DX2 Series
Insert Manual

For complete installation instructions, reference the Tube Heater General Manual that accompanies this insert manual.

The DX2 Series Infrared Tube Heater is a positive pressure, single-stage radiant heater system. This insert manual is a supplement to the Tube Heater General Manual and provides specific information related to the DX2 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)
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NOTE: See page 10 for a list of available models and specifications.
WARNING

Read and understand all safety information and warnings in this 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: LLAC Air Metering Orifice

F/N: LLTB018 (Natural Gas)
F/N: LLTB019 (Propane Gas)

F/N: LLTCL001 Clearances to Combustibles Label.

F/N: LLLOGO32

Fluids, Chemicals, and Their Locations

Contact either your local distributor or the product manufacturer for obtaining replacement signs or labels.
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 vapors 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 your series tube heater and configuration must be maintained. Refer to Chart 1.1 on the following page to determine the required distances for your model.

The stated clearances to combustibles represent 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.
### 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>DX2 (20, 30, 40) - 50, 60 [N, P]</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>39</td>
<td>8</td>
<td>10</td>
<td>47</td>
</tr>
<tr>
<td>with 1 side shield</td>
<td>0°</td>
<td>29</td>
<td>8</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td>with 2 side shields</td>
<td>0°</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td>47</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>DX2 (20, 30, 40) - 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>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>DX2 (20, 30, 40, 50) - (80, 100) [N, P]</td>
<td>0°</td>
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<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>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>DX2 (30, 40, 50, 60) - 125 [N, P]</td>
<td>0°</td>
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<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>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>DX2 (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>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>DX2 (40, 50, 60, 70) - 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>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>DX2 (50, 60, 70, 80) - 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>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° and 45° must maintain clearances posted for 0° or 45°, whichever is greater.*

### Figure 1.1 • Mounting Angles

0° Mounting Angle

![0° Mounting Angle](image1)

45° Mounting Angle

![45° Mounting Angle](image2)

0° Mounting Angle with 1 Side Shield (P/N: SSE)

![0° Mounting Angle with 1 Side Shield](image3)

0° Mounting Angle with 2 Side Shields (P/N: SSE)

![0° Mounting Angle with 2 Side Shields](image4)
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

**NOTICE**

The DX2 series comes standard requiring a 120 VAC connection to the thermostat. An optional 24 VAC internal relay (24VAO) may be factory installed if the heater is to be controlled via a 24 VAC thermostat. A 40 VA transformer is necessary when using the 24VAO option.

**Note:** A relay transformer may be used in lieu of the factory installed 24VAO option.

- 120 VAC - 60 Hz GRD, 3-wire.
- 120 VAC thermostat connection.
- Starting current 4.8 amps
- Running current 1.1 amps
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. 120 VAC Single/Multiple Line Voltage Heater(s)**

Heaters on the same vent **must** share the same thermostat.  
**NOTE:** Up to 4 line voltage tube heaters can be wired to most thermostats.

**B. 24VAO Add-On (Internal Relay Option)**

Common required for thermostats that require constant power.  
1/4" spade terminals required (as supplied)
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, 105° C.

