

# EHL Series

## Installation, Operation, Maintenance and Parts Manual

CE Certified 230V-50Hz. [G20(C5), G25(C6), G31(C7)] Infrared Tube Heater.



The EHL Series Infrared Tube Heater is a positive pressure, two-stage radiant heater system. All persons involved with the installation, operation and maintenance of the heater system must read and understand the information in this manual.

### ⚠ WARNING



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

This heater **must** be installed and serviced by a Gas Safe Registered Gas Engineer only! Conversion of the heater for use with other gases must be carried out by a Gas Safe Registered Gas Engineer. Failure to comply could result in personal injury, asphyxiation, death, fire and/or property damage.



In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats, in a conspicuous location.

### For Your Safety

#### If you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone.
- Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Keep these instructions for future reference.



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## AVAILABLE MODELS

Model	Input	Input	Consumption M <sup>3</sup>			Length		Kit	Combustion Chamber	Radiant Tubes
	MBH High/Low	Kw High/Low	G20	G25	G31	Ft	M			
EHL-20-75	75/50	22.0/14.7	2.07	2.59	0.83	21'-8"	6.6	20KIT	Aluminized	Aluminized or HRT
EHL-30-75	75/50	22.0/14.7	2.07	2.59	0.83	31'-4"	9.5	30KIT	Aluminized	Aluminized or HRT
EHL-30-100	100/65	29.3/19.0	2.76	3.46	1.11	31'-4"	9.5	30KIT	Aluminized	Aluminized or HRT
EHL-40-75	75/50	22.0/14.7	2.07	2.59	0.83	41'-0"	12.5	40KIT	Aluminized	Aluminized or HRT
EHL-40-100	100/65	29.3/19.0	2.76	3.46	1.11	41'-0"	12.5	40KIT	Aluminized	Aluminized or HRT
EHL-40-125	125/95	36.7/27.8	3.44	4.32	1.38	41'-0"	12.5	40KIT	Aluminized	Aluminized or HRT
EHL-40-150	147/100	43.0/29.3	4.13	5.18	1.66	41'-0"	12.5	40KIT	Titan-Alum	Aluminized or HRT
EHL-50-100	100/65	29.3/19.0	2.76	3.46	1.11	50'-8"	15.4	50KIT	Aluminized	Aluminized or HRT
EHL-50-125	125/95	36.7/27.8	3.44	4.32	1.38	50'-8"	15.4	50KIT	Aluminized	Aluminized or HRT
EHL-50-150	147/100	43.0/29.3	4.13	5.18	1.66	50'-8"	15.4	50KIT	Titan-Alum	Aluminized or HRT
EHL-50-170 <sup>†</sup>	170/120	50.0/35.0	4.71	5.90	1.89	50'-8"	15.4	50KIT	Titan-Alum	Aluminized or HRT
EHL-50-187 <sup>†</sup>	187/130	55.0/38.5	5.18	6.49	2.08	50'-8"	15.4	50KIT	Titan-Alum	Aluminized or HRT
EHL-50-204 <sup>†</sup>	204/145	60.0/42.0	5.65	7.08	2.27	50'-8"	15.4	50KIT	Titan-Alum	Aluminized or HRT
EHL-60-125	125/95	36.7/27.8	3.44	4.32	1.38	60'-4"	18.4	60KIT	Aluminized	Aluminized or HRT
EHL-60-150	147/100	43.0/29.3	4.13	5.18	1.66	60'-4"	18.4	60KIT	Titan-Alum	Aluminized or HRT
EHL-60-170 <sup>†</sup>	170/120	50.0/35.5	4.71	5.90	1.89	60'-4"	18.4	60KIT	Titan-Alum	Aluminized or HRT
EHL-60-187 <sup>†</sup>	187/130	55.0/38.5	5.18	6.49	2.08	60'-4"	18.4	60KIT	Titan-Alum	Aluminized or HRT
EHL-60-204 <sup>†</sup>	204/145	60.0/42.0	5.65	7.08	2.27	60'-4"	18.4	60KIT	Titan-Alum	Aluminized or HRT
EHL-70-170 <sup>†</sup>	170/120	50.0/35.5	4.71	5.90	1.89	70'-0"	21.3	70KIT	Titan-Alum	Aluminized or HRT
EHL-70-187 <sup>†</sup>	187/130	55.0/38.5	5.18	6.49	2.08	70'-0"	21.3	70KIT	Titan-Alum	Aluminized or HRT
EHL-70-204 <sup>†</sup>	204/145	60.0/42.2	5.65	7.08	2.27	70'-0"	21.3	70KIT	Titan-Alum	Aluminized or HRT

<sup>†</sup> These models are not CE certified for (G31) Propane gas.

# 1.0 Introduction

## 1.1 Overview

The intent of this manual is to provide information regarding general safety, installation, operation and maintenance of this tube heater. You must read and understand all instructions and safety warnings before installing or servicing the tube heater.

## 1.2 EHL Series Technical Specifications

Model	Gas Type	Heat input (kW)	Injector Size (mm)	Injector Markings (DMS)	Air Inlet		Gas Connection Size (mm)	Minimum Inlet Gas Pressure (mbar)	Normal Inlet Gas Pressure (mbar)	Burner Operating Pressure		Flue Dia. (mm)	Air Proving SetPoint (Pa)
					Orifice (mm)	Air Inlet Marking				HI/LOW (mbar)			
EHL 75	I2H (20)	22.0	4.22	19	39.7	1 9/16	Rp1/2 (DN15)	11.5	20.0	9/4.5	100	25	
	I2L (25)		4.22	19	39.7	1 9/16		15.5	25.0	13/6.5			
	I3P (31)		2.64	37	41.3	1 5/8		27.5	37.0	25/12.5			
EHL 100	I2H (20)	29.3	4.85	11	41.3	1 5/8	Rp1/2 (DN15)	11.5	20.0	9/4.5	100	35	
	I2L (25)		4.85	11	41.3	1 5/8		15.5	25.0	13/6.5			
	I3P (31)		2.95	32	47.6	1 7/8		27.5	37.0	25/12.5			
EHL 125	I2H (20)	36.7	5.22	5	46.0	1 13/16	Rp1/2 (DN15)	12.5	20.0	10/5	100	50	
	I2L (25)		5.22	5	46.0	1 13/16		17.5	25.0	15/7.5			
	I3P (31)		3.26	30	50.8	2		27.5	37.0	25/12.5			
EHL 150	I2H (20)	43.0	5.41	3	47.6	1 7/8	Rp1/2 (DN15)	12.5	20.0	10/5	100	50	
	I2L (25)		5.41	3	47.6	1 7/8		17.5	25.0	15/7.5			
	I3P (31)		3.66	27	54.0	2 1/8		27.5	37.0	25/12.5			
EHL 170	I2H (20)	50.0	6.14	C	50.8	2	Rp1/2 (DN15)	12.5	20.0	9/6	100	50	
	I2L (25)		6.14	C	50.8	2		17.5	25.0	13.2/8.0			
	I3P (31)		N/A	N/A	N/A	N/A		27.5	37.0	25/12.5			
EHL 187	I2H (20)	55.0	6.52	F	57.2	2 1/4	Rp1/2 (DN15)	12.5	20.0	9/6	100	50	
	I2L (25)		6.52	F	57.2	2 1/4		17.5	25.0	13.2/8.0			
	I3P (31)		N/A	N/A	N/A	N/A		27.5	37.0	25/12.5			
EHL 204	I2H (20)	60.0	7.03	J	60.3	2 3/8	Rp1/2 (DN15)	12.5	20.0	9/6	100	50	
	I2L (25)		7.03	J	60.3	2 3/8		17.5	25.0	13.2/8.0			
	I3P (31)		N/A	N/A	N/A	N/A		27.5	37.0	25/12.5			

\* Consult factory for technical specifications on all other models.

**IMPORTANT:** Reference box label for baffle lengths.

## 2.0 Safety

### ⚠ WARNING



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

### 2.1 Warning Symbols

Safety is the most important consideration during installation, operation and maintenance of the tube heater. You will see the following symbols and signal words when there is a hazard related to safety or property damage.

#### ⚠ WARNING

**Warning** indicates a potentially hazardous situation which, if not avoided, could result in death or injury.

#### ⚠ CAUTION

**Caution** indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

#### NOTICE

**Notice** indicates a potentially hazardous situation which, if not avoided, could result in property damage.

### 2.2 Applications

This is not an explosion-proof heater. No EHL Series heater may be used in a Class 1 or Class 2 Explosive environment. Consult the local fire Marshall, fire insurance carrier and other authorities for approval if the proposed installation is in question.

#### Commercial and Industrial

This tube heater is designed and certified for use in industrial and commercial buildings such as, warehouses, manufacturing plants, aircraft hangars and vehicle maintenance shops.

### ⚠ WARNING



**Not for residential use!**  
Do not use this heater in the home, sleeping quarters, attached garages, etc.

## 2.3 Codes and Regulations

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The following must be reviewed before installing this heater:

- Check the heater rating label on the heater to verify the proper gas to be used. Check other labels on the heater to verify proper mounting and clearance to combustibles.
- Signs must be posted in storage areas to specify maximum stacking heights allowed in order to maintain published clearances to combustibles.
- Notwithstanding their limited scope, this appliance must be installed in accordance with relevant provisions of the following regulations:

**GB - United Kingdom:**

Gas Safety (Installation and Use) Regulations 1998 and BS6891:1998. Due account should be taken of any obligations arising from the Health and Safety at Work etc. Act 1974, the current Building Regulations, the current I.E.E. Regulations and other relevant codes of practice.

**IE - Ireland:**

I.S.3212:1987, ICP 4, I.S.327. Due account should be taken of any obligations arising for the current Building Regulations, the current I.E.E. Regulations and other relevant codes of practice.

- Under no circumstance is either the gas supply line or the electrical supply line to the heater to provide any assistance in the suspension of the heater.
- The weight of the heater must be entirely suspended from a permanent part of the building structure having adequate load characteristics.
- Neither the gas supply line, electrical supply line or sprinkler heads shall be located within the minimum published clearance to combustibles as shown in on page 7.

## 2.4 Clearance to Combustibles

### ⚠ WARNING



This is not an explosion-proof heater. Do not store or use flammable objects, liquids or vapor in the vicinity of the heater. Where there is the possibility of exposure to flammable vapors or highly combustible materials, consult the local fire marshal, fire insurance carrier and other authorities for approval of the proposed installation.

### Hazards

For maximum safety, the building must be evaluated for hazards before installing this heating system. A critical safety factor before installation is the clearance to combustibles.

Clearances to combustibles is defined as the minimum distance that **must** be maintained between the tube surface or reflector and combustible materials. It also pertains to the distance that must be maintained from moving objects (e.g. overhead doors, cranes, vehicle lifts, etc.) around the tube heater.

The following is a partial list of items to maintain clearances from:

- Gas and electrical lines
- Combustible and explosive materials
- Chemical storage areas
- Areas of high chemical fume concentrations
- Vehicle parking areas
- Vehicle lifts
- Hoists or cranes
- Storage areas with stacked materials
- Lighting
- Sprinkler heads
- Overhead doors and tracks
- Dirty, contaminated areas

If you are unsure about the proposed installation, consult your local fire Marshall, fire insurance carrier or other qualified authorities for the approval of the proposed installation.

### Safety Signs and Labels

It is important to provide warnings to alert individuals to potential hazards and safety actions. Local codes may require you to post a sign “specifying the maximum permissible stacking height to maintain the required published clearances from the heater to combustibles” near the heater’s thermostat or, in the absence of such thermostats, in a conspicuous location.

All safety labels must be maintained on this appliance. Contact your distributor if replacement labels are needed.

### ⚠ WARNING



**Fire Hazard.** Always maintain published clearance to combustibles. Failure to comply with the stated clearances to combustibles could result in personal injury, death and/or property damage.

### ⚠ WARNING



This heater should be installed so that the minimum clearances to combustibles, as marked on the heater, will be maintained from vehicles parked below. If vehicle lifts are present, ensure that these clearances will be maintained from the highest raised vehicle.

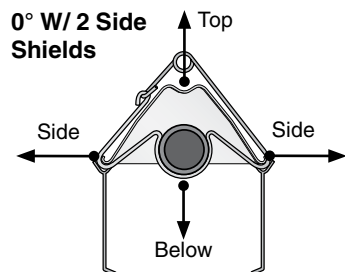
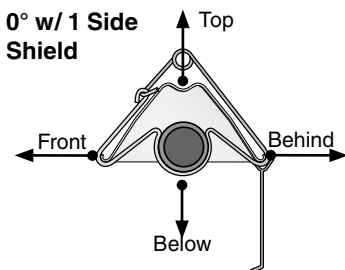
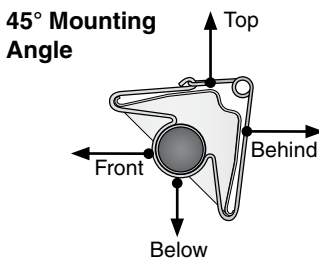
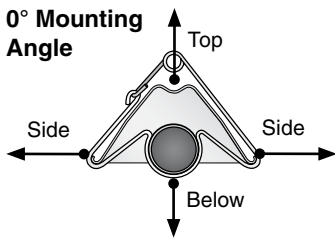
## Clearance to Combustibles

### IMPORTANT:

For the safe installation of this unit, the clearance to combustibles data below contains clearances that **must** be maintained.

Check the rating plate on the heater to verify the minimum clearance to combustibles and gas type for your model heater.

### EHL Series Clearance to Combustibles Data (mm)



Model No.	Mounting Angle*	Side		Top	Below	
		Front	Behind			
<b>EHL 75 (22.0 kW)</b>	0°	229	229	152	1524	
	45°	991	203	254	1524	
	w/ 1 side shield	0°	737	203	152	1524
	w/ 2 side shields	0°	229	229	152	1524
6.1m downstream of burner	0°	178	178	152	762	
<b>EHL 100 (29.3 kW)</b>	0°	356	356	152	1676	
	45°	991	203	254	1676	
	w/ 1 side shield	0°	737	203	152	1676
	w/ 2 side shields	0°	406	406	152	1676
6.1m downstream of burner	0°	178	178	152	762	
<b>EHL 125 (36.7 kW)</b>	0°	508	508	152	1930	
	45°	1473	203	254	1930	
	w/ 1 side shield	0°	1067	203	152	1930
	w/ 2 side shields	0°	508	508	152	1930
6.1m downstream of burner	0°	178	178	152	762	
<b>EHL 150 (43.0 kW)</b>	0°	610	610	152	2057	
	45°	1473	203	254	2057	
	w/ 1 side shield	0°	1067	203	152	2057
	w/ 2 side shields	0°	584	584	152	2057
6.1m downstream of burner	0°	279	279	152	1118	
<b>EHL 170 (50.0 kW)</b>	0°	864	864	152	2337	
	45°	1600	203	254	2337	
	w/ 1 side shield	0°	1270	203	152	2337
	w/ 2 side shields	0°	762	762	152	2337
6.1m downstream of burner	0°	279	279	152	1118	
<b>EHL 188 (55.0 kW)</b>	0°	1041	1041	152	2388	
	45°	1600	203	254	2388	
	w/ 1 side shield	0°	1372	203	152	2388
	w/ 2 side shields	0°	762	762	152	2388
6.1m downstream of burner	0°	279	279	152	1118	
<b>EHL 204 (60.0 kW)</b>	0°	1041	1041	152	2388	
	45°	1600	203	254	2388	
	w/ 1 side shield	0°	1372	203	152	2388
	w/ 2 side shields	0°	762	762	152	2388
6.1m downstream of burner	0°	279	279	152	1118	

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

End clearance is 310mm.

# 3.0 Installation

## 3.1 Design Considerations and Prechecks

Placement of infrared tube heaters is influenced by many factors. Aside from safety factors, considerations such as the number of elbows that are allowed, maximum vent lengths, ducting of combustion air and combining vents are a few examples. This manual, along with national, state and local codes, addresses these issues. It is critical that all guidelines and instructions are followed.

To ensure a properly designed heating system, a heating layout should be developed for the correct placement of the burner control box, radiant tubing, venting and combustion air intake ducts. Inspect and evaluate the mounting conditions, vent locations, gas supply and electrical wiring. Refer to the chart below for the recommended distances for the model being installed.

EHL SERIES HEATER INSTALLATION CHART (mm)

Model #	Recommended Mounting Heights	Distance Between Heaters	Distance Between Heater Rows	Maximum Distance Between Heater and Wall
EHL 75 (22.0 kW)	3050 - 5490	6100 - 9150	9150 - 15240	5180
EHL 100 (29.3 kW)	3355 - 6100	6100 - 9150	9150 - 15240	6100
EHL 125 (36.7 kW)	3965 - 8230	6100 - 9150	9150 - 15240	6100
EHL 150 (43.0 kW)	4270 - 9150	9150 - 12200	12200 - 18290	6100
EHL 170 (50.0 kW)	4575 - 12800	9150 - 12200	12200 - 18290	9145
EHL 188 (55.0 kW)	4875 - 12800	9150 - 12200	12200 - 18290	9145
EHL 204 (60.0 kW)	5180 - 12800	9150 - 12200	12200 - 18290	9145

**NOTE:** This chart is provided as a guideline. Actual conditions may dictate variation from this data.

### When designing an infrared radiant heating system, consider the following:

- Has the building's heat loss been evaluated?
- Does the design meet the needs of the space?
- Have all clearance to combustible situations been observed?
- Have recommended mounting heights been observed?
- Is the supply (burner) end of the heater located where more heat is required?
- Is it best to offset the heaters and/or rotate the reflectors towards the heat zone?
- Are protective guards, side shields, 'U' or 'L' reflector covers needed?
- Does the heater require outside fresh air for combustion?
- Is the environment harsh or contaminated (requiring outside air for combustion)?
- Are chemicals or vapor a concern (requiring outside air for combustion)?

**NOTE:** In outdoor applications, the effective infrared surface temperature of a person or object may be diminished with wind above 8 km/h. The use of adequate wind barrier(s) may be required.

**NOTE:** When heated, materials high in hydrocarbons (solvents, paint thinner, mineral spirits, formaldehydes, etc.) can evaporate. This may result in odors or fumes being emitted into the environment. To correct this problem, clean the area and/or introduce additional ventilation.

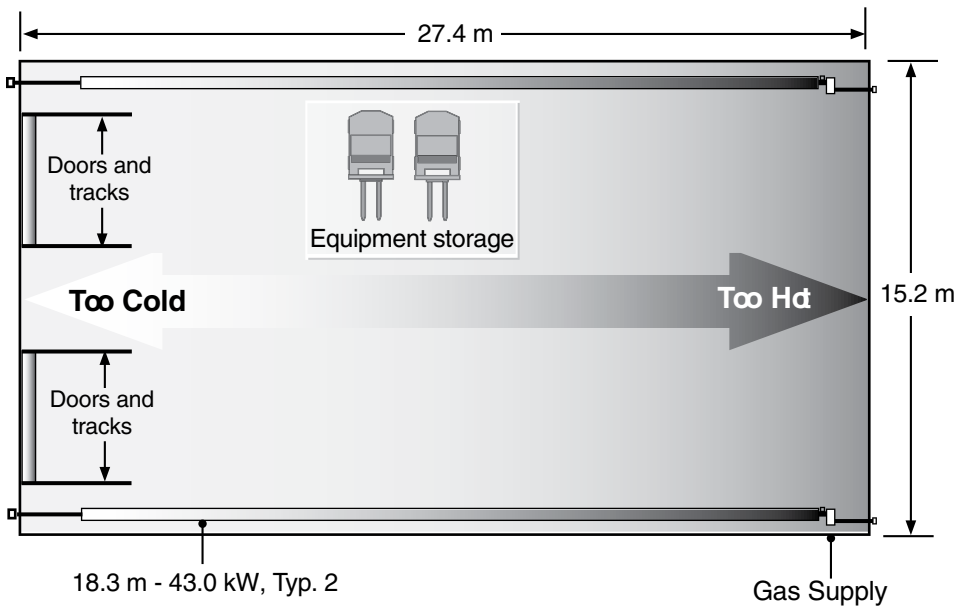
Heaters installed and serviced in accordance with the installation manual do not emit odors into the environment. See notice on page 28 for additional information.



