3.0 Operation

⚠ WARNING



This heater must be installed and serviced by trained gas installation and service personnel only.

Do not bypass any safety features or the heater's built in safety mechanisms will be compromised.

Note: Reference the Tube Heater General Manual for installation requirements.

Sequence of Operation

Standby: The 35-66 control continually checks for internal faults, circuit integrity and relay contact positioning.

Starting Circuit: Upon a call for heat, the control verifies that the differential switch is in the proper position (open). The control energizes the fan. Once operational static pressure is achieved, the differential switch will close initiating the ignition sequence. The glo-bar is powered and the gas valve opens after 45 seconds. If the flame is not sensed, the heater will attempt to re-ignite for a total of three (3) trials for ignition before proceeding to soft lockout.

Single Stage Running Circuit: After ignition, the flame rod monitors burner flame. If sense of flame is lost, the control closes the gas valve within one second and a new trial sequence (identical to the starting sequence) is initiated. If flame sense is not established within 8.5 seconds, the heater will attempt two (2) additional ignition sequences before proceeding to soft lockout. The control can be reset by briefly interrupting the power source.

Two Stage Running Circuit: The second stage on the gas valve is powered directly from the second stage of the thermostat. In order for two stage to flow to a higher output, single stage must be energized as well. The thermostat determines which stage to maintain for the desired temperature.

Shut Down: When the thermostat is satisfied, the fan will enter a two (2) minute post-purge cycle. Refer to Soft and Hard Lockout under Diagnostics; p. 13.

Thermostat

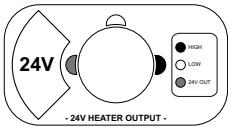
HL3 Series heaters require a 24VAC, two-stage thermostat to operate. The burner control box is equipped with a round terminal strip that accepts three (3) 1/4" insulated female spade terminals. Do not supply 120V to the 24V connection.

The HL3 Series is equipped with or without relays (P/N: HLRP). The optional relays must be factory installed. **NOTE:** Units with a relay installed must have an external transformer (field supplied), see wiring diagram. (Figure 2.2B).

Standard Configuration

Without relays (identified with white label around the terminal block):

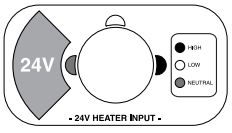
- Single burner control box.
- Single thermostat.



Optional Configuration

With relays (identified with orange label around the terminal block):

- A single thermostat controls two or more burner control boxes.
- Heaters are common vented.
- Must be factory installed.



Diagnostics

Lockout:

The controls will automatically lockout the heater system when an external or system fault occurs. There are two types of lockout:

Soft Lockout: The heater will attempt to light three times. In the event of a failed attempt to light, (gas pressure, valve, no flame sense etc.), the heater will enter a soft lockout period for 15 minutes and then attempt to light three more times before entering Hard Lockout mode.

Hard Lockout: If proof of flame is not established, a component failure occurs or blockages are evident, the heater will enter hard lockout. If lockout occurs, the control can be reset by briefly interrupting the power source. Refer to Chart 3.1 below for a description of LED codes.

