DET3 Series
Insert Manual

For complete installation instructions, see the Tube Heater General Manual that accompanies this Series Insert Manual.

The DET3 Series Infrared Tube Heater is a positive pressure, two-stage radiant heater system. This insert manual is a supplement to the Tube Heater General Manual and provides specific information related to the DET3 Series model. All persons involved with the installation, operation and maintenance of the heater system must read and understand the information in this insert manual and the accompanying Tube Heater General Manual.

⚠️ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operation and maintenance instructions thoroughly before installing or servicing this equipment.

This heater must be installed and serviced by trained gas installation and service personnel only. Failure to comply could result in personal injury, asphyxiation, death, fire or property damage.

In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats, in a conspicuous location.

Not for residential use! Do not use this heater in the home, sleeping quarters, attached garages, etc. Installation of a commercial tube heater system in residential indoor spaces may result in property damage, serious injury, asphyxiation or death.

For Your Safety

If you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.

- Immediately call your gas supplier from a neighbor’s phone.
- Follow the gas supplier’s instructions.
- If you cannot reach your gas supplier, call the fire department.

Keep these instructions for future reference.
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**NOTE:** See page 10 for a list of available models and specifications.
1.0 Safety

Read and understand all safety information and warnings in this Insert Manual and the Tube Heater General Manual before installation, operation and maintenance of the radiant tube heater system.

Safety Labels and Their Locations

Product safety signs or labels should be replaced by the product user when they no longer are legible. Contact either your local distributor or the product manufacturer for obtaining replacement signs or labels.

- F/N: LLV3EP1 120V Input
- F/N: LLV3EP2 24V Input
- F/N: LLV3EP7 High Fire Light
- F/N: LLAC Air Metering Orifice
- F/N: LLTB018 (Natural Gas)  F/N: LLTB019 (LP Gas)
- F/N: LLTCL001L, C, R Clearance to Combustibles Labels
- F/N: LLLOGO4 Logo Label
Clearance to Combustibles

**WARNING**

Placement of explosive objects, flammable objects, liquids and vapors close to the heater may result in explosion, fire, property damage, serious injury or death. Do not store, or use, explosive objects, liquids and vapor in the vicinity the heater.

Clearance to Combustibles is defined as the minimum distance that must exist between the tube surface, or reflector, and any combustible items (see Figure 1.1). It also pertains to the distance that must be maintained from moving objects around the tube heater.
When installing the tube heater system, clearances to combustibles for the model tube heater and configuration must be maintained. Refer to Chart 1.1 below to determine the required distances for your model.

**Chart 1.1 • Clearance to Combustibles in Inches** (see Figure 1.1 for Mounting Angles)

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Mounting Angle*</th>
<th>Front</th>
<th>Side</th>
<th>Top</th>
<th>Below</th>
</tr>
</thead>
<tbody>
<tr>
<td>DET (20, 30, 40) - (65, 75) [N, P] (-3)</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>29</td>
<td>8</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>20 ft. from burner</td>
<td>0°</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>DET (30, 40) - 100 [N, P] (-3)</td>
<td>0°</td>
<td>14</td>
<td>14</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>29</td>
<td>8</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>16</td>
<td>16</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td>20 ft. from burner</td>
<td>0°</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>DET (40, 50) - 125 [N, P] (-3)</td>
<td>0°</td>
<td>20</td>
<td>20</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>42</td>
<td>8</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>20</td>
<td>20</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td>20 ft. from burner</td>
<td>0°</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>DET (40, 50, 60) - 150 [N, P] (-3)</td>
<td>0°</td>
<td>24</td>
<td>24</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>42</td>
<td>8</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>23</td>
<td>23</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td>20 ft. from burner</td>
<td>0°</td>
<td>11</td>
<td>11</td>
<td>6</td>
<td>44</td>
</tr>
<tr>
<td>DET (50, 60) - 175 [N, P] (-3)</td>
<td>0°</td>
<td>34</td>
<td>34</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>50</td>
<td>8</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>30</td>
<td>30</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td>20 ft. from burner</td>
<td>0°</td>
<td>11</td>
<td>11</td>
<td>6</td>
<td>44</td>
</tr>
<tr>
<td>DET (50, 60) - 200 [N, P] (-3)</td>
<td>0°</td>
<td>41</td>
<td>41</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>54</td>
<td>8</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>30</td>
<td>30</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td>20 ft. from burner</td>
<td>0°</td>
<td>11</td>
<td>11</td>
<td>6</td>
<td>44</td>
</tr>
</tbody>
</table>

