FOR YOUR SAFETY
If you smell gas:
1. Open windows.
2. DO NOT try to light any appliance.
3. DO NOT use electrical switches.
4. DO NOT use any telephone in your building.
5. Extinguish any open flame.
6. Leave the building.
7. Immediately call your local gas supplier after leaving the building. Follow the gas supplier’s instructions.
8. If you cannot reach your gas supplier, call the Fire Department.

WARNING
Fire Hazard
Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.
Some objects will catch fire or explode when placed close to heater.
Failure to follow these instructions can result in death, injury or property damage.

WARNING
Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the Installation, Operation and Service Manual thoroughly before installing or servicing this equipment.

Installation must be done by a contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

Model CTH2V
Gas-Fired, Low Intensity Unitary Heater
Installation, Operation & Service Manual

CTH2V-40
CTH2V-60
CTH2V-80
CTH2V-100
CTH2V-125
CTH2V-150
CTH2V-175

Installer
Please take the time to read and understand these instructions prior to any installation.
Installer must give a copy of this manual to the owner.

Owner
Keep this manual in a safe place in order to provide your service technician with necessary information.

Roberts-Gordon LLC
1250 William Street
P.O. Box 44
Buffalo, New York 14240-0044
Telephone: +1.716.852.4400
Fax: +1.716.852.0854
Toll Free: 800.828.7450
www.robertsgordon.com

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P/N 131200NA Rev C 02/18
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SECTION 1: HEATER SAFETY

Your Safety is Important to Us!
This symbol is used throughout the manual to notify you of possible fire, electrical or burn hazards. Please pay special attention when reading and following the warnings in these sections.

Installation, service and annual inspection of heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

Read this manual carefully before installation, operation or service of this equipment.

This heater is designed for heating nonresidential indoor spaces. Do not install in residential spaces. This heater is not certified to meet the requirements of NFPA30A-2012 Section 7.6.6. (maximum tube temperature of 750 °F (399 °C)). Do not install this heater in facilities where compressed natural gas (CNG) or liquid natural gas (LNG) are present. These instructions, the layout drawing, local codes and ordinances, and applicable standards that apply to gas piping, electrical wiring, venting, etc. must be thoroughly understood before proceeding with the installation.

Protective gear is to be worn during installation, operation and service in accordance to the Occupational Safety and Hazard Administration (OSHA). Gear must be in accordance to NFPA 70E, latest revision when working with electrical components. Thin sheet metal parts have sharp edges. To prevent injury, the use of work gloves is recommended. The use of gloves will also prevent the transfer of body oils from the hands to the surface of the reflector.

Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of the appliance are compatible.

This heater must be applied and operated under the general concepts of reasonable use and installed using best building practices.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do no play with the appliance.

For additional copies of the Installation, Operation and Service Manual, please contact Roberts-Gordon LLC.

1.1 Manpower Requirements
To prevent personal injury and damage to the heater, two persons will be required for installation.

1.2 Safety Labels and Their Placement
Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. See Page 2, Figure 1 through Page 3, Figure 2.

1.3 California Proposition 65
In accordance with California Proposition 65 requirements, a warning label must be placed in a highly visible location on the outside of the equipment (i.e., near equipment's serial plate). See label placement drawing on Page 2, Figure 1 for label location. Avoid placing label on areas with extreme heat, cold, corrosive chemicals or other elements. To order additional labels, please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor.
### FIGURE 1: Top and Bottom Panel Label Placement

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logo Label</td>
<td>91013221</td>
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<tr>
<td>Rating Plate Label</td>
<td>91010401</td>
</tr>
<tr>
<td>Gas Connection Label</td>
<td>91018122</td>
</tr>
<tr>
<td>Proposition 65 Label</td>
<td>91070016</td>
</tr>
<tr>
<td>Burner Status Label</td>
<td>91033301</td>
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</tbody>
</table>
FIGURE 2: Side and Back Panel Label Placement

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Wiring Label</td>
<td>91030310</td>
</tr>
<tr>
<td>Clearances to Combustibles Label</td>
<td>91013436</td>
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<tr>
<td>Vent Length Label</td>
<td>91039500</td>
</tr>
<tr>
<td>Thermostat Connection Label</td>
<td>91037930</td>
</tr>
</tbody>
</table>

Control Side Panel

Clearances to Combustibles Label

Wiring Label

Vent Length Label

Lighting Instruction Plate Label
SECTION 2: INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- To install the heater, as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Roberts-Gordon recommends the installer contact a local Building Inspector or Fire Marshal for guidance.
- To use the information given in a layout drawing and in the manual together with the cited codes and regulations to perform the installation.
- To install the heater in accordance with the clearances to combustibles.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports.
- To provide access to burners for servicing on all sides for burner removal.
- To provide the owner with a copy of this installation, operation and service manual.
- To never use heater as support for a ladder or other access equipment and never hang or suspend anything from heater.
- To ensure there is adequate air circulation around the heater and to supply air for combustion, ventilation and distribution in accordance with local codes.
- To safely and adequately install heater using materials with a minimal working load of 75 lbs (33 kg).
- To ensure the heater is placed in a approved application.

2.1 Wall Tag

A laminated wall tag is available for the heater as a permanent reminder of the safety instructions and the importance of the required clearances to combustibles. Please contact Roberts-Gordon or your ROBERTS GORDON® independent distributor to obtain the wall tag. Affix the tag by peeling off the backing of the adhesive strips on the rear surface and position the tag on a wall near the heater (e.g. thermostat or ROBERTS GORDON® Controller).

A copy of the wall tag (P/N 91037912) is illustrated on the back cover. For an immediate solution, you may affix this copy on the wall near the heater.

Know your model number and installed configuration. Model number and installed configuration are found on the burner and in the Installation, Operation and Service Manual. See Page 5, Figure 3 through Page 8, Figure 12. Write the proper clearance dimensions in permanent ink according to your model number and configuration in the open spaces on the tag.

2.2 Corrosive Chemicals

CAUTION

Product Damage Hazard

Do not use heater in area containing corrosive chemicals.

Refer to appropriate Material Safety Data Sheets (MSDS).

Failure to follow these instructions can result in product damage.

Roberts-Gordon cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. It is essential that the contractor, the sub-contractor, or the owner identifies the presence of combustible materials, corrosive chemicals or halogenated hydrocarbons* anywhere in the premises.

* Halogenated Hydrocarbons are a family of chemical compounds characterized by the presence of halogen elements (fluorine, chlorine, bromine, etc.). These compounds are frequently used in refrigerants, cleaning agents, solvents, etc. If these compounds enter the air supply of the burner, the life span of the heater components will be greatly reduced. An outside air supply must be provided to the burners whenever the presence of these compounds is suspected. Warranty will be invalid if the heater is exposed to halogenated hydrocarbons.

2.3 National Standards and Applicable Codes

All appliances must be installed in accordance with the latest revision of the applicable standards and national codes. This refers also to the electric, gas and venting installation. Note: Additional standards for installations in Public Garages, Aircraft Hangars, etc. may be applicable.
SECTION 3: CLEARANCES TO COMBUSTIBLES

3.1 Required Clearances to Combustibles

Clearances are the required distances that combustible objects must be away from the heater to prevent serious fire hazards. Combustibles are materials that may catch on fire and include common items such as wood, paper, rubber, fabric, etc. Maintain clearances to combustibles at all times for safety.

Clearances for all heater models are located on the burner of the heater and on Page 5, Figure 3 through Page 8, Figure 12 in this manual. Check the clearances on each burner for the model heater being installed to make sure the product is suitable for your application and the clearances are maintained. Read and follow the safety guidelines below:

- Keep gasoline or other combustible materials including flammable objects, liquids, dust or vapors away from this heater or any other appliance.
- The stated clearances to combustibles represents a surface temperature of 90° F (32°C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, triply, etc) may be subject to degradation at lower temperatures. It is the installer’s responsibility to assure that adjacent materials are protected from degradation.
- Maintain clearances from heat sensitive equipment and workstations.
- Maintain clearances from vehicles parked below the heater.
- Maintain clearances from swinging and overhead doors, overhead cranes, vehicle lifts, partitions, storage racks, hoists, building construction, etc.

NOTE: 1. All dimensions are from the surfaces of all tubes, couplings and elbows.
   2. Clearances B, C and D can be reduced by 50% after 25’ (7.5 m) of tubing downstream from where the burner and burner tube connect.

### FIGURE 3: LEVEL REFLECTOR

<table>
<thead>
<tr>
<th>Model</th>
<th>A (inches)</th>
<th>B (inches)</th>
<th>C (inches)</th>
<th>D (inches)</th>
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<table>
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<th>C (centimeters)</th>
<th>D (centimeters)</th>
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<td>209</td>
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</tbody>
</table>

**WARNING**

Fire Hazard

Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.

