

# PH-SERIES Specifications, Installation, Operation Service and Spare Parts Manual



Gas Fired Outdoor Infrared Patio Heater / *Gas-Fired Infrared Patio Heater*  
 Vented Radiant Tube Heater / L'Appareil de chauffage de Tube Rayonnant donné vent  
 Gravity Vented Wall Furnace / La gravité A Donné vent Fournaise de Mur  
 MODELS PH40, 50, 75, 80, 100 and 125 ONLY: For either indoor or outdoor installation/Installer à l'intérieur  
 ou à l'extérieur



For Industrial, Commercial, and Residential Patio and Restaurant Applications.

**⚠ WARNING: MODELS PH-40HO, PH-75HO, PH-80, PH-100HO, PH-125HO Are For Outdoor Use Only**

**⚠ WARNING:** Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read (refer to) the installation operating and maintenance instructions thoroughly before installing or servicing this equipment. For assistance or additional information consult a qualified installer, service agency or the gas supplier.

**⚠ ADVERTISSEMENT.** L'installation déplacée, l'ajustement, le changement, le service ou l'entretien peuvent causer les dommages de propriété, la blessure ou la mort. Lire (se référer à) l'installation qui fonctionne et les instructions d'entretien à fond avant d'installer ou entretenir cet équipement. Pour obtenir de l'aide ou les informations supplémentaires consultez un programme d'installation, une agence de service ou le fournisseur de gaz qualifié.

**⚠ WARNING:** If the information in these instructions is not followed exactly, a fire or explosion may result; causing property damage, personal injury or loss of life.

**⚠ ADVERTISSEMENT:** Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risqué d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

- **WHAT TO DO IF YOU SMELL GAS:**

- 1) Extinguish any open flame
- 2) **DO NOT** try to light any appliance.
- 3) **DO NOT** use or touch any electrical switches.
- 4) **DO NOT** use any phone in your building
- 5) Turn off gas.
- 6) Open Windows
- 7) Leave the building
- 8) Immediately call your gas supplier from a neighbor's phone or after you have left the building. Follow the gas supplier's instructions.
- 9) If you cannot reach your gas supplier, call the fire department.

- Installation and service must be performed by a qualified installer, service agency or the gas supplier

- Ne pas entreposer ni utiliser d'essence ni d'autres vapors ou liquidés inflammables à proximité de cet appareil ou de tout autre appareil.

- **QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ:**

- 1) Éteindre la flamme ouverte
- 2) Ne pas tenter d'allumer d'appareils
- 3) Ne touchez à aucun interrupteur.
- 4) Ne pas vous servir des téléphones dans le bâtiment ou vous vous trouvez.
- 5) le Virage du gaz.
- 6) Ouvrir Windows
- 7) Part le bâtiment
- 8) Appelez immédiatement votre fournisseur de gaz depuis un voisin ou après que vous êtes parti le bâtiment. Suivez les instructions du fournisseur.
- 9) Si vous ne pouvez rejoindre le service des incendies.

- L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par fournisseur de gaz.

**⚠ WARNING:** Heat exchanger surface is hot. Do not touch surface or burn may result. Combustible material or articles should not be placed on or near heater. Observe clearance to combustibles as noted on heater and in this manual.

**INSTALLER:** Leave this manual with the appliance.  
**CONSUMER:** Retain this manual for future reference.

**INSATLLATEUR:** Laissez cette notice avec l'appareil.  
**CONSOMMATEUR:** Conservez cette notice pour consultation ultérieure.

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## PH-SERIES

**WHEN AN EXISTING CATEGORY I HEATER IS REMOVED OR REPLACED, THE ORIGINAL VENTING SYSTEM MAY NO LONGER BE SIZED TO PROPERLY VENT THE ATTACHED APPLIANCES.**

The effects of an improperly sized venting system can include but not limited to: the formation of condensate, leakage, spillage etc. The following test procedure is required:



### **WARNING**

#### **CARBON MONOXIDE POISONING HAZARD**

Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation could result in carbon monoxide poisoning or death.

The following steps shall be followed for each appliance connected to the venting system being placed into operation, while all other appliances connected to the venting system are not in operation:

- 1) Seal any unused openings in the venting system.
- 2) Inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code, ANSI Z223.1/NFPA 54 or the Natural Gas and Propane Installation Code, CSA B149.1 and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
- 3) As far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building.
- 4) Close fireplace dampers.
- 5) Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they are operating at maximum speed. Do not operate a summer exhaust fan.
- 6) Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so appliance is operating continuously.
- 7) Test for spillage from draft hood equipped appliances at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
- 8) If improper venting is observed during any of the above tests, the venting system must be corrected in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and/or Natural Gas and Propane Installation Code, CSA B149.1.
- 9) After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-fired burning appliance to their previous conditions of use.

# PH-SERIES

## TABLE OF CONTENTS

<b>1.0 OWNERS RESPONSIBILITY</b> -----	<b>1</b>
<b>2.0 INSTALLER RESPONSIBILITY</b> -----	<b>3</b>
<b>3.0 CODE COMPLIANCE</b> -----	<b>5</b>
<b>4.0 SPECIFICATIONS: GENERAL SPECIFICATIONS</b> -----	<b>6</b>
<b>5.0 PATIO HEATER SIDE DIMENSIONS</b> -----	<b>7</b>
<b>6.0 INSTALLATION CLEARANCES AND CLEARANCE TO COMBUSTIBLES</b> -----	<b>9</b>
<b>7.0 PRE-INSTALLATION INSPECTION:</b> -----	<b>11</b>
<b>8.0 INSTALLATION</b> -----	<b>12</b>
<b>8.1 PLANNING</b> -----	<b>12</b>
<b>9.0 ASSEMBLY OF COMPONENTS</b> -----	<b>13</b>
<b>9.1 GENERAL INSTRUCTIONS</b> -----	<b>13</b>
<b>9.2 SUSPENSION DETAILS</b> -----	<b>14</b>
A. CHAIN MOUNTING-----	14
B. RIGID MOUNTING-----	15
<b>10.0 ASSEMBLY OF COMPONENTS</b> -----	<b>16</b>
A. <b>PH-50 &amp; 75 ASSEMBLY</b> -----	16
<b>10.1 COMPONENT ASSEMBLY</b> -----	<b>17</b>
A. JOINT HANGER TO REFLECTOR (PH-50 & 75 MODELS)-----	17
B. CLAMP COUPLER (PH-50 & 75 MODELS)-----	18
C. END CAP TO REFLECTOR (PH-50 & 75 MODELS)-----	18
D. 90° ELBOW KIT (PH-50 & 75 MODELS)-----	19
E. 180° U-BEND KIT (PH-50 & 75 MODELS)-----	19
<b>11.0 VENTING REQUIREMENTS</b> -----	<b>20</b>
<b>11.1 VENTING</b> -----	<b>22</b>
ANSI Z83.20-2016/CSA 2.34-2016-----	22
GAS PRODUCTS NO. 405-----	22
JANUARY 1, 2019-----	22
VERTICAL VENTING (CONTINUED) ROOF EXHAUST : TWO OR MORE UNITS - USE 'B' STYLE CHIMNEY.-----	27
<b>12.0 GAS PIPING</b> -----	<b>29</b>
<b>13.0 GAS CONNECTION</b> -----	<b>30</b>
A. HARD PIPE-----	30
B. FLEX CONNECTOR-----	30
<b>14.0 ELECTRICAL CONNECTION 120 VOLTS</b> -----	<b>32</b>
<b>14.1 120 VOLT WIRING DIAGRAM</b> -----	<b>33</b>
<b>15.0 ELECTRICAL CONNECTION 24 VOLT (ALTERNATE POWER SUPPLY)</b> -----	<b>34</b>
<b>15.1 24 VOLT WIRING DIAGRAM</b> -----	<b>35</b>
<b>16.0 INITIAL START-UP</b> -----	<b>36</b>
<b>16.1 SETTING MANIFOLD PRESSURE</b> -----	<b>37</b>
<b>17.0 GAS INPUT RATE</b> -----	<b>41</b>
<b>18.0 SEQUENCE OPERATION</b> -----	<b>42</b>
<b>18.1 DESCRIPTION OF 3-TRY DIRECT SPARK IGNITION SYSTEM:</b> -----	<b>42</b>
<b>18.2 OPERATION:</b> -----	<b>42</b>
A. POWER UP/STANDBY-----	42
B. HEAT MODE-----	42
C. FLAME FAILURE - RE-IGNITION-----	42
<b>19.0 TROUBLESHOOTING</b> -----	<b>43</b>
A. NO POWER TO HEATER-----	43
B. INITIAL ELECTRICAL CHECKS-----	43
C. INITIAL GAS CHECKS-----	44
D. ELECTRICITY AND GAS TO HEATER, BUT STILL INOPERATIVE-----	44
E. CHECK CONTROL BOARD-----	45
F. FAULT CONDITIONS-----	45
G. INTERNAL CONTROL FAULT-----	45
H. AIRFLOW FAULT - LOCK OUT (COMBUSTION AIR FLOW PROBLEMS)-----	45
I. FLAME WITH NO CALL FOR HEAT (FLAME FAULT)-----	46
J. IGNITION LOCK OUT (FAILURE TO LIGHT)-----	46
K. FLAME SENSOR CURRENT CHECK-----	46
L. PROPER ELECTRODE LOCATION-----	47
<b>20.0 MAINTENANCE</b> -----	<b>48</b>
A. CHECK COMBUSTION AIR INTAKE FOR BLOCKAGE.-----	48
B. CHECK EXHAUST TERMINAL FOR BLOCKAGE.-----	48
C. OPEN SERVICE DOOR.-----	48
D. CHECK BLOWER MOTOR AND SCROLL FOR DIRT AND/OR LOCKED ROTOR. REMOVE DIRT WITH COMPRESSED AIR OR VACUUM CLEANER. IF ROTOR IS LOCKED, REPLACE ASSEMBLY. -	48
E. IF BURNER NEEDS CLEANING, REMOVE BURNER HEAD FROM TUBE AND USE A COMBINATION OF COMPRESSED AIR AND/OR A WIRE BRUSH TO REMOVE ANY DEPOSITS OR DEBRIS THAT MAY BE ON THE ACTUAL BURNER.-----	48
F. MAKE SURE ALL WIRING IS INTACT AND IN GOOD CONDITION.-----	48
G. CHECK ELECTRODE FOR PROPER GAP AND CLEANLINESS. CLEAN OR REPLACE AS NECESSARY.-----	48
H. CHECK IGNITION SYSTEM FOR SPARK. REPLACE AS NECESSARY.-----	48
I. CHECK EXCHANGER TUBE FOR HOLES AND/OR CRACKS, DIRT AND/OR DEPOSITS. CLEAN AND/OR REPLACE AS NECESSARY. ---	48
J. WASH ANY DIRT OR JUST OFF OF THE UNIT WITH A SOAP AND WATER SOLUTION.-----	48
K. CHECK ANY GAS CONNECTIONS THAT WERE DISCONNECTED DURING MAINTENANCE FOR LEAKS. USE SOAP AND WATER SOLUTION. DO NOT USE FLAME.-----	48
L. TEST FIRE UNIT BY TURNING CONTROL "ON". MAKE SURE UNIT IS OPERATING QUIETLY AND EFFICIENTLY.-----	48
M. PERIODICALLY VISUALLY CHECK BURNER THROUGH VIEW PORT TO CONFIRM PROPER OPERATION.-----	48
N. CHECK ALL COUPLERS FOR TIGHTNESS AND/OR LEAKAGE.-	48
<b>21.0 PARTS:</b> -----	<b>49</b>
<b>21.1 BURNER HEAD AND RELATED PARTS</b> -----	<b>49</b>
<b>21.2 REFLECTOR AND TUBE PARTS</b> -----	<b>50</b>
<b>21.3 PARTS LIST:</b> -----	<b>51</b>
<b>22.0 WARRANTY</b> -----	<b>53</b>
<b>23.0 CONVERSION KIT FOR VARIABLE INPUT GAS VALVES</b>	<b>54</b>
<b>24.0 EXAMPLE OF CONVERSION KIT LABEL</b> -----	<b>56</b>
<b>25.0 SAFETY AND OPERATING INSTRUCTIONS</b> -----	<b>57</b>

# PH-SERIES

## TABLE OF FIGURES

Figure 1. PATIO HEATER SIDE DIMENSION.....	7
Figure 2. PATIO HEATER END PROFILES .....	8
Figure 3. OUTDOOR END CLEARANCES .....	9
Figure 4. VENTED CLEARANCES.....	9
Figure 5. STANDARD REFLECTOR .....	10
Figure 6. 25' TO 45' TILT .....	10
Figure 7. CHAIN MOUNTING .....	15
Figure 8. RIGID MOUNTING .....	15
Figure 9. PH-50 & 75 ASSEMBLY .....	16
Figure 10. JOINT HANGER INSTALLATION .....	17
Figure 11. CLAMP COUPLER INSTALLATION.....	18
Figure 12. END CAP INSTALLATION .....	18
Figure 13. 90° ELBOW KIT INSTALLATION .....	19
Figure 14. 180° U-BEND KIT INSTALLATION .....	19
<b>Figure 15. SIDE WALL VENTING, SINGLE UNIT .....</b>	<b>25</b>
<b>Figure 16. VERTICAL VENTING, SINGLE UNIT .....</b>	<b>26</b>
Figure 17. COMMON VERTICAL VENTING, TWO OR MORE UNITS INTO ONE COMMON VENT .....	27
Figure 18. HARD PIPE INSTALLATION .....	30
Figure 19. GAS LINE CONNECTION WITH CERTIFIED FLEXIBLE GAS CONNECTION.....	31
Figure 20. ELECTRICAL CONNECTIONS 120 VOLT.....	32
Figure 21. WIRING DIAGRAM 120 VOLT .....	33
Figure 22. ELECTRICAL CONNECTIONS 24 VOLT.....	34
Figure 23. WIRING DIAGRAM 24 VOLT .....	35
Figure 24. GAS VALVE.....	37
Figure 25. FLAME SENSOR CURRENT CHECK.....	46
Figure 26. PROPER ELECTRODE LOCATION .....	47
Figure 27. BURNER HEAD PARTS.....	49
Figure 28. REFLECTOR AND TUBE PARTS .....	50

# PH-SERIES

## **1.0 OWNERS RESPONSIBILITY**


Thank you for purchasing our product. We have designed this unit to provide you with years of trouble-free heating enjoyment.

**READ THIS MANUAL IN ITS ENTIRETY!** If you do not understand any of the safety or hazardous warnings contained in this manual, or have questions or concerns about the installation, operation, maintenance or service of this heater, or any other questions or concerns relating to this heater, you **MUST CALL THE FACTORY** at the telephone number noted on the front cover of this manual or as detailed on the rating plate on the heater before operating this heater. Store this manual in a location near the heater, for future reference. Make sure installation is performed by well qualified, licensed contractors in the required field of work. If in doubt, DO NOT allow unit to be installed.

**DO NOT** park vehicles or place combustible objects close to the heater other than specified on the Clearance to Combustible chart located in this manual and on the heater. Failure to observe the clearance to combustibles can result in property damage, injury or death.

**IMPORTANT NOTICE:** The installation portion of these instructions are for the use of qualified individuals specially trained, licensed and experienced in the installation of this type of equipment and related system components.


**NOTE:** - The words "shall" or "must" indicate a requirement which is essential to satisfactory and safe performance.

 **GENERAL HAZARD WARNING:** The heater and related gas piping, fitting & wiring must be installed by individuals or firms qualified, licensed and specially trained and experienced in installation of this type of equipment and related system components.

Only persons who can understand and follow the instructions shall install or service this heater.


Persons not qualified shall not install this equipment nor interpret these instructions.


Failure to comply with the precautions and instructions provided with this heater can result in death, serious bodily injury and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning or electrical shock.

 **WARNING:** Installation and repair should be done by a qualified service person. The heater should be inspected before use and at least annually by a qualified service person and prior to heating season. Heaters used in dusty locations such as brooder barns, sawmills, woodworking shops, etc. will require maintenance on a more regular basis and more frequent cleaning may be required as necessary. It is imperative that the control compartments, burner(s) and circulating air passageways of the appliance be kept clean. Periodic examination of the venting system is to be performed.

No one should work on a heater unless they are a licensed/qualified gas fitter or contractor. For all repairs, parts **MUST** originate from the manufacturer of this heater in order not to void CGA/AGA certification. Safety devices are not allowed to be rendered inoperative and left unattended as this action can cause property damage, injury or death. Failure to do so will void your warranty.

## PH-SERIES


 **WARNING:** Improper installation, adjustment, alteration, servicing or maintenance can cause property damage, injury, or death

 **WARNING:** Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition.

Young children should be carefully supervised when they are in the same place as the heater.

Clothing or other flammable materials should not be hung from the heater, or placed on or near the heater.

Any guard or other protective device removed for servicing a heater must be replaced prior to operating the heater.


 **WARNING:** MODELS PH-40HO and PH-75HO ONLY: These appliances shall be used only outdoors in a well-ventilated space and shall not be used in a building, garage or any other enclosed area.

 **WARNING:** **California Proposition 65**

If not installed, operated and maintained in accordance with manufacturer's instructions. This product could expose you to substances in the fuel or from combustion which can cause death or serious illness and which are known to the State of California to cause cancer, birth defects or reproductive harm.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Ne pas se servir de cet appareil sil a été plongé dans l'eau, complètement ou en partie, Faire inspecter l'appareil par un technicien qualifié et remplacer toute partie du système de control et toute commande qui ont été plongée dans l'eau.

 **WARNING: SEE PAGE 15A FOR VENTILATION REQUIREMENTS FOR THIS HEATER. MAKE SURE YOU HAVE THE CORRECT MODEL FOR THE INTENDED APPLICATION. IF IN DOUBT CONTACT THE FACTORY FOR DETAILS PRIOR TO INSTALLATION OR OPERATION.**

**2.0 INSTALLER RESPONSIBILITY**

 **WARNING:**

**FIRE OR EXPLOSION HAZARD**

The heater and related gas piping and wiring must be installed only by individuals or firms well qualified and licensed in the required field of work.

Read and understand this manual in its entirety BEFORE you install this heater. If you have any questions call your local representative. Verify that the fuel on the installation site is the same as what is required for this heater. Check heater for damage or missing parts. If damage has occurred, notify carrier or point of purchase at once for reconciliation of damaged goods. We are not responsible for transit damage. Do not install if heater is damaged.

**If you do not understand any of the safety or hazardous warnings contained in this manual, or have questions or concerns about the installation, operation, maintenance or service of this heater, or any other questions or concerns relating to this heater, you MUST CALL THE FACTORY at the telephone number noted on the front cover of this manual or as detailed on the rating plate on the heater before operating this heater.**

Verify that model, input & length is what was ordered and is appropriate for installation. This appliance shall be use only outdoors in a well ventilated space and shall not be used in a building, garage, or any other enclosed area.

Installation shall be in accordance with local codes. (See 'CODE COMPLIANCE').

If installation requires tilting, DO NOT over tilt the unit. Units are certified for installations up to 25°.

Install unit according to the "Clearance to Combustibles" for that particular heater and type of installation. Make sure that clearances are maintained from vehicles parked below or in front of heater. Failure to do so could result in property damage, injury or death.

Make sure unit is adequately suspended from ceiling or roof. Select hanging location that has adequate strength to support heater.

Adequate clearance around air openings into the combustion chamber, clearance from combustible material, provisions for accessibility and for combustion and ventilation air supply.

Do not render safety devices inoperable. Make sure gas line and/or service have adequate capacity for the increased load of heater.

Check line and manifold pressure with a manometer to confirm unit is set according to the specification on the rating plate. Perform check with all gas-fired appliances operating. (see gas manifold test)

Provide adequate accessibility clearances for servicing.

Leave copy of this manual with owner (or a copy) for future reference.

This heater needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air. . If in a confined space make sure model of heater can be installed and attached to either a sidewall or roof vent. Models PH-40, 50, 75, 80, 100 and 125 can be installed in this fashion.

Continued on page 4

 **WARNING:**

## PH-SERIES

### **FIRE OR EXPLOSION HAZARD**

The PH-40, 50, 75, 80, 100, and 125 heaters must not be connected to a chimney flue serving a separate solid-fuel burning appliance. These models, in a space heating application, must only be installed with the venting that they are certified for. Refer to the installation instructions for installation details. If you are installing a PH-40, 50, 75, 80, 100, and 125 unit indoors it will need to be vented either with a sidewall vent kit, (use pin #800208 sidewall vent kit) or via a certified "B" vent system through the roof. For side wall applications, make sure vent cap is past eave (See venting section for both types of installation) **PH-40HO, PH-75HO, PH-80HO, PH-100HO and PH-125HO units are for outdoor applications only.**

Make sure units are operating as quiet and efficient a possible before leaving the job site and instruct owner/s on the safe operation of the heater as well as safety and hazardous issues as they relate to the heater, it's installation, operation and this manual.

Leave this manual with the consumer and instruct them to retain the manual for future reference.



### **WARNING:**

#### **California Proposition 65**

If not installed, operated and maintained in accordance with manufacturer's instructions. This product could expose you to substances in the fuel or from combustion which can cause death or series illness and which are known to the State of California to cause cancer, birth defects or reproductive harm.

**HEATER OPERATION NOTE:** PH-40, 50, 75, 80, 100, and 125 Patio Heaters will have a higher heat output at the burner end as compared to the exhaust end.

**SPACE HEATING:** As a general rule, it is suggested to locate the burner end toward the highest heat-loss area (doors) of the space being heated. If you have any concerns or questions concerning orientation or layout of the heater in your application, contact factory for assistance.

**SPOT HEATING:** On PH-40, 50, 75, 80, 100, and 125 heaters with a straight line configuration, there will be a noticeable and more pronounced perception of greater heat output from the burner end of the heater as compared to the exhaust end. **As a general rule, it is suggested for spot heating applications, to use the PH-40HO, PH-75HO, PH-80HO, PH-100HO or PH-125HO models** or a u-tube configuration to provide a more even source of heat; or two units, side by side with the burner heads at opposite ends to promote even heating. If you have any concerns or questions concerning orientation or layout of the heater in your application, contact factory for assistance.

