REZNOR

Installation & Operating Manual

# Vision
# VS Radiant
## Radiant Tube Heater (Propane)

**Warnings**

Nortek Global HVAC equipment must be installed and maintained in accordance with the requirements of the Codes of Practice or rules in force.

All external wiring must comply with the codes of practice or rules in force in the country of installation. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.

Read instructions before installing or servicing this equipment. For use with all Vision VS models with Generation code BB & BC. Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapours or combustible dust, containing chlorinated or halogenated hydrocarbons, or in applications with airborne silicone substances.

UK CA CE

**Manual Part No. D301178 Issue L**

Reznor® is a registered trademark of Nortek Global HVAC, LLC.

**IMPORTANT NOTICE TO INSTALLERS**

Installers should satisfy themselves that the fuel pipework installation is carried out in accordance with all current legislation, Codes of Practice and recommendations.

Additionally it may be necessary to protect the fuel valves which form part of the heater or burner assembly from potential pipe contamination particularly, but not exclusively, where copper gas pipework is used. In instances where copper pipework is to be used for all or part of a gas pipework installation, including short length final connections then we advise that installers consult with gas supplier or provider and satisfy themselves what additional precautions may be necessary.

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

Do not use this appliance if any part has been immersed in water. Immediately call a qualified service technician to inspect the appliance and replace any gas control that has been immersed in water.

These appliances are not designed for use in hazardous atmospheres containing flammable vapours or combustible dust, in atmospheres containing chlorinated or halogenated hydrocarbons or in applications with airborne silicone substances.

Should overheating occur, or the fuel supply fail to shut off, close the manual fuel valve to the appliance before shutting off the electrical supply.

This appliance is not intended for use by persons (including children) with reduced sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Any reference made to laws, standards, directives, codes of practice or other recommendations governing the application and installation of heating appliances and which may be referred to in brochures, specifications, quotations, and installation, operation and maintenance manuals is done so for information and guidance purposes only and should only be considered valid at the time of the publication.

The manufacturer cannot be held responsible from any matters arising from the revision to or introduction of new Laws, Standards, Directives, Codes of Practice or other recommendations.

WARNING

CAUTION

**Failure to comply with the information given with these symbols will result in severe personal injury or death and/or property damage.**

**WARNINGS:** For your safety, if you smell gas:

- Do not try to light any appliance
- Do not touch any electrical switch, do not use any phone in your building
- Evacuate all personnel & contact your gas supplier immediately
- Do not store or use petrol or other flammable vapours and liquids in the vicinity of the appliance.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.
- Read the installation, operation and maintenance instructions thoroughly before installing or servicing this equipment.
- In case of persisting problems, contact your distributor

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# Welcome

Welcome to the new range of high efficiency 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.

All Dimensions shown are in mm unless stated otherwise.

**PLEASE READ:**

Read this document prior to installation to familiarise yourself with the components and tools you require at the various stages of assembly.

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

# 1. Installation requirements

## 1.1 Health and Safety

The Vision VS Radiant Tube Heater detailed herewith is manufactured within a strictly controlled quality environment within the parameters of ISO 9001.

These instructions are only valid for appliances designed to operate in Europe. If the country code and gas category on the appliance data label does not match the country of installation or the country codes and gas category's as shown in this instruction manual, it will be necessary to contact the distributor or manufacturer to provide the necessary information for the modification of the appliance to the conditions of use for the country of installation.

The Vision VS Radiant Tube Heater has been tested and assessed for compliance with the following European Directives.

- Gas Appliances Regulations (EU) 2016/426
- Eco-Design Directive (2009/125/EC)
- Machinery Directive: (2006/42/EC)
- Low Voltage Directive: (2014/35/EU)
- Electromagnetic Compatibility Directive (2014/30/EU)
- Product Liability Directive: (85/374/EEC)
- The Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2020(SI 2020/676)

The manufacturer has taken reasonable and practical steps to ensure that the Vision Radiant Tube Heater is safe and without risk when properly used.

These heaters should therefore only be used in the manner and purpose for which they were intended and in accordance with the recommendations detailed herewith.

The heaters have been designed, manufactured, assembled, inspected, and strictly tested with safety and quality in mind. There are certain basic precautions which the installer and user should be aware of, and they are strongly advised to read the appropriate sections of the information pack accompanying the heater, prior to installation or use.

The Manufacturer supports all new products being supplied to their customers with a comprehensive information pack; this clearly defines mandatory instructions for the safe installation, use, and maintenance, of the appliance(s).

Where proprietary items are incorporated into Vision Radiant Tube Heaters, detailed information and instructions are provided as part of the information pack.

It is the responsibility of the installer, owner, user, or hirer, of the Vision Radiant Tube Heater, to ensure that they are familiar with the appropriate information/manuals, supplied by the manufacturer, and that they are suitably aware of the purpose of the manuals and the safety instructions. In addition, operators must be suitably trained in the use of the appliance so as to ensure its continued safe and efficient use.

The manufacturer has a commitment to continuous improvement and therefore reserves the right to amend or change the specification of the vision radiant tube range subject to compliance with the appropriate European, national, and local regulations.

Contained within the text of the manual, the words 'Caution' and 'Warning' are used to highlight certain points.

**Caution is used when failure to follow or implement the instruction(s) can lead to premature failure or damage to the heater or its component parts.**

**Warning is used when failure to heed or implement said instruction(s) can lead to not only component damage, but also to hazardous situations developing, where personal injury is at risk.**

**The Vision VS Radiant Tube Heater conforms to the following standards:**

EN 416
Gas-fired overhead radiant tube heaters and radiant tube heater systems for non-domestic use - safety and energy efficiency.

EN 60335-1
Safety of Household and Similar Electrical Appliances General Requirements.

EN 60335-2-102
Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections.

EN 55014-1
Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Emission.

EN 55014-2
Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Immunity.

**Note:** Neither asbestos nor soft soldered joints are used in the construction or manufacture of the Vision Radiant Tube Heaters. The materials selected for use can withstand the mechanical, chemical, and thermal stresses which they will be subject to during foreseen normal use when installed in accordance with the manufacturers recommendations.

## 1.2 Model Definitions

- VSUTE = Vision U Tube heater with painted induced burner, aluminised steel reflector & end caps.
- VSUHE = Vision U Tube heater in Herringbone manifold configurations with painted induced burner, aluminised steel reflector & end caps.
- VSLIE = Vision Single Linear heater with painted induced burner, aluminised steel reflector & end caps.
- VSLHE = Vision Linear heater in Herringbone manifold configurations with painted induced burner, aluminised steel reflector & end caps.
- VSDLE = Vision Double Linear heater with painted induced burner, aluminised steel reflector & end caps.

## 1.3 General requirements

CAUTION **Before the installation, please check the local distribution conditions, the nature of pressure and gas, and the current state adjustment of the appliance are all compatible.**

Installation and assembly procedures must be carried out by suitable competent persons. Commissioning and service procedures must be carried out by suitable qualified individuals.

WARNING **Any unauthorised modifications to the appliance, or departure from the manufacturers guidance on the intended use, or, installation contrary to the manufacturers recommendations may constitute a hazard.**

**Note:** To ignore the warning and caution notices and to ignore the advice from the manufacturer on installation, commissioning, servicing or use will jeopardise any applicable warranty, moreover, such a situation could also compromise the safe and efficient running of the appliance itself, and thereby constitute a hazard.

The installation of the appliance must meet all the relevant European, national, and local criteria.

Prior to installation the following points should be considered;

- The position of the heater for the optimum efficient distribution.
- The position of the heater relative to the route of the flue.
- The position of the heater relative to the supply of gas
- The position of the heater relative to the electrical services, and if appropriate, any additional controls.
- The position of the heater relative to the supply of fresh air if applicable
- The position of the heater relative to service and maintenance requirements

CAUTION **The heater must not be installed within an area where the conditions are unsuitable, e.g. where the atmosphere is highly corrosive, has a high degree of salinity, or where high wind velocities may affect burner operation. Suitable protection should be provided for the appliance when it is located in a position where it may be susceptible to external mechanical damage from; for example, fork lift trucks, overhead cranes etc.**

## 1.4 Delivery and Pre-Installation checks.

**On receipt of the heater, the following checks should be carried out;**

- The model is as per order.
- That it is undamaged.
- That it is suitable for the fuel supply.
- That it is suitable for the electrical supply.

If any of these points mentioned are not satisfied then contact should be made with the seller of this equipment. In the case of claims for damage, this must be signed for as damaged and reported in writing within 24 hours of delivery, in order to comply with insurance criteria.

## 1.5 Heater Suspension

Please see Figure 4 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.

CAUTION **Wire rope MUST NOT be used for the final connection to the heater bracket.**

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 4. 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 VS heaters are given in the table to the right.

## 1.6 Wall/Angle Mounting

These radiant tube heaters can be wall -mounted using the appropriate bracket (part no 1001836).

When using wall-mounted brackets, the heater must be inclined at an angle that is no greater than 45°.

**Note:** Models 15-25 U-Tube heaters cannot be installed angle mounted.

| Model | Minimum Mounting Height (m) Horizontal | Recommended Mounting Height (m) Horizontal | Minimum Mounting Height (m) Inclined / Wall Mounted | Recommended Mounting Height (m) Inclined / wall mounted |
|---|---|---|---|---|
| 15 | 3.3m | 4.0 - 5.0m | 2.7m | 3.5 - 4.5m* |
| 20 | 3.7m | 4.5 - 7.0m | 3.0m | 3.5 - 5.0m* |
| 25 | 4.1m | 5.0 - 8.0m | 3.4m | 4.0 - 5.0m* |
| 30 | 4.5m | 5.5 - 9.0m | 3.8m | 4.0 - 6.0m |
| 35 | 4.8m | 6.0 - 10.0m | 4.1m | 4.5 - 6.5m |
| 40 | 5.3m | 6.5 - 11.0m | 4.6m | 5.0 - 7.0m |
| 45 | 6.0m | 7.0 - 12.0m | 5.3m | 5.5 - 8.0m |
| 50 | 6.3m | 7.5 - 13.0m | 5.6m | 6.0 - 9.0m |

**Table 1 –** Mounting heights

| Heater Size | Required angle | U Tube Eye bolt position 1 Chain length | U Tube Chain length Eye bolt position 10 | Linear Eye bolt position 1 Chain length | Linear Chain length Eye bolt position 6 | Linear Chain length Eye bolt position 8 |
|---|---|---|---|---|---|---|
| 15 - 25 | 45° | N/A | N/A | 465 mm | 531 mm | N/A |
| 30 - 50 | 45° | 491 mm | 743 mm | 433 mm | N/A | 572 mm |

**Table 2 –** Angle mounting

The burner must be positioned on the lowest side of the heater and mounted on a level horizontal plane.

This is to ensure the gas valve coils are not installed beyond 90° from the upright position. See Figure 2.

The burner and outlet tubes may be reversed on U-Tube models 30-50 to allow more flexibility when angle mounting. See Figure 3.

**Note:** When Angle mounting a U tube heater, the burner MUST be located on the bottom (lowest) tube (see Figure 2)Models 15-25 U-Tube heaters cannot be installed angle mounted

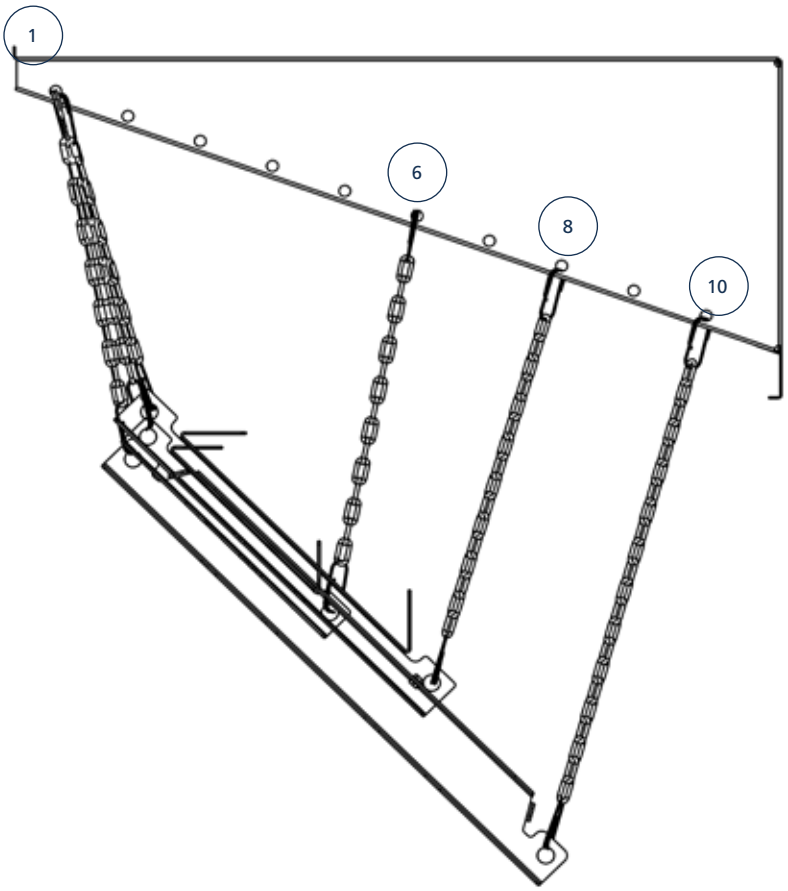



**Figure 1.** Angle mounting using the wall mounting bracket

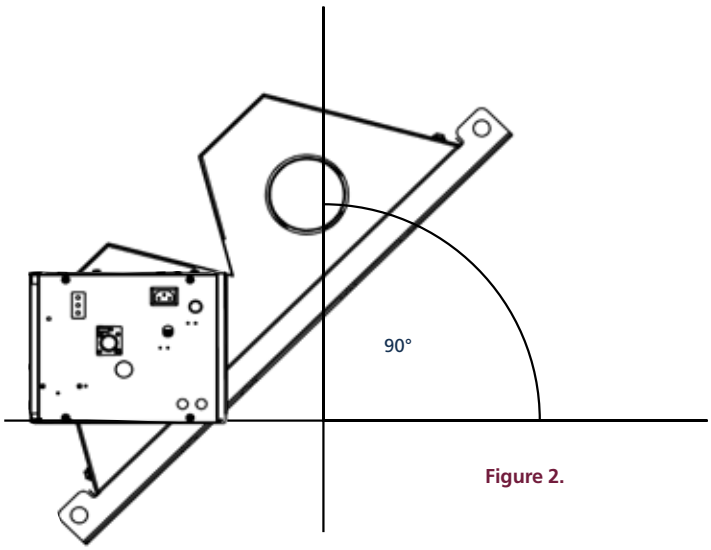



**Figure 2.**

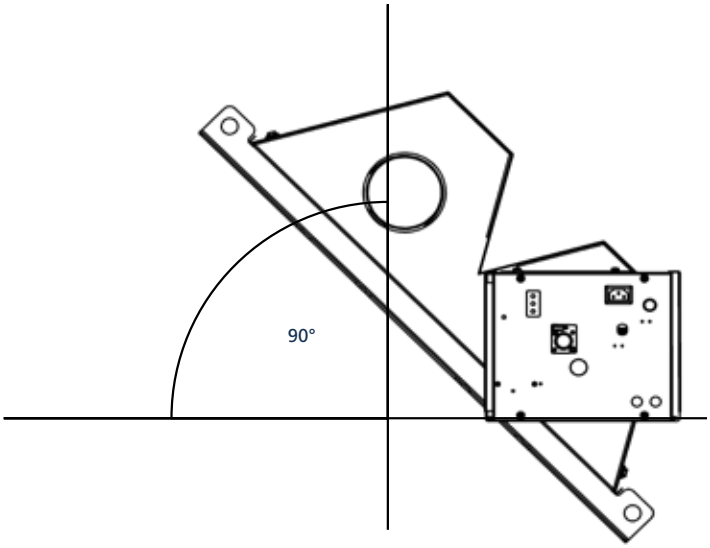
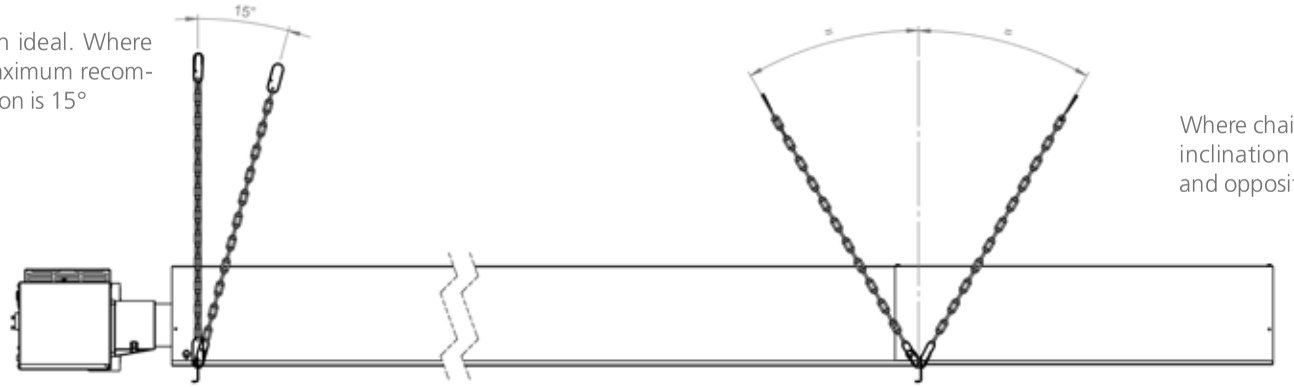



**Figure 3.**

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



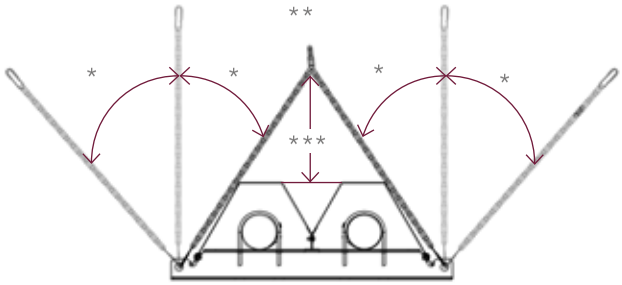

Where chain supports have an angle of inclination greater than 15° an equal and opposite support is recommended

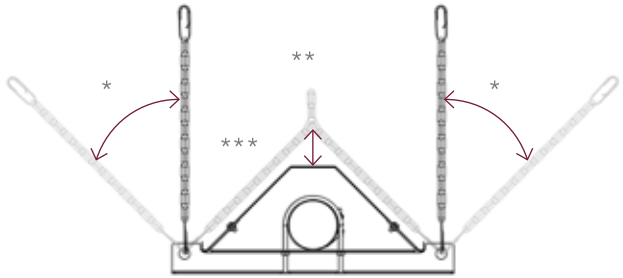
**Note:** On U-Tube variants the heater should slope downwards towards the return bend and on linear variants should slope downwards towards the burner by approximately 25mm. This distance is measured from one end of the radiant tube to the other and is applicable for both horizontal and wall mounted installations.

WARNING **The final connection to the heater suspension bracket MUST NOT be made with wire rope.**

Vertical or inclined suspension on this plane is acceptable for U-Tube and linear variants

**Alternative single point suspension method.



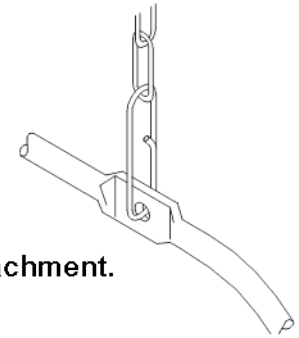




* These angles to be equal and not more than 45°

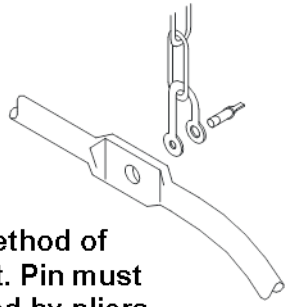
*** Minimum distances for U-Tube heaters:
370mm for 3"
480mm for 4"

*** Minimum distances for linear heaters:
50mm for 3"
100mm for 4"

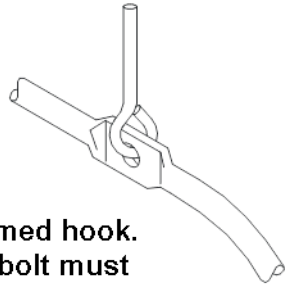
**Figure 4.** Recommended Methods of Heater Suspension



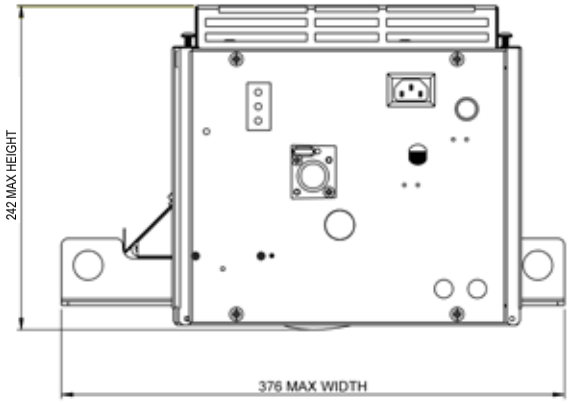
Typical Speedlink attachment.



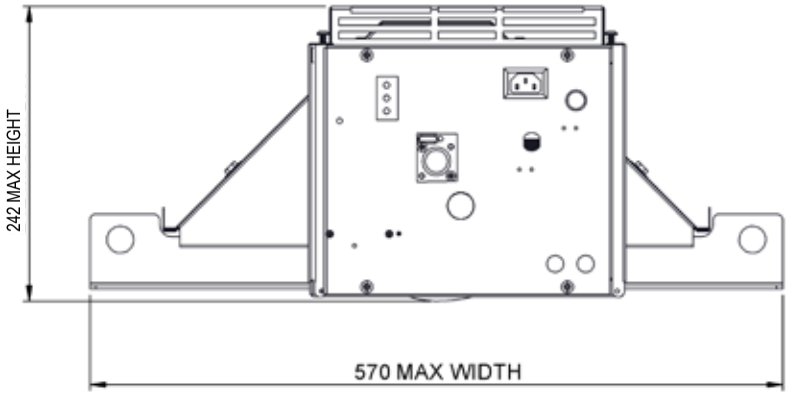
Shackle method of attachment. Pin must be tightened by pliers.



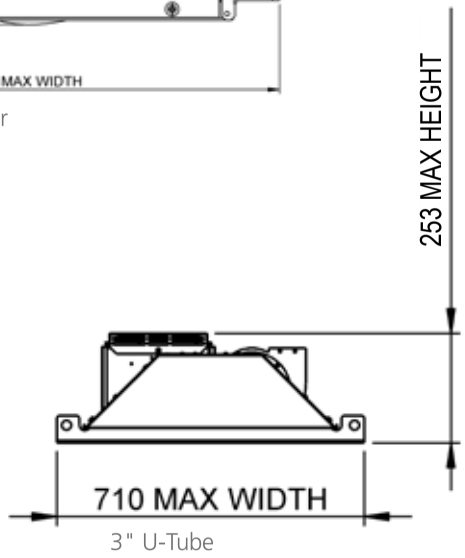
Drop rod with formed hook. note. hook or eyebolt must be closed tight.



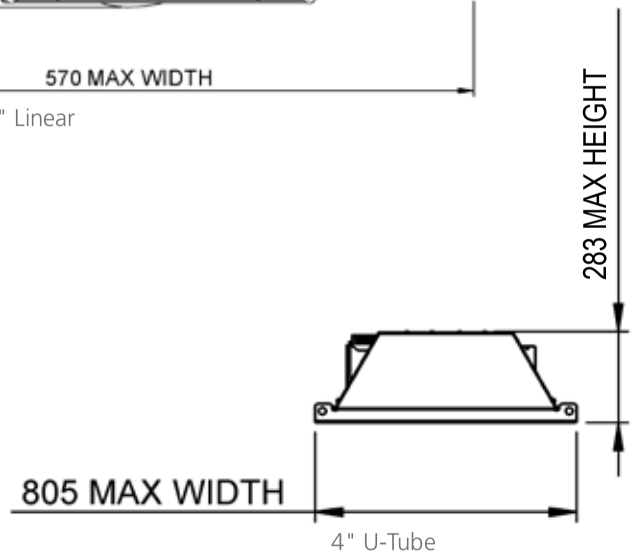

3" Linear




4" Linear




3" U-Tube




4" U-Tube

**Figure 5.** Recommended Methods of Heater Suspension Continued

## 1.7 Herringbone systems (UHE & LHE)

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 6 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.

The flexible couplers (it is supplied by the manufacturer) must be inserted within the manifold system to allow linear expansion to take place and prevent stress and strain on the system.

CAUTION **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 National Codes. A system damper assembly should be installed before the fan and after all heater tail pipe branches. A condensate trap assembly must be provided at the end of the manifold system before the hot gas vacuum fan. 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 is to be fitted with a flush flanged tank connector.

Any protrusion is to be removed leaving the inside flush with the end cap. 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. 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 Figure 6.2 and Figure 6.3 to the left.

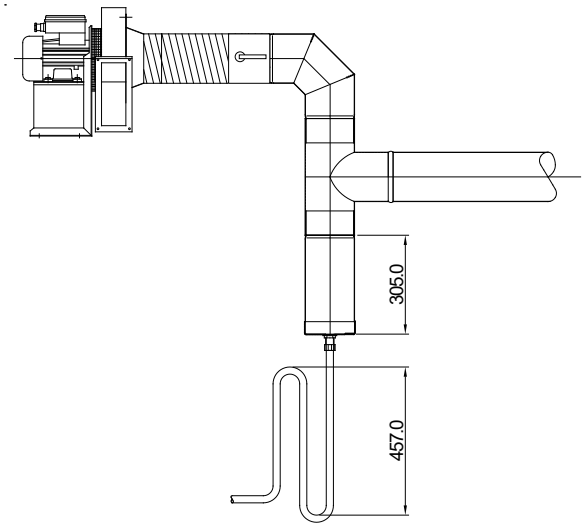



**Figure 6.** Condensate Trap Arrangement

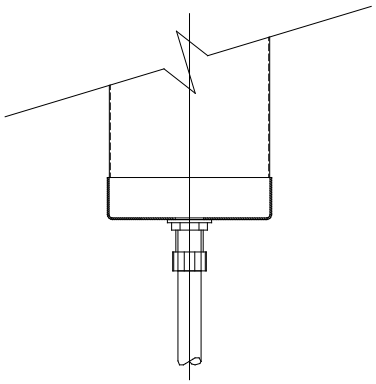


**Figure 6.1** Collecting Condensate Trap Arrangement

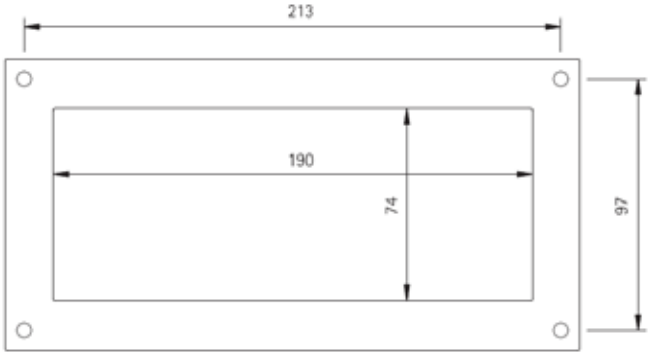



**Figure 6.2** Type 'O' Fan Outlet Dimensions

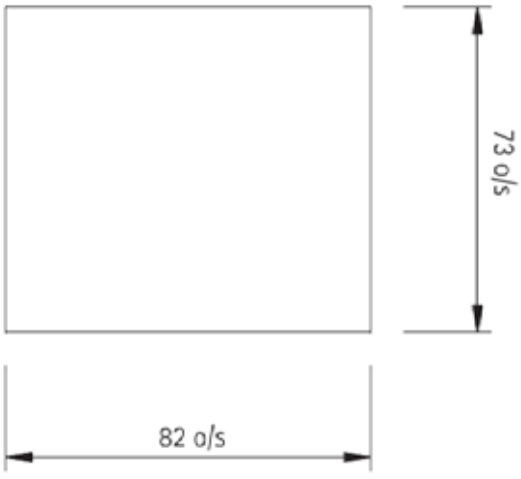



**Figure 6.3** Type 2 Fan Outlet Dimensions

Where a conventional flue is to be installed, the manufacturer can 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.

