




Vision VPLUS HiLo Range

VPLUSHL 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 high efficiency AmbiRad Vision HiLo 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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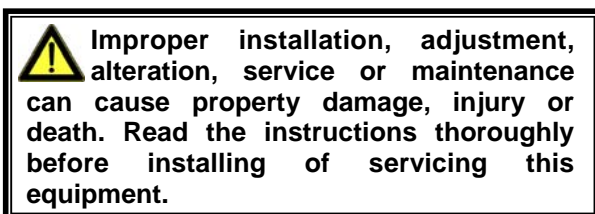
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1. Installation Requirements.



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 ANSJJNFPA 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.

Heaters include:	Options:
Burner/Control	1 180° Bend
Radiant Tubes	1 or 2 90° Bends
Reflectors	
Brackets	Ball Valve
Fan	Vent Hoods
U-Bend (U-tube 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.

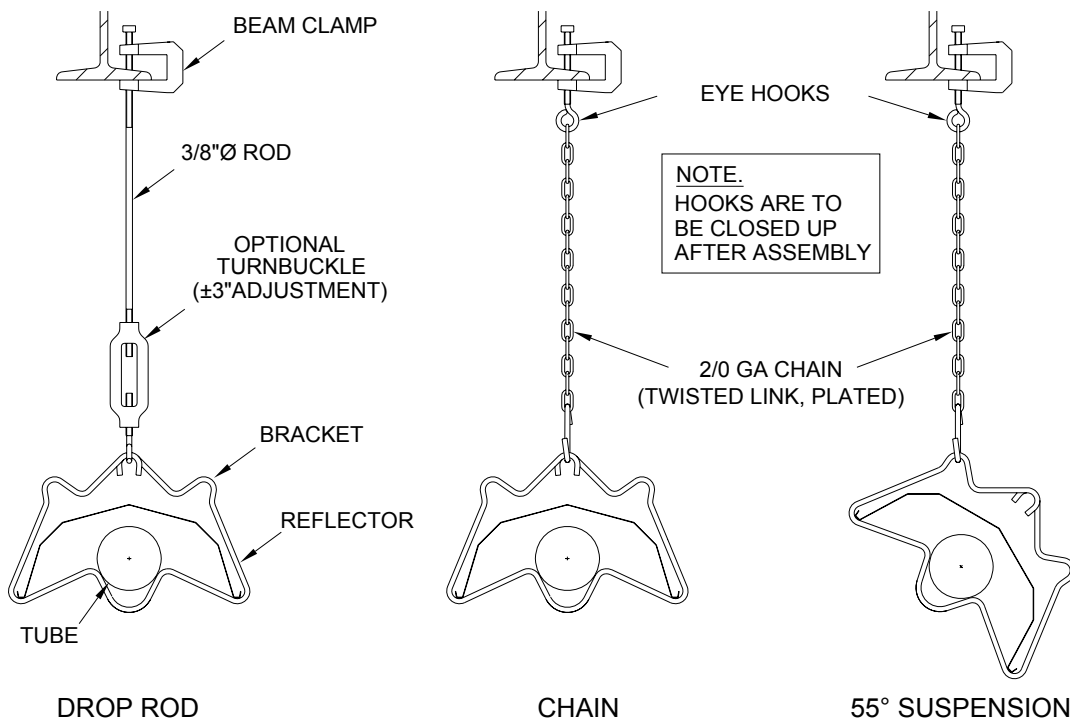
1.3 Heater Suspension

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 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.

Figure 1. Recommended Methods of Heater Suspension.



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°.

in Figures 2a, and 2b . Refer to corresponding tables 2a, 2b and 2c 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.

1.5 Clearance to Combustibles.

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

Minimum clearance to combustibles are shown




Table 2a	Clearance to Combustibles (in) Standard indoor reflector 								
Model	A	B	B1	C1 (*)	C2	C3	D1	D2	E
80	74	29	41	6 (3)	8	22	8	14	10
100	74	32	41	6 (3)	8	22	8	16	10
125	74	39	47	6 (3)	8	22	20	18	10
150	74	39	48	6 (3)	8	22	20	18	10
170	86	48	48	6 (3)	11	22	20	20	10
200	86	48	48	6 (3)	11	22	20	20	10

Table 2b	Clearance to Combustibles (in) Optional agricultural reflector 								
Model	A	B	B1	C1 (*)	C2	C3	D1	D2	E
80	73	41	41	6 (3)	8	22	8	14	10
100	73	41	41	6 (3)	8	22	8	16	10
125	76	43	47	6 (3)	8	22	20	18	10
150	76	43	48	6 (3)	8	22	20	18	10
170	86	70	48	6 (3)	8	22	20	20	10
200	86	70	48	6 (3)	8	22	20	20	10

(*) distance with end caps fitted.

Table 2c	Clearance to Combustibles (in) Reflector with undershield 								
Model	A	B	B1	C1 (*)	C2	C3	D1	D2	E
80	44	45	41	6 (3)	8	22	8	14	10
100	44	45	41	6 (3)	8	22	8	16	10
125	44	48	47	6 (3)	8	22	20	18	10
150	44	48	48	6 (3)	8	22	20	18	10
170	67	81	48	6 (3)	8	22	20	20	10
200	67	81	48	6 (3)	8	22	20	20	10

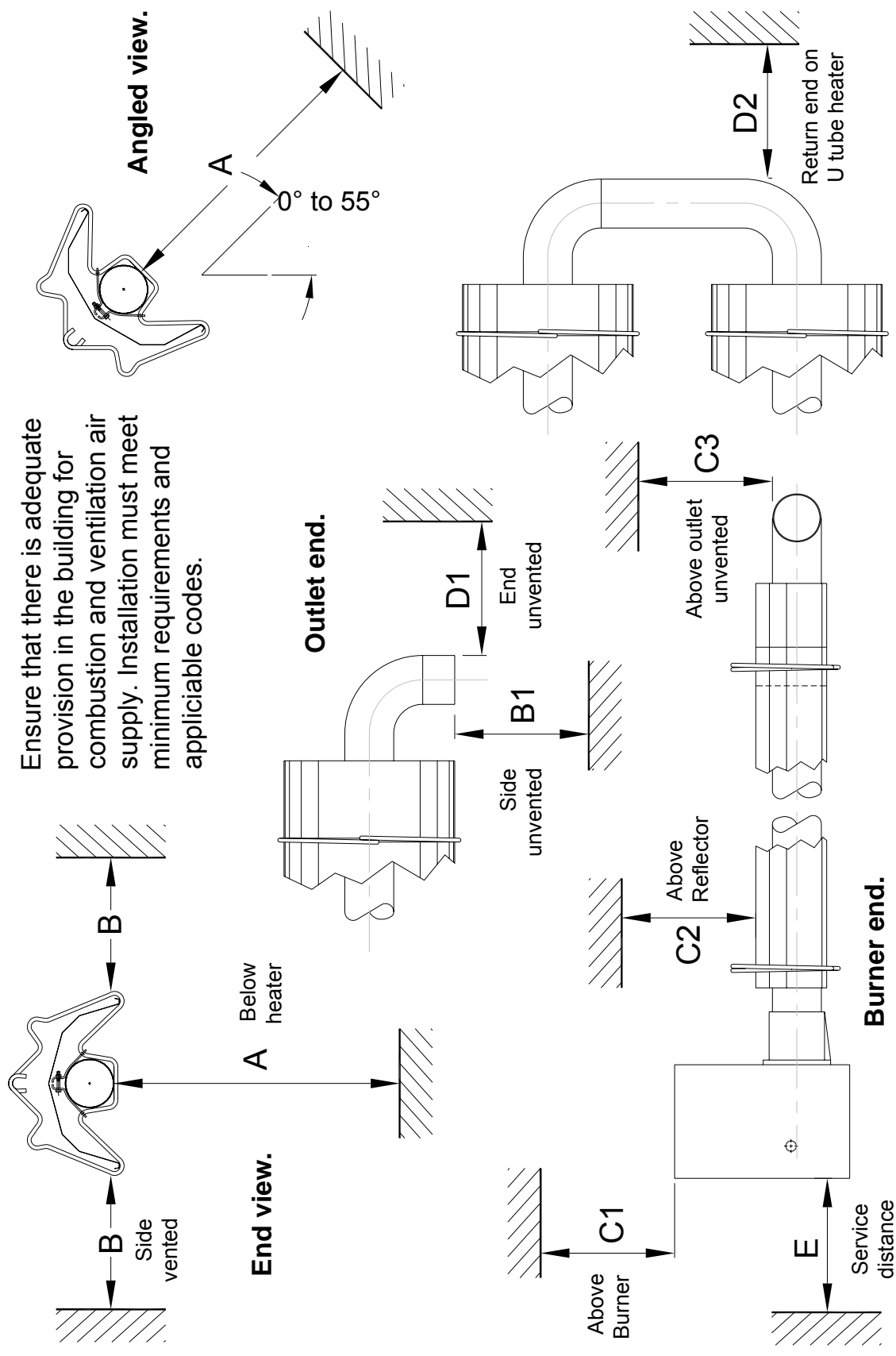


WARNING:

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 (Standard indoor reflectors).

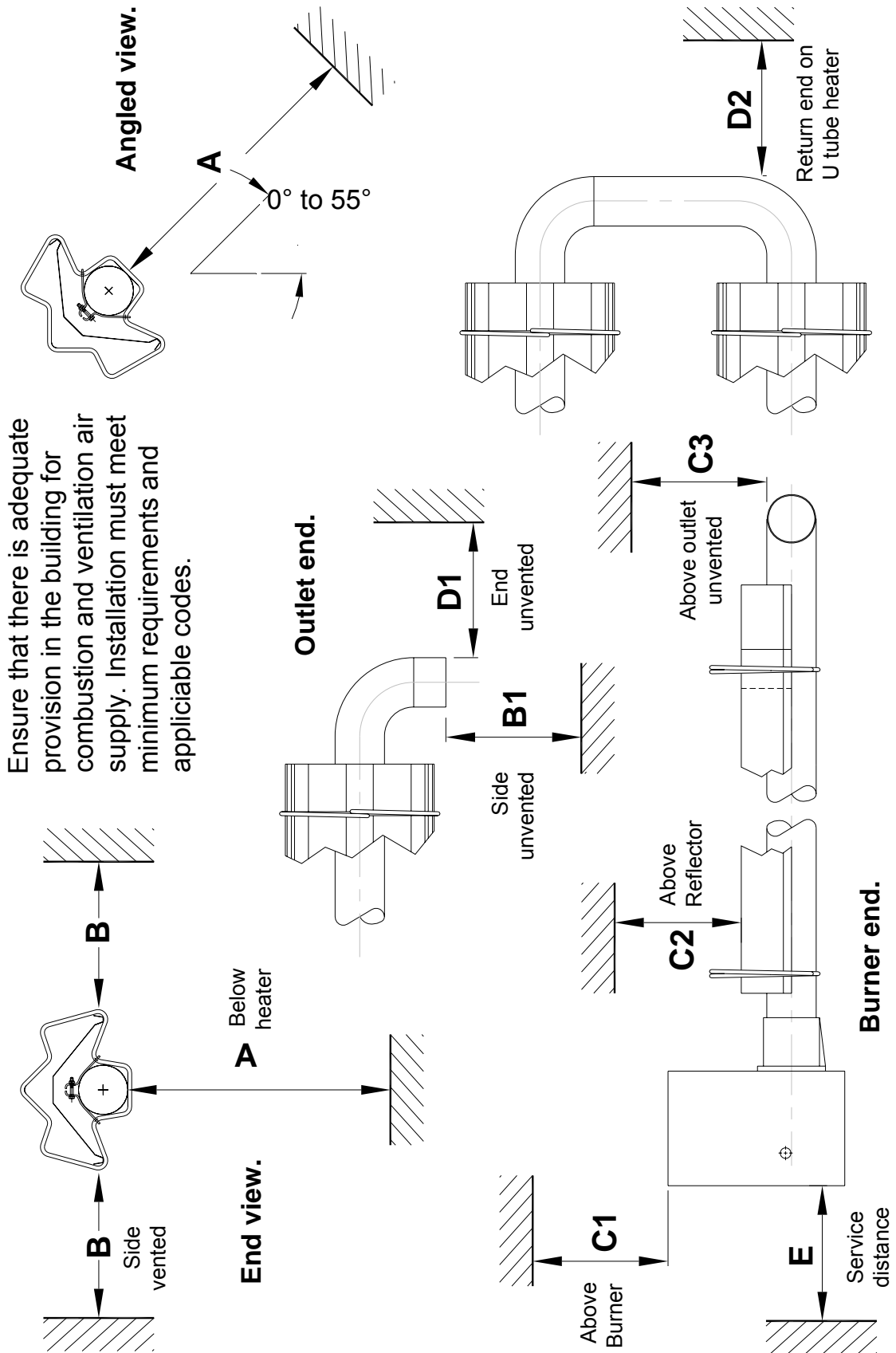
The minimum clearances to combustibles are given in the tables below. These minimum distances **MUST** be adhered to at all times.



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

Figure 2b Clearance to Combustibles (Optional agricultural reflectors).

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



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 on the heater is ½”N.P.T external thread.

