




# Vision Range

VSUS & VSLUS OWNERS MANUAL

 **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.



  
ENERGY EFFICIENT HEATING SYSTEMS

# Introduction.

Welcome to the new range of AmbiRad VS infra-red heaters. Local regulations may vary and it is the installer's responsibility to ensure that such regulations are satisfied.

All installation, assembly, commissioning and service procedures must be carried out by suitable qualified competent persons and conform with local building codes, or in the absence of local codes, with the National Fuel Gas Code ANSI Z223.1/NFPA 54.

When assembling, installing, commissioning and servicing is undertaken on radiant tube heaters specified in these instructions, due care

and attention is required to ensure that working at height regulations are adhered to at the mounting heights specified.



**PLEASE READ** this document prior to installation to familiarize yourself with the components and tools you require at the various stages of assembly.

All Dimensions shown are in inches unless otherwise stated.

**The manufacturer reserves the right to alter specifications without prior notice.**

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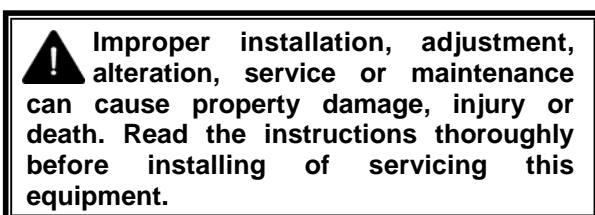
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# 1. Installation Requirements.

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

## 1.1 Health and Safety

- A. Heater is intended for heating non-residential indoor spaces and should only be installed where flammable gases or vapors are not generally present.
- B. Heaters may be suspended either horizontal or at an angle, or may be wall mounted. See section 1.5 for clearance dimensions.
- C. The installation must conform with local building codes or, in the absence of local codes, with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*.
- D. The unit shall be electrically grounded in accordance with National Electric Code ANSI/NFPA 70.
- E. The heater may be installed in aircraft hangars installed in accordance with the Standard for *Aircraft Hangars, ANSI/NFPA 409* and in automotive garages when installed in accordance with the Standard for *Parking Structures, ANSI/NFPA 88A*, or the Standard for *Repair Garages, ANSI/NFPA 88B*, and are so marked.  
Ensure that minimum clearances will be maintained to vehicles parked below the heater.

## 1.2 Packing and Shipping Information

See section 2 for assembly drawings. Material list with part numbers and descriptions for each part will accompany each shipment.

<b>Heaters include:</b>	<b>Options:</b>
Burner/Control	1 180° Bend } 1 or 2 90° Bends } (VSLUS only)
Radiant Tubes	
Reflectors	
Brackets	Ball Valve
Fan	Vent Hoods
U-Bend (VSUS only)	Hanging Assembly
Flex Gas Connector*	(Chain etc)
Tube Couplings	

\* Connector must be certified for use on a radiant tube type infrared heater and must comply with Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10 for the United States.

For heaters up to 150,000Btu/h, 1/2" ID x 24" long  
For heaters 169,000Btu/h and above, 3/4" ID x 36" long

Shipping packages for individual projects will be boxed and crated as outlined in the specific bill of lading.

## 1.3 Heater Suspension

Attachment to the heater support lugs should be made by a 'speed link', D shackle or in the case of drop rods, a closed formed hook. The hanging attachments to overhead steelwork etc. must be purpose made to good sound engineering practice or of a proprietary type fixing. They must be adequately fixed and designed to carry the whole weight of the heater. In the event of suitable roof steelwork being unavailable, additional steelwork should be fitted to enable vertical hangers to be used for suspending the heaters.

These methods are illustrated in Figure 1. If there are any doubts as to the strength or suitability of roof steelwork to which heaters are to be suspended, please refer to a Consultant, Architect, structural engineer, or owner of the building.

It is recommended that the heater is raised to its final position once the assembly of the tube/ bracket/reflector has been completed. Longer tube assemblies may be raised in more than one sub-assembly with final tube connection made in the air.

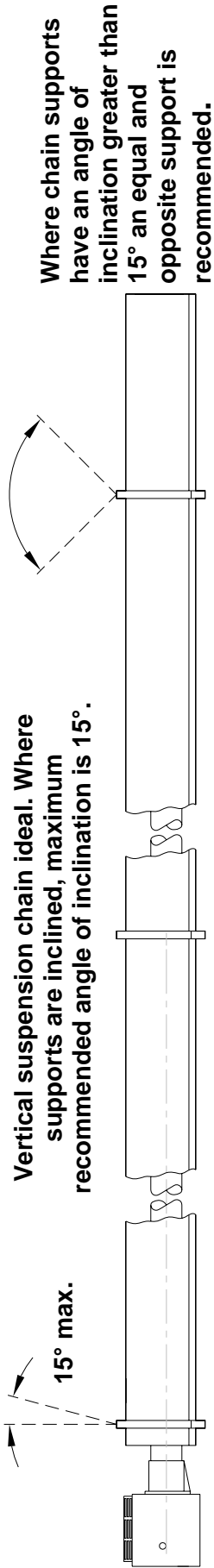
The suggested mounting heights for AmbiRad heaters are given in table 1.

## 1.4 Wall Mounting

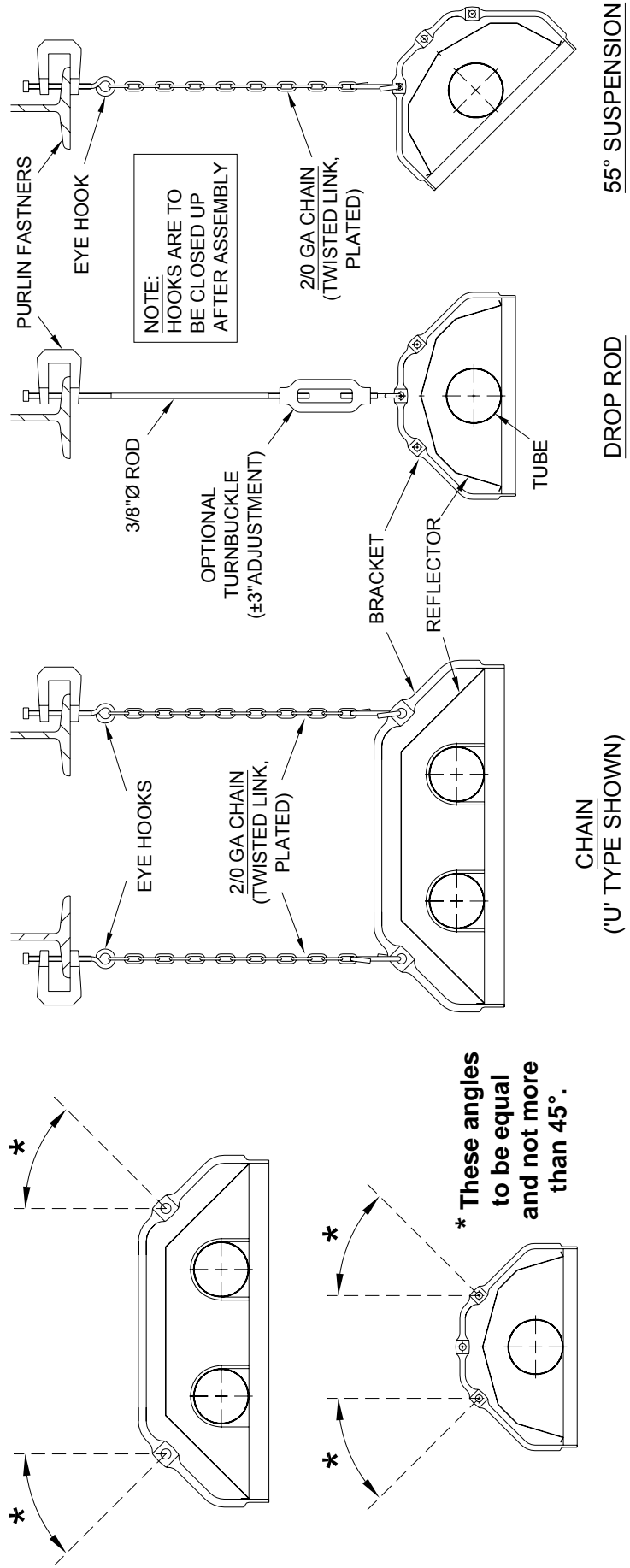
*These radiant tube heaters can be wall mounted using the appropriate bracket.*

When using the wall mounting brackets the heater must be inclined at an angle between 35° and 55°, when side wall (perimeter) reflectors are not used.

Figure 1. Recommended Methods of Heater Suspension.



**ON U TUBE VARIANTS THE HEATER SHOULD SLOPE DOWNWARDS TOWARDS THE RETURN BEND AND ON LINEAR VARIANTS SHOULD SLOPE DOWNWARDS TOWARDS BURNER BY APPROX. 1/2" FOR BOTH HORIZONTAL AND WALL MOUNTED INSTALLATIONS.**



**Table 1. Recommended mounting heights**

Model	Recommended Mounting Height (ft)			
	Standard		Inclined	
	min	recommended	min	recommended
<b>40</b>	12	14	10	11
<b>60</b>	12	14	10	11
<b>80</b>	12	14	10	11
<b>100</b>	14	16	12	13
<b>125</b>	14	16	12	13
<b>150</b>	16	18	14	15
<b>170</b>	16	18	14	15
<b>200</b>	18	20	16	17

**1.5 Clearance to Combustibles.**

Minimum clearance to combustibles are shown in Figure 2a/2b. Refer to table 2 below.

**IMPORTANT:**

The stated clearance to combustibles represents a surface temperature of 90°F (32°C)


above room temperature. Building material with a low heat tolerance may be subject to degradation at lower temperatures.

It is the installer’s responsibility to assure that adjacent material are not subject to degradation.

**Table 2. Clearance to Combustibles.**

\* unvented      \*\* with end caps

Model	Clearance to Combustibles (in)												E
	A		B	B1		C1 (*)	C2 (*)		C3	D(**)	D1	D2	
	VSUS	VSLUS		VSUS	VSLUS		VSUS	VSLUS					
<b>40</b>	63	49	25	48	41	10(16)	10(16)	8	10	48(14)	18	20	10
<b>60</b>	66	66	30	48	41	10(16)	10(16)	8	10	48(14)	18	20	10
<b>80</b>	72	72	30	48	41	10(16)	10(16)	8	10	48(14)	18	20	10
<b>100</b>	72	72	32	48	41	10(16)	10(16)	8	10	48(20)	18	20	10
<b>125</b>	74	74	39	48	47	10(16)	10(16)	8	10	48(20)	18	20	10
<b>150</b>	78	86	39	48	48	10(17)	10(17)	8	10	48(28)	18	28	10
<b>170</b>	86	86	48	48	48	10(17)	10(17)	11	10	48(40)	18	28	10
<b>200</b>	86	86	48	48	48	10(17)	10(17)	11	10	48(40)	18	28	10

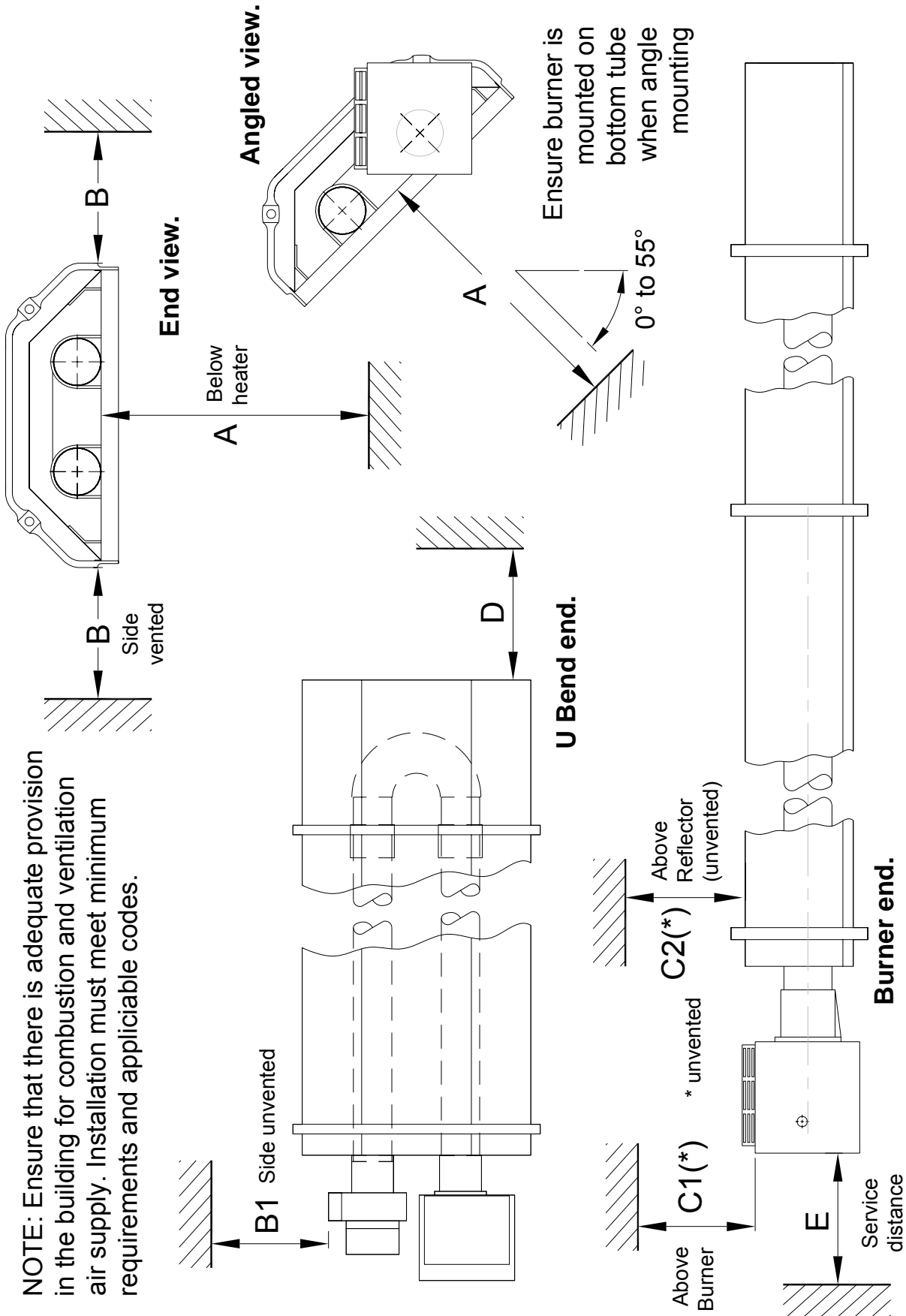


**WARNING:**

Minimum clearance from the heater must be maintained from vehicles parked below heater. In all situations, clearances to combustibles must be maintained. Signs should be posted in storage areas to specify maximum stacking height to maintain required clearance to combustibles. Refer to mounting clearance tables.

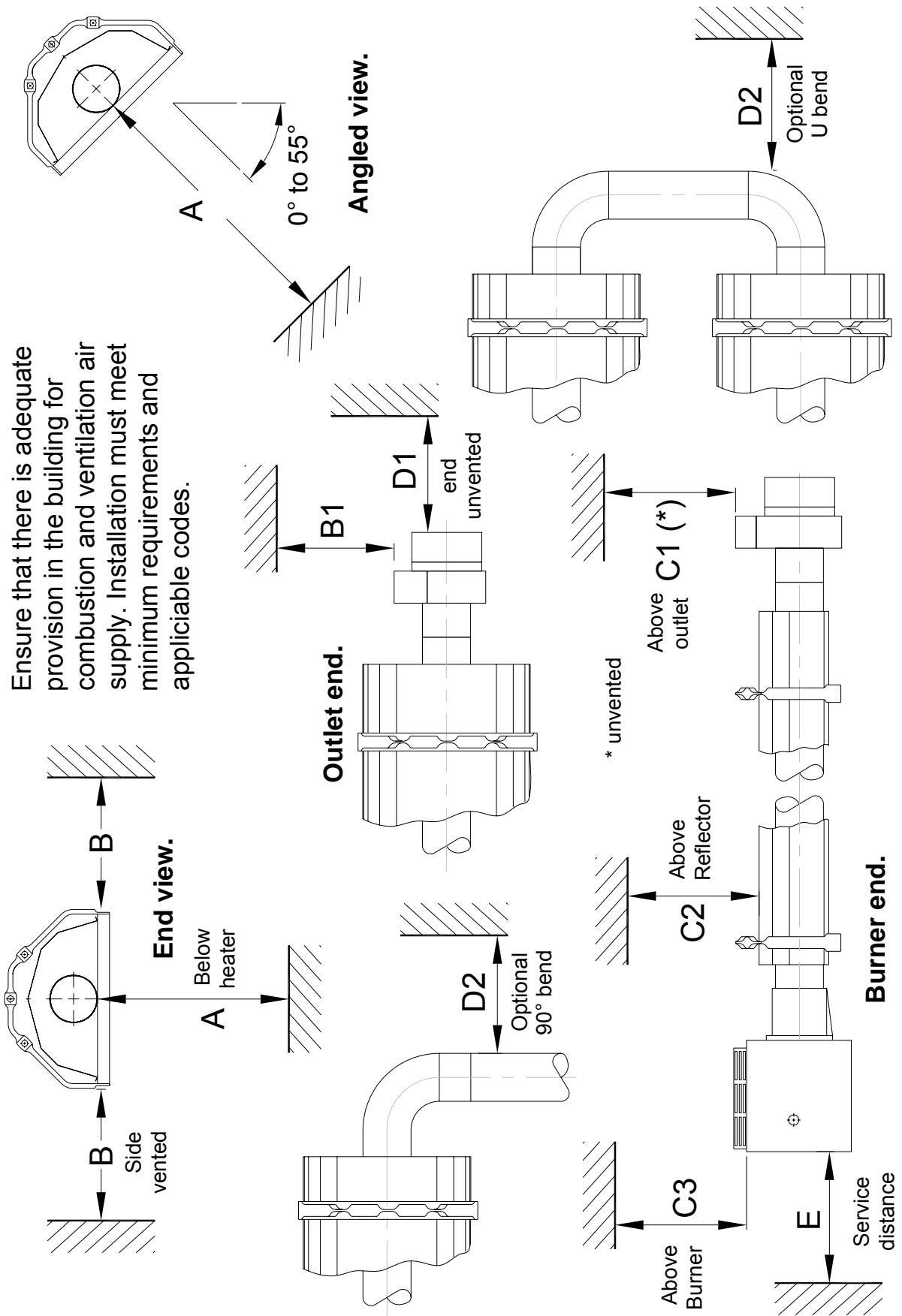
**Figure 2a Clearance to Combustibles (VSUS Tube variants).**

The minimum clearances to combustible materials are given in the tables below. These minimum distances **MUST** be adhered to at all times.



**Figure 2b Clearance to Combustibles (VSLUS Tube variants).**

The minimum clearances to combustibles are given in the tables below. These minimum distances **MUST** be adhered to at all times.



Ensure that there is adequate provision in the building for combustion and ventilation air supply. Installation must meet minimum requirements and applicable codes.



## 1.6 Gas Connection and Supply

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

The gas connection to the heater is ½" N.P.T internal thread.

Injector sizes and manifold pressure for the burners are shown in table 3. The gas supply piping and connections must be installed so that the recommended pressure stated is achieved.

A gas shut off valve and union should be fitted in the gas supply line close to the heater and a ⅛" N.P.T plugged tapping, accessible for test gauge connection, provided immediately upstream of the appliance gas inlet.

It is essential to provide some flexibility in the final gas connection preferably by use of an approved flexible gas connector or stainless steel expansion loop.

**i** Take care when making a gas connection to the heater not to apply excessive turning force to the internal controls.

Depending on the specific installation, the flexible gas hose may be routed to the gas cock at any of the following angles in relation to the burner:

Care must be taken to observe the minimum pipe bend diameter (minimum 10", maximum 14") & pipe expansion distance (minimum 1⅛", maximum 3¾").

**i** The correct installation as shown will allow for approx 4" of movement due to expansion.

Figure 3. Correct orientation of Ball Valve

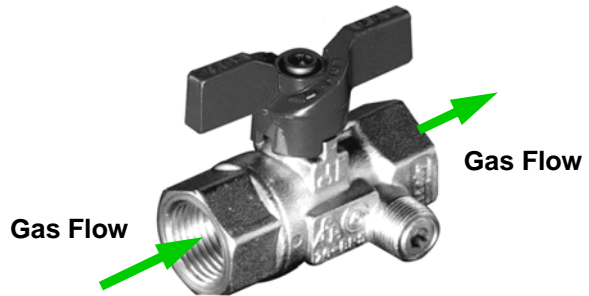
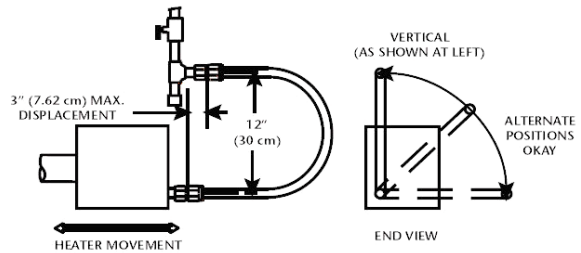
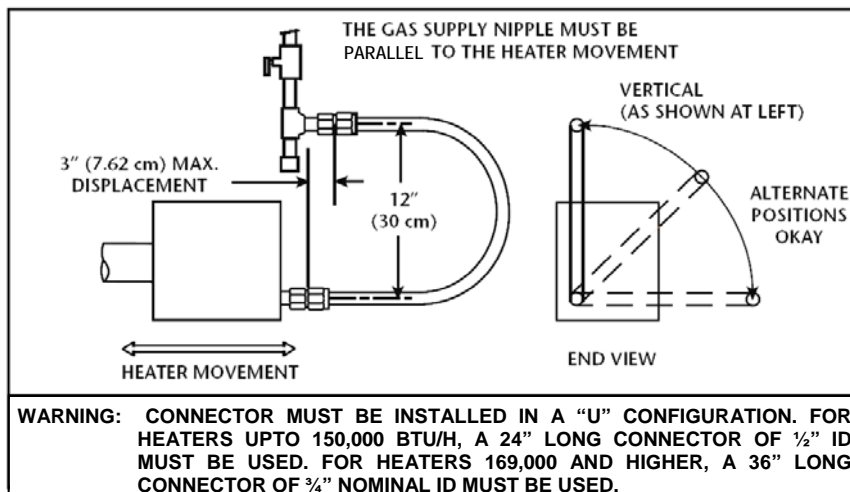
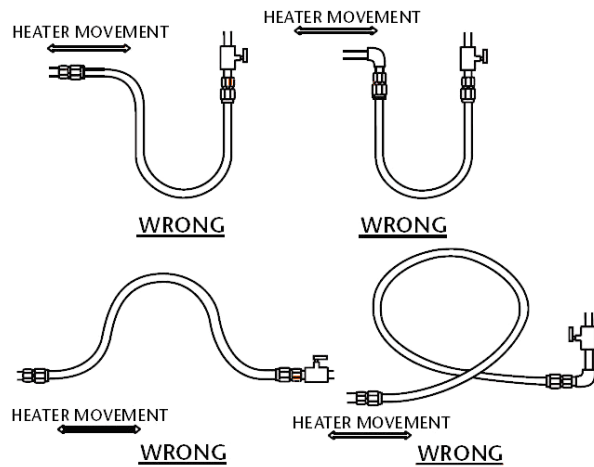


Figure 4. Correct Installation of Flexible Gas Connection

### CORRECT POSITIONS



### INCORRECT POSITIONS





**! WARNING: FIRE OR EXPLOSION HAZARD - Expansion of the radiant pipe occurs with each firing cycle causing the burner to move with respect to the gas line. This can result in a gas leak producing an unsafe condition. It is therefore essential to provide some flexibility in the final gas line connection by use of an approved armoured flexible connector or stainless steel expansion loop as shown in the drawings.**

**Table 3 Gas Supply Pressures**

Gas Type	Natural Gas
Required Gas Pressure (in W.C) 40 to 150,000 btu	5.0
Required Gas Pressure (in W.C) 170 to 200,000 btu	7.0
Max Supply Pressure (in W.C)	14.0
Gas Supply Connection	½" N.P.T internal thread

**1.7 Electrical Connections**

**! WARNING: Before making electrical connections, switch OFF the main electrical disconnect. There may be more than one disconnect switch. Lock out and tag switch with a suitable warning label. Electrical shock can cause personal injury or death.**

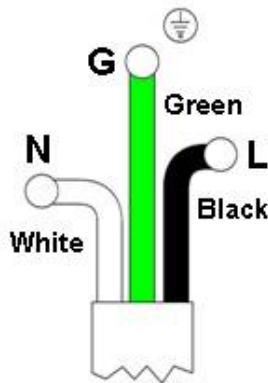


This appliance must be electrically grounded

It is recommended that the electrical circuit controlling the heater or group of heaters are controlled via a SmartCom Control Panel.