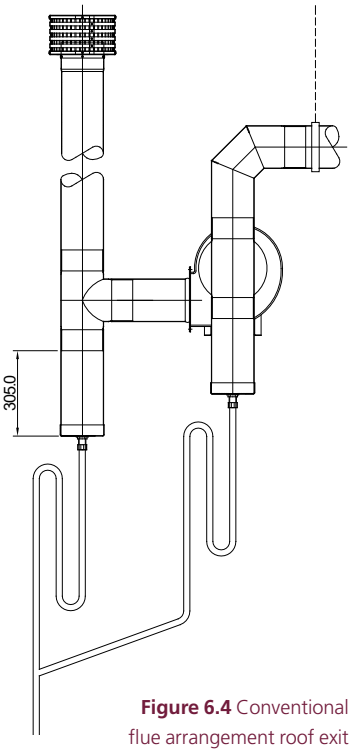



**Figure 6.4** Conventional flue arrangement roof exit

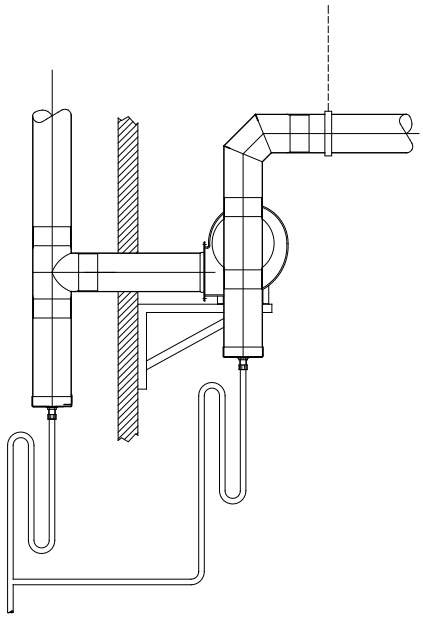


**Figure 6.5** Conventional flue arrangement wall exit

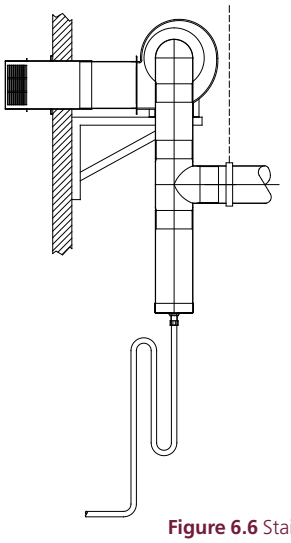


**Figure 6.6** Stainless steel telescopic through the wall arrangement (available for Type 'O' and Type '2' fans)

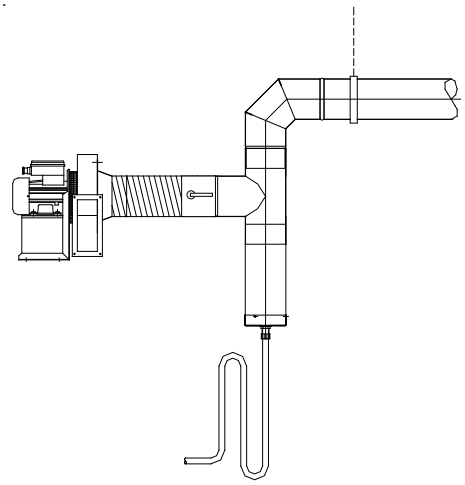


**Figure 6.7** Typical low fan arrangement

| 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 (W)** | 550 | 120 |
| **Voltage** | 230V 1ph | 230V 1ph |
| **Running (A)** | 2.6 | 0.8 |
| **Starting (A)** | 15.4 | 4.0 |

**Table 3 –** HB fan details

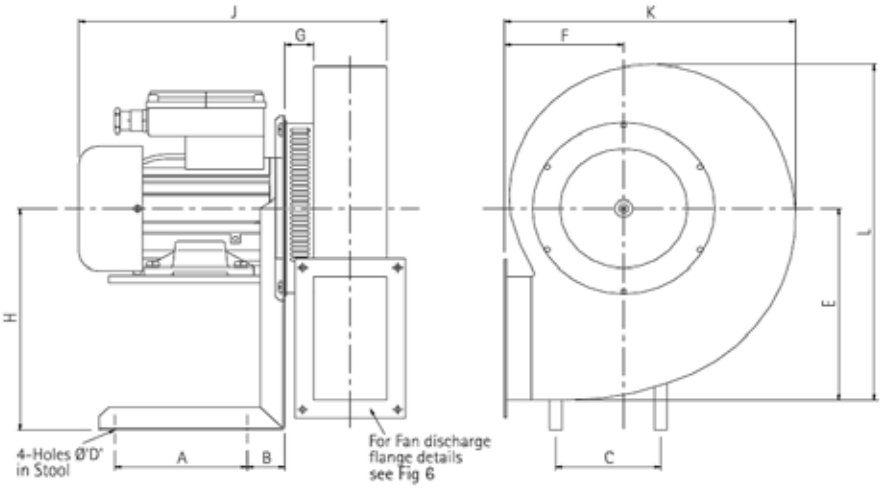



**Figure 7.** Vacuum fan mounting details (Type 'O' fan illustrated)

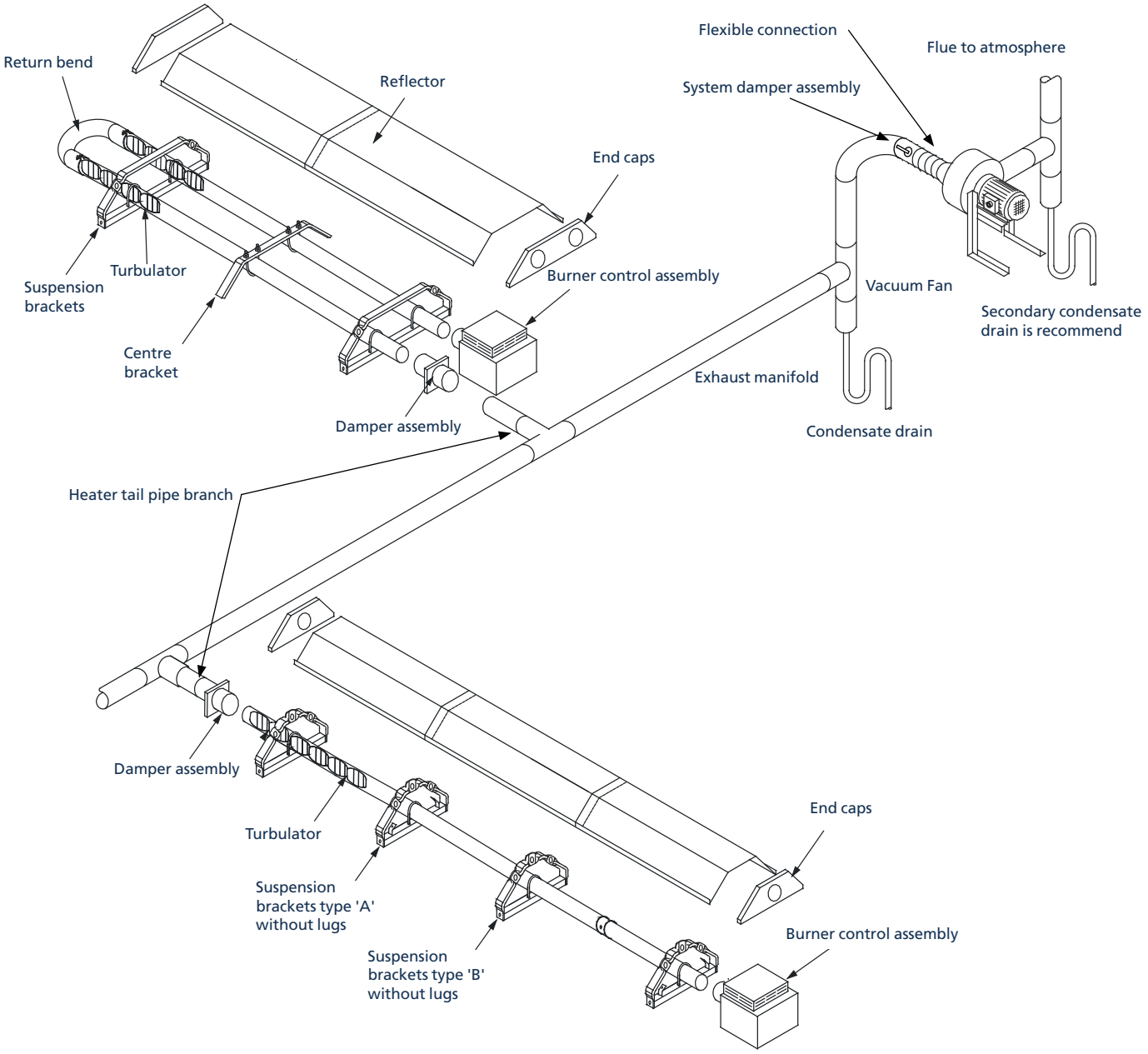



**Figure 8.** HB installation

## Dos

- Check design pressure drop.
- Check for corrosive industrial process in proposed building - e.g. cleaning, electroplating, printers using sugar powder etc.
- Drain all flue ducts and seal all joints.
- Secure joints with pop rivets as well as sealing compound (refer to assembly instructions).
- Fit drain traps before and after fans.
- Fit expansion joints before fan and at intermediate points on the herringbone system.
- Run drains in galvanised steel or plastic pipes.
- Follow guide to combined flue heating system.
- Fit system damper assembly before the fan and after all heater tail pipe branches.

## Don'ts

- Run drains in copper or mild steel pipework.
- Install system with extra 90° bends without asking the manufacturer if the system will operate correctly.
- Install flue with vertical rise without firstly fitting a drain point at it's lowest level.
- Fit fan with outlet vertical or with top horizontal discharge.
- Fit damper upside down or on it's side.
- Fit damper wrong way round. (See section 2.2.11.4 on page 32)
- Silicone seal tube to burner and/or damper assy.

## 1.8 Clearance to Combustibles

CAUTION

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

WARNING

**The stated clearance to combustibles represents a surface temperature of 50°C above room temperature. Building material with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.**

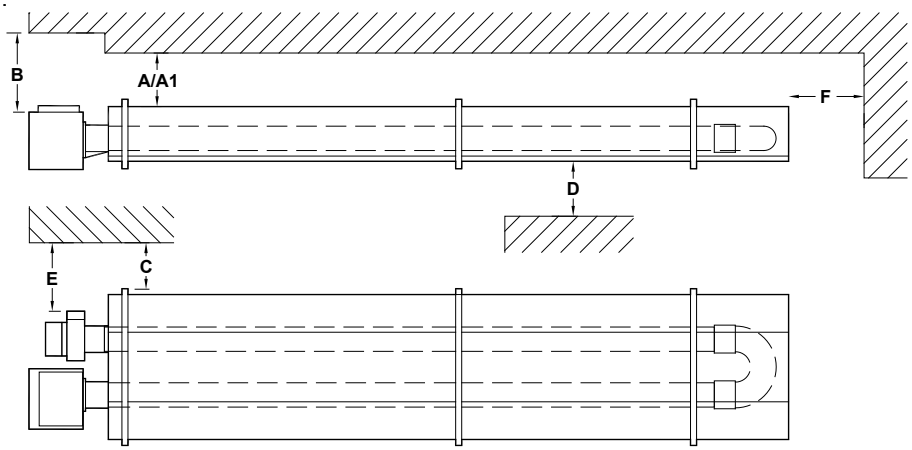



**Figure 9.** Diagram illustrating the clearance to combustibles (U Tube shown)

| VSUTE; VSUHE | | 15 | 20/25 | 30/35 | 40 | 45/50 |
|---|---|---|---|---|---|---|
| Above Reflector | A | 280 | 280 | 380 | 380 | 380 |
| Above Burner / Heater Outlet | B* | 500 | 500 | 500 | 500 | 500 |
| To the Sides | C | 420 | 510 | 620 | 800 | 800 |
| Below Tubes | D | 1500 | 2000 | 2100 | 2100 | 2100 |
| Horizontally from Heater Outlet (un-flued) | E | 1200 | 1200 | 1200 | 1200 | 1200 |
| End Wall | F | 100 | 100 | 100 | 100 | 100 |

**Table 4 –** Clearance to Combustibles U-Tube

B* Clearance distance shown allows for correct installation of vertical flue outlet. Where heater is un-flued, clearance distance is shown to prevent condensation and flue gas recirculation. See section 1.11.4 for flue clearance distances.

WARNING

**Minimum clearance from 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 the required clearance to combustibles. Such signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats in a conspicuous location. Refer to mounting clearance tables.**

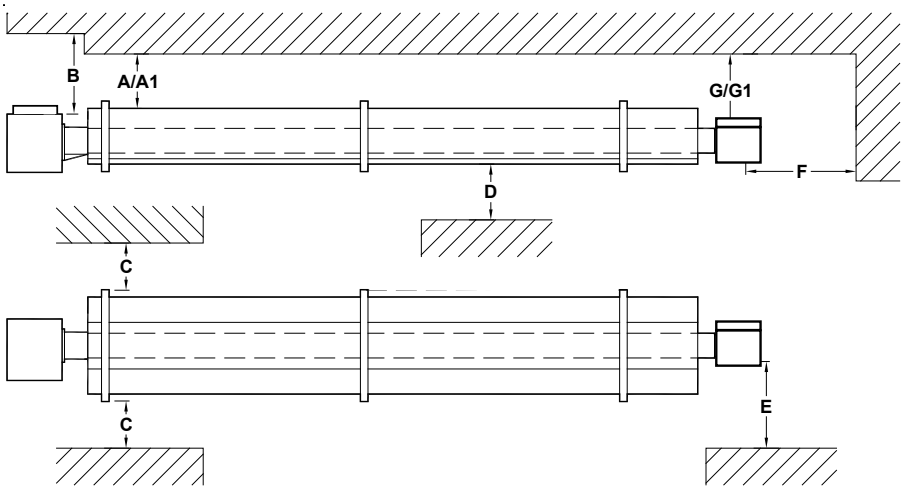



**Figure 10.** Diagram illustrating the clearance to combustibles (Linear shown)

| VSLIE, LSLHE, VSDLE | | 15/20 | 25 | 30/35/40 | 45/50 |
|---|---|---|---|---|---|
| Above Reflector | A | 280 | 280 | 280 | 280 |
| Above Burner | B* | 500 | 500 | 500 | 500 |
| To the Sides | C | 750 | 750 | 750 | 750 |
| Below Tubes | D | 1500 | 1700 | 2100 | 2100 |
| Horizontally from Heater Outlet (un-flued) | E | 1200 | 1200 | 1200 | 1200 |
| End Wall | F | 500 | 500 | 500 | 500 |
| Above Heater Outlet (Flued) | G | 150 | 150 | 150 | 150 |
| Above Heater Outlet (Un-flued) | G1 | 500 | 500 | 500 | 500 |

**Table 5 –** Clearance to Combustibles Linear

## 1.9 Gas Connection and Supply Details

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

A competent and/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 national standards 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.

CAUTION **The gas union service cock must be fitted in the gas supply close to the heater, but not onto the burner itself**

**Note:** 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.

**Note:** The installation layout described below must only be carried out by a qualified/competent gas engineer.

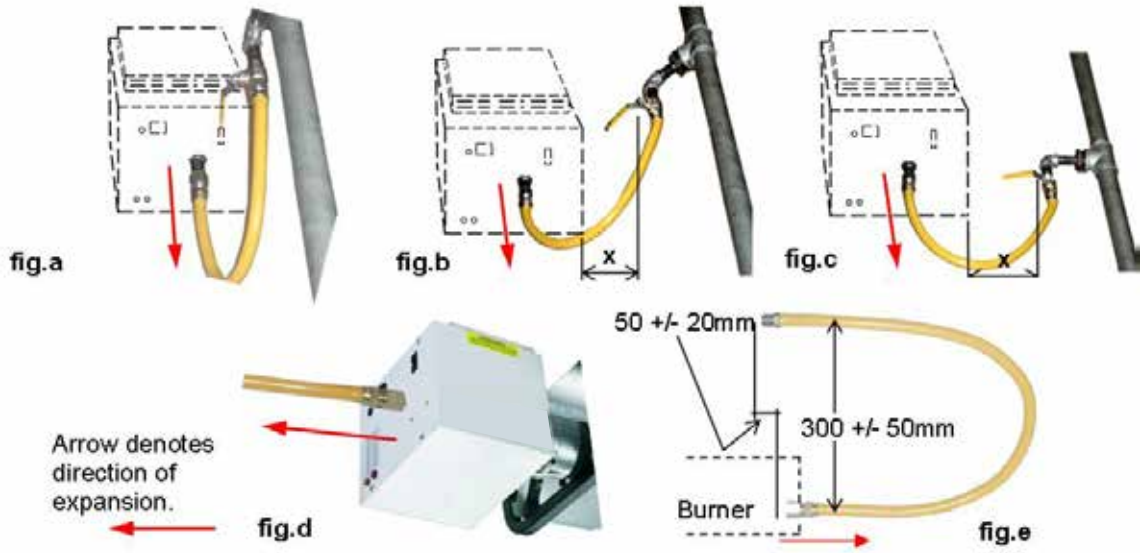



**Figure 11.** Correct Installation of Flexible Gas Connection

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 (Figure. a)
- 45° angle (Figure. b)
- 90° angle (Figure. 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 (Figure b & c)

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

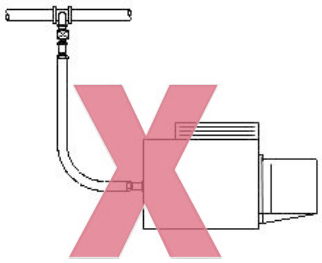


Figure 12.

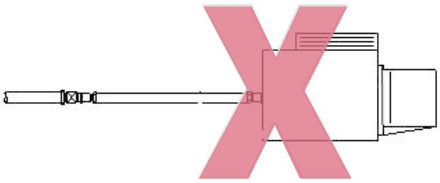


Figure 13.

The methods shown in the above figures are unacceptable, due to undue stress on the hose and fittings.

| Gas Category | Gas Type | Nominal Pressure (mbar) | Max Supply (mbar) | Min Supply Pressure (mbar) |
|---|---|---|---|---|
| **I3P (30)** | Propane Gas (G31) | 30 | 35 | 25 |
| **I3P (37)** | Propane Gas (G31) | 37 | 45 | 25 |
| **I3P (50)** | Propane Gas (G31) | 50 | 57.5 | 42.5 |

**Table 6 –** Gas supply pressures

## 1.10 Electrical Connection

This appliance must be earthed.

- Supply 230V 50Hz single phase.
- Standard heater 116W.
- Each burner only for herringbone and double linear heaters 32W.
- Current rating 0.55 amp max (inductive).
- Fuse: external 3 amp

All electrical work should be carried out to National Standards and local regulations 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 0.5mm$^2$ and comply with National Standards. 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 the Nortek Global HVAC (UK) Ltd approved controls. Please refer to the control manual for citing and installation details. Where alternative manufactures controls are used, please refer to their instructions for their citing and installation details.

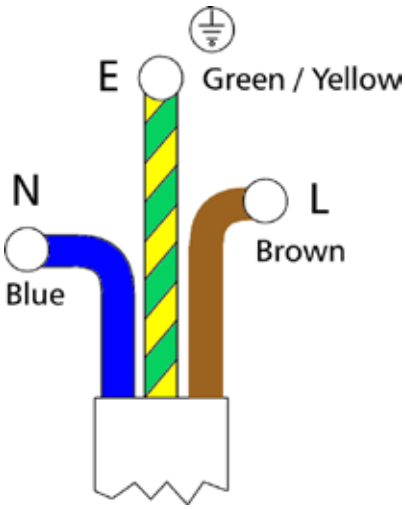



**Figure 14.** Single phase wiring

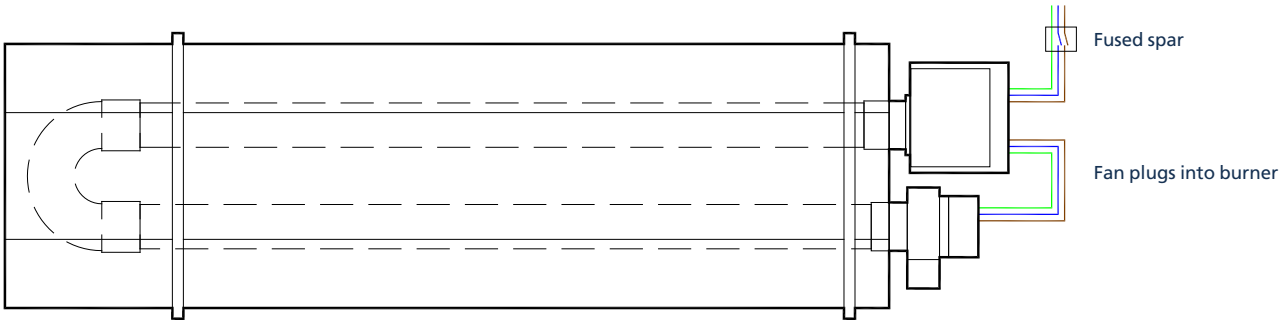



**Figure 15.** Typical VSUTE Wiring connections

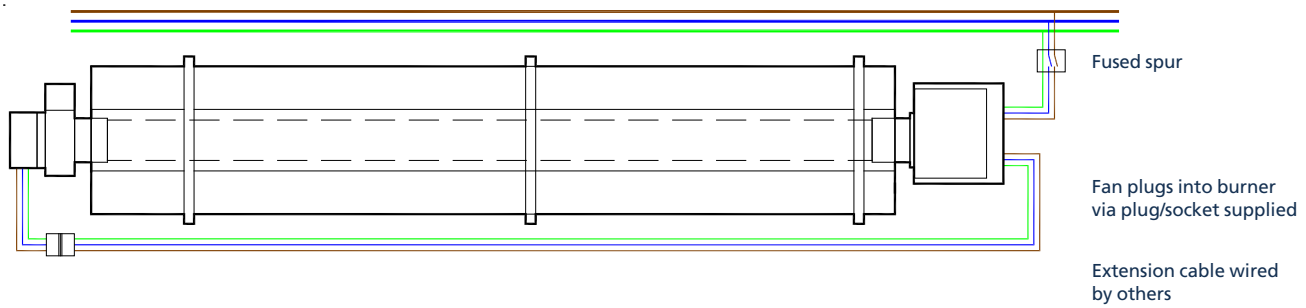



**Figure 15.1** Typical VSLE Wiring connections

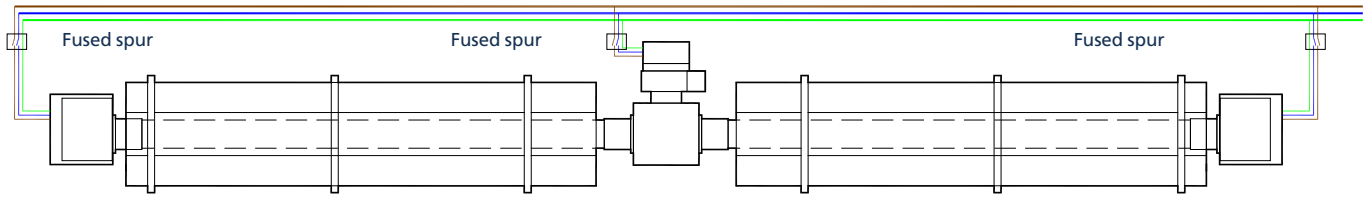



**Figure 15.2** Typical Unitary VSLDE Wiring connections

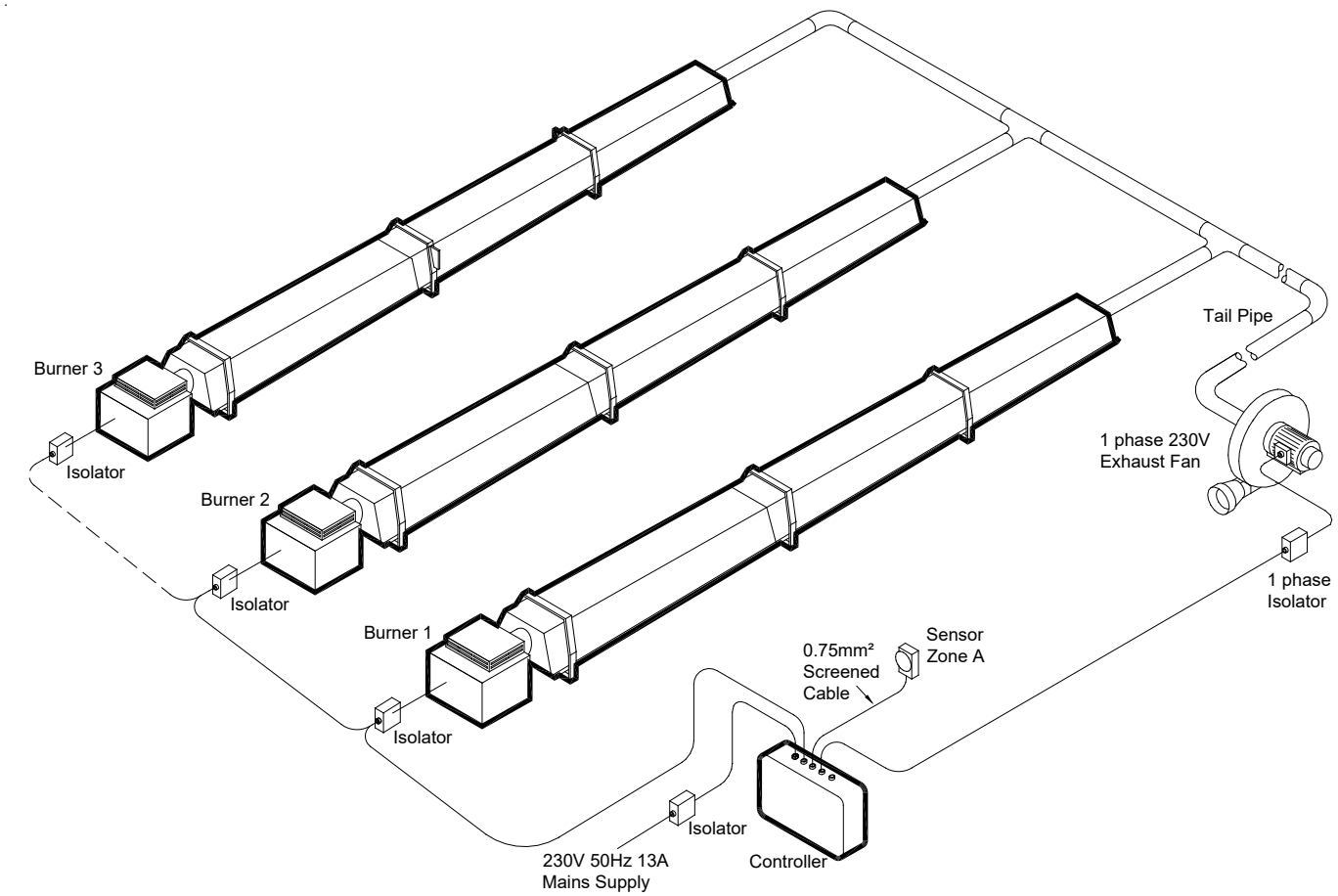



**Figure 16.** Typical Unitary VSLHE Wiring connections

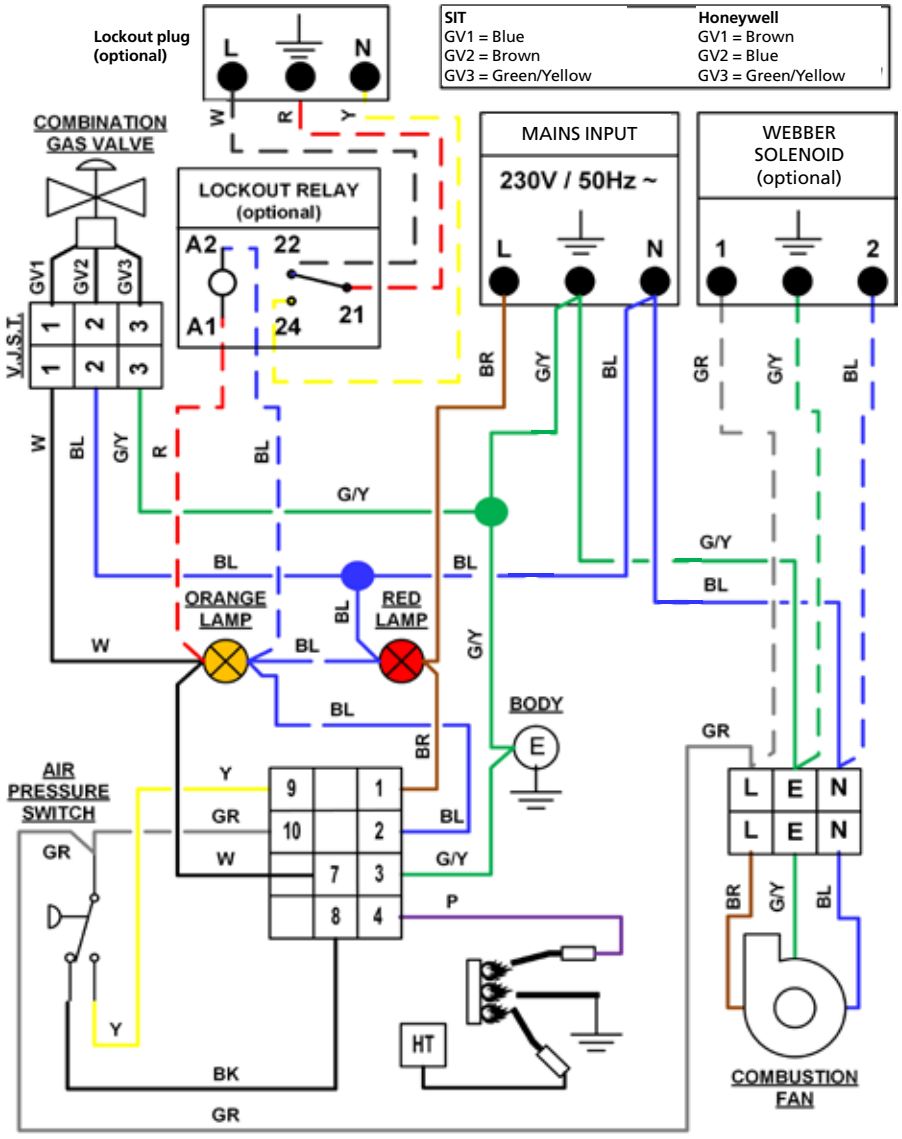



**Figure 17.** VS Internal Burner Wiring Diagram

## 1.11 Ventilation Requirements

Vision tube heaters can be operated as flued or un-flued appliances (not for 50kW models) in accordance with the relevant national requirements in the country of the installation.

### 1.11.1 Un-flued Radiant Heater (not for 50kW models)

Radiant tube heaters can be operated as un-flued appliances, so that concentration of Carbon Dioxide (CO2) at positions where the air will be inhaled does not exceed 0.28%. 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/m$^3$, 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 un-flued (see section 1.8 on page 12).

