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.

**INSTALLER: Present this manual to the end user.**

Keep these instructions in a clean and dry place for future reference.

Model#: ____________________ Serial #: ____________________

(located on rating label)
## Contents

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**NOTE:** See page 10 for a list of available models and specifications.
1.0 Safety

WARNING

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

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
(Orange crescent - with relay option)

F/N: LLV3EP4
(White crescent - no relay)

F/N: LLV3EP7
High Fire Light

F/N: LLTCL006L, LLTCL001C/R
Clearances to Combustibles Labels

F/N: LLOGO32
Logo Label

F/N: LLTB018 (Natural Gas)
F/N: LLTB019 (Propane Gas)
1.0 Safety • Safety Labels and Their Locations • Clearances to Combustibles

Clearances 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, or vapor in the vicinity of 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 on page 5 to determine the required distances for your model.

**Chart 1.1 • Clearances 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>Behind</th>
<th>Top</th>
<th>Below</th>
</tr>
</thead>
<tbody>
<tr>
<td>DET3 (20, 30, 40) - (65, 75) [N, P]</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>39</td>
<td>8</td>
<td>10</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>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20 ft. from burner</td>
<td>0°</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>DET3 (30, 40) - 100 [N, P]</td>
<td>0°</td>
<td>14</td>
<td>14</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>39</td>
<td>8</td>
<td>10</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>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>16</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20 ft. from burner</td>
<td>0°</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>DET3 (30, 40, 50) - 125 [N, P]</td>
<td>0°</td>
<td>20</td>
<td>20</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>58</td>
<td>8</td>
<td>10</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>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>20</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20 ft. from burner</td>
<td>0°</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>DET3 (40, 50, 60) - 150 [N, P]</td>
<td>0°</td>
<td>24</td>
<td>24</td>
<td>6</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>58</td>
<td>8</td>
<td>10</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>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>23</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20 ft. from burner</td>
<td>0°</td>
<td>11</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>DET3 (40, 50, 60) - 175 [N, P]</td>
<td>0°</td>
<td>34</td>
<td>34</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>63</td>
<td>8</td>
<td>10</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>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>30</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20 ft. from burner</td>
<td>0°</td>
<td>11</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>DET3 (50, 60) - 200 [N, P]</td>
<td>0°</td>
<td>41</td>
<td>41</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>63</td>
<td>8</td>
<td>10</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>
</tr>
<tr>
<td></td>
<td>with 2 side shields</td>
<td>0°</td>
<td>30</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20 ft. from burner</td>
<td>0°</td>
<td>11</td>
<td>11</td>
<td>6</td>
</tr>
</tbody>
</table>

* Heaters mounted on an angle between 0° and 45° must maintain clearances posted for 0° or 45°, whichever is greater.

The stated clearances to combustibles represents a surface temperature of 90°F (50°C) 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>Propane</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

- 120 VAC - 60 Hz, GND, 3-wire
- 24 VAC 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 24 VAC 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).
**Wiring**

---

**WARNING**

**Electric Shock**
Field wiring to the tube heater must be connected and grounded in accordance with national, state, provincial, and 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**

![Diagram A](image)

**B. Multiple Heaters, Single Thermostat**

![Diagram B](image)
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 rating of at least 600 V and 105° C.

Figure 2.2 • Internal Wiring Diagram

WIRING INFORMATION:

