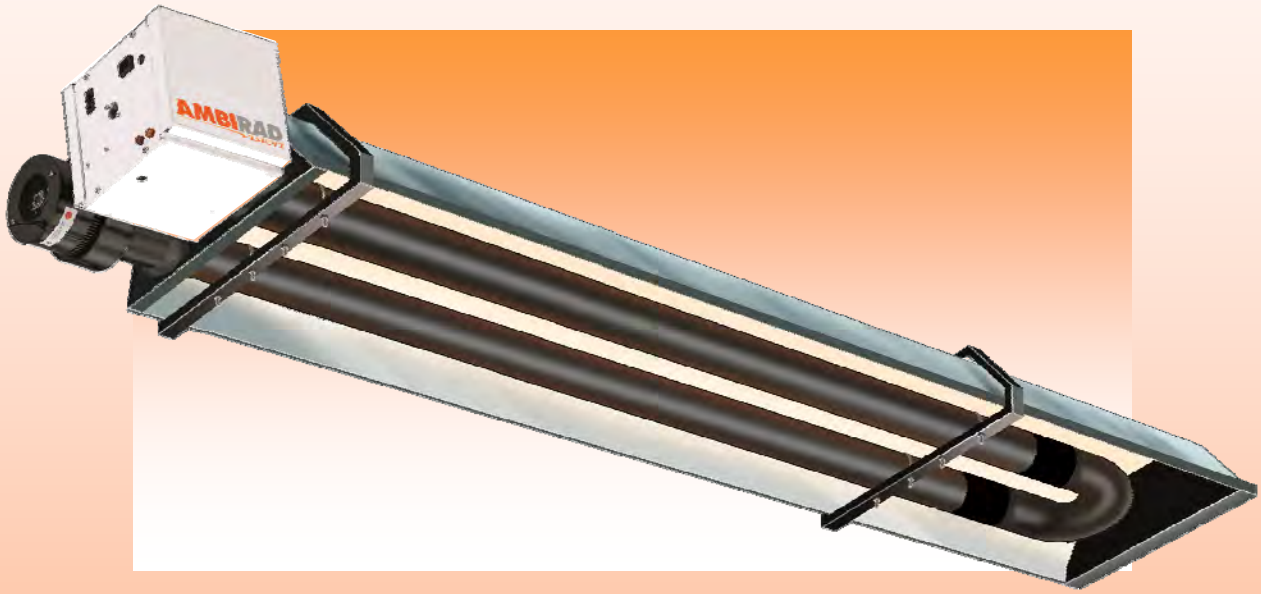
Assembly, Installation & Servicing Manual for AmbiRad Vision® VS Range of Radiant Tube Heaters



INDEX **Section**

WARNINGS

AmbiRad equipment must be installed and maintained in accordance with the relevant provisions of the Gas Safety (Installations and Use) Regulations 1998 for gas fired products. Due account should also be taken of any obligations arising from the Health and Safety at Works Act 1974 or relevant codes of practice. In addition the installation must be carried out in accordance with the current IEE wiring regulations (BS 7671), BS 6896 (Industrial & Commercial) and any other relevant British Standards and Codes of Practice by a qualified installer. All external wiring MUST comply with the current IEE wiring regulations.

Introduction.

Welcome to the new range of high efficiency AmbiRad Vision radiant tube heaters. Local regulations may vary in the country of use and it is the installers responsibility to ensure that such regulations are satisfied
All installation, assembly, commissioning and service procedures must be carried out by suitable qualified competent persons to the statutory regulations in the country of use.
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 familiarise yourself with the components and tools you require at the various stages of assembly.*

All Dimensions shown are in mm unless otherwise stated.

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

Document Index.

1. Installation Requirements.

Isolate any electrical supply to the heater and controller before proceeding.

1.1 Health and Safety

AmbiRad heaters must be installed in accordance with the relevant provisions of the Gas Safety (Installations and Use) Regulations 1998. Due account should also be taken of any obligations arising from the Health and Safety at Works Act 1974 or relevant codes of practice. In addition the installation must be carried out in

accordance with the current IEE wiring regulations (BS 7671), BS 6896: (Industrial & Commercial) and any other relevant British Standards and Codes of Practice by a qualified installer. Isolate all electrical supplies to the heater & controller before proceeding.

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.

1.2 Model Definitions

VSUT = AmbiRad Vision U Tube heater with painted induced burner, stainless steel reflector & end caps.
VSUH= AmbiRad Vision U Tube heater in Herringbone manifold configurations with painted induced burner, stainless steel reflector & end caps.
VSLI = AmbiRad Vision Single Linear heater with painted induced burner, stainless steel reflector & end caps.
VSLF = AmbiRad Vision Single Linear heater with painted Forced burner, stainless steel reflector & end caps. (Nat Gas ONLY)
VSLH = AmbiRad Vision Linear heater in Herringbone manifold configurations with painted induced burner, stainless steel reflector & end caps.
VSDL = AmbiRad Vision Double Linear heater with painted induced burner, stainless steel reflector & end caps.

VSAUT, VSAUH, VSALI, VSALF, VSALH & VSADL = As above except: aluminised reflector with *no* end caps.

1.3 Heater Suspension

See fig 3b. 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 3.b. 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. The recommended mounting heights for AmbiRad heaters are given in the table above.

Model	Recommended Mounting Height (m)	
	Horizontal	Inclined / wall mounted
15	4.0 - 5.0m	3.5 - 4.5m
20	4.5 - 7.0m	3.5 - 5.0m
25	5.0 - 8.0m	4.0 - 5.0m
30	5.5 - 9.0m	4.0 - 6.0m
35	6.0 - 10.0m	4.5 - 6.5m
40	6.5 - 11.0m	5.0 - 7.0m
45	7.0 - 12.0m	5.5 - 8.0m
50	7.5 - 13.0m	6.0 - 9.0m
70	9.5 - 17.0m	8.0 - 13.0m

1.4 Wall Mounting

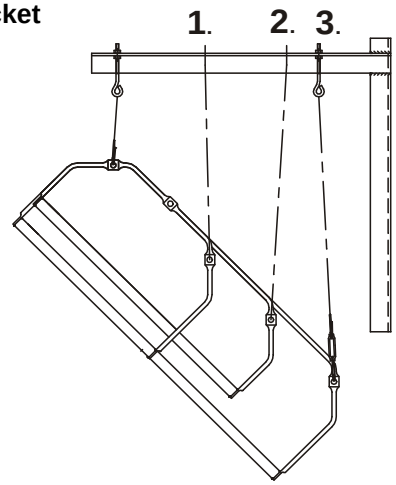
These radiant tube heaters can be wall mounted using the appropriate bracket (AmbiRad part no WMB-13-22-38).

When using the wall mounting brackets the heater must be inclined at an angle between 30° and 45°.

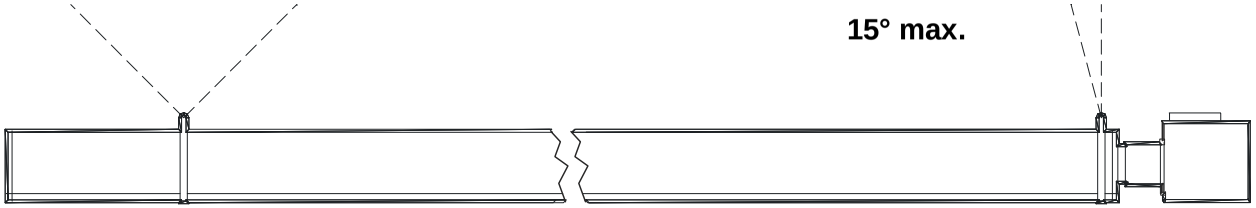
Table 1 Angle Mounting

		U Tube		Linear	
Heater Size	Required angle	Chain length	Eyebolt position	Chain length	Eyebolt position
15 - 30	**30-35°**	10 links	2	7 links	1
	45°	13 links	2	9 links	1
35 - 50	**30-35°**	12 links	3	8 links	1
	45°	16 links	3	10 links	1
70	**30-35°**	N/A	N/A	8 links	1
	45°	N/A	N/A	10 links	1

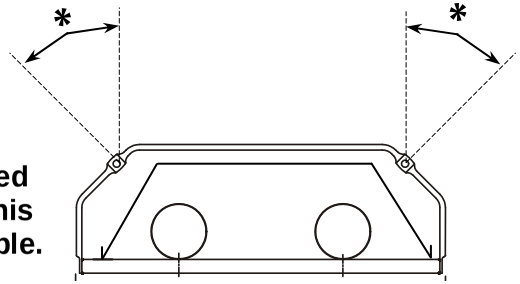
Figure 3.a. Angle Mounting using the Wall mounting bracket



Where chain supports have an angle of inclination greater than 15° an equal and opposite support is recommended.



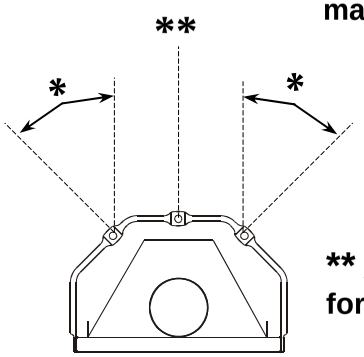
Vertical suspension chain ideal. Where supports are inclined, maximum recommended angle of inclination is 15°.



Vertical or inclined suspension on this plane is acceptable.

U TUBE SUSPENSION

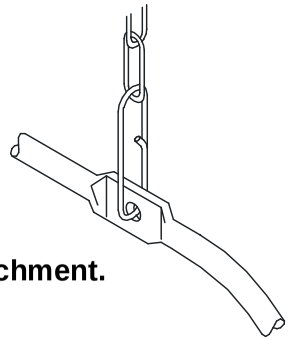
* These angles to be equal and not more than 45°.



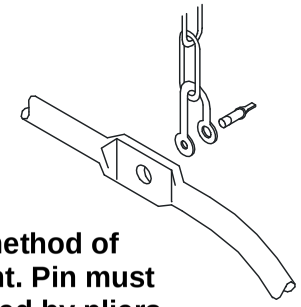
** Alternative suspension for Linear via single chain.

SINGLE LINEAR SUSPENSION

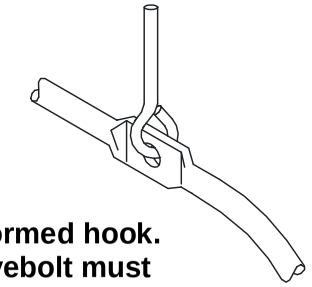
ON U TUBE VARIANTS THE HEATER SHOULD SLOPE DOWNWARDS TOWARDS THE RETURN BEND AND ON LINEAR VARIANTS SHOULD SLOPE DOWNWARDS TOWARDS BURNER BY APPROX. 10mm FOR BOTH HORIZONTAL AND WALL MOUNTED INSTALLATIONS.



Typical Speedlink attachment.



Shackle method of attachment. Pin must be tightened by pliers.



Drop rod with formed hook. note. hook or eyebolt must be closed tight.

Figure 3.b. Recommended Methods of Heater Suspension.

1.5 Herringbone systems (UH & LH).

The manifold system should be arranged to fall slightly in the direction of the vacuum fan. This ensures that any condensation formed in the manifold on cold start and cool down is not trapped or allowed to drain back into the heater unit. This allows condensate to flow towards the condensate trap located at the vacuum fan end of the manifold system. (See figure 4a below for condensate trap arrangement).

The manifold should be supported by chain, stainless steel flexible wire, or other flexible means from the roof structure to allow movement caused by thermal expansion. For 100mm diameter manifold the maximum distance between supports is 2.4m and 3.0m for 150mm diameter.

Flexible couplers (supplied by AmbiRad) must be inserted within the manifold system to allow linear expansion to take place and prevent stress and strain on the system.

> The manifold must be supported either side of the flexible coupler.

The exhaust flue should be adequately supported from the building structure and installed in accordance with the British Standard Code of Practice BS 5440: Part 1: – Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases)

A condensate trap assembly must be provided at the end of the manifold system before the hot gas vacuum fan.

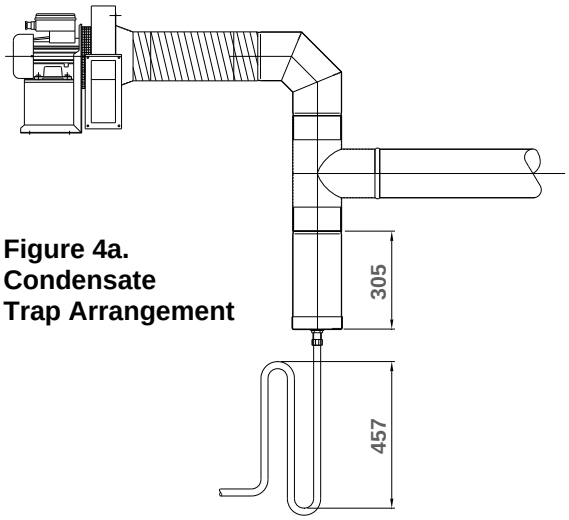


Figure 4a. Condensate Trap Arrangement

The minimum depth of the condensate collecting chamber shall be 305mm and the minimum depth of the condensate drain pipe 'U' trap shall be 457mm deep. The end cap of the collecting chamber to be fitted with a flush flanged tank connector. Any protrusion to be removed leaving the inside flush with end cap.

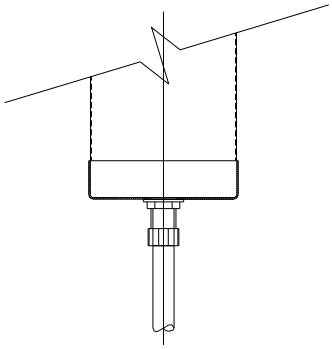


Figure 4b. Collecting Chamber Arrangement

The end cap should be sealed with silicon jointing compound and pop riveted in position. All condensate drains from the flue collecting chamber to the disposal point shall be corrosion-resistant material of not less than 22mm internal diameter. Copper or copper based alloy shall not be used for condensation drains. See reference BS 6896: Condensate drain pipes must be protected against the effects of freezing.

The Type '0' and Type '2' vacuum fans have bottom horizontal discharge with rectangular connections (flanged on the type 0) and must be mounted in that position by means of the fan support stool onto a suitable platform or brackets fixed to the building structure.

For details of the fan outlet fixing holes see below.

Figure 4c. Type 'O' Fan Outlet Dimensions

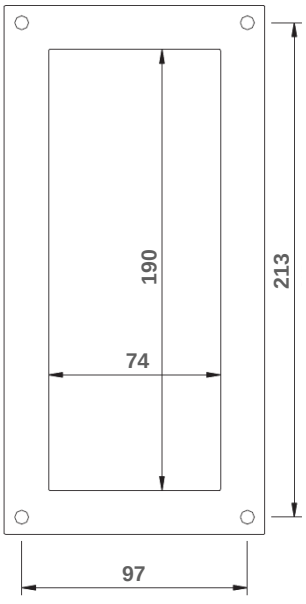
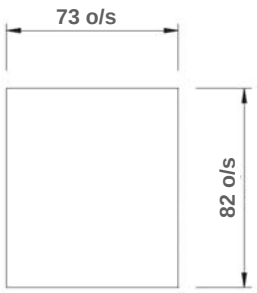


Figure 4d. Type 2 Fan Outlet Dimensions



For details of fan mounting bracket and fixing down holes see figure 5.

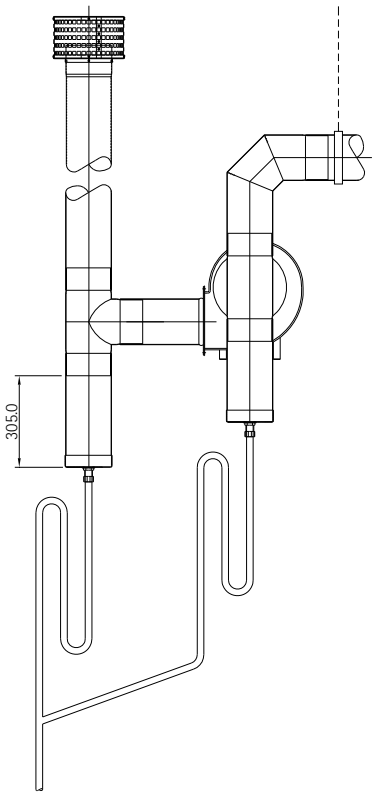


Figure 4e. Conventional Flue Arrangement Roof Exit.

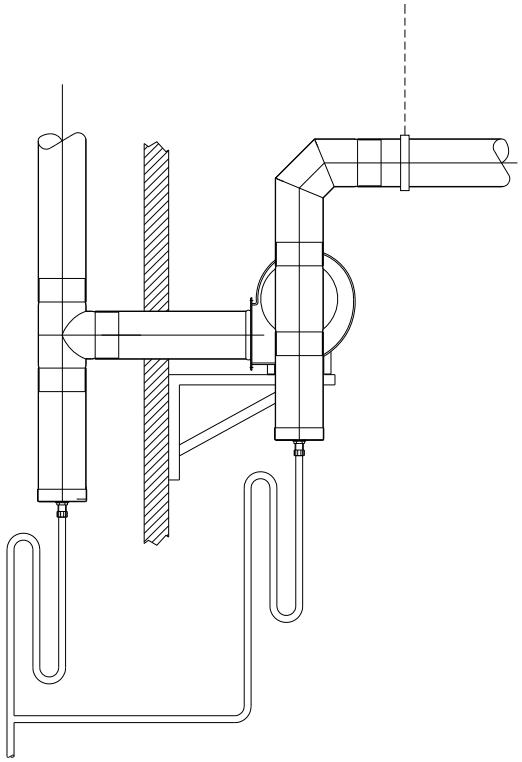


Figure 4f. Conventional Flue Arrangement Wall Exit.

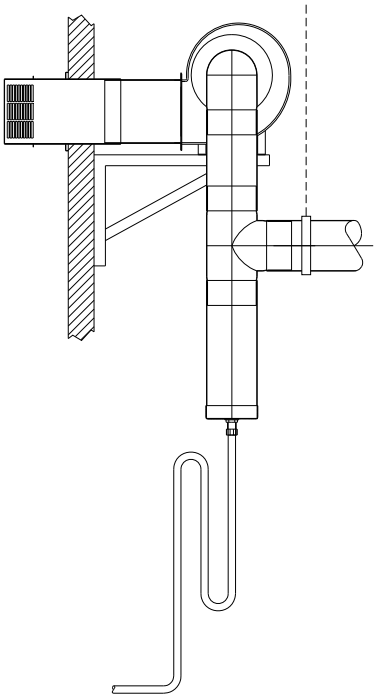


Figure 4g. Stainless Steel Telescopic Through The Wall Arrangement (available for Type 'O' and Type '2' fans)

Where a conventional flue is to be installed, AmbiRad supply an aluminium transformation piece to which a 150mm (6ins) diameter flue must be attached.

The length of flue which may be connected to the fan outlet must be adequately supported from the building structure.

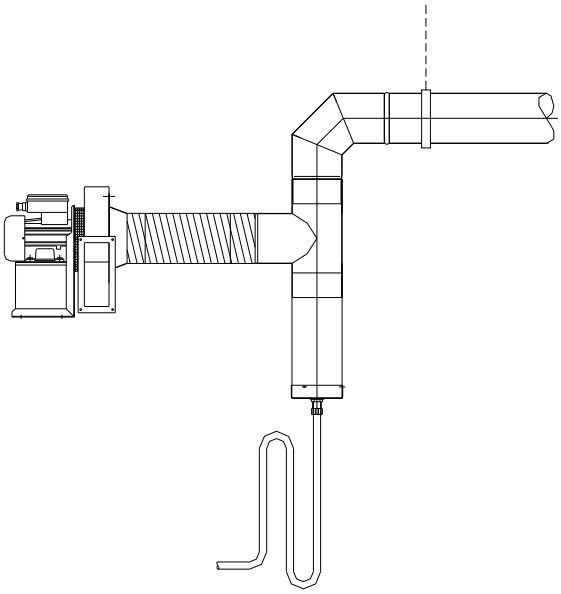
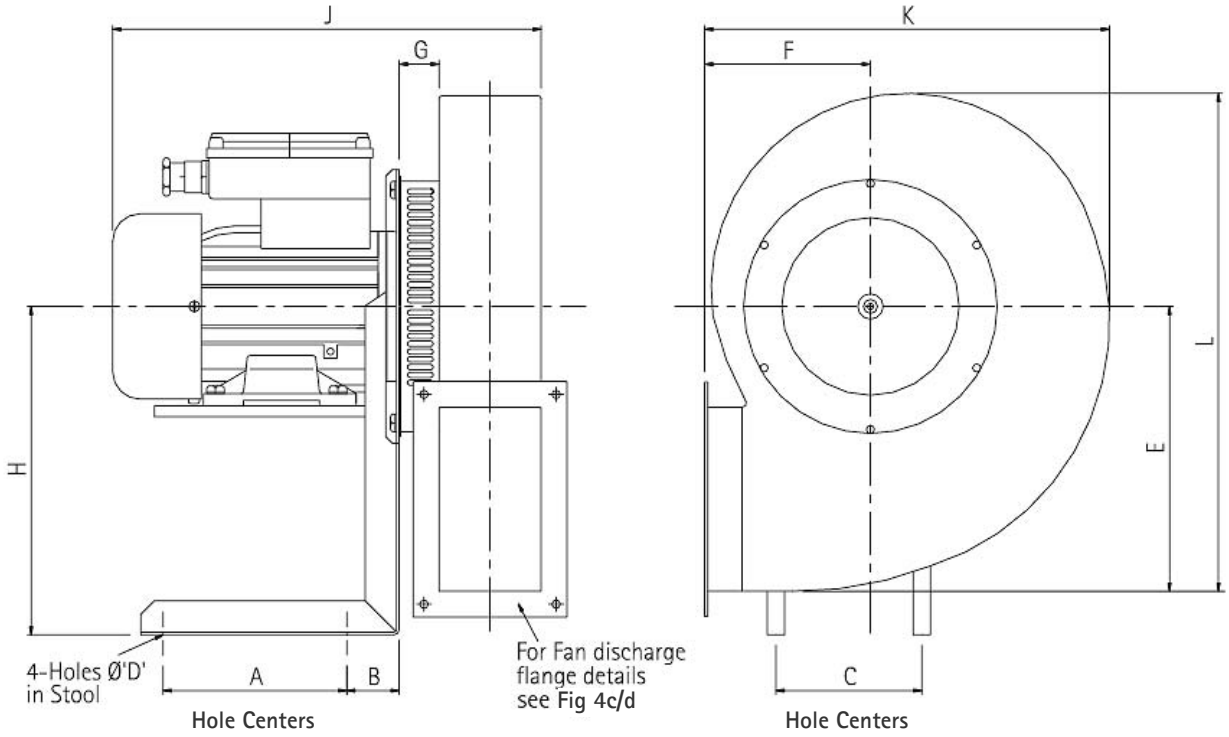


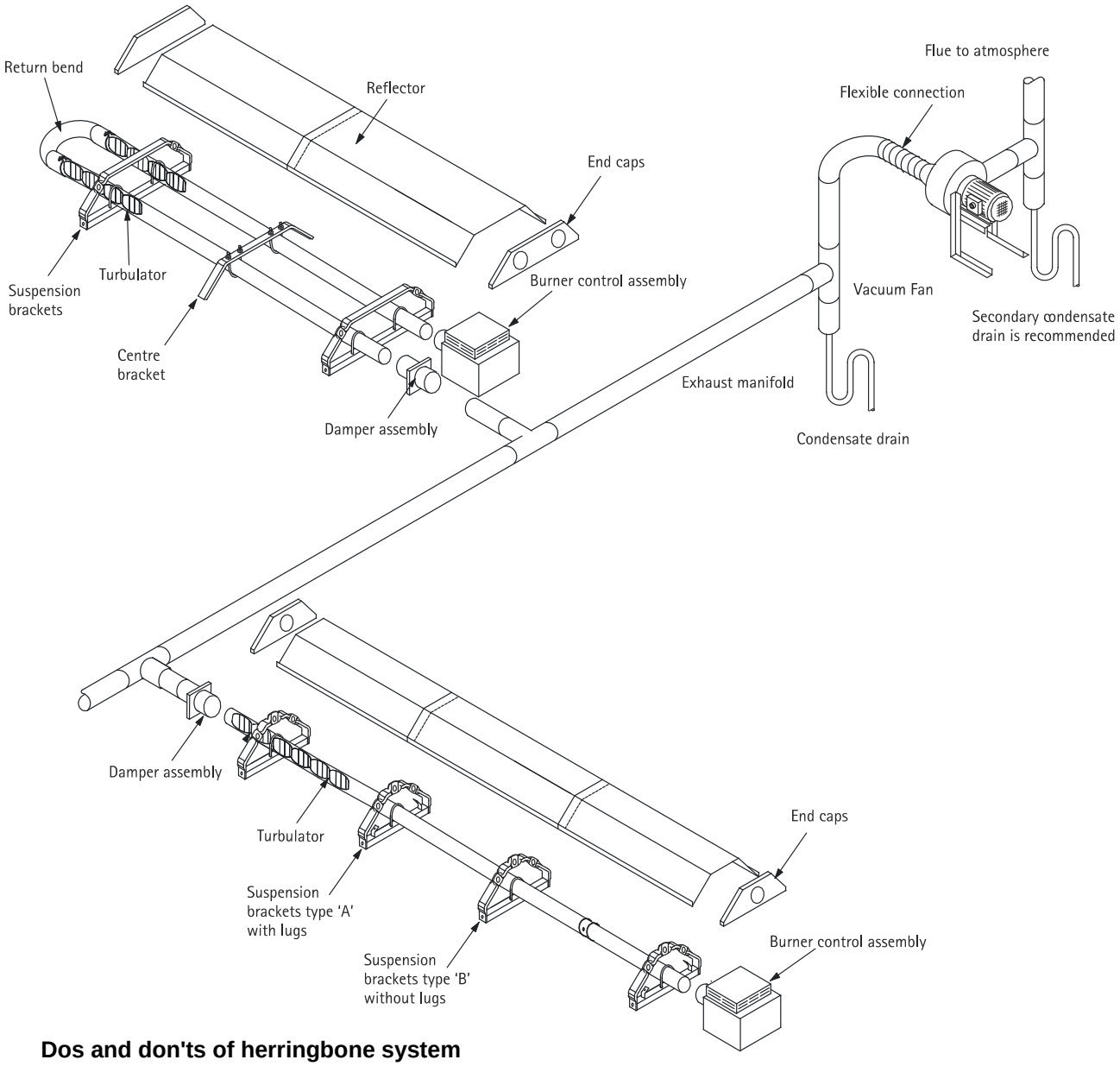
Figure 4h. Typical Low Fan Arrangement

Figure 5. Vacuum fan mounting details (Type 'O' fan illustrated)