*Heaters mounted on an angle between 0° to 45° must maintain clearances posted for 0° or 45°; whichever is greater. The stated clearance to combustibles represents a surface temperature of 90ºF (32ºC) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.

**Figure 1.1 • Mounting Angles**
2.0 Installation

⚠️ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury or death. Read and understand, the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Only trained, qualified gas installation and service personnel may install or service this equipment.

**Not for residential use!** Do not use this heater in the home, sleeping quarters, attached garages, etc. Installation of a commercial tube heater system in residential indoor spaces may result in property damage, serious injury or death.

Instructions for the following are detailed in the Tube Heater General Manual:

- Design considerations
- Hanger suspension and placement
- Tube layout and assembly
- Burner control box suspension
- Reflectors (and accessories)
- Venting and combustion air intake
- Gas requirements
- Baffle assembly

**NOTE:** Electronic versions of all manuals are available at www.detroitradiant.com

### Gas Requirements

<table>
<thead>
<tr>
<th>Type of Gas</th>
<th>Required Manifold Pressure</th>
<th>Minimum Inlet Pressure</th>
<th>Maximum Inlet Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>3.5 inches W.C.</td>
<td>5.0 inches W.C.</td>
<td>14.0 inches W.C.</td>
</tr>
<tr>
<td>Liquefied Petroleum</td>
<td>10.0 inches W.C.</td>
<td>11.0 inches W.C.</td>
<td>14.0 inches W.C.</td>
</tr>
</tbody>
</table>

⚠️ **IMPORTANT:** Consult the Tube Heater General Manual for gas connection requirements.

### Electrical Requirements

- 120VAC-60 Hz., single-phase, 3-wire.
- 24VAC thermostat connection.
- Starting current 1.7 amps
- Running current 1.1 amps

**NOTICE**

Connecting the thermostat with a voltage other than 24VAC may damage the heater. The DET3 Series requires a 24VAC connection to the thermostat. The DET3 Series is equipped with an internal relay board. A field supplied external transformer must be installed, see wiring diagram (Figures 2.1A-B).

**NOTE:** A yellow control wire replaces the external terminal plug on stainless steel models or models with water resistant upgrades.
Figure 2.1 - Field Wiring Diagrams

A. Single Heater, Single Thermostat.

Electric Shock
Field wiring to the tube heater must be connected and grounded in accordance with national, state, provincial, local codes and to the guidelines in the Tube Heater General Manual and Series Insert Manual. In the United States refer to the most current revisions to the ANSI/NFPA 70 Standard, and in Canada refer to the most current revisions to the CSA C22.1 Part I Standard.

WARNING

NOTE: If optional yellow control cord is installed then the following wire colors apply:
Neutral = green
Low = white
High = black
Before field wiring this appliance - Check existing wiring; replace if necessary.

NOTE: If any of the original wire supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.

