN'T BE STRESSED ENOUGH <<<, DO NOT DISASSEMBLE YOUR THERMOSTAT OR OVEN CONTROL VALVE. THERE WILL BE NOTHING INSIDE THAT YOU CAN FIX & YOU WILL DESTROY THE VALUE OF THE CORE. WE WILL NOT GIVE YOU CREDIT FOR UNITS THAT HAVE BEEN DISASSEMBLED & WE WILL NOT SELL YOU A REPLACEMENT WITHOUT A GOOD CORE.

READ ME!

This page is only meant as a guide & does not cover every possible issue. Only properly trained personnel should attempt gas appliance repair. Improper repair can lead to property damage, injury or death.

Feel free to contact Sure Marine if you require assistance or parts at (206) 784-9903 or stoverepair@suremarine.com. If you email photos, please do not email unnecessarily large files.

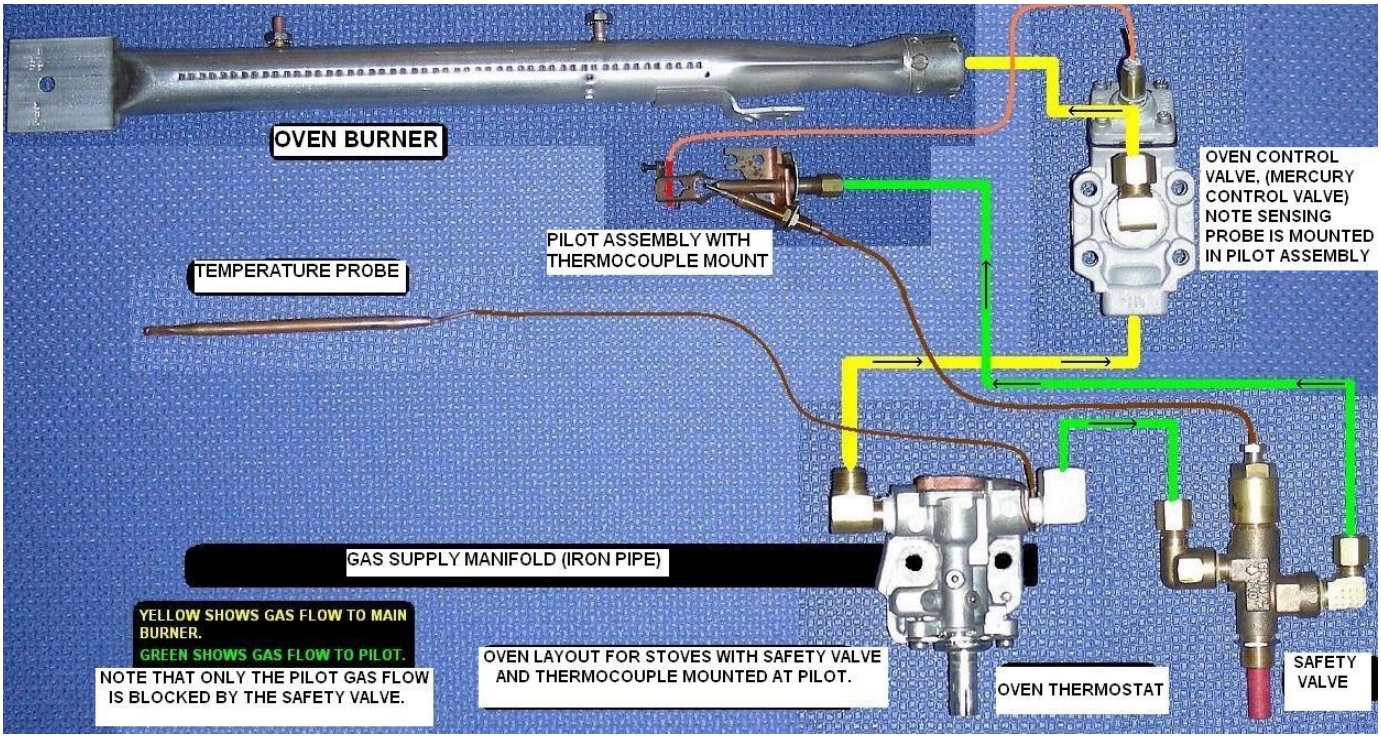
Be aware that oven issues occasionally have nothing to do with the oven itself. While the top burners may not be particularly sensitive to low gas pressure or flow, any issue with fuel delivery can make the oven not function correctly.

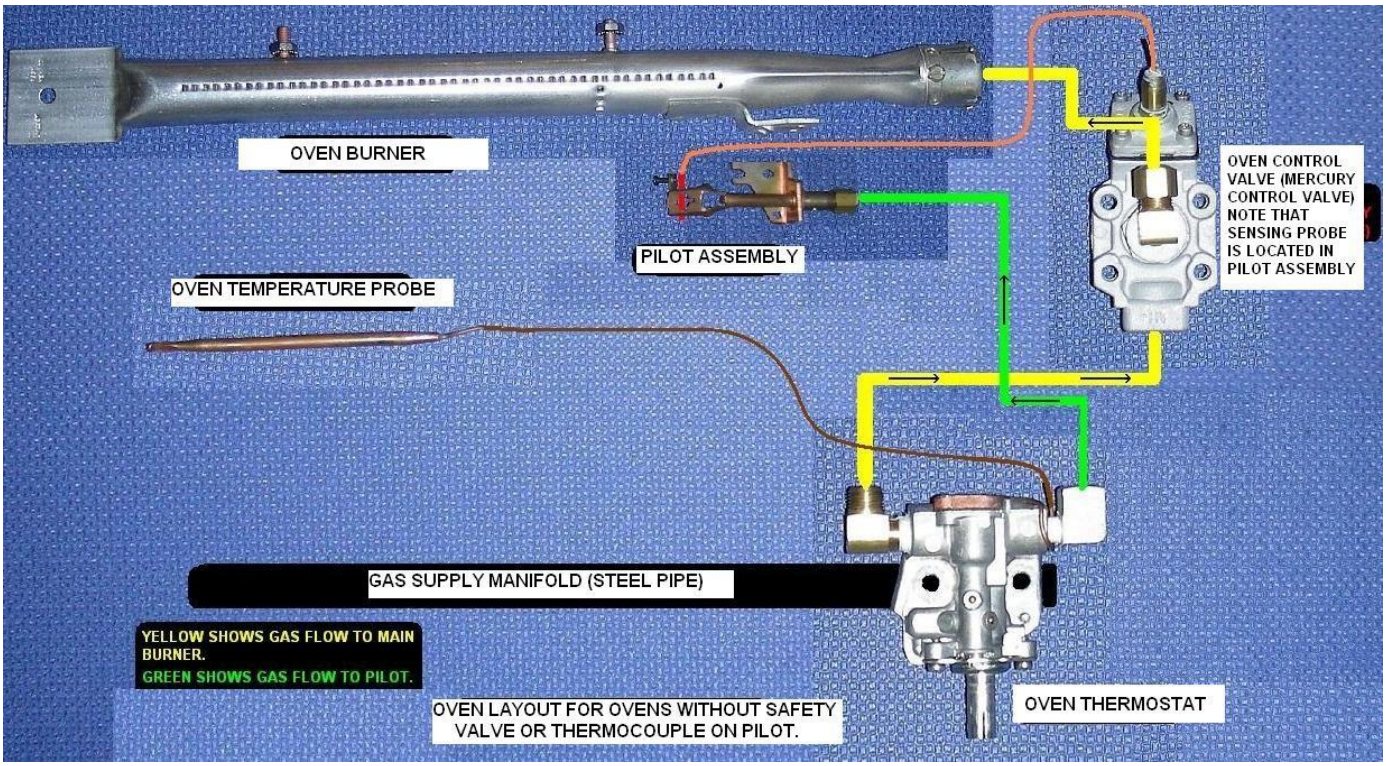
These ovens are designed to only operate on a regulated LPG supply at a very low fuel pressure of 11" W.C….. less than ½ PSI.

When working correctly. Even the most basic regulator assembly should be capable of running all burners on the stove simultaneously, at maximum output, with zero obvious change to flame height as more burners are lit. If there is any obvious drop in pressure/flame height as you light more burners, your propane system has a problem.

The basic oven components are the oven thermostat, the mercury control valve, the pilot assembly and the main oven burner.