Some objects will catch fire or explode when placed close to heater.

Failure to follow these instructions can result in death, injury 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 required clearances from the heater to the combustibles. Signs must be posted adjacent to the heater thermostat. In the absence of a thermostat, signs must be posted in a conspicuous location.
- Consult local Fire Marshal, Fire Insurance Carrier or other authorities for approval of proposed installation when there is a possibility of exposure to combustible airborne materials or vapors.
- Hang heater in accordance to the minimum suspension requirements on Page 16, Figure 15.
- If the radiant tubes must pass through the building structure, be sure that adequate sleeving and fire stop is installed to prevent scorching and/or fire hazard.
NOTE: 1. All dimensions are from the surfaces of all tubes, couplings and elbows.
2. Clearances B, C and D can be reduced by 50% after 25' (7.5 m) of tubing downstream from where the burner and burner tube connect.

### FIGURE 4: LEVEL SIDE REFLECTOR

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
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### FIGURE 5: TWO SIDE REFLECTORS

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### FIGURE 6: 45° TILT REFLECTOR

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<th>Model</th>
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</table>
**NOTE:** 1. All dimensions are from the surfaces of all tubes, couplings and elbows.
2. Clearances B, C and D can be reduced by 50% after 25' (7.5 m) of tubing downstream from where the burner and burner tube connect.

---

**FIGURE 7: U-TUBE, LEVEL REFLECTOR**

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<tr>
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<th>(centimeters)</th>
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<td>CTH2V-80</td>
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<td>CTH2V-100</td>
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<td>CTH2V-150</td>
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<tr>
<td>CTH2V-175</td>
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**FIGURE 8: U-TUBE, 45°**

<table>
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<tr>
<th>Model</th>
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<th>(centimeters)</th>
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<tr>
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<td>A</td>
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<tr>
<td>CTH2V-40</td>
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<td>8</td>
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<td>CTH2V-60</td>
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<td>CTH2V-80</td>
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<tr>
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<td>74</td>
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<tr>
<td>CTH2V-150</td>
<td>12</td>
<td>76</td>
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</table>

**FIGURE 9: U-TUBE, OPPOSITE 45° REFLECTOR**

<table>
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<th>Model</th>
<th>(inches)</th>
<th>(centimeters)</th>
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<tr>
<td>CTH2V-40</td>
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<td>CTH2V-60</td>
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<td>CTH2V-80</td>
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<td>10</td>
<td>70</td>
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<tr>
<td>CTH2V-125</td>
<td>12</td>
<td>74</td>
</tr>
<tr>
<td>CTH2V-150</td>
<td>12</td>
<td>76</td>
</tr>
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</table>
NOTE: 1. All dimensions are from the surfaces of all tubes, couplings and elbows.
2. Clearances B, C and D can be reduced by 50% after 25’ (7.5 m) of tubing downstream from where the burner and burner tube connect.

### Figure 10: 2-Foot Deco Grille and Protective Grille

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td>CTH2V-60</td>
<td>6</td>
<td>35</td>
<td>63</td>
<td>35</td>
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<td>38</td>
<td>66</td>
<td>38</td>
<td>16</td>
<td>97</td>
<td>168</td>
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<td>CTH2V-100</td>
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<td>40</td>
<td>71</td>
<td>40</td>
<td>16</td>
<td>102</td>
<td>181</td>
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<td>CTH2V-125</td>
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<td>46</td>
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<td>16</td>
<td>117</td>
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<tr>
<td>CTH2V-150</td>
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<td>50</td>
<td>80</td>
<td>50</td>
<td>16</td>
<td>127</td>
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<td>CTH2V-175</td>
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<td>21</td>
<td>133</td>
<td>209</td>
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### Figure 11: Lower Clearance Shield*

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<th>C</th>
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<td>39</td>
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<td>84</td>
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<td>CTH2V-80</td>
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<td>38</td>
<td>40</td>
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<td>102</td>
<td>97</td>
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<tr>
<td>CTH2V-100</td>
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<td>50</td>
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<td>16</td>
<td>127</td>
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<td>- UNAPPROVED -</td>
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<td>- UNAPPROVED -</td>
<td></td>
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</table>

*When installed in the first 10’ (3 m).

### Figure 12: Venting

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<th>F</th>
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<th>E</th>
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<td>18</td>
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<td>51</td>
<td>61</td>
<td>46</td>
</tr>
<tr>
<td>CTH2V-100</td>
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<td>24</td>
<td>18</td>
<td>51</td>
<td>61</td>
<td>46</td>
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<tr>
<td>CTH2V-125</td>
<td>20</td>
<td>24</td>
<td>18</td>
<td>51</td>
<td>61</td>
<td>46</td>
</tr>
<tr>
<td>CTH2V-150</td>
<td>20</td>
<td>30</td>
<td>18</td>
<td>51</td>
<td>77</td>
<td>46</td>
</tr>
<tr>
<td>CTH2V-175</td>
<td>20</td>
<td>30</td>
<td>18</td>
<td>51</td>
<td>77</td>
<td>46</td>
</tr>
</tbody>
</table>
## 4.1 Gas Codes

The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.


Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

### 4.2 Aircraft Hangars

Installation in aircraft hangars must be in accordance with the following codes:

United States: Refer to Standard for Aircraft Hangars, NFPA 409 - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

In aircraft storage and servicing areas, heaters shall be installed at least 10' (3 m) above the upper surface of wings or of engine enclosures of the highest aircraft which may be housed in the hangar. The measurement shall be made from the wing or engine enclosure (whichever is higher from the floor) to the bottom of the heater.

- In shops, offices and other sections of aircraft hangars communicating with aircraft storage or servicing areas, heaters shall be installed not less than 8' (2.4 m) above the floor.
- Suspended or elevated heaters shall be so located in all spaces of aircraft hangars that they shall not be subject to injury by aircraft, cranes, movable scaffolding or other objects. Provisions shall be made to assure accessibility to suspended heaters for recurrent maintenance purposes.

### 4.3 Public Garages

Installation in garages must be in accordance with the following codes:


Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

- Heaters must not be installed less than 8' (2.4 m) above the floor. Minimum clearances to combustibles must be maintained from vehicles parked below the heater.
- When installed over hoists, minimum clearances to combustibles must be maintained from the upper most point of objects on the hoist.

### 4.4 Electrical

The heater must be electrically grounded in accordance with the following codes:

United States: Refer to National Electrical Code®, NFPA 70 - latest revision. Wiring must conform to the most current National Electrical Code®, local ordinances and any special diagrams furnished.

Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.

### 4.5 Venting

The venting must be installed in accordance with the requirements within this manual and the following codes:


Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

### 4.6 High Altitude

These heaters are approved for installations up to 2000' (610 m)(US), 4500' (1370 m)(Canada) without modification. Consult factory if US installation is above 2000' (610 m) or Canadian installation is above 4500' (1370 m).
SECTION 5: MAJOR COMPONENTS

FIGURE 13: Major Component Descriptions - Standard Reflector

Burner with Tube Gasket
- Must be installed with the flame observation window facing down.

Burner Tube
- Supplied in 10’ (3 m) lengths. Burner tube is always the first tube after the burner.

Standard Reflector (Aluminum or Stainless Steel)
- Alternate overlap as shown on overview and on Page 18, Figure 17. Minimum overlap is 6” (16 cm).

Tube
- Hot rolled or heat treated aluminized tube supplied in 10’ (3 m) lengths.

Coupling Assembly with Lock

Reflector End Cap
- Punch out center section to accommodate tube.

Vent Adapter

Turbulator
- Install turbulator as specified in the "Turbulator Installation" chart. See Page 22, Step 6.4. Turbulator is not required on the CTH2V-125/150/175.

Flex Gas Line with Shut Off Cock
**FIGURE 14: Major Component Descriptions - High Efficiency Reflector**

- **Burner with Tube Gasket**
  Must be installed with the flame observation window facing down.

- **Burner Tube**
  Supplied in 10' (3 m) lengths. Burner tube is always the first tube after the burner.

- **High Efficiency Reflector (Aluminum)**
  Alternate overlap as shown on overview and on Page 18, Figure 17.
  Minimum overlap is 6" (16 cm).

- **Tube**
  Hot rolled or heat treated aluminized tube supplied in 10' (3 m) lengths.

- **Tube and Reflector Hanger with Clamp Package-EF**
  Position this hanger no more than 4" (10 cm) away from the burner.

- **Tube and Reflector Hanger-EF**
  Suspend system from these hangers.