Fan	Type O	Type 2
A	124	80
B	38	35
C	175	174
D	7.1	7
E	209	125
F	153	100
G	42	25
H	239	120
J	340	210
K	332	205
L	363	215
Power (watts)	550	120
Running Current (amps)	2.6	0.8
Starting Current (amps)	15.4	4.0
Voltage	230V 1ph	230V 1ph

Figure 6. Typical Herringbone system



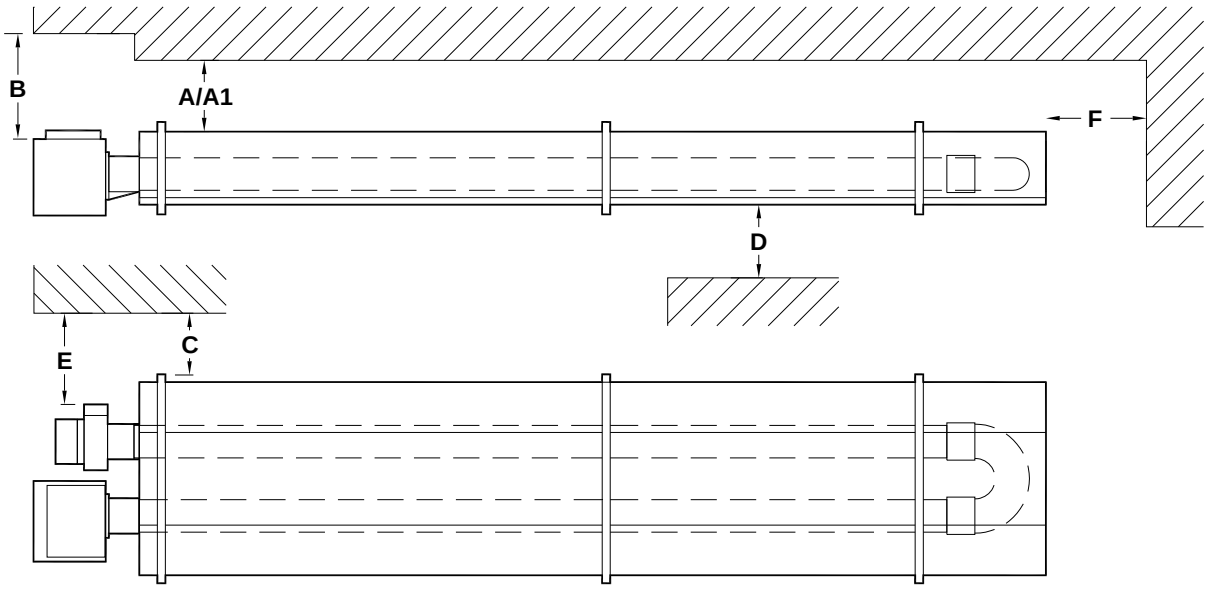
Dos and don'ts of herringbone system

Dos	Don'ts
Check design pressure drop.	Run drains in copper or mild steel pipework.
Check for corrosive industrial process in proposed building - e.g. cleaning, electroplating, printers using sugar powder etc.	Install system with extra 90° bends without asking AmbiRad if the system will operate correctly.
Drain all flue ducts and seal all joints.	Install flue with vertical rise without firstly fitting a drain point at it's lowest level.
Secure joints with pop rivets as well as sealing compound (refer to assembly instructions).	Fit fan with outlet vertical or with top horizontal discharge.
Fit drain traps before and after fans (see figs 4).	Fit damper upside down or on it's side.
Fit expansion joints before fan and at intermediate points on the herringbone system.	Fit damper wrong way round. (see fig14 page 31.)
Run drains in galvanised steel or plastic pipes.	Silicone seal tube to burner and/or damper assy.
Follow guide to combined flue heating system.	

1.6 Clearance to Combustibles.

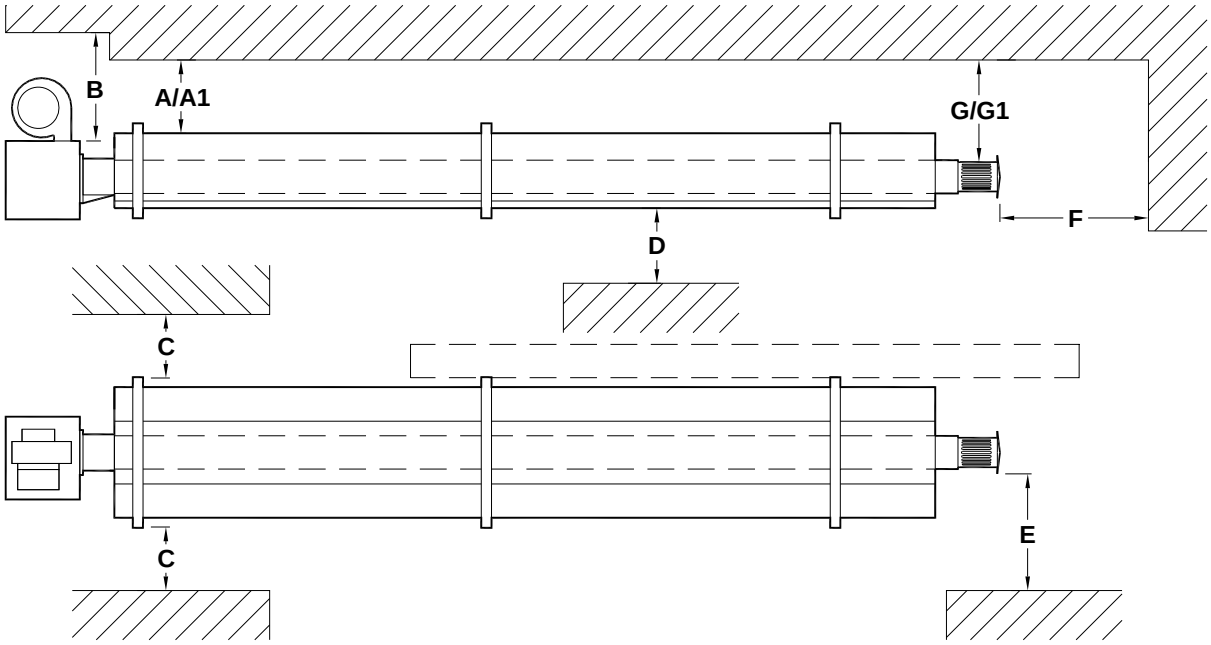
The minimum clearances to combustible materials are given in the tables below. These minimum distances MUST be adhered to at all times.

Figure 7.a Diagram illustrating the clearance to combustibles (U tube shown)



VSUT / VSAUT		15/20	25/30	35/40	45/50
Above Reflector (VSUT NG ONLY)	**A**	180	180	180	180
Above Reflector (VSAUT and ALL LPG ONLY)	**A1**	280	280	280	280
Above Burner / Heater Outlet	**B**	500	500	500	500
To the Sides	**C**	900	1000	1100	1100
Below Tubes	**D**	1500	1700	2100	2100
Horizontally from Heater Outlet (UNFLUED)	**E**	1200	1200	1200	1200
End Wall (VSUT ONLY)	**F**	500	500	500	500

Figure 7.b Diagram illustrating the clearance to combustibles (VSLF shown)



VS(A)LI; VS(A)LF; VS(A)LH; VS(A)DL		15/20	25/30	35/40	45/50	70
Above Reflector (VSLI/LF/LH/DL NG ONLY)	**A**	150	150	150	150	230
Above Reflector (VSALI/LF/LH/DL NG and ALL LPG ONLY)	**A1**	280	280	280	280	280
Above Burner	**B**	500	500	500	500	500
To the Sides	**C**	750	750	750	750	1250
Below Tubes	**D**	1500	1700	2100	2100	2400
Horizontally from Heater Outlet (UNFLUED)	**E**	1200	1200	1200	1200	1200
End Wall	**F**	500	500	500	500	500
Above Heater Outlet (FLUED)	**G**	150	150	150	150	150
Above Heater Outlet (UNFLUED)	**G1**	500	500	550	550	550

1.7 Gas Connection and Supply

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

A competent or qualified engineer is required to either install a new gas meter to the service pipe or to check that the existing meter is adequate to deal with the rate of gas supply required. Installation pipes should be fitted in accordance with BS 6896, so that the supply pressure, as stated in Table 4 will be achieved. It is the responsibility of the competent engineer to ensure that other relevant Standards and Codes of Practice are complied with in the country of installation. Pipes of smaller size than the heater inlet gas connection must not be used. The complete installation must be tested for soundness as described in the country of installation.

The gas union service cock MUST be fitted in the gas supply close to the heater, but not onto the burner itself.

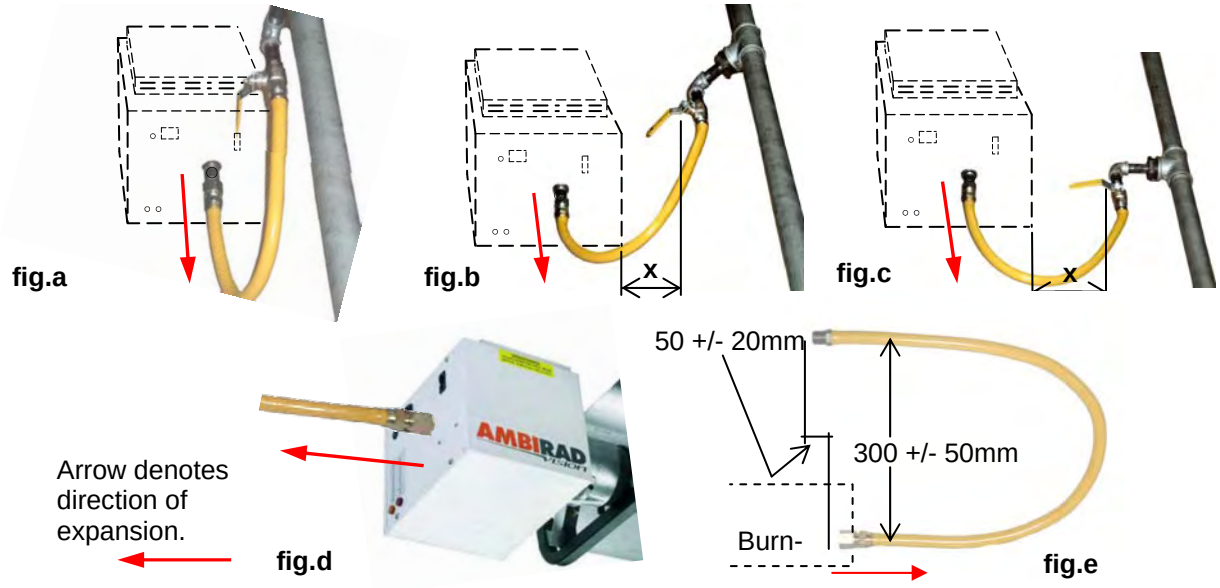
Take care when making a gas connection to the heater not to apply excessive turning force to the internal controls.

A flexible hose is installed to allow safe linear expansion of the heater without creating undue stress on the gas supply pipe work. It is therefore important that a tested and certified hose assembly made to ISO 10380, supplied with ½" BSP female cone seat adapters, is installed as per these instructions.

It is also important to ensure that expansion is taken up in the body of the flexible hose, and not on its attachment to the pipe work. The cone seat adapter supplied on one end of the flexible gas hose provides a `swivel` action, and must be fitted on the burner using a ½" BSP barrel nipple to provide ease of disconnection for future servicing. This assumes that the heater and fixed gas supply to the isolating valve have been installed.

The installation layout described below is the only method recommended by the institute of gas engineers, the hose manufacturer, and AmbiRad and must only be carried out by a qualified/competent gas engineer.

Figure 8. Correct Installation of Flexible Gas Connection



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:

Vertical (fig.a)
45° angle (fig.b)
90° angle (fig.c)

Any other position in between these angles is acceptable.

A clearance distance 'x' of min 200mm must be observed to allow side door access .

Care must be taken to observe the minimum pipe bend diameter (minimum 250mm, maximum 350mm) & pipe expansion distance (minimum 30mm, maximum 70mm) as shown in fig.e.

Maximum bend diameter for the 1000mm hose is 450mm.

The correct installation as shown will allow for approx 100mm of movement due to expansion.

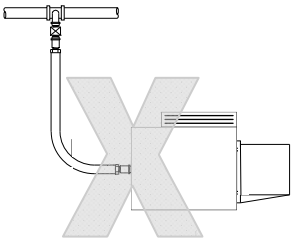


fig.f

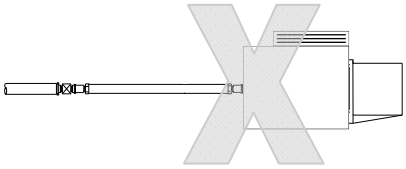


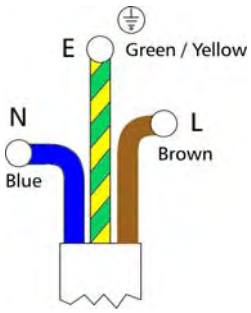
fig.g

The methods shown in fig.f and fig.g are unacceptable, due to undue stress on the hose & fittings.

Table 4 Gas Supply Pressures

Gas Category	I2H	I3P
Gas Type	Natural Gas (G20)	Propane (G31)
Max Supply Pressure (mbar)	25	45
Min Supply Pressure (mbar)	17	25
Nominal Pressure (mbar)	20	37
Gas Supply	Connection R½ ½in BSP Internal Thread	

1.8 Electrical Connections



This appliance must be earthed.
Supply 230V 50Hz single phase.
Standard heater 116W. Herringbone 16W.
Current rating 0.55 amp max (inductive).
Fuse: external 3 amp.

All electrical work should be carried out to IEE standards by a competent electrician. The electrical connection to the heater is made by means of a three pin plug-in power connector. Live, neutral and earth connections should be made via a flexible supply cable to the power connector and routed clear of the heater or tubes.

The flexible supply cables should be of 0.5mm² and comply with BS 6500. The wires in the mains lead are coloured in accordance with the following code: Green & Yellow Earth; Blue Neutral; Brown Live

It is recommended the heater or group of heaters are controlled by thermostats, a time switch and if required manual control switches and a frost thermostat.

We recommend use of AmbiRad approved controls. Please refer to control manual for siting and installation details.
Where alternative manufactures controls are used, please refer to their instructions for their siting and installation details.

Figure 9.a Typical VSUT/VSAUT Wiring Connections

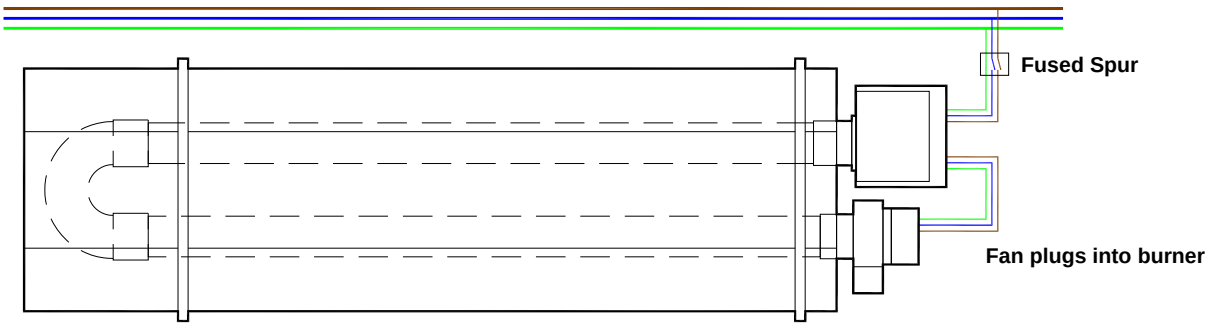


Figure 9.b Typical VSLF/VSALF Wiring Connections

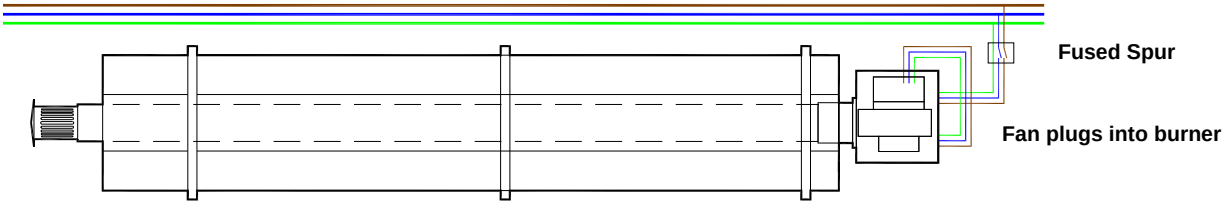


Figure 9.c Typical VSLI/VSALI Wiring Connections

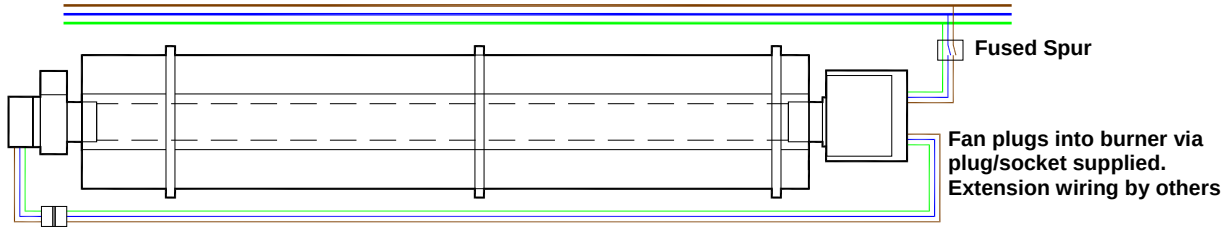


Figure 9.d Typical VSDL Wiring Connections

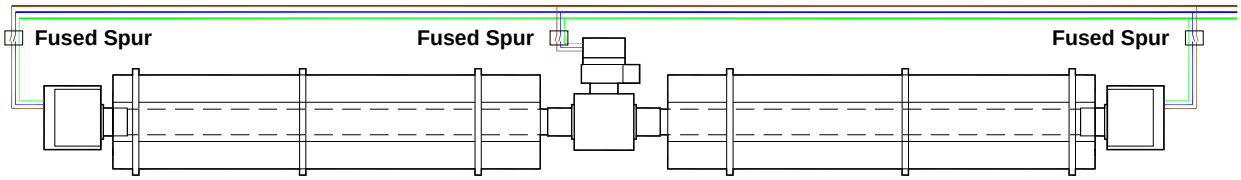


Figure 10. Internal Burner Wiring Diagram.

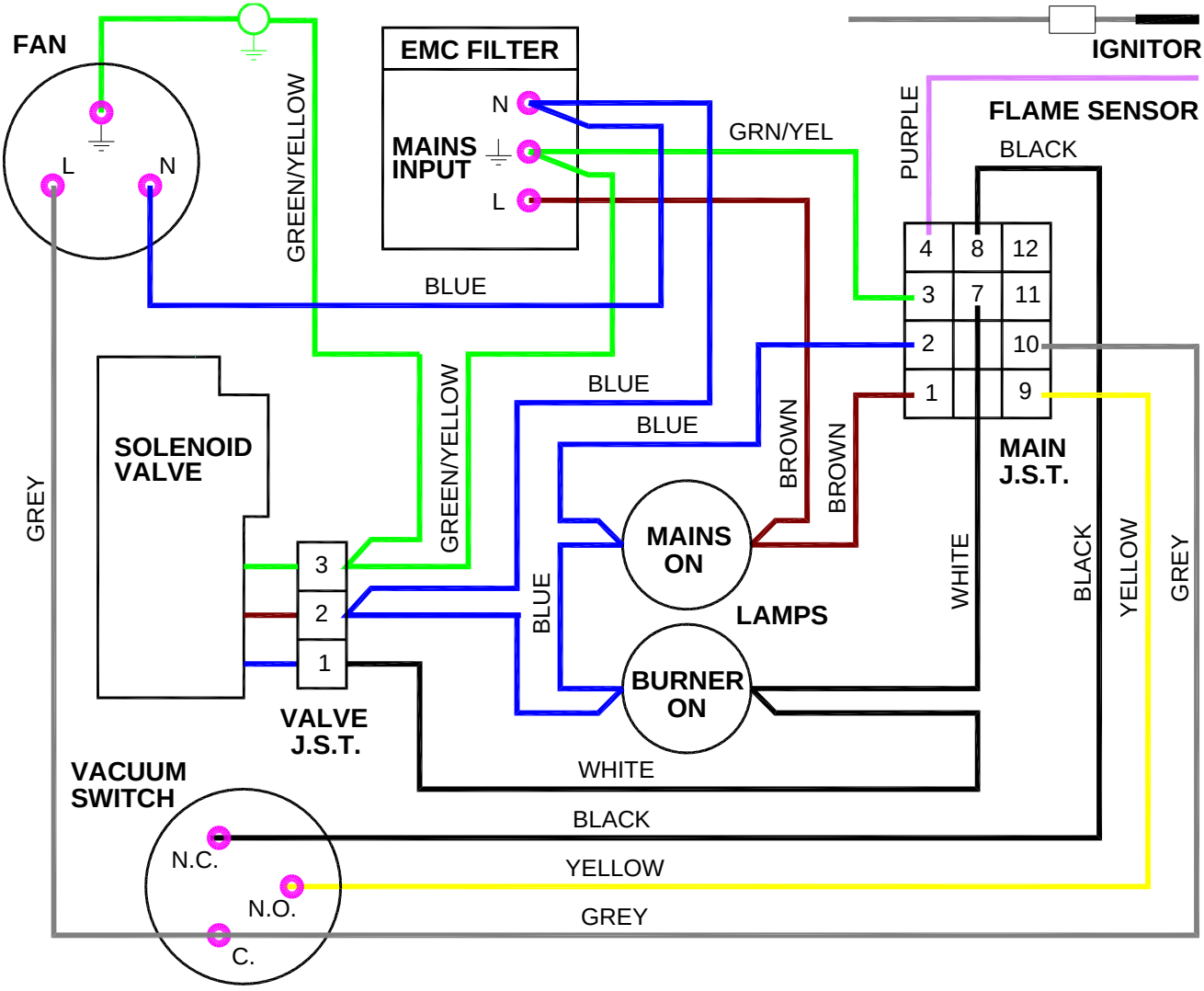
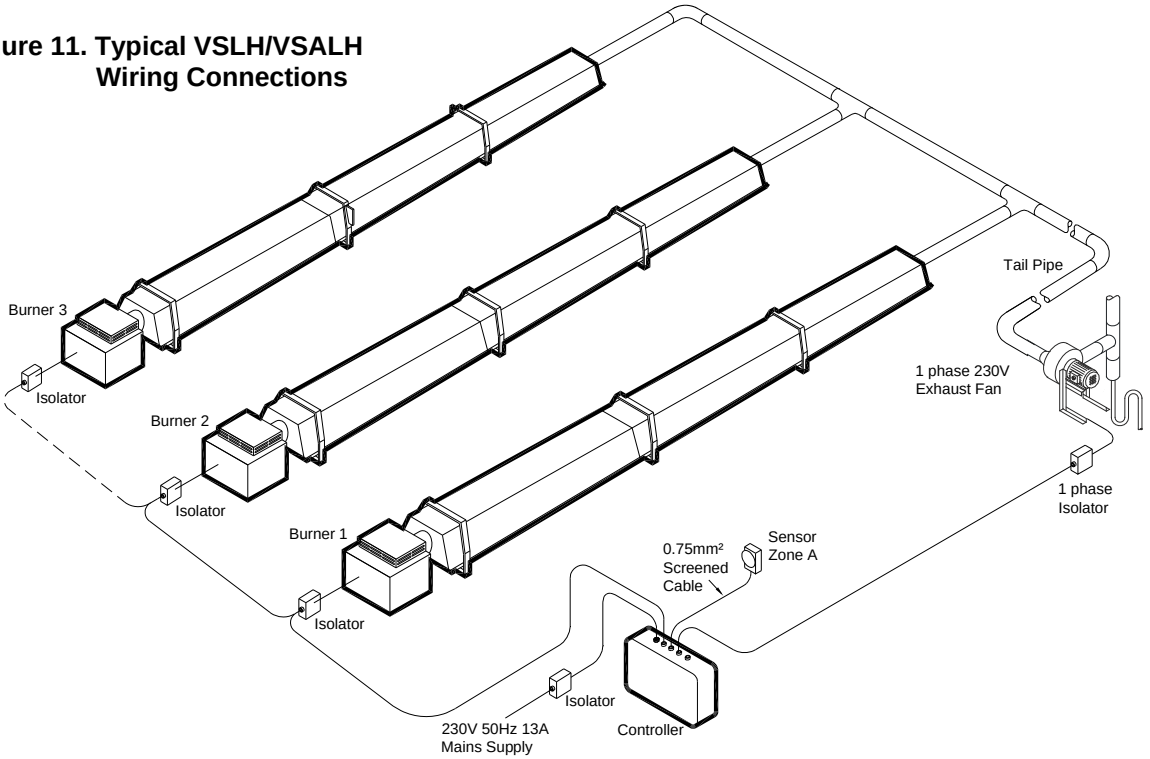


Figure 11. Typical VSLH/VSALH Wiring Connections



1.9 Ventilation Requirements

AmbiRad tube heaters can be operated as flued or unflued appliances in accordance with the relevant national requirements in the country of installation.

1.9.1 Unflued Radiant Heater

Radiant tube heaters can be operated as unflued appliances so that the concentration of Carbon Dioxide (CO_2) at positions where the air will be inhaled does not exceed 0.28%. BS EN 13410 is a guide to achieving this requirement.