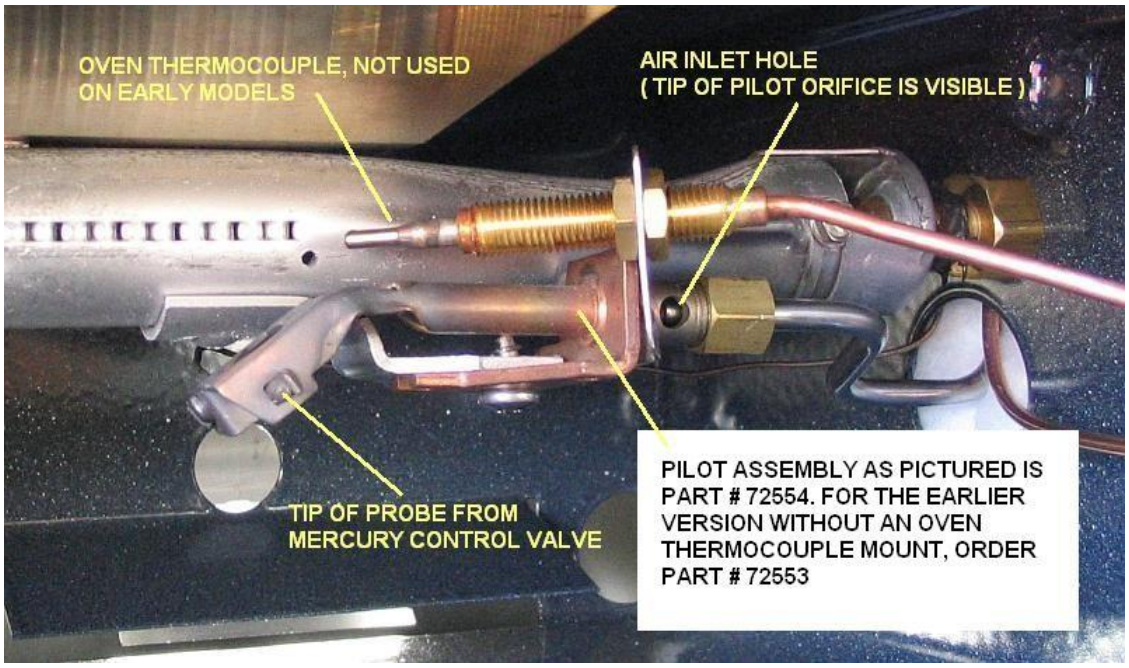
Later oven versions are also equipped with an oven thermocouple & safety valve (upper photo.)
These additional parts are ONLY responsible for holding the pilot light on once the push button is released.





All Seaward / Princess / Hillerange stoves built after about 1993 should have an oven thermocouple & safety valve.
Stoves built between 1984 & 1993 might have an oven thermocouple & safety valve.

If you do not have the small push button (safety valve,) on the RH end of the faceplate that needs to be depressed in order to allow gas to exit the pilot assembly, there would be no 'oven thermocouple'.
Most stoves built prior to 1984 would operate this way.
If you do have an oven thermocouple, you would need to depress and hold a button in order to light the oven pilot.



INFORMATION ABOUT THE SAFETY VALVE AND PILOT ASSEMBLY

If your stove is equipped with an 'oven thermocouple', you should be able to see a threaded probe mounted directly above the pilot flame.(see photo above)

You would also have a push button on the front panel next to the oven temperature control (thermostat.)

If you are having trouble getting the pilot to stay lit after you release the push button, verify that the tip of the thermocouple's probe is centered with flame in the 'low pilot mode'.

>>> If the probe is in the pilot flame <<<, but the flame goes out as soon as you release the safety button, here are a few common causes.

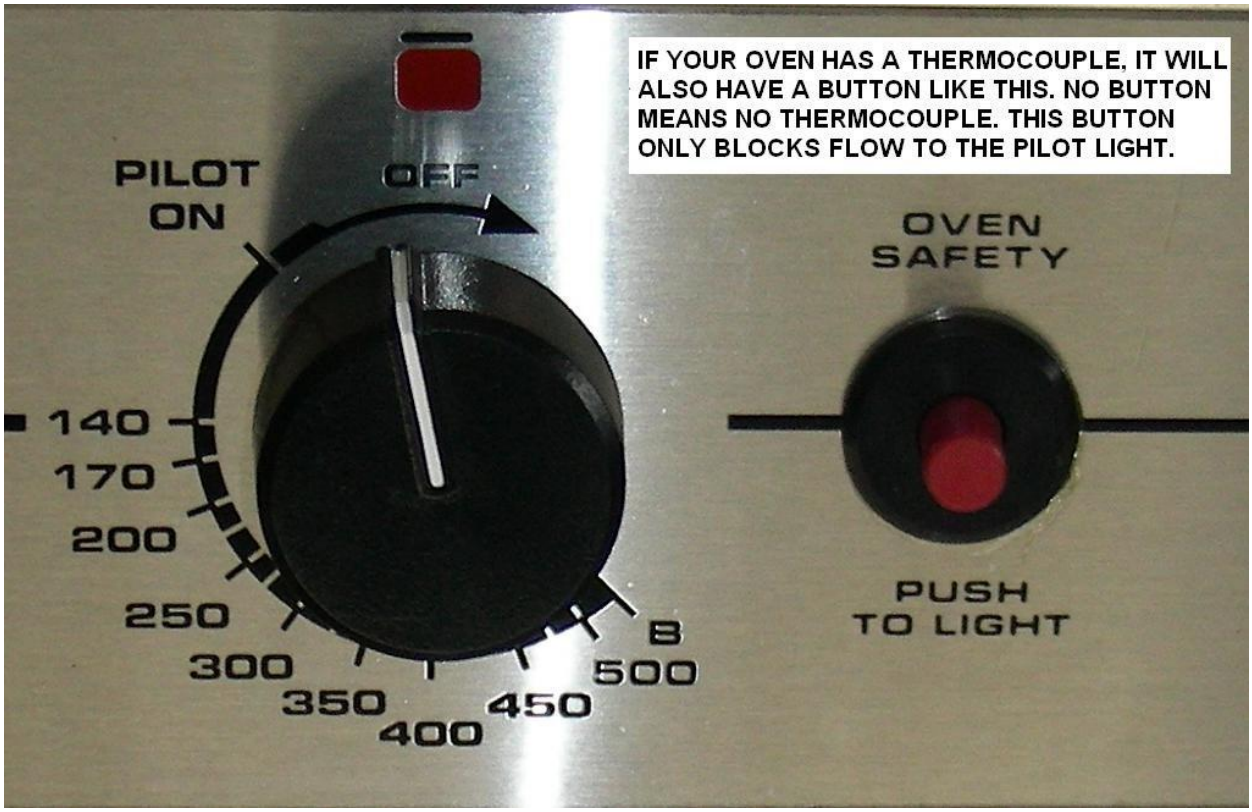
The thermocouple could be defective.
(Note: a thermocouple is an electrical device with no moving parts that generates a small electrical current when heated. >>> They rarely fail unless physically damaged. <<<)

The electromagnet inside the safety valve could be defective.
(The safety valve is the push button you need to depress and hold when lighting the pilot.)

You could also have a bad connection between the thermocouple & safety valve.
The thermocouple to safety valve connection loosens with a 5/16" wrench.
You can try wire brushing the end of the thermocouple where it installs into the safety valve & reassembling.
>>> Do not over tighten; this is only an electrical connection <<<.

Generally you need to hold the safety button for about 15 seconds after the pilot is lit, then release the button and the pilot should stay on.

The 'safety valve' and 'oven thermocouple' only affect the pilot staying lit,
If you can get your pilot light to stay lit, these parts are probably not defective.



INFORMATION ABOUT THE THERMOSTAT

The 'oven thermostat' monitors the oven temperature using a sensing probe usually located in the top rear of the oven. This is NOT the probe connected to the pilot assembly.
The thermostat compares the interior oven temperature to the temperature you have selected with the oven dial.
The thermostat modulates the pilot flame height up to 'high pilot' when it senses there is need for more heat, & cycles down to 'low pilot' when it senses that the oven is at temperature.
This is a completely mechanical device, and can fluctuate +/- 50F by design.

For practical purpose, that is all the thermostat does. It modulates the pilot flame up & down while comparing the knob setting to the interior oven temperature.
If it thinks the oven needs to be hotter, it makes the pilot flame big.

In the "oven off" position the thermostat also blocks all gas flow to the oven, both via the 'mercury control valve', and to the pilot light.
This is what differentiates a marine/RV oven thermostat from most residential or commercial oven thermostats; in the off position it will actually extinguish the pilot light/cut gas supply to the pilot.