## Design Scenario

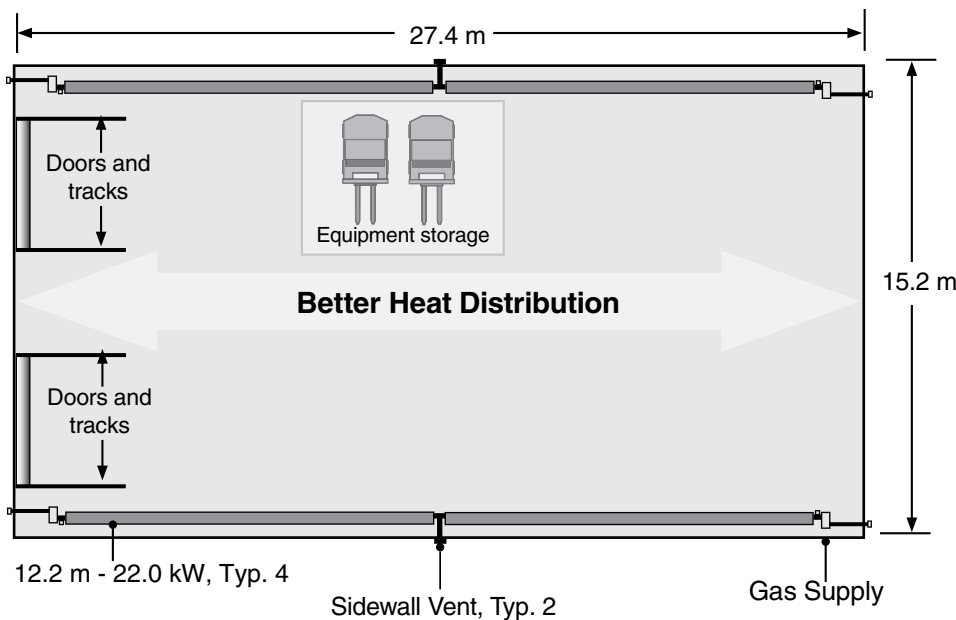
A tube heater system is being installed in a 27.4 m (L) x 15.2 m (W) space with 4.3 m ceilings. Two overhead doors are located at one end and an equipment storage area exists on one side. The calculated heat load is 85.0 kW.

**Figure 3.1 • Poor Design**



- Two burners (43.0 kW each) are placed at one end, opposite the area of highest demand (overhead doors).
- Recommended mounting heights are not observed.
- Produces an uneven heat distribution.

**Figure 3.2 • Good Design**



- Four burners (22.0 kW each) are placed in each corner. Burner (hotter) ends direct heat to areas of highest heat demand.
- Recommended mounting heights observed.
- Distributes heat more evenly.

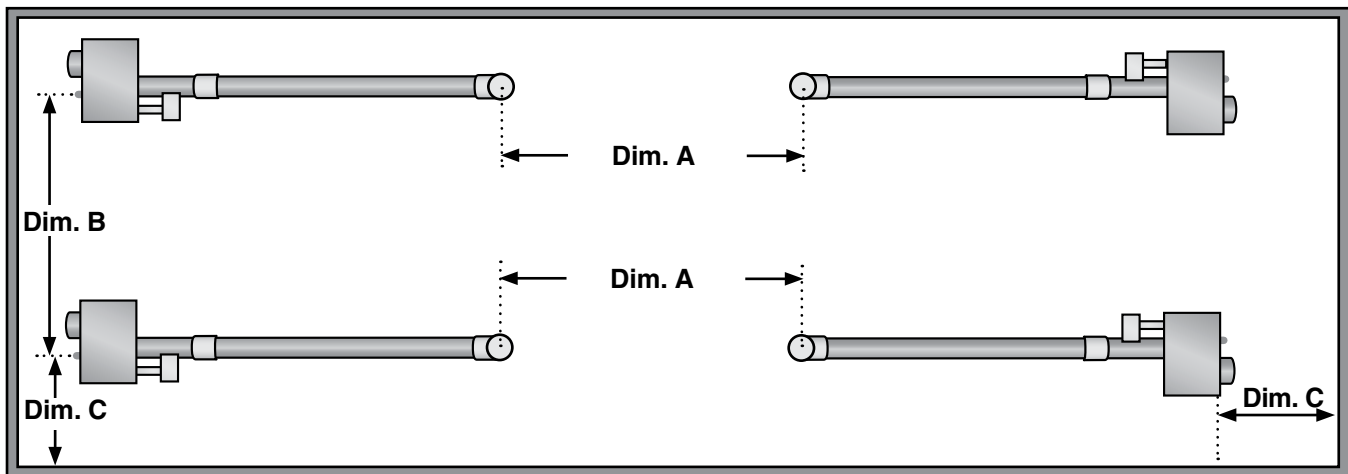
## Design Criteria

### 3.2 Recommended Mounting Heights

Model Length	BTU Range	kw Range	Recommended Mounting Heights (m)	Coverage Straight Config. (LxW) (m)	Coverage U-Tube Config. (LxW)	Distance Between Heaters (m) Dim. A	Distance Between Heater Rows (m) Dim. B	Max. Distance Between Heaters and Wall (m) Dim. C
6.6M	75 MBH	22.0	3.5 - 6.5	7.0 x 4.5	5.0 x 4.0	6.5 - 9.5	9.5 - 15.5	5.5
9.6M	75-100 MBH	22.0-29.3	4.0 - 6.5	10.0 x 5.5	5.5 x 4.5	6.5 - 9.5	9.5 - 15.5	6.5
12.5M	75-125 MBH	22.0-36.7	4.0 - 7.0	13.5 x 6.5	7.0 x 5.5	6.5 - 9.5	9.5 - 15.5	6.5
	147 MBH	43.0	5.0 - 9.5	14.0 x 8.0	7.5 x 6.5	9.5 - 12.5	12.5 - 18.5	8.0
15.4M	125-150 MBH	36.7-43.0	5.0 - 9.5	17.5 x 9.5	9.0 x 7.0	9.5 - 12.5	12.5 - 18.5	8.0
18.4M	147-204 MBH	43.0-60.0	5.5 - 12.5	20.5 x 10.5	10.5 x 8.0	9.5 - 12.5	12.5 - 18.5	8.0
21.3M	170-204 MBH	50.0-60.0	5.5 - 13.5	24.0 x 11.5	12.0 x 9.0	9.5 - 12.5	12.5 - 18.5	9.0

**NOTE:** Factory recommended mounting heights are listed as a guideline. If infrared heaters are mounted too low or too high, they may result in heat discomfort or lack of heat. It is generally recommended to observe the recommended mounting heights to optimize comfort conditions. However, certain applications such as spot heating, freeze protection, outdoor patio heating or very high ceilings may result in the heaters being mounted outside of the factory recommended mounting heights. Clearances to combustibles **must** always be maintained.

Figure 3.3 • Recommended Mounting Heights and Distances - see chart above for dimensions.



### 3.3 Hanger Placement and Suspension

#### ⚠ WARNING



Improper suspension of the heater may result in collapse and being crushed. Always suspend the appliance from a permanent part of the building structure that can support the total weight and force of the heater.

#### ⚠ WARNING



Failure to maintain the published clearance to combustibles may result in fire and/or explosion, property damage, serious injury or death. Always maintain clearances and post signs where needed.

Suspension of the heater must conform to applicable codes referenced in the Safety section and these instructions.

① Lay radiant tubing out in the following order. Position tubes in their approximate locations. Figure 3.4.

- Primary combustion chamber.
- Radiant emitter tubes.

**IMPORTANT!** EHL-150, -177, -187 and -204 (43.0-60.0 kW) models must use the titanium alloy treated combustion chamber as the first tube connected to the burner control box. The combustion chamber has an orange identification sticker located on the swaged end of the tube.

② Mark locations for hanging points. Figure 3.4.

**NOTE:** If the available hanging points do not allow for the recommended spacing (or if an alternative hanging method is utilized) then additional hangers may be necessary.

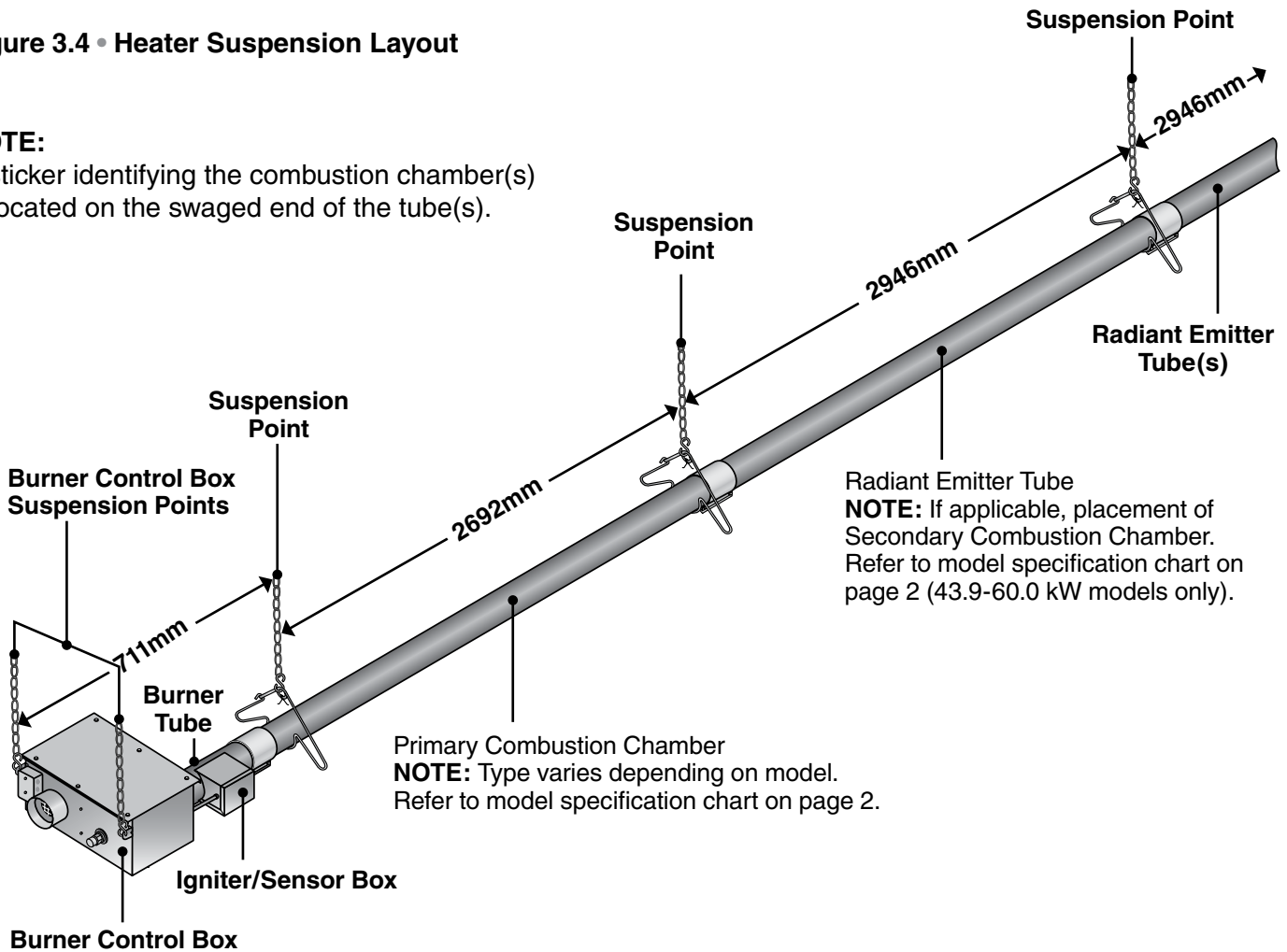
- The spacing between the burner control box mounting brackets and the first hanger should be approximately 711mm.
- The space between the first two hangers placed on the first tube should be approximately 2692mm.
- The space between hangers thereafter, one per tube, should be approximately 2946mm.

## Hanger Placement and Suspension

Figure 3.4 • Heater Suspension Layout

**NOTE:**

A sticker identifying the combustion chamber(s) is located on the swaged end of the tube(s).



## Heater Mounting Requirements and Weights

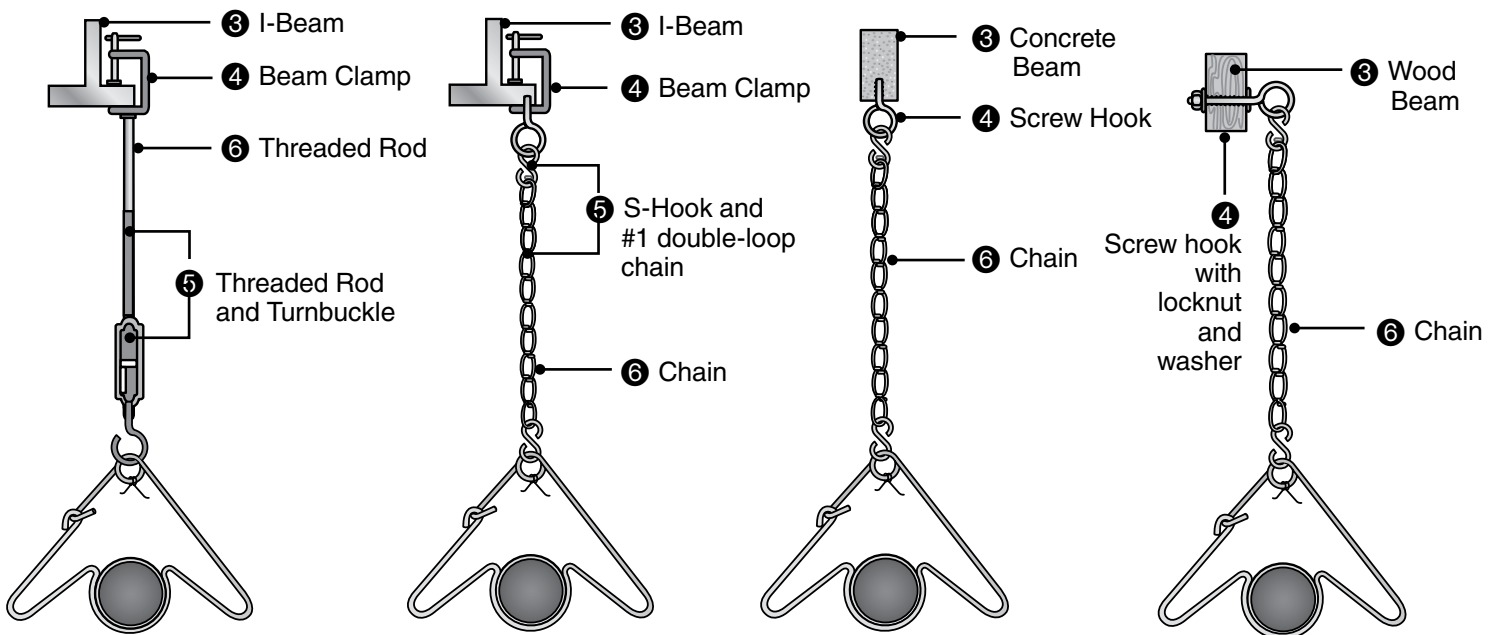
Model Length	Dimension Straight Config. (mm)	Suspension Points	Control Box Stabilizer	Shipping Weight (kg)	Chain Set Qty. Straight Config.	Chain Set Qty. U-Tube Config.	Optional Brass Knuckles (P/N: BK)	Optional Single Mount Bracket (P/N: SMB) U Config. Only.
EHL 6.6	6604	3	2	54.5	5	6	3	2
EHL 9.6	9550	4	2	73.0	6	7	4	N/A
EHL 12.5	12497	5	2	86.5	7	8	5	3
EHL 15.4	15443	6	2	107.0	8	9	6	N/A
EHL 18.4	18390	7	2	120.5	9	10	7	4
EHL 21.3	21336	8	2	136.0	10	11	8	N/A

## Hanger Placement and Suspension

Suspension of the heater must conform to applicable codes referenced in the Safety section and these instructions.

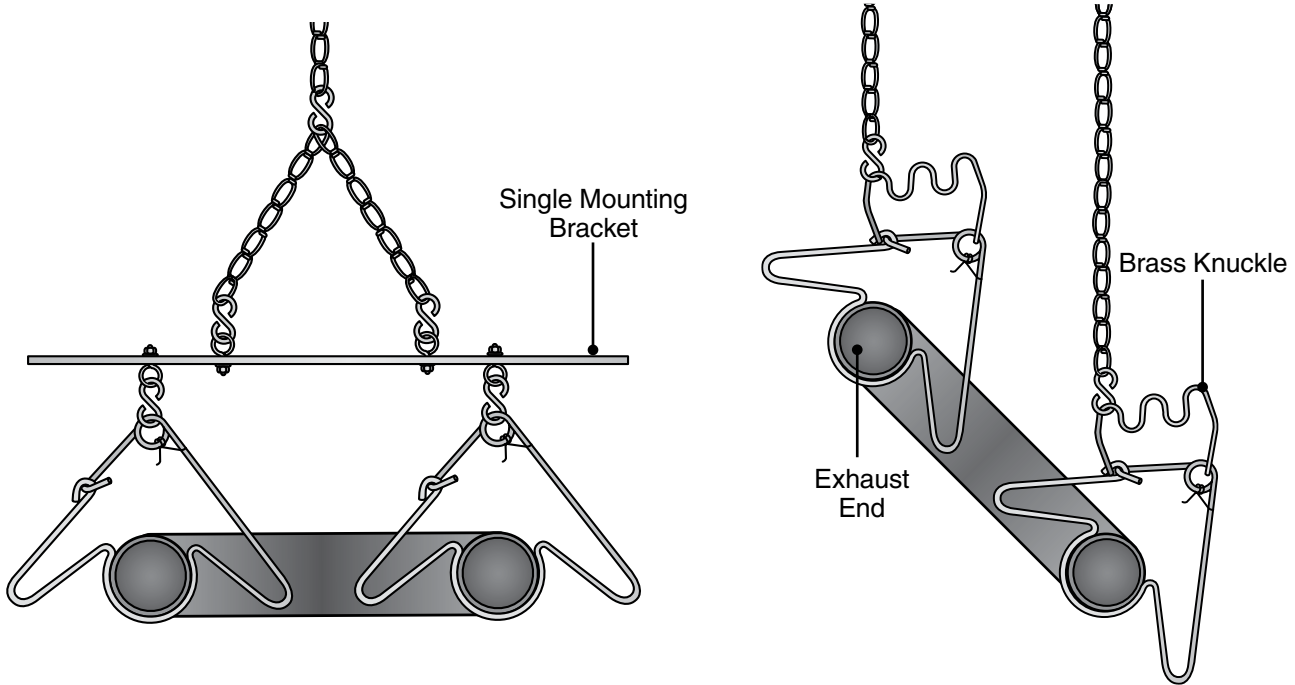
- ③ Prepare the mounting surface, if necessary, such as: weld blocks, drill holes. Figure 3.5.  
**NOTE:** The burner control box and radiant tubes should be in straight alignment and level.
- ④ Fasten beam clamp, screw hook or other type of suspension anchor to hanging point.
- ⑤ Attach and close S-hook and #1 double-loop chain to anchor. Check that it is securely attached.  
**NOTE:** Threaded rod and turnbuckles may be used.
- ⑥ Attach hangers to chains. Adjust chain lengths until radiant tubing is level and equal weight distribution is achieved. **NOTE:** Chains must be straight up and down. Do not install chains at an angle as this can result in tube warpage or separation.

