The DET3 Series Infra-Red 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

F/N: LLV3EP2

F/N: LLV3EP7

Rear Panel

Air Metering Orifice

F/N: LLAC

F/N: LLT018 (Natural Gas)

F/N: LLT019 (LP Gas)

Top Panel

Clearance to Combustibles Labels

F/N: LLTCL001L, C, R

F/N: LLLOGO4 Logo Label

Bottom Panel

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>Behind</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>
<td>60</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>39</td>
<td>8</td>
<td>10</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>with 1 side shield</td>
<td>0°</td>
<td>29</td>
<td>8</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td></td>
<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>
<td>66</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>39</td>
<td>8</td>
<td>10</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>with 1 side shield</td>
<td>0°</td>
<td>29</td>
<td>8</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>16</td>
<td>16</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td></td>
<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>
<td>76</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>58</td>
<td>8</td>
<td>10</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>with 1 side shield</td>
<td>0°</td>
<td>42</td>
<td>8</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>20</td>
<td>20</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td></td>
<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>
<td>81</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>58</td>
<td>8</td>
<td>10</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>with 1 side shield</td>
<td>0°</td>
<td>42</td>
<td>8</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>23</td>
<td>23</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td></td>
<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>
<td>92</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>63</td>
<td>8</td>
<td>10</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>with 1 side shield</td>
<td>0°</td>
<td>50</td>
<td>8</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>30</td>
<td>30</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td></td>
<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>
<td>94</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>63</td>
<td>8</td>
<td>10</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>with 1 side shield</td>
<td>0°</td>
<td>54</td>
<td>8</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>30</td>
<td>30</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td></td>
<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.

**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 in. W.C.P.</td>
<td>5.0 in. W.C.P.</td>
<td>14.0 in. W.C.P.</td>
</tr>
<tr>
<td>Liquefied Petroleum</td>
<td>10.0 in. W.C.P.</td>
<td>11.0 in. W.C.P.</td>
<td>14.0 in. W.C.P.</td>
</tr>
</tbody>
</table>

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

### Electrical Requirements

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

**NOTICE**

Connecting the thermostat with a voltage other than 24V may damage the heater. The DET3 Series requires a 24V 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.
Wiring

WARNING

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.

Figure 2.1 • Field Wiring Diagrams
A. Single Heater, Single Thermostat.