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

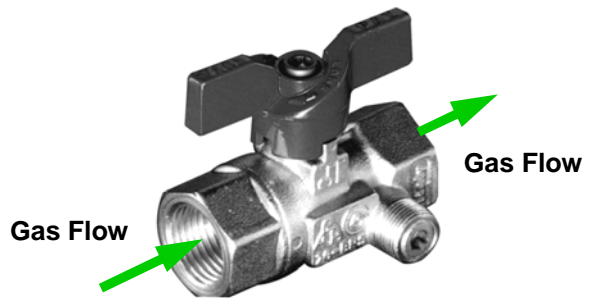
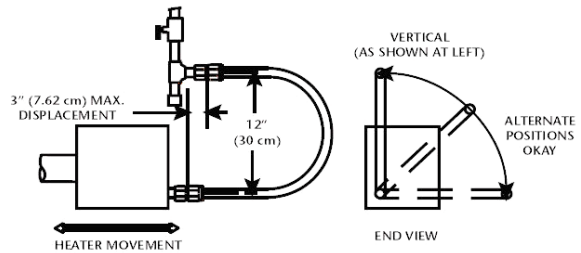
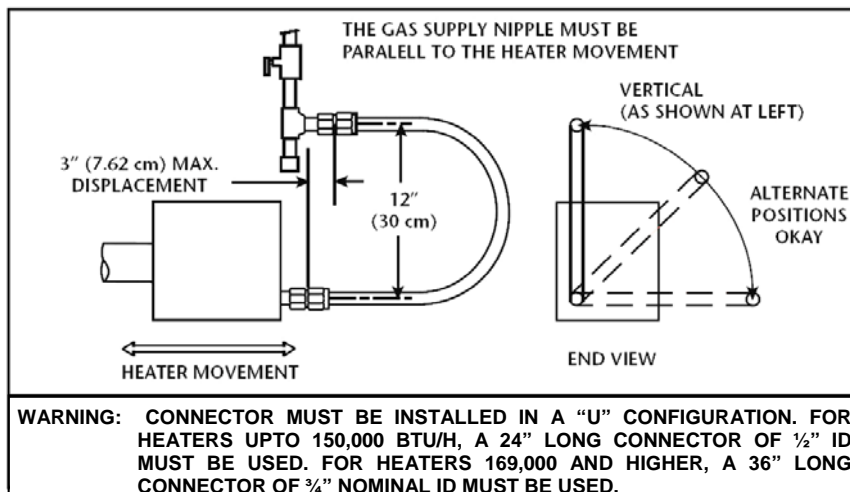
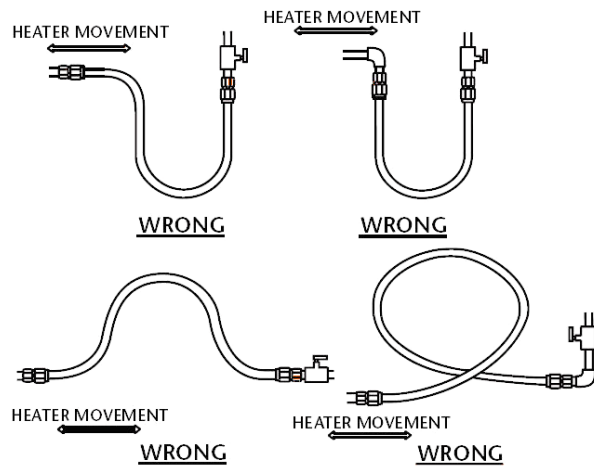


Figure 4. Correct Installation of Flexible Gas Connection

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	LP/Propane Gas
Required Gas Pressure (in W.C)	7.0	11.0
Maximum Supply Pressure (in W.C)	14.0	14.0
Gas Supply	Connection 1/2" N.P.T internal thread	

1.7 Electrical Connections



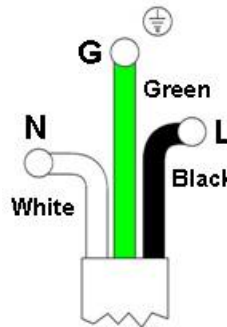
WARNING: Before making electrical connections, switch OFF the main electrical disconnect. There may be more than one disconnect switch. Lock out and tag switch with a suitable warning label. Electrical shock can cause personal injury or death.

This appliance must be electrically grounded

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.

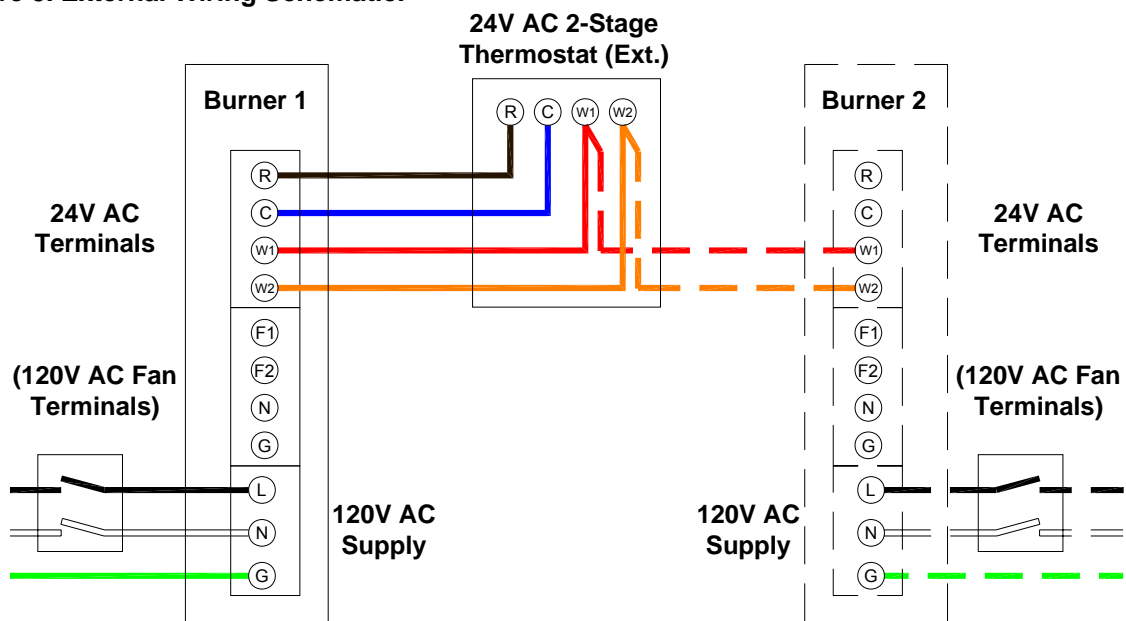
The electrical supply to the heater is by three wires: hot (Live), neutral and ground connections.



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. External Wiring Schematic.



Notes:

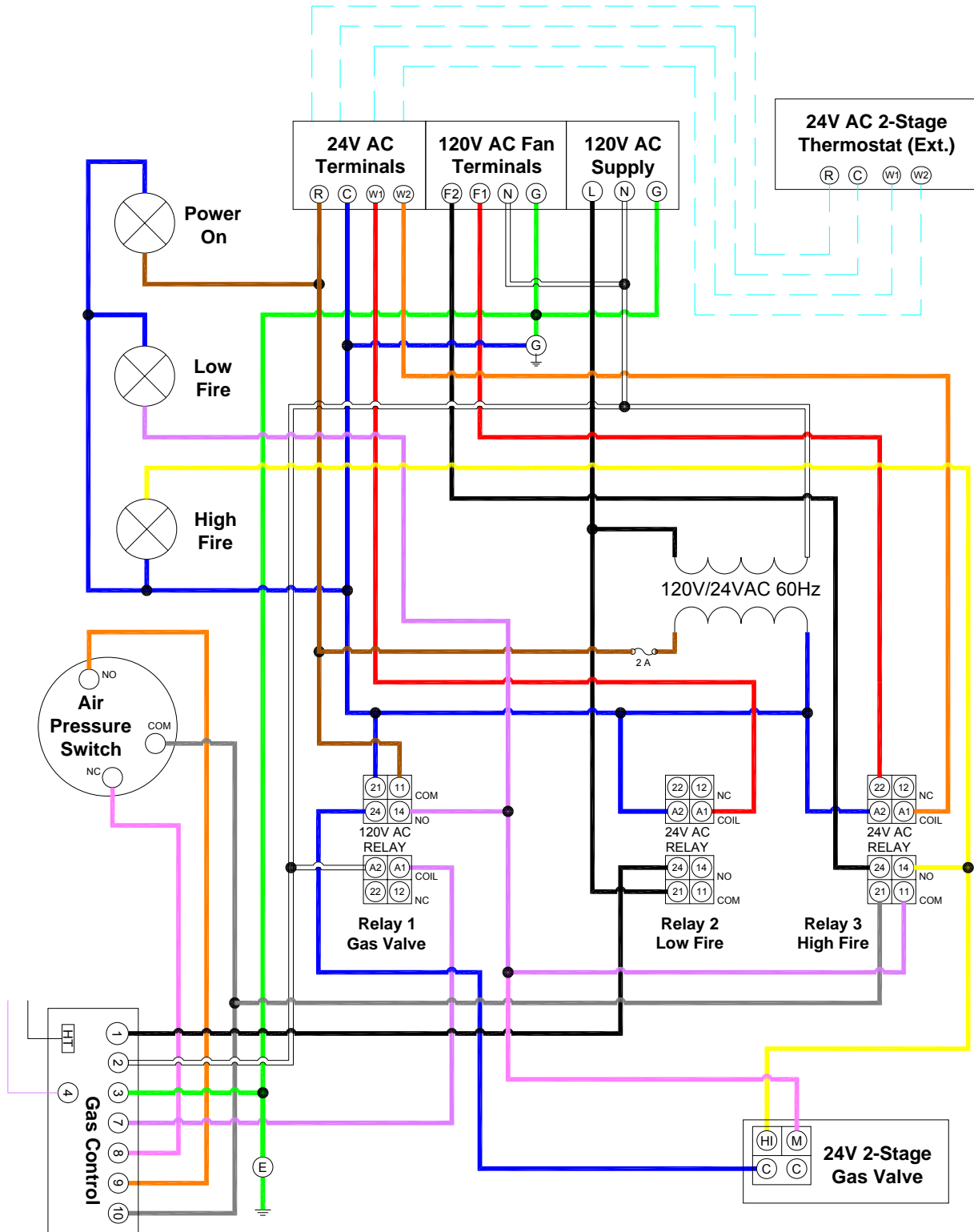
Use 18/4 class 2 thermostat cable between heater(s) and thermostat.
Max. length @ 18 Awg (0.8mm²) = 100ft.

No more than 2 burners can operate from one thermostat as supplied. However, a control is available from the manufacturer that allows up

to 8 burners to be operated from one thermostat as a single zone.

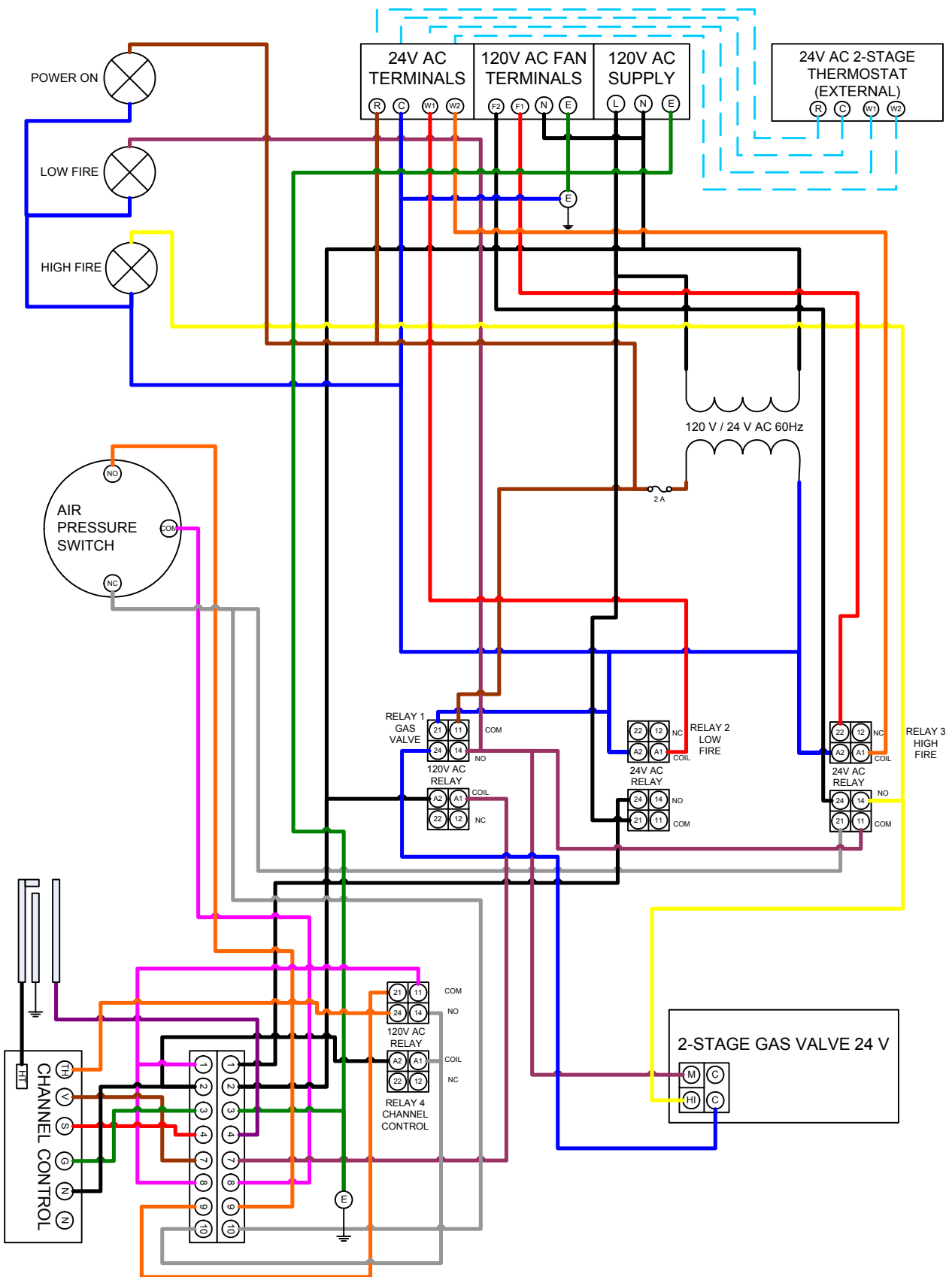
If two heaters are installed on a common exhaust vent they must be controlled by the same thermostat as above.

Figure 6a. Internal Burner Wiring Diagram. (Pactrol Control)



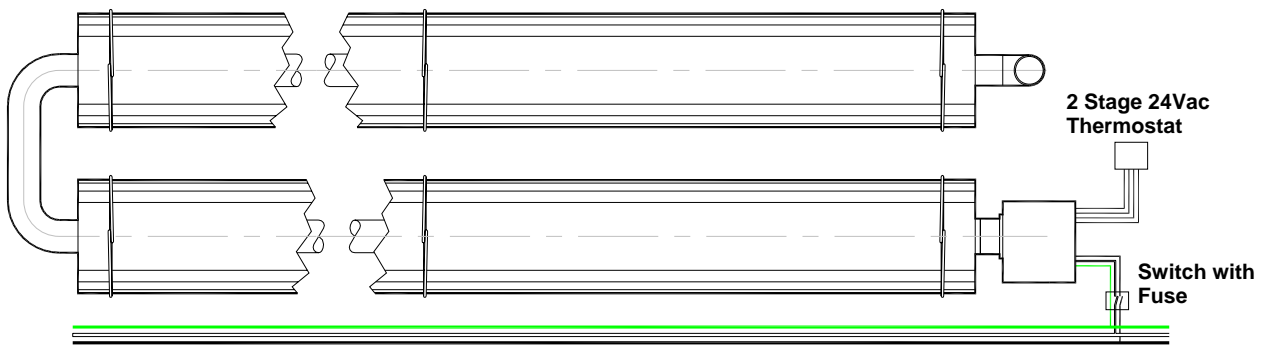
⚠ If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 220°F/105°C

Figure 6b. Internal Burner Wiring Diagram. (Channel Control)



⚠️ 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 VPLUSHL Wiring Connections (U range shown in standard configuration).