- **Coupling Assembly with Lock**

- **Reflector End Cap-EF**
  Punch out center section to accommodate tube.

- **Flex Gas Line with Shut Off Cock**

- **Reflectors Support Strap & Wire Form**

- **Turbulator**
  Install turbulator as specified in the "Turbulator Installation" chart. See Page 22, Step 6.4.
  Turbulator is not required on the CTH2V-125/150/175.
### 5.1 Standard Parts List

#### Table 1: Contents of the Burner Carton

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>CTH2V-40</th>
<th>CTH2V-60</th>
<th>CTH2V-80</th>
<th>CTH2V-100</th>
<th>CTH2V-125</th>
<th>CTH2V-150</th>
<th>CTH2V-175</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>1</td>
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<td>1</td>
<td>1</td>
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<td>02568200</td>
<td>Gasket (Burner to Burner Tube)</td>
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<td>Installation, Operation and Service Manual</td>
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<td>4</td>
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<td>96411600</td>
<td>Split Lock washer</td>
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<td>4</td>
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<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<td>91201708</td>
<td>Pipe Nipple (Black) 1/2” NPT x 4”</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>91317300</td>
<td>1/4” Quick Disconnect (Wire)</td>
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<tr>
<td>*91412200</td>
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</table>

*Canadian Models: Rubber (Type 1) Gas Hoses available as an accessory. See Page 42, Section 9.

#### Table 2: Contents of Standard Core and Extension Packages

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Core Packages</th>
<th>Extension Packages</th>
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<td></td>
<td>Hot Rolled</td>
<td>Aluminized</td>
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<tr>
<td></td>
<td></td>
<td>20’ (6m)</td>
<td>30’ (9m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10’ (3m)</td>
<td>20’ (6m)</td>
</tr>
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<td>Tube, Hot Rolled Steel, 10’ (3 m)</td>
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<tr>
<td>91409408</td>
<td>Tube, HT Aluminized, 10’ (3 m)</td>
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<td>- 1 2 3</td>
</tr>
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<tr>
<td>02750303</td>
<td>Standard Reflector, 8’ (3.5 m)</td>
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<td>2 3 4 6</td>
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<td>End Cap</td>
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<tr>
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<td>Tube Clamp Package</td>
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<td>Extension Packages</td>
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<td></td>
<td>Hot Rolled</td>
<td>Aluminized</td>
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<td>20&quot; (6m)</td>
<td>30&quot; (9m)</td>
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<td>S-Hook</td>
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**Part Number**

- CP20RSEF
- CP30RSEF
- CP40RSEF
- CP10ALUMEF
- CP20ALUMEF
- CP30ALUMEF
- CP40ALUMEF
- EXP10RSEF
- EXP20RSEF
- EXP30RSEF
- EXP40RSEF
- EXP10ALUMEF
- EXP20ALUMEF
- EXP30ALUMEF
- EXP40ALUMEF
Although not recommended, additional tube lengths may be added to the heater. Tubing must be hot-rolled steel, aluminized (heat-treated) or porcelain coated. Additional tube lengths beyond the specified minimum tubing length are considered vent pipe for length determination. Maximum vent length allowed is 45’ (13.7 m) total.
To ensure your safety, and comply with the terms of the warranty, all units must be installed in accordance with these instructions.

The gas or the electrical supply lines must not be used to support the heater.

Do not locate the gas or electric supply lines directly over the path of the flue products from the heater.

The heater must be installed in a location that is readily accessible for servicing.

The heaters must be installed in accordance with clearances to combustibles as indicated on the rating plate and in this instruction manual.

The minimum and maximum gas inlet pressures must be maintained as indicated on the rating plate.
FIGURE 15: Critical Hanger Placement

Typical Suspension Details

- Beam Clamp
- Anchor
- Screw Hook 3/8"
- Concrete Beam
- Wood Beam
- Washer
- Chain Size 3/16"
- Minimum
- S-hooks
- Turnbuckle Not Included

- Run Length
  - 10' (3 m) - 50' (15 m) ±1" (3 cm) 12" (305 mm)
  - 51' (15 m) - 60' (18 m) ±2" (5 cm) 18" (457 mm)
  - 61' (18 m) - 70' (24 m) ±3" (8 cm) 24" (609 mm)

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-Hook</td>
<td>91907302</td>
</tr>
<tr>
<td>Tube/Reflector Hanger</td>
<td>030901XX</td>
</tr>
</tbody>
</table>

* Allows for thermal expansion of system

24" min. (61 cm) "X" 10' (3 m) - 50' (15 m) ±1" (3 cm) 12" (305 mm)
51' (15 m) - 60' (18 m) ±2" (5 cm) 18" (457 mm)
61' (18 m) - 70' (24 m) ±3" (8 cm) 24" (609 mm)

Side View

Must Be Within 4" (10 cm)

Front View

Hanger Reflector
FIGURE 16: Linear Heater Assembly Overview
**LEGEND**

- **Burner**
- **Reflector**
- **Tube**
- **Tube/Reflector Hanger**
- **Coupling Assembly**
- **Vent Adapter**

**DIMENSIONS**

- **a = 14" (36 cm)**
  reflector width (not shown)
- **b = 2" (5 cm)**
  end cap to burner
- **c = 2" (5 cm)**
  end cap to hanger
- **d = 7'6" (229 cm)**
  distance first hanger
- **e = 10' (305 cm)**
  distance between hangers
- **f = 9.5" (24 cm)**
  burner height
- **g = 11.5" (29.2 cm)**
  burner length
FIGURE 18: Linear Heater Layout Overview (Continued)
Step 6.1 Burner Tube Installation

NOTE: Tubing requires a downward slope of 1/2" (1.3 cm) per 20' (6 m) away from burner.

Offset mounting hole must be to the top.

Weld seam must be to the bottom of the tube.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burner Tube</td>
<td>03051XXX</td>
</tr>
<tr>
<td>S-Hook</td>
<td>91907302</td>
</tr>
<tr>
<td>Tube/Reflector Hanger</td>
<td>030901XX</td>
</tr>
</tbody>
</table>

Step 6.2 Tube Clamp Package Installation

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Clamp Package</td>
<td>013189XX</td>
</tr>
</tbody>
</table>
Step 6.3 Coupling and Tube Assembly

A Close coupling and slide opposite end into tab. Position tab underneath guide rail.

B Insert wide end of slide bar/coupling lock into guide rail on opposite end of tabs. Slide the slide bar/coupling lock up the guide rail until snug (approximately 3" (8 cm) to 4" (10 cm)).

C Insert tubes into coupling until end of each tube rests against internal pins.

D Strike slide bar/coupling lock with mallet or hammer until tight.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling</td>
<td>01329600</td>
</tr>
<tr>
<td>Slide Bar/Coupling Lock</td>
<td>01329700</td>
</tr>
<tr>
<td>Tube</td>
<td>91409XXX</td>
</tr>
</tbody>
</table>

Step 6.3.1 Coupling and Tube Assembly (Continued)

Tighten slide bar as shown below.

Be sure not to over tighten slide bar/coupling lock. Slide bar/coupling lock should be within tolerance listed below.

Correct slide bar dimensions

Incorrect slide bar position

• Repeat Step 6.3 A - D until all tubes are assembled. See Page 22, Section 6.3.2.
Step 6.3.2 Coupling and Tube Assembly (Continued)

<table>
<thead>
<tr>
<th>Model</th>
<th>Tube Length Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTH2V-40</td>
<td>10’ (3 m)</td>
</tr>
<tr>
<td>CTH2V-60</td>
<td>20’ (6 m)</td>
</tr>
<tr>
<td>CTH2V-80</td>
<td>20’ (6 m)</td>
</tr>
<tr>
<td>CTH2V-100</td>
<td>30’ (9 m)</td>
</tr>
<tr>
<td>CTH2V-125</td>
<td>40’ (12 m)</td>
</tr>
<tr>
<td>CTH2V-150</td>
<td>50’ (15 m)</td>
</tr>
<tr>
<td>CTH2V-175</td>
<td>60’ (18 m)</td>
</tr>
</tbody>
</table>

7’ 6” ± 1’
(229 cm ± 25 cm)

10’ ± 1’
(305 cm ± 25 cm)

Total Overall Tube Length

Step 6.4 Turbulator Installation

Install turbulator as specified in the "Turbulator Installation" charge below. Turbulator is not required on the CTH2V-125, 150, 175.