Figure 2.2 - Internal Wiring Diagrams
A. Ladder Diagram - TP-351A

B. Block Diagram - TP-351A
Figure 2.3 • Alternative Wiring Diagrams

A. TP-351A Ladder Diagram - Internal Relay Option (24VAO)

B. TP-351A Block Diagram - Internal Relay Option (24VAO)
## Specifications

### Chart 2.1 - Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Gas Type (Select One)</th>
<th>BTU/h</th>
<th>Straight Length (Dim A)</th>
<th>U-Tube Length (Dim. B)</th>
<th>Weight (lbs.)</th>
<th>Stainless Steel Weight (lbs.)</th>
<th>Recommend Mounting Height</th>
<th>Combustion Chamber (Black Coated)</th>
<th>Radiant Emitter Tube(s) (Black Coated)</th>
<th>Radiant Surface Area (sq. ft.)</th>
<th>36” Baffle Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX2-20-50</td>
<td>N or P</td>
<td>50,000</td>
<td>21'-8&quot;</td>
<td>13'-0&quot;</td>
<td>120</td>
<td>N/A</td>
<td>9' to 15'</td>
<td>Alum</td>
<td>Alum</td>
<td>20.2</td>
<td>5</td>
</tr>
<tr>
<td>DX2-20-60</td>
<td>N or P</td>
<td>60,000</td>
<td>21'-8&quot;</td>
<td>13'-0&quot;</td>
<td>120</td>
<td>N/A</td>
<td>10' to 15'</td>
<td>Alum</td>
<td>Alum</td>
<td>20.2</td>
<td>5</td>
</tr>
<tr>
<td>DX2-20-75</td>
<td>N or P</td>
<td>75,000</td>
<td>21'-8&quot;</td>
<td>13'-0&quot;</td>
<td>120</td>
<td>145</td>
<td>11' to 18'</td>
<td>Alum</td>
<td>Alum</td>
<td>20.2</td>
<td>5</td>
</tr>
<tr>
<td>DX2-20-80</td>
<td>N or P</td>
<td>80,000</td>
<td>21'-8&quot;</td>
<td>13'-0&quot;</td>
<td>120</td>
<td>145</td>
<td>11' to 18'</td>
<td>Alum</td>
<td>Alum</td>
<td>20.2</td>
<td>5</td>
</tr>
<tr>
<td>DX2-30-50</td>
<td>N or P</td>
<td>50,000</td>
<td>31'-4&quot; **17'-8&quot;</td>
<td>160</td>
<td>N/A</td>
<td>195</td>
<td>12' to 20'</td>
<td>Alum</td>
<td>Alum</td>
<td>30.4</td>
<td>4</td>
</tr>
<tr>
<td>DX2-30-60</td>
<td>N or P</td>
<td>65,000</td>
<td>31'-4&quot; **17'-8&quot;</td>
<td>160</td>
<td>N/A</td>
<td>195</td>
<td>12' to 20'</td>
<td>Alum</td>
<td>Alum</td>
<td>30.4</td>
<td>4</td>
</tr>
<tr>
<td>DX2-30-75</td>
<td>N or P</td>
<td>75,000</td>
<td>31'-4&quot; **17'-8&quot;</td>
<td>160</td>
<td>N/A</td>
<td>195</td>
<td>12' to 20'</td>
<td>Alum</td>
<td>Alum</td>
<td>30.4</td>
<td>5</td>
</tr>
<tr>
<td>DX2-30-80</td>
<td>N or P</td>
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<td>31'-4&quot; **17'-8&quot;</td>
<td>160</td>
<td>N/A</td>
<td>195</td>
<td>12' to 20'</td>
<td>Alum</td>
<td>Alum</td>
<td>30.4</td>
<td>5</td>
</tr>
<tr>
<td>DX2-30-100</td>
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<td>100,000</td>
<td>31'-4&quot; **17'-8&quot;</td>
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<td>195</td>
<td>13' to 23'</td>
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<td>Alum</td>
<td>30.4</td>
<td>5</td>
</tr>
<tr>
<td>DX2-30-125</td>
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<td>31'-4&quot; **17'-8&quot;</td>
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<td>Alum</td>
<td>30.4</td>
<td>5</td>
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<td>N or P</td>
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<td>41'-0&quot;</td>
<td>22'-8&quot;</td>
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<td>N/A</td>
<td>11' to 18'</td>
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<td>Alum</td>
<td>40.5</td>
<td>2</td>
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<td>235</td>
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<td>Alum</td>
<td>40.5</td>
<td>5</td>
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<td>Alum</td>
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<td>13' to 23'</td>
<td>Alum</td>
<td>Alum</td>
<td>40.5</td>
<td>5</td>
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<tr>
<td>DX2-40-100</td>
<td>N or P</td>
<td>100,000</td>
<td>41'-0&quot;</td>