**NOTE:** A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up. On models PH-40, 50, 75, 80, 100, and 125 and if using a venting system, make sure venting is sealed and installed according to section title VENTING



## PH-SERIES

### **3.0 CODE COMPLIANCE**

Installation shall be in accordance with local building codes, or in the absence of local codes, in accordance with:

#### **A. FUEL SUPPLY:**

**CANADA:** *Natural Gas and Propane Installation Code, CSA B149.1 or latest edition.*

**USA:** *National Fuel Gas Code, ANSI Z223.1/NFPA 54, or latest edition.*

#### **B. ELECTRICAL GROUNDING:**

**CANADA:** *Canadian Electrical Code, CSA C22.1 or latest edition.*

**USA:** *National Electrical Code, ANSI/NFPA 70 or latest edition*

In Canada: Electrical equipment and wiring shall comply with the applicable provisions of the current *Canadian Electrical Code, CAN/CSA C22.1, Part I and Part II, and CAN/CSA C22.2 No.3, Electrical features of Fuel Burning Equipment.*



**WARNING: SEE PAGE 20 FOR VENTILATION REQUIREMENTS FOR THIS HEATER. MAKE SURE YOU HAVE THE CORRECT MODEL FOR THE INTENDED APPLICATION. IF IN DOUBT CONTACT THE FACTORY FOR DETAILS PRIOR TO INSTALLATION OR OPERATION.**

# PH-SERIES

## 4.0 SPECIFICATIONS: GENERAL SPECIFICATIONS

**Rating:** (Input: Natural and Propane Gas)

In Canada: 0-4500' (1372 m) In USA: 0-2000' (610 m) - De-rate Above 2000' (610 m) (see page 37)

MODEL	BURNER INPUT BTU/hr		TUBE LENGTH
	MIN	MAX	
PH-40	20,000	40,000	137" (341 cm)
PH-40 HO	20,000	50,000	64" (163 cm)
PH-50	25,000	50,000	197" (501 cm)
PH-75	37,500	75,000	257" (653 cm)
PH-75 HO	37,500	75,000	124" (315 cm)
PH-80	40,000	80,000	257" (653 cm)
PH-80HO	40,000	80,000	124" (315 cm)
PH-100	50,000	100,000	377" (957.58 cm)
PH-100HO	50,000	100,000	197" (501 cm)
PH-125	62,500	125,000	497" (1262.38 cm)
PH-125HO	62,500	125,000	257" (653 cm)

### GAS PRESSURE at MANIFOLD:

**Natural Gas:** Lo: 1.5" (3.8 cm) W.C. Hi 3.5" (8.89 cm) W.C.  
**Propane Gas:** Lo: 5.5" (13.97 cm) W.C. Hi: 10.5" (26.67 cm) W.C.  
**Gas Connection** 0.5" (1.27 cm) N.P.T.

### GAS INLET PRESSURE:

GAS:	MINIMUM:	MAXIMUM:
Natural	4.5" (11.43 cm) W.C.	14.0" (35.56 cm) W.C.
Propane	11.5" (29.21 cm) W.C.	14.0" (35.56 cm) W.C.

FOR MODELS PH-40, 50, & 75 ONLY: Vent Connection is 3" (7.62 cm)

### ELECTRICAL RATING:

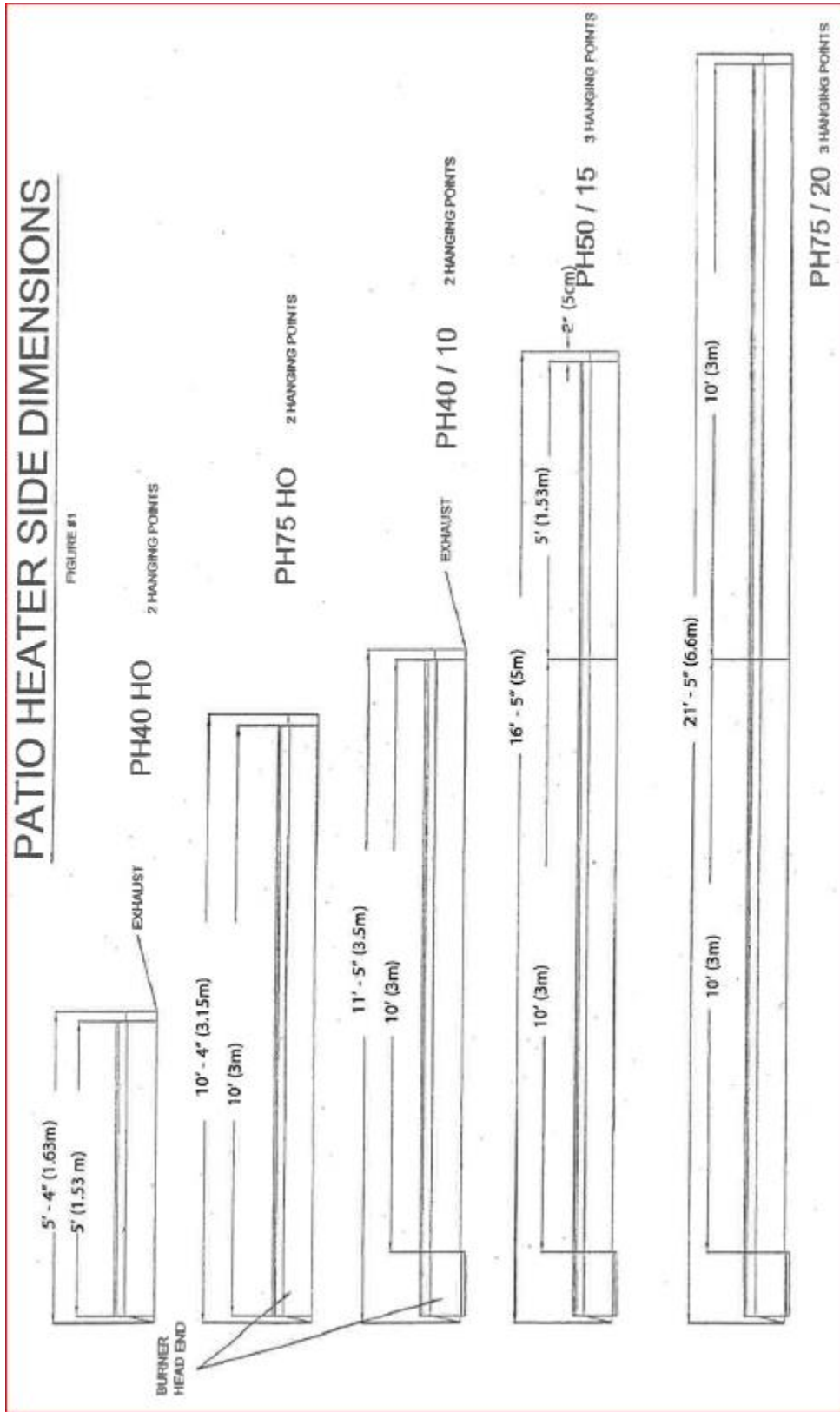
DSI Ignition, 120v. 60 Hz, 1 Amps, Appliance, 24 volt low voltage control.

### STANDARD EQUIPMENT:

Burner control housing is pre-assembled and pre-wired; unit comes complete with the following: industry standard gas, electrical and venting connections, balanced air rotor, thermal overload protected motor, visual burner inspection sight glass, combustion and air proving safety switches, 3-try spark ignition control, low voltage control connection, aluminized heat-treated steel combustion tube, polished aluminum standard reflector, aluminized steel radiant heat exchanger, tube couplers, joint/hanger pieces, heat economizer baffle, wave concentrator, grille, variable input control and remote control panel.

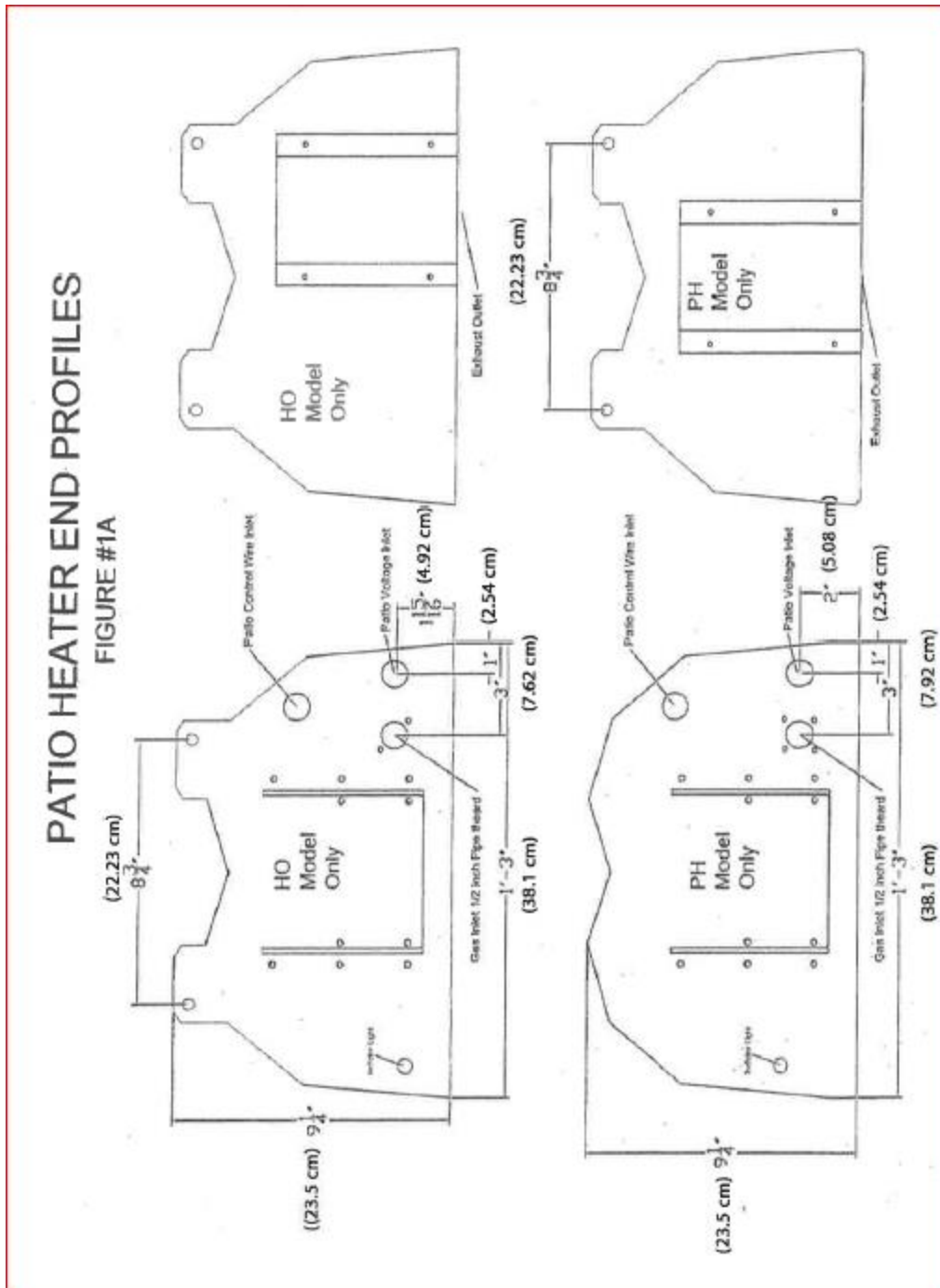
<b>Optional Equipment:</b>
- 90° Elbow Kit (PH-50, 75, 80, 100, 125 Only)
- 180° U-Bend Kit (PH-50, 75, 80, 100, 125 Only)
- Stainless Steel Construction
- 24 Volt input
- Hanging Brackets

5.0 PATIO HEATER SIDE DIMENSIONS



PATIO HEATER SIDE DIMENSIONS

Figure 1. PATIO HEATER SIDE DIMENSION



PATIO HEATER END PROFILES

Figure 2. PATIO HEATER END PROFILES

# PH-SERIES

## 6.0 INSTALLATION CLEARANCES AND CLEARANCE TO COMBUSTIBLES

Installation of overhead heaters in garages or hangars MUST meet the requirements for bottom (below) clearances detailed in **CANADA: Natural Gas and Propane Installation Code, CSA B149.1** or latest edition or **USA: National Fuel Gas Code, ANSI Z223.1/NFPA 54**, or latest edition.

Minimum mounting height from ground or floor to bottom portion of tube is 78" (199 cm)

- WARNING:** In all situations, clearances to combustibles must be maintained. Minimum clearance from heater must be maintained from vehicles parked below heater. The posting of signs may be required in storage areas referring to clearances to combustibles to the heater and/or limiting the stacking height of stored items near the heater specifying a maximum height. Clearances are not for use in four (4) sided enclosures. Certain materials or items, when stored under the heater, will be subjected to radiant heat and could be seriously damaged.
- WARNING:** For Models PH-40, 50, 75, 80, 100, and 125 when used indoors and vented accordingly, the stated clearance to combustibles represents a surface temperature of 90°F (32°C) above room temperature. Building material with low heat tolerance may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent material with a low heat tolerance which may degrade at lower temperatures are protected to prevent degradation

### END CLEARANCES (BURNER HEAD END)

Minimum clearances from air intake end of burner head to object is 5" (12.7 cm).

Provide adequate accessibility clearances for servicing and proper operation. Do not install unit in such a manner that the combustion air entering the heater is reduced in any manner

### OUTDOOR APPLICATIONS ONLY

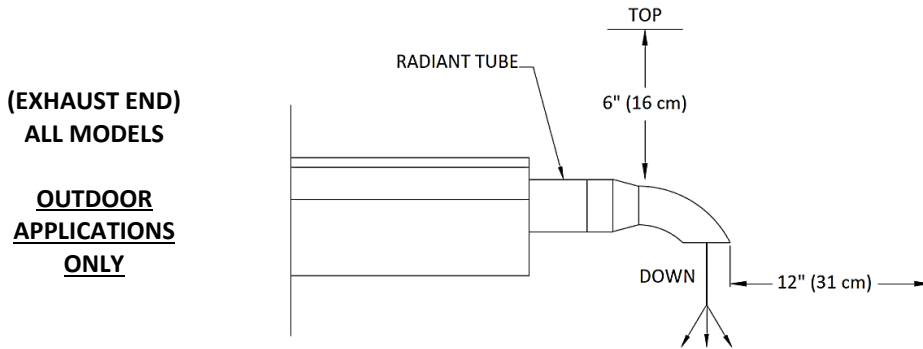


Figure 3. OUTDOOR END CLEARANCES

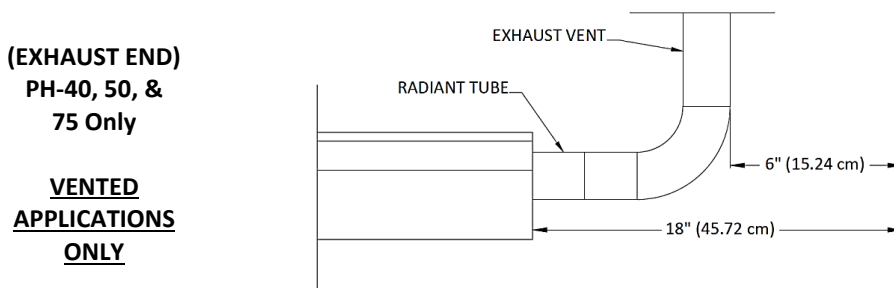
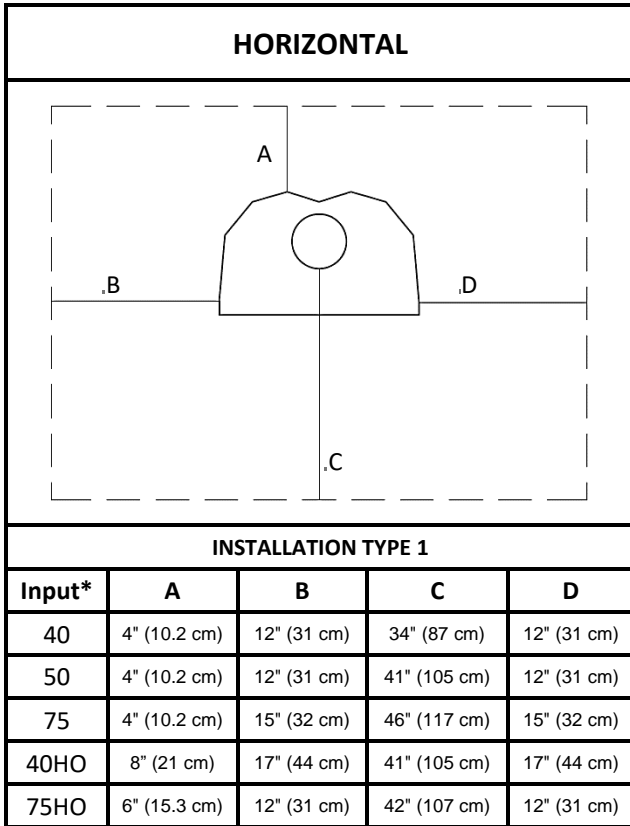
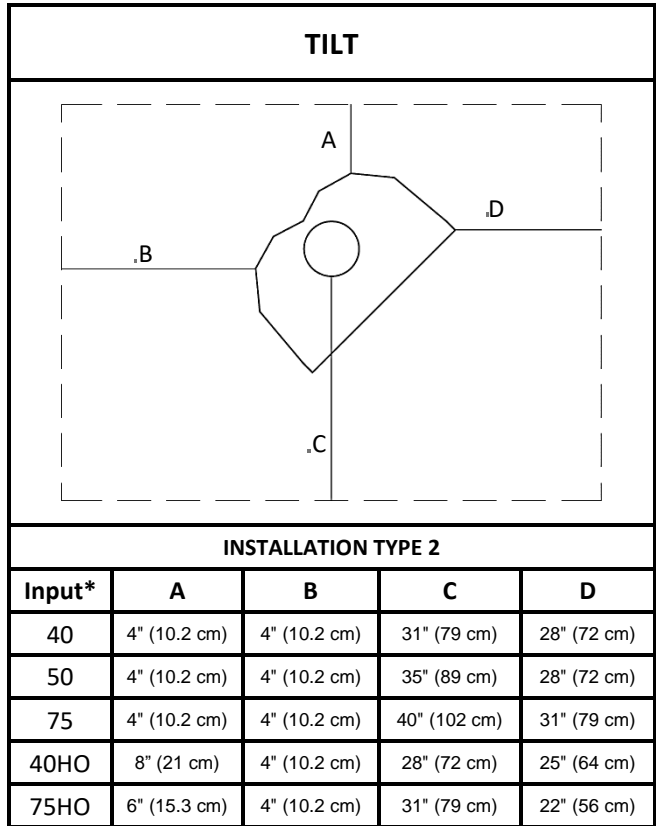


Figure 4. VENTED CLEARANCES

**PH-SERIES**



**Figure 5. STANDARD REFLECTOR**



**Figure 6. 25' TO 45' TILT**

**7.0 PRE-INSTALLATION INSPECTION:**

Inspect the shipping container and heater for any evidence of shipping damage. If heater damage is found, notify freight carrier and file a claim.

<b>⚠ WARNING:</b>
<b>IF HEATER IS DAMAGED, DO NOT INSTALL</b>

Check that all parts and pieces are present and accounted for. Report any missing items to carrier or point of purchase at once.

Check that overall general appearance, source of fuel required and model numbers match unit requested. Report any discrepancy to carrier or point of purchase at once.

**THOROUGHLY INSPECT THE EQUIPMENT  
IMMEDIATELY UPON ARRIVAL**

**OUR RESPONSIBILITY FOR THIS SHIPMENT CEASED WHEN THE CARRIER SIGNED THE WAYBILL.**

If goods are received short or in damaged condition, it is important that you notify the carrier and insist on a notation of the loss or damage across the face of the freight bill; otherwise no claim can be enforced against the transportation company.

If concealed loss or damage is discovered, notify your carrier at once and request an inspection. This is absolutely necessary. A concealed damage report must be made within 15-days of delivery of shipment. Unless you do this, the carrier will not entertain any claim for loss or damage. The Agent will make an Inspection and grant a concealed damage notation. If you give the Transportation Company a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

WE ARE WILLING TO ASSIST YOU IN EVERY POSSIBLE MANNER TO COLLECT CLAIMS FOR LOSS OR DAMAGE, BUT THIS WILLINGNESS ON OUR PART DOES NOT MAKE US RESPONSIBLE FOR COLLECTION OF CLAIMS OR REPLACEMENT OF MATERIAL. THE ACTUAL FILING AND PROCESSING OF THE CLAIM IS YOUR RESPONSIBILITY.

<p><b>WE ARE NOT RESPONSIBLE FOR FREIGHT DAMAGED IN TRANSIT!</b></p> <p><b>IF CONTENTS ARE DAMAGED:</b></p> <p><b><u>EVEN THOUGH CARTON DOES NOT LOOK DAMAGED:</u></b></p> <p><b>A. MAKE CLAIM TO DELIVERY CARRIER AT ONCE</b></p> <p><b>B. <u>SAVE CARTONS</u> FOR INSPECTION BY CARRIER</b></p>
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## PH-SERIES

### **8.0** INSTALLATION

Provide for adequate clearance around air openings into the combustion chamber, clearances from combustible material, provisions for accessibility and for combustion and ventilating air supply.

#### **8.1** PLANNING


- Familiarize yourself with the equipment and any accessories that you may require.
- Locate the area where unit is to be installed.
- Locate area where any holes might have to be cut for:
  - a) Electrical and control wire.
  - b) Any gas piping requirements
  - c) Venting (PH-40, 50, 75, 80, 100, and 125 only)
- Make sure that there is no obstruction such as hidden electrical wiring, water lines etc... in the areas of concern.
- Locate the control (All Models) and thermostat (PH-40, 50, 75, 80, 100, and 125 models indoors only) location.

 **WARNING:** Observe minimum clearance to combustibles.  
REFER TO PAGE 9.

#### **FOR 120 VOLT SYSTEM INSTALLATION**

- Locate a grounded, adequate electrical source.
- Measure the required amount of the various materials required to do the installation, and have these materials on site in an organized manner prior to commencement.

#### **WARNING NOTES FOR INSTALLATION AND SUSPENSION OF THE OVERHEAD HEATER**

 **WARNING:** If the installer is to install the heater via hanging chains, it is the responsibility of the installer to use hanging chain that has a minimum support capacity of no less than 100 lbs. Also make sure all suspension points are adequate to support weight of heater and any accessories. Also make sure all S-Hooks are affixed properly and the open ends squeezed closed. If the suspension system fails, it is the responsibility of the installer.

If utilizing installation brackets or another means of suspension is used, make sure all brackets and fasteners have sufficient load bearing capacity to satisfy the local codes as well as the extra load that may be place upon the heater and suspension methods encountered during windy conditions.