1.8 Vent Requirements and Details

1.8.1 Unvented units

Heaters maybe 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 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. Recommended terminals are AmbiRad V0700 for 4" and V0800 for 6".

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 8a & 8b

1.9 Fresh Air Intake

Whenever the heater is installed in locations where airbourne 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 burner housing. A flexible jointing piece should be installed at the burner connection with hose clamps to facilitate expansion and contraction.

Figure 8.a Vertical Venting.

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 & 8d

Note: IP models must be connected to a vent and a fresh air intake.

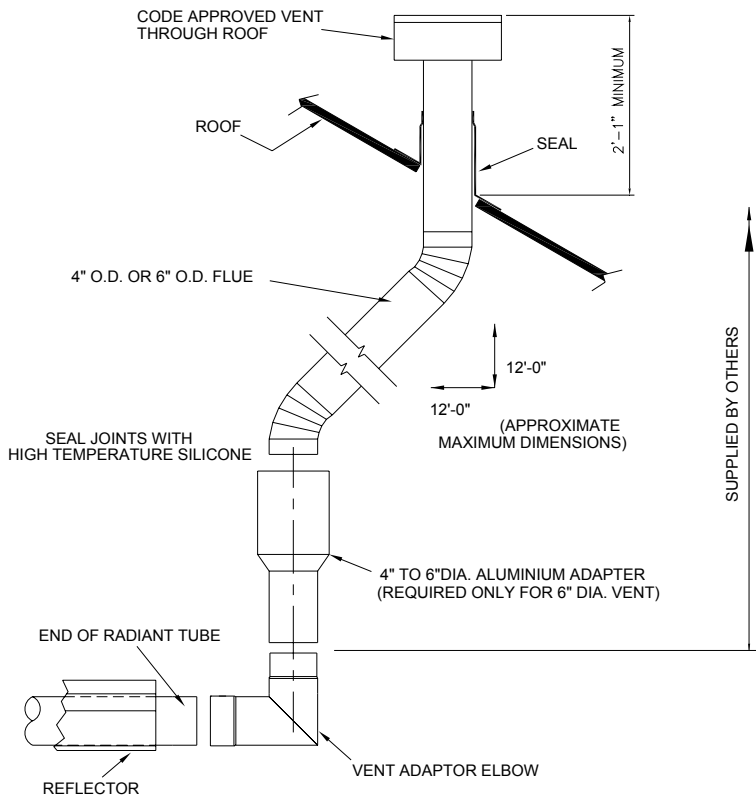


Figure 8.b Horizontal Venting.

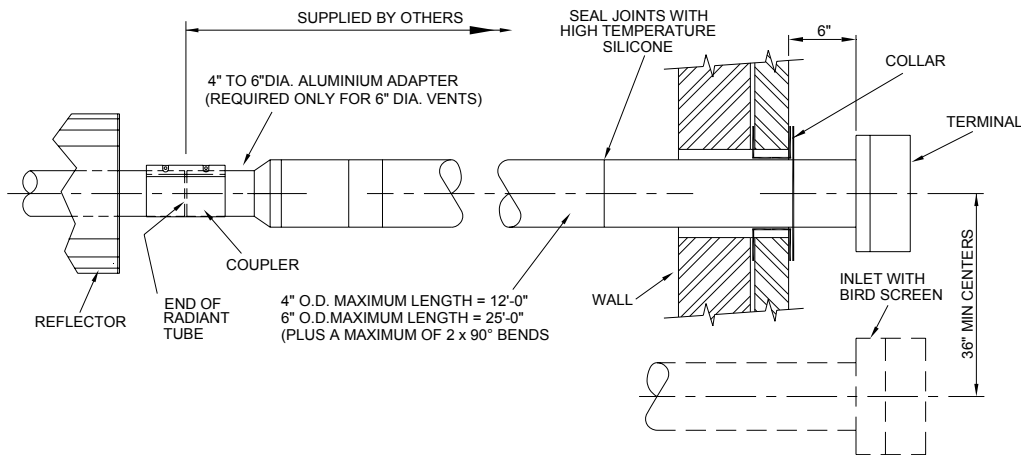


Figure 8.c Fresh Air Ducted Intake.

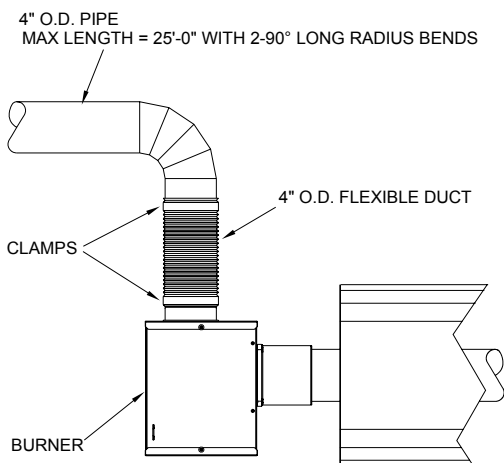
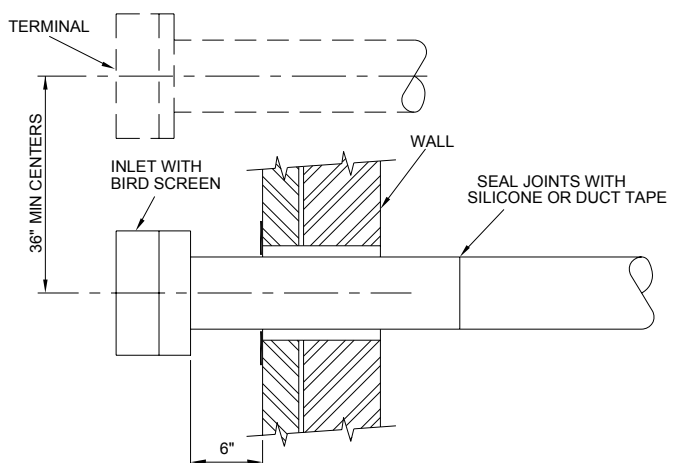


Figure 8.d Wall Terminal Intake Kit.



1.10 Technical Details - Table 4

No of Injectors	1
Gas Connection	½" N.P.T nipple.
Electrical Supply	120 volt 1 phase 60Hz
Vent size (in)	4" or 6"
Unitary Fan Motor Details	120 volt 1 phase 60Hz
Current Rating	1.2A MAX
Ignition	Electronic Program Start up with Spark Ignition
Thermostat	24Vac 60Hz 1.5A Max. total load

Burner Size S Heaters	Natural Gas		LP Propane		Min. Heater Length	Max. Heater Length
	High Rate BTU/Hr	Low Rate BTU/Hr	High Rate BTU/Hr	Low Rate BTU/Hr	S (ft)	S (ft)
VPLUS80HL	80,000	60,000	80,000	60,000	30	40
VPLUS100HL	100,000	65,000	100,000	65,000	30	40
VPLUS125HL	123,500	95,000	125,000	95,000	30	50
VPLUS150HL	150,000	100,000	150,000	100,000	40	60
VPLUS170HL	169,000	125,000	169,000	125,000	50	70
VPLUS200HL	200,000	150,000	N/A		50	70

Burner Size U Heaters	Natural Gas		LP Propane		Min. Heater Length	Max. Heater Length
	High Rate BTU/Hr	Low Rate BTU/Hr	High Rate BTU/Hr	Low Rate BTU/Hr	U (ft)	U (ft)
VPLUS80HL	80,000	60,000	80,000	60,000	40	40
VPLUS100HL	100,000	65,000	100,000	65,000	40	40
VPLUS125HL	123,500	95,000	125,000	95,000	40	40
VPLUS150HL	150,000	100,000	150,000	100,000	40	60
VPLUS170HL	169,000	125,000	169,000	125,000	60	60
VPLUS200HL	200,000	150,000	N/A		60	60

Burner Size	Natural Gas				LP Propane			
	Burner Orifice Plate	Injector	Injector Pressure		Burner Orifice Plate	Injector	Injector Pressure	
	Part No.	Part No.	Inches WG.		Part No.	Part No.	Inches WG.	
			High	Low			High	Low
VPLUS80HL	201063-67	201007-18	3.9	2.3	201063-72	201007-13	5.2	3.0
VPLUS100HL	201063-23	201007-19	4.9	2.1	201063-56	201007-13	8.2	3.7
VPLUS125HL	201063-26	201007-23	4.5	2.7	201063-55	201007-15	7.6	4.4
VPLUS150HL	201063-25	201007-30	4.4	2.2	201063-54	201007-17	7.2	3.3
VPLUS170HL	201063-24	201631-28	4.0	2.4	201063-68	201007-19	6.8	3.9
VPLUS200HL	201063-24	201631-32	4.6	2.8	N/A			

	Natural Gas			LP Propane			All types
	Combustion Fan Details		Pressure Switch	Combustion Fan Details		Pressure Switch	Burner Head
Burner Size	Fan Type	Orifice Part No.	Part No.	Fan Type	Orifice Part No.	Part No.	Part No.
VPLUS80HL	201957	L200301	201676	201957	L200301	201676	200988
VPLUS100HL		L200281			201825		
VPLUS125HL		L200262			L200244		
VPLUS150HL		201425			L200246		
VPLUS170HL	202132	202133	202132	202141			
VPLUS200HL		201911	201697	N/A			

MODEL	U TUBE		STRAIGHT TUBE						
	U40	U60	S30	S40	S50	S60	S70	SE1	SE2
VPLUS80HL	0		0	0				0	0
VPLUS100HL	0		0	0				0	0
VPLUS125HL	0		0	0	0			0	0
VPLUS150HL	0	0		0	0	0		0	0
VPLUS170HL		0			0	0	0	0	0
VPLUS200HL		0			0	0	0	0	0

MODEL	TUBE TYPE MATERIAL		MIN DISTANCE TO BEND
	AL.S	MS	
VPLUS80HL	TUBE 1	REMAINDER	20
VPLUS100HL	TUBE 1	REMAINDER	20
VPLUS125HL	TUBE 1	REMAINDER	20
VPLUS150HL	TUBE 1	REMAINDER	20
VPLUS170HL	TUBE 1 & 2	REMAINDER	30
VPLUS200HL	TUBE 1 & 2	REMAINDER	30

OPTIONS

- 1 All standard units fitted with unvented vent, natural gas, aluminum reflectors and ducted air attachments.
- 2 Tube length (U20-10ft and S20-20ft)
- 3 180° bend (U suffix), 1-90° bend (SE1 suffix), 2-90° bends (SE2 suffix)
- 4 Vented design (v suffix)
- 5 Stainless steel tubes (ST suffix)
- 6 Stainless steel reflectors (SR suffix)
- 7 End caps (E suffix)

2. Assembly Instructions.

i **PLEASE READ** this section prior to assembly to familiarise 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.

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

i 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.



i Suitable alternative tools may be used.

2.2 Assembly Notes.

! **Please read** these assembly notes in conjunction with the correct assembly drawings (figs 14 to 28).

2.2.1 Tubes

Each heating unit has two types of emitter tubes. The first tube section, connected to the burner, will be AlumaTherm®, silver in color and marked with yellow paint. The remaining tubes are mild steel marked with blue paint. All tube connections are made with a band coupling.

Identify and position tubes on saw horses. For aesthetics it is advisable to position **all tube seam facing down**. Position coupling fastener so that these cannot be seen from beneath the heater.

Mark out the position of the bracket centres from the dimensions shown on the assemblers' drawings.

2.2.2 Turbulators (where fitted)

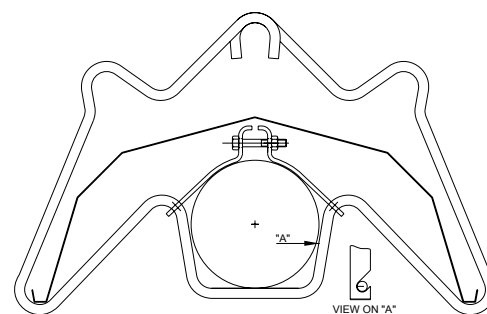
Insert turbulator into correct tube as indicated in the assembly drawings

2.2.3 Brackets

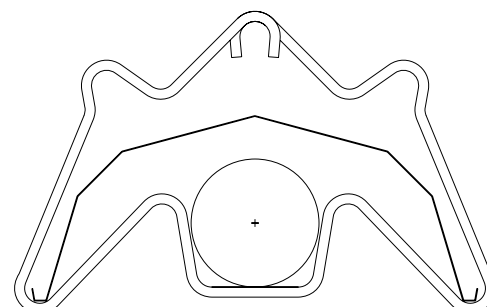
There are two separate versions of the VPLUS HL available: Indoor and Agricultural (IP rated). Within these categories there can be four types of brackets supplied with these heaters.

2.2.3.1 Brackets for Indoor heaters

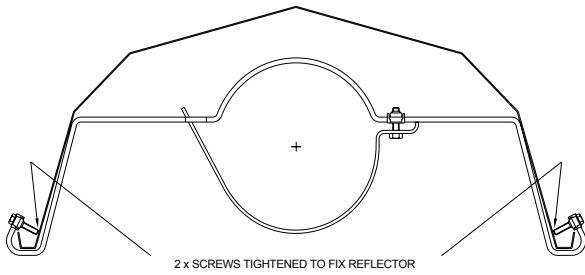
- *Type 'H' are suspension brackets with tube straps.*



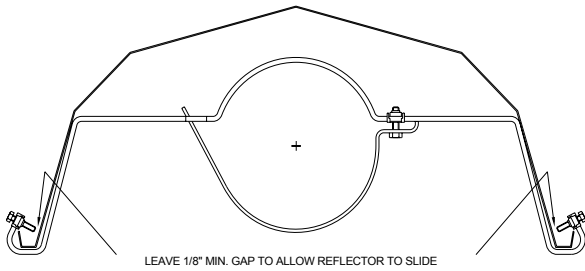
- *Type 'G' are suspension brackets with no tube straps.*



- Type 'F' are fixed reflector brackets.



- Type 'S' are sliding reflector brackets.