If the building air change rate exceeds 1.5 per hour or if the heat input is less than 5W/m³, no additional ventilation is required.

In addition to the ventilation requirements, consideration needs to be given to the possibility of condensation forming on cold surfaces.

It should be noted that the clearance distance around the burner increases when the unit is operated unflued (see section 1.6). It should be ensured that the combustion gases do not impinge on any combustible materials.

Mechanical Ventilation
Mechanical ventilation must be rated at minimum 10m³/h per kW input using appropriately sized fans and interlocked with heaters.

Natural Ventilation
BS EN 13410: should be used to size air vents to provide adequate ventilation, an example of this calculation is given below:

Site Details:
20°c Internal Operating Temperature
0°c Outside Air Temperature
5m between high and low level vents

Following the sizing procedure in BS EN 13410 gives an air exit velocity of 1.6m/s. This equates to a free area vent at both high level and low level of 17.36cm²/kW free area.

1.9.2 Flued Radiant Heater

In buildings having an air change rate of less than 0.5 per hour, additional mechanical or natural ventilation is required. For detailed information, please see BS6896 section 5.2.2.2.1

Mechanical Ventilation
Mechanical ventilation must be installed to meet a minimum of 0.5 air changes per hour using appropriately sized fans and interlocked with the heaters.

Natural Ventilation
Low level ventilation openings with a free area of at least 2cm²/kW shall be provided. See section 5.2.2.2.2.1.

1.10 Flue and Combustion Air Inlet - Options

Dependent on the type of burner fitted to your heater it is possible to have configurations of flue and combustion air inlet options to those shown overleaf:

- **Option 1**
  For induced burner with / without flue and / or optional ducted air inlet refer to Figure 12.

- **Option 2**
  For forced burner with / without flue and ducted air inlet refer to Figure 14.

- **Option 3**
  For herringbone heaters refer to Figure 15 & section 1.5 Herringbone Systems (UH/LH).

1.10.1 Important Information

1.10.1.1 Option 1 and 2

A suitable flue system complying with EN1856-1 (type T250 N1 D Vm L11040 O50) should be used.

Flue size 125mm diameter twin wall.

Flue systems can run either vertically or horizontally up to a **maximum length of 9.5m** (including up to 2 x 90° bends plus the terminal).

The minimum flue length shall be 1m.

The flue system **must be terminated in a vertical position** and in accordance with the British Standard Code of Practice BS 5440: Part 1 - Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases), and the flue system manufacturers instructions as supplied with the flue.

1.10.1.2 Option 3

The tailpipe as supplied by the manufacturer is to be used and installed as per the manufacturers design drawing.

A suitable flue system complying with EN1856-1 (type T250 N1 D Vm L11040 O50) may be used as an alternative to that offered by the manufacturer.

Flue systems can run either vertically or horizontally up to a **maximum length of 9.0m** (including up to 2 x 90° bends plus the terminal).

The minimum flue length shall be 1m.

The flue system **may be terminated vertically or horizontally** but in accordance with the British Standard Code of Practice BS 5440: Part 1 - Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases), and the flue system manufacturers instructions as supplied with the flue.

1.10.2 Installation

Connection to an appliance which is not connected to the fuel supply may be carried out by a competent person. However, connection to an appliance that is connected to the fuel supply **must** be carried out by a registered installer.

If the flue passes through a wall, ceiling, or roof made from combustible material then it has to be sleeved so as to provide a minimum of a 50mm void between the exterior of the flue and the internal wall of the sleeve. A minimum of 50mm must be maintained as a clearance distance to all other combustible materials.

The manifold should be supported by chain, stainless steel flexible wire, or other flexible means from the roof structure to allow movement caused by thermal expansion.

The maximum distance between supports is 1.5m for horizontal runs.

Wall bands are not load bearing and give lateral support only. If used, wall bands should be fitted every 3m on vertical runs to ensure the system is rigidly held. The system should be braced immediately below passing through the roof line to ensure the flashing does not suffer lateral pressures.

The maximum height unsupported above the roof line is 1.5m. Where a joint is above the roofline it should be determined that in extreme wind conditions this joint would not be over exerted. If there is any doubt then a guy wire should be used. Beyond this guy wires should be installed every meter.

The POCED is capable of withstanding its own weight when installed in accordance with these instructions and the Regulations shown below.

The exhaust flue should be adequately supported from the building structure and installed in accordance with the British Standard Code of Practice BS 5440: Part 1: -

Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases), and the flue system manufacturers instructions as supplied with the flue.

See reference BS 6896: Condensate drain pipes must be protected against the effects of freezing.

1.10.3 Condensation

When designing the flue system the prevention of the formation and entrapment of condensation must be a key consideration.

Horizontal flue where fitted should be fitted ensuring a slight gradient approx 5° towards the terminal. Due consideration should be given to the possibility of condensation from the flue freezing on any footpaths that pass below the terminal.

Where condensation is unavoidable traps should be included to encourage the condensates to flow freely to a point from which they may be released, preferably into a gully.

The condensate pipe from the flue to the disposal point must be made from corrosion resistant pipe of not less than 25mm internal diameter.

1.10.4 Flue / Tailpipe Connection

1.10.4.1 Option 1, 2 and 3

All pipe lengths and flue gas carrying components are joined together by a twist lock, bayonet system. The system should be installed with the visible male collar pointing upwards, this is reaffirmed by the directional arrow pointing upwards, indicating the directional flow of flue gases. Taping of the joints is unnecessary.

1.10.4.2 Option 3 Tailpipe

After allowing for a minimum of 75mm (3in) of penetration of the fitting into the tube, cut the tubes to the lengths required and remove all burrs and wipe off any grease or oil with a clean rag.

The components are joined by pushing the male spigot and female socket together until the stop is reached.

To seal use an applicator gun and apply a 4mm diameter bead of high temperature silicon jointing compound externally round the end of the male spigot and internally round the end of the female socket.

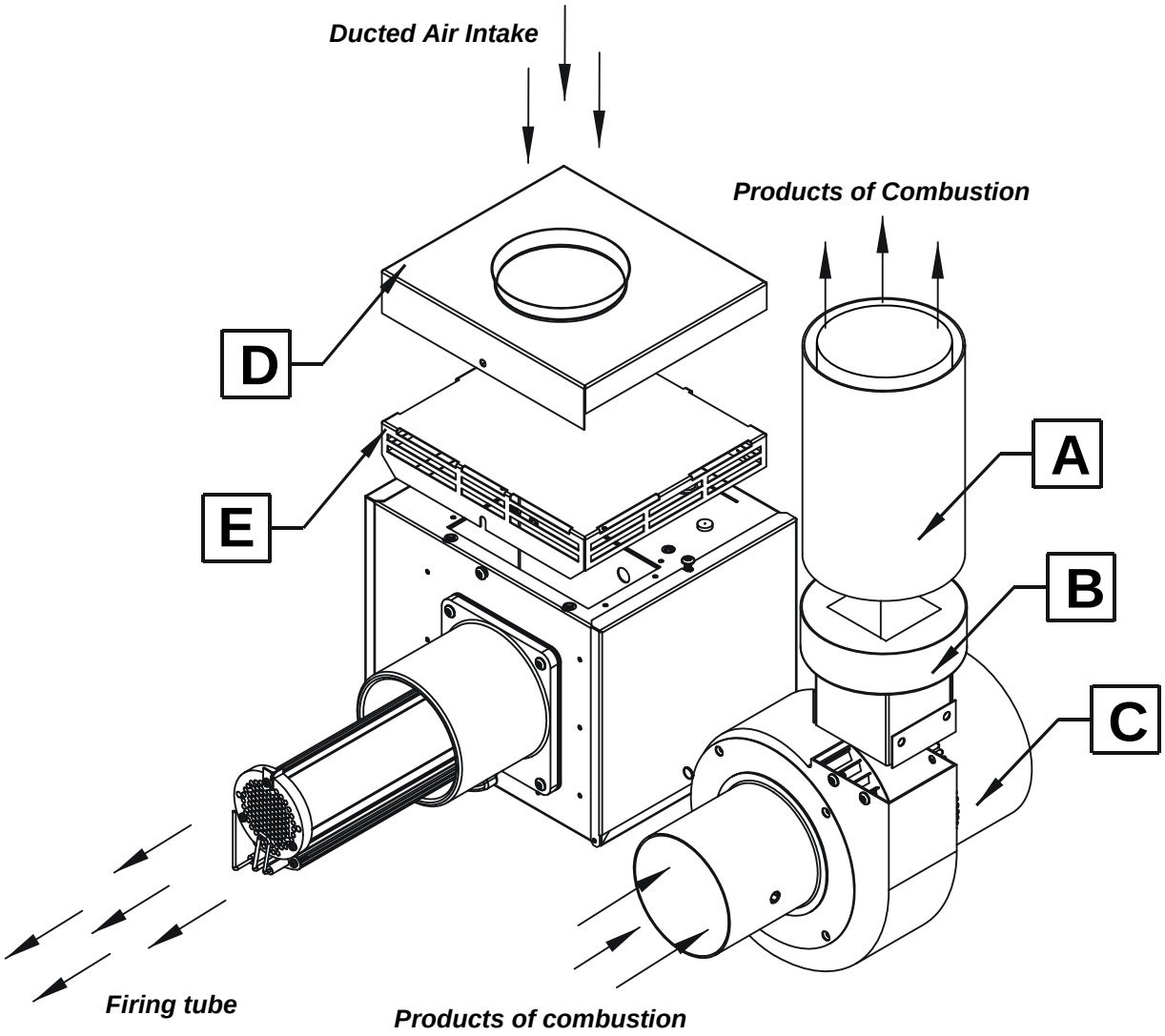
Push the male spigot into the female socket using a slight rotating movement to spread the jointing compound uniformly until a penetration of 75mm (3in) is achieved.

Note The silicon jointing compound remains workable after application for only 5 minutes

Secure the joint by drilling through the tube and fitting and fix with three pop rivets at 12 o'clock, 4 o'clock and 8 o'clock positions. 4.8mm (3/16in) diameter pop rivets are recommended.

Figure 12. Option 1. Flue Attachment Induced Burners (VSUT or VSAUT)

For non-flued installations, delete items A and B and rotate fan outlet to the HORIZONTAL position away from the burner.



Ventilation requirements are as detailed in section 1.9

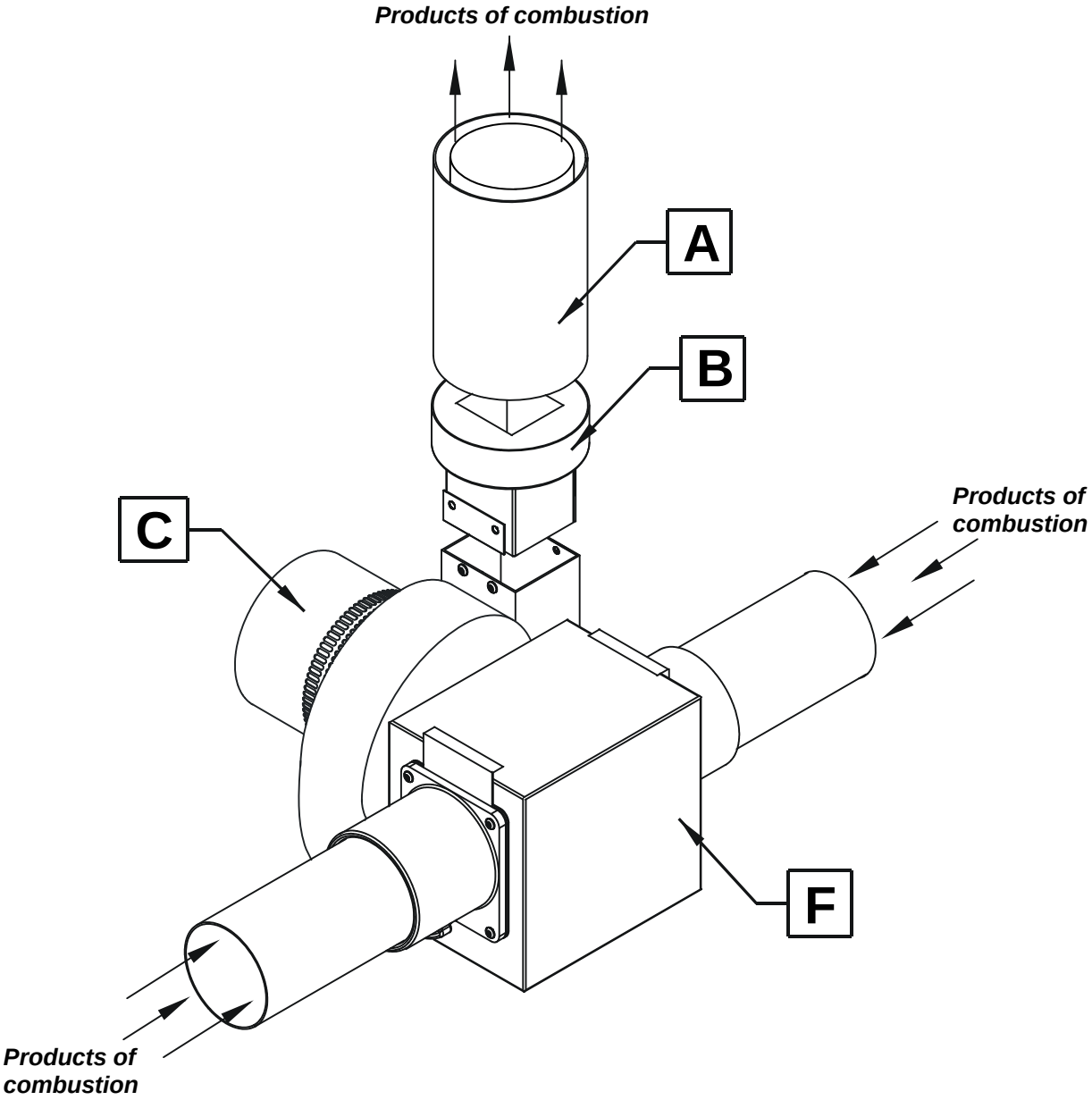
Ducted air must be used in locations where there is airborne dust or where there is a polluted atmosphere e.g. Chlorinated Vapours.

Maximum length = 9m
Minimum diameter = 100mm
Maximum no of bends = 2

A	**127mm (5ins) Twin Wall Flue System**
B	**Fan Adaptor *7177-SUB (2501/2507 fan) or 7176-SUB (2506 fan)***
C	**Fan *2501/2507 or 2560***
D	**Optional Ducted Air Intake. *VSI-DA***
E	**Standard Air Intake (supplied as standard)**

Maximum flue run = 9.5m @ Ø125mm
Maximum no of bends = 2
All flues must **terminate** vertically.
For further information on flue runs, please refer to section 1.10.1 and BS 5440 pt.1

Figure 13. Option 1. Flue Attachment Induced Burners (VSDL or VSADL)



A	**127mm (5ins) Twin Wall Flue System**
B	**Fan Adaptor *7176-SUB***
C	**Fan *2560***
F	**Condensate Box *CBHBxx-T2***

xx Denotes tube diameter 22=76mm 3", 38=100mm 4"

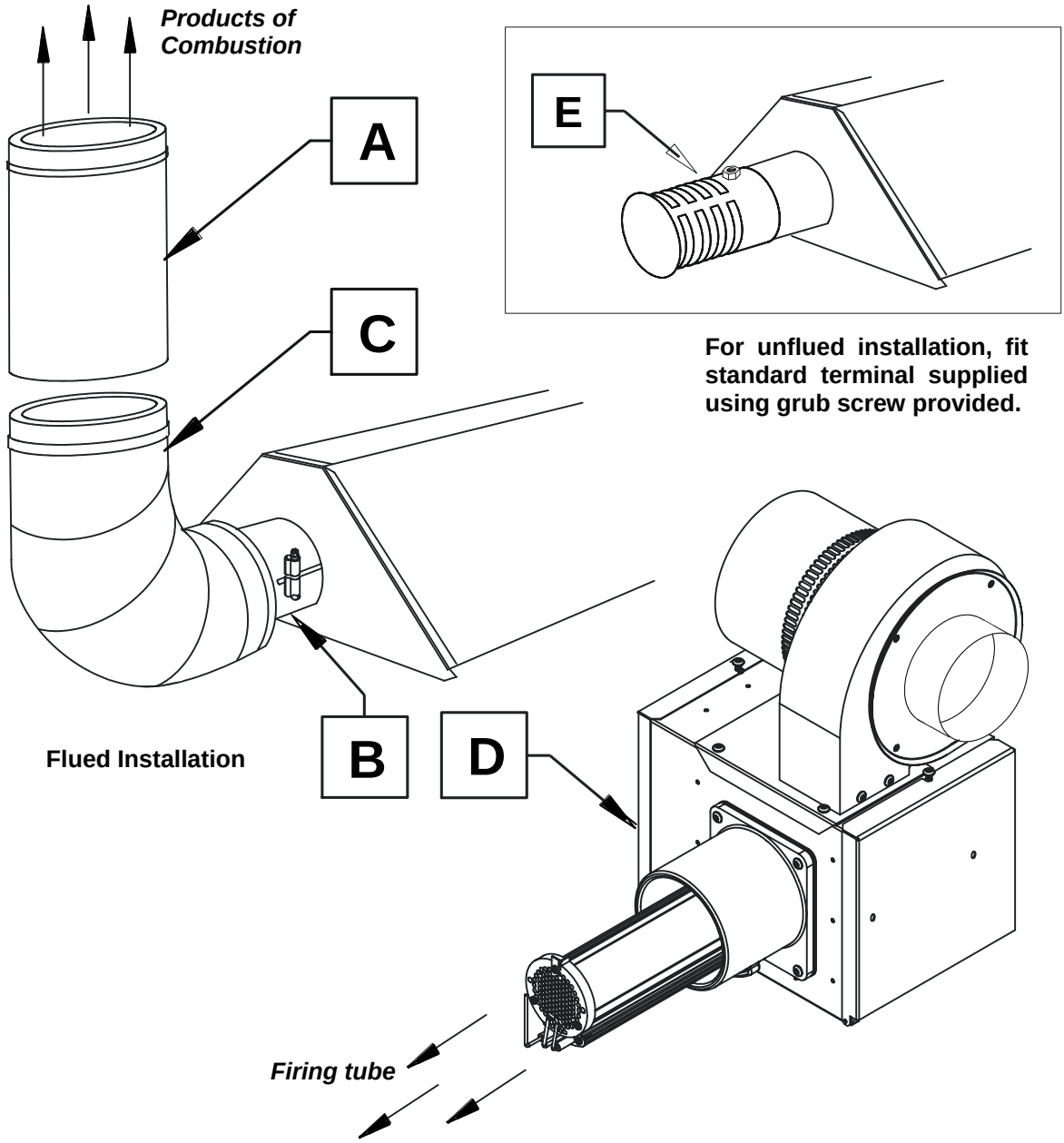
Ventilation requirements are as detailed in section 1.9

Ducted air must be used in locations where there is airborne dust or where there is a polluted atmosphere e.g. Chlorinated Vapours.

Maximum length = 9m
Minimum diameter = 100mm
Maximum no of bends = 2

Maximum flue run = 9.5m @ Ø125mm
Maximum no of bends = 2
All flues must **terminate** vertically.
For further information on flue runs, please refer to section 1.10.1 and BS 5440 pt.1

Figure 14. Option 2. End Attachments Forced Burners (VSLF or VSALF)



Ventilation requirements are as detailed in section 1.9

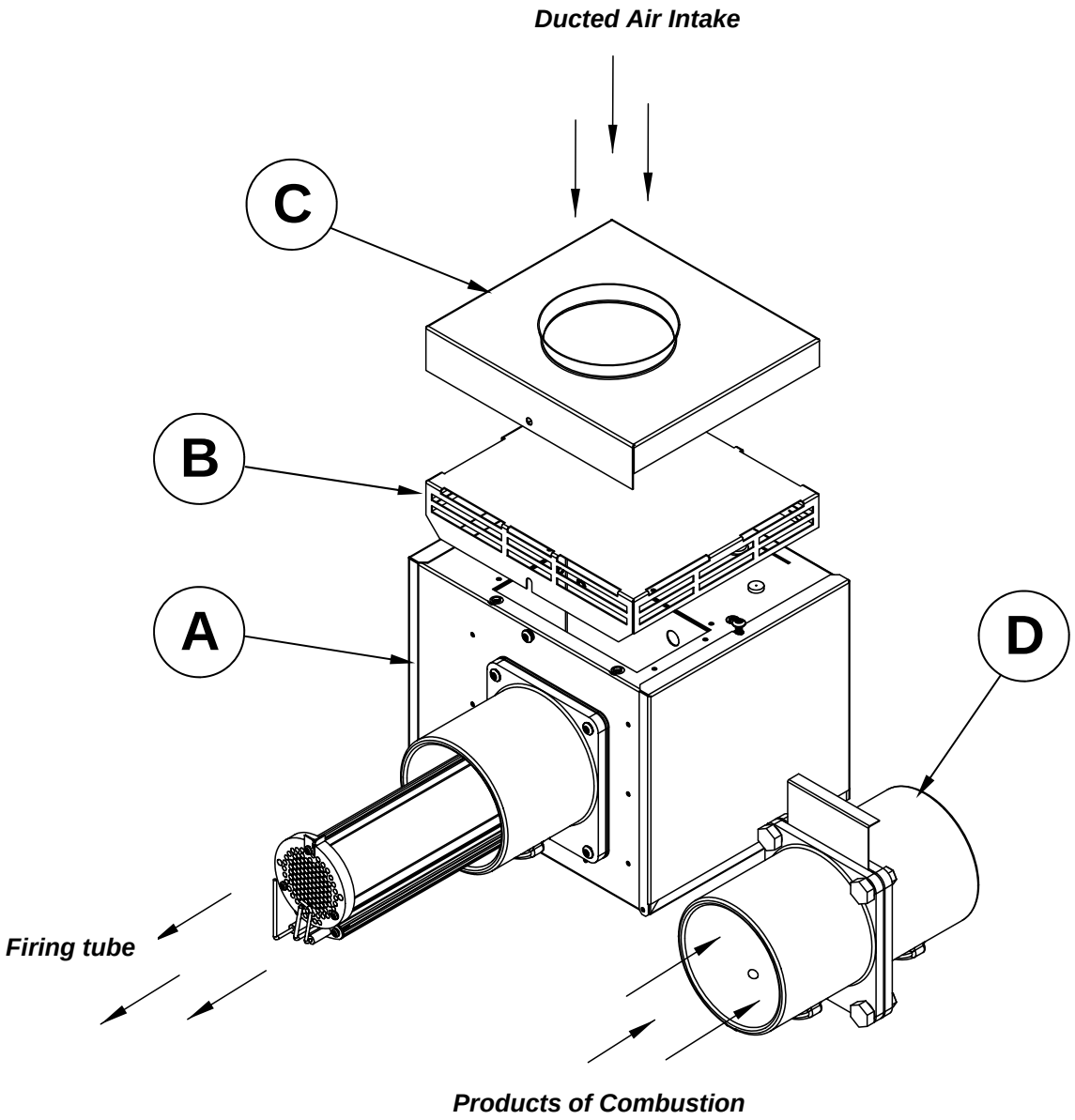
Ducted air must be used in locations where there is airborne dust or where there is a polluted atmosphere e.g. Chlorinated Vapours.

Maximum length = 9m
Minimum diameter = 100mm
Maximum no of bends = 2

A	**127mm (5ins) Twin Wall Flue System**
B	**Tube to Flue Adaptor *75mm 201881*** ***100mm 201882***
C	**Flue Bend *7166***
D	**Forced Burner**
E	**Standard end terminal (unflued)**

Maximum flue run = 9.5m @ Ø125mm
Maximum no of bends = 2
All flues must **terminate** vertically.
For further information on flue runs, please refer to section 1.10.1 and BS 5440 pt.1

Figure 15. Option 3. Flue Attachment Induced Burners (VSLH or VSAUH)



Ventilation requirements are as detailed in section 1.9

Ducted air must be used in locations where there is airborne dust or where there is a polluted atmosphere e.g. Chlorinated Vapours.