Figure 2.2 • Internal Wiring Diagrams
A. DET3 Ladder Diagram

B. DET3 Block Diagram
This page intentionally left blank.
There are no alternative wiring diagrams for the DET3 Series.
## Specifications

### Chart 2.1 • Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Gas Type (Select One)</th>
<th>BTU/h (High Fire)</th>
<th>BTU/h (Low Fire)</th>
<th>Straight Length</th>
<th>U-Tube Length</th>
<th>Weight (lbs.)</th>
<th>Recommended Mounting Heights^</th>
<th>Combustion Chamber(s) (Black Coated)</th>
<th>Radiant Emitter Tube(s) (Uncoated)</th>
<th>Radiant Surface Area (sq. ft.)</th>
<th>36&quot; Baffle Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DET3-20-65</td>
<td>N or LP</td>
<td>65,000</td>
<td>50,000</td>
<td>21'-9&quot;</td>
<td>13'-1&quot;</td>
<td>120</td>
<td>9' to 14'</td>
<td>Alum</td>
<td>HRT</td>
<td>20.2</td>
<td>5</td>
</tr>
<tr>
<td>DET3-20-75</td>
<td>N or LP</td>
<td>75,000</td>
<td>50,000</td>
<td>21'-9&quot;</td>
<td>13'-1&quot;</td>
<td>120</td>
<td>10' to 15'</td>
<td>Alum</td>
<td>HRT</td>
<td>20.2</td>
<td>5</td>
</tr>
<tr>
<td>DET3-30-65</td>
<td>N or LP</td>
<td>65,000</td>
<td>50,000</td>
<td>31'-5&quot;</td>
<td>**17'-9&quot;</td>
<td>160</td>
<td>10' to 15'</td>
<td>Alum</td>
<td>HRT</td>
<td>30.4</td>
<td>4</td>
</tr>
<tr>
<td>DET3-30-75</td>
<td>N or LP</td>
<td>75,000</td>
<td>50,000</td>
<td>31'-5&quot;</td>
<td>**17'-9&quot;</td>
<td>160</td>
<td>11' to 18'</td>
<td>Alum</td>
<td>HRT</td>
<td>30.4</td>
<td>5</td>
</tr>
<tr>
<td>DET3-30-100</td>
<td>N or LP</td>
<td>100,000</td>
<td>65,000</td>
<td>31'-5&quot;</td>
<td>**17'-9&quot;</td>
<td>160</td>
<td>12' to 20'</td>
<td>Alum</td>
<td>HRT</td>
<td>30.4</td>
<td>5</td>
</tr>
<tr>
<td>DET3-40-65</td>
<td>N or LP</td>
<td>65,000</td>
<td>50,000</td>
<td>41'-1&quot;</td>
<td>22'-9&quot;</td>
<td>190</td>
<td>11' to 18'</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
<td>3</td>
</tr>
<tr>
<td>DET3-40-75</td>
<td>N or LP</td>
<td>75,000</td>
<td>50,000</td>
<td>41'-1&quot;</td>
<td>22'-9&quot;</td>
<td>190</td>
<td>11' to 18'</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
<td>4</td>
</tr>
<tr>
<td>DET3-40-100</td>
<td>N or LP</td>
<td>100,000</td>
<td>65,000</td>
<td>41'-1&quot;</td>
<td>22'-9&quot;</td>
<td>190</td>
<td>12' to 20'</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
<td>4</td>
</tr>
<tr>
<td>DET3-40-125</td>
<td>N or LP</td>
<td>125,000</td>
<td>82,000</td>
<td>41'-1&quot;</td>
<td>22'-9&quot;</td>
<td>190</td>
<td>13' to 23'</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
<td>5</td>
</tr>
<tr>
<td>DET3-40-150</td>
<td>N or LP</td>
<td>150,000</td>
<td>100,000</td>
<td>41'-1&quot;</td>
<td>22'-9&quot;</td>
<td>190</td>
<td>14' to 25'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>40.5</td>
<td>5</td>
</tr>
<tr>
<td>DET3-50-125</td>
<td>N or LP</td>
<td>125,000</td>
<td>82,000</td>
<td>50'-9&quot;</td>
<td>**27'-5&quot;</td>
<td>235</td>
<td>15' to 27'</td>
<td>Alum</td>
<td>HRT</td>
<td>50.6</td>
<td>3</td>
</tr>
<tr>
<td>DET3-50-150</td>
<td>N or LP</td>
<td>150,000</td>
<td>100,000</td>
<td>50'-9&quot;</td>
<td>**27'-5&quot;</td>
<td>235</td>
<td>15' to 27'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>50.6</td>
<td>3</td>
</tr>
<tr>
<td>DET3-50-175</td>
<td>N or LP</td>
<td>*175,000</td>
<td>125,000</td>
<td>50'-9&quot;</td>
<td>**27'-5&quot;</td>
<td>235</td>
<td>16' to 30'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>50.6</td>
<td>3</td>
</tr>
<tr>
<td>DET3-50-200</td>
<td>N or LP</td>
<td>*200,000</td>
<td>145,000</td>
<td>50'-9&quot;</td>
<td>**27'-5&quot;</td>
<td>235</td>
<td>17' to 35'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>50.6</td>
<td>2</td>
</tr>
<tr>
<td>DET3-60-150</td>
<td>N or LP</td>
<td>150,000</td>
<td>100,000</td>
<td>60'-5&quot;</td>
<td>32'-5&quot;</td>
<td>265</td>
<td>16' to 30'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>60.7</td>
<td>2</td>
</tr>
<tr>
<td>DET3-60-175</td>
<td>N or LP</td>
<td>*175,000</td>
<td>125,000</td>
<td>60'-5&quot;</td>
<td>32'-5&quot;</td>
<td>265</td>
<td>16' to 30'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>60.7</td>
<td>2</td>
</tr>
<tr>
<td>DET3-60-200</td>
<td>N or LP</td>
<td>*200,000</td>
<td>145,000</td>
<td>60'-5&quot;</td>
<td>32'-5&quot;</td>
<td>265</td>
<td>17' to 35'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>60.7</td>
<td>2</td>
</tr>
</tbody>
</table>