Supply 120V 60Hz single phase.  
Standard heater 0.16HP.  
Current rating 1.2 amp max (inductive).  
Fuse: external 3 amp.

Important: All electrical work should be done by a qualified electrician in strict accordance with the National Electrical Code ANSI/NFPA 70.



SmartCom<sup>3</sup> provides cost effective energy for small single heater installations through to large multi-zone applications requiring centralised control.

The electrical supply to the heater is by three wires: live, neutral and ground connections.

For further information, please contact your local distributor.

Install in accordance with all state & local codes.

Where alternative manufactures' controls are used, please refer to their instructions for their siting and installation details.

**Figure 5.a Typical VSUS range Wiring Connections**



Figure 5.b Typical VSLUS range Wiring Connections

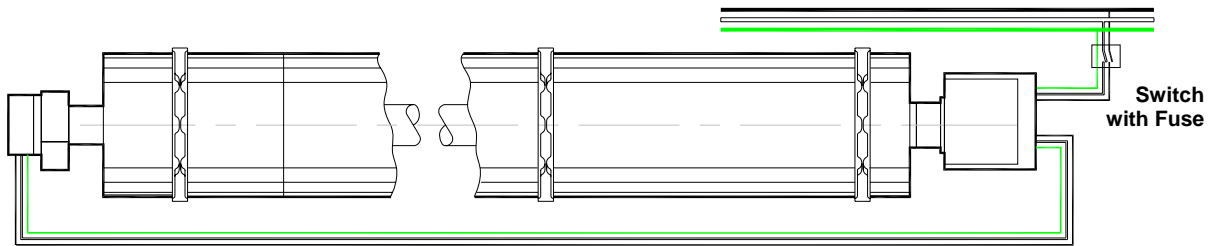
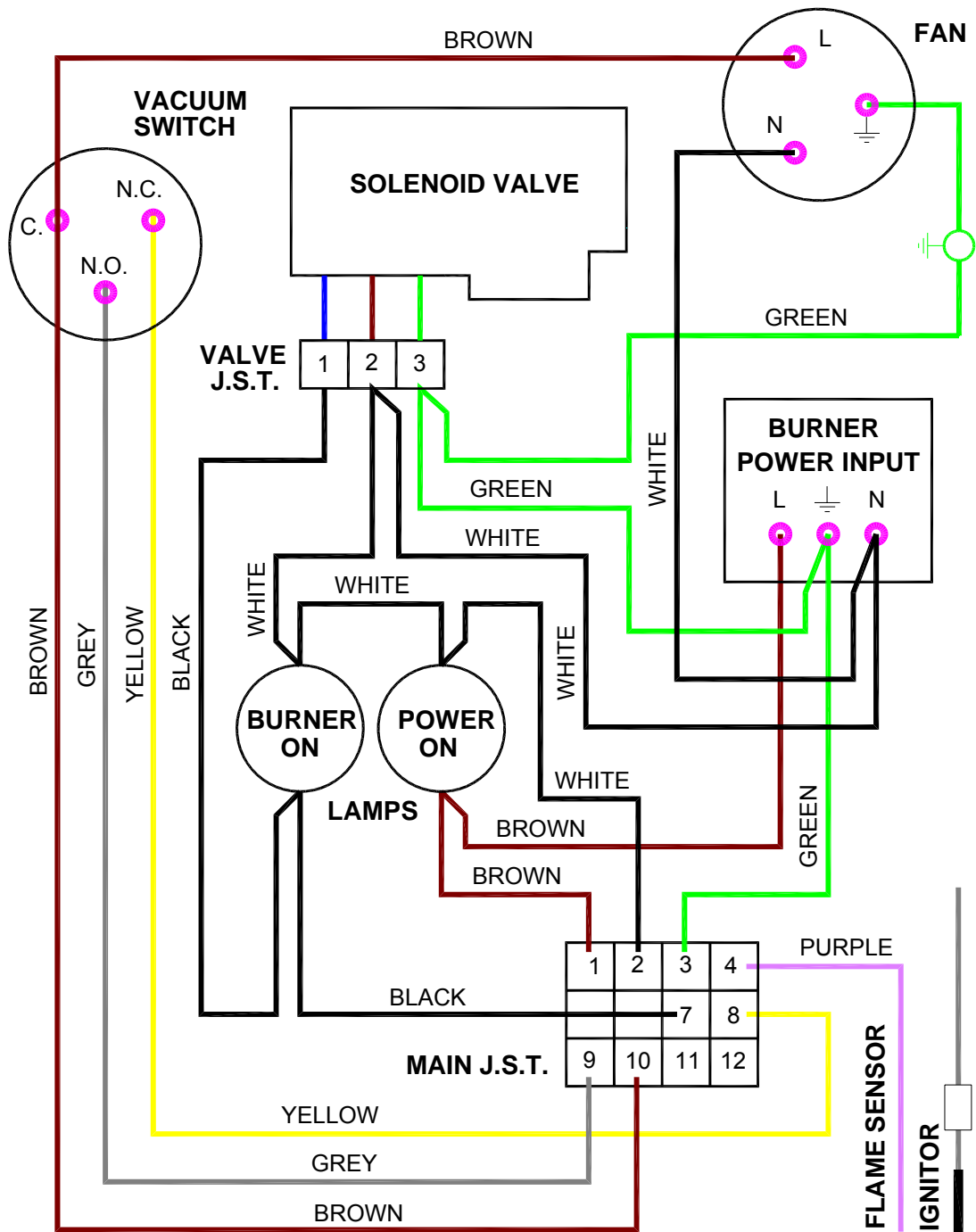
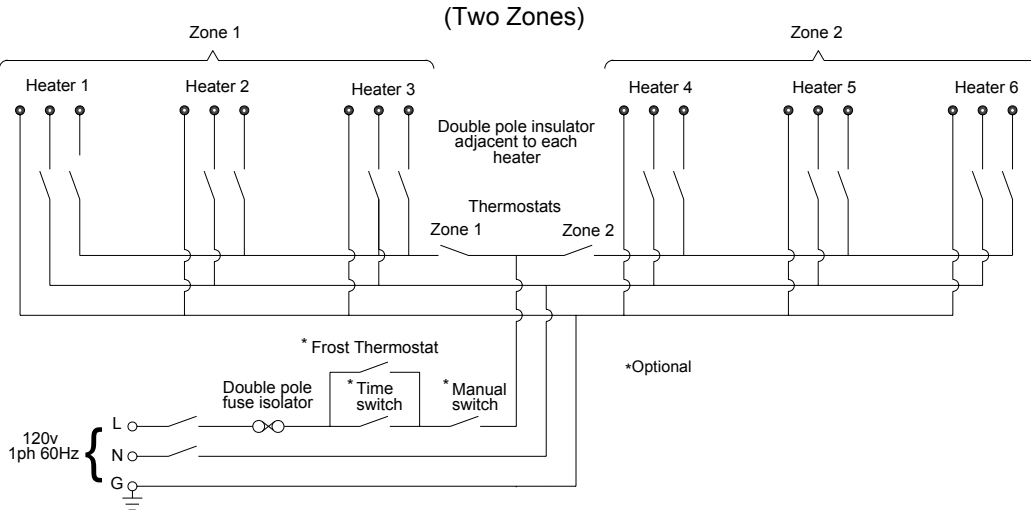


Figure 6. Internal Burner Wiring Diagram.



**!** If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 220°F/105°C

**Figure 7. Typical External Wiring Schematic.**



## 1.8 Vent Requirements and Details

### 1.8.1 Unvented units

Heaters installed without a vent providing the governing building codes are met and consideration is properly given to possibilities of condensation on cold surfaces.

Installation shall meet the following requirements when unvented:

- Internal volume of the heated room must be greater than 214cu.ft. per 100 BTU/HR of heaters installed.  
OR
- Natural or mechanical means shall be provided to supply and exhaust at least 4 CFM per 1000 BTU per hour input of installed heaters.
- Combustion gasses shall not impinge on combustible materials with a temperature in excess of 150°F.

### 1.8.2 Vertical venting

The heater can be installed with a vertical vent.

All vent piping should be adequately supported from the building structure and terminated with an approved terminal. **The maximum recommended vent length is 25ft in either 4" or 6" with a maximum of two bends.** All connections should be properly sealed. Refer fig 8a

### 1.8.3 Horizontal venting

Individual units can be vented horizontally through side walls using standard approved terminals.

Distances from adjacent public walkways,

adjacent buildings, openable windows and building openings, consistent with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54.*

Maximum length of vent is 25ft with 2 - 90° long radius elbows.

Runs of 12ft or shorter can use 4" dia vent. Runs over 12ft should use 6" vent pipe.

Any portion of vent that passes through a combustible wall must be insulated, or use an approved insulating thimble.

Standard vent terminals must extend at least 6" from the wall and at least 24" from any combustible overhang. Protect the building material from degradation by the vent gasses.

Vent joints should be sealed and secured using at least 3 sheet metal screws. Should condensation occur the vent should be shortened or insulated.

The terminal should be at least 3ft away from any air intake to the building

If the heater is equipped with ducted combustion air, the vent terminal must be at least 3ft away from the air inlet and located higher than the inlet.

The vent terminal must be protected from blockage by snow. Refer fig 8b

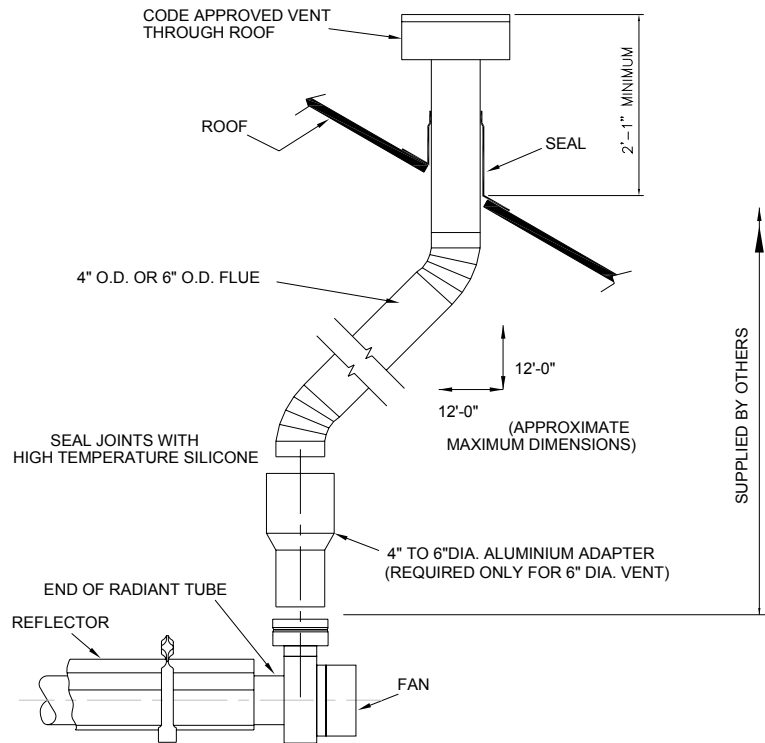
## 1.9 Fresh Air Intake

Whenever the heater is installed in locations where airborne dust or other pollutants are present, a fresh air supply should be ducted to the burner.

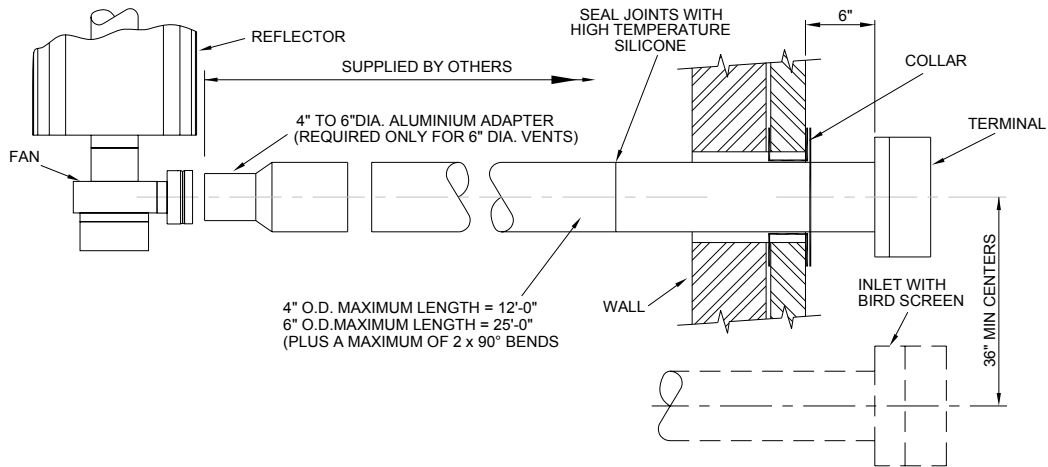
A fresh air duct of 4" dia. Should be installed from the fresh air to the air intake connection on the fan housing. A flexible jointing piece should be installed at the fan connection with hose clamps to facilitate expansion and contraction.

The maximum recommended length air duct is 25ft and the maximum number of bends is 2. The minimum length is 18". The location of the fresh air duct inlet must be where it will receive dust free clean air. An inlet cap with bird screen must be fitted at the inlet of the duct. If the duct inlet is located above the roof the underside of the inlet terminal must be at least 2ft above roof level and at least 10" above any projection on the roof within 7ft of the inlet. Intake pipe, fittings and sealant are not furnished by the manufacturer. Refer fig 8c & d

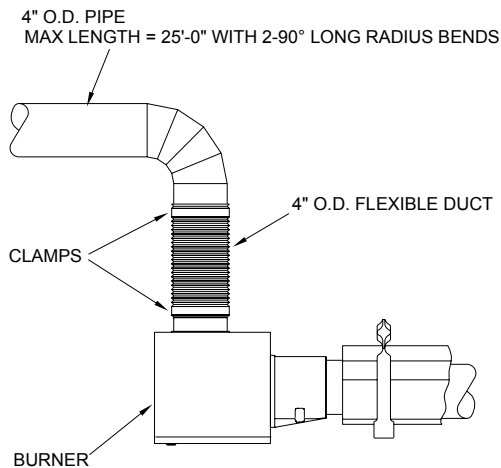
**Figure 8.a Vertical Venting.**



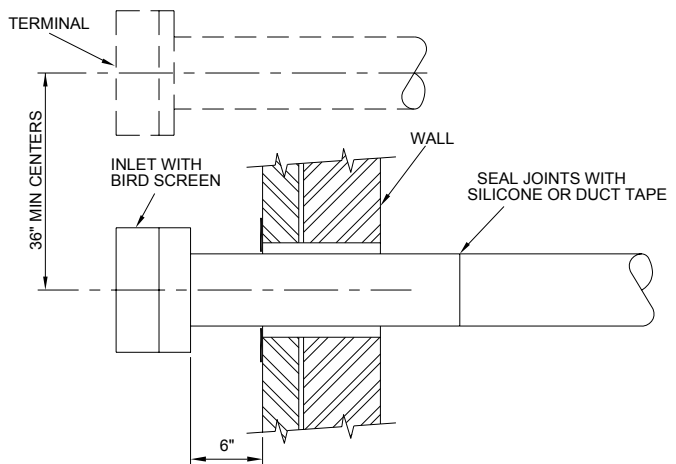
**Figure 8.b Horizontal Venting.**



**Figure 8.c Fresh Air Ducted Intake.**



**Figure 8.d Wall Terminal Intake Kit.**



## 1.10 Technical Details

All heaters to run on **Natural Gas**

<b>No of Injectors</b>	1
<b>Gas Connection</b>	½" N.P.T nipple.
<b>Electrical Supply</b>	120 volt 1 phase 60Hz
<b>Vent size (in)</b>	4" or 6"
<b>Unitary Fan Motor Details</b>	120 volt 1 phase 60Hz
<b>Current Rating</b>	1.2A MAX
<b>Ignition</b>	Electronic Program Start up with Spark Ignition

**Table 4a - VSUS Technical Details.**

Burner Size	Nominal Gross Heat Input	Burner Head	Burner Orifice Plate	Injector		Injector Pressure
	BTU/Hr	Part No.	Part No.	Size (mm)	Part No.	Inches WG.
<b>VSUS40</b>	45,720	200988	201063-65	7 x 1.3	201007-13	3.4
<b>VSUS60</b>	60,000	200988	201063-36	7 x 1.5	201007-15	3.7
<b>VSUS80</b>	80,000	200988	201063-64	7 x 1.8	201007-18	3.2
<b>VSUS100</b>	100,000	200988	201063-70	7 x 2.1	201007-21	2.7
<b>VSUS125</b>	125,000	200988	201063-26	7 x 2.4	201007-24	3.6
<b>VSUS150</b>	150,000	200988	201063-25	7 x 3.0	201007-30	3.4
<b>VSUS170</b>	175,000	200988	201063-24	7 x 2.5	201631-25	4.4
<b>VSUS200</b>	200,000	200988	201063-71	7 x 3.2	201631-32	2.7

Burner Size	Tube Size	Combustion Fan Details		Pressure Switch	Min. Heater Length	Max. Heater Length
		Fan Type	Support spinning Part No.	Part No.	U (ft)	U (ft)
<b>VSUS40</b>	3"	2576T	201845	201676	20	30
<b>VSUS60</b>	3"	2576T	201841	201676	20	40
<b>VSUS80</b>	3"	2576T	201841	201676	30	40
<b>VSUS100</b>	4"	2576T	FSER38UK	201676	34	34
<b>VSUS125</b>	4"	2576T	FS100-96DE	201676	34	44
<b>VSUS150</b>	4"	2560-1	FS100-4H-66DE	201676	34	44
<b>VSUS170</b>	4"	2560-1	FS100-4H-70DE	201676	44	64
<b>VSUS200</b>	4"	2560-1	FS100-4H-96DE	201676	54	74

**Table 4b - VSLUS Technical Details.**

Burner Size	Nominal Gross Heat Input	Burner Head	Burner Orifice Plate	Injector		Injector Pressure
	BTU/Hr	Part No.	Part No.	Size (mm)	Part No.	Inches WG.
VSLUS40	45,720	200988	201063-65	7 x 1.3	201007-13	3.4
VSLUS60	60,000	200988	201063-36	7 x 1.5	201007-15	3.7
VSLUS80	80,000	200988	201063-64	7 x 1.8	201007-18	3.2
VSLUS100	100,000	200988	201063-70	7 x 2.1	201007-21	2.7
VSLUS125	125,000	200988	201063-26	7 x 2.4	201007-24	3.6
VSLUS150	150,000	200988	201063-25	7 x 3.0	201007-30	3.4
VSLUS170	175,000	200988	201063-24	7 x 2.5	201631-25	4.4
VSLUS200	200,000	200988	201063-71	7 x 3.2	201631-32	2.7

Burner Size	Tube Size	Combustion Fan Details		Pressure Switch	Min. Heater Length	Max. Heater Length
		Fan Type	Support spinning Part No.	Part No.	S (ft)	S (ft)
VSLUS40	3"	2576T	201845	201676	20	30
VSLUS60	3"	2576T	201841	201676	20	40
VSLUS80	3"	2576T	201841	201676	25	40
VSLUS100	4"	2576T	FSER38UK	201676	30	50
VSLUS125	4"	2576T	FS100-96DE	201676	40	60
VSLUS150	4"	2560-1	FS100-4H-66DE	201676	40	60
VSLUS170	4"	2560-1	FS100-4H-70DE	201676	50	70
VSLUS200	4"	2560-1	FS100-4H-96DE	201676	50	80

**Table 5a: VSUS Tube Materials**

Model number		BTU/Hr	Combustion tube length (ft)	Radiant tube length (ft)
VSUS 40U20	3	45,720	10 (1-CC)	10 (1-MS)
VSUS 60U20	3	60,000		
VSUS 40U30	3	42,720	10 (1-CC)	10 (1-MS) 10 (2#5'-MS)
VSUS 60U30	3	60,000		
VSUS 80U30	3	80,000		
VSUS 100U35	4	100,000	10 (1-AS)	10 (1-MS) 14 (2#7'-MS)
VSUS 125U35	4	125,000		
VSUS 150U35	4	150,000		
VSUS 60U40	3	60,000	10 (1-CC)	30 (3#10'-MS)
VSUS 80U40	3	80,000		
VSUS 125U45	4	125,000	10 (1-AS)	10 (1-MS) 10 (2#5'-MS) 14 (2#7'-MS)
VSUS 150U45	4	150,000		
VSUS 170U45	4	175,000	10 (1-AS) 5 (1-AS)	10 (1-MS) 5 (1#5'-MS) 14 (2#7'-MS)
VSUS 170U55	4	175,000	20 (2#10'-AS)	20 (2#10'-MS) 14 (2#7'-MS)
VSUS 200U55	4	200,000		
VSUS 170U65	4	175,000	20 (2#10'-AS)	20 (2#10'-MS) 10 (2#5'-MS) 14 (2#7'-MS)
VSUS 200U65	4	200,000		
VSUS 200U75	4	200,000	10 (2#10'-AS)	40 (4#10'-MS) 14 (2#7'-MS)

Tube nomenclature:

- CC 4"-3" Combustion tube
- AS Aluminum coated steel
- MS Mild steel




**Table 5b: VSLUS Tube Materials**

Model number	Tube diameter	BTU/Hr	Combustion tube length (ft)	Radiant tube length (ft)	Min distance to bend (ft)
VSUS 40S20	3	45,720	10' (1-CC)	10' (1-MS)	10'
VSUS 60S20	3	60,000			
VSUS 40S25	3	45,720	10' (1-CC)	10' (1-MS) 10' (2#5'-MS)	10'
VSUS 60S25	3	60,000			
VSUS 80S25	3	80,000			20'
VSUS 40S30	3	45,720	10' (1-CC)	20' (2#10'-MS)	10'
VSUS 60S30	3	60,000			
VSUS 80S30	3	80,000			20'
VSUS 100S30	4	100,000	10' (1-AS)	20' (2#10'-MS)	20'
VSUS 60S40	3	60,000	10' (1-CC)	30' (3#10'-MS)	10'
VSUS 80S40	3	80,000			20'
VSUS 100S40	4	100,000	10' (1-AS)	30' (3#10'-MS)	20'
VSUS 125S40	4	125,000			
VSUS 150S40	4	150,000			
VSUS 100S50	4	100,000	10' (1-AS)	40' (4#10'-MS)	20'
VSUS 125S50	4	125,000			
VSUS 150S50	4	150,000			
VSUS 170S50	4	175,000	20' (2#10'-AS)	30' (3#10'-MS)	30'
VSUS 200S50	4	200,000			
VSUS 125S60	4	125,000	10' (1-AS)	50' (5#10'-MS)	20'
VSUS 150S60	4	150,000			
VSUS 170S60	4	175,000	20' (2#10'-AS)	40' (4#10'-MS)	30'
VSUS 200S60	4	200,000			
VSUS 170S70	4	175,000	20' (2#10'-AS)	50' (5#10'-MS)	30'
VSUS 200S70	4	200,000			
VSUS 200S80	4	200,000	20' (2#10'-AS)	60' (6#10'-MS)	30'


Tube nomenclature:


- CC 4"-3" Combustion tube
- AS Aluminum coated steel tube
- MS Mild steel tube

## 2. Assembly Instructions.

 **PLEASE READ** this section prior to assembly to familiarize yourself with the components and tools you require at the various stages of assembly. Carefully open the packaging and check the contents against the parts and check list.