**A FAILED SUSPENSION SYSTEM CAN CAUSE PROPERT DAMAGE, SEVERE INJURY AND/OR DEATH. THE INSTALLER TAKES FULL RESPONSIBILITY AND LIABILITY FOR THE CORRECT AND ADEQUATED METHOD OF INSTALLATION AND SUSPENSION OF THE HEATER FOR THE CONDITIONS AND/OR LOCATION THAT IT IS TO BE INSTALLED AT. THE SUSPENSION DETAILS IN THIS MANUAL ARE SUGGESTIONS ONLY. IF IN DOUBT AS TO THE CORRECT METHODS TO INSTALL THIS HEATER FOR YOUR LOCAL CODES AND CONDITIONS, DO NOT INSTALL THE HEATER. CONTACT LOCAL BUILDING OFFICIALS FOR FURTHER INFORMATION.**



**9.0 ASSEMBLY OF COMPONENTS**



**WARNING: SEE PAGE 20 FOR VENTILATION REQUIREMENTS FOR THIS HEATER. MAKE SURE YOU HAVE THE CORRECT MODEL FOR THE INTENDED APPLICATION. IF IN DOUBT CONTACT THE FACTORY FOR DETAILS PRIOR TO INSTALLATION OR OPERATION.**

**9.1 GENERAL INSTRUCTIONS**

Refer to figures on page 11 to 15

Note: If unit is to be installed on a 25 degree tilt refer to page 11 for this type of installation.

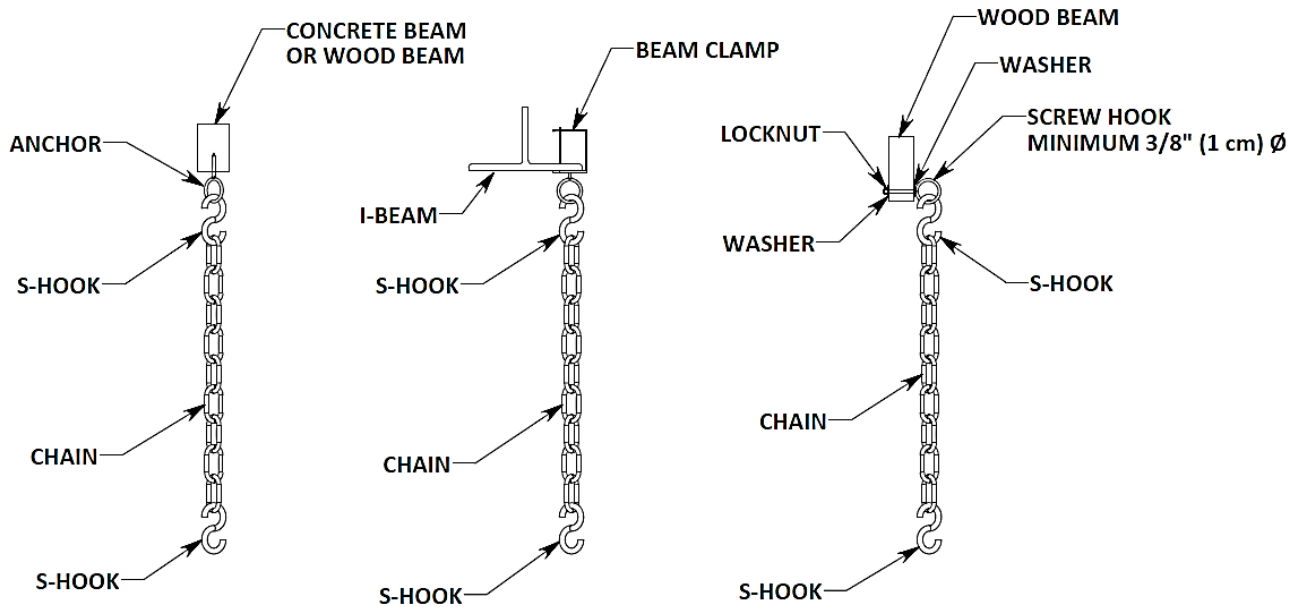
- 1) Measure and locate holes to be drilled for mounting brackets into overhead beams or support. The PH-40, PH-40 HO and PH-75 HO have two (2) mounting locations, one at each end. The PH-50, 75, and 80 have a third located in the center of the unit. The PH-100 has 4 and the PH-125 has 5.
- 2) **FOR RIDGID INSTALLATION: READ WARNING ON PAGE 9 FIRST.**  
When installing fasteners such as bolts, inserts, threaded rod, etc, it is suggested that the fastener(s) are no less than 3/8 inch (.9525 cm) in diameter (two (2) per hanging point) and must penetrate and be secured in the overhead material in such a way that the unit will not be dislodged from the mounting location during normal use and operation, including wind load. This is the responsibility of the installing contractor and if in doubt, they shall contact the manufacturer of the fastener chosen to verify its use. **(See WARNING on page 9)**
- 3) Lift and support preassembled unit in a safe manner, and locate where heater is to be installed. Install fasteners through hanging brackets (optional) into the mounting material (beam, support etc.). Then attach heater to the brackets. PH-40, 40 HO & 75 HO are now mounted. In the case of the PH-50 & 75, the last section will have to be installed to the mounted, preassembled, first 10'. (see item #5)
- 4) **CHAIN INSTALLATION: DO NOT USE IN WINDY CONDITIONS - READ WARNING ON PAGE 9 FIRST.**  
Adequately secure hanging chains as mentioned in the above item #2. Drop chains to desired elevation and attach heater to them utilizing two lengths per hanging point.
- 5) PH-50 & 75: Unassembled parts. Secure end cap to one end of the reflector by over lapping reflector onto end cap 1/2 inch, (1.905 cm) (see page 13) and secure via self tapping screws.
- 6) Attach the reflector assembly to the 10' (3m) section already mounted by overlapping the opposite reflector end onto the hanger assembly by 1/2 inch. (1.905 cm). Secure hanger on end cap end via fasteners into the previously drilled holes located in the beam, support etc. Secure opposite end of reflector to hanger via self tapping screws.
- 7) Install radiant tube by positioning three (3) inch (7.62 cm) end into end cap from below, and butting the other end to the previously installed section. Secure clamp with self tapping screws (see figure 9 page 13). For PH-50 tube slides over the first 10' (3m) section tube. Secure with screws.
- 8) Install decorative grille (2 - 5' (1.53m) pieces) onto lip of reflector in a similar fashion used to install 2x4 ceiling panels. If need be, remove some of the screws securing the reflector to the hanger and/or end cap, spread reflector to facilitate installation, being careful not to damage reflector, install grille and re-secure the reflector.

# PH-SERIES

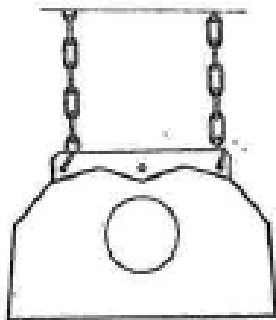
- 9) Install retaining clips (6 per section of screen)
- 10) If installing models PH-40, 50, 75, 80, 100, or 125 indoors, attach venting as per pages 22-29,  
**NOTE:** PH40HO, PH75HO, PH-80HO, PH-100HO and PH-125HO models cannot be vented. See page 20 for Ventilation requirements to make sure you have the correct heater for your application.
- 11) Connect gas, electricity, and mount controls in a convenient location.
- 12) Follow guidelines for startup on page 24.

## 9.2 SUSPENSION DETAILS

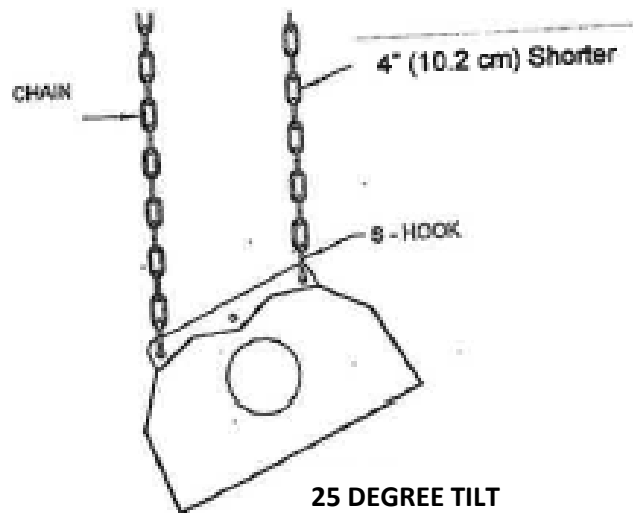
### A. CHAIN MOUNTING



**WHEN USING CHAIN METHOD, SECURE UNIT FROM POSSIBLE WIND DAMAGE (See warning on Page 9)**



**HORIZONTAL**



**25 DEGREE TILT**

Figure 7. CHAIN MOUNTING

**B. RIGID MOUNTING**

(See warning on Page 9)

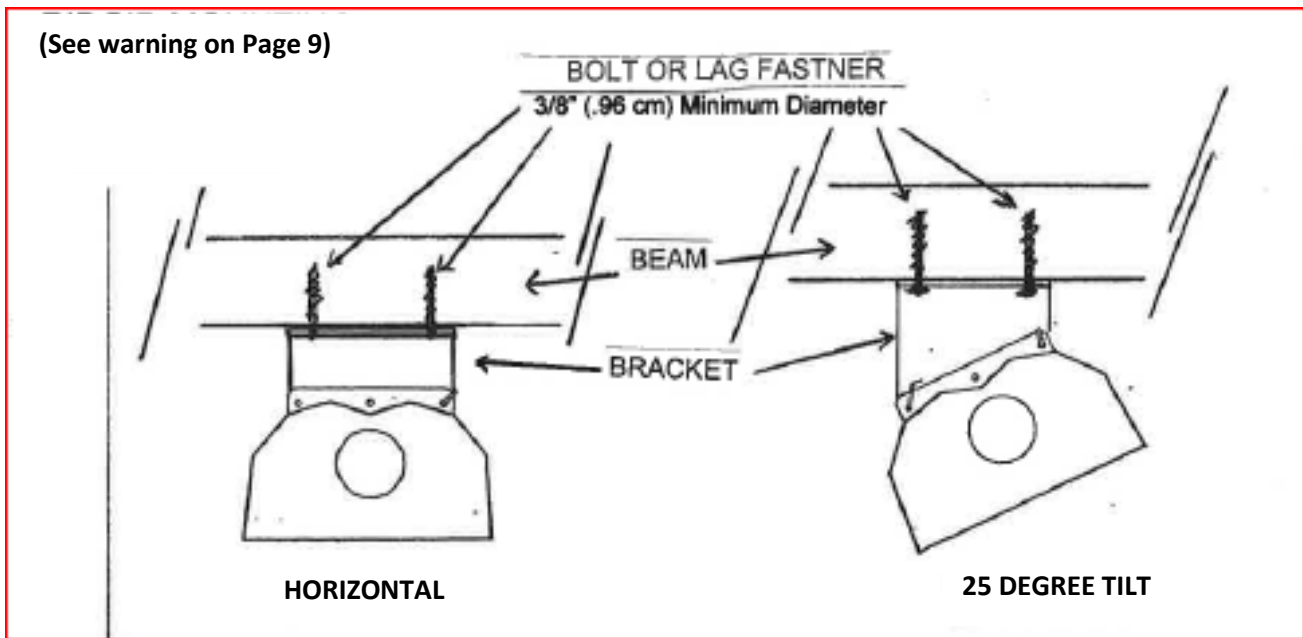


Figure 8. RIGID MOUNTING

# PH-SERIES

## 10.0 ASSEMBLY OF COMPONENTS

### A. PH-50 & 75 ASSEMBLY

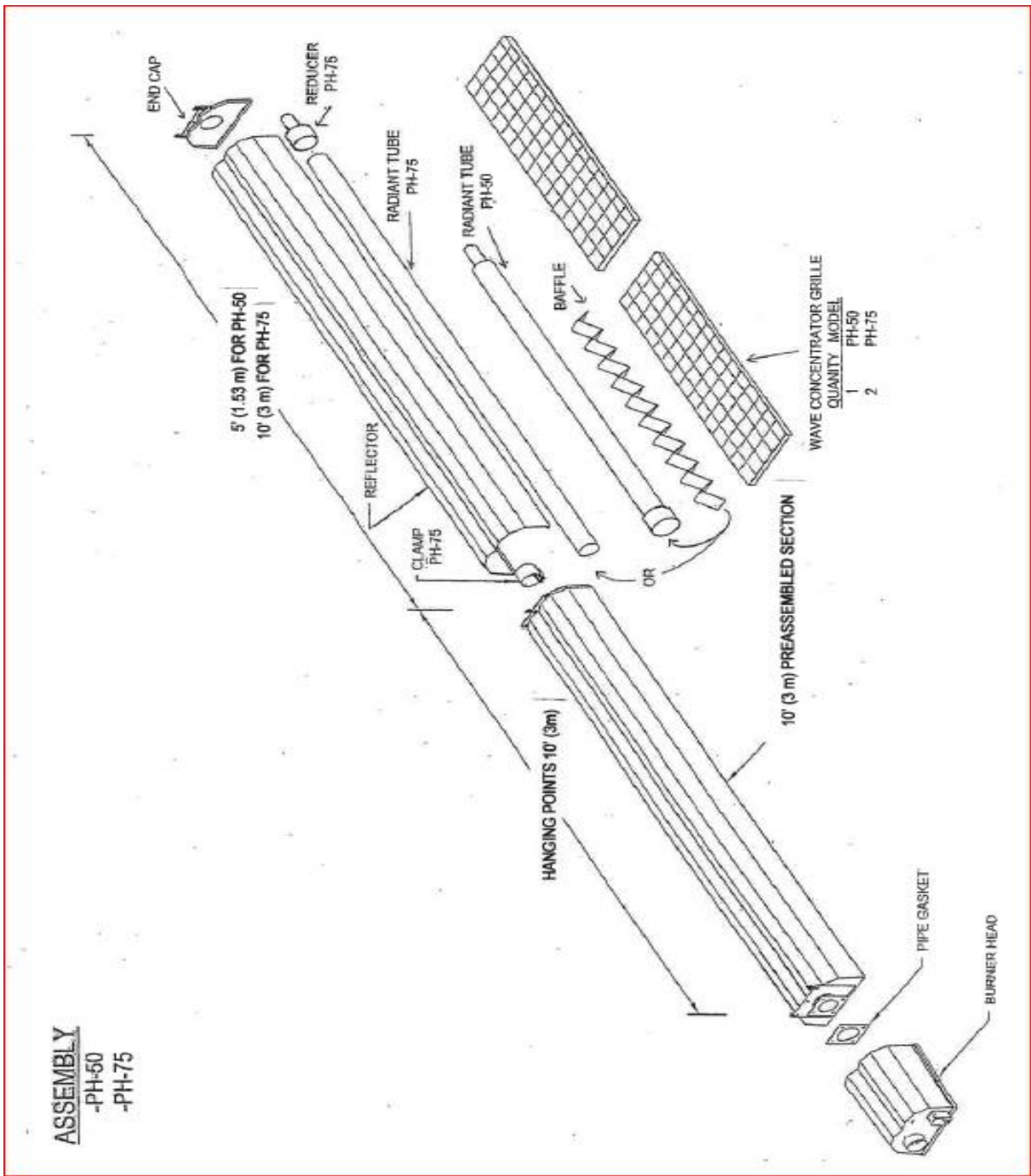
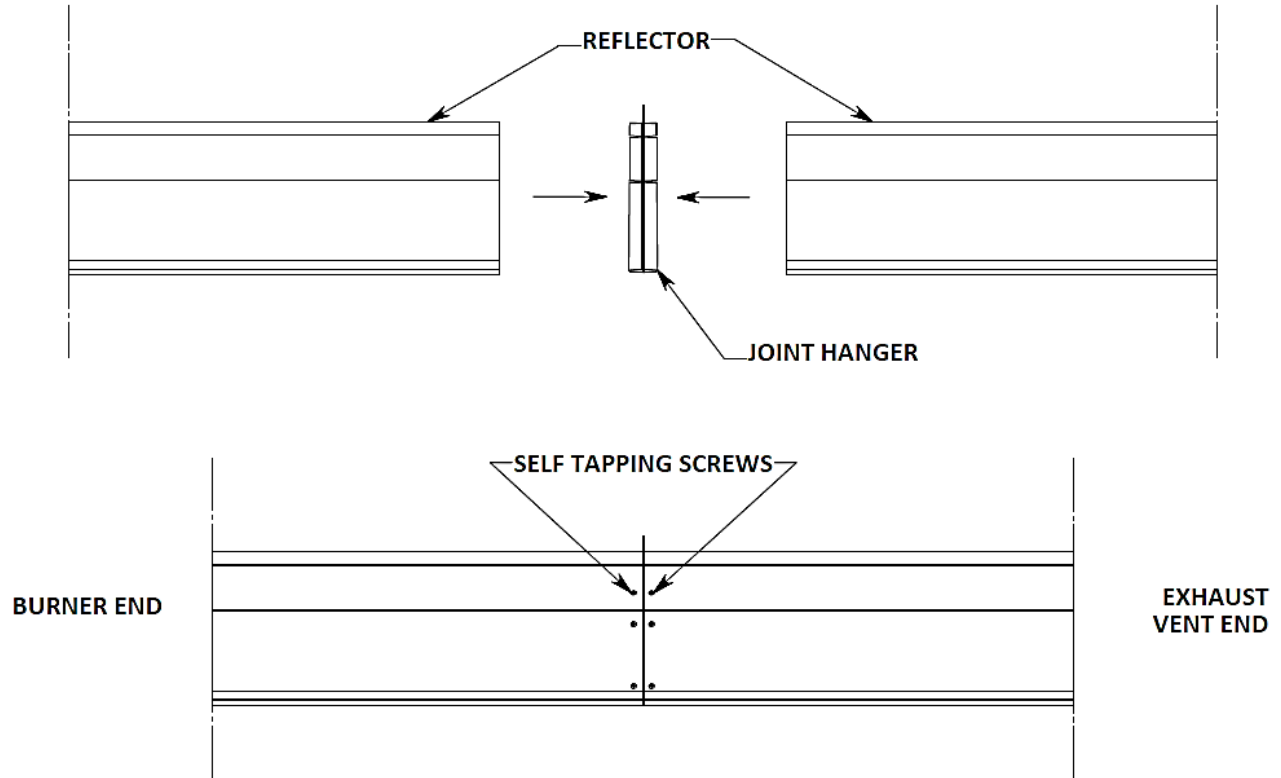