B. Multiple Heaters, Single Thermostat.
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>BTUH (High Fire)</th>
<th>BTUH (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>
</tr>
</thead>
<tbody>
<tr>
<td>DET-20-65(-3)</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>
</tr>
<tr>
<td>DET-20-75(-3)</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>
</tr>
<tr>
<td>DET-30-65(-3)</td>
<td>N or LP</td>
<td>65,000</td>
<td>50,000</td>
<td>31'-5&quot;</td>
<td>**17’-9”</td>
<td>160</td>
<td>10’ to 15’</td>
<td>Alum</td>
<td>HRT</td>
<td>30.4</td>
</tr>
<tr>
<td>DET-30-75(-3)</td>
<td>N or LP</td>
<td>75,000</td>
<td>50,000</td>
<td>31'-5&quot;</td>
<td>**17’-9”</td>
<td>160</td>
<td>11’ to 18’</td>
<td>Alum</td>
<td>HRT</td>
<td>30.4</td>
</tr>
<tr>
<td>DET-30-100(-3)</td>
<td>N or LP</td>
<td>100,000</td>
<td>65,000</td>
<td>31'-5&quot;</td>
<td>**17’-9”</td>
<td>160</td>
<td>12’ to 20’</td>
<td>Alum</td>
<td>HRT</td>
<td>30.4</td>
</tr>
<tr>
<td>DET-40-65(-3)</td>
<td>N or LP</td>
<td>65,000</td>
<td>50,000</td>
<td>41'-1&quot;</td>
<td>22’-9”</td>
<td>190</td>
<td>11’ to 18’</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
</tr>
<tr>
<td>DET-40-75(-3)</td>
<td>N or LP</td>
<td>75,000</td>
<td>50,000</td>
<td>41'-1&quot;</td>
<td>22’-9”</td>
<td>190</td>
<td>11’ to 18’</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
</tr>
<tr>
<td>DET-40-100(-3)</td>
<td>N or LP</td>
<td>100,000</td>
<td>65,000</td>
<td>41'-1&quot;</td>
<td>22’-9”</td>
<td>190</td>
<td>12’ to 20’</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
</tr>
<tr>
<td>DET-40-125(-3)</td>
<td>N or LP</td>
<td>125,000</td>
<td>95,000</td>
<td>41'-1&quot;</td>
<td>22’-9”</td>
<td>190</td>
<td>13’ to 23’</td>
<td>Alum</td>
<td>HRT</td>
<td>40.5</td>
</tr>
<tr>
<td>DET-40-150(-3)</td>
<td>N or LP</td>
<td>150,000</td>
<td>100,000</td>
<td>41'-1&quot;</td>
<td>22’-9”</td>
<td>190</td>
<td>14’ to 25’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>40.5</td>
</tr>
<tr>
<td>DET-50-125(-3)</td>
<td>N or LP</td>
<td>125,000</td>
<td>95,000</td>
<td>50'-9”</td>
<td>**27’-5”</td>
<td>235</td>
<td>15’ to 27’</td>
<td>Alum</td>
<td>HRT</td>
<td>50.6</td>
</tr>
<tr>
<td>DET-50-150(-3)</td>
<td>N or LP</td>
<td>150,000</td>
<td>100,000</td>
<td>50'-9”</td>
<td>**27’-5”</td>
<td>235</td>
<td>15’ to 27’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>50.6</td>
</tr>
<tr>
<td>DET-50-175(-3)</td>
<td>N or LP</td>
<td>^175,000</td>
<td>125,000</td>
<td>50'-9”</td>
<td>**27’-5”</td>
<td>235</td>
<td>16’ to 30’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>50.6</td>
</tr>
<tr>
<td>DET-50-200(-3)</td>
<td>N or LP</td>
<td>*200,000</td>
<td>145,000</td>
<td>50'-9”</td>
<td>**27’-5”</td>
<td>235</td>
<td>17’ to 35’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>50.6</td>
</tr>
<tr>
<td>DET-60-150(-3)</td>
<td>N or LP</td>
<td>150,000</td>
<td>100,000</td>
<td>60'-5”</td>
<td>32’-5”</td>
<td>265</td>
<td>16’ to 30’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>60.7</td>
</tr>
<tr>
<td>DET-60-175(-3)</td>
<td>N orLP</td>
<td>*175,000</td>
<td>125,000</td>
<td>60'-5”</td>
<td>32’-5”</td>
<td>265</td>
<td>16’ to 30’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>60.7</td>
</tr>
<tr>
<td>DET-60-200(-3)</td>
<td>N or LP</td>
<td>*200,000</td>
<td>145,000</td>
<td>60'-5”</td>
<td>32’-5”</td>
<td>265</td>
<td>17’ to 35’</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>60.7</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.
Figure 2.4 • Tube Installation Sequence

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

- Burner Control Box with 16" Burner Tube
- Primary Combustion Chamber Tube
- Secondary Aluminized Steel Combustion Chamber (150-200 MBH models only)
- Aluminized steel secondary combustion chamber location on 150-200 MBH models.
- Hot-rolled Steel Radiant Emitter Tube
- Standard Tube Clamp
- Stainless Steel Tube Clamp (P/N: TP-220)
- 175-200 MBH models only - Located between 1st and 2nd 10 ft. tube sections.
- Baffle Location

Key:

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 (120V supply and 24V 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 24V from the thermostat. The relay is closed sending 120V 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 flame rod monitors burner flame. If sense of flame is lost, the control immediately acts to reignite the gas-air mixture (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 24V signal to the high fire relay. The energized coil of the relay is closed, allowing 24V 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 24V, two-stage thermostat to operate. The burner control box is equipped with a round terminal strip that accepts three (3) 1/4” female spade terminals. Do not supply 120V to the 24V 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 ignitor spark?