* Model requires stainless steel tube clamp (P/N: TP-220) to be located at the seam between the primary combustion chamber and the secondary combustion tube downstream of the burner control box.

** Model requires 5EA-SUB accessory package when installing in a 'U' configuration (P/N: TF1B).

^ Factory recommended mounting heights are listed as a guideline.

**IMPORTANT:** Reference box label to determine the quantity of required baffle sections for each model heater.

HRT = Uncoated hot-rolled steel.

Alum = Black coated aluminized treated steel.

Titan = Black coated titanium stabilized aluminized steel.
Figure 2.4 • Tube Installation Sequence

Important! The combustion chamber(s) & radiant tube section(s) must be installed in the following order.

20 Foot

30 Foot

40 Foot

Aluminized steel secondary combustion chamber location on 150-200 MBH models.

50 Foot

Aluminized steel secondary combustion chamber location on 150-200 MBH models.

60 Foot

Aluminized steel secondary combustion chamber location on 150-200 MBH models.

Key

- Burner Control Box with 16" Burner Tube
- Hot-rolled Steel Radiant Emitter Tube
- Primary Combustion Chamber Tube
- Standard Tube Clamp
- Secondary Aluminized Steel Combustion Chamber (150-200 MBH models only)
- Stainless Steel Tube Clamp (P/N: TP-220)

175-200 MBH models only - Located between 1st and 2nd 10 ft. tube sections.

- Baffle Location

NOTE: Refer to the Tube Heater General Manual, Chart 3.6 (page 23) for secured reflector joints.
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 Tube Heater General Manual for installation requirements.

**Sequence of Operation**

Two voltages (120VAC supply and 24VAC control) must be supplied to the DET3 Series burner control box for proper operation.

**Starting Circuit:** Upon a call for heat, the low fire relay is energized by 24VAC from the thermostat. The relay is closed sending 120VAC to the blower beginning the sequence of operation.

Air pressure generated by the blower causes the normally open pressure switch to close, sending power to the ignition module. After a seven-second pre-purge, the spark electrode, transformer and gas valve are simultaneously energized. The trial for ignition is 15 seconds.