LINE VOLTAGE:
- FACTORY STANDARD
- FACTORY OPTION
- FIELD INSTALLED

LOW VOLTAGE:
- FACTORY STANDARD
- FACTORY OPTION
- FIELD INSTALLED
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 Height(^{v})</th>
<th>Combustion Chamber(s) (Black Coated)</th>
<th>Radiant Emitter Tube(s) (Uncoated)</th>
<th>36&quot; Baffle Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DET3-20-65</td>
<td>Nat. or Prop.</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>5</td>
</tr>
<tr>
<td>DET3-20-75</td>
<td>Nat. or Prop.</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>5</td>
</tr>
<tr>
<td>DET3-30-65</td>
<td>Nat. or Prop.</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>4</td>
</tr>
<tr>
<td>DET3-30-75</td>
<td>Nat. or Prop.</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>5</td>
</tr>
<tr>
<td>DET3-30-100</td>
<td>Nat. or Prop.</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>5</td>
</tr>
<tr>
<td>DET3-30-125</td>
<td>Nat. or Prop.</td>
<td>125,000</td>
<td>82,000</td>
<td>31'-5&quot;</td>
<td>**17'-9&quot;</td>
<td>160</td>
<td>13' to 23'</td>
<td>Alum</td>
<td>HRT</td>
<td>6</td>
</tr>
<tr>
<td>DET3-40-65</td>
<td>Nat. or Prop.</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>3</td>
</tr>
<tr>
<td>DET3-40-75</td>
<td>Nat. or Prop.</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>4</td>
</tr>
<tr>
<td>DET3-40-100</td>
<td>Nat. or Prop.</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>4</td>
</tr>
<tr>
<td>DET3-40-125</td>
<td>Nat. or Prop.</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>5</td>
</tr>
<tr>
<td>DET3-40-150*</td>
<td>Nat. or Prop.</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>5</td>
</tr>
<tr>
<td>DET3-40-175*</td>
<td>Nat. or Prop.</td>
<td>175,000</td>
<td>125,000</td>
<td>41'-1&quot;</td>
<td>22'-9&quot;</td>
<td>190</td>
<td>16' to 30'</td>
<td>Titan/Alum</td>
<td>HRT</td>
<td>5</td>
</tr>
<tr>
<td>DET3-50-125</td>
<td>Nat. or Prop.</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>3</td>
</tr>
<tr>
<td>DET3-50-150*</td>
<td>Nat. or Prop.</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>3</td>
</tr>
<tr>
<td>DET3-50-175*</td>
<td>Nat. or Prop.</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>3</td>
</tr>
<tr>
<td>DET3-50-200*</td>
<td>Nat. or Prop.</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>2</td>
</tr>
<tr>
<td>DET3-60-150*</td>
<td>Nat. or Prop.</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>2</td>
</tr>
<tr>
<td>DET3-60-175*</td>
<td>Nat. or Prop.</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>2</td>
</tr>
<tr>
<td>DET3-60-200*</td>
<td>Nat. or Prop.</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>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).

\(^{v}\) 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.
Tube Installation Sequence

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

Stainless steel clamp location on 150 MBH models (P/N: TP-220).

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

50 Foot

Stainless steel clamp location on 150 - 200 MBH models (P/N: TP-220).

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

60 Foot

Stainless steel clamp location on 150 - 200 MBH models (P/N: TP-220).

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

Key

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

Sequence of Operation

Two voltages (120 VAC supply and 24 VAC 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 24 VAC from the thermostat. The relay is closed sending 120 VAC 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 24 VAC signal to the high fire relay. The energized coil of the relay is closed, allowing 24 VAC 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 24 VAC, 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 120 VAC to the 24 VAC 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?**
  - No: **Find the source of the electrical problem.**
  - Yes: Continue to next step.

- **Does the igniter spark?**
  - No: **Check the gap on the igniter.**
    - No: **Replace igniter.**
    - Yes: Continue to next step.
  - Yes: **Replace 24VAC transformer.**

- **During the ignition trial, does the gas valve open?**
  - No: **Test for 24 VAC at the gas valve during valve opening (typically 10 seconds after power to the heater).**
    - No: **Is 120VAC being sent to the transformer?**
      - No: **Correct problem.**
      - Yes: **Switch to the ON position.**
    - Yes: **Check that gas pressure is within minimum and maximum inputs as indicated on the heater's rating plate.**
      - No: **Correct problem.**
      - Yes: **Switch to the ON position.**

- **Is 120VAC being sent to the transformer?**
  - Yes: **Replace 24VAC transformer.**
  - No: **Correct problem.**

- **Is the valve switch in the ON position?**
  - No: **Switch to the ON position.**
  - Yes: Continue to next step.

**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.

---

**Correct wiring or replace relay.**

- **No**

- **Yes**

  The blower is faulty and must be replaced.

---

**Remove obstruction**

**Yes**

- **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.

- **No**

  Repair wiring or hose connections.