Figure 3.5 • Mounting the Hangers



### 3.4 Optional U-Bend or Elbow Accessory Configuration

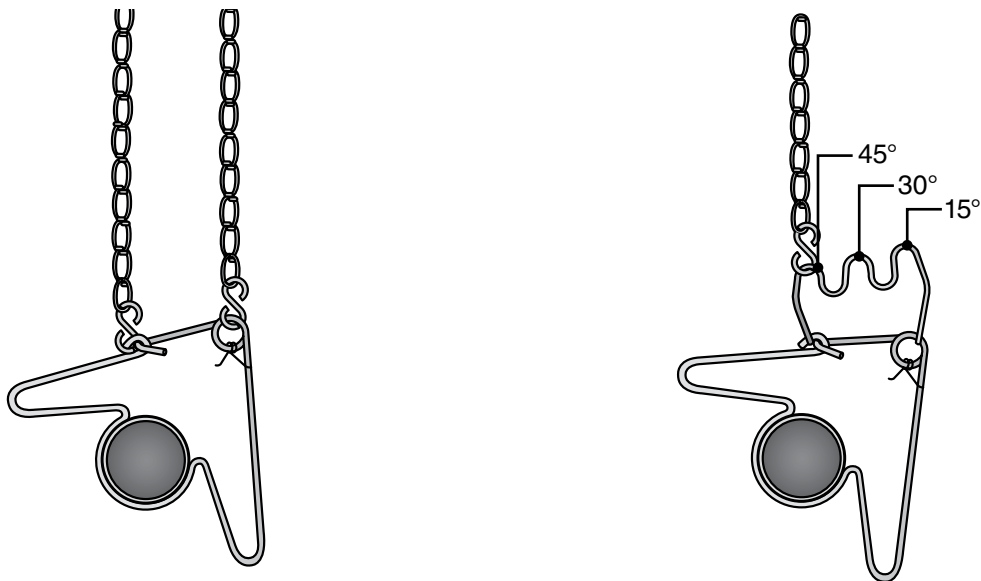
Figure 3.6 • U-Tube Hanger Mounting Options



U-Tubes can be mounted from a single suspension point using a Single Mounting Bracket (P/N: SMB) with five S-hooks and #1 double-loop chains.

U-Tubes can be mounted at a 15, 30 or 45 degree angle with two suspension points, using two Brass Knuckle (P/N: BK) fittings, #1 double-loop chains and S-hooks.

Figure 3.7 • Angled Hanger Mounting Options



For 45 degree hanging angle use two S-hooks and two #1 double-loop chains.

For variety of hanging angles, use the Brass Knuckle (P/N: BK) fitting with a #1 double-loop chain and S-hook.

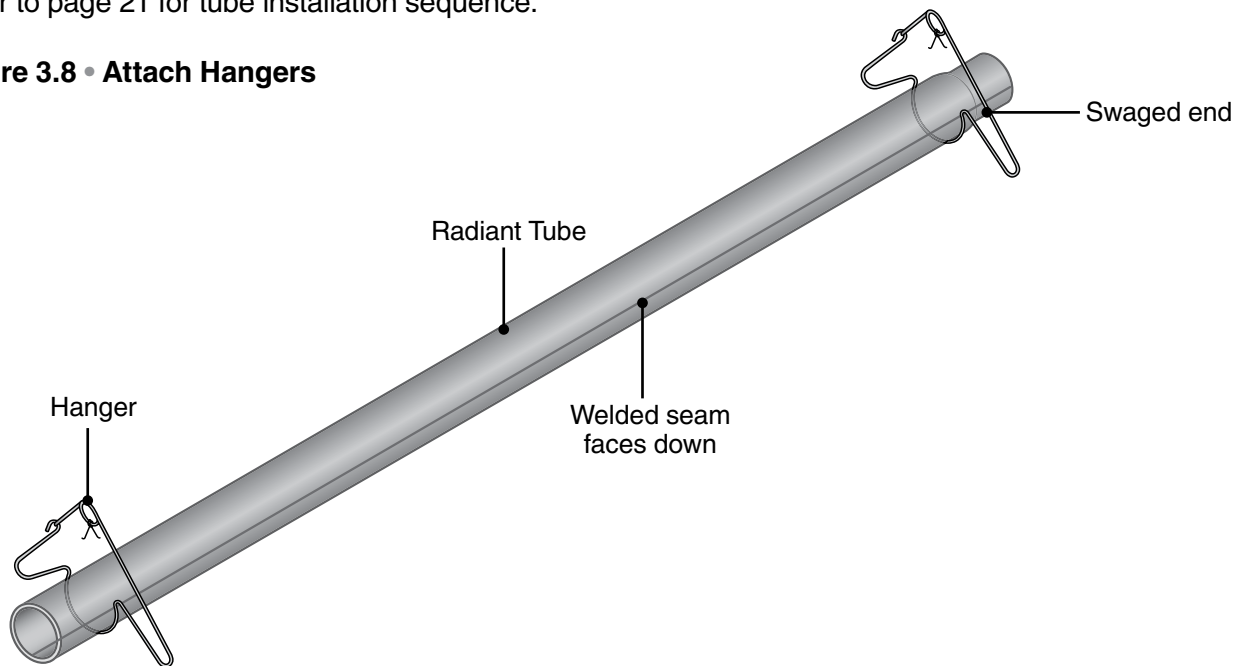
### 3.5 Radiant Tube Assembly

To install the radiant tubes:

- 1 Place tubes in hangers with the welded seam facing downward and the swaged end of the tube towards the exhaust end of the heater system (see Figure 3.8).

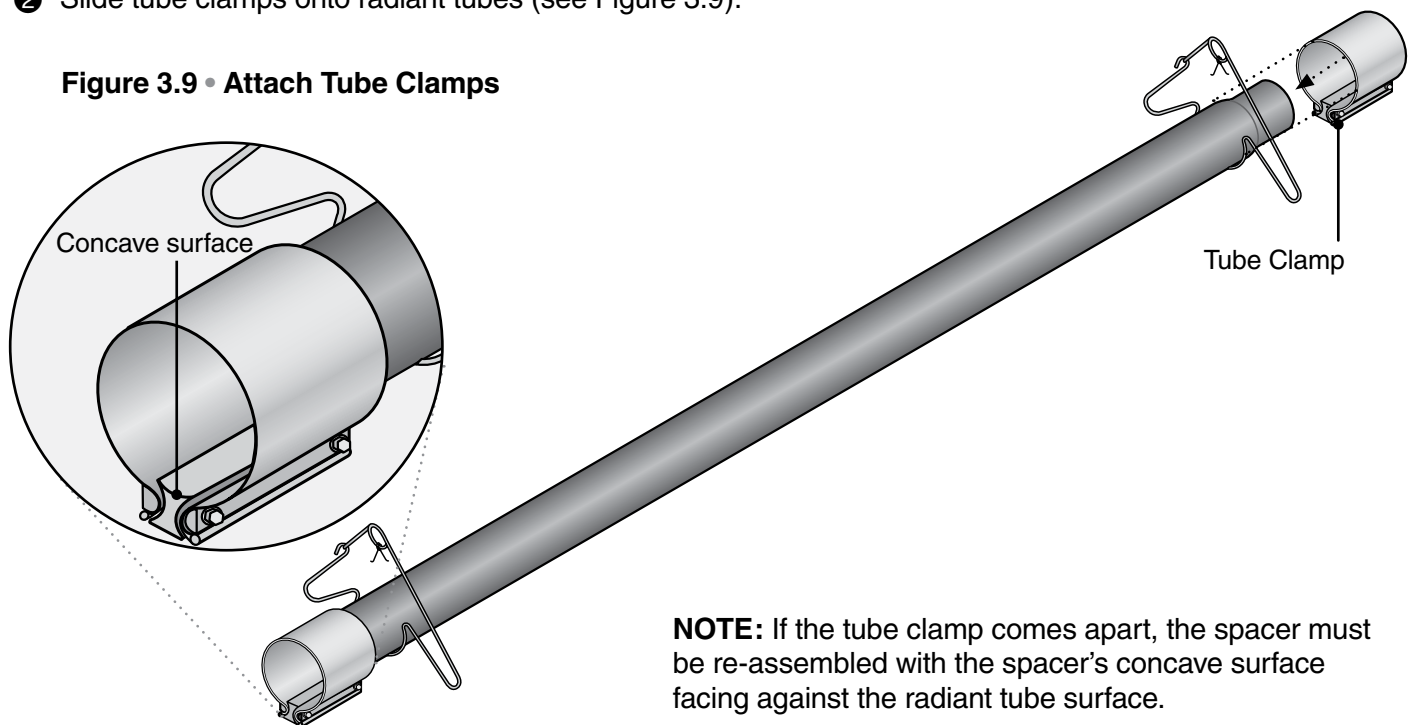
Refer to page 21 for tube installation sequence.

**Figure 3.8 • Attach Hangers**



- 2 Slide tube clamps onto radiant tubes (see Figure 3.9).

**Figure 3.9 • Attach Tube Clamps**

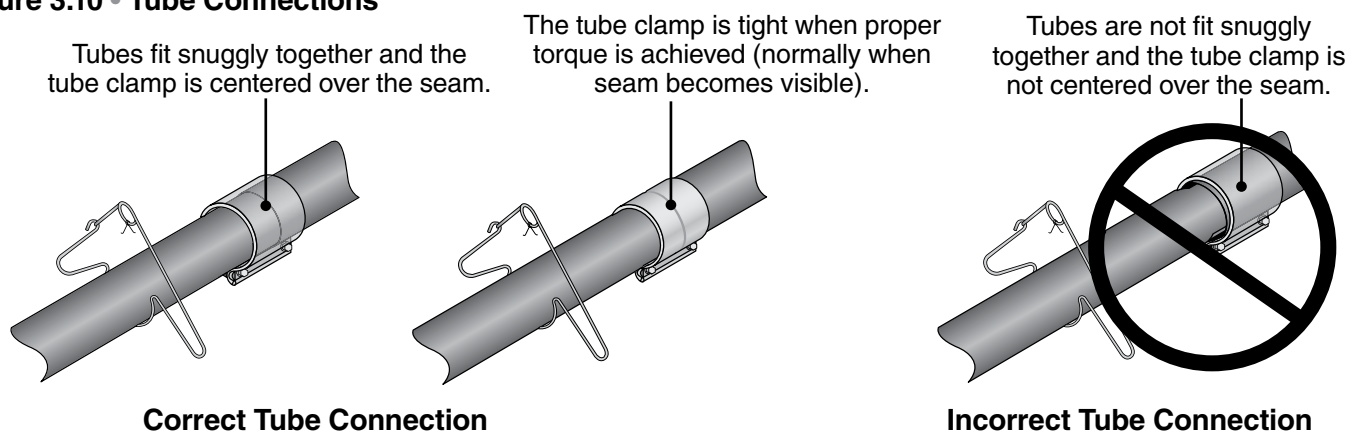


**NOTE:** If the tube clamp comes apart, the spacer must be re-assembled with the spacer's concave surface facing against the radiant tube surface.

## Radiant Tube Assembly

- ③ Slip-fit the radiant tube sections together until tightly connected (install swaged end of each tube towards exhaust end). **NOTE:** If it is difficult to mate the tubes, they may be installed incorrectly.
- ④ Center tube clamps over the seams where two radiant tube sections connect. If necessary, rotate tube clamps so they will not interfere with the reflector end caps during expansion and contraction of the heater while operating.
- ⑤ Tighten tube clamp bolts to secure. When proper compression is obtained (30-44 Nm), the tube seam will create a visible mark on the tube clamp. **NOTE:** Excessive torque may damage the tube clamp.
- ⑥ Determine the location of the burner control box and note the placement of the mounting chains.

**Figure 3.10 • Tube Connections**



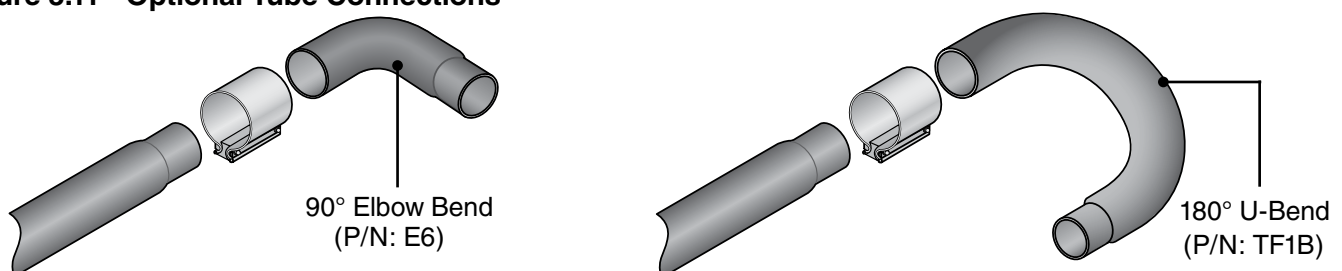
### Optional U-Bend or Elbow Accessory Configurations

A 180 degree U-bend or 90 degree accessory fitting may be installed in the radiant tube heater system. Refer to page 17 for minimum distance requirements from the burner control box.

#### When installing a U-bend or Elbow Accessory Fitting:

- The top clearance of an uncovered (no reflector) U-bend or elbow accessory fitting to combustibles is 458mm.
- If operating the heater un-vented, separate the intake air to the heater from its exhaust products a minimum of 1220mm; further separation may be necessary (see Figure 3.12). Outside combustion air may also be supplied.
- A maximum of one 180° U-bend or two 90° elbows can be installed on a heater.
- Omit one 840mm section of turbulator baffle. Refer to Baffle Assembly section.

**Figure 3.11 • Optional Tube Connections**





## Radiant Tube Assembly

Figure 3.12 • Elbow and U-Bend Clearances

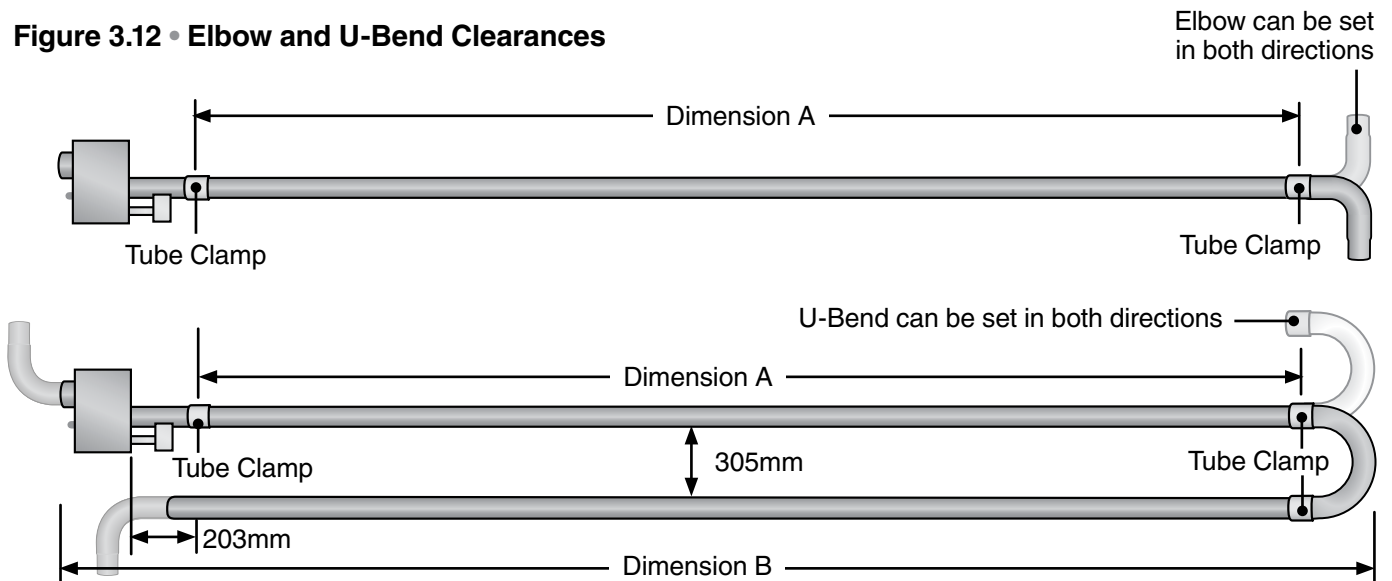
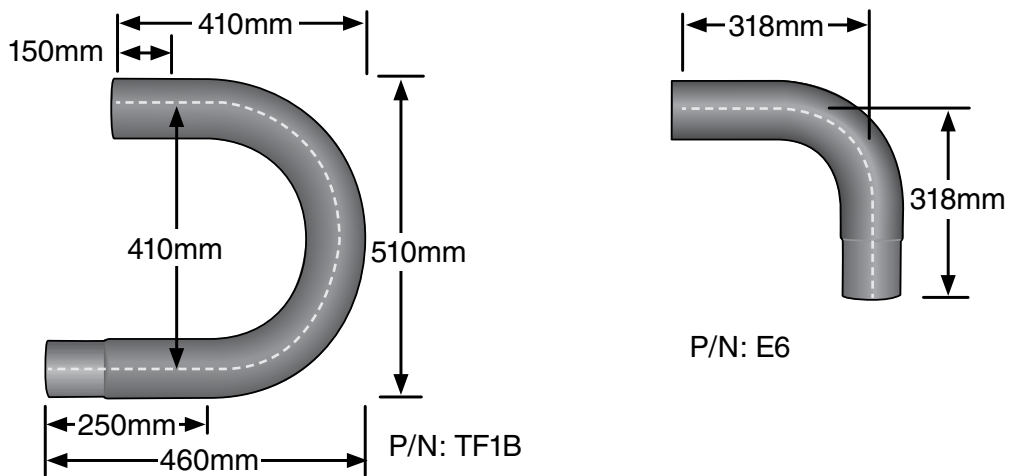


Figure 3.13 • U-Bend and Elbow Dimensions



### Minimum Distance from Burner Control Box to U-Bend or Elbow Accessory

kW Range	Dimension A
22.0 - 29.3 kW	3050 mm
36.7 kW	4570 mm
43.0 - 50.0 kW	6100 mm
55.0 - 60.0 kW	7620 mm

### Overall Dimensions for Heaters Configured with U-Bend (P/N: TF1B)

Heater Length	Dimension B
6M	3963 mm
9M	5385 mm
12M	6909 mm
15M	8332 mm
18M	9856 mm
21M	11328 mm

### 3.6 Burner Control Box Suspension

Suspending the burner control box must be done in accordance with applicable codes listed in the Safety section and these instructions.

The burner control box must be in straight alignment with the radiant tubes and level.

- ❶ Determine the mounting chain locations for hanging the burner control box.
- ❷ Fasten beam clamp, screw hook or other type of suspension anchor to hanging point.
- ❸ Attach and close S-hook and double-loop chain to anchor. Check that it is securely connected.
- ❹ Attach chain assemblies and S-hooks to mounting brackets on the burner control box. Adjust chain lengths until level and in straight alignment with the radiant tubes. The burner sight glass will be visible from the floor.