During normal operation, the only component blocking gas to the main burner is the 'mercury control valve'

INFORMATION ABOUT THE MERCURY CONTROL VALVE

The 'mercury control valve' monitors the pilot flame height using a small probe mounted in the end/tip of the pilot assembly. When it senses a large pilot flame (which happens when the oven thermostat has sensed a need for more heat,) the 'mercury control valve' opens and allows gas to flow to the 'main/large oven burner'.

The 'mercury control valve' itself is normally located on top of the stove directly behind the thermostat, but in early stoves it can be mounted in the oven interior, in the side wall or on the back wall of the oven.
On some very early models, it is sometimes mounted on the outside of the back wall of the oven.

The mercury control valve is often replaced by the customers due to misdiagnoses of an oven problem.
The 'mercury control valve' acts as a safety feature, if there is no pilot flame sensed/present in the oven (specifically no high pilot flame,) the mercury control valve prevents a large amount of gas from entering the oven cavity through the main burner.

If you can ever get the main oven burner to come on, the mercury control valve is probably not defective

DIAGNOSING A PROBLEM

If you can get the pilot to light, and you can get the main burner to come on, but periodically everything, including the pilot light goes out; it is often something as simple as dirt in the pilot or pilot orifice.

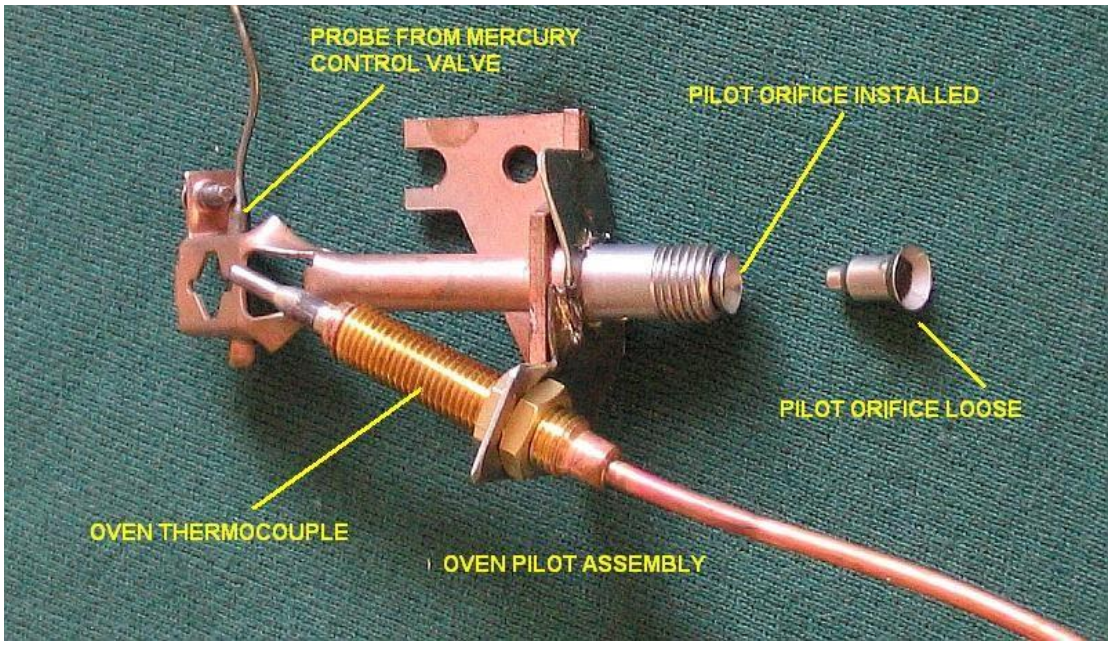
The pilot orifice is located at the inlet to the pilot assembly behind the 3/16" compression nut. (Removal requires 7/16" wrench to loosen, and a small nail or similar to push it out.)

Many oven problems can be traced to issues with the pilot assembly or with a dirty orifice.

This problem with the pilot going out could also be caused by a bent pilot assembly, low gas pressure to the stove or even a sticking propane regulator.

If running a top burner while operating the oven eliminates the problem it would point towards a sticking propane regulator (this is not part of the stove, it is near the propane tank.)

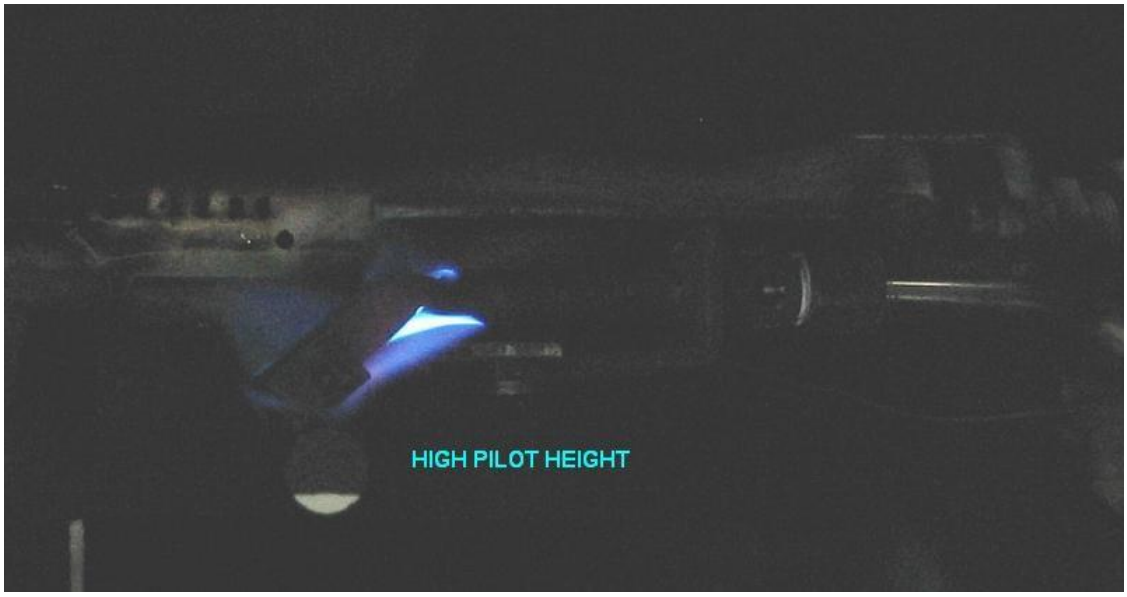
If your stove is equipped with an 'oven thermocouple', verify that the thermocouple's probe tip is directly over the flame in 'low pilot' mode.



If the pilot does stay lit, but the main burner does not light you need to verify proper operation of the oven thermostat. Verify you have two distinct pilot flame heights 'low pilot height' when the oven is up to temperature (or in pilot only setting,) and 'high pilot height' when the oven is colder than thermostat setting.

(example, cold oven with control knob set to 350F).

Try lighting the pilot, and turning the control knob up and down. You should see the two obvious different pilot flame heights.



If the pilot flame is going out, it often happens when transitioning between the two flame heights.

Try lighting the pilot and repeatedly cycling the pilot high/low/high/low by turning the knob up and down. If you are able to make the pilot go out/blow out while cycling upand down, the issue is probably related to dirt in the pilot orifice or pilot assembly, or a bent pilot assembly.

These are common problems and generally require no parts to fix.