---

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

**Yes**

- **Yes**

  Repair wiring or hose connections.

- **No**

  Remove obstruction

---

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

**No**

- **No**

  Repair wiring or hose connections.

---

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

**Yes**

- **Yes**

  Repair wiring or hose connections.

- **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 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.

---

**Temporarily place a jumper across the terminal of the switch. Does the igniter spark?**

**Yes**

- **Yes**

  Repair wiring or hose connections.

- **No**

  Replace circuit board.

---

**Start**

- **Question**

- **Process**

- **Corrective Action**
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

No

No

Adjust gap.

No

Adjust gap.

Yes

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.

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.

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.

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.
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 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.

Check for 24 VAC across the COM and HIGH on the 24 VAC terminal. Is there 24 VAC? Yes, Is there 24 VAC across the red wire on the relay board and ground on the circuit board? Yes, Replace gas valve.

No, Repair or replace faulty wiring or thermostat. No, Replace relay.
### 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-70A</td>
<td>1 in. 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” x 3/4”</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-84</td>
<td>1/2 in. Female/Male Flare Fitting</td>
</tr>
<tr>
<td>TP-16</td>
<td>Sight Glass Washer</td>
<td>TP-85</td>
<td>1/2 in. Female/Male Flare Fitting</td>
</tr>
<tr>
<td>TP-17</td>
<td>Sight Glass Kit</td>
<td>TP-105</td>
<td>Reflector End Cap</td>
</tr>
<tr>
<td>TP-19B</td>
<td>4 in. Wire Hanger with Tension Spring</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-113</td>
<td>Reflector Tension Spring</td>
</tr>
<tr>
<td>TP-20D*</td>
<td>10 ft. Stainless Steel Reflector</td>
<td>TP-201B</td>
<td>V.3 Mid-High Burner (Color Code - TAN)</td>
</tr>
<tr>
<td>TP-21B</td>
<td>4 in. Tube Clamp</td>
<td>TP-204</td>
<td>Gas Orifice - Consult Factory</td>
</tr>
<tr>
<td>TP-25</td>
<td>1/4 in. Female Spade Terminal (Qty. 3)</td>
<td>TP-212</td>
<td>1/2” x 3” Pipe Nipple</td>
</tr>
<tr>
<td>TP-26A</td>
<td>10 ft. Aluminized Combustion Tube</td>
<td>TP-217</td>
<td>Brass Pressure Switch Barb Fitting</td>
</tr>
<tr>
<td>TP-26B</td>
<td>10 ft. Titanium Primary Combustion Tube</td>
<td>TP-219</td>
<td>Differential Vinyl Sensing Tube</td>
</tr>
<tr>
<td>TP-26C</td>
<td>10 ft. Uncoated Hot Rolled Radiant Tube</td>
<td>TP-220</td>
<td>4 in. Dia. Stainless Steel Tube Clamp</td>
</tr>
<tr>
<td>TP-31D</td>
<td>Mounting Bracket (Qty. 2)</td>
<td>TP-221</td>
<td>Spark Igniter Mounting Bracket Gasket</td>
</tr>
<tr>
<td>TP-55A</td>
<td>1/20 hp Inducer Assembly (50-150 MBH)</td>
<td>TP-245</td>
<td>3/16” X 1/8” Plastic Gas Valve 90° Vent</td>
</tr>
<tr>
<td>TP-65i</td>
<td>36 in. Interlocking Turbulator Baffle Section</td>
<td>TP-264D</td>
<td>Differential Pressure Switch, 60 to 75 MBH</td>
</tr>
<tr>
<td>TP-68B</td>
<td>Large Strain Relief Bushing</td>
<td>TP-264F</td>
<td>Differential Pressure Switch, 150 to 200 MBH</td>
</tr>
<tr>
<td>TP-70</td>
<td>1/2 in. Control Box Gasket (10.3 inches)</td>
<td>TP-321</td>
<td>Ignition Plate Gasket</td>
</tr>
</tbody>
</table>