Figure 3.14 • Burner Control Box Assembly • Side View

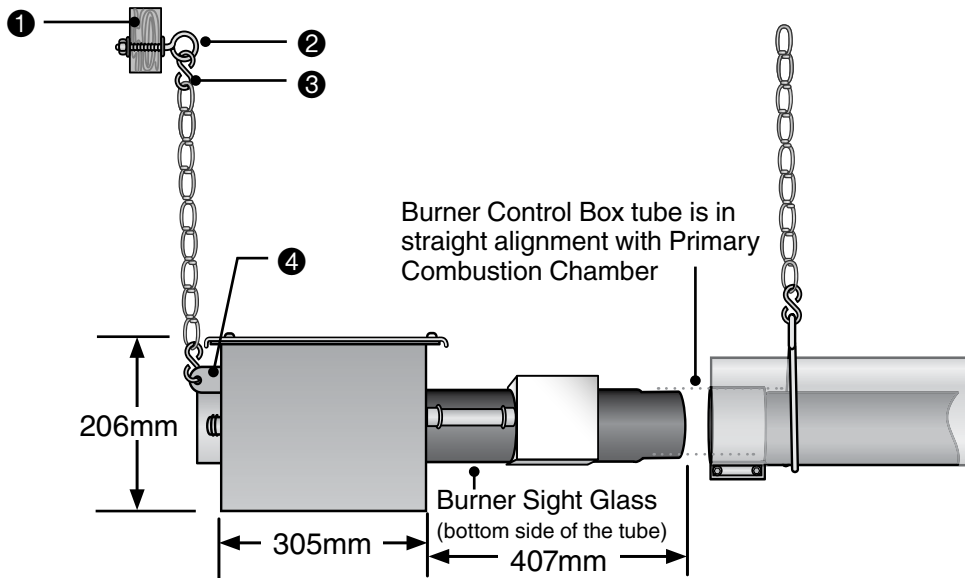
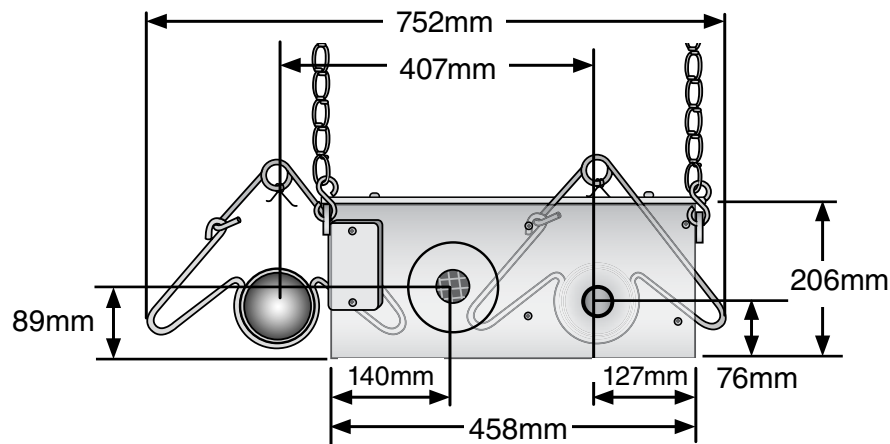


Figure 3.15 • Burner Control Box with U-Bend • End View



### 3.7 Reflector Assembly

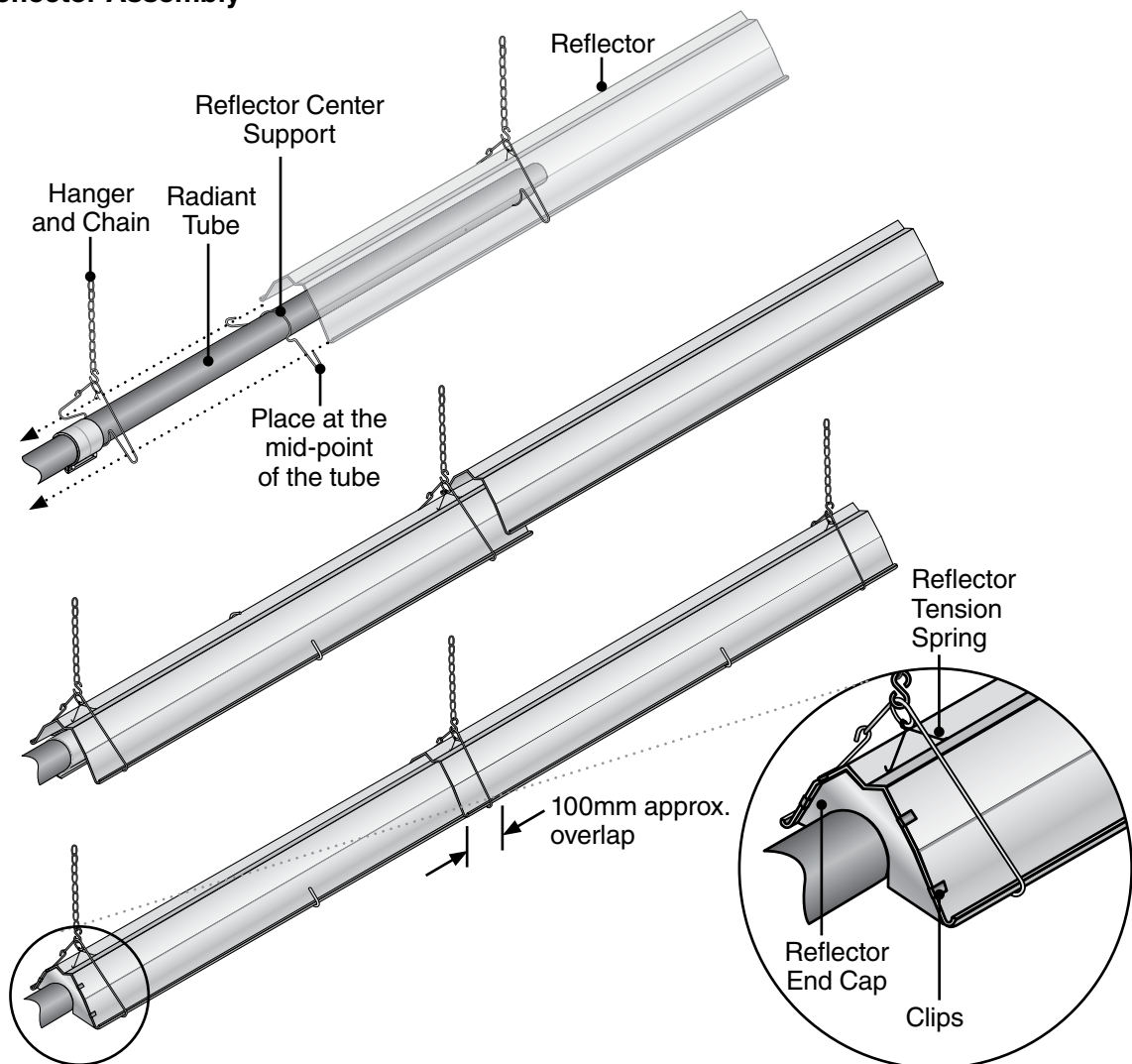
#### To install the reflectors:

- ① Attach reflector center supports onto radiant tubes.
- ② Slide each reflector section through the hangers and adjust the reflector tension spring into the V-groove on the top of the reflector. The reflectors should overlap approximately 102mm.
- ③ To prevent the reflectors from shifting, secure the reflector sections together using sheet metal screws except at the expansion joint (see page 21). **NOTE:** Installer to provide sheet metal screws.
- ④ Attach reflector end caps, with polished side inward, to each end of the reflector run.

Reflectors, and reflector accessories, direct infrared energy to the floor level. The reflector assembly depends on the heater configuration, proximity to combustibles and the space surrounding the heater.

Before you begin assembly, determine if the use of reflector accessories are necessary (see page 20).

Figure 3.16 • Reflector Assembly



## Reflector Assembly

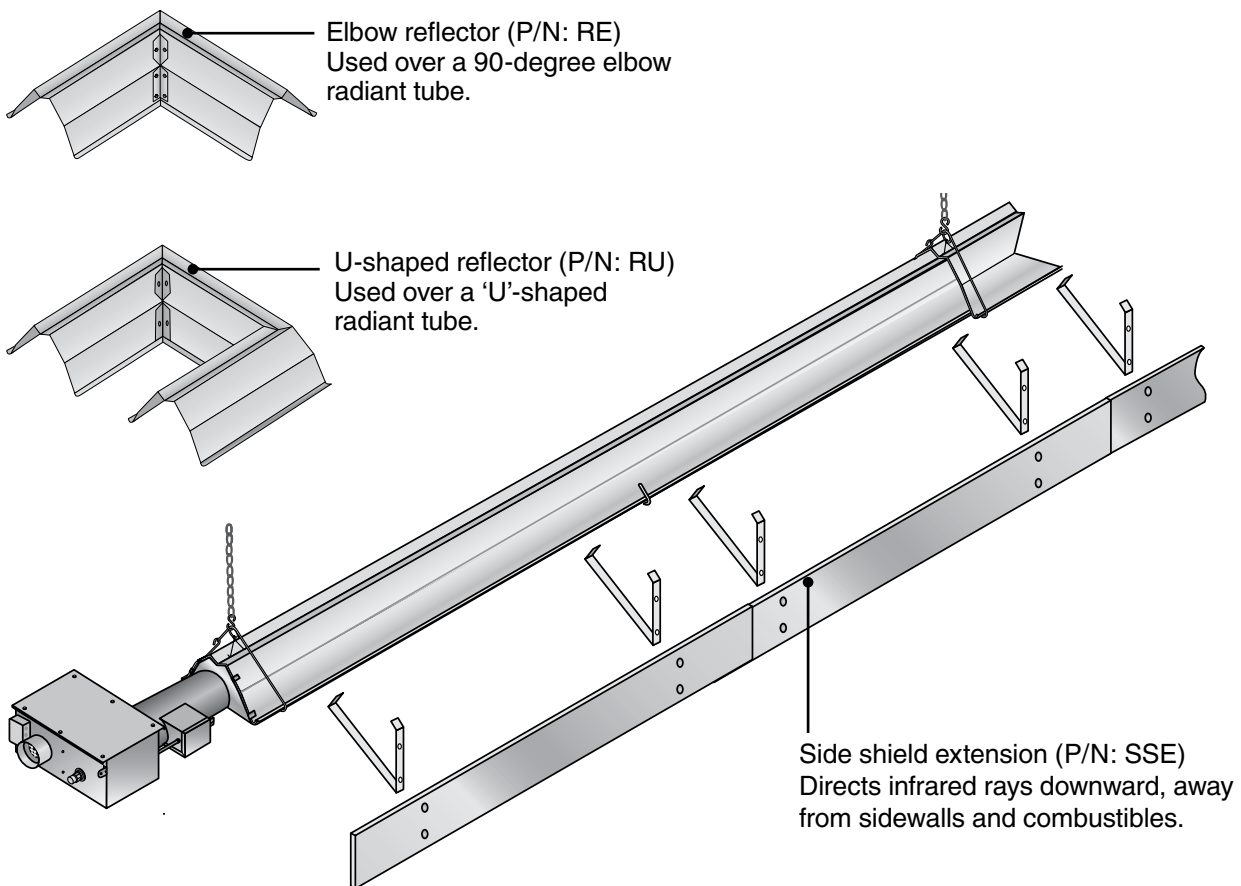
### Common Optional Accessories

Reflector Accessories	Description	Part #
Elbow Reflector*	90° bend, highly polished aluminum reflector elbow designed to fit atop one elbow accessory fitting.	RE
U-Reflector*	180° bend, highly polished aluminum reflector U-bend designed to fit atop one U-bend accessory fitting.	RU
Side Shield Reflector *^	Highly polished side shield extension used to direct infrared rays downward, away from side walls and combustibles.	SSE
Protective Guard	Used to prevent debris or objects from becoming lodged between the radiant tube and reflector. Required when mounting heaters below 8 ft.	PG

\* Reflectors cannot be rotated when used with this accessory.

^ Refer to the Clearance to Combustibles data on page 7 for minimum distances to combustibles when side shield extensions) are used.

Figure 3.17 • Reflector Shield Accessories



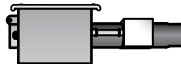





### 3.8 Baffle Assembly and Placement

#### Tube Installation Sequence, Baffle Location and Secured Joints for Reflectors

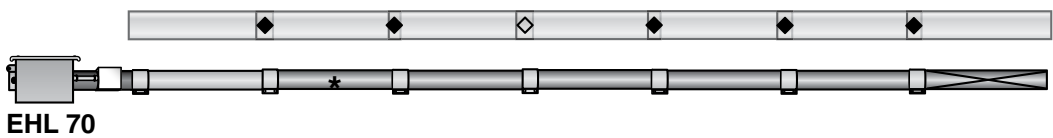
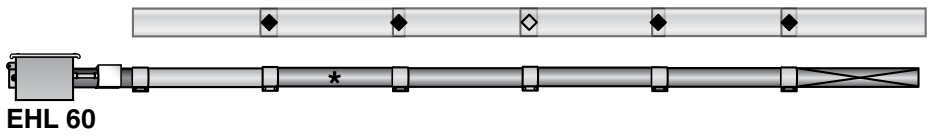
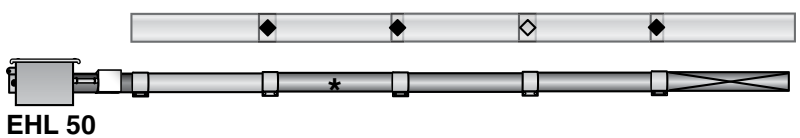
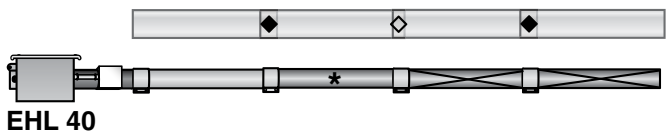
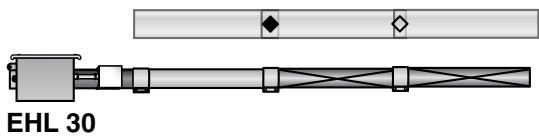
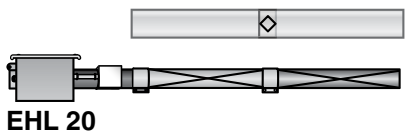
## NOTICE

Different inputs and models utilize different baffle lengths. Remove all enclosed baffle sections from box and retain with applicable heater. Reference shipping label for proper baffle size.

Each 840mm baffle section must be assembled with other baffles and placed in the radiant tube section furthest from the burner. **IMPORTANT:** Omit one section of baffle if heater is configured with a U-bend or Elbow accessory fitting.

Key	
	Burner Control Box with Burner Tube
	Expansion joint on Reflectors
	Secured joint on Reflectors
	Primary Combustion Chamber Tube with clamp
	Radiant Tube with clamp
	Baffle location

\* 43.0-60.0 kW (147-204 MBH) models utilize a secondary aluminized steel combustion chamber placed immediately downstream of the primary combustion tube.

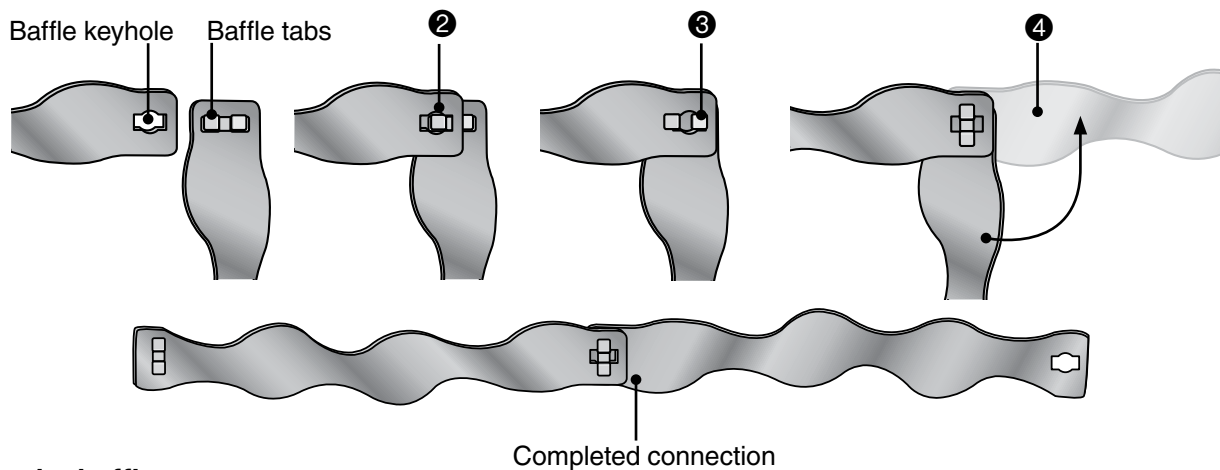


## Baffle Assembly and Placement

To assemble the baffles: NOTE: Baffles may be inserted into the tube while being assembled.

- ❶ Determine the number of baffles needed for your model number. Remove one 840mm baffle section if heater is installed with an elbow or U-bend accessory.
- ❷ Install the baffle tabs at a 90° angle to the baffle keyhole (see Figure 3.18).
- ❸ Insert one baffle tab into keyhole and slide completely to one side until both baffle tabs appear in the keyhole.
- ❹ Adjust the tabs to the center of the keyhole and rotate the baffle 90 degrees to lock the baffle sections together.
- ❺ Repeat this process with remaining baffle sections to complete assembly.

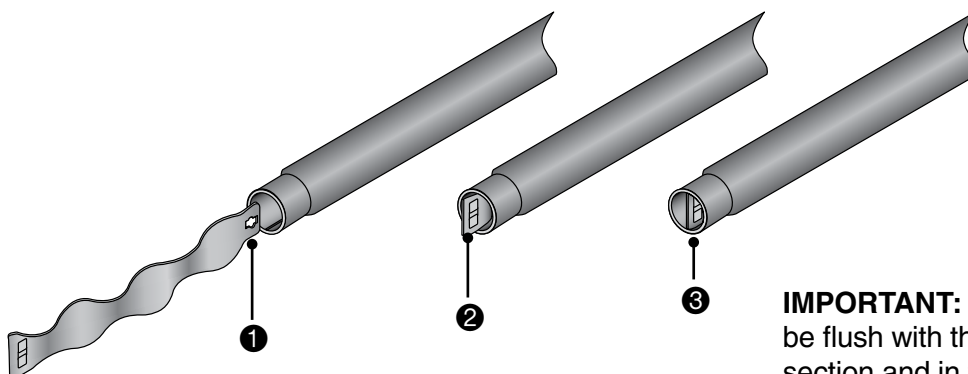
Figure 3.18 • Assembling the Baffles



### To insert the baffles:

- ❶ Insert baffles with the keyhole end first.
- ❷ Rotate baffle assembly so that it is in the vertical position.
- ❸ Slide baffle assembly into the last radiant tube section, furthest from burner control box.  
NOTE: Baffle assemblies longer than 3048mm will continue to be fed into next tube section.

Figure 3.19 • Inserting the Baffles



**IMPORTANT:** Baffle assembly must be flush with the end of the last tube section and in the vertical position.

## 3.9 Venting

---

### **WARNING**



Insufficient ventilation and/or improperly sealed vents may release gas into the building which could result in health problems, carbon monoxide poisoning or death.

Improper venting may result in fire, explosion, injury or death.



Seal vent pipes with high temperature sealant and three (3) sheet metal screws. Vent enclosed spaces and buildings according to the guidelines in this manual and applicable national, state, provincial and local codes.