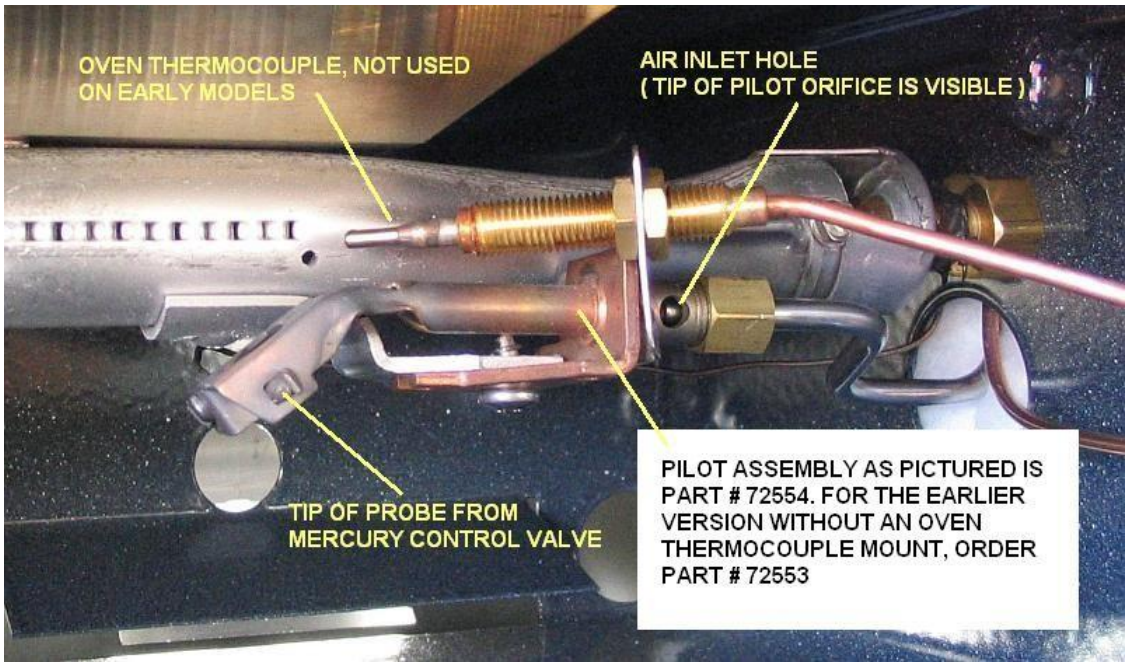
The 'high pilot height' is limited by the pilot orifice inside the pilot assembly.
The 'low pilot height' is limited by a ridiculously tiny orifice/passage located inside the oven thermostat body.
If you only have gas flow at high pilot, but zero or extremely low gas flow at low pilot, this internal orifice is probably clogged (and the thermostat needs to be rebuilt/replaced.)

If you only have a 'low pilot height' at all knob/temperature settings, you probably have a defective thermostat.
(>>> It is also possible you have a partially clogged pilot orifice, or even low gas pressure to the stove, so you should eliminate those possibilities before replacing a thermostat. <<<)

Remember, basically all the thermostat does is monitor oven temperature & modulate the pilot flame height up and down. If you don't have a high pilot, the thermostat is PROBABLY defective.

If you do have two pilot flame heights, but the main burner still doesn't come on reliably at high pilot, it is often still just dirt in the pilot orifice. Sometimes, the high pilot is simply not quite high/hot enough.

You can try turning the thermostat up until you achieve 'high pilot height', then take a good lighter or small torch and apply some additional heat to the probe located at the end of the pilot assembly.
(This is the probe connected to the 'mercury control valve', not the threaded thermocouple on top of the pilot.)

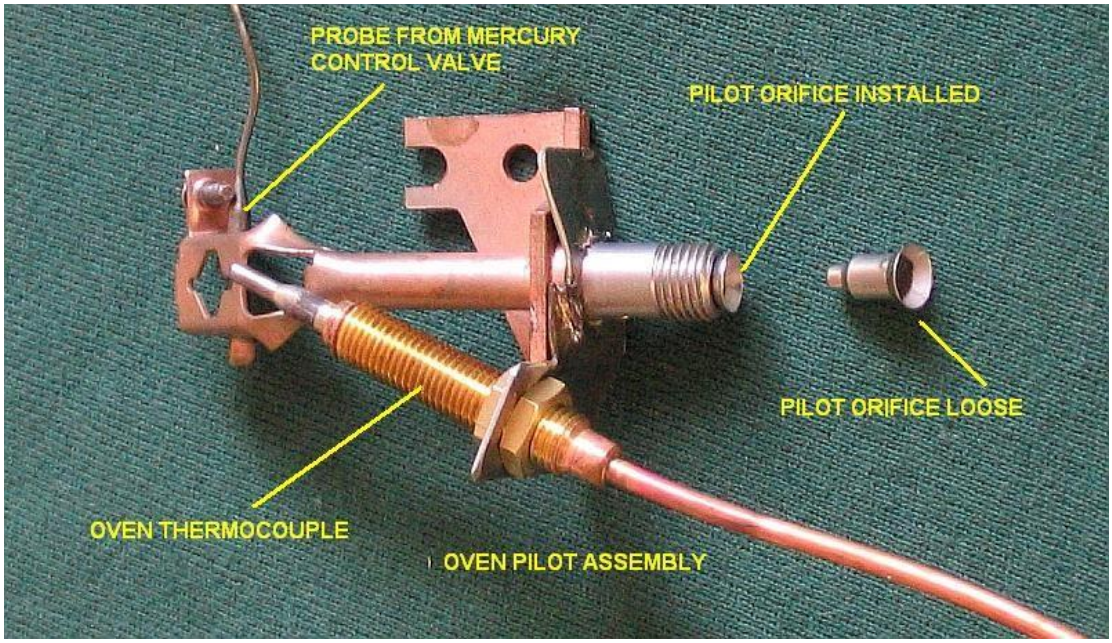


If the main burner does come on when extra heat is added, the pilot flame PROBABLY just isn't getting the probe hot enough.
(Again, look for dirty pilot orifice, bent pilot assembly, low gas pressure.)
Verify the probe is properly located in the pilot assembly.

This test can take some time, so a plastic ended gas match or plastic lighter are not the ideal tools for this test. Most lighters are not designed to run continuously for extended lengths of time.

If the pilot assembly has been on high pilot for a while, and the probe is already glowing red hot, there is no need to do this test.

When functioning correctly, the 'mercury control valve' should open well before anything gets red hot.
If the pilot starts glowing red hot, you can stop the test.
It is not unusual for the pilot assembly to get red hot, but it is not required for normal operation.



If you have the thermostat turned up, and the pilot size is big, and you apply additional heat to the probe but the main burner still won't light, you probably have a defective mercury control valve.

Under normal operation, the main burner should light before the mercury control valve's probe glows red hot.

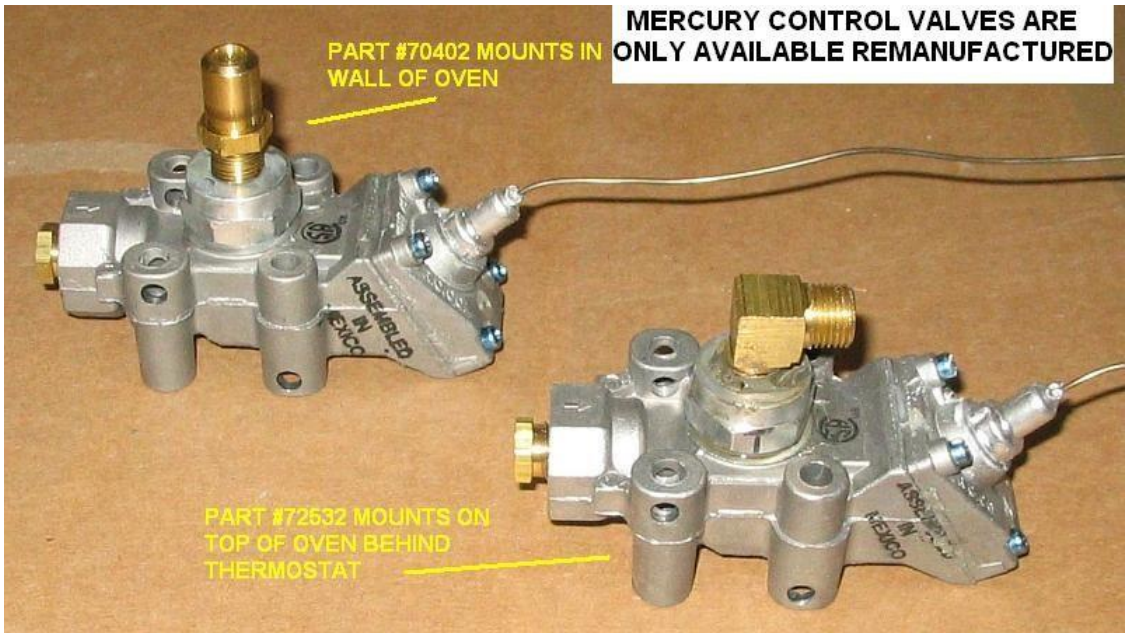
In theory, no gas to the main burner could be a clogged oven main burner jet, but this would be unusual.

In a Seaward / Princess / Hillerange, if the mercury control valve is located on top of the stove it is part #72532.
If the mercury control valve is located in the side wall of the oven, it is probably part # 70402.
There are several variations besides these common two,

If you need to order a replacement we will need to see a photo of the defective one.

The 72532 & 70402 are both factory discontinued items, there are a limited number of remanufactured units available sold on an exchange basis. Some of the remanufactured units require modification of the supply lines.

If you purchase a replacement, please send your core back for credit in a timely manner.