It should be ensured that the combustion gases do not impinge on any combustible materials.

#### Mechanical Ventilation

Mechanical ventilation must be rated at the minimum 10m$^3$/h per kW input using approx. sized fans and interlocked with heaters.

#### Natural Ventilation

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 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 17.36cm$^2$/kW free area.

### 1.11.2 Flued Radiant Heater

In buildings having an air change rate of less than 0.5 per hour, additional mechanical or natural ventilation will be required. For detailed information, refer to local or National Standards.

#### 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 2cm$^2$/kW shall be provided.

**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 in Figure 18 to Figure 20:

- Option 1 - For induced burner with / without flue and / or optional ducted air inlet refer to Figure 18.
- Option 2 - For induced DLE burner with / without flue and ducted air inlet refer to Figure 19.
- Option 3 - For herringbone heaters refer to Figure 20 on page 20 & section 1.7 on page 9 Herringbone Systems (UHE/LHE).

**1.11.3 Important Information**

**Option 1 and 2**

A suitable flue system that complies 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 can be terminated in a vertical or horizontal position and in accordance with local regulations, national standards and the flue system manufacturers instructions as supplied with the flue.

**Option 3**

The tailpipe as supplied by the manufacturer are 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 local regulations, national standards and the flue system manufacturers instructions as supplied with the flue.

**1.11.4 Flue Installation**

The 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 roof-line 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 (Products Of Combustion Evacuation Ducts) is capable of withstanding its own weight when installed in accordance with these instructions and the Regulations shown below.

The exhaust flue should be self supporting from the building structure and installed in accordance with the national codes and the flue system manufacturers instructions as supplied with the flue. Condensate drain pipes must be protected against the effects of freezing.

**1.11.5 Condensation Considerations**

When designing the flue system, 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 becomes 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.

**1.11.6 Flue / Tailpipe Connections**

**Option 1 and 2**

All the 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.

**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. 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.

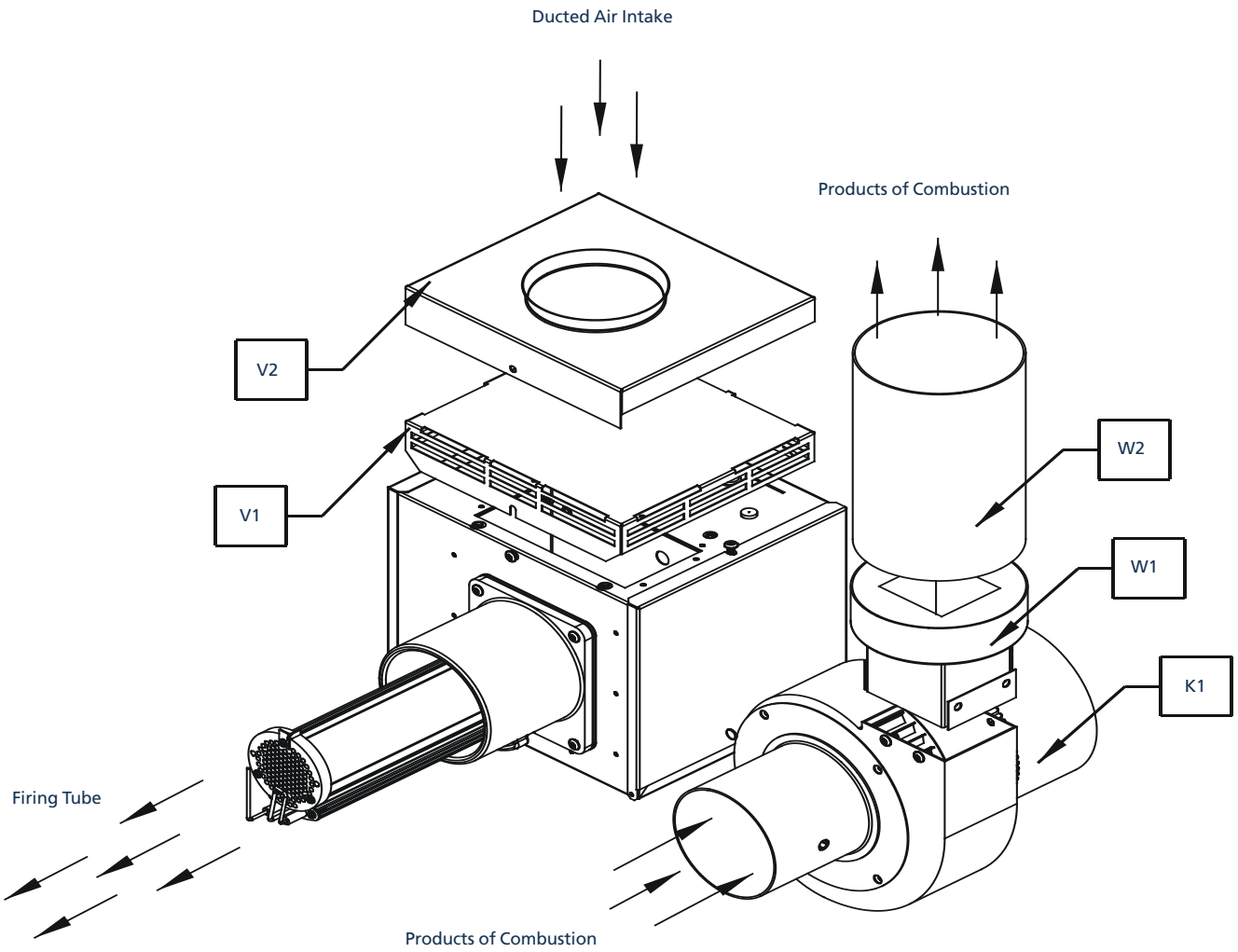



**Figure 18.** Option 1. Flue Attachment Induced Burners (VSUTE)

| | |
|---|---|
| **K1** | Fan 2501-DE/2507-DE or 2560 |
| **V1** | Std air Intake (supplied as standard) |
| **V2** | Optional Ducted Air Intake VSI-DA |
| **W1** | Fan Adaptor 7177-SUB (2501-DE/2507-DE fan) or 7176-SUB (2560 fan) |
| **W2** | 127mm (5") Twin Wall Flue System |

For non-flued installations (not 50kW models), delete items W1 and W2 and rotate fan outlet to the horizontal position away from the burner.

For further information on flue runs, please refer to Section 1.12 and National Standards.

Flues can be terminated vertically or horizontally.

- Maximum flue run = 9.5m @ Ø125mm
- Maximum no of bends = 2

CAUTION

**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

**Note:** Ventilation requirements are as detailed in Section 1.11

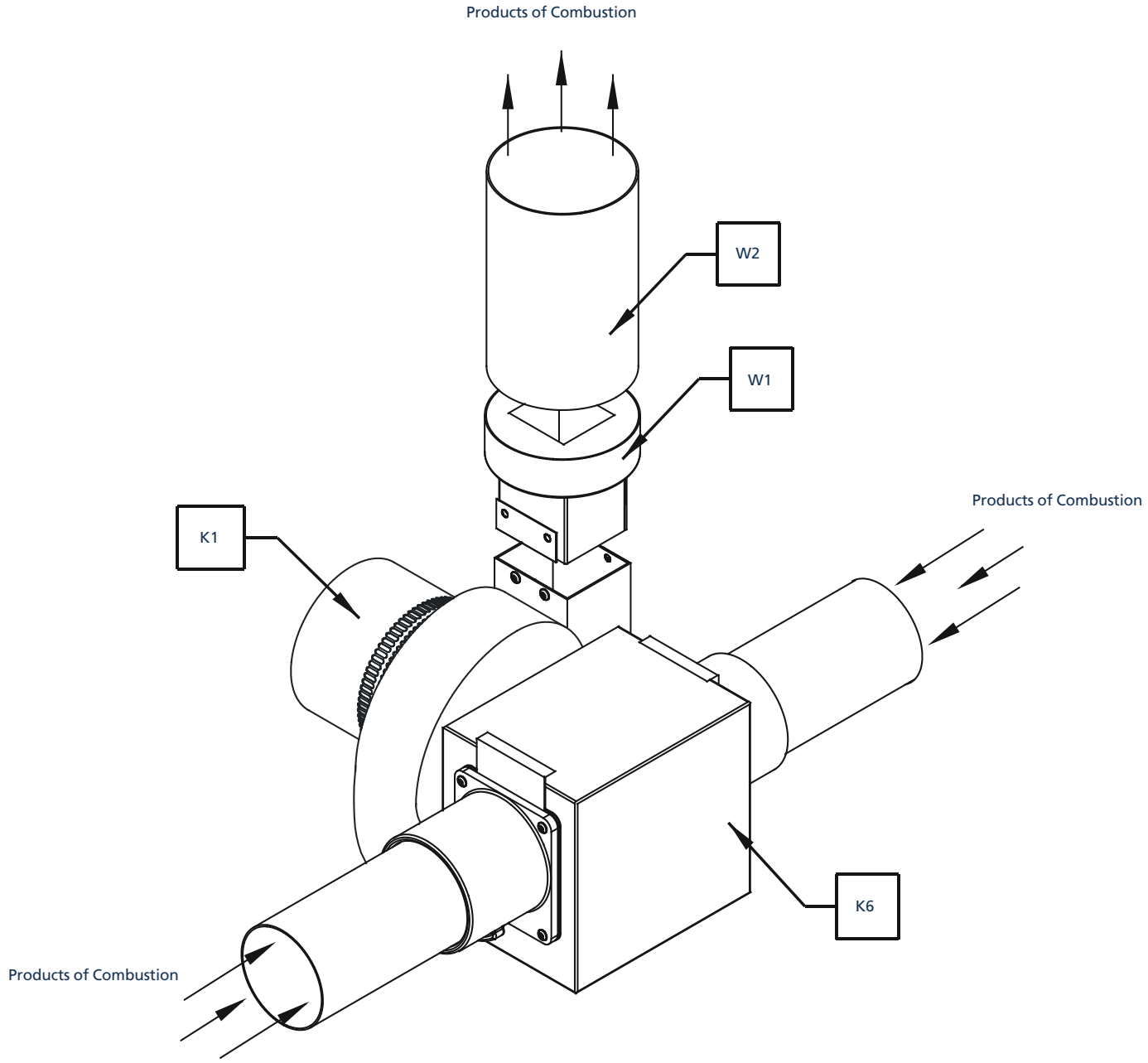



**Figure 19.** Option 2. Flue Attachment Induced Burners (VSDLE)

| | |
|---|---|
| **K1** | Fan 2560 (VS15-40) or 202343 (VS45-50) |
| **K6** | Condensate Box CBHBxx-T2 (VS15-40) or 202277-SUB (VS45-50) |
| **W1** | Fan Adaptor 7176-SUB (VS15-40) or 202365 (VS45-50) |
| **W2** | 127mm (5") Twin Wall Flue System |

*xx denotes tube diameter. 22=76mm 3"; 38=100mm 4"

Flues can be terminated either vertically or horizontally.

For further information on flue runs, please refer to Section 1.12 and National Standards. Maximum flue run = 9.5m @ Ø125mm

- Maximum no. of bends = 2

CAUTION

**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

**Note:** Ventilation requirements are as detailed in Section 1.11

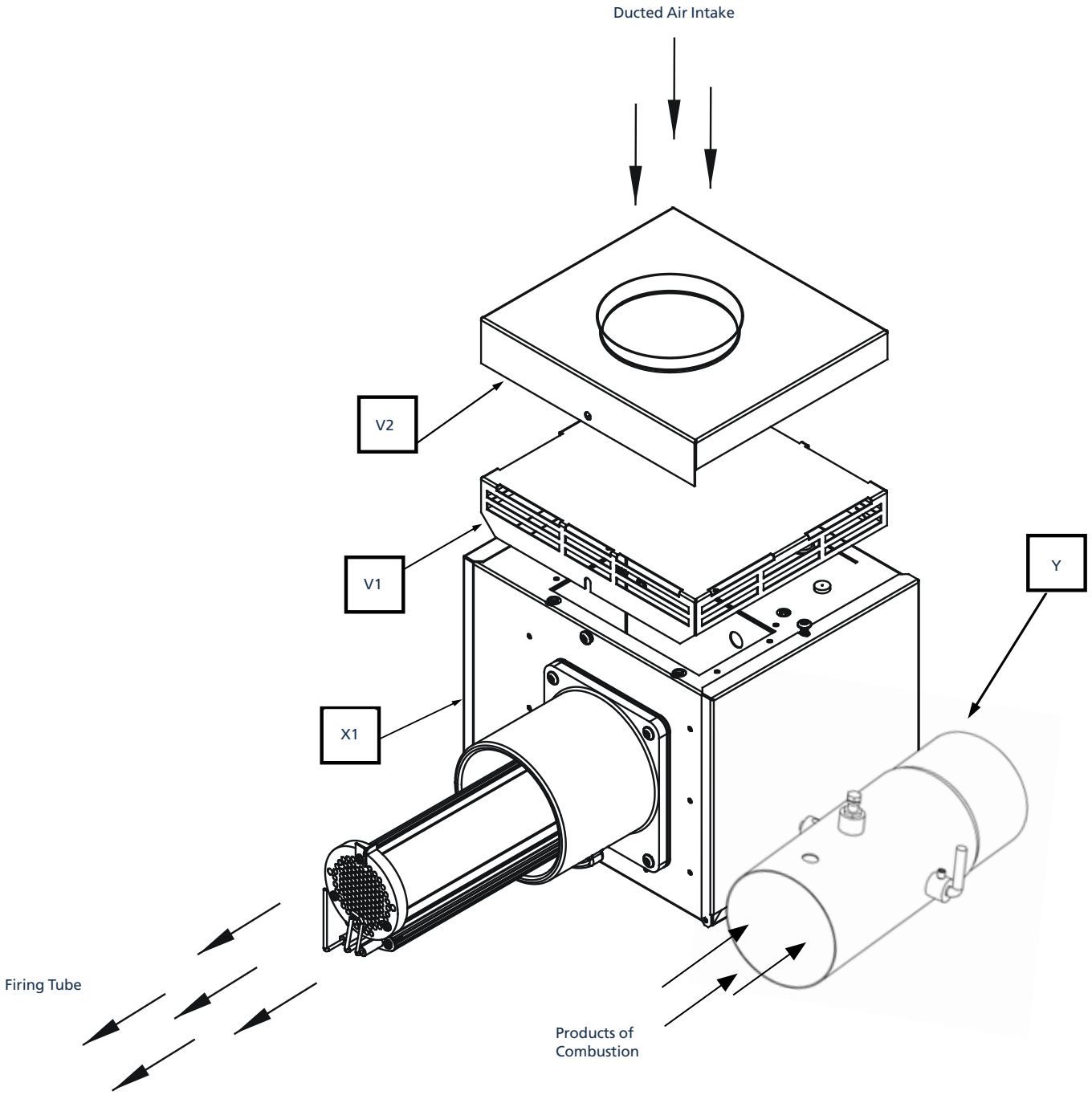



**Figure 20.** Option 3. Flue Attachment Induced Burners (VSLHE)

| | |
|---|---|
| **V1** | Air intake (supplies as standard) |
| **V2** | Optional ducted air intake VSI-DA |
| **X1** | Induced burner |
| **Y** | Damper Assembly 1001668 (VS15-25), 1001667 (VS30-50) |
| | Damper Tube Coupler 201813 (VS15-25), C112110-1 (VS30-50) omitted for clarity |

CAUTION

**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

**Note:** Ventilation requirements are as detailed in Section 1.11

## 1.12 Technical details

| Country | Approved Gas Category |
|---|---|
| CZ, DK, HU, MT, NL, RO | I3P (30) |
| BE, CH, CZ, ES, FR, GB, GR, HR, IE, IT, LU, PL, PT, SI, SK, TR | I3P (37) |
| AT, BE, CH, CZ, DE, ES, FR, GB, GR, HU, NL, SK | I3P (50) |
| Number of Injectors | 1 |
| Gas Connection | ½ in BSP Internal Thread |
| Flue Nominal Bore mm (in) | 125 (5) |
| Fan Motor Voltage | 230V 1ph 50Hz |
| Flue Categories | A2, B22, B52 |

**Table 7 –** Propane Gas (G31)

| Heater Model | Heat Input kW Gross | Heat Input kW Nett | G31 Gas Flow-rate (l/hr) | G31 Injector Pressure (mbar) | Injector Size (mm) | Size (h x l x w) | Weight (Kg) | Fan Rating (A) | Fan Type |
|---|---|---|---|---|---|---|---|---|---|
| **VS15UTE** | 15.0 | 13.9 | 2.09 | 12.5 | 1.0 | 253x4542x710 | 61 | 0.5 | 2501-DE |
| **VS20UTE** | 19.5 | 18.1 | 2.7 | 12.0 | 1.2 | 253x5168x710 | 68 | 1.0 | 2507-DE |
| **VS25UTE** | 23.5 | 21.8 | 3.3 | 10.8 | 1.3 | 253x5168x710 | 68 | 1.0 | 2507-DE |
| **VS30UTE** | 32.0 | 29.6 | 4.5 | 22.0 | 1.3 | 283x7644x805 | 135 | 1.0 | 2507-DE |
| **VS35UTE** | 36.0 | 33.3 | 5.0 | 20.5 | 1.4 | 283x7644x805 | 135 | 1.0 | 2560 |
| **VS40UTE** | 40.0 | 37.0 | 5.6 | 19.5 | 1.5 | 283x8512x805 | 146 | 0.5 | 2560 |
| **VS45UTE** | 44.0 | 40.7 | 6.1 | 14.9 | 1.7 | 283x9304x805 | 161 | 0.5 | 202126 |
| **VS50UTE** | 48.0 | 44.4 | 6.7 | 14.9 | 1.8 | 283x9304x805 | 161 | 0.5 | 202126 |
| **VS15LIE8** | 15.0 | 13.9 | 2.09 | 12.5 | 1.0 | 242x7983x376 | 58 | 0.5 | 2501-DE |
| **VS20LIE10-5** | 19.5 | 18.1 | 2.7 | 12.0 | 1.2 | 242x10579x376 | 79 | 1.0 | 2507-DE |
| **VS25LIE8** | 23.5 | 21.8 | 3.3 | 10.8 | 1.3 | 242x7983x376 | 58 | 1.0 | 2507-DE |
| **VS25LIE10-5** | 23.5 | 21.8 | 3.3 | 10.8 | 1.3 | 242x10579x376 | 79 | 1.0 | 2507-DE |
| **VS30LIE10-5** | 32.0 | 29.6 | 4.5 | 22.0 | 1.3 | 242x10892x570 | 110 | 0.5 | 2560 |
| **VS30LIE13-5** | 32.0 | 29.6 | 4.5 | 22.0 | 1.3 | 242x13510x570 | 136 | 1.0 | 2507-DE |
| **VS35LIE10-5** | 36.0 | 33.3 | 5.0 | 20.5 | 1.4 | 242x10892x570 | 110 | 0.5 | 2560 |
| **VS35LIE13-5** | 36.0 | 33.3 | 5.0 | 20.5 | 1.4 | 242x13510x570 | 136 | 0.5 | 2560 |
| **VS35LIE16** | 36.0 | 33.3 | 5.0 | 20.5 | 1.4 | 242x16117x570 | 159 | 0.5 | 2560 |
| **VS40LIE13-5** | 40.0 | 37.0 | 5.6 | 19.5 | 1.5 | 242x13510x570 | 146 | 0.5 | 2560 |
| **VS40LIE16** | 40.0 | 37.0 | 5.6 | 19.5 | 1.5 | 242x16117x570 | 159 | 0.5 | 2560 |
| **VS45LIE13-5** | 44.0 | 40.7 | 6.1 | 14.9 | 1.7 | 242x13510x570 | 136 | 0.5 | 2560 |
| **VS45LIE16** | 44.0 | 40.7 | 6.1 | 14.9 | 1.7 | 242x16117x570 | 158 | 0.5 | 2560 |
| **VS50LIE13-5** | 48.0 | 44.4 | 6.7 | 14.9 | 1.8 | 242x13510x570 | 136 | 0.5 | 2560 |
| **VS50LIE16** | 48.0 | 44.4 | 6.7 | 14.9 | 1.8 | 242x16117x570 | 159 | 0.5 | 2560 |

**Table 7.1 –** Propane Gas (G31)

| Heater Model | Heat Input kW Gross | Heat Input kW Nett | G31 Gas Flow-rate (l/hr) | G31 Injector Pressure (mbar) | Injector Size (mm) | Size (h x l x w) | Weight (Kg) |
|---|---|---|---|---|---|---|---|
| **VS15UHE** | 15.0 | 13.9 | 2.09 | 12.5 | 1.3 | 253x4542x710 | 60 |
| **VS20UHE** | 19.5 | 18.1 | 2.7 | 12.0 | 1.5 | 253x5168x710 | 67 |
| **VS25UHE** | 23.5 | 21.8 | 3.3 | 10.8 | 1.8 | 253x5168x710 | 67 |
| **VS30UHE** | 32.0 | 29.6 | 4.5 | 22.0 | 2.0 | 283x7644x805 | 132 |
| **VS35UHE** | 36.0 | 33.3 | 5.0 | 20.5 | 2.3 | 283x7644x805 | 132 |
| **VS40UHE** | 40.0 | 37.0 | 5.6 | 19.5 | 2.7 | 283x8512x805 | 145 |
| **VS45UHE** | 44.0 | 40.7 | 6.1 | 14.9 | 2.9 | 283x9304x805 | 160 |
| **VS50UHE** | 48.0 | 44.4 | 6.7 | 14.9 | 2.5 L | 283x9304x805 | 160 |
| **VS15LHE8** | 15.0 | 13.9 | 2.09 | 12.5 | 1.3 | 242x7945x376 | 57 |
| **VS20LHE10-5** | 19.5 | 18.1 | 2.7 | 12.0 | 1.5 | 242x10541x376 | 78 |
| **VS25LHE8** | 23.5 | 21.8 | 3.3 | 10.8 | 1.8 | 242x7945x376 | 57 |
| **VS25LHE10-5** | 23.5 | 21.8 | 3.3 | 10.8 | 1.8 | 242x7945x376 | 78 |
| **VS30LHE10-5** | 32.0 | 29.6 | 4.5 | 22.0 | 2.0 | 242x10903x570 | 110 |
| **VS30LHE13-5** | 32.0 | 29.6 | 4.5 | 22.0 | 2.0 | 242x13521x570 | 135 |
| **VS35LHE10-5** | 36.0 | 33.3 | 5.0 | 20.5 | 2.3 | 242x10903x570 | 110 |
| **VS35LHE13-5** | 36.0 | 33.3 | 5.0 | 20.5 | 2.3 | 242x13521x570 | 135 |
| **VS35LHE16** | 36.0 | 33.3 | 5.0 | 20.5 | 2.3 | 242x16128x570 | 157 |
| **VS40LHE13-5** | 40.0 | 37.0 | 5.6 | 19.5 | 2.7 | 242x13521x570 | 134 |
| **VS40LHE16** | 40.0 | 37.0 | 5.6 | 19.5 | 2.7 | 242x16128x570 | 157 |
| **VS45LHE13-5** | 44.0 | 40.7 | 6.1 | 14.9 | 2.9 | 242x13521x570 | 134 |
| **VS45LHE16** | 44.0 | 40.7 | 6.1 | 14.9 | 2.9 | 242x16128x570 | 157 |
| **VS50LHE13-5** | 48.0 | 44.4 | 6.7 | 14.9 | 2.5 L | 242x13521x570 | 134 |
| **VS50LHE16** | 48.0 | 44.4 | 6.7 | 14.9 | 2.5 L | 242x16128x570 | 157 |

**Table 7.2 –** Propane Gas (G31)

| Heater Model | Mass Flow Rate of Flue Gases (kg/s) | Flue Pressure (Pa) Maximum Flue Resistance | Flue Gas Temp (°C) | %CO2/CO ppm |
|---|---|---|---|---|
| **VS15UTE** | 0.0112 | 1.0 | 177 | 6.1/<50 |
| **VS20UTE** | 0.0169 | -5.0 | 188 | 5.6/<50 |
| **VS25UTE** | 0.0116 | -3.0 | 214 | 7.6/<50 |
| **VS30UTE** | 0.0173 | -4.0 | 150 | 7.3/<50 |
| **VS35UTE** | 0.0156 | 4.0 | 159 | 8.1/<50 |
| **VS40UTE** | 0.0210 | -3.0 | 151 | 7.4/<50 |
| **VS45UTE** | 0.0179 | -3.0 | 168 | 8.3/<50 |
| **VS50UTE** | 0.0150 | -3.0 | 175 | 9.2/<50 |
| **VS15LIE8** | 0.0116 | 1.0 | 183 | 6.1/<50 |
| **VS20LIE10-5** | 0.0157 | -3.0 | 195 | 5.9/<50 |
| **VS25LIE8** | 0.0114 | -2.0 | 246 | 7.8/<50 |
| **VS25LIE10-5** | 0.0102 | -2.0 | 197 | 8.1/<50 |
| **VS30LIE10-5** | 0.0193 | -1.0 | 210 | 6.9/<50 |
| **VS30LIE13-5** | 0.0219 | 1.0 | 153 | 6.5/<50 |
| **VS35LIE10-5** | 0.0190 | 2.0 | 211 | 7.4/<50 |
| **VS35LIE13-5** | 0.0190 | 3.0 | 181 | 7.4/<50 |
| **VS35LIE16** | 0.0217 | 2.0 | 133 | 6.9/<50 |
| **VS40LIE13-5** | 0.0197 | 2.0 | 218 | 7.6/<50 |
| **VS40LIE16** | 0.0212 | 3.0 | 150 | 7.4/<50 |
| **VS45LIE13-5** | 0.0181 | 4.0 | 210 | 8.2/<50 |
| **VS45LIE16** | 0.0201 | 4.0 | 159 | 7.8/<50 |
| **VS50LIE13-5** | 0.0194 | 4.0 | 227 | 8.4/<50 |
| **VS50LIE16** | 0.0187 | 4.0 | 174 | 8.5/<50 |

**Note:** Combustion values are typical data obtained under laboratory conditions and provided for guidance purposes only, which are subject to fluctuation due to variations in gas quality and manufacturing tolerances.

**Table 8 –** Flue details

| Fan type | | 'Type O' | 'Type 2' | 202343 |
|---|---|---|---|---|
| Heater format | | VSHB | VS15-40DLE/VSHB | VS45-50DLE |
| Power | (W) | 370 | 120 | 120 |
| Running current (overload setting) | (A) | 2.6 | 0.8 | 0.9 |
| Starting current | (A) | 15.4 | 4.0 | 2.5 |
| Phase | | | Single | |
| Voltage | (V) | 230 | 230 | 230 |

**Table 10 –** Herringbone & DL Vacuum Fan Characteristics

**Note:** The cold herringbone pressure is for guidance purposes only. The system damper should be used to set the cold vacuum (within 0.5 mbar of the stated value) at the heater damper furthest from the fan. Fine tuning of the heater damper will be necessary to achieve the correct hot herringbone pressure.