The manufacturer reserves the right to alter specifications without prior notice.

 Please ensure that all packaging is disposed of in a safe environmentally friendly way.

 For your own safety we recommend the use of safety boots and leather faced gloves when handling sharp or heavy items. The use of protective eye wear is also recommended.

### 2.1 Tools Required.

The following tools and equipment are advisable to complete the tasks laid out in this manual.



Saw Horses



Leather Faced Gloves



Phillips Screwdriver



Wrench Set



Cordless Drill



5/16" Drive



3/16" (5mm)  
5/32" (4mm)  
Allen wrench



Tape Measure

 Suitable alternative tools may be used.

### 2.2 Assembly Notes.



**Please read** these assembly notes in conjunction with the correct assembly drawings (figs 9 to 26).

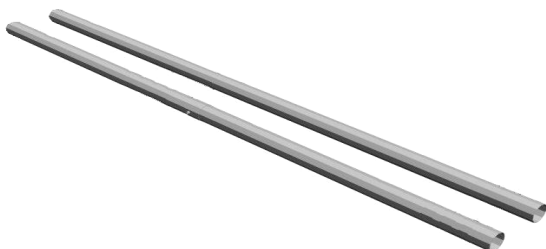
#### 2.2.1 Tubes

Each heating unit has two types of emitter tubes. See Table 5a and 5b of this manual.

Identify and position tubes on saw horses. **All tubes should be positioned with seams facing down when installed.** Position coupling fastener so that these cannot be seen from beneath the heater.

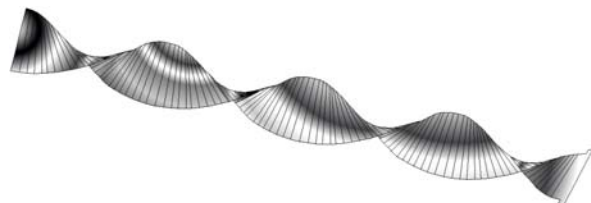
3" heater versions have a 4" diameter burner spigot welded at one end. Ensure this tube assembly is correctly positioned as shown on the assembly drawings.

Where necessary, mark out the position of the bracket centres from the dimensions shown on the assembly drawings.



#### 2.2.2 Turbulators

All models include a turbulator or a set of turbulators. Carefully insert turbulator inside the tube up to the end tab.



Turbulator lengths and positioning inside the tube vary between models.

**Always ensure correct turbulator is fully inserted into the correct tube and from the correct end. Failure to ensure this practice could cause the heater to fail.**

Turbulator dimensions and positioning are indicated on individual assembly drawings (fig.9 to fig.26).

#### 2.2.3 Brackets

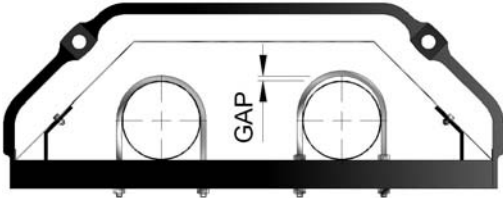


**Always ensure correct bracket is used.** Bracket type and positioning are indicated on individual assembly drawings (fig.9 to fig.26).

### 2.2.3.1 VSUS - U tube heaters

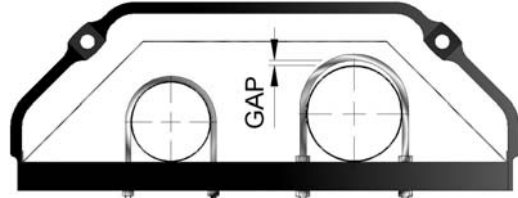
- **Type 'A2'** is a fixed reflector suspension bracket, tabbed with reflector fixing points. An extra long 'floating U bolt' with 'stop nuts' is located on the firing tube ONLY as indicated and bolted into position.

! Clearance of 1/8" must be provided above the tube to allow for thermal expansion.



- **Type 'B3'** is a sliding reflector suspension bracket and NOT fastened to the reflector. An oversized extra long 'floating U bolt' with 'stop nuts' is located on the 4" burner tube ONLY as indicated and bolted into position.

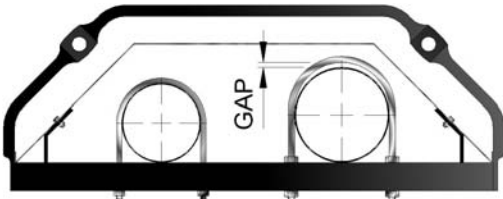
! Clearance of 1/8" must be provided above the tube to allow for thermal expansion.



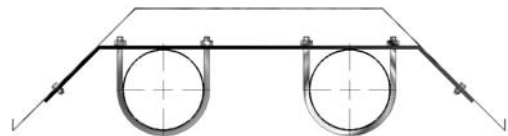
- **Type 'A3'** is a fixed reflector suspension bracket, tabbed with reflector fixing points. An oversized extra long 'floating U bolt' with 'stop nuts' is located on the 4" burner tube ONLY as indicated and bolted into position.

! Clearance of 1/8" must be provided above the tube to allow for thermal expansion.

This bracket is **ALWAYS** closest to the burner.



- **Type 'C'** is a reflector support bracket to retain the reflector (certain VSUT models).

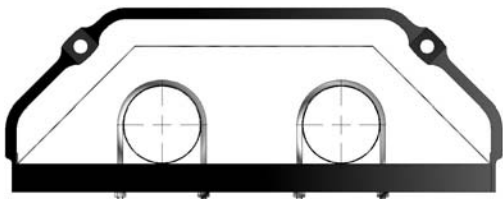


Slip the brackets onto the tubes in correct order and fix at correct points as shown on the relevant assembly drawing.

Ensure fixings are tight to brackets

! Note. The first bracket, 'A3' on 3" UT heaters have an oversized 'U' bolt on the burner leg to accommodate the 4" burner spigot.

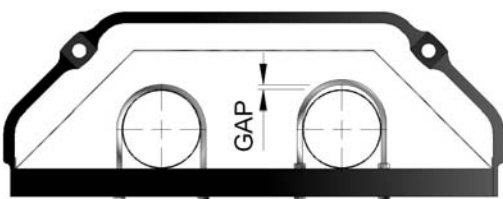
- **Type 'B'** is a sliding reflector suspension bracket and NOT fastened to the reflector.



- **Type 'B2'** is a sliding reflector suspension bracket.

An extra long 'floating U bolt' with 'stop nuts' is located on the firing tube ONLY as indicated and bolted into position.

! Clearance of 1/8" must be provided above the tube to allow for thermal expansion.



### 2.2.3.2 Tube alignment sections

(For VS170 & 200 Angle Mounted Installations ONLY).

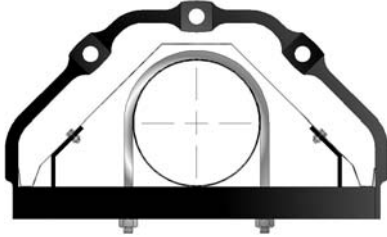
To allow for differential expansion of the tubes, a tube alignment assembly is fitted to the first bracket on the fan side radiant tube.

Position U bolt tube alignment sections over the tube and through bracket prior to clamping.

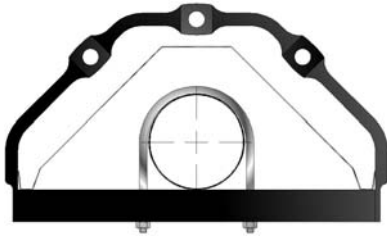


### 2.2.3.3 VSLUS - 3" SL tube heaters

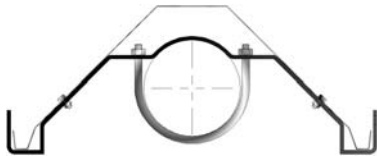
- Type 'A1' is a fixed reflector suspension bracket, tabbed with reflector fixing points. An oversized 'U' bolt is located on the 4" burner tube only as indicated and bolted into position. This bracket is **ALWAYS** closest to the burner.



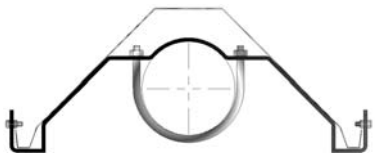
- Type 'B' is a sliding reflector suspension bracket and NOT fastened to the reflector. They are fixed at regular intervals down the length of the tube.




- Type 'F' is a fixed reflector support bracket and are fixed to the reflector via set screws.



- Type 'S' is a sliding reflector support bracket and NOT fastened to the reflector which allow the reflector to move within.

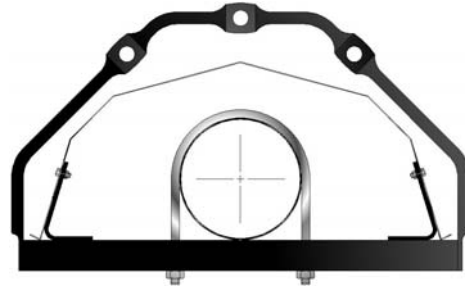


Slip the brackets onto the tubes in correct order and fix at correct points as shown on the relevant assembly drawing. Ensure fixings are tight to brackets

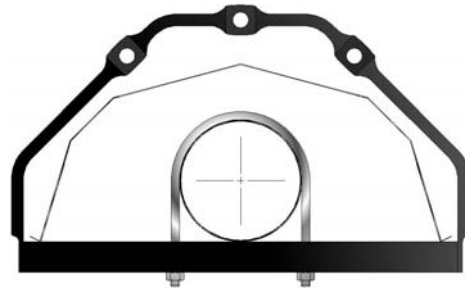
 Note. The first bracket, 'A1' on 3" UT heaters have an oversized 'U' bolt on the burner leg to accommodate the 4" burner spigot.

### 2.2.3.4 VSLUS - 4" SL tube heaters

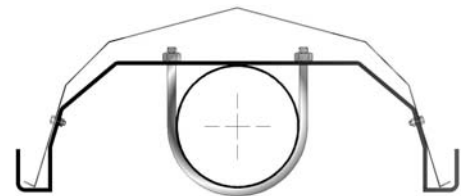
- Type 'A' is a fixed reflector suspension bracket, tabbed with reflector fixing points. This bracket is **ALWAYS** closest to the burner.



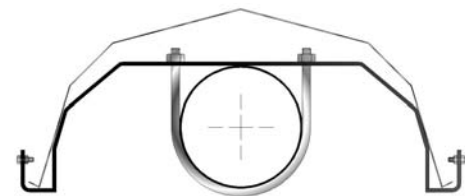
- Type 'B' is a sliding reflector suspension bracket and NOT fastened to the reflector. They are fixed at regular intervals down the length of the tube.



- Type 'F' is a fixed reflector support bracket and are fixed to the reflector via set screws.



- Type 'S' is a sliding reflector support bracket and NOT fastened to the reflector which allow the reflector to move within.



Slip the brackets onto the tubes in correct order and fix at correct points as shown on the relevant assembly drawing. Ensure fixings are tight to brackets

## 2.2.4 Couplers

There are two types of 3" and 4" couplers for joining radiant tubes, bends or optional bend kits as detailed in Table 6 opposite.

A high temperature stainless steel coupling.



Slide the coupler over the tube ensuring that the rivet stop has butted up to the tube ends. Using the Allen wrench, tighten the pins.

Moving between the two set pins, tighten both ensuring that equal pressure is applied to each set pin in turn. Complete assembly by drilling and screwing self tapping retention zip screws.

A standard stainless steel coupling which is used for all other connections.



Slide the coupler over the tube ensuring that the tube stop has butted up to the tube ends. Using the 5/16" drive or flat blade screwdriver, tighten the bolts.

Moving between the two band coupling bolts, tighten both ensuring that equal pressure is applied to each in turn. Complete assembly by drilling and screwing self tapping retention zip screws.

**! DO NOT OVERTIGHTEN!!**

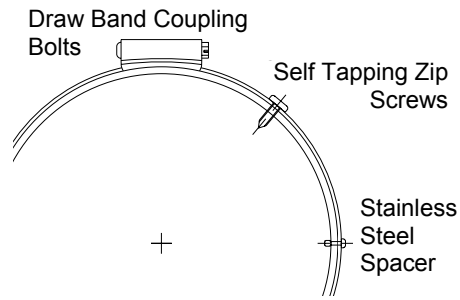


Table 6. Coupler positions (from burner)

VSUS	1st coupler	2nd coupler	Remainder
40-100	Standard	Standard	Standard
125-200	Hi-temp	Standard	Standard
VSLUS	1st coupler	2nd coupler	Remainder
40-100	Standard	Standard	Standard
125-150	Hi-temp	Standard	Standard
170-200	Hi-temp	Hi-temp	Standard

**!** At this point raise the tube assembly into position and suspend from previously fixed chains (2/0 min. gauge), or attach to wall mounting brackets. Wall mounting brackets must support heater at an angle of inclination of  $45^\circ \pm 10^\circ$ . Longer tube assemblies may be raised in more than one sub-assembly with final tube connection made in the air. It is recommended that the heater be suspended to slope slightly - refer to note in figure 1 for details

## 2.2.5 Reflectors.

**!** All reflectors must be positioned/ attached to the brackets exactly as detailed in the assembly drawings.

**!** All reflectors are shipped with a protective plastic coating which **MUST** be removed before use.

**VSUS UT models only.** After removing the protective plastic coating, slip the first reflector through the brackets until the locating slots align with the type A bracket fixing points.

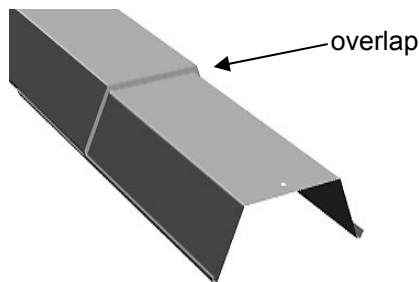
\* Note: the first suspension bracket may not necessarily be a fixed type 'A' bracket.

Slide the next reflector backwards through the brackets and overlap the existing reflector until the locating slots line up with the type 'A' bracket. Continue along the heater where necessary.



**VSLUS SL models only.** After removing the protective plastic coating, slip the first reflector through the brackets until the locating slots align with the first type 'A' suspension bracket fixing point. Secure using nuts, bolts and flat mud washers.

! Each subsequent reflector must **OVERLAP** the previous one as shown below and to a distance as indicated by their individual assembly sheets.



Slide the next reflector backwards through the brackets and **overlap** the existing reflector until the locating slots line up with the type 'F' reflector support bracket.

Adjust the type 'F' bracket along the tube to give the correct overlap as shown in the relevant assembly sheet. Secure U bolt to tube in this position.

Slide the next reflector through the brackets and **overlap** the existing reflector until the locating slots line up with the previous reflector slots and type 'F' reflector support bracket. Secure all three items using nuts, bolts and flat mud washers.

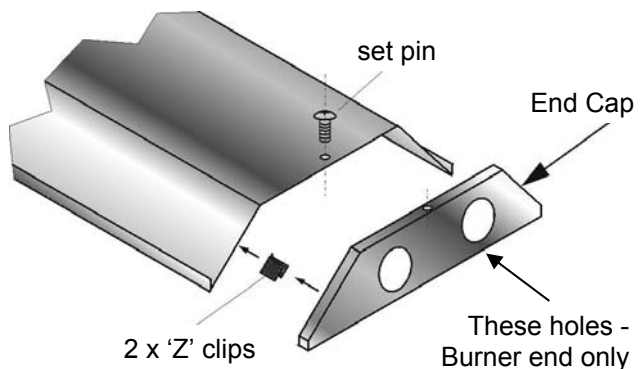
Continue along the heater where necessary.

### 2.2.6 U Bend.

**For VSUS UT models only.** Slide the 'U' bend onto the tube ends with the clamping bolts facing upwards until the predefined stop position. Tighten clamping bolt arrangement using socket and wrench.

### 2.2.7 End Caps.

**On VSUS UT models only,** position the end cap with no tube holes beneath the reflector profile at the U bend end with the end cap flanges facing inwards. Fasten to reflector using pozi set pin and 'Z' clips. Position the end cap with tube holes beneath the reflector profile at the burner end with the end cap flanges facing inwards. Fasten to reflector using pozi set pin and 'Z' clips.



**On VSLUS SL models only,** position ONE end cap beneath the reflector profile at the fan end with the end cap flanges facing inwards. Fasten to reflector using 'Z' clips. Position the other end cap beneath the reflector profile at the burner end with the end cap flanges facing inwards. Fasten to reflector using 'Z' clips.

! **NOTE:** on 3" models, the end cap at the burner end will have one larger hole to accommodate the 4" combustion chamber spigot.

### 2.2.8 Burner Assembly.

**On VSUS UT models only,** slide the burner assembly onto the **RIGHT HAND TUBE** when viewed from above, ensuring it is fully engaged. Secure with set screws.

**On VSLUS SL models only,** slide the burner assembly onto the **inlet end of the tube** ensuring it is fully engaged. Secure with set screws.

### 2.2.9 Fan Assembly.

**On VSUS UT models only,** slide fan onto the left hand tube ensuring it is fully engaged.

**On VSLUS SL models only,** slide fan onto the opposite end to the burner ensuring it is fully engaged.

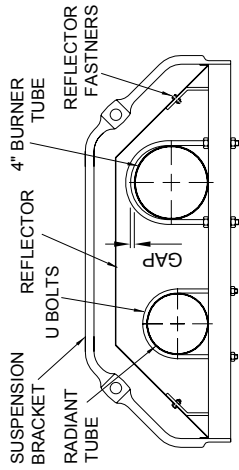
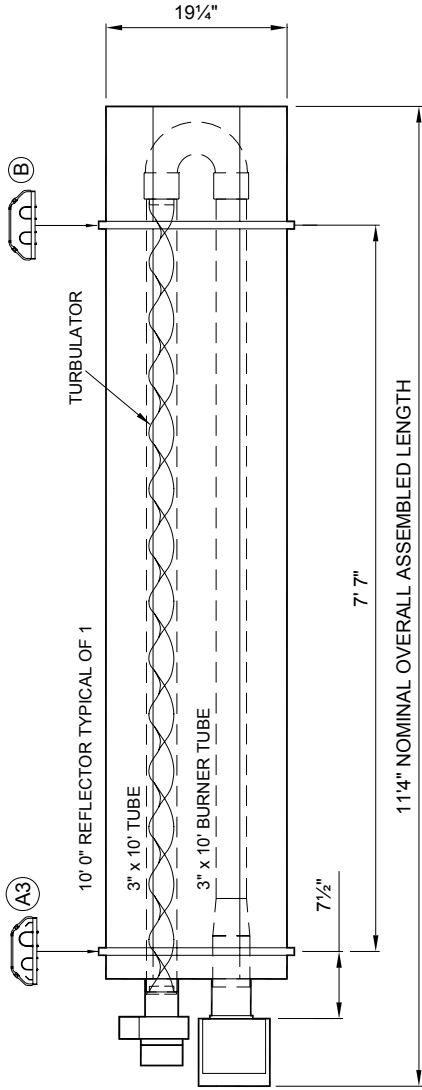
The fan discharge should face vertically or horizontally for individually vented or horizontally away from the burner if unvented.

### 2.2.10 Detailed Assembly Drawings

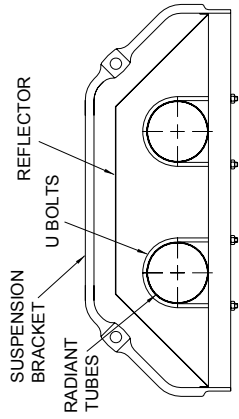
The following pages show the technical dimensional details for the VSUS and VSLUS range of heaters.

Please note the heater type, length and reference number from the delivery/advice note before identifying the correct model drawing.

Figure 9. VSUS Heater Assembly: Model U tube 40U20 and 60U20.



FIRST POINT SUSPENSION BRACKET TYPE A  
3\"/>



SUSPENSION BRACKET TYPE B  
DETAIL B # 6576-SUB



92\"/>

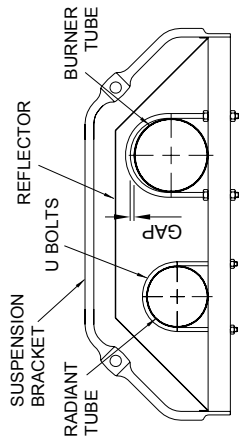
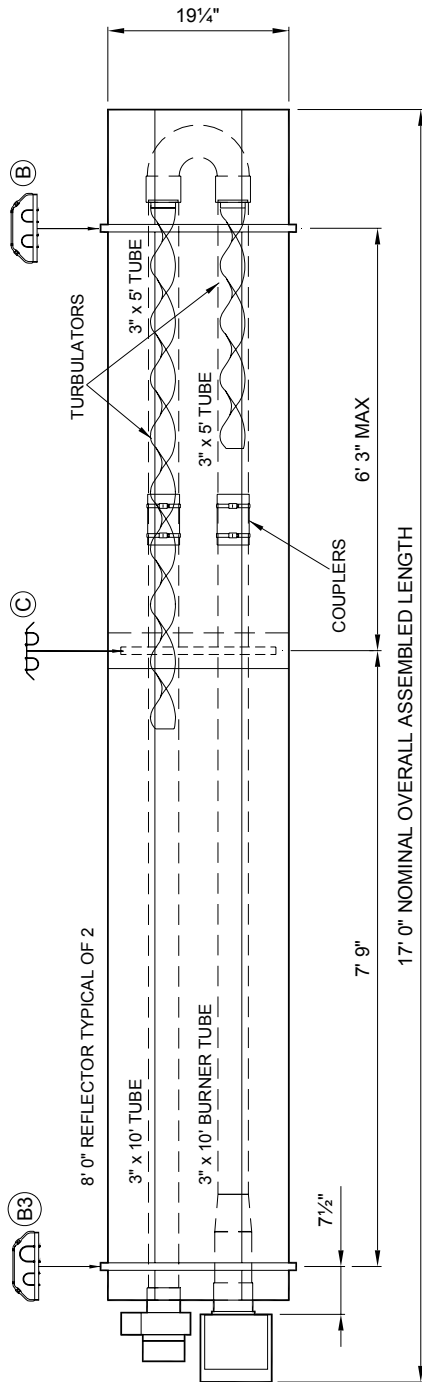
MODEL NUMBER	BTU/HR
VSUS40-U20	45,720
VSUS60-U20	60,000

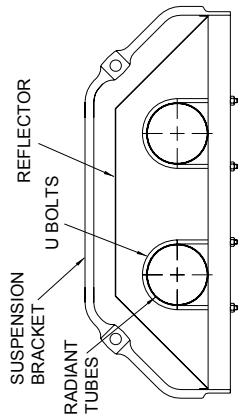
PARTS LIST	PART #
BURNER TUBE 10' ALUMINIZED	1 no 202163
RADIANT TUBE 10' MILD STEEL	1 no T-3103
REFLECTOR 10' ALUMINUM or	1 no 202191
REFLECTOR 10' STAINLESS STEEL	or 1 no 201818
END CAP PLAIN ALUMINUM	1 no 3294PMF
END CAP HOLE ALUMINUM or	1 no 202196
END CAP PLAIN STAINLESS STEEL	or 1 no 3178PMF
END CAP HOLE STAINLESS STEEL	or 1 no 201803
BRACKET SET	1 no BR3UTU20
TURBULATOR	1 no 201823T
FAN	1 no 2576T



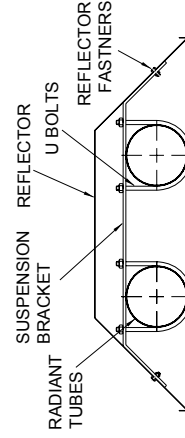
Figure 10. VSUS Heater Assembly: Model U tube 40U30, 60U30 and 80U30.