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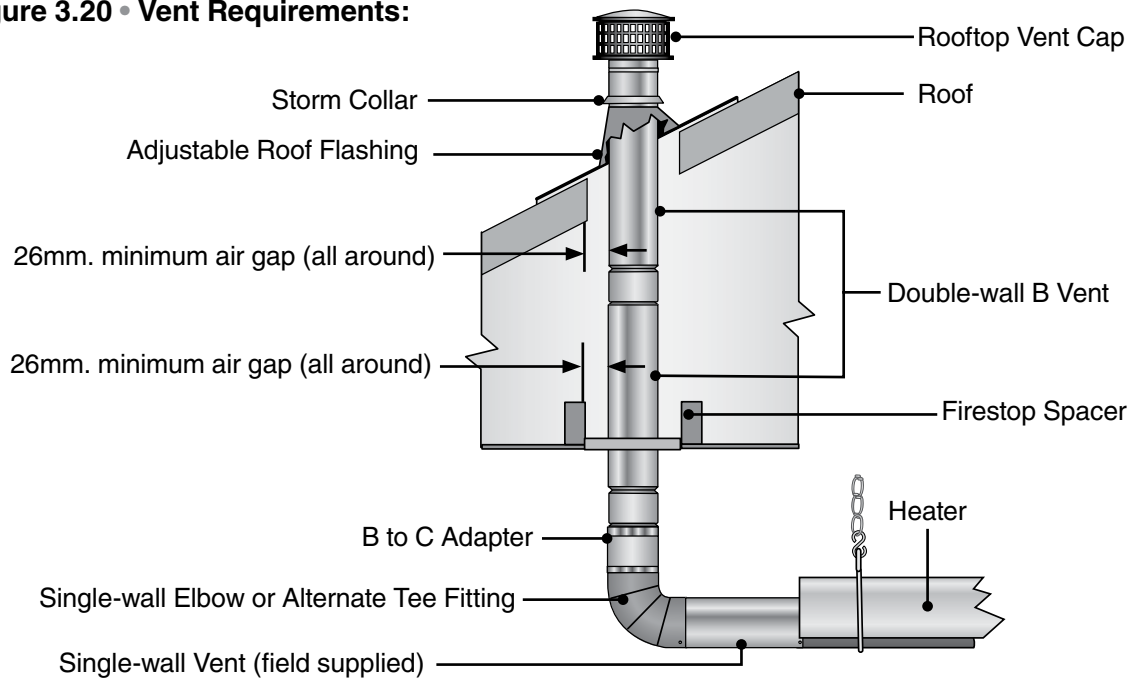
The heating system may operate either vented or un-vented (see page 27). Venting can terminate through the sidewall (horizontal) or the roof (vertical) and be individually or commonly vented.

### **Venting Requirements**

- Seal single wall vent with high temperature sealant and three (3) sheet metal screws.
- Single wall galvanized vent pipe must be insulated in cold environments.
- Do not use more than two 90 degree elbows in the exhaust vent.
- To maintain clearances to combustibles, the use of an approved wall or roof thimble and double-wall Type B-vent is required for the portion of vent pipe that runs through combustible material in the building wall or roof (see Figures 3.20 & 3.21).
- The maximum vent length is 6100mm.

## Vent Assembly

Figure 3.20 • Vent Requirements:

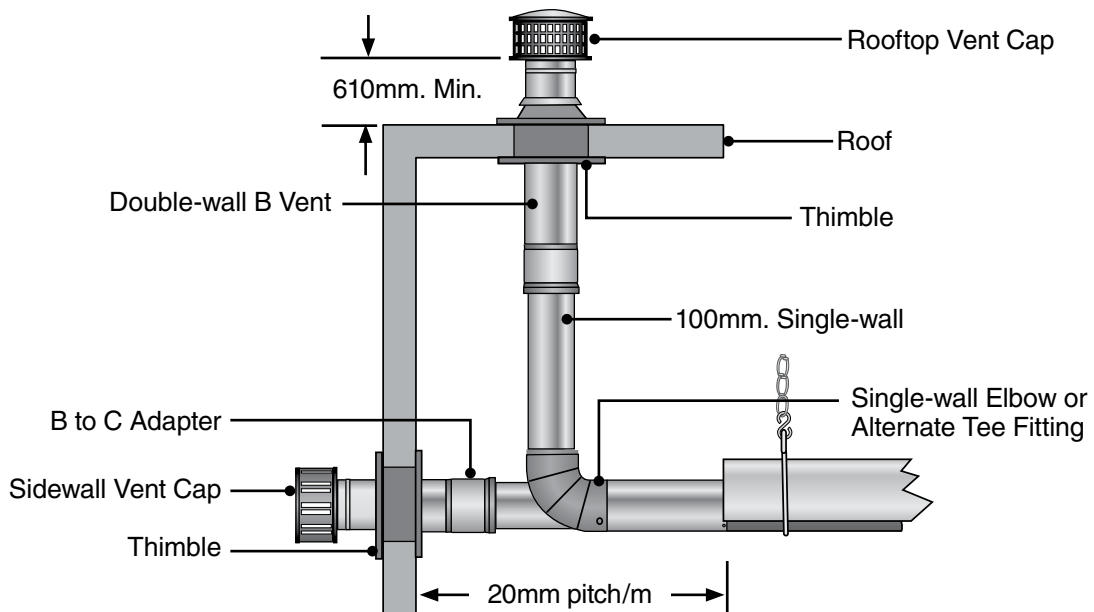


## Sidewall (Horizontal) Venting

### Guidelines:

- To prevent moisture from entering the heater system, slope the vent pipe down toward the outlet 20mm. per meter of vent length. Do not pitch the heater.
- Vent must extend beyond any combustible overhang.

Figure 3.21 • Vent Slope - Side View





## Vent Assembly

### Vent Termination

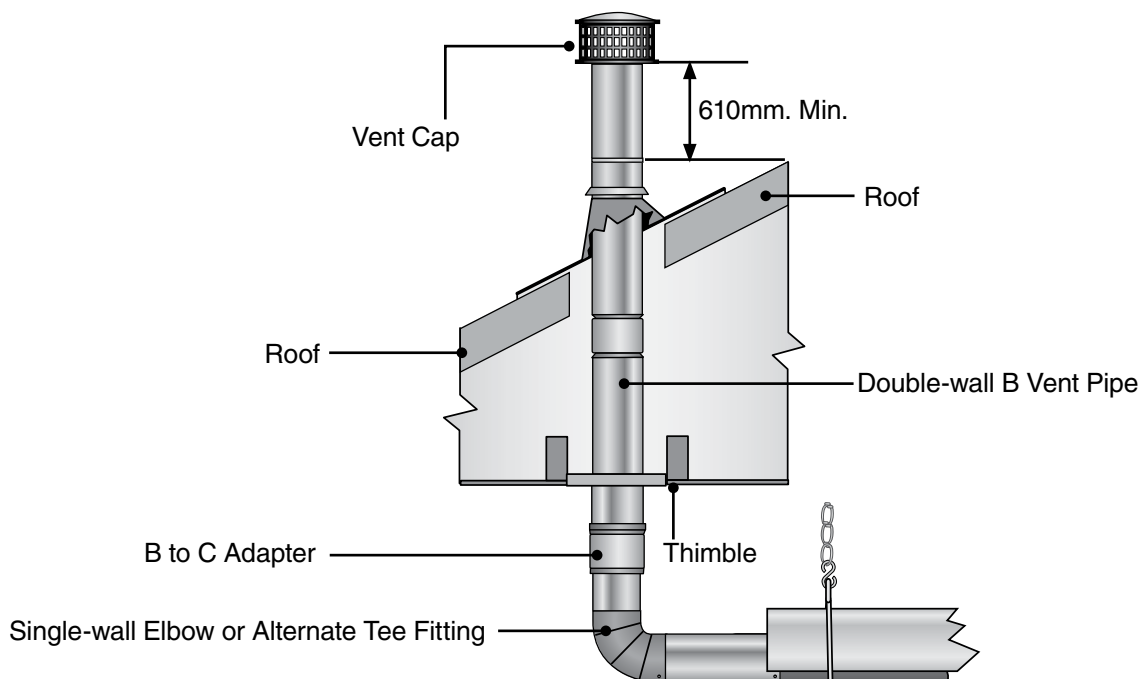
- Vent must terminate a minimum of 1200mm below, 1200mm horizontally from and 300mm above any window or door that may be opened and gravity air inlet into the building.
- Vent must terminate a minimum of 900mm above any forced air inlet that is located within 3100mm.
- The bottom of the vent terminal must be located a minimum of 300mm above grade level and must extend beyond any combustible overhang. Vents adjacent to public walkways must terminate a minimum a 2100mm above grade level.
- The vent terminal must be installed to prevent blockage by snow and protect building materials from degradation by flue gases.
- The vent cap must be a minimum of 152mm from the sidewall of the building.
- Vents must extend beyond any combustible or be a minimum of 915mm below a combustible overhang.

### Roof (vertical) Venting

#### Guidelines:

- Separate air intake duct from vent pipe a minimum of 1200mm by placing vent pipes higher than adjacent air intake duct.
- Venting may utilize standard B-vent cap.
- The vent terminal must extend a minimum of 610mm above the roof.

Figure 3.22 • Vertical Ventilation - Side View



## Vent Requirements

### Common Venting

- A dual exhaust assembly (P/N: Y or YSM) must be used when joining two heaters to a common vent so that by-products of one heater do not flow into the adjoining vent of the other heater.
- 150mm diameter double-wall Type B-vent and 150mm vent cap must be used.
- Common vented heaters must be controlled with the same thermostat. Do not operate individually.

Figure 3.23 • Common Vertical Venting - Side View

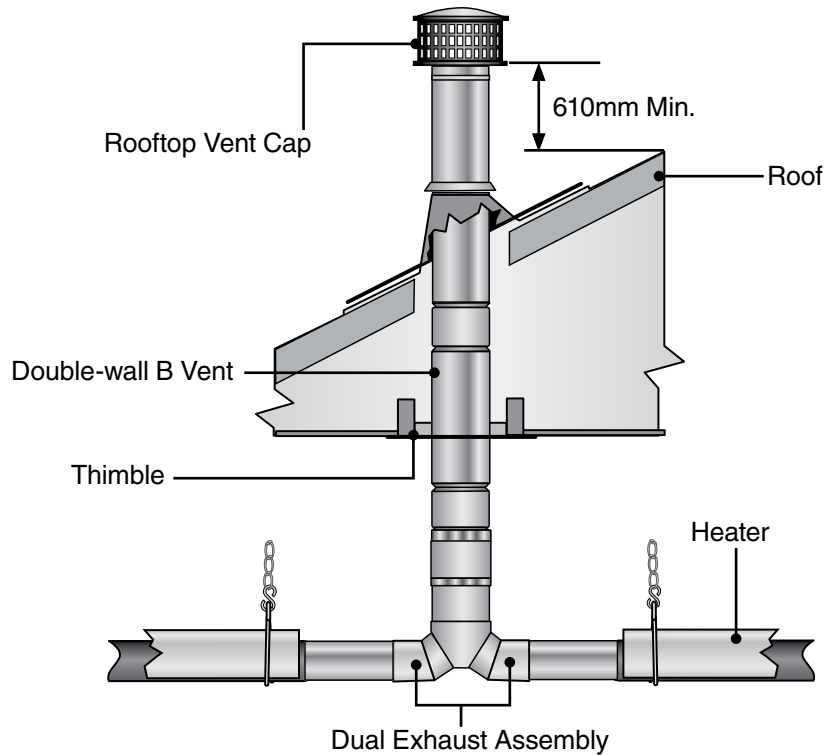
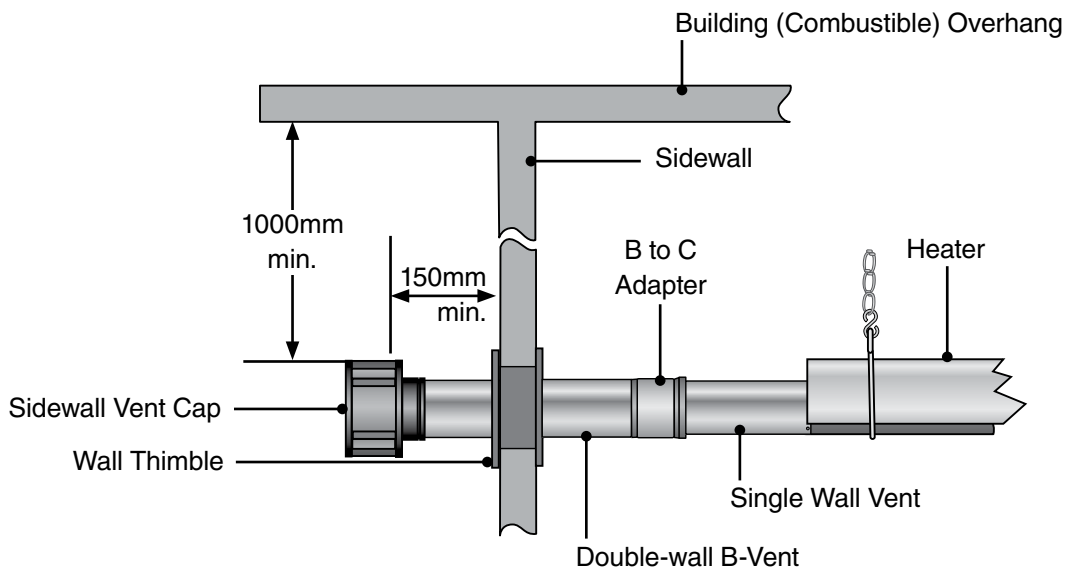


Figure 3.24 • Sidewall Venting - Side View



## Optional Unvented Operation

### ⚠ WARNING



Not for residential use. The use of unvented tube heaters in residential indoor spaces may result in property damage, serious injury or death. Use unvented operation in commercial and industrial installations with proper ventilation rates only.

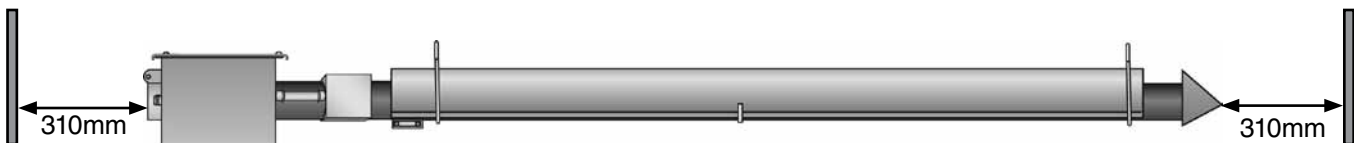
#### When installing in an un-vented configuration:

- A factory supplied vent cap/diffuser (P/N: WVE-GALV) must be used.
- Ventilation of the space is required to dilute the by-products of combustion. Sufficient displacement of fresh air intake and exhaust by-product must be provided.
- The minimum clearance between the air intake and the exhaust terminal is 1220mm. **Note:** When installing in a U-bend configuration, use caution to separate vent gases from heater intake.
- A minimum positive air displacement (movement) for **G20 and G25 gas**:  $2\text{m}^3/\text{hr}$  per kW is required.
- A minimum positive air displacement (movement) for **G31 Gas**:  $2.3\text{m}^3/\text{hr}$  per kW is required.

**NOTE:** Gravity or mechanical means may be used to accomplish the air displacement. Local codes may require that the mechanical exhaust system be interlocked with the electrical supply line to the heaters, enabling both to function simultaneously.

- The use of combustion air intake is recommended.

Figure 3.25 • Minimum end clearance for unvented heater



### 3.10 Combustion Air Requirements

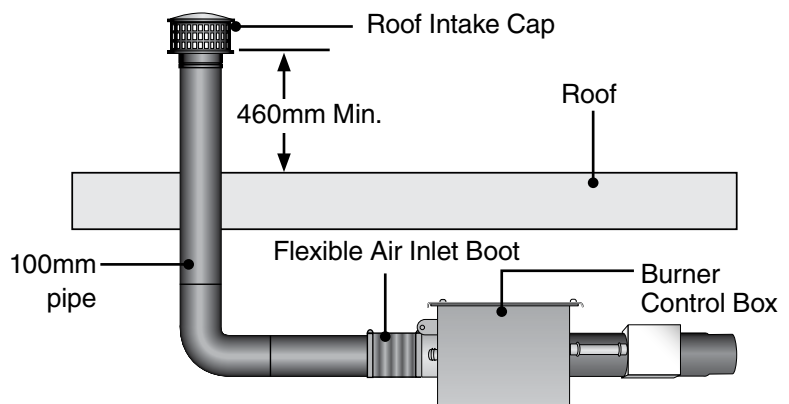
## NOTICE

This heater has a factory preset air orifice for proper combustion air supply. If combustion air is to be provided for a tightly closed area, 440 sq. mm free air opening must be provided for each kW of heater input.

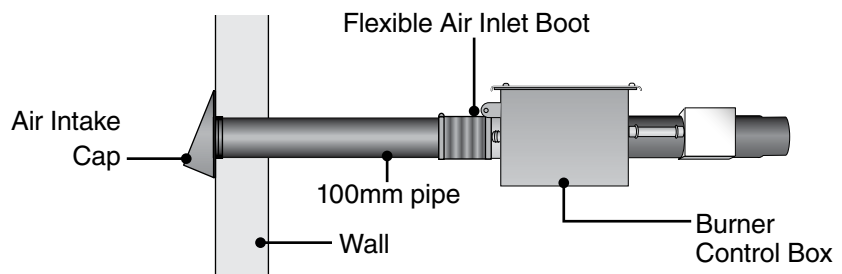
Non-contaminated air for combustion must be ducted to the heater if chlorinated or fluorinated contaminants, high humidity and other contaminants such as sawdust or welding smoke are present in the area where the heater is installed, or if the building has a negative pressure.

Combustion air intake may be located on either the sidewall or the roof. Figures 3.26 - 3.28.

**Figure 3.26**  
Vertical Outside Air Supply  
for Single Heater • Side View

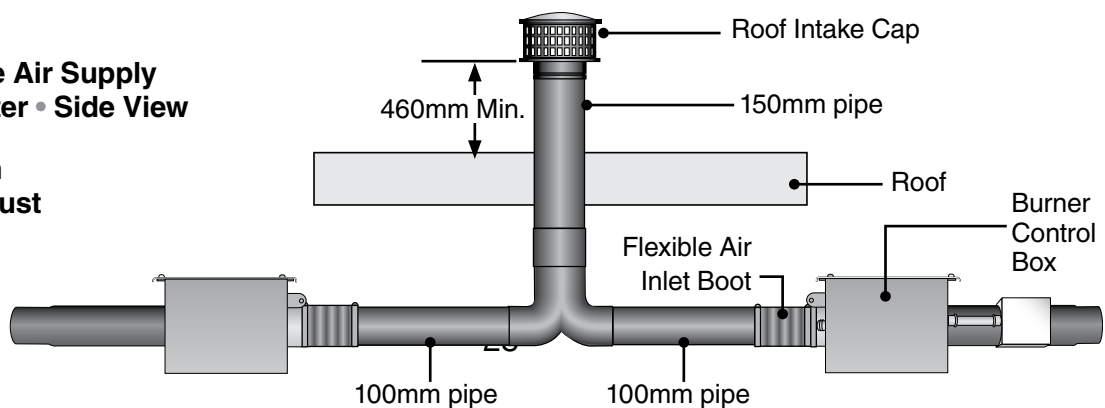


**Figure 3.27**  
Horizontal Outside Air Supply  
for Single Heater • Side View



**Figure 3.28**  
Vertical Outside Air Supply  
for Double Heater • Side View

**NOTE:** Common intake heaters **must** share the same thermostat.



## Combustion Air Requirements

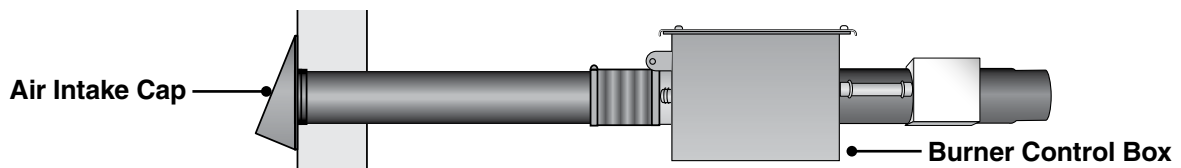
### Guidelines:

#### Limitations for length and size of combustion air intake duct

Single Heater Intake		Dual Heater Intake	
Air Intake Duct Size	Max. Intake Length	Duct Size	Max. Intake
100mm	6100mm	100mm.(single)/150mm.(dual)	6100mm
130mm	9140mm	100mm.(single)/200mm.(dual)	9140mm
150mm	12200mm	Consult factory for longer intake lengths.	