Figure 3.1 • **Operational Indicator Lights**

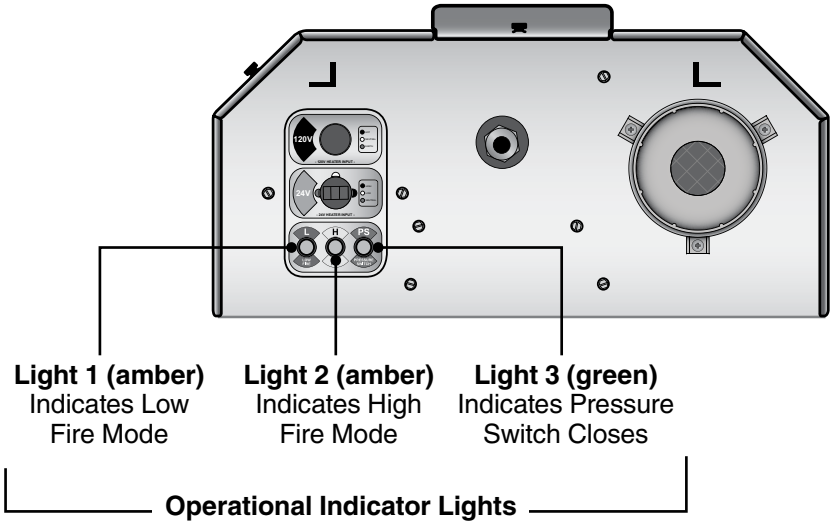
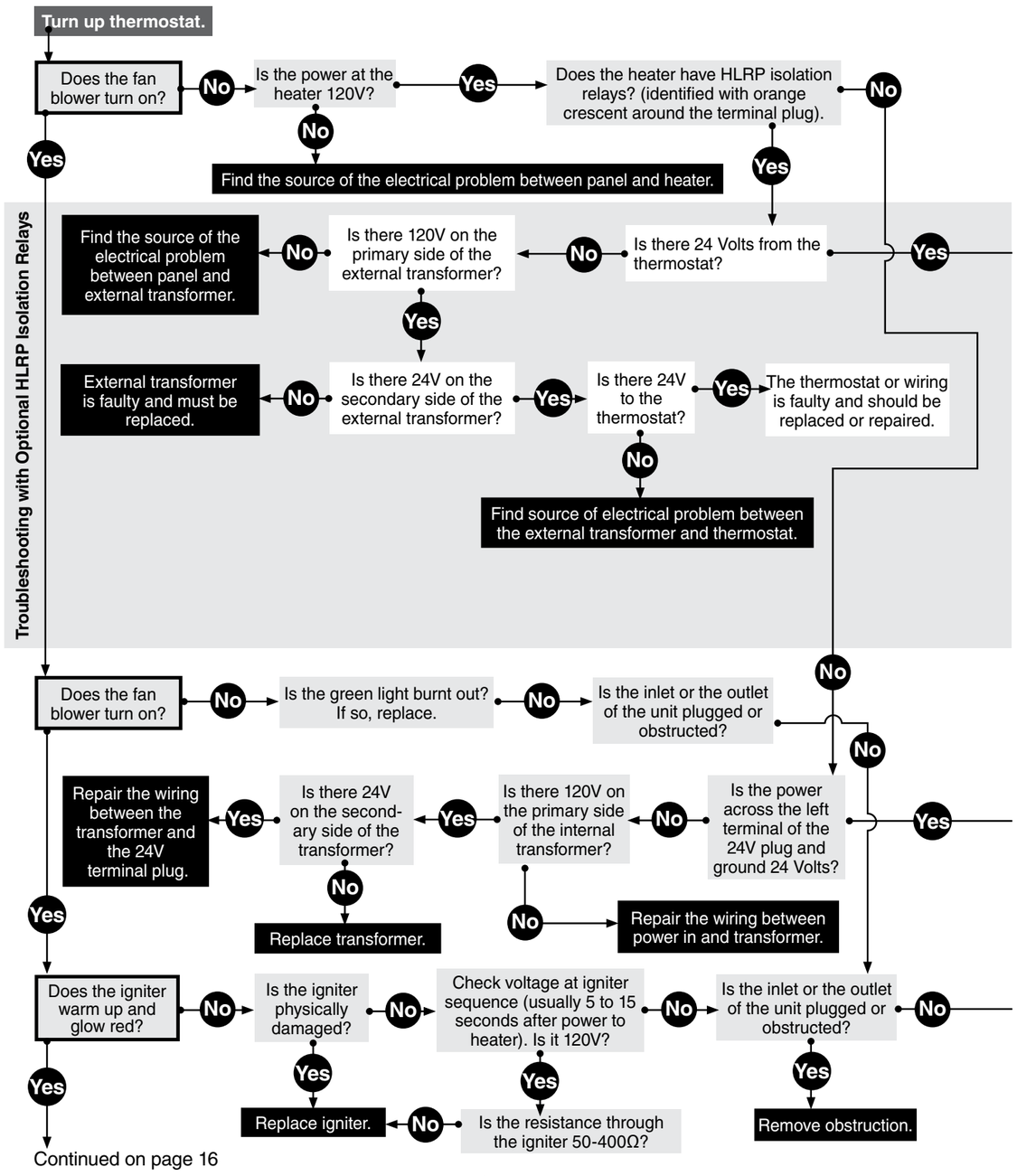


Chart 3.1 • **LED Fault Code Status** (located internally on circuit board)

LED Code	Fault Status	Fault Code Delay*
Initial flash on power up, then steady off	No fault, normal operation	No delay
Steady ON	Module failure / Internal fault	No delay
1 flash	Ignition failure	3 minutes
2 flashes	APS (Air Proving Switch) (Fan / Intake / Exhaust)	0 - 30 seconds
3 flashes	Lockout	17 minutes
4 flashes	Solenoid valve fault Leaky valve Flame amplifier fault	No delay
No flash on 117V startup	Transformer fault	No delay