Maximum length = 9m
Minimum diameter = 100mm
Maximum no of bends = 2

A	**Induced Burner**
B	**Air Intake (supplied as standard)**
C	**Optional Ducted Air Intake. (see notes)**
D	**Damper assembly *DBHBxx/4-UK***

xx Denotes tube diameter 22=76mm 3", 38=100mm 4"

1.11 Technical Details.

Tables 5a/b/c/d & e - Natural Gas (G20)

No of Injectors	1
Gas Connection	½ in BSP Internal thread
Flue Nominal Bore mm (in)	125 (5)
Unitary Fan Motor Details	230 volt 1 phase 50Hz

Heater Model	Heat Input kW		Gas Flowrate (m^3/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
	Gross	Nett							
VS(A)15UT4	15.8	14.2	1.5	11.1	1.3	260x2219x670	41	0.5	2501
VS(A)15UT	15.0	13.5	1.4	10.7	1.3	240x3417x500	43	0.5	2501
VS(A)20UT	19.5	17.6	1.9	10.8	1.5	240x4142x500	50	0.5	2501
VS(A)25UT	23.5	21.2	2.3	8.0	1.8	240x5066x500	60	1.0	2507
VS(A)30UT	29.5	26.5	2.8	9.5	2.0	240x6029x500	70	1.0	2507
VS(A)35UT	36.0	32.4	3.4	9.7	2.3	260x5709x670	92	1.0	2507
VS(A)40UT	40.0	36.0	3.8	12.2	2.3	260x5709x670	92	1.0	2507
VS(A)45UT	44.0	39.6	4.2	8.9	2.9	260x7471x670	121	0.5	2560
VS(A)50UT	48.0	43.2	4.6	9.1	2.5	260x7471x670	121	0.5	2560

Heater Model	Heat Input kW		Gas Flowrate (m^3/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
	Gross	Nett							
VS(A)15LF6	13.8	12.4	1.3	9.8	1.3	390x5984x315	43	0.5	2501
VS(A)15LF8	13.8	12.4	1.3	9.8	1.3	390x8022x315	53	0.5	2501
VS(A)20LF7	19.5	17.6	1.9	12.0	1.5	390x6992x315	49	1.0	2507
VS(A)20LF10-5	19.5	17.6	1.9	12.0	1.5	390x10662x315	72	1.0	2507
VS(A)25LF8	23.5	21.2	2.3	9.5	1.8	390x8022x315	53	0.5	2501
VS(A)25LF10-5	23.5	21.2	2.3	9.5	1.8	390x10662x315	72	0.5	2501
VS(A)30LF10-5	29.5	26.6	2.8	11.5	2.0	390x10662x315	72	1.0	2507
VS(A)30LF12-5	29.5	26.6	2.8	11.5	2.0	390x12652x315	84	1.0	2507
VS(A)35LF10-5	36.5	32.9	3.5	11.5	2.3	390x10892x470	103	0.5	2501
VS(A)35LF13-5	36.5	32.9	3.5	11.5	2.3	390x13492x470	126	0.5	2501
VS(A)40LF13-5	40.0	36.0	3.8	12.5	2.4	390x13492x470	126	1.0	2507
VS(A)40LF16	40.0	36.0	3.8	12.5	2.4	390x16092x470	147	1.0	2507
VS(A)45LF13-5	45.0	40.5	4.3	11.0	2.9	390x13492x470	126	1.0	2507
VS(A)45LF16	45.0	40.5	4.3	11.0	2.9	390x16092x470	147	1.0	2507
VS(A)50LF13-5	50.0	45.0	4.8	13.6	3.0	390x13492x470	126	1.0	2507
VS(A)50LF16	50.0	45.0	4.8	13.6	3.0	390x16092x470	147	1.0	2507

Heater Model	Heat Input kW		Gas Flowrate (m^3/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
	Gross	Nett							
VS(A)15LI8	15.0	13.5	1.4	10.7	1.3	390x7917x315	53	0.5	2501
VS(A)20LI7	19.5	17.6	1.9	10.8	1.5	390x6907x315	49	0.5	2501
VS(A)20LI10-5	19.5	17.6	1.9	10.8	1.5	390x10537x315	72	0.5	2501
VS(A)25LI8	23.5	21.2	2.3	8.0	1.8	390x7917x315	53	0.5	2501
VS(A)25LI10-5	23.5	21.2	2.3	8.0	1.8	390x10537x315	72	0.5	2501
VS(A)30LI10-5	29.5	26.6	2.8	9.5	2.0	390x10537x315	72	1.0	2507
VS(A)30LI12-5	29.5	26.6	2.8	9.5	2.0	390x12567x315	84	1.0	2507
VS(A)35LI10-5	36.0	32.4	3.4	9.6	2.3	390x10787x470	103	1.0	2507
VS(A)35LI13-5	36.0	32.4	3.4	9.6	2.3	390x13387x470	126	1.0	2507
VS(A)40LI13-5	40.0	36.0	3.8	12.2	2.3	390x13387x470	126	1.0	2507
VS(A)40LI16	40.0	36.0	3.8	12.2	2.3	390x16006x470	147	1.0	2507
VS(A)45LI13-5	44.0	39.6	4.2	8.9	2.9	390x13387x470	126	1.0	2507
VS(A)45LI16	44.0	39.6	4.2	8.9	2.9	390x16006x470	147	1.0	2507
VS(A)50LI13-5	50.0	45.0	4.8	10.0	2.5	390x13387x470	126	0.5	2560
VS(A)50LI16	50.0	45.0	4.8	10.0	2.5	390x16006x470	147	1.0	2507
VS(A)70LI16	70.0	63.1	6.7	8.2	3.2	390x16006x470	147	1.5	202343

Heater Model	Heat Input kW		Gas Flowrate (m^3/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)
	Gross	Nett					
VS(A)15LH6	15.0	13.5	1.4	10.7	1.3	390x5725x315	42
VS(A)15LH8	15.0	13.5	1.4	10.7	1.3	390x7763x315	52
VS(A)20LH7	19.5	17.6	1.9	10.8	1.5	390x6733x315	48
VS(A)20LH10-5	19.5	17.6	1.9	10.8	1.5	390x10363x315	71
VS(A)25LH8	23.5	21.2	2.3	8.0	1.8	390x7763x315	52
VS(A)25LH10-5	23.5	21.2	2.3	8.0	1.8	390x10363x315	71
VS(A)30LH10-5	29.5	26.6	2.8	9.5	2.0	390x10363x315	71
VS(A)30LH12-5	29.5	26.6	2.8	9.5	2.0	390x12393x315	83
VS(A)35LH10-5	36.0	32.4	3.4	9.6	2.3	390x10633x470	101
VS(A)35LH13-5	36.0	32.4	3.4	9.6	2.3	390x13233x470	124
VS(A)40LH13-5	40.0	36.0	3.8	12.2	2.3	390x13233x470	124
VS(A)40LH16	40.0	36.0	3.8	12.2	2.3	390x15832x470	145
VS(A)45LH13-5	44.0	39.6	4.2	8.9	2.9	390x13233x470	124
VS(A)45LH16	44.0	39.6	4.2	8.9	2.9	390x15832x470	145
VS(A)50LH13-5	50.0	45.0	4.8	10.0	2.5	390x13233x470	124
VS(A)50LH16	50.0	45.0	4.8	10.0	2.5	390x15832x470	145
VS(A)70LH16	70.0	63.1	6.7	8.2	3.2	390x15832x470	145

Heater Model	Heat Input kW		Gas Flowrate (m^3/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)
	Gross	Nett					
VS(A)15UH4	15.8	14.2	1.5	11.1	1.3	260x2219x670	40
VS(A)15UH	15.0	13.5	1.4	10.7	1.3	240x3417x500	42
VS(A)20UH	19.5	17.6	1.9	10.8	1.5	240x4142x500	49
VS(A)25UH	23.5	21.2	2.3	8.0	1.8	240x5066x500	59
VS(A)30UH	29.5	26.5	2.8	9.5	2.0	240x6029x500	69
VS(A)35UH	36.0	32.4	3.4	9.7	2.3	260x5709x670	91
VS(A)40UH	40.0	36.0	3.8	12.2	2.3	260x5709x670	91
VS(A)45UH	44.0	39.6	4.2	8.9	2.9	260x7471x670	120
VS(A)50UH	48.0	43.2	4.6	9.1	2.5	260x7471x670	120

Tables 6a/b/c & d. Technical Details - Propane Gas (G31)

Heater Model	Heat Input kW		Flowrate (l/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
	Gross	Nett							
VS(A)15UT	15.2	14.1	2.16	23.7	1.2	240x3417x500	43	0.5	2501
VS(A)20UT	19.2	17.8	2.73	26.1	1.0	240x4142x500	50	1.0	2507
VS(A)25UT	23.5	21.8	3.34	10.8	1.3	240x5066x500	60	1.0	2507
VS(A)30UT	28.0	25.9	3.98	9.2	1.5	240x6029x500	70	1.0	2507
VS(A)35UT	36.0	33.3	5.12	22.4	1.4	260x5709x670	92	0.5	2560
VS(A)40UT	40.0	37.0	5.68	18.4	1.5	260x5709x670	92	0.5	2560
VS(A)45UT	44.0	40.7	6.25	14.9	1.7	260x7471x670	121	0.5	2560
VS(A)50UT	48.0	44.4	6.82	14.3	1.8	260x7471x670	121	0.5	2560

Heater Model	Heat Input kW		Flowrate (l/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)
	Gross	Nett					
VS(A)15UH	15.2	14.1	2.16	23.7	1.2	240x3417x500	42
VS(A)20UH	19.2	17.8	2.73	26.1	1.0	240x4142x500	49
VS(A)25UH	23.5	21.8	3.34	10.8	1.3	240x5066x500	59
VS(A)30UH	28.0	25.9	3.98	9.2	1.5	240x6029x500	69
VS(A)35UH	36.0	33.3	5.12	22.4	1.4	260x5709x670	91
VS(A)40UH	40.0	37.0	5.68	18.4	1.5	260x5709x670	91
VS(A)45UH	44.0	40.7	6.25	14.9	1.7	260x7471x670	120
VS(A)50UH	48.0	44.4	6.82	14.3	1.8	260x7471x670	120

Heater Model	Heat Input kW		Gas Flowrate (l/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
	Gross	Nett							
VS(A)15LI6	15.2	14.1	2.16	23.7	1.2	390x5879x315	43	0.5	2501
VS(A)15LI8	15.2	14.1	2.16	23.7	1.2	390x7917x315	53	0.5	2501
VS(A)20LI7	19.2	17.8	2.73	26.1	1.0	390x6907x315	49	0.5	2501
VS(A)20LI10-5	19.2	17.8	2.73	26.1	1.0	390x10537x315	72	0.5	2501
VS(A)25LI8	23.5	21.8	3.34	10.8	1.3	390x7917x315	53	1.0	2507
VS(A)25LI10-5	23.5	21.8	3.34	10.8	1.5	390x10537x315	72	1.0	2507
VS(A)30LI10-5	28.0	25.9	3.98	9.2	1.3	390x10537x315	72	1.0	2507
VS(A)30LI12-5	28.0	25.9	3.98	9.2	1.5	390x12567x315	84	1.0	2507
VS(A)35LI10-5	36.0	33.3	5.12	22.4	1.4	390x10787x470	103	1.0	2507
VS(A)35LI13-5	36.0	33.3	5.12	22.4	1.4	390x13387x470	126	1.0	2507
VS(A)40LI13-5	40.0	37.0	5.68	18.4	1.5	390x13387x470	126	1.0	2507
VS(A)40LI16	40.0	37.0	5.68	18.4	1.5	390x16006x470	147	1.0	2507
VS(A)45LI13-5	44.0	40.7	6.25	14.9	1.7	390x13387x470	126	0.5	2560
VS(A)45LI16	44.0	40.7	6.25	14.9	1.7	390x16006x470	147	0.5	2560
VS(A)50LI13-5	48.0	44.4	6.82	14.3	1.8	390x13387x470	126	0.5	2560
VS(A)50LI16	48.0	44.4	6.82	14.3	1.8	390x16006x470	147	0.5	2560

Heater Model	Heat Input kW		Gas Flowrate (l/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)
	Gross	Nett					
VS(A)15LH6	15.2	14.1	2.16	23.7	1.2	390x5879x315	42
VS(A)15LH8	15.2	14.1	2.16	23.7	1.2	390x7917x315	52
VS(A)20LH7	19.2	17.8	2.73	26.1	1.0	390x6907x315	48
VS(A)20LH10-5	19.2	17.8	2.73	26.1	1.0	390x10537x315	71
VS(A)25LH8	23.5	21.8	3.34	10.8	1.3	390x7917x315	52
VS(A)25LH10-5	23.5	21.8	3.34	10.8	1.3	390x10537x315	71
VS(A)30LH10-5	28.0	25.9	3.98	9.2	1.5	390x10537x315	71
VS(A)30LH12-5	28.0	25.9	3.98	9.2	1.5	390x12567x315	83
VS(A)35LH10-5	36.0	33.3	5.12	22.4	1.4	390x10787x470	101
VS(A)35LH13-5	36.0	33.3	5.12	22.4	1.4	390x13387x470	124
VS(A)40LH13-5	40.0	37.0	5.68	18.4	1.5	390x13387x470	124
VS(A)40LH16	40.0	37.0	5.68	18.4	1.5	390x16006x470	145
VS(A)45LH13-5	44.0	40.7	6.25	14.9	1.7	390x13387x470	124
VS(A)45LH16	44.0	40.7	6.25	14.9	1.7	390x16006x470	145
VS(A)50LH13-5	48.0	44.4	6.82	14.3	1.8	390x13387x470	124
VS(A)50LH16	48.0	44.4	6.82	14.3	1.8	390x16006x470	145

Table 7. Flue details - Natural Gas

Heater Model	Mass Flow Rate of Flue Gasses (kg/s)	Flue Pressure (Pa) Maximum Flue Resistance	Flue Gas Temp (°C)
VS(A)15UT4	0.0110	15 - 31	200 - 250
VS(A)15UT	0.0115		
VS(A)20UT	0.0117		
VS(A)25UT	0.0139		
VS(A)30UT	0.0171		
VS(A)35UT	0.0193		
VS(A)40UT	0.0210		
VS(A)45UT	0.0212		
VS(A)50UT	0.0261		
VS(A)15LI6	0.0098	19 - 30	210 - 270
VS(A)20LI7	0.0119		
VS(A)25LI8	0.0131		
VS(A)30LI10-5	0.0171		
VS(A)35LI10-5	0.0207		
VS(A)40LI13-5	0.0216		
VS(A)45LI13-5	0.0249		
VS(A)50LI13-5	0.0256		
VS(A)15LI8	0.0100	25 -35	160 - 210
VS(A)20LI10-5	0.0120		
VS(A)25LI10-5	0.0145		
VS(A)30LI12-5	0.0174		
VS(A)35LI13-5	0.0194		
VS(A)40LI16	0.0214		
VS(A)45LI16	0.0237		
VS(A)50LI16	0.0237		
VS(A)70LI16	0.0298	26	240
VS(A)15LF6	0.0075	18 - 25	250 - 290
VS(A)20LF7	0.0106		
VS(A)25LF8	0.0127		
VS(A)30LF10-5	0.0130		
VS(A)35LF10-5	0.0157		
VS(A)40LF13-5	0.0168		
VS(A)45LF13-5	0.0189		
VS(A)50LF13-5	0.0206		
VS(A)15LF8	0.0077	20 - 30	180 - 240
VS(A)20LF10-5	0.0105		
VS(A)25LF10-5	0.0126		
VS(A)30LF12-5	0.0136		
VS(A)35LF13-5	0.0161		
VS(A)40LF16	0.0167		
VS(A)45LF16	0.0190		
VS(A)50LF16	0.0207		

Table 8. Flue details - Propane

Heater Model	Mass Flow Rate of Flue Gasses (kg/s)	Flue Pressure (Pa) Maximum Flue Resistance	Flue Gas Temp (°C)
VS(A)15UT	0.0119	15 - 31	190 - 240
VS(A)20UT	0.0132		
VS(A)25UT	0.0147		
VS(A)30UT	0.0154		
VS(A)35UT	0.0264		
VS(A)40UT	0.0281		
VS(A)45UT	0.0300		
VS(A)50UT	0.0300		
VS(A)15LI6	0.0105	19 - 30	190 - 240
VS(A)20LI7	0.0135		
VS(A)25LI8	0.0126		
VS(A)30LI10-5	0.0180		
VS(A)35LI10-5	0.0210		
VS(A)40LI13-5	0.0220		
VS(A)45LI13-5	0.0280		
VS(A)50LI13-5	0.0263		
VS(A)15LI8	0.0109	25 - 35	160 - 200
VS(A)20LI10-5	0.0149		
VS(A)25LI10-5	0.0137		
VS(A)30LI12-5	0.0185		
VS(A)35LI13-5	0.0210		
VS(A)40LI16	0.0224		
VS(A)45LI16	0.0268		
VS(A)50LI16	0.0262		

Table 9. Herringbone Vacuum Fan characteristics

Fan type		Type 'O'	Type '2'
Power	(W)	370	120
Running current (overload setting)	(A)	2.6	0.8
Starting current	(A)	15.4	4.0
Phase		Single	Single
Voltage	(V)	230	230

Table 10. Herringbone & DL Settings- Natural Gas (G20)

Model	Cold HB Pressure		Hot HB Pressure	
	mm H_2O	mbar	mm H_2O	mbar
VS(A)15UH4	21.4	2.1	12.7	1.2
VS(A)15UH	21.4	2.1	16.3	1.6
VS(A)20UH	19.4	1.9	15.3	1.5
VS(A)25UH	24.5	2.4	20.4	2.0
VS(A)30UH	23.5	2.3	19.4	1.9
VS(A)35UH	25.5	2.5	15.3	1.5
VS(A)40UH	29.6	2.9	17.3	1.7
VS(A)45UH	33.0	3.2	23.5	2.3
VS(A)50UH	33.0	3.2	23.5	2.3
VS(A)15LH6/DL12	18.4	1.8	13.3	1.3
VS(A)15LH8/DL16	18.4	1.8	14.3	1.4
VS(A)20LH7/DL14	19.4	1.9	14.3	1.4
VS(A)20LH10-5/DL21	18.4	1.8	14.3	1.4
VS(A)25LH8/DL16	20.4	2.0	16.3	1.6
VS(A)25LH10-5/DL21	22.4	2.2	18.4	1.8
VS(A)30LH10-5/DL21	24.5	2.4	19.4	1.9
VS(A)30LH12-5/DL25	33.6	3.3	25.5	2.5
VS(A)35LH10-5/DL21	27.5	2.7	13.3	1.3
VS(A)35LH13-5/DL27	20.9	2.0	12.7	1.2
VS(A)40LH13-5/DL27	22.4	2.2	12.2	1.2
VS(A)40LH16/DL32	21.4	2.1	14.3	1.4
VS(A)45LH13-5/DL27	27.5	2.7	16.8	1.6
VS(A)45LH16/DL32	26.5	2.6	17.3	1.7
VS(A)50LH13-5/DL27	30.0	2.9	18.3	1.8
VS(A)50LH16/DL32	27.5	2.7	17.8	1.7
VS(A)70LH16/DL32	TBA	TBA	TBA	TBA

Table 11. Herringbone & DL Settings- Propane Gas (G31)

Model	Cold HB Pressure		Hot HB Pressure	
	mm H_2O	mbar	mm H_2O	mbar
VS(A)15UH	21.4	2.1	16.3	1.6
VS(A)20UH	21.4	2.1	16.3	1.6
VS(A)25UH	24.5	2.4	21.4	2.1
VS(A)30UH	26.5	3.1	17.3	1.8
VS(A)35UH	35.7	3.5	21.4	2.1
VS(A)40UH	38.7	3.8	23.5	2.3
VS(A)45UH	37.7	3.7	23.5	2.3
VS(A)50UH	38.7	3.8	24.5	2.4
VS(A)15LH6/DL12	21.4	2.1	14.3	1.4
VS(A)15LH8/DL16	19.4	1.9	15.3	1.5
VS(A)20LH7/DL14	22.4	2.2	15.3	1.5
VS(A)20LH10-5/DL21	21.4	2.1	16.3	1.6
VS(A)25LH8/DL16	22.4	2.2	17.3	1.7
VS(A)25LH10-5/DL21	20.4	2.0	16.3	1.6
VS(A)30LH10-5/DL21	28.6	2.9	19.4	1.9
VS(A)30LH12-5/DL25	28.6	2.7	20.9	1.7
VS(A)35LH10-5/DL21	24.5	2.4	18.4	1.8
VS(A)35LH13-5/DL27	21.4	2.1	17.3	1.7
VS(A)40LH13-5/DL27	22.4	2.2	18.4	1.8
VS(A)40LH16/DL32	30.6	3.0	20.9	2.0
VS(A)45LH13-5/DL27	34.7	3.4	24.5	2.4
VS(A)45LH16/DL32	34.7	3.4	23.5	2.3
VS(A)50LH13-5/DL27	33.6	3.3	21.4	2.1
VS(A)50LH16/DL32	30.6	3.0	20.4	2.0

2. Assembly Instructions.

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.

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.

Suitable alternative tools may be used.


Trestles


Leather Faced Gloves


Pozidrive Screwdriver


10mm, 12mm & 13mm Spanners


Wrench With Extension


13mm Socket


Tape Measure


4 & 5mm Allen Keys


Saw


Pop Riveter & 3/16" Rivets


Silicone Sealant & Gun

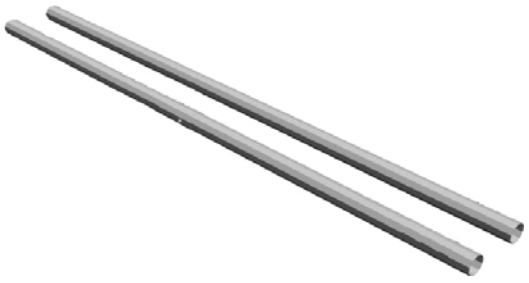
Herringbone Systems Only

2.2 Assembly Notes.

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

2.2.1 Tubes

Identify and position tubes on trestles. For aesthetics it is advisable to position the tube seam and 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 assembly drawings.



2.2.2 Turbulators (where fitted)

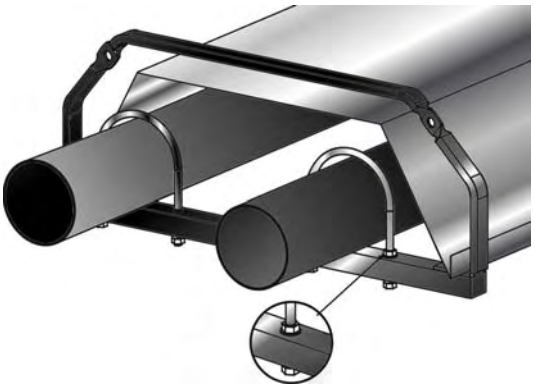
Insert turbulator(s) into tube(s) ensuring the correct length and quantity are inserted into their respective correctly identified tube(s) as detailed in the assembly drawings.

2.2.3 Brackets

There can be three types of brackets supplied with these heaters:

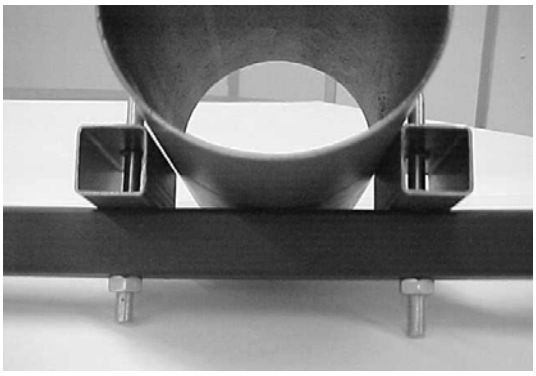
- *Type 'A' are suspending brackets with reflector fixing points.*
- *Type 'B' are suspending brackets with no fixing points.*
- *Type 'C' is a centre bracket to retain the reflector. (certain models only)*

Slide the bracket assemblies along to the tubes to the marked positions in their correct order as detailed in the assembly drawings. Tighten clamping 'U' bolt arrangement to tubes **ONLY WHERE STATED** on the assembly drawings.



2.2.3.1 Tube alignment sections

For VS(A)50UT 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.



2.2.4 U Bend.

For VS(A) 'U' tube heaters 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 13mm socket and wrench.

2.2.5 Couplers.

For VS(A)LF, VS(A)LH, VS(A)LI and VS(A) 45/50UT tube heaters only. For joining radiant tubes, locate and position tube couplers at the end of the tubes so that the socket heads are facing outwards. Tighten clamping bolt arrangement to secure ensuring the bolts are not over tightened.

To avoid damaging the heater whilst installing we recommend the heater chassis be suspended prior to fitting reflectors.

2.2.6 Reflectors.

After removing the protective plastic coating, slip the reflector through the brackets until the locating slots are aligned with the type A bracket fixing points.

Slide the next reflector through the brackets and overlap the existing reflector until the locating slots line up with the same bracket fixing points Secure overlapped reflectors to bracket using M6 nuts, bolts and flat mud washers.

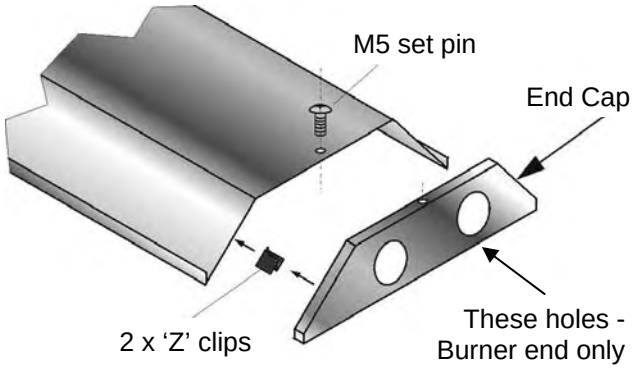
All reflectors must be positioned/ attached to the brackets exactly as detailed in the assembly drawings.

Remove the protective plastic coating.

2.2.7 End Caps.

On VSUT 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 M5 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 M5 pozi set pin and 'Z' clips.

On VS(A)LF, VS(A)DL & VS(A)LH models only, position ONE end cap beneath the reflector profile at the open/fan/damper 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.



2.2.8 Burner Assembly.

On VS(A)UT only, slide the burner assembly onto the **RIGHT HAND TUBE** when viewed from above**,** ensuring it is fully engaged. Secure with grub screws. *Do not silicone seal!*

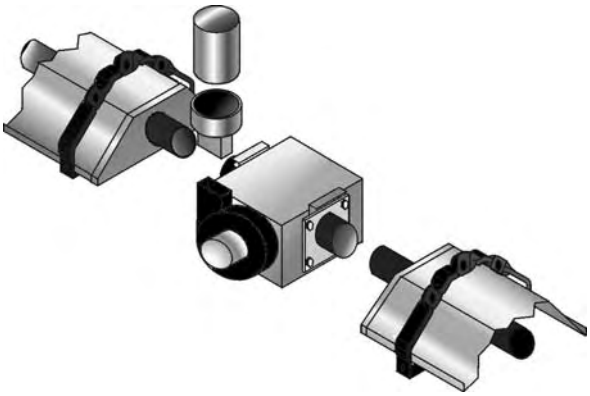
On VS(A)LF, VS(A)DL & VS(A)LH models only, slide the burner assembly onto the **inlet end of the tube** ensuring it is fully engaged. Secure with grub screws. *Do not silicone seal!*

2.2.9 Fan Assembly.

On U Tube heaters only, slide fan onto the left hand tube ensuring it is fully engaged. The fan discharge should face vertically for individually flued or horizontally away from the burner if unflued. Secure with grub screw. *Do not silicone seal!*

2.2.10 Condensate Box Assembly.

On VS(A)DL models only, slide the condensate box flange onto the **outlet end of the tube** ensuring it is fully engaged. Ensure fan is in the upright position. Secure with grub screws. *Do not silicone seal!*



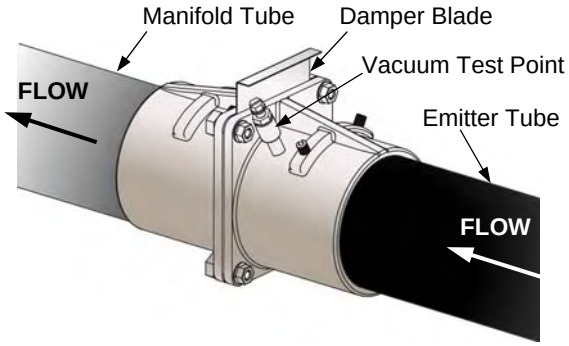
2.2.11 Herringbone Damper Assembly.