See Section 3.2 Balancing the Herringbone System and Section 3.3 Balancing a DLE System for more details.

| Models | ON (Pa) | OFF (Pa) |
|---|---|---|
| All models | 75+/-5 | 55+/-5 |

**Table 11 –** Air Pressure Switch Settings

| Model | Cold HB Pressure (mbar) | Hot HB Pressure (mbar) |
|---|---|---|
| VS15UHE | 2.3 | 1.7 |
| VS20UHE | 3.1 | 2.0 |
| VS25UHE | 3.0 | 2.0 |
| VS30UHE | 2.5 | 2.0 |
| VS35UHE | 2.9 | 2.2 |
| VS40UHE | 3.7 | 2.6 |
| VS45UHE | 3.9 | 2.9 |
| VS50UHE | 3.9 | 2.9 |
| VS15LHE8/DLE16 | 2.6 | 1.8 |
| VS20LHE10-5/DLE21 | 2.7 | 1.7 |
| VS25LHE8/DLE16 | 3.0 | 1.7 |
| VS25LHE10-5/DLE21 | 2.7 | 1.9 |
| VS30LHE10-5/DLE21 | 3.1 | 1.9 |
| VS30LHE13-5/DLE27 | 2.8 | 1.9 |
| VS35LHE10-5/DLE21 | 3.2 | 2.0 |
| VS35LHE13-5/DLE27 | 3.0 | 1.9 |
| VS35LHE16/DLE32 | 2.9 | 2.1 |
| VS40LHE13-5/DLE27 | 3.0 | 1.9 |
| VS40LHE16/DLE32 | 3.5 | 2.4 |
| VS45LHE13-5/DLE27 | 3.7 | 2.4 |
| VS45LHE16/DLE32 | 3.7 | 2.7 |
| VS50LHE13-5/DLE27 | 3.6 | 2.1 |
| VS50LHE16/DLE32 | 3.4 | 2.5 |

**Table 12 –** Herringbone & DLE Cold HB Pressure Settings

# 2. Assembly instructions

**Important:** 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 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.

| VS U-Tube Assembly | | VS U-Tube Model Numbers | | | | |
|---|---|---|---|---|---|---|
| Step | Operation | 15 | 20 & 25 | 30 & 35 | 40 | 45 & 50 |
| 1 | Tubes | Section 2.2.1 | | | | |
| 2 | Turbulator(s) | Section 2.2.2 | | N/A | Section 2.2.2 | |
| 3 | Connecting Tubes | N/A | | Section 2.2.3 | | |
| 4 | Turbulator(s) | N/A | | Section 2.2.2 | N/A | |
| 5 | Brackets | Section 2.2.3.1 | | | | |
| 6 | U-Bend | Section 2.2.4 | | | | |
| 7 | Reflectors | Section 2.2.5.1, 2.2.5.3, 2.2.5.4 and 2.2.5.6 | | Section 2.2.5.1, 2.2.5.2, 2.2.5.3, 2.2.5.4 and 2.2.5.6 | | |
| 8 | End Caps | Section 2.2.6 and 2.2.7 | | | | |
| 9 | Burner Assembly | Section 2.2.9 | | | | |
| 10 | Fan Assembly | Section 2.2.10.1 | | | | |
| 11 | Herringbone Damper Assembly | Section 2.2.10.4 | | | | |

**Table 9 –** U-Tube assembly procedure

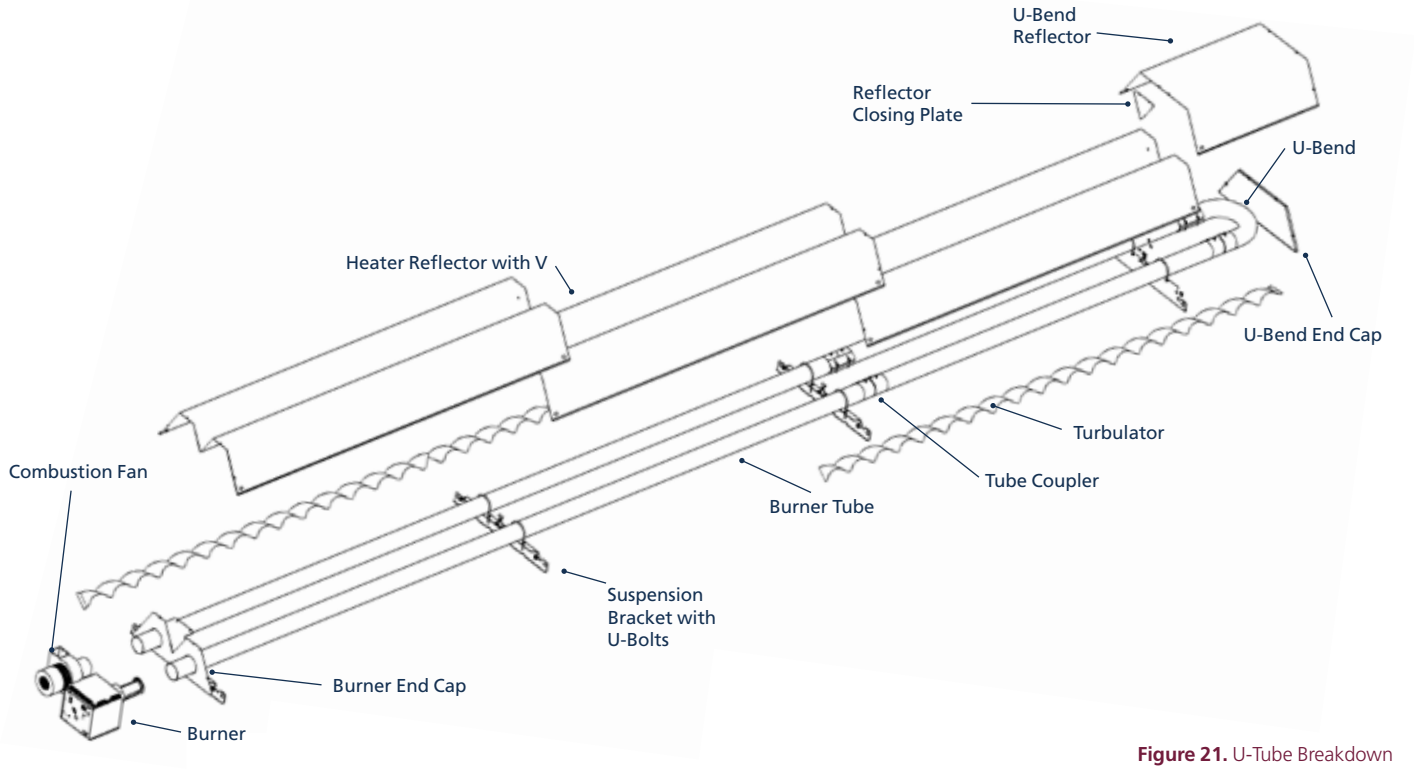



**Figure 21.** U-Tube Breakdown

| VS Linear Assembly | | VS Linear Model Number / Lengths | | | | |
|---|---|---|---|---|---|---|
| Step | Operation | 15 & 25/8m | 20 & 25/10.5m | 30 & 35/10.5m | 30 - 50/13.5m | 35 - 50/16m |
| 1 | **Tubes** | Section 2.2.1 | | | | |
| 2 | **Turbulator(s)** | Section 2.2.2 | | | | |
| 3 | **Connecting Tubes** | Section 2.2.3 | | | | |
| 4 | **Brackets** | Section | | | | |
| 5 | **Reflectors** | Section 2.2.6.5 and 2.2.6.6 | | | | |
| 6 | **End Caps** | Section 2.2.9 | | | | |
| 7 | **Burner Assembly** | Section 2.2.10 | | | | |
| 8 | **Fan Assembly** | Section 2.2.11.2 | | | | |
| 9 | **Double Linear Fan Assembly** | Section 2.2.11.3 | | | | |
| 10 | **Herringbone Damper Assembly** | Section 2.2.11.4 | | | | |

**Table 13 –** Linear assembly procedure

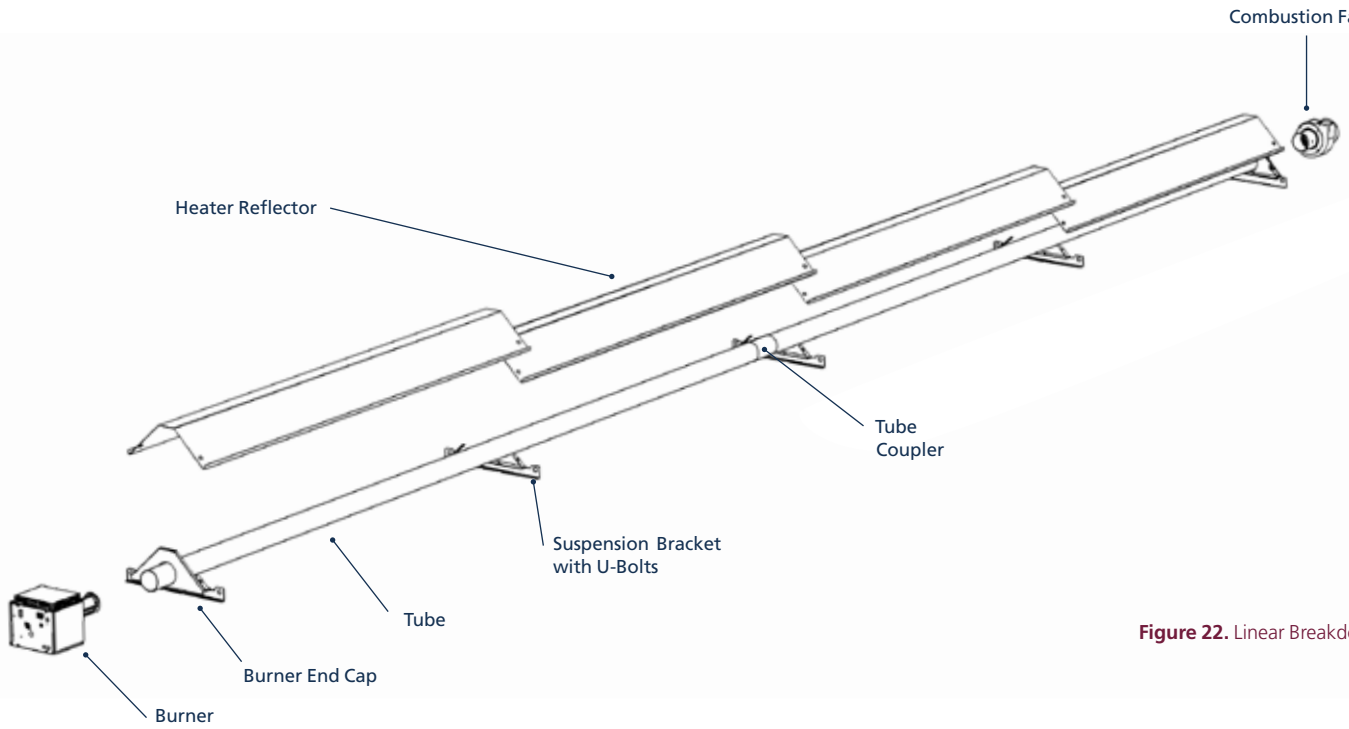



**Figure 22.** Linear Breakdown

## 2.1 Tools Required

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

**Note:** Suitable alternative tools may be used.

3mm, 4mm and 5mm Allen Keys

Tape Measure

Trestles

Leather Faced Gloves

Pozidrive Screwdrivers

10mm and 13mm Spanners

10mm and 13mm Sockets

*Saw

*Pop Riveter and 3/16" Rivets

*Silicone Sealant and Gun

Wrench with Extension

***Herringbone systems only**

## 2.2 Assembly Notes.

**Note:** Please read assembly notes in conjunction with the correct assembly drawings.

### 2.2.1 Tubes

Locate and identify tubes on trestles. The welded seam on the tubes should be positioned at the top. There will be a 13mm hole in the tube at one end only for 15-25kW U-Tube models, this is the U-Bend end of the heater. For 30-50kW models, the burner tube will be half stainless steel/half mild steel construction. The burner is fitted to the stainless steel section of tube. 13mm holes are present at both ends of the remaining tubes for 30-50kW models. Unused holes do not need to be sealed. 15-25kW linear models do not have 13mm holes in the tubes, refer to assembly drawings on page 34 to 43.

### 2.2.2 Turbulator(s)

Insert turbulator(s) into tube(s) ensuring the correct length and quantity are inserted into their respective identified tube(s) as detailed in the assembly drawings. For 40kW U-Tube models, the turbulator in the burner tube must be fitted after the tubes have been connected. Refer to detailed assembly drawings on page 34 to 43.

**Figure 23.** Tubes

### 2.2.3 Connecting radiant tubes together.

Locate and position tube couplers at the end of the tubes, with the socket heads facing upwards towards the welded seam. Make sure the pre-fitted bolts in the couplers engage with the 13mm locating holes in the tubes (not 15-25kW models). Slide the next tube into the open end of the coupler and ensure the 13mm locating holes in the second tube engage with the pre-fitted bolts in the couplers (not 15-25kW models). Tighten socket head clamping bolts, alternating between bolts until fully secure. For 40kW U-Tube models, fit burner tube turbulator. It is advised to join the linear tube assemblies together once safely suspended.

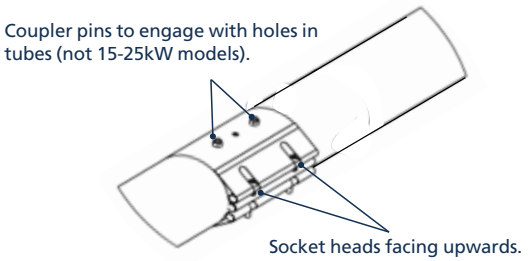



**Figure 24.** Radiant Tube

### 2.2.4 For Brackets

**Note:** U-Bolts, washers and nuts are stainless steel. All other fixings are BZP.

**Fit reflector support clips to heater suspension brackets. For (U-Tube models only)**

The clips are attached by passing through the key-way slot in the suspension bracket and fixing together with 1 off M6 set pin, split washer, washer and locknut.

**Note:** Clips are not fitted to the burner end bracket.

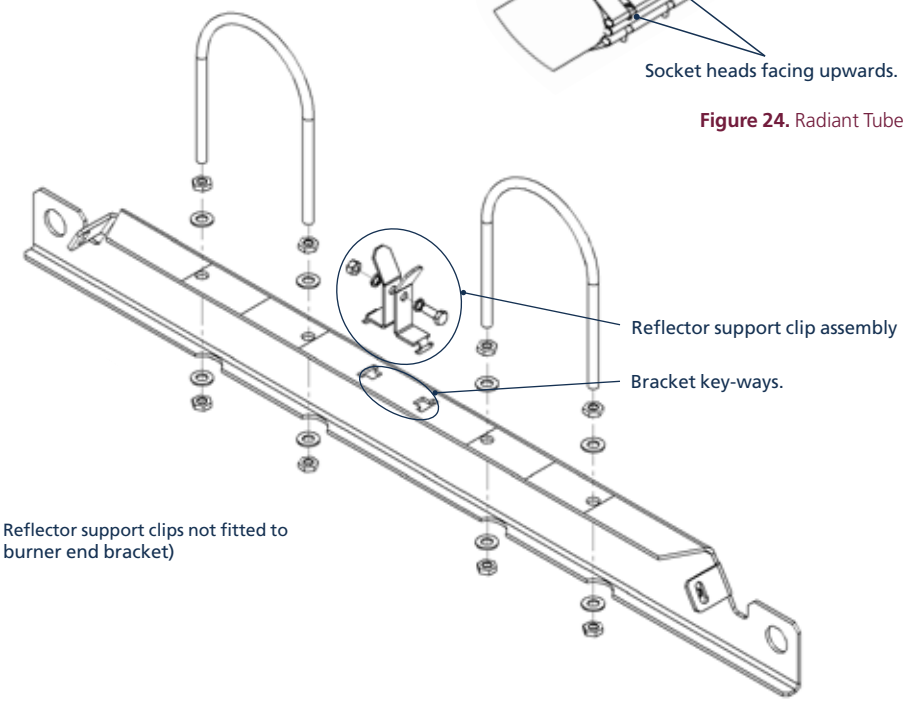
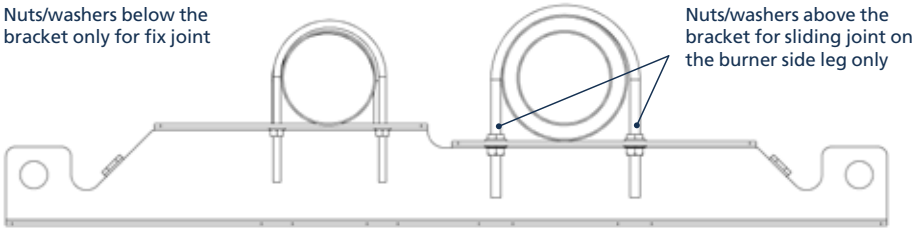


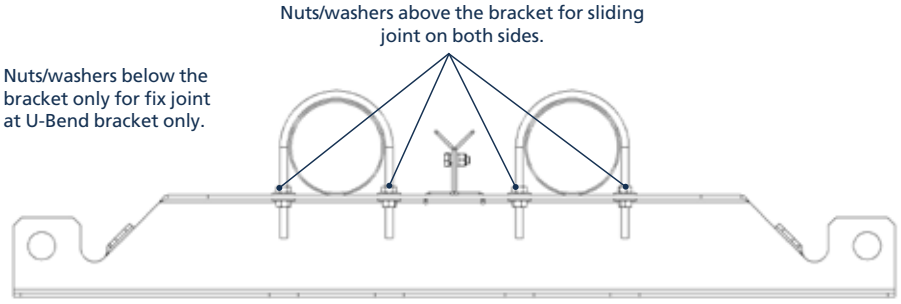

**Figure 25.** Reflector support

**Attach U-Bolts to U-Tube heater suspension brackets.**

15-25kW U-Tube heaters have two types of suspension bracket, 30-50kW U-Tube heaters have one type of bracket




Models 15-25kW burner end bracket only, M6 and M8 U-Bolts.




Models 15-25kW remaining brackets M6 U-Bolts and models 30-50kW all brackets M8 U-Bolts.

**Figure 26.** U-Bolt to U-Tube heater suspension brackets

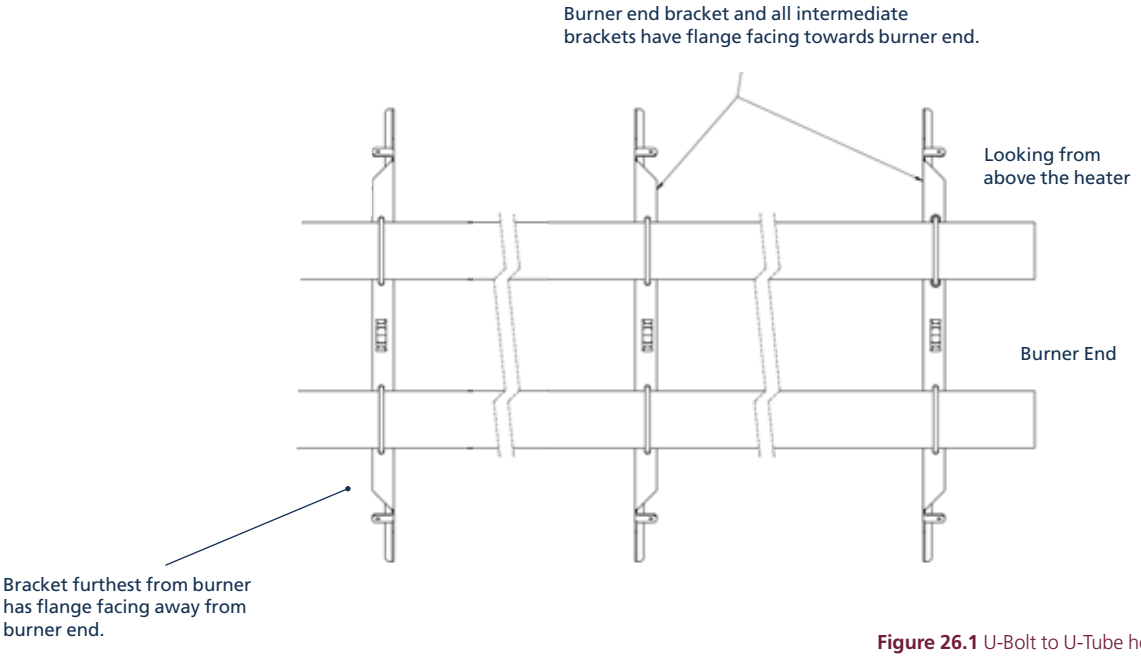



**Figure 26.1** U-Bolt to U-Tube heater suspension brackets

Fit nuts and washers to the U-Bolts and loosely secure to the bracket.

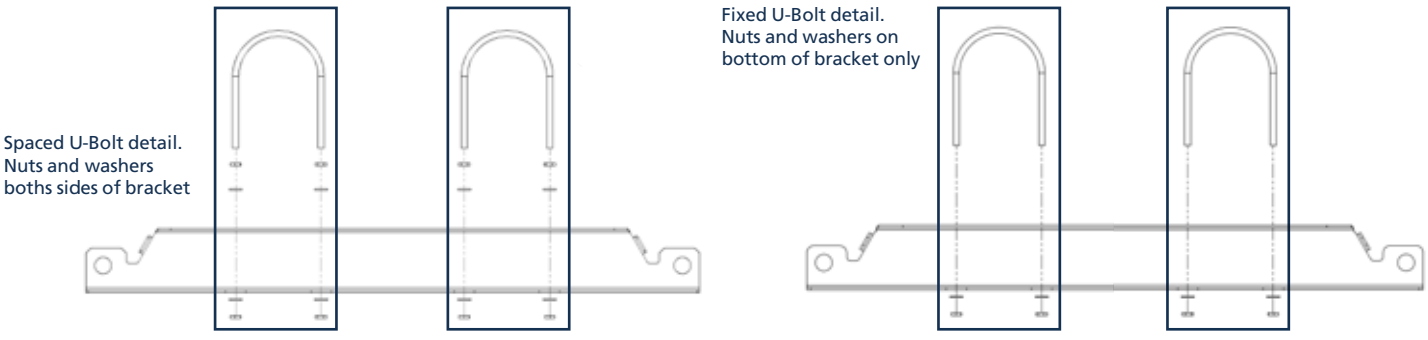



**Figure 26.2** U-Bolt to U-Tube heater suspension brackets

All the brackets on the burner tube, except, the bracket adjacent to the U-Bend end, should have spaced U-Bolts. All middle brackets on the fan tube should have nuts and washers on both sides of the bracket.

This is to allow the U-Bolt to be tightened whilst still allowing a 3mm gap for the tube to expand.

Slide the bracket assemblies along the tubes to the correct position, in the correct order (15-25kW models have a different first bracket). Refer to detailed assembly drawing (Figure 41 to Figure 50) for more details.

**Note:** Do not tighten any of the nuts at this stage.

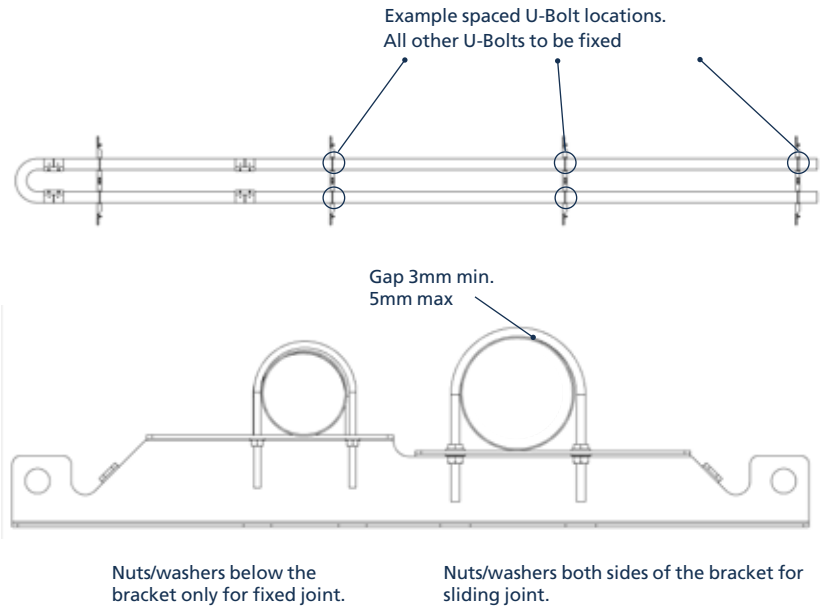



**Figure 26.3** U-Bolt to U-Tube heater suspension brackets

**Attach U-Bolts to the linear heater suspension brackets.**

**Note:** U-Bolts, washers and nuts are stainless steel. All other fixings are BZP.

Note that the 15-25kW linear heaters have two types of U-Bolt, 30-50kW linear heaters have one type of U-Bolt.

The bracket furthest from the burner must be installed with the flange and reflector fixing tabs facing away from the burner end of the heater. All other brackets must have the flanges facing towards the burner end.

Bracket furthest from burner has flange facing away from burner end.

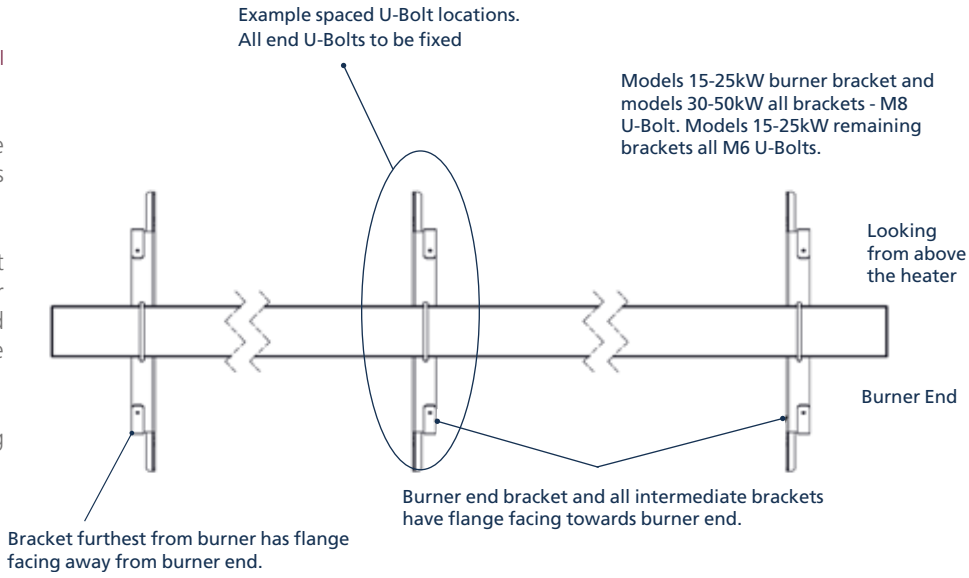



**Figure 26.4** U-Bolt to U-Tube heater suspension brackets

Fit nuts and washers to the U-Bolts and loosely secure to the bracket.

All middle brackets should have the spaced U-Bolt detail.

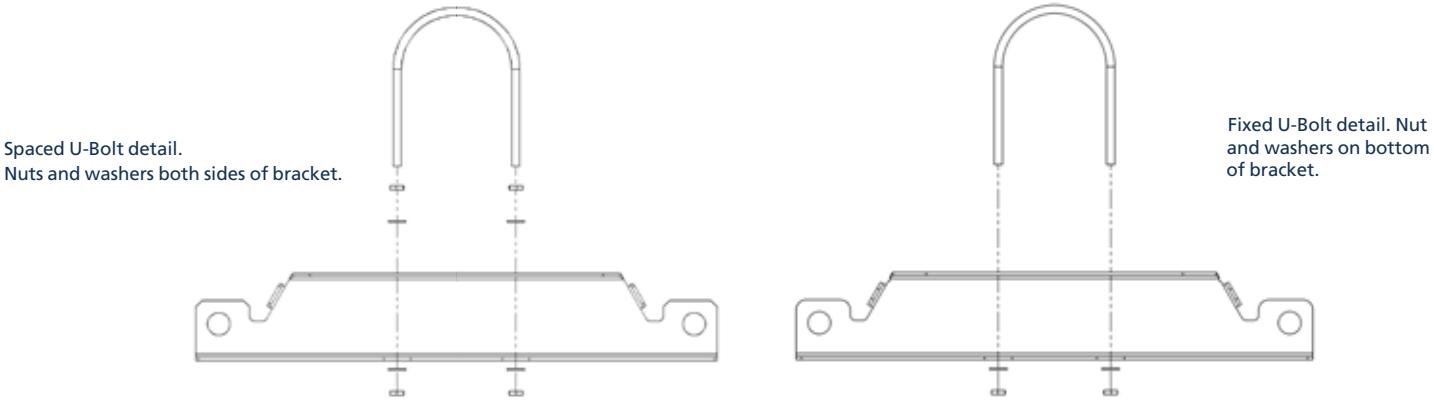



**Figure 26.5** U-Bolt to U-Tube heater suspension brackets

The bracket furthest from the burner must be installed with the flange and reflector fixing tabs facing away from the burner end of the heater. All other brackets must have the flanges facing towards the burner end.

Slide the bracket assemblies along the tubes to the correct position and in the correct order (15-25kW models have a different first U-Bolt). Tighten all U-Bolt nuts. Refer to detailed assembly drawing (Figure 41 to Figure 50) for more details.

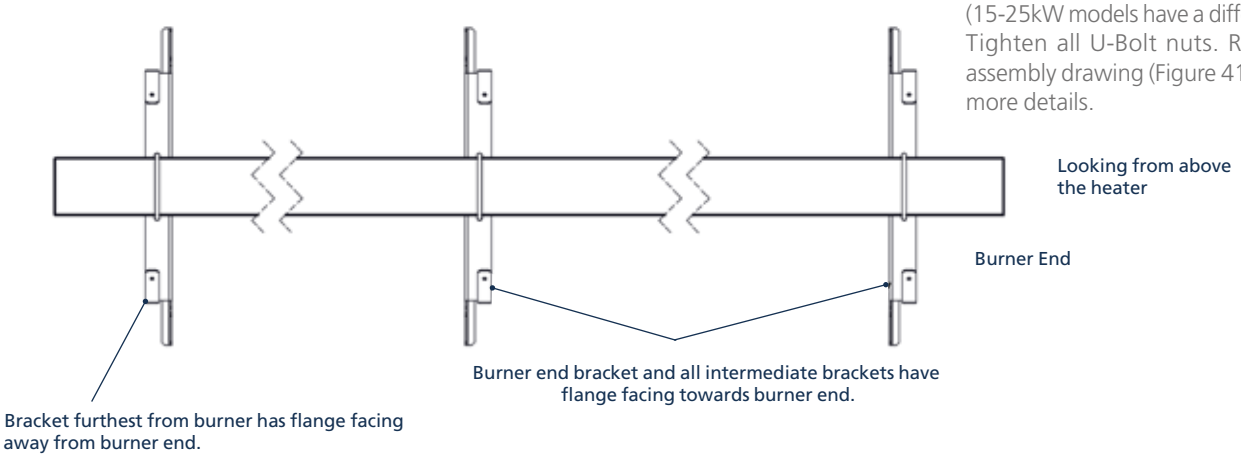



**Figure 26.6** U-Bolt to U-Tube heater suspension brackets

**2.2.5 Connecting the U-Bend.**

Locate and position tube couplers at the end of the tubes so that the socket heads are facing upwards towards the welded seam. Make sure the pre-fitted bolts in the couplers engage with the 13mm locating holes in the tubes.

Slide U-Bend into open end of the couplers and ensure the 13mm locating holes in the U-Bend engage with the pre-fitted bolts in the couplers.

Tighten socket head clamping bolts on both couplers, alternating between bolts until fully secure. Re-check bracket positions and tighten all U-Bolt nuts.