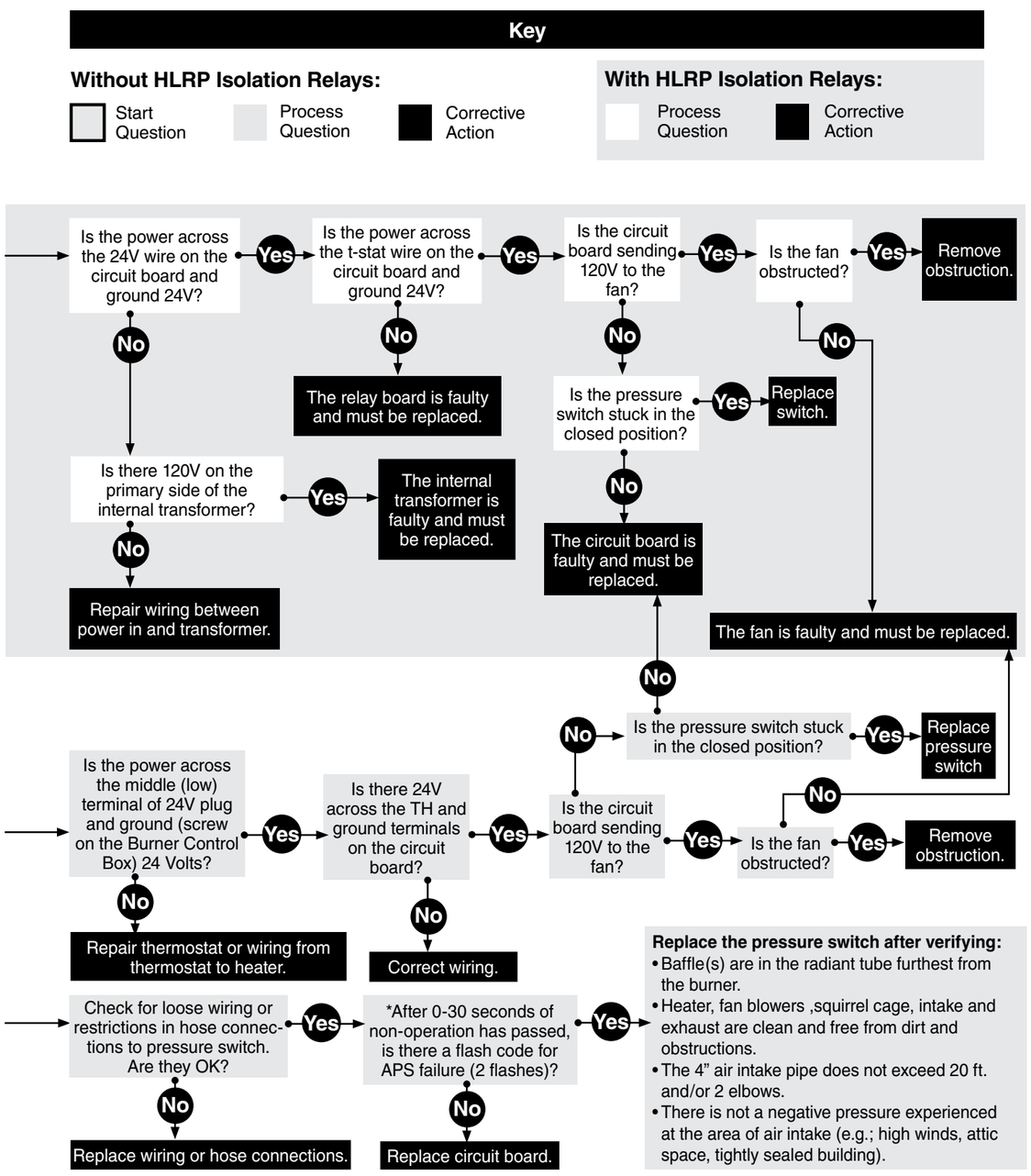
*Some LED codes have a time delay before the LED will flash.

4.0 Troubleshooting Guide



Continued on page 16

NOTICE Bypassing any switch is intended for testing purposes only. Do not leave switch bypassed during normal operation or the heater's built-in safety mechanisms will be compromised.



* Refer to LED diagnostic Fault Code Chart; p.13.

Continued from page 14