<td>22'-8&quot;</td>
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<td>235</td>
<td>14' to 25'</td>
<td>Alum</td>
<td>Alum</td>
<td>40.5</td>
<td>5</td>
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<td>N or P</td>
<td>125,000</td>
<td>41'-0&quot;</td>
<td>22'-8&quot;</td>
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<td>235</td>
<td>15' to 27'</td>
<td>Titan</td>
<td>Alum</td>
<td>40.5</td>
<td>5</td>
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<td>DX2-40-150</td>
<td>N or P</td>
<td>150,000</td>
<td>41'-0&quot;</td>
<td>22'-8&quot;</td>
<td>190</td>
<td>235</td>
<td>15' to 27'</td>
<td>Titan</td>
<td>Alum</td>
<td>40.5</td>
<td>5</td>
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<td>16' to 30'</td>
<td>Titan</td>
<td>Alum</td>
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<td>5</td>
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<td>100,000</td>
<td>50'-8&quot; **27'-4&quot;</td>
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<td>290</td>
<td>15' to 27'</td>
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<td>Titan</td>
<td>Alum</td>
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<td>2</td>
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<td>N or P</td>
<td>125,000</td>
<td>50'-8&quot; **27'-4&quot;</td>
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<td>290</td>
<td>15' to 27'</td>
<td>Alum</td>
<td>Titan</td>
<td>Alum</td>
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<td>4</td>
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<td>N or P</td>
<td>150,000</td>
<td>50'-8&quot; **27'-4&quot;</td>
<td>235</td>
<td>290</td>
<td>16' to 30'</td>
<td>Titan</td>
<td>Titan</td>
<td>Alum</td>
<td>50.6</td>
<td>4</td>
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<tr>
<td>DX2-50-175</td>
<td>N or P</td>
<td>175,000</td>
<td>50'-8&quot; **27'-4&quot;</td>
<td>235</td>
<td>N/A</td>
<td>17' to 35'</td>
<td>Titan</td>
<td>Titan</td>
<td>Alum</td>
<td>50.6</td>
<td>4</td>
</tr>
<tr>
<td>DX2-50-200</td>
<td>N or P</td>
<td>200,000</td>
<td>50'-8&quot; **27'-4&quot;</td>
<td>235</td>
<td>N/A</td>
<td>18' to 40'</td>
<td>Titan</td>
<td>Titan</td>
<td>Alum</td>
<td>50.6</td>
<td>4</td>
</tr>
<tr>
<td>DX2-60-125</td>
<td>N or P</td>
<td>125,000</td>
<td>60'-4&quot; **32'-4&quot;</td>
<td>265</td>
<td>330</td>
<td>16' to 30'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>60.7</td>
<td>2</td>
</tr>
<tr>
<td>DX2-60-150</td>
<td>N or P</td>
<td>150,000</td>
<td>60'-4&quot; **32'-4&quot;</td>
<td>265</td>
<td>330</td>
<td>17' to 35'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>60.7</td>
<td>2</td>
</tr>
<tr>
<td>DX2-60-175</td>
<td>N or P</td>
<td>175,000</td>
<td>60'-4&quot; **32'-4&quot;</td>
<td>265</td>
<td>N/A</td>
<td>18' to 40'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>60.7</td>
<td>2</td>
</tr>
<tr>
<td>DX2-60-200</td>
<td>N or P</td>
<td>200,000</td>
<td>60'-4&quot; **32'-4&quot;</td>
<td>265</td>
<td>N/A</td>
<td>19' to 42'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>70.9</td>
<td>2</td>
</tr>
<tr>
<td>DX2-70-175</td>
<td>N or P</td>
<td>175,000</td>
<td>70'-0&quot; **37'-2&quot;</td>
<td>300</td>
<td>N/A</td>
<td>19' to 42'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>70.9</td>
<td>2</td>
</tr>
<tr>
<td>DX2-70-200</td>
<td>N or P</td>
<td>200,000</td>
<td>70'-0&quot; **37'-2&quot;</td>
<td>300</td>
<td>N/A</td>
<td>20' to 45'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>70.9</td>
<td>2</td>
</tr>
<tr>
<td>DX2-80-200</td>
<td>N or P</td>
<td>200,000</td>
<td>70'-0&quot; **37'-2&quot;</td>
<td>300</td>
<td>N/A</td>
<td>20' to 45'</td>
<td>Titan</td>
<td>Titan</td>
<td>Titan</td>
<td>81.0</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-shaped configuration (P/N: TF1B).