**Single Stage Running Circuit:** After ignition, the electrode monitors burner flame. If sense of flame is lost, the control immediately disrupts power to the gas valve and then re-cycle the unit (identical to the starting sequence). If flame sense is not established within 15 seconds, the heater will attempt two (2) additional ignition sequences before proceeding to lockout mode. The control can be reset by briefly interrupting the power source.

**Two Stage Running Circuit:** High fire operation is actuated by the thermostat sending a 24VAC signal to the high fire relay. The energized coil of the relay is closed, allowing 24VAC to continue onto the high fire of the gas valve.

**Figure 3.1 - Operational Indicator Light**

Light 1 Indicates High Fire Mode
Thermostat

**NOTE:** Different thermostats operate according to their particular features. Refer to thermostat specifications for details.

DET3 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 in. female spade terminals. Do not supply 120VAC to the 24VAC connection.

**Example:** Desired room temperature is 65° F. The preset differential of the thermostat is 1° F. The preset differential for High fire mode is 3° F.

When the temperature drops below the Low Fire preset differential of the thermostat (63° F), Low Fire will activate. If the temperature continues to drop below the preset differential for High Fire, High Fire will activate bringing the temperature back up to the Low Fire preset quickly.
4.0 Troubleshooting Guide

**Turn up thermostat.**

**Does the fan blower turn on?**

- **Yes**
  - **Does the igniter spark?**
    - **Yes**
      - **During the ignition trial, does the gas valve open?**
        - **Yes**
          - Replace gas valve.
        - **No**
          - Replace igniter.
    - **No**
      - **Check the gap on the igniter. Is the gap between 3/16 in. and 1/4 in.?**
        - **Yes**
          - Adjust gap.
        - **No**
          - Replace igniter.

**No**

- **Is the power at the heater 120VAC?**
  - **Yes**
    - **Test for 24VAC at the gas valve during valve opening (typically 10 seconds after power to the heater). Is there 24VAC to the valve?**
      - **Yes**
        - Replace 24VAC transformer.
      - **No**
        - **Is 120VAC being sent to the transformer?**
          - **Yes**
            - **The circuit board and/or wiring harness could be faulty. These should be replaced.**
          - **No**
            - Correct problem.

**Is the blower obstructed?**

- **Yes**
  - **Remove obstruction and lubricate blower.**
- **No**
  - **Is the blower physically damaged?**
    - **Yes**
      - Replace igniter.
    - **No**
      - **Is the valve switch in the ON position?**
        - **Yes**
          - Switch to the ON position.
        - **No**
          - **Does the burner light?**
            - **Yes**
              - **Find the source of the electrical problem.**
            - **No**
              - **Correct problem.**

**Continued on page 16.
Correct wiring or replace relay.

Is there 120VAC coming to the fan from the low fire relay? Yes → The blower is faulty and must be replaced.

No

Remove obstruction

Is the inlet or outlet of the unit obstructed? i.e. ice, birds nest, dirt, etc.

Yes → Check for loose wiring or restrictions in hose connections to the pressure switch. Are they ok?

No

No → Repair wiring or hose connections.

Yes → Repair wiring or hose connections.

The heater is equipped with a safety differential pressure switch. The switch is a normally open switch and is located in the air chamber. Temporarily place a jumper across the terminal of the switch. Does the igniter spark?

No

Faulty wiring. Repair or replace wiring.

Yes → Replace the pressure switch after verifying the following:

- Baffle(s) is in the tube farthest from the burner.
- Heater, blower, squirrel cage, intake and exhaust are clean and free from dirt and obstructions.
- The 4 in. dia. air intake pipe does not exceed 20 ft. and/or two elbows.
- There is not a negative pressure experienced at the area of air intake (i.e. attic space, high winds, very tight buildings, etc.)

If any of the above were occurring, please address the problem.

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.
Continued from page 14.