Figure 9. PH-50 & 75 ASSEMBLY

**PH-SERIES**

**10.1 COMPONENT ASSEMBLY**

**A. JOINT HANGER TO REFLECTOR  
(PH-50 & 75 MODELS)**



**Figure 10. JOINT HANGER INSTALLATION**

**B. CLAMP COUPLER  
(PH-50 & 75 MODELS)**

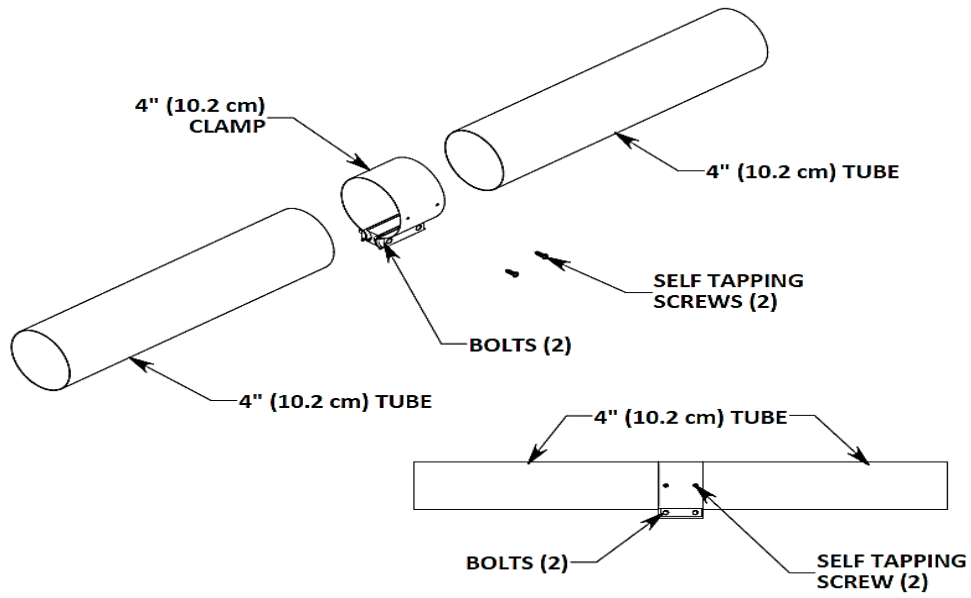


Figure 11. CLAMP COUPLER INSTALLATION

**C. END CAP TO REFLECTOR  
(PH-50 & 75 MODELS)**

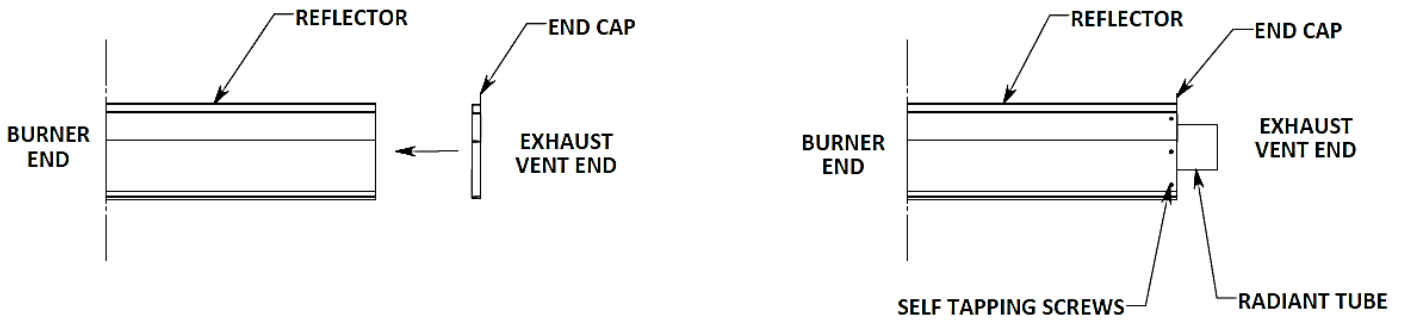


Figure 12. END CAP INSTALLATION

# PH-SERIES

## D. 90° ELBOW KIT (PH-50 & 75 MODELS)

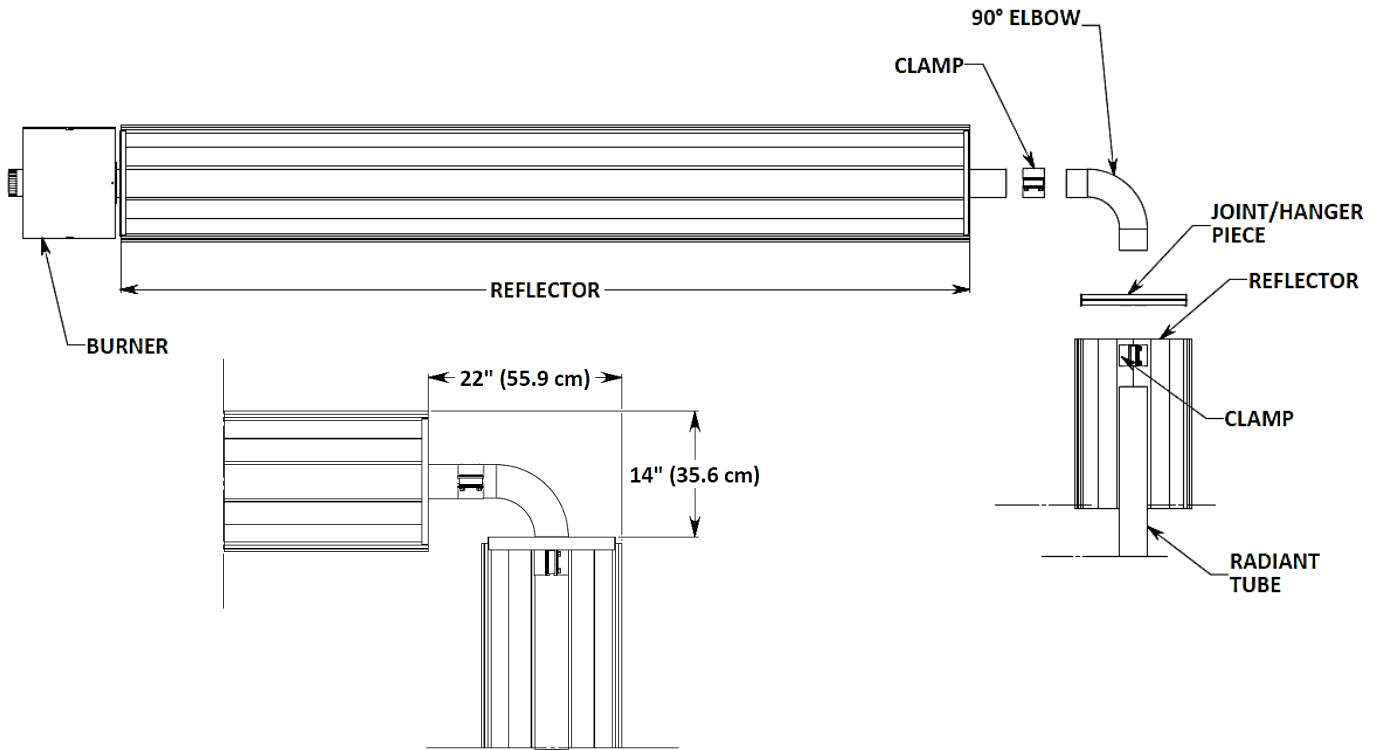


Figure 13. 90° ELBOW KIT INSTALLATION

## E. 180° U-BEND KIT (PH-50 & 75 MODELS)

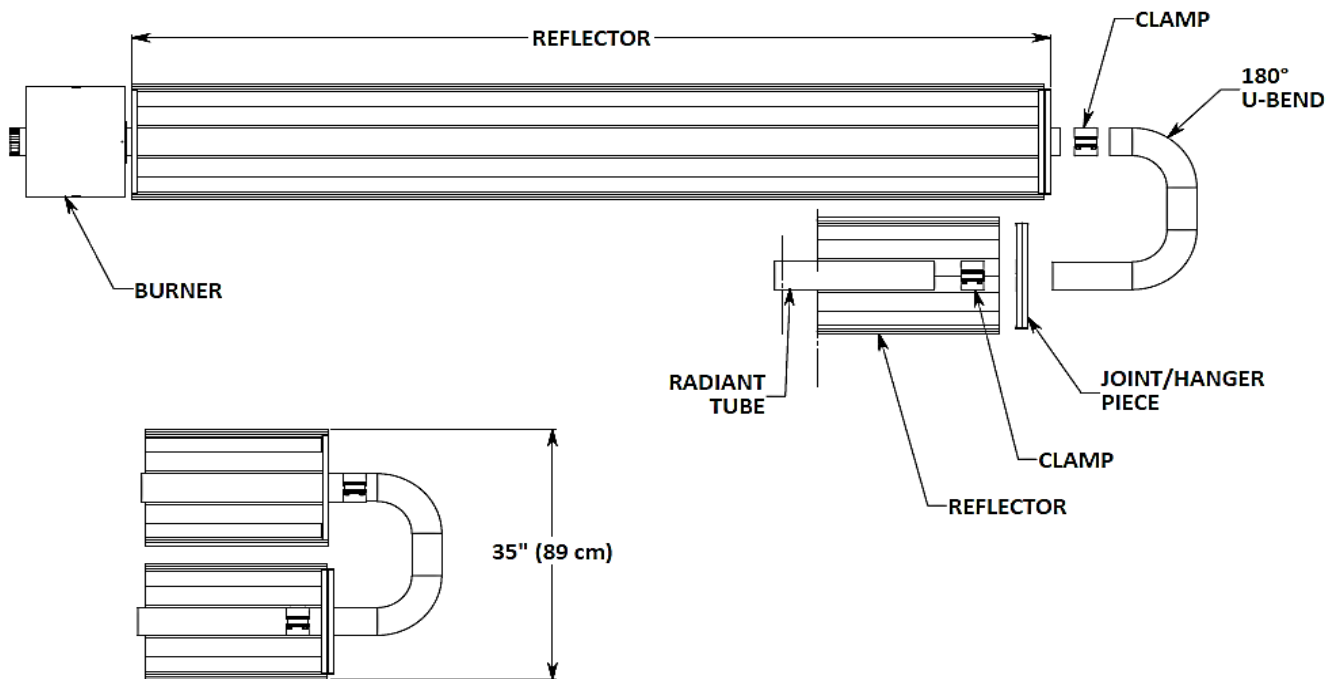


Figure 14. 180° U-BEND KIT INSTALLATION

## PH-SERIES

### **11.0 VENTING REQUIREMENTS**

#### ***(UNVENTED APPLICATIONS: (All Models)***

This appliance shall only be used in a well vented space and shall not be used in a building, garage or any other enclosed or semi enclosed space unless the space conforms to the specifications under the sections titled: "FOR UNVENTED INSTALLATIONS IN SEMI ENCLOSED APPLICATIONS" or "FOR VENTED INSTALLATIONS"

If no other means of ventilation is provided (either mechanical or natural ventilation) in the area to be heated, an appliance may be installed with shelter no more inclusive than:

- a) With walls on all sides, but no overhead cover.
- b) Within a partial enclosure which includes an overhead cover and no more than two side walls. These side walls may be parallel, as in a breezeway, or at right angles to each other.
- c) Within a partial enclosure which includes an overhead cover and three side walls, as long as 30 percent or more of the horizontal periphery of the enclosure is permanently open.

#### ***FOR UNVENTED INSTALLATIONS IN SEMI ENCLOSED APPLICATIONS: (All models)***

If the heater is to be used or installed in a semi enclosed application, which is more confining than as described under the section titled "UNVENTED APPLICATIONS" but is not totally enclosed; adequate ventilation must be provided to dilute the products of combustion. This rate is a minimum of four (4) CFM (cubic feet per minute) or .12 cubic meters per 1000 BTU/Hr of installed heater input. Ventilation is to be provided via mechanical or natural gravity (convection). Provision must be provided for adequate fresh, outdoor air to enter the space through either, building crack-age and/or fresh air ventilation inlets and/or mechanical exhaust and/or supply fans. Contact local authorities for verification of local code compliance prior to operation.

If adequate ventilation cannot be provided, a condition can occur whereby the exhaust gases can displace the available air at ceiling level to such an extent that the heater may not operate properly and cause one or all of the following symptoms: black residue at the exhaust outlet (soot) and /or backfiring and/or complete heater shutdown. In order to eliminate this possible condition, do not install this heater in recessed ceiling applications that are not ventilated (if clarification of this type of installation is required, call the factory for further information prior to installation or purchase), or In situations where the products of combustions cannot escape or be ventilated at a rate sufficient to support combustion. Ventilation in tray ceiling or peak ceiling applications can be via mechanical ventilation, or natural convection through ventilation and exhaust inlets or grilles at a minimum rate of four (4) CFM (cubic feet per minute) or .12 cubic meters per 1000 BTU/Hr of installed heater input.

**If you do not understand or are unfamiliar with the terminology or instruction as they are written, do not install this product until you contact the local authorities for clarification or approval.**



## PH-SERIES

### ***FOR VENTED INSTALLATIONS: (For PH -40, 50, 75, 80, 100 and 125 models only)***



**WARNING: DO NOT ATTEMPT TO CONNECT ANY HO (HIGH OUTPUT) MODEL TO ANY VENTING.**

If adequate ventilation cannot be provided by the methods previously described under the heading "FOR UNVENTED INSTALLATIONS IN SEMI ENCLOSED APPLICATIONS", an approved chimney or sidewall venting system must be used. ***Only models PH-40, 50, 75, 80, 100 and 125 can be connected to an approved venting system.***

If you have an HO model and cannot provide adequate ventilation to safely operate the unit as per the previous heading ("FOR UNVENTED INSTALLATIONS IN SEMI ENCLOSED APPLICATIONS"), return unit to your supplier and purchase the appropriate model for this type of application.

If you do not understand or are unfamiliar with how to vent a gas fired appliance, do not install this product until you contact the local authorities for clarification or approval.

To connect to an approved chimney (by others) or side wall vent system (Part #800208) remove the exhaust hood from the end cap by drilling out four (4) retaining rivets and discarding the hood. The exposed tubing is 3" I.D. and can be connect to an approved venting system by following the instructions on appropriate pages (22-29) for your particular installation.

If the roof/chimney type installation is selected also adhere to any instructions supplied by the manufacturer of the system.

## **PH-SERIES**

### **11.1 VENTING**

**ANSI Z83.20-2016/CSA 2.34-2016  
GAS PRODUCTS NO. 405  
JANUARY 1, 2019**

**APPROVED CATEGORY III Venting Method**

In North America (Canada and the USA) the SPECIAL VENTING method, as detail below, is approved as a Category III venting system for Calcana installations where venting is required.

The venting system is to be provided by the installer. The use of readily available, single wall venting materials with a thickness no less than 26 gauge is to be used. If 26 gauge "C-vent" or galvanized "stove pipe" is selected, each joint will need to be sealed with high temperature silicone as prescribed below, as well as the connection will require a minimum of three (3) #8 sheet metal or self tapping screws to be used in a pattern such that each screw is installed at a distance that is equal between the number of fasteners selected. If material other than the aforementioned is employed, connect sections of material in such a fashion that each connection is secure and sealed. A minimum 36" (91 cm) length of 3" (7.62 cm) (PH-40, PH-50,PH-75) or 4" (10 cm) (for PH-40, PH-50, PH-75, PH-80, PH-100, PH-125) single wall material, with a thickness no less than 26 gauge is to be installed at the exhaust end of heater. This length can include elbows. If a portion of venting is to pass through a wall, installer can continue the single wall vent as long as a combustible wall thimble is used to provide adequate clearance to combustibles, or "B-vent (and related accessories) can be used. If a portion of venting is to pass through a roof, installer to use "B-vent" (and related accessories) for these sections. Use approved chimney cap for vertical installations and approved high wind terminal, as described below in subsection B and C for HORIZONTAL VENTING. Installer is to adequately support vent system to prevent sagging in a manner that is in accordance with codes for the area.

Installer is to make sure all flue joints are sealed. Use only suitable products equal to General Electric RTV106 or Permatex 81160 High-Temp Red RTV, Red High Temperature Silicone Adhesive Sealant (not supplied). Apply a minimum of ¼ " x ¼" (6.35mm x 6.35 mm) bead of silicone to each joint, and to each seam. The bead should be applied to venting material with a smaller diameter as compared to the larger opening of the mating material or in some instances, clamp, in such a fashion that when the joint is secured, the silicone is squeezed between the two materials to form a sealed connection. Apply additional silicone if needed to accomplish a sealed joint or seam.

Follow the silicone manufacturer's instructions for curing, and after the material has cured, the installer is to perform a leak test on the venting system. A soap and water solution test, on the venting installed inside the occupied space, can be used. If seamed, 26 gauge "C-vent" material is used, seal seam(s) with RTV high temperature silicone. Once the installer is satisfied that the venting system is sealed, the heater can be placed in permanent operation.

## **HORIZONTAL AND VERTICAL VENTING APPLICATIONS**

Venting of the unit must comply with the Installation Codes CAN/CGA-B149.1. In the USA, refer to **NATIONAL FUEL CODE ANSI Z223.1/NFPA 54**; current edition or local codes.

A. Select exhaust point:

A vent shall not terminate:

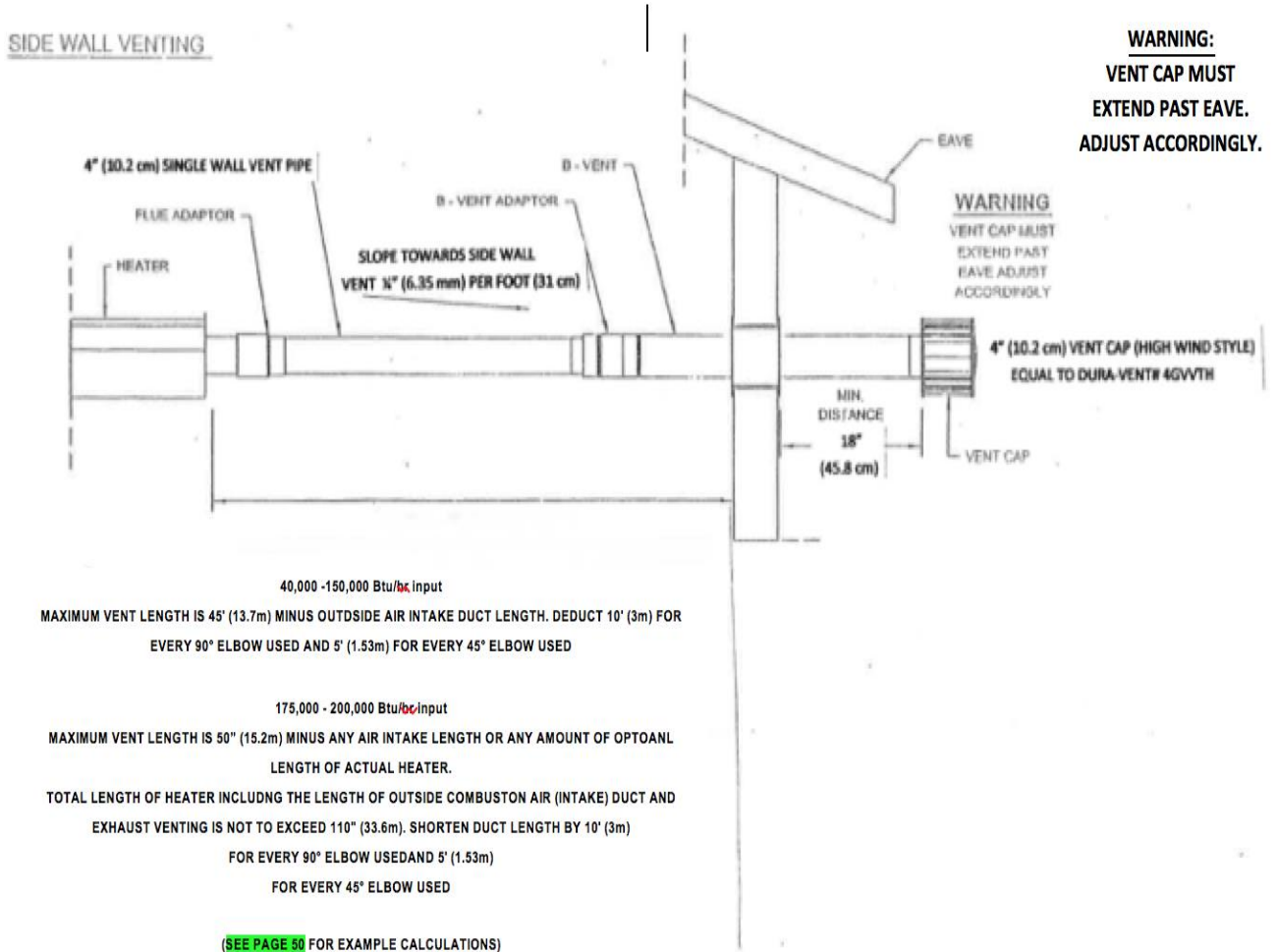
- a. within 6 feet (1.8 m) of a mechanical air supply inlet to a building;
- b. above a meter/regulator assembly within 3 feet (.9 m) horizontally of the vertical center line of the regulator,
- c. within 6 feet (1.8 m) of any gas service regulator vent outlet,
- d. less than 1 foot (.3 m) above grade level;
- e. less than 7 feet (2.1 m) above a paved sidewalk or a paved highway;
- f. within 3 feet (.3 m) of a Window or door which can be opened in any building , any non-mechanical air supply inlet to any building or the combustion air Inlet or any other appliances.

NOTE: May be reduced to 1 foot for inputs up to 100,000 BTUH (30kW) and 3 feet (.9 m) for inputs exceeding 100,000 BTUH.

In the U.S.: The National Fuel Gas code, **ANSI Z223.1/NFPA 54**, specifies a 4 foot (1.22 m) vent terminal clearance from gas and electrical meters, regulators and relief equipment.

# PH-SERIES

**B. HORIZONTAL VENTING – SINGLE UNIT:** For horizontal, sidewall venting a single unit, use 4" (10.16 cm) "B-Vent" equal to DuraVent PIN# 4GV36 in combination with a combustible wall thimble, a "B-vent" to "C-Vent" (single wall) adaptor equal to DuraVent PIN#4GVC, and HIGH WIND VENT TERMINAL equal to DuraVent PIN# 4GVVTH.

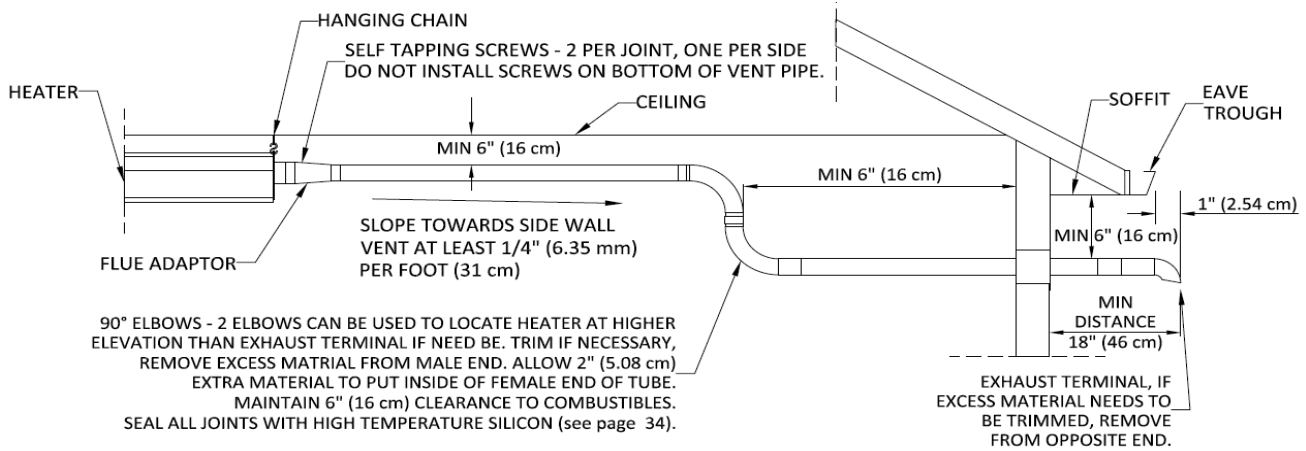


**NOTE: MAKE SURE THAT ALL FLUE/EXHAUST JOINTS (AND SEAMS IF NECESSARY) INSIDE AN OCCUPIED BUILDING ARE SEALED. USE ONLY SUITABLE PRODUCTS EQUAL TO GENERAL ELECTRIC RTU 106 OR PERMATX FORM A GASKET RED HIGH TEMPERATURE SILICONE ADHESIVE SEALANT. (NOT SUPPLIED)**

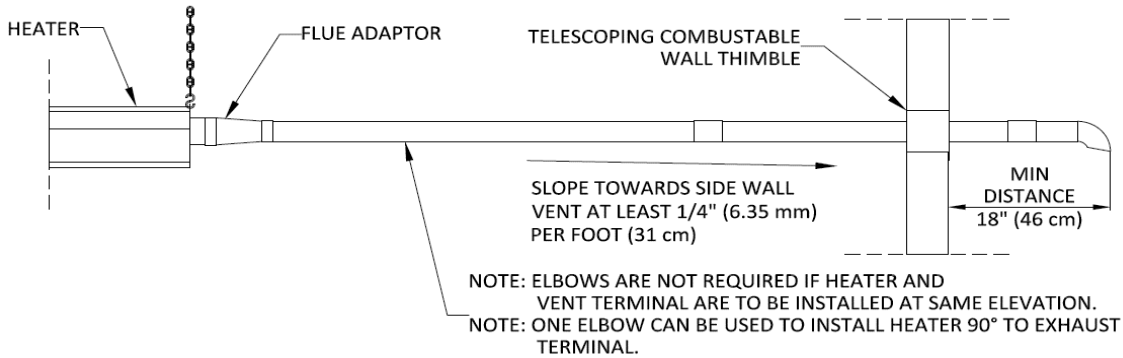
Figure 54. SIDE WALL VENTING, SINGLE UNIT

**PH-SERIES**

ALTERNATIVELY, for models PH-40, PH-50, PH-75, installer can use material equal to Calcana 3" x 16 gauge sidewall vent kit PIN#800208, c/w 4" x 3" 16 gauge reducer.



**NOTE: MAKE SURE THAT ALL FLUE/EXHAUST JOINTS ARE SEALED. USE ONLY SUITABLE PRODUCTS EQUAL TO GENERAL ELECTRIC RTU 106 OR PERMATX FORM A GASKET RED HIGH TEMPERATURE SILICONE ADHESIVE SEALANT. (NOT SUPPLIED)**



D

**NOTE: VENT PIPE CAN BE TRIMMED IF NEEDED. CUT EXCESS MATERIAL AS REQUIRED. MAINTAIN 6" (16 cm) CLEARANCE TO COMBUSTIBLES. SEAL ALL JOINTS WITH HIGH TEMPERATURE SILICON (SEE PAGE Error! Bookmark not defined.).**

**Figure 15. SIDE WALL VENTING, SINGLE UNIT**

NOTE: Maximum length is 25 feet including, two (2) 90° elbows, deduct 10' for every additional 90° elbow and 5' for every 45° elbow.

