

Ultra-Low NOx Furnace Troubleshooting

Most common fault codes explained. By Eddie M Lopez U S Air Tech Services

Tools

You will need to own the following:

Multimeter that is capable of micro amps, amps, volts a/c & d/c, ohms/continuity, HZ and Duty Cycle for PWM measurements.

Dual digital Manometer

Tee for tubing Pressure sensor testing. 3/16

Jumpers,

Tips

Do not rotate the induce draft motor, leave it in the original factory position. Which is out the top of the furnace. Turning the inducer motor cuts off the flow of the draft motor significantly and causes problems.

Always disconnect the furnace from the thermostat while troubleshooting and use jumpers to bring on the call.

1 RED FLASH, SYSTEM LOCKOUT, TOO MANY RETRIES.

This could mean a bad gas valve, gas supply, bad ignitor, bad flame sensor, wires burnt or melted to previously mentioned components.

For gas valves: Check to make sure the 120-volt pigtail connections from your power supply to furnace 120-volt wire connections are not broken or twisted breaking some of the strands off, this could power everything else until the gas valve is energized.

Gas supply: Make sure your gas supply is not restricted. You can verify this by using a Manometer on the incoming gas pressure it should be 7-10" and maintain this pressure throughout the heating cycle.

The gas pressure should be maintained by the gas meters regulator. If you suspect your gas pressure dropping you can run all the gas appliances, water heater, stove oven etc. The gas company's regulator should be able to keep up with all of them running, if not call your gas supplier.

We have seen where the furnace works during the day but not at night or in the morning, suspect that you may have a restriction in your line. You may need to go to the customers house when the event is occurring.

Gas valve opens however no flow, check for an obstruction in the burner tube where the U-bend goes into the burner (spider web). Make sure your outlet gas pressure of gas valve is 3.5, anything lower than this could cause a failure to ignite.

Flame sensor,

Make sure the wires are secure, (**CAUTION**, the flame sensor is powered by line voltage). Check for continuity on the wire with power off. Perform flame rectification test, reading should be about 17uA.

If you need to clean the sensor, use steel wool. Sand cloth could insulate the rod with Silica.

Ignitor,

When the ignitor is working properly it should draw about .5 amps.

Ground

Verify you have a good ground. The easiest way to check is to purchase a GFI circuit checker from Home Depot Etc.

2 RED FLASHES, PRESSURE SENSOR ZERO ERROR INCORRECT PRESSURE.

Replace sensor/transducer/pressure sensor. If the code repeats after replacement, call me.

The sensor used on **all but** the 100 K btu 95 percent is a 0-2" wc, part number S1-0243592200, part number physically on switch is (531536). The 100 K btu 95 percent sensor is a 0-4' wc, part number is S1-02551762000. Part number physically on switch is (5761636).

Do not use competitors' sensors.

3 RED FLASHES, PRESSURE SENSOR SPAN ERROR/INCORRECT PRESSURE.

Flash code 3 pressure sensor span error/incorrect pressure. This code could be caused by multiple issues.

If the 3 flashes happen immediately, I suspect the inducer motor to be the trouble, however it could be caused by the board, index chip, pressure sensor, wiring harness.

If you suspect the inducer, order a replacement, but do not install it. simply plug it in and call for heat if the code goes away proceed with install. If it does not, call me.

If the code happens after the inducer starts, check for a bad inducer wheel, debris or obstructions in the vent motor or blocked flue. On 95 percent furnaces, the external trap must be installed. Failure to do so will result in a code 3 due to the water not draining from the collector pan.

4 RED FLASHES, High limit switch open.

Make sure the motor is turning the right direction,

The factory default speed setting is medium low (Yellow wire), The factory expects the installing contractor to do a temp rise measurement and adjust the speed settings accordingly.

Red = low (fan), yellow = med low, grey= medium, blue = med-hi, blk = high. You can tie the heat and cool tabs using the black wire for heating and cooling if needed.

Check for restricted or collapsed ducts, dirty filters, closed supply vents.

5 RED FLASHES, Flame present with gas valve off

This could mean the gas valve is stuck open, or the board could have sensed a flame when the unit shut down (momentarily).

6 RED FLASHES, Auxiliary limit open.

On both 80 and 95 percent furnaces this could be caused by a dirty burner or blocked mesh in the burner.

On 95 percent furnaces try moving the pressure sensor hose from the collector to the inducer port.

This also could occur if the speed of the inducer motor is not correct. typically, on 95 percent furnaces.

On a 95 percent furnace, make sure your delivery gas manifold pressure is 3.5"wc. Then move the pressure transducer hose location from the collector to the inducer port, cap the collector port.

This increases the speed of the inducer motor, eliminating the error code and sometimes quieting the flame harmonic noise.

In some cases, moving the hose will cause the burner to not light, (woof woof sound). If this happens put the hose back to its original position and call me.

RAPID RED FLASHES, Incorrect line voltage polarity

Reverse L1 & L2

STEADY RED FLASHES,

Replace board.

Flame Harmonics:

On occasion the ULN furnace can produce a horrible noise that seems to pierce thru walls, your body and on to the neighbors' ears.

This phenomenon can be caused by an incorrect index chip and or orifice see chart below:

TL9E060 Id Plug 5528280 orifice .144 TL8E060 Id Plug 5894122 orifice .144

TL9E080 Id Plug 5894195 orifice .166 TL8E080 Id plug 5894182 orifices .166.

TL9E100 Id Plug 5528282 orifice .182 TL8E100 Id Plug 5528279 orifice .182

PCG4A50 ID Plug 5996829 orifice .136 PCG4B65 Id Plug 5996822 orifice .154

The gas pressure setting should be 3.5, however adjusting the gas pressure between 3-4 is acceptable.

If after verifying the index chip and orifice are correct and the problem remains. Replace the gas valve if that does not fix it call me.

On a 95 percent furnace especially the three ton in a horizontal position, after verifying the correct Id chip and Orifice. Move the grey pressure sensor hose from the collector to the induced draft motor port.

adjust the gas valve to 3.5.

On occasion, the inducer motor can produce a whine.

If the whine is loud, replace the inducer motor.

If you're not sure if the inducer or gas valve is making the noise, turn the gas off to the furnace and see if the noise continues.

Part numbers:

Gas Valve for all ULN part number S1-02551463000

80 percent inducer Part number S1-02649699000

95 percent inducer Part number S1-02649700000

PCG4A/B inducer part number S1-02649702000

Pressure sensor 0-2 wc all but 5-ton 95% Part number s1-02435922000

Pressure sensor 0-4'wc 95% 5-ton part number S1-02551762000

Control board al ULN furnace's part number S1-03103762000

Control board for all package units, part number S1-03103765000

Adaptor kit for testing manifold pressure F92-1003

Eddie M. Lopez

Technical Support Representative

US Air Conditioning Distributors

Direct Phone number 626-493-2155 you can text to this number.

Email e.lopez@us-ac.com

If you are contacting me for help, please send a picture of the board and the burner Assy. area. As well as the serial number of the furnace.

Thank you.

Ver. Date 5-25-23