On VS(A)UH and VS(A)LH models only, slide the damper assembly flange onto the **outlet end of the tube** ensuring it is fully engaged. Secure with grub screws. *Do not silicone seal!* Note: The damper assembly must be located with its damper blade vertical and left in the closed position. The manifold tube is to be sealed and secured (as described below) to the damper assembly.

2.2.12 Herringbone Manifold Assembly.

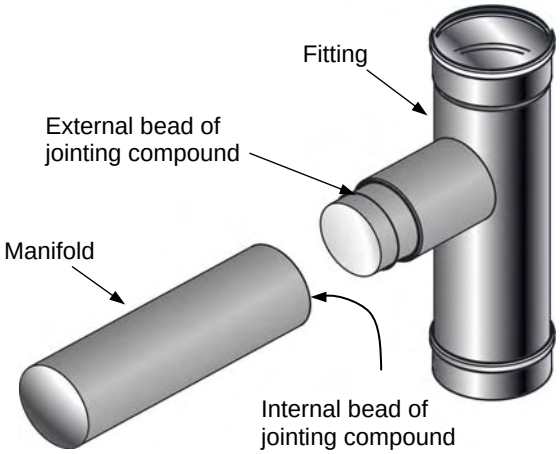
HB Models ONLY. After fixing the heaters in the desired position, the manifold system requires fitting.

After allowing for a minimum of 75mm (3in) of penetration of the fitting into the tube, cut the tubes to the lengths required and remove all burrs and wipe off any grease or oil with a clean rag.



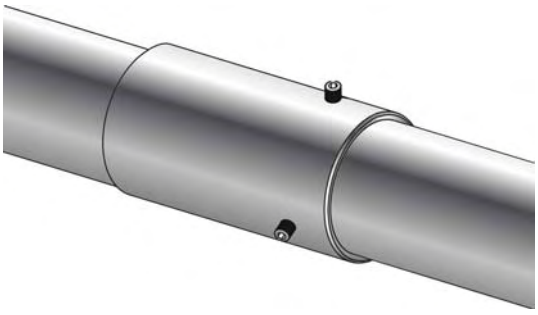
Method of jointing aluminium tube

Using the applicator gun exude 4mm diameter bead of high temperature silicon jointing compound externally round the end of the fitting and internally round the end of the tube.



Enter the fitting into the tube using a slight rotating movement to spread the jointing compound uniformly until a penetration of 75mm (3in) is achieved.

Note The silicon jointing compound remains workable after application for only 5 minutes.



Secure the joint by drilling through the tube and fitting and fix with three pop rivets at 12 o'clock, 4 o'clock and 8 o'clock positions. 4.8mm (3/16in) diameter pop rivets are recommended.

2.2.13 Detailed Assembly Drawings

The following pages show the technical dimensional details of the VSUT/VSAUT, VSU-H/VSAUH and VSLF/VSLH/VSALH, VSDL/ VSADL range of heaters.

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

Figure 16. Vision Heater Assembly: Models VS/VSA U tube Nat Gas 15kW. 100mm (4ins) Nominal Dia

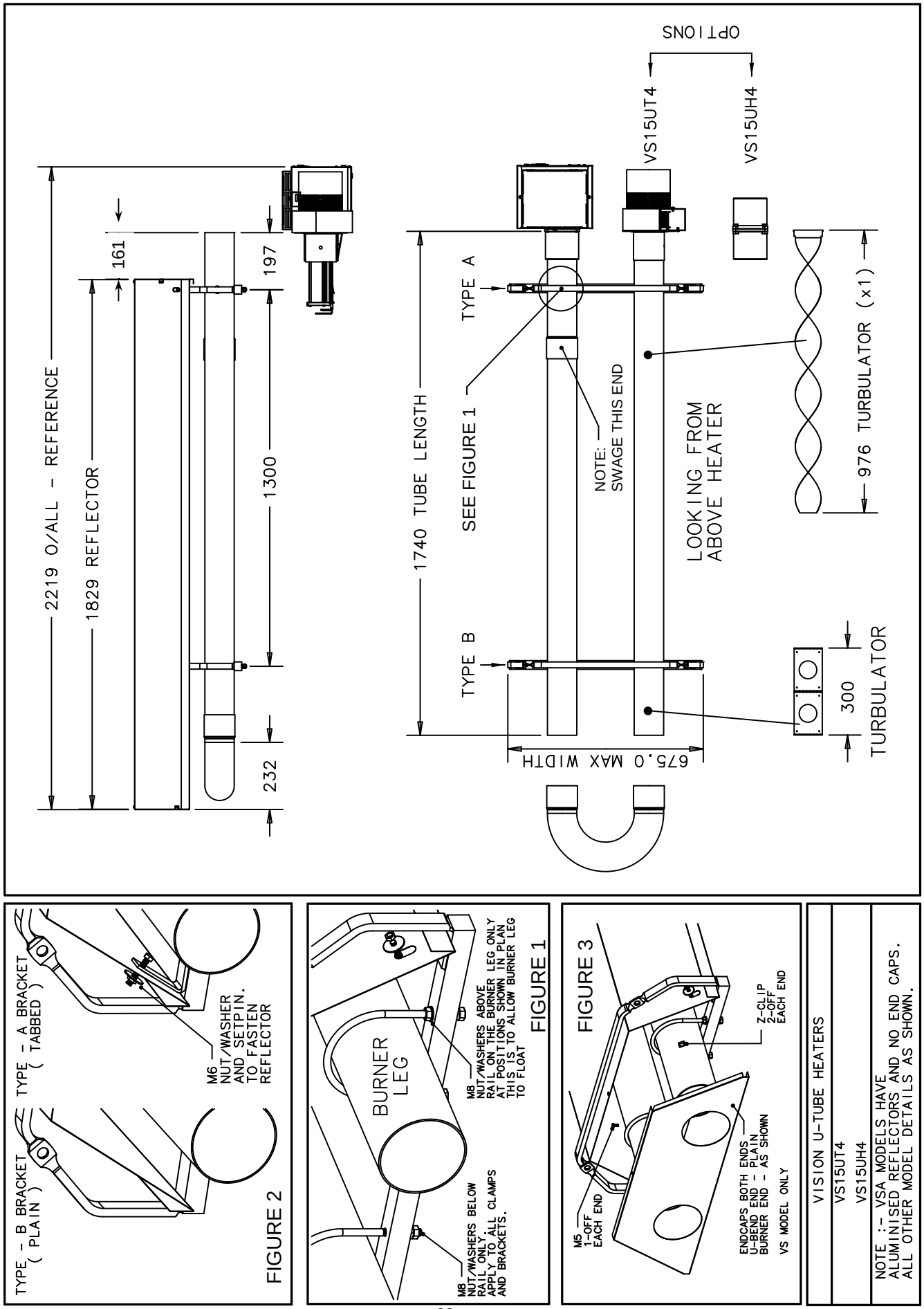


Figure 17. Vision Heater Assembly: Models VS/VSA U tube 15kW.

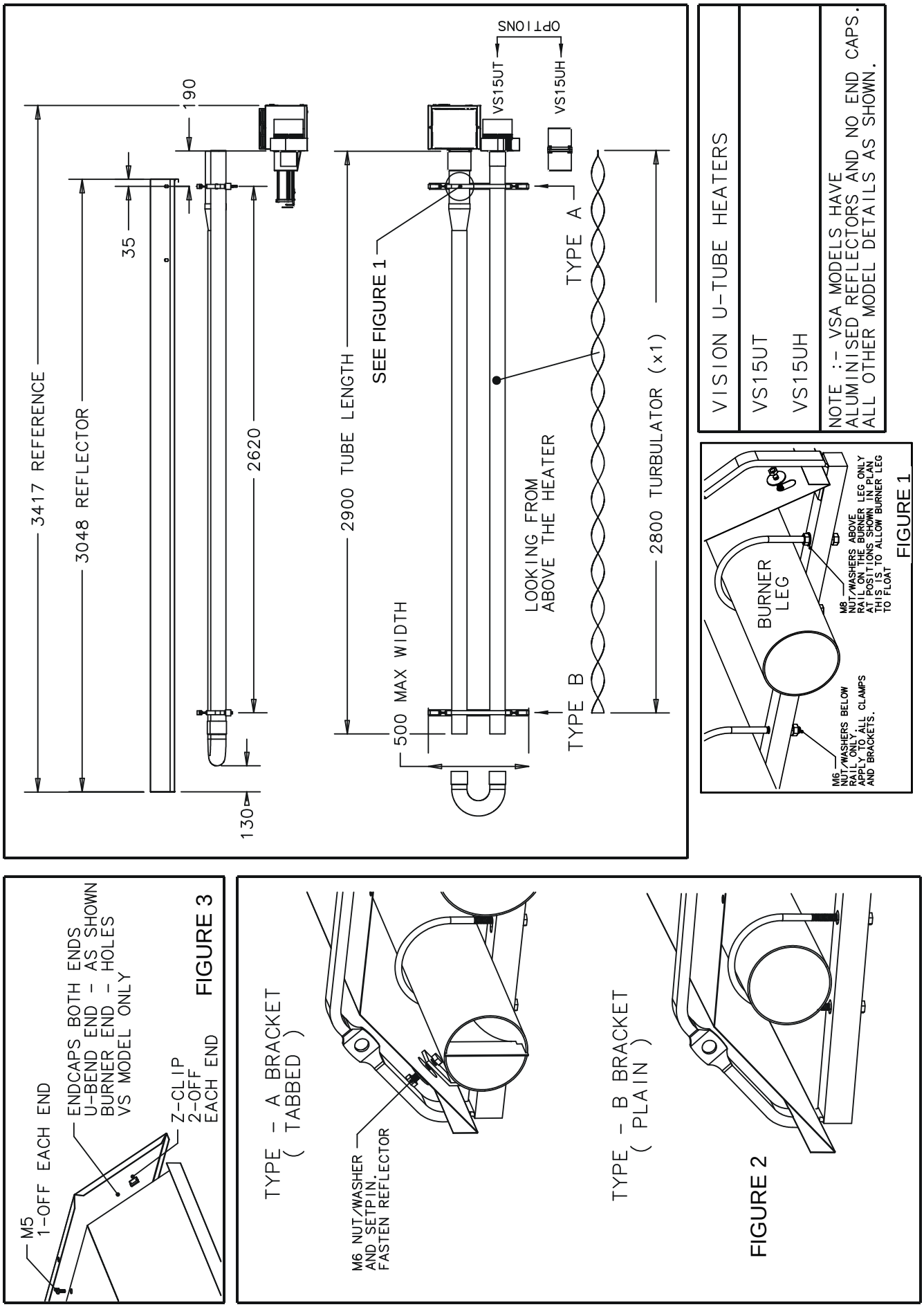


Figure 18. Vision Heater Assembly: Models VS/VSA U tube 20kW.

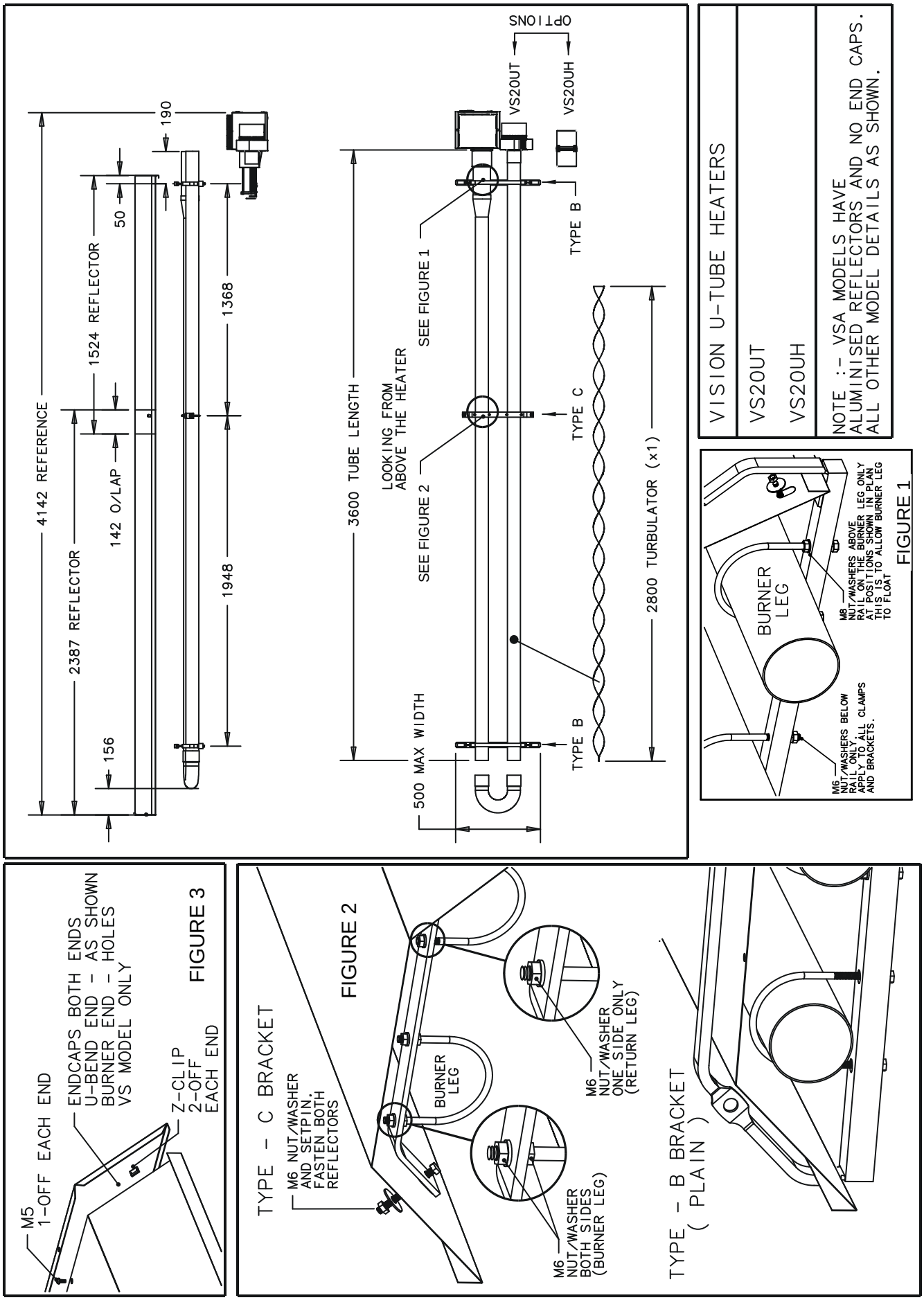


Figure 19. Vision Heater Assembly: Models VS/VSA U tube 25kW.

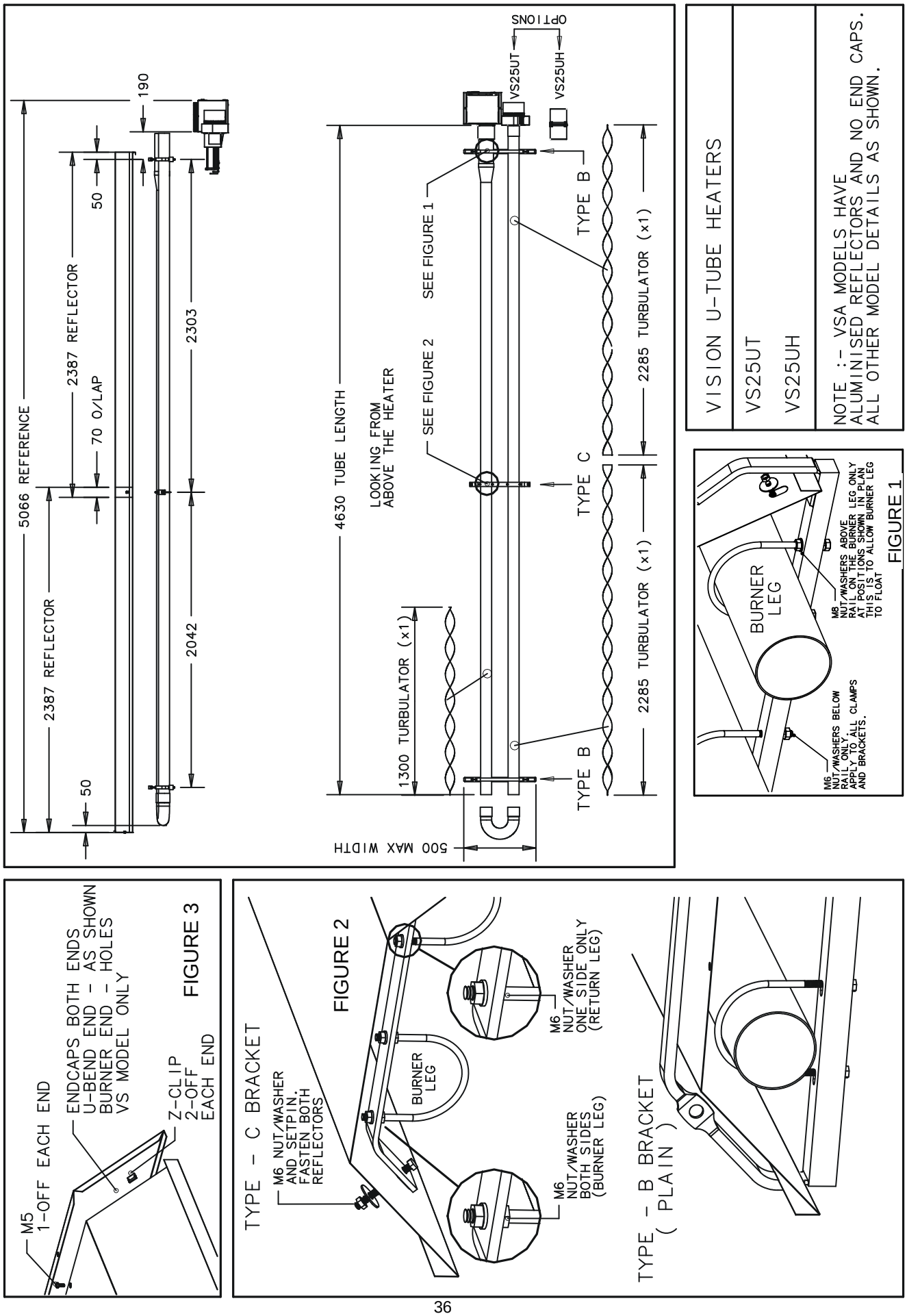


Figure 20. Vision Heater Assembly: Models VS/VSA U tube 30kW.

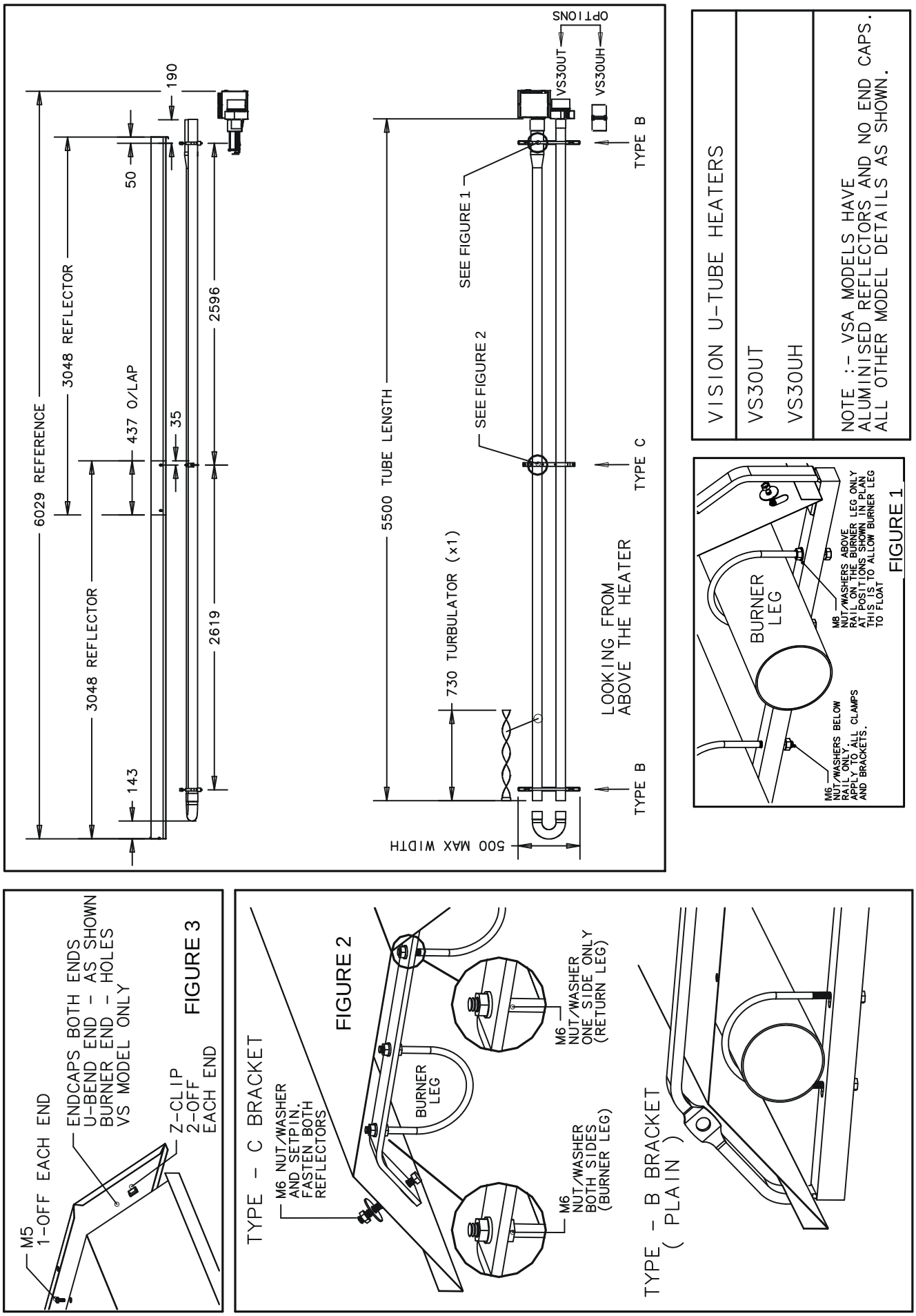


Figure 21. Vision Heater Assembly: Models VS/VSA U tube 35/40kW.

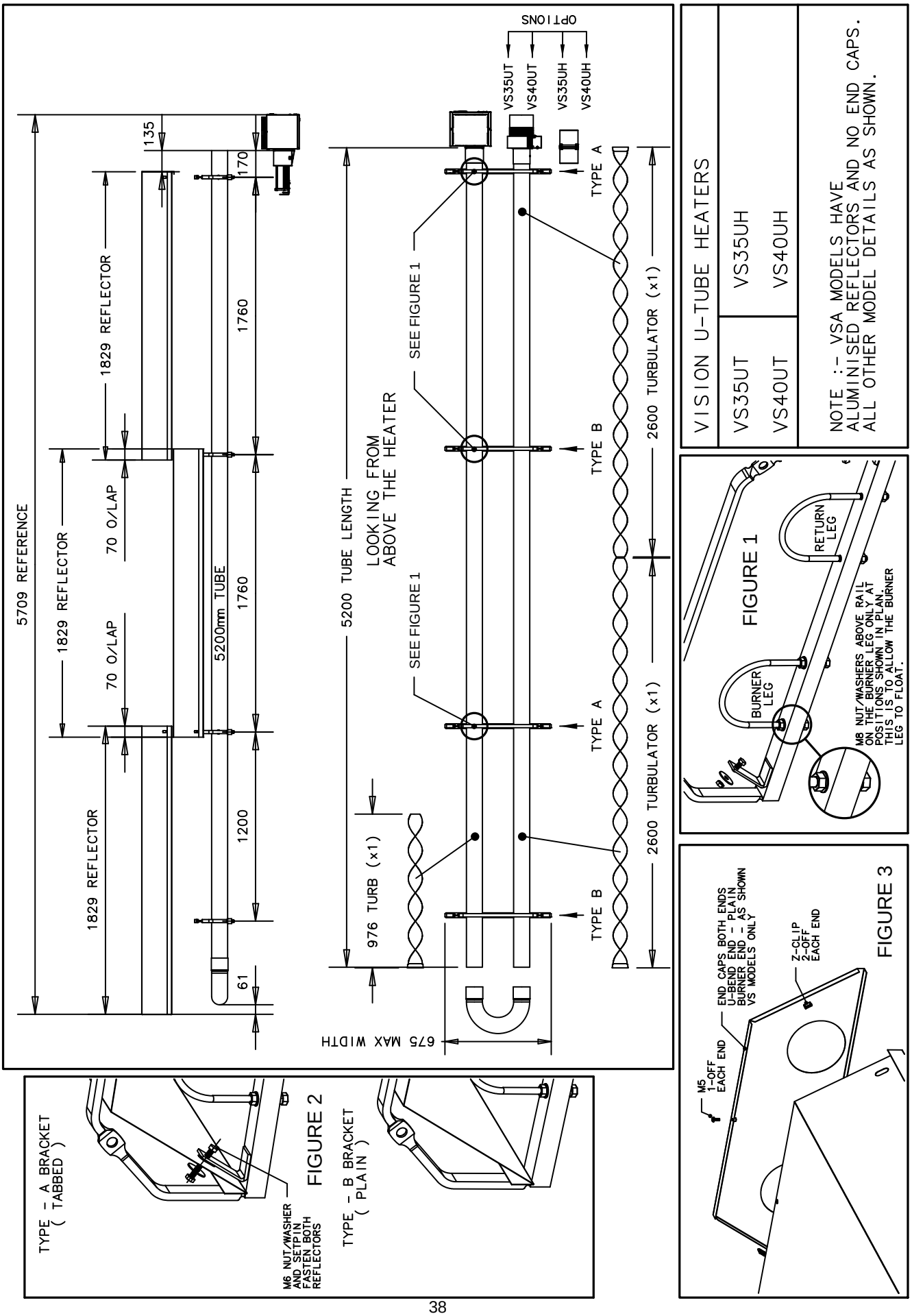


Figure 22. Vision Heater Assembly: Models VS/VSA U tube 45/50kW.