**PH-SERIES**

C. ROOF EXHAUST – VERTICAL VENTING: Use 'B' style chimney.

SIDE VIEW

**WARNING: MAKE SURE VENT CAP IS NOT OBSTRUCTED BY SNOW. ADJUST ACCORDINGLY.**

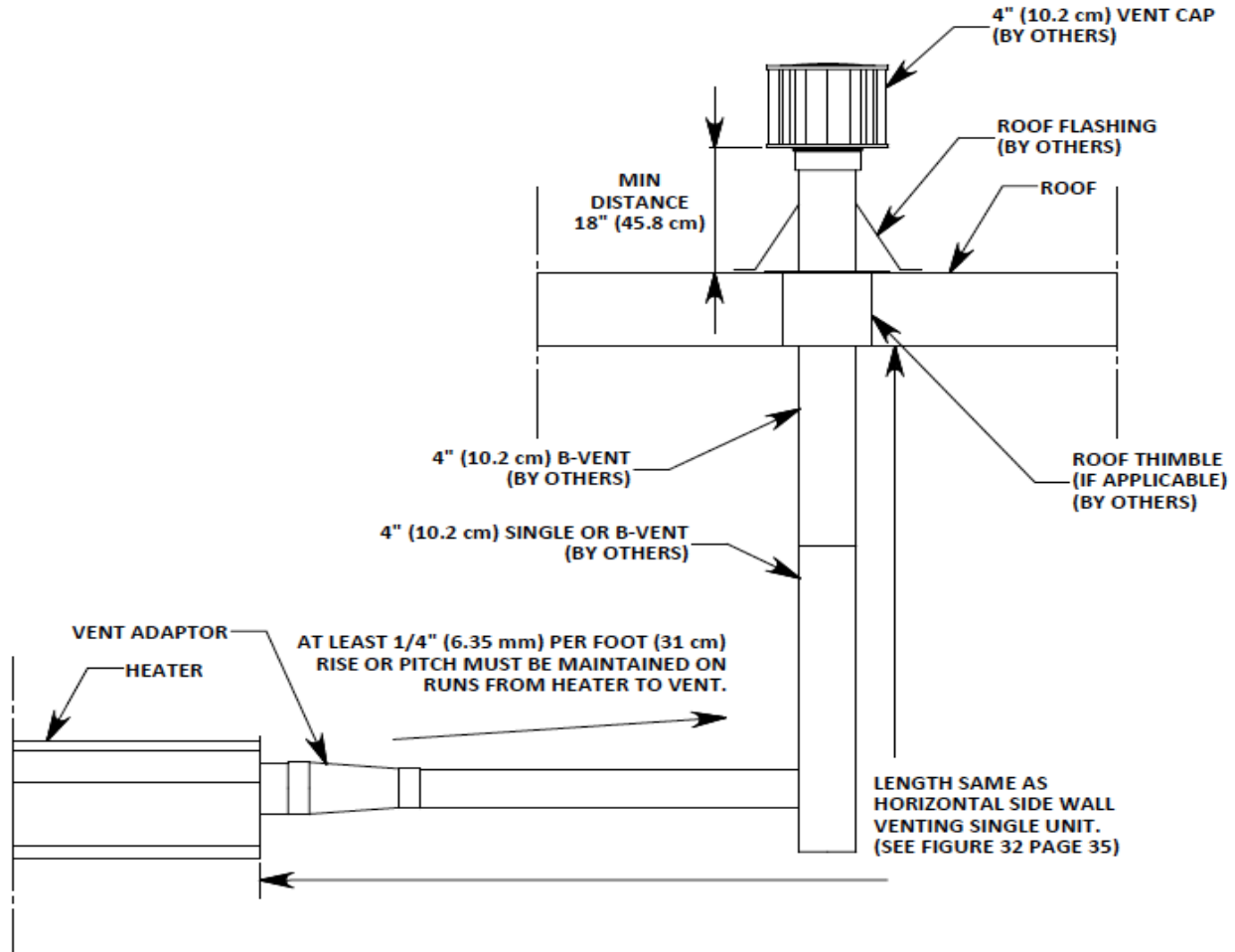


Figure 16. VERTICAL VENTING, SINGLE UNIT

# PH-SERIES

## VERTICAL VENTING (CONTINUED) ROOF EXHAUST : TWO OR MORE UNITS - USE 'B' STYLE CHIMNEY.

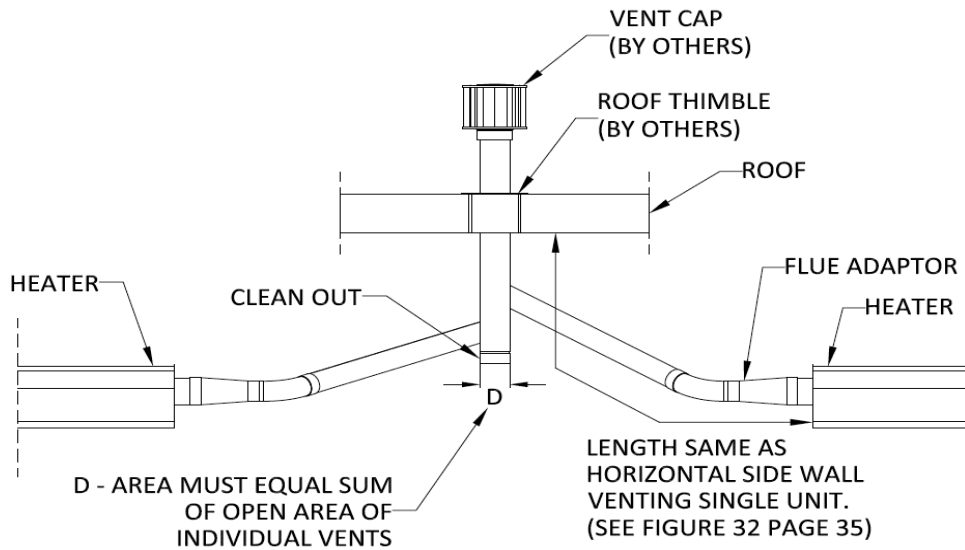
### TWO OR MORE UNITS INTO A COMMON CHIMNEY – SIDE VIEW

NOTE: For venting of two or more heaters into one common chimney, in Canada refer to the *Natural Gas and Propane Installation Code, CSA B149.1* or latest edition and in the USA, the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or latest edition.

Units that are commonly vented must be controlled by the same line voltage thermostat.

#### SIDE VIEW

**WARNING:** MAKE SURE VENT CAP IS NOT OBSTRUCTED BY SNOW. ADJUST ACCORDINGLY.



#### TOP VIEW

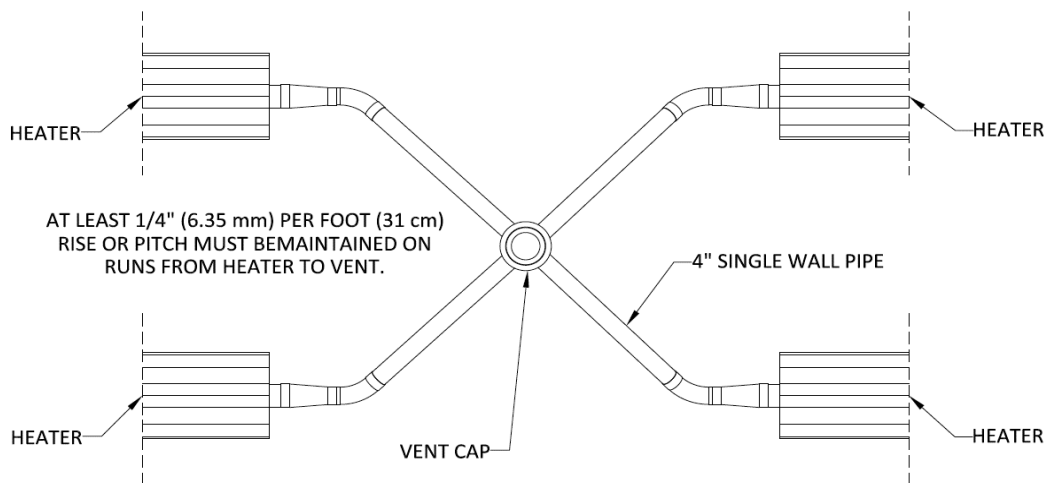


Figure 17. COMMON VERTICAL VENTING, TWO OR MORE UNITS INTO ONE COMMON VENT

## PH-SERIES

- D. Vent terminal must be installed at a height sufficient to prevent any blockage by snow.
- E. Protect building materials from any degradation that may be caused by flue gases.
- F. Support vent to prevent sagging.

Make sure that all flue joints are sealed. Use only suitable products equal to General Electric RTU106 or Permatex Form a Gasket Red High Temperature Silicone Adhesive Sealant (not supplied).

For sidewall venting, the heater must not be connected to a separate chimney, but must be installed using the venting system supplied with the heater.

If condensation in flue is present then flue should be insulated or shortened. Install according to Codes CAN/CGA-B149.1. In the USA., refer to **ANSI Z223.1/NFPA 54 NATIONAL FUEL GAS CODE** current edition.


NOTE: Refer to the CAN/CGA-B149.1 code for venting of two or more heaters into one common vertical chimney. In the USA., refer to **ANSI Z223.1/NFPA 54 NATIONAL FUEL GAS CODE** current edition.


NOTE: A small amount of condensation may occur from the heater, when it starts the heating cycle. The condensation will stop once the heater warms up. Make sure all vent



## PH-SERIES

### 12.0 GAS PIPING


 **WARNING:** All gas work MUST be performed by qualified/licensed personnel with adequate training and experience in this field.

 **WARNING:** Use only the type of gas for which the heater is equipped. Using the wrong gas could create a hazard, resulting in damage, personal injury or death.

In Canada refer to the *Natural Gas and Propane Installation Code, CSA B149.1* or latest edition and in the USA, the *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or latest edition.

- a) Adequate supply of gas to the heater is required for it to produce the designed amount of heat output. The gas meter must have a large enough capacity to handle the extra consumption required by the heater.
- b) The gas line must be of an adequate size to deliver the necessary amount of fuel to the unit.
- c) If there is any question concerning a) or b) call your local gas company for further assistance.
- d) Make sure that all piping is supported properly.
- e) All connections must have special sealing compound applied to them.
- f) A drip leg must be installed before the heater to prevent contaminating matter interfering with the operation of the unit.
- g) Check piping for leaks via pressure test. **Install a 1/8" (3.175 mm) N.P.T plugged tapping** immediately ahead of heater in gas supply. Use this location for test gauge. A soap and water test can be used to verify location of any possible leak.

 **WARNING:** Do not use an open flame for testing!

 **WARNING:** For high pressure testing, disconnect heater(s) and shut-off cocks and cap off pipe for test. Failure to do so will damage pressure ratings on the above mentioned equipment and cause a complete replacement of these parts.

## **WARNING:**

The heater and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing for that system at test pressures in excess of ½ psig.

The heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig.

Refer to pages 30 & 31 for gas connection to heater.

## PH-SERIES

### 13.0 GAS CONNECTION

#### A. HARD PIPE

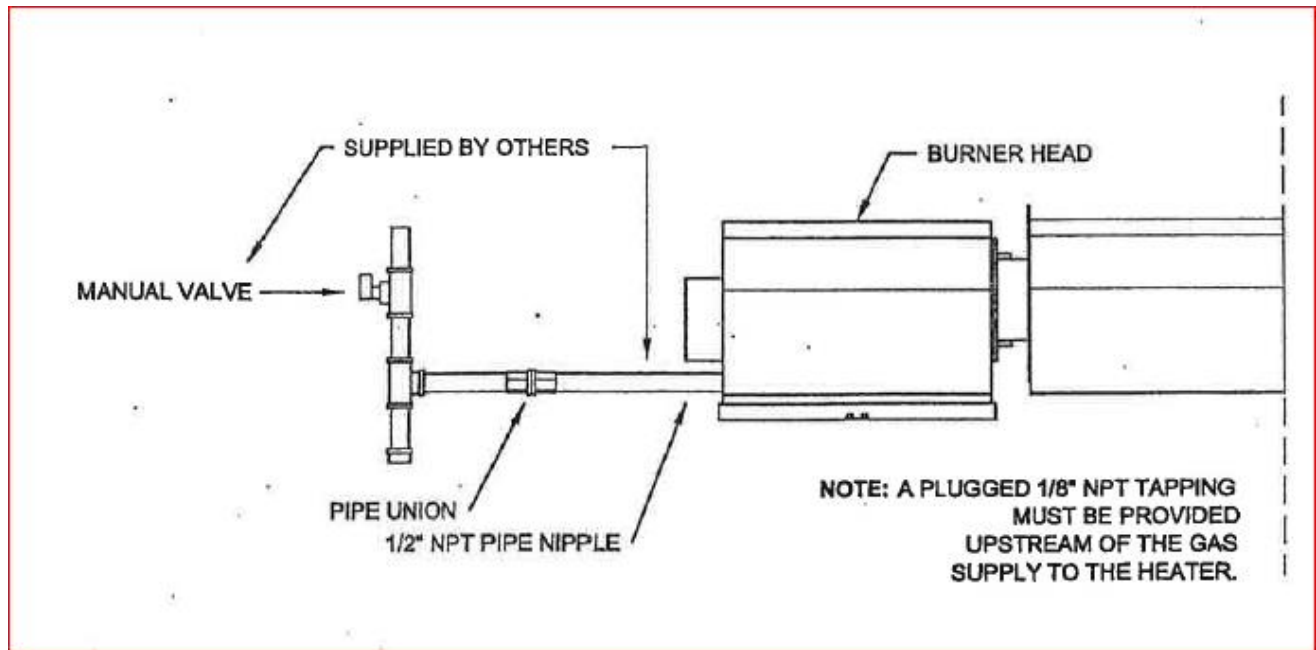


Figure 18. HARD PIPE INSTALLATION

#### B. FLEX CONNECTOR

### ⚠ WARNING:

#### FIRE AND/OR EXPLOSION HAZARD

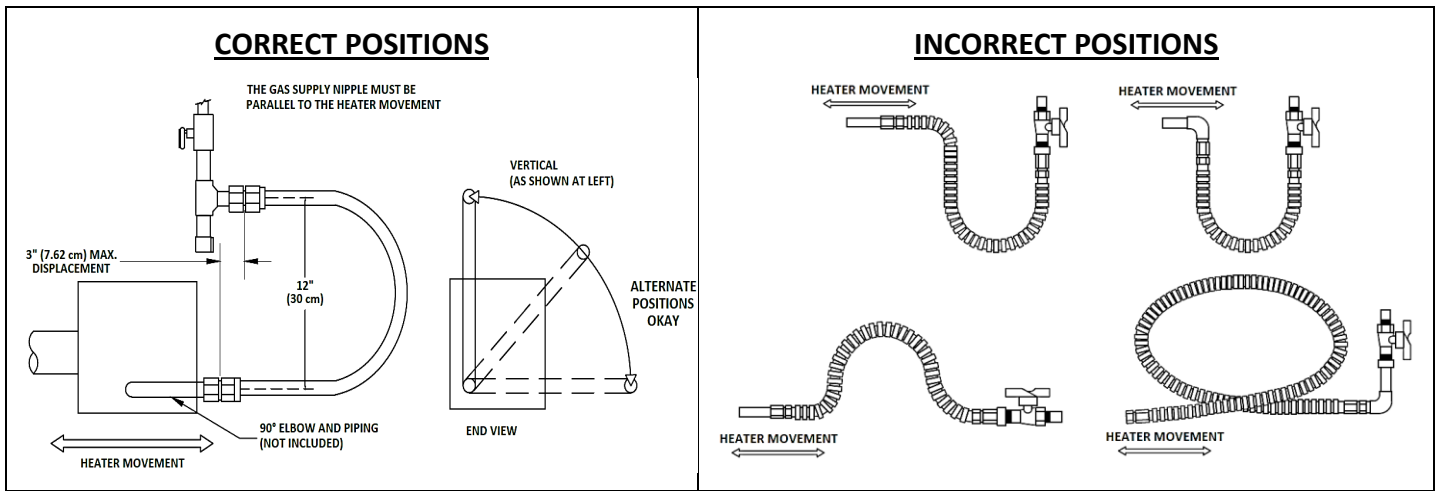
*Can cause property damage, severe injury or death.*

With each firing cycle, the radiant pipe will expand and contract which can cause the burner head to move horizontally with reference to the gas supply line.

If the gas connection is not installed in strict accordance as shown in Figure 19, a gas leak can occur resulting in an extreme unsafe condition.

"Certified connectors are recommended to be installed as shown, (Figure 19, page 31) in one plane, and without sharp bends, kinks, or twists. The gas take off must be parallel to the burner gas inlet connection. "

(CSA)



**⚠ WARNING:**

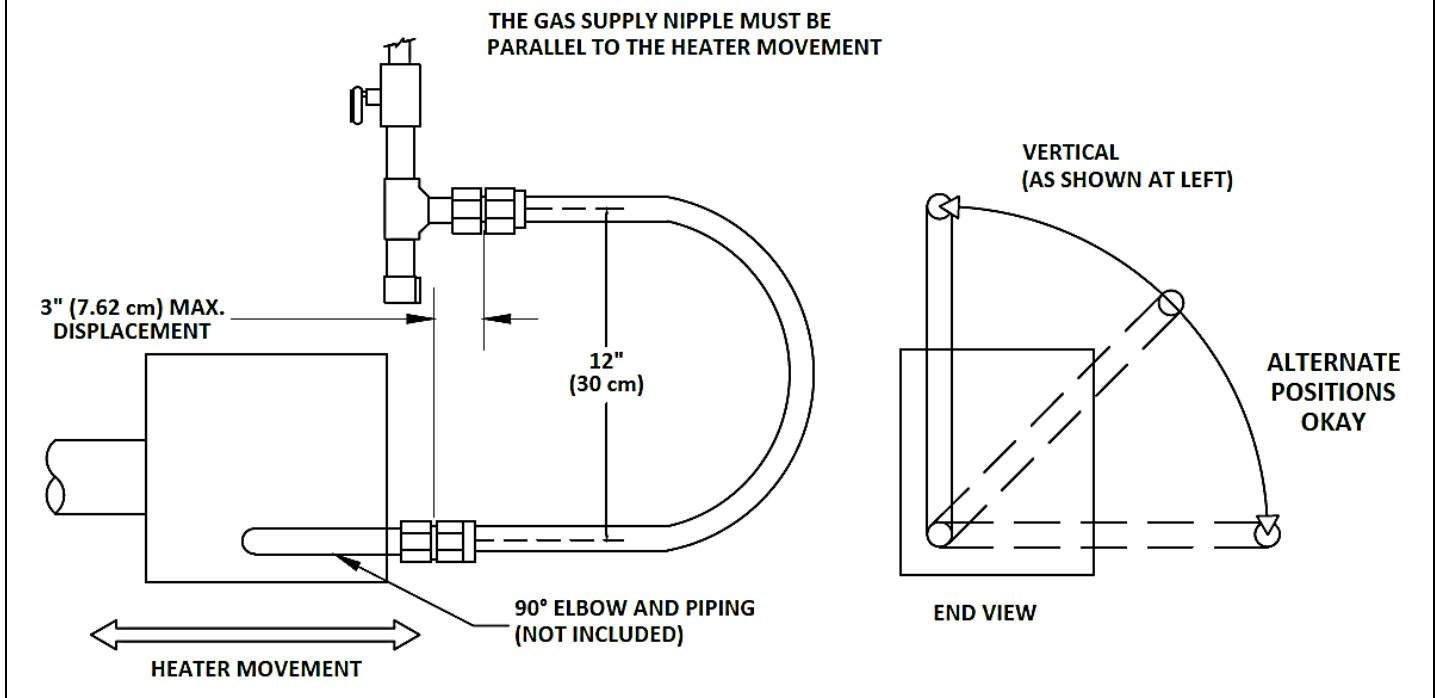
**CONNECTOR MUST BE INSTALLED AS PER THE CONFIGURATION ILLUSTRATED ABOVE.**

**USE ONLY THE 36" (90 cm) CONNECTOR OF ½" (1.27 cm) NOMINAL ID FOR LENGTHS FROM 10' (3m) TO 70' (21.3 m) AND A 36" (90 cm) CONNECTOR OF ¾" (1.905 cm) NOMINAL ID FOR LENGTHS GREATER THAN 70' (21.3m).**

**IN CANADA:** "A radiant tube-type infrared heater shall only be connected with a Type 1 hose connector that is (a) 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 and (b) of a length of 36 +/- 6" (90 +/-15 cm)."

**IN USA:** Flexible Metallic connectors must be certified for use on a radiant tube-type infrared heater as per the Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10.

**Connector is available from manufacturer.**



**Figure 19. GAS LINE CONNECTION WITH CERTIFIED FLEXIBLE GAS CONNECTION**

## PH-SERIES

### **14.0 ELECTRICAL CONNECTION 120 VOLTS**

Refer to rating plate on heater for electrical specifications.

Supply adequate grounded electrical power supply to heater via watertight, outdoor rated electrical wiring. Fasten ground wire to grounding lug on frame of burner head and connect 120 volts to the black and white pigtail wires from the transformer.

**⚠ WARNING:** DO NOT operate heater until it has been thoroughly installed, inspected and is ready for initial fire-up.

**NOTE:** All connections and wiring must be made in accordance with CSA C22.1 CANADIAN ELECTRICAL CODE PART 1 as well as/or local codes, conditions and authorities. Refer to wiring diagrams on pages 23. In the USA refer to NATIONAL ELECTRIC CODE ANSI/NFPA 70-1987 or most current edition.

**NOTE:** If any of the original wire supplied with the unit must be replaced do so only with material having at least 105 degrees centigrade temperature rating.

The heater, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with ANSI/NFPA 70.

DO NOT use an extension cord as the electrical source for the heater.

#### REMOTE CONTROL PANEL

(Low voltage connection)

Locate low voltage controller in convenient location. Connect multi-strand, low voltage wires to panel. Secure wiring accordingly and make final connection inside heater burner box compartment making sure that the correct number on the terminal strip matches identically with the color wires on the HI/Lo switch: The terminals for the on/off switch, 3 and 4, are not location specific but must be wired only to 3 and 4 in the burner head.

#### ONLY USE APPROVED OUTDOOR WIRE.

Use 18 gauge for distances up to 50' and 16 for distances greater than 50 feet.

#### MODELS PH-40, 50 & 75 ONLY:

##### THERMOSTAT CONNECTION:

USE THERMOSTAT EQUAL TO: HONEY WELL LINE VOLTAGE MODEL T4098A or T410A. INSTALLED SUCH THAT THE THERMOSTAT CONTROLS THE VOLTAGE BEING SUPPLIED TO THE UNIT.