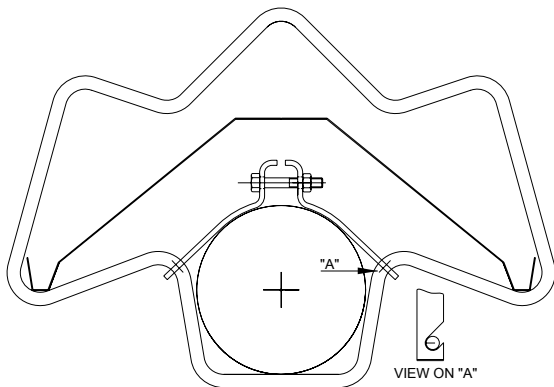


Slip the suspension brackets onto the tube assembly. The fixed suspension point 'H' shown on the drawings are adjacent to the burner and secures the first suspension bracket to the tube with a tube strap. All other suspension brackets 'G' shown on the drawings, have floating suspension points.

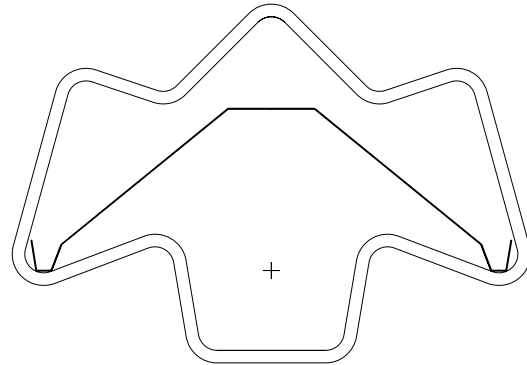
Reflectors are fixed at point 'F' with a reflector support bracket and reflectors are held in position with fixing screws. Fixed and sliding joints alternate along the heater at the spacing's indicated on the individual heater assembly sheets.

2.2.3.2 Brackets for Agricultural heaters (IP rated)

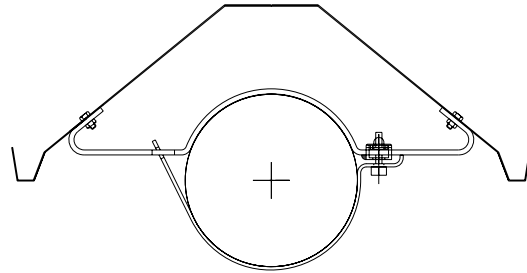
- Type 'H' are suspension brackets with tube straps.



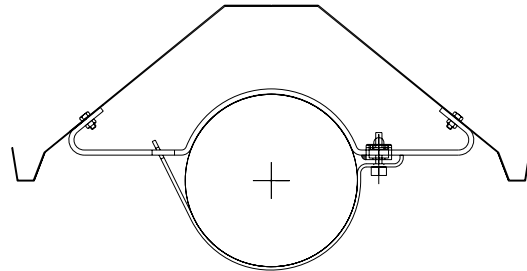
- Type 'G' are suspension brackets with no tube straps.



- Type 'F' are fixed reflector brackets.



- Type 'S' are sliding reflector brackets.



2.2.4 Couplers

There are two types of couplers for joining radiant tubes and U bends.

A high temperature stainless steel 4" coupling which is used as detailed in the table below.

VPLUS	First coupler	Second coupler
125-150	Hi-temp	Standard
170-200	Hi-temp	Hi-temp

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.

DO NOT OVERTIGHTEN.

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

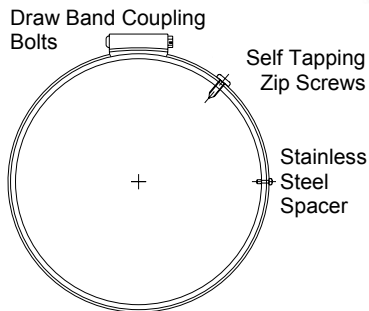
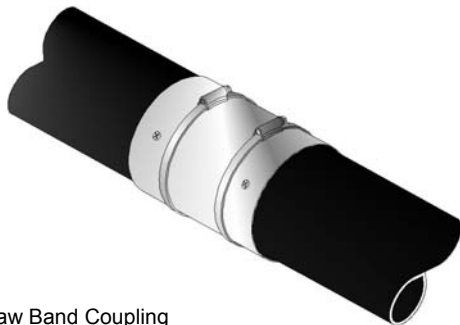


A standard stainless steel 4" coupling is used for all other fixings.

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

DO NOT OVERTIGHTEN.

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



! *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 down-ward from the burner approximately 1" in 20 feet, but not more than 2" total overall.*

2.2.5 Reflectors.

After removing the protective plastic coating, slip the reflectors through the hanger brackets until they overlap each other.

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

The first and second reflector are fixed at the point F by a type F reflector support bracket and are held in place by tightening the fixing screws.

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

Alternate fixings of further reflectors by type S and type F reflector brackets and space as indicated by individual assembly sheets.

! Reflector support bracket assemblies are fitted at each reflector joint, with the clamp screws adjusted so that reflectors are fixed together.

2.2.5.1 Undershield deflector (optional)

Each undershield has two slots, 1" in length at each end of the deflector. These slots are used to position the munsen rings apart. Mark the first point of the deflector on the radiant tube. Use the undershield (or a tape measure if required) to mark the second point.

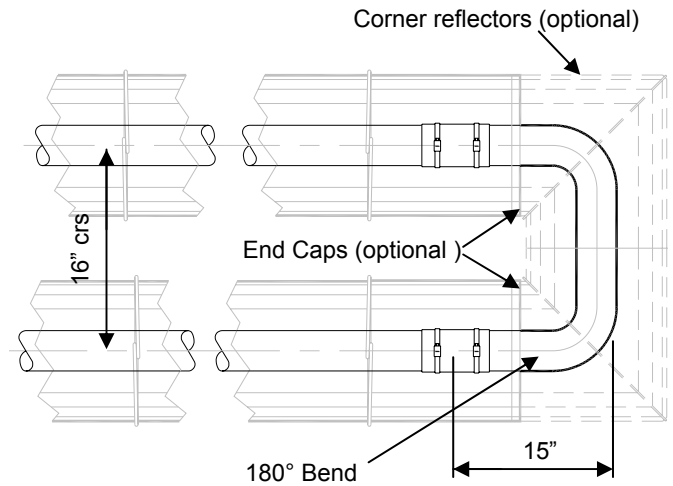
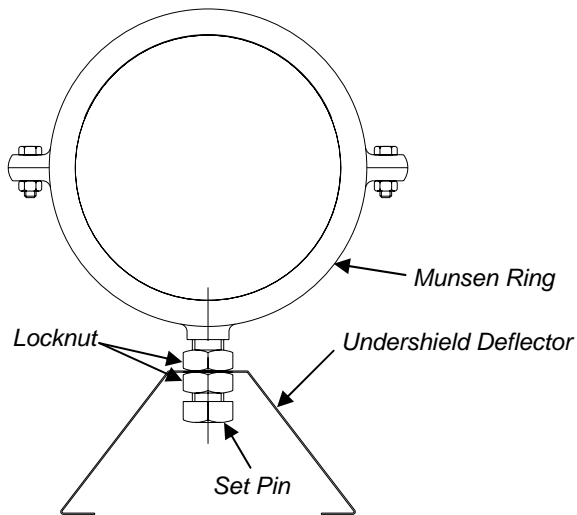
The munsen rings are supplied assembled. Using a flat head screwdriver remove both screws retaining the two parts together.

Offer one half, then the other onto the radiant tube at the first mark with the boss facing downwards. Replace the screws and tighten. Repeat for the second munsen.

Screw a M12 locknut onto the M12 set pin. Pass the set pin through the slot on the undershield and loosely attach the M12 locknut. Repeat for the second set pin.

Offer the undershield deflector up to the munsen rings. Locate set pins to the boss and tighten.

Secure assembly by tightening locknut. Repeat for second munsen.

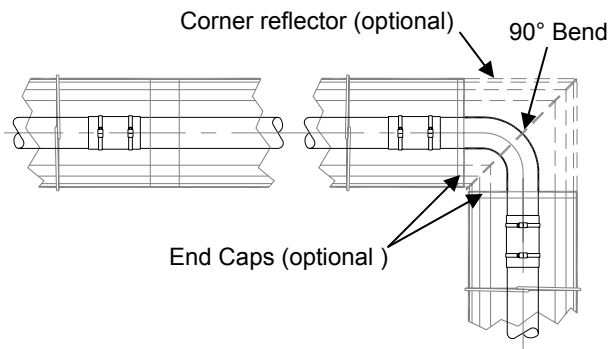


! Bends must be fitted at a distance of at least 50% of the total heat exchanger e.g. for a 60ft long heater, the closest to the burner a bend can be is 30ft.

2.2.6 Bend(s) (where fitted)

The heater can be installed with 1 or 2 90° bends or a 180° U bend.

Slide the bend into the open end of the coupler ensuring that the rivet stop has butted up to the tube ends. Refer to 2.2.4 for fastening. Typical usage of bend kits:



Bend kit comprises of:
 1 off Bend (90° or 180°); 1 off Coupler; 1 off extra Support Bracket; 1 off extra Suspension Bracket; 1 off End Cap (optional); Fasteners as necessary.

2.2.7 Burner/Fan Assembly.

Slide the burner assembly onto the open tube end, ensuring it is fully engaged. Secure with set screws.

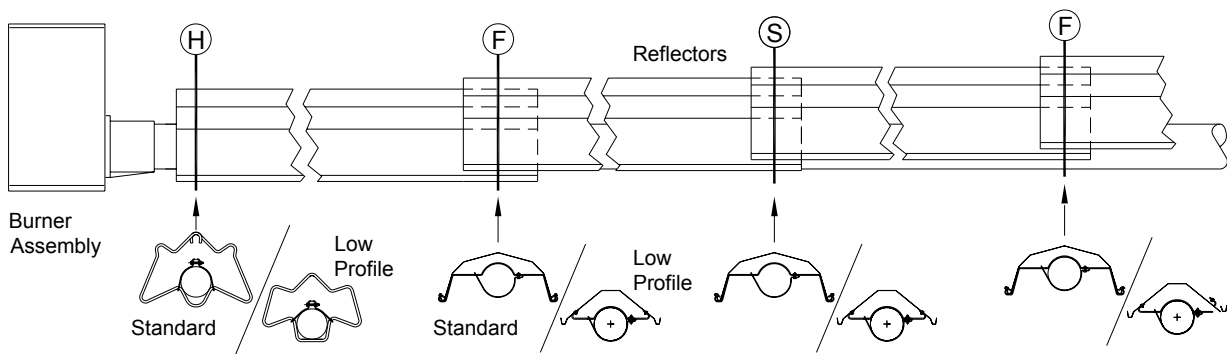
For the purpose of unvented applications, a 4" 90° elbow should be used on the terminating end of the radiant tube sections. This elbow should be turned with the outlet facing either side.

Connect Gas and Electrical supplies as described in sections 1.6 and 1.7.

2.2.8 Detailed Assembly Drawings

The following pages show the technical dimensional details of the VPLUS range of heaters.


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



2.2.9 Heater Configurations

these recommendations.

The following sketches show various heater configurations for the VPLUSHL series dependant on heater length and rating. It is important not to configure a heater outside of

 Bends must be fitted at a distance of at least 50% of the total heat exchanger e.g. for a 60ft long heater, the closest to the burner a bend can be is 30ft.


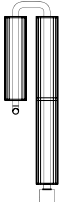
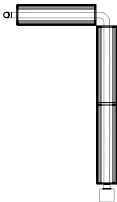

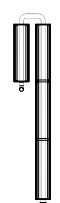
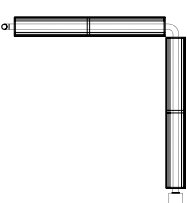
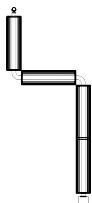


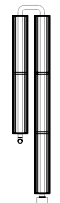
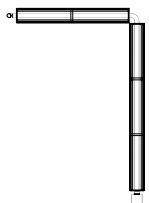
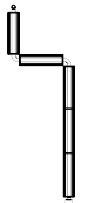

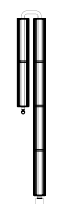
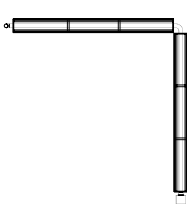


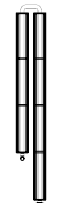
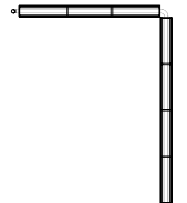
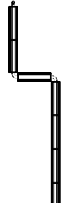


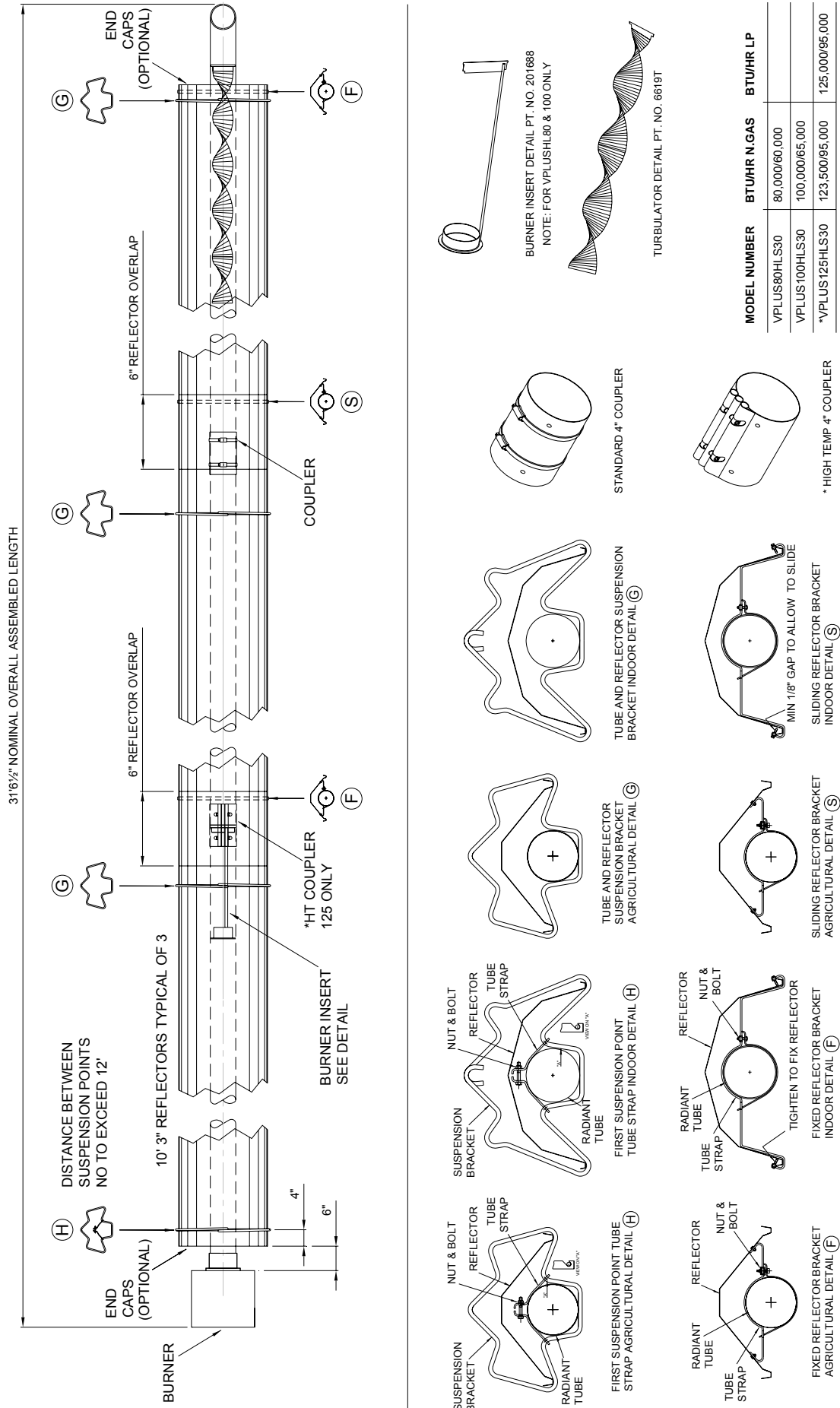
S30					
S40					
S50					
S60					
S70					
U40					
U60					

Figure 9. VPLUS Heater Assembly: Model Linear 80-S30, 100-S30 and 125-S30.