PILOT ORIFICE REPLACEMENT

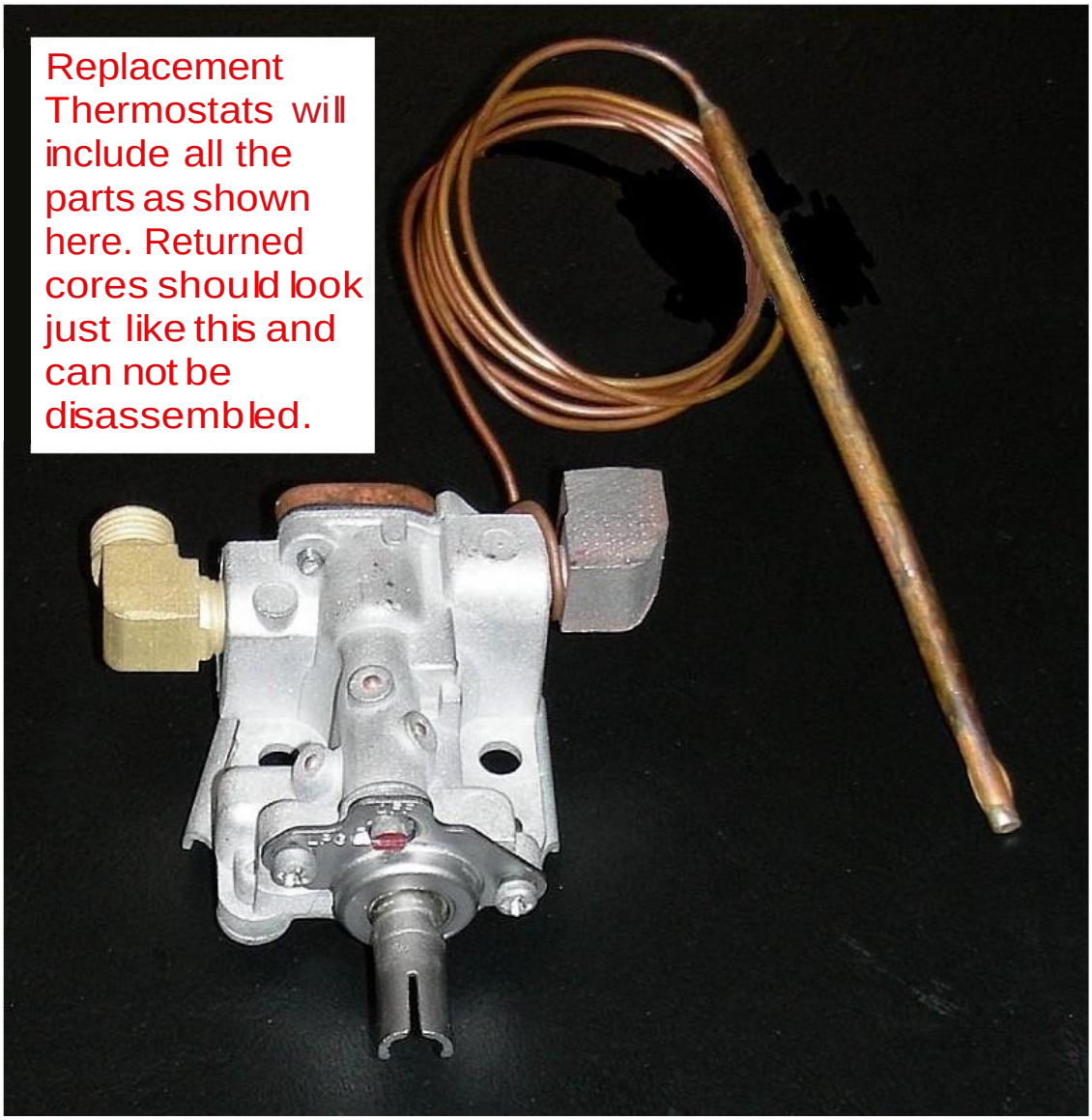
A new pilot orifice is part #70392 for LPG. #70393 for CNG
You can normally just clean / blow through the pilot orifice and reinstall it.
The hole is tiny and not round. Do not stick a needle in it or you will ruin it.

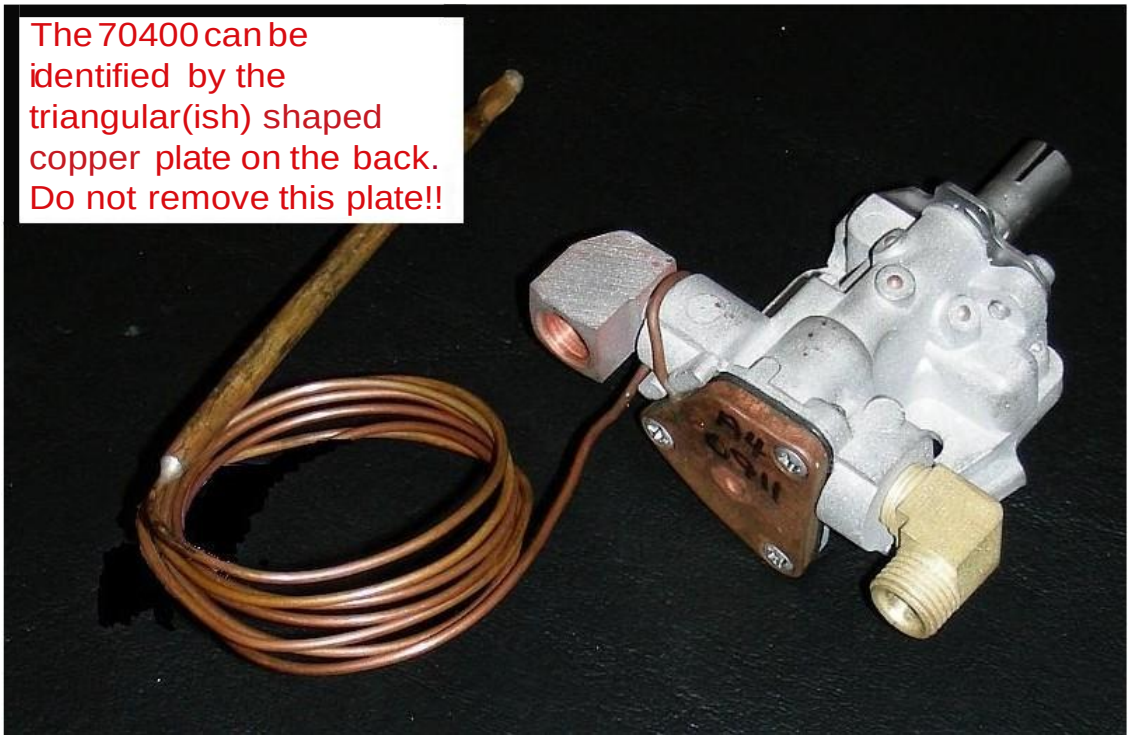
To remove the pilot orifice, start by removing the 3/16" propane line using a 7/16" wrench.
You may also want a pair of pliers to hold the pilot while loosening.
The orifice may simply fall out, or you may need to push it out using a nail or small screwdriver through the air inlet hole.
Insert the tool through an air hole located just beyond the threads where the propane line was removed.
Use caution as the orifice is easily damaged.
If your oven does not have automatic spark ignition you can turn on the oven control briefly (and depress the safety valve button if applicable) to blow out the pilot supply line in case there is more dirt inside.