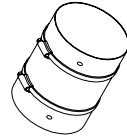
FIRST POINT SUSPENSION BRACKET TYPE B  
3" + 4" BURNER U BOLT. DETAIL (B3) # 201821



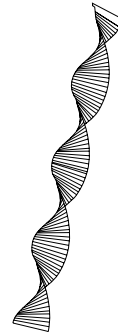
SUSPENSION BRACKET TYPE B  
DETAIL (B) # 66576-SUB



REFLECTOR SUPPORT BRACKET TYPE C  
DETAIL (C) # 66575



STANDARD  
3" COUPLER

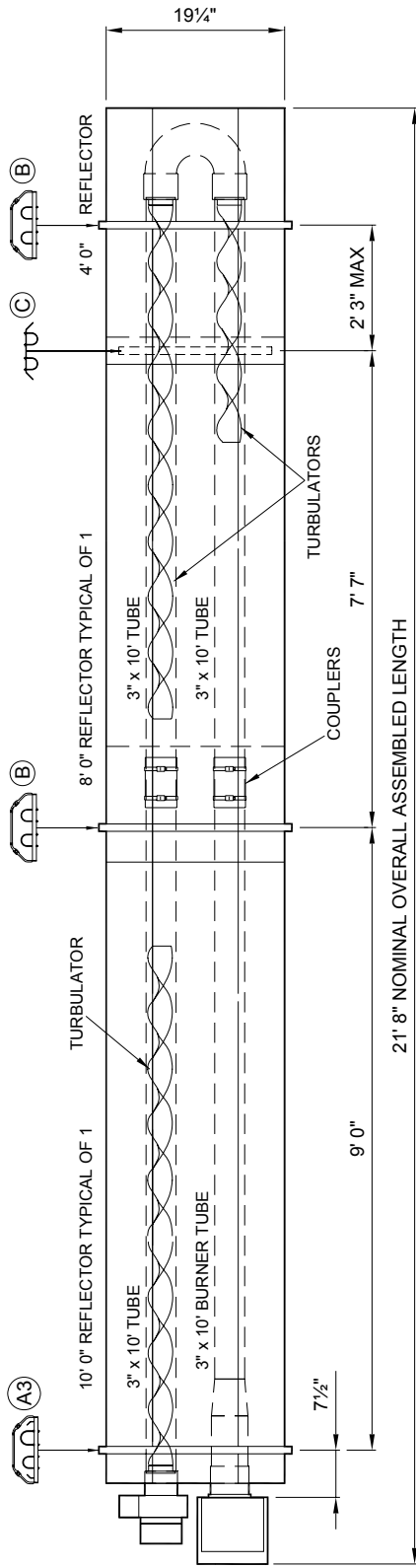


4'3" (1300mm) - BURNER TUBE  
7'6" (2285mm) - FAN TUBE  
TURBULATOR DETAIL

**IMPORTANT:  
THE 2ND REFLECTOR  
OVERLAPS THE 1ST.**

MODEL NUMBER	BTU/HR
VSUS40-U30	45,720
VSUS60-U30	60,000
VSUS80-U30	80,000
PARTS LIST	PART #
BURNER TUBE 10' ALUMINIZED	1 no 202163
RADIANT TUBE 10' MILD STEEL	1 no T-3103
RADIANT TUBE 5' MILD STEEL	2 no T-3154
REFLECTOR 8' ALUMINUM or	2 no 202193
REFLECTOR 8' STAINLESS STEEL	or 2 no 1260
END CAP PLAIN ALUMINUM	1 no 3294PMF
END CAP HOLE ALUMINUM or	1 no 202196
END CAP PLAIN STAINLESS STEEL	or 1 no 3178PMF
END CAP HOLE STAINLESS STEEL	or 1 no 201803
BRACKET SET	1 no BR3UTU30
TURBULATOR (BURNER TUBE)	1 no 6600T
TURBULATOR (FAN TUBE)	1 no 6614T
FAN	1 no 2576T

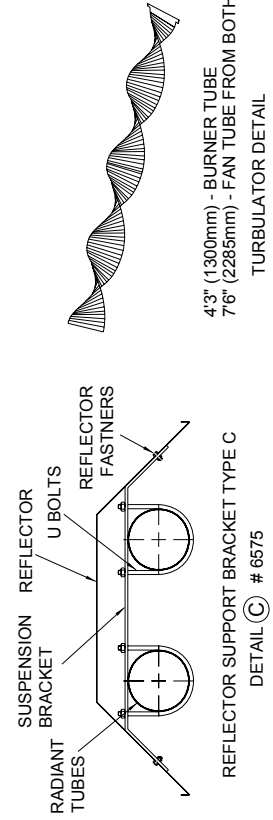
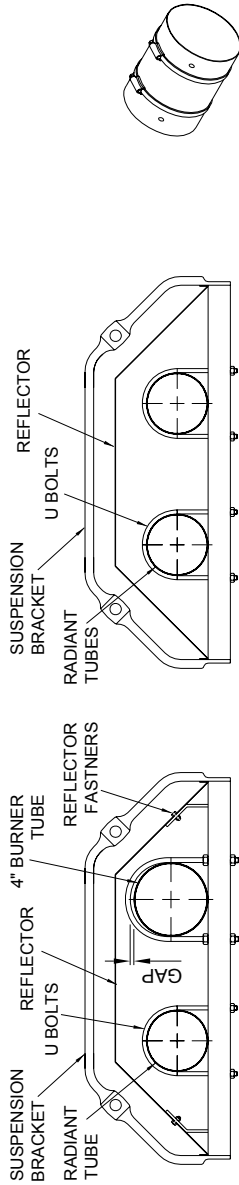
Figure 11. VSUS Heater Assembly: Model U tube 60U40 and 80U40



MODEL NUMBER	BTU/HR
VSUS60-U40	60,000
VSUS80-U40	80,000

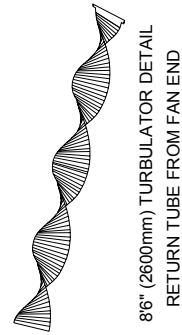
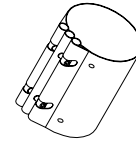
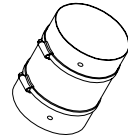
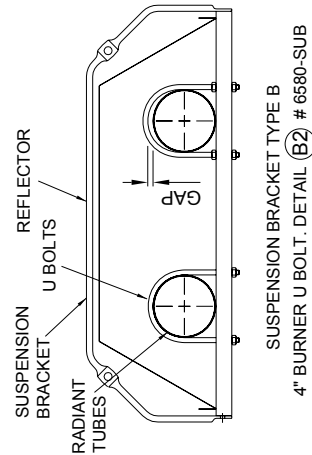
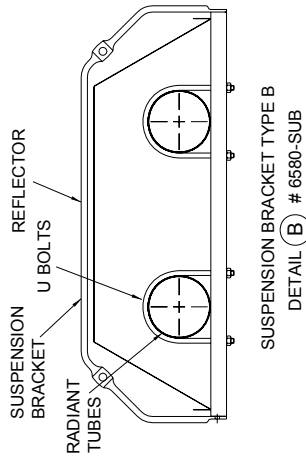
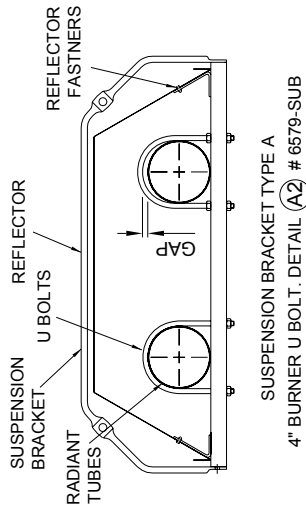
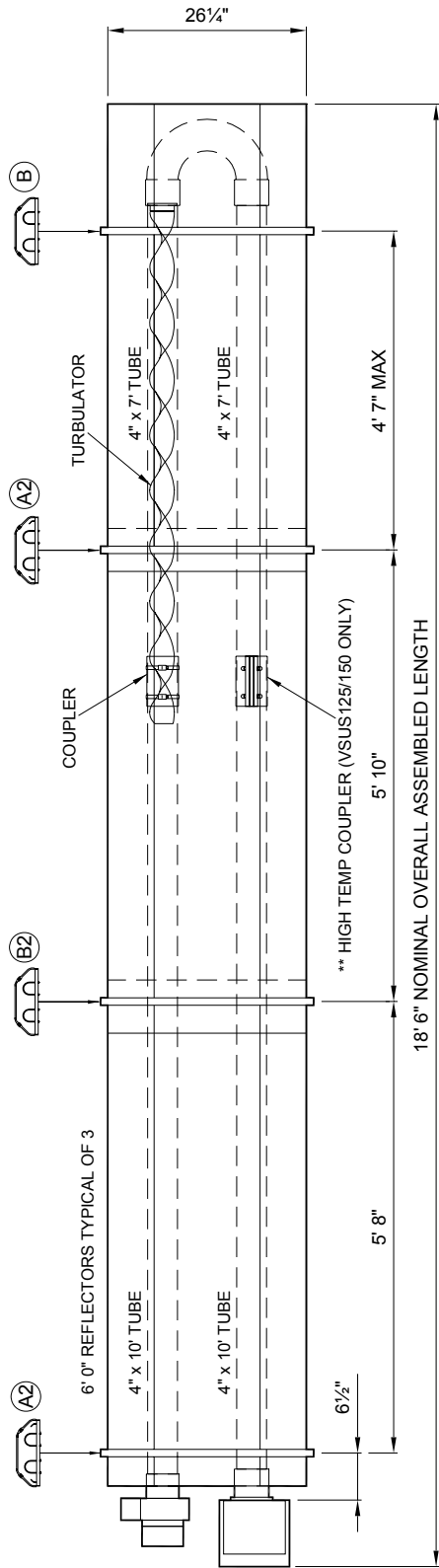
  

PARTS LIST	PART #
BURNER TUBE 10' ALUMINIZED	1 no 202163
RADIANT TUBE 10' MILD STEEL	3 no T-3103
REFLECTOR 10' ALUMINUM <i>or</i>	1 no 202191
REFLECTOR 10' STAINLESS STEEL	<i>or</i> 1 no 201818
REFLECTOR 8' ALUMINUM <i>or</i>	1 no 202193
REFLECTOR 8' STAINLESS STEEL	<i>or</i> 1 no 1260
REFLECTOR 4' ALUMINUM <i>or</i>	1 no 202194
REFLECTOR 4' STAINLESS STEEL	<i>or</i> 1 no 1349-1
END CAP PLAIN ALUMINUM	1 no 3294PMF
END CAP HOLE ALUMINUM <i>or</i>	1 no 202196
END CAP PLAIN STAINLESS STEEL	<i>or</i> 1 no 3178PMF
END CAP HOLE STAINLESS STEEL	<i>or</i> 1 no 201803
BRACKET SET	1 no BR3UTU40
TURBULATOR (BURNER TUBE)	1 no 6600T
TURBULATOR (FAN TUBE)	2 no 6614T
FAN	1 no 2576T



**IMPORTANT:**  
THE 2ND REFLECTOR **OVERLAPS**  
THE 1ST. THE 3RD REFLECTOR  
**OVERLAPS** THE 2ND.

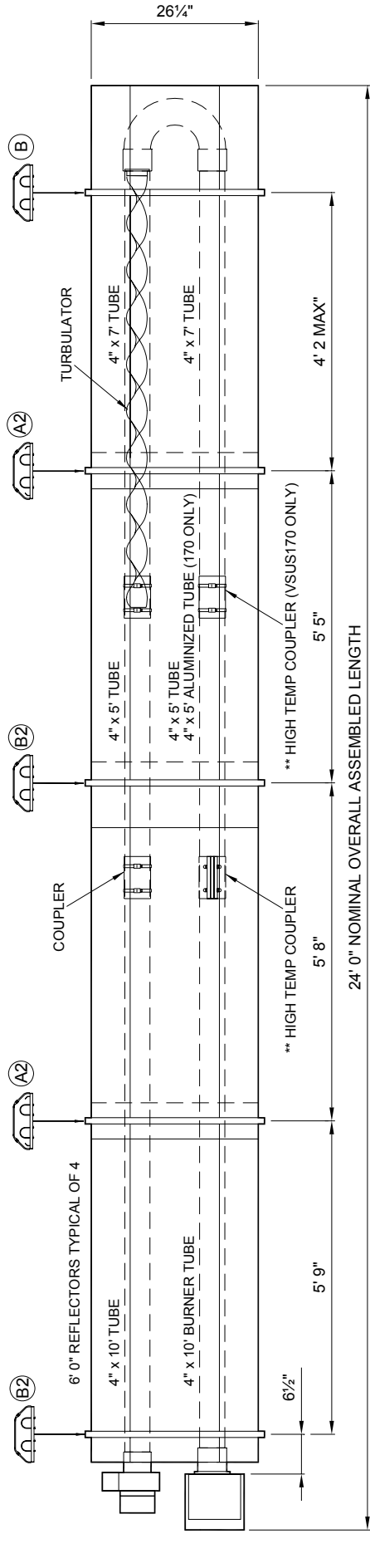
Figure 12. VSUS Heater Assembly: Model U tube 100U35, 125U35 and 150U35



**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS  
THE 1ST. THE 3RD REFLECTOR  
OVERLAPS THE 2ND.

MODEL NUMBER	BTU/HR	PARTS LIST	PART #
VSUS100-U35	100,000	BURNER TUBE 10' ALUMINIZED	1 no T-4101
VSUS125-U35	125,000	RADIANT TUBE 10' MILD STEEL	1 no T-4103
VSUS150-U35	150,000	RADIANT TUBE 7' MILD STEEL	2 no T-4073
		REFLECTOR 6' ALUMINUM or	3 no 202195
		REFLECTOR 6' STAINLESS STEEL	or 3 no 1265
		END CAP (SET) ALUMINUM or	1 no 3293-SUB
		END CAP (SET) STAINLESS STEEL	or 1 no 3182-SUB
		BRACKET SET	1 no BR4UTU35
		TURBULATOR (FAN TUBE)	1 no 6619T
		** HT COUPLER (125 & 150)	1 no C112110
		FAN (100 & 125)	1 no 2576T
		FAN (150)	1 no 2560-1

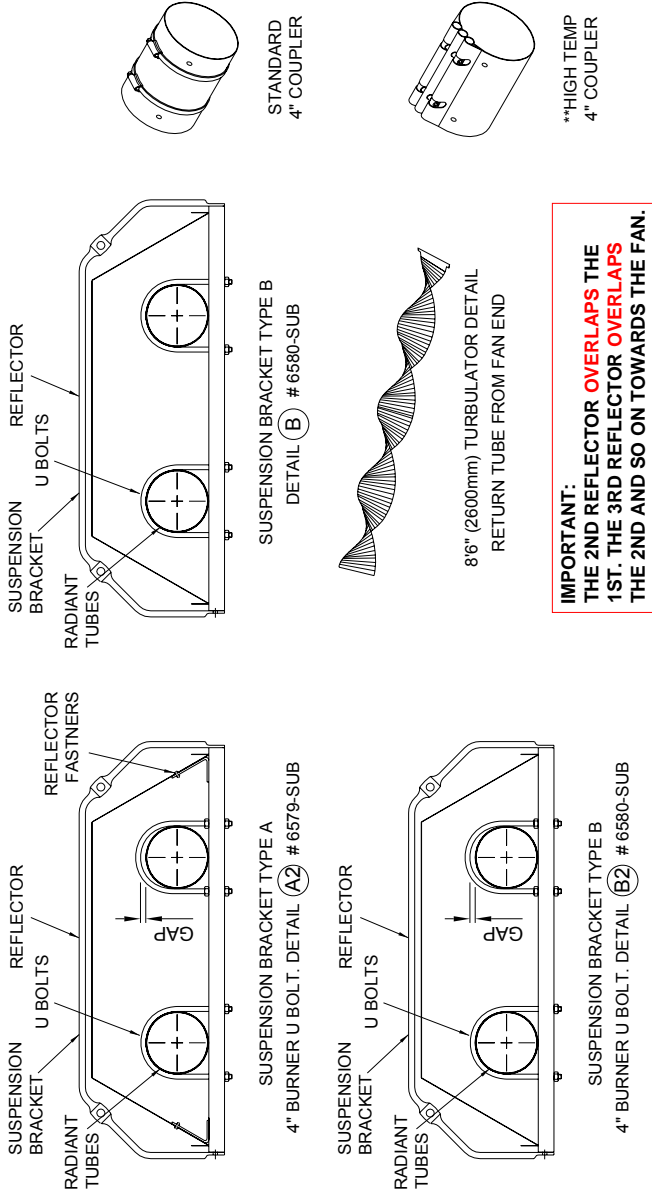
Figure 13. VSUS Heater Assembly: Model U tube 125U45, 150U45 and 170U45



MODEL NUMBER	BTU/HR
VSLUS125-U45	125,000
VSLUS150-U45	150,000
VSLUS170-U45	175,000

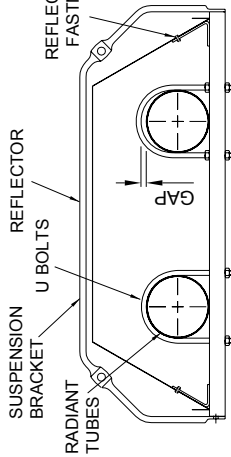
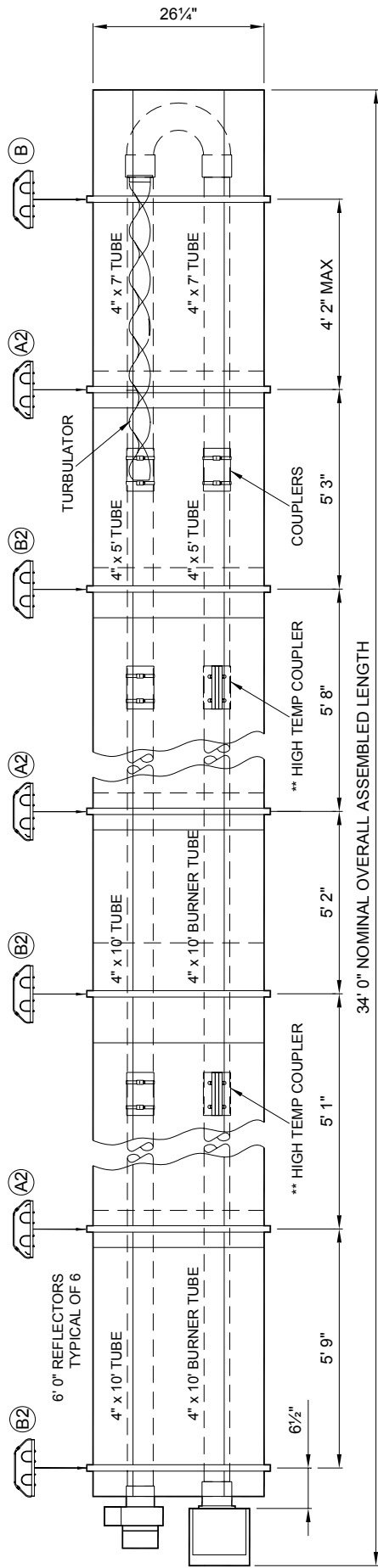
PARTS LIST	PART #
BURNER TUBE 10" ALUMINIZED	1 no T-4101
BURNER TUBE 5" ALUMINIZED (170 ONLY)	1 no T-4106
RADIANT TUBE 10" MILD STEEL	2 no T-4103
RADIANT TUBE 7" MILD STEEL	2 no T-4073
RADIANT TUBE 5" MILD STEEL (170 ONLY)	1 no T-4053
RADIANT TUBE 5" MILD STEEL (125/150)	2 no T-4053
REFLECTOR 6" ALUMINUM or	4 no 202195
REFLECTOR 6" STAINLESS STEEL	or 4 no 12665
END CAP (SET) ALUMINUM or	1 no 3293-SUB
END CAP (SET) STAINLESS STEEL	or 1 no 3182-SUB
BRACKET SET	1 no BR4UTU45
TURBULATOR (FAN TUBE)	1 no 6619T
** HT COUPLER (125 & 150)	1 no C112110
** HT COUPLER (170 ONLY)	2 no C112110
FAN (125)	1 no 2576T
FAN (150 & 170)	1 no 2560-1



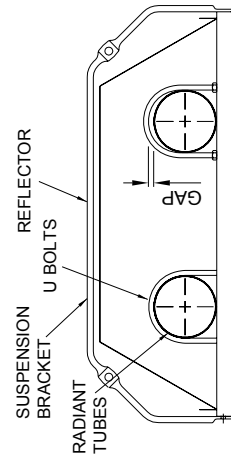
**IMPORTANT:**  
 THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND AND SO ON TOWARDS THE FAN.



