

Sequence of Operation – DC Models (2- Stage Excalibur™ Furnaces ONLY)

The digital thermostat controls the operating circuit to the furnace by reacting to room temperature. When the room temperature is below the thermostat set point by 2°F a heat demand signal will be sent to the controller module.

The ON/OFF switch is an agency safety power shut off to the furnace ignition and gas valve systems.

The circuit breaker limits amperage draw of the motor.

Current flow to the controller module and during the first seconds the micro-processor confirms inputs and verifies correct operation of safety redundancies. This module will perform the following diagnostic checks of the system.

- a. Sail Switch is open
- b. Internal Microprocessor faults
- c. Voltage inputs
- d. Ignition
- e. Open Limit Switch

In the event of a failure, an LED on the controller module will flash a code. On newer control a diagnostic error code light has been added by counting the flashes an error code can be determined. See diagnostic information for code failures.

The motor receives current from the controller module and will run at high speed or low speed depending on the demand signal the digital thermostat sends to the controller module. One end of the motor shaft is for the circulating air wheel and the other end is for the combustion air wheel.

Circulating air blows against the sail switch and closes the contacts, completing the circuit. The sail switch is a safety device that insures air flow before ignition.

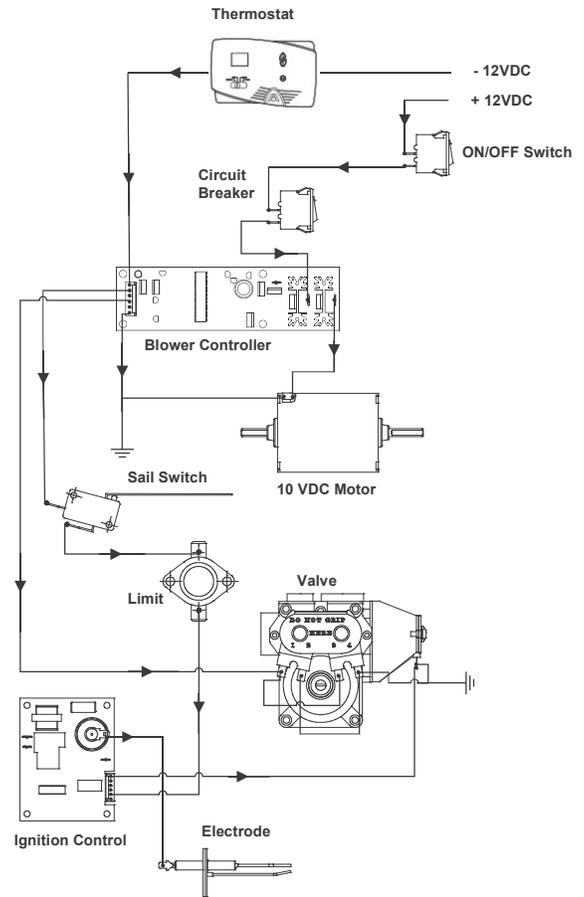
The limit switch is a safety device that protects the furnace from overheating, the contacts in the limit switch open at a given temperature setting, shutting off power. This activates the open limit switch diagnostics and the LED on the controller module flash shutting down the gas valve. See Chart.

As power is applied to the circuit board, the system does the following:

- a. Timing circuits allow the blower to purge the heat chamber for 15 seconds.
- b. When current is supplied to the gas valve it opens to high burn stage. (The controller module activates the low burn operation on the valve.)
- c. As the valve opens, the ignition module sends a high voltage spark to the electrode at the burner. The ignition module detects the presence of a flame. If the flame is not sensed after 7 seconds of sparking a signal is sent to the controller module that there is no ignition and shuts off the valve. After another 24 second purge, it will try again. After a third try, the controller will go into "soft" lockout, timing for one hour and the diagnostic LED will flash a code, See Chart. After the timed hour, the controller will initiate (3) more tries for ignition. If there is no ignition, the timing sequence begins again.
- d. If the system does not ignite and the thermostat is still calling for a heat demand, the blower will for 90 seconds as a post purge then shut off.

When the thermostat senses the desired room air temperature, a signal is sent to the controller module to shut down operation of the gas valve and run the blower for 90 seconds as a post purge of heat from the furnace heat chamber.

Two-Stage operation in automatic mode, when temperature is within 1°F of the set point of thermostat the furnace will start in low fire mode. If temperature is above 1°F of the set point of thermostat the furnace will start in high fire mode. Thermostat can also be set to manual for either high or low modes this will not allow the unit to switch automatically with temperature changes.



Number of Flashes	Diagnostic Information
1	Low Input Voltage
2	Ignition Failure
3	Open High Limit
4	Stuck APS (sail switch)
5	Module Fault