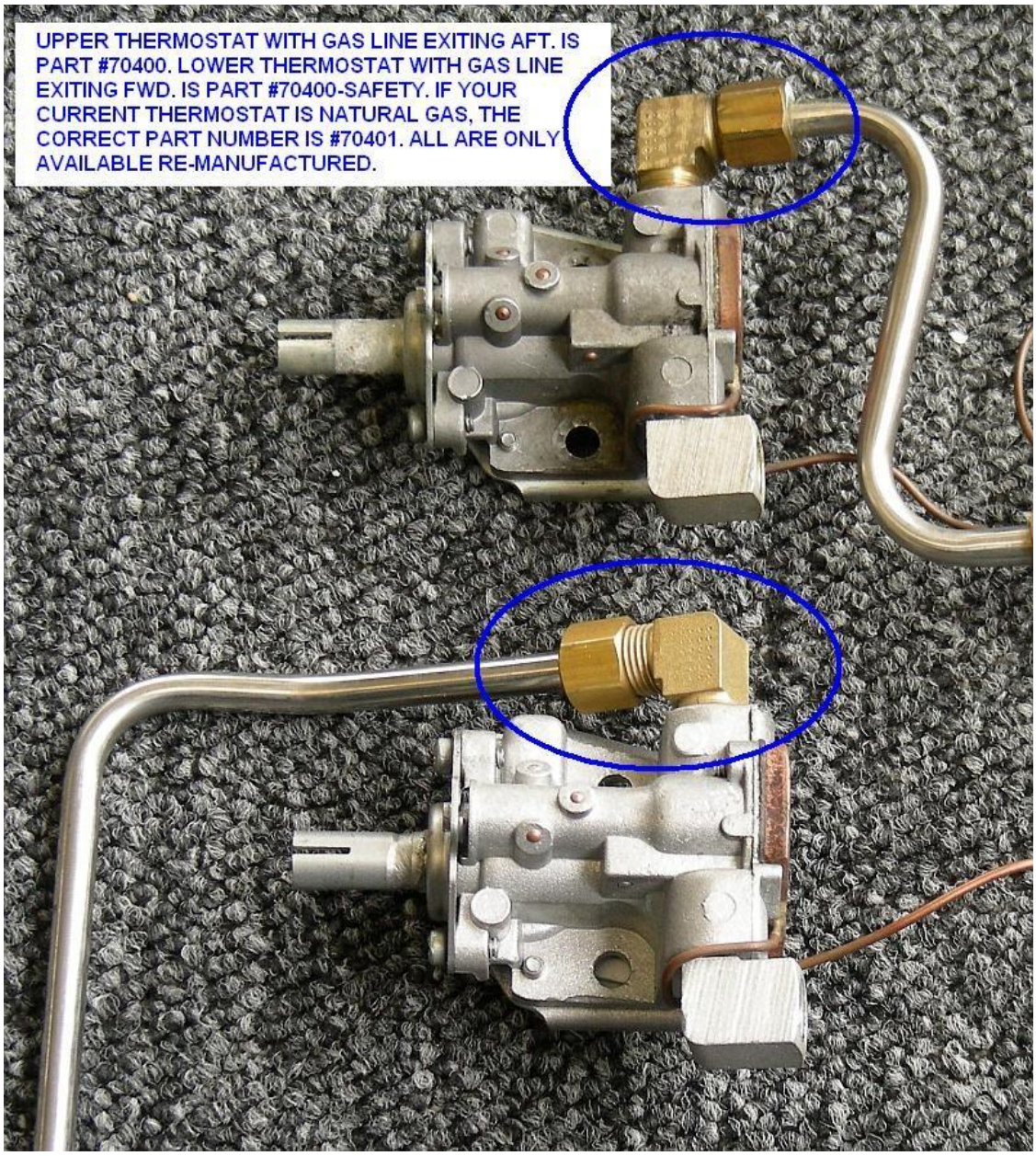
OVEN THERMOSTAT REPLACEMENT

If you need to replace the oven thermostat, many styles have been discontinued.
There are many different configurations, more than I can describe here.
If you are not sure what parts you need, you can email us photos.

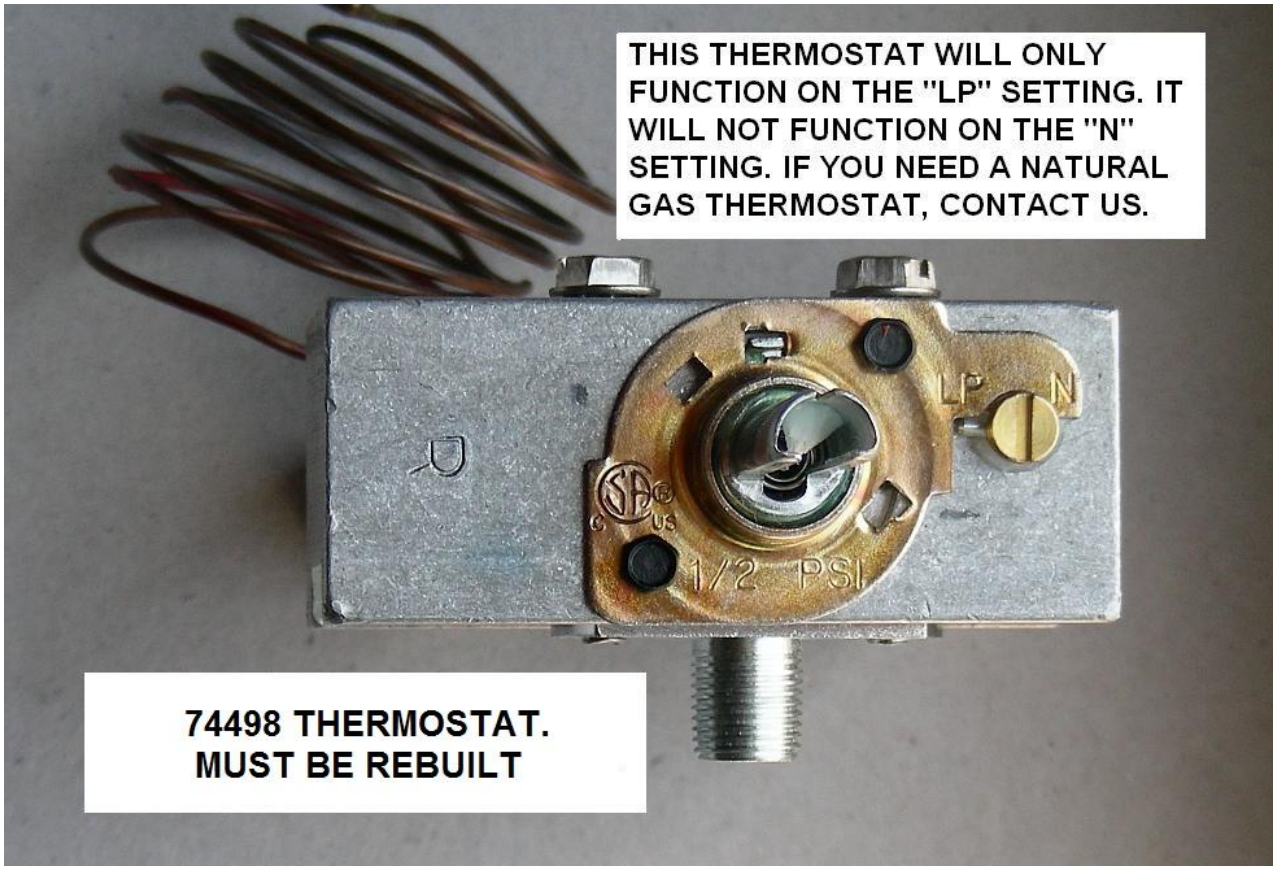
The most common thermostat is the #70400.

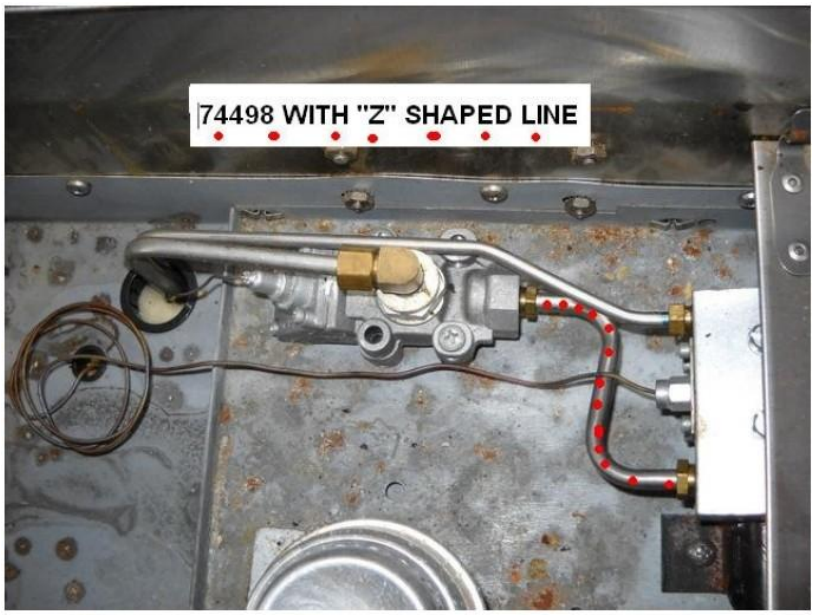

Replacement Thermostats will include all the parts as shown here. Returned cores should look just like this and can not be disassembled.