Titan = Coated titanium treated steel.

Alum = Coated aluminized treated steel.
Figure 2.4 • Tube Installation Sequence

Important! The combustion chamber and radiant tube sections must be installed in the following order.

20 Foot

30 Foot

40 Foot

50 Foot

60 Foot

70 Foot

80 Foot

Key

Burner Control Box with 16” Burner Tube

Black Coated Combustion Chamber Tube*

Black Coated Aluminized Combustion Chamber/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

*Aluminized steel (50,000 to 125,000 BTU/h models), titanium stabilized aluminized steel (150,000 to 200,000 models). 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 the Tube Heater General Manual for installation requirements.

#### Sequence of Operation

**Starting Circuit:** Upon a call for heat, the fan is energized. Once operational static pressure is achieved, the differential switch will close initiating the ignition sequence. After a 5-second delay, the Glo-bar™ is energized for 45 seconds and the control allows the gas valve to open.

The trial for ignition is 8 seconds. If flame sense is not established within 8.5 seconds, the heater will attempt two (2) additional ignition sequences before proceeding to soft lockout. Soft lockout automatically retries after one (1) hour or the control can be reset by briefly interrupting the power source.

**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 8.5 seconds, the heater will attempt two (2) additional ignition sequences before proceeding to soft lockout. The control can be reset by briefly interrupting the power source.

#### Thermostat

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

The DX2 series comes standard requiring a 120 VAC connection to the thermostat. An optional 24 VAC internal relay (24VAO) may be factory installed if the heater is to be controlled via a 24 VAC thermostat. A 40 VA transformer is necessary when using the 24VAO option (Figure 2.1B).

**NOTE:** A relay transformer may be used in lieu of the factory installed 24VAO option.
Operational Indicator Lights

The externally located operational indicator lights are provided to assist in troubleshooting of the heater. Refer to the following pages for additional troubleshooting.

Figure 3.1 • Operational Indicator Lights

Light 1 Indicates Valve Opens
Light 2 Indicates Pressure Switch Closes

Operational Indicator Lights
4.0 Troubleshooting Guide

Does the fan blow turn on?

No

Is the power at the heater 120 V?

Yes

Is the blower obstructed?

No

Find the source of the electrical problem between panel and heater.

Yes

Remove obstruction and lubricate fan.

No

Is the igniter physically damaged?

Yes

Replace igniter.

No

Check voltage at igniter during ignition sequence (usually 30-45 seconds after power to the heater). Is it 120 V?

Yes

Replace faulty light.

No

The circuit board and/or wiring harness may be faulty and needs to be replaced.

No

Correct problem.

Yes

Replace gas valve.

No

Confirm that gas pressure is within minimum and maximum inputs as indicated on the burner rating plate. Are they ok?

Yes

Replace gas valve.

No

Correct problem.

Yes

Replace faulty light.

No

The circuit board and/or wiring harness may be faulty and needs to be replaced.

No

Correct problem.

Yes

Replace faulty light.

No

The circuit board and/or wiring harness may be faulty and needs to be replaced.

No

Correct problem.

Yes

Replace gas valve.

No

Correct problem.

Yes

Replace faulty light.

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.

---

**Key**

- Start Question
- Process Question
- Corrective Action

---

**Troubleshooting Guide**

**Is 120 V coming to the fan?**

- **Yes**: The fan is faulty and must be replaced.
- **No**: Correct wiring.

**Check for loose wiring or resistance in hose connection to pressure switch. Are they ok?**

- **Yes**: Temporarily place jumpers across the terminals of the switch (Be sure to reinstall the burner control box cover).
- **No**: Repair.

**Is resistance through the igniter 50-150 Ω?**

- **No**: Replace igniter.
- **Yes**: Consult factory.

**The heater is equipped with a safety pressure switch. This differential switch, located in the valve compartment, is a normally open pressure switch. Temporarily place jumpers across the terminals of the switch (Be sure to reinstall the burner control box cover). Does the light energize?**

- **No**: Replace faulty light.
- **Yes**: Replace the differential switch after verifying the following:
  - Baffle(s) is/are in the radiant tube(s) farthest from the burner.
  - The heater, fan blower, squirrel cage, intake and exhaust are free from dirt and obstructions.
  - The 4” air intake pipe does not exceed 20 feet and/or 2 elbows.
  - There is not a negative pressure experienced at the area of air intake (i.e., attic space, high winds, very tight building).