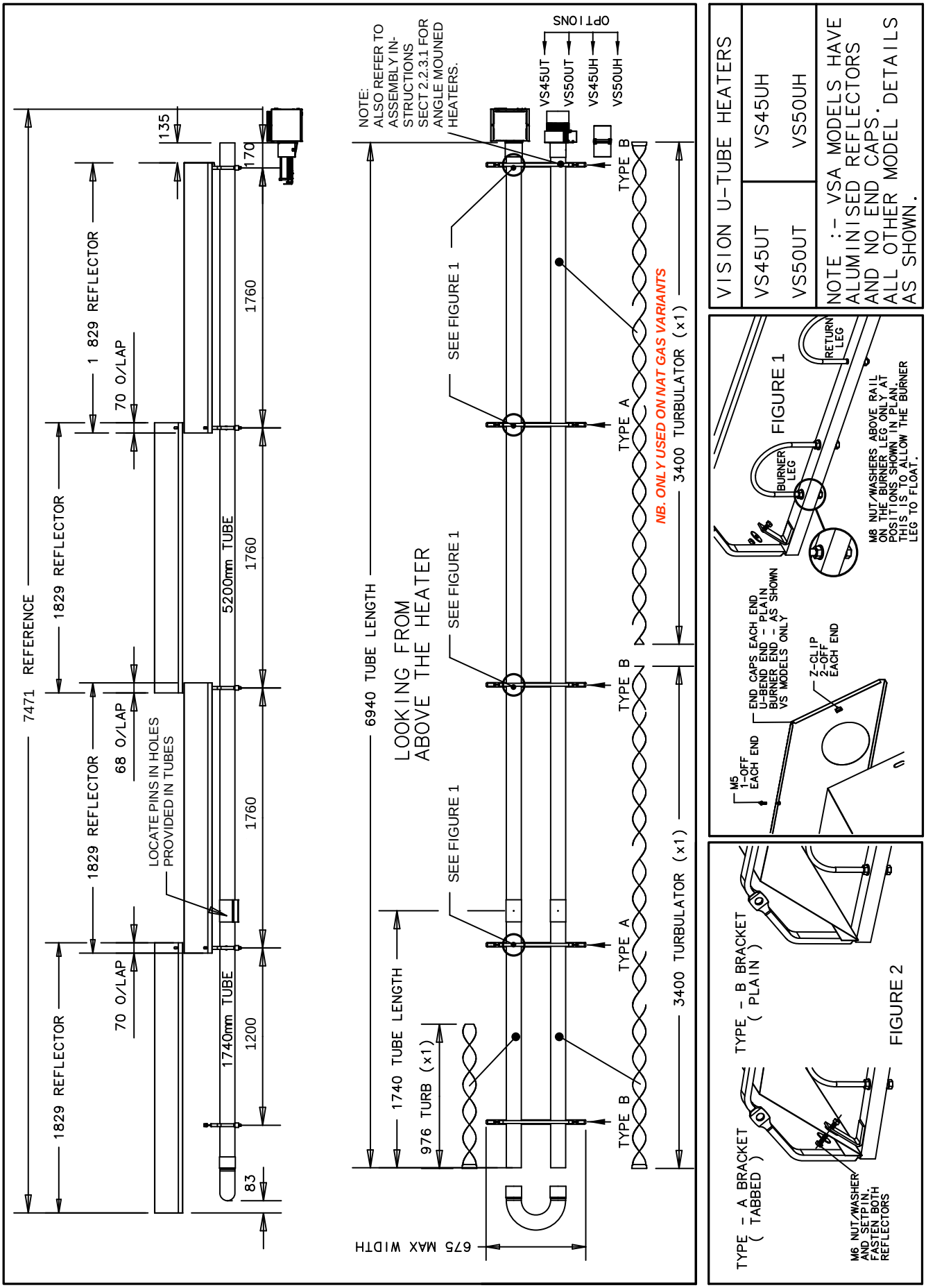


Figure 23. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 15kW 6m - 75mm (3ins) Nom Dia.

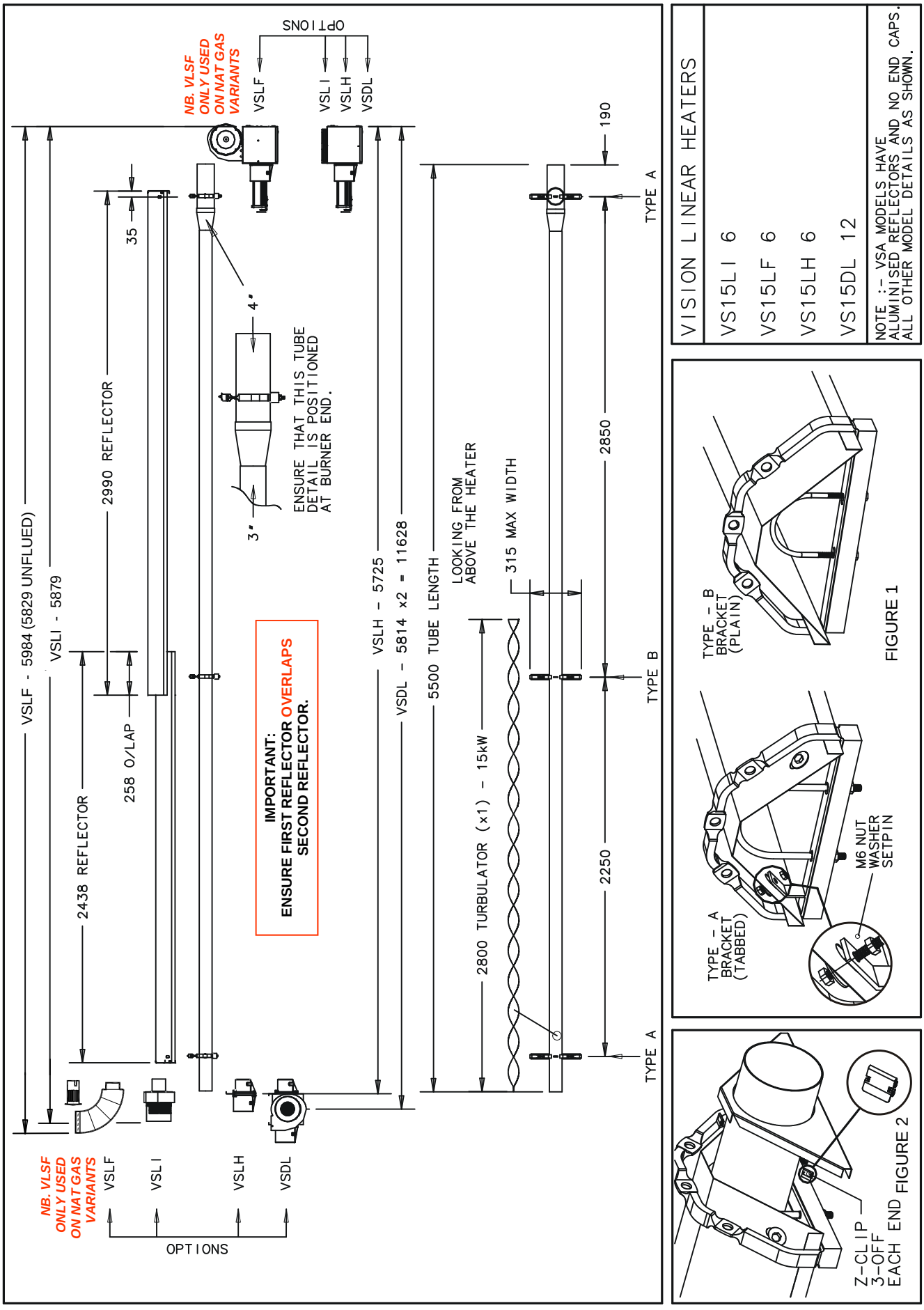
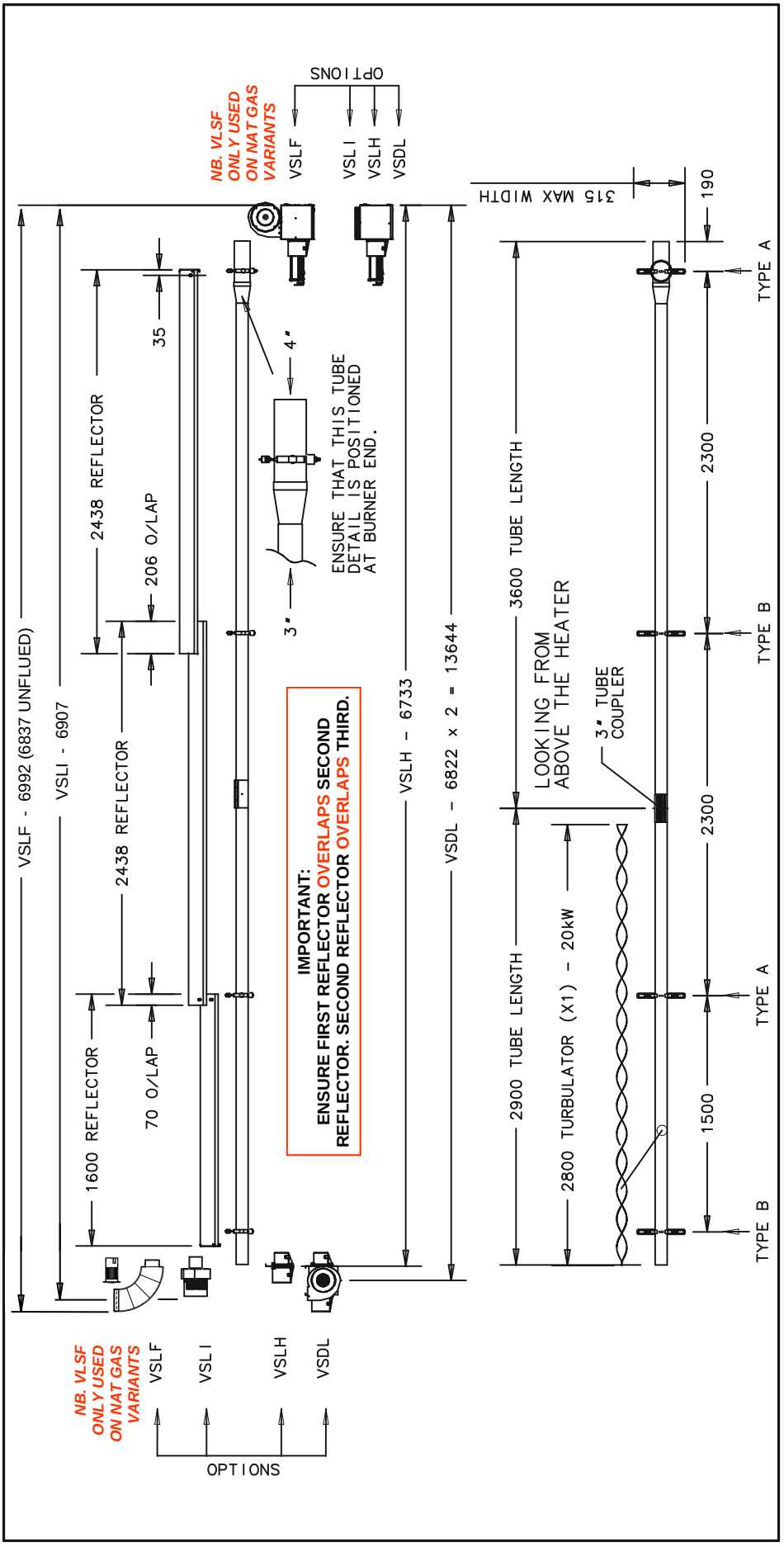


Figure 24. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 20kW 7m - 75mm (3ins) Nom Dia.



VISION LINEAR HEATERS
VS20LI 7
VS20LF 7
VS20LH 7
VS20DL 14

NOTE :- VSA MODELS HAVE ALUMINISED REFLECTORS AND NO END CAPS. ALL OTHER MODEL DETAILS AS SHOWN.

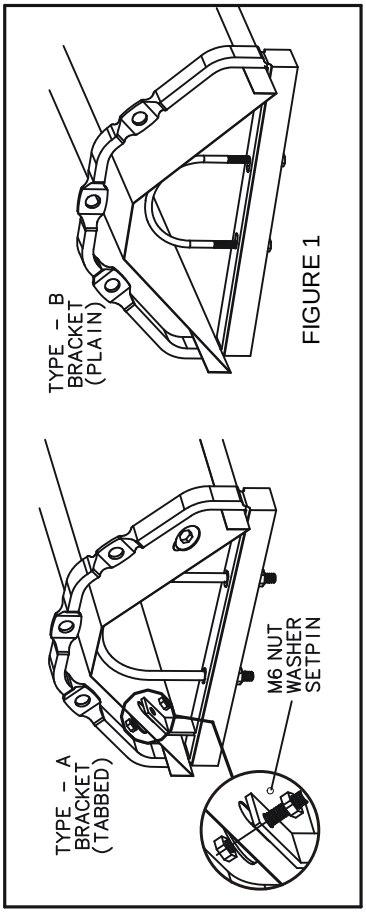


FIGURE 1

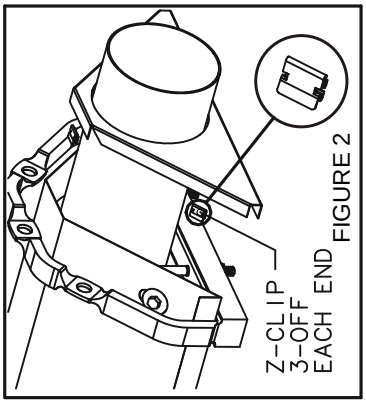
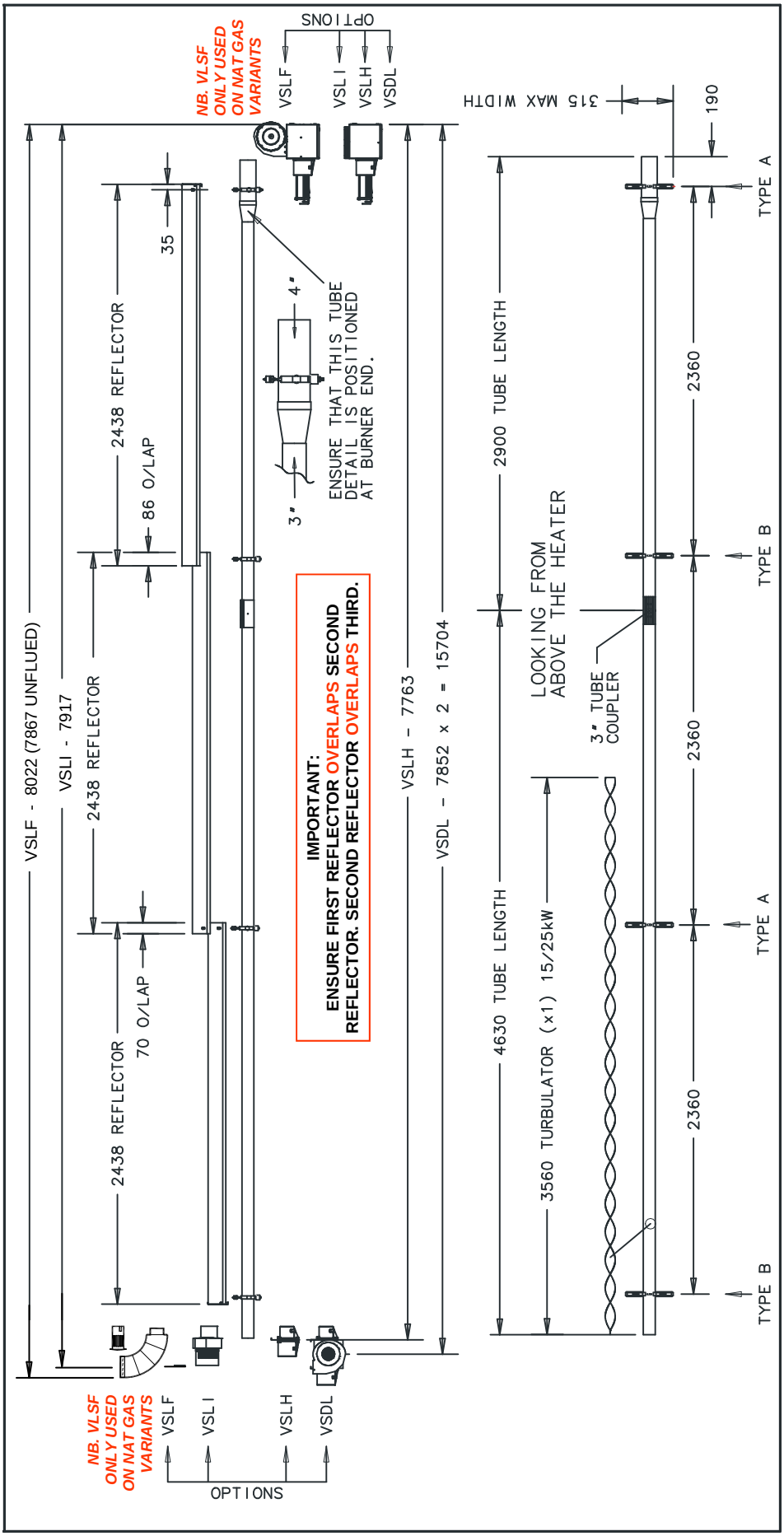


FIGURE 2

Figure 25. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 15/25kW 8m - 75mm (3ins) Nom Dia.



VISION LINEAR HEATERS	
VS15LI 8	VS25LI 8
VS15LF 8	VS25LF 8
VS15HB 8	VS25HB 8
VS15DL 16	VS25DL 16

NOTE:- VSA MODELS HAVE ALUMINISED REFLECTORS AND NO END CAPS. ALL OTHER MODEL DETAILS AS SHOWN.

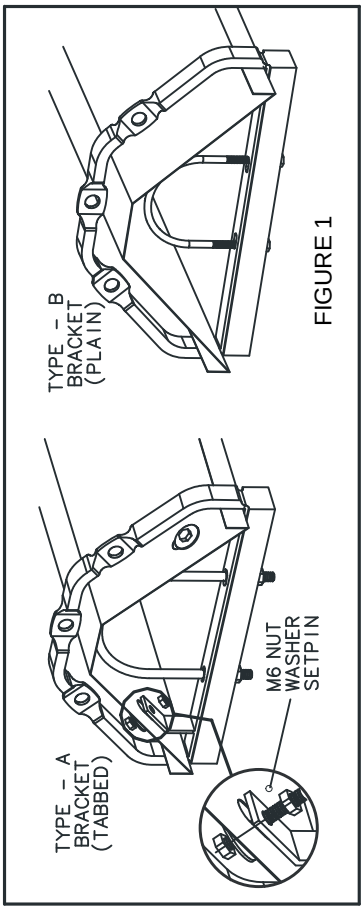


FIGURE 1

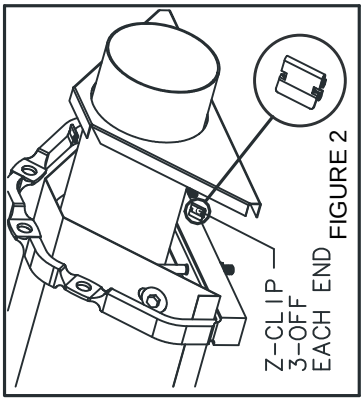


FIGURE 2

Figure 26. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 20/25/30kW 10.5m - 75mm (3ins) Nom Dia.

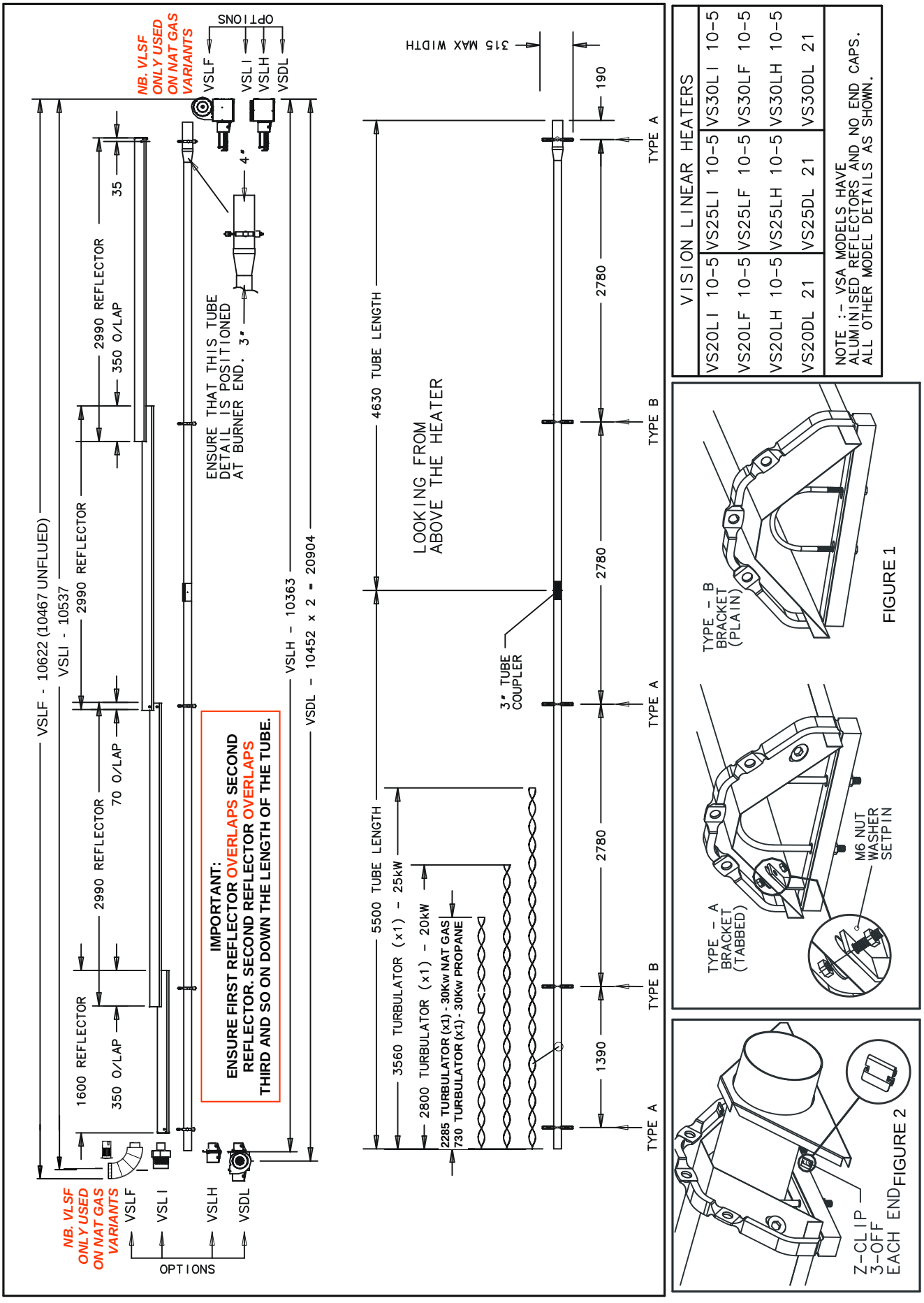


Figure 27. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 30kW 12.5m - 75mm (3ins) Nom Dia.

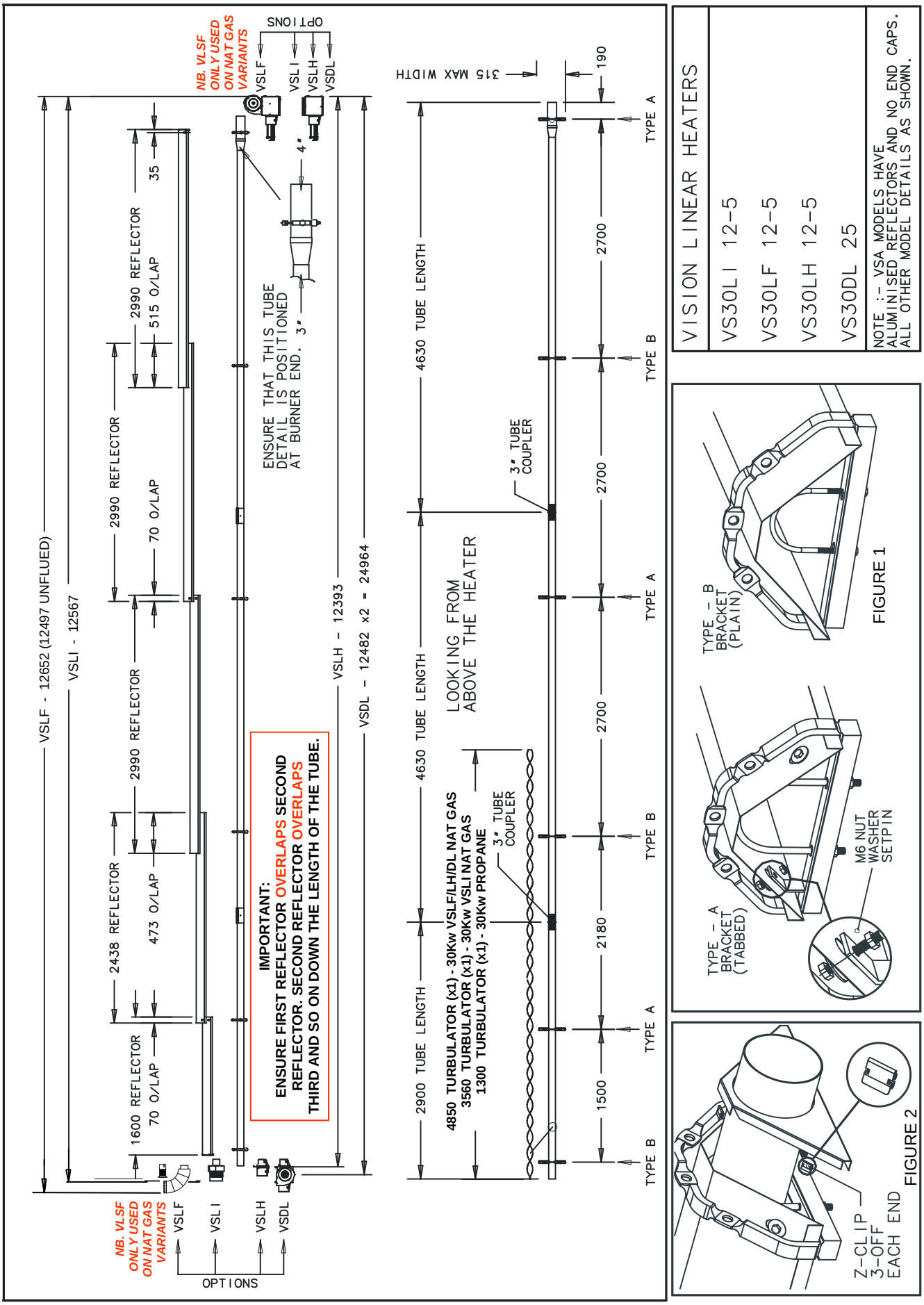


Figure 28. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 35kW - 10.5m - 100mm (4ins) Nom Dia.