<table>
<thead>
<tr>
<th>Turbulator Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>CTH2V-40</td>
</tr>
<tr>
<td>CTH2V-60</td>
</tr>
<tr>
<td>CTH2V-80</td>
</tr>
<tr>
<td>CTH2V-100</td>
</tr>
<tr>
<td>CTH2V-125</td>
</tr>
<tr>
<td>CTH2V-150</td>
</tr>
<tr>
<td>CTH2V-175</td>
</tr>
</tbody>
</table>

Turbulator Section (stainless) used in CTH2D-40 heaters must be in the section of tube nearest to the burner.

Fold tab around outside of tube nearest to the vent to hold turbulator in place. Where a vent sleeve is used, do not fold tab.
Step 6.5 Reflector Installation

![Warning Symbol]

**WARNING**

Fire Hazard

Support reflector with reflector hanger and support strap.

Reflector must not touch tube.

Failure to follow these instructions can result in death, injury or property damage.

**NOTE:** All tube surfaces must be covered by a reflector, except for a U-Tube.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube/Reflector Hanger</td>
<td>030901XX</td>
</tr>
<tr>
<td>Burner Tube</td>
<td>03051XXX</td>
</tr>
<tr>
<td>Reflector - 96&quot; (244cm)</td>
<td>027503XX</td>
</tr>
</tbody>
</table>
Step 6.5.1 Reflector, U-Clip and Reflector Support Installation

The pictorial drawings of the heater construction in Section 6 are schematic only and provide a general guideline of where hangers, reflector supports and U-clips are to be installed.

To ensure proper expansion and contraction movement of the reflectors, a combination of U-clips and reflector supports are used. The positioning of reflectors and U-clips depends on the individual installation. Use either pop rivets or sheet metal screws instead of u-clips when installing end caps and joint pieces in areas where impact and high wind may be a factor. The following rules must be observed.

1. Slide first reflector after burner a minimum 2" (4 cm) through first hanger and ensure reflector end cap is securely fastened via U-clips, pop rivets, or sheet metal screws. Position reflector support with tight screws in middle of first reflector.

2. The overlap at the first and second reflector is a slip overlap. Thereafter, every third reflector joint is a slip overlap. A slip overlap is achieved by either:
   a.) both reflectors lay inside a hanger.
   b.) using a reflector support with loose screws at the reflector overlap.

3. The remaining reflector overlaps require a non-slip overlap connection. To affix the reflectors together in a non-slip overlap either:
   a.) use reflector support and tight screws.
   b.) if both reflectors lay inside a hanger, u-clips or sheet metal screws may be used.

   This section of three reflectors joined together must be affixed to the tube with at least one reflector support with tight screws.

---

**NOTE:** High efficiency reflectors should NOT be used in applications exposed to wind.

---

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflector Support Package</td>
<td>030500XX</td>
</tr>
<tr>
<td>Wire Form</td>
<td>91908004</td>
</tr>
<tr>
<td>Reflector Support Strap</td>
<td>030500XX</td>
</tr>
<tr>
<td>Screw #8 x 3/4</td>
<td>94320812</td>
</tr>
<tr>
<td>U-Clip Package</td>
<td>91107720</td>
</tr>
<tr>
<td>Reflector End Cap</td>
<td>027508XX</td>
</tr>
</tbody>
</table>
Step 6.6 Burner Installation

NOTE: To ensure proper orientation, attached burner tube with tube weld facing downward

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burner</td>
<td>031XXXXX</td>
</tr>
<tr>
<td>Lock Washer</td>
<td>9641600</td>
</tr>
<tr>
<td>Gasket</td>
<td>02568200</td>
</tr>
</tbody>
</table>

Burner must be installed with the flame observation window facing down.
SECTION 7: OPTIONAL HEATER ACCESSORIES

WARNING

Cut/Pinch Hazard
Wear protective gear during installation, operation and service.
Edges are sharp.
Failure to follow these instructions can result in injury.

7.1 U-Tube Configuration
Heaters (except CTH2V-40) are approved for optional U-Tube configurations.

The U-Tube may be installed in either a standard horizontal position, a 45° position or in an opposite 45° position as shown on Page 7, Figure 7 through Figure 9. When using a U-Tube configuration, the following additional rules must be adhered to:

- A minimum of 10' (3 m) on CTH2V-60/80 and a minimum of 15' (4.5 m) on CTH2V-100/125/150/175 is required between the burner and the U-Tube.
- The correct turbulator (See Page 22, Figure 6.4) must be installed in the last standard section of tube.
- The burner must never be operated in a tilted position.
- The heater must be properly supported at all locations. See Page 28, Figure 20.
### FIGURE 19: U-Tube Heater Assembly Overview

- **U-Tube Support Bracket**
- **Reflector Support**
- **Burner**
- **Turbulator with Select Models**
- **U-Clips**
- **Reflector End Caps**
- **U-Tube**
- **Tube Clamp Package**
- **Burner Tube**
- **Couplings**

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U-Tube Package</strong></td>
<td>03011XXX</td>
</tr>
<tr>
<td>180° U-Tube</td>
<td>013359XX</td>
</tr>
<tr>
<td>Tube and Reflector Hanger</td>
<td>030901XX</td>
</tr>
<tr>
<td>Coupling</td>
<td>01312700</td>
</tr>
<tr>
<td>Reflector End Cap</td>
<td>027508XX</td>
</tr>
<tr>
<td>U-Tube Support Bracket</td>
<td>030205XX</td>
</tr>
<tr>
<td>4&quot; (10 cm) U-Bolts</td>
<td>91912500</td>
</tr>
<tr>
<td><strong>Reflector Support Set</strong></td>
<td>030500XX</td>
</tr>
<tr>
<td>S-Hook</td>
<td>91907302</td>
</tr>
<tr>
<td>Hex Nut</td>
<td>92113000</td>
</tr>
<tr>
<td>Lock Washer</td>
<td>96441500</td>
</tr>
</tbody>
</table>

1. **Tight U-Bolt**: 4" (10 cm) U-Bolt secured to Burner Tube with 1/4" (6 mm) Lockwashers and 1/4-20 Hex Nuts.
2. **Loose U-Bolt**: 4" (10 cm) U-Bolt, secured to Bracket with 1/4" (6 mm) Lockwashers and 1/4-20 Hex Nuts on top and bottom to allow for tube expansion and contraction.
FIGURE 20: U-Tube Heater Layout Overview

LEGEND

Burner
Reflector
Tube 10'
Tube 5' **
Tube/Reflector Hanger
Coupling Assembly
U-Tube

a = 14" (36 cm)
reflector width (not shown)

b = 2" (5 cm)
end cap to burner

c = 2" (5 cm)
end cap to hanger

d = 76" (229 cm)
distance first hanger

e = 10' (305 cm)
distance between hangers

f = 5' (153 cm)
distance between last full tube hanger and half tube hanger

g = 11.5" (29.2 cm)
burner length

h = 9.5" (24 cm)
burner height

*Requires the last reflector before the U-Tube to be cut in half for use on both sides.

**Requires the last tube before the U-Tube to be cut in half for use on both sides.
FIGURE 21: U-Tube Heater Layout Overview (Continued)

50’ Tube Length

60’ Tube Length

70’ Tube Length

80’ Tube Length
7.2 Elbow Package Configuration

Step 7.2.1 Elbow Installation

Step 7.2.2 Elbow Installation

Step 7.2.3 Reflector Joint Installation
Step 7.2.4 Reflector Joint Installation

Cut away contour with tin snips.

Punch/drill six 3/32" (2 mm) holes.

Step 7.2.5 Reflector Joint Detail

Install reflector end cap.

Attach reflector joint with six #8 sheet metal screws.

