

9.3.5 Preheater and Nozzle PTC Testing Procedure

Tools Required:

1/4", 5/16" wrenches, alligator clips or jumper wire, 120VAC capable Digital Multi-Meter DMM, temperature probe, or the TPI combustion analyzer with a type K thermocouple attached.

Preheater/Nozzle PTC Function:

Heats the fuel to a temperature over 120°F for proper combustion. There are standby PTCs in the Preheater and the Nozzle that are energized whenever there is power to the burner in order to keep the fuel warm for immediate start up. When the burner is firing, there are extra run PTCs in the Preheater that energize to heat the fuel as it flows to the nozzle. **Note:** During this test, if the preheater does not function as stated, call Technical Services for assistance, or Customer Service to order a new preheater.

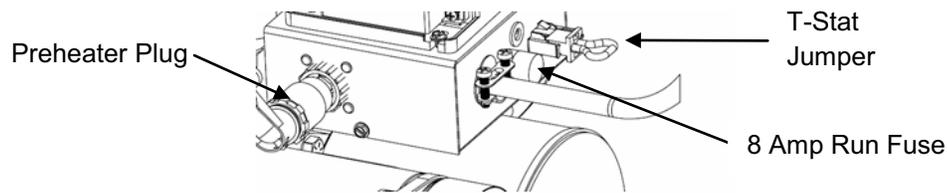
CAUTION The preheaters are on at all times, making the nozzle block and external preheater assembly very hot to the touch.

CAUTION Make sure the Preheater has recently been maintained. Neglect will negatively affect the results of testing

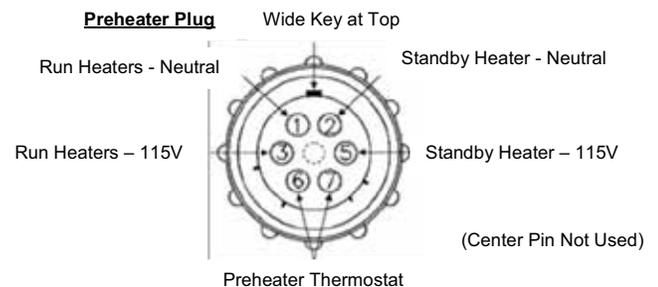
DANGER During a portion of this test, high voltage electrical components will be energized. Only a certified electrician is to perform the following procedures, and with extreme caution.

Procedure:

1. With the burner unplugged, verify the pins at the preheater plug and receptacle are straight and secure.
2. Check the 8 Amp fuse (refer to figure below). If the fuse is blown, there is a high probability that at least one of the run PTCs has shorted out.



3. Remove the thermostat connector / jumper from the side of the primary control and/or any jumpers across the T-T terminals.
4. Disconnect the preheater plug. Allow the preheater to cool, and check the following with the digital multimeter:
 - a. Verify that the circuit between the two thermostat pins is open.
 - b. Verify that there is a resistance of 100-1000 ohms between the standby power and neutral pins.
 - c. Verify that there is a resistance of 100-1000 ohms between the run power and neutral pins.

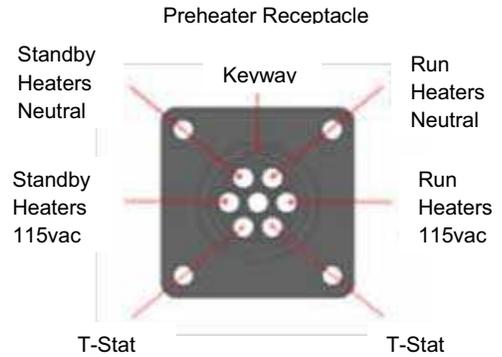


If any of these tests fail, the preheater will need to be replaced.



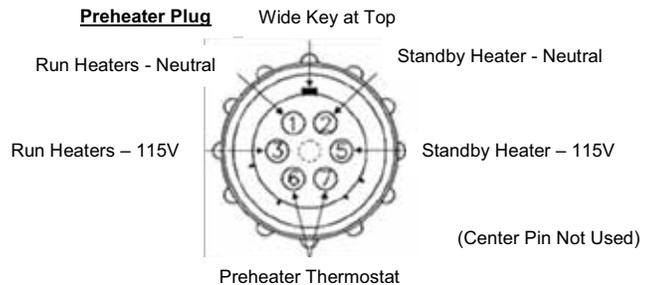
5. Plug the burner in. Unplug the preheater. Turn the preheater ball valve off. Verify power by testing for 120VAC across the preheater receptacle (see figure).

- a. Verify power across the preheater receptacle Standby Heater pins.
- b. Note: This should only be performed with the burner fully attached to the boiler vessel. Next, jump across the TT and FF terminals on the Primary Control. Verify power across the preheater receptacle Run Heater pins.
- c. Remove the jumpers from the TT and FF terminals, return the plug to the receptacle and open the ball valve when finished.



6. If the tests in step 4 and 5 are successful, plug the preheater into the receptacle and allow the preheater to heat up. After 30 minutes, the standby PTC should have heated the oil to the point where the preheater thermostat should have closed. Note: If the room temperature is below 50°F, allow additional time.

- a. Using the temperature probe (or TPI combustion analyzer with a type K thermocouple attached), touch the thermocouple probe to the surface of the top preheater cap (under the insulation). It should register above 120°F.
- b. Unplug the preheater and check for continuity across the thermostat pins of the preheater plug (refer to figure). If the preheater is hot, but there is no continuity across the thermostat pins, the preheater will need to be replaced.



7. If the burner does not light off well, there may be a problem with the Nozzle Block Standby PTC. To check the Nozzle Block Standby PTC: Remove the screws and flip back the transformer on top of the burner to expose the nozzle block.
 - a. Using the temperature probe (or TPI combustion analyzer with a type K thermocouple attached), touch the thermocouple probe to the surface of the nozzle extrusion, it should register above 120°F
 - b. Unplug the burner and check the physical connection and pins of the white PTC electrical plug.
 - c. Return the transformer to its operational position. Plug the burner in.
8. If the burner starts okay, but then trips after a few minutes, then restarts again repeatedly, then the run pills may not be providing enough heat or the incoming oil is cold. If the incoming oil to the preheater is above 50°F and the preheater cannot maintain temperature, the preheater will need to be cleaned or replaced.