Yes

During the ignition trial, does the gas valve open?

Yes

Test for 24V at the gas valve during valve opening (typically 10 seconds after power to the heater). Is there 24V to the valve?

Yes

Replace 24V transformer.

No

The circuit board and/or wiring harness could be faulty. These should be replaced.

Correct problem.

No

Replace gas valve.

Yes

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

Yes

Switch to the ON position.

No

Correct problem.

No

Check the gap on the ignitor. Is the gap between 3/16” and 1/4”?

Yes

Adjust gap.

No

Replace ignitor.

Yes

Is the power at the heater 120V?

Yes

Is the blower obstructed?

No

Turn up thermostat.

No

Remove obstruction and lubricate blower.

Yes

Is the valve switch in the ON position?

No

Switch to the ON position.

Yes

Does the burner light?

Yes

Correct problem.

No

Replace ignitor.

Yes

Is the ignitor physically damaged?

No

Replace ignitor.

Yes

Is the ignitor physically damaged?

No

Check the gap on the ignitor. Is the gap between 3/16” and 1/4”?

No

Adjust gap.

Yes

Replace 24V transformer.

No

Is 120V being sent to the transformer?

No

Is the power at the heater 120V?

Yes

Is the blower obstructed?

No

Remove obstruction and lubricate blower.

Yes

Is the ignitor spark?

No

Does the ignitor spark?

Yes

Is the ignitor physically damaged?

Yes
Correct wiring or replace relay.

No

Is there 120V coming to the fan from the low fire relay?

Yes

The blower is faulty and must be replaced.

No

Remove obstruction

Yes

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

No

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

No

Repair wiring or hose connections.

Yes

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 ignitor spark?

No

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” 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.
Continued from page 14.

Does the burner stay on briefly and then shut off?

- Yes: 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.

Is the gap on the ignitor 3/16" and 1/4"?

- No: Adjust gap.
- Yes: Correct problem.

Does the burner stay on?

- Yes: Does the heater stay on until the call for heat ends?
- No: Troubleshooting ends.

Is the heater properly grounded? Is the polarity correct?

- Yes: 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.
If 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” natural or 10” propane). 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” Natural (model dependent) and 6.0” to 7.5” propane (model dependent), the heater is in low fire mode and the troubleshooting steps described below should be followed.

- **Check for 24V across the COM and HIGH on the 24V terminal. Is there 24V?**
  - Yes: Is there 24V across the red wire on the relay board and ground on the circuit board?
    - Yes: Replace gas valve.
    - No: Replace relay.
  - No: Repair or replace faulty wiring or thermostat.

- Correct problem.

- Adjust gap.

- Purge gas lines.

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

- Is the differential switch in the closed position?
  - Yes: With a micrometer, check amperage at flame rod. Is it greater than 0.7 microamps?
    - Yes: Check that flame sensor wire is OK and then replace circuit board.
    - No: Sensing rod is faulty or flame is weak. Check that heater is operating at proper gas pressure as indicated on the heaters rating label. Clean or replace sensing rod if needed.
  - No: Sensing rod is faulty or flame is weak. Check that heater is operating at proper gas pressure as indicated on the heaters rating label. Clean or replace sensing rod if needed.

- Check that gas pressure is within minimum and maximum inputs as indicated on the heater’s rating plate. Is gas pressure ok?
  - No: Correct problem.
  - Yes: Differential switch may be faulty or there is a restriction in the exhaust or intake.

- Were the gas lines purged of air?
  - Yes: Check the gap on the ignitor. Is the gap between 3/16” and 1/4”?
    - No: Differential switch may be faulty or there is a restriction in the exhaust or intake.
    - Yes: Correct problem.
  - No: Purge gas lines.