**To avoid damage to the heater whilst completing installation we recommend the heater chassis be suspended prior to fitting reflectors.**

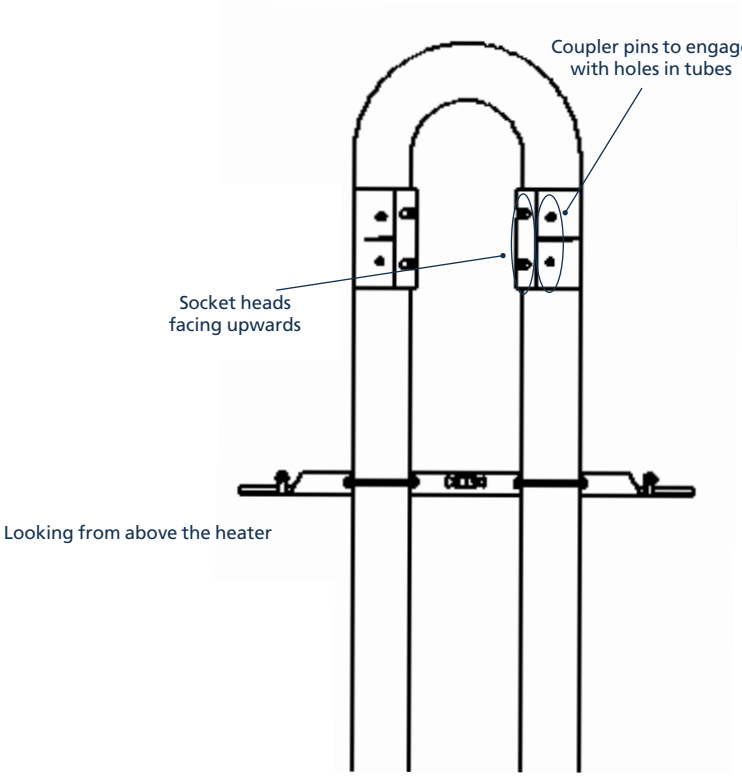



**Figure 27.** U-Bolt to U-Tube heater suspension brackets

### 2.2.6 Reflectors, U-Bend reflector

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

#### 2.2.6.1 First U-Tube V reflector.

U-tube heaters have two types of reflectors – a short U-Bend reflector and longer heater reflectors with a central V.

The V reflector adjacent to the U-Bend requires a closing plate to be fitted before installation on the heater. This is fixed inside the central V with 4 off M5 pozi set pins and washers. Note the direction of the flanges is correct. This reflector assembly is placed onto the heater so that it rests on the last two brackets, with the reflector closing plate at the U-Bend end of the heater.

#### 2.2.6.2 Intermediate U-Tube V reflector(s)

Intermediate V reflector(s) are fitted after the first reflector and before the last V reflector. These can be fitted in any orientation.

Place the reflector on the heater so that it overlaps the previous reflector and sits on top of the next bracket. Repeat process for all intermediate reflectors.

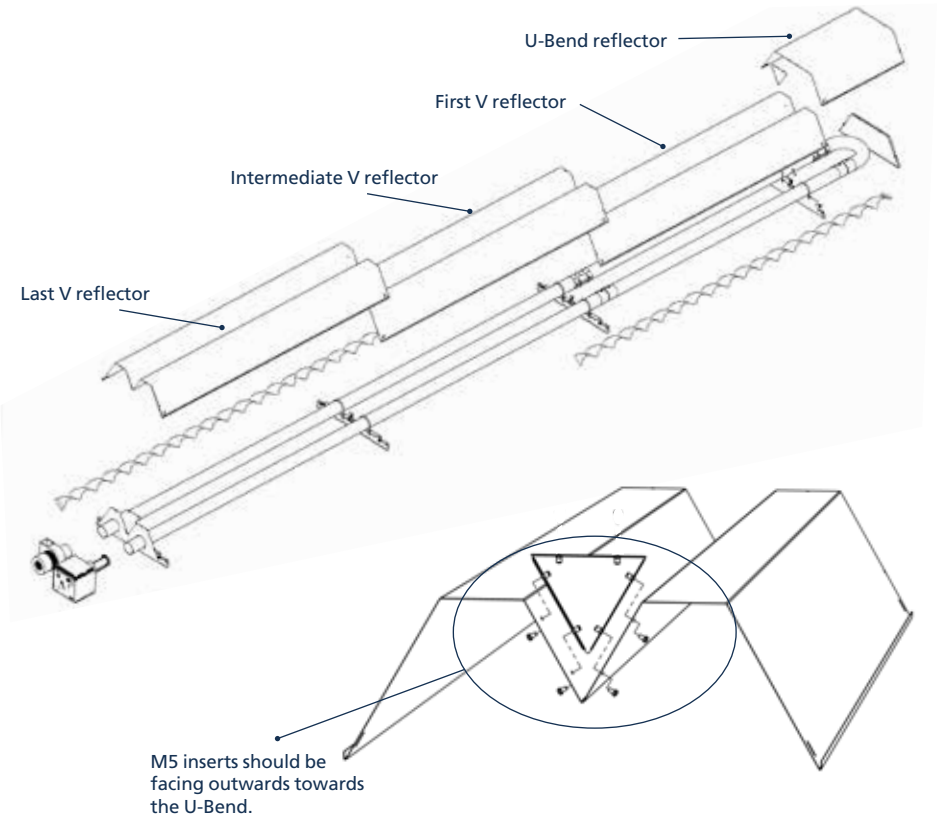



**Figure 28.** Reflectors

#### 2.2.6.3 Final U-Tube V reflector.

The final V reflector is placed on the heater so that it overlaps the previous reflector and sits on top of the burner end bracket. Ensure the burner end cap fixing holes are at the burner end of the heater.

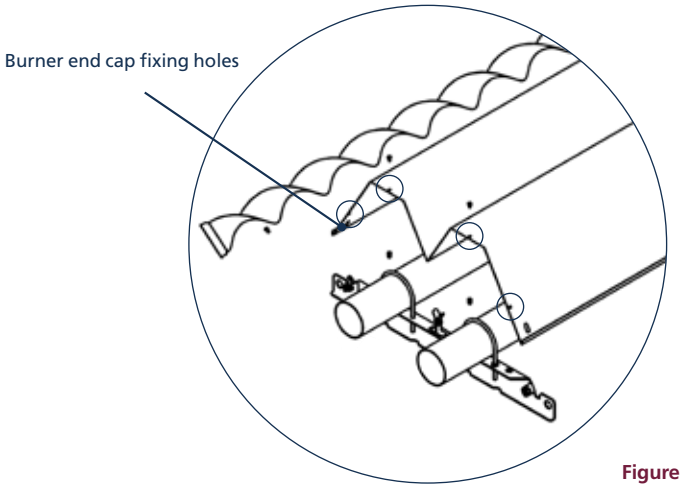



**Figure 29.** Final U-Tube V reflector

#### 2.2.6.4 U-Bend reflector.

The U-Bend reflector is fitted last by overlapping the first V reflector, and secured to the V reflector closing plate with 2 off M5 pozi set pins and washers.

Ensure the U-Bend reflector is level before fully tightening the fixings.

Refer to section 2.2.6.6 for details of fixing all reflectors to the brackets.

**Note:** All the reflectors must be positioned/attached to the brackets exactly as they are detailed in the assembly drawings.

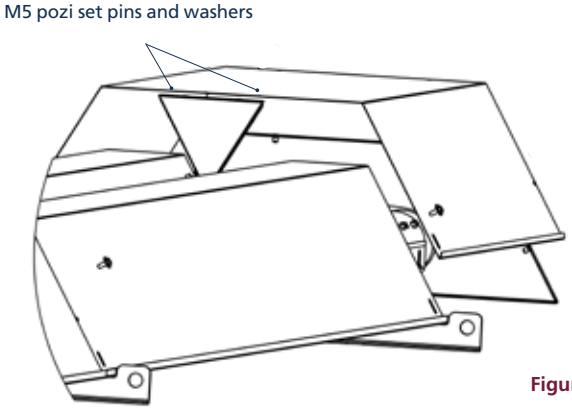



**Figure 30.** U-Bend reflector

### 2.2.6.5 Linear reflectors.

The linear heater reflectors are supplied pre-punched with universal hole patterns.

**Note:** 30-50kW models have two reflector lengths on each heater.

Refer to the detailed assembly drawings (Figure 41 to Figure 50) for more details. Starting at the far end, place one of the reflectors onto the last two brackets (ensure correct length reflector is fitted for 30-50kW models).

Place the following reflector on the heater so that it overlaps the previous reflector and sits on top of the next bracket.

Repeat process for all remaining reflectors, refer to section 2.2.6.6 for details of fixing all reflectors to the brackets.

**Note:** All reflectors must be positioned/attached to the brackets exactly as they are detailed in the assembly drawings.

### 2.2.6.6 Reflector fixings

For U-Tube heaters the reflector fixing to the bracket nearest the U-Bend does not have a spacer. All other U-Tube reflector fixings have the spacer fitted. For linear heaters the reflector fixing to the bracket furthest from the burner does not have a spacer. All other linear reflector fixings have the spacer fitted.

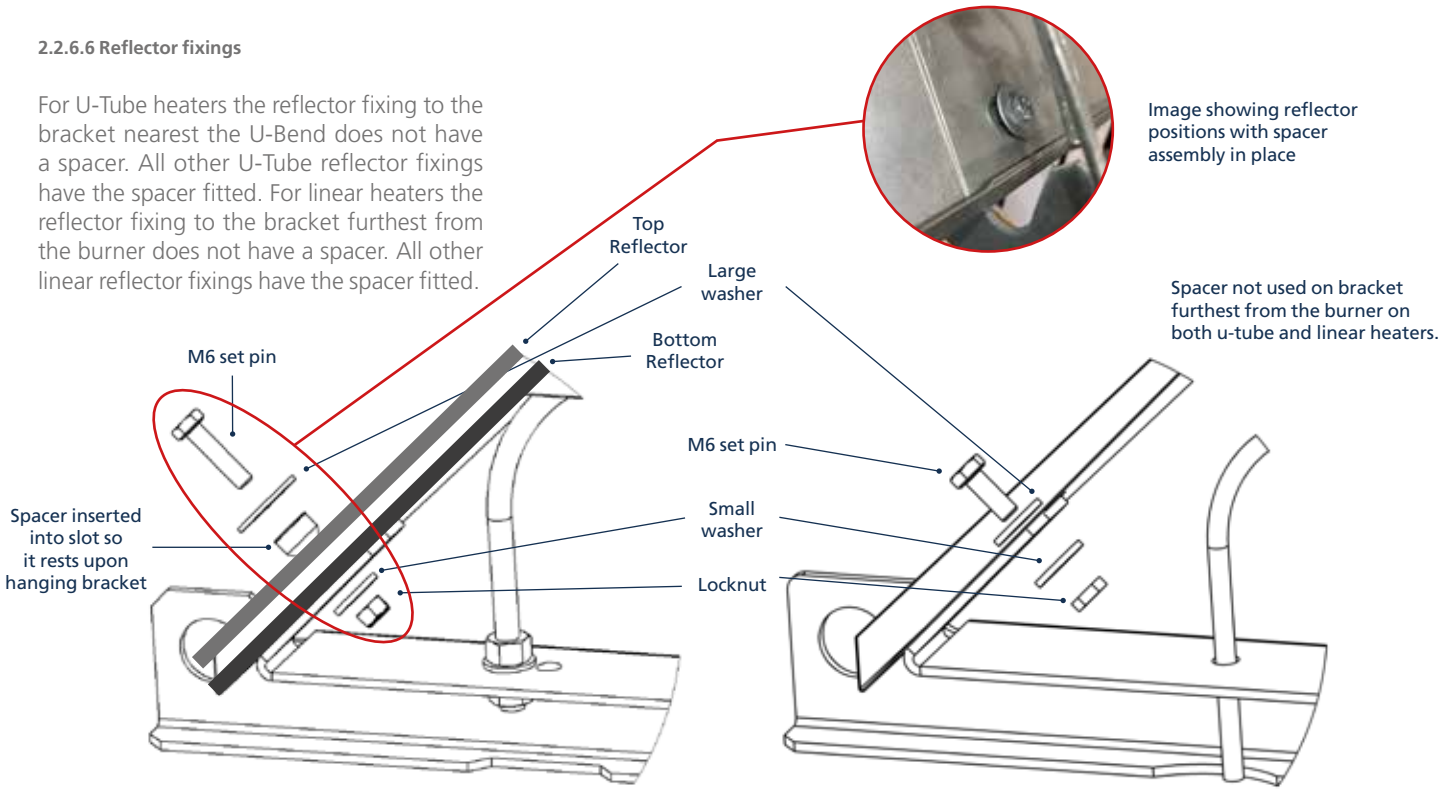



**Figure 31.** Intermediate U-Tube V reflector

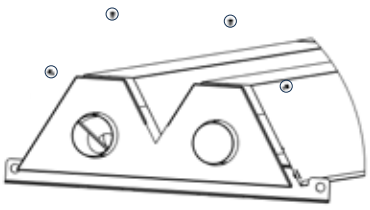


**Figure 32.** End cap burner side fasten as shown M5 set pins and washers

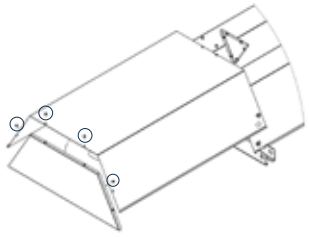


**Figure 33.** M5 set pins and washers.

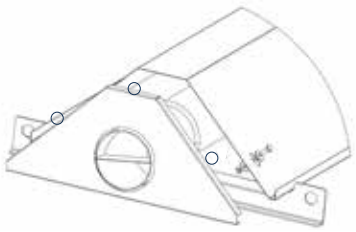


**Figure 34.** M5 set pins and washers.

### 2.2.7 U-Tube, burner end cap.

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 4 off M5 pozi set pins and washers.

### 2.2.8 U-Tube, U-Bend end cap.

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 4 off M5 pozi set pins and washers.

### 2.2.9 Linear end caps.

Position one end cap beneath the reflector profile at the burner end with the end cap flanges facing inwards. Fasten to reflector using 3 off M5 pozi set pins and washers. Repeat process at other end of heater.

**Note:** Please note that on 15-25kW models the burner end cap has a larger hole.

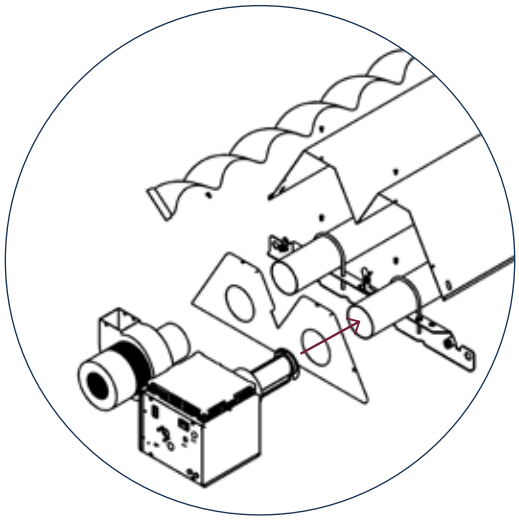


**Figure 35.** Burner assembly

### 2.2.10 Burner Assembly.

Slide the burner assembly onto the tube at the burner end (RIGHT HAND TUBE for U-Tube heaters when viewing heater from the burner end), ensuring it is fully engaged. Lift burner assembly square to tube and secure grub screws. Do not apply sealant!

CAUTION **When angle / wall mounting, the burner MUST remain horizontal to the floor and on U-Tube heaters be located on the bottom (lowest) tube. (See section 1.6 on page 5 for more details)**.

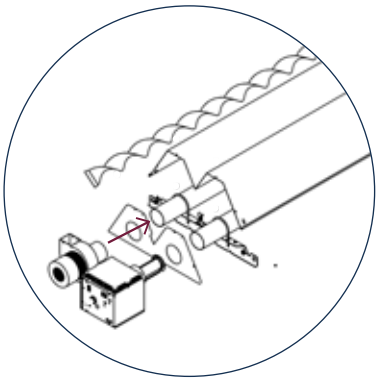


**Figure 36.** U-Tube fan assembly

### 2.2.11 Outlet Assembly.

#### 2.2.11.1 U-tube fan assembly.

Slide the fan onto the left hand tube when viewing from the burner end, ensuring it is fully engaged.

The fan discharge can face either vertically or horizontally for flued appliances.

Any un-flued appliances must discharge horizontally away from the burner. Secure grub screw. Do not apply sealant!

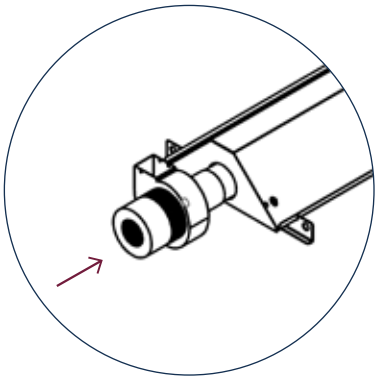


**Figure 37.** Linear fan assembly

#### 2.2.11.2 Linear fan assembly.

Slide the fan onto the tube from the outlet end, ensuring it is fully engaged. The fan discharge can face either vertically or horizontally (bottom discharge) for flued appliances. Un-flued appliances must discharge horizontally (bottom discharge).

Secure grub screw.

CAUTION **Do not apply sealant!**

#### 2.2.11.3 Double Linear Fan Assembly.

Slide the condensate box flange onto the outlet end of the tube ensuring it is fully engaged. The fan must be in the upright position.

Secure grub screw.

CAUTION **Do not apply sealant!**

**Note:** The fan assembly must be located with the fan outlet vertical.

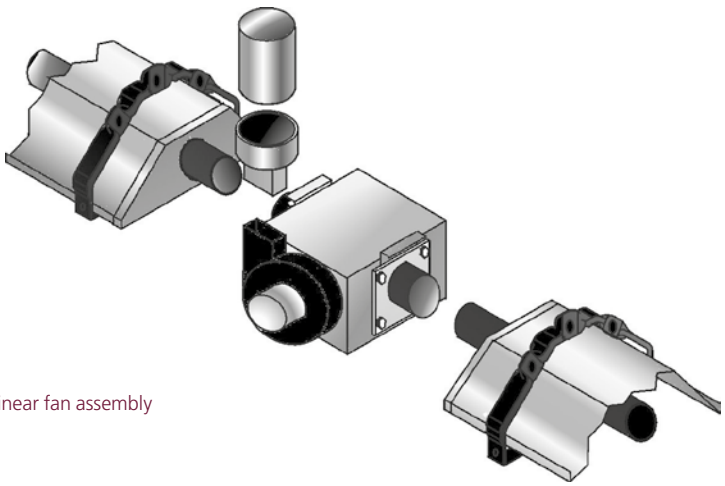


**Figure 38.** Double linear fan assembly

#### 2.2.11.4 Herringbone Damper Assembly

Locate and position tube coupler onto the outlet end of the tube so that the socket heads are facing upwards towards the welded seam. Make sure the pre-fitted bolt in the coupler engages with the 13mm locating hole in the tube (not 15-25kW models). Slide the herring-bone damper assembly into the open end of the coupler and ensure the 13mm locating hole in the damper engages with the pre-fitted bolt in the coupler (not 15-25kW models).

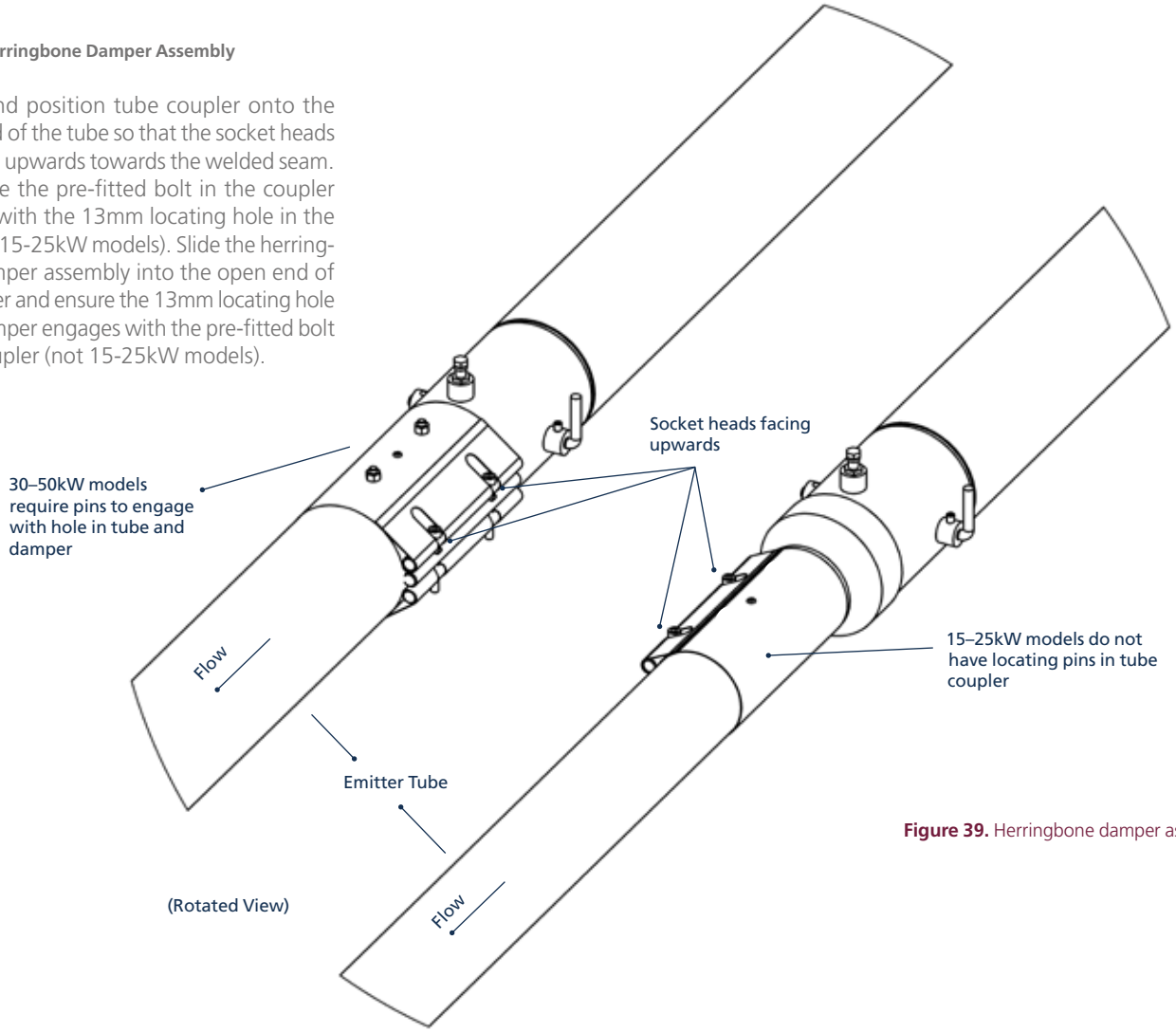



**Figure 39.** Herringbone damper assembly

The damper assembly must be positioned so that the test nipple is on the top. Tighten socket head clamping bolts, alternating between bolts until fully secure.

The damper assembly must be located with its damper blade in the closed position.

CAUTION **Do not apply sealant!**

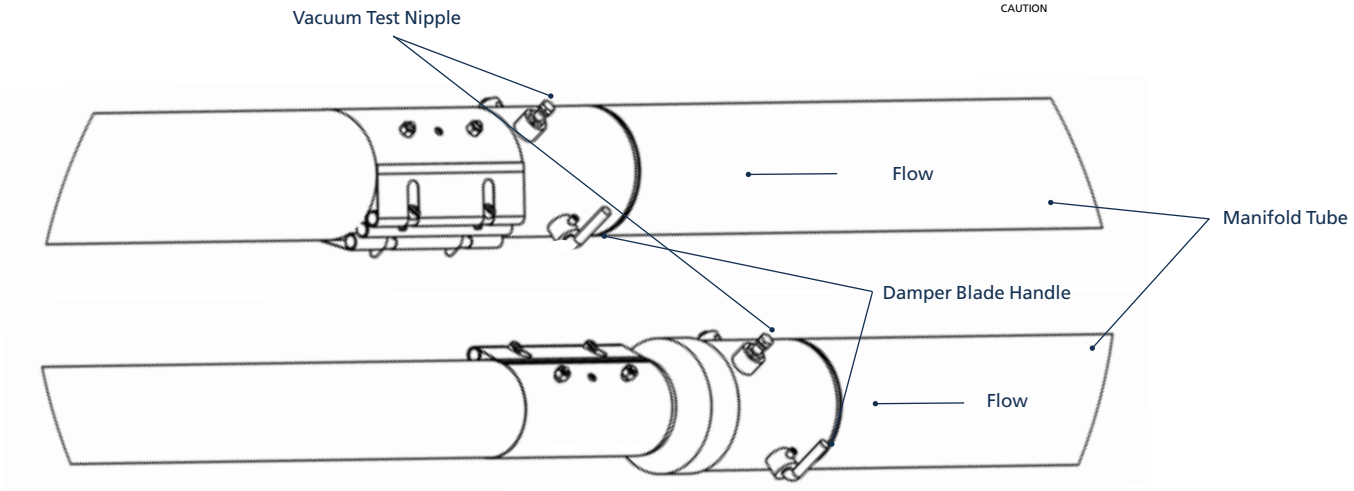



**Figure 39.1** Herringbone damper assembly

## 2.3 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.

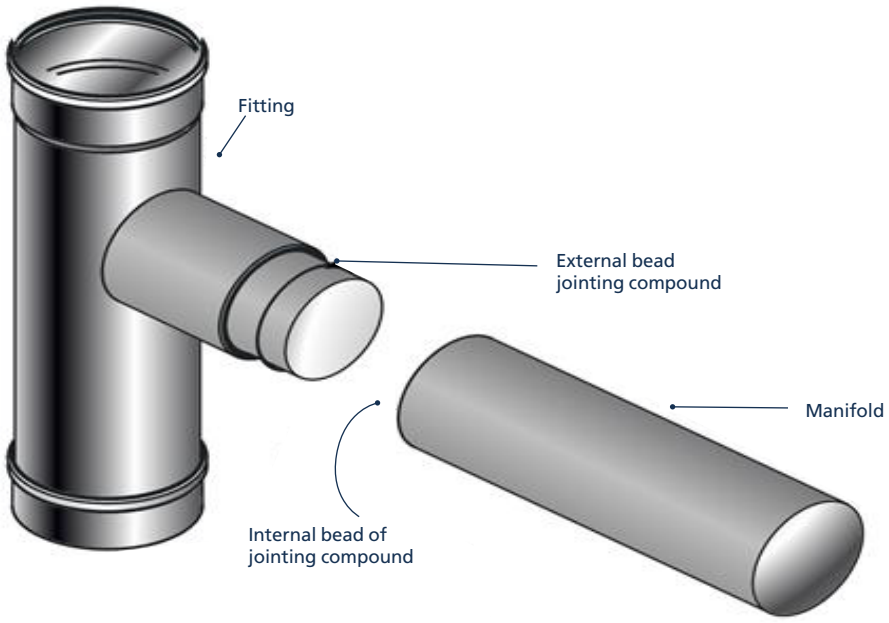



**Figure 40.** Aluminium tube

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.

## 2.4 Detailed Assembly Drawings

The following pages show the technical dimensional details of the VSUTE, VSUHE and VSLIE, VSLHE, and VSDLE range of heaters (Figure 41 to Figure 50).