MODEL NUMBER	BTU/HR N.GAS	BTU/HR LP
VPLUS80HLS30	80,000/60,000	
VPLUS100HLS30	100,000/65,000	
*VPLUS125HLS30	123,500/95,000	125,000/95,000

Figure 10. VPLUS Heater Assembly: Model Linear 80-S40, 100-S40, 125-S40 and 150-S40.

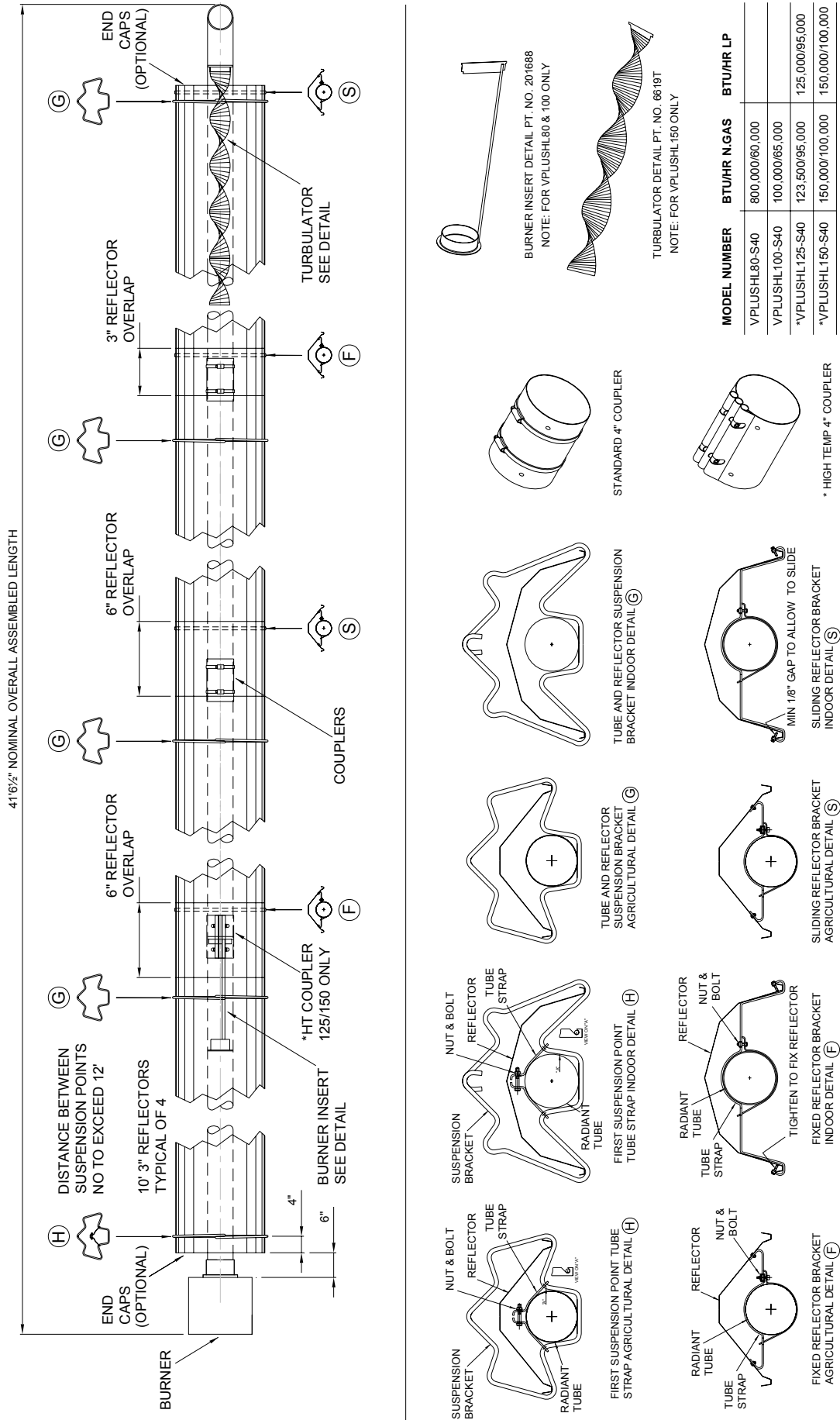


Figure 11. VPLUS Heater Assembly: Model Linear 125-S50, 150-S50, 170-S50 and 200-S50

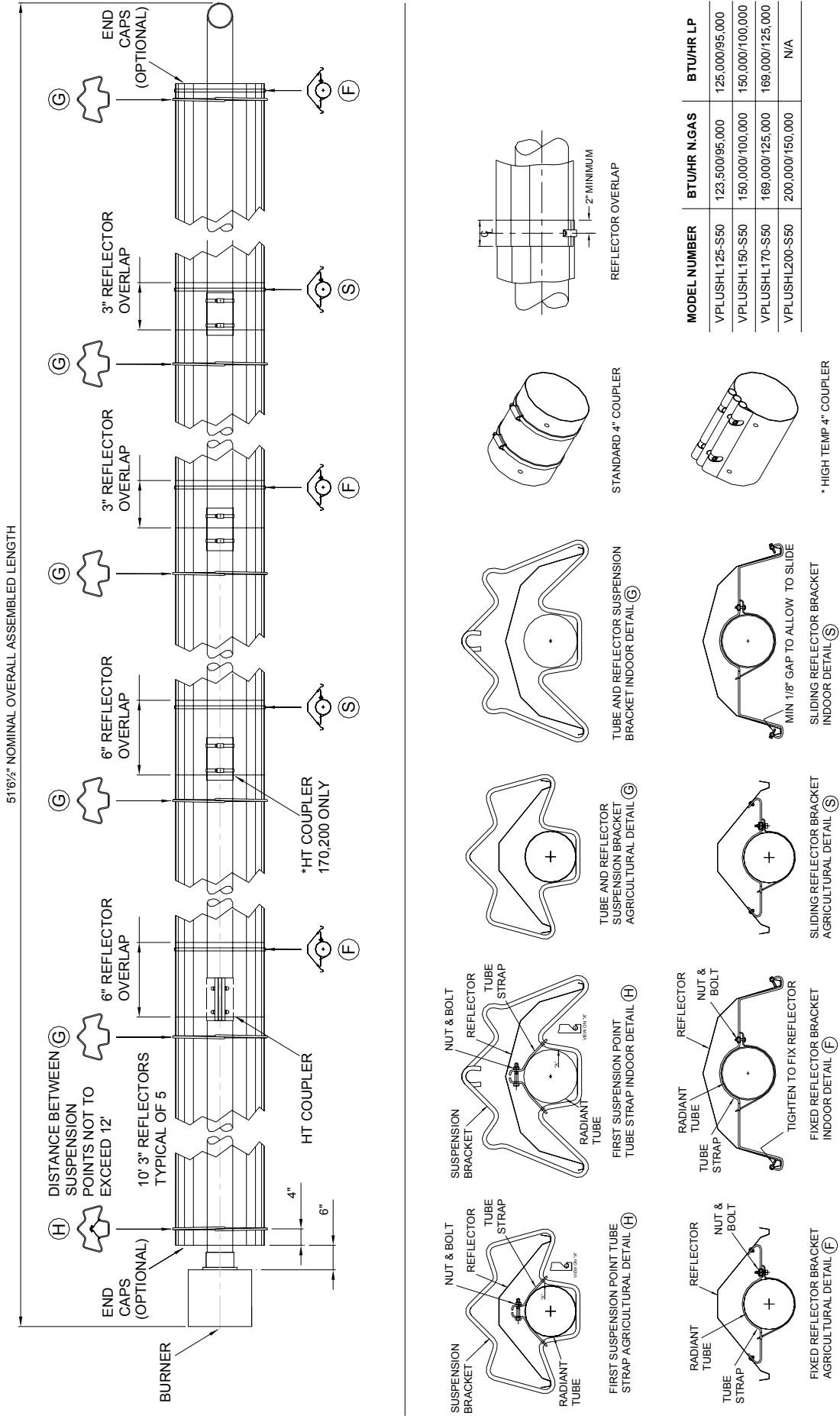
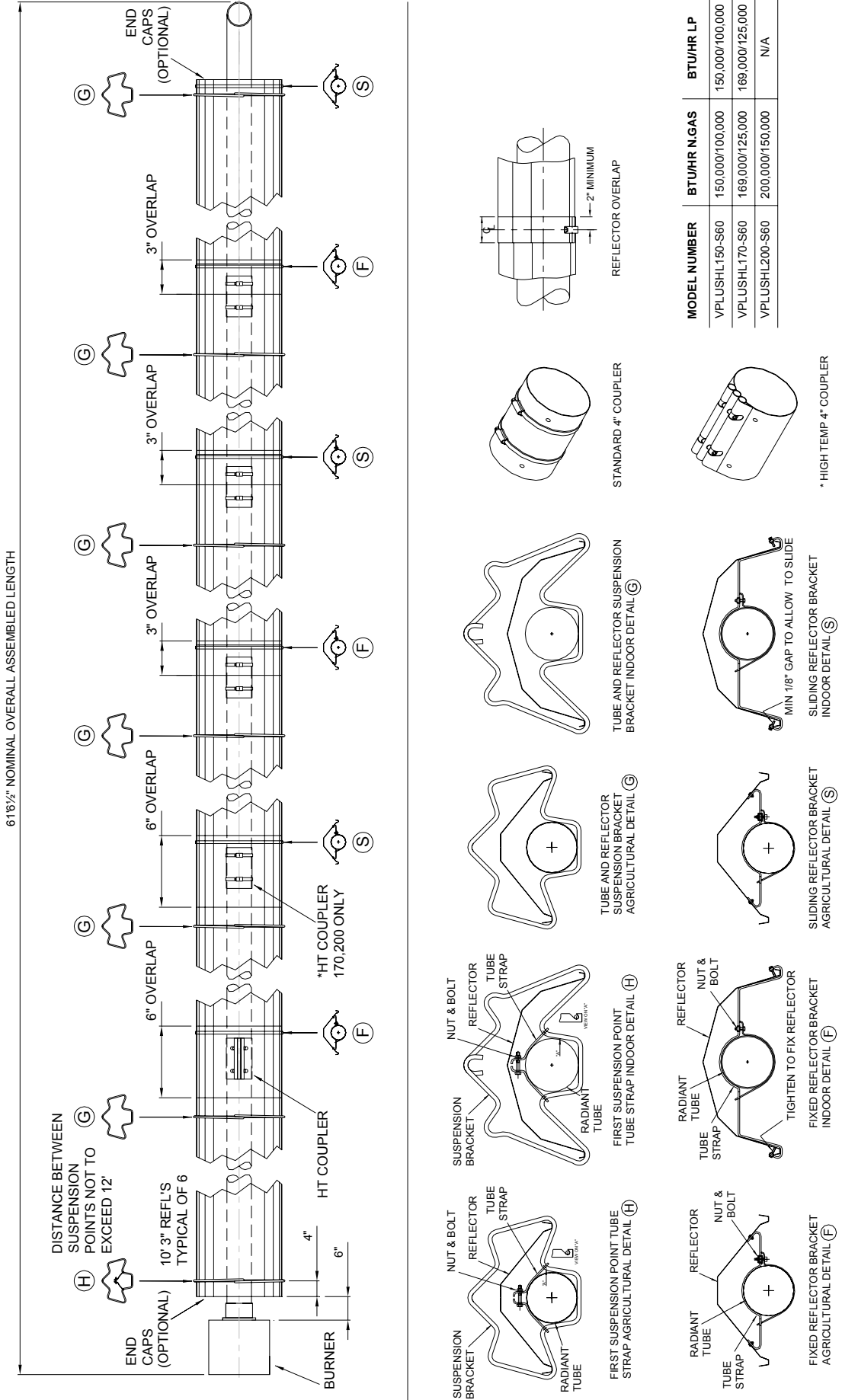


Figure 12. VPLUS Heater Assembly: Model Linear 150-S60, 170-S60 and 200-S60.



MODEL NUMBER	BTU/HR N.GAS	BTU/HR LP
VPLUSHL150-S60	150,000/100,000	150,000/100,000
VPLUSHL170-S60	169,000/125,000	169,000/125,000
VPLUSHL200-S60	200,000/150,000	N/A

* HIGH TEMP 4" COUPLER

Figure 13. VPLUS Heater Assembly: Model Linear 170-S70 and 200-S70.