### General Requirements:

- No more than two 90 degree elbows are allowed.
- Allow for expansion. Use a 100mm diameter flexible hose to connect the duct to the burner control box.
- In humid environments, use insulated duct, PVC pipe or DWV (drain waste vent) to prevent condensation on the outer surface.
- Do not draw air from attic space.
- A factory approved wall intake cap (P/N: WIV-4) must be used with horizontal outside air intake ducts. The wall intake cap must be installed to prevent blockage. Locate the intake where dirt, steam, snow, etc. will not contaminate or clog the intake screen.
- Separate air intake duct from vent pipe a minimum of 100mm. Also, place pipe higher than adjacent air intake duct.



### 3.11 Gas Supply

## ⚠ WARNING



Improperly connected gas lines may result in fire, explosion, poisonous fumes, toxic gases, asphyxiation or death. Connect gas lines in accordance to national, state, provincial and local codes.

**Important!** Before connecting the gas supply to the burner control box:

- **Verify that the heater's gas type (as listed on the rating plate) matches that of your application.**
- Check that the gas piping and service has the capacity to handle the total gas consumption of all heaters being installed, as well as any other gas appliances being connected to the supply line.
- Check that the main gas supply line is of proper diameter to supply the required fuel pressures.
- If utilizing used pipe, verify that its condition is clean and comparable to a new pipe. Test all gas supply lines in accordance with local codes.
- Test and confirm that inlet pressures are correct. Refer to the rating plate on the burner control box for required minimum and maximum pressures (see chart below). The gas supply pipe must be of sufficient size to provide the required capacity and inlet pressure to the heater (if necessary, consult the local gas company). Do not exceed the maximum allowed pressure for the heater, the space or the gas piping system.

#### Gas Supply and Pressure Chart

Type of Gas	Chart	Composition	Calorific Value	Burner Setting	Minimum Inlet Pressure*	Maximum Inlet Pressure
<b>I2H (G20)</b> Natural	5	CH <sub>4</sub> = 100 [methane]	37.78MJ/m <sup>3</sup>	9-10 Mbar (reference chart on page 40 for your model)	11.5-12.5 Mbar (reference chart on page 40 for your model)	50 Mbar
<b>I2L (G25)</b> Derated Natural	6	CH <sub>4</sub> = 86 N <sub>2</sub> = 14 [methane]	32.49MJ/m <sup>3</sup>	13-15 Mbar (reference chart on page 40 for your model)	15.5-17.5 Mbar (reference chart on page 40 for your model)	50 Mbar
<b>I3P (G31)</b> Liquified Petroleum	7	C <sub>3</sub> H <sub>8</sub> = 100 [petroleum]	95.65MJ/m <sup>3</sup>	25 Mbar	27.5 Mbar	50 Mbar

\* For purpose of adjustment

**NOTE:** Check manifold pressure at the tap on the gas valve. Readings will be above atmospheric pressure.

## Gas Connection

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### WARNING



Failure to install, operate or service this appliance in the approved manner may result in property damage, injury or death. Only trained, qualified gas installation and service personnel may install or service this equipment.

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#### To connect the gas:

This heater must be installed and service by trained gas installation and service personnel only.

The installation must conform with local building codes.

**Important!** The heating system will expand and contract during operation. Allowances for expansion must be made between the connection to the heater and the gas supply. Excessive bending, kinks, twists or vibration must be avoided. A flexible gas connection of approved type is required. Flexible stainless steel gas connectors installed in one plane, and without sharp bends, kinks or twists is recommended.

The gas pipe and connection must be supported independently. Do not install gas supply line in a manner that bears the weight of the heater. Connect the main gas supply line with an approved flexible connector (Figure 3.29) or, if national or local codes require rigid piping, a swing joint. See the safety messages at the beginning of this section.

The gas outlet must be in the same room as the appliance and accessible. It may not be concealed within or run through any wall, floor or partition. When installing the heater in a corrosive environment (or near corrosive substances), use a gas connector suitable for the environment. Do not use the gas piping system to electrically ground the heater.

- ❶ Install a sediment trap / drip leg if condensation may occur at any point of the gas supply line. This will decrease the possibility of loose scale or dirt in the supply line entering the heater's control system and causing a malfunction. **NOTE:** High pressure gas above 50 Mbar requires a high pressure regulator and ball valve.
- ❷ Form the stainless steel flexible connector into a smooth C-shape allowing 305mm between the flexible connector's end nuts (see Figure 3.29).
- ❸ Attach the ball valve to the gas supply pipe. Apply pipe compound to NPT adapter threads to seal the joint. Use only a pipe compound resistant to LP (G31).  
**NOTE:** Provide a 3.2mm BSP plugged tapping accessible for test gauge connection immediately upstream of gas connection to the heater (provided on ball valve).

## Gas Supply

### ⚠ CAUTION

When using a stainless steel flexible connector, do not attach the connector nuts directly to the gas pipe supply. Connector nuts must be installed to an approved adapter.

- ④ Attach the flexible connector to the adapter and burner control box inlet. Seal the joints.  
**NOTE:** Excessive torque on the manifold may misalign the orifice. Always use two wrenches to tighten mating pipe connections.
- ⑤ Final assembly must be tested for gas leaks according to relevant country codes.

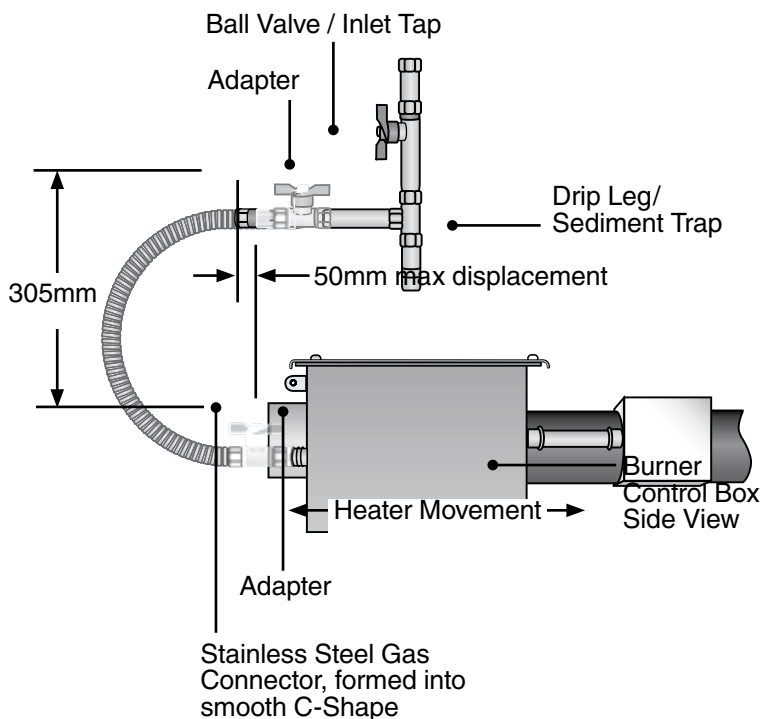
**IMPORTANT:** Before installation, check that local distribution conditions, nature of gas and pressure, and the adjustment of the appliance are compatible.

### ⚠ WARNING

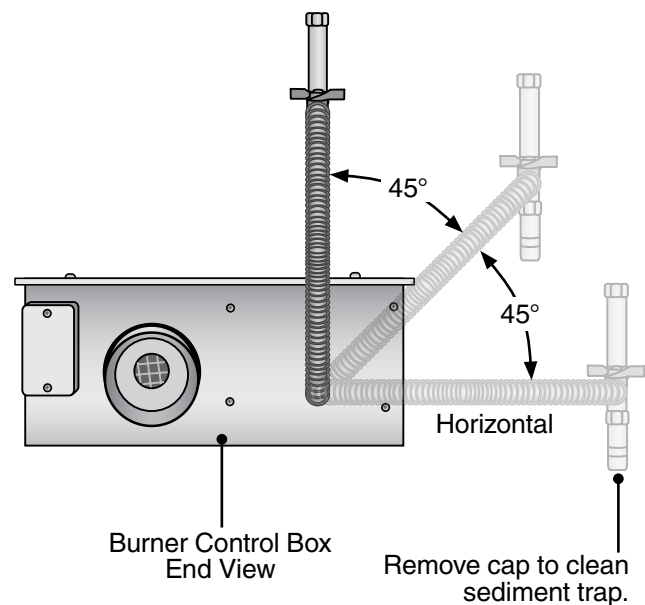


Testing for gas leaks with an open flame or other sources of ignition may lead to a fire or explosion and cause serious injury or death. Test in accordance with relevant codes of practice.

**Figure 3.29 • Gas Connection (Flexible Gas Connection shown) • Side View**



**Figure 3.30 • Gas Connection (Flexible Gas Connection shown) • End View**

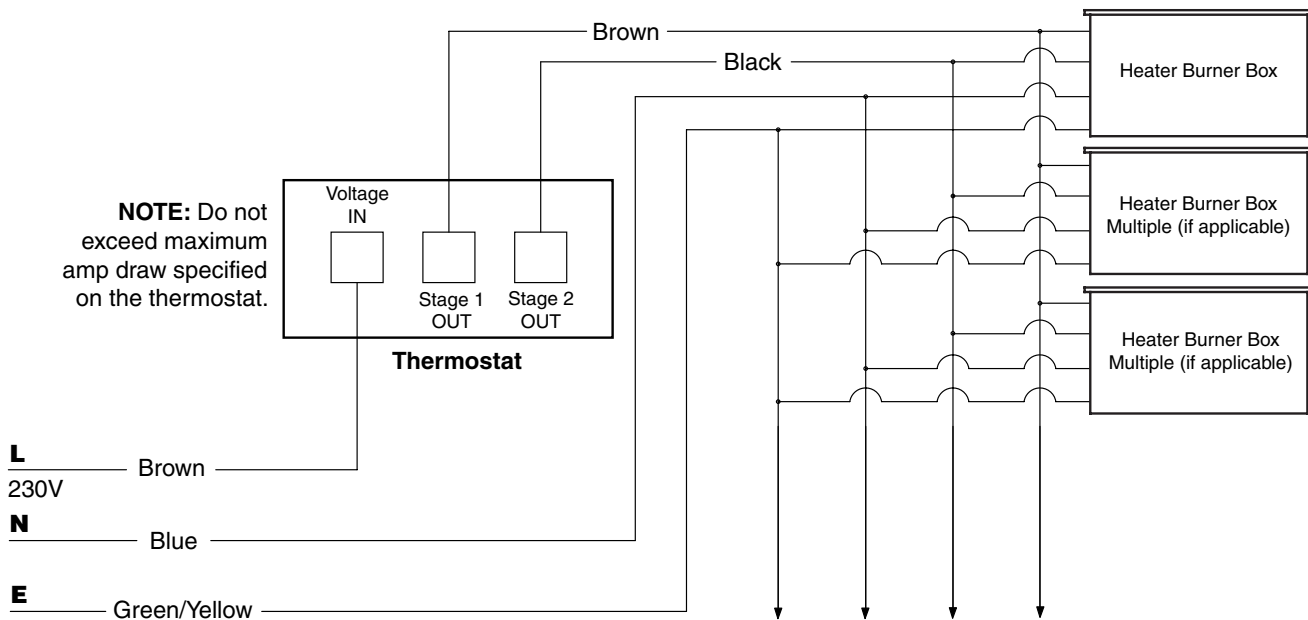




### 3.12 Electrical Requirements

- Verify that the heater’s voltage (as listed on the rating plate) matches that of your application.
- Heaters operate on 230 volts, 50Hz., single phase. The maximum amperage requirement is 4.8 Amps starting current; 0.6 Amps running current per heater.
- The heater must be grounded in accordance with the I.E.E. Regulations and local codes.
- Observe proper electrical polarity.
- The method of connection to the electrical supply must facilitate complete isolation and should preferably be made via a fuse isolator having a contact separation of at least 3mm in all poles and supplying the appliance only.
- Clearance to combustibles must be maintained between electrical apparatus and wiring (page 7).
- Wiring must not be run above or below the heater or exposed to the radiant output.
- Installations utilizing a 24-volt thermostat require a relay transformer.

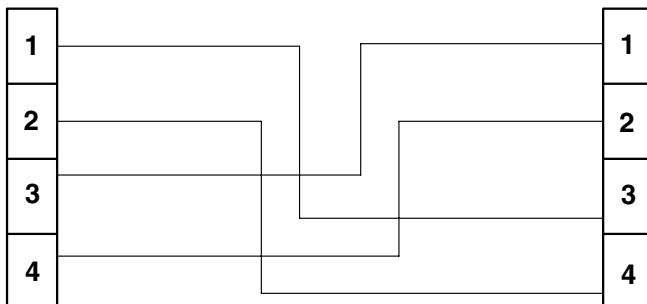
**Figure 3.31 - Field Wiring using Line Voltage Thermostat.**



**Figure 3.32 - Optional (factory installed) Field Wiring for Common Venting Two Heaters.**

**Heater #1**  
**4-pole Terminal Blcck**  
 Locate in heater’s external junction box

**Heater #2**  
**4-pole Terminal Blcck**  
 Locate in heater’s external junction box

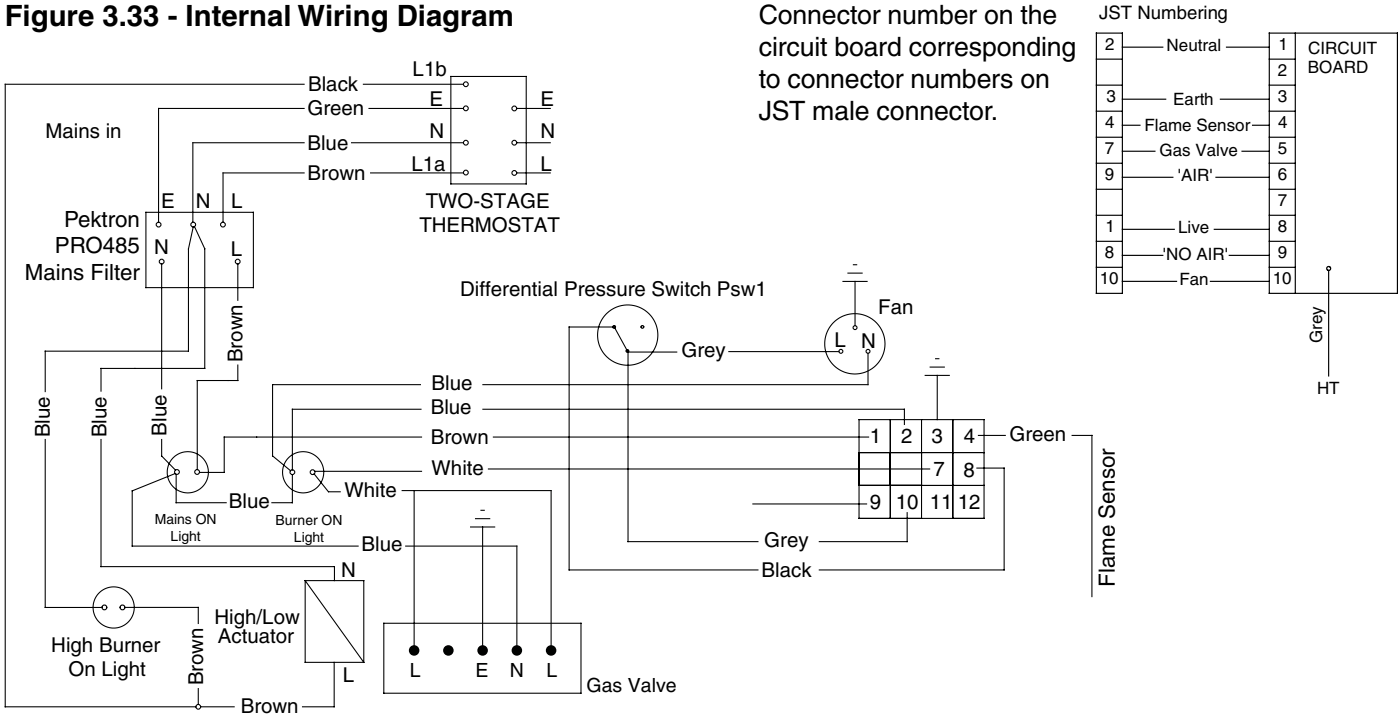


**NOTE:** If common venting two heaters, it is required that the appliance pressure switches are interlinked according to these instructions. If the appliance is singly vented, the jumper between T1 and T2 remains.

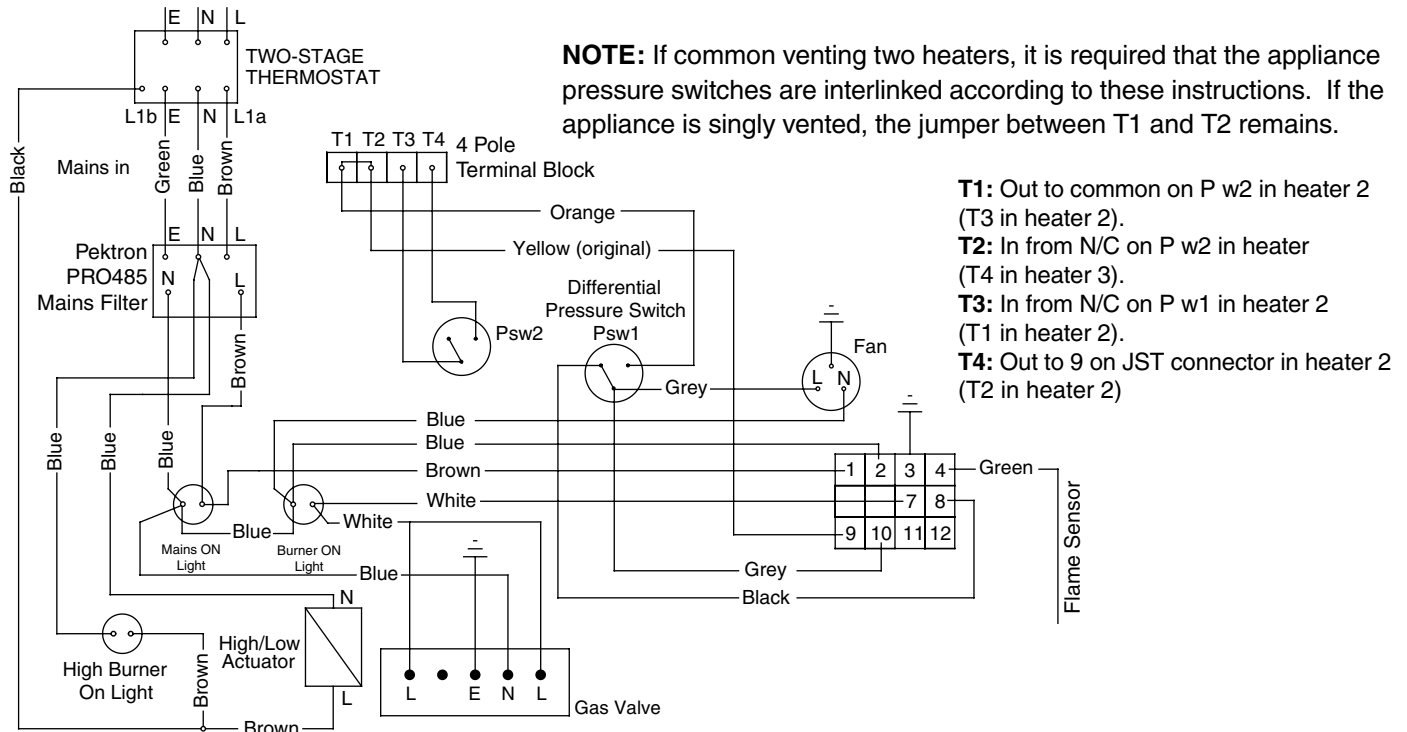
# Internal Wiring Diagrams

If any of the original wire as supplied with this appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.