FIGURE 22: Reflector Joint Detail
7.3 Reflector Side Extension

Step 7.3.1 Bracket Installation

- Use additional supports in high air movement applications.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflector Side Extension Package</td>
<td>0271270X</td>
</tr>
<tr>
<td>Reflector Side Extension - 96&quot; (244cm)</td>
<td>0136800X</td>
</tr>
<tr>
<td>Retainer Clips</td>
<td>02751200</td>
</tr>
<tr>
<td>Sheet Metal Screws</td>
<td>94118106</td>
</tr>
</tbody>
</table>

Order Separately

- Reflector Side Extension Bracket 01329911

Step 7.3.2 Side Reflector Installation

- #8 x 3/8 (3.9 x 9.5 mm) Sheet Metal Screw
- Cut relief notches for supports and hangers.
7.4 Lower Clearance Shield Installation

Step 7.4.1 Shield Support Strap Assembly

![Diagram of Shield Support Strap Assembly]

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Clearance Shield Package</td>
<td>01397501</td>
</tr>
<tr>
<td>Shield Support Strap</td>
<td>01397500</td>
</tr>
<tr>
<td>Lower Clearance Shield 8’ (2447cm)</td>
<td>02793000</td>
</tr>
<tr>
<td>Locknut #8</td>
<td>92311400</td>
</tr>
<tr>
<td>Flat Washer #8</td>
<td>95310800</td>
</tr>
<tr>
<td>Screw #8 x 3/8”</td>
<td>93511406</td>
</tr>
</tbody>
</table>

7.5 Two-Foot Decorative Grille Installation

Step 7.5.1 Grille Installation

![Diagram of Decorative Grille Installation]

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Grille 2’ x 4’ (.6 m x 1.2 m)</td>
<td>91407000</td>
</tr>
</tbody>
</table>
Step 7.5.2 Frame Shield Installation

Step 7.5.3 Reflector Side Extension Installation for Decorative Grilles

**NOTE:** If the decorative grille system is to be installed in an area with considerable air movement, it is recommended that one #8 x 3/8" sheet metal screw be installed per reflector extension to prevent it from blowing over.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deco Grille Shield - 24&quot; (61cm)</td>
<td>01365900</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance “A”</th>
<th>Extension</th>
<th>Part No.</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
<td>013704XX</td>
<td>8&quot; (20 cm)</td>
</tr>
<tr>
<td>2&quot; (4 cm)</td>
<td>6&quot; (15 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot; (15 cm)</td>
<td>10&quot; (26 cm)</td>
<td>013704XX</td>
<td>12&quot; (30 cm)</td>
</tr>
<tr>
<td>10&quot; (26 cm)</td>
<td>14&quot; (37 cm)</td>
<td>013704XX</td>
<td>16&quot; (40 cm)</td>
</tr>
</tbody>
</table>

Description | Part Number |
-------------|-------------|
Reflector Side Extension | 013704XX |
7.6 Protective Grille Installation

Step 7.6.1 Silicone Cap Installation

NOTE: Protective grille available for use with standard reflector ONLY.

Step 7.6.2 Grille End Cap Installation

Step 7.6.3 Grille Installation
SECTION 8: VENTING

⚠️ WARNING

Carbon Monoxide Hazard

Heaters installed unvented must be interlocked with sufficient building exhaust.

Heaters must be installed according to the installation manual.

Failure to follow these instructions can result in death or injury.

⚠️ WARNING

Cut/Pinch Hazard

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

8.1 General Venting Requirements

This heater must be vented in accordance with the rules contained in this manual and with the following national codes and any state, provincial or local codes which may apply:


Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

Exhaust end of heater will accept a 4' (10 cm) vent pipe using the vent adapter (P/N 90502700). To prevent leakage of condensation, install the vent adapter with the seam on top and seal the joint using a high temperature silicone sealant.

Any portion of vent pipe passing through a combustible wall must have an approved thimble to conform with the above listed codes.

Vent pipe must be sloped downward away from the burner 1/2" (1 cm) for every 20' (6 m).

The heater may be individually vented or commonly vented. When venting horizontally, a maximum of two heaters can be commonly vented. See Page 38, Section 8.9. When venting vertically, a maximum of four heaters can be commonly vented. See Page 39, Section 8.10.

The heater may also be installed unvented in certain circumstances according to building ventilation codes. Refer to the above codes and Page 36, Section 8.2 for further information. Unvented operation also requires compliance with the clearances to combustibles given on Page 8, Figure 12.

The bottom of the vent or air intake terminal shall not be located less than 1' (.3 m) above grade level.

The vent shall not terminate less than 7' (2.1 m) above grade where located adjacent to public walkways.

Vent terminal must be installed at a height sufficient to prevent blockage by snow and building materials protected from degradation by flue gasses.

Secure all joints with #8 x 3/8 sheet metal screws. Seal all joints with high temperature silicone sealant.

Vent terminal must be beyond any combustible overhang.

8.1.1 United States Requirements

Vent must terminate at least 3' (.9 m) above any forced air inlet located within 10' (3.1 m).

Vent must terminate at least 4' (1.2 m) below, 4' (1.2 m) horizontally from, or 1' (.3 m) above any door, operable window, or gravity air inlet into any building.

8.1.2 Canadian Requirements

The vent shall not terminate within 6' (1.8 m) of a mechanical air supply inlet to any building.

The vent shall not terminate within 3' (.9 m) of a window or door that can be opened in any building, any non-mechanical air supply inlet to any building, or of the combustion air inlet of any other appliance.

8.2 Unvented Operation

Sufficient ventilation must be provided in the amount of 4 cfm per 1000 Btu/h firing rate (United States); 3 cfm per 1000 Btu/h firing rate (Canada).

Use of optional outside combustion air is not recommended with unvented heaters.

If exhaust fans are used to supply ventilation air, an interlock switch must be used to prevent the heater from coming on when the fans are off. This may be done using a pressure switch.
8.3 Horizontal Venting
In noncombustible walls only, vent terminal (P/N 02537801-1P) may be used.

For 4" (10 cm) vents in either combustible or noncombustible walls, use Tjernlund VH1-4 (P/N 90502100) or equivalent insulated vent terminal. Follow the manufacturer's instructions for proper installation.

For 6" (15 cm) common vents in either combustible or noncombustible walls, use Tjernlund VH1-6 (P/N 90502101) or equivalent insulated vent terminal. Follow the manufacturer's instructions for proper installation.

8.4 Vertical Venting
For 4" (10 cm), an approved vent cap (P/N 90502300) must be used. For 6" (15 cm) common vents, an approved vent cap (P/N 90502302) must be used. For common vertical venting of more than two heaters, See Page 39, Section 8.10. A vent shall not extend less than 2' (.6m) above the highest point where it passes through a flat roof of a building.

8.5 Unvented Operation Tube Termination
Turndown type vent terminal with a screen must be installed at the exhaust end of the tube. Vent terminal design shall not incorporate backdraft flap.

**FIGURE 23: Tube Termination**

![Tube Termination Diagram](image)

8.7 Horizontal Ventilation 4" (10 cm) Pipe

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vent Terminal (Comb. Wall)</td>
<td>90502100</td>
</tr>
<tr>
<td>Vent Terminal</td>
<td>02537801-XX</td>
</tr>
</tbody>
</table>

8.6 Length Requirements

The maximum vent length allowed is 45' (13.7 m). The maximum outside air supply duct length allowed is 45' (13.7 m).

The total vent length, plus outside air duct length, plus any extensions to minimum heat exchanger lengths, cannot exceed 65' (19.8 m).

Vent length should be limited to less than 20' (6 m). If using vent lengths greater than 20' (6 m), condensation will form in the vent pipe. Insulation and additional sealing measures (high temperature silicone at all seams) are required. Optional heat exchanger beyond minimum lengths is considered as vent length for length determination.

Subtract 15' (4.6 m) of maximum allowed vent or duct length per vent elbow if more than two are used.

8.6.1 Vent Material Recommendations

Vent recommendations:

1. Porcelain coated tubing 4" (10 cm) O.D. (P/N 9141030D)
2. Heat treated aluminized tubing 4" (10 cm) O.D. (P/N 91409408)  
   Heat treated aluminized tubing 6" (15 cm) O.D. (P/N E0009105)
   (Supplied by others)

**NOTE:** 4" (10 cm) O.D. Porcelain coated tubing (P/N 9141030D), 4" (10 cm) O.D. Heat treated aluminized tubing (P/N 91409408), and 6" (15 cm) O.D. Heat treated aluminized tubing (P/N E0009105) are equivalent to single wall flue pipe.
8.8 Vertical Ventilation 4" (10 cm) Pipe

**Requirements:**
- Maximum of two heaters can be commonly vented through a side wall.
- Heaters must be of the same BTU output.
- Heaters must be controlled by a common thermostat.

**Step 8.9 Common Sidewall Venting**

**Requirements:**
- Maximum of two heaters can be commonly vented through a side wall.
- Heaters must be of the same BTU output.
- Heaters must be controlled by a common thermostat.
8.10 Common Vertical Venting

**Requirements:**
- Maximum of four heaters can be commonly vented through the roof.
- Heaters must be of the same BTU output.
- Heaters must be controlled by a common thermostat.
- Connections to a common stack must be positioned to avoid direct opposition between streams of combustion gases.
8.11 Outside Combustion Air Supply

IMPORTANT: If the building has a slight negative pressure or corrosive contaminants, such as halogenated hydrocarbons, are present in the air, an outside combustion air supply to the heater is required. Seal all combustion air pipe joints.

Use of optional outside combustion air is not recommended with unvented heaters.

8.11.1 Length Requirements

Follow the constraints listed on Page 37, Section 8.6.