Check that gas pressure is within minimum and maximum inputs as indicated on the heater’s rating plate. Is gas pressure ok?

No

Check that gas supply pressure meets minimum and maximum requirements.

Correct problem.

No

Does the burner stay on briefly and then shut off?

Yes

Is the heater properly grounded? Is the polarity correct?

Yes

Yes

Troubleshooting ends.

No

No

The following can cause the heater to shut down:
• Improper grounding.
• High winds.
• Taking combustion air from the attic.
• Dirty environment.
• Baffle not located properly.
• Fluctuating gas pressure.

No

Adjust gap.

Flame Current Check: Single Spark & Sense

To measure flame current, disconnect input voltage, then insert a 0-50 μA DC meter and capacitor in series with the spark electrode as shown below. Reconnect input voltage and initiate call for heat. After sparking is complete and flame is established, meter should read 1.0 μA or higher while flame is established. If meter reads below “0” on the scale, meter leads are reversed. Disconnect power and reconnect meter lead for proper polarity.
Check that gas pressure is within minimum and maximum inputs as indicated on the heater's rating plate. Is gas pressure ok?

If the heater does not enter high fire mode, check the following:

**NOTE**: To confirm the heater is not in high-fire mode, check the manifold pressure (3.5 inches W.C. natural gas or 10 inches W.C. propane gas). If the indicator light is not illuminated, it is faulty and should be replaced. If the manifold pressure ranges from 2.3 to 2.8 inches W.C. natural gas (model dependent) and 6.0 to 7.5 inches W.C. propane gas (model dependent), the heater is in low fire mode and the troubleshooting steps described below should be followed.

Were the gas lines purged of air?

- Yes
- No
  - Purge gas lines.

Check the gap on the igniter. Is the gap between 1/8 in. and 3/16 in.?

- Yes
- No
  - Adjust gap.

Differential switch may be faulty or there is a restriction in the exhaust or intake.

- Yes
- No
  - Replace.

Is the differential switch in the closed position?

- Yes
- No
  - Replace.

Check for damaged insulation or loose terminals on the high voltage spark wire. Is it ok?

- Yes
- No
  - Correct problem.

Differential switch may be faulty or there is a restriction in the exhaust or intake.

Check that the spark electrode is in the closed position. Is the ceramic cracked or loose?

- Yes
- No
  - Replace electrode.

Electrode sensing may be faulty or flame signal may be weak. Check that heater is operating at proper gas pressure as indicated on the rating label. Clean or replace electrode if needed.

Check for 24VAC across the COM and HIGH on the 24VAC terminal. Is there 24VAC?

- Yes
- No
  - Repair or replace faulty wiring or thermostat

Is there 24VAC across the red wire on the relay board and ground on the circuit board?

- Yes
- No
  - Replace relay.