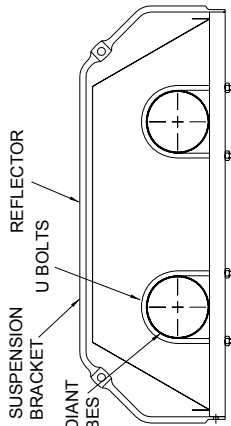
Figure 15. VSUS Heater Assembly: Model U tube 170U65 and 200U65



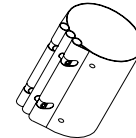
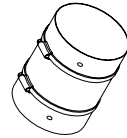
SUSPENSION BRACKET TYPE A  
4" BURNER U BOLT. DETAIL (A2) # 6579-SUB



SUSPENSION BRACKET TYPE B  
4" BURNER U BOLT. DETAIL (B2) # 6580-SUB



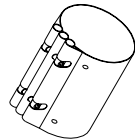
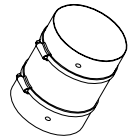
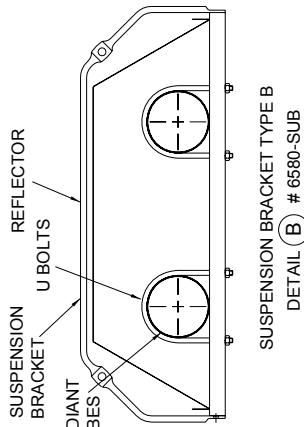
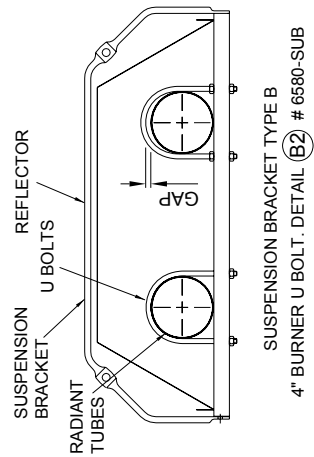
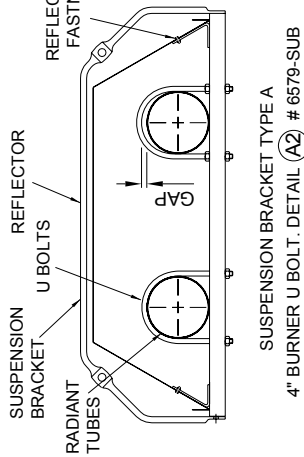
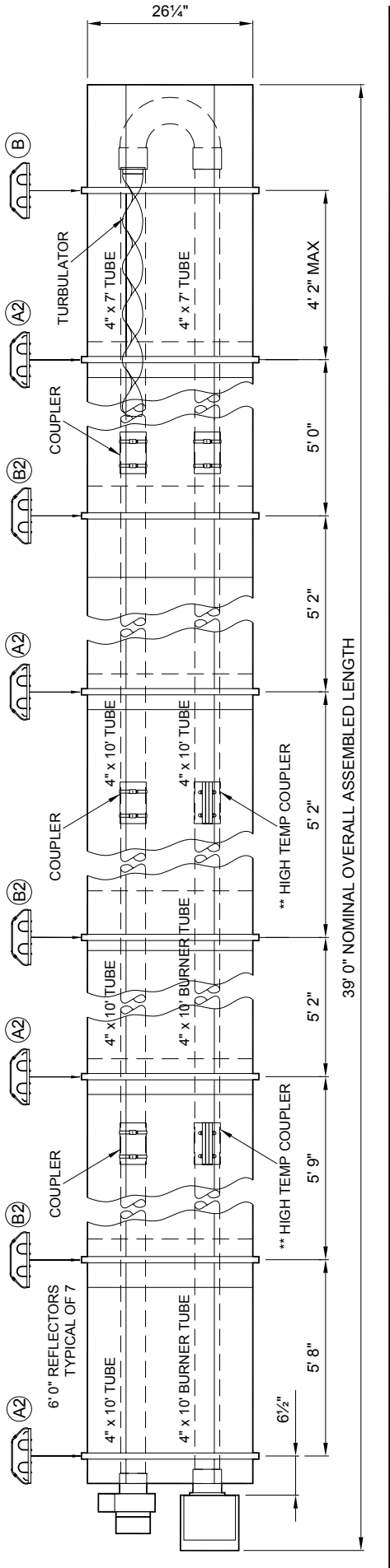
SUSPENSION BRACKET TYPE B  
DETAIL (B) # 6580-SUB



MODEL NUMBER	BTU/HR	PARTS LIST	PART #
VSUS170-U65	175,000	BURNER TUBE 10' ALUMINIZED	2 no T-4101
VSUS200-U65	200,000	RADIANT TUBE 10' MILD STEEL	2 no T-4103
		RADIANT TUBE 7' MILD STEEL	2 no T-4073
		RADIANT TUBE 5' MILD STEEL	2 no T-4053
		REFLECTOR 6' ALUMINUM or	6 no 202195
		REFLECTOR 6' STAINLESS STEEL	or 6 no 1265
		END CAP (SET) ALUMINUM or	1 no 3293-SUB
		END CAP (SET) STAINLESS STEEL	or 1 no 3182-SUB
		BRACKET SET	1 no BR4UTU65
		TURBULATOR (FAN TUBE)	1 no 6619T
		** HT COUPLER	2 no C112110
		FAN	1 no 2560-1

**IMPORTANT:**  
THE 2ND REFLECTOR **OVERLAPS** THE  
1ST. THE 3RD REFLECTOR **OVERLAPS**  
THE 2ND AND SO ON TOWARDS THE FAN.

Figure 16. VSUS Heater Assembly: Model U tube 200U75

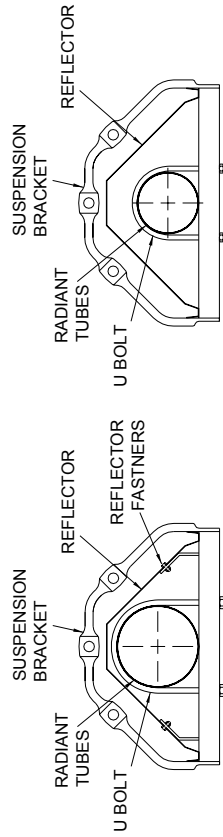
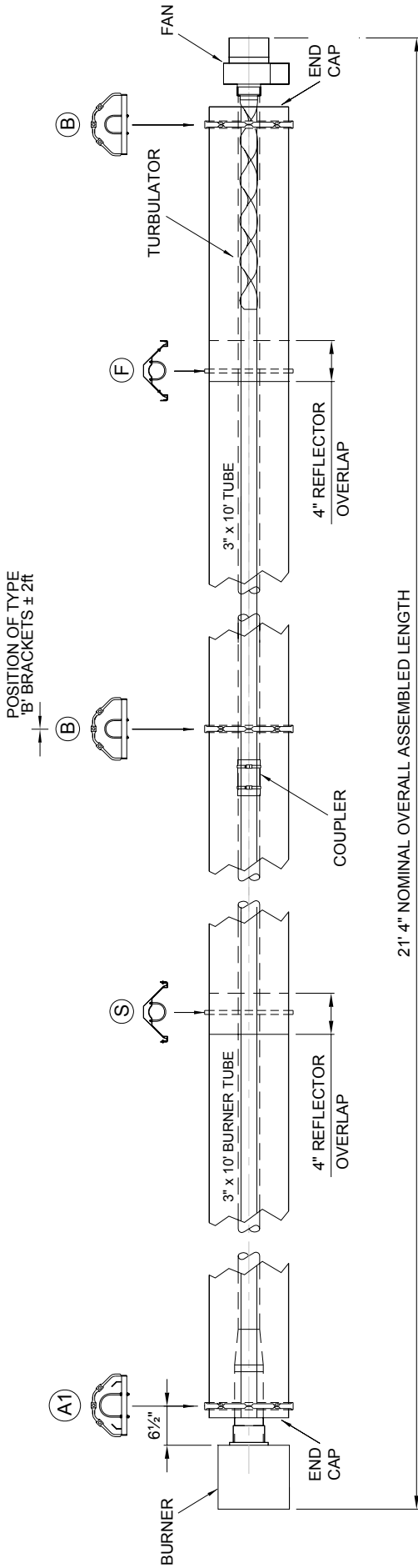


**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND AND SO ON TOWARDS THE FAN.

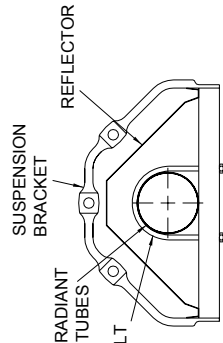
MODEL NUMBER	BTU/HR
VSUS200-U75	200,000
PARTS LIST	
BURNER TUBE 10' ALUMINIZED	2 no T-4101
RADIANT TUBE 10' MILD STEEL	4 no T-4103
RADIANT TUBE 7' MILD STEEL	2 no T-4073
REFLECTOR 6' ALUMINUM or	7 no 202195
REFLECTOR 6' STAINLESS STEEL	or 7 no 1265
END CAP (SET) ALUMINUM or	1 no 3293-SUB
END CAP (SET) STAINLESS STEEL	or 1 no 3182-SUB
BRACKET SET	1 no BR4UTU75
TURBULATOR (FAN TUBE)	1 no 6619T
** HT COUPLER	2 no C112110
FAN	1 no 2560-1



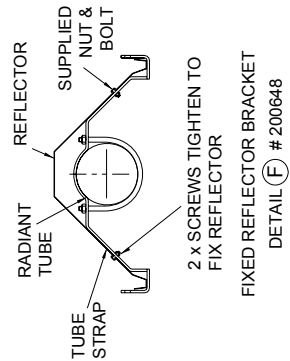
Figure 17. VSLUS Heater Assembly: Model Linear 40S20 and 60S20.



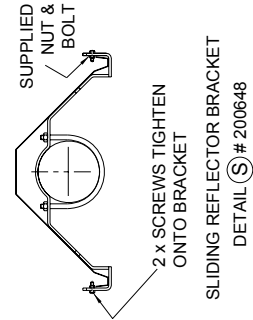
SUSPENSION BRACKET TYPE A  
4" BURNER U BOLT. DETAIL (A1) # 201851



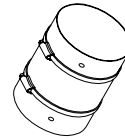
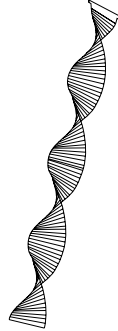
SUSPENSION BRACKET TYPE B  
DETAIL (B) # 6578-SUB



FIXED REFLECTOR BRACKET  
DETAIL (F) # 200648



SLIDING REFLECTOR BRACKET  
DETAIL (S) # 200648

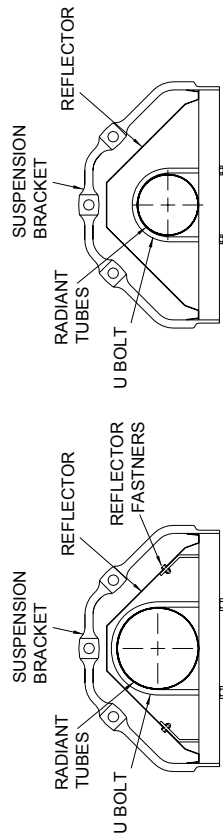
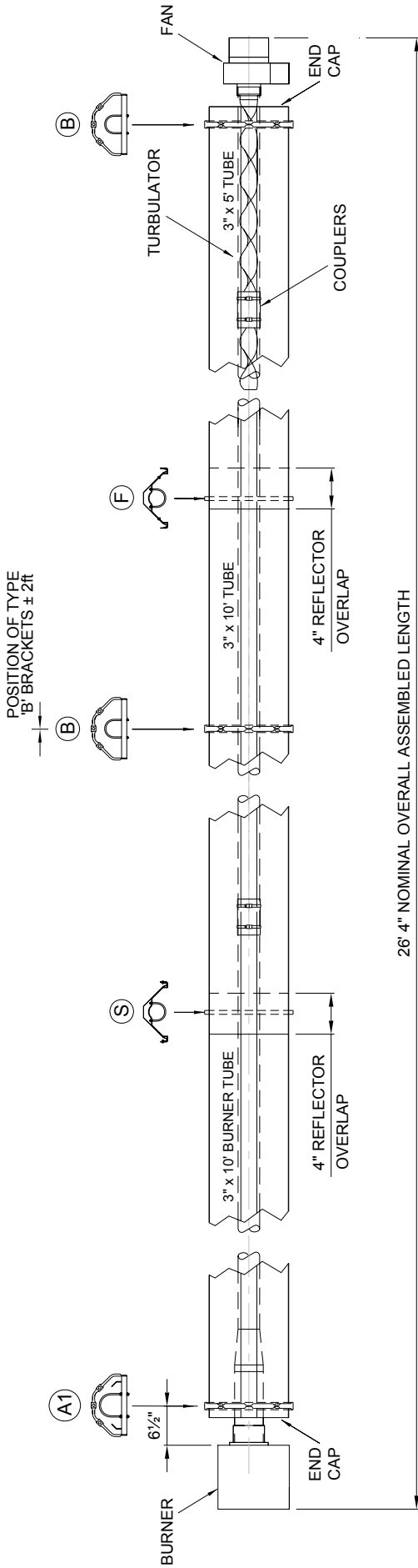


STANDARD 3" COUPLER

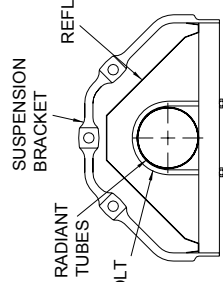
**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS  
THE 1ST. THE 3RD REFLECTOR  
OVERLAPS THE 2ND.

MODEL NUMBER	BTU/HR	PARTS LIST	PART #
VSLUS40-S20	45,720	BURNER TUBE 10' ALUMINIZED RADIANT TUBE 10' MILD STEEL	1 no 202163 1 no T-3103
VSLUS60-S20	60,000	REFLECTOR 8' ALUMINUM or REFLECTOR 8' STAINLESS STEEL	2 no 1280-5 or 2 no 1261-5
		REFLECTOR 4' ALUMINUM REFLECTOR 4' STAINLESS STEEL	1 no 202192 or 1 no 202190
		END CAP PLAIN ALUMINUM END CAP HOLE ALUMINUM or	1 no 3291 1 no 202200
		END CAP PLAIN STAINLESS STEEL END CAP HOLE STAINLESS STEEL	or 1 no 3191-1HMF or 1 no 202197
		BRACKET SET	1 no BR3SLS20
		TURBULATOR	1 no 201823T
		FAN	1 no 2576T

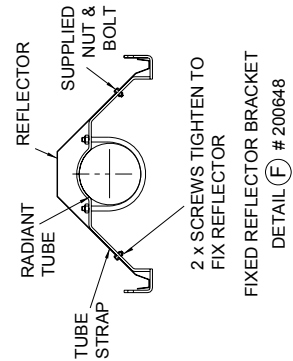
Figure 18. VSLUS Heater Assembly: Model Linear 40-S25, 60-S25 and 80-S25.



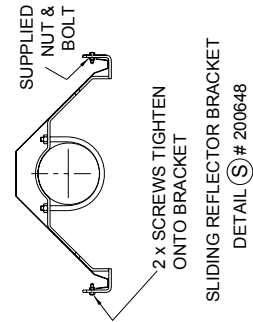
SUSPENSION BRACKET TYPE A  
4" BURNER U BOLT. DETAIL (A1) # 201851



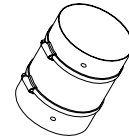
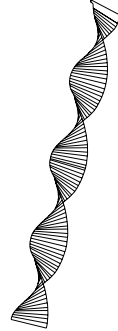
SUSPENSION BRACKET TYPE B  
DETAIL (B) # 6578-SUB



2 x SCREWS TIGHTEN TO FIX REFLECTOR  
FIXED REFLECTOR BRACKET  
DETAIL (F) # 200648



2 x SCREWS TIGHTEN ONTO BRACKET  
SLIDING REFLECTOR BRACKET  
DETAIL (S) # 200648

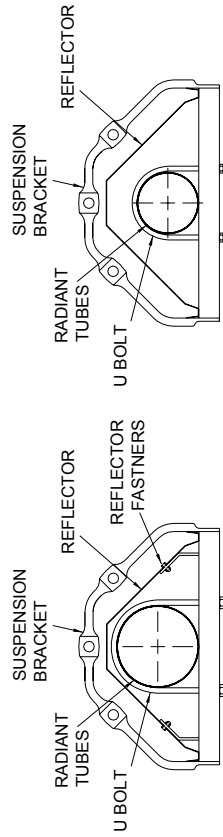
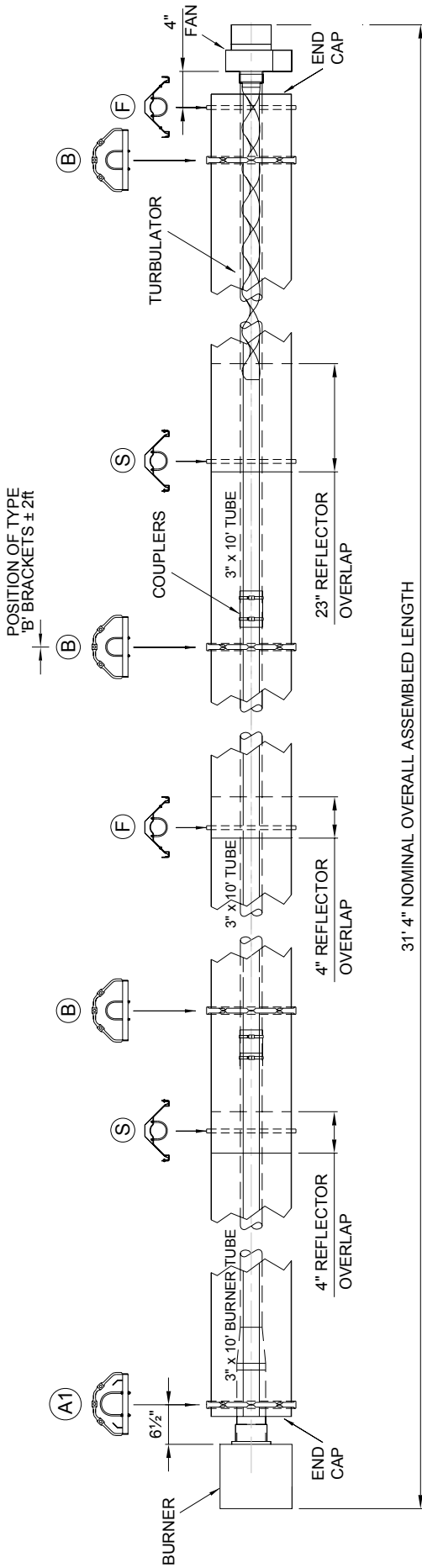


STANDARD 3" COUPLER

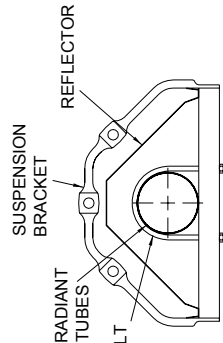
**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND.

MODEL NUMBER	BTU/HR	PARTS LIST	PART #
VSLUS40-S25	45,720	BURNER TUBE 10' ALUMINIZED	1 no 202163
VSLUS60-S25	60,000	RADIANT TUBE 10' MILD STEEL	1 no T-3103
VSLUS80-S25	80,000	RADIANT TUBE 5' MILD STEEL	1 no T-3154
		REFLECTOR 8' ALUMINUM or	3 no 1280-5
		REFLECTOR 8' STAINLESS STEEL	or 3 no 1261-5
		END CAP PLAIN ALUMINUM	1 no 3291
		END CAP HOLE ALUMINUM or	1 no 202200
		END CAP PLAIN STAINLESS STEEL	or 1 no 3191-1HMF
		END CAP HOLE STAINLESS STEEL	or 1 no 202197
		BRACKET SET	1 no BR3SLS20
		TURBULATOR	1 no 200414T
		FAN	1 no 2576T

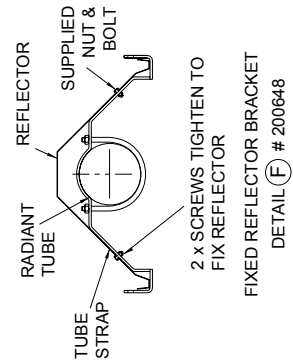
Figure 19. VSLUS Heater Assembly: Model Linear 40S30, 60S30 and 80S30.



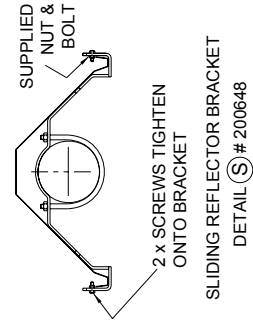
SUSPENSION BRACKET TYPE A  
4" BURNER U BOLT. DETAIL (A1) # 201851



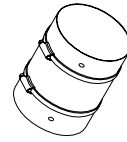
SUSPENSION BRACKET TYPE B  
DETAIL (B) # 6578-SUB



2 x SCREWS TIGHTEN TO  
FIX REFLECTOR  
FIXED REFLECTOR BRACKET  
DETAIL (F) # 200648



2 x SCREWS TIGHTEN  
ONTO BRACKET  
SLIDING REFLECTOR BRACKET  
DETAIL (S) # 200648



STANDARD 3" COUPLER

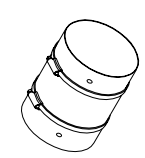
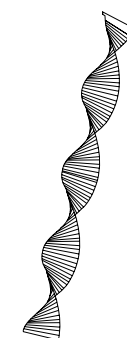
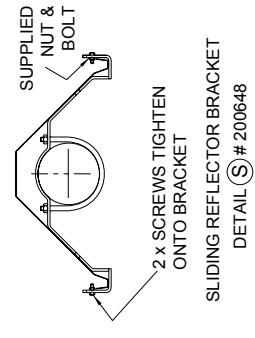
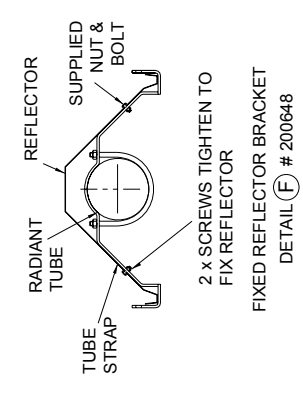
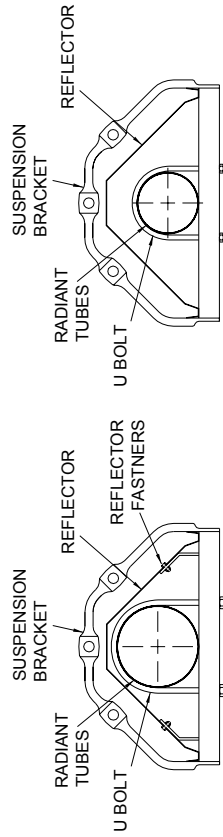
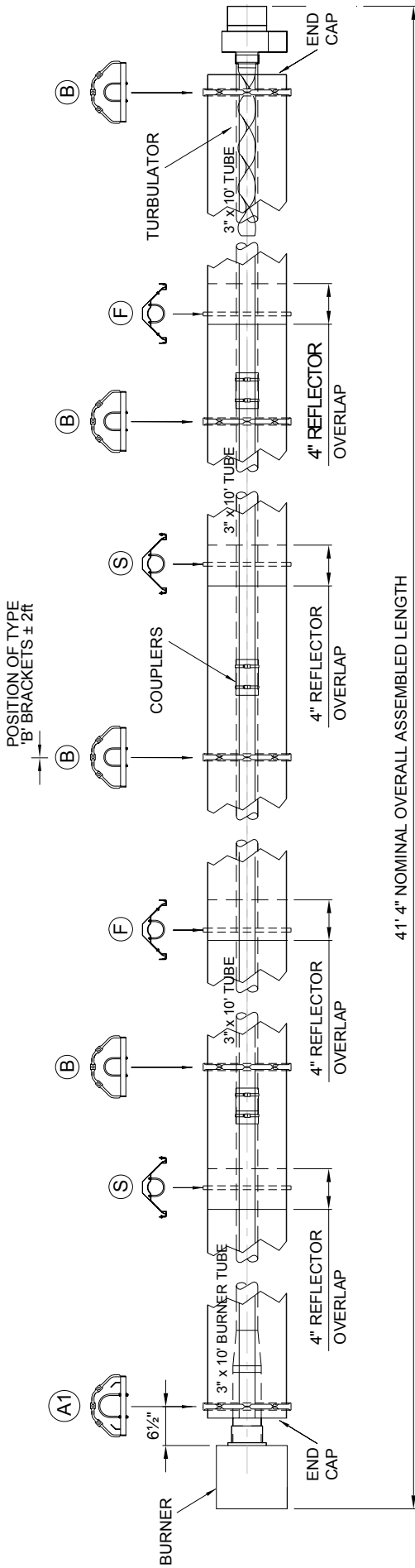
MODEL NUMBER	BTU/HR
VSLUS40-S30	45,720
VSLUS60-S30	60,000
VSLUS80-S30	80,000

PARTS LIST	PART #
BURNER TUBE 10' ALUMINIZED	1 no 202163
RADIANT TUBE 10' MILD STEEL	2 no T-3103
REFLECTOR 8' ALUMINUM or	4 no 1280-5
REFLECTOR 8' STAINLESS STEEL	or 4 no 1261-5
END CAP PLAIN ALUMINUM	1 no 3291
END CAP HOLE ALUMINUM or	1 no 202200
END CAP PLAIN STAINLESS STEEL	or 1 no 3191-1HMF
END CAP HOLE STAINLESS STEEL	or 1 no 202197
BRACKET SET	1 no BR3SLS30
TURBULATOR	1 no 200414T
FAN	1 no 2576T

**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS THE  
1ST. THE 3RD REFLECTOR OVERLAPS  
THE 2ND AND SO ON TOWARDS THE FAN.