8.11.2 Vertical Outside Air Supply for Single Heater Installation

![Diagram of Vertical Outside Air Supply]

- 2' (0.61 m) Min.
- 4" (10 cm) Single Wall Pipe
- Flex Hose (Recommended)
- Band Clamp (Recommended)
- Vent Cap
- Roof

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vent Cap 4&quot; (10 cm)</td>
<td>90502300</td>
</tr>
</tbody>
</table>

8.11.3 Horizontal Outside Air Supply for Single Heater Installation

![Diagram of Horizontal Outside Air Supply]

- 4" (10 cm) Single Wall Pipe
- Flex Hose (Recommended)
- Band Clamp (Recommended)
- Vent Cap
- Wall

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vent Cap 4&quot; (10 cm)</td>
<td>90502300</td>
</tr>
</tbody>
</table>
8.11.4 Vertical Outside Air Supply for Double Heater Installation

Requirements:
- Heaters must be controlled by a common thermostat.

---

8.11.5 Horizontal Outside Air Supply for Double Heater Installation

Requirements:
- Heaters must be controlled by a common thermostat.
SECTION 9: GAS PIPING

**WARNING**

Fire Hazard

Tighten gas hose fittings to connect gas supply according to Figure 23.

Gas hose can crack when twisted.

Gas hose moves during normal operation.

Use only 36" (91 cm) long connector of 1/2" or 3/4" nominal ID.

Connector supplied with heater for U.S. models (not with Canadian models).

Failure to follow these instructions can result in death, injury or property damage.

**WARNING**

Explosion Hazard

Leak test all components of gas piping before operation.

Gas can leak if piping is not installed properly.

Do not high pressure test gas piping with heater connected.

Failure to follow these instructions can result in death, injury or property damage.

There is an expansion of the tube with each firing cycle. This will cause the burner to move with respect to the gas line. This can cause a gas leak resulting in an unsafe condition if the gas connection is not made in strict accordance with Figure 24.

Meter and service must be large enough to handle all the burners being installed plus any other connected load. The gas line which feeds the system must be large enough to supply the required gas with a maximum pressure drop of 1/2" wc. When gas piping is not included in the layout drawing, the local gas supplier will usually help in planning the gas piping.

Gas lines must meet applicable codes:

**United States:** The Flexible Stainless Steel Gas Hose (US models) supplied with the heater is certified per the Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10 - latest revision.

**Canada:** The Rubber Type 1 Gas Hose (Canadian models) optional with the heater is certified as being in compliance with the Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1 - Latest revision.

- Check the pipe and tubing ends for leaks before placing heating equipment into service. When checking for gas leaks, use a soap and water solution; never use an open flame.

Install the gas hose as shown in Figure 24. The gas hose accommodates expansion of the heating system and allows for easy installation and service of the burner. Before connecting the burners to the supply system, verify that all high pressure testing of the gas piping has been completed.
FIGURE 24: Gas Connection with Flexible Gas Hose

**CORRECT POSITIONS**

Shut-Off Valve (included with gas hose) must be parallel to burner gas inlet. The 3" (8 cm) displacement shown is for the cold condition. This displacement may reduce when the system is fired.

High Gas Pressure Regulator to be installed upstream of flexible gas hose if inlet pressure exceeds maximum allowance.

**CAUTION**

Product Damage Hazard

Hold gas nipple securely with pipe wrench when attaching gas hose.

Failure to follow these instructions can result in product damage.

Flexible Gas Hose

- **36" (91 cm) length**
- **3" (8 cm) max. displacement**

Heater Movement

**INCORRECT POSITIONS (WRONG INSTALLATION)**

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; Flexible Stainless Steel Gas Hose (US Models)</td>
<td>91412200</td>
</tr>
<tr>
<td>3/4&quot; Flexible Stainless Steel Gas Hose (US Models)</td>
<td>91412203</td>
</tr>
<tr>
<td>1/2&quot; Rubber Type 1 Gas Hose (Canadian Models)</td>
<td>91412206</td>
</tr>
<tr>
<td>3/4&quot; Rubber Type 1 Gas Hose (Canadian Models)</td>
<td>91412207</td>
</tr>
</tbody>
</table>
Heaters can be controlled using several methods. Normally thermostats are used to control the heaters but they can also be controlled by an Energy Management System. Section 10.1 below illustrates the connection for heaters controlled by a line voltage thermostat. NOTE: In order to use line voltage thermostats, the low voltage terminal located at the back of each burner must be connected as shown in the detail. For a single heater on a low voltage thermostat, See Section 10.2 below. To control multiple heaters on one low voltage thermostat, See Page 45, Section 10.3. NOTE: In order to control multiple heaters on one low voltage thermostat, the low voltage terminals on each heater must be connected as shown in detail. Heater must be grounded in accordance with applicable codes: United States: refer to National Electrical Code® NFPA 70 - latest revision Canada: refer to Canadian Electrical Code, CSA C22.1 Part I - latest revision. If any of the original internal wiring must be replaced, it must be replaced with wiring materials having a temperature rating of at least 105° C and 600 V.

10.1 Line Voltage Thermostat Wiring

10.2 Low Voltage Thermostat with One Burner
10.3 Low Voltage Thermostat Wiring with Multiple Burners

NOTE: Maximum 8 Burners Per Relay

NOTE: 24VAC thermostat cannot be powered by burners when controlling multiple burners

10.4 Internal Wiring
10.5 Ladder Diagram

10.6 Electrical Connection to the Burner

Electrical Cord or Flexible Conduit

BX or Romex Connector

Junction Box

Connect wires together with suitable approved wire connectors.

Green to Ground
White to N
Black to L
This heater is equipped with a direct spark ignition system.

11.1 Sequence of Operation
4. Turn the thermostat up. When the thermostat calls for heat, the blower motor will energize.
5. When the motor approaches nominal running RPM, the pressure switch closes and activates the ignition module.
6. After a 45 second prepurge, the ignition module then opens the gas valve and energizes the spark igniter.
7. When the flame is established, the sparking sequence ceases.
8. If the flame is not established during the ignition sequence, the ignition module closes the gas valve and purge begins. Module will try 2 additional times for ignition (with purges in between trials). If ignition is not established, the module will lockout.
9. If the flame extinguishes during operation, the ignition module will attempt the multiple trial sequence described in step 5. If ignition is not re-established, the module will lockout for one hour or until reset.
10. After lockout, the control can be reset by turning down thermostat for five seconds, and then raising it again to desired temperature, or by disconnecting power and then reconnecting.
11. When thermostat is satisfied, all power to the unit is shut off.

11.2 To Shut Off Heater
Set thermostat to lowest setting.
Turn OFF electric power to heater.
Turn OFF manual gas valve in the heater supply line.

11.3 To Start Heater
Turn gas valve and electric power OFF and wait five minutes for unburned gases to vent from heater.
Turn ON main gas valve.
Turn ON electric power.
Set thermostat to desired temperature. Burner should light automatically.

11.4 Pre-Season Maintenance and Annual Inspection
To ensure your safety and years of trouble-free operation of the heating system, service and annual inspections must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

Turn off gas and electric supplies before performing service or maintenance. Allow heater to cool before servicing.

Before every heating season, a contractor qualified in the installation and service of gas-fired heating equipment must perform a thorough safety inspection of the heater.

For best performance, the gas, electrical, thermostat connections, tubing, venting, suspensions and over-
### 11.5 Maintenance Checklist

**Installation Code and Annual Inspections:**
All installation and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon LLC and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment.