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

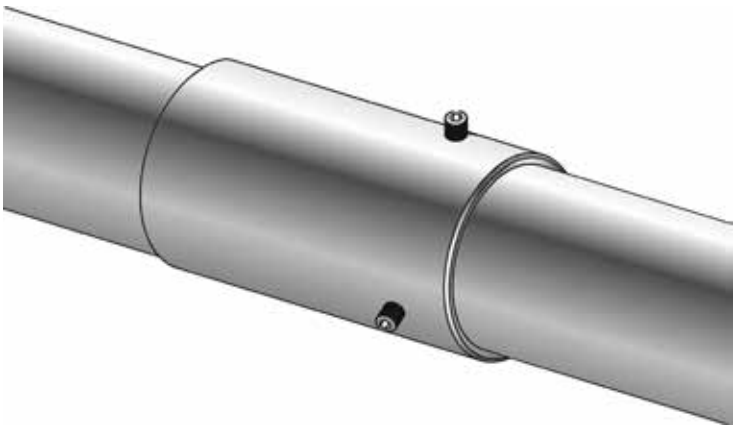
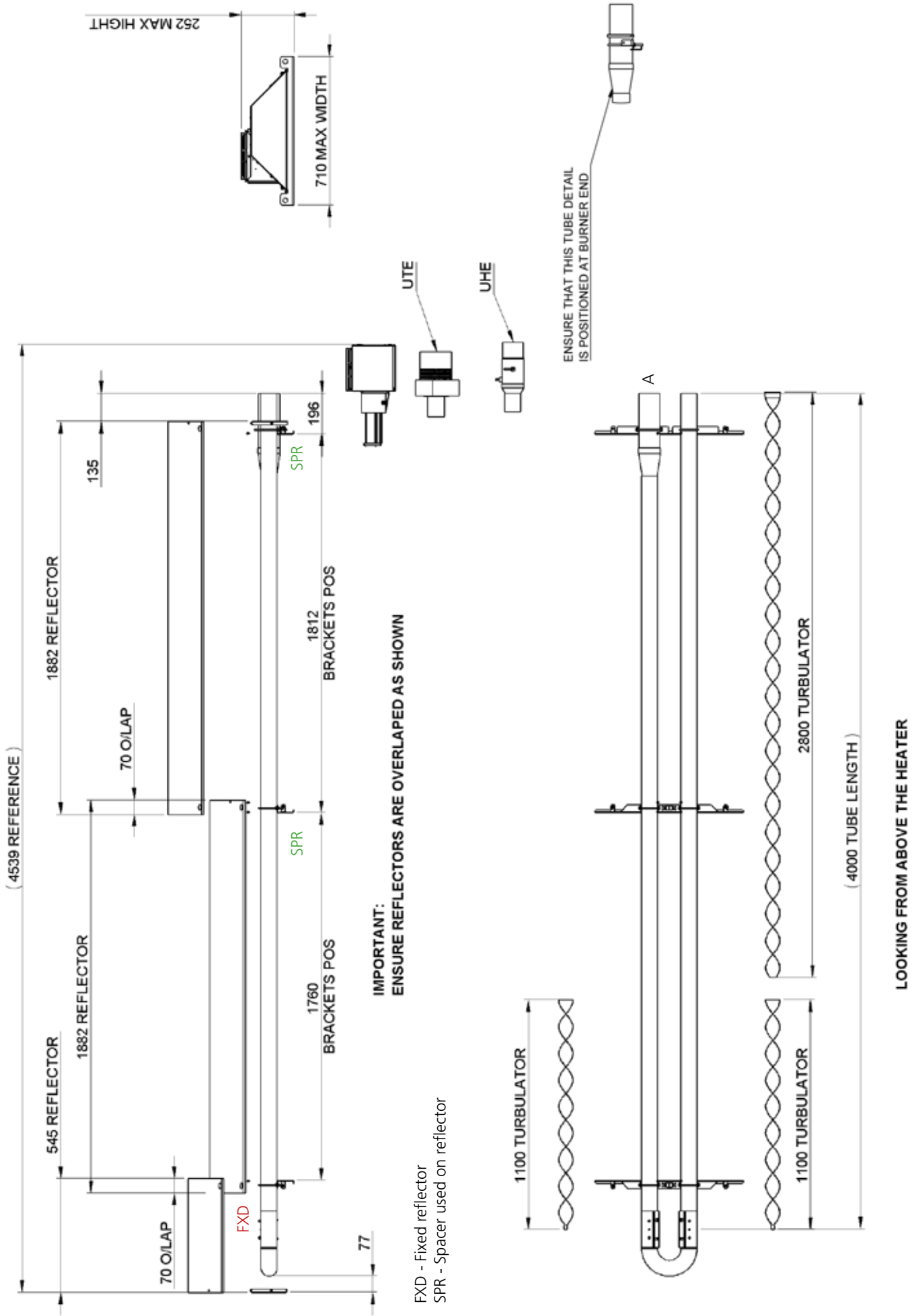
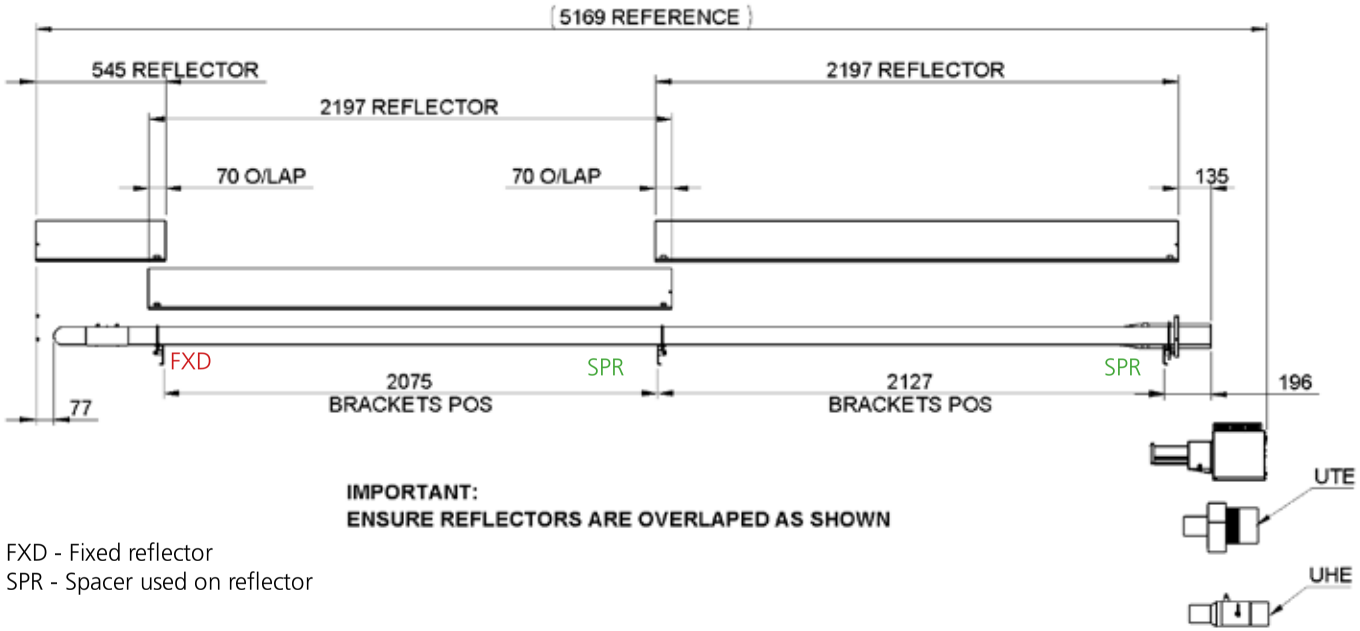


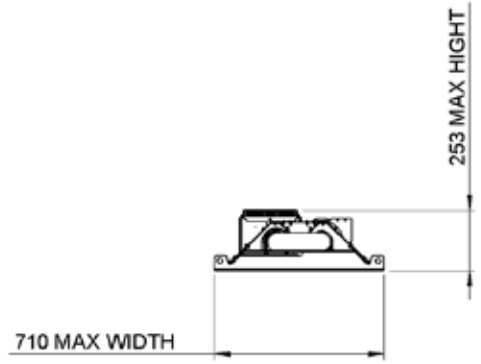
**Figure 40.1** Aluminium tube

**Figure 41.** Vision Heater Assembly: Models VSUTE/VSUHE 15kW. 76mm (3ins) Nom Dia

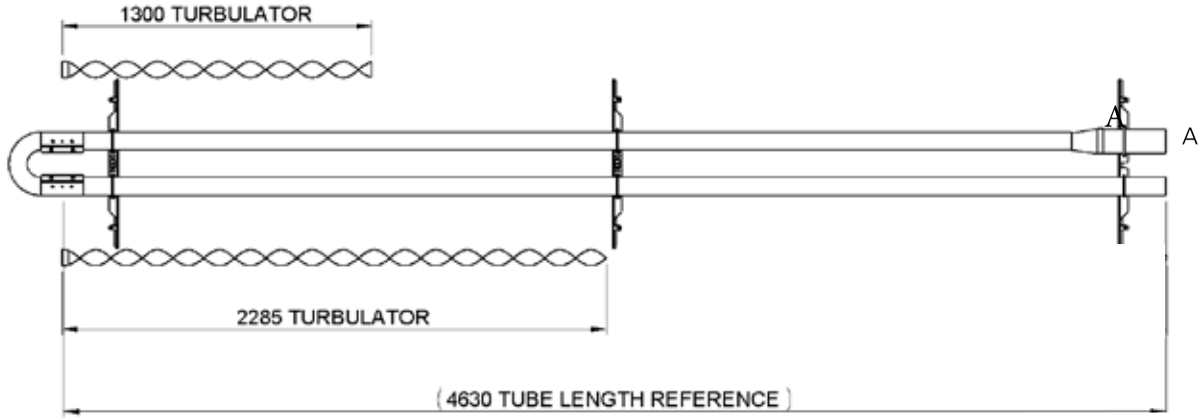



FXD - Fixed reflector
SPR - Spacer used on reflector




FXD - Fixed reflector
SPR - Spacer used on reflector



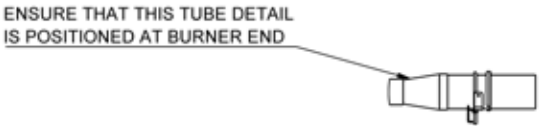




**Figure 42.** Vision Heater Assembly: Models VSUTE/VSUHE 20 & 25kW. 76mm (3ins) Nom Dia

**Figure 43.** Vision Heater Assembly: Models VSUTE/VSUHE 30/35kW. 100mm (4ins) Nom Dia

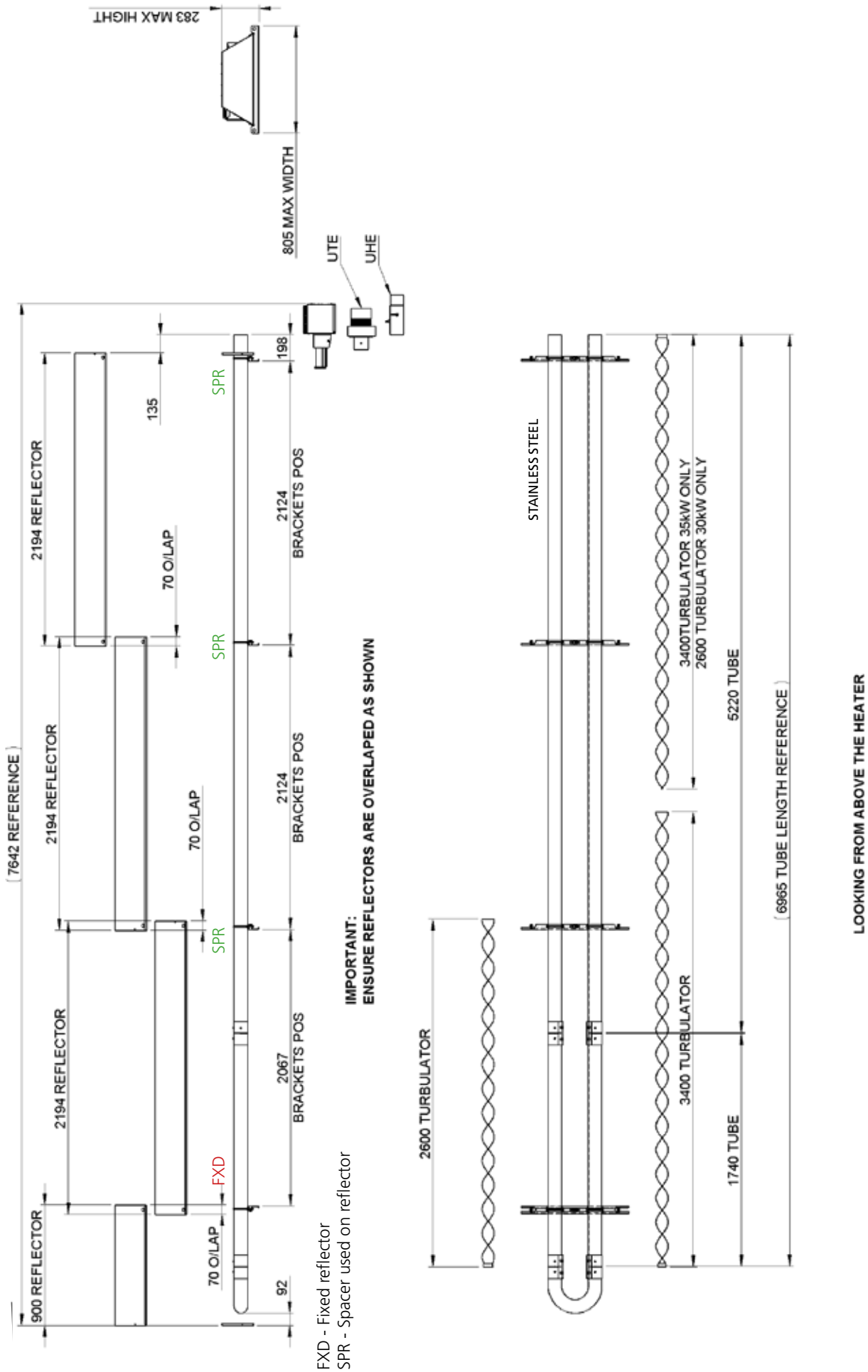
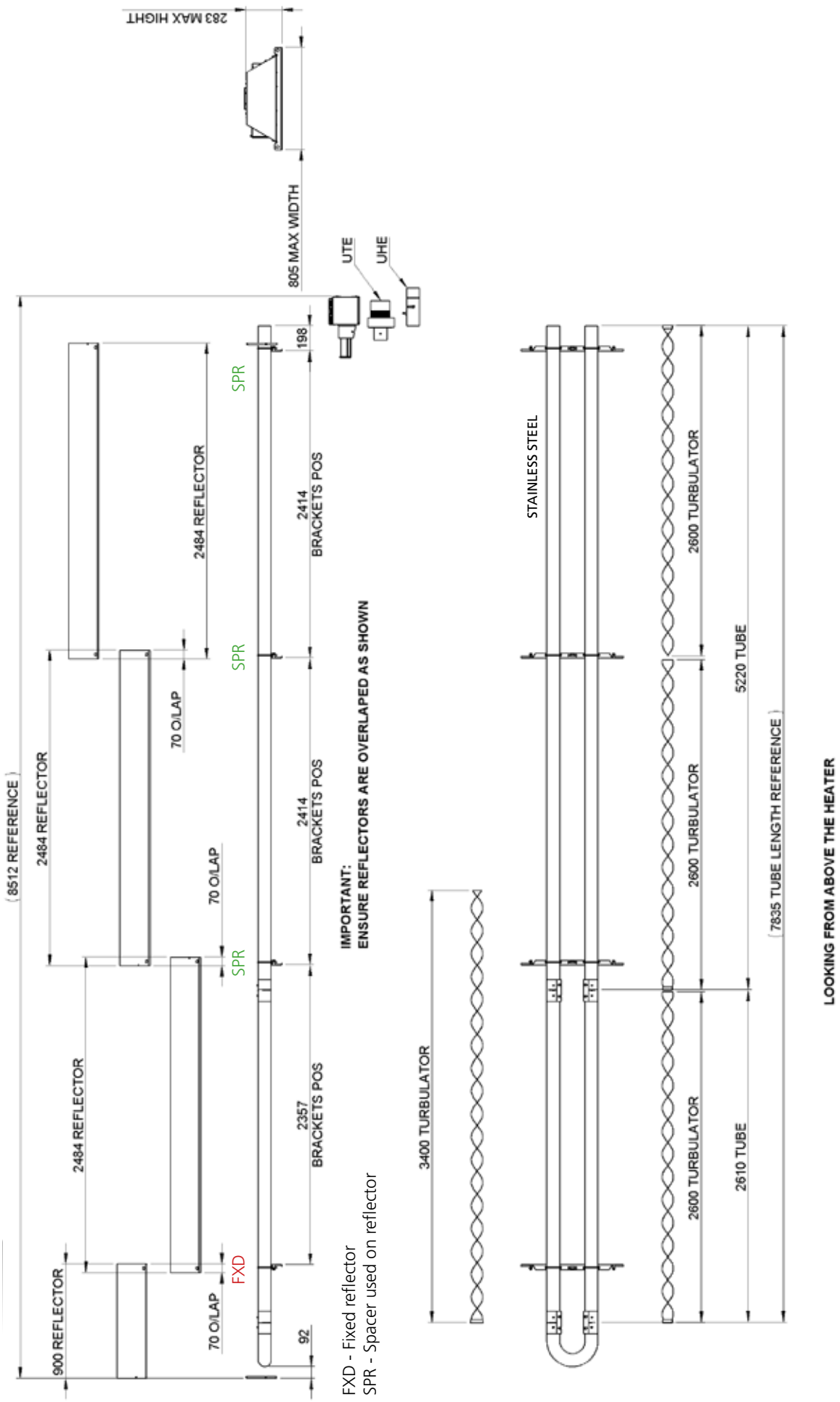


**Figure 44.** Vision Heater Assembly: Models VSUTE/VSUHE 40kW. 100mm (4ins) Nom Dia




FXD - Fixed reflector
SPR - Spacer used on reflector

**Figure 45.** Vision Heater Assembly: Models VSUTE/VSUHE 45/50kW. 100mm (4ins) Nom Dia

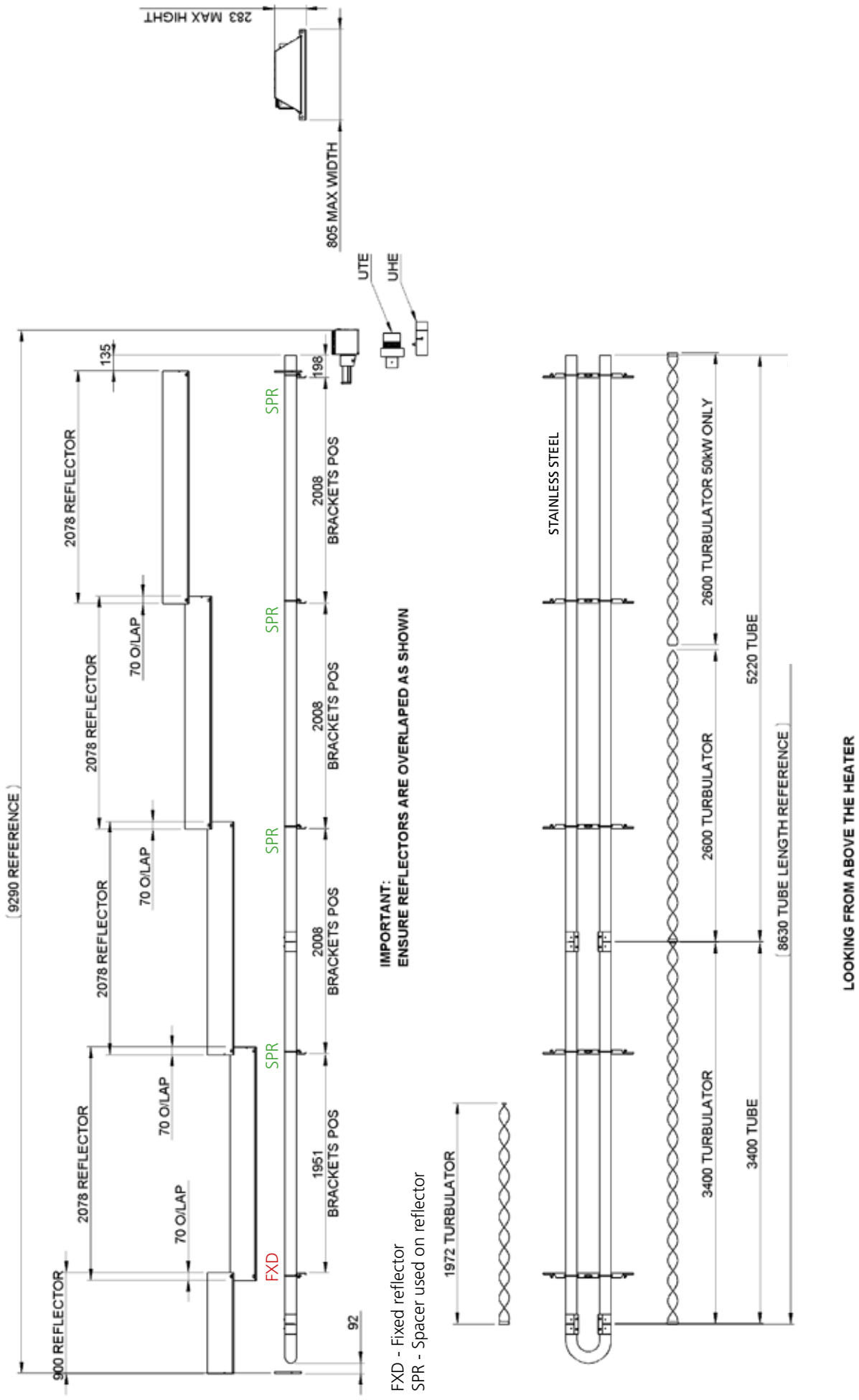
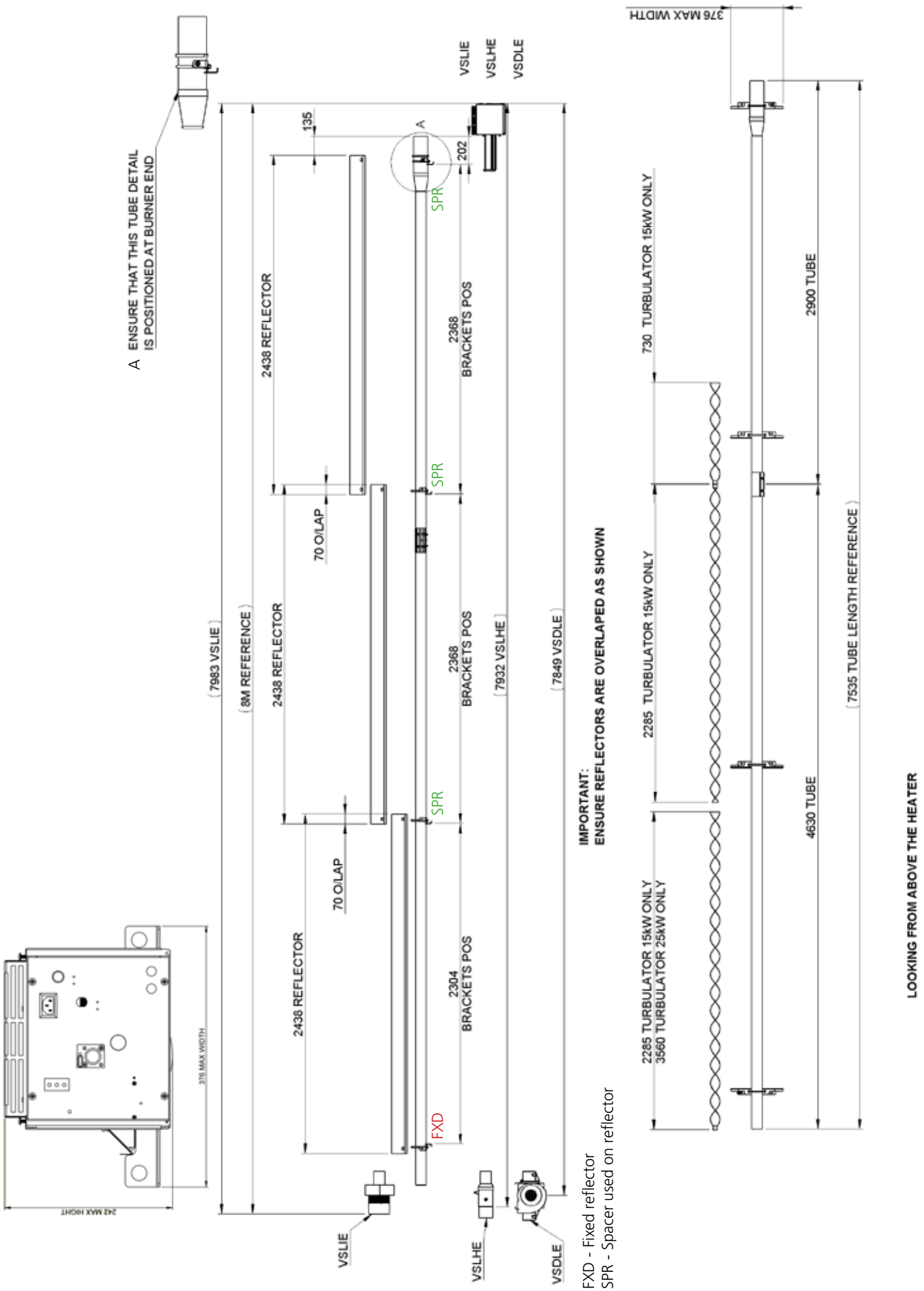
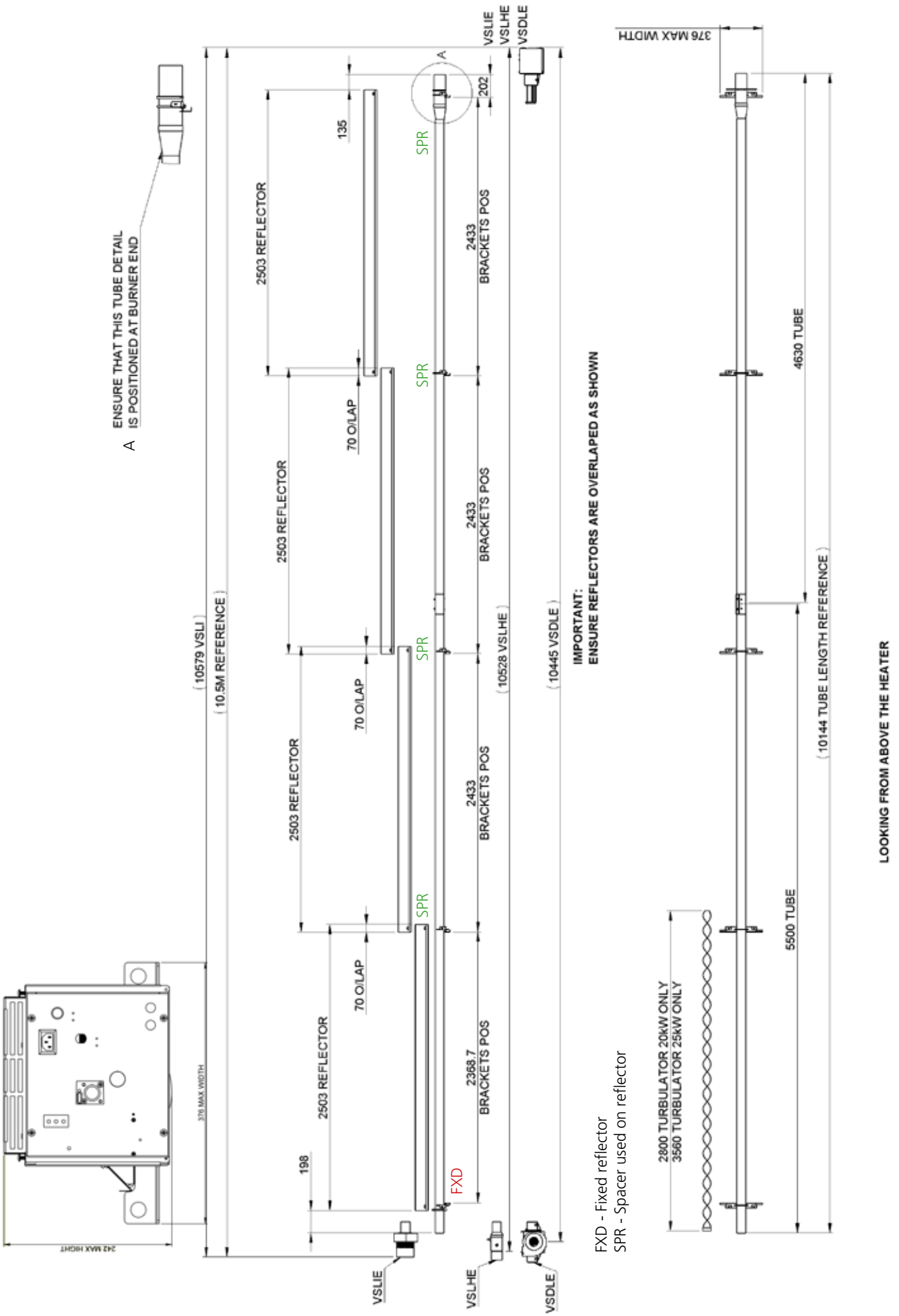


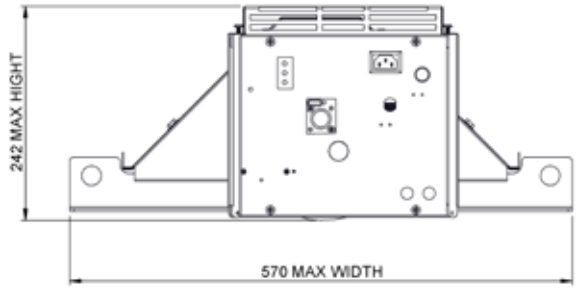
**Figure 46.** Vision Heater Assembly: Models VSLIE/VSLHE/VSDLE 15/25kW 8m - 76mm (3ins) Nom Dia.