Figure 20. VSLUS Heater Assembly: Model Linear 60-S40 and 80-S40.



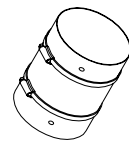
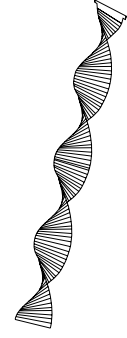
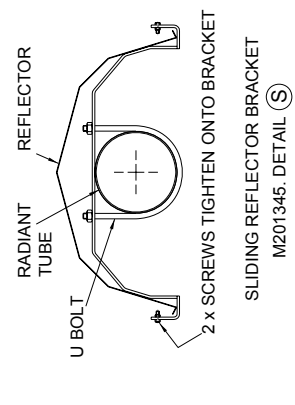
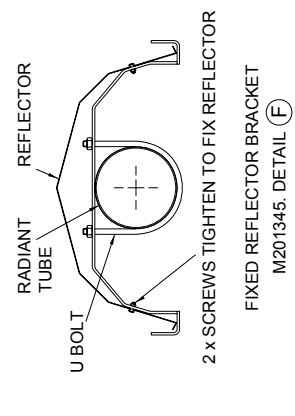
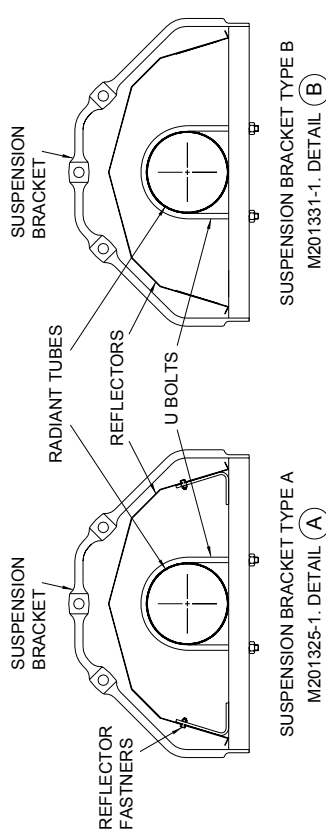
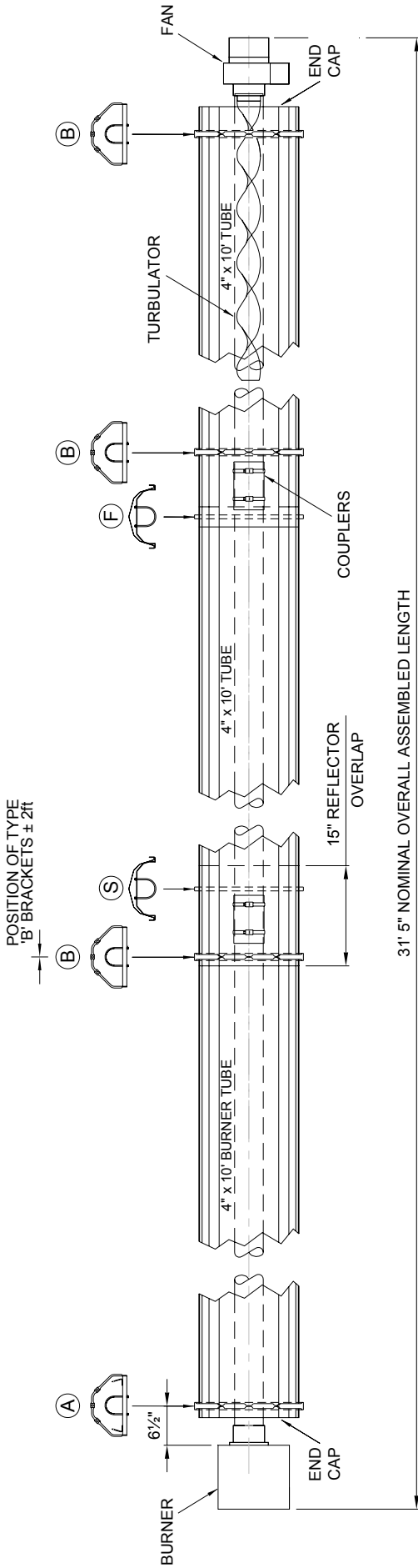
MODEL NUMBER	BTU/HR
VSLUS60-S40	60,000
VSLUS80-S40	80,000

PARTS LIST	PART #
BURNER TUBE 10' ALUMINIZED	1 no 202163
RADIANT TUBE 10' MILD STEEL	3 no T-3103
REFLECTOR 8' ALUMINUM or	or 5 no 1280-5
REFLECTOR 8' STAINLESS STEEL	5 no 1261-5
END CAP PLAIN ALUMINUM	1 no 3291
END CAP HOLE ALUMINUM or	1 no 202200
END CAP PLAIN STAINLESS STEEL	or 1 no 3191-1HMF
END CAP HOLE STAINLESS STEEL	or 1 no 202197
BRACKET SET	1 no BR3SLS40
TURBULATOR	1 no 200414T
FAN	1 no 2576T

**IMPORTANT:**  
 THE 2ND REFLECTOR OVERLAPS THE  
 1ST. THE 3RD REFLECTOR OVERLAPS  
 THE 2ND AND SO ON TOWARDS THE FAN.

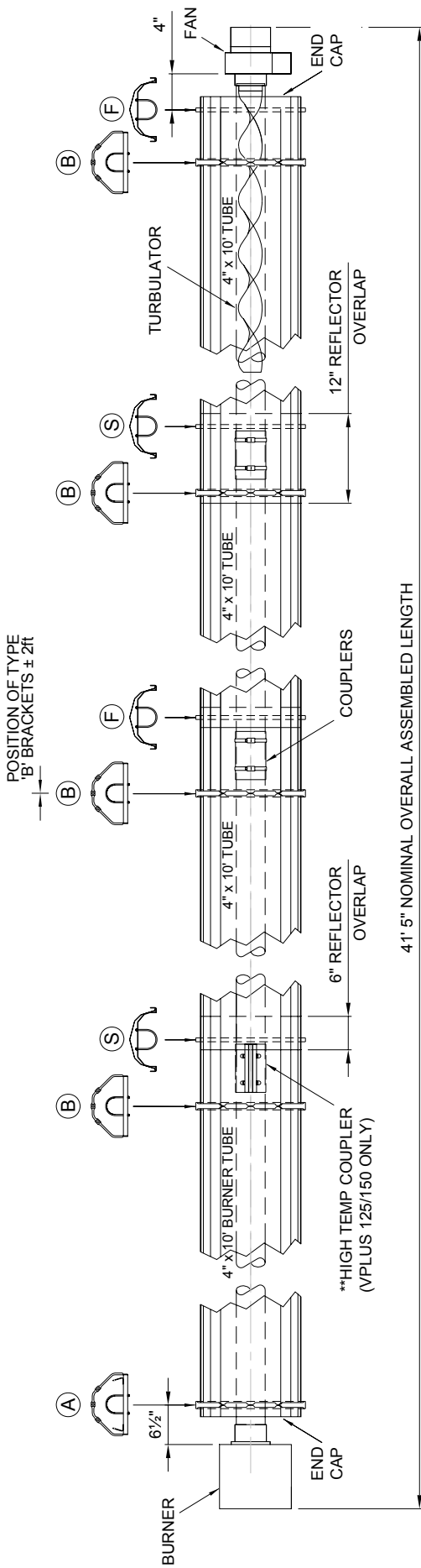
Figure 21. VSLUS Heater Assembly: Model Linear 100S30.



**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS  
THE 1ST. THE 3RD REFLECTOR  
OVERLAPS THE 2ND.

MODEL NUMBER	BTU/HR
VSLUS100-S30	100,000
PARTS LIST	
BURNER TUBE 10' ALUMINIZED	1 no T-4101
RADIANT TUBE 10' MILD STEEL	2 no T4103
REFLECTOR 10' ALUMASTEEL or	3 no L201032
REFLECTOR 10' ALUMINUM or	or 3 no L201031
REFLECTOR 10' STAINLESS STEEL	or 3 no L201030
END CAP ALUMASTEEL or	2 no L105043
END CAP ALUMINUM or	or 2 no L105041
END CAP STAINLESS STEEL	or 2 no L105023
BRACKET SET	1 no BR4SLS30
TURBULATOR	1 no 6619T
FAN	1 no 2576T

Figure 22. VSLUS Heater Assembly: Model Linear 100S40, 125S40 and 150S40



MODEL NUMBER	BTU/HR
VSLUS100-S40	100,000
VSLUS125-S40	125,000
VSLUS150-S40	150,000

PARTS LIST	PART #
BURNER TUBE 10' ALUMINIZED	1 no T-4101
RADIANT TUBE 10' MILD STEEL	3 no T4103
REFLECTOR 10' ALUMASTEEL or	4 no L201032
REFLECTOR 10' ALUMINUM or	or 4 no L201031
REFLECTOR 10' STAINLESS STEEL	or 4 no L201030
END CAP ALUMASTEEL or	2 no L105043
END CAP ALUMINUM or	or 2 no L105041
END CAP STAINLESS STEEL	or 2 no L105023
BRACKET SET	1 no BR4SLS40
TURBULATOR	1 no 6619T
** HT COUPLER (125/150 ONLY)	1 no C112110
FAN (100 & 125)	1 no 2576T
FAN (150 ONLY)	1 no 2560-1

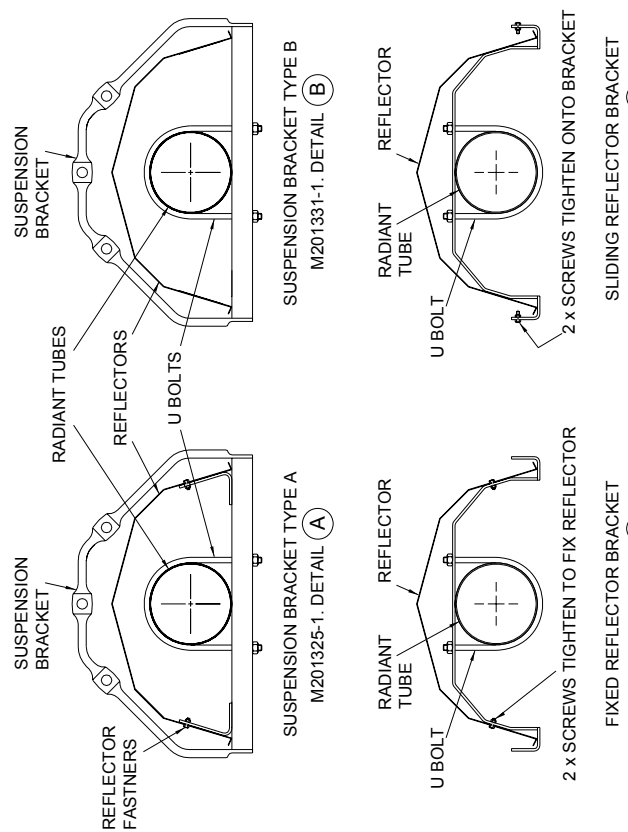
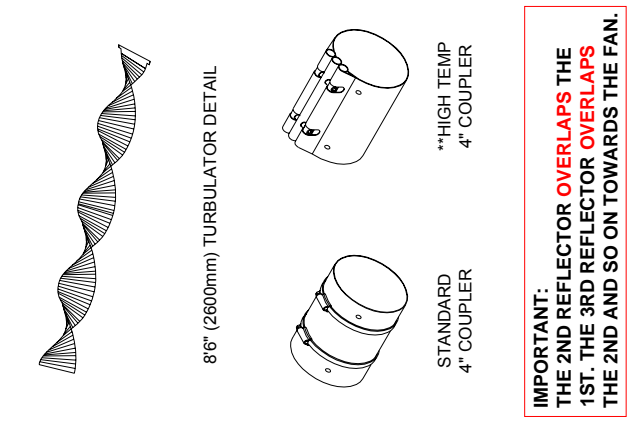
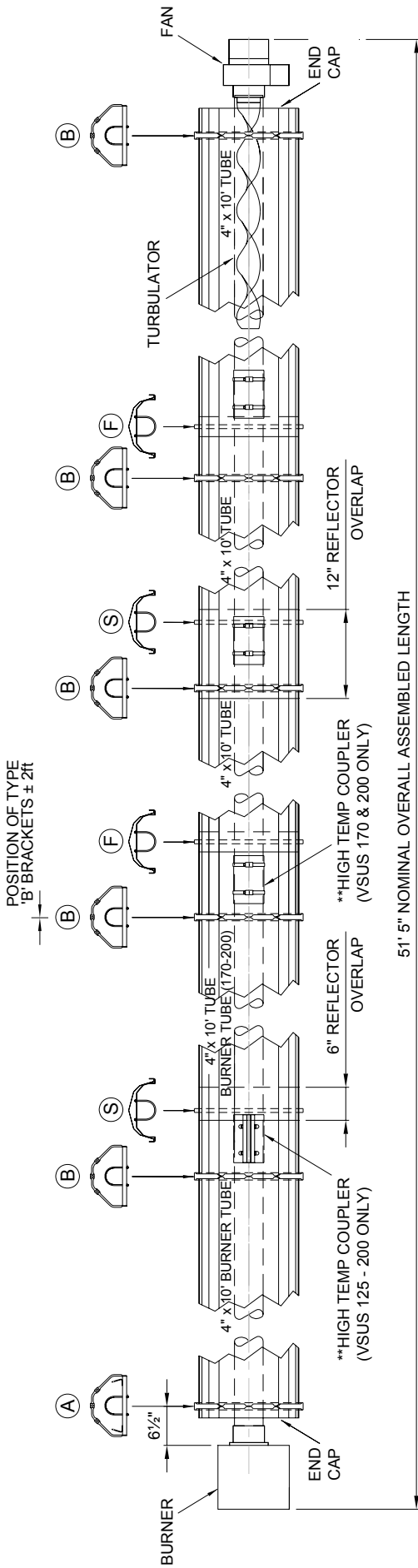
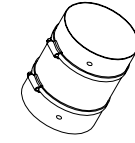
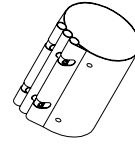
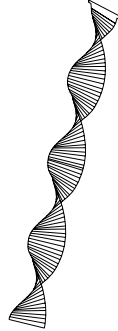


Figure 23. VSLUS Heater Assembly: Model Linear 100S50, 125S50, 150S50, 170S50 and 200S50



MODEL NUMBER	BTU/HR	TUBES
VSLUS100-S50	100,000	T-4101 4 no
VSLUS125-S50	125,000	1 no 4 no
VSLUS150-S50	150,000	1 no 4 no
VSLUS170-S50	175,000	2 no 3 no
VSLUS200-S50	200,000	2 no 3 no

PARTS LIST	PART #
REFLECTOR 10' ALUMASTEEL or REFLECTOR 10' ALUMINUM or REFLECTOR 10' STAINLESS STEEL	5 no L201032 or 5 no L201031 or 5 no L201030
END CAP ALUMASTEEL or END CAP ALUMINUM or END CAP STAINLESS STEEL	2 no L105043 or 2 no L105041 or 2 no L105023
BRACKET SET	1 no BR4SLS50
TURBULATOR	1 no 6619T
** HT COUPLER (125 & 150)	1 no C112110
** HT COUPLER (170 & 200)	2 no C112110
FAN (100 & 125)	1 no 2576T
FAN (150, 170 & 200)	1 no 2560-1



**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND AND SO ON TOWARDS THE FAN.

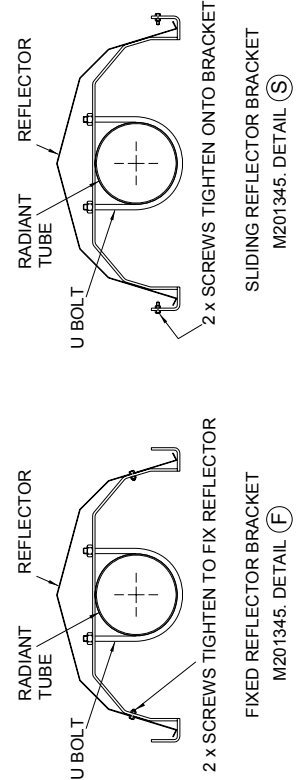
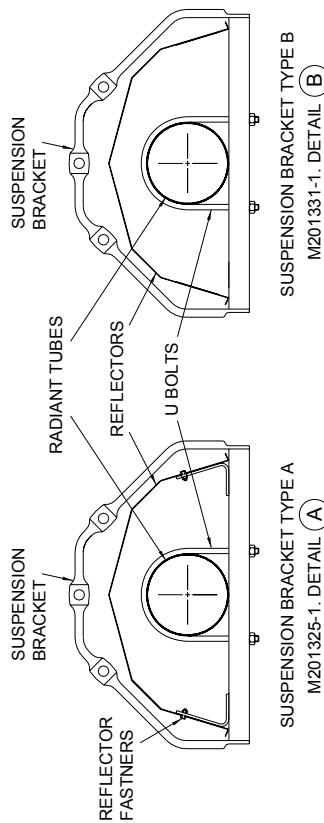
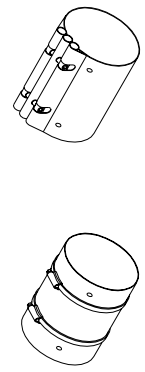
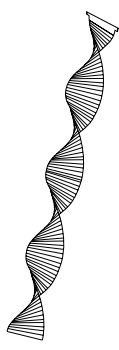
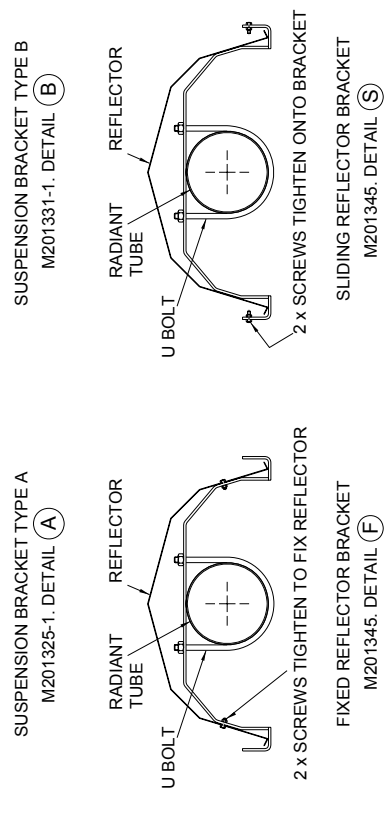
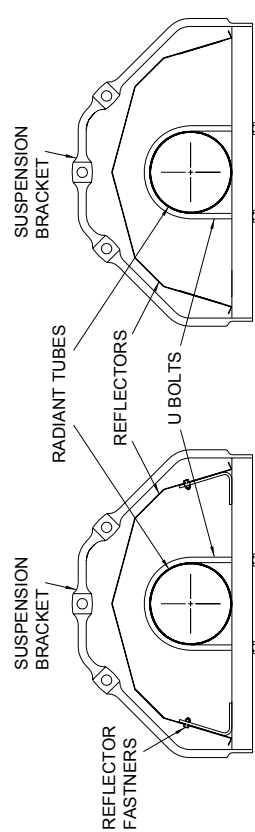
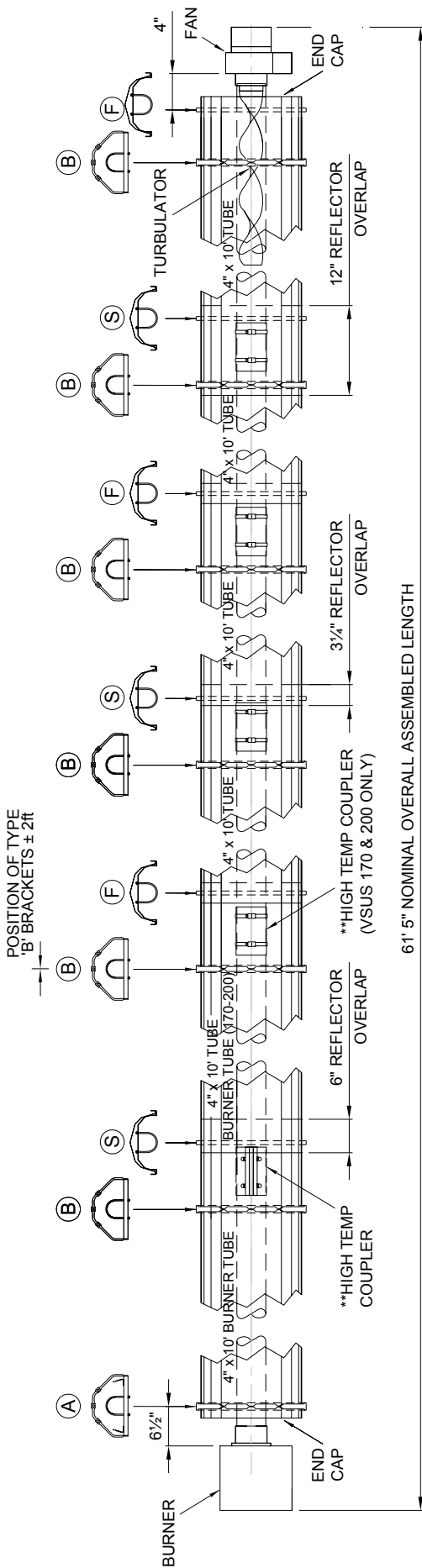