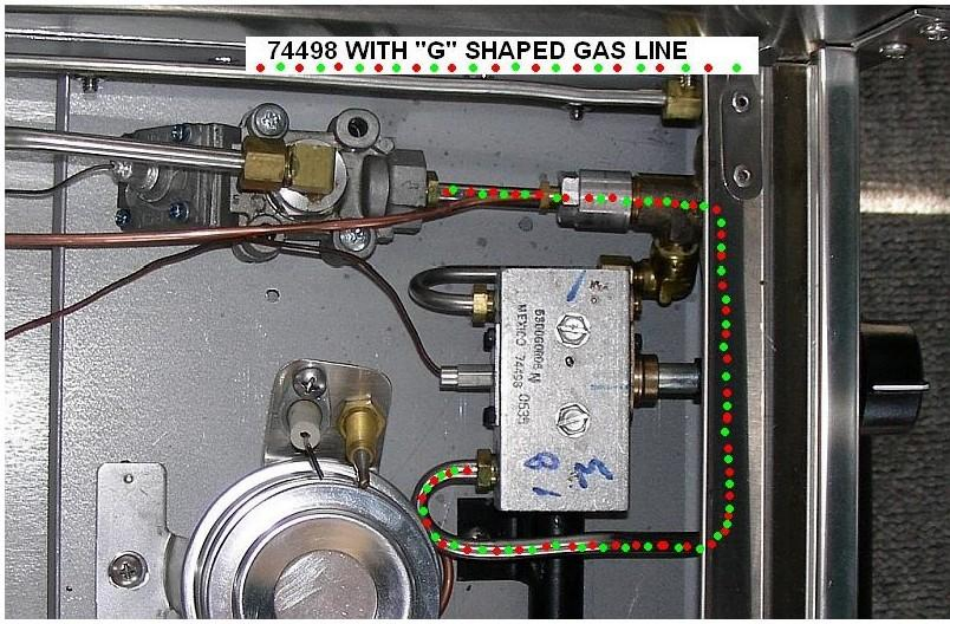

The 70400 can be identified by the triangular(ish) shaped copper plate on the back. Do not remove this plate!!



The #70400 (CNG version is #70401) can be identified by the "triangularish" shaped copper plate attached to the rear of the thermostat body.
As with all seaward thermostats, incoming gas enters through the bottom of the thermostat.
There are two gas lines leaving the thermostat, a 3/16" supplying gas to the pilot light & a 1/4" line supplying gas to the main burner via the mercury control valve.
the 70400/70401 is only available remanufactured & currently the demand greatly exceeds the supply.
We are attempting to collect more cores to rebuild, so it is important that people return their defective 70400 thermostats in a timely manner.
The Seaward thermostat is unusual because it shuts off the pilot in the off position.
(as required by the USCG / ABYC.)
Residential standing pilot style oven thermostats are designed so that the pilot stays lit all the time.


THIS THERMOSTAT WILL ONLY FUNCTION ON THE "LP" SETTING. IT WILL NOT FUNCTION ON THE "N" SETTING. IF YOU NEED A NATURAL GAS THERMOSTAT, CONTACT US.
LP
N
1/2 PSI
74498 THERMOSTAT.
MUST BE REBUILT

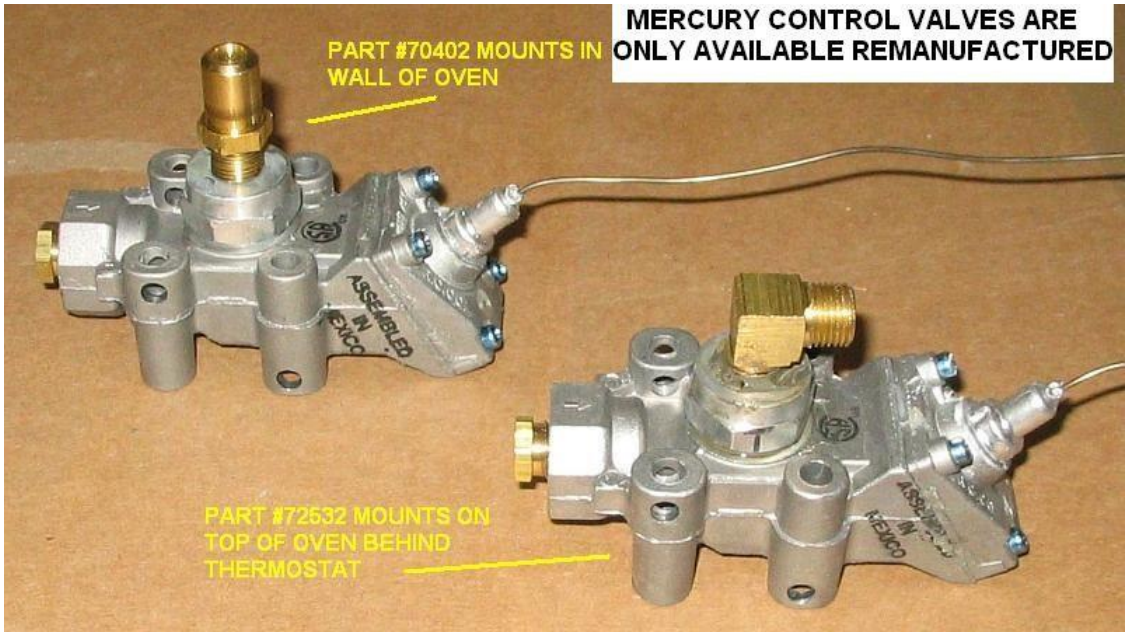

74498 WITH "Z" SHAPED LINE



MERCURY CONTROL VALVE REPLACEMENT

If your mercury control valve is located in the oven, make sure that we are aware if the replacement is for LPG or CNG.

If your mercury control valve is mounted on top of the oven, there is a designated runway for the sensing probe to route through.
In the sidewall of the oven is a small tube to push the replacement probe through.
The tube is perfectly straight, so you will need to reach into the sidewall of your oven & snag the new probe with your finger.
Closely watch how the old probe is routed as you remove it.
Make sure to tuck any excess length of tubing up so that it can't become snagged & damaged.
Do not locate the excess sensing probe's tubing where the main burner's flame can hit it.