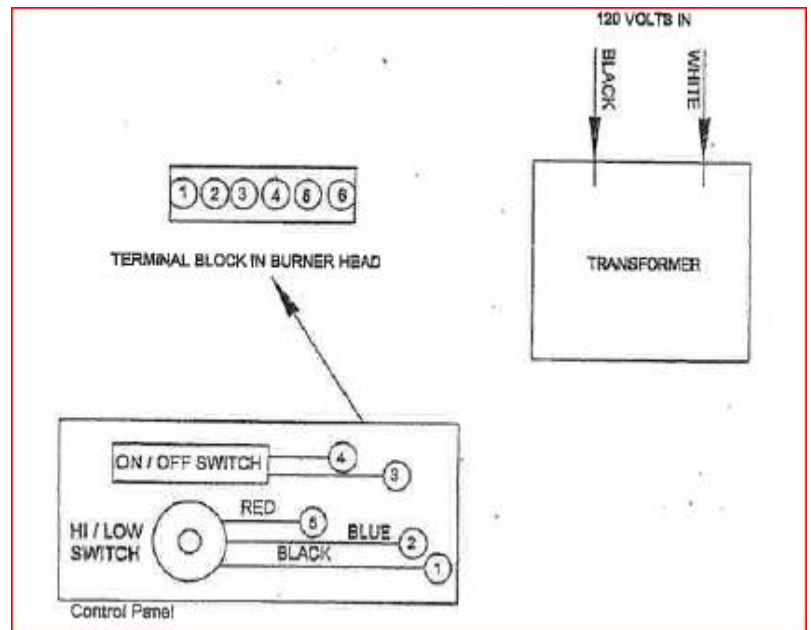
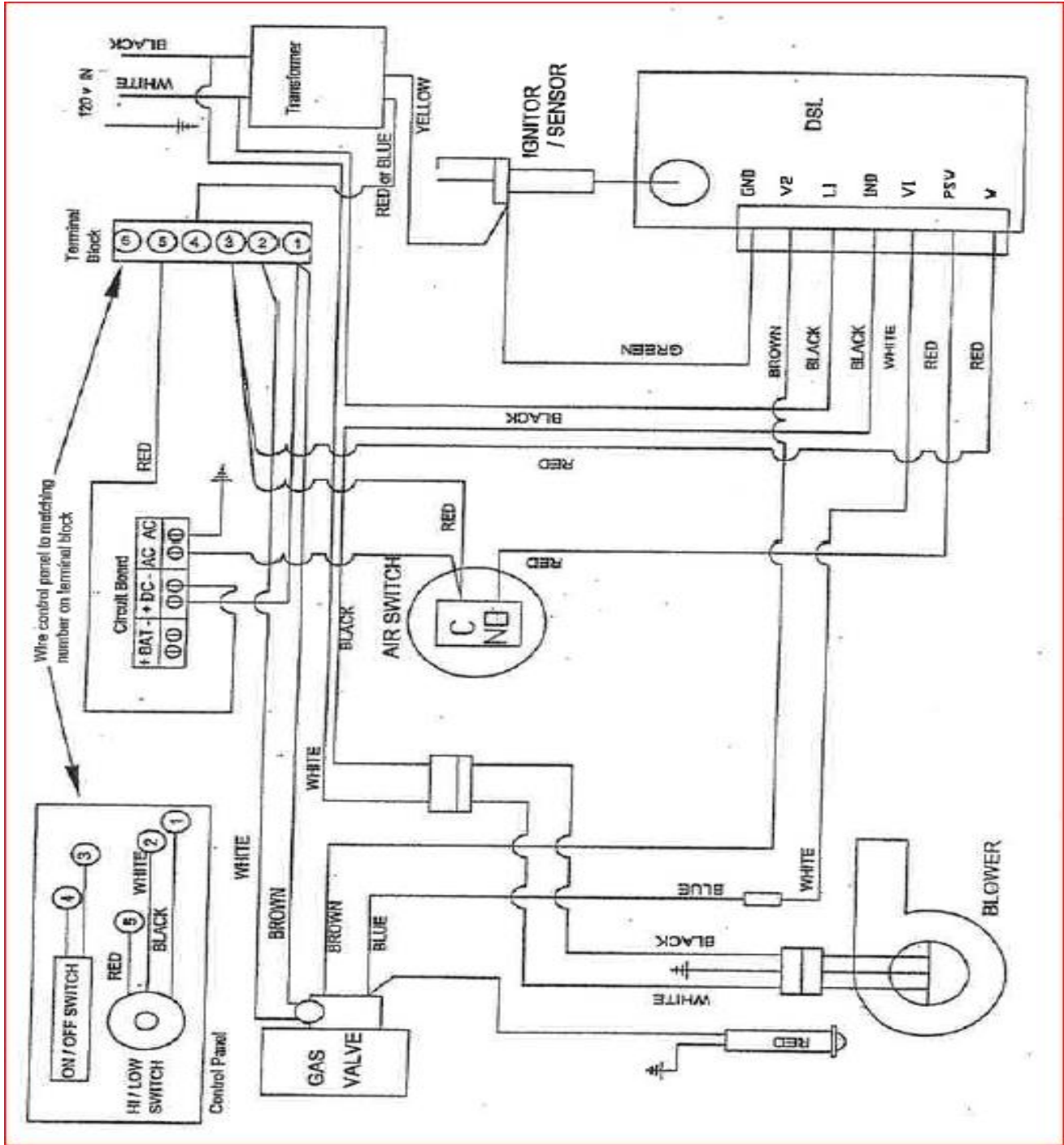


Figure 20. ELECTRICAL CONNECTIONS 120 VOLT

# PH-SERIES

## 14.1 120 VOLT WIRING DIAGRAM



MODELS PH-40, 50, 75, 80, 100 and 125 ONLY: THERMOSTAT CONNECTION:

USE THERMOSTAT EQUAL TO: HONEY WELL LINE VOLTAGE MODEL T4098A or T410A. INSTALLED SUCH THAT THE THERMOSTAT CONTROLS THE VOLTAGE BEING SUPPLIED TO THE UNIT.

Figure 21. WIRING DIAGRAM 120 VOLT

**NOTE:** If any of the original wire supplied with the unit must be replaced do so only with material having at least 105 degrees centigrade temperature rating.

## PH-SERIES

### **15.0 ELECTRICAL CONNECTION 24 VOLT (ALTERNATE POWER SUPPLY)**

- 1) Locate 24 VAC volt transformer near 120 volt source.
- 2) Supply wire from transformer to heater must have adequate capacity and insulation temperature ratings for total connected load. Use 18 gauge wire from transformer to heater for distances up to 50 feet. For distances greater than 50 feet use 16 gauge.
- 3) If any of the original wire supplied with the unit must be replaced do so only with material having at least 105 degrees centigrade temperature rating.
- 4) All connections and wiring must be made in accordance with CSA C22.1 CANADIAN ELECTRICAL CODE PART 1 as well as/or local codes, conditions and authorities. Refer to wiring diagrams on pages 23. In the USA refer to NATIONAL ELECTRIC CODE ANSI/NFPA 70-1987 or most current edition.

**⚠ WARNING:** DO NOT operate heater until it has been thoroughly installed, inspected and is ready for initial fire-up.

#### REMOTE CONTROL PANEL

##### (Low voltage connection)

Locate low voltage controller in convenient location.  
Connect multi-strand, low voltage wires to panel.  
Secure wiring accordingly and make final connection inside heater burner box compartment making sure that the correct number on the terminal strip matches identically with the color wires on the HI/Lo switch: The terminals for the on/off switch, 3 and 4, are not location specific but must be wired only to 3 and 4 in the burner head.

#### ONLY USE APPROVED OUTDOOR WIRE.

Use 18 gauge for distances up to 50' and 16 for distances greater than 50 feet.

#### 24 VAC POWER SUPPLY

Connect to terminal leads #4 and #6 inside burner box.

#### **MODELS PH-40, 50, 75, 80, 100, 125**

##### **ONLY: THERMOSTAT CONNECTION:**

USE THERMOSTAT EQUAL TO: HONEY WELL LINE VOLTAGE MODEL T4098A or T410A. INSTALLED SUCH THAT THE THERMOSTAT CONTROLS THE VOLTAGE BEING SUPPLIED TO THE UNIT.

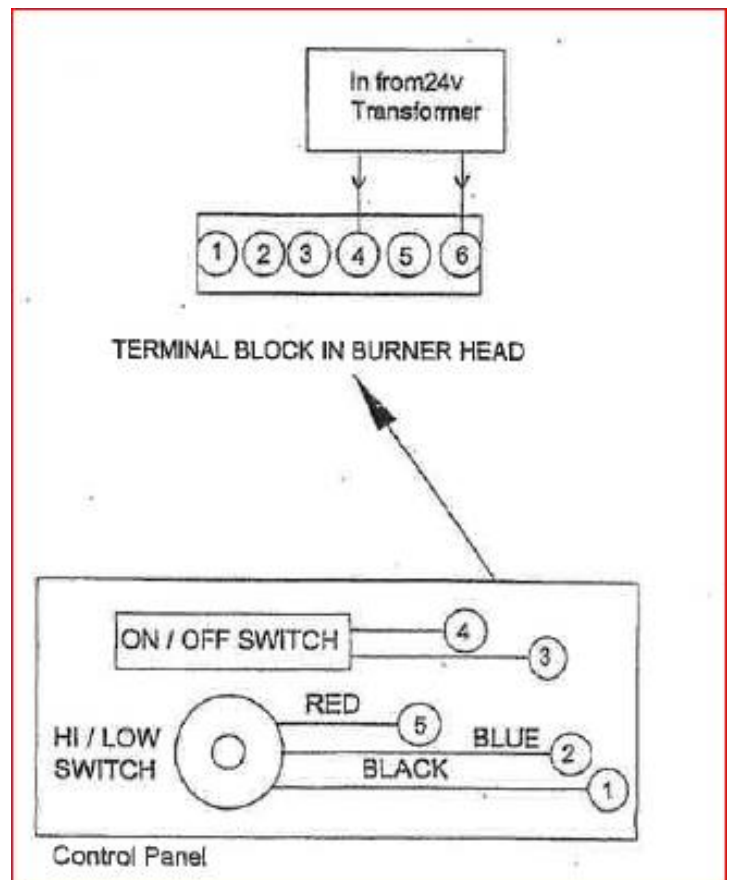
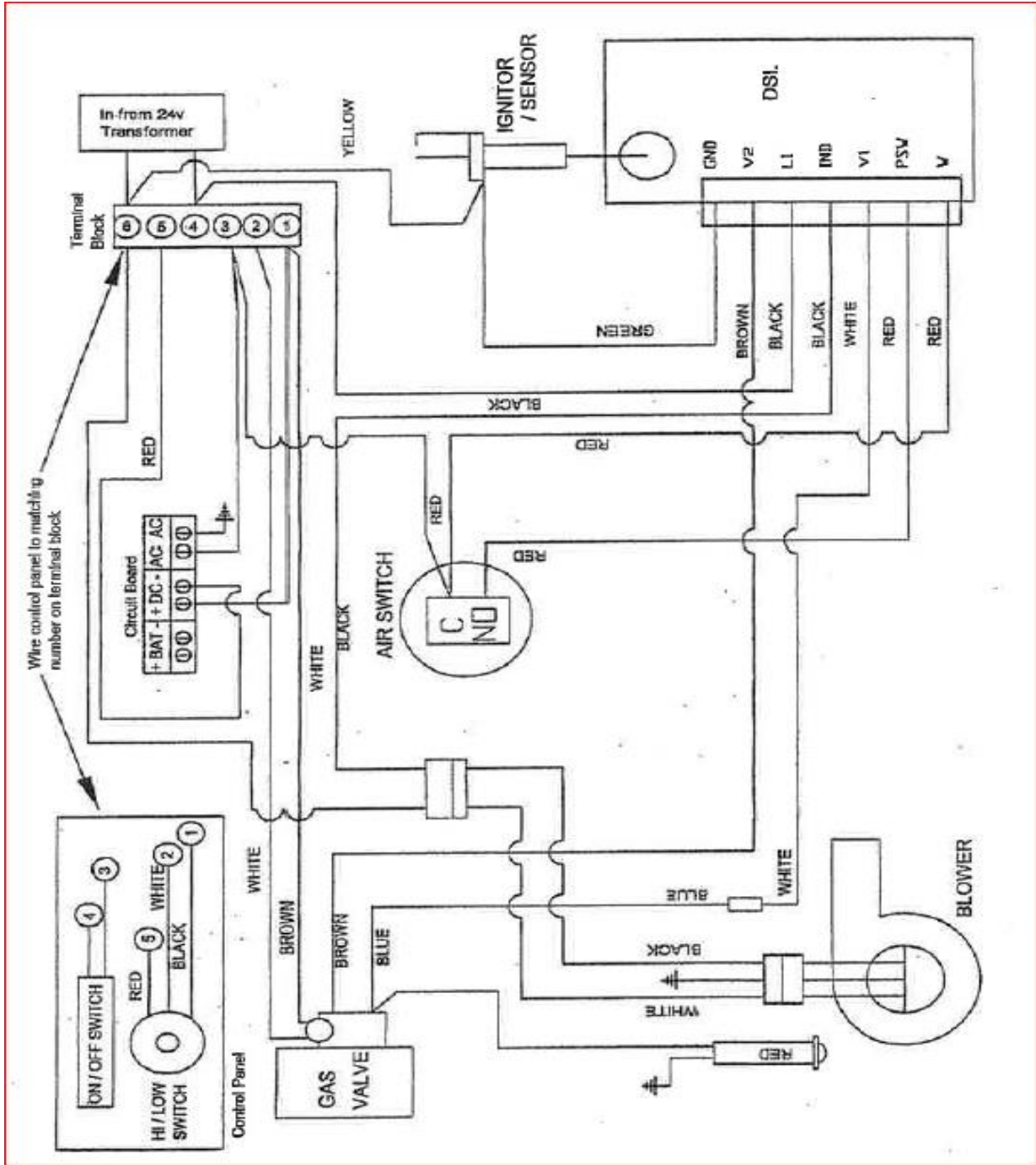


Figure 22. ELECTRICAL CONNECTIONS 24 VOLT

# PH-SERIES

## 15.1 24 VOLT WIRING DIAGRAM



### MODELS PH-40, 50, 75, 80, 100, and 125 ONLY: THERMOSTAT CONNECTION:

USE THERMOSTAT EQUAL TO: HONEYWELL LINE VOLTAGE MODEL T4098A or T410A. INSTALLED SUCH THAT THE THERMOSTAT CONTROLS THE VOLTAGE BEING SUPPLIED TO THE UNIT.

Figure 23. WIRING DIAGRAM 24 VOLT

**NOTE:** If any of the original wire supplied with the unit must be replaced do so only with material having at least 105 degrees centigrade temperature rating.

**16.0 INITIAL START-UP**

**⚠ WARNING:**

**DO NOT ATTEMPT TO IGNITE HEATER BY HAND!!**

**IMPORTANT NOTICE:** This heater is not to be used as a construction heater to supply heat to an unfinished building during the finishing phases of Construction. This practice exposes the unit to an abnormally corrosive atmosphere from sources such as paint, varnish and adhesives, which can lead to premature radiant tube exchanger or vent failure. The practice also allows foreign materials such as sawdust or sheet rock dust to enter the combustion blower, burner, heat exchanger and vent system, resulting in shorter life of the unit.

**Use of the heater as a construction heater will void the warranty.**

**Procedure:**

- a) Make sure gas is turned on.
- b) Check for any possible blockages in combustion air intake and exhaust areas of unit.
- c) Make sure all options are attached securely.
- d) Make sure electricity is on to unit.
- e) Turn control on/off switch to on.
- f) Check the flame port to see flame has established,
- g) If flame is not established, turn on/off switch to off for 5 seconds then turn back up or interrupt electrical supply to unit for 5 seconds, and allow unit to try again.
- h) Verify that the manifold pressure (outlet pressure tap) on the gas valve is the same pressure as stated on the rating plate of the unit. Use a manometer that measures inches of water column for this procedure. If adjustment is required, remove the cap-screw from the pressure regulator housing. Adjust the pressure regulator adjusting screw according to instruction on page 25. Replace cap-screw. After measurement has been taken, replace pipe plug in outlet pressure tap. Check for leaks. (see pages 3, 4 & 37)
- i) Verify gas input rate. (see page 37)

**NOTE:** Oil smoke might appear off of exchanger tube after it heats up for initial firing. Do not be alarmed. The smoke is just a small amount of oil on the surface of the tube from manufacturing. If smoke is excessive, open door and 'air out' the building until smoke is removed.

**NOTE: Heater will have a higher heat output by the burner head as compared to the exhaust end. This is normal.**

**NOTE: A small amount of condensation may occur from the heater when it starts the heating cycle. The condensation will stop once the heater warms up.**



Figure 24. GAS VALVE

**16.1 SETTING MANIFOLD PRESSURE**

**MANIFOLD PRESSURE REGULATOR ADJUSTMENT and PRESSURE VERIFICATION PROCEDURE:**



**INSTALLER MUST VERIFY AND ADJUST, IF NECESSARY, THE MANIFOLD OPERATING PRESSURE OF THIS HEATER ACCORDING TO THE INSTALLATION MANUAL AND RATING PLATE OF THIS HEATER.**

**FAILURE TO DO SO WILL VOID ALL WARRANTIES AND MAY CAUSE DAMAGE, INJURY AND/OR DEATH.**

**IF YOU HAVE ANY QUESTIONS CONCERNING THESE INSTRUCTIONS, CALL CALCANA AT 800-778-6729 BEFORE YOU VERIFY AND/OR ADJUST THE MANIFOLD FUEL PRESSURE ON THE HEATER. No one should work on or install this heater unless they are a licensed/qualified and insured contractor trained in the appropriate trade or technical fields (Gasfitting-HVAC-Electrician) related to the installation and/or service of this heater.**

**Person(s) who service and/or install this unit accept full liability and responsibility for its operation.**

**TOOLS REQUIRED**

- Small Flat Blade Screw Driver
- 2 mm (millimeter) allen wrench
- 3 mm (millimeter) allen wrench
- Manometer that measures inches of water column (" W.C.)
- Volt Meter capable of reading AC and DC voltage in a range of 0 to at least 30 volts

**INITIAL STEPS:**

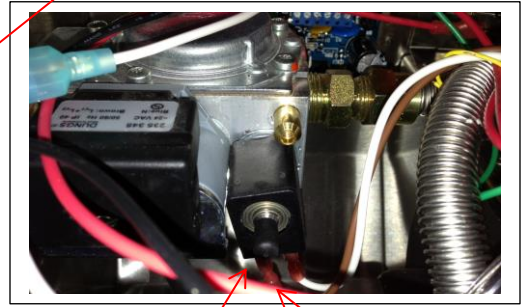
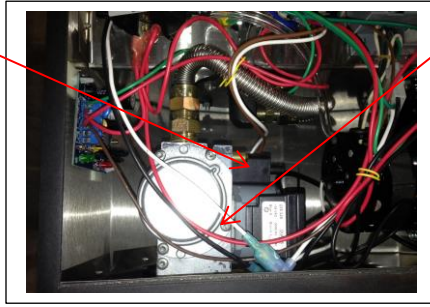
- 1) **The installer must verify that the heater being installed is of the correct fuel type for the available fuel that is supplied for this installation. This includes any high altitude correction that may be applicable for your installation. Confirm site has adequate fuel supply to operate all gas fired appliances, including this/these heater(s), at their maximum rated capacity simultaneously (at the same time). Make sure gas lines and pressure regulators are of a capacity to deliver the correct line pressure within the specified range for your fuel type (5" to 14" w.c. for natural gas and 12" to 14" w.c. for propane or Propane fuel) to the heater's gas line inlet connection, with all gas fired appliances on site operating at the same time. If you are unable to achieve the stated line pressures during operation, you will not be able to verify and/or adjust the gas manifold pressure setting on this heater, and the heater will not operate correctly. If fuel pressure is too low, the heater will not have enough fuel to achieve its maximum heat level. Alternatively, if the fuel line pressure is too high, the valve can be damaged.**
- 2) **Make sure all gas-fired appliances on site, other than this heater, are on and operating at the same time. Otherwise, an inaccurate reading of manifold pressure may occur.**
- 3) **Make sure this heater is not operating and is turned off when you start this procedure.**

# PH-SERIES

- 4) **START BY** opening the service door and identifying the location of the gas valve and the modulator. Remove the black plastic cap from the adjustment tower.



Service Door

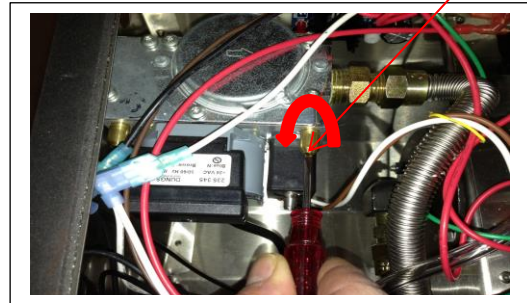


Black Plastic Cap

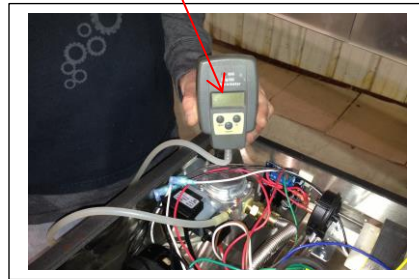
Adjustment Tower

1 of 3

- 5) Locate manifold pressure tap. Open the manifold pressure tap by using a small flathead screwdriver to turn the screw inside the brass fitting counterclockwise 3 turns. **DO NOT REMOVE THIS SCREW.**



- 6) Connect a manometer that registers pressure in inches of water column ("W.C.) to the manifold pressure tap.

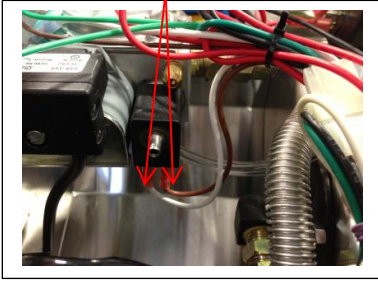


## PH-SERIES

### ***FOR LOW PRESSURE VERIFICATION and/or ADJUSTMENT:***

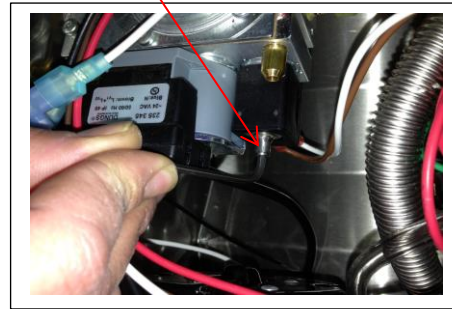
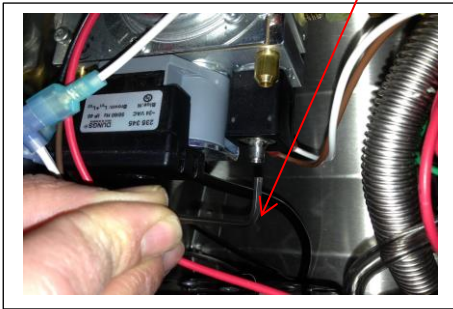
**CAUTION:** Always adjust low pressure setting first since the low setting will affect the high setting.

