

## Tech Tip Flame Sensors

Hey Rick, how much voltage does a flame sensor produce?

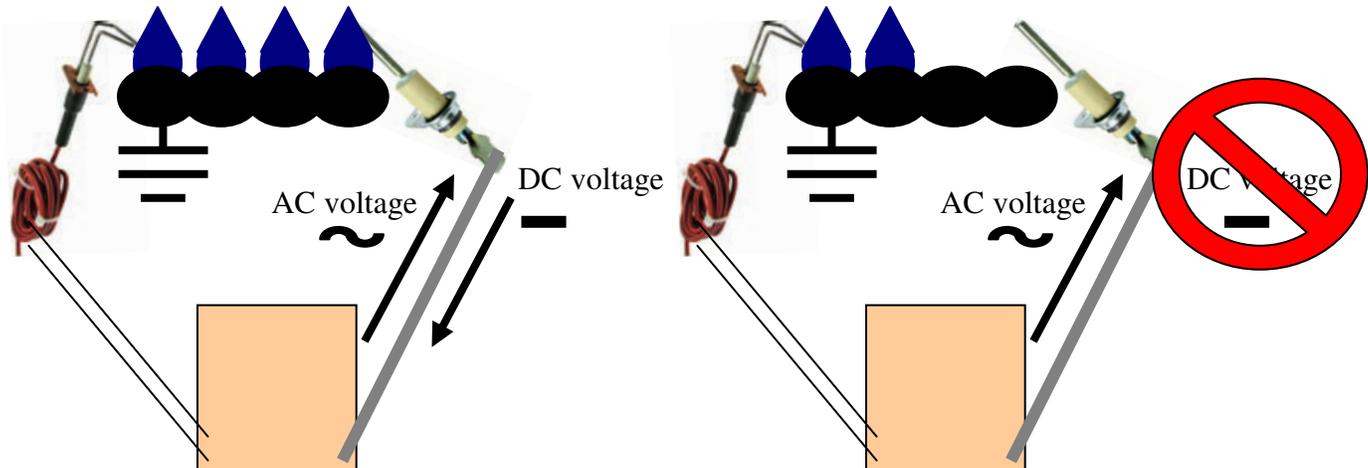
“None” replied Rick.

The flame sensor is only a conductor ...it is not like a **thermocouple** that can actually produce a millivoltage (Typically 30/1,000 of a volt or 30 milivolts).

Flame sensors, as their name imply, sense the flame on a gas furnace, and conduct a signal to the control board, keeping the burners in operation.

To understand the ignition sequence helps to understand the flame sensor.

- The control board sends voltage to the gas valve and the DSI or HSI\*
- The burners light
- The control board sends an A/C current up the flame sensor lead
- The flame “rectifies” this current to a D/C current (Like your phone charger)
- The D/C current goes through the flame to the burner ground.
- The Control board sees this ground and keeps the gas flowing



If the flame does not fully light the A/C current is never rectified and the circuit board does not see the burner ground.

In this case the control board shuts off the voltage to the gas valve and the ignition control and tries again possibly 2 more times before locking out.

The Ground is VERY important in this operation...if the control board loses this ground (anywhere from the furnace all the way back to the ground rod under the main circuit breaker panel) because of a loose or disconnected connection the furnace may act erratically, either not firing up at all or locking out intermittently.

The current is very small usually less than 10ua (microamps) 10 millionths of an amp.

If the flame sensor gets dirty clean it with steel wool not sandpaper. Any sand residue left behind when heated turns to glass and blocks the current flow.

Also check the porcelain for cracks. Any breach will allow the current to take a different path and this will have the control board lock the gas valve out.

\* DSI Direct Spark Igniter      HSI Hot Surface Igniter