If any of the above are occurring, please address the problem.
4.0 Troubleshooting Guide

Continued from page 14

After igniter is warmed up, does gas valve open?

- **No**
  - Test for 120 V at valve opening period (usually 30 to 45 seconds after power to heater). Is there 120 V to valve for 8 seconds?

- **Yes**
  - Replace circuit board and/or wiring harness.

Does the burner ignite?

- **No**
  - Is the gas supply to the heater in the ON position?

  - **Yes**
    - Check to make sure gas pressure is within minimum and maximum inputs, as indicated on burner rating plate. Is gas pressure OK?

  - **No**
    - Turn on.

  - **Yes**
    - Correct problem.

- **Yes**
  - Does the burner stay on for approx. 8 seconds and then shut off?

  - **No**
    - Does the burner come on and turn off immediately (1 or 2 seconds)?

      - **Yes**
        - Check to make sure gas pressure is within minimum and maximum inputs, as indicated on burner rating plate. Is gas pressure OK?

      - **No**
        - Pressure switch may be faulty or there is a restriction in the exhaust.

      - **Yes**
        - Correct problem.

- **Yes**
  - The heater can shut down due to:
    - Improper grounding.
    - High winds.
    - Taking combustion air from the attic.
    - Dirty environment.
    - Improperly positioned baffles.
    - Fluctuating gas pressure.

Does the heater stay ON until a call for heat ends?

- **No**
  - Correct problem.

- **Yes**
  - Troubleshooting ends
Check to make sure gas pressure is within minimum and maximum inputs, as indicated on burner rating plate.

Is gas pressure OK?

---

Yes

Replace gas valve.

No

Correct problem.

---

Were the gas lines purged of air?

---

Yes

Confirm manifold pressure is correct and/or gas orifice is not plugged and is the correct size.

No

Purge gas line.

---

Is the heater properly grounded? Is the heater's polarity correct?

---

Yes

With micrometer, check amperage at flame rod. Is it greater than .7 microamps?

---

Yes

Check to make sure flame sensor wire is OK. If so, then replace circuit board.

No

Sensing rod is faulty or flame is weak. Check to make sure heater is operating at proper gas pressure as indicated on burner rating plate and then, if needed, replace sensing rod.

---

No

Correct problem.