To help facilitate optimum performance and safety, Roberts-Gordon LLC recommends that a qualified contractor conduct, at a minimum, annual inspections of your ROBERTS GORDON® equipment and perform service where necessary, using only replacement parts sold and supplied by Roberts-Gordon LLC.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Vicinity of the Heater</strong></td>
<td>Do not store or use flammable objects, liquids or vapors near the heater.</td>
</tr>
<tr>
<td></td>
<td>Immediately remove these items if they are present.</td>
</tr>
<tr>
<td></td>
<td>See Page 5, Section 3.</td>
</tr>
<tr>
<td><strong>Vehicles and Other Objects</strong></td>
<td>Maintain the clearances to combustibles.</td>
</tr>
<tr>
<td></td>
<td>Do not hang anything from, or place anything on, the heater.</td>
</tr>
<tr>
<td></td>
<td>Make sure nothing is lodged underneath the reflector, in between the tubes or</td>
</tr>
<tr>
<td></td>
<td>in the decorative or protective grilles (included with select models).</td>
</tr>
<tr>
<td></td>
<td>Immediately remove objects in violation of the clearances to combustibles.</td>
</tr>
<tr>
<td></td>
<td>See Page 5, Section 3.</td>
</tr>
<tr>
<td><strong>Reflector</strong></td>
<td>Support reflector with reflector hanger and support strap.</td>
</tr>
<tr>
<td></td>
<td>Reflector must not touch tube.</td>
</tr>
<tr>
<td></td>
<td>Make sure there is no dirt, sagging, cracking or distortion.</td>
</tr>
<tr>
<td></td>
<td>Do not operate if there is sagging, cracking or distortion.</td>
</tr>
<tr>
<td></td>
<td>Make sure reflectors are correctly overlapped. See Page 24, Section 6.5.1.</td>
</tr>
<tr>
<td></td>
<td>Clean outside surface with a damp cloth.</td>
</tr>
<tr>
<td><strong>Vent Pipe</strong></td>
<td>Venting must be intact. Using a flashlight, look for obstructions, cracks on</td>
</tr>
<tr>
<td></td>
<td>the pipe, gaps in the sealed areas or corrosion.</td>
</tr>
<tr>
<td></td>
<td>The area must be free of dirt and dust. Clean as required.</td>
</tr>
<tr>
<td></td>
<td>Remove any carbon deposits or scale using a wire brush.</td>
</tr>
<tr>
<td></td>
<td>See Page 36, Section 8.</td>
</tr>
<tr>
<td><strong>Outside Air Inlet</strong></td>
<td>Inlet must be intact. Look for obstructions, cracks on the pipe, gaps in the</td>
</tr>
<tr>
<td></td>
<td>sealed areas or corrosion.</td>
</tr>
<tr>
<td></td>
<td>The area must be free of dirt and dust. Clean and reinstall as required.</td>
</tr>
<tr>
<td><strong>Tubes</strong></td>
<td>Make sure there are no cracks.</td>
</tr>
<tr>
<td></td>
<td>Make sure tubes are connected and suspended securely.</td>
</tr>
<tr>
<td></td>
<td>See Page 15, Section 6.</td>
</tr>
<tr>
<td></td>
<td>Make sure there is no sagging, bending or distortion. Clean or replace as required.</td>
</tr>
<tr>
<td><strong>Gas Line</strong></td>
<td>Check for gas leaks. See Page 42, Section 9.</td>
</tr>
<tr>
<td><strong>Burner Observation Window</strong></td>
<td>Make sure it is clean and free of cracks or holes.</td>
</tr>
<tr>
<td></td>
<td>Clean and replace as required.</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Blower Scroll, Wheel and Motor</strong></td>
<td>Compressed air or a vacuum cleaner may be used to clean dust and dirt.</td>
</tr>
<tr>
<td><strong>Burner Cup and Orifice</strong></td>
<td>Clear of obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner.</td>
</tr>
<tr>
<td><strong>Electrode</strong></td>
<td>Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrode. The electrode gap should be 1/8” (3.2 mm).</td>
</tr>
<tr>
<td><strong>Thermostat</strong></td>
<td>There should be no exposed wire or damage to the thermostat. See Page 44, Section 10.</td>
</tr>
<tr>
<td><strong>Suspension Points</strong></td>
<td>Make sure the heater is hanging securely. Look for signs of wear on the chain or ceiling. See Page 16, Figure 15.</td>
</tr>
<tr>
<td><strong>Decorative and Protective Grille (optional)</strong></td>
<td>The grille must be securely attached. Check that the side reflector extensions are installed correctly and secured in place if necessary. (Decorative grille only.) See Page 33, Section 7.5 and Page 35, Section 7.6. Make sure shield is installed correctly and secured in place if necessary. (Decorative grille only.) See Page 34, Section 7.5.2.</td>
</tr>
<tr>
<td><strong>Lower Clearance Shield (optional)</strong></td>
<td>The lower shield must be securely attached. Inspect shield support straps and lower clearance shield anchor points. See Page 33, Section 7.4. Make sure shield is installed correctly and secured in place if necessary. See Page 33, Section 7.4.</td>
</tr>
<tr>
<td><strong>Wall Tag</strong></td>
<td>If wall tag is present, make sure it is legible and accurate. Please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor, if you need a wall tag. See Page 4, Section 2.1.</td>
</tr>
<tr>
<td><strong>Safety Labels</strong></td>
<td>Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. See Page 2, Figure 1 through Page 3, Figure 2.</td>
</tr>
</tbody>
</table>
SECTION 12: TROUBLESHOOTING

⚠️ DANGER

Electrical Shock Hazard

Disconnect electric before service.
Heater must be properly earthed.
Failure to follow these instructions can result in death or electrical shock.

⚠️ WARNING

Fire Hazard
Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.
Some objects will catch fire or explode when placed close to heater.

Explosion Hazard
Turn off gas supply to heater before service.

Burn Hazard
Allow heater to cool before service.
Tubing may still be hot after operation.

Cut/Pinch Hazard
Wear protective gear during installation, operation and service.
Edges are sharp.

Failure to follow these instructions can result in death, injury or property damage.
**12.1 Troubleshooting Flow Chart**

**Module Diagnostic Codes:**

<table>
<thead>
<tr>
<th>LED</th>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 second steady flash at start of cycle</td>
<td><strong>Normal</strong></td>
<td>Wait for valve to open</td>
</tr>
<tr>
<td>Steady on</td>
<td><strong>Microprocessor failure within module</strong></td>
<td>Replace module</td>
</tr>
<tr>
<td>Three flashes</td>
<td><strong>Ignition lockout</strong></td>
<td>Recycle unit: check for spark and valve opening and replace: if none, replace module</td>
</tr>
<tr>
<td></td>
<td><strong>Lockout of module after 3 tries</strong></td>
<td></td>
</tr>
</tbody>
</table>
Does the burner light? NO
  Were the gas lines purged of air? NO
    Purge lines.
  YES
    Is the inlet gas pressure during ignition correct? (Natural 4.6" min., LP should be 11")
    YES
      Check gas line stop cock. Contact gas company.
    NO
      Measure voltage on valve terminals. Is there 24 V during ignition time?
      YES
        Is there gas outlet pressure available during the ignition period?
        YES
          Replace gas valve.
        NO
          Replace ignition module.
      NO
        Are the wires connecting the ignition module OK?
        YES
          Replace/repair wires.
        NO
          Replace ignition module.

Does the burner stay on? NO
  Are the wires connecting the module and electrode OK? NO
    Replace/repair wires.
  YES
    Inspect the ignition/flame sense electrodes. Are they in good condition?
    YES
      Yes
      Measure the flame current between the F+ and F- terminals on the ignition module using a 0-10 direct current microamp meter.
      Is the flame above 2μA/DC?
      YES
        Replace ignition module.
      NO
        No
        Replace electrode.
    NO
      No
      Clean or replace electrode.
  NO
    Check the thermostat and check the continuity of the ground wire.

Does the burner turn off when the call for heat ends? NO
  Check the thermostat and check the continuity of the ground wire.
  YES
  TROUBLESHOOT ENDS.
  If problems persist, contact your local ROBERTS-GORDON distributor.
  NO
12.2 Manifold Gas Pressure Setting
SECTION 13: REPLACEMENT PARTS

⚠️ DANGER ⚠️ WARNING

Electrical Shock Hazard  Explosion Hazard  Fire Hazard  Carbon Monoxide Hazard

Use only genuine ROBERTS GORDON® replacement parts per this installation, operation and service manual.

Failure to follow these instructions can result in death, electric shock, injury or property damage.

See warnings and important information before removing or replacing parts. After any maintenance or repair work, always test fire the heater in accordance with the start-up instructions on Page 47, Section 11 to help ensure all safety systems are in working order before leaving the heater to operate. Minor faults may be traced by using the troubleshooting charts on Page 50, Section 12 through Page 53, Figure 12.2.
### FIGURE 25: Burner Exploded View

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Gas Valve (Natural)</td>
<td>90032510</td>
</tr>
<tr>
<td>1 Gas Valve (LP)</td>
<td>90032512</td>
</tr>
<tr>
<td>Tube Gasket (Not Shown)</td>
<td>02568200</td>
</tr>
<tr>
<td>Blower Inlet Gasket (Not Shown)</td>
<td>03050900</td>
</tr>
<tr>
<td>2 Motor and Blower Assembly</td>
<td>90708600-P</td>
</tr>
<tr>
<td>Air Adapter Collar</td>
<td>91911704</td>
</tr>
<tr>
<td>3 Burner Cup Assembly</td>
<td>90427400</td>
</tr>
<tr>
<td>4 Electrode Assembly</td>
<td></td>
</tr>
<tr>
<td>Mica Window Assembly (Not Shown)</td>
<td>02553203</td>
</tr>
<tr>
<td>5 Transformer</td>
<td>90436900K</td>
</tr>
<tr>
<td>6 Thermostat Connection (3 Pin)</td>
<td>91317904</td>
</tr>
<tr>
<td>Jumper Wire (Not Shown)</td>
<td>03090900</td>
</tr>
<tr>
<td>7 Pressure Switch:</td>
<td>90439802K</td>
</tr>
<tr>
<td>(175)</td>
<td></td>
</tr>
<tr>
<td>(100)</td>
<td>90439803K</td>
</tr>
<tr>
<td>(40, 60, 125)</td>
<td>90439805K</td>
</tr>
<tr>
<td>(80, 150)</td>
<td>90439810K</td>
</tr>
<tr>
<td>8 24 Vac Relay</td>
<td>90447140</td>
</tr>
<tr>
<td>9 DSI Ignition Module</td>
<td>90439500K</td>
</tr>
<tr>
<td>10 LED Burner Status Light</td>
<td>91316103</td>
</tr>
</tbody>
</table>
SECTION 14: GENERAL SPECIFICATIONS

14.1 Material Specifications

14.1.1 Reflectors

.024 Aluminum
(optional .024 Stainless Steel Type 304)

14.2 Heater Specifications

14.2.1 Ignition

Fully automatic, three-try, direct spark, electronic ignition control, 100% safety shut-off.