- 7) Remove the electrical connection from the modulator. (Brown and White Wires)



- 8) Start the heater and take a pressure reading. The manifold pressure required on the low setting for natural gas is 1.25 "W.C. For liquefied petroleum gas, the manifold pressure should be 5.25" W.C. on low. The manifold pressure setting information is also contained on the rating plate which is affixed to the side of the heater near where the service lid is located.

- 9) If adjustment is needed, insert a 3mm allen wrench into the adjustment tower and turn clockwise to lower pressure and counterclockwise to increase pressure.

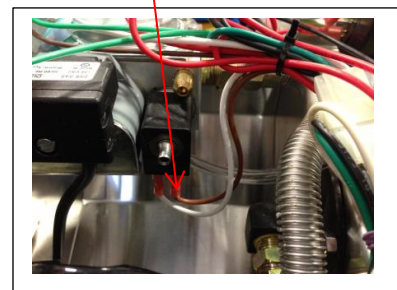


2 of 3

- 10) Once proper pressure is confirmed, turn off the heater, and go to step 11) for high pressure verification and/or adjustment instructions.

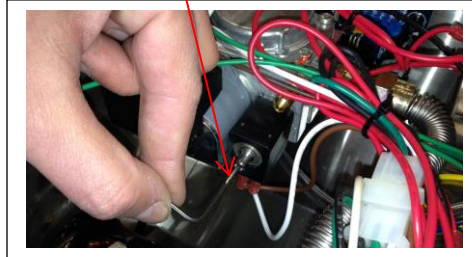
### ***FOR HIGH PRESSURE VERIFICATION and/or ADJUSTMENT:***

- 11) Rotate the modulator control knob on the control panel to high. Connect electrical meter to the modulator control wires. Operate heater by turning it on. Voltage output should be between 24 to 28 volts D.C. current. If voltage is correct, turn off heater and connect the electrical supply wires to the terminals on the modulator. If voltage is incorrect, determine cause for deficient voltage and repair before you continue.



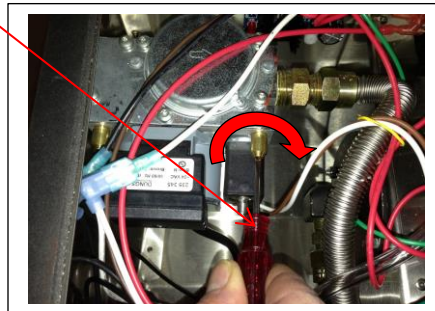
## PH-SERIES

- 12) Start heater and take a pressure reading. For natural gas, manifold pressure should be 3.5 " W.C. on high. For liquefied petroleum gas, manifold pressure should be 10.5" W.C. on high.
- 13) If adjustment is needed, insert a 2mm allen wrench into the adjustment tower and turn clockwise to lower pressure and counterclockwise to increase pressure.

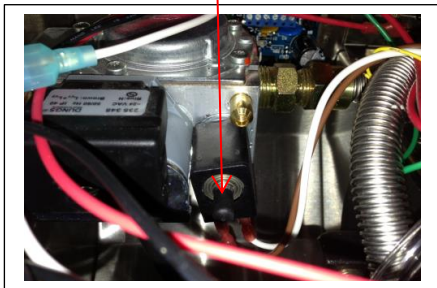


### **FINAL STEPS:**

- 14) Once proper pressure is confirmed, turn off the heater, remove the manometer and use a small flathead screwdriver to turn screw inside brass fitting clockwise until tight. **DO NOT OVER TIGHTEN.**



- 15) Replace the black plastic cap on the adjustment tower.



- 16) Close the service lid and replace the self-tapping screw that secures the service lid.



**17.0 GAS INPUT RATE**

**⚠ WARNING:**

Natural gas heating values can vary widely. It is the responsibility of the Installer to make sure that the input rate to the heater as installed does not exceed the nameplate rating of the heater. Failure to do so can cause radiant tube failure, resulting in injury or death.

The maximum BTUH input capacity for each model is shown on the heater's rating plate and in the specification table. This input must not be exceeded.

The input shown may be used in geographic area where the elevation is from 0 to 4,500 feet (1372m) above sea level (Canada only) in accordance with CGA 2.17-M91 (R2003), no change required to main orifice. For installations above 4,500 (1372 m) refer to **Natural Gas and Propane Installation Code, CSA B149.1** or latest edition, or contact the factory. In the USA: For installations above 2000 feet (610 m), the appliance shall be de-rated 4 percent (%) for each 1000 feet (305 m) of elevation above sea level. The Btu/hr input depends on the calorific heating value of the gas, orifice size, and manifold pressure. Orifice sizes are based upon values of 1000 Btu/hr/cu. ft (.028316 cubic meter) and 2500 Btu/hr/cu. ft. (.028316 cubic meter) for L.P.G. (propane).

**⚠ WARNING:**

**NEVER ATTEMPT TO MODIFY THIS HEATER - FIRE, EXPLOSION, OR ASPHYXIATION MAY RESULT.** If malfunction is apparent, contact qualified service agency and or gas utility for assistance.

**How to Determine Gas Input Rate:**

Where gas is metered, the input rate may be determined by the following method, Contact the gas supplier, Public Utility Company or Propane gas distributor to obtain the calorific gas value of the gas being used. When checking the gas input rate, any other gas burning appliances connected to the same meter must be completely off. The heater should be allowed to operate for 5 minutes before attempting to check the gas input rate.

To check flow rate, observe the one cubic foot dial on the gas meter and determine the number of seconds required for the dial hand to complete one revolution (seconds to flow one cubic foot).

To determine the number of seconds per cubic foot that is necessary to achieve the correct input rate, use the following formula:

$$\text{GAS VALUE X 3600 / DESIRED INPUT} = \text{SECONDS NEEDED}$$

**Example: 1000 BTU gas, heater input 100,000 BTUH**

**Seconds for one cubic foot = 1000 X 3600 /100,000 = 36 seconds**

If when clocking the meter, the one cubic foot dial makes a complete revolution in less time than was calculated that it should be de-rated. If it takes more time for the meter to make one revolution than was calculated, the unit is under-fired.

The orifice size must be changed to correct an over-fired or under-fired condition. If it is determined that different orifices are needed, please contact your distributor for assistance in selecting the correct replacement.

**18.0 SEQUENCE OPERATION**

**18.1 DESCRIPTION OF 3-TRY DIRECT SPARK IGNITION SYSTEM:**

The TRITON 2461D is a 24 VAC Microprocessor Based Direct Spark Ignition Control designed for use in all types of heating applications such as gas furnaces, boilers, water heaters and other similar appliances: The control utilizes a microprocessor to continually and safely monitor, analyze and control the proper operation of the gas burner. Value added features such as: combustion blower control, LED diagnostics, automatic one hour reset, and flame current test pins highlight the controls benefits.

**18.2 OPERATION:**

**A. POWER UP/STANDBY**

- Upon applying power (24 volts) to 24 VAC/R, the control will reset, perform a self-check routine, initiate fulltime flame sensing, flash the diagnostic LED for up to four seconds, and enter the thermostat scan state.

**B. HEAT MODE**

- When a call for heat is received from the thermostat supplying 24 volts to TH/W, the control will check the pressure switch for normally open contacts. The combustion blower is then energized and once the pressure switch contacts close, a pre-purge delay begins. Following the pre-purge period the gas valve is energized and sparks commence for the trial for ignition period.
- When flame is detected during the trial for ignition, sparks are shut off immediately and the gas valve and combustion blower remains energized. The thermostat, pressure switch, and main burner flame are constantly monitored to assure the system continues to operate properly. When the thermostat is satisfied and the demand for heat ends, the main valve is de-energized immediately, the control senses the loss of flame signal and de-energizes the combustion blower.

**C. FLAME FAILURE - RE-IGNITION**

- If the established flame signal is lost while the burner is operating, the control will respond within 0.8 seconds. The HV spark will be energized for a trial for ignition period in an attempt to re-light the burner. If the burner does not light, the control will make two more attempts to re-light the burner. If the burner does not re-light, the control will go into lockout and flash the LED 3-times. If flame is re-established, normal operation resumes.

## PH-SERIES

### 19.0 TROUBLESHOOTING

#### A. NO POWER TO HEATER

**CAUTION:** Prior to performing any service or maintenance work on the unit:

- a) disconnect the electrical supply
- b) shut off gas to supply unit
- c) make sure unit has cooled down before opening service panel

 **Warning:**

Only allow qualified, licensed, service people trained to service gas fired heating equipment to perform any repairs on this unit. All replacement parts **MUST** originate from the manufacturer of this heater in order not to void CGA/AGA certification.

Safety devices are not allowed to be rendered inoperative and left unattended. Failure to do any of the above can cause property damage, injury or death.

#### B. INITIAL ELECTRICAL CHECKS

- a) Make sure thermostat is calling for heat.
- b) Make sure electrical connection is secure.
- c) Check electrical supply for blown fuse or breaker.
- d) Test for power to burner head.
- e) Check wiring to components. Refer to wiring diagrams on pages 33 to 32. Also refer to legend below; this legend is located on the control module.

#### TERMINAL DESIGNATIONS

S1	NOT USED
GND	SYSTEM GROUND (GREEN)
V2	VALVE GROUND (BROWN)
R	NOT USED
L1	120/240 VAC INPUT (HOT) (BLACK)
IND	INDUCER BLOWER OUTPUT (BLACK)
V1	VALVE POWER (WHITE)
PSW	PRESSURE SWITCH INPUT (RED)
W	THERMOSTAT INPUT (RED)

**CAUTION:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. A functional checkout of a replacement control is recommended. Verify proper operation after servicing.

*Attention. Au moment de l'entretien commandes, étiquetez tous les fils avant le débranchement. D'erreurs de câblage peuvent entraîner un fonctionnement inadéquat et dangereux. S'assurer que l'appareil fonctionne adéquatement une fois l'entretien terminé.*

## PH-SERIES

### C. INITIAL GAS CHECKS

- a) Make sure manual valve is turned on.
- b) Make sure gas valve knob is turned on.
- c) Check for gas supply and proper pressure to valve.
- d) Check wires and make sure that they and their connections are in good condition.
- e) Check for power to valve.
- f) If no power, check control board. (see page 45)

### D. ELECTRICITY AND GAS TO HEATER, BUT STILL INOPERATIVE

If after confirming that adequate gas and electricity are present and unit still does not operate, review the symptoms below. After the symptom has been identified, refer to the corresponding cause/cure, Review CHECK CONTROL BOARD section, and finalize troubleshooting procedure.

Symptom	Cause/Cure
1. Dead	A) Mis-wired B) Transformer bad C) Fuse/circuit breaker bad D) Bad control (check LED for steady on)
2. Thermostat on - No Blower Output	A) Mis-wired (check PSW terminal voltage) B) Bad thermostat - Do voltage @terminal W C) Bad control (check LED for steady on)
3. Pressure Switch input okay but no Trial for Ignition after purge delay	A) Mis-wired (check PSW terminal voltage) B) Flame sense problem (existing flame-check LED-2 Flashes) C) Bad control (check voltage between L1 & IND)
4. Valve on, no spark	A) Shorted electrode B) Open HV cable C) Bad Control
5. Spark on, no valve	A) Valve coil open B) Open valve wire C) Bad control (check voltage between V1 & V2)
6. Flame okay during TFI, no flame sense (after TFI)	A) Bad electrode B) Bad S1 or HV wire C) Poor ground at burner D) Poor flame (check flame current)

NOTE: TFI = Trial For Ignition



## **PH-SERIES**

### **E. CHECK CONTROL BOARD**

Open access door and view the diagnostic red LED, located on the grey direct spark ignition module.

### **F. FAULT CONDITIONS**

<b>Error Mode</b>	<b>LED Indication</b>
Internal Control Failure	Steady On
Air Flow Fault	1 flash
Flame with No Call for Heat	2 flashes
Ignition Lock Out	3 flashes

The LED will flash on for ¼ second, then off for ¼ second during a fault condition. The pause between fault codes is 3-seconds.

### **G. INTERNAL CONTROL FAULT**

- If power supply cycles are fluctuating beyond 50/60 cycles such as with an un-stabilized power supply from a generator, unit will not operate. If the circuit board is faulty the unit will not operate.

### **H. AIRFLOW FAULT - LOCK OUT (COMBUSTION AIR FLOW PROBLEMS)**

- Combustion airflow is continually monitored during an ignition sequence by the airflow switch (PSW). If during the initial call for heat the pressure switch contacts are in the closed position for 30-seconds without an output to the Combustion Blower, an airflow fault will be declared and the control will remain in this mode with the combustion blower off.
- If the airflow switch remains open for more than 30-seconds after the combustion blower output (L1 & IND) is energized, an airflow fault will be declared and the control will stay in this mode with the combustion blower off.
- If the airflow signal is lost while the burner is firing, the control will immediately de-energize the gas valve and the combustion blower will remain on. If the call for heat remains, the control will wait for proper airflow to return. If proper airflow air is not detected after 30-seconds an airflow fault signal will be declared.

Proceed as follows to verify reason for airflow lockout:

1. Check air intake and exhaust for blockage. Remove any blockage.
2. Check combustion air blower for dirt. Clean and/or replace as necessary.
3. If there is no blockage, disconnect fresh air intake at burner head (if equipped). Retry for ignition. If unit does ignite, check to verify that duct size to unit is of proper size and length and that there is no blockage. Replace ducting as necessary to reduce amount of air restriction to unit.

## PH-SERIES

### I. FLAME WITH NO CALL FOR HEAT (FLAME FAULT)

- If at any time the main valve fails to close completely and maintains a flame, the full time flame sense circuit will detect it and energize the combustion blower. Should the main valve later close off completely removing the flame signal, the combustion blower will power off.

### J. IGNITION LOCK OUT (FAILURE TO LIGHT)

- FENWAL DSI Module will attempt three ignition trials before going into lockout. The valve relay will be de-energized immediately, and the combustion blower will be turned off.
- Recovery from lockout requires a manual reset by either resetting the thermostat or removing 24 volts, or removing the electrical power supply for a period of 5-seconds.
- If the thermostat is still calling for heat after one hour, the control will automatically reset and attempt to ignite the burner again.

If unit still does not operate, proceed as follows:

- Check flame sensor current. (see below)
- Check electrode for cracks and proper location, (see page 47)

### K. FLAME SENSOR CURRENT CHECK

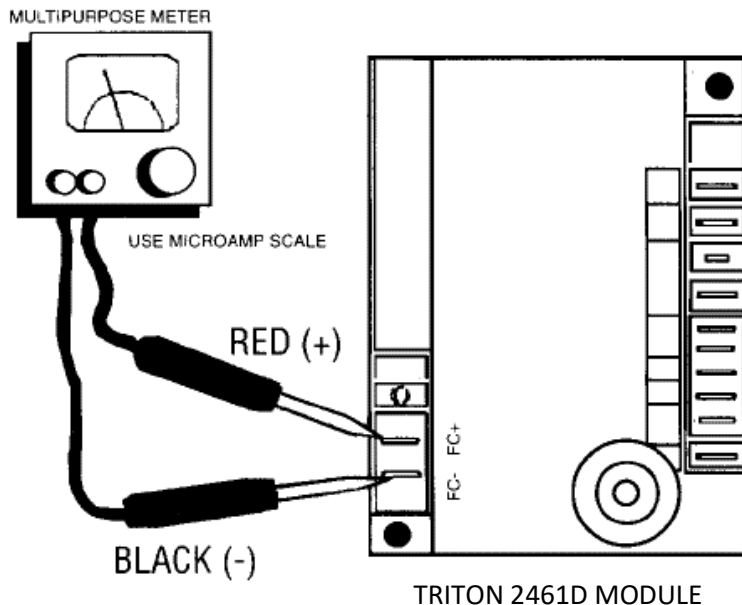


Figure 25. FLAME SENSOR CURRENT CHECK

### SERVICE CHECKS

Flame current is the current which passes through the flame from the sensor to the ground. The minimum flame current necessary to keep the system from lockout is .7 micro amps. To measure flame current, connect an analog DC micro ammeter to the FC- FC+ terminals per figure. Meter should read .7 uA or higher. If meter reads below "0" on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.

## PH-SERIES

### L. PROPER ELECTRODE LOCATION

Proper location of the electrode assembly is important for optimum system performance. The electrode assembly should be located so that the tips are inside the flame envelope about  $\frac{3}{4}$ " (1.9 cm) to 1" (2.54 cm).

#### CAUTIONS:

- 1) Ceramic insulators should not be in or close to the flame
- 2) Electrode assemblies should not be adjusted or disassembled, Electrodes should have a gap spacing of .125" (3.175 mm). If this spacing is not correct, the assembly must be replaced. Electrodes are NOT field adjustable.
- 3) Exceeding the temperature limits can cause nuisance lockouts and premature electrode failure.

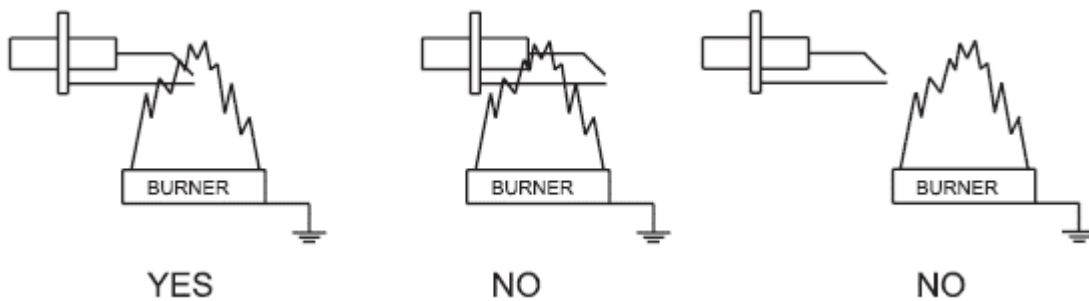


Figure 26. PROPER ELECTRODE LOCATION

## PH-SERIES

### 20.0 MAINTENANCE

Maintenance is required once a year. Annually inspect your heater, before the heating season starts. If unit is in a dusty environment, maintenance will be required more often. If dust conditions are extreme, monthly or weekly maintenance may be required.

#### **WARNING:**

Disconnect electrical supply to heater and shutoff gas prior to inspection.

- A. CHECK COMBUSTION AIR INTAKE FOR BLOCKAGE.
- B. CHECK EXHAUST TERMINAL FOR BLOCKAGE.
- C. OPEN SERVICE DOOR.
- D. CHECK BLOWER MOTOR AND SCROLL FOR DIRT AND/OR LOCKED ROTOR. REMOVE DIRT WITH COMPRESSED AIR OR VACUUM CLEANER. IF ROTOR IS LOCKED, REPLACE ASSEMBLY.
- E. IF BURNER NEEDS CLEANING, REMOVE BURNER HEAD FROM TUBE AND USE A COMBINATION OF COMPRESSED AIR AND/OR A WIRE BRUSH TO REMOVE ANY DEPOSITS OR DEBRIS THAT MAY BE ON THE ACTUAL BURNER.
- F. MAKE SURE ALL WIRING IS INTACT AND IN GOOD CONDITION.
- G. CHECK ELECTRODE FOR PROPER GAP AND CLEANLINESS. CLEAN OR REPLACE AS NECESSARY.
- H. CHECK IGNITION SYSTEM FOR SPARK. REPLACE AS NECESSARY.
- I. CHECK EXCHANGER TUBE FOR HOLES AND/OR CRACKS, DIRT AND/OR DEPOSITS. CLEAN AND/OR REPLACE AS NECESSARY.
- J. WASH ANY DIRT OR JUST OFF OF THE UNIT WITH A SOAP AND WATER SOLUTION.
- K. CHECK ANY GAS CONNECTIONS THAT WERE DISCONNECTED DURING MAINTENANCE FOR LEAKS. USE SOAP AND WATER SOLUTION. **DO NOT USE FLAME.**
- L. TEST FIRE UNIT BY TURNING CONTROL "ON". MAKE SURE UNIT IS OPERATING QUIETLY AND EFFICIENTLY.
- M. PERIODICALLY VISUALLY CHECK BURNER THROUGH VIEW PORT TO CONFIRM PROPER OPERATION.
- N. CHECK ALL COUPLERS FOR TIGHTNESS AND/OR LEAKAGE.

#### **WARNING:**

Only allow qualified/licensed service people, trained to service gas fired heating equipment, to perform any repairs on this unit. All replacement parts **MUST** originate from the manufacturer of this heater in order not to void CGA/AGA certification. Safety devices are not allowed to be rendered inoperative.

#### **WARNING:**

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

The heater area must be kept clear and free from combustible materials, gasoline and other flammable vapors and liquids. The flow of combustion and ventilation air to heater must not be obstructed.