Figure 24. VSLUS Heater Assembly: Model Linear 125S60, 150S60, 170S60 and 200S60



**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND AND SO ON TOWARDS THE FAN.

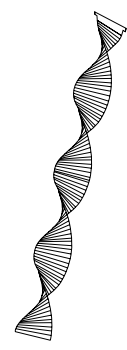
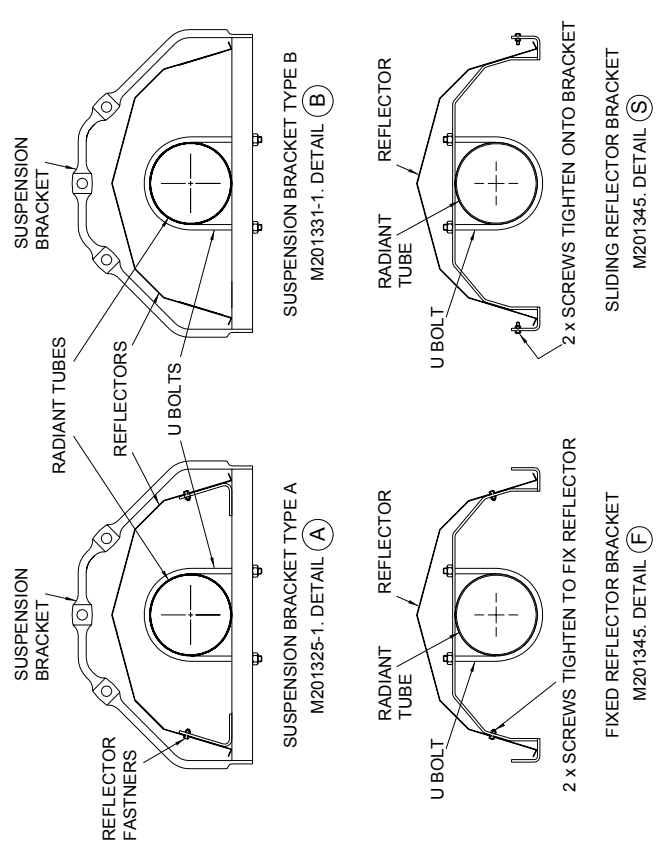
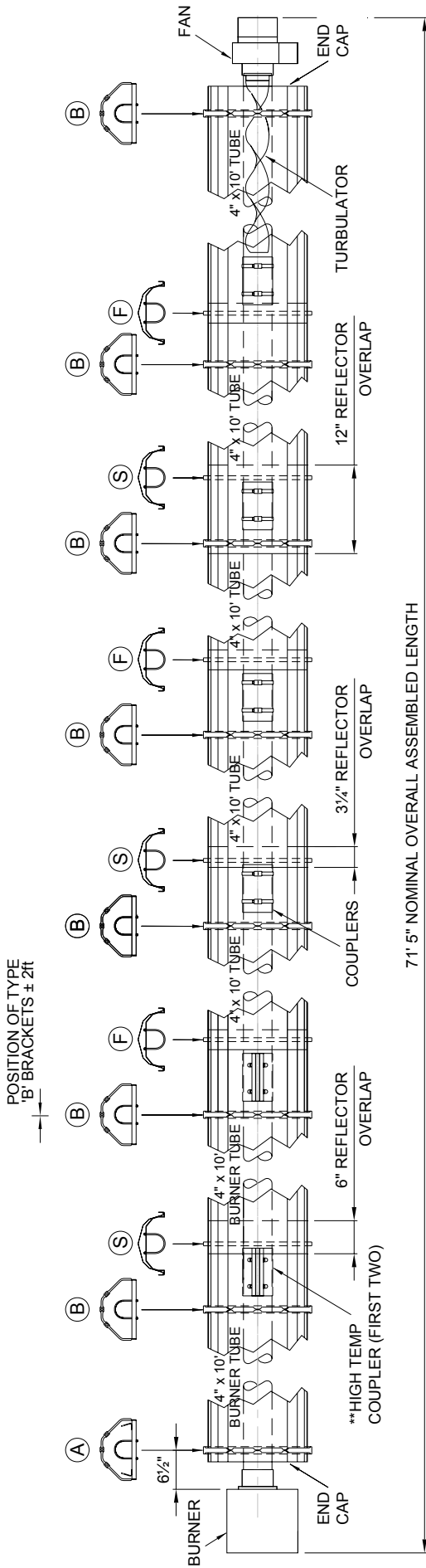
MODEL NUMBER	BTU/HR	TUBES
VSLUS125-S60	125,000	T-4101 1 no 5 no
VSLUS150-S60	150,000	1 no 5 no
VSLUS170-S60	175,000	2 no 4 no
VSLUS200-S60	200,000	2 no 4 no

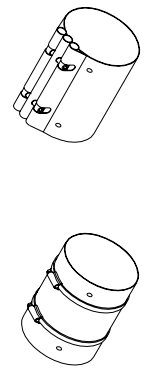
PARTS LIST	PART #
REFLECTOR 10' ALUMASTEEL or REFLECTOR 10' ALUMINUM or REFLECTOR 10' STAINLESS STEEL	6 no L201032 or 6 no L201031 or 6 no L201030
END CAP ALUMASTEEL or END CAP ALUMINUM or END CAP STAINLESS STEEL	2 no L105043 or 2 no L105041 or 2 no L105023
BRACKET SET	1 no BR4SLS60
TURBULATOR	1 no 6619T
** HT COUPLER (125 & 150)	1 no C112110
** HT COUPLER (170 & 200)	2 no C112110
FAN (125 ONLY)	1 no 2576T
FAN (150, 170 AND 200)	1 no 2560-1



Figure 25. VSLUS Heater Assembly: Model Linear 170S70 and 200S70



86" (2600mm) TURBULATOR DETAIL



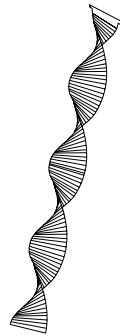
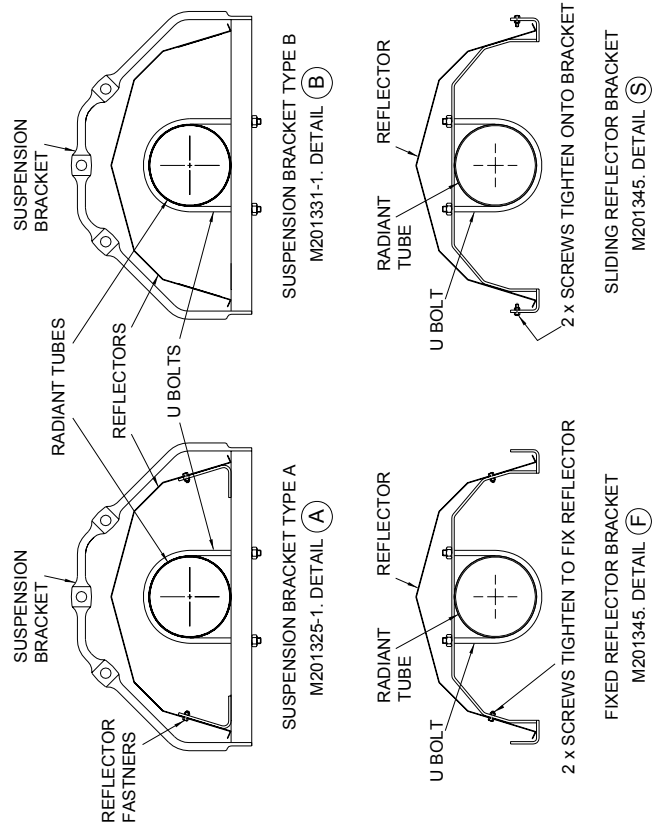
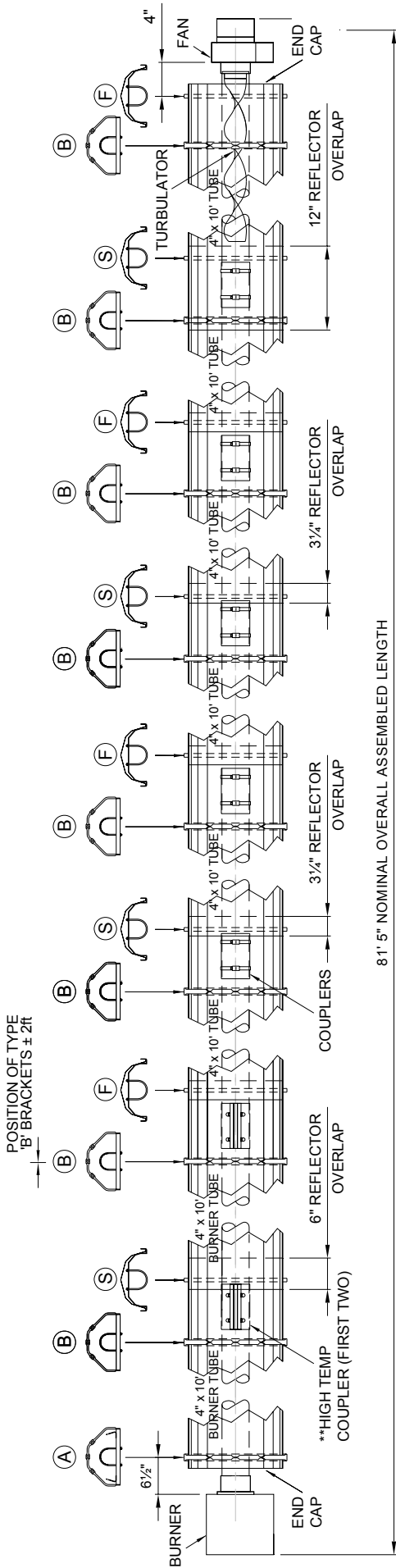
STANDARD 4" COUPLER

\*\*HIGH TEMP 4" COUPLER

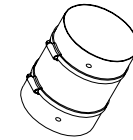
**IMPORTANT:**  
 THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND AND SO ON TOWARDS THE FAN.

MODEL NUMBER	BTU/HR	PARTS LIST	PART #
VSLUS170-S70	175,000	BURNER TUBE 10' ALUMINIZED	2 no T-4101
VSLUS200-S70	200,000	RADIANT TUBE 10' MILD STEEL	5 no T4103
		REFLECTOR 10' ALUMASTEEL or	7 no L201032
		REFLECTOR 10' ALUMINIUM or	or 7 no L201031
		REFLECTOR 10' STAINLESS STEEL	or 7 no L201030
		END CAP ALUMASTEEL or	2 no L105043
		END CAP ALUMINIUM or	or 2 no L105041
		END CAP STAINLESS STEEL	or 2 no L105023
		BRACKET SET	12 no BR4SL70
		TURBULATOR	1 no 6619T
		** HT COUPLER	2 no C112110
		FAN	1 no 2560-1

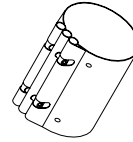
Figure 26. VSLUS Heater Assembly: Model Linear 200S80



86" (2600mm) TURBULATOR DETAIL



STANDARD 4" COUPLER



\*\*HIGH TEMP 4" COUPLER

**IMPORTANT:**  
THE 2ND REFLECTOR OVERLAPS THE 1ST. THE 3RD REFLECTOR OVERLAPS THE 2ND AND SO ON TOWARDS THE FAN.

MODEL NUMBER	BTU/HR	PARTS LIST	PART #
VSLUS200-S80	200,000	BURNER TUBE 10' ALUMINIZED	2 no T-4101
		RADIANT TUBE 10' MILD STEEL	6 no T4103
		REFLECTOR 10' ALUMASTEEL or	8 no L201032
		REFLECTOR 10' ALUMINIUM or	8 no L201031
		REFLECTOR 10' STAINLESS STEEL	or 8 no L201030
		*END CAP ALUMASTEEL or	2 no L105043
		*END CAP ALUMINIUM or	or 2 no L105041
		*END CAP STAINLESS STEEL	or 2 no L105023
		BRACKET SET	1 no BR4SLS80
		TURBULATOR	1 no 6619T
		** HT COUPLER	2 no C112110
		FAN	1 no 2560-1

\* OPTIONAL

### 3. Start Up Instructions.



**These appliances should be commissioned by a qualified mechanical contractor.**

#### 3.1 Tools Required.

The following tools and equipment are advisable to complete the tasks laid out in this manual.



**Suitable alternative tools may be used.**



**Leather Faced Gloves**



**Phillips Screwdriver**



**Small Flat Head Screwdriver**



**Large Adjustable Wrenches for fitting Of Gas Flex.**



**1/2" Wrench**



**5/32" (4mm) Allen Wrench**



**Manometer**



**Multimeter**

#### 3.2 Start Up procedure

Inspect installation and ensure that it has been carried out in accordance with these instructions. Remove burner and inspect the electrode assemblies ensuring these are securely fixed and all electrical connections securely made. Re-fit the burner ensuring that it is correctly positioned and the screws are fully tightened. Ensure that electrical and gas supplies are isolated.

The gas supply should be purged and tested for soundness in accordance with local and National Safety codes.

Open isolating gas valve and test gas connections for soundness using soap solution.

Open the control housing door by unscrewing the securing screw. Ensure all internal components are securely fixed and all connections securely made.

Open the manual gas valve outside the control housing

Switch on the electrical supply to start the heater and observe the correct start up sequence. Ensure that the setting of any time switch and thermostat are such that the heating system will be required to operate.

The fan will start to run and the 'power on' lamp will illuminate. Safe-start checks are carried out automatically. After the fan has run up to full speed and a satisfactory pressure condition has been established, the ignition sequence will commence. The spark ignition will be energized producing a spark at the ignition electrode. The gas solenoid valve will at the same time be energized and the 'burner on' lamp will

illuminate. If the ignition is successful the flame is detected by the flame sensing probe and the 'burner on' lamp will remain on.

If ignition is unsuccessful the gas valve will close and the spark ignition de-energized after approximately 10 seconds. For approximately 10 to 20 seconds the fan will purge the system then re-ignition will be attempted. After 2 further attempts at ignition the control unit will 'lock-out', the 'power on' lamp will remain illuminated and the fan will continue to run. To reset after 'lockout' switch off the power supply to the system and wait 5 minutes (refer section 1.26.1 ANSI Z83.20). Then turn the power on. If repeated 'lockout' occurs investigate the cause.

Check the gas inlet pressure with a suitable 'U' tube manometer against those shown in table 3. Adjust if necessary.

Set burner gas pressure as follows:

Switch off the power supply to the heating system. Connect a 'U' tube manometer to the pressure test point provided on the combination gas control valve. Remove the cover from the pressure regulator revealing the adjustable screw. Start the heater and using a suitable screwdriver adjust the pressure regulator, turning the screw clockwise to increase the pressure or counter-clockwise to decrease the pressure. Set the pressure to appropriate inches w.c. from the table of gas pressures for correct heater description. Switch off the power supply to the heating system. Disconnect 'U' tube manometer, then securely replace screw in pressure test nipple.

Check the operation of the flame safeguard equipment as follows:

With the heater running normally, switch off the

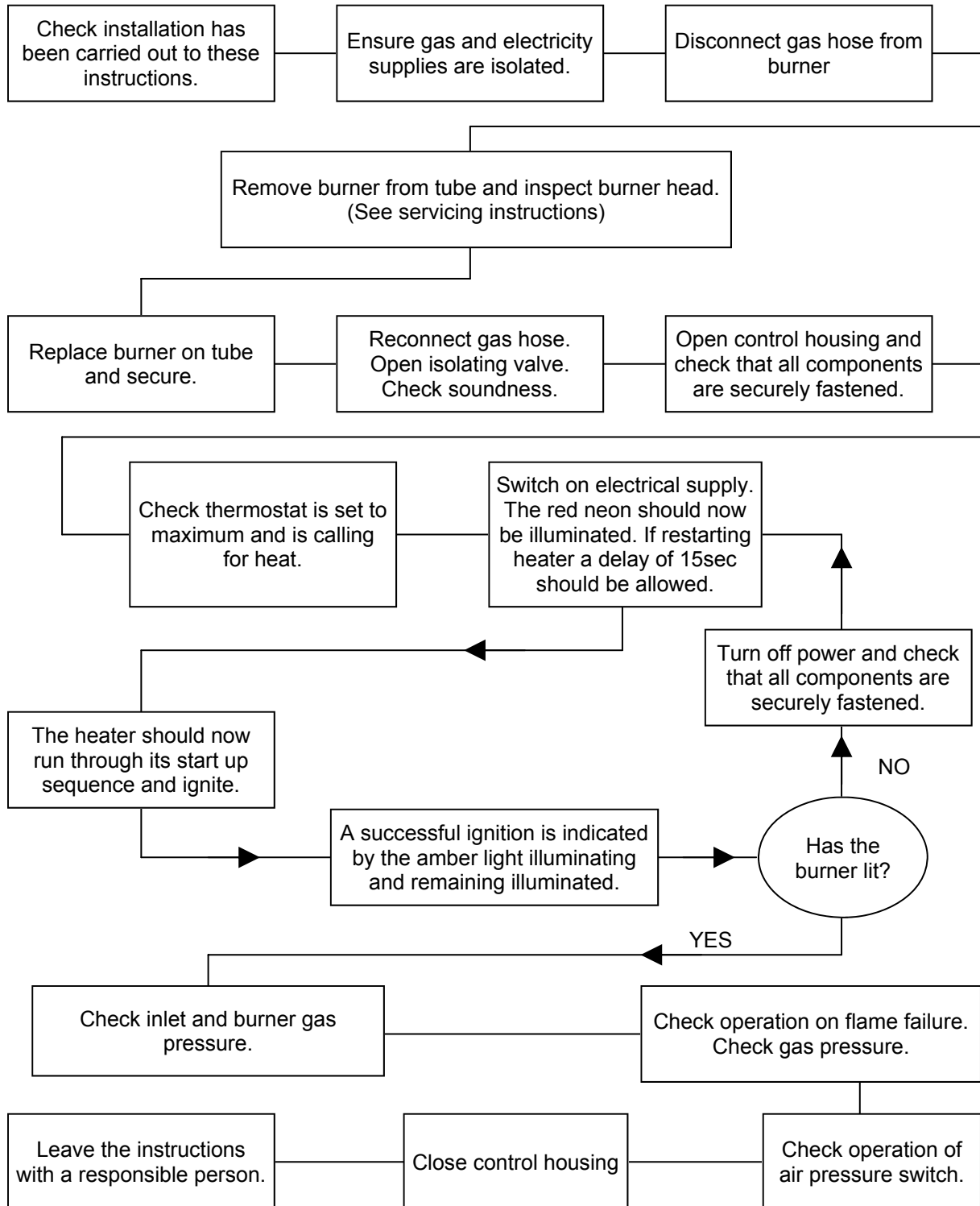
gas supply at the shut off valve. The heater should attempt to relight and if the gas valve has been left off 'lock-out' should occur indicated by the 'power on' lamp being illuminated and fan running, but the 'burner on' lamp being off.

With the heater running normally, pull off the silicone rubber tube connecting the vacuum switch to the combustion chamber. Within 4 seconds the burner should shut off. Then replace the tube securely and observe that the heater proceeds to ignite in the normal way.

Check the operation of the pressure proving switch as follows:

Close the controls door securing it with the screw.

**Commissioning chart**



## 4. Servicing Instructions.



These appliances should be serviced annually by a competent person to ensure safe and efficient operation. In exceptional dusty or polluted conditions more frequent servicing may be required. Servicing work should be carried out by a qualified mechanical contractor.

### 4.1 Tools Required.



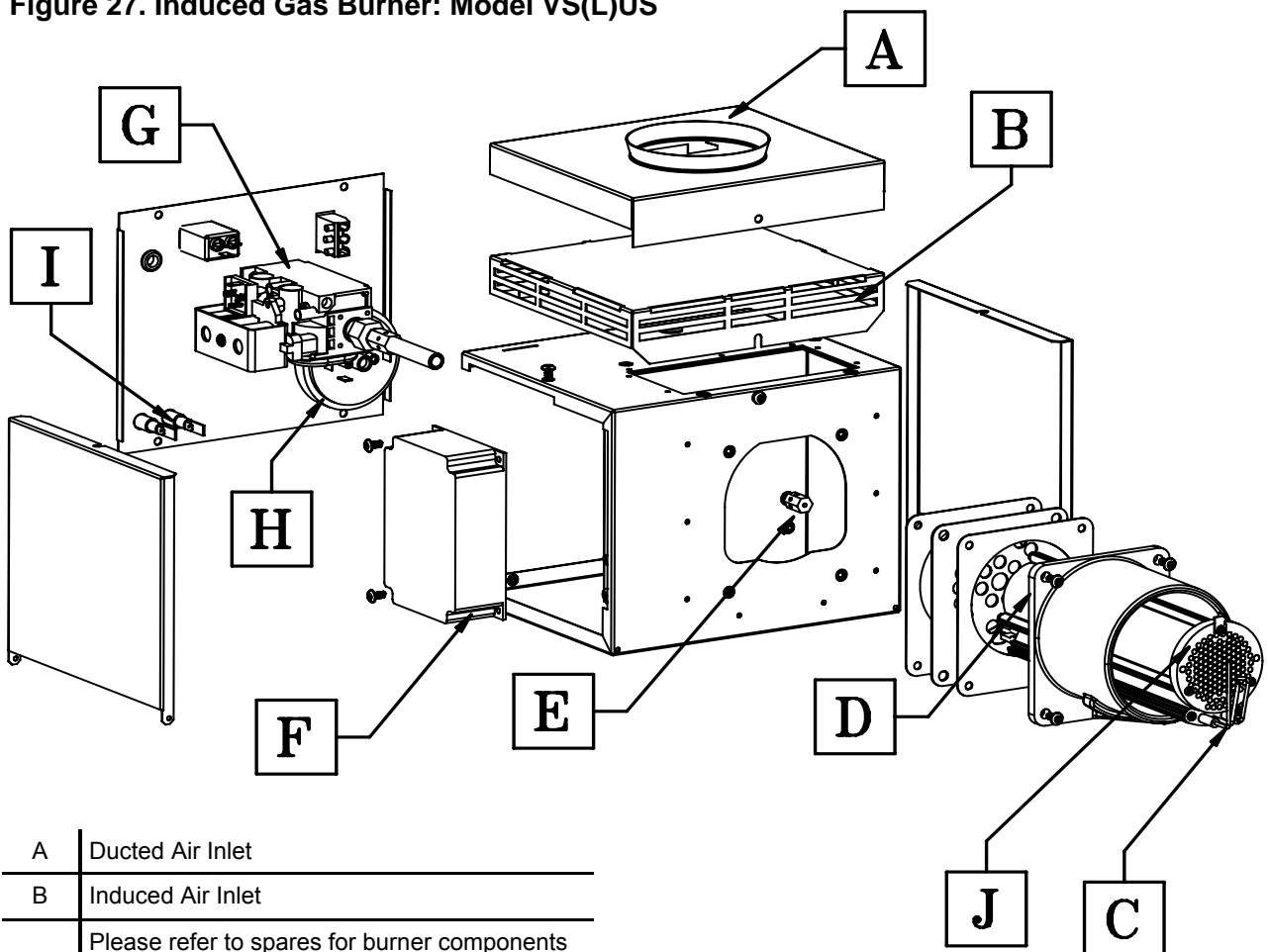
Suitable alternative tools may be used.

The following tools and equipment are advisable to complete the tasks laid out in this manual.



### 4.2 Burner Description.

Figure 27. Induced Gas Burner: Model VS(L)US








A	Ducted Air Inlet
B	Induced Air Inlet
	Please refer to spares for burner components
C	Ignitor Assembly
D	Burner Tube
E	Multi Hole Injector
F	Ignition Controller

G	Gas Valve
H	Pressure Switch
I	Neon's (Red/Amber)
J	Pepperpot Head

### 4.3. Spare Parts


In order to aid troubleshooting and servicing we recommend that the components shown in this section should be stocked.