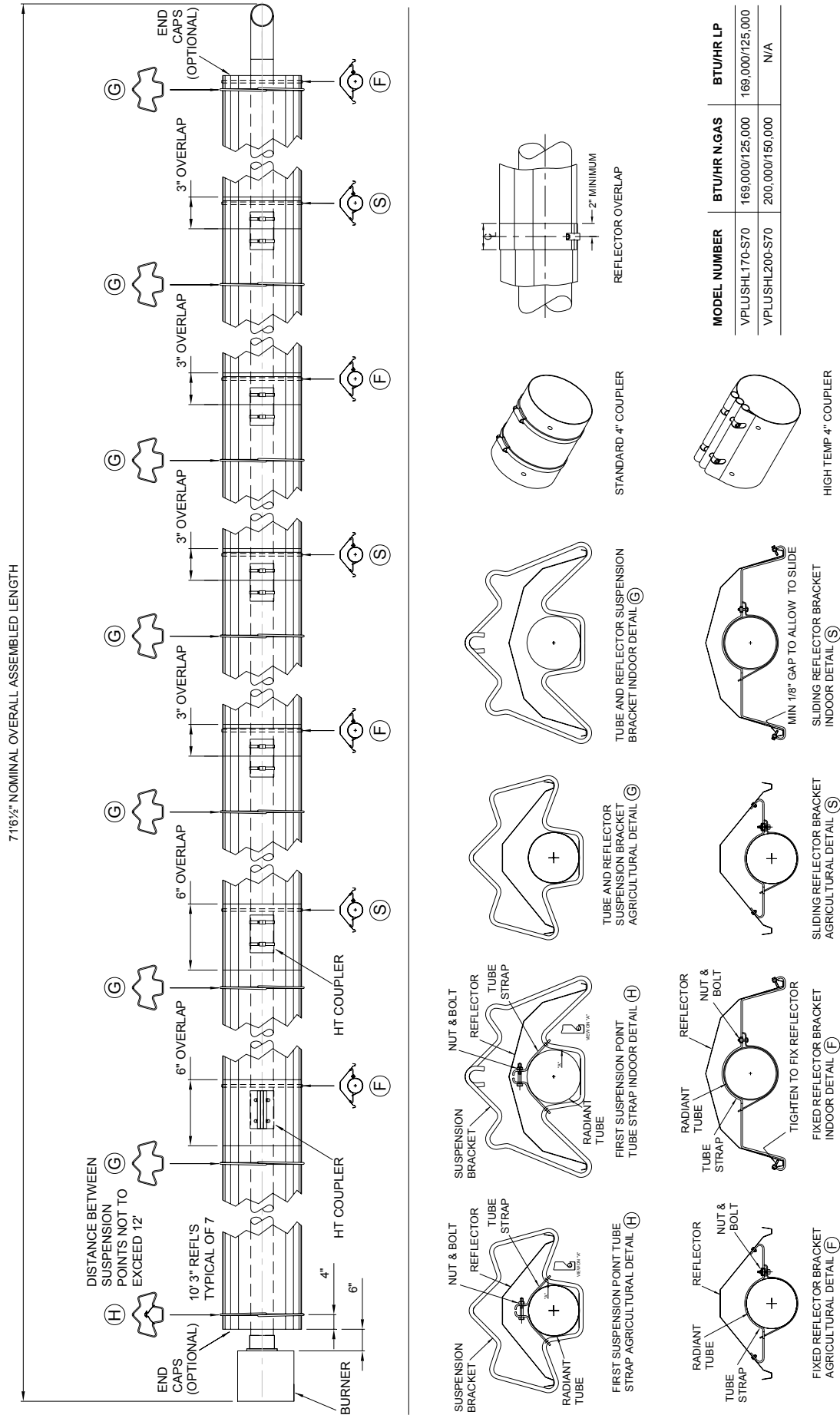


Figure 14. VPLUS Heater Assembly: Model Linear 80-U40, 100-U40, 125-U40 and 150-U40.

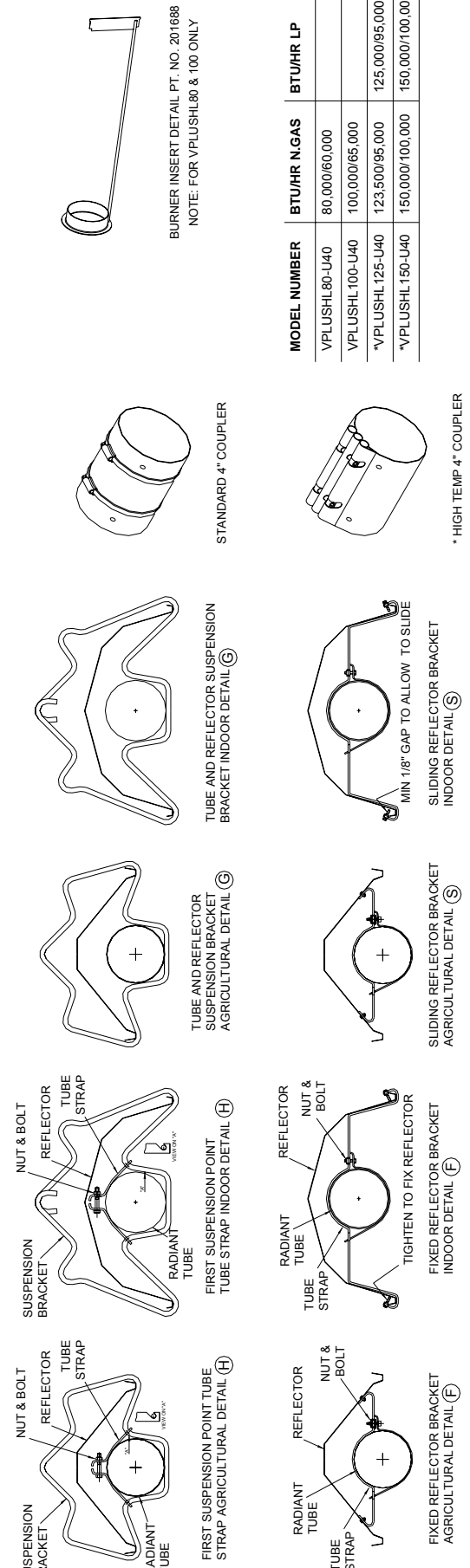
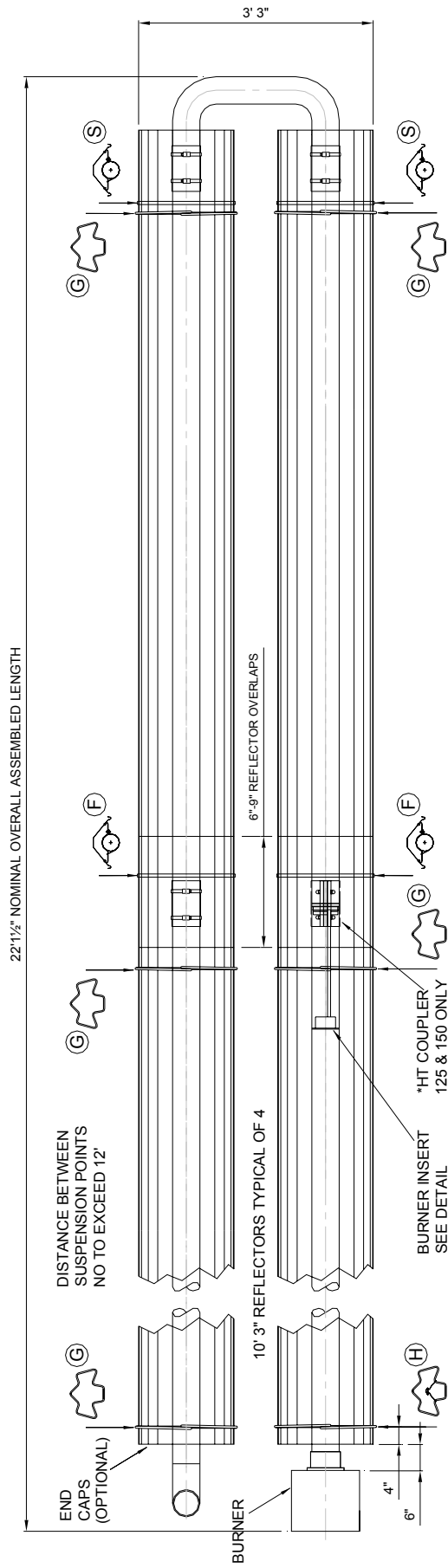
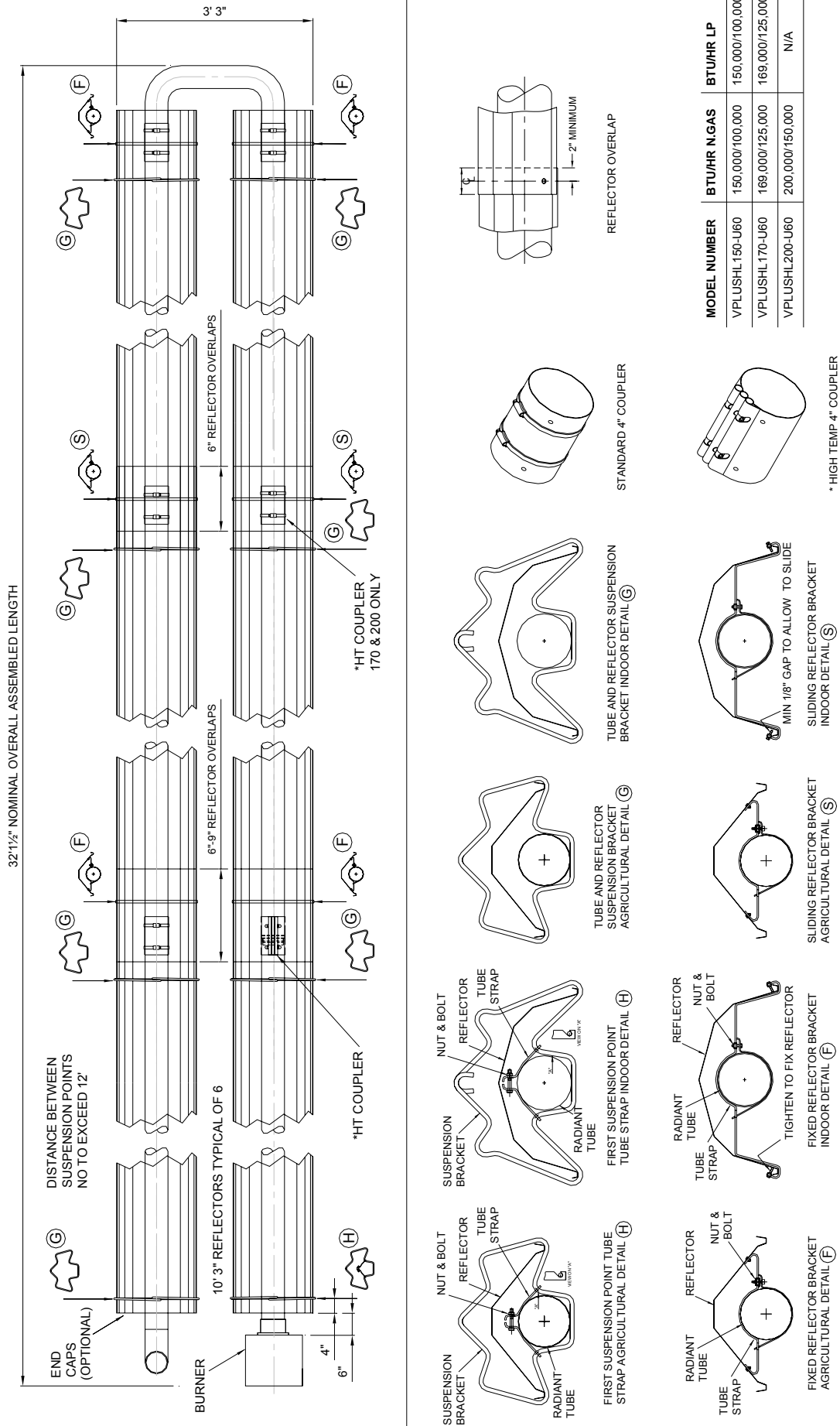


Figure 15. VPLUS Heater Assembly: Model Linear 150-U60, 170-U60 and 200-U60.



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" Spanner



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 2 minutes. Then turn the power on. If repeated 'lockout' occurs investigate the cause.

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 and orifice plate dimensions 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.

Check the operation of the pressure proving switch as follows:

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.

Close the controls door securing it with the screw.



3.3 Two stage thermostat set up

NOTE

To prevent static discharge problems, touch side of thermostat to release static build-up before touching any keys.

If at any time during testing your system does not operate properly, contact a qualified service person.

Heating System

1. Press System key to select the Flame icon (🔥)
2. Press  to adjust thermostat setting to 1° above room temperature. The heater system should begin to operate.
3. Press  to adjust thermostat setting below room temperature. The heating system should stop operating.

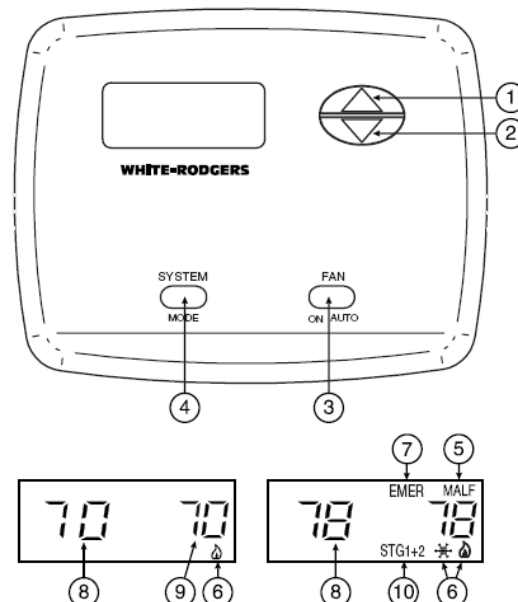
Before you begin configuring your thermostat, you should be familiar with its features and with the display and the location and operation of the thermostat buttons. Your thermostat consists of two parts: the **thermostat cover** and the **base**. To remove the cover, gently pull it straight out from the base. To replace the cover, line up the cover with the base and press gently until the cover snaps onto the base.

3.3.1 The Thermostat Buttons and Switches

- 1 (Up arrow) Raises temperature setting.
 - 2 (Down arrow) Lowers temperature setting.
 - 3 FAN switch* (**ON**, **AUTO**).
 - 4 SYSTEM key (**HEAT** (🔥), **EMER***, **OFF**, **COOL*** (❄️), **AUTO*** (❄️ 🔥)).
- * denotes Not Used

3.3.2 The Display

- 5 Indicates a malfunction with the system.
- 6 **Flame icon** (🔥) is displayed when the SYSTEM mode is in HEAT. **Flame icon** (🔥) is displayed flashing when 2nd-stage heat (Aux or Emergency) is energized.
- 7 Not used
- 8 Displays current temperature.
- 9 Displays currently programmed set temperature (this is blank when SYSTEM switch is in the OFF position).
- 10 **Stage 1 & 2 Indicators:** The thermostat shall indicate when the first and second stage is energized. The icon is **STG 1** for the first stage energized. The icons for the first and second stage energized are **STG1+2** located in the lower right side of the display.