**Figure 3.33 - Internal Wiring Diagram**



**Figure 3.34 - Alternate Internal Wiring Diagram (factory installed common venting option)**



# 4.0 Operation

## ⚠ WARNING



This heater is not equipped with a pilot ignition system.  
Do not attempt to light the system manually.

### Commissioning Procedures:

- 1 Ensure that ball valve to the heater is turned “OFF”.
- 2 Purge air from the gas supply line and test for gas soundness in accordance with relevant Standards.
- 3 Check that all electrical connections are made to the heater and that the unit has a sound earth connection.
- 4 Remove operating pressure test point screw and connect the pressure gauge.
- 5 Switch on power to the heater. After a purge period, the gas valve is energized and will attempt to ignite for 5-10 seconds. (If ignition fails, the heater will lock out). To reset the heater, briefly interrupt power to the heater.
- 6 With the heater running, test operating pressure. Refer to the Technical Specifications chart on page 40 for details on your particular gas type.

### Lighting Procedures:

- 1 Verify that service lid is secured.
- 2 Open (turn on) gas supply to the heater.
- 3 Close (turn on) electrical circuit (typically thermostat).
- 4 If the heater fails to light, turn off gas, open electrical circuit (set thermostat to lowest setting or to off). Wait five (5) minutes before repeating above steps.

### Shutdown Procedures:

- 1 Open (turn off) electrical circuit.
- 2 Close (turn off) gas supply to the heater.
- 3 Wait five (5) minutes before relighting heater.

## Sequence of Operation

### Starting Circuit

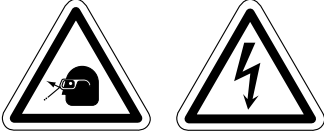
The blower fan is mounted in the control box and rated to supply sufficient air for combustion. Air pressure generated by the blower will cause the differential switch to close. The system is purged for 10 seconds and the control module sends a spark through the electrode. The gas valve is opened and an attempt at ignition is made for 10 seconds. If ignition fails, the heater will go into lockout until the electrical supply is interrupted for more than two seconds.

### Running Circuit

After ignition, the flame rod monitors the flame. As long as flame is present, the valve is held open. If the flame is lost, the control acts to close the valve within one second and a new trial sequence identical to that at startup is initiated. If proof of flame is not established within 10 seconds, the unit will lock out. If lockout occurs, the control can be reset by briefly interrupting the power source.

# 5.0 Maintenance

## ⚠ WARNING



- Use protective glasses when cleaning the heater.
- Disconnect power to heater before servicing.
- Do not operate unit if repairs are necessary.

### Maintenance Checks:

EHL Series gas fired, infrared heaters require minimum routine maintenance to keep them operating at peak performance.

- Ensure that the squirrel cage in the blower is kept clean. If dirt becomes a problem, installation of outside air intake ducts for combustion is recommended.
- Periodically check the integrity of the combustion tube and heat exchangers. Replace if there are signs of structural failure. Contact service personnel if repairs are necessary. Do not operate unit.
- Periodically inspect the integrity of the gas connection to the heater. Check for leaks, damage, fatigue or corrosion. Do not operate if repairs are necessary and turn off gas supply to the heater. Contact service personnel.
- Periodically inspect the integrity of the heater venting system. Check for leaks, damage, fatigue or corrosion. Do not operate heater if repairs are necessary. Contact service personnel.
- To maintain effective infrared heating, always keep reflectors clean by vacuuming or blowing off dirt and/or dust from both sides of the reflector.
- Check integrity of the electrode. If damaged, it must be replaced complete with holder.

### Maintenance Log

Date	Maintenance Period	Replacement Parts Required

## 5.1 Converting Heaters from one Gas to Another

Table 5.1 • Suitable Conversions

Marking	Gas Type	Gas Supply		Notes
		Pressure	Country of Use	
I2H	Natural		United Kingdom, Ireland, Austria, Denmark, Finland, Italy, Portugal, Spain, Sweden, Switzerland	Suitable for use without modification.
I3P	LPG (Propane)	37 mbar	United Kingdom, Ireland, France, Denmark, Portugal, Spain	Suitable for use without modification.
	LPG (Propane)	50 mbar	Austria, Germany, Netherlands, Spain	Check operating pressure and reset to 25 mbar during heater commissioning. See page 15.
	LPG (Propane)	30 mbar	Denmark, Finland, Netherlands, Sweden	Check operating pressure and reset to 25 mbar during heater commissioning. See page 15.
Convert to I2E+	Natural		France, Belgium	Convert heaters by changing gas valve with a valve which includes a flow restrictor instead of a governor.
Convert to I2ELL	Natural	20 mbar	Germany	These are physically identical to the I2H heaters, except that a change of injectors is required when the appliances are to be used on group LL gases (G25 @ 20mbar). The operating gas pressure of the burner must be reset to 15mbar after the injectors have been changed. <b>NOTE:</b> EHL-75 models are not suitable for use with LL gases.
Convert to I2L	Natural	25 mbar	Netherlands	Injectors must be changed to the sizes given in Table 3.3. Adjust operating pressure to 15mbar after changing injectors. This must be done while the heater is supplied with Natural Gas at an inlet pressure of 25mbar.

Table 5.2 • Injector Sizes

Model No.	Injector Size I2H, I2E+ and I2ELL Heaters (Nat Gas - G20)		Injector Size I2L, and I2ELL Heaters Using group L and LL gases (Nat Gas - G25)		Injector Size I3P Heaters (LPG - Propane - G31)		Number of Injectors
	(mm)	Marking	(mm)	Marking	(mm)	Marking	
EHL-75 (22.0)	2.25	43	2.50	41	1.65	52	1
EHL-100 (29.3)	2.15	44	2.35	43	1.55	53	1
EHL-125 (36.6)	2.25	43	2.50	41	1.65	52	1
EHL-150 (43.9)	2.15	44	2.35	43	1.55	53	1
EHL-170 (50.0)	2.25	43	2.50	41	1.65	52	1
EHL-188 (55.0)	2.35	42	2.60	39	1.65	52	1
EHL-204 (60.0)	2.25	43	2.50	41	1.65	53	1

## Converting a Heater from Natural Gas (I2H) to LPG (I3P)

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1. If the heater is already installed, switch OFF the gas and electricity then remove the heater to the ground level.
2. Remove the injectors.
3. Replace the injectors with the correctly sized injectors for propane (see Table 3.3).
4. Re-install heater and connect electrical and gas supply.
5. Connect gas pressure gauge to operating pressure test point on the outlet of the gas valve (see commissioning on page 15).
6. Switch ON the heater.
7. Read the operating pressure from the pressure gauge. This must be adjusted to **25mbar**.
8. Remove the sealing ring on the governor adjusting screw. Turn the screw clockwise to increase the gas pressure to **25mbar** (see pressure adjustment on page 22).
9. When operating pressure has stabilized at **25mbar**, switch OFF the heater.
10. Remove pressure gauge and replace pressure test point screw.
11. Re-seal the governor adjusting screw using the sealing ring.
12. Replace or amend the heater data badge to show that the heater has been adjusted for LPG.

## Converting a Heater from LPG (I3P) to Natural Gas (I2H)

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1. If the heater is already installed, switch OFF the gas and electricity then remove the heater to the ground level.
2. Remove the injectors.
3. Replace the injectors with the correctly sized injectors for natural gas (see Table 3.3).
4. Re-install heater and connect electrical and gas supply.
5. Connect gas pressure gauge to operating pressure test point on the outlet of the gas valve (see commissioning on page 15).
6. Switch ON the heater.
7. Read the operating pressure from the pressure gauge. This must be adjusted to **15mbar**.
8. Remove the sealing ring on the governor adjusting screw. Turn the screw anti-clockwise to reduce the gas pressure to 15mbar.
9. When operating pressure has stabilized at **15mbar**, switch OFF the heater.
10. Remove pressure gauge and replace pressure test point screw.
11. Re-seal the governor adjusting screw using the sealing ring.
12. Replace or amend the heater data badge to show that the heater has been adjusted for natural gas.

## Converting a Heater for Operation on Nat. Gas (I2E+) in France or Belgium

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Follow the procedure outlined above for conversion of a heater for operation on natural gas.

The gas valve on the heater (SIT valve model 0.840.061) must be replaced with a different valve (SIT valve model 0.830.010). This valve incorporates a gas flow adjuster instead of a governor. Follow the procedure outlined in Figure 3.2 - Replacement of Gas Valve; page 18.

The operating pressure must be adjusted to **15mbar** as described above.

Seal the flow rate adjuster screw using the sealing ring.

Replace or amend the heater data badge to show that the heater has been adjusted.

**WARNING: The inlet gas pressure must not exceed 20mbar for G20 or 25mbar for heater equipped with a flow adjuster.**

## Converting a Heater for Operation on Group LL Nat. Gas (I2ELL) in Germany

---

Follow the procedure outlined on the previous page for conversion of a heater for operation on natural gas. Replace the injectors with the correctly sized injectors for Group LL Natural Gas (see Table 3.3 on page 20). Adjust the operating pressure to 15mbar using the procedure given on the previous page. Seal the flow rate adjuster screw using the sealing ring. Replace or amend the heater data badge to show that the heater has been adjusted.

## Converting a Heater for Operation on Natural Gas (I2L) in the Netherlands

---

Follow the procedure outlined on the previous page for conversion of a heater for operation on natural gas. Replace the injectors with the correctly sized injectors for Group L Natural Gas (see Table 3.3 on page 20). With an inlet gas pressure of 25mbar, adjust the operating pressure to 15mbar using the procedure given on the previous page. Seal the flow rate adjuster screw using the sealing ring. Replace or amend the heater data badge to show that the heater has been adjusted.

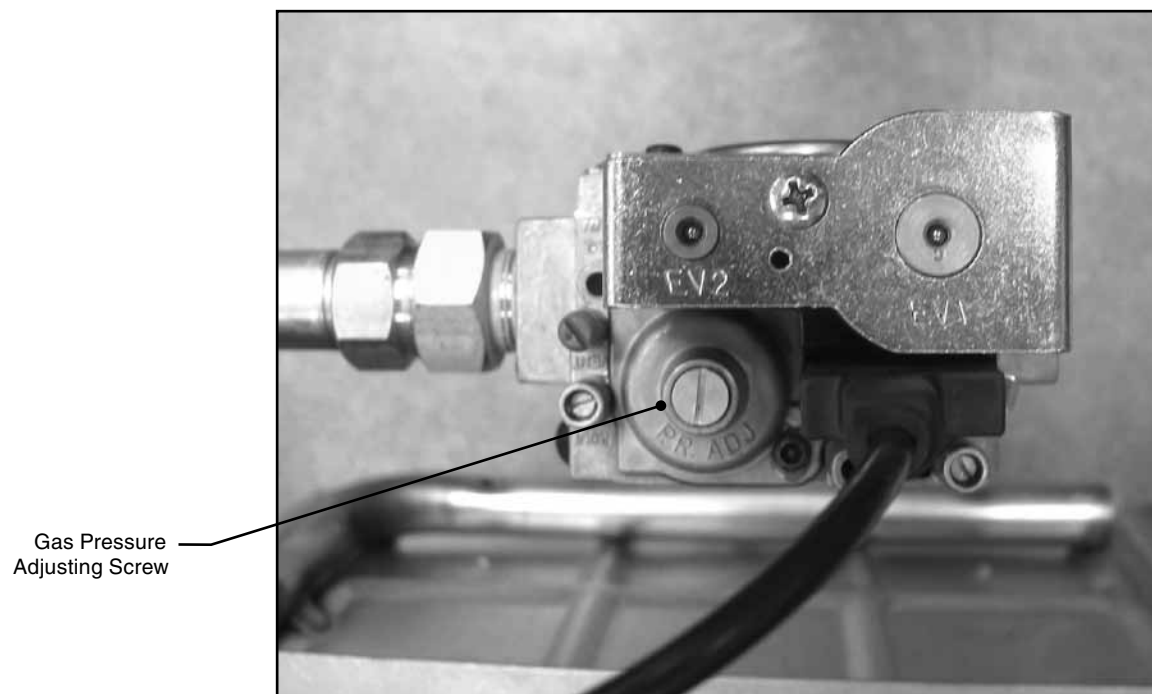
## Adjusting the Gas Pressure

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The gas pressure is adjusted using the pressure adjusting screw on the SIT valve. On valve type 0.840.061 with governor, the screw is rotated clockwise to increase the pressure.

The pressure adjusting screw is covered by a sealing ring. This must be removed prior to making any adjustments and replaced afterwards.