General Specifications for the heaters are as follows:

<table>
<thead>
<tr>
<th>Model</th>
<th>Heat Input Rate (Btu/h) x (1000)</th>
<th>Length “A”</th>
<th>Recommended Minimum Mounting Height*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTH2V-40</td>
<td>40</td>
<td>Minimum</td>
<td>8'-10’ (2.4 - 3m)</td>
</tr>
<tr>
<td>CTH2V-60</td>
<td>60</td>
<td>Minimum</td>
<td>10'-12’ (3 - 3.6m)</td>
</tr>
<tr>
<td>CTH2V-80</td>
<td>80</td>
<td>Minimum</td>
<td>12'-15’ (3.6 - 4.5m)</td>
</tr>
<tr>
<td>CTH2V-100</td>
<td>100</td>
<td>Minimum</td>
<td>12'-15’ (3.6 - 4.5m)</td>
</tr>
<tr>
<td>CTH2V-125</td>
<td>125</td>
<td>Minimum</td>
<td>15'-20’ (4.5 - 6m)</td>
</tr>
<tr>
<td>CTH2V-150</td>
<td>150</td>
<td>Minimum</td>
<td>20'-25’ (6 - 7.6m)</td>
</tr>
<tr>
<td>CTH2V-175</td>
<td>175</td>
<td>Minimum</td>
<td>25' (7.6m)</td>
</tr>
</tbody>
</table>

*See Page 5, Section 3 for clearances to combustibles.

GAS PRESSURE AT MANIFOLD:

Natural Gas: 3.5" wc
LP Gas: 10.5" wc

PIPE CONNECTION:

1/2" NPT (for 40, 60, 80, 100, 125)
3/4" NPT (for 150 & 175)

DIMENSIONS:

Vent Connection Size: 4" (10 cm)
Outside Air Connection Size: 4" (10 cm)

Refer to figure above for dimensional information.

GAS INLET PRESSURE:

Natural Gas:
for 40,60,80,100,125,150 4.6" wc Minimum
for 175 5.0" wc Minimum

LP Gas:
11.0" wc Minimum
14.0" wc Maximum

ELECTRICAL RATING (ALL MODELS):

120 V - 60 Hz., 1.0 A
SECTION 15: THE ROBERTS GORDON® VANTAGE® CTH2V WARRANTY

ROBERTS-GORDON WILL PAY FOR:

Within 36 months from date of purchase by buyer or 42 months from date of shipment by Roberts-Gordon LLC (whichever occurs first), replacement parts will be provided free of charge for any part of the product which fails due to a manufacturing or material defect.

Roberts-Gordon LLC will require the part in question to be returned to the factory. Roberts-Gordon LLC will, at its sole discretion, repair or replace after determining the nature of the defect and disposition of part in question.

ROBERTS GORDON® Replacement Parts are warranted for a period of 12 months from date of shipment from Roberts-Gordon LLC or the remaining ROBERTS GORDON® VANTAGE® CTH2V warranty.

ROBERTS-GORDON WILL NOT PAY FOR:

Service trips, service calls and labor charges.

Shipments of replacement parts.

Claims where the total price of the goods has not been paid.

Damage due to:

- Improper installation, operation or maintenance.
- Misuse, abuse, neglect, or modification of the ROBERTS GORDON® VANTAGE® CTH2V in any way.
- Use of the ROBERTS GORDON® VANTAGE® CTH2V for other than its intended purpose.
- Incorrect gas or electrical supply, accident, fire, floods, acts of God, war, terrorism, or other casualty.
- Improper service, use of replacement parts or accessories not specified by Roberts-Gordon.
- Failure to install or maintain the ROBERTS GORDON® VANTAGE® CTH2V as directed in the Installation, Operation and Service manual.
- Relocation of the ROBERTS GORDON® VANTAGE® CTH2V after initial installation.
- The use of the ROBERTS GORDON® VANTAGE® CTH2V in a corrosive atmosphere containing contaminants.
- The use of the ROBERTS GORDON® VANTAGE® CTH2V in the vicinity of a combustible or explosive material.
- Any defect in the ROBERTS GORDON® VANTAGE® CTH2V arising from a drawing, design, or specification supplied by or on behalf of the consumer.
- Damage incurred during shipment. Claim must be filed with carrier.

WARRANTY IS VOID IF:

The ROBERTS GORDON® VANTAGE® CTH2V is not installed by a contractor qualified in the installation and service of gas fired heating equipment.

You cannot prove original purchase date and required annual maintenance history.

The data plate and/or serial number are removed, defaced, modified or altered in any way.

The ownership of the ROBERTS GORDON® VANTAGE® CTH2V is moved or transferred. This warranty is nontransferable.

Roberts-Gordon is not permitted to inspect the damaged controller and/or component parts.

READ YOUR INSTALLATION, OPERATION AND SERVICE MANUAL

If you have questions about your controller, contact your installing professional. Should you Need Replacement Parts or have additional questions, call or write:

Roberts-Gordon LLC
1250 William Street
P.O. Box 44
Buffalo, New York 14240-0044
Telephone: +1.716.852.4400
Fax: +1.716.852.0854
Toll Free: 800.828.7450
www.robertsgordon.com

Roberts-Gordon LLC’s liability, and your exclusive remedy, under this warranty or any implied warranty (including the implied warranties of merchantability and fitness for a particular purpose) is limited to providing replacement parts during the term of this warranty. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. There are no rights, warranties or conditions, expressed or implied, statutory or otherwise, other than those contained in this warranty.

Roberts-Gordon LLC shall in no event be responsible for incidental or consequential damages or incur liability for damages in excess of the amount paid by you for the ROBERTS GORDON® VANTAGE® CTH2V.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

Roberts-Gordon shall not be responsible for failure to perform under the terms of this warranty if caused by circumstances out of its control, including but not limited to war, fire, flood, strike, government or court orders, acts of God, terrorism, unavailability of supplies, parts or power. No person is authorized to assume for Roberts-Gordon any other warranty, obligation or liability.

LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

No representative of Roberts-Gordon LLC, other than an Executive Officer, has authority to change or extend these provisions. Changes or extensions shall be binding only if confirmed in writing by Roberts-Gordon LLC’s duly authorized Executive Officer.
Attach this information to a wall near the ROBERTS GORDON® heater.

Read the Installation, Operation, and Service Manual thoroughly before installation, operation, or service.

Know your model number and installed configuration.

Model number and installed configuration are found on the burner and in the Installation, Operation and Service Manual.

Write the largest clearance dimensions with permanent ink according to your model number and configuration in the open spaces below.

**OPERATING INSTRUCTIONS**

1. STOP! Read all safety instructions on this information sheet.
2. Open the manual gas valve in the heater supply line.
3. Turn off electric power to the heater.
4. Set the thermostat to desired setting.

**TO TURN OFF THE HEATER**

1. Set the thermostat to off or the lowest setting.

**IF THE HEATER WILL NOT OPERATE, TO ENSURE YOUR SAFETY, FOLLOW THESE INSTRUCTIONS TO SHUT DOWN YOUR HEATER**

1. Set the thermostat to off or the lowest setting.
2. Turn off electric power to the heater.
3. Turn off the manual gas valve in the heater supply line.
4. Call your registered installer/contractor qualified in the installation and service of gas-fired heating equipment.

**WARNING**

Fire Hazard

Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.

Some objects will catch fire or explode when placed close to heater.

Failure to follow these instructions can result in death, injury or property damage.

Maintain [__] clearance to the side and [__] clearance below the heater from vehicles and combustible materials.