- Differential switch may be faulty or there is a restriction in the exhaust or intake.
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-70A</td>
<td>1&quot; Control Box Gasket (6 inches)</td>
</tr>
<tr>
<td>TP-9</td>
<td>Conduit Coupling</td>
<td>TP-76</td>
<td>Rubber Grommet</td>
</tr>
<tr>
<td>TP-10A</td>
<td>Conduit 4&quot; x 3/4&quot;</td>
<td>TP-82</td>
<td>Reflector Center Support</td>
</tr>
<tr>
<td>TP-14</td>
<td>Sight Glass Gasket</td>
<td>TP-83</td>
<td>Stainless Steel Flexible Gas Connector</td>
</tr>
<tr>
<td>TP-15</td>
<td>Sight Glass</td>
<td>TP-105</td>
<td>Reflector End Cap</td>
</tr>
<tr>
<td>TP-16</td>
<td>Sight Glass Washer</td>
<td>TP-106</td>
<td>Reflector End Cap Clips (8 pcs.)</td>
</tr>
<tr>
<td>TP-17</td>
<td>Sight Glass Kit</td>
<td>TP-108*</td>
<td>5 Ft. Coated Alum-Titan Tube w/ Clamp</td>
</tr>
<tr>
<td>TP-20C</td>
<td>10 Ft. Aluminum Reflector</td>
<td>TP-108*</td>
<td>5 Ft. Coated Aluminized Tube w/ Clamp</td>
</tr>
<tr>
<td>TP-20D*</td>
<td>10 Ft. Stainless Steel Reflector*</td>
<td>TP-112*</td>
<td>5 Ft. Aluminum Reflector</td>
</tr>
<tr>
<td>TP-21B</td>
<td>4&quot; Tube Clamp</td>
<td>TP-112*</td>
<td>5 Ft. Aluminum Reflector</td>
</tr>
<tr>
<td>TP-25</td>
<td>1/4&quot; Female Spade Terminal</td>
<td>TP-204</td>
<td>Gas Orifice - Consult Factory</td>
</tr>
<tr>
<td>TP-26A</td>
<td>10 Ft. Aluminized Combustion Tube</td>
<td>TP-204</td>
<td>Gas Orifice - Consult Factory</td>
</tr>
<tr>
<td>TP-26B</td>
<td>10 Ft. Titanium Primary Combustion Tube</td>
<td>TP-204</td>
<td>Gas Orifice - Consult Factory</td>
</tr>
<tr>
<td>TP-26C</td>
<td>10 Ft. Uncoated Hot Rolled Radiant Tube</td>
<td>TP-204</td>
<td>Gas Orifice - Consult Factory</td>
</tr>
<tr>
<td>TP-31D</td>
<td>Interlocking Mounting Bracket (Qty. 2)</td>
<td>TP-212</td>
<td>1/2&quot; x 3&quot; Pipe Nipple</td>
</tr>
<tr>
<td>TP-33B*</td>
<td>1/2&quot; Shut-off Ball Valve/Inlet Tap*</td>
<td>TP-212</td>
<td>1/2&quot; x 3&quot; Pipe Nipple</td>
</tr>
<tr>
<td>TP-55A</td>
<td>Fan Blower</td>
<td>TP-332</td>
<td>Divider Grommet</td>
</tr>
<tr>
<td>TP-65I</td>
<td>36&quot; Interlocking Turbulator Baffle Section</td>
<td>TP-333</td>
<td>36&quot; Black 120V Power Cord</td>
</tr>
<tr>
<td>TP-68B</td>
<td>Large Strain Relief Bushing</td>
<td>TP-380</td>
<td>16&quot; Burner Tube with Flange</td>
</tr>
<tr>
<td>TP-70</td>
<td>1/2&quot; Control Box Gasket (per foot**)</td>
<td>TP-383B</td>
<td>Spark Igniter Plate</td>
</tr>
</tbody>
</table>