Configuration Menu

1. The configuration menu allows you to set certain thermostat operating characteristics to your system or personal requirements. The menu mode may be exited by pressing the system key to change from the OFF mode or after 15 minutes has elapsed with no keypad activity.
2. Not Used.
3. **Fast or Slow Cycle Selection** – The factory default setting is fast cycle, which cycles 1st stage at approximately 1.2°F and 2nd stage 0.75°F. If you prefer slow cycle, press the temperature key to change to SL. The 1st stage and 2nd stage would be 1.5°F and 1.2°F respectively.
4. **Select backlit display** – The display backlight improves display contrast in low

lighting conditions. Selecting backlight ON will keep the light on continuously. Selecting backlight OFF will keep the light off.













5. In the run mode, if the setpoint temperature is manually raised by 3°F (2°C) or more above the actual temperature with the **TEMPERATURE UP** key, and the fast second stage feature is enabled, FA on, the second stage will energize immediately. With FA off, second stage will not energize until the set point temperature is 1°F or more above actual temperature for more than ten minutes.

6. *Not Used*

7. **Select Temperature Display Adjustment 3 LO to 3 HI** – Allows you to adjust the room temperature display up to 3° higher or lower. Your thermostat was accurately calibrated at the factory but you have the option to change the display temperature to match your previous thermostat. The current or adjusted room temperature will be displayed on the left side of the display.

8. **°F or °C Selection** – The factory default setting for temperature display is Fahrenheit. If you want the temperature in Celcius, press temperature key to change to °C.

Configuration Menu

Step	Press Button(s)	Displayed (Factory Default)	Press   to select:
1	Set SYSTEM switch to OFF		
2	 and  momentarily	FA	SL
3	 and  momentarily	L (ON)	OFF
4	 and  momentarily	FA (ON)	OFF
5	 and  momentarily	0 HI (0)	3 LO TO 3 HI
6	 and  momentarily	°F	°C

OPERATION

Press three times to switch on.

Press once to switch off.

The system “mode” is selected by pressing the system key. Icons on the bottom right corner of the display will indicate the mode; COOL (❄️), AUTO (❄️🔥), HEAT (🔥), EMER, or OFF. In any mode except OFF, the setpoint temperature will be shown on the right side of the display. In OFF, this area will be blank. The current temperature will be displayed on the left side of the display.

To select the OFF mode, press the SYSTEM key once when in HEAT mode. To return the controller to HEAT mode, press the SYSTEM key three times, the flame icon will appear in the bottom right hand corner of the screen.

SPECIFICATIONS

ELECTRICAL DATA

Electrical Rating:

20 to 30 VAC 50/60 Hz.

0.05 to 1.0 Amps (Load per terminal)

1.5 Amps Maximum Total Load (All terminals combined)

THERMAL DATA

Setpoint Temperature Range:

45°F to 90°F (7°C to 32°C)

Operating Ambient Temperature Range:

32°F to 105°F

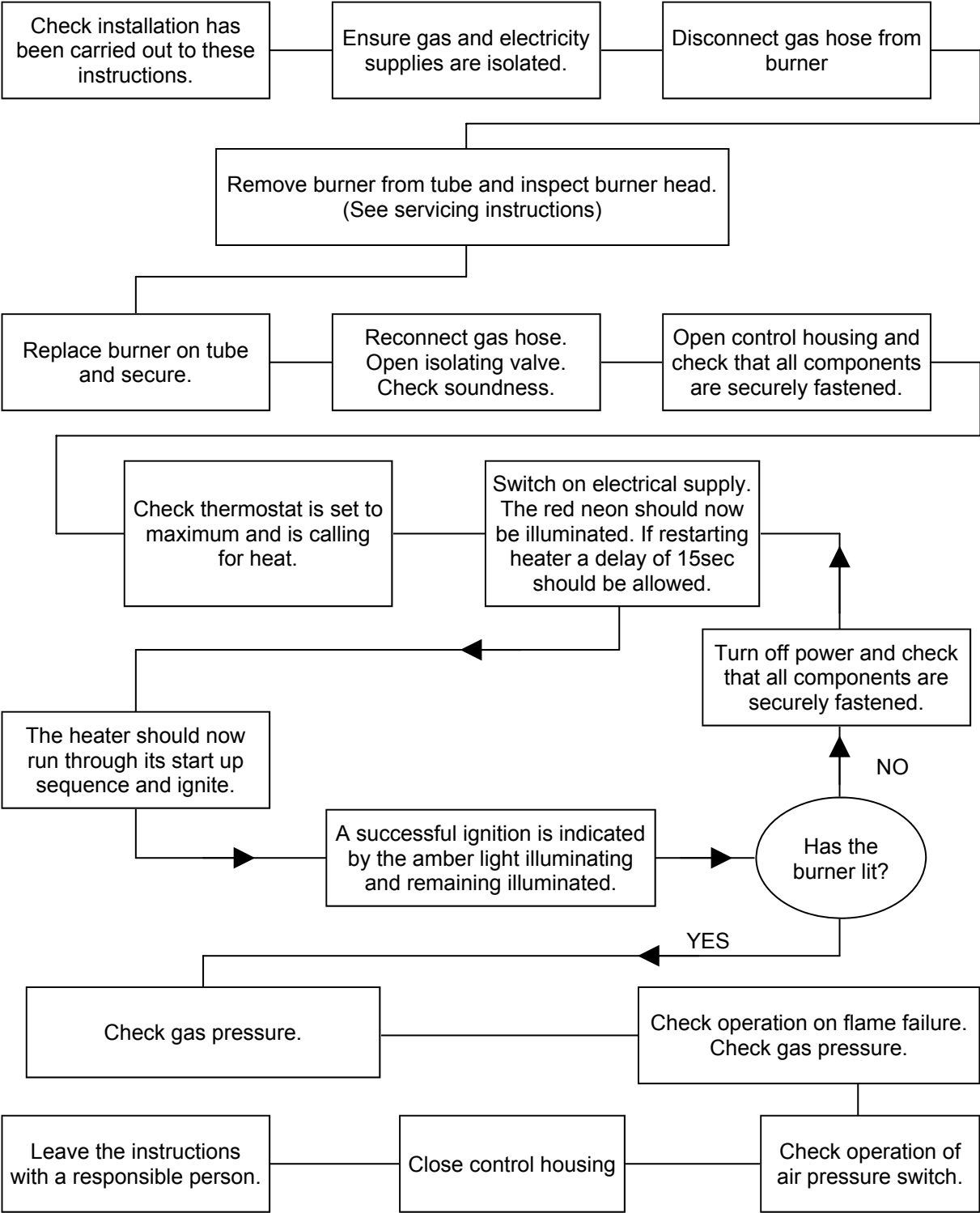
Operating Humidity Range:

0 to 90% RH (non-condensing)

Shipping Temperature Range:

-40°F to 150°F

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.



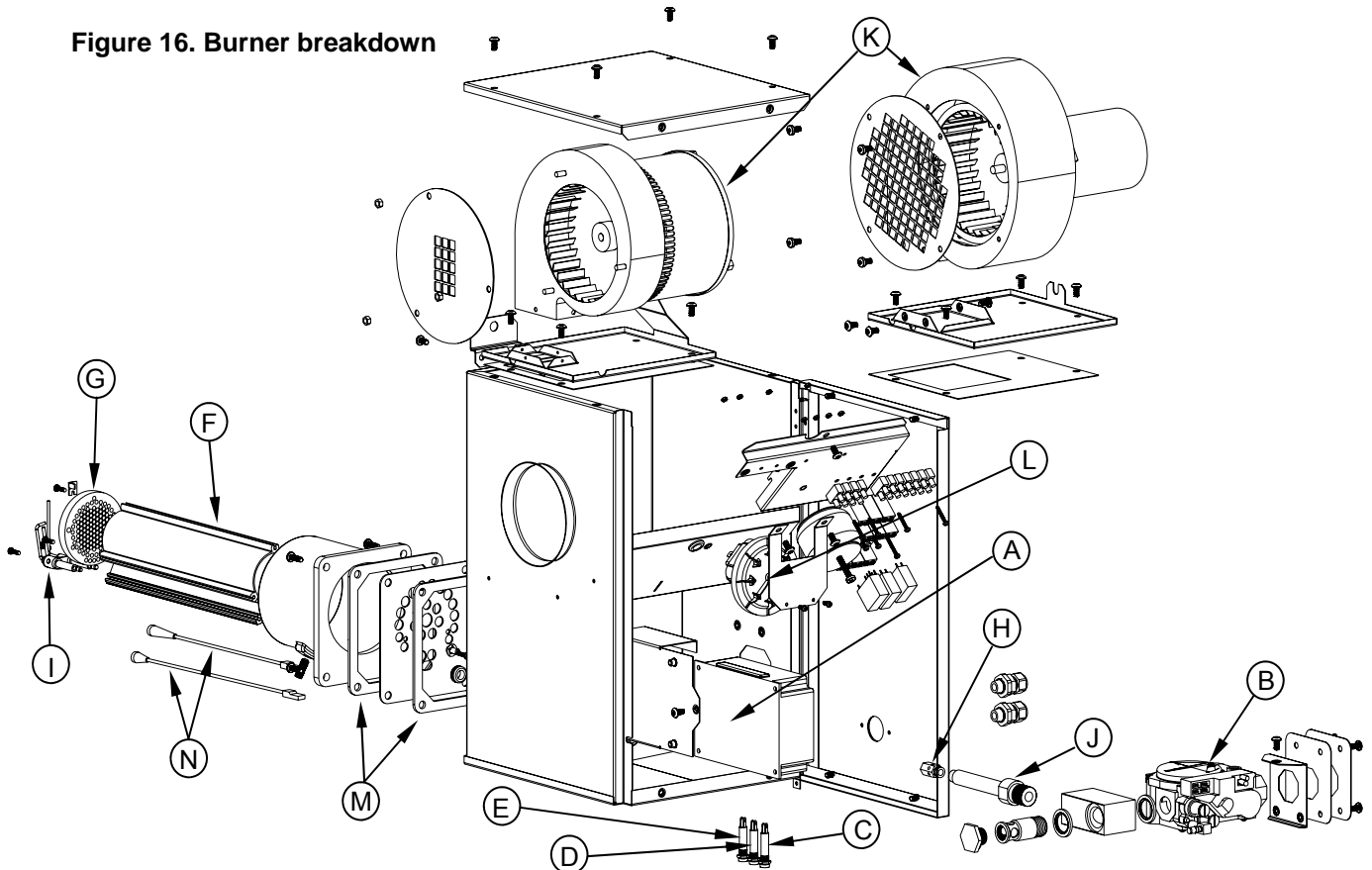
Suitable alternative tools may be used.

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




4.2 Burner Description.

Figure 16. Burner breakdown

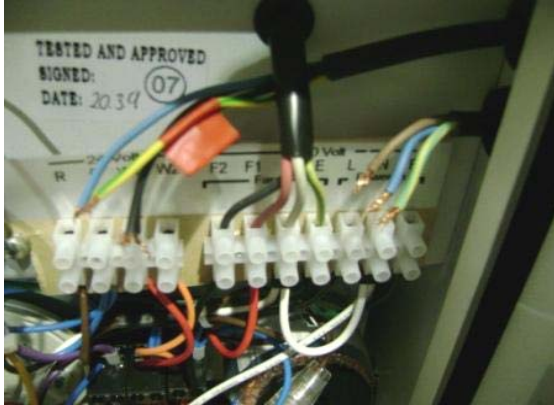


A	Ignition Controller	H	Injector
B	Gas Valve	I	Igniter Assembly
C	Power On Red LED	J	Jet Carrier
D	Low fire Yellow LED	K	Combustion Fan
E	High fire Yellow LED	L	Pressure Switch
F	Burner Tube	M	Gaskets
G	Pepperpot Head	N	Ignition/rectification Leads

4.3 Burner Removal

 Step 1 Isolate power and gas supplies.

Step 2 Disconnect the external power/control connections.



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



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



Step 5 Slacken 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.



4.4 Burner Gas Injector Servicing


Step 1.a Remove the 4 retaining screws, then 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 earth lead and pressure switch silicone 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.

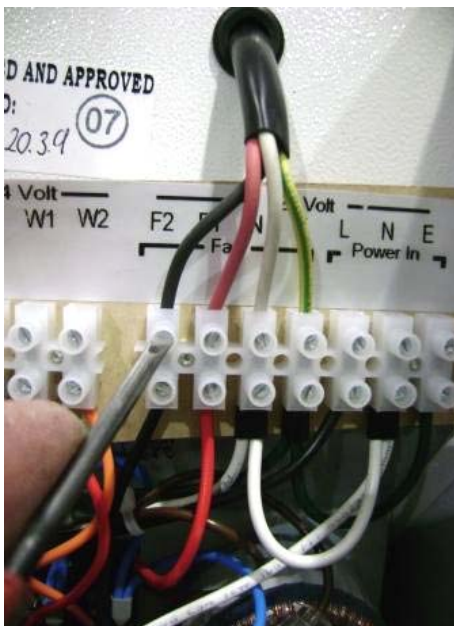
Step 3 Reconnect ignition leads and silicone tube to test nipple. Refit gasket and support casting.

4.5 Combustion Fan Servicing

Step 1 Remove the four top lid screws to reveal the combustion fan shown below.



Step 2 Disconnect the fan cables after first noting their positions, then pull cable through to fan compartment.



Step 3 Remove the four fan fixing screws then withdraw the fan complete with mounting bracket as shown below.



Step 4 Remove fan orifice plate.

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.

4.6 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 head.

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

Step 3 The condition of the igniter assembly can be checked for deterioration. However, we advise replacement at each service to ensure continued reliability. Detach the electrode assembly from the burner head by removing the two screws as shown and separating the igniter assembly lead connectors.



Step 4 Refit the electrode assembly and ensure the connections are secure to prevent incorrect sparking of the spark electrode.

Step 5 Check the positions and spark gap as shown in diagram below.

Step 6 The burner assembly is ready to refit after servicing the combustion fan and the radiant tube assembly.