* Optional upgrade or add-on item.
**Chart 5.2 • Parts List**

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-331</td>
<td>Green Self-Tap Ground Screw (Qty. 2)</td>
<td>TP-3012</td>
<td>Spark Igniter Box Cover</td>
</tr>
<tr>
<td>TP-332</td>
<td>Divider Grommet</td>
<td>TP-3014</td>
<td>Plastic Air Orifice w/ Screen - Contact Factory</td>
</tr>
<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-3072</td>
<td>Low BTU Burner (Color Code - GREEN)</td>
</tr>
<tr>
<td>TP-1018</td>
<td>APS 1/4 in. Silicone Sensing Tube</td>
<td>TP-3093</td>
<td>#8-32 Cage Nut (Qty. 4)</td>
</tr>
<tr>
<td>TP-1264A</td>
<td>Differential Pressure Switch, 100 to 125 MBH</td>
<td>TP-3094</td>
<td>#8-32 x ½ in. Black Nylon Shoulder Screw (Qty. 4)</td>
</tr>
<tr>
<td>TP-1325</td>
<td>24VAC Switching Relay (Qty. 2)</td>
<td>TP-3096A</td>
<td>Valve Compartment Bottom Panel</td>
</tr>
<tr>
<td>TP-3001</td>
<td>Divider Panel</td>
<td>TP-3097A</td>
<td>Valve Compartment Top Panel</td>
</tr>
<tr>
<td>TP-3002A</td>
<td>Plastic Control Compartment End Panel</td>
<td>TP-3098</td>
<td>Valve Compartment Side Panel</td>
</tr>
<tr>
<td>TP-3003A</td>
<td>Plastic Fan Compartment End Panel</td>
<td>TP-3099</td>
<td>Controls Mounting Panel</td>
</tr>
<tr>
<td>TP-3004</td>
<td>Main Control Box Panel</td>
<td>TP-3140</td>
<td>36G54-224 Gas Valve - Natural Gas Assembly</td>
</tr>
<tr>
<td>TP-3005A</td>
<td>Plastic Valve Compartment Lid</td>
<td>TP-3141</td>
<td>36G54-226 Gas Valve - Propane Gas Assembly</td>
</tr>
<tr>
<td>TP-3008A</td>
<td>Gas Valve Mounting Bracket</td>
<td>TP-3215</td>
<td>1/15 hp Inducer Assembly (175-200 MBH)</td>
</tr>
<tr>
<td>TP-3010</td>
<td>Service Panel Hinge</td>
<td>TP-3216</td>
<td>Restrictor Plate (175-200 MBH)</td>
</tr>
<tr>
<td>TP-3011</td>
<td>Spark Igniter Box</td>
<td>TP-3580</td>
<td>16 in. DSI Burner Tube Flange with Fittings</td>
</tr>
</tbody>
</table>

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

Chart 5.3 • Kit Contents for DET3 Series - Reference the length column for your model.

<table>
<thead>
<tr>
<th>DET3 Series Kit Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TP-19B</strong> 4&quot; Hanger with Reflector Tension Spring</td>
</tr>
<tr>
<td><strong>TP-82</strong> 4 in. Reflector Center Support (RCS)</td>
</tr>
<tr>
<td><strong>TP-25</strong> 1/4 in. Female Spade Terminals</td>
</tr>
<tr>
<td><strong>TP-83</strong> 24 in. Stainless Steel Flex. Gas Connector</td>
</tr>
<tr>
<td><strong>TP-105</strong> Reflector End Caps</td>
</tr>
<tr>
<td><strong>TP-21B</strong> 4 in. Tube Clamp</td>
</tr>
<tr>
<td><strong>TP-106</strong> Reflector End Cap Clips</td>
</tr>
</tbody>
</table>

**Part No.** | **Description** | **20 ft.** | **30 ft.** | **40 ft.** | **50 ft.** | **60 ft.** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-19B</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>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>
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<td>8</td>
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<td>8</td>
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<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:**

* 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
- Indoor Approval
- Outdoor Approval with OD-KIT
- Commercial Approval

**Limited Warranty**

- 1 year - Burner box components
- 2 years - Combustion and radiant tubes
- 3 years - Stainless steel burner
- See page 36 of the General Tube Heater Manual for Terms and Conditions

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