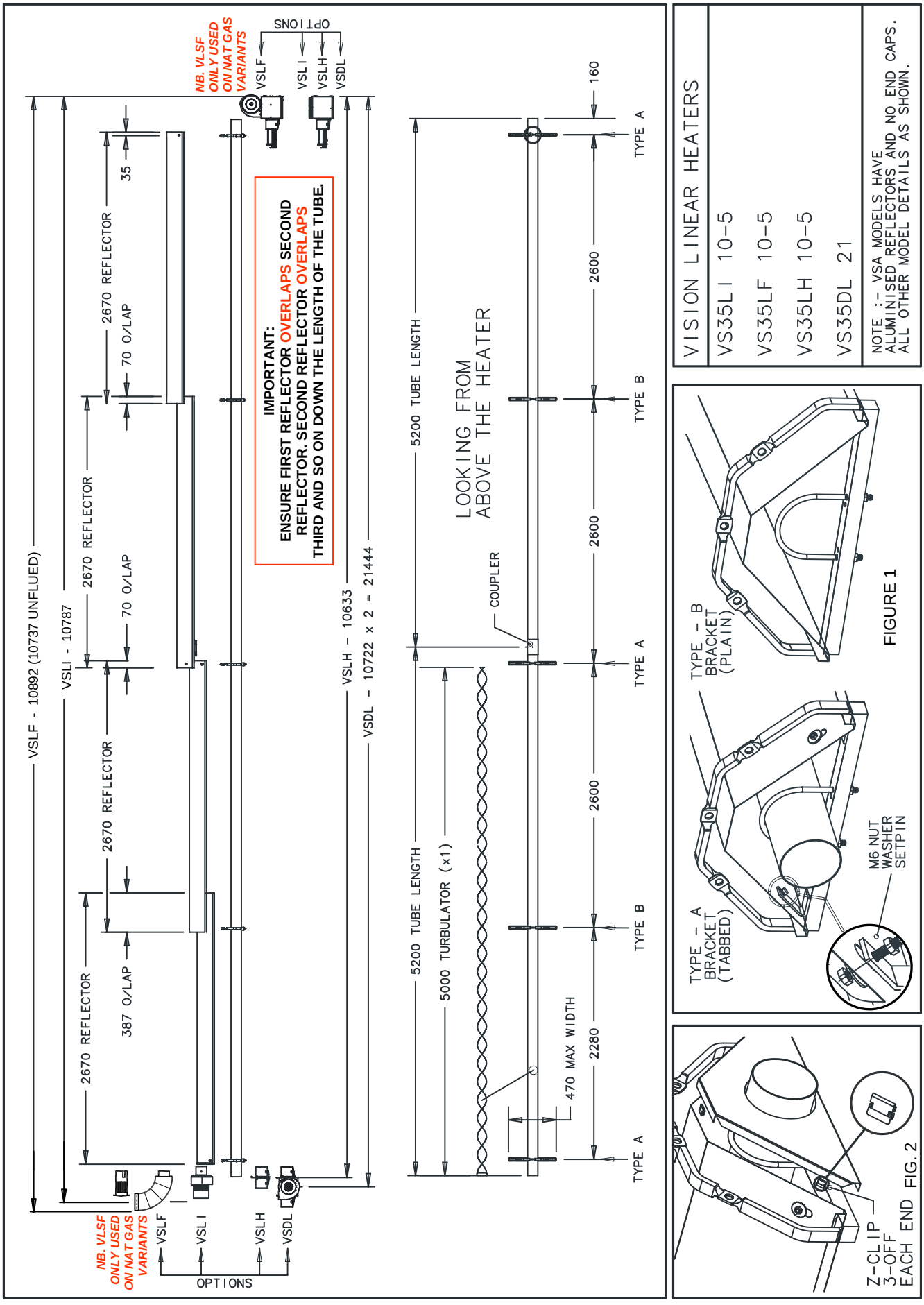
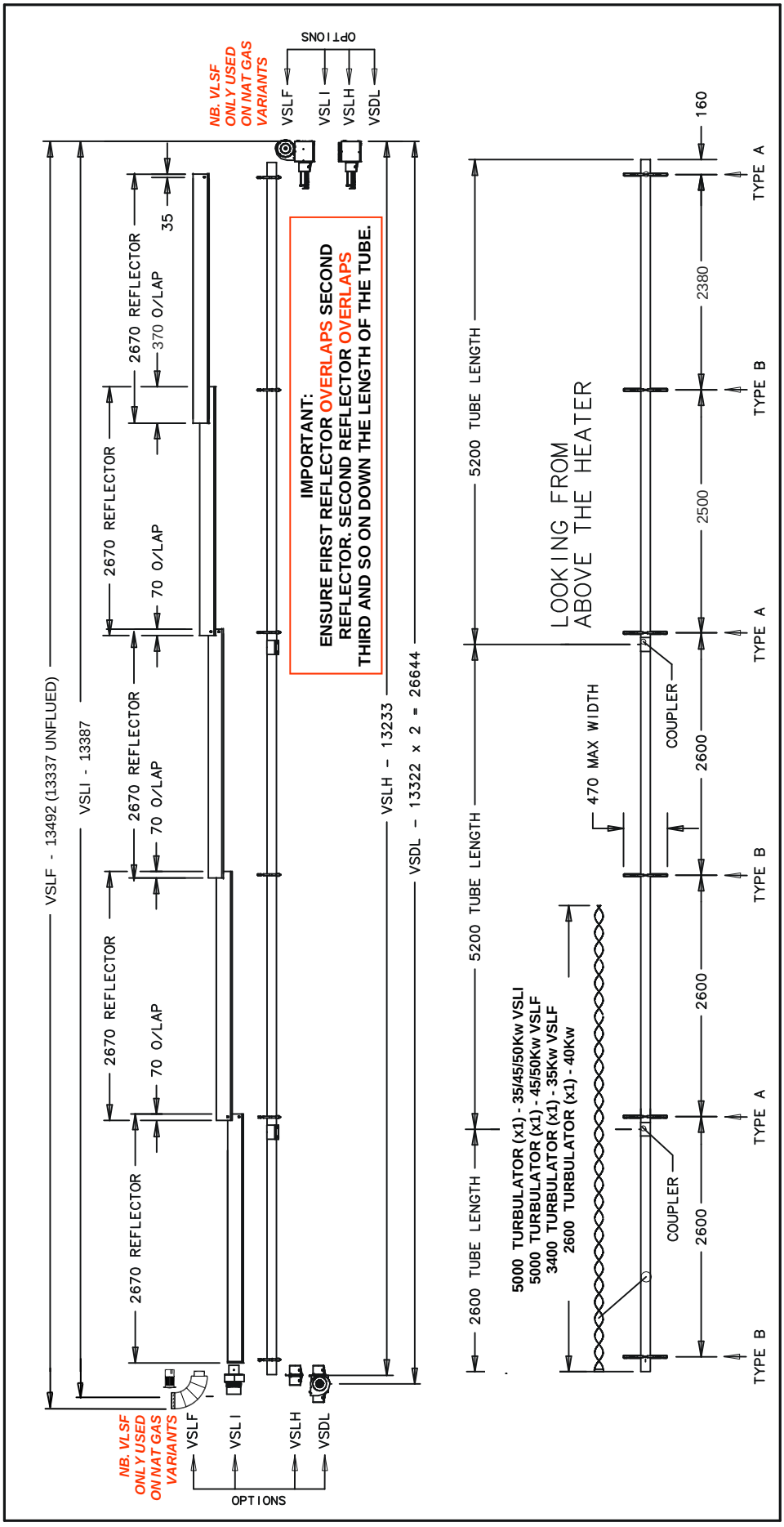
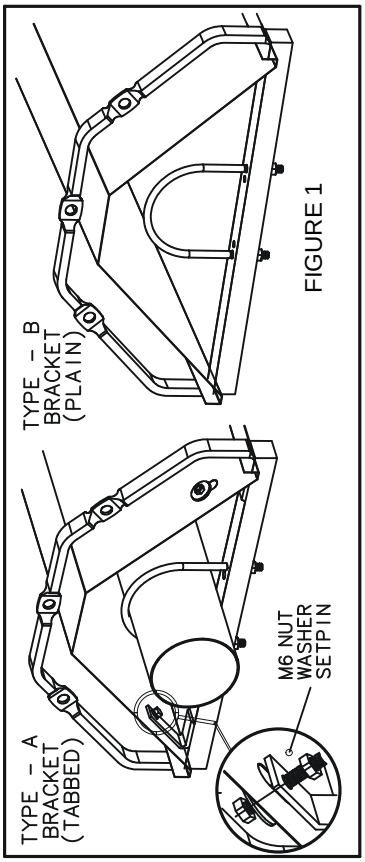


Figure 29. Vision Heater Assembly: Models VSLF/VSDL/VSLHB 35/40/45/50kW - 13.5m - 100mm (4ins) Nom Dia.



VISION LINEAR HEATERS			
VS35LI 13-5	VS40LI 13-5	VS45LI 13-5	VS50LI 13-5
VS35LF 13-5	VS40LF 13-5	VS45LF 13-5	VS50LF 13-5
VS35LH 13-5	VS40LH 13-5	VS45LH 13-5	VS50LH 13-5
VS35DL 27	VS40DL 27	VS45DL 27	VS50DL 27

NOTE :- VSA MODELS HAVE ALUMINISED REFLECTORS AND NO END CAPS. ALL OTHER MODEL DETAILS AS SHOWN.



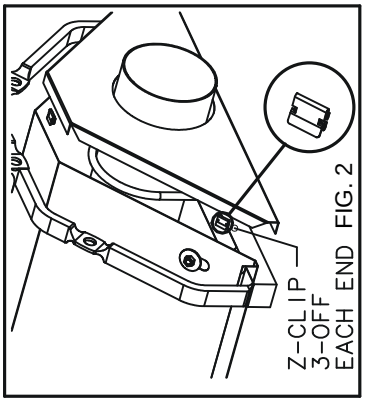
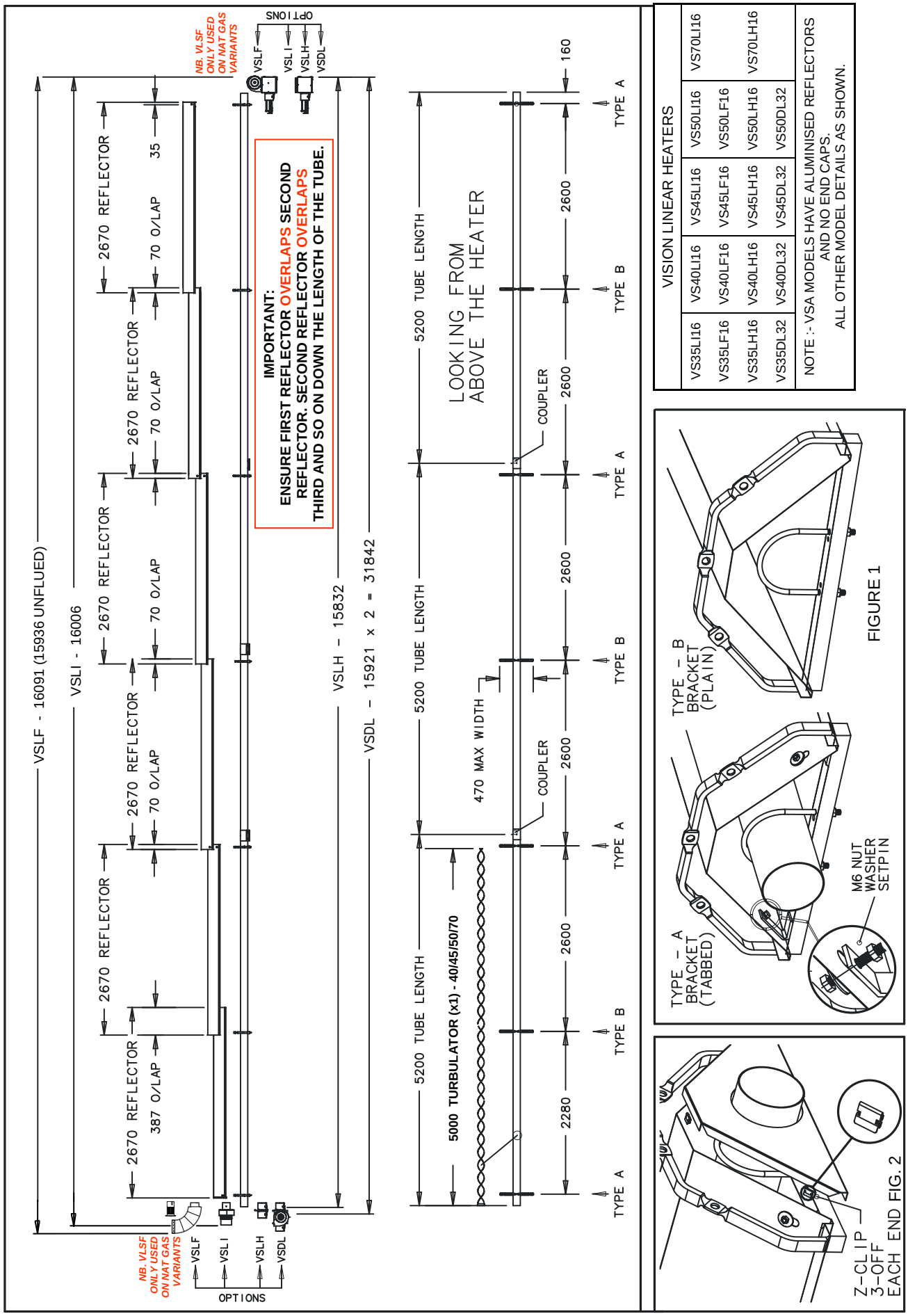


Figure 30. Vision Heater Assy: Models VSLF/VSDL/VSLHB 35/40/45/50/70kW - 16m - 100mm (4ins) Nom Ø



3. Commissioning Instructions.

These appliances should be commissioned by a qualified engineer.

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

Pozidrive Screwdriver

Small Flat Head Screwdriver

Large Adjustable Spanners or 22, 26 & 27mm Spanners for fitting Of Gas Flex.

12mm Spanner

4mm Allen Key

Manometer

Wrench with Extension

13mm Socket

3.2 Balancing The Herringbone System

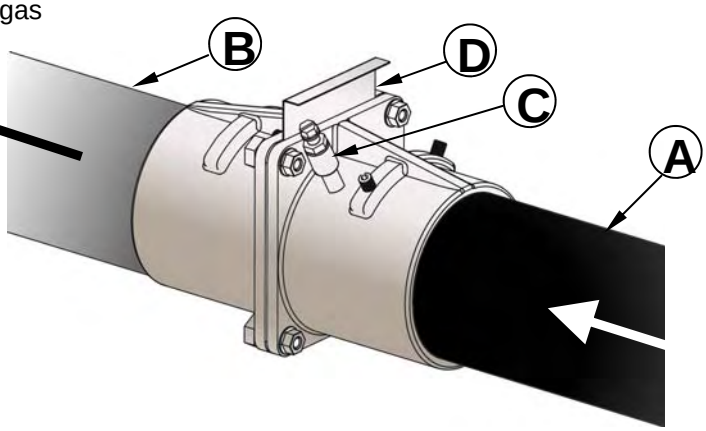
Important When all the heaters have been installed the vacuum settings must be finally balanced in the hot condition.

Before attempting to start up the heating system it is essential to perform the preliminary balancing of the vacuum level at each burner unit. Isolate each heater unit by unplugging the electrical connector and closing the gas isolating valve.

Start all burners up and allow them to run for at least 20 minutes. Adjust the damper at exit of each heater using a 4mm Allen key in the damper blade securing screw. Observing the vacuum reading using a 'U' tube manometer connected to the vacuum test point (see fig31) each damper should be readjusted and set at a hot condition reading as shown in table 9 (NG) and table 10 (LPG) for the appropriate size of heater and model.

Ref	Description
A	Radiant Emitter Tube
B	Manifold Tube
C	Vacuum Test Point
D	Damper Blade

Figure 31. HB Damper Assembly

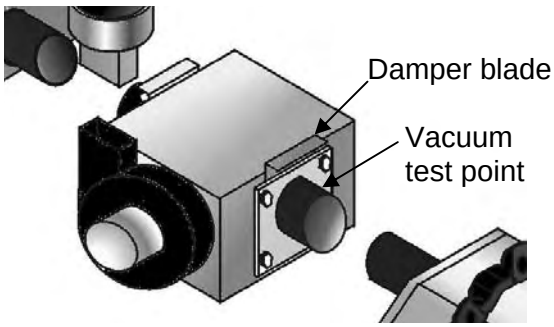


3.3 Balancing a DL System

Important When all the heaters have been installed the vacuum settings must be finally balanced in the hot condition.

As with a Herringbone system above, start both burners up and allow them to run for at least 20 minutes. Adjust the damper on the condensate box using a 4mm Allen key in the damper blade securing screw. Observing the vacuum reading using a manometer connected to the vacuum test point (see figure 32) each damper should be readjusted and set at a hot condition reading as shown in table 9 (NG) and table 10 (LPG) for the appropriate size of heater and model.

Figure 32. DL Condensate Box Assembly



3.4 Commissioning chart for VS series unitary heaters

Check installation has been carried out to these instructions.

Ensure gas and electricity supplies are isolated.

Disconnect gas hose from burner

Remove burner from tube and inspect burner head. (See servicing instructions)

Replace burner on tube and secure.

Reconnect gas hose. Open isolating valve. Check soundness.

Open control housing and check that all components are securely fastened.

Check thermostat is set to maximum and is calling for heat.

Switch on electrical supply. The red neon should now be illuminated. If restarting heater a delay of 15s should be allowed.

Turn off power and check that all components are securely fastened.

The heater should now run through its start up sequence and ignite.

NO

A successful ignition is indicated by the amber light illuminating and remaining illuminated.

Has the burner lit?

YES

Check gas pressure.

Check operation on flame failure. Check gas pressure.

Check operation of air pressure switch.

Close control housing

Leave the instructions with a responsible person.

Gas Valve adjustment

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. The manufacturer offers a maintenance service. Details available on request

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.

Leather Faced Gloves

Pozidrive Screwdriver

Small Flat Head Screwdriver

Large Adjustable Spanners or 22, 26 & 27mm Spanners for Fitting of Gas Flex.

12mm Spanner

4mm Allen Key

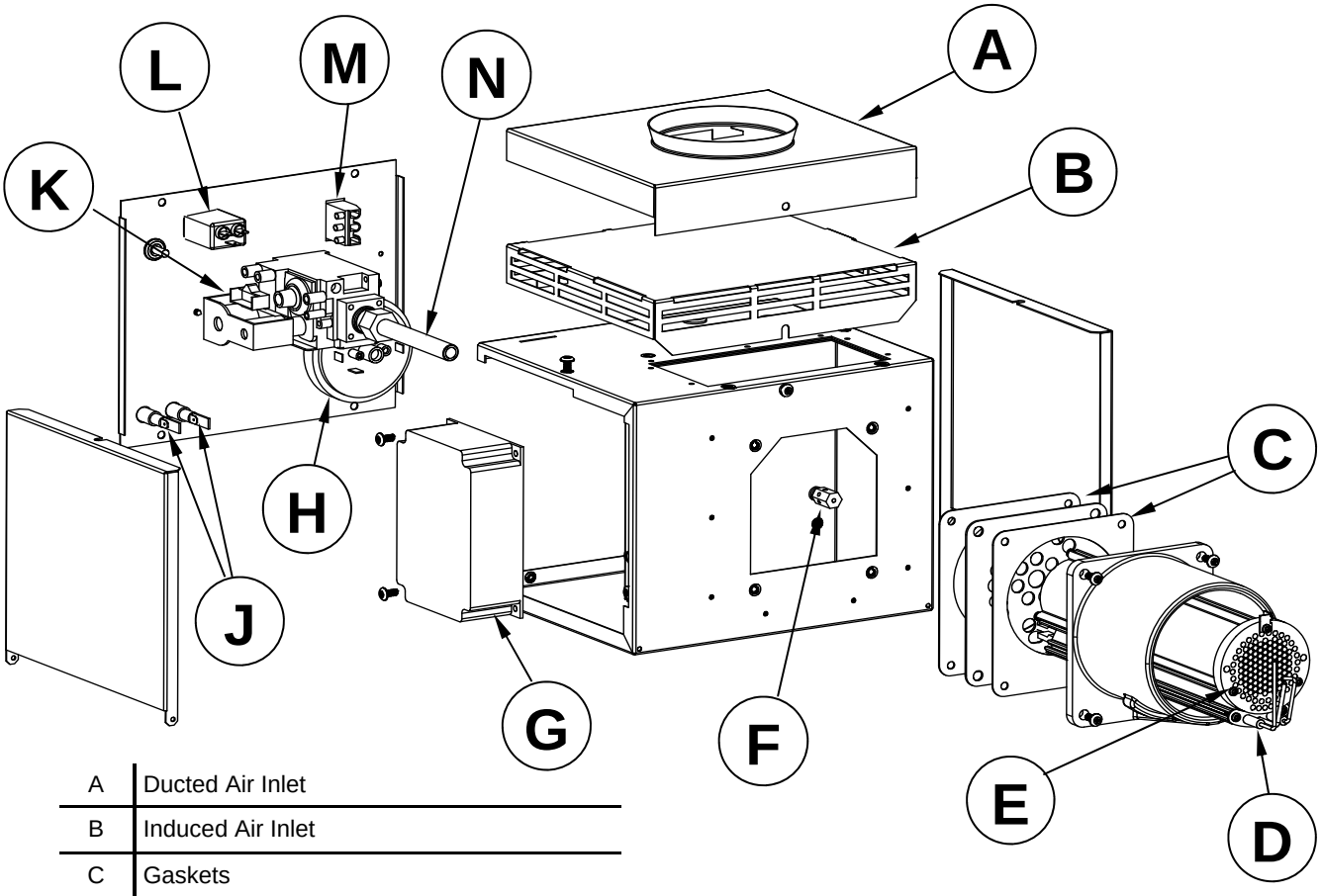
Manometer

Wrench with 13mm Socket

Soft Brush

4.2 Burner Description.

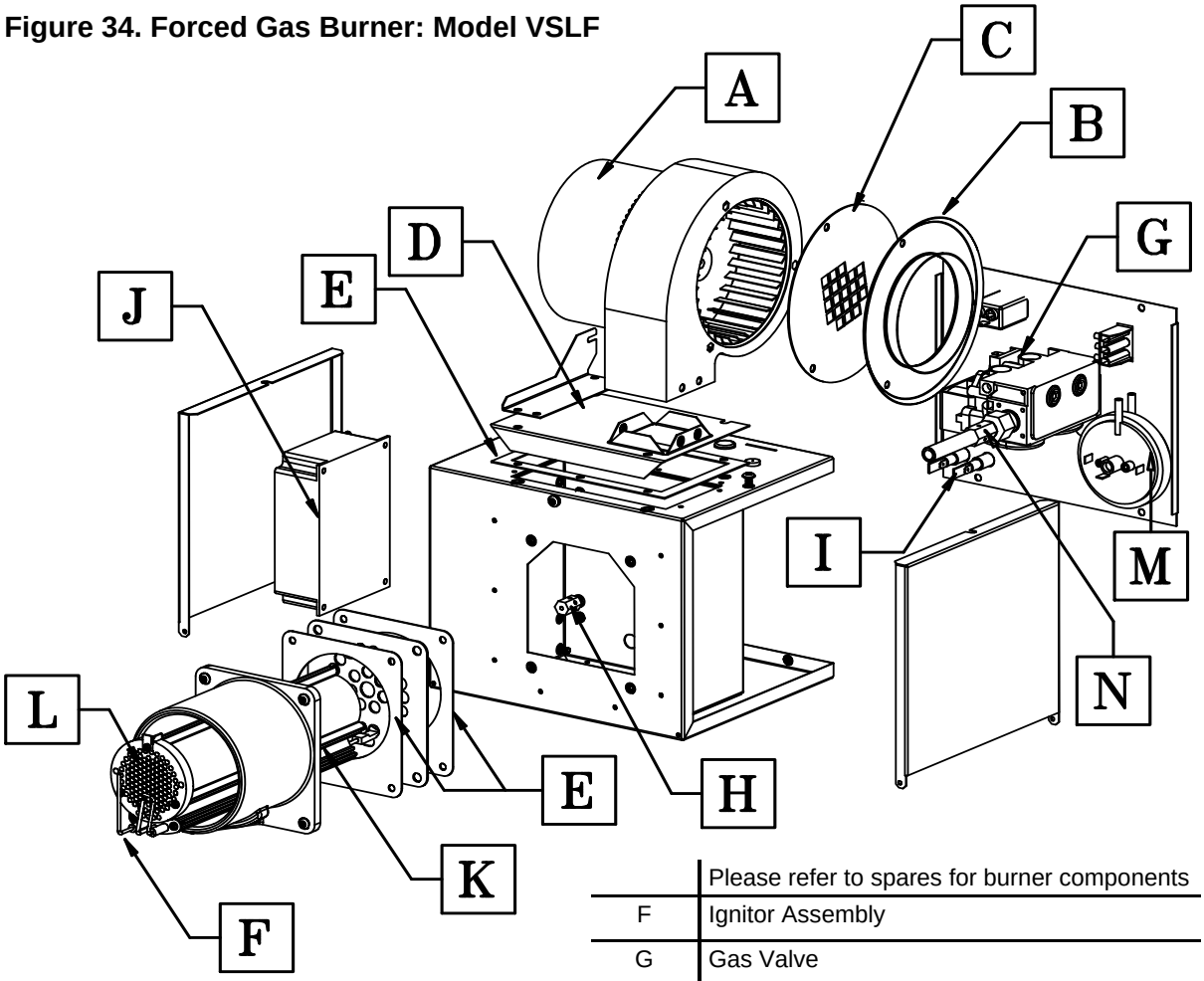
Figure 33. Induced Burner: Models VS(A)LI, VS(A)LH, VS(A)UH and VS(A)DL



A	Ducted Air Inlet
B	Induced Air Inlet
C	Gaskets
D	Ignitor Assembly
E	Pepperpot Head
F	Multi Hole Injector
G	Ignition Controller
H	Pressure Switch

J	Neon's (Red/Amber)
K	Gas Valve
L	Mains Input Socket
M	Fan Socket
N	Injector Carrier

Figure 34. Forced Gas Burner: Model VSLF



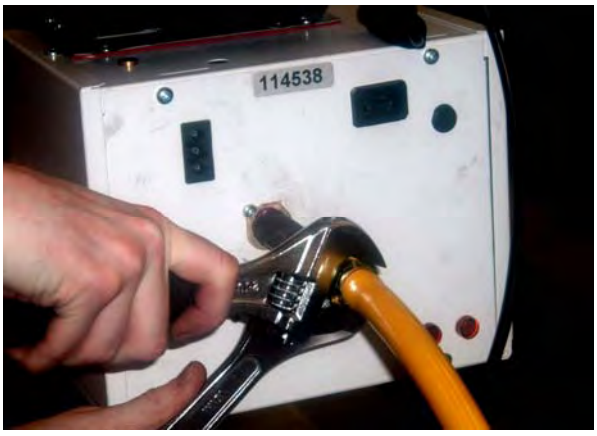
A	2501 or 2507 Fan
B	Fan Inlet Spigot
C	Fan Orifice plate
D	Fan Mount Plate and Support
E	Gasket Set

	Please refer to spares for burner components
F	Ignitor Assembly
G	Gas Valve
H	Multi Hole Injector
I	Neon's (Red/Amber)
J	Ignition Controller
K	Extruded Burner Head
L	Pepperpot Head
M	Pressure Switch
N	Jet Carrier

4.3 Burner Removal (All Options)

Step 1 Isolate mains electric and gas supplies. Unplug the fan and mains electricity connectors.