**Figure 5.1 • Gas Valve Pressure Adjusting Screw**

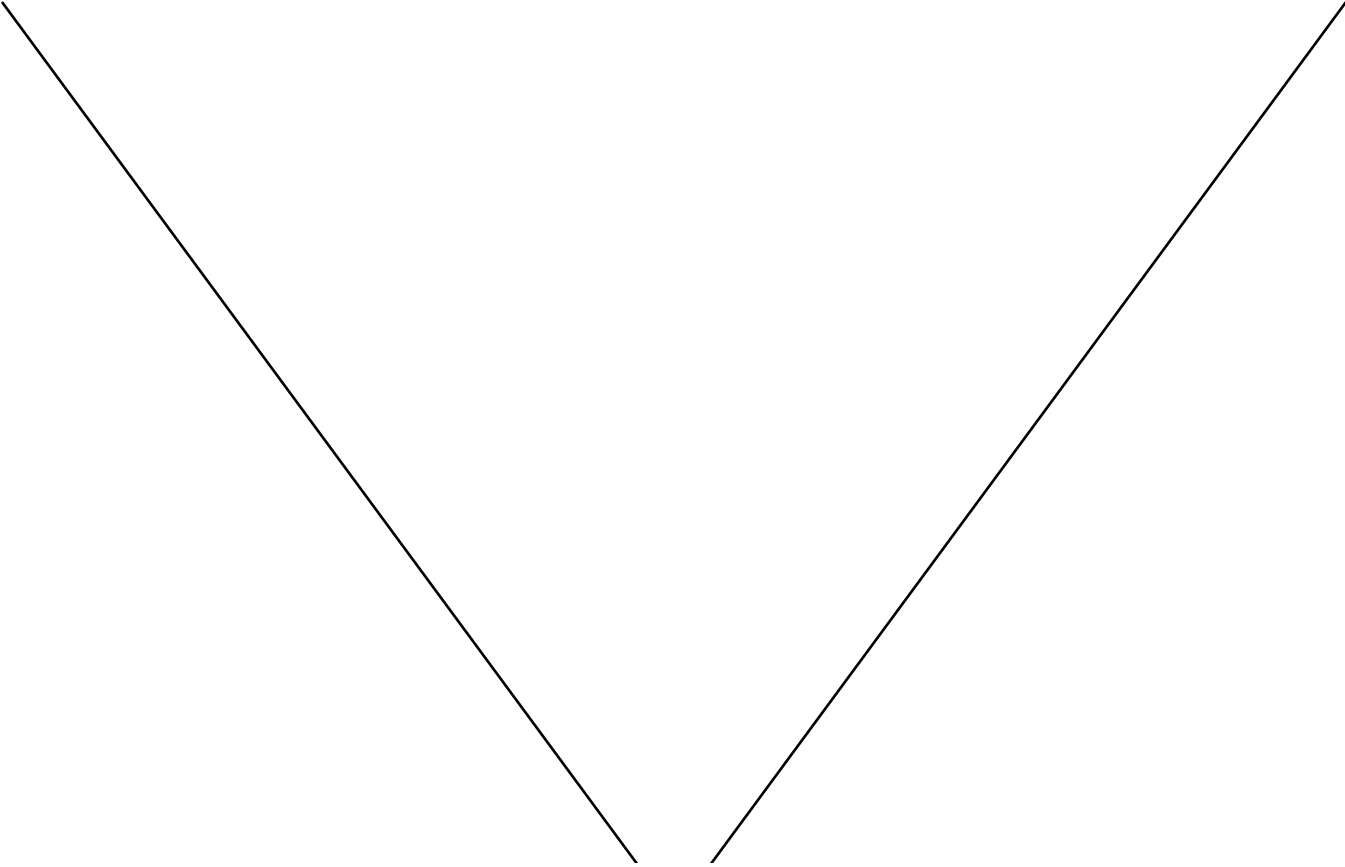


## 5.2 Troubleshooting Guide

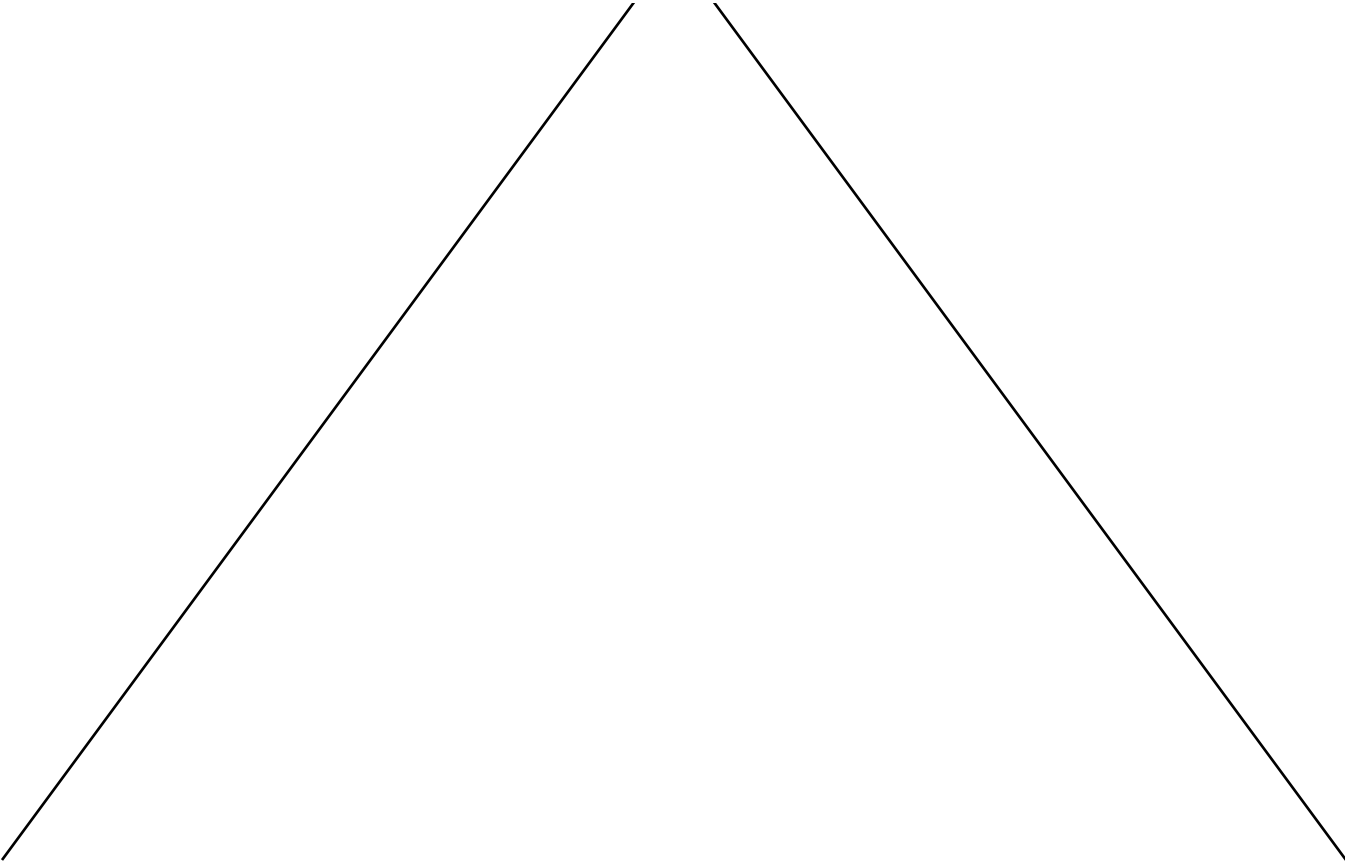
### Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
Thermostat closed, fan doesn't operate.	<ul style="list-style-type: none"> <li>Blown fuse.</li> <li>Faulty thermostat.</li> <li>Loose or disconnected wire.</li> <li>Faulty fan.</li> </ul>	<ul style="list-style-type: none"> <li>Replace.</li> <li>Replace.</li> <li>Repair as required.</li> <li>Repair or replace.</li> </ul>
Thermostat closed. Fan operates. Electrode does not spark.	<ul style="list-style-type: none"> <li>Loose or disconnected wire.</li> <li>Box lid or gasket not in place.</li> <li>Plugged pressure switch lines.</li> <li>Plugged or restricted exhaust vent.</li> <li>Faulty electrode set.</li> <li>Faulty pressure switch.</li> <li>Faulty circuit control.</li> </ul>	<ul style="list-style-type: none"> <li>Repair as required.</li> <li>Put in place.</li> <li>Clean as necessary.</li> <li>Remove foreign matter.</li> <li>Replace.</li> <li>Replace only. Do not adjust.</li> <li>Replace circuit control.</li> </ul>
Thermostat closed. Fan and electrode set operate. After 10 seconds electrode stops sparking. No ignition.	<ul style="list-style-type: none"> <li>Closed gas supply.</li> <li>Dirty or restricted orifice.</li> <li>Faulty valve or disconnected valve wire.</li> </ul>	<ul style="list-style-type: none"> <li>Open all gas connections.</li> <li>Remove and clean with soft object.</li> <li>Repair or replace.</li> </ul>
Thermostat closed. Fan and electrode operate. Ignition occurs. Burner cycles off and will not recycle.	<ul style="list-style-type: none"> <li>No electrical ground.</li> <li>Faulty circuit control.</li> <li>Low gas pressure.</li> <li>Poor circuit control connection.</li> </ul>	<ul style="list-style-type: none"> <li>Connect electrical ground to junction box.</li> <li>Replace.</li> <li>Provide required gas pressure.</li> <li>Repair or replace.</li> </ul>
Thermostat closed. Fan and electrode operate. Ignition occurs. Burner cycles off. Burner cycles on.	<ul style="list-style-type: none"> <li>Low gas pressure.</li> <li>Baffle improperly positioned.</li> <li>Faulty pressure switch.</li> <li>Restricted flue vent.</li> </ul>	<ul style="list-style-type: none"> <li>Provide required gas pressure.</li> <li>Reposition baffle.</li> <li>Replace.</li> <li>Remove foreign matter.</li> </ul>
Loss of heater efficiency.	<ul style="list-style-type: none"> <li>Low gas pressure.</li> <li>Dirty or restricted orifice.</li> <li>Foreign matter inside burner.</li> <li>Unit cycles on and off.</li> <li>Reflector is dirty or not in place.</li> <li>Clogged fan blower.</li> </ul>	<ul style="list-style-type: none"> <li>Provide required gas pressure.</li> <li>Remove. Clean with a soft object.</li> <li>Clean as necessary.</li> <li>Check previous symptom.</li> <li>Clean with aluminum cleaner and soft cloth.</li> <li>Clean.</li> </ul>
Radiant tube leaking burnt gases.	<ul style="list-style-type: none"> <li>Loose tube connections.</li> <li>Holes or cracks in radiant tubes.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that tubes are fully connected and clamped properly.</li> <li>Replace.</li> </ul>
Condensation.	<ul style="list-style-type: none"> <li>Stack length is too long.</li> <li>Light gauge flue stack used.</li> <li>Contaminated combustion air.</li> </ul>	<ul style="list-style-type: none"> <li>Shorten stack length.</li> <li>Minimum of 26 ga. vent pipe required.</li> <li>Provide fresh air inlet duct.</li> </ul>
Tube bowing.	<ul style="list-style-type: none"> <li>Insufficient combustion air.</li> <li>Overfired.</li> <li>Contaminated combustion air.</li> <li>Heater unable to expand properly.</li> </ul>	<ul style="list-style-type: none"> <li>Provide 440 sq. mm. of free air per kW of input.</li> <li>Check gas pressure and orifice size.</li> <li>Provide fresh air inlet duct.</li> <li>Remount with flexible inlet or vent pipe.</li> </ul>
Tube corroding.	<ul style="list-style-type: none"> <li>Contaminated combustion air.</li> </ul>	<ul style="list-style-type: none"> <li>Provide fresh air inlet duct.</li> </ul>
Visual inspection of burner operation not possible.	<ul style="list-style-type: none"> <li>Dirty or sooted sight glass.</li> <li>Unit mounted upside-down.</li> </ul>	<ul style="list-style-type: none"> <li>Remove, clean or replace.</li> <li>Mount correctly.</li> </ul>
Stack sooting.	<ul style="list-style-type: none"> <li>Insufficient combustion air.</li> <li>Improper gas.</li> <li>Dirty fan or blockage.</li> </ul>	<ul style="list-style-type: none"> <li>Provide 440 sq. mm. of free air per kW of input.</li> <li>Correct with proper gas input (or clean).</li> <li>Clean fan or remove blockage.</li> </ul>
Odor or fumes in space (normal during first firing and will subside after initial burn off, approximately 20 minutes).	<ul style="list-style-type: none"> <li>Vaporized solvents decomposing when contacting radiant tubes.</li> <li>Evaporation of oils, solvents at floor level.</li> <li>Fork lifts.</li> <li>Loose tube / vent connections.</li> </ul>	<ul style="list-style-type: none"> <li>Provide proper ventilation.</li> <li>Provide proper ventilation.</li> <li>Tighten tube clamps to 30-44 Nm.</li> <li>Seal vent pipes.</li> </ul>





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# 6.0 Parts

Figure 6.1 • Burner Assembly Components

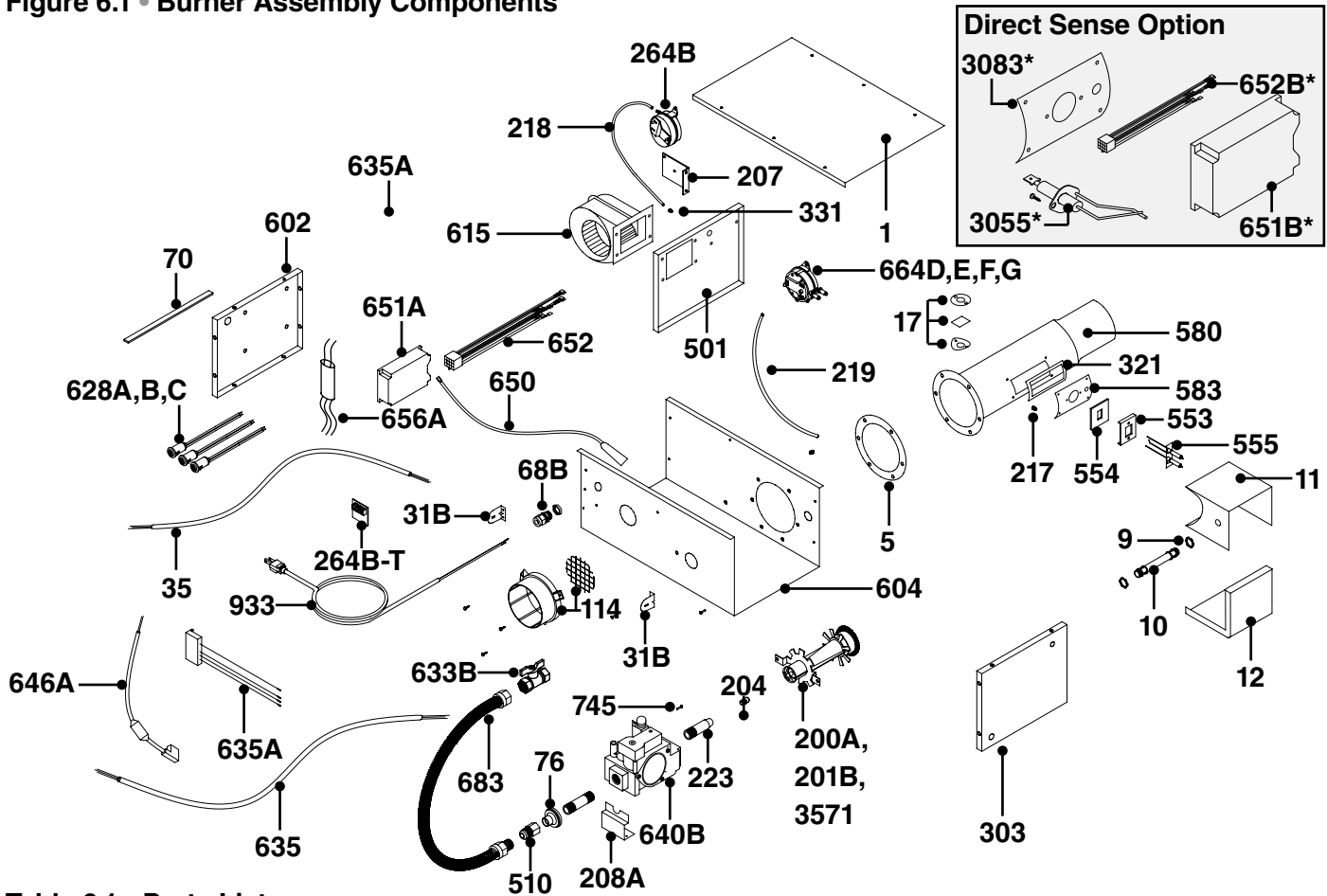


Table 6.1 • Parts List

Part #	Description	Part #	Description
TP-1	Control Box Cover	TP-651	Interlocking 838mm Baffle Section
TP-5	Flange Gasket	TP-68B	1/2" Strain Relief Bushing
TP-9	Conduit Coupling	TP-70^	Control Box Cover Gasket (per meter)^
TP-10	Conduit	TP-76	Rubber Grommet
TP-11	Electrode Set Igniter Box	TP-82	Reflector Center Support
TP-12	Electrode Set Box Cover	TP-105	Reflector End Cap
TP-17	Sight Glass Kit	TP-106	Reflector End Cap Clips (8)
TP-19B	101mm Wire Hanger with Tension Spring	TP-108	1525mm Coated Alum-Titan Tube w/ Clamp
TP-20C	3050mm Aluminum Reflector	TP-111	1525mm Coated Aluminized Tube w/ Clamp
TP-20D	3050mm Stainless Steel Reflector	TP-112	1525mm Aluminum Reflector
TP-21B	101mm Tube Clamp	TP-113	Reflector Tension Spring
TP-26A	3050mm Alum. Combustion/Radiant Tube	TP-114	Plastic Air Orifice Collar - Consult Factory
TP-26B	3050mm Titanium Combustion Tube	TP-200A	Low SS Burner (Blue) - consult factory
TP-26C	3050mm Uncoated Hot Rolled Radiant Tube	TP-201B	Mid SS Burner (Tan) - consult factory
TP-26D	3050mm Stainless Steel Radiant Tube	TP-204	Gas Orifice - Consult Factory
TP-26E	3050mm Stainless Steel Combustion Tube	TP-207	Pressure Switch Mounting Bracket
TP-31B	Control Box Mounting Bracket	TP-208A	EZ Valve Mounting Bracket
TP-35	V.2 Ground wire	TP-212	Gas Valve Pipe Nipple

^ 1.83m total required to cover outer edges of the burner control box.

\*Direct sense option.

## Basic Parts List

Figure 6.2 • Tube & Reflector Components

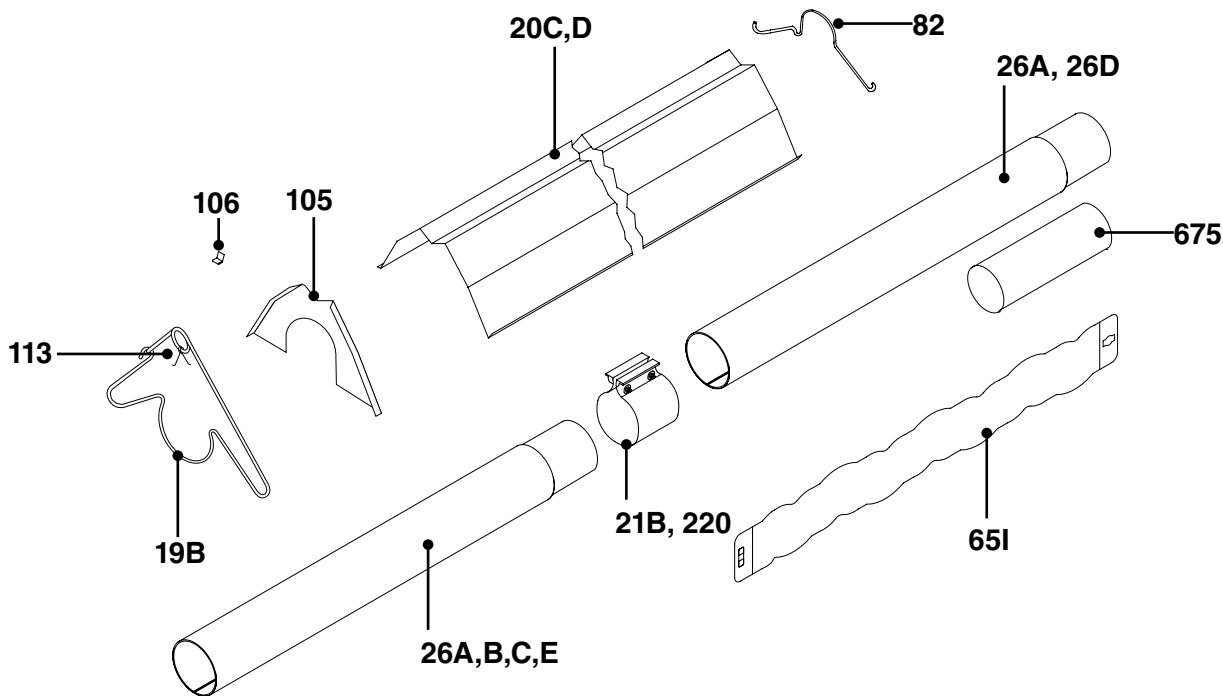


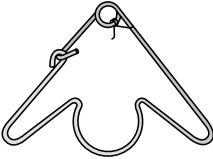
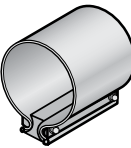

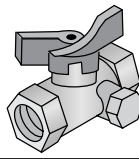

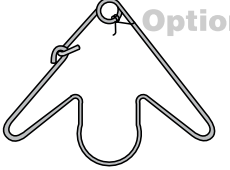
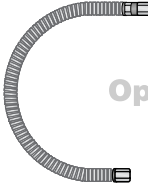
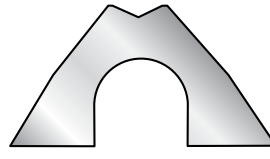
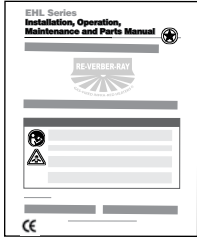
Table 6.2 • Parts List (continued)

Part #	Description	Part #	Description
TP-217	Pressure Barb Fitting	TP-628C	Amber Indicator Light
TP-218	Differential Switch Vinyl Sensing Tube (Exhaust)	TP-633B	Ball Valve Shut-off
TP-219	Differential Vinyl Sensing Tube (Burner)	TP-635	4-Core Cable Wire
TP-220	101mm Stainless Steel Tube Clamp	TP-635A	Valve Main Coil Cord
TP-223	Gas Manifold	TP-640B	SIT-SIG 843 Gas Valve Assembly
TP-264B	Common Vent Normally Open Pressure Switch	TP-646A	AC Rectifier Cord
TP-264B-T	Common Vent Terminal Strip	TP-650	12kv High Temperature Lead w/ Rubber Boot
TP-303	Right End Panel - Specify Model	TP-651A	Circuit Control Board
TP-321	Ignition Plate Gasket	TP-651B*	230V Pactrol Circuit Control Board
TP-330	Divider Grommet	TP-652	Remote Sense Wiring Harness
TP-331	Green Self-Tap Ground Screw	TP-652B*	Direct Sense Wiring Harness
TP-501	Divider Panel - Specify Model	TP-656A	Pactrol Ignition Filter
TP-510	Flexible Gas Connector Attachment Fitting	TP-664D	Normally Open Pressure Switch - .10 (25Pa)
TP-553	Igniter Mounting Bracket	TP-664E	Normally Open Pressure Switch - .14 (35Pa)
TP-554	Igniter Mounting Bracket Gasket	TP-664F	Normally Open Pressure Switch - .20 (50Pa)
TP-555	Spark Igniter Electrode	TP-664G	Normally Open Pressure Switch
TP-580	Spark Burner Tube with Flange	TP-675	203mm No Swage Hot Rolled Tube Section
TP-583	Spark Igniter Plate	TP-683	Stainless Steel Flexible Gas Connector
TP-602	Left End Panel - Specify Model	TP-702	Left End Panel - Specify Model
TP-604	Control Box Outer Shell - Specify Model	TP-745	Pilot Blanking Plug
TP-615	Fasco 220-240V 50/60Hz Fan	TP-3055*	Direct Spark 2-Prong Electrode
TP-628A	Red Indicator Light	TP-3083*	Direct Spark Igniter Plate
TP-628B	Green Indicator Light	TP-3571	High SS Burner (Black) - consult factory

\*Direct sense option.

# 6.0 Kit Contents

Prior to installation, verify that you have received all heater components included with your tube heater. Refer to the chart below for a list of the kit contents for your model heater. Materials not included in the kit (e.g. sheet metal screws, vent material, terminals, etc.) are the responsibility of the installer.

Kit Contents for EHL Series - Reference the column for your model.							
TP-19B Hanger with Reflector Tension Spring 	TP-21B Tube Clamp 	TP-82 Reflector Center Support (RCS) 	TP-633B Shut-Off Valve* (Ball Valve & Inlet Tap) Optional 	TP-106 Reflector End Caps Clips 			
TP-19E Elongated Hanger with Reflector Tension Spring Optional 	TP-683 Stainless Steel Flexible Gas Connector* Optional 	TP-105 Reflector End Caps 		Installation, Operation and Maintenance Manual F/N: LIOEHLc 			
Part No.	Description	EHL 20	EHL 30	EHL 40	EHL 50	EHL 60	EHL 70
TP-19B	Hanger w/ Tension Spring	3	4	5	6	7	8
TP-19E*	Elongated AG Hanger*	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
TP-21B	Tube Clamp	2	3	4	5	6	7
TP-82	Reflector Center Support	2	3	4	5	6	7
TP-105	Reflector End Cap	2	2	2	2	2	2
TP-106	Reflector End Cap Clip	8	8	8	8	8	8
TP-633B*	Shut-off Valve & Inlet Tap*	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
TP-683*	S.S Flexible Gas Connector*	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
LIOEHLc	EHL Installation Manual	1	1	1	1	1	1
Filled by:							

\* Optional Accessory.