# PH-SERIES

## 21.0 PARTS:

### 21.1 BURNER HEAD AND RELATED PARTS

(Refer to pages 51 & 47 for part number & description)

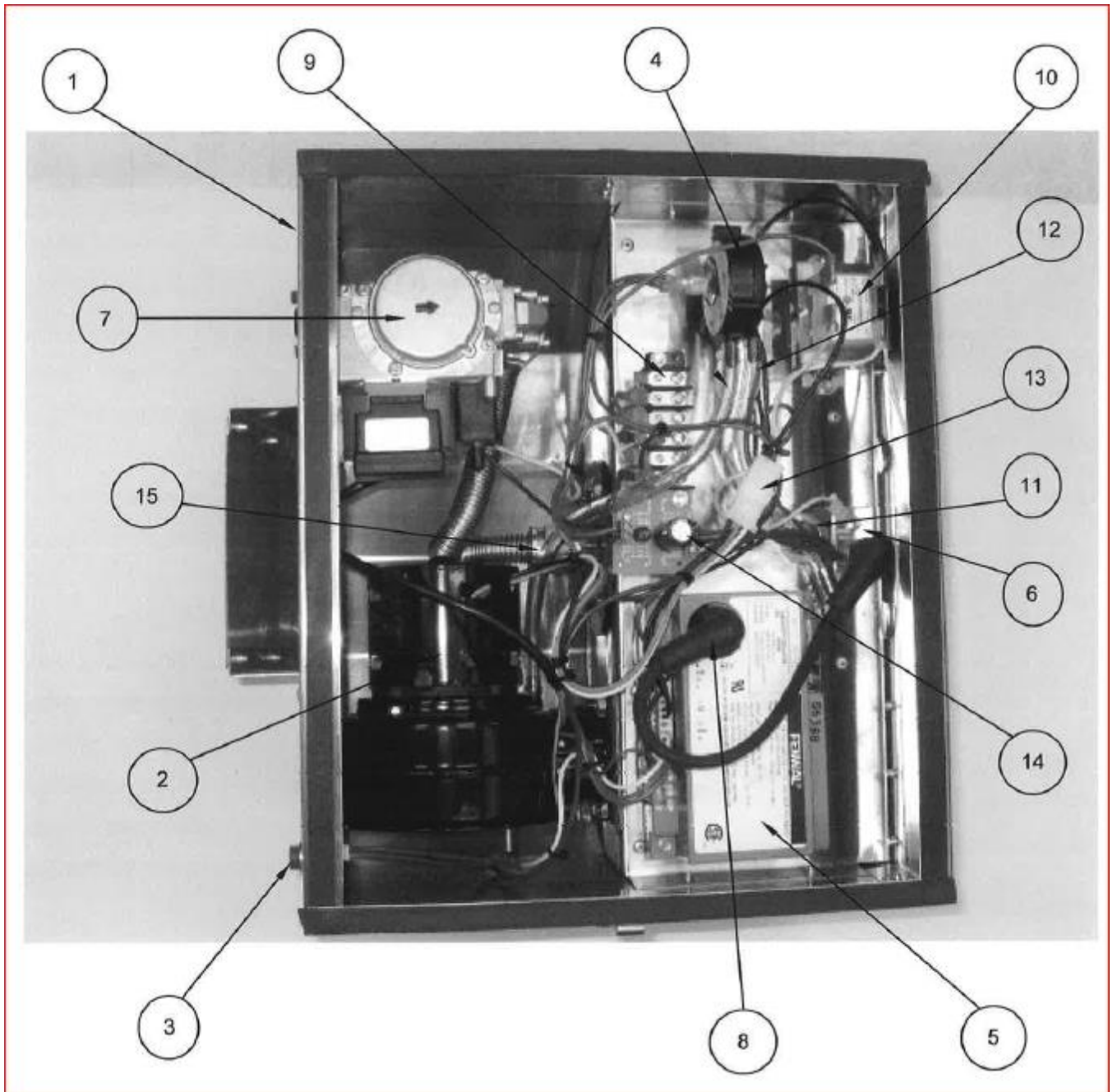


Figure 27. BURNER HEAD PARTS

21.2 REFLECTOR AND TUBE PARTS

(Refer to page 51 & 47 for part number & description)

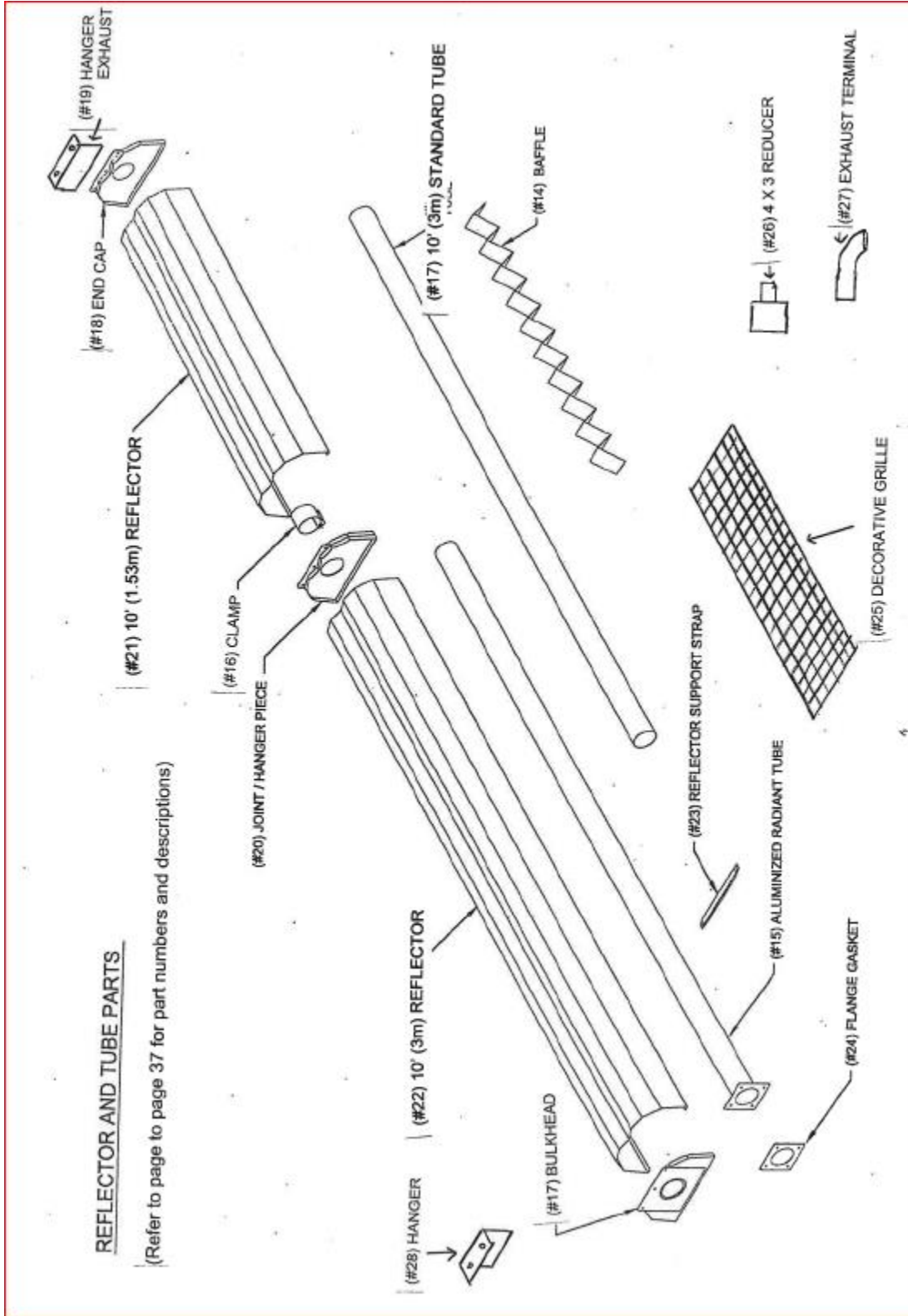


Figure 28. REFLECTOR AND TUBE PARTS

**PH-SERIES**

**21.3 PARTS LIST:**

(See page 49 & 50 for visual details)

<b>REPLACEMENT BURNER HEADS:</b>				
<b>ITEM</b>	<b>PIN</b>	<b>INPUT</b>	<b>FUEL</b>	<b>WEIGHT</b>
1	5120000	PH-40	NG	32 lbs (36 kg)
1	5120001	PH-40	Propane	32 lbs (36 kg)
1	5120002	PH-50	NG	32 lbs (36 kg)
1	5120003	PH-50	Propane	32 lbs (36 kg)
1	5120004	PH-75	NG	32 lbs (36 kg)
1	5120005	PH-75	Propane	32 lbs (36 kg)
<b>BURNER HEAD COMPONENTS:</b>				
<b>ITEM</b>	<b>PIN</b>	<b>DESCRIPTION</b>	<b>WEIGHT</b>	
2	3010001	Blower Motor Assembly	**	
3	1090C1	Indicator Light	**	
4	3070401	Air Switch PH - 40	**	
4	3070402	Air Switch PH - 50	**	
4	3704003	Air Switch PH - 75	**	
5	3030021	Direct Spark Ignition Module ( Fenwal)	**	
6	3030633	Electrode Assembly	**	
7	3020005	Gas Valve Propane	**	
7	3020003	Gas Valve NG	**	
8	3030026	High Voltage Ignition Wire	**	
9	3070025	Terminal Block	**	
10	3070016	Transformer	**	
11	3110022	View Port - Mica Window	**	
12	5040374	Vinyl Hose for Differential Air Proving Switch	**	
13	3070321	Wire Harness	**	
14	LX1000	Variable Input Control	**	
15	590156	Burner Assembly	**	
<b>TUBE COMPONENTS:</b>				
<b>ITEM</b>	<b>PIN</b>	<b>DESCRIPTION</b>	<b>WEIGHT</b>	
16	5170147	Baffle Turbulator	5 lbs (2.3 kg)	
17	3170325	Flanged Tube Aluminized PH - 40	30 lbs (13.7 kg)	
17	3170327	Flanged Tube Aluminized PH - 50 & 75	30 lbs (13.7 kg)	
18	37760	Radiant PH - 75	15 lbs (6.8 kg)	
19	37759	Radiant PH - 50	30 lbs (13.7 kg)	
20	3170201	Tube Clamp	**	
21	715013	PH-40 High Output Tube Assembly	45 lbs (21 kg)	
22	715014	PH-75 High Output Tube Assembly	65 lbs (30 kg)	
23	3200744	4 x 3 Reducer	5 lbs (2.3 kg)	

\*\* UNDER 5 LBS

**PH-SERIES**

<b>REFLECTOR COMPONENTS:</b>			
<b>ITEM</b>	<b>PIN</b>	<b>DESCRIPTION</b>	<b>WEIGHT</b>
24	5120034	PH Bulkhead SS	5 lbs (2.3 kg)
25	5120033	PH End Cap SS Exhaust	5 lbs (2.3 kg)
26	5120040	PH - 50 & 75 Hanger Assembly	5 lbs (2.3 kg)
27	5180161	Reflector 5' (1.53m)	10 lbs (4.54 kg)
28	5180162	Reflector 10' (3m)	20 lbs (9.1 kg)
29	5180708	SS Reflector SupportStrap	**
30	5080319	Flange Gasket	**
31	4160152	Decorative Egg Crate Grill	5 lbs (2.3 kg)
32	715001	PH-40 High Output Reflector Assembly	15 lbs (6.8 kg)
33	715007	PH-75 High Output Reflector Assembly	30 lbs (13.7 kg)

\*\* UNDER 5 LBS



**22.0 WARRANTY**

**Non-Transferable / Limited Warranty - Calcana Heaters**

Calcana Industries Ltd. ("the Manufacturer") warrants to the original owner at the original installation site that the heater manufactured by the manufacturer ("the Product") will be free from defects in material and workmanship for one (1) year from date of shipment from the factory. Calcana further warrants that the heat exchanger, reflectors, brackets, burner and burner box will be free from defects in material and workmanship for three (3) years from the date of shipment from the factory. If upon examination by the Manufacturer the Product is shown to have a defect in the material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective. In no event shall the customer be entitled to consequential, indirect or special damages of any nature for defective merchandise, and in no instance may damages include loss of profit. Calcana reserves the right to inspect the system involved in any claim against the warranty. The warranty is null and void if any of the components installed are not original Calcana parts or the installation does not conform to the supplied installation manual.

This limited warranty does not apply:

- a) If the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way by an unauthorized person.
- b) To any expenses, including labor or material, incurred during removal or reinstallations of the Product.
- c) To any damage due to corrosion by chemicals, including halogenated hydrocarbons precipitated in the air.
- d) To any workmanship of the Installer of the Product
- e) If Product is not paid for in a timely manner and in accordance with payment terms
- f) If Product or any part of it is damaged by any act of nature including, but not limited to; hurricanes, gales, tornadoes, wind snow, sleet, hail, rain, flood, fire or any other similar or dissimilar condition, or by normal wear and tear, which included marks and/or dents to the reflector caused by improper transportation or installation.
- g) If Product or any part of it is damaged by vandalism, improper use, accumulation of weight or heavy loads on the heater.
- h) If Product is damaged due to lack of cleaning or maintenance, whether routine or otherwise.

The limited warranty is conditional upon:

- a) Advising the installing contractor, who will in turn notify the distributor or Manufacturer.
- b) Shipment to the Manufacturer of that part of the Product thought to be defective. Goods can only be returned with prior written approval of the Manufacturer. All returns must be freight prepaid.
- c) Determination in the reasonable opinion of the Manufacturer that there exists a defect in material or workmanship.

Repair or replacement of any part under the Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

All labor during the warranty period is the responsibility of the installing person or contractor.

This Limited Warranty is in lieu of all other warranties, either express or implied, and all such other warranties, including without limitation implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed and excluded from this limited warranty. The warranty cannot be transferred or assigned by the Customer. All disputes arising from this warranty are to be governed by the laws of the Province of Alberta and any action to enforce this warranty must be initiated in the Province of Alberta. In no event shall the Manufacturer be liable, in any way for any consequential, special, or incidental damages of any nature whatsoever, or for any amounts in excess of the selling price of the Product or any parts thereof found to be defective. This Limited Warranty gives the original owner of the Product specific legal rights. You may also have other rights which may vary by each jurisdiction.

USA  
**Calcana USA Ltd.**  
30201 County Road 49  
Loxley, AL, 36551  
Tel: 251-964-4400  
Fax: 251-964-4404

**23.0 CONVERSION KIT FOR VARIABLE INPUT GAS VALVES**

The conversion shall be carried out in accordance with the requirements of the provincial/state authorities having jurisdiction and in accordance with the requirements as follows:

**CANADA: Natural Gas and Propane Installation Code, CSA B149.1** or latest edition.

**USA: National Fuel Gas Code, ANSI Z223.1/NFPA 54,** or latest edition.

**⚠ WARNING:** This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit. The installer of this conversion kit assumes full responsibility and liability for the installation of this conversion kit. If you do not understand these instructions or the information contained in the installation manual, **DO NOT INSTALL THIS CONVERSION KIT OR OPERATE THE UNIT ASSOCIATED WITH THIS GAS CONVERSION.**

**DIRECTIONS:**

- 1) Caution the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion.
- 2) Turn off electrical supply to heater
- 3) Disconnect gas supply line to heater
- 4) Disconnect electrical supply to heater
- 5) Disconnect thermostat control wire from heater
- 6) Remove burner head from reflector assembly being careful to support burner head in such a fashion that it will not fall from the location overhead where it was installed. Use two people if necessary.
- 7) Remove service door that provides access to gas valve location
- 8) Remove igniter assembly.
- 9) Use deep wall socket to remove orifice spud.
- 10) Install correct orifice for the fuel that you are converting to. **CHECK TWICE TO MAKE SURE.** Reference chart below:
- 11) Locate gas valve and **REPLACE WITH THE GAS VALVE IN CONVERSION KIT.** Verify you have the correct valve for the fuel type you want to convert to. **CHECK TWICE TO MAKE SURE.**
- 12) Verify Manifold pressure using a manometer. Adjust pressure if necessary. (see valve instructions for details)

**Manifold Pressure is:**

<b>NG: Hi</b>	<b>3.5" w.c.</b>	<b>Lo</b>	<b>1.5" w.c.</b>
<b>LPG: Hi</b>	<b>10.5" w.c.</b>	<b>Lo</b>	<b>5.5" w.c.</b>

**Leak Test all Fittings Prior to Operation**

- 13) When the conversion is complete, fill out the information as required on the enclosed conversion label.
- 14) **Attach completed label on or near the rating plate**

**Conversion Chart With Part Numbers and Corresponding Orifice Sizes**

MODEL	PIN	FROM	TO	ORIFICE
<b>CAL/PH 40</b>	3025025	NG	Propane	#51
<b>CAL/PH 50</b>	3025026	NG	Propane	#48
<b>CAL/PH 75</b>	3025027	NG	Propane	#42

MODEL	PIN	FROM	TO	ORIFICE
<b>CAL/PH 40</b>	3025028	Propane	NG	#32
<b>CAL/PH 50</b>	3025029	Propane	NG	3.3mm
<b>CAL/PH 75</b>	3025030	Propane	NG	#21

**NOTE:** CONVERSION KITS COME WITH GAS VALVE CONVERSION SPRING, PREDRILLED ORIFICE AND CONVERSION LABEL. CONVERSION KITS ARE FOR UNITS RATED FOR THE FOLLOWING LOCATIONS AND ELEVATIONS: FOR INSTALLATIONS ABOVE THE DESIGNATED ELEVATIONS, CONTACT FACTORY.

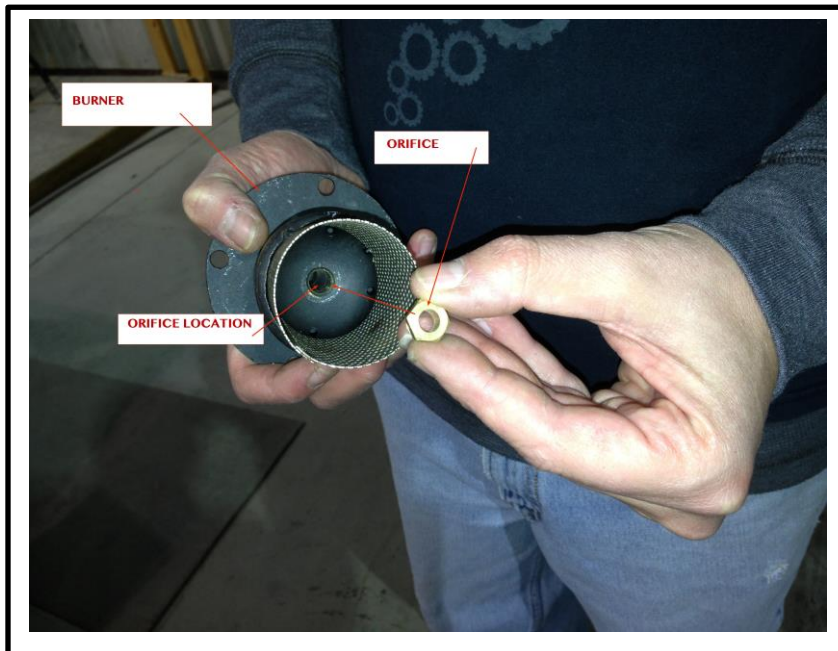
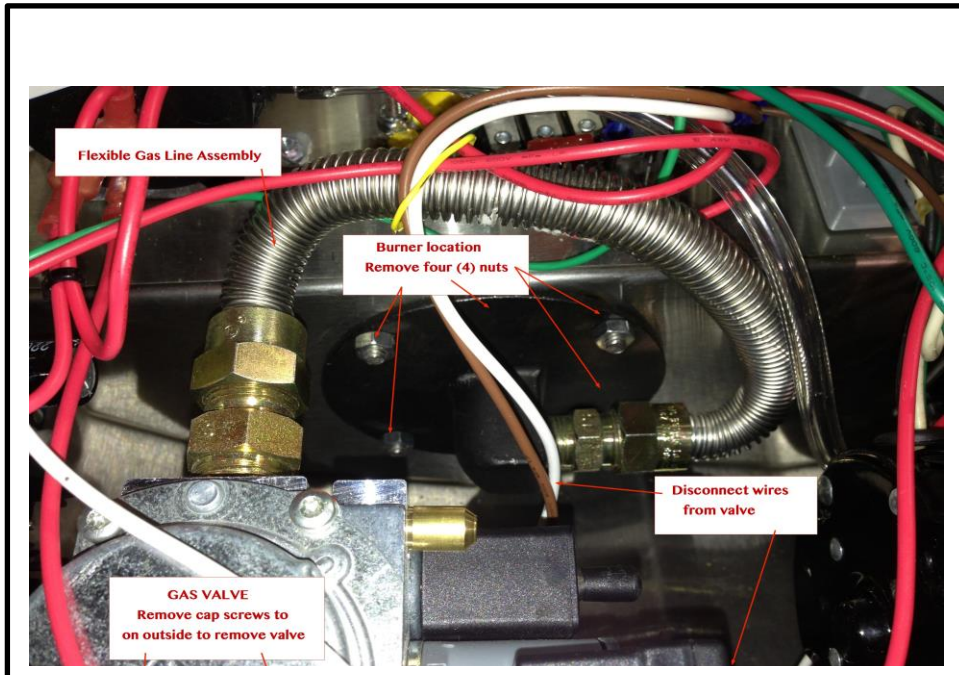
**CANADA: 0 – 4500 FT (1372 m)**  
**USA: 0 – 2000 FT (610 m)**



**Calcana USA Ltd.**  
30201 Country Road 49  
Loxley, AL. 36551  
Tel: 251-964-4400  
Fax: 251-964-4404



**BURNER AND GAS ORIFICE LOCATION**



PH-SERIES

**24.0 EXAMPLE OF CONVERSION KIT LABEL**  
**TO BE COMPLETED AS PER INSTRUCTIONS IN KIT**

This appliance was converted on DAY: \_\_\_\_\_  
MONTH: \_\_\_\_\_ YEAR: \_\_\_\_\_  
to NG: \_\_\_\_\_ Propane. \_\_\_\_\_ gas with Kit #  
\_\_\_\_\_

by: NAME: \_\_\_\_\_  
COMPANY: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
CITY/TOWN: \_\_\_\_\_ STATE/PRO: \_\_\_\_\_  
TELEPHONE: \_\_\_\_\_

Orifice Size: \_\_\_\_\_ leak Test Performed: Yes: \_\_\_\_\_  
Manifold Pressure: Min \_\_\_\_\_ Max \_\_\_\_\_  
Input: \_\_\_\_\_ Altitude: \_\_\_\_\_

(The name of the individual and organization making this conversion accepts the responsibility that this conversion has been properly made and has performed a leak test on the appliance prior to placing into service.) Locate label in a conspicuous location on the appliance near rating plate.

=====

Cet appareil a ete converti au: \_\_\_\_\_  
Injecteur: \_\_\_\_\_ Date: \_\_\_\_\_  
Pression a la tubulure d'alimentation: \_\_\_\_\_  
Debit calorifique: \_\_\_\_\_

**25.0 SAFETY AND OPERATING INSTRUCTIONS**

<b>! WARNING: !</b>	
Failure to follow these instructions will cause death, personal injury or property damage. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.	
<b>SAFETY INSTRUCTIONS READ BEFORE OPERATING</b>	<b>OPERATING INSTRUCTIONS</b>
<p>A) This gas heater does not have a pilot. It is equipped with an Ignition device which automatically lights the burner. <b>DO NOT</b> try to light the burner with a match, or flame.</p> <p>B) <b>BEFORE OPERATING</b>, smell all around the heater area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle to the floor.</p> <p><b>WHAT TO DO IF YOU SMELL GAS</b></p> <ul style="list-style-type: none"> <li>• Do not try to operate heater.</li> <li>• Do not touch any electric switch; do not use any phone in your building.</li> <li>• Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions.</li> <li>• If you cannot reach your gas supplier, call the fire department.</li> </ul> <p>C) Use only your hand to turn the gas valve handle. Never use tools. If handle will not turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.</p> <p>D) Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of the control system which has been under water.</p>	<ol style="list-style-type: none"> <li>1. <b>STOP!</b> Read the safety Instructions on this label.</li> <li>2. Open the manual gas valve in the heater supply line.</li> <li>3. Turn on electric power to the heater.</li> <li>4. Set the thermostat to the desired setting.</li> <li>5. This heater is equipped with an Ignition device, which automatically lights burner. Do not try to light the burner with a match, or flame.</li> <li>6. If heater will not operate, follow instructions "To Turn Off Gas To Heater" and call your service technician or gas supplier.</li> </ol>
	<b>TO TURN OFF THE GAS TO HEATER</b>
	<ol style="list-style-type: none"> <li>1. Set the thermostat to the lowest setting.</li> <li>2. Turn off electric power to the heater if service is to be performed.</li> <li>3. Turn off the manual gas valve in the heater supply line.</li> <li>4. Wait 5 minutes before attempting to relight heater.</li> </ol>