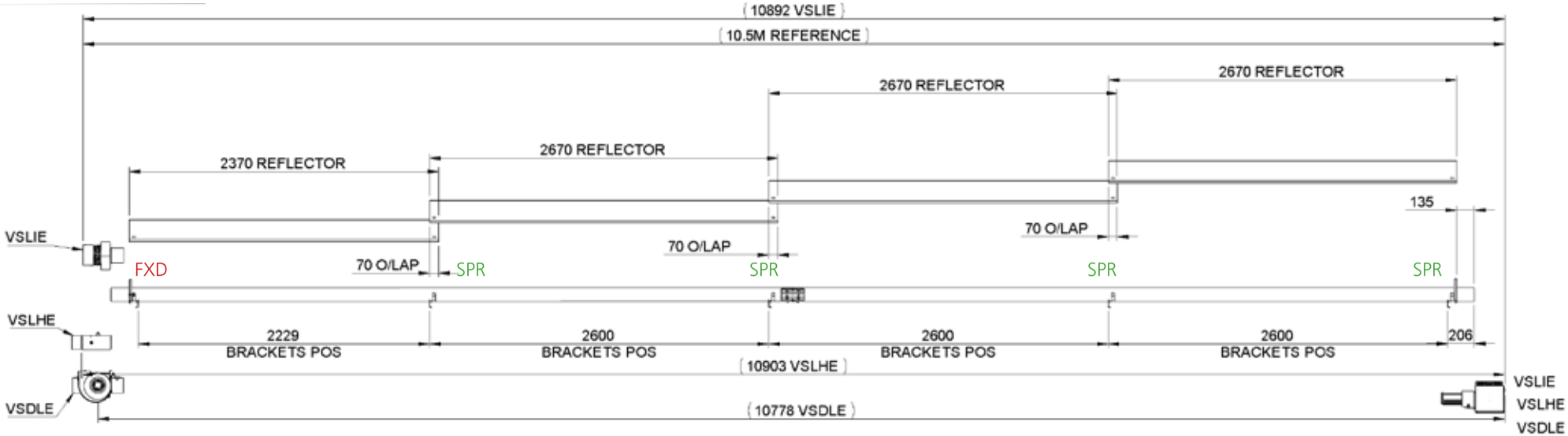



FXD - Fixed reflector
SPR - Spacer used on reflector

**Figure 47.** Vision Heater Assembly: Models VSLIE/VSLHE/VSDLE/20/25kW 10.5m - 76mm (3ins) Nom Dia.

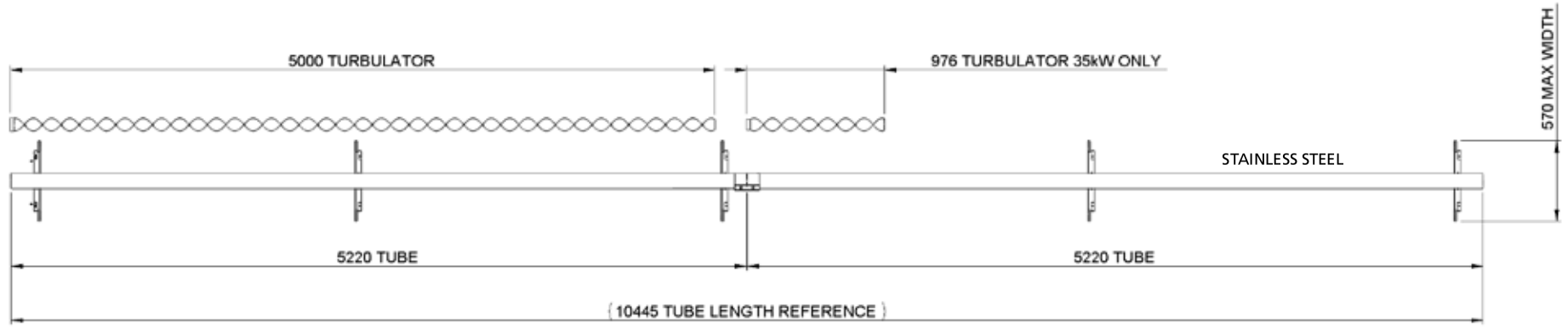





FXD - Fixed reflector
SPR - Spacer used on reflector

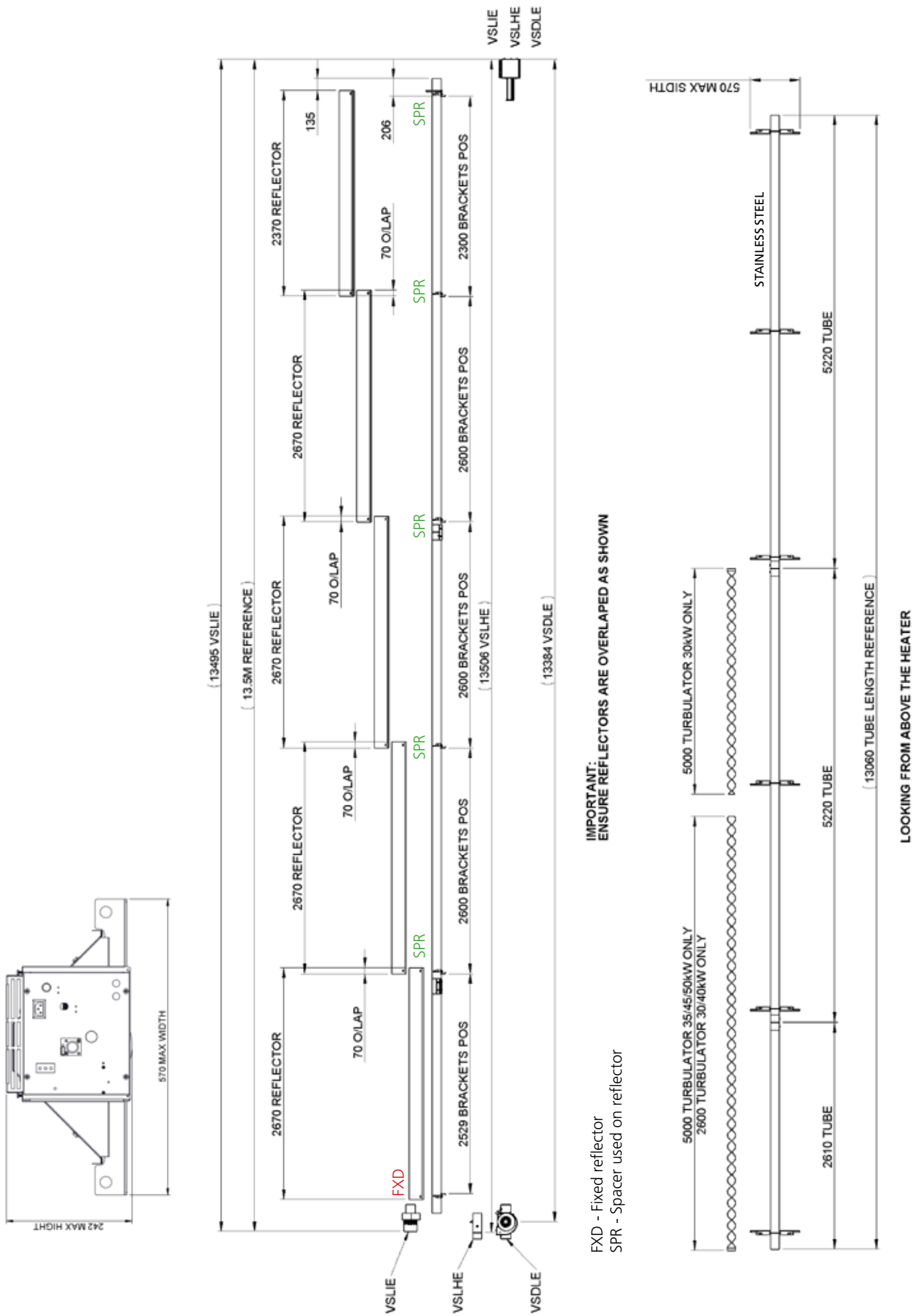
**IMPORTANT:**
**ENSURE REFLECTORS ARE OVERLAPED AS SHOWN**

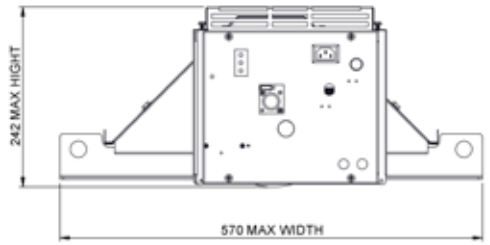


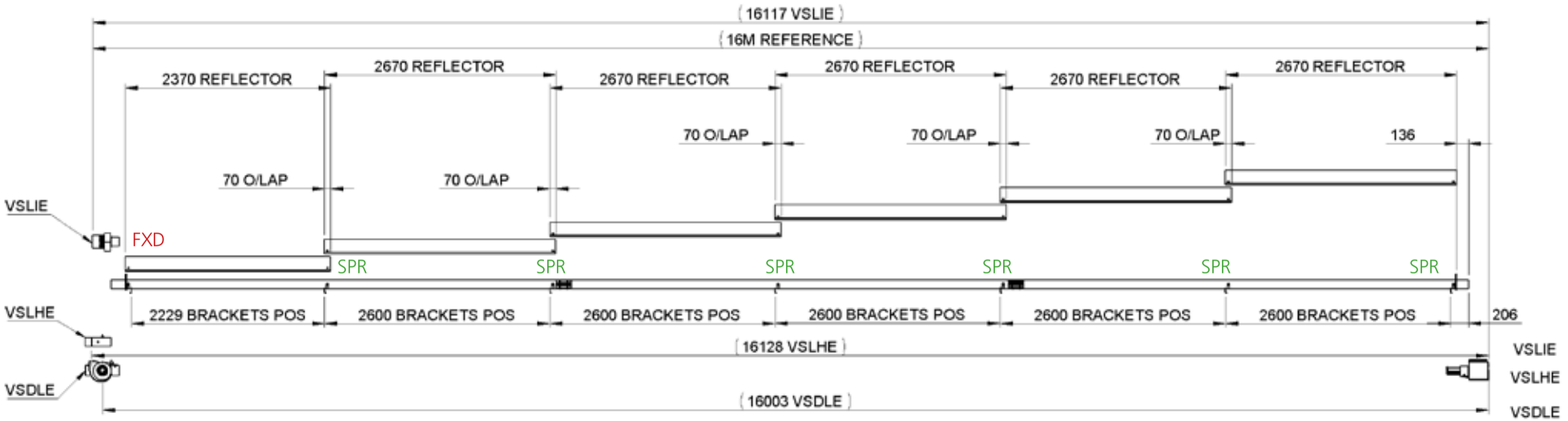

**LOOKING FROM ABOVE THE HEATER**

**Figure 48.** Vision Heater Assembly: Models VSLIE/VSLHE/VSDLE 30/35kW - 10.5m - 100mm (4ins) Nom Dia.

**Figure 49.** Vision Heater Assembly: Models VSLIE/VSLHE/VSDLE 30/35/40/45/50kW - 13.5m - 100mm (4in) Nom Dia.

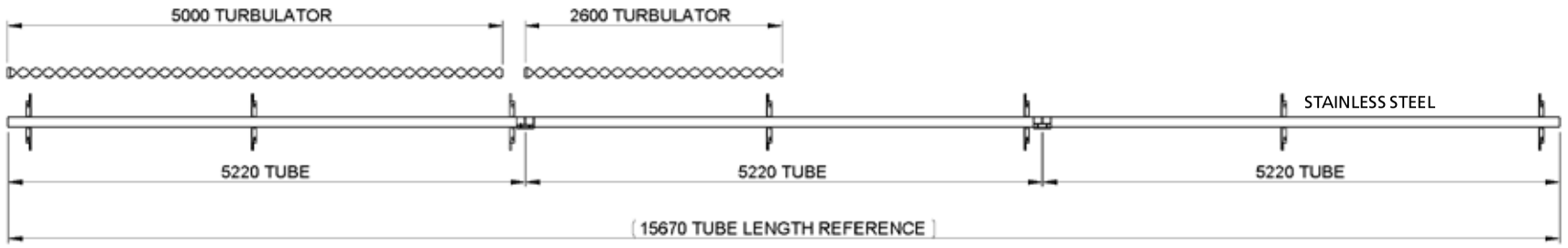





FXD - Fixed reflector
SPR - Spacer used on reflector

**IMPORTANT:**
**ENSURE REFLECTORS ARE OVERLAPED AS SHOWN**




**LOOKING FROM ABOVE THE HEATER**

**Figure 50.** Vision Heater Assy: Models VSLIE/VSLHE/VSDLE 35/40/45/50/kW - 16m - 100mm (4ins) Nom Dia.

# 3. Commissioning

## 3.1 Tools Required.

The following tools on the right are advisable to complete the tasks laid out within this manual.

**Note:** Suitable alternative tools may be used.

Leather Faced Gloves

Small Flat Head Screwdrivers

3mm and 4mm Allen Keys

Pozidrive Screwdrivers

Manometer

Adjustable Spanner or 22mm, 26mm and 27mm Spanners

## 3.2 Balance the herringbone system

WARNING

**The appliances should be commissioned by a competent/qualified engineer. Isolate each heater unit by unplugging the electrical connector and closing the gas isolating valve.**

CAUTION

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

**Note:** Before starting the heating system it is essential to perform the preliminary balancing of the vacuum level at each burner unit by setting the cold damper pressures (see Table 12).

Adjust the damper at the exit of each heater using a 3mm allen key in the damper blade securing screw. Once the system damper has been adjusted to give the cold herringbone pressure (within 0.5 mbar of the stated value) at the heater damper furthest from the fan, start all burners up and allow them to run for at least 20 minutes. Observing the vacuum reading using a manometer connected to the vacuum test point (see Figure 51). Each damper should be set at a hot condition, as shown in Table 10 for the appropriate size of heater and model. If the hot vacuum is too low with the heater damper fully open, the system damper will need to be adjusted to provide more system vacuum.

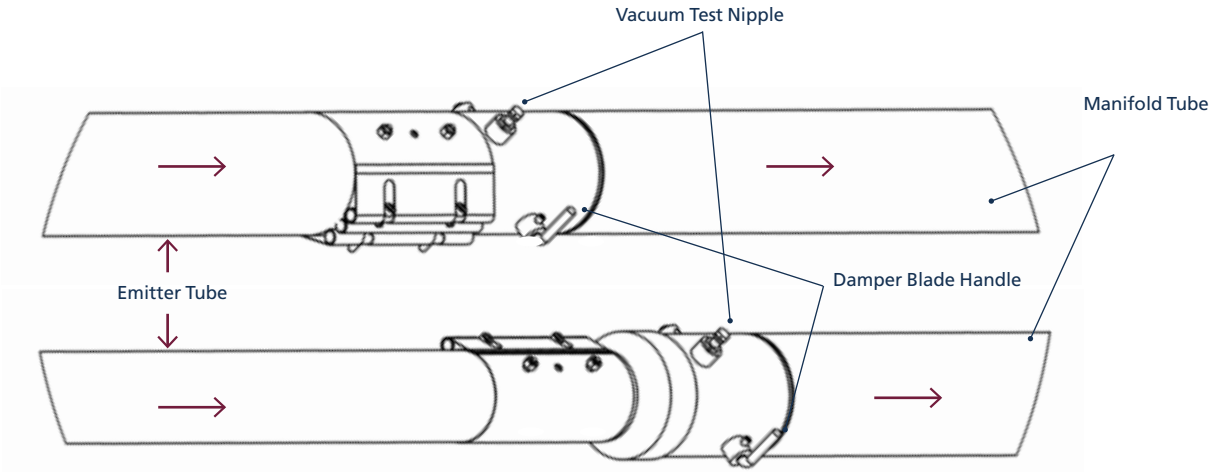



**Figure 51.** HB damper assembly

## 3.3 Balancing a DLE System

WARNING

**Isolate each heater unit by unplugging the electrical connector and closing the gas isolating valve.**

**Note:** Before attempting to start up the heating system it is essential to perform the preliminary balancing of the vacuum level at each burner unit.

CAUTION

**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, once the cold damper pressures have been set, 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 52). Each damper should be readjusted and set at a hot condition reading as shown in Table 10 for the appropriate size of heater and model.

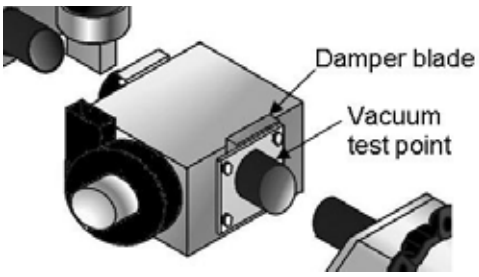



**Figure 52.** DLE damper assembly

## 3.4 Gas valve adjustment

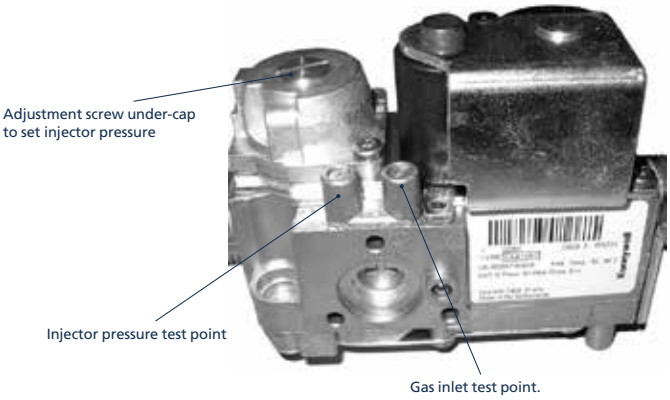



**Figure 53.** Honeywell VK4105 Series

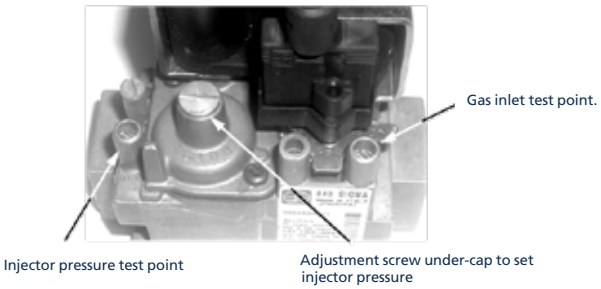
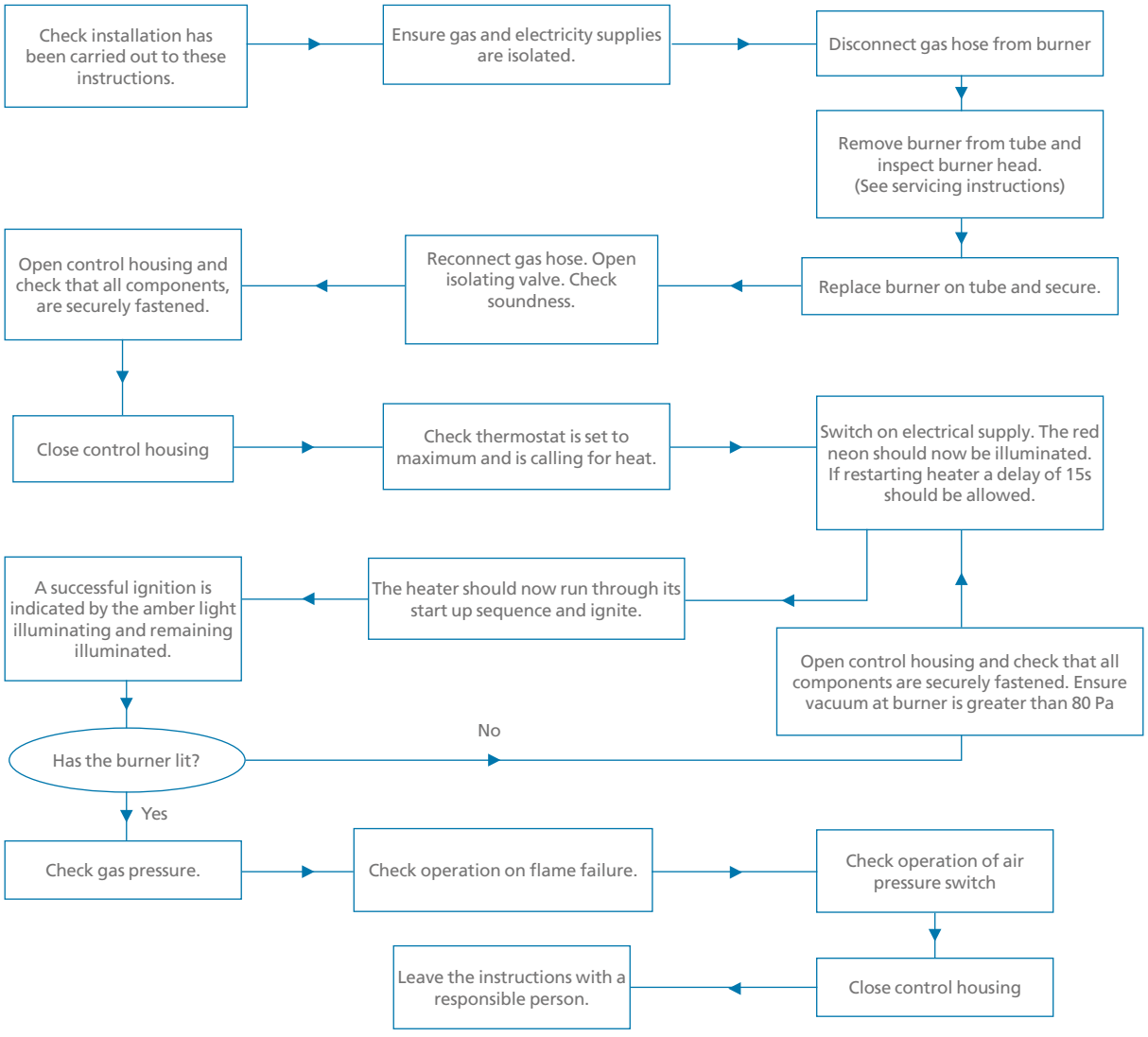



**Figure 54.** SIT Sigma 840 Series

## 3.5 Commissioning chart for VS series unitary heaters



# 4. Servicing instructions

**These appliances should be serviced annually by a competent person to ensure a safe and efficient operation. In exceptional dusty or polluted conditions more frequent servicing may be required. The manufacturer offers a maintenance service. Details are available on request**

WARNING

## 4.1 Tools Required.

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

Leather Faced Gloves

Small Flat Head Screwdriver

Large Adjustable Spanners or 22, 26 and 27mm Spanners for fitting of Gas Flex

Soft Brush

8, 10, 12 and 13mm Spanners

4mm and 5mm Allen Keys

Manometer

Pozidrive Screwdriver

**Note:** Suitable alternative tools may be used.

## 4.2 Burner description

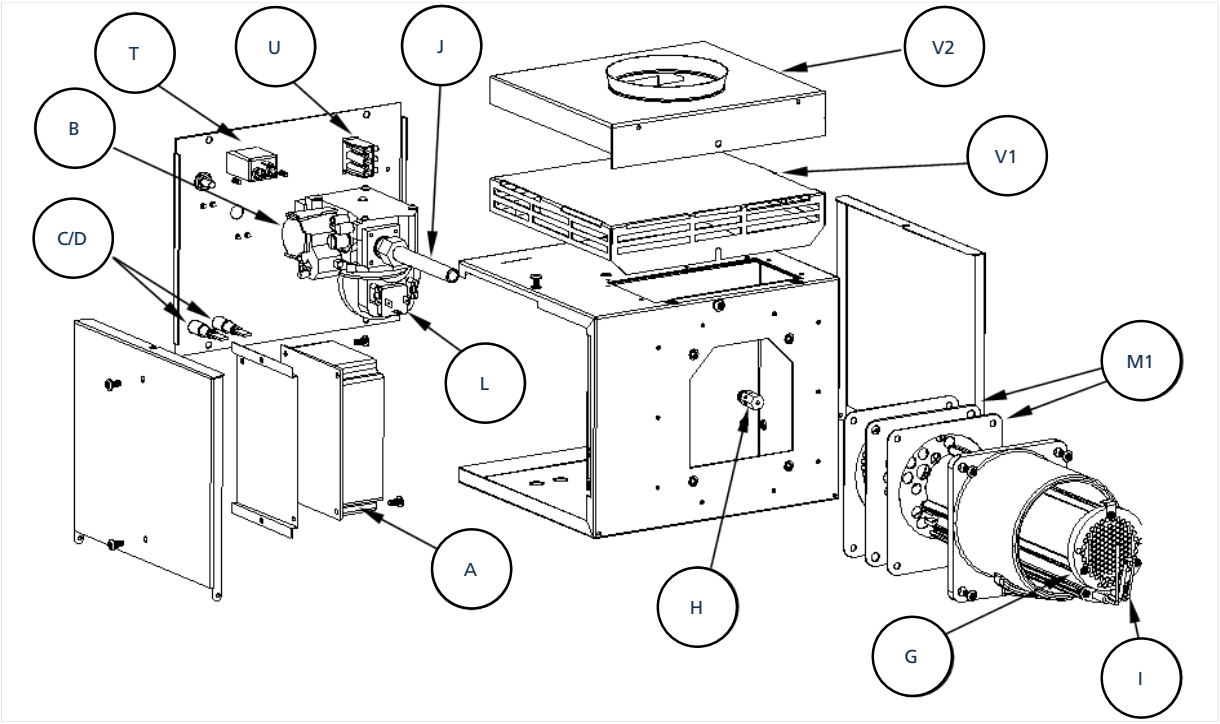



**Figure 55.** Honeywell VK gas valve

| | | | | | |
|---|---|---|---|---|---|
| **A** | Ignition Controller | **I** | Igniter Assembly | **U** | Fan Socket |
| **B** | Gas Valve | **J** | Injector Carrier | **V1** | Induced Air Inlet |
| **C/D** | Neon's (Red/Amber) | **L** | Pressure Switch | **V2** | Ducted Air Inlet |
| **G** | Pepper-pot Head | **M1** | Gaskets | | |
| **H** | Multi Hole Injector | **T** | Mains Input Socket | | |

**Table 14 –** Honeywell VK gas valve

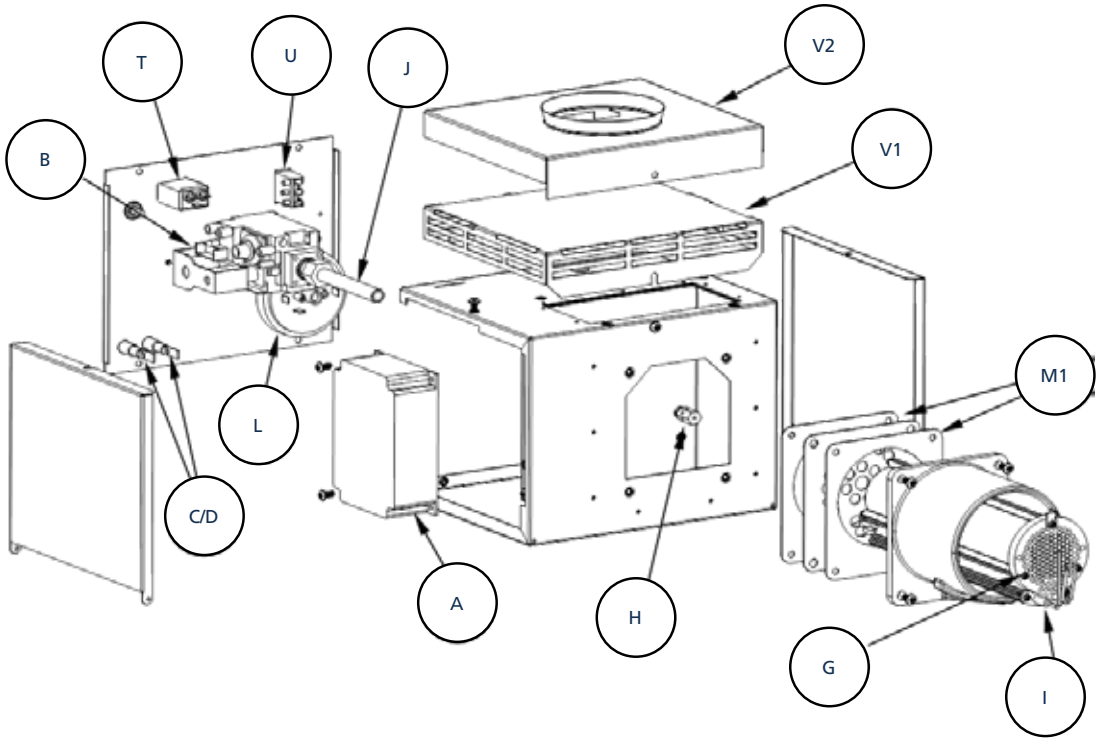



**Figure 56.** SIT sigma gas valve

| | | | | | |
|---|---|---|---|---|---|
| **A** | Ignition Controller | **I** | Igniter Assembly | **U** | Fan Socket |
| **B** | Gas Valve | **J** | Injector Carrier | **V1** | Induced Air Inlet |
| **C/D** | Neon's (Red/Amber) | **L** | Pressure Switch | **V2** | Ducted Air Inlet |
| **G** | Pepper-pot Head | **M1** | Gaskets | | |
| **H** | Multi Hole Injector | **T** | Mains Input Socket | | |

**Table 15 –** SIT sigma gas valve

## 4.3 Burner removal

**STEP 1**

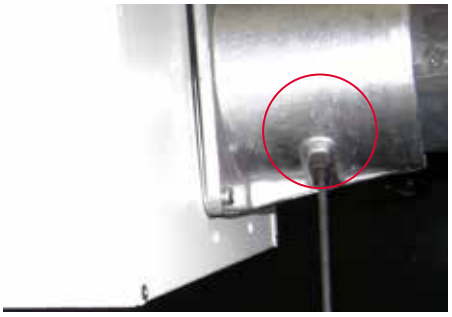
WARNING **Isolate mains electric and gas supplies. Unplug the fan and mains electricity connectors**

**STEP 2**

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

**STEP 3**

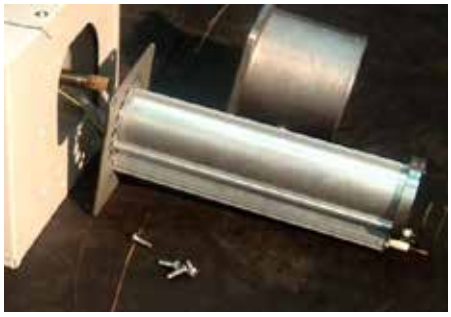
On burners with ducted air attachment slacken jubilee clip and remove the flexible hose.



**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.

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 removed, by disconnecting the silicon tube from the pressure test point, the earth cable and withdrawing the ignition lead once disconnected from the controller.

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

**STEP 3**

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

Refit the casting following the above procedure in reverse 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 this can be removed. It can be cleaned together with the Inside of the burner head.

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

**STEP 2**

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 and disconnecting the leads.

Refit the electrode assembly in the reverse order, making sure to connect the leads securely.

Check the positions and spark gap as shown in Figure 57

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

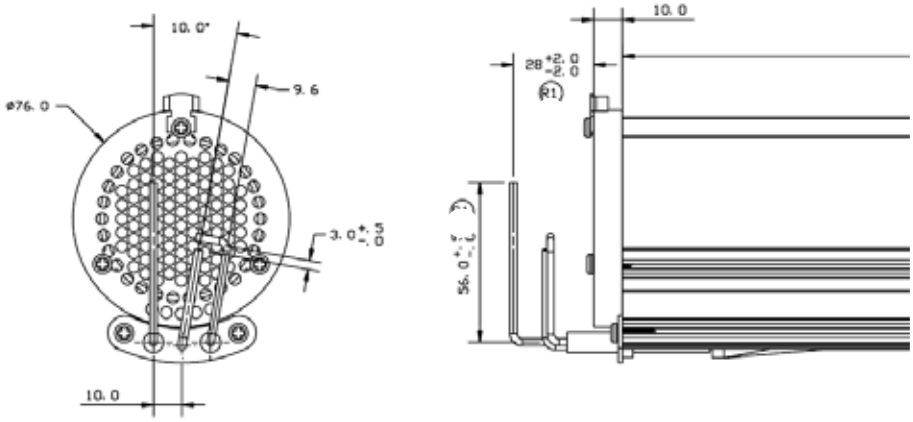
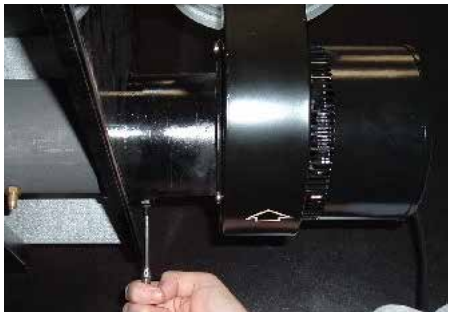



**Figure 57.** Burner head detail

## 4.6 Combustion Fan Assembly Induced Burner

**STEP 1**

Loosen the clamp fitting on the flue and remove.