Step 2 Detach the gas supply as shown below, taking care to support the burner connection.



Step 3 On forced burners with ducted air attachment slacken jubilee clip and remove the flexible hose from the fan.

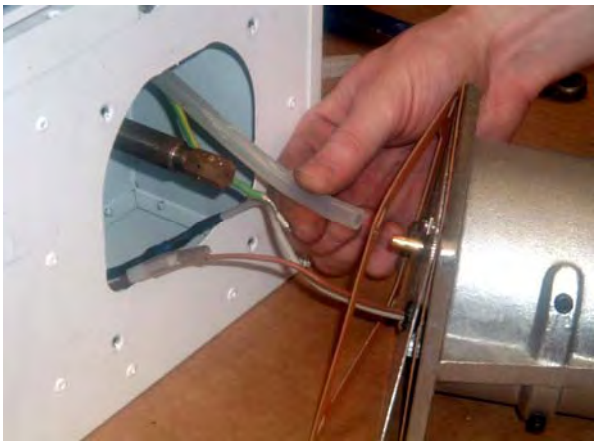
Step 4 Slacken the grub screw on the burner support casting using a 4mm Allen key to enable the burner to be removed from the radiant tube.

Step 5 Carefully remove the burner to prevent it or any components from falling to the ground and position the assembly in a safe area.

4.4 Burner Gas Injector Servicing

Step 1 Remove the burner support casting and gasket.

Step 2 The burner head assembly can be disconnected by separating the connectors of the ignition lead assembly and removing the pressure switch silicon tube.



Step 3 The gas injector can be inspected and replaced if contaminated or blocked.

When replacing the gas injector use a 12mm spanner and ensure approved thread sealant is used.

Step 4 Refit the burner support casting and replace the gaskets to ensure effective sealing.

4.5 Burner Head and Electrode Servicing

Step 1 Check the pepper pot burner head for contamination. If necessary the head can be removed for cleaning of the inside of the burner head, see below.

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 ignitor assembly can be checked for deterioration. However, we advise replacement at each service to ensure continued reliability.

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

Step 5 Refit the electrode assembly and ensure the silicon sleeving is fitted as shown above to prevent arcing of the spark electrode.

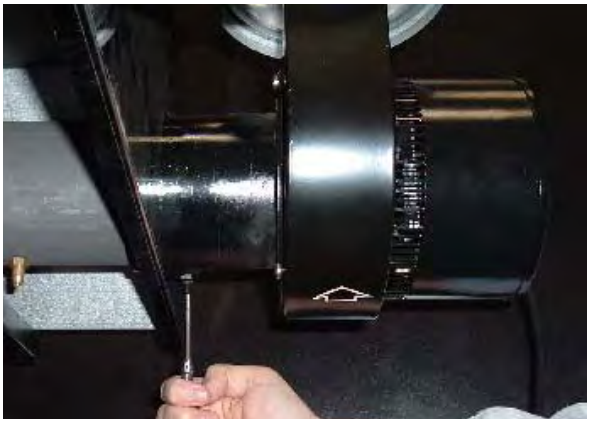
Step 6 Check the positions and spark gap as shown below.

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

4.6 Combustion Fan Assembly Induced Burner (Model VSLI/VSALI)

Step 1 Loosen the clamp fitting on the flue

Step 2 Loosen the 4mm grub screw.



Step 3 The combustion fan can now be detached.

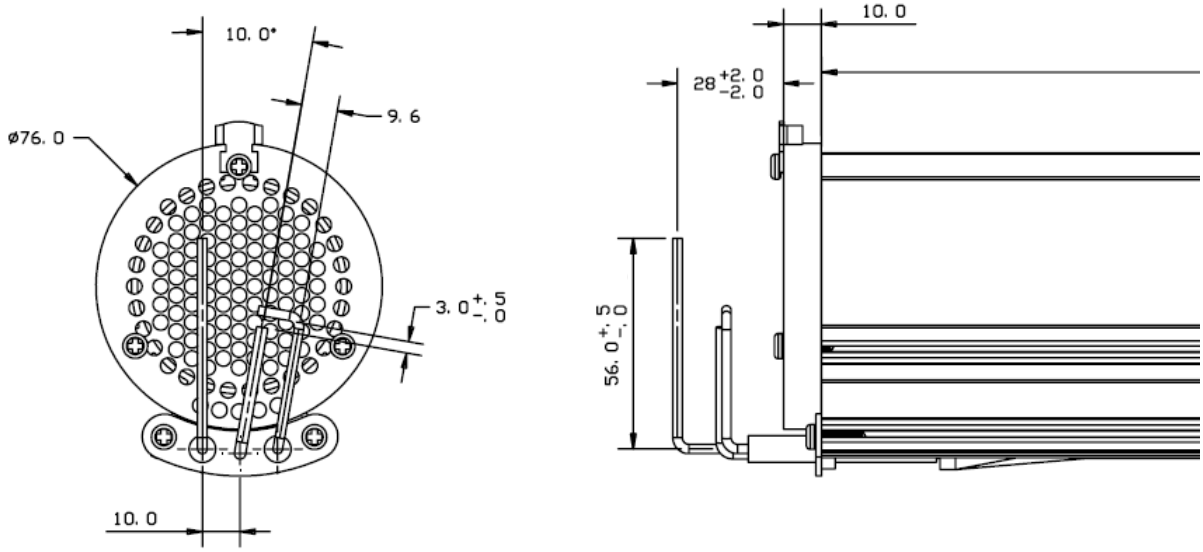


Figure 35. Burner head detail

Step 4 Remove the fan orifice plate spinning.

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

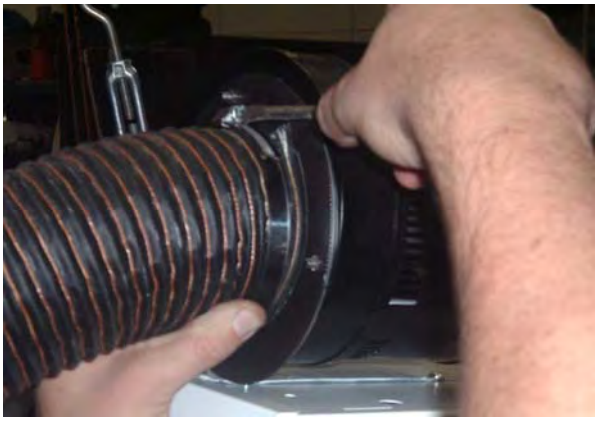
Step 6 Remove any dust from fan scroll and from around the motor.

Step 7 Ensure the impeller rotates freely.

Step 8 Refit components.

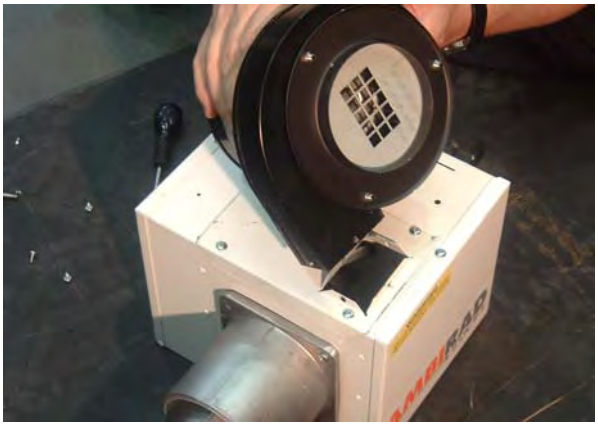
4.7 Combustion Fan Assembly Forced Burner (Model VSLF only)

Step 1 On Forced burners with ducted air attachment slacken jubilee clip and remove the flexible hose from the fan.



Step 2 Remove fan spigot fixings.

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

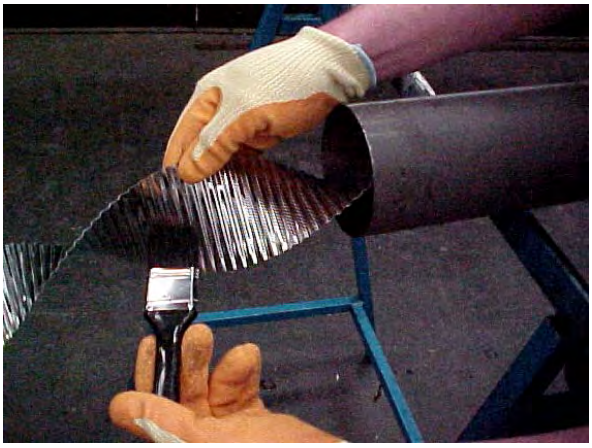
Step 1 Brush any dust from the exterior of the tubes.

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 (or damper - HB products or condensate box - DL products)

Step 4 Withdraw the turbulators from the appliance. Carefully noting 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 Inspection of Flue

The flue needs to be inspected and cleaned if necessary or in accordance to the regulations of the country that the appliance is installed.

4.11 Re-commissioning 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.

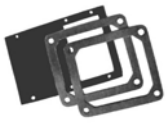
5. Spare Parts.

Required Spares

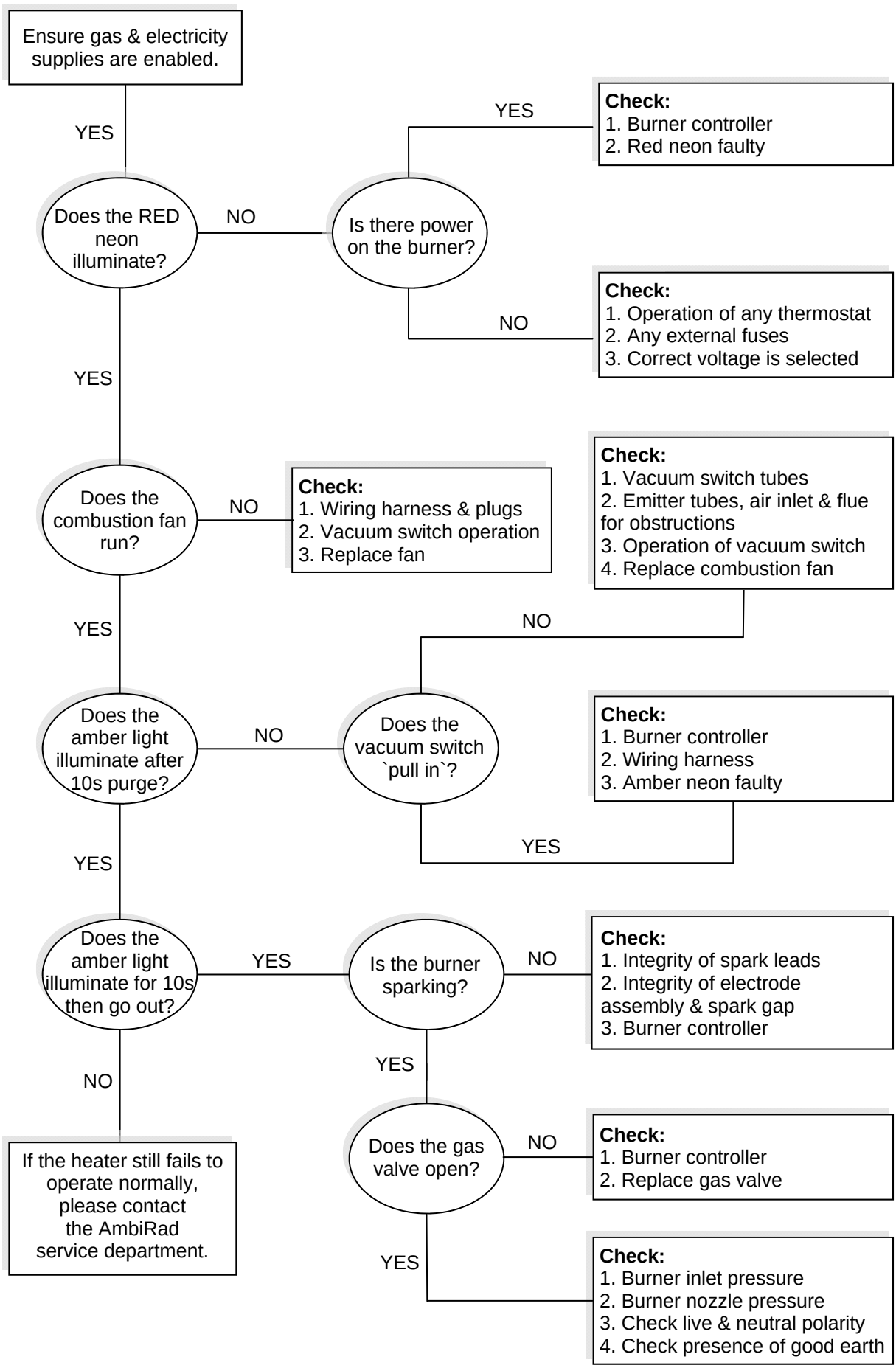
In order to aid troubleshooting and servicing we recommend that the components shown in this section should be stocked.

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

Item	Description	Part No.
	Ignition Controller	2015S
	Nat Gas Valve Twin sol reg 220/240	201857
	Propane Valve Twin sol reg 220/240	201914
	Pepperpot Head	200988
	Ignitor Assembly	201284
	Extruded Burner Head	200358
	Injector	See section 1.11
	Jet Carrier (all except *)	200420
	Flame Plate (VS15 ONLY Nat Gas & Propane)	201358
	Flame Plate (VS20/25/30 Propane ONLY)	201854

Item	Description	Part No.
	Pressure Switch: VSLF/VS70 (Red) All others (Green)	 201676 201508
	Amber Neon (Burner On)	2175
	Red Neon (Mains On)	2180
	Combustion Fan	See Section 1.11
	Gasket Set	201488-2
	Cables: Spark Electrode *(black)* Rectification lead *(purple)* Earth lead *(green/yellow)*	 900225-2 900225-3 900225-1
	Jet Carrier * VS50N UT/UH/LI/LH/DL	201630
	Flame Plate (VS35/40/45 Propane ONLY)	201571
	Flame Plate (VS50 Propane ONLY)	201905

6. Fault Finding Guide.



7. Replacing Parts.

7.1 Burner Controller Replacement

Step 1 Slacken 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.

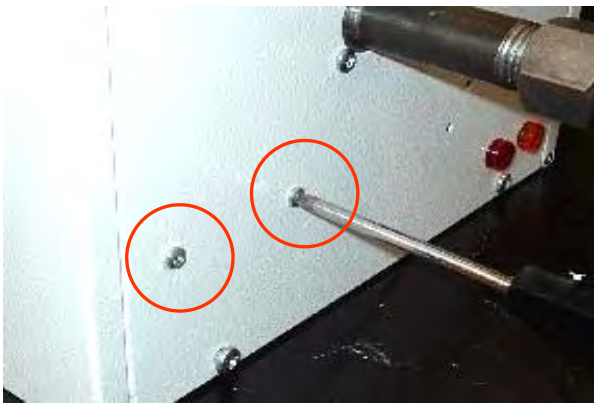
Step 6 Refit HT leads and refit burner controller to wiring harness.

Step 7 Test product and close access door.

7.2 Air Pressure Switch Replacement

Step 1 Disconnect the two silicone impulse tubes.

Step 2 Remove the two screws as shown below.



Step 3 The air pressure switch can now be removed.

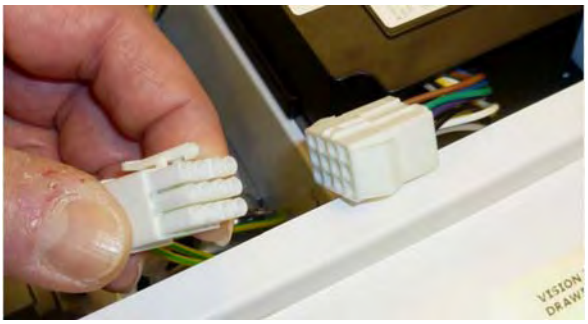
Step 4 Fit the new air pressure switch ensuring the impulse tubes are connected as shown below.

Step 5 Test product and close access doors.

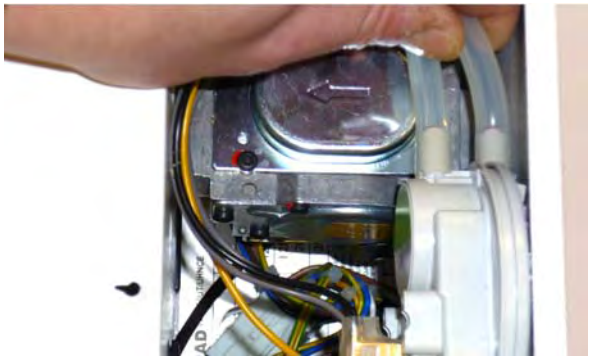
7.3 Gas Valve Replacement

Step 1 Remove the burner assembly as described in section 4.3 Servicing.

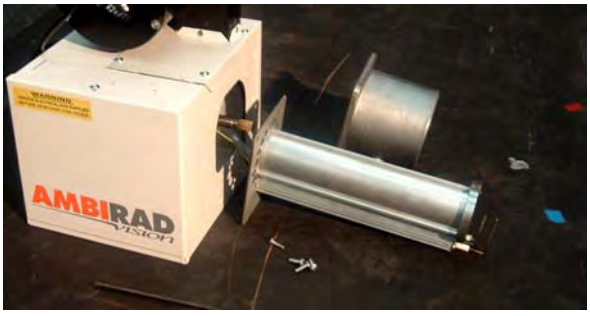
Step 2 Open the right hand access door and detach the burner controller from the wiring harness.



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

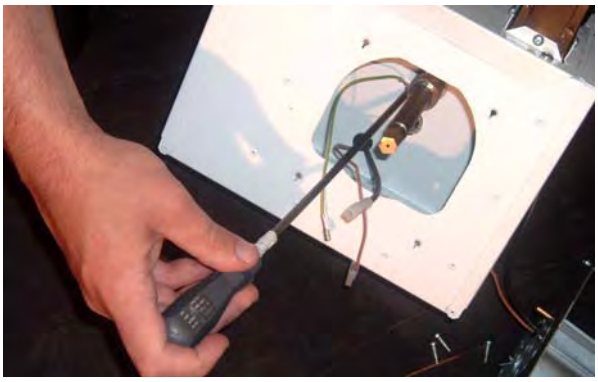


Step 4 Remove the 4 screws holding the burner head onto the burner assembly.

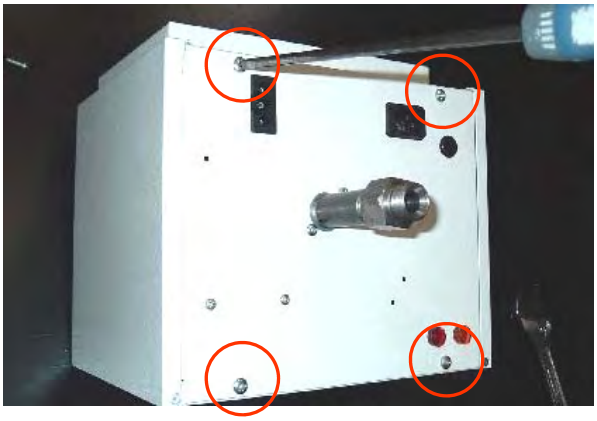


Step 5 The burner head can now be detached by disconnecting the impulse tube and the burner head wiring.

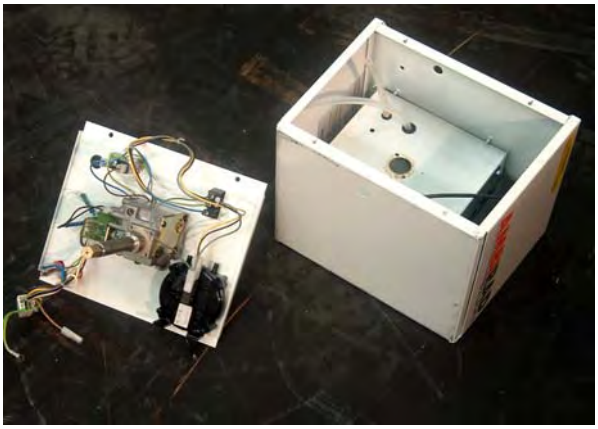
Step 6 Detach the two screws holding the front of the gas valve.



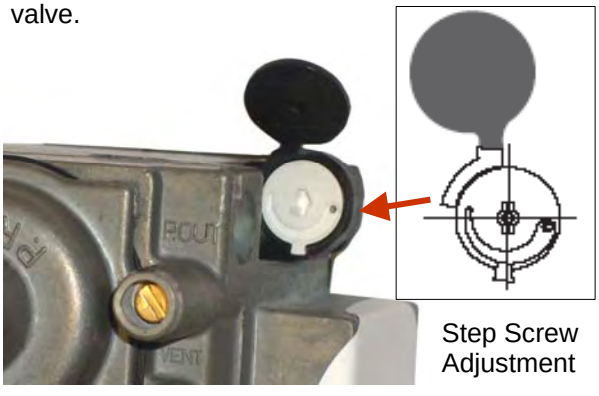
Step 7 Remove the four screws holding the rear burner plate in position.



Step 8 Remove the rear plate.



Step 9 The jet carrier, gas inlet, and wiring harness can now be detached from the gas valve.



Step Screw Adjustment

Step 10 The two screws retaining the gas valve can then be removed.

Step 11 The gas valve can now be replaced.

Step 12 Refit all components in reverse order.

Step 13 Ensure step screw is in the correct position as indicated in the previous diagram. (For Natural Gas burners ONLY).

Step 14 Set gas pressures to data badge or as per section 1.11 and ensure reliable burner performance.

Step 15 Test product and close access doors.

8. User & Operating Instructions.

8.1 To Start the Heater

1. Ensure gas supply is turned on.

2. Electrical supply to the controls is on.

3. Ensure that the controls are correctly set i.e.;

   - Clock is correctly set.
   - Heater program is correctly set.
   - Required room temp is correctly set

4. Once the heating controller 'calls for heat' power will be supplied to the heater(s). The red neon will then illuminate.

5. After a pre-purge period of 10 seconds the burner will ignite and the amber neon will then illuminate.

6. If lockout occurs press the lockout reset button (if available), or switch off electrical supply and restart after 15 seconds.

7. If lockout occurs three times consecutively switch off and isolate the gas and electricity supplies.
   Contact the AmbiRad Service department.

8.2. To Switch Off Heater

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

2. If the heater is to be switched off for periods in excess of one week it is highly recommended that both the gas and the electrical supplies are turned off.

8.3. Routine Maintenance between Service Intervals

After ensuring that the heater is cold and mains electric isolated, cleaning of the reflectors with a soft cloth and a mild detergent (non solvent based cleaners only) in water can be undertaken.

Additional removal of dust from the radiant tubes, burner and heat exchanger can be undertaken.

8.4 Frequency of Servicing

The manufacturer recommends that to ensure continued efficient and safe operation of the appliance, the heater is serviced annually by a competent person e.g. every year in normal working conditions but in exceptional dusty or polluted conditions more frequent servicing may be required.

The manufacturer offers a maintenance service. Details are available on request.

For Service requirements, please contact AmbiRad.

For further technical and service support visit our Support Information Database at www.s-i-d.co.uk

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