Replace gas valve.
5.0 Parts

Figure 5.1 • Burner Assembly Components

Chart 5.1 • Parts List

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-5</td>
<td>Flange Gasket</td>
<td>TP-76</td>
<td>Rubber Grommet</td>
</tr>
<tr>
<td>TP-9</td>
<td>Conduit Coupling</td>
<td>TP-82</td>
<td>Reflector Center Support</td>
</tr>
<tr>
<td>TP-10A</td>
<td>Conduit 4&quot; x 3/4&quot;</td>
<td>TP-83</td>
<td>Stainless Steel Flexible Gas Connector</td>
</tr>
<tr>
<td>TP-14</td>
<td>Sight Glass Gasket</td>
<td>TP-84</td>
<td>1/2 in. Female/Male Flare Fitting</td>
</tr>
<tr>
<td>TP-15</td>
<td>Sight Glass</td>
<td>TP-85</td>
<td>1/2 in. Male / Male Flare Fitting</td>
</tr>
<tr>
<td>TP-16</td>
<td>Sight Glass Washer</td>
<td>TP-105</td>
<td>Reflector End Cap</td>
</tr>
<tr>
<td>TP-17</td>
<td>Sight Glass Kit</td>
<td>TP-106</td>
<td>Reflector End Cap Clips (8 pcs.)</td>
</tr>
<tr>
<td>TP-20C</td>
<td>10 ft. Aluminum Reflector</td>
<td>TP-201B</td>
<td>V.3 Mid Burner (Color Code - TAN)</td>
</tr>
<tr>
<td>TP-20D*</td>
<td>10 ft. Stainless Steel Reflector</td>
<td>TP-204</td>
<td>Gas Orifice - Consult Factory</td>
</tr>
<tr>
<td>TP-21B</td>
<td>4 in. Tube Clamp</td>
<td>TP-212</td>
<td>1/2&quot; x 3&quot; Pipe Nipple</td>
</tr>
<tr>
<td>TP-25</td>
<td>1/4 in. Female Spade Terminal (Qty. 3)</td>
<td>TP-217</td>
<td>Brass Pressure Switch Barb Fitting</td>
</tr>
<tr>
<td>TP-26A</td>
<td>10 ft. Aluminized Combustion Tube</td>
<td>TP-219</td>
<td>Differential Vinyl Sensing Tube</td>
</tr>
<tr>
<td>TP-26B</td>
<td>10 ft. Titanium Primary Combustion Tube</td>
<td>TP-220</td>
<td>4 in. Dia. Stainless Steel Tube Clamp</td>
</tr>
<tr>
<td>TP-26C</td>
<td>10 ft. Uncoated Hot Rolled Radiant Tube</td>
<td>TP-221</td>
<td>Spark Igniter Mounting Bracket Gasket</td>
</tr>
<tr>
<td>TP-31D</td>
<td>Mounting Bracket (Qty. 2)</td>
<td>TP-245</td>
<td>3/16&quot; X 1/8&quot; Plastic Gas Valve 90° Vent</td>
</tr>
<tr>
<td>TP-55A</td>
<td>Fan Blower</td>
<td>TP-264D</td>
<td>Differential Pressure Switch, 60 to 75 MBH</td>
</tr>
<tr>
<td>TP-65I</td>
<td>36 in. Interlocking Turbulator Baffle Section</td>
<td>TP-264F</td>
<td>Differential Pressure Switch, 150 to 200 MBH</td>
</tr>
<tr>
<td>TP-68B</td>
<td>Large Strain Relief Bushing</td>
<td>TP-321</td>
<td>Ignition Plate Gasket</td>
</tr>
<tr>
<td>TP-70</td>
<td>1/2 in. Control Box Gasket (10.3 inches)</td>
<td>TP-331</td>
<td>Green Self-Tap Ground Screw (Qty. 2)</td>
</tr>
<tr>
<td>TP-70A</td>
<td>1 in. Control Box Gasket (6 inches)</td>
<td>TP-332</td>
<td>Divider Grommet</td>
</tr>
</tbody>
</table>