**STEP 2**

Loosen the 4mm grub screw.

The combustion fan can now be detached.

**STEP 3**

Remove the fan orifice plate spinning.

**STEP 3**

Inspect the impeller and ensure it rotates freely. Remove any dust from the impeller, fan scroll and around the motor with a soft brush.

Refit components.

## 4.7 Radiant Tube Servicing

**STEP 1**

Brush any dust from the exterior of the tubes.

Inspect the tubes visually. If the tubes appear clean, skip to servicing the reflector.

Remove the U bend (or damper - HB products or condensate box - DLE products)

**STEP 2**

Withdraw the turbulators from the appliance. Carefully noting their condition and position. Replace turbulators if necessary.

The turbulators should be cleaned with a soft brush.

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

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.

**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.

**Re-commissioning After Service**

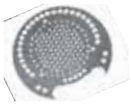
After servicing the heater has been under-taken, it will be necessary to re-commission the heater as detailed in Section 3 of these instructions.

# 5. Required spare parts

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

CAUTION

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

| Item | Description | Part No. | Item | Description | Part No. |
|---|---|---|---|---|---|
| | Ignition Controller | 2015 | | Combustion Fan | See section 1.12 on page 21 |
| | Mains Input Filter | 202703 | | Pressure Switch (Green) | 201508 |
| | Igniter Assembly | 201284 | | Amber Neon (Burner On) | 2175 |
| | Fan Gasket (2501-DE & 2507-DE only) | 201413 | | Red Neon (Mains On) | 2180 |
| | Fan Gasket (2560 & 202126 only) | 201414 | | Burner Head Gasket (two required) | 201959 |
| | Jet Carrier | 200420 |  | Flame Plate (VS15, 20, 30, 35, 40 & 45 only) | 201571 |
| | Injector | See section 1.12 on page 21 | | Flame Plate (VS25 only) | 201854 |
| | **Cables:**<br>Spark Electrode (black)<br>Rectification lead (purple)<br>Earth lead (green/yellow) | <br>900225-2<br>900225-3<br>900225-1 | | Flame Plate (VS50 only) | 201905 |
| | **76mm (3") Turbulators:**<br>730mm<br>1100mm<br>1300mm<br>2285mm<br>2800mm<br>3560mm | <br>200415-SUB<br>1001613<br>6600T<br>6614T<br>201823T<br>200414T | | **100mm (4") Turbulators:**<br>976mm<br>1972mm<br>2600mm<br>3400mm<br>5000mm | <br>6618T<br>6602T<br>6619T<br>200015T<br>201402T |
| | Pepper-pot Head | 200988 | | | |

## 5.1 Gas Valves

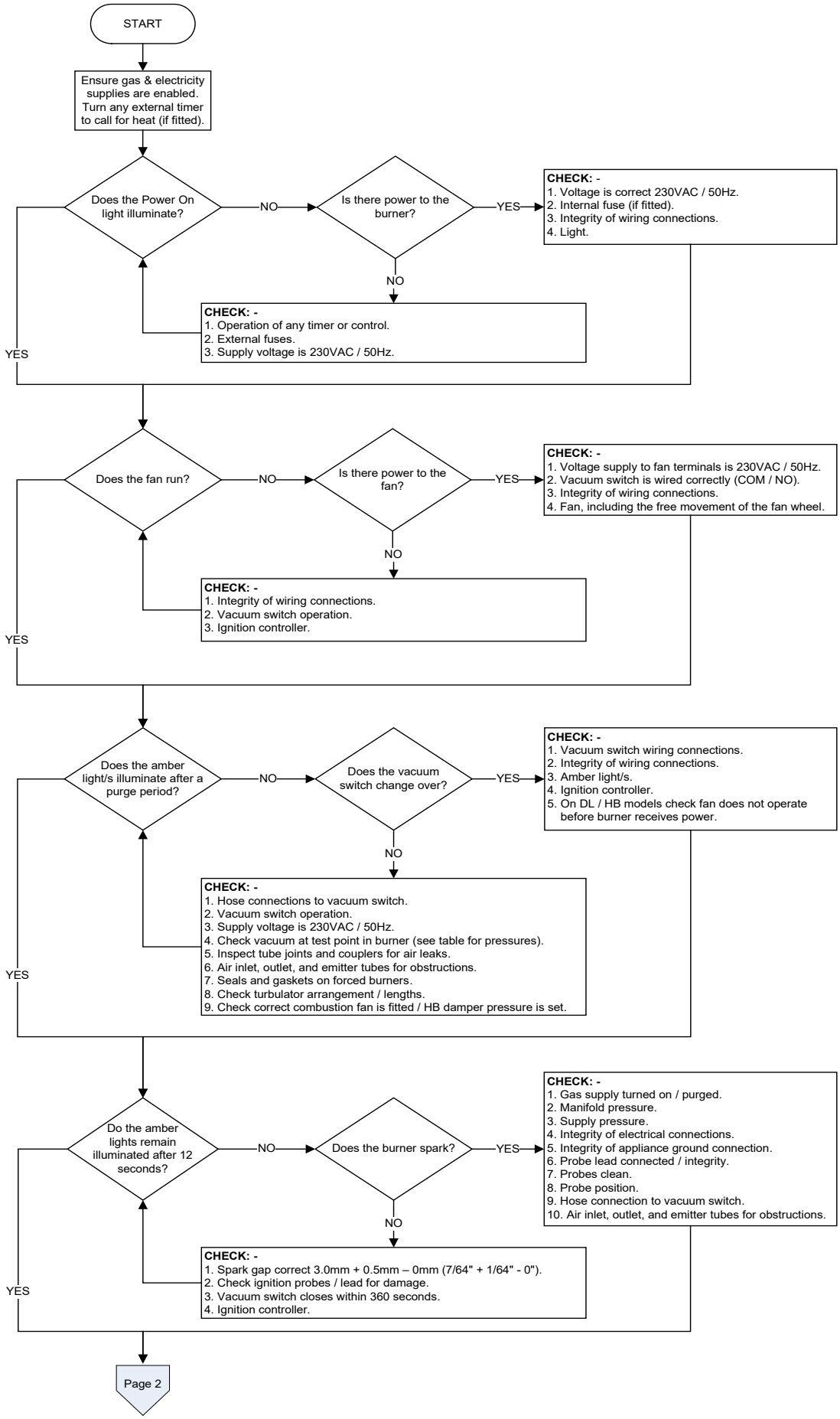
CAUTION

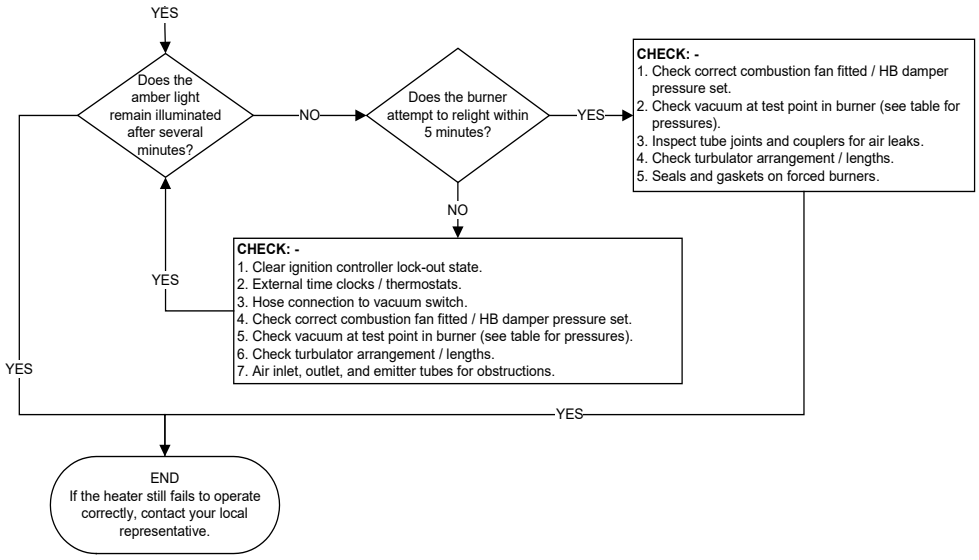
**Any spare part components that are not approved by the manufacturer could invalidate appliance approval and validity of the warranty.**

**The gas valves are NOT interchangeable. A burner fitted with a Honeywell gas valve MUST have a Honeywell gas valve as a replacement. A burner fitted with a SIT gas valve MUST have a SIT gas valve as a replacement.**

| Item | Description | Part No. |
|---|---|---|
| | Honeywell VK4105A Gas Valve<br>Twin solenoid regulator 220/240V | 202657 |
| | SIT Sigma 840Gas Valve<br>Twin solenoid regulator 220/240V | 201914 |

# 6. Fault finding guide






# 7. Replacement parts (all models)

## 7.1 Air Pressure Switch Replacement

**STEP 1**

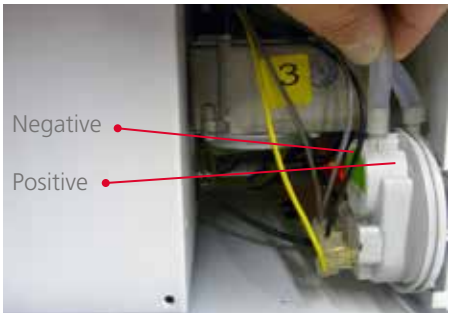
Slacken screw in burner lid and open the left hand burner access door.

Disconnect the two silicone impulse tubes, noting which way round they connect to the pressure switch. Disconnect the three electrical cables from the pressure switch.

**STEP 2**

Remove the two screws as shown below.

The air pressure switch can now be removed.




**STEP 3**

Fit the new air pressure switch ensuring the impulse tubes are connected the correct way around (vacuum to the left and positive to the right as shown in the photo). Test product and close access doors.

**Electrical cables are connected as follows:**

- Grey = Terminal 1, COM
- Black = Terminal 2, NC
- Yellow = Terminal 3, NO

## 7.2 Burner Control Replacement (SIT sigma gas valve)

**STEP 1**

Slacken screw in burner lid and open the right hand burner access door. Disconnect burner controller from the wiring harness.

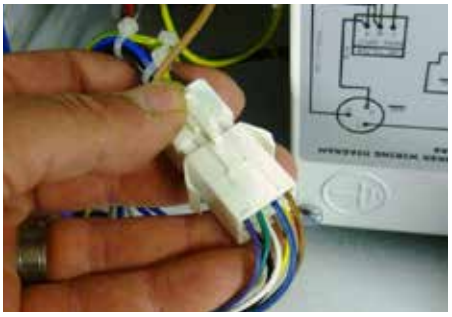
**STEP 2**

Disconnect the HT Lead from burner controller.

**STEP 3**

Remove the two screws attaching the controller to the burner and remove. Refit HT leads and refit burner controller to wiring harness.

Test product and close access door.



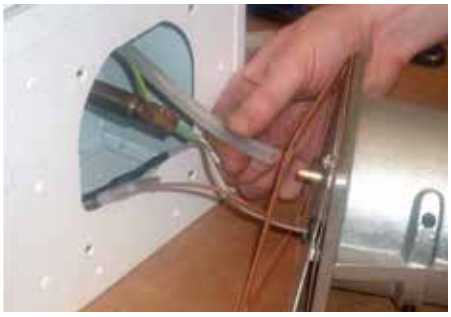
## 7.3 SIT Sigma gas valve replacement

**STEP 1**

Remove the burner assembly as described in section 4.3 Servicing. Open the right hand access door and detach the burner controller from the wiring harness.

**STEP 2**

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



**STEP 3**

Remove the four screws holding the burner head onto the burner assembly.

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

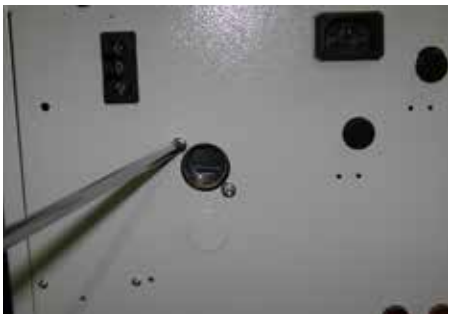
**STEP 4**

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

**STEP 5**

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

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



**STEP 6**

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

**STEP 7**

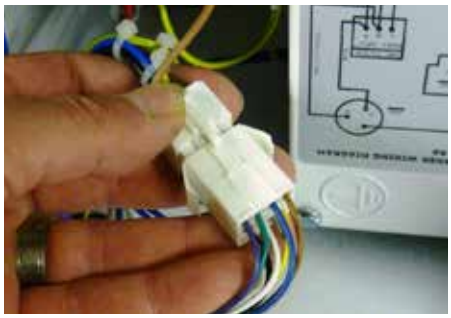
The gas valve can now be replaced.

Ensure the correct type of gas valve is used, see Section 5.1 for more details.

Refit all components in reverse order.

Set gas pressures to data badge or as per section 1.12 on page 21 and ensure reliable burner performance.

Test product and close access doors.



## 7.4 Burner controller replacement (Honeywell VK valves)

**STEP 1**

Slacken screw in burner lid and open the right hand burner access door.

Disconnect wiring harness from the burner controller.

**STEP 2**

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

Disconnect HT Lead from burner controller.

**STEP 3**

Fit new burner controller.

Refit HT leads and refit burner controller to wiring harness.

Test product and close access door.

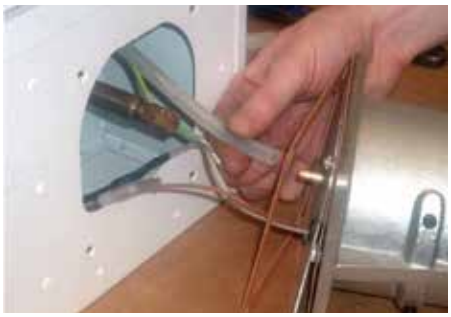
## 7.5 Honeywell VK Gas Valve Replacement

**STEP 1**

Remove the burner assembly as described in section 4.3 on page 47. Open the right hand access door and detach the burner controller from the wiring harness.

**STEP 2**

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



**STEP 3**

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

The burner head can now be detached, disconnect the impulse tube and the burner head wiring.

**STEP 4**

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

**STEP 5**

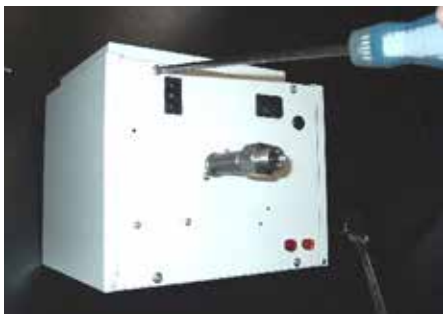
Remove the four screws holding the rear burner plate in position.

Remove the rear plate.

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

**STEP 6**

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



**STEP 7**

The gas valve can now be replaced. Ensure the correct type of gas valve is used, see Section 5.1 for more details. Refit all components in reverse order. Set gas pressures to data badge or as per section 1.12 and ensure reliable burner performance. Test product and close access doors.

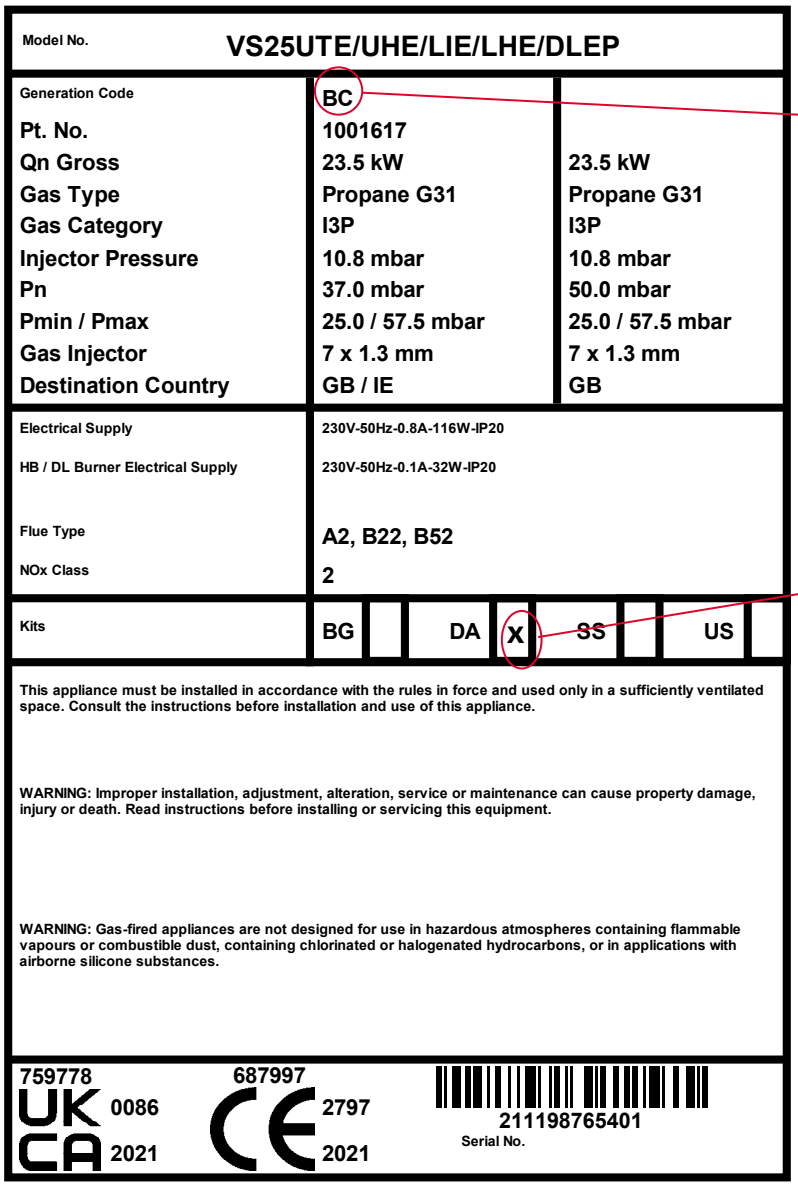
# 8. Generation codes

Each burner will have a 'Generation Code' denoting the version the burner has been manufactured to.

The generation code is displayed on the product label thus:

- Generation code BB: SIT Sigma gas valve
- Generation code BC: Honeywell VK gas valve

This instruction manual is only for use with Generation codes BB & BC.



| Model No. | VS25UTE/UHE/LIE/LHE/DLEP | |
|---|---|---|
| Generation Code | BC | |
| Pt. No. | 1001617 | |
| Qn Gross | 23.5 kW | 23.5 kW |
| Gas Type | Propane G31 | Propane G31 |
| Gas Category | I3P | I3P |
| Injector Pressure | 10.8 mbar | 10.8 mbar |
| Pn | 37.0 mbar | 50.0 mbar |
| Pmin / Pmax | 25.0 / 57.5 mbar | 25.0 / 57.5 mbar |
| Gas Injector | 7 x 1.3 mm | 7 x 1.3 mm |
| Destination Country | GB / IE | GB |
| Electrical Supply | 230V-50Hz-0.8A-116W-IP20 | |
| HB / DL Burner Electrical Supply | 230V-50Hz-0.1A-32W-IP20 | |
| Flue Type | A2, B22, B52 | |
| NOx Class | 2 | |

| Kits | BG | | DA | X | SS | | US | |
|---|---|---|---|---|---|---|---|---|

This appliance must be installed in accordance with the rules in force and used only in a sufficiently ventilated space. Consult the instructions before installation and use of this appliance.

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

WARNING: Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapours or combustible dust, containing chlorinated or halogenated hydrocarbons, or in applications with airborne silicone substances.

759778 UK CA 0086 2021

687997 CE 2797 2021

211198765401
Serial No.

## Generation Code

When optional kits are fitted to the appliance, please indicate on the data label with permanent ink as follows:

- BG = Ball Guards
- DA = Ducted Air
- SS = Side Shields
- US = Undershield

For example if ducted air fitted, indicate on data label as shown.

**Note:** A label will be provided in the official language of destination country.

# 9. Ancillaries

| Item | Description | Part No. | Item | Description | Part No. |
|---|---|---|---|---|---|
| | ½" BSP Gas Valve | 6506 | | Straight Flue 914mm length | 7156 |
| | ½" BSP Gas Flex<br>600mm<br>1000mm | <br>6500<br>6500-2 | | Straight Flue 1524mm length | 7157 |
| | Galv Suspension Chain<br>10m length<br>90m length | <br>6515<br>6516 | | Adj Straight Flue 450mm length | 7158 |
| | Speedlinks (8/pack) | 6524–SUB | | Gas Vent Terminal/Cowl | 7162 |
| | Galv D Shackle | 6518 | | Adjustable Elbow 0-90° | 7166 |
| | Turnbuckle Assembly | C766300–SUB | | Ducted Air Kits | VSI-DA |
| | **Flue Kit Type A**<br>1x7156, 1x7157,<br>1x7158, 1x7162<br>& 1x33-51-222 | TWFK–5A | | Flexible Tube | 201321 |
| | Flue Kit Type B as Type A Kit PLUS 2x7166 | TWFK–5B | | Jubilee Clips | 7541 |
| | Rubberised Roof Plate<br>c/w Fixing Kit | 33-51-222 | | Fresh Air Intake Kit | FAFK–4 |
| | Fan to Flue 2501DE/2507DE fans | 7177–SUB | | Bends<br>45°<br>90° | <br>7076<br>7075 |
| | Fan to Flue 2560 fans | 7176–SUB | | Coupler | 7095 |
| | Fan to Flue 202343 fans | 202365 | | Extra 3M Flue | 7070–SUB |

# 10. ErP information requirements

| Model no. | Fuel | Seasonal space heating efficiency | Space heating emissions $NO_x$ | Heat output | | Radiant factor | | Useful efficiency (GCV) | | Auxiliary electricity consumption | | | Pilot flame power requirement | Envelope losses | | | *UK building regulations | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Nominal | Minimum | Nominal | Minimum | Nominal | Minimum | Nominal | Minimum | Standby mode | | Insulation class | Loss factor | Heat generator to be installed outside heated area | Effective heat generator seasonal efficiency | |
| Radiant Tube | Gaseous | $n_s$ >= 74.0% | mg/$kWh_{input}$(GCV) <= 200 | $P_{nom}$ kW | $P_{min}$ kW | $RF_{nom}$ | $RF_{min}$ | $nt_{h,nom}$ % | $n_{th,min}$ % | $el_{max}$ kW | $el_{min}$ kW | $el_{sb}$ kW | $P_{pilot}$ kW | U | $F_{env}$ | Yes / No | Heat output control type | Thermal (NCV)> = 86% | Radiant (NCV)> = 55% |
| VS15UTEP | Propane Gas | 76.0% | 161.9 | 12.1 | 12.1 | 0.6 | 0.6 | 80.7% | 80.7% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | No | Single stage | 88% | 58% |
| VS20UTEP | | 75.0% | 190.9 | 15.4 | 15.4 | 0.6 | 0.6 | 78.9% | 78.9% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 86% | 59% |
| VS25UTEP | | 76.8% | 196.2 | 19.0 | 19.0 | 0.6 | 0.6 | 80.7% | 80.7% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 88% | 58% |
| VS30UTEP | | 78.9% | 191.9 | 26.8 | 26.8 | 0.6 | 0.6 | 83.8% | 83.8% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 91% | 56% |
| VS35UTEP | | 79.3% | 194.7 | 30.2 | 30.2 | 0.6 | 0.6 | 84.0% | 84.0% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 92% | 56% |
| VS40UTEP | | 79.9% | 190.8 | 33.6 | 33.6 | 0.6 | 0.6 | 84.0% | 84.0% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 92% | 57% |
| VS45UTEP | | 79.8% | 195.5 | 36.9 | 36.9 | 0.6 | 0.6 | 83.8% | 83.8% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 91% | 57% |
| VS50UTEP | | 80.7% | 186.3 | 40.4 | 40.4 | 0.6 | 0.6 | 84.2% | 84.2% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 92% | 58% |
| VS15LIEP8 | | 76.8% | 161.0 | 12.1 | 12.1 | 0.6 | 0.6 | 80.6% | 80.6% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 88% | 60% |
| VS20LIEP10-5 | | 74.9% | 183.2 | 15.4 | 15.4 | 0.6 | 0.6 | 78.9% | 78.9% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 86% | 59% |
| VS25LIEP8 | | 74.0% | 183.9 | 18.6 | 18.6 | 0.6 | 0.6 | 78.9% | 78.9% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 86% | 57% |
| VS25LIEP10-5 | | 77.8% | 190.4 | 19.3 | 19.3 | 0.6 | 0.6 | 82.1% | 82.1% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 90% | 58% |
| VS30LIEP10-5 | | 74.9% | 196.9 | 25.4 | 25.4 | 0.6 | 0.6 | 79.5% | 79.5% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 87% | 57% |
| VS30LIEP13-5 | | 80.8% | 198.0 | 26.5 | 26.5 | 0.6 | 0.6 | 82.8% | 82.8% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 90% | 61% |
| VS35LIEP10-5 | | 75.3% | 171.5 | 28.9 | 28.9 | 0.6 | 0.6 | 80.2% | 80.2% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 87% | 56% |
| VS35LIEP13-5 | | 77.5% | 188.0 | 29.6 | 29.6 | 0.6 | 0.6 | 82.2% | 82.2% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 90% | 56% |
| VS35LIEP16 | | 83.2% | 191.1 | 30.5 | 30.5 | 0.6 | 0.6 | 84.6% | 84.6% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 92% | 62% |
| VS40LIEP13-5 | | 76.1% | 196.1 | 32.1 | 32.1 | 0.6 | 0.6 | 80.1% | 80.1% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 87% | 57% |
| VS40LIEP16 | | 81.6% | 199.4 | 33.5 | 33.5 | 0.6 | 0.6 | 83.9% | 83.9% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 91% | 60% |
| VS45LIEP13-5 | | 77.5% | 182.8 | 35.8 | 35.8 | 0.6 | 0.6 | 81.4% | 81.4% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 89% | 57% |
| VS45LIEP16 | | 82.2% | 197.5 | 37.0 | 37.0 | 0.6 | 0.6 | 84.0% | 84.0% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 92% | 61% |
| VS50LIEP13-5 | | 76.3% | 189.5 | 38.8 | 38.8 | 0.6 | 0.6 | 80.8% | 80.8% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 88% | 56% |
| VS50LIEP16 | | 80.9% | 195.4 | 40.1 | 40.1 | 0.6 | 0.6 | 83.6% | 83.6% | 0.116 | 0.116 | 0.000 | 0.000 | N/A | 0.0 | | | 91% | 59% |

***Heating efficiency credits for additional measures applicable to radiant heaters (UK Building Regulations only).**

**Table 16 –** Information Requirements for Commercial Local Space Heaters Commission Regulation (EU) 2015/1188

| Measure | | Heating Efficiency Credits (% points) | Comments |
|---|---|---|---|
| Controls | Optimum stop | 1 | A control system which stops plant operation at the earliest possible time such that internal conditions will not deteriorate beyond pre-set limits by the end of the occupancy period. |
| | Optimum start | 0.5 | A control system which starts plant operation at the latest possible time such that internal conditions will be up to required limits at the start of the occupancy period. |
| Zone Control | | 1 | A control system in which each zone operates independently in terms of start / stop time. It is only appropriate where operational conditions change in different zones. |

**Note:** The SmartCOM control range available from Nortek offers all of the above benefits.

**Table 16.1 –** Information Requirements for Commercial Local Space Heaters Commission Regulation (EU) 2015/1188

## 11. User & operating instructions

**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 your local representative**

**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.

**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, and burner can be undertaken.

**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 your local representative

## 12. Disposal and Recycling

When the product reaches the end of its useful life, the person in charge of dismantling or disposing of the product shall do so in accordance with Waste Electrical and Electronic Equipment (WEEE) Regulations.

Follow the rules in force for the relevant country.

Dispose of equipment at applicable recycling facilities for electrical and electronic equipment waste.

Components such as radiant tubes, turbulators, reflectors and hanging brackets are metal and can be recycled accordingly.

By disposing of this equipment through the appropriate means, it will help prevent potential hazards to the environment and to human health, which could otherwise be caused by unsuitable waste handling.

Recycling material from this product will help reduce environmental impact.

Do not dispose old electrical and electronic equipment through household waste collection.

## Notes

| Revision History | | | | |
|---|---|---|---|---|
| **Revision** | **Date** | **Author** | **Summary** | **Approved** |
| A | 05.2013 | - | Creation of document | - |
| B-F | Various | Various | Undocumented modifications | - |
| G | 01.08.2022 | K Harper | Removal of 20 and 30kW models | D Italiano |
| H | 26.11.2022 | K Harper | Modification of gas injector sizes | D Wild |
| J | 16.08.2024 | K Harper | Revision number update to rationalise numbering | - |
| K | 28.08.2024 | K Harper | Re-introduction of 20 and 30kW models | L Watson |
| L | 19.10.2026 | K Harper | Update of weights due to revised reflectors | R Walsh |

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