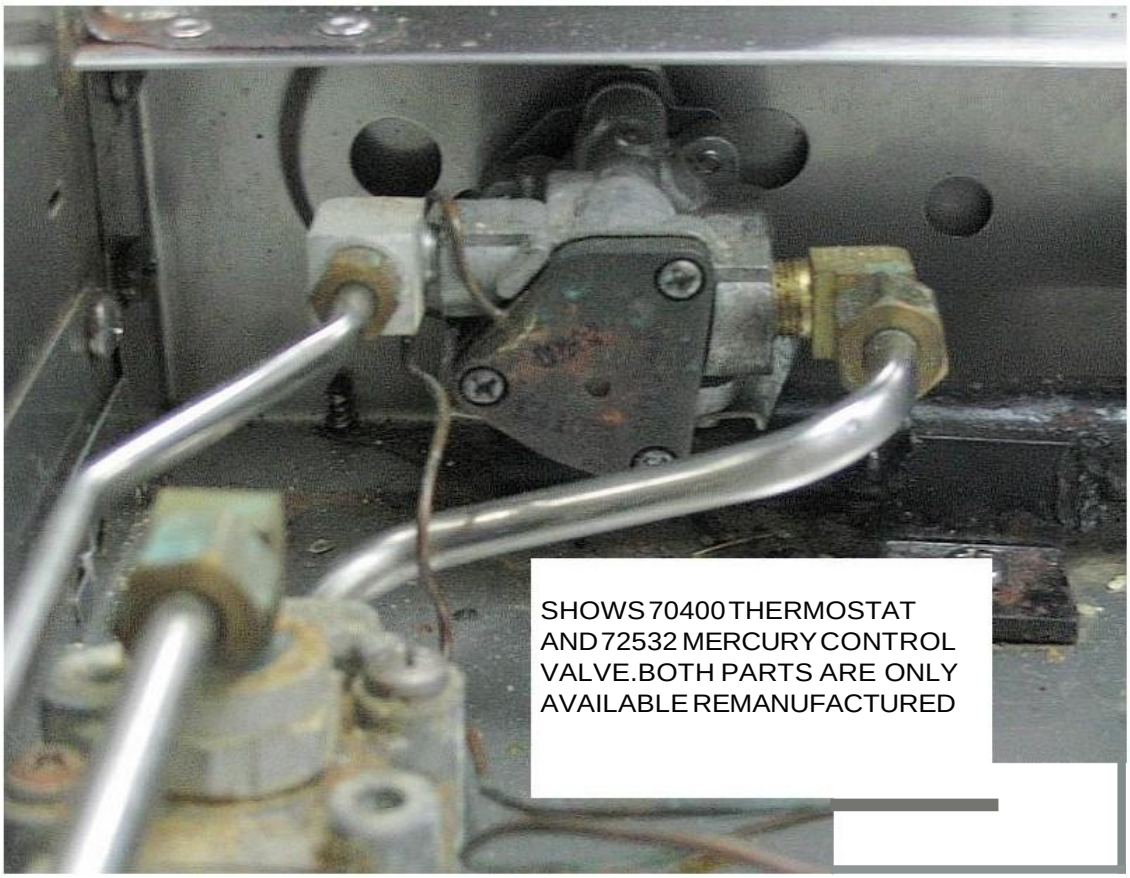


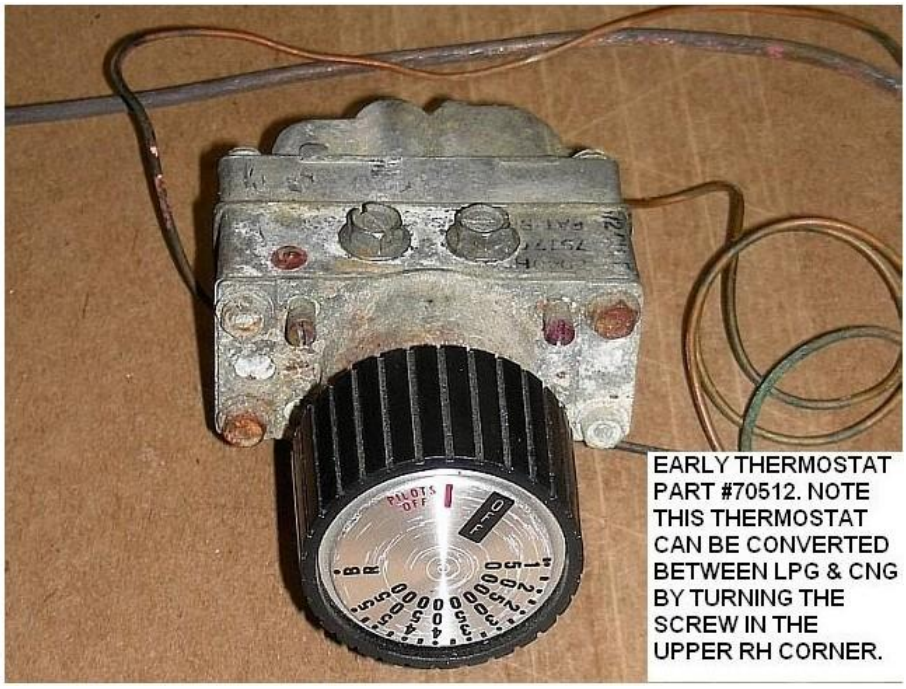
REMEMBER TO LEAK CHECK ALL CONNECTIONS BEFORE USING THE STOVE. TO BE SAFE & ABYC COMPLIANT, YOUR PROPANE SYSTEM SHOULD HAVE A 300PSI TO LEAK CHECK YOUR SYSTEM, FIRST MAKE SURE THE MANUAL VALVE ON YOUR PROPANE TANK IS CLOSED. IF SYSTEM IS EQUIPPED WITH AN ELECTRIC GAS VALVE, TURN IT ON. OPEN THE MANUAL VALVE ON YOUR FUEL TANK BRIEFLY, THIS SHOULD PRESSURIZE THE PROPANE SYSTEM UP TO THE BOTTOM OF THE THERMOSTAT IMMEDIATELY, CLOSE THE MANUAL VALVE ON YOUR PROPANE TANK AGAIN & LOOK AT THE PRESSURE GAUGE.
FOR A PROPANE SYSTEM TO BE CONSIDERED LEAK FREE, IT MUST HOLD PRESSURE WITH ZERO PRESSURE DROP FOR AT LEAST 3 MINUTES. IT SHOULD

RETAIN SOME PRESSURE AFTER ONE HOUR.

CONNECTIONS AFTER THE THERMOSTAT ARE ONLY PRESSURIZED WITH THE OVEN THERMOSTAT TURNED ON. YOU WILL NEED TO LEAK CHECK THESE CONNECTIONS VERY CAREFULLY. YOU CAN USE A SOAPY WATER SOLUTION & CHECK FOR BUBBLES, CLEAN UP THE EXCESS WHEN DONE. DO NOT USE ANYTHING WITH AMMONIA, IT WILL ATTACK THE BRASS FITTINGS, USE DISH SOAP OR SIMILAR. COMMERCIAL LEAK DETECTION FLUIDS ARE BEST BECAUSE THEY DO NOT LEAVE A CORROSIVE RESIDUE. WE HAVE IT IN STOCK.

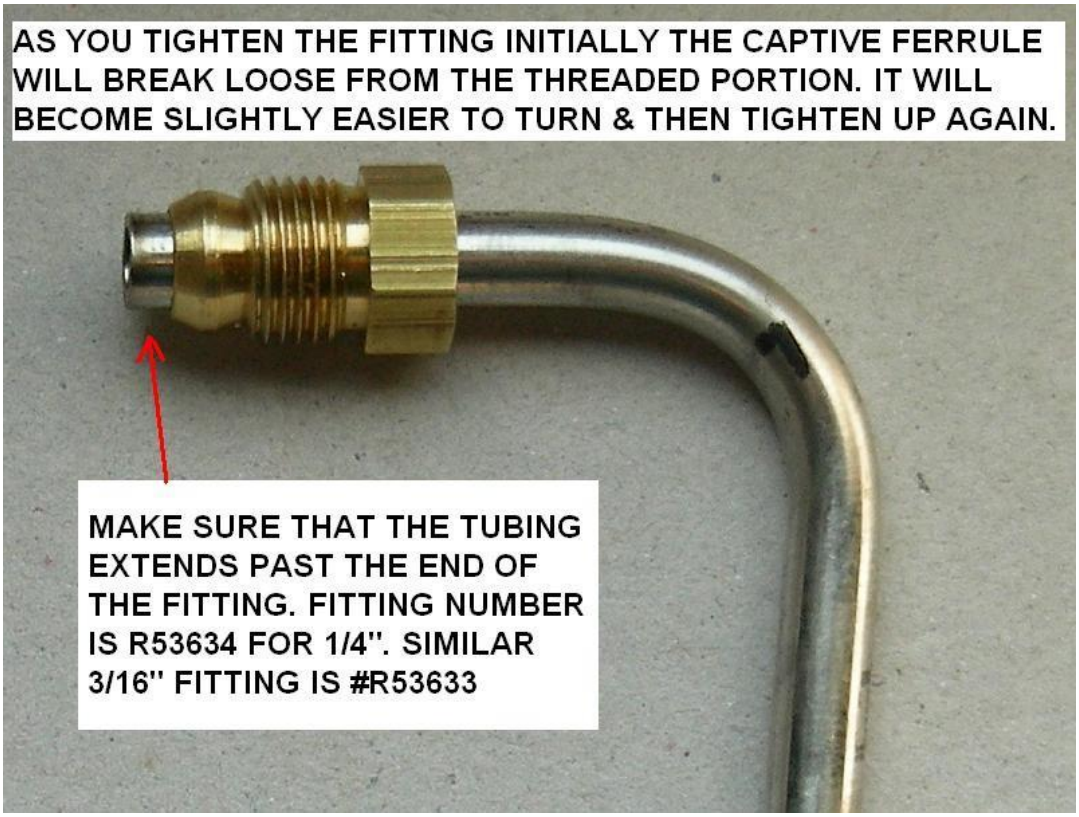
REMEMBER THAT PROPANE IS DANGEROUS, IF YOU ARE NOT PROPERLY SKILLED TO PERFORM THIS TYPE OF WORK, HIRE A PROFESSIONAL.
IT WILL BE MONEY WELL SPENT.





EARLY THERMOSTAT PART #70512. NOTE THIS THERMOSTAT CAN BE CONVERTED BETWEEN LPG & CNG BY TURNING THE SCREW IN THE UPPER RH CORNER.

AS YOU TIGHTEN THE FITTING INITIALLY THE CAPTIVE FERRULE WILL BREAK LOOSE FROM THE THREADED PORTION. IT WILL BECOME SLIGHTLY EASIER TO TURN & THEN TIGHTEN UP AGAIN.



MAKE SURE THAT THE TUBING EXTENDS PAST THE END OF THE FITTING. FITTING NUMBER IS R53634 FOR 1/4". SIMILAR 3/16" FITTING IS #R53633

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