* Optional upgrade or add-on item.
Figure 5.2 • Tube & Reflector Components

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-333</td>
<td>6 ft. Black 120VAC Power Cord</td>
<td>TP-3033B</td>
<td>DET3 Power Entry Plate</td>
</tr>
<tr>
<td>TP-550</td>
<td>Spark Transfer Wire - Orange</td>
<td>TP-3044</td>
<td>Gas Manifold</td>
</tr>
<tr>
<td>TP-579</td>
<td>4 in. Wire Hanger</td>
<td>TP-3051</td>
<td>35-72 DSI Circuit Board</td>
</tr>
<tr>
<td>TP-583</td>
<td>Spark Igniter Plate</td>
<td>TP-3052</td>
<td>Wiring Harness</td>
</tr>
<tr>
<td>TP-826</td>
<td>40VA Transformer</td>
<td>TP-3055</td>
<td>Spark Igniter Electrode</td>
</tr>
<tr>
<td>TP-828</td>
<td>Yellow 24VAC High Fire Indicator Light</td>
<td>TP-3060</td>
<td>Pressure Switch Mounting Bracket</td>
</tr>
<tr>
<td>TP-832</td>
<td>Thermostat Terminal Strip</td>
<td>TP-3071</td>
<td>High BTU Burner (Color Code - PURPLE)</td>
</tr>
<tr>
<td>TP-1018</td>
<td>APS 1/4 in. Silicone Sensing Tube</td>
<td>TP-3072</td>
<td>Low BTU Burner (Color Code - GREEN)</td>
</tr>
<tr>
<td>TP-1264A</td>
<td>Differential Pressure Switch, 100 to 125 MBH</td>
<td>TP-3093</td>
<td>#8-32 Cage Nut (Qty. 4)</td>
</tr>
<tr>
<td>TP-1325</td>
<td>24VAC Switching Relay (Qty. 2)</td>
<td>TP-3094</td>
<td>#8-32 x ½ in. Black Nylon Shoulder Screw (Qty. 4)</td>
</tr>
<tr>
<td>TP-3001</td>
<td>Divider Panel</td>
<td>TP-3096A</td>
<td>Valve Compartment Bottom Panel</td>
</tr>
<tr>
<td>TP-3002A</td>
<td>Plastic Control Compartment End Panel</td>
<td>TP-3097A</td>
<td>Valve Compartment Top Panel</td>
</tr>
<tr>
<td>TP-3003A</td>
<td>Plastic Fan Compartment End Panel</td>
<td>TP-3098</td>
<td>Valve Compartment Side Panel</td>
</tr>
<tr>
<td>TP-3004</td>
<td>Main Control Box Panel</td>
<td>TP-3099</td>
<td>Controls Mounting Panel</td>
</tr>
<tr>
<td>TP-3005A</td>
<td>Plastic Valve Compartment Lid</td>
<td>TP-3140</td>
<td>36G54-224 Gas Valve - Natural Gas Assembly</td>
</tr>
<tr>
<td>TP-3008A</td>
<td>Gas Valve Mounting Bracket</td>
<td>TP-3141</td>
<td>36G54-226 Gas Valve - LP Gas Assembly</td>
</tr>
<tr>
<td>TP-3010</td>
<td>Service Panel Hinge</td>
<td>TP-3580</td>
<td>16 in. DSI Burner Tube Flange with Fittings</td>
</tr>
<tr>
<td>TP-3011</td>
<td>Spark Igniter Box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP-3012</td>
<td>Spark Igniter Box Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP-3014</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Optional upgrade or add-on item.
## Kit Contents Check List

### Chart 5.2 • Kit Contents for DET3 Series - Reference the length column for your model.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>20 ft.</th>
<th>30 ft.</th>
<th>40 ft.</th>
<th>50 ft.</th>
<th>60 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-21B</td>
<td>4 in. Tube Clamps</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5**</td>
<td>6**</td>
</tr>
<tr>
<td>TP-25*</td>
<td>1/4 in. Female Spade Terminals*</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TP-82</td>
<td>4 in. Reflector Center Support</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TP-83</td>
<td>24 in. S.S. Flexible Gas Connector</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TP-105</td>
<td>Reflector End Caps</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>TP-106</td>
<td>Reflector End Cap Clips</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>TP-579</td>
<td>4 in. Wire Hanger</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>LIOGT3</td>
<td>Tube Heater General Manual</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>LIODET3</td>
<td>DET3 Series Insert Manual</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Filled By: ____________________________

* Not included when heater is equipped with yellow control cord.
** One 4" stainless steel tube clamp (P/N: TP-220) is provided for each 175,000 - 200,000 BTU model. Place as shown on page 11.

### Approvals
- CSA
- Commercial approval.

### Limited Warranty
- 1 year - Burner box components.
- 2 years - Combustion and radiant tubes.
- 3 years - Stainless steel burner.

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