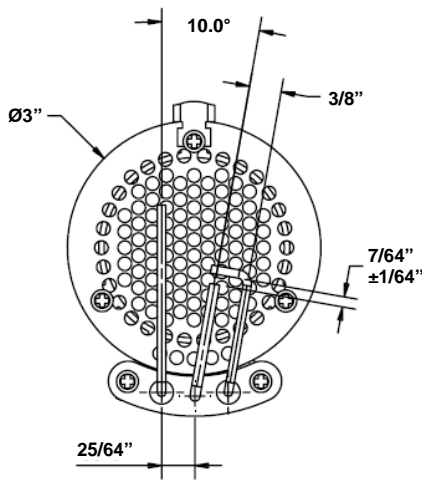
4.7 Radiant Tube Servicing

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 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.



4.8 Reflector Servicing

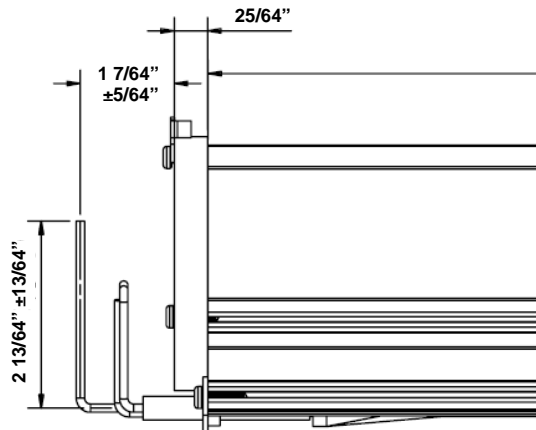
The condition of the reflectors should be noted. If necessary the reflectors can be cleaned with a mild detergent. This can significantly improve the efficiency of the appliance.

4.9 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.

4.10 Re-commissioning After Service

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





5. Spare Parts.

Required Spares

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

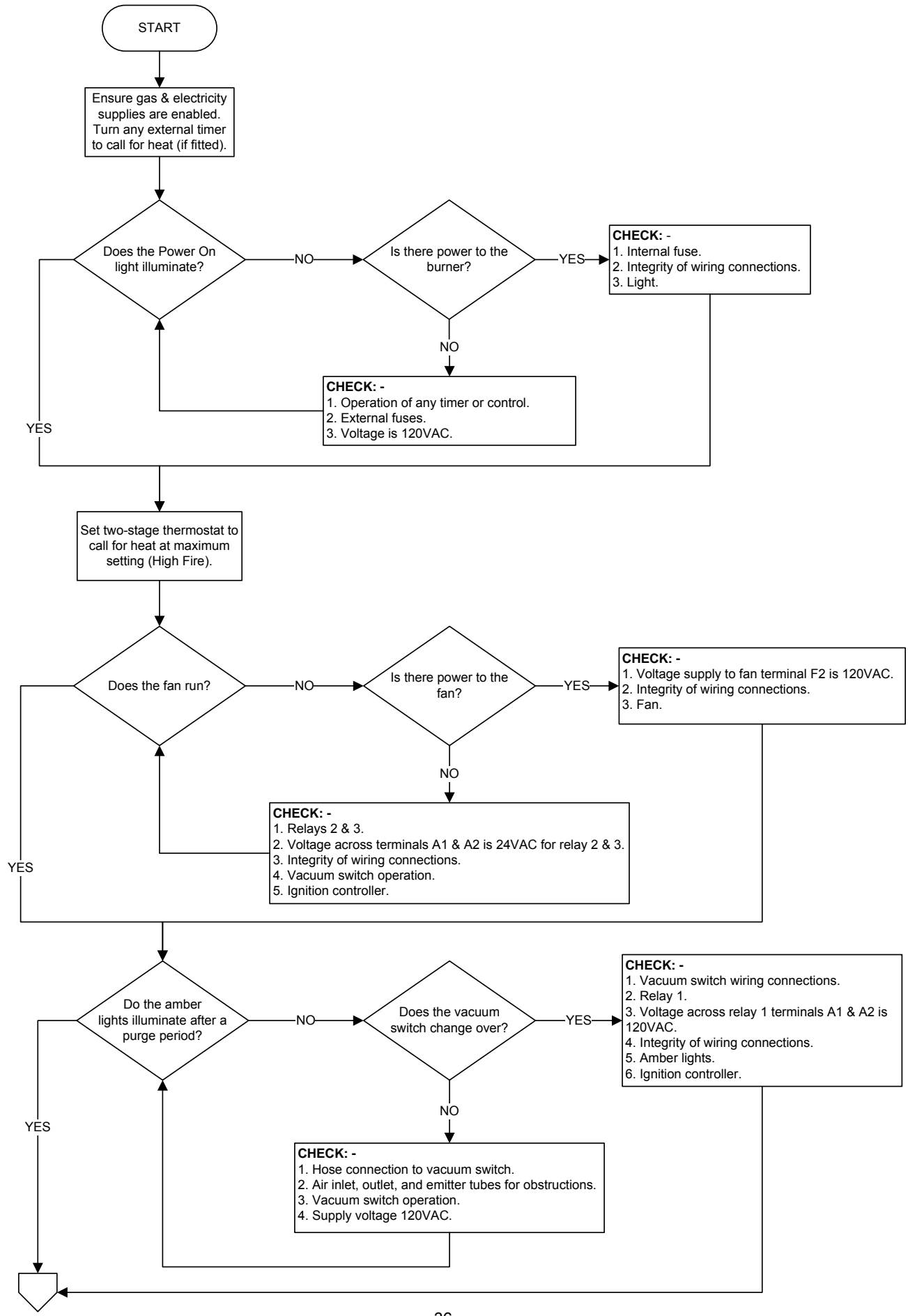


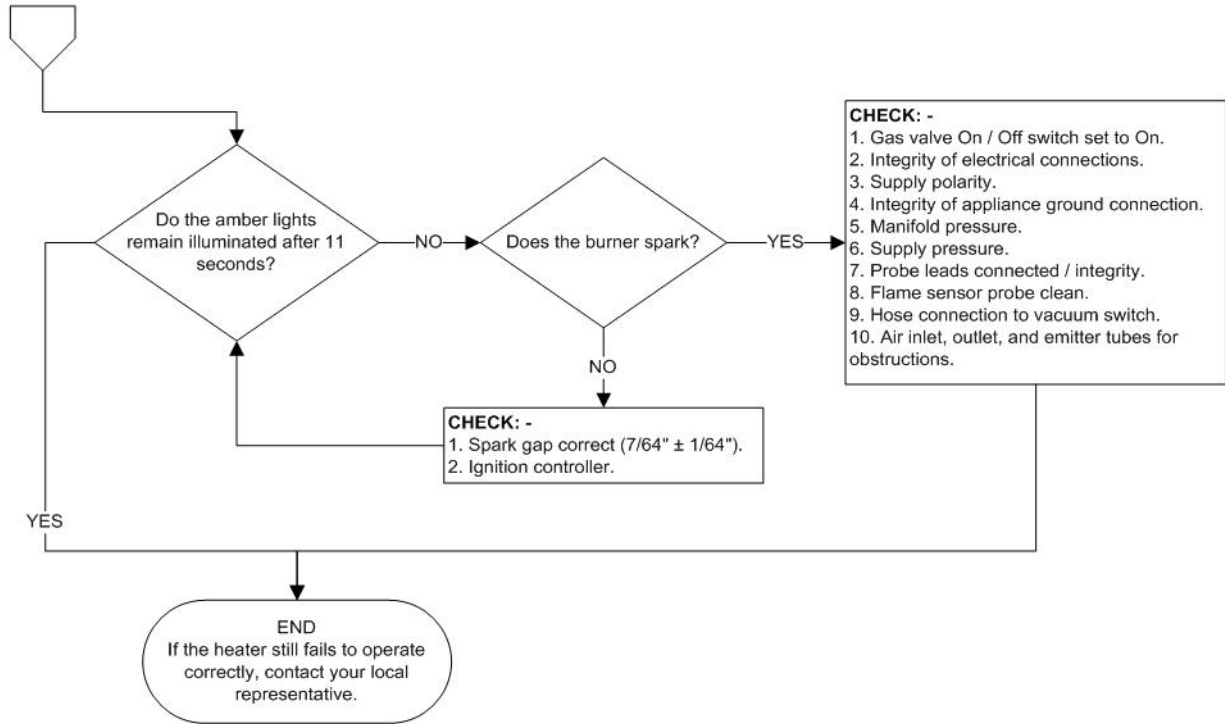
Note: Any spare part components that are not approved by AmbiRad could invalidate the approval of the appliance and the warranty.

Item	Description	Part No.	Item	Description	Part No.
	24V Relay	2104-2		110V Relay	2104-1


Item	Description	Part No.	Item	Description	Part No.
	Two stage thermostat	201964		Pressure Switch VPLUS80-170 VPLUS200	201676 201697
	Ignition Controller	3256-11		Transformer	900391
	Channel Controller	3256-1		YELLOW LED (x 2) (Hi/Lo fire)	201968
	Hi Lo Valve Nat Gas LPG	201964 201983		Red LED (Power On)	201969
	Pepperpot Head	200988		Combustion Fan VPLUS80-150 VPLUS170-200	201957 202132
	Ignitor Assembly	201284		Flame Plate 80 & 100P 125 & 150P 170P	201571 201854 201905
	Burner Tube	200358		Dowty Washer 1 1/2"	202063
	Injector	See section 1.10		Tube insert 80 & 100N ONLY	201688
	Jet Carrier 170 & 200N only	200420 201630		Turbulator 100/125 S30 & 150 S40 ONLY	6619T
	Cables: Channel Spark Electrode (<i>black</i>) or Pactrol Spark Electrode (<i>black</i>)	900400 900225-2		Gasket Set	202033
	Rectification lead (<i>purple</i>)	900225-3		Ducted Air Hose Hose Clamp	201321 7541
	Earth lead (<i>green/yellow</i>)	900225-1			

6. Troubleshooting Guide.





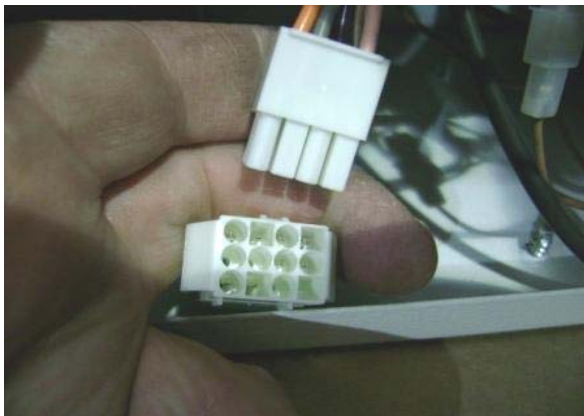
7. Replacing Parts.

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

7.1 Burner Controller Replacement

Step 1 Remove the four screws securing the rear access door.

Step 2 Disconnect burner controller from the wiring harness connector



Step 3 Disconnect the HT Lead from burner controller.



Step 4 Gently prise burner controller from its retaining pegs and remove.

Step 5 Fit new burner controller.

Step 6 Refit HT lead and wiring harness connector.

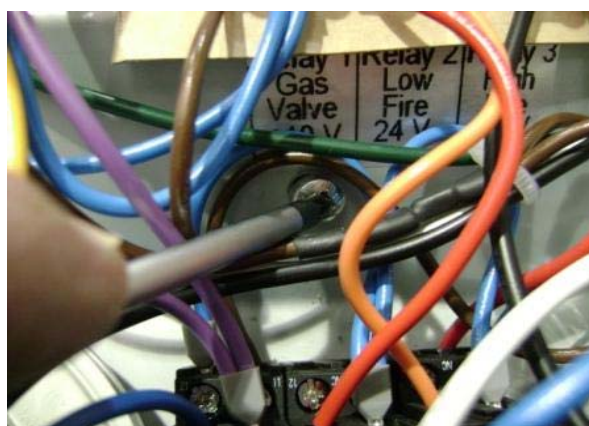
Step 7 Test product and close access door.

7.2 Air Pressure Switch Replacement

Step 1 Disconnect the two silicone impulse tubes from the pressure switch spigots.



Step 2 Remove the two electrical chassis retaining screws.



Step 3 Disconnect pressure switch wiring.

Step 4 *It may be necessary to partially disconnect the chassis wiring to access the pressure switch mounting screws at the rear.*

The air pressure switch can now be removed.

Step 5 Fit the new air pressure switch ensuring the impulse tubes are connected as shown below.



Step 6 Re-connect wiring.

Step 7 Test product and close access door.

7.3 Gas Valve Replacement

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

Step 2 Open the rear access door.

Step 3 Remove the two securing screws from the base of the injector tube, noting earth terminal connection.



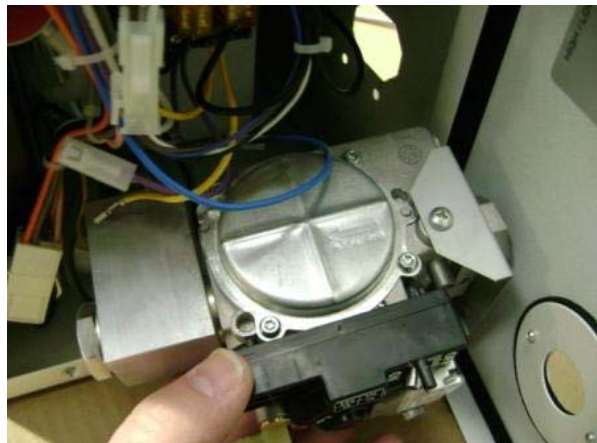
Step 4 Remove the gas valve wiring connections, noting their positions.



Step 5 Remove the four screws securing the gas valve inlet plate to the burner housing and remove plate.



Step 6 Remove gas valve rearwards as shown.



Step 7 The jet carrier and gas inlet can now be detached from the gas valve.

Step 8 Replace gas valve

Step 9 Re-connect wiring.

Step 10 Set burner pressure.

Step 11 Test product and close access door.

8. 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.**

8.1 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. Switch on the electrical supply to the heater. The 'power on' lamp will illuminate.
3. Ensure that the settings of the two stage thermostat and any time switch are set so that the heating system will be required to operate.
4. The fan will start and the ignition sequence will commence.
5. Ignition of the burner will occur and the 'low fire' light only will illuminate for low fire and both the 'low fire' and 'high fire' lights will illuminate for high fire.
6. If ignition is unsuccessful 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.

8.2. To Switch Off Heater

To switch off heater, press SYSTEM key on thermostat. Burner will stop and fan will shut off.

8.3. Servicing

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



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