*Optional add-on or accessory item. ** 3 foot total required to cover all applicable surfaces.
### Figure 5.2 - Tube & Reflector Components

![Diagram of Tube & Reflector Components](image)

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-550</td>
<td>Spark Transfer Wire - Orange</td>
<td>TP-3010</td>
<td>Service Panel Hinge</td>
</tr>
<tr>
<td>TP-551</td>
<td>MARK 10DX-117 DSI Circuit Board w/ Pre-Purge</td>
<td>TP-3011</td>
<td>Spark Ignitor Box</td>
</tr>
<tr>
<td>TP-552</td>
<td>Wiring Harness</td>
<td>TP-3012</td>
<td>Spark Ignitor Box Cover</td>
</tr>
<tr>
<td>TP-553</td>
<td>Spark Ignitor Mounting Bracket</td>
<td>TP-3014</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-554</td>
<td>Spark Ignitor Mounting Bracket Gasket</td>
<td>TP-3015</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-555</td>
<td>Spark Ignitor Electrode</td>
<td>TP-3016</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-579</td>
<td>4&quot; Wire Hanger</td>
<td>TP-3017</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-826</td>
<td>40VA Transformer</td>
<td>TP-3018</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-828</td>
<td>Yellow 24V High Fire Indicator Light</td>
<td>TP-3019</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-832</td>
<td>Thermostat Terminal Strip</td>
<td>TP-3020</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-840A</td>
<td>36G54-224 Gas Valve - Natural Gas Assembly</td>
<td>TP-3021</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-841A</td>
<td>36G54-226 Gas Valve - LP Gas Assembly</td>
<td>TP-3022</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-1018</td>
<td>APS 1/4&quot; Silicone Sensing Tube</td>
<td>TP-3023</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-1018</td>
<td>APS 1/4&quot; Silicone Sensing Tube</td>
<td>TP-3024</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-1325</td>
<td>24V Switching Relay Board (Qty. 2)</td>
<td>TP-3025</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-3001</td>
<td>Divider Panel</td>
<td>TP-3026</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<tr>
<td>TP-3002A</td>
<td>Plastic Control Compartment End Panel</td>
<td>APS</td>
<td>Select Pressure Switch Below (BTU Dependent)</td>
</tr>
<tr>
<td>TP-3003A</td>
<td>Plastic Fan Compartment End Panel</td>
<td>(TP-264D)</td>
<td>Atmospheric Pressure Switch (75 MBH)</td>
</tr>
<tr>
<td>TP-3004</td>
<td>Main Control Box Panel</td>
<td>(TP-1264A)</td>
<td>Atmospheric Pressure Switch (100 MBH)</td>
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<tr>
<td>TP-3005A</td>
<td>Plastic Valve Compartment Lid</td>
<td>(TP-264F)</td>
<td>Atmospheric Pressure Switch (125-150 MBH)</td>
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<td>TP-3008</td>
<td>Gas Valve Mounting Bracket</td>
<td>(TP-1064B)</td>
<td>Atmospheric Pressure Switch (175-200 MBH)</td>
</tr>
</tbody>
</table>
### Kit Contents Check List

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

#### DET3 Series Kit Contents

<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>
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</thead>
<tbody>
<tr>
<td>TP-21B</td>
<td>4” 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” 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” Reflector Center Support</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TP-83</td>
<td>24” 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>
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<td>2</td>
</tr>
<tr>
<td>TP-106</td>
<td>Reflector End Cap Clips</td>
<td>8</td>
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</tr>
<tr>
<td>TP-579</td>
<td>4” 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>
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<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>

* 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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21400 Hoover Road • Warren, MI 48089
Phone: 586-756-0950 • Fax: 586-756-2626
www.detroitradiant.com • sales@drp-co.com

Printed in U. S. A.