---

Correct problem.
5.0 Parts

Chart 5.1 • Parts List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-1</td>
<td>Control Box Cover</td>
<td>TP-31B</td>
<td>Control Box Mounting Bracket</td>
</tr>
<tr>
<td>TP-5</td>
<td>Flange Gasket</td>
<td>TP-33B</td>
<td>1/2&quot; Shut-Off Ball Valve / Inlet Tap</td>
</tr>
<tr>
<td>TP-9</td>
<td>Conduit Coupling</td>
<td>TP-50A</td>
<td>Glo-Bar™ Igniter</td>
</tr>
<tr>
<td>TP-10</td>
<td>Conduit 4” x 1/2”</td>
<td>TP-55A</td>
<td>Fan Blower</td>
</tr>
<tr>
<td>TP-11</td>
<td>Glo-Bar™ Igniter Box</td>
<td>TP-65I</td>
<td>36” Interlocking Turbulator Baffle</td>
</tr>
<tr>
<td>TP-12</td>
<td>Glo-Bar™ Igniter Box Cover</td>
<td>TP-66</td>
<td>2&quot; x 4&quot; Outlet Box</td>
</tr>
<tr>
<td>TP-13</td>
<td>8 x 1/2” Self-Drilling Screw</td>
<td>TP-67</td>
<td>2&quot; x 4&quot; Outlet Box Cover</td>
</tr>
<tr>
<td>TP-14</td>
<td>Sight Glass Gasket</td>
<td>TP-70</td>
<td>Control Box Cover Gasket (per foot**)</td>
</tr>
<tr>
<td>TP-15</td>
<td>Sight Glass</td>
<td>TP-76</td>
<td>Rubber Grommet</td>
</tr>
<tr>
<td>TP-16</td>
<td>Sight Glass Washer</td>
<td>TP-82</td>
<td>Reflector Center Support (RCS)</td>
</tr>
<tr>
<td>TP-17</td>
<td>Sight Glass Kit</td>
<td>TP-83</td>
<td>24” Stainless Steel Flexible Gas Connector</td>
</tr>
<tr>
<td>TP-19B</td>
<td>4” Wire Hanger with Tension Spring</td>
<td>TP-84</td>
<td>1/2” Female / Male Flare Fitting</td>
</tr>
<tr>
<td>TP-20C</td>
<td>120” Aluminum Reflector</td>
<td>TP-97</td>
<td>1/4” x 1/4” Brass Int./Ext. Atmos. Barb Fitting</td>
</tr>
<tr>
<td>TP-20D</td>
<td>120&quot; Stainless Steel Reflector*</td>
<td>TP-105</td>
<td>Aluminum Reflector End Cap</td>
</tr>
<tr>
<td>TP-21B</td>
<td>4” Standard Tube Clamp</td>
<td>TP-106</td>
<td>Reflector End Cap Clips (8 pcs.)</td>
</tr>
<tr>
<td>TP-26A</td>
<td>10 ft. Coated-ALUM Combustion/Radiant Tube</td>
<td>TP-113</td>
<td>Reflector Tension Spring</td>
</tr>
<tr>
<td>TP-26B</td>
<td>10 ft. Coated-AL-Ti Combustion Tube</td>
<td>TP-114</td>
<td>Plastic Air Orifice with Screen (consult factory)</td>
</tr>
<tr>
<td>TP-26D</td>
<td>10 ft. 304 Stainless Steel Radiant Tube*</td>
<td>TP-200A</td>
<td>Burner (Blue) - consult factory</td>
</tr>
<tr>
<td>TP-26E</td>
<td>10 ft. 409 Stainless Steel Combustion Tube*</td>
<td>TP-201B</td>
<td>Burner (Tan) - consult factory</td>
</tr>
</tbody>
</table>

*Stainless steel upgrades available. ** 6 feet total required to cover outer edges of the burner control box.
**Figure 5.2 • Tube and Reflector Components**