 *Note Any spare part components that are not approved by AmbiRad will invalidate the approval of the appliance and validity of the warranty.*

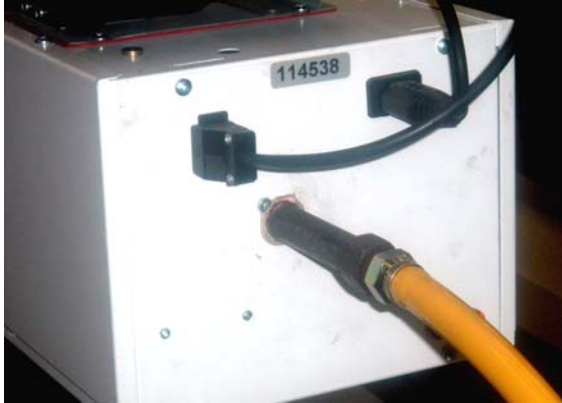
Item	Description	Part No.	Item	Description	Part No.
	Ignition Controller	3256-11		Pressure Switch	201676
	Valve Twin sol reg	201706		Amber Neon (Burner On)	2181
	Pepperpot Head	200988		Red Neon (Power On)	2176
	Ignitor Assembly	201284		Combustion Fan (40 - 125) (150 - 200)	2576T 2560-1
	Burner Tube	200358		Flame Plate 60 & 100 ONLY	201854
	Injector	See section 1.11		Gasket Set	201488
	Jet Carrier (40 - 150)	200420		Ducted Air Hose	201321
	Jet Carrier (170 - 200)	201630		Hose Clamp	7541
	Cables:				
	Spark Electrode (black)	900225-2			
	Rectification lead (purple)	900225-3			
	Earth lead (green/yellow)	900225-1			



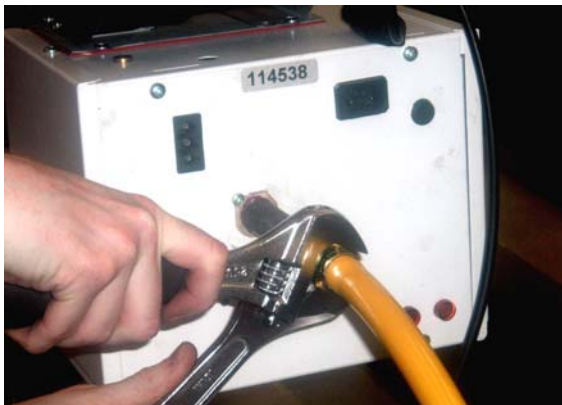
#### 4.4 Burner Removal

 Step 1 Isolate power and gas supplies.

Step 2 Unplug the power connectors.




Step 3 Detach the gas supply as shown below, taking care to support the burner connection.



Step 4 If ducted air is connected, loosen hose clamp and remove the flexible hose from the burner.

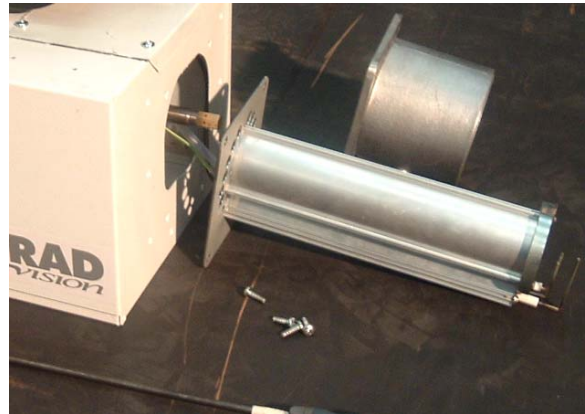
Step 5 Loosen the set screw on the burner support casting to enable the burner to be removed from the radiant tube.



 Step 6 Remove the burner and position the burner in a safe area to prevent the burner or components attached to the burner from falling to the ground.

#### 4.5 Burner Gas Injector Servicing

Step 1.a Remove the burner support casting and gasket.




Step 1.b The burner head assembly can be disconnected by separating the connectors of the ignition lead assembly and removing the pressure switch silicon tube.



Step 2 The gas injector can be inspected and replaced if contaminated or blocked.



 When replacing the gas injector ensure approved thread sealant is used.

Step 3 Reconnect ignition leads and silicon tube to test nipple. Refit gasket and support casting.

Step 3 The condition of the igniter assembly can be checked for deterioration. However, we advise replacement at each service to ensure continued reliability.

#### 4.6 Burner Head and Electrode Servicing

Step 1 Check the pepper pot burner head for contamination. If necessary this can be removed. See below. This can be cleaned together with the inside of the burner tube.

Step 4 Detach the electrode assembly from the burner head by removing the two screws and separating the igniter lead connectors.

Step 5 Refit the electrode assembly and ensure the connections are secure to prevent incorrect sparking of the spark electrode.

Step 6 Check the positions and spark gap as shown below.

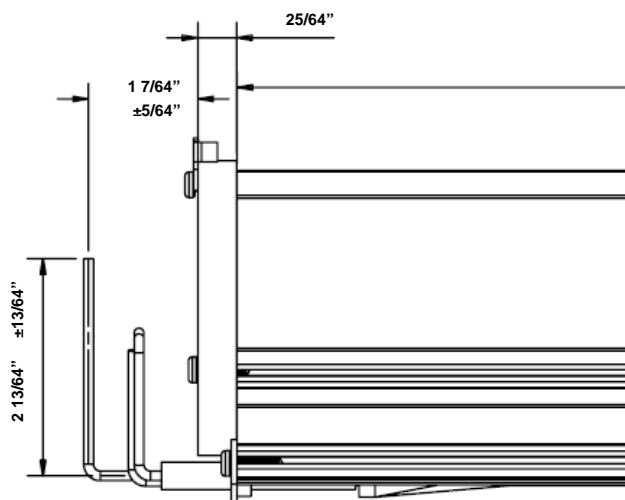
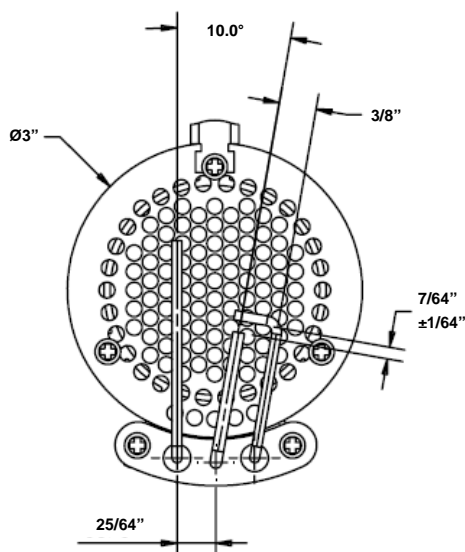
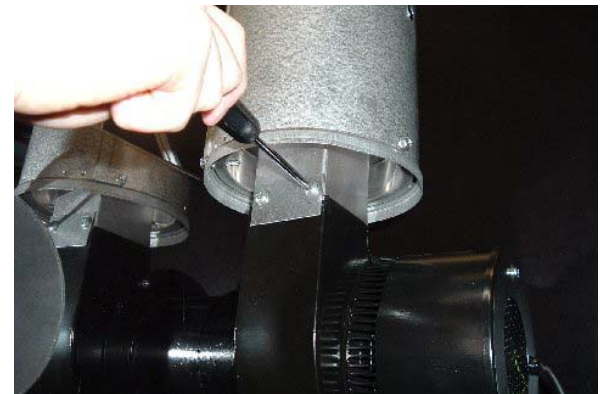
Step 7 The burner assembly is ready to refit after servicing the combustion fan and the radiant tube assembly.



Step 2 The pepper pot burner head should be replaced ensuring the 5 holes on the outer ring are aligned alongside the probes.

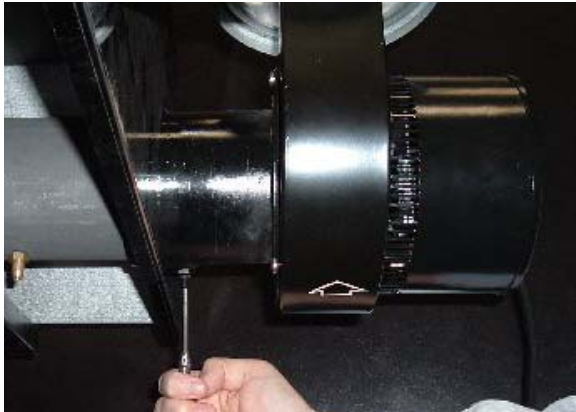
#### 4.7 Combustion Fan Assembly

Step 1 Loosen the clamp fitting on the vent.





Step 2 Loosen the set screw.



Step 3 The combustion fan can now be detached.

Step 4 Remove the fan orifice plate spinning.



Step 5 Inspect the impeller and remove any dust with a soft brush.



Step 6 Remove any dust from fan scroll and from around the motor.

Step 7 Ensure the impeller rotates freely.

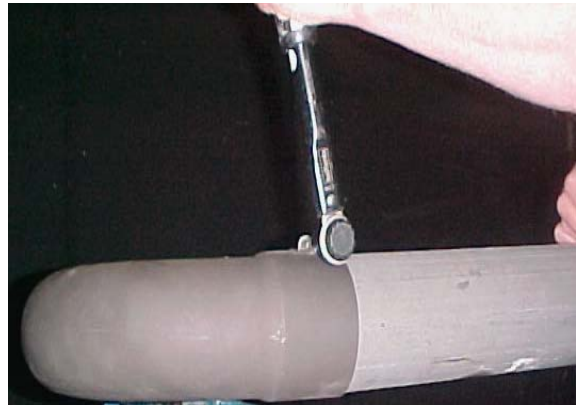
Step 8 Refit components.

#### 4.8 Radiant Tube Servicing

Step 1 Brush any dust from the exterior of the tubes.

Step 2 Inspect the fan and burner tubes visually. If the tubes appear clean, skip to servicing the reflector.

Step 3 Remove the U bend (on U heaters)



Step 4 Withdraw the turbulators from the appliance. Carefully note their condition and position. Replace turbulators if necessary.



Step 5 The turbulators should be cleaned with a soft brush.



Step 6 If required the interior of the tubes can then be cleaned using an industrial vacuum cleaner or by using long poles and a scraper.

Step 7 Refit components.

#### **4.9 Reflector Servicing**

The condition of the reflectors should be noted. If necessary the reflectors can be cleaned with a mild detergent. This can significantly improve the efficiency of the appliance.

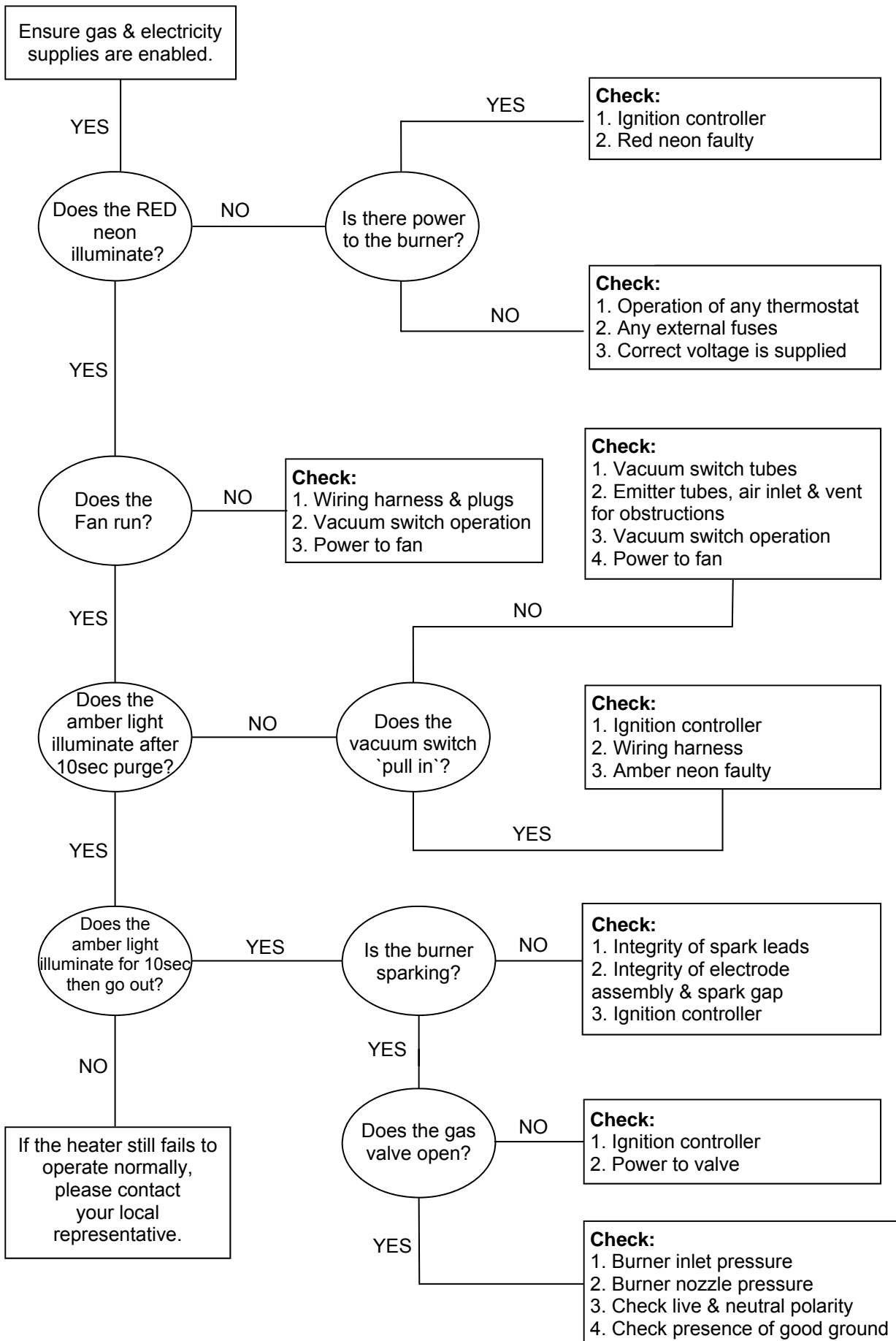
#### **4.10 Sweeping of Vent**

Inspect the fresh air inlet duct and vent to ensure they are free from any blockage or obstruction. The air inlet terminal and vent terminal should be inspected to ensure they are not liable to obstruction.

#### **4.11 Recommissioning After Service**

After servicing of the heater has been undertaken, it will be necessary to re-commission the heater as detailed in Section 3 of these instructions.

## 5. Troubleshooting Guide.



## 6. Replacing Parts.

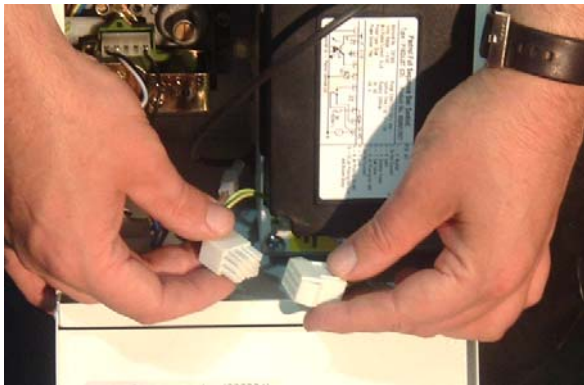


Turn off gas and any electrical supplies to the heater before starting repair work.

### 6.1 Burner Controller Replacement

Step 1 Loosen screw in burner lid and open the right hand burner access door.

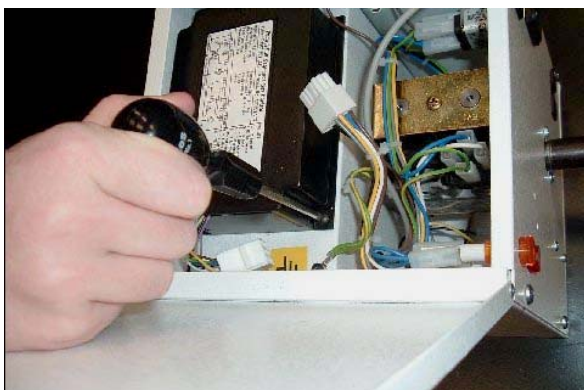
Step 2 Disconnect burner controller from the wiring harness.



Step 3 Disconnect the HT Lead from burner controller



Step 4 Remove the two screws attaching the controller to the burner and remove.



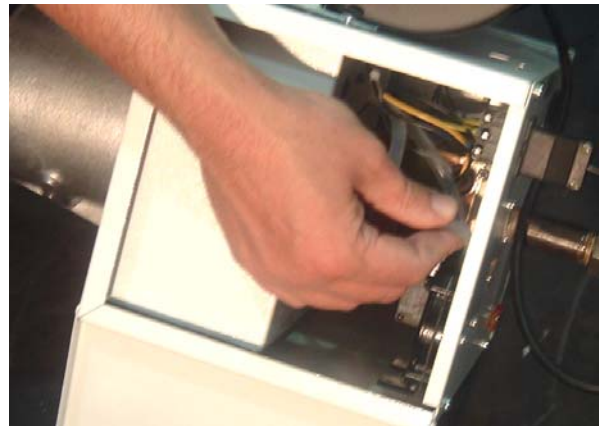
Step 5 Fit new burner controller

Step 6 Refit leads

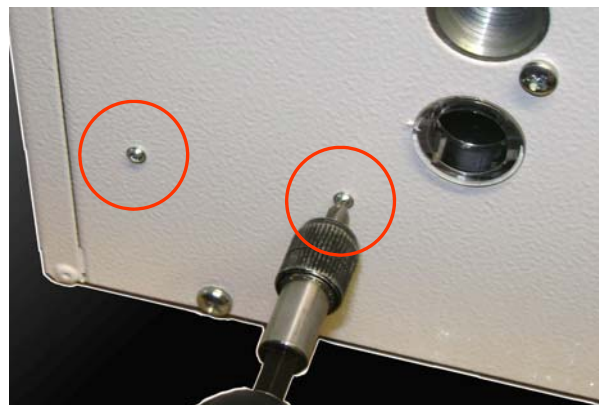
Step 7 Test product and close access door.

### 6.2 Air Pressure Switch Replacement

Step 1 Open left hand door. Disconnect the two silicone impulse tubes.



Step 2 Remove the two screws as shown below.



Step 3 Remove electrical connections. The air pressure switch can now be removed.

Step 4 Fit the new air pressure switch ensuring the impulse tubes and wire connections are connected as shown below.



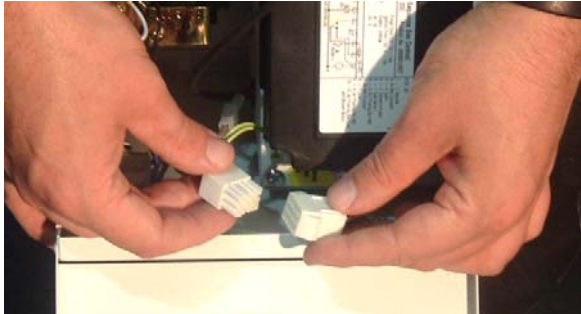
Step 5 Test product and close access doors.



### 6.3 Gas Valve Replacement

Step 1 Remove the burner assembly as described in the Servicing Sections.

Step 2 Open the right hand access door and detach the burner controller from the wiring harness.



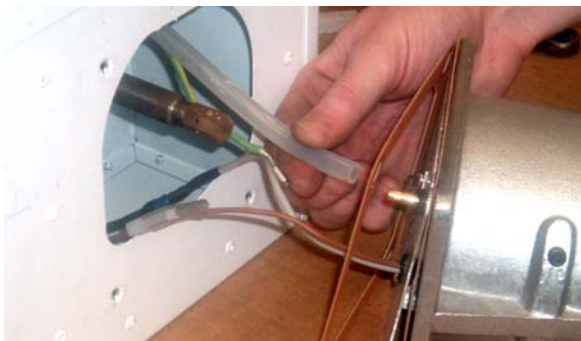
Step 3 Open the left hand access door and detach the impulse hoses from the air pressure switch.



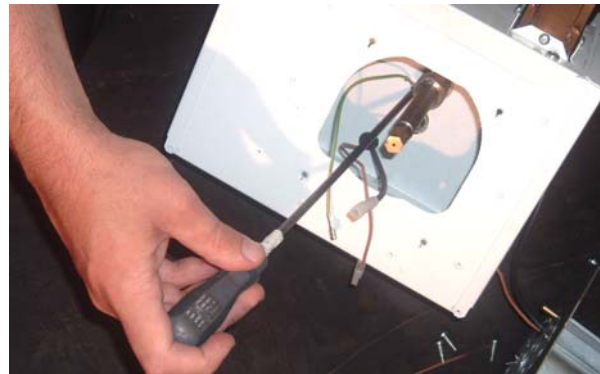
Step 4 Remove the 4 screws holding the burner head onto the burner assembly.



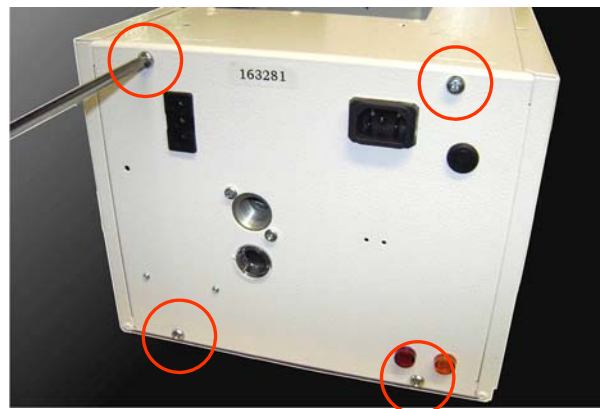
Step 5 The burner head can now be detached by disconnecting the impulse tube and the burner head wiring.



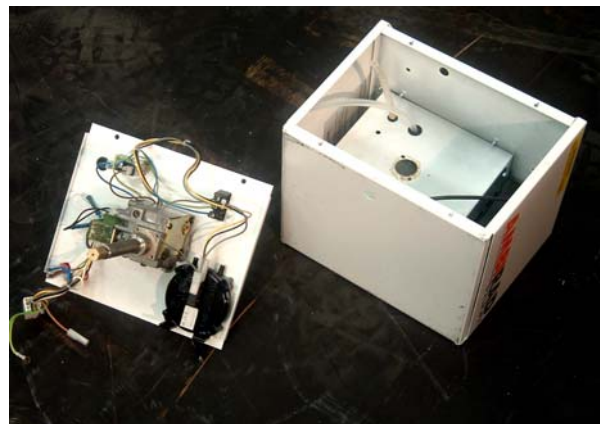
Step 6 Detach the two screws holding the front of the gas valve.



Step 7 Remove the four screws holding the rear burner plate in position.



Step 8 Remove gas fitting and the rear plate.



Step 9 The two screws retaining the gas valve can then be removed.

Step 10 The jet carrier and wiring harness can now be detached from the gas valve.

Step 11 The gas valve can now be replaced.

Step 12 Refit all components.

Step 13 Set pressures and ensure reliable burner performance.

Step 14 Test product and close access door.

# Notes



## 7. User & Operating Instructions.

AmbiRad is the manufacturer of a series of tubular infra-red heaters designed for overhead heating of industrial and commercial buildings. Individual heating units are suspended from the roof or mounted at an angle on the wall



- 1. This appliance must only be installed by qualified craftsmen in accordance with the requirements of local and National Codes.**
- 2. This appliance must be grounded in accordance with the National Electrical Code ANSI/NFPA No.70.**
- 3. Never rest anything, especially ladders against the heaters.**

### 7.1 To Start the Heater

1. First ensure that the gas supply to each heater is turned on by opening the main gas shut off valve.
2. Ensure that the setting of any time switch and thermostat are such that the heating system will be required to operate.
3. Switch off the electricity supply to the heater. The fan will start, the 'power on' light on the burner will illuminate and ignition commence.
4. Ignition will occur.
5. If ignition is successful the gas valve will close and the spark ignition de-energize after approximately 10 seconds. For approximately 10 - 20 seconds the fan will purge the system then re-ignition will be attempted. After 3 attempts at ignition the control unit will 'lock-out', the 'power on'

lamp will remain illuminated and the fan will continue to run. To reset after 'lockout', switch off the power supply to the heater and wait 5 minutes. Then turn the power on. If repeated 'lockout' occurs investigate the cause.

### 7.2. To Switch Off Heater

1. Switch off electrical supply to the heater. The burner will stop and the fan will shut off.

### 7.3. Servicing

1. To ensure continued, efficient and safe operation it is recommended that the heater be serviced regularly by a qualified person every year in normal working conditions but in exceptionally dusty or polluted conditions more frequent servicing may be needed.

Your Local Representative

An AmbiRad Group brand



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Website [www.ambirad.com/us](http://www.ambirad.com/us)

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