### 5.0 Parts • Heater Components and Parts List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-202</td>
<td>16” Burner Tube with Flange (fittings included)</td>
<td>TP-301</td>
<td>Center Divider Panel</td>
</tr>
<tr>
<td>TP-204</td>
<td>Gas Orifice (consult factory)</td>
<td>TP-302</td>
<td>End Panel, Left</td>
</tr>
<tr>
<td>TP-205</td>
<td>Glo-Bar™ Holder</td>
<td>TP-302A</td>
<td>End Panel, Left with 24VAO Option.</td>
</tr>
<tr>
<td>TP-206</td>
<td>Glo-Bar™ Holder Spring Clip</td>
<td>TP-303</td>
<td>End Panel, Right</td>
</tr>
<tr>
<td>TP-207</td>
<td>Pressure Switch Mounting Bracket</td>
<td>TP-304</td>
<td>Burner Control Box Outer Shell w/ PC-36</td>
</tr>
<tr>
<td>TP-208B</td>
<td>Gas Valve Mounting Bracket</td>
<td>TP-321</td>
<td>Ignition Plate Gasket</td>
</tr>
<tr>
<td>TP-212</td>
<td>1/2” x 3” Pipe Nipple</td>
<td>TP-328</td>
<td>120 V Amber Operational Indicator Light</td>
</tr>
<tr>
<td>TP-214</td>
<td>Glo-Bar™ Wiring Harness</td>
<td>TP-329</td>
<td>1/4” Neutral Terminal Block</td>
</tr>
<tr>
<td>TP-217</td>
<td>Pressure Switch Barb</td>
<td>TP-331</td>
<td>Green Self Tap Ground Screw</td>
</tr>
<tr>
<td>TP-218</td>
<td>Differential Switch Vinyl Sensing Tube (exhaust)</td>
<td>TP-351A</td>
<td>Potted Circuit Board</td>
</tr>
<tr>
<td>TP-219</td>
<td>Differential Vinyl Sensing Tube (burner)</td>
<td>TP-352A</td>
<td>Circuit Board Wiring Harness for TP-351A</td>
</tr>
<tr>
<td>TP-220</td>
<td>Stainless Steel Tube Clamp (150-200 MBH)*</td>
<td>TP-380</td>
<td>16” Burner Tube with Flange (no fittings)</td>
</tr>
<tr>
<td>TP-221</td>
<td>Glo-Bar™ Holder Gasket</td>
<td>TP-383A</td>
<td>Glo-Bar™ Igniter Plate</td>
</tr>
<tr>
<td>TP-222</td>
<td>Flame Rod</td>
<td>TP-804</td>
<td>Burner Control Box Outer Shell</td>
</tr>
<tr>
<td>TP-222A</td>
<td>Flame Rod Wire</td>
<td>TP-NOPS</td>
<td>Normally Open Pressure Switch; select below:</td>
</tr>
<tr>
<td>TP-223</td>
<td>Gas Manifold</td>
<td>TP-264B</td>
<td>Differential Pressure Switch, 65 to 100 MBH</td>
</tr>
<tr>
<td>TP-240</td>
<td>VR4205M-1324 Gas Valve Assembly - Nat. Gas</td>
<td>TP-264E</td>
<td>Differential Pressure Switch, 125 to 150 MBH</td>
</tr>
<tr>
<td>TP-241</td>
<td>VR4205M-1357 Gas Valve Assembly - Prop. Gas</td>
<td>TP-264D</td>
<td>Differential Pressure Switch, 175 MBH</td>
</tr>
<tr>
<td>TP-244</td>
<td>Plastic Gas Valve Vent</td>
<td>TP-264F</td>
<td>Differential Pressure Switch, 200 MBH</td>
</tr>
</tbody>
</table>
## Kit Contents Check List

**Chart 5.2 • Kit Contents for DX2 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>
<th>70 Ft.</th>
<th>80 Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-19B</td>
<td>4&quot; Hanger w/ Tension Spring</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>TP-21B</td>
<td>4&quot; Tube Clamp</td>
<td>2</td>
<td>3</td>
<td>4*</td>
<td>5*</td>
<td>6*</td>
<td>7*</td>
<td>8*</td>
</tr>
<tr>
<td>TP-33B</td>
<td>1/2&quot; Shut-Off Valve w/ Inlet Tap</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TP-83</td>
<td>24&quot; Stainless Steel Flexible Gas Connector</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
<td>1</td>
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</tr>
<tr>
<td>TP-105</td>
<td>Reflector End Cap</td>
<td>2</td>
<td>2</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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<tr>
<td>LIOGTa</td>
<td>General Tube Heater Manual</td>
<td>1</td>
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<td>LIODX2a</td>
<td>DX2 Series Insert Manual</td>
<td>1</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Part No. Description**

- **TP-19B** 4" Hanger w/ Tension Spring
- **TP-21B** 4" Tube Clamp
- **TP-33B** 1/2" Shut-Off Valve (Ball Valve & Inlet Tap)
- **TP-82** 4" Reflector Center Support (RCS)
- **TP-83** 24" Stainless Steel Flexible Gas Connector
- **TP-105** Reflector End Cap
- **TP-106** Reflector End Cap Clips
- **LIOGTa** General Tube Heater Manual
- **LIODX2a** DX2 Series Insert Manual

### Chart 5.2: DX2 Series Kit Contents

- **Additional kit contents as supplied when heater is configured with Add-On Options (if applicable)**
- **TP-25** 1/4" Female Spade Terminal (24VAO)

**Filled By:**

*NOTE: One 4" stainless steel tube clamp (P/N: TP-220) is provided for each 150,000 - 200,000 BTU model. Place as shown on page 11.*

---

**Approvals**

- CSA
- Indoor approval
- Outdoor approval with OD-Kit
- Commercial approval

**Limited Warranty**

- 3 years - Burner box components
- 5 years - Combustion and radiant tubes